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Non-VESCH and proprietary control measures shall be installed per the manufacturer's instructions and with the intent of the VESCH specifications. Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized.

Please note that all Non-VESCH measures will require that a detail, narrative, and manufacturer's installation and maintenance requirements be shown on the approved plan and/or included in the SWPPP.

CONSTRUCTION ENTRANCE / CONSTRUCTION ROAD STABILIZATION

ALTURNAMATS & VERSAMATS

Definition

Temporary protective mats placed at points of ingress and egress or for access to other construction activities on-site.

Purpose

To protect existing ground cover from damage and provide tracking for vehicular access.

Conditions Where Practice Applies

Wherever traffic will be entering or leaving a construction site, particularly for areas that only need access for a short amount of time (2 weeks or less) when installing a construction entrance or construction road stabilization is not practicable.



Planning Considerations

Minimum Standard #17 requires that provisions be made to minimize the transport of sediment by vehicular traffic onto a public or paved surface. Providing matting to prevent tires from coming into contact with grassed or denuded areas will minimize possible tracking and assist in keeping existing vegetation in good condition.. This measure is not acceptable where vehicular traffic will be driving off of matting onto denuded areas, but may be used to connect to existing construction entrances or construction road stabilization.

Construction Specifications

1. Lay down mats where vehicle/equipment tires/tracks may come into contact with the ground.
2. To keep mats joined together, links may be installed.

AlturnaMATS®
World's Toughest Ground Protection Mat

AlturnaMATS Built Tough!

The Original Ground Protection Mats Featuring Maximum Traction Diamond Plate Tread Design

These rugged mats are made of 1/2" thick polyethylene so they are virtually indestructible. They withstand vehicles weighing up to 120 tons, bend but do not break and feature a Limited Lifetime Warranty. AlturnaMATS have been tested in record cold and heat. AlturnaMATS are an environmentally friendly mat as they are made from recycled plastic materials.

With AlturnaMATS, getting stuck is virtually eliminated. They are available smooth on one side or smooth on both sides, ideal for removing dirt or gravel.

- Easily supports 120 ton vehicles
- Rugged 1/2" thick polyethylene
- Bold cleat design for great traction
- Build a roadway or working platform in minutes
- Leave turf smooth, even in soft conditions
- No more splintered, warped, water logged plywood
- Simply hosing down leaves the mats clean
- Available in both black or white mats
- Mats can be locked together with Turn-A-Links forming a continuous roadway
- Limited Lifetime Warranty

Black	White	Weight
4' x 8'	4' x 8'	86 lbs.
3' x 8'	3' x 8'	64.5 lbs.
3' x 6'	3' x 6'	51 lbs.
2' x 8'	2' x 8'	43 lbs.
2' x 6'	2' x 6'	32.25 lbs.
2' x 4'	2' x 4'	21.5 lbs.

Sizes to meet your needs

Landscaping **Tree Care** **Construction** **Concrete**

VersaMATS

Most Versatile Mats in the Industry



Reverse Side



VersaMATS

Easy to Walk On - Safe to Work On - Great to Drive On
Featuring an Exclusive Slip-Resistant Tread Design

VersaMATS literally are the most versatile ground protection mats in the industry. The flat, slip-resistant tread permits pedestrians to walk safely on the mats, yet they are as rugged as the original AlturnaMATS. The reverse side has the same diamond plate tread as AlturnaMATS, providing great traction for vehicles.

VersaMATS are also available in white, making them ideal for safe use as long walkways even in darkened conditions. They are also available smooth on one side.

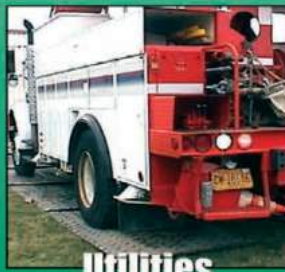
- Leaves turf smooth even in soft soil conditions
- Tough 1/2" thick polyethylene
- Two practical cleat designs... for walking and vehicle traffic
- Withstand 120-ton loads
- Build a temporary roadway or walkway in minutes
- Lock together with Turn-A-Links
- Limited Lifetime Warranty

Sizes to meet your needs

Black	White	Weight
4' x 8'	4' x 8'	86 lbs.
3' x 8'	3' x 8'	64.5 lbs.
2' x 8'	2' x 8'	43 lbs.



Snow/Slush



Utilities



Golf Courses



Cemeteries



Drilling



AlturnaMATS

One Piece Plastic Outrigger Pads



- Safety Tech Pad Features:
- Reliable Load Distribution
 - Lightweight
 - Safety Texturing
 - Memory Recovery
 - Lifetime Guarantee

Safety Tech Pads

Deliver the safety, quality and performance you expect from the industry leader.



Stock Models

MODEL	LOAD CAPACITY		WIDTH	LENGTH	HEIGHT	WEIGHT	SQ. IN.
	VERTICAL	45 DEGREE					
PAD1515.75	40,000# (KG20,412)	18,000# (KG9,072)	15" (C38.1)	15" (C38.1)	.75" (C1.905)	5.5# (KG3.40)	225 (CT1,451.70)
PAD18181	55,000# (KG27,248)	30,000# (KG13,608)	18" (C45.72)	18" (C45.72)	1" (C2.54)	11.0# (KG4.99)	324 (CT2,090.45)
PAD24241	60,000# (KG30,218)	35,000# (KG16,878)	24" (C60.96)	24" (C60.96)	1" (C2.54)	20.0# (KG9.07)	576 (CT3,701.30)
PAD24242	62,000# (KG31,223)	40,000# (KG19,144)	24" (C60.96)	24" (C60.96)	2" (C5.08)	38.0# (KG17.24)	576 (CT3,701.35)
PAD30301	81,000# (KG40,741)	41,000# (KG20,597.6)	30" (C76.2)	30" (C76.2)	1" (C2.54)	31.0# (KG14.06)	900 (CT5,806.8)
PAD36361	93,000# (KG46,594.5)	43,000# (KG21,504.5)	36" (C91.44)	36" (C91.44)	1" (C2.54)	45.0# (KG20.41)	1296 (CT8,361.79)
PAD48481	135,000# (KG67,236)	52,000# (KG25,887.2)	48" (C121.92)	48" (C121.92)	1" (C2.54)	80.0# (KG36.29)	2304 (CT14,865.4)
PAD30302	85,000# (KG42,500)	43,000# (KG21,504.5)	30" (C76.2)	30" (C76.2)	2" (C5.08)	62.0# (KG28.12)	900 (CT5,806.8)
PAD36362	98,000# (KG49,262.8)	45,000# (KG22,500)	36" (C91.44)	36" (C91.44)	2" (C5.08)	90.0# (KG40.83)	1296 (CT8,361.79)
PAD48482	140,000# (KG70,000)	55,000# (KG25,400)	48" (C121.92)	48" (C121.92)	2" (C5.08)	180.0# (KG81.65)	2304 (CT14,865.4)

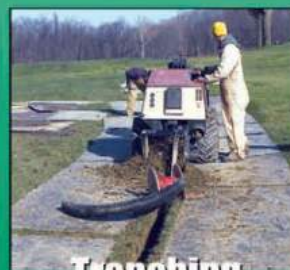
*8" X 10" OUTRIGGER LEG APPLIED UNDER TWO SEPARATE CONDITIONS: 10,000# VERTICALLY & 10,000# WITH A 45° ANGLE.
 **HANDLE LOCATED ON WIDTH SIDE OF ALL PADS. PADS 900 SQ. IN. & LARGER HAVE 2 OR MORE HANDLES OPPOSITE EACH OTHER.
 ***CUSTOM SIZE PADS ARE AVAILABLE. REQUIRES A MINIMUM ORDER. LEAD TIME FOR NON-STOCK ITEMS IN 30-45 DAYS.
 KEY: C = CENTIMETERS; KG = KILOGRAMS; CT = SQUARE CENTIMETERS



Manufactured Housing



Recreation Areas & Events



Trenching



Septic Pumping

AlturnaMATS Accessories

Turn-A-Links

Single Turn-A-Link



Steel links lock mats together to form a semi-permanent, yet portable, continuous roadway, walkway or working platform.

Double Turn-A-Link



Galvanized Turn-A-Link: Single or Double



The same steel material, but with a galvanized coating: easier to locate & harder to rust.

		Item #	Ship Wt.
Round Links	Single	RTL-S-G	8 oz.
	Double	RTL-G-G	20 oz.
Flat Links	Single	FTL-S-G	8 oz.
	Double	FLT-D-G	20 oz.
EZ Links	Single	EZL-S	4 oz.
	Double	EZL-D	6 oz.

Handi-Hooks



AlturnaMATS' Handi-Hooks make moving mats easier, even in wet areas. Made of steel rod, painted white.

Length	Weight
3' (91.44 cm)	2.5 lbs. (1.13 kg)

E-Z Link System



E-Z Links are a quick & convenient linking system for the AlturnaMATS VersaMATS. The links are available in single or double, & are suitable for pedestrian applications as well as movement of light, compact equipment (less than 12,000 GVW) when on stable ground conditions.

Single E-Z Link



MAT-PAK



This complete package is the handy way to transport and store your AlturnaMATS.

Consists of:
 12 Mats (4' x 8' or 3' x 8')
 1 Metal storage, skid rack
 20 Single Turn-A-Links
 2 Handi-Hooks
 2 Ratchet Straps

MAT-PAK	Item No.	Weight
Original Diamond Plate		
Black - 4' x 8' Package	AMCP4	1126 lbs.
Black - 3' x 8' Package	AMCP3	868 lbs.
White - 4' x 8' Package	WMCP4	1126 lbs.
White - 3' x 8' Package	WMCP3	868 lbs.
VersaMATS		
Black - 4' x 8' Package	VMCP4	1126 lbs.
Black - 3' x 8' Package	VMCP3	868 lbs.
White - 4' x 8' Package	WVCP4	1126 lbs.
White - 3' x 8' Package	WVCP3	868 lbs.



Phone: 888-544-6287 • Fax: 814-827-2903 • E-mail: sales@alturnamats.com

www.alturnamats.com

AHA - 408

AlturnaMATS *VersaMATS*[®]

Easy to Walk On... Safe to Work On... Great to Drive On
Plus... Perfect for storing materials on work site and out of the mud

VersaMATS Features:

- New, flat tread design
- New, AlturnaGrip slip resistant finish
- Safe to walk on
- Virtually eliminates ground restoration costs from vehicle damage
- Limited Lifetime Warranty
- Tough 1/2" thick polyethylene
- Eliminates need for plywood which splinters and warps
- Withstands heavy truck loads
- Prepared for linking together with flat Turn-a-Links
- Easy to handle
- Flexible, conforming to ground variations
- Field tested in record cold and heat
- Water and chemical resistant
- Sizes: 4' x 8' and 3' x 8'

VersaMATS are a totally new mat design, created for both pedestrian and vehicular traffic. The new flat, slip resistant finish assure safe foot traffic without fear of turning an ankle and vehicles can cross soft terrain without fear of getting stuck. *VersaMATS* are ideal for a wide variety of applications wherever pathways, parking areas and vehicle movement are considerations.



Turn-a-Links lock *VersaMATS* together



Withstand heavy vehicle loads



Easy and safe to walk on

AlturnaMATS[®]

www.alturamats.com



VersaMATS lock together to form continuous walkway

VersaMATS® Ground Protection Mats

Ideal for a Wide Range of Applications

VersaMATS Applications:

- Tree care industry
- Cemeteries
- Landscape industry
- General construction
- Golf courses
- Movie production companies
- Park and recreation facilities
- Special event contractors and operators
- Rental companies
- Educational facilities
- Municipalities



Flat Turn-a-Links permit locking the mats together to form a roadway or working platform which make VersaMATS ideal for staging and parking areas. The mats are tough and flexible, conforming to ground variations, yet they support heavy vehicles crossing soft terrain. Millions of dollars are spent each year on equipment repairs due to unnecessary damage to vehicle drive trains, frames and bodies. Plus, VersaMATS eliminate expensive wrecker removal and towing charges.

Turn-a-Links, made of 1/4" x 3/4" cold roll steel are of flat design. When creating a continuous roadway or working platform, they form a low profile, minimizing the possibility of tripping. Turn-a-Links are available as single units for connecting straight line pathways and as double units for connecting larger working platforms. Handi-Hooks are designed to slip into prepared holes for easy maneuvering of VersaMATS.

Sizes to Suit Your Need

Size	Item Number	Approx. Ship. Wt.
		lbs. kg.
4' x 8' (1.22 x 2.44m)	VM48	86.00 (39.00)
3' x 8' (0.91 x 2.44m)	VM38	64.00 (29.25)
Handi Hook	AMHH	2.50 (1.13)
Turn-a-Link (Single)	FTL-S	8 oz. (227 gr.)
Turn-a-Link (Double)	FTL-D	20 oz. (567 gr.)



No more plywood!
Plywood often breaks during the first use. It splinters, warps, gets water logged and is awkward to handle. Plywood often lasts less than one year. *AlturnaMATS* eliminates all the aforementioned.



www.alturmat.com

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AHA - 6M - 3/07

Maintenance/Inspections

The matting and access way shall be maintained in a condition which will prevent tracking or flow of mud onto public rights-of-way and paved surfaces. All materials spilled, dropped, or washed from vehicles onto roadways or into storm drains must be removed immediately. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of the day as required by minimum standard #17.

If matting becomes separated from adjacent pieces, links will need to be installed to keep mats aligned as needed.

DEWATERING

DANDY DEWATERING BAG / DIRT BAG

Definition

A temporary settling and filtering device for water which is discharged from dewatering activities.

Purpose

To filter sediment-laden water prior to the water being discharged from the site.

Conditions Where Practice Applies

Wherever sediment-laden water must be removed from a construction site by means of pumping.



Planning Considerations

Minimum Standard #19 requires that properties and waterways downstream be protected from sediment deposition. Water which is pumped from a construction site usually contains a large amount of sediment. A dewatering structure is designed to remove the sediment before water is released off-site.

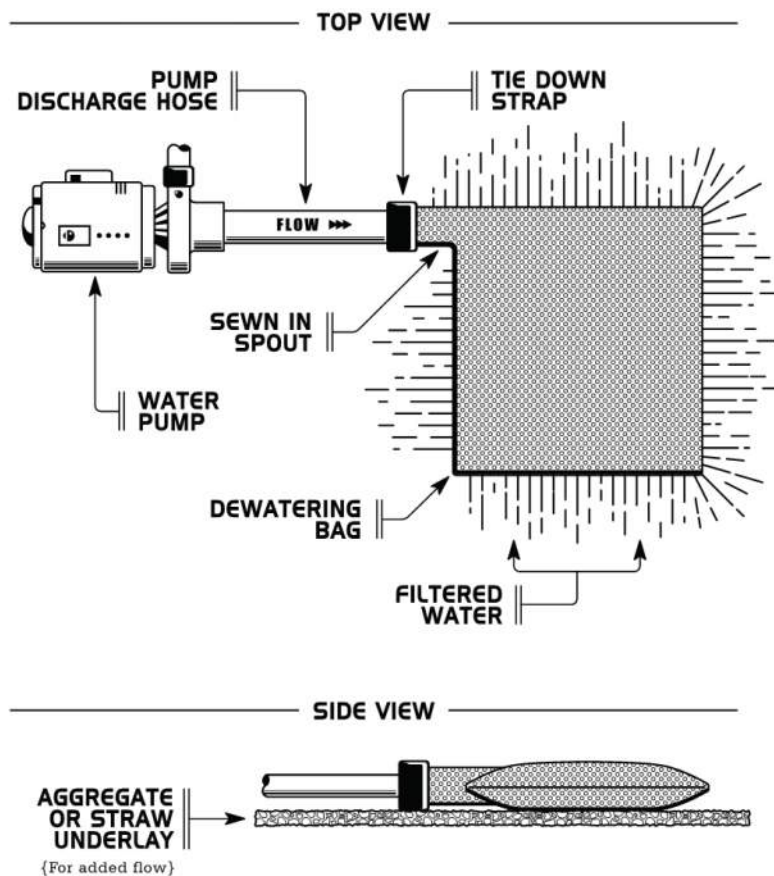
A dewatering structure may not be needed if there is a well stabilized, vegetated area on-site to which water may be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. A minimum filtering length of 75 feet must be available in order for such a method to be feasible.

Design Criteria

1. The Dewatering Bag used for each project must be sized appropriately for the pump used. DO NOT allow a pump to be used that discharges greater than the allowable rate allowed for the Dewatering Bag to be used.

Construction Specifications

1. Lifting straps (not included) should be placed under the unit to facilitate removal after use.
2. Unfold Dewatering Bag on a stabilized area over dense vegetation, straw, or gravel (if an increased drainage area is needed) or as detailed in plans.
3. Insert discharge hose from pump into Bag a minimum of six (6) inches and tightly secure with attached strap to prevent water from flowing out of the unit without being filtered.
4. Must be monitored during use.



Maintenance/Inspections

1. Ensure water is not discharging from the hose connection point. Stop pumping and re-secure if needed.
2. Replace the unit when $\frac{1}{2}$ full of sediment or when sediment has reduced the flow rate of the pump discharge to an impractical rate.

DIVERSION DIKE

DIVERSION DIKE OF COMPACTED 21A OR #26 STONE

Definition

A temporary ridge of compacted stone constructed at the top or base of a sloped area of a proposed construction site.

Purpose

1. To divert stormwater runoff from upslope drainage areas away from construction activity.
2. To divert sediment-laden runoff from a disturbed area to a sediment-trapping facility such as a sediment trap or sediment basin.

Conditions Where Practice Applies

Wherever stormwater runoff must be temporarily diverted on an impervious surface (pavement, concrete, compacted gravel, etc.) where an earthen diversion dike is not practical to protect disturbed areas and slopes or retain sediment on site during construction. These structures generally have a life expectancy of 18 months or less, which can be prolonged with proper maintenance.



Planning Considerations

A temporary diversion dike of compacted 21A or #26 stone is intended to divert overland sheet flow to a stabilized outlet or a sediment-trapping facility. When used at the up-slope from construction activity, the structure prevents additional stormwater runoff from flowing through the construction site and the potential of greater erosion and sediment transportation. When used down-slope from construction activity, the structure protects adjacent and downstream areas by diverting sediment-laden runoff to a sediment trapping facility.

The dike itself must be adequately compacted to prevent erosion of the dike itself. The dike must have a positive grade to assure drainage, but if the gradient is too great, precautions must be taken to prevent erosion due to high velocity channel flow behind the dike. The cross-section of the channel which runs behind the dike should be of a parabolic or trapezoidal shape to help inhibit a high velocity of flow which could arise in a vee ditch.

Design Criteria

Drainage Area - The maximum allowable drainage area is 5 acres.

Height – The minimum allowable height measured from the upslope side of the dike is 18 inches.

Side Slopes – 1 ½:1 or flatter, along with a minimum base width of 4.5 feet.

Grade – The channel behind the dike shall have a positive grade to a stabilized outlet.

Construction Specifications

1. Temporary diversion dikes of compacted 21A or #26 stone must be installed as a first step in the land-disturbing activity and must be functional prior to upslope land disturbance.
2. The dike shall be adequately compacted to prevent failure.
3. The dike should be located to minimize damages by construction operations and traffic.

Maintenance

The measure shall be inspected after every storm and repairs made to the dike, flow channel, outlet or sediment trapping facility as necessary. Once every two weeks, whether a storm event has occurred or not, the measure shall be inspected and repairs made as needed. Damages caused by construction traffic or other activity must be repaired before the end of the working day.

INLET PROTECTION

DANDY BAG / DANDY CURB / DANDY CURB BAG / DANDY CURB SACK / DANDY SACK

Definition

A temporary filter for a storm drain inlet or curb inlet.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

Conditions Where Practice Applies

Where existing or proposed grated storm drain inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

This practice contains several types of inlet filters which have different applications dependent upon site conditions and the type of inlet. The following inlet protection devices are for drainage areas of one acre or less. Runoff from larger disturbed areas should be routed to a temporary sediment trap (VESCH Std. & Spec. 3.13) or a temporary sediment basin (VESCH Std. & Spec. 3.14).

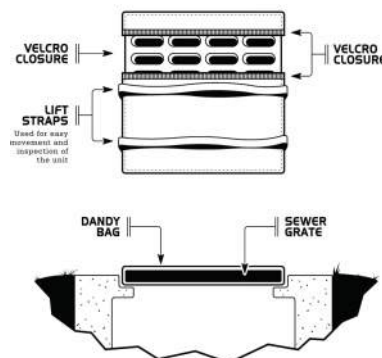
Design Criteria

1. The drainage area shall be no greater than 1 acre.
2. Dandy Bags, Curb Bags, and Curb Sacks are to be sized/ordered to fit the appropriately sized grate. (ie. A 3'x3' bag should not be used for a 2'x2' grate.)

Construction Specifications

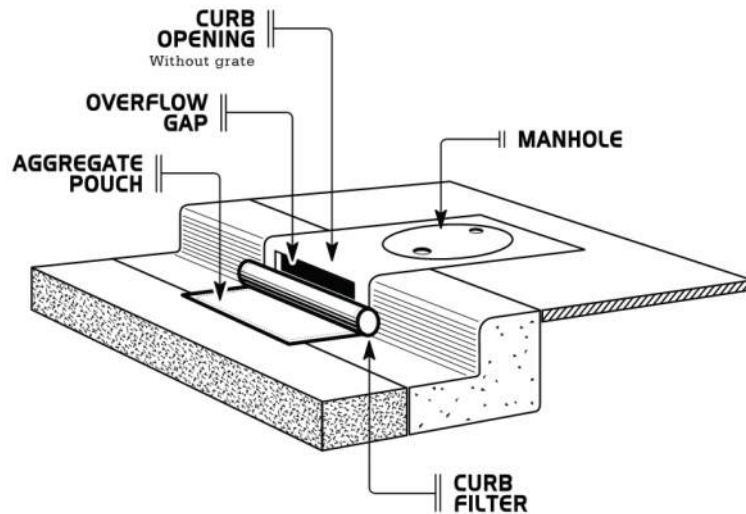
Dandy Bag

1. Place the empty Dandy Bag over the grate as the grate stands on end.
2. Tuck the enclosure flap inside to completely enclose the grate.
3. Holding the lifting devices, insert the grate into the inlet being careful not to damage the Dandy Bag unit.



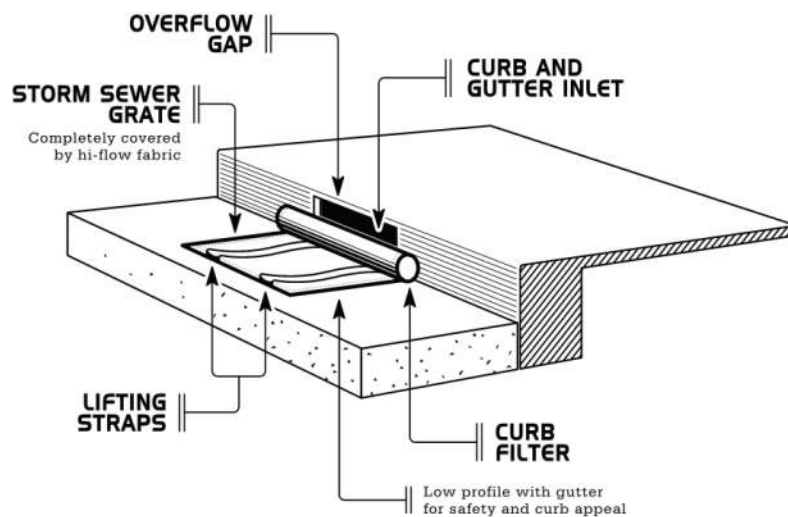
Dandy Curb

1. Place Dandy Curb inlet protection unit on ground with aggregate pouch on street side near inlet it will be installed on.
2. Fill pouch with aggregate such as #5-7, 8's or similar to a level (at least ½ full) that will keep unit in place during a rain event and create a seal between the Dandy Curb and the surface of the Street. Reseal Velcro access.
3. Center the unit against curb or median inlet opening so that the curb side of the unit creates a seal with the curb or median barrier and inlet structure. There will be approximately twelve (12) inches of the inlet protection unit overhanging on each side of the opening. If the unit is not installed in this manner, it will not function properly.



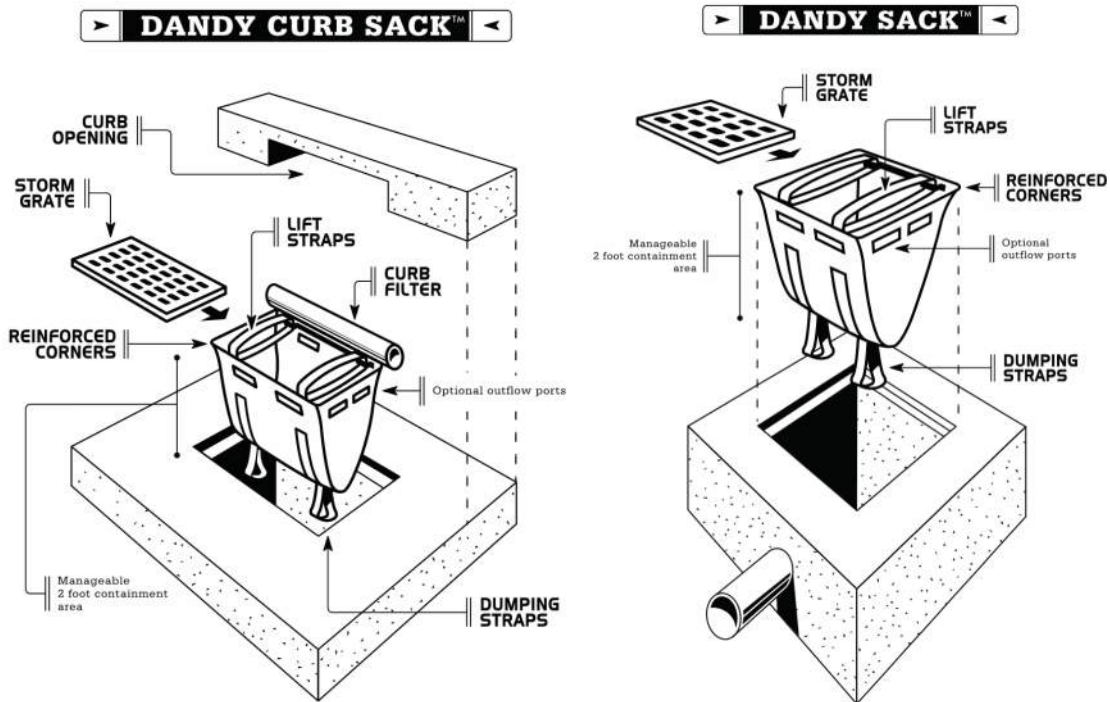
Dandy Curb Bag

1. Place the empty Dandy Curb Bag unit over the grate as the grate stands on end.
2. Tuck the enclosure flap inside to completely enclose the grate.
3. Holding the lifting devices, being careful not to damage the sewn fabric unit, insert the grate into its frame, street side edge first, then lower back edge with cylindrical tube into place. The cylindrical tube should be partially blocking the curb hold opening when installed properly.



Dandy Curb Sack

1. Remove the grate from the catch basin.
2. Stand the grate on end. Move the top lifting straps out of the way and place the grate into the Dandy Curb Sack unit so that the grate is below the top straps and above the lower straps. The grate should be cradled between the upper and lower straps.
3. Holding the lifting devices, insert the grate into the inlet, then lower back edge with cylindrical tube into place, being careful that the grate remains in place and being careful not to damage the Dandy Curb Sack unit. The cylindrical tube should partially block the curb hood opening when installed properly.



Dandy Sack

1. Remove the grate from the catch basin.
2. Stand the grate on end. Move the top lifting straps out of the way and place the grate into the Dandy Sack unit so that the grate is below the top straps and above the lower straps. The grate should be cradled between the upper and lower straps.
3. Holding the lifting devices, insert the grate into the inlet, being careful that the grate remains in place and being careful not to damage the Dandy Sack unit.

Maintenance/Inspections

1. Dandy products shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Accumulated sediment and debris from surface and vicinity of unit shall be removed.
3. If any rips/tears are noticed, unit will need to be replaced.

EROSION EEL / GUTTER BUDDY / GUTTER GATOR

Definition

A temporary sediment filter for a storm drain curb inlet.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

Conditions Where Practice Applies

Where existing or proposed storm drain curb inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

This practice contains several types of filters by different manufacturers. The following inlet protection devices are for drainage areas of one acre or less. Runoff from larger disturbed areas should be routed to a temporary sediment trap (VESCH Std. & Spec. 3.13) or a temporary sediment basin (VESCH Std. & Spec. 3.14).

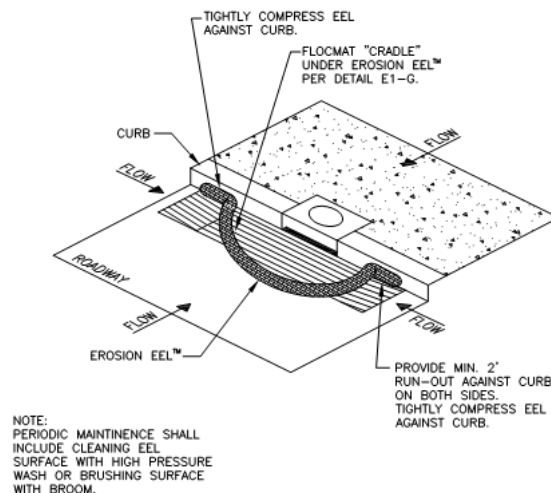
Design Criteria

The drainage area shall be no greater than 1 acre.

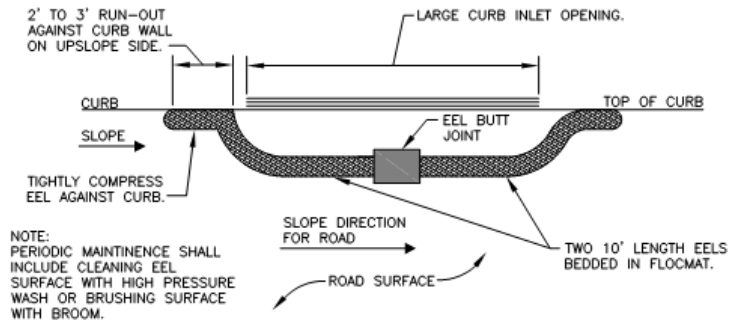
Construction Specifications

Erosion Eel

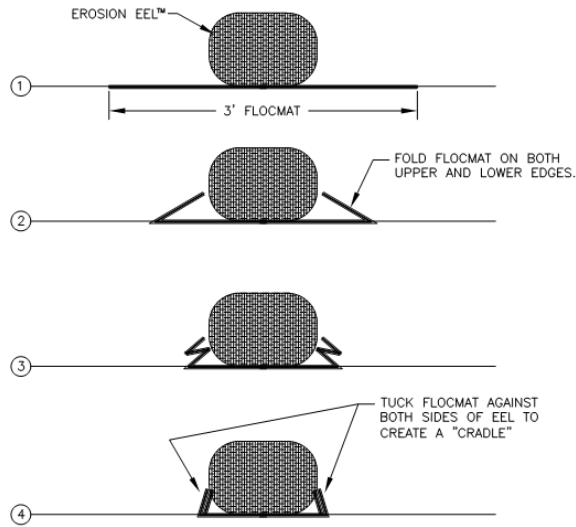
1. Center Erosion Eel at curb inlet. Install Floccmat "cradle" under Erosion Eel.
2. Ensure Erosion Eel does not completely cover inlet. Pull out from center to allow overflow as needed.
3. Tightly compress eel against curb on each end of inlet. There should be a minimum 2' run-out against curb on both sides.



ISOMETRIC DETAIL E3-C: SMALL CURB INLET SEDIMENT TRAP
N.T.S.



DETAIL E3-E: PLAN VIEW - LARGE CURB INLET
N.T.S.

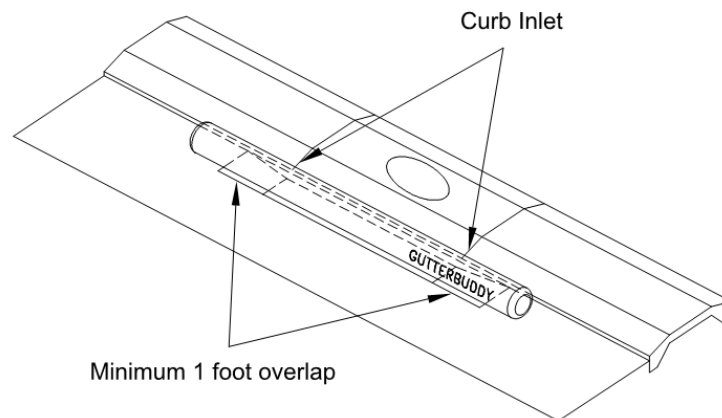


INSTALL FLOCCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

DETAIL E1-G: SECTION - FLOCCMAT
N.T.S.

Gutter Buddy

1. Install the Gutterbuddy in front of the curb inlet opening. Each end of the Gutterbuddy should overlap the curb inlet a minimum of approximately 12".



Gutter Gator



1. Remove GutterGator grids and sleeves from box.

**GutterGator
Assembly Instructions:**



2. Slide grid sections to desired length.



3. Insert grid section into GutterGator sleeve.



4. Install stabilizer arms.



5. Seal velcro on GutterGator sleeve.



6. Remove Gatorweight from box.



- 7.** Place 7lb minimum weight (Gatorweight recommended) into each weight pocket into each weight pocket.



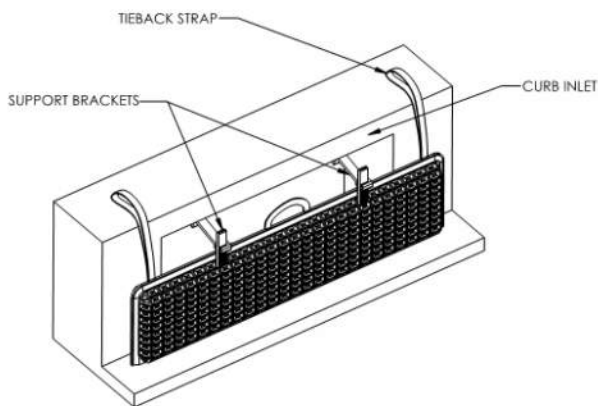
- 8.** Slide weight pockets into curb throat, holding unit tight to curb face. (leave 12" overlap on each end of curb opening)



- 9.** Use GutterGator tiebacks if applicable.



- 10.** Clean unit after each wet weather event.



- 11.** Replace GutterGator sleeves as needed.

Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Accumulated sediment and debris from surface and vicinity of unit shall be removed to prevent ponding.
3. If any rips/tears are noticed, unit will need to be replaced.

GRATE PYRAMID

Definition

A temporary filter for a grated storm drain inlet.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

Conditions Where Practice Applies

Where existing or proposed grated storm drain inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.



Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

This practice contains several types of inlet filters which have different applications dependent upon site conditions and the type of inlet. The following inlet protection devices are for drainage areas of one acre or less. Runoff from larger disturbed

areas should be routed to a temporary sediment trap (VESCH Std. & Spec. 3.13) or a temporary sediment basin (VESCH Std. & Spec. 3.14).

Design Criteria

1. The drainage area shall be no greater than 1 acre.

Construction Specifications

1. Install Grate Pyramid base over grate.
2. Install anchors.
3. Install base with 2 to 4 anchors, as needed.
4. Install safety caps on anchors.
5. Install tower frame.
6. Push button to lock tower into base.
7. Slide tower filter over frame.
8. Tightly secure base to tower.



Standard drop inlet grate.



Install Grate Pyramid base over grate.



Install anchors.



Install base with 2 to 4 anchors as needed.



Install safety caps on anchors.



Install tower frame.



Push button to lock tower into base.



Slide tower filter over frame.



Tightly secure base to tower.



Installation completed.



Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Accumulated sediment and debris from surface and vicinity of unit shall be removed to prevent ponding.
3. If any rips/tears are noticed, unit will need to be replaced.

SILTSACK

Definition

A temporary filter for a grated storm drain inlet.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

Conditions Where Practice Applies

Where existing or proposed grated storm drain inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

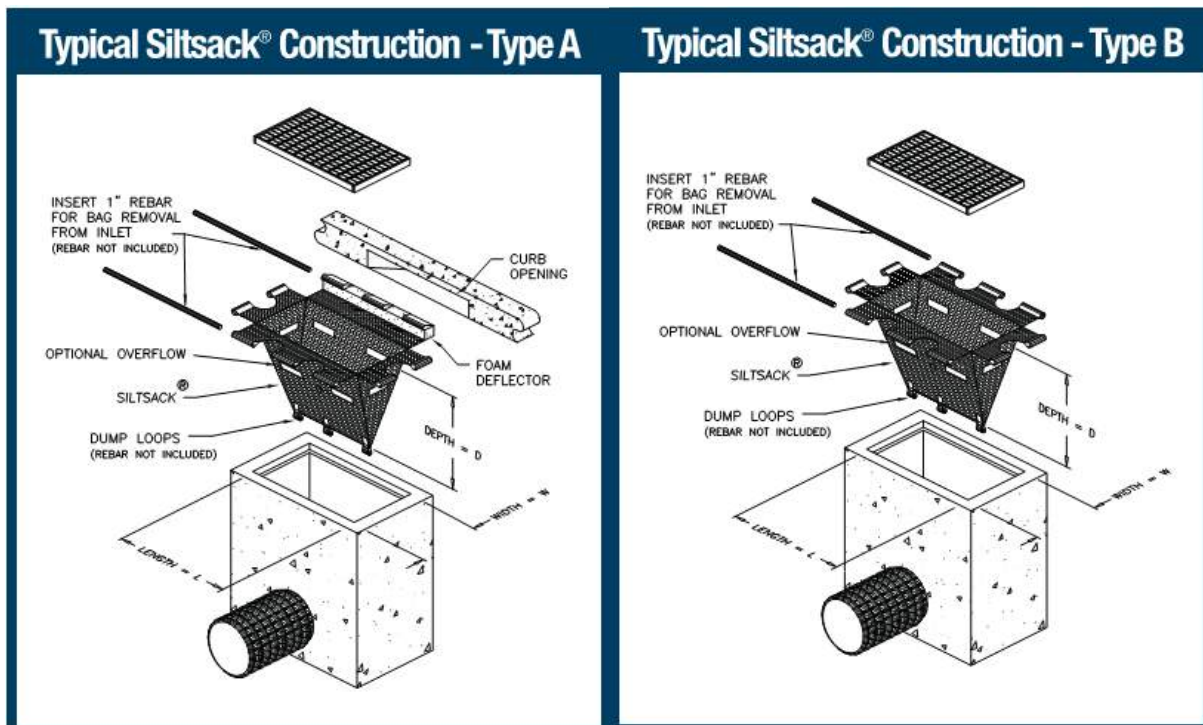
Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

This practice contains several types of inlet filters which have different applications dependent upon site conditions and the type of inlet. The following inlet protection devices are for drainage areas of one acre or less. Runoff from larger disturbed areas should be routed to a temporary sediment trap (VESCH Std. & Spec. 3.13) or a temporary sediment basin (VESCH Std. & Spec. 3.14).

Design Criteria

1. The drainage area shall be no greater than 1 acre.



Construction Specifications

1. Remove the grate and place the sack in the opening. Hold approximately six inches of the sack outside the frame. This is the area of the lifting straps.
2. Replace the grate to hold the sack in place.

Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Check for tears/rips in sack. If noticed, have replaced immediately.
3. The SiltSack is full and should be emptied when the restraint cord is no longer visible.
 - a. To remove, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack to facilitate the lifting of the SiltSack.

TRENCH DRAIN FILTER FABRIC

Definition

A temporary inlet filter for slot and trench drains.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of surrounding areas where wire mesh with gravel is not suitable.

Conditions Where Practice Applies

Where existing or proposed slot or trench drain storm inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

The following inlet protection measure is for drainage areas of 1/2 acre or less.

Design Criteria

1. The drainage area shall be no greater than 1/2 acre.

Construction Specifications

Filter fabric shall be placed underneath grate system with a minimum of 4" of fabric extended past the outer edge of the grate.

Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Check for tears and accumulated sediment and perform maintenance or replace fabric as needed.

TRENCH DRAIN SLOT GUARD

Definition

A temporary inlet filter for slot and trench drains.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of surrounding areas where wire mesh with gravel is not suitable.

Conditions Where Practice Applies

Where existing or proposed slot or trench drain storm inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

The following inlet protection devices are for drainage areas of 1 acre or less.

Design Criteria

1. The drainage area shall be no greater than 1 acre.

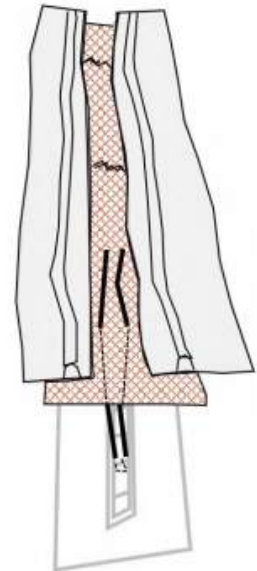
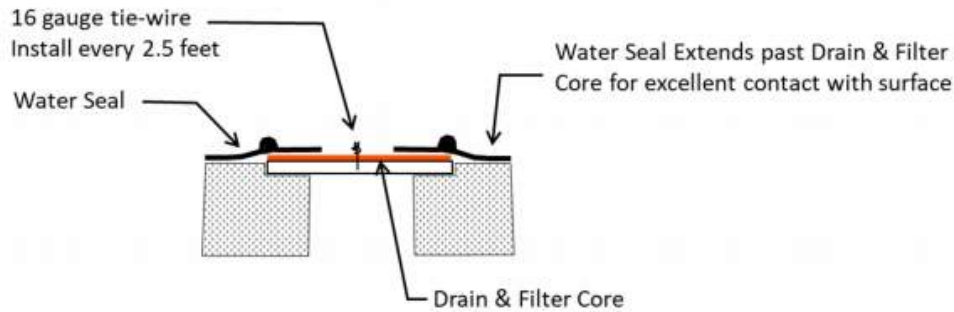
Construction Specifications

1. Placement: Select correct size (Table 1). Lay the Slot Guard on top of the slot or trench drain grate. For safety, assure the grate is in place. Do not remove the grate.
2. Anchor Method: Attach with 16 gauge tie wire every 2.5 linear feet (Fig 1). Cut wire to 12" lengths. Feed one end of wire down thru Slot Guard, around grate bar, and back up thru Slot Guard. Above ground, pull tight and twist wires several times. Cut off excess and bend twisted nub down.
3. Overlap: Slot Guard segments overlap for long slot/trench drains.
4. Clean: Accumulation of leaves, debris and sediment can cause backups! Clean after every storm or as necessary.
5. Protect: In stop and go traffic areas where exposed to constant tire abuse, it is useful to place traffic cones or delineators on or near Slot Guard to discourage run-overs. Slot Guard works well with periodic run-overs, but does not survive long in constant stop and start traffic.

Table 1

Slot/Trench drains up to:	SG Size
6" width	SG 84x06
12" width	SG 84x12
15" width	SG 84x15
20" width	SG 84x20

Fig. 1



Maintenance/Inspections

Perform maintenance as required. Inspect following rainfall events and at least daily during prolonged rainfall. Maintain to provide an adequate sediment holding capacity. Debris shall be removed daily and sediment shall be removed when the sediment accumulation reaches 50% of the barrier height. Removed sediment shall be incorporated in the project at designed locations.

YARD DRAIN FILTER FABRIC

Definition

A temporary inlet filter for small yard grate drain inlets of 15" diameter or less.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of surrounding areas and other more conventional measures are not practical.

Conditions Where Practice Applies

Where existing or proposed yard drain inlets are to be made operational before project completion and permanent stabilization of the corresponding disturbed drainage area.

Planning Considerations

Minimum Standard #10 requires that all storm drain inlets that are made operational during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

The following inlet protection is for drainage areas of 1/2 acre or less.

Design Criteria

1. The drainage area shall be no greater than 1/2 acre.

Construction Specifications

Filter fabric shall be placed underneath grate system with a minimum of 4" of fabric extended past the outer edge of the grate.

Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period).
2. Accumulated sediment and debris from surface and vicinity of unit shall be removed to prevent ponding.
3. If any rips/tears are noticed, fabric will need to be replaced.

OUTLET PROTECTION OR DISSIPATION ALTERNATIVES

SHOREMAX FLEXIBLE TRANSITION MAT

Definition

A permanent, erosion-resistant ground cover.

Purpose

1. To protect the soil from the erosive forces of concentrated runoff.
2. To slow the velocity of concentrated runoff while enhancing the potential for infiltration.
3. To stabilize slopes with seepage problems and/or non-cohesive soils.

Conditions Where Practice Applies

Wherever soil and water interface and the soil conditions, water turbulence and velocity, expected vegetative cover, etc., or such that the soil may erode under the design flow conditions. Adequate matting solutions may be used, as appropriate, at storm drain outlets, on channel banks and/or bottoms, roadside ditches, drop structures, at the toe of slopes, as a transition from impervious channels to vegetated channels, etc.

Planning Considerations

Minimum Standard # 11 requires that before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

Introduction to the ShoreMax® Transition Mat

The North American Green® RevetMax™ System ShoreMax® Transition Mat is designed for protection of high scour and high velocity applications. The flexible transition mat can be used in varying applications and can replace hard-armor designs with "green" vegetated designs.

To create the maximum vegetated design, we suggest combining two high-performance North American Green Erosion Control Products (ECPs), the ShoreMax Mat and a VMax® Turf Reinforcement Mat (TRM). North American Green offers many different VMax TRMs that can be used with the ShoreMax Mat. The VMax TRM's special structural design anchors and reinforces the roots and stems of vegetation for long-term stability, and helps create a shear plane that deflects the flowing water away from the soil surface. The ShoreMax Mat provides mechanical protection and ballasting to the protected area and increases the immediate permissible shear stress capabilities of the system.

Once installed, the ShoreMax Mat offers protection comparable to hard-armor products such as rock riprap and articulated concrete blocks in turbulent flow and wave attack applications. ShoreMax Mat can take your high flow projects to the maximum in green vegetated design with unvegetated shear performance up to 8.6 lbs/ft²

FEATURES OF SHOREMAX TRANSITION MAT

ShoreMax Mat is the first flexible soft revetment scour protection system that easily installs over difficult soil topography, and does not require heavy equipment or expensive earth anchors to install. It's also non-buoyant, so it won't float or uplift in submerged and heavy flow conditions. ShoreMax Mat is designed with "spikes" that bite into the underlying mat, which prevents horizontal shifting of the mat.

KEY APPLICATIONS

ShoreMax Transition Mat is designed for immediate to permanent protection for high scour applications such as head-to-tail protection of drainage channels, culvert and pipe outfalls, and steep chute and slope drains like those associated with parking lots, roadways, mines and landfills. The flexible transition mat can be used to create soft revetment systems. ShoreMax Mat can be utilized for shorelines, streambanks, and spillway applications where wave attack can reach the super critical stage.

Design Criteria

SHOREMAX TRANSITION MAT DESIGN CRITERIA						
TRM Underlayment Type and Phase		Maximum Permissible Shear Stress	Maximum Flow Velocity	Maximum Wave Attack Applications		
SC250	Unvegetated	7.5 lb/ft ²	18 ft/s	6 in. wave height, ≤4:1 slope	12 in. wave height, ≤5:1 slope	N/A
	Vegetated	10 lb/ft ²	18 ft/s			
C350	Unvegetated	8.0 lb/ft ²	19 ft/s	6 in. wave height, ≤3:1 slope	12 in. wave height, ≤4:1 slope	N/A
	Vegetated	12 lb/ft ²	20 ft/s			
P550	Unvegetated	8.5 lb/ft ²	19.5 ft/s	6 in. wave height, ≤2:1 slope	12 in. wave height, ≤3:1 slope	18 in. wave height, ≤5:1 slope
	Vegetated	14 lb/ft ²	25 ft/s			

The ShoreMax Transition Mat has been evaluated for its performance in conjunction with a VMax TRM in both channel and wave attack applications, resulting in these guidelines.

MAXIMUM DESIGN CONDITIONS				Anchor Pattern	MINIMUM ANCHOR TYPE BASED ON SOIL TYPE	
Shear Stress	Velocity	Wave Height	Soil Type		Anchor Type	
≤6 lb/ft ²	≤14 ft/s	6 in.	F	Clay - Clay Loam	10 in. Wire Staple or 12 in. ShoreMax Stake	
>6-8 lb/ft ²	>14-18 ft/s	12 in.	G	Silt Loam - Loam	10 in. Wire Staple or 12 in. ShoreMax Stake	
>8 lb/ft ²	>18 ft/s	18 in.	H	Sandy Loam	12 in. Wire Staple or 12 in. ShoreMax Stake	
				Sand/Muck ≤6 in.	12 in. Rebar Staple	
				Sand/Muck 6-12 in.	18 in. Rebar Staple	
				Sand/Muck 12-18 in.	Earth Anchor 400 + 12 in. Rebar Staple	
				Sand/Muck >18 in.	Earth Anchor 680 + 18 in. Rebar Staple	

TABLE 1: Minimum anchor pattern

TABLE 2: Minimum anchor type

Anchoring and Guidelines

Installation of the ShoreMax Mat can be done simply and without the need for expensive equipment. The ShoreMax Mat and TRM underlayment are simply installed over a prepared seeded soil and fastened into place with anchors. Special percussion earth anchors are typically not required.

The ShoreMax Mat's flexibility allows it to be easily installed using a variety of fasteners such as the ShoreMax Stake, wire staples, rebar staples and percussion earth anchors. Because it easily self-conforms to the underlying terrain, fasteners are not required to force conformance with the underlayment material – they only serve to hold the panels in place. The type and size of fastener used is simply dependent upon the underlying soil and degree of compaction.

Anchoring patterns for the ShoreMax Mat vary depending on the project applications with increased anchoring patterns required for higher flow or scour applications. Please refer to the tables and figures on this page to determine the appropriate anchor type and anchor pattern. For site-specific recommendations use the Erosion Control Materials Design Software® (ECMDS) for help in selecting a ShoreMax Mat and fastening details. Visit www.ECMDS.com for more information.

ANCHORING GUIDE

1. When installing the ShoreMax Mat, the anchor pattern (Figures 1 or 2) should be selected based on the expected maximum design conditions (shear stress, velocity or wave impact) (Table 1).
2. Anchor type selection should be based on the soil type and pull-out strength required (Table 2). In soft, highly erodible soils percussion earth anchors may be necessary. Earth anchors can be installed in conjunction with staples (Figure 2).
3. When using percussion earth anchors, position anchors in each corner and the center of the panel. Place staples in the appropriate pattern through remainder of mat. Staples can be shared between two adjacent panels.

***NOTE:** Number of staples used per panel can be reduced by 30-40 percent when sharing staples between panels.

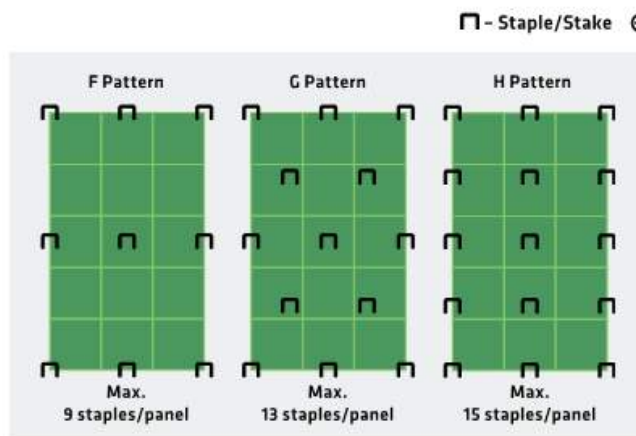


FIGURE 1: Anchor Patterns for use with staples/stakes

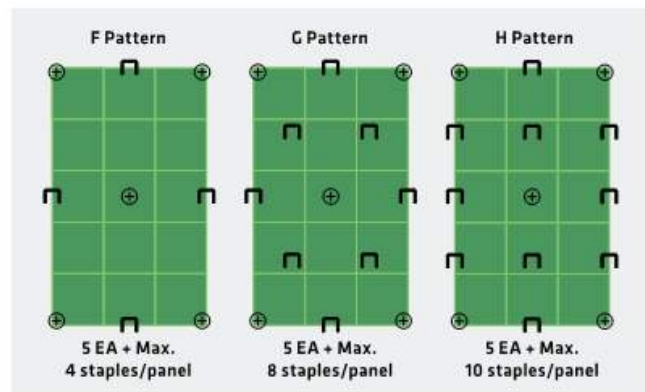


FIGURE 2: Anchor Patterns for use with a combination of earth anchors and staples

Channel Design Guideline

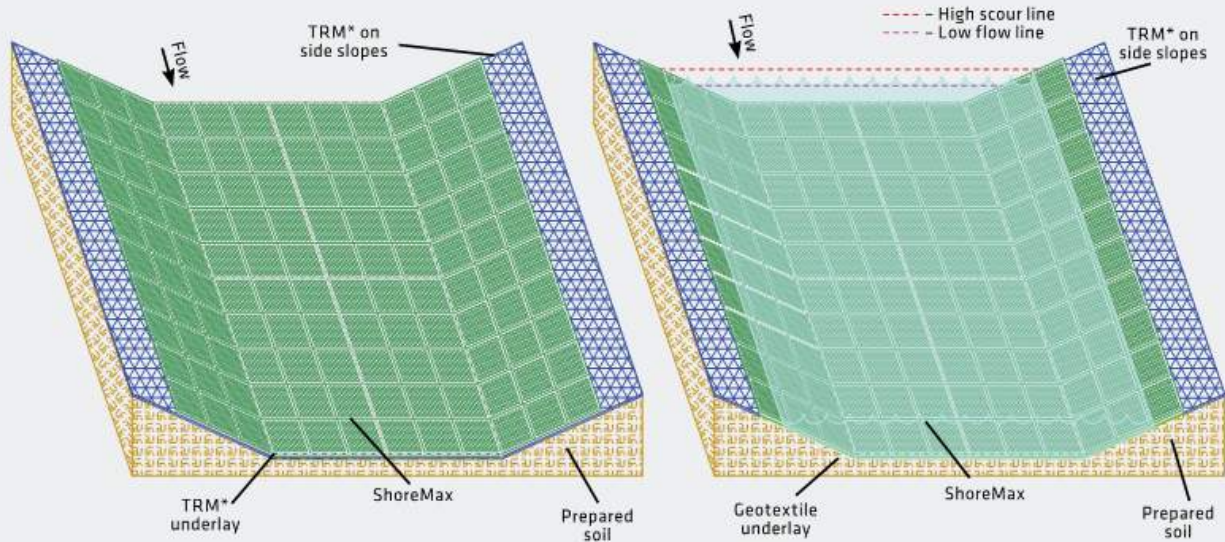


FIGURE 3: Steep channel

FIGURE 4: Continuous flow channel

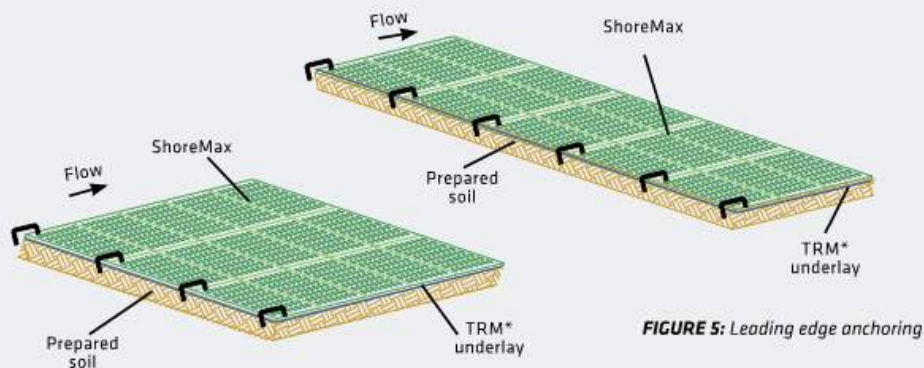


FIGURE 5: Leading edge anchoring

STEEP CHANNEL/CHUTE SPILLWAY DETAIL

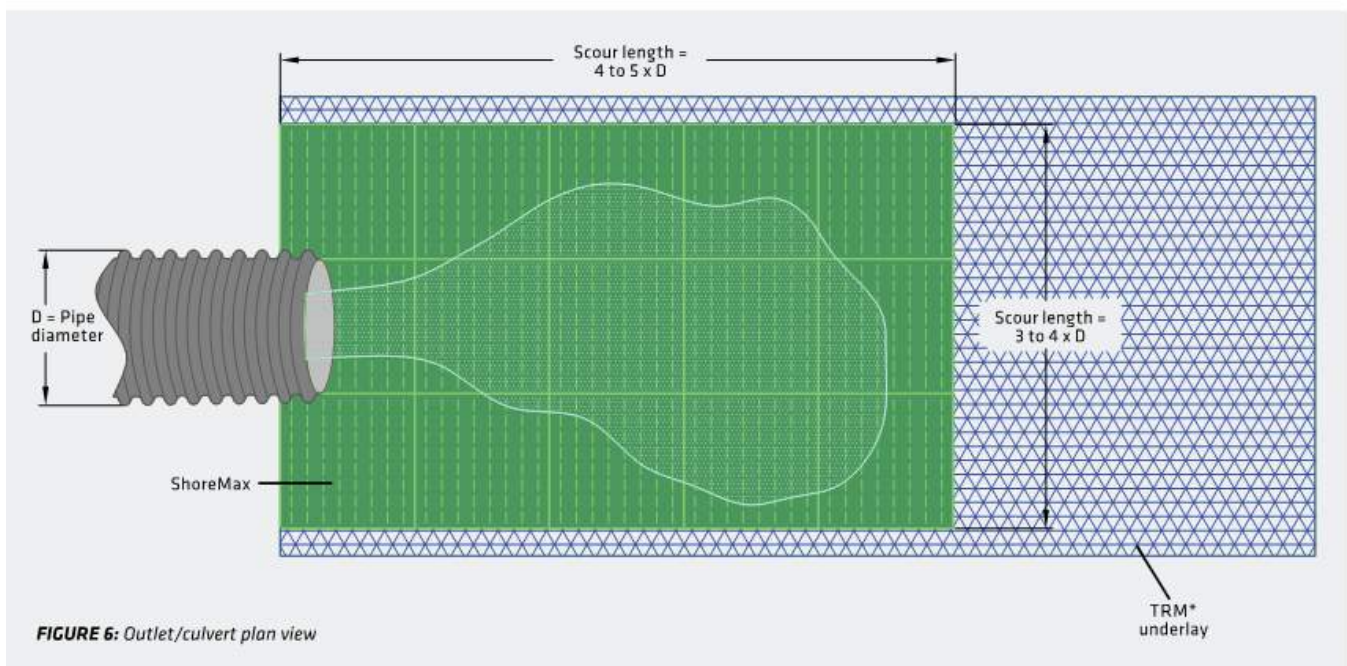
* ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases Erosion Control Blankets (ECBs).

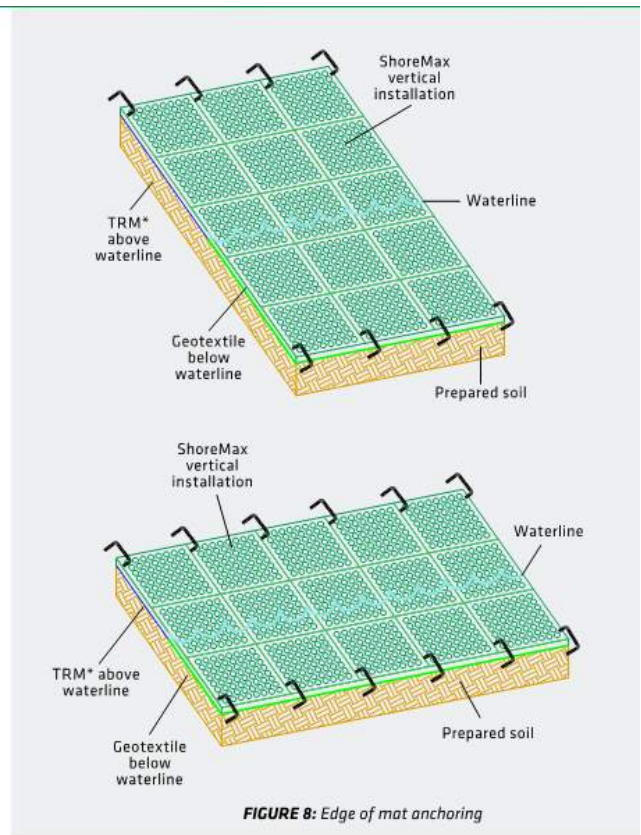
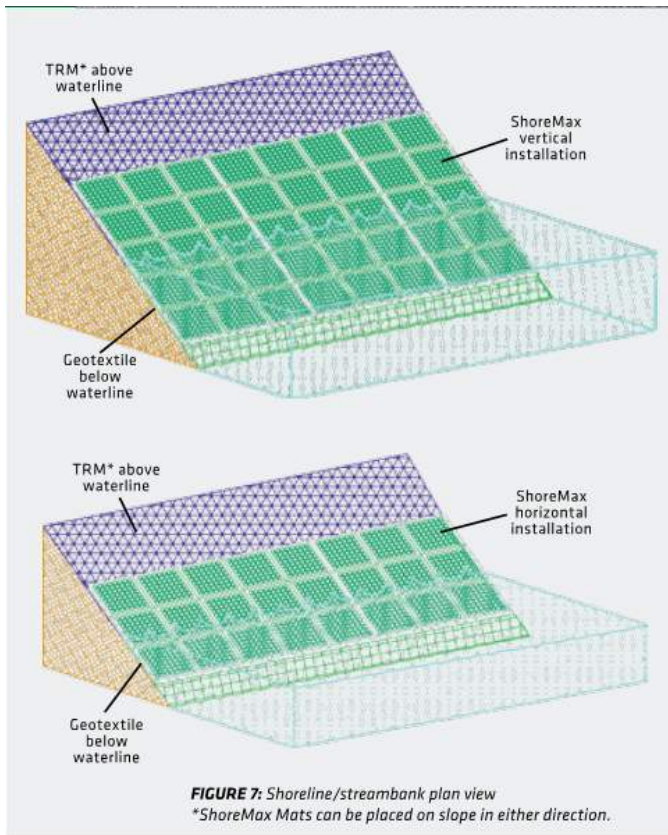
1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer and seed (when installing TRM or ECB underlayment).
2. Install TRM over prepared soils according to manufacturer's recommendations.
3. Place the ShoreMax Mat in the bottom of the channel over the installed TRM (Figure 3). The ShoreMax Mat should be installed up to the appropriate elevation on the side slope as determined by the engineer. The ShoreMax Mat can be laid in either direction.
4. For channels carrying continuous water flows, an appropriate geotextile should be placed under the ShoreMax Mat for submerged applications (Figure 4).
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
6. At the beginning of channels and other areas where significant concentrated flows are directed onto the ShoreMax Mat, place one staple/pin per linear foot along the leading edge of the ShoreMax Mat, resulting in one staple/pin on each corner and gridline (Figure 5).

OUTLET/CULVERT PROTECTION DETAIL

* ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases ECBs.

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer, and seed (when installing with a TRM or ECB).
2. Install TRM over prepared soils according to manufacturer's recommendations.
3. Place the ShoreMax Mat over the installed TRM (Figure 6). The ShoreMax Mat can be laid in either direction.
4. For culvert and outfall applications, the ShoreMax Transition Mat should extend a minimum width of 3-4 times the pipe diameter and a minimum length of 4-5 times the pipe diameter (Figure 6). With steeper channel gradients, the length of the ShoreMax Mat may need to be extended.
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
6. Place one staple/pin per linear foot along the leading edge of the ShoreMax Mat, resulting in one staple/pin on each corner and gridline (Figure 5).





SHORELINE/STREAMBANK/LEVEE DETAIL

** ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases ECBs.*

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer and seed (when installing TRMs or ECBs underlayment).
2. Install TRM above the waterline following manufacturer's recommendations.
3. In areas below the normal water elevation, an appropriate geotextile should be installed beneath the ShoreMax Mat.
4. Place the ShoreMax Mat over the installed TRM or geotextile (Figure 7). The ShoreMax Mat can be laid in either direction (Figures 7 and 8).

5. Extend the ShoreMax Mat to cover the transitional range where scour is predicted based on typical water level fluctuations and wave lap.
6. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
7. Place one staple/pin per linear foot along the top and bottom edges of the ShoreMax System, placing one on each corner and gridline (Figure 8).

NOTE: A bottom anchor trench is not required when using ShoreMax Mat in conjunction with a TRM or geotextile.

PERIMETER CONTROL

EROSION EEL

Definition

A temporary sediment barrier for perimeter control.

Purpose

1. To intercept and detain small amounts of sediment from disturbed areas during construction operations in order to prevent sediment from leaving the site.
2. To decrease the velocity of sheet flows and low-to-moderate level channel flows.

Conditions Where Practice Applies

1. Below disturbed areas where erosion could occur in the form of sheet or rill erosion and the installation of silt fence is not practicable such as on paved, concrete or other similar surfaces.



Planning Considerations

1. Erosion Eels can be placed at the top, on the face, or at the toe of slopes to intercept runoff, reduce flow velocity, releasing the runoff as sheet flow, and provide reduction/removal of suspended solids from the runoff.
2. No trenching is required for the installation of Erosion Eels.

Design Criteria

1. Where the size of the drainage area is no more than one quarter acre per 100 feet of Erosion Eels.
2. See spacing recommendations chart for slope percentages.

SPACING RECOMMENDATIONS FOR THE
EROSION EEL™ FOR PERIMETER CONTROLS AND
INTERCEPTING SHEET FLOW ON SLOPES

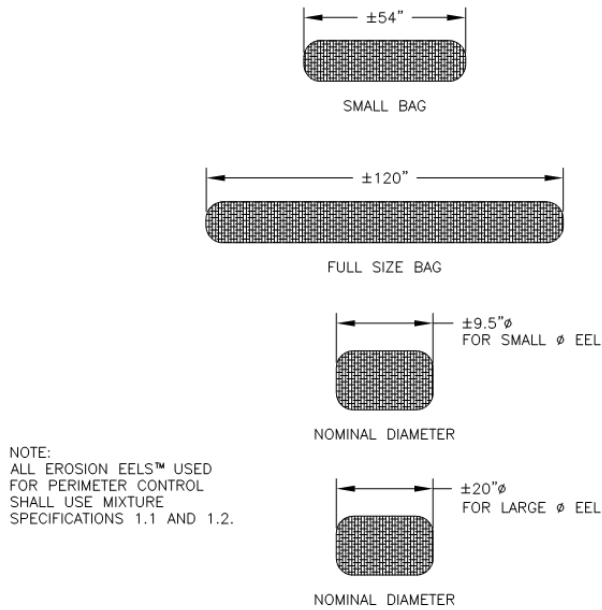
SLOPE(%)	SINGLE EEL SPACING(ft)	*STACKED DUAL EEL SPACING(ft)
0.5	300	N/A
1	200	N/A
2	160	N/A
3	80	N/A
4	50	N/A
5	40	N/A
6	35	N/A
8	30	N/A
10	25	N/A
15	+17	N/A
20	+12	+25
25	N/A	+15
33	N/A	+10
50	N/A	+6

* DUAL STACK REFERS TO TWO EELS
STACKED ATOP ONE ANOTHER AND
STABILIZED WITH T-POSTS. SEE DETAIL
E2-E ON SHEET E-2.

+ PLACE STAKES BEHIND EELS @ 24"
C/C SPACING. SEE SHEET E-2 FOR
STAKING DETAILS.

Construction Specifications

1. Prepare bed for Eel installation by removing any large debris including rocks, soil clods, and woody vegetation (greater than 1 inch in size). Erosion eels can also be placed over paved surfaces including concrete and asphalt with no surface preparation required.
2. Rake bed area with a hand rake or by drag harrow.
3. All surfaces shall be uniformly and well-compacted for maximum seating and stability of the Eels in place.
4. Bed the Eels in a FlocMat (coir matting) cradle per the detailed drawings. (Detail E1-G)
5. As Eels are placed in a row, butt ends of Eels together tightly by firmly pressing the tied end of the Eel against the sewn edge of the adjacent Eel. (Detail E1-B1)

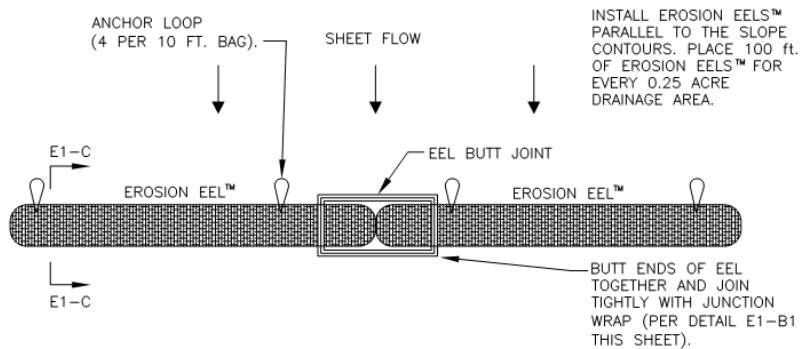


NOTE:
ALL EROSION EELS™ USED FOR PERIMETER CONTROL SHALL USE MIXTURE SPECIFICATIONS 1.1 AND 1.2.

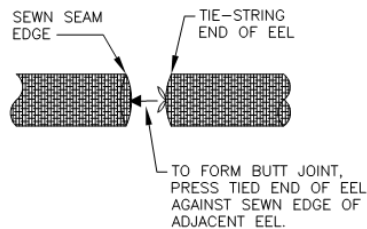
DETAIL E1-A: EROSION EELS™
N.T.S.

EROSION EELS™ USED IN PERIMETER CONTROL APPLICATIONS SHALL HAVE A SPECIFICATION MIXTURE 1.1 OR 1.2.

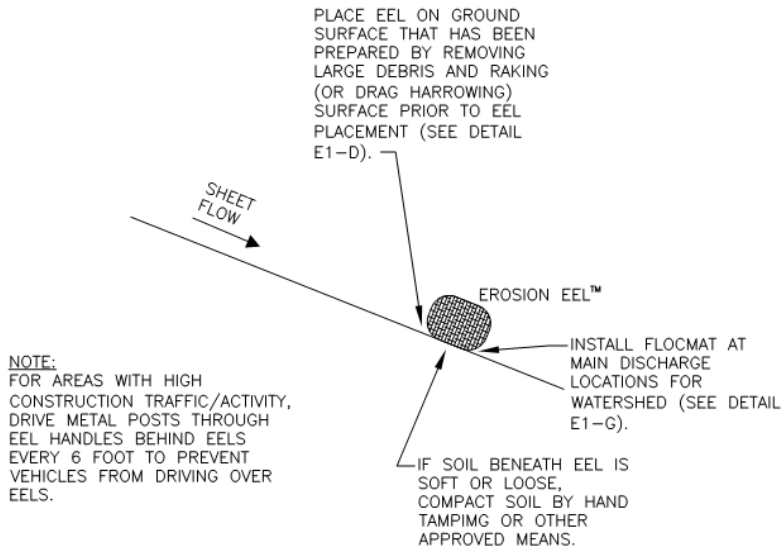
- a. MIXTURE SPECIFICATION 1.1. A FILTER MIXTURE COMPRISED OF 50% SHREDDED RUBBER AND 50% WOOD CHIP PARTICLES BY VOLUME. THE SHREDDED RUBBER SHALL BE WASHED AND PROCESSED TO REMOVE MOST, IF NOT ALL, METAL COMPONENTS. THE RUBBER SHALL BE DERIVED FROM RECYCLED TIRES AND SHALL BE SHREDDED TO PRODUCE A MAXIMUM PARTICLE SIZE OF +/- 3/4 INCH. THE WOOD CHIPS SHALL BE PRODUCED FROM HARDWOOD TREES AND SHALL CONFIRM TO AASHTO CERTIFICATION SPECIFICATION MP 9-03.
- b. MIXTURE SPECIFICATION 1.2. A FILTER MIXTURE COMPRISED OF 1/3 SHREDDED RUBBER, 1/3 WOOD CHIPS, AND 1/3 RECYCLED SYNTHETIC FIBERS. THE SHREDDED RUBBER SHALL BE WASHED AND PROCESSED TO REMOVE MOST, IF NOT ALL, METAL COMPONENTS. THE RUBBER SHALL BE DERIVED FROM RECYCLED TIRES AND SHALL BE SHREDDED TO PRODUCE A MAXIMUM PARTICLE SIZE OF +/- 3/4 INCH. THE WOOD CHIPS SHALL BE PRODUCED FROM HARDWOOD TREES AND SHALL CONFIRM TO AASHTO CERTIFICATION SPECIFICATION MP 9-03. THE SYNTHETIC FIBERS SHALL BE PRODUCED FROM RECYCLED, MANUFACTURED MATERIALS, SUCH AS, BUT NOT LIMITED TO, PRE-CONSUMER SCRAP CARPET, TIRE CHORD, AND TIRE FIBER MATERIALS.



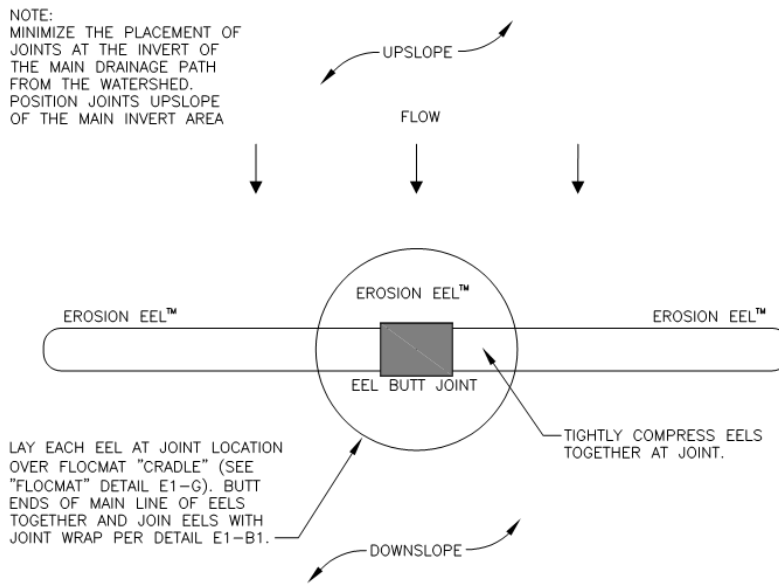
DETAIL E1-B: INTERCEPTING SHEET FLOW
PERPENDICULAR TO FLOW PATH - PLAN VIEW



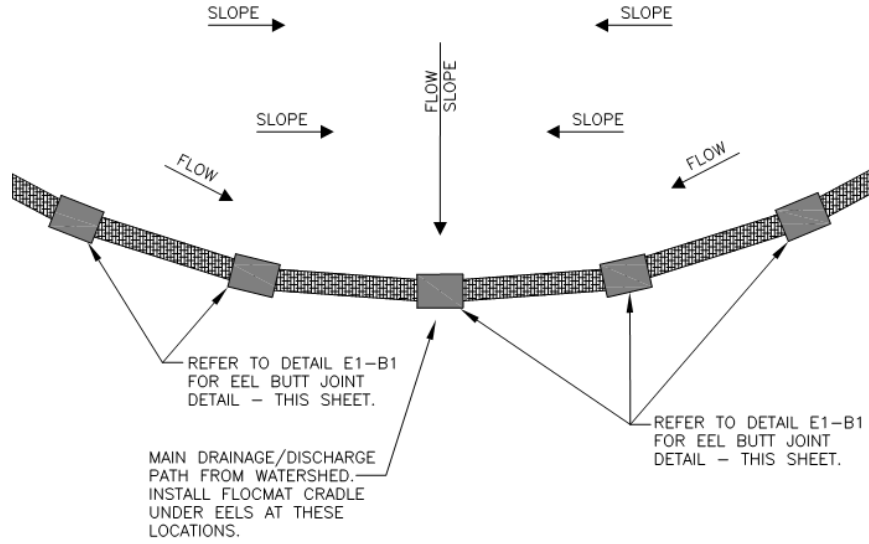
DETAIL E1-B1



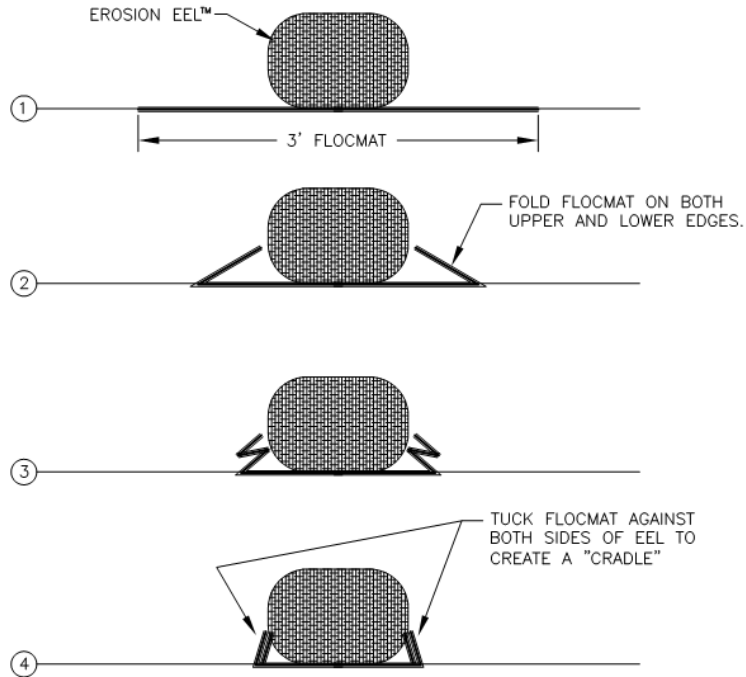
DETAIL E1-C: INTERCEPTING SHEET FLOW PERPENDICULAR TO FLOW PATH – PLAN VIEW



DETAIL E1-E: PLAN VIEW – OVERLAP/JOINT DETAIL NEAR DISCHARGE POINTS FROM WATERSHED
N.T.S.

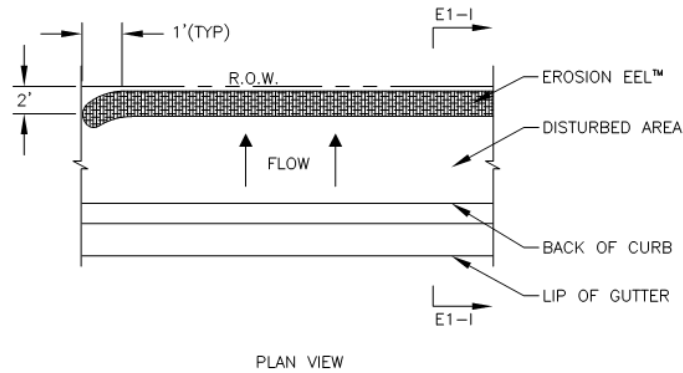


DETAIL E1-F: PLAN VIEW - TYPICAL ARRANGEMENT OF EELS USED FOR PERIMETER CONTROL
N.T.S.

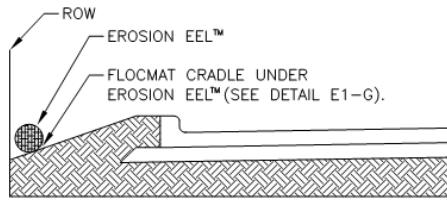


INSTALL FLOCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

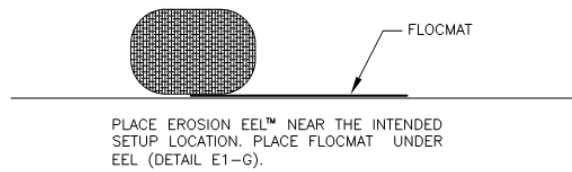
DETAIL E1-G: SECTION - FLOCMAT
N.T.S.



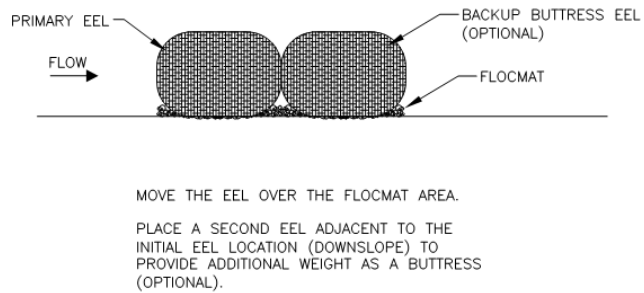
DETAIL E1-H: EROSION EEL™
PLACED AT EDGE OF ROADWAY RIGHT-OF-WAY
N.T.S.



STEP 1



STEP 2



DETAIL E1-K: STABILIZING PROCEDURE FOR
EROSION EEL PLACED OVER HARD SURFACE (PAVED, ROCK, ETC.)
N.T.S.

Maintenance/Inspections

1. Inlet protection shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period). Any required repairs shall be made immediately.
2. Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the Eel.
3. If any rips/tears are noticed, section of Erosion Eel will need to be replaced.

SLOPE INTERRUPTION DEVICE (SID)

TERRA TUBE - FIBER FILTRATION TUBE (FFT)

Definition

A fiber filter tube (FFT) of engineered composites used for sediment filtration and slope interruption.

Purpose

To provide filtration and slow down velocity of run-off on slopes.

Conditions Where Practice Applies

On slopes where the combination of slope gradient and slope length would create a critical erosion hazard.

Slope Gradient	Slope Length
0-7%	300 feet (100 meters)
7-15%	150 feet (50 meters)
15% & over	75 feet (25 meters)

Planning Considerations

Minimum Standard #7 requires that cut and fill slopes be designed and constructed in a manner that will minimize erosion. Installation of slope interruption devices assist in preventing slopes from becoming a critical erosion hazard.

Construction Specifications**FFT Installation Overview—****Slopes:**

Vertical spacing for slope installations should be determined by site conditions. Key parameters include slope gradient, length of slope, soil type, climate, design event and anticipated runoff. General guidelines follow:

Slope Gradient	FFT Interval
1H:1V	15' (4.6 m)
2H:1V	25' (7.6 m)
3H:1V	35' (10.7 m)
4H:1V	50' (15.2 m)

When installing on highly erosive soils, decrease interval distance. On less erosive soils, increase interval distance.

- For maximum performance Terra-Tubes must be installed to maintain intimate contact with the soil surface. Terra-Tubes should be installed prior to hydraulic or dryland seeding applications. They may be installed before or after the installation of Rolled Erosion Control Products (RECPs). Smooth soil surface and remove all obstructions >1"-2" in diameter.
Deploy Terra-Tubes FFT where material is to be installed.
- Anchor the upslope/upstream side of FFT using 6"- 8" U-shaped wire staples or approved devices at 1' intervals. Position anchors 1" inward from upper edge of FFT and drive flush to soil surface.
- Raise tube to fullest height and drive 12"-18" wooden stakes or approved metal rods through downslope/downstream side of FFT at 2' intervals. Drive stakes 1" inward from downslope/downstream edge of FFT, leaving 2"- 3" of the stake protruding above the FFT. Take care not to compress the FFT structure.
- The FFT should appear more rectangular than round. Backfill and compact loose soil against upslope/upstream side of FFT.
- Overlap adjacent FFT roll ends by a minimum of 1'. Reduce stake interval on downslope/downstream FFT to 1' interval making sure to place a stake at the terminus of the FFT. Continue to use wire staples on 1" centers on upslope/upstream side of FFT. Extend next FFT 1' past terminus and upslope/upstream of preceding FFT and place wire staples on 1" intervals. Then, drive stakes through outer 1" of both FFTs to complete the overlap.

Channels:

- Construct anchor trench 3" deep by FFT roll diameter and place loose soil against upstream side of FFT. For channel gradients of 2%, install anchor trenches on 25' intervals. Decrease interval distance of anchor trenches with steeper channel gradients or more highly erosive soils.
- Follow above installation sequence for slope installations, but decrease interval of both upstream and downstream anchoring devices to 1'.



step 1



step 2



step 3



step 4



step 5

Maintenance/Inspections

- Tubes shall be inspected immediately after each measurable storm event (0.25" of rain or greater over a 24 hour period). Any required repairs shall be made immediately.
- During inspections, if rill erosion is noticed, measures will need to be taken as soon as practical to re-grade and stabilize problem areas.