



# CHAPTER 1

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While all lands erode, not all land can be considered a source of sediment pollution. There has always been a certain amount of erosion that occurs naturally. However, major problems can occur when large amounts of sediment enter our waterways. This accelerated erosion is most often caused by surface mining, poorly managed croplands, construction sites, urban/suburban stream banks, and logging roads.

This publication focuses on one specific sediment pollution source: construction sites. The typical construction site erodes at a rate of up to 100,000 tons per square mile per year. This rate is 200 times greater than erosion from cropland and 2000 times greater than erosion from woodland (48).

The successful mitigation of soil losses on urban construction sites results in the reduction of on-site and off-site environmental damage and substantial savings to developers and their subcontractors. When implemented properly, erosion and sediment control (E&S) measures can control soil movement to a point where there is only minimal loss of this very precious resource; no appreciable damage to off-site receiving channels; enhanced project aesthetics before, during and after development; and fewer complaints from concerned government agencies and citizens. Notably, there is a state law and regulation which dictate the use of such measures.

A function of the Virginia Erosion and Sediment Control Handbook (hereafter referred to as "handbook") is to establish minimum design and implementation standards for these measures in the effort to control erosion and sedimentation from land-disturbing activities in Virginia. (The term "land-disturbing activity" in this book refers to the definition found in Section 10.1-560 in the Virginia Erosion and Sediment Control Law (VESCL) located in Chapter 8). The other function of the handbook is to provide guidelines for the implementation of those standards in accordance with the VESCL and the Virginia Erosion and Sediment Control Regulations (VESCR).

At the time the original handbook was developed in 1974, the emphasis was on local program establishment. That document served as a basis for the development and adoption of local E&S programs throughout the state. Once the program establishment phase had been completed, the emphasis was shifted to program implementation.

The handbook was revised in 1980 to improve the effectiveness of the statewide E&S program. This latest revision provides updated information on E&S measures, engineering methods, law and regulation changes and stresses proper program implementation to further enhance the state and local attempts to mitigate sediment loss as a result of urban construction.

## HANDBOOK OBJECTIVES

- \* Revised Standards and Specifications: New conservation practices and methods have been introduced as well as improved criteria for designing and implementing existing practices. Site planners and engineers need to be aware of the most recent technological developments in the field to improve the effectiveness of their erosion and sediment control design.
- \* Present an Acceptable Level of Control: The handbook contains assistance for site planners and plan reviewers on the selection of conservation practices in order to achieve an acceptable level of control on a project. Specific guidance is also provided in the application of conservation practices.
- \* Address Stormwater Management: The handbook addresses post-development stormwater considerations associated with runoff from regulated activities. The design of a stormwater management system should receive high priority in site planning. Requirements for designing such systems which minimize adverse downstream effects of increased runoff are contained in the VESCR in Minimum Standard (MS) #19, and methods for meeting those requirements are contained within. Off-site erosion, flooding and nonpoint source pollution due to urban development in a watershed have become significant statewide problems which must be addressed.
- \* Compliance with Section 319 of the Clean Water Act of 1987 and the Virginia Nonpoint Source Pollution (NPS) Management Program: Since the development of the original handbook, Section 319 of the Federal Clean Water Act was created and dictated the creation of a Virginia NPS Management Program. The Virginia NPS Management Program identifies statewide programs designed to quantify, control and limit the detrimental effects of nonpoint source pollution. The state's Erosion and Sediment Control Program has been placed under the category of urban nonpoint source pollution control and will strive to meet the goals noted in the program. The Virginia Erosion and Sediment Control Handbook is one of three proposed urban nonpoint source pollution control manuals. The other two volumes will be developed in the near future.
- \* Make the Handbook More Usable: It is extremely important that the people who administer the VESCL be provided with useful information which is written in terms they can easily understand and pass on to those responsible for design or those involved in site implementation of E&S. While a certain amount of technical expertise is required to adequately prepare or review E&S plans and specifications, technical material which is presented in a manner which is more understandable tends to be more readily accepted and adhered to by the public.
- \* Provide Revised Information: Amendments to the VESCL have required the replacement of outdated and obsolete guidelines.

## MAJOR CHANGES

The 1992 revision of the handbook is intended to incorporate changes in the VESCL that have been made in the last decade. In September of 1990, the VESCR were adopted and took the place of the 14 "General Criteria" which appeared in the 1980 edition. The format and style of the handbook have been maintained; however, an effort has been made to refine each chapter and include language that accurately reflects the parameters set forth by the VESCR.

## EFFECT OF HANDBOOK REVISION ON LOCAL PROGRAMS

Local programs should benefit from the introduction of the VESCR into the handbook. The VESCR contain the "Minimum Standards" that more clearly define the intent of the VESCL and provide the framework for greater consistency among local programs in terms of administration, implementation and enforcement.

## CHANGES IN CONSERVATION PRACTICES

Technical advances of the past decade have prompted the addition of new practices for the control of erosion and sedimentation and the refinement of existing practices. Also, improvements to some of the engineering methods used in the previous handbook have resulted in changes when appropriate.

## HOW TO USE THIS HANDBOOK

This handbook is intended to serve as a technical guide in the effort to meet the requirements dictated by the VESCL and the VESCR. The use of words such as "shall," "will," and "must" within design or implementation standards (notably in Chapter 3) is meant to emphasize the directions which will ensure that the control measure or design procedure will serve its intended purpose. Innovative modifications to the control measures or design procedures are acceptable and encouraged, especially if they improve upon sediment-loss mitigation. However, designers and plan reviewers should be sure that the modified practice or procedure will be at least as successful as those noted in this handbook in meeting the intent of the VESCL and the VESCR.

## ABBREVIATIONS/ACRONYMS

The following terms are abbreviated or appear as acronyms in the handbook:

Abbreviation/ Acronym	Term	Abbreviation/ Acronym	Term
approx.	approximate	N.C.	North Carolina
A.S.T.M.	American Society for Testing and Materials	pt.	point
avg.	average	R/W	right-of-way
cfs	cubic feet per second	sq.	square
csf/in.	cubic feet per second, per square mile, per inch	spec.	specification
corp.	corporation	std.	standard
cu.	cubic	tol.	tolerance
dept.	department	typ.	typical
dia.	diameter	USDA-SCS	U.S. Department of Agriculture, Soil Conservation Service
ed.	edition	USDI	U.S. Department of the Interior
elev.	elevation	Va. DSWC	Virginia Division of Soil and Water Conservation
E&S	erosion and sediment control	VCIA	Virginia Crop Improvement Association
fps	feet per second	VDOT	Virginia Department of Transportation
gal.	gallon	VESCL	Virginia Erosion and Sediment Control Law
inc.	incorporated	<u>VESCR</u>	<u>Virginia Erosion and Sediment Control Regulations</u>
lbs.	pounds	VHTRC	Virginia Highway and Transportation Research Council
max.	maximum	vol.	volume
min.	minimum	VPI&SU	Virginia Polytechnic Institute and State University
min	minute	VTM	Virginia Testing Methods
mm.	millimeter	yd.	yard
N/A	not applicable	yr.	year

### FUTURE UPDATES

It is envisioned that modifications to the handbook will be necessary from time to time. The handbook has been designed to accommodate inclusion of information as needed.