



**ANNUAL STANDARDS AND SPECIFICATIONS
FOR
EROSION AND SEDIMENT CONTROL
AND
STORMWATER MANAGEMENT**

Submitted: September 2011

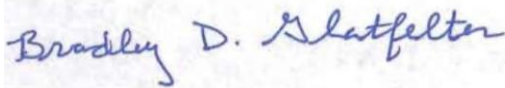
Revised: October 2011

**Subject: GEORGE MASON UNIVERSITY ANNUAL STANDARDS AND SPECIFICATIONS FOR EROSION AND
SEDIMENT CONTROL AND STORMWATER MANAGEMENT**

Dated: October 18, 2011

I certify under penalty of law that all documents and all attachments related to the submission and updating of the GEORGE MASON UNIVERSITY ANNUAL STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT are 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,



Bradley D. Glatfelter
University Erosion and Sediment Control Combined Administrator

INTRODUCTION

George Mason University Erosion and Sediment Control and Stormwater Management Programs are integral components of George Mason University's design, construction, maintenance, and management of the University's facilities and campuses. George Mason University's Erosion and Sediment Control and Stormwater Management (ESC & SWM) Annual Standards and Specifications submittal has been developed to provide information regarding George Mason University's implementation of these programs in accordance with Virginia Erosion and Sediment Control Law (§10.1-560 et. seq.), the Virginia Erosion and Sediment Control Regulations (4VAC50-30 et. seq.), the Virginia Erosion and Sediment Control Certification Regulations (4VAC50-50 et. seq.), the Virginia Stormwater Management Act (§10.1-603 et. seq.), and the Virginia Stormwater Management Program (VSMP) Permit Regulations (4VAC50-60 et. seq.) as related to municipal separate storm sewer systems and regulated construction activities.

George Mason University Annual Standards and Specifications for ESC & SWM shall apply to all plan design, construction, and maintenance activities undertaken by George Mason University, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia Erosion and Sediment Control Law and Regulations (VESCL&R) or the Virginia Stormwater Management Act and VSMP Permit Regulations. During any inspections of George Mason University's land disturbing activities by DCR, EPA, and other applicable environmental agencies, compliance with the approved George Mason University Annual Standards and Specifications for ESC & SWM (and all parts thereof), the VESCL&R, the Virginia Stormwater Management Act and the VSMP Permit Regulations will be required.

George Mason University Annual Standards and Specifications for ESC & SWM are submitted to the Virginia Department of Conservation and Recreation for review and approval on an annual basis. George Mason University shall ensure that project specific plans are developed and implemented in accordance with these Annual Standards and Specifications. This submittal constitutes George Mason University's commitment to execute all provisions contained herein on our regulated land disturbing activities and land development projects. As such, this submittal will be made available and utilized as an operational guidance by all appropriate George Mason University and DCR personnel. This submittal and errata information are available for download as PDF files at: <http://facilities.gmu.edu/>

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1.0 **ABBREVIATIONS and ACRONYMS**

Abbreviation/ Acronym	Term
BMP	Best Management Practice
Board	Virginia Soil and Water Conservation Board
DCR	Virginia Department of Conservation and Recreation
ESC	Erosion and Sediment Control
LD	Land Development
LID	Low-Impact Development
Mason LD	George Mason University Land Development
MS4	Municipal Small Storm Sewer System
NLDPP	Mason LD How-To Guide: Navigating the Land Disturbance Permitting Process
SWM	Stormwater Management
SWPPP	Storm Water Pollution Protection Plan
VESCL&R	Virginia Erosion and Sediment Control Law and Regulations
VSMP	Virginia Stormwater Management Program
VSMPP	Virginia Stormwater Management Program Permit for discharges from construction activities

2.0 ANNUAL STANDARDS AND SPECIFICATIONS ADMINISTRATION

- 2.1** *George Mason University Annual Standards and Specifications for ESC & SWM* approved by DCR are composed of general specifications. The general specifications for erosion and sediment control and storm water management that apply to the land-disturbing activities include by reference the following:
- 2.1.1** *Virginia Erosion and Sediment Control Law* (§10.1-560 et seq. as amended);
 - 2.1.2** *Virginia Erosion and Sediment Control Regulations* (4VAC50-30 et seq. as amended);
 - 2.1.3** *Virginia Erosion and Sediment Control Certification Regulations* (4VAC50-50 et seq. as amended);
 - 2.1.4** *Virginia Erosion and Sediment Control Handbook*, 1992, as amended;
 - 2.1.5** *Virginia Stormwater Management Act* (§10.1-603 et seq. as amended);
 - 2.1.6** *Virginia Stormwater Management Program Permit Regulations* (4VAC50-60 et seq. as amended);
 - 2.1.7** *Virginia Stormwater Management Handbook*, 1999, as amended.
 - 2.1.8** Technical Bulletins, as amended, on DCR web site at www.dcr.virginia.gov.
 - 2.1.9** *Mason LD How-To Guide: Navigating the Land Disturbance Permitting Process (NLDPP)*
- 2.2** Any land-disturbing activity, as defined by carried out by George Mason University shall comply with *George Mason University Annual Standards and Specifications for ESC & SWM*.
- 2.3** Any land disturbing work, as defined by *VESCL&R*, must be vetted through Mason LD. A Land Disturbance Application (See *NLDPP*- Appendix B) must always be completed and submitted with a construction schematic and location of the proposed work. Prior to starting a land-disturbing project, the project must have an approval issued by Mason LD for the plan by way of a Land Disturbance Permit (See *NLDPP*- Appendix F).
- 2.4** Site-Specific ESC Plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in §10.1-560 or when deemed necessary by Mason LD if development is outside the purview of the *VESCL&R* and poses potential environmental implications. Site-specific ESC plans shall be submitted to Mason LD for review. Prior to starting a land-disturbing project, as defined in §10.1-560, the project must have an approval issued by Mason LD for the plan by way of a Land Disturbance Permit. In addition, if the addition of impervious surfaces is part of the scope, a SWM narrative and/or schematic must be submitted concurrently to explain/show how the run-off will be treated.
- 2.5** Site-Specific SWM plans shall be prepared for all projects involving a regulated land-disturbing activity that requires:
- (a)** a Virginia Stormwater Management Program General Permit for Discharges from Construction Activities (VSMPP)
 - (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 Mason LD for review. Prior to starting a land-disturbing project requiring a SWM plan, the project must have an approval issued by Mason LD for the plan by way of a Land Disturbance Permit.

- 2.6 Mason LD may request DCR to grant a project specific variance or exception, in terms of ESC and SWM, respectively, to the approved George Mason University Annual Standards and Specifications for ESC and SWM. All requested variances and exceptions are to be considered unapproved until written approval from DCR is received. Refer to Section 7.0 for more information on variances and exceptions.

3.0 ANNUAL STANDARDS AND SPECIFICATIONS PERSONNEL

Mason LD shall be the plan approving authority for George Mason University projects. The following is a breakdown in responsibilities and titles in regard to *George Mason University Annual 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 2.1.3. The following titles are designated to ensure compliance with erosion and sediment control and stormwater management regulations on all George Mason University projects.

- 3.1 **“Certified Inspector”** means an employee or agent of Mason LD 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 permitted plan and record the state and effectiveness of such measures in an effort maximize site erosion and sediment control; and, (iv) shall be responsible to inspect the construction and effectiveness of permanent stormwater management controls; and, (v) shall be responsible to verify that all required documents are available on-site for view/review, including but not limited to, land disturbance permit, permitted plans, inspections log, VSMP permits, SWPPP, etc.
- 3.2 **“Inspection Certified Program Administrator”** means an employee or agent of Mason LD who: (i) holds a certificate of competence from the Board in the area of program administration and project inspection; or, (ii) is enrolled in the Board’s training programs for the program administrator and project inspector and successfully completes such programs within one year after enrollment; and (iii) is currently a Certified Inspector; and, (iv) shall oversee all of the project inspectors; and, (v) shall assign inspection duties; and, (vi) shall ensure all inspections are completed as mandated by the VESCL&R; and, (vii) shall review and post completed inspection reports; (viii) shall assist in the certification/re-certification process of inspectors; and (ix) shall update the *George Mason University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management* yearly.

- 3.3 “Certified Plan Reviewer”** means an employee or agent of Mason LD who: (i) holds a certificate of competence from the Board in the area of plan review; or, (ii) is enrolled in the Board’s training program for project inspection 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 or Title 54.1 of the Code of Virginia; and, (iv) shall be responsible to review and permit erosion and sediment control and stormwater management plans; and, (v) shall be responsible to review and approve SWPPPs; and, (vi) can assume the role of inspector or assist with inspections when needed.
- 3.4 “Plan Review Certified Program Administrator”** means an employee or agent of Mason LD who: (i) holds a certificate of competence from the Board in the area of program administration and plan review; or, (ii) is enrolled in the Board’s training programs for the program administrator and plan reviewer and successfully completes such programs within one year after enrollment; and (iii) is currently a Certified Plan Reviewer; and, (iv) shall oversee all of the plan reviewers; and, (v) shall designate plan review assignments; and, (vi) shall ensure all reviews are completed in a timely manner; (vii) shall assist in the certification/re-certification process of plan reviewers; and, (viii) shall update the *George Mason University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management* yearly.
- 3.5 “Senior Combined Program Administrator”** means an employee or agent of Mason LD who: (i) holds a certificate of competence from the Board in the combined areas of program authority, plan review, and project inspection; or, (ii) is enrolled in the Board’s training program for the program administrator, plan reviewer, and project inspection and successfully completes such program within one year after enrollment; and (i) shall oversee all of the inspection and plan review personnel; and, (ii) shall designate the Inspection Administrator and Plan Review Administrator; and, (iii) shall directly communicate with the Contractor and DCR when circumstances require disciplinary actions; and, (vi) shall oversee update of the *George Mason University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management* yearly; and, (vii) is DCR’s delegated permitting authority.
- 3.6** Certifications shall be in accordance with the *Virginia Erosion and Sediment Control Certification Regulations* (4VAC50-50 et seq. as amended).

4.0 ANNUAL STANDARDS AND SPECIFICATIONS IMPLEMENTATION

ESC and SWM plans shall comply with *George Mason University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management*, the *Virginia Erosion and Sediment Control Law* (§10.1-560 et. seq.), the *Virginia Stormwater Management Act* (§10.1-603 et. seq.), associated ESC and SWM regulations, and the *Virginia Stormwater Management Program Permit* regulations (4VAC50-60 et. seq.). Refer to Section 2.1 for more information on general specifications.

4.1 Submittals ESC and SWM application, plans, narratives, and necessary attachments shall be submitted to the Mason LD for review and approval prior to any land-disturbing activities. Below are the typical submittals expected to be completed for each project, however, exact composition of submittals is project specific.

- Land Disturbance Application
- Stamped/Signed (by a licensed Professional Engineer) Civil Plans and Profiles
- Plan Review Checklist
- SWPPP
- Copy of Completed VSMP Permit Application
- SWM Narrative/Schematic
- Vicinity Map
- Construction Schematic

The Mason LD shall have 30 days to review the plan and provide written comments. Prior to commencement of a land-disturbing project, the project must have received approval for the plan(s) from Mason LD.

4.2 Plan Reviews Plan reviews shall be conducted by qualified personnel. Plan reviews shall ensure compliance with the *George Mason University Annual Specifications for ESC and SWM*. Plan reviewers shall use the *Plan Review Checklist* provided in the NLDPP guide, Appendix E for ESC plans. Re-submission should include (1) red-lined plan set of the first submission showing all to-date revisions and at least (1) clean, updated plan set. When approved, at least (3) unmarked, updated plan sets must be submitted and stamped by a licensed Professional Engineer. These plan sets are allocated as follows: (1) for Record, (1) for the Engineer, and (1) for the Contractor. Additional copies may be requested as needed.

4.3 Inspections The Certified Inspector(s) is responsible for ensuring that the construction and installation of all structural and non-structural controls are in accordance with the project’s ESC and SWM plans and intention. In addition, if circumstances arise where the current plan is proven inadequate, the inspector is responsible to take the necessary steps to address and resolve the issue. Inspectors are responsible to complete and submit Inspection Reports as required by VESCL&R. Inspection Reports will eventually be posted on a website for public view. Refer to Section 6.0 for more information on inspections.

4.4 Changes and Amendments to Approved Plans An approved plan may be changed by Mason LD in the following cases (§10.1-563(C)):

- (i) Where inspection has revealed the plan is inadequate to satisfy applicable regulations; or

(ii) Where the person responsible for carrying out the approved plan finds that such plan is no longer effective due to field conditions and/or changes to the overall project scope. In such case, an amended plan, consistent with the requirements of this article, must be promptly proposed.

Revisions to an approved ESC and SWM plan must be submitted in writing to the Mason LD. Revisions shall not be considered approved until written notice is provided. Revision must comply with the George Mason University Annual Standards and Specifications for ESC and SWM. Exceptions maybe allowed in the event of an emergency.

5.0 ESC AND SWM PLAN REQUIREMENTS

- Complete/Approved ESC and SWM plans shall be provided in the construction plans. Refer to Plan Preparer’s Checklist (NLDPP- Appendix C).
- Minimum Standards 1 through 19 (4VAC50-30-40) shall be listed in the construction plans.
- Construction sequence of operations shall be provided on the construction plans with staged implementation of erosion and sediment control measures for each phase. The area which may be disturbed in each phase shall be set forth in the construction plans.
- Plans shall provide information on the maintenance of BMPs or reference the narrative section that contains the information.
- Permanent SWM BMPs shall have unique identifications and the identifications shall be referenced/used in all documentation, such as, but not limited to, SWPPP, narrative, construction plans, and calculations. Identifications should correspond with University BMP Identification System and MS-4 reporting. Identification should adhere to the following format: Campus Code (FX, PW, A, L) – Consecutive Three-Digit Number – BMP Type. For example, FX – 001 – Grass Swale. Coordinate with Mason LD.
- Profiles shall be included for all closed and open storm systems. The profile shall include the existing surface, final surface, proposed water elevations, pipes, pipe crossings, and hydraulic grade line. Surcharges shall be clearly indicated on the profile.
- Plans shall have included the amount of disturbed area listed per phase and proposed net increase in impervious area.
- SWM calculations include but are not limited to: ditch computations, stormwater routing, storm inlet computations, pipe capacity computations, BMP computations, pond routings and computations, etc.
- Proof of adequate outfall and adequacy of the receiving channel to the SWM treatment facility needs to be provided to Mason LD.
- Plans should also include a detailed landscape plan with a planting schedule. Landscape plans should adhere to George Mason University Landscape Guidelines.
- Suggested Sheets (actual sheets may vary accordingly):
 - Cover Sheet (General Notes, Vicinity Map, Soils Map)
 - General Construction Details (handicap ramp, cross-sections, sidewalk, etc.)
 - Existing Conditions and Grading (2’ contours)
 - Existing Drainage Divides (include calculated areas, impervious areas, and C-values)
 - Proposed Site Plan
 - Proposed Grading Plan (1-2’ contours and spot elevations @ high/low points and)

- Proposed Drainage Divides (include calculated areas, impervious areas, and C-values)
- Phase 1 E&S w/ Drainage Divides
- Phase 2 E&S w/ Drainage Divides
- E&S/BMP/SWM Details
- Stormwater Pipe Profiles (include dimensioned utility crossings; V=1:5 H=1:25)
- Stormwater Calculations (ex. ditch comps, pipe comps, inlet comps, pond routings, etc.)
- Detailed Landscaping plan (include planting schedule)

6.0 **INSPECTIONS**

Periodic inspections shall be conducted, at a minimum, every two weeks and within 48 hours of a significant rainfall event producing runoff. In addition, inspections shall be made during or immediately following initial installation of erosion and sediment controls and at the completion of the project. Completion of the project is defined as the achievement of final stabilization, not completion of construction.

- 6.1 Erosion and Sediment Control Inspections** *The Land Disturbance Inspection Report*, provided in Appendix I shall be used on each site inspection visit. All measures shown on the plan shall be inspected. 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. LD Inspection Reports 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 LD Inspection Report will be emailed to the project Contractor and archived by Mason LD.
- 6.2 Stormwater Management Inspections** *The Land Disturbance Inspection Report* provided in Appendix I is also used to record SWM inspections and shall be filled out on each site inspection. All stormwater BMPs must be identified on the site plan. As previously addressed, identification of permanent BMPs shall be coordinated with the University BMP Identification System. Refer to 5.0 for further information. Critical areas that require continuous inspections shall also be identified on the site plan. Photographs will be taken during the inspection and referenced within the report.
- 6.3 Project Close-Out** As previously stated, project completion is defined as the achievement of final stabilization. The Inspector will recommend to the Mason LD that final stabilization has been achieved. Once the Mason LD concurs, the permit will be closed-out. After which, the Mason LD may recommend that full retainage be released. If deemed appropriate, retainage may be withheld as a performance guarantee for up to 60 days after achievement of final stabilization unless otherwise directed by the Contract. Full retainage may not be released without recommendation by the Mason LD.
- 6.4 Post-construction Inspections** Post-construction (long-term) inspections shall be made in accordance with the manufacture's and/or engineer's recommendation, the provisions of these standards and specifications, and the general specifications provided in Section 2.1. Complete campus inspections shall be conducted at least quarterly.

6.5 Violations and Documentation Violations shall be documented in the *Land Disturbance Inspection Report*, including photographs, descriptions, and necessary corrective actions. If a violation continues to be repeated, then a formal Notice of Non-Compliance will be issued, and DCR notified. At the discretion of Mason LD, the Land Disturbance Permit may be suspended and/or revoked; at which time all land disturbing activity must cease until the violation(s) of the plan or permit has ceased, corrective action completed, and any related environmental or property damages abated. Alternatively, Mason LD also has the option to contract with a 3rd party to install and maintain the Erosion and Sediment Control and/or Stormwater Management measures in accordance with the approved plan, complete any necessary corrective actions, and abate any related damages. Once the site is stabilized to the satisfaction of the Mason LD, site work may resume. All associated costs will be back-charged to the Contractor.

7.0 VARIANCES and EXCEPTIONS

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

For a variance or exception to become part of the project ESC and SWM plans, a written request must be submitted to Mason LD for 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 is sought. (Ref. 4VAC50-30-50)

7.1 Variance or Exception Request Policy and Procedures:

- The design professional shall draft a letter of request to Mason LD and shall be accompanied by complete details and documentation, including justification and impacts associated with the request.
- All requests shall be considered unapproved until written approval from Mason LD is received.
- All approved variations or exceptions shall be listed in the General Notes section of the ESC & SWM plans for land disturbing activities and included in the Narrative.

8.0 LAND-DISTURBING ACTIVITIES:

8.1 Future Land-disturbing Activities A list of regulated land-disturbing activities expected to soon be under contract is included in Appendix A. The list includes project location, estimated disturbed acreage, and approximate start and completion date for each project.

8.2 Current Land-disturbing Activities A list of current permitted land-disturbing activities during the referenced time period is included in Appendix A. The list includes project location, project start and completion date, and actual disturbed area.

8.3 Project Tracking and Notification

- Mason LD shall use GIS to track regulated land-disturbing activities.
- Mason LD will update the GIS map quarterly with project information as related to ESC and SWM.
- The GIS will be accessible through Microsoft Windows Explorer to DCR. Mason LD shall send an email notification to DCR each time the website is updated.

8.4 Responsible Land Disturber

- Mason LD shall notify the DCR Warrenton Office of the Responsible Land Disturber (RLD) at least two week in advance of land-disturbing Activities. The information to be provided shall include the name, contact information and certification number of the RLD.
- Unless otherwise specified in the narrative, land disturbing activities shall be completed under the supervision of: Bradley D. Glatfelter, #34017, (571)-265-1977, bglatfel@gmu.edu

9.0 LONG-TERM MAINTENANCE:

- Project plans shall contain information on long-term maintenance of BMPs.
- Mason LD shall use GIS to track stormwater management facilities and associated watersheds.
- The Mason LD BMP GIS will be updated quarterly with information as related BMPs.
- The GIS will be accessible through a web browser to DCR.
- Inspections will be conducted in accordance with section 6.0.

10.0 PROGRAM REVIEW and EVALUATION

10.1 DCR’S RESPONSIBILITIES

- DCR shall have sixty days in which to comment on any erosion and sediment control specifications submitted to it for review, and its comments shall be binding on the Mason LD and any private business hired by Mason LD (§10.1564.D).
- DCR shall perform random site inspections to assure compliance with this article, the Erosion and Sediment Control Law and regulations adopted there under (§10.1-603.5.B)

10.2 GEROGE MASON UNIVERSITY’S RESPONSIBILITIES

- Mason LD shall ensure compliance with the approved plan and annual standards and specifications (§10.1-564.F and §10.1-603.5.B).
- The Contractor shall provide the Local District Office with a copy of the approved plan sheets (preferably – half size sheets) and narrative for each regulated land-disturbing activity by use of BCOM Form CO-5.
- Mason LD shall provide DCR with the appropriate information, in a timely manner, when requested.

Note: Due to technology and budget constraints, George Mason does not currently have GIS capabilities. However, recent funds have been allocated to develop such technologies. It is the goal of

Mason Facilities to implement such measures as soon as possible.

11.0 PROPOSED EROSION and SEDIMENT CONTROL STRUCTURES

11.1. SILTSACK SPECIFICATIONS (*Appendix B-1*)

11.2. GUTTERBUDDY SPECIFICATIONS (*Appendix B-2*)

11.3. FILTERBAG SPECIFICATIONS (*Appendix B-3*)

11.4. FILTER FABRIC SPECIFICATIONS (*Appendix B-4*)

11.5. LEVEL SPREADER SPECIFICATIONS (*Appendix B-5*)