MS4 PROGRAM PLAN ANNUAL REPORT

JAMES MADISON UNIVERSITY

Reporting Period: July 1, 2016 - June 30, 2017

James Madison University – Harrisonburg, Virginia
MS4 Program Plan Annual Report

Reporting Period: July 1, 2016 – June 30, 2017

Registration Number: VAR040112

In compliance with the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4)

Report Prepared by:
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Acronyms and Abbreviations

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

Introduction

This document represents James Madison University's plan to meet the requirements of 9VAC25-890 General Virginia Stormwater Management Program (VSMP) Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.

Registration Statement

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

VSMP GENERAL PERMIT REGISTRATION STATEMENT FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS [VAR04]

(Please Type or Print All Information)
(The applicable fee specified in Form DCR 199-145 must additionally be submitted to the address given in that form to obtain coverage)

1. **Regulated Small MS4**

Name: James Madison University

Type: ☐ City ☐ County ☐ Incorporated Town ☐ Unincorporated Town ☒ College or University
☐ Local School Board ☐ Military Installation ☐ Transport System ☐ Federal or State Facility ☐ Other

Location (County or City): City of Harrisonburg

2. **Regulated Small MS4 Operator**

Name: James Madison University

Address: 181 Patterson St., MSC 7004

City: Harrisonburg State: VA Zip: 22807

3. **Hydrologic Unit Code(s) as identified in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset currently receiving discharges or that have potential to receive discharges from the regulated small MS4:**
020700050602 - PS22 - Blacks Run

4. **Attach a description of the estimated drainage area, in acres, served by the regulated small MS4 discharging to any impaired receiving surface waters listed in the most recent Virginia 305(b)/303(d) Water Quality Assessment Integrated Report, and a description of the land use of each such drainage area.**
See Section 1.3 Description of Drainage Areas of plan.

5. **Any TMDL waste loads allocated to the regulated small MS4 (this information may be found at http://www.deq.state.va.us/tmdl/develop.html):**
None

6. **The name(s) of any regulated physically interconnected MS4s to which the regulated small MS4 discharges.**
City of Harrisonburg, Virginia Department of Transportation (VDOT)

7. **A copy of the MS4 Program Plan that includes:**

a. A list of BMPs that the operator proposes to implement for each of the stormwater minimum control measures and their associated measurable goals pursuant to 4VAC50-60-1240, Section II B; that includes:

i. A list of the existing policies, ordinances, schedules, inspection forms, written procedures, and other documents necessary for BMP implementation; and

ii. The individual, department, division, or unit responsible for implementing the BMP;

b. The objective and expected results of each BMP in meeting the measurable goals of the stormwater minimum control measures;

c. The implementation schedule including any interim milestones for the implementation of a proposed new BMP; and

(DCR 199-148) (07/08)

d. The method that will be utilized to determine the effectiveness of each BMP and the program as a whole.

8. List all existing signed agreements between the operator and any applicable third parties where the operator has entered into an agreement in order to implement minimum control measures or portions of minimum control measures.

JMU does not have any signed agreements with other parties.

9. The name, address, telephone number and e-mail address of either the principal executive officer or ranking elected official as defined in 4VAC50-60-370.

Charles W. King, Jr., Senior Vice President, 91 Alumnae Drive MSC 7606, Harrisonburg, VA 22807
(540) 568-3400, kingcw@jmu.edu

10. The name, position title, address, telephone number and e-mail address of any duly authorized representative as defined in 4VAC50-60-370.

Dale Chestnut, Stormwater Coordinator, 181 Patterson St. MSC 7004, Harrisonburg, VA 22807, (540) 568-7606, chestndl@jmu.ed

11. Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly 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 fine and imprisonment for knowing violations."

Print Name: Charles W. King, Jr. Title: Senior Vice President

Signature: Charles W King Date: 2-11-13

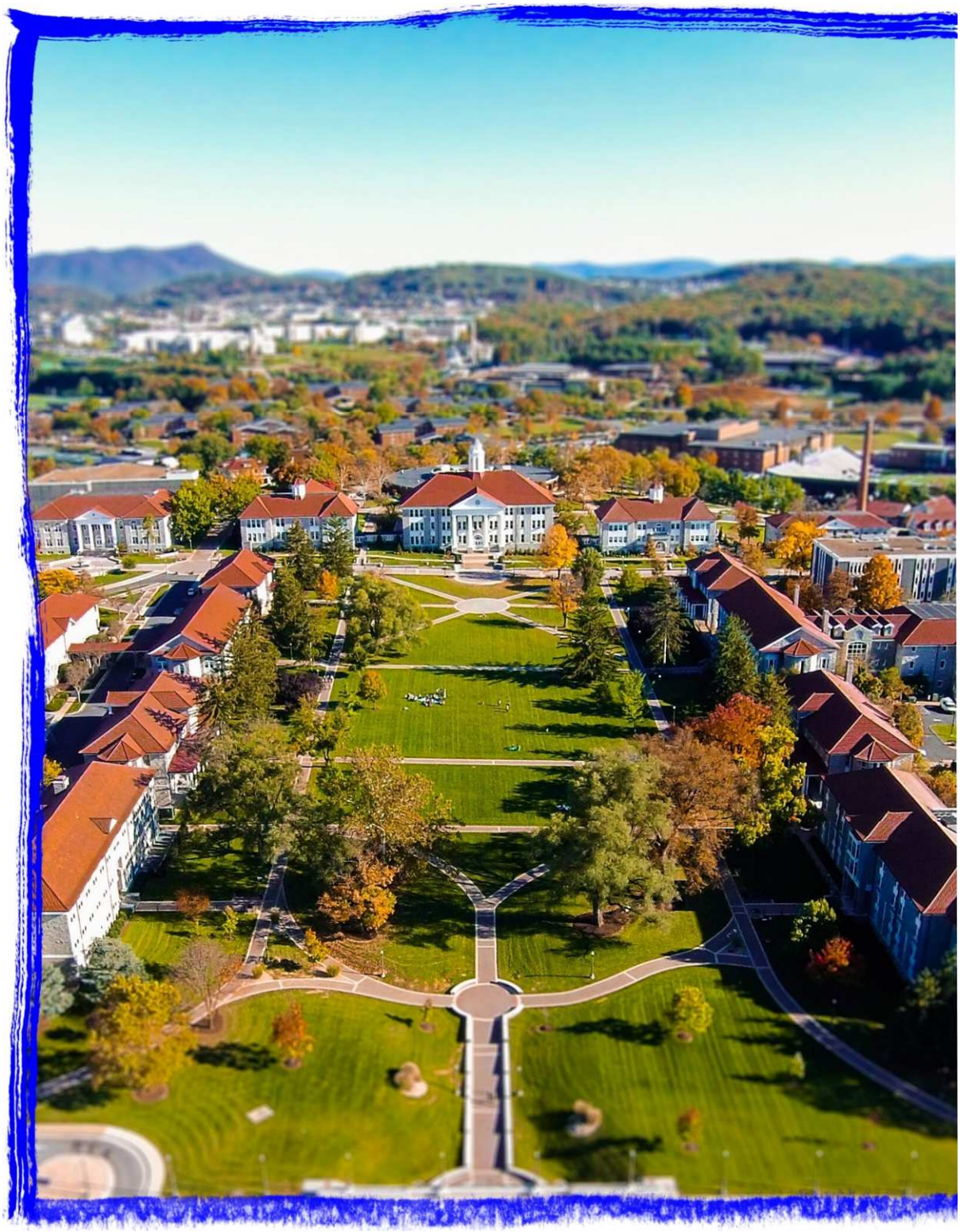
For Department of Conservation and Recreation Use Only

Accepted/Not Accepted by: _____ Date: _____

Basin _____ Stream Class _____ Section _____ Special Standards _____

(DCR 199-148) (07/08)

SECTION 1: MS4 OVERVIEW



1.1 Organizational Structure

The Department of Sustainability is responsible for coordinating James Madison University's VSMP Phase II permit and for implementing a majority of the permit requirements. Additional information is gathered from several other departments including: Grounds/Landscaping, Operations, Power Plant, Recycling/Waste Management, Transportation, Risk Management, Integrated Science & Engineering and the Office of Environmental Stewardship & Sustainability.

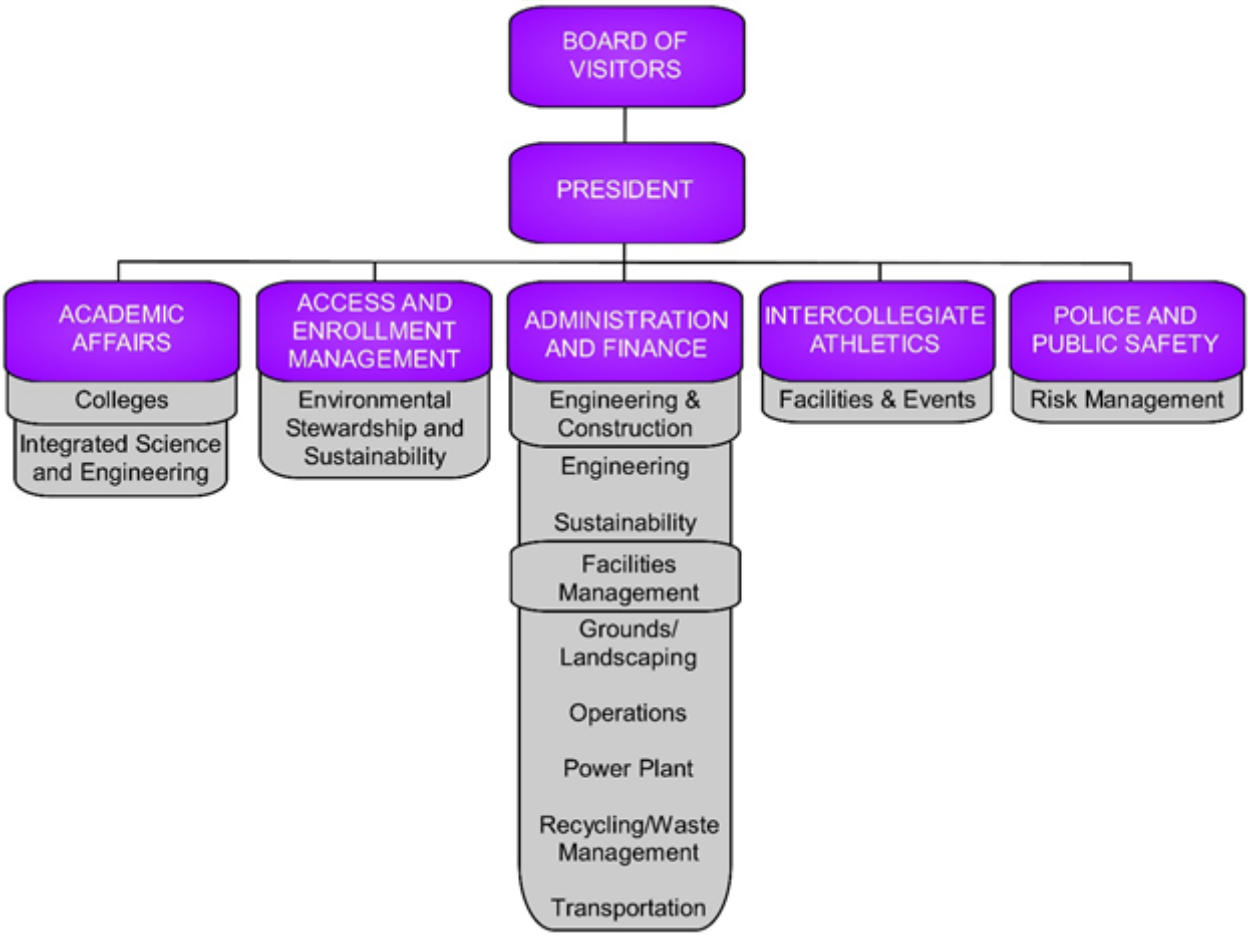


Figure 1. James Madison University Stormwater Management Organizational Structure

1.2 Contact Information

Principle Executive Officer:	Duly Authorized Representative:
Title: Senior Vice President	Title: Stormwater Coordinator
Name: Charles W. King, Jr.	Name: Dale Chestnut
Address: 91 Alumnae Drive, MSC 7606 Harrisonburg, VA 22807	Address: 181 Patterson St., MSC 7004 Harrisonburg, VA 22807
Phone: (540) 568-3400	Phone: (540) 568-7606
Email: kingcw@jmu.edu	Email: chestndl@jmu.edu

Administration and Finance:	Sustainability:
Title: Senior Vice President	Title: Stormwater Coordinator
Name: Charles W. King, Jr.	Name: Dale Chestnut
Address: 91 Alumnae Drive, MSC 7606 Harrisonburg, VA 22807	Address: 181 Patterson St., MSC 7004 Harrisonburg, VA 22807
Phone: (540) 568-3400	Phone: (540) 568-7606
Email: kingcw@jmu.edu	Email: chestndl@jmu.edu
Office of Environmental Stewardship & Sustainability:	FM – Grounds/Landscaping:
Title: Executive Director	Title: Manager
Name: C.J. Hartman	Name: Frankie Lucas
Address: MSC 1106 Harrisonburg, VA 22807	Address: MSC 7007 Harrisonburg, VA 22807
Phone: (540) 568-3202	Phone: (540) 568-3411
Email: brodricj@jmu.edu	Email: lucascf@jmu.edu
Risk Management:	FM – Operations:
Title: Environmental Health Coordinator	Title: Administrative Analyst
Name: Marcella Mullenax	Name: Carlene Heatwole
Address: 131 W. Grace St., MSC 6703 Harrisonburg, VA 22807	Address: MSC 7002 Harrisonburg, VA 22807
Phone: (540) 568-4959	Phone: (540) 568-1773
Email:	Email: heatwocc@jmu.edu
Integrated Science & Technology:	FM – Power Plant:
Title: Professor	Title: Manager
Name: Thomas Benzing	Name: Dennis Hart
Address: MSC 4102 Harrisonburg, VA 22807	Address: MSC 0501 Harrisonburg, VA 22807
Phone: (540) 568-2794	Phone: (540) 568-6235
Email: benzintr@jmu.edu	Email: hartdb@jmu.edu
Integrated Science & Technology:	FM – Recycling/Waste Management:
Title: Associate Professor	Title: Manager
Name: Wayne Teel	Name: Tony Smith
Address: MSC 4102 Harrisonburg, VA 22807	Address: MSC 7007 Harrisonburg, A 22807
Phone: (540) 568-2798	Phone: (540) 568-8144
Email: teelws@jmu.edu	Email: smith2tr@jmu.edu
Integrated Science & Technology:	FM – Transportation:
Title: Assistant Professor	Title: Garage Supervisor
Name: Robert Brent	Name: Bennie Wheelbarger
Address: MSC 4102 Harrisonburg, VA 22807	Address: 181 Patterson St., MSC 7001 Harrisonburg, VA 22807
Phone: (540) 568-2728	Phone: (540) 568-6364
Email: brentrn@jmu.edu	Email: wheel2bl@jmu.edu

Facilities & Events:		Sustainability:	
Title:	Assistant Athletics Director	Title:	GIS Coordinator
Name:	Ty Phillips	Name:	Sam Hottinger
Address:	MSC 4703 Harrisonburg, VA 22807	Address:	181 Patterson St., MSC 7004 Harrisonburg, VA 22807
Phone:	(540) 568-8810	Phone:	(540) 568-4029
Email:	phillidt@jmu.edu	Email:	andricba@jmu.edu

1.3 Description of Drainage Areas

James Madison University is located within the City of Harrisonburg and has approximately 20,000 students and 4,000 faculty and staff. The campus consists of approximately 755 acres of developed and undeveloped land comprising of academic buildings, student housing, recreation buildings, conference halls, parking areas, maintenance yards, athletic fields, a power plant and an arboretum.

Approximately 117 acres of the campus drain directly to Blacks Run while the remaining acreage drains to either Sibert Creek or Newman Lake. Sibert Creek then flows into Blacks Run directly adjacent to the campus. The hydrologic unit code (HUC) from Virginia's 6th Order National Watershed Boundary Dataset (NWBD) for this drainage area is PS-22. Blacks Run is included on the state's Draft 2012 305(b)/303(d) Integrated Report as a Category 4A water body. Category 4A waters are those that are impaired and have been assigned a TMDL to address the impairments. Blacks Run has been deemed to be impaired due to elevated levels of fecal coliform and escherichia coli, as well as benthic-macroinvertebrate bioassessments.

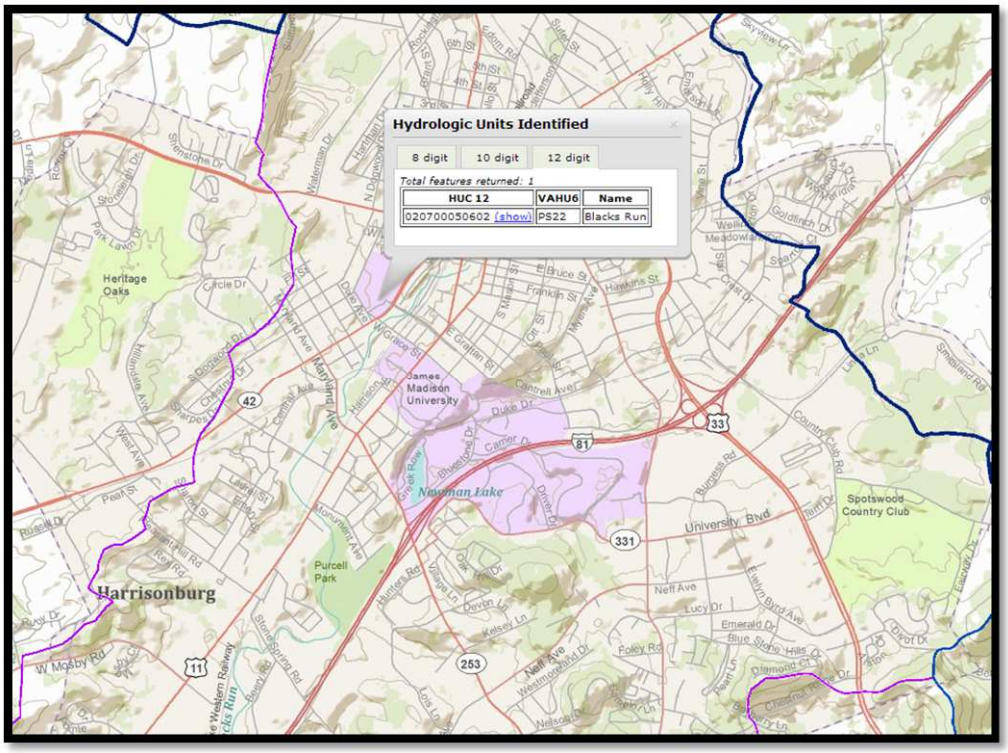


Figure 2. Hydrologic Unit Code (HUC), Source: Virginia Department of Conservation & Recreation

The University also owns a 30 acre tract of land located outside of the urbanized area, approximately 9 miles southeast of the main campus. This property consists primarily of wooded land and does not contain a storm sewer system.

SECTION 2: PROGRAM OVERVIEW

2.1 Program History

The 1972 amendments to the Federal Water Pollution Control Act, also known as the Clean Water Act or CWA; provide the statutory basis for the National Pollution Discharge Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Under Section 402 of the CWA the Environmental Protection Agency is the authorized agency to develop and implement the NPDES program. Therefore, Congress amended the Federal Water Pollution Control Act (CWA) to prohibit the discharge of any pollutant to waters of the United States from a point source unless the discharge is authorized by an NPDES permit. The NPDES program is designed to track point sources and require the implementation of the best management practices or controls necessary to minimize the discharge of pollutants. Initial efforts to improve water quality under the NPDES program primarily focused on reducing pollutants in industrial process wastewater and municipal sewage. These discharge sources were easily identified as responsible for poor water quality.

As pollution control measures for industrial process wastewater and municipal sewage were implemented and refined, it became increasingly evident that stormwater runoff was found to be a major cause of water quality impairment. In response to the 1987 Amendments to the Clean Water Act (CWA), the U.S. Environmental Protection Agency (EPA) developed Phase I of the NPDES Stormwater Program in 1990. The Phase I program addressed sources of stormwater runoff that had the greatest potential to impact water quality. Under Phase I, EPA required NPDES permit coverage for stormwater discharges from Medium and Large Municipal Separate Storm Sewer Systems with populations of 100,000 or more people, industrial activities, and construction activities that disturbed 5 or more acres.

In 1999, the EPA developed the Stormwater Phase II Final Rule which tightened the regulations that requires operators of regulated small municipal separate storm sewer systems (MS4s) to obtain a NPDES permit and develop a stormwater management program designed to prevent pollutants from being washed into the MS4 system during a storm event (or from being discharged directly into the MS4) and then discharged from the MS4 into local water bodies.

James Madison University falls under the Phase II regulations as a small municipal storm sewer system operator. Based on 40 CFR 122.26(b)(8), the definition of a “municipal separate storm sewer” means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.”

Also what defines James Madison University under the MS4 program is that the university is considered to be within an urbanized area. By definition, an urbanized area (UA) is a land area comprising one or more places – central place(s) – and the adjacent densely settled surrounding area – urban fringe – that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas.

2.2 Program Type

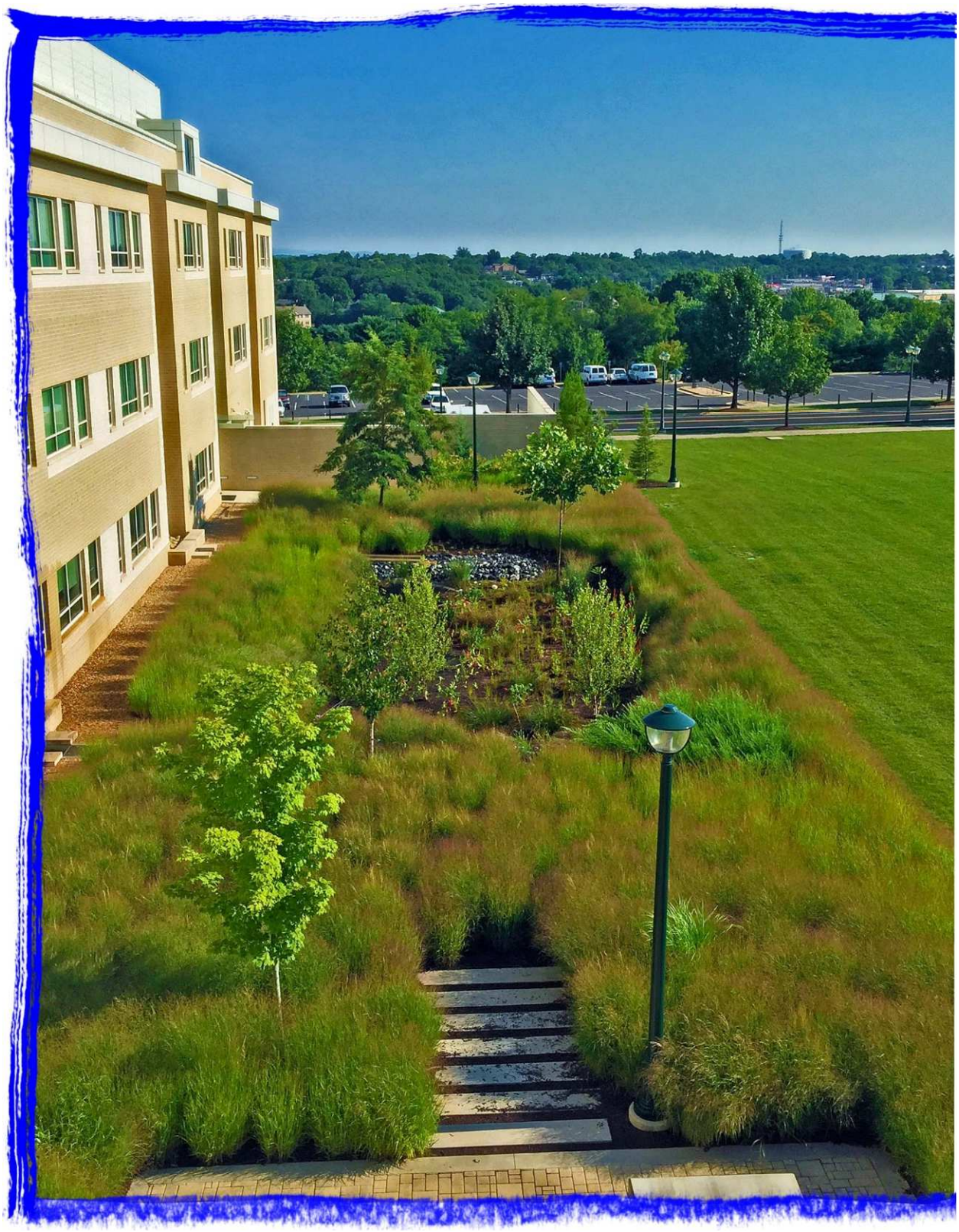
As a state university, JMU is considered to be a non-traditional MS4. Due to this unique structure, some of the traditional program elements will need to be modified or may not be entirely applicable. Concerning the interpretation of "public" as it relates to the university for education, outreach and involvement, JMU considers its employees as part of the "public" for the purposes of compliance with this permit. This is in line with EPA's statement regarding "public" and its applicability to MS4 Programs administered by state entities as published in the Federal Register, Volume 64, No. 235 page 68,750 on December 8, 1999.

2.3 Program Evaluation

In accordance with the provisions of 9VAC25-890-40 Section II.E, James Madison University will annually evaluate the MS4 Plan for program compliance, the appropriateness of identified BMP's and the progress towards achieving the identified measurable goals. The information gathered for including in annual reports will determine if BMP's are effective as is, or if modifications are needed.

JMU's MS4 Plan has been evaluated by staff and with the included annual report achievements and modifications listed in section 5.7 has been found to be compliant with the requirements of applicable regulations.

SECTION 3: MINIMUM CONTROL MEASURES



The Phase II MS4 Program requirement found in 9VAC25-890-40 Section II.A states:
"*The operator of a small MS4 must develop, implement, and enforce a MS4 Program designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practicable (MEP), to protect water quality, to ensure compliance by the operator with water quality standards, and to satisfy the appropriate water quality requirements of the Clean Water Act and its attendant regulations. The MS4 Program must include the minimum control measures described in paragraph B of this section. Implementation of best management practices consistent with the provisions of an iterative MS4 Program required pursuant to this section constitutes compliance with the standard of reducing pollutants to the "maximum extent practicable," protects water quality in the absence of a TMDL wasteload allocation, ensures compliance by the operator with water quality standards, and satisfies the appropriate water quality requirements of the Clean Water Act and regulations in the absence of a TMDL WLA.*"

The six minimum control measures described in 9VAC25-890-40 Section II.B are:
1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The following are James Madison University's best management practices (BMPs) that have been developed in order to meet the minimum control measures.

3.1 MCM 1: Public Education and Outreach on Stormwater Impacts

This section describes the best management practices that will be implemented in order to meet regulatory requirements for public education and outreach on stormwater impacts as set forth by Section II.B.1 of the General Permit found in 9VAC25-890-40.

3.1.1 BMP: Stormwater Management Website

Program Description: Provide information on the JMU website regarding the impacts of stormwater runoff and steps people can take to reduce stormwater pollution. The website will also have information on the JMU MS4 plan and general information about illicit discharge detection and elimination. JMU's stormwater information can be found on the web at http://www.jmu.edu/stormwater.

Measurable Goals / Expected Results: Record the number of pageviews to the Stormwater Management Website. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Annual Report Achievements/Notes: The JMU Stormwater Management website (www.jmu.edu/stormwater) is reviewed/updated on a regular basis to ensure accurate and up-to-date information is available to the public. The following table shows Pageviews, using Google Analytics, for stormwater related web pages:

Page Description	Pageviews
Stormwater Main Page	410
IDDE Information	72
MS4 Information	204
Site Plan Review	174
FAQ	40
Total	900

Schedule of Activities: Evaluate website annually and update as necessary.

Responsible Department: Engineering and Construction - Sustainability

3.1.2 BMP: Classroom Education on Stormwater Impacts

Program Description: A variety of classes are offered at the University that cover issues related to the impact of urban stormwater runoff on the environment.

Measurable Goals / Expected Results: Record the number of classes that are offered at the University that cover stormwater impacts. Increase the overall awareness of the impacts of stormwater among the students at the University.

Annual Report Achievements/Notes: Cross Disciplinary Studies (CDS) 301 was taught in Spring 2017, with 6 students. This was a special topics course that served as the capstone for the Environmental Science Minor. The topic was Water Quality in the Shenandoah Valley, and one component of the class was the effects of urban sources, including stormwater. The students completed their studies with a presentation of a website they created which can be found at https://mcalliea.wixsite.com/waterquality .

Three sections of ISAT 321 (Fundamentals of Environmental Science and Technology II) were taught in Spring 2017. These classes included a total of approximately 66 students. ISAT 321 specifically covers stormwater impacts and best management practices designed to reduce those impacts.

One section of GEOG 427 (Water Resources of the World) was taught in Fall 2016. Seventeen students in the Geographic Science program completed the course which included a unit on stormwater management and a project to evaluate ways to reduce stormwater runoff on a local property with extensive impermeable surface area.

Schedule of Activities: Courses will be taught as scheduled by the academic departments.

Responsible Department: Various Academic Departments – Integrated Science & Technology

3.1.3 BMP: Recycling & Trash Management

Program Description: Provide information on JMU's website regarding recycling & trash management and work with the Office of Environmental Stewardship & Sustainability to promote recycling activities. The mission statement of the Recycling Department is "to reduce the flow of waste and materials into the landfill, educate the JMU community on the proper disposal of waste items as well as the future impact of global waste stream issues".

Measurable Goals / Expected Results: Record the participation and amount of material that is recycled annually. JMU currently recycles more than 25% of its waste materials which exceeds the state guideline. Continue to meet or exceed the state guideline for recycling and "keep resources out of our waste stream".

Annual Report Achievements/Notes: The University's recycling rate for calendar year 2016 was 43%. Approximately 6,850,056 pounds of waste was received and 2,963,816 pounds was recycled.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Recycling/Waste Management

3.1.4 BMP: Proper Disposal & Reduction of Hazardous Materials

Program Description: The University's Environmental Health Coordinator performs informal "area tours" to check for potential problems and assists in identifying hazardous materials which are no longer necessary and may be properly disposed of.

Measurable Goals / Expected Results: During area tours, ensure all safety and health issues, including improper storage and/or handling of hazardous materials, are noted and communicated to the responsible parties. Follow-up to verify that issues have been satisfactorily addressed and to facilitate on-going compliance and environmental stewardship. Assist all areas of the University in identifying, and determining proper disposal for unnecessary hazardous materials. Unnecessary hazardous materials will be identified and properly disposed of reducing their likelihood of polluting the environment. Report amount and type of hazardous materials disposed of during permit cycle.

Annual Report Achievements/Notes: There were 878 containers of hazardous waste that were disposed of from academic areas, studio spaces, support facilities, and the University Health Center Pharmacy. All waste was effectively managed to ensure that no Small Quantity Generator (SQG) limits were exceeded.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Police & Public Safety - Risk Management

3.1.5 BMP: Office of Environmental Stewardship and Sustainability

Program Description: The Office of Environmental Stewardship and Sustainability (OESS) is responsible for facilitating implementation of JMU's 18th defining characteristic, "The University will be an environmentally literate community whose members think critically and act, individually and collectively, as model stewards of the natural world." OESS has a role in carrying out the mission and vision of the university with regard to environmental stewardship.

The OESS coordinates the Institute for Stewardship of the Natural World (ISNW). The ISNW is currently divided into four committees with over 100 stakeholders who advance environmental stewardship via annual recommendations and programs that advocate for best environmental practices.

Measurable Goals / Expected Results: Document the activities that the OESS is participating in that facilitate environmental stewardship as it relates to stormwater. Improved coordination and communication between various departments within the University regarding their efforts towards environmental sustainability.

Annual Report Achievements/Notes: On September 12, 2016 a tour was given to 190 students highlighting the sustainability and stormwater management practices implemented at the East Campus Dining Hall.

During the weeks of September 19th and September 26th, 2016, tours were given to a total of 160 students highlighting the sustainability and stormwater management practices used at Wayland Hall, East Campus Dining Hall and the Hillside project.

Also, during the weeks of March 27th and April 3rd, 2017, tours were given to a total of 160 students highlighting the sustainability and stormwater management practices used at Wayland Hall, East Campus Dining Hall and the Hillside project.

Schedule of Activities: Activities will be coordinated by the OESS.

Responsible Department: Access and Enrollment Management - Office of Environmental Stewardship and Sustainability

3.1.6 BMP: Distribute Educational Materials/Promote Education

Program Description: Seek innovative methods to distribute information related to stormwater impacts to students and staff. Three main issues have been identified as; (i) public awareness and reporting of water quality issues, (ii) litter prevention at outdoor athletic events, and (iii) pollution prevention related to facilities management operations. These three issues have been selected as they target audiences that are most likely to have significant impacts on stormwater quality. Possible methods of increasing public knowledge include; printed materials (newspaper advertisements, brochures, flyers, etc.), signage, websites, social media, training (seminars, presentations), and other activities deemed appropriate. As with most targeted audiences, there will be some overlap in promotion.

Public Awareness of Pollution Prevention and Reporting of Water Quality Issues

Rationale: Illicit discharges to the MS4 can be acutely harmful to aquatic life, and pose a risk to health and safety on campus. These factors make it a critical issue of which the entire university community should be aware. The focus of this high priority issue is recognizing and reporting illicit discharges (water quality issues). While minimum control measure 3 requires JMU to "promote, publicize, and facilitate public reporting of illicit discharges into or from" the MS4, the general public doesn't necessarily know how to identify or prevent such, or why. To maximize outreach effectiveness, this issue will combine education on general awareness with outreach on reporting water quality issues on campus.

Target Audience: Stormwater literacy and illicit discharges are general awareness issues, and thus affect everyone on campus. An illicit discharge could be noticed by anyone, at any time, necessitating broad outreach to the campus community. The target audiences for these issues include the faculty (1,400), staff (2,600), and students (20,000). Faculty and staff are considered long-term members of the university community, and as such, will receive outreach on this topic cumulatively over the years. Students are short-term members of the campus community, but will carry these lessons with them when they move on. Together these groups are the eyes and ears of the stormwater management staff, and play a critical role in addressing illicit discharges on campus.

Annual Report Achievements/Notes: The following methods were utilized in efforts to reach the target audience for public awareness of pollution prevention and reporting of water quality issues.

Description	Estimated # of people reached	% of target audience
Stormwater Pollution Prevention ad in JMU's "the Breeze" publication. With a circulation of 9,500 people, the Breeze serves a readership of more than 22,000 including more than 18,000 students, 3,000 faculty and staff and members of the Harrisonburg community. In addition, local businesses receive more than 1,000 free copies of the Breeze for their patrons. (September 1st, 2016)	4,750	20%
Stormwater Pollution Prevention poster at Carrier and Rose Libraries. (Ongoing)	9,750	42%
Table tent advertisement at campus dining hall. (Weeks of August 29th and September 5th 2016)	9,750	42%
Social media advertisement on JMU's Facebook/Twitter page. (September 2016)	5,200	22%
Storm drain markers. (Ongoing)	6,300	27%
FM training and class presentations.	1,085	4.5%

Litter Prevention at Outdoor Athletic Events

Rationale: JMU welcomes a large number of visitors, in addition to faculty, staff, and students to events that take place on campus. While JMU hosts other outdoor events, there are none that are as numerous and regularly scheduled as athletic events. Athletic events are more prone to create litter than normal campus activities and events, as attendees often participate in tailgating and other activities, involving eating, drinking, and vending in outdoor areas for extended periods of time, and the use of disposable items is the norm. Various promotional debris related to these events can also be left behind at the facilities, in the parking lots, and on the roads. Thus, targeting outdoor athletic events maximizes the opportunity to reduce litter on campus.

By rain and wind, litter can end up in drainage ways, storm sewers, stormwater controls, and ultimately Sibert Creek and Blacks Run. While JMU's Landscaping Department is tasked with cleaning up the debris created by athletic events, there is the opportunity to reduce litter before it is created. Preventing litter from entering stormwater infrastructure is a priority.

Target Audience: JMU will focus on football game attendees. Football games account for approximately 94% of outdoor athletic event activity, accounting for the audience that is most likely to create the largest amount of

litter, and providing the best potential for litter prevention outreach. The population size of the target audience is approximately 22,000 people per game. All other outdoor athletic events combined attract only approximately 300 people per event. This includes seven additional sports team schedules including track, soccer, lacrosse, baseball, softball, field hockey and tennis.

Annual Report Achievements/Notes: The Athletics Department has committed to making at least two public service announcements at each outdoor event to promote pollution prevention by requesting spectators to be responsible and discard all wastes in the trash and recycling receptacles located throughout the sports facility. With approximately 130,000 spectators at about 90 events, these targeted announcements are expected to reach more than 90% of the target audience.

Pollution Prevention Related to Facilities Management Operations

Rationale: JMU manages a wide variety of land and infrastructure that allows each student to be well prepared in the educational process. These facilities require operation and maintenance using materials and methods that can pose a risk to water quality. Examples include housekeeping, fueling stations, solid waste facilities, energy generation, landscaping, and snow removal. These operations are likely the biggest threat to water quality on campus, qualifying them as a high priority issue on which to focus outreach activities. Risks to water quality will be minimized by performing outreach on basic watershed and stormwater literacy, laws and regulations, and appropriate management techniques to minimize stormwater pollution.

Target Audience: As a nontraditional MS4, one segment of JMU's public is its staff (~1,530 total people). Facilities management (FM) staff (~593 people) is the segment of the staff that is most likely to have an effect on water quality, as it is responsible for the operations described above. FM staff is the target audience for this high priority issue.

Annual Report Achievements/Notes: Facilities Management is primarily responsible for maintenance of buildings and grounds. Annual training was held during the months of March and April. JMU's Stormwater Management Training Guide was used for training and provided basic information on stormwater management, pollution prevention, JMU's stormwater programs, policies & procedures, local waterways, IDDE and how to report, and best management practices for good housekeeping. This training reached 420 out of the total 593 facilities management staff. The annual training provided was able to reach 71% of the target audience.

As part of FM's new employee orientation, 14 presentations with an introduction to the same material presented in the guidebook was given for 85 new employees.

Measurable Goals / Expected Results: Record the number of methods utilized to distribute information to the target audiences described above. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Schedule of Activities: Utilize adequate and similar methods previously used aimed at reaching at least 20% of the estimated target audience for each priority issue annually.

Responsible Department: Engineering and Construction - Sustainability

3.1.7 BMP: Pollution Reporting Hotline

Program Description: Create and publicize a phone number and email that students and staff can call to report illicit discharges or other pollution issues. Use the creation of a pollution hotline to educate staff and students of the hazards of illicit discharges and improper waste disposal. The stormwater pollution hotline can be found on the main JMU stormwater web page and illicit discharge detection and elimination webpage.

Measurable Goals / Expected Results: Track the number of calls or emails received through the hotline. Increase the public knowledge of the implications of illicit discharges and improper waste disposal.

Annual Report Achievements/Notes: Four notifications of possible illicit discharges were reported through the pollution hotline.

On Sunday August 7th, 2016 at 11:28am an email was received stating there was a discharge coming from a trailer that was being used to treat ground water from a fuel leak from an adjacent gas station. A visit was made to the site by noon to confirm water was flowing from the trailer. There was evidence of sediment and a slight sheen to the leak and fuel odor. Emergency contact listed for the trailer was notified, and the Fire Department was called in to assess the leak. Fire Department considered the leak to be a "non-issue" at 1:10pm. Contractor was on-site later that evening and replaced a ruptured hose on the post-treatment of the filters, so the leak was treated water. DEQ Regional Office was notified of the issue and the investigation was closed on August 8th.

On Friday November 18, 2016 at 2:17pm an email was received that an individual was observed dumping gasoline at the C-16 parking lot. Police, fire, and JMU Hazwoper were notified prior to notification on the hotline and had arrived on-site by 1:30pm. An estimated 2 gallons of gasoline had been dumped in a graveled area of the parking lot. Fire and police saw no immediate concern to public safety as the Hazwoper team was prepaired for clean-up. Contaminated soil was excavated, collected and removed for proper disposal as hazardous waste. Individual that dumped the material has not been able to be identified. Site was revisited on 11/28/16 and investigation was closed.

On Tuesday April 11, 2017 at 2:00 a message was received stating a section of Siberts Creek was white/milky in color. Investigation revealed that the substance was calcium carbonate that was washed down from an irrigation line break that infiltrated into a steam manhole. According to MSDS, and confirmed with DEQ, material determined to be non-hazardous and did not require mitigation. JMU grounds did clean-up as best as possible. Non-emergency discharge report completed and filed with DEQ at 3:30pm and investigation closed.

On Monday June 12, 2017 at 9:40am a discharge was observed coming from a trailer that was being used to treat ground water from a prior fuel leak from an adjacent gas station. There was evidence of sediment and a slight sheen to the leak and fuel odor. Triad Engineering and DEQ Regional Office was immediately notified, and responsibility for corrective actions put on Triad for cleanup. Issue was resolved by the end of the day. Investigation closed on 6/12/17.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.1.8 BMP: Storm Drain Marking Campaign

Program Description: The University has purchased stainless steel storm drain markers which state "No Dumping - Drains to Stream". The markers will be installed on storm drain inlets across campus.

Measurable Goals / Expected Results: Document the number of inlets that are marked across campus on an annual basis. Increased public knowledge and awareness of the fact that stormwater drains to waterways and not a public treatment facility.

Annual Report Achievements/Notes: A total of 3 markers were installed on storm drains this permit cycle. These were placed on new inlets as part of completion of the Madison Hall Renovation project.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.2 MCM 2: Public Involvement/Participation

This section describes the best management practices that will be implemented in order to meet regulatory requirements for public involvement/participation as set forth by Section II.B.2 of the General Permit found in 9VAC25-890-40.

3.2.1 BMP: Forming Partnerships

Program Description: James Madison University seeks to build active partnerships with local groups and government agencies in respect to stormwater concerns to share information and resources whenever possible.

Measurable Goals / Expected Results: Record the partnership activities that JMU is involved in over the course of annual reporting period. The formation of partnerships will help to pool resources to complete shared objectives and provide for a consistent message to nearby municipalities.

Annual Report Achievements/Notes: JMU continues to partner with the City of Harrisonburg for the Annual Blacks Run CleanUp Day (See BMP 3.2.5). JMU also continues to have active membership in the Virginia Municipal Stormwater Association (VAMSA). Faculty/Staff are also involved in the Friends of the Shenandoah River, the Pure Water Forum and the Shenandoah Valley Soil & Water Conservation District. Refer to section 5.16 for additional information.

JMU is also a member of the Central Shenandoah Stormwater Network. This network is administered by the Central Shenandoah Planning District Commission and is made up of stormwater managers from the Cities of Harrisonburg, Staunton, and Waynesboro, Augusta and Rockingham Counties, James Madison University, and the Town of Bridgewater. The group meets quarterly to discuss matters related to the local stormwater programs.

Schedule of Activities: Continue involvement with partnerships as opportunities become available.

Responsible Department: Engineering and Construction - Sustainability

3.2.2 BMP: Promote Availability of MS4 Program Plan & Reports

Program Description: Publish MS4 Program Plan and annual reports on Facilities Management website. Also provide printed copies of the MS4 Program Plan and annual reports to interested parties. Public comment on the MS4 Program Plan is always available through the Stormwater Coordinator. Contact information is provided on the stormwater and MS4 web pages at http://www.jmu.edu/sustainability/Stormwater

Measurable Goals / Expected Results: Keep website up to date with stormwater related material. Increase the accessibility of the information regarding the efforts JMU is taking to improve stormwater quality.

Annual Report Achievements/Notes: An up-to-date copy of JMU's MS4 Program Plan is provided on the Facilities Management webpage at www.jmu.edu/stormwater. Copies of annual reports are also available.

Schedule of Activities: Update website as necessary to include program plan modifications

Responsible Department: Engineering and Construction - Sustainability

3.2.3 BMP: Encourage Student Efforts to Improve Stormwater Quality

Program Description: Continue to support student efforts to improve stormwater quality by providing information and materials whenever possible.

Measurable Goals / Expected Results: Record the number of student activities that occur each semester which relate to stormwater quality. Increase the effectiveness of student activities by providing assistance whenever possible.

Annual Report Achievements/Notes: Cross Disciplinary Studies (CDS) 301 was taught in Spring 2017, with 6 students. This was a special topics course that served as the capstone for the Environmental Science Minor. The topic was Water Quality in the Shenandoah Valley, and one component of the class was the effects of urban sources, including stormwater. The students completed their studies with a presentation of a website they created which can be found at https://mcalliea.wixsite.com/waterquality .

Two students worked with faculty as undergraduate researchers investigating the impacts of stormwater in JMU's Arboretum. This project was associated with the stream restoration project sponsored by the National Fish and Wildlife Foundation (NFWF). NFWF supported the physical and ecological restoration of 1080 linear feet of impaired stream within JMU's Arboretum. Students monitored the success of the restoration project by monitoring stormwater quality prior to, during, and following the restoration project. Nitrogen, phosphorus, and suspended sediment loads were monitored upstream and downstream of the restoration area during four storm events.

Schedule of Activities: Offer assistance to students when requested.

Responsible Department: Engineering and Construction - Sustainability, and Integrated Science & Technology

3.2.4 BMP: Student Water Quality Testing

Program Description: Students from the ISAT 320 class (Fundamentals of Environmental Science and Technology I) perform water quality sampling of tributaries within the North River watershed, including Blacks Run. Parameters measured include specific conductivity, pH, dissolved oxygen, nitrogen, phosphorus, and Fecal Coliform / E. Coli counts. In addition, students performed biological and physical habitat assessments of macro-invertebrates and fish communities.

Measurable Goals / Expected Results: Record the number of students and sections of this course that is offered each semester. Increase the awareness of local water quality issues within the student body.

Annual Report Achievements/Notes: The ISAT 320 (Fundamentals of Environmental Science and Technology I) course offered 3 sections in the fall with a total of approximately 70 students. This course included a 6-week water project that incorporated surveys of water quality, fish and macroinvertebrate communities, and physical habitat within the North River watershed. The ISAT 112 (Issues in Environmental Science and Technology) course offered 6 sections in the fall and 6 sections in the spring for a total of 286 students. This course included water quality testing of water bodies on JMU's campus.

Students from the ISAT 112 class (Issues in Environmental Science and Technology) perform water quality sampling of on-campus waterbodies including the Arboretum Pond, ISAT Retention Ponds, Siebert Creek, and Newman Lake. Parameters measured include phosphorus, nitrate, pH, dissolved oxygen, and hardness.

Schedule of Activities: This course is scheduled to be offered in the fall semester.

Responsible Department: Academic Department – Integrated Science & Technology

3.2.5 BMP: Stream Clean-up Events

Program Description: Participate with the City of Harrisonburg in stream clean-up events.

Measurable Goals / Expected Results: Document the activities that JMU students or staff participate in related to stream clean-ups. Increase the awareness among students and staff of the opportunity to help improve the local water quality through these events.

Annual Report Achievements/Notes: Approximately 516 volunteers collected about 3.24 tons of trash during the 20th Annual Blacks Run Clean-Up Day held on Saturday April 8th, 2017. Several JMU sororities, clubs and alumni participated in this event. A "Green Scene" was also available with many organizations provided information related to water quality and pollution prevention.

Schedule of Activities: Blacks Run/Downtown Clean-Up Day occurs annually in April.

Responsible Department: Engineering and Construction – Sustainability

3.3 MCM 3: Illicit Discharge Detection and Elimination

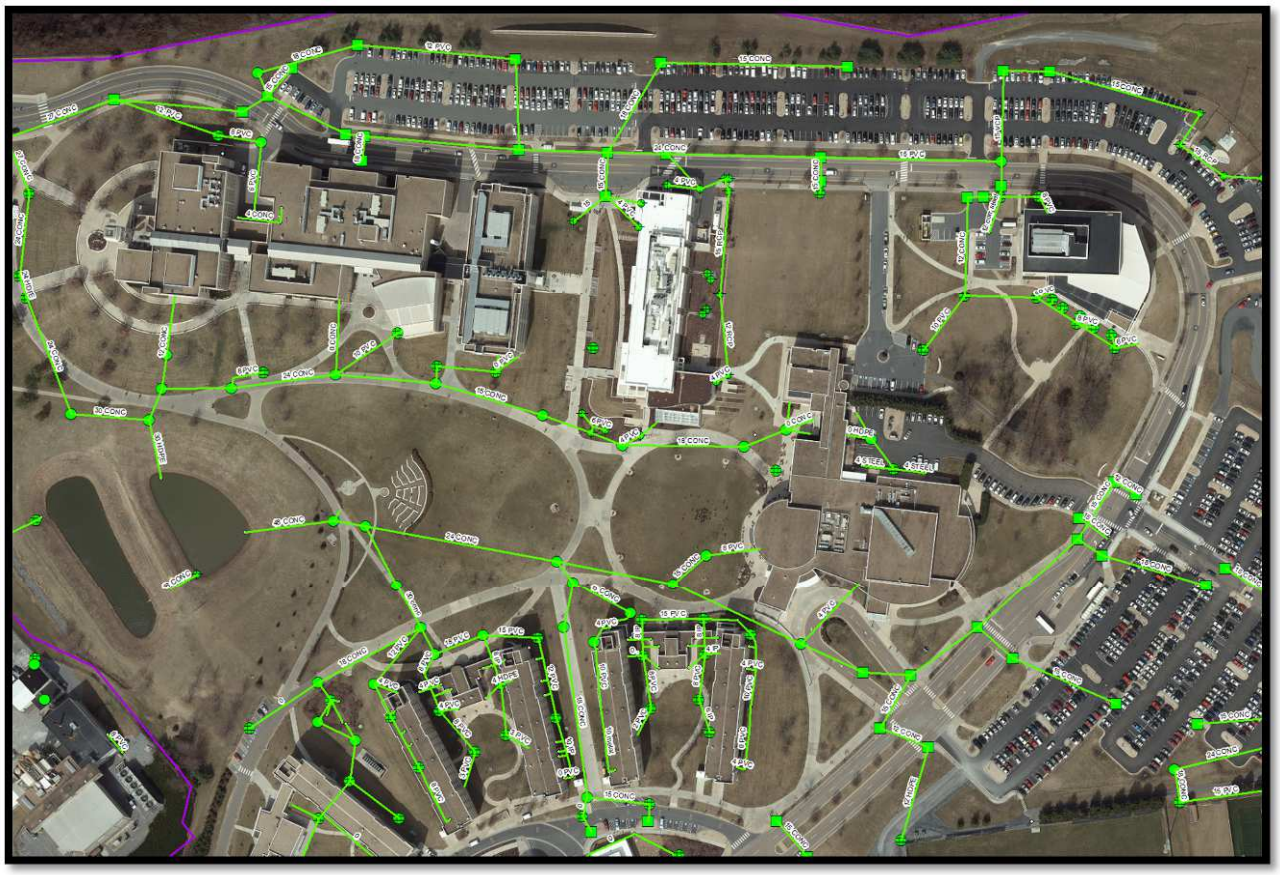
This section describes the best management practices that will be implemented in order to meet regulatory requirements for illicit discharge detection and elimination as set forth by Section II.B.3 of the General Permit found in 9VAC25-890-40.

3.3.1 BMP: Storm Drain System Map

Program Description: The University currently has a storm sewer system GIS map and corresponding database. This map contains locations and attributes of the entire storm sewer system maintained by JMU and includes culverts, pipes, inlets, catch basins, trench drains, and outfalls. MS4 outfalls are further identified to include receiving waters, HUC, a unique identifier, estimated MS4 acreage served and any applicable TMDL's. This GIS data is used for illicit discharge tracking and recording maintenance activities.

Measurable Goals / Expected Results: Continue to update and maintain GIS map to ensure all known structures are located. An accurate and up-to-date storm sewer system map will aid in illicit discharge detection and elimination.

Annual Report Achievements/Notes: JMU's GIS data is continually updated as new structures are built, located and/or removed. Refer to appendix D for JMU's stormwater outfall map and outfall ID list.



Schedule of Activities: GIS position will update map as new structures are completed. Report completed projects that are added to the storm sewer system.

Responsible Department: Engineering and Construction - Sustainability

3.3.2 BMP: Stormwater Outfall Inspections

Program Description: Conduct field investigations and inspections of MS4 stormwater outfalls. Monitor for dry weather discharges using visual observation, odor and other indicators to identify for possible illicit discharges.

Measurable Goals / Expected Results: Maintain records of outfalls that were inspected and number of illicit discharges detected. Prompt detection and elimination of illicit discharges.

Annual Report Achievements/Notes: A total of 105 inspections were conducted on the 105 outfalls within JMU's jurisdiction. No illicit discharge were noticed during annual outfall inspections.

Approximately $915 was spent for inspections, maintenance and repairs related to stormwater outfalls.

Schedule of Activities: Continue current program and evaluate annually. At a minimum, inspect at least 50 of outfalls per year.

Responsible Department: Engineering and Construction - Sustainability

3.3.3 BMP: IDDE Policy & Procedures

Program Description: Being a non-traditional MS4, JMU will implement a campus wide IDDE policy which will include procedures for the detection and elimination of illicit discharges. Refer to appendix B for a copy of JMU's IDDE policy.

Measurable Goals / Expected Results: Policy will be updated as needed to remain compliant with applicable regulations. Students, faculty, staff, contractors, affiliates and visitors of JMU will have access to IDDE policy and procedures via JMU's website.

Annual Report Achievements/Notes: An IDDE Policy & Procedures document was created and approved campus wide in February 2014. No policy modifications were made this report period. An internal work flow document has been developed and is updated as needed explaining the processes for following aspects of the approved policy and procedures.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.3.4 BMP: Spill Prevention Control & Countermeasure (SPCC) Plan

Program Description: A SPCC Plan was initially prepared for the University in 1975 to establish procedures to prevent discharges of oil from facilities and to contain such discharges should they occur. Continue to implement plan to reduce the risk of hazardous substances from entering the storm sewer system.

Measurable Goals / Expected Results: Maintain and update SPCC plan as needed. Reduce the risk of hazardous substances from entering the storm sewer system.

Annual Report Achievements/Notes: No changes were made to the JMU SPCC plan this reporting period. The SPCC was last updated in January 2015.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Power Plant

3.3.5 BMP: Trace and Remove Illicit Discharges

Program Description: Promptly address illicit discharges and utilize storm sewer system map to determine source of discharge. Determine best method of eliminating the discharge in a timely manner.

Measurable Goals / Expected Results: Track the number of illicit discharges detected and eliminated through a database. Timely removal of illicit discharge from storm sewer system.

Annual Report Achievements/Notes: See notes from BMP 3.1.7, 3.3.2 and 3.4.7.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction – Sustainability, FM - Operations

3.3.6 BMP: Illicit Discharge Detection & Elimination (IDDE) Education

Program Description: Refer to BMP 3.1.6, 3.1.7, 3.1.8 and 3.6.7. Establish pollution reporting hotline and storm drain marking campaign to increase awareness of what illicit discharges are.

Measurable Goals / Expected Results: Refer to BMP 3.1.6, 3.1.7, 3.1.8 and 3.6.7. Increase the awareness among students and staff that storm drains are only intended to receive stormwater.

Annual Report Achievements/Notes: Annual stormwater training was conducted in the months of March and April to 420 employees providing basic information on stormwater management, pollution prevention, JMU's stormwater programs, policies & procedures, local waterways, IDDE and how to report, and best management practices for good housekeeping. There were also 14 FM new employee orientations held throughout the year for 85 new hires providing similar information.

Schedule of Activities: Refer to BMP's 3.1.6, 3.1.7, 3.1.8 and 3.6.7.

Responsible Department: Engineering and Construction - Sustainability

3.3.7 BMP: Notification of Downstream MS4 Interconnections

Program Description: Notify downstream MS4's of known physical interconnections.

Measurable Goals / Expected Results: Record when notification was given to the City of Harrisonburg. The City of Harrisonburg and VDOT has been made aware of JMU's physical interconnection with their system.

Annual Report Achievements/Notes: In June of 2014, both the City of Harrisonburg and VDOT was informed of our continued interconnection with their stormwater conveyance systems. A meeting was later held with VDOT on October 3rd, 2014 and the City of Harrisonburg on March 4th, 2015 to further discuss interconnections, IDDE, and drainage areas. Following these meetings, an agreement was made with VDOT on October 9th, 2014 and a MOU with the City on June 26th, 2015 regarding how our municipalities would handle interconnections, IDDE and drainage areas. Until notified otherwise, we have acknowledged that we will continue to have interconnections between our systems. Mapping data is available upon request.

Schedule of Activities: Notification of MS4 interconnection has been sent to MS4's downstream.

Responsible Department: Engineering and Construction - Sustainability

3.4 MCM 4: Construction Site Stormwater Runoff Control

This section describes the best management practices that will be implemented in order to meet regulatory requirements for construction site stormwater runoff control as set forth by Section II.B.4 of the General Permit found in 9VAC25-890-40. Progressive compliance and enforcement shall be met through the use of the following BMP's.

3.4.1 BMP: ESC/SWM Annual Standards and Specifications

Program Description: JMU initially received approval from DCR to operate its own erosion and sediment control program under a set of annual standards and specifications on July 6, 2009. JMU continues to submit standards and specifications to DEQ on a regular basis to continue its program. JMU included stormwater

management to its annual standards and specifications in response of amended stormwater regulations. Combined ESC/SWM Annual Standards and Specifications was originally approved by DEQ on May 28, 2014. Refer to Appendix A for a complete copy of the JMU Annual Standards and Specifications for ESC & SWM.

Measurable Goals / Expected Results: JMU's Annual Standards and Specifications for ESC & SWM shall be kept current. With annual submissions, standards will keep up to date with any changes DEQ implements into the Virginia Erosion and Sediment Control Laws and Regulations, and the Virginia Stormwater Management Laws and Regulations.

Annual Report Achievements/Notes: JMU's Annual Standards and Specifications for ESC & SWM is up to date and was last approved by the DEQ Central Office on July 21, 2016. Staff and consultants with DEQ certifications can be found in the table below:

Certification	Person	Certificate Number	Expiration Date
Dual Combined Administrator	Dale Chestnut	DCA0106	10/15/2020
Dual Combined Administrator	Abe Kaufman	DCA0330	7/11/2020
SWM Plan Reviewer	Gil Colman	SWPR0264	2/22/2020
Responsible Land Disturber	Frankie Lucas	41740	4/7/2020
Responsible Land Disturber	Jack Losth	41742	4/7/2020

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.2 BMP: Requirement for ESC Plan and Review

Program Description: Site specific ESC plans shall be prepared for all JMU projects involving a regulated land-disturbing activity as defined in §62.1-44-15:51 of the Virginia Erosion and Sediment Control Law and submitted to JMU's Engineering and Construction department for review. Plans will be reviewed by a certified plan reviewer.

Measurable Goals / Expected Results: Plan review process will be able to be tracked through use of database and reports created as needed.

Annual Report Achievements/Notes: All JMU projects which disturb over 10,000 square feet, or are considered part of a larger common plan of development, were required to prepare and submit a plan for review with adequate erosion and sediment control (ESC) measures. Refer to section 5.12 for a list of active construction projects this reporting period. Following is a table showing site plans receiving ESC approvals this reporting period.

Project Name	Proposed Disturbed Acreage	Date Approved
East Grace and Mason Street Signal and Roadway Improvements	0.70	3/20/17

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.3 BMP: Contract Language

Program Description: 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 as issued by DGS is included in every contract and stipulates in Section 31(e) that:

"The Contractor shall have, On-Site, an employee certified by the Department as a Responsible Land Disturber who shall be responsible for the installation, inspection and maintenance of erosion control and stormwater management measures and devices. The Contractor shall prevent Site soil erosion, the runoff of silt and/or debris carrying water from the Site, and the blowing of debris off the Site in accordance with the applicable requirements and standards of the Contract and the Virginia Department of Conservation and Recreation's Erosion and Sediment Control Regulations and the Virginia Stormwater Management Regulations."

Measurable Goals / Expected Results: Ensure contractors comply with the Erosion and Sediment Control Law and attendant regulations and implement applicable ESC controls.

Annual Report Achievements/Notes: All site projects at JMU included contract language requiring certified personnel be on-site for land disturbing activities. Refer to section 5.12 for a list of projects requiring approved ESC plans for this permit cycle.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.4 BMP: Construction and Professional Services Manual

Program Description: 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. Furthermore, language is included in construction specifications for each project as required by CPSM 902.2.4 stating that contractors are responsible for satisfying any and all erosion control and stormwater management requirements for any land disturbing activities.

Measurable Goals / Expected Results: Ensure contractors obtain the necessary approval and applicable permits before any land disturbing activities begin.

Annual Report Achievements/Notes: All site projects at JMU received proper approval from local and state agencies before site work began. Refer to section 5.12 for a list of projects requiring and approved ESC and/or SWM plan for this permit cycle.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.5 BMP: Requirement for Pre-Construction Meeting with Contractors

Program Description: Prior to the commencement of regulated land-disturbance, a pre-construction meeting shall be held in order to clarify ESC/SWM roles, responsibilities and obligations of all parties involved with the land-disturbing activity. The meeting will be attended by the JMU Project Manager, JMU Construction Inspector, JMU Stormwater Coordinator, general construction permit operator (if applicable), and the project RLD. The DEQ's

Valley Regional Office will be notified of land-disturbing activities as outlined in Annual Standards and Specifications.

Measurable Goals / Expected Results: Approved plans will be able to be tracked through a database and reports created as needed. Ensure contractors fully understand the ESC and SWM measures shown in plans before construction begins.

Annual Report Achievements/Notes: Pre-construction meetings were held to discuss ESC measures and stormwater management facilities for all JMU site projects requiring an ESC and/or SWM plan. Refer to section 5.12 for a list of projects requiring ESC and/or SWM approval for this report year.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.6 BMP: Requirement for Construction Site Inspections

Program Description: Projects approved for land-disturbance shall be inspected for compliance with the approved plan and other requirements related to ESC and the VSMP, as applicable. A database shall be used to record inspections and violations for each project. Site inspections will be conducted by certified personnel. During site visits, applicable measures will be visually assessed to ensure continued performance of their intended function. Any comments and/or violations noted in an inspection report will be forwarded to the project manager, RLD, and/or any other persons of interest involved in the project.

Site inspections will be made during or immediately following initial installation of erosion and sediment controls, at least once in every two-week period, within 48 hours following any runoff producing storm event, and at the completion of the project.

Measurable Goals / Expected Results: Track the number of inspections and noted violations through the use of a database. Routine site inspections can help identify problems sooner to reduce ESC and SWM related problems.

Annual Report Achievements/Notes: A total of 330 construction site inspections were conducted over the reporting period on 14 projects. Alleged deficiencies observed on-site were noted as comments or corrective actions in inspection reports and were addressed in an acceptable manor and time frame, thus requiring no further methods of enforcement. Copies of inspection reports are kept on file and are available upon request.

Number of Inspections	Corrective Actions Issued	Violations Issued	Notices to Comply Issued	Stop Work Orders Issued
330	20	0	0	0

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.7 BMP: Pollution Reporting Hotline

Program Description: Establish a pollution reporting hotline and provide the public a method to share any information regarding stormwater runoff and construction activities. Any information submitted by the public concerning active construction projects will be reviewed by a JMU project manager.

Measurable Goals / Expected Results: Track the number of calls and emails received through the hotline number. Increase the public knowledge and awareness of issues regarding stormwater runoff from construction sites.

Annual Report Achievements/Notes: See BMP 3.1.7 for notifications of possible illicit discharges were reported through the pollution hotline.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.5 MCM 5: Post-Construction Stormwater Management

This section describes the best management practices that will be implemented in order to meet regulatory requirements for post-construction stormwater management as set forth by Section II.B.5 of the General Permit found in 9VAC25-890-40.

Please note that as a non-traditional MS4, JMU has not created special criteria for stormwater facilities on individual residential lots as this is not applicable. All known structural BMPs are included in the University's stormwater facility database and will be inspected and maintained to meet compliance with the stormwater regulations.

3.5.1 BMP: Requirement for SWM Plan and Review

Program Description: Site specific SWM plans shall be prepared for all JMU projects involving regulated construction activity as defined in 9VAC25-870-10 of the Virginia Stormwater Management Program Regulations and submitted to JMU's Engineering and Construction department for review. Plans will be reviewed by a certified plan reviewer.

Measurable Goals / Expected Results: Track the number of regulated construction activities and report the total disturbed acreage. Ensure construction activity operators obtain the necessary approval from DEQ for land disturbing activities.

Annual Report Achievements/Notes: All JMU projects which disturbed an acre or more, or were considered to be part of a larger common plan of development, were required to prepare and submit a plan for review. Refer to section 5.12 for a list of active construction projects for this reporting period. Following is a table showing site plans receiving SWM approvals this reporting period.

Project Name	Proposed Disturbed Acreage	Date Approved
East Grace and Mason Street Signal and Roadway Improvements	0.70 (Common plan)	3/20/17

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.5.2 BMP: Stormwater Management Facilities Policy

Program Description: Continue to implement the University's Stormwater Management Facilities Policy which sets forth requirements and procedures for stormwater BMP design, plan review, installation and approval, inspections, maintenance and reporting. Refer to appendix B for a copy of the policy.

Measurable Goals / Expected Results: Record the number of structural management facilities that are added to the University's BMP inventory and the number of inspections performed each year. Ensure structural stormwater management facilities are maintained and operating properly.

Annual Report Achievements/Notes: The Stormwater Management Facilities Policy was developed in July of 2009 and was last updated in November of 2015. No modifications were made this report period. An internal work flow document has been developed and is updated as needed explaining the processes for following aspects of the approved policy and procedures. Refer to Appendix B to view the policy.

One new BMP was brought on line and has been included in JMU's BMP database to ensure annual inspections and required maintenance. This brings JMU's total stormwater BMP inventory to 92. These additions to the BMP database are referenced in section 5.13.

A total of 125 inspections were performed on the structural BMP's. Several work orders were placed which included typical maintenance items. Major maintenance work included the re-construction of a bio-retention due to poor draining and work on an eroding ditch leading to a detention basin.

Approximately $128,000 was spent for inspections, maintenance and repairs of stormwater management facilities.

Schedule of Activities: Each stormwater management facility shall be inspected at least annually. Any required maintenance shall be documented and information forwarded for remedial work.

Responsible Department: Engineering and Construction - Sustainability

3.5.3 BMP: Map Structural BMP's

Program Description: Track all known permanent stormwater management facilities that discharge to the regulated small MS4.

Measurable Goals / Expected Results: Maintain list of facilities and other required information about facility. Report number of structural BMPs added to system. Comply with conditions of MS4 General Permit.

Annual Report Achievements/Notes: A GIS map and separate database continues to be updated with all known SWM facilities. See section 5.13 for a list of BMPs added this permit cycle.

Schedule of Activities: Map new structures as projects are completed.

Responsible Department: Engineering and Construction - Sustainability

3.6 MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

This section describes the best management practices that will be implemented in order to meet regulatory requirements for pollution prevention/good housekeeping for municipal operations as set forth by Section II.B.6 of the General Permit found in 9VAC25-890-40.

3.6.1 BMP: Spill Prevention Control and Countermeasure (SPCC) Plan

Program Description: A SPCC Plan was initially prepared for the University in 1975 to establish procedures to prevent discharges of oil from facilities and to contain such discharges should they occur. Continue to implement plan to reduce the risk of hazardous substances from entering the storm sewer system.

Measurable Goals / Expected Results: Maintain and update SPCC plan as needed. Reduce the risk of hazardous substances from entering the storm sewer system.

Annual Report Achievements/Notes: No changes were made to the JMU SPCC plan this reporting period. The SPCC was last updated in January 2015.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Power Plant

3.6.2 BMP: Hazardous Materials and Chemical Storage

Program Description: Inspect and evaluate storage locations and method of storing hazardous materials and chemicals to ensure compliance with State and EPA regulations and ensure proper disposal of these materials. Continue to phase out the use of hazardous materials and chemicals whenever possible.

Measurable Goals / Expected Results: Perform periodic audits to verify accuracy of the records and monitor overall inventory for opportunities to reuse, recycle, or reduce the amount of hazardous materials at JMU. Ensure hazardous materials are properly stored. Report the number of spills. Reduction in the overall presence of hazardous materials on Campus.

Annual Report Achievements/Notes: There were a total of 10 outdoor incidents that required JMU's HAZWOPER team for cleanup. All clean-ups were contained before transporting into the storm sewer system.

Date	Description	Approximate Amount
7/27/16	Oil spill.	1 gallon
7/28/16	Hydraulic hose leak.	1.5 pints
8/9/16	Transmission fluid leak from personal vehicle.	1 liter
8/26/16	Transmission fluid leak from a delivery truck.	1.5 quarts
9/2/16	Hydraulic hose break.	2 gallons
10/19/16	Dumpster juice near temporary dining building.	2 gallons
11/18/16	Vandalism, dumping of gasoline.	2 gallons
1/26/17	Gasoline spill from blown over moped.	1 gallon
4/7/17	Spill from diesel fuel pump.	1 gallon
4/11/17	Oil leak from vehicle accident.	< 1 gallon

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Police and Public Safety - Risk Management

3.6.3 BMP: Oil & Antifreeze Recycling

Program Description: Continue to collect and recycle used oil and antifreeze.

Measurable Goals / Expected Results: Monitor the locations where vehicle maintenance operations take place. Document any incidents where waste materials were improperly disposed of. Ensure waste materials are properly disposed of.

Annual Report Achievements/Notes: There were no documented incidents of improper disposal of oil and antifreeze from activities involving the Recycling/Waste Management Department this reporting period. Approximately 200 pounds of anti-freeze and 9,540 pounds of oil was recycled in 2016.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Recycling/Waste Management

3.6.4 BMP: Storage of Erodible Materials

Program Description: Evaluate the storage of all soil, sand and other erodible materials on campus to ensure proper techniques are being utilized to minimize stormwater pollution.

Measurable Goals / Expected Results: Monitor the locations where erodible materials are being stored to check for the possibility of stormwater pollution. Prevent the storage of erodible materials on campus from causing stormwater pollution.

Annual Report Achievements/Notes: JMU has a soil stockpile location that is operating under a current general construction permit. The project is known as the South Main Spoils Site (Eby Property), and is listed in section 5.12. JMU's Daily Operational Procedures for Stormwater Control Best Management Practices also describes procedures for managing smaller erodible material storage.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.6.5 BMP: Salt Storage, Application and Snow Removal

Program Description: Salt is currently stored in a shed on an impervious surface to minimize the amount of infiltration and runoff that leaves the site. The minimum amount of salt necessary is being used for deicing and more environmentally friendly alternatives are currently being evaluated by the Landscaping Department. Following a storm event where salt or other materials are applied, regularly scheduled street sweeping will occur to remove the materials from roadways and parking lots to prevent it from entering the storm sewer system. Also, whenever possible, snow stockpiles will be stored in a way that they do not block stormwater inlets and away from environmentally sensitive areas such as streams, lakes and swales.

Measurable Goals / Expected Results: Document the estimated amount of salt applied each winter and the other types of materials applied to aid in ice and snow removal. Ensure snow and ice removal on campus is done in a manner that minimizes stormwater pollution.

Annual Report Achievements/Notes: A salt shed continues to be used for mass storage. Approximately 400 tons of salt and 400 bags of purple heat were used this reporting period for snow/ice removal.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.6 BMP: Vehicle and Equipment Washing

Program Description: The University has a contract with a car wash vendor where the majority of vehicles are washed. Equipment is washed at the Sports Park facility or the Main Street Landscaping facility or as outlined in JMU's Daily Operational Procedures (Appendix B). Continue to work with the Landscaping Department to determine suitable locations to wash their equipment.

Measurable Goals / Expected Results: Monitor the locations where vehicles or equipment are washed and seek alternative washing practices to reduce stormwater pollution. Reduction in illicit discharges from vehicle and equipment washing operations.

Annual Report Achievements/Notes: Vehicle and equipment washing are done at approved locations. Approved locations for cleaning are mentioned during annual and new employee stormwater training.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.7 BMP: Employee Training

Program Description: A "Stormwater Pollution Prevention/IDDE" presentation and guidebook has been developed for use with employee training. Training is offered once a year for Facilities Management (FM) staff and during FM new employee orientations. Material in these presentations teach basic stormwater information, stormwater pollution prevention, good housekeeping measures, and how to recognize and report illicit discharges.

Appropriate emergency response employees shall have training in spill response.

Measurable Goals / Expected Results: Document the number of individuals which receive training when it is offered. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Annual Report Achievements/Notes: Annual stormwater training was conducted in the months of March and April to 420 out of a total of 593 FM employees. The training provided basic information on stormwater management, pollution prevention, JMU's stormwater programs, policies & procedures, local waterways, IDDE and how to report, and best management practices for good housekeeping.

As part of FM's new employee orientation, 14 presentations with an introduction to the same material presented in the guidebook was given for 85 new employees.

There are also a total of 24 team members on the HAZWOPER team that are certified in spill response.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.6.8 BMP: Parking Lot and Street Sweeping

Program Description: The University owns and regularly operates a street sweeper to pick up litter and debris from parking lots and streets on campus. All campus parking lots and streets are scheduled to be swept three times each month, or on an as needed basis, with additional measures taken to address the cleanup of parking lots that are used during football games.

Measurable Goals / Expected Results: Record the number of times the street sweeper cleans campus streets and parking lots and/or hours spent street sweeping. Reduce the amount of sediment and debris that enters the storm sewer system from streets and parking lots.

Annual Report Achievements/Notes: The landscaping department spent approximately 198 hours on street and parking lot sweeping. Streets and parking lots are swept as needed, along with as needed due to weather related and special events. JMU now has two street sweepers and one smaller parking deck sweeper. There was 11.03 tons of materials taken to the landfill or Green Earth this reporting period.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.9 BMP: Storm Structure Maintenance and Cleaning

Program Description: Storm structures are inspected and cleaned by Facilities Management staff to ensure they remain free of obstructions and to prevent sediment and other pollutants from entering the storm sewer system.

Measurable Goals / Expected Results: Record the number of structures cleaned and/or man-hours spent performing maintenance on storm structures. Reduce the amount of sediment and debris that enters the storm sewer system.

Annual Report Achievements/Notes: Landscaping spent approximately 483 man hours inspecting, cleaning and performing other needed maintenance to storm drains on campus during this reporting period.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Landscaping

3.6.10 BMP: Outdoor Trash, Ground Litter and Landscaping Debris Collection

Program Description: The Recycling Department oversees the collection of outdoor trash and ground litter. The mission statement of the Recycling Department is "to reduce the flow of waste and materials into the landfill, educate the JMU community on the proper disposal of waste items as well as the future impact of global waste stream issues. The Grounds Department is responsible for the collection of landscaping debris and performs this activity on a regular basis. During the fall there are up to 20 people performing leaf collection daily.

Measurable Goals / Expected Results: Record the activities that the Recycling and Landscaping Department undertakes regarding outdoor trash, litter and landscaping debris collection. Reduce the amount of trash, ground litter, and landscaping debris that enters the storm sewer system.

Annual Report Achievements/Notes: There was approximately 5,200 total hours dedicated to ground litter cleanup during this report period, with four part-time employees working during the schools regular sessions at a combined 116 hours per week, and approximately 60 hours per week during the summer months.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: FM – Landscaping, and FM – Recycling/Waste Management

3.6.11 BMP: Fertilizer & Pesticide Application

Program Description: The application of all fertilizers and pesticides will be conducted in accordance with the Virginia Department of Agriculture and Consumer Services (VDACS) rules and regulations for agricultural chemical operations. The University currently has an Integrated Pest Management (IPM) program which seeks to control pests with a minimum of pesticide use while maximizing effectiveness and cost efficiency. The University also has a Nutrient Management Plan which outlines the proper application of fertilizer. Only property trained and/or certified employees or contractors will apply fertilizer or pesticides on campus.

Measurable Goals / Expected Results: Record the number of certified applicators for fertilizer and pesticides. Ensure the proper application of fertilizer and pesticides.

Annual Report Achievements/Notes: JMU has 20 Certified Fertilizer Applicators, 6 Certified Pesticide Applicators and 34 Registered Technicians.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.12 BMP: Nutrient Management Plan

Program Description: The University is currently implementing a Nutrient Management Plan. The Nutrient Management Plan covers all lawn and landscaped areas of the University that receive nutrients and outlines the rates and frequencies that nutrients may be applied. The plan also covers best practices to follow regarding the application of these nutrients. A copy of this plan can be located in the office of the Landscape Manager and the Stormwater Coordinator.

Measurable Goals / Expected Results: Maintain records of nutrient applications per requirements outlined in Nutrient Management Plan. Ensure nutrients are applied in a manner that will minimize their impact on stormwater quality.

Annual Report Achievements/Notes: NMP's are up to date. Application records are kept on file with FM Operations and are available upon request.

Plan Name	Acreage	Expiration Date
Main Campus	184.80	May 25, 2018
Supplemental Plan	41.82	November 1, 2018
Forest Hills Off Campus Properties	4.55	December 4, 2018
2868 S. Main St. Property	23.9	May 18, 2019
Total	255.07	

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability, and FM – Operations

3.6.13 BMP: SWPPPs for High-Priority Facilities

Program Description: SWPPP's shall be developed and implemented (as scheduled in state permit) for all high-priority facilities identified as (i) composting facilities, (ii) equipment storage and maintenance facilities, (iii) materials storage yards, (iv) pesticide storage facilities, (v) public works yards, (vi) recycling facilities, (vii) salt storage facilities, (viii) solid waste handling and transfer facilities, and (ix) vehicle storage and maintenance yards.

Measurable Goals / Expected Results: List the number of facilities/groups of facilities that have SWPPP's or will require SWPPP's.

Annual Report Achievements/Notes: SWPPP's were provided for implemented for the following facilities in May 2017:

Facility/Group	Type of Facility
Arboretum Storage Yard	Materials storage.
Memorial Hall Maintenance Shop	Maintenance shop.
R2 Lot Storage Yard	Materials and salt storage.
South Main Street Facilities HVAC	Maintenance shop.
South Main Street Facilities Recycling	Recycling.
South Main Street Facilities Salt & Other Material Storage	Material storage.
South Main Street Facilities Transportation	Vehicle storage and maintenance.
South Main Street Maintenance Facility by K Lot	Equipment Storage, maintenance shop, mulch storage.
University Park Maintenance Shop	Maintenance shop.
University Services Building & Annex	Equipment, vehicle and materials storage. Maintenance facilities.

Schedule of Activities: Continue to update existing SWPPP's as needed, and identify additional high-priority facilities as new development is completed.

Responsible Department: Engineering and Construction – Sustainability

3.6.14 BMP: Daily Operational Procedures

Program Description: Implement a policy with procedures for daily operations and maintenance activities associated with facilities management. This policy shall include written procedures designed to minimize or prevent pollutant discharge from: (i) daily operations such as road, street and parking lot maintenance; (ii) equipment maintenance; and (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. These procedures will be utilized as part of new FM employee orientation training.

Measurable Goals / Expected Results: Record the number of FM employees in attendance at FM new employee orientation and that receive annual stormwater training. FM employees will be made aware of proper procedures associated with daily operations and possible impacts on waterways. Policy will be updated as needed to remain compliant with applicable regulations.

Annual Report Achievements/Notes: The Daily Operational Procedures for Stormwater Control Best Practices Policy was developed in May of 2015 and was last updated in November of 2015 to include additional practices. No modifications were made this report period. An internal work flow document has been developed and is updated as needed explaining the processes for following aspects of the approved policy and procedures. Refer to Appendix B to view the policy.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction – Sustainability

SECTION 4: TMDL ACTION PLANS

In order to meet pollutant reductions required for the Chesapeake Bay, an Action Plan has been developed using guidance materials from the DEQ to outline the means and methods to be implemented in order to meet the required goals.

Before action plan guidance was circulated, two studies were completed to assist in determining the best way to meet the Chesapeake Bay TMDL. One study, completed by Vanasse Hangen Brustlin, Inc. (VHB) looked at two options: (1) Constructing a series of stand-alone stormwater improvement projects; and (2) Requiring all Capital Improvement Projects to reduce post-construction pollutant loading by roughly 2.25 times the required amount. The second study, completed by the Center for Watershed Protection (CWP), looked at meeting the required reductions through stormwater retrofits.

A combination of methods may be used in JMU's action plans to meet reduction goals. Refer to Appendix C to view JMU's Chesapeake Bay TMDL Action Plan.

Locally, Blacks Run has been listed as an impaired waterway and while a TMDL has been developed, there are currently no associated WLA's. The impairments include bacteria (fecal coliform and e. coli) and aquatic life (benthic-macroinvertebrate bioassessments) due to excess sediments. Existing BMPs, such as construction site inspections, IDDE and stormwater facility maintenance, currently assist in efforts to clean up Blacks Run.

Annual Report Achievements/Notes: No changes were made to the Chesapeake Bay TMDL Action Plan this report period.

Schedule of Activities: Continue current program and update as needed.

Responsible Department: Engineering and Construction – Sustainability

SECTION 5: ADDITIONAL INFORMATION

Following is additional information required as part of the annual report.

5.1 Modification to Operator's Department Roles & Responsibilities.

Sam Hottinger has taken over the role of GIS Coordinator as listed in section 1.2. Other than that change, there were no modifications to the operator's department roles and responsibilities this report period.

5.2 New MS4 Outfalls

Three MS4 outfalls were added this reporting period.

A new outfall (ID# BR-6728) was installed as part of new construction for the University Services Building Annex. The approximate drainage area to this outfall is 1.03 acres. This outfall took approximately 0.16 acres of drainage area from an existing outfall (ID# BR-7150) drainage area reducing its approximate drainage area from 10.13 to 9.97 acres.

As part of new property acquisition from the City of Harrisonburg (East Campus Power Plant, formerly City's Resource Recovery Facility), two new outfalls were added to JMU's inventory. ID# EC-3454 has an approximate drainage area of 0.28 acres and ID# EC-3666 has an approximate drainage area of 10.46 acres.

Please note that all campus outfalls drain either directly into Blacks Run, or into tributaries to Blacks Run. Tributaries are Sibert Creek, East Campus Creek, and West Campus Creek.

5.3 Signed Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure 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 is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print Name: Dale Chestnut Title: Stormwater Coordinator

Signature:  Date: 8-8-17

5.4 Status of Compliance with Permit Conditions

A review of the MS4 Program Plan currently implemented at JMU has found that we are in compliance with all conditions of the permit. An assessment of the identified BMP's has determined that they are appropriately addressing the minimum control measures outlined in the MS4 General Permit. The progress towards achieving identified measurable goals for each of the minimum control measures is included in Section 3 of this report.

5.5 Results of Information Collected and Analyzed

The results of information collected by the students in the Environmental Instrumentation course (BMP 3.2.4) is used for reference purposes only and is not included in this report.

5.6 Summary of Future Stormwater Activities

A summary of future activities for each BMP is listed in Section 3 with each individual BMP measure.

5.7 Modifications to BMP's or Measurable Goals

No modifications to BMP's or measurable goals were made this report period.

5.8 Notice that the Operator is Relying on another Government Entity

The University currently is not relying on another government entity.

5.9 Approval Status of any Programs Pursuant to Section II C

Currently, no existing program has required the implementation of any minimum control measures pursuant to Section II C.

5.10 Information Required for any applicable TMDL special condition contained in Section I

Other than the Chesapeake Bay TMDL, there are currently no other TMDLs with WLAs assigned to JMU.

5.11 Illicit Discharges Identified

Possible illicit discharges are identified in BMP's 3.3.2 and 3.6.2.

5.12 Regulated Land-Disturbing Activities

During this permit year, 14 regulated land-disturbing activities were active.

Project	Disturbed Acreage
Arboretum Stream Restoration	3.36
Bluestone Trail Extension	1.26
East Grace & Mason Street Signal and Roadway Improvements	0.70
East Tower	2.01
Farm Renovations	0.95
Gibbons Hall	3.52
Gibbons Hall Temporary Retail Building	0.44
Hotel Madison	2.85
Hunters Road Parcel Clean-Up Project	0.99
Madison Hall Renovation	1.90
Mason Street Parking Deck	3.15
South Main Spoils Site (Eby Property)	6.20
University Services Building Annex	3.64
UREC Addition	14.00
Total	44.97

5.13 New Stormwater Management Facility Data

During this permit year, 1 new BMP was added to JMU's database and GIS. As all the BMP's listed below were installed as part of a project under a Construction General Permit, specific details have been, or will be, provided to DEQ along with the permit Notice of Termination.

BMP Type	HUC	Impaired Water	Acres Treated	Description
Manufactured BMP	PS22	Blacks Run		Mason Street Parking Deck Hydrodynamic Separator

5.14 Third Party Agreements

The University has an agreement with the Central Shenandoah Planning District Commission (CSPDC) for the purposes of providing stormwater management site plan review to satisfy BMP 3.5.1. Review is completed by certified individuals.

5.15 MS4 Program Plan Comments

JMU's MS4 Program Plan is posted on-line for viewing and we accept comments at any time. The MS4 Program is also discussed during annual training and prior to requesting information for completing this annual report, all persons involved with submitting information as part of the annual report were asked to verify information on BMP's related to their department.

No comments were received concerning the MS4 Program Plan.

5.16 Compliance with Public Participation Pursuant to Section II B 2(b).

Following is a list of some of the activities that JMU participated in through promotion, sponsorship or other involvement this reporting period as required per section II B 2(b) of the permit.

Activity	Partner(s)	Timeframe
Faculty participates as supervisor of the volunteer water quality monitoring for the Friends of the Shenandoah River. Visit www.fosr.org for more information.	Friends of the Shenandoah River	Ongoing
Faculty participates on board of directors of the Shenandoah Valley Pure Water Forum. Visit www.purewaterforum.org for more information.	Shenandoah Valley Pure Water Forum	Ongoing; quarterly and annual meetings
JMU Faculty and staff currently serves on the board of directors and associate directors for the SVSWCD. Visit www.svswcd.org for more information.	Shenandoah Valley Soil & Water Conservation District (SVSWCD)	Ongoing; monthly meetings
JMU participates in meetings with the "Central Shenandoah Stormwater Network", which is a group of stormwater managers which provides regular opportunities to share information, resources and explore opportunities for collaboration.	Central Shenandoah Planning District Commission (CSPDC), Cities of Harrisonburg, Staunton, Waynesboro, Augusta and Rockingham Counties, Town of Bridgewater, and VDOT	Ongoing; quarterly meetings
Solicit input from stakeholders in the development of the MS4 Program.	FM Operations and Engineering Departments	Ongoing
Participation in water quality monitoring programs. Refer to BMP 3.2.4 for additional information.	ISAT Department	Spring and Fall semesters.
Staff participates on the City of Harrisonburg's Stormwater Advisory Committee. Visit www.harrisonburgva.gov/swac for more information.	City of Harrisonburg	Ongoing; quarterly meetings
Stormwater Management @ JMU presentation and BMP tour provided for senior water resources class. (19 students and 1 faculty)	ISAT	September 9 and 12, 2016
East Campus Dining Hall Sustainability/SWM Tour for 190 students.	ISAT & OESS	September 12, 2016
JMU Sustainability/SWM Tour at East Campus Dining Hall and Wayland Hall for 160 students. Refer to BMP 3.1.5 for additional information.	ISAT & OESS	Weeks of Sept. 19 and 26, 2016
Contech BMP inspection and maintenance training held at Rockingham County Offices with field demonstration performed by APEX at JMU.	Rockingham County, Contech Engineered Solutions, & APEX	October 19, 2016
JMU Sustainability/SWM Tour at East Campus Dining Hall and Wayland Hall for 160 students. Refer to BMP 3.1.5 for additional information.	ISAT & OESS	Weeks of March 27 and April 3, 2017

Participated in the City of Harrisonburg's Blacks Run Cleanup Day. Refer to BMP 3.2.5 for additional information.	City of Harrisonburg	April 8, 2017
Hillside 5 Year Anniversary Celebration. Presentation on planning, construction, and educational use of the Hillside Project and adjacent stream restoration for 50 students and faculty.	ISAT, OESS, & FM	April 19, 2017

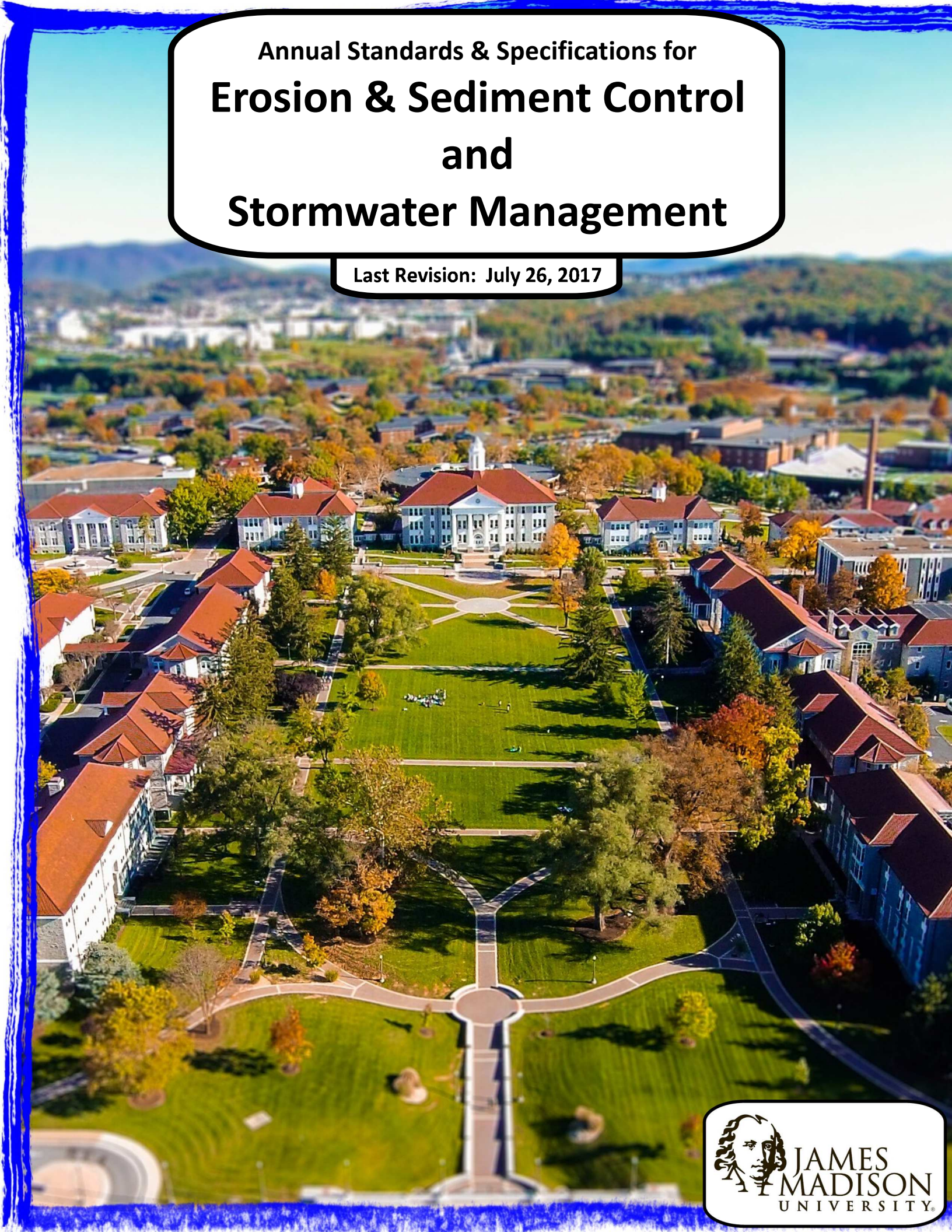
Appendix A

Annual Standards & Specifications for ESC & SWM

Annual Standards & Specifications for

Erosion & Sediment Control and Stormwater Management

Last Revision: July 26, 2017



JAMES MADISON UNIVERSITY

CONTENTS

LETTER OF ENDORSEMENT

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

Dated: July 26, 2017

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

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 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.

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. 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

Variances 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. Variances 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 variances 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 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 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.

APPENDIX A

ESC/SWM Plan Submitter's Checklist

SECTION 1: GENERAL INFORMATION

Plan Submission Date: _____ Total Disturbed Acreage: _____

Project Name: _____

Project Address or Location: _____

Principal Designer Name and Company: _____

Principal Designer Phone Number: _____ email: _____

SECTION 2: ESC/SWM PLAN PREPARER/REVIEWER CHECKLIST

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. Please fill in all blanks and reference where the information may be found, where appropriate, or write N/A by items that are not applicable.

_____ **2.1 Complete set of plans and supporting documentation** - Include all sheets pertaining to the site grading and stormwater and any activities impacting erosion and sediment control and drainage:

- □ 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
- □ Hydrologic and hydraulic computations, including runoff characteristics
- □ Documentation and calculations verifying compliance with water quality and quantity requirements

_____ **2.2 Professional's seal** - The designer's original seal, signature, and date are required on the cover sheet of each Narrative and each set of Plan Sheets. A facsimile is acceptable for subsequent Plan Sheets.

_____ **2.3 Number of plan sets** – A copy of ESC and SWM (if applicable) plans and engineering report are to be submitted initially and with each re-submission in pdf format. Also submit a copy of the VRRM spreadsheet in excel format.

_____ **2.4 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*.

_____ **2.5 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*.

_____ **2.6 Completed Plan Submitter's Checklist** - Include a completed and signed ESC/SWM Plan Submitter's Checklist.

SECTION 3: ESC MINIMUM STANDARDS

Yes	No	NA		
[]	[]	[]	MS-1	Have temporary and permanent stabilization been addressed in the narrative?
[]	[]	[]		Are practices shown on the plan?
[]	[]	[]		Temporary and permanent seed specifications?
[]	[]	[]		Lime and fertilizer?
[]	[]	[]		Mulching?
[]	[]	[]		Blankets/Matting?
[]	[]	[]		Pavement/Construction Road Stabilization?
[]	[]	[]	MS-2	Has stabilization of soil stockpiles, borrow areas, and disposal areas been addressed in the narrative and on the plan?
[]	[]	[]		Have sediment trapping measures been provided?
[]	[]	[]	MS-3	Has the establishment and maintenance of permanent vegetative stabilization been addressed?
[]	[]	[]	MS-4	Does the plan specifically state that sediment-trapping facilities shall be constructed as a first step in land-disturbing activities?
[]	[]	[]	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?
[]	[]	[]	MS-6	Are sediment traps and sediment basins specified where needed and designed to the standard and specification?
[]	[]	[]	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?
[]	[]	[]	MS-8	Have adequate temporary or permanent conveyances (paved flumes, channels, slope drains) been provided for concentrated stormwater runoff on cut and fill slopes?
[]	[]	[]	MS-9	Has water seeping from a slope face been addressed (e.g., subsurface drains)?
[]	[]	[]	MS-10	Is adequate inlet protection provided for all operational storm drain and culvert inlets?
[]	[]	[]	MS-11	Are adequate outlet protection and/or channel linings provided for all stormwater conveyance channels and receiving channels? Is there a schedule indicating:
[]	[]	[]		Dimensions of the outlet protection? Lining? Size of riprap?

Yes	No	NA		
[]	[]	[]		Cross section and slope of the channels? Type of lining? Size of riprap, if used?
[]	[]	[]	MS-12	Are in-stream protection measures required so that channel impacts are minimized?
[]	[]	[]	MS-13	Are temporary stream crossings of non-erodible material required where applicable?
[]	[]	[]	MS-14	Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being followed?
[]	[]	[]	MS-15	Has immediate restabilization of areas subject to in-stream construction (bed and banks) been adequately addressed?
[]	[]	[]	MS-16	Have disturbances from underground utility line installations been addressed?
[]	[]	[]		No more than 500 linear feet of trench open at one time?
[]	[]	[]		Effluent from dewatering filtered or passed through a sediment-trapping device?
[]	[]	[]		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: NARRATIVE & ENGINEERING REPORT

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

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

- □ Provide the area (acres) to be disturbed. This disturbed area shall include laydown, access and any other areas that may be disturbed during the course of the project.
- □ Provide the existing impervious area and the increase, or decrease, in impervious area (acres).
- □ Estimated schedule for project.
- □ Ultimate developed condition of the site.

_____ **4.2 Existing site conditions** - 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** - 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** - 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** - 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 references for soil information.
- □ Provide a copy of soil survey map

_____ **4.6 Critical areas** - A description of areas on the site that may have potentially serious erosion problems or that are sensitive to sediment impacts (e.g., steep 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** - 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).

_____ **4.8 Management strategies / Sequence of construction** - Address management strategies, the sequence of construction, and any phasing of installation of ESC measures.

_____ **4.9 Permanent stabilization** - 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** - 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** - For each temporary ESC measure, provide the calculations and worksheets included in the standards and specifications (e.g. traps, basins, channels, outlet protection etc).

_____ **4.12 Stormwater management considerations** - 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.

_____ **4.13 Water quality and quantity compliance** – Provide a summary description of the water quantity and quality compliance strategy along with adequate documentation, including required limits of analysis, to show compliance with the criteria. Cleary define and/or label point of analysis.

- □ Water quality compliance: 9VAC25-870-65
  - □ VRRM compliance spreadsheet (excel format)
- □ Water quantity, channel protection: 9VAC25-870-66 B
- □ Water quantity, flood protection: 9VAC25-870-66 C

_____ **4.14 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.

_____ **4.15 Documentation and Calculations** - Provide the following design calculations, as applicable:

□ Drainage area map with time of concentration (TC) path shown and points of analysis with worksheets.
□ 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
□ Hydraulic Grade Line on profiles of pipe systems
□ Culvert design calculations

_____ **4.16 BMP Information** - Provide a table or summary for all stormwater quantity and quality BMP facilities including the following information: BMP Name, Impervious Acres Treated, Total Acres Treated, Amount of runoff treated by practice in acre-feet, geographic coordinates (Lat/Long), and Lifespan.

_____ **4.17 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.

□ Provide metes and bounds all the way around any conserved forest/open space.

□ 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.

_____ **4.18 Page numbers** – Number the pages of the Narrative and the Calculations.

_____ **4.19 Supporting documentation** – Provide applicable supporting documents and studies (e.g. infiltration tests, geotechnical investigations, TMDLs, flood studies, etc.)

_____ **4.20 Other required permits** – Provide a copy of other required permits as necessary (e.g. USACE)

SECTION 5: SITE PLAN

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

_____ **5.1 Owner Contact Information** – Provide name, address, telephone number and email of the owner representative.

_____ **5.2 Vicinity map** - A small map locating the site in relation to the surrounding area. Include any landmarks that might assist in locating the site.

_____ **5.3 Indicate north** - The direction of north in relation to the site.

_____ **5.4 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.

_____ **5.5 Existing contours** - The existing contours of the site shall be shown as dashed light lines and elevation labeled adequately.

_____ **5.6 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.

_____ **5.7 Plan view of storm drainage system** – Existing and proposed storm drainage components shall be provided in a plan view. Pipe diameter, material, inverts, stationing, and direction of flow shall be included as part of the plan view.

_____ **5.8 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.

_____ **5.9 Existing vegetation** - The existing tree lines, grassed areas, or unique vegetation.

_____ **5.10 Soils map** – The boundaries of different soil types, K factor and soil survey classifications.

_____ **5.11 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.

_____ **5.12 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.

_____ **5.13 Critical areas** – Note all areas with potentially serious erosion problems. Identify any on-site or adjacent water bodies included in the Virginia 303(d) list of impaired waters.

_____ **5.14 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.

_____ **5.15 Landscape plan** – Include a plan showing location and plant selection for landscaped areas.

_____ **5.16 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.

_____ **5.17 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.

_____ **5.18 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.

_____ **5.19 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. VDOT IS-1 storm drain shaping will be required for storm drain structures.

_____ **5.20 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.

_____ **5.21 Minimum Standards** – Minimum Standard 1 through Minimum Standard 19 shall be included in the plan set.

_____ **5.22 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.

_____ **5.23 Property lines and easements** - Show all property lines and known easements.

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: _____

APPENDIX B

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.

APPENDIX C

ESC/SWM Inspection Report

JAMES MADISON UNIVERSITY

ESC/SWM INSPECTION REPORT

FACILITIES MANAGEMENT - ENGINEERING
181 PATTERSON ST., HARRISONBURG, VA 22807
OFFICE: (540) 568-7606 FAX: (540) 568-3547

PROJECT INFORMATION

PROJECT NAME		INSPECTION DATE
PROJECT MANAGER	PROJECT NUMBER	INSPECTION TIME
RLD NAME	RLD NUMBER	INSPECTOR

Does the project require a VSMP General Construction Permit? Yes ◯ No ◯ Permit Number (if applicable):

WEATHER DATA

CURRENT CONDITIONS	CURRENT TEMP.	RECENT RAINFALL TOTALS

ADDITIONAL INFORMATION

REASON FOR INSPECTION

- ◯ INSTALLATION OF CONTROLS
- ◯ SCHEDULED INSPECTION
- ◯ POST STORM EVENT
- ◯ PROJECT COMPLETION
- ◯ RE-INSPECTION
- ◯ OTHER: _____

STAGE OF CONSTRUCTION

- ◯ INSTALLATION OF E&S CONTROLS
- ◯ CLEARING & GRUBBING
- ◯ ROUGH GRADING
- ◯ BUILDING CONSTRUCTION
- ◯ FINISH GRADING
- ◯ FINAL STABILIZATION
- ◯ CONSTRUCTION OF SWM FACILITIES
- ◯ MAINTENANCE OF SWM FACILITIES
- ◯ OTHER: _____

RESULT OF INSPECTION

- ◯ SATISFACTORY
- ◯ SATISFACTORY w/ COMMENTS
- ◯ CORRECTIVE ACTION(S) REQUIRED
- ◯ NOTICE OF VIOLATION(S)
- ◯ NOTICE TO COMPLY
- ◯ STOP WORK ORDER

	VIOLATION CODE		*Description and location of problem/violation. Required or recommended corrective actions. Other Comments.*
ITEM #1	VIOLATION CODE	◯ INITIAL ◯ REPEAT	*Description and location of problem/violation. Required or recommended corrective actions. Other Comments.*
ITEM #2	VIOLATION CODE	◯ INITIAL ◯ REPEAT	*Description and location of problem/violation. Required or recommended corrective actions. Other Comments.*
ITEM #3	VIOLATION CODE	◯ INITIAL ◯ REPEAT	*Description and location of problem/violation. Required or recommended corrective actions. Other Comments.*

VIOLATION	BRIEF DESCRIPTION
JMU-1	Land Disturbance w/o Approved Plan
JMU-2	Non-Compliance w/ Approved Plan
JMU-3	Maintenance/Repair of Controls
JMU-4	Other/VSMP
MS-1	Stabilization
MS-2	Stockpiles, Waste & Borrow Areas
MS-3	Permanent Vegetation
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

DEADLINE DATE FOR NOTED ITEMS

COMMENTS/NOTES

Violation code refers to 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 corrective deadline date applies to all violations noted on this report. If listed violation(s) currently constitute non-compliance and/or required corrective actions are not completed by the deadline, a NOTICE TO COMPLY, STOP WORK ORDER, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance on the above project.

VSMP AUTHORITY CONSTRUCTION GENERAL PERMIT CHECK LIST

		Yes	No	N/A
1	Copy of notice of coverage letter posted near main entrance: Part II(C)			
2	Information for public access to electronic format or had copy of SWPPP posted near main entrance: Part II(C)			
3	Copy of complete SWPPP available onsite: Part II(A)			
3a	Signed copy of registration statement: Part II(A)1.a			
3b	Copy of permit: Part II(A)1.b			
3c	Copy of notice of coverage letter: Part II(A)1.c			
3d	Narrative description of the nature of construction activity: Part II(A)1.d			
3e	Legible site plan: Part II(A)1.e			
3f	Approved ESC plan or ESC plan developed in accordance with department approved annual standards and specifications: Part II(A)3			
3g	Approved SWM plan or SWM plan developed in accordance with department approved annual standards and specifications: Part II(A)4			
3h	Pollution prevention plan: Part II(A)4			
3i	Requirements for discharges to impaired waters, surface waters with an applicable TMDL, exceptional waters: Part II(A)5			
3j	Contact information for qualified personnel conducting inspections: Part II(A)6			
3k	SWPPP signed in accordance with Part III K: Part II(A)8			
4	SWPPP is being amended, modified and updated: Part (B)			
4a	SWPPP clearly identifies the contractor(s) that will implement and maintain each control measure identified in SWPPP: Part II(B)3			
4b	Record dates when major grading activities occurred: Part II(B)4.a(1)			
4c	SWPPP amendments, modifications, or updates singed in accordance with Part III K: Part II(B)5			
5	SWPPP inspections carried out: Part II(F)			
5a	Inspections conducted at required frequency: Part II(F)2			
5b	Inspection reports summarize findings of inspections including corrective actions: Part II(F)4.a-i			
5c	Inspection reports have date and signature of qualified personnel conducting inspections and the operator or authorized representative: Part II(F)4.j			
5d	Inspection reports retained as part of SWPPP: Part II(F)4			
6	Erosion and sediment controls implemented: Part II(A)2.c			
6a	Volume and velocity of stormwater runoff controlled within site to minimize erosion: Part II(A)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(A)2.c(2)			
6c	Soil exposed during construction activity minimized: Part II(A)2.c(3)			
6d	Disturbance of steep slopes minimized: Part II(A)2.c(4)			
6e	Natural buffers around surface waters provided and maintained, stormwater directed to vegetated areas to increase sediment removal, and maximizes stormwater infiltration: Part II(A)2.c(6)			
6f	Soil compaction minimized and topsoil preserved: Part II(A)2.c(7)			
6g	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(A)2.c(8)			
6h	Outlet structures utilized that withdraw stormwater from the surface when discharging from sediment basins or sediment traps: Part II(A)2.c(9)			
7	Pollution prevention plan implemented: Part II(A)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(A)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(A)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(A)4.e(3)			
7d	Minimize discharge of pollutants from vehicle and equipment washing, wheel wash water and other types of washing: Part II(A)4.e(4)			
7e	Direct concrete wash water into a leak proof container or leak proof settling basin: Part II(A)4.e(5)			
7f	Minimize discharge of pollutants from storage, handling, and disposal of construction products, materials and wastes: Part II(A)4.e(6)			
7g	Prevent discharge of fuels, oils, and other petroleum products, hazardous or toxic wastes, and sanitary wastes: Part II(A)4.e(7)			
7h	Address any other discharge from the potential pollutant-generating activities not addressed above: Part II(A)4.e(8)			
8	Appears to be impact(s) to receiving waters: Part I(B)6, Part I(D), or Part II(A)2c(2) or (5)			

APPENDIX D

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:		Zone:
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:		

	Rating
Contributing Drainage Area	
Inlet	
Vegetation/Mulch	
Structure	
Outlet	
Other	
Overall Rating	

APPENDIX E

Projects

James Madison University

Existing and Proposed Land Disturbing Activities

July 1, 2017 thru June 30, 2018

Project Name	Project Location	Project Manager	Contact Information	Project Description	Approx. Area (acres)	Proposed Construction Start Date	Proposed Construction Finish Date
Bluestone Trail Extension	Bluestone Drive(Sonner Hall to Carrier Drive)	Abe Kaufman	(540) 568-4201	Extension of existing Bluestone Trail	1.26	5/8/2017	8/11/2017
College of Business Expansion	421 Bluestone Drive	Glenn Wayland	(540) 568-6345	Demolition and re-construction/expansion of existing buildings.	3.00	5/7/2018	3/15/2021
Convocation Center and Parking Deck	645 University Blvd.	Glenn Wayland	(540) 568-6345	Construction of new convocation center and parking deck	18.50	5/12/2018	8/7/2020
East Grace and Mason Street Signal Work	Intersection of E. Grace St. & Mason St.	Mike Derrow	(540) 568-7127	Signal work and roadway improvements.	0.70	5/8/2017	8/11/2017
Farm Renovations	8399 Alumnae Drive, Port Republic	Anna Hudick	(540) 568-6738	Amphitheater next to existing shelter.	0.95	2/23/2017	11/23/2017
Gibbons Hall Demolition & Reconstruction	150 Bluestone Drive	Scott Wachter	(540) 568-3006	Demo and construct new building.	2.50	8/1/2016	2/28/2018
Hotel Madison w/ Grace Street Improvements	734 S. Main St.	Mike Derrow	(540) 568-7127	Construction of hotel and conference center.	2.85	5/1/2016	7/1/2018
Madison Hall Renovation	100 E. Grace St.	Scott Wachter	(540) 568-3006	Renovation to existing building	1.90	9/29/2015	7/1/2018
Softball Practice Facility	291 Veterans Memorial Dr.	Tim Shantz	(540) 568-5909	Update existing practice facility	2.00	7/13/2017	10/27/2017
South Main Street Soil Stock Pile	1593 S. Main St.	Abe Kaufman	(540) 568-4201	Ongoing soil stock pile area.	6.20	1/4/2010	Ongoing
University Services Building Annex	543 Chesapeake Ave.	Rick Miller	(540) 568-3007	Construct new building with parking.	3.64	5/16/2016	7/1/2017
UREC Tennis Dome	601 Convocation Service Dr.	Tim Shantz	(540) 568-5909	Construct dome over existing tennis courts	0.90	8/1/2017	12/15/2017
West Campus Parking Deck	101 W. Grace St.	Glenn Wayland	(540) 568-6345	Construct new parking deck	2.50	12/1/2017	12/1/2018

APPENDIX F

Non-VESCH Specifications

CONTENTS

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.

VersaMATS

Most Versatile Mats in the Industry

ALTURNAMATS Ground Protection Mats LIMITED LIFETIME GUARANTEE

VersaMATS

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

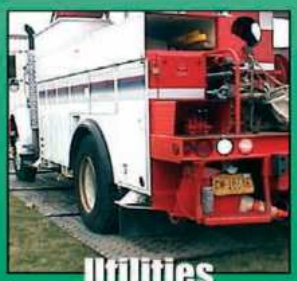
VersaMATS literally are the most versatile ground protection mats in the industry. The flat, slip-resistant tread permits pedestrians to walk safely on the mats, yet they are as rugged as the original AlturnaMATS. The reverse side has the same diamond plate tread as AlturnaMATS, providing great traction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

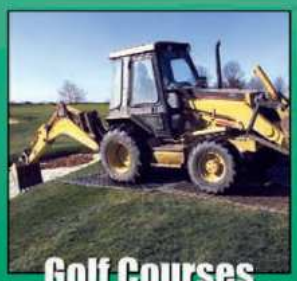
VersaMATS are also available in white, making them ideal for safe use as long walkways even in darkened conditions. They are also available smooth on one side.

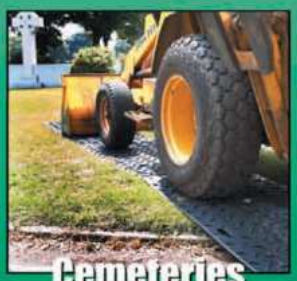
- Leaves turf smooth even in soft soil conditions
- Tough 1/2" thick polyethylene
- Two practical cleat designs… for walking and vehicle traffic
- Withstand 120-ton loads
- Build a temporary roadway or walkway in minutes
- Lock together with Turn-A-Links
- Limited Lifetime Warranty

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.







AlturnaMATS®

One Piece Plastic Outrigger Pads

Safety Tech Pads

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

ALTURNAMATS Ground Protection Mats LIMITED LIFETIME GUARANTEE

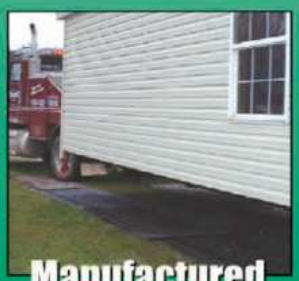
Safety Tech Pad Features:

- Reliable Load Distribution
- Lightweight
- Safety Texturing
- Memory Recovery
- Lifetime Guarantee

Stock Models

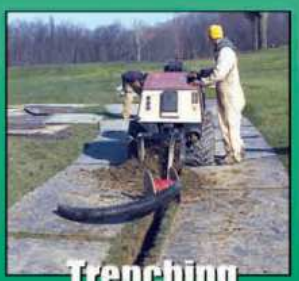
MODEL	LOAD CAPACITY		WIDTH	LENGTH	HEIGHT	WEIGHT	SQ.IN.
	VERTICAL	45 DEGREE					
PAD1515.75	40,000# (KG20,412)	18,000# (KG9,072)	15" (C38.1)	15" (C38.1)	.75" (C1.905)	5.5# (KG3.40)	225 (CT1,451.70)
PAD18181	55,000# (KG24,948)	30,000# (KG13,608)	18" (C45.72)	18" (C345.72)	1" (C2.54)	11.0# (KG4.99)	324 (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 (CT3,701.35)
PAD24242	62,000# (KG28,123)	40,000# (KG18,144)	24" (C60.96)	24" (C60.96)	2" (C5.08)	38.0# (KG17.24)	576 (CT3,701.35)
PAD30301	81,000# (KG36,741)	41,000# (KG18,597.0)	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# (KG44,252.8)	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)	160.0# (KG72.58)	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

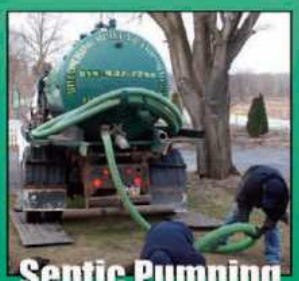


Manufactured Housing

Recreation Areas & Events



Trenching



Septic Pumping

AlturnaMATS Accessories

Turn-A-Links

Single Turn-A-Link

Double Turn-A-Link

Galvanized Turn-A-Link: Single or Double

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

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

*Alturna*MATS' 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 *Alturna*MATS 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 *Alturna*MATS.

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.

AlturnaMATS®

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'

Turn-a-Links lock *VersaMATS* together

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.

Withstand heavy vehicle loads

Easy and safe to walk on

VersaMATS lock together to form continuous walkway

AlturnaMATS®

www.alturnamats.com

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.

AlturnaMATS®
www.alturnamats.com

Distributed By:

Call Today
888-544-6287 814-827-8884

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 my 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.

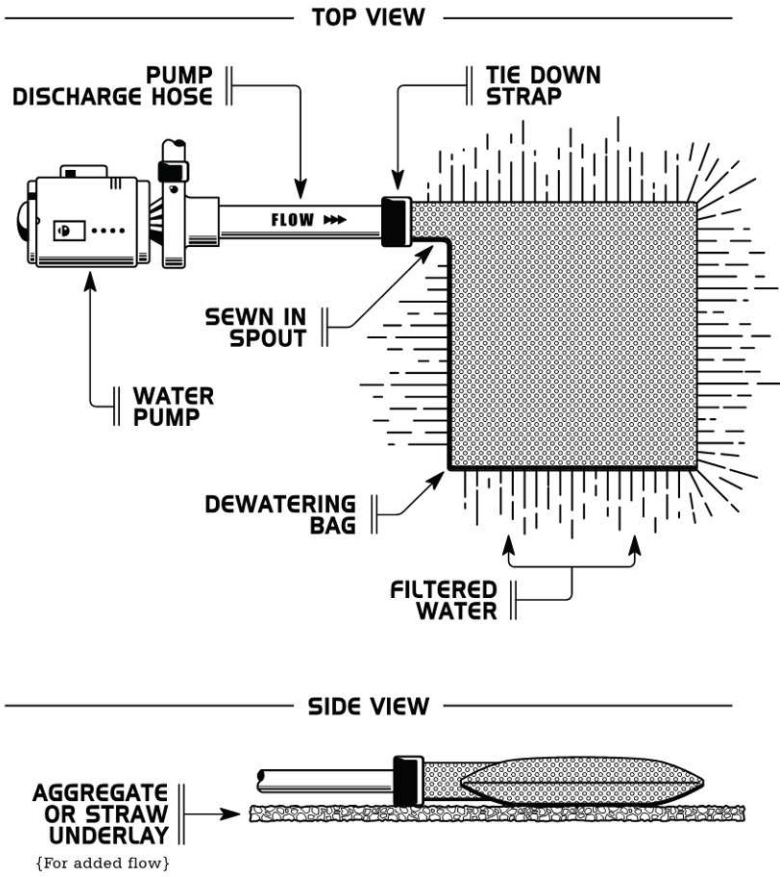
A dewatering structure may not be needed if there is a well stabilized, vegetated area on-site to which water may be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. A minimum filtering length of 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 ½ 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).

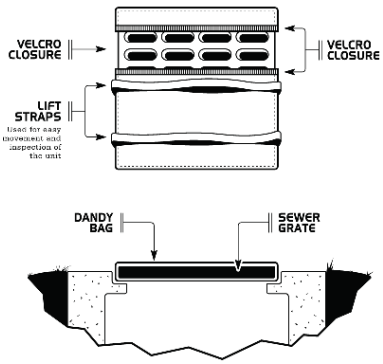
Design Criteria

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

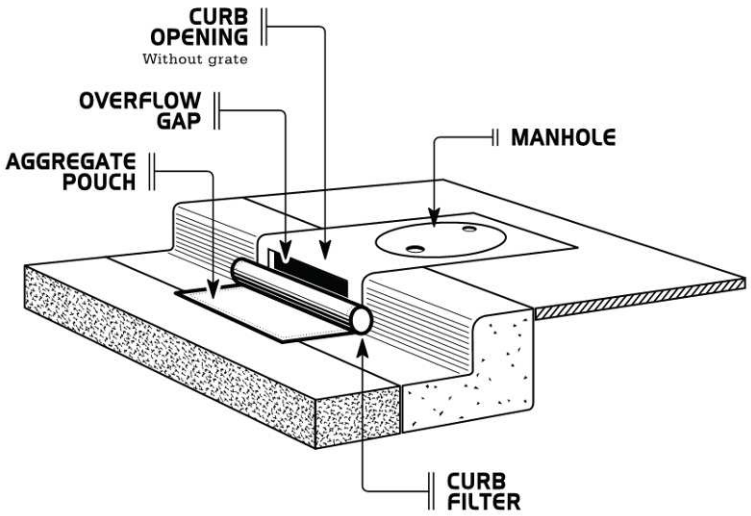
Dandy Bag

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 devises, insert the grate into the inlet being careful not to damage the Dandy Bag unit.



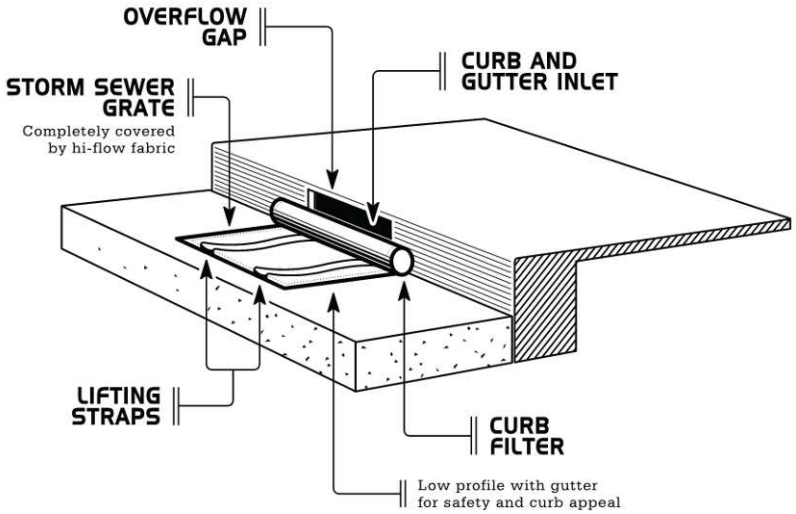
Dandy Curb

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.



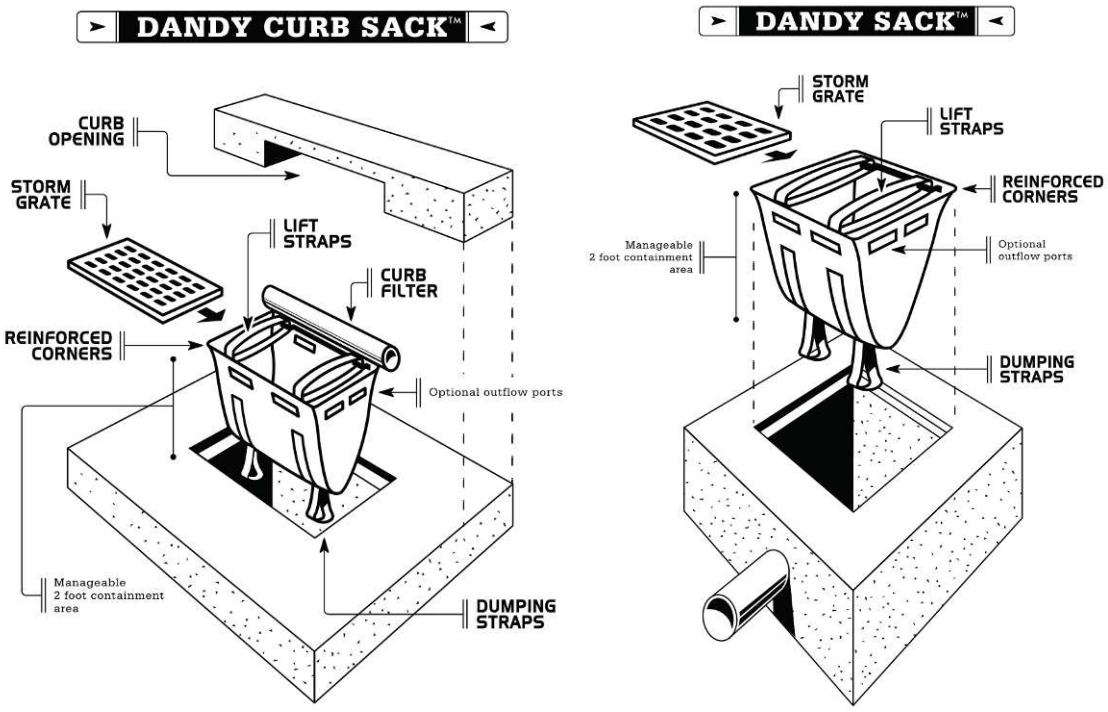
Dandy Curb Bag

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.

<u>Maintenance/Inspections</u>

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).

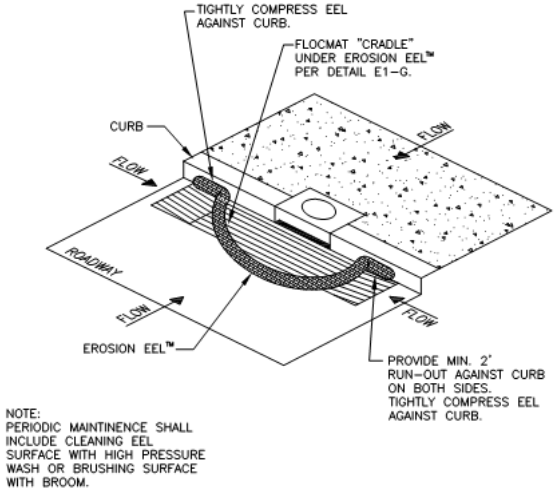
Design Criteria

The drainage area shall be no greater than 1 acre.

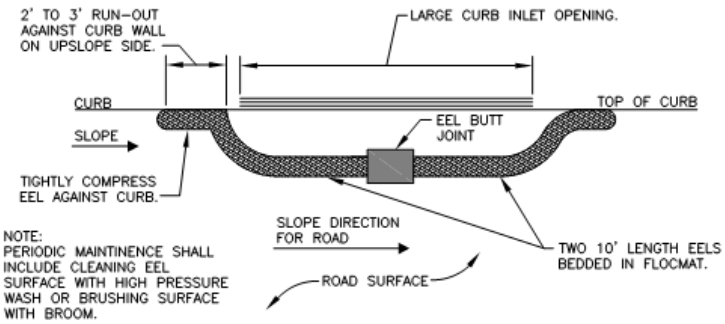
Construction Specifications

Erosion Eel

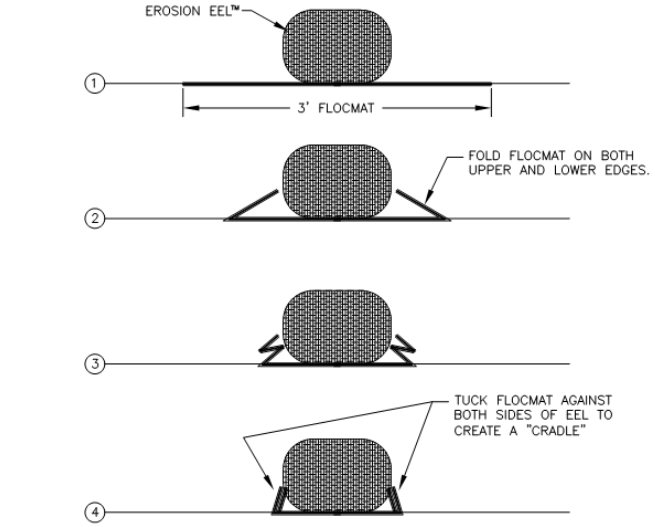
1. Center Erosion Eel at curb inlet. Install Flocmat “cradle” under Erosion Eel.
2. Ensure Erosion Eel does not completely cover inlet. Pull out from center to allow overflow as needed.
3. Tightly compress eel against curb on each end of inlet. There should be a minimum 2’ run-out against curb on both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



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



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

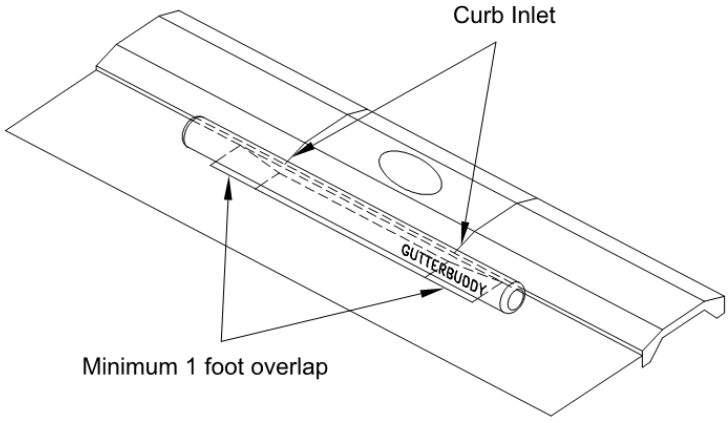


INSTALL FLOCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

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

GutterGator
Assembly Instructions:

1. Remove GutterGator grids and sleeves from box.

2. Slide grid sections to desired length.

3. Insert grid section into GutterGator sleeve.

4. Install stabilizer arms.

5. Seal velcro on GutterGator sleeve.

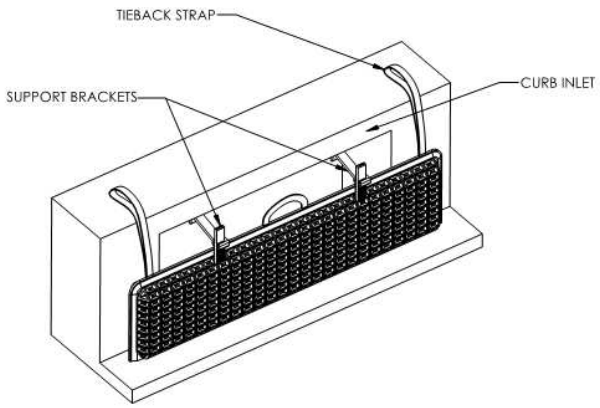
6. Remove Gatorweight from box.

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.

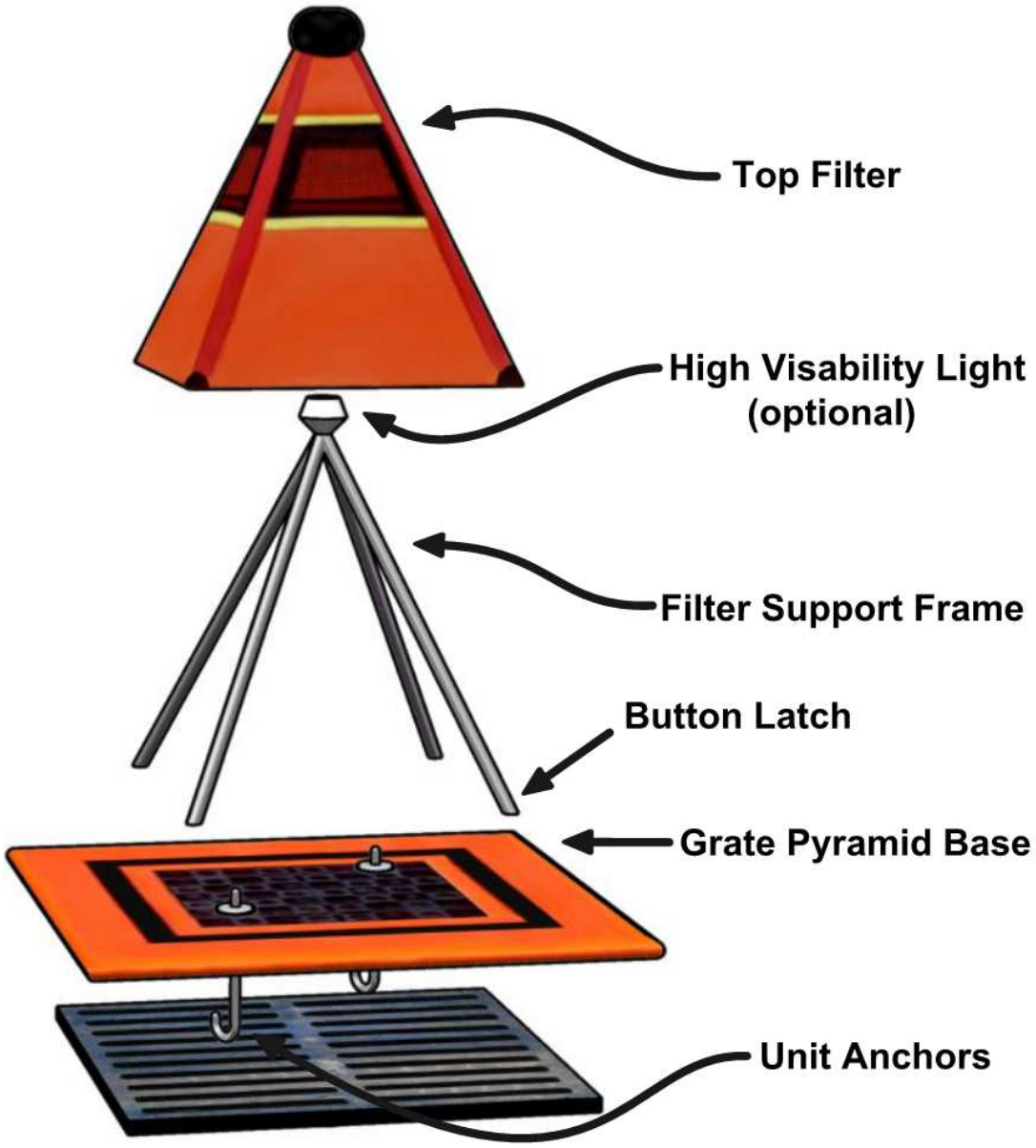

Install tower frame.


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.

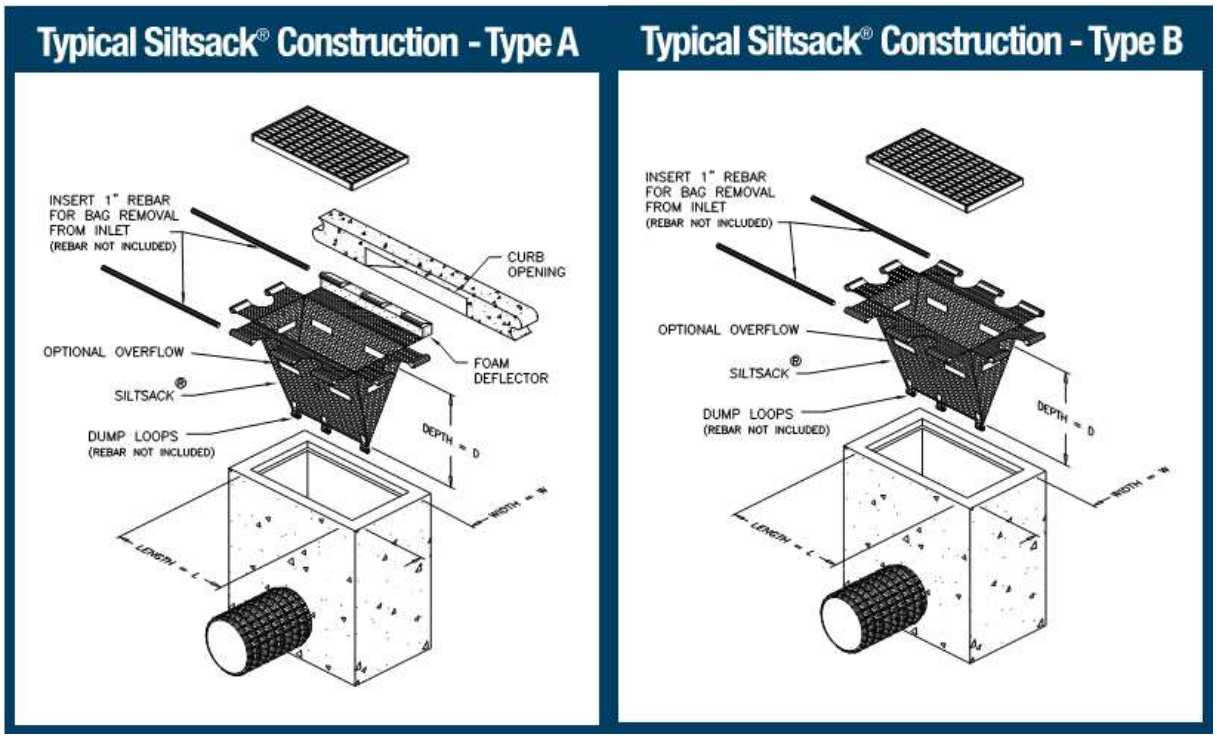
Planning Considerations

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.

OUTLET PROTECTION OR DITCH 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/ft^2

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/ft²	18 ft/s	6 in. wave height, ≤4:1 slope	12 in. wave height, ≤5:1 slope	N/A
	Vegetated	10 lb/ft²	18 ft/s			
C350	Unvegetated	8.0 lb/ft²	19 ft/s	6 in. wave height, ≤3:1 slope	12 in. wave height, ≤4:1 slope	N/A
	Vegetated	12 lb/ft²	20 ft/s			
P550	Unvegetated	8.5 lb/ft²	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/ft²	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
Shear Stress	Velocity	Wave Height	
≤6 lb/ft²	≤14 ft/s	6 in.	F
>6–8 lb/ft²	>14-18 ft/s	12 in.	G
>8 lb/ft²	>18 ft/s	18 in.	H

***TABLE 1:** Minimum anchor pattern*

MINIMUM ANCHOR TYPE BASED ON SOIL TYPE	
Soil Type	Anchor Type
Clay – Clay Loam	10 in. Wire Staple or 12 in. ShoreMax Stake
Silt Loam – Loam	10 in. Wire Staple or 12 in. ShoreMax Stake
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 2:** Minimum anchor type*

Construction Specifications

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.*

⊓ - Staple/Stake ⊕ - Percussion Earth Anchor

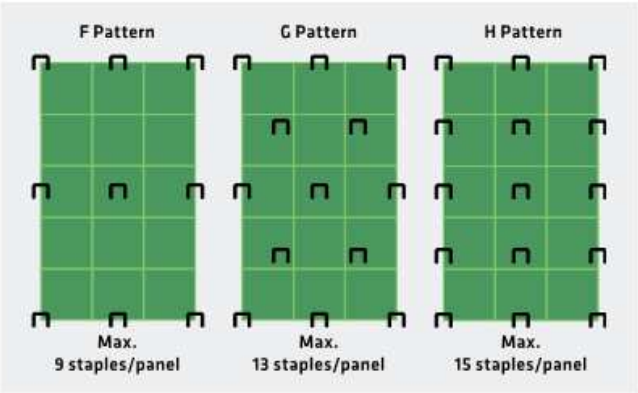


***FIGURE 1:** Anchor Patterns for use with staples/stakes*

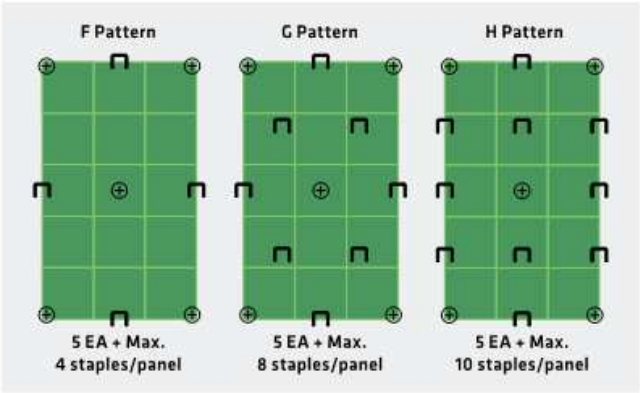


***FIGURE 2:** Anchor Patterns for use with a combination of earth anchors and staples*

Channel Design Guideline

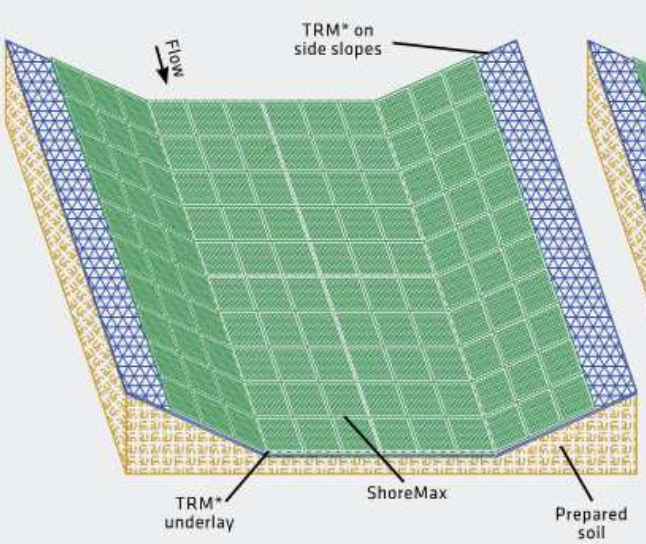


FIGURE 3: *Steep channel*

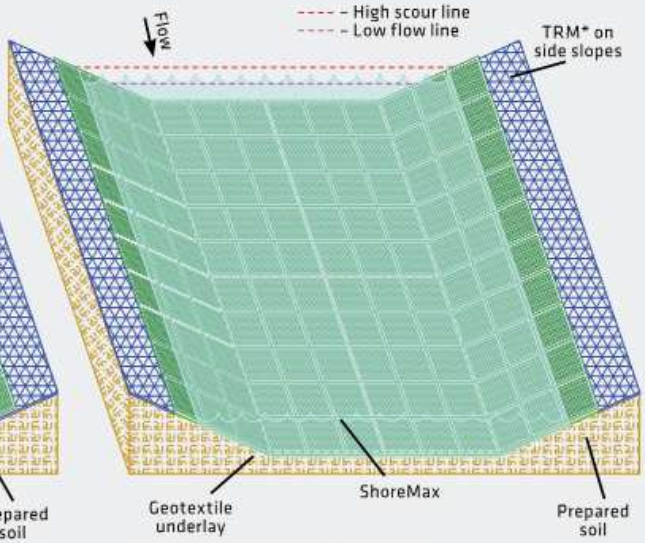


FIGURE 4: *Continuous flow channel*

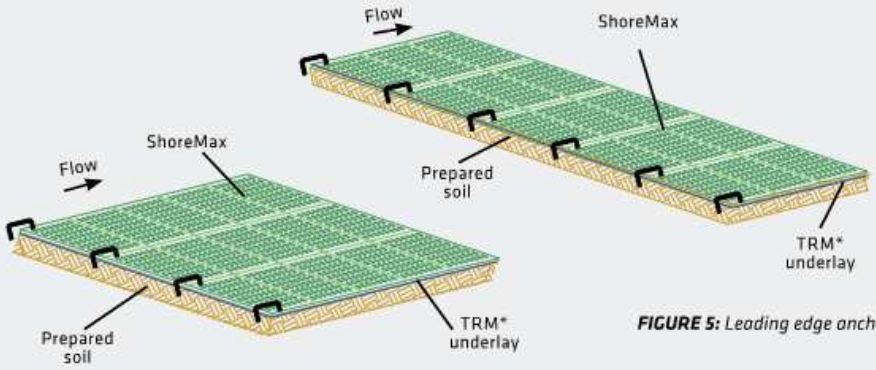


FIGURE 5: *Leading edge anchoring*

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).

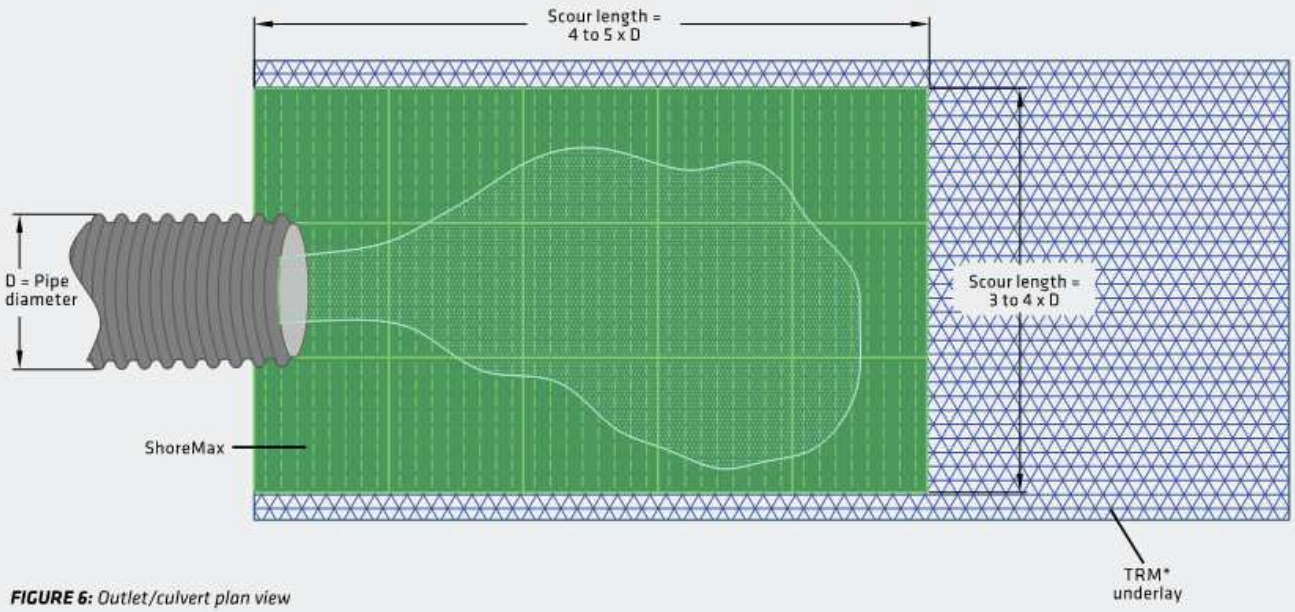


FIGURE 6: *Outlet/culvert plan view*

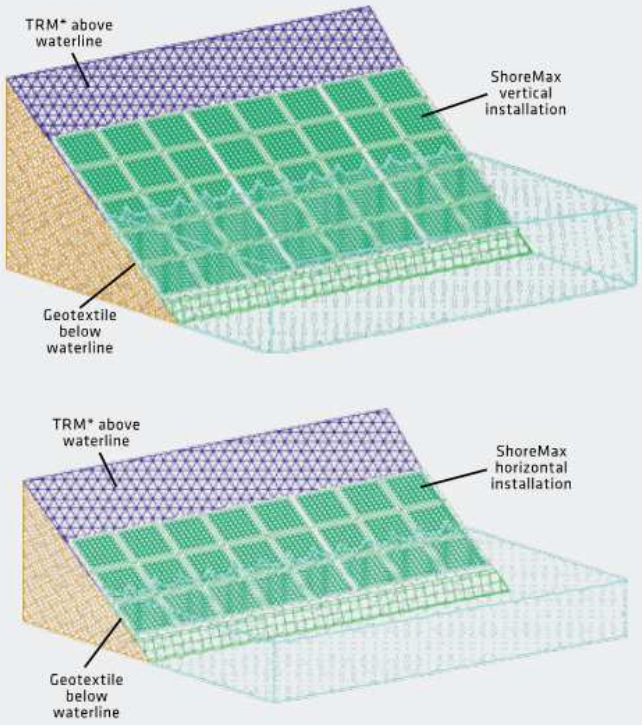


FIGURE 7: *Shoreline/streambank plan view*
**ShoreMax Mats can be placed on slope in either direction.*

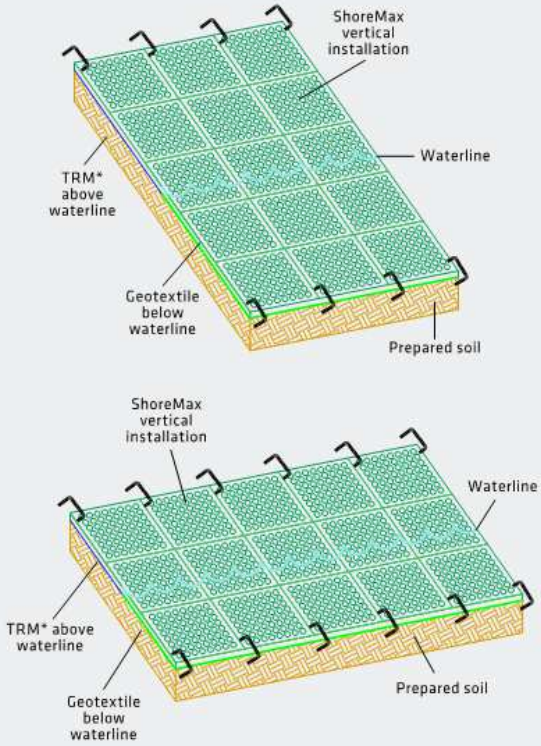


FIGURE 8: *Edge of mat anchoring*

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

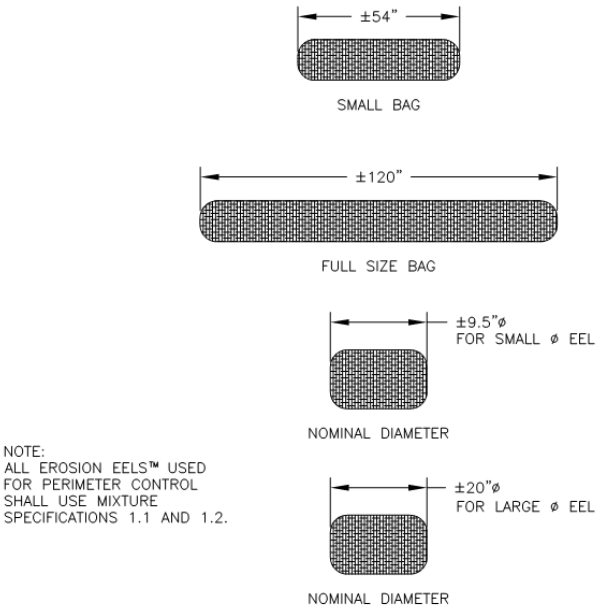
SLOPE(%)	SINGLE EEL SPACING(ft)	*STACKED DUAL EEL SPACING(ft)
0.5	300	N/A
1	200	N/A
2	160	N/A
3	80	N/A
4	50	N/A
5	40	N/A
6	35	N/A
8	30	N/A
10	25	N/A
15	+17	N/A
20	+12	+25
25	N/A	+15
33	N/A	+10
50	N/A	+6

* 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)

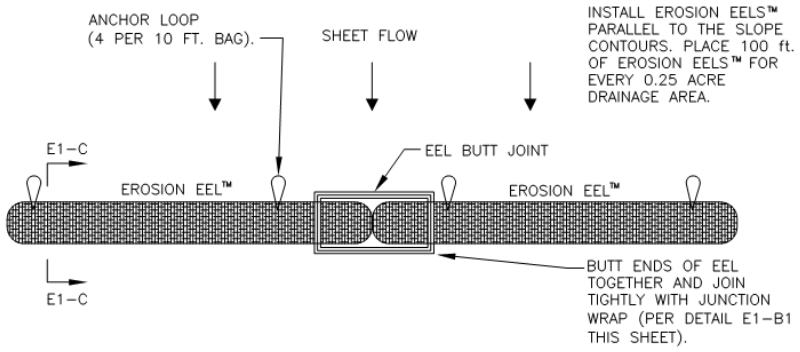


DETAIL E1–A: EROSION EELs™
N.T.S.

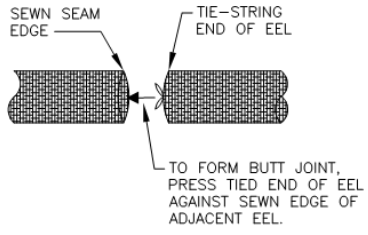
EROSION EELS® USED IN PERIMETER CONTROL APPLICATIONS SHALL HAVE A SPECIFICATION MIXTURE 1.1 OR 1.2.

a. MIXTURE SPECIFICATION 1.1. A FILTER MIXTURE COMPRISED OF 50% SHREDDED RUBBER AND 50% WOOD CHIP PARTICLES BY VOLUME. THE SHREDDED RUBBER SHALL BE WASHED AND PROCESSED TO REMOVE MOST, IF NOT ALL, METAL COMPONENTS. THE RUBBER SHALL BE DERIVED FROM RECYCLED TIRES AND SHALL BE SHREDDED TO PRODUCE A MAXIMUM PARTICLE SIZE OF +/– 3/4 INCH. THE WOOD CHIPS SHALL BE PRODUCED FROM HARDWOOD TREES AND SHALL CONFORM TO AASHTO CERTIFICATION SPECIFICATION MP 9–03.

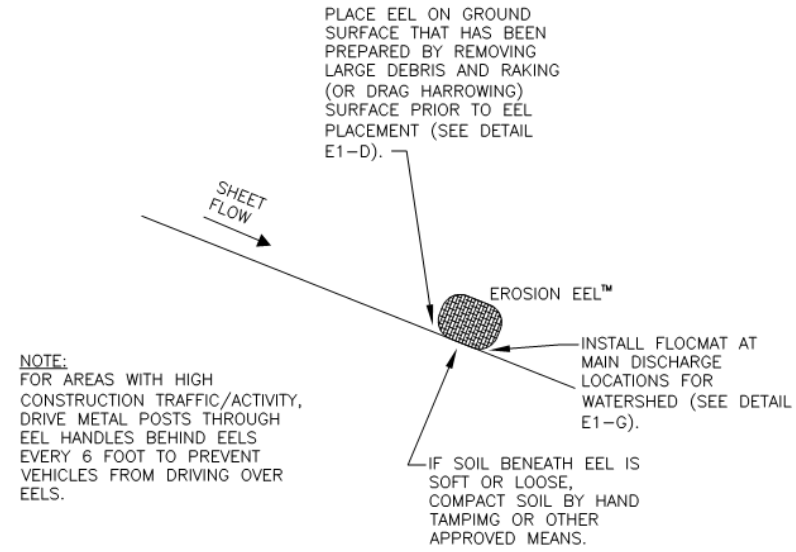
b. MIXTURE SPECIFICATION 1.2. A FILTER MIXTURE COMPRISED OF 1/3 SHREDDED RUBBER, 1/3 WOOD CHIPS, AND 1/3 RECYCLED SYNTHETIC FIBERS. THE SHREDDED RUBBER SHALL BE WASHED AND PROCESSED TO REMOVE MOST, IF NOT ALL, METAL COMPONENTS. THE RUBBER SHALL BE DERIVED FROM RECYCLED TIRES AND SHALL BE SHREDDED TO PRODUCE A MAXIMUM PARTICLE SIZE OF +/– 3/4 INCH. THE WOOD CHIPS SHALL BE PRODUCED FROM HARDWOOD TREES AND SHALL CONFORM 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.



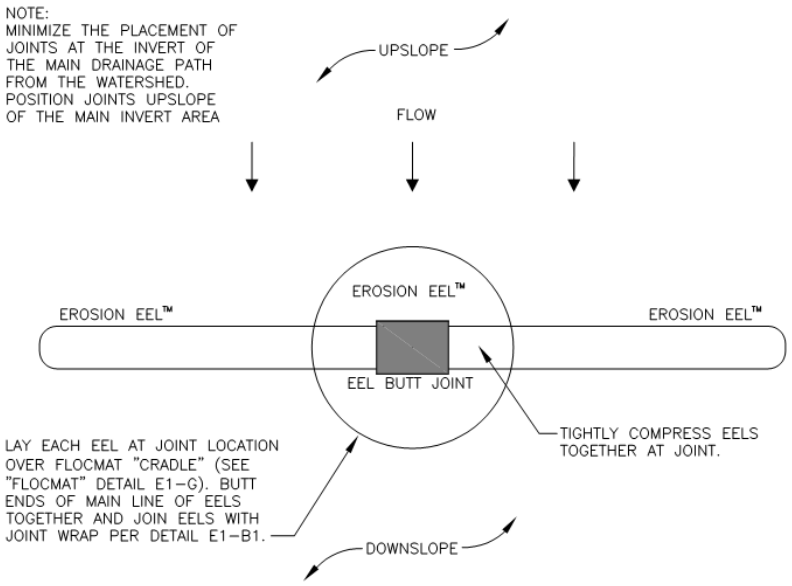
DETAIL E1–B: INTERCEPTING SHEET FLOW
PERPENDICULAR TO FLOW PATH – PLAN VIEW



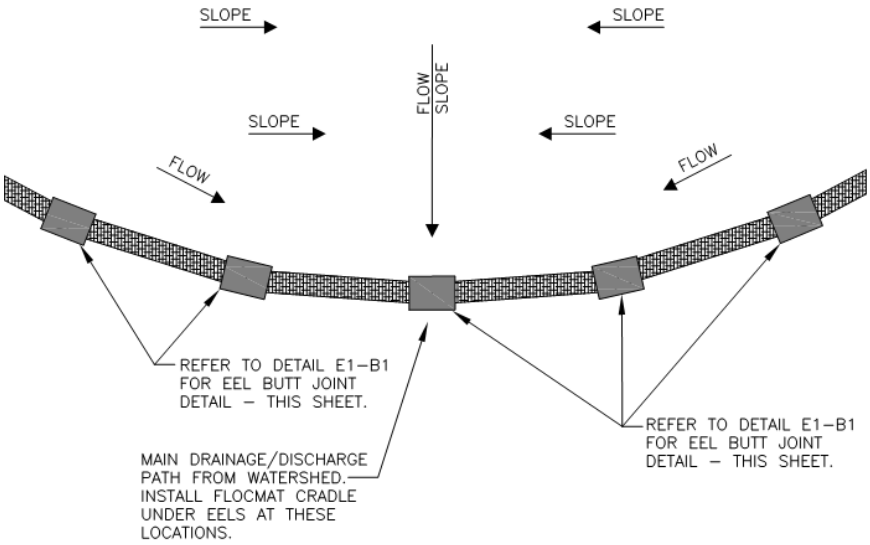
DETAIL E1–B1



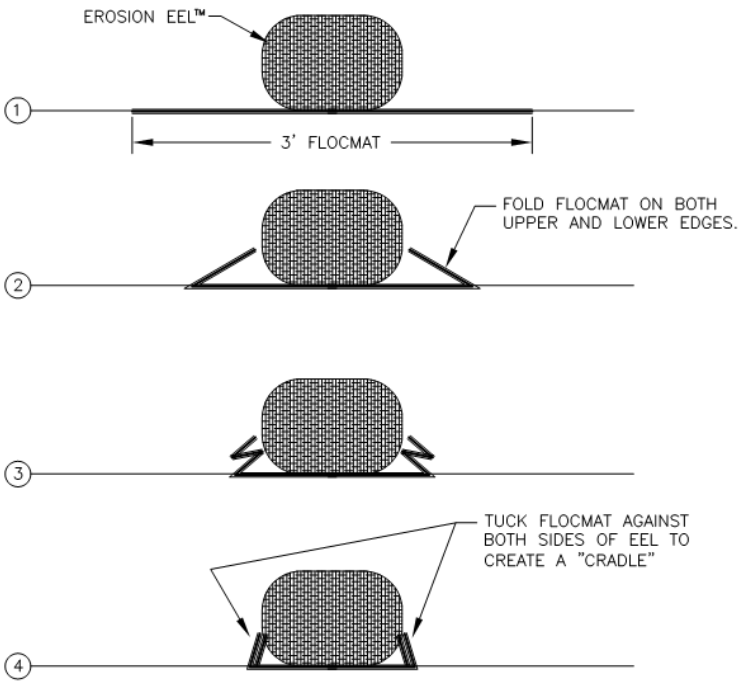
DETAIL E1–C: INTERCEPTING SHEET FLOW
PERPENDICULAR TO FLOW PATH – PLAN VIEW



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

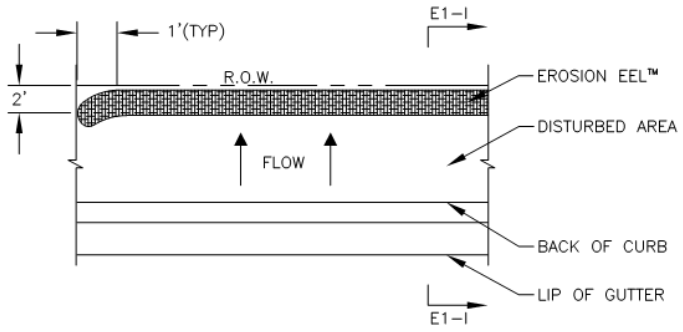


DETAIL E1–F: PLAN VIEW – TYPICAL ARRANGEMENT OF EELS USED FOR PERIMETER CONTROL
N.T.S.



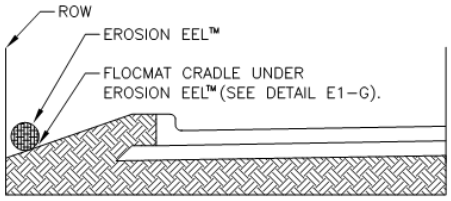
INSTALL FLOCMAT AT MAIN DISCHARGE LOCATIONS FOR WATERSHED.

DETAIL E1–G: SECTION – FLOCMAT
N.T.S.

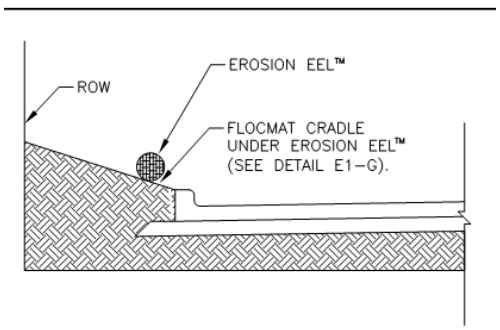


PLAN VIEW

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



DETAIL E1–I: SECTION
N.T.S.

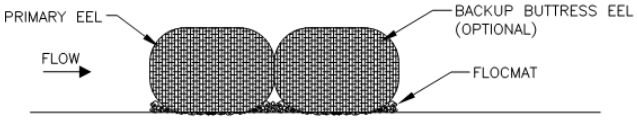


DETAIL E1–J: SECTION
N.T.S.

STEP 1

PLACE EROSION EEL™ NEAR THE INTENDED SETUP LOCATION. PLACE FLOCMAT UNDER EEL (DETAIL E1–G).

STEP 2



MOVE THE EEL OVER THE FLOCMAT AREA.

PLACE A SECOND EEL ADJACENT TO THE INITIAL EEL LOCATION (DOWNSLOPE) TO PROVIDE ADDITIONAL WEIGHT AS A BUTTRESS (OPTIONAL).

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

Maintenance/Inspections

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

SLOPE INTERRUPTION DEVICE (SID)

TERRA TUBE - FIBER FILTRATION TUBE (FFT)

Definition

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

Purpose

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

Conditions Where Practice Applies

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

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

Planning Considerations

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

Construction Specifications

FFT Installation Overview—

Slopes:

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

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

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

1. 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.
2. 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.
3. 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.
4. The FFT should appear more rectangular than round. Backfill and compact loose soil against upslope/upstream side of FFT.
5. 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:

1. 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.
2. 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

1. 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.
2. During inspections, if rill erosion is noticed, measures will need to be taken as soon as practical to re-grade and stabilize problem areas.

Appendix B

Policies & Procedures

Daily Operational Procedures for Stormwater Control Best Management Practices
Illicit Discharge Detection and Elimination (IDDE)
Land-Disturbing Activities
Stormwater Management Facilities

POLICY IV 12: Daily Operational Procedures for Stormwater Control Best Management Practices	
APPROVED: *Towana Moore, Associate Vice President, Business Services*	Policy Review: Annually Dated: May 2015 Updated: Nov. 2015

Table of Contents

1.0 Purpose

James Madison University has a permit to operate a Municipal Separate Storm Sewer System (MS4) issued by the Virginia Department of Environmental Quality (DEQ). The permit makes JMU responsible for any discharges to the storm sewer system, or waterways, that is not entirely composed of stormwater run-off.

The purpose of this policy is to develop and implement written procedures designed to minimize or prevent pollutant discharge as required by state and federal stormwater regulations. As stated in state regulations, these procedures will include daily operations such as (i) road, street, and parking lot maintenance; (ii) vehicle and equipment maintenance; (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers; and (iv) the storage of erodible materials. Procedures will be designed to:

1. Prevent illicit discharges;
2. Ensure the proper disposal of waste materials, including landscape wastes;
3. Prevent the discharge of municipal vehicle wash water into the MS4 without authorization under a separate VPDES permit;
4. Prevent the discharge of wastewater into the MS4 without authorization under a separate VPDES permit;
5. Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities;
6. Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices;
7. Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and
8. Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendation.

Discharges, other than stormwater run-off to a storm sewer system or state waterway, is considered an "illicit discharge" and can result in significant fines from regulatory agencies such as the DEQ and the Environmental Protection Agency (EPA). Please note that JMU's storm sewer system is connected to the City of Harrisonburg and the Virginia Department of Transportation. Discharges to their systems could also result in civil and criminal penalties.

2.0 Definitions

Best Management Practice (BMP) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices to prevent or reduce pollution of surface waters and groundwater systems.

Environmental Protection Agency (EPA) – Federal entity responsible for monitoring, standard-setting and enforcing activities to ensure environmental protection.

Illicit Discharge – Any discharge to a MS4 that is not composed entirely of stormwater, except discharges pursuant to a separate VPDES permit, discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3). (water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), uncontaminated pumped ground water, potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.)

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

Stormwater Management Facility - A structural best management practice that controls stormwater runoff and changes the characteristics of that runoff, including but not limited to, the quantity and quality, the period of release, or the velocity of flow.

Virginia Department of Environmental Quality (DEQ) – State department responsible overseeing the universities stormwater related programs and the enforcement of stormwater legislation.

Virginia Pollutant Discharge Elimination System (VPDES) – A permit program allowing the discharge of stormwater from MS4s, industrial activities and construction activities.

3.0 Responsibilities

Director of Engineering and Construction, and Director of Facilities Management: Responsible for the overall implementation of this policy and procedures.

Project Managers and Supervisors: Responsible for ensuring that employees and outside contractors are properly informed and follow procedures.

Stormwater Coordinator: Responsible for fulfilling training requirements to FM employees. This will be done through annual stormwater training sessions and new FM employee orientation.

4.0 Procedures

4.1 Building and Other Exterior Washing

Waste water from exterior cleaning activities such as the washing of university buildings, loading docks, patios, roads, parking decks and parking lots can contain a variety of materials that if not filtered or captured can pollute the university's storm sewer system and the state's waterways.

4.1.1 Cleaning with Potable Water (no chemicals)

When potable wash water will be used without chemicals and the resulting waste water is not expected to contain anything other than the water and dirt generated from the surface being cleaned, waste water can be handled in one of the following methods:

- Waste water can be directed onto a grass or vegetated area where it can be absorbed into the soil. No runoff from the area should occur and no runoff may enter a storm drain inlet, conveyance, roof drain or waterway.
- Waste water can be directed to adequate filtration methods, such as inlet protection, if sediments or other solids are the only anticipated waste materials. Existing stormwater BMP's such as bio-retention filters or manufactured stormfilters are not to be considered as adequate filters, and must be protected from waste water.
- If there is not an adequate amount of vegetated area nearby, waste water can be captured or diverted to a holding area for proper disposal. Wet/dry vacuums can be used for smaller jobs. Larger jobs can be broken into smaller sections with moving containment if necessary.

4.1.2 Cleaning with the use of Chemicals

The use of chemicals in strongly discouraged, but may be needed for certain circumstances. When using chemicals, or when washing items that may contain hazardous waste, such as power washing paint off a building, all waste water must be captured or diverted to a holding area for proper disposal. Wastes may not be allowed to drain into stormwater systems, waterways, or into other areas to be absorbed into the soil. Wet/dry vacuums can be used for smaller jobs. Larger jobs can be broken into smaller sections with moving containment if necessary.

4.2 Building Fire Sprinkler System Flushing

Sprinkler systems are originally filled with potable water, but it remains stagnant for long periods of time. As such, water flushed from sprinkler systems may contain high levels of iron, zinc, oils and biological contaminants. The initial discharge from flushing may not be discharged to stormwater conveyances or waterways.

Ensure the first flush is either collected or directly discharged to the sanitary sewer system. Once flushed water is clear, it may be directed to a vegetated area, or if none available, to a paved area or conveyance.

4.3 Concrete and Related Masonry Work

Waste water containing concrete and other masonry materials is caustic with a pH of approximately 12 and contains a high concentration of solids. Wastes from concrete, joint compounds, limes, cement, plaster, and other masonry materials may not be allowed to enter storm conveyance systems or waterways. These items have a direct effect on aquatic life, especially benthic macroinvertebrates.

Waste water must be captured or diverted to a holding area for proper disposal. Wet/dry vacuums can be used for smaller jobs. Larger jobs can be broken into smaller sections with moving containment if necessary.

Measures shall be installed before construction activity begins and wastes shall be confined to the immediate work area, not allowed to flow down curb and gutter to a distant inlet. At end of each day, sweep up or shovel any residual debris and dispose of properly.

4.4 Dewatering Activities

Water removed from maintenance or operational activities could contain pollutants such as bacteria, nutrients, oils, sediments or other materials. Depending on the scenario, the water may need to be filtered, or collected for proper disposal.

4.4.1 Clean Water (Rainwater or groundwater infiltration)

After a visual inspection is completed and it is determined that the water is clean due to a lack of potential pollutant sources, water may be pumped into a nearby vegetated area which will allow infiltration. If there is not a large enough vegetated area nearby, or the water is sediment laden, water will need to be pumped through an adequately sized filtration device, such as a dewatering bag.

4.4.2 Contaminated Water

After a visual inspection is completed and it is determined that there are possible contaminants, water will need to be collected and transported for proper disposal. Possible disposal options could include discharging the water to the sanitary sewer or hauling to an off-site permitted disposal facility. Consultation with the Environmental Health Coordinator may be needed for proper disposal depending on the pollutant.

4.5 Erodible Material Storage (Soil, sand, road salt, etc.)

Precipitation can cause stock piles to erode, and stormwater runoff can pick up and transport material to conveyance systems and waterways. These materials have a direct effect on aquatic life, especially benthic macroinvertebrates.

Cover and contain materials to prevent erosion whenever possible. Erosion results in stormwater contamination and the loss of valuable product. The preferred storage location for soils is the South Main Street Soil Stockpile Site which has an active construction general permit for land disturbance with adequate control measures installed. The Stormwater Pollution Prevention Plan (SWPPP) for this project can be viewed at either the Stormwater Coordinator or Landscape Managers office. If erodible material is to be stored at any other location, the following measures shall be applied.

- Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent material) over the material and anchor to prevent contact between erodible material and precipitation.
- Install a berm or use other methods at upslope edge of storage pile to prevent stormwater run-off from flowing through stock pile.
- Install erosion control measures, as needed, downslope of storage pile.
- Inspect after each run-off event to make sure no erosion is present.

Existing stormwater BMP's, such as bio-retention filters or manufactured stormfilters, are not to be considered as adequate control measures, and must be protected from excess sedimentation from material storage locations.

4.6 Landscape Wastes

Landscape wastes are typically high in nutrient content. Any organic, plant or soil wastes generated as a result of landscape maintenance, including but not limited to grass clippings, leaves, or other debris shall be handled in an environmentally responsible manner to reduce the likelihood of material from entering stormwater conveyances or waterways.

4.6.1 Grass Clippings

Grass clippings should be collected or blown back on to grassed areas. Clippings should not be blown onto pavement or in to storm drains.

4.6.2 Leaves

Collected leaves are to be picked up as soon as practical. This will keep storm conveyances clear of obstructions which will prevent flooding issues. In the event leaves cannot be picked up in a timely manner, they should be blown back onto vegetated surfaces.

There is a compost site located at the South Main Street Soil Stockpile Site. All vegetative waste that cannot be re-used on site should be taken to this location.

4.7 Pesticides, Herbicides and Fertilizers

Chemicals used for the purposes of dealing with pest control, unwanted plants, and aiding in plant growth shall be handled in a manner to minimize possible discharge to stormwater conveyance systems and waterways.

4.7.1 Application

Pesticides, herbicides and fertilizers shall only be applied by certified personnel or personnel currently fulfilling the hands on requirement for obtaining certification. All applications shall follow the guidelines included in the campus integrated pest management (IPM) plan and/or the nutrient management plan (NMP). Other applicable guidelines to follow when applying are:

- Avoid spraying over impervious surfaces.
- Do not spray when wind could affect proper application.
- Do not apply to bare or eroding soil.
- Do not apply near water systems. Maintain a buffer zone of at least 20' between waterways and application of chemicals.
- Only limited use of fertilizers and pesticides may be used in bioretention areas (rain gardens, filterra units, etc.) for the purposes of assisting initial and new plantings, and controlling weeds and invasive species.
- Do not apply if it is raining or immediately before rain is expected (unless the label directs such timing).

4.7.2 Storage

Chemicals shall either be stored in an enclosed area, or in an area under cover that is protected from precipitation and does not receive flow from stormwater run-off. If possible, keep chemicals in their original containers and mark date of purchase on each container to enable using older product first. Preferred storage location is inside the storage building at the end of Chesapeake Avenue (old Rockingham Cooperative building).

4.7.3 Transport

Chemicals shall be transported in leak proof containers.

4.7.4 Disposal

Chemicals shall only be disposed of as recommended by the product manufacturer.

4.8 Road, Street, and Parking Lot Maintenance

Sweep or vacuum roads, streets and parking lots regularly, or as needed, to collect dirt, waste, and debris. Debris may be stored at the designated area at the South Main Stockpile Site, or covered as erodible material (refer to section 4.5) at the designated area at the lower section of the R2 parking lot. Dispose as solid waste by transporting to an approved facility.

Any pavement, concrete or other maintenance and repair projects shall be done in a manor to prevent discharges of waste material to storm conveyance systems. Appropriate control measures shall be implemented and wastes disposed of properly. Before any work begins, evaluate where drainage ways are located and determine adequate measures to install to protect drainage areas before work begins (e.g., concrete wash out areas, saw cutting waste water collection and disposal, etc.). Measures shall be installed before construction activity begins and wastes shall be confined to the immediate work area, not allowed to flow down curb and gutter to a distant inlet. At end of each day, sweep up or shovel any residual debris and dispose of properly.

4.9 Saw Cutting, Grinding and Drilling

Waste water from saw cutting, grinding or drilling activities shall not be allowed to enter stormwater conveyance systems or waterways without first being filtered. In addition, the sediment created from these activities shall not be allowed to remain on impervious surfaces after project completion.

Storm drains or other access to stormwater conveyance systems shall have measures installed to filter waste water. Standard erosion and sediment control inlet control measures may be used for this purpose. Wastes can also be collected, vactored and transported for proper disposal. Measures shall be installed before construction activity begins and wastes shall be confined to the immediate work area, not allowed to flow down curb and gutter to a distant inlet. At end of each day, sweep up or shovel any residual debris and dispose of properly.

Existing stormwater BMP's, such as bio-retention filters or manufactured stormfilters, are not to be considered as adequate control measures, and must be protected waste water from these types of activities.

4.10 Snow Removal and Deicing

Use of salt for roadway and walkway deicing, shall be applied as recommended by the manufacturer and only as needed using minimum quantities. Excess snow should not be placed in stormwater treatment facilities such as bio-retention filters, or in stormwater drainage ways.

4.11.1 Maintenance after Deicing and Snow Removal

Increase maintenance of stormwater structures as necessary to ensure proper operation of drainage systems. Sweep or clean up accumulated deicing and anti-icing materials and grit from roads as soon as possible after the road surface clears in order to prevent access debris from entering the storm sewer system and allow drainage of snow melt.

4.11.2 Storage

The primary storage area for road salt is the South Main Salt Shed. If stored at any other location, refer to section 4.5 for Erodible Material Storage.

4.11 Spill Control & Response

Spill control kits are located at several locations throughout campus and shall be kept adequately stocked. Be aware of drainage ways and where the nearest spill control kit is located when working outside with chemicals.

Festival Loading Dock Harrison Hall Huffman Hall ISAT Loading Dock Memorial Hall Power Plant Recycling Rose Library Showker Hall Taylor Hall	UREC USB Garage **HAZWOPER SHEDS** Harrison Hall Annex Power Plant ISAT/CS Building Spill kits can be unlocked with key A473	

For small spills, spot clean immediately, dry clean only (no water spraying), and sweep up absorbents and dispose of properly. For large spills contact Work Control at (540) 568-6101 or campus police at (540) 6911 for assistance.

Spills should be documented using the Facilities Management HAZWOPER Incident Report. In the event of an audit from DEQ or EPA, JMU will need to provide documentation about the spill and clean up procedures implemented (e.g., if auditor notices a stain adjacent at a gas pump or storage bin, they will want to see documentation of the incident.)

4.12 Vehicle and Equipment Maintenance

Improperly maintained vehicles and equipment can generate spills or leaks that can contaminate stormwater runoff and enter stormwater conveyances and waterways.

4.12.1 Vehicle and Equipment Storage

Ensure that vehicles and equipment are not leaking oil or other fluids. If leaks are noted, contact Garage Supervisor for maintenance.

4.12.2 Vehicle and Equipment Washing

Wastewater from cleaning vehicles and equipment must be discharged into a sanitary sewer drain at a site that is approved for discharge. Pollutants released while washing vehicles and equipment include surfactants, petroleum hydrocarbons, toxic organic compounds, oils and greases, nutrients, metals, and suspended solids.

Approved washing locations are:

- Transportation Wash Bay at South Main Street Facility (1603 South Main Street)
- Wash Bay at University Sports Park Maintenance Shop (1285 Kelsey Lane)
- Other preferred or contracted privately owned car wash facilities. (Contact your supervisor for approved list)
- In instances where it is not practicable to move machinery/equipment to a wash bay before transporting, field washing may be allowed without the use of chemicals (soaps, degreasers, etc.) as long as it is done in a large grassed area with little or no slope away from storm drainage systems.

4.12.3 Vehicle and Equipment Maintenance

JMU's Garage Supervisor will ensure that vehicles and equipment receive routine maintenance as needed. Maintenance and repair activities must be conducted indoors whenever possible. If work must be performed outdoors, drip pans or other containment devises shall be used beneath the vehicle or equipment to capture all spills and drips. Tarps or other methods shall also be employed to prevent precipitation from coming in contact with vehicle and equipment leaks.

Maintenance and repair areas may not be hosed down to outdoor areas. All cleaning must be done inside and by using appropriate control measures.

Drains located inside buildings must be connected to the sanitary sewer. Sanitary sewer connections should not be made without prior approval from any appropriate agencies.

All fluids shall be stored and disposed of properly by following the product manufacturer's recommendations.

5.0 References

Following are references to stormwater related laws, regulations, and specifications:

Code of Virginia. Chapter 3.1. State Water Control Law
http://law.lis.virginia.gov/vacode/title62.1/chapter3.1/

James Madison University. *Annual Standards and Specifications for ESC & SWM*
http://www.jmu.edu/facmgt/sustainability/Stormwater/site-plan-review.shtml

James Madison University. *Municipal Separate Storm Sewer (MS4) Program Plan*
http://www.jmu.edu/facmgt/sustainability/Stormwater/ms4.shtml

Virginia Administrative Code. Chapter 840. Erosion and Sediment Control Regulations
http://law.lis.virginia.gov/admincode/title9/agency25/chapter840/

Virginia Administrative Code. Chapter 870. Virginia Stormwater Management Program (VSMP) Regulation
http://law.lis.virginia.gov/admincode/title9/agency25/chapter870/

Virginia Administrative Code. Chapter 880. General VPDES Permit for Discharges of Stormwater from Construction Activities
http://law.lis.virginia.gov/admincode/title9/agency25/chapter880/

Virginia Administrative Code. Chapter 890. General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.
http://law.lis.virginia.gov/admincode/title9/agency25/chapter890/

6.0 Evaluation

This policy with procedures will be evaluated annually and updated as needed.

Policy #4310
Illicit Discharge Detection and Elimination (IDDE)

Date of Current Revision: February 2014
Responsible Officer: Associate Vice President, Business Services

1. PURPOSE

Establish methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, as implemented through the Virginia Stormwater Management Program (VSMP) Permit for James Madison University (JMU).

2. AUTHORITY

The Board of Visitors has been authorized by the Commonwealth of Virginia to govern James Madison University. See Code of Virginia section 12-164.6; 23-9.2:3. The board has delegated the authority to manage the university to the president.

3. DEFINITIONS

Affiliate: An individual who has a formal affiliation with the university and receives some services from the university, but is not a student or employee of the university and receives no remuneration from the university (Formal affiliation means that a necessary relationship exists between the university and the individual to provide a service of value to the university). Affiliates are defined in Policy 1337 and include employees of contractors such as ARAMARK, Pitney Bowes, Follett, etc.

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices, to prevent or reduce the pollution of surface waters and groundwater systems.

Contractor: An individual or company, including a subcontractor, hired to perform services on university property.

Illicit Discharge: Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater, except discharges pursuant to VPDES or state permit (other than the state permit for discharges from the municipal separate storm sewer), discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3).

Municipal Separate Storm Sewer: A conveyance or system of conveyances otherwise known as a municipal separate storm sewer system, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains:

a. Owned or operated by a federal, state, city, town, county, district, association, or other public body, created by or pursuant to state law, having jurisdiction or delegated authority for erosion and sediment control and stormwater management, or a designated and approved management agency under § 208 of the Clean Water Act (CWA) that discharges to surface waters;
b. Designed or used for collecting or conveying stormwater;
c. That is not a combined sewer; and
d. That is not part of a publicly owned treatment works.

Municipal Separate Storm Sewer System (MS4): All separate storm sewer systems that are defined as “large” or “medium” or “small” municipal separate storm sewer systems or designated under 9VAC25-870.

Visitor: A person who is not enrolled at, compensated by or an affiliate of the university.

4. APPLICABILITY

This policy is applicable to all students, faculty, staff, contractors, affiliates and visitors of James Madison University.

5. POLICY

No university employee, student, visitor, contractor or department shall cause or allow discharges into the university’s storm sewer system which are not composed entirely of stormwater, except for the allowed discharges provided in the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870). Prohibited discharges include, but are not limited to: oil, anti-freeze, grease, chemicals, wash water, paint, animal waste, garbage, and litter. The spilling, dumping, or disposal of materials other than stormwater to the storm drainage system is prohibited.

6. PROCEDURES

a. Field Screening

Field observations of MS4 outfalls shall be conducted at least once per year during dry weather conditions. Observations shall be recorded using the current inspection form and information entered into a tracking database.

If flow is observed, or evidence suggests that illicit discharges may exist, further investigation shall be administered by any of the following methods:

i. Tracing discharge up storm sewer system;
ii. Taking a sample of discharge for analysis in order to determine if a pollutant is present and identify the pollutant;
iii. Implement best management practices to eliminate illicit discharges;
iv. Scheduling follow up observations; and
v. Any other appropriate measures deemed necessary.

b. Notification of Spills and Illicit Discharges

Once a spill or illicit discharge has been observed, the incident shall be reported to the Stormwater Coordinator and Safety & Training Coordinator. If those individuals are unavailable, contact Work Control or Campus Police. Failure to provide notification of the incident shall be a violation of this policy.

An initial investigation shall be performed within one business day of receiving notification and appropriate measures taken in order to prevent further discharge and begin remediation of pollution.

c. Tracking

Field observations shall be tracked in a database. Data fields to be included shall be:

i. Date discharge observed/reported

ii. Location of discharge
iii. Summary
    1. Results of investigation
    2. Any follow-up to investigation
    3. Resolution of investigation
iv. Date investigation closed

d. Enforcement

When a violation of this policy has been detected, JMU may order compliance, by either verbal notice or written notice, to the responsible party. Such notice may require without limitation:

i. The performance of monitoring, analyses, and reporting;
ii. The elimination of prohibited discharges or connections;
iii. Cessation of any violating discharges, practices, or operations;
iv. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
v. Payment of any fee, penalty, or fine assessed against JMU to cover remediation cost;
vi. The implementation of new stormwater management practices; and
vii. Disciplinary action up to and including dismissal, where appropriate.

The listed requirements will be at the expense of the responsible party.

In the event that adequate measures are not initiated, JMU may issue work orders to correct the violation and bill the responsible party for expenses incurred.

If additional measures are required for enforcement, the president will be notified.

e. Training/Education

A training program for Stormwater Pollution Prevention/Good Housekeeping and Illicit Discharge Detection & Elimination (IDDE) will be presented for Facilities Management employees on an annual basis, and during new employee orientation for Facilities Management staff.

Educational materials for Stormwater Pollution Prevention and Illicit Discharge Detection & Elimination will be distributed through various forms of media to the members of the JMU community.

7. RESPONSIBILITIES

Stormwater Coordinator: Responsible for administration, implementation and enforcement of this policy.

All students, faculty, staff, contractors, affiliates and visitors of James Madison University are responsible for abiding by this policy and reporting illicit discharges to the proper authority.

8. SANCTIONS

Regarding employees of JMU and affiliates, sanctions will be commensurate with the severity and/or frequency of the offense and may include termination of employment.

Regarding students, sanctions will be commensurate with the severity and/or frequency of the offense and may include suspension or expulsion.

9. EXCLUSIONS

The following discharges to the municipal storm sewer system are allowed as they are considered to be not significant contributors of pollutants to the MS4:

a. Discharges that are covered under a separate individual or general Virginia Pollutant Discharge Elimination System (VPDES) or Virginia Stormwater Management Program (VSMP) permit for non-stormwater discharges.
b. Discharges or flows which are not significant contributors of pollutants to the municipal separate storm sewer system
    - Water line flushing
    - Landscape irrigation
    - Diverted stream flows
    - Rising ground waters
    - Potable water sources
    - Foundation drains
    - Air conditioning condensation
    - Irrigation water
    - Springs
    - Water from crawl space pumps
    - Footing drains
    - Flows from riparian habitats and wetlands
    - Dechlorinated swimming pool discharges
    - Street wash water

10. INTERPRETATION

Authority to interpret this policy rests with the President and is generally delegated to the Associate Vice President of Business Services.

POLICY IV 11: Land Disturbing Activities	
APPROVED: *Towana Moore, Associate Vice President, Business Services*	Policy Review: Annually Dated: July 2009 Updated: Nov. 2015

Table of Contents

1.0 Purpose

James Madison University is required to operate an Erosion and Sediment Control (ESC) and Stormwater Management (SWM) program as part of permit and legislative requirements. JMU is responsible for ensuring all regulated land disturbing activities have adequate documentation before construction activity begins and that construction activities follow approved site plans, JMU's *Annual Standards and Specifications for ESC and SWM*, and regulatory requirements.

The purpose of this policy is to layout the procedures for regulatory compliance concerning all regulated land-disturbing activities at the University.

2.0 Definitions

Best Management Practice (BMP) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices to prevent or reduce pollution of surface waters and groundwater systems.

Common Plan of Development – A contiguous area where separate and distinct construction activities may be taking place at different times on different schedules.

The EPA has provided guidance stating that there are several situations where discrete projects, that could be considered part of a larger "common plan," can actually be treated as separate projects for the purposes of permitting:

> A public entity (e.g., a municipality, state, tribe, or federal agency) need not consider all construction projects within their jurisdiction to be part of an overall "common plan." For example, construction roads or buildings in different parts of a state, city, military base, university campus, etc. could be considered separate "common plans." Only the interconnected parts of a project would be considered to be a "common plan" (e.g. a building and its associated parking lot and driveways, airport runway and associated taxiways, a building complex, etc.) – 2008 Construction General Permit FAQ
>
> When can you consider future construction on a property to be part of a separate plan of development or sale? After the initial "common plan" construction activity is completed for a particular parcel, any subsequent development or redevelopment of that parcel would be regarded as a new plan of development. For example, after a house is built and occupied, any future construction on that lot (e.g. reconstructing after fire, adding a pool or parking area, etc.), would stand alone as a new "common plan" for purposes of calculating acreage disturbed to determine if a permit was required. This would also apply to similar situations at an industrial facility, such as adding new buildings, a pipeline, new wastewater treatment facility, etc. that was not part of the original plan. – 2003 Construction General Permit Fact Sheet.

For example, a 4 acre project has been completed which included water quantity and quality control measures. Later, an additional 8,000 square feet is planned to be added onto the parking lot, this would not be considered to be a regulated land-disturbing activity. If after that work was completed, and an additional 8,000 square feet was to be added, then it would be considered a regulated activity as 16,000 square feet will have been disturbed without an approved site plan to account for water quantity. If then, another 30,000 square feet were to be disturbed, it would obviously meet the criteria for an ESC plan, but now the total disturbance would be over an acre, and water quality would need to be included for the entire 46,000 square feet. Once that project was completed, the cycle could start over again.

Environmental Protection Agency (EPA) – Federal entity responsible for monitoring, standard-setting and enforcing activities to ensure environmental protection.

Erosion and Sediment Control (ESC) Plan – A site specific plan identifying best management practices and control measures to be implemented during a land-disturbing activity of 10,000 square feet or more, or part of a common plan of development, to prevent or minimize downstream impacts from sediment deposition, erosion, and damage due to increases in stormwater run-off. Will include a quantity analysis for channel protection and flood protection.

Illicit Discharge – Any discharge to a MS4 that is not composed entirely of stormwater, except discharges pursuant to a separate VPDES permit, discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3). (water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), uncontaminated pumped ground water, potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.)

Land Disturbance or ***Land Disturbing Activity*** – A manmade change to the land surface that potentially changes its runoff characteristics including, but not limited to, clearing, grading, excavating, transporting and filling of land.

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

Non-Regulated Land Disturbance – A land disturbance that does not require an approved site plan before construction activity begins. Best management practices shall be implemented as needed to prevent sediment deposition and illicit discharges to an MS4 or waterway. These practices may include, but not limited to, construction entrances, road sweeping, silt fence installation, inlet protection, trash management, and washout locations.

Regulated Land Disturbance – A land disturbance that meets criteria requiring a site plan be prepared and approved before land disturbance may begin.

Responsible Land Disturber (RLD) – An individual holding a certificate of competence issued by the DEQ, or previously issued by the Department of Conservation and Recreation (DCR), who will be in charge of and responsible for ensuring the land-disturbing activity follows the approved ESC plan and remains compliant with JMU's *Annual Standards and Specifications for ESC and SWM*, and other applicable stormwater management requirements.

Stormwater Management Facility - A structural best management practice that controls stormwater runoff and changes the characteristics of that runoff, including but not limited to, the quantity and quality, the period of release, or the velocity of flow.

Stormwater Management (SWM) Plan – A site specific plan identifying best management practices and control measures to be implemented during a land-disturbing activity of 1 acre or more, or part of a common plan of development, to mitigate effects of additional pollutant loads from development or redevelopment projects. Will include a water quantity analysis for channel protection and flood protections, and a water quality analysis to meet regulatory design criteria requirements.

Stormwater Pollution Prevention Plan (SWPPP) – A document that is prepared in accordance with good engineering practices and that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges. A SWPPP required under a VSMP for construction activities shall identify and require the implementation of control measures, and shall include, but not be limited to the inclusion of, or the incorporation by reference of an approved ESC plan, an approved SWM plan, and a pollution prevention plan.

Virginia Department of Environmental Quality (DEQ) – State department responsible overseeing the universities stormwater related programs and the enforcement of stormwater legislation.

Virginia Pollutant Discharge Elimination System (VPDES) – A permit program allowing the discharge of stormwater from MS4s, industrial activities and construction activities.

3.0 Responsibilities

Director of Engineering and Construction, and Director of Facilities Management: Responsible for the overall implementation of this policy and procedures.

Assistant Director of Facilities Management for Operations, Project Managers and Supervisors: Responsible for ensuring that the requirements outlined in this policy are followed for all land-disturbing activities by both JMU employees and outside contractors under their supervision.

Stormwater Coordinator: Responsible for the coordination of plan review, approval and related inspections concerning regulated land-disturbing. Ensuring regulated land-disturbing activities follow approved measures to stay compliant with JMU's *Annual Standards and Specifications for ESC and SWM*, stormwater related policies and procedures, and applicable laws and regulations.

4.0 Procedures

Project Managers or supervisors planning work that will require land disturbance should consult with FM Engineering to determine if the proposed project will be considered a regulated or non-regulated land disturbing activity.

4.1 Non-Regulated Land Disturbing Activities

Projects that do not meet the criteria requiring a site plan are still required to implement control measures, as needed, to prevent sediment deposition and other illicit discharges to a MS4 or waterway. These measures may include, but are not limited to, construction entrances, road sweeping, silt fence installation, inlet protection, trash management and washout locations. If additional guidance is needed, contact FM Engineering.

If site issues are noticed at a non-regulated land disturbing activity, or if a non-regulated land disturbing activity expands in scope to where it will meet regulated criteria, notification of such will be forwarded to the Director of Engineering and Construction to coordinate needed corrective actions.

4.2 Regulated Land Disturbing Activities

Projects disturbing 10,000 square feet or more, or part of a common plan of development will require an ESC plan, narrative and supporting documentation for review and approval. Projects disturbing an acre or more, or part of a larger common plan of development will require an ESC and SWM plan, narrative, and supporting documentation for review and approvals. Shape of the land disturbance does not matter, so whether it is a land disturbance of 100' by 100', a utility project that is 10' wide and a length of 1,000', or any other configuration of 10,000 square feet or more, an approved plan will be required.

Following is a list of questions to be considered when determining if a proposed project will be considered a regulated activity:

- How large of a land disturbance will be needed for construction activity?
    - This will include borrow and waste areas, and any other areas that may be denuded related to the construction activity.
- What site changes have been done since the purchase of the property?
- What site changes have been done since the last approved site plan?
- How will new construction or redevelopment connect to adjacent areas?
- What is the current purpose of the project area?

- Is the project routine maintenance that is being performed to maintain the original grade line and grade, hydraulic capacity, or original construction of the project?
    - Is the routine maintenance on impervious or pervious surface?

Please note that if site limits during construction increases over land disturbing benchmarks, additional requirements will need to be met. For example, if a site plan is approved with a disturbance of 0.95 acres, but during site activity over an acre is disturbed. Site plans will need to be updated to include stormwater management criteria (water quality) and General Permit Coverage will need to be obtained from the state. In addition, if a project were to increase in size that would require a higher fee for permit coverage, the difference in fees will need to be paid to the state (see permit fee form and fee schedule on DEQ's website for construction general permits).

4.2.1 Plan Review & 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. The plan checklist included in the appendix of JMU's *Annual Standards and Specifications for ESC and SWM* will also need to be completed and submitted.

Site plans will be reviewed by certified individuals to ensure compliance is met with JMU's *Annual Standards and Specifications for ESC and SWM, 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.

Please note that plan review and approval is not an instant process. The plan review process typically takes 4 to 8 weeks to complete from the time of initial plan submission, depending on the size of the project and its complexity. This time frame includes both plan review and time for the engineering consultant to respond to comments and re-submit.

Once the plan and supporting documentation is deemed to be adequate, a plan approval letter will be forwarded to the project engineer. 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.

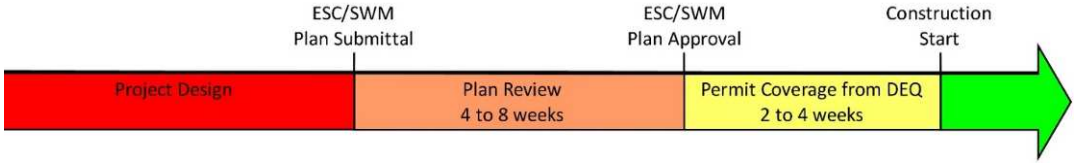


Figure 1. Typical time frame for plan review approval and receipt of permit coverage.

4.2.2 Prerequisites for Land Disturbance After Plan Approval

Before land disturbance may begin, there are several prerequisites that will need to be fulfilled.

- Notification of a RLD will need to be submitted to FM Engineering. This notification shall include the RLD's name, certification number and contact information (including email). RLD information will then be forwarded to the DEQ with basic project information.
- A pre-construction conference will also need to be conducted in order to clarify the ESC/SWM roles, responsibilities and obligations of parties involved with the land disturbing activity. The JMU Project Manager, JMU Project Engineer, JMU Stormwater Coordinator, general construction permit operator (if applicable) and RLD should be in attendance.
- If the project requires state construction general permit coverage, a copy of the coverage letter will need to be forwarded to FM Engineering. Please note that by submitting the registration statement

for general permit coverage, the operator is certifying that they have received ESC and SWM plan approval, and have prepared a SWPPP.

Once all prerequisites have been fulfilled, land disturbance may being. Please note that ESC measures intended to trap sediment shall be constructed as a first step in any land disturbing activity.

4.2.3 Inspections During Land Disturbance

Inspections will be conducted by certified personnel to confirm site compliance with applicable stormwater laws and regulations, the approved site plan, the construction general permit (if applicable), and JMU's *Annual Standards and Specifications for ESC and SWM*. Inspection frequency will be completed as stated in JMU's *Annual Standards and Specification for ESC and SWM*.

Documentation of findings will be forwarded to the JMU Project Manager, JMU Project Engineer, RLD, and any other persons identified during the pre-construction conference using the *ESC/SWM Inspection Report* included in JMU's *Annual Standards and Specifications for ESC and SWM*. Any site issues will include a description of the issue and photo documentation. In the event site compliance is not met within an acceptable time period, the issue will be forwarded to the Director of Engineering and Construction for further enforcement actions as deemed appropriate.

4.2.4 Project Close Out

Project completion may be issued once the following items have been completed and documentation submitted as applicable:

- 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. Verification of final product according to approved plans.
- All temporary erosion and sediment control measures are removed and any trapped sediment and disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized.
- A construction record drawing for permanent stormwater management facilities shall be submitted to the JMU Stormwater Coordinator. The construction record drawing shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved plan. Once all items have been finalized, an inspection report will be submitted stating the ESC and/or SWM has been completed. Notice of Termination of the general construction permit may then be submitted to the DEQ by the operator.
- Completion of TV inspection of the installed storm sewer system.
- As-built CAD files for updating JMU campus map and GIS.

Any constructed stormwater facility BMPs will be entered into JMU's stormwater facility database and the related layer in JMU's GIS will be updated.

5.0 References

Following are references to stormwater related laws, regulations, and specifications:

Code of Virginia. Chapter 3.1. State Water Control Law
http://law.lis.virginia.gov/vacode/title62.1/chapter3.1/

James Madison University. *Annual Standards and Specifications for ESC & SWM*
http://www.jmu.edu/facmgt/sustainability/Stormwater/site-plan-review.shtml

James Madison University. *Municipal Separate Storm Sewer (MS4) Program Plan*
http://www.jmu.edu/facmgt/sustainability/Stormwater/ms4.shtml

Virginia Administrative Code. Chapter 840. Erosion and Sediment Control Regulations
http://law.lis.virginia.gov/admincode/title9/agency25/chapter840/

Virginia Administrative Code. Chapter 870. Virginia Stormwater Management Program (VSMP) Regulation
http://law.lis.virginia.gov/admincode/title9/agency25/chapter870/

Virginia Administrative Code. Chapter 880. General VPDES Permit for Discharges of Stormwater from Construction Activities
http://law.lis.virginia.gov/admincode/title9/agency25/chapter880/

Virginia Administrative Code. Chapter 890. General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.
http://law.lis.virginia.gov/admincode/title9/agency25/chapter890/

6.0 Evaluation

This policy with procedures will be evaluated annually and updated as needed.

POLICY IV 10: Stormwater Management Facilities	
APPROVED: *Towana Moore, Associate Vice President, Business Services*	Policy Review: Annually Dated: July 2009 Updated: Nov. 2015

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1.0 Purpose

James Madison University is required to operate a Virginia Stormwater Management Program (VSMP) as part of permit and legislative requirements. Stormwater Best Management Practices (BMPs) are required to be installed for the mitigation of construction projects or for pollution reduction credits related to watershed cleanup efforts such as the Chesapeake Bay Total Maximum Daily Load (TMDL). These BMPs must remain in place as designed and be maintained in perpetuity to function as intended.

The purpose of this policy is to establish procedures for the design, installation, acceptance, inspections, and maintenance of stormwater management facilities installed on campus.

2.0 Definitions

Best Management Practice (BMP) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices to prevent or reduce pollution of surface waters and groundwater systems.

Environmental Protection Agency (EPA) – Federal entity responsible for monitoring, standard-setting and enforcing activities to ensure environmental protection.

Erosion and Sediment Control (ESC) Plan – A site specific plan identifying best management practices and control measures to be implemented during a land-disturbing activity of 10,000 square feet or more, or part of a common plan of development, to prevent or minimize downstream impacts from sediment deposition, erosion, and damage due to increases in stormwater run-off. Will include a quantity analysis for channel protection and flood protection.

Stormwater Management Facility - A structural best management practice that controls stormwater runoff and changes the characteristics of that runoff, including but not limited to, the quantity and quality, the period of release, or the velocity of flow.

Stormwater Management (SWM) Plan – A site specific plan identifying best management practices and control measures to be implemented during a land-disturbing activity of 1 acre or more, or part of a common plan of development, to mitigate effects of additional pollutant loads from development or redevelopment projects. Will include a water quantity analysis for channel protection and flood protections, and a water quality analysis to meet regulatory design criteria requirements.

Virginia Department of Environmental Quality (DEQ) – State department responsible overseeing the universities stormwater related programs and the enforcement of stormwater legislation.

3.0 Responsibilities

Director of Engineering and Construction: Responsible for the overall implementation of this policy and procedures.

Director of Facilities Management for Operations, and Assistant Director of Facilities Management for Operations: Responsible for ensuring that stormwater management facilities are properly maintained when work orders are issued for maintenance and/or repair.

Project Manager: Responsible for ensuring that stormwater management facilities are designed in accordance with the appropriate water quality and water quantity design criteria as required in 9VAC25-870 and installed in

accordance with the approved site plan and applicable requirements of the Department of Environmental Quality (DEQ) and any annual standards and specifications adopted by the university.

Stormwater Coordinator: Responsible for overseeing site plan review, long-term maintenance inspections, preparation of report for work orders for BMPs requiring maintenance, and submitting the required annual report to the Department of Environmental Quality

4.0 Procedures

4.1 Design & Plan Review

Project Manager will ensure that a professional engineer licensed in the Commonwealth of Virginia 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.

Stormwater Coordinator shall oversee review of plans to ensure compliance with stormwater regulations. Project construction shall not begin until site plan has been approved for erosion and sediment control and stormwater management. Refer to JMU's *Annual Standards and Specifications for ESC and SWM* and JMU's *Land Disturbing Policy* for more information.

4.2 Installation & Approval

Project Manager, or project inspector, shall observe construction of the stormwater management facility to ensure compliance with approved plan.

Project Manager shall have contractor provide any requested as-built documentation. Construction as-built documentation shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved plan.

Stormwater Coordinator will file as-built certification with BMP files for reference during maintenance inspections and any needed repair work. Stormwater Facility database and related layer in GIS will be updated as facilities are completed in the field.

4.3 Long-Term Maintenance & Inspections

Stormwater Coordinator shall oversee required inspections on stormwater management facilities. Any required maintenance shall be documented and information included in a work order to Operations or outside contractor for remedial work.

Assistant Director of Facilities Management for Operations shall ensure that maintenance is performed as instructed by work orders, unless outside contractor is hired for repair.

Stormwater Coordinator will perform a final inspection once informed of completion of remedial work.

4.4 Reporting

Stormwater Coordinator will be responsible for preparing and submitting required annual BMP report to DEQ. A copy of this report will be kept in the Engineering Department file. The report shall include the following information:

- Type of structural stormwater facility installed as defined in the Virginia Stormwater Management Handbook or Virginia Stormwater BMP Clearinghouse
- Geographic Location (Hydrologic Unit Code)
- Where applicable, the impaired surface water that the stormwater management facility is discharging into
- Number of acres treated

5.0 References

Following are references to stormwater related laws, regulations, and specifications:

Code of Virginia. Chapter 3.1. State Water Control Law
http://law.lis.virginia.gov/vacode/title62.1/chapter3.1/

James Madison University. *Annual Standards and Specifications for ESC & SWM*
http://www.jmu.edu/facmgt/sustainability/Stormwater/site-plan-review.shtml

James Madison University. *Municipal Separate Storm Sewer (MS4) Program Plan*
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Virginia Administrative Code. Chapter 840. Erosion and Sediment Control Regulations
http://law.lis.virginia.gov/admincode/title9/agency25/chapter840/

Virginia Administrative Code. Chapter 870. Virginia Stormwater Management Program (VSMP) Regulation
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Virginia Administrative Code. Chapter 880. General VPDES Permit for Discharges of Stormwater from Construction Activities
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Virginia Administrative Code. Chapter 890. General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.
http://law.lis.virginia.gov/admincode/title9/agency25/chapter890/

6.0 Evaluation

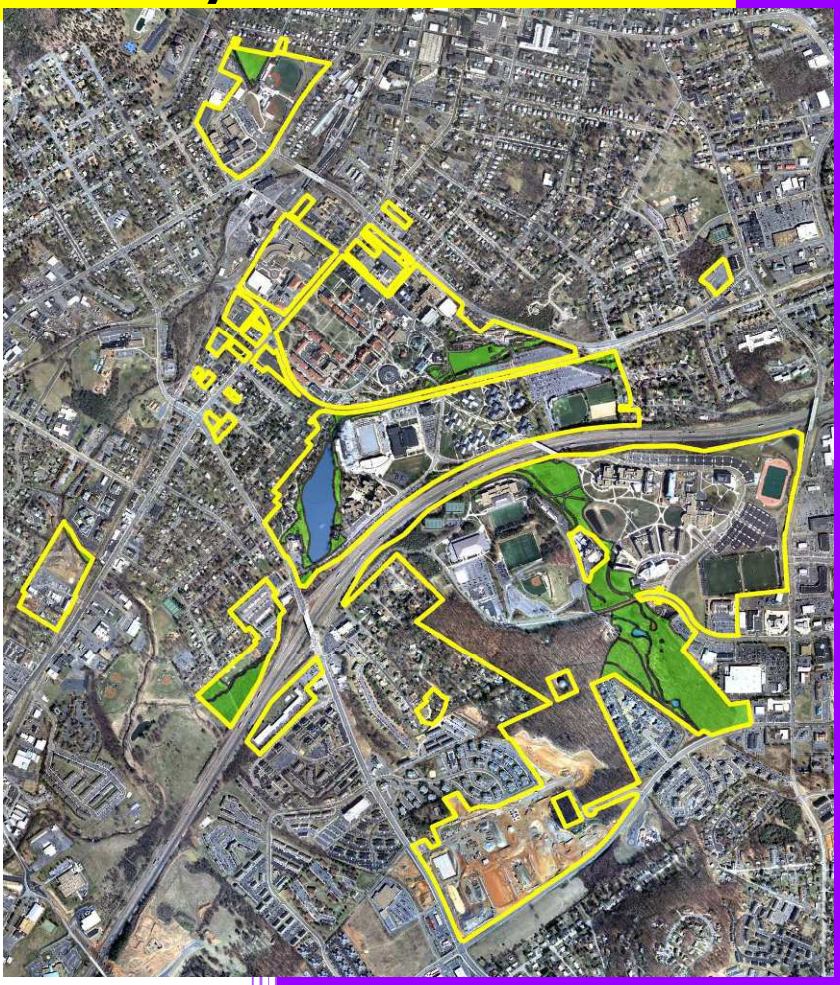
This policy with procedures will be evaluated annually and updated as needed.

Appendix C

Chesapeake Bay TMDL Action Plan

2016

Chesapeake Bay Action Plan



JAMES MADISON UNIVERSITY

Dale Chestnut

JMU Facilities – Engineering & Construction

3/23/2016

Chesapeake Bay Action Plan
James Madison University – Harrisonburg, Virginia

2016 Update

Submitted to satisfy the terms of the
General VPDES Permit for Discharges of Stormwater from
Small Municipal Separate Storm Sewer Systems (MS4)

Registration Number: VAR040112

Contact Information:
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Abbreviations

CGP – Construction General Permit

DCR – Virginia Department of Conservation and Recreation

DEQ – Virginia Department of Environmental Quality

EOS – Edge of Stream

ESC – Erosion and Sediment Control

JMU – James Madison University

MCM – Minimum Control Measure

MS4 – Municipal Separate Storm Sewer System

POC – Pollutant of Concern

RUI – Regulated Urban Impervious

SWPPP – Stormwater Pollution Prevention Plan

TMDL– Total Maximum Daily Load

VSMP – Virginia Stormwater Management Program

Introduction

This Action Plan was created to satisfy Section I.C. of the 2013-2018 General Permit for Discharges of Stormwater from Small (Phase II) Municipal Separate Storm Sewer Systems (MS4). Section I.C. is the Special Condition for the Chesapeake Bay Total Maximum Daily Load (TMDL), which requires reductions of the Chesapeake Bay pollutants of concern (POCs) from existing development, including both impervious and pervious land that drains to James Madison University's MS4. The Chesapeake Bay POCs include nitrogen, phosphorus, and sediment. This Action Plan was developed to conform to the Virginia Department of Environmental Quality (DEQ) Guidance Memo No. 15-2005, dated May 18, 2015.

The Action Plan provides a review of the current MS4 program, which demonstrates James Madison University's (JMU) ability to ensure compliance with the Special Condition. It describes the required reduction in POCs, as well as the means and methods to be utilized in achieving 5.0% of the total reductions during the 2013 - 2018 permit cycle, as required by the permit. The required POC reductions are based on the Level 2 scoping run reduction for existing development, as defined in Virginia's Phase II Watershed Implementation Plan. Level 2 implementation refers to a modeled pollution reduction level of effort. It equates to an average reduction of 9.0% of nitrogen loads, 16% of phosphorus loads, and 20% of sediment loads from impervious regulated acres from the 2009 baseline loads. From pervious regulated acres, Level 2 implementation requires the reduction of 6.0% of nitrogen loads, 7.25% of phosphorus loads and 8.75% sediment loads from the 2009 baseline loads. Further discussion of required pollution reductions may be found in Virginia's Phase II Watershed Implementation Plan.

The Action Plan is composed of the following elements:

1. Current Program and Existing Legal Authority
2. New or Modified Legal Authority
3. Means and Methods to Address Discharges from New Sources
4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions
5. Means and Methods to Meet the Required Reductions and Schedule
6. Means and methods to Offset Increased Loads Form New Sources Initiating Construction Between July 1, 2009 and June 30, 2014
7. Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction After July 1, 2014
8. List of Future Projects, and Associated Acreage that Qualify as Grandfathered
9. An Estimate of the Expected Cost to Implement the Necessary Reductions
10. Public Comments on Draft Action Plan

The Action Plan was initially completed in June, 2015, and will be submitted to the DEQ with JMU's MS4 Program Annual Report for the reporting period of July 1, 2014 through June 30, 2015. Should the Action Plan need to be updated to reflect new project opportunities, to address projects deemed infeasible, or for any other reason, updates will be submitted to the Department in accordance with the Program Plan Modification section of the General Permit (GP Section II.F.1).

1. Current Program and Existing Legal Authority

General Permit Section I.C.2.a.(1)

James Madison University falls under the Phase II MS4 regulations as a small municipal storm sewer system operator, based on the definition found in 40 CFR 122.26(b)(8). As an operator of a small MS4, JMU must develop, implement, and enforce a MS4 Program designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practicable, to protect water quality, to ensure compliance with water quality standards, and to satisfy the water quality requirements of the Clean Water Act and its attendant regulations.

As the operator of the MS4, and other campus infrastructure, University Administration has assigned the Facilities Management Department the responsibility of, and authority to administer a comprehensive and compliant Stormwater Management Program. JMU has developed and administered a compliant MS4 program since it was first permitted in 2007. The core of the program revolves around the six minimum controls measures (MCM) found in the Phase II MS4 General Permit. Best management practices implemented to comply with the minimum control measures and outcomes achieved can be found in JMU's MS4 Program Plan and annual reports, respectively. The MCMs include:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination (IDDE)
4. Construction site stormwater runoff control
5. Post-construction stormwater management
6. Pollution prevention/good housekeeping for municipal operations

The Facilities Management Department maintains four stormwater policies that provide it with the authority to administer the program and comply with the MCMs. The policies describe in detail their purpose, definitions, responsibilities, and procedures. They provide guidance to faculty, staff, students and the public, which results in the efficient administration of the program, and continuity of operations within the Stormwater Division. These policies can be found in the Appendices of the MS4 Program Plan, and are viewed annually. The MS4 Program Plan will be updated with various additional policies and procedures according to the schedule established in the 2013 Phase II MS4 General Permit. The existing policies and their most recent version include:

- Illicit Discharge Detection and Elimination (IDDE) Policy & Procedure, February 2014
- Land-Disturbing Activities Policy & Procedure, November 2015
- Stormwater Management Facilities Policy & Procedure, November 2015
- Erosion and Sediment Control/Stormwater Management (ESC/SWM) Annual Standards & Specifications, November 2014
- Daily Operating Procedures for Stormwater Control Best Management Practices, November 2015

MCMs 4 and 5 regulate construction and post-construction stormwater management, respectively. § 62.1-44.15:54 of the Virginia Administrative Code allows state agencies to adopt their own Virginia Erosion and Sediment Control (ESC) Program. JMU has administered its own ESC program since 2009, with the oversight of the Virginia Department of Conservation and Recreation (DCR), and now DEQ. As of July 1, 2014, the University now also administers its own Virginia Stormwater Management Program (VSMP), as allowed by § 62.1-44.15:27. JMU submits ESC and stormwater management Annual Standards & Specifications for approval by DEQ to ensure all development on the campus conforms with the intent of the Virginia Erosion and Sediment Control Law, the Virginia Stormwater Management Act, and attendant regulations.

Regarding legal authority over contractor activities, all contractors performing land disturbing activities on JMU properties are required, through contract documents, to obtain all applicable permits before construction activity commences, and to follow JMU's Annual Standards and Specifications. CO-7 of the General Conditions of the Construction Contract addresses requirements of related to land disturbance.

1.1 Ability to Address Special Condition for the Chesapeake Bay TMDL

The existing program provides adequate authority to address the Special Condition for the Chesapeake Bay TMDL. The required deliverables will be produced with existing Facilities Management staff, and outside support available to staff. Projects implemented to achieve pollutant reduction targets, and strategies to fund them, will be developed and managed by existing staff. A robust recordkeeping system will provide long-term continuity for managing load reductions and maintenance activities. Additionally, through the development of a Stormwater Management Master Plan and Stormwater Retrofit Opportunities study, staff has inventoried additional options for POC reductions, beyond what is identified in the Action Plan. Existing staff will also provide for the adoption of stormwater practices and infrastructure into a long-term stormwater asset management program. Funds to meet the Special Condition may continue to be requested from the University General Fund, and may be supplemented with grant funds.

2. New or Modified Legal Authority

General Permit Section I.C.2.a.(2)

No new legal authorities are required for compliance with the Special Condition for the Chesapeake Bay TMDL. JMU already possess the authorities necessary to meet the pollution reduction goals identified in Section 4.

However, compliance may be more easily managed by communicating and formalizing responsibilities with neighboring MS4 jurisdictions. JMU and neighboring jurisdictions have decided that each will be responsible for the drainage areas that fall within their municipal boundary. JMU and the City of Harrisonburg are in discussions about formalizing this agreement with a Memorandum of Understanding. This plan will be updated to reflect any agreements that JMU enters into that affect the management of the MS4.

3. Means and Methods to Address Discharges from New Sources

General Permit Section I.C.2.a.(3)

When it comes to site development, JMU has the advantage of being the project manager, which assist with administering site design, stormwater regulatory conformance, and construction all within the same department. Therefore, the University is in a good position to design projects that meet or exceed the requirements of the Erosion and Sediment Control Law and Virginia Stormwater Management Act and regulations.

JMU's VESC Program and VSMP operate under DEQ approved Annual Standards and Specifications. JMU requires all development projects that are 10,000 square feet or greater to have an ESC plan that conforms to the Annual Standards and Specifications. The VSMP requires the development of a Stormwater Pollution Prevention Plan (SWPPP) for all construction projects that require a VSMP permit. The SWPPP includes the following elements:

- Erosion and Sediment Control Plan
- Stormwater Management Plan
- Pollution Prevention Plan
- Description of control measures necessary to address a TMDL

The Project Manager is responsible for requiring site design that meets the technical criteria of the Virginia Stormwater Management Regulations, and that a VSMP Construction General Permit (CGP) is obtained from DEQ. The Stormwater Coordinator is responsible for reviewing and providing comments to confirm conformance of the plans with the regulations and Annual Standards and Specifications. The Stormwater Coordinator may seek qualified assistance for plan review, at his discretion.

Pre-construction meetings are routinely held to clarify ESC and SWM expectations. Construction sites are inspected regularly by certified personnel to ensure compliance with the CGP, approved plans, and all applicable regulations, standards and specifications. Inspection reports are issued to project personnel, and violations corrected under the supervision of the Project Manager. The General Conditions of the Construction Contract document requires contractors to have a Responsible Land Disturber on-site. A detailed procedure that allows for variances and exceptions that are still protective of offsite property and resources is documented in the Annual Standards and Specifications.

Permanent stormwater facilities are inspected for conformance to plans, specifications and standards, and as-built drawings are submitted to the Stormwater Coordinator to file and draw upon for long-term inspections of permanent stormwater facilities. Stormwater management plans must include maintenance information. Inspections of stormwater facilities will be conducted annually, and work orders submitted for maintenance, as needed. Maintenance is performed by Facilities Management staff or a contractor of the department. Additional information on these programs, policies, and procedures may be found in the MS4 Program Plan Appendices, as noted in section 1.

Prior to 2014, new sources of stormwater discharges were regulated by the Virginia Department of Conservation and Recreation. Implementation of JMU's VSMP began July 1, 2014 with oversight from DEQ and the State Water Control Board.

4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions

General Permit Section I.C.2.a.(4) & (5)

For the purposes of the Action Plan, JMU estimated existing source loads and total pollutant of concern (POC) required reductions using its most recent jurisdictional boundary, excluding open water and unregulated acreage that sheet flows directly to waters of the United States, to represent the MS4 service area. The jurisdictional boundary was identified using JMU's property record Geographic Information System data. Pervious and impervious acreage from which loads were derived were delineated by Vanasse Hagen Brustlin, Inc. in a 2013 study that was used to develop a stormwater master plan for JMU. For the study, a GIS analysis of aerial imagery was conducted to categorize land cover into pervious and impervious categories. Construction site plans from projects constructed between the aerial imagery year and the study year were used to update the land cover data to reflect the most recent conditions. A map of JMU's MS4 service area used for this plan can be found in Figure 1.

Acres	
Pervious	389.15
Impervious	242.44
Total	631.59

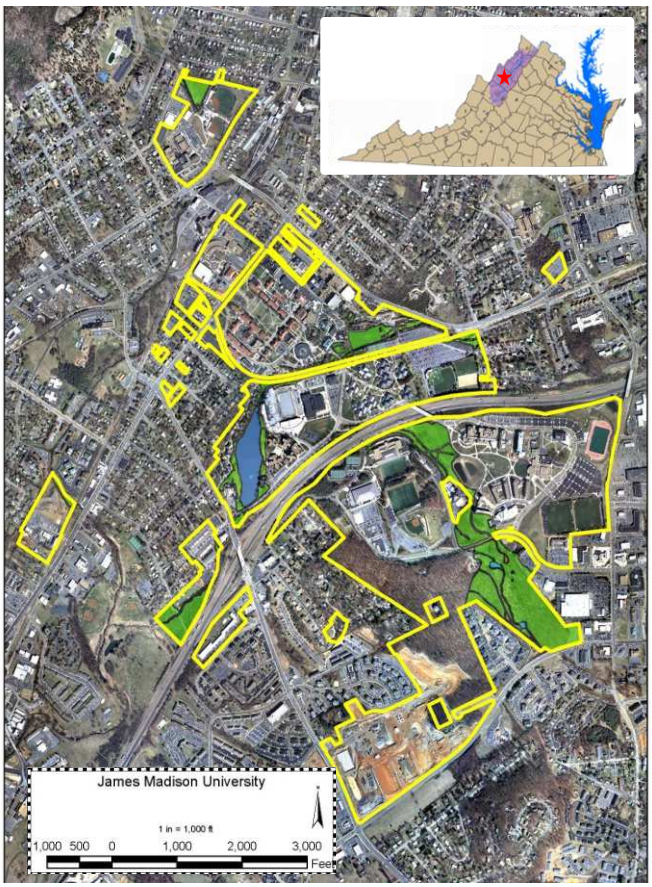

Figure 1. Regulated urban acreage inside service area (jurisdictional boundary – indicated by yellow outline). Open Water (blue) and unregulated acreage sheet flowing to waters of the U.S. (green) are excluded.

The baseline loads and required POC required reductions will be recalculated after mapping of JMU's MS4 drainage areas is complete, and more accurate land cover estimates can be made. Recalculations will be included in the second phase of the Action Plan, to be submitted with the reapplication package, in accordance with Section I.C.5.b. of the MS4 General Permit.

The estimated existing source loads and POC required reductions are based on the regulated urban acreage identified in Figure 1, and the Level 2 scoping for POC reductions identified in Virginia's Phase II Watershed Implementation Plan. Level 2 scoping provides for the reduction (from 2009 baseline loads) of 9.0% of nitrogen loads, 16% of phosphorus loads, and 20% of sediment loads from impervious regulated acres, and 6.0% of nitrogen loads, 7.25% of phosphorus loads and 8.75% sediment loads from pervious regulated acreage. The Phase II MS4 permit requires that 5% of the reduction targets (identified in Table 2) be achieved within the 2013 – 2018 permit term (referred to by the permit, and in the tables below, as "first permit cycle").

Table 1 includes the information required by Phase II MS4 Permit, Section I.C.2 Tables 2b and 3b, entitled: "Table 2b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin," and "Table 3b: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the Potomac River Basin."

Table 1. Estimated Existing Source Loads and Total POC Reductions Required in First Permit Cycle

Pollutant	Land Cover[1] & L2 % Reduction	2009 EOS Loading Rate[2] (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run (lbs)	First Permit Cycle Required Reduction in Loading Rate[3] (lbs/ acre)	Total Reduction Required First Permit Cycle (lbs)
Total Nitrogen	RUI 9%	16.86	4,087.54	.07587	18.39
	RUP 6%	10.07	3,918.74	.03021	11.77
Total Phosphorus	RUI 16%	1.62	392.75	.01296	3.14
	RUP 7.25%	0.41	159.55	.00148625	0.58
Total Suspended Solids	RUI 20%	1,171.32	283,974.82	11.7132	2,839.75
	RUP 8.75%	175.80	68,412.57	.769125	299.30

*RUI = Regulated Urban Impervious; RUP = Regulated Urban Pervious; EOS = Edge of Stream; POC = Pollutant of Concern

[1] 2009 EOS Loading Rate as listed in Section I Part C Table 2b - Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin

[2] 2009 EOS Loading Rate as listed in Part II of the Chesapeake Bay TMDL Special Condition Guidance document for the Potomac River Basin

[3] Reduction Loading Rate listed as "Corrected Loading Rate" in Part II of the Chesapeake Bay TMDL Special Condition Guidance document for the Potomac River Basin

5. Means and Methods to Meet the Required Reductions and Schedule

General Permit Section I.C.2.a.(6)

Stream restoration, and land use changes associated with stream restoration projects, are the primary strategies JMU will use to achieve the pollution reductions called for by the General Permit. Bioretention will also play a part. Calculations to determine the pollution reductions to result from these projects adhere to the guidelines established in Guidance Memo No. 15-2005. Projects completed since 2009 will be used to account for part of the required POC reductions, and the remainder will be reduced by a planned stream restoration project. Together, these projects exceed 100% of the pollutant of concern (POC) reductions required of JMU through 2028. Accordingly, pollution reductions achieved during this permit cycle will be applied to the POC reductions required in subsequent permit cycles. Additionally, all means and methods included in this plan are guaranteed to be credited at the efficiencies established at the time this Action Plan is submitted, according to the Guidance Memo (Part III. Eligible BMPs and Credit Opportunities), which states "Likewise, if the BMPs included in the initial Action Plan result in reductions beyond the required 5% those reductions will also be guaranteed at the efficiencies available at the time the Action Plan is submitted." Table 2 compares the required pollutant reductions to those which are planned by 2018.

Table 2. Pollutant reductions required versus planned.

	TP	TN	TSS
Required by 2018, lbs. (5%)	3.72	26.04	3,139.05
Required by 2028, lbs. (100%)	74.41	603.00	62,781.06
Planned by 2018, lbs.	342.79	835.03	173,566.99

This section of the Action Plan describes the projects JMU plans to use to achieve its permitted pollution reduction goals required by 2018 (and beyond). However, JMU maintains flexibility to remove any of the identified projects from the plan, adapt them, or to consider different projects as opportunities arise, as long as the changes do not compromise JMU's ability to comply with the goals and schedule established in the General Permit.

5.1 Completed and Planned Projects

JMU has implemented several stormwater best management practices and stream restoration projects since 2009, and prior to the submission of this plan in June, 2015. These projects, described in Table 3, were developed to address in-stream erosion caused by watershed urbanization. The approved interim rates for urban stream restoration were used to calculate the mass reduction of POCs per length of stream restored found in Appendix V.J. of the Guidance Memo.

Land use changes associated with adding grass buffers to the restored streams also yielded pollutant reductions, and are included as a strategy in this plan. Efficiencies from Table V.H.1. of the Guidance Memo were used to calculate these reductions. A bioretention filter was also completed in 2012. Chesapeake Bay Program efficiencies were used to calculate POC reductions resulting from the bioretention filter.

The one project that will not be completed until after the Action Plan is submitted, is a stream restoration project that will be implemented on campus, at the Edith J. Carrier Arboretum. The project will restore 1,080 feet of a headwaters tributary to Blacks Run, an impaired waterbody in Harrisonburg, Virginia. The design for the restoration includes the creation of 0.37 acres of interconnected wetland cells in a large floodplain area that is to be reconnected to the tributary by the project.

The POC reductions for the Arboretum stream restoration project were calculated using two protocols found in Appendix V.J. of the Guidance Memo. These protocols were approved in 2014 by the Chesapeake Bay Program's Urban Stormwater Workgroup and Water Quality Goal Implementation Team. Details of the protocols can be found in the guidance document entitled *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*, and include Protocol 1: Sediment Prevented, and Protocol 3: Floodplain Reconnection. The estimates do not take into consideration potential rate reductions due to sediment transport/delivery or the limited stream flow of the project reach. The degraded condition of the stream, information about the calculations and other project design details are documented in the *Final Design and Pollutant Reduction Report* completed in January, 2015. This document is available upon request.

Table 3 summarizes the completed and proposed projects, and their associated POC reductions. Detailed pollution reduction calculations for each project are located in the electronic spreadsheet ledger submitted with this plan, as directed by the Guidance Memo. Baseline reductions in credit calculated for unregulated land in the drainage area of the projects are included in the spreadsheet, where applicable. The spreadsheet ledger contains the following data:

- the total reductions required;
- each practice that will be implemented;
- the approximate location of the project;
- the load that will be reduced by each project, and
- the project schedules.

Table 3. Projects completed since 2009.

ID	Project Name/Description	BMP Total Removal			Status
		TP	TN	TSS	
ST1	SRP: East Campus (1031')	69.74	71.03	45,895.20	Complete
ST1a	SRP: East Campus Land Use Change - Pervious to Grass		2.75		Complete
ST2	SRP: Siberts Creek - Segment 'A' (407')	27.63	29.47	18,231.23	Complete
ST3	SRP: Siberts Creek - Segment 'B' (498')	33.80	36.09	22,283.14	Complete
ST4	SRP: Siberts Creek - Segment 'C' (711')	47.91	47.45	31,446.04	Complete
ST4a	SRP: Siberts Creek Land Use Change - Pervious to Grass		4.31		Complete
S4	SRP: Siberts Creek Bioretention	1.87	13.02	1,551.38	Complete
ST5	SRP: Arboretum w/ Constructed Wetlands	161.84	630.91	54,160.00	Complete

5.2 Project Schedules

Project ID's ST1, ST1a, ST2, ST3, ST4, ST4a and S4 had a completion date of September 15, 2012, as they were constructed at essentially the same time, and were deemed "stabilized" on that date. The Arboretum stream restoration project (ST5) was initiated in September of 2013 and construction was completed on March 23, 2016. The Facilities Management Department will inspect all projects annually to ensure that they continue to function as designed.

6. Means and methods to Offset Increased Loads From New Sources Initiating Construction Between July 1, 2009 and June 30, 2014

General Permit Section I.C.2.a.(7)

JMU does not have increased loads to offset in this category, as it has never used an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities.

7. Means and Methods to Offset Increased Loads from Grand-fathered Projects that Begin Construction After July 1, 2014

General Permit Section I.C.2.a.(8)

JMU will not have increased loads to offset in this category. As the VSMP authority, the University will not use an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities for grandfathered projects.

8. List of Future Projects, and Associated Acreage that Qualify as Grandfathered

General Permit Section I.C.2.a.(10)

JMU has two projects that would qualify for grandfathering in accordance with 9VAC25-870-48. Should any revisions be made to the plans that would increase the amount of Total Phosphorus discharged from the site, the plans will no longer be considered grandfathered. It is undetermined whether either of these projects will ever be built. The projects include:

1. Name: James Madison University Port Republic Road Athletics Complex
   Approval Date: March 15, 2010
   Acres: 4.2

   This project was completed in 2013, but was not fully constructed as planned. Minor site work to accommodate a concession stand, bleachers, and artificial turf remains.

2. Name: CISAT Campus Pond Relocation
   Approval Date: March 10, 2011
   Acres: 4.93

   No increase in impervious surface will occur with this project.

9. An Estimate of the Expected Cost to Implement the Necessary Reductions

General Permit Section I.C.2.a.(11)

JMU estimates that the projects described in section 5 will cost approximately $485,000 to implement. All of the projects were funded, in part, by federal grants that were matched by JMU with a mix of cash and in-kind contributions. The most significant allocation of funds, to date, will go to the planned Arboretum stream restoration. The University will provide $100,000 to implement this project. The estimated cost does not account for long-term operation and maintenance of the improvements.

There may not be a need to implement projects in future Action Plans, as all reductions are anticipated to be met during this permit cycle. However, if needed, JMU's funding strategy for the future would include a combination of continuing to pursue grants, incorporation of projects into the Capital Improvements Plan, and continuing to request funding from the University general fund, when needed.

10. Public Comments on Draft Action Plan

General Permit Section I.C.2.a.(12)

The Facilities Management Department informed the public of the draft Chesapeake Bay Action Plan and 2-week public comment period before finalizing and submitting the Plan to the DEQ. An article was published in the Facilities Management Human Resources monthly newsletter on June 1, 2015, which is sent to all Facilities Management staff (587 employees). The draft document was also added to the Facilities Management Department webpage on the JMU website on May 29, 2015, where it could be accessed by any member of JMU's faculty, staff, student body, or the community. The webpage is located at www.jmu.edu/facmgt/sustainability/Stormwater/ms4.shtml. These outreach efforts informed the public of the development of the Chesapeake Bay Action Plan draft, and directed them to the location on the Facilities Management Department webpage where the draft could be obtained. The article and webpage also instructed the public on how to provide comments on the plan. Documentation regarding outreach efforts will reside with the Action Plan documents.

The Department requested that comments be emailed to the Stormwater Coordinator. Seven responses were received with no requests for changes to the plan. There were further explanations related to the TMDL requirements and how numbers were calculated. The Stormwater Coordinator documented all comments, which will reside with the Action Plan documents. All comments were taken into consideration before finalizing the Action Plan. Final guidance for the development of the Action Plan was not available until May, 2015, after much of the student body had left Harrisonburg for summer vacation. As such, this segment of the public was not accessible to be engaged during the public comment period. However, awareness of the plan and its contents will continue to grow as a result of JMU's on-going public education and involvement activities, and the Facilities Management Department will encourage and accept feedback on the plan, year-round.

Resources

Chesapeake Bay Program - Urban Stormwater Workgroup and Water Quality Goal Implementation Team. (2014) *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects* http://chesapeakestormwater.net/bay-stormwater/baywide-stormwater-policy/urban-stormwater-workgroup/urban-stream-restoration/

Ecosystem Services, Inc. (2016 Update) *Edith J. Carrier Arboretum Stream Restoration Final Design and Pollutant Reduction Report.*

James Madison University. (2014) *Municipal Separate Storm Sewer (MS4) Plan* http://www.jmu.edu/facmgt/sustainability/Stormwater/files/ms4-program-plan.pdf

Virginia Department of Environmental Quality. (2013) *General Permit for Discharges of Stormwater from Small (Phase II) Municipal Separate Storm Sewer Systems* http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-890-40

Virginia Department of Environmental Quality. (2015) *Guidance Memo No. 15-2005* http://www.deq.virginia.gov/Portals/0/DEQ/Water/Guidance/152005.pdf

Virginia Department of Environmental Quality. (2012) *Phase II Watershed Implementation Plan* http://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/Baywip/vatmdlwipphase2.pdf

How to Calculate 2009 Loads and Total Required First Permit Term Reductions

Step 1: Determine or estimate the amount of pervious and impervious acreage of the MS4 service area that existed as of June 30, 2009. Fill that data into the green cells below. 2009 Loads and Required Reductions (blue cells) will be automatically calcualted.

	Pervious	Impevious
Regulated Urban Acreage Inside Service Area:	389.15	242.44

Step 2: Calculate the 2009 POC Load based on the appropriate river basin Table 2 in the Small MS4 General

Step 3: Calculate the first permit cycle Total Reduction based on the appropriate river basin Table 3 in the Small MS4 General Permit.

Pollutant	Land Cover	2009 EOS Loading Rate[1] (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	First Permit Cycle Required Reduction in Loading Rate[2] (lbs/ acre)	Total Reduction Required First Permit Cycle (lbs)
Total Nitrogen	Regulated Urban Impervious	16.86	4087.5384	0.07587	18.3939228
	Regulated Urban Pervious	10.07	3918.7405	0.03021	11.7562215
Total Phosphorus	Regulated Urban Impervious	1.62	392.7528	0.01296	3.1420224
	Regulated Urban Pervious	0.41	159.5515	0.00148625	0.578374188
Total Suspended Solids	Regulated Urban Impervious	1,171.32	283,974.82	11.7132	2839.748208
	Regulated Urban Pervious	175.8	68412.57	0.769125	299.3049938

[1] 2009 EOS Loading Rate as listed in Section I Part C Table 2b - Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin

[2] 2009 EOS Loading Rate as listed in Part II of the Chesapeake Bay TMDL Special Condition Guidance document for the Potomac River Basin

	1st Permit Required Reductions (5%)	2nd Permit Required Reductions (35%)	3rd Permit Required Reductions (60%)	Totals (100%)
Total Nitrogen	30.1501443	211.0510101	361.8017316	603.002886
Total Phosphorus	3.720396588	26.04277611	44.64475905	74.40793175
Total Suspended Solids	3139.053202	21973.37241	37668.63842	62781.06404

Step 4: Sum the Regulated Urban Impervious and Pervious Reduction Required for each POC.

Step 5: Estimate the 35% and 60% Reduction Requirements that will be required by future Permit Cycles by multiplying by 7 and 12, respectively.

James Madison University
Registration Number: VAR040112
Chesapeake Bay Action Plan - Calculations Ledger

ID	Project Name/Description	Location	Construction Estimate	Pollutant Load			BMP Efficiency			BMP Total Removal			Project Initiated	Estimated Dates	
				TP	TN	TSS	TP	TN	TSS	TP	TN	TSS		Construction Start	Construction Completed
ST1	Stream Restoration Project: East Campus (1031')	38°26'02.44" N 78°51'57.61" W	$26,800.00							69.74	71.03	45,895.20			9/15/2012
ST1a	Stream Restoration Project: East Campus Land Use Change - Pervious to Grass	38°26'02.44" N 78°51'57.61" W									2.75				9/15/2012
ST2	Stream Restoration Project: Siberts Creek - Segment 'A' (407')	38°26'16.35" N 78°51'48.62" W	$23,200.00							27.63	29.47	18,231.23			9/15/2012
ST3	Stream Restoration Project: Siberts Creek - Segment 'B' (498')	38°26'18.26" N 78°51'58.06" W	$28,400.00							33.80	36.09	22,283.14			9/15/2012
ST4	Stream Restoration Project: Siberts Creek - Segment 'C' (711')	38°26'15.84" N 78°52'06.26" W	$40,500.00							47.91	47.45	31,446.04			9/15/2012
ST4a	Stream Restoration Project: Siberts Creek Land Use Change - Pervious to Grass	38°26'18.26" N 78°51'58.06" W									4.31				9/15/2012
S4	Siberts Creek Bioretention	38°26'15.95" N 78°52'01.57" W	$26,000.00	4.15	52.06	2820.69	0.45	0.25	0.55	1.87	13.02	1,551.38			9/15/2012
ST5	Arboretum Stream Restoration Project w/ Constructed Wetlands	38°25'39.49" N 78°51'39.30" W	$340,000.00							161.84	630.91	54,160.00	9/1/2013	7/1/2015	3/17/2016
		Total	$484,900.00						**Total Credit**	**342.79**	**835.03**	**173,566.99**			
										TP	**TN**	**TSS**			
											MS4 Credit				

	1st Permit Required Reductions (5%)	2nd Permit Required Reductions (35%)	3rd Permit Required Reductions (60%)	Total
Total Nitrogen	30.15	211.05	361.80	603.00
Total Phosphorus	3.72	26.04	44.64	74.41
Total Suspended Solids	3,139.05	21,973.37	37,668.64	62,781.06

Appendix D

Stormwater Map and Outfall List

JMU MS4 Outfall List

Unique Identifier	Estimated Acreage Served
BR-2553	9.37
BR-6444	0
BR-6728	1.03
BR-7150	9.97
BR-7338	2.46
EC-1068	8.29
EC-1069	0
EC-1189	3.12
EC-1191	3.12
EC-1642	1.52
EC-1908	5.02
EC-2084	9.57
EC-2269	0.84
EC-2366	0
EC-2854	1.51
EC-2982	3.16
EC-3042	0.47
EC-3187	51.38
EC-3373	0
EC-3377	0
EC-3454	0.28
EC-3666	10.46
EC-4290	2.15
EC-4544	10.46
EC-4550	0.34
EC-4552	0.61
EC-4560	0.28
EC-4821	13.77
EC-5946	5.87
SC-1195	1.18
SC-1417	1.55
SC-1569	2.07
SC-1771	2.1
SC-1967	3.34
SC-2403	1.52
SC-3063	0.13
SC-3175	0.97
SC-3214	2.02
SC-3253	0.12
SC-3313	0.76
SC-3318	0
SC-3422	0.24
SC-3583	1.68
SC-3632	1.4
SC-3663	0.3
SC-3668	0.66
SC-3790	0
SC-3810	1.13
SC-3814	0
SC-3837	0.1
SC-3881	2.29
SC-3912	1.06
SC-3916	0.12
SC-3991	0.83
SC-3995	1.11
SC-4081	1.03
SC-4105	0.07
SC-4108	0.03
SC-4226	0.23
SC-4286	0.95
SC-4290	3.93
SC-4296	3.93
SC-4310	0.12
SC-4337	3.84
SC-4392	0.84
SC-4447	0.11
SC-4530	0
SC-4575	1.7
SC-4580	0
SC-4582	0
SC-4631	0.02
SC-4640	4.91
SC-4729	0.03
SC-5049	0.67
SC-5113	5.87
SC-5374	4.9
SC-5414	4.78
SC-5649	2.82
SC-5946	18.62
SC-6058	1.2
SC-6172	0.05
SC-6194	1.07
SC-6199	1.01
SC-6245	1.24
SC-6305	22.05
SC-6557	2.92
SC-6880	1.33
SC-6957	0.31
SC-7048	0.5
SC-7070	2.38
SC-7072	0
SC-7145	0.45
SC-7166	1.72
SC-7433	0.23
SC-7677	42.33
SC-8194	12.14
WC-0561	22.92
WC-0646	1.42
WC-1115	0.43
WC-1118	4.61
WC-1207	1.14
WC-1233	1.02
WC-1295	20.71
WC-1307	0
WC-1423	0.6

All outfalls are to PS22 - Blacks Run which has TMDL's for fecal coliform, e. coli and impairments for macroinvertebrates. No WLA has been established.
Please note that outfalls with a drainage area of "0" are either end pipes from abandoned pipes or underdrains.


WC-1123
WC-1307
WC-1295
WC-1233
WC-1207
WC-1115
WC-1118
West Campus Creek
WC-0640
WC-0561
BR-7338
BR-7150
BR-6444
BR-2553
Blacks Run
SC-7433
SC-7677
SC-7145
SC-7070
SC-7072
SC-7048
SC-6880
SC-8194
SC-6557
SC-6245
SC-5305
SC-6194
SC-6172
SC-6058
SC-5946
SC-5414
Sibert Creek
SC-5649
SC-5049
SC-6374
SC-5113
SC-4729
SC-4631
SC-4690
SC-4530
SC-4576
SC-4447
SC-4392
SC-4337
SC-4290
SC-4286
SC-4310
SC-4226
SC-4105
SC-4081
SC-4108
SC-3995
SC-3991
SC-3912
SC-3916
SC-3837
SC-3814
SC-3780
SC-3881
SC-3810
SC-3668
SC-3632
SC-3663
SC-3583
SC-3422
SC-3313
SC-3318
SC-3253
SC-3175
SC-3063
SC-2403
SC-1967
SC-1771
SC-1569
SC-1417
SC-1195
EC-2269
EC-2084
EC-2366
EC-1089
EC-1068
EC-1188
EC-1191
EC-1642
EC-1905
EC-2854
EC-2982
EC-3042
EC-3187
EC-3377
EC-3373
EC-3454
East Campus Creek
EC-3666
EC-4290
EC-4552
EC-4560
EC-4544
EC-4550
EC-4821
EC-5946
James Madison University
Outfall Map
1 in = 300 ft
300 150 0 300 600 900
Feet