

ASCE STANDARD

ANSI/ASCE/EWRI

66-17

Management Practices for Control of Erosion and Sediment from Construction Activities



ENVIRONMENTAL &
WATER RESOURCES
INSTITUTE



This is a preview. Click here to purchase the full publication.

ASCE STANDARD

ANSI/ASCE/EWRI

66-17

Management Practices for Control of Erosion and Sediment from Construction Activities



PUBLISHED BY THE AMERICAN SOCIETY OF CIVIL ENGINEERS

This is a preview. Click here to purchase the full publication.

Library of Congress Cataloging-in-Publication Data

Names: American Society of Civil Engineers.

Title: Management practices for control of erosion and sediment from construction activities / American Society of Civil Engineers.

Description: Reston, Virginia : American Society of Civil Engineers, [2017] | “ANSI/ASCE/EWRI 66-17.” | Includes bibliographical references and index.

Identifiers: LCCN 2017015047 | ISBN 9780784414224 (soft cover : alk. paper) | ISBN 9780784449407 (PDF)

Subjects: LCSH: Soil stabilization—Standards. | Building sites—United States—Standards. | Soil erosion—Prevention—Standards. | Sediment control—Standards. | Soil conservation—Standards.

Classification: LCC TA749 .A44 2017 | DDC 624.1/51363—dc23 LC record available at <https://lccn.loc.gov/2017015047>

Published by American Society of Civil Engineers

1801 Alexander Bell Drive

Reston, Virginia, 20191-4382

www.asce.org/bookstore | ascelibrary.org

This standard was developed by a consensus standards development process that has been accredited by the American National Standards Institute (ANSI). Accreditation by ANSI, a voluntary accreditation body representing public and private sector standards development organizations in the United States and abroad, signifies that the standards development process used by ASCE has met the ANSI requirements for openness, balance, consensus, and due process.

While ASCE's process is designed to promote standards that reflect a fair and reasoned consensus among all interested participants, while preserving the public health, safety, and welfare that is paramount to its mission, it has not made an independent assessment of and does not warrant the accuracy, completeness, suitability, or utility of any information, apparatus, product, or process discussed herein. ASCE does not intend, nor should anyone interpret, ASCE's standards to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this standard.

ASCE has no authority to enforce compliance with its standards and does not undertake to certify products for compliance or to render any professional services to any person or entity.

ASCE disclaims any and all liability for any personal injury, property damage, financial loss, or other damages of any nature whatsoever, including without limitation any direct, indirect, special, exemplary, or consequential damages, resulting from any person's use of, or reliance on, this standard. Any individual who relies on this standard assumes full responsibility for such use.

ASCE and American Society of Civil Engineers—Registered in U.S. Patent and Trademark Office.

Photocopies and permissions. Permission to photocopy or reproduce material from ASCE publications can be requested by sending an e-mail to permissions@asce.org or by locating a title in ASCE's Civil Engineering Database (<http://cedb.asce.org>) or ASCE Library (<http://ascelibrary.org>) and using the “Permissions” link.

Errata: Errata, if any, can be found at <http://dx.doi.org/10.1061/9780784414224>.

Copyright © 2017 by the American Society of Civil Engineers.

All Rights Reserved.

ISBN 978-0-7844-1422-4 (soft cover)

ISBN 978-0-7844-4940-7 (PDF)

Manufactured in the United States of America.

ASCE STANDARDS

In 2014, the Board of Direction approved revisions to the ASCE Rules for Standards Committees to govern the writing and maintenance of standards developed by ASCE. All such standards are developed by a consensus standards process managed by the ASCE Codes and Standards Committee (CSC). The consensus process includes balloting by a balanced standards committee, and reviewing during a public comment period. All standards are updated or reaffirmed by the same process. Extensions beyond a five-year period shall require the approval of both the appropriate Executive Committee and CSC. Requests for formal interpretations shall be processed in accordance with Section 7 of ASCE Rules for Standards Committees, which are available at www.asce.org. Errata, addenda, supplements, and interpretations, if any, for this standard can also be found at www.asce.org.

The provisions of this document are written in permissive language and, as such, offer to the user a series of options or instructions but do not prescribe a specific course of action. Significant judgment is left to the user of this document.

This standard has been prepared in accordance with recognized engineering principles and should not be used without the user's competent knowledge for a given application. The publication of this standard by ASCE is not intended to warrant that the information contained therein is suitable for any general or specific use, and ASCE takes no position respecting the validity of patent rights. The user is advised that the determination of patent rights or risk of infringement is entirely his or her own responsibility.

A complete list of currently available standards is available in the ASCE Library (<http://ascelibrary.org/page/books/s-standards>).

This page intentionally left blank

This is a preview. Click [here](#) to purchase the full publication.

CONTENTS

PREFACE	ix
ACKNOWLEDGMENTS	xi
1 INTRODUCTION AND SCOPE	1
1.1 Appropriate Documents	1
2 BACKGROUND	3
2.1 Erosion and Sediment Problems Associated with Construction Activities	3
2.2 Environmental Impacts of Sediment	4
2.2.1 In-stream and Off-stream Impacts	4
2.2.2 Specific Environmental Impacts	4
2.3 Economic Impacts of Sediment	5
2.4 Other Potential Nonsediment Pollutants	5
2.4.1 Metals	5
2.4.2 Nutrients	5
2.4.3 Pesticides	5
2.4.4 Spills and Illegal Dumping of Construction Materials	5
2.4.5 Miscellaneous Wastes	6
2.5 Economic Advantages of Compliance	6
2.6 Environmental Advantages of Compliance	6
3 REGULATIONS AND PERMITTING	7
3.1 Model Ordinance	7
3.2 Federal Regulations	7
3.2.1 NPDES Program (Phases I and II)	7
3.2.2 Phase II Municipal Requirements	8
3.3 State and Local Regulations	8
3.3.1 Declaration of Purpose and Objectives	8
3.3.2 Definitions	8
3.3.3 Application Guidelines	8
3.3.4 Permit Requirements and Approval Process	8
3.3.5 Contents of an Erosion and Sediment Control Plan	8
3.3.6 Design Requirements	8
3.3.7 Inspection and Monitoring	8
3.3.8 Maintenance Requirements	8
3.3.9 Enforcement Procedures	8
3.3.10 Training and Certification	8
4 CONTROL PROCESSES AND SITE PLANNING CONCEPTS	9
4.1 Erosion Processes	9
4.1.1 Raindrop Erosion	9
4.1.2 Sheet Erosion	9
4.1.3 Rill Erosion	9
4.1.4 Gully Erosion	9
4.1.5 Channel Erosion	9
4.2 Factors Influencing Erosion	9
4.2.1 Climate / Rainfall (R)	10
4.2.2 Soils and Soil Erodibility (K)	10
4.2.3 Topography	10
4.2.4 Vegetative Cover (C)	11
4.2.5 Conservation Practices (P)	11
4.3 Sedimentation	11
4.4 Site Planning Concepts	11

4.4.1	Plan the Development to Fit the Site	11
4.4.2	Determine the Limits of Clearing and Grading	11
4.4.3	Divide the Site into Natural Drainage Areas	11
4.4.4	Minimize the Area and Duration of Exposure	11
4.4.5	Apply Perimeter Control Practices	12
4.4.6	Apply Erosion Control Practices to Prevent Excessive On-Site Damage	12
4.4.7	Keep Runoff Velocities Low and Retain Runoff On Site	12
4.4.8	Stabilize Disturbed Areas Immediately	12
4.4.9	Implement a Thorough Maintenance and Follow-Up Program.	12
4.4.10	Summary of Concepts	12
5	CONTROL CONCEPTS, PRACTICES, AND STANDARDS	13
5.1	Erosion and Sediment Control Concepts	13
5.1.1	Erosion Control Practices	13
5.1.2	Sediment Control Practices	13
5.1.3	Operation and Maintenance	13
5.2	Erosion Control Practices	13
5.2.1	Site Preparation	13
5.2.1.1	Land Grading/Roughening.	13
5.2.1.2	Topsoiling	14
5.2.2	Vegetative Stabilization	14
5.2.3	Blankets and Matting	14
5.2.4	Road Stabilization	15
5.2.4.1	Construction Road Stabilization	15
5.2.4.2	Stabilized Construction Entrances.	16
5.2.4.3	Stabilized Construction Entrances with Wash Racks.	17
5.3	Sediment Control Measures	17
5.3.1	Sediment Barriers	17
5.3.2	Sediment Traps	21
5.3.3	Sediment Basins	23
5.4	Water Conveyance Measures	24
5.4.1	Dikes and Diversions	24
5.4.2	Downdrains and Flumes.	25
5.5	Grass or Lined Waterways	27
5.6	Inlet and Outlet Protection.	27
5.6.1	Riprap Inflow Protection.	27
5.6.2	Gabion Inflow Protection	29
5.6.3	Stone Check Dams	30
5.6.4	Stone Outlet Structures	30
5.6.5	Rock Outlet Protection	30
5.7	Temporary In-Stream Construction Measures.	30
5.7.1	Pump Around Practice.	31
5.7.2	Culvert Pipe with Access Road	31
5.7.3	Diversion Pipe	33
5.7.4	Channel Diversion	33
5.7.5	Fabric-Based Channel Diversion	33
5.7.6	Turbidity Curtain	33
5.8	Dewatering Practices.	33
5.8.1	Removable Pumping Station	34
5.8.2	Sump Pit	34
5.8.3	Pumped Water Filter Bag	36
5.8.4	Sediment Tank.	36
5.8.5	Dewatering Basin	36
5.9	Other Control Practices	38
5.9.1	Tree Protection.	38
5.9.2	Dust Control	38
5.9.3	Chemical Soil Conditioners	38
6	EROSION AND SEDIMENT CONTROL PLAN	41
6.1	Components of an Erosion and Sediment Control Plan	41
6.1.1	Narrative	41
6.1.2	Map/Site Plan	41

6.1.3	Construction Details, Specifications, and Notes	41
6.1.4	Calculations	41
6.2	Preparing an Erosion and Sediment Control Plan	41
6.2.1	Identify Issues and Concerns and Develop Goals and Objectives	42
6.2.2	Collect Site Data	42
6.2.3	Analyze Site Data	43
6.2.4	Develop Site Plan	44
6.2.5	Identify, Screen, and Select BMPs	44
6.3	Site Plan Development Concepts	45
6.3.1	Evaluate Site Drainage Patterns	45
6.3.2	Minimize Exposure	45
6.3.3	Retain Existing Vegetation	45
6.3.4	Stabilize and Protect Denuded Areas	45
6.3.5	Divert Runoff Away from Denuded Areas	45
6.3.6	Minimize Length and Steepness of Slopes	45
6.3.7	Prepare Conveyances and Outlets to Handle Concentrated or Increased flows	46
6.3.8	Trap Sediment On Site	46
6.3.9	Inspect and Maintain Control Measures	46
6.4	Evaluating an Erosion and Sediment Control Plan	46
6.4.1	General Considerations	47
6.4.2	Site Stormwater	47
6.4.3	Vegetation	47
7	CONTROL GUIDANCE FOR SPECIFIC TYPES OF DEVELOPMENT	49
7.1	Road Construction Projects	49
7.2	Utility Construction	49
7.3	Commercial/Industrial Development, Small Scale	50
7.4	Commercial/Industrial Development, Large Scale	50
7.4.1	Phasing	50
7.4.2	Two-Stage Plans	50
7.5	Residential Development, Small Scale	50
7.6	Residential Development, Large Scale	51
7.6.1	Bulk Grading Stage	51
7.6.2	Site Improvement Stage	51
7.6.3	Home Construction Stage	51
8	CONSTRUCTION INSPECTION AND MAINTENANCE	53
8.1	Inspector Guidance	53
8.1.1	Inspector Authority and Responsibilities	53
8.1.2	Conduct	53
8.1.3	Compliance	53
8.1.4	Violation Handling	54
8.2	Site Inspection	54
8.2.1	Inspection	54
8.2.2	Tolerances	54
8.2.3	Inspection Preparation	54
8.2.4	Preconstruction Conference	55
8.2.5	Office Preparation	55
8.2.6	Site Inspection	55
8.2.7	Causes of Noncompliance	57
8.2.8	Little or No Effort to Comply	57
8.2.9	Inadequate Design or Changes in Site Conditions	57
8.3	Inspection of Erosion and Sediment Control Practices	57
8.3.1	Entrances and Exits	57
8.3.2	Inlet Protection	58
8.3.3	Sediment Traps and Barriers	58
8.3.4	Perimeter Controls (Silt Fences)	59
8.3.5	Stream Crossings	59
8.3.6	Buffer Zones	59
8.4	Maintenance	59
8.5	Inspecting Vegetation used for Erosion Control	59
8.5.1	Vegetation for Erosion Control	59

9	ENFORCEMENT	61
9.1	General Guidelines	61
9.1.1	Available Remedies	61
9.1.2	Selecting Appropriate Remedies	61
9.1.3	Communication—An Asset to Enforcement	61
9.1.4	Additional Assistance in Determining Appropriate Remedy to Use	61
9.2	Failed Inspection Report	61
9.3	Notice of Violation	61
9.3.1	When to Use a NOV	61
9.3.2	Issuing a NOV	62
9.4	Stop Work Order	63
9.4.1	Posting SWO Forms	64
9.4.2	Serving of a SWO to Owner/Contractor at Site	64
9.4.3.	Inability to Serve at the Site	64
9.5	Penalties	64
	APPENDIX A – CONTROL OF EROSION AND SEDIMENT MODEL ORDINANCE	67
	APPENDIX B – U.S. REGULATIONS AND PROGRAMS	73
	APPENDIX C – STATE EROSION AND SEDIMENT CONTROL REGULATORY AGENCIES WITHIN THE UNITED STATES	79
	APPENDIX D – GLOSSARY	83
	APPENDIX E – REFERENCES	87
	INDEX	91

PREFACE

From a brief assessment of the major areas for the control of erosion and sediment (ESR), this standard is written as summarized as follows.

In assembling the first draft of this document, Michael Clar reviewed a number of public guidance documents, from which he abstracted liberally from the best of the available information.

For example, Chapter 2, Background, borrows liberally from the Delaware Erosion and Sediment Control Handbook.

Chapter 6, Erosion and Sediment Control Plan, incorporates a substantial amount of information from the International Erosion and Sediment Control Association (IECA 2003).

Chapter 7 was also largely adapted from another document, from the Delaware Department of Natural Resources and Environmental Control (DNREC, 2013).

Chapter 8, Construction Inspection and Maintenance, was adapted from documents used by New Castle County in Delaware and the Delaware Construction Inspection program.

Chapter 9, Enforcement, was adapted from documents developed by New Castle County, Delaware.

The units in these guidelines are Système International (SI) units followed by customary units.

Major Resource Documents

The developers of these guidelines provide a special acknowledgment of the following documents, which served as valuable resources for the development of the standard.

Delaware Sediment and Stormwater Program, Division of Soil and Water Conservation, Department of Natural Resources and Environmental Control (DNREC). (2013). *Delaware erosion and sediment control handbook*, Dover, DE.

Department of Health, Environmental Health Administration, Bureau of Environmental Quality, Watershed Protection Division. (2003). "District of Columbia standards and specifications for soil erosion and sediment control." Government Printing Office, Washington, DC.

ICEA (International Erosion Control Association). (2001). "Workbook: How to select, install and inspect construction site erosion and sediment control BMPs for NPDES storm water permit compliance." Steamboat Springs, CO.

Maryland Department of the Environment, Natural Resources Conservation Service, and Maryland Association of Soil Conservation Districts. (2011). "Maryland standards and specifications for soil erosion and sediment control." Water Management Administration, Baltimore.

Michigan Infrastructure Services, Design and Construction Division, Department of Management and Budget. (2002). "Michigan soil erosion and sedimentation control guidebook." Grand Rapids, MI.

New York State Department of Environmental Conservation Soil and Water Conservation Committee. (2005). "New York State standards and specifications for erosion and sediment control." New York Dept. of State, New York.

Nonpoint Source Management Program, Department of Environmental Protection. (2003). "The Florida stormwater, erosion, and sediment control inspector's manual." Florida Dept. of Environmental Protection, Tallahassee, FL.

Pennsylvania Department of Environmental Protection, Bureau of Waterways Engineering and Wetlands. (2012). "Erosion and sediment pollution control program manual." Harrisburg, PA.

Virginia Department of Environmental Quality (VDEQ), Division of Soil and Water Conservation. (1992). *Virginia erosion and sediment control handbook*, 3rd Ed., Richmond, VA.