

Corrugated Steel Pipes, Per Foot	
Size	Supplied and Installed Cost (No Trenching Included)
12"	\$19.60 per LF
15"	\$22.00
18"	\$26.00
24"	\$32.00
30"	\$50.00
PVC Pipes, Per Foot	
Size	Supplied and Installed Cost (No Trenching Included)
12"	\$24.50
14"	\$49.00
16"	\$51.00
18"	\$54.00
20"	\$66.00
24"	\$93.00
30"	\$130.00

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.
- Inspect outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented.
- Insert inlet for clogging or undercutting. Remove debris from inlet to maintain flows. Repair undercutting at inlet and if needed, install flared section or rip rap around the inlet to prevent further undercutting.
- Inspect pipes for leakage. Repair leaks and restore damaged slopes.
- Inspect slope drainage for accumulations of debris and sediment.

- Remove built up sediment from entrances and outlets as required. Flush drains if necessary; capture and settle out sediment from discharge.
- Make sure water is not ponding onto inappropriate areas (e.g., active traffic lanes, material storage areas, etc.).
- Pipe anchors must be checked to ensure that the pipe remains anchored to the slope. Install additional anchors if pipe movement is detected.

References

Draft – Sedimentation and Erosion Control, An Inventory of Current Practices, U.S.E.P.A., April 1990.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: <http://anrcatalog.ucdavis.edu/pdf/8125.pdf>

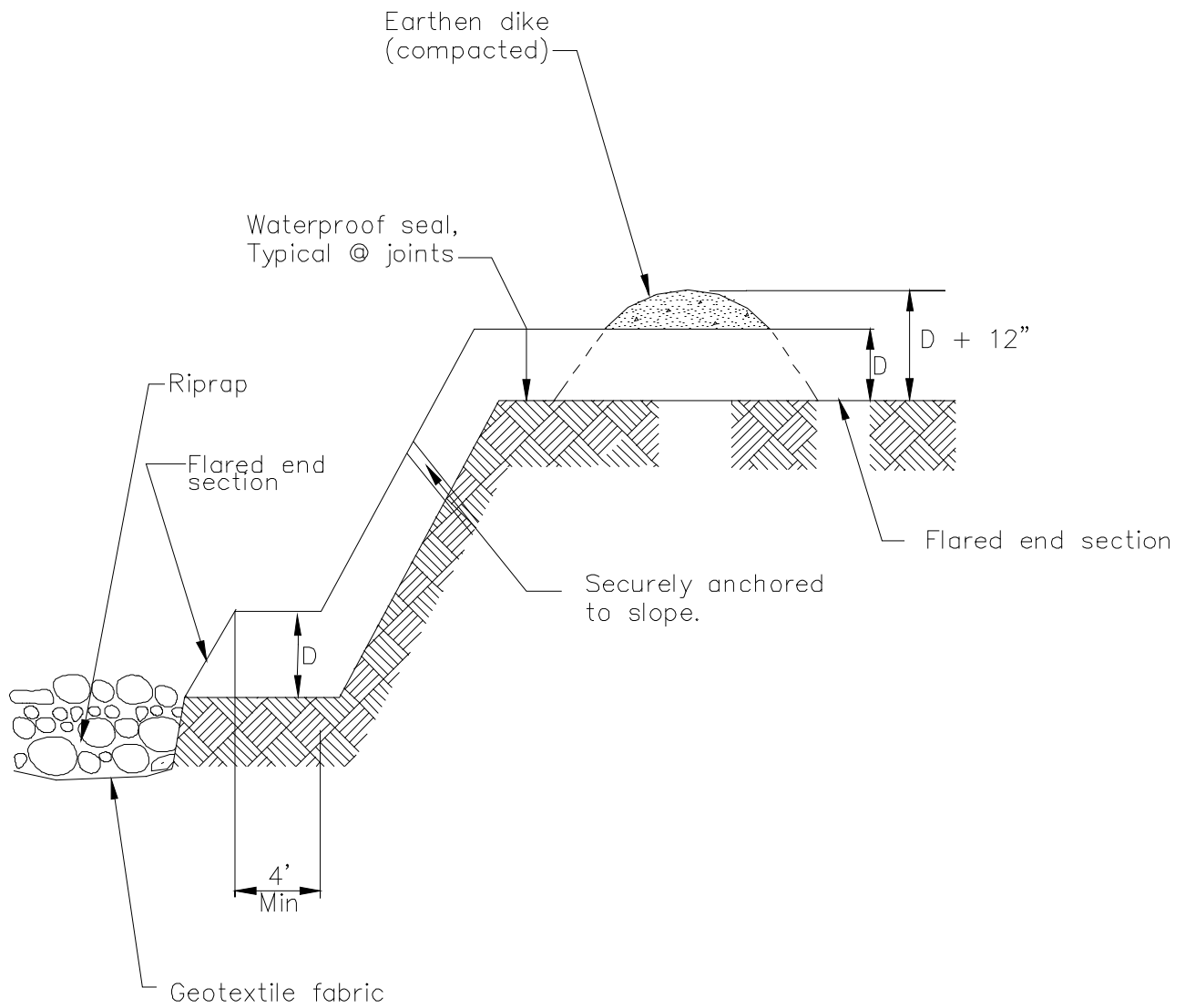
National Association of Home Builders (NAHB). Stormwater Runoff & Nonpoint Source Pollution Control Guide for Builders and Developers. National Association of Home Builders, Washington, D.C., 1995

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



TYPICAL SLOPE DRAIN
NOT TO SCALE



Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheep's foot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including RECPs or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- EC-3 Hydraulic Mulch
- EC-5 Soil Binders
- EC-7 Geotextiles and Mats

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- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.
- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.
- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.
- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs (erosion control blankets) should not be used with soil roughening due to a “bridging” effect, which suspends the blanket above the seed bed.
- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulching).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.
- Based upon soil testing conducted, apply additional soil amendments (e.g. fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 feet (0.6 m) high in soft materials or more than 3 feet (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 inches (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 inches (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes which require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 inches), and not less than 1 inch deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening With Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

Costs

Costs are based on the additional labor of tracking or preparation of the slope plus the cost of any required soil amendment materials.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



Description and Purpose

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths;
- Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
- Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
- Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions.

Decomposed Granite (DG) is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface.

Degradable Mulches of various types (see EC-3, EC-6, EC-8) can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips or hydraulic mulch.

Geotextiles and Mats can be used for temporary non-vegetative stabilization (see EC-7). These BMPs are typically manufactured from degradable or synthetic materials and are

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TR	Tracking Control	
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted.

Gravel Mulch is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel, 16 mm to 64 mm (0.6" - 2.5"), similar to an AASHTO No. 3 coarse aggregate.

Rock Slope Protection consists of utilizing large rock or rip-rap (4" - 24") to stabilize slopes with a high erosion potential and those subject to scour along waterways.

Soil Binders can be used for temporary non-vegetative stabilization (see EC-5). The key to their use is functional longevity. In most cases, the soil binder will need to be routinely monitored and re-applied to maintain an erosion-resistant coverage.

Suitable Applications

Non-vegetated stabilization methods are suitable for use on disturbed soil areas and on material stockpiles that need to be temporarily or permanently protected from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established in the required timeframe, due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

Decomposed Granite (DG) and Gravel Mulch are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes (i.e., 10:1 [H:V]). DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.

Degradable Mulches can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets for more information.

Geotextiles and Mats can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 mos – 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats.

Rock Slope Protection can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).

Soil Binders can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders for more information.

Limitations

General

- Refer to EC-3, EC-6, EC-8, and EC-14 for limitations on use of mulches. Refer to EC-7 for limitations on use of geotextiles and mats. Refer to EC-5 for limitations on use of Soil Binders.

Decomposed Granite

- Not available in some geographic regions.
- If not tackified, material may be susceptible to erosion even on slight slopes (e.g., 30:1 [H:V]).
- Installed costs may be more expensive than vegetative stabilization methods.

Gravel Mulch

- Availability is limited in some geographic regions.
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems.
- If inadequately sized, material may be susceptible to erosion on sloped areas.
- Pore spaces fill with dirt and debris over time; may provide a growing medium for weeds.

Rock Slope Protection

- Installation is labor intensive.
- Installed costs can be significantly higher than vegetative stabilization methods.
- Rounded stones may not be used on slopes greater than 2:1 [H:V].

Implementation

General

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls and sediment controls.
- Refer to EC-3, EC-6, EC-8, and EC-14 for implementation details for mulches. Refer to EC-7 for implementation details for geotextiles and mats. Refer to EC-5 for implementation details for soil binders.
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base.
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications.
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway.

Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall).
- If permanent, a weed control fabric should be placed prior to installation.
- Should be installed at a minimum 2" depth.
- Should completely cover all exposed surfaces.

Rock Slope Protection

- Rock slope protection installation should follow Caltrans Standard Specification 72-2: Rock Slope Protection. Refer to the specification for rock conformity requirements and installation methods.
- When using rock slope protection, rock size and installation method should be specified by an Engineer.
- A geotextile fabric should be placed prior to installation.

Costs

- Costs are highly variable depending not only on technique chosen, but also on materials chosen within specific techniques. In addition, availability of certain materials will vary by region/location, which will also affect the cost. Costs of mulches, geotextiles and mats, and soil binders are presented in their respective fact sheets. Costs for decomposed granite, gravel mulch stabilization and rock slope protection may be higher depending on location and availability of materials. Caltrans has provided an estimate for gravel mulch of \$10 - \$15/yd² in flat areas and \$11 - \$23/yd² on side slopes.

Inspection and Maintenance

General

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- For permanent installation, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
- All damage should be repaired immediately.
- Refer to EC-3, EC-6, EC-8, and EC-14 for inspection and maintenance requirements for mulches. Refer to EC-7 for inspection and maintenance requirements for geotextiles and mats. Refer to EC-5 for inspection and maintenance requirements for soil binders.

Decomposed Granite and Gravel Mulch Stabilization

- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.

- Should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.

References

Arid Zone Forestry: A Guide for Field Technicians. Food and Agriculture Organization of the United Nations, 1989.

Design of Roadside Channels with Flexible Linings, Hydraulic Engineering Circular Number 15, Third Edition, Federal Highway Administration, 2007.

Design Standards for Urban Infrastructure - Soft Landscape Design, Department of Territory and Municipal Services - Australian Capital Territory http://www.tams.act.gov.au/work/standards_and_procedures/design_standards_for_urban_infrastructure

Erosion and Sediment Control Handbook: A Guide for Protection of State Waters through the use of Best Management Practices during Land Disturbing Activities, Tennessee Department of Environment and Conservation, 2002.

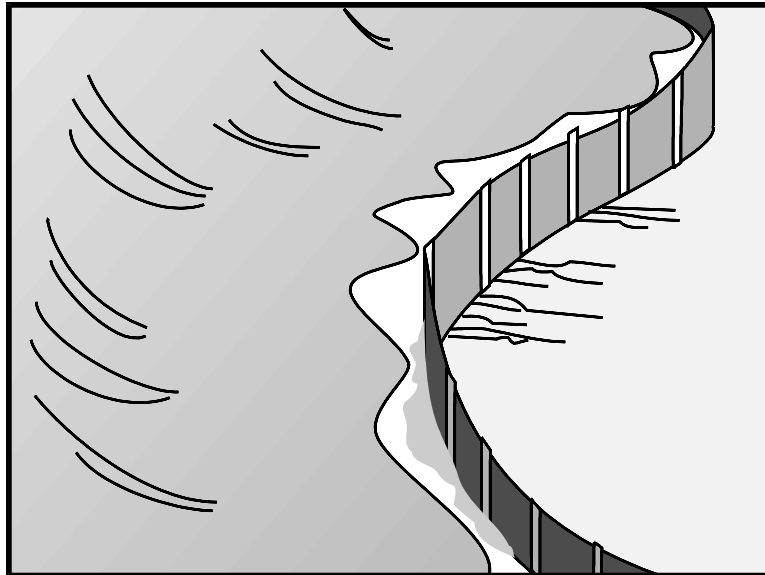
Gravel Mulch, Landscape Architecture Non-Standard Specification 10-2, California Department of Transportation (Caltrans), <http://www.dot.ca.gov/hq/LandArch/roadside/detail-gm.htm>

Maine Erosion and Sediment Control BMPs, DEPLW0588, Maine Department of Environmental Protection: Bureau of Land and Water Quality, 2003.

National Menu of Best Management Practices, US Environmental Protection Agency, 2006.

Standard Specification 72-2: Rock Slope Protection. California Department of Transportation, 2006.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.



Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment (coarse sediment)	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm SE-12 Manufactured Linear Sediment Controls
- SE-13 Compost Socks and Berms
- SE-14 Biofilter Bags

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft² of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)
- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb- 100-feet of silt fence per 10,000 square feet of disturbed area.) (EPA 2012)

- The maximum length of slope draining to any point along the silt fence should be 100 ft per foot of silt fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.
- J-Hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.
- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
 - Fabric is reinforced with wire backing or additional support.
 - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.
- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the

thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts instead of wood stakes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy-duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
 - Ease of installation (most often done with a 2 person crew).
 - Minimal soil disturbance.
 - Better level of compaction along fence, less susceptible to undercutting
 - Uniform installation.
- Limitations:
 - Does not work in shallow or rocky soils.
 - Complete removal of geotextile material after use is difficult.
 - Be cautious when digging near potential underground utilities.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is \$7 per linear foot based on vendor research. Range of cost is \$3.50 - \$9.10 per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches 1/3 of the barrier height.
- Silt fences should be left in place until the upgradient area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.

- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Monitoring Data on Effectiveness of Sediment Control Techniques, Proceedings of World Water and Environmental Resources Congress, Barrett M. and Malina J. 2004.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), USEPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

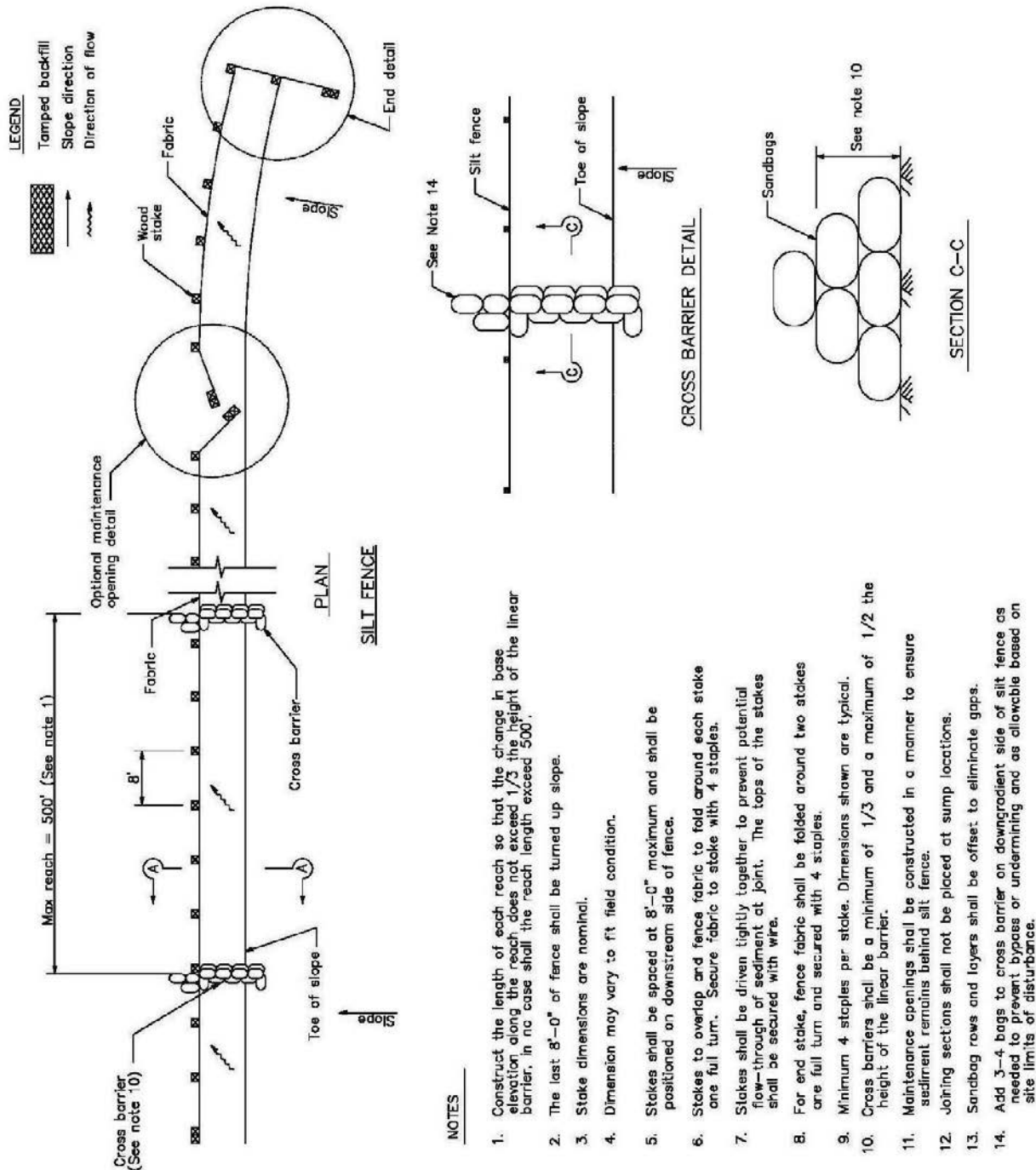
U.S. Environmental Protection Agency (USEPA). Stormwater Best Management Practices: Silt Fences. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 2012.

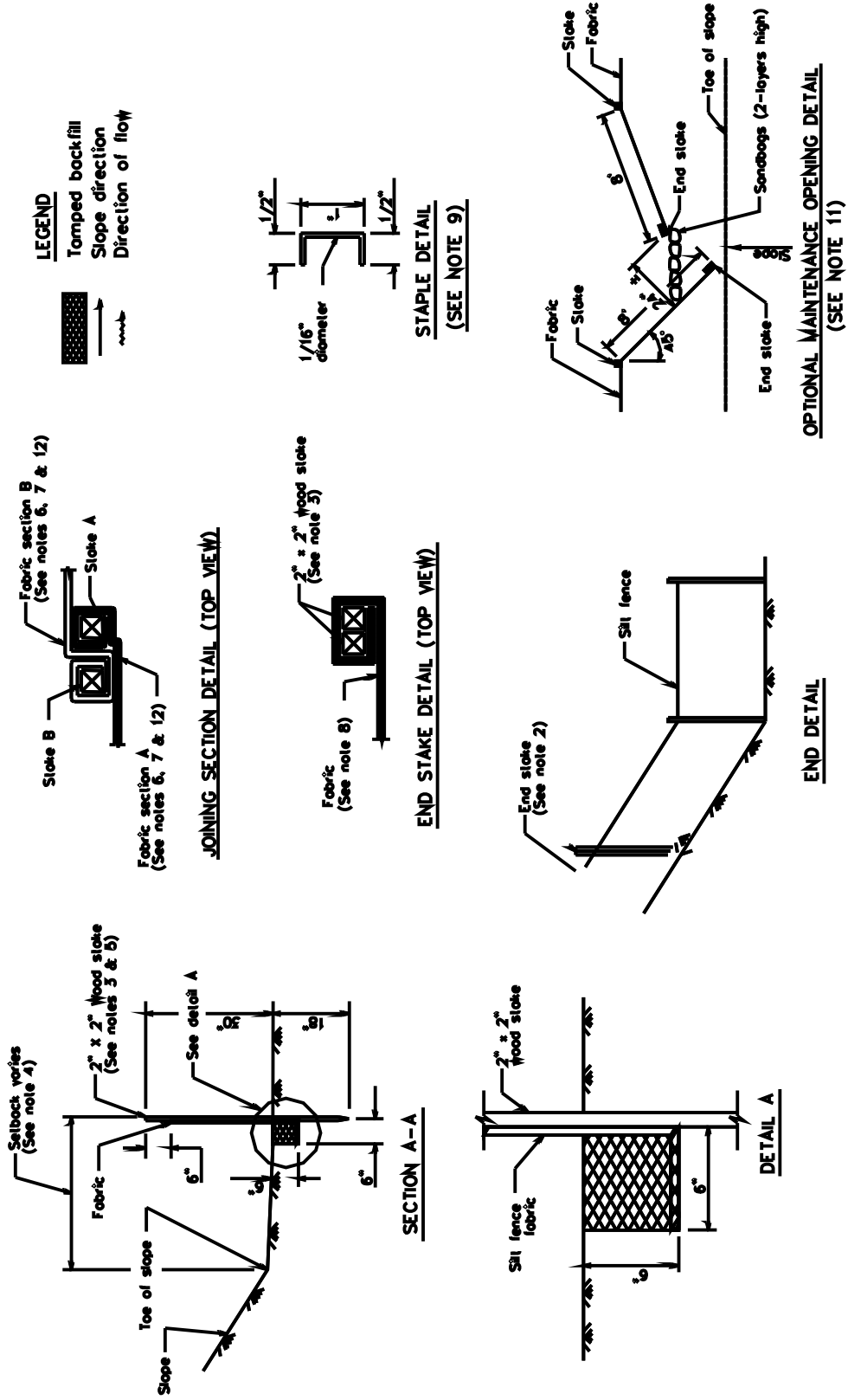
U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

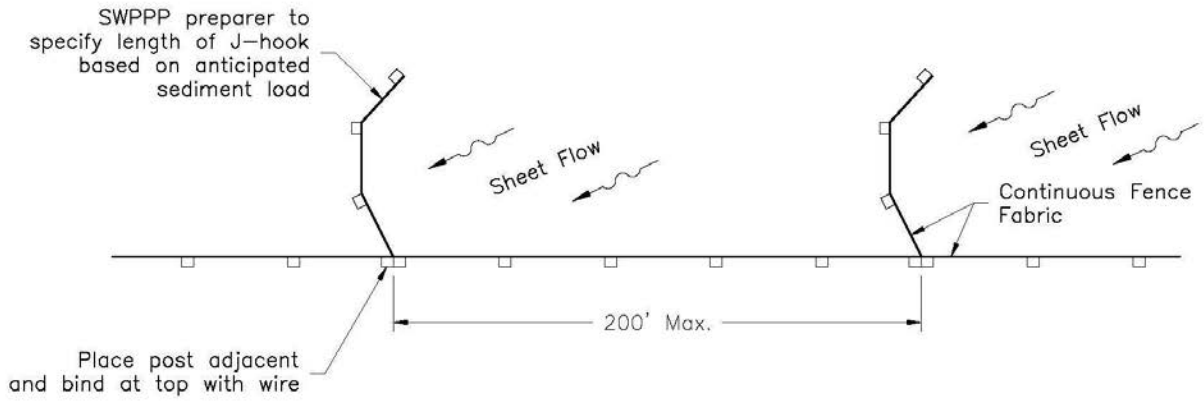
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

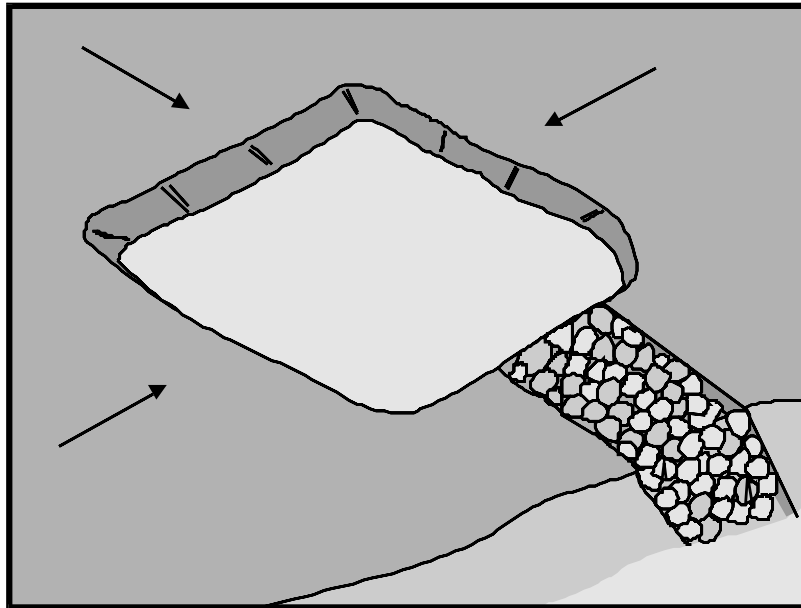






Plan

J-HOOK



Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged by gravity flow. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment traps should be used in conjunction with a comprehensive system of BMPs.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.
- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

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placed where sediment-laden stormwater may enter a storm drain or watercourse. SE-2, Sediment Basins, must be used for drainage areas greater than 5 acres.

- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Conducive to vector production.
- Should not be located in live streams.

Implementation

Design

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation or by construction of an earthen embankment. Its purpose is to collect and store sediment from sites cleared or graded during construction. It is intended for use on small drainage areas with no unusual drainage features and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately six months to one year and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to SE-2, Sediment Basins, or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed, such as in fill areas onsite, or removal to an approved offsite dump. Sediment traps used as perimeter controls should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. However, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks:

- Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
- Restrict basin side slopes to 3:1 or flatter.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see SE-2, Sediment Basin). As a rule of thumb, the larger the basin volume

the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a 2-year storm is a common design criteria for a sediment trap. The sizing criteria below assume that this runoff volume is 0.042 acre-ft/acre (0.5 in. of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California:

- Locate sediment traps as near as practical to areas producing the sediment.
- Trap should be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap should be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 yd³/acre and 33 yd³/acre of contributing drainage area, respectively, based on 0.5 in. of runoff volume over a 24-hour period. In many cases, the size of an individual trap is limited by available space. Multiple traps or additional volume may be required to accommodate specific rainfall, soil, and site conditions.
- Traps with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,000 ft³, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- The outlet pipe or open spillway must be designed to convey anticipated peak flows.
- Use rock or vegetation to protect the trap outlets against erosion.
- Fencing should be provided to prevent unauthorized entry.

Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainage ways. The following steps must be followed during installation:

- The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
- The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.
- All cut-and-fill slopes should be 3:1 or flatter.
- When a riser is used, all pipe joints must be watertight.

- When a riser is used, at least the top two-thirds of the riser should be perforated with 0.5 in. diameter holes spaced 8 in. vertically and 10 to 12 in. horizontally. See SE-2, Sediment Basin.
- When an earth or stone outlet is used, the outlet crest elevation should be at least 1 ft below the top of the embankment.
- When crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

Costs

Average annual cost per installation and maintenance (18 month useful life) is \$0.73 per ft³ (\$1,300 per drainage acre). Maintenance costs are approximately 20% of installation costs.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect outlet area for erosion and stabilize if required.
- Inspect trap banks for seepage and structural soundness, repair as needed.
- Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Inspect fencing for damage and repair as needed.
- Inspect the sediment trap for area of standing water during every visit. Corrective measures should be taken if the BMP does not dewater completely in 96 hours or less to prevent vector production.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the trap capacity. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.
- Remove vegetation from the sediment trap when first detected to prevent pools of standing water and subsequent vector production.
- BMPs that require dewatering shall be continuously attended while dewatering takes place. Dewatering BMPs per NS-2 shall be implemented at all times during dewatering activities.

References

Brown, W., and T. Schueler. The Economics of Stormwater BMPs in the Mid-Atlantic Region. Prepared for Chesapeake Research Consortium, Edgewater, MD, by the Center for Watershed Protection, Ellicott City, MD, 1997.

Draft – Sedimentation and Erosion Control, an Inventory of Current Practices, USEPA, April 1990.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Metzger, M.E., D.F. Messer, C.L. Beitia, C.M. Myers, and V.L. Kramer, The Dark Side of Stormwater Runoff Management: Disease Vectors Associated with Structural BMPs, 2002.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

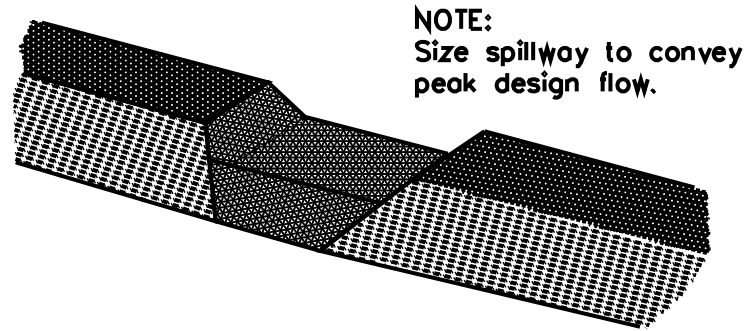
Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

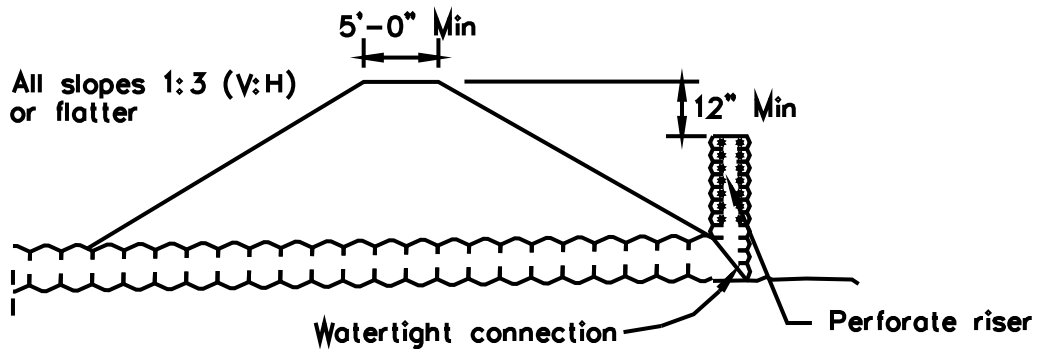
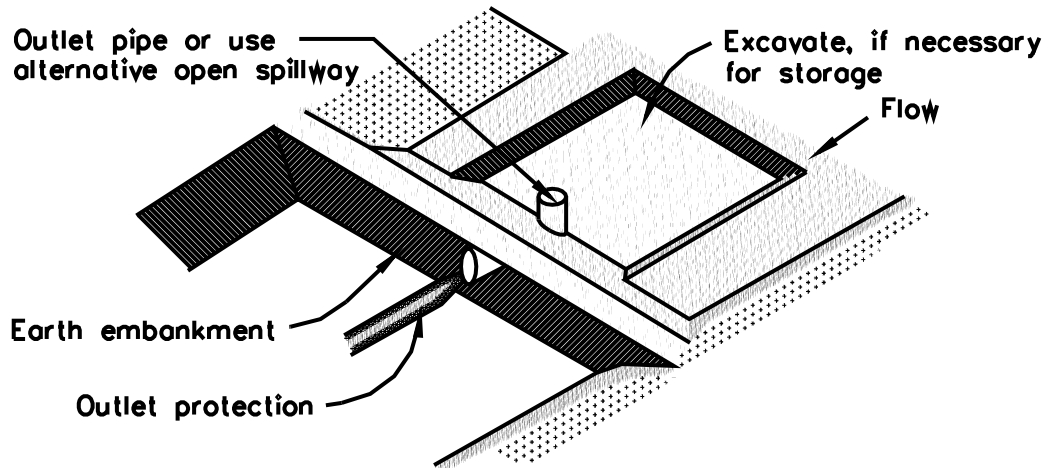
U.S. Environmental Protection Agency (USEPA). Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters. EPA 840-B-9-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



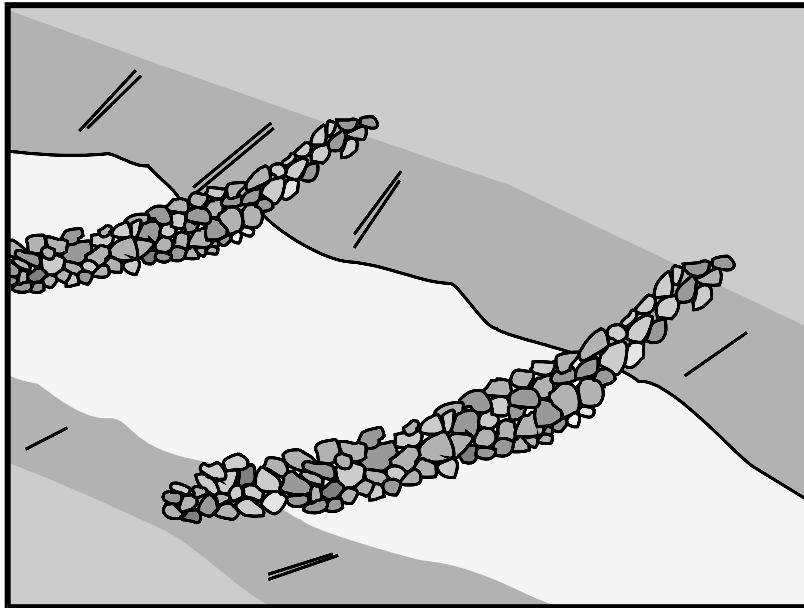
NOTE:
Size spillway to convey
peak design flow.

TYPICAL OPEN SPILLWAY



EMBANKMENT SECTION THRU RISER

TYPICAL SEDIMENT TRAP
NOT TO SCALE



Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category**
- Secondary Category**

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-14 Biofilter Bags

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Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a **“permanent” ditch or swale being constructed early and used as a “temporary” conveyance for construction flows**, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- **Don't use check dams. Consider alternative BMPs, or.**
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see **“Spacing Between Check Dams” detail at the end of this fact sheet**). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see “**Typical Rock Check Dam**” detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber, and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see “**Gravel Bag Check Dam**” detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance **with the manufacturer’s instructions**. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows of gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

Costs

Cost consists of labor costs if materials are readily available (such as gravel on-site). If material must be imported, costs will increase. For other material and installation costs, see SE-5, SE-6, SE-8, SE-12, and SE-14.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.

- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

References

Draft – Sedimentation and Erosion Control, and Inventory of Current Practices, USEPA, April 1990.

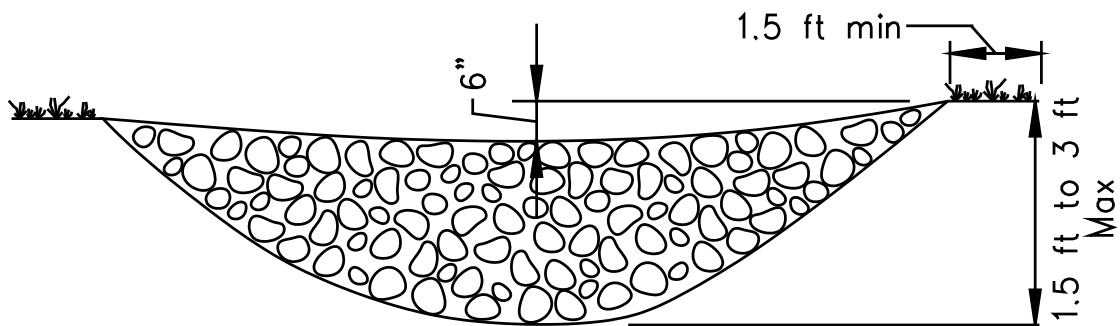
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

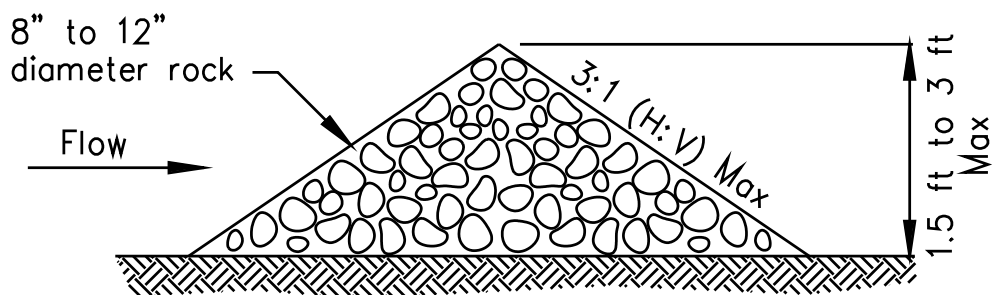
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: <http://anrcatalog.ucdavis.edu/pdf/8125.pdf>

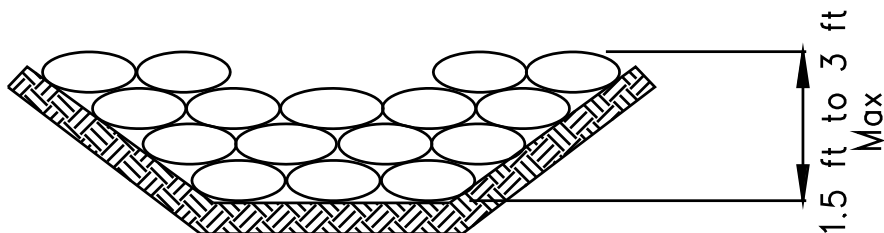


ELEVATION

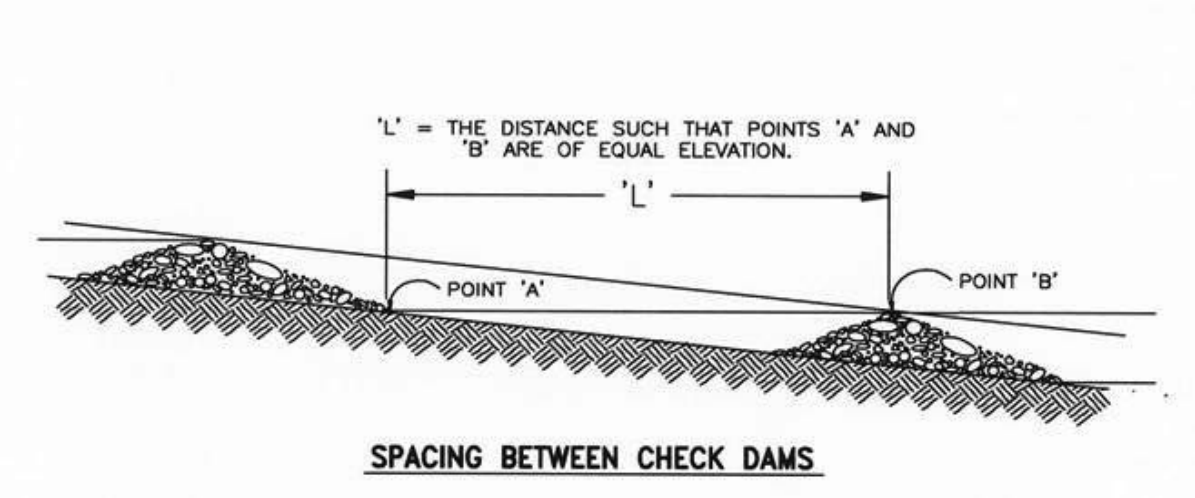


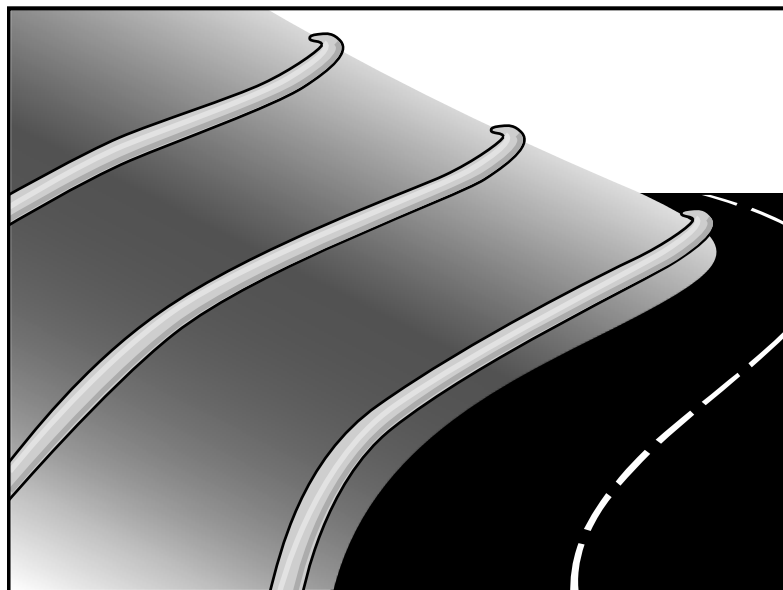
TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE



GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE





Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-14 Biofilter Bags

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
 - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
 - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
 - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be $\frac{1}{4}$ to $\frac{1}{3}$ of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
 - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
 - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from \$20 - \$30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-\$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

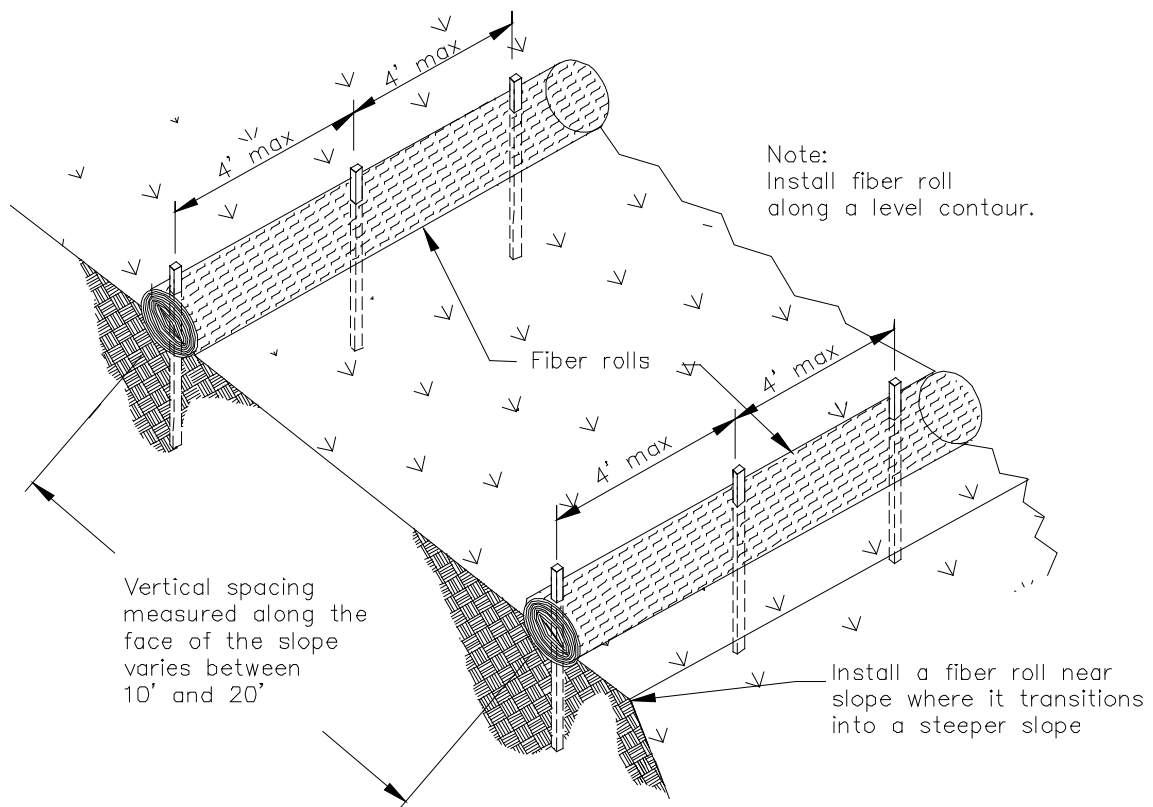
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

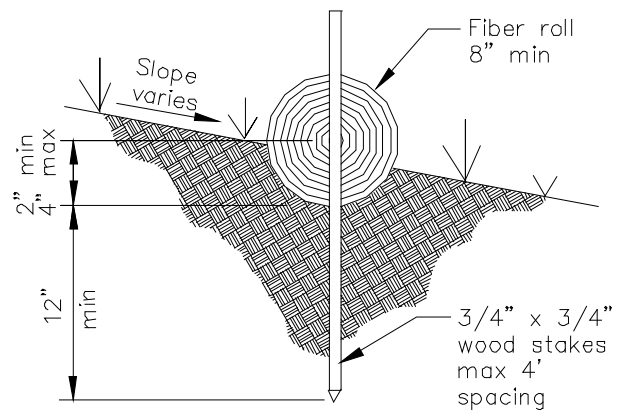
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



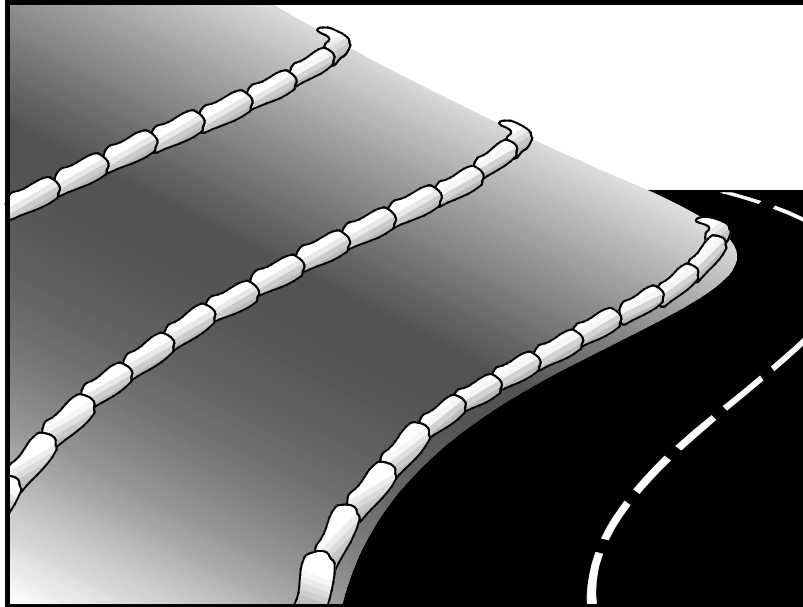
TYPICAL FIBER ROLL INSTALLATION

N.T.S.



ENTRENCHMENT DETAIL

N.T.S.



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
 - Below the toe of slopes and erodible slopes
 - As sediment traps at culvert/pipe outlets
 - Below other small cleared areas
 - Along the perimeter of a site
 - Down slope of exposed soil areas
 - Around temporary stockpiles and spoil areas
 - Parallel to a roadway to keep sediment off paved areas
 - Along streams and channels
- As a linear erosion control measure:
 - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Roll
- SE-8 Sandbag Barrier
- SE-12 Temporary Silt Dike
- SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
 - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
 - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
 - Height = 18 in. maximum
 - Top width = 24 in. minimum for three or more layer construction
 - Top width = 12 in. minimum for one or two layer construction
 - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
 - Height = 12 in. maximum
 - Top width = 24 in. minimum for three or more layer construction.
 - Top width = 12 in. minimum for one or two layer construction.
 - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- **Bag Material:** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd², Mullen burst strength exceeding 300 lb/in² in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- **Bag Size:** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- **Fill Material:** Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. \$2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from \$58/hour (3 yd³ hopper) to \$88/hour (9 yd³ hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

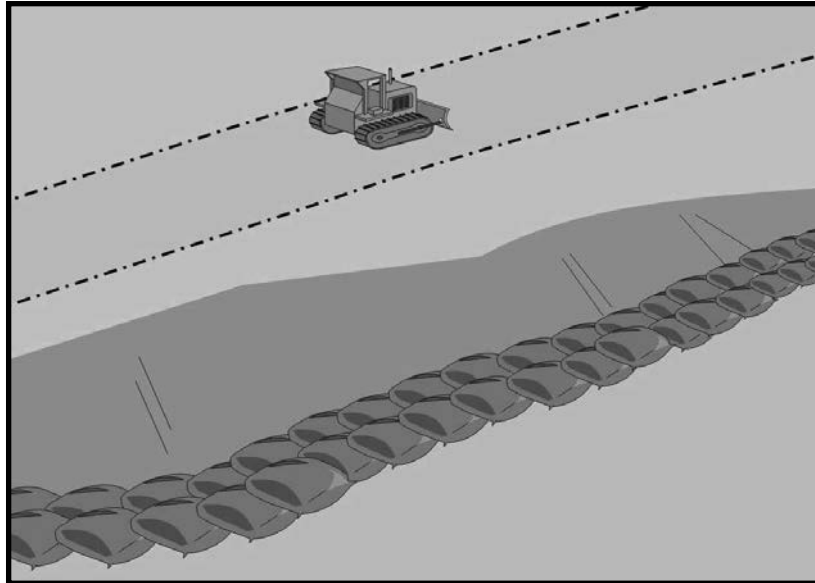
Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.



Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be a suitable control measure for the applications described below. It is important to consider that sand bags are less porous than gravel bags and ponding or flooding can occur behind the barrier. Also, sand is easily transported by runoff if bags are damaged or ruptured. The SWPPP Preparer should select the location of a sandbag barrier with respect to the potential for flooding, damage, and the ability to maintain the BMP.

- As a linear sediment control measure:
 - Below the toe of slopes and erodible slopes.
 - As sediment traps at culvert/pipe outlets.
 - Below other small cleared areas.
 - Along the perimeter of a site.
 - Down slope of exposed soil areas.
 - Around temporary stockpiles and spoil areas.
 - Parallel to a roadway to keep sediment off paved areas.
 - Along streams and channels.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-12 Manufactured Linear Sediment Controls
- SE-14 Biofilter Bags

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- As linear erosion control measure:
 - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
 - At the top of slopes to divert runoff away from disturbed slopes.
 - As check dams across mildly sloped construction roads.

Limitations

- It is necessary to limit the drainage area upstream of the barrier to 5 acres.
- Sandbags are not intended to be used as filtration devices.
- Easily damaged by construction equipment.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor intensive.
- Durability of sandbags is somewhat limited and bags will need to be replaced when there are signs of damage or wear.
- Burlap should not be used for sandbags.

Implementation

General

A sandbag barrier consists of a row of sand-filled bags placed on a level contour. When appropriately placed, a sandbag barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. Sand-filled bags have limited porosity, which is further limited as the fine sand tends to quickly plug with sediment, limiting or completely blocking the rate of flow through the barrier. If a porous barrier is desired, consider SE-1, Silt Fence, SE-5, Fiber Rolls, SE-6, Gravel Bag Berms or SE-14, Biofilter Bags. Sandbag barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets which erode rills, and ultimately gullies, into disturbed, sloped soils. Sandbag barriers are similar to gravel bag berms, but less porous. Generally, sandbag barriers should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate sandbag barriers on a level contour.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
 - Slope inclination of 4:1 (H:V) or flatter: Sandbags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
 - Slope inclination between 4:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Slope inclination 2:1 (H:V) or greater: Sandbags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.
- Turn the ends of the sandbag barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, sand bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the sand bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- Butt ends of bags tightly.
- Overlap butt joints of row beneath with each successive row.
- Use a pyramid approach when stacking bags.
- In non-traffic areas
 - Height = 18 in. maximum
 - Top width = 24 in. minimum for three or more layer construction
 - Side slope = 2:1 (H:V) or flatter
- In construction traffic areas
 - Height = 12 in. maximum
 - Top width = 24 in. minimum for three or more layer construction.
 - Side slopes = 2:1 (H:V) or flatter.
- See typical sandbag barrier installation details at the end of this fact sheet.

Materials

- **Sandbag Material:** Sandbag should be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight of 4 ounces/yd², Mullen burst strength exceeding 300 lb/in² in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355. Use of burlap is not an acceptable substitute, as sand can more easily mobilize out of burlap.
- **Sandbag Size:** Each sand-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.

- **Fill Material:** All sandbag fill material should be non-cohesive, Class 3 (Caltrans Standard Specification, Section 25) or similar permeable material free from clay and deleterious material, such as recycled concrete or asphalt.

Costs

Empty sandbags cost \$0.25 - \$0.75. Average cost of fill material is \$8 per yd³. Additional labor is required to fill the bags. Pre-filled sandbags are more expensive at \$1.50 - \$2.00 per bag. These costs are based upon vendor research.

Inspection and Maintenance

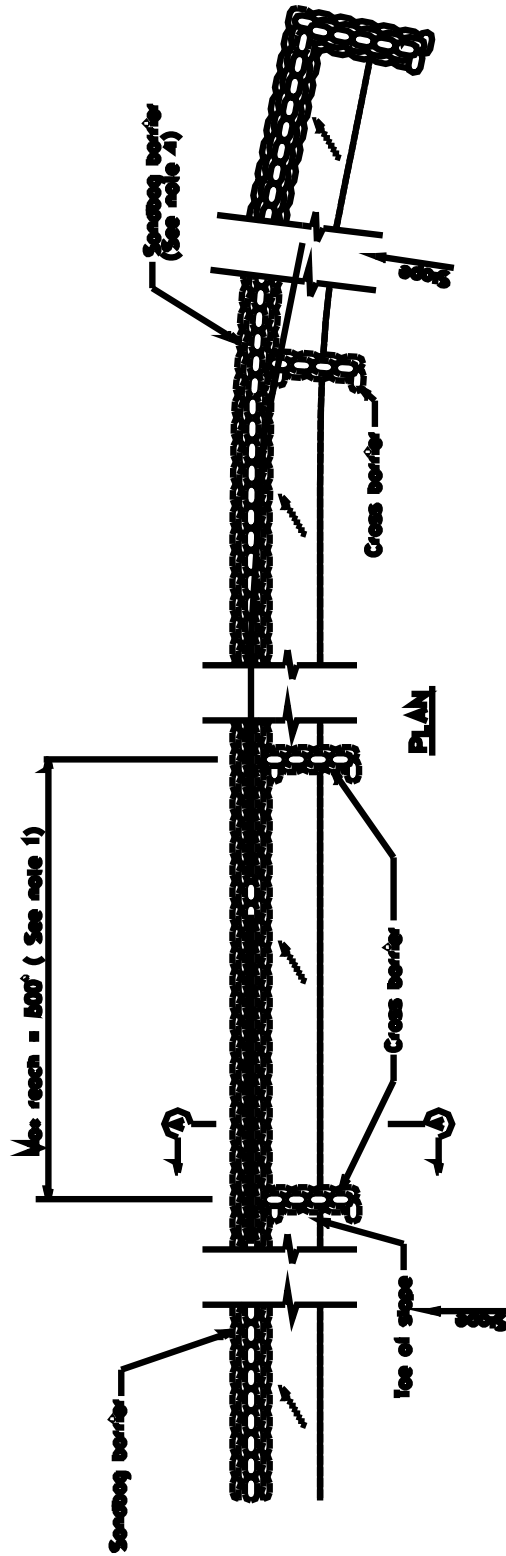
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sandbags exposed to sunlight will need to be replaced every two to three months due to degradation of the bags.
- Reshape or replace sandbags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove sandbags when no longer needed and recycle sand fill whenever possible and properly dispose of bag material. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

References

Standard Specifications for Construction of Local Streets and Roads, California Department of Transportation (Caltrans), July 2002.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

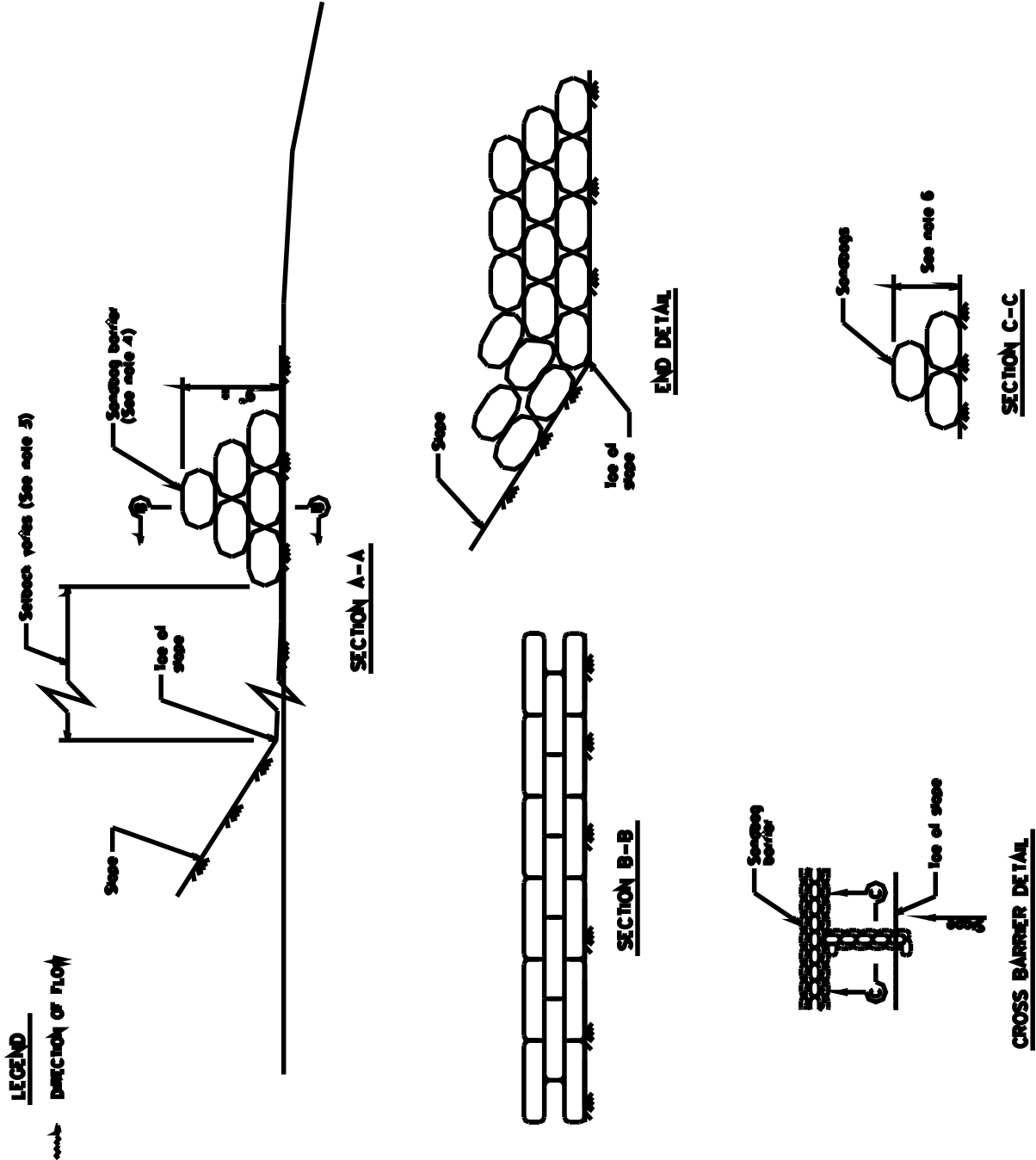
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

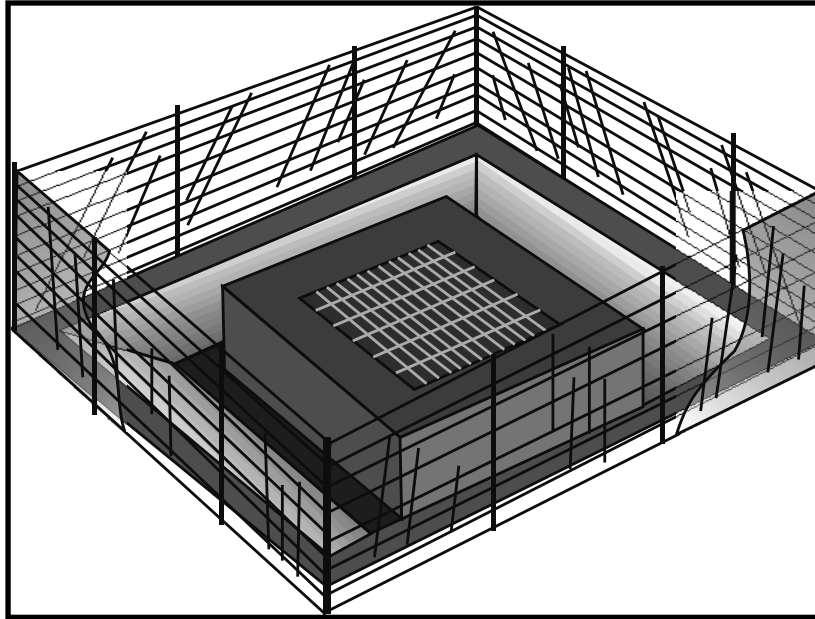


SANDBAG BARRIER

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed $1/2$ the height of the linear barrier, in no case shall the reach length exceed 500'.
2. Place sandbags tightly.
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum of 3 bags high.
5. The end of the barrier shall be turned up stone.
6. Cross barriers shall be a min of $1/2$ and a max of $2/3$ the height of the linear barrier.
7. Sandbag rope end layers shall be staggered to eliminate gaps.





Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection temporarily ponds runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-14 Biofilter Bags
- SE-13 Compost Socks and Berms

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other onsite sediment trapping techniques in conjunction with inlet protection.

- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
 - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
 - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.
- Seven types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

- Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.
 - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).
 - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.
 - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.
 - Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.
 - Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.
 - Compost Socks: Allow filtered run-off to pass through the compost while retaining sediment and potentially other pollutants (SE-13). Appropriate for flows under 1.0 cfs.
- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.
 - Provide area around the inlet for water to pond without flooding structures and property.
 - Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
 - Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- **DI Protection Type 1 - Silt Fence** - Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.
 1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.
 2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.
 3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.
 4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- **DI Protection Type 2 - Excavated Drop Inlet Sediment Trap** - Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd³/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.
- **DI Protection Type 3 - Gravel bag** - Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.
 1. Construct on gently sloping street.
 2. Leave room upstream of barrier for water to pond and sediment to settle.
 3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.
 4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.
- **DI Protection Type 4 – Block and Gravel Filter** - Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.
 1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
 2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.
 3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
 4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.
- **DI Protection Type 5 – Temporary Geotextile Insert (proprietary)** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- **DI Protection Type 6 - Biofilter bags** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.
 1. Construct in a gently sloping area.
 2. Biofilter bags should be placed around inlets to intercept runoff flows.
 3. All bag joints should overlap by 6 in.
 4. Leave room upstream for water to pond and for sediment to settle out.
 5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.
- **DI Protection Type 7 – Compost Socks** – A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence). Compost socks should conform to specification detailed in SE-13, Compost Socks and Berms.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is \$200 per inlet.
- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from \$50-75 plus installation, but costs can exceed \$100. This cost does not include maintenance.
- See SE-13 for Compost Sock cost information.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.

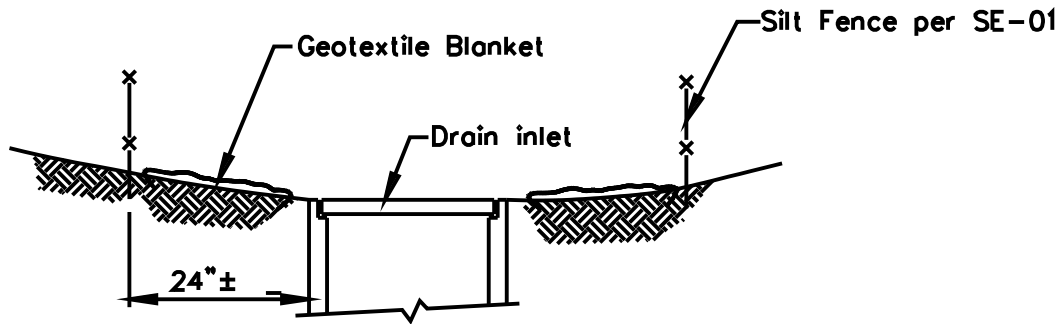
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile **insert devices according to manufacturer's** specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.
 - Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

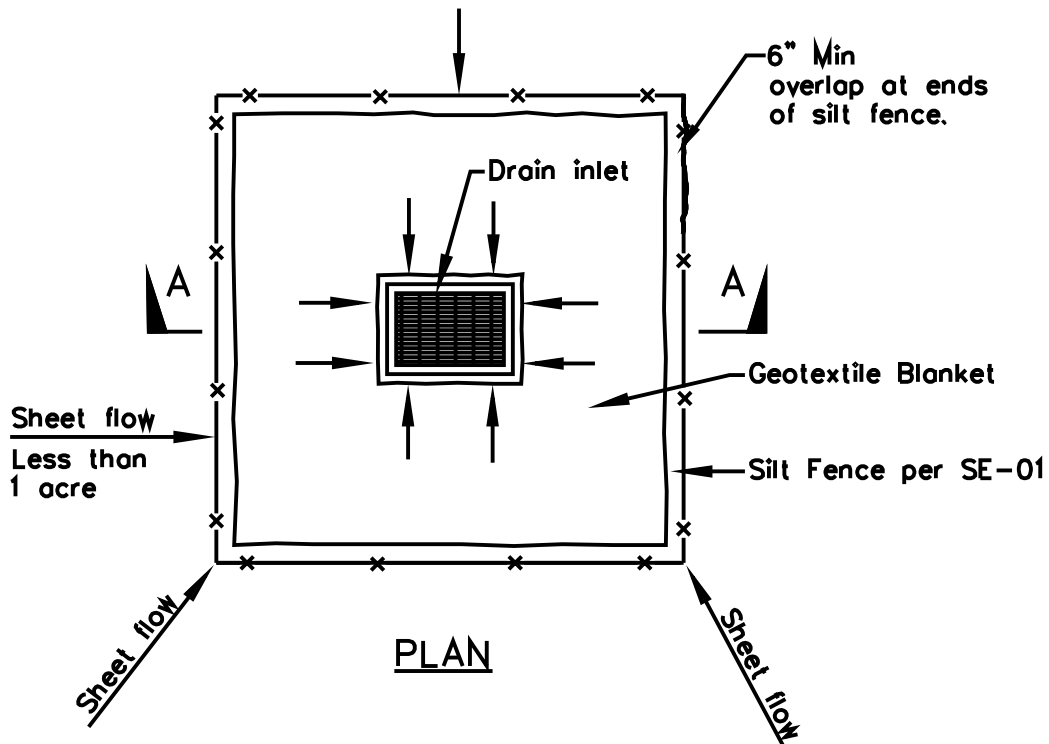
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



SECTION A-A

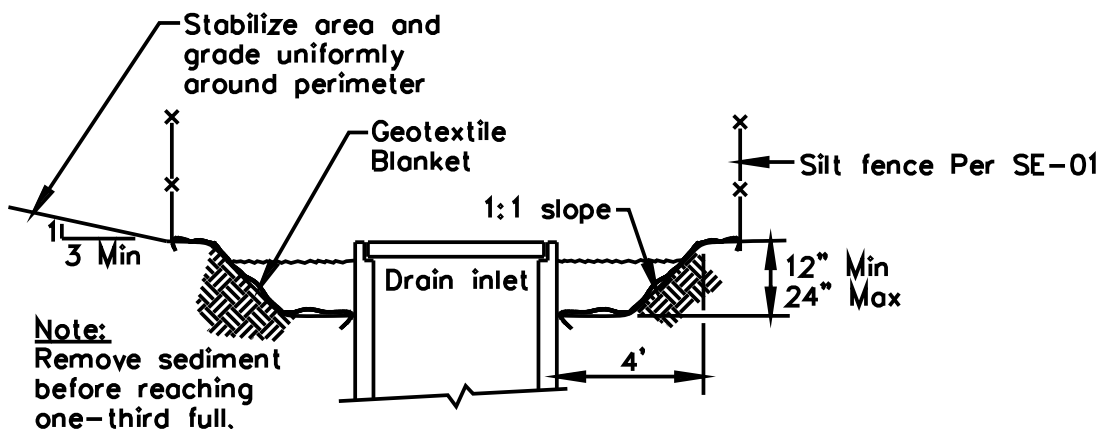


PLAN

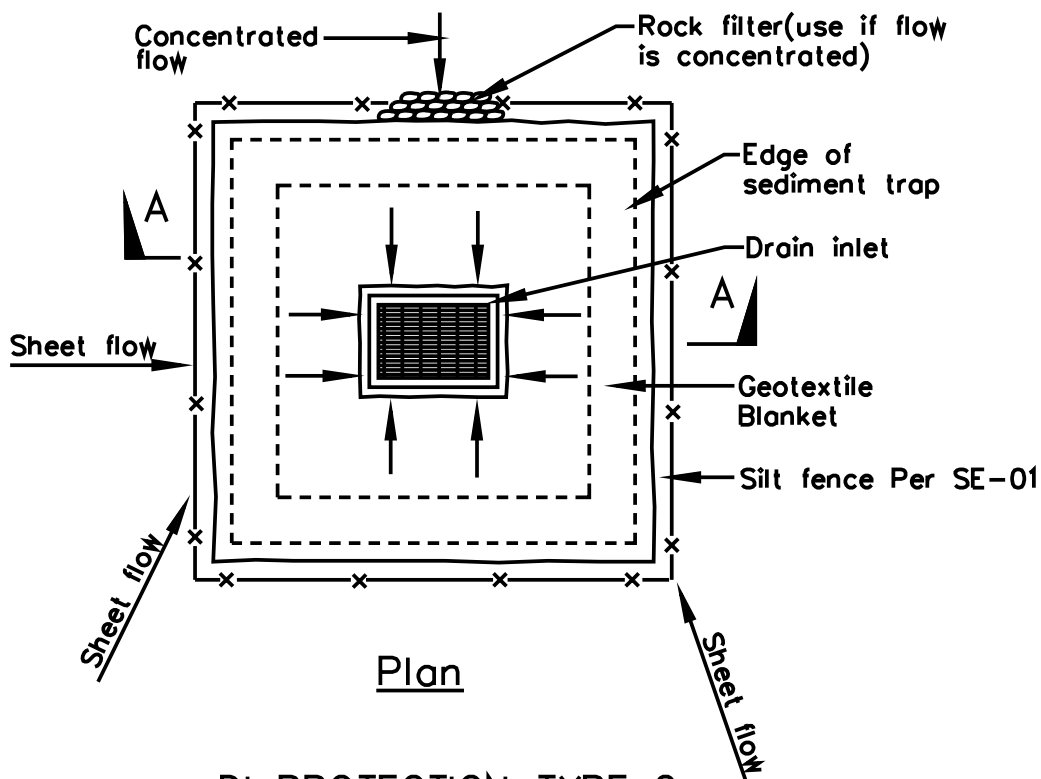
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



Section A-A

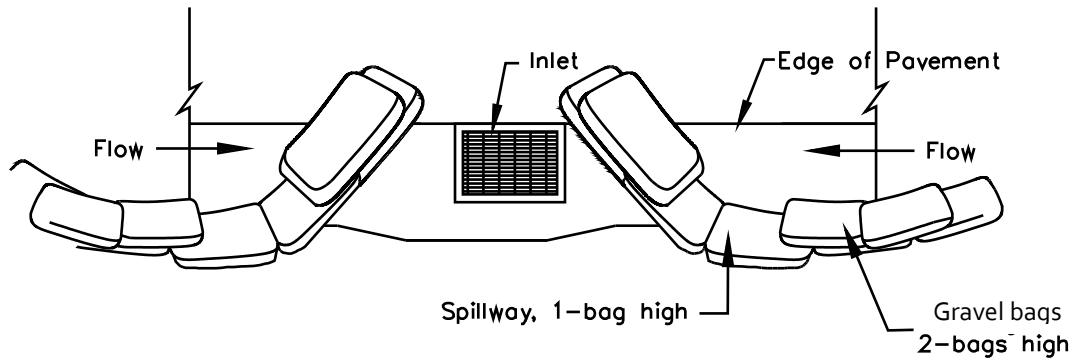


Plan

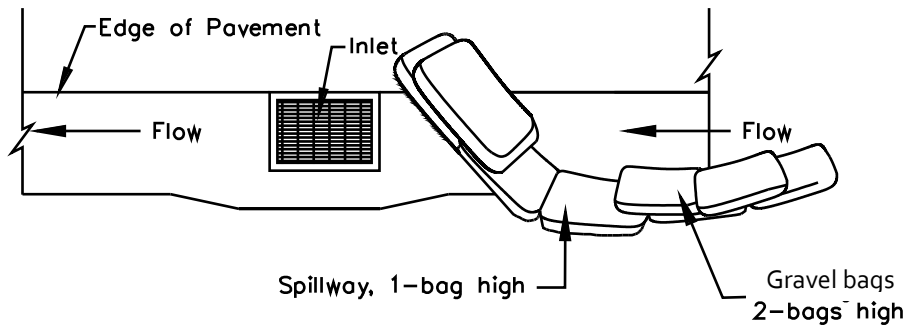
DI PROTECTION TYPE 2
NOT TO SCALE

Notes

1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



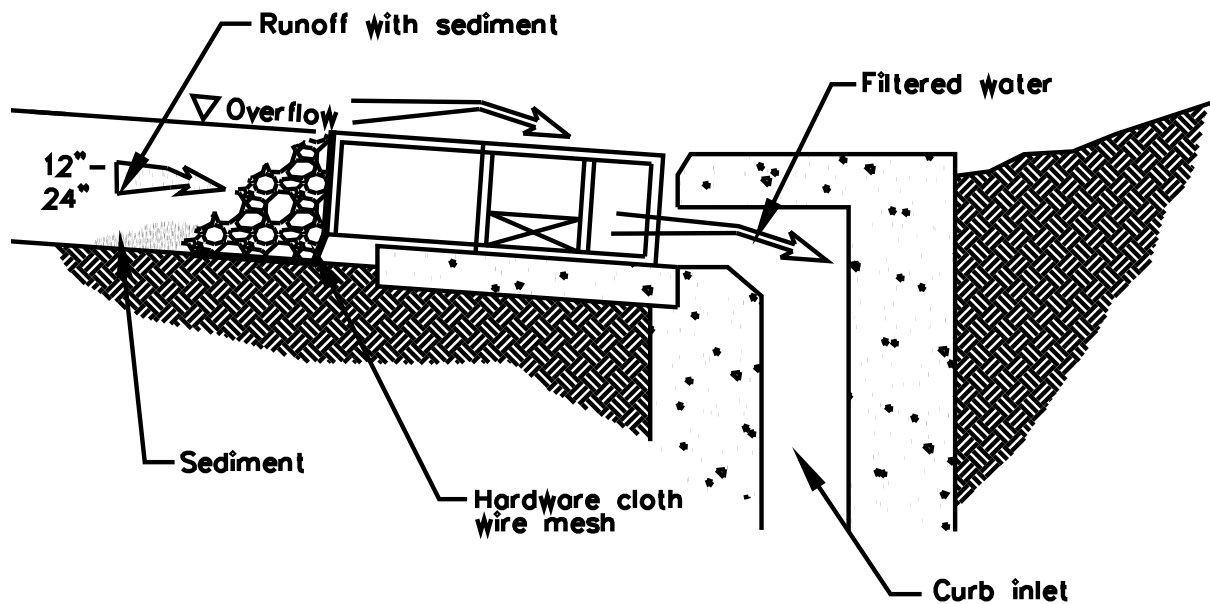
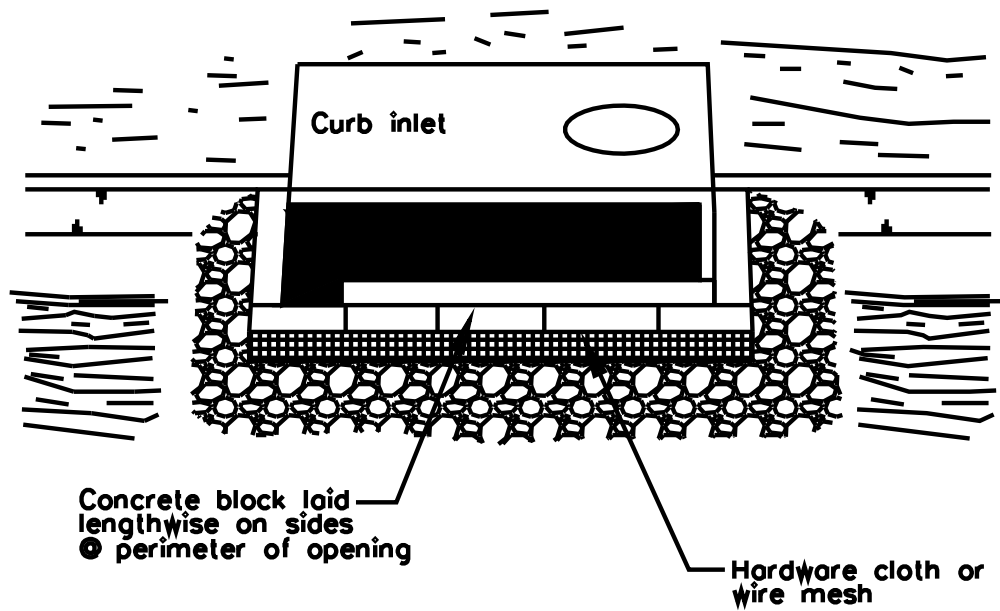
TYPICAL PROTECTION FOR INLET ON SUMP



TYPICAL PROTECTION FOR INLET ON GRADE

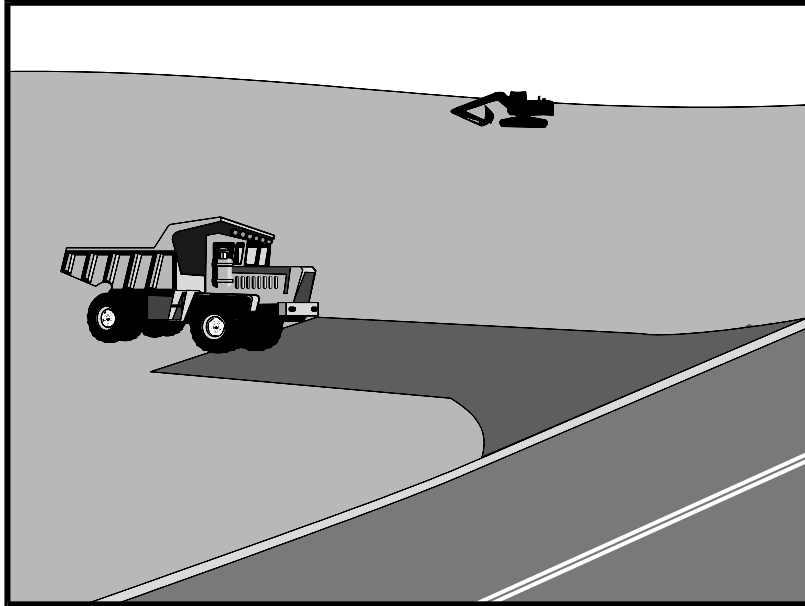
NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.



DI PROTECTION – TYPE 4
NOT TO SCALE

Stabilized Construction Entrance/Exit TC-1



Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Stabilized Construction Entrance/Exit TC-1

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

Stabilized Construction Entrance/Exit TC-1

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from \$1,200 to \$4,800 each, averaging \$2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from \$1,200 - \$6,000 each, averaging \$3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stabilized Construction Entrance/Exit TC-1

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

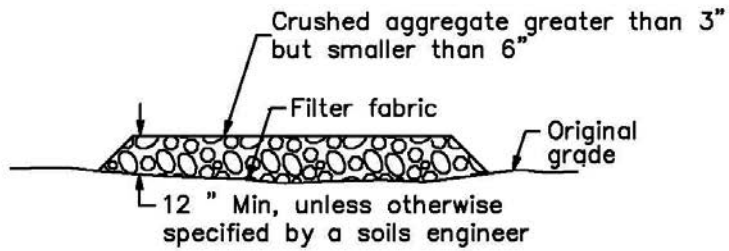
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

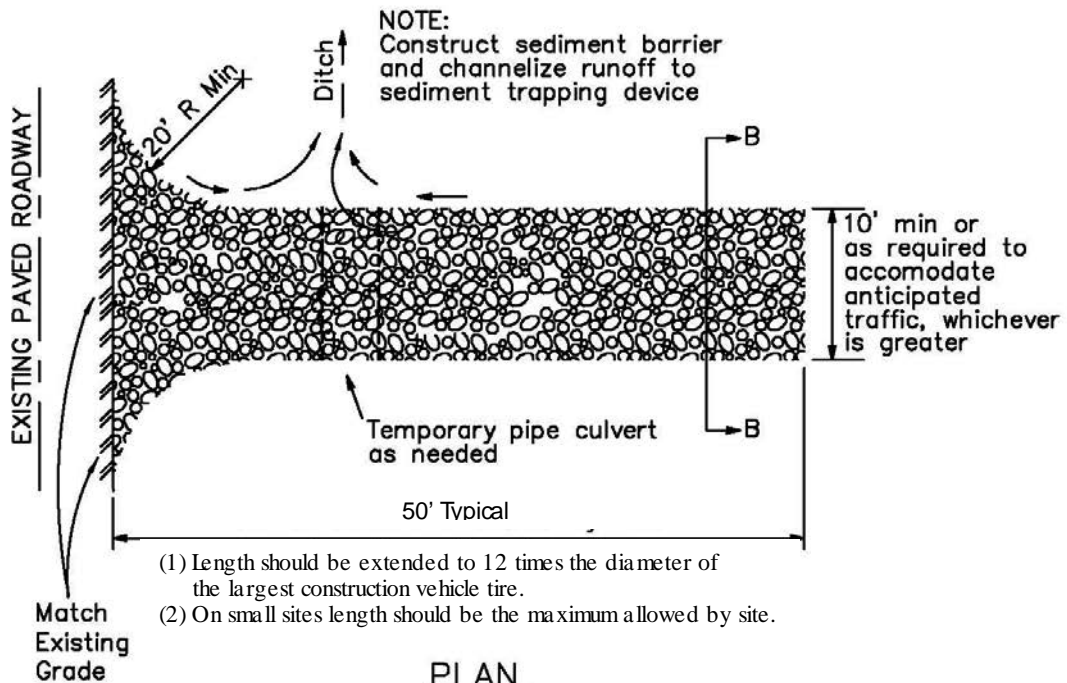
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1

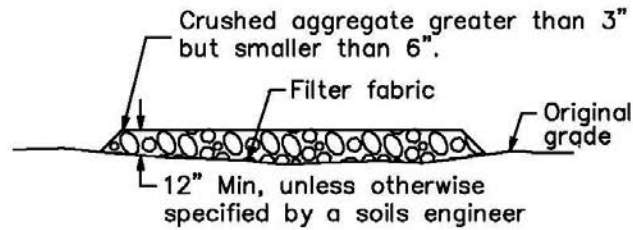


SECTION B-B
NTS

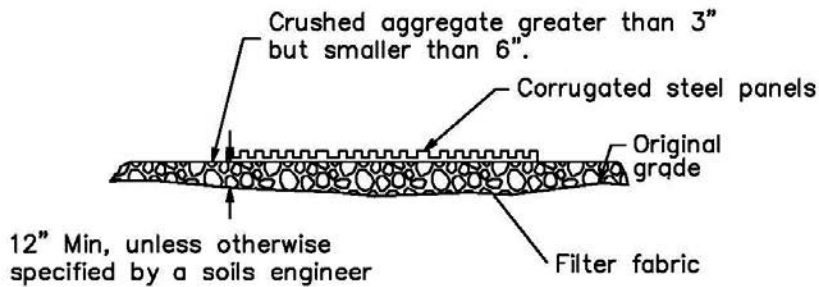


PLAN
NTS

Stabilized Construction Entrance/Exit TC-1

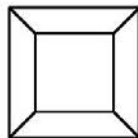


SECTION B-B
NTS

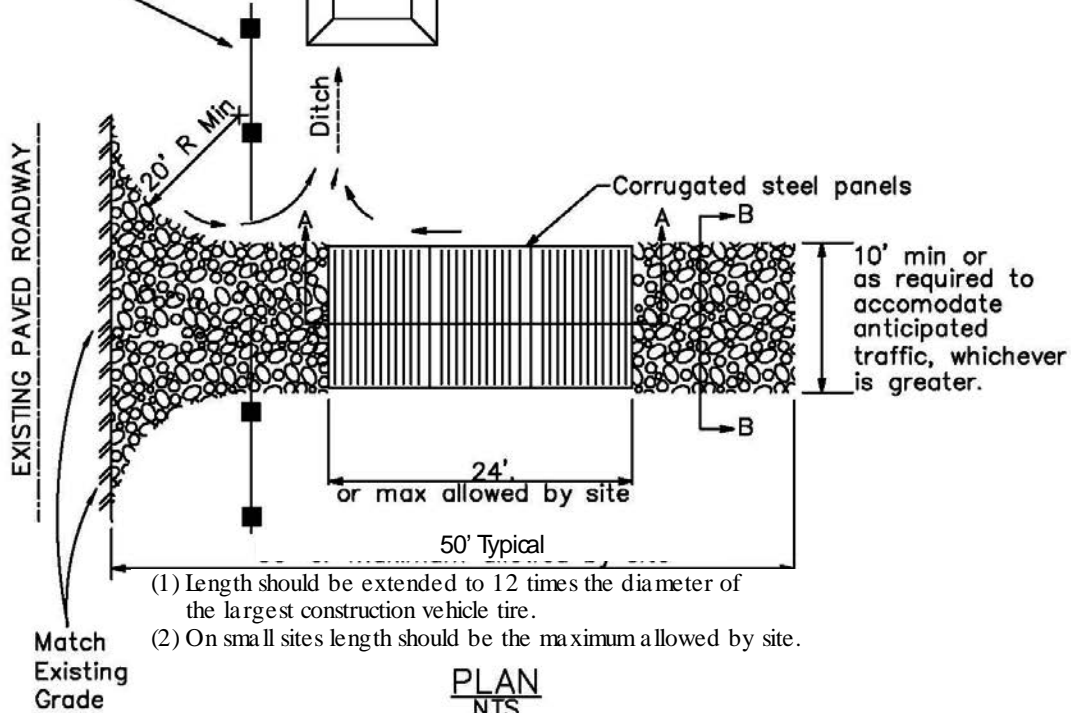


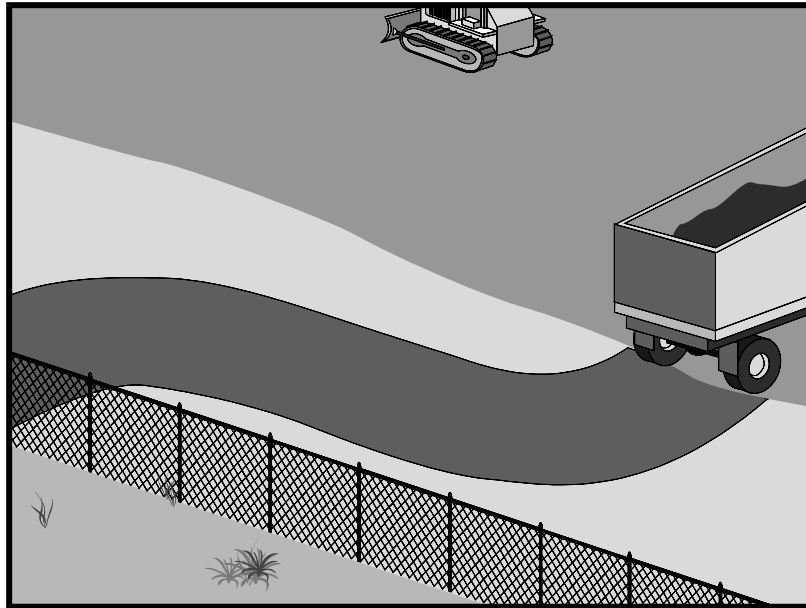
SECTION A-A
NOT TO SCALE

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device



Sediment trapping device





Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

Suitable Applications

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
 - Phased construction projects and offsite road access
 - Construction during wet weather
- Construction roadways and detour roads:
 - Where mud tracking is a problem during wet weather
 - Where dust is a problem during dry weather
 - Adjacent to water bodies
 - Where poor soils are encountered

Limitations

- The roadway must be removed or paved when construction is complete.



- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See WE-1, Wind Erosion Control.
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

Implementation

General

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

Installation/Application Criteria

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered.

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (WE-1, Wind Erosion Control).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.

- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

Costs

Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay. No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

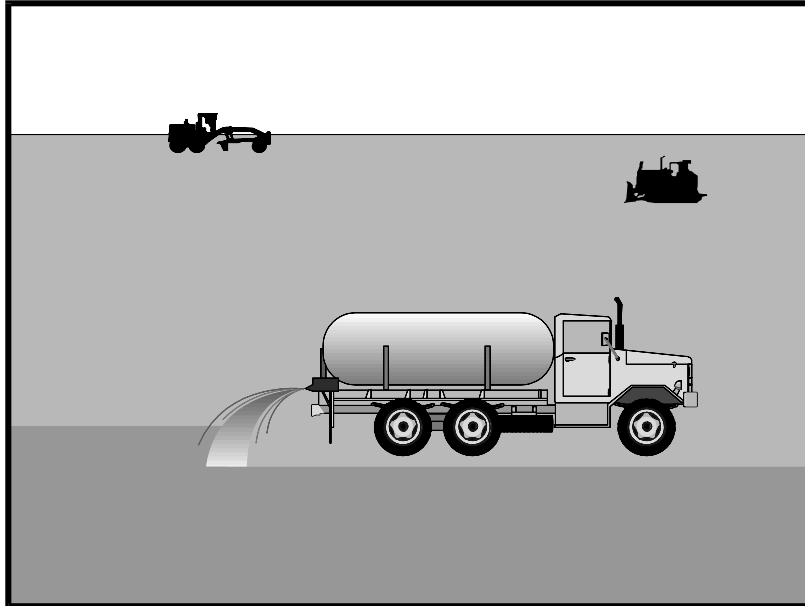
Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California’s Mediterranean climate, with a short “wet” season and a typically long, hot “dry” season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellent, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montmorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	X	X	X	X	X			X
Disturbed Areas Subject to Traffic			X	X	X	X		X
Material Stockpiles		X	X	X			X	X
Demolition			X			X	X	
Clearing/Excavation			X	X				X
Truck Traffic on Unpaved Roads			X	X	X	X	X	
Tracking					X	X		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

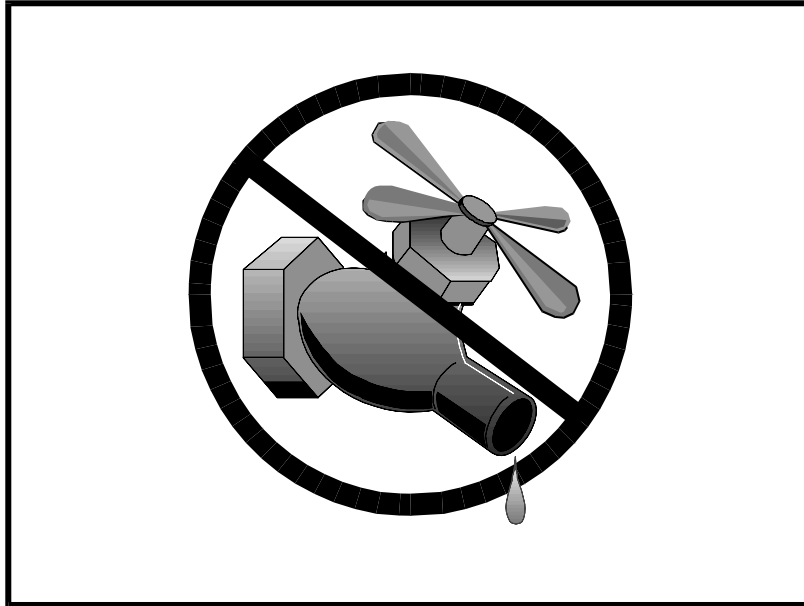
Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.



Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

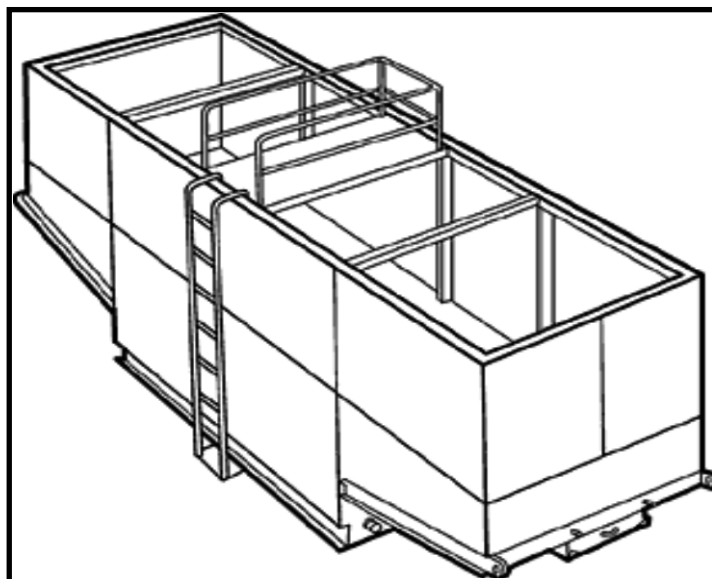
The cost is small to none compared to the benefits of conserving water.

Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occurring.
- Repair water equipment as needed to prevent unintended discharges.
 - Water trucks
 - Water reservoirs (water buffalos)
 - Irrigation systems
 - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.



Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

- SE-5: Fiber Roll
- SE-6: Gravel Bag Berm

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precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Limitations

- Dewatering operations will require, and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required for the discharge. For example, when discharging to a water of the U.S., a dewatering permit may be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained from the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (see SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

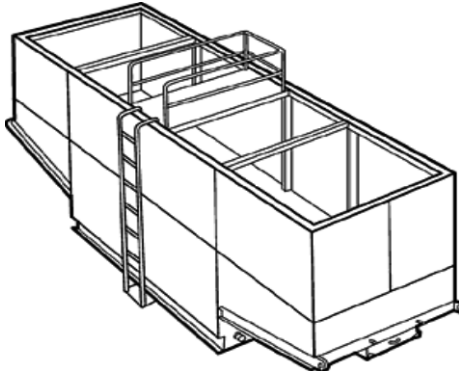
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks



Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

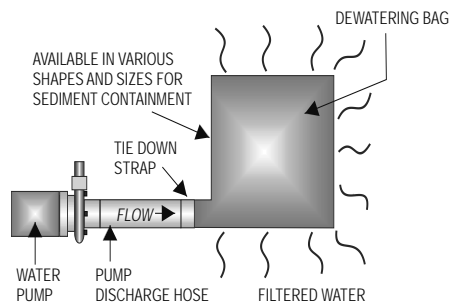
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter



Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter



Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter



Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter



Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from \$360 per month for a 1,000 gallon tank to \$2,660 per month for a 10,000 gallon tank. Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.
- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

References

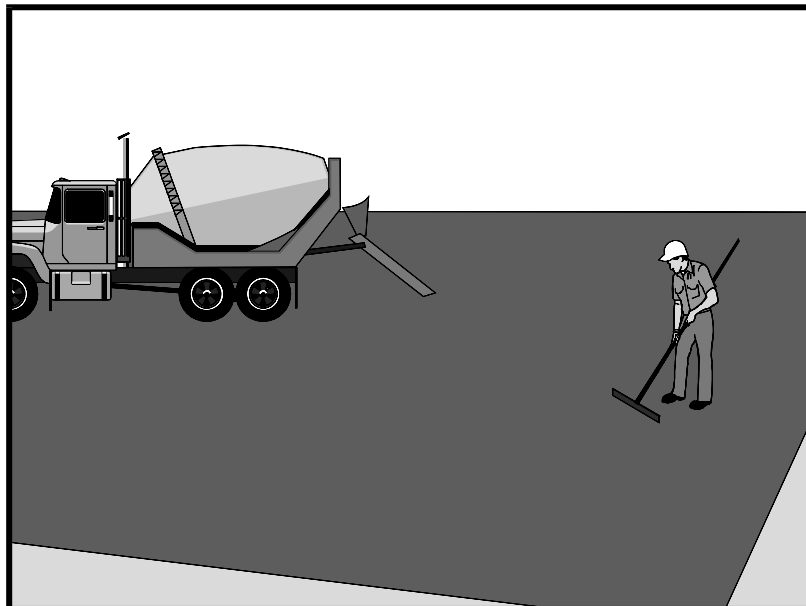
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runoff and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runoff (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
 - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of) or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
 - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:
 - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
 - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).
- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.
- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.
- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

Costs

- All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

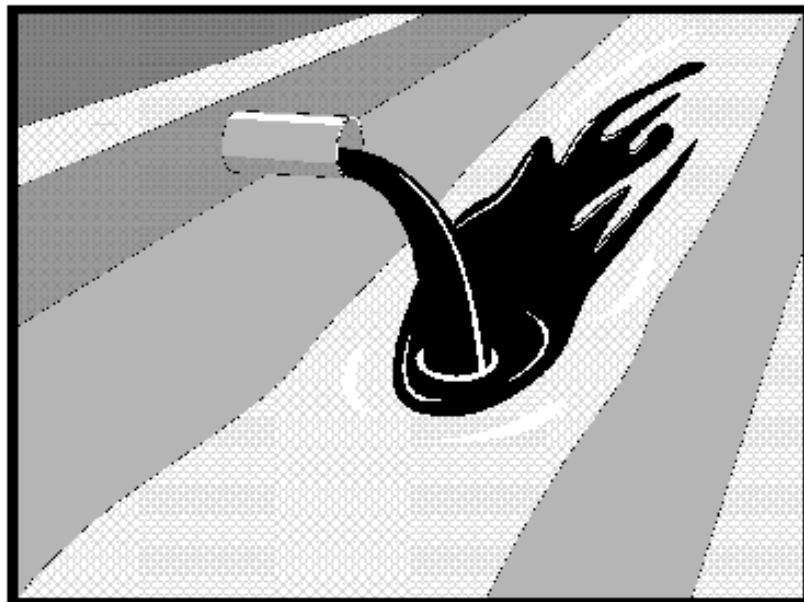
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
 - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
 - Pungent odors coming from the drainage systems
 - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
 - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
 - Abnormal water flow during the dry weather season
 - Unusual flows in sub drain systems used for dewatering
 - Pungent odors coming from the drainage systems
 - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
 - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
 - Abnormal water flow during the non-irrigation season
 - Non-standard junction structures
 - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

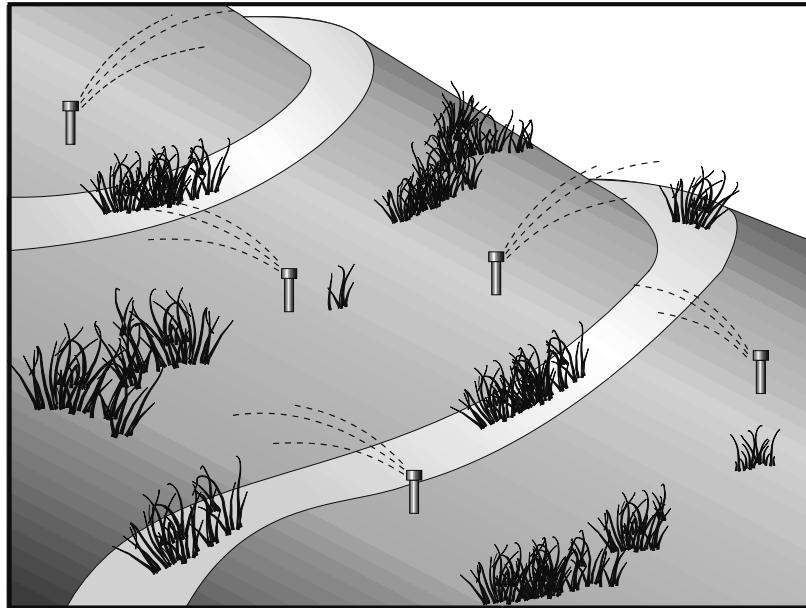
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

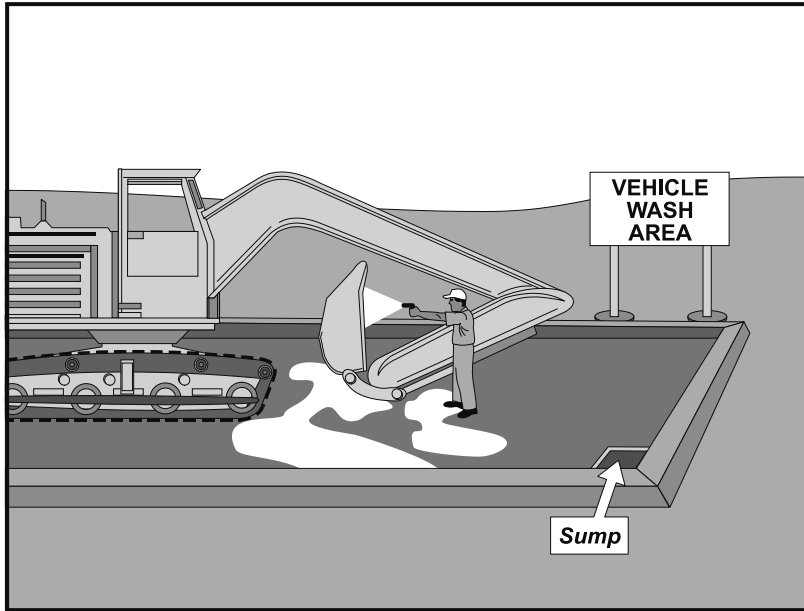
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried, and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
 - Located away from storm drain inlets, drainage facilities, or watercourses
 - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runoff
 - Configured with a sump to allow collection and disposal of wash water
 - No discharge of wash waters to storm drains or watercourses
 - Used only when necessary
- When cleaning vehicles and equipment with water:
 - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
 - Use positive shutoff valve to minimize water usage
 - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

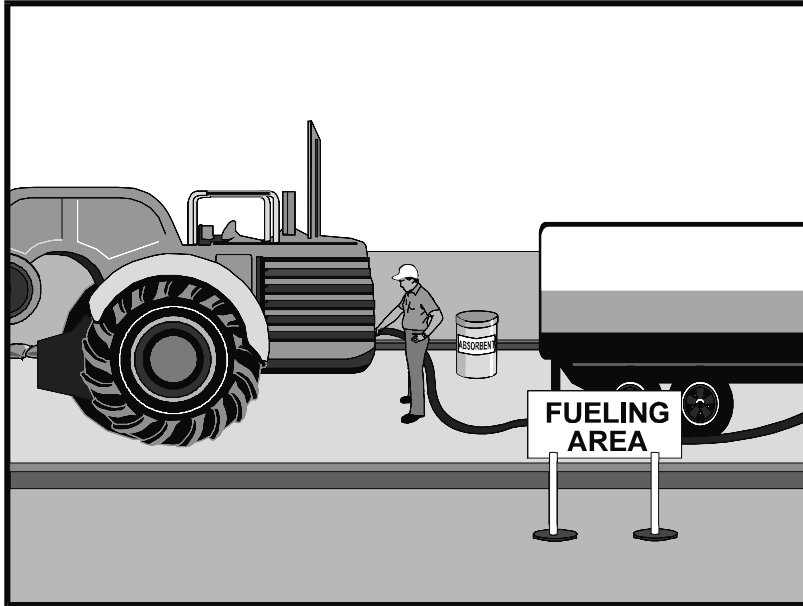
Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.



Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should be disposed of properly after use.
- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runoff and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

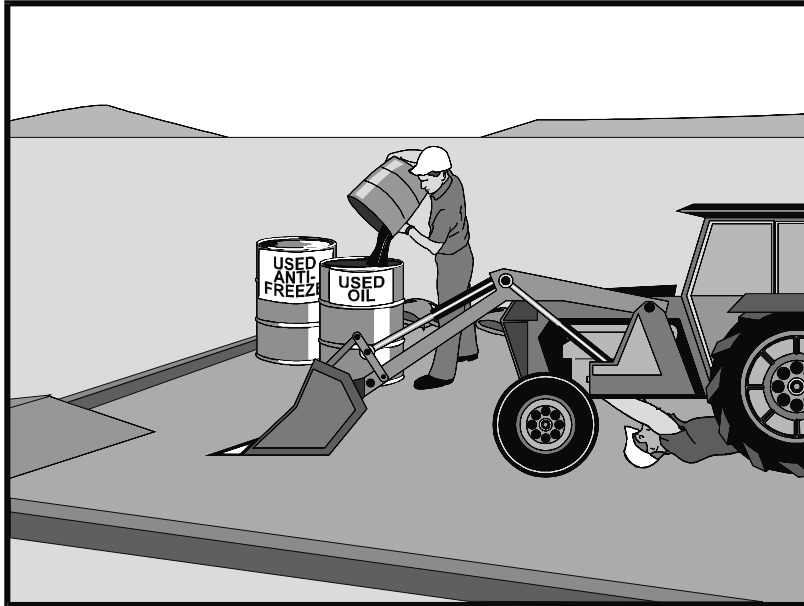
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a “dry and clean site”. The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Vehicle & Equipment Maintenance NS-10

Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runoff and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

Vehicle & Equipment Maintenance NS-10

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an “environmentally friendly” label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The “chlor” term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like, -trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Vehicle & Equipment Maintenance NS-10

Inspection and Maintenance

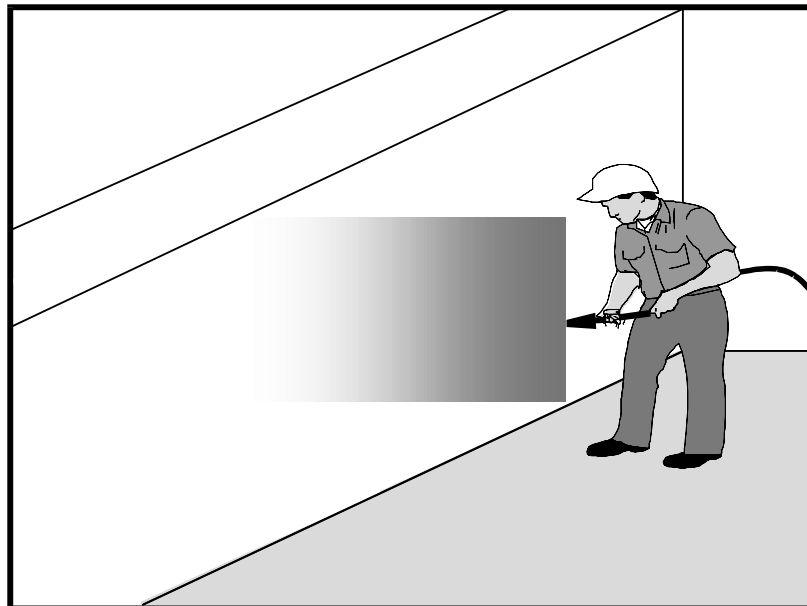
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.



Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

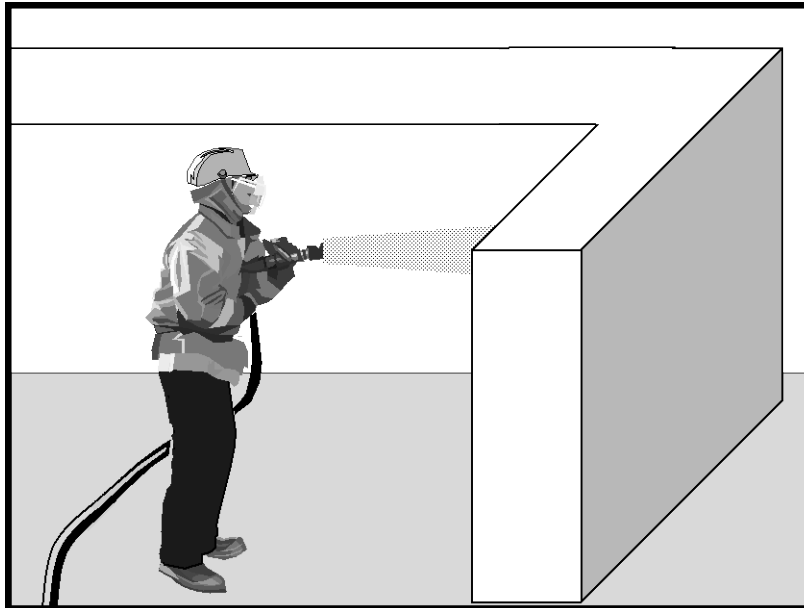
References

Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

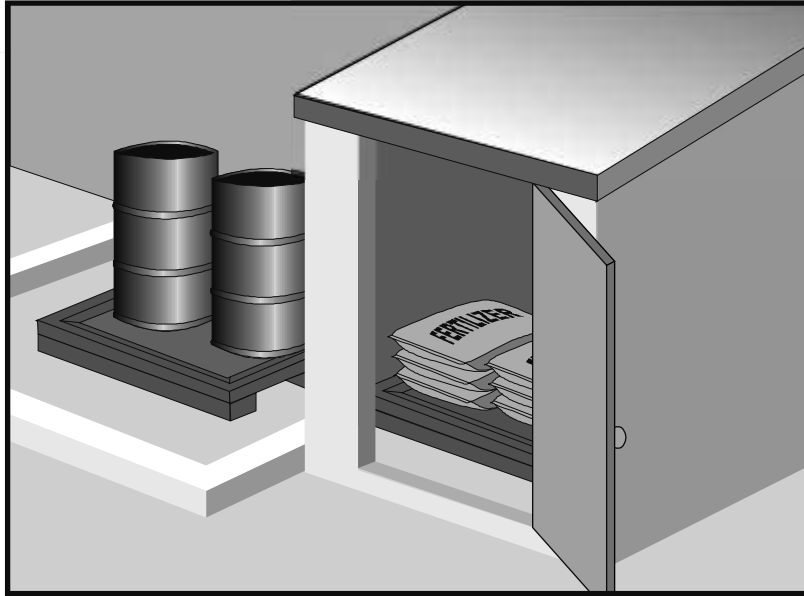
- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
 - Avoid transport near drainage paths or waterways.
 - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
 - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

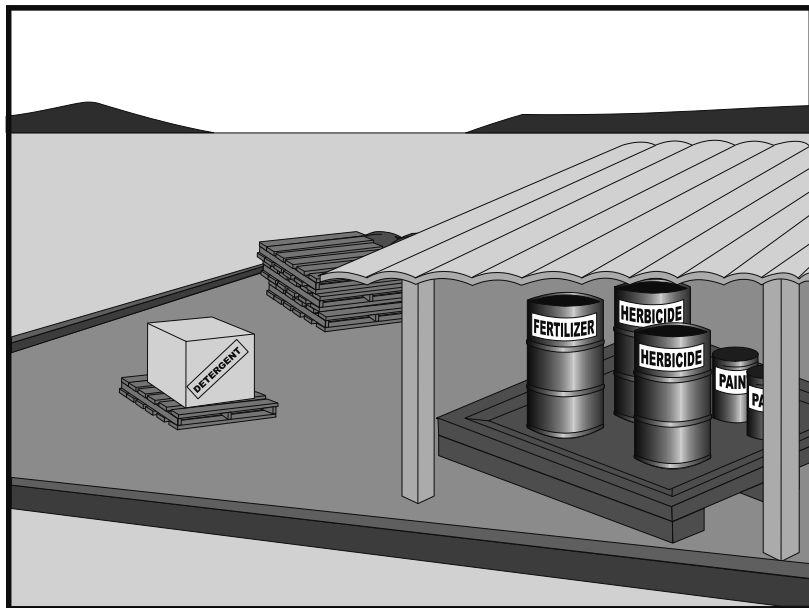
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
 - Do not treat soil that is water-saturated or frozen.
 - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
 - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
 - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
 - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
 - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
 - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
 - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

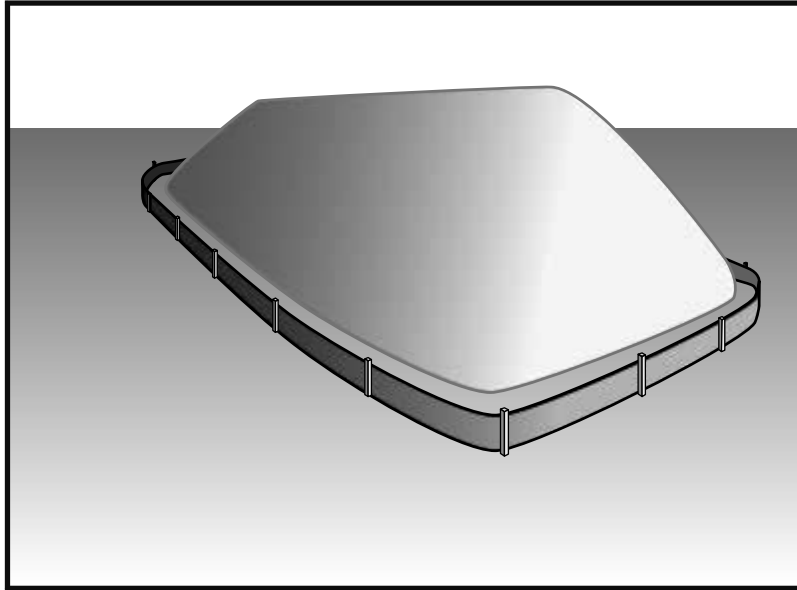
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP-2005-0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006. Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called “cold mix” asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater runoff using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of “cold mix”

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of “cold mix” and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

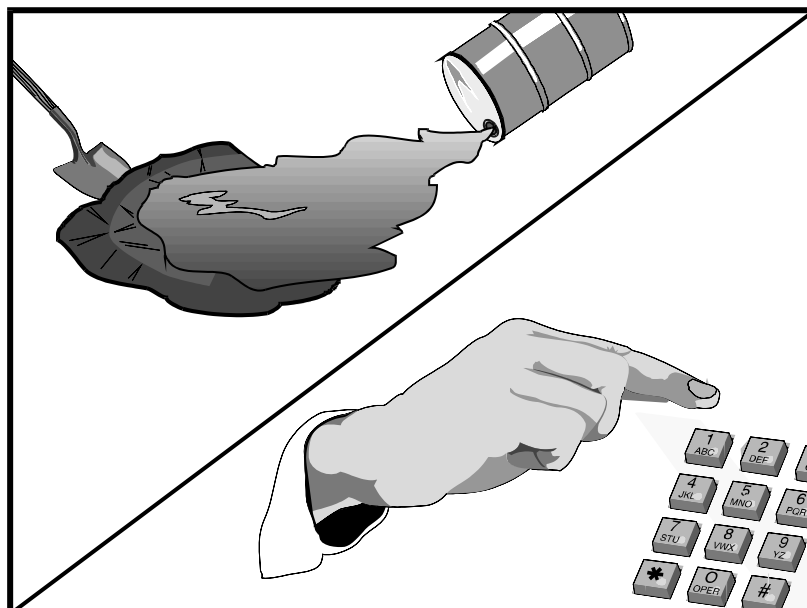
For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor’s superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn’t compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
 - Contain the spread of the spill.
 - Recover spilled materials.
 - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
 - Contain spread of the spill.
 - Notify the project foreman immediately.
 - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
 - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
 - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
 - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
 - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
 - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
 - Notification should first be made by telephone and followed up with a written report.
 - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
 - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

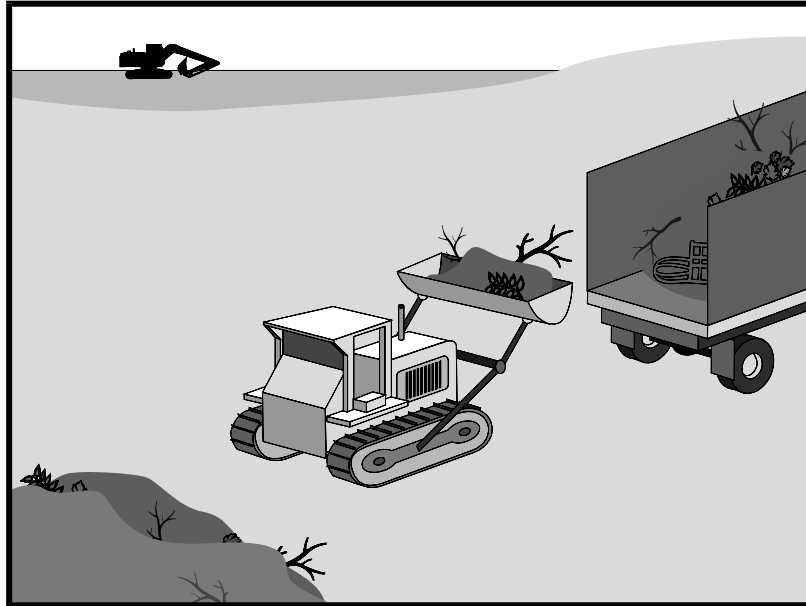
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runoff should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

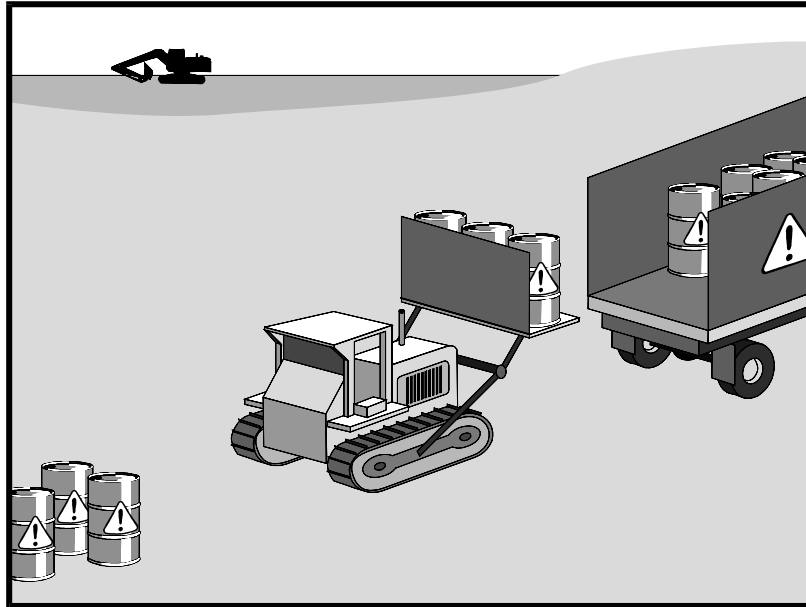
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Concrete Curing Compounds
- Palliatives
- Septic Wastes
- Stains
- Wood Preservatives
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302
- Asphalt Products
- Pesticides
- Acids
- Paints
- Solvents
- Roofing Tar



In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
 - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
 - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
 - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
 - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.
- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
 - Ensure that adequate hazardous waste storage volume is available.
 - Ensure that hazardous waste collection containers are conveniently located.
 - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
 - Minimize production or generation of hazardous materials and hazardous waste on the job site.
 - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
 - Segregate potentially hazardous waste from non-hazardous construction site debris.
 - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

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Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
 - Past site uses and activities
 - Detected or undetected spills and leaks
 - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
 - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
 - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
 - Cover the stockpile with plastic sheeting or tarps.
 - Install a berm around the stockpile to prevent runoff from leaving the area.
 - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
 - United States Department of Transportation (USDOT)
 - United States Environmental Protection Agency (USEPA)
 - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

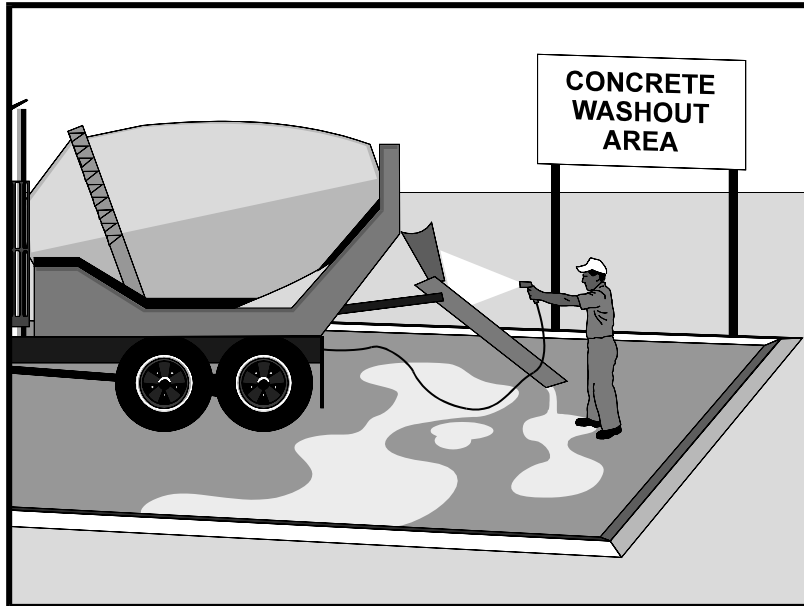
References

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Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- Mortar-mixing stations exist.
- Stucco mixing and spraying.
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
 - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
 - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
 - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
 - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
 - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
 - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
 - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
 - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
 - Lath and flagging should be commercial type.
 - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-Off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

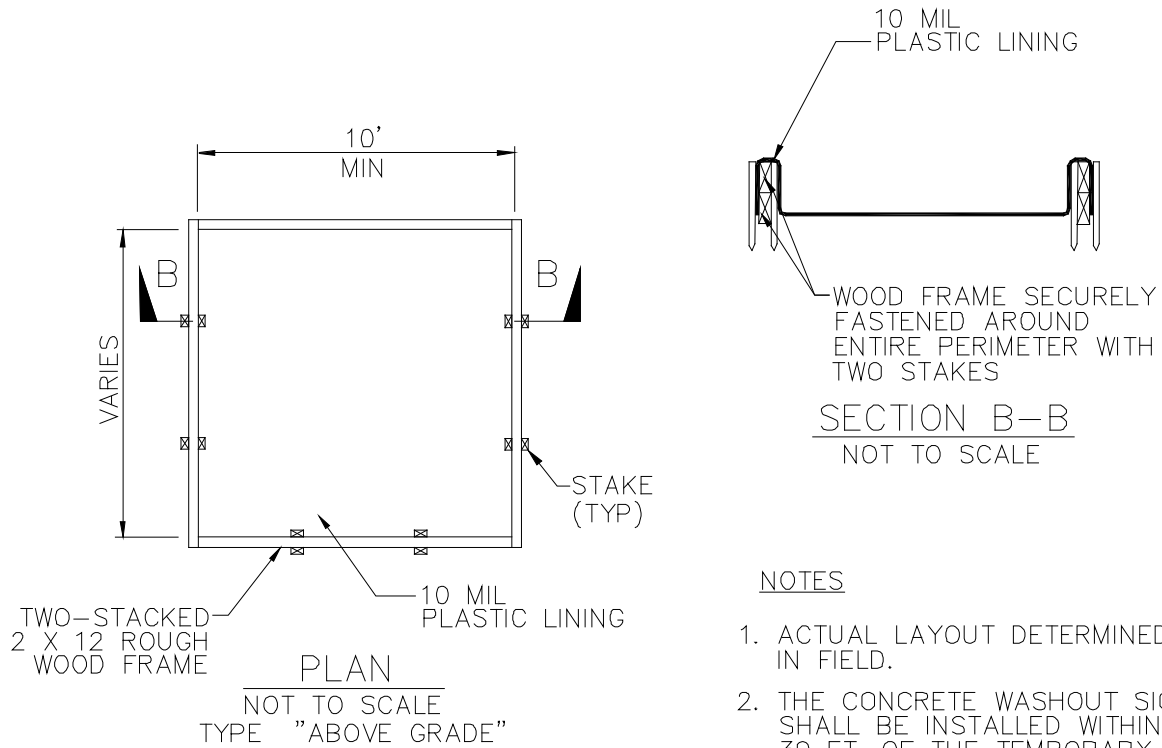
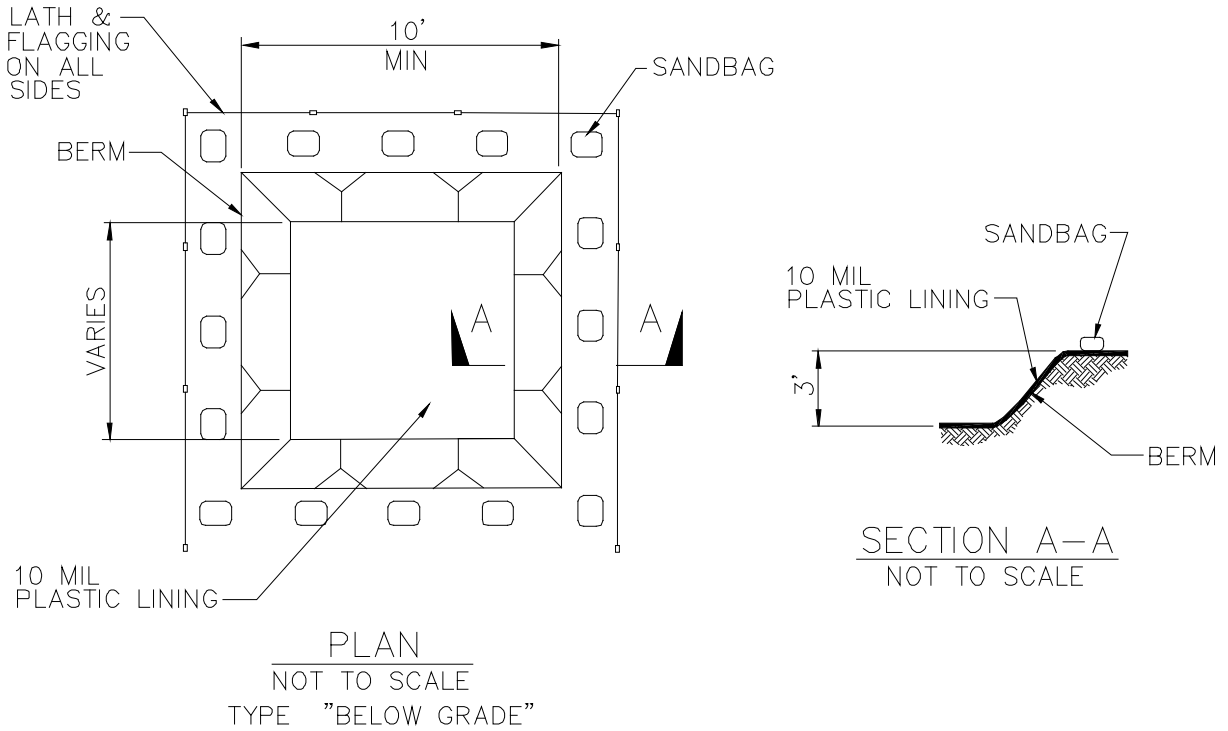
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

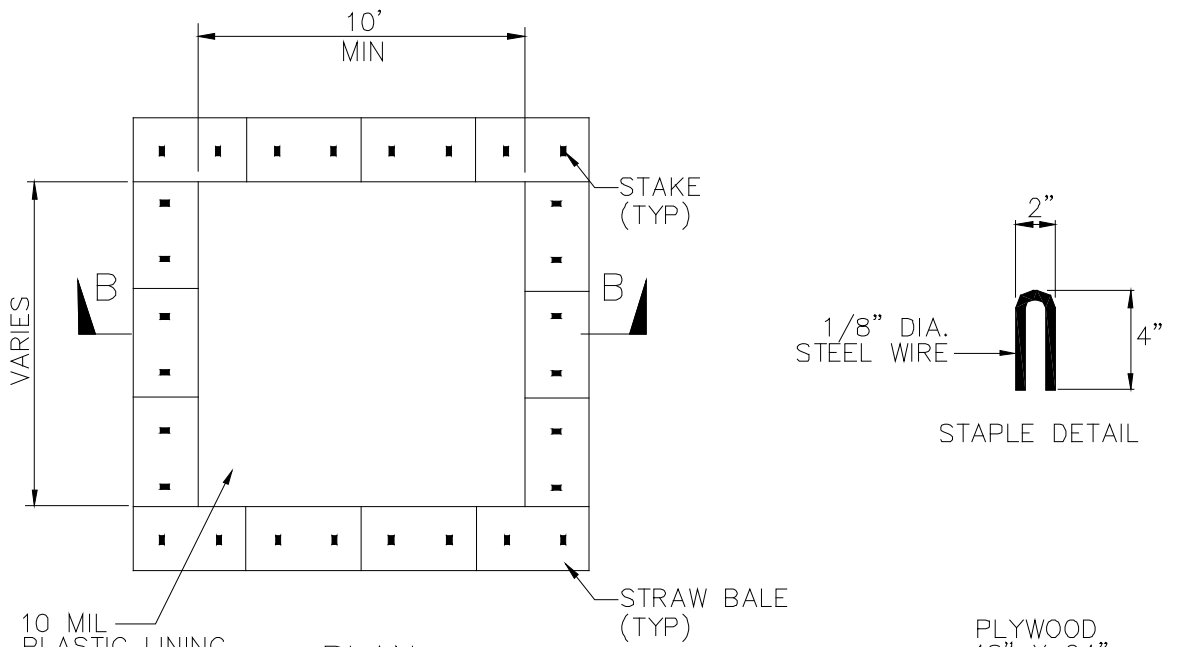
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

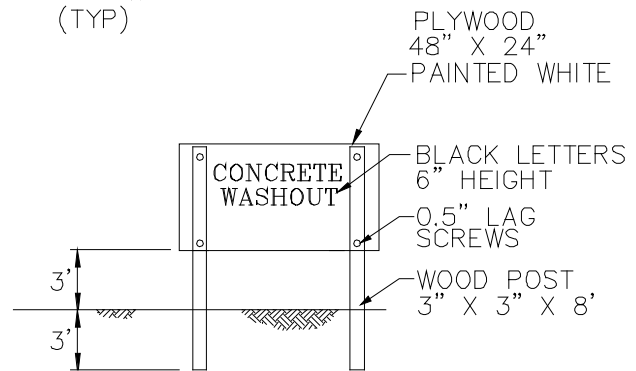


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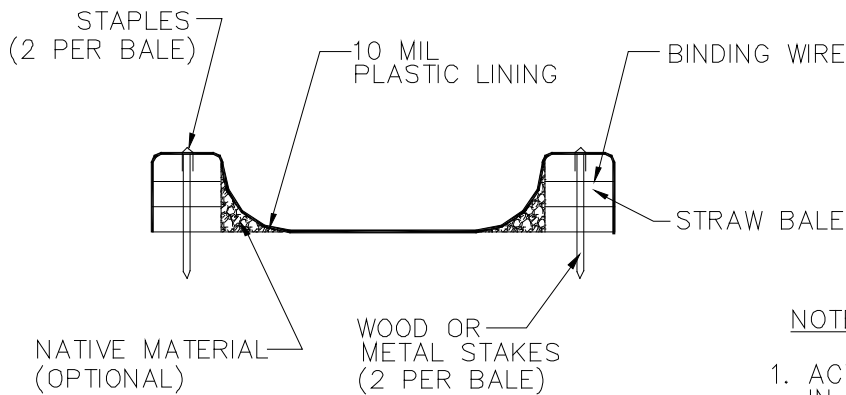
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



**CONCRETE WASHOUT
SIGN DETAIL**
(OR EQUIVALENT)

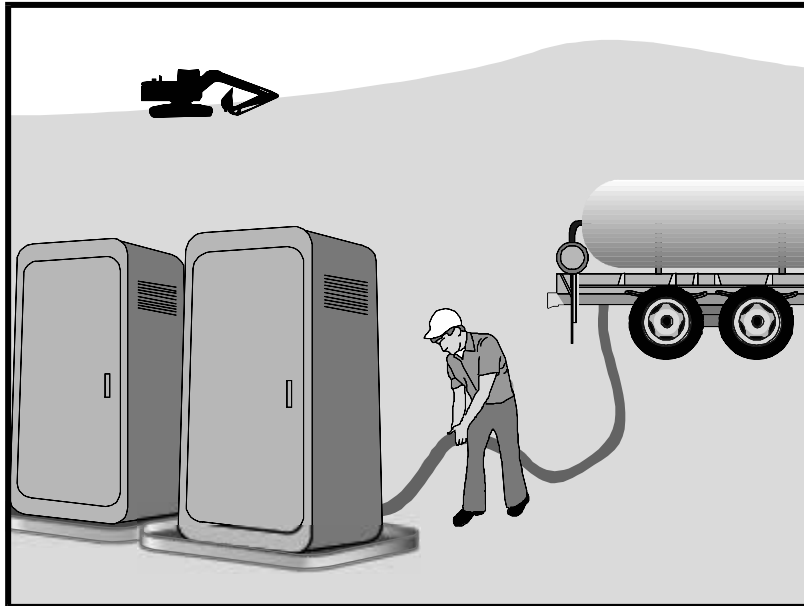


SECTION B-B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Sanitary/Septic Waste Management WM-9

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Sanitary/Septic Waste Management WM-9

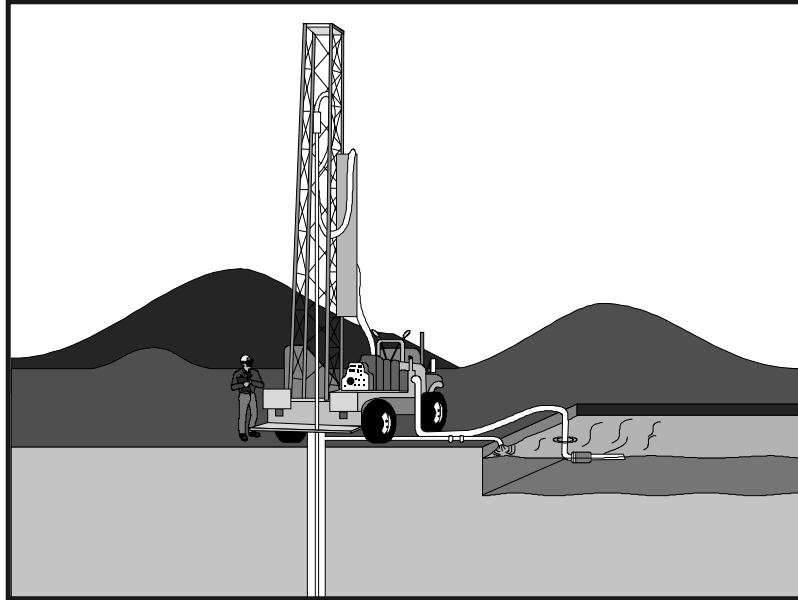
Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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concrete slurry residue (WM-8, Concrete Waste Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

Implementation

General Practices

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.
- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.
- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.
- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.
- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.
- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.
- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.
- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.
- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

Costs

Prevention costs for liquid waste management are minimal. Costs increase if cleanup or fines are involved.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

TRAINING DOCUMENTATION FORMS &
SAMPLE MEMORANDUM TO EMPLOYEES

DRAFT

Trained Contractor Personnel Log

Stormwater Management Training Log and Documentation

Project Name: _____

WDID #: _____

Stormwater Management Topic: (check as appropriate)

- | | |
|--|---|
| <input type="checkbox"/> Erosion Control | <input type="checkbox"/> Sediment Control |
| <input type="checkbox"/> Wind Erosion Control | <input type="checkbox"/> Tracking Control |
| <input type="checkbox"/> Non-Stormwater Management | <input type="checkbox"/> Waste Management and Materials Pollution Control |
| <input type="checkbox"/> Stormwater Sampling | |

Specific Training Objective: _____

Location: _____

Date: _____

Instructor: _____

Telephone: _____

Course Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

As needed, add proof of external training (e.g., course completion certificates, credentials for QSP, QSD).

Trained Contractor Personnel Log

Stormwater Management Training Log and Documentation

Project Name: _____

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Stormwater Management Topic: (check as appropriate)

- | | |
|--|---|
| <input type="checkbox"/> Erosion Control | <input type="checkbox"/> Sediment Control |
| <input type="checkbox"/> Wind Erosion Control | <input type="checkbox"/> Tracking Control |
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| <input type="checkbox"/> Stormwater Sampling | |

Specific Training Objective: _____

Location: _____

Date: _____

Instructor: _____

Telephone: _____

Course Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

As needed, add proof of external training (e.g., course completion certificates, credentials for QSP, QSD).

MEMORANDUM TO EMPLOYEES

(May be periodically attached to paychecks)

TO ALL EMPLOYEES:

[Client Name] supports the protection of our environment and has developed a program for this project to reduce pollutants from entering the local waterways.

You will be expected to abide by all requirements of the program and do your part to comply with the program while you are working on this project by:

- Disposing of trash, rubbish, and construction debris properly.
- Reporting, to the General Contractor, leaky vehicles or equipment or other pollution sources that may be present.
- Covering material, which may be exposed to the rain.
- Encouraging your co-workers to do the same.

Remember, we all benefit from the recreation that is provided by these waters that we are protecting.

A copy of the storm water pollution plan developed for this site is available for your review at the construction office.

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD) AND QUALIFIED SWPPP PRACTITIONER (QSP)

Lynn V. Kubasek

Apr 20, 2015 - May 10, 2017

Certificate # 00573



California Stormwater Quality Association and
California Construction General Permit Training Team

DRAFT

RESPONSIBLE PARTIES

Project Owner:

Meritage Commons LLC
2532 Dupont Drive
Irvine, CA 92612
949.861.4700

Kory Kramer, Chief Investment Officer
kkramer@pacifichospitality.com

Authorized Signatory:

TynanGroup, Inc.
1230 W. Washington Street, Suite 210
Tempe, AZ 85281
602.522.2655

Brian Nystuen, Senior Vice President
bnystuen@tynangroup.com

General Contractor:

Pending – to be provided prior to start of construction

Company Name:

Address:

City, State, Zip:

Telephone:

Name, Title:

Email:

Qualified SWPPP Practitioner (QSP):

Pending – to be provided prior to start of construction

Company Name:

Address:

City, State, Zip:

Telephone:

Name, Title:

Email:

City of Napa

Engineering Division
1195 Third Street
Napa, CA 94559
707.259.8371

DRAFT

SAMPLE SUBCONTRACTOR NOTIFICATION LETTER
AND LOG

DRAFT

Sample Subcontractor Notification Letter

[Date]

[Subcontractor/Supplier's Name]
[Company]
[Address]
[City, State]

Dear [Subcontractor/Supplier's Name]

Please be advised that this contract is subject to the requirements and conditions of the National Pollutant Discharge Elimination System (NPDES) General Construction Permit.

In short, the purpose of this system is to eliminate pollutants from entering into the storm drain systems which eventually lead into our lakes, streams and oceans. Common pollutants include oil, grease, trash, sediment, asphaltic emulsions, concrete wastes, fertilizers, and pesticides.

[Fusco Engineering, Inc. (example)] has developed a Storm Water Pollution Prevention Plan (SWPPP) in accordance with state requirements.

You, as a Subcontractor/supplier are required to comply with the SWPPP and the NPDES General and Regional Permits (if any) for all work performed on this site.

Any person or group who violates any condition of the general permit may be subject to substantial penalties in accordance with Section 309 of the Clean Water Act and the Porter-Cologne Water Quality Control Act. You are encouraged to advise each of your employees working on this project of requirements and guidelines of the SWPPP. Periodic memorandums attached to paychecks are often effective means to remind employees of their responsibilities (see Appendix 13).

In the event that any violation of the above referenced permit conditions is committed by a representative of [Subcontractor/Supplier], the liability for any associated penalties levied against [Client Name] becomes the responsibility of the [Subcontractor/Supplier].

A copy of the General Construction Activity Storm Water Permit, and the SWPPP developed for this site is available for your review at the construction office.

Please call if you have any questions.

Sincerely,

[Name of Sender]

I hereby acknowledge receipt of this document, and agree with the terms and conditions represented herein.

[Subcontractor/Supplier]

SUBCONTRACTOR NOTIFICATION LOG

Project Name: _____

WDID: _____

SUBCONTRACTOR COMPANY NAME	CONTACT NAME	ADDRESS	PHONE NUMBER	PAGER/ FIELD PHONE	DATE NOTIFICATION LETTER SENT	TYPE OF WORK

SUBCONTRACTOR COMPANY NAME	CONTACT NAME	ADDRESS	PHONE NUMBER	PAGER/ FIELD PHONE	DATE NOTIFICATION LETTER SENT	TYPE OF WORK

USE ADDITIONAL PAGES AS NECESSARY

DRAFT

SIGNIFICANT SPILL REPORT

WDID: _____

Date of Occurrence: _____

Discovered by: _____

Location: _____

Material Type: _____

Volume
Spilled: _____

Cause of Spill: _____

Corrective
Action Taken: _____

Agencies
Contacted: _____

Signed: _____

Printed Name: _____

Title: _____

SIGNIFICANT SPILL REPORT

WDID: _____

Date of Occurrence: _____

Discovered by: _____

Location: _____

Material Type: _____

Volume
Spilled: _____

Cause of Spill: _____

Corrective
Action Taken: _____

Agencies
Contacted: _____

Signed: _____

Printed Name: _____

Title: _____

DRAFT

QUICK REFERENCE — DISPOSAL ALTERNATIVES

(Adopted from Santa Clara County Nonpoint Source Solution Control Program — December 1992)

All of the waste products on this chart are prohibited from discharge to the storm drain system. Use this matrix to decide which alternative disposal strategies to use. **ALTERNATIVES ARE LISTED IN PRIORITY ORDER.**

- Key: HHW Household hazardous waste (Government-sponsored drop-off events)
 POTW Publicly Owned Treatment Plant
 Reg.Bd. Regional Water Quality Control Board (Oakland)

“Dispose to sanitary sewer” means dispose into sink, toilet, or sanitary sewer clean-out connection.

“Dispose as trash” means dispose in dumpsters or trash containers for pickup and/or eventual disposal in landfill.

“Dispose as hazardous waste” for business/commercial means contract with a hazardous waste hauler to remove and dispose.

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Paint; Street and Utility Maintenance			
Excess paint (oil-based)	1. Recycle/reuse 2. Dispose as hazardous waste		1. Recycle/reuse 2. Take to HHW drop-off
Excess paint (water-based)	1. Recycle/reuse 2. Dry residue in cans, dispose as trash 3. If volume is too much to dry, dispose as hazardous waste		1. Recycle/reuse 2. Dry residue in cans, dispose as trash 3. If volume is too much to dry, take to HHW drop-off
Paint cleanup (oil-based)	Wipe paint out of brushes, then: 1. Filter & reuse thinners, solvents 2. Dispose as hazardous waste		Wipe paint out of brushes, then: 1. Filter & reuse thinners, solvents 2. Take to HHW drop-off
Paint cleanup (water-based)	Wipe paint out of brushes, then: 1. Rinse to sanitary sewer		Wipe paint out of brushes, then: 1. Rinse to sanitary sewer
Empty paint cans (dry)	1. Remove lids, dispose as trash		1. Remove lids, dispose as trash
Paint stripping (with solvent)	1. Dispose as hazardous waste		1. Take to HHW drop-off
Building exterior cleaning (high-pressure water)	1. Prevent entry into storm drain and remove offsite 2. Wash onto dirt area, spade in 3. Collect (e.g., mop up) and discharge to sanitary sewer	POTW	
Cleaning of building exteriors which have HAZARDOUS MATERIALS (e.g., mercury, lead) in paints	1. Use dry cleaning methods 2. Contain and dispose washwater as hazardous waste (Suggestion: dry material first to reduce volume)		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Paint; Street and Utility Maintenance (cont'd)			
Non-hazardous paint scraping/sand blasting	1. Dry sweep, dispose as trash		1. Dry sweep, dispose as trash
HAZARDOUS paint scraping/sand blasting (e.g., marine paints or paints containing lead or tributyl tin)	1. Dry sweep, dispose as hazardous waste		1. Dry sweep, take to HHW drop-off
Soil from excavations during periods when storms are forecast	1. Should not be placed in street or on paved areas 2. Remove from site or backfill by end of day 3. Cover with tarpaulin or surround with hay bales, or use other runoff controls (e.g., sandbags) 4. Place filter mat over storm drain Note: Thoroughly sweep following removal of dirt in all four alternatives		
Soil from excavations placed on paved surfaces during period when storms are not forecast	1. Keep material out of storm conveyance systems and thoroughly remove via sweeping following removal of dirt 2. Surround with sandbags		
Cleaning streets in construction areas	1. Dry sweep and minimize tracking of mud 2. Use silt ponds and/or similar pollutant reduction techniques when flushing pavement		
Soil erosion, sediments	1. Cover disturbed soils, use erosion controls and block entry to storm drain 2. Seed or plant immediately		
Fresh cement, grout, and mortar	1. Use/reuse excess 2. Dispose to trash		1. Use/reuse excess 2. Dispose to trash
Washwater from concrete/mortar (etc.) cleanup	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer	POTW	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer
Aggregate wash from driveway/patio construction	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer	POTW	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Paint; Street and Utility Maintenance (cont'd)			
Rinsewater from concrete mixing trucks	<ol style="list-style-type: none"> 1. Return truck to yard for rinsing into pond or dirt area 2. At construction site, wash into settling pond or dirt area lined with plastic and bermed, or surrounded with sandbags 		
Non-hazardous construction and demolition debris	<ol style="list-style-type: none"> 1. Recycle/reuse (concrete, wood, etc.) 2. Dispose as trash 		<ol style="list-style-type: none"> 1. Recycle/reuse (concrete, wood, etc.) 2. Dispose as trash
Hazardous demolition and construction debris (e.g., asbestos)	<ol style="list-style-type: none"> 1. Dispose as hazardous waste 		<ol style="list-style-type: none"> 1. Do not attempt to remove yourself. Contact asbestos removal service for safe removal and disposal 2. Very small amounts (less than 5 lbs.) may be double-wrapped in plastic and take to HHW drop-off
Saw-cut slurry	<ol style="list-style-type: none"> 1. Use dry cutting technique and sweep up residue 2. Vacuum slurry and dispose off-site 3. Block storm drain or berm with low weir as necessary to allow most solids to settle. Shovel out gutters; dispose residue to dirt area, construction yard or landfill 		
Construction dewatering (Nonturbid, uncontaminated groundwater)	<ol style="list-style-type: none"> 1. Recycle/Reuse 2. Discharge to storm drain 		
Construction dewatering (other than nonturbid, uncontaminated groundwater)	<ol style="list-style-type: none"> 1. Recycle/Reuse 2. Discharge to sanitary sewer 3. As appropriate, treat prior to discharge to storm drain 	POTW Reg. Bd.	
Portable toilet waste	<ol style="list-style-type: none"> 1. Leasing company shall dispose to sanitary sewer at POTW 	POTW	
Leaks from garbage dumpsters	<ol style="list-style-type: none"> 1. Collect, contain leaking material. Eliminate leak, keep covered, return to leasing company for immediate repair 2. If dumpster is used for liquid waste, use plastic liner 		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Paint; Street and Utility Maintenance (cont'd)			
Leaks from construction debris bins	1. Ensure that bins are used for dry nonhazardous materials only (Suggestion: Fencing, covering helps prevent misuse)		
Dumpster cleaning water	1. Clean at dumpster owner's facility and discharge waste through grease interceptor to sanitary sewer 2. Clean on-site and discharge through grease interceptor to sanitary sewer	POTW POTW	
Cleaning driveways, paved areas * (Special Focus = Restaurant alleys, Grocery dumpster areas) * Note: Local drought ordinances may contain additional restrictions	1. Sweep and dispose as trash (Dry cleaning only) 2. For vehicle leaks, restaurant/grocery alleys, follow this 3-step process: a. Clean up leaks with rags or absorbents b. Sweep, using granular absorbent material (cat litter) c. Mop and dispose of mopwater to sanitary sewer (or collect rinse-water and pump to the sanitary sewer) 3. Same as 2 above, but with rinsewater (2c) (no soap) discharged to storm drain		1. Sweep and dispose as trash (Dry cleaning only) 2. For vehicle leaks, restaurant/grocery alleys, follow this 3-step process: a. Clean up leaks with rags or absorbents; dispose as hazardous waste b. Sweep, using granular absorbent material (cat litter) c. Mop and dispose of mopwater to sanitary sewer
Steam cleaning of sidewalks, plazas * * Note: Local drought ordinances may contain additional restrictions	1. Collect all water and pump to sanitary sewer 2. Follow this 3-step process: a. Clean oil leaks with rags or absorbents b. Sweep (Use dry absorbent as needed) c. Use no soap, discharge to storm drain		
Potable water/line flushing Hydrant testing	1. Deactivate chlorine by maximizing time water will travel before reaching creeks		
Super-chlorinated (above 1 ppm) water from line flushing	1. Discharge to sanitary sewer 2. Complete dechlorination required before discharge to storm drain		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
Landscape/Garden Maintenance			
Pesticides	<ol style="list-style-type: none"> 1. Use up. Rinse containers. Use rinsewater as product. Dispose rinsed containers as trash 2. Dispose unused pesticide as hazardous waste 		<ol style="list-style-type: none"> 1. Use up. Rinse containers. Use rinsewater as pesticide. Dispose rinsed containers as trash 2. Take unused pesticide to HHW drop-off
Garden clippings	<ol style="list-style-type: none"> 1. Compost 2. Take to Landfill 		<ol style="list-style-type: none"> 1. Compost 2. Dispose as trash
Tree trimming	<ol style="list-style-type: none"> 1. Chip if necessary, before composting as recycling 		<ol style="list-style-type: none"> 1. Chip if necessary, before composting as recycling
Swimming pool, spa, fountain water (emptying)	<ol style="list-style-type: none"> 1. Do not use metal-based algicides (i.e., Copper Sulfate) 2. Recycle/reuse (e.g., irrigation) 3. Determine chlorine residue = 0, wait 24 hours and then discharge to storm drain 	POTW	<ol style="list-style-type: none"> 1. Do not use metal-based algicides (i.e., Copper Sulfate) 2. Recycle/reuse (e.g., irrigation) 3. Determine chlorine residue = 0, wait 24 hours and then discharge to storm drain
Acid or other pool/spa/fountain cleaning	<ol style="list-style-type: none"> 1. Neutralize and discharge to sanitary sewer 	POTW	
Swimming pool, spa filter backwash	<ol style="list-style-type: none"> 1. Reuse for irrigation 2. Dispose on dirt area 3. Settle, dispose to sanitary sewer 		<ol style="list-style-type: none"> 1. Use for landscape irrigation 2. Dispose on dirt area 3. Settle, dispose to sanitary sewer
Vehicle Wastes			
Used motor oil	<ol style="list-style-type: none"> 1. Use secondary containment while storing, send to recycler 		<ol style="list-style-type: none"> 1. Put out for curbside recycling pickup where available 2. Take to Recycling Facility or auto service facility with recycling program 3. Take to HHW events accepting motor oil
Antifreeze	<ol style="list-style-type: none"> 1. Use secondary containment while storing, send to recycler 		<ol style="list-style-type: none"> 1. Take to Recycling Facility
Other vehicle fluids and solvents	<ol style="list-style-type: none"> 1. Dispose as hazardous waste 		<ol style="list-style-type: none"> 1. Take to HHW event
Automobile batteries	<ol style="list-style-type: none"> 1. Send to auto battery recycler 2. Take to Recycling Center 		<ol style="list-style-type: none"> 1. Exchange at retail outlet 2. Take to Recycling Facility or HHW event where batteries are accepted
Motor home/construction trailer waste	<ol style="list-style-type: none"> 1. Use holding tank. Dispose to sanitary sewer 		<ol style="list-style-type: none"> 1. Use holding tank, dispose to sanitary sewer

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
Vehicle Wastes (cont'd)			
Vehicle Washing	<ol style="list-style-type: none"> 1. Recycle 2. Discharge to sanitary sewer, never to storm drain 	POTW	<ol style="list-style-type: none"> 1. Take to Commercial Car Wash 2. Wash over lawn or dirt area 3. If soap is used, use a bucket for soapy water and discharge remaining soapy water to sanitary sewer
Mobile Vehicle Washing	<ol style="list-style-type: none"> 1. Collect washwater and discharge to sanitary sewer 	POTW	
Vehicle leaks	<p>Follow this 3-step process:</p> <ol style="list-style-type: none"> 1. Clean up leaks with rags or absorbents 2. Sweep, using granular absorbent material (cat litter) 3. Mop and dispose of mopwater to sanitary sewer 		
Other Wastes			
Carpet cleaning solutions & other mobile washing services	<ol style="list-style-type: none"> 1. Dispose to sanitary sewer 	POTW	<ol style="list-style-type: none"> 1. Dispose to sanitary sewer
Roof drains	<ol style="list-style-type: none"> 1. If roof is contaminated with industrial waste products, discharge to sanitary sewer 2. If no contamination is present, discharge to storm drain 		
Cooling water Air conditioning condensate	<ol style="list-style-type: none"> 1. Recycle/reuse 2. Discharge to sanitary sewer 	POTW	
Pumped groundwater, infiltration/ foundation drainage (contaminated)	<ol style="list-style-type: none"> 1. Recycle/reuse (landscaping, etc.) 2. Treat if necessary; discharge to sanitary sewer 3. Treat and discharge to storm drain 	Reg. Bd. POTW Reg. Bd.	
Fire fighting flows	If contamination is present, Fire Dept. will attempt to prevent flow to stream or storm drain		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	RESIDENTIAL Disposal Priorities
Other Wastes (cont'd)		
Kitchen Grease	<ol style="list-style-type: none"> 1. Provide secondary containment, collect, and/or send to recycler. 2. Provide secondary containment, collect, and/or send to POTW via hauler 	POTW <ol style="list-style-type: none"> 1. Collect, solidify, dispose as trash
Restaurant cleaning of floor mats, exhaust filters, etc.	<ol style="list-style-type: none"> 1. Clean inside building with discharge through grease trap to sanitary sewer 2. Clean outside in container or bermed area with discharge to sanitary sewer 	
Clean-up wastewater from sewer back-up	<ol style="list-style-type: none"> 1. Follow this procedure: <ol style="list-style-type: none"> a. Block storm drain, contain, collect, and return spilled material to the sanitary sewer b. Block storm drain, rinse remaining material to collection point, and pump to sanitary sewer (no rinse-water may flow to storm drain) 	

VISUAL INSPECTION FORMS, REPORTS &
RAIN GAUGE LOGS

DRAFT

VISUAL MONITORING / INSPECTIONS

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

The attached forms may be utilized for documenting visual monitoring & inspections performed on the project site. The General Permit includes the following requirements for visual monitoring:

Visual Monitoring (all Risk Levels)

- Visual monitoring for non-storm water discharges (quarterly)
 - January-March
 - April-June
 - July-September
 - October-December
- Baseline pre-rain event inspection (within 48 hours of qualifying rain events)
- BMP inspections (weekly and every 24 hours during extended storm events)
- Post-rain event inspection (within 2 business days after qualifying rain events)

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

The General Permit requires that the construction site be inspected within **two days prior** to a predicted qualifying rain event, once **every 24-hours** during extended storm events, and within **two days after** a qualifying rain event. These inspections are only required during normal business hours of the construction site. The General Permit requires that only weather forecasts from the National Oceanographic and Atmospheric Administration (NOAA) are used. Pre-project inspections should be initiated after consulting NOAA for a qualifying rain event with 50% or greater probability of precipitation (PoP). These forecasts can be obtained at <http://www.weather.gov/>.

Records must be kept of all qualifying rain event inspections, included in Appendix P. Records need to be maintained on site and document:

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

If deficiencies are identified during BMP inspections, repairs or design changes to BMPs must be initiated within 72 hours of identification and need to be completed as soon as possible. All BMP inspections must be documented on an inspection checklist (see attached forms). The checklist should be made site specific based on the BMPs and outfalls for each construction project, and copies of the completed inspection forms, any corrective actions and any photographs taken shall be included in this SWPPP (Appendix P).

Results of all visual monitoring & inspections are included as part of the **Annual Report** (see Section 7.9.3 and Appendix F).

If the site is Risk Level 2 or 3 and there are non-storm water discharges, then samples must be collected and analyzed per Section 7.6.

Refer to Section 7.5 of the SWPPP for further information regarding visual monitoring requirements.

WEEKLY INSPECTION

BMP INSPECTION REPORT

Date and Time of Inspection:		Date Report Written:		
Inspection Type: (Circle one)	<i>Weekly Complete Parts I, II, III and VII</i>	<i>Pre-Storm Complete Parts I, II, III, IV and VII</i>	<i>During Rain Event Complete Parts I, II, III, V, and VII</i>	<i>Post-Storm Complete Parts I, II, III, VI and VII</i>
Part I. General Information				
Site Information				
Construction Site Name:			WDID#:	
Construction stage and completed activities:			Approximate area of site that is exposed:	
Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:	
Weather				
Estimate storm beginning: (date and time)		Estimate storm duration: (hours)		
Estimate time since last storm: (days or hours)		Rain gauge reading and location: (in)		
Is a "Qualifying Event" predicted or did one occur (i.e., 0.5" rain with 48-hrs or greater between events)? (Y/N) If yes, summarize forecast:				
Exemption Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.				
Inspector Information				
Inspector Name:			Inspector Title:	
Signature:			Date:	

WEEKLY INSPECTION

Part II. BMP Observations. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level _____ Sites	Failures or other short comings (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

WEEKLY INSPECTION

Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level _____ Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Linear sediment control along toe of slope, face of slope an at grade breaks (Risk Level 2 & 3 Only)			
Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 & 3 Only)			

WEEKLY INSPECTION

Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities the reduce their effectiveness (Risk Level 2 & 3 Only)			
Inspect all immediate access roads daily (Risk Level 2 & 3 Only)			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available on-site and being properly implemented?			

Part III. Descriptions of BMP Deficiencies		
Deficiency	Repairs Implemented: Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.	
	Start Date	Action
1.		
2.		
3.		
4.		

Part IV. Additional Pre-Storm Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).	
	Yes, No, N/A
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	

WEEKLY INSPECTION

Notes:

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Part V. Additional During Storm Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.

Outfall, Discharge Point, or Other Downstream Location	
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description

WEEKLY INSPECTION

Part VI. Additional Post-Storm Observations. Visually observe (inspect) stormwater discharges at all discharge locations within two business days (48 hours) after each qualifying rain event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.	
Discharge Location, Storage or Containment Area	Visual Observation

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.	
Required Actions	Implementation Date

**Risk Level 1, 2, 3
Visual Inspection Field Log Sheet**

Date and Time of Inspection:	Report Date:
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Inspection Type:	<input type="checkbox"/> Weekly	<input type="checkbox"/> Before predicted rain	<input type="checkbox"/> During rain event	<input type="checkbox"/> Following qualifying rain event	<input type="checkbox"/> Contained stormwater release	<input type="checkbox"/> Quarterly non-stormwater
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Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____ (date and time)	Estimate storm duration: _____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location

Odors	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Floating material	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Suspended Material	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sheen	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Discolorations	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Turbidity	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Site Inspections

Outfalls or BMPs Evaluated	Deficiencies Noted
(add additional sheets or attached detailed BMP Inspection Checklists)	
Photos Taken: Yes <input type="checkbox"/> No <input type="checkbox"/>	Photo Reference IDs:

Corrective Actions Identified (note if SWPPP/REAP change is needed)

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Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

**Risk Level 1, 2, 3
Visual Inspection Field Log Sheet**

Date and Time of Inspection:	Report Date:
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Inspection Type:	<input type="checkbox"/> Weekly	<input type="checkbox"/> Before predicted rain	<input type="checkbox"/> During rain event	<input type="checkbox"/> Following qualifying rain event	<input type="checkbox"/> Contained stormwater release	<input type="checkbox"/> Quarterly non-stormwater
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Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____	Estimate storm duration: _____	Estimate time since last storm: _____	Rain gauge reading: _____
(date and time)	(hours)	(days or hours)	(inches)

Observations: If yes identify location

Odors	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Floating material	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Suspended Material	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sheen	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Discolorations	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Turbidity	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Site Inspections

Outfalls or BMPs Evaluated	Deficiencies Noted
(add additional sheets or attached detailed BMP Inspection Checklists)	
Photos Taken:	Yes <input type="checkbox"/> No <input type="checkbox"/> Photo Reference IDs:

Corrective Actions Identified (note if SWPPP/REAP change is needed)

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Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

RAIN EVENT INSPECTION

Visual Inspection Field Log Sheet Risk Level 1, 2, 3						
Date and Time of Inspection:				Report Date:		
Inspection Type:	<input type="checkbox"/> Weekly	<input type="checkbox"/> Before Predicted Rain	<input type="checkbox"/> During Rain Event	<input type="checkbox"/> Following Qualifying Rain Event	<input type="checkbox"/> Contained Stormwater Release	<input type="checkbox"/> Quarterly Non-Stormwater
Site Information						
Construction Site Name:				WDID#:		
Construction stage and completed activities:				Approximate area of exposed site:		
Weather and Observations						
Date Rain Predicted to Occur:				Predicted % chance of rain:		
Estimate storm beginning: <hr style="width: 100%; border: none; border-top: 1px solid black; margin-top: 5px;"/> (date and time)	Estimate storm duration: _____ (hours)		Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)		
Observations: If yes identify location						
Odors	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Floating material	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Suspended Material	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Sheen	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Discolorations	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Turbidity	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Site Inspections						
Outfalls or BMPs Evaluated			Deficiencies Noted			
(add additional sheets or attached detailed BMP Inspection Checklists)						
Photos Taken:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Photo Reference IDs:			
Corrective Actions Identified (note if SWPPP/REAP change is needed)						
Inspector Information						
Inspector Name:				Inspector Title:		
Signature:					Date:	

RAIN EVENT INSPECTION

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

RAIN EVENT INSPECTION

BMP INSPECTION REPORT

Date and Time of Inspection:		Date Report Written:		
Inspection Type: (Circle one)	<i>Weekly Complete Parts I, II, III and VII</i>	<i>Pre-Storm Complete Parts I, II, III, IV and VII</i>	<i>During Rain Event Complete Parts I, II, III, V, and VII</i>	<i>Post-Storm Complete Parts I, II, III, VI and VII</i>
Part I. General Information				
Site Information				
Construction Site Name:			WDID#:	
Construction stage and completed activities:			Approximate area of site that is exposed:	
Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:	
Weather				
Estimate storm beginning: (date and time)		Estimate storm duration: (hours)		
Estimate time since last storm: (days or hours)		Rain gauge reading and location: (in)		
Is a "Qualifying Event" predicted or did one occur (i.e., 0.5" rain with 48-hrs or greater between events)? (Y/N) If yes, summarize forecast:				
Exemption Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.				
Inspector Information				
Inspector Name:			Inspector Title:	
Signature:			Date:	

RAIN EVENT INSPECTION

Part II. BMP Observations. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level _____ Sites	Failures or other short comings (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

RAIN EVENT INSPECTION

Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level _____ Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Linear sediment control along toe of slope, face of slope an at grade breaks (Risk Level 2 & 3 Only)			
Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 & 3 Only)			

RAIN EVENT INSPECTION

Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities the reduce their effectiveness (Risk Level 2 & 3 Only)			
Inspect all immediate access roads daily (Risk Level 2 & 3 Only)			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available on-site and being properly implemented?			

Part III. Descriptions of BMP Deficiencies		
Deficiency	Repairs Implemented: Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.	
	Start Date	Action
1.		
2.		
3.		
4.		

Part IV. Additional Pre-Storm Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).	
	Yes, No, N/A
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	

RAIN EVENT INSPECTION

Notes:

Part V. Additional During Storm Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.	
Outfall, Discharge Point, or Other Downstream Location	
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description

RAIN EVENT INSPECTION

Part VI. Additional Post-Storm Observations. Visually observe (inspect) stormwater discharges at all discharge locations within two business days (48 hours) after each qualifying rain event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.	
Discharge Location, Storage or Containment Area	Visual Observation

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.	
Required Actions	Implementation Date

DRAFT

RAIN EVENT ACTION PLANS (REAPs)

REAPs are to be completed by the QSP when there is a forecast of a likely precipitation event in the project area according to the National Oceanic and Atmospheric Administration (NOAA) forecast website (<http://www.weather.gov/>).

A “likely precipitation event” is any weather pattern that is forecast to have a **50% or greater chance of precipitation** in the project area. Forecasts are normally issued for 12-hour time periods. It is recommended that the NOAA forecast be printed and saved where REAPs are required for documentation of the forecast. Copies may be saved in Appendix Q.

REAPs are also required for project sites where construction activities are indefinitely halted or postponed.

REAP templates are included in Appendix Q. Copies of completed REAPs shall be documented in the SWPPP (Appendix Q) and submitted through SMARTS with the Annual Report (Appendix F).

Note: REAPs are to be prepared and implemented in addition to the pre-storm event visual inspection requirements, described further in Section 7.5.

REAPs are not required for Risk Level 1 dischargers.

Rain Event Action Plan (REAP)

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

Site Information:

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

Site Stormwater Manager Information:

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

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

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

Stormwater Sampling Agent:

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

Current Phase of Construction

Check ALL the boxes below that apply to your site.

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

Activities Associated with Current Phase(s)

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

Grading and Land Development:

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

Streets and Utilities:

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

Vertical Construction:

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

Final Landscaping & Site Stabilization:

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

Inactive Construction Site:

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

Rain Event Action Plan (REAP)

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

Trades Active on Site during Current Phase(s)

Check ALL the boxes below that apply to your site

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

Trade Contractor Information Provided

Check ALL the boxes below that apply to your site.

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

Continued on next page.

Rain Event Action Plan (REAP)

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

Predicted Rain Event Triggered Actions

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

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

Continued on next page.

Other / Discussion /
Diagrams

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

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

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

Date: _____

Qualified SWPPP Practitioner (Use ink please)

DRAFT

Guidance on Field Measurements

Source: California Stormwater Quality Association (CASQA). *California Stormwater Quality Handbook for Construction, Appendix D – Field Monitoring and Analysis Guidance*. November 2009.

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

Instrument Calibration

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

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

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

Field Meter Sampling

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



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

Measurements In-Stream

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



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

Measurements in a Sample Container

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

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

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



Figure D-4 Collecting grab samples

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



Figure D-5 Transferring sample to field meter sample container

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



Figure D-6 Inserting meter into sample container

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

Complete the field logs with results and any important information to describe the sampling settings. Include in the documentation any apparent odor, color, clarity, sheen, and other visual characteristics of the water sample.



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

Construction General Permit – Technical Bulletin Series

Issue 2013.1

The Construction General Permit (CGP) Technical Bulletin Series is written and produced by staff of the State Water Board and aims to address common, public questions about how to implement the CGP. We will occasionally address topics using this bulletin format for questions that require more detailed answers than those found in the “Frequently Asked Questions” answers on the CGP FAQ web page::

http://www.swrcb.ca.gov/water_issues/programs/stormwater/gen_const_faq.shtml

This issue will address the following questions:

Q1: pH is required to be averaged by the CGP, but averaging pH is awkward in general and especially awkward for sites with multiple drainage areas and outfalls – how does the Water Board want pH values to be reported?

Q2: What are my options for meeting the “final stabilization” criteria in the CGP?

Q1: pH is required to be averaged by the CGP, but averaging pH is awkward in general and especially awkward for sites with multiple drainage areas and outfalls – how does the Water Board want pH values to be reported?

A1: Determination of Average Daily pH

The General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit or CGP) establishes Numerical Action Levels (NALs) for pH. For Risk Level 2 and 3 sites, the CGP sets a pH NAL of between 6.5 and 8.5. When daily average pH levels are below or above pH 6.5 or 8.5 respectively, the permit directs the discharger to take certain actions that are explained in the permit.

pH is a measure of the hydrogen ion concentration in storm water. If more than one measurement of pH is taken, the average pH is dependent upon the hydronium ion concentration, storm water flow (gallons per minute - gpm) and the time period of the pH observation. pH 7 is considered neutral. pH values less than 7 are considered acidic and pH values greater than 7 are considered basic or alkaline.

pH is defined as:

$$\text{pH} = -\text{Log}_{10}(\text{H}_3\text{O}^+)$$

The concentration of hydronium ion is defined as:

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}};$$

where $[\text{H}_3\text{O}^+]$ is the concentration, C, of hydronium ion.

Determination of the accurate or true daily average pH requires the discharger to measure pH and volume of discharge corresponding to the pH measured. The true daily average pH is defined as:

$$-\log_{10} \left[\frac{C_1 \Delta t_1 Q_1 + C_2 \Delta t_2 Q_2}{\Delta t_1 Q_1 + \Delta t_2 Q_2} \right]$$

Where C_1 and C_2 is the concentration of hydronium ion (defined above in terms of pH measured), Δt_1 and Δt_2 are the observation time periods and Q_1 and Q_2 are the storm water flows at the time of pH measurement.

Unfortunately the permit does not require the discharger to measure flow, nor does it require the calculation and reporting of the volumes of discharges over an observed time period, as is

needed to compute the true daily average pH in the equation, above. Meanwhile it is not technically valid to calculate an arithmetic mean as the daily average pH. For the purpose of this permit, though, it is acceptable to report the daily average pH is defined as the arithmetic average of the pH readings, if all readings are above pH 7 or below pH 7. For a combination of acidic and alkaline readings, the discharger must report two daily averages of pH – one for the acidic and one for the alkaline readings.

Determining the daily average pH

The daily average pH will be taken as the arithmetic average of two or more pH readings taken during a twenty four hour period defined as midnight to midnight.

As, under most circumstances, the difference between the arithmetic average and true average is small, the discharger is not required to determine the true average, unless it's their opinion that the true average is a significantly more accurate representation of the daily average pH for their site.

The arithmetic average pH is defined as:

$$\frac{\sum pH}{n}$$

Where $\sum pH$ means the sum of the daily pH measurements and “n” is the number of measurements.

pH measurements above pH 7

Example 1

Measurement 1; pH = 7.4

Measurement 2; pH = 8.9

$$\text{Daily Average pH} = \frac{7.4+8.9}{2}$$

= 8.2 (rounded to one decimal place)

pH measurements below pH 7

Example 2

Measurement 1; pH = 6.8

Measurement 2; pH = 4.5

$$\text{Daily Average pH} = \frac{6.8+4.5}{2}$$

= 5.7 (rounded to one decimal place)

CHARLES R. HOPPIN, CHAIRMAN | THOMAS HOWARD, EXECUTIVE DIRECTOR

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Under no circumstance should pH measurements above pH 7 be averaged with pH measurements below pH 7. pH measurements above and below 7 should be averaged and reported separately.

pH measurements above and below pH 7

Example 3

Measurement 1; pH = 6.8

Measurement 2; pH = 8.6

For this example there are two daily average pH's, 6.8 and 8.6. As daily average of 8.6 exceeds the NAL for risk level 2 and 3 construction sites then the discharger must report this value as an NAL exceedance. A simple calculation tool is provided in excel ([Technical Bulletin 2013.1 – pH](#)) to demonstrate the different calculation options.

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Q2: What are my options for meeting the “final stabilization” criteria in the CGP?

A2: Options for Meeting Final Stabilization Criteria

The discharger shall continue coverage under the CGP for any parcel that has not achieved “final stabilization”. In order for the site to reach “final stabilization” the site should not pose any additional sediment discharge risk than it did prior to the commencement of construction activity as specified in Section II.D.1.a. Disturbed areas on lands that will be returned to an agricultural use such as cropland, rangeland, or silviculture shall be returned to the preexisting agricultural use condition at minimum (e.g., tilled land, grass rangeland, agricultural buffer strip, etc.)

Section II.D.3. of the CGP requires final stabilization conditions to be demonstrated by one of the following methods:

- a. “70% final cover method,” no computational proof required
OR:
- b. “RUSLE or RUSLE2 method,” computational proof required
OR:
- c. “Custom method”, the discharger shall demonstrate in some other manner than a or b, above, that the site complies with the “final stabilization” requirement

Note that these methods are stand-alone options to demonstrate compliance with the final stabilization criteria.

Final stabilization must be demonstrated with photographs at minimum. Projects demonstrating final stabilization utilizing RUSLE, RUSLE2 or a custom method must also submit computational support and/or all testing and analysis results.

To qualify for NOT approval, all the conditions of Section II.D1.of the CGP have to be met (e.g., a site may have achieved final stabilization, but the NOT may be denied because the site still has potential for construction-related storm water pollutants to be discharged into site runoff).

70% Final Cover Method

70% Final Cover refers to the percent of exposed soil that is covered by vegetation or any other non-vegetative means of stabilization. Vegetative final stabilization only requires getting to 70 percent of the "natural" vegetative cover in that part of the state. If the natural cover is only 50 percent, you only have to get back to 35 percent cover (70 percent of 50 percent). Non-vegetative stabilization measures could include rip-rap, gravel, gabions, etc., and in some circumstances mulch and bark. Impervious cover such as concrete or asphalt should be avoided as a final stabilization technique. Long term semi-permanent erosion control practices combined with seeds that would establish vegetative stabilization (e.g., properly secured seed impregnated erosion control mats, etc.) may also be used as "final stabilization" at the discretion of the Regional Water Board Inspector. To qualify as "long-term", the erosion control practice must be selected, designed, and installed so as to provide at least three years of erosion control.

Notices of Termination or NOTs may be denied were sites have been seeded but 70 percent growth has not occurred. Dischargers may be allowed to terminate prior to achieving full 70% vegetative coverage if they can demonstrate that the site will not pose any threat to water quality. The Regional Water Board should make this decision on a case-by-case basis considering all site specific factors.

RUSLE or RUSLE2 Method

The Revised Universal Soil Loss Equation or RUSLE can be used to meet the final stabilization requirements in the CGP. RUSLE is available as a computer program used to evaluate erosion potential. Using RUSLE, the calculations should match the pre-development erosion potential with the post-construction erosion potential showing that the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity. The current version of RUSLE (RUSLE2) is a Windows-based model that uses extensive databases that are geographically-linked. RUSLE2 can require a large investment of time to set up, but this model may allow for less than 70% final cover. RUSLE2 can be downloaded free of charge from the Internet. The California Department of Transportation (Caltrans) has developed a version of RUSLE2 that incorporates California specific information and can be downloaded at: <http://www.dot.ca.gov/hq/oppd/stormwtr/rusle2.htm>. Note that RUSLE2 is an upgrade of RUSLE, and contains more detailed data therefore calculations may differ based on the program used. More information on RUSLE is contained in the Agricultural Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), Chapter 2, pp. 21-64, January 1997 available at: <http://www.epa.gov/npdes/pubs/ruslech2.pdf>.

RUSLE 1.06c is also available for download at the following internet address:

<http://www.ars.usda.gov/Research/docs.htm?docid=5971>.

Hand calculations of RUSLE may be accepted if appropriate factors are determined (R, K, LS, C, P etc.). Below is a short list of sources where factors for RUSLE can be found.

- Fifield, J.S. 2011. Designing and Reviewing Effective Sediment and Erosion Control Plans, 3rd Edition. Santa Barbara, CA. Forester Press.
- Haan, C.T., B.J. Barfield, and J.C. Hayes. 1994. Design Hydrology and Sedimentology for Small Catchments. Academic Press, New. York
- Various manufacturer websites (e.g., North American Green, <http://www.nagreen.com/>)

Custom Method

Dischargers may use a Custom Method if the other methods are not suitable to demonstrate final stabilization at the project site. This methodology must be technically accepted by the larger, scientific and academic community and must relate to the concepts of final stabilization in the other methods. Please contact your local Regional Water Board for further information. A contact list is available at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.shtml

POLLUTANT TESTING GUIDANCE TABLE

DRAFT

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Asphalt Products (Sections 37, 39, 92, 93, 94, and Special Provisions)	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
<i>Cleaning Products</i>	Acids	No	pH Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH)
					SM 2310B (Acidity)
					EPA 300.0 (Anion)
	Bleaches	No	<i>Residual Chlorine</i>	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	<i>Phosphate</i>	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
SVOC			None	EPA 625 (SVOC)	

Pollutant Testing Guidance Table ¹

Category	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Portland Concrete Cement & Masonry Products (Section 27, 28, 29, 40, 41, 42, 49, 50, 51, 53, 63, 65, 72, 73, 80, 81, 83, 90, and Special Provisions)	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Alkalinity		SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	<i>Methyl Methacrylate</i>	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	Aluminum Calcium Vanadium Zinc	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter Alkalinity or Acidity Test Kit	SM 2310B (Acidity)
Alkalinity			SM 2320 (Alkalinity)		
pH			EPA 150.1 (pH)		
VOC			EPA 601/602 or EPA 624 (VOC)		
SVOC			EPA 625 (SVOC)		

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory	
Landscaping and Other Products (Section 20, 24, and Special Provisions)	Aluminum Sulfate	No	Aluminum	TDS Meter Sulfate	EPA 200.8 (Metal)	
			<i>TDS</i>		EPA 160.1 (TDS)	
			Sulfate		EPA 300.0 (Sulfate)	
	Sulfur-Elemental	No	<i>Sulfate</i>	Sulfate	EPA 300.0 (Sulfate)	
	Fertilizers-Inorganic ⁴	No	<i>Nitrate</i>	Nitrate	EPA 300.0 (Nitrate)	
			Phosphate	Phosphate	EPA 365.3 (Phosphate)	
			Organic Nitrogen	None	EPA 351.3 (TKN)	
			Potassium	None	EPA 200.8 (Metal)	
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)	
			<i>Nitrate</i>		EPA 300.0 (Nitrate)	
			Organic Nitrogen		EPA 351.3 (TKN)	
			COD		EPA 410.4 (COD)	
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required			
	Herbicide	No	<i>Herbicide</i>	None	Check lab for specific herbicide or pesticide	
	Pesticide		Pesticide			
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)	
pH			EPA 150.1 (pH)			

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Painting Products (Section 12-3.08, 20-2.32, 50-1.05, 59, 91, and Special Provisions)	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	COD	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	COD	None	EPA 410.4 (COD)
	Solvents	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Contaminated Soil ⁵	Aerially Deposited Lead ³	No	<i>Lead</i>	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Mining or Industrial Waste, etc.	No	<i>Contaminant Specific</i>	Contaminant Specific – Check with laboratory	Contaminant Specific – Check with laboratory
<i>Line Flushing Products</i>	Chlorinated Water	No	<i>Total chlorine</i>	Chlorine	SM 4500-CL G (Res. Chlorine)
<i>Adhesives</i>	Adhesives	No	COD	None	EPA 410.4 (COD)
			<i>Phenols</i>	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products (Section 18)	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	Chloride	EPA 300.0 (Chloride)
			<i>TDS</i>	TDS Meter	EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
<i>Vehicle</i>	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required			

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Soil Amendment/Stabilization Products	Polymer/Copolymer ^{6,7}	No	<i>Organic Nitrogen</i>	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			<i>TDS</i>	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			<i>TOC</i>		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			<i>TOC</i>		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)
	Gypsum	No	pH	pH Meter, Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			<i>Sulfate</i>	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
Manganese					
Vanadium					

Pollutant Testing Guidance Table ¹

<i>Category</i>	Construction Site Material	Visually Observable?	Pollutant Indicators ²	Suggested Analyses Field ³	Laboratory
Treated Wood Products (Section 58, 80-3.01B(2), and Special Provisions)	Ammoniacal-Copper-Zinc-Arsenate (ACZA)	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
	Copper-Chromium-Arsenic (CCA)		Total Chromium		
	Ammoniacal-Copper-Arsenate (ACA)		<i>Copper</i>		
	Copper Naphthenate		Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Notes:

1. 1 If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.yei.com and www.chemetrics.com for some of the test kits
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the Standard Special Provisions for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by Caltrans, the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

ACRONYMS:

BOD – Biochemical Oxygen Demand

COD – Chemical Oxygen Demand

DOC – Dissolved Organic Carbon

EPA – Environmental Protection Agency

HACH – Worldwide company that provides advanced analytical systems and technical support for water quality testing.

SM – Standard Method

SVOC – Semi-Volatile Organic Compounds

TDS – Total Dissolved Solids

TKN – Total Kjeldahl Nitrogen

TOC – Total Organic Carbon

TSP – Tri-Sodium Phosphate

VOC - Volatile Organic Compounds

REFERENCES:

Construction Storm Water Sampling and Analysis Guidance Document, California Stormwater Quality Task Force, October 2001.

Environmental Impact of Construction and Repair Materials on Surface and Ground Waters, Report 448, National Cooperative Highway Research Program, 2001

Soil Stabilization for Temporary Slopes, Environmental Programs, California Department of Transportation, October 1, 1999.

Statewide Storm Water Management Plan, Division of Environmental Analysis, California Department of Transportation, April 2002.

Statewide Storm Water Quality Practice Guidelines, Environmental Program, California Department of Transportation, August 2000.

Soil Stabilization for Temporary Slopes and District 7 Erosion Control Pilot Study, June 2000.

Stormwater Monitoring Protocols, Guidance Manual, California Department of Transportation, May 2000.

SWPPP/WPCP Preparation Manual, Caltrans Storm Water Quality Handbooks, February 2003.

DRAFT

SAMPLING & ANALYSIS

Sampling & Analysis for Risk Level 1

- Non-visible pollutants, spills and/or BMP failures (within first 2 hours of discharge from site)
- Other (as required by dewatering permits, RWQCB or TMDLs)

Sampling & Analysis for Risk Level 2

- Effluent sampling for turbidity and pH (minimum 3 samples per day per discharge point per qualifying rain event)
- Contained rain water (at time of discharge)
- Non-visible pollutants, spills and/or BMP failures (within first 2 hours of discharge from site)
- Other (as required by dewatering permits, RWQCB or TMDLs)

Sampling & Analysis for Risk Level 3

- Effluent sampling for turbidity and pH (minimum 3 samples per day per discharge point per qualifying rain event)
- Suspended sediment concentration (SCC) (required only if turbidity exceeds NEL, minimum 3 samples per day per discharge point, per qualifying rain event)
- Receiving water sampling for turbidity and SCC and/or pH (if NEL is exceeded and project has a direct discharge to receiving water, minimum 3 samples per day per discharge point, per qualifying rain event)
- Bioassessment (if project is 30 acres or more and directly discharges to a wadeable stream, conduct up- and down-stream of point of discharge to receiving water, conduct before start of construction activity and after completion)
- Contained rain water (at time of discharge)
- Non-visible pollutants, spills and/or BMP failures (within first 2 hours of discharge from site)
- Other (as required by dewatering permits, RWQCB or TMDLs)

Copies of all inspection and sampling reports are to be documented in the SWPPP and included in the Annual Report. All sampling data is required to be entered into SMARTS through the Annual Reports and Ad Hoc Monitoring Reports interface prior to submitting the Annual Report. Refer to the SWPPP Section 7.6 for additional sampling and monitoring requirements, and Section 7.9 for reporting requirements and records retention. Instructions for submitting ad hoc monitoring reports are included in Appendix U.

In the event that the storm event average of the samples exceeds an applicable NAL (see Section 7.3), Risk Level 2 and 3 dischargers must electronically submit all storm event sampling results to the SWRCB's SMARTS no later than 10 days after the conclusion of the storm event. (Note, however that Risk Level 3 dischargers must submit all field data regardless of exceedance status within five days of the storm event conclusion). In addition, the RWQCBs may request the submittal of an NAL

Exceedance Report through SMARTS. The discharger must certify each NAL Exceedance Report in accordance with the General Permit's Special Provisions for Construction Activity.

In the event that the daily average of the samples exceed an applicable NEL (see Section 7.3), Risk Level 3 dischargers must electronically submit a NEL Violation Report to the SWRCB's SMARTS within 24 hours of identifying the exceedance. ATS dischargers must submit an NEL Violation Report to the SWRCB's SMARTS within 24 hours after the NEL exceedance has been identified. The discharger must certify each NEL Violation Report in accordance with the General Permit's Special Provisions for Construction Activity (General Permit Section IV).

Instructions for submitting ad hoc monitoring reports are included in Appendix U.

**Risk Level 2
Effluent Sampling Field Log Sheets**

Construction Site Name:		WDID:	
Sampler:		Date:	Time Start:
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant

Field Meter Calibration

pH Meter ID No./Desc.:	Turbidity Meter ID No./Desc.:
Calibration Date/Time:	Calibration Date/Time:

Field pH and Turbidity Measurements

Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected

Discharge Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

**Risk Level 2
Effluent Sampling Field Log Sheets**

Construction Site Name:		WDID:	
Sampler:		Date:	Time Start:
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant

Field Meter Calibration

pH Meter ID No./Desc.:	Turbidity Meter ID No./Desc.:
Calibration Date/Time:	Calibration Date/Time:

Field pH and Turbidity Measurements

Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected

Discharge Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

CHAIN-OF-CUSTODY

DATE:

Lab ID:

DESTINATION LAB: ATTN: ADDRESS: Office Phone: Cell Phone:						REQUESTED ANALYSIS				Notes:			
						SAMPLED BY:							
						Contact:							
						Project Name							
Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container									
				#	Type	Pres.							
SENDER COMMENTS:						RELINQUISHED BY							
						Signature:							
						Print:							
						Company:							
Date:						TIME:							
LABORATORY COMMENTS:						RECEIVED BY							
						Signature:							
						Print:							
						Company:							
Date:						TIME:							

CHAIN-OF-CUSTODY

DATE:

Lab ID:

DESTINATION LAB: ATTN: ADDRESS: Office Phone: Cell Phone:						REQUESTED ANALYSIS				Notes:			
						SAMPLED BY:							
						Contact:							
						Project Name							
Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container									
				#	Type	Pres.							
SENDER COMMENTS:						RELINQUISHED BY							
						Signature:							
						Print:							
						Company:							
Date:						TIME:							
LABORATORY COMMENTS:						RECEIVED BY							
						Signature:							
						Print:							
						Company:							
Date:						TIME:							

HOW TO SUBMIT AN AD HOC REPORT FOR
CONSTRUCTION SITE MONITORING

DRAFT

How to Submit an Ad Hoc Report for Construction Site Monitoring

State Water Board Order No. 2009-009-DWQ, the Construction General Permit (CGP) is a National Pollutant Discharge Elimination System (NPDES) permit that implements Federal regulations (40 CFR § 122.44) requiring enrollees to self-report effluent monitoring for their covered discharges. The CGP requires some permittees to self-report effluent monitoring information under specific circumstances. For example, if the permittees are Risk Level or Type 2 then they are subject to Numeric Action Levels (NALs). If the permittees are Risk Level or Type 3 then they are subject to Numeric Effluent Limitations (NELs). All Risk Level and Type 2 and 3 CGP permittees must report results of their sampling and analysis of effluent discharges to characterize discharges associated with construction activity from the entire area disturbed by the project. Risk Level and Type 1 permittees must conduct water quality monitoring of their effluent **only** if non-visible pollutants are present on the project.

The CGP requires both annual (September 1 of each year) and ad hoc electronic reporting of this information, depending on the circumstances. These instructions are specifically for ad hoc reporting. We will produce similar instructions for annual reporting as soon as possible.

All of this effluent monitoring information must be reported electronically through the Stormwater Multi Application & Report Tracking System (SMARTS) by the deadlines listed below:

Risk Level/LUP Type	Non-Visible Monitoring Results ¹	Effluent Monitoring Results	NAL Exceedance Results	NEL Exceedance Results
1	Prior to Annual Report Submittal		N/A	N/A
2	Prior to Annual Report Submittal		10 days after storm event conclusion	N/A
3	5 days after storm event conclusion			

For more information on the CGP:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

If you have any questions please contact the Storm Water help desk at smarts@waterboards.ca.gov or 1-866-563-3107.

¹ Up to date analytical data must be included in the SWPPP

Instructions

Objectives

- Learn how to enter effluent monitoring data for Construction sites.

Prerequisites

- Best used in Internet Explorer.
- Data reviewed by a Qualified SWPPP Practitioner.

Logging into SMARTS

1. Open Internet Explorer and visit <https://smarts.waterboards.ca.gov/>



NOTE: This screen provides notifications regarding system maintenance times and/or other important information about SMARTS.

2. Enter your User ID & Password.



NOTE: The User ID and Password are case sensitive.

Ad Hoc Report

1. After logging in, select the menu item:

"Annual Report"



NOTE: Ad Hoc reports for monitoring data are part of the Annual Report. At the end of the reporting year all Ad Hoc reports will be submitted as part of the Annual Report.

2. Select the Construction Site to begin the Ad Hoc Report

Facility/Site Name:

WDID:

Facility/Site Address:

City: Zip: County:


Region:

Reporting Period:

Report Status:

Program Type:

Industrial Annual Reports										
Facility Name	WDID	Facility Address	Report Period	Status	Receipt Date	Entry By	Remand	Delete	Required?	
Construction Annual Reports										
Construction Site	5834C360043	NWC 10th and I St	07/01/2010-06/30/2011	Future						Y

 **NOTE:** Both Construction & Industrial Annual Reports are accessible via this search screen.

3. Begin a New Ad Hoc Report

Annual Report :

New Adhoc Report :

This section allows you to start a new adhoc report.

Event Type: *

Event Start Date/Time: * Date in MM/DD/YYYY and Time in HH24:MI format

Event End Date/Time: * Date in MM/DD/YYYY and Time in HH24:MI format

Rain fall amount: Inches

No.of Business days *

- a. Select **“Event Type”**
 - 1) Rain Event: Storm Event producing 0.50 inches of precipitation or more.
 - 2) Non-Storm Water Discharge Event: All other discharges.
- b. Enter **“Event Start Date/Time”** (Time is optional)
- c. Enter **“Event End Date/Time”** (Time is optional)
- d. Enter **“Rain fall amount”** in inches
 - 1) Recorded from onsite rain gauge or nearby governmental rain gauge..
- e. Enter **“Number of Business Days”** during rain event
 - 1) Effluent monitoring is only required during normal site business hours.
- f. Click on **“Start New Event Report”**



NOTE: Ad hoc reports may be saved at anytime and users can return at a later time to complete the submittal. Ad Hoc reports associated with this WDID are listed at bottom of the screen under **“Ad Hoc Reports”**

4. General Information

Owner/Site information to verify you are working in the correct WDID. If the information needs to be updated, click on **“Click here to go to NOI screens”** link.

- a. Click “Next” to continue

5. Monitoring Location Tab

In this tab you create & maintain monitoring locations on the project site.

- a. Click the **“Create a New Monitoring Location”** button if the appropriate monitoring location has not been created.

Event Type:	RAIN EVENT	Event Period:	10/04/2010 - 10/13/2010	Event Status:	In-Progress	No. of Business days:	5
General Info Mon. Locations Raw Data Data Summary Daily Averages Attachments Certify Back to Report Home Page							
<input type="button" value="Create New Monitoring Location"/>							
Monitoring Location Name	Discharge Point Type	Description	Latitude	Longitude	Status	Delete	
MonLoc1	Effluent Monitoring		38.56535	-121.50879	ACTIVE	Delete	
<input type="button" value="Back"/> <input type="button" value="Next"/>							
<small>© 2010 State of California. Conditions of Use. Privacy Policy.</small>							

b. Enter Monitoring Location Information


General Info Mon. Locations Raw Data Data Summary Daily Averages Attachments Certify Back to Report Home Page	
Add/Edit Monitoring Location	
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	
Facility	asdf *
Discharge Point Type	Select *
Monitoring Location Name	<input type="text"/> *
CDF Identifier	<input type="text"/> *
Description	<input type="text"/>
Latitude	<input type="text"/> * 2.(Decimal degrees only, minimum 5 significant digits! Ex: 99.99999)
Longitude	<input type="text"/> * 2.(Decimal degrees only, minimum 5 significant digits! Ex: 99.99999)
Accuracy	Select
Datum	Select
Status	ACTIVE *
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	
<small>* - Indicates required.</small>	

1) Select “Discharge Point Type” from drop down


- a) Effluent Monitoring
- b) Influent Monitoring
- c) Internal Monitoring
- d) Receiving Water Monitoring

2) Enter “**Monitoring Location Name**”

3) Enter “**CDF Identifier**”

 NOTE: For future use to link data from a MS Excel spreadsheet template to upload all monitoring data at one time.

4) Enter “**Description**” (not required)

 NOTE: Although the "Description" field is not required, it is recommended that a description of the monitoring location be entered (e.g. NW corner outfall)

5) Enter “**Latitude**” in decimal degrees

6) Enter “**Longitude**” in decimal degrees


7) Select “**Accuracy**” (optional)

8) Select “**Datum**” (optional)

9) Select “**Status**”

a) Active

b) In-Active

 NOTE: For different rain events, monitoring locations may not discharge so you can choose to in-activate the monitoring location.

10) Click “**Save**” and repeat steps i – ix to add all monitoring locations

11) Click “**Next**” to continue to Raw Data tab.

6. Raw Data Tab

All monitoring data will be entered in this tab.

a. Select “**Enter New Sample**”



NOTE: The basic parameters and parameters specific to the site will be populated in the table.



b. Select “**Monitoring Location**” from the drop down box for this sample.

c. Enter “**Sample Date/Time**”

The date and time must be in the following format:

MM/DD/YYYY HH:MM. There must be a space in between the

date and time, and the time must be in 24-hour format (e.g. to enter March 1, 2006 at 3pm, enter 03/01/2006 15:00).

- d. Enter the “**Qualified SWPPP Practitioner’s**” name
- e. Enter “**% of Total Discharge**”
This is the percent contribution of discharge point as compared to the sum of all discharge points (100%). Can be area or flow weighted.
- f. Enter the results for the parameter(s) listed

Parameter	ND Entry Result Qualifier	Result	Unit Conversions Units	Analytical Method	Method Detection Limit	Analyzed By	Delete
pH	=		SU	A4500HB		LAB	
Turbidity	=		NTU	GRAB		LAB	

Add Additional Parameter

Save & Stay Save & Add New Sample Save & Back To List Delete Sample

- 1) If a pH sample is not required, enter zero for the result. Click "Save & Stay". A hyperlink will appear on the right to "delete". Click the hyperlink to delete the parameter.

Non-Visible Pollutant/Non-Storm Water Discharge Sample

- 2) To add additional parameters for a non-visible pollutant discharge or non-storm water sample, click the "**Add Additional Parameter**" button and enter the additional parameters to the table.

- 3) Enter the Parameter Name and click “**Search**”

General Info Mon/Locations **Raw Data** Data Summary Daily Averages Attachments Certify Back to Report Home Page

Parameter Search
Enter search criteria and click 'Search'.

Parameter Name:

STORET Number:

CAS Number:

PCS Number:

[Parameter Reference List](#)

Parameter	Attribute Description	Storet Number	Cas Number	PCS Number	Action
Copper	Copper, Total Recoverable			01119	Select
Copper	Copper, Percent Removal			51402	Select
Copper	Copper, Dissolved			01040	Select
Copper	Copper, Total			01042	Select

- 4) When a parameter result(s) appears, choose the appropriate selection by clicking the “**Select**” hyperlink under the "**Action**" column.

- 5) Selected parameter is added to the Raw Data table

Parameter	ND Entry Result Qualifier	Result	Unit Conversions Units	Analytical Method	Method Detection Limit	Analyzed By	Delete
pH	=		SU	A4500HB		LAB	Delete
Turbidity	=		NTU	GRAB		LAB	Delete
Copper, Total	=		ug/L	E200.8		LAB	Delete

Add Additional Parameter

Save & Stay Save & Add New Sample Save & Back To List Delete Sample

- 6) Enter the result for this parameter
- 7) If a sample result is marked as ND (non-detect), the user must locate the MDL (Method Detection Limit) on the laboratory report, change the Result Qualifier to

"<", enter the MDL value, and then again in the MDL column. Also, if the sample result is marked as "TRACE" amounts detected, change the Result Qualifier to "<", enter the most restrictive value (either PQL or MDL), and then again in the MDL column.

- 8) If the sample result units do not match the units listed in SMARTS, convert the result units by using the "Unit Conversions" table. Click the "**Unit Conversions**" hyperlink to view this table.
- 9) Click "**Save & Stay**"
- 10) Repeat Steps iii – ix to add additional parameters.



NOTE: The following are instructions on each "**Save**" button:

- "**Save & Stay**": Saves any changes that have been made on the screen and will remain on the screen.
- "**Save & Add New Sample**": Saves any changes that have been made on the screen and clears the data fields for a new sample record. This is to be used when multiple monitoring locations and/or samples need to be entered.
- "**Save & Back to List**": Saves any changes that have been made on the screen and takes the user back to the "Create New Event" screen.

7. Data Summary Tab

This tab allows users to review all data entered on the Raw Data tab. Return to the Raw Data tab if edits are necessary

Monitoring Location	Sample Date / Time	% of Total Discharge	Parameter	Result in Units	Analytical Method	Method Detection Limit	Analyzed By	QSP Practitioner	Delete
MonLoc1	12/01/2010 00:00:00	25	Copper, Total	=0.0636 ug/L	E200.8		LAB	John Doe	Delete
MonLoc1	12/01/2010 00:00:00	25	pH	=8.5 SU	GRAB		SELF	John Doe	Delete
MonLoc1	12/01/2010 00:00:00	25	Turbidity	=225 NTU	GRAB		SELF	John Doe	Delete
MonLoc1	12/02/2010 00:00:00	75	pH	=8 SU	GRAB		SELF	John Doe	Delete
MonLoc1	12/02/2010 00:00:00	75	Turbidity	=275 NTU	GRAB		SELF	John Doe	Delete

Back Next

Click "**Next**" when done reviewing the data.

- a. Click "**Back**" to go to Raw Data tab.

8. Daily Average Tab

Enter the daily average for pH and/or turbidity for each business day of the rain event. The number of days is automatically populated based on the business days entered when starting the report.

Business Day Number	Business Day Date	pH Average / SU (Please enter this value if you have pH in your sample)	Turbidity Average / NTU	Calculation Summary (Maximum 2000 characters. If more upload an attachment)
1	12/01/2010	8.5	250	Average of all samples taken
2	12/02/2010	8.0	275	Average of all samples taken

Save


Back Next

- Enter **“Business Day Date”**
- Enter **“pH”** average
- Enter **“Turbidity”** average
- Enter **“Calculation Summary”**
A summary is required so Water Board staff can view what individual samples were used to calculate the submitted average.
- Follow steps a – d for additional business days.
- Click **“Save”** when complete.
- Click **“Next”** to go to Attachment Tab


9. Attachments Tab

Scanned or electronic documents required for the SMARTS report are attached using this tab.

General Info	Mon. Locations	Raw Data	Data Summary	Daily Averages	Attachments	Certify	Back to Report Home Page
Please click on Upload Attachment button to upload the corresponding files						Upload Attachment	
Attached files: The following are the current documents related to the SWARM Reports. Click on the link to view them.							

 NOTE: Laboratory reports are required to be attached to the report to validate data.

- Click **“Upload Attachment”**

 NOTE: Separate Browser Window will pop-up. Make sure pop-up blockers are turned off.

Please provide the following details to upload the corresponding files.

Attachment FileType: SWPPP

Attachment Title:

File Description:

If Partial Document, Part No 1 of Total Parts 1

Click "Browse" to locate the file and then click "Upload File"

File Name:

File size should be less than 75MB. Those greater than 75MB will not be uploaded. MS Office, PDF, and Picture files are accepted. (PDF is recommended)

- Select the appropriate **“Attachment File Type”** from the drop down menu

- c. Give the file an “**Attachment Title**”
- d. If necessary, enter a “**File Description**”
- e. If the document is large, you can upload in portions. i.e. 1 of 5, 2 of 5 etc...
- f. Click “**Browse**” to locate the “**File Name**” on your computer. Click “Open” to select the file.
- g. Click “**Upload**” to upload the attachment to SMARTS.
- h. Once the file has successfully uploaded, it will populate in the Attachment table on the bottom of the screen.

Attached files: The following are the current documents related to the NOI. Click on the link to view them.

Attachment ID	File Type	File Title	File Desc	Part #
1029781	SWPPP	SWPPP		1/1
1033097	Laboratory Results	Lab Results		1/1

Fields marked with * are mandatory fields.

- i. Close the attachment window
- j. Click “**Next**” to go to the Certify Tab

10. Certify Tab

General Info	Mon. Locations	Raw Data	Data Summary	Daily Averages	Attachments	Certify	Back to Report Home Page
------------------------------	--------------------------------	--------------------------	------------------------------	--------------------------------	-----------------------------	--------------------------------	--

Completion/Error Check Completed: Report appears to be complete!

Please take a moment to review, print (if necessary), and certify your submission.
[Review & Print Ad Hoc report](#)

Report Certification:
 You can now certify this Report by completing the form below.

Approve	Certification & Submission check list
<input checked="" type="checkbox"/>	I certify, under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Certifier Name: John Doe *
 Date: 12/14/2010

- a. Click “**Perform Completion Check**”
 - 1) Any mandatory fields without data will be displayed.
 - a) Correct any errors and Perform Completion Check again
 - 2) If no errors are found:
 - a) You can choose to “**Review & Print the Ad Hoc report**” for your files
 - b) Mark the Certification Statement and click the “**Certify Ad Hoc Report.**”
 - a. If you are a Data Entry Person, notify the Legally Responsible Person and/or Approved Signatory to certify the Ad Hoc Report.

11. Ad Hoc Report(s) table

New Adhoc Report:
 This section allows you to start a new adhoc report.

Event Type: ▾

Event Start Date/Time: Date in MM/DD/YYYY and Time in HH:MM format

Event End Date/Time: Date in MM/DD/YYYY and Time in HH:MM format

Rain fall amount: inches

No. of Business days: +

Adhoc Reports

Event Id	Event Type	Start Date & Time	End Date & Time	Status	Recieved Date	Remand	Delete
888821	RAIN EVENT	10/19/2010 00:00	10/21/2010 00:00	Submitted		Remand	Delete
888874	RAIN EVENT	10/04/2010 00:00	10/13/2010 00:00	Submitted		Remand	Delete
881884	RAIN EVENT	12/01/2010 00:00	12/02/2010 00:00	In-Progress		Remand	Delete

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- Ad Hoc reports that are **“In-Progress”** or **“Submitted”** are listed in the Ad Hoc reports table.
- To continue an **“In-Progress”** or view a **“Submitted”** report, click on the **“Event ID”** to open the report.
- “In-Progress”** reports can be deleted by clicking the **“delete”** link on the right.
- “Submitted”** reports may be remanded if changes are required after the LRP or Approved Signatory certified the report.

NAL/NEL EXCEEDANCE SITE EVALUATIONS &
NON-COMPLIANCE REPORTS

DRAFT

NAL or NEL Exceedance Evaluation Summary Report		Page ___ of ___
Project Name		
Project WDID		
Project Location		
Date of Exceedance		
Type of Exceedance	NAL Daily Average <input type="checkbox"/> pH <input type="checkbox"/> Turbidity NEL Daily Average <input type="checkbox"/> pH <input type="checkbox"/> Turbidity <input type="checkbox"/> Other (specify) _____	
Measurement or Analytical Method	<input type="checkbox"/> Field meter (Sensitivity: _____) <input type="checkbox"/> Lab method (specify) _____ (Reporting Limit: _____) (MDL: _____)	
Calculated Daily Average	<input type="checkbox"/> pH _ pH units <input type="checkbox"/> Turbidity __ NTU	
Rain Gauge Measurement	_____ inches	
Compliance Storm Event	_____ inches (5-year, 24-hour event)	
Visual Observations on Day of Exceedance		

**Description of BMPs
in Place at Time of
Event**

**Initial Assessment of
Cause**

**Corrective Actions
Taken (deployed
after exceedance)**

**Additional Corrective
Actions Proposed**

Report Completed By

(Print Name, Title)

Signature

DRAFT



California Regional Water Quality Control Board

Los Angeles Region



Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

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Secretary for
Environmental Protection

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Arnold Schwarzenegger
Governor

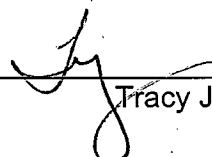
ORDER NO. R4-2008-0032

**WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES OF GROUNDWATER FROM CONSTRUCTION AND PROJECT DEWATERING
TO SURFACE WATERS
IN
COASTAL WATERSHEDS OF LOS ANGELES AND VENTURA COUNTIES
(GENERAL NPDES PERMIT NO. CAG994004)**

This Order was adopted by the Regional Water Quality Control Board on:	June 5, 2008
This Order shall become effective on:	July 5, 2008
This Order shall expire on:	June 5, 2013
The Discharger shall file a Report of Waste Discharge (Notice of Intent) in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	60 days from the date of notification of adoption of this Order
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Board have classified this discharge as a minor discharge.	

IT IS HEREBY ORDERED, that Order No. R4-2003-0111 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted thereunder, and the provisions of the federal Clean Water Act (CWA), and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

I, Tracy J. Egoscue, Executive Officer, do hereby certify the following is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on June 5, 2008.



Tracy J. Egoscue, Executive Officer

California Environmental Protection Agency

Recycled Paper

Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

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I. FACILITY/DISCHARGE INFORMATION

1. This Order (hereafter, General Permit) is intended to authorize discharges of treated or untreated groundwater generated from permanent, temporary dewatering operations or other applicable wastewater discharges not specifically covered in other general NPDES permit. Discharges from facilities to waters of the United States that do not cause, have the reasonable potential to cause, or contribute to an in-stream excursion above any applicable state or federal Water quality objectives/criteria or cause acute or chronic toxicity in the receiving water are authorized discharge in accordance with the conditions set forth in this Order.

II. NOTIFICATION REQUIREMENTS

A. Eligibility Criteria

1. This order covers discharges to surface waters of treated or untreated groundwater from dewatering operations and other wastewaters.
2. To be covered under this Order, a discharger must:
 - a. Demonstrate that pollutant concentrations in the discharge shall not cause violation of any applicable water quality objective for the receiving waters, including discharge prohibitions;
 - b. Demonstrate that discharge shall not exceed the water quality criteria for toxic pollutants (Attachment B and Part V of this Order), and there shall be no reasonable potential to cause or contribute to an excursion above the criteria.
 - c. Perform reasonable potential analysis using a representative sample of groundwater or wastewater to be discharged. The sample shall be analyzed and the data compared to the water quality screening criteria for the constituents listed on Attachment A to determine the most appropriate permit. If the analytical test results exceeds the water quality screening criteria listed on Attachment A, then a reasonable potential for discharge of toxics shall be considered to exist.
 - i. If the analytical test results of the discharge show that only petroleum products or only volatile organic compounds (VOCs) exceed the water quality screening criteria listed on Attachment A, then the discharger may not be enrolled under this Order, but will be enrolled under Regional Board Order Nos. R4-2007-0021 or R4-2007-0022, as appropriate.
 - ii. If the analytical test results of the discharge show that petroleum products, VOCs and other toxics exceed the water quality screening criteria listed on Attachment A, then the discharger will be enrolled under this permit and treatment of the groundwater will be required for discharge.
 - iii. If the analytical test results of the discharge show that toxics are below the screening levels in Attachment A, then the discharger will be enrolled under this permit and treatment of the groundwater for toxics will not be required for discharge.
 - d. The discharge shall not cause acute nor chronic toxicity in receiving waters;

- e. If necessary, the discharge shall pass through a treatment system designed and operated to reduce the concentration of contaminants to meet the effluent limitations of this Order; and
 - f. The discharger shall be able to comply with the terms or provisions of this General Permit.
3. New discharges and existing discharges regulated under existing general or individual permits, which meet the eligibility criteria, may be regulated under this Order.
 4. For the purpose of renewal of existing individual NPDES permits with this General Permit, provided that all the conditions of this General Permit are met, renewal is effective upon issuance of a notification by the Executive Officer and issuance of a new monitoring program.
 5. When an individual NPDES permit with more specific requirements is issued to a discharger, the applicability of this Order to that discharger is automatically terminated on the effective date of the individual permit.

B. Ineligibility

The discharge of wastewater contaminated with toxic pollutants with no effluent limitations in this permit are not eligible for enrollment under this General Permit.

C. Authorization

To be authorized to discharge under this Order, the discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part D of this Order. Upon receipt of the application, the Executive Officer shall determine the applicability of this Order to such a discharge. If the discharge is eligible, the Executive Officer shall notify the discharger that the discharge is authorized under the terms and conditions of this Order and prescribe an appropriate monitoring and reporting program. For new discharges, the discharge shall not commence until receipt of the Executive Officer's written determination of eligibility for coverage under this general permit or until an individual NPDES permit is issued by the Regional Board.

D. Notice of Intent

1. Deadline for Submission
 - a. Renewal of permits of existing dischargers covered under individual permits that meet the eligibility criteria and have submitted a NOI will consist of a letter of determination from the Executive Officer of coverage under this Order.
 - b. Existing dischargers covered under Order No. R4-2003-0111 will be sent a NOI form that must be completed and returned to the Regional Board within 60 days of receipt; otherwise permit coverage may be revoked. Existing dischargers enrolling under this Order are required to collect a representative groundwater/wastewater sample and analyze it for all the constituents listed on Attachment A. Dischargers shall conduct this

analysis and submit the result with a NOI, otherwise the existing authorization may be terminated. If the analytical sample result of any constituent other than those listed in Item V. of this Order exceeds the water quality screening criteria listed on Attachment A, the discharge will be considered ineligible for enrollment under this permit. However, the discharge will be enrolled under other appropriate general permit, and then, the existing coverage under this general permit will be terminated. Existing discharges that has been enrolled under the existing permit within the last one year can re-submit the analytical data used for their initial enrollment with their NOI.

- c. New dischargers shall file a complete application at least 45 days before commencement of the discharge.

2. Forms for Report of Waste Discharge

- a. Dischargers shall use the NOI Form or appropriate USEPA Forms.
- b. The discharger, upon request, shall submit any additional information that the Executive Officer deems necessary to determine whether the discharge meets the criteria for coverage under this Order, to prescribe an appropriate monitoring and reporting program, or both.
- c. The discharger must obtain and analyze (using appropriate methods) a representative sample of the groundwater to be treated and discharged under this Order. The analytical method used shall be capable of achieving a detection limit at or below the minimum level, otherwise, a written explanation shall be provided. The analytical result shall be submitted with the NPDES application. The data shall be tabulated and shall include the results for every constituent listed on Attachment A.
- d. The following should be included with the NOI Form:
 - i. The feasibility study on reuse and/or alternative disposal methods of the wastewater;
 - ii. Description of the treatment system;
 - iii. The type of chemicals that will be used (if any) during the operation and maintenance of the treatment system;
 - iv. Flow diagram of the influent to the discharge point; and
 - v. Preventive maintenance procedures and schedule for the treatment system.
 - vi. **Creekside construction dewatering operations.** Creekside construction dewatering operations for the purposes of this permit are defined as the dewatering of groundwater (1) where the dewatering is necessary during construction operations and (2) where the groundwater has a direct hydrologic connection with, and

similar mineral chemistry for TDS, chloride and sulfate to, the surface waterbody to which it will be discharged. For creekside construction dewatering operations, the following additional information shall be submitted with the ROWD.

- i. Best Management Practices (BMPs) for preventing degradation of water quality or impairment of receiving water beneficial uses,
 - ii. Demonstration of direct hydrologic connection and similar water chemistry between the groundwater and the surface water body must be substantiated with hydrogeological and analytical data, and certified by registered hydrogeologist. Water isotope tracing and other geophysical techniques may be used to demonstrate hydrologic connectivity. In addition, when feasible evidence of the physical connection between the groundwater and the surface water body could be demonstrated by stream depletion or drawdown by test well dewatering operation,
 - iii. The treatment system to be used for removing toxic compounds from the wastewater (if applicable),
 - iv. A demonstration that the discharger has considered sewerage, re-use, or other discharge options and that it is infeasible to discharge to the sanitary sewer system, to re-use the dewatered groundwater/wastewater, or to otherwise lawfully discharge the dewatered groundwater/wastewater.
- e. Title 23 of the California Code of Regulations (CCR), Division 3, Chapter 9, Article (1)(A), section 2200, *Annual Fee Schedule*, requires that all discharges subject to a specific general permit shall pay the same annual fee.

1. Notice of Termination

Dischargers shall submit a Notice of Termination or Transfer (NOTT) when coverage under this General Permit is no longer needed. An NOTT contains the Waste Discharge Identification Number (WDID), the name and address of the owner of the facility, and is signed and dated by the owner certifying that the Dischargers associated with Permit No. CAG994004 have been eliminated or that there has been a change in ownership. Upon submission, the Discharger is no longer authorized to discharge wastewater associated with this General Permit.

2. Change of Ownership

Coverage under this Order may be transferred in case of change of ownership of land or discharge facility provided the existing discharger notifies the Executive Officer at least 30 days before the proposed transfer date, and the notice includes a written agreement between the existing and new dischargers containing a specific

date of transfer of coverage, responsibility for compliance with this Order, and liability between them.

III. FINDINGS

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board), finds:

A. Background

1. On August 7, 2003, the Regional Board adopted Order No. R4-2003-0111 General NPDES Permit No. CAG994004-Waste Discharge Requirements for Discharges from construction and project dewatering to surface waters. This General Permit expires on August 7, 2008. Approximately 281 dischargers are enrolled under this General Permit. This Order now renews the requirements of this General Permit.
2. On September 22, 1989, the United States Environmental Protection Agency (USEPA) granted the State of California, through the State Water Resources Control Board (State Board) and the Regional Boards, the authority to issue general National Pollutant Discharge Elimination System (NPDES) permits pursuant to 40 Code of Federal Regulations (40 CFR) parts 122 and 123.
3. 40 CFR section 122.28 provides for issuance of general permits to regulate a category of point sources if the sources:
 - a. Involve the same or substantially similar types of operations;
 - b. Discharge the same type of waste;
 - c. Require the same type of effluent limitations or operating conditions;
 - d. Require similar monitoring; and
 - e. Are more appropriately regulated under a general permit rather than individual permits.
4. General waste discharge requirements and NPDES permits enable Regional Board staff to expedite the processing of requirements, simplify the application process for dischargers, better utilize limited staff resources, and avoid the expense and time involved in repetitive public noticing, hearings, and permit adoptions.

B. Facility and Discharge Description

1. Discharges covered under this permit include treated or untreated groundwater generated from permanent or temporary dewatering operations or other appropriate wastewater discharge not specifically covered in other general NPDES permit. In addition, this permit covers discharge from cleanup of contaminated sites where other project specific General Permits may not be appropriate, such as groundwater impacted by metals and/or other toxic compounds. This permit also covers discharges from dewatering operations in the vicinity of creeks where surface waters and groundwaters are hydrologically connected and have similar water chemistry. Creekside discharges which qualify under this permit will not be required to comply with the waterbody specific limitations for total dissolved solids (TDS), sulfate or chloride. The purpose of this approach to regulating creekside

discharges is to avoid requiring a discharger to treat a surface waterbody to lower than naturally occurring, background, mineral content. In such circumstance, cycling the extracted creekside water back into the waterbody would not cause any decrease in the quality of the waterbody or degradation.

2. Wastewater discharge from permanent or temporary dewatering activities include, but are not limited to the following:
 - a. Treated or untreated wastewater from permanent or temporary construction dewatering operations
 - b. Groundwater pumped as a aid in the containment and/or cleanup of contaminant plume
 - c. Groundwater extracted during short-term and long-term pumping/aquifer tests
 - d. Groundwater generated from well drilling, construction or development and purging of wells
 - e. Equipment decontamination water
 - f. Subterranean seepage dewatering
 - g. Incidental collected stormwater from basements
3. Other wastewater discharges covered by this permit include process and non-process wastewater that meet the eligibility criteria and could not be covered under other specific general NPDES permit.
4. To enroll under this general permit, a discharger must certify that there is no reasonable potential for pollutants other than those regulated by this permit to be in the discharge. Existing and new dischargers enrolling under this permit are required to collect a representative groundwater or wastewater sample and analyze it for all the constituents listed on Attachment A. Existing dischargers shall conduct this analysis and submit the result with a Notice of Intent Form, otherwise the existing authorization will be terminated.
5. Pursuant to section 2, Article X, California Constitution, and section 275 of the California Water Code on preventing waste and unreasonable use of waters of the state, this Regional Board encourages, wherever practical, water conservation and/or re-use of wastewater. To obtain coverage under this Order, the discharger shall first investigate the feasibility of conservation, land disposal and/or reuse of the wastewater.
6. This Regional Board adopted *Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles* contained in Order No. 01-182 [NPDES No. CAS614001] and *Waste Discharge Requirements for Municipal Stormwater and Urban Runoff Discharges within Ventura County Flood Control District, County of Ventura, and the Cities of Ventura County* contained in Order No. 00-108 [NPDES No. CAS004002] on July 15, 1996, and July 27, 2000, respectively. These Orders prohibit non-stormwater discharges to storm drain systems unless they are covered by separate NPDES permits. This prohibition, in general, does not apply to rising groundwater, uncontaminated groundwater infiltration discharges, discharges from potable water distribution

system releases¹, foundation and footing drains discharges, and water from crawl space pumps. The municipality may allow discharge of these types of discharges into the storm drain system. However, the municipality or the Regional Board may prohibit these discharges if they are determined to cause, or threaten to cause, degradation of water quality, violation of water quality objectives, cause nuisance and/or impair beneficial uses of receiving waters.

C. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the Water Code (commencing with section 13260).

D. Background and Rationale for Requirements

The Regional Water Board developed the requirements of this Order based on information submitted as part of the applications for several like facilities, through monitoring and reporting programs, and through special studies and the following information.

1. The effluent limitations for discharges covered under this permit are calculated assuming no dilution. For most practical purposes, discharges from facilities covered under this permit do not flow directly into receiving water with significant flow volume to consider dilution credit or to allocate a mixing zone. Most discharges flows to storm drain systems that discharge to creeks and streams. Many of these creeks and streams are dry during the summer months. Therefore, for many months of the year, these discharges may represent all or nearly all of the flow in some portions of the receiving creeks or streams. These discharges therefore have the potential to recharge groundwaters protected as drinking waters.

An exception to this policy may be applied based on approved mixing zone study and based on demonstration of compliance with water quality objectives in the receiving water as prescribed in the Basin Plan. This exception process is more appropriate for an individual permit, and would not be appropriate for a general permit, that should be protective of most stringent water quality objectives and beneficial uses. If discharger requests that a dilution credit be included in the computation of effluent limit or that a mixing zone be allowed, an individual permit will be required. However, if no mixing zone is proposed, this general permit provides coverage for all discharges to receiving water bodies in Coastal Watersheds of Los Angeles and Ventura Counties.

¹ "Potable Water Distribution Systems Releases" means sources of flows from drinking water storage, supply and distribution systems including flows from system failures, pressure releases, system maintenance, distribution line testing, fire hydrant flow testing; and flushing and dewatering of pipes, reservoirs, vaults, and minor non-invasive well maintenance activities not involving chemical addition(s). It does not include wastewater discharges from activities that occur at wellheads, such as well construction, well development (i.e., aquifer pumping tests, well purging, etc.), or major well maintenance.

2. This order regulates the discharge of groundwater that may or may not be impacted by toxic compounds and/or conventional pollutants.

Various biological, chemical, physical, thermal treatment systems could be employed to remove these toxic or conventional pollutants in groundwater to applicable permit limits. For example, air stripping, carbon absorption, chemical oxidation treatment systems could be used to remove volatile organic compounds in groundwater. Reverse osmosis, ion exchange, or pH adjustment could be used as treatment technologies to remove conventional pollutants and metals. Biological systems could be used to degrade or remove semi-volatile organic compounds. This permit does not provide specific treatment technologies for the universe of toxic compounds that could be found in groundwater. When treatment is required prior to discharge, dischargers will be required to submit schematics of treatment flow diagrams with descriptions of the treatment system including statements on the effectiveness of the system to achieve the applicable permit limits during the permit process.

3. This permit includes effluent limitations for metals in discharges from dewatering or other operations to both freshwater and saltwater. For purposes of this permit, saltwater is defined as waterbodies with saline, estuarine or marine beneficial use designations. Additional clarification for applying saltwater objectives is contained in the CTR. All other inland surface waters are considered freshwater. The toxicity of certain metals in freshwater including cadmium, chromium III, copper, lead, nickel, silver, and zinc is dependent on water hardness. The CTR expresses the objectives for these metals through equations where the hardness of the receiving water is a variable. To simplify the permitting process, it is necessary that fixed hardness values be used in these equations. This order requires the discharger to propose appropriate receiving water hardness or effluent hardness based on analytical results of receiving water or effluent samples. Upon approval of the Executive Officer, this hardness value will be used to determine the appropriate metal limitation from the appropriate table of limits (E. 2. b. i.) in the Order.
4. Total Maximum Daily Load (TMDLs) for metals, nutrients and other toxic pollutants have been developed for various watersheds in Los Angeles and Ventura County Watersheds. Where ever applicable, Section V.B. of this Order prescribes appropriate TMDL for these pollutants. Generally where wet weather and dry weather TMDLs are specified this permit applies only dry weather TMDL to streamline the permitting process. However, where wet weather TMDL is specified and no dry weather TMDL is specified, then wet weather TMDL is specified in this permit. Receiving water with specified TMDL include Los Angeles River and tributaries (copper, cadmium, lead, zinc and silver), Ballona Creek and tributaries (copper, lead, zinc, and silver), San Gabriel River and tributaries (copper, lead, zinc, and silver), Calleguas Creek and tributaries and Mugu Lagoon (copper, nickel, lead, zinc, silver and pesticides). TMDL limitations will not be prescribed for discharges that show no reasonable potential for these constituents to be in the effluent above the applicable screening criteria. If Discharge can not meet these effluent limitations immediately, Discharger can apply for individual permit and seek a Time Schedule Order with interim limits for the pollutants of concern.

6. Because this Order is intended to serve as a general NPDES permit and covers discharges to all surface waters in the Los Angeles Region, the effluent limitations established pursuant to this general order are established to protect the most protective water quality objective for the surface water beneficial uses in the Los Angeles Region.

E. California Environmental Quality Act (CEQA)

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

F. Technology-Based Effluent Limitations

Section 301(b) of the CWA and implementing USEPA permit regulations at section 122.44, title 40 of the Code of Federal Regulations², require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Best Professional Judgment (BPJ) in accordance with Part 125, section 125.3 of CWA.

G. Water Quality-Based Effluent Limitations

Section 301(b) of the CWA and section 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

Section 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi). The WQBELs are based on the Basin Plan, other State plans and policies, or USEPA water quality criteria which are taken from the California Toxics Rule (CTR). These requirements, as they are met, will protect and maintain existing beneficial uses of the receiving water. The attached fact sheet for this Order includes specific bases for the effluent limitations.

H. Water Quality Control Plans.

The Regional Water Board adopted a Water Quality Control Plan for the Los Angeles Region (hereinafter Basin Plan) on June 13, 1994, that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies

² All further statutory references are to title 40 of the Code of Federal Regulations unless otherwise indicated.

to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Resources Control Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

1. Basin Plan. The Basin Plan contains water quality objectives for, and lists the beneficial uses of, specific water bodies (receiving waters) in the Los Angeles Region. Typical beneficial uses covered by this Order include the following:
 - a. Inland surface waters above an estuary - municipal and domestic supply, industrial service and process supply, agricultural supply, groundwater recharge, freshwater replenishment, aquaculture, warm and cold freshwater habitats, inland saline water and wildlife habitats, water contact and noncontact recreation, fish migration, and fish spawning, preservation of rare and endangered species, preservation of biological habitats, and shellfish harvesting.
 - b. Inland surface waters within and below an estuary - industrial service supply, marine and wetland habitats, estuarine and wildlife habitats, water contact and noncontact recreation, commercial and sport fishing, aquaculture, migration of aquatic organisms, fish migration, fish spawning, preservation of rare and endangered species, preservation of biological habitats, and shellfish harvesting.
 - c. Coastal Zones (both nearshore and offshore) - industrial service supply, navigation, water contact and noncontact recreation, commercial and sport fishing, marine habitat, wildlife habitat, fish migration and spawning, shellfish harvesting, and rare, threatened, or endangered species habitat.

Requirements of this Order implement the Basin Plan.

Total Maximum Daily Loads: Section 303(d) of the CWA requires states to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Los Angeles Region has been developing TMDLs for metals, nutrients and other toxic compounds. This Order implements approved and relevant TMDLs. Attachment B prescribes the limits for the pollutants that are waterbody specific. Detailed discussion on TMDLs is provided in the Attachment F.

2. The State Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975.
3. The State Board adopted a *Water Quality Control Policy for the Enclosed Bays and Estuaries of California* in May 1974 (Policy). The Policy contains narrative and numerical water quality objectives that are designed to prevent water quality degradation and protect beneficial uses in enclosed bays and estuaries.

The Policy also lists principles of management that include the State Board's goal to phase out all discharges (excluding cooling waters), particularly industrial process water,

to enclosed bays and estuaries as soon as practicable. The waste described above is not considered an industrial process wastewater.

I. National Toxics Rule (NTR) and California Toxics Rule (CTR)

USEPA adopted the NTR on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

J. State Implementation Policy

On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000 with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plan. The SIP became effective on May 18, 2000 with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005 that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

K. Compliance Schedules and Interim Requirements (Not Applicable)

L. Alaska Rule.

On March 30, 2000, USEPA revised its regulation that specifies when new and revised State and Tribal water quality standards become effective for CWA purposes (40 CFR §131.21, 65 FR 24641, April 27, 2000). Under USEPA's new regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

M. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based and water quality-based effluent limitations for individual pollutants that are no more stringent than required by CWA. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. Water quality-based effluent limitations have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards.

N. Antidegradation Policy

Section 131.12 of 40 CFR requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. As discussed in detail in the Fact Sheet (Attachment F), the permitted discharge is consistent with the antidegradation provision of 40 CFR §131.12 and State Water Board Resolution No. 68-16.

O. Anti-Backsliding Requirements

Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR §122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

P. Endangered Species Act.

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

Q. Monitoring and Reporting

Section 122.48 of 40 CFR requires that all NPDES permits specify requirements for recording and reporting monitoring results. Sections 13267 and 13383 of the CWC authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program (hereinafter MRP) establishes monitoring and reporting requirements to implement federal and State requirements. This MRP is provided in Attachment E.

R. Standard and Special Provisions

Standard Provisions, which apply to all NPDES permits in accordance with section 122.41, and additional conditions applicable to specified categories of permits in accordance with section 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under section 122.42. The Regional Water Board has also included in this Order special provisions applicable to the Discharger. A rationale for the special provisions contained in this Order is provided in the attached Fact Sheet.

S. Provisions and Requirements Implementing State Law (Not Applicable)

T. Notification of Interested Parties.

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment F) of this Order.

U. Consideration of Public Comment.

The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet (Attachment F) of this Order.

IV. DISCHARGE PROHIBITIONS

- A.** The discharge of wastes other than those which meet eligibility requirements of this Order is prohibited unless the discharger obtains coverage under another general permit or an individual permit that regulates the discharge of such wastes.
- B.** Bypass or overflow of untreated or partially treated contaminated groundwater to waters of the State either at the treatment system or from any of the collection or transport systems or pump stations tributary to the treatment system is prohibited.
- C.** The discharge shall not cause, have a reasonable potential to cause, or contribute to an in-stream excursion above any applicable criterion promulgated by USEPA pursuant to section 303 of the CWA, or water quality objective adopted by the State or Regional Board.
- D.** The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.
- E.** The purposeful or knowing discharge of polychlorinated biphenols (PCBs) is prohibited.

V. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

- 1. Discharge of an effluent from the outfall location(s) listed in the enrollment authorization factsheet in excess of the following limitations is prohibited. (In the authorization letter, when a discharger is enrolled under this permit, the Executive Officer shall list in the factsheet each constituent(s) from the appropriate limitations table(s) below that is applicable to the specific discharge).

a. Limits applicable to discharges to freshwater or saltwater bodies

i. Table 1-General Constituents

Constituents	Units	Discharge Limitations	
		Daily Maximum	Monthly Average
Total Suspended Solids	mg/L	150	50
Turbidity	NTU	150	50
BOD ₅ 20°C	mg/L	30	20
Oil and Grease	mg/L	15	10
Settleable Solids	ml/L	0.3	0.1
Sulfides	mg/L	1.0	
Phenols	mg/L	1.0	
Residual Chlorine	mg/L	0.1	
Methylene Blue Active Substances (MBAS)	mg/L	0.5	

ii. Table 2-Organic compounds

Constituent	Units	Discharge Limitations			
		Other Waters		MUN ³	
		Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
Volatile Organic Compounds					
1,1,1,2-tetrachloroethane	µg/L	1		0.34	0.17 ⁴
1,1,2-trichloroethane	µg/L	5		1.2	0.6
1,1,1-trichloroethane	µg/L	200		200	
1,1-dichloroethane	µg/L	5		5	
1,1-dichloroethylene	µg/L	6	3.2	0.11	0.057 ⁴
1,2-dichloroethane	µg/L	0.50		0.50	0.38 ⁴
1,2-dichloropropane	µg/L	5		1.1	0.52 ⁴
1,2-trans-dichloroethylene	µg/L	10		10	
1,3-dichloropropylene	µg/L	0.5		0.5	
Acrolein	µg/L	100		100	
Acrylonitrile	µg/L	1.7	0.66	0.12	0.059 ⁴
Acetone	µg/L	700		700	
Benzene	µg/L	1.0		1.0	
Bromoform	µg/L	720	360	8.6	4.3
Carbon tetrachloride	µg/L	0.5		0.5	0.25
Chlorobenzene	µg/L	30		30	
Chlorodibromomethane	µg/L	68	34	0.81	0.40 ⁴

³ MUN refers to discharges to those waterbodies designated MUN (Municipal and Domestic Supply) identified in the Basin Plan with an "E" or an "I" designation.

⁴ If the reported detection level is greater than the effluent limit for this constituent, then a non-detect using ML detection is deemed to be in compliance.

Constituent	Units	Discharge Limitations			
		Other Waters		MUN ³	
		Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
Dichlorobromomethane	µg/L	92	46	1.1	0.56
Chloroethane	µg/L	100		100	
Chloroform	µg/L	100		100	
Methyl ethyl ketone	µg/L	700		700	
Ethylbenzene	µg/L	700		700	
Ethylene dibromide	µg/L	0.05		0.05	
Methyl tertiary butyl ether (MTBE)	µg/L	5		5	
Methylbromide	µg/L	10		10	
Methylchloride	µg/L	3		3	
Methylene chloride	µg/L	3,200	1,600	9.5	4.7
Tetrachloroethylene	µg/L	5.0		1.6	0.8
Toluene	µg/L	150		150	
Trichloroethylene	µg/L	5.0		5.0	2.7
Vinyl chloride	µg/L	0.5		0.5	
Xylenes	µg/L	1750		1750	
Pesticides and PCBs					
4,4'-DDD	µg/L	0.0017	0.00084	0.0017	0.00083 ⁴
4,4'-DDE	µg/L	0.0012	0.00059	0.0012	0.00059 ⁴
Aldrin	µg/L	0.00028	0.00014	0.00027	0.00013 ⁴
alpha-BHC	µg/L	0.026	0.013	0.0079	0.0039 ⁴
beta-BHC	µg/L	0.092	0.046	0.028	0.014
Endosulfan Sulfate	µg/L	480	240	220	110
Endrin Aldehyde	µg/L	1.6	0.81	1.5	0.76
Gamma-BHC	µg/L	0.12	0.063	0.039	0.019 ⁴
PCBs	µg/L	0.00034	0.00017	0.00034	0.00017 ⁴
Semi-Volatile Organic Compounds					
1,2 Dichlorobenzene	µg/L	600		600	
1,2-Diphenylhydrazine	µg/L	1.1	0.54	0.081	0.040 ⁴
1,3 Dichlorobenzene	µg/L	5,200	2,600	800	400
1,4 Dichlorobenzene	µg/L	5		5	
2,4,6-Trichlorophenol	µg/L	13	6.5	4.3	2.1 ⁴
2,4-Dichlorophenol	µg/L	1600	790	190	93
2,4-Dimethylphenol	µg/L	4,600	2,300	1100	540
2,4-Dinitrophenol	µg/L	28,000	14,000	140	70
2,4-Dinitrotoluene	µg/L	18	9.1	0.23	0.11 ⁴
2-Chloronaphthalene	µg/L	8,600	4,300	3,400	1,700
2-Chlorophenol	µg/L	800	400	241	120
2-Methyl-4,6-Dinitrophenol	µg/L	1540	765	26.9	13.4
3,3-Dichlorobenzidine	µg/L	0.16	0.077	0.088	0.04 ⁴
Acenaphthene	µg/L	5,400	2,700	2,400	1,200
Anthracene	µg/L	220,000	110,000	19,000	9,600

Constituent	Units	Discharge Limitations			
		Other Waters		MUN ³	
		Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
Benzidine	µg/L	0.0011	0.00054	0.00025	0.00012 ⁴
Benzo(a)Anthracene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Benzo(a)Pyrene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Benzo(b)Fluoranthene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Benzo(k)Fluoranthene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Bis(2-Chloroethyl)Ether	µg/L	2.8	1.4	0.063	0.031 ⁴
Bis(2-Chloroisopropyl)Ether	µg/L	340,000	170,000	2,800	1,400
Bis(2-Ethylhexyl)Phthalate	µg/L	11	5.9	3.7	1.8 ⁴
Butylbenzyl Phthalate	µg/L	10,000	5,200	6,000	3,000
Chrysene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Dibenzo(a,h)Anthracene	µg/L	0.098	0.049	0.0089	0.0044 ⁴
Diethyl Phthalate	µg/L	240,000	120,000	46,000	23,000
Dimethyl Phthalate	µg/L	5,800,000	2,900,000	629,000	313,000
Di-n-Butyl Phthalate	µg/L	24,000	12,000	5,400	2,700
Fluoranthene	µg/L	740	370	600	300
Fluorene	µg/L	28,000	14,000	2,600	1,300
Hexachlorobenzene	µg/L	0.0016	0.00077	0.0015	0.00075 ⁴
Hexachlorobutadiene	µg/L	100	50	0.89	0.44 ⁴
Hexachlorocyclopentadiene	µg/L	34,000	17,000	480	240
Hexachloroethane	µg/L	18	8.9	3.8	1.9
Indeno(1,2,3-cd) Pyrene	µg/L	0.098	0.049	0.0088	0.0044 ⁴
Isophorone	µg/L	1200	600	17	8.4
Naphthalene	µg/L	21		21	
Nitrobenzene	µg/L	3,800	1,900	34	17
N-Nitrosodimethyl amine (NDMA)	µg/L	16	8.1	0.0014	0.00069 ⁴
N-Nitrosodi-n-Propylamine	µg/L	2.8	1.4	0.011	0.005 ⁴
N-Nitrosodiphenylamine	µg/L	32	16	10	5.0
Phenol	µg/L	1,000	no limit	1,000	no limit
Pyrene	µg/L	22,000	11,000	1930	960
Miscellaneous					
Asbestos	fib/L	no limit	no limit	14,000,000	7,000,000
Di-isopropyl ether (DIPE)	µg/L	0.8	0	0.8 ⁴	
1,4-Dioxane	µg/L	3		3	
Perchlorate	µg/L	6		6	
2,3,7,8-TCDD (Dioxin)	µg/L	0.000000028	0.000000014	0.000000026	0.000000013 ⁴
Tertiary butyl alcohol (TBA)	µg/L	12		12	
Total petroleum hydrocarbons	µg/L	100		100	

b. Limits applicable to discharges to freshwater waterbodies where no TMDLs has been established

i. Table 3-Hardness-dependent metals

Hardness (mg/L)	Units	up to 200		200 – 300		300 and above	
		Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
Cadmium	µg/L	2.8	5	4.1	5	5	5
Copper	µg/L	10.4	20.8	16.6	33.3	22.1	44.4
Lead	µg/L	4.4	8.7	8.3	16.7	12.8	25.6
Nickel	µg/L	60	100	90	100	100	100
Silver	µg/L	4.0	8.1	10	20	20	41
Zinc	µg/L	86	170	130	260	170	350

ii. Table 4-Other compounds

Constituents	Units	Discharge Limitations			
		Other Waters		MUN ³	
		Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.
Metals					
Antimony	µg/L	6		6	
Arsenic	µg/L	10		10	
Beryllium	µg/L	4		4	
Chromium III	µg/L	50		50	
Chromium VI	µg/L	16	8	16	8
Cyanide	µg/L	8.5	4.2	8.5	4.2 ⁵
Mercury	µg/L	0.1	0.05 ⁴	0.1	0.05 ⁵
Selenium	µg/L	8	4	8	4
Thallium	µg/L	13	6	3.4	1.7
Organic Compounds					
Pentachlorophenol	µg/L	1.5	0.73	0.56	0.28 ⁵
Chlordane	µg/L	0.0012	0.00059	0.0012	0.00057 ⁵
4,4'-DDT	µg/L	0.0012	0.00059	0.0012	0.00059 ⁵
Dieldrin	µg/L	0.00028	0.00014	0.00028	0.00014 ⁵
alpha-Endosulfan	µg/L	0.092	0.046	0.092	0.046 ⁵
beta-Endosulfan	µg/L	0.092	0.046	0.092	0.046 ⁵
Endrin	µg/L	0.059	0.029	0.059	0.029 ⁵
Heptachlor	µg/L	0.00042	0.00021	0.00042	0.00021 ⁵
Heptachlor Epoxide	µg/L	0.00022	0.00011	0.00020	0.00010 ⁵
Toxaphene	µg/L	0.0015	0.00075	0.0015	0.00073 ⁵

c. Limits applicable to discharges to freshwater waterbodies where TMDLs has been established

iii. Table 5-Los Angeles River and Tributaries Metals TMDL⁶

⁵ If the reported detection level is greater than the effluent limit for this constituent, then a non detect using ML detection is deemed to be in compliance.

Reach	Units	Copper		Lead		Zinc		Selenium		Cadmium	
		Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.
Reach 5 and 6	µg/L	30	15	19	9.5			5	2.5	3.1	1.6
Reach 4	µg/L	26	13	10	5					3.1	1.6
Reach 3 above LA-Glendale WRP and Verdugo	µg/L	23	11.5	12	6					3.1	1.6
Reach 3 below LA-Glendale WRP	µg/L	26	13	12	6					3.1	1.6
Burbank Western Channel (above WRP)	µg/L	26	13	14.	7					3.1	1.6
Burbank Western Channel (below WRP)	µg/L	19	9.5	9.1	4.5					3.1	1.6
Reach 2 and Arroyo Seco	µg/L	22	11	11	5.5					3.1	1.6
Reach 1	µg/L	23	11.5	12	6					3.1	1.6
Compton Creek	µg/L	19	9.5	8.9	4.5					3.1	1.6
Rio Hondo Rch. 1	µg/L	13	12.5	5.0	2.5	131	65.5			3.1	1.6

ii. Table 6-Ballona Creek and Tributaries Metals TMDL⁶

Constituents	Units	Discharge Limitations	
		Daily Max.	Monthly Avg.
Metals			
Copper	µg/L	24	12.5
Lead	µg/L	13	6.5
Selenium	µg/L	5	2.5
Zinc	µg/L	304	152

iii. Table 7-San Gabriel River and its Tributaries

Reach	Units	Copper	Lead	Zinc	Selenium
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⁶ This effluent limit shall be deemed vacated at such time as Regional Board Resolutions R05-006 and R05-007 are vacated in compliance with a writ of mandate in the matter of Cities of Bellflower et al v. State Water Resources Control Board et al, Los Angeles Superior Court #BS101732. The Regional Board shall provide notice to the discharger of any such action.

		Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.
San Jose Creek Reach 1 (Confluence to temple street)	µg/L							5	2.5
San Jose Creek Reach 2 (Temple St. to I-10 at White Ave.)	µg/L							5	2.5
San Gabriel River Reach 1 (Firestone to Estuary)	µg/L	18	9						
San Gabriel River Reach 2 (Whittier Narrows to Firestone)	µg/L			166	83				
Coyote Creek	µg/L	20	10	106	53	158	79		
Estuary	µg/L	3.7	1.8						

iv. Table 8-Calleguas Creek, its Tributaries and Mugu Lagoon

Reach	Units	Copper		Nickel		Selenium	
		Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.
1-Mabu Lagoon	µg/L	----	5.6	----	8.2	----	----
2- Calleguas Creek South	µg/L	----	13.7	----	8.2	----	----
3- Revolon Slough	µg/L	----	27	----	149	----	----
4- Calleguas Creek North	µg/L	----	3.7	----	8.3	----	5
5-Beardsley Channel	µg/L	----	3.7	----	8.3	----	5
6-Arroyo Las Posas	µg/L	----	----	----	----	----	----
7-Arroyo Simi	µg/L	----	----	----	----	----	----
8-Tapo Canyon	µg/L	----	----	----	----	----	----
9-Conejo Creek	µg/L	----	29.1	----	160	----	----
10-Hill Canyon reach of Conejo Creek	µg/L	----	29.1	----	160	----	----
11-Arroyo Santa Rosa	µg/L	----	29.1	----	160	----	----
12-North Fork Conejo Creek	µg/L	----	29.1	----	160	----	----
13-Arroyo Conejo (S.Fork Conejo Cr)	µg/L	----	29.1	----	160	----	----

Table 9-TMDL for Organochloride (OC) Pesticides, Polychlorinated Biphenyls (PCBs) in Calleguas Creek, Its Tributaries, and Magu Lagoon

Constituents	Units	Discharge Limitations	
		Daily Max.	Monthly Avg.
Chlordane	ng/L	1.2	0.59 ⁵
4,4-DDD	ng/L	1.7	0.84 ⁵
4,4-DDE	ng/L	1.2	0.59 ⁵
4,4-DDT	ng/L	1.2	0.59 ⁵
Dieldrin	ng/L	0.28	0.14 ⁵
PCBs	ng/L	0.34	0.17 ⁵
Toxaphene	ng/L	0.33	0.16 ⁵

d. Table 10-Limits applicable to discharges to saltwater waterbodies

Constituents	Units	Discharge Limitations	
		Daily Max.	Monthly Avg.
Metals			
Antimony	µg/L	6	
Arsenic	µg/L	10	5
Beryllium	µg/L		
Cadmium	µg/L	5	
Chromium III	µg/L	50	
Chromium VI	µg/L	82	41
Copper	µg/L	5.8	2.9
Cyanide	µg/L	1.0	0.50 ⁵
Lead	µg/L	14	7
Mercury	µg/L	0.1	0.05 ⁵
Nickel	µg/L	14	6.7
Selenium	µg/L	120	58
Silver	µg/L	2.2	1.1
Thallium	µg/L	13	6
Zinc	µg/L	95	47
Organic Compounds			
Pentachlorophenol	µg/L	13	6.4
Chlordane	µg/L	0.0012	0.00059 ⁵
4,4'-DDT	µg/L	0.0012	0.00059 ⁵
Dieldrin	µg/L	0.00028	0.00014 ⁵
Alpha-Endosulfan	µg/L	0.014	0.0071 ⁵
Beta-Endosulfan	µg/L	0.014	0.0071 ⁵
Endrin	µg/L	0.0038	0.0019 ⁵
Heptachlor	µg/L	0.00042	0.00021 ⁵
Heptachlor Epoxide	µg/L	0.00022	0.00011 ⁵
Toxaphene	µg/L	0.00033	0.00016 ⁵

2. The pH of the discharge shall at all times be within the range of 6.5 and 8.5.
3. The temperature of the discharge shall not exceed 86°F.
4. Attachment B establishes the applicable effluent limits for mineral and nitrogen constituents for discharges covered by this Order. The discharge of an effluent with mineral and nitrogen constituents in excess of applicable limits established in Attachment B is prohibited. In the letter of determination, the Executive Officer shall indicate the watershed/stream reach limitations in Attachment B applicable to the particular discharge. Creekside construction dewatering discharges covered under Part D.2.d.vi are determined to have hydrologic connection and/or similar water chemistry between groundwater and surface water. Therefore, since the groundwater and surface water are essentially the same, discharges qualified under creekside dewatering as approved by Executive Office are not required to comply with Attachment B (TDS, sulfate, chloride) except for nitrogen and boron.
5. Pass-through or uncontrollable discharges of PCBs shall not exceed daily average concentrations of 14 ng/L into fresh waters or 30 ng/L into estuarine waters.
6. The acute toxicity of the effluent shall be such that the average survival in the undiluted effluent for any three (3) consecutive 96-hour static or continuous flow bioassay tests shall be at least 90%, with no single test less than 70% survival.
7. The discharge shall meet effluent limitations and toxic and effluent standards established pursuant to sections 301, 302, 304, 306, and 307 of the Clean Water Act, and amendments thereto.

C. Land Discharge Specifications

Not Applicable.

D. Reclamation Specifications

Not Applicable.

VI. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

The discharge shall not cause the following to be present in receiving waters:

- a. Toxic pollutants at concentrations that will bioaccumulate in aquatic life to levels that are harmful to aquatic life or human health.

- b. Biostimulatory substances at concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.
 - c. Chemical substances in amounts that adversely affect any designated beneficial use.
 - d. Visible floating materials, including solids, liquids, foams, and scum.
 - e. Oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the receiving water or on objects in the water.
 - f. Suspended or settleable materials in concentrations that cause nuisance or adversely affect beneficial uses.
 - g. Taste or odor-producing substances in concentrations that alter the natural taste, odor, and/or color of fish, shellfish, or other edible aquatic resources; cause nuisance; or adversely affect beneficial uses.
 - h. Substances that result in increases of BOD₅20°C that adversely affect beneficial uses.
 - i. Fecal coliform concentration which exceed a log mean of 200 per 100 ml (based on a minimum of not less than five samples equally spaced over a 30-day period), any single sample shall not exceed 400 per 100 ml.
 - j. Concentrations of toxic substances that are toxic to, or cause detrimental physiological responses in, human, animal, or aquatic life.
2. The discharge shall not cause the following to occur in the receiving waters:
- a. The dissolved oxygen to be depressed below:

WARM ¹ designated waters	5 mg/L
COLD ¹ designated waters	6 mg/L
COLD and SPWN ¹ Designated waters	7 mg/L

¹ Beneficial Uses: WARM - Warm Freshwater Habitat; COLD - Cold Freshwater Habitat; SPWN - Spawning, Reproduction, and/or Early Development.
 - b. The pH to be depressed below 6.5 or raised above 8.5, and the ambient pH levels to be changed from natural conditions in inland waters more than 0.5 units or in estuaries more than 0.2 units.
 - c. The temperature at any time or place and within any given 24-hour period to be altered by more than 5°F above natural temperature; but at no time be raised above 80°F for waters with a beneficial use of WARM (Warm Freshwater Habitat).

- d. The turbidity to increase to the extent that such an increase causes nuisance or adversely affects beneficial uses; such increase shall not exceed 20% when the natural turbidity is over 50 NTU or 10% when the natural turbidity is 50 NTU or less.
 - e. Residual chlorine in concentrations that persist and impairs beneficial uses.
 - f. Any individual pesticide or combination of pesticides in concentrations that adversely affect beneficial uses or increase pesticide concentration in bottom sediments or aquatic life.
3. The discharge shall not alter the color, create a visual contrast with the natural appearance, nor cause aesthetically undesirable discoloration of the receiving waters.
 4. The discharge shall not degrade surface water communities and population including vertebrate, invertebrate, and plant species.
 5. The discharge shall not damage, discolor, nor cause formation of sludge deposits on flood control structures or facilities nor overload their design capacity.
 6. The discharge shall not cause problems associated with breeding of mosquitoes, gnats, black flies, midges, or other pests.

B. Groundwater Limitations

Not Applicable.

VII. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in Attachment D of this Order.
2. The Discharger shall comply with the following provisions:
 - a. The Executive Officer may require any discharger authorized under this Order to apply for and obtain an individual NPDES permit with more specific requirements. The Executive Officer may require any discharger authorized to discharge under this permit to apply for an individual permit only if the discharger has been notified in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of the individual permit, the authority to discharge under this general permit is no longer applicable.

- b. The discharger shall comply with all the applicable items of the *Standard Provisions and Reporting for Waste Discharge Requirements* (Standard Provisions), which are part of this general permit (Attachment D). If there is any conflict between provisions stated herein and the Standard Provisions, those provisions stated herein prevail.
- c. Prior to application, the discharger shall submit for Executive Officer's approval the list of chemicals and proprietary additives that may affect the discharge, including rates/quantities of application, compositions, characteristics, and material safety data sheets, if any.
- d. Oil or oily materials, chemicals, refuse, or other materials that may cause pollution in storm water and/or urban runoff shall not be stored or deposited in areas where they may be picked up by rainfall/urban runoff and discharged to surface waters. Any spill of such materials shall be contained, removed and cleaned immediately.
- e. This Order neither exempts the discharger from compliance with any other laws, regulations, or ordinances that may be applicable, nor legalizes the waste disposal facility.
- f. The discharger shall at all times properly operate and maintain all facilities and systems installed or used to achieve compliance with this Order.
- h. Any discharge authorized under this Order may request to be excluded from the coverage of this Order by applying for an individual permit.
- i. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from treatment facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

B. Monitoring and Reporting Program Requirements

The Executive Officer is hereby authorized to prescribe a Monitoring and Reporting Program for each authorized discharger. The Discharger shall comply with the MRP accompanying the transmittal for enrollment under this General NPDES permit, and future revisions thereto. If there is any conflict between provisions stated in the MRP and the Regional Water Board Standard Provisions, those provisions stated in the MRP shall prevail.

C. Special Provisions

1. Reopener Provision

- a. This Order may be modified, revoked and reissued, or terminated for cause. Reasons for modification may include new information on the impact of discharges regulated under this Order become available, promulgation of new effluent standards and/or regulations, adoption of new policies and/or water quality objectives, and/or new judicial decisions affecting requirements of this Order.
- b. Pursuant to 40 CFR sections 122.62 and 122.63, this Order may be modified, revoked and reissued, or terminated for cause. Reasons for modification may include new information on the impact of discharges regulated under this Order become available, promulgation of new effluent standards and/or regulations, adoption of new policies and/or water quality objectives, and/or new judicial decisions affecting requirements of this Order. In addition, if receiving water quality is threatened due to discharges covered under this permit, this permit will be reopened to incorporate more stringent effluent limitations for the constituents creating the threat. TMDLs have not been developed for all the parameters and receiving waters on the 303(d) list. When TMDLs are developed this permit may be reopened to incorporate appropriate limits. In addition, if TMDL identifies that a particular discharge covered under this permit is a load that needs to be reduced; this permit will be reopened to incorporate appropriate TMDL based limit and/or to remove any applicable exemptions.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

Not Applicable

3. Best Management Practices and Pollution Prevention

All Dischargers are encouraged to implement Best Management Practices and Pollution Prevention Plans to minimize pollutant concentrations in the discharge.

4. Construction, Operation and Maintenance Specifications

All owners or operators authorized discharge under the General Permit shall maintain and update, as necessary, a Groundwater Treatment System Operation and Maintenance (O&M) Manual to assure efficient and effective treatment of contaminated groundwater (pollutants concentrations above water quality criteria and goals). The O&M Manual shall address, but not limited to, the following.

The O&M manual shall specify both normal operating and critical maximum or minimum values for treatment process variables including influent concentrations, flow rates, water levels, temperatures, time intervals, and chemical feed rates.

The O&M manual shall specify an inspection and maintenance schedule for active and reserve system and shall provide a log sheet format to document inspection observations and record completion of maintenance tasks.

The O&M manual shall include a Contingency and Notification Plan. The plan shall include procedures for reporting personnel to assure compliance with this General Permit, as well as authorization letters from the Executive Officer.

The O&M manual shall specify safeguards to prevent noncompliance with limitations and requirements of the General Permit resulting from equipment failure, power loss, vandalism, or ten-year return frequency rainfall.

5. Engineering Design Report

For all new dischargers and existing dischargers where significant changes have made since prior submittals to the Regional Water Board, the NOI shall be accompanied by treatment flow schematic diagram and a certification, which demonstrates that the treatment process and the physical design of the treatment components will ensure compliance with the prohibitions, effluent limitations, and other conditions of the General Permit.

7. Special Provisions for Municipal Facilities (POTWs Only)

Not Applicable

8. Other Special Provisions

a. Expiration and Continuation of this Order

This Order expires on June 5, 2013; however, for those dischargers authorized to discharge under this Order, it shall continue in full force and effect until a new order is adopted. Notwithstanding Provision J (Expiration and Continuation of this Order) of Order No. R4-2003-0111, discharges regulated under Order No. R4-2003-0111 on or before sixtieth day of notification of adoption of this Order, that has submitted a completed NOI may continue under Order No. R4-2003-0111 until enrolled under this General Permit.

b. Reauthorization

Upon reissuance of a new general permit order, dischargers authorized under this Order shall file a Notice of Intent or a new Report of Waste Discharge within 60 days of notification by the Executive Officer.

c. Rescission

Except for enforcement purposes, Order No. R4-2003-0111, adopted by this Regional Board on August 7, 2003, is rescinded effective June 5, 2008.

9. Compliance Schedules

Not Applicable

VIII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section V of this Order will be determined as specified below:

A. General.

Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined in the MRP and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

B. Multiple Sample Data.

When determining compliance with an AMEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

C. Average Monthly Effluent Limitation (AMEL).

If the average (or when applicable, the median determined by subsection B above for multiple sample data) of daily discharges over a calendar month exceeds the AMEL for a given parameter, this will represent a single violation, though the Discharger will be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of non-compliance in a 31-day month). If only a single sample is taken during the calendar month and the analytical result for that sample exceeds the AMEL, the Discharger will be considered out of compliance for that calendar month. The

Discharger will only be considered out of compliance for days when the discharge occurs. For any one calendar month during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar month.

D. Average Weekly Effluent Limitation (AWEL).

If the average (or when applicable, the median determined by subsection B above for multiple sample data) of daily discharges over a calendar week exceeds the AWEL for a given parameter, this will represent a single violation, though the Discharger will be considered out of compliance for each day of that week for that parameter, resulting in 7 days of non-compliance. If only a single sample is taken during the calendar week and the analytical result for that sample exceeds the AWEL, the Discharger will be considered out of compliance for that calendar week. The Discharger will only be considered out of compliance for days when the discharge occurs. For any one calendar week during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar week.

E. Maximum Daily Effluent Limitation (MDEL).

If a daily discharge <(or when applicable, the median determined by subsection B above for multiple sample data of a daily discharge)> exceeds the MDEL for a given parameter, the Discharger will be considered out of compliance for that parameter for that 1 day only within the reporting period. For any 1 day during which no sample is taken, no compliance determination can be made for that day.

F. Instantaneous Minimum Effluent Limitation.

If the analytical result of a single grab sample is lower than the instantaneous minimum effluent limitation for a parameter, the Discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of non-compliance with the instantaneous minimum effluent limitation).

G. Instantaneous Maximum Effluent Limitation.

If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for a parameter, the Discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both exceed the instantaneous maximum effluent limitation would result in two instances of non-compliance with the instantaneous maximum effluent limitation).

DEFINITIONS, ACRONYMS & ABBREVIATIONS

DEFINITIONS

Arithmetic Mean (μ), also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL): the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL): the highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Daily Discharge: Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

Detected, but Not Quantified (DNQ) are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Effluent Concentration Allowance (ECA) is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in U.S. EPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance

between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

Estimated Chemical Concentration is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters included, but are not limited to, the Sacramento-San Joaquin Delta, as defined in Water Code section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

Inland Surface Waters are all surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

Instantaneous Maximum Effluent Limitation: the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation: the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL) means the highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median is the middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the $n/2$ and $n/2+1$).

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in title 40 of the Code of Federal Regulations, Part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Not Detected (ND) are those sample results less than the laboratory's MDL.

Ocean Waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program (PMP) means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements.

Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State or Regional Water Board.

Reporting Level (RL) is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Satellite Collection System is the portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

Source of Drinking Water is any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan.

Standard Deviation (σ) is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

x is the observed value;

μ is the arithmetic mean of the observed values; and

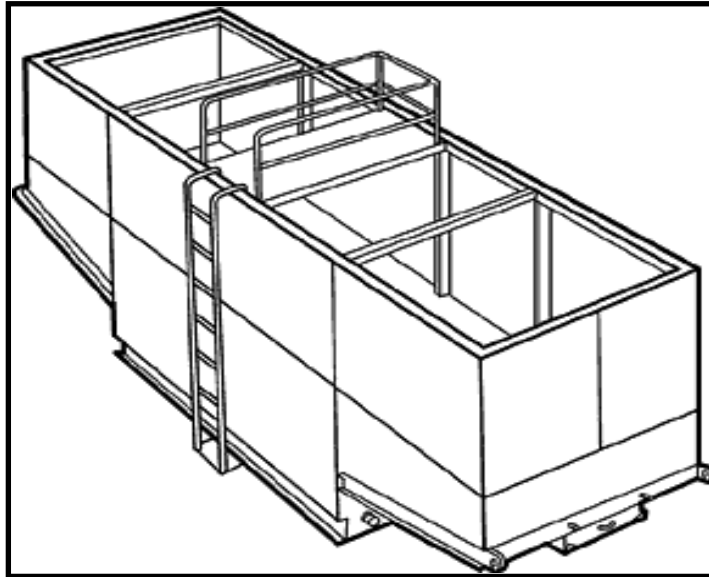
n is the number of samples.

Toxicity Reduction Evaluation (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

ACRONYMS & ABBREVIATIONS

AMEL	Average Monthly Effluent Limitation
B	Background Concentration
BAT	Best Available Technology Economically Achievable
Basin Plan	<i>Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties</i>
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practices
BMPPP	Best Management Practices Plan
BPJ	Best Professional Judgment
BOD	Biochemical Oxygen Demand
BPT	Best practicable treatment control technology
C	Water Quality Objective
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CTR	California Toxics Rule
CV	Coefficient of Variation
CWA	Clean Water Act
CWC	California Water Code
DMR	Discharge Monitoring Report
DNQ	Detected But Not Quantified
ECA	Effluent Concentration Allowance
ELAP	California Department of Health Services Environmental Laboratory Accreditation Program
ELG	Effluent Limitations, Guidelines and Standards
gpd	gallons per day
IC	Inhibition Coefficient
IC ₁₅	Concentration at which the organism is 15% inhibited
IC ₂₅	Concentration at which the organism is 25% inhibited
IC ₄₀	Concentration at which the organism is 40% inhibited
IC ₅₀	Concentration at which the organism is 50% inhibited
LA	Load Allocations
LOEC	Lowest Observed Effect Concentration
LTA	Long-Term Average
MDEL	Maximum Daily Effluent Limitation
MDL	Method Detection Limit
MEC	Maximum Effluent Concentration
MGD	Million Gallons Per Day
mg/L	Milligrams per Liter
ML	Minimum Level
MRP	Monitoring and Reporting Program
ND	Not Detected
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NTR	National Toxics Rule
OAL	Office of Administrative Law

POTW	Publicly-Owned Treatment Works
PMP	Pollutant Minimization Plan
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
RPA	Reasonable Potential Analysis
RWQCB	Regional Water Quality Control Board
SCP	Spill Contingency Plan
SIP	State Implementation Policy (<i>Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California</i>)
SMR	Self Monitoring Reports
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Test Acceptability Criteria
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document
TSS	Total Suspended Solid
TU	Toxicity Unit
USEPA	United States Environmental Protection Agency
WDR	Waste Discharge Requirements
WET	Whole Effluent Toxicity
WLA	Waste Load Allocations
WQBEL	Water Quality-Based Effluent Limitation
µg/L	Micrograms per Liter



Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedences of the General Permit requirements.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

- SE-5: Fiber Roll
- SE-6: Gravel Bag Berm



Limitations

- Dewatering operations will require, and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required by the discharger. For example, when discharging to a water of the U.S., a groundwater extraction permit will be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained through the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

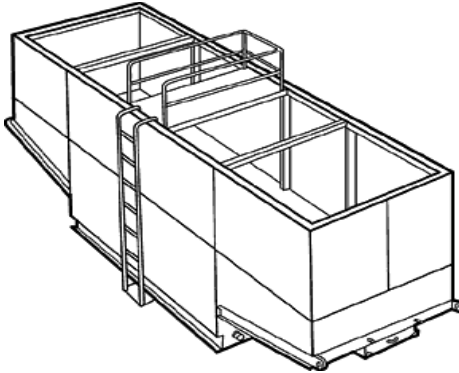
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks



Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

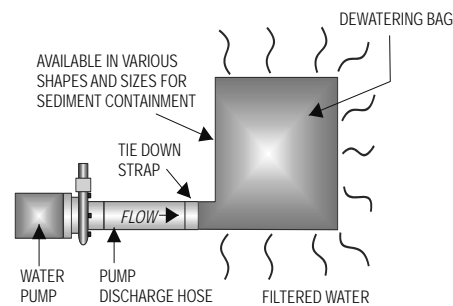
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter



Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter



Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter



Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter



Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from \$360 per month for a 1,000 gallon tank to \$2,660 per month for a 10,000 gallon tank. Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.
- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



CALIFORNIA WATER SERVICE

Rancho Dominguez District 2632 West 237th Street, Torrance, CA 90505

Tel: (310) 257-1400

May 10, 2016

Bolour Associates
8383 Wilshire Boulevard
Beverly Hills, CA 90211
Attn: Michael Matthews

Will Serve Letter
11-81 Pier Avenue, 20-60 13th Street, Hermosa Beach
Developer: Bolour Associates

Dear Mr. Matthews:

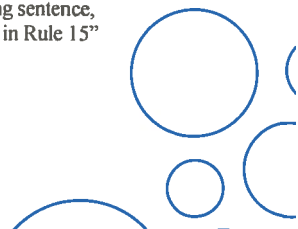
As a regulated utility, California Water Service Company Rancho Dominguez district ("Cal Water") has an obligation to provide water service in accordance with the rules and regulations of the California Public Utility Commission (CPUC). Assuming you receive all required permits from the City of Hermosa Beach or Los Angeles County, Cal Water will provide water service to the above referenced project. Cal Water agrees to operate the water system and provide service in accordance with the rules and regulations of the California Public Utilities Commission (CPUC) and the company's approved tariffs on file with the CPUC. This will serve letter shall remain valid for **two years** from the date of this letter. If construction of the project has not commenced within this **two year** time frame, Cal Water will be under no further obligation to serve the project unless the developer receives an updated letter from Cal Water reconfirming our commitment to serve the above mentioned project. Additionally, Cal Water reserves the right to rescind this letter at any time in the event its water supply is severely reduced by legislative, regulatory or environmental actions.

Cal Water will provide such potable¹ water at such pressure as may be available from time to time as a result of its normal operations per the company's tariffs on file with the CPUC. Installation of facilities through developer funding shall be made in accordance with the current rules and regulations of the CPUC including, among others, Tariff Rules 15 and 16 and General Order 103-A. In order for us to provide adequate water for domestic use as well as fire service protection, it may be necessary for the developer to fund the cost of special facilities, such as, but not limited to, booster pumps, storage tanks and/or water wells,² in addition to the cost of mains and services. Cal Water will provide more specific information regarding special facilities and fees after you provide us with your improvement plans, fire department requirements, and engineering fees for this project.

This letter shall at all times be subject to such changes or modifications by the CPUC as said Commission may, from time to time, require in the exercise of its jurisdiction.

¹ This portion of the letter to be modified accordingly in the event the development for which this letter is being generated is to be served with potable and non potable water.

² For the districts that collect facility fees on a per lot basis, delete the reference to wells as a special facility here and add in the following sentence, "Developer will also be required to contribute towards Cal Water's water supply by paying facilities fees on a per lot basis as described in Rule 15"





CALIFORNIA WATER SERVICE

May 10, 2016
Mr. Michael Matthews
Page 2

If you have any questions regarding the above, please call me at (310) 257-1400.

Sincerely,

A handwritten signature in blue ink, appearing to read "Daniel Trejo", with a horizontal line extending to the right.

Daniel Trejo
District Manager – Acting

cc: Ting He – Cal Water Engineering Dept
Frank Scotty – General Superintendent
Rob Olsen – Superintendent
File

