



Construction Activities Best Management Practice Manual



STATE OF HAWAII, DEPARTMENT OF
TRANSPORTATION, AIRPORTS
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TABLE OF CONTENTS

1	Introduction	1
2	List of BMPs	3
3	Erosion Control BMPs.....	5
	EC-0 EMPLOYEE AND SUBCONTRACTOR TRAINING	6
	EC-1 SCHEDULING	8
	EC-2 PRESERVATION OF EXISTING VEGETATION	10
	EC-3 HYDROMULCH	12
	EC-5 SOIL BINDERS	14
	EC-7 GEOTEXTILES AND MATS	16
	EC-8 MULCHING	18
	EC-9 TEMPORARY EARTH DIKES AND SWALES	20
	EC-10 VELOCITY DISSIPATION DEVICES.....	23
	EC-11 SLOPE DRAINS.....	26
	EC-12 STREAMBANK STABILIZATION	30
	EC-13 TEMPORARY RIPRAP AND GABION INFLOW PROTECTION	33
	EC-14 GRASS AND PLANTING.....	36
	EC-15 SLOPE ROUGHENING AND TERRACING	39
	EC-16 TOPSOIL MANAGEMENT.....	43
	EC-17 DUST CONTROL.....	45
4	Sediment Control BMPs	47
	SE-1 SILT FENCE.....	48
	SE-3 SEDIMENT TRAP	52
	SE-4 CHECK DAMS.....	54
	SE-6 GRAVEL BAG BARRIER.....	57
	SE-8 SANDBAG BARRIER.....	59
	SE-10 STORM DRAIN INLET PROTECTION	62
	SE-12 POTENTIAL SEDIMENT SOURCE LOCATION	68
	SE-13 LEVEL SPREADER	69
	SE-15 VEGETATED BUFFER STRIPS AND CHANNELS	70
	SE-16 COMPOST FILTER BERM OR SOCK.....	73
5	Tracking Control BMPs	75
	TR-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT	76
	TR-2 CONSTRUCTION ROAD STABILIZATION	80
	TR-3 STREET SWEEPING	82
6	Site Operations BMPs.....	84
	SO-1 WATER CONSERVATION AND USAGE PRACTICES	85

SO-2 DEWATERING OPERATIONS	87
SO-3 MILLING AND PAVING OPERATIONS	89
SO-4 TEMPORARY STREAM CROSSING	91
SO-5 TEMPORARY WATER DIVERSION.....	96
SO-6 ILLICIT DISCHARGE, ILLEGAL CONNECTION, SPILL, AND LEAK PREVENTION AND CONTROL	98
SO-8 VEHICLE AND EQUIPMENT CLEANING	102
SO-9 VEHICLE AND EQUIPMENT REFUELING	104
SO-10 VEHICLE AND EQUIPMENT OPERATION, STORAGE, AND ROUTINE MAINTENANCE	106
SO-12 CONCRETE CURING	109
SO-13 STRUCTURE CONSTRUCTION AND PAINTING	111
SO-14 MATERIAL OVER WATER	114
SO-15 DEMOLITION ADJACENT TO WATER	116
SO-16 TEMPORARY BATCH PLANTS	117
SO-17 HYDROTESTING EFFLUENT MANAGEMENT	119
SO-18 WATER-JET WASH AND HYDRO-DEMOLITION WATER MANAGEMENT	121
7 Materials Handling and Waste Management BMPs.....	123
WM-1 MATERIAL DELIVERY AND STORAGE.....	124
WM-2 MATERIAL USE	127
WM-3 PROTECTION OF STOCKPILES.....	129
WM-5 SOLID WASTE MANAGEMENT - DEBRIS.....	131
WM-6 SOLID WASTE MANAGEMENT - HAZARDOUS WASTE	133
WM-7 CONTAMINATED SOIL MANAGEMENT	135
WM-8 CONCRETE WASTE MANAGEMENT.....	137
WM-9 SANITARY/SEPTIC WASTE MANAGEMENT	139
WM-10 LIQUID MANAGEMENT	140
8 References	142

LIST OF ACRONYMS

AIR-EE	State of Hawaii, Department of Transportation, Airports, Engineering Branch, Environmental Section
AOA	Airport Operations Area
AST	Aboveground Storage Tank
BMP	Best Management Practice
C&D	Construction and Demolition
CWRM	State of Hawaii, Department of Land and Natural Resources, Commission on Water Resources Management
DLNR	State of Hawaii, Department of Land and Natural Resources
DOH	State of Hawaii, Department of Health
DOH CWB	State of Hawaii, Department of Health, Clean Water Branch
DOH WWB	State of Hawaii, Department of Health, Wastewater Branch
DOH SHWB	State of Hawaii, Department of Health, Solid and Hazardous Waste Branch
DOH HEER	State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response Office
DOH TGM	State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response Office Technical Guidance Manual
DOT	State of Hawaii, Department of Transportation
DOTA	State of Hawaii, Department of Transportation, Airports
EC	Emergency Coordinator
FAA	Federal Aviation Administration
FOD	Foreign Object Debris
HAR	Hawaii Administrative Rules
HDH	Kawaihapai Airfield
HNL	Daniel K. Inouye International Airport
HNM	Hana Airport
H:V	Horizontal to Vertical
ITO	Hilo International Airport
JHM	Kapalua Airport
JRF	Kalaelo Airport
KOA	Ellison Onizuka Kona International Airport at Keahole
LIH	Lihue Airport
LNK	Lanai Airport
LUP	Kalaupapa Airport
MKK	Molokai Airport
MUE	Waimea-Kohala Airport
NGPC	Notice of General Permit Coverage
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center

OGG	Kahului Airport
PAK	Port Allen Airport
PBMP	Post-construction Best Management Practice; Permanent Best Management Practice
PPE	Personal Protective Equipment
QEP	Qualified Environmental Professional
RCRA	Resource Conservation and Recovery Act
SCAP	Stream Channel Alteration Permit
SDS	Safety Data Sheet
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
UPP	Upolu Airport
U.S.	United States of America
USACE	U.S. Army Corps of Engineers

1 INTRODUCTION

The purpose of this *Construction Activities Best Management Practice Manual* (herein referred to as “Manual”) is to provide guidance on BMP selection, installation, and maintenance procedures for construction activities. Implementation of these BMPs is intended to minimize the discharge of pollutants from land-disturbing activities to the DOTA storm drainage system and receiving waters to the extent achievable based on available technology and economic practicability. This manual does not constitute an exhaustive list of BMPs available for use. Designers and contractors may use BMPs other than those listed in this manual provided they are approved by AIR-EE.

This manual is intended for use by DOTA staff, consultants, and contractors involved in projects that require construction work within DOTA property. The BMPs included in this manual focus on the areas of erosion control, sediment control, tracking control, potential pollutant control, and materials and waste management control. Erosion control BMPs are measures installed or implemented to protect the ground surface from erosion due to wind, rain, or runoff. Sediment control BMPs are measures that intercept and detain sediment-laden runoff to allow for sediment to settle and filter out prior to discharge. Tracking control BMPs are devices or procedures that minimize the amount of sediment and debris that is tracked offsite by vehicles and equipment. Potential pollutant control BMPs and materials and waste management control BMPs are established practices and procedures designed to control potential pollutants at their source.

BMPs should be selected for a given project area in consideration of the expected amount, frequency, intensity, and duration of precipitation; existing flow conditions such as run-on and channelization; present soil and vegetative characteristics of the project area; and identified potential pollutant sources. It is further advised to install multiple, sequential BMPs to effectively prevent potential pollutants from leaving the site, entering the storm drainage system or receiving waters, or potentially impacting soil or groundwater. For example, storm drain inlet protection is considered the last line of defense and should be combined with other BMPs that are designed to prevent pollution at the source.

Each BMP measure provided in this manual consists of the following sections:

- Description
- Limitations
- Practice
- Maintenance and Inspection

Temporary Construction BMPs should be routinely maintained and only removed after the potential to discharge the pollutants targeted by the BMPs is eliminated. Erosion and sediment control BMPs must remain until after the area is stabilized or restored to pre-construction conditions.

For post-construction or permanent BMP measures, please refer to the State of Hawaii, DOTA Post-Construction/Permanent Best Management Practice Manual.¹

¹ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/pbmp-manual/>

DISCLAIMER

The information presented in this Construction Activities BMP Manual was taken from available and most recent sources deemed to be representative of acceptable BMPs and stormwater runoff control measures. This manual has been prepared as a reference guideline. However, due to site-specific conditions, the BMPs employed must be selected in conjunction with professional judgment and sound engineering principles to ensure the proper function and performance of the BMPs contained herein. The author does not guarantee the accuracy or completeness of this document and will not assume any liability or responsibility for the use of, or for any damages resulting from the use of any information contained herein. The detail and the wording in this manual will not necessarily result in compliance with the Standard Specifications. Application of BMPs should comply with applicable federal, state, and county regulations.

2 LIST OF BMPS

Because designers and contractors may be accustomed to naming conventions commonly used by other agencies and throughout the industry, the identifiers most commonly used for BMPs were generally used in this Manual although, in a few cases, two BMPs were combined into one. Below is a list of BMPs in this Manual and their identifiers. Common BMP identifiers that are not included in this Manual are shown as “reserved.”

BMPS	
Erosion Control (EC)	
EC-0	Employee and Subcontractor Training
EC-1	Scheduling
EC-2	Preservation of Existing Vegetation
EC-3	Hydromulch
EC-4	<Reserved>
EC-5	Soil Binders
EC-6	<Reserved>
EC-7	Geotextiles and Mats
EC-8	Mulching
EC-9	Temporary Earth Dikes and Swales
EC-10	Velocity Dissipation Devices
EC-11	Slope Drains
EC-12	Streambank Stabilization
EC-13	Temporary Riprap and Gabion Inflow Protection
EC-14	Grass and Planting
EC-15	Slope Roughening and Terracing
EC-16	Topsoil Management
EC-17	Dust Control
Sediment Control (SE)	
SE-1	Silt Fence
SE-2	<Reserved>
SE-3	Sediment Trap
SE-4	Check Dams
SE-5	<Reserved>
SE-6	Gravel Bag Barrier
SE-7	<Reserved>
SE-8	Sandbag Barrier
SE-9	<Reserved>
SE-10	Storm Drain Inlet Protection
SE-11	<Reserved>
SE-12	Potential Sediment Source Location
SE-13	Level Spreader
SE-14	<Reserved>
SE-15	Vegetated Buffer Strips and Channels
SE-16	Compost Filter Berm or Sock
Tracking Control (TR)	
TR-1	Stabilized Construction Entrance/Exit
TR-2	Construction Road Stabilization
TR-3	Street Sweeping

Site Operations (SO)	
SO-1	Water Conservation and Usage Practices
SO-2	Dewatering Operations
SO-3	Milling and Paving Operations
SO-4	Temporary Stream Crossing
SO-5	Temporary Water Diversion
SO-6	Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control
SO-7	<Reserved>
SO-8	Vehicle and Equipment Cleaning
SO-9	Vehicle and Equipment Refueling
SO-10	Vehicle and Equipment Operation, Storage, and Routine Maintenance
SO-11	<Reserved>
SO-12	Concrete Curing
SO-13	Structure Construction and Painting
SO-14	Material Over Water
SO-15	Demolition Adjacent to Water
SO-16	Temporary Batch Plants
SO-17	Hydrotesting Effluent Management
SO-18	Water-Jet Wash and Hydro-Demolition Water Management
Materials Handling and Waste Management (WM)	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Protection of Stockpiles
WM-4	<Reserved>
WM-5	Solid Waste Management - Debris
WM-6	Solid Waste Management - Hazardous Waste
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

3 EROSION CONTROL BMPS

Erosion control BMPs are practices that protect the soil surface and prevent soil particles from being detached by rainfall, flowing water, or wind. Erosion control can also be used as soil stabilization.

All inactive and most active disturbed areas on the project site must be protected from erosion. Typically, steep slopes and large exposed areas require the most robust erosion control BMPs; flatter slopes and smaller areas still require protection, but less robust materials may be appropriate for these areas.

Some erosion control BMPs can be used effectively to temporarily prevent erosion by concentrated flows. These BMPs, used alone or in combination, prevent erosion by intercepting, diverting, conveying, and discharging concentrated flows in a manner that prevents soil detachment and transport.

Temporary concentrated flow conveyance controls may be required to direct run-on around or through the project in a way that does not cause erosion.

EC-0 EMPLOYEE AND SUBCONTRACTOR TRAINING



Description

Training programs help employees and subcontractors understand construction BMP requirements as applicable to their responsibilities. Training topics include, but are not limited to, stormwater management; potential contamination sources; and BMP function, installation, and maintenance.

Limitations

- Availability of staff time to coordinate and conduct training.

EC-0 EMPLOYEE AND SUBCONTRACTOR TRAINING	
Practice	
EC-0.P1	Complete training for all parties involved with construction project responsibilities, including DOTA engineers, inspectors, contractors, consultants, and designers before construction begins and annually during construction. Refer to the Construction Site Runoff/PBMP Program webpage ² for the latest training information. Training must be completed annually.
EC-0.P2	Integrate stormwater quality management training with existing training programs that may be required for the project by other regulations such as: the Safety and Health Program (Hawaii Occupational Safety and Health Standards), the Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120), the SPCC Plan (40 CFR 112), and the Hazardous Materials Management Plan.
EC-0.P3	Provide stormwater management training through courses, seminars, workshops, product demonstrations, employee meetings, posters, and bulletin boards.
EC-0.P4	Improve stormwater quality management based on experience involving water quality problems at construction sites. Implement revised practices and procedures in training.
EC-0.P5	Train employees/subcontractors in standard operating procedures and spill cleanup techniques as well as reporting requirements outlined in the airport-specific DOTA Spill Response Fact Sheets (SO-6 Illicit Discharge, Illicit Connection, Spill, and Leak Prevention and Control).
EC-0.P6	Personnel who use pesticides should be trained in their use. The State Department of Agriculture, Pesticides Branch licenses pesticide dealers, certifies pesticides applicators, and conducts on-site inspections.
EC-0.P7	Ensure that employees know the on-site location and purpose of environmental compliance documents such as the SWPPP or SSBMP Plan, BMP Map, and NGPC.

² <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/>

EC-0 EMPLOYEE AND SUBCONTRACTOR TRAINING	
EC-0.P8	Train employees to properly conduct and record BMP self-inspections following the practices, maintenance, and inspection items listed herein. BMP self-inspections must accurately and thoroughly record on-site conditions of all BMPs, disturbed areas, and receiving storm drain systems and waters.
Maintenance and Inspection	
EC-0.M1	Provide annual training on construction BMP implementation for all employees involved with construction activities.

EC-1 SCHEDULING



Description

Proper scheduling of construction activities can reduce the area and duration of soil exposure to erosion from wind, rain, runoff, and vehicle tracking.

Limitations

- None

EC-1 SCHEDULING	
Practice	
EC-1.P1	Avoid operations during rainy periods as much as possible. Schedule major grading operations during dry months (April through October), if possible.
EC-1.P2	Monitor the weather forecast for rainfall. Allow sufficient time before rainfall begins to stabilize the soil with vegetation or physical means, or to install temporary sediment trapping devices.
EC-1.P3	Minimize area of soil exposed at any one time. Schedule projects to disturb only small portions of the site at a time. Complete grading as timely as possible.
EC-1.P4	Avoid creating ponded areas or water features that can attract wildlife hazardous to airport operations.
EC-1.P5	<p>Initiate stabilization of disturbed areas no later than the end of the next workday after earth-disturbing activities have permanently ceased or will be suspended for a period of 14 or more calendar days through one of the following activities:</p> <ul style="list-style-type: none">• Prepping the soil for vegetative or non-vegetative stabilization.• Applying mulch or other non-vegetative product to the exposed area.• Planting, including sprigging, sodding, and/or plugging, the exposed area.• Finalizing arrangements to have stabilization product fully installed in compliance with final stabilization deadlines. <p>For vegetative stabilization, complete activities necessary to plant the area to be stabilized as soon as practicable, but no later than 14 calendar days after initiation. Final stabilization must be complete for project close out and is achieved when established uniform vegetation provides 70 percent or more of the density of coverage that was provided by vegetation prior to commencing earth-disturbing activities. If 70 percent density cannot be achieved within 14 calendar days after earth-disturbing activities have ceased, implement temporary non-vegetative stabilization measures to prevent erosion until final stabilization is achieved.</p>

EC-1 SCHEDULING	
	For non-vegetative stabilization, install or apply non-vegetative stabilization measures on the area to be stabilized as soon as practicable, but no later than 14 calendar days after initiation. If the project discharges to a sediment- or nutrient-impaired water, or if the disturbed area is located within 50 feet of a receiving State water without a natural buffer, vegetative or non-vegetative stabilization must be complete within 7 calendar days after initiation.
EC-1.P6	Backfill open trenches as soon as possible. Sequence trenching projects so open portions of the trench are backfilled before excavating the next trench section.
EC-1.P7	Minimize disturbance on steep slopes (greater than 5:1 (H:V)). If disturbance of steep slopes is unavoidable, phase disturbance and use erosion controls.
EC-1.P8	Schedule handling, use, and disposal of hazardous materials such as paint, pesticides, hazardous waste, etc. such that materials are stored on site for the minimum amount of time necessary.
EC-1.P9	Schedule waste management servicing such as C&D waste removal, sanitary facility cleaning, hazardous waste pickup, etc. regularly. Arrange servicing such that waste containment facilities are operational when needed and not at risk of exceeding capacity.
EC-1.P10	Consider the timeline of BMP-related activities in the construction schedule, including: <ul style="list-style-type: none"> • Installation • Maintenance • Inspection (e.g., coordinating third-party BMP inspections to begin work in a new area, conducting weekly self-inspections) • Document and permit preparation, including AIR-EE review and comment response
Maintenance and Inspection	
EC-1.M1	Verify the work is in accordance with the construction schedule. If the work deviates from the schedule, take corrective actions.
EC-1.M2	Update the construction schedule as specified in the contract or as needed for unforeseen changes.
EC-1.M3	Perform weekly self-inspections of all BMPs and maintain records of inspection and maintenance on site.

EC-2 PRESERVATION OF EXISTING VEGETATION



Description

Carefully planned preservation and protection of existing vegetation at construction sites minimizes the potential of harming or needlessly destroying existing trees, vines, shrubs, and/or grasses that stabilize soil and control erosion. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. Vegetation also helps to keep soil from drying out and becoming susceptible to erosion by wind. Reduced root systems equate to diminished soil anchoring and a proportionate increase in erosion. Identifying the type of vegetation desirable or ideal for the area to be preserved can also contribute to the aesthetics of the site.

Preserve existing vegetation in the following locations:

- Areas within the project site where construction activities are not required.
- Sensitive areas where natural vegetation exists, such as on steep slopes (e.g., steeper than 3:1), areas near drainage ways, and wooded areas.
- Areas where local, state, or federal agencies require preservation, such as delineated wetlands, marshes, shorelines, conservation land, etc.
- Vegetation within swales and natural drainage ways.

The following criteria may be used for deciding which vegetation shall remain on the site:

- Preserve native species.
- Aesthetic value including foliage, flowering habits, and tree characteristics (e.g., bark, crown, etc.).
- Freedom from disease and rot.
- Life span of tree species (e.g., short-lived trees need not be preserved).
- Environmental values, including habitat, screening, and buffers; invasive species need not be preserved and may be encouraged to be removed.
- Exposure resistance (e.g., preserve vegetation that grows in direct sunlight and can withstand radiated heat from proposed structures and pavement).
- Space needed, because sufficient space must be provided between vegetation and structures, electric and telephone lines, water and sewer lines, driveways, and roadways.

Limitations

- Topography, sub-surface geological characteristics, soil quality, and a restrictive land development area may make it difficult and expensive to preserve existing vegetation on site.
- FAA rules regarding aircraft clearances and lines of sight may require the removal of existing vegetation.

EC-2 PRESERVATION OF EXISTING VEGETATION	
Practices	
EC-2.P1	Do not include plant species that compete destructively with the existing vegetation in landscaping plans.
EC-2.P2	Minimize disturbed areas or phase work to preserve existing vegetation whenever feasible and for as long as possible.
EC-2.P3	Preserve native topsoil where practicable.
EC-2.P4	Protect trees and their root systems during construction and prevent soil erosion by prohibiting soil disturbance within a specified distance identified in the project plans.
EC-2.P5	Clearly mark, flag, berm, or fence areas where vegetation and trees are to be preserved.
EC-2.P6	Define an appropriate setback area from vegetation to be preserved based on the location, species, size, and age of the vegetation, and on the potential impact of adjacent construction activities or permanent improvement. No disturbance related to construction activities is to be allowed within the setback area around the vegetation to be preserved.
EC-2.P7	Stake off root system limits (tree dripline).
EC-2.P8	Incorporate tree wells and retaining walls (permanent) to help preserve existing vegetation, large enough to protect the root system.
EC-2.P9	When grading under trees is necessary, limit excavation and fill to a distance 1 foot or more from the tree driplines.
EC-2.P10	Do not locate construction support activity areas (e.g., contractor's staging and storage yards, stockpile areas, chemical storage, waste management facilities, sanitary facilities, material storage areas, vehicle/equipment parking areas, vehicle/equipment fueling/maintenance areas, temporary batch plant yards, etc.), including access routes to the project, in areas where significant adverse impact on existing vegetation may occur.
EC-2.P11	Prepare landscaping plans that preserve as much existing vegetation as possible and provide information on the required care for this vegetation to thrive during and after construction.
Maintenance and Inspection	
EC-2.M1	Inspect swales and natural drainage ways prior to an anticipated rain event, after the rain event, and regularly at the end of each workweek to verify existing vegetation is in good condition.
EC-2.M2	Maintain markings around the boundary of the disturbed area and existing vegetation to be preserved.
EC-2.M3	Verify that protective measures remain in place and inspect them for damage. Restore damaged protection measures by the end of the next workday after incident.
EC-2.M4	Retain protective measures until all other construction activity is complete to avoid damage to vegetation during site cleanup and stabilization.
EC-2.M5	If damage to existing vegetation, consult with an arborist.

EC-3 HYDROMULCH



Description

Various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion. Hydromulching (also known as hydraulic mulching) is generally performed utilizing specialized machines that have a large water-holding/mixing tank and some form of mechanical agitation or other recirculation method to keep water, mulch, and soil amendments in suspension. The mixed hydraulic slurry can be applied from a tower sprayer on top of the machine or by extending a hose to areas remote from the machine.

Limitations

- In general, hydromulch is not limited by slope length, gradient, or soil type. However, the following limitations typically apply:
 - Most hydromulch applications, including wood fiber and bonded fiber matrices, require at least 24 hours of drying time prior to a rain event to be effective.
 - Temporary applications may require a second application, typically within 6-12 months of initial application, to remain effective for an entire rainy season.
 - Avoid use in areas where the mulch would be incompatible with immediate future earthwork activities and would have to be removed.
 - Application areas must be accessible to mulching equipment and near water sources for mixing and application.
 - Cellulose fiber mulches alone may not perform well on steep slopes or coarse soils.
- Per FAA Regulations, seeds are not to be applied within hydromulch on DOTA property in areas that could attract wildlife and cause safety concerns for aircraft operations. If seeds are to be used in areas that do not create safety concerns for aircraft operations, consult with USDA prior to implementation.
- Paper mulches alone are not permitted. Paper mulch is allowed if in combination with other mulch such as wood.

EC-3 HYDROMULCH	
Practice	
EC-3.P1	Prior to application, where feasible, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical. The majority of hydromulch applications do not require surface/soil preparation (See EC-15 Slope Roughening/Terracing); although, soil preparation can be beneficial in cases where re-vegetation is included as part of the practice. An advantage of hydromulch over other erosion control methods is that it can be applied in areas where soil preparation is precluded by site conditions, such as steep slopes, rocky soils, or inaccessibility.
EC-3.P2	Monitor predicted weather patterns and complete hydromulch activities in time to allow at least 24 hours of drying time before rainfall occurs.
EC-3.P3	Avoid overapplication of hydromulch. Do not apply hydromulch onto impervious areas, drainage ways, existing vegetation, etc.
EC-3.P4	Ensure that selection of hydromulches by the contractor is approved by the Engineer.
Maintenance and Inspection	
EC-3.M1	Repair eroded areas and reinstall BMPs within 7 calendar days. Exercise care to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
EC-3.M2	Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
EC-3.M3	Maintain slopes to prevent erosion for the duration of the project.
EC-3.M4	Provide training for personnel detailing the location and BMP requirements for any areas with hydromulch applications.

EC-5 SOIL BINDERS



Description

Soil binders are applied to exposed soil to provide temporary stabilization and prevent erosion of exposed soils on construction sites from water and wind.

Soil binders are typically applied to disturbed areas requiring short-term, temporary protection. Because soil binders are relatively convenient to implement, they are an efficient and cost-effective alternative to mulches in areas where grading activities will soon resume. Soil binders are also suitable for use on stockpiles.

Limitations

- Some soil binders may not perform well in the following site conditions:
 - High-traffic areas for vehicles or pedestrians.
 - Low relative humidity.
 - Curing may be limited if low temperatures occur within 24 hours of application.
 - Surface soils consisting of primarily of fine-grained soils such as silts and clays, particularly when compacted.
- Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders are temporary in nature and may need reapplication after rain events and may experience spot failures during heavy rain events.
- If runoff penetrates the soil at the top of a slope treated with a soil binder, the runoff may undercut the stabilized soil layer and discharge at a point further downslope.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer.
- Soil binders may not penetrate soil surfaces consisting primarily of silt and clay, particularly when compacted.
- The water quality impacts of some soil binders are relatively unknown, and some may have water quality impacts due to their chemical makeup.

EC-5 SOIL BINDERS	
Practice	
EC-5.P1	Select soil binders known to work well with the onsite soil types.
EC-5.P2	Select soil binders that are environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and do not stain paved or painted surfaces. Soil binders must not pollute stormwater.
EC-5.P3	Avoid overapplication of soil binders. Do not apply soil binders onto impervious areas, drainage ways, existing vegetation, etc.
EC-5.P4	Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
EC-5.P5	Prior to application, roughen embankment and fill areas where feasible.
EC-5.P6	Consider drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
EC-5.P7	For liquid agents: <ul style="list-style-type: none"> • Crown or slope ground to avoid ponding. • Uniformly pre-wet ground at .03 to 0.3 gal/yd² or according to manufacturer's recommendations. • Apply solution under pressure and overlap solution 6 to 12 inches. • Apply second treatment before first treatment becomes ineffective, using 50 percent application rate.
Maintenance and Inspection	
EC-5.M1	Eroded areas and/or areas where erosion is evident should be repaired and BMPs re-applied by the end of the next workday. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
EC-5.M2	Reapply the selected soil binder as needed to maintain effectiveness.
EC-5.M3	Provide training for personnel detailing the location and BMP requirements for areas with soil binder applications.

EC-7 GEOTEXTILES AND MATS



Description

Coverings made of natural or synthetic material are used to stabilize soil temporarily or permanently.

The following are examples of synthetic soil covers that may be used with or without vegetation for temporary or permanent stabilization:

- Excelsior matting
- Glass fiber matting
- Mulch netting

Limitations

- Matting is more costly than other BMP practices; therefore, it is most used in areas where other BMPs are ineffective (e.g., channels, steep slopes). Matting is not suitable for rocky sites or areas that will have vegetation that requires mowing (i.e., the matting and staple anchors can get caught in the mower).
- Matting may delay seed germination due to reduction in soil temperature.
- Installation requires experienced contractors to install the matting material in such a manner that continuous contact between the material and the soil occurs.
- Matting is not suitable for areas that have heavy foot traffic because it presents tripping hazards.

EC-7 GEOTEXTILES AND MATS	
Practice	
EC-7.P1	Use for temporary or permanent stabilization of highly erosive soils such as channels, streams, and steep slopes. Geotextiles or mats used for final stabilization must be designed for longevity and must be placed in accordance with the timeline described in EC-1 Scheduling.
EC-7.P2	Apply jute or similar matting where appropriate to disturbed soils and where existing vegetation has been removed. Note: products must be designed, selected, and installed such that they do not become a FOD risk.
EC-7.P3	When used on slopes, anchor geotextile or matting to the top of the slope in a 6-inch-deep trench and backfill, or anchor per manufacturer's recommended procedures, whichever is more stringent.

EC-7 GEOTEXTILES AND MATS	
EC-7.P4	Overlap the edges of the blankets approximately 2 to 3 inches and staple every 3 feet, or overlap per manufacturer’s recommended procedures, whichever is more stringent. Ensure close and continuous contact with the soil.
Maintenance and Inspection	
EC-7.M1	Repair damage to the matting within 7 calendar days of the incident or before the next anticipated rain event, whichever comes first.
EC-7.M2	If washout or breakage occurs, repair damage to the eroded area of the slope or channel and reinstall the material within 7 calendar days of the incident. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
EC-7.M3	Train required personnel about proper installation and maintenance of geotextile mats as well as the importance of preventing sediment discharge.

EC-8 MULCHING



Description

Mulching consists of applying a mixture of shredded wood mulch, bark, compost, or gravel to disturbed soils. The primary function of mulching is to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Mulching is suitable for disturbed soil areas requiring temporary protection until permanent stabilization is established.

The construction application procedures for mulches vary significantly depending upon the type of mulching method specified. Two methods are highlighted here:

- Green Material: This type of mulch is produced by the recycling of vegetation trimmings such as grass, shredded shrubs, and trees.
- Shredded Wood: Suitable for ground cover in ornamental or revegetated plantings. For sites that will include the demolition of many trees, consider the use of shredded wood covers as a temporary erosion control measure.

This section does not apply to hydromulching. Please refer to EC-3 Hydromulching.

Limitations

- Not suitable for use on slopes steeper than 3:1 (H:V). Best suited to flat areas or gentle slopes 5:1 (H:V) or flatter.
- Wood mulch and compost should be carefully procured so unwanted species are not introduced.
- Not suitable for areas exposed to concentrated flows. Mulch produced from a tub type grinder interlocks with adjacent fibers and the mix is more resistant to concentrated flows compared to wood chips.
- May need to be removed prior to further earthwork.
- Straw and other non-wood mulches alone are not permitted. Methods of application are generally by hand.

EC-8 MULCHING	
Practice	
EC-8.P1	Prior to application and after existing vegetation has been removed, roughen embankment and fill areas by rolling with a device such as a punching type of roller or by track walking.
EC-8.P2	Distribute mulch evenly on site to a depth of no more than 2 inches.
EC-8.P3	Remove large stones/clods, roots, stumps, sticks, debris, noxious weeds, and other deleterious material from mulch prior to application.
EC-8.P4	Do not apply mulch onto impervious areas, drainage ways, existing vegetation, etc.
EC-8.P5	Obtain approval from DOTA on mulch type and location to mitigate FOD risk.
Maintenance and Inspection	
EC-8.M1	Repair eroded areas and reinstall BMPs within 7 calendar days. Exercise care to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
EC-8.M2	Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked. If the mulch is applied as a standalone erosion control method over disturbed areas, it should last the length of time the site will remain barren or until final re-grading and revegetation.
EC-8.M3	Maintain slopes to prevent erosion for the duration of the project.
EC-8.M4	Where vegetation is not the permanent cover, such as ornamental and landscape applications of bark or wood chips, focus inspection and maintenance activities on longevity and integrity of the mulch.
EC-8.M5	Reapply mulch where bare earth becomes visible.

EC-9 TEMPORARY EARTH DIKES AND SWALES



Description

A temporary earth dike is a temporary berm or ridge of compacted soil used to divert offsite runoff around the construction site, to divert runoff around disturbed areas or unstable slopes, to direct runoff through disturbed areas into another BMP (e.g., sediment basins or traps), or as containment for construction materials and wastes.

Temporary swales are used to divert offsite runoff around the construction site, to divert runoff around disturbed areas or unstable slopes, or to direct runoff through disturbed areas into sediment basins or traps.

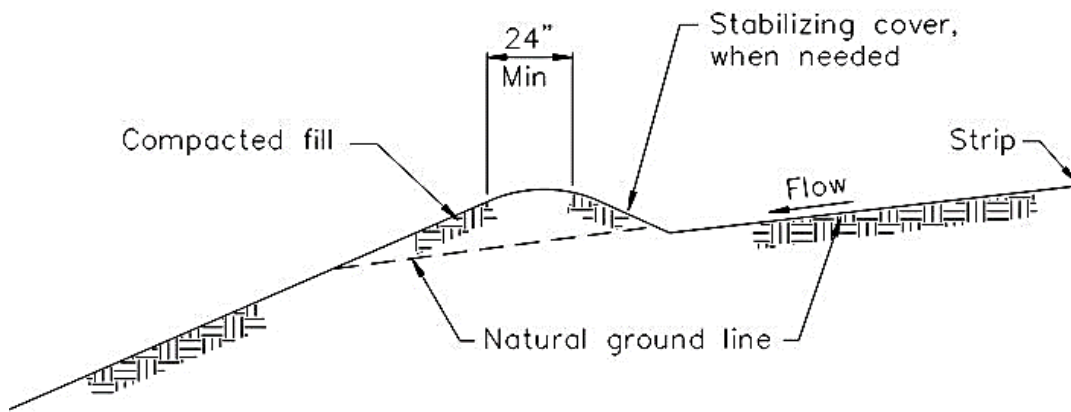
Limitations

Temporary earth dikes shall not be used for drainage areas greater than 10 acres, or along slopes greater than 10:1 (H:V). For larger areas, more permanent drainage structures shall be built. Additional limitations include the following:

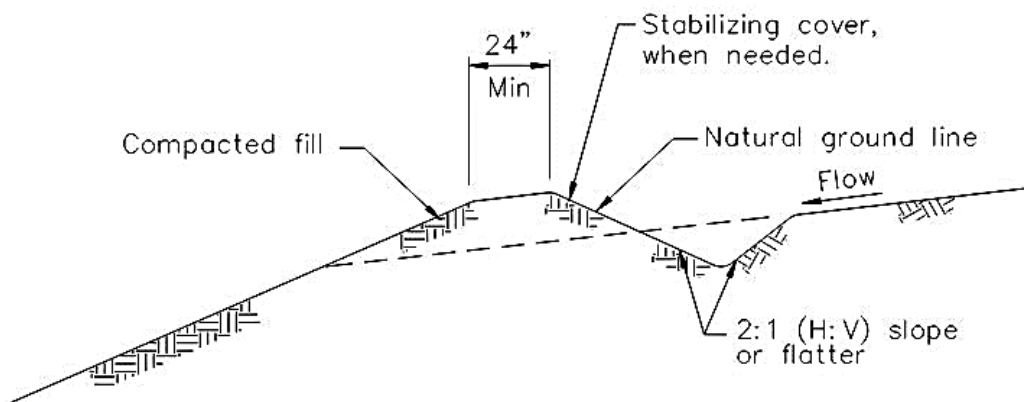
- Earth dikes may create more disturbed area.
- Earth dikes must be stabilized immediately, which adds cost and maintenance considerations.
- Diverted stormwater, if not managed properly, may cause downstream damage.
- Dikes are not to be constructed of soils that erode easily.
- Regrading or filling the site to remove the BMPs may add additional costs.
- Temporary runoff diversions shall not adversely impact upstream or downstream properties.
- Temporary runoff diversions must conform to local flood plain management requirements.
- A licensed, qualified engineer must design the runoff diversion if it is to be permanent.

EC-9 TEMPORARY EARTH DIKES AND SWALES	
Practice	
<i>GENERAL</i>	
EC-9.P1	Design and construct temporary earth dikes and swales to divert runoff to an approved location or sediment trapping device (e.g., SE-3 Sediment Trap).
<i>EARTH DIKES</i>	
EC-9.P2	Obtain approval for the locations and size of temporary earth dikes from the State Engineer and Airport Manager to prevent possible hazards and adverse impacts to aircraft and airport operations.

EC-9 TEMPORARY EARTH DIKES AND SWALES	
EC-9.P3	Properly compact dikes during construction. Do not construct earth dikes of easily erodible material.
EC-9.P4	Construct dikes to have 2:1 or flatter side slopes, 18 inches minimum height, and a minimum top width of 24 inches. Top width may be wider and side slopes may be flatter at crossing(s) for construction traffic.
EC-9.P5	Stabilize dike surfaces with vegetation, soil binders (refer to EC-5 Soil Binders), or physical devices within 1 calendar day after construction of the dike has been completed.
EC-9.P6	Do not remove dikes until the upstream disturbed areas are permanently stabilized.
EC-9.P7	Design dikes to safely convey anticipated flood flows.
<i>SWALES</i>	
EC-9.P8	At a minimum, the swale shall conform to pre-development drainage patterns and capacities.
EC-9.P9	Construct the swale with an uninterrupted, positive grade to a stabilized outlet.
EC-9.P10	Provide erosion protection or energy dissipation measures (EC-10 Velocity Dissipation Devices) at the outlet if the flow can reach an erosive velocity.
EC-9.P11	Size temporary drainage swales using local drainage design criteria.
EC-9.P12	Include erosion control measures along the swale if the flow can reach an erosive velocity.
Maintenance and Inspection	
EC-9.M1	Repair damage sustained to the dike or swale within 7 calendar days of the incident or before the next anticipated rain event, whichever comes first.
EC-9.M2	Provide training for personnel detailing the location and BMP requirements for any earth dikes or swales on site.

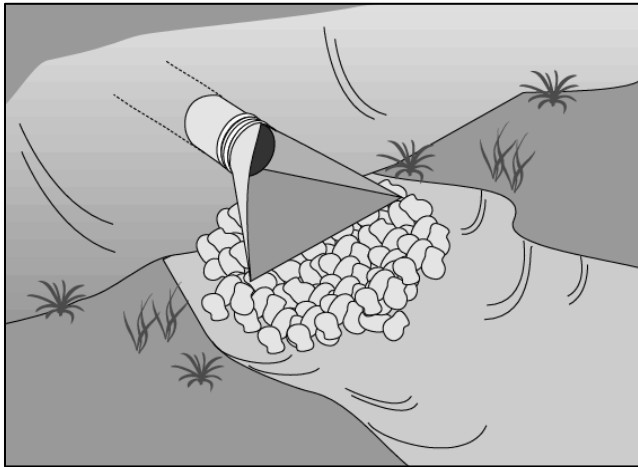


Typical Earth Dike
Not to Scale



Typical Drainage Swale
Not to Scale

EC-10 VELOCITY DISSIPATION DEVICES



Description

Velocity dissipation devices serve as outlet protection. They are composed of rock, grouted riprap, or concrete rubble placed at the outlet of a pipe or channel to prevent scour of the soil by concentrated, high-velocity flows.

The velocity dissipation device selected must consider the depth of flow, roughness, gradient, side slopes, discharge rate, and velocity in the outlet design; as well as compliance with all local, state, and federal regulations while working in streambeds.

Outlet protection is needed where discharge velocities and energies are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small, eroded pools (plunge pools) and protects against gully erosion resulting from scouring at a culvert mouth. Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipaters. It also serves to trap sediment and reduce flow velocities.

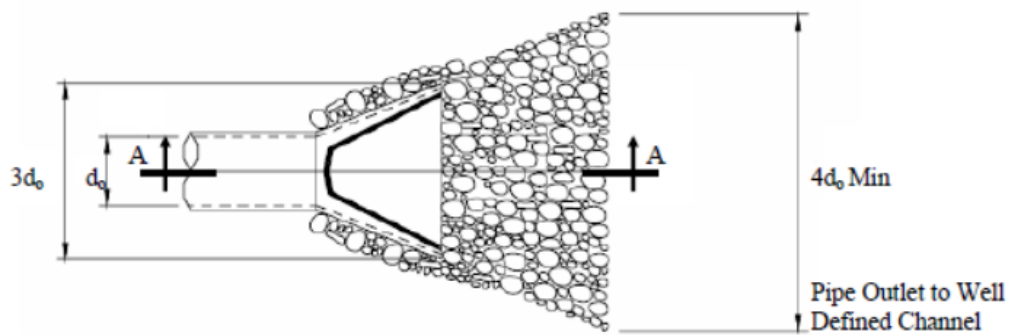
These devices may be suitable for the following locations:

- Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits, or channels.
- Outlets at the bottom of mild to steep slopes.
- Discharge outlets that carry continuous flows of water.
- Outlets subject to short, intense flows of water, such as flash floods.
- Points where lined conveyances discharge to unlined conveyances.

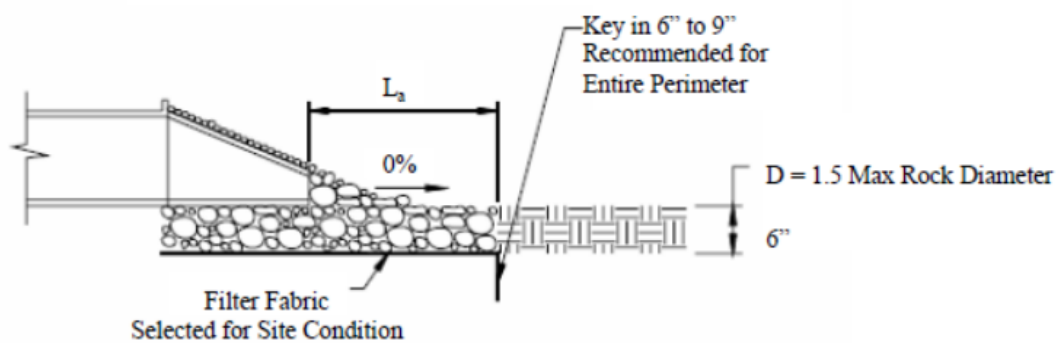
Limitations

- Large storms or high flows can wash away the rock outlet protection.
- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- If water builds up behind grouted riprap due to inadequate drainage, the grouted riprap may break up due to the resulting hydrostatic pressure.
- Additional permit requirements may be required for work in streambeds or other drainage ways.

EC-10 VELOCITY DISSIPATION DEVICES	
Practice	
EC-10.P1	<p>Design velocity dissipation devices properly to address flow and site conditions:</p> <ul style="list-style-type: none"> • Consider depth of flow, roughness, gradient, side slopes, discharge rate, and velocity in the outlet design. • General recommendations for rock size and length of outlet protection mat are shown in the Typical Velocity Dissipation Device figure below and should be considered minimum. • Consider drainage pipe diameter and/or estimated discharge rate when determining apron length and rock size gradation. • Design the device to accommodate the same flows as the culvert or channel design flow, but never less than the 10-year, 1-hour peak flow for temporary structures.
EC-10.P2	Use sound, durable, and angular rock for best results.
EC-10.P3	Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction. Grouted or wire-tied rock riprap may minimize maintenance requirements.
EC-10.P4	<p>Carefully place riprap to avoid damaging the filter fabric.</p> <ul style="list-style-type: none"> • Stone 4 to 6 inches may be carefully dumped onto filter fabric from a height not to exceed 12 inches. • Stone 8 to 12 inches should be hand placed onto filter fabric, or the filter fabric may be covered with 4 inches of gravel and the 8- to 12-inch rock may be dumped from a height not to exceed 16 inches. • Stone greater than 12 inches should only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the D50 rock size (nominal rock size of which 50 percent of the rocks are smaller), and the dump height limited to twice the depth of the gravel protection layer thickness.
EC-10.P5	Align the apron with receiving stream and keep the apron straight throughout its length. If a curve is needed to fit site conditions, place the curve in upper section of the apron.
EC-10.P6	Install additional protection measures on outlets on slopes greater than 1:10 (H:V).
Maintenance and Inspection	
EC-10.M1	Inspect apron for riprap displacement and damage to the underlying fabric. Repair fabric and replace riprap that has washed away within 7 calendar days of the incident or before the next anticipated rain event, whichever comes first. If riprap continues to wash away, consider using larger diameter material.
EC-10.M2	Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric within 7 calendar days of the incident.
EC-10.M3	Inspect velocity dissipation device for accumulations of debris and sediment and remove by the end of the same workday that the sediment was observed.
EC-10.M4	Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.
EC-10.M5	Provide training for personnel detailing the location and BMP maintenance requirements.



PLAN VIEW



SECTION A-A

Pipe Diameter, d_o (inches)	Discharge (ft ³ /s)	Apron Length, L_a (ft)	Rip Rap D_{50} Diameter Min (inches)
12	5	10	4
	10	13	6
18	10	10	6
	20	16	8
	30	23	12
	40	26	16
24	30	16	8
	40	26	8
	50	26	12
	60	30	16

For larger or higher flows consult a Licensed Civil Engineer

Source: USDA- SCS

Typical Velocity Dissipation Device
Not to Scale

EC-11 SLOPE DRAINS



Description

Slope drains intercept and direct surface runoff or groundwater into a stabilized drainage way, trapping device, or containment area.

These devices may be suitable for the following locations:

- Where concentrated flow of surface runoff should be conveyed down a slope to prevent erosion.
- Drainage for top of slope diversion dikes or swales.
- Drainage for top of cut and fill slopes where water can accumulate.
- Emergency spillway for a sediment basin.

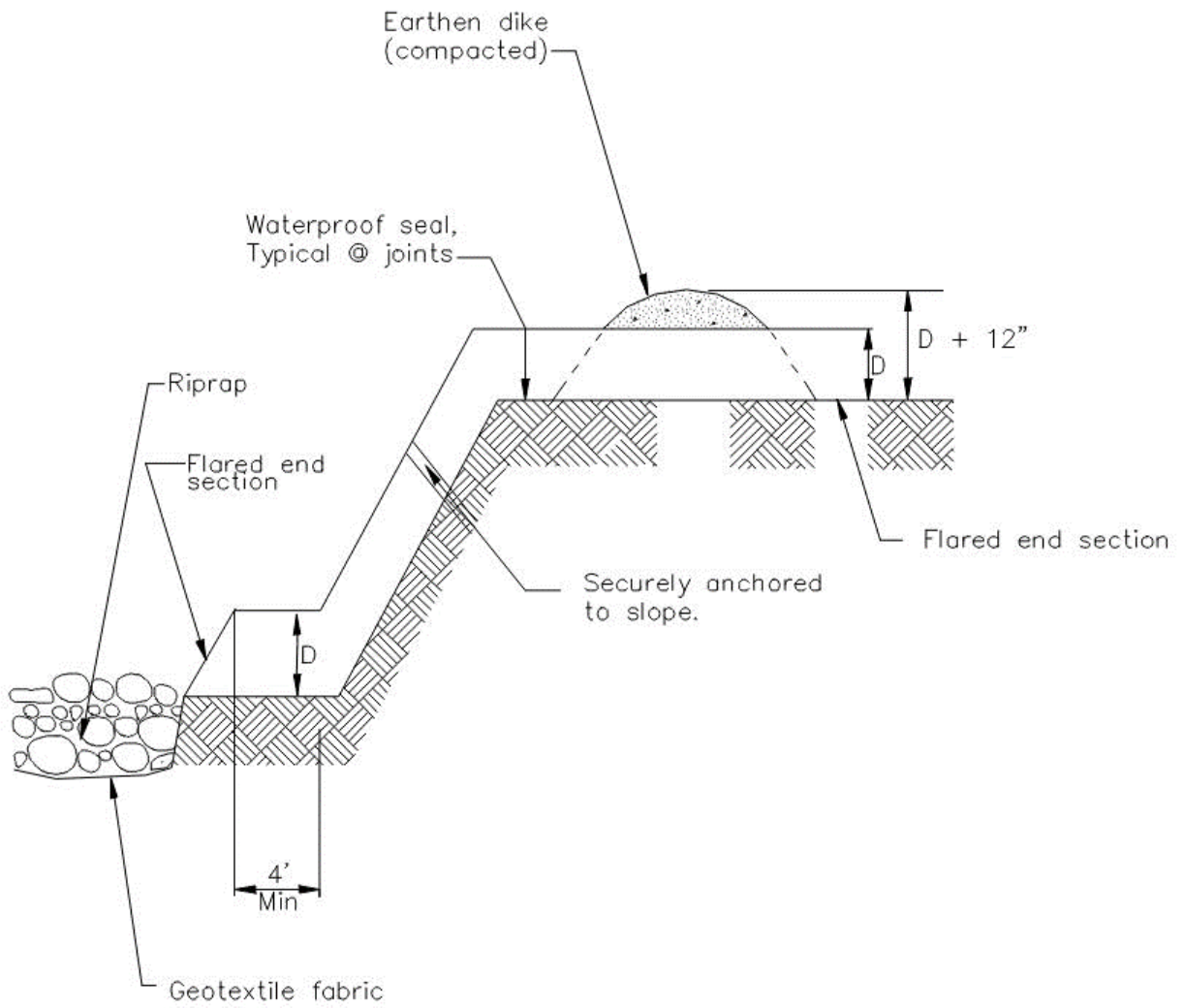
Slope drains may be placed or buried below the slope surface as needed.

Limitations

- Installation is critical for effective use of drain to minimize potential gully erosion.
- Recommendations given here are for temporary slope drains and not post-construction. Check with other design guidance if post-construction slope drains are to be installed.
- Maximum drainage area per slope drain is 10 acres (for areas larger than 10 acres, use a paved chute, rock-lined channel, or additional slope drains).
- Maximum slope is 2:1 (H:V) as energy dissipation below steeper slopes may be difficult and inefficient.
- Severe erosion may result when slope drains fail by overtopping, piping, or pipe separation from the slope.
 - During large storms, pipe slope drains may become clogged or over charged, forcing water around the pipe, and causing damaging slope erosion.
 - If the sectional downdrain is not sized correctly, the runoff can spill over the drain sides causing gully erosion and potential failure of the structure.
- Dissipation of high flow velocities at the slope drain outlet is required to avoid downstream erosion.

EC-11 SLOPE DRAINS	
Practice	
EC-11.P1	If constructed or implemented early, permanent structures included in the project plans can often serve as construction BMPs. In these cases, ensure the permanent structure meets or exceeds the temporary structure criteria.
EC-11.P2	Securely entrench and compact inlet structures to avoid severe gully erosion.
EC-11.P3	Securely anchor slope drains to the slope and size slope drains adequately to carry the minimum capacity of the design storm and associated forces.
EC-11.P4	Stabilize outlets with riprap, concrete, or other velocity dissipation devices (EC-10 Velocity Dissipation Devices) or direct water into a stable sediment trap (SE-3 Sediment Trap).
EC-11.P5	It is recommended to install debris racks at or several feet upstream of the inlet. Construct debris racks upstream of the inlet to be larger than racks at the inlet to provide enhanced debris protection and less plugging.
EC-11.P6	It is recommended to install safety racks at the inlet and outlet of slope drains where children or animals could become entrapped.
EC-11.P7	Secure inlet and surround with dikes to prevent gully erosion and anchor pipe to slope.
EC-11.P8	Limit drainage area to 10 acres per slope drain. For areas larger than 10 acres, use a paved chute, rock-lined channel, or a series of slope drains.
EC-11.P9	Direct surface runoff to slope drains with interceptor dikes. Top of interceptor dikes should be 12 inches higher than the top of the slope drain.
EC-11.P10	Construct slope drains from metal, plastic, or concrete pipe. Slope drains may have either corrugated or smooth walls.
EC-11.P11	<p>When installing slope drains:</p> <ul style="list-style-type: none"> • Install slope drains perpendicular to slope contours. • Prepare the ground surface according to geotechnical recommendations for the pipe bedding and to control erosion. • Securely anchor and stabilize pipe and appurtenances into soil. • Check that pipe connections are watertight. • Protect area around inlet with filter fabric. A flared end section installed at the inlet will improve flow into the slope drain and prevent erosion at the pipe entrance. Use a flared end section with a 6-inch minimum toe plate to help prevent undercutting. The flared section should slope toward the pipe inlet. • Protect outlet with riprap or other energy dissipation device. For high-energy discharges, reinforce riprap with concrete or use reinforced concrete device. • Protect outlet of slope drains using a flared end section when outlet discharges to a flexible energy dissipation device.
EC-11.P12	Provide training for personnel detailing the location and BMP maintenance requirements.
Maintenance and Inspection	
EC-11.M1	Inspect outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures within 7 calendar days. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented.
EC-11.M2	Inspect inlet for clogging and undercutting. Remove debris from inlet to maintain flows. Repair undercutting at inlet and if needed, install flared section or riprap around the inlet to prevent undercutting.
EC-11.M3	Inspect pipes for leakage. Repair leaks and restore damaged slope within 7 calendar days.
EC-11.M4	Inspect slope drainage for accumulation of debris and sediment and remove by the end of the same workday that the sediment is observed.

EC-11 SLOPE DRAINS	
EC-11.M5	Remove built-up sediment from entrances and outlets to maintain flow. Flush drains if necessary; capture all discharge and dispose according to DOH requirements.
EC-11.M6	Do not allow water to pond in inappropriate areas (e.g., active traffic lanes, material storage areas, etc.). If ponding is observed, address the issue or initiate design assistance within 7 calendar days.
EC-11.M7	Check pipe anchors to verify that the pipe remains anchored to the slope. Install additional anchors if pipe movement is detected.



Typical Slope Drain
Not to Scale

EC-12 STREAMBANK STABILIZATION



Description

Stream channels, streambanks, and associated riparian areas are dynamic and sensitive ecosystems that respond to changes in land use activity. Streambank and channel disturbance resulting from construction activities can increase the stream's sediment load, which can cause channel erosion or sedimentation and have adverse effects on the biotic system. BMPs can reduce the discharge of sediment and other pollutants to minimize the impact of construction activities on drainage ways. Streams on the 303(d) list may require measures to prevent increases in sediment and other pollutants to the stream.

Limitations

- Specific permit requirements or mitigation measures required for work in the stream by the USACE, DLNR CWRM, DOH CWB, or any other Federal, State, or County agency, supersede the guidance in this Manual.
 - If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required. Streams listed as 303(d) impaired waters are required to conduct sampling to verify that there is no net increase in pollutant load due to construction activities.
 - For instream work within jurisdictional waters, a Clean Water Act Section 401 Water Quality Certification Permit is required by DOH (HAR 11-54 Water Quality Standards), and Section 404 permit (33 United States Doc 1344) is required by USACE. If the work is within the tidal zone, a River and Harbors Act Section 10 permit is required by the USACE (33 U.S.C. 403).
 - For stream alteration or diversion, CWRM may require a SCAP or a Stream Diversion Works Permit (HAR 13-168 Water Use, Wells, and Stream Diversion Works; and HAR 13-169 Protection of Instream Uses of Water).
- BMPs must be carefully selected and implemented on steep and unstable banks, highly erodible or saturated soils, and highly fractured rock.

EC-12 STREAMBANK STABILIZATION	
Practice	
EC-12.P1	Schedule construction activities to minimize exposed areas.
EC-12.P2	<p>Schedule construction activities according to the sensitivity of the environmental concerns and in accordance with EC-1 Scheduling. Scheduling considerations will be different when working near perennial streams vs. ephemeral streams, and are as follows:</p> <ul style="list-style-type: none"> • When working in or near ephemeral streams, perform work during the dry season, to the maximum extent practicable. At the end of the project, remove fines accumulated in the channel to decrease pollution from the first rainstorm of the season. • When working near ephemeral or perennial streams, implement erosion and sediment controls (e.g., silt fences, gravel bag berms, etc.) to keep sediment out of the stream channel.
EC-12.P3	Minimize disturbance through avoiding heavy equipment stream crossings; selection of the narrowest crossing location; limiting the number of equipment trips across a stream during construction; and minimizing the number and size of construction support areas (e.g., contractor's staging and storage yards, stockpile areas, chemical storage, waste management facilities, sanitary facilities, material storage areas, vehicle/equipment parking areas, vehicle/equipment fueling/maintenance areas, temporary batch plant yards, etc.). Place construction support areas at least 50 feet from the stream channel and use appropriate BMPs.
EC-12.P4	Minimize disturbance of aquatic species and habitat in accordance with project environmental planning and permitting obligations.
EC-12.P5	Select equipment that reduces the amount of pressure exerted on the ground surface (less than 5 or 6 lb/in ²) to reduce erosion potential, where possible. Low ground pressure equipment includes wide or high flotation tires (34 to 72 inches wide); dual tires; bogie axle systems; tracked machines; lightweight equipment; and central tire inflation systems.
EC-12.P6	If a vegetated buffer strip is maintained between a work or construction support areas and the stream, maintain the buffer strip to be 50 feet plus four times the percent slope of the land, measured between the disturbed area and the top of stream bank.
EC-12.P7	Do not place hydromulch or soil binders within the channel, as these materials could wash into the channel and impact water quality or possibly cause eutrophication (an algal bloom caused by excessively high nutrient levels in the water).
EC-12.P8	Select soil binders (EC-5 Soil Binders) that are environmentally benign and non-toxic to aquatic organisms.
EC-12.P9	If using Geotextiles and Mats (EC-7 Geotextiles and Mats) within the channel, select an application that is appropriate for in-channel use. Select biodegradable geotextile fabric or blankets that are also adequate to sustain anticipated hydraulic forces. Do not use geotextile netting that may snag fish gills in fish bearing streams.
EC-12.P10	Install appropriately sized outlet protection and velocity dissipation devices at outlets to minimize erosion and scour.
EC-12.P11	Install silt fences only where sediment-laden water can pond and promote sedimentation.
EC-12.P12	Place perimeter controls along contour of slopes above the channel to intercept runoff, reduce flow velocity, release the runoff as sheet flow, and provide sediment removal from the runoff.
EC-12.P13	Do not use compost filter socks, sandbags, or gravel bags for streambank stabilization due to the risk of deterioration and discharge to the stream.
EC-12.P14	Provide training for personnel detailing the location and BMP maintenance requirements.

EC-12 STREAMBANK STABILIZATION	
Maintenance and Inspection	
EC-12.M1	Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities requiring BMPs are underway, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
EC-12.M3	Reshape berms as needed and replace lost or dislodged rock and filter fabric by the end of the next workday.
EC-12.M4	Maintain erosion and sediment control BMPs in accordance with applicable practices. Should damage occur or maintenance be required, conduct maintenance by the end of the next workday after the maintenance need was identified.

EC-13 TEMPORARY RIPRAP AND GABION INFLOW PROTECTION



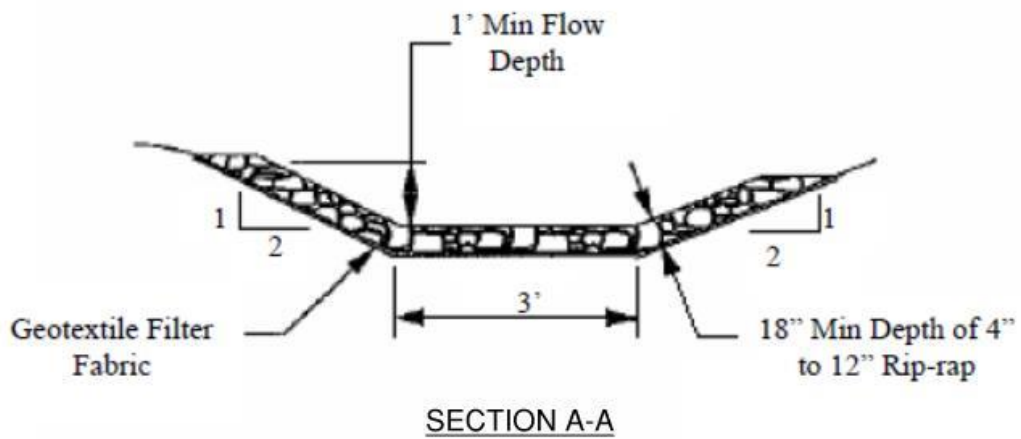
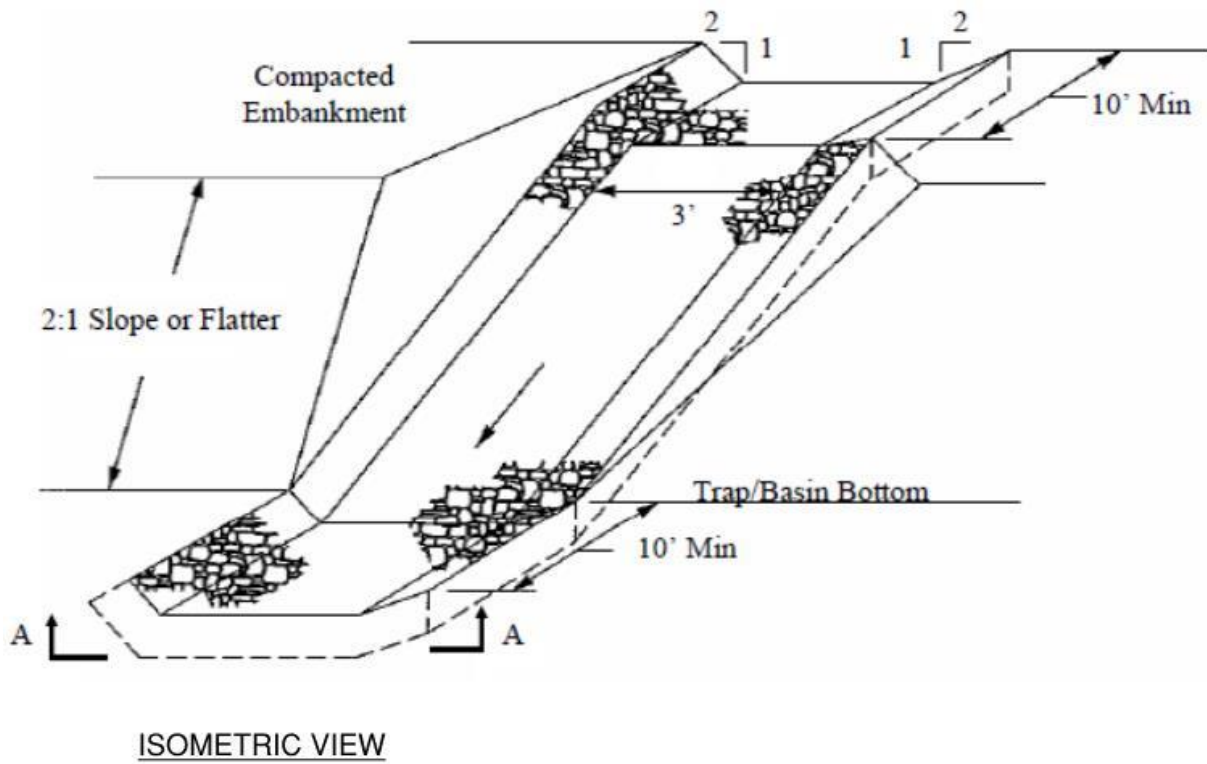
Description

Riprap and gabion inflow protections are variations of lined drainageways used to stabilize the flow channel along steep slopes. Gabions are large rectangular wire mesh boxes filled with large stone or riprap. The wire mesh is typically galvanized to resist corrosion and may also receive a PVC coating if intended for use in water.

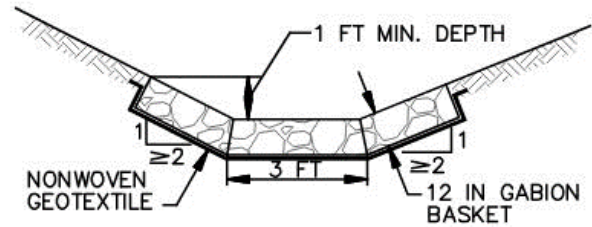
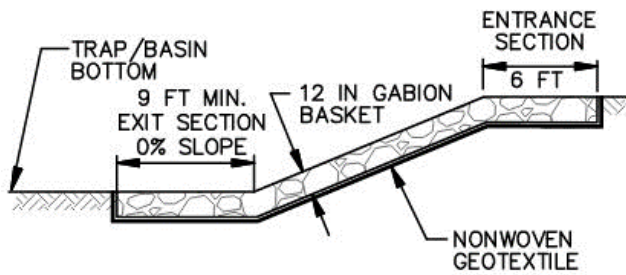
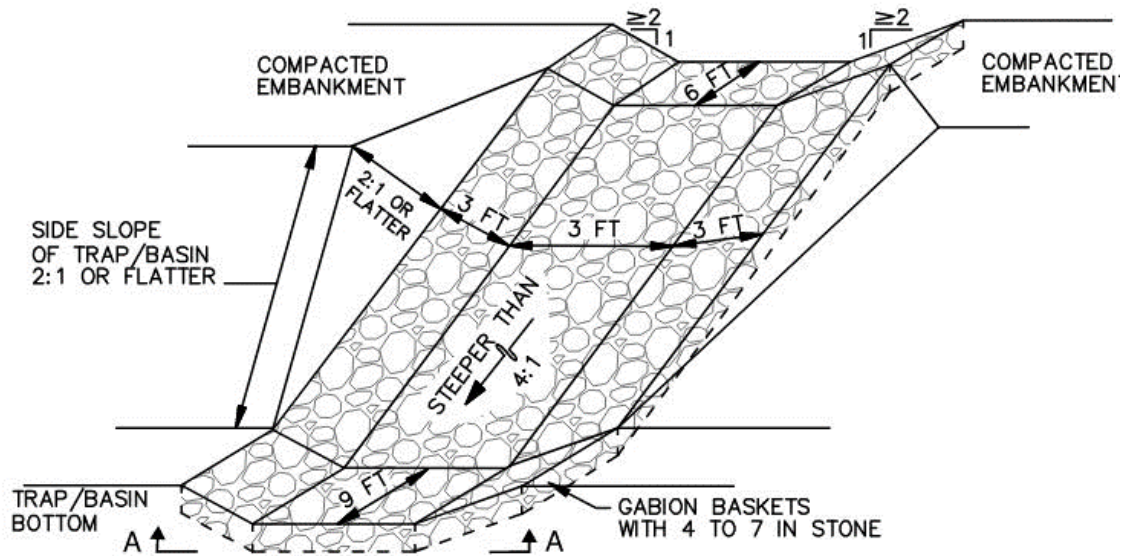
Limitations

- Not appropriate for use along/within sensitive riparian habitats.
- Use near streams and other waterways may require federal, state, or local permits prior to installation.

EC-13 TEMPORARY RIPRAP AND GABION INFLOW PROTECTION	
Practice	
<i>RIPRAP INFLOW PROTECTION</i>	
EC-13.P1	Use riprap inflow protection when slopes are between 10:1 and 4:1 (H:V).
EC-13.P2	Line channel with 5-inch to 12-inch riprap at a depth of 18 inches.
EC-13.P3	Install geotextile filter fabric under all riprap.
EC-13.P4	Blend riprap into existing ground.
<i>GABION INFLOW PROTECTION</i>	
EC-13.P5	Use gabion inflow protection when slopes exceed 4:1 (H:V). Gabion inflow protection may be used in lieu of riprap inflow protection on lesser slopes.
EC-13.P6	Construct 2:1 (H:V) side slopes, 3-foot bottom width, and 1-foot depth using 9-foot by 3-foot by 9-inch gabion baskets.
EC-13.P7	Install geotextile fabric under all gabion baskets.
EC-13.P8	Fill gabion baskets with 4-inch to 7-inch stone.
EC-13.P9	Install gabions in accordance with manufacturer's recommendations.
Maintenance and Inspection	
EC-13.M1	Remove accumulated sediment at inlet structure by the end of the next workday.
EC-13.M2	Inspect for damage and repair within 7 calendar days of identifying damage.



Rip-Rap Inflow Protection
Not to Scale



Rip-Rap Inflow Protection
Not to Scale

EC-14 GRASS AND PLANTING



Description

Planting of trees, shrubs, vines, grasses, and ground covers provides long-term stabilization of soil. In some areas, with suitable climates, grasses can be planted for temporary stabilization.

Limitations

- Permanent and temporary vegetation may need irrigation in dry seasons or in dry areas.
- Fertilizer requirements may have potential to create stormwater pollution if improperly applied.
- FAA regulations may prohibit the implementation of vegetation due to concerns over creating bird habitats and possible bird strikes with aircraft in movement areas of the airport. Consult with AIR-EE for exemptions in these cases.
- Per FAA Regulations, seeds are not to be scattered or applied through hydroseeding or within hydromulch in areas that could attract wildlife and cause safety concerns for aircraft operations. Alternative methods such as sprigs or sod shall be utilized, as approved in the project documents. If seeds are to be used in areas that do not create safety concerns for aircraft operations, consult with USDA prior to implementation.
- If vegetation is necessary, consult with the Airport District and USDA for recommended grasses and plants that are non-seeding.
- Excessive irrigation may cause erosion.
- Invasive plants and grasses may cause harm to existing vegetation and wildlife.

EC-14 GRASS AND PLANTING	
Practice	
EC-14.P1	Grass and other plants used for final stabilization must be perennial and must be established in accordance with the timeline described in EC-1 Scheduling.
EC-14.P2	Do not select vegetation that has the potential to attract wildlife in areas where it could pose a risk to aircraft safety.
EC-14.P3	Prioritize planting and use of native plants.
EC-14.P4	Do not use invasive species that may cause harm to existing vegetation and wildlife.
<i>GRASSES</i>	
EC-14.P5	Prior to planting grass, it is recommended to prepare the ground by properly applying fertilizer and stabilizing the soil.

EC-14 GRASS AND PLANTING	
EC-14.P6	Select grass species that are tolerant of short-term temperature extremes and waterlogged soil conditions.
EC-14.P7	Only plant grass in suitable soil conditions (e.g., shallow soil base, good drainage, slope of 2:1 [H:V] or flatter).
EC-14.P8	Use grass plugs, sod, or other methods that do not attract birds and other wildlife in areas where aircraft safety is a consideration.
EC-14.P9	Mow, irrigate, and fertilize planted areas to promote vigorous grass growth.
<i>TREES AND SHRUBS</i>	
EC-14.P10	<p>The following criteria may be used for tree selection:</p> <ul style="list-style-type: none"> • Aesthetic value: consideration should be given to foliage, flowering habits, and tree characteristics (e.g., bark, crown, etc.). • Freedom from disease and rot. • Life span of tree species. • Environmental value. • Wind and exposure resistance: prioritize vegetation that can withstand windy conditions, grows in direct sunlight, and can withstand radiated heat from structures and pavement. • Space needed: sufficient space must be provided between the vegetation and structures, electric and telephone lines, water and sewer lines, driveways, and roadways. • Requirements to use native plants. • Irrigation needs: prioritize drought-resistant species and native species suitable for the site climate.
<i>VINES AND GROUND COVERS</i>	
EC-14.P11	Plant vines and ground covers in suitable soil conditions with appropriate drainage, acidity, fertilizer, and slopes.
EC-14.P12	Generally, avoid species requiring irrigation, and use native plants suitable for the environment where practical.
<i>FERTILIZERS AND SOIL CONDITIONERS</i>	
EC-14.P13	Fertilizers and soil conditioners shall not be applied during or within 24 hours of inclement weather or rain events.
EC-14.P14	Do not over-apply fertilizers, herbicides, or pesticides. Over-application is expensive and can lead to contamination in soil, groundwater, surface water and stormwater.
EC-14.P15	Do not apply fertilizers, herbicides, or pesticides to stormwater conveyance channels with flowing water, or within 6 feet of a water body.
EC-14.P16	Prepare only the amount needed for fertilizer, herbicide, or pesticide application to prevent waste or over-application. Follow the recommended usage instructions.
<i>FERTILIZERS AND SOIL CONDITIONERS</i>	
EC-14.P17	Except on steep slopes, if possible, till fertilizer into the soil rather than surface spreading or spraying it. 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.
EC-14.P18	Choose plants that require minimal fertilizers and pesticides to sustain growth.
EC-14.P19	Follow federal, state, and local laws regarding fertilizer application.
EC-14.P20	Provide cover and dunnage when storing fertilizer to prevent contact with rainwater and runoff.
EC-14.P21	Store hazardous pesticides under cover with secondary containment large enough to capture 100 percent of the capacity of the single largest container. Review the SDS to identify the chemical composition and hazard category and label the container accordingly.

EC-14 GRASS AND PLANTING	
<i>IRRIGATION SYSTEMS</i>	
EC-14.P22	Where possible, group plants with similar water requirements to reduce excess irrigation runoff and promote surface filtration. Choose plants with no or low irrigation requirements.
EC-14.P23	Design timing and application methods of irrigation to reduce or eliminate excess irrigation runoff into the storm drainage system or receiving waters.
EC-14.P24	Employ rain-triggered shutoff devices to prevent irrigation during and after precipitation.
EC-14.P25	Include flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
Maintenance and Inspection	
EC-14.M1	Inspect planted areas for dead or unhealthy plant growth, and re-fertilize and replant within 7 calendar days after the problem is identified.
EC-14.M2	Where soil has eroded, replant dislodged or damaged vegetation and replace eroded soil by the end of the next workday after the incident.
EC-14.M3	Maintain a log of fertilizer, herbicide, and pesticide applications.
EC-14.M4	Clean any spills from fertilizer, herbicide, and pesticide mixing or application and report to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.
EC-14.M5	Inspect fertilizer, herbicide, and pesticide storage areas regularly, in accordance with the timeline identified in EC-1 Scheduling.
EC-14.M6	Repair broken sprinkler heads and lines by the end of the next workday after the problem is identified. Turn water off and depressurize the irrigation system immediately upon identifying the break.

EC-15 SLOPE ROUGHENING AND TERRACING



Description

Slope roughening/terracing creates microclimates for establishing vegetation, reduces runoff velocity, increases infiltration, and provides small depressions for trapping sediment.

Surface roughening is recommended for all slopes steeper than 3:1 and greater than 5 vertical feet, providing localized erosion protection on bare soil while vegetative cover is being established. This is an inexpensive, simple, and short-term erosion control measure for roadway and other cut slopes.

Slope roughening/terracing may include the following (see typical details for each below):

- Stair-step grading
- Grooving
- Furrowing
- Tracking
- Rough grading
- No grading

Factors to be considered in choosing a method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.

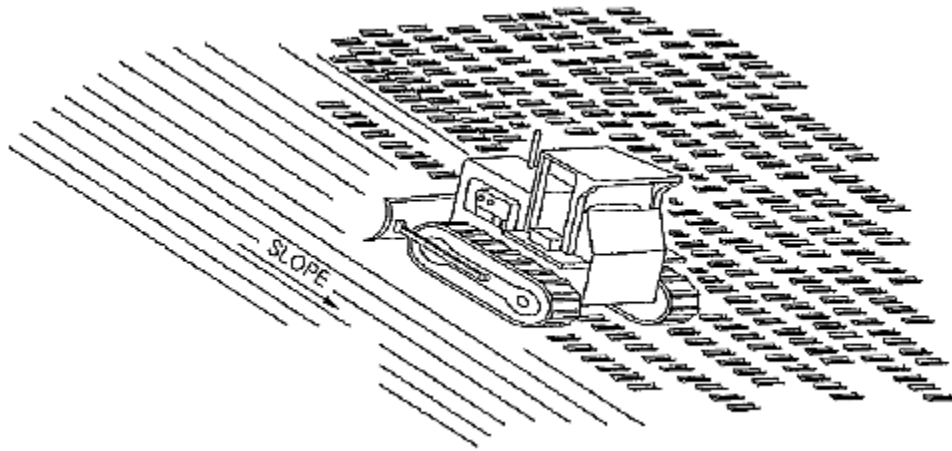
Terracing is usually employed as a permanent measure used to stabilize a steep slope. Terraces should be designed by a licensed professional engineer and included in the project construction plans. County-specific design criteria should be used.

Limitations

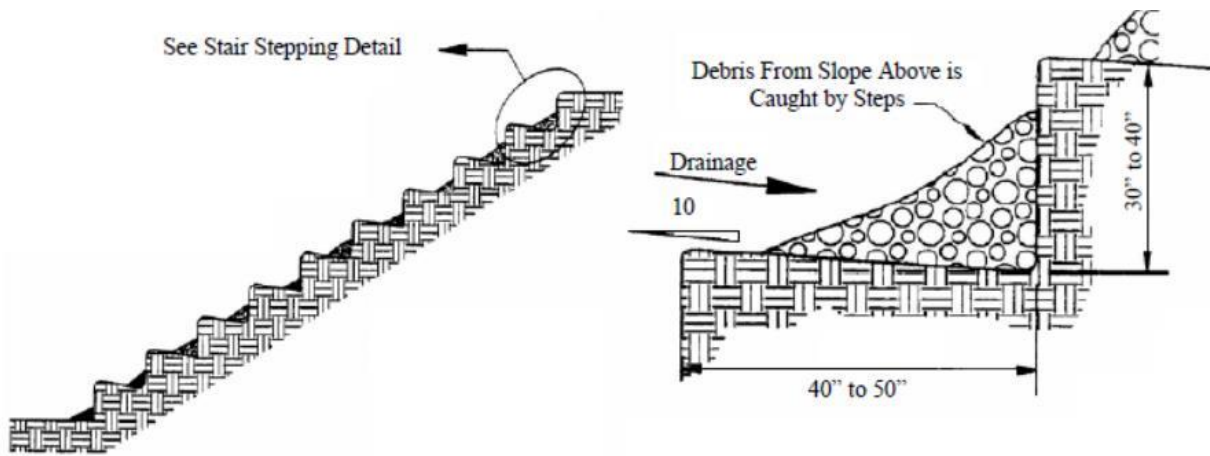
- Roughening is of limited effectiveness on its own but may be used to speed revegetation.

EC-15 SLOPE ROUGHENING AND TERRACING	
Practice	
EC-15.P1	Disturbed areas that will not require mowing may be stair-step graded, grooved, or left rough after filling.
EC-15.P2	Graded areas steeper than 3:1 should be stair-stepped with benches (see figure below). Stair stepping will help vegetation become anchored to the ground and trap soil eroded from the slopes

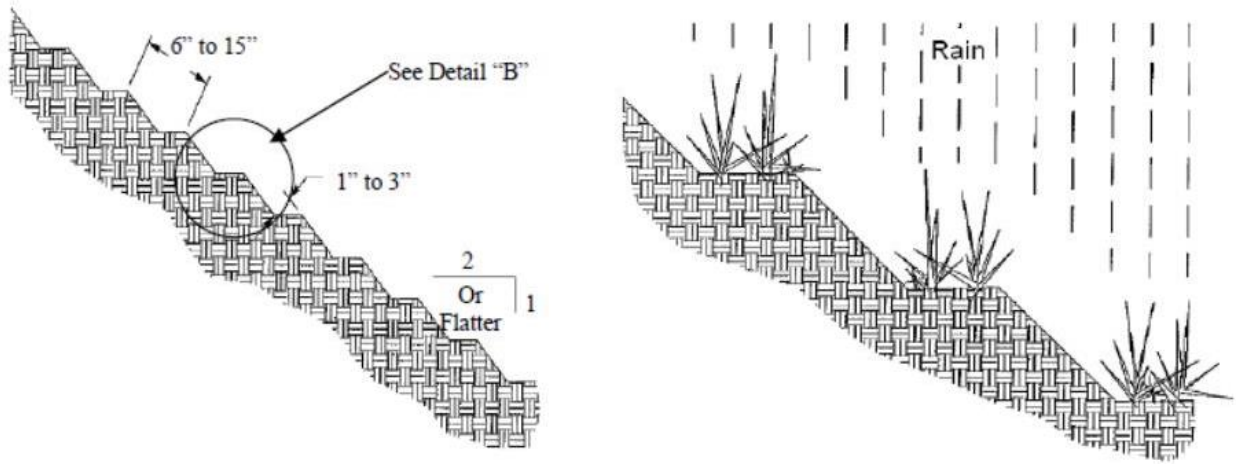
EC-15 SLOPE ROUGHENING AND TERRACING	
	above. Stair-step grading is particularly appropriate in soils containing large amounts of soft rock. Each “step” catches material that sloughs from above and provides a level site where vegetation can become established. Stairs should be wide enough to work with standard earth moving equipment.
EC-15.P3	Avoid excessive compacting of the soil surface when slope roughening. Tracking with bulldozer treads is preferable to not roughening at all but is not as effective as other forms of roughening because the soil surface is severely compacted and runoff is increased. This method should only be used where other methods are impractical. Tracking can be accomplished in a variety of ways, including “track walking,” which involves driving a crawler tractor up and down the slope, leaving a pattern of cleat imprints parallel to slope contours.
Maintenance and Inspection	
EC-15.M1	Inspect roughened slopes weekly and after rainfall for excessive erosion. Eroded areas should be repaired within 7 calendar days.
EC-15.M2	Initiate stabilization of roughened slopes in accordance with EC-1 Scheduling.



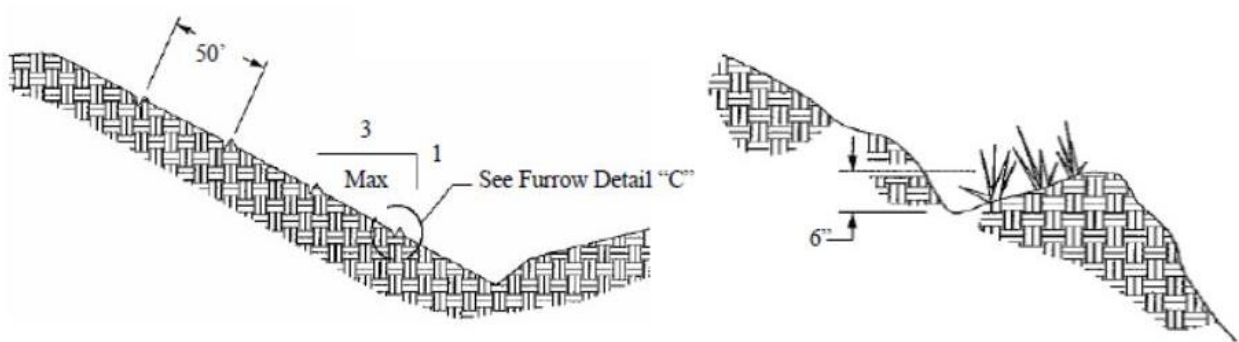
Typical Tracking
Not to Scale



Typical Stair Stepping
Not to Scale



Typical Grooving
Not to Scale



Typical Furrowing
Not to Scale

EC-16 TOPSOIL MANAGEMENT



Description

Topsoil management includes the salvaging, stockpiling and reapplication of topsoil or other selected material to be used as growth medium in the reclamation of surface disturbances.

Topsoil and/or soil replacement depths are determined by several factors including:

- Pre-disturbance soil depths
- Vegetation types
- The physical and chemical properties of the material being covered

Generally, the poorer the physical and chemical properties of the spoil or waste material, the greater the required depth of replacement soil and/or topsoil.

Limitations

- Avoid installation and placement of topsoil during windy and rainy weather events.

EC-16 TOPSOIL MANAGEMENT	
Practice	
EC-16.P1	Conduct a site-specific survey of the project area as a part of baseline investigations. Identify the soils suitable for salvaging and their depth prior to disturbance.
EC-16.P2	Provide a description in the SWPPP or SSBMP Plan with the following considerations: <ul style="list-style-type: none">• The amount and quality of existing topsoil or growth medium.• Preservation of suitable native topsoil to the maximum extent practicable.• The amount of disturbed area that will receive topsoil or growth medium and the required depth of application.• Methodology to be utilized for salvage of topsoil or growth medium.• Storage location, the duration of storage of salvaged soils, and the protection of stockpiled soils to prevent erosion.• The feasibility of direct replacement of the salvaged soils.• Availability of additional growth media to supplement topsoil replacement and stabilization.

EC-16 TOPSOIL MANAGEMENT	
EC-16.P3	Obtain AIR-EE approval prior to reusing any soil within or outside of the construction site boundary. Test topsoil, replacement soils, and the materials to be covered for all potential contaminants of concern in accordance with DOH and DOTA guidelines prior to topsoil application.
EC-16.P4	If conditions permit, apply topsoil or growth medium directly to disturbed areas.
EC-16.P5	Install dust control measures, perimeter controls, and storm drain inlet protection measures prior to and during topsoil placement.
EC-16.P6	Initiate stabilization of exposed topsoil areas in accordance with the timeline described in EC-1 Scheduling.
Maintenance and Inspection	
EC-16.M1	Conduct periodic maintenance of topsoil stockpiles to prevent erosion. Cover the topsoil stockpiles with plastic or another substrate, or re-vegetate stockpiles to protect from wind, rain, and erosion. Refer to WM-3 Protection of Stockpiles.

EC-17 DUST CONTROL



Description

Dust control measures are used to stabilize soil from wind erosion and reduce dust generated by construction activities.

Limitations

- Watering prevents dust only for a short period and may need to be applied daily (or more often) to be effective.
- Excessive water usage for dust control may cause erosion.
- Oil is not to be used for dust control because the oil may migrate into a drainage way and/or seep into the soil.
- Certain dust suppression chemicals may make soil water repellent, increasing runoff. Chemical treatment of the soil shall not be allowed without the approval of AIR-EE.

EC-17 DUST CONTROL	
Practice	
EC-17.P1	Schedule construction activities to minimize exposed areas.
EC-17.P2	Employ dust control BMPs until dust-generating activities are complete. If utilizing water, water as needed to control dust, and avoid over-watering to prevent runoff.
EC-17.P3	Identify and stabilize key access points prior to commencement of construction. Refer to TR-1 Stabilized Construction Entrance/Exit.
EC-17.P4	Minimize the impact of dust by anticipating the direction of prevailing winds.
EC-17.P5	Direct as much construction traffic as practicable to stabilized roadways within the project site.
EC-17.P6	Comply with DOH requirements for dust control.
EC-17.P7	Chemical treatment of the soil shall not be allowed without the approval of the Engineer.
EC-17.P8	If using water or chemical treatment, maintain daily records of the date and time of application and number of gallons or loads of product applied. Provide records upon request by the Engineer. When using water for dust control: the smallest, practical volume of potable water shall be used to prevent excessive runoff. Oil is not to be used for dust control.
EC-17.P9	If a dust screen or fence is used in conjunction with other dust control measures, the Airport Manager must approve the location. Screens located on or adjacent to the AOA fence line may not be allowed due to airport security concerns.

EC-17 DUST CONTROL	
EC-17.P10	Size dust screens and fences to contain airborne dust particles. Dust screens and fences must be a continuous in length, without gaps, and firmly secured to posts and other supporting devices.
EC-17.P11	Dust fences may contain appropriately spaced V-shaped flaps to allow passage of wind through the fence and prevent damage to the dust fence fabric or fence itself. Flaps must be spaced and sized as to not compromise the fence's capacity to trap and contain dust on site.
EC-17.P12	Transport soil and sediment in covered vehicles and/or with at least 2 feet of freeboard to minimize the mobilization of sediment by wind during transport. If necessary, provide signage or other methods to remind vehicle operators to cover and protect soil/sediment loads.
EC-17.P13	When siting dust screens, prioritize site locations where aircraft operations may create localized high velocity wind gusts.
Maintenance and Inspection	
EC-17.M1	Inspect all areas that have been sprayed for dust control to verify coverage and that excessive runoff is not generated. Adjust application rates and locations as needed before the end of the next workday after the maintenance need was identified.
EC-17.M2	Inspect all areas where soil binders, hydromulch, and or other temporary stabilization measures have been applied for dust control to confirm dust is being controlled. Reapply temporary stabilization measures as needed before the end of the next workday after the maintenance need was identified.
EC-17.M3	If using water for dust control, reapply when dust generation becomes unacceptable.
EC-17.M4	Inspect dust screens regularly. Repair damage, such as rips and tears, and remove accumulated dust at the base of the screen by the end of the next workday after the accumulation was identified.
EC-17.M5	Provide training for personnel detailing the location and BMP maintenance requirements.

4 SEDIMENT CONTROL BMPS

Sediment control BMPs are practices that trap soil particles after they have been detached and mobilized by rain, flowing water, or wind. Sediment control measures are usually passive systems that rely on filtering or settling particles out of water or wind. Linear sediment barriers are typically placed below the toe of exposed and erodible slopes, downslope of exposed soil areas, around soil stockpiles, and along the site perimeter. Sediment control BMPs can also be placed on the face of slopes to reduce flow velocity.

Sediment control BMPs are to be installed at the downslope perimeter of all disturbed areas where runoff will leave the site (herein referred to as “perimeter controls”). For projects with disturbed areas located within 50 feet of a receiving State water without a natural buffer or with a natural buffer less than 50 feet, two layers of perimeter controls (“double perimeter controls”), spaced a minimum of 5 feet apart, are required. For linear projects with rights-of-way that restrict or prevent the use of perimeter controls, maximize use of sediment controls where practicable and document why it is impracticable in other areas of the project.

Some BMPs may control both sediment and erosion. This Manual classifies these BMPs as either erosion control or sediment control based on the BMP’s most common and effective use. Sediment control BMPs are most effective when used in conjunction with erosion control BMPs. The combination of erosion control and sediment control is usually the most effective means to prevent sediment from leaving the project site and potentially entering storm drains or receiving waters.

SE-1 SILT FENCE



Description

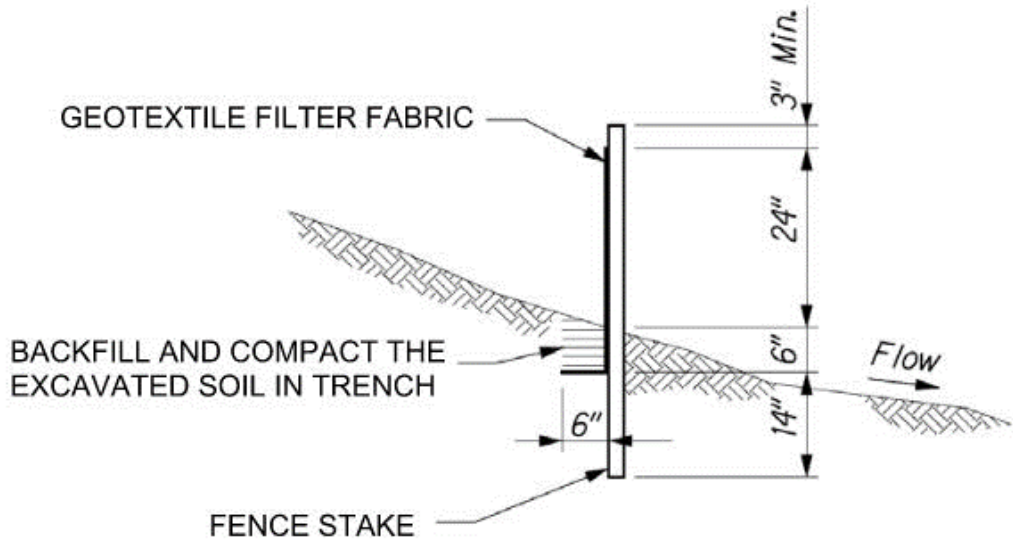
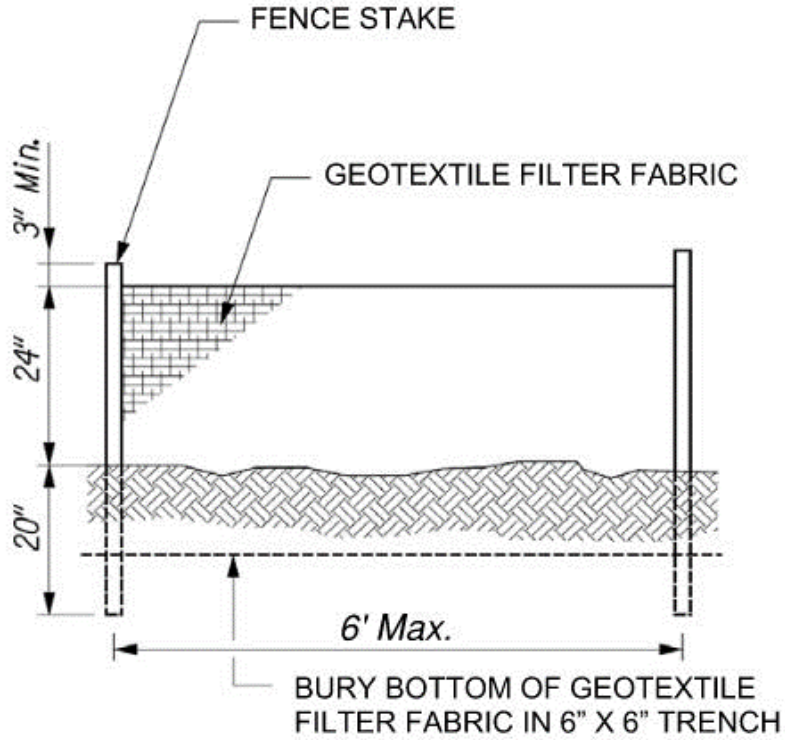
A silt fence is made of a filter fabric that has been entrenched, attached to supporting poles, and sometimes backed by a wire fence for support. The silt fence detains sediment-laden water and promotes sedimentation behind the fence.

Limitations

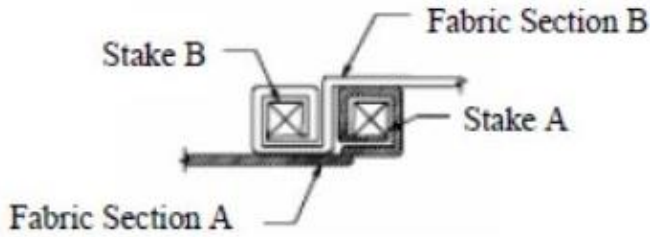
- Do not place fence on a slope, or across any contour line.
- Do not use in streams, channels, or anywhere that concentrated flow may occur.
- Do not use in locations where ponded water may cause flooding concerns that pose a risk to safety, loss of property, or erosion.
- No more than 1 acre, 100 feet, or 0.5 cubic feet per second of concentrated flow should drain to any point along the silt fence.

SE-1 SILT FENCE	
Practice	
SE-1.P1	Use principally in areas where sheet flow occurs.
SE-1.P2	Install along a contour so water does not pond more than 1.5 feet at any point.
SE-1.P3	Turn ends of the fence uphill to promote detention of sediment-laden water.
SE-1.P4	Provide area behind the fence for runoff to pond and sediment to settle (approx. 1200 square feet per acre draining to the silt fence).
SE-1.P5	Select a fabric that retains 85 percent of the soil, by weight, based on sieve analysis, but is not finer than an equivalent opening size of 0.0083 inches (#70 sieve).
SE-1.P6	Install in accordance with the following methods: <ul style="list-style-type: none">• Excavate trench approximately 6-inches wide and 6-inches deep along the line of the proposed silt fence.• Drive posts securely into the ground a minimum of 20 inches or 14 inches below the bottom of the trench, whichever is deeper, spaced a maximum of 6 feet apart.• Stretch silt fence fabric tightly on the upslope face of posts.• Key in the bottom of the fabric such that at least 12 inches of fabric is buried below grade. This can include fabric wrapped along the trench sides and bottom forming an “L” or “J” shape.• Overlap sections a minimum of 6 inches or wrap sections of fabric around adjacent posts to create a strong bond.

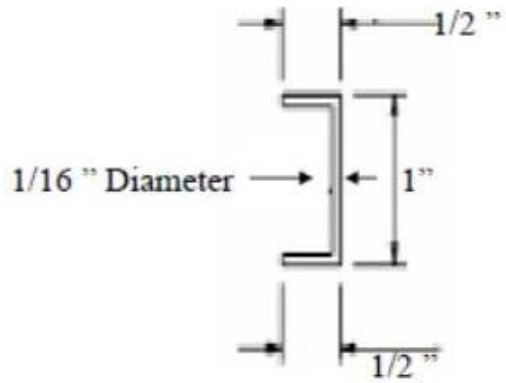
SE-1 SILT FENCE	
SE-1.P7	Reinforce the perimeter silt fence with chain link fence or concrete barriers, if needed.
Maintenance and Inspection	
SE-1.M1	Repair or replace damage sustained to the silt fence or posts by the end of the next workday after the incident.
SE-1.M2	Inspect the silt fence for sections no longer keyed-in with at least 12 inches of fabric buried below grade. Where observed, re-key the silt fence into the ground by the end of the next workday after improper entrenchment was observed.
SE-1.M3	Remove sediment by the end of the next workday after accumulation reaches one-third the fence height. Ensure that sediment removal maintains the minimum keyed-in length of 12 inches.
SE-1.M4	Provide training for personnel, detailing the location and BMP installation and maintenance requirements to prevent sediment discharges



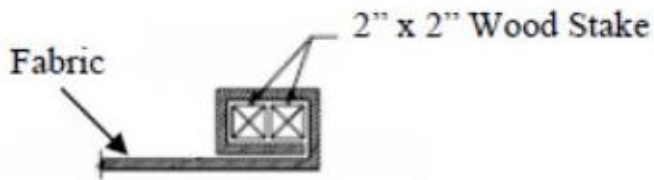
Typical Silt Fence
Not to Scale



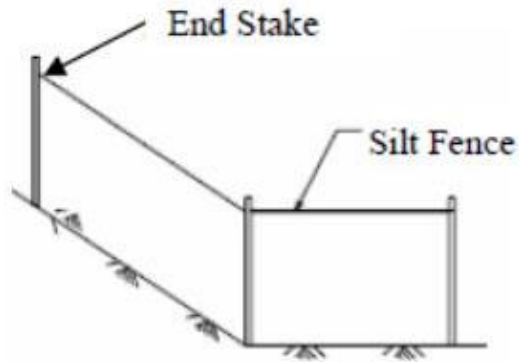
Typical Joining Section
Not to Scale



Typical Staple Detail
Not to Scale



Typical End Stake Detail
Not to Scale



Typical Silt Fence
Not to Scale

SE-3 SEDIMENT TRAP



Description

A sediment trap is a small, excavated or bermed area where runoff from small drainage areas is detained and sediment can settle.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency. Construct larger sediment traps to address larger drainage areas and to achieve greater desired sediment removal.

Limitations

- Only use for drainage areas up to 5 acres.
- Sediment traps only remove coarse sediment (medium silt size and larger).

SE-3 SEDIMENT TRAP	
Practice	
SE-3.P1	Provide the location and size of temporary sediment traps to the Airport Manager for review and approval to prevent possible hazards and adverse impacts to aircraft and airport operations due to the potential for ponded water to attract wildlife hazardous to airport operations.
SE-3.P2	Install sediment traps along the perimeter of the site at locations where runoff from disturbed areas is discharged offsite.
SE-3.P3	Install sediment traps around and/or upslope from storm drain inlet protection measures.
SE-3.P4	Install sediment traps at any point within the site where sediment-laden runoff may enter stabilized or natural areas or waterways.
SE-3.P5	Build sediment traps outside the area to be graded before clearing, grubbing, and grading begin.
SE-3.P6	Locate the sediment trap where it may be easily cleared of sediment.
SE-3.P7	Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency.
SE-3.P8	Install a stable emergency spillway to safely convey flows from storm and flooding events.
SE-3.P9	The outlet or spillway of the trap must be stabilized with rock, vegetation, or another suitable material.
SE-3.P10	Provide fencing around the sediment trap to prevent unauthorized entry.
SE-3.P11	Design the sediment trap with at least 1 foot of freeboard. DOTA Engineer may require additional freeboard depending on site conditions.
Maintenance and Inspection	
SE-3.M1	Dewater sediment trap if infiltration has not completed within 72 hours and properly discharge of removed water.
SE-3.M2	Routinely inspect for and remove accumulated sediment by the end of the next workday after accumulation reaches one-third the height of the sediment trap walls.
SE-3.M3	Inspect outlet area for erosion and stabilize within 7 calendar days after erosion is identified.
SE-3.M4	Inspect trap banks for seepage and structural soundness. Repair within 7 calendar days after required maintenance is identified.
SE-3.M5	Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions within 7 calendar days after required maintenance is identified.
SE-3.M6	Provide training for personnel detailing the location and BMP installation and maintenance requirements to prevent sediment discharges

SE-4 CHECK DAMS



Description

A check dam is a small barrier constructed of rock, gravel bags, sandbags, or reusable products placed across a swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing the velocity of flowing water and allowing sediment to settle.

Check dams may be appropriate in the following situations:

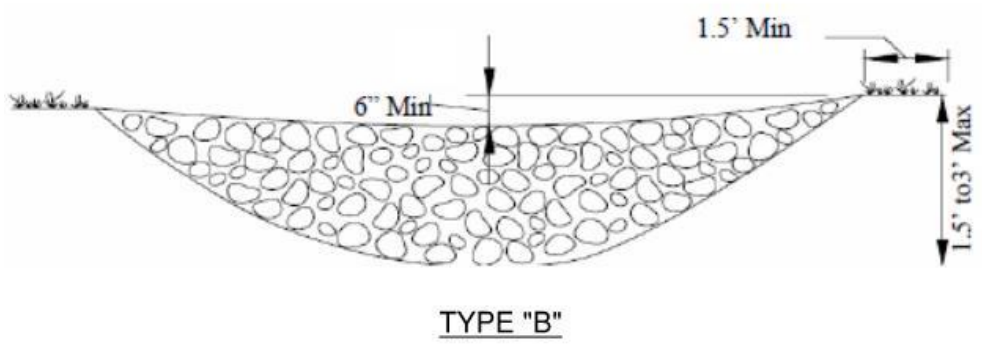
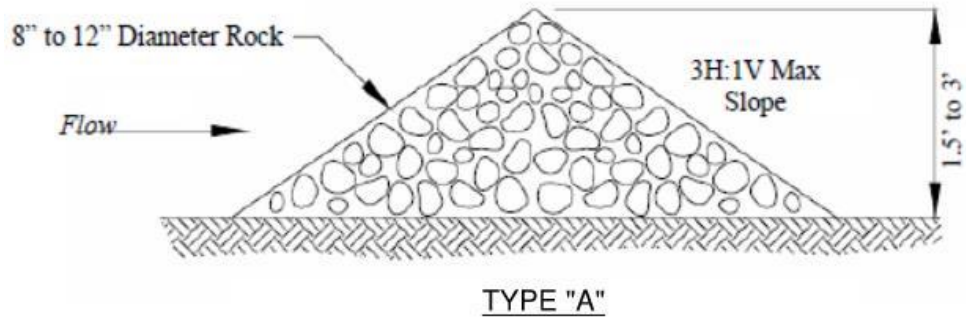
- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment 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.

Limitations

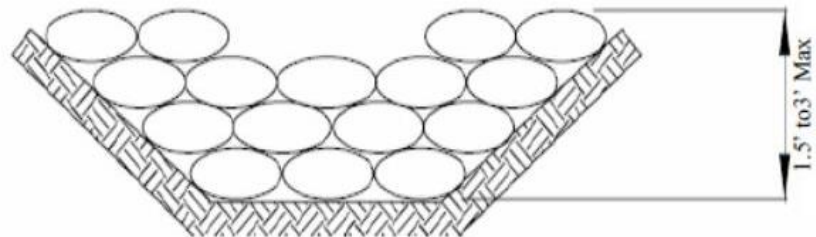
- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Trapped sediment may be re-suspended during subsequent storms or removal of the check dam.

SE-4 CHECK DAMS	
Practice	
SE-4.P1	Use check dams in areas that drain 10 acres or less.
SE-4.P2	Install the first check dam in a sequence of check dams approximately 16 feet from the discharge location and at regular intervals based on slope gradient and soil type.
SE-4.P3	Construct check dams so that the foot of the upstream dam is at the same elevation as the top of the next downstream dam in the sequence.

SE-4 CHECK DAMS	
SE-4.P4	Construct check dams from rock, gravel bags, and sandbags. Check dams should not be constructed from strawbales or silt fences.
SE-4.P5	If grass is planted to stabilize the ditch or swale, remove the check dam when the grass has matured (unless the slope of the swale is greater than 5 percent).
SE-4.P6	Place check dams at a distance and height to allow small pools to form between each check dam.
Maintenance and Inspection	
SE-4.M1	Repair damage sustained to the check dams by the end of the next workday after the incident.
SE-4.M2	Remove sediment by the end of the next workday after accumulation reaches one-third the barrier height.
SE-4.M3	Remove accumulated sediment prior to soil stabilization.
SE-4.M4	Remove check dams and accumulated sediment when check dams are no longer needed.
SE-4.M5	Monitor check dams during periods of high flow rates to ensure that water is flowing over the top of, and not circumventing, the dam. If circumventing is observed, repair or reconstruct the check dam by the end of the next workday after the maintenance need is identified.

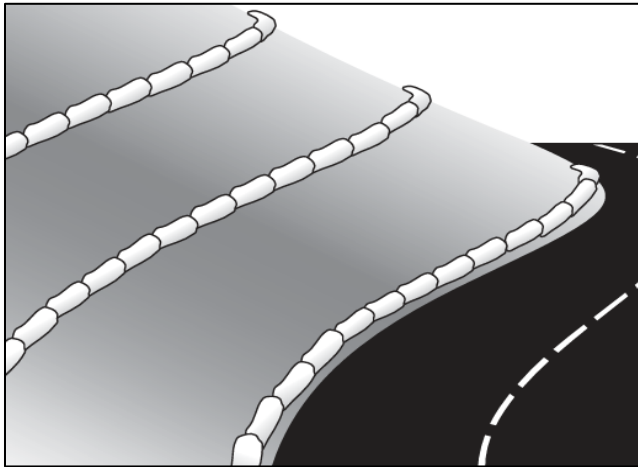


Typical Rock Check Dam
Not to Scale



Typical Gravel Bag Check Dam
Not to Scale

SE-6 GRAVEL BAG BARRIER



Description

Stacking gravel bags along a contour creates a barrier that detains sediment-laden sheet flows, ponding water upstream of the barrier and promoting sedimentation.

Suitable for use as a linear sediment control measure:

- Below the toe of slopes and erodible slopes.
- As sediment traps at culvert/pipe outlets.
- Along the perimeter of a site.
- Downslope of exposed soil areas.
- Around temporary stockpiles and spoil areas.
- Parallel to a roadway to keep sediment off paved areas.

Suitable for use 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.
- At the top of slopes to divert runoff away from disturbed slopes.
- As check dams across mildly sloped construction roads.

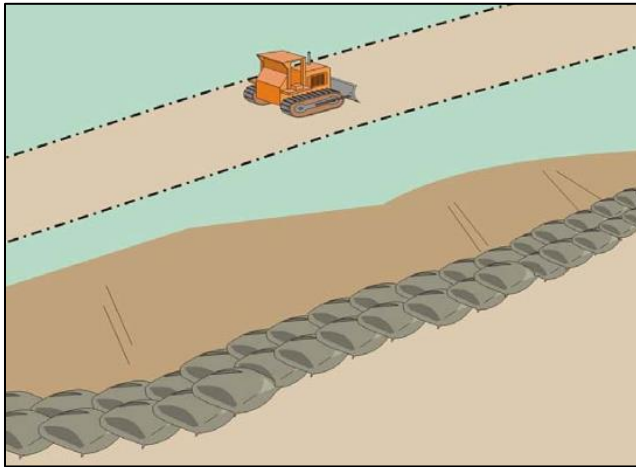
Limitations

- Do not install sandbag barriers at locations that could compromise traffic or pedestrian safety.
- Removal of gravel berms can be difficult due to settling and degradation of the bags.
- Upstream ponding can cause flooding conditions.
- Installation is labor-intensive.

SE-6 GRAVEL BAG BARRIER	
Practice	
SE-6.P1	Gravel bag barriers may be used in drainage areas up to 5 acres.
SE-6.P2	Install gravel bag barrier along a contour with less than 50 feet between sequential barriers.
SE-6.P3	Ends of gravel bag barriers should be turned upslope to prevent runoff from circumventing the berm.
SE-6.P4	Height of gravel bag barrier shall be at most 18 inches in non-traffic areas and 12 inches in construction traffic areas.

SE-6 GRAVEL BAG BARRIER	
SE-6.P5	Provide area behind barrier for runoff to pond and sediment to settle and allow for ease of maintenance.
SE-6.P6	For installation near the toe of the slope, place the barrier a sufficient distance from the slope toe to facilitate cleaning. To prevent flow behind the barrier, place gravel bags perpendicular to the barrier to serve as cross barriers.
SE-6.P7	Allow sufficient space upslope from the barrier to allow ponding.
SE-6.P8	Use a pyramid approach when stacking bags and minimize spacing between adjacent bags.
Maintenance and Inspection	
SE-6.M1	Repair or replace damaged gravel bags by the end of the next workday.
SE-6.M2	Remove sediment from behind the barrier by the end of the next workday after accumulation reaches one-third the barrier height.
SE-6.M3	Provide training for personnel detailing the location and BMP placement and maintenance requirements to prevent sediment discharges

SE-8 SANDBAG BARRIER



Description

Stacking sandbags along a contour creates a barrier that detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation.

Suitable for use as a linear sediment control measure:

- Below the toe of slopes and erodible slopes.
- As sediment traps at culvert/pipe outlets.
- Along the perimeter of a site.
- Downslope of exposed soil areas.
- Around temporary stockpiles and spoil areas.
- Parallel to a roadway to keep sediment off paved areas.
- Below other small, cleared areas.

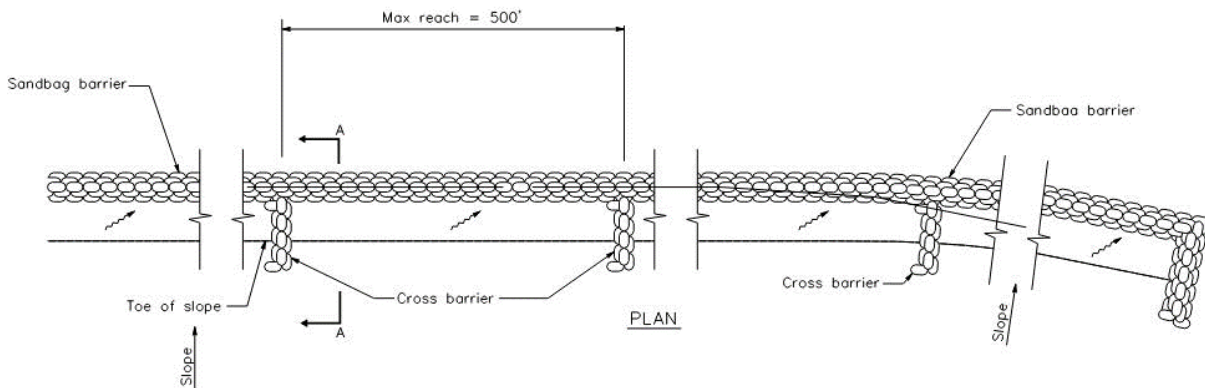
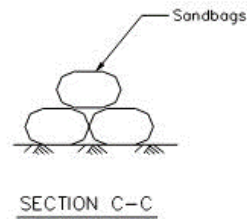
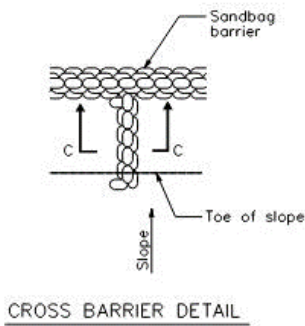
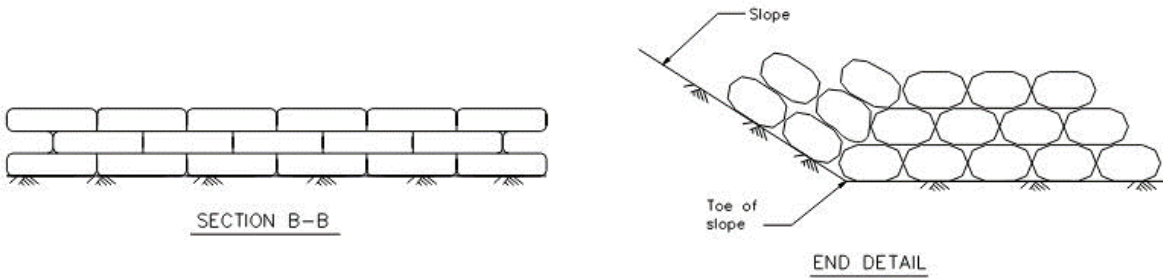
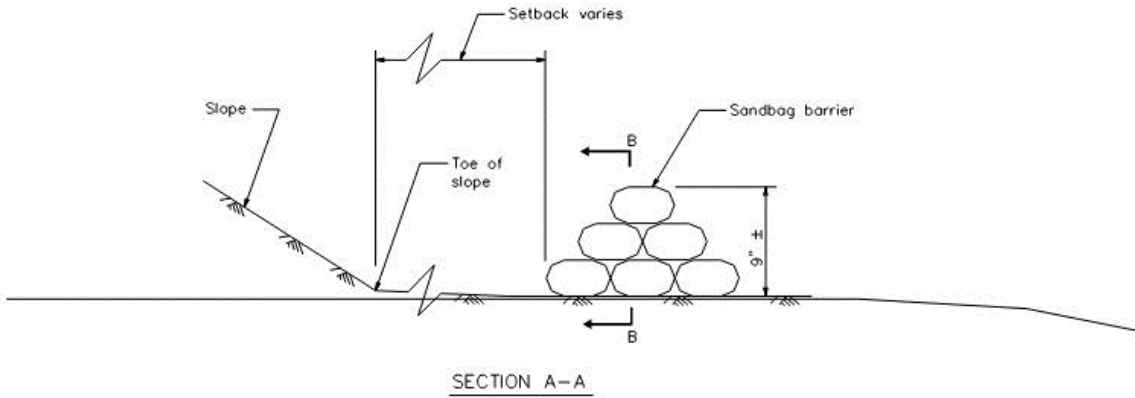
Suitable for use as a linear erosion control measure:

- Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the top of slopes to divert runoff away from disturbed slopes.

Limitations

- Do not install sandbag barriers at locations that could compromise traffic or pedestrian safety.
- Sandbags are more expensive than other barriers, but also more durable; although, they may not be sufficiently durable for long-term projects.
- Do not use burlap for sandbags.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation may be labor-intensive.
- Upstream ponding can cause flooding conditions.

SE-8 SANDBAG BARRIER	
Practice	
SE-8.P1	Install along a contour.
SE-8.P2	Base of sandbag barrier shall be at least 48 inches wide.
SE-8.P3	Height of sandbag barrier shall be at least 18 inches.
SE-8.P4	Slopes between 20:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 50 feet (a closer spacing is more effective), with the first row near the slope toe. Slopes 2:1 (H:V) or steeper: Sandbags should be placed at a maximum interval of 25 feet (a closer spacing is more effective), with the first row placed near the slope toe.
SE-8.P5	Turn the ends of the sandbag barrier upslope to prevent runoff from circumventing the barrier.
SE-8.P6	4-inch Polyvinyl Chloride (PVC) pipe may be installed between the top layers of sandbags to drain large flood flows.
SE-8.P7	Provide area behind barrier for runoff to pond and sediment to settle.
SE-8.P8	For installation near the toe of the slope, place the barrier a sufficient distance from the slope toe to facilitate cleaning. To prevent flow behind the barrier, place sandbags perpendicular to the barrier to serve as cross barriers, as necessary.
SE-8.P9	Allow sufficient space upslope from the barrier to allow ponding.
SE-8.P10	Use a pyramid approach when stacking bags and minimize spacing between adjacent bags.
SE-8.P11	Use sandbags large and sturdy enough to stay intact and in place during significant flooding.
Maintenance and Inspection	
SE-8.M1	Inspect sandbags prior to anticipated rain events, after rain events, and regularly at the end of each workweek.
SE-8.M2	Repair or replace damaged sandbags by the end of the next workday after the incident.
SE-8.M3	Remove sediment by the end of the next workday after accumulation reaches one-third the barrier height.
SE-8.M4	Provide training for personnel detailing the location and BMP placement and maintenance requirements to prevent sediment discharges



Sandbag Barrier
Not to Scale

SE-10 STORM DRAIN INLET PROTECTION



Description

Storm drain inlet protection consists of a sediment filter or an impounding area 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 configurations also remove sediment by filtering.

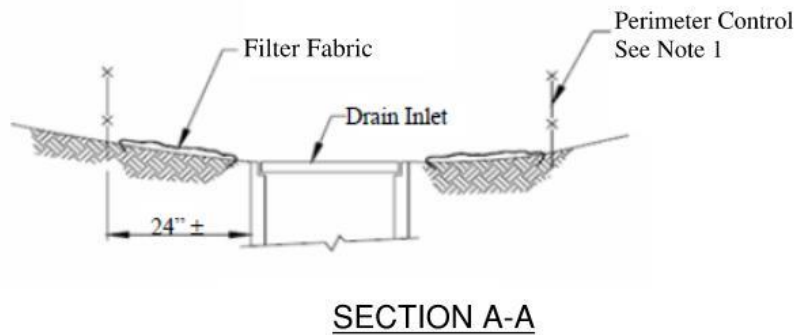
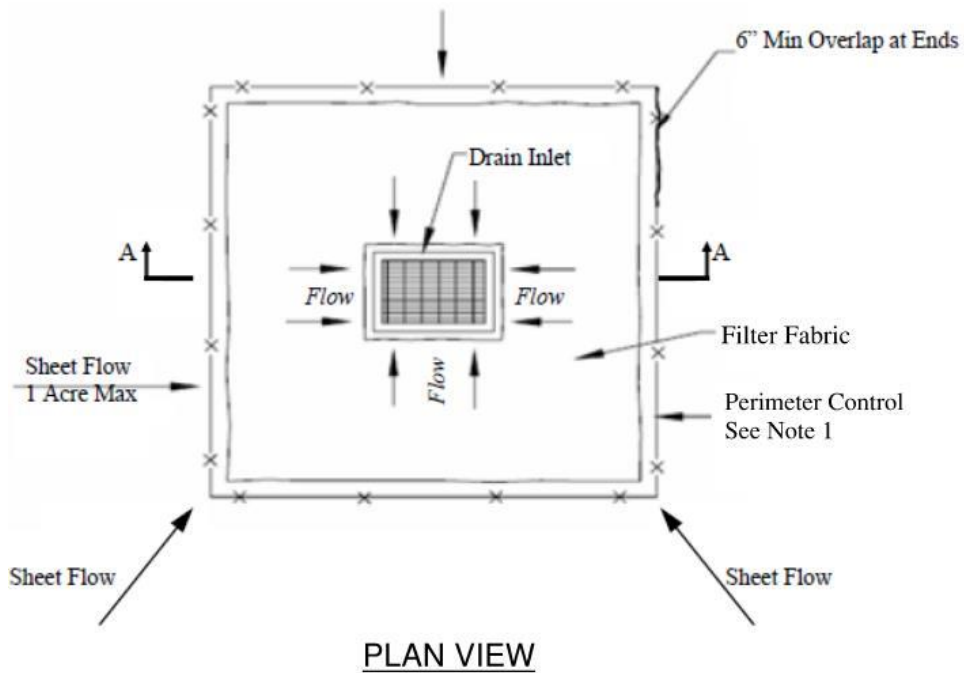
Select the storm drain inlet protection type most suitable to the site conditions. Acceptable storm drain inlet protection measures include, but are not limited to, the following (details presented below):

- Perimeter control: Appropriate for drainage basins with less than a 5 percent slope, sheet flows, and flows under 0.5 cubic foot per second.
- Excavated drop inlet sediment trap: An excavated area around the inlet to trap sediment. Appropriate for grubbed and graded areas.
- Gravel bag barrier: Used to create a small sediment trap upstream of storm drain inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cubic foot per second, and where flow must pass over the barrier to prevent flooding.
- Gravel and wire mesh filter: Used on curb or drop inlets where construction equipment may drive over the inlet.
- Sediment control with supports: Suitable for curb inlets to prevent sediment control BMPs from becoming displaced or falling into a storm drain inlet. Supports must not compromise the effectiveness of sediment controls.
- Temporary geotextile insert: Fabric measures installed across the opening of a curb or grated inlet, held in place by the grate or other securement around the full perimeter of the inlet opening. Application dependent on type and manufacturer.

Limitations

- Storm drain inlet protection must not create a potential hazard to traffic and pedestrians.
- Drainage area shall not exceed 1 acre. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows (SE-3 Sediment Traps).
- Runoff may bypass protected storm drain inlets on slopes.
- Ponding may occur at a protected inlet, with possible short-term flooding.
- Straw bales are NOT effective storm drain inlet protection.

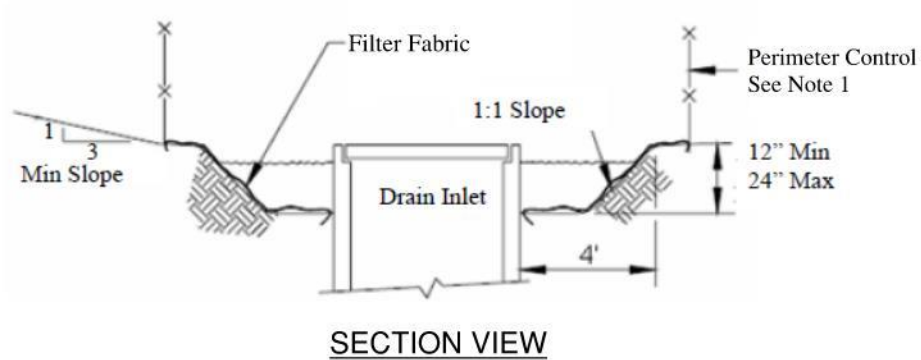
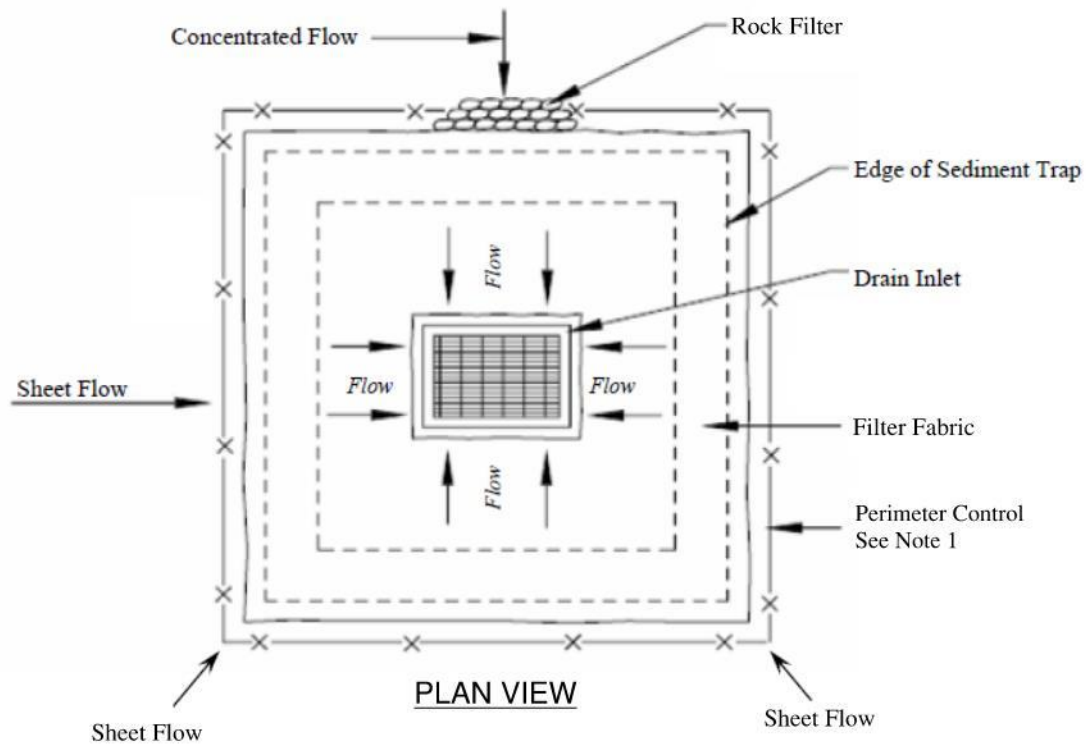
SE-10 STORM DRAIN INLET PROTECTION	
Practice	
SE-10.P1	Protect every storm drain inlet with the potential to receive runoff from disturbed areas, either by covering the inlet with a sediment filter or promoting sedimentation around or directly upstream of the inlet.
SE-10.P2	Filter fabric must be of sufficient strength and permeability to allow stormwater to pass through while retaining sediment. Filter fabric must be anchored such that the fabric will not fall into the drain when the grate is removed for maintenance.
SE-10.P3	For proprietary devices, install and secure storm drain inlet protection per manufacturer's specifications.
SE-10.P4	Provide area around the inlet for water to pond without flooding structures and property.
Maintenance and Inspection	
SE-10.M1	Repair damaged storm drain inlet protection devices by the end of the same workday that the damage was observed.
SE-10.M2	Remove, clean, or replace sediment protection measures as sediment accumulates, the filter becomes clogged, or performance is compromised by the end of the same workday that the sediment, clogging, or other issues were observed.
SE-10.M3	Where there is evidence of sediment accumulation adjacent to the storm drain inlet protection measure or along the runoff flow pattern toward the inlet, such as within a concrete gutter or swale, remove the deposited sediment by the end of the same workday that the sediment was observed.
SE-10.M4	Report any storm drain inlet protection failures and pollutant discharges (including sediment) into the storm drains to AIR-EE immediately after the failure or discharge is observed.
SE-10.M5	Remove storm drain inlet protection measures when: <ul style="list-style-type: none"> • Directed by Airport Manager or other DOTA entity in anticipation of forecasted rain events with a potential threat to public safety, loss of property, or significant erosion. • Apparent flooding concerns develop that pose an immediate threat to public safety, loss of property, or significant erosion. Restore storm drain inlet protection devices immediately following notice from DOTA or the cessation of flooding concerns.
SE-10.M6	Prior to removing or replacing storm drain inlet protection measures for maintenance or flooding prevention, remove sediment and debris that has accumulated on the storm drain inlet protection device and adjacent to the storm drain inlet to prevent it from falling into the drain. Prior to re-installing storm drain inlet protection measures, inspect storm drain inlet and remove any debris or sediment from the drain inlet.
SE-10.M7	Provide training for personnel detailing the location and BMP storm drain protection from sediment discharge and construction site contaminants.



Note:

1. Acceptable perimeter controls include Silt Fence, Gravel Bag Berms, Sandbag Barriers, or Compost Socks and Berms.

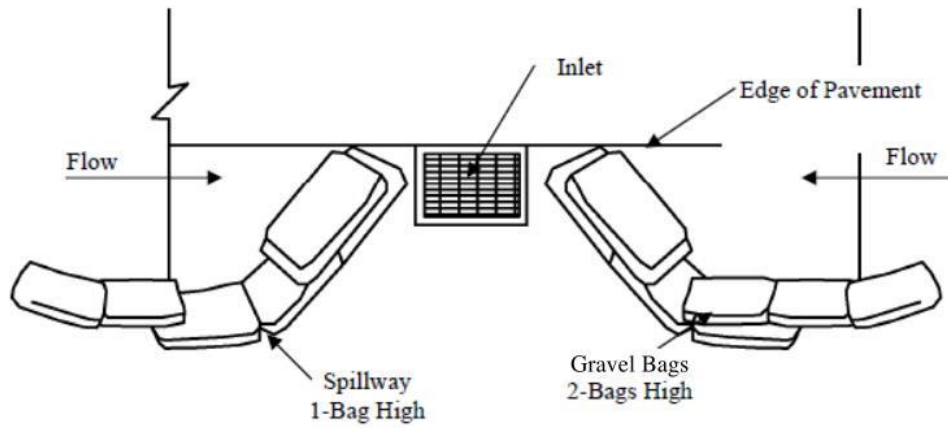
Storm Drain Inlet Protection (Perimeter Control)
Not to Scale



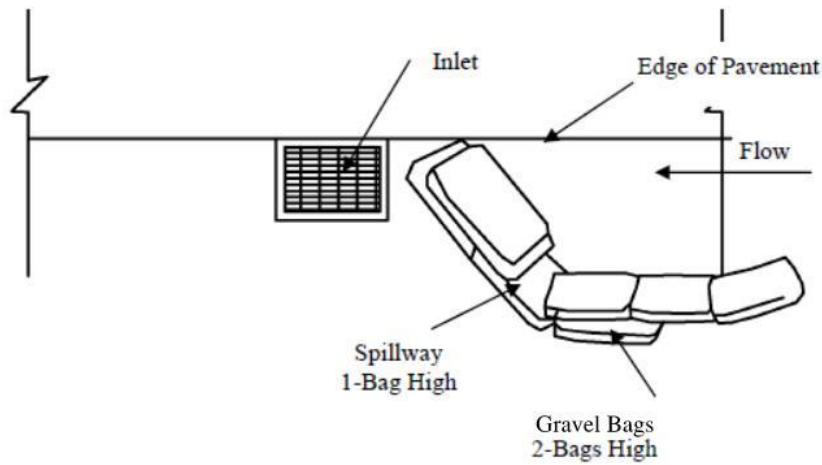
Note:

1. Acceptable perimeter controls include Silt Fence, Gravel Bag Berms, Sandbag Barriers, or Compost Socks and Berms.

Storm Drain Inlet Protection (Excavated Drop Inlet Sediment Trap)
Not to Scale

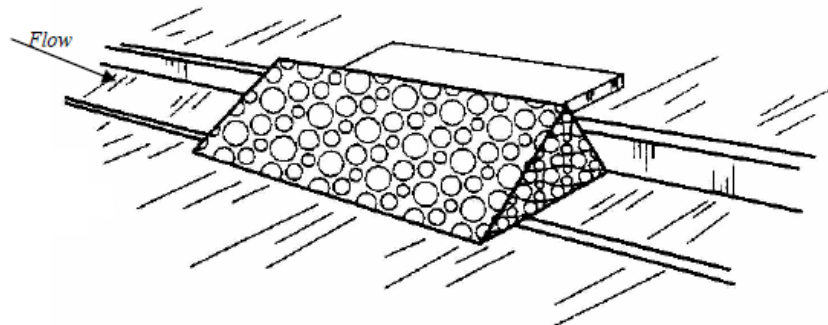


INLET WITH TWO ENTRY POINTS

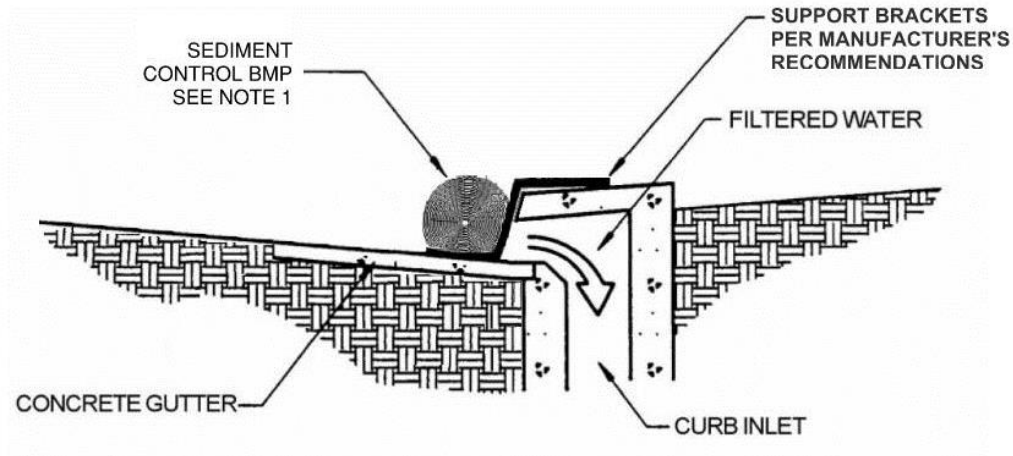


INLET WITH SINGLE ENTRY POINT

Storm Drain Inlet Protection (Gravel Bag Barrier)
Not to Scale



Storm Drain Inlet Protection (Gravel and Wire Mesh Filter)
Not to Scale

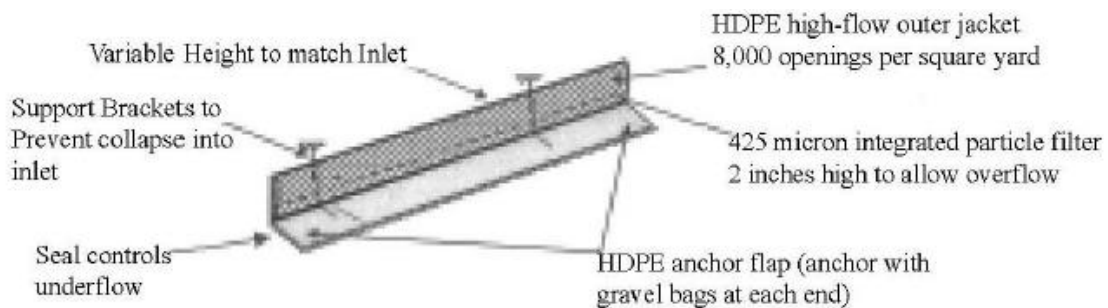


Note:

1. Acceptable sediment control BMPs include Gravel Bag Berms, Sandbag Barriers, or Compost Socks and Berms.

Storm Drain Inlet Protection (Sediment Control with Supports)

Not to Scale



Storm Drain Inlet Protection (Geotextile Insert)

Not to Scale

SE-12 POTENTIAL SEDIMENT SOURCE LOCATION



Description

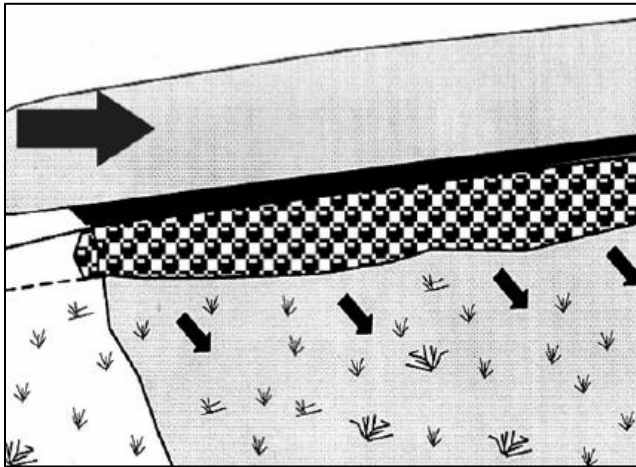
Proper location of potential sediment sources may reduce the amount of material eroded and the generation of sediment from construction sites.

Limitations

- Prevention of sediment-laden runoff should be supplemented with location-appropriate mulching, planting, and structural controls such as berms, silt fences, and silt basins.
- Contaminated soil must be managed and protected separately.

SE-12 POTENTIAL SEDIMENT SOURCE LOCATION	
Practice	
SE-12.P1	Lay out the site so that haul roads and stockpiles are buffered by vegetated areas to remove suspended sediment and other pollutants from runoff prior to discharging offsite. Vegetation along the perimeter of the site, especially on the downhill side of sloped sites, provides an effective buffer against sediment leaving the site.
SE-12.P2	Locate stockpiles away from waterways or low spots and at least 50 feet away from storm drain inlets, drainage ways, and receiving waters.
SE-12.P3	Redirect offsite runoff, where possible, so that it flows through or around the work site without contacting areas where the surface has been disturbed (Refer to SO-5 Temporary Water Diversion).
SE-12.P4	Properly maintain vegetation within swales and natural drainage ways.
SE-12.P5	If available, use naturally level areas for parking and equipment staging during construction.
Maintenance and Inspection	
SE-12.M1	Verify that the work site layout is in accordance with the project phasing plan. Update the layout to match on-site conditions. An updated layout plan must be submitted to AIR-EE prior to the commencement of work for that phase, stage, or project area.
SE-12.M2	Inspect swales and natural drainage ways prior to anticipated rain events, after rain events, and regularly at the end of each workweek.
SE-12.M3	Provide training for personnel detailing the location and BMP requirements for areas with potential on-site sediment sources.

SE-13 LEVEL SPREADER



Description

Level spreaders convert concentrated flow to sheet flow at outlets, preventing erosion of the receiving area. Tops of channels, earthen berms, or rigid weir-like structures may function as level spreaders.

These devices may be used at the following locations:

- Flat or gentle sloping areas.
- Outlets for dikes and diversions.

Limitations

- Not applicable for sediment-laden runoff.

SE-13 LEVEL SPREADER	
Practice	
SE-13.P1	Construct level spreaders on undisturbed soil.
SE-13.P2	Do not construct level spreaders on fill material.
SE-13.P3	Locate level spreaders where re-channelization or concentration of flow will not occur.
SE-13.P4	Install a stabilized and well vegetated slope of less than 10 percent below the level spreader.
SE-13.P5	Filter runoff containing high sediment loads through a sediment-trapping device prior to release to the level spreader.
SE-13.P6	Incorporate a rigid outlet lip design for high-discharge flows.
SE-13.P7	Construct the spreader lip to be flat for uniform sheet flow.
SE-13.P8	Avoid operating vehicles and heavy equipment on the level spreader to maintain a smooth level surface of the overflow weir.
Maintenance and Inspection	
SE-13.M1	Verify that the spreader lip lays flat or reconstruct within 7 calendar days.
SE-13.M2	Inspect the discharge area for signs of erosion or concentrated flow and stabilize or reconstruct within 7 calendar days after the problem is identified.
SE-13.M3	Provide training for personnel detailing the location and BMP maintenance requirements.

SE-15 VEGETATED BUFFER STRIPS AND CHANNELS



Description

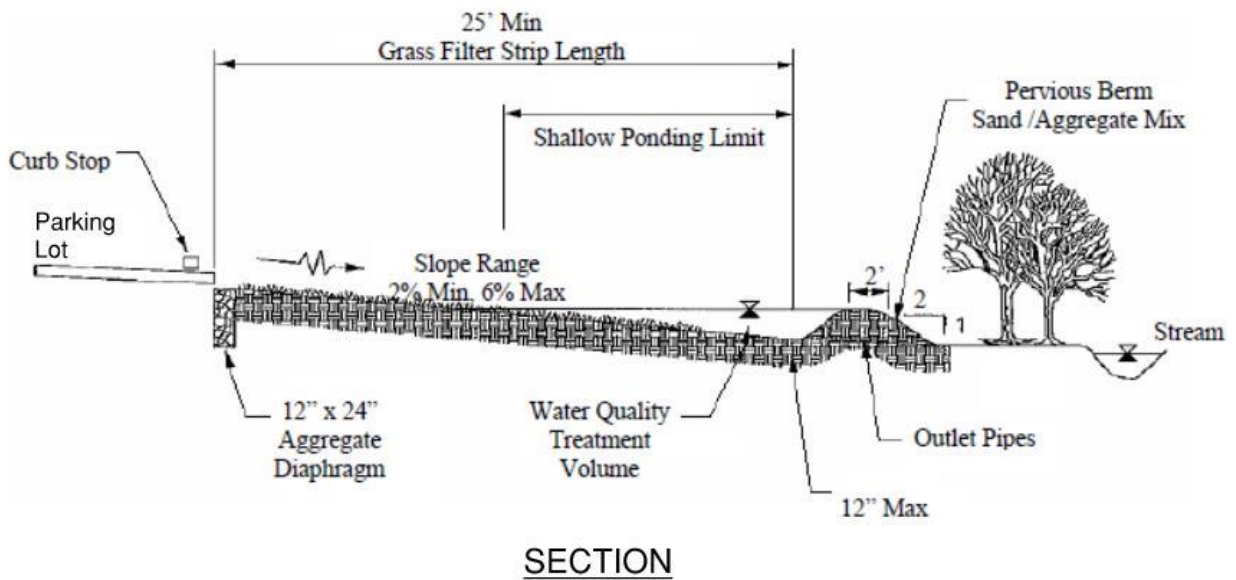
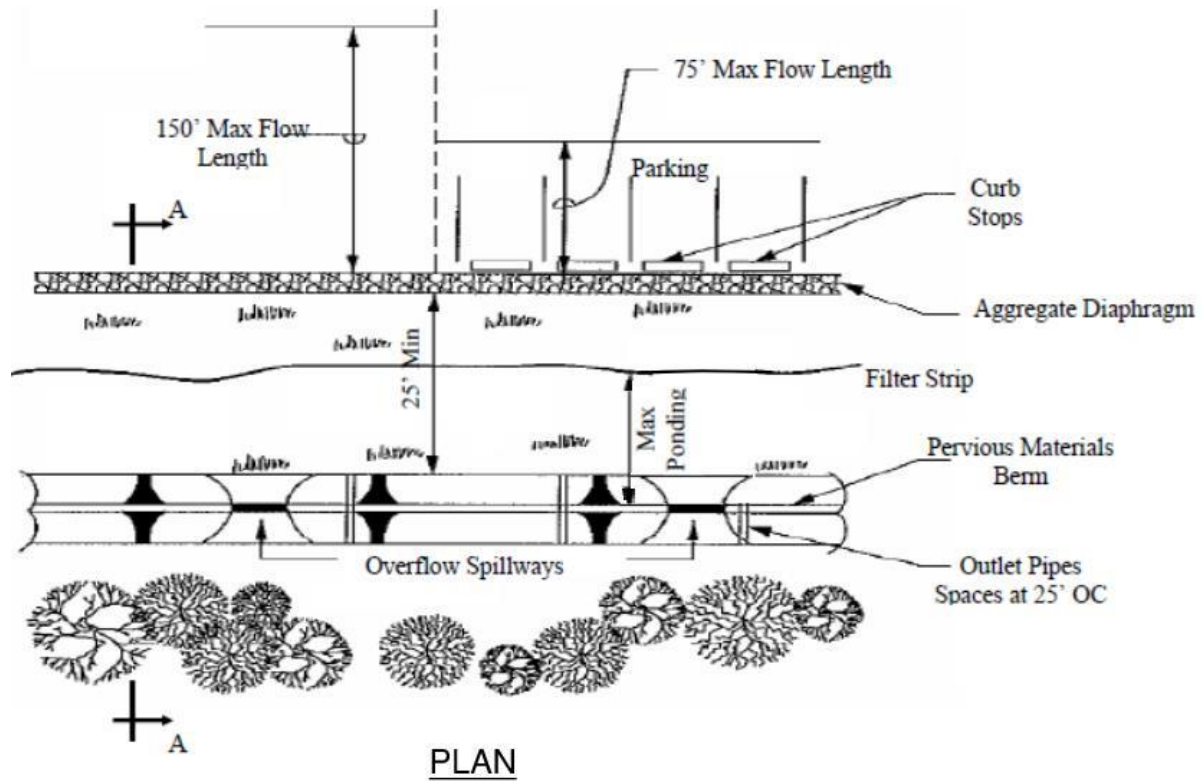
Vegetated buffer strips and channels protect soil from erosion, increase infiltration, and remove sediment from surface runoff. Vegetated buffer strips located adjacent to pollutant sources such as construction sites also provide protection to downstream receiving water bodies.

Limitations

- May be infeasible if sufficient land is not available within project limits.
- Effectiveness may be compromised by high flow rates and poor/sparse vegetation. High maintenance requirements may exist depending on the design condition of the vegetation.
- May require irrigation to maintain vegetation.
- Unless the buffer strip consists of existing vegetation, an area must be designated for the buffer strip and sufficient vegetation must be established.
- Maintaining sheet flow in buffer strips may be difficult.
- Vegetated channels require a larger surface area than lined channels.
- Grassed channels require gradual slopes since runoff with high flow velocity may flow over grass rather than through it.

SE-15 VEGETATED BUFFER STRIPS AND CHANNELS	
Practice	
SE-15.P1	Prior to cultivation of the designated buffer strip area, remove and dispose of all weeds and debris in accordance with contract documents.
SE-15.P2	During construction of the vegetated buffer strip and prior to planting activities, strip and stockpile topsoil in good condition for surface preparation purposes.
SE-15.P3	Plant the area upon completion of grading.
SE-15.P4	Fine grade and roll areas to be planted after cultivating soil and, if applicable, installing the irrigation system.
SE-15.P5	Provide watering or irrigation of vegetation to supplement rainfall until vegetation has been established.
SE-15.P6	Fertilize vegetation in accordance with manufacturer's specifications and grass/soil requirements determined by soil testing. Do not over-apply fertilizers. Refer to EC-14 Grass and Planting.

Maintenance and Inspection	
SE-15.M1	Inspect weekly and after significant rain events until vegetation is established. Repair eroded or damaged areas within 7 calendar days of identifying maintenance needs.
SE-15.M2	Maintenance activities include mowing, weeding, and verifying irrigation systems are operating properly. Properly remove and dispose of clippings from mowing and trimming.



Typical Vegetated Buffer Strip
Not to Scale

SE-16 COMPOST FILTER BERM OR SOCK



Description

Compost socks and berms act as biodegradable filtering structures to intercept runoff and are generally placed at the perimeter or at intervals on sloped areas, perpendicular to the flow. Compost socks are generally a mesh sock containing compost; compost berms are generally trapezoidal dikes of compost.

A compost sock may be assembled on site by filling a mesh sock with compost using a pneumatic blower or similar, or they may be manufactured off site and delivered to the site for installation. The compost berm should be constructed using a backhoe or equivalent and/or a pneumatic delivery (blower) system and should be properly compacted after placement. Compost socks and berms act as filters, reduce runoff velocities, and in some cases, aid in future establishment of vegetation.

Limitations

- It is recommended that the drainage areas of these compost BMPs do not exceed 0.25 acre per 100-foot placement interval and runoff does not exceed 1 cubic foot per second.
- Compost quality shall comply with all local, state, and federal requirements.
- Do not overlap berms by placing individual berms on top of each other.
- Compost can potentially leach nutrients (dissolved phosphorous and nitrogen) into runoff and potentially impact water quality. Compost should not be used directly upstream from nutrient-impaired water bodies.
- Compost socks and berms should not be implemented at the base of slopes greater than 2:1 (H:V). They can be implemented in combination with erosion control methods for steeper slopes.
- Difficult to move once saturated.
- Compost filter socks should not be implemented in areas where ponding or short-term flooding may occur because they may float and become ineffective.
- Compost berms should not be applied in areas of concentrated flows.

SE-16 COMPOST FILTER BERM OR SOCK	
Practice	
SE-16.P1	Select the appropriately sized berm based on rainfall amount and slope.
SE-16.P2	If assembling on site, select compost material meeting DOT standards, fill a mesh tube until it is at least 10 inches in diameter, and tie knots at both ends of the sock.
SE-16.P3	Install berm per manufacturers' recommended procedures and instructions.
SE-16.P4	Place socks or berm perpendicular to flow along the site perimeter or base of slopes. Ensure that the berm has continuous contact with the ground.
SE-16.P5	When encountering a difference in elevation or "step" along the ground, including curbs or walls, turn the end of the berm towards the flow along the face of the curb or wall. Extend the berm a minimum of 3 feet against the face of the curb or wall. Similarly, if the berm continues on top of the curb or wall, turn the berm toward the flow for a minimum distance of 3 feet. Do not "bridge" the elevation difference by extending the berm on top of the wall or curb unless allowed per the manufacturer's recommended procedures and uses.
SE-16.P6	Overlap adjacent socks a minimum distance of 6 inches and place them side-by-side. Do not overlap socks by placing them one on top of another.
SE-16.P7	Secure filter socks on slopes by placing stakes on the downstream side at regular, appropriately spaced intervals.
SE-16.P8	Berms and socks shall be accessible and visible for inspection and monitoring. No materials and equipment shall be stored on top of or immediately abutting the berm or sock.
SE-16.P9	When compost is no longer needed for use in socks or berms, compost may be added to the site as a soil amendment with approval from AIR-EE.
Maintenance and Inspection	
SE-16.M1	Repair or replace damaged berms, such as ripped mesh, by the end of the next workday after the incident.
SE-16.M2	If socks or berms are damaged such that compost spills out of the sock or berm, spilled compost must be removed, and the damaged berm or sock repaired or replaced by the end of the same workday on which the damage was identified.
SE-16.M3	Remove accumulated sediment from the upslope side of the sock or berm by the end of the next workday after accumulation reaches one-third the barrier height.
SE-16.M4	Provide training for personnel detailing the location and BMP installation and maintenance requirements to prevent sediment discharges

5 TRACKING CONTROL BMPS

Tracking control BMPs are devices or procedures that minimize the amount of sediment and debris that is tracked off-site by vehicles and equipment.

TR-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT



Description

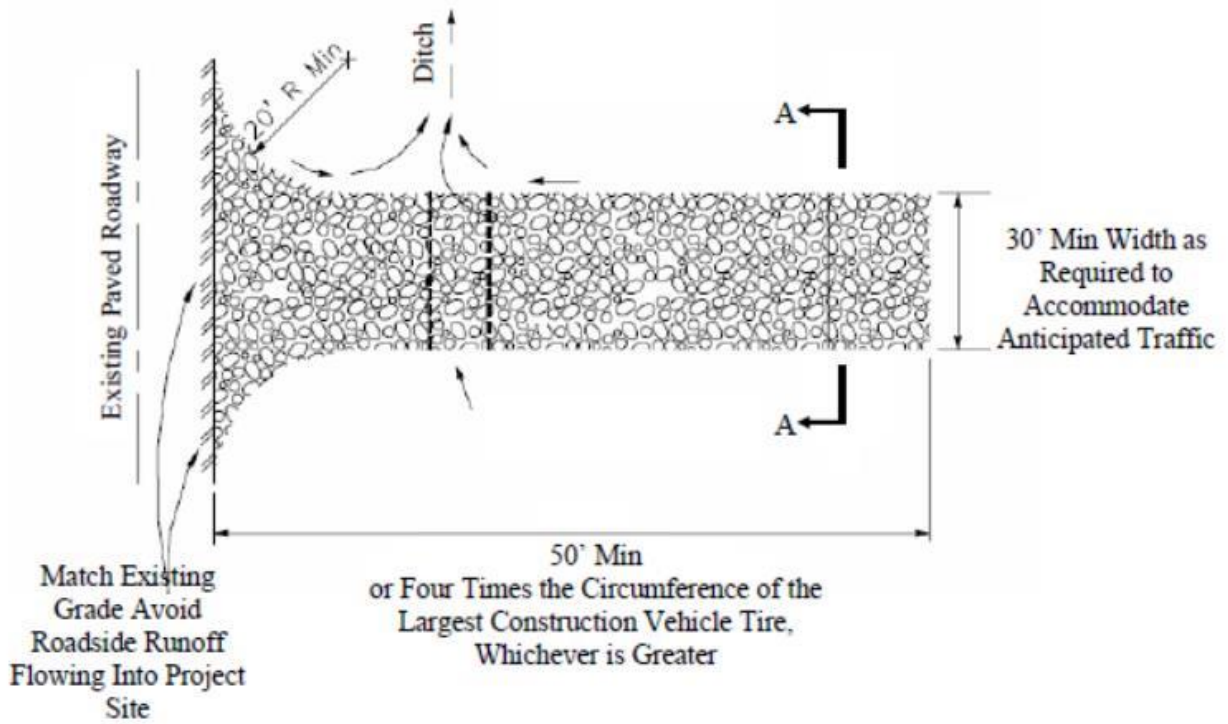
A stabilized construction entrance/exit is a pad of aggregate underlain with filter fabric, constructed where vehicles and/or equipment enter or leave an unpaved portion of a construction site to or from a paved surface. The purpose of a stabilized construction entrance/exit is to reduce the amount of sediment tracked by vehicles and/or equipment transitioning from unpaved to paved surfaces. The effectiveness of a stabilized construction entrance/exit is greatly increased if a wash rack is included for removing caked-on sediment from vehicles and equipment before they leave the site.

Limitations

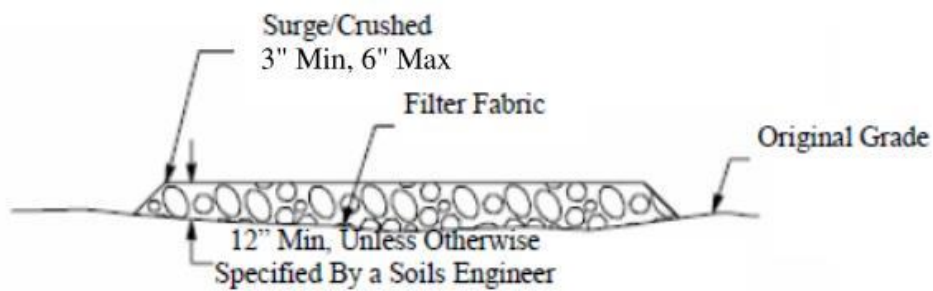
- Periodic replenishment of surface aggregate is required.
- Additional street sweeping of adjacent roadways or other paved areas may be required during the work.
- A wash rack and sediment trap can significantly increase the cost of a stabilized construction entrance.
- The effectiveness of a stabilized construction entrance/exit is limited by the type and moisture content of construction site soils, the inclusion of a wash rack, and the level of care taken to remove sediment from vehicles and equipment if a wash rack is used.

TR-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT	
Practice	
TR-1.P1	Construct stabilized construction entrances/exits on level ground, where possible.
TR-1.P2	Grade the entrance/exit to prevent runoff from leaving the construction site.
TR-1.P3	Aggregate shall be 3- to 6-inch-diameter coarse aggregate.
TR-1.P4	Minimum depth of aggregate is to be 12 inches or as recommended by the soils engineer.
TR-1.P5	Stabilized construction entrances/exits are to be a minimum of 50 feet long and 30 feet wide.
TR-1.P6	Provide ample turning radii in the dimensions of the stabilized entrance/exit.
TR-1.P7	If a wash rack is provided, wash vehicle and equipment tires on paved or crushed stone pad that drains into a properly constructed sediment trap. Refer to SE-3 Sediment Trap for the design, installation, and maintenance of the sediment trap.
TR-1.P8	Include additional BMPs that remove sediment prior to vehicle/equipment exit when the minimum stabilized entrance/exit dimensions cannot be met.

TR-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT	
TR-1.P9	The pavement shall not be cleaned by washing down the street. If washing becomes necessary, wash water must be contained by constructing a sump and diverting the water to an acceptable disposal area away from storm drainage facilities and water bodies or by vacuuming the wash water into a container for proper disposal.
TR-1.P10	Restrict vehicle use to properly designated exit points, implementing signage as needed.
TR-1.P11	Construct stabilized construction entrances/exits at all points that exit onto paved roads, sidewalks, and other impervious surfaces.
TR-1.P12	Alternative construction entrance/exit products may be used in lieu of aggregate if approved by the Engineer and installed per manufacturer's specifications. If approved, alternative products such as rumble strips, rubber pads, and portable tire wash systems may provide tracking controls that are easily relocated for projects with many sequential phases and locations of work.
Maintenance and Inspection	
TR-1.M1	Inspect the stabilized construction entrance/exit and wash rack ditches for sediment clogging. Remove the aggregate, separate, and dispose of the sediment, and reconstruct or repair the stabilized construction entrance/exit within 7 calendar days of identified maintenance need.
TR-1.M2	Inspect storm drain inlet protection and BMP measures for evidence of sediment from tracking.
TR-1.M3	Remove sediment tracked from the site onto off-site roads, paved areas, sidewalks, and other impervious areas by the end of the same workday in which the track-out occurs.
TR-1.M4	If tracking is excessive or sediment is being transported along the pavement or sidewalk by vehicles and/or pedestrians exiting unpaved areas, conduct sweeping immediately and either conduct maintenance on the stabilized entrance/exit to increase effectiveness or increase routine sweeping activities.
TR-1.M5	If tracking is excessive and sweeping is ineffective, or it becomes necessary to wash impervious surfaces, wash water must be contained by constructing a sump and diverting the water to an acceptable disposal area away from storm drainage facilities and receiving waters or by vacuuming the wash water into a container for proper disposal.
TR-1.M6	Once construction is complete and/or stabilized construction entrances/exits are no longer necessary, remove the stabilized construction entrance/exit and establish final stabilization of the area, as required by DOTA.
TR-1.M7	Provide education for required personnel about proper stabilized construction entrance/exit installation, use, and maintenance. Train on the importance of preventing sediment tracking.

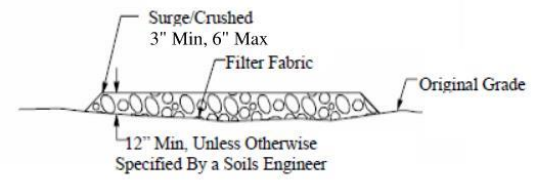
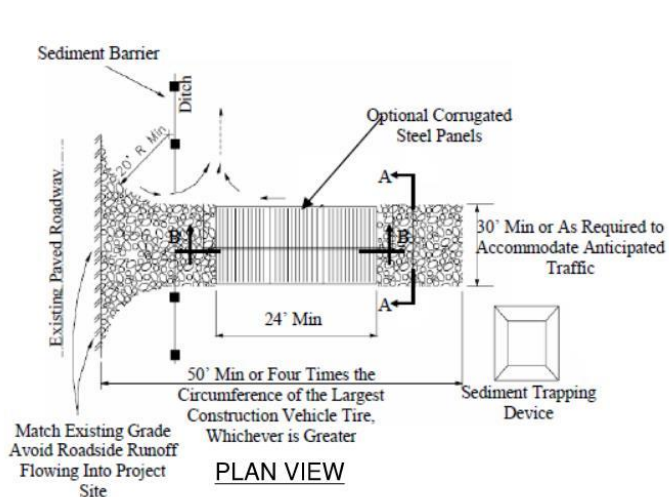


PLAN VIEW

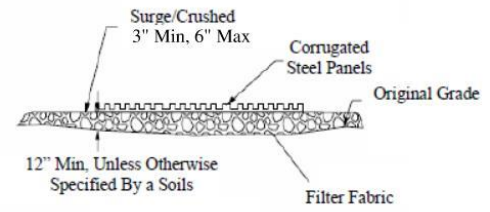


SECTION A-A

Stabilized Construction Entrance/Exit with Corrugated Steel Panels
Not to Scale



SECTION A-A



SECTION B-B

Stabilized Construction Entrance/Exit with Corrugated Steel Panels
Not to Scale

TR-2 CONSTRUCTION ROAD STABILIZATION



Description

Unpaved access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized with gravel immediately after grading and frequently maintained to prevent erosion and control dust. Efficient construction road stabilization not only reduces on-site erosion but can significantly expedite on-site work, prevent instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather.

Limitations

- The roadway slope should not exceed 15 percent.
- The roadway must be removed or paved when construction is complete unless otherwise authorized by AIR-EE.
- Chemical stabilization methods are restricted to the guidelines listed in EC-17 Dust Control BMPs.
- Management of construction traffic is subject to air quality control measures and, if applicable, Airport Operations supervision. Consult with DOH Clean Air Branch to ensure compliance with fugitive dust regulations and properly address dust concerns.
- If a construction road is designed to be left as a permanent roadway after construction, it must be approved by Airport Management prior to construction.

TR-2 CONSTRUCTION ROAD STABILIZATION	
Practice	
TR-2.P1	Road should follow topographic contours to reduce erosion of the roadway.
TR-2.P2	Construct gravel roads from 2- to 3-inch-diameter coarse aggregate, a minimum of 4 inches deep. Apply the coarse aggregate base immediately after grading, or as recommended by a soils engineer.
TR-2.P3	Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust. (Refer to EC-17 Dust Control BMPs).
Maintenance and Inspection	
TR-2.M1	When evidence of erosion is noted, apply additional aggregate on gravel roads.
TR-2.M2	Inspect the stabilized construction roads and repair as needed by the end of the next workday.

TR-2 CONSTRUCTION ROAD STABILIZATION	
TR-2.M3	Water dirt construction roads three or more times per day during the dry season and as needed to prevent dust.
TR-2.M4	Once construction is complete and/or stabilized construction roads are no longer necessary, remove the stabilized construction road and establish final stabilization of the area, as required by DOTA.
TR-2.M5	Provide education for required personnel about proper construction road installation and maintenance. Train on the importance of preventing sediment discharge.

TR-3 STREET SWEEPING



Description

Routine or as-needed deployment of dry street sweeping equipment to mitigate material track-out. Conduct sweeping using manual, mechanical, or vacuum-assisted means to treat soiled surfaces. Properly dispose of swept waste materials.

Limitations

- Site safety/ accessibility
- Wet sediment is difficult to sweep and may require scraping
- Cost of purchase, maintenance, and operation of mechanical and/or vacuum-powered equipment
- Disposal of swept waste materials

TR-3 STREET SWEEPING	
Practice	
TR-3.P1	Remove all deposited sediment by the end of the same workday in which the track-out occurs.
TR-3.P2	Remove all track-out by dry sweeping, shoveling, or vacuuming surfaces, or by using other similarly effective means of sediment removal.
TR-3.P3	Hosing or sweeping tracked-out sediment into any storm drain inlet, drainage way, or receiving water (unless it is connected to a sediment basin, sediment trap, or similarly effective control) is prohibited.
TR-3.P4	Operate powered sweeping equipment at the speed recommended by the manufacturer to maximize the amount of sediment collected across a range of grain sizes.
TR-3.P5	Designate a sweeping route including areas of concentrated vehicular and pedestrian traffic, such as points of egress, where track-out is likely to occur.
TR-3.P6	Do not conduct street sweeping during or immediately after rainstorms.
TR-3.P7	Designate a properly protected waste container or stockpile staging area to empty sweeper hoppers and/trucks. Do not empty sweeper hoppers, even temporarily, onto areas near storm drains, drainage ways, or receiving waters.
TR-3.P8	Consider site-specific conditions that may require specialized sweeping equipment.

TR-3 STREET SWEEPING	
Maintenance and Inspection	
TR-3.M1	Prior to operating mechanical sweeping equipment, perform a routine inspection to check for leaks and perform maintenance as necessary.
TR-3.M2	Inspect cleaning equipment (e.g., brushes, water spray hoses, etc.) for functionality and cleanliness before street sweeping.
TR-3.M3	Properly clean and inspect all equipment after use to promote longevity of the equipment. Replace brush when bristles are no longer effective.

6 SITE OPERATIONS BMPS

Sources of non-stormwater (such as wash water, irrigation water, fuels, and chemicals) must be identified in the SWPPP or SSBMP Plan due to their potential to discharge pollutants to stormwater or other media. Site Operations BMPs are source control practices that prevent pollution by limiting or reducing potential pollutants at their source or eliminating offsite discharge. Examples are procedures and practices designed to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning, fueling, and maintenance operations. These practices involve day-to-day operations of the construction site and are usually under the control of the contractor. These BMPs may also be referred to as “good housekeeping practices,” which involve keeping a clean, orderly construction site.

Other activities required by construction, such as dewatering and hydrotesting, require separate NPDES permits and strict controls if they require discharge to the storm drainage system or to receiving waters.

SO-1 WATER CONSERVATION AND USAGE PRACTICES



Description

Water conservation and usage practices are activities that minimize the water usage during the construction of a project to avoid causing erosion and the transport of pollutants offsite. Includes practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines; landscape irrigation, lawn, or garden watering; and planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing. These practices can reduce or eliminate non-stormwater discharges.

Limitations

- None

SO-1 WATER CONSERVATION AND USAGE PRACTICES	
Practice	
SO-1.P1	When utilizing water for construction activities, only use the amount of water necessary for the intended use to prevent excess runoff.
SO-1.P2	Keep water-handling or distributing equipment in good working condition.
SO-1.P3	Stabilize water truck filling area(s).
SO-1.P4	Repair water leaks promptly.
SO-1.P5	Do not wash vehicles or equipment on site.
SO-1.P6	Direct uncontaminated potable or irrigation water runoff to areas where it can infiltrate into the ground or be collected and reused.
SO-1.P7	Lock water tank valves to prevent unauthorized use.
SO-1.P8	Direct water from offsite irrigation sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
SO-1.P9	Reuse discharges from water line flushing for landscaping purposes, where feasible.
SO-1.P10	Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
SO-1.P11	Implement rain shut-off devices and precision sprinkler heads for irrigation systems, where practical.
SO-1.P12	Protect downstream storm drainage systems, drainage ways, and receiving waters from water pumped or bailed from trenches excavated to repair water lines.

SO-1 WATER CONSERVATION AND USAGE PRACTICES	
Maintenance and Inspection	
SO-1.M1	If runoff of potable water or irrigation water is observed, adjust operations to reduce or eliminate runoff.
SO-1.M2	Inspect and verify that appropriate BMPs are in place prior to the commencement of portable and irrigation water discharges.
SO-1.M3	Inspect BMPs daily while non-stormwater discharges are occurring.
SO-1.M4	Repair water-containing and -distributing equipment as needed to prevent unintended discharges: <ul style="list-style-type: none"> • Water trucks • Water reservoirs • Irrigation systems • Hydrant connections
SO-1.M5	Depressurize broken water lines immediately. Repair broken water lines by the end of the next workday after the broken line was identified.
SO-1.M6	Inspect irrigated areas regularly for signs of erosion and/or discharge.
SO-1.M7	Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to use an appropriate amount of water 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.

SO-2 DEWATERING OPERATIONS



Description

Prevent or reduce the discharge of pollutants to stormwater from dewatering operations by using sediment controls and by testing dewatering effluent for pollution.

Dewatering effluent could contain sediment or chemical constituents, including petroleum products from contaminated groundwater. High sediment content in dewatering effluent may occur because of pumping, and this water must be treated prior to discharge. Petroleum contamination may be identified through discoloration, odors, or sheen on the groundwater. Pollutants may be detected via dewatering effluent sample testing.

Limitations

- Dewatering operations that will discharge effluent to State waters or storm drainage systems, will require an NPDES Dewatering Permit Application (NOI-G).
- Dewatering operations that require NOI-G coverage will require sampling, testing, and review/approval of testing results.
- Dewatering operations that discharge to a treatment pit may require UIC permitting.

SO-2 DEWATERING OPERATIONS	
Practice	
SO-2.P1	If the contractor elects to discharge dewatering effluent into State waters or existing storm drainage systems, the contractor shall prepare and submit an NPDES Dewatering Permit Application (NOI-G) to DOTA for review and acceptance and then to DOH CWB at least 30 calendar days prior to the start of dewatering activities. Once a notice of general permit coverage is obtained, appropriate BMPs must be implemented, inspected, and approved prior to the start of dewatering activities to comply with all permit requirements.
SO-2.P2	Submit and obtain a Construction Connection, Discharge, and Surface Runoff Permit ³ from DOTA, at least 30 calendar days prior to the start of dewatering activities.
SO-2.P3	Use settlement, filtration, and/or other treatment to remove sediment from dewatering effluent. Methods must be detailed in the dewatering plan required by the permit and approved by DOTA and DOH.

³ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/construction-connection-discharge-surface-runoff-permit/>

SO-2 DEWATERING OPERATIONS	
SO-2.P4	Sample the groundwater near the excavation site as required for the permit, and have the water tested for known or suspected pollutants. The testing laboratory shall use methods listed in 40 CFR Part 136 and have a quality assurance/quality control measures program. Verify testing requirements and disposal options with DOH.
SO-2.P5	Notify the DOTA Engineer and AIR-EE if contaminated media are identified.
SO-2.P6	Notify the DOH CWB (808) 586-7309 at least 90 days prior to dewatering from known areas of contamination.
SO-2.P7	If discharge to a sanitary sewer is considered, consult with DOH WWB and with the owner of the wastewater system for additional testing requirements and disposal options. Only with approval from DOH and the owner of the wastewater system may dewatering effluent be discharged to the sanitary sewer.
Maintenance and Inspection	
SO-2.M1	Follow the maintenance and inspection guidelines for the BMPs chosen for the dewatering operations.
SO-2.M2	For projects operating under a NPDES Dewatering Permit, properly sample, test, and report characteristics of dewatering effluent(s) to DOH CWB for each monitoring period in which dewatering discharges to State or surface waters occur.
SO-2.M3	Inspect filtering devices frequently to ensure they are operating correctly and are not clogged. Adjustments may be needed depending on the amount of sediment in the water being pumped.
SO-2.M4	Fill in or otherwise remove temporary dewatering systems and facilities when dewatering is no longer needed.
SO-2.M5	Provide education for personnel operating the dewatering system about proper controls, discharge limitations, and corrective actions.
SO-2.M6	Report any overflows, upsets, or illicit discharges to the storm drainage system or receiving water to DOH and AIR-EE.

SO-3 MILLING AND PAVING OPERATIONS



Description

Prevent or reduce the discharge of pollutants from milling and paving operations by using measures to prevent stormwater, soil, and/or groundwater pollution; properly disposing, recycling, and reusing wastes; and providing employee training.

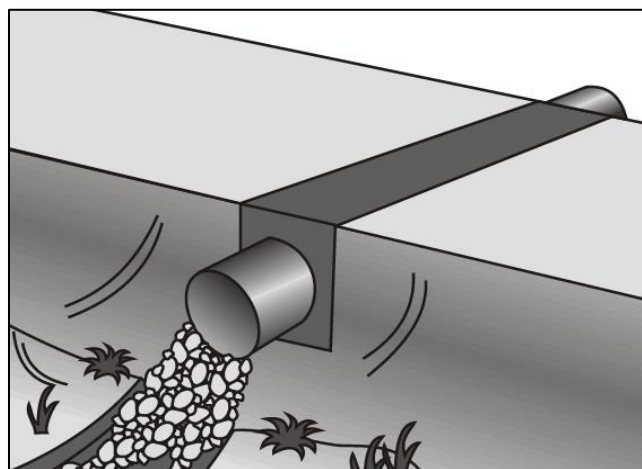
Limitations

- None

SO-3 MILLING AND PAVING OPERATIONS	
Practice	
SO-3.P1	Avoid paving during wet weather.
SO-3.P2	Use reduced tracking asphalt emulsions as tack coat where possible.
SO-3.P3	Store materials away from drainage ways to minimize contact with stormwater runoff or discharge to receiving waters.
SO-3.P4	Prior to application of tack coat, seal coat, slurry seal, or fog seal, or during other paving operations, including milling and saw cutting, protect receiving storm drain inlets, drainage ways, and water bodies, particularly in sloped areas, by employing BMPs to divert or filter runoff.
SO-3.P5	Leaks and spills from paving equipment can contain toxic levels of heavy metal, oil, and grease. Store paving equipment over absorbent materials with an impermeable layer that covers the entire equipment footprint when not in use. For equipment that uses material with a high liquid content, a berm on the downgradient side of the equipment is recommended.
SO-3.P6	Clean up spills promptly with absorbent materials.
SO-3.P7	Shovel or vacuum saw-cut slurry and remove from the site or store properly in a container or containment device for disposal. Slurry residue may be placed in a temporary pit (as described in the WM-8 Concrete Waste Management BMP to promote evaporation). Dispose of solid waste in accordance with the WM-6 Solid Waste Management - Hazardous Waste and WM-5 Solid Waste Management - Debris BMPs.
SO-3.P8	When removing existing asphalt pavement, properly dispose of removed material. Collect and remove all broken asphalt from the site.
SO-3.P9	Reuse or recycle asphalt pavement and millings whenever possible. Reuse of asphalt millings on DOTA property is subject to AIR-EE review and approval. If asphalt millings are to be re-used on site, prepare a plan for reuse, including any applicable testing measures, and submit to AIR-EE for

SO-3 MILLING AND PAVING OPERATIONS	
	approval. Recycled asphalt pavement used for roadways or staging areas must be compacted to prevent loose material from being dislodged, sloped appropriately for drainage, and free of large pieces of asphalt that could damage small vehicles. If a roadway using recycled asphalt pavement will be left permanently in place after construction, it must be approved by Airport Management prior to construction, designed to be at least 6 inches thick, and re-compacted after the contractor is no longer using it for construction support.
SO-3.P10	When stockpiling removed or new asphalt pavement material, follow requirements for WM-3 Protection of Stockpiles, as applicable.
SO-3.P11	If paving involves Portland Cement Concrete, refer to WM-8 Concrete Waste Management.
SO-3.P12	If paving involves asphaltic concrete, follow these steps: <ul style="list-style-type: none"> • Sweep excess sand or gravel placed over new asphalt to prevent it from washing into storm drains, drainage ways, or receiving waters. Properly dispose of these wastes by referring to applicable practices herein. • If paving involves an onsite mixing plant, follow the stormwater permitting requirements, whether the plant is covered under the construction permit or requires a separate industrial permit.
Maintenance and Inspection	
SO-3.M1	Inspect and maintain paving equipment daily to minimize leaks and drips. Follow requirements for SO-8 Vehicle and Equipment Cleaning, SO-9 Vehicle and Equipment Refueling, and SO-10 Vehicle and Equipment Operation, Storage, and Routine Maintenance, as applicable.
SO-3.M2	Inspect drip protection daily. Clean, remove and properly dispose of accumulated material and rainwater by the end of the next workday.

SO-4 TEMPORARY STREAM CROSSING



Description

A temporary stream crossing is a temporary culvert, ford, or bridge placed across a waterway to provide access for construction purposes. Temporary access crossings are not intended to maintain traffic for the public or to remain in place when the construction project is completed. The temporary access works to reduce or eliminate erosion and downstream sedimentation caused by vehicles.

Temporary stream crossings should be installed at all designated crossings of perennial and ephemeral streams on the construction site, as well as for dry channels that may be significantly eroded by construction traffic.

These devices may be installed at sites:

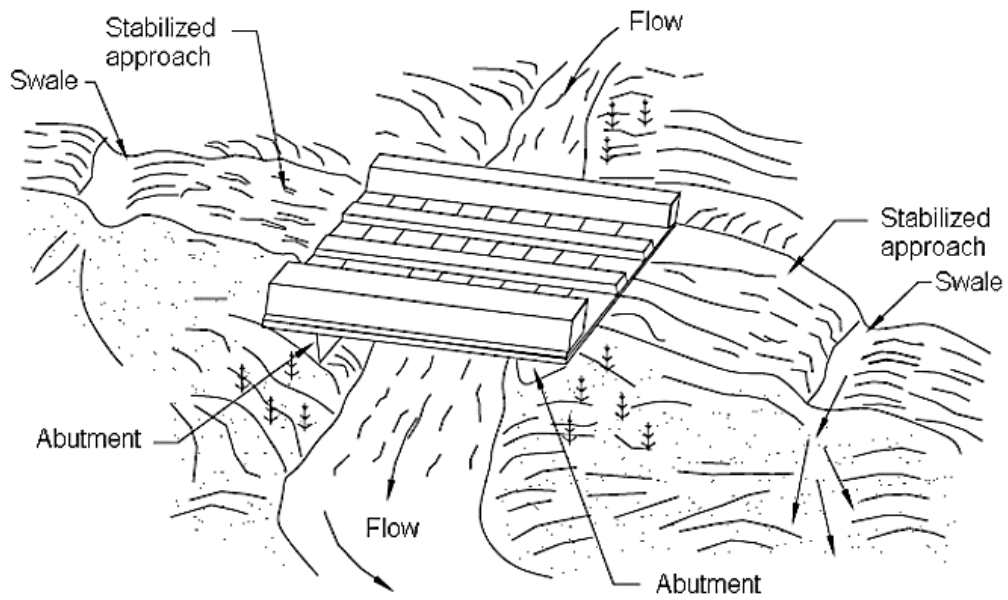
- Where appropriate permits have been secured, e.g., USACE 404 Permit, DOH CWB 401 Certification, and/or CWRM SCAP (HAR Title 13, Chapter 169-50, Protection of Instream Uses of Water).
- Where construction equipment or vehicles frequently cross a waterway.
- When alternate access routes are not feasible.
- When crossing perennial streams or waterways causes significant erosion.

Limitations

- Installation and removal may disturb the waterway and requires stringent use of BMPs to minimize soil disturbance and discharge of sediment.
- Installation may require DOH CWB 401 Certification and USACE 404 permit, a SCAP, and other permits or approvals. If numerical-based water quality standards are mentioned in any permit, testing and sampling may be required.
- Installation may require dewatering or temporary diversion of the stream (see SO-2 Dewatering Operations and SO-5 Temporary Water Diversion).
- Installation may cause a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.

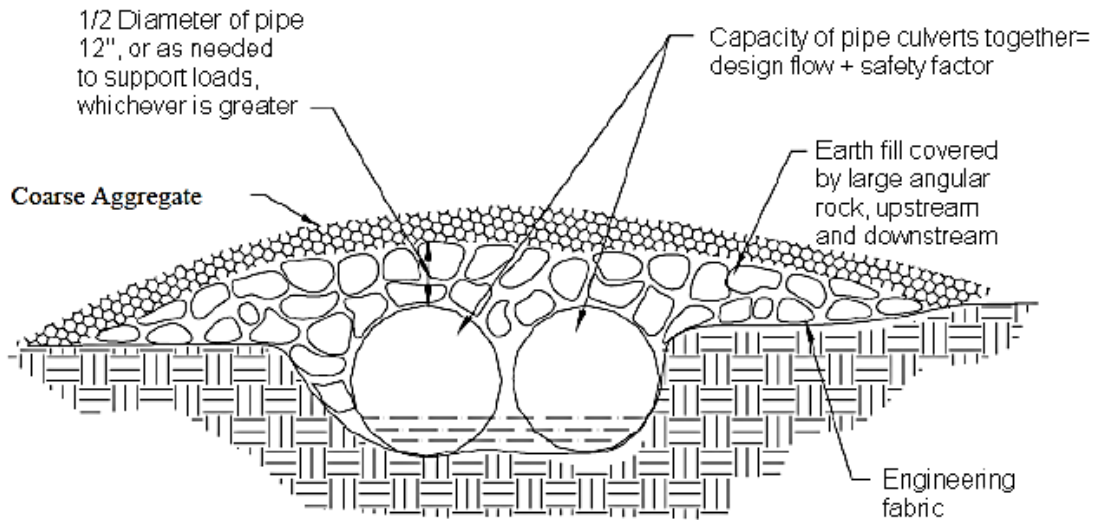
- Ford crossings should be used in flowing waterways only if the crossing is stabilized (e.g., large rock, concrete slab, or pavement) such that discharge of sediment does not occur. Vehicles must be monitored for discharge of petroleum to the water.
- May be expensive for a temporary improvement.
- The crossing should be designed so it will not pose significant flooding risks.

SO-4 TEMPORARY STREAM CROSSING	
Practice	
SO-4.P1	Stabilize construction roadways, adjacent work area, and stream bottom against erosion.
SO-4.P2	Construct during dry periods to minimize stream disturbance and reduce costs.
SO-4.P3	Construct at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.
SO-4.P4	Install appropriate temporary erosion control BMPs to minimize erosion of embankment into flow lines.
SO-4.P5	Build any temporary artificial obstruction placed within flowing water from material, such as clean gravel or sandbags, that will not introduce sediment or silt into the drainage way.
SO-4.P6	Construct temporary water body crossings and encroachments to minimize scour. Cobbles used for temporary water body crossings or encroachments must be clean, rounded stream cobble.
SO-4.P7	Do not drive, operate, fuel, clean, maintain, or store vehicles and equipment in the wet or dry portions of a water body or where wetland vegetation, riparian vegetation, or aquatic organisms may be affected.
SO-4.P8	Maintain the exterior of vehicles and equipment that will encroach on the water body within the project and keep them free of grease, oil, fuel, and residues. Routinely check hydraulic lines for wear and replace lines as needed to prevent breaks and spills.
SO-4.P9	Place drip protection under all vehicles and equipment on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
SO-4.P10	Land disturbance and vegetation removal must not exceed the minimum necessary to complete operations. Take precautions to avoid damage to vegetation by people or equipment. Replace disturbed vegetation with appropriate soil stabilization measures.
SO-4.P11	When removing riparian vegetation pursuant to the provisions of the work, cut off no lower than ground level to promote rapid re-growth. Cover access roads and work areas built over riparian vegetation with a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. Remove the cobble upon completion of project activities.
SO-4.P12	Construction in waterways may be subject to additional permit requirements. Contact USACE and DLNR for additional information.
Maintenance and Inspection	
SO-4.M1	Check for sediment buildup, trapped debris in culverts, and blockages in channels, behind fords, and under bridges. Remove within 7 calendar days after maintenance needs are identified.
SO-4.M2	Check for erosion of abutments, channel scour, riprap displacement, or piping in the soil. Repair within 7 calendar days after maintenance needs are identified.
SO-4.M3	Check for structural weakening of the temporary crossings, such as cracks, and undermining of foundations and abutments. Repair within 7 calendar days after maintenance needs are identified.
SO-4.M4	Remove sediment that collects behind fords, in culverts, and under bridges by the end of the next workday after accumulation is identified.
SO-4.M5	Replace lost or displaced aggregate from inlets and outlets of culverts and cellular confinement systems within 7 calendar days after maintenance needs are identified.
SO-4.M6	Remove temporary crossing promptly when it is no longer needed, ensuring all final stabilization requirements are met.

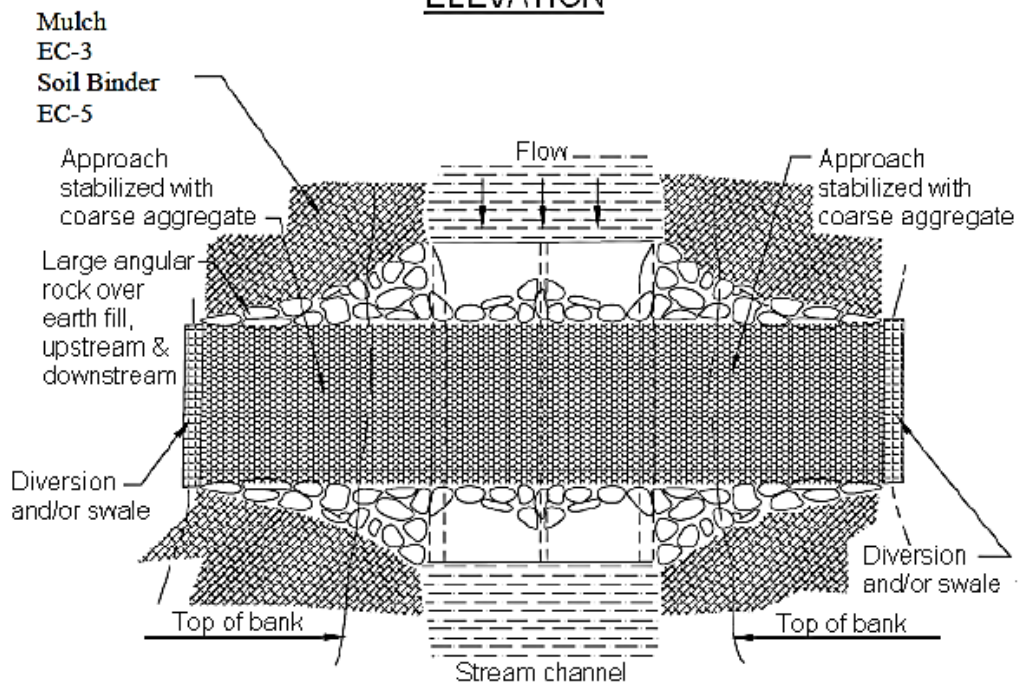


NOTE:
Surface flow of road diverted
by swale and/or dike.

Typical Bridge Crossing
Not to Scale

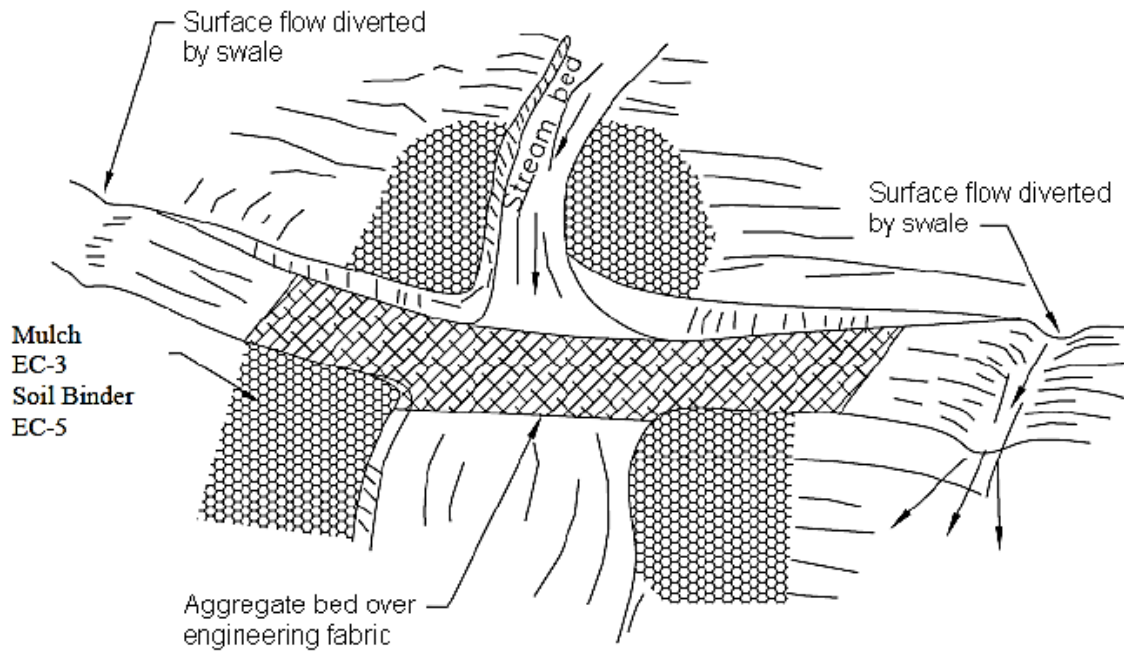


ELEVATION

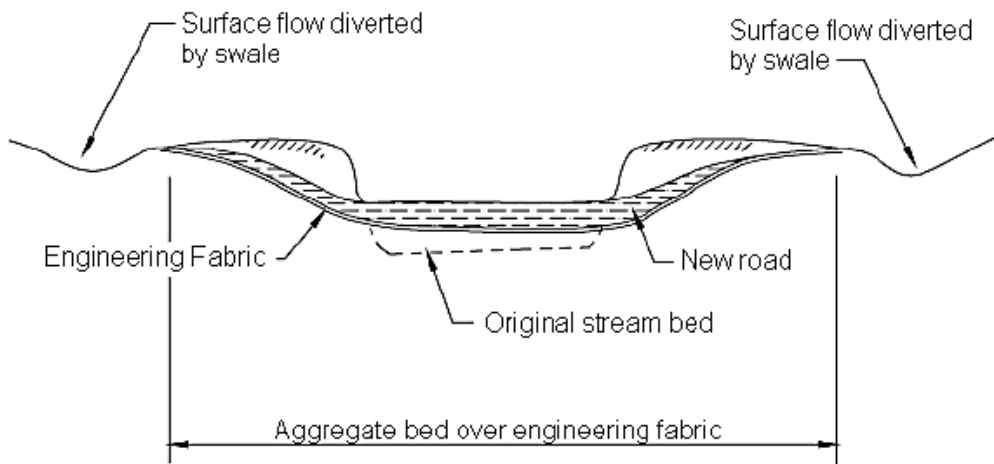


PLAN

Typical Culvert Crossing
Not to Scale

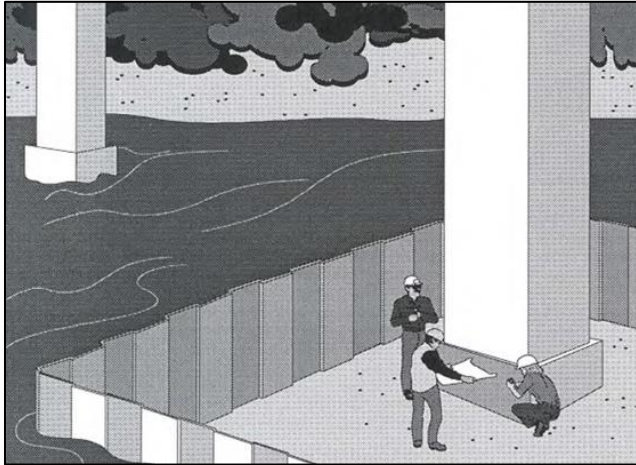


Aggregate approach



Typical Ford Crossing
Not to Scale

SO-5 TEMPORARY WATER DIVERSION



Description

Temporary water diversions consist of a system of structures and measures that intercept surface water runoff upstream of a project, transport it around the work area, and discharge it downstream with minimal water quality degradation from either the project construction operations or the construction of the diversion. Temporary water diversions are used in a waterway to enclose a construction area and reduce sediment pollution from construction work occurring in or adjacent to water. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes.

Limitations

- Installation and removal of diversion structures may disturb the waterway.
- Installation may require USACE 404 Permit, DOH CWB 401 Certification, and/or CWRM SCAP (HAR Title 13, Chapter 169-50, Protection of Instream Uses of Water). If numerical-based water quality standards are mentioned in any permit, testing and sampling may be required.
- A Stream Diversion Works Permit (HAR Title 13, Chapter 168-32 to 35: Water Use, Wells, and Stream Diversion Works) may be required.
- Diversion activities may constrict the waterway and obstruct flood flows and cause flooding or washouts. Diversion structures should not be installed without identifying potential impacts to the stream channel.
- Diversion activities are not appropriate in channels where there is insufficient stream flow to support aquatic species in the area dewatered because of the diversion.
- Diversion activities are inappropriate in deep water unless designed or reviewed by an engineer registered in Hawaii.
- Diversion activities must not completely dam stream flow.
- Dewatering and removal may require additional sediment control or water treatment (see SO-2 Dewatering Operations).
- Diversion activities are not appropriate if installation, maintenance, and removal of the structures will disturb sensitive aquatic species of concern.

SO-5 TEMPORARY WATER DIVERSION	
Practice	
SO-5.P1	Implement guidelines presented in EC-12 Streambank Stabilization, to minimize impacts to streambanks.
SO-5.P2	Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to tides, storms, flash floods, etc.
SO-5.P3	Ensure that stream pumping is properly permitted per local codes, such as HAR Title 13, Chapter 168-32 to 35: Water Use, Wells, and Stream Diversion Works.
SO-5.P4	Allow sufficient water to pass downstream when any artificial obstruction is being constructed or operated. Sufficient downstream flow is necessary to maintain aquatic life.
SO-5.P5	Do not park equipment below the high-water mark, unless explicitly necessary and allowed by an applicable permit.
SO-5.P6	Construct diversion structures with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil.
SO-5.P7	Construction in waterways is subject to additional permit requirements. Contact the USACE and DLNR for additional information.
Maintenance and Inspection	
SO-5.M1	Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are underway, inspect each BMP measure at least weekly during the rainy season and at 2-week intervals in the non-rainy season to verify proper BMP implementation.
SO-5.M2	Inspect downstream discharges for evidence of pollutants or other concerns. If pollutants are identified, immediately locate the pollutant source and take mitigative action.
SO-5.M3	Refer to applicable BMP-specific inspection and maintenance requirements herein.

SO-6 ILLICIT DISCHARGE, ILLEGAL CONNECTION, SPILL, AND LEAK PREVENTION AND CONTROL



Description

Procedures and practices designed for construction contractors to recognize and report spills, leaks, illicit discharges, and illegal connections and prevent or reduce the discharge of pollutants to stormwater and soil from leaks and spills by reducing the chance of spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spilled or illegally dumped materials, and training employees.

Refer to the airport-specific DOTA Illicit Discharges and Illegal Connections Fact Sheets for detailed information on how to respond anytime an illicit discharge or illegal connection is discovered:

- [HNL Illicit Discharges and Illegal Connections \(IDDE\) Fact Sheet](#)⁴
- [LIH Illicit Discharge and Illegal Connections \(IDDE\) Fact Sheet](#)⁵
- [OGG Illicit Discharge and Illegal Connections \(IDDE\) Fact Sheet](#)⁶
- [JHM Illicit Discharge and Illegal Connections Fact Sheet](#)⁷
- [JRF, HDH, ITO, KOA, MKK \(UIC Airports\): Illicit Discharge and Illegal Connections Fact Sheet](#)⁸

Report all spills, regardless of size or type, to DOTA using the online spill reporting form.⁹ Refer to the airport-specific DOTA Spill Reporting Fact Sheets for detailed spill reporting information:

- [JRF and HDH Spill Reporting Fact Sheet](#)¹⁰

⁴ https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/hnl-environmental-compliance/hnl_idde_fact_sheet/

⁵ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/lih-environmental-compliance/lih-idde-fact-sheet/>

⁶ https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/ogg-environmental-compliance/ogg_idde_fact_sheet/

⁷ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/jhm-idde-fact-sheet/>

⁸ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/uic-airports-idde-fact-sheet/>

⁹ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/spill-reporting-form/>

¹⁰ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/jrf-hdh-spill-reporting-fact-sheet/>

- [MKK Spill Reporting Fact Sheet](#)¹¹
- [ITO and KOA Spill Reporting Fact Sheet](#)¹²
- [PAK, LUP, LNY, JHM, HNM, UPP and MUE Spill Reporting Fact Sheet](#)¹³
- [LIH Spill Reporting Fact Sheet](#)¹⁴
- [OGG Spill Reporting Fact Sheet](#)¹⁵
- [HNL Spill Reporting Fact Sheet](#)¹⁶

Spills that are capable of being contained and cleaned up within 72 hours and do not threaten ground or surface waters can be cleaned up using absorbent materials and/or other acceptable practices. Daily facility inspections will help identify spills, which must be addressed immediately.

In the event of a large or uncontrolled release, the Construction Manager or an individual appointed by the contractor shall act as the EC. If necessary, use a private spill cleanup company to help with the appropriate spill response.

Limitations

- If hazardous materials or wastes are known to exist on site, they must be identified in the SWPPP or SSBMP Plan and handled accordingly.

SO-6 ILLICIT DISCHARGE, ILLEGAL CONNECTION, SPILL, AND LEAK PREVENTION AND CONTROL	
Practice	
<i>ILLICIT DISCHARGE AND ILLEGAL CONNECTION PREVENTION AND CONTROL</i>	
SO-6.P1	Refer to the airport-specific DOTA Illicit Discharges and Illegal Connections Fact Sheets (linked above) for detailed information on how to respond anytime an illicit discharge or illegal connection is discovered.
SO-6.P2	Identify and document pre-existing areas of contamination in the SWPPP or SSBMP Plan.
SO-6.P3	Inspect the site before beginning construction activities and during project execution for evidence of illegal connections, or illicit discharges.
SO-6.P4	Observe site perimeter for evidence of or the potential for illicitly discharged material which may enter the project site.
SO-6.P5	Notify the Airport Manager and DOTA of any illegal connections or illicit discharge incidents at the time of discovery. For illegal connections or illicit discharges to the storm drainage system, notify the Airport Manager and DOTA.
SO-6.P6	Consult with AIR-EE and DOH as needed to determine the responsibility for cleanup of illicit discharges. Responsibilities will vary by location.

¹¹ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/mkk-spill-reporting-fact-sheet/>

¹² <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/ito-koa-spill-reporting-fact-sheet/>

¹³ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/all-other-airports-environmental-compliance/all-other-airports-spill-reporting-fact-sheet/>

¹⁴ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/lih-environmental-compliance/lih-spill-reporting-fact-sheet/>

¹⁵ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/ogg-environmental-compliance/ogg-spill-reporting-fact-sheet/>

¹⁶ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/hnl-environmental-compliance/hnl-spill-reporting-fact-sheet/>

SO-6 ILLICIT DISCHARGE, ILLEGAL CONNECTION, SPILL, AND LEAK PREVENTION AND CONTROL	
<i>SPILL AND LEAK PREVENTION AND CONTROL</i>	
SO-6.P7	Report all spills, regardless of size or type, to DOTA via the online reporting form. Refer to the airport-specific DOTA Spill Reporting Fact Sheets (linked above) for detailed spill reporting information.
SO-6.P8	Provide secondary containment for liquids that pose a potential risk to stormwater if they are: <ul style="list-style-type: none"> • Stored outdoors or in an area where spills could potentially be exposed to stormwater, regardless of container size. • Stored in a container with a capacity of 25 gallons or more, regardless of location. • Categorized as hazardous, regardless of location. Secondary containment must be large enough to capture 100 percent of the capacity of the single largest container. If stored outdoors and exposed to rainfall, additional freeboard must be included to account for the precipitation of a 25-year, 24-hour storm event.
SO-6.P9	Place spill cleanup materials where they will be readily accessible. Clearly label all spill kits.
SO-6.P10	Train employees in spill prevention and cleanup.
SO-6.P11	Designate individuals responsible for spill response.
SO-6.P12	Review spill response requirements at each work site.
SO-6.P13	Clean up leaks and spills immediately.
SO-6.P14	If a spill occurs on soil, clean it up immediately and properly dispose of the contaminated soil (refer to WM-7 Contaminated Soil Management) and cleanup materials in accordance with HEER guidance.
SO-6.P15	If a spill occurs on hard surfaces, such as asphalt or concrete, clean it up immediately with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, used cleanup materials are also hazardous. Properly dispose of hazardous materials, and collect records of proper disposal (e.g., landfill receipt, waste manifest) as applicable. Remove residual oil staining using an environmentally friendly degreaser appropriately rated for the surface.
SO-6.P16	Never hose down or bury spills. Clean up as much of the material as possible and dispose of properly. Refer to WM-5 Solid Waste Management -Debris for BMPs.
SO-6.P17	If repair or maintenance must occur onsite, refer to SO-10 Vehicle and Equipment Operation, Storage, and Routine Maintenance.
SO-6.P18	Place drip protection or absorbent materials with an impermeable layer under all equipment when not in use or operating in a stationary position. Drip protection measures must be durable and able to withstand frequent use.
SO-6.P19	Promptly transfer used fluids to the proper waste or recycling drums.
SO-6.P20	Oil filters disposed of in trash cans or dumpsters can leak oil and pollute stormwater. Place used oil filters in a funnel over a used oil recycling drum to drain excess oil before disposal. Recycle oil filters if a nearby service is available or properly remove to a receiving facility.
SO-6.P21	Store cracked batteries, even those that appear to have drained all acid, in secondary containment compatible with acids. Treat dropped or potentially damaged batteries as cracked. Store all batteries in designated secondary containment and properly dispose in accordance with regulations.
SO-6.P22	If fueling must occur onsite, refer to SO-9 Vehicle and Equipment Refueling.
Maintenance and Inspection	
<i>ILLICIT DISCHARGE AND ILLEGAL CONNECTION</i>	
SO-6.M1	Inspect the site and site perimeter regularly to check for any illegal dumping or discharge.

SO-6 ILLICIT DISCHARGE, ILLEGAL CONNECTION, SPILL, AND LEAK PREVENTION AND CONTROL	
SO-6.M2	Prohibit employees and subcontractors from disposing of non-project-related debris or materials at the construction site.
<i>SPILL AND LEAK PREVENTION AND CONTROL</i>	
SO-6.M3	Ensure spill kits are fully stocked, quickly accessible, and easily opened at the beginning of each workday. Replenish depleted spill cleanup materials within seven (7) days.
SO-6.M4	Remove any product and fluid collected in drip protection, secondary containment devices, and absorbent materials by the end of the next workday after accumulation was identified.
SO-6.M5	Replace damaged drip protection measures, containment devices, and absorbent materials by the end of the next workday after damage is observed.
SO-6.M6	Implement mandatory monthly good housekeeping and BMP refresher sessions for employees.

SO-8 VEHICLE AND EQUIPMENT CLEANING



Description

Prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by using offsite facilities, washing in designated and contained areas only, eliminating discharges to the storm drainage system by infiltrating or recycling the wash water, and/or training employees.

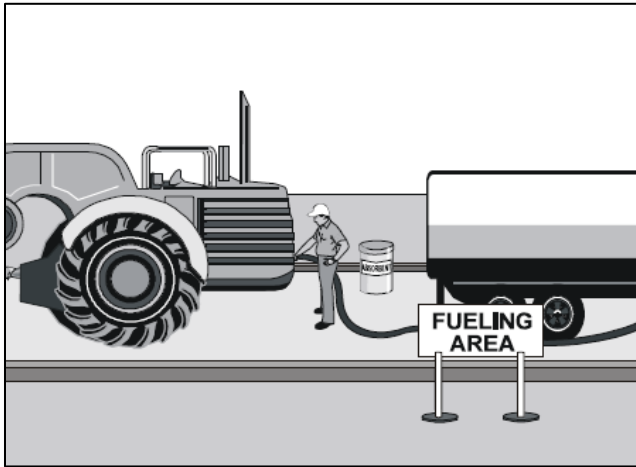
Limitations

- Even phosphate-free, biodegradable soaps may be toxic to fish before the soap degrades. Check the product SDS if wash water could reach a storm drain or receiving water.

SO-8 VEHICLE AND EQUIPMENT CLEANING	
Practice	
SO-8.P1	Use offsite vehicle wash racks or commercial washing facilities as much as possible. These facilities are more adequately equipped to handle and dispose of the wash waters properly. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute stormwater and is not allowed.
SO-8.P2	If washing must occur onsite, use designated, bermed, and lined wash areas to prevent wash water contact with stormwater and receiving waters. If necessary, slope the wash area for wash water collection and subsequent proper disposal offsite. Refer to WM-10 Liquid Waste Management for information on disposal. AIR-EE shall approve the wash area location prior to implementation and washing BMPs shall be inspected prior to use.
SO-8.P3	Use as little water as possible to reduce non-stormwater runoff.
SO-8.P4	Use phosphate-free, biodegradable soaps. Select soaps that are not expected to be hazardous to the environment and do not contain substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42), per the product SDS. Avoid soaps with warnings that indicate the product could contaminate soil or be harmful to aquatic species if released into waterways or storm drainage systems.
SO-8.P5	Address spills of soap concentrate, even biodegradable and phosphate-free soap, immediately. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control.
SO-8.P6	Check all vehicles and equipment for leaks and repair all known leaks immediately.
SO-8.P7	Educate employees on pollution prevention measures.
SO-8.P8	Avoid steam cleaning in uncontained areas. Steam cleaning may generate higher pollutant concentrations than normal washing.

SO-8 VEHICLE AND EQUIPMENT CLEANING	
SO-8.P9	Washing personal vehicles on DOTA property is prohibited.
Maintenance and Inspection	
SO-8.M1	Inspect on-site wash areas at the end of each workweek to verify practices listed above are implemented.
SO-8.M2	Monitor employees and subcontractors throughout the duration of the construction project to ensure good housekeeping practices are implemented.

SO-9 VEHICLE AND EQUIPMENT REFUELING



Description

Prevent fuel spills and leaks. Reduce the impacts of spills and leaks to stormwater, soil, or groundwater by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees.

Limitations

- If an aboveground storage tank or mobile storage tank is to be used for on-site vehicle and equipment fueling, prior approval from AIR-EE and an AST Installation Permit/Certificate from the Fire Department is required. Aboveground fuel storage greater than 1,320 gallons may require an SPCC Plan to also be prepared and submitted to AIR-EE.

SO-9 VEHICLE AND EQUIPMENT REFUELING	
Practice	
SO-9.P1	Use offsite fueling stations as much as possible because these businesses are better equipped to handle fuel and spills properly. Fueling vehicles and equipment outdoors or in areas may allow stormwater to encounter spilled or leaked fuel.
SO-9.P2	If fueling must occur onsite, use a designated area located away from storm drainage systems and receiving waters to prevent stormwater contamination. Prior to conducting fueling activities, the fueling area location and SWPPP or SSBMP Plan must be approved by AIR-EE.
SO-9.P3	Prepare and maintain an SPCC Plan onsite if the total oil storage capacity is greater than 1,320 gallons summing all containers with individual capacities equal to or greater than 55 gallons. Please note, DOT is not the primary regulator for the SPCC Rule. The U.S. Environmental Protection Agency oversees all SPCC regulations; the project contractor is responsible for SPCC plan implementation and compliance with the SPCC Rule.
SO-9.P4	Do not “top off” fuel tanks.
SO-9.P5	Use spill containment measures, such as a drip pan or drop cloth, when fueling to catch spills/leaks. Clean up spills immediately.
SO-9.P6	Place spill cleanup materials where they will be readily accessible. Clearly label spill kits and other cleanup materials.
SO-9.P7	Use dry cleanup methods to absorb small spills and properly dispose of spent materials and/or contaminated soil. Do not hose down or bury spills.
SO-9.P8	Avoid mobile fueling of construction equipment at the site. Transport equipment to designated fueling areas to the maximum extent practicable.

SO-9 VEHICLE AND EQUIPMENT REFUELING	
SO-9.P9	Train employees in proper fueling and cleanup procedures. Contractor fueling employees must stay with the truck at all times and ensure the fuel delivery hose is uncoupled prior to driving away.
SO-9.P10	In addition to the requirements listed under WM-1 Material Delivery and Storage, store gasoline, diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in properly labeled, watertight containers. Dispose of containers only after all the product has been used. Store and dispose or recycle product and containers according to federal, state, and local requirements.
Maintenance and Inspection	
SO-9.M1	Inspect fueling areas and facilities at the end of each workday for spills and/or stains.
SO-9.M2	Ensure the spill kits are fully stocked, quickly accessible, and easily opened at the beginning of each workday. Replenish depleted spill cleanup materials within seven (7) days.
SO-9.M3	Inspect vehicles and equipment for leaks at the beginning and end of each day. Repair leaks immediately.
SO-9.M4	If a spill occurs, clean it up immediately and properly dispose of the contaminated soil and cleanup materials. Remove residual staining using an environmentally friendly degreaser.
SO-9.M5	Report all spills to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.

SO-10 VEHICLE AND EQUIPMENT OPERATION, STORAGE, AND ROUTINE MAINTENANCE



Description

Vehicle and equipment operation, storage, and routine maintenance is a potentially significant source of pollution. This section covers use of all vehicles and equipment needed for construction, including trucks, grading and paving equipment, pile driving equipment, etc. During operation, vehicles and equipment can deposit pollutants through brake pad usage, excessive application of grease or lubricant, and leaks from poorly maintained equipment.

Outdoor vehicle or equipment maintenance activities include vehicle and equipment repair and service, including changing and filling of fluids, and outdoor equipment storage and parking, which can result in fluid leaks.

Practices to prevent or reduce the discharge of pollutants to stormwater, soil, and/or groundwater from vehicle and equipment operation and maintenance include:

- Using offsite facilities.
- Performing work in designated areas only.
- Storing vehicles and equipment on spill containment measures with drip protection when not in use.
- Checking equipment and pavement for leaks and spills.
- Containing and cleaning up spills immediately.
- Training employees.

Limitations

- None

SO-10 VEHICLE AND EQUIPMENT OPERATION, STORAGE, AND ROUTINE MAINTENANCE	
Practice	
SO-10.P1	Keep vehicles and equipment clean; don't allow excessive buildup of oil and grease.
SO-10.P2	Use off-site repair shops as much as possible because these businesses are better equipped to handle vehicle fluids and spills properly. Maintaining vehicles and equipment outdoors may allow stormwater to come into contact with spilled or leaked oil, grease, fluid, etc.
SO-10.P3	Prior to conducting fueling activities, the vehicle maintenance area location and SWPPP or SSBMP Plan must be approved by AIR-EE.

SO-10 VEHICLE AND EQUIPMENT OPERATION, STORAGE, AND ROUTINE MAINTENANCE	
SO-10.P4	Always use spill containment measures, such as anchored drip protection, to capture spills or leaks when removing or changing fluids.
SO-10.P5	Place spill cleanup materials where they will be readily accessible. Clearly label spill kits and other cleanup materials.
SO-10.P6	Use dry cleanup methods to absorb spills and properly dispose of spent materials. Do not hose down or bury spills.
SO-10.P7	Inspect incoming vehicles and equipment (including delivery trucks, and employees' vehicles) regularly for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
SO-10.P8	Segregate and recycle wastes, such as grease, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic fluid, and transmission fluids.
SO-10.P9	Dispose of all wastes from vehicle maintenance activities properly. Recycle waste materials to the maximum extent practicable.
SO-10.P10	Train employees on proper maintenance and spill cleanup. Ensure employees are knowledgeable to the locations of the spill kits and SDS.
SO-10.P11	Place drip protection or containment devices under vehicles or equipment when not in use or operating in a stationary position, such as light plants and trailer-mounted generators, to capture/absorb potential leaks and prevent spills. Drip protection measures must be durable and able to withstand frequent use.
SO-10.P12	Store paving equipment over absorbent materials with an impermeable layer when not in use. For equipment that uses material with a high liquid content, implement a berm on the downgradient side of the equipment.
SO-10.P13	Do not allow accumulation of contents and rainwater to overflow from drip protection or containment devices.
SO-10.P14	If excess grease/oil is applied to equipment or evidence of a leak is observed on the equipment, prevent area from contacting rainwater or contain rainwater that comes into contact with grease/oil or leaked fluid and properly dispose.
SO-10.P15	Do not clean surfaces or spills by hosing the area down.
SO-10.P16	In addition to the requirements listed under WM-1 Material Delivery and Storage, store diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in watertight containers. Do not remove original product labels. Have SDS located onsite and ensure employees are knowledgeable of its location. Follow BMPs in WM-1 Material Delivery and Storage for storage of other materials.
SO-10.P17	Oil filters disposed in trash cans or dumpsters may leak oil and pollute stormwater. Place used oil filters in a funnel over a used oil recycling drum to drain excess oil before disposal. Recycle oil filters if a nearby service is available.
SO-10.P18	Dispose of containers only after all the product has been used. Deliver and store only the amount of product that is needed.
SO-10.P19	Dispose of or recycle oil or oily wastes according to federal, state, and local requirements.
SO-10.P20	Prepare and maintain an SPCC Plan onsite if the total oil storage capacity is greater than 1,320 gallons for all ASTs with individual capacities equal to or greater than 55 gallons. Please note, DOT is not the primary regulator for the SPCC Rule. The U.S. Environmental Protection Agency oversees all SPCC regulations; the project contractor is responsible for SPCC plan implementation and compliance with the SPCC Rule.
SO-10.P21	Operation and use of equipment and vehicles that show excessive emissions of exhaust gases shall not be allowed until corrective repairs or adjustments are made.
SO-10.P22	Furnish construction equipment with suitable mufflers to maintain noise levels in compliance with applicable regulations.

SO-10 VEHICLE AND EQUIPMENT OPERATION, STORAGE, AND ROUTINE MAINTENANCE	
Maintenance and Inspection	
SO-10.M1	Ensure spill kits are fully stocked, quickly accessible, and easily opened at the beginning of each workday.
SO-10.M2	Inspect vehicles and equipment for leaks at the beginning and end of each workday. Repair leaks immediately or remove the leaking equipment from the project site.
SO-10.M3	Inspect drip pans or drop cloths daily. Clean, remove and properly dispose of the contents and any rainwater accumulation by the end of the next workday, or prior to a rain event (whichever is sooner) after accumulation was observed.
SO-10.M4	If a spill occurs on soil, clean it up immediately and properly dispose of the contaminated soil (refer to WM-7 Contaminated Soil Management) and cleanup materials.
SO-10.M5	If a spill occurs on hard surfaces, such as asphalt or concrete, clean it up immediately and properly dispose of the cleanup materials. Remove residual oil staining using an environmentally friendly degreaser appropriately rated for the surface.
SO-10.M6	Report all spills to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.
SO-10.M7	Procure a spill response contractor for any large spills that cannot be contained.
SO-10.M8	Inspect equipment maintenance areas daily while in use.
SO-10.M9	Train employees on proper maintenance of the equipment and spill procedures.

SO-12 CONCRETE CURING



Description

Concrete curing is used in the construction of structures such as bridges, walls, columns, beams, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Stormwater and soil exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. Implementing proper procedures can reduce or eliminate the contamination of stormwater runoff, soil, and/or groundwater during concrete curing.

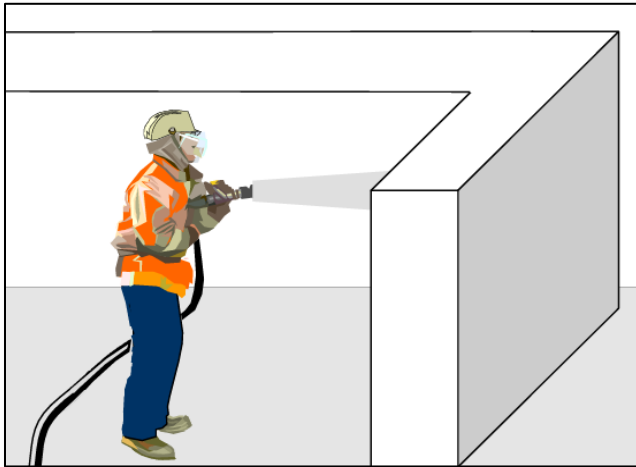
Limitations

- Uncured concrete cement has very high pH that is lethal to fish. Discharge of wet concrete to the airport drainage system or to receiving waters is strictly prohibited.

SO-12 CONCRETE CURING	
Practice	
SO-12.P1	Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1 Material Delivery and Storage.
SO-12.P2	Protect storm drain inlets, drainage ways, and receiving waters prior to applying curing compounds.
SO-12.P3	Spills of concrete curing water must be addressed immediately. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control.
SO-12.P4	Direct cure water away from storm drain inlets, drainage ways, and receiving waters and toward collection areas for infiltration or other means of removal in accordance with all applicable permits.
SO-12.P5	Collect cure water at the top of slopes and transport or dispose of water in a non-erodible manner. Refer to EC-9 Temporary Earth Dikes, Drains, and Swales.
SO-12.P6	Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.
SO-12.P7	Avoid overapplication of the curing compound. Apply an amount of compound that covers the surface but does not allow any runoff of the compound. Follow manufacturer's recommended application rate and coverage.
SO-12.P8	Avoid or minimize applying curing compound in windy conditions. Maintain proper distance between sprayer tip and concrete surface to minimize curing compound dissipation due to wind.

SO-12 CONCRETE CURING	
SO-12.P9	Store dry and wet concrete materials in a covered area or under covering, away from drainage ways.
SO-12.P10	Avoid mixing excess amounts of fresh concrete or cement onsite.
SO-12.P11	If concrete involves an onsite batch plant, follow the stormwater permitting requirements (for sole use of a construction project, the batch plant may be permitted under the project's NOI-C; for other situations, the batch plant may require an industrial permit). The Airport Manager must approve the batch plant location. Locate the batch plant away from drainage facilities and storm drainage paths to the extent practical. Comply with applicable federal, state, and local regulations. See SO-16 Temporary Batch Plant for additional practices.
Maintenance and Inspection	
SO-12.M1	Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
SO-12.M2	Inspect cure containers and spraying equipment for leaks.

SO-13 STRUCTURE CONSTRUCTION AND PAINTING



Description

Prevent or reduce the discharge of pollutants to stormwater from structure repair/construction and painting by enclosing, covering, or providing secondary containment around material storage areas; implementing good housekeeping practices; using alternative products that pose fewer environmental hazards; and training employees.

Water-based paints are not considered hazardous wastes for disposal purposes. Waste oil-based paints are hazardous wastes.

Limitations

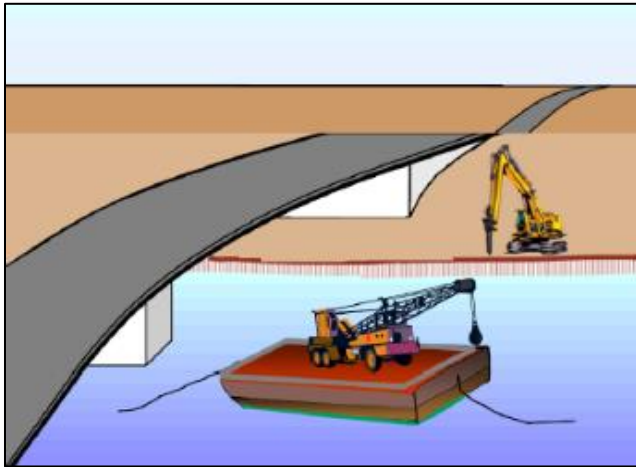
- Alternative products which pose fewer environmental hazards may not be available, suitable, or effective in every case.

SO-13 STRUCTURE CONSTRUCTION AND PAINTING	
Practice	
SO-13.P1	Keep the work site clean and orderly.
SO-13.P2	Buy recycled painting products to the maximum extent practicable.
SO-13.P3	Conduct painting operations consistent with the state and federal safety (Occupational Safety and Health Administration) and air quality regulations.
SO-13.P4	Properly store paints, epoxy compounds, solvents, and other liquid chemicals in clearly labeled, watertight containers with closed lids or covers.
SO-13.P5	Store containers with the capacity to hold 25 gallons or more of liquids that pose a potential risk to stormwater indoors or under cover.
SO-13.P6	<p>Provide secondary containment for liquids that pose a potential risk to stormwater if they are:</p> <ul style="list-style-type: none"> • Stored outdoors or in an area where spills could potentially be exposed to stormwater, regardless of container size. • Stored in a container with a capacity of 25 gallons or more, regardless of location. • Categorized as hazardous, regardless of location. <p>Secondary containment must be large enough to capture 100 percent of the capacity of the single largest container. If stored outdoors and exposed to rainfall, additional freeboard must be included to account for the precipitation of a 25-year, 24-hour storm event.</p>

SO-13 STRUCTURE CONSTRUCTION AND PAINTING	
SO-13.P7	Store small containers of reactive, ignitable, or flammable materials in flammable storage lockers, unless otherwise complying with local fire codes. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. Refer to the Flammable and Combustible Liquid Code, National Fire Protection Association, NFPA 30.
SO-13.P8	Properly store powder chemicals and materials, such as cement, in sealed containers or bags that are well-labeled. Cover and immediately repair or replace damaged containers.
SO-13.P9	Store materials in their original containers with original labels intact.
SO-13.P10	Properly store and dispose waste materials generated from the activity. Refer to WM-6 Solid Waste Management – Hazardous Waste, WM-5 Solid Waste Management – Debris, and WM-10 Liquid Waste Management.
SO-13.P11	Enclose or cover painting operations to avoid dispersal of painting products by wind.
SO-13.P12	Avoid over-spraying paint. Apply paint per manufacturer’s recommended application rate and coverage. Avoid or minimize applying paint in windy conditions. Maintain proper distance between sprayer tip and surface to minimize dissipation of the paint due to the air from the sprayer. Apply paint with brush or roller, if possible.
SO-13.P13	Clean up spills immediately and report to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements. Maintain ample supply of cleanup materials on site in designated, clearly labeled locations. Do not clean surfaces or spills by hosing the area down. Identify and address the source of the spill to prevent additional spills.
SO-13.P14	Use a drop cloth and contained area to collect residue from scraping or sand blasting operations and dispose of the residue properly.
SO-13.P15	Mix and clean paints and equipment in a covered and contained area, over secondary containment, when possible, to minimize adverse impacts from spill.
SO-13.P16	Designate and locate onsite wash areas a minimum of 50 feet away, or as far as practicable, from storm drain inlets, drainage ways, or receiving waters.
SO-13.P17	When painting is completed, use as much of the residual paint on the painted surface as possible. For water-based paints, wash brush and other instruments in a bucket and dispose of wash water into the sanitary sewer, where possible. If not possible, collect all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so to prevent overflows due to inadequate sizing or precipitation. Allow water to evaporate and collect and properly dispose of residual paint solids. Dispose of excess oil-based paints and sludge as hazardous waste.
SO-13.P18	Paint chips containing lead or tributyltin are considered a hazardous waste. Refer to WM-6 Solid Waste Management – Hazardous Waste BMPs for proper disposal practices.
SO-13.P19	Dispose of painting materials according to applicable laws and regulations. Recycle residual paints, solvent, lumber, and other materials to the maximum extent practicable.
SO-13.P20	Dispose of containers only after all product has been used and all residual product has dried. Bag containers before placing them in C&D waste containers.
SO-13.P21	Ensure that receiving storm drain inlets, drainage ways, and receiving waters are properly protected to prevent the discharge of paint-derived pollutants.
SO-13.P22	Schedule painting to allow for enough drying time prior to the next forecasted rain event.
SO-13.P23	Do not over-apply traffic paint or thermoplastic. Minimize excessive spreading or over-application of beads when applied manually to the surface of the thermoplastic.
SO-13.P24	Ensure that employees completing the work are properly trained.
SO-13.P25	Properly dispose of sandblasted material. Chips and dust from marine paints or paints containing lead are hazardous waste and must be disposed of per WM-6 Solid Waste Management –

SO-13 STRUCTURE CONSTRUCTION AND PAINTING	
	Hazardous Waste. Paint chips and dust from non-hazardous dry stripping and sandblasting may be collected and disposed of as construction debris per WM-5 Solid Waste Management – Debris.
SO-13.P26	Retain SDSs for products used on site at a designed location for easy access.
Maintenance and Inspection	
SO-13.M1	At the beginning and ending of each workday, inspect material storage areas to verify that materials are properly stored or covered.
SO-13.M2	Inspect the storm drainage system in the immediate work area daily, and remove any dirt or debris collected by the end of the same workday.
SO-13.M3	Collect and properly dispose of paint chips from sandblasting or scraping at the end of each workday.
SO-13.M4	Inspect and clean work areas at the end of each workday.
SO-13.M5	Check secondary containment exposed to stormwater daily. Remove any accumulated liquids to prevent overflows.

SO-14 MATERIAL OVER WATER



Description

Procedures for the proper use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, or similar locations, that minimize or eliminate the discharge of potential pollutants to a drainage way, including State waters.

These procedures should be implemented for construction materials and wastes (solid and liquid), soil or dredging materials, or any other materials that may cause or contribute to exceedances of water quality standards.

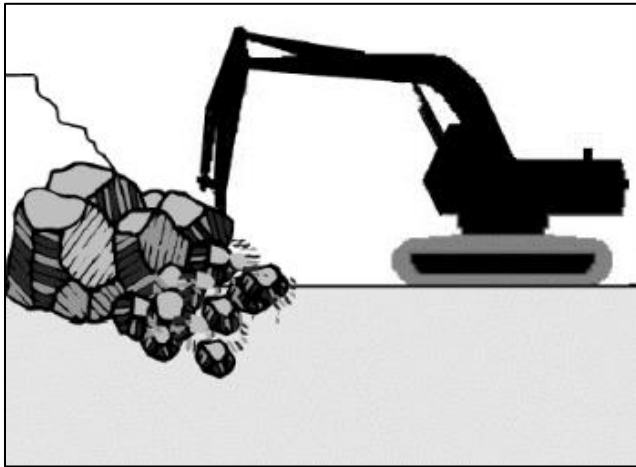
Limitations

- Dredge and fill activities are regulated by the USACE and DOH CWB under Section 404/401 of the Clean Water Act.

SO-14 MATERIAL OVER WATER	
Practice	
SO-14.P1	Use drip protection and absorbent pads for equipment and vehicles placed on docks, barges, or other structures over water bodies when not in use or expected to be idle for more than 1 hour.
SO-14.P2	Maintain clearly labeled, accessible spill kits.
SO-14.P3	Provide watertight curbs or toe boards to contain spills and prevent materials, tools, and debris from leaving the barge, platform, or dock.
SO-14.P4	Provide sediment control BMPs for openings on top of bridges where runoff could enter the water.
SO-14.P5	Secure all materials to prevent tipping and possible discharges to receiving waters.
SO-14.P6	Identify types of spill control measures to be employed, including the storage of such materials and equipment. Staff must be trained regarding the use of materials, deployment and access of control measures, and reporting measures.
SO-14.P7	Report discharges into waterways to DOH CWB immediately upon discovery. A written discharge notification must follow within 7 calendar days. Follow the spill reporting procedures provided in the SWPPP or SSBMP Plan and other applicable site plans.
SO-14.P8	Report all spills to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements. .

SO-14 MATERIAL OVER WATER	
Maintenance and Inspection	
SO-14.M1	Monitor employees and subcontractors for implementation of appropriate measures for storage and use of materials and equipment.
SO-14.M2	Inspect and maintain all associated BMPs and perimeter controls to ensure continuous protection of the drainage ways and receiving waters.
SO-14.M3	Inspect material storage, containment, and securement measures at the end of each workweek and the day before anticipated adverse weather events. Adverse weather events, including high winds and heavy rainfall, may cause waves and wind capable of rocking the barge, boat or dock and tipping improperly stored materials.

SO-15 DEMOLITION ADJACENT TO WATER



Description

Procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to drainage ways. BMPs apply to any structure or landscape demolition and removal that could potentially affect the quality of receiving waters.

Limitations

- None

SO-15 DEMOLITION ADJACENT TO WATER	
Practice	
SO-15.P1	Provide sediment control BMPs for the upland demolition activities.
SO-15.P2	Use attachments on construction equipment to catch debris from demolition operations.
SO-15.P3	Use covers or platforms installed below or downland of bridges or near-water structures to collect debris. Platforms and covers must be approved by AIR-EE and inspected prior to use.
SO-15.P4	Stockpile accumulated debris and waste generated during demolition away from drainage ways. Follow BMPs outlined WM-5 Solid Waste Management – Debris and WM-3 Protection of Stockpiles.
SO-15.P5	Report discharges into waterways to DOTA via the online reporting form and to the DOH CWB immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures provided in the SWPPP or SSBMP Plan and other applicable site plans. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.
Maintenance and Inspection	
SO-15.M1	Empty debris-catching devices regularly. Collected debris shall be removed, properly disposed, or stored away from the drainage way and protected from run-on and runoff.

SO-16 TEMPORARY BATCH PLANTS



Description

The construction of roads and structures often requires temporary batch plant facilities to manufacture concrete or asphalt. Temporary batch plant facilities typically consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; ASTs containing concrete additives and water; and designated areas for sand and gravel truck unloading, material loading, and concrete truck washout. Proper control and use of equipment, materials, and waste products from temporary batch plant facilities will reduce the discharge of pollutants to the storm drainage system or receiving waters, reduce air emissions, and mitigate noise impacts.

Limitations

- Temporary batch plants and rock crushing activities may require coverage under an industrial activities NPDES permit for the state of Hawaii if not singularly associated with a construction project and permitted under the project’s NOI-C.
- Other agencies or regulations by DOH Clean Air Branch or County ordinances may require alternative mitigation measures for temporary batch plants.

SO-16 TEMPORARY BATCH PLANTS	
Practice	
SO-16.P1	A temporary batch plant may be permitted as a construction support activity under the project’s NOI-C if it is for the sole use of that construction project. Otherwise, the plant likely requires an NPDES General Permit Authorizing Discharges of Storm Water Associated with Industrial Activities; contact DOH CWB for a determination. If batch plant requires a separate industrial permit, the contractor shall prepare and submit an NPDES Industrial Permit Application (NOI-B) to DOTA for review and acceptance and then to DOH CWB. Once a NGPC is obtained, appropriate BMPs must be implemented to comply with all permit requirements.
SO-16.P2	Proper planning, design, and construction of temporary batch plants should be implemented to minimize potential water quality, air pollution, and noise impacts associated with temporary batch plants.
SO-16.P3	BMPs must be included in the project SWPPP or SSBMP Plan. BMPs must be implemented, inspected, and maintained.
SO-16.P4	Manage temporary batch plants in compliance with DOH CWB requirements.

SO-16 TEMPORARY BATCH PLANTS	
SO-16.P5	Construct temporary batch plants downwind of existing developments whenever possible.
SO-16.P6	Plan access roads and haul routes to minimize and mitigate water and air quality impacts.
SO-16.P7	Report all spills to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.
Maintenance and Inspection	
SO-16.M1	Inspect equipment and facilities for damage and improper function. Repair identified concerns within 7 calendar days of discovering damage.
SO-16.M2	Inspect and maintain TR-1 Stabilized Construction Entrance/Exit as needed.
SO-16.M3	Inspect and maintain TR-2 Construction Road Stabilization BMPs as needed.
SO-16.M4	Inspect and maintain material and waste storage areas as needed.
SO-16.M5	Inspect pavement and soil for spills and stains at the end of each workday. Clean up spills and remove stains per SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control.

SO-17 HYDROTESTING EFFLUENT MANAGEMENT



Description

Constructing new water lines may require hydrotesting and water-flushing of the pipes to clear them of all debris, sediment, and other pollutants that may have entered the pipe during manufacture, transport, and installation. New potable water systems are chlorinated to eliminate bacteria; hydrotesting waters may mobilize this chlorine, which is harmful to aquatic life and plants.

Responsibly manage hydrotesting waters to prevent contaminating State and surface waters during hydrotesting, flushing, chlorination, and discharge.

Discharges of hydrotesting effluents to State waters or storm drainage systems requires coverage under a DOH NPDES Hydrotesting Permit.

Limitations

- High levels of chlorine in water used to disinfect piping can kill aquatic life and plants.
- Flushing waters can contain sediment, chemicals, and residual oils that enter the pipe prior to and during installation.

SO-17 HYDROTESTING EFFLUENT MANAGEMENT	
Practice	
SO-17.P1	If the contractor elects to discharge hydrotesting effluent into State waters or existing storm drainage systems (other than UIC wells which cannot receive discharge), the contractor shall prepare and submit an NPDES Hydrotesting Permit Application (NOI-F) to DOTA for review and acceptance and then to DOH CWB at least 30 calendar days prior to the start of hydrotesting activities, if necessary. Once a NGPC is obtained, appropriate BMPs must be implemented, inspected, and approved prior to the start of hydrotesting activities to comply with all permit requirements.
SO-17.P2	Submit and obtain a Construction Connection, Discharge, and Surface Runoff Permit ¹⁷ from DOTA, at least 30 calendar days prior to the start of hydrotesting activities.

¹⁷ <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/construction-connection-discharge-surface-runoff-permit/>

SO-17 HYDROTESTING EFFLUENT MANAGEMENT	
SO-17.P3	Direct chlorinated water away from storm drain inlets, drainage ways, and receiving waters to collection areas for infiltration or other means of removal in accordance with all applicable permits. Do not direct chlorinated water to vegetated areas.
SO-17.P4	Collect and dechlorinate hydrotesting effluent prior to it reaching any surface water or storm drainage system.
SO-17.P5	Properly deliver and store chemicals. Refer to WM-1 Material Delivery and Storage.
SO-17.P6	Properly handle chemicals per the manufacturer's procedures and precautions. Refer to WM-2 Material Use.
SO-17.P7	Prior to flushing the water line, protect storm drain inlets, drainage ways, and receiving waters and provide perimeter controls, as applicable.
SO-17.P8	Treat, trap, or collect sediment, particles, and any residual oils from the waters during flushing.
SO-17.P9	Design hydrotesting operations and BMPs appropriate for the volume and rate of water to be discharged.
SO-17.P10	Use settlement, filtration, and/or treatment to remove sediment and debris from hydrotesting effluent.
SO-17.P11	If discharge to a sanitary sewer is considered, consult with DOH WWB and with the owner of the wastewater system for additional testing requirements and disposal options. Only with approval from DOH and the owner of the wastewater system may hydrotesting effluent be discharged to the sanitary sewer.
Maintenance and Inspection	
SO-17.M1	Follow the maintenance and inspection guidelines for the temporary BMPs chosen for the hydrotesting operations.
SO-17.M2	For projects operating under a NPDES Hydrotesting Permit, properly sample, test, and report characteristics of hydrotesting waters to DOH CWB for each monitoring period in which hydrotesting discharges to State or surface waters occur.
SO-17.M3	Inspect filtering devices frequently to ensure they are operating correctly and are not clogged. Adjustments may be needed depending on the amount of sediment in the water being pumped.
SO-17.M4	Fill in or otherwise remove temporary hydrotesting systems when activities are complete.
SO-17.M5	Provide education for personnel operating the hydrotesting system about proper controls, discharge limitations, and permit requirements.
SO-17.M6	Report any overflows, upsets, or illicit discharges to the storm drainage system or a receiving water to DOH and AIR-EE.

SO-18 WATER-JET WASH AND HYDRO-DEMOLITION WATER MANAGEMENT



Description

Prevents the discharge of contaminants released from concrete or impervious surfaces during cleaning and demolition into the storm drainage system and surface water.

Limitations

- Water-jet washing may reduce or eliminate the contamination of stormwater runoff during rain events when used to clean impervious surfaces, which potentially contain residual oil, chemicals, and/or fines. Jetting mobilizes these contaminants within jetting wash waters. Proper procedures during water-jet washing will prevent contaminants from entering the storm drainage system and receiving waters.
- Hydro-demolition wastewater may have a high pH and contain metals, chemicals, and fines.

SO-18 WATER-JET WASH AND HYDRO-DEMOLITION WATER MANAGEMENT	
Practice	
SO-18.P1	For water-jet wash water used to clean vehicles and equipment, use offsite wash racks or commercial washing facilities that recycle or disposes of the water in the sanitary sewer, when practicable.
SO-18.P2	Refer to C.38 Vehicle and Equipment Cleaning.
SO-18.P3	Do not allow runoff from water-jet washing of impervious surfaces or hydro-demolition wastewater to flow into storm drainage systems or receiving waters.
SO-18.P4	Prior to water-jetting and hydro-demolition, clean surfaces using dry methods, such as wiping with rags, sweeping, or vacuuming, if practicable.
SO-18.P5	Prior to operation, check area for any spills or oil stains. Absorb free product, clean spills, and remove oil stains prior to water-jet washing.
SO-18.P6	Collect or contain wastewater and properly dispose or allow it to evaporate. Properly dispose of all detained sediment and residual solids. Discharge of water-jet wash water or hydro-demolition wastewater to the storm drainage system or State waters is prohibited.
SO-18.P7	Properly collect, stockpile, and dispose of solid waste from hydro-demolition activities. Refer to WM-3 Protection of Stockpiles, WM-5 Solid Waste Management - Debris, SO-12 Concrete Curing, and WM-8 Concrete Waste Management.

SO-18 WATER-JET WASH AND HYDRO-DEMOLITION WATER MANAGEMENT

Maintenance and Inspection

SO-18.M1	Check storage and containment of wastewater collection facilities daily for leaks and damage. Repair immediately.
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7 MATERIALS HANDLING AND WASTE MANAGEMENT BMPs

Materials handling and waste management BMPs are source control practices that prevent pollution by limiting or reducing potential pollutants at their source before they contact stormwater. These BMPs also involve day-to-day operations of the construction site, are under the control of the contractor, and are additional “good housekeeping practices,” which involve keeping a clean, orderly construction site.

Waste management consists of implementing procedural and structural BMPs for handling, storing, and disposing of wastes generated by a construction project to prevent the release of waste materials.

Materials handling consists of implementing procedural and structural BMPs in the handling, storing, and use of construction materials. These controls must be implemented for all applicable activities, material usage, and site conditions.

WM-1 MATERIAL DELIVERY AND STORAGE



Description

Prevent or reduce the discharge of pollutants to stormwater, soil, and/or groundwater from material delivery and storage areas by minimizing the storage of hazardous materials on site, storing materials in designated areas, implementing secondary containment measures, conducting regular inspections, and training employees.

Limitations

- Storage sheds often must meet building and fire code requirements.
- Storage areas near or within the AOA must be designed to minimize potential FOD risks.
- An SPCC Plan must be prepared and approved by DOH if the total oil storage capacity is greater than 1,320 gallons for all aboveground containers with individual capacities equal to or greater than 55 gallons.

WM-1 MATERIAL DELIVERY AND STORAGE	
Practice	
WM-1.P1	<p>Designate areas of the construction site for material delivery and storage.</p> <ul style="list-style-type: none"> • Locate storage areas near construction entrances and away from storm drains, drainage ways, and receiving waters. • Avoid transporting potential pollutants within 50 feet of drainage paths or receiving waters. • Surround storage areas for potential pollutants with berms or other approved containment devices. • Store potential pollutants in areas covered or otherwise protected from rain, wind, and runoff. • Situate outdoor material storage areas on paved or impervious surfaces, if practical.
WM-1.P1	<p>Store small containers of reactive, ignitable, or flammable materials in flammable storage lockers, unless otherwise complying with local fire codes. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. Refer to the Flammable and Combustible Liquid Code, National Fire Protection Association, NFPA 30.</p>
WM-1.P1	<p>Keep an accurate, up-to-date inventory of materials used at work sites.</p> <ul style="list-style-type: none"> • Minimize on-site inventory.

WM-1 MATERIAL DELIVERY AND STORAGE	
	<ul style="list-style-type: none"> Minimize storage of hazardous materials. Clearly and accurately label materials and containers. Keep materials in their original containers and maintain original product labels.
WM-1.P1	Handle hazardous materials as infrequently as possible. Ensure that only trained individuals are handling hazardous materials.
WM-1.P1	Maintain SDSs at the work site. Keep SDSs at a designated location and ensure employees are knowledgeable of the location.
WM-1.P1	Do not store material directly on the ground. Place materials on a pallet or dunnage and, when possible, in secondary containment.
WM-1.P1	<p>Provide secondary containment for liquids that pose a potential risk to stormwater if they are:</p> <ul style="list-style-type: none"> Stored outdoors or in an area where spills could potentially be exposed to stormwater, regardless of container size. Stored in a container with a capacity of 25 gallons or more, regardless of location. Categorized as hazardous, regardless of location. <p>Secondary containment must be large enough to capture 100 percent of the capacity of the single largest container. If stored outdoors and exposed to rainfall, additional freeboard must be included to account for the precipitation of a 25-year, 24-hour storm event.</p>
WM-1.P3	Store bagged and boxed materials, including powdered materials such as cement, on pallets or dunnage. Store in a covered area or under cover to prevent contact with wind, rain, and stormwater runoff. Check packaging and containers for damage, and immediately repair, replace, or remove damaged containers from site.
WM-1.P4	Store metal materials prone to rusting, such as reinforcing steel and dowels, on pallets or dunnage and in a covered area, under cover, or in containers to prevent contact with rain and runoff.
WM-1.P5	If drums must be stored in an uncovered area, store them at a slight angle to reduce corrosion from ponding of rainwater on the lids, or use inexpensive, domed, snap-on drum covers to prevent water from collecting on drum lids.
WM-1.P6	Keep chemicals in properly labeled, original containers. Labels shall be clearly and easily legible. Position containers with labels clearly visible. Label empty containers "EMPTY." Label containers of non-potable water as "Non-Potable Water."
WM-1.P7	Secure cover(s) over materials and material storage areas to minimize FOD risks.
WM-1.P8	Provide sufficient separation between stored materials to allow for spill monitoring, spill cleanup, and emergency response access.
WM-1.P9	If tires are stored outdoors, place on pallets or dunnage and provide cover to reduce contact with rain and runoff.
WM-1.P10	Train employees in emergency spill cleanup procedures. Ensure that trained employees are present when dangerous materials and liquid chemicals are unloaded, moved, and accessed.
WM-1.P11	Ensure spill kits are readily available on site at designated locations.
WM-1.P12	Use proper storage and handling techniques for paint, solvents, and epoxy materials and supplies.
WM-1.P13	Properly store paints, epoxy compounds, solvents, and other liquid chemicals in properly labeled, watertight containers with closed lids or covers. It is recommended to store materials in their original containers. Retain a complete set of SDS onsite.
WM-1.P14	Materials are to be covered, enclosed, or in their sealed containers while on site and being transported to and from the site. Loads are to be properly secured to prevent tipping, shifting, or movement of the material during transport.
WM-1.P15	Do not store material immediately next to or on top of BMP measures and devices that could affect or prevent the performance and inspection of the BMP measure or device.

WM-1 MATERIAL DELIVERY AND STORAGE	
Maintenance and Inspection	
WM-1.M1	Keep storage areas clean and well-organized. Provide ample cleanup supplies readily accessible for all materials expected to be used on site.
WM-1.M2	Inspect perimeter controls daily. Repair any damages by the end of the next workday.
WM-1.M3	Inspect material storage areas daily to ensure that materials are properly stored. Cover and repair or replace damaged containers by the end of the next workday after the damage was identified.
WM-1.M4	Ensure that employees handling potential pollutants have received adequate training regarding the hazards and proper handling procedures for the materials.
WM-1.M5	Clearly differentiate wastes from stored materials.
WM-1.M6	Secondary containment exposed to stormwater must be checked daily. Remove any accumulated liquids to prevent overflows.
WM-1.M7	In the event of spills or leaks, accumulated rainwater and product shall be collected and placed in appropriate containers for proper disposal. Properly dispose or recycle all liquids according to federal, state, and local requirements. Refer to WM-10 Liquid Waste Management for disposal information.

WM-2 MATERIAL USE



Description

Prevent or reduce impacts from potential pollutants to stormwater, soil, and/or groundwater from material use by using non-hazardous alternative products, minimizing hazardous material use on site, and training employees in the proper handling and use of construction materials.

Limitations

- Non-hazardous alternative materials may not be available, suitable, or effective in every case.
- Use of specific materials may require inspection and monitoring from other regulatory agencies.
- Restricted-use pesticides are not allowed for use on DOTA property.
- Fertilizers and pesticides should not be sprayed within 6 feet of storm drains or surface water body and should not be applied before or during times of rainy or windy weather.

WM-2 MATERIAL USE	
Practice	
WM-2.P1	Use less hazardous, alternative materials, as much as possible.
WM-2.P2	Minimize use of hazardous materials on site. Buy recycled or less hazardous products to the maximum extent practicable.
WM-2.P3	Use materials only where and when needed to complete the work.
WM-2.P4	Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals. Keep SDSs at a designated location and ensure employees are knowledgeable of the location. Ensure that only trained individuals are handling hazardous materials.
WM-2.P5	Do not over-apply fertilizers, herbicides, or pesticides. Follow the recommended usage instructions and prepare only the amount needed to prevent waste or over application. Over-application is expensive and can lead to contamination of soil, groundwater, surface water and stormwater. Except on steep slopes, if possible, till fertilizer into the soil rather than surface spreading or spraying it. Apply surface dressings in several small applications to allow time for infiltration and to avoid excess material from being carried offsite by runoff. Do not apply these chemicals just before it rains.

WM-2 MATERIAL USE	
WM-2.P6	Maintain a log of amount, type, and locations where fertilizers, herbicides, and pesticides were applied as well as the BMPs utilized. Refer to EC-14 Grass and Planting. These logs must be available onsite for review by DOTA inspectors.
Maintenance and Inspection	
WM-2.M1	Spot check employees monthly to ensure proper practices are being performed.
WM-2.M2	Ensure that the SDSs are maintained for all chemicals used.
WM-2.M3	Train employees in proper material use.

WM-3 PROTECTION OF STOCKPILES



Description

Stockpiles can be a significant source of sediment and fugitive dust. These BMPs mitigate the potential for stockpile erosion. Stockpiled materials addressed in this section may include, but are not limited to, soil, sediment, vegetative waste/debris, solidified concrete waste, asphalt millings, and/or mixtures of any of these materials. The BMPs listed herein may vary depending on the type of material stockpiled.

Limitations

- Stockpiles are for temporary storage of material only. Provisions for permanent removal of stockpiled material must be described in the project SWPPP or SSBMP Plan.

WM-3 PROTECTION OF STOCKPILES	
Practice	
WM-3.P1	Locate stockpiles a minimum of 50 feet, or as far as practicable, from concentrated runoff, storm drain inlets, drainage ways, and receiving waters. Do not place stockpiles within natural buffers identified on the BMP Plan. Refer to WM-7 Contaminated Soil Management for additional requirements for contaminated soil stockpiles.
WM-3.P2	Avoid locating stockpiles on sloped ground.
WM-3.P3	Minimize stockpile height to the maximum extent practicable. For stockpiles higher than 15 feet, incorporate 8-foot-wide benching.
WM-3.P4	Provide earth dikes or other physical diversion measures to protect stockpiles from runoff and run-on.
WM-3.P5	Provide silt fences, sediment traps, or other sediment control measures at the toe of the stockpile to mitigate discharge of sediment from the stockpile during rain events. Unless infeasible, establish toe perimeter controls at least 2 feet from the stockpile footprint to avoid spill over.
WM-3.P6	To the maximum extent practicable, cover stockpiles of sediment or soil with plastic, mulch (when appropriate), geotextiles, or other stabilization measures to protect from erosion by wind or water and minimize sediment discharge. Properly secure plastic, geotextiles, and other materials that may be mobilized by wind to minimize potential FOD risks.
WM-3.P7	Provide adequate setback distance from lot lines.
WM-3.P8	All applicable protection measures (e.g., cover, sediment control measures, erosion control measures, etc.) shall be in place immediately after the stockpile becomes inactive. Inactive is

WM-3 PROTECTION OF STOCKPILES	
	defined as all times other than when addition to or removal from the stockpile is actively occurring.
WM-3.P9	Physically separate stockpiles and their stormwater controls from other stormwater controls that are implemented on the site to facilitate inspection and maintenance.
WM-3.P10	Stockpiles must not endanger traffic or be detrimental to the completed work, health, or the operation of the airport.
WM-3.P11	Stockpiled materials that contain minimal amounts of fine sediments, are unlikely to become windborne, do not contain contaminants that may leach during a rain event, and do not otherwise pose a threat of discharging from the site (e.g., gravel, cold planed material, recycled asphalt material, or similar) must be protected with sediment control measures at the toe of the stockpile; however, covering the stockpile or placing the material on an impervious surface may not be required.
Maintenance and Inspection	
WM-3.M1	Maintain and inspect BMP measures according to the type(s) being used.
WM-3.M2	Inspect stockpiles for overtopping of toe protection measures and tears or gaps in cover. Repair and reinstall stockpile protection measures by the end of the next workday after the maintenance need was identified.

WM-5 SOLID WASTE MANAGEMENT - DEBRIS



Description

Prevent or reduce discharge of pollutants to stormwater, soil, and/or groundwater from solid waste or C&D waste by providing designated waste collection areas, separating containers for recyclable waste materials, timing collection of waste and recyclable materials with each stage of the work, and properly training employees.

Limitations

- All waste debris and trash that can enter the AOA are FOD, which has the potential to cause injury to airport and airline personnel and damage to aircrafts. FOD prevention is a high priority for safe airport operation, and wastes must be strictly controlled.

WM-5 SOLID WASTE MANAGEMENT - DEBRIS	
Practice	
WM-5.P1	All projects operating under a NPDES Construction Permit must submit a Solid Waste Disclosure Form to AIR-EE and then DOH SHWB. The form must address the disposal sites and procedures for C&D waste, site clearing debris, and/or dredged spoils.
WM-5.P2	Properly clean up materials contaminated with hazardous substances. Friable asbestos, waste/used paint, solvents, sealers, adhesives, and/or similar materials are not acceptable at C&D disposal sites. Separate contaminated materials from C&D wastes.
WM-5.P3	Store inert fill material (i.e., earth, soil, rock, or rock-like material that will not decompose or produce leachate) such that it will not be subject to erosion from runoff. Refer to WM-3 Protection of Stockpiles for additional requirements.
WM-5.P4	Recycle or reuse C&D waste whenever practical.
WM-5.P5	Select designated waste collection areas onsite.
WM-5.P6	Provide only watertight dumpsters. Inspect dumpsters for leaks and repair any dumpster that is not watertight by the end of the next workday.
WM-5.P7	Place waste containers in a covered area or with cover. Provide an adequate number of containers with lids or covers to keep rain out of the container and to prevent scattering of wastes by wind.
WM-5.P8	Obtain additional containers and arrange for more frequent pickup during the demolition phase of a project, if needed.
WM-5.P9	Collect on-site trash daily, especially during rainy and windy conditions.

WM-5 SOLID WASTE MANAGEMENT - DEBRIS	
WM-5.P10	Dispose of trash into designated waste containers.
WM-5.P11	Ensure that hazardous wastes (e.g., used oils, solvents, paints, etc.) and chemicals (e.g., acids, pesticides, additives, curing compounds, etc.) are not disposed of in dumpsters designed for refuse or construction debris. Refer to WM-6 Solid Waste Management - Hazardous Waste.
WM-5.P12	Salvage, recycle, or reuse material wherever practicable. For example, trees and shrubs from land clearing activities may be mulched and used on graded areas. Reuse of project-derived materials must be consistent with project plans/specifications, must not provide FOD, and approved by AIR-EE.
WM-5.P13	Provide waste containers of sufficient size and number to contain C&D waste. Containers shall have good integrity with no holes.
WM-5.P14	Schedule solid waste collection regularly. Empty waste containers weekly or when they are two-thirds full, whichever is sooner.
WM-5.P15	Do not allow containers to overflow. If overflow occurs, clean up spilled waste immediately and provide additional waste containers.
WM-5.P16	Do not hose out or clean dumpsters on the construction site. Ensure that dumpster cleaning is conducted offsite by trash hauling employees.
WM-5.P17	Require waste haulers to maintain at least 2 feet of freeboard in waste collection trucks, and cover truck beds and waste containers to prevent dust.
Maintenance and Inspection	
WM-5.M1	Inspect the entire site for litter and debris daily and remove completely by the end of the next workday.
WM-5.M2	Inspect the construction waste and recycling areas regularly.
WM-5.M3	Remove solid waste collected against erosion and sediment control devices by the end of the next workday after issue is identified.
WM-5.M4	If a container does spill or overflow, clean up immediately.
WM-5.M5	Inspect waste containers for impermeable covers and repair or replace damage to covers by the end of the next workday.
WM-5.M6	Train employees in proper solid waste management.

WM-6 SOLID WASTE MANAGEMENT - HAZARDOUS WASTE



Description

Proper material use, waste disposal, and training of employees for hazardous waste.

Limitations

- None

WM-6 SOLID WASTE MANAGEMENT - HAZARDOUS WASTE	
Practice	
WM-6.P1	<p>Determine if a material or item is a potentially hazardous waste:</p> <ul style="list-style-type: none"> • Check label and shipping papers. • Look for words such as hazardous, danger, caustic, corrosive, flammable, carcinogenic, or toxic. • Check the SDS from the manufacturer of the product.
<i>MATERIAL USE</i>	
WM-6.P2	Use the entire product before disposing of the container. For liquid materials, allow residual product to dry before disposing of the container.
WM-6.P3	Do not remove the original product label. Manufacturer labels contain important safety and disposal information.
WM-6.P4	Do not over-apply herbicides, pesticides, paints, or other sprayed liquids that could be hazardous. Prepare only the amount needed. Follow the recommended usage instructions. Do not apply these substances in high winds, rainy conditions, or 24 hours before anticipated rainfall.
WM-6.P5	<p>Properly use and dispose of paints, epoxy compounds, solvents, and other liquid chemicals.</p> <ul style="list-style-type: none"> • When painting operation is completed, use as much of the residual paint on the painted surface as possible. • Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, drainage system, or water bodies. • Clean oil-based painting equipment into a leak-proof container or leak-proof pit. The container or pit must be designed to prevent overflows due to inadequate sizing or precipitation. Allow water to evaporate and properly dispose of residual paint solids. • Filter and re-use thinners and solvents. • Dispose of excess oil-based paints and sludge as hazardous waste.

WM-6 SOLID WASTE MANAGEMENT - HAZARDOUS WASTE	
<i>WASTE RECYCLING/DISPOSAL</i>	
WM-6.P6	Separate contaminated cleanup materials from C&D wastes.
WM-6.P7	Select designated hazardous waste collection and storage areas onsite and follow EPA limitations for storage and requirements for transport and disposal.
WM-6.P8	Store hazardous materials and wastes in covered containers protected from vandalism.
WM-6.P9	Place hazardous waste containers in secondary containment sized to capture 100 percent of the capacity of the single largest liquid container or compartment.
WM-6.P10	Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.
WM-6.P11	Recycle any useful material such as used oil or e-waste to the maximum extent practicable.
WM-6.P12	Make sure that toxic liquid wastes (e.g., used oils, solvents, oil-based paints, etc.) and chemicals (e.g., acids, pesticides, additives, curing compounds, etc.) are not disposed of in dumpsters designated for construction debris.
WM-6.P13	Arrange for regular waste collection before containers overflow.
WM-6.P14	Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of as required by regulations. A licensed hazardous waste transporter must dispose of hazardous waste that cannot be reused or recycled. Collect records of disposal (e.g., landfill receipts, waste manifests) as applicable.
WM-6.P15	Place warning signs in areas recently treated with chemicals.
WM-6.P16	Keep spill cleanup materials where they are readily accessible.
WM-6.P17	Clean up any spilled material immediately.
Maintenance and Inspection	
WM-6.M1	Monitor onsite hazardous waste storage and disposal daily.
WM-6.M2	Keep storage areas clean and well-organized. Provide ample cleanup supplies for the various materials being stored.
WM-6.M3	Inspect storage areas prior to an anticipated rain event and after the rain event.
WM-6.M4	Report all spills, regardless of size or type, to DOTA via the online reporting form. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.).
WM-6.M5	Procure a spill response contractor for any large spills that cannot be contained.
WM-6.M6	Provide a copy of the hazardous waste manifest to the AIR-EE.

WM-7 CONTAMINATED SOIL MANAGEMENT



Description

Prevent or reduce the discharge of pollutants to stormwater and to the land from contaminated soil. Evaluate contaminated soils by conducting pre-construction surveys and inspecting excavations regularly, and remediate contaminated soil promptly. If previously unidentified contaminated soils are encountered during construction, refer to the DOTA Programmatic EHE-EHMP to further address contaminated soil management. Contamination may be identified through discoloration, odors, or sheen on the groundwater. Visual and/or olfactory observations should be verified through sampling of the potentially affected media.

Limitations

- Contaminated soils must be disposed at DOH-permitted facilities by DOH-approved transporters. Note: If transporting petroleum-contaminated soil offsite to facilities other than permitted remediation facilities, use transporters approved by DOH SHWB.
- Contamination may be identified through discoloration, odors, or sheen on the groundwater. Visual and/or olfactory indications of contamination should be verified through sampling and testing of the potentially affected media.

WM-7 CONTAMINATED SOIL MANAGEMENT	
Practice	
WM-7.P1	Conduct thorough site planning including pre-construction review of in-house records regarding potential sources of contamination in the area.
WM-7.P2	Inspect soils for evidence of contamination, such as discoloration, odors, difference in soil properties, abandoned underground tanks or pipes, buried debris, etc.
WM-7.P3	Notify DOH CWB at (808) 586-4309 at least 90 days prior to disturbing contaminated soil or dewatering from known areas of contamination. Notify DOH HEER office within 90 days of excavating contaminated soil from contaminated sites listed in their database.
WM-7.P4	Notify the DOTA Engineer and AIR-EE when contaminated media are encountered.
WM-7.P5	Make notifications in accordance with the State Contingency Plan, if it is a reportable quantity: <ol style="list-style-type: none"> HEER Office at (808) 586-4249. LEPC at (808) 723-8958. NRC at (800) 424-8802.

WM-7 CONTAMINATED SOIL MANAGEMENT	
	Prepare and submit any associated written documentation as required by these agencies and provide a copy to AIR-EE.
WM-7.P6	Prevent leaks and spills to the maximum extent practicable. Contaminated soil can be expensive to treat and/or dispose of properly.
WM-7.P7	Test suspect soils at certified laboratories per DOH TGM. Consult with a QEP for the proper handling and disposal of the contaminated soil, if applicable.
WM-7.P8	If the soil is contaminated, dispose in accordance with all applicable regulations. Contaminated soils must be disposed at a DOH-permitted facility by a DOH-approved transporter. Ensure that the final disposal location for contaminated soils is approved by the DOTA Engineer and AIR-EE. The disposal location, soil disposal receipts, truck tags, and waste manifests must be documented.
WM-7.P9	Secure required DOH permits. Submit any associated written documentation required by these agencies to DOTA Engineer and AIR-EE.
WM-7.P10	Do not remove contaminated or potentially contaminated soils from DOTA property. Contaminated or potentially contaminated soils may only be removed and disposed once a Stockpile Characterization Plan has been approved by AIR-EE.
WM-7.P11	Treat potentially contaminated stockpiles as if they are contaminated until testing from a certified laboratory verifies that contamination (concentrations of compounds above DOH Unrestricted Tier I EALs) is not present.
WM-7.P12	<p>When temporarily storing contaminated soil onsite:</p> <ul style="list-style-type: none"> • Locate stockpiles so that they do not endanger traffic or be detrimental to the completed work, health, or the operation of the airport. Place contaminated soil and material on an impermeable liner or device, such as 20 mil plastic sheeting. • Contain contaminated soil and material by surrounding with impermeable berms or earthen berms with an impermeable liner and cover exposed contaminated soil with plastic sheets. • Provide physical diversion to protect stockpiles from concentrated run-on. • Locate stockpiles a minimum of 50 feet, or as far as practicable, from concentrated runoff, storm drains, drainage ways, and receiving waters. Do not place stockpiles within natural buffers identified on the BMP Plan. • Avoid locating stockpiles on sloping ground and minimize stockpile height. • Manage contaminated soil or materials properly to minimize exposure by workers. • Contain any dewatering effluent or wastewater generated during decontamination of equipment and dispose properly. • Ensure all control measures are in-place or restored by the end of each workday. • Refer to WM-3 Protection of Stockpiles for additional requirements, as applicable.
WM-7.P13	Ensure that soil monitoring and testing procedures involve testing for all potential contaminants of concern required by the DOTA Programmatic EHE-EHMP.
WM-7.P14	The presence of contaminated soil may indicate contaminated groundwater as well. Refer to SO-2 Dewatering Operations to address contaminated groundwater.
Maintenance and Inspection	
WM-7.M1	Monitor onsite contaminated soil storage and disposal daily. If maintenance is required for stockpile liner, cover, berm, or other measures, repair measures by the end of the workday on which the maintenance need was identified.
WM-7.M2	Inspect contaminated soil storage areas daily.

WM-8 CONCRETE WASTE MANAGEMENT



Description

Prevent or reduce the discharge of pollutants to stormwater, soil, and/or groundwater from concrete waste by conducting washout offsite, performing onsite washout in a designated area, and training employees and subcontractors to properly use washout facilities. Concrete waste includes, but is not limited to, concrete, mortar, plaster, stucco, and grout.

Concrete washout water is a caustic, corrosive, acidic (high pH) slurry containing toxic metals.

Limitations

- Offsite washout of concrete wastes may not always be possible.

WM-8 CONCRETE WASTE MANAGEMENT	
Practice	
WM-8.P1	Perform washout of concrete trucks offsite or in designated areas only.
WM-8.P2	Do not wash concrete trucks or stormwater accumulated on recently poured concrete into storm drains, drainage ways or receiving waters.
WM-8.P3	Do not allow excess concrete to be dumped onsite, except in designated, lined washout pits.
WM-8.P4	<p>For onsite concrete washout facilities:</p> <ul style="list-style-type: none"> • Locate washout area at least 50 feet from storm drain inlets, drainage ways, and receiving waters. Contain discharges from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste. • Line the washout area or pit with a minimum of 10-millimeter polyethylene sheeting that is free of holes, tears, or other defects that compromise the impermeability of the material. The seams of multiple sheets should be thoroughly adhered such that liquid wastes are contained. • Wash out wastes into the temporary pit where the concrete slurry can dry, be broken up, and disposed of properly. Two pits or separated areas may be required so that one area can be active while the other is drying. • Provide a minimum freeboard of 4 inches at the washout facilities to account for rainwater accumulation.
WM-8.P5	When sandblasting, avoid creating runoff by draining the water to a bermed or level area.

WM-8 CONCRETE WASTE MANAGEMENT	
WM-8.P6	Do not sweep excess exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in C&D waste containers.
WM-8.P7	Train employees in proper concrete waste management.
WM-8.P8	Do not dump liquid wastes directly onto ground. Report spills of concrete waste per SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control.
WM-8.P9	Follow requirements of WM-3 Protection of Stockpiles when storing dried concrete waste on site. Concrete waste may only be stockpiled once fully dry.
WM-8.P10	Provide signage directing vehicle operators and/or subcontractors to properly dispose of concrete waste in designated areas.
WM-8.P11	When heavy rains are forecasted, monitor the washout's liquid level. Cover the washout or pump out the liquid from the washout to avoid an overflow during the storm.
WM-8.P12	Dispose of liquid and solid concrete wastes in compliance with the federal, state, and local standards. Refer to WM-5 Solid Waste Management - Debris, for additional requirement for disposal and transportation, as applicable.
WM-8.P14	When saw-cutting concrete, collect or vacuum the sawcut slurry and remove from the site. Avoid saw-cutting during wet weather. Cover or barricade storm drains during saw-cutting to contain slurry. Slurry may be placed in a temporary pit or container, as described in this section, to promote evaporation.
WM-8.P15	Wastewater from mortar, plaster, stucco, and grout shall not be allowed to flow into storm drain, drainage structures, or surface waters. Direct all wastewater to a leak-proof pit or container, as described in this section.
WM-8.P16	Remove and properly dispose any significant residual material from concrete, mortar, plaster, stucco, and grout remaining on the ground after the completion of construction. If the residual materials stained or contaminated soil, remove and properly dispose of soil with the residual materials.
Maintenance and Inspection	
WM-8.M1	Inspect concrete washout facilities after heavy rains and weekly. Repair any damages before the next use or within 7 calendar days, whichever comes first.
WM-8.M2	Service concrete washout facilities and/or provide additional washout facilities when active washouts exceed 75 percent of their storage capacity or 4 inches freeboard, whichever is greater. Clean out or provide additional facilities by the end of the next workday after the maintenance need was identified.

WM-9 SANITARY/SEPTIC WASTE MANAGEMENT



Description

Prevent or reduce the discharge of pollutants to stormwater from sanitary/septic waste by providing convenient, well-maintained facilities and arranging for regular service and waste disposal.

Limitations

- None

WM-9 SANITARY/SEPTIC WASTE MANAGEMENT	
Practice	
WM-9.P1	Locate sanitary facilities in a convenient location, away from storm drain inlets, drainage ways and receiving waters, and high-traffic areas.
WM-9.P2	Never discharge untreated wastewater directly into the ground.
WM-9.P3	If using an onsite disposal system, such as a septic system, comply with DOH WWB requirements.
WM-9.P4	Properly connect temporary sanitary facilities that discharge to the sanitary sewer system to avoid illicit discharges.
WM-9.P5	If discharging to the sanitary sewer, contact the local wastewater treatment plant for applicable requirements.
WM-9.P6	Provide enough sanitary facilities to accommodate the labor work force and usage frequency.
WM-9.P7	Arrange for regular waste collection by a licensed transporter before facilities overflow.
WM-9.P9	Position sanitary facilities and secure to the ground so they will not be tipped over, knocked down, or blown over by strong wind gusts.
WM-9.P10	When servicing sanitary facilities, implement spill prevention techniques to reduce or eliminate spills of cleaning solutions, cleaning wastewater, and sanitary waste.
WM-9.P11	Clean up spills immediately. For sanitary waste spills, disinfect area of spill after cleanup and report to DOTA via the online reporting form. Do not over-apply disinfectant. Prevent sanitary waste and/or cleaning materials from discharging to storm drain inlets, drainage ways, and receiving waters. Refer to SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control for additional reporting requirements.
Maintenance and Inspection	
WM-9.M1	Inspect sanitary/septic waste storage facilities weekly.
WM-9.M2	Monitor disposal operations for spills.
WM-9.M3	Maintain sanitary/septic facilities in good working order using a licensed service provider.

WM-10 LIQUID MANAGEMENT



Description

Procedures to prevent discharge of pollutants to the storm drainage system or to waterways from the creation, use, collection, and disposal of liquids not identified as hazardous under RCRA.

BMPs apply to construction projects that generate non-hazardous liquids or liquid wastes.

Limitations

- Disposal of 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, UIC permits, USACE permits, etc.).

WM-10 LIQUID MANAGEMENT	
Practice	
WM-10.P1	Instruct employees and subcontractors to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
WM-10.P2	Instruct employees, subcontractors, and suppliers that it is unacceptable for any non-stormwater liquid to enter any storm drainage device, drainage way, or receiving water.
WM-10.P3	Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
WM-10.P4	Refer to SO-8 Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.
WM-10.P5	Contain liquid wastes in containers or a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
WM-10.P6	Construct and/or use structurally sound, leak-free containment devices. Washouts, liquid storage, and treatment facilities shall prevent the infiltration of contaminants that may affect subsurface soils and groundwater.
WM-10.P7	Keep chemicals in properly labeled, original containers. Labels shall be clearly and easily legible. Position containers with labels clearly visible. Label empty containers "EMPTY." Label containers of non-potable water as "Non-Potable Water."
WM-10.P8	Store liquid containers with the capacity to hold 25 gallons or more indoors or under cover.

WM-10 LIQUID MANAGEMENT	
WM-10.P9	<p>Provide secondary containment for liquids that pose a potential risk to stormwater if they are:</p> <ul style="list-style-type: none"> • Stored outdoors or in an area where spills could potentially be exposed to stormwater, regardless of container size. • Stored in a container with a capacity of 25 gallons or more, regardless of location. • Categorized as hazardous, regardless of location. <p>Secondary containment must be large enough to capture 100 percent of the capacity of the single largest container. If stored outdoors and exposed to rainfall, additional freeboard must be included to account for the precipitation of a 25-year, 24-hour storm event.</p>
WM-10.P10	<p>Store small containers of reactive, ignitable, or flammable materials in flammable storage lockers, unless otherwise complying with local fire codes. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. Refer to the Flammable and Combustible Liquid Code, National Fire Protection Association, NFPA 30.</p>
WM-10.P11	<p>Precautions should be taken to avoid spills or accidental releases of contained liquids. Apply the education measures and spill response procedures outlined in SO-6 Illicit Discharge, Illegal Connection, Spill, and Leak Prevention and Control.</p>
WM-10.P12	<p>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.</p>
WM-10.P13	<p>Capture liquid wastes such as wash water and rinse water from cleaning walls or pavement that have the potential to affect the storm drainage before they run off a surface.</p>
WM-10.P14	<p>Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Statements, 401 or 404 permits, county discharge permits, or under RCRA regulations. Review the SWPPP or SSBMP Plan to see if disposal methods are identified.</p>
WM-10.P15	<p>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.</p>
WM-10.P16	<p>For disposal of hazardous waste, see WM-6 Solid Waste Management – Hazardous Waste.</p>
Maintenance and Inspection	
WM-10.M1	<p>Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids following all applicable regulations.</p>
WM-10.M2	<p>Inspect containment areas and capturing devices and repair any damages before the next use or within 7 calendar days, whichever comes first.</p>
WM-10.M3	<p>Check secondary containment exposed to stormwater daily. Remove any accumulated liquids to prevent overflows.</p>

8 REFERENCES

1. City and County of Honolulu. 2011, November. Storm Water Construction Best Management Practice Manual.
2. County of Maui. 2023, December. Construction Activities Best Management Practices Manual.
3. Los Angeles County Department of Public Works. 2010, August. Construction Site Best Management Practices Manual.
4. Alaska Department of Transportation and Public Facilities. 2021, March. Alaska Storm Water Pollution Prevention Plan Guide.