

NCHRP

Synthesis 648

A SYNTHESIS OF HIGHWAY PRACTICE

National
Cooperative
Highway
Research Program

Construction Stormwater Program Management, Tracking, Reporting, and Compliance



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NCHRP SYNTHESIS 648

Construction Stormwater Program Management, Tracking, Reporting, and Compliance

A Synthesis of Highway Practice

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed, and implementable research is the most effective way to solve many problems facing state department of transportation (DOT) administrators and engineers. Often, highway problems are of local or regional interest and can best be studied by state DOTs individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation results in increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

Recognizing this need, the leadership of the American Association of State Highway and Transportation Officials (AASHTO) in 1962 initiated an objective national highway research program using modern scientific techniques—the National Cooperative Highway Research Program (NCHRP). NCHRP is supported on a continuing basis by funds from participating member states of AASHTO and receives the full cooperation and support of the Federal Highway Administration (FHWA), United States Department of Transportation.

The Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine was requested by AASHTO to administer the research program because of TRB's recognized objectivity and understanding of modern research practices. TRB is uniquely suited for this purpose for many reasons: TRB maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; TRB possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; TRB's relationship to the National Academies is an insurance of objectivity; and TRB maintains a full-time staff of specialists in highway transportation matters to bring the findings of research directly to those in a position to use them.

The program is developed on the basis of research needs identified by chief administrators and other staff of the highway and transportation departments, by committees of AASHTO, and by the FHWA. Topics of the highest merit are selected by the AASHTO Special Committee on Research and Innovation (R&I), and each year R&I's recommendations are proposed to the AASHTO Board of Directors, the FHWA, and the National Academies. Research projects to address these topics are defined by NCHRP, and qualified research agencies are selected from submitted proposals. Administration and oversight of research contracts are the responsibilities of NCHRP.

The needs for highway research are many, and NCHRP can make significant contributions to solving highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement, rather than to substitute for or duplicate, other highway research programs.

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Learn more about the National Academies of Sciences, Engineering, and Medicine at **www.nationalacademies.org**.

The **Transportation Research Board** is one of seven major program divisions of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to mobilize expertise, experience, and knowledge to anticipate and solve complex transportation-related challenges. The Board's varied activities annually engage about 8,500 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state departments of transportation, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

Learn more about the Transportation Research Board at **www.TRB.org**.

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ABOUT THE NCHRP SYNTHESIS PROGRAM

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-05, “Synthesis of Information Related to Highway Practices,” searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, Synthesis of Highway Practice.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

FOREWORD

By Jo Allen Gause

Staff Officer

Transportation Research Board

State department of transportation (DOT) construction activities must comply with federal and state National Pollutant Discharge Elimination System construction general permit requirements. The regulations require state DOTs to implement policies, procedures, and practices to minimize offsite discharges of sediment-laden stormwater to protect downstream receiving water bodies during construction. To obtain permit coverage, regulated construction activities require the development, implementation, and maintenance of project-specific stormwater pollution prevention plans (SWPPPs). The SWPPP provides construction stormwater-related management requirements and details on the installation and maintenance of structural and non-structural practices implemented during land-disturbing activities.

The objective of this synthesis is to document state DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements.

Information for this study was gathered through a literature review, a survey of state DOTs, and follow-up interviews with selected DOTs. Case examples of six state DOTs provide additional information on construction stormwater program management practices.

Christofer M. Harper, Black Dog Consultants, LLC; Daniel Tran, Tran and Associates, LLC; and Roy E. Sturgill, Jr., Blue CyClone, LLC, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on page iv. This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.



CONTENTS

1 Summary

5 **Chapter 1** Introduction

- 5 Overview
- 6 Synthesis Objectives
- 6 Synthesis Approach
- 7 Synthesis Organization

8 **Chapter 2** Literature Review

- 8 Introduction
- 8 Clean Water Act of 1972
- 9 National Pollutant Discharge Elimination System
- 9 Construction General Permit
- 11 Stormwater Pollution Prevention Plans
- 12 Municipal Separate Storm Sewer System Permits
- 13 Erosion and Sediment Discharges
- 13 Best Management Practices and Erosion and Sediment Control Measures
- 15 Inspections

19 **Chapter 3** State of the Practice Survey

- 19 Introduction
- 19 Overview of Construction Stormwater Management Programs
- 23 Preparation and Management of Stormwater Pollution Prevention Plans
- 25 Responsibilities for Construction Stormwater Management
- 28 Design Standards and Qualifications of Construction Stormwater Programs
- 30 Stormwater Management Tracking and Inspection
- 32 Construction Stormwater Management Audits

34 **Chapter 4** State DOT Case Examples

- 34 Introduction
- 34 Colorado Department of Transportation
- 42 Florida Department of Transportation
- 47 Iowa Department of Transportation
- 54 New York State Department of Transportation
- 60 Pennsylvania Department of Transportation
- 65 Texas Department of Transportation
- 71 Summary of Case Examples

74 **Chapter 5** Summary of Findings

- 74 Literature Review
- 75 Survey Questionnaire
- 75 Case Examples
- 76 Knowledge Gaps and Suggested Future Research

78	References
80	List of Abbreviations and Acronyms
82	Appendix A Survey Questionnaire
90	Appendix B Individual Survey Responses
140	Appendix C Case Examples Questionnaire
142	Appendix D Oklahoma DOT Clean Water Inspection Form
146	Appendix E West Virginia DOT Division of Highways Environmental Construction Inspection Form
149	Appendix F Colorado DOT Form 1176: Stormwater Field Inspection Report
154	Appendix G Florida DOT SWPPP Template
163	Appendix H Iowa DOT QA Inspection Form
167	Appendix I New York State DOT SPDES Stormwater Inspection Report Form
170	Appendix J Pennsylvania DOT Summary of Compliance Response Policy Table
172	Appendix K Texas DOT Form 2118: Field Inspection and Maintenance Report

Construction Stormwater Program Management, Tracking, Reporting, and Compliance

To construct highway infrastructure systems, departments of transportation (DOTs) and their associated contractors and consultants perform various tasks that typically involve earthwork operations at and around a construction project site. Disturbing the site by removing protective ground covers (e.g., vegetation, rocks, pavement) and exposing underlying soils can lead to erosion and stormwater runoff discharges, thereby potentially impacting nearby receiving waters. Therefore, disturbed areas requiring erosion and sediment control (E&SC) and protection are evident for projects as small as shoulder-widening and as large as a highway interchange. Protecting surrounding areas and implementing stormwater management reduce the potential for polluted stormwater to flow into receiving waters.

Construction stormwater management practices protect surface and downstream water bodies from discharge and runoff. If not managed properly, stormwater can contain unacceptable amounts of sediment and suspended solids, which impact the water quality of receiving waters and potentially harm surrounding habitats. Stormwater management is a comprehensive program that DOTs implement for managing the water quality of disturbed area discharges associated with the municipal separate storm sewer system (MS4) program for general stormwater management across the state. Construction stormwater management, a component of a stormwater management program (SWMP) at state DOTs, consists of processes and procedures to conform with the National Pollutant Discharge Elimination System (NPDES) program's construction general permit (CGP) for construction activities disturbing 1 acre of land or more. In most states, a state regulatory agency administers the NPDES CGP for statewide construction projects, which state DOTs must acquire for proper coverage during construction.

The objective of this synthesis is to investigate and document DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements. Specifically, this synthesis performs the following:

- Identifies the current state of the practice for managing construction stormwater programs, including best management practices (BMPs) and associated E&SC measures; tracking, monitoring, and reporting permit requirements; inspections and compliance requirements; and other related aspects.
- Documents processes for preparing and managing stormwater pollution prevention plans (SWPPPs) from state DOTs.
- Reports qualifications and training information for designers and inspectors related to NPDES as well as the responsible parties for developing standards and specifications for stormwater management and E&SC practices.
- Documents the benefits and challenges of stormwater management for the construction of highways based on information provided by state DOTs.

The synthesis methodology includes reviewing relevant literature, collecting information from state DOTs using a survey questionnaire, and conducting case example interviews with state DOTs for in-depth discussions about construction stormwater management. Literature was collected from state DOTs, the FHWA, EPA, AASHTO, and other related documents, manuals, and journal articles. The survey was developed based on information found in the literature review and was distributed to the AASHTO Committee on Construction, which includes representatives from all 50 state DOTs, along with the Washington, DC, and Puerto Rico DOTs. A total of 42 state DOTs responded to the survey, yielding an 81% response rate. Based on the findings from the survey, the DOTs from the following six states were identified and agreed to participate in the case examples: Colorado, Florida, Iowa, New York, Pennsylvania, and Texas.

The information presented covers the scope of the work of this project from the data collected and reviewed. The information reviewed in the literature and the survey reveals that most state DOTs perform stormwater management as part of their project management process. Every state DOT complies with the NPDES CGP requirements at the national or state regulatory agency level. Moreover, the CGP is required for every highway construction project, which the state regulatory or environmental agency typically administers. Some state DOTs also comply with MS4 permit requirements for construction stormwater management, typically addressing the construction site runoff minimum control measure program requirements.

The survey indicates that state DOTs use different approaches to construction stormwater, including the following:

- Participation in the project management process (25 of 42 DOTs, 60%)
- Formal construction stormwater management program (11 of 42 DOTs, 26%)
- Combination of project management process and formal construction stormwater management program depending on project scope and size (6 of 42 DOTs, 14%)

Of 42 responding state DOTs, 33 (79%) have used statewide approaches, while 27 (64%) indicated that the approach to construction stormwater management varies project by project. In the case examples, state DOTs noted they have an office or division at headquarters that helps with the permit process and initiates stormwater management for a project. Subsequently, the districts or regions within the state DOT are in charge of implementing and overseeing compliance with permit requirements for construction stormwater management.

State DOTs use various BMPs and control measures for sediment containment, erosion, and runoff control. BMPs are practices and controls installed at a construction site to help prevent or reduce sediment-laden runoff and erosion. The literature review includes lists of BMPs commonly used for highway construction stormwater management. From the survey responses, 42 of 42 DOTs (100%) use the following BMPs for construction stormwater management:

- Erosion control logs, sediment tubes, fiber rolls, or composite socks
- Check dams, including rock, sandbags, socks, rolls, silt fence, or tubes
- Stabilized construction entrances and exits
- Silt fence and barriers
- Sediment basins
- Temporary or permanent hydromulching/seeding

In addition, 20 of 42 state DOTs (48%) have used flocculants for construction stormwater management. In the case examples, the common BMPs mentioned are silt fences; turbidity barriers; seeding, fertilizing, and mulching; straw bales; sediment logs; drainage interceptors; and check dams. DOTs also mentioned using flocculants as a last resort.

The SWPPP is an important stormwater management component, as it provides stormwater management details specifically for each individual construction site and is required under the CGP for state DOTs to prepare and implement at highway construction project sites. Based on the literature review, common components of the SWPPP include the site map; an assessment of the site to identify potential problem areas, pollutants, and sediment-laden runoff areas; number and location of stormwater management practices, including BMPs and control measures; monitoring and reporting procedures; employee training and education; emergency response plans; and inspection and maintenance schedules.

According to the survey, the main parties responsible for preparing SWPPPs include the following:

- Design engineers (26 of 42 DOTs, 62%)
- Contractors (24 of 42 DOTs, 57%)
- Consultants (21 of 42 DOTs, 50%)

In addition, the survey also identified the main parties responsible for managing SWPPPs during construction, which include the following:

- Contractors (33 of 42 DOTs, 79%)
- Construction project managers (26 of 42 DOTs, 62%)
- Consultants (16 of 42 DOTs, 38%)

The survey reported the period during which the SWPPP is prepared by the DOT, which includes the following:

- During project design and engineering (25 of 42 DOTs, 60%)
- During the pre-construction phase (15 of 42 DOTs, 36%)
- Prior to the construction phase (8 of 42 DOTs, 19%)
- In conjunction with the National Environmental Policy Act Plan (4 of 42 DOTs, 10%)

In the case examples, state DOTs mentioned that the SWPPP is a requirement that must be prepared before receiving permit authorization from the state regulatory agency as part of the CGP. Various DOT divisions, offices, and departments are involved in construction stormwater management, including the following:

- Construction (41 of 42 DOTs, 98%)
- Environmental (35 of 42 DOTs, 83%)
- Design and engineering (31 of 42 DOTs, 74%)
- Stormwater management and drainage (23 of 42 DOTs, 55%)
- Permitting (18 of 42 DOTs, 43%)

The common responsibilities of the DOT include the following:

- Development of design guidelines (36 of 41 DOTs, 88%)
- Monitoring and tracking control measures (36 of 41 DOTs, 88%)
- Inspections (35 of 41 DOTs, 85%)
- Training project personnel (34 of 41 DOTs, 83%)
- Reporting (33 of 41 DOTs, 80%)

The common responsibilities of the contractor include the following:

- Installation of BMPs (41 of 41 DOTs, 100%)
- Maintenance of BMPs (39 of 41 DOTs, 95%)
- Deficiency remediation (36 of 41 DOTs, 88%)
- Monitoring and tracking control measures (33 of 41 DOTs, 80%)
- Inspections (31 of 41 DOTs, 76%)

The common responsibilities of consultants include the following:

- Inspections (22 of 41 DOTs, 54%)
- Monitoring and tracking control measures (19 of 41 DOTs, 46%)
- Reporting (17 of 41 DOTs, 41%)
- Development of design guidelines (15 of 41 DOTs, 37%)

In the case examples, state DOTs mentioned they are responsible for providing guidelines, overseeing the management of stormwater and E&SC at the construction site, and inspecting stormwater management controls for the project. Also, the contractor is responsible for properly installing and maintaining stormwater management and associated BMPs. In addition, state DOTs have mechanisms in their specifications that allow them to assess liquidated damages or payment deductions when the contractor is not sufficiently complying with permit requirements.

Various approaches are used to develop design guidelines for stormwater management. The survey and case examples indicate that DOTs have guidebooks and manuals available for design and management during construction, along with guides outlining approved BMPs and control measures. Furthermore, the survey respondents were asked to identify the design guidelines used for construction stormwater management, which include the following:

- DOT guidelines (40 of 42 DOTs, 95%)
- State regulatory and environmental agency guidelines (34 of 42 DOTs, 81%)
- Federal guidelines or general construction practices (21 of 42 DOTs, 50%)
- Scientific research (11 of 42 DOTs, 26%)
- Rules of thumb and current practices (10 of 42 DOTs, 24%)
- EPA guidelines (2 of 42 DOTs, 5%)

The process for regulatory and internal audits of the implementation of construction components of stormwater programs varies among state DOTs. Based on survey examples, the frequency of internal audits conducted includes annually (17 of 40 DOTs, 43%), as needed (17 of 40 DOTs, 43%), and when revisions occur to federal and state permit requirements (5 of 40 DOTs, 13%). The frequency of regulatory audits includes as needed (20 of 40 DOTs, 50%), every 4 to 5 years (8 of 40 DOTs, 20%), and annually (6 of 40 DOTs, 15%). In addition, in the case examples, the DOTs have various levels or tiers of audits, which are required under some permits. In each case example, the DOT also mentioned that regulatory audits by the EPA or FHWA are infrequent.

The gaps in knowledge and practice identified in this synthesis may serve as indicators for potential future research. To improve state DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements, future research is suggested for the following areas:

- Develop guidelines for construction stormwater management programs, including alternative contracting methods (e.g., design-build, construction manager, general contractor), uniformity in training and certifications, phasing approaches to minimize ground disturbances during construction, monitoring discharges during construction, and technologies, programs, and applications used for construction stormwater management.
- Develop consistency of BMP and construction stormwater management terminology and applications by creating guidelines for stormwater management and BMP programs during and after construction.
- Conduct a synthesis study on MS4 programs and the methods used by DOTs to comply with permit requirements.
- Conduct a synthesis study on state DOT implementation of post-construction BMPs.

Introduction

Overview

State departments of transportation (DOTs) oversee the construction and maintenance of transportation and highway systems. To construct and maintain highway infrastructure systems, DOTs and their associated contractors and consultants perform various tasks that typically involve earthwork operations at and around a project site, which can create stormwater, erosion, and sedimentation runoff issues, thereby potentially impacting receiving waters. Disturbed areas occur when vegetation, rocks, pavement, and other protective ground covers are removed during construction, thereby exposing the underlying soil, which is susceptible to erosion and sediment-laden runoff.

Examples of soil-disturbing activities include, but are not limited to, the following:

- Clearing and grubbing
- Grading
- Excavating (e.g., cutting, filling, and trenching)
- Stockpiling of soils
- Demolition work

Disturbed areas requiring erosion and sediment control (E&SC) and protection are evident for projects as small as shoulder-widening and as large as mega-highway projects. Protecting surrounding areas and implementing proper stormwater management reduces the potential for polluted stormwater flowing into receiving waters (Colorado DOT, 2021).

Construction stormwater management practices protect surface and downstream water bodies from discharge and runoff. If not managed properly, stormwater can contain large amounts of sediment and suspended solids, some of which contain pollutants toxic to surrounding environments and wildlife. Stormwater management is a comprehensive program that DOTs have developed, implemented, and refined over the years to manage the water quality of disturbed area discharges, to protect water quality during land-disturbing activities, and to conform with the National Pollutant Discharge Elimination System (NPDES) and construction general permits (CGPs). The CGP authorizes the discharge of allowable stormwater and non-stormwater associated with regulated construction activities into or adjacent to receiving waters. The CGP specifies construction activities that may be authorized, are eligible for waivers, and that require an authorized individual permit (EPA, 2022). The CGP includes information about the proper discharge of stormwater associated with activities at construction sites to comply with permit requirements, which typically entails compliance with discharges of stormwater runoff from earthwork construction activities and disposal areas for excavated materials. A primary requirement of the CGP is the development and use of a site-specific stormwater pollution prevention plan (SWPPP) for construction.

Erosion and sediment control are necessary for environmental protection, water quality, and safety. Uncontrolled erosion and sediment runoff during highway construction may cause harmful impacts on receiving waters and habitats, drainage structures, and surrounding lands, and could be subject to public criticism and complaints. Best management practices (BMPs), which incorporate E&SC measures, are a set of procedures and controls installed at a construction site to help prevent soil erosion and reduce or eliminate water pollution and sedimentation problems during construction. These techniques also can minimize the need for contractors to take corrective actions during construction operations. To assist with E&SC practices, state DOTs have stormwater management programs (SWMPs), approaches, and guidelines that help address water quality degradation and minimize erosion and sediment runoff associated with highway construction activities. These SWMPs also guide the implementation of planning, construction, and proper installation and maintenance of BMPs as construction proceeds.

Although state DOTs have managed environmental and water quality issues associated with highway construction for years, information about the current state of the practice in construction stormwater management is needed to understand processes that work as well as existing challenges to managing stormwater permit and compliance requirements. In addition, gaps in knowledge and approaches can be identified for future research. Overall, a need exists to understand how state DOTs manage compliance with stormwater and environmental permit requirements for stormwater and E&SC for highway construction work.

Synthesis Objectives

The objectives of this synthesis are to investigate and document DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements. Specifically, this synthesis performs the following:

- Identifies the current state of the practice for managing construction stormwater programs, including BMPs and E&SC measures; tracking, monitoring, and reporting permit requirements; inspections and compliance; and other related aspects.
- Documents processes for preparing and managing SWPPPs from state DOTs.
- Reports qualifications and training information for designers and inspectors in the NPDES permitting program as well as the responsible parties for developing standards and specifications for stormwater management and E&SC practices.
- Documents the benefits and challenges of stormwater management for the construction of highways based on information provided by state DOTs.

Based on the objectives, the following areas were considered for data collection:

- Current practices, approaches, and processes used by state DOTs to manage, monitor, track, and record information for proper stormwater management during construction
- Types of BMPs and control measures used on DOT highway projects that are designed, installed, maintained, and inspected during construction
- Formal and informal tools, guidelines, and training that DOTs have in place for executing stormwater management according to specifications and permit requirements
- Information about the development and execution of the SWPPP for construction

Synthesis Approach

The literature review provided information about the current state of the practice for construction stormwater management, as well as the Clean Water Act (CWA), permits, BMPs, control measures, and inspections. Various reports, documents, manuals, journal articles, and websites

from state DOTs, the FHWA, and the EPA were consulted that address stormwater management and control measures for highway construction projects. The findings of the literature review are in Chapter 2.

A survey questionnaire was developed using the literature review and that follows the scope of work developed for this project. The survey questionnaire captured the state of the practice in construction stormwater program management. The survey was developed using the Qualtrics online survey platform and was electronically distributed to the AASHTO Committee on Construction voting members. This distribution included representatives from all 50 state DOTs and the Washington, DC, and Puerto Rico DOTs. The survey findings are presented in Chapter 3 based on 42 state DOT respondents (81% response rate). The survey questionnaire is presented in Appendix A. Individual state DOT survey question responses are provided in Appendix B.

Following the analysis of the survey responses, case example interviews were conducted to gather detailed information from DOTs about construction stormwater program management, SWPPPs, BMPs, and training. Initially, nine state DOTs were identified as candidates for case example interviews and were contacted. In total, six state DOTs participated: Colorado (AASHTO Region 4), Florida (AASHTO Region 2), Iowa (AASHTO Region 3), New York State (AASHTO Region 1), Pennsylvania (AASHTO Region 1), and Texas (AASHTO Regions 3/4). Details of the state DOT case example interviews are outlined in Chapter 4. The interview questions used for the case examples are provided in Appendix C.

Synthesis Organization

This synthesis includes five chapters.

- Chapter 1: Introduction to the subject area and description of the synthesis scope, objectives, and methodology
- Chapter 2: Literature review of the CWA, permitting, E&SC and BMPs, and inspections for stormwater management of highway construction
- Chapter 3: Current construction stormwater program management practices collected through the state DOT survey questionnaire
- Chapter 4: Case examples of construction stormwater management and associated factors conducted with six state DOTs (Colorado, Florida, Iowa, New York State, Pennsylvania, and Texas)
- Chapter 5: Key findings, current practices, and suggested future research to address knowledge gaps identified by the synthesis

The synthesis also includes the following sections:

- References: a list of sources cited within the synthesis
- List of Abbreviations and Acronyms used within the synthesis
- Appendix A: Survey Questionnaire
- Appendix B: Individual Survey Responses
- Appendix C: Case Examples Questionnaire
- Appendix D: Oklahoma DOT Clean Water Inspection Form
- Appendix E: West Virginia DOT Division of Highways Environmental Construction Inspection Form
- Appendix F: Colorado DOT Form 1176: Stormwater Field Inspection Report
- Appendix G: Florida DOT SWPPP Template
- Appendix H: Iowa DOT QA Inspection Form
- Appendix I: New York State DOT SPDES Stormwater Inspection Report Form
- Appendix J: Pennsylvania DOT Summary of Compliance Response Policy Table
- Appendix K: Texas DOT Form 2118: Field Inspection and Maintenance Report



CHAPTER 2

Literature Review

Introduction

Highway construction project sites that disturb more than 1 acre of land are required by law to properly manage stormwater so that pollutants do not reach surrounding receiving waters. Uncontrolled stormwater runoff from construction sites significantly impacts rivers, lakes, and estuaries. Sediment collection in water bodies potentially causes harmful impacts on the environment, such as reducing the sunlight that reaches aquatic plants and animals, clogging fish gills, suppressing habitats, and impeding navigation (EPA, 2024a). EPA lists common pollutants and construction practices associated with stormwater management at construction project sites, which include the following (EPA, 2022):

- Sediment runoff from stormwater
- Erosion of sediment
- Solid and sanitary waste
- Phosphorus, nitrogen, and other chemicals
- Pesticides
- Oil and grease
- Construction materials and chemicals
- Construction debris

Protecting receiving waters from pollutants was a cause of concern in the United States in the 1960s as major water bodies became seriously polluted (Cook et al., 2020). This situation led to federal legislation establishing regulations and permit requirements for construction projects to alleviate the potential pollution from construction activities entering into receiving waters at or near the site.

Clean Water Act of 1972

The Clean Water Act (CWA) of 1972 marked a major milestone in protecting water bodies in the United States from environmental pollution. The CWA ensures access to clean water for economic development and population growth, limits water pollution, and enhances water quality. Regarded as significant environmental legislation (Hawkins, 2015), the CWA protects all waterways and water bodies.

Although water quality laws are not exclusively concerned with construction activities, the construction industry's interaction with receiving waters in and around project sites underscores its relevance. Construction can positively and negatively impact the environment, depending on the materials and methods employed (Barrett and Malina, 1995). A report by the EPA highlighted the potential for construction methods and materials to pollute water runoff, thus

prompting CWA amendments in 1987 that mandated compliance with regulations governing sediment, erosion, and stormwater runoff and discharges at and from construction sites (Faucette et al., 2009).

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established to limit water pollution by regulating the point sources that discharge sediment-laden runoff into receiving waters (Campbell, 2022). Three goals of the NPDES permitting program for stormwater management associated with highway construction activities are to reduce erosion, minimize sedimentation, and minimize the discharge of pollutants (NMDOT, 2023). Enacted as part of the CWA, the NPDES dictates that discharging sediment into receiving waters is prohibited without a valid NPDES permit or waiver authorizing possible discharges. In the context of construction activities, the NPDES program regulates the quantity of sediment and other pollutants that can be discharged. Currently, 47 states and one U.S. territory are authorized to administer their own state NPDES programs, with oversight provided by the EPA. A state regulatory agency for environmental quality typically administers the NPDES for state DOTs to follow for highway construction.

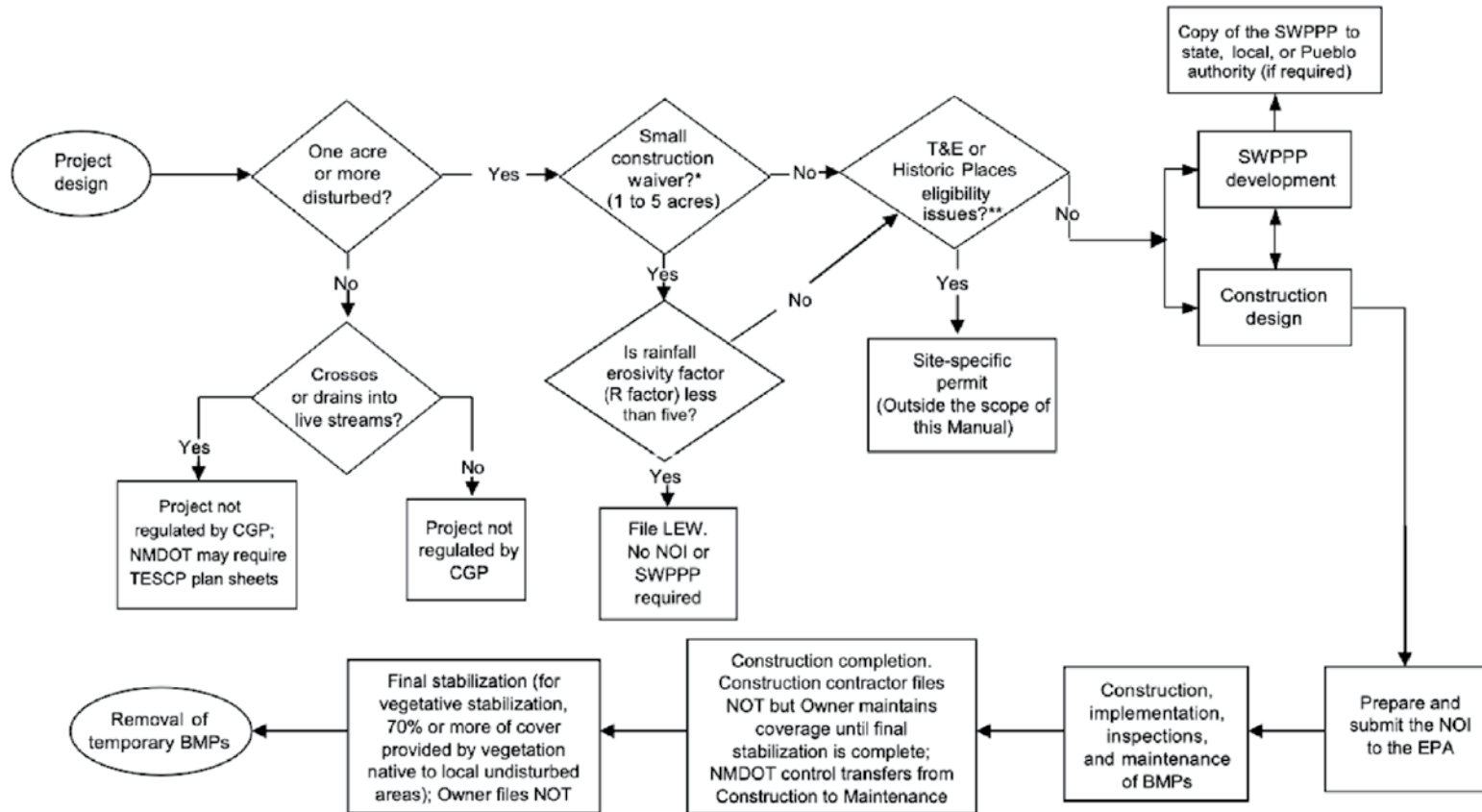
Construction General Permit

The construction general permit (CGP), as part of the NPDES permit program, is typically administered by a state regulatory agency (except in Massachusetts, New Hampshire, New Mexico, and the District of Columbia, where the EPA issues the CGP). The CGP authorizes the discharge of allowable amounts of stormwater and non-stormwater associated with regulated construction activities into receiving waters. The CGP describes the construction activities covered under the permit, specifies activities eligible for waivers, and identifies activities requiring an authorized individual permit (EPA, 2022). Typically, every construction project that disturbs more than 1 acre of land requires a project-specific CGP.

The CGP provides regulations for properly discharging stormwater linked with construction site activities, thus ensuring compliance with permit requirements. Typically, these activities include the following:

- Discharging stormwater runoff from earthwork construction operations, concrete batch plants, asphalt batch plants, equipment staging areas, materials storage yards, and materials borrow areas
- Managing excavated materials disposal areas at, adjacent to, or near the permitted construction site that directly supports construction activities

New Mexico DOT adheres to EPA regulations, since it does not have a regulatory agency of its own to administer the CGP. It follows an NPDES CGP permitting process for highway construction (see Figure 1). The first step entails determining whether a project disturbs more than 1 acre of land. If so, the DOT requires a CGP for construction work. Coverage under the CGP is required by obtaining an individual NPDES CGP. The next step is determining whether the project encroaches on any threatened or endangered species or historic properties at the site. Upon this determination, New Mexico DOT prepares a project site-specific stormwater pollution prevention plan (SWPPP). The SWPPP is completed before submitting the notice of intent (NOI), which must be completed before the start of construction. After the SWPPP is prepared, the DOT and the contractor, at a minimum, must prepare and file an NOI with the EPA.



* See Section I.C.6. of this Manual, Small Construction Waivers, or Appendix C of the CGP

** See Appendices D and E of the CGP

BMPs = Best Management Practices
CGP = Construction General Permit
EPA = U.S. Environmental Protection Agency
LEW = Low Erosivity Waiver
NMDOT = New Mexico Department of Transportation
NOI = Notice of Intent
NOT = Notice of Termination
TESCP = Temporary Erosion and Sediment Control Plan
SWPPP = Stormwater Pollution Prevention Plan

Figure 1. New Mexico DOT CGP permitting process.

New Mexico DOT can delegate the responsibilities of individual parties in the SWPPP. Any actions or responsibilities delegated to the contractor or other third party are specifically addressed in the SWPPP. After the SWPPP has been prepared and an NOI has been submitted and accepted by the EPA, project construction may begin within 14 calendar days after acknowledgment of receipt of the completed NOIs.

During construction, the contractor installs and maintains control measures, which are inspected by New Mexico DOT personnel as outlined in the SWPPP. If site conditions, project design changes, or construction sequencing warrant revisions in the type, design, and scheduling of stormwater pollution control measures, the SWPPP must be revised, signed, and dated. The SWPPP is considered a living document and is updated as site conditions change during construction. Inspections of the site are conducted during construction. As necessary, changes to control measures must be made for any deficiencies found to ensure the SWPPP is followed and the project is in compliance with permit requirements.

Stormwater Pollution Prevention Plans

SWPPPs are comprehensive documents that manage and mitigate the potential impact of stormwater runoff from construction sites on water quality (Caltrans, 2016). All highway construction project sites are unique; therefore, the SWPPP is specifically prepared for each site. SWPPPs are required under the NPDES permitting program for construction activities when 1 or more acres of land are disturbed. SWPPPs are short-term solutions for only the construction phase of a project.

SWPPPs typically include the following components:

- **Site map and assessment:** Detailed information about the construction site, including the location, size, topography, soil types, potential problem areas, and proximity to receiving waters.
- **Identification of potential pollutants:** Assessment of potential pollutants generated by construction activities, such as sediment, chemicals, and debris.
- **Stormwater management practices:** Strategies and BMPs to prevent or minimize stormwater pollution, including erosion and sediment control (E&SC) measures, runoff management techniques, and pollution prevention practices.
- **Monitoring and reporting procedures:** Protocols for monitoring stormwater discharges, including sampling methods, frequency of monitoring, and reporting requirements to regulatory agencies.
- **Employee training and education:** Training programs for on-site personnel to ensure they understand their roles and responsibilities when implementing the SWPPP and preventing pollution.
- **Emergency response plans:** Procedures for responding to and managing emergencies such as spills, leaks, or extreme weather events that could impact water quality.
- **Inspection and maintenance schedules:** Regular inspection schedules and maintenance procedures for BMPs and E&SC measures to ensure they remain effective throughout the construction project.

According to Nevada DOT (NDOT, 2013), the construction site map is one of the most important elements of the SWPPP. The map includes site topography and drainage patterns along with the locations of the following components for stormwater management and E&SC:

- Erosion and sediment control BMPs used at the site
- Stabilized construction entrances and exits to prevent tracking sediment onto pavements

- Vehicle equipment maintenance, fueling, and cleaning areas
- Storage areas for construction materials, supplies, and waste
- Designated concrete washout areas
- Areas where stormwater runoff discharges outside the limits of the site into either the storm drain system or nearby waters
- Areas to be revegetated or stabilized with other methods

SWPPPs are crucial to ensuring compliance with NPDES permit requirements and protecting water quality during construction activities. SWPPPs are living documents that may be updated as the project progresses or as conditions change on the construction site.

Municipal Separate Storm Sewer System Permits

Municipal separate storm sewer systems (MS4s) are networks of conveyances, such as storm sewers, gutters, drains, and related infrastructure, that are owned by states, towns, villages, counties, and other public entities. These systems collect and discharge stormwater runoff within municipalities across a state into receiving waters (CDPHE, 2024). However, polluted stormwater runoff can be transported through these systems, discharging the untreated stormwater into receiving waters and causing issues with water quality. Therefore, to prevent pollutants and sediment from entering MS4s, transportation agencies are typically required to obtain NPDES permits and to develop a stormwater management program (SWMP) (EPA, 2024c).

The MS4 SWMP is a long-term strategy to implement a permanent solution for managing stormwater and water quality beyond construction. The SWMP outlines the stormwater management procedures to use in accordance with MS4 permit requirements in order to reduce the potential discharge of sediment and pollutants into receiving waters (National Association of Clean Water Agencies, 2018). The SWMP is not the same as the SWPPP: the SWMP is a long-term solution for managing stormwater discharges in general, while the SWPPP is a project site-specific plan for managing stormwater discharges and water quality during the construction phase of a project.

The MS4 permitting program includes six minimum control measures (MCMs). Each has a set of associated BMPs to help minimize discharges of pollutants and sediment in stormwater runoff. The following six MCMs guide the planning and implementation of the MS4 permitting program (Bustios and Stanhouse, 2024):

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

MS4 permits protect municipal stormwater systems from pollutants and sediment discharges. Unlike the CGP, the MS4 permit is not required specifically for construction activities outside of site stormwater management. Typically, state DOTs obtain coverage for construction activities through the CGP and develop a project site-specific SWPPP. In contrast, DOTs utilize the MS4 permit for their SWMP, which addresses pollutant and sediment discharges from any DOT property (including the right-of-way) and includes PCSM. In some cases, state DOTs are required to get MS4 and CGP permit coverage for a construction project, which means that DOTs must meet the MS4 and CGP permit requirements during construction. Colorado DOT (Colorado DOT, 2023) and Texas DOT (Texas DOT, 2018) require an MS4 permit and a CGP permit for construction projects that disturb 1 or more acres of land.

Erosion and Sediment Discharges

When total suspended solids or sediments occur in excessive quantities, the resulting degraded water quality can harm plants and animals and interfere with photosynthesis, respiration, growth, and reproduction. Sediment constitutes the primary environmental pollutant originating from construction sites, comprising approximately 10% of all sediment runoff into water bodies and aquatic environments (Belayutham et al., 2016).

Sedimentation emerges during land disruptions when conducting highway construction activities, facilitated by erosion and conveyed by rainfall and surface runoff. If suspended in water, sediments may become a major water pollutant. Sediment-loading causes the following impacts (FDOT, 2013):

- Construction areas with 10–20 times more soil particles lost compared to lands with vegetation
- Reservoirs, harbors, and canals clogged with silt
- Loss of recreational areas and wildlife habitats
- Reduction of the beneficial uses of water for humans
- Harm to plant, animal, and aquatic life

Sedimentation and pollution originating from highway construction activities have various impacts. Sediment contributes to the deterioration of water quality and disrupts the habitats of aquatic plants and species. Moreover, sediment deposition alters the hydrodynamic patterns and diminishes the visual appeal of fluvial landscapes (Reice and Carmin, 2000). Consequently, numerous federal and state legislative measures, regulations, and policies have been instituted to govern construction site pollution and safeguard water quality. Beginning in 2003, the EPA initiated the enforcement of BMPs and control measures at construction sites exceeding 1 acre to mitigate stormwater contamination from sediment and erosion (Faucette et al., 2009).

Texas DOT indicated that the effectiveness of BMPs in mitigating sediment-laden runoff and erosion hinges on proper installation and continuous maintenance (Barrett and Malina, 1995). Having adequate BMPs in place does not guarantee minimizing erosion and sediment-laden runoff unless implemented and upheld as intended. Texas DOT suggested that a viable approach to addressing this challenge involves implementing temporary and permanent water quality control measures at construction project sites if they are found to be discharging sediment into receiving waters.

Best Management Practices and Erosion and Sediment Control Measures

BMPs, also referred to as E&SC measures or control measures, are methods used to prevent or control construction stormwater runoff and discharge of sediment and pollutants into nearby receiving waters (EPA, 2024a). Table 1 lists BMPs and E&SC measures used for highway construction projects, collected from the EPA's National Menu of BMPs for stormwater – construction (EPA, 2024a).

Hawaii DOT's *Construction Best Management Practices Field Manual* outlines the practices and controls used for highway construction in Hawaii for the islands of Oahu and Maui. Hawaii DOT requires the use of construction stormwater controls that must be maintained due to the fragile nature of the Hawaiian ecosystem. The manual categorizes the BMPs across three areas: site management, erosion control, and sediment control. Table 2 outlines the BMPs across these categories at the Hawaii DOT (HDOT, 2021).

The South Carolina Department of Health and Environmental Control created a BMP handbook to help the South Carolina DOT evaluate numerous BMPs by detailing usage, installation,

Table 1. BMPs and E&SC measures for highway construction projects.

Municipal Program Oversight	<ul style="list-style-type: none"> • Construction phase plan review • Contractor training and certification • Local ordinances for construction site stormwater control • Municipal construction inspection program
Construction Site Planning and Management	<ul style="list-style-type: none"> • Construction sequencing • Erosion and sediment control inspection and maintenance • Preserving natural or existing vegetation
Erosion Control	<ul style="list-style-type: none"> • Chemical stabilization • Compost blankets • Dust control • Geotextiles, matting, netting • Land grading • Mulching • Riprap • Permanent seeding • Sodding • Soil retention • Soil roughening • Temporary slope drains • Temporary stream crossings • Wind and sand fences
Runoff Control	<ul style="list-style-type: none"> • Check dams • Grass-lined channels • Land grading
Sediment Control	<ul style="list-style-type: none"> • Brush barrier • Compost filled berms • Compost filter socks • Construction track-out controls • Fiber rolls • Filter berms • Sediment basins and rock dams • Sediment filters and sediment chambers • Sediment traps • Silt fence • Storm drain inlet protection • Straw/hay bales • Treatment chemicals • Vegetated buffers
Good Housekeeping/Materials Management	<ul style="list-style-type: none"> • Concrete washout • Construction site waste management • Spill prevention and control measures • Vehicle maintenance and washing areas at construction sites

inspection, maintenance, and design specifications. The handbook also provides design aids to determine the efficiencies of various sediment control measures (SCDHEC, 2005). Table 3 outlines the erosion prevention, sediment control, runoff control, and conveyance measures used by the South Carolina DOT for construction activities.

California DOT (Caltrans) has a *Construction Site BMP Manual* (Caltrans, 2024) that guides project teams when selecting and implementing BMPs into highway construction projects. The manual provides a construction site BMP applicability flowchart (see Figure 2) that indicates whether the project triggers an SWPPP or a water pollution control plan and where to find information about BMPs for each of the steps in the flowchart. The manual also includes information about different permit requirements, SWPPP BMP requirements, minimum construction BMPs, and six categories of construction site BMPs.

The six categories of construction site BMPs at Caltrans are as follows (Caltrans, 2024):

1. Temporary soil stabilization
2. Temporary sediment control

Table 2. List of BMPs and E&SC measures used by Hawaii DOT for highway construction.

Site Management	<i>Training</i>	Construction BMP training
	<i>Materials Management</i>	Materials storage and handling
		Stockpile management
	<i>Waste Management</i>	Concrete wash and waste management
		Asphalt cement waste management
		Solid waste management
		Sanitary waste management
		Contaminated soil management
		Hazardous materials and waste management
		Spill prevention and control
	<i>Vehicle and Equipment Management</i>	Vehicle and equipment cleaning
		Vehicle and equipment maintenance
		Vehicle and equipment refueling
	<i>Site Planning</i>	Scheduling
		Location of potential sources of sediment
		Staging area
	<i>General Practices</i>	Preservation of existing vegetation
		Dewatering operations
		Dust control
		Paving operations
		Structure construction and painting
		Topsoil management
Erosion Control	<i>General Practices</i>	Temporary stream crossing
		Flared culvert end sections
		Run-on diversion
		Slope roughening, terracing, and rounding
		Earth dikes, swales, ditches
		Level spreader
	<i>Temporary Concentrated Flow Controls</i>	Slope drains and subsurface drains
		Outlet protection and velocity dissipation devices
		Slope interceptor or diversion ditches/berms
		Riprap and gabion inflow protection
	<i>Soil Stabilization</i>	Geotextile and mats
		Seeding and planting
		Hydroseeding
		Mulching
		Hydromulching
Sediment Control	<i>General Practices</i>	Storm drain inlet protection
		Vegetated filter strips and buffers
		Check dams
	<i>Sediment Containment Systems</i>	Sediment trap
		Sediment basin
	<i>Sheet Flow BMPs</i>	Compost filter berm/sock
		Silt fence or filter fabric fence
		Sandbag barrier
	<i>Tracking BMPs</i>	Brush or rock filter
		Construction roads and parking areas stabilization
		Stabilized construction entrance/exit

3. Wind erosion control
4. Tracking control
5. Non-stormwater management
6. Waste management and materials pollution control

Inspections

Adhering to permit requirements and following the SWPPP developed for a construction project requires regular inspections of BMPs and control measures at the highway construction site. Oklahoma DOT developed a Clean Water Inspection Form (see Appendix D) completed

Table 3. BMPs and control measures used by South Carolina DOT.

Erosion Prevention BMPs	Sediment Control BMPs	Runoff Control and Conveyance Measures
Surface roughening	Temporary sediment basin	Pipe slope drains
Temporary seeding	Temporary sediment trap	Temporary stream crossing
Mulching	Silt fence	Runoff diversion measures
Erosion control blankets	Rock check dams	Level spreader
Turf reinforcement mats	Sediment tubes	Subsurface drains
Flexible growth matrix	Stabilized construction entrances	Construction dewatering
Bonded fiber matrix	Storm drain inlet protection	
Permanent seeding	Rock sediment dikes	
Sodding		
Riprap		
Outlet protection		
Dust control		
Polyacrylamide		

in the field and filed electronically. The fillable, PDF form requests information about the specific project, minimizations of erosion and sediment discharges, BMP maintenance, solid and hazardous waste, and documentation and SWPPP stabilization. The form also includes a section for signatures to hold project personnel accountable for adhering to permit requirements.

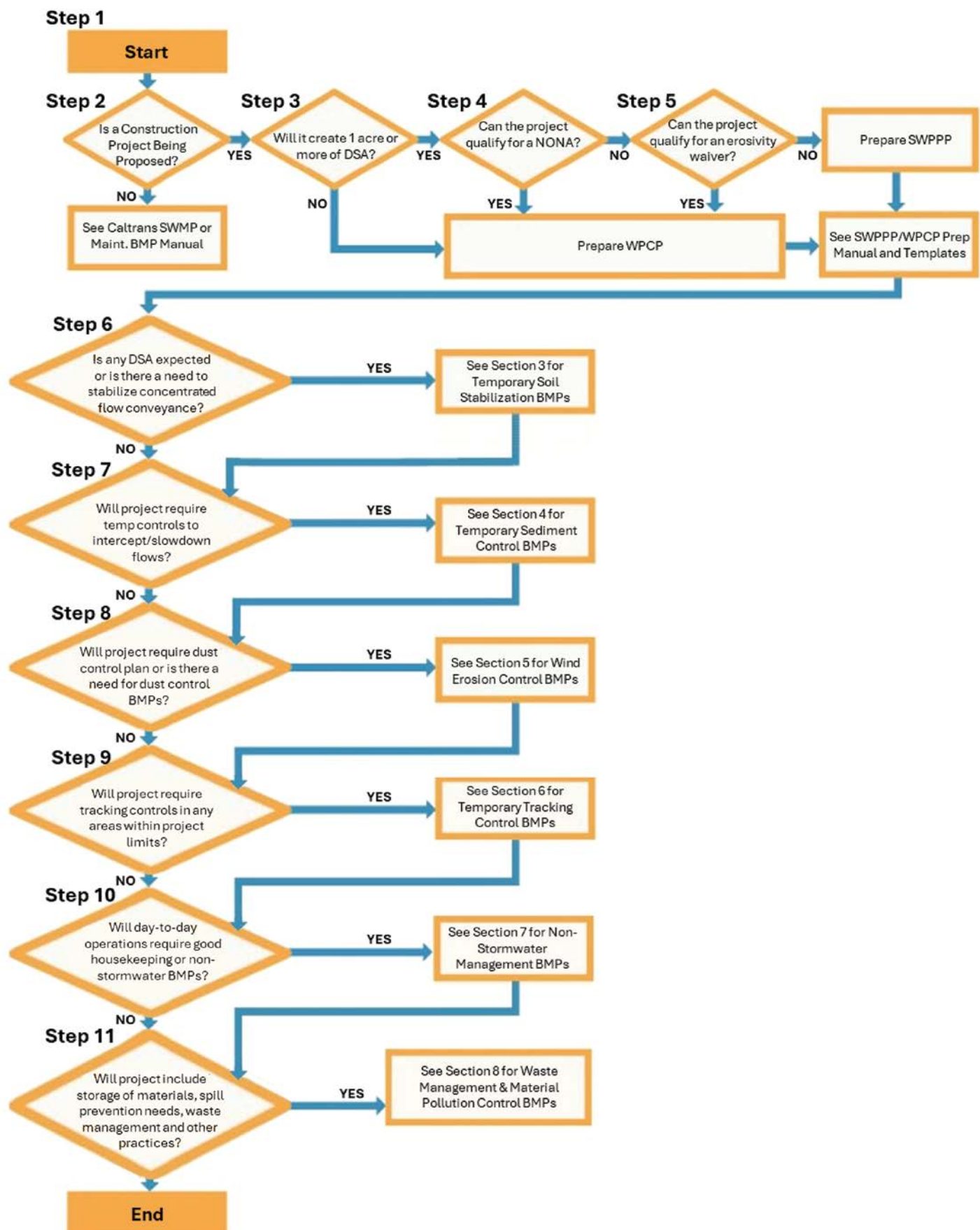
Nevada DOT provides guidelines for dividing construction sites into natural drainage areas and controlling erosion and sediment-laden runoff using BMPs. All construction BMPs are inspected weekly and within 24 hours of a half-inch rainfall event. All inspections are conducted by Nevada DOT qualified personnel or consultants who have attended stormwater management training and understand the general permit requirements from the Nevada Department of Environmental Protection. The inspector documents the inspection and observations and includes them with the SWPPP. The contractor is instructed to install and maintain all BMPs and control measures in good working order until project completion (NDOT, 2013).

The Utah Department of Environmental Quality (DEQ) is the regulatory agency that administers the general permit for stormwater discharges from construction activities for Utah DOT. The construction general stormwater permit includes requirements for qualified inspectors to perform inspections of BMPs and control measures for construction stormwater management. The DEQ defines a qualified person as knowledgeable in the principles and practices of E&SC measures and pollution prevention and possessing the skills to assess conditions at the construction site that could impact stormwater quality.

According to the Utah DEQ, qualified persons can be any of the following:

- Utah Registered Storm Water Inspector—State qualification
- Utah Department of Transportation Environmental Control Supervisor—State qualification
- Certified Professional in Erosion and Sediment Control—National qualification
- Certified Professional in Storm Water Quality—National qualification
- Certified Erosion, Sediment, and Storm Water Inspector—National qualification
- Certified Inspector of Sediment and Erosion Control—National qualification
- National Institute for Certification in Engineering Technologies, Erosion and Sediment Control, Level 3—National qualification

Utah DOT is required, at a minimum, to conduct site inspections of the BMPs and control measures installed and maintained by the contractor at least once every 7 calendar days or once every 14 calendar days and within 24 hours of the occurrence of a storm event of a half-inch or more, or the occurrence of runoff from snowmelt sufficient to cause a discharge. Utah DOT is required to maintain rain gauges properly at the construction site (Utah DEQ, 2020).



Note on Abbreviations: DSA (Division of State Architect), NONA (Notice on Non-Applicability), WPCP (Water Pollution Control Program)

Figure 2. Caltrans construction site BMP applicability flowchart (Source: Caltrans, 2024).

During construction, the West Virginia Division of Highways uses an environmental site inspection form to check for permit compliance with the installed BMPs and control measures. Appendix E provides the Environmental Site Inspection Form, which includes the following four sections:

1. **Project information:** This section contains specific project information, including name, project number, weather and rain conditions, inspection date and time, and name of the inspector.
2. **Construction site assessment:** This section contains 12 environmental protection measures to investigate in the field with room to add three more project-specific environmental protection measures. Each measure is assessed as compliant, non-compliant, or not applicable. This section includes a place to add corrective action information and to rate any deficiencies found. It also includes a rating system table providing four risk levels indicating when deficiencies must be addressed and corrected as follows:
 - **Low-risk:** within 5 working days.
 - **Medium-risk:** within 3 working days.
 - **High-risk:** within 24 hours.
 - **Extreme:** immediately.
3. **Off-site pollution discharge:** In this section, the inspector notes whether sediment discharge has been observed outside the project limits and whether these discharges have been found in state receiving waters. If so, the inspector notifies the project team immediately.
4. **Inspection closeout summary:** This section includes an overview of the inspection, the work ongoing at the site, and information about BMPs. BMP information includes corrective actions, additional BMPs, and communications with project personnel as needed.

State of the Practice Survey

Introduction

This chapter presents current practices, tools, and approaches used by state DOTs for managing compliance with state and federal construction stormwater permit requirements. To collect the most current information on policies, procedures, and guidelines used by DOTs to track and report on construction stormwater compliance, a web-based survey was distributed to the voting members of the AASHTO Committee on Construction, which includes representatives from all 50 state DOTs, the District of Columbia, and Puerto Rico. The findings presented are based on 42 state DOT respondents (an 81% response rate) (see Figure 3). In addition, the analysis of relevant documents obtained from the survey is also included to support the findings. The chapter begins by reporting the general findings of construction stormwater management, including types of construction stormwater programs, best management practices (BMPs), and the preparation and management of stormwater pollution prevention plans (SWPPPs) for highway construction projects. The chapter then presents responsible parties for the development of construction stormwater management programs. Next, qualifications and design standards for construction stormwater management are discussed. The chapter concludes by presenting the current practices in tracking, monitoring, and auditing the implementation of construction components of the stormwater program.

It is important to note that the 42 state DOT respondents were not required to respond to all questions in the survey. As a result, the sample size (N) for each question varies. Additionally, some questions were marked as “Select all that apply,” meaning that the frequencies for some questions did not add up to 100% as respondents were allowed to choose more than one selection. Appendix A provides the complete survey questionnaire. Appendix B provides individual agency responses to each survey question.

Overview of Construction Stormwater Management Programs

The survey results indicate that construction stormwater management practices vary among state DOTs. Figure 4 shows that DOTs use three approaches for construction stormwater management. Construction stormwater management can be a part of the project management process into which it is infused with the rest of the project management processes carried out during construction. Within a formal construction stormwater management program, the DOT has a separate office or division outside of project management that manages the construction stormwater program for highway construction. Some DOTs also use a combination of these two approaches: the DOT determines from project to project which approach to use. Of 42 DOT responses, 25 (60%) have handled construction stormwater management practices as a part of

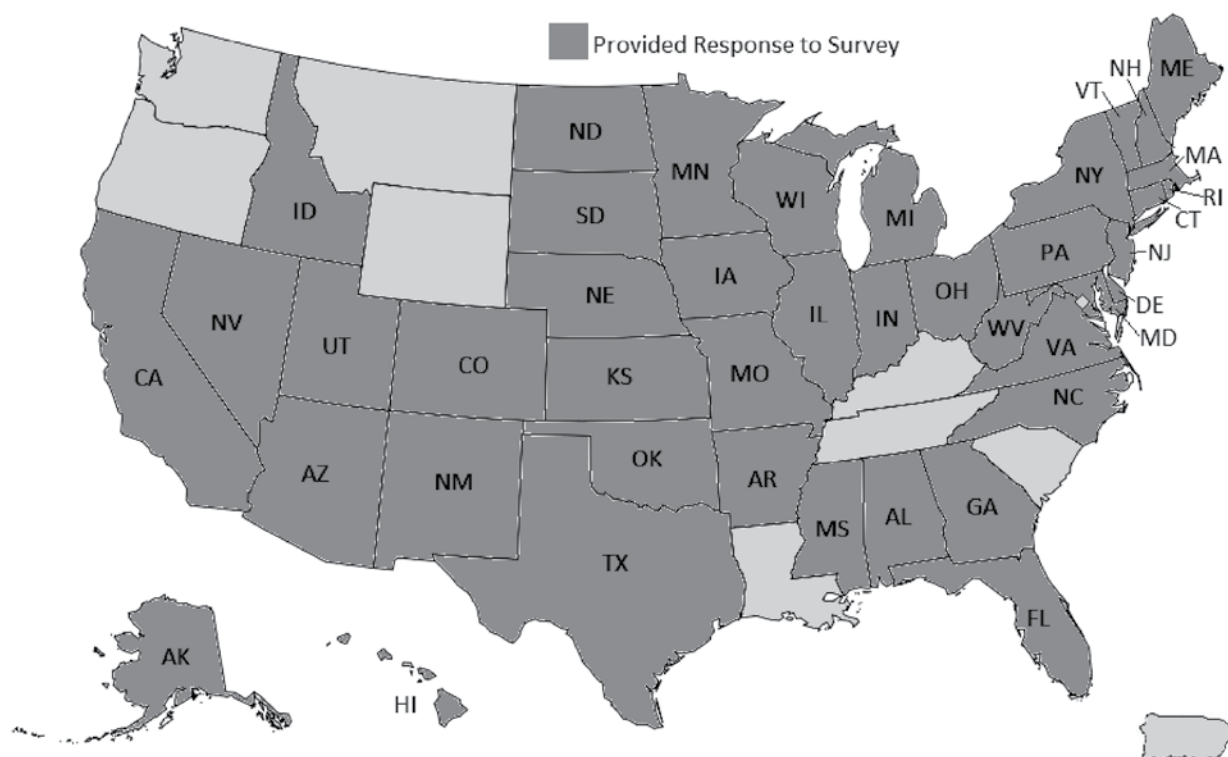


Figure 3. Map of state DOTs responding to the survey.

their project management process; 11 (26%) have a formal construction stormwater management program; and 6 (14%) have managed their construction stormwater systems by using either a formal program or a project management process, depending on the scope and size of a project.

The survey respondents were asked to identify divisions involved in the construction stormwater management programs in their state DOTs and were allowed to select all that apply. Figure 5 summarizes the results of this question. More than half of the 42 DOTs indicated that the following four divisions are involved in the construction stormwater management program:

1. Construction division (41 of 42 DOTs, 98%)
2. Environment division (35 of 42 DOTs, 83%)

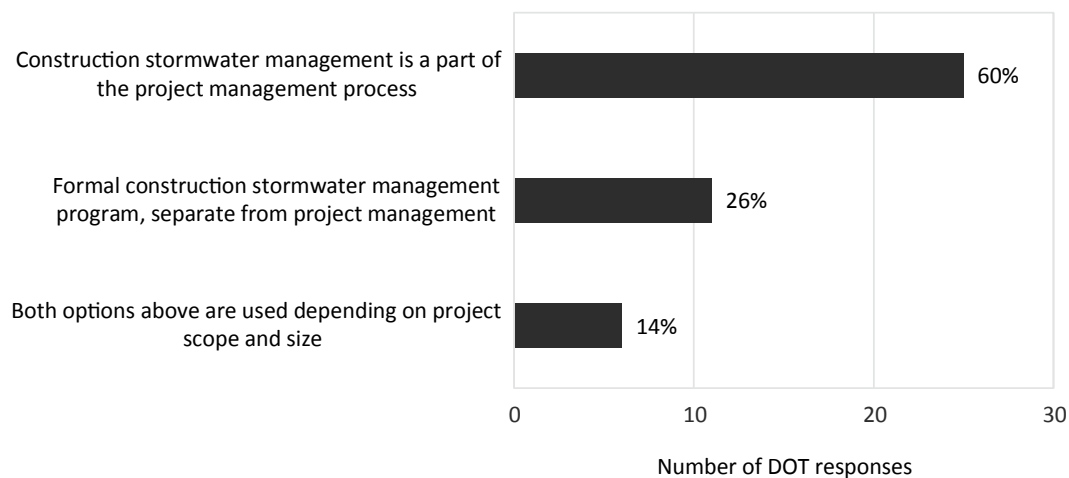


Figure 4. Construction stormwater programs managed by state DOTs (N = 42).

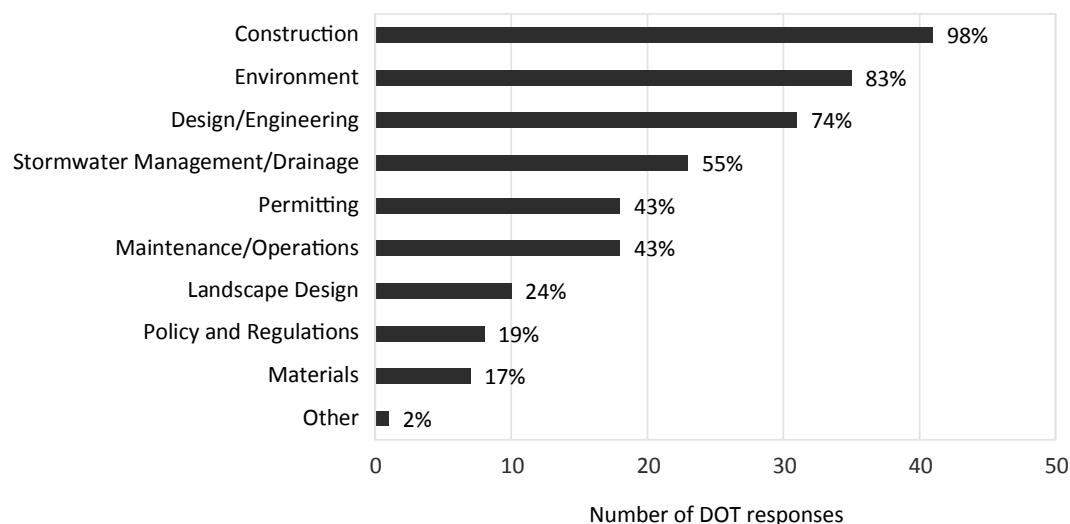


Figure 5. Divisions involved in construction stormwater management programs (N = 42).

3. Design/Engineering division (31 of 42 DOTs, 74%)
4. Stormwater Management/Drainage division (23 of 42 DOTs, 55%)

Figure 5 also shows that 18 state DOTs (43%) have managed their construction stormwater management programs through either permitting or maintenance and operation divisions; 10 (24%) have managed their construction stormwater management programs through the landscape design division; 8 (19%) have managed their construction stormwater management programs through the policy and regulation divisions; and 7 (17%) have managed their construction stormwater management programs through materials divisions.

Figure 6 summarizes the approaches to construction stormwater management state DOTs regularly use for highway projects. Of 42 DOT responses (selecting all that apply), 33 (79%) have used statewide approaches; 27 (64%) indicated that the approaches to construction stormwater management vary project by project; 14 (33%) selected an approach to construction stormwater management based on types of projects; and 9 (21%) have relied on state DOT districts to manage construction stormwater systems for highway projects.

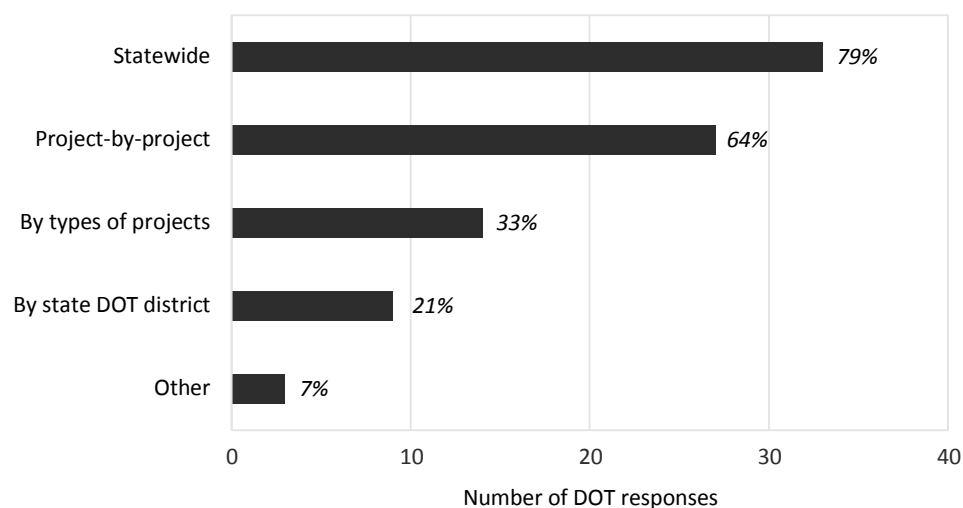


Figure 6. Approaches to construction stormwater management (N = 42).

From the responding state DOTs that selected “Other” for this question, one DOT mentioned that all projects that disturb 1 or more acres of land require a CGP to follow its water quality specifications and that all projects smaller than 1 acre are required to follow a special standard. Another DOT uses the DOT Resident Construction Engineer Office to manage construction stormwater systems. In addition, one other DOT stated that their approach to construction stormwater management is based on the size of the contributing area.

The survey respondents were asked to select all the construction stormwater management control measures approved by their DOTs for use in highway construction projects, as each respondent could choose more than one selection. Figure 7 summarizes the results of this question.

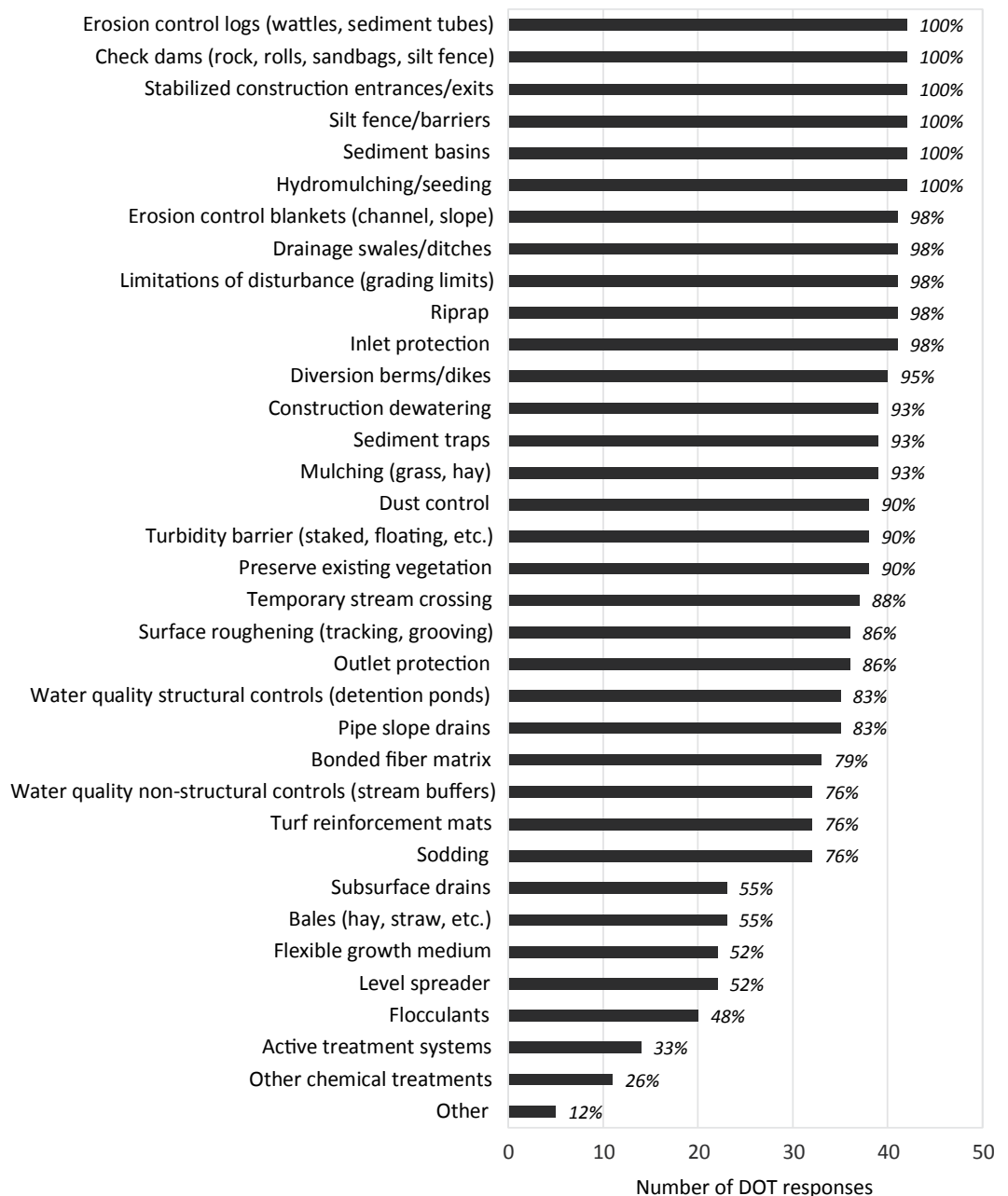


Figure 7. Construction stormwater management control measures (N = 42).

More than 90% of the responding 42 state DOTs have approved the following construction stormwater management control measures for use in highway construction projects:

- Erosion control logs such as wattles, sediment tubes, fiber rolls, or composite socks (42 of 42 DOTs, 100%)
- Check dams, including rock, sandbags, socks, rolls, silt fence, or tubes (42 of 42 DOTs, 100%)
- Stabilized construction entrances and exits (42 of 42 DOTs, 100%)
- Silt fence and barriers (42 of 42 DOTs, 100%)
- Sediment basins (42 of 42 DOTs, 100%)
- Temporary or permanent hydromulching/seeding (42 of 42 DOTs, 100%)
- Erosion control blankets such as channel or slope (41 of 42 DOTs, 98%)
- Drainage swales/ditches (41 of 42 DOTs, 98%)
- Limitations of disturbance, such as grading limits (41 of 42 DOTs, 98%)
- Riprap (41 of 42 DOTs, 98%)
- Inlet protection (41 of 42 DOTs, 98%)
- Diversion berms/dikes (40 of 42 DOTs, 95%)
- Construction dewatering (39 of 42 DOTs, 93%)
- Sediment traps (39 of 42 DOTs, 93%)
- Mulching such as grass, hay, wood chips, wood fibers, or straw (39 of 42 DOTs, 93%)

More than 80% of the responding 42 state DOTs have approved the following construction stormwater management control measures for use in highway construction projects:

- Dust control (38 of 42 DOTs, 90%)
- Turbidity barrier such as staked or floating (38 of 42 DOTs, 90%)
- Preservation of existing vegetation (38 of 42 DOTs, 90%)
- Temporary stream crossing (37 of 42 DOTs, 88%)
- Surface roughening, such as tracking, stair-step grading, and grooving (36 of 42 DOTs, 86%)
- Outlet protection (36 of 42 DOTs, 86%)
- Water quality structural controls such as detention ponds and vegetated filter strips (35 of 42 DOTs, 83%)
- Pipe slope drains (35 of 42 DOTs, 83%)

Five state DOT responses selected “Other” and provided additional information. One DOT mentioned using topography (landform), vegetative buffers, and temporary stabilization phasing (tracking, terracing, slope controls). The same DOT allows non-standard control measures if a project specialist or engineer approves. Another DOT has a stormwater design manual that includes standard permanent practices and an environmental handbook for construction operations that covers standard temporary control measures.

Figure 7 also shows that 20 of the 42 responding state DOTs (48%) have used flocculants for their construction stormwater management control measures. For the five DOTs that selected “Other,” one DOT had used flocculants in the form of synthetic polymers (e.g., polyacrylamide), and two DOTs had used flocculants in the form of inorganic polymers (e.g., polyaluminum chloride). Additionally, one DOT indicated that anionic polyacrylamide is allowed but has not yet been used. One DOT mentioned that it does not have restrictions on flocculants and that contractors determine the use of flocculants. The same DOT also pointed out using flocculants in some cases of sediment discharges.

Preparation and Management of Stormwater Pollution Prevention Plans

The survey respondents were asked to identify parties responsible for preparing and managing SWPPPs in highway construction projects and to select all parties that apply. Figure 8 summarizes the results of this question. The main parties responsible for preparing SWPPPs include

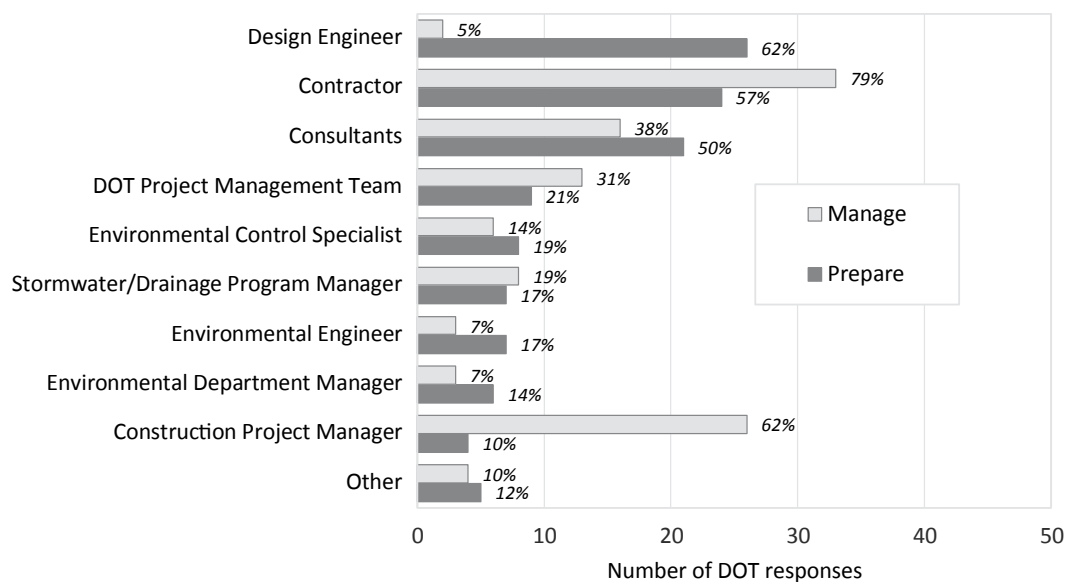


Figure 8. Preparation and management of SWPPPs (N = 42).

design engineers (26 of 42 responding state DOTs, 62%), contractors (24 of 42 DOTs, 57%), and consultants (21 of 42 DOTs, 50%). The main parties responsible for managing SWPPPs include contractors (33 of 42 DOTs, 79%), construction project managers (26 of 42 DOTs, 62%), and consultants (16 of 42 DOTs, 38%).

From the “Other” responses, two state DOTs mentioned that an agronomist is responsible for preparing SWPPPs for their highway construction projects. One DOT uses a District Environmental Planner to prepare SWPPPs. Another DOT indicated that an inspector is responsible for preparing and managing SWPPPs. One DOT stated that the contractor prepares SWPPPs for design-build projects but that the department approves and oversees the plan during construction. Another DOT uses a Resident Engineer to manage SWPPPs. One DOT responded that preparation and management of SWPPPs are incorporated into municipal separate storm sewer systems (MS4s) permit requirements for a design-bid-build project.

Figure 9 shows the timeline for state DOTs preparing a SWPPP for a highway construction project. Each responding DOT was allowed to select all that apply. Of 42 DOTs, 25 (60%) reported that they prepare SWPPPs during project design and engineering; 15 (36%) prepare SWPPPs

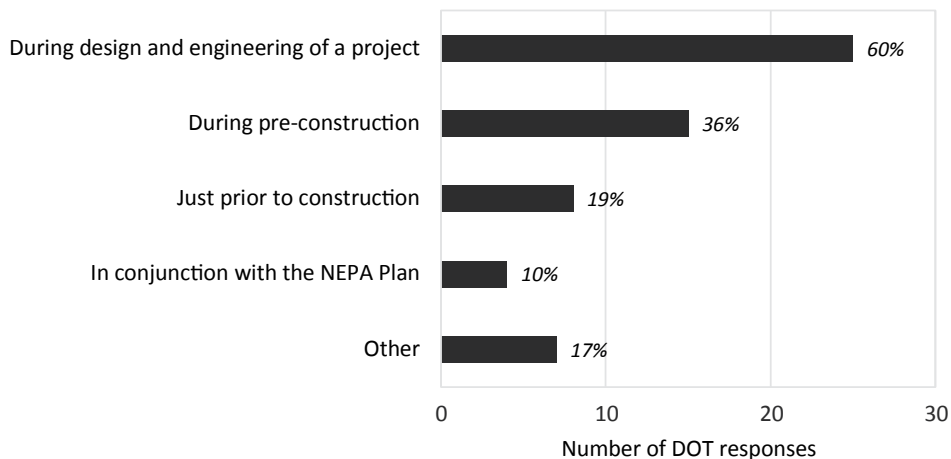


Figure 9. Timeline to prepare SWPPPs (N = 42).

during the pre-construction phase; and 8 (19%) prepare SWPPPs prior to the construction phase. Four responding DOTs (10%) prepare the SWPPP for a highway construction project in conjunction with the National Environmental Policy Act plan.

From the responding state DOTs that selected “Other,” one DOT mentioned that the contractor is required to complete the SWPPP following the permitting requirements before starting any earth-disturbing activities. Another DOT indicated that a contractor is responsible for preparing the SWPPP before getting a permit. One DOT reported that the design team completes SWPPP components as known and that contractors prepare an implementation plan for unknown items such as schedule-related items and dewatering activities. Another DOT prepares the SWPPP after the project is awarded. One DOT mentioned that “preparing the SWPPP varies based on contract types. It is a requirement from the Form 128 Clearance process in most cases. The design of the SWPPP is completed on projects before the advertisement on design-bid-build projects and modified by the contractor per specifications when the project is active.”

Responsibilities for Construction Stormwater Management

State DOTs rely on in-house staff, contractors, or consultants to design, monitor, and maintain construction stormwater systems. Figure 10 summarizes the responsibilities of state DOTs, contractors, and consultants associated with typical tasks in construction stormwater management. For each party listed (state DOT, consultant, contractor), responding state DOTs could select all that apply.

Figure 10 also shows that more than three-quarters of 41 state DOT responses (one responding DOT did not answer this question) indicated that contractors are responsible for the following tasks related to construction stormwater management:

- Installation (41 of 41 DOTs, 100%)
- Violation remediation (40 of 41 DOTs, 98%)

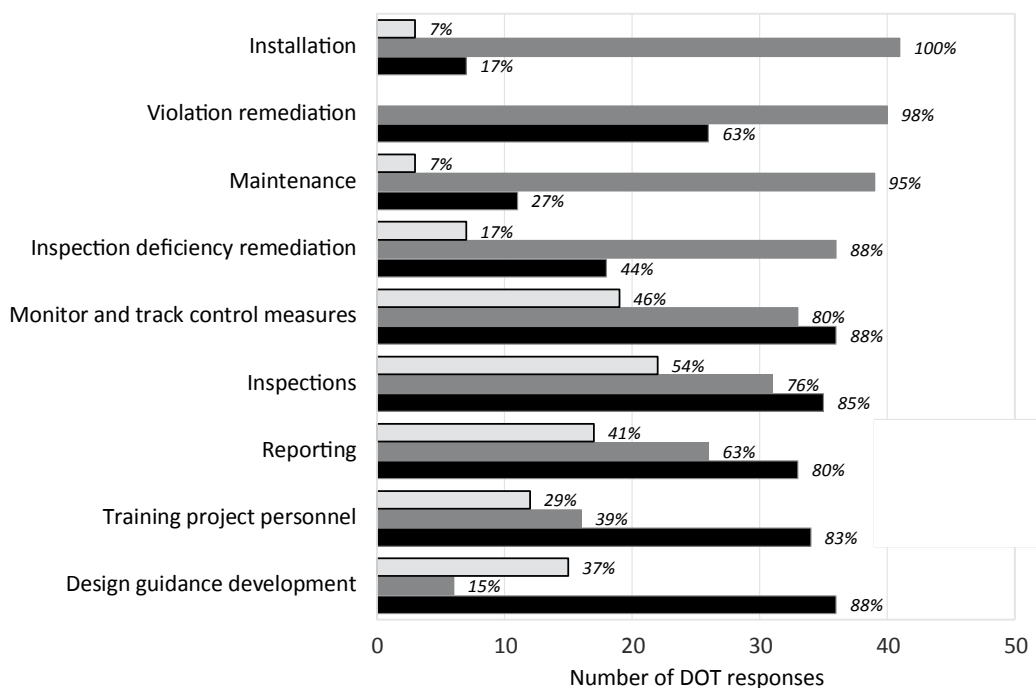


Figure 10. Responsibilities of construction stormwater management (N = 41).

- Maintenance (39 of 41 DOTs, 95%)
- Inspection deficiency remediation (36 of 41 DOTs, 88%)
- Monitoring and tracking control measures (33 of 41 DOTs, 80%)
- Inspections (31 of 41 DOTs, 76%)

More than half of 41 state DOTs responding to this question indicated they are responsible for the following tasks related to construction stormwater management:

- Design guidelines development (36 of 41 DOTs, 88%)
- Monitoring and tracking control measures (36 of 41 DOTs, 88%)
- Inspections (35 of 41 DOTs, 85%)
- Training project personnel (34 of 41 DOTs, 83%)
- Reporting (33 of 41 DOTs, 80%)
- Violation remediation (26 of 41 DOTs, 63%)

More than one-third of 41 state DOT responses indicated that consultants are responsible for the following tasks related to construction stormwater management:

- Inspections (22 of 41 DOTs, 54%)
- Monitoring and tracking control measures (19 of 41 DOTs, 46%)
- Reporting (17 of 41 DOTs, 41%)
- Design guidelines development (15 of 41 DOTs, 37%)

The survey respondents were asked about the percentage of construction stormwater management inspections conducted by consultants. Figure 11 summarizes the results of this question. Of 42 responding state DOTs, 15 (36%) indicated that consultants conduct less than 10% of their construction stormwater inspections; 6 (14%) have not used consultants to inspect their construction stormwater management; and 5 (12%) have used consultants for more than 50% of their construction stormwater management inspections.

Respondents were asked about the cost of installing and maintaining control measures; each respondent could select all parties that apply. Figure 12 shows that 27 of 41 responding state DOTs (66%) (one responding state DOT did not answer this question) indicated that they are responsible for the cost of installing stormwater control measures for highway construction

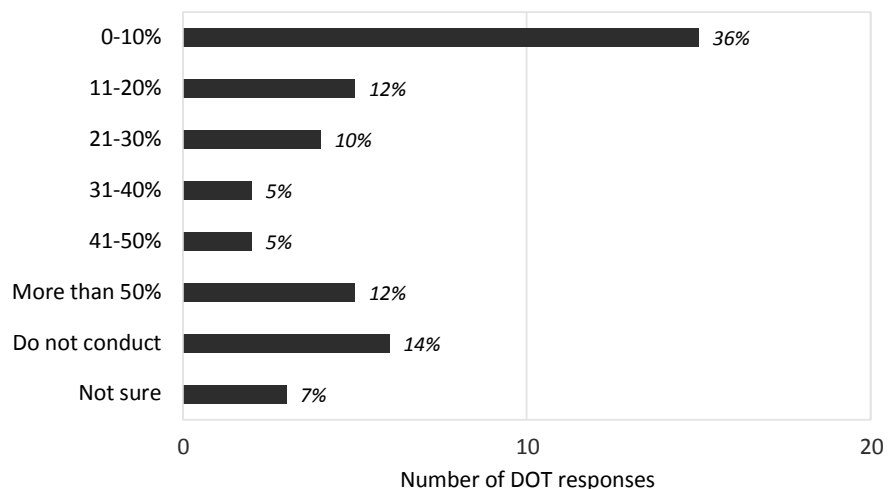


Figure 11. Percentage of construction stormwater management inspections conducted by consultants (N = 42).

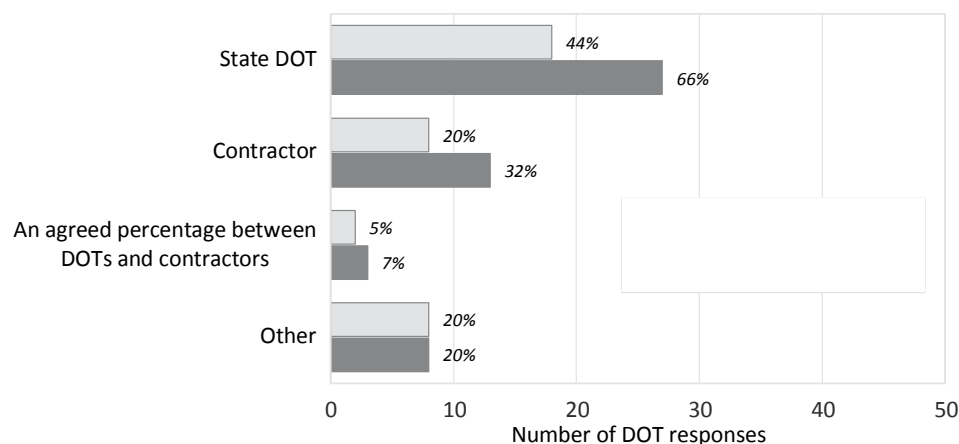


Figure 12. Cost of installing and maintaining construction stormwater control measures (N = 41).

projects. In contrast, 13 DOTs (32%) mentioned that contractors are responsible for the cost of installing stormwater control measures.

Figure 12 also shows that 18 of 41 responding state DOTs (44%) indicated that they are responsible for the cost of maintaining and replacing stormwater control measures. In comparison, 8 DOTs (20%) reported that contractors are responsible for the cost of maintaining and replacing stormwater control measures. Two DOTs (5%) have used a percentage agreed upon between DOTs and contractors for the cost of maintaining and replacing stormwater control measures. Three DOTs (7%) have used a percentage agreed upon between DOTs and contractors for the cost of installing stormwater control measures.

Of the responding state DOTs that selected “Other,” one DOT mentioned that the cost of installing and maintaining control measures varies by project and is included as separate bid price items, a change order, or a percentage of the total contract bid. Another DOT emphasized that “there is a bid item for temporary erosion control, and the costs are included in the bidding process. The contractor includes the costs in their bid. Additionally, erosion control is incorporated into the individual bid items.” One DOT mentioned that “during construction, the contractor is not reimbursed for short-term stabilization and repair (such as covering an excavation area with straw prior to rain or repairing an eroded temporary construction access road) but is paid for building the permanent practices and for most of the temporary practices such as silt fence, hydroseeding, mulch, topsoil, and turf establishment.”

Survey respondents were asked about estimating initial costs to install and maintain control measures for highway construction projects. Figure 13 summarizes the results of this question. Of 37 responding state DOTs (five responding DOTs did not answer this question), 22 (59%) have used a standard estimating approach to initial costs to install and maintain stormwater control measures; and 9 (24%) have used estimated ranges based on project size and complexity.

Additionally, for the state DOTs that responded with “Other,” one DOT uses established cost for individual items and includes a stormwater budget item for payment on the contract. Another DOT uses a combination of cost ranges based on size and complexity and risk management to estimate the costs of installing and maintaining stormwater control measures for a highway construction project. One DOT responded: “The DOT defines the initial cost of installing and maintaining stormwater control measures per project based on the quantities of the SWPPP plan sets. The plan sets are part of the contract documents, and bids are prepared according to the contract type.”

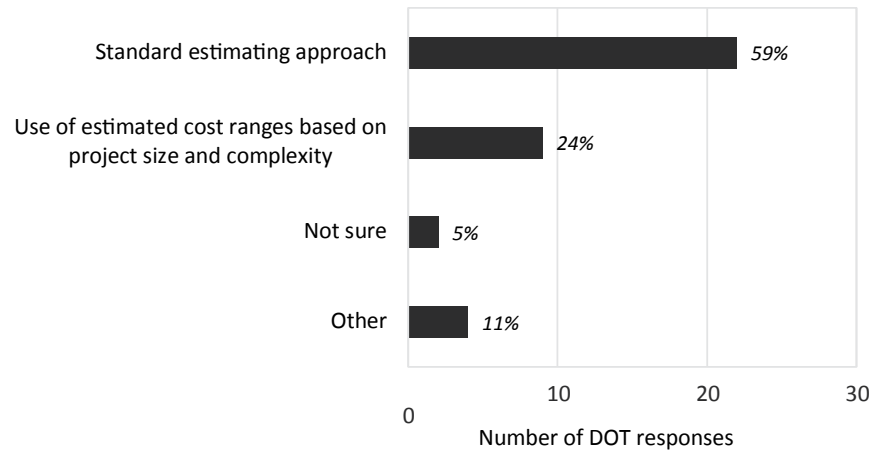
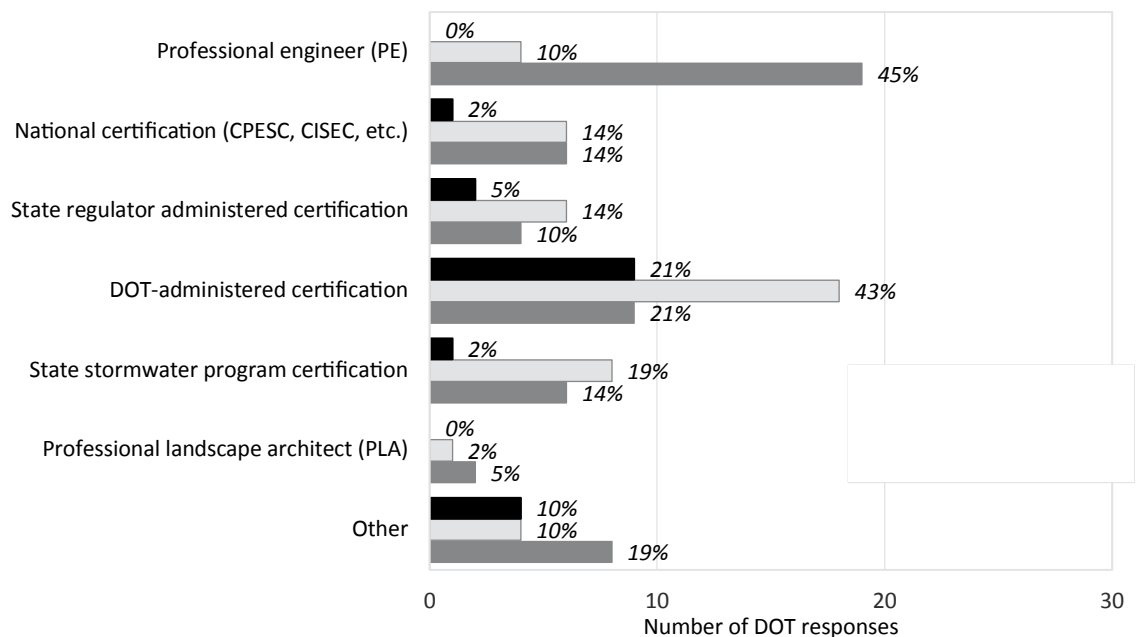


Figure 13. Cost-estimating approaches to stormwater control measures (N = 37).

Design Standards and Qualifications of Construction Stormwater Programs

Installing and maintaining construction stormwater systems require designers and inspectors to have specific qualifications to comply with permit requirements. Therefore, state DOTs were asked to select the qualification requirements for designers, inspectors, and installers; respondents were allowed to select all the qualifications that apply to each party. For designers, Figure 14 shows that 19 of 42 DOTs (45%) require designers to have a Professional Engineer (PE); 9 (21%) require designers to have DOT-administered certification; and 6 (14%) require designers to have national certifications such as Certified Professional in Erosion and Sediment Control (CPESC), Certified Inspector of Sediment and Erosion Control (CISEC), or State Stormwater Program Certification. Additionally, one DOT mentioned that licensed professionals



NOTE: For the PE category, 0% refers to installers. For the PLA category, 0% refers to installers.

Figure 14. Qualifications required by state NPDES (N = 42).

(e.g., PE, Professional Geologist, Registered Landscape Architect, Professional Land Surveyor) are required for permanent stormwater control measures design. One DOT indicated that qualification requirements for designers vary by project. Another DOT requires field project engineers to be certified through the DOT E&SC measures certification program.

In relation to inspectors, 18 of 42 responding state DOTs (43%) require them to have DOT-administered certification; 8 (19%) require inspectors to have State Stormwater Program Certification; and 6 (14%) require inspectors to have national certification (CPESC, CISEC) or state regulator administered certification.

Figure 14 also shows that 9 of 42 responding state DOTs (21%) require installers to have a DOT-administered certification. From the “Other” responses, one DOT indicated that “the SPDES General Permit requires the prime contractor and all subcontractors performing earthwork or soil-disturbing activities to identify at least one trained individual from each company who is responsible for implementing the SWPPP and who shall be on-site daily when the company is performing soil disturbance activities. These activities include clearing, grubbing, grading, filling, excavation, stockpiling, demolition.”

The survey respondents were asked to identify the basis for design guidelines for construction stormwater management; respondents selected all that apply. Figure 15 summarizes the results of this question. Of 42 responding state DOTs, 40 (95%) have relied on DOT guidelines for their construction stormwater management; 34 (81%) have relied on state regulator guidelines; and 21 (50%) have used federal guidelines or general construction practices. Less than a third of DOTs have used scientific research or rules of thumb and current practices to develop design standards for their construction stormwater management.

In addition, two responding state DOTs selected “Other” for this question. One DOT has used its Department of Environmental Conservation guidelines to develop design standards for construction stormwater management. Another DOT mentioned that its primary guidelines are based on state permit requirements and current practices.

The survey respondents were asked to identify the parties responsible for developing design standards for construction stormwater management. Responses included selecting all that apply for this question, as multiple parties are responsible for developing design standards at state DOTs. Figure 16 shows that, of 42 responding state DOTs, 37 (88%) indicated state DOTs; 22 (52%) indicated state environmental agency; 6 (14%) indicated FHWA; and 4 (10%) indicated AASHTO as the parties responsible for the development of design standards for construction stormwater management. Additionally, one DOT mentioned that it relied on the state’s Soil and

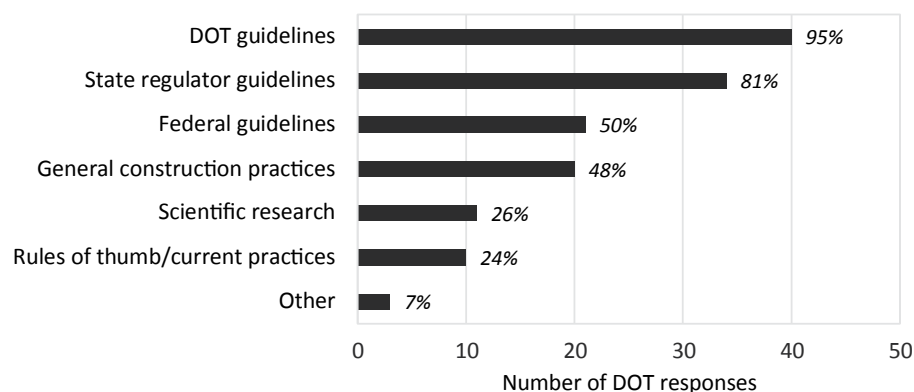


Figure 15. Design guidelines for construction stormwater management (N = 42).

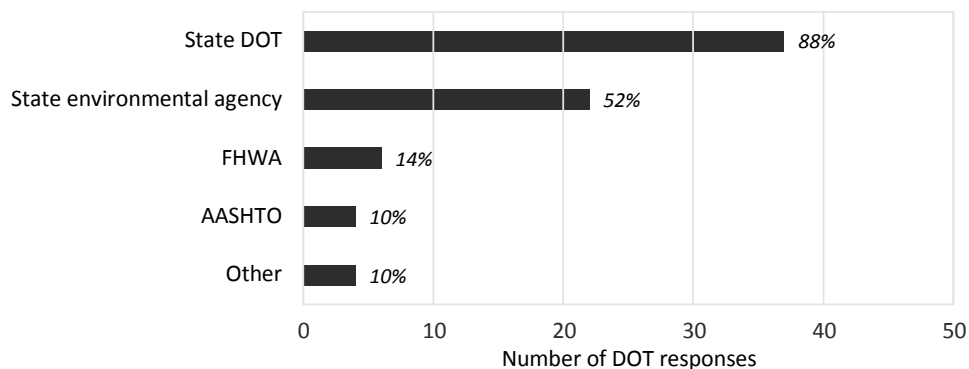


Figure 16. Parties responsible for the development of design standards for construction stormwater management (N = 42).

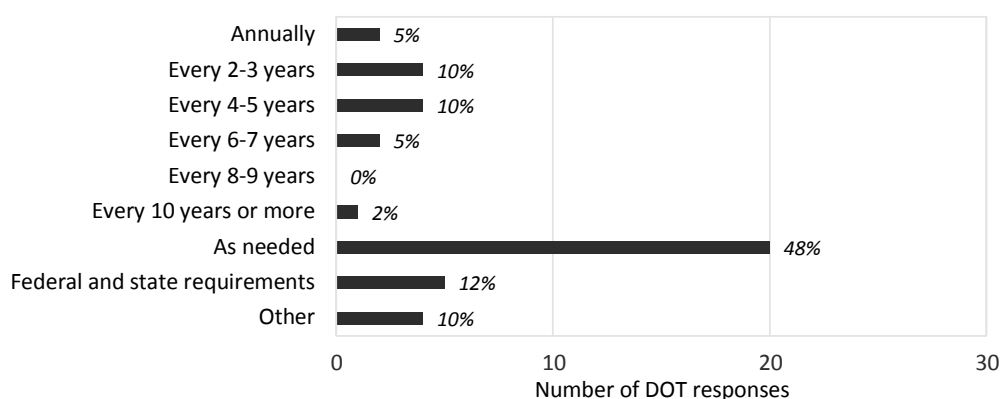


Figure 17. Timeline to update construction stormwater guidelines (N = 42).

Water Conservation Committee, and two DOTs indicated that the Environmental Protection Agency is the main party responsible for developing design standards for construction stormwater management.

The survey results also identify the frequency of updating state DOT guidelines for construction stormwater management. Figure 17 shows that, of 42 responding state DOTs, 20 (48%) have updated their guidelines as needed; 5 (12%) have updated their guidelines based on the federal and state requirements; and 4 (10%) have updated their construction stormwater management guidelines every 2–3 years or every 4–5 years. Additionally, one DOT mentioned that its major construction stormwater design manual has been updated every 5 years in line with nationwide permit updates.

Stormwater Management Tracking and Inspection

State DOTs were asked to provide methods used to track construction stormwater compliance. The responses from state DOTs included selecting all that apply, as DOTs use multiple methods. Figure 18 shows that the top five methods that state DOTs have used for tracking their construction stormwater management compliance are as follows:

- Site investigations (38 of 42 DOTs, 90%)
- Field logs and databases (33 of 42 DOTs, 79%)
- Photographs and videos (31 of 42 DOTs, 74%)

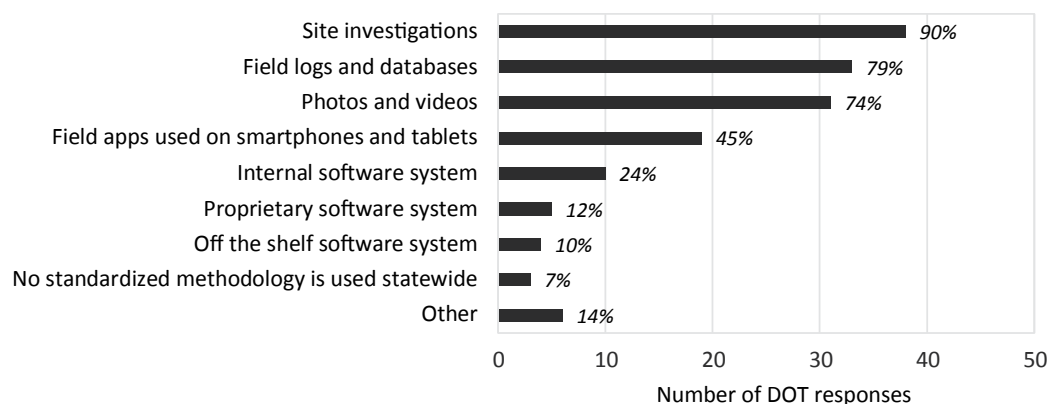


Figure 18. Methods for tracking construction stormwater compliance (N = 42).

- Field applications on smartphones and tablets (19 of 42 DOTs, 45%)
- Internal software system (10 of 42 DOTs, 24%)

Some responding state DOTs selected “Other.” One DOT uses standardized inspection forms to track its construction stormwater management compliance. In contrast, another DOT uses highly customized, off-the-shelf software for tracking construction stormwater compliance.

The survey respondents were asked to identify all methods used to monitor the performance of construction stormwater management requirements; respondents were allowed to choose all selections that apply, as some DOTs use more than one method. Figure 19 summarizes the results of this question. Of 42 responding state DOTs, 35 (83%) have an inspection of control measures in place; 33 (79%) have conducted regular site investigations; 20 (48%) constantly review control measures; and 16 (38%) have used their internal audits to monitor the performance of construction stormwater management requirements.

Additionally, from the “Other” selections, one responding state DOT uses a proprietary software program that contains quality controls such as picture documentation to monitor the performance of construction stormwater management requirements. Another DOT reported: “the DOT has contractors perform inspections per the general construction permit, and we do audits of the projects per our MS4 permit. Innovative contracts may have additional quality assurance/quality control requirements built into the contract.”

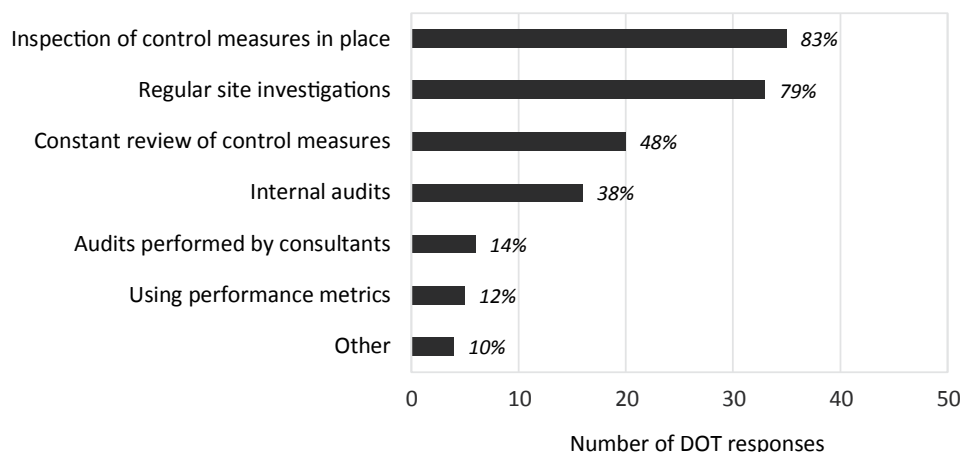


Figure 19. Monitoring performance of construction stormwater management (N = 42).

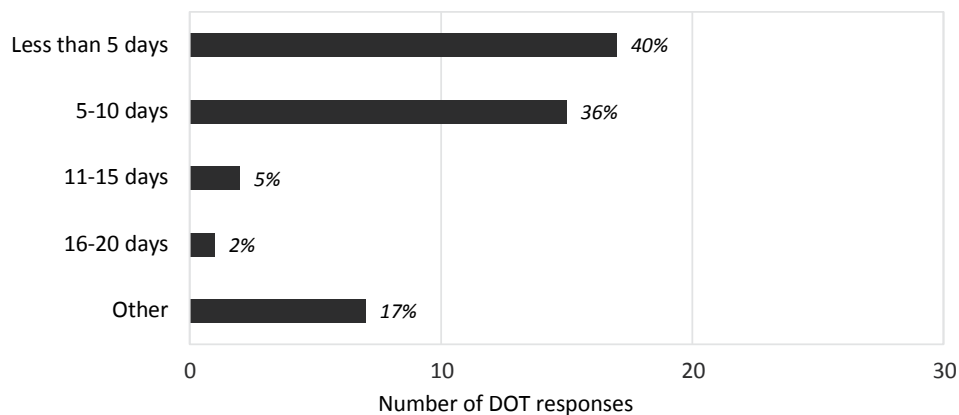


Figure 20. Time to correct an inspection deficiency (N = 42).

Figure 19 also shows that 5 of 42 responding state DOTs (12%) have used performance metrics to monitor their construction stormwater management requirements. The main performance metrics used by these four DOTs include the following:

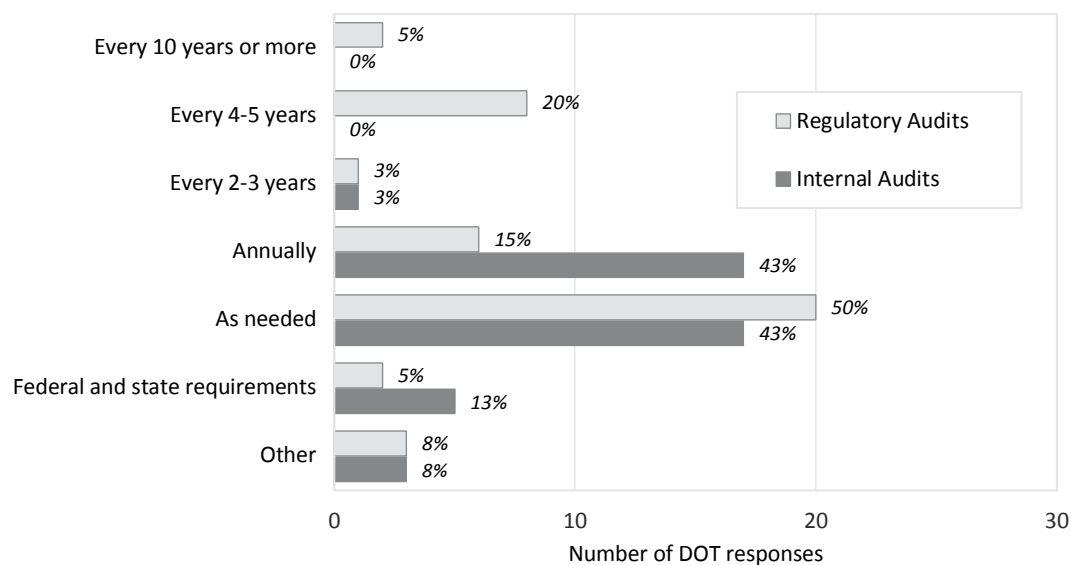
- Regular intervals for inspecting control measures and BMPs (4 of 4 DOTs, 100%)
- Number of control measures and BMPs in place (3 of 4 DOTs, 75%)
- Percentage of time the project is in non-compliance with stormwater permit requirements (3 of 4 DOTs, 75%)
- Amount of time used to remedy deficiencies (2 of 4 DOTs, 50%)

When an inspection deficiency of construction stormwater occurs, state DOTs often take less than 2 weeks to correct it, as the timeline for correcting deficiencies is typically a requirement included in contract documents. Figure 20 shows that, of 42 responding state DOTs, 17 (40%) take fewer than 5 days to correct deficiencies found in an inspection, while 15 (36%) take 5–10 days to correct an inspection deficiency of construction stormwater.

Furthermore, seven responding state DOTs selected “Other” for this question. One DOT mentioned that, if sediment from a deficiency has already entered receiving waters or the department’s right-of-way, the deficiency must be addressed within 24 hours. Another DOT reported that “deficiencies are listed as low-, medium-, or high-priority. Low-priority must be addressed within 7 calendar days, medium-priority within 3 days, and high-priority within 24 hours.”

Construction Stormwater Management Audits

Audits of construction stormwater management are detailed inspections by internal DOT personnel (internal audits) or third-party agencies or firms (regulatory audits) to help ensure that construction stormwater practices and associated BMPs and E&SC measures adhere to all permit requirements. In the survey, state DOTs were asked about the frequency of audits performed, and each response included selecting all that apply. As shown in Figure 21, of 40 responding state DOTs (two responding state DOTs did not answer this question), 17 (43%) indicated that internal audits have been conducted annually or as needed, and 5 (13%) have internal audits when revisions to federal and state permit and regulatory requirements occur. In relation to regulatory audits, 20 DOTs (50%) are subject to them as needed; 8 (20%) have been involved in audits of their construction stormwater management program every 4 to 5 years; and 6 (15%) are subject to regulatory audits annually.



NOTE: For the “Every 10 years or more” category, 0% refers to internal audits. For the “Every 4-5 years” category, 0% refers to internal audits.

Figure 21. Audits of construction stormwater management implementation (N = 40).

From the “Other” responses, one DOT mentioned that “the internal audit of contractors per project is every 30 days. Our regulating agency typically audits our projects at about 12 per year.” Two DOTs indicated that the regulatory agency determines the frequency of audits of construction stormwater management programs.

Finally, survey respondents were asked whether their DOTs had been fined for non-compliance with construction stormwater management requirements. Of 42 responding state DOTs, 22 (52%) indicated that they had been fined for non-compliance or stormwater discharge issues within the past 10 years.



CHAPTER 4

State DOT Case Examples

Introduction

Follow-up case example interviews and data collection were conducted after the survey to gather more details about state DOT construction stormwater program management. The case example selection was based on the following qualification questions:

- Did your agency complete the survey?
- Does your agency have a comprehensive construction stormwater management program for monitoring, tracking, recording, and compliance?
- Does your agency use a variety of best management practices (BMPs) and erosion and sediment control (E&SC) measures?
- Does your agency provide training for construction stormwater management?
- Is your agency willing to participate?

Six state DOTs met the qualifications and agreed to participate: Colorado in AASHTO Region 4, Florida in AASHTO Region 2, Iowa in AASHTO Region 3, New York State and Pennsylvania in AASHTO Region 1, and Texas in AASHTO Regions 3/4. Details of the individual case example interviews are outlined in the following sections. The interviews were conducted using a semi-structured approach; the questions used for the interviews are provided in Appendix C. Each state DOT was invited to discuss its experiences with construction stormwater program management and provide additional documentation, data, information, or website links. Each case example is summarized in the following sections: Approaches and Processes, Benefits and Challenges, Stormwater Pollution Prevention Plan (SWPPP), Best Management Practices, Training, Audits, and Experience and Findings.

Colorado Department of Transportation

Colorado DOT has a unique approach to construction stormwater program management. A statewide municipal separate storm sewer system (MS4) permit program is in place for highway construction projects, in addition to the construction general permit (CGP). Colorado DOT is required to comply with the MS4 permit, which authorizes discharges from the municipal storm sewer system within the permit area. The permit also requires Colorado DOT to implement and use control measures to prevent or reduce discharges to receiving waters by requiring Colorado DOT to comply with the following seven MS4 programs (with wet weather monitoring being an added MS4 program beyond the traditional six programs):

1. **Construction sites:** Colorado DOT is required to implement a program to reduce or prevent the discharge of pollutants to the MS4 from construction activities. Requirements include assuring adequate design, implementation, and maintenance of control measures at highway construction sites.

2. **Illicit discharge:** The Illicit Discharge Detection and Elimination program requires Colorado DOT to implement a program for detecting and removing illicit discharges and improperly disposed materials into the MS4.
3. **Industrial facilities:** Colorado DOT requires all facilities discharging stormwater to obtain specific authorization. This program highlights education to promote the minimization of pollutants from facilities contributing to the MS4.
4. **Public education and outreach:** Colorado DOT has implemented a public education program to promote behavior change and reduce pollutants in discharges from the MS4. Colorado DOT conducts a variety of outreach activities for employees and the public.
5. **Permanent water quality:** Each Colorado DOT region is responsible for evaluating new construction and redevelopment sites in the Colorado DOT MS4 permit area to determine whether stormwater controls are required. Controls are permanent water quality control (QC) measures.
6. **Pollution prevention and good housekeeping:** Colorado DOT prioritizes the minimization of pollutants in stormwater by developing runoff control plans for maintenance facilities, requiring the proper application of chemicals such as pesticides and fertilizers, and operating public roadways to promote safety and stormwater quality protection.
7. **Wet weather monitoring:** Colorado DOT assesses wet weather impacts from highways and the performance of control measures used to control stormwater discharges.

Of the seven MS4 programs, the Construction Sites MS4 Permit program focuses on construction stormwater management. The *MS4 Construction Program Manual* (Colorado DOT, 2023) assists Colorado DOT in consistently managing permit requirements. The Construction Sites MS4 Permit requires Colorado DOT to implement a program to reduce or prevent pollutant and sediment discharges to the MS4 for construction activities. This program helps to build consistency in the Colorado DOT stormwater management program. Temporary and permanent control measures are selected, designed, installed, implemented, and maintained to control all potential pollutant sources, especially sediment. In addition, Colorado DOT also requires a stormwater management plan, inspections of construction sites, associated control measures, and enforcement of permit requirements. To meet MS4 requirements for construction sites, Colorado DOT uses a variety of documents, forms, templates, guidelines, and training to ensure compliance during construction. Many of these documents can be found at <https://www.codot.gov/programs/environmental/water-quality/construction-sites-program>.

Approaches and Processes

Colorado DOT has a set of water quality specifications (i.e., Specification Sections 107.25, 208, 213, and 216) used for projects larger than 1 acre, which help Colorado DOT consistently perform construction stormwater management. These specifications are included in the contract documents. The contract spells out project-specific directions along with quantities of stormwater and E&SC measures so that contractors can accurately bid on the work. However, Colorado DOT personnel pointed out that the process for stormwater management differs depending on whether the project was design-bid-build, design-build, or construction manager/general contractor delivery. Colorado DOT has an oversight role within the MS4 program until Colorado DOT requires the contractor to obtain the CGP for all projects with land disturbances larger than 1 acre. The CGP for the state of Colorado is issued through the Colorado Discharge Permit System (CDPS) and is called the “Stormwater Construction Permit” (SCP). All projects with an SCP must follow water quality specifications. Subsequently, regional and headquarters staff perform MS4 and SCP inspections at the construction site. The statewide approach was implemented because the SCP requires Colorado DOT to be listed as the owner and the contractor to be listed as the operator (it is a dual permit). Colorado DOT ensures that work is performed according to the contract and conforms with the regulations and permits issued by the Colorado Department of Public Health and Environment (DPHE), the regulatory agency in Colorado.

The Colorado DPHE recently developed a new SCP, which requires Colorado DOT to make specification revisions for highway construction projects requiring the SCP. These revisions require resources and time. In addition, Colorado DOT has revised its regulatory authority to be practice-based so that the contractors are more proactive in complying with the SCP requirements. The regulatory mechanism approach has pushed the contractors who work with Colorado DOT to be more proactive in their construction stormwater management. Typically, and based on the contract, if contractors notice a deficiency, they must address those items to fully comply with the permits and the contract. Therefore, if deficiencies become a chronic problem and the contractor shows no motivation to comply, Colorado DOT has the resources and approach to assess liquidated damages to get the contractor and the control measures back in line.

Colorado DPHE implemented practice-based permitting to comply with federal and state stormwater and erosion control regulations and laws, which Colorado DOT is required to follow. As defined by Colorado DOT personnel, “practice-based” means that the documents do not define a rain or storm event to be controlled at a construction site. Therefore, Colorado DOT and the contractor are responsible to prevent or minimize pollutants or sediment from leaving the construction site. There are no numeric quantities to follow, and measurements of total dissolved solids and total suspended solids are not required. Rain gauges are not required. The approach ensures that no pollutants or sediments are discharged outside the limits of the construction permit area. Practice-based methods rely on observations, inspections, and proactive decisions to ensure sediments and pollutants do not leave the site.

The contractor conducts inspections of construction stormwater management practices and control measures. Inspections of a project’s SCP requirements occur every 7 days, with the option to conduct inspections more frequently based on the discretion of Colorado DOT personnel. Any findings or deficiencies noted in an SCP inspection are to be corrected within 2 calendar days; findings that note spills or discharges off the project site must be corrected upon observation. Subsequently, Colorado DOT personnel conduct MS4 monthly audit reports (MARs). For these audit inspections, a software program is used to document conditions and look for findings that are regular (minor issues found throughout the site), severe [discharge outside of the limits of construction (LOC)], chronic (several deficiencies at the same location), or chronic and severe (several instances of discharges outside of the LOC at the same location). Chronic conditions may result in liquidated damages assessed on the contractor by Colorado DOT for repeated findings at the same location that appear on two MARs conducted in the last 3 months. While MS4 deficiencies are deemed non-compliant, they also signal to Colorado DOT a breach of contract; that is, the contractor is not following the permit requirements defined in the contract, thereby leading to potentially assessing liquidated damages.

Liquidated damages can be assessed immediately after the seventh day for unaddressed deficiencies found in the MS4 audits and range from \$1,500 per finding for regular findings to \$5,000 per finding for chronic and severe findings. This condition is spelled out in Erosion Control Specification subsection 208.09: Regulatory Mechanism for Water Quality. Liquidated damages are assessed when the contractor is found in non-compliance with Specification 208, and the liquidated damages are deducted from payments owed to the contractor.

Based on Specification 208, liquidated damages can be applied for failure to comply with the specification and failure to perform the following:

- Implementing necessary actions required by the engineer
- Constructing or implementing erosion control or spill containment measures required by the contract or constructing or implementing them in accordance with the contractor’s project schedule
- Stabilizing disturbed areas as required

- Replacing or performing maintenance on an erosion control feature after notice from the engineer to replace or perform maintenance as required
- Removing and disposing of sediment from control measures as required
- Installing and properly utilizing a concrete washout structure for containing washout from concrete placement activities
- Performing permanent stabilization as required
- Preventing discharges not composed entirely of stormwater from leaving the construction site
- Surveying permanent water quality features when required on the project

Depending on the contract type, consultants are used as quality assurance (QA)/(QC) teams for innovative contracting projects such as design-build and construction manager/general contractor. The QA/QC teams perform inspections along with the project and MS4 inspections. Colorado DOT is also considering a program to qualify consultants as project compliance administrators so that, in addition to Colorado DOT personnel, consultants can oversee more aspects of construction stormwater management.

Benefits and Challenges

One of the benefits shared by Colorado DOT personnel is the use of specifications, which make contractors more proactive in their stormwater management and maintenance during construction. As long as the contractor is performing their job according to contract specifications, Colorado DOT lets them work without much interference. This approach has helped to improve relations between Colorado DOT and its contractors. Along with this benefit, the specifications also include processes for assessing liquidated damages to contractors when they are not working according to permit and contract requirements. The regulatory mechanism in Specification 208.09 stipulates liquidated damages that can be assessed, as well as stop work orders and the requirements that differentiate between assessing liquidated damages and stop work orders. The contractor is aware of this specification before the project starts. This approach allows Colorado DOT to assess liquidated damages when contractors are not working according to contract specifications.

The primary challenge mentioned by Colorado DOT personnel is determining quantities. During design, when control measures are over-quantified, design costs are inflated and potentially increase bids from contractors to account for the over-quantification. However, when control measures are under-quantified, change modification orders (CMOs) are issued to account for the additional work not originally included. Colorado DOT mentioned that CMOs that account for additional stormwater management work tend to be 20% to 40% more than if they were included in the original design.

Stormwater Pollution Prevention Plan

In lieu of a stormwater pollution prevention plan, Colorado DOT develops a stormwater management plan for each construction site that disturbs 1 acre or more of land, according to Construction Sites MS4 Permit program requirements and the state CDPS SCP. The objective of this plan is to prevent sediment from reaching outside the LOC as defined in the SCP permit. Various erosion control and pollution prevention requirements are addressed when developing the stormwater management plan as well as items to address public engagement and education initiatives, among others. Each project must have a site-specific plan and must consider all measures stated in the Colorado DOT Water Quality Specification 107.25 and the Erosion Control Specification 208. Colorado DOT uses a template to develop the project site-specific stormwater management plan, which can be found here: <https://www.codot.gov/programs/environmental/landscape-architecture/swmp/stormwater-management-plan-swmp>.

The stormwater management plan varies in length and complexity depending on project size, severity of site conditions, and proximity of the site to state waters and sensitive habitats. Typically, the plan encompasses measures for managing construction-induced runoff, erosion control, detection and elimination of illicit discharges, post-construction stormwater management (PCSM), and pollution prevention.

The stormwater management plan is required to contain information and control measures necessary for the following actions:

- Minimizing the amount of disturbed soil
- Controlling and minimizing erosion and sedimentation during and after the construction phase of a project
- Preventing runoff from off-site areas from flowing across the state
- Slowing runoff
- Reducing pollutants in stormwater runoff

Information needed for the stormwater management plan is listed in Table 4. In addition, the plan addresses the following factors when applicable to a highway construction project:

- Unstable stream reaches and flood mark
- Watershed areas
- Stream crossings
- Access routes for construction
- Access for maintenance of temporary and permanent erosion controls
- Borrow and waste disposal areas
- Critical natural and constructed slopes, soil types, eroding areas, rock outcroppings, and seep-age zones
- Requirements imposed by adjacent landowners and stewards
- Construction dewatering methods and locations
- Detours
- Concrete washout methods and locations
- Fuel storage areas
- Methods of limiting off-site soil tracking

All projects that include 1 acre or more of soil disturbances require a site-specific stormwater management plan. The Colorado DOT requires plan designers to obtain and maintain

Table 4. Information needed for Colorado DOT's SWMP (Colorado DOT, 2023).

Site Information	Key Design Elements
Location Map	Seeding plan, including seeding, mulching, and fertilizing applications and requirements
Discharge Locations	Requirements to protect existing vegetation
Soil Classification	Tabulation and location of erosion and sedimentation control items
Presence of Fisheries, Spawning Areas, and Wetlands	Force account erosion control plan to compensate for unforeseen conditions caused by erosion and sedimentation
Presence of Threatened and Endangered Species	Mapping existing wetlands and wetland mitigation sites
Area of Disturbance	Reference to standard and project specifications pertinent to the stormwater management plan
Stream Crossings	Reference to drainage features not included in the stormwater management plan
Unique Landscape and Cultural Values to Protect	Notes defining methods of implementation of BMPs and plan
Identification of Existing Vegetation	Notes defining methods of incremental stabilization
Compliance with the 107.25 Water Quality Specification	Inclusion of design details not included in the standard plans

certification from the Colorado DOT. The certification is available through a two-day training class provided by Colorado DOT. The stormwater management plan designer can be a Colorado DOT employee or a contractor. The design of the plan is completed before advertisement and bidding for design-bid-build projects. Form 128 includes requirements for when the stormwater management plan is prepared depending on the contract type used for a project. Form 128 documents all National Environmental Policy Act (NEPA) and stormwater management permits and requirements for a specific project.

The Colorado DOT Water Quality Construction Section at headquarters manages the stormwater management plan template for designers. The template notes all areas required by the SCP and the contract and where project-specific information is needed. Typically, before active construction, the awarded contractor receives the following two tabs of information from the stormwater management plan notebook:

- **Tab 1:** Stormwater Management Plan Narrative (derived from the Stormwater Management Plan Template and reviewed by Colorado DOT prior to signing Form 128).
- **Tab 2:** Stormwater Management Plan Maps based on the permit requirements and part of the contract documents.

After the stormwater management plan is prepared, the plan reviewer checks it to ensure all components are included and detailed. Stormwater management plan reviewers must be Colorado DOT personnel, must maintain certification, and cannot review their own work. After the review, the stormwater management plan is sent to the contractor to implement, manage, and maintain throughout construction. The plan defines the project limits, areas of disturbance, sequence of construction, control measures for stormwater pollution prevention, methods of materials handling and spill prevention, methods of waste disposal, and final stabilization methods. During construction, the stormwater management plan can be modified by the contractor according to specifications.

Best Management Practices

At Colorado DOT, construction BMPs are called “control measures” and can be temporary or permanent. Generally, the Colorado DOT water quality specifications state the control measures that can be used across the state for highway construction. Specifications 208 and 216 define the control measures that can be used, which include the following:

- Erosion bales
- Silt fence (used regularly)
- Temporary berms (used regularly)
- Temporary slope drains
- Silt berms
- Rock check dams
- Sediment traps
- Sediment logs (used regularly)
- Silt dikes
- Concrete washout structures (used regularly)
- Prefabricated concrete washout structures
- Vehicle tracking pads (used regularly)
- Aggregate bags (used regularly)
- Storm drain inlet protection (used regularly)
- Topographical controls
- Stabilization methods
- Spill response plans
- Washout areas

- Erosion control blankets
- Grading techniques

If a contractor wants to use practices outside the Colorado DOT specifications and standards, the contractor can submit a non-standard control measure form that describes the potential practice. The Colorado DOT engineer then reviews and either approves or rejects its use. While non-standard control measures may be approved, flocculants cannot be used, since Colorado does not allow their use for water quality processes.

Beginning in 2009, Colorado DOT management and the state environmental department encouraged increased use of permanent BMPs. Currently, Colorado DOT retrofits these permanent stormwater management structures, which have been through a cycle of use and must be enlarged, smoothed, or expanded for use as temporary BMPs for new construction. Colorado DOT is developing processes for their design engineers to use permanent structures as temporary practices for new highway construction.

Training

Colorado DOT requires that the contractor employ a trained and certified Stormwater Management Plan Administrator. This administrator must possess working knowledge of and experience in construction stormwater management and hold a current Transportation Erosion Control Supervisor (TECS) certificate issued by Colorado DOT and obtained through a two-day training course at Colorado DOT's water quality training center.

The first training day focuses on stormwater management plan administration and includes topics such as updating the stormwater management plan and reporting requirements. The second day of training explains stormwater management concepts and familiarizes the trainees with watersheds; drainage basins; soil types; control measures; installation, maintenance, and inspection requirements; channelized flows and sheet flows; evaluation and site management; and other items related to construction stormwater management. The trainees observe different scenarios and simulators to demonstrate how, for example, if a secondary drainage pipe is added, the drainage basin is doubled, which is accounted for in the design. The afternoon session of day 2 is conducted in the field at a training facility to demonstrate sheet, blow, and channelized flow; stockpile capacity; sensitive areas; concrete washouts; and proper BMP installation and inspection. Course completion certifies the trainee for 3 years, and a refresher class is required every 3 years after initial certification.

Additionally, Colorado DOT requires stormwater management plan designers and reviewers to be certified. They can become certified by completing training at a water quality training center. A two-day virtual class provides a basic understanding of construction stormwater management and E&SC principles for the design and review of stormwater management plans. This certification is required for Colorado DOT environmental staff who review stormwater management plans and all Colorado DOT and consultant staff who design stormwater management plans.

Colorado DOT also has a new hire training for Region Water Pollution Control Managers (RWPCMs). RWPCMs, who are Colorado DOT employees, are responsible for conducting the MARs at highway construction sites that have an SCP. As indicated by Colorado DOT personnel, the RWPCMs are key to auditing for MS4 compliance and assisting project staff with all other compliance measures. This training is an intensive two-year program that includes the following three tracks:

- **First track:** Field cross-training across all construction stormwater management permits and Colorado DOT regions.
- **Second track:** Learning about the MS4 program and additional responsibilities.
- **Third track:** Review of *MS4 Construction Program Manual*.

Audits

Colorado DOT has four audit tiers, as described in the *MS4 Construction Program Manual*. The following describes each tier:

- **Tier I:** The contractor follows the contract and performs Form 1176 SCP permit inspections as stated. Form 1176 is included in Appendix F.
- **Tier II:** MS4 permit inspections are MARs that RWPCMs perform over the shoulder of the contractor to verify and ensure compliance with permit requirements.
- **Tier III:** The Water Quality section from Colorado DOT headquarters performs audits of each region by overseeing and monitoring the work to ensure it is consistent and meets all permit requirements.
- **Tier IV:** Regulatory or internal audits performed by the Colorado DOT auditing department or a third-party contractor occur every 5 years.

While the Colorado DPHE conducts frequent audits of projects with an SCP Regulatory MS4, audits occur infrequently at Colorado DOT. However, a regulatory audit conducted by the Environmental Protection Agency (EPA) in 2015 found that Colorado DOT MS4 programs were not uniform and inconsistently implemented across the state. The MS4 Construction Program was emphasized, leading to the development of the *MS4 Construction Program Manual*. Colorado DOT made processes and approaches more uniform across all six DOT regions. When regulatory audits occur, they invoke changes to the stormwater management program.

Experiences and Findings

Sharing the experiences of Colorado DOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements.

The findings from Colorado DOT include the following:

- **Proactive specifications for stormwater management:** Colorado DOT's Specifications 107.25, 208, 213, and 216 provide that, if contractors perform work according to the contract, they are in compliance with the contract. Compliance typically refers to minimum findings occurring during the MARs, thereby allowing better use of time to find solutions to issues. When the contractor stays on top of construction stormwater management and maintenance, Colorado DOT normally does not need to intervene or provide much information because the contractor is managing proactively in the field.
- **Liquidated damages:** Colorado DOT has set up a regulatory mechanism in their specifications that allows them to assess liquidated damages for non-compliance. Liquidated damages are assessed so that Colorado DOT can add more resources to help manage compliance. Liquidated damages are assessed per finding and based on failing to address a finding within 7 days. The amount of liquidated damages increases depending on the severity and frequency of the deficiency.
- **Training program:** Colorado DOT has established training and certification programs for construction stormwater management. A two-day TECS class certifies the contractor's stormwater management plan administrator. Stormwater management plan designers and reviewers are also required to attend training and obtain certification to design and review the project site-specific plan. Finally, RWPCM new hire training for Colorado DOT MS4 auditors is an intensive two-year program that helps ensure uniformity and consistency of the statewide MS4 program.

Florida Department of Transportation

Florida adopted a statewide stormwater rule in 1982, making it the first state in the United States to require stormwater treatment for all new developments, including highways. The stormwater rule is technology-based and was captured from the National Pollutant Discharge Elimination System (NPDES). The rule is based on performance standards (e.g., environmental goals), and BMPs designed and presumed to meet the goals are implemented on construction projects. The Water Resources Implementation Rule for the state of Florida sets performance standards.

Performance standards for erosion and sediment control (E&SC) measures retain sediment on-site, with a backstop so that no discharge violates the state of Florida's water quality standards, including those for turbidity. Therefore, the objectives of the state's stormwater regulatory program and the Florida Department of Environmental Protection (DEP) are to protect water quality and to minimize erosion and sedimentation by requiring the use of effective BMPs during and after grading or removal of vegetation.

As mandated by the Clean Water Act (CWA), permits must be obtained for stormwater discharges from construction sites that meet or exceed the EPA's criteria. The EPA administers CWA requirements by requiring Florida DOT to follow the NPDES CGP process. The Florida DEP implements the NPDES program and issues the NPDES CGP as the state regulatory authority. Florida DOT works with the Florida DEP and their contractors to obtain the necessary permits.

Various rules and regulations are in place for managing stormwater and associated permit requirements. Therefore, the *Erosion and Sediment Control Designer and Reviewer Manual* (referred to in this synthesis as "the Manual") was created in 2007 for Florida DOT and Florida DEP. The Manual was updated in 2013 and contains the fundamental guidelines for preparing, implementing, and maintaining stormwater management during highway construction. The purpose of the Manual is to assist designers and reviewers by providing practical E&SC options as part of the SWPPP for the contractor to implement during construction. The overall purpose of the Manual is to build a level of consistency in technical expertise and professional conduct to ensure the desired benefits of the construction stormwater management program are achieved.

Beyond the Manual and guides available, each of the districts within Florida DOT has its own processes for monitoring and tracking construction stormwater management. Furthermore, it is important to note that the Manual provides guidelines only and does not dictate specific means and methods to the contractor, except for specifications and standards (e.g., a contractor is not allowed to clear more than 750,000 square feet for a project without engineering approval).

Approaches and Processes

Construction stormwater management at Florida DOT is part of project management, but the program includes personnel from various offices within the DOT, including construction and environmental. However, Florida DOT is undergoing a substantial change in its construction stormwater management program. Florida DOT is decentralized: districts handle day-to-day activities while headquarters provides support, policies, and oversight for stormwater management. The Florida DEP oversees the stormwater permitting process, and regional water management districts (WMDs) are delegated by the DEP across the state. The WMDs require environmental resource permitting (ERP) when installing additional impervious areas such as pavements or structures or impacting surrounding environments such as wetlands. Florida DOT has an Office of Environmental Management for proposed projects. The Florida DOT Roadway Design Office obtains the ERP with assistance from their consultant design engineers along with information received from the Office of Environmental Management. After the ERP is obtained

during design, Florida DOT includes this information in the contract documents and sends it to contractors so that they comply with the permit criteria and requirements during construction.

In Florida, along with the ERP, the contractor is required to obtain the NPDES CGP before construction begins. While the ERP and the NPDES CGP are similar, both must be obtained. For example, the ERP and the NPDES CGP have a section describing what the project team must do during construction. The project designers from Florida DOT complete this section during the ERP process, and contractors complete their portion of this section during the NPDES CGP process. Florida DOT is implementing changes in its stormwater management program to separate the responsibilities of managing stormwater from design through final construction. Clearly stating roles and responsibilities helps improve consistency in the Florida DOT construction stormwater management program.

Inspections of installed BMPs and control measures on construction projects occur every 7 days according to the NPDES CGP or within 24 hours of a storm event. The rule for conducting inspections after a storm event has been to inspect within 24 hours of one-half inch or more of rainfall, but this may be changing along with other modifications proposed by the Florida DEP and the NPDES CGP. The project team relies on third-party consultants for each district to ensure that the contractor monitors, manages, and maintains BMPs and control measures. Florida DOT personnel conduct regular audit inspections or checks when needed, such as after a major storm event.

Florida DOT follows the ERP and the NPDES CGP during construction to ensure compliance. Therefore, when a deficiency is discovered or sediment is found to be running off the site, third-party consultants step in to notify contractors of a failure and instruct them to fix the deficiency as soon as possible and address any issues occurring outside project limits, such as shoveling dirt or disposing of trash. When the contractor neglects stormwater management and maintenance, Florida DOT third-party consultants discuss the situation with the contractor. They may issue verbal warnings, written warnings, or deficiency letters for environmental deficiencies needing to be addressed. Florida uses a contractor past performance rating, part of which is environmental compliance. If a deficiency escalates, a past performance rating is negatively affected, making it more difficult for a contractor to gain future work with Florida DOT.

Consistency is built into the construction stormwater management program at Florida DOT. Guidelines provided by headquarters are consistently provided to all DOT districts. Management and enforcement fall on third-party consultants, while internal audits of the districts and the third-party consultants are the central office's responsibility to ensure that stakeholders comply. This approach has helped Florida DOT build consistency into the program. However, with the newly revised construction stormwater management process implemented, Florida DOT personnel acknowledged that it might take time for stakeholders to get up to speed on the new practices.

Benefits and Challenges

When the project team, DOT staff, consultants, and contractors follow requirements and guidelines, Florida DOT realizes compliance, evident by cleaner waters near and around construction sites. Federal and state laws and regulations keep water clean by not allowing pollutants or sediment to leave a site and impact property or other receiving waters. Florida DOT's goal is to minimize impact and negative public relations, since they receive complaints from the public and state legislators. Negative impacts on water bodies also affect tourism and recreation, which Florida is known for due to its tropical climate and numerous beaches. Florida DOT understands that following permit requirements and complying with all laws and regulations is an important component of roadway construction. Since Florida implemented stormwater management in 1982, the state has had cleaner waters that are not as severely impacted.

One of Florida DOT's main challenges is related to environmental and weather conditions. During some months of the year, Florida receives rain every day. Consistent rainfall creates issues at highway construction sites, since the contractor is motivated to complete the project but also must adhere to stormwater and permit requirements for the site. When weather continuously impacts a construction site as work progresses, complying with stormwater permit requirements becomes more difficult.

Another challenge is finding space to construct BMPs. For example, since right-of-way (ROW) can be expensive, Florida DOT uses as much of the existing ROW as possible to avoid unnecessary ROW purchases. However, this situation can make placing effective BMPs difficult when there is little room to install and use them. Florida has many wetlands, rivers, lakes, and streams. Some of these receiving waters are designated as outstanding Florida water bodies, with their own special and more stringent criteria above and beyond NPDES CGP requirements. These criteria pose challenges to obtaining permits and managing stormwater and E&SC during construction near these water bodies.

Stormwater Pollution Prevention Plan

The previous process at Florida DOT was to provide a signed and sealed SWPPP and an E&SC plan to the contractor to implement and follow during construction. The SWPPP was a narrative of information about permanent and temporary practices, while the E&SC included plan drawings of the BMPs and locations. Because Florida DOT created the SWPPP and E&SC plan, any mistakes or errors would be the DOT's responsibility, not the contractor's. Moving forward, contractors will be required to be more involved in developing the SWPPP and E&SC plans. With the revised process, Florida DOT provides only specific project site information to the contractor to develop the SWPPP and E&SC plan.

The contractor is required to finalize the SWPPP using templates provided by Florida DOT. (See Appendix G for Form 251-B NPDES CGP SWPPP Template for Florida DOT Projects). The design team completes the design portions of the templates, which are sent to the contractor to complete the contractor's section. The completed SWPPP template becomes the project-specific SWPPP, which can be used to obtain the NPDES CGP permit. Florida DOT is making this change because the contractor is responsible for installing and maintaining BMPs and control measures. Obtaining their input and finalizing plans are crucial to the success of the stormwater management plan for a highway construction project. In addition, Florida DOT uses performance-based stormwater management in which the contractor is held accountable for their responsibilities and actions.

With the change to the administration portion of the SWPPP and E&SC plan development, Florida DOT is no longer signing and sealing SWPPP and E&SC documents, which are temporary and living and typically change during construction, since highway construction project sites are dynamic. If the documents are signed and sealed, it is more difficult to adjust the plans. In fact, Florida DOT personnel stated that engineers are happy that they no longer must sign and seal the SWPPP and the E&SC plan. The new SWPPP process allows personnel to adjust the plans more easily as construction proceeds. Florida DOT provides the estimated quantities of BMPs to install and maintain on any highway construction project so that all contractors bid on the same items for stormwater management during procurement.

Best Management Practices

The Manual includes a variety of erosion control methods, sediment containment systems, and temporary construction site BMPs. The BMPs in the Manual include a description of BMPs that are categorized and provide instructions for installation and maintenance. While the

Manual includes dozens of BMPs and control measures, Florida DOT personnel indicated that most BMPs used for highway construction are silt fences, staked turbidity barriers, and floating turbidity barriers. Figure 22 shows a drawing of a staked turbidity barrier installation from the Manual. Florida DOT also indicated that silt fence is the most used BMP, but it requires constant maintenance and is a deficiency for the contractor to address on almost every highway construction project. Additional information is available for installers and inspectors of BMPs from the *Florida Stormwater Erosion and Sedimentation Control Manual*, Tiers I and II (<https://www.fsesci.com/downloads/>), developed by Florida DEP in 2018. Tier I is for installers, and Tier II is for inspectors.

Flocculants can be used as BMPs for E&SC when other practices do not meet permit requirements. Flocculant use commonly occurs when water becomes turbid around the construction site and standard practices cannot lower the turbidity levels to meet state water quality criteria. The Manual outlines using polymers and alum as flocculants to improve turbidity. The Manual describes the use, monitoring, and maintenance of flocculants. For example, if a polymer is used, it can change the water's pH level; therefore, pH has to be monitored and controlled. Florida DOT is not allowed to use ionic flocculants, which have been found to kill fish and cause habitat damage.

Training

Any employee involved with installing, maintaining, and inspecting BMPs for Florida DOT highway projects undergoes certification training. The Florida DEP provides the Florida Stormwater, Erosion, and Sedimentation Control Inspector (FSESCI) program to train and certify inspectors for stormwater inspections on construction sites. This training program educates inspectors and installers on proper BMP selection, installation, layering, maintenance, and restoration. Also, the program teaches individuals to correctly inspect BMPs for use during and after construction in order to minimize or eliminate on-site and off-site impacts from uncontrolled erosion, sedimentation, and other pollutant discharges. The program is a two-day class that follows the *Florida Stormwater, Erosion, and Sedimentation Control Inspector's Manual*. After completing the class, trainees take a one-hour proctored exam requiring a 70% or higher to pass and receive the FSESCI Qualified Inspector Certificate.

Some Florida DOT districts have certified third-party consultants who offer free training to DOT staff and contractors. Whether a person is trained and certified by the FSESCI program or by third-party consultants, after they have been trained and certified, they are not required to become re-certified or repeat any training on construction stormwater management.

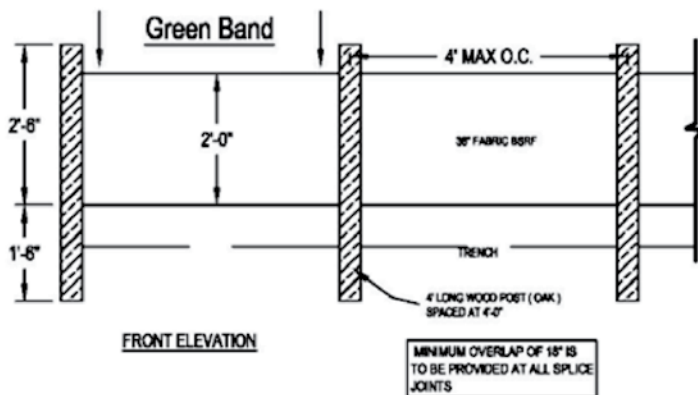
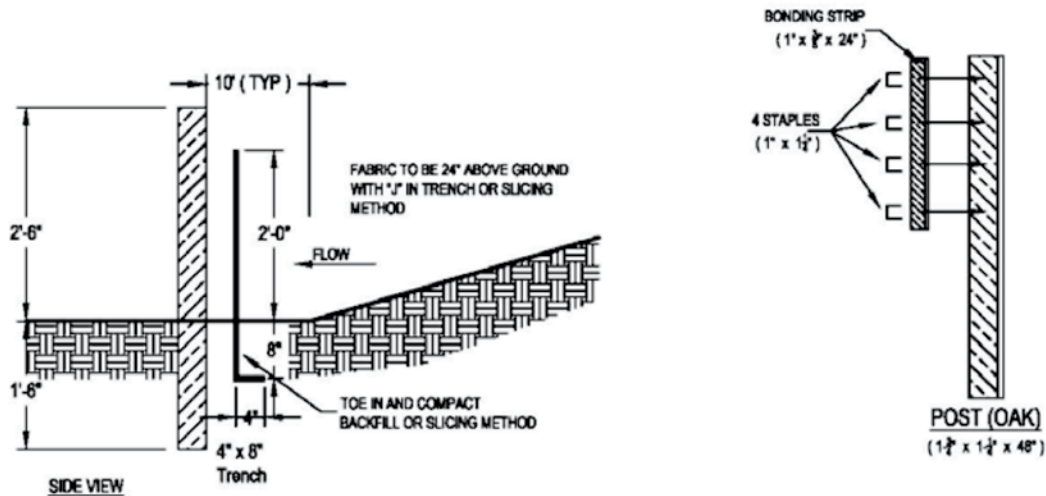
Audits

The districts and the Construction Office from the central office headquarters conduct internal audits. Internal audits occur quarterly, with the central office auditing one district every three months. There are seven districts along with the Florida Turnpike Enterprise; each district is subjected to an internal audit every two years. Internal audits involve visiting a random selection of projects within a district and reviewing environmental and permit requirements, conditions of BMPs and control measures, documentation review, and field reviews to observe the field level for each project. Regulatory audits occur infrequently at Florida DOT. MS4 audits tend to be more focused but are not conducted often; therefore, Florida DOT does not spend much time preparing for them other than using internal audits to check and improve processes.

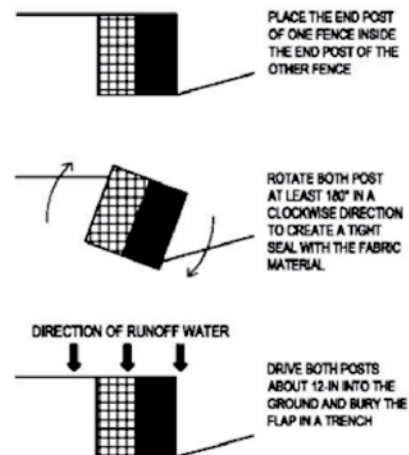
Experiences and Findings

Sharing the experiences of Florida DOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and

Approved Alternate
FDOT - Staked Turbidity Barrier
State of Florida Erosion & Sediment Control Designer & Reviewer Manual
Belted Silt Retention Fence (Priority 1)



REPAIR DETAIL
ATTACHING TWO SILT FENCES
WHEN TRENCHING IS USED



BELTED SILT RETENTION FENCE (BSRF)
Priority 1 - Green Band

STAKED TURBIDITY BARRIER INSTALLATION

Illustration of a Staked Turbidity Barrier

Figure 22. Staked turbidity barrier installation at Florida DOT.

associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements. The findings from Florida DOT include the following:

- **Move from a prescriptive-based to performance-based approach:** With a prescriptive approach, Florida DOT obtains permits, prepares the SWPPP and the E&SC plan, and provides them to the contractor to follow. This approach created accountability challenges: determining responsibilities for errors, poorly chosen BMPs, and improper installation and maintenance. In contrast, Florida DOT's performance-based approach provides a template for the SWPPP and E&SC plan. The design team and contractors provide input to complete their portions. The contractor can then use the completed templates to obtain the NPDES CGP. The contractor is now more involved in developing the SWPPP, which clarifies responsibility for the administrative and practical application of stormwater controls.
- **Set performance standards:** As Florida DOT implements this performance-based approach, they set standards and performance measures in place of telling the contractors how to work. Designers in the past would provide the exact information for the contractors to follow; if that did not work, determining who was responsible for failure was difficult. Contractors are the construction experts; allowing them to use their expertise to manage construction stormwater makes sense.

Iowa Department of Transportation

Iowa DOT uses a construction stormwater program as a part of project management for highway projects. The Central Construction Office at the main headquarters for Iowa DOT is the primary resource and support center for construction. The regional construction field offices manage the contract administration of highway construction projects. The construction stormwater program is centralized in the Central Construction Office, which manages permits for highway construction projects. Each of the 13 Resident Engineer Offices across the six districts of Iowa DOT administers the construction stormwater management program and compliance during construction. The resident construction engineer manages the permit requirements with assistance from project inspectors who perform the inspections and audits of the practices and control measures used during construction to determine compliance with permit requirements. The Central Construction Office manages post-construction closeout of the stormwater and E&SC permits. It is important to note that Iowa DOT does not operate under an MS4 permit, and post-construction components of MS4 are not required.

To assist with construction stormwater management, Iowa DOT developed an *Erosion and Sediment Control Field Guide*, which includes information about permit requirements and regulatory agencies, training and certification, BMPs, SWPPP, frequently asked questions, and additional resources. The current version of the guide includes photographs and figures for visually outlining E&SC. Iowa DOT also has a *Design Guide*, with Chapter 10 outlining design aspects of sediment and erosion control BMPs, and a *Construction Manual*, with Chapter 7 discussing erosion control measures for use during construction. In addition, the Iowa Department of Natural Resources (DNR) provides a guide to *Developing Stormwater Pollution Prevention and Best Management Practices*. This guide provides a step-by-step approach to developing an effective, site-specific SWPPP for any project requiring the NPDES General Permit No. 2 (Stormwater Discharge Associated with Construction Activities), representing the CGP for Iowa DOT.

Approaches and Processes

The Iowa DNR, the state regulatory authority, has the authority from the EPA to issue NPDES general stormwater permits across the state. The Iowa DNR is the facilitator of General Permit

No. 2. Any construction project that disturbs more than 1 acre of land is required to obtain coverage under General Permit No. 2 before construction begins. During construction, Iowa DOT administers the permit, and the contractor must comply with permit requirements. The Iowa DNR has an online portal and uses an online application process to obtain coverage under General Permit No. 2. The permit is not applicable until a completed notice of intent (NOI) is submitted to the Iowa DNR and authorization is issued to Iowa DOT.

In 2018, Iowa DOT received Order for Compliance on Consent from the EPA. This order resulted from multiple inspections and audits of various Iowa DOT highway construction projects over several years. The outcome of the order was a penalty assessed to Iowa DOT, which therefore had to implement changes to its construction stormwater management program. The primary changes included establishing training and certification program requirements for construction staff, as well as E&SC specification changes and implementation of QA oversight inspections during construction in addition to weekly stormwater and E&SC inspections conducted on all highway construction projects. Overall, the order was perceived to have a positive impact, as it demonstrated to DOT management and contractors the importance of following environmental permit requirements.

Iowa DOT tracks permit authorizations through the Central Construction Office. General Permit No. 2 coverage is required on every highway construction project site that disturbs 1 acre or more of land; therefore, permit authorizations from Iowa DNR must be tracked. The information tracked includes start date, end date, and projects each permit covers. Knowing information such as expiration date allows Iowa DOT to renew the permit promptly so that it does not expire while a project is active. A simple spreadsheet is used to track permit authorizations. In addition, ensuring compliance during construction starts with confirming that every highway construction project has coverage complying with environmental and permit requirements. The Central Construction Office reviews project SWPPPs monthly to ensure proper coverage and to submit for permit authorizations when needed so that construction can begin.

At Iowa DOT, all stormwater permit documentation, such as inspection reports, permit authorizations, non-compliance notifications, the SWPPP, and other important forms and documents, is digitally stored for its highway construction projects. Iowa DOT uses Doc Express for stormwater management documentation.

Iowa DOT conducts weekly inspections of construction stormwater management and E&SC measures. Form 830214, shown in Figure 23, is used for weekly inspections, documentation of comments and observations, deficiencies, additions needed, and times when specific corrective actions were performed. The SWPPP, part of the contract documents, spells out inspection requirements, corrections for deficiencies, and timeframes for addressing deficiencies. If deficiencies are not resolved according to requirements, the resident construction engineer staff may issue non-compliance, which can lead to enforcement actions. A non-compliance form is used to document non-compliance of any nature and to communicate information to the contractor. The non-compliance notice form used by Iowa DOT is shown in Figure 24.

Any deficiency must be initially addressed within 72 hours of the inspection. The contractor has 7 calendar days to finalize the corrective action and comply with permit requirements. Iowa DOT uses its standard specification, which includes an item for the Mobilization for Erosion Control. The specification sets a specific unit price per day if corrective actions are not mobilized within 72 hours of notification of the deficiency and 7 days to complete all corrective actions. If mobilization takes longer than 72 hours or the corrective actions are not in place within 7 days, the construction engineer or project inspector can impose that unit price per day deduction from work payments.



STORM WATER SITE INSPECTION

Inspections Made At Least Once Every Seven Calendar Days

Inspection Date and Time: _____ DNR Auth. No.: IA _____ - _____

Project Number: _____ County: _____

Inspection Made By: _____ Title: _____

Precipitation since previous inspection: _____

Comments and Observations (Include area inspected, status of site, and erosion/sediment control work performed since previous inspection):

Deficiencies Found (items requiring maintenance or inadequate controls) and Additions Required (new items needed due to status of work) (Include specific locations):

Can Corrective Action(s) be made within 72 hours after inspection? If no, document why it is impracticable.

Note: Permit requires Corrective Actions be completed within 7 calendar days following inspection:

Date of Corrective Action (start within 3 days of inspection) and Corrective Action Performed (document either current week or previous week):

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 gathered and evaluated 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.

Inspector's Signature: _____ Date: _____

ESC
Basics

ECT

☐
☐

Contractor's Signature: _____ Date: _____

☐
☐

Figure 23. Iowa DOT weekly construction stormwater site inspection form.



NONCOMPLIANCE NOTICE

Contractor _____ Project No. _____

County _____ Contract ID _____ Date _____ Time _____

To: _____
(Name) (Title) (Signature)

You are hereby notified that the following observation and/or test noted

and is a violation of Article

The test data value is

and the specification limits are

- Additional tests may be performed.
- The violation identified in this notice shall be ceased and/or corrected. This may require a modification of current practices or removal and replacement of materials, including labor, at no cost to the Contracting Authority.
- You are to determine corrective action necessary.
- You are to determine if you wish to discontinue operations until the violation is corrected or additional tests confirm or refute this failing test.

Remarks:

Correction:

Inspector's Signature

Distribution: Contractor, Project Engineer, Inspector

Figure 24. Iowa DOT non-compliance notice form.

Iowa DOT established guidelines for QA review inspections to be conducted on all projects that disturb 5 acres or more and are located in environmentally sensitive areas according to the EPA consent order. The permit authorization designates whether a project is disturbing more than 5 acres. QA inspections are conducted by Iowa DOT personnel who are technician-certified. Each QA inspection occurs at least once every 120 calendar days during the active construction phase of a project. In each QA inspection, the inspector reviews the project site for deficiencies, including any additional controls and project documents, which include previous inspection reports, training records of personnel, and subcontractor co-permittee statements.

The QA inspector is required to complete a QA inspection report (see Appendix H). After the inspection, the QA inspector meets with the project inspection staff to review findings and questions. If deficiencies are found or documentation is missing, the QA inspector communicates that information to the project inspection staff, who follow up with the contractor to correct deficiencies and provide the missing documentation.

To conduct stormwater permit inspections, Iowa DOT uses a web-based software system. However, this software system is not currently used widely across the state due to technological challenges that Iowa DOT is resolving.

Benefits and Challenges

Some of the benefits mentioned by Iowa DOT personnel when construction stormwater management is implemented successfully for highway projects include cleaner waters, fewer deficiencies, fewer non-compliance issues, and better relations between Iowa DOT and its contractors and the public. Bad publicity or complaints from the public due to improper stormwater management for a construction project are not what Iowa DOT wants to occur. Consistency and continuous management are key to successfully managing stormwater runoff and E&SC discharges.

One of the challenges mentioned by Iowa DOT personnel was the lack of staff available for planning, designing, developing, overseeing, and inspecting its construction stormwater management program. Iowa DOT has lost experienced staff over the years and is replacing them with less experienced individuals or not replacing them at all. Dueling priorities are also an issue. For example, a project inspector might be responsible for conducting weekly site inspections for stormwater management. However, that week's work may also include extensive concrete pours that the project inspector must oversee. This situation may result in a less than thorough weekly site inspection, and items that are vital to stormwater management and E&SC may get overlooked.

Another challenge has been a lack of consistency in regulatory audits and inspections. In some cases, a regulatory inspector may find few issues and deficiencies, while for the same project, another inspector might find many issues and deficiencies. This situation causes confusion and difficulties about what must be done to comply with permit requirements.

Stormwater Pollution Prevention Plan

The Iowa DNR has guidelines for developing and implementing an SWPPP (see Figure 25). An SWPPP is developed to guide the design process by Iowa DOT for each construction site covered by General Permit No. 2. The SWPPP must be developed before Iowa DOT submits the NOI to Iowa DNR for General Permit No. 2 authorization. The staff responsible for developing the SWPPP depends on the staff responsible for preparing the overall design of a highway project. If the Central Design Office performs the engineering and design, then the SWPPP is typically developed by the internal Roadside Development Office, which is a part of the Central Office. If the project is designed by a district, each district's internal staff engineers develop and prepare the SWPPP. If consultants prepare the design, the consultant design team develops the SWPPP and the plans for a project.

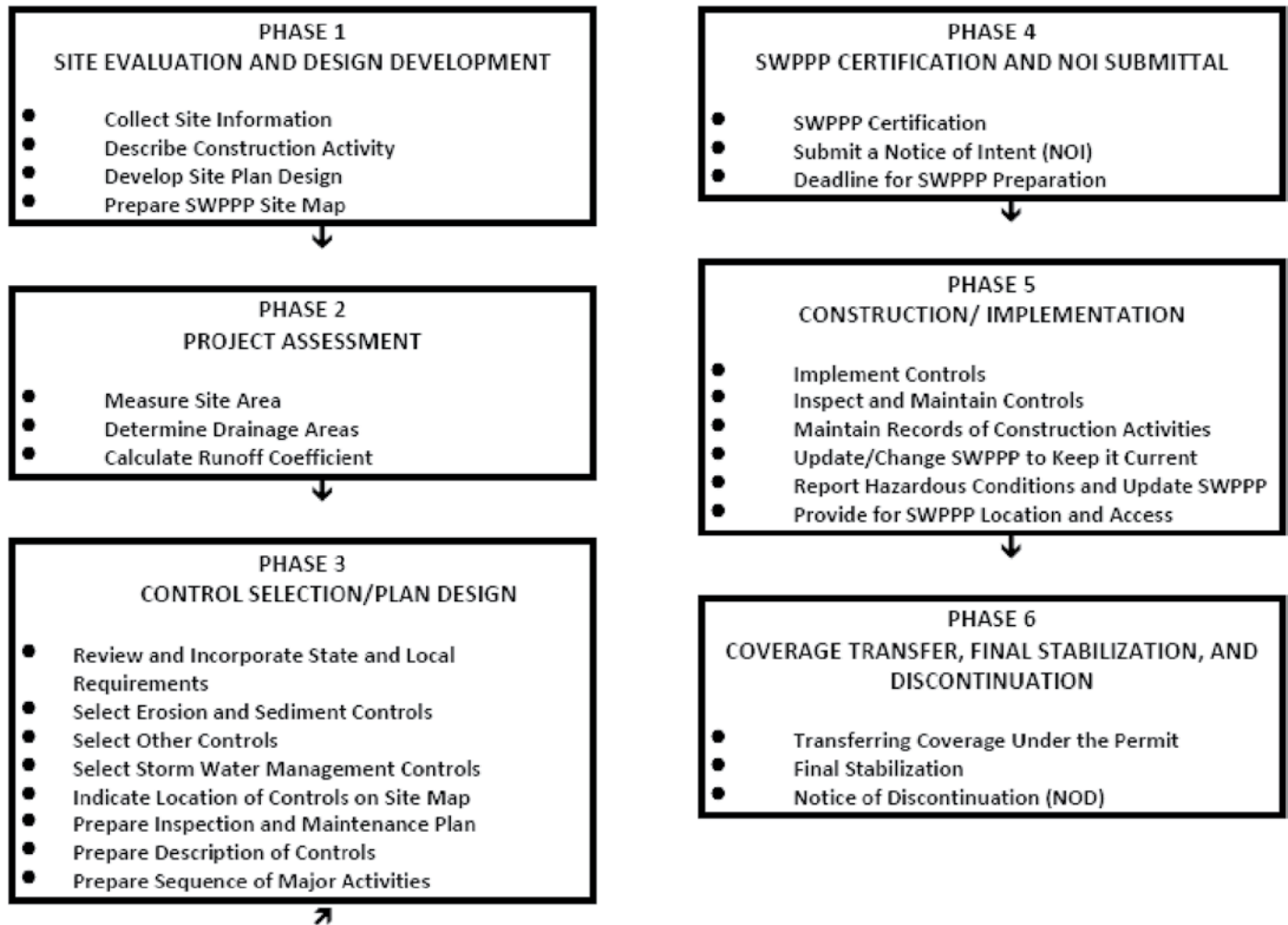


Figure 25. Iowa DNR SWPPP development and implementation guidelines.

The SWPPP identifies project-specific potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharge from construction activities. In addition, the SWPPP describes the implementation of practices to reduce the pollutants in stormwater discharge associated with industrial activity for construction activities at the construction site and to assure compliance with permit requirements.

After the SWPPP is developed, it becomes one of the contract documents. The SWPPP must be implemented at the start of construction. While Iowa DOT initiates the SWPPP, the contractor is responsible for installing, managing, adding, removing, and maintaining stormwater BMPs and E&SC measures. If changes to the SWPPP are needed, Iowa DOT specifications require the contractor to submit an amended SWPPP site map by essentially marking up the base site map plan prepared by the design group included with the original SWPPP.

Best Management Practices

The BMPs commonly used at Iowa DOT, referred to as E&SC measures, focus on temporary structures for controlling sediment and erosion of the construction site or permanent erosion. Chapter 10 of the Iowa DOT *Design Manual—Roadside Development and Erosion Control*—includes three sections: 10A) topsoil; 10B) seeding, fertilizing, and mulching; and 10C) erosion

control. Under 10C, the five categories of E&SC measures used by Iowa DOT for construction stormwater management are as follows:

1. **Temporary sediment control devices:** covers silt basins, silt fences, rock check dams, temporary sediment control basins, silt curtains, and stabilized construction entrances.
2. **Stormwater detention:** discusses silt fence for ditch check, rock check dam, temporary sediment control basin, silt basin, and slash mulch berm.
3. **Vegetated buffers:** outlines how undisturbed areas typically consisting of grass can be used in place of temporary sediment control devices.
4. **Temporary sediment control devices for intakes and maintenance holes:** covers erosion control devices for intakes and maintenance hole wells, grate intake sediment filter bag, and open-throat curb intake sediment filter.
5. **Temporary sediment control in urban areas:** outlines the limited space in and around construction sites in urban areas that make it difficult to place temporary stormwater and sediment control measures.

In addition, Iowa DOT rarely uses flocculants for E&SC—typically in last-resort situations or when trying something new—although their use is optional.

Training

As a result of an EPA inspection conducted over 15 years ago, Iowa DOT implemented a training program for stormwater management. Training is important for improving compliance, infusing consistency into processes, and implementing construction stormwater management successfully. Therefore, Iowa DOT has an Erosion and Sediment Control Training and Certification Program. Typically, DOT personnel, including resident construction engineers and project inspectors, take the training or certification courses in the program. Local public agencies, prime contractors, subcontractors, and consultants also take the courses. As stated by Iowa DOT personnel, anyone is welcome to attend the courses available in the program.

The training and certification program has two levels. The first is a web-based course, Erosion and Sediment Control Basics (ESC Basics). This course is a one- to two-hour session with no prerequisites, fee to attend, or exam to complete or pass. Iowa DOT specifications require the training, since every project with General Permit No. 2 coverage must have at least one DOT employee and one contractor holding the ESC Basics certificate, which is valid for 2 years before renewal is needed. The second level is the Erosion Control Technician (ECT) course, which is a two- to two-and-a-half-day class with no prerequisites but requires a fee to attend. An exam at the end of the course requires a score of 80% or higher to pass. Certification lasts for 5 years, and ECT certifications from other state DOTs or national programs are accepted for reciprocity by the Iowa DOT. Every resident construction engineer's office has at least one DOT employee certified as an ECT. Every prime contractor working with Iowa DOT and on projects with General Permit No. 2 coverage needs at least one employee certified as an ECT.

Audits

Internal audits at Iowa DOT include weekly site inspections and QA review inspections. Since Iowa DOT does not fall under an MS4 program, regulatory audits by the EPA rarely occur. However, when they do, they tend to invoke significant changes in stormwater management and E&SC processes and approaches. The Iowa DNR, the state regulatory agency, audits Iowa DOT projects routinely or after receiving a complaint. For some projects, the Iowa DNR may become involved a few times a year, while many other projects will not have a regulatory audit performed. Involvement is at the discretion of the Iowa DNR. When the Iowa DNR audits a

project, they perform an inspection similar to weekly and QA inspections by visually observing practices and controls in the field in order to ensure that they are working properly and reviewing documentation, such as the SWPPP, to ensure that all required information is provided by the contractor. The Iowa DNR inspector reports the audit findings, recommendations, and potential corrective actions to the project inspection team, a process similar to the way QA inspections are conducted. The project inspection team is responsible for facilitating the efforts to fix deficiencies or violations.

Experiences and Findings

Sharing the experiences of Iowa DOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements. The findings from Iowa DOT include the following:

- **Resources:** Iowa DOT staff noted that having enough resources is important for fully executing the construction stormwater management program. Iowa DOT is challenged with limited resources, thus making it difficult to fully execute the program successfully.
- **Training and certification:** Iowa DOT created its Erosion and Sediment Control Training and Certification Program to reduce deficiencies and improve consistency. The training program includes two levels: a web-based course on the basics of E&SC and an ECT certification course. Each has improved stormwater permit compliance.

New York State Department of Transportation

New York State DOT has a construction stormwater program as part of project management for highway projects. The Engineering Division within the Office of Environment at New York State DOT administers their construction stormwater program. New York State DOT is organized by geographic regions. Although regions manage stormwater management slightly differently, each is required to follow the State Pollution Discharge Elimination System (SPDES) for construction projects. The SPDES program began approximately 15 years ago and was not well received at first. However, the SPDES program today has matured due to training and awareness and is part of highway construction across each New York State DOT region. The New York State Department of Environmental Conservation (DEC) administers the SPDES and associated permits for highway construction.

The DEC developed both the New York State *Stormwater Management Design Manual* and the New York State *Standards and Specifications for Erosion and Sediment Control* (known as “the Bluebook”) to guide New York State DOT personnel in stormwater management. Contractors and consultants also follow the standards and specifications for E&SC, which describe standard practices, measures, and controls. These guidelines, along with the developed forms for tracking and inspection, build consistency in their stormwater management program for highway construction, which New York State DOT enforces during construction.

Approaches and Processes

New York State DOT follows the SPDES, which the New York State DEC administers. The state legislature enacted Article 17 of the Environmental Conservation Law to protect and maintain surface and groundwater resources, which included the creation of SPDES to maintain New York State waters within reasonable standards of quality. The owner of construction projects—in this case, New York State DOT for highway construction—involving soil disturbance of 1 or more acres is required to obtain coverage under the SPDES general permit for stormwater discharges

from construction activity (also known as the CGP). The SPDES program reduces and eliminates pollution in state water bodies and maintains the highest quality of water possible, consistent with public health, public enjoyment of water resources, protection and proliferation of fish and wildlife, and industrial development across the state. The EPA has approved the SPDES to control surface water and storm discharges in alignment with the CWA. The SPDES includes requirements to control point source discharges to groundwaters in addition to surface waters. The SPDES permit certification form used by New York State DOT is provided in Figure 26. Any contracting firm that installs and maintains SPDES BMPs is required to be certified by the New York State DEC.

During construction, New York State DOT and the contractor's inspection personnel are tasked to periodically inspect all the SPDES practices in place for a highway construction project. The time frame is based on the BMPs installed at a construction site. Inspections are typically conducted every 14 days or after any major storm event. All BMPs used are photographed, and any deficiencies are noted as failed and sent to the contractor for correction. A common deficiency found during inspections is a silt fence not placed properly, not buried, or with high levels of sediment build-up. In those cases, the contractor would be instructed to correct the placement, bury the bottom of the fence, or remove the sediment before it becomes a larger issue. Also, if any erosion is found during an inspection, New York State DOT directs the contractor to place erosion control measures for the project. The stormwater inspection form used by New York State DOT is provided in Appendix I.

When a deficiency is found during an inspection, the contractor has a set time frame to correct the deficiency. Per the Bluebook, contractors must address deficiencies within 24 hours from the time they are discovered. As mentioned by New York State DOT personnel, deficiencies are addressed quickly. They are typically not a major issue for highway construction projects at New York State DOT.

All stormwater management documents are filed into ProjectWise, New York State DOT's file management system. Spreadsheets are used to track permit requirements and BMPs. Inspection forms document deficiencies in BMPs and the corrective actions taken to maintain the practice.

Benefits and Challenges

When the SPDES and SWPPP are followed during highway construction, New York State DOT realizes cleaner waters around project sites, better flood mitigation, and fewer complaints from state representatives or the traveling public. In addition, New York State DOT has noticed fewer ecological impacts as fewer fish and less aquatic life are affected by the reduced or eliminated sediment and pollutant runoffs. Less sediment in recreational receiving waters is also a benefit by increasing the recreational value of the water body as well as the surrounding property values. Less sediment in receiving waters also means less dredging and maintenance.

One of the main challenges to construction stormwater management is having enough space to place BMPs and control measures. Some practices used by New York State DOT can be wide and take up space that may require using ROW. Obtaining ROW can be difficult and time-consuming, thereby delaying projects. Another challenge is having enough time during design to develop the BMPs comprehensively for a highway construction project. Lack of time means fewer details are included in the SPDES and SWPPP. Additionally, in the past, maintenance personnel would clean out BMPs (e.g., for sediments, pollutants, chemicals), but would not check to make sure they were working properly. Currently, inspectors and maintenance personnel must both clean out BMPs and ensure they are performing properly. In short, personnel are now doing their due diligence.

CONR 5
(10/19)

Contractor / Subcontractor SPDES Permit Certification

Contract No.: _____ PIN: _____

Description: _____

Town, Village, City: _____

County: _____

Check Applicable Box: ☐ Prime Contractor ☐ Subcontractor

Name of Contractor/
Subcontractor: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____ Fax: _____

Core Pay Item Groups for which the Contractor/Subcontractor will be responsible (e.g. 203, 207, 209, etc.): _____

Mandatory Certification: The SPDES General Permit for Stormwater Discharges from Construction Activities requires the Prime Contractor and subcontractors to certify they understand the Stormwater Pollution Prevention Plan (SWPPP), the General Permit conditions, and their responsibilities for compliance. The certification must be signed prior to performing any contract work. The certification shall be signed by an Owner, Principal, President, Secretary or Treasurer of the firm in accordance with the signature requirements of 102-05 *Proposal Submission* of the Standard Specifications.

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

Required Training: Effective April 30, 2010, the SPDES General Permit also requires the Prime Contractor and all subcontractors performing earthwork or soil-disturbing activities to identify at least one trained individual *from each company* who will be responsible for implementing the SWPPP and who shall be on-site on a daily basis when the company is performing soil disturbance activities. These activities include clearing, grubbing, grading, filling, excavation, stockpiling, demolition, landscaping, and installation and maintenance of Erosion & Sediment Control practices. Training must consist of 4 hours of NYSDEC-endorsed Erosion & Sediment Control Training every 3 years. (Training is not required if the individual is a licensed Professional Engineer, registered licensed Landscape Architect, or CPESC.) Provide the information below for trained individuals who will be on-site and responsible for SWPPP implementation on this Contract (attach a separate sheet if needed for additional Trained Individuals):

Trained Individual Name/Title : _____

Name of Training Course: _____

Trainee Number: _____ Date of Training: _____

Trained Individual Name/Title : _____

Name of Training Course: _____

Trainee Number: _____ Date of Training: _____

Figure 26. SPDES permit certification form.

To address challenges, New York State DOT has made changes to its stormwater management program in recent years. One of the changes mentioned by New York State DOT personnel was moving from 4 inches to 6 inches of topsoil on restoration projects, because New York State DOT had issues getting plants and vegetation to return and grow each year. The 6 inches has made a substantial difference in vegetation growth, which is essential for erosion control.

Another adjustment was a requirement to use double-bagging for gravel or sandbags as weights to support temporary traffic signs around a construction site. Using only one bag, New York State DOT found that, if it were cut or punctured, sand and gravel would reach one of the BMPs, thereby causing additional maintenance. Double-bagging gravel and sand helps reduce sediment-laden runoff.

Stormwater Pollution Prevention Plan

For any highway construction project at New York State DOT, the design group responsible for the project determines whether a SWPPP is required based on criteria for generating the design. When an SWPPP is required, the highway and drainage design groups prepare the SWPPP for the project using a New York State DEC template and following the New York State *Standards and Specifications for Erosion and Sediment Control*. After the SWPPP is developed, it is added to the project plans and sent to the construction staff and the contractor. New York State DOT submits the SWPPP as a part of the SPDES permit application, which is entered into a permit database system that allows the New York State DEC to review and approve the permit and SWPPP. The construction staff performs monitoring and tracking of the SWPPP and compliance by the contractor periodically and after major storm events. After construction, regional environmental units or consultants working for New York State DOT monitor permanent controls to ensure they are functional or are repaired. The operations group within New York State DOT is responsible for maintaining permanent controls. If permanent controls need restoration, New York State DOT can contract out the work rather than assign it to the operations group. One of the forms used during construction for revising the SWPPP is provided in Figure 27.

Best Management Practices

Some permanent BMPs used by New York State DOT include swales for highway projects, dry swales, check dams, and retention ponds for intersection projects. Some of the temporary BMPs used by New York State DOT include silt fences, straw bales, sediment control logs, drainage interceptors, and check dams. New York State DOT uses any BMP tool available for any project depending on what is needed to manage stormwater, sediment, and erosion control. New York State DOT has the authority to use flocculants for stormwater management; however, these are rarely used due to the maintenance needed to check and refill the chemicals and change filters at BMP locations. In most cases, flocculants are considered a last-resort BMP for New York State DOT construction stormwater management. For example, although flocculants have been proposed for projects for half the price, in many cases, New York State DOT elects to use traditional BMPs that may cost more but require much less maintenance and oversight.

When the SPDES program began, New York State DOT noted that their personnel were not maintaining BMPs well. For example, swales were not maintained properly. When ditches needed to be cleaned of collected sediments, personnel would remove the berms, not recognizing that they must remain. Maintenance personnel are now aware of this situation and have developed methods to clean out ditches without disturbing the BMP.

Figure 27. New York State DOT SWPPP construction revision form.

Approximately 15 years ago, New York State DOT was not tracking types of BMP and their locations. However, some of the BMPs are permanent structures that must be maintained. Therefore, New York State DOT now tracks all BMPs installed and their locations using spreadsheets to help maintain these structures to comply with the SPDES. Each regional environmental unit across New York State DOT tracks its BMPs through project SWPPPs. Every BMP within the SWPPP is assigned a tracking number, and each practice type has a maintenance and inspection interval assigned to it.

Training

Training for the New York State DOT construction stormwater management program focuses on on-the-job training. More experienced personnel teach less experienced personnel how to perform stormwater management responsibilities in the field during construction. Little classroom training is conducted for stormwater management at New York State DOT. Stormwater management inspectors are required to become certified in some areas of the state (not all areas of the state require certified inspectors); this certification requires classroom training and a final exam. Self-guidance for using various stormwater management documents developed by New York State DOT and New York State DEC is also used to help personnel manage stormwater properly during construction.

Since the inception of the SPDES program, more training has led to better compliance with permit requirements and improved and more consistent installation and maintenance of BMPs. Project staff have more awareness, experience, and knowledge about the work requirements of any highway construction project.

Audits

Regulatory audits of New York State DOT's construction stormwater management program are infrequent. However, when they do occur, New York State DOT has always performed well. For internal audits, New York State DOT must comply with the regulations and rules of the SPDES. New York State DOT and New York State DEC perform the inspection audits to determine what can be improved.

Experiences and Findings

Sharing the experiences of New York State DOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements. The findings from the New York State DOT include the following:

- **Map out the locations of BMPs and control measures:** New York State DOT realized that tracking the locations of BMPs and control measures was important so that proper maintenance at the right intervals would be conducted on the BMPs to keep them fully functional. Currently, New York State DOT designs BMPs with an overhead plan view and includes a tracking number. The plan view and tracking information are shared with contractors and consultants for proper installation and maintenance.
- **Inspection of BMPs and SPDES requirements is a potential worker-power burden:** With the use of the SPDES over the last 15 years, New York State DOT has constructed many more BMP control measures. As in roadway maintenance, the more BMPs, the more inspections and maintenance needed, thus requiring additional personnel. Therefore, New York State DOT uses consultants when needed to help fill this workforce burden.

- **Require contractors to take photographs and videos of corrective actions:** New York State DOT learned early that, despite contractors' reports that everything had been addressed and fixed, the next inspection would prove otherwise. Therefore, New York State DOT changed its policy to require contractors to take photographs and videos of their corrective actions to ensure that the BMPs were fixed and no longer deficient.

Pennsylvania Department of Transportation

PennDOT has a Bureau of Operations at its central office, which includes a stormwater section. The state stormwater management regulatory agency is the Pennsylvania DEP. The Bureau of Operations assists with the permitting processes, and the individual districts throughout Pennsylvania lead the stormwater management efforts during design and construction. Each of the 11 PennDOT districts has an environmental manager who helps with stormwater management during construction. Each district also has a stormwater maintenance manager who manages post-construction maintenance of control measures but is not generally involved during construction. PennDOT personnel mentioned that they have limited resources at the central office and the districts to manage stormwater and E&SC during the construction of highway projects.

The Pennsylvania Stormwater Management Act 167 was enacted by the state legislature in 1978 partly in response to the impacts of accelerated stormwater runoff resulting from land development projects across the state. Act 167 established a comprehensive systematic program to develop watershed-based stormwater management plans that provide control measures for activities affecting stormwater runoff, including construction.

PennDOT has a Keystone Environmental e-Permitting System (KEES), which houses stormwater permit applications for state and federally funded projects. Along with KEES, PennDOT follows the Pennsylvania Code, Title 25, Chapter 102 and Chapter 105. Chapter 102 requires an NPDES permit from the Pennsylvania DEP for construction activities with earth disturbances greater than or equal to 1 acre. Chapter 105 outlines the general permits required for specific types of activities that may impact water bodies in and around construction sites.

Approaches and Processes

In 2018, as part of a consent agreement with the EPA, PennDOT implemented a compliance management program (CMP) to guide its execution of policies and procedures for construction stormwater runoff. The program applies to projects that require coverage under the NPDES permit for stormwater discharges resulting from construction activities. The CMP contains the following five primary elements:

1. **Stormwater inspection training:** A key element of the CMP is to train and certify personnel to conduct construction stormwater inspections.
2. **Stormwater self-audit program:** A three-tiered QC process for construction stormwater inspections.
3. **Compliance response policy:** Provides the actions PennDOT staff, consultants, and contractors must take to respond to deficiencies, violations, or recurring compliance issues.
4. **Stormwater compliance data:** To assist in organizing stormwater compliance data and reporting, PennDOT implemented an electronic tracking system.
5. **Public information portal:** Provides public information about the CMP as required by the EPA consent agreement on a website. Information is updated every 3 months.

In relation to the consent agreement from the EPA, PennDOT staff mentioned that they have revised the construction stormwater management program based on EPA requirements, which

has positively impacted and led to improvements managing stormwater compliance during construction.

The Bureau of Clean Water within the Pennsylvania DEP administers the NPDES permitting and CMP for construction stormwater management and oversees the implementation of Act 167 in the DEP regional offices. The Bureau of Clean Water also administers the statewide E&SC program based on Chapter 102 of Title 25 of the Pennsylvania Code. An NPDES permit is required from the DEP for any construction activities with ground disturbances of 1 or more acres of land. PennDOT uses the following two types of NPDES permits:

1. PAG-02 NPDES General Permit for Discharges of Stormwater Associated with Construction Activities
2. NPDES Individual Permit for Discharges of Stormwater Associated with Construction Activities

PennDOT also uses the Chapter 102 Erosion and Sediment Control Permit, which is required for 25 acres or more of road maintenance activity (as defined in Chapter 102).

After the project is awarded, the contractor is required to provide information related to the permit requirements, which includes the following:

- Signing the Co-Permittee Acknowledgement Form, which is also signed by a PennDOT representative so that both the DOT and the contractor can be held accountable for compliance
- Identifying licensed professionals to be present on-site and responsible for implementing critical stages of the approved erosion and sediment pollution control (ESPC) plan and the PCSM plan
- Developing a preparedness, prevention, and contingency plan

PennDOT has revamped its construction stormwater management program in the last 10 years. One of the major additions was the development of an application for field tablets and smartphones to document construction stormwater inspections. The application is used to conduct inspections in accordance with the NPDES construction stormwater permit. In recent years, the application has been updated to match the Pennsylvania DEP Visual Site Inspection Report (VSIR), a standard form for conducting stormwater inspections during construction. The application is more robust and useful since the update, as it allows for more information to be entered and can be used to take photographs of deficiencies. The application is part of a more integrated program in which, if a deficiency is identified, notifications about a series of events are sent to district personnel and the contractor to address the deficiency as quickly as possible. The notifications are sent continually until the deficiency is addressed. The VSIR application is used in the field to track and monitor construction stormwater management and associated control measures. PennDOT developed a VSIR user's manual in 2021 for correct use of the application. All applications used for construction stormwater management and inspections are integrated with the PennDOT engineering construction management system (ECMS) web-based application that captures all information for a project, including construction stormwater management. The collection of information in the ECMS allows PennDOT to generate reports submitted to the PennDOT Deputy Secretary and the EPA as part of the consent agreement.

Inspections of stormwater and control measures during construction occur weekly, at a minimum, and after rainfall events, which are documented in the VSIR application. If an inspection is not conducted or not completed correctly, the ECMS sends out notifications to upper management until the inspection is completed correctly. The ECMS also helps PennDOT collect compliance data and track NPDES CGP permit requirements across the field applications and the ECMS. The data collected includes dates of notices of intent, submission, and approval; the start of earth disturbance activities; inspections conducted by the districts; self-audits conducted and the

associated findings; inspections conducted by regulatory agencies and associated findings; alerts for missing weekly inspections; compliance actions against PennDOT; and notice of termination submission and approval.

When deficiencies are found during an inspection, they are documented. Corrective actions follow the Compliance Response Policy (CRP) summary table (see Appendix J), which was developed as a result of the EPA consent agreement. The CRP summary table contains the sequence of actions PennDOT personnel take to ensure the contractor is in compliance with permit requirements, which include the time to correct and the expected actions of the inspector-in-charge, PennDOT district, and contractor. After the inspector-in-charge of a project notifies the contractor of a deficiency, the contractor is directed to correct deficiencies within 24 hours if pollution has already occurred. If pollution has the potential to occur, the contractor is directed to correct deficiencies no later than the end of the next business day. Also, if rain is forecasted, repairs must be made before the rainfall occurs.

The CRP summary table has the following six categories:

1. Deficiencies resulting in significant discharge of pollutants
2. Deficiencies that could result in significant discharge or pollutants
3. Failure to comply with the approved ESPC plan
4. Concerns about compliance with the ESPC plan
5. Concerns about a design aspect of the ESPC plan
6. Failure to perform a visual site inspection

When a deficiency in one of the first two categories in the CRP summary table occurs, the Pennsylvania DEP or a delegated county conservation district (CCD) is contacted by PennDOT within 4 hours of the finding. The VSIR documenting the non-compliance deficiency is sent to the Pennsylvania DEP or the delegated CCD within 5 calendar days. In general, if a deficiency has led to or may lead to a release of concentrated pollutants (e.g., sediment-laden runoff, concrete washout water) into receiving waters, it falls into one of the first two categories. Deficiencies in the first two categories may include missing, inoperable, or ineffective erosion and sediment BMPs.

Upon reduction, loss, or failure of any erosion and sediment BMP, the contractor must take sufficient action to restore, repair, or replace the E&S BMP or provide an alternative treatment method consistent with the CRP summary table. Restored E&S BMPs or alternative treatments are required to be at least as effective as the original E&S BMP after it is properly installed. Sufficient actions must be undertaken to ensure that no pollutants are discharged into receiving waters.

After a deficiency has been addressed, a follow-up inspection is conducted to ensure the deficiency was addressed properly and the corrective actions taken have resulted in a control measure in compliance with permit requirements. When deficiencies are not addressed in a timely manner or are not repaired to the original conditions of the ESPC plan, PennDOT can charge liquidated damages to the contractor for permit non-compliance. Based on the CRP summary table, the PennDOT district can hold payments of work if the contractor fails to resolve a deficiency within the stated time to correct. Liquidated damages are assessed to contractors when they fail to begin deficiency repair work within 24 hours of notification and for each additional 24-hour period until compliance is attained.

Benefits and Challenges

Changes invoked by the EPA consent agreement were mentioned by PennDOT personnel as a primary benefit. Although the work to comply with the consent agreement was difficult and time-consuming, the processes in place currently are much better than those before the consent agreement. Construction stormwater management is a more formal process for PennDOT;

guidelines and policies provide details about effective stormwater management during construction and compliance with permit requirements.

One of the challenges mentioned by PennDOT personnel is that many personnel and agencies are involved with construction stormwater management, thereby making the approach complex. Sometimes it is difficult for PennDOT to get stakeholders on the same page. Also, the Pennsylvania DEP has delegated authority to 65 CCDs for stormwater management, which complicates approaches and approvals. To overcome the challenges of involving various personnel, agencies, and districts in construction stormwater management for a highway project, PennDOT mentioned that consistent processes and definitions are vital so that stakeholders understand the approach and are on board with how stormwater will be managed during construction.

Stormwater Pollution Prevention Plan

In Pennsylvania, in lieu of an SWPPP, two stormwater management plans are normally required for highway construction projects. One is the ESPC plan used during construction, and the other is for PCSM. The ESPC plan is a required document for permit compliance for construction projects that disturb 5,000 square feet or more of land. The purpose of the ESPC plan is to identify potential erosion and sediment issues and to define effective control measures used together with construction operations to minimize erosion and sediment-laden runoff.

Each ESPC plan typically consists of the following information:

- Maps and drawings showing the topography of the construction site, proposed alterations, locations of erosion and sediment BMPs and control measures, and instructions for inspecting, maintaining, and repairing erosion and sediment BMPs when deficiencies are identified
- A narrative report that describes the project and indicates the purpose, engineering assumptions, and calculations for erosion and sediment BMPs
- Detailed instructions defining staging, sequencing, and scheduling of operations from the contract documents, along with installation and removal information for erosion and sediment BMPs and control measures

PennDOT typically hires consultants to develop the ESPC and PCSM plans. PennDOT districts, with the assistance of consultants, obtain the necessary permits for the project before award. The inspector-in-charge of the project is responsible for overseeing contractor adherence to the ESPC plan during construction.

Best Management Practices

Under Chapter 102 regulations, the Pennsylvania DEP requires PennDOT to develop, implement, and maintain effective erosion and sediment BMPs and control measures to reduce erosion and prevent sediment-laden runoff resulting from construction activities from entering receiving waters. Common erosion and sediment BMPs used during construction include compost filter socks, sediment traps, water filter bags, swales, vehicle tracking pads at entry and exit points, pipe and channel outlet protection, and stabilization products.

The Pennsylvania DEP *Erosion and Sediment Pollution Control Program Manual* (<https://greenport.pa.gov/elibrary//getfolder?folderid=4680>) provides guidelines for those engaged in earth disturbance activities to prepare E&SC plans that comply with Chapter 102 permit regulations. The manual includes information on BMP sequencing, site access, sediment barriers and filters, runoff conveyance BMPs, sediment basis, sediment traps, outlet protection, stabilization methods and standards, streambank stabilization, grading standards, and areas of concern.

In relation to flocculant use for construction stormwater management, PennDOT personnel mentioned that they do not use polyacrylamide and rarely use any type of flocculant for stormwater management during construction. The Pennsylvania DEP provides non-chemical options as alternatives to flocculants. PennDOT does not have a specific policy for using flocculants other than that they are to be used only as a last resort.

Training

PennDOT has several training programs for construction stormwater management, including (E&SC) measures design, construction stormwater inspection, and PCSM design. Based on the consent agreement with the EPA and the establishment of the CMP, PennDOT developed its mandatory construction stormwater inspection training program for in-house and consultant inspectors. The purpose of this training is to emphasize the importance of E&SC, improve the effectiveness of visual site inspections, and train individuals to use the VSIR application. When performed correctly, site inspections reduce the potential for pollution, minimize PennDOT's and the contractor's exposure to risk associated with stormwater pollution, and ensure PennDOT complies with the applicable permits. The training covers various topics dealing with the construction, inspection, maintenance, and potential compliance issues related to E&SC measures on PennDOT projects. This self-paced, web-based training is accessed through the Training Calendar provided on the PennDOT website.

In addition, Pennsylvania DEP offers Pennsylvania Clean Water Academy training for the PAG-01 NPDES general permit. The course has the following five online modules:

- **Chapter 1:** Provides a high-level overview of the PAG-01 permit during which course participants learn about the background and objectives, eligibility requirements, and administrative processes associated with the permit.
- **Chapter 2:** Explains the similarities and differences between the PAG-01 General Permit and the PAG-02 General Permit.
- **Chapter 3:** Explains the PCSM BMPs that permit applicants select.
- **Chapter 4:** Discusses the information needed to apply for the PAG-01 General Permit coverage. A submission checklist is used, and each item is explained.
- **Chapter 5:** Provides information about the various actions taken by a permittee following approval of coverage under the permit.

Audits

The Stormwater Self-Assessment Program is a three-tiered QC process for construction stormwater inspections. Each level is performed by different personnel to ensure a comprehensive and impartial evaluation. The three levels are as follows:

- **Level 1:** Includes field inspections using the VSIR application required by the NPDES CGP permit. These field inspections are typically performed by the inspector-in-charge for a project or a designer through the VSIR application and are completed weekly or after each measurable stormwater event, defined as 0.25 inches of rainfall or more.
- **Level 2:** Includes district self-inspections that are also field inspections performed by trained personnel other than those assigned to the project field inspection team. At least one district self-inspection is conducted per construction season for each active construction project.
- **Level 3:** Includes stormwater self-audits performed by trained personnel other than those assigned to the field or district self-inspections. The Central Office Construction Quality Assurance Section normally performs these inspections. At least one stormwater self-audit is completed per construction season for each active construction project.

Experiences and Findings

Sharing the experiences of PennDOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements. The findings from PennDOT include the following:

- **Transparency and consistency:** PennDOT has realized that transparency in construction stormwater management is key for personnel to understand the approach and to align expectations. Transparency also helps PennDOT be consistent in its approach to construction stormwater management by following the available published guidelines and adhering to the Pennsylvania DEP NPDES CGP permit requirements.
- **Training:** PennDOT has developed various training programs for stormwater management, including training for design, implementation, and inspection, which have helped build more consistency and expertise into their stormwater management program. Some of these training programs resulted from the EPA consent agreement.

Texas Department of Transportation

The second largest state in the United States, Texas crosses different ecosystems, from coastal and tropical areas in the east and south to hill country karst areas in central Texas and deserts and arid conditions in the west and north. The Environmental Resource Management–Operations Compliance Section of the Environmental Affairs Division at the central office is a dedicated section within Texas DOT and has four full-time employees who dedicate their time to oversight, management, and compliance of construction stormwater, MS4, and facilities management programs. The 25 districts and the associated construction offices across the state manage stormwater and E&SC of a project during construction.

The Texas DOT stormwater management program consists of the CGP and the MS4 program, both of which are administered by the Texas Commission on Environmental Quality (CEQ) through the Texas Pollutant Discharge Elimination System (TPDES) permitting program. Texas DOT intends to ensure that all construction activities discharging to MS4s have developed and implemented a SWPPP following the TPDES CGP requirements. When CGP requirements are met, MS4 permit requirements are also met.

Texas DOT developed guidelines and tools for use in construction stormwater management. Texas DOT has an SWP3 (its term for SWPPP), which provides guidelines for completing the project site-specific SWPPP summary sheets and binder documentation. Texas DOT also follows Specification Item 506, which details the standards for temporary E&SC during construction. In addition, *Design Division Roadway Standards* include criteria for compliance with stormwater management and permit requirements. Texas DOT also has a web page (<https://www.txdot.gov/business/resources/environmental/stormwater/bmp-resources.html>) of BMP construction job aids for environmental resources that describe various practices and controls that can be implemented on Texas DOT highway projects. Finally, the approved products list provides contractors with a website with information about approved E&SC products (e.g., erosion control blankets, roll-on products, and seeding) that can be used to manage stormwater and erosion during construction.

Approaches and Processes

Texas DOT construction operations are regulated by the TPDES CGP, which applies to stormwater discharges from construction activities that disturb 1 acre or more of land. However, Texas DOT personnel pointed out that construction projects that disturb less than 1 acre of land must develop an SWPPP, install BMPs, and inspect the site regularly; however, these projects do not need a CGP. Administered by Texas CEQ, the CGP has requirements to develop an SWPPP for

a construction project that includes specific information on stormwater management and E&SC for highway construction projects. The CGP is a co-permit for which Texas DOT and the contractor pull their own CGPs (i.e., obtain them to start work). Texas DOT is the primary operator responsible for providing plans and specifications, while the contractor is the primary operator of daily stormwater management operations during construction. However, both parties are responsible for complying with permit requirements; that is, the regulatory agency can impose a fine on a contractor directly when not in compliance. The CGP was renewed in March 2023, and all projects after this date use the new CGP. With the advent of a renewed CGP, Texas DOT had to update guidelines and training programs.

Along with a renewed CGP, Texas DOT developed a new SWPPP template in the last couple of years. Previously, each district used slightly different templates, resulting in a lack of consistency. With 25 districts using different SWPPP templates, tracking and understanding the SWPPPs became cumbersome. By requiring the use of a new template, Texas DOT expects more consistency in the information provided in the SWPPP, since it is organized similarly for all highway construction projects across all districts.

One of the major tools Texas DOT uses for stormwater management is Form 2118–Construction SWPPP Field Inspection and Maintenance Report, provided in Appendix K. This form is used by inspectors when conducting inspections of stormwater management and E&SC measures. Form 2118 meets the requirements of the CGP. Each section of Form 2118 is completed in full for every stormwater management inspection of a highway construction project.

Form 2118 includes the following sections:

- **Project Information:** Includes all necessary project details to be recorded in the form.
- **Inspected BMPs/Areas:** All BMPs used on a project are marked. The inspection ensures that all BMPs are functioning and maintained properly to comply with permit requirements.
- **Corrective Actions, Maintenance, Updating, or Additional Controls:** Lists the actions and maintenance required to fix a deficiency, along with updates to BMPs and control measures and any additional measures needed for the project that the contractor addresses. This section also has a box to report the priority of the deficiency. Any changes noted are updated in the project site-specific SWPPP.
- **Temporary and Permanent Stabilization:** When construction is complete or work stops for 14 or more days, erosion control and stabilization measures are used. This section notes whether temporary or permanent stabilization is needed.
- **Observations:** Notes about field operations of stormwater management and the BMPs in place. Observations typically contain information about items in compliance that must be monitored so that they do not progressively become non-compliant.
- **Compliance Certification:** Provides that the inspector has noted whether the project complies, along with a signature and date.
- **Contractor Notification:** The contractor is provided with the inspection report within 1 day of the inspection and must review and sign this section.
- **Inspection Certification:** A certification statement confirming that the Texas DOT certifying representative, typically a project manager or engineer, provides accurate information.
- **Post Signature Updates:** This section documents items, notes, or corrections taken after the form was signed.

Texas DOT has a *Ladder Guidance Escalation Document* for inspections, which defines deficiencies as low-, medium-, and high-priority as follows:

- **Low-priority deficiency:** Particular BMPs require attention before the next inspection, since these deficiencies, while not causing immediate issues, must be addressed before they become larger problems. If low-priority deficiencies are not addressed for two consecutive inspections, they are elevated to medium-priority.

- **Medium-priority deficiency:** Requires attention by the contractor within 3 working days. Medium-priority refers to a deficiency that can potentially harm human health or the environment. Any medium-priority deficiency not addressed within 1 week is escalated to high-priority.
- **High-priority deficiency:** Requires immediate attention by the contractor. High-priority deficiencies cause immediate endangerment to human health and the environment. High-priority deficiencies can become a violation based on a regulatory agency audit; therefore, they are addressed immediately. Work in areas around the high-priority deficiency must stop to address the deficiency. Area engineers and the project manager must be notified of any high-priority deficiencies by the inspector.

Texas DOT also uses a Construction Stage Gate Checklist (CSGC), which is a part of its environmental management system (EMS). The CSGC is used as a construction project inspection and communication tool. The CSGC helps ensure that Texas DOT and the associated contractor for a project meet their commitment to environmental compliance by providing a comprehensive overview of all environmental requirements and identifying areas where improvements, additional attention, or actions are needed. As a part of the CSGC, district environmental quality coordinators perform quarterly and annual inspections of projects using EMS Form 2448, which investigates not only stormwater management and E&SC but also any other environmental impacts from the project.

Benefits and Challenges

Benefits mentioned by Texas DOT personnel include fewer CGP and MS4 violations and deficiencies, along with cleaner water protected from sediment, chemicals, and other pollutants found at construction sites that can harm surrounding receiving waters, habitats, and wetlands. Proper construction stormwater management provides better flood control and less liability for the traveling public. Stormwater running off a site or dust in the air around a highway construction site is detrimental to the public, who file complaints. By holding stormwater runoff and dust in check with proper stormwater management, less negative publicity about environmental protection is generated.

One of the main challenges that Texas DOT has experienced is building consistency into its construction stormwater management program. In the past, many districts conducted their construction stormwater management differently from one another—even among area offices within the same district. Each district would have its own template for designing the SWPPP. Texas DOT now provides a standard template for each district to create more consistency in construction stormwater management. Also, deficiencies used to be prioritized without considering how different districts defined low-, medium-, or high-priority. Therefore, implementing guidelines, forms, and templates has helped alleviate inconsistencies in developing the SWPPP and conducting site inspections.

Another challenge is keeping enough personnel to manage the permitting and stormwater processes that must be conducted for each project. Having fewer and less experienced personnel leads to more issues; moreover, these employees must be trained, thereby causing additional issues for Texas DOT. Respondents mentioned that inspectors are a “revolving door,” since for every 20 hired, another 20 resign.

Furthermore, as mentioned earlier, Texas is a large state with several ecosystems spanning different areas of the state. These ecosystems pose unique challenges to construction stormwater management; for instance, BMPs and approaches to SWPPP may apply to work in one area, but not in others.

Stormwater Pollution Prevention Plan

Texas DOT uses summary sheets and mandatory SWPPP binders to develop and manage stormwater during construction. The SWPPP provides an action plan to prevent or minimize sediment and other pollutants at construction sites from reaching state water bodies during construction activities. The SWPPP for highway construction projects outlines erosion control, sediment control, and BMPs that can be used to control those pollutants during construction.

The SWPPP at Texas DOT is prepared at the district level. Design engineers and environmental staff are responsible for developing and preparing the SWPPP for construction. In some cases, consultants may also prepare the SWPPP. The SWPPP summary sheets must be completed to prepare the SWPPP. The SWPPP summary sheets outline the project's proposed construction activities that may generate sediment or pollutants. The summary sheets also outline the selected BMPs for construction to manage stormwater runoff from the project site. After the SWPPP summary sheets are developed, they are included as plan sheets in the Texas DOT construction drawings for the highway project. The contractor manages and maintains the SWPPP throughout the construction phase, while Texas DOT conducts the SWPPP inspections (weekly or bi-weekly). The SWPPP binder is stored and maintained by Texas DOT.

In addition to the summary sheets, the SWPPP also includes the SWPPP binder. The SWPPP binder is used by Texas DOT personnel during construction to store all required documents as required by the CGP. The binder includes copies of the SWPPP summary sheets and all required appendices. Texas DOT project personnel must use, complete, and maintain up-to-date and current SWPPP binders while construction activities are ongoing. Overall, the SWPPP summary sheets and binder are considered living documents by Texas DOT and are to be maintained and updated while the project has active construction activities. Although SWPPP documents can be electronic or hard copies, Texas DOT prefers using digital files; therefore, the DOT continues to move toward an e-construction platform for all aspects of a highway construction project.

Best Management Practices

Texas DOT has the following four categories of construction BMPs used for stormwater management and E&SC:

1. Erosion control devices and practices
2. Sediment control devices and practices
3. Pollution prevention and housekeeping practices
4. BMPs for environmental permits, issues, and commitments (EPIC)

Each BMP listed in these categories includes a design fact sheet and an inspection fact sheet used by Texas DOT design engineers, project inspectors, and consultants. The information also helps contractors understand building plans and inspection processes that occur during construction.

Erosion control devices and practices help minimize the potential for erosion by protecting exposed soil. The erosion control devices and practices used on Texas DOT projects during construction include the following:

- Vehicle tracking
- Biodegradable erosion control logs
- Preservation of existing vegetation
- Stockpile management
- Sediment control fence
- Outlet protection

- Rock filter dam
- Temporary pipe slope drain
- Runoff interception
- Vegetated filter strips and buffers

Sediment control devices and practices help reduce or eliminate sediment discharges outside the project limits caused by stormwater runoff. The sediment control devices and practices used on Texas DOT projects during construction include the following:

- Floating turbidity barrier
- Sediment control fence
- Stockpile management
- Stabilized construction entrance and exit
- Biodegradable sediment control logs
- Construction perimeter silt fence
- Street sweeping
- Stream and clear water diversion
- Sediment trap
- Earthen berm

Pollution prevention and housekeeping practices help minimize stormwater pollution by managing non-sediment pollutants such as chemicals and trash found at highway construction sites. The pollution prevention and housekeeping practices used by Texas DOT during construction include the following:

- Spill and leak response
- Stockpile management
- Sanitary waste management
- Chemical management
- Concrete waste management
- General materials and equipment management
- Materials and equipment used over water
- Dewatering controls
- Watering trucks and street sweepers

EPIC BMP measures and practices are implemented during construction to protect biological, historical, and archeological sites; vegetation and habitats; and water resources. EPIC are also used to manage hazardous materials. EPIC are typically used during construction when required by the NEPA process rather than for stormwater management.

EPIC BMPs used on Texas DOT construction projects include the following:

- Amphibian and reptile exclusion fence
- Preservation of existing vegetation
- Tree protection
- Vegetation filter strips and buffers
- Dewatering controls

Texas DOT has no policy for using flocculants as a BMP for E&SC. Texas DOT staff mentioned that flocculants are not used often and that a few districts in Texas DOT have used them in rare instances. Flocculants are used mostly as a last resort when other practical options do not suffice.

Texas DOT has several options for stormwater management training. Training programs are either online or in-person and set up in tracks in a training matrix for inspectors, designers, environmental personnel, and contractors. The inspector training track includes learning how to

inspect BMPs and use Form 2118 to record deficiencies and complete inspections. The classes for designers focus on learning how to properly prepare the SWPPP and associated summary sheets. Texas DOT also offers required training classes for contractors. In addition, Texas DOT has a required eight-hour online class to learn about the different types of BMPs allowed for use on construction projects that Texas DOT employees and external employees (from contractors to consultants) can attend. This training informs them how to design and prepare the SWPPP and inspect stormwater management during construction. Texas DOT personnel and third-party construction engineering and inspection (CEI) personnel are required to take the training, while consultants and local government agencies are also allowed to take courses at their discretion. District DOT staff typically conduct in-person training. The Operations Compliance Section of the Environmental Affairs Division at the central office is in charge of training district personnel, who lead the in-person training and provide virtual training for CEIs.

Each Texas DOT district has at least one District Environmental Quality Coordinator (DEQC). These coordinators are responsible for ensuring stormwater and environmental compliance in the districts and teaching district inspectors. Stormwater subject matter experts from the Operations Compliance Section of the Environmental Affairs Division at the central office teach an annual DEQC Summit to update the DEQCs on any changes to the CGP, processes and procedures, training, and so forth.

Texas DOT currently teaches much of its training in-house, with the help of DEQCs in each district, and has eliminated many outside vendors who taught classes previously. This situation has increased the number of personnel trained and has also resulted in DOT cost savings.

Audits

Internal audits, also referred to as EPIC surveys, inspect all aspects of the environment, permitting, issues, and commitments, along with stormwater management and E&SC measures. Audits are conducted in each district (typically every 5–6 years) by stormwater personnel from the Operations Compliance Section at headquarters. The inspection takes approximately 4 days in each district and focuses on three to four projects in detail. A checklist is used to review all aspects of the SWMP for a project, including permit, SWPPP summary sheets, SWPPP binder, and BMPs and control measures in place on the project. The Construction Division conducts a similar internal survey; stormwater compliance is one component of this construction survey. Finally, the EMS Construction Stage Gate Checklist, which is completed by the project manager or DEQC at least annually on each project, also focuses on stormwater and environmental compliance.

The EPA and the FHWA have performed regulatory audits in the past, but rarely. These audits are difficult to prepare because the time of their occurrence is unknown. However, a few years ago, an EPA regulatory audit led to changes resulting in the current EMS program. The FHWA audited the NEPA program and reviewed Texas DOT's compliance with its stormwater management program and its EPIC program. The state regulatory agency, Texas CEQ, conducts regulatory audits of Texas DOT construction projects. The Texas CEQ has recently audited highway construction projects for the MS4 program to determine compliance with those permit requirements.

Experiences and Findings

Sharing the experiences of Texas DOT staff involved with construction stormwater program management helps other DOTs with their construction stormwater management program and

associated processes and procedures for managing, tracking, monitoring, and reporting compliance with permit requirements. The findings from Texas DOT include the following:

- **Consistency:** Texas DOT realized recently that many districts handled construction stormwater management differently from one district to the next. This inconsistency made it cumbersome to track and monitor all projects under construction and to inspect projects using different processes. By using new guidelines, forms, and templates that are now standard for all districts, Texas DOT has achieved more consistency in its program.
- **Digital stormwater management:** Texas DOT is moving all documents and information related to stormwater management, E&SC, and the SWPPP to electronic and digital files to ensure all documentation is stored properly and can be referred to later if needed.
- **Co-permits:** Texas DOT has set up its CGP as a co-permittee. Texas DOT and the contractor are responsible for complying with permit requirements, which adds more accountability on the contractor, who can be directly cited by a regulatory agency when not in compliance with permit requirements.
- **In-house trainers:** Texas DOT uses in-house personnel to teach their stormwater classes in lieu of outside vendors. In addition, Texas DOT is also building more online classes to reach larger audiences, resulting in more availability of classes and higher numbers of personnel trained annually. The use of in-house personnel and online classes also allows for updating training classes more easily as permit requirements and guidance change.

Summary of Case Examples

The six case examples provided in-depth information about the state of the practice related to state DOT construction stormwater management programs. Each of the state DOTs was asked to discuss the approaches and processes used for construction stormwater management, including the following:

- Obtaining required permits and ensuring compliance with permit requirements
- Benefits and challenges experienced by state DOTs when managing construction stormwater runoff
- Preparing and managing SWPPPs, BMPs, and control measures
- Training for construction stormwater management including BMP installation and inspection training
- Internal and regulator audits
- Experiences and findings helping state DOTs with their construction stormwater management program

Table 5 outlines similarities and differences found in the six state DOTs related to their approach to permitting, E&SC, site plan, and the state regulatory agency that administers the permit and provides regulatory audits of construction sites.

In addition, the case examples provided information on the training programs for construction stormwater management. Table 6 summarizes the training programs offered by the six state DOTs for in-house and contractor personnel, including designers, inspectors, and installers.

Finally, each state DOT was asked to provide experiences and findings that have impacted construction stormwater management. Table 7 summarizes the experiences and findings collected from the case examples. Similarities are evident in proactive and performance-based approaches, building in consistency, and providing training for construction stormwater management. Other findings include the use of liquidated damages when deficiencies are not addressed, requirements for contractors to take photographs of corrective measures, and the use of co-permitting, in which the DOT and the contractor are equally accountable for permit compliance.

Table 5. Similarities and differences of construction stormwater management among state DOTs in case examples.

DOT	Permit Requirements	Stormwater Specifications	Site Plan	State Regulatory Agency	Audit Frequency
Colorado	Colorado Discharge Permit System – Stormwater Construction Permit and the Construction Sites MS4 Permit	Liquidated damages can be assessed on the contractor after 7 days for failure to comply with the construction stormwater specification.	Stormwater Management Plan	Colorado Department of Public Health and Environment	Regulatory: Every 5 years Internal: Monthly
Florida	NPDES CGP	Issue warnings or deficiency letters for deficiencies needing to be addressed. When a deficiency continues to escalate, it negatively impacts the past performance rating, making it more difficult for a contractor to obtain future work.	SWPPP and E&SC Plan	Florida Department of Environmental Protection	Regulatory: Infrequently (every 3–5 years) Internal: Quarterly
Iowa	NPDES General Permit No. 2	The specification includes an item for the Mobilization for Erosion Control, which sets a pre-determined unit price that the contractor has 72 hours to mobilize and 7 days to complete the corrective work to be paid. If mobilization takes longer than 72 hours or the work takes more than 7 days to complete, the DOT imposes a deduction per calendar day from the payment for the work.	SWPPP	Iowa Department of Natural Resources	Regulatory: Quarterly Internal: Weekly
New York State	State Pollution Discharge Elimination System (SPDES)	Per the Bluebook, contractors must address deficiencies within 24 hours from the time they are discovered.	SWPPP	New York State Department of Environmental Conservation	Regulatory: Infrequently (every 3–5 years) Internal: Based on the SPDES for the project
Pennsylvania	PAG-02 NPDES General Permit and the Erosion & Sediment Control Permit	When deficiencies are found, information is documented, and corrective actions must follow the Compliance Response Policy (CRP) summary table.	Erosion & Sediment Pollution Control (ESPC) Plan	Pennsylvania Department of Environmental Protection	Regulatory: Infrequently (every 3–5 years) Internal: One self-inspection per construction season
Texas	Texas Pollution Discharge Elimination System (TPDES) CGP and the MS4	The <i>Ladder Guidance Escalation Document</i> defines deficiencies as Low-Priority, Medium-Priority, and High-Priority. After a deficiency is elevated to High-Priority, it can become a violation.	SWP3	Texas Commission on Environmental Quality	Regulatory: Annually Internal: EPIC surveys conducted every 5 years per district

Table 6. Construction stormwater management training programs of state DOTs in case examples.

DOT	Training Program
Colorado	<ul style="list-style-type: none"> • Transportation Erosion Control Supervisor (TECS) certification training for stormwater management plan administrators (for contractors) • Stormwater management plan designer training (for in-house staff) • Stormwater management plan reviewer training (for in-house staff) • Region Water Pollution Control Manager (RWPCM) new hire training (for new DOT hires)
Florida	<ul style="list-style-type: none"> • Florida Stormwater, Erosion, and Sedimentation Control Inspector (FSESCI) program for training and certifying inspectors
Iowa	<ul style="list-style-type: none"> • Erosion and Sediment Control Training and Certification program for resident engineers, inspectors, local agencies, contractors, and consultants
New York State	<ul style="list-style-type: none"> • On-the-job training and classroom certification training for installers and inspectors
Pennsylvania	<ul style="list-style-type: none"> • Construction Stormwater Inspection Training Program for in-house and consultant inspectors • Pennsylvania Clean Water Academy training for the PAG-01 NPDES Permit
Texas	<ul style="list-style-type: none"> • Training Tracks for inspectors, designers, environmental personnel, and contractors • Online training for BMP types and installation • Online training for SWPPP development

Table 7. Experiences and findings of state DOTs in case examples.

DOT	Experiences and Findings
Colorado	<ul style="list-style-type: none"> • Use of proactive construction stormwater management specifications. • Use of liquidated damages when deficiencies are not addressed per the contract. • Training programs for construction stormwater management.
Florida	<ul style="list-style-type: none"> • Moving from a prescriptive-based to a performance-based approach to construction stormwater management. • Set performance standards for the contractor to follow to manage stormwater during construction.
Iowa	<ul style="list-style-type: none"> • Having enough resources helps for full execution of the construction stormwater management program. • The Erosion and Sediment Control Training and Certification Program helps reduce deficiencies and improve consistency.
New York State	<ul style="list-style-type: none"> • Map out the locations of BMPs and control measures. • Inspection of BMPs and SPDES requirements is a potential worker-power burden to be offset by using consultants. • Require contractors to take photographs of corrective actions of BMPs.
Pennsylvania	<ul style="list-style-type: none"> • Transparency and consistency are key for stakeholders to understand the approach and to align expectations for construction stormwater management. • Training programs for designers, implementers, and inspectors help build more consistency and experience into the construction stormwater management program.
Texas	<ul style="list-style-type: none"> • Implemented new guidelines, forms, and templates for all districts to improve consistency of construction stormwater management. • The CGP is a Co-Permit in which the DOT and contractor are both equally accountable for complying with permit requirements. • Use of in-house trainers has resulted in more availability of classes and higher numbers of personnel trained annually.



CHAPTER 5

Summary of Findings

By the late 1960s, industrial discharges, deficiencies in sewage treatment, and agricultural runoff had mounted a growing cause for concern about water quality. This situation and events such as the Cuyahoga River Fire led to a call for action; consequently, the Clean Water Act (CWA) of 1972 was passed into law. The National Pollutant Discharge Elimination System (NPDES) permitting program's construction general permit (CGP) is a critical component of the CWA and is administered by the EPA. It regulates the discharge of pollutants from construction activities to protect water quality. The CGP covers stormwater discharges from construction activities that disturb 1 or more acres of land. It requires construction site operators or owners, including state departments of transportation (DOTs), to implement measures to control sediment and pollutants in stormwater runoff. As part of this process, state DOTs must navigate a multi-stage permit and implement elements such as a stormwater pollution prevention plan (SWPPP) detailing how erosion and sediment discharges are controlled during construction.

This synthesis summarizes an investigation of state DOTs' approaches to implementing and maintaining compliance with the CWA, NPDES program, and federal and state stormwater permits (e.g., the CGP). This synthesis documents state DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements. The synthesis was completed through a literature review, a survey of state DOTs, and interviews with select state DOTs.

Literature Review

The synthesis reviews academic and research literature, FHWA and AASHTO documents, reports, websites, and relevant legislation and policy. The literature review demonstrates that most states have regulatory agencies authorized to implement the NPDES programs on behalf of the EPA and that the state NPDES must be at least as stringent as the federal requirements. In these cases, state DOTs must comply with federal and state-specific requirements. For compliance with state-authorized NPDES permitting programs and the associated CGP for construction, DOTs typically work closely and in coordination with state environmental and regulatory agencies.

The literature review also includes information about best management practices (BMPs) and associated erosion and sediment control (E&SC) measures. These devices or treatments may be temporary or permanent during active construction; that is, they remain in place after project completion and continue to treat runoff and discharge from the project. The literature review notes differences in the terminology used to describe construction BMPs across state DOTs. Based on a review of specifications and manuals, BMPs may be referred to by different names. The review of specifications also indicated that payment terms and responsibilities (between

state DOTs and contractors) vary. These differences in payment terms and responsibilities were further discussed in the feedback from the state DOT survey.

Survey Questionnaire

The objective of the survey questionnaire is to identify current practices in use by state DOTs to address, track, monitor, and manage construction stormwater compliance requirements. The survey collected 42 DOT responses from its distribution to 50 state DOTs, the District of Columbia, and Puerto Rico DOTs (81% response rate). The survey was distributed to the voting members of the AASHTO Committee on Construction. The following summarizes the survey findings.

In relation to how programs are managed for construction stormwater, 33 of 42 responding state DOTs (79%) noted having a statewide program; 27 of 42 DOTs (64%) have a project-by-project approach; and 14 of 42 DOTs (33%) have a program based on types of projects. In relation to SWPPPs, the survey responses indicate that most SWPPPs (25 of 42 DOTs, 60%) are prepared during the design and engineering phase of the project, with 15 of 42 DOTs (36%) noting that they are prepared during the pre-construction phase. While the results indicate shared responsibilities between design engineers (26 of 42 DOTs, 62%), contractors (24 of 42 DOTs, 57%), and consultants (21 of 42 DOTs, 50%) in preparing the project site-specific SWPPP, most DOTs indicated that managing SWPPPs is the responsibility of the contractors (33 of 42 DOTs, 79%) or construction project managers (26 of 42 DOTs, 62%).

Similarly, the results indicate that the state DOTs are responsible for design guidelines development (36 of 41 DOTs, 88%), monitoring and tracking control measures (36 of 41 DOTs, 88%), inspections (35 of 41 DOTs, 85%), training project personnel (34 of 41 DOTs, 83%), and reporting (33 of 41 DOTs, 80%). Contractors are responsible for the installation of BMPs (41 of 41 DOTs, 100%), violation remediation (40 of 41 DOTs, 98%), BMP maintenance (39 of 41 DOTs, 95%), inspection deficiency remediation (36 of 41 DOTs, 88%), and monitoring and tracking control measures (33 of 41 DOTs, 80%).

In relation to inspection of control measures, most state DOTs (35 of 42 responses, 83%) have an inspection process in place. These approaches include regular site investigations (33 of 42 DOTs, 79%); 20 of 42 DOTs (48%) constantly review control measures; and 16 of 42 DOTs (38%) have used their internal audits to monitor the performance of construction stormwater management requirements. Alternatively, 4 of 42 DOTs (10%) noted using performance-based metrics to monitor their construction stormwater management requirements.

The survey indicated the differences among state DOTs in recording, reporting, maintenance, inspection program responsibilities, training, qualifications, and certification requirements. Similarities were also found between responding state DOTs related to the common BMPs used for construction stormwater management, such as erosion control logs, check dams, stabilized construction entrances and exits, silt fences and barriers, sediment basins, temporary or permanent hydromulching/seeding, and many more. However, as mentioned earlier, these BMPs may not be referred to with the same name from state to state.

Case Examples

The case examples were conducted to provide details about the survey findings related to state DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements. Colorado, Florida, Iowa, New York, Pennsylvania, and Texas were selected for case example interviews.

The case example interviews describe the differences and successes among construction stormwater management programs from state to state. For example, Colorado and Texas DOTs operate under the general statewide CGP and municipal separate storm sewer system (MS4) permits and associated requirements, whereas Iowa DOT does not have a state-level MS4 permit. Additionally, New York State DOT has a State Pollutant Discharge Elimination System for administering the NPDES CGP; recently, the DOT has started to map out and track the locations of temporary and permanent BMPs. Florida DOT is moving toward performance-based specifications for construction stormwater management and placing the responsibility on the contractor for filing for the CGP and its compliance. The contractor is also involved in developing the project site-specific SWPPP at Florida DOT. Colorado DOT follows a practice-based approach, encouraging contractors to proactively manage construction stormwater.

The case examples noted the importance of being proactive and consistent in construction stormwater management. They also noted that consistency can be improved through inspection programs built specifically for state DOTs. Implementing uniform guidelines, forms, and templates, as mentioned by the Iowa, Pennsylvania, and Texas DOTs, can be another approach to building consistency within construction stormwater management programs (SWMPs). DOTs also mentioned that recently implemented changes to their construction SWMPs allow them to hold the contractor more accountable in their actions related to construction stormwater management. This situation is indicated by the liquidated damages mechanism in place at Colorado DOT, the requirement to photograph corrective actions by New York State DOT, and DOT and contractor co-permittees, as mentioned by Florida and Texas DOTs. In each case example, interviewees noted that resource constraints limit the time available for the DOT to inspect construction sites for stormwater management. The responsibility must be shared with the contractor through well-developed specifications and permit requirements.

Knowledge Gaps and Suggested Future Research

The gaps in knowledge and practice identified in this synthesis may serve as potential future research topics. Each of these gaps will require greater insight and development before performing the research. Therefore, to improve and enhance state DOT practices, tools, and approaches for managing compliance with state and federal construction stormwater permit requirements, future research is suggested in the following areas:

- Develop guidelines for construction SWMPs, including alternative contracting methods (e.g., design-build, construction manager/general contractor), uniformity in training and certifications, phasing approaches to minimize ground disturbances during construction, monitoring discharges during construction, and technologies, programs, and applications used for construction stormwater management.
- Develop consistency in BMP and construction stormwater management terminology and applications by creating guidelines for stormwater management and BMP programs during and after construction.
- Conduct a synthesis on MS4 programs and DOT compliance with permit requirements for construction, operations, and maintenance.
- Conduct a synthesis on state DOT implementation, maintenance, and inspection of post-construction BMPs for stormwater management after a project is complete and in operation.

These areas are interconnected for standardization across programs; thus, they would build consistency into BMP terminology and applications. Consistency would create efficiencies among states in areas such as approved products (i.e., states could use the approved products list of other states if they share similar requirements and standards). Greater consistency may

also enable more uniform construction stormwater management training programs. If training programs were similar, certification could be transferable from state to state, making work across state lines more efficient for contractors and consultants. Additionally, stormwater management tends to be handled differently for design-build and construction manager/general contractor delivery methods. Investigating different approaches would help DOTs improve stormwater management for innovative contracting projects. Finally, investigating the current state of the practice in compliance with MS4 programs and implementing post-construction BMPs would benefit state DOTs and their associated contractors and consultants.



References

- Barrett, M. E., and Malina, J. F. (1995). *Water Quality and Quantity Impacts of Highway Construction and Operation: Summary and Conclusions*.
- Belayutham, S., González, V. A., and Yiu, T. W. (2016). A Cleaner Production-Pollution Prevention Based Framework for Construction Site Induced Water Pollution. *Journal of Cleaner Production*, 135, pp. 1363–1378. <https://doi.org/10.1016/j.jclepro.2016.07.003>
- Bustios, A., and Stanhouse, A. (2024). What Is a Minimum Control Measure? *Stormwater Solutions*, January. <https://www.stormwater.com/stormwater-management/sewers-drainage-systems/article/53082676/what-is-a-minimum-control-measure>
- Caltrans. (2016). *Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual*, Report CTSW-RT-16-314.14.1. California Department of Transportation, Division of Environmental Analysis, Stormwater Program.
- Caltrans. (2024). *Construction Site Best Management Practices (BMP) Manual*. Report CTSW-RT-24-425.11.1. California Department of Transportation, Division of Environmental Analysis, Stormwater Program. https://dot.ca.gov/-/media/dot-media/programs/construction/documents/environmental-compliance/construction-site-bmps_final-march-2024_a11y.pdf
- Campbell, B. (2022). What Is the National Pollutant Discharge Elimination System (NPDES)? *Wastewater Digest*, June. <https://www.wwdmag.com/what-is-articles/article/11004207/what-is-the-national-pollutant-discharge-elimination-system-npdes>
- CDPHE. (2024). *Water Quality Municipal MS4 Permits*. Colorado Department of Public Health and Environment, Glendale, CO. <https://cdphe.colorado.gov/wq-municipal-ms4-permits>
- Colorado DOT (2021). *MS4 Construction Sites Program Manual*, Version 1.4. Colorado Department of Transportation.
- Colorado DOT. (2023). *MS4 Construction Program Manual Design-Bid-Build Projects*. Colorado Department of Transportation, Denver, CO.
- Cook, M., Gilinsky, E., Hanlon, J., Quigley, M., Shapiro, M., and Wayland, B. (2020). *Water Quality: A Half Century of Progress*. Environmental Protection Agency Alumni Association, Washington, DC.
- EPA. (2022). *2022 Construction General Permit (CGP). National Pollutant Discharge Elimination System Construction General Permit for Stormwater Discharges from Construction Activities*. Environmental Protection Agency, Washington, DC. <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-permit.pdf>
- EPA. (2024a). *National Menu of Best Management Practices (BMPs) for Stormwater – Construction*. Environmental Protection Agency, Washington, DC. <https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater-construction>
- EPA. (2024b). *About NPDES*. Environmental Protection Agency, Washington, DC. <https://www.epa.gov/npdes/about-npdes#overview>
- EPA. (2024c). *Stormwater Discharges from Municipal Sources*. Environmental Protection Agency, Washington, DC. <https://www.epa.gov/npdes/stormwater-discharges-municipal-sources>
- Faucette, L. B., Scholl, B., Beighley, R. E., and Governo, J. (2009). Large-Scale Performance and Design for Construction Activity Erosion Control Best Management Practices. *Journal of Environmental Quality*, 38(3), pp. 1248–1254. <https://doi.org/10.2134/jeq2008.0415>
- FDOT. (2013). *Erosion and Sediment Control: Designer and Reviewer Manual*. Florida Department of Transportation and Florida Department of Environmental Protection, State Erosion and Sediment Control Task Force. <https://www.fdot.gov/docs/default-source/roadway/Drainage/files/Erosion-Sediment-Control.pdf>
- Hawkins, C. P. (2015). The Clean Water Rule: Defining the Scope of the Clean Water Act. *Freshwater Science*, 34(4), pp. 1585–1587. <https://doi.org/10.1086/684005>

- HDOT. (2021). *Construction Best Management Practices Field Manual*. State of Hawaii Department of Transportation, Highways Division. https://www.stormwaterhawaii.com/wp-content/uploads/2021/10/Construction-BMP-Field-Manual_October-2021.pdf
- National Association of Clean Water Agencies. (2018). *MS4 Stormwater Permitting Guide*. Washington, DC. https://www.nacwa.org/docs/default-source/news-publications/white-papers/2018-03-07permittingguide.pdf?sfvrsn=29e1f761_4
- NDOT. (2013). *Nevada Contractors Field Guide for Construction Site Best Management Practices*. Nevada Department of Transportation. <https://www.dot.nv.gov/home/showpublisheddocument/3728/636186193540570000>
- NMDOT. (2023). *National Pollutant Discharge Elimination System Manual: Stormwater Management Guidelines for Construction, MS4, and Industrial Activities*. New Mexico Department of Transportation. <https://www.dot.nm.gov/wp-content/uploads/2024/01/NMDOT-NPDES-Manual-Rev-4-2023.pdf>
- Reice, S., and Carmin, J. (2000). *Regulating Sedimentation and Erosion Control into Streams: What Really Works and Why*. National Conference on Tools for Urban Water Resource Management and Protection Proceedings, February 7–10, p. 291.
- SCDHEC. (2005). *Storm Water Management BMP Field Manual*. South Carolina Department of Health and Environmental Control, Columbia, SC. https://scdhec.gov/sites/default/files/docs/Environment/docs/OCRM_DHEC_FIELD_MANUAL.pdf
- Texas DOT. (2018). *Municipal Separate Storm Sewer System (MS4) Permit Number WQ0005011000*. Texas Department of Transportation, Environmental Affairs Division, Stormwater Management Program. <https://ftp.txdot.gov/pub/txdot-info/env/toolkit/515-01-pmt.pdf>
- Utah DEQ. (2020). *Utah Pollutant Discharge Elimination System, General Permit for Storm Water Discharges from Construction Activities*. Utah Department of Environmental Quality, Division of Water Quality, Salt Lake City, UT.



List of Abbreviations and Acronyms

BMP	best management practice
CCD	county conservation district
CDPS	Colorado Discharge Permit System
CEI	construction engineering and inspection
CEQ	Commission on Environmental Quality
CGP	construction general permit
CI	construction inspection
CISEC	Certified Inspector of Sediment and Erosion Control
CMO	change modification order
CMP	compliance management program
CPESC	Certified Professional in Erosion and Sediment Control
CPPR	contractor past performance rating
CRP	Compliance Response Policy
CSGC	Construction Stage Gate Checklist
CWA	Clean Water Act
DEC	Department of Environmental Conservation
DEP	Department of Environmental Protection
DEQ	Department of Environmental Quality
DEQC	District Environmental Quality Coordinator
DHEC	Department of Health and Environmental Control
DNR	Department of Natural Resources
DPHE	Department of Public Health and Environment
E&SC	erosion and sediment control
ECB	erosion control blanket
ECL	environmental conservation law
ECMS	engineering construction management system
ECT	Erosion Control Technician
EMS	environmental management system
EPIC	environmental permits, issues, and commitments
ERP	environmental resource permitting
ESPC	erosion and sediment pollution control
FGM	flexible growth matrix
FSESCI	Florida Stormwater, Erosion, and Sedimentation Control Inspector
KEES	Keystone Environmental e-Permitting System
LOC	limits of construction
MAR	monthly audit report
MCM	minimum control measure
MS4	municipal separate storm sewer system

NEPA	National Environmental Policy Act
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
PAM	polyacrylamide
PCSM	post-construction stormwater management
PE	Professional Engineer
PPC	preparedness, prevention, and contingency
PWQCM	permanent water quality control measures
QA	quality assurance
QC	quality control
ROW	right-of-way
RWPCM	Region Water Pollution Control Manager
SCP	stormwater construction permit
SME	subject matter expert
SPDES	State Pollution Discharge Elimination System
SSWMP	statewide stormwater management program
SWMP	stormwater management program
SWPPP	stormwater pollution prevention plan
TDS	total dissolved solids
TECS	Transportation Erosion Control Supervisor
TPDES	Texas Pollutant Discharge Elimination System
TRM	turf reinforcement mat
TSS	total suspended solids
VSIR	Visual Site Inspection Report
WMD	water management district



APPENDIX A

Survey Questionnaire

1. I consent to participate in this survey.

☐ Yes

☐ No (*If “No” is selected, the participant is directed to the end of the survey.*)

GENERAL INFORMATION

2. Please provide the following contact information.

First & Last Name:	
Title/Role:	
Phone Number:	
Email:	
Your DOT:	

3. What department/group/division do you primarily work in?

☐ Construction

☐ Stormwater Management/Drainage

☐ Environment

☐ Landscape Design

☐ Materials

☐ Maintenance/Operations

☐ Design/Engineering

☐ Policy and Regulations

☐ Permitting

☐ Other, please specify: _____

4. How is construction stormwater management handled at your DOT?

☐ Formal construction stormwater management program, separate from project management

☐ Construction stormwater management is part of the project management process.

☐ Both options above are used depending on the project scope and size.

5. What division(s)/department(s) within your DOT is/are involved in the construction stormwater management program? (Select all that apply.)

- ☐ Construction
- ☐ Stormwater Management/Drainage
- ☐ Environment
- ☐ Landscape Design
- ☐ Materials
- ☐ Maintenance/Operations
- ☐ Design/Engineering
- ☐ Policy and Regulations
- ☐ Permitting
- ☐ Materials
- ☐ Other, please specify: _____

CONSTRUCTION STORMWATER MANAGEMENT

6. What approaches to construction stormwater management does your DOT regularly use for highway projects? (Select all that apply.)

- ☐ Statewide
- ☐ Regional
- ☐ By DOT district
- ☐ Project-by-project
- ☐ By types of projects
- ☐ Other, please specify: _____

7. What construction stormwater management control measures have your DOT approved for use in highway construction? (Select all that apply.)

Measure	Approved for use by your DOT
Active treatment system	<input type="checkbox"/>
Bales (hay, straw, etc.)	<input type="checkbox"/>
Bonded fiber matrix	<input type="checkbox"/>
Check dams (rock, sandbag, socks, rolls, silt fence, tubes, etc.)	<input type="checkbox"/>
Construction de-watering	<input type="checkbox"/>
Diversion berms/dikes	<input type="checkbox"/>
Drainage swales/ditches	<input type="checkbox"/>
Dust control	<input type="checkbox"/>
Erosion control blankets (channel, slope, etc.)	<input type="checkbox"/>
Erosion control logs (wattles, sediment tubes, fiber rolls, composite socks, etc.)	<input type="checkbox"/>
Flexible growth medium	<input type="checkbox"/>
Flocculants	<input type="checkbox"/>
Hydromulching/seeding (temporary, permanent, etc.)	<input type="checkbox"/>
Inlet protection	<input type="checkbox"/>
Level spreader	<input type="checkbox"/>

Measure	Approved for use by your DOT
Limitations of disturbance (grading limits, etc.)	<input type="checkbox"/>
Mulching (grass, hay, wood chips, wood fibers, straw, etc.)	<input type="checkbox"/>
Other chemical treatments	<input type="checkbox"/>
Outlet protection	<input type="checkbox"/>
Pipe slope drains	<input type="checkbox"/>
Preserve existing vegetation	<input type="checkbox"/>
Riprap	<input type="checkbox"/>
Sediment basin	<input type="checkbox"/>
Sediment trap	<input type="checkbox"/>
Silt fence/barrier	<input type="checkbox"/>
Sodding	<input type="checkbox"/>
Stabilized construction entrances/exits	<input type="checkbox"/>
Subsurface drains	<input type="checkbox"/>
Surface roughening (tracking, stair-step grading, grooving, etc.)	<input type="checkbox"/>
Temporary stream crossing	<input type="checkbox"/>
Turbidity barrier (staked, floating, etc.)	<input type="checkbox"/>
Turf reinforcement mats	<input type="checkbox"/>
Water quality non-structural controls (stream buffers, vegetated conveyance systems, etc.)	<input type="checkbox"/>
Water quality structural controls (detention ponds, vegetated filter strips, etc.)	<input type="checkbox"/>
Other, please specify: _____	<input type="checkbox"/>

8. Which flocculants does your DOT use for construction stormwater management? (Select all that apply.) *(NOTE: This question is only shown to the participant if they select "Flocculants" in the previous question.)*

- ☐ Natural polymer (e.g., Chitosan)
☐ Synthetic polymer (e.g., Polyacrylamide)
☐ Inorganic polymer (e.g., Polyaluminum chloride, Calcium sulfate)
☐ Natural flocculant (e.g., Natural starch, Mimosa bark)
☐ Monomer (e.g., Diallyl Dimethyl Ammonium Chloride)
☐ Other, please specify: _____

9. Who is responsible for preparing and managing the SWPPP for a highway construction project at your DOT? (Select all that apply.)

	Prepares the SWPPP	Manages the SWPPP
Construction Project Manager	<input type="checkbox"/>	<input type="checkbox"/>
Design Engineer	<input type="checkbox"/>	<input type="checkbox"/>
Environmental control specialist	<input type="checkbox"/>	<input type="checkbox"/>
Environmental Engineer	<input type="checkbox"/>	<input type="checkbox"/>
Environmental Department Manager	<input type="checkbox"/>	<input type="checkbox"/>

	Prepares the SWPPP	Manages the SWPPP
Stormwater/Drainage Program Manager	<input type="checkbox"/>	<input type="checkbox"/>
DOT project management team	<input type="checkbox"/>	<input type="checkbox"/>
Inspector	<input type="checkbox"/>	<input type="checkbox"/>
Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Consultants	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>

10. When does your DOT prepare the SWPPP for a highway construction project? (Select all that apply.)

- ☐ Once a project receives funding
- ☐ During design and engineering of a project
- ☐ During pre-construction
- ☐ Just prior to construction
- ☐ Other, please specify: _____

RESPONSIBILITIES FOR CONSTRUCTION STORMWATER MANAGEMENT

11. Please select which party typically performs the following tasks related to construction stormwater management at your DOT. (Select all that apply.)

	State DOT	Contractor	Consultants
Monitor and track control measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design guidance development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspection deficiency remediation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training project personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Violation remediation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. On average, what percentage of construction stormwater management inspections are conducted by consultants at your DOT? (This can be an approximate estimate.)

- ☐ 0-10%
- ☐ 11-20%
- ☐ 21-30%
- ☐ 31-40%
- ☐ 41-50%
- ☐ More than 50%
- ☐ Not sure

13. Who is responsible for the cost of installing and maintaining control measures for highway construction projects at your DOT? (Select all that apply.)

	Cost to Install	Cost to Maintain and Replace
DOT pays for all of it.	<input type="checkbox"/>	<input type="checkbox"/>
The contractor pays for all of it.	<input type="checkbox"/>	<input type="checkbox"/>
An agreed upon percentage is paid for by the contractor and the rest is paid for by the DOT.	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>

14. How are initial costs to install and maintain control measures for highway construction projects estimated at your DOT?

- ☐ Standard estimating approach
- ☐ Risk-based estimating approach
- ☐ Use of estimated cost ranges based on project size and complexity
- ☐ Not sure
- ☐ Other, please specify: _____

STORMWATER MANAGEMENT TRACKING AND INSPECTION

15. How does your DOT track construction stormwater management requirements or compliance? (Select all that apply.)

- ☐ Internal software program
- ☐ Off the shelf software program
- ☐ Proprietary software program
- ☐ Site investigations
- ☐ Field logs and databases
- ☐ Field apps used on a smartphone or tablet
- ☐ Photos and videos
- ☐ No standardized methodology is used statewide
- ☐ Other, please specify: _____

16. How does your DOT monitor the performance of the construction stormwater management requirements for highway projects? (Select all that apply.)

- ☐ Using performance metrics
- ☐ Review of control measures in place
- ☐ Inspection of control measures in place
- ☐ Regular site investigations
- ☐ Internal audits
- ☐ Audits performed by consultants
- ☐ Other, please specify: _____

17. What performance metrics are used by your DOT to track construction stormwater management requirements? (*NOTE: This question is only shown to the participant if they select "Using performance metrics" in the previous question.*) (Select all that apply.)

- ☐ Number of control measures/BMPs in place
- ☐ Amount of stormwater management maintenance performed on a project

- ☐ Percentage of project costs used for installing control measures/BMPs
- ☐ Percentage of project costs used for maintaining control measures/BMPs
- ☐ Total cost of the construction stormwater management program for a project
- ☐ Delays caused by maintaining control measures/BMPs
- ☐ Number of stormwater discharge, erosion or sedimentation deficiencies received
- ☐ Percentage of time project is in non-compliance with stormwater permit requirements
- ☐ Amount of time used to remedy deficiencies
- ☐ Regular inspection intervals for inspecting control measures/BMPs
- ☐ Other, please specify: _____

18. On average, when an inspection deficiency occurs, how much time on average does it take to correct the deficiency? (This can be an approximate estimate.)

- ☐ Less than 5 days
- ☐ 5-10 days
- ☐ 11-15 days
- ☐ 16-20 days
- ☐ 21-25 days
- ☐ 26-30 days
- ☐ More than a month
- ☐ Other, please specify: _____

DESIGN STANDARDS AND QUALIFICATIONS

19. What qualifications are required by NPDES permits for designers, inspectors, and installers at your DOT? (Select all that apply.)

	Designers	Inspectors	Installers
Professional Engineer (PE)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Professional Landscape Architect (PLA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State stormwater program certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOT-administered certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State regulatory administered certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National certification (CPESC, CISEC, etc.)			
Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Design guidelines for construction stormwater management at your DOT are based on (select all that apply):

- ☐ DOT guidelines
- ☐ Federal guidelines
- ☐ General construction practices
- ☐ Rules of thumb/current practices
- ☐ Scientific research
- ☐ State regulator guidelines
- ☐ Other, please specify: _____

21. Which of the following parties are responsible for the development of design standards for construction stormwater management that are used by your DOT? (Select all that apply.)

- ☐ State DOT
- ☐ State environmental agency
- ☐ AASHTO
- ☐ FHWA
- ☐ Other state agency
- ☐ Other, please specify: _____

22. How often, on average, does your DOT update guidelines for construction stormwater management?

- ☐ Annually
- ☐ 2-3 years
- ☐ 4-5 years
- ☐ 6-7 years
- ☐ 8-9 years
- ☐ 10 years or more
- ☐ As needed
- ☐ When revisions to federal and state permit and regulatory requirements occur
- ☐ Other, please specify: _____

CONSTRUCTION STORMWATER MANAGEMENT PROGRAM AUDITS

23. How often is your DOT subject to internal and regulatory audits of the construction stormwater management program for highway projects? (Select all that apply.)

	Internal Audits	Regulatory Audits
Annually	<input type="checkbox"/>	<input type="checkbox"/>
2-3 years	<input type="checkbox"/>	<input type="checkbox"/>
4-5 years	<input type="checkbox"/>	<input type="checkbox"/>
6-7 years	<input type="checkbox"/>	<input type="checkbox"/>
8-9 years	<input type="checkbox"/>	<input type="checkbox"/>
10 years or more	<input type="checkbox"/>	<input type="checkbox"/>
As needed	<input type="checkbox"/>	<input type="checkbox"/>
When revisions to federal and state permit and regulatory requirements occur	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>

24. In terms of construction stormwater management, in the last 10 years, has your DOT been fined for noncompliance or stormwater discharge issues?

- ☐ Yes
- ☐ No

FINAL THOUGHTS

25. Please upload or provide any links to relevant documents from your DOT. Example documents include manuals, guides, reports, plans, checklists, approved control measures, inspection processes, violation remediation approaches, etc., related to construction stormwater management, control measures, and associated information. *(Upload function will be enabled for this question.)*
26. *We would like to interview select DOT respondents for use in developing case examples. Case examples will be included in the final synthesis report. The case example DOTs will be identified, but the interviewees will remain anonymous. DOTs will have the opportunity to review the case for accuracy before publication. Would you be willing to participate in a case example interview?*
- ☐ *Yes*
- ☐ *No*
27. *Please let us know who we should contact at your DOT to discuss participation in an interview. If you are unable to participate, can you please direct us to someone else in your DOT that may be interested in participating in an interview?* (This question is shown if “yes” is selected for the previous question.)

<i>First and Last Name:</i>	
<i>Phone Number:</i>	
<i>Email:</i>	

We appreciate your participation in this study!



APPENDIX B

Individual Survey Responses

No	Question 1&2: Please provide your state department of transportation (DOT) and consent to the survey.	
1	Alabama	✓
2	Alaska	✓
3	Arizona	✓
4	Arkansas	✓
5	California	✓
6	Colorado	✓
7	Connecticut	✓
8	Delaware	✓
9	Florida	✓
10	Georgia	✓
11	Hawaii	✓
12	Idaho	✓
13	Illinois	✓
14	Indiana	✓
15	Iowa	✓
16	Kansas	✓
17	Maine	✓
18	Maryland	✓
19	Massachusetts	✓
20	Michigan	✓
21	Minnesota	✓
22	Mississippi	✓
23	Missouri	✓
24	Nebraska	✓
25	Nevada	✓
26	New Hampshire	✓
27	New Jersey	✓
28	New Mexico	✓
29	New York	✓
30	North Carolina	✓
31	North Dakota	✓
32	Ohio	✓
33	Oklahoma	✓
34	Pennsylvania	✓
35	Rhode Island	✓
36	South Dakota	✓
37	Texas	✓
38	Utah	✓
39	Vermont	✓
40	Virginia	✓
41	West Virginia	✓
42	Wisconsin	✓

Question 3: What group/division do you primarily work in?					
State DOT	Construction	Stormwater Management/Drainage	Environment	Design/ Engineering	Permitting
Alabama	✓				
Alaska	✓				
Arizona	✓				
Arkansas	✓				
California	✓				
Colorado			✓		
Connecticut	✓				
Delaware		✓			
Florida					✓
Georgia				✓	
Hawaii		✓			
Idaho			✓		
Illinois			✓		
Indiana	✓				
Iowa	✓				
Kansas	✓				
Maine				✓	
Maryland				✓	
Massachusetts			✓		
Michigan	✓				
Minnesota	✓				
Mississippi	✓				
Missouri	✓				
Nebraska			✓		
Nevada			✓		
New Hampshire				✓	
New Jersey			✓		
New Mexico	✓				
New York			✓		
North Carolina		✓			
North Dakota			✓		
Ohio	✓				
Oklahoma			✓		
Pennsylvania		✓			
Rhode Island			✓		
South Dakota			✓		
Texas			✓		
Utah		✓			
Vermont	✓				
Virginia	✓				
West Virginia			✓		
Wisconsin	✓				
TOTAL	18	5	14	4	1

Question 4: How is construction stormwater management handled at your DOT?			
State DOT	O1	O2	O3
Alabama	✓		
Alaska		✓	
Arizona		✓	
Arkansas		✓	
California			✓
Colorado		✓	
Connecticut		✓	
Delaware	✓		
Florida		✓	
Georgia		✓	
Hawaii	✓		
Idaho		✓	
Illinois	✓		
Indiana			✓
Iowa		✓	
Kansas		✓	
Maine			✓
Maryland	✓		
Massachusetts	✓		
Michigan		✓	
Minnesota		✓	
Mississippi		✓	
Missouri		✓	
Nebraska	✓		
Nevada		✓	
New Hampshire		✓	
New Jersey		✓	
New Mexico		✓	
New York		✓	
North Carolina	✓		
North Dakota		✓	
Ohio	✓		
Oklahoma		✓	
Pennsylvania		✓	
Rhode Island	✓		
South Dakota		✓	
Texas			✓
Utah			✓
Vermont		✓	
Virginia		✓	
West Virginia			✓
Wisconsin	✓		
TOTAL	11	25	6

O1. Formal construction stormwater management program, separate from project management
O2. Construction stormwater management is part of the project management process
O3. Both options above are used depending on the project scope and size

Question 5: What division(s)/department(s) within your DOT is/are involved in the construction stormwater management program? (Select all that apply)										
State DOT	O1	O2	O3	O4	O5	O6	O7	O8	O9	Other
Alabama	✓	✓	✓		✓		✓			
Alaska	✓		✓		✓					
Arizona	✓	✓	✓		✓					
Arkansas	✓		✓		✓	✓		✓		
California	✓	✓	✓	✓	✓	✓			✓	
Colorado	✓	✓	✓	✓			✓			
Connecticut	✓						✓			
Delaware	✓	✓			✓	✓				
Florida	✓	✓			✓		✓			
Georgia	✓		✓		✓					
Hawaii	✓	✓	✓	✓	✓	✓			✓	
Idaho			✓							
Illinois	✓		✓		✓				✓	
Indiana	✓		✓		✓	✓				
Iowa	✓									
Kansas	✓									
Maine	✓		✓			✓				
Maryland	✓	✓	✓	✓			✓	✓		
Massachusetts	✓	✓	✓		✓					✓
Michigan	✓	✓	✓		✓	✓	✓		✓	
Minnesota	✓		✓		✓	✓	✓			
Mississippi	✓		✓							
Missouri	✓		✓		✓					
Nebraska	✓	✓	✓		✓	✓	✓	✓		
Nevada	✓	✓	✓	✓	✓	✓	✓			
New Hampshire	✓	✓	✓		✓	✓		✓	✓	
New Jersey	✓		✓		✓	✓	✓			
New Mexico	✓	✓	✓							
New York	✓		✓	✓	✓	✓	✓		✓	
North Carolina	✓	✓			✓	✓				
North Dakota	✓		✓		✓					
Ohio	✓	✓								
Oklahoma	✓	✓	✓		✓					
Pennsylvania	✓	✓	✓		✓	✓	✓			
Rhode Island	✓	✓	✓		✓					
South Dakota	✓		✓	✓	✓			✓		
Texas	✓		✓		✓	✓				
Utah	✓	✓	✓	✓	✓	✓			✓	
Vermont	✓		✓		✓			✓		
Virginia	✓	✓	✓	✓	✓	✓				
West Virginia	✓	✓	✓		✓		✓	✓	✓	
Wyoming	✓	✓	✓	✓						
TOTAL	41	23	35	10	31	18	13	7	8	1

KEY:

O1. Construction

O2. Stormwater Management/Drainage

O3. Environment

O4. Landscape Design

O5. Design/Engineering

O6. Maintenance/Operations

O7. Permitting

O8. Materials

O9. Policy and Regulations

Question 5 (cont.)

Other:

- Designers show erosion and sedimentation controls (ESCs) on design plans. Contractors will put those controls out on site, or make modifications as necessary during construction. Environmental and Construction staff may be contacted to troubleshoot issues and review ESC plans.

Question 6: What approaches to construction stormwater management does your DOT regularly use for highway projects? (Select all that apply)					
State DOT	Statewide	State DOT district	Project by project	Types of projects	Other
Alabama	✓				
Alaska	✓			✓	
Arizona			✓		
Arkansas	✓	✓	✓		
California	✓				
Colorado	✓				✓
Connecticut			✓		
Delaware			✓		
Florida	✓		✓		
Georgia	✓			✓	
Hawaii			✓	✓	
Idaho		✓	✓		
Illinois			✓		
Indiana	✓				
Iowa	✓		✓		✓
Kansas	✓				
Maine	✓				
Maryland	✓	✓	✓		
Massachusetts		✓		✓	
Michigan	✓	✓	✓	✓	
Minnesota	✓	✓	✓		
Mississippi	✓		✓	✓	
Missouri	✓		✓	✓	
Nebraska	✓				
Nevada	✓		✓		
New Hampshire	✓				
New Jersey			✓	✓	
New Mexico	✓	✓			
New York	✓	✓	✓	✓	✓
North Carolina	✓		✓		
North Dakota		✓	✓		
Ohio	✓		✓		
Oklahoma	✓		✓		
Pennsylvania	✓				
Rhode Island	✓		✓		
South Dakota	✓		✓	✓	
Texas	✓				
Utah	✓				
Vermont	✓		✓	✓	
Virginia	✓		✓	✓	
West Virginia	✓		✓	✓	
Wisconsin	✓		✓	✓	
TOTAL	33	9	27	14	3

Question 6 (cont.)

Other:

- The DOT requires all projects over an acre that require a general construction permit to follow our water quality specifications. All projects below an acre without a permit are required to follow requirements under a standard special.
- State DOT Resident Construction Engineer office
- Size of contributing area

Question 7a: What construction stormwater management control measures have your DOT approved for use in highway construction? (Select all that apply)									
State DOT	Active treatment systems	Bales (hay, straw, etc.)	Bonded fiber matrix	Check dams	Construction de watering	Diversion berms/dikes	Drainage swales/ditches	Dust control	Erosion control blankets
Alabama	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alaska	✓		✓	✓	✓	✓	✓	✓	✓
Arizona		✓	✓	✓	✓	✓	✓	✓	✓
Arkansas		✓		✓		✓	✓	✓	✓
California	✓	✓	✓	✓	✓	✓	✓	✓	✓
Colorado		✓	✓	✓	✓	✓	✓	✓	✓
Connecticut		✓	✓	✓	✓	✓	✓	✓	✓
Delaware			✓	✓	✓	✓	✓	✓	✓
Florida				✓	✓	✓	✓	✓	✓
Georgia		✓		✓	✓	✓	✓	✓	✓
Hawaii				✓	✓	✓	✓	✓	✓
Idaho		✓	✓	✓	✓	✓	✓	✓	✓
Illinois	✓	✓		✓	✓		✓	✓	✓
Indiana			✓	✓	✓	✓	✓	✓	✓
Iowa			✓	✓	✓	✓	✓	✓	✓
Kansas			✓	✓	✓	✓	✓	✓	✓
Maine		✓	✓	✓	✓	✓	✓	✓	✓
Maryland				✓	✓	✓	✓	✓	
Massachusetts		✓	✓	✓	✓	✓	✓	✓	✓
Michigan			✓	✓	✓	✓	✓	✓	✓
Minnesota	✓		✓	✓	✓	✓	✓	✓	✓
Mississippi				✓	✓	✓	✓		✓
Missouri			✓	✓	✓	✓	✓		✓
Nebraska			✓	✓	✓	✓	✓	✓	✓
Nevada	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Hampshire	✓		✓	✓	✓	✓	✓	✓	✓
New Jersey	✓	✓	✓	✓	✓		✓		✓
New Mexico	✓	✓	✓	✓	✓	✓	✓	✓	✓
New York	✓	✓	✓	✓		✓	✓	✓	✓
North Carolina			✓	✓	✓	✓	✓	✓	✓
North Dakota		✓	✓	✓	✓	✓	✓	✓	✓
Ohio			✓	✓	✓	✓	✓	✓	✓
Oklahoma				✓		✓			✓
Pennsylvania		✓	✓	✓	✓	✓	✓	✓	✓
Rhode Island	✓	✓		✓	✓	✓	✓	✓	✓
South Dakota	✓	✓	✓	✓	✓	✓	✓	✓	✓
Texas	✓	✓	✓	✓	✓	✓	✓	✓	✓
Utah		✓	✓	✓	✓	✓	✓	✓	✓
Vermont	✓		✓	✓	✓	✓	✓	✓	✓
Virginia		✓	✓	✓	✓	✓	✓	✓	✓
West Virginia			✓	✓	✓	✓	✓	✓	✓
Wisconsin		✓	✓	✓	✓	✓	✓	✓	✓
TOTAL	14	23	33	42	39	40	41	38	41

Question 7b: What construction stormwater management control measures have your DOT approved for use in highway construction? (Select all that apply)									
State DOT	Erosion control logs	Flexible growth medium	Flocculants	Hydromulching/ seeding	Inlet protection	Level spreader	Limitations of disturbance	Mulching	Other chemical treatments
Alabama	✓		✓	✓	✓	✓	✓	✓	✓
Alaska	✓	✓	✓	✓	✓		✓	✓	
Arizona	✓	✓		✓			✓	✓	✓
Arkansas	✓			✓	✓				
California	✓	✓	✓	✓	✓	✓	✓	✓	
Colorado	✓	✓		✓	✓		✓	✓	
Connecticut	✓			✓	✓	✓	✓	✓	
Delaware	✓	✓	✓	✓	✓	✓	✓	✓	✓
Florida	✓		✓	✓	✓		✓		✓
Georgia	✓		✓	✓	✓	✓	✓	✓	
Hawaii	✓	✓		✓	✓	✓	✓	✓	
Idaho	✓	✓		✓	✓	✓	✓	✓	
Illinois	✓			✓	✓		✓	✓	
Indiana	✓			✓	✓		✓	✓	
Iowa	✓	✓		✓	✓		✓	✓	
Kansas	✓			✓	✓		✓	✓	
Maine	✓			✓	✓	✓	✓	✓	
Maryland	✓			✓	✓	✓	✓	✓	
Massachusetts	✓	✓	✓	✓	✓	✓	✓		
Michigan	✓			✓	✓	✓	✓	✓	
Minnesota	✓		✓	✓	✓		✓	✓	
Mississippi	✓			✓	✓		✓	✓	
Missouri	✓	✓	✓	✓	✓		✓	✓	✓
Nebraska	✓	✓		✓	✓		✓	✓	
Nevada	✓			✓	✓		✓	✓	
New Hampshire	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Jersey	✓		✓	✓	✓		✓	✓	
New Mexico	✓	✓	✓	✓	✓	✓	✓	✓	✓
New York	✓		✓	✓	✓		✓	✓	
North Carolina	✓	✓	✓	✓	✓	✓	✓	✓	
North Dakota	✓	✓	✓	✓	✓	✓	✓	✓	
Ohio	✓	✓		✓	✓		✓	✓	
Oklahoma	✓			✓	✓		✓	✓	
Pennsylvania	✓	✓		✓	✓	✓	✓	✓	
Rhode Island	✓			✓	✓	✓	✓	✓	
South Dakota	✓	✓	✓	✓	✓	✓	✓	✓	✓
Texas	✓	✓	✓	✓	✓	✓	✓	✓	✓
Utah	✓	✓		✓	✓		✓	✓	
Vermont	✓		✓	✓	✓	✓	✓	✓	
Virginia	✓	✓		✓	✓	✓	✓	✓	
West Virginia	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wisconsin	✓		✓	✓	✓		✓	✓	✓
TOTAL	42	22	20	42	41	22	41	39	11

Question 7c: What construction stormwater management control measures have your DOT approved for use in highway construction? (Select all that apply)									
State DOT	Outlet protection	Pipe slope drains	Preserve existing vegetation	Riprap	Sediment basins	Sediment traps	Silt fence/barriers	Sodding	Stabilized construction entrances/exits
Alabama	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alaska	✓	✓	✓	✓	✓	✓	✓	✓	✓
Arizona		✓	✓	✓	✓	✓	✓		✓
Arkansas	✓	✓	✓	✓	✓	✓	✓		✓
California	✓	✓	✓	✓	✓	✓	✓	✓	✓
Colorado	✓	✓	✓	✓	✓	✓	✓		✓
Connecticut	✓			✓	✓	✓	✓	✓	✓
Delaware	✓	✓	✓	✓	✓	✓	✓		✓
Florida		✓	✓	✓	✓	✓	✓	✓	✓
Georgia	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hawaii	✓	✓	✓	✓	✓	✓	✓	✓	✓
Idaho	✓	✓	✓	✓	✓	✓	✓	✓	✓
Illinois	✓	✓	✓	✓	✓	✓	✓	✓	✓
Indiana	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iowa	✓		✓	✓	✓	✓	✓	✓	✓
Kansas	✓		✓	✓	✓	✓	✓		✓
Maine	✓		✓	✓	✓	✓	✓	✓	✓
Maryland	✓	✓	✓	✓	✓	✓	✓	✓	✓
Massachusetts			✓	✓	✓	✓	✓		✓
Michigan	✓	✓	✓	✓	✓	✓	✓	✓	✓
Minnesota	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mississippi		✓	✓	✓	✓	✓	✓	✓	✓
Missouri	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nebraska	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nevada	✓	✓	✓	✓	✓	✓	✓		✓
New Hampshire	✓	✓	✓	✓	✓	✓	✓		✓
New Jersey	✓		✓	✓	✓	✓	✓		✓
New Mexico	✓	✓	✓	✓	✓	✓	✓	✓	✓
New York	✓	✓	✓	✓	✓	✓	✓	✓	✓
North Carolina	✓	✓	✓	✓	✓	✓	✓	✓	✓
North Dakota	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ohio		✓			✓	✓	✓		✓
Oklahoma				✓	✓		✓	✓	✓
Pennsylvania	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rhode Island	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Dakota	✓	✓	✓	✓	✓	✓	✓	✓	✓
Texas	✓	✓	✓	✓	✓	✓	✓	✓	✓
Utah	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vermont	✓	✓	✓	✓	✓	✓	✓	✓	✓
Virginia	✓	✓		✓	✓	✓	✓	✓	✓
West Virginia	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wisconsin	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOTAL	36	35	38	41	42	41	42	32	42

Question 7d: What construction stormwater management control measures have your DOT approved for use in highway construction? (Select all that apply)

State DOT	Subsurface drains	Surface roughening	Temporary stream crossing	Turbidity barrier	Turf reinforcement mats	Water quality non structural controls	Water quality structural controls	Other
Alabama		✓	✓	✓	✓	✓	✓	
Alaska	✓	✓	✓	✓	✓	✓	✓	
Arizona		✓						
Arkansas			✓				✓	
California	✓	✓	✓	✓	✓	✓	✓	
Colorado		✓	✓		✓	✓	✓	✓
Connecticut	✓	✓		✓	✓			✓
Delaware	✓	✓	✓	✓	✓	✓	✓	
Florida		✓		✓			✓	
Georgia	✓	✓	✓	✓	✓	✓	✓	
Hawaii	✓	✓	✓	✓	✓	✓	✓	
Idaho		✓	✓	✓	✓	✓	✓	
Illinois	✓	✓	✓	✓	✓	✓	✓	
Indiana	✓	✓	✓	✓		✓	✓	
Iowa	✓		✓	✓	✓	✓		
Kansas			✓	✓	✓			
Maine	✓	✓	✓	✓	✓	✓	✓	
Maryland		✓	✓	✓	✓	✓	✓	
Massachusetts		✓	✓	✓		✓	✓	
Michigan	✓	✓	✓	✓	✓	✓	✓	✓
Minnesota		✓	✓	✓		✓	✓	
Mississippi		✓	✓	✓				
Missouri		✓	✓		✓			
Nebraska		✓	✓	✓	✓	✓	✓	
Nevada	✓	✓	✓	✓		✓	✓	
New Hampshire			✓	✓		✓	✓	
New Jersey				✓		✓	✓	
New Mexico	✓	✓	✓	✓	✓	✓	✓	✓
New York	✓	✓	✓	✓	✓	✓	✓	✓
North Carolina	✓	✓	✓	✓	✓	✓	✓	
North Dakota	✓	✓	✓	✓	✓	✓	✓	
Ohio		✓	✓	✓	✓		✓	
Oklahoma				✓	✓		✓	
Pennsylvania	✓	✓	✓	✓	✓	✓	✓	
Rhode Island		✓	✓	✓	✓	✓	✓	
South Dakota		✓	✓	✓	✓	✓	✓	
Texas	✓	✓	✓	✓	✓	✓	✓	
Utah	✓	✓	✓	✓	✓	✓	✓	
Vermont	✓	✓	✓	✓	✓	✓	✓	
Virginia	✓	✓	✓	✓	✓	✓	✓	
West Virginia	✓	✓	✓	✓	✓	✓	✓	
Wisconsin	✓	✓	✓	✓	✓	✓	✓	
TOTAL	23	36	37	38	32	33	36	5

Question 7 (cont.)

Other:

- Topography (landform), vegetative buffers, temporary stabilization (tracking, terracing, slope controls) phasing, administrative controls (all control measures are located in 107.25, 208, 213, 216 related to water quality and we allow non-standard control measures if approved by a project special or the Project Engineer.
- We will also use temporary tanks and dewatering basins for active dewatering activities.
- Gravel Access Approach
- BMPs are determined by the contractor managing SWPPP.
- NYS has a stormwater design manual written by our New York State DEC which includes standard permanent practices. We also have the *Environmental Handbook for Construction Operations*, also by New York State DEC, which covers standard temporary measures.

Question 8: What types of flocculants does your DOT use for construction stormwater management? (Select all that apply)			
State DOT	Synthetic polymer (e.g., Polyacrylamide)	Inorganic polymer (e.g., polyaluminum chloride)	Other
Alabama			
Alaska			
Arizona			
Arkansas			
California			
Colorado			
Connecticut			
Delaware	✓	✓	
Florida			
Georgia			
Hawaii			
Idaho			
Illinois			
Indiana			
Iowa			
Kansas			
Maine			
Maryland			
Massachusetts			✓
Michigan			
Minnesota			✓
Mississippi			
Missouri			
Nebraska			
Nevada			
New Hampshire			
New Jersey			✓
New Mexico			✓
New York			✓
North Carolina			
North Dakota			✓
Ohio			
Oklahoma			
Pennsylvania			
Rhode Island			
South Dakota			
Texas			
Utah			
Vermont			
Virginia			
West Virginia			
Wisconsin		✓	✓
TOTAL	1	2	7

Question 8 (cont.)

Other:

- Used in some cases of sediment discharges
- An approved listing is management by our Department of Natural Resources. I believe most are an anionic polyacrylamide, but cannot be certain.
- We have the ability to allow anionic PAM but have not had anyone use it yet.
- The DOT does not have restrictions on flocculants...flocculants used determined by contractor.
- Unsure. My understanding is that we primarily use flocculants for disposal of materials containing hazardous chemicals, such as when we demolish polymer overlays on bridge decks. We avoid permanent stormwater management practices which require the intermittent addition of chemicals, and prefer to limit permanent maintenance to vegetation management and sediment removal where possible.

Question 9a: Who is responsible for preparing and managing the SWPPP for a highway construction project at your DOT? (select all that apply)												
State DOT	O1		O2		O3		O4		O5		O6	
	Preparing	Managing	Preparing	Managing	Preparing	Managing	Preparing	Managing	Preparing	Managing	Preparing	Managing
Alabama		✓	✓									✓
Alaska												✓
Arizona		✓	✓				✓					
Arkansas		✓	✓									
California	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
Colorado			✓		✓							
Connecticut			✓					✓				
Delaware		✓	✓								✓	✓
Florida												
Georgia		✓	✓				✓					
Hawaii	✓	✓	✓		✓	✓	✓		✓		✓	✓
Idaho		✓		✓								
Illinois		✓	✓									
Indiana			✓			✓			✓			
Iowa		✓	✓									
Kansas		✓										
Maine		✓				✓						
Maryland		✓	✓									
Massachusetts												
Michigan		✓	✓		✓		✓			✓	✓	
Minnesota		✓	✓		✓		✓					
Mississippi		✓	✓									
Missouri	✓	✓										
Nebraska		✓			✓							
Nevada									✓			
New Hampshire												
New Jersey		✓	✓		✓							
New Mexico												
New York		✓	✓									
North Carolina		✓	✓								✓	✓
North Dakota												
Ohio												
Oklahoma												
Pennsylvania		✓										
Rhode Island		✓										
South Dakota		✓	✓						✓	✓	✓	✓
Texas		✓	✓		✓	✓						
Utah			✓			✓			✓			
Vermont			✓				✓	✓			✓	✓
Virginia			✓									
West Virginia			✓	✓					✓			
Wyoming	✓	✓	✓	✓								
TOTAL	4	26	26	3	8	6	7	3	6	3	7	8

KEY:

O1. Construction Project Manager
O2. Design Engineer
O3. Environmental Control Specialist

O4. Environmental Engineer
O5. Environmental Department Manager
O6. Stormwater/Drainage Program Manager

Question 9b: Who is responsible for preparing and managing the SWPPP for a highway construction project at your DOT (Select all that apply)?								
State DOT	O7		O8		O9		Other	
	Prep.	Mngm.	Prep.	Mngm.	Prep.	Mngm.	Prep.	Mngm.
Alabama			✓					
Alaska		✓	✓	✓	✓	✓		
Arizona	✓			✓	✓	✓		
Arkansas		✓						
California	✓	✓	✓	✓	✓	✓		
Colorado				✓			✓	✓
Connecticut		✓	✓	✓				
Delaware	✓			✓	✓	✓		
Florida			✓	✓				
Georgia				✓				
Hawaii	✓	✓	✓		✓	✓		
Idaho			✓	✓	✓	✓	✓	
Illinois				✓	✓	✓		
Indiana		✓		✓		✓		
Iowa					✓		✓	
Kansas	✓	✓	✓	✓		✓		
Maine			✓	✓				
Maryland								
Massachusetts			✓	✓				
Michigan	✓	✓	✓		✓		✓	
Minnesota	✓			✓	✓	✓		
Mississippi			✓	✓				
Missouri					✓	✓	✓	✓
Nebraska						✓		
Nevada			✓	✓				
New Hampshire			✓	✓				
New Jersey				✓	✓			
New Mexico		✓		✓				
New York				✓				
North Carolina				✓	✓			
North Dakota			✓	✓				
Ohio		✓	✓	✓				
Oklahoma			✓	✓	✓			
Pennsylvania		✓	✓	✓	✓			
Rhode Island					✓			
South Dakota				✓				
Texas			✓	✓	✓	✓		
Utah			✓	✓	✓	✓		✓
Vermont	✓		✓	✓	✓			✓
Virginia			✓	✓				
West Virginia		✓	✓	✓	✓	✓		
Wisconsin	✓	✓	✓	✓	✓	✓		
TOTAL	9	13	24	33	21	16	5	4
O7. DOT project management team			O8. Contractor		O9. Consultants			
Prep. = Preparing			Mngm. = Managing					

Question 9 (cont.)

Other:

Prepare and Manage

- This would be for a design-bid-build project that is triggered to be incorporated into MS4 permit requirements. We have different methodologies for other contract types and internal projects (Property mgt, Colorado DOT Mtce, and Utility/Access and Special use permits).
- Inspector

Prepare

- District Environmental Planner
- Agronomist
- For Design-Build Projects the contractor prepares the SWPPP program but the department must approve the plan and oversee the plans during construction.
- Agronomist

Manage

- Resident Engineer

Question 10: When does your DOT prepare the SWPPP for a highway construction project (Please select all that apply)?					
State DOT	During design and engineering	During pre construction	Just prior to construction	In conjunction with the NEPA Plan	Other
Alabama	✓				
Alaska					✓
Arizona		✓			
Arkansas	✓				
California		✓	✓	✓	
Colorado	✓			✓	✓
Connecticut	✓				
Delaware	✓				
Florida		✓			
Georgia	✓	✓			
Hawaii	✓	✓			
Idaho			✓		
Illinois	✓				
Indiana	✓			✓	
Iowa	✓				
Kansas		✓			
Maine		✓			
Maryland		✓			
Massachusetts		✓			
Michigan	✓				
Minnesota	✓				
Mississippi	✓		✓		
Missouri		✓	✓		
Nebraska	✓				
Nevada					✓
New Hampshire			✓		
New Jersey	✓				
New Mexico		✓			
New York	✓				
North Carolina	✓				
North Dakota					✓
Ohio			✓		✓
Oklahoma		✓			✓
Pennsylvania	✓				
Rhode Island	✓				
South Dakota	✓				
Texas	✓			✓	
Utah	✓	✓			
Vermont	✓				
Virginia	✓	✓	✓		
West Virginia		✓			
Wisconsin	✓		✓		✓
TOTAL	25	15	8	4	7

Question 10
(cont.)

Other:

- PF only prepares an SWPPP if the project is a Maintenance and Operations project that is greater than 1 acre, and does not involve a contractor.
- This is very dependent on contract type. It is a requirement from the Form 128 Clearance process in most cases. Please note that Colorado is a practice based permit for our general construction and the design of the SWMP is completed on projects prior to advertisement on design-bid-build projects and modified by the contractor per our specifications when the project is active.
- The DOT does not prepare the SWPPP. The contractor is required to complete the SWPPP in accordance with permitting requirements and must have it completed prior to the start of any earth-disturbing activities.
- Contractor prepares SWPPP before getting a permit.
- After a project is awarded.
- This is the contractor's responsibility. Usually, they consult out SWPPP preparation.
- The design team completes SWPPP components as known in the design, and contractors prepare an implementation plan for unknown items such as schedule-related items, dewatering activities, etc.

Question 11a: Which of the following parties typically performs the tasks related to the construction stormwater management at your DOT? (Select all that apply)												
State DOT	O1			O2			O3			O4		
	DOT	Contr.	Cons	DOT	Contr.	Cons	DOT	Contr.	Cons	DOT	Contr.	Cons
Alabama	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Alaska	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Arizona	✓	✓	✓	✓		✓	✓	✓		✓		
Arkansas	✓			✓			✓				✓	
California	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Colorado	✓			✓	✓	✓	✓	✓	✓		✓	
Connecticut	✓	✓		✓			✓	✓		✓	✓	
Delaware	✓		✓	✓		✓	✓		✓	✓	✓	
Florida	✓							✓			✓	
Georgia	✓		✓	✓			✓	✓	✓		✓	
Hawaii	✓	✓	✓	✓		✓	✓	✓	✓		✓	
Idaho	✓	✓		✓	✓		✓	✓		✓	✓	
Illinois	✓			✓			✓		✓	✓		
Indiana	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Iowa	✓	✓		✓			✓	✓			✓	
Kansas	✓	✓		✓			✓	✓	✓	✓	✓	✓
Maine	✓	✓		✓		✓	✓			✓		
Maryland												
Massachusetts	✓	✓	✓	✓			✓	✓	✓		✓	
Michigan	✓	✓	✓	✓		✓	✓	✓	✓		✓	
Minnesota	✓	✓	✓	✓			✓				✓	
Mississippi	✓	✓	✓				✓	✓	✓		✓	
Missouri	✓		✓	✓			✓		✓		✓	
Nebraska	✓			✓		✓	✓		✓		✓	
Nevada	✓	✓			✓		✓	✓		✓	✓	
New Hampshire		✓						✓			✓	
New Jersey	✓			✓		✓	✓		✓	✓		
New Mexico	✓	✓		✓			✓	✓			✓	
New York	✓	✓		✓			✓	✓	✓	✓	✓	
North Carolina	✓	✓		✓		✓	✓	✓		✓		
North Dakota	✓	✓	✓	✓				✓			✓	
Ohio	✓			✓				✓			✓	
Oklahoma	✓	✓		✓			✓	✓		✓	✓	
Pennsylvania	✓			✓			✓				✓	
Rhode Island	✓	✓		✓		✓	✓	✓			✓	
South Dakota	✓	✓		✓			✓	✓			✓	
Texas	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
Utah	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Vermont	✓	✓	✓	✓			✓	✓	✓		✓	
Virginia	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
West Virginia	✓	✓		✓				✓			✓	
Wisconsin	✓		✓	✓			✓		✓	✓	✓	✓
TOTAL	40	29	19	37	5	15	36	30	22	18	36	7

O1.Monitor and track control measures

O3.Inspections

O2.Design guidance development

O4.Inspection deficiency remediation

Question 11b: Which of the following parties typically performs the tasks related to the construction stormwater management at your DOT? (Select all that apply)

State DOT	O5			O6			O7			O8			O9		
	DOT	Contr.	Cons	DOT	Contr.	Cons	DOT	Contr.	Cons	DOT	Contr.	Cons	DOT	Contr.	Cons
Alabama		✓			✓		✓		✓	✓		✓	✓	✓	✓
Alaska		✓			✓		✓	✓	✓	✓	✓			✓	
Arizona		✓			✓		✓	✓				✓	✓	✓	
Arkansas		✓			✓		✓			✓				✓	
California	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Colorado		✓			✓		✓	✓		✓	✓			✓	
Connecticut	✓	✓		✓	✓		✓	✓					✓	✓	
Delaware	✓	✓		✓	✓		✓		✓	✓		✓	✓	✓	
Florida		✓			✓			✓		✓	✓	✓		✓	✓
Georgia		✓			✓		✓	✓	✓	✓		✓	✓	✓	
Hawaii		✓			✓		✓	✓	✓	✓		✓		✓	
Idaho	✓	✓		✓	✓		✓	✓		✓	✓		✓	✓	
Illinois		✓			✓		✓			✓			✓		
Indiana		✓			✓		✓	✓	✓	✓				✓	
Iowa		✓			✓		✓			✓				✓	
Kansas		✓			✓		✓	✓		✓			✓	✓	
Maine	✓	✓		✓			✓			✓	✓			✓	
Maryland															
Massachusetts		✓			✓			✓	✓	✓	✓	✓		✓	
Michigan		✓			✓		✓		✓	✓		✓	✓	✓	✓
Minnesota		✓			✓			✓			✓		✓	✓	
Mississippi	✓	✓			✓		✓	✓	✓			✓		✓	
Missouri		✓			✓		✓			✓				✓	
Nebraska		✓		✓	✓		✓		✓	✓			✓	✓	✓
Nevada		✓			✓		✓	✓			✓		✓	✓	
New Hampshire		✓			✓		✓	✓			✓			✓	
New Jersey		✓		✓	✓		✓		✓	✓			✓	✓	
New Mexico		✓			✓			✓		✓	✓		✓	✓	
New York		✓		✓			✓			✓	✓		✓	✓	
North Carolina	✓	✓		✓	✓		✓	✓		✓			✓	✓	✓
North Dakota		✓			✓			✓		✓	✓		✓	✓	
Ohio		✓			✓			✓		✓			✓	✓	
Oklahoma		✓			✓		✓			✓	✓		✓	✓	
Pennsylvania		✓			✓		✓			✓			✓	✓	
Rhode Island		✓			✓		✓	✓		✓			✓	✓	
South Dakota		✓		✓	✓		✓	✓		✓			✓	✓	
Texas		✓			✓		✓		✓	✓		✓	✓	✓	
Utah		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vermont		✓			✓		✓	✓	✓	✓	✓			✓	
Virginia		✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
West Virginia		✓			✓			✓			✓			✓	
Wisconsin		✓			✓		✓		✓	✓			✓	✓	
TOTAL	7	41	3	11	39	3	34	26	17	34	16	12	26	40	7

O5.Installation

O7.Reporting

O9.Violation remediation

O6.Maintenance

O8.Training project personnel

Question 12: On average, what percentage of construction stormwater management inspections are conducted by consultants at your DOT?								
State DOT	0 10%	11 20%	21 30%	31 40%	41 50%	>50%	Do not conduct	Not Sure
Alabama								✓
Alaska								✓
Arizona			✓					
Arkansas	✓							
California		✓						
Colorado		✓						
Connecticut	✓							
Delaware						✓		
Florida	✓							
Georgia					✓			
Hawaii						✓		
Idaho							✓	
Illinois	✓							
Indiana		✓						
Iowa	✓							
Kansas	✓							
Maine							✓	
Maryland								✓
Massachusetts	✓							
Michigan				✓				
Minnesota	✓							
Mississippi			✓					
Missouri	✓							
Nebraska	✓							
Nevada							✓	
New Hampshire							✓	
New Jersey			✓					
New Mexico	✓							
New York	✓							
North Carolina						✓		
North Dakota							✓	
Ohio							✓	
Oklahoma			✓					
Pennsylvania						✓		
Rhode Island	✓							
South Dakota	✓							
Texas		✓						
Utah				✓				
Vermont					✓			
Virginia	✓							
West Virginia		✓						
Wisconsin						✓		
TOTAL	15	5	4	2	2	5	6	3

Question 13: Who is responsible for the cost to install and maintain control measures for highway construction projects at your DOT? (Select all that apply)								
State DOT	State DOT		Contractor		Agreed % contractor and DOT		Other	
	Install	Maintain	Install	Maintain	Install	Maintain	Install	Maintain
Alabama	✓	✓						
Alaska	✓	✓						
Arizona	✓				✓			
Arkansas	✓	✓						
California	✓	✓			✓	✓		
Colorado			✓	✓				
Connecticut							✓	✓
Delaware	✓	✓						
Florida			✓	✓				
Georgia			✓	✓				
Hawaii	✓	✓						
Idaho	✓	✓						
Illinois	✓		✓					
Indiana	✓	✓						
Iowa	✓	✓						
Kansas	✓		✓					
Maine			✓	✓				
Maryland								
Massachusetts			✓	✓				
Michigan							✓	✓
Minnesota	✓		✓					
Mississippi	✓	✓						
Missouri	✓	✓						
Nebraska	✓	✓						
Nevada			✓	✓			✓	✓
New Hampshire	✓	✓						
New Jersey	✓	✓						
New Mexico	✓		✓					
New York	✓						✓	
North Carolina	✓	✓						
North Dakota	✓	✓					✓	✓
Ohio							✓	✓
Oklahoma	✓							
Pennsylvania			✓	✓				
Rhode Island	✓	✓						
South Dakota	✓	✓						
Texas			✓	✓				
Utah					✓	✓		
Vermont	✓							✓
Virginia			✓				✓	
West Virginia							✓	✓
Wisconsin	✓							✓
TOTAL	27	18	13	8	3	2	8	8

Question 13
(cont.)

Other:

Install and Maintain

- The cost of installation and maintenance of control measures varies by project and may be included as either separate bid price items, incidental to something else, a change order, or a percentage of the total contract bid.
- Cost is provided to the contractor through the contract.
- Contractor may pay for controls that they damaged during their work or that need to be replaced due to how they phased the project.
- There is a bid item for temporary erosion control, and the costs are included in the bidding process. The Contractor builds the costs into the bid. Additionally, erosion control is incorporated into the individual bid items.
- Contractor bids a price and is paid to install, maintain and remove the SESC item.
- Contractor is reimbursed by specific contract items. Maintenance is included with the upfront costs unless field conditions require additional control measures.

Install

- During construction, the Contractor is not reimbursed for short-term stabilization and repair (such as covering an excavation area with straw prior to rain or repairing an eroded temporary construction access road), but is paid for building the permanent practices and for most of the temporary practices (i.e., we have contract pay items for silt fence, hydroseeding, mulch, topsoil and turf establishment, etc.).
- The DOT pays the contractor by the appropriate contracting method. Design-bid-build is paid by pay item, design-build is paid lump sum.

Maintain

- Typically DOT pays for installation but maintenance is included in that installation cost.
- Maintenance is included in the cost of installation. The cost to replace depends on the reason for failure.

Question 14: How are initial costs to install and maintain control measures for highway construction projects estimated at your DOT?				
State DOT	Standard estimating	Use of estimated cost ranges	Not sure	Other
Alabama		✓		
Alaska		✓		
Arizona	✓			
Arkansas	✓			
California		✓		
Colorado				✓
Connecticut	✓			
Delaware	✓			
Florida				
Georgia	✓			
Hawaii	✓			
Idaho		✓		
Illinois		✓		
Indiana				✓
Iowa				
Kansas	✓			
Maine		✓		
Maryland				
Massachusetts	✓			
Michigan	✓			
Minnesota	✓			
Mississippi	✓			
Missouri	✓			
Nebraska			✓	
Nevada	✓			
New Hampshire	✓			
New Jersey				
New Mexico		✓		
New York	✓			
North Carolina	✓			
North Dakota	✓			
Ohio		✓		
Oklahoma		✓		
Pennsylvania	✓			
Rhode Island			✓	
South Dakota	✓			
Texas				
Utah	✓			
Vermont	✓			
Virginia				✓
West Virginia	✓			
Wisconsin				✓
TOTAL	22	9	2	4

Question 14
(cont.)

Other:

- We define per project in the quantities section of the SWMP (SWPPP) plan sets. The plan sets are part of the contract documents, and bids are prepared according to the contract type.
- Use established costs for individual items and include a Stormwater Budget item for payment on the contract.
- Combination of estimated cost ranges based on size/complexity and risk management

Question 15: How does your DOT track construction stormwater management requirements or compliance?
(Select all that apply)

State DOT	O1	O2	O3	O4	O5	O6	O7	O8	Other
Alabama	✓			✓	✓		✓		
Alaska		✓	✓	✓	✓	✓	✓		
Arizona				✓	✓	✓			
Arkansas				✓	✓				
California				✓	✓		✓		
Colorado	✓			✓	✓		✓		✓
Connecticut				✓	✓		✓		
Delaware			✓	✓	✓	✓	✓		
Florida				✓	✓	✓	✓	✓	
Georgia				✓	✓		✓		
Hawaii			✓	✓	✓	✓	✓		
Idaho				✓					✓
Illinois				✓	✓				✓
Indiana	✓			✓		✓	✓		
Iowa			✓			✓	✓		✓
Kansas				✓	✓		✓		
Maine				✓	✓	✓	✓		
Maryland				✓					
Massachusetts				✓	✓		✓	✓	
Michigan				✓	✓	✓	✓		
Minnesota				✓	✓				
Mississippi	✓			✓	✓	✓	✓		
Missouri	✓			✓	✓	✓	✓		
Nebraska				✓	✓	✓	✓		✓
Nevada				✓	✓		✓		
New Hampshire				✓	✓		✓		
New Jersey				✓					
New Mexico				✓		✓	✓		
New York				✓	✓		✓		✓
North Carolina	✓			✓	✓	✓	✓		
North Dakota				✓	✓				
Ohio			✓						
Oklahoma				✓	✓		✓		
Pennsylvania						✓			
Rhode Island	✓			✓		✓	✓		
South Dakota	✓			✓	✓		✓		
Texas				✓	✓				
Utah		✓		✓	✓	✓	✓		
Vermont	✓	✓		✓	✓		✓		
Virginia	✓	✓		✓	✓	✓	✓		
West Virginia					✓	✓	✓	✓	
Wisconsin				✓	✓		✓		
TOTAL	10	4	5	38	33	19	31	3	6

O1.Internal software program	O4.Site investigations	O7.Photos and videos
O2.Off the shelf software program	O5.Field logs and databases	O8.No standardized methodology is used statewide
O3.Proprietary software program	O6.Field apps used on a smartphone or tablet	

Question 15 (cont.)

Other:

- Standardized inspection forms
- Files are kept in job box at the construction site.
- Mostly with PDF form. But have a software/app used on some projects.
- Spreadsheet using a unique name for each practice, similar to how bridges are tracked by Bridge Identification Number
- Off the shelf software that is highly customized for our DOT.

Question 16: How does your DOT monitor the performance of the construction stormwater management requirements for highway projects?							
State DOT	O1	O2	O3	O4	O5	O6	Other
Alabama			✓	✓			
Alaska		✓	✓	✓	✓	✓	
Arizona		✓	✓	✓			
Arkansas			✓	✓			
California	✓	✓	✓	✓	✓	✓	
Colorado	✓	✓	✓	✓	✓	✓	✓
Connecticut		✓	✓	✓			
Delaware		✓	✓				
Florida				✓	✓		
Georgia			✓	✓	✓		
Hawaii		✓	✓	✓		✓	
Idaho			✓				
Illinois			✓	✓			
Indiana	✓		✓	✓	✓		
Iowa			✓				
Kansas		✓	✓	✓			
Maine			✓	✓			
Maryland			✓				
Massachusetts		✓	✓		✓		
Michigan		✓	✓	✓	✓		
Minnesota		✓	✓	✓			
Mississippi			✓	✓		✓	
Missouri		✓	✓	✓	✓		
Nebraska		✓	✓	✓	✓		
Nevada			✓	✓	✓		
New Hampshire							✓
New Jersey							✓
New Mexico			✓	✓			
New York		✓	✓	✓	✓		
North Carolina				✓			
North Dakota		✓	✓	✓	✓		
Ohio							✓
Oklahoma				✓			
Pennsylvania					✓		
Rhode Island		✓	✓	✓	✓	✓	
South Dakota			✓	✓	✓		
Texas			✓	✓			
Utah	✓	✓	✓	✓			
Vermont		✓	✓	✓			
Virginia	✓	✓	✓	✓			
West Virginia		✓	✓	✓			
Wisconsin			✓	✓			
TOTAL	5	20	35	33	16	6	4

O1.Using performance metrics	O4.Regular site investigations
O2.Constant review of control measures	O5.Internal audits
O3.Inspection of control measures in place	O6.Audits performed by consultants

Question 16 (cont.)

Other:

- The DOT has contractors perform inspections per the general construction permit and we do audits of the projects per our MS4 permit. Innovative contracts may have additional QA/QC requirements built into the contract.
- Through the use of a proprietary software program that contains quality controls such as picture documentation.
- Contractor is responsible.

Question 17: What performance metrics are used by your DOT to track construction stormwater management requirements? (Select all that apply)								
State DOT	O1	O2	O3	O4	O5	O6	O7	Other
Alabama								
Alaska								
Arizona								
Arkansas								
California	✓	✓	✓	✓	✓	✓		
Colorado	✓							✓
Connecticut								
Delaware								
Florida								
Georgia								
Hawaii								
Idaho								
Illinois								
Indiana					✓	✓	✓	
Iowa								
Kansas								
Maine								
Maryland								
Massachusetts								
Michigan								
Minnesota								
Mississippi								
Missouri								
Nebraska								
Nevada								
New Hampshire								
New Jersey								
New Mexico								
New York								
North Carolina								
North Dakota								
Ohio								
Oklahoma								
Pennsylvania								
Rhode Island								
South Dakota								
Texas								
Utah	✓				✓	✓	✓	
Vermont								
Virginia						✓		
West Virginia								
Wisconsin								
TOTAL	3	1	1	1	3	4	2	1

O1.Number of control measures/BMPs in place

O2.Percentage of project costs used for installing control measures/BMPs

O3.Percentage of project costs used for maintaining control measures/BMPs

O4.Total cost of the construction stormwater management program for a project

O5.Percentage of time project is in non-compliance with stormwater permit requirements

O6.Regular intervals for inspecting control measures/BMPs

O7.Amount of time used to remedy deficiencies

Question 17 (cont.)

Other:

- The DOT typically monitors matrices by compliance goals and built in matrix noted in our regulatory authority specification noted in subsection 208.09. Non-compliance to our water quality specifications is our target matrix.

Question 18: On average, when an inspection deficiency occurs, how much time does it take to correct the deficiency? (This can be an approximate estimate)								
State DOT	< 5 days	5-10 days	11-15 days	16-20 days	21-25 days	26-30 days	> 30days	Other
Alabama	✓							
Alaska		✓						
Arizona	✓							
Arkansas		✓						
California		✓						
Colorado								✓
Connecticut	✓							
Delaware				✓				
Florida	✓							
Georgia		✓						
Hawaii	✓							
Idaho		✓						
Illinois	✓							
Indiana	✓							
Iowa		✓						
Kansas		✓						
Maine	✓							
Maryland	✓							
Massachusetts	✓							
Michigan								✓
Minnesota		✓						
Mississippi		✓						
Missouri		✓						
Nebraska		✓						
Nevada								✓
New Hampshire	✓							
New Jersey								✓
New Mexico	✓							
New York	✓							
North Carolina	✓							
North Dakota	✓							
Ohio			✓					
Oklahoma			✓					
Pennsylvania		✓						
Rhode Island								✓
South Dakota	✓							
Texas								✓
Utah		✓						
Vermont		✓						
Virginia		✓						
West Virginia	✓							
Wisconsin								✓
TOTAL	17	15	2	1	0	0	0	7

Question 18
(cont.)

Other:

- Our general construction permit requires all findings to be completed as soon as possible; immediately in most cases. We track progress on our Colorado DOT form 1176 to note any corrective actions that are not completed within this permit requirement.
- 24 hours to remove the deficiency if sediment has entered into a stream, lake or wetland or left department right of way. Five days for other corrections.
- Identified deficiencies are corrected in accordance with the permitting requirements.
- Unsure - since we don't have an electronic database to track these, it is difficult to determine.
- Deficiencies listed as low, medium, or high priority. Low must be addressed within 7 calendar days. Medium 3 days. High within 24 hours.
- Project dependent, 5–30 days

Question 19a: What qualifications are required by NPDES permits for designers and inspectors at your DOT? (Select all that apply)												
State DOT	O1			O2			O3			O4		
	Desgn	Insp.	Instl.	Desgn	Insp.	Instl.	Desgn	Insp.	Instl.	Desgn	Insp.	Instl.
Alabama	✓	✓						✓				
Alaska												
Arizona	✓											
Arkansas											✓	
California	✓	✓		✓	✓		✓	✓		✓	✓	
Colorado										✓	✓	
Connecticut	✓						✓	✓				
Delaware	✓			✓								
Florida							✓	✓	✓			
Georgia	✓										✓	✓
Hawaii												
Idaho											✓	✓
Illinois	✓	✓								✓	✓	
Indiana												
Iowa											✓	
Kansas							✓	✓				
Maine												
Maryland	✓											
Massachusetts												
Michigan							✓	✓				
Minnesota	✓										✓	✓
Mississippi										✓	✓	
Missouri	✓	✓								✓	✓	
Nebraska										✓	✓	✓
Nevada											✓	
New Hampshire	✓											
New Jersey												
New Mexico												
New York	✓											
North Carolina										✓	✓	✓
North Dakota											✓	✓
Ohio												
Oklahoma	✓							✓				
Pennsylvania											✓	
Rhode Island	✓											
South Dakota										✓	✓	✓
Texas	✓									✓	✓	✓
Utah	✓										✓	
Vermont	✓											
Virginia	✓						✓	✓				✓
West Virginia												
Wisconsin	✓											
TOTAL	19	4	0	2	1	0	6	8	1	9	18	9

O1. Professional Engineer (PE)

O3. State stormwater program certification

O2. Professional Landscape Architect (PLA)

O4. DOT administered certification

Question 19b: What qualifications are required by NPDES permits for designers and inspectors at your DOT? (Select all that apply)									
State DOT	O5			O6			Other		
	Desgn	Insp.	Instl.	Desgn	Insp.	Instl.	Desgn	Insp.	Instl.
Alabama				✓	✓				
Alaska		✓					✓		
Arizona					✓	✓			
Arkansas							✓		
California	✓	✓		✓	✓				
Colorado							✓		
Connecticut									
Delaware		✓	✓						
Florida									
Georgia	✓	✓							
Hawaii									
Idaho									
Illinois									
Indiana							✓		
Iowa									
Kansas									
Maine									
Maryland	✓	✓	✓						
Massachusetts									
Michigan									
Minnesota									
Mississippi				✓					
Missouri									
Nebraska									
Nevada									
New Hampshire				✓	✓				
New Jersey							✓		
New Mexico								✓	✓
New York								✓	✓
North Carolina									
North Dakota							✓		
Ohio								✓	✓
Oklahoma									
Pennsylvania							✓		
Rhode Island					✓				
South Dakota									
Texas									
Utah				✓			✓		
Vermont				✓				✓	✓
Virginia	✓	✓							
West Virginia									
Wisconsin									
TOTAL	4	6	2	6	5	1	8	4	4

O5.State regulator administered certification

O6.National certification (CPESC, CISEC, etc.)

Question 19 (cont.)

Other:

Designer

- Field Project Engineer must be certified through the NDDOT erosion and sediment control certification as well.
- Qualification requirements vary by project.
- Project Superintendents attend same certification program as DOT inspectors.
- Licensed professional (PE, PG, RLA, PLS) for permanent stormwater control measures design; only with relevant experience for E&S design.
- Registered Stormwater Writer (RSW)
- Please note that the DOT is a practice based permit.
- Note sure
- EPA CGP Certification or Equivalent

Inspectors and Installers

- Competent person. From our CONR5: Required Training: Effective April 30, 2010, the SPDES General Permit also requires the Prime Contractor and all subcontractors performing earthwork or soil-disturbing activities to identify at least one trained individual from each company who will be responsible for implementing the SWPPP and who shall be on-site on a daily basis when the company is performing soil disturbance activities. These activities include clearing, grubbing, grading, filling, excavation, stockpiling, demolition.
- Landscaping and installation and maintenance of Erosion & Sediment Control practices. Training must consist of 4 hours of New York State DEC-endorsed Erosion & Sediment Control Training every 3 years. (Training is not required if the individual is a licensed Professional Engineer, registered licensed Landscape Architect, or CPESC.) Provide the information below for trained individuals who will be on-site and responsible for SWPPP implementation on this Contract (attach a separate sheet if needed for additional Trained Individuals).
- Prior experience with State standards and specifications
- NPDES does not require anything other than a "knowledgeable individual." No requirements for installers.

Question 20: Design guidelines for erosion and sediment control at your DOT are based on (Select all that apply)							
State DOT	DOT guidelines	Federal guidelines	General construction practices	Rules of thumb	Scientific research	State regulator guidelines	Other
Alabama	✓	✓			✓	✓	
Alaska	✓	✓	✓	✓	✓	✓	
Arizona	✓	✓	✓				
Arkansas	✓		✓			✓	
California	✓	✓	✓			✓	
Colorado	✓	✓	✓			✓	
Connecticut	✓						
Delaware	✓	✓				✓	
Florida	✓		✓			✓	
Georgia	✓		✓		✓	✓	
Hawaii	✓	✓	✓	✓	✓	✓	
Idaho	✓	✓	✓				
Illinois	✓				✓	✓	
Indiana	✓	✓	✓			✓	
Iowa	✓			✓		✓	✓
Kansas	✓	✓					
Maine	✓					✓	
Maryland	✓					✓	
Massachusetts	✓	✓	✓			✓	
Michigan							✓
Minnesota	✓	✓				✓	
Mississippi	✓	✓	✓			✓	
Missouri	✓	✓	✓	✓	✓	✓	
Nebraska	✓	✓	✓	✓	✓	✓	
Nevada	✓	✓	✓	✓	✓	✓	
New Hampshire	✓						
New Jersey	✓					✓	
New Mexico	✓	✓					
New York	✓					✓	✓
North Carolina	✓					✓	
North Dakota	✓		✓	✓		✓	
Ohio	✓		✓	✓		✓	
Oklahoma	✓					✓	
Pennsylvania	✓					✓	
Rhode Island	✓	✓	✓			✓	
South Dakota	✓	✓	✓	✓		✓	
Texas	✓				✓		
Utah						✓	
Vermont	✓	✓				✓	
Virginia	✓				✓	✓	
West Virginia	✓					✓	
Wisconsin	✓	✓	✓	✓	✓	✓	
TOTAL	40	21	20	10	11	34	3

Question 20
(cont.)

Other:

- Primarily DOT guidelines based on state permit requirements and rules of thumb/current practices
- The Department of Environmental Conservation guidelines
- The Department of Environment, Great Lakes Energy has approved the Michigan Department of Transportation Soil Erosion and Sedimentation Control Program.

Question 21: Which of the following parties are responsible for the development of design standards for construction stormwater management that are used by your DOT? (Select all that apply)						
State DOT	State DOT	State environmental agency	AASHTO	FHWA	Other state agency	Other
Alabama	✓					✓
Alaska	✓	✓				
Arizona	✓					
Arkansas	✓					
California	✓					
Colorado	✓	✓				
Connecticut	✓	✓				
Delaware		✓				
Florida	✓	✓				
Georgia	✓	✓				
Hawaii	✓		✓	✓		
Idaho	✓		✓	✓		
Illinois	✓					
Indiana	✓	✓		✓		
Iowa	✓					
Kansas	✓					
Maine	✓	✓				
Maryland	✓	✓				
Massachusetts	✓	✓				✓
Michigan	✓			✓		
Minnesota		✓				
Mississippi	✓	✓				
Missouri	✓					
Nebraska	✓					
Nevada		✓	✓	✓		
New Hampshire						✓
New Jersey	✓					
New Mexico	✓					
New York	✓	✓				
North Carolina	✓	✓				
North Dakota	✓					
Ohio	✓	✓				
Oklahoma	✓					
Pennsylvania	✓	✓				
Rhode Island	✓	✓	✓	✓		
South Dakota	✓					
Texas	✓					✓
Utah	✓	✓				
Vermont	✓	✓				
Virginia	✓					
West Virginia		✓				
Wisconsin	✓	✓				
TOTAL	37	22	4	6	0	4

Question 21
(cont.)

Other:

- DOT Soil and Water Conservation Committee
- EPA, NH is non-delegate
- AGC
- EPA

Question 22: How often, on average, does your DOT update design guidelines for construction stormwater management?									
State DOT	Annual	2-3 yrs	4-5 yrs	6-7 yrs	8-9 yrs	>10 yrs	As needed	Fed/State req.	Other
Alabama							✓		
Alaska							✓		
Arizona		✓							
Arkansas				✓					
California							✓		
Colorado	✓								
Connecticut			✓						
Delaware								✓	
Florida							✓		
Georgia							✓		
Hawaii								✓	
Idaho			✓						
Illinois							✓		
Indiana		✓							
Iowa							✓		
Kansas							✓		
Maine							✓		
Maryland							✓		
Massachusetts							✓		
Michigan							✓		
Minnesota		✓							
Mississippi							✓		
Missouri			✓						
Nebraska							✓		
Nevada							✓		
New Hampshire									✓
New Jersey									✓
New Mexico	✓								
New York									✓
North Carolina				✓					
North Dakota							✓		
Ohio							✓		
Oklahoma						✓			
Pennsylvania								✓	
Rhode Island								✓	
South Dakota							✓		
Texas			✓						
Utah		✓							
Vermont							✓		
Virginia									✓
West Virginia							✓		
Wisconsin								✓	
TOTAL	2	4	4	2	0	1	20	5	4

Question 22
(cont.)

Other:

- We use the EPA CGP.
- Not sure
- The major SWDM design manual has been updated about every 5 years in line with the nationwide permit updates.
- Both as needed and when revisions to requirements occur

Question 23: How often is your DOT subject to internal and regulatory audits of the construction stormwater management program for highway projects?														
State DOT	Annual		2-3 yrs		4-5 yrs		>10 yrs		As needed		Fed/State req.		Other	
	Int.	Reg.	Int.	Reg.	Int.	Reg.	Int.	Reg.	Int.	Reg.	Int.	Reg.	Int.	Reg.
Alabama									✓	✓				
Alaska											✓			
Arizona	✓									✓				
Arkansas						✓					✓			✓
California									✓	✓				
Colorado													✓	
Connecticut	✓	✓												
Delaware	✓			✓										
Florida			✓							✓				
Georgia	✓									✓				
Hawaii	✓									✓				
Idaho						✓			✓		✓			
Illinois									✓	✓				
Indiana	✓					✓								
Iowa	✓													✓
Kansas	✓													
Maine	✓	✓							✓					
Maryland									✓	✓				
Massachusetts									✓	✓				
Michigan						✓							✓	
Minnesota										✓				
Mississippi									✓	✓				
Missouri	✓					✓						✓		
Nebraska	✓									✓				
Nevada						✓			✓					
New Hampshire														
New Jersey														
New Mexico									✓	✓				
New York									✓	✓				
North Carolina		✓							✓					
North Dakota	✓									✓				
Ohio									✓					✓
Oklahoma						✓								
Pennsylvania	✓												✓	
Rhode Island	✓	✓							✓	✓	✓	✓		
South Dakota	✓	✓												
Texas	✓									✓				
Utah						✓		✓	✓	✓	✓			
Vermont									✓	✓				
Virginia								✓						
West Virginia	✓	✓												
Wisconsin									✓	✓				
TOTAL	17	6	1	1	0	8	0	2	17	20	5	2	3	3

Question 23
(cont.)

Other:

Internal Audits

- Our internal audit of Colorado DOT contractors per project is every 30 days per our MS4 Permit. Our regulating agency (CDPHE) typically conducts audits on our projects at about 12 per year.
- The DOT does annual internal reviews of active road and bridge construction projects.
- EPA NPDES audits

**Regulatory
Audits**

- Citizen complaints
- When determined by regulatory agency
- As determined by NPDES regulatory agency. No specific timeframes.

Question 24: In terms of construction stormwater management, in the last 10 years, has your DOT been fined for non compliance or stormwater discharge issues?		
State DOT	Yes	No
Alabama		✓
Alaska	✓	
Arizona		✓
Arkansas		✓
California	✓	
Colorado	✓	
Connecticut	✓	
Delaware	✓	
Florida	✓	
Georgia	✓	
Hawaii	✓	
Idaho	✓	
Illinois		✓
Indiana	✓	
Iowa	✓	
Kansas		✓
Maine		✓
Maryland		✓
Massachusetts	✓	
Michigan	✓	
Minnesota	✓	
Mississippi		✓
Missouri	✓	
Nebraska		✓
Nevada	✓	
New Hampshire		✓
New Jersey	✓	
New Mexico	✓	
New York		✓
North Carolina		✓
North Dakota		✓
Ohio		✓
Oklahoma		✓
Pennsylvania	✓	
Rhode Island		✓
South Dakota		✓
Texas	✓	
Utah	✓	
Vermont		✓
Virginia		✓
West Virginia	✓	
Wisconsin		✓
TOTAL	22	20

Question 25: Please provide any website links to relevant documents from your DOT.	
State DOT	Web link
Alabama	https://www.dot.state.al.us/programs/ConstructionStormwaterManagement.html
Alaska	https://dot.alaska.gov/stwddes/desenviron/resources/stormwater.shtml
Arizona	NA
Arkansas	https://www.ardot.gov/wp-content/uploads/2020/10/2019-SWMP-ARDOT-7-1-19.pdf https://www.ardot.gov/wp-content/uploads/2021/02/Erosion-and-Sediment-Control-Manual-12-6-16-Current.pdf https://www.ardot.gov/divisions/environmental/natural-resources/stormwater-welcome-page/construction-program-overview/esc-training/
California	https://dot.ca.gov/programs/construction https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control https://env.onramp.dot.ca.gov/sw/stormwater-management-plan-swmp
Colorado	NA
Connecticut	https://portal.ct.gov/DEEP/Water/Soil-Erosion-and-Sediment-Control-Guidelines
Delaware	NA
Florida	https://www.fdot.gov/docs/default-source/roadway/Drainage/files/Erosion-Sediment-Control.pdf
Georgia	https://gaswcc.georgia.gov/sites/gaswcc.georgia.gov/files/related_files/site_page/GSWCC-2016-Manual-As-Approved-by-Overview-Council.pdf https://www.dot.ga.gov/PartnerSmart/Business/Source/construction/2016WECS-CompleteManual.pdf https://www.dot.ga.gov/PartnerSmart/DesignManuals/Drainage/Drainage%20Manual.pdf
Hawaii	NA
Idaho	https://itd.idaho.gov/env/ https://apps.itd.idaho.gov/Apps/FormFinder2DMZ/
Illinois	https://idot.illinois.gov/transportation-system/environment/storm-water-management-program.html
Indiana	https://www.in.gov/indot/engineering/environmental-services/storm-water/
Iowa	https://iowadot.gov/design/design-manual#555672687-chapter-10--roadside-development-and-erosion-control https://www.iowadot.gov/erl/current/CM/Navigation/nav7.htm https://iowadot.gov/design/ShellLetters/StormWaterPermits/PollutionPreventionPlanSheetSample.pdf https://iowadot.gov/construction_materials/earthwork_erosion/Erosion_Sediment_Control_Field_Guide.pdf https://iowadot.gov/construction_materials/storm-water-inspection-information https://iowadot.gov/construction_materials/earthwork_erosion/ESControl_training
Kansas	https://www.ksdot.gov/bureaus/burconsmain/Connections/swppp.asp https://kart.ksdot.gov/StandardDrawings/PrePackaged.aspx
Maine	https://www.maine.gov/mdot/env/documents/bmp/BMP2008full.pdf https://www.maine.gov/mdot/env/documents/bmp/Appendices.pdf
Maryland	NA
Massachusetts	NA
Michigan	NA
Minnesota	https://dot.state.mn.us/manuals/index.html https://www.dot.state.mn.us/environment/erosion/index.html
Mississippi	https://mdot.ms.gov/portal/stormwater https://mdot.ms.gov/documents/Environmental/Plan/Stormwater/Stormwater%20Pollution%20Prevention%20Plan.pdf https://mdot.ms.gov/documents/Environmental/Permits/Stormwater/Mississippi%20Dept.%20of%20Environmental%20Quality%20MS4%20Permit.pdf https://mdot.ms.gov/documents/Environmental/Manuals/Stormwater/MDEQ%20Field%20Manual.pdf https://mdot.ms.gov/documents/Environmental/Permits/Stormwater/Large%20Construction%20General%20Permit%20(MRS10).pdf
Missouri	https://epg.modot.org/index.php/Category:806_Pollution,_Erosion_and_Sediment_Control https://www.modot.org/sites/default/files/documents/2023%20Missouri%20Standard%20Specifi

Question 25: Please provide any website links to relevant documents from your DOT.	
State DOT	Web link
	c%20-%20MHTC%20%28April%202024%29 combined 0.pdf
Nebraska	https://dot.nebraska.gov/projects/environment/roadside/ https://dot.nebraska.gov/projects/environment/stormwater/ https://dot.nebraska.gov/business-center/materials/approved-products/
Nevada	https://www.dot.nv.gov/doing-business/about-ndot/ndot-divisions/stormwater
New Hampshire	https://www.epa.gov/hpdes/2022-construction-general-permit-cgp
New Jersey	NA
New Mexico	https://www.dot.nm.gov/infrastructure/environment/roadside-community-design-section/ https://realfilef260a66b364d453e91ff9b3fedd494dc.s3.amazonaws.com/fcd4d178-70ff-4a21-8ea5-2bede74c831b?AWSAccessKeyId=AKIAJBKPT2UF7EZ6B7YA&Expires=1709743647&Signature=J%2F7jSmVjQ0j%2BvIJzlt%2BEKr7kVe0%3D&response-content-disposition=inline%3B%20filename%3D%222019%20Specs%20for%20Highway%20and%20Bridge%20Construction.pdf%22&response-content-type=application%2Fpdf
New York State	https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-8 https://www.dot.ny.gov/divisions/engineering/environmental-analysis/water-ecology/stormwater-management https://extapps.dec.ny.gov/fs/docs/pdf/stormwaterdesignmanual.pdf https://extapps.dec.ny.gov/fs/docs/pdf/erosionsediment_bluebook.pdf https://dec.ny.gov/regulatory/permits-licenses/wastewater-stormwater-water-withdrawal/spdes-permit-program https://extapps.dec.ny.gov/docs/water_pdf/constgp020001.pdf
North Carolina	https://connect.ncdot.gov/resources/roadside/Pages/Soil-Water.aspx https://connect.ncdot.gov/resources/roadside/Pages/Field-Operations.aspx
North Dakota	https://www.dot.nd.gov/construction-and-planning/construction-planning/environmental/stormwater-management
Ohio	https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/832_07212023_for_2023.pdf https://www.transportation.ohio.gov/wps/portal/gov/odot/working/engineering/hydraulic/location-design-vol-2/01-location-design-vol-2
Oklahoma	https://oklahoma.gov/odot/business-center/pre-construction-design/roadway-design/support-units/oklahoma-roadway-drainage-manual.html https://www.odot.org/roadway/roadway2019/IndexStandards2019.html https://oklahoma.gov/odot/programs-and-projects/environmental.html
Pennsylvania	NA
Rhode Island	https://www.dot.ri.gov/business/contractorsandconsultants.php
South Dakota	https://dot.sd.gov/doing-business/engineering/design-services/forms-manuals/#listItemLink_0
Texas	NA
Utah	https://www.udot.utah.gov/connect/business/contractor-stormwater-resources/construction-longterm-stormwater-management/
Vermont	NA
Virginia	https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/location-and-design/water-resources/ https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/environmental/#d.en.101826 https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/technical-guidance-documents/iim-cd-2013-0101-environmental-and-safety-responsibility/
West Virginia	NA
Wisconsin	https://wisconsin.dot.gov/Pages/doing-business/eng-consultants/cnslt-rsrces/environment/erosion-ctrl-drainage.aspx https://wisconsin.dot.gov/Pages/doing-business/eng-consultants/cnslt-rsrces/rdwy/default.aspx

Question 26: Would you be willing to participate in a case example interview?		
State DOT	Yes	No
Alabama		✓
Alaska	✓	
Arizona	✓	
Arkansas	✓	
California		✓
Colorado	✓	
Connecticut	✓	
Delaware	✓	
Florida	✓	
Georgia	✓	
Hawaii		✓
Idaho	✓	
Illinois	✓	
Indiana		✓
Iowa	✓	
Kansas	✓	
Maine		✓
Maryland	✓	
Massachusetts	✓	
Michigan	✓	
Minnesota	✓	
Mississippi		✓
Missouri		✓
Nebraska	✓	
Nevada	✓	
New Hampshire	✓	
New Jersey		✓
New Mexico		✓
New York	✓	
North Carolina	✓	
North Dakota	✓	
Ohio	✓	
Oklahoma		✓
Pennsylvania	✓	
Rhode Island		✓
South Dakota		✓
Texas	✓	
Utah		✓
Vermont	✓	
Virginia	✓	
West Virginia		✓
Wisconsin	✓	
TOTAL	28	14



APPENDIX C

Case Examples Questionnaire

Construction Stormwater Management Overview

1. Please explain the stormwater management program used by your DOT for highway construction. Does your DOT have a dedicated program, or is it a part of project management?
2. Please describe any recent substantial changes made to your DOT's construction stormwater management program and explain the benefits received from making these changes.

Construction Stormwater Management Processes

3. What tools are used at your DOT for implementing, tracking, monitoring, managing, and maintaining stormwater management and control measures for highway construction?
4. How does your DOT track and monitor compliance of construction stormwater management permit requirements during construction?
5. Please briefly explain the process at your DOT for addressing stormwater discharge and erosion and sedimentation deficiencies during construction of highway projects.

SWPPP and Erosion and Sediment Control Measures

6. What is your DOT's process for developing and implementing the SWPPP for highway construction projects?
7. Please explain the best management practices (BMPs) and control measures used by your DOT to comply with stormwater and other associated permits.
8. What is the policy at your DOT for using/not using flocculants for construction stormwater management? What are the reasons for not using flocculants?

Construction Stormwater Management Guidance and Audits

9. What types of guidance does your DOT have for implementing stormwater management practices?
10. How does your DOT build consistency into your construction stormwater management program?
11. What audits has your DOT experienced in regard to your stormwater management program? How does your DOT prepare for internal and regulatory audits?
12. How does your DOT train personnel in stormwater management practices?

Benefits and Challenges

13. What are the benefits that your DOT regularly achieves when implementing the stormwater management program for highway construction (e.g., clean water, reduced deficiencies, no violations, etc.)?
14. What challenges has your DOT faced in implementing the stormwater management program for highway construction?

Final Thoughts

15. What lessons learned or experiences has your DOT experienced in construction stormwater program management, tracking, reporting, and compliance?
16. Do you have any additional information to share on your DOT's construction stormwater management program?



APPENDIX D

Oklahoma DOT Clean Water Inspection Form



OKLAHOMA
Transportation

CLEAN WATER INSPECTION FORM

Date	
Job Piece	
Project Number	
Contract ID	
Location Description	
RE and/or ODOT Contact	
Type of Inspection	



EROSION MINIMIZATION	
BMPs are in place to minimize erosion?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Areas of work are delineated and steep slope disturbance is minimized?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> N/A
Soils are stabilized where work has stopped for 14 days?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Conveyance channels are in place to route water around unstabilized areas?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Pipe Outlets have energy dissipation if connected to surface water?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A
BMPs discharge to vegetated areas?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Notes:

SEDIMENT DISCHARGE MINIMIZATION	
Effective sediment control practices used?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Dust prevention practices used?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Erosion and sediment controls in place prior to soil disturbing activities?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A
Perimeter control BMPs used on downgradient perimeters and upgradient of bufferzones?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Sediment control devices reinstalled if they've been adjusted for short-term work?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
All storm drain inlets are protected?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Soil stockpiles have sediment controls and are not in conveyances or natural bufferzones?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Effective vehicle tracking BMPs used?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
50 ft (100 ft in sensitive water) buffer preserved or redundant controls in place if site is within 50 ft of or drains to surface water?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A

Notes:

The items in this inspection form align with the commitments of the OKR10. The most recent iteration of this permit, along with supporting documents can be found through the QR code at the top.

BMP MAINTENANCE	
Are all perimeter control BMPs maintained, functioning, and properly installed?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Sediment in sediment control BMPs is at less than ½ the device height?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Surface waters and discharge points are free of erosion and sediment?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Paved surfaces on or adjacent to site are free of tracked sediment?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A

Notes:

SOLID AND HAZARDOUS WASTE	
Building products and chemicals (pesticides, herbicides, fertilizer, etc.) are covered?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Solid and hazardous waste is stored and disposed of properly?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Portable toilets are positioned properly?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Vehicle fueling in a contained area?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
All material handling and storage areas reasonably clean and free of spills, leaks, and other harmful materials?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Dumpsters have a lid or cover for use during rain events or inactivity?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Site is free of floatables and litter?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Concrete and other washout wastes are contained and washouts are properly identified?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Vehicle and equipment washing wastes not in contact with ground and no engine degreasing occurs on site?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Notes:

DOCUMENTATION AND SWPPP	
Notice is posted with permit number, contact information, project description and SWPPP location?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Was the SWPPP inspected on this visit?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Is the SWPPP up to date and implemented?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Does the SWPPP contain the following:	
Employee training	<input type="checkbox"/> YES <input type="checkbox"/> NO
Inspection documentation every 7 days or within 24 hours of half in rain	<input type="checkbox"/> YES <input type="checkbox"/> NO
Changes to site are noted and Erosion Control plan sheets included	<input type="checkbox"/> YES <input type="checkbox"/> NO
Site conditions are documented accurately	<input type="checkbox"/> YES <input type="checkbox"/> NO

Notes:

The items in this inspection form align with the commitments of the OKR10. The most recent iteration of this permit, along with supporting documents can be found through the QR code at the top.

STABILIZATION	
Is this site ready for final stabilization?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If so, when is project expected to have final stabilization complete?	/ /

Notes:

ADDITIONAL INFORMATION	
Temporary sediment basin used if 10 or more acres disturbed?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Dewatering activities present on site?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Notes:

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 this 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.

Inspected by: _____

Inspector Signature: _____

Reviewed by: _____

Reviewer Signature: _____

Reviewer Comments:

The items in this inspection form align with the commitments of the OKR10. The most recent iteration of this permit, along with supporting documents can be found through the QR code at the top.



APPENDIX E

West Virginia DOT Division of Highways Environmental Construction Inspection Form

WEST VIRGINIA DIVISION OF HIGHWAYS

ENVIRONMENTAL CONSTRUCTION INSPECTION FORM



A. PROJECT INFORMATION

Project Name:		Inspection Date:	
State Project #		Inspection Time:	
Federal Project #		Inspector Name:	
Rain in last 24 hrs:		Weather Conditions:	

B. CONSTRUCTION SITE ASSESSMENT

Environmental Protection Measure	Compliant?			Note or Description of Corrective Action with Risk Rating ¹
	Yes	No	N/A	
1. Copies of project permit applications and approvals onsite (e.g., 404, 401, NEPA, construction stormwater, Floodplain).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. All required BMPs installed according to plans for current phase of construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Perimeter controls installed downslope of disturbed areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. All materials, equipment, and project activities are contained within the project boundary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. BMPs for instream work being conducted in accordance with permit (e.g., pump around, temp. bypass channel, coffer dam).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Dewatering work area using appropriate BMPs to prevent sediment laden water from leaving work site (e.g., dewatering bag).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Concrete washouts properly set up and maintained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Storage of petroleum and other equipment maintenance products properly stored.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Spill kit available onsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Project is free of mud on the roads outside the project area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Disturbed areas where no work is undertaken are properly stabilized (e.g., stone, seed and mulch).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Project demonstrates good housekeeping practices. Solid wastes are properly handled and disposed of at an approved facility.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
List other environmental protection measures if applicable.				
13.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

¹Action Risk Rating Scale: 1-Extreme, 2-High, 3-Medium, 4-Low (Additional guidance on risk rating provided in Table 1, next page.)

C. OFFSITE POLLUTION DISCHARGE	
1. Is there evidence of discharge of sediment or other pollutants outside the project boundary? *	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has sediment or other pollutants discharged from the site reached State waters? *	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>*If yes, the contractor's onsite personnel and foreman should be notified immediately. Provide a brief description of the communication with the contractor in Section D. Include names, method of communication, and plans for corrective action.</p> <p>WVDEP Spill Hotline: 1-800-642-3074</p>	
D. INSPECTION CLOSEOUT SUMMARY	
<p>Provide a brief description of the current construction activities at the site. Note the effectiveness of the current BMPs and whether any additional BMPs are recommended. If corrective actions are needed, provide a brief description of your communication with onsite personnel regarding inspection findings. Include names, method of communication, and plans for corrective actions.</p>	

Table 1. ACTION RISK RATING SCALE

Rating	Risk Level	Corrective Action Timeframe	Examples
1	Extreme	Immediate-must be closed out by the end of workday	- Sediment laden water leaving project site - NEPA or 404 permit violation
2	High	Within 24-hours	Critical E&S controls are damaged and need to be reinstalled before a rain event (e.g., perimeter controls washed out)
3	Medium	Within 3 working days	Less critical E&S controls are damaged and need to be reinstalled before a rain event
4	Low	Within 5 working days	Seeding stockpiles



APPENDIX F

Colorado DOT Form 1176: Stormwater Field Inspection Report

COLORADO DEPARTMENT OF TRANSPORTATION STORMWATER FIELD INSPECTION REPORT - ACTIVE CONSTRUCTION				
(1) Project Name:	(2) Project Contractor:	(3) SWMP Administrator (Qualified Stormwater Manager) Erosion Control Inspector:		
(4) CDOT Project Engineer/CDOT Designee:	(5) Other Attendee(s) (Name and Title):			
(6) CDOT Project Number:	(7) Project Code (Sub Account #):	(8) CDPS-SCP Certification#:	(9) CDOT Region:	
(10) Date of Project Inspection:	(11) Weather at Time of Inspection:			
(12) REASON FOR INSPECTION / EXCLUSION				
<input type="checkbox"/> Routine Inspection: (A routine erosion control inspection shall be conducted at a minimum, once every 7 Calendar Days)				
<input type="checkbox"/> Runoff Event: (Post-storm event inspections must be conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion. If no construction activities will occur following a storm event, post-storm event inspections shall be conducted prior to re-commencing construction activities, but no later than 72 hours following the storm event. The occurrence of any such delayed inspection must be documented in the inspection record.) Routine inspections still must be conducted every 7 calendar days. Storm Start Date: _____ Approximate End Time of Storm (hrs): _____				
<input type="checkbox"/> Third Party Request: Winter Conditions Inspections Exclusion: Inspections are not required at sites where construction activities are temporarily halted, snow cover exists over the entire site for an extended period, and melting conditions posing a risk of surface erosion do not exist. This exception is applicable only during the period where melting conditions do not exist, and applies to the routine 7-day inspections, as well as the post-storm-event inspections. If visual inspection of the site verifies that all of these conditions are satisfied, document the conditions in section 17 (General Notes) and proceed to section 18 (Inspection Certification). Documentation must include: dates when snow cover existed, date when construction activities ceased, and date when melting conditions began.				
<input type="checkbox"/> Other: _____				
(13) SWMP MANAGEMENT				
	Yes	No	N/A	(g) Reason for N/A
(a) Is the SWMP located on site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(b) Are changes to the SWMP documents noted and approved?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(c) Are the inspection reports retained in the SWMP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(d) Are corrective actions from the last inspection completed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(e) Is the Spill Response Plan updated in the SWMP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(f) Is a list of potential pollutants updated in the SWMP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(14) CURRENT CONSTRUCTION ACTIVITIES				
(a) Describe current phase of construction activities				
(b) Estimate of disturbed area at the time of the inspection, use guidance found in 208.04 (e):				
	Acres	Notes		
Temporary Stabilization (includes areas of vertically tracked and/or surface roughened temporary stabilizing surface treatments) +				
Interim Stabilization (spray on soil tackifier such as organic mulch tackifier, bonded fiber matrix, wood cellulose fiber with tackifier, etc.) +				
Permanent Stabilization (includes areas of permanent seeding that have not achieved 70% of pre-disturbance vegetation levels) +				
Other (Includes ground disturbing, clearing and grubbing, materials storage, equipment staging, haul roads) +				
Total acres of disturbance (includes cumulative total number of acres including temporary, interim, permanent stabilized and other) =				
(c) Has the SWMP Phased Control Measure Implementation Matrix been updated? <input type="checkbox"/> Yes <input type="checkbox"/> No				

(15) CONSTRUCTION SITE ASSESSMENT & CORRECTIVE ACTIONS

*****Off-site Pollutant Discharges are a Violation of the Permit and Reason for Immediate Project Suspension*****

The Construction Site Boundary/Limits of Construction (LOC), all disturbed areas, designated haul roads, material and/or waste storage areas that are exposed to precipitation, discharge locations, and locations where vehicles exit the site shall be inspected for evidence of, or the **potential** for, pollutants leaving the LOC, entering the stormwater drainage system, or discharging to State waters. If there is evidence of sediment or other pollutants discharging from the site, see section 16 (Construction Site Assessment).

All erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are maintained and operating correctly. Identify the condition of the control measure, using more than one letter if necessary: **(I)** Inadequate control measure; **(M)** Maintenance is needed; **(A)** Additional control measure is needed; **(R)** Remove control measure. Keep copies of this blank page for additional room if needed.

Continuous maintenance is required on all control measures. As per CDPS-SCP: "Control measures that are not operating effectively, have proven to be inadequate, or have failed must be addressed as soon as possible, immediately in most cases."

[illegible]

(16) CONSTRUCTION SITE ASSESSMENT **Off-site Pollutant Discharges are a Violation of the Permit and Reason for Immediate Project Suspension**		
(a) Is there evidence of discharge of sediment or other pollutants from the site? <input type="checkbox"/> Yes <input type="checkbox"/> No <small>*If yes, explain the discharge, the location and the associated corrective actions in section 15 (Construction Site Assessment & Corrective Actions) or section 18 (General Notes).</small>		
(b) Has sediment or other pollutants discharging from the site reached State waters? <input type="checkbox"/> Yes <input type="checkbox"/> No <small>*If yes, see subsection 208.03(c) and Part I.L.6 of the permit for reporting requirements.</small>		
(17) GENERAL NOTES <div style="border: 1px solid black; height: 100px; width: 100%; margin-top: 5px;"></div>		
(18) INSPECTION CERTIFICATION		
By signing this form, I certify that I attended the inspection in accordance with specification 208.03.		
Contractor's SWMP Administrator (Qualified Stormwater Manager) Print Name: <input style="width: 90%;" type="text"/>	Signature Required: <input style="width: 90%;" type="text"/>	Date: <input style="width: 80%;" type="text"/>
Contractor's Erosion Control Inspector (If Needed): Print Name: <input style="width: 90%;" type="text"/>	Signature (if needed) <input style="width: 90%;" type="text"/>	Date: <input style="width: 80%;" type="text"/>
(19) COMPLIANCE CERTIFICATION		
I verify that, to the best of my knowledge and belief, that if any corrective action items were identified during the inspection, those corrective actions are complete, and the site is currently in compliance with the permit (Part I.A.3.f.i).		
Contractor's SWMP Administrator/ECI Print Name: <input style="width: 90%;" type="text"/>	Signature Required: <input style="width: 90%;" type="text"/>	Date: <input style="width: 80%;" type="text"/>
Contractor's Superintendent/Approved Designee Print Name: <input style="width: 90%;" type="text"/>	Signature Required: <input style="width: 90%;" type="text"/>	Date: <input style="width: 80%;" type="text"/>
CDOT Project Engineer/CDOT Designee Print Name: <input style="width: 90%;" type="text"/>	Signature Required: <input style="width: 90%;" type="text"/>	Date: <input style="width: 80%;" type="text"/>

Stormwater Management Field Inspection Report Instructions

State waters are defined to be any and all surface and subsurface waters which are contained in or flow through the state, including, streams, rivers, lakes, drainage ditches, storm drains, ground water, and wetlands, but not including waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed. (Per subsection 107.25 and 25-8-103 (19) CRS)

- (3) **SWMP Administrator (Qualified Stormwater Manager) and Erosion Control Inspector:** Indicate the name(s) of the individual responsible for implementing, maintaining and revising the SWMP. An Erosion Control Inspector(s) may be the SWMP Administrator in projects with not more than 40 acres of disturbance (see 208.03(c)).
- (4) **CDOT Project Engineer/CDOT Designee:** Indicate the name of the CDOT representative performing the inspection with the SWMP Administrator/Erosion Control Inspector(s). This person should be the Project Engineer or an authorized representative.
- (9) **CDPS-SCP Certification #:** Indicate the Colorado Discharge Permit System (CDPS) Stormwater Construction Permit (SCP) (for Stormwater Discharges Associated with Construction Activities) certification number, issued by CDPHE, for the project which the report is being completed. Certification number can be found on the first page of the SCP.
- (12) **Reason(s) for Inspection / Exclusion:** Indicate the purpose for the inspection or exclusion. These inspections are required to comply with the CDOT Specifications and the CDPS-SCP.
 - ☐ Routine Inspections. These inspections are required at least every 7 calendar days during active construction. Suspended projects require the 7 calendar day inspection unless snow cover exists over the entire site for an extended period of time, and melting conditions do not exist (see, Winter Conditions Inspections Exclusions). ☐ Runoff Event Inspection for Active Sites. See page 1 for definition.
 - ☐ Third Party Request. Indicate the name of the third party requesting the inspection and, if known, the reason the request was made.
 - ☐ Winter Conditions Inspections Exclusions. See page 1 for definition. An inspection does not need to be completed, but use this form to document the conditions that meet the Exclusion. ☐ Other. Specify any other reason(s) that resulted in the inspection.
- (13) **SWMP Management:** Review the SWMP records and documents and use a ✓ to answer the question. To comply with CDOT Standard Specifications and the CDPS-SCP, all of the items identified must be adhered to. If No is checked, indicate the necessary corrective action in section 15 (Construction Site Assessment & Corrective Actions). Specification 208.03(d).
 - a) A copy of the SWMP must be retained on site, unless another location (specified by the permit) is approved by the Division.
 - b) Indicate all changes that have been made to any portion of the SWMP documents during construction. Changes shall be dated and signed at the time of occurrence. Amendments may include items listed in subsection 208.03(d).
 - c) The SWMP Administrator shall keep a record of inspections. Inspection reports must identify any incidents of noncompliance with the terms and conditions of the CDOT specifications or the CDPS-SCP. Inspection records must be retained for three years from expiration or inactivation of permit coverage.
 - d) Are corrective actions from the last inspection completed? Is a description of the corrective action(s), the date(s) of the corrective action(s), and the measure(s) taken to prevent future violations (including changes to the SWMP, as necessary) documented?
 - e) Subsection 208.06(c) requires that a Spill Response Plan be developed and implemented to establish operating procedures and that the necessary employee training be provided to minimize accidental releases of pollutants that can contaminate stormwater runoff. Records of spills, leaks or overflows that result in the discharge of pollutants must be documented and maintained. Information that should be recorded for all occurrences include the time and date, weather conditions, reasons for spill, etc. Some spills may need to be reported to the Water Quality Control Division immediately.
 - f) (f) Subsection 107.25(b)6 requires the Erosion Control Supervisor to identify and describe all potential pollutant sources, including materials and activities, and evaluate them for the potential to contribute pollutants to stormwater discharge.
 - g) (g) If N/A is checked for any of the items (a) through (f), indicate why in the space provided, if additional space is needed indicate in section 17 (General Notes).



APPENDIX G

Florida DOT SWPPP Template

NPDES CGP SWPPP Template for FDOT Projects

This template was produced to meet the requirements of the State of Florida Department of Environmental Protection NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities (CGP), effective 02/2015, Table 4.7.1.

This template is intended for use on traditional design-bid-build contracts. The information for each item is intended to be supplied the entity identified in parentheses. (Contractor) refers to the Department's construction contractor and subcontractor(s). (Design) refers to the Department's in-house or consultant design team. (Design/Contractor) items are intended to be initially provided by Design and supplemented, as needed, by the Contractor.

Italic text was obtained directly from DEP Document No. 62-621.300(4)(a) effective 02/2015. In all cases, the requirements listed in the NPDES CGP shall control.

Submit all required documents associated with the NPDES CGP prior to the preconstruction conference in accordance with FDOT Standard Specification Section 104.

(Contractor) Stormwater Team

Identify the personnel (by name or position) that are part of the stormwater team responsible for implementing the SWPPP, including the qualified inspector. List their individual responsibilities in developing or implementing the SWPPP.

[illegible]

Note: If additional rows are needed, attach supplemental table.

(Contractor) Contractors/Subcontractors

List all the contractors or subcontractors who will be conducting construction activities at the site, and identify the areas of the site in which they will be working. All listed contractors and subcontractors must sign the certification.

Company Name	Work Area

Note: If additional rows are needed, attach supplemental table.

(Contractor) Signed Certifications

Complete FDOT Contractor Certification - NPDES Generic Permit for Storm Water Discharges From Large and Small Construction Activities ([FDOT Form No. 650-040-07](#)) for the Contractor and all subcontractors that are conducting construction activities at the site, including but not limited to, installing, maintaining, and inspecting erosion control items, environmental sampling and testing activities, earthwork, dewatering, paving, etc.

"I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan."

Name	Title	Form 650-040-07 Completed
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

Note: If additional rows are needed, attach supplemental table.

Site/Construction Activities

(Design) Describe the nature of the construction activity.

(Contractor) Describe the intended sequence and time table of major activities that will disturb soils.

(Contractor) Include the scheduled starting and ending date for each major activity such as land clearing, grubbing, grading, cut and fill, dewatering operations, installation of erosion and sediment controls, installation of stormwater management systems, paving, final or temporary stabilization of exposed soil, and removal of construction equipment and vehicles.

Major Activity	Start Date	End Date

Note: If additional rows are needed, attach supplemental table.

Estimate the total area of the site and the total area that is expected to be disturbed by excavation, grading, or other construction activity.

(Design) Total area of site – (as shown on Contract Plans)		Acre(s)
(Contractor) Any additional area(s) outside project limits		Acre(s)
Total		Acre(s)
(Design) Total Area expected to be disturbed by excavation or grading as shown on Contract Plans		Acre(s)
(Contractor) Any additional areas expected to be disturbed by other construction activities (staging, stockpiling, etc)		Acre(s)
Total		Acre(s)

(Design) Include existing data on soil types and the quality of any existing discharge from the site.

Existing data on soil types is provided on the Roadway Soil Survey sheet in the Contract Plans Set.

(Add site specific water quality information, if applicable)

(Design/Construction) * For each proposed discharge point provide the following:

[illegible]

*If temporary/interim discharge points used during construction to be provided by contractor, if applicable.

(Contractor) Estimate the amount of land that will be cleared during the construction activity for each drainage area.

Site Map

Include a site map showing all of the following:

(Design) Develop the Site Map in accordance with FDOT Design Manual (FDM) Chapters 251 and 908.

Design File Reference Table			
Site Map Elements	Contract Plan	CADD.zip Folder	File Name
Boundaries of the property	Plan Sheets	Roadway	Planrd* Ref: rwdtrd*
Locations where construction activities will occur	Plan Sheets	Roadway	Planrd*
Drainage patterns	Drainage Map	Drainage	Drmpd*
Approximate slopes and elevations anticipated after major grading activities	Plan/Profile Sheets Cross Sections	Roadway	Planrd* Rdxsrd*
	Pond Sheet(s) Bridge Hydraulic Recommendation Sheet(s) Lateral Ditch XS Sheet(s)	Drainage	Pdplrd* Pdxsrd* Ldxsrd*
Areas of soil disturbance	Typical Section Plan Sheets	Roadway	Planrd* Qtdsrd* clearing and grubbing limits model
Areas which will not be disturbed	Plan Sheets	Roadway	Planrd*
Location of major structural and nonstructural controls	Plan Sheets Estimated Quantities Report	Roadway	Planrd* Ref: Drprrd* Qtdsrd* E&SC pay item models
Location of areas where stabilization practices are expected to occur	Typical Section Plan Sheets Estimated Quantities Report	Roadway	Typsrd* Planrd* Qtdsrd* Turf pay item models
Location of surface waters and wetlands	Plan Sheets	Roadway	Planrd* Ref: wettrd*
Location where stormwater is proposed to be discharged during construction to a surface water or MS4	Plan Sheets	Roadway	Planrd* Ref: Drprrd*
	Drainage Map	Drainage	Drmpd*

(Contractor) Items to be added or updated by the Contractor, as applicable:

- *Boundaries of the property* (any additional areas used by contractor outside the limits shown in the Contract Plans Set)
- *Entrance/Exit Points*

- *Locations where construction activities will occur.*
- *Locations where dewatering operation will occur.*
- *Drainage patterns and approximate slopes and elevations anticipated after major grading activities.*
- *Areas of soil disturbance.*
- *Location of major structural and nonstructural controls.*
- *Location of areas where stabilization practices are expected to occur.*
- *Location where stormwater is proposed to be discharged during construction to a surface water or MS4.*

(Contractor) Non-Stormwater Discharges

List all non-stormwater discharges covered under this permit and the pollution prevention procedures that will be implemented.

You can discharge the following types of non-stormwater discharges, if they are listed in your SWPPP and your SWPPP includes appropriate pollution prevention procedures as to not cause or contribute to a violation of water quality standards.

The following table is a list of the allowable CGP non-stormwater discharges from CGP Part 3.2.

Included (Y/N)	Discharge Type	Pollution Prevention Procedures to be implemented
	Discharges from firefighting activities.	
	Fire hydrant flushings.	
	Waters without detergents used to spray off loose solids from vehicles.	
	Waters used to control dust.	
	Potable water sources such as waterline flushings.	
	Landscape irrigation water and drainage.	
	Routine external building washdown provided no detergents are used.	
	Pavement washwaters that do not contain detergents, leaks, spills of toxic or hazardous materials.	
	Air conditioning condensate.	
	Spring water.	
	Foundation or footing drain flows that are not contaminated with process material such as solvents.	
	Noncontaminated ground water associated with dewatering activities as described in Part 3.4.	

See NPDES CGP Part 3.3 for prohibited non-stormwater discharges.

(Contractor) Dewatering Controls, if applicable

Include a description of the BMPs that will be used to ensure that discharges of noncontaminated ground water from dewatering operations do not cause or contribute to violations of state water quality standards.

(Contractor) BMPs

Describe the BMPs that will be implemented for each major activity and the timing during the construction process that they will be implemented. (See Part 5)

(Design) Permanent Stormwater Management Controls

Describe the stormwater management controls or BMPs (e.g., stormwater detention or retention systems, vegetated swales, or velocity dissipation devices at discharge points) that will be installed during the construction process to control pollutants in stormwater discharges. (See Part 5.7)

(Contractor) Inspections

Must be at least once every seven calendar days and within 24- hours of the end of a storm event that is 0.50 inches or greater (even if it rains on the weekend or a holiday). Your site must be inspected by a qualified inspector that you must provide (See Part 6).

Inspections are required to be documented on [FDOT Form 650-040-03](#). Maintain records in accordance with the NPDES CGP.

Responsible Authority for NPDES CGP – per Rule 62-620.305, F.A.C.

Company	Name	Position

Duly Authorized Representative(s)

A duly authorized representative is a person who has been designated by the responsible authority to sign documents relating to this permit on the responsible authority's behalf. A responsible authority may authorize a duly authorized representative by submitting to the [Notices Center](#), by email or in writing an authorization that names either an individual or a position having overall responsibility for the operation of the your project, such as the project engineer, project superintendent, a position of equivalent responsibility, or an individual or position having overall responsibility for implementing the CGP at the site.

[illegible]

Note: If additional rows are needed, attach supplemental table.

(Contractor) Maintenance


Describe the maintenance activities and schedules that will be followed to keep BMPs in good and effective operating condition.

113



APPENDIX H

Iowa DOT QA Inspection Form

04-18		 IOWA DOT <small>SMARTER SIMPLER CUSTOMER DRIVEN</small>	
STORM WATER OVERSIGHT (QUALITY ASSURANCE) INSPECTION			
Date & Time of Inspection: _____		DNR Authorization Number: IA _____ - _____	
Project No.: _____		County: _____	
Prime Contractor: _____		Inspection Made By: _____	
Date of Previous QA Inspection _____			
<u>Contractor Staff:</u>		Name	Expiration Date
Erosion Control Technician (ECT) (minimum 1 per company)		_____	
Contractor Staff – Individual(s) joining weekly inspections:		ECT Certified?	Expiration Date
_____		ESC Basics Trained?	Expiration Date
_____		_____	_____
_____		_____	_____
<u>DOT Inspection Staff</u>			
DOT Staff – Individual(s) completing weekly inspections:		ECT Certified?	Expiration Date
_____		ESC Basics Trained?	Expiration Date
_____		_____	_____
_____		_____	_____
<u>Documentation Review</u>			
Erosion Control Implementation Plan (ECIP) provided?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A
ECIP updated since last inspection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Subcontractor co-permittee statements provided?	<input type="checkbox"/>	<input type="checkbox"/>	If yes, how many? _____
Comments:			
<u>Inspection Reports Review (review reports since last inspection):</u>			
Missing reports?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Lacking information?	<input type="checkbox"/>	<input type="checkbox"/>	
Comments:			
General Comments/Observations:			

Stormwater Management Field Inspection Report Instructions (continued)

(14) Current Construction Activities:

- a) Provide a short description of the current construction activities/phase at the project site; include summary of grading activities, installation of utilities, paving, excavation, landscaping, etc.
- (1) Estimate of disturbed area at the time of the inspection, use guidance found in 208.04 (e). Estimate the acres of disturbed area at the time of the inspection. Include clearing, grading, excavation activities, areas receiving overburden (e.g. stockpiles), demolition areas and areas with heavy equipment/vehicle traffic, installation of new or improved haul roads and access roads, staging areas, borrow areas and storage that will disturb existing vegetative cover, (Areas that have been: hard armored or paved should not be counted for total disturbance).
- b) Has the Phased control measure Implementation Matrix on the SWMP been updated? As part of the inspection the Phased control measure Implementation matrix for both the structural and non-structural control measures found at the beginning of the SWMP sheets must be reviewed to ensure that "In use on site" box is checked for control measures currently in use at the time of the inspection.

(15) Construction Site Assessment & Corrective Actions: Inspect the construction site and indicate where control measure feature(s) identified in section 13 (SWMP Management), require corrective action. Erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are operating correctly.

- Condition. Identify the condition of the control measure, using more than one letter (identified in section 15) if necessary.
- Location. Site location (e.g., project station number, mile marker, intersection quadrant, etc.).
- Control measure. Indicate the type of control measure at this location that requires corrective action (e.g., silt fence, erosion logs, soil retention blankets, etc.).
- Date Completed & Initials. Date and initial when the corrective action was completed and the preventative measure statement finished.
- Description of Corrective Action and Preventative Measure Taken. Provide the proposed corrective action needed to bring the area or control measure into compliance. Once corrective actions are completed, state the measures taken to prevent future violations and ensure that the control measures are operating correctly, including the required changes made to the SWMP.

Inadequate control measure: Is any control measure that is not designed or implemented in accordance with the requirements of the permit and/or any control measure that is not implemented to operate in accordance with its design, this includes control measures that have not been implemented for pollution sources. If it is infeasible to install or repair the control measure immediately after discovering the deficiency the reason must be documented and a schedule included to return the control measure to effective operating condition as soon as possible.

Control measures requiring routine maintenance: Any control measure that is still operating in accordance with its design and the requirements of the permit, but requires maintenance to prevent a breach of the control measure. These items are not subject to the corrective action requirements as specified in Part I.b.1.c of the permit.

Additional: Any control measure inadequate for its application or an area with insufficient control measure(s). If it is infeasible to install revised or additional control measure(s) immediately after discovering the deficiency the reason must be documented and a schedule included to return the control measure to effective operating condition as soon as possible.

Remove: Control measure no longer necessary

(16) Construction Site Assessment: Was there any off site discharge of sediment at this site since the last inspection?

- a) Is there evidence of discharge of sediment or other pollutants from the site? **Off-site pollutant discharges are a violation of the permit.** (The construction site perimeter, all disturbed areas, material and/or waste storage areas that are exposed to precipitation, discharge locations, and locations where vehicles access the site shall be inspected for evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system).
- b) Are pollutants discharging to State water?
- c) Has sediment or other pollutants discharging from the site reached State waters? **Off-site pollutant discharges are a violation of the permit.** If off site discharge has occurred, explain the discharge and the corrective actions in section 15 (Construction Site Assessment & Corrective Actions) or section 17 (General Notes).

(17) General Notes: Indicate any additional notes that add detail to the inspection; this may include positive practices noted on the project.

(18) Inspection Certification: In accordance with 208.03, required personnel shall sign to verify that they were in attendance.

(19) Compliance Certification: After all corrections have been made, this signature must be completed in accordance with Part I.A.3.f of the CDPS-SCP.



APPENDIX I

New York State DOT SPDES Stormwater Inspection Report Form

MURK 6 (1/21)		SPDES STORMWATER INSPECTION REPORT																																																												
JOB STAMP <div style="border: 1px solid black; height: 150px; width: 100%;"></div>		Date: _____ Day of Week: S M T W T F S Sheet No. ____ of ____																																																												
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%;"></th> <th style="width: 35%; text-align: center;">AM</th> <th style="width: 35%; text-align: center;">PM</th> </tr> <tr> <td>Weather</td> <td colspan="2"></td> </tr> <tr> <td>Temperature</td> <td style="text-align: center;">° F</td> <td style="text-align: center;">° F</td> </tr> <tr> <td>Soil Condition</td> <td colspan="2"></td> </tr> </table>					AM	PM	Weather			Temperature	° F	° F	Soil Condition																																															
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<p>This form is to be used on contracts covered by the <u>SPDES General Permit for Stormwater Discharges from Construction Activity</u>. The completed form must be filed in the Engineer's Field Office and distributed to contractors.</p> <p>Reason for this Inspection:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <input type="checkbox"/> 7-calendar day inspection <input type="checkbox"/> 30-day inspection (temporary shut-down) <input type="checkbox"/> Subsequent inspection in 7 calendar day period due to soil disturbance exceeding 5 acres or project site within TMDL or 303(d) watershed </div> </div> <p>Codes for Erosion and Sediment control measures and Stormwater Management Practices to be inspected: (1) mulch, (2) seed and mulch, (3) check dams, (4) sediment filter logs, (5) silt fence, (6) sediment trap, (7) turbidity curtains, (8) pipe slope drains, (9) drainage structure inlet protection, (10) rolled erosion control products, (11) soil stabilizers, (12) construction entrances/exits, (13) temporary catch basin inserts, (14) water diversion structures, (15) infiltration/bioretention basins/swales, (16) coffer dams, (17) staging area, (18) stockpile stabilization, (19) stormwater ponds/wetlands, (20) Other _____</p> <p>List ONLY those practices that require repair, maintenance, reinstallation or replacement. Attach COLOR copies of photographs to this report with accurate date stamp that shows the condition of practices identified as needing corrective action within 7 calendar days of the inspection. Attach COLOR copies of photographs to this report with accurate date stamp showing the condition of the practice(s) after completion of the corrective actions that document the completion of the corrective actions within a reasonable timeframe after the inspection.</p>																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 5%;">ID</th> <th rowspan="2" style="width: 30%;">Location of Practice (Use stations or descriptions)</th> <th colspan="2" style="width: 15%;">Practice</th> <th rowspan="2" style="width: 50%;">Remarks (Describe Specific Maintenance Required)(Including sediment removal, replacement, replacement or installation of practice)</th> </tr> <tr> <th style="width: 10%;">Code #</th> <th style="width: 5%;">Temp or Perm? (T or P)</th> </tr> </thead> <tbody> <tr><td>1</td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>						ID	Location of Practice (Use stations or descriptions)	Practice		Remarks (Describe Specific Maintenance Required)(Including sediment removal, replacement, replacement or installation of practice)	Code #	Temp or Perm? (T or P)	1					2					3					4					5					6					7					8					9					10				
ID	Location of Practice (Use stations or descriptions)	Practice		Remarks (Describe Specific Maintenance Required)(Including sediment removal, replacement, replacement or installation of practice)																																																										
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MURK 6 REVERSE
(1/21)

ID	Location of Practice (Use stations or descriptions)	Practice		Remarks (Describe Specific Maintenance Required)(including sediment removal, replacement, replacement or installation of practice)
		Code #	Temp or Perm? (T or P)	
11				
12				
13				
14				
15				

Attach a location map showing all disturbed areas and areas stabilized since the last inspection.

Identify all locations where stormwater is discharged from the site to a Water of the U.S. (e.g. streams, lakes, wetlands, etc.) within or adjacent to the limits of construction, and all locations where stormwater exits the construction site. Describe the condition of the stormwater and the condition of the receiving waterbodies. Add Form MURK 6-2 for continuation as necessary.

	Location of Outlet (STA / OFFSET)	Type of Outlet (e.g. pipe, ditch, overland flow, etc.)	Does this discharge to a Water of the US?	Describe Runoff (if any) (e.g. clear, turbid, oily)	Describe Receiving Water (if any) (e.g. clear, turbid, oily, unknown)
1					
2					
3					

Number of Acres currently disturbed: _____

If more than 5 Acres of soil disturbed at any one time, was NYSDEC advised? (Form HC209 may apply) _____

Describe existing deficiencies in the SWPPP. Specify for each location using row ID number from front

Were significant deficiencies identified that require the SWPPP to be revised: ☐ Yes ☐ No

If Yes, complete a CONR-8 SWPPP Revision Form and file in the Engineer's Field Office

NOTE: Within 1 business day of completion of this inspection, the Contractor(s) must be notified of any corrective actions required. The Contractor(s) or identified Sub-Contractor(s) shall begin corrective actions within 1 business day of notification, and shall complete corrective actions within 1 business day of notification or within a reasonable timeframe for complex corrective actions.

Qualified Inspector Name/Title _____

Company Name (If Consultant) _____

Qualified
Inspector
Signature: _____

Prepared: _____
(Date)

Copy to
Contractor: _____
(Date)

Reviewed By: _____

Date
Reviewed: _____
(Date)

☐ MURK 6-1 SPDES Stormwater Inspection Report -
Continuation attached

☐ MURK 6-2 SPDES Stormwater Outlets to Waters of the U.S. -
Continuation attached

Print Form



APPENDIX J

Pennsylvania DOT Summary of Compliance Response Policy Table

Summary of Compliance Response Policy					
Category	Time to Correct	Inspector-in-Charge Action	District Action	Expected Contractor Action	Additional Notes
[1] Deficiencies resulting in significant discharge of pollutants	Initiate actions immediately upon discovery or directed by the Department. Correct within 24 hours or before next rainfall, whichever occurs first. The Department must approve proposed corrective actions that would exceed the above timeframe.	Immediately notify Contractor that a Cat. 1 deficiency has been observed and work should begin immediately to resolve the problem. Refer the Contractor to this table for expected response timeframes and consequences of failing to meet them. Email a summary to the ACE before the end of the business day.	Issue a project stop work order if deficiency is not resolved within the time to correct. May use discretion on large projects in issuing a partial-area stop work order for only those areas connected to the deficiency.	Perform necessary work to stop discharge and resolve deficiencies within the time to correct. Provide a written description of measures or steps that will be taken to ensure the same deficiency does not reoccur.	A "significant discharge of pollutants" is an observed discharge of significant quantities of sediment to a surface water of the Commonwealth. Quantity is a function of the concentration of sediment and the duration of the discharge. For example, a release of stormwater over several days from a sediment basin with very low sediment concentration (e.g., minimal discoloration or cloudiness) would not fit Cat. 1. Whereas a sediment trap that discharges "dark" water into an adjacent stream over a 24-hour period would be Cat. 1.
[2] Deficiencies that could result in significant discharge of pollutants	Initiate actions immediately upon discovery or directed by the Department. Correct prior to the end of the next business day or before next rainfall, whichever occurs first. The Department must approve proposed corrective actions that would exceed the above timeframe.	Immediately notify Contractor that a Cat. 2 deficiency has been observed and work should begin immediately to resolve the problem. Refer the Contractor to this table for expected response timeframes and consequences of failing to meet them. Email a summary to the ACE before the end of the business day.	Issue a project stop work order if deficiency is not resolved within the time to correct. May use discretion on large projects in issuing a partial-area stop work order for only those areas connected to the deficiency.	Perform necessary work within the time to correct to resolve deficiencies.	These are noted deficiencies where a significant discharge of pollutants has not been observed, but conditions are such that future rainfall events could result in such a discharge. An example of this would be an exceptional value (EV) wetland that lies at the base of a large, recently graded fill slope that has not yet been stabilized, or even protected with rolled erosion control product. A significant rainfall event could severely erode the slope and fill the wetland with sediment.
[3] Failure to comply with the approved ESPC Plan	Initiate work within 24 hours after being notified by the Department and diligently continue until completed within the timeframe established by the Department.	Immediately notify Contractor and establish timeframe in writing for completing work.	Hold payment of estimates for work until work is completed if Contractor fails to resolve within the time to correct. Per Sec. 108.07(d) of Pub. 408, liquidated damages will be assessed for failure to begin work within 24 hours of notification of a non-compliance and each subsequent 24-hour period until compliance is attained.	Perform necessary work to restore compliance with the ESPC Plan within the time to correct.	The timeframe to correct the issue depends on the nature of the issue. Some issues require significantly more work than others and should be given consideration. For example, draining and removing accumulated sediment from a sediment basin may require one or more days to complete. Whereas, removing tracked sediment from paved surfaces that are not connected to a sediment control BMP can be done quickly.
[4] CCD concerns regarding compliance with the ESPC Plan	Initiate work within 24 hours after being notified by the Department and diligently continue until completed within the timeframe established by the CCD.	Evaluate CCD concerns and either direct Contractor to begin work or forward concerns to the District Design PM.	Evaluate CCD concerns and either confirm work to be completed or contact the CCD to discuss concerns. Hold payment of estimates for work until work is completed if Contractor fails to resolve within the time to correct.	Perform necessary work within the time to correct to restore compliance with the ESPC Plan.	Treat similar to Cat. 3 unless the compliance issue could result in a significant discharge of pollutants to a surface water of the Commonwealth (in which case it would be Cat. 2).
[5] CCD concerns regarding a design aspect of the ESPC Plan	Varies, depending on circumstances.	Forward concern(s) to the District Design PM.	Investigate concerns and contact CCD to discuss potential resolutions.	If requested by the District, participate in meeting(s) with the CCD to discuss concerns and potential resolutions.	
[6] Failure to perform a visual site inspection	Within 24 hours.	Immediately perform a visual site inspection.	Perform a self-inspection before the next rainfall event.	Participate in the visual site inspection with the Department Inspector.	

ACE = Assistant Construction Engineer

IIC = Inspector-in-Charge

District Design PM = District Design Project Manager



APPENDIX K

Texas DOT Form 2118: Field Inspection and Maintenance Report



CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN FIELD INSPECTION AND MAINTENANCE REPORT

Form 2118
(Rev. 3/22)
Page 5 of 8

Project Information

Inspection Cycle (select only one):

- ☐ At least once every 7 calendar days.
- ☐ At least once every 14 calendar days and within 24 hours after 0.5 inches or more of rainfall.
- ☐ *Other:

Inspection Date:

CSJ:

RN:

Highway:

County:

TxDOT Authorization No.:

Contractor Authorization No.:

Date of Last Rainfall:

Amount of Last Rainfall: (inches)

Inspected Best Management Practice (BMP)/Areas

All of these BMPs/areas must be inspected when present on the right-of-way

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> Disturbed areas | <input type="checkbox"/> Concrete truck washout areas | <input type="checkbox"/> Material stockpiles | <input type="checkbox"/> Construction material storage areas |
| <input type="checkbox"/> Discharge locations | <input type="checkbox"/> Areas where litter/debris/trash collect | <input type="checkbox"/> Areas where vehicles enter/leave site | <input type="checkbox"/> Parking/equipment storage areas |
| <input type="checkbox"/> Erosion control BMPs | <input type="checkbox"/> Areas that generate dust | <input type="checkbox"/> Portable sanitary facilities | <input type="checkbox"/> Chemical/fuel storage areas |
| <input type="checkbox"/> Sediment control BMPs | <input type="checkbox"/> Postings | <input type="checkbox"/> Dewatering activities | <input type="checkbox"/> Soil stabilization areas |

Other:

Corrective Actions, Maintenance, Upgrading or Additional Controls

Except the items listed below, all areas/BMPs indicated above have been inspected and do not require maintenance, upgrading or additional controls. Document all changes to the SWP3.

Low	Requires attention by the next inspection; Low priority items are those that are not causing immediate endangerment to human health or the environment but need to be addressed to avoid becoming an issue. If not addressed by the next inspection, but the issue is still not causing immediate or imminent harm to the environment or safety, it may remain at low priority for one more inspection period. Low priority items that have not been addressed in two consecutive inspections should be escalated to medium priority items. Low priority items should be immediately escalated to high priority if conditions change that cause immediate endangerment to human health or the environment.
Medium	Requires attention from contractor within 3 working days (and a follow-up by inspector at 3 business days); Medium priority items are those that may endanger human health or the environment if left unchecked but are not yet a direct threat or a low priority item from the previous inspection that has not been addressed within the required time frame. If a medium priority item is not addressed after one weekly inspection, it will be moved to a high priority and will be considered non-compliant.
High	High – Requires immediate attention; High priority items are those that are causing immediate endangerment to human health or the environment or a medium priority item that appeared on the prior week's inspection that was not addressed during the required timeframe. High priority items need to be brought to the attention of the Area Engineer or Project Manager immediately. For high priority items, work must immediately be stopped in the vicinity of the issue, and the issue must be immediately addressed. If the issues are widespread, work can be stopped on the entire project until issues are addressed. Vicinity will be defined as the immediate drainage area to the BMP(s) in question, or the area of work causing impact to the BMP(s) in question, as determined by the engineer. If work is stopped in the vicinity of a high priority issue, the area must comply with stabilization requirements.

Corrective Actions, Maintenance, Upgrading or Additional Controls

BMP No.:	New or Existing Issue:	Station(s) or Location:	Left or Right of Centerline:	Notes:	Potential Non-Compliance <input type="checkbox"/>
		to			
BMP/Area:		Issue:			
Cause:		Priority:	Date Corrective Action Completed	TxDOT Rep. Initials of Verification	
Corrective Action:					
Add More		Remove			

Hide Temporary & Permanent Stabilization

Temporary and Permanent Stabilization

When construction activities permanently cease, or temporarily cease and are not expected to resume for 14 or more days, on a disturbed portion of the site, erosion control and stabilization measures must be initiated immediately, unless excluded by Part III.F.2(b)(iii) of the CGP. Indicate the stabilization measures that have been initiated under these circumstances.

Area No.	Sheet No.	Phase	Station(s) or Location:	Left or Right of Centerline:	Date Soil Disturbance Initiated	Ongoing? <input type="checkbox"/>	Date Activity Ceased	Days Idle	
			to						
Stabilization Required:	Temporary <input type="checkbox"/>	Permanent <input type="checkbox"/>	70% Permanent Cover Achieved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Correct Seed Mix/Sod Used?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Stabilization Measure:						Date Stabilization Initiated			
Notes:						Priority:	Date Corrective Action Completed	TxDOT Rep. Initials of Verification	
Corrective Action:						Potential Non-Compliance <input type="checkbox"/>			
Add More		Remove							

Hide Observation

Observations

Observations can be used to document any items noted in the inspection that do not fall into the "Corrective Actions, Maintenance, Upgrading, or Additional Controls" or the "Temporary and Permanent Stabilization" sections. Observations are notes, warnings, comments, and reminders to the Contractor.

BMP No. or Area:	Station(s) or Location: to	Left or Right of Centerline: ▼	Comments:
Observation:			
Note/Reminder:			
Add More Remove			

Compliance Certification

Check One and Complete Signature.

- ☐ With the corrective actions noted (if any), the site is in compliance with the CGP regulations and the SWP3.
- ☐ The site is in potential non-compliance with the CGP and/or the SWP3 and are noted with a check box in the above-listed items. Notify engineer of potential non-compliance.

TxDOT Assigned Inspector's Name (Print clearly):	Title:	Date:	get date
TxDOT Assigned Inspector's Signature:			

Contractor Notification

Furnish a copy of this inspection report to the Contractor within one calendar day of the inspection. Corrective actions must be taken as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. If corrective actions are not made within this timeframe and become potential noncompliance issues, other work on the project may be suspended by the Engineer. Time charges will continue until the project is brought into compliance and documentation of corrective action is provided. This in no way releases the contractor of liability for noncompliance.

Contractor's Representative's Name (Print clearly):	Title:	Date:	get date
Contractor's Representative's Signature:			

Inspection 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

TxDOT's Certifying Representative's Name (Print clearly):	Title:	Date:	get date
TxDOT's Certifying Representative's Signature:			

Hide Post Signature Updates

Post Signature Updates

Document any items, notes, or corrections that occurred after the form was signed. If no post signature updates are documented, this section can be hidden using the "Hide Post Signature Updates" button.

Date of Update	TxDOT Rep Initials	Contractor Rep Initials
Update Notes:		
Additional Required Actions:		
Add More	Remove	

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI-NA	Airports Council International-North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation Act (2015)
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GHSA	Governors Highway Safety Association
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S. DOT	United States Department of Transportation

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