

JAMES MADISON UNIVERSITY®



*Annual Standards and
Specifications for ESC & SWM
Revision Date: March 11, 2021*

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LETTER OF ENDORSEMENT

Subject: James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management.

Dated: January 5, 2021

I certify under penalty of law that all documents and all attachments related to the submission and updating of the James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management have been prepared under my direction or supervision in a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of a fine and imprisonment for knowing violations.

Sincerely,



Dale Chestnut

James Madison University Stormwater Coordinator

INTRODUCTION

James Madison University (JMU) has incorporated Annual Standards and Specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) that are integral components of James Madison University's design, construction, maintenance, and management of the university's stormwater program. The James Madison University Annual Standards and Specifications for ESC and SWM submittal has been developed to provide information regarding JMU's implementation in accordance with the Virginia Erosion and Sediment Control Law (§62.1-44 et. seq.), the Virginia Erosion and Sediment Control Regulations (9VAC25-840 et. seq.), the Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850 et. seq.), the Virginia Stormwater Management Act (§62.1-44 et. seq.), and the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870 et. seq.) as related to municipal separate storm sewer systems (MS4) and regulated construction activities.

James Madison University Annual Standards and Specifications for ESC and SWM shall be administered by Facilities Management Engineering Department and shall apply to all design, plan review and approval, construction and maintenance activities undertaken by James Madison University, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations or the Virginia SWM Act and VSMP Permit Regulations. During any inspections of James Madison University's land disturbing activities by DEQ, EPA or other such environmental agencies, compliance with the approved James Madison University Annual Standards and Specifications for ESC and SWM (and all parts thereof), the Virginia ESC Law and Regulations, the Virginia SWM Act and the VSMP Permit Regulations will be expected.

James Madison University Annual Standards and Specifications for ESC and SWM are submitted to the Virginia Department of Environmental Quality (DEQ) for review and approval on an annual basis per 9VAC25-870-170 and §62.1-44.15:55D, or as determined by the DEQ. James Madison University shall ensure that project specific plans are developed and implemented in accordance with these Annual Standards and Specifications. While the Department of Environmental Quality or Board will remain the ESC and VSMP Authority, JMU shall act as the administrator of these Annual Standards and Specifications in order to implement all aspects of the program except for the following items:

- Construction General Permit registration statement review and acceptance. (9VAC25-880-50)
- Construction General Permit issuance.
- Construction General Permit enforcement.
- Construction General Permit Notice of Termination (9VAC25-880-60, CGP Part I.F)
- Acceptance of variances and exceptions.

Enforcement for SWM §62.1-44.15:27.F. Enforcement shall be administered by the Department and the Board where applicable with the provisions of this article.

Enforcement for ESC §62.1-44.15:54E., §62.1-44.15:56.G. The Department and the Board, where applicable, shall provide project oversight and enforcement as necessary and comprehensive program compliance review and evaluation. The Department may take enforcement actions in accordance with this article and related regulations.

Complaints and inspections related to SWM §62.1-44.15:31.C. The Department shall perform random site inspections or inspections in response to a complaint to assure compliance with this article, the Erosion and Sediment Control Law, and regulations adopted thereunder.

Fees for SWM §62.1-44.15:31.D. The Department shall assess an administrative charge to cover the costs of services rendered associated with its responsibilities pursuant to this section.

Fees for ESC §62.1-44.15:31.D. The Board shall have the authority to enforce approved specifications and charge fees equal to the lower of (i) \$1,000 or (ii) an amount sufficient to cover the costs associated with standard and specification review and approval, project inspections, and compliance.

This submittal constitutes James Madison University's commitment to execute all provisions contained herein on regulated land disturbing activities and land development projects. As such, this submittal will be made available and utilized as an operational guidance document for James Madison University projects. This submittal and errata information are available for download as PDF files at: <http://www.jmu.edu/facmgt/sustainability/Stormwater/site-plan-review.shtml>

ACRONYMS AND ABBREVIATIONS

Bay	Chesapeake Bay	MCM	Minimum Control Measure
BMP	Best Management Practice	MS	Minimum Standard
Board	State Water Control Board	MS4	Municipal Separate Storm Sewer System
CWA	Clean Water Act	NPDES	National Pollution Discharge Elimination System
CSS	Combined Sewer System	NOI	Notice of Intent
DCR	Department of Conservation and Recreation	NOV	Notice of Violation
DEQ	Department of Environmental Quality	POC	Pollutants of Concern
EPA	Environmental Protection Agency	RLD	Responsible Land Disturber
ERP	Enforcement Response Plan	SOP	Standard Operating Procedures
ESC	Erosion & Sediment Control	SWM	Stormwater Management
FM	Facilities Management	SWPPP	Stormwater Pollution Protection Plan
GIS	Geographic Information Systems	TMDL	Total Maximum Daily Load
GPS	Global Positioning System	UA	Urbanized Area
HUC	Hydrologic Unit Code	VESCL&R	Virginia Erosion & Sediment Control Law & Regulations
IDDE	Illicit Discharge Detection & Elimination	VPDES	Virginia Pollution Discharge Elimination System
JMU	James Madison University	VRRM	Virginia Runoff Reduction Method
LID	Low Impact Development	VSMP	Virginia Stormwater Management Program
MEP	Maximum Extent Practicable	WLA	Waste Load Allocation

SECTION 1: ANNUAL STANDARDS AND SPECIFICATIONS ADMINISTRATION

- 1.1 James Madison University follows the policies and procedures described in *the Virginia Erosion and Sediment Control Handbook* and the *Virginia Stormwater Management Handbook*. *James Madison University Annual Standards and Specifications for ESC & SWM* approved by DEQ are composed of general specifications. The general specifications for erosion and sediment control and stormwater management are included by referencing the following.
- 1.1.1 *Virginia Erosion and Sediment Control Law* (§62.1-44 et seq. as amended);
 - 1.1.2 *Virginia Erosion and Sediment Control Regulations* (9VAC25-840 et seq. as amended);
 - 1.1.3 *Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations* (9VAC25-850 et seq. as amended);
 - 1.1.4 *Virginia Erosion and Sediment Control Handbook*, 1992, as amended;
 - 1.1.5 *Virginia Stormwater Management Act* (§62.1-44 et seq. as amended);
 - 1.1.6 *Virginia Stormwater Management Permit Regulations* (9VAC25-870 et seq. as amended);
 - 1.1.7 *Virginia Stormwater Management Handbook*, 1999, as amended;
 - 1.1.8 *Virginia Stormwater Construction General Permit Regulations* (9VAC25-880 et seq. as amended);
 - 1.1.9 *Virginia Stormwater BMP Clearinghouse*, www.vwrrc.vt.edu/swc/StandardsSpecs.html
 - 1.1.10 Technical Bulletins, as amended, on the Virginia DEQ website at www.deq.virginia.gov; and
 - 1.1.11 Memos, as amended, on the Virginia DEQ website at www.deq.virginia.gov.
- 1.2 Any land-disturbing activity, as defined in the SWM Act (§62.1-44.15:24) and ESC Law (§62.1-44.15:51), shall comply with the *James Madison University Annual Standards and Specifications for ESC & SWM*.
- 1.3 Any land-disturbing activity must be vetted through FM Engineering. Prior to starting a regulated land-disturbing project, the project must have plans stamped approved by FM Engineering.
- 1.4 Site specific ESC plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in §62.1-44 or when deemed necessary by FM Engineering if development is outside the purview of the VESCL&R and poses potential environmental implications. Site specific ESC plans shall be submitted to FM Engineering for review. Prior to starting a land-disturbing project, the project must have plans stamped approved by FM Engineering. Projects requiring CGP coverage shall not begin land-disturbance until permit coverage letter has been received from DEQ.
- 1.5 Site specific SWM plans shall be prepared for all projects involving a regulated land—disturbing activity, as defined in the SWM Act (§62.1-44.15:24) and ESC Law (§62.1-44.15:51), that requires:
- (a) A Virginia Stormwater Management Program (VSMP) General Permit for Discharges from Construction Activities
 - (b) Land-disturbing activity contained within a watershed of a regional water quality Stormwater management facility
 - (c) Incorporates the use of an LID and/or BMP.
 - (d) Changes the University MS4.

Site specific SWM plans shall be submitted to FM Engineering for review. Prior to starting a land-disturbing project requiring a SWM plan, the project must have an approval issued by FM Engineering and proof of state permit coverage.

- 1.6 Project specific variance and/or exceptions, in terms of ESC and SWM, may be requested by the design engineer to FM Engineering. Requests will be forwarded to the DEQ Central Office for final approval. All requested variances and exceptions are to be considered unapproved until written approval from DEQ is received. Refer to Section 6 for more information on variances and exceptions.
- 1.7 The use of offsite options for stormwater quality compliance may be approved by JMU as long as conditions satisfy requirements stated in § 62.1-44.15:35 and 9VAC25-870-69.
- 1.8 Modifications to checklists, inspection reports, and worksheets provided in the appendix may be made as needed to provide additional information, clarify requested information, or to create more efficient work flows.

SECTION 2: ANNUAL STANDARDS AND SPECIFICATIONS PERSONNEL

FM Engineering shall be the program administrator for James Madison University projects. The following is a breakdown in responsibilities and titles in regard to the James Madison University Annual Standards and Specifications for ESC and SWM. Responsibilities may be combined in terms of staffing resources only if the person responsible for the task(s) is qualified per Section 1.1.3. JMU may enter into agreements or contracts with soil and water conservation districts, planning district commissions, adjacent localities, or other public or private entities to carry out or assist with the responsibilities of this article as long as individuals within those entities performing tasks are qualified per Section 1.1.3. The following titles are designated to ensure compliance with erosion and sediment control and stormwater management regulations on all James Madison University projects.

- 2.1 “DEQ-Certified ESC Inspector” means an individual who: (i) holds a certificate of competence from the Board in the area of project inspection; or, (ii) is enrolled in the Board’s training program for project inspection and successfully completes such program within one year after enrollment; and (iii) shall be responsible to inspect as mandated by the VESCL&R erosion and sediment control measures to ensure proper installation in accordance with the approved plan and record the state and effectiveness of such measures in an effort to minimize site erosion and sediment control.
- 2.2 “DEQ-Certified SWM Inspector” means an individual who: (i) holds a certificate of competence from the Board in the classification of project inspector in the area of SWM; or, (ii) is enrolled in the Board’s training program for project inspector and successfully completes such program within one year after enrollment; and, (iii) shall be responsible to inspect construction sites for SWPPP compliance.
- 2.3 “DEQ-Certified ESC Plan Reviewer” means an individual who: (i) holds a certificate of competence from the Board in the area of plan review; (ii) is enrolled in the Board’s training program for plan review and successfully completes such program within one year after enrollment; or (iii) is licensed as a professional engineer, architect, certified landscape architect, or land surveyor pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia; or (iv) is a professional soil scientist as defined in Chapter 22 (§ 54.1-2200 et seq.) of Title 54.1 of the Code of Virginia.
- 2.4 “DEQ-Certified SWM Plan Reviewer” means an individual who: (i) holds a certificate of competence from the Board in the classification of plan reviewer in the area of SWM; or, (ii) is enrolled in the Board’s training program for plan reviewer and successfully completes such program within one year after enrollment.
- 2.5 “DEQ-Certified ESC Program Administrator” means an individual who: (i) holds a certificate of competence from the Board in the area of program administration; or, (ii) is enrolled in the Board’s training program for program administration and successfully completes such program within one year after enrollment.

- 2.6 “DEQ-Certified SWM Program Administrator” means an individual who: (i) holds a certificate of competence from the Board in the classification of program administration in the area of SWM; or, (ii) is enrolled in the Board’s training program for program administration and successfully completes such program within one year after enrollment.
- 2.7 “DEQ-Certified ESC Combined Administrator” means an individual who: (i) holds a certificate of competence from the Board in the area of program administration, plan review and project inspection; or, (ii) is enrolled in the Board’s training program for program administration, plan review and project inspection and successfully completes such program within one year after enrollment.
- 2.8 “DEQ-Certified SWM Combined Administrator” means an individual who: (i) holds a certificate of competence from the Board in the classification of program administration, plan reviewer and project inspector in the area of SWM; or, (ii) is enrolled in the Board’s training program for program administration, plan reviewer, and project inspector and successfully completes such program within one year after enrollment.

Please note that any person who holds a valid and unexpired certificate of competence issued by the board in the classification of ESC or SWM, or who obtains such a certificate, and who later successfully obtains an additional certificate may surrender both certificates of competence to the board and request in writing issuance of a dual certificate showing certification in both classifications. Such a request must be made while both the ESC and SWM certificates of competence obtained are valid and unexpired.

SECTION 3: ANNUAL STANDARDS AND SPECIFICATIONS IMPLEMENTATION

JMU shall be considered the plan approving authority for ESC and SWM. ESC and SWM plans shall comply with James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management, the Virginia Erosion and Sediment Control Law (62.1-44 et. seq.), the Virginia Stormwater Management Act (62.1-44 et. Seq.), associated ESC and SWM regulations, and the Virginia Stormwater Management Program Permit regulations (9VAC25-870 et. Seq.). Refer to Section 1.1 for more information on general specifications.

- 3.1 Submittals: Project Manager will ensure that a professional engineer licensed in the Commonwealth submits a site plan for review to FM Engineering that is designed to incorporate required stormwater management facilities and will meet current water quality and water quantity standards and specifications. Two complete sets of ESC/SWM plans, narratives and necessary attachments along with digital copies shall be submitted to the JMU FM-Engineering Department for review and approval prior to any land-disturbing activities. JMU FM-Engineering shall have 30 days to review the plan and provide written comments. Re-submittals shall include revision notes referenced to written comments.
- 3.2 Plan Reviews: JMU’s Stormwater Coordinator shall oversee the review of plans to ensure compliance with stormwater regulations. Plan reviews shall be conducted by certified personnel as defined in section 2. When approved, additional copies may be requested to be stamped approved by JMU for ESC/SWM. One set shall be kept on file with the Stormwater Coordinator. Digital copies in pdf format are acceptable. Other copies of stamped approvals will be distributed to the Project Manager as needed.
- 3.3 Pre-Construction Conference: Prior to commencement of a land disturbance, a pre-construction conference shall be held in order to clarify ESC/SWM roles, responsibilities and obligations of all parties involved with the land-disturbing activity. At a minimum, the pre-construction conference will be attended by the JMU Project Manager, JMU Construction Inspector, JMU Stormwater Coordinator, general construction permit operator (if applicable) and the project RLD.

- 3.4 Inspections: Site inspections shall be conducted by certified personnel as defined in section 2. See section 5 for more information.
- 3.5 Enforcement: The JMU Project Manager shall be responsible for ensuring that corrective action is taken in response to comments and violations listed on inspection reports. In the event that the project manager is unable to get the contractor to comply with requests, documentation will be forwarded to the Director of Engineering and Construction for further enforcement actions as deemed appropriate. This could include notifying the DEQ of project non-compliance for further enforcement and possible fines.
- 3.6 Changes and Amendments to Approved Plans: Amendments to approved plans related to ESC and SWM must be reviewed and approved by FM-Engineering. Revisions shall not be considered approved until written notice is provided. Project SWPPP will need to be updated with approved changes and amendments. If a change would increase the land disturbance to a higher permit fee, the difference in fees will need to be paid to the DEQ.
- 3.7 At DEQ's discretion, JMU may be required to provide the following:
- (a) Inspection reports, complaint logs and complaint responses;
 - (b) Weekly e-reporting to the Department's applicable regional office, to include;
 - Inspection reports;
 - Pictures
 - Complaint logs and complaint responses; and
 - Other compliance documents.

SECTION 4: PLAN REVIEW AND APPROVAL

Once it is determined that a project will require an approved site plan, the project manager will need to have a professional engineer licensed in the commonwealth prepare and submit a site plan with supporting documentation to FM Engineering for review. Detailed requirements of specific items to be included in the ESC and SWM plans are located in the ESC/SWM Plan Submitter's Checklist (Appendix A) and General Erosion and Sediment Control Notes (Appendix B).

Site plans will be reviewed by certified individuals to ensure compliance is met with these Annual Standards and Specifications, Virginia Erosion and Sediment Control Law, Virginia Erosion and Sediment Control Regulations, Virginia Stormwater Management Act, Virginia Stormwater Management Permit Regulations, and any other applicable stormwater requirements.

Once the plan and supporting documentation is deemed to be adequate, JMU will provide plans in pdf format stamped for ESC and/or SWM approval, along with an approval letter forwarded to the project engineer along with any other prerequisites needed before land disturbance may commence. If the project will require a state construction general permit coverage, a SWPPP will need to be developed and a construction general permit registration statement submitted to the DEQ.

Approved plan and plan review documentation will be kept on file in JMU's Facilities Management Engineering Office.

SECTION 5: INSPECTIONS

Periodic inspections shall be conducted as required by state law for ESC and SWM. Inspectors shall be notified 24 hours prior to installation of BMPs. Completion of the project will only be considered after establishment of permanent stabilization, not completion of construction.

- 5.1 Erosion and Sediment Control Inspections: Construction sites shall be inspected by DEQ-Certified ESC or SWM Inspectors during or immediately following initial installation of erosion and sediment controls, at least once in every two-week period and within 48 hours following any runoff producing storm event, and at the completion of the project prior to the release of any performance bonds. In the event an inspection would fall on a weekend, or another day when the university is closed, the inspection will be performed on the next business day. The ESC/SWM Inspection Report form provided in Appendix C shall be used on each required site inspection visit. All control measures shown on the plan shall be inspected. Any issues and violations shall be photographed and documented in the report. Critical areas that require continuous inspections shall also be identified on the site plan. The inspection report shall specify the required corrective action for each issue or violation noted and a date by which all corrective actions must be completed. A copy of the ESC/SWM Inspection Report will be emailed to the project manager and any other persons identified during the pre-construction meeting.
- 5.2 Stormwater Management Inspections: Construction sites shall be inspected by qualified personnel along with ESC inspections. The ESC/SWM Inspection Report form provided in Appendix C will also be used to record SWM inspections and any construction general permit deficiencies will be noted. The projects SWPPP will be reviewed for compliance by a DEQ-Certified SWM inspector at the beginning of the project and periodically after that as deemed necessary. All stormwater BMPs must be identified on the site plan. All issues and violations shall be photographed and documented in the report. Critical areas that require continuous inspections shall also be identified on the site plan. The inspection report shall specify the required corrective action for each issue or violation noted and a date by which all corrective actions must be completed. A copy of the ESC/SWM Inspection Report will be emailed to the project manager and any other persons identified during the pre-construction meeting. Periodic inspections of the installation of stormwater management measures shall be provided by DEQ-Certified SWM Inspectors.
- 5.3 Project Close-Out: Project completion is defined as the achievement of permanent stabilization, verification of final product according to approved plans, completion of TV inspection of the installed storm sewer system and receipt of as-built certification of SWM BMPs (if applicable). Project completion, concerning ESC and SWM, will be noted using the ESC/SWM Inspection Report form.
- 5.4 Post-Construction Inspections: Post-construction (maintenance) inspections for permanent SWM BMPs shall be made on an annual basis and after any storm which causes the capacity of the facility principal spillway to be exceeded. The BMP Field Assessment Worksheet provided in Appendix D shall be used during inspections. In the case where maintenance or repair is required, fund requests and/or work orders shall be made in order to have items corrected.
- 5.5 Violations and Documentation: Violations shall be documented in the ESC/SWM Inspection Report, including photographs, descriptions, and necessary corrective actions. If a violation continues to be repeated, then a Notice to Comply will be issued and DEQ notified. At the discretion of JMU FM, the land disturbance approval may be suspended and/or revoked; at which time all land disturbing activity must cease until corrective actions have been completed. Alternatively, JMU FM has the option to contract with a 3rd party to install and maintain ESC and/or SWM measures in accordance with the approved plan, complete any necessary corrective actions, and/or abate any related damages. Once the site is brought back into compliance to the satisfaction of JMU FM, site work may resume. All associated costs will be back-charged to the contractor.

SECTION 6: VARIANCES AND EXCEPTIONS

Variations and exceptions to regulations must ensure protection of off-site properties and resources from damage. Economic hardship is not sufficient reason to request a variance or an exception from VESCL&R or James Madison University Annual Specifications for ESC and SWM. Variations and exceptions are considered to be project specific.

For a variance or exception to become part of the project ESC and SWM plans, a written request must be submitted to the JMU Stormwater Coordinator for a cursory review. If acceptable, the request will then be forwarded to the DEQ Central Office for final review and approval. This request must include an explanation and description of the specific condition necessitating the request. The request must also include a detailed description of the alternative practice and justification that the practice meets the intent of the regulation for which the variance or exception is sought. (Ref. 9VAC25-840-50).

6.1 Variance or Exception Request Policy and Procedure:

- 6.1.1 The design professional shall draft a letter of request to JMU FM and shall be accompanied by complete details and documentation, including justification and impacts associated with the request.
- 6.1.2 A cursory review will be completed by JMU FM to ensure the request is complete and then will forward to the DEQ Central Office.
- 6.1.3 All requests shall be considered unapproved until written approval from DEQ is received. JMU may, at DEQ's discretion, be required to produce documentation to demonstrate the applicability of variance requests.
- 6.1.4 All approved variations or exceptions shall be included as part of the site plan.
- 6.1.5 JMU has included a list of non-VESCH specifications that are acceptable to be used for ESC measures on construction projects in Appendix F. Non-VESCH specifications will require that the manufacturer's planning, construction, installation and maintenance requirements be include with the approved plan. Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized.

The use of Virginia Erosion and Sediment Control Handbook (VESCH), along with accompanying technical documents and guidance, control measures is strongly preferred. Non-VESCH control measures, BMPs, and specifications may be included in the Annual Standards and Specifications submission but their use may be further reviewed and approved by the applicable DEQ Regional Office on a project-specific basis.

SECTION 7: LAND-DISTURBING ACTIVITIES

- 7.1 A list of regulated land-disturbing activities currently under construction and expected to be under construction during this period are included in Appendix E.
- 7.2 James Madison University FM-Engineering will notify the DEQ Harrisonburg Regional Office, and the DEQ Central Office at StandardsandSpecs@deq.virginia.gov, two weeks prior to initiating a regulated LDA with project information. E-notification will include:
 - Project name or project number;
 - CGP number;
 - Project location (address, nearest intersection, lat/long, or nearest access point)
 - On-site project manager name and contact information;
 - Responsible Land Disturber (RLD) name and contact information;
 - Project description;

- Acreage of disturbance of project;
- Estimated project start and completion date;
- Any variances/exemption associated with project (except those listed in Appendix F).

Any information not available at the time of initial notification will be provided as soon as received. Due to contractual agreements, some information may not be available at the time of notification such as RLD information and/or CGP number.

7.3 James Madison University FM-Engineering will notify the DEQ Harrisonburg Regional Office, and the DEQ Central Office at StandardsandSpecs@deq.virginia.gov, of any additional projects involving regulated land disturbing activities unknown at the time of the Annual Standards & Specifications submission.

SECTION 8: CONSTRUCTION REQUIREMENTS

All contractors performing land disturbing activities on campus property are required through contract documents to follow existing ESC requirements and obtain all applicable permits before construction activity commences. The CO-7 General Conditions of the Construction Contract requires that the contractor have a DEQ-certified responsible land disturber on-site. In addition to contract language, all work performed on University property is required to comply with the Construction and Professional Services Manual (CPSM) published by the Bureau of Capital Outlay Management and JMU's Design and Construction Guidelines.

SECTION 9: LONG-TERM MAINTENANCE

Project plans shall contain information on long-term maintenance of BMPs. Permanent stormwater facilities will be inspected as required within stormwater regulations and campus policy and procedures.

ESC/SWM Plan Submitter's Checklist

JAMES MADISON UNIVERSITY®

ESC & SWM PLAN SUBMITTER'S CHECKLIST

In order to obtain plan approval for Erosion and Sediment Control (ESC) and Stormwater Management (SWM), adequate documentation needs to be provided to show compliance with state law, regulations, and JMU's DEQ approved standards and specifications. The purpose of this document is to provide a checklist of required components to be included with plan submissions for review. While this list is not all inclusive due to variability and complexities of each site, this checklist will assist with expediting review times by providing a comprehensive list of needed components and requested formatting. The submitted narratives, construction details and plan views shall clearly convey the construction process for the plan reviewers, construction contractor and regulatory inspectors.

Please fill in all blanks and provide a reference where the information can be found (i.e. plan sheet, engineering report page, appendix name and page number, etc.), or write N/A by items that are not applicable.

SECTION 1: PROJECT INFORMATION

Plan Submission Date: _____ Total Disturbed Acreage (nearest hundredth): _____

Project Name: _____

Project Address or Location: _____

Principal Designer Name and Company: _____

Principal Designer Phone Number: _____ email: _____

1.1 Virginia Stormwater Management Program (VSMP) – Does the VSMP apply to this project? Check the box that applies:

- Yes, the land-disturbing activity will disturb one acre or more of land.
- Yes, the land-disturbing activity will disturb less than one acre of land but is part of a larger common plan of development or sale that will result in one acre or more of land disturbance.
- No, the land-disturbing activity will disturb less than one acre of land and is not part of a larger common plan of development or sale.

1.2 Design Criteria for VSMP Projects – Check the box that applies for this project.

- Part IIB, for projects obtaining initial state permit on or after July 1, 2014.
- Part IIC, for projects obtaining initial state permit or commence land disturbance prior to July 1, 2014.
- Part IIC, for projects considered grandfathered provided: 1. There has been an obligation of locality, state, or federal funding, in whole or in part, prior to July 1, 2012, or the department has approved a stormwater management plan prior to July 1, 2012; 2. A state permit has not been issued prior to July 1, 2014; and 3. Land disturbance did not commence prior to July 1, 2014.

SECTION 2: SUBMITTAL COMPLETENESS CHECK

The Erosion and Sediment Control (ESC) and Stormwater Management (SWM) Plan consists of the Narrative (including any supporting calculations) and the construction sheets (site plan), as noted below. These items shall be provided initially and with each re-submission. All documents shall be provided in digital (pdf) format, except for the VRRM worksheet which shall be submitted digitally in Excel format. The designer's seal, signature, and date are required on the cover sheet of each Narrative and each set of Plan Sheets.

- Completed Plan Submitters Checklist
- Plan Set
- ESC Narrative
- Engineering/Drainage Report
- VRRM Worksheet (if applicable)
- Variances & Exceptions (if applicable)
- Off-site Compliance (if applicable)

2.1 Completed Plan Submitter's Checklist - Provide a completed ESC & SWM Plan Submitter's Checklist.

2.2 Plan Set – A pdf shall be provided that shall include all sheets pertaining to the site grading and stormwater and any activities impacting erosion and sediment control and drainage. The designer's original seal, signature and date are required on the cover sheet of each set of plan sheets. See section 3 for more information.

- Existing conditions
- Demolition
- Site grading
- Erosion and sediment control
- Storm sewer systems
- Stormwater management facilities
- Utility layout
- Landscaping
- On-site and off-site borrow and disposal areas

2.3 ESC Narrative – A narrative shall be provided as a separate pdf or included within the plan set or engineering report. See section 4 for more information.

2.4 Engineering/Drainage Report – An engineering/drainage report shall be provided in pdf format that shall include support documentation for required analysis and calculations. See section 5 for more information.

Sections shall include the following:

- Project summary
- Stormwater management regulations that apply and strategies used to comply with the criteria
- Summary tables showing compliance with the regulations
- Pre-development conditions
- Post-development conditions
- Hydrologic / Hydraulic Analysis
- Calculations
- Stormwater Model / Report
- Drainage Area Maps
- FEMA FIRM panel reference designating special flood hazard areas or zone designations associated with the site, as applicable.

2.5 VRRM Worksheet – A digital copy of the VRRM worksheet in excel format shall be required for projects requiring stormwater quality.

2.6 Variances & Exceptions – Provide a letter requesting a variance or exception with details and documentation including justification and associated impacts. Variances are governed by Section 9VAC25-840-50 of the *Virginia Erosion and Sediment Control Regulations*. Exceptions are governed by Section 9VAC25-870-57 of the *Virginia Stormwater Management Regulations*.

2.7 Off-site Compliance – For off-site stormwater quality compliance, provide a letter of availability from the off-site provider as governed by Section 9VAC-25-870-55 of the *Virginia Stormwater Management Regulations*.

SECTION 3: PLAN SET

A pdf shall be provided that shall include all sheets pertaining to the site grading, stormwater management, and any activities impacting erosion and sediment control and drainage.

All plan sheets shall provide a north arrow and graphical scale

Reference the plan sheet or engineering report where the information can be found in the blanks below.

- Existing conditions
- Demolition
- Site grading
- Erosion and sediment control w/ phasing
- Storm sewer systems
- Stormwater management facilities
- Utility layout
- Landscaping
- Control and structure details
- On-site and off-site borrow and disposal areas

_____ **3.1 Owner Contact Information** – On the cover sheet, provide name, address, telephone number and email of the owner representative/project manager.

_____ **3.2 Vicinity Map** – On the cover sheet, provide a small map locating the site in relation to the surrounding area. Include any landmarks that might assist in locating the site.

_____ **3.3 Limits of disturbance** – Areas which are to be cleared and graded and areas to be protected during construction. This disturbed area shall include laydown, access and any other areas that may be disturbed during the course of the project. Provide notes on how areas will be marked for areas NOT to be disturbed.

_____ **3.4 Existing contours** - The existing contours of the site shall be shown as dashed light lines and elevation labeled adequately. Contours shall be either a 1' or 2' contour interval with spot shot elevations as necessary to define high and low topographic information.

_____ **3.5 Final contours and elevations** - Changes to the existing contours, including final drainage patterns. Note the finished floor elevation (FFE) of all buildings on site, including basements. Proposed contour lines shall be solid and bolder than existing contour lines and the elevation labeled adequately. Contours shall be either a 1' or 2' contour interval with spot shot elevations as necessary to define high and low topographic information.

_____ **3.6 Plan view of storm drainage system** – Existing and proposed storm drainage components shall be provided in a plan view. Pipe diameter, lengths, material, inverts, stationing, and direction of flow shall be included as part of the plan view. Structure inlets, manholes, junctions and end sections shall be shown with a unique identifier, rim elevation, inverts, structure type, and required grate or top type. Label directly on plan or use a structure/pipe schedule on the same plan sheet.

_____ **3.7 Profile of storm drainage system** – Existing and proposed storm drainage components shall be provided in a profile. Pipe diameter, material, inverts, stationing, percent slope, proposed and existing grade, and hydraulic grade lines shall be included as part of the profile.

_____ **3.8 Existing vegetation** - The existing tree lines, grassed areas, or unique vegetation.

_____ **3.9 Soils map** – The boundaries of different soil types, K factor and soil survey classifications.

_____ **3.10 Existing drainage patterns** – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage area and size of impervious area.

_____ **3.11 Proposed drainage patterns** – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage and size of impervious area.

_____ **3.12 Critical areas** – Note all areas with potentially serious erosion problems, or critical slopes. K factors of 0.37 or higher, or slope steepness and length combinations such as slopes between 7-15% with slope lengths of 150'

or more, and slopes 15% and higher with a slope length of 75' or more. Also identify any on-site or adjacent water bodies included in the Virginia 303(d) list of impaired waters.

3.13 Site development – Show all improvements such as buildings, parking lots, access roads, utility construction, etc. Show all physical items that could affect or be affected by erosion, sediment, and drainage.

3.14 Landscape plan – Include a plan showing location and plant selection for landscaped areas.

3.15 Location of practices – Show locations of ESC and SWM practices to be used on the site. Use standard symbols and abbreviations from ESC and SWM handbooks. A legend denoting symbols, line uses and other special characters shall be provided.

3.16 Off-site areas - Include any off-site land-disturbing activities (e.g., borrow sites, disposal areas, etc.) not covered by a separate approved ESC Plan.

3.17 Specifications / Detail Drawings for erosion and sediment control measures – For each VESCH and accepted non-VESCH erosion and sediment control measure employed in the plan, include, at a minimum, the applicable standard detail, narrative, maintenance requirements and associated legend symbol. Include any approved variances or revisions to the standards and specifications. Details should be provided which are clearly dimensioned and reflect the ability to be “built” in the field according to proper design criteria. Corresponding details or reference tables not shown on plan sheets shall be referenced to the detail (ie. “See detail on sheet...”)

3.18 Specifications / Detail Drawings for stormwater management structures – Provide specifications for stormwater management structures such as pipe materials, pipe bedding, structures, etc. Details should be provided which are clearly dimensioned and reflect the ability to be “built” in the field according to proper design criteria. Corresponding details or reference tables not shown on plan sheets shall be referenced to the detail (ie. “See detail on sheet...”)

- Dimensions of pretreatment devices. Note that all pretreatment measures shall be outside the required surface area of the BMP.
- Delineation of permanent pools and 1-, 2-, and 10-year design water surface elevations. (and 100-yr design storm where required)
- VDOT IS-1 storm drain shaping will be required for storm drain structures.

3.19 Erosion and sediment control notes - At a minimum, include the erosion and sediment control notes found appendix B. Ensure that all applicable Minimum Standards not covered elsewhere in the plan have been addressed.

3.20 Minimum Standards – Minimum Standard 1 through Minimum Standard 19 shall be included in the plan set.

3.21 Legend - Provide a complete listing of all ESC and SWM measures to be used, including the VESCH uniform code symbol and the standard and specification number. Include any other items necessary to identify pertinent features in the plan. Hatching patterns shall also be adequately labeled.

3.22 Property lines and easements – Internal property lines within JMU’s jurisdiction is not required, but all property lines adjacent to JMU property shall be shown on plan sheets along with any easements.

ESC MINIMUM STANDARDS

Yes	No	NA		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-1	Have temporary and permanent stabilization been addressed in the narrative?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Are practices shown on the plan?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Temporary and permanent seed specifications?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lime and fertilizer?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Mulching?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Blankets/Matting?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Pavement/Construction Road Stabilization?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-2	Has stabilization of soil stockpiles, borrow areas, and disposal areas been addressed in the narrative and on the plan?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Have sediment trapping measures been provided?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-3	Has the establishment and maintenance of permanent vegetative stabilization been addressed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-4	Does the plan specifically state that sediment-trapping facilities shall be constructed as a first step in land-disturbing activities?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-5	Does the plan specifically state that stabilization of earthen structures is required immediately after installation? Is this noted for each measure on the plan?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-6	Are sediment traps and sediment basins specified where needed and designed to the standard and specification?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-7	Have the design and temporary/permanent stabilization of cut and fill slopes been adequately addressed? Is Surface Roughening provided for slopes steeper than 3:1?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-8	Have adequate temporary or permanent conveyances (paved flumes, channels, slope drains) been provided for concentrated stormwater runoff on cut and fill slopes?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-9	Has water seeping from a slope face been addressed (e.g., subsurface drains)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-10	Is adequate inlet protection provided for all operational storm drain and culvert inlets?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-11	Are adequate outlet protection and/or channel linings provided for all stormwater conveyance channels and receiving channels? Is there a schedule indicating:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Dimensions of the outlet protection? Lining? Size of riprap?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Cross section and slope of the channels? Type of lining? Size of riprap, if used?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-12	Are in-stream protection measures required so that channel impacts are minimized?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-13	Are temporary stream crossings of non-erodible material required where applicable?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-14	Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being followed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-15	Has immediate restabilization of areas subject to in-stream construction (bed and banks) been adequately addressed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MS-16	Have disturbances from underground utility line installations been addressed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		No more than 500 linear feet of trench open at one time?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Effluent from dewatering filtered or passed through a sediment-trapping device?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Proper backfill, compaction, and restabilization?

- MS-17 Is the transport of soil and mud onto public roadways properly controlled? (i.e., Construction Entrances, wash racks, transport of sediment to a trapping facility, cleaning of roadways at the end of each day, no washing before sweeping and shoveling)
- MS-18 Has the removal of temporary practices been addressed?
Have the removal of accumulated sediment and the final stabilization of the resulting disturbed areas been addressed?
- MS-19 Are properties and waterways downstream from development adequately protected from sediment deposition, erosion, and damage due to increases in volume, velocity and peak flow rate of stormwater runoff?
- Is concentrated stormwater runoff leaving the development site discharged to an adequate natural or man-made receiving channel, pipe or storm sewer system?
- Are calculations provided to verify the adequacy of all channels and pipes?
- If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, have provisions been made to prevent downstream erosion?
- Have increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property been diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility?
- Have water quantity requirements under 9VAC25-870-66 been satisfied? Provide documentation.

SECTION 4: ESC NARRATIVE

The ESC narrative is a written statement that explains the erosion and sediment control and stormwater management decisions made for the project and the justification for those decisions. At a minimum, the narrative shall include a section for each of the items described below.

Reference the plan sheet or engineering report page where the information can be found in the blanks below.

- Project Description
- Existing Site Conditions
- Adjacent Areas
- Off-site Areas
- Soils
- Critical Areas
- ESC Measures
- Management Strategies/Sequence of Construction
- Permanent Stabilization
- Maintenance of ESC Measures
- Calculations
- Stormwater Management Considerations

_____ **4.1 Project description** – This section shall describe the nature and purpose of the land-disturbing activity. Provide project specific information. Also include the following:

- Provide the area (acres to the nearest hundredth) to be disturbed. This disturbed area (limits of disturbance) shall include laydown, access and any other areas that may be disturbed during the course of the project. This area shall provide adequate space for the contractor to perform required work for excavation and grading.
- Provide the existing impervious area and the increase, or decrease, in impervious area (acres).
- Estimated schedule for project. (Start/end dates, or estimated length of project in months or years)
- Ultimate developed condition of the site.

_____ **4.2 Existing site conditions** – This section shall provide a description of the existing topography (% slopes), ground cover, and drainage (on-site and receiving channels).

- Discuss any existing drainage or erosion problems and how they are to be corrected.

_____ **4.3 Adjacent areas** – This section shall provide a description of all neighboring areas such as residential developments, agricultural areas, streams, lakes, roads, etc., that may be affected by the land disturbance. Discuss any environmentally sensitive areas, including any on-site or adjacent water bodies included in the Virginia 303(d) list of impaired waters, and any possible problems during and after construction (traffic issues, dust control, increases in runoff, etc.).

4.4 Off-site areas – This section shall describe any off-site land-disturbing activities that may occur (borrow sites, disposal areas, easements, etc.).

- Provide information on whether the proposed site is balanced, estimated cubic yards needed, or to be removed from the site.
- If borrow/disposal site is known, provide documentation showing that site has an approved and current ESC plan (locality land-disturbance permit, construction general permit coverage letter, etc.). If borrow/disposal site does not have an approved ESC plan, this plan will need to incorporate that area as part of the proposed disturbance.
- If borrow/disposal site will not be known until after a contractor has been hired, provide a narrative explaining that the contractor will need to provide documentation showing that their borrow/disposal site has an approved and current ESC plan, or will need to work with the engineer to have their borrow/disposal site included into the proposed plan.

4.5 Soils – This section shall provide a description of the soils on the site, giving such information as soil name, mapping unit, erodibility, permeability, surface runoff, and a brief description of depth, texture and soil structure.

- Indicate reference for additional soil information if not included within this section.
- Provide a reference to where a copy of the soil survey map can be found within the plan set or engineering report.

4.6 Critical areas – This section shall provide a description of areas on the site that may have potentially serious erosion problems or that are sensitive to sediment impacts (e.g., critical slopes, watercourses, wet weather / underground springs, etc.). Discuss any area(s) of the project which may become critical during the project.

4.7 Erosion and sediment control measures – This section shall provide a description of the structural and vegetative methods that will be used to control erosion and sedimentation on the site. Controls should satisfy applicable minimum standards and specifications in Chapter 3 of the latest edition of the Virginia Erosion and Sediment Control Handbook (VESCH) or items alternative measures approved within JMU's *Standards and Specifications for ESC and SWM*.

4.8 Management strategies / Sequence of construction – This section shall address management strategies, the sequence of construction, and any phasing for the installation of ESC measures. The sequence of construction shall provide specific details concerning the construction and installation and phasing of ESC and SWM measures.

4.9 Permanent stabilization – This section shall provide a brief description, including specifications, of how the site will be stabilized after construction is completed. List any soil testing requirements. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

4.10 Maintenance of ESC measures – This section shall provide a schedule of regular inspections, maintenance, and repair of erosion and sediment control structures should be set forth. List who will be responsible for ESC maintenance during the course of the project. VESCH control measures shall be maintained in accordance with the VESCH maintenance schedules, and non-VESCH control measures shall be maintained in accordance with the manufacturer's recommendations.

4.11 Calculations for temporary erosion and sediment control measures – This section shall provide a summary of measures needing calculations and a reference to where calculations and worksheets for each temporary ESC measure can be located (e.g. traps, basins, channels, outlet protection, etc.).

4.12 Stormwater management considerations – This section shall provide a summary of considerations made for the project along with permanent control measures including a reference to where each piece of information can be found within the plan set or engineering report. Will the development of the site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream?

All calculations showing pre-development and post-development runoff should be provided including any worksheets, assumptions and engineering decisions. Describe the strategy to control stormwater runoff.

SECTION 5: ENGINEERING/DRAINAGE REPORT

The Engineering/Drainage Report shall provide a summary describing the methodology and design of stormwater management facilities and how compliance with regulations were met along with supporting documentation.

Design assumptions made along with identification of computation methodology shall be proved for calculations.

Reference the plan sheet or engineering report page where the information can be found in the blanks below.

- Project Summary
- SWM Regulations
- Summary Tables
- Pre-Development Conditions
- Post-Development Conditions
- Hydrologic / Hydraulic Analysis
- Calculations
- Stormwater Model / Report
- Drainage Area Maps

5.1 Water quantity compliance – Provide a summary description of the water quantity compliance strategy along with adequate documentation. Clearly define and label the design points and points of analysis to show compliance with the criteria.

- Channel Protection: 9VAC25-870-66B. Check boxes that apply.
 - 1. Manmade stormwater conveyance systems
 - a. or b.
 - 2. Restored stormwater conveyance systems
 - a. or b.
 - 3. Natural stormwater conveyance systems
 - a. or b.
 - 4. Limits of analysis
 - a. or b.
- Flood Protection: 9VAC25-870-66C. Check boxes that apply.
 - 1. Concentrated stormwater flow to stormwater conveyance systems that currently do not experience localized flooding during the 10-year 24-hour storm event.
 - 2. Concentrated stormwater flow to stormwater conveyance systems that currently experience localized flooding during the 10-year 24-hour storm event: The point of discharge either:
 - a. or b.
 - 3. Limits of analysis. Unless subdivision 2 b of this subsection is utilized to comply with the flood protection criteria, stormwater conveyance systems shall be analyzed for compliance with flood protection criteria to a point where:
 - a. or b. or c.

5.2 Water quality compliance – Provide a summary description of the water quality compliance strategy along with adequate documentation, including required limits of analysis, to show compliance with the criteria. Clearly define and/or label point of analysis.

- Identify the water quality compliance strategies and provide adequate documentation.
- Tabulated runoff curve numbers for pre-developed and post-developed site.
- Runoff reduction method spreadsheet (in Excel format) to show water quality compliance.

5.3 Adequate conveyances – Ensure that stormwater conveyances with adequate capacity and adequate erosion resistance have been provided for all on-site concentrated stormwater runoff. Off-site channels that runoff from the site, including those receiving runoff from stormwater management facilities, must be adequate. Increased volumes of sheet flows must be diverted to a stable outlet, adequate channel, pipe or pipe system, or a stormwater management facility.

- Provide exhibits showing draining divides, direction of flow, and size (acreage) of each of the site drainage areas that discharge runoff off-site, both existing and proposed.
- Provide calculations for pre- and post-development runoff from these drainage areas

- Ensure that quantity requirements are satisfied for each off-site receiving channel, including those that receive runoff from stormwater management facilities.
- Provide calculations for the design of each permanent stormwater management facility.
- Provide adequacy calculations for all on-site stormwater conveyances.

5.4 Documentation and Calculations - Provide the following design calculations, as applicable:

- Drainage area map with time of concentration (TC) path shown and points of analysis.
 - Provide TR-55 worksheets 2 thru 4 or equivalent data in a table.
- TC calculation/nomograph
- Locality IDF curve
- Composite runoff coefficient or RCN calculation
- Peak runoff calculations
- Imperviousness of the entire site and each drainage area
- NRCS runoff curve numbers or volumetric runoff coefficients
- Hydrologic analysis for the existing (pre-development) conditions, including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations.
- Hydrologic analysis for the proposed (post-development) conditions including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations.
- Hydrologic and hydraulic analysis of the stormwater management system for all applicable design storms.
- Stormwater conveyance channel design calculations
- Storm drain and storm sewer system design calculations
- Curb Inlet length calculations. (limit spread to 6' maximum)
- Drop inlet backwater calculations
- Hydraulic Grade Line on profiles of pipe systems
- Culvert design calculations and analysis
- BMP calculations
- Quantity compliance calculations
- Quality compliance calculations

5.5 BMP Information - Provide a table or summary for all stormwater quantity and quality BMP facilities including the following information:

- BMP Name
- Total Acres Treated
- Impervious Acres Treated
- Pervious Acres Treated with soil type(s) identified
- Pounds of phosphorus removed
- Volume of runoff treated by practice in acre-feet
- Geographic coordinates (Lat/Long)
- Lifespan

5.6 State Maintenance Agreement Information – The following information shall be printed on the approved stormwater management plan for state projects:

- A description of the requirements for maintenance and maintenance inspection of the stormwater facilities and a recommended schedule of maintenance inspection and maintenance. The maintenance inspection schedule and maintenance requirements should be in accordance with the Virginia BMP Clearinghouse, the Virginia SWM Handbook, the MS4 permit (if applicable) and/or the manufacturer's specifications.
- The identification of the person(s) who will be responsible for maintenance inspection and maintenance.
 - Inspections:
 - Stormwater Coordinator
 - University Services Building
 - 181 Patterson Street, Room 201BC, MSC 7004
 - Harrisonburg, VA 22807
 - Phone: (540) 568-7606
 - Maintenance
 - Facilities Management – Operations, Landscape Manager

University Services Building
181 Patterson Street, Room 158, MSC 7007
Harrisonburg, VA 22807
Phone: (540) 568-3411

- Clearly depict the types of land cover on the site (i.e. different type of hatching for each land cover), including the acreage for each cover type. The acreage should be labeled in all of the subareas. Also provide a table that adds the land cover up by type on the sheet.
- For “Conserved forest/open space” areas, provide metes and bounds around the perimeter.
 - Label any conserved forest/open space as “Runoff Reduction Compliance Forest/Open Space”.
 - Include the following note on the sheet: “The Runoff Reduction Compliance Forest/Open Space area shown shall be maintained in a forest/open space manner until such time that an amended stormwater management plan is approved by the VSMP Authority or entity with DEQ approved standards and specifications for stormwater plan approval.

_____ **5.7 Page numbers** – Provide unique page numbers for plan sheets and the engineering report for referencing.

_____ **5.8 Supporting documentation** – Provide applicable supporting documents and studies (e.g. infiltration tests, geotechnical investigations, TMDLs, flood studies, etc.)

_____ **5.9 Other required permits** – Provide a statement of notification of additional environmental permits and approvals needed prior to land disturbance, and copies of approvals if already received. (e.g. USACE, FEMA)

SECTION 6: CHECKLIST PREPARER CERTIFICATION STATEMENT

I certify that I am a professional in adherence to all minimum standards and requirements pertaining to the practice of that profession in accordance with Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia and attendant regulations. By signing this checklist, I am certifying that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete.

Signature: _____

Printed Name: _____

Date: _____

General Erosion and Sediment Control Notes

GENERAL EROSION AND SEDIMENT CONTROL NOTES

- ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 9VAC25-840 Erosion and Sediment Control Regulations.
- ES-2: The plan approving authority (JMU Stormwater Coordinator) must be notified at least one week prior to the pre-construction conference, one week prior to commencement of land disturbing activity and one week prior to final inspection. The name of the certified responsible land disturber, including their certification number and contact information must be provided to the plan approving authority prior to actual engagement in land disturbing activity.
- ES-3: All erosion and sediment control measures shall be placed prior to or as a first step in clearing.
- ES-4: A copy of the approved erosion and sediment control plan and access to the Virginia Erosion and Sediment Control Handbook shall be maintained on the site at all times.
- ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the JMU Stormwater Coordinator for review and approval, or submit documentation that the other area is currently covered under a separate approved erosion and sediment control plan.
- ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved, after which, upon approval of the plan approving authority, the controls shall be removed. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized.
- ES-8: During dewatering operations, water shall be pumped into an approved filtering device.
- ES-9: The contractor shall inspect all erosion control measures at least once in every two-week period and within 48 hours following any runoff producing storm event. The operator shall inspect in accordance with the Construction General Permit requirements when applicable. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately. Contractor shall submit evidentiaries of inspection reports to the owner or within the Stormwater Pollution Prevention Plan (SWPPP).
- ES-10: The contractor is responsible for the removal of sediment that has been transported onto paved or public roads. At a minimum, tracking shall be cleaned by the end of each work day.
- ES-11: Temporary/Permanent stabilization operations shall be initiated within 7 days after reaching final grade or upon suspension of grading operations for anticipated duration of greater than 14 days or upon completion of grading operations for a specific area.
- ES-12: The contractor shall be responsible for preventing surface and air movement of dust from exposed soils.

ESC/SWM Inspection Report

JAMES MADISON UNIVERSITY®

ESC/SWM INSPECTION REPORT | FACILITIES MANAGEMENT – ENGINEERING | 181 PATTERSON ST., HARRISONBURG, VA 22807 | OFFICE: (540) 568-7606

PROJECT INFORMATION	PROJECT NAME		INSPECTION DATE
	PROJECT MANAGER	PROJECT NUMBER	INSPECTION TIME
	RLD NAME	RLD NUMBER	INSPECTOR
VSMP General Construction Permit Number (if applicable):			

WEATHER DATA	CURRENT CONDITIONS	CURRENT TEMP.	RECENT PRECIPITATION TOTALS
	ADDITIONAL INFORMATION		

REASON FOR INSPECTION
<input type="radio"/> INSTALLATION OF CONTROLS <input type="radio"/> SCHEDULED INSPECTION <input type="radio"/> POST STORM EVENT <input type="radio"/> CONSTRUCTION OF SWM BMP <input type="radio"/> PROJECT COMPLETION <input type="radio"/> RE-INSPECTION <input type="radio"/> OTHER

STAGE OF CONSTRUCTION
<input type="radio"/> INSTALLATION OF ESC CONTROLS <input type="radio"/> CLEARING & GRUBBING <input type="radio"/> ROUGH GRADING <input type="radio"/> BUILDING CONSTRUCTION <input type="radio"/> FINISH GRADING <input type="radio"/> FINAL STABILIZATION <input type="radio"/> OTHER:

RESULT OF INSPECTION
<input type="radio"/> SATISFACTORY <input type="radio"/> INSPECTION REPORT NOTIFICATION <input type="radio"/> CORRECTIVE ACTION(S) REQUIRED <input type="radio"/> VIOLATION(S) NOTED

REQUIRED DEADLINE DATE

VIOLATION CODE W/ BRIEF DESCRIPTION
MS-1 Stabilization MS-2 Stockpiles, Waste & Borrow Areas MS-3 Permanent Stabilization MS-4 First Step Measures MS-5 Earthen Structure Stabilization MS-6 Trap and Basin Sizing MS-7 Cut and Fill Slopes MS-8 Concentrated Runoff MS-9 Water Seeps MS-10 Inlet Protection MS-11 Channel / Outlet Protection MS-12 Watercourse Construction MS-13 Temporary Stream Crossing MS-14 Other Watercourse Regulations MS-15 Bed and Bank Stabilization MS-16 Utility Construction MS-17 Construction Entrance, Tracking MS-18 Control Removal MS-19 Downstream & Property Protection JMU-1 Land Disturbance w/o Approved Plan JMU-2 Non-Compliance w/ Approved Plan JMU-3 Maintenance/Repair of ESC Measures JMU-4 Standards & Specifications JMU-5 Other/VSMP

Violation code refers to the applicable regulation found in the most recent publication of the *Virginia Erosion and Sediment Control Regulations* (9VAC25-840), *Virginia Stormwater Management Permit Regulations* (9VAC25-870), or James Madison University's *Annual Standards & Specifications for ESC & SWM*.

The required deadline date applies to all non-compliance items noted on this report. If violation(s) noted and/or corrective actions are not completed by the deadline, other enforcement actions may be issued to the entity responsible for ensuring compliance on the listed project.

CONSTRUCTION GENERAL PERMIT CHECKLIST		Yes	No	N/A
1	Copy of notice of coverage letter posted near main entrance: Part II(D)			
2	Information for public access to electronic format or hard copy of SWPPP posted near main entrance: Part II(E)2&3			
3	Copy of complete SWPPP available onsite or made available: Part II(E)1&2			
3a	Signed copy of registration statement: Part II(B)1.a			
3b	Copy of notice of coverage letter: Part II(B)1.b			
3c	Copy of permit: Part II(B)1.c			
3d	Narrative description of the nature of construction activity: Part II(B)1.d			
3e	Legible site plan: Part II(B)1.e			
3f	Approved ESC plan, "agreement in lieu of a plan", or ESC plan developed in accordance with department approved annual standards and specifications: Part II(B)2			
3g	Approved SWM plan or SWM plan developed in accordance with department approved annual standards and specifications: Part II(B)3			
3h	Pollution prevention plan: Part II(B)4			
3i	Requirements for discharges to nutrient and sediment impaired waters, PCB impaired waters, or exceptional waters (if applicable): Part II(B)5, 6, & 7			
3j	Contact information for qualified personnel conducting inspections: Part II(B)8			
3k	Delegation of authority forms for individuals or positions with delegated authority: Part II(B)9			
3l	SWPPP signed in accordance with Part IIIK: Part II(B)10			
4	SWPPP is being amended, modified and updated: Part II(C)			
4a	SWPPP clearly identifies the contractor(s) that will implement and maintain each control measure identified in SWPPP: Part II(C)3			
4b	Record of dates when major grading activities occurred: Part II(C)4.a(1)			
4c	SWPPP amendments, modifications, or updates signed in accordance with Part III K: Part II(C)5			
5	SWPPP inspections carried out: Part II(G)			
5a	Inspections conducted at required frequency: Part II(G)2			
5b	Inspection reports summarize findings of inspections including corrective actions: Part II(G)4.a-i			
5c	Inspection reports have date and signature of qualified personnel conducting inspections and the operator or authorized representative: Part II(G)4.j			
5d	Inspection reports retained as part of SWPPP: Part II(G)5 & 6			
6	Erosion and sediment controls implemented: Part II(B)2.c			
6a	Volume and velocity of stormwater runoff controlled within site to minimize erosion: Part II(B)2.c(1)			
6b	Stormwater discharges, including peak flow rates and total stormwater volume controlled to minimize erosion at outlets and to minimize downstream channel and stream bank erosion: Part II(B)2.c(2)			
6c	Soil exposed during construction activity minimized: Part II(B)2.c(3)			
6d	Disturbance of steep slopes minimized: Part II(B)2.c(4)			
6e	Minimize sediment discharges from the site: Part II(B)2.c(5)			
6f	Natural buffers around surface waters provided and maintained, stormwater directed to vegetated areas to increase sediment removal, and maximizes stormwater infiltration: Part II(B)2.c(6)			
6g	Soil compaction minimized and topsoil preserved: Part II(B)2.c(7)			
6h	Stabilization of disturbed areas initiated immediately whenever any clearing, grading, or excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for more than 14 days: Part II(B)2.c(8)			
6i	Outlet structures utilized that withdraw stormwater from the surface when discharging from sediment basins or sediment traps: Part II(B)2.c(9)			
7	Pollution prevention plan implemented: Part II(B)4			
7a	Prevent and respond to leaks, spills and other releases including (i) procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases; and (ii) procedures for reporting leaks, spills, and other releases: Part II(B)4.e(1)			
7b	Prevent discharge of spilled and leaked fuels and chemicals from vehicle fueling and maintenance activities (e.g. providing secondary containment such as spill berms, decks, spill containment pallets, providing cover where appropriate, and having spill kits readily available: Part II(B)4.e(2)			
7c	Prevent discharge of soaps, solvents, detergents, and wash water from construction materials, including clean-up of stucco, paint, form release oils, and curing compounds: Part II(B)4.e(3)			
7d	Minimize discharge of pollutants from vehicle and equipment washing, wheel wash water and other types of washing by diverting to ESC measures: Part II(B)4.e(4)			
7e	Direct concrete wash water into a leak proof- container or leak-proof settling basin: Part II(B)4.e(5)			
7f	Minimize discharge of pollutants from storage, handling, and disposal of construction products, materials and wastes: Part II(B)4.e(6)			
7g	Prevent discharge of fuels, oils, and other petroleum products, hazardous or toxic wastes, and sanitary wastes: Part II(B)4.e(7)			
7h	Address any other discharge from the potential pollutant-generating activities not addressed above: Part II(B)4.e(8)			
7i	Minimize exposure to waste materials by having containers closed or covered during precipitation events and at the end of the business day: Part II(B)4.e(9)			
8	Appears to be impact(s) to receiving waters: Part I(B)6, Part I(D), or Part II(B)2c(2) or (5)			

BMP Field Assessment Worksheet

JAMES MADISON UNIVERSITY

FACILITIES MANAGEMENT

181 PATTERSON ST., HARRISONBURG, VA 22807

OFFICE: (540) 568-7606 FAX: (540) 568-3547

BMP FIELD ASSESSMENT WORKSHEET



BMP ID:		AiM ID:	
Inspector:		Rating Key 0 = Good Condition. No action required. 1 = Moderate Condition. See recommendation. 2 = Degraded Condition. Routine maintenance and/or repair needed. 3 = Serious Condition. Immediate need for maintenance, repair and/or replacement. N/A = Not applicable.	
Inspection Date:			
Inspection Time:			
Last Storm Event:			
Notes:			

Contributing Drainage Area	Rating
Inlet	
Vegetation/Mulch	
Structure	
Outlet	
Other	

Zone:	Database: Access AiM	Overall Rating
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Projects

JAMES MADISON UNIVERSITY®

Existing and Proposed Land Disturbing Activities Report for March 1, 2021 thru June 30, 2022

Project Name: Arboretum Children's Garden
Project Location: 780 University Blvd.
Harrisonburg, VA 22807
Project Manager (JMU): Ed Roach / 540-568-6720 / roachel@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Construction of a children's garden near main entrance of JMU's arboretum around existing walking paths.
Acreage of Disturbance: 0.88
Plan Approval: 7/23/20
Estimated Start/Completion: TBD
Variances/Exceptions: N/A

Project Name: College of Business (VAR10K975)
Project Location: 421 Bluestone Drive
Harrisonburg, VA 22807
Project Manager (JMU): Glenn Wayland / 540-568-6345 / waylangr@jmu.edu
Project Manager (Contractor): Brett Tucker / 840-640-5207 / btucker@kjellstromandlee.com
RLD: Brett Tucker / 840-640-5207 / btucker@kjellstromandlee.com / 41322
Project Description: Renovation and expansion to an existing building.
Acreage of Disturbance: 3.70
Plan Approval: 3/28/18
Estimated Start/Completion: May 2018 - March 2021
Variances/Exceptions: N/A

Project Name: Convocation Center & East Campus Parking Deck (VAR10K974)
Project Location: 649 University Blvd.
Harrisonburg, VA 22807
Project Manager (JMU): Glenn Wayland / 540-568-6345 / waylangr@jmu.edu
Project Manager (Contractor): Jeff Navarra / 757-406-5939 / jnavarra@sballard.com
RLD: Jeff Navarra / 757-406-5939 / jnavarra@sballard.com / 42308
Project Description: Construct a new convocation center and parking deck.
Acreage of Disturbance: 19.90
Plan Approval: 3/28/18
Estimated Start/Completion: May 2018 - December 2020
Variances/Exceptions: N/A

Project Name: East Campus Housing (VAR10K553)
Project Location: 831 University Blvd.
Harrisonburg, VA 22807
Project Manager (JMU): Rick Miller / 540-568-3007 / millerr1@jmu.edu
Project Manager (Contractor): Patrick Barbier / 804-233-6921 / pbarbier@wmjordan.com
RLD: Tom Emerson / 804-972-2288 / temerson@wmjordan.com / RLD02282
Project Description: Redevelopment of existing softball field to new student housing.
Acreage of Disturbance: 11.75
Plan Approval: 11/21/17

Estimated Start/Completion: December 2018 to August 2019
Variances/Exceptions: N/A

Project Name: Food Compactor Relocation Project
Project Location: 1609 S. Main St.
Harrisonburg, VA 22801
Project Manager (JMU): Jared Combs / 540-568-6580 / combsjm@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Concrete pad for food compactor with small shed. Also to include gravel parking.
Acreage of Disturbance: 2.17
Plan Approval: 9/2/19
Estimated Start/Completion: TBD
Variances/Exceptions: N/A

Project Name: Harrison Street Parking Lots
Project Location: 1155 Harrison Street
Harrisonburg, VA 22807
Project Manager (JMU): Abe Kaufman / 540-568-4201 / kaufmaat@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Construct permanent parking lots on previously graveled parking areas.
Acreage of Disturbance: 2.89
Plan Approval: 8/6/20
Estimated Start/Completion: TBD
Variances/Exceptions: N/A

Project Name: ISAT Solar Upgrade
Project Location: 601 Carrier Drive
Harrisonburg, VA 22807
Project Manager (JMU): Abe Kaufman / 540-568-4201 / kaufmaat@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Upgrade existing solar panel area.
Acreage of Disturbance: 1.23
Plan Approval: 7/27/20
Estimated Start/Completion: TBD
Variances/Exceptions: N/A

Project Name: JMAC6 Office Building
Project Location: 1131 Harrison St.
Harrisonburg, VA 22801
Project Manager (JMU): Scott Wachter / 540-568-3006 / wachtesm@jmu.edu
Project Manager (Contractor): Charlie Newman / 540-434-9560 / charlie@harrisonburgconstruction.com
RLD: TBD
Project Description: Construction of new office building.
Acreage of Disturbance: 1.47
Plan Approval: 5/1/19
Estimated Start/Completion: June 2019 - December 2020
Variances/Exceptions: N/A

Project Name: Justice Studies (Jackson Hall) Renovations
Project Location: 58 Bluestone Drive
Harrisonburg, VA 22807
Project Manager (JMU): Rick Miller / 540-568-3007 / millerr1@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Renovations to an existing building, and addition of an elevator tower.
Acreage of Disturbance: 0.36
Plan Approval: 7/16/19
Estimated Start/Completion: November 2019 - November 2019
Variances/Exceptions: N/A

Project Name: Land Bridge (VAR10L222)
Project Location: 1629 Driver Drive
Harrisonburg, VA 22801
Project Manager (JMU): Rick Miller / 540-568-3007 / millerr1@jmu.edu
Project Manager (Contractor): Patrick Barbier / 804-233-6921 / pbarbier@wmjordan.com
RLD: Tom Emerson / 804-972-2288 / temerson@wmjordan.com / RLD02282
Project Description: Construct a land bridge connecting East Campus Housing to ISAT campus.
Acreage of Disturbance: 6.47
Plan Approval: 4/27/18
Estimated Start/Completion: May 2018 - August 2019
Variances/Exceptions: N/A

Project Name: Sentara Park Renovations and Additions
Project Location: 1085 Neff Avenue
Harrisonburg, VA 22807
Project Manager (JMU): Tim Shantz / 540-568-5909 / shantz@jmu.edu
Project Manager (Contractor): TBD
RLD: TBD
Project Description: Construction of two small one-story athletic buildings adjacent to existing bleachers.
Acreage of Disturbance: 0.36
Plan Approval: 8/20/20
Estimated Start/Completion: TBD
Variances/Exceptions: N/A

Project Name: South Main Spoils Site - Eby Property (VAR108454)
Project Location: 1593 S. Main St.
Harrisonburg, VA 22807
Project Manager (JMU): Abe Kaufman / 540-568-4201 / kaufmaat@jmu.edu
Project Manager (Contractor): Frank Lucas / 540-568-8003 / lucascf@jmu.edu
RLD: Frank Lucas / 540-568-8003 / lucascf@jmu.edu / 41740
Project Description: Spoils site location.
Acreage of Disturbance: 6.20
Plan Approval: 5/29/07
Estimated Start/Completion: May 2007 - Ongoing
Variances/Exceptions: N/A

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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.

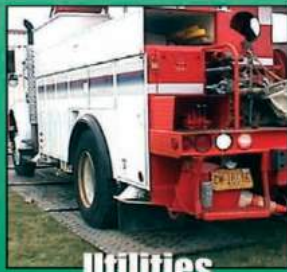
- Leaves turf smooth even in soft soil conditions
- Tough 1/2" thick polyethylene
- Two practical cleat designs... for walking and vehicle traffic
- Withstand 120-ton loads
- Build a temporary roadway or walkway in minutes
- Lock together with Turn-A-Links
- Limited Lifetime Warranty

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.



Now/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

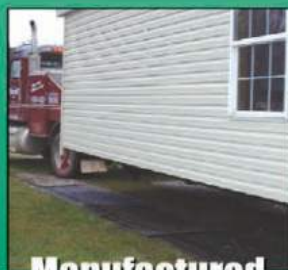
Deliver the safety, quality and performance you expect from the industry leader.



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# (KG24,948)	30,000# (KG13,608)	18" (C45.72)	18" (C45.72)	1" (C2.54)	11.0# (KG4.99)	324 (CT2,090.45)
PAD24241	60,000# (KG27,216)	35,000# (KG15,876)	24" (C60.96)	24" (C60.96)	1" (C2.54)	20.0# (KG9.07)	576 (CT3,761.30)
PAD24242	62,000# (KG28,123)	40,000# (KG18,144)	24" (C60.96)	24" (C60.96)	2" (C5.08)	38.0# (KG17.24)	576 (CT3,761.35)
PAD30301	81,000# (KG36,741)	41,000# (KG18,597.6)	30" (C76.2)	30" (C76.2)	1" (C2.54)	31.0# (KG14.06)	900 (CT5,806.8)
PAD36361	93,000# (KG42,184.8)	43,000# (KG19,504.8)	36" (C91.44)	36" (C91.44)	1" (C2.54)	45.0# (KG20.41)	1296 (CT8,361.79)
PAD48481	135,000# (KG61,236)	52,000# (KG23,587.2)	48" (C121.92)	48" (C121.92)	1" (C2.54)	80.0# (KG36.29)	2304 (CT14,865.4)
PAD30302	85,000# (KG38,556)	43,000# (KG19,504.8)	30" (C76.2)	30" (C76.2)	2" (C5.08)	62.0# (KG28.12)	900 (CT5,806.8)
PAD36362	98,000# (KG44,262.8)	45,000# (KG20,412)	36" (C91.44)	36" (C91.44)	2" (C5.08)	90.0# (KG40.83)	1296 (CT8,361.79)
PAD48482	140,000# (KG63,504)	55,000# (KG24,948)	48" (C121.92)	48" (C121.92)	2" (C5.08)	180.0# (KG81.72)	2304 (CT14,865.4)

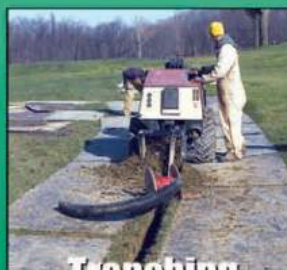
*8" X 10" OUTRIGGER LEG APPLIED UNDER TWO SEPARATE CONDITIONS: 10,000# VERTICALLY & 10,000# WITH A 45° ANGLE.
 **HANDLE LOCATED ON WIDTH SIDE OF ALL PADS. PADS 900 SQ. IN. & LARGER HAVE 2 OR MORE HANDLES OPPOSITE EACH OTHER.
 ***CUSTOM SIZE PADS ARE AVAILABLE. REQUIRES A MINIMUM ORDER. LEAD TIME FOR 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



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.

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.

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

Distributed By:

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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.

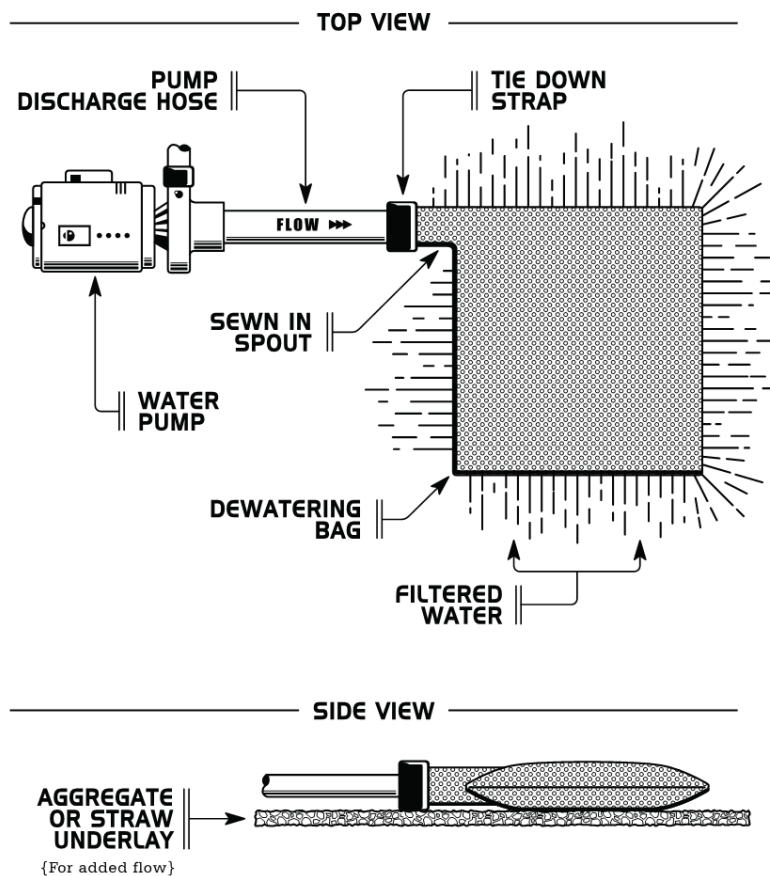
A dewatering structure may not be needed if there is a well stabilized, vegetated area on-site to which water may be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. A minimum filtering length of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

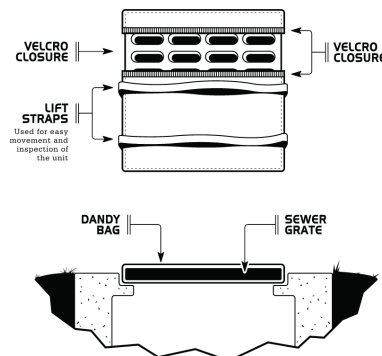
Design Criteria

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

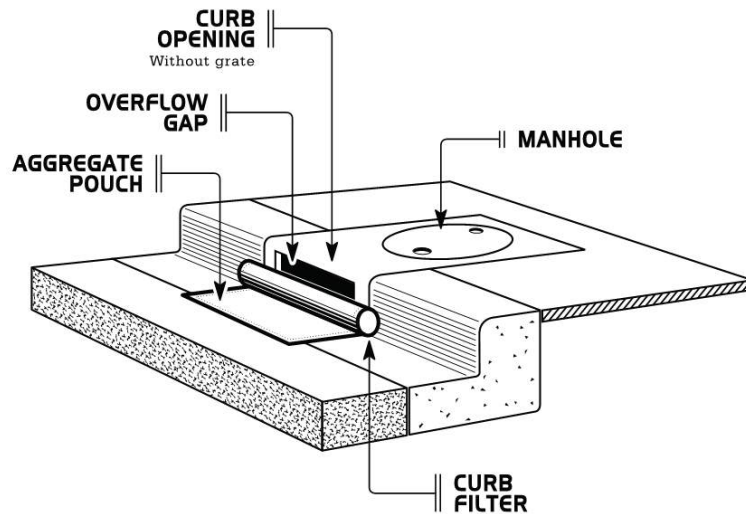
Dandy Bag

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.



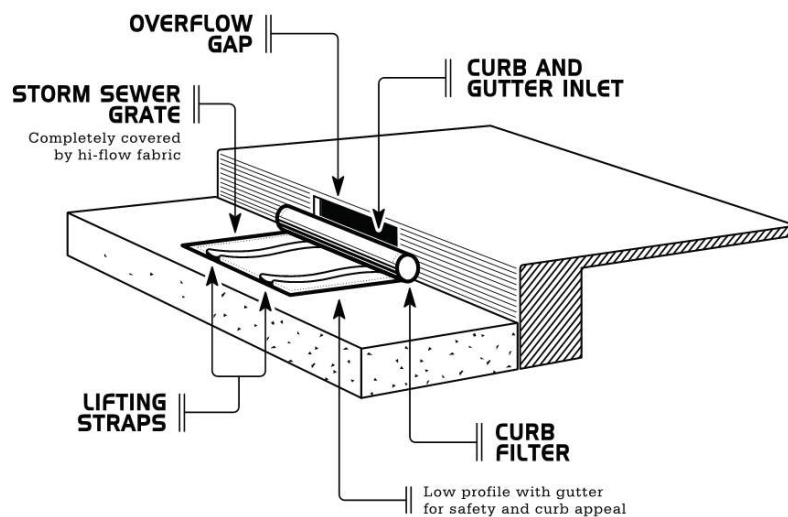
Dandy Curb

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.



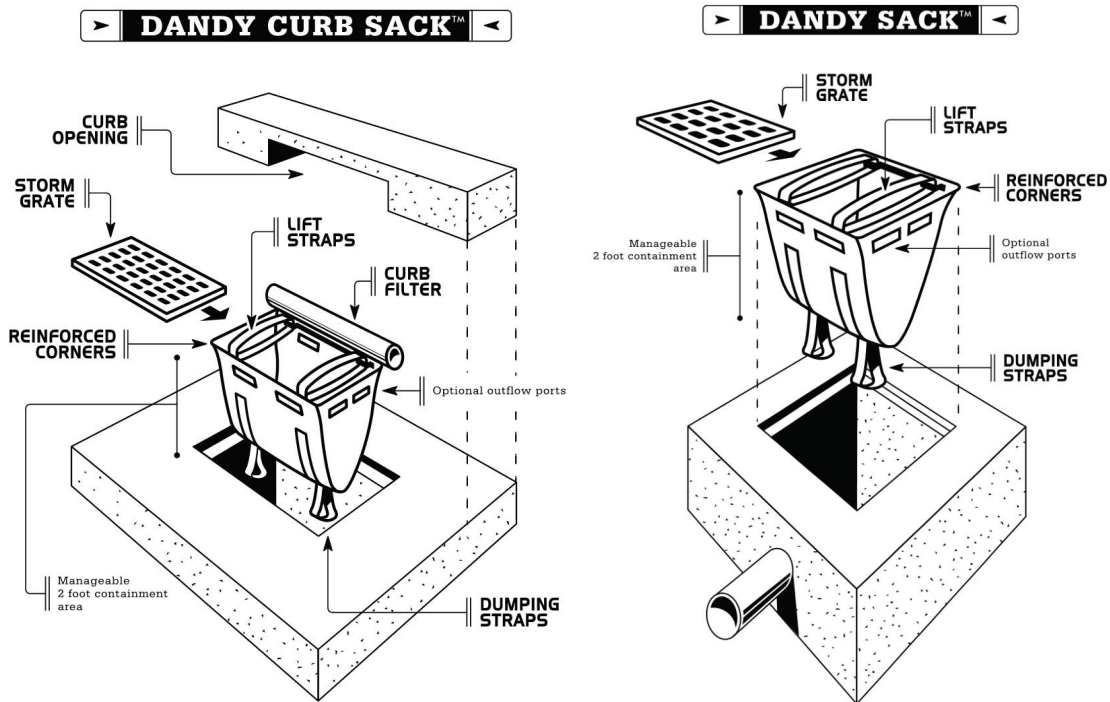
Dandy Curb Bag

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).

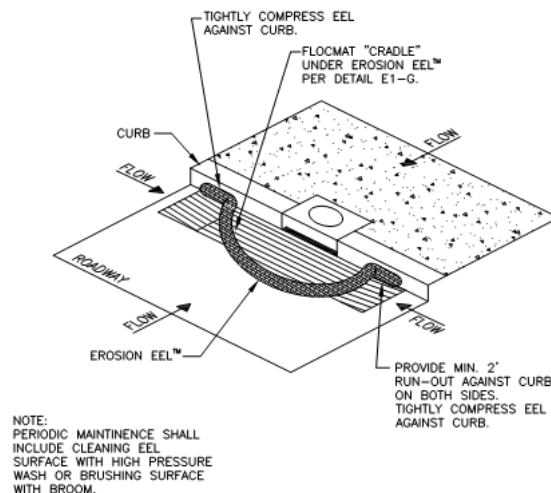
Design Criteria

The drainage area shall be no greater than 1 acre.

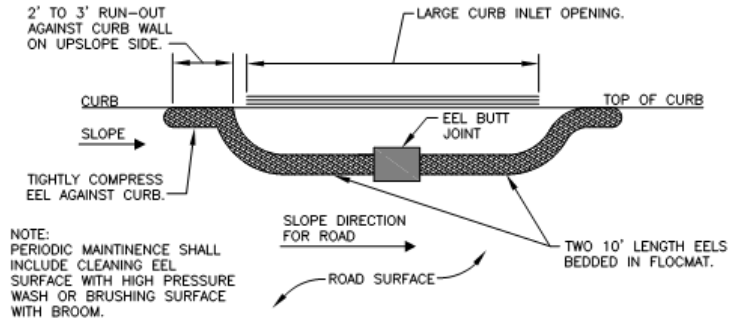
Construction Specifications

Erosion Eel

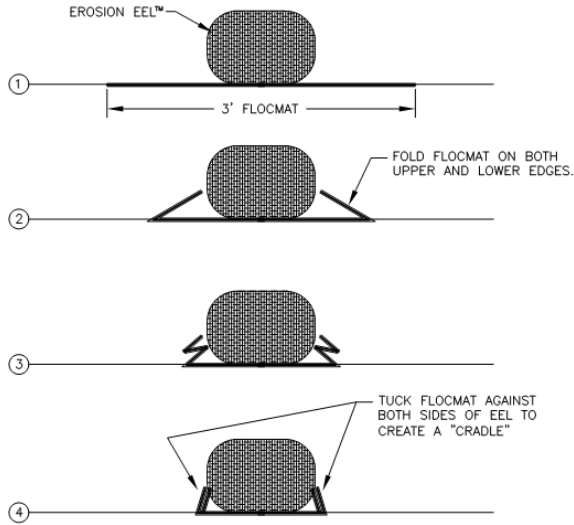
1. Center Erosion Eel at curb inlet. Install Floccmat "cradle" under Erosion Eel.
2. Ensure Erosion Eel does not completely cover inlet. Pull out from center to allow overflow as needed.
3. Tightly compress eel against curb on each end of inlet. There should be a minimum 2' run-out against curb on both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



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



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

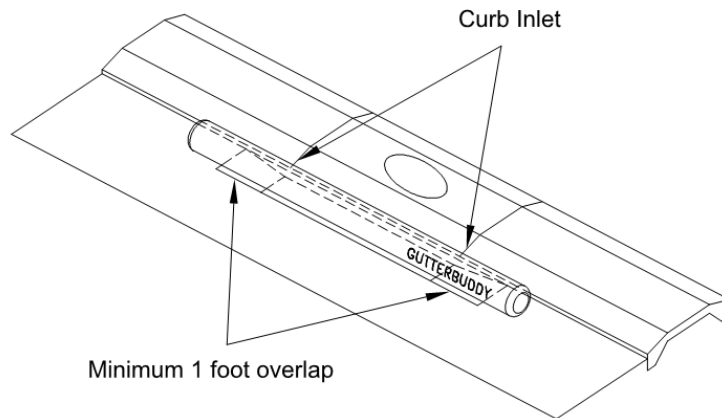


INSTALL FLOCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

DETAIL E1-G: SECTION - FLOCMAT
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.



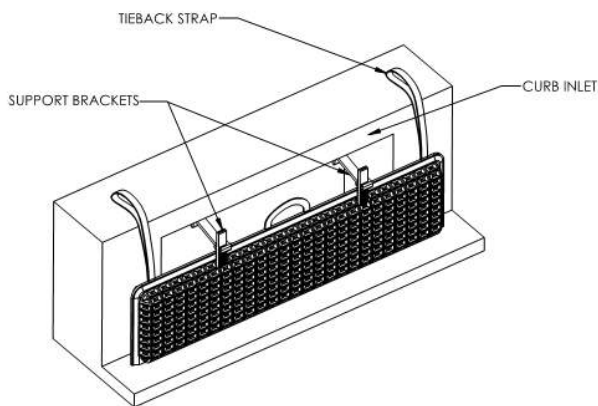
- 8.** Slide weight pockets into curb throat, holding unit tight to curb face. (leave 12" overlap on each end of curb opening)



- 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.



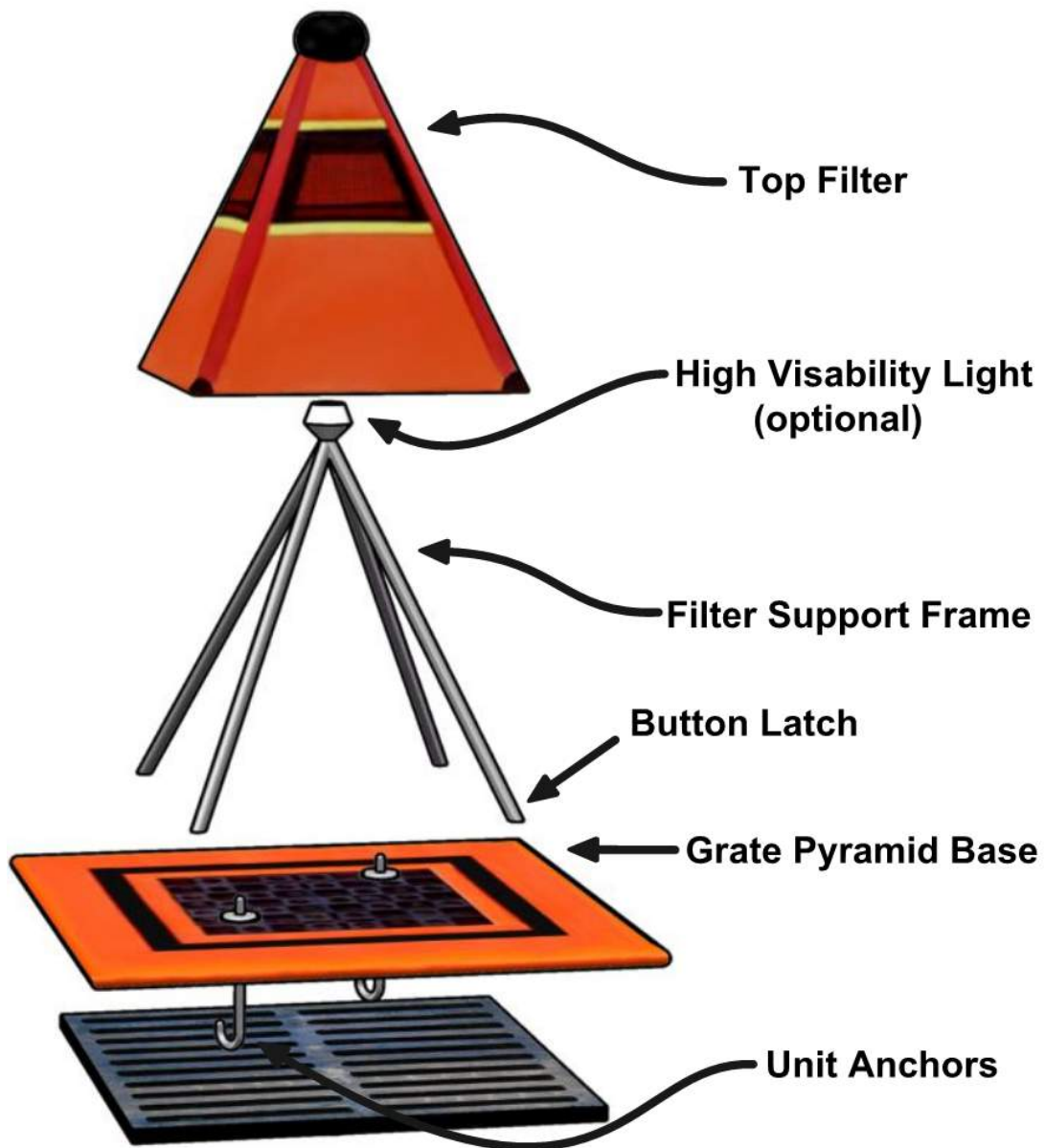
Slide tower filter over frame.



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.

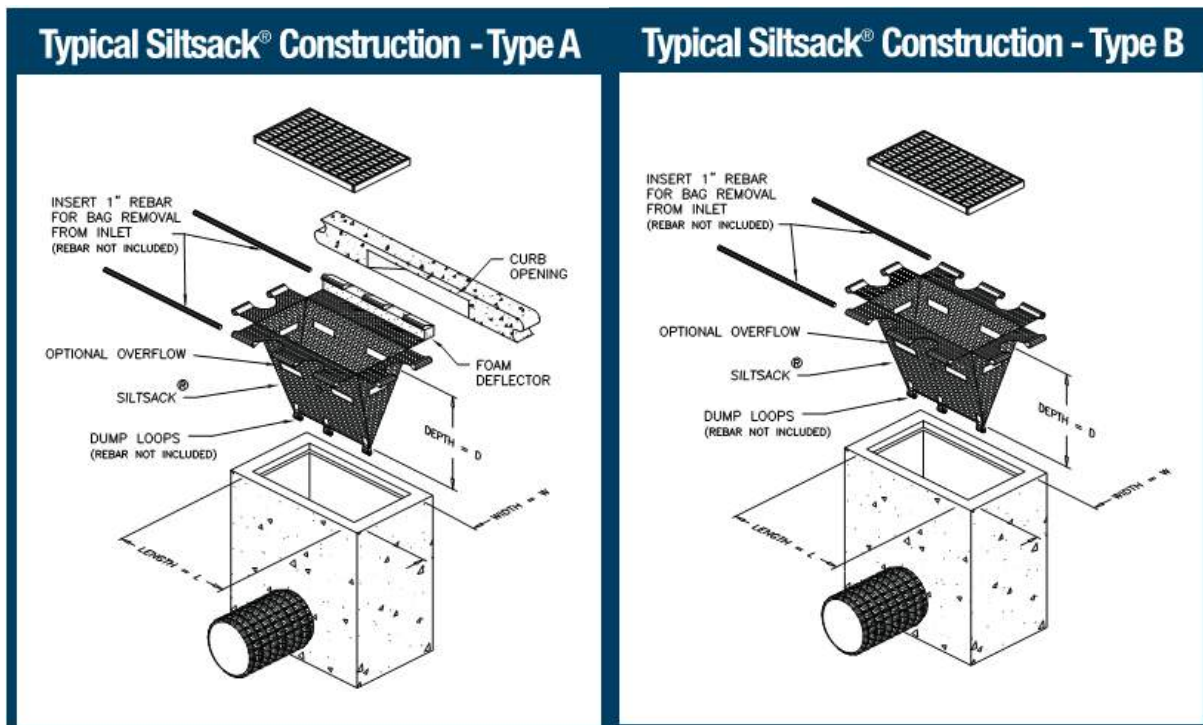
Planning Considerations

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.

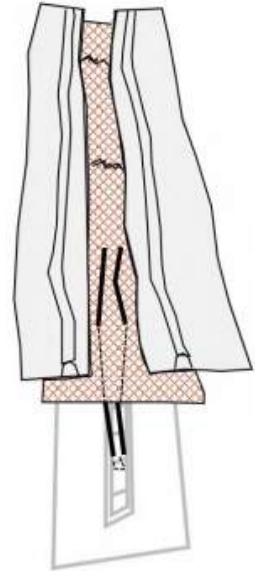
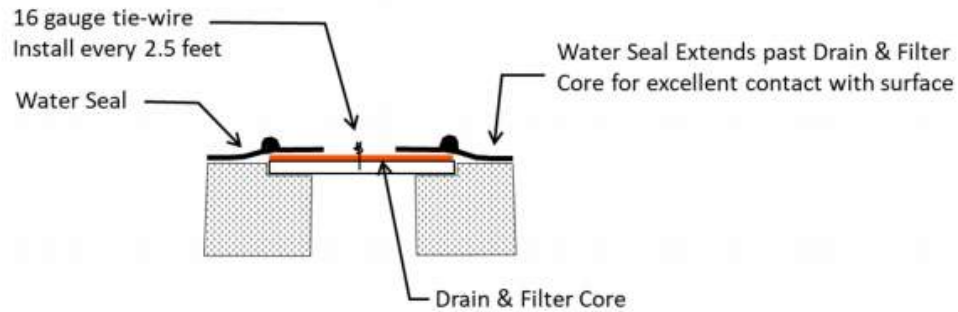
Construction Specifications

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.

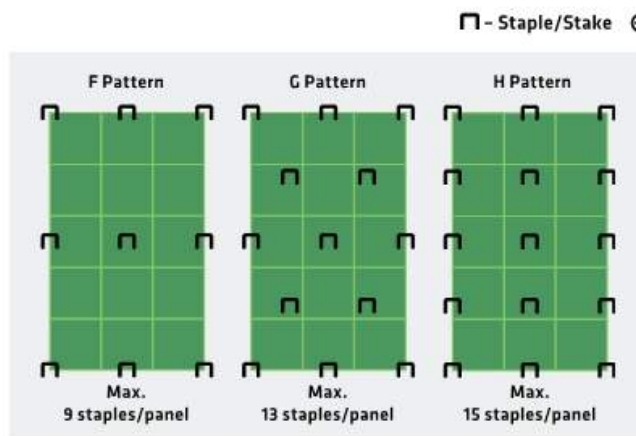


FIGURE 1: Anchor Patterns for use with staples/stakes

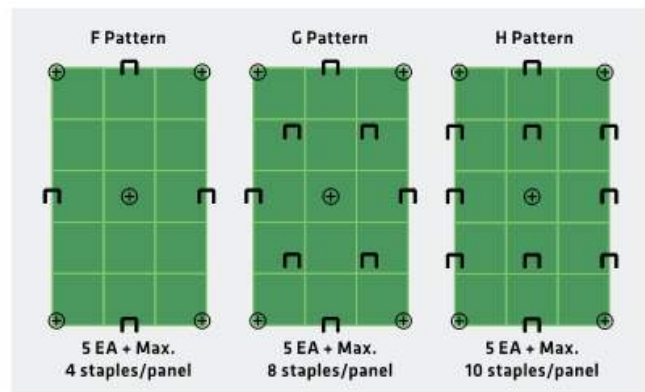


FIGURE 2: Anchor Patterns for use with a combination of earth anchors and staples

Channel Design Guideline

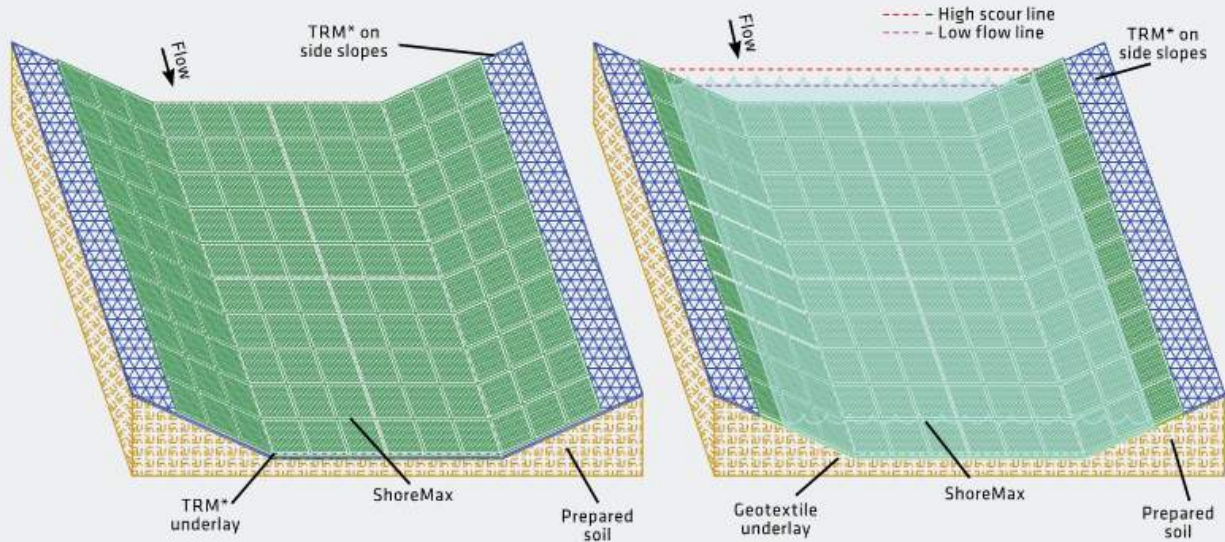


FIGURE 3: Steep channel

FIGURE 4: Continuous flow channel

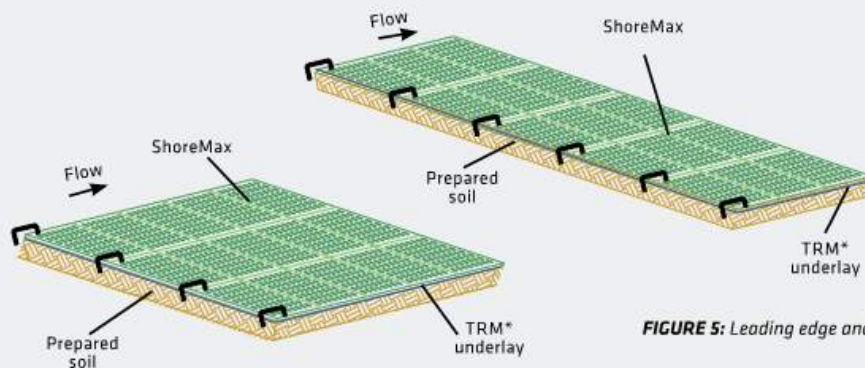


FIGURE 5: Leading edge anchoring

STEEP CHANNEL/CHUTE SPILLWAY DETAIL

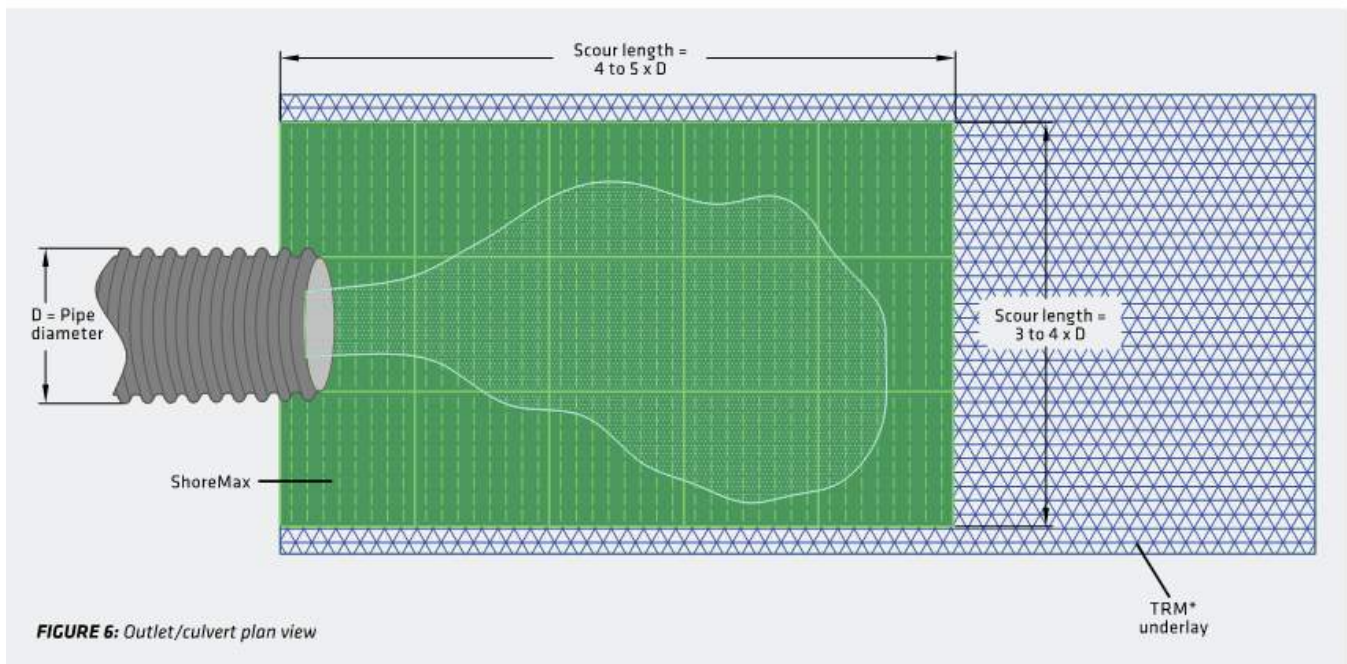
* ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases Erosion Control Blankets (ECBs).

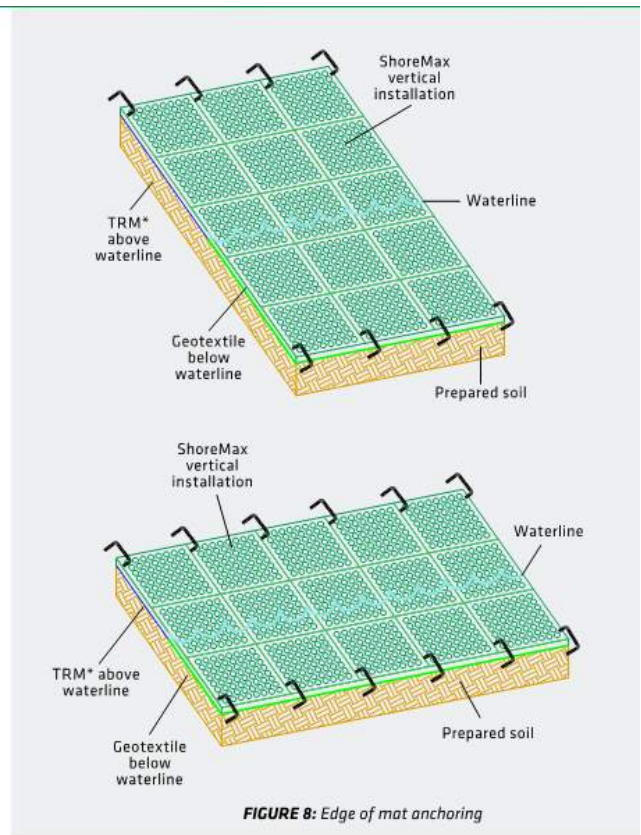
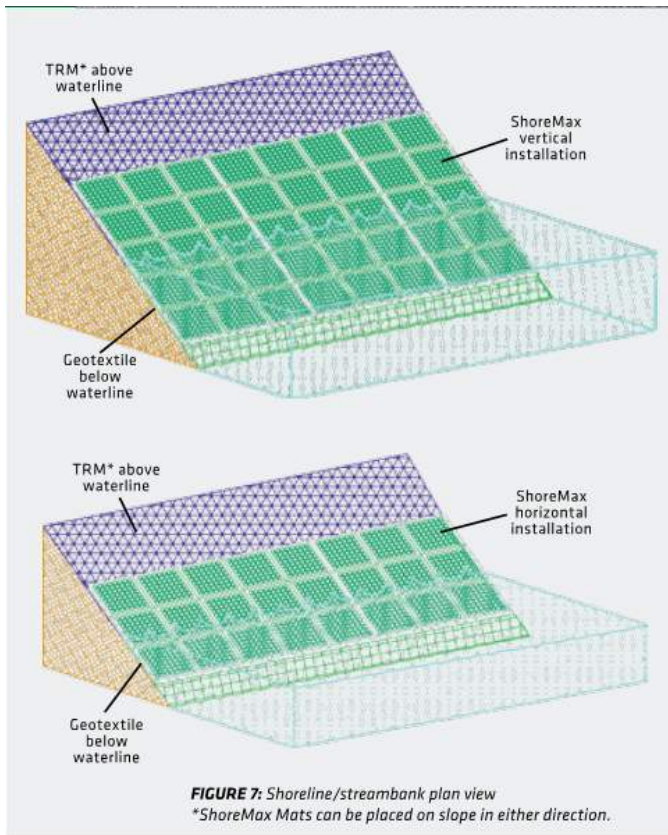
1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer and seed (when installing TRM or ECB underlayment).
2. Install TRM over prepared soils according to manufacturer's recommendations.
3. Place the ShoreMax Mat in the bottom of the channel 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

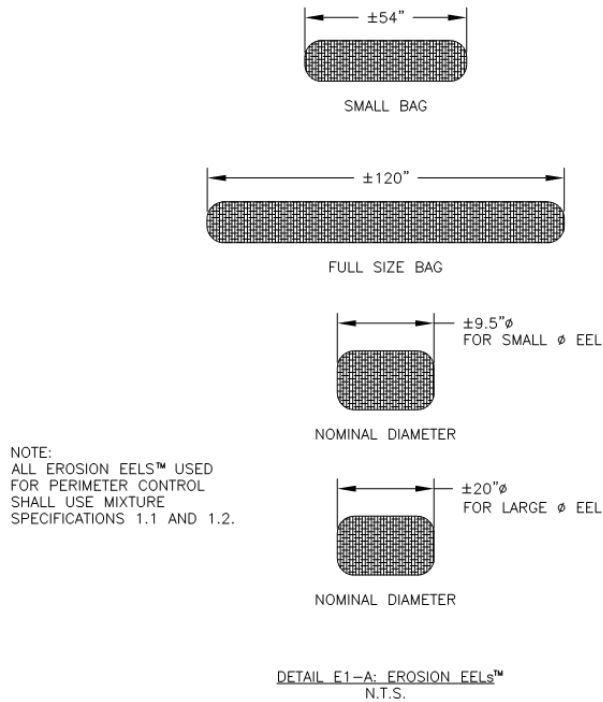
SLOPE(%)	SINGLE EEL SPACING(ft)	*STACKED DUAL EEL SPACING(ft)
0.5	300	N/A
1	200	N/A
2	160	N/A
3	80	N/A
4	50	N/A
5	40	N/A
6	35	N/A
8	30	N/A
10	25	N/A
15	+17	N/A
20	+12	+25
25	N/A	+15
33	N/A	+10
50	N/A	+6

* 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.

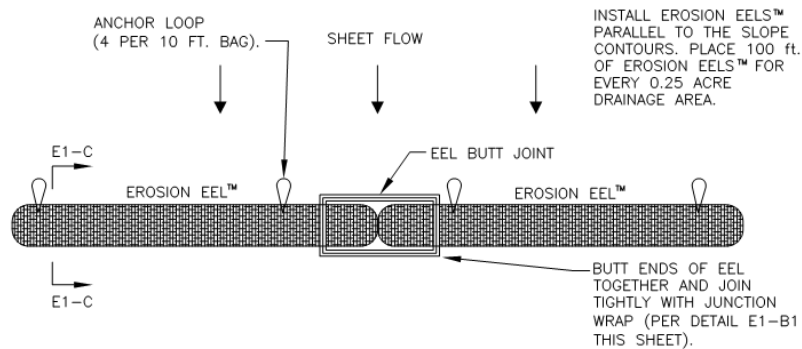
Construction Specifications

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)

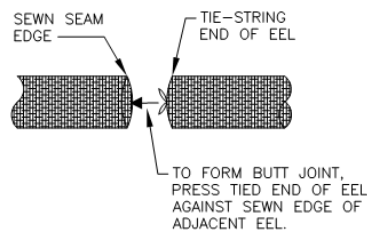


EROSION EELS™ USED IN PERIMETER CONTROL APPLICATIONS SHALL HAVE A SPECIFICATION MIXTURE 1.1 OR 1.2.

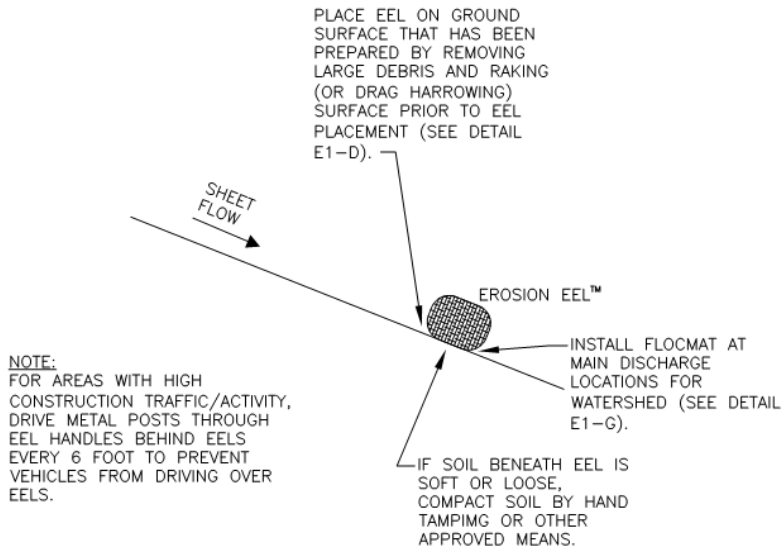
- a. MIXTURE SPECIFICATION 1.1. A FILTER MIXTURE COMPRISED OF 50% SHREDDED RUBBER AND 50% WOOD CHIP PARTICLES BY VOLUME. THE SHREDDED RUBBER SHALL BE WASHED AND PROCESSED TO REMOVE MOST, IF NOT ALL, METAL COMPONENTS. THE RUBBER SHALL BE DERIVED FROM RECYCLED TIRES AND SHALL BE SHREDDED TO PRODUCE A MAXIMUM 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.



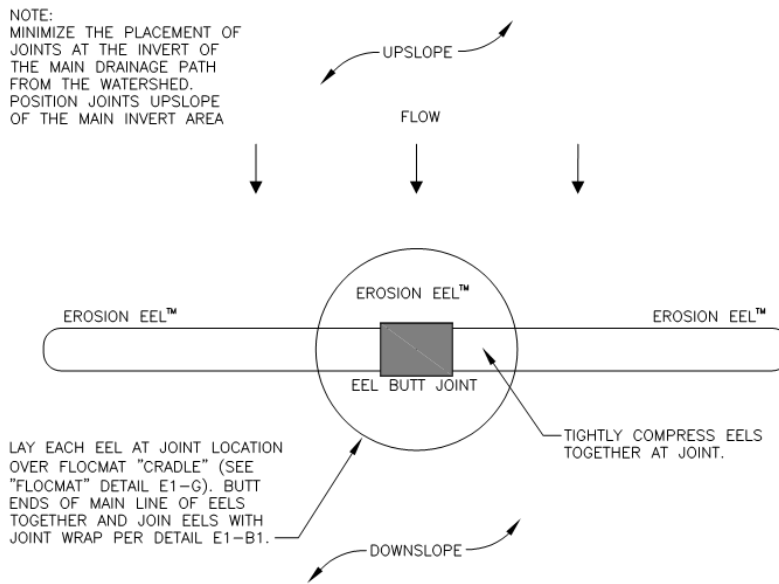
DETAIL E1-B: INTERCEPTING SHEET FLOW
PERPENDICULAR TO FLOW PATH - PLAN VIEW



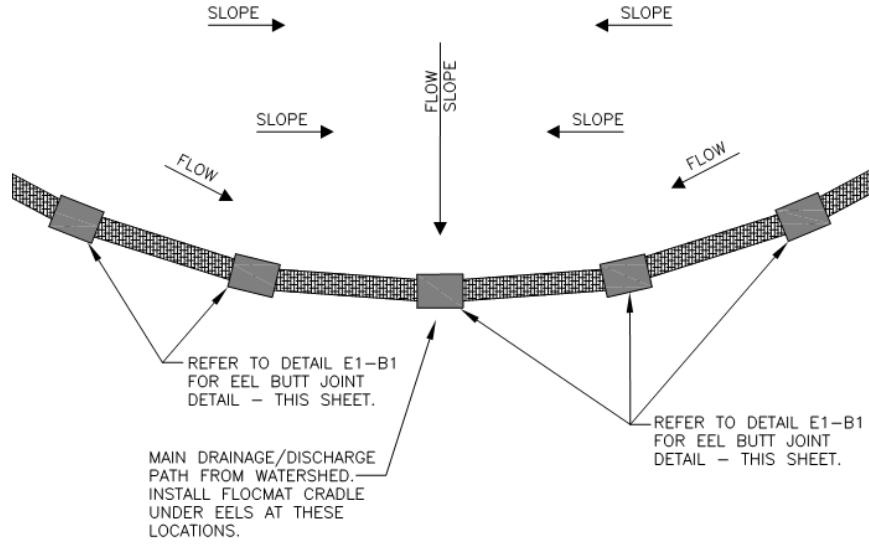
DETAIL E1-B1



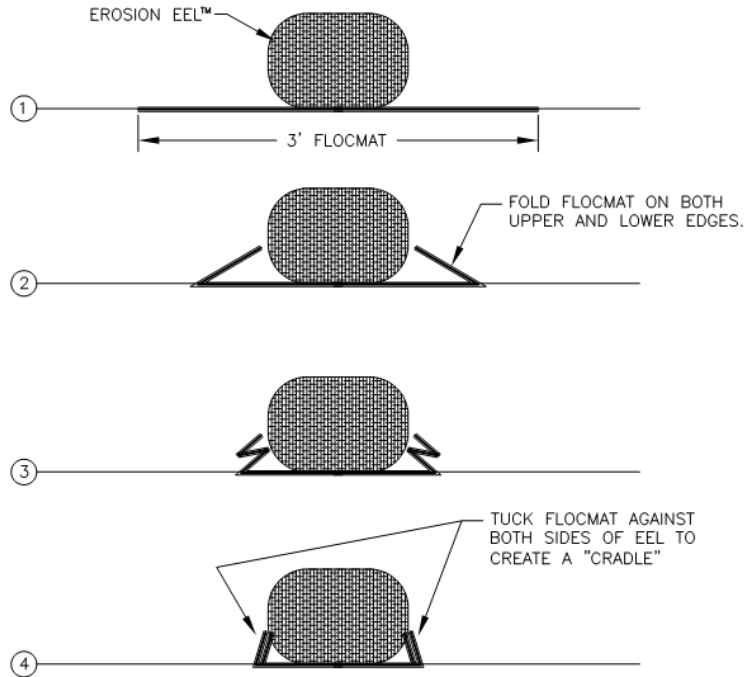
DETAIL E1-C: INTERCEPTING SHEET FLOW PERPENDICULAR TO FLOW PATH - PLAN VIEW



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

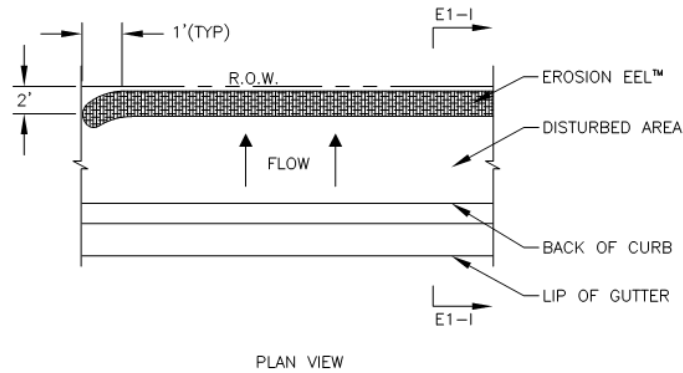


DETAIL E1-F: PLAN VIEW - TYPICAL ARRANGEMENT OF EELS USED FOR PERIMETER CONTROL
N.T.S.

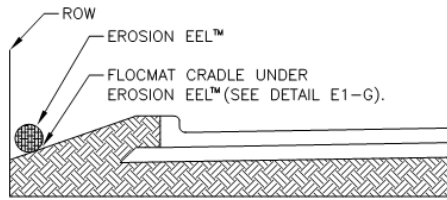


INSTALL FLOCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

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

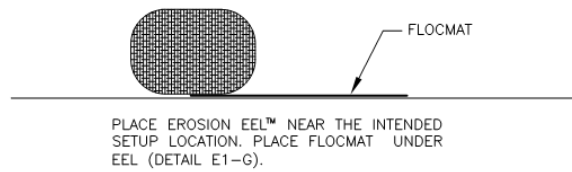


DETAIL E1-H: EROSION EEL™
PLACED AT EDGE OF ROADWAY RIGHT-OF-WAY
N.T.S.

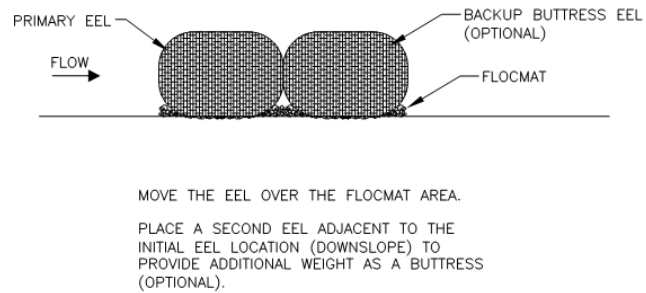


DETAIL E1-I: SECTION
N.T.S.

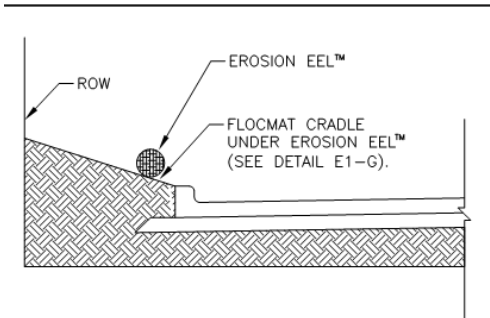
STEP 1



STEP 2



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



DETAIL E1-J: SECTION
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.