

City of Lexington Development Services

Construction Address _____

Documentation:

Completed Application: Yes: _____ No: _____

Fee (project cost) : Yes: _____ No: _____

Physical Set of Plans: Yes: _____ No: _____

Stamped if Applicable: Yes: _____ No: _____ Not required _____

- Stamped plans are required in residential construction when verification of structural components is needed.
- Stamped plans are required in commercial construction when there are structural repairs, modifications or in new construction.

Digital Copy of Plan: Yes: _____ No: _____

SWPPP (Over 1 Acre): Yes: _____ No: _____ Not required _____

Electrical Permit: Yes: _____ No: _____

Fire Marshall Review: Yes: _____ No: _____ Not required _____

Comments: _____

Zoning:

Zoning for property: _____

Allowable Use: Yes: _____ No: _____ By Conditional Use: _____

I-Codes Occupancy: _____

Comprehensive Plan: Yes: _____ No: _____

Lot Dimension: Conforming: _____ Non-conforming: _____

Lot Coverage: Allowed: _____ Projected: _____

Yard Requirements: Met: _____ Not Met: _____

Height Requirement: Met: _____ Not Met: _____

Flood Zone: _____

Elevation Certificate Yes: _____ No: _____ Not required _____

LOMA: Yes: _____ No: _____ Not required _____

Wellhead Area: Yes: _____ No: _____

Airport Overlay District: Yes: _____ No: _____

Comments: _____

Off-Street Parking (No requirement in Ag Zones):

Residential Zones:

Spaces Required: Quantity: _____ Met: _____ Not Met: _____

Drives surfaced: Yes: _____ No: _____

Surfacing: _____

Approach verified: Yes: _____ No: _____

Commercial Zones:

Spaces Required: Quantity: _____ Met: _____ Not Met: _____

ADA Parking: Quantity: _____ Met: _____ Not Met: _____

Driveways: Yes: _____ No: _____ Surfacing: _____

Approach verified: Yes: _____ No: _____ Surfacing: _____

Display Areas: Yes: _____ No: _____ Surfacing: _____

Storage Areas: Yes: _____ No: _____ Surfacing: _____

Industrial Zones:

Spaces Required: Quantity: _____ Met: _____ Not Met: _____

ADA Parking: Quantity: _____ Met: _____ Not Met: _____

Driveways: Yes: _____ No: _____ Surfacing: _____

Approach verified: Yes: _____ No: _____ Surfacing: _____

Display Areas: Yes: _____ No: _____ Surfacing: _____

Storage Areas: Yes: _____ No: _____ Surfacing: _____

Comments: _____

Landscaping & Screening:

Residential Zones:

25% of Lot Landscaped: Quantity: _____ Met: _____ Not Met: _____

Parking Lot Plan:

Size of improvements:

>4,000 square feet requires an overall parking lot plan; less than requires improvements on only new area.

Commercial & Industrial Zones:

25% of Lot Landscaped: Quantity: _____ Met: _____ Not Met: _____

Street Frontage:

Frontage (15 ft): Quantity: _____ Met: _____ Not Met: _____

<25% of Inorganic: Quantity: _____ Met: _____ Not Met: _____

Trees: Quantity: _____ Met: _____ Not Met: _____

Side Yard:

Residential Buffer: Met: _____ Not Met: _____

<10% of Inorganic: Quantity: _____ Met: _____ Not Met: _____

Rear Yard:

Residential Buffer: Met: _____ Not Met: _____

<10% of Inorganic: Quantity: _____ Met: _____ Not Met: _____

Comments: _____

Lighting Requirements (for Commercial and Industrial):

Local impacts: Met: _____ Not Met: _____

Screening (for Commercial and Industrial):

Residential Buffer: Met: _____ Not Met: _____

Comments: _____

ADA:

Parking: Quantity: _____ Met: _____ Not Met: _____

Signage: Met: _____ Not Met: _____

Restrooms: Met: _____ Not Met: _____

Accessible Route: Met: _____ Not Met: _____

Drinking fountain: Met: _____ Not Met: _____

Doors & Hardware: Met: _____ Not Met: _____

Comments: _____

Commercial Permit Requirements

- Completed permit application and pay fee;
 - If the building is existing, a Certificate of Occupancy Application must be completed;
- Complete set of stamped drawings to scale;
 - If no structural alterations are being proposed an architect's stamp is not required;
 - If disturbing more than an acre, a Stormwater Pollution Prevention Plan must be provided along with a Notice of Intent submitted to the Nebraska Department of Environmental Quality.
 - Site plan to include all parking and landscaping requirements;
 - If in a high hazard flood area an elevation certificate must be obtained;
 - A digital copy of all drawings is required;
- Fire Marshal review is required before a Certificate of Occupancy is issued. Working without a Fire Marshal review is at your risk.
- All electrical permits issued by the Nebraska State Electrical Division. No Certificate of Occupancy will be issued until the State Electrical inspector has completed a final inspection.
- All City of Lexington Codes must be followed

Nebraska State Electrical Division

521 South 14th Street, Suite 400
PO Box 95066
Lincoln, NE 68508-2707
PH: 402.471.3550 - FX: 402.471.4297

Gary Lofton
gary.lofton@nebraska.gov
PO Box 372
McCook NE 69001
(308) 325-2219-Cellular

Nebraska State Fire Marshall

246 South 14th Street
Lincoln, NE. 68508
402-471-9469

Mike Hoeft
mike.hoeft@nebraska.gov
(402) 395-2164-Office
(308) 530-9493-Cellular

CITY OF LEXINGTON

DEVELOPMENT SERVICES DEPARTMENT

APPLICATION FOR COMMERCIAL CONSTRUCTION PERMIT				
OWNER				
Name:		Mailing Address:		Unit #:
City:		State:		Zip:
Phone:	Cell:	E-Mail:		
CONTRACTOR				
Name:		Mailing Address:		Unit #:
City:		State:		Zip:
Phone:		E-Mail:		
ARCHITECT				
Name:		Mailing Address:		Unit #:
City:		State:		Zip:
Phone:		Cell Phone:	E-Mail:	
JOB INFORMATION				
Job Address:		Flood Zone:	Zoning:	
Legal Description:			Estimated Cost of Project:	
Description & Location of work on premises/special conditions:			NPDES #	
			<u>Diggers Hotline:</u> 1-800-331-5666	
BUILDING INFORMATION				
Building Description	Building Details		Items Required for Submittal	
	Existing Area :		<ul style="list-style-type: none">• Completed set of stamped drawings• Specifications• Physical Address• SWPPP if over an acre disturbed <input type="checkbox"/> Check upon receiving stormwater pollution prevention material from City Staff.	
	New Area:			
	No. of Stories:			
	Basement Area:			
	Type Of Construction:			
	Occupancy:			
Building Use:		<u>NOTE:</u> You must contact the Nebraska State Fire Marshal and Nebraska State Electrical Inspector before permit issuance		
I hereby certify I have read and examined this application and corresponding documents. All provisions of laws and ordinances governing this work will be complied with, whether specified or not.				
Authorized Signature: _____				Date: _____
OFFICE USE ONLY				
Date Rec'd:	Issued By:	Est. Cost:	FEES CHARGED	FEES PAID



CERTIFICATE OF COMPLETION

presented to

Jason Harris

who has successfully completed EPA's Construction General Permit (CGP) Site Inspector Training Course and passed the final exam



Date Certified: 4/24/2023

Expiration Date: May 17, 2027

Chris Kloss, Water Permits Division Director

By completing this course and passing the final exam, Jason Harris has complied with the CGP Part 6.3.a training requirements for conducting construction inspections under the 2022 CGP.



StormwaterQPE

Certifies that

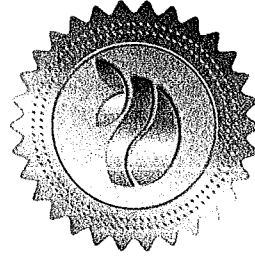
Jason Harris

has successfully completed

How to Choose the Correct BMP's for Your Construction Site

Completion Date 04/10/2023

Certification Number b4f1b159



PDHs: 1

Andrew Demers

Andrew Demers, President

StormwaterQPE

Certifies that

Jason Harris

has successfully completed

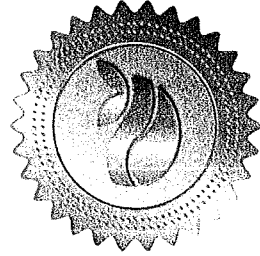
Prepping Construction Stormwater Controls for Winter Weather

Completion Date

04/06/2023

Certification Number

7dcfa248



PDHs: 1

Andrew Demers

Andrew Demers, President

StormwaterQDE

Certifies that

Jason Harris

has successfully completed

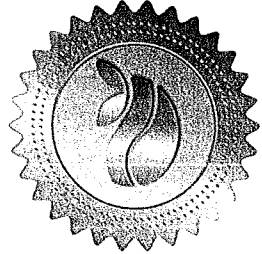
Understanding EPA's NPDES MS4 Permit Program Webinar

Completion Date

04/05/2023

Certification Number

a508dd19



PDHs: 1

Andrew Demers

Andrew Demers, President



NPDES Construction Stormwater Inspection Report

Program ID: CSW-

Inspection Date:

Time:

NOEC number:

Project Name and Address:

Site entrance latitude/longitude:

Last storm event of one-half (0.5) inches or greater:

Current Weather: Clear Cloudy Mist Rain Wind Fog Snow

Inspector:

Individuals accompanying inspector: -----

Opening conference:

Phase of Active Construction *(check all that apply):*

<input type="checkbox"/> Pre-Construction/installation of erosion/sediment controls	<input type="checkbox"/> Clearing/Demo/Grading	<input type="checkbox"/> Infrastructure/storm/roads
<input type="checkbox"/> Concrete pours	<input type="checkbox"/> Vertical Construction/buildings	<input type="checkbox"/> Utilities
<input type="checkbox"/> Offsite improvements	<input type="checkbox"/> Site temporary stabilized	<input type="checkbox"/> Final stabilization

Authorization, NOI, and SWPPP Information *(check all that apply and/or fill in information)*

Permit Coverage? <input type="checkbox"/> Yes <input type="checkbox"/> No	Comments:
Copy of SWPPP on site? <input type="checkbox"/> Yes <input type="checkbox"/> No	
NOI visibly posted at entrance? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Construction sign visibly posted at entrance? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Certifying Official, Company, Address, and Phone Number:

SWPPP Designer, Company, Address, and Phone Number:

Name of Receiving Waters:

MS4 Yes No Name:

Project Start Date (approximate):

Project End Date (estimated):

Site Inspection

	BMP/activity	Included in SWPPP	Observation/GPS/Photo #
Pre- construction	Natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	The construction exit preventing sediment from being tracked into the street <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Erosion control	All slopes and disturbed areas not actively being worked are properly stabilized <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Flow control measures are installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Exposed un-worked soils have been stabilized with effective BMP to prevent erosion and sediment deposition <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Stockpiles are stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Included in SWPPP	Observation/GPS/Photo #
	Soils have been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Stormwater and ground water has been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) are adequately installed (keyed into substrate) and maintained <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Stormwater runoff from disturbed areas is directed to sediment removal BMP <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Storm drain inlets are properly protected <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Discharge points and receiving waters are free of any sediment deposits <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Basins and impoundments	Outlet structures withdraw water from the surface, unless infeasible. <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	Stormwater ponds retention/detention are being maintained <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A

	BMP/activity	Included in SWPPP	Observation/GPS/Photo #
	If permanent infiltration ponds are used for flow control during construction, they are protected from siltation <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
Permeable surfaces, Low impact development, Infiltration	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
Dust suppression	Dust is minimized through appropriate water or other dust suppression techniques <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Prohibited non-storm water discharges	Trash/litter from work areas is collected and placed in covered dumpsters <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Washout facilities (e.g., paint, stucco, concrete) are available, clearly marked, and maintained <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	Vehicle and equipment fueling, cleaning, and maintenance areas are free of spills, leaks, or any other deleterious material <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	Materials that are potential stormwater contaminants are stored inside or under cover <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	Non-stormwater discharges (e.g., wash water, dewatering) are properly controlled? <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

SWPPP and Records Review

SWPPP Element	Description	Observation
Site and Activity Description	The SWPPP describes the nature of the construction activity included in CSW-GP Part III.B.1-3 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Control measures	The SWPPP describes the control measures implemented as required by CSW-GP Part III.B.1-11 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Non-storm water	The SWPPP identifies all allowable sources of non-storm water discharges listed in CSW-GP Part I.C.2 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Endangered Species	The SWPPP includes endangered species documentation required by CSW-GP Part III.G. 1-4 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Documents	The SWPPP Includes the required documents required by CSW-GP Part III.H <input type="checkbox"/> Yes <input type="checkbox"/> No	
State or Local Requirements	Meets CSW-GP Part III.I <input type="checkbox"/> Yes <input type="checkbox"/> No	
Inspections	Regular inspection, monitoring and maintenance have been performed as required by CSW-GP Part III.J <input type="checkbox"/> Yes <input type="checkbox"/> No	
Updates	The SWPPP has been updated, implemented, and records maintained as required by CSW-GP Part III.K <input type="checkbox"/> Yes <input type="checkbox"/> No	

Photo Log

Photo #: 1
Photo date:
Project Name:
Photographer:
Direction facing:
Description:

Walk Through of the Online Application – NER210000

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Department of
Environment and Energy

CONSTRUCTION STORM WATER PERMITTING

Log In

User Name
NPDES_Permits

Password

Login

Reset Password

Update User Account Information

New Users

If you are a first time user and have not yet registered for an account, click the following link and follow the instructions

Register Here

This is a government computer system. UNAUTHORIZED ACCESS IS PROHIBITED. Anyone using this system is subject to monitoring. UNAUTHORIZED ACCESS or ATTEMPTS to use, alter, destroy or damage data, programs or equipment could result in criminal prosecution.

Contact Us: ndee.credentials@nebraska.gov

The DEE State Website
Security, Privacy & Accessibility Policy
The State of Nebraska Website

THIS IS A GOVERNMENT COMPUTER SYSTEM. UNAUTHORIZED ACCESS IS PROHIBITED. ANYONE USING THIS SYSTEM IS SUBJECT TO MONITORING. UNAUTHORIZED ACCESS OR ATTEMPTS TO USE, ALTER, DESTROY OR DAMAGE DATA, PROGRAMS OR EQUIPMENT COULD RESULT IN CRIMINAL PROSECUTION.

Nebraska Department of Environment and Energy
245 Fairbrook Blvd, Lincoln, NE 68521 • P.O. Box 98922, Lincoln, NE 68509 • (402) 471-2186

- ❖ If you are a new user, please register for an account and make sure to keep all of your username and passwords saved. The NDEE does not save any username/passwords in our system. Follow the guidance document on how to register for an account.
- ❖ Once registered, log into the portal.

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Department of
Environment and Energy

Welcome, NPDES_Permits. [LOG OUT](#)

CONSTRUCTION STORM WATER PERMIT

Getting Started Click Begin New Application Process below to start a new application

[Begin New Application Process](#)

List of Existing Applications Select a Permit Number link to review the permit application information

Filter [Clear](#)

Permit Number	Project Name	Start Date	End Date	Status
CSW-202207176	Test 1			NOI CREATED
CSW-202207009	Guidance Document - Test	10/12/2023	3/25/2024	NOI RETURNED TO APPLICANT

After submission, the permit application information will be read only.

- ❖ Once logged in, you will see a page with “**Getting Started**” and “**Listing of Existing Applications**”. Any CSW NOIs that you have created, either submitted or not, will show up on your list of existing applications. The list will show the permit number associated with the project, the project name, anticipated start date, end date, and the status of the project.
 - For more information regarding NOI Status, please check the CSW Frequently Asked Questions Document.
- ❖ When you are ready to start a new application, click on the “**Begin New Application Process**” option.



- As a courtesy, NDEE will allow you to save an incomplete application for up to thirty (30) calendar days from initial application creation.
- After thirty days, the application will be marked invalid and removed from the system.
- For an application to be marked complete, it must be submitted and signed electronically by the Certifying Official.

SWPPP Inspection Reporting

Search By CSW Permit Number [Click to show/hide more information](#)

The following link provides options to search for completed SWPPP inspection reports: [DEE CSW Inspection Report](#)

List of Existing SWPPP Inspection Reports

Select a Permit Number link to review and create SWPPP Inspection Reports for permits

[Load SWPPP Inspection Reports](#)

CSW Permit Number Lookup

Construction Storm Water Projects and Records:

The following links provide options to search for Construction Storm Water Projects in Nebraska. Two links are available:

[DEE CSW NOI Permit Number](#) can be used to find the Construction Storm Water Permit Number, Project Name, County, Project Start and End Dates, and the Permit Status. The search can be limited by entering a County and/or Date Range. The Dates field searches the date the NOI document was received by the agency, rather than project dates.

[DEE CSW NOI Public Access](#) can be used to retrieve and view documents for a specific Construction Storm Water Project. Enter the Permit Number (i.e.: CSW-201600001) and press Search

Contact Us: ndee.credentials@nebraska.gov

- ❖ Please see the following calendar section for your convenience.

Further down on the page is **“SWPPP Inspection Reporting”** and links to our public portal to search CSW projects.

- ❖ If you are an inspector and trying to submit your inspection reports, you will first search for the CSW Permit Number. After, the portal will give you the option to either fill out the report online or upload your report.

- ❖ If you need to look up a CSW project, but do not have the CSW number, you can search for projects by county, project name, start and end dates. Its best to have a smaller time frame to filter out projects from your query. This function allows you to view the project statuses as well.

CONSTRUCTION STORM WATER PERMITTING PROCESS OVERVIEW



- Scroll down and read the entire overview of the process.
- Click on each PART to expand and read content.
- At the bottom of the page, you must Agree to the conditions below before you can continue.

Authorization to Discharge Under the
National Pollutant Discharge Elimination System (NPDES)
General NPDES Permit Number NER210000 for Storm Water Discharges from Construction Sites to Waters of the State of Nebraska

- › Part I. Coverage Under this Permit
 - › Part II. Authorization for Discharges of Storm Water from Construction Activity
 - › Part III. Construction Storm Water Effluent Limitation Guidelines
 - › Part IV. Storm Water Pollution Prevention Plans (SWPPP)
 - › Part V. Special Conditions, Management Practices, Other Non-Numeric Limitations
 - › Part VI. Termination, Transfer, or Reassignment of Permit Coverage
 - › Part VII. Standard Conditions and Requirements
 - › Part VIII. Definitions
 - › Reference List A: Abbreviations
- › Appendix B - List of MS4s in the State of Nebraska

Permit PDF download:

You can download this permit as a PDF file to review and keep for your records.

[Download PDF](#)

Agreement of Conditions

Do you agree to the above conditions in which to complete this project application?

Contact Us: ndee.credentials@nebraska.gov

New Permit Application: 47 required steps remaining

Click Next Step [You must agree to the current permit regulations.](#)

0%

- ❖ After you start your permitting process, you will see a permitting process overview. Here, the NER210000 permit is divided up into parts for your convenience. Please review the permit before applying for coverage. **The permittee is responsible for compliance with the CSW General Permit**, please adhere to these sections to ensure accurate and complete NOI Submissions.
- ❖ The CSW General Permit is also available in PDF form for downloading.
- ❖ At the bottom of the screen, you will notice a progress bar. As you move through the application, you can track where you stop and start. The online portal automatically saves all of your information, however, please see the calendar section on the previous page.
 - Press the “**Home**” button to go back to the front page of the portal.
 - Press “**Project Application Overview**” to review all of the project information that you submitted in one long form.

CONSTRUCTION WATER PERMITTING PROCESS OVERVIEW

Certifying Official Statement

"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."

Project Name

► Certification Official Information

📌 Complete all the personnel information in the tabs below that apply to the project.

Certifying Official

Certifying Official (Optional)

Authorized Representative

Project Proponent

Certifying Official

Title

Company

First Name

Last Name

Work Phone

Cell Phone

Email

Confirm Email

Address Line

City

State

Zip Code

Save

Next

- ❖ For guidance as to who would need to be the **Certifying Official**, please review our definition in Part VII.E of the CSW General Permit or the green drop down option to review more information.
- ❖ The Certifying Official will sign the NOI DocuSign via email, so please make sure its correct and accurate. The DocuSign NOI is considered a legal document, the email is required to be sent to the certifying official. Please see Part VII.E of the CSW General Permit for more details.
- ❖ NOTE: If the Certifying Official changes or the CSW permit is transferred to a new Certifying Official, the permittee must complete a new CSW- NOI on the NDEE website within (7) calendar days of the change/transfer. Once the new CSW-NOI has been submitted and approved by NDEE, the permittee will need to submit a letter to the Department stating the change in Certifying Officials, and the project will be voided.
- ❖ You do have the option to have two Certifying Officials. Both will be able to sign the NOI and NOT.
- ❖ **Authorized Representative** and **Project Proponent** can be anyone else involved in the project (engineer, SWPPP designer, consultant, etc.).
 - If we ever need to contact someone about the project, we try to contact either the SWPPP designer, project proponent or the authorized rep before we contact the CO.
 - Designation of Authority documentation should be submitted for Authorized Representatives.

CONSTRUCTION WATER NOTICE OF INTENT APPLICATION - READINESS TO APPLY

▸ Limitations on Coverage

Based on [Part I.C.4] and its sub-parts, does a reasonable potential exist for permit authorization to be limited?

YES NO

Back Save Next

Contact Us: ndee.credentials@nebraska.gov

- ❖ Please review the “**Limitations on Coverage**” drop down option before continuing on with the application.
 - If there is no reasonable potential for permit authorization to be limited, please select “**No**” and continue on in the application by selecting “**Next**”.
 - If “**Yes**”, please contact the NPDES and State Permits Section for more guidance, as an individual permit may be needed.

Welcome, NPDES, Permits [LOG OUT](#)

CONSTRUCTION STORM WATER NOTICE OF INTENT APPLICATION - SWPPP

Storm Water Pollution Prevention Plan (SWPPP) Part IV

- Storm Water Pollution Prevention Plan Framework [Part IV, A.]
 - Has a Storm Water Pollution Prevention Plan been developed for this project?
 - Has a qualified individual [Part IV A] prepared the SWPPP?
- Pollution Prevention Plan Contents: Site and Activity Description [Part IV, B.]
 - Has the site and activity descriptions, as per Part IV.B, been incorporated into the SWPPP?
- Storm Water Pollution Prevention Plan to Eliminate or Minimize Pollution [Part IV, C.]
 - Has the sediment and pollution control measures and record keeping, as per Part IV.C, been incorporated into the SWPPP?
 - Has the Erosion prevention measures and record keeping, as per Part III.C, been incorporated into the SWPPP?
- Maintenance of Control BMPs [Part IV, F.]
- Inspections [Part IV, J.]

1. A record of each inspection and of any actions taken must be retained as part of the SWPPP for at least three (3) years from the date that permit coverage expires or is terminated. The inspection reports must identify any incidents of non-compliance with the permit conditions. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the construction project or site is in compliance with the SWPPP and this permit. The report must be signed in accordance with Part VIII.B of this permit.
- Maintaining an Updated Plan [Part IV, K.]
 - Has Inspections, maintenance of BMPs and associated record keeping, as per Part IV.F, J-K, been incorporated into the SWPPP?
- Final Stabilization
 - Has the Final Stabilization addressed, as per Part I.C.5, been incorporated into the SWPPP?
 - Does the SWPPP include documentation supporting a determination of permit eligibility with regards to Threatened and Endangered species and critical habitat?

(Guidance is available on the NDEE website: <http://deedee.gov>)

Required - Attach Storm Water Pollution Prevention Plan (SWPPP) file(s) for upload into the application.

Accepted file types: PDF, JPG, GIF, and TIFF.

Document ID	Document Type
No attached documents were found.	

- ❖ This portion of the application asks questions about the **Storm Water Pollution Prevention Plan (SWPPP)**.
- ❖ Please see and review the drop-down options for the specific sections of the CSW General Permit the questions relate to.
- ❖ The Department advises permittees to review the EPA SWPPP Template as a guidance document when developing their SWPPPs. Consultant firms can have their own templates however, the permittee/preparer is responsible for ensuring that all items are submitted in a complete manner for accurate NOI approval.
- ❖ A new requirement of the NER210000 permit is that the SWPPPs must be uploaded with the NOI Submission.
- ❖ You cannot move forward with the application until you upload your SWPPP. The application will save your place and all of the information you submitted if you need to come back at a later time to complete.
- ❖ To upload, select “**Browse...**” to search for the document in your files, then select “**Upload Swppp**”. You should be able to see the option to “**View Document**” if the SWPPP is uploaded correctly.



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CONSTRUCTION SWPPP DESIGNER INFORMATION

SWPPP Designer Company Name

First Name

Last Name

Phone

Email

Address

City

State

Zip Code

Where will the SWPPP be located?

[Back](#) [Save](#) [Next](#)

Contact Us: ndee.credentials@nebraska.gov

- ❖ In this section of the portal, you will put in the contact information of the **SWPPP Designer**. Please make sure the email and phone number are correct, the Department will contact the SWPPP Designer first should any questions arise during the application review process.
- ❖ For the question of “**Where will the SWPPP be located?**”, it is asking where the physical copy of the SWPPP will be. Some examples of potential SWPPP locations can be seen on the example above and should be as specific as possible. If this portion is left blank or has the city name (i.e., Waverly, NE), the application will be sent back to the permittee for review. Please be specific as possible. The permittee must follow all state and local guidelines when filling out the NOI Application and include specific requirements, if applicable.

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CONSTRUCTION SITE DESCRIPTION

County

Physical Address

Indicate general location description if no address is available.

Project Type

(residential, industrial, commercial, livestock, linear, other etc.)

Project Size acres
 Area to be disturbed acres

Nearby Surface Waters

Identify surface waters within 1/2 mile of project boundary that will receive storm water or discharge from permanent storm water management system.

Name of Receiving Waters

Bodies of waters and/or Outfalls
 Waterbody Type

(ditch, pond, stream, river etc.)

Legal Description

Describe the quarter, section, township, range, and/or any other legal descriptions.

Project Start Date

Project End Date

- ❖ In this portion, please describe the proposed construction site and ensure surface water information is filled out.
- ❖ If the project discharges to an MS4, be aware that you may be prompted to submit more documentation.
- ❖ Note that if the size of the construction site expands substantially past the listed areas being disturbed, the permittee will need to submit a new NOI with an updated and/or new SWPPP. Specific site coverage requirements can be found in the CSW General Permit. Contact NPDES and State Permits Section at NDEE if you have any questions.

- ❖ Because construction is fluid, the Department advises that you add extra time to your projects end date. They can be extended after the project is approved and can be done by clicking on the project in the portal and modifying the date, if the permittee has any issues, please contact the NPDES and State Permits Section at NDEE. If the project goes past the end date, it is overdue and should either be extended or submit an NOT.

For sites previously authorized under a Construction Storm Water (CSW) permit and undergoing a transfer of **owner and/or certifying official**. List the previous NPDES CSW Permit Number (CSW _____)

Previous NPDES CSW Permit Number

CSW-

Back Save Next

Contact Us: ndee.credentials@nebraska.gov

CSW-202207369: Stormwater Portal Application Walkthrough 15 required steps remaining

Click Next Step → **The Construction Site County is required**

68% Complete

Home Project Application Overview

- ❖ If you are **transferring** one permit to another, the permittee must provide the previous permit number in this text box.
- ❖ With transferring a project, the permittee allowed to use the original documents but must cite the previous permit number so both projects match.

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NDOT PROJECT

Is this a Nebraska Department of Transportation project or other federal or State of Nebraska or public power project that, as part of their siting requirements, completed a threatened and endangered species review which resulted in a no effect determination or a mitigation plan approved by Nebraska Game and Parks?

YES NO

Back Save Next

Contact Us: ndee.credentials@nebraska.gov

CSW-202207369: Stormwater Portal Application Walkthrough 4 required steps remaining

Click Next Step → **The NDOR Project field must be answered**

91% Complete

Home Project Application Overview

- ❖ This question is only for **projects that are submitted by the NDOT or contractor for NDOT**.
- ❖ If the permittee is a contractor with the NDOT for a project, you may answer “**Yes**”, however the permittee will need to submit documentation from the NDOT as they have their own environmental review. Selecting “Yes” will bypass the CERT requirement, and the application will be sent back for edits.
- ❖ For non NDOT projects, please select “**No**”.



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CERT

Attach CERT file(s) for upload into the application.

Required
Before submitting Construction Storm Water Notice of Intent application, attach evaluation obtained from Nebraska Game and Parks Commission's Conservation and Environmental Review Tool (CERT).

[Browse...](#) [Upload NGPC](#)

Accepted file types: PDF, JPG, GIF, and TIFF.

Document ID	Document Type
No attached documents were found.	

[Back](#) [Save](#)

Contact Us: ndee.credentials@nebraska.gov

CSW-202207369: Stormwater Portal Application Walkthrough 3 required steps remaining

Click Next Step [Cert missing upload into the application](#)

94% Complete

[Home](#) [Project Application Overview](#)

- ❖ The permittee, prior to applying for an NOI, will need to obtain a **CERT** (Conservation Environmental Review Tool) from Nebraska Game and Parks. The weblink is cited below.
- ❖ With this review tool, the permittee will receive one of three environmental reviews:
 - *“No Effect”*, *“More information needed”*, or *“Potential Impact”*
- ❖ Depending on the results given by the CERT, which are listed above, please follow the directions provided in the CERT (Page 3-4). Sign and date the CERT before submission of the NOI. NOTE: please ensure that all questions are answered before submitting the NOI.
- ❖ Note that if you have a **“Potential Impact”**, the permittee will need to contact Game and Parks for a further review. Once the permittee has obtained that letter, it will then need to be submitted with the application. Nebraska Game and Park reviews can take up to 30 days and should be done before an NOI submission has been done.



CONSTRUCTION STORM WATER PERMITTING PROCESS SUBMISSION

Attach project map file(s) for upload into the application.

Required

Before submitting Construction Storm Water Notice of Intent application, attach map(s)/aerial photo(s) with enough detail to identify the location of the construction site and waters of the state within one mile of the site. Aerial photo of project area with project area delineated on the photo is preferred. (e.g. USGS 7.5 minute quad map, a portion of a city or county map, or equivalent map)

[Browse...](#)

[Upload Map](#)

Accepted file types: PDF, JPG, GIF, and TIFF.

Document ID

Document Type

[View Document](#)

DEQ CSW Project Map

[Delete](#)

[Back](#)

[Save](#)

[Next](#)

Contact Us: ndee.credentials@nebraska.gov

❖ Please upload your project map in this section.

- A general location map (e.g., USGS quadrangle map, a portion of the city or county map, or other map) with enough detail to identify the location of the construction site and water(s) of the state within one mile of the site. Site map should have the acres being disturbed clearly outlined and labeled.

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CONSTRUCTION STORM WATER PERMITTING PROCESS SUBMISSION

By clicking submit you are acknowledging that you have filled this form out truthfully and to the best of your knowledge.

[Home](#) [Project Application Overview](#)

[Back](#) [Save](#) [Submit](#)

Contact Us: ndee.credentials@nebraska.gov

- ❖ The NOI Application submission is almost done. Please review all of the uploaded documents and information one more time before submitting your CSW NOI Application.
- ❖ Once completed with the submittal review, please press **“Submit”**.
- ❖ There is the option to **“Save”** the project if a review is needed to be done at a later time.

WHAT NEXT?

Construction Storm Water Permit application for Project '**Stormwater Portal Application Walkthrough**' has been saved. Within 30 minutes, **Anthony Candelas** will receive an email from DocuSign with a link to electronically sign the application. Your application will only be submitted to Nebraska Department of Environment and Energy for review once the application has been signed.

Contact Us: ndee.credentials@nebraska.gov

- ❖ Congrats! The submission of the CSW NOI has been completed. Within 30 minutes of submission, the Certifying Official will receive a DocuSign Link that will take them to a separate webpage for them to review the NOI. Please have them sign the NOI and select “Finish”. They do not need to create an account in order to do this.
- ❖ The email will come from “**DocuSign System**”, **not NDEE**
- ❖ Please see the example DocuSign Email. NOTE: Ensure that all applicable folders are checked such as the **SPAM** or **Trash** folders.

NEBRASKA



DEE Production DocuSign sent you a document to review and sign.

[REVIEW DOCUMENT](#)

DEE Production DocuSign
ndee.ecmdoctransmit@nebraska.gov

Anthony Candelas,

Please DocuSign CSW-202207369 - DEE CSW NOI PDF (126437991)

Thank You, DEE Production DocuSign

Powered by **DocuSign**

How to Register for an Account

To start the online application process, you must first register for an account. Please read all the steps carefully before registering.


1. From your internet browser, go to the DEE portal for registration and application authorization:

<https://ecmp.nebraska.gov/DEQ-CSW/Account/Login>

CONSTRUCTION STORM WATER PERMITTING LOGIN	NEW USERS
Construction Storm Water Permitting	If you are a first time user and have not yet registered for an account, click the following link and follow the instructions
User Name <input type="text"/>	Register Here (Non-State Employees)
Password <input type="text"/>	
<input type="button" value="Login"/>	
Reset Password (Non-State Employees)	
Update User Account Information (Non-State Employees)	

THIS IS A GOVERNMENT COMPUTER SYSTEM. UNAUTHORIZED ACCESS IS PROHIBITED. ANYONE USING THIS SYSTEM IS SUBJECT TO MONITORING. UNAUTHORIZED ACCESS OR ATTEMPTS TO USE, ALTER, DESTROY OR DAMAGE DATA, PROGRAMS OR EQUIPMENT COULD RESULT IN CRIMINAL PROSECUTION.

2. You will be at the DEE portal.
 - a. To create a new user ID – click on the Register Here under NEW USERS on the right side of the screen.
 - b. If you have a user ID – type in your User Name (user ID) and password to verify your authorization to the application.
 - c. If you need to reset your password – click on the Reset Password option.
 - d. If you need to update other account information – click on the Update User Account Information.
 - e. NOTE: If you have previously registered an account with the same email address you will receive the message below. If you would like to have the other usernames associated with the email address you entered, click Yes for this message.

Email Address Information	
	The email address you have entered is already registered with at least one other account, would you like to have the other usernames associated with this address sent to your email account?
<input type="button" value="Yes"/>	<input type="button" value="No"/>

3. After clicking on the Register Here option, you will be at the New Account Registration Page. You will need to complete all of the fields on this page. If you would like to view details on requirements for specific fields such as Username and Password, click the **Field Requirements** link. The following list will guide you through the fields you will need to complete:
 - a. **First Name** – enter your first name.
 - b. **Last Name** – enter your last name.
 - c. **Email Address** – enter the email address that will be associated with this account and grant applications.
 - d. **Confirm Email** – re-enter the email address typed above.
 - e. **Username** – Create a username for this account.
 - f. **Password** – Create a password for this account.

PLEASE NOTE: the password must be at least ten characters and contain at least three of the following four items: at least one uppercase letter, at least one lowercase letter, at least one number, and/or at least one symbol. Click the Field Requirements or Password Rules link for more information on password requirements.

- g. **Password Reminder Questions** – You must select three password reminder questions and supply an answer for each question. These questions will be used to authenticate your identify if you need to change your password or account information.
 - i. Select a security question from the drop-down box.
 - ii. Type your answer in the Your Answer field. This field is not case sensitive.

NEBRASKA ENTERPRISE SELF REGISTRATION

NEW ACCOUNT REGISTRATION

* Required

User Information

[Field Requirements](#)

First Name * Tom

Last Name * Sample

Email Address * tsample@hotmail.com

Confirm Email * tsample@hotmail.com

Login Information

Username * tsample001

Password * ●●●●●●

Confirm Password * ●●●●●● [Password Rules](#)

Password reminder questions

Question One * What was your childhood nickname? ▼

Your Answer * buddy

Question Two * In what city or town did your mother and father meet? ▼

Your Answer * Hastings

Question Three * In what town was your first job? ▼

Your Answer * Lincoln

4. Prior to completing your registration, **please note or record your user ID, security questions and answers.** The Help Desk does not have access to this information and cannot reset passwords. This is a user responsibility.
5. To complete your registration, click **Register Account.**
6. After successfully creating an account, a message will appear stating that your account has been created, and that you are being redirected to the sign in page. If you do not see the sign in page within 10 seconds, click the link that says **here.**



Your account has been successfully created, you will be redirected to the sign in page in 5 seconds...

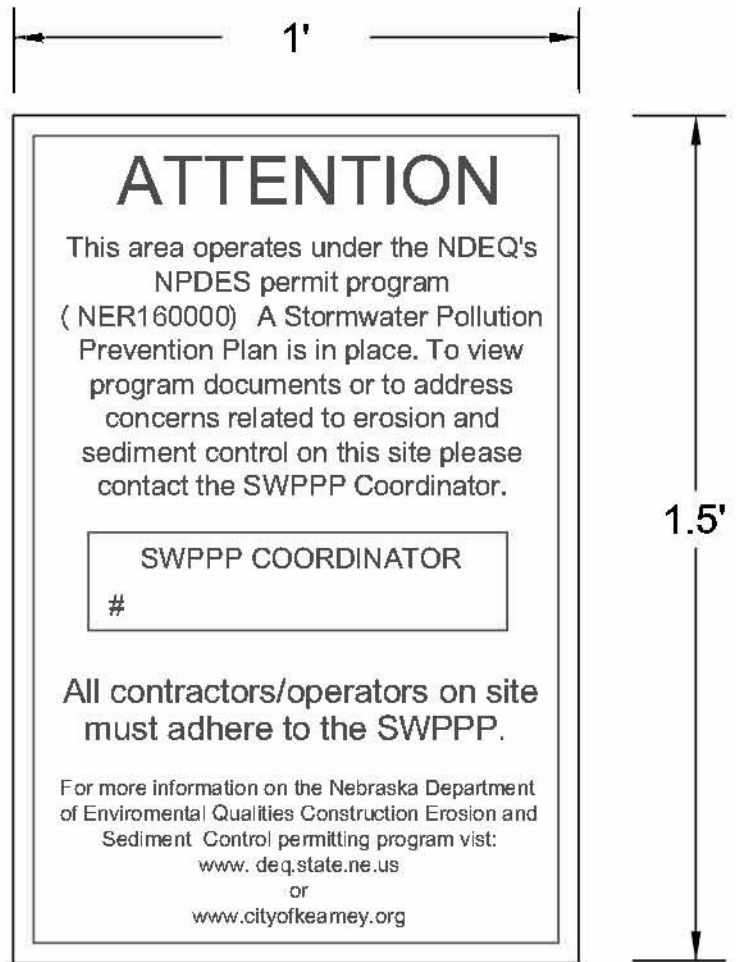
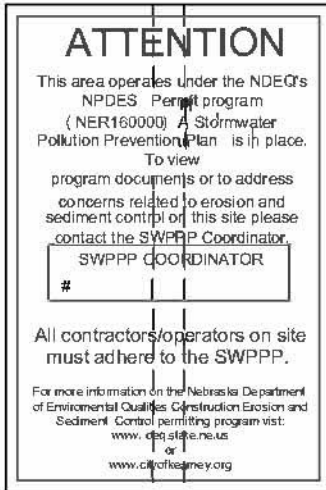
If you are not redirected, please click [here](#)

8. You will be redirected/returned to the DEE portal page.

<h3>LOGIN</h3> <p>User Name <input type="text"/></p> <p>Password <input type="password"/></p> <p>Login</p> <p>Reset Password (Non-State Employees)</p> <p>Update User Account Information (Non-State Employees)</p> <p>THIS IS A GOVERNMENT COMPUTER SYSTEM. UNAUTHORIZED ACCESS IS PROHIBITED. ANYONE USING THIS SYSTEM IS SUBJECT TO MONITORING. UNAUTHORIZED ACCESS OR ATTEMPTS TO USE, ALTER, DESTROY OR DAMAGE DATA, PROGRAMS OR EQUIPMENT COULD RESULT IN CRIMINAL PROSECUTION.....</p>	<h3>NEW USERS</h3> <p>If you are a first time user and have not yet registered for an account, click the following link and follow the instructions Register Here (Non-State Employees)</p>
--	---

9. On the left side of the screen, enter your User Name (userID) and password and click the Login box.

10. You will be signed on to the application.



Note:

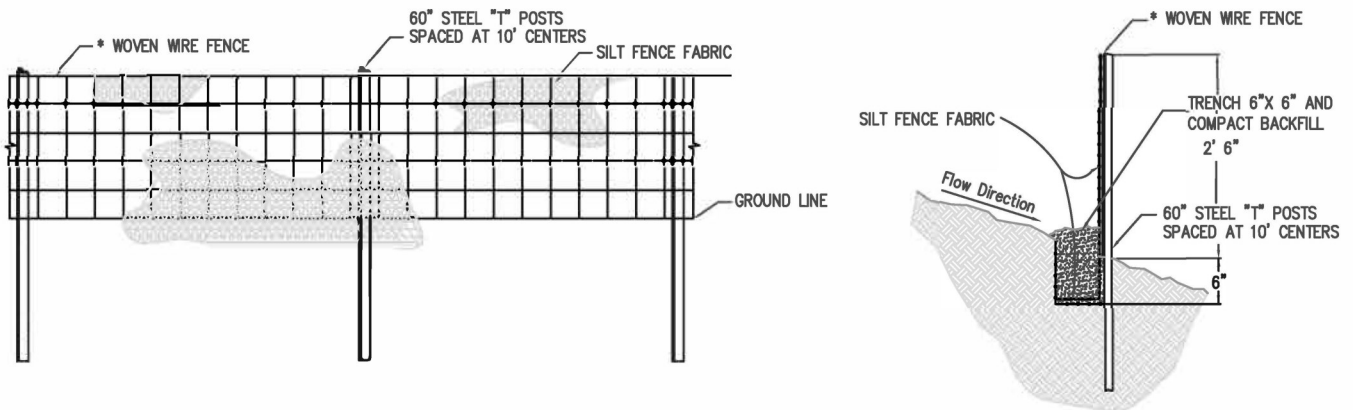
A sign or other notice must be posted conspicuously near the main entrance of the construction site. The sign or other notice must contain the contact telephone number for required document viewing, compliance issues and project inspections.

CREATED:	Nov. 2009
SCALE:	Not to Scale
DRAWN BY:	Andy Harter
REVISIONS	BY

City of Lexington
SWPPP SIGN



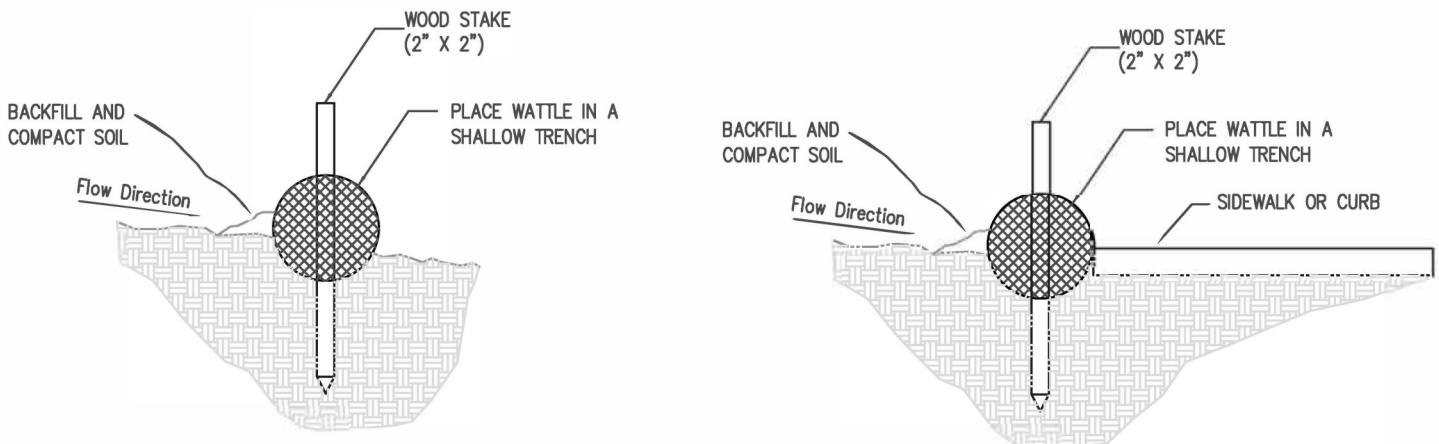
Silt Fence Installation



SILT FENCE INSTALLATION:

1. Dig a 6" x 6" trench.
2. Place posts into ground with fabric on upstream side of post, place fabric in trench.
3. Use excavated soil to backfill trench.
4. Woven wire fence shall be fastened to posts using wire ties on 24" centers, top, and middle.
5. When connecting two section of fabric overlap a minimum of 6'.
6. Maintenance shall be performed as needed and material shall be removed when 1/3 of the exposed fabric is covered.

Wattle Installation



WATTLE INSTALLATION:

1. Extend end of wattles far enough to prevent runoff from flowing around the ends of the barrier.
2. Tightly abut wattle ends to prevent gaps.
3. Spacing between stakes (4'-0" MAX.)

CREATED:	
Nov. 2009	
SCALE:	
Not to Scale	
DRAWN BY:	
Andy Harter	
REVISIONS	BY

City of Lexington
Sediment Control Detail





City of Lexington, Nebraska

Post-Construction Stormwater Management Program

Pages from Drainage Criteria Manual

August, 2020-Version 1.0

9. POST-CONSTRUCTION BEST MANAGEMENT PRACTICES

9.1 Overview

The physical and chemical characteristics of stormwater runoff change as urbanization occurs. As stormwater flows across roads, rooftops, and other hard surfaces, pollutants are picked up and then discharged to streams and lakes. Additionally, the increased frequency, flow rate, duration, and volume of stormwater discharges due to urbanization can result in the scouring of rivers and streams, degrading the physical integrity of aquatic habitats, stream function, and overall water quality.

The intent of this Chapter is the proper selection, design, implementation, and maintenance of post-construction stormwater quality Best Management Practices (BMPs) for new developments and redevelopment efforts. It should be noted that constructed stormwater controls may be referred to as Stormwater Treatment Facilities (STFs) and some references use these terms interchangeably. This Chapter provides information and guidance regarding the selection, design, and maintenance of selected BMPs. Implementation of BMPs is expected to reduce pollutants in stormwater runoff and receiving waters, improving the water quality and environment of the community.

9.1.1 Clean Water Act Requirements

The Federal Water Pollution Control Act of 1972, as amended is commonly known as the Clean Water Act and establishes minimum stormwater management requirements for urbanized areas in the United States. At the federal level, the EPA is responsible for administering and enforcing the requirements of the Clean Water Act. Section 402(p) of the Clean Water Act establishes minimum stormwater management requirements for urbanized areas in the United States. It requires urban and industrial stormwater be controlled through the National Pollutant Discharge Elimination System (NPDES) permit program. Requirements affect both construction and post-construction phases of development. As a result, urban areas must meet requirements of Municipal Separate Storm Sewer System (MS4) permits, and many industries and institutions must also meet NPDES stormwater permit requirements. MS4 permittees are required to develop a Stormwater Management Program that includes measurable goals and to implement stormwater management controls (i.e., BMPs). MS4 permittees are also required to assess controls and the effectiveness of their stormwater programs and to reduce the discharge of pollutants to the “maximum extent practicable.”

Although it is not the case for every state, the EPA has delegated Clean Water Act authority to the State of Nebraska. The State must meet the minimum requirements of the federal program. The state rules and regulations are promulgated under the Nebraska Environmental Protection Act, as amended (Neb. Rev. Stat. §81-1501 et seq).

9.2 Applicability

Post-construction stormwater program requirements shall be applicable to all construction activity and land developments including, but not limited to, site plan applications, subdivision applications, building applications, street projects, and right-of-way applications from the City, unless exempt below. These provisions apply to all portions of any common plan of development or sale that would cause the **disturbance of at least one acre of soil** even though multiple, separate, and distinct land development activities may occur at different times on different schedules.

Unless the master planning process has shown that stormwater treatment requirements can be transferred to a regional facility approved by the City, on-site BMPs are required for projects that disturb one acre of soil or more. Even if treatment requirements can be transferred to a regional facility, on-site facilities may still be necessary to protect downstream channels and the receiving stream.

The following activities are exempt from these requirements:

- Any emergency activity that is necessary for the immediate protection of life, property, or natural resources; and
- Construction activity that provides maintenance and repairs performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

9.3 General Planning and Design Guidelines

The following general planning and design guidelines for post-construction stormwater BMPs are recommended when developing a water quality control strategy:

- Promote natural infiltration of urban runoff by minimizing onsite impervious areas and preserving natural, broad drainageways.
- Minimize directly connected impervious areas by providing grassed buffer zones between impervious surfaces. Divert runoff from impervious areas to pervious surfaces before the flows enter surface drainageways.
- Locate BMPs in areas that avoid creating a nuisance and the need for increased maintenance.
- Provide multiple accesses to facilities to improve maintenance capabilities.
- Revegetate and/or stabilize all areas disturbed by construction activities and all drainageways created as a part of a development.
- Ensure the plantings (e.g., grass) are established before the initial owner's obligation is released and maintenance efforts begin.
- Select the appropriate option for the control objectives, specific conditions at the site, and proper implementation and maintenance for the most successful BMP.

9.3.1 Ownership and Maintenance of Best Management Practices

Proposed BMPs, along with all inlet and outlet structures and/or channels, are to be owned and maintained by the developer or a property-owners' association unless the City has approved a different ownership or maintenance arrangement. Post-construction stormwater BMPs are part of the storm drainage system and shall remain permanently functional as such unless or until the City relieves the owner of such responsibility in writing. Documentation of the BMP and owner maintenance responsibility will be made in permanent records such as a plat, agreement, or other record acceptable to the City.

9.4 Design Criteria

The City will require new and redevelopment projects to satisfy minimum site performance standards that address water quality. The methodology for calculating the Water Quality Control Volume (WQCV) and/or Water Quality Volume Discharge Rate (Qwq) is based on average daily rainfall data applied to three zones across the state (Table 9-1). From that data the runoff amount is calculated and applied to the treatment drainage area to get the WQCV or Qwq.

9.4.1 New Development

For new development sites that have a land disturbance of one acre or greater, the WQCV shall be based on the 80th percentile rainfall event, at a minimum. WQCV shall be calculated using Equation 9.1.

New development requirements apply to those areas that are being platted for development or have been platted but not built and are within the extraterritorial jurisdiction of the City:

- Example 1: A parcel that had not been platted or zoned for development (i.e., agricultural land) is being platted as a subdivision for single family residential and is greater than one acre. The subdivision would be required to meet the minimum standard set forth herein for new development.
- Example 2: Several parcels that have never been built on are being re-platted for development and the total area being re-platted is greater than one acre. The re-platted parcels would be required to follow new development standards.
- Example 3: An undeveloped parcel is being rezoned for another use and is greater than one acre. The rezoned parcel would be required to follow new development standards.
- Example 4: A warehouse has been proposed on an undeveloped parcel in an industrial area. Site disturbance is greater than one acre. The proposed development would be required to follow new development standards.

9.4.2 Redevelopment

For redevelopment sites that have land disturbance of one acre or greater, the WQCV shall be based on the 70th percentile rainfall event, at a minimum. The WQCV shall be calculated using Equation 9.1.

Redevelopment requirements apply to those areas that have been platted and built on within an urban area prior to rezoning, re-platting, preliminary platting, or issuance of a building permit for the redevelopment:

- Example 1: A parcel that included a structure that was purchased and demolished by the City or other entity was sold or deeded over to a new property owner for constructing their own building. Site disturbance is greater than one acre. This site would be required to meet the minimum standard for redevelopment.
- Example 2: A parcel with a building has been sold and is being converted into a new use with expanded parking. Site disturbance is greater than one acre. This parcel would be subject to requirements for redevelopment.

9.4.3 Percentile Rainfall Event

The percentile rainfall event varies across the state. Three regional rainfall zones have been established to support the calculation of WQCV or Qwq for MS4s in Nebraska.

Rainfall amounts by region for new and redevelopment are provided in Table 9-1. These values will be used to calculate the WQCV.

Table 9-1. Rainfall Depth (P) By Region for Defined Percentile Rainfall Events

Applicable Region	Rainfall, P	
	80th Percentile Event (New Development)	70th Percentile Event (Redevelopment)
A (West) <ul style="list-style-type: none"> • Scottsbluff/Gering 	0.61"	0.44"
B (Central) <ul style="list-style-type: none"> • Hastings • Lexington 	0.72"	0.53"
C (East) <ul style="list-style-type: none"> • Beatrice • Columbus • Fremont • Norfolk 	0.83"	0.62"

9.4.4 Minimum Design Criteria

Post-construction stormwater BMPs must be sized to handle the appropriate WQCV or Qwq to properly treat stormwater. BMPs include retention-based stormwater treatment practices that typically require or encourage using infiltration, evapotranspiration, or harvest practices to control a specified volume of stormwater.

9.4.4.1 Water Quality Control Volume

Design criteria to meet minimum site performance standards for new and redevelopment are expressed as the runoff from a specified percentile rainfall event applied across the treatment drainage area. The minimum WQCV for new and redevelopment can be calculated as follows:

$$WQCV = P \times (0.05 + 0.009 \times \%Imp) \times A \times 1/12 \times 43,560$$

Where:

$$WQCV = \text{Water Quality Control Volume, cubic feet}$$

$$P = \text{Rainfall Depth, inches}$$

$$A = \text{Treatment Drainage Area, acres}$$

$$\%Imp = \text{Maximum Percent Impervious Expressed as a Whole Number (1)}$$

(1) The maximum percent imperviousness should be selected for the proposed zoning type if established by the City. If these values are not established by the zoning regulations, maximum percent imperviousness should be selected according to the percent impervious for urban districts and residential districts by average lot sizes provided in Chapter 2, Table 2.7 within the NRCS Curve Number Method procedure.

The following example illustrates use of the WQCV equation:

Example 1) A 4.2-acre parcel was purchased to construct a storage facility. The parcel is one of four in a new development that was zoned limited industrial district (M-I). Light industrial zoning has a maximum impervious percentage of 90 percent. On that parcel, 2.4 acres will be disturbed to construct the facility. An additional 0.4 acres, also zoned M-I, drain directly onto the site from adjacent property. The WQCV for the site is calculated as follows:

$$WQCV = 0.72 \times (0.05 + 0.009 \times 90) \times (2.4 + 0.4) \times 1/12 \times 43,560 = 6,294 \text{ cubic feet}$$

If there are multiple land uses within the treatment drainage area, the effective maximum percent imperviousness should be weighted based on the area of each zone as a percentage of the total area.

Stormwater runoff from all disturbed areas shall be treated before leaving the site. The treatment drainage area shall include all disturbed areas on the site and upstream drainage or “run-on” unless the run-on is diverted or bypasses the disturbed site (i.e., by pipe or swale) so that BMPs are not overwhelmed. BMPs may be distributed across the site to provide the required treatment.

Additional storage in the BMP may be allowed, depending on the type of BMP selected, to address stormwater detention requirements to control runoff from larger storm events such as the 2-, 10-, or 100-year event as described in Chapter 7.

9.4.4.2 Storage Volume

Storage volume of BMPs shall be adequate to hold the WQCV. To maintain the design WQCV, proper implementation of site erosion and sediment measures is necessary to prevent clogging and failure of Structural BMPs. Phasing is also critical as Structural BMPs should typically be the last infrastructure constructed.

9.4.4.3 Water Quality Volume Discharge Rate

BMPs that are sized based on a flow rate (i.e., swales, filter strips, manufactured systems, etc.) shall use the water quality volume discharge rate (Qwq). The Qwq is the peak runoff from the design water quality volume rainfall event. This peak runoff equivalent shall be calculated using the Natural Resources Conservation Service (NRCS) Curve Number (CN) procedure. The calculation is based on the 80th percentile rainfall event depth by region, a 24-hour duration storm event, and a time of concentration of 5 minutes. The area used is the impervious surface only within the treatment drainage area.

Table 9-2 has been prepared to provide the Qwq in each Region for sites with up to 6 acres of impervious area. These values shall be used to size BMPs for the area of impervious surface within a given treatment drainage area. For sites greater than 6 acres, the designer shall use the methods and criteria specified above in a suitable model to calculate the discharge rate.

Table 9-2. Water Quality Discharge Rate (Qwq) for Selected Impervious Areas by Region

Impervious Area (Acres)	Qwq (cfs)			Impervious Area (Acres)	Qwq (cfs)			Impervious Area (Acres)	Qwq (cfs)		
	West	Central	East		West	Central	East		West	Central	East
0.2	0.1	0.2	0.2	2.2	1.5	1.9	2.2	4.2	2.9	3.6	4.2
0.4	0.3	0.3	0.4	2.4	1.6	2.0	2.4	4.4	3.0	3.7	4.4
0.6	0.4	0.5	0.6	2.6	1.8	2.2	2.6	4.6	3.2	3.9	4.6
0.8	0.5	0.7	0.8	2.8	1.9	2.4	2.8	4.8	3.3	4.1	4.8
1.0	0.7	0.8	1.0	3.0	2.1	2.5	3.0	5.0	3.4	4.2	5.0
1.2	0.8	1.0	1.2	3.2	2.2	2.7	3.2	5.2	3.6	4.4	5.2
1.4	1.0	1.2	1.4	3.4	2.3	2.9	3.4	5.4	3.7	4.6	5.4
1.6	1.1	1.4	1.6	3.6	2.5	3.0	3.6	5.6	3.8	4.7	5.6
1.8	1.2	1.5	1.8	3.8	2.6	3.2	3.8	5.8	4.0	4.9	5.8
2.0	1.4	1.7	2.0	4.0	2.7	3.4	4.0	6.0	4.1	5.1	6.0

9.4.4.4 Infiltration and Release Rates

For facilities that function just for water quality control, the WQCV will be stored for a duration between 24 and 40 hours. For facilities that combine water quality control with flood control, the runoff from the design storms for the flood control criteria shall be “stacked” on top of the WQCV. In this case, the facility shall be drained within 72 hours. These types of facilities may be required to have multi-stage control structures to control runoff from the WQCV, as well as the flood control design storms. Refer to Chapter 7 for further guidance.

For BMPs that are designed for subsurface storage (e.g., pervious pavements, underground stormwater chambers, etc.), the subsurface storage must hold the WQCV for the required period and release or infiltrate into the underlying soil.

Infiltration tests shall be done to determine the local infiltration rates if infiltration is a critical part of the Structural BMP facility. An underdrain is needed if the infiltration rate is inadequate or if infiltration is not desired, as well as for maintenance and cleanout purposes.

9.5 Platting and Site Plan Review

Land development that meets the land disturbance criteria of this memorandum must address storm water runoff quality through the use of BMPs. BMPs shall be provided for in the drainage plan for any subdivision plat, annexation plat, development agreement, subdivision agreement or other local development plan.

9.5.1 Procedures

9.5.1.1 Platting

For major subdivision applications, drainage and post-construction shall be discussed at the pre-application conference. This would be followed by an initial review of the general design at the preliminary platting stage and detailed design carrying over into final design review.

The plat applicant shall identify, through the Subdivision Agreement or other City-approved means, whether post-construction stormwater management facilities will be (1) constructed by each lot owner on their own lot (Lot Level BMPs); (2) constructed for the subdivision by the developer with reimbursement sought from individual lot builders (Neighborhood BMPs); (3) mitigated off-site at regional facilities (Regional BMPs), or (4) addressed by other means approved by the City. Any other conditions agreed to between the two parties, including inspections, maintenance, and funding of maintenance, shall be included in that agreement.

9.5.1.2 Building Permits

If Lot Level BMPs are required per the Subdivision Agreement or other agreement, then the lot builder will need to develop and have approved a drainage study, post-construction stormwater management plan, and maintenance agreement. A maintenance agreement for an individual lot shall include provisions for maintenance that shall be binding on all subsequent owners.

9.5.2 Submittals

The PCSMP submittal will include the following components: plans, calculations, certifications of permanent BMPs, ongoing inspection and maintenance of BMPs, and PCSMP submittal checklist.

9.5.2.1 Plans

Plans showing topographic survey information, along with proposed, grading, stormwater infrastructure (including BMPs), pavement, and structures, shall accompany any PCSMP submittal. Specifically, plans shall include the following information:

- Site topography including existing contours, property lines and easements, utilities, and site features such as existing water bodies, trees and shrubs, pavement and other structures
- Proposed contours
- Proposed inlets, storm sewer, culverts, and drainageways
- Proposed BMPs and/or detention facilities
- Proposed roadways, parking, building footprints, and other structures

Construction drawings shall provide a table that includes, for each BMP, (1) a location identifier, (2) the type of BMP, (3) the location for each BMP in latitude/longitude format, (4) the drainage area, and (5) the water quality volume/water quality volume discharge rate. The designer shall differentiate between the amount required by design and the amount that will be provided. Any discrepancies should be discussed with and approved by the City. The information shall be provided on drawings in a format that is consistent with the following:

BMP Identification Number	BMP Type	BMP Location (Lat/Long)	Drainage Area (Acres)	Design WQCV (cu ft) or Qwq (cfs)	WQCV (cu ft) or Qwq (cfs) Provided

9.5.2.2 Calculations

All calculations for water quality volume and water quality volume discharge rate shall be submitted to the City as part of the site development drainage study. Calculations shall be completed as described herein for the appropriate BMPs. Design criteria specific to the various BMPs shall also be shown in the drainage study (i.e., calculations for drain down and infiltration).

When combining stormwater detention with BMPs, the designer shall provide calculations that address both water quality volume and stormwater detention requirements using methodology found in Chapter 7 of this manual.

BMPs shall be clearly shown on the drainage map, along with other stormwater infrastructure and drainage basin boundaries.

9.5.2.3 Certification of Permanent BMPs

Upon completion of a project, the City shall be provided a written certification, by qualified personnel, stating that the completed project is in compliance with the approved Final Drainage Plan. Qualified personnel shall be a professional civil engineer licensed in the State of Nebraska or person(s) under the direct supervision of a professional engineer licensed in the State of Nebraska.

For commercial and industrial construction, certification will be required before a Certificate of Occupancy is granted (unless authorized by the City). All applicants shall submit “as built” plans certified by a professional engineer licensed in the State of Nebraska once final construction is completed. A final inspection by the City of all post-construction BMPs shall be required before a Certificate of Occupancy will be issued or any public infrastructure is accepted.

9.5.2.4 Ongoing Inspection and Maintenance of BMPs

A maintenance agreement will be required by the developer or builder for proposed BMPs. The maintenance agreement shall include provisions that outline regular maintenance activity, and a schedule of periodic inspections by the Owner or Designees. Inspection frequency shall be consistent with the design criteria manual used and generally includes quarterly inspections during the first year of establishment following construction and annually thereafter.

The Owner or Designees providing routine inspections shall document all inspections and maintenance and repair needs to ensure compliance with the requirements of the agreement and the plan. The agreement shall allow access to City personnel for inspection and maintenance should the owner default in their responsibilities with the intent to invoice the owner for said work, if needed. The Owner shall provide the City information about inspections and maintenance upon request.

9.5.2.5 PCSMP Submittal Checklist

A PCSMP checklist shall be submitted with design plans and be recorded by the City with the project record. The PCSMP checklist can be provided by the City and may be used for reference by developers, designers, and builders.

9.5.3 Off-Site Stormwater Mitigation

In some cases, it may not be practicable to provide the required treatment within project limits due to various constraints such as site limitations, costs, or other obstacles. If shown by the Owner that it is not practicable, off-site mitigation may be allowed at the discretion of the City.

Offsite mitigation may be provided by a private landowner in a City-approved stormwater treatment facility or within a City-approved publicly owned stormwater treatment facility provided the proposed mitigation location meets the following minimum criteria.

- A drainage study confirms that the proposed mitigation location provides excess stormwater treatment that is not required to provide treatment for the drainage area.
- The excess treatment capacity in the proposed mitigation location is not already providing mitigation of required stormwater treatment for another development or redevelopment project.
- The owner of the proposed mitigation location maintains or enters into a maintenance agreement that shall be binding on all subsequent owners and includes all required inspection and maintenance requirements for stormwater treatment practices.

Offsite mitigation requires additional documentation, tracking of water quality debits/credits and an additional fee structure to fund any available BMPs. For these reasons offsite mitigation may or may not be available so the City should be consulted to determine if offsite mitigation is available.

9.6 Post-Construction Stormwater BMPs

BMPs shall be designed using an approved design guidance manual that provides minimum design criteria and considerations. A selection of regional design guides is recommended for design within the City. The most recent versions of the following design guides and manuals are approved for general use in the design of BMPs:

- City of Omaha, “Omaha Regional Stormwater Design Manual – Chapter 8: Stormwater Best Management Practices”
- City of Lincoln, “Drainage Criteria Manual - Chapter 8: Stormwater Best Management Practices”

- NDOR, “Drainage and Erosion Control Manual – Chapter 3: Stormwater Treatment within MS4 Communities”
- Mile High Flood District (formerly Urban Drainage and Flood Control District), “Urban Storm Drainage Criteria Manual, Volume 3: Best Management Practices”

The designer is encouraged to adopt one design guide/manual for use on a project to the extent practicable. Other approved design guides and manuals may be used if design criteria for the desired BMP are not provided in the primary design guide/manual. Any variances from these manuals will require approval of the City. The City may evaluate the suitability of other types of BMPs not referenced in the approved design guides and manuals on a case-by-case basis.

The designer shall discuss the use of the alternative design guidance manuals before starting design along with any variance in BMP design. The designer shall also discuss other requirements for stormwater management within the City including the potential need for stormwater detention. Where one manual conflicts with another, the Engineer shall use sound, cost-effective design practices to resolve the issue. The following minimum design standards are provided to help resolve some identified conflicts.

9.6.1 BMP Selection

Each design guidance manual includes a unique selection of BMPs and what is included in one may not be included in another. Furthermore, two manuals may use different names for BMPs with the same or similar function. The function, criteria, and considerations of a specific BMP is what shall be used to determine its use by a design engineer. Table 9-3 provides a general comparison of the types of BMPs included in the approved design guidance manuals.

Table 9-3. BMP Design Guidance for Various Regulatory Agencies

BMP Type	Omaha	Lincoln	NDOR	UDFCD
Vegetated Filter Strip	X		X	X
Grass Swale	X		X	X
Infiltration Trench			X	
Infiltration Basin			X	
Bioretention Basin	X	X	X	X
Media Filter			X	
Sand Filter				X
Extended Dry Detention	X	X	X	X
Wet Detention Ponds	X	X	X	X
Stormwater Wetland	X	X	X	X
Underground Detention		X		X
Pervious Pavement	X	X	X	X
Proprietary Structural Treatment Controls	X		X	X
Green Roofs	X	X		X
Soil Conditioning	X			

NOTE: All BMPs must be sized using WQCV or Qwq design criteria provided in Section 9.4 of this Chapter.

9.7 Maintenance of Controls

BMPs located on private property shall be owned and operated by the owner(s) of the property on which the BMP is located; unless the City agrees in writing that a person or entity other than the Owner shall own or operate such BMP. As a condition of approval of the BMP, the Owner shall also maintain the BMP in perpetuity to its design capacity unless or until the City shall relieve the property owner of that responsibility in writing. The obligation to maintain the BMP shall have been memorialized on a subdivision plat, annexation plat, development agreement, subdivision agreement, or other form acceptable to the City and recorded by the City with the project records.

The City shall continue to maintain public storm sewer infrastructure including public BMPs. Each homeowner's association of a subdivision or individual lot owner shall maintain post-construction BMPs. When the City constructs public infrastructure improvements, such as with the widening of a major arterial or other public improvement, the City shall take responsibility for maintenance of the BMP unless otherwise specified in a maintenance agreement.

9.8 Landscaping

The following resources have been provided to assist in the design of landscaping for a project. It is strongly suggested that a landscape architect or designer assist with plant selection and landscape design.

- UNL Extension, *Stormwater Management: Plant Selection for Rain Gardens in Nebraska*
- UNL Extension, *Nebraska Bioretention and Rain Garden Plants Guide*
- NDOR, *Plan for the Roadside Environment*
- NDOR, *Roadside Flowers and Grasses*
- NDOR, *Roadside Vegetation Establishment and Maintenance*
- Nebraska Statewide Arboretum, Fall 2008. *The Seed*

These documents may contain other references to sources that may be helpful in plant selection and suitability for use with BMPs. Keep in mind regional difference in your selection of plants, along with differences in soil, light, and moisture within the stormwater BMP itself.

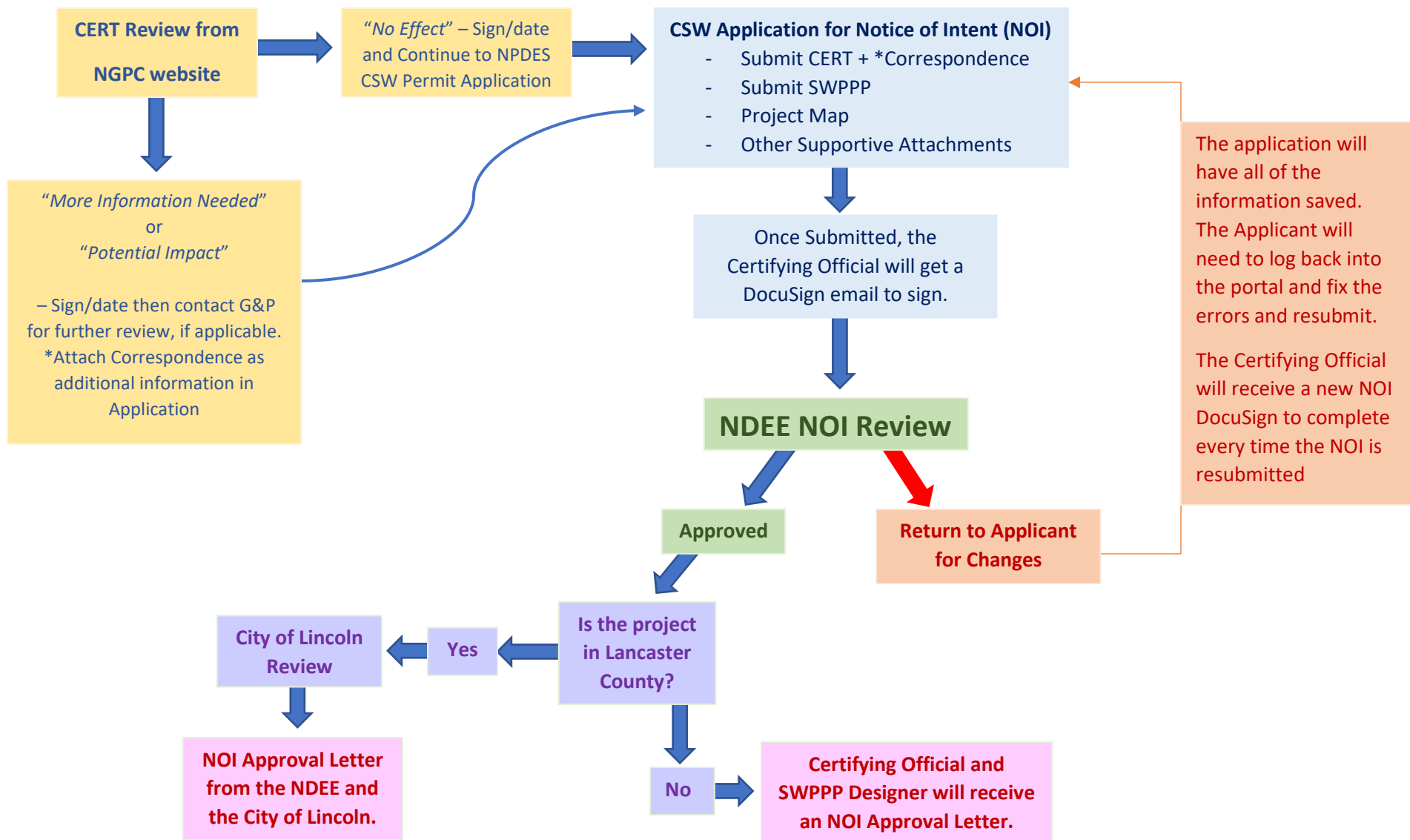
9.9 References

- City of Lincoln Public Works and Utilities Department, 2014. *Drainage Criteria Manual*.
- City of Omaha Environmental Quality Control Division, 2014. *Omaha Regional Stormwater Design Manual*.
- Iowa Department of Natural Resources, 2009. *Iowa Storm Water Management Manual*.
- Nebraska H₂O, 2015. *Final Post-Construction Stormwater Program Design Standards and Procedures Memorandum*.
- Mile High Flood District (formerly Urban Drainage and Flood Control District), 2016. *Urban Storm Drainage Criteria Manual*.

APPENDIX A: FACILITIES LIST

APPENDIX B: INSPECTION REPORT

Flow Chart for NER210000 Construction Storm Water Online Application Process



Construction Storm Water Application – Frequently Asked Questions

✚ **My permit statuses says “Expired Coverage”. What does that mean?**

- After the NER210000 permit was issued December 1st, applicants had until May 31st to sign under the new permit to continue coverage. A new DocuSign link was sent to the Certifying Official in the NOI December 1st and again in May. Letters were sent as a reminder as well. If the CO did not sign by June 1st, then those projects were administratively terminated. An email along with the attached letter was sent to the CO and the SWPPP designer on the project. If the project was still active past June 1st, then it would be considered discharging without a permit until the application resubmitted a new NOI along with all of the required documents listed in Part II.B of the NER210000 permit.

✚ **My application status says _____, what does that mean?**

- *NOI Created* = The application was started, but not submitted.
- *NOI – Awaiting Signature* = the project was submitted, and a DocuSign was sent to the Certifying Officials email. They will have to go in and sign the DocuSign in order for the project to be completely submitted for review.
- *NOI DocuSign Expired* = The DocuSign link has expired. We can resend the link.
- *NOI – Waiting for DEQ Review* = The application is now with the Department for review. We have up to a week to review an application, but we usually take 2-3 days for a review.
- *NOI – Waiting for COL Review* = The application is with the City Of Lincoln for review.
- *NOI Approved* = Your project is active.
- *Expired Coverage* = The project never signed under the NER210000 permit to continue coverage, and therefore was administratively terminated in our system.
- *Closed* = The NOT was approved, and the project was closed out.

✚ **What is a CERT?**

- It is an environmental review tool designed for conservation planning. The tool provides conservation information on biological diversity, protected lands, and other natural resources for planning purposes and allows users to submit proposed projects for review of potential impacts to threatened and endangered species. Everyone is required to obtain a CERT review from Game and Parks prior to applying for a NOI, even if the project is within city limits or construction on a previous project/existing building.
- Please go to: cert.outdoornebraska.gov to complete this task

✚ **The Certifying Official is no longer with the project, can I have (NAME) sign it?**

- If the Certifying Official has changed for any reason, you will need to go through the transfer process:
 - Submit a NOI with the new Certifying Official, citing the old CSW number when prompted to in the application,
 - Submit a memo to the Specialist reviewing the permit stating why the permit is transferring,
 - After the new NOI is approved, the Specialist will send the memo to file and void on the old permit number,
 - The Permittee is then free to submit the NOT with the new CO's signature via DocuSign.

✚ **How long does it take to get an NOI application reviewed?**

- The Department has 10 days to review the application, but we typically review them within 2-3 business days, depending on the number of submittals.
- If a Game and Parks review is needed, that can take up to 30 days to complete.

✚ **Can I modify the application after it is approved?**

- We can only update the username, SWPPP Designer contact information, and end date of a project.
- If you are needing to alter the acres being disturbed, you will need to send a memo to the Specialist stating that the acres have changed and submit a new NOI to obtain coverage for the new total acres being disturbed. Please check your CERT and make sure that expansion is covered. If not, you will need to obtain a new CERT. The Specialist will then send the memo to file and void out the old CSW project once the new one is approved and active. It is your responsibility to have all of the updated SWPPP/CERT/CSW number onsite.

✚ **Can our consultant group use one username?**

- The NDEE has no requirements for usernames. Consultant groups can use one username for all construction projects, but one project can only be under one username.
- Note: Please make sure that when you are ready to submit an NOI that no other projects are open under the username. If two projects are open when one is submitted, the two will combine and our IT Specialist will have to detangle them.

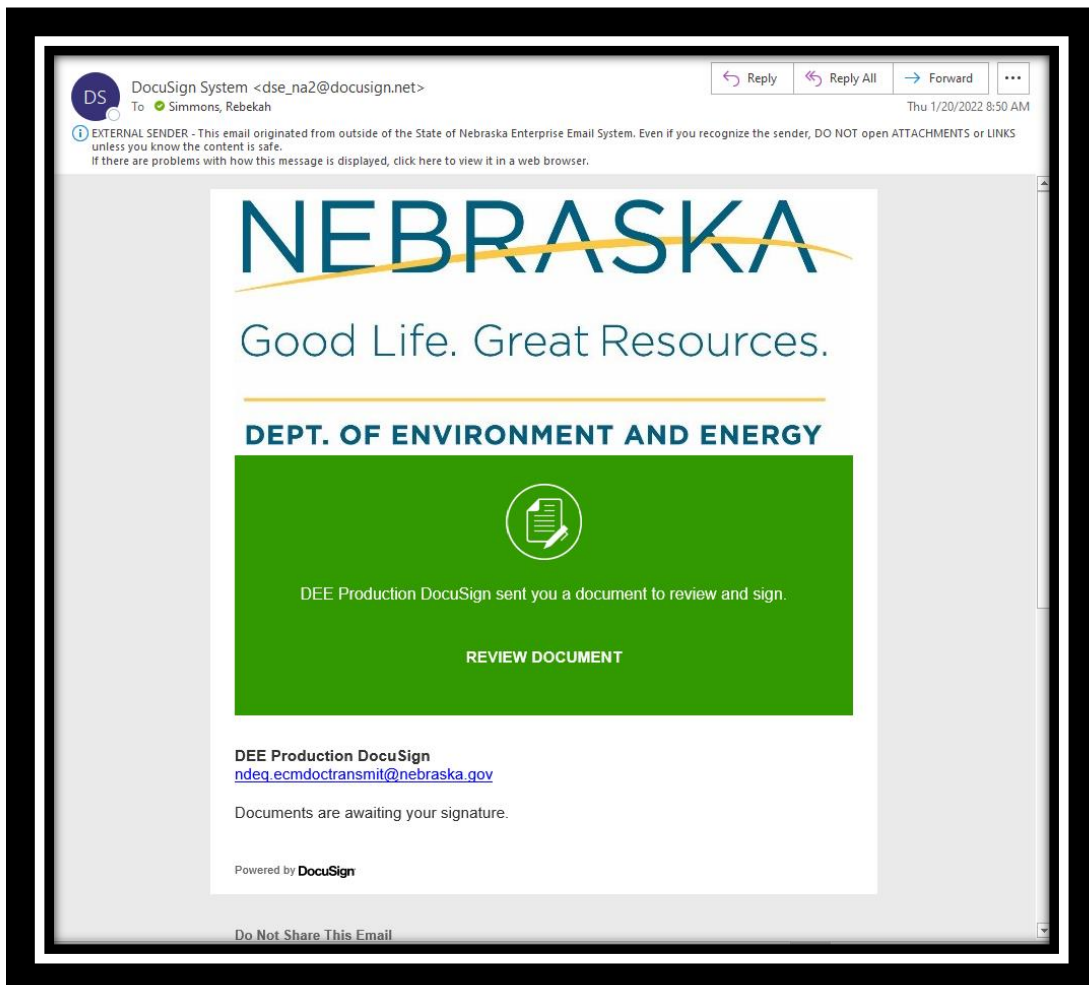
✚ **My Certifying Official did not get the DocuSign email, can we send/email/mail a physical copy with a wet signature?**

- No – We are only going to accept signatures via DocuSign. We will not accept “wet signatures” or PDF versions of the NOI. We can resend the DocuSign email as many times as it takes for the Certifying Official to receive it.
- We can change the DocuSign link to another email option for the CO, but we cannot send the DocuSign to anyone else. Since it is considered a legal document, it has to go to the CO for signature.

- ✚ **The consultant is no longer with the project, can we move it to a new username?**
 - We can move the project to a new or different username.
 - Send the Specialist the updated contact information for the SWPPP Designer, as we contact them for any questions about the permit first.

- ✚ **I received an email about my project being past its end date, what do I do?**
 - You will either have to go into the application to submit the NOT if the project has reached final stabilization, or we can change the end date of the project.

- ✚ **What does the DocuSign link look like?**
 - Below is an example of what the Certifying Official will receive via email when the NOI is submitted. Clicking “Review Document” will take them to a new tab where they can review the NOI and sign. They do not need to create an account or log into DocuSign to sing the document. Once they hit “complete”, the NOI will then come to the Department for review. Please have the CO sign the NOI electronically. We will not accept “wet signatures” or PDF versions of the DocuSign.



5.0 VIOLATIONS AND RANGE OF ACTIONS

The Table 5.1 identifies the most common violations and indicates the potential circumstances associated with each violation. The Recommended Enforcement Response Plan, under a typical situation, is described in three levels of urgency.

Level 1 – Administrative issues with relatively low environmental risk and an infrequent record of violation by the construction site operator should cause the following enforcement sequence: **Personal Contact -> Refusal of Municipal Inspections -> Notice of Violation -> Stop Work Order -> Administrative Order -> Termination/Suspension -> Judicial Action**

Level 2 – Record keeping and site conditions that pose a relatively moderate/significant environmental risk to discharge pollutants into the MS4 or adjacent receiving waterbody should cause the following enforcement sequence: **Personal Contact and Refusal of Municipal Inspections -> Notice of Violation -> Stop Work Order -> Administrative Order -> Termination/Suspension -> Judicial Action with Administrative Fees**

Level 3 – Any immediate threat to human health and environment or demonstrated willful non-compliance by a construction site operator should cause the following enforcement sequence: **Personal Contact -> Notice of Violation -> Termination/Suspension -> Stop Work Order -> Administrative Order with Administrative Fees -> Judicial Action with Administrative Fees**

Table 5.1 Construction Stormwater Violations

NONCOMPLIANCE	CIRCUMSTANCES OF VIOLATION	RECOMMENDED ENFORCEMENT RESPONSE PLAN
Failure to Prepare or Maintain a Storm Water Pollution Prevention Plan or Required Records	Operator is unaware of requirements to complete and maintain a SWPPP.	Level 1
	Operator is aware but does not follow requirements to prepare and maintain a SWPPP.	Level 2
Failure to Install, Maintain or Properly Select Best Management Practices per Approved Plan	Good faith effort has been demonstrated to select, install, and maintain BMPs	Level 1
	Operator has disregarded responsibilities to select, install, and maintain BMPs	Level 2
Conducting Covered Activity without Approval of Erosion and Sediment Control Plan	Operator is unaware of requirements to obtain approval for land disturbance activities.	Level 2
	Operator is aware of requirements to obtain approval for land disturbance activities but has not or has refused.	Level 3
Failure to Perform Inspections or Submit Required/Requested Reports and/or Documents	Infrequent occurrences	Level 1
	Frequent or routine occurrences	Level 2



Construction Stormwater Field Guide

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Chapter 1. INTRODUCTION

Scope and Objective

Construction sites can be a source of sediment and other pollutants to waterways. Best management practices (BMPs) are devices and activities that reduce or eliminate pollution sources and can include silt fences, settling basins, and even training.

This guide is a quick reference for inspectors and resident engineers in construction on topics related to installation, maintenance, and inspection of common BMPs. Using this guide helps departments of transportation (DOTs) stay in compliance with federal, state, and local regulations for improving stormwater quality and provides guidance where local publications may currently be lacking.



Fig. 1-1. Proper management of construction sites through the use of BMPs can dramatically reduce stormwater impacts. Source: RBF Consulting

Preface to Readers

This publication includes discussion of BMPs, organized by their use. Categorization of BMPs may vary from state to state; however the basic recommendations for field implementation remain consistent. The information

presented in this guide is based on techniques and control measures considered generally effective in many areas of the country. This guide is not meant to be a design manual or pollution prevention plan, nor is it meant to supersede, substitute, or make more stringent well-defined practices or regulatory standards.



Fig. 1-2. Construction sites should aim to produce no more sediment risk than the natural condition as this re-vegetated slope does.

Source: *Utah DOT*

Federal Laws and Requirements

Federal water quality regulations require that construction sites disturbing one acre or more of land get coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Permits may be issued by the United States Environmental Protection Agency (EPA) or at the state level.

The goal of the EPA is to prevent the construction site from causing or contributing to water pollution. Water pollution can result from most activities on a construction site if they are not correctly managed with BMPs.

BMPs use the following strategies to protect water quality:

- Reduce the time bare soil is exposed to rainfall by project sequencing and scheduling.

- Use pollution prevention as a more practical and effective means compared to pollution removal. Do what is possible to prevent pollution contact with stormwater.
- Use effective combinations of erosion and sediment control measures on the construction site.
- Use buffers of natural vegetation when construction sites are next to environmentally sensitive areas or water bodies.
- Control the perimeter of the site with appropriate sediment controls.
- Reduce the volume of construction site runoff wherever feasible.
- Control offsite/onsite runoff during construction to protect slopes and disturbed areas.
- Avoid disturbing natural channels.
- Stabilize bare soil areas as soon as possible, to eliminate erosion.

The information discussed in this guide provides information on installing and maintaining BMPs so that they are effective.

Erosion Control Fundamentals

You need an understanding of the different types of erosion to maintain erosion control BMPs.

Splash erosion is the primary source of erosion. It results from rain drops striking bare soil directly.

Sheet erosion is the removal of a uniform thin layer of soil by raindrop splash or water runoff. It is characterized by a surface film of water 1/16"–1/8" deep.

Rill erosion results from sheet flow that becomes concentrated into many small channels. Rill erosion areas are generally small enough to step across.

Gully erosion is easily identifiable by large (too far to step across), deep cuts in the soil. They are often found in areas

without evidence of other erosion types. Rill erosion can easily progress to gully erosion if BMPs are not installed, installed correctly, or not maintained.



Fig. 1-3. Splash erosion is often very hard to see, but it is a significant physical process.

Source: <http://www.dot.ca.gov> (modified)



Fig. 1-4. Gully formation occurs when flows are not adequately controlled with the appropriate BMPs.

Source: RBF Consulting



Fig. 1-5. All forms of erosion can occur at a construction site. Here the rills and gullies will need repair and could have been prevented with proper BMPs. Source: *RBF Consulting*

General Tips

Assessment and Planning

You should perform a general site assessment and planning before implementing BMPs. Things to be reviewed in the field include:

- Review the project's stormwater pollution prevention plan (SWPPP) requirements.
- Identify and understand the basic drainage patterns of the project site—from where does runoff originate, where does it go, and how much is anticipated.
- Understand how the continuing sequence of project construction activities will change current drainage patterns based on grading, vegetation changes, paving, and other physical features.
- Identify all areas where runoff will discharge from the site for all phases of construction.
- Identify the areas of the project site that are the most likely sources of sediment. Cover and contain construction materials.

- Select BMPs for runoff management, soil stabilization, and sediment control based on the project site conditions, geography, and typical precipitation patterns.

BMP Tool Box—Runoff Management

Runoff management approaches include tools to convey water into and through the site. In many instances, prudent runoff management strategies involve the diversion of clean water from offsite areas around the site.

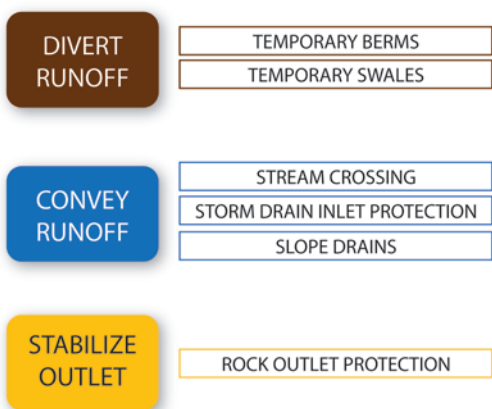


Fig. 1-6. Planning flow chart—runoff management.

BMP Tool Box—Soil Stabilization

Erosion control BMPs include a range of cover options including spray-on binders, spray-on mulches, spray-on matrices, hydroseed, rolled erosion control products (RECPs), and others. They all share common function in that they keep soil from becoming mobile. The best approach for your site will depend on the intended design life, project slope, soil type, environmental requirements, and cost. In general, the original product used for erosion control will need to be reapplied as it becomes ineffective over time.

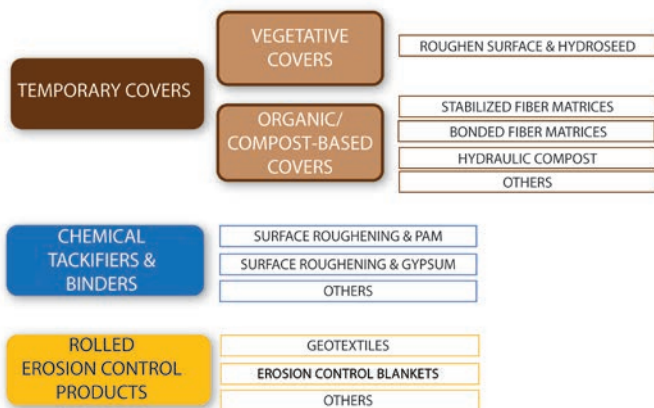


Fig. 1-7. Planning flow chart—soil stabilization.

BMP Tool Box—Sediment Control

Sediment control BMPs include silt fence, wattles, gravel bags, check dams, and sediment basins and traps. These measures should always be used as a supplement to appropriate runoff management and erosion control BMPs.

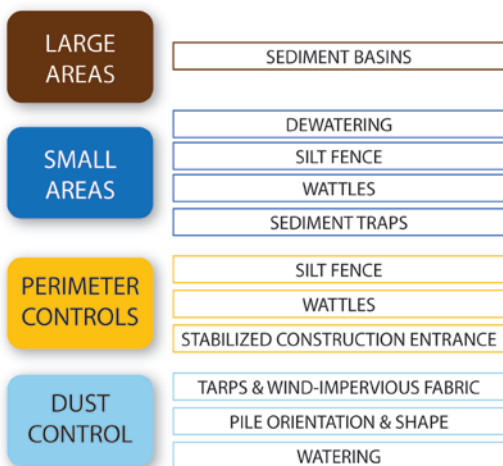


Fig. 1-8. Planning flow chart—sediment control.

Controlling Dust

Wind erosion control practices function by:

- Reducing wind effects on the soil surface by covering piles with a wind-impervious fabric or other material, or by changing pile orientation and shape and/or;
- Water or calcium chloride applications.

Special Considerations for Linear Projects

Linear projects such as highways present special challenges for installation and maintenance of BMPs. Safety considerations, along with limited work area for effectively managing erosion and sediment controls are two main challenges. The following are things to keep in mind when maintaining BMPs for linear projects:

- Avoid deep ponding areas that are not protected by temporary barriers.
- Do not allow water to pond in the clear recovery zone.
- Pay attention to sight distance obstructions when selecting controls. Do not use controls that may obstruct sight lines.
- Create a plan for maintenance. BMPs must be maintained; provide access that does not require traffic control and keeps personnel safe.
- Do not use inlet protection BMPs that would cause flooding in the traveled way, or cause the flow spread to enter the traveled way.
- Use alternative control methods where standing water may create potential hazards.
- Large drainage areas present situations with high flow volumes but limited areas for proper controls. It is imperative to recognize these areas at the beginning of a project and identify BMPs intended to control large flows at the start and as construction progresses. And also:
 - Look to provide diversions to bypass offsite water around the project area.

- Use alternative BMPs or modify the traditional design when limited work area is a concern.

Communication During Construction

Designate a point of contact within all functional units associated with a project regarding construction stormwater issues. Construction sites change over time. Make sure the site meets the requirements of the stormwater pollution prevention plan (SWPPP) at all times. Keep good documentation, and take pictures of BMPs before and after maintenance.



Fig. 1-9. Covering a pile and maintaining a low profile shape are good ways to reduce wind erosion potential.

Source: RBF Consulting

Record Keeping and Reporting

Project documents must be kept for at least three years from the date the site is stabilized and the NPDES coverage is terminated. At a minimum, records should include:

- Copy of the project SWPPP and its amendments.
- Permit application and termination records.
- Inspection forms, including the date, place, time, significant observations (spills, leaks, etc.), and all non-stormwater discharges.

- The corrective Action Log.
- Records of weather conditions (keeping a rain gage on site is highly recommended).
- BMP maintenance activity and troubleshooting.
- Names of inspector(s) and other key members of the DOT, contractor, and sub-contractors.



Fig. 1-10. Establishing responsibility for regular inspection and maintenance of stormwater BMPs is an important part of work and communication management key to preventing failures as show here. Source: *RBF Consulting*

Work Management

Stormwater pollution prevention is typically handled by more than one person. Roles and responsibilities should be understood and documented within the project SWPPP including:

- Overall lead
- Spill response
- Weather monitoring
- Housekeeping and BMP installation and maintenance
- Record keeping and reporting
- Training

General BMP Inspection and Troubleshooting

Each BMP presented in this guide has information on inspection, maintenance, and associated work. Many of the problems occurring in the field fall into the following general categories and are not associated specifically with any one BMP. A consideration for all is staff training.

Table 1-1. General BMP Troubleshooting

If Your BMP Experiences	Then Consider
Erosion	<ul style="list-style-type: none"> • Additional erosion control/soil stabilization BMPs • Diversion of flow around the area of concern using temporary runoff management practices • Modifying your construction sequence or schedule
Turbid Discharge	<ul style="list-style-type: none"> • Maintenance or redesign
Sediment and Debris Buildup	<ul style="list-style-type: none"> • Additional erosion control/soil stabilization BMPs • More frequent maintenance and clean out • Diversion using temporary runoff management practices • Modifying your construction sequence or schedule
Standing Water	<ul style="list-style-type: none"> • Inspection of inlets and pipes for blockage from trash and debris • Limit the drainage area to the BMP using runoff management practices • Increase the size (surface area) of your BMP • Add erosion and sediment control BMPs within the contributing drainage area
Bypass	<ul style="list-style-type: none"> • Increase the size of your BMP • Verify the size and physical adequacy of inflow and outflow structures, conduits, etc.
Malfunction Due to Design Deficiency	<ul style="list-style-type: none"> • Provide temporary runoff management controls to divert runoff away from problem area • Use runoff controls to slow the flow of runoff • Contact the design engineer of record for solution
Trackout	<ul style="list-style-type: none"> • Perform maintenance or provide additional perimeter controls • Verify that access points are controlled • Provide a tire cleaning area • Perform street sweeping

Final Stabilization and Permit Termination

BMPs must be maintained until work is completed, the project site is stabilized, and the project is eligible to end NPDES permit coverage. Requirements vary based on location, but stabilization generally occurs when vegetation covers unpaved areas with a uniform density of at least 70 percent of the pre-project condition. NPDES permit coverage also requires:

- Removal of trash and debris
- Removal of temporary BMPs and stabilization of resulting bare areas
- Repair and stabilization of areas showing erosion
- Permanent BMPs and drainage systems are in place and working



Fig. 1-11. Final stabilization is reached typically at 70 percent uniform cover. That percentage should be applied to the percent cover of pre-existing conditions.

Source: *RBF Consulting*

Chapter 2. POLLUTION PREVENTION AND GENERAL HOUSEKEEPING

Material and Waste Management

General Description

Building materials, including stockpiles, construction site wastes, sanitary wastes, and concrete wash water must be properly disposed of.

Implement and maintain the following:

- Protect stockpile areas with perimeter controls
- Cover and contain solid and liquid waste, including concrete washout areas and sanitary facilities
- Trash disposal and recycling
- Cover and contain materials
- Have a spill kit and clean up spills



Fig. 2-1. Trash and debris are among those most common pollutants at construction sites. Proximity to open storm drains is especially problematic.

Source: RBF Consulting

Inspection and Maintenance

Inspect weekly or as required otherwise by local procedures or regulatory standards.

Stockpiles and Contaminated Zones

- Inspect covers, liners, perimeter controls, and containment structures for tears or failure points. Repair as necessary to maintain proper function.
- Inspect perimeter controls for breaches or failure points.
- Check for signs of erosion or rilling on stockpiles.
- Inspect capacity of containment structures.



Fig. 2-2. This portable toilet shows no evidence of trash, debris, or drainage of liquid waste. Note the use of perimeter controls along the downward sides.
Source: RBF Consulting

Solid and Liquid Waste Management

- Inspect concrete washout facility for torn liner, missing or damaged gravel bags, and sufficient remaining holding capacity.
- Provide signs for the concrete washout-area location.
- Inspect areas around dumpsters and drainage ways for trash and debris.
- Collect site trash daily. Cover trash containers at the end of each work day and when it is raining.
- If dumpsters are full, empty them immediately.

- Inspect areas in and around portable toilets for trash and debris or liquid waste.

Material Use, Storage, and Spills

- Keep temporary containment facilities free of captured rainwater and spills.
- Keep supplies of spill control and cleanup materials onsite, especially near storage, unloading, and maintenance areas.
- Keep Material Safety Data Sheets (MSDS) and the spill prevention and control plan up to date.
- Ensure SWPPP requirements are followed.
- Do periodic staff training on spill prevention and containment methods.



Fig. 2-3. Paints should ideally be stored inside. When this is not possible, a tarp or cover is the next best option.

Source: RBF Consulting

Other General Practices

Stockpiles and Contaminated Zones

- DO** install perimeter controls around stockpile to protect the pile from erosion and prevent sedimentation.
- DO** wet stockpiles to control dust during dry periods.

- DO** cover stockpiles with plastic sheeting to protect from rain and wind.
- DO** clean up contaminated zones.
- DO NOT** allow ground, surface, or stormwater to flow through contaminated zones.
- DO NOT** stockpile contaminated soils near stormdrains, waterways, wetlands, or low lying areas.



Fig. 2-4. Materials are being properly stored on pallets, and unused materials are covered with a tarp.
Source: Colorado DOT

Solid and Liquid Waste Management

- DO** designate waste collection areas and sanitary facility areas that are level, paved, covered or in secondary containment, and provide easy access for servicing.
- DO** prevent stormwater from entering waste containment areas.
- DO** treat and dispose of sanitary or septic wastes in accordance with state and local requirements.
- DO** secure temporary sanitary facilities to prevent overturning during high winds or by vandals.



DO designate waste collection areas and sanitary facility areas that are level, paved, covered or in secondary containment, and provide easy access for servicing.



Fig. 2-5. Leaving trash dumpsters uncovered is among the most typical mistakes on construction sites.

Source: Nevada DOT

- DO NOT** place liquid waste and chemicals (e.g., petroleum products, paints, solvents, pesticides, curing compounds, etc.) in dumpsters designated for litter and construction debris.
- DO NOT** wash out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- DO NOT** place temporary sanitary facilities or concrete washouts within 50 feet of drainage facilities,

watercourses, and traffic circulation. Keep both away from concentrated storm flow.

DO NOT discharge or bury wastewater.



DO NOT discharge or bury wastewater.



Fig. 2-6. Careful inspection could have prevented this spill onto the roadway. Stormwater inlets near the areas should immediately be assessed for impact. Since the spill appears small, rags may prove effective for cleanup.

Source: RBF Consulting

Material Use, Storage, and Spills

- DO** keep plenty of spill cleanup supplies available for the materials being stored or used onsite. Keep spill cleanup supplies near storage, unloading, and maintenance areas.
- DO** designate an area(s) for material delivery and storage.
- DO** line and berm material storage areas if located on

bare soil. When available, place material storage areas in paved areas.

- DO** store chemicals in a storage shed or in water-tight containers with secondary containment.
 - DO** store materials in original containers with legible product labels.
 - DO** minimize the storage of hazardous materials onsite.
 - DO** keep a list of potential non-visible pollutants at the site. Have authorized and trained personnel do sampling in accordance with requirements, if needed.
 - DO** cover and protect spills from stormwater run-on during rainfall so long as it does not compromise cleanup activities.
 - DO** use a rag for small spills on paved surfaces. Use a damp mop for general cleanup. Use absorbent material for larger spills.
-



DO keep a list of potential non-visible pollutants at the site. Have authorized and trained personnel do sampling in accordance with requirements, if needed.



DO use a rag for small spills on paved surfaces. Use a damp mop for general cleanup. Use absorbent material for larger spills.

- DO NOT** over-apply fertilizers, pesticides, and herbicides—follow manufacturer's directions. Do not apply if rain is in forecast within three days.

DO NOT locate temporary storage areas near vehicular traffic.

DO NOT store bagged or boxed materials on the ground. Cover them and store on pallets.

DO NOT hose down or bury dry materials.

DO NOT locate material delivery and storage areas near waterways or any place with the potential to come into contact with stormwater runoff.

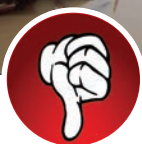


Fig. 2-7. Waste and debris permitted to come into contact with large amounts of drainage represent a significantly greater environmental risk.

Source: RBF Consulting



DO NOT locate material delivery and storage areas near waterways or any place with the potential to come into contact with stormwater runoff.



Fig. 2-8. Left—A concrete washout left unprotected.

Source: Nevada DOT



Right—A concrete washout adequately covered.



Fig. 2-9. While there appears room in this concrete washout, it has reached the recommended 75 percent capacity and should be cleaned out.

Source: RBF Consulting



Fig. 2-10. This sanitary facility has not been provided with secondary containment, and is located very close to a large amount of concentrated drainage.

Source: RBF Consulting



Fig. 2-11. Materials should be stored in designated areas and not with direct discharge to unprotected inlets.

Source: RBF Consulting



Fig. 2-12. Workers overlook placement of small amounts of waste material such as this in proper disposal areas.

Source: RBF Consulting



Fig. 2-13. Equipment and vehicles should be inspected routinely for leaks. An ample supply of cleanup materials should be kept at all designated maintenance areas where leaks and spills are likely to occur.

Source: Colorado DOT



Fig. 2-14. This picture depicts residue from cleanout of a concrete truck not performed in a controlled washout area.

Source: RBF Consulting

Street Cleaning

General Description

The construction of streets, roads, highways, and parking lots can generate pollutants like sediment, debris, and trash, which can be controlled by street sweeping. Street sweeping involves the use of self-propelled or walk-behind equipment to remove sediment and other pollutants from paved surfaces.

Inspection and Maintenance

Inspect weekly for pollutant accumulation or as dictated otherwise by local procedures or regulatory standards.

- Inspect entrance and exit points for sediment tracking daily.
- Adjust brooms as necessary to get the best results.



Fig. 2-15. This sweeper is properly cleaning up a construction site.

Source: Colorado DOT

Other General Practices

- DO** perform street cleaning more often based on traffic and inspection results.
- DO** properly dispose of wastes.
- DO NOT** rely on sweeping if it is ineffective due to soil type or moisture present.
- DO NOT** sweep up unknown substances or objects that may be hazardous.



DO perform street cleaning more often based on traffic and inspection results.

Other Associated Work

- If the sweeper is not picking up sediment, adjust the sweeper brooms or consider alternate attachments.
- If sweeping causes excessive dust, use a sweeper with water, air recirculation, or filtration.

Protection of Permanent BMPs

General Description

Permanent BMPs are used to treat stormwater after site development is completed. State and federal programs require public agencies engaged in new development or redevelopment activities to install permanent BMPs.

Some permanent BMPs can be used as temporary construction BMPs if indicated by the plans. However, other permanent BMPs including infiltration, bioretention, and media filter BMPs must be protected from construction activities. This may be done with the use of diversion berms or ditches and fencing or roping off of future protected areas.

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Check condition of construction fencing or roping around permanent BMP areas.
- Inspect diversion berms or ditches for possible breach or washout. Look for signs of sediment entering future infiltration areas.
- Do not allow construction site runoff to enter permanent BMPs unless the BMP has been designated for use during construction and approved by the Engineer.
- Remove sediment retained by diversion berms once it has reached one-half of the exposed height of the berm.



DO stabilize upstream drainage areas before construction of infiltration, bioretention, and media filter BMPs.

Other General Practices

- DO** stabilize upstream drainage areas before construction of infiltration, bioretention, and media filter BMPs.
- DO** place diversion berms around edges of future infiltration sites to prevent sediment from entering during construction.
- DO NOT** use retention/detention permanent BMPs as temporary construction BMPs unless designated for temporary use on plans.



If permanent infiltration, bioretention, or media filter BMP areas are clogged with sediment, they must be re-built.

Other Associated Work

If permanent infiltration, bioretention, or media filter BMP areas are clogged with sediment, they must be cleaned. Additional perimeter protection and soil stabilization measures should be provided where appropriate.

Illegal Discharges

General Description

Illegal (a.k.a. “illicit”) discharges refer to unpermitted non-stormwater discharges and dumping of waste within the project site.

Inspection

Inspect weekly, following a runoff-producing event, or as dictated otherwise by local procedures or regulatory standards.

- Inspect site for illegal dumping before beginning the job.

- Inspect site during the job for illegal dumping or connections.
- Inspect the site perimeter for illegally dumped material that may enter the job site.
- Inspect storm drain outfall locations and manholes for illicit connections. Signs of illicit connections include:
 - Water flow during dry weather
 - Ground staining
 - Pungent odors
 - Discoloration or oily substances in the water
 - Excessive sediment deposits, especially next to or near other active construction projects
 - Non-standard junction structures
 - Broken concrete or other disturbances at or near junction structures



Fig. 2-16. Illegal dumping often occurs at the perimeter of the site, where access is hardest to control. Source: RBF Consulting

Other General Practices

- DO** treat unlabeled and unidentifiable material as hazardous.
- DO** notify your environmental division or section of illicit connections and illegal dumping or discharge events at the time of discovery.

- DO** notify the local stormwater management agency and state regulatory agency of illicit connections or discharges to the storm drain system.
 - DO** notify the local law enforcement agency for illegal dumping.
 - DO NOT** allow employees and subcontractors to dispose of non-job-related trash or materials at the construction site.
-



DO notify the local stormwater management agency of illicit connections or discharges to the storm drain system.

Paving and Concrete Construction

General Description

Paving and concrete construction activities include:

- Saw cutting and pavement demolition and grinding
- Pavement installation
- Concrete curing and finishing
- Tack coating and sealing
- Striping and pavement marking

General Practices

- DO** protect drainage inlet structures and manholes either with plastic covering or sediment barriers.
- DO** collect removed material by mechanical or manual methods (do not hose down areas).
- DO** properly recycle or dispose of old, spilled, or broken asphalt.



DO protect drainage inlet structures and manholes either with plastic covering or sediment barriers.

- DO** collect and contain residue from grinding operations, including cooling water.
 - DO** clean up leaks and spills with absorbent materials.
 - DO NOT** apply seal coat, tack coat, slurry seal, or fog seal, if rain is predicted during the application or curing period.
 - DO NOT** allow slurry, sweepings, or aggregate to enter storm drains or watercourses.
 - DO NOT** allow sand or gravel placed over new asphalt to wash into storm drainage systems, streets, or watercourses.
 - DO NOT** pre-heat, transfer, or load bituminous material near stormwater drainage systems or watercourses.
 - DO NOT** fill pre-heaters or melting tanks beyond six inches from the top.
-



DO NOT apply seal coat, tack coat, slurry seal, or fog seal, if rain is predicted during the application or curing period.

Non-Stormwater Management

General Description

Non-stormwater management includes water conservation and management of potable water/irrigation. Non-stormwater must be fully contained and properly disposed of, unless discharges to the storm drain or off the site are explicitly permitted.

Inspection and Maintenance

Inspect daily for non-stormwater or as dictated otherwise by local procedures or regulatory standards.

- Inspect and verify that activity-based BMPs are in place before starting authorized non-stormwater discharges.
- Inspect irrigated areas within the construction limits for excess watering and overspray—correct problems.
- Inspect irrigated areas regularly for signs of erosion—correct problems.
- Maintain water equipment as needed to prevent unintended discharges. Water equipment includes water trucks, water reservoirs, irrigation systems, and hydrant connections.



Fig. 2-17. Vehicle leaks are a common non-stormwater discharge. They must be identified and fixed as soon as possible.

Source: RBF Consulting

Other General Practices

- DO** stabilize water truck filling area.
 - DO** repair water leaks promptly.
 - DO** direct uncontaminated construction water runoff to areas where it can soak into the ground or be collected and reused.
 - DO** lock water tank valves to prevent unauthorized use.
-



DO direct uncontaminated construction water runoff to areas where it can soak into the ground or be collected and reused.

DO NOT allow washing of vehicles and equipment onsite.

DO NOT use water to clean construction areas. If water must be used, sweep and vacuum the surface first to remove dirt.



DO NOT use water to clean construction areas.

Other Associated Work

- Repair broken water lines as soon as possible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.

Chapter 3. SEDIMENT CONTROL

Perimeter Controls

General Description

Perimeter controls are used to keep sediment-laden stormwater from entering or leaving a construction site and often define limits of disturbance. Perimeter controls should be installed prior to beginning construction activities. Common perimeter controls include silt fences, wattles, and stabilized construction entrances. It is worth noting that silt fences and wattles, although discussed within this section for organizational purposes, are effective controls that are also commonly applied within the interior of a site.



Fig. 3-1. Perimeter controls should clearly define the entrance/exit of the site. This is critical for separate projects in adjacent locations.

Source: Nevada DOT

Silt Fence

A silt fence is a length of filter fabric stretched between anchoring posts spaced at regular intervals. Silt fences can be an effective barrier to prevent sediment transport in stormwater flow.

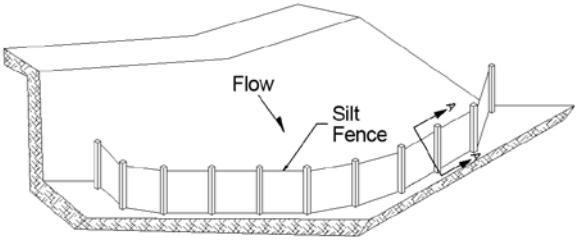


Fig. 3-2. Isometric view of a silt fence installation.

Source: Colorado DOT



Fig. 3-3. Notice the sediment within the gutter caused by lack of perimeter controls.

Source: Nevada DOT

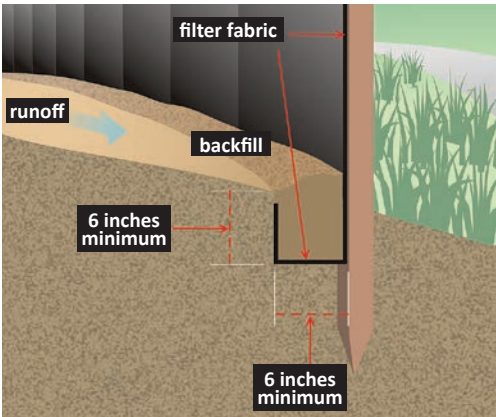


Fig. 3-4. Silt fence installation detail.

Source: Utah DOT



Fig. 3-5. Too much dirt can cause the silt fence to tip over or break.

Source: Colorado DOT

Wattles

Wattles, also called fiber rolls, are biodegradable rolls of straw fibers or compost surrounded by natural fiber netting. Synthetic materials may be used, check the project requirements. They can be used at the perimeter of the construction area or on graded slopes. Wattles can slow down runoff and trap sediment.

Stabilized Construction Entrances



Fig. 3-6. This is a poor installation of a construction entrance. It lacks perimeter controls.

Source: Colorado DOT

Construction entrances can be stabilized with the use of gravel three to six inches in diameter or larger and geotextile fabrics. As a vehicle exits, the stabilized entrance removes mud and dirt from the tires and undercarriage, reducing sediment transport off site.

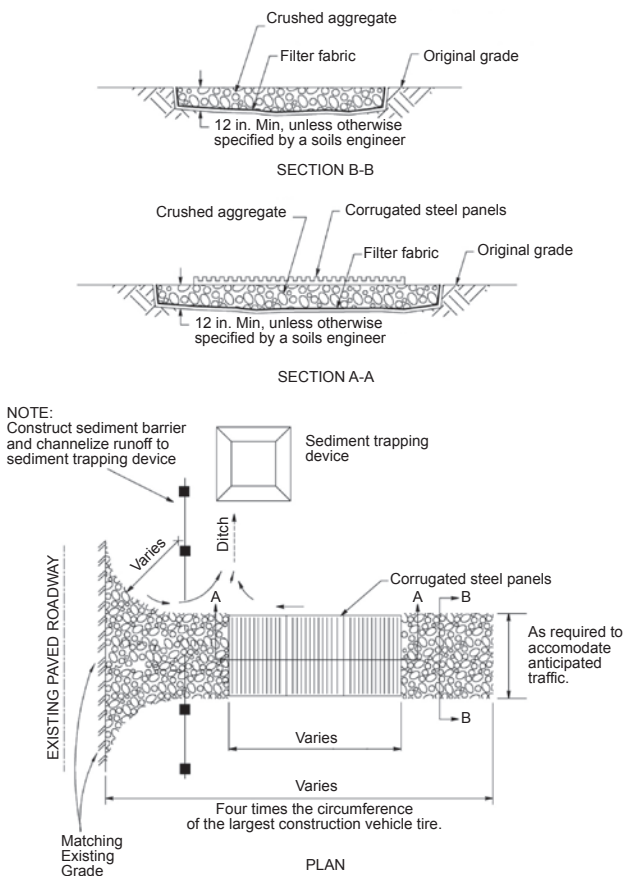


Fig. 3-7. California Standard Plans.

Source: Caltrans

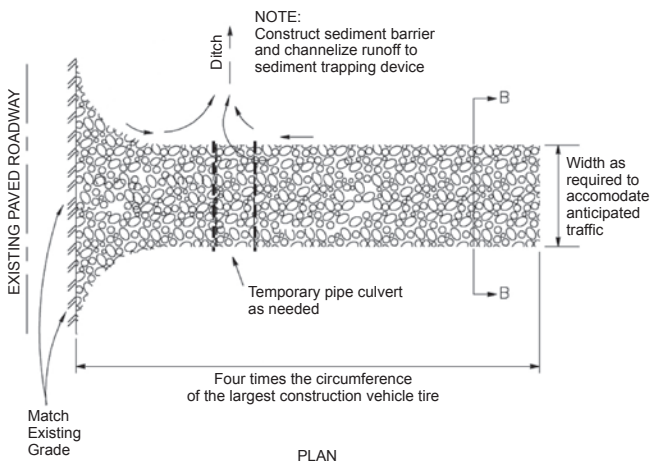


Fig. 3-8. California Standard Plans.

Source: Caltrans

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

Silt Fence

- Inspect for unprotected areas that may need silt fencing.
- Inspect for incorrect placement; specifically make sure fence is placed along contours and not in areas of concentrated flow.



Make sure silt fence is placed along contours and not in areas of concentrated flow.

- Inspect for incorrect installation; specifically lack of entrenchment, breaches or end flanking, stakes on downslope side of fabric and fabric trenched in.

- Inspect reinforcement and staking materials for undermining or structural failure.
- Inspect for over-accumulation of sediment and remove collected sediment when it reaches a critical height along fence as required.
- Inspect connections of silt fence sections to ensure ends are wrapped together and not gaps are present.

Wattles

- Inspect for sediment build up behind wattle. Remove sediment if it has collected to more than half the diameter of the wattle.
- Inspect for incorrect placement; specifically make sure wattles are placed along contours and not in areas of concentrated flow.
- Inspect for gaps between wattles or evidence that flow is going around the ends of the wattles.
- Inspect for missing stakes or damaged netting.

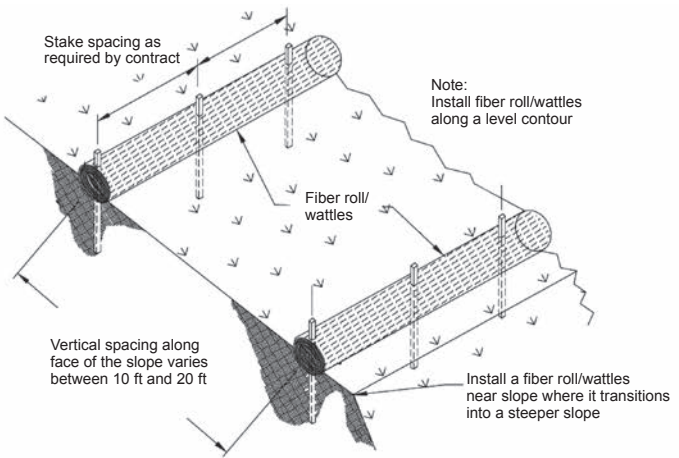


Inspect for sediment build-up behind wattle. Remove sediment if it has collected to more than half the diameter of the wattle.



Fig. 3-9. This wattle is clearly trapping sediment, although removal of trapped sediment is required to maintain effectiveness.

Source: Idaho Transportation Department



TYPICAL FIBER ROLL/WATTLE INSTALLATION

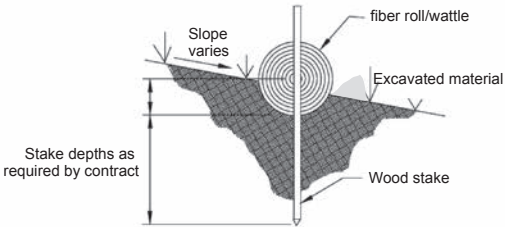


Fig. 3-10. California Standard Plans.

Source: Caltrans

Stabilized Construction Entrances

- Inspect for sediment buildup within the gravel.
- Inspect for muddy conditions at the entrance or in the adjacent roadway to check functionality.
- Inspect for bypassing of entrance protection by construction traffic.
- Clean up sediment tracked onto paved surfaces.
- Remove aggregate, separate and dispose of sediment, if gravel is clogged.



Fig. 3-11. A stabilized construction entrance is needed to prevent tracking of sediment offsite.
Source: *Ohio DOT*



Remove aggregate, separate and dispose of sediment, if gravel is clogged.

Other General Practices

Silt Fence

- DO** ensure silt fence fabric is trenched into soil.
- DO** extend the filter fabric into the trench on the uphill side of the posts. This will require folding over the

first six inches of fabric so that is anchored under the trench backfill material.

- DO** reinforce standard strength filter fabric with wire mesh when placed at the base of steep slope in limited work areas.
- DO** install J-Hooks to increase effectiveness at 12- to 18-foot vertical intervals along the base of the fence at no greater than 500-foot horizontal intervals.
- DO NOT** place across live streams or intermittently flowing channels or perpendicular to slopes.



Fig. 3-12. This picture shows an improperly installed silt fence (trenching, post and fence placement). This is a common problem with some bridge projects and limited work area. Silt fence backing or reinforced silt fence is recommended.

Source: RBF Consulting

Wattles

- DO** ensure that wattles are installed in a shallow depression along a level contour.
- DO** overlap ends of adjacent wattles.
- DO NOT** allow flow or sediment to pass under the wattle.
- DO NOT** damage netting while installing stakes.

Stabilized Construction Entrances

- DO** construct at least to minimum agency dimensional standards.
- DO** construct with angular, clean, washed gravel at least three to six inches in diameter (or as required otherwise by local standards). Increase rock size as equipment size increases.



Fig. 3-13. The size and placement of rock is ineffective at controlling sediment at the project entrance. Larger rock combined with a filter fabric would help. Source: RBF Consulting

- DO** place geotextile fabric underneath the gravel to prevent it from being pressed into the underlying soil.
- DO** construct on level ground that is properly graded to prevent runoff.
- DO** use clearly visible physical barriers to guide vehicles to use the stabilized entrance/exit.
- DO** limit the speed of vehicles to five miles per hour or less to lessen dust.



DO place geotextile fabric underneath the gravel to prevent it from being pressed into the soil.

Other Associated Work

Silt Fence

- Repair undercut silt fences by re-trenching and compacting.
- Repair or replace split, torn, weathered, or slumping fabric.

Wattles

- Repair or replace wattles that are torn or flattened.
- Replace wattles that have biodegraded. The typical life span for straw wattles is 12 months.



Fig. 3-14. This silt fence is poorly maintained. Accumulated sediment should be removed. Silt fence should not be installed in a water course.

Source: Colorado DOT

Stabilized Construction Entrances

- If construction entrance is muddy:
 - Stone is too small. Install larger stone.
 - Pad too thin. Install additional stone.
 - Install additional filter fabric under pad to reduce migration of underlying soil into the stone and vice versa.

- If sediment is washing onto road:
 - Runoff control is inadequate. Improve up-gradient runoff control, as necessary.
 - Entrance is too short for construction traffic. Extend the entrance beyond the minimum design standard.
 - Entrance is not sufficiently flared at the road entrance.
 - Use a tire wash in combination with the stone entrance. Wash the tires of exiting vehicles with pressurized water. Do not allow water to exit the site.



Fig. 3-15. Persistent sediment tracking may require street sweeping or a tire wash in combination with an entrance control (in this case, shaker plates).

Source: Nevada DOT

Dewatering

General Description

Dewatering is used to draw down water in pits and trenches that have been submerged from:

- Discharges of non-stormwater and stormwater
- Groundwater
- Water diversions

Dewatering structures settle and filter sediment-laden water using a variety of tanks and filters. The quantity and

type of discharge from dewatering activities is regulated by NPDES permits. Construction staff should be familiar with these requirements and restrictions.

Inspection and Maintenance

For all dewatering systems:

- Ensure only clear water is discharged offsite
- Monitor operations to ensure prevention of offsite discharge or erosion.

When using filter bags for dewatering:

- Place the filter bag on flat ground for efficient operation.
- Replace the bag when it no longer filters sediment or stops passing water at a reasonable rate.
- Properly dispose of used filter bags and trapped sediment offsite.
- Conduct pump refueling within a plastic containment structure or at a distance of over 100 feet from wetlands or other bodies of water.



Fig. 3-16. Remember to stop dewatering when reaching capacity (filtering bags at right nearly submerged) or when bags fail to filter sediment.

Source: RBF Consulting

When using a weir tank or dewatering tank for dewatering:

- Clean periodically based on visual inspection or reduced flow or reduced performance.
- Dispose of oil and grease using a licensed waste disposal company.

When using a media (sand, compost, activated carbon, perlite, etc.) filter for dewatering:

- Monitor the filter's outflow daily while in use. Clean the filter when flow reaches target levels given by the vendor.
- If cleaned by backwashing, properly dispose of backwash water as required. Backwash water may be returned to the start of filtration systems, in some cases.

When using a pressurized bag filter or cartridge filter for dewatering:

- Replace filter bags or cartridges when pressures reach manufacturer's recommendations.



Fig. 3-17. This dewatering bag should not be located in a water course.

Source: Colorado DOT

Other General Practices

- DO** place dewatering bags on level ground that has been stabilized.
- DO** avoid dewatering discharges where possible by using the water for dust control if allowed by permit.
- DO** protect the discharge point from erosion.
- DO NOT** discharge water into wetlands, irrigation ditches, canals, or storm sewers unless allowed by regulatory permit.
- DO NOT** discharge water into sanitary sewers unless permitted by the municipality or owner of the sanitary sewer system.



Fig. 3-18. Direct discharge from dewatering operations into bridge crossings or gutter areas can allow pollutants to enter into streams and rivers.

Source: RBF Consulting



DO NOT discharge water into wetlands, irrigation ditches, canals, or storm sewers unless allowed by regulatory permit.

Other Associated Work

- If discharge of treated water causes erosion, use outlet protection or an energy dissipation structure.
- If dewatering discharge flow is higher than expected, ensure that the rate is consistent with permit limitations.
- If water is not infiltrating fast enough for discharge to land, stop dewatering. Install a sediment treatment system and test discharge as necessary.



If dewatering discharge flow is higher than expected, alter the treatment unit to handle increased flow. Notification of local officials may be necessary before resuming dewatering operations.

Sediment Traps and Basins

General Description

Sediment traps and basins are small impoundments that allow sediment to settle out of stormwater runoff. A sediment trap can be an excavated depression or a dike made of stable materials. Sediment traps are usually used for areas draining less than five acres. Sediment basins used for areas draining five acres or more may need to be designed by a registered civil engineer.

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Inspect inlet, outlet, embankment, and spillway structures for erosion, damage, or obstructions.
- Inspect stability of rock, if used as outlet erosion protection.
- Check basin banks for seepage.
- Inspect for depth of sediment collected. Use of marked cleanout stakes is highly recommended.
- Remove sediment when the wet storage volume has been reduced by one half. Where float skimmers are used, inspect for clogging or blockage of intake, leaks around joints, and grounding.
- Check for proper drainage from the basin or trap.



Fig. 3-19. A typical installation of sediment trap is shown. Notice there are no signs of overflow, spot failures, or scour.

Source: RBF Consulting

Other General Practices

- DO** install temporary sediment traps and basins before any land disturbance takes place in the drainage area.
- DO** use sediment traps and basins in combination with soil stabilization (erosion) controls.

Sediment Traps

- DO** underlay the rock outlet of a trap with geotextile fabric.

DO use rock at the outlet to limit erosion and provide additional filtration.

Permanent Basins Used for Temporary BMP

DO use only when designated on plans and incorporated into the contractor's SWPPP.

DO remove silt and debris and return the basin to its permanent design specifications before project acceptance.

DO NOT put traps or basins closer than 20 feet from a proposed building foundation or highway alignment.

DO NOT put traps in creeks, state or national waters, or other areas of flow.

DO NOT allow groundwater to mix with traps.

DO NOT allow overflows of ponded water to flood buildings, roadways, or other structures.

Other Associated Work

- Repair erosion problems immediately.
- If there is potential for an embankment failure, a competent geotechnical engineer shall design or review details or specifications.

Chapter 4. EROSION CONTROL

Surface Roughening

General Description

Surface roughening is used as a temporary BMP to reduce the speed of runoff, increase infiltration, reduce erosion, trap sediment, and prepare the soil for seeding and planting by capturing moisture for seed. Surface roughening may be accomplished by furrowing, scarifying, ripping, or disking the soil to create a two- to four-inch variation in soil surface.

Track walking is a method of surface roughening that involves roughening a bare soil with horizontal grooves using construction equipment.

Soil roughening can be done over an entire slope face or channel or just along the contour slope at regular intervals.



Fig. 4-1. Track walking is among the most common techniques used to roughen a slope. Grooves should be created along the slope contour line.

Source: *Utah DOT*

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Inspect for rills.
- Inspect for adequate depth of roughening.

- Inspect for correct direction of tracking.
- Track slopes at the end of each work day.

Other General Practices

- DO** use surface roughening along the contour of slopes with other BMPs, including seed, mulch, or soil binders.
- DO** run track-mounted machinery up/down the slope to leave horizontal depressions in the soil running parallel to the slope contour.
- DO** roughen the soil at least three to six inches into the soil surface.
- DO NOT** back-blade during the final grading operations.



Fig. 4-2. Track walking in the wrong direction increases rilling and erosion.

Source: Utah DOT



DO run track-mounted machinery up/down the slope to leave horizontal depressions in the soil running parallel to the slope contour.

Other Associated Work

Re-grade and re-seed and/or re-mulch if rills appear.



Fig. 4-3. Surface roughening is shown correct near the top of the slope; however shallow grooves in the lower half are in the wrong direction.

Source: RBF Consulting



Fig. 4-4. Excellent example of proper tracking; tracks are perpendicular to the slope.

Source: Colorado DOT



Fig. 4-5. Excellent example of proper tracking; tracks are perpendicular to the slope.

Source: Colorado DOT

Tackifier and Binders

General Description

Tackifiers are synthetic bonding agents used to stick, or tack, hydraulic seeding and hay or straw mulch to the soil surface. Wind can blow hay and straw away, allowing rain to cause erosion. Tackifiers provide immediate and extended protection of the hay or straw mulch from wind and rain to allow vegetation enough time to grow.

Soil binders are chemical stabilizers that provide temporary soil stabilization for stockpiles, berms, haul roads, or when slopes cannot be seeded due to seasonal constraints. Soil binders are sprayed onto exposed soil surfaces to hold them in place and minimize wind and runoff erosion.

Common tackifiers and binders may include plant-based binders, poly-acrylamide (PAM), and gypsum.

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Inspect areas for signs of erosion.
- Inspect for signs that runoff has broken through the soil at the top of a slope treated with a soil stabilizer, causing undercutting of the stabilized soil layer and discharge at a point further down slope.
- Re-apply soil binder every 6 to 12 months or after the surface has been disturbed again. Follow manufacturer's guidance.



Inspect for signs that runoff has broken through the soil at the top of a slope treated with a soil stabilizer, causing undercutting of the stabilized soil layer and discharge at a point further down slope.



Fig. 4-6. Stockpiles left exposed need surface treatment.

Source: Colorado DOT

Other General Practices

- DO** roughen soil surface prior to applying soil binder.
- DO** use soil binder on stockpiles to reduce wind erosion.
- DO** apply tackifier and a binder per the manufacturer's recommended application rates and pre-wetting conditions.
- DO** apply tackifier and binders with adequate drying time allowed before predicted rainfall, allowing a minimum of 24 hours of curing time.
- DO** direct runoff from binder-applied areas to a sediment control BMP prior to discharge to a storm drain or water course.



DO roughen soil surface prior to applying soil binder.

- DO NOT** apply tackifier or binder during rain events, high winds, or over snow.
- DO NOT** use soil binder in areas with vehicular traffic, unless specifically recommended by manufacturer.
- DO NOT** apply binders to frozen soil, areas with standing water, or when the air temperature is below 40 degrees Fahrenheit during the curing period.
- DO NOT** overspray tackifier and binders onto roads, sidewalks, drainage channels, or existing vegetation.



Fig. 4-7. This is a good example of tackifier application using a fan nozzle.

Source: Colorado DOT



DO NOT overspray tackifier and binders onto roads, sidewalks, drainage channels, or existing vegetation.

Other Associated Work

- If the application is no longer performing, re-apply the soil binder.

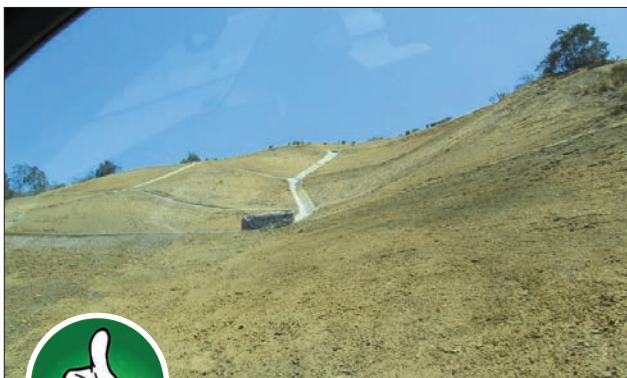


Fig. 4-8. Spray-on binders such as PAM can offer quick response to exposed areas in advance of forecasted rain.

Source: Colorado DOT

Hydroseeding

General Description

Hydroseeding (hydraulic seeding) is the method by which temporary or permanent seed is applied to soil. Hydroseeding typically involves applying hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher. Hydroseeding ultimately protects soils from erosion by water and wind by providing a vegetation cover.

Hydroseeding is applied to:

- Disturbed areas requiring temporary protection until permanent vegetation is set.
- Disturbed areas that must be re-disturbed following an extended period of inactivity.

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Inspect areas for signs of erosion.
- Areas of inadequate coverage.
- Re-apply hydroseed to areas of poor coverage or vegetation establishment, using not less than half the original application rates.



Fig. 4-9. Hydroseeding of large slopes is always more effective when done in combination with sediment control measures such as the fiber rolls shown here. Source: RBF Consulting

Other General Practices

- DO** roughen the slope and fill area, with the furrows trending along the contours, before application.
- DO** use mulch or other erosion control cover after hydroseeding to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- DO** ensure hydroseeded areas will receive enough water to germinate.
- DO NOT** over-spray onto the roadway, sidewalks, drainage channels, or existing vegetation.
- DO NOT** use hydroseeding as a stand-alone erosion control BMP. Combine hydroseeding with other BMPs, such as mulch or binder, until vegetation is established.
- DO NOT** use hydroseeding in areas of vehicular traffic.



DO NOT use hydroseeding as a stand-alone erosion control BMP. Combine hydroseeding with other BMPs, such as mulch or other cover, until vegetation is established.

Other Associated Work

- When failure locations are found, re-seed, fertilize, and mulch the area within the planting season. Re-apply using not less than half the original application rates.

Mulching

General Description

Mulching consists of the application of a protective layer of certified weed-free straw, hay or other plant residue; compost or organic waste; wood mulch or synthetic material to the soil surface to provide short-term soil protection. Mulch can be applied by hand or with hydraulic machinery (hydraulic mulch). Hydraulic mulch includes:

- Stabilized fiber matrices
- Bonded fiber matrix
- Hydraulic compost matrix



Fig. 4-10. Hydraulically applied straw mulch is an effective means to anchor temporary or permanent seeding to a highway slope.

Source: *Utah DOT*

Inspection and Maintenance

Inspect weekly and following a runoff-producing event or as dictated otherwise by local procedures or regulatory standards.

- Ensure there is continuous, uniform coverage.
- Ensure rilling or gulying does not occur beneath tacked mulch.

- Re-apply mulch to areas of poor coverage or vegetation establishment and to maintain adequate soil protection.
- Repair or replace mulch, if washed or blown away.



Fig. 4-11. The mulch application shown here has properly avoided the adjacent channel area.

Source: *Utah DOT*

Other General Practices

- DO** cover the entire site leaving no bare areas.
- DO** apply mulch as soon as possible after seeding.
- DO** anchor hay or straw mulch by mechanically crimping the hay or straw followed by mulch tackifier.
- DO** loosely spread hay and straw mulch to a uniform depth over unseeded areas at a rate directed by the engineer.
- DO** hydraulically apply mulch in a uniform manner over designated seeded areas at a rate directed by the engineer.
- DO** replace or repair mulch, if washed or blown away.
- DO NOT** apply mulch during windy conditions.

DO NOT place mulch in drainage channels, on roads, sidewalks, or existing vegetation.



Fig. 4-12. This is a poor example of a spray-on mulch. There is uneven coverage and holes/uncovered areas. Source: *Colorado DOT*

Rolled Erosion Control Products

General Description

Rolled erosion control products (RECPs) are prefabricated blankets typically constructed from interlocking fibers of straw, coconut fiber (coir), excelsior, synthetic or similar material between biodegradable or photodegradable netting.

Inspection and Maintenance

Inspect weekly or as dictated otherwise by local procedures or regulatory standards.

- Inspect for signs of undercutting at the top of the slope.
- Inspect for erosion beneath the matting.
- Ensure blankets are trenched in at top and bottom of the slope.
- Ensure adequate staple checks are installed (refer to manufacturer's or designer's specifications).

- Ensure staples are driven flush with the soil surface and are preventing the blanket from lifting away from the soil.
- Ensure the entire blanket has good contact with the ground surface.
- Replace damaged blanket.

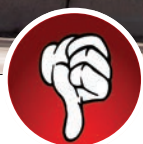


Fig. 4-13. This is a poor installation of soil retention blankets. Blankets should have been overlapped, staked down, and cover the entire disturbed area. Additionally, straw wattles should be placed along the contour lines.

Source: Colorado DOT



Ensure the entire blanket has good contact with the ground surface.

Other General Practices

- DO** cover the entire site, leaving no bare areas.
- DO** remove large rocks or vegetation and fix surface rills before placing blankets.
- DO** prepare areas for blanketing by first applying topsoil or soil conditioning; fertilizer, if required; and seed before installing RECPs.



Fig. 4-14. This is an excellent installation of soil retention blankets. The blanket is entrenched at the top and bottom of the slope.

Source: Colorado DOT

- DO** place RECPs smoothly but loosely on the soil surface without stretching. Underlying surface must be relatively smooth.
- DO** trench in RECPs at the top, beyond the crest to avoid undercutting, and the bottom of slopes. Trench them in six inches wide by six inches deep, or as directed by the engineer or manufacturer.
- DO** install blankets up and down long slopes with overlapping seams.
- DO NOT** stretch blankets.
- DO NOT** use on excessively rocky sites or on areas where the final vegetation will be mowed.
- DO NOT** track walk prior to blanket installation.



DO remove large rocks or vegetation and fix surface rills before placing blankets.



Fig. 4-15. RECPs are an effective way to provide immediate stabilization to steep slopes.

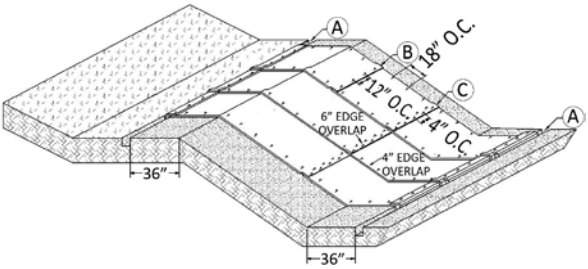
Source: *Utah DOT*



DO NOT track walk prior to blanket installation.

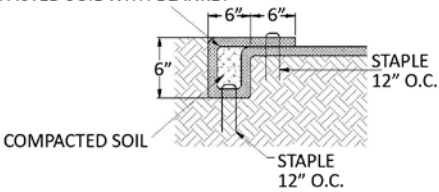
Other Associated Work

- If damaged by equipment, replace or patch blankets.
- If staples or blankets become dislodged, re-install with staples spaced per engineer's or manufacturer's directions.
- If the blanket is lifting away from the soil, check that the staples are driven flush with the soil surface.



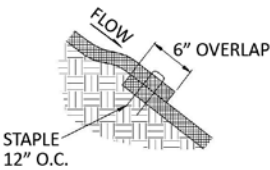
**SOIL RETENTION BLANKETS/TURF REINFORCEMENT MATS (TRM)
SLOPE APPLICATION**

APPLY SEED AND ANY REQUIRED SOIL
CONDITIONERS PRIOR TO COVERING
COMPACTED SOIL WITH BLANKET



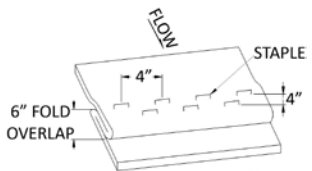
**ANCHOR TRENCH
SECTION A**

TO BE USED AT THE BEGINNING AND END
OF THE CHANNEL ACROSS ITS ENTIRE WIDTH.



**CONSECUTIVE ROLL OVERLAP
SECTION B**

TO BE USED WHEREVER ONE ROLL OF
BLANKET ENDS AND ANOTHER BEGINS
WITH THE UPHILL BLANKET PLACED ON TOP
OF THE BLANKET ON THE DOWNHILL SIDE.



**STAPLE CHECK
SECTION C**

TO BE USED ON SLOPE EVERY 35 FEET

Fig. 4-16. Rolled erosion control product slope application detail.

Source: Colorado DOT

CHAPTER 5. TEMPORARY DRAINAGE MANAGEMENT

Stream Crossing and Bank Stabilization

General Description

This section discusses BMPs related to stream crossings and bank stabilization. Clean Water Act Section 404 permitting may be required for work done in or near a stream.

It is preferred to span the stream but stream crossing protections include:

- Installing turf reinforcement mats (TRMS) within permanent streams
- Slope drains and energy dissipation in permanent streams
- Silt fence on stream banks (see perimeter controls)
- In-stream construction practices
- Temporary stream crossings

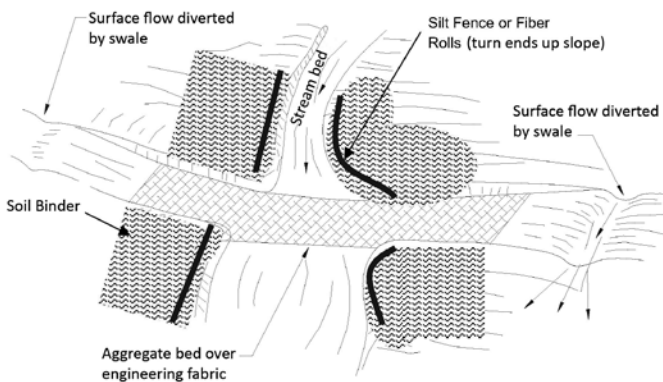


Fig. 5-1. Proper temporary stream crossings like this aggregate-only version incorporate swales to divert flow from the work zone away from the stream. Temporary stream crossings should also incorporate soil stabilization and sediment controls within disturbed slope areas as shown here. Source: *Caltrans BMP Manual*

TRMs within Permanent Streams

TRMs are composed of interwoven layers of non-degradable, geosynthetic materials for use on stream banks,

swales, and other drainage channels where moving water is likely to cause scour and wash out new vegetation. They are also used in areas where the soil surface is disturbed and where existing vegetation has been removed. TRMs could impact wildlife so it may be necessary to consult with resource agencies before their use.

Slope Drains and Energy Dissipation in Permanent Streams

A slope drain intercepts and directs surface flow away from or down slope areas to protect slopes from erosion and entering the stream.

In-Stream Construction Practices

Water dams, diversions, silt barriers, and construction practices can be used to minimize sediment suspension.



Fig. 5-2. A BMP configuration of silt fence and gravel bags helps stabilize this temporary drainage crossing.

Source: RBF Consulting

Temporary Stream Crossings

A temporary stream crossing is used to provide a way for construction vehicle traffic to cross a watercourse. A bridge or culvert is the best choice for most temporary stream crossings. The materials used to construct most bridges and culverts can be salvaged after they are removed.



Fig. 5-3. Temporary bridge with good sediment controls on bridge and embankments.

Source: Colorado DOT

Inspection and Maintenance

Inspect weekly, after rain events, or as dictated otherwise by local procedures or regulatory standards.

Permanent TRM Installations in Streams

- Check for erosion, undermining, and anchorage failure.
- Ensure matting is uniformly in contact with the soil.
- Ensure lap joints are secure.
- Re-anchor loosened TRMs and replace missing areas as required.

Floating Siltation Barriers

- Inspect daily for turbidity in the stream flow; if present, locate source.
- Repair rips or tears with overlapping pieces of geotextile fabric.
- Remove accumulated sediment from the bed of the confined area. If necessary, dewater turbid water to an onshore filter bag or other apparatus before removing the barrier.

- Remove the barrier carefully when work is completed and after suspended sediments have been allowed sufficient time to settle out.



Fig. 5-4. This is a good application of a temporary culvert. Note the riprap approach to the culvert.

Source: Colorado DOT

Temporary Stream Crossings

- Check for erosion of abutments, channel scour, riprap displacement, or piping in the soil.
- Check for structural weakening of the temporary crossings, such as cracks and undermining of foundations and abutments. Periodically remove silt from crossings.
- Replace lost or displaced aggregate from inlets and outlets of culverts.
- Remove temporary crossings after the structure is no longer needed.

Other General Practices

TRMs within Permanent Streams

- DO** always follow the manufacturer's recommendations. Ensure that the physical conditions of the stream and

flow characteristics are appropriate for the product selected.

- DO** remove clods, large rocks, and vegetation before placing TRMs.
- DO** place TRMs smoothly but loosely on the surface without stretching.
- DO** trench the top of the TRM into the ground to prevent runoff from flowing under it.
- DO** overlap the ends of TRMs to prevent undercutting.
- DO** seed the area before blanket installation for erosion control and re-vegetation.
- DO NOT** use non-biodegradable geotextile fabrics in streams.
- DO NOT** drive tracked or heavy equipment over installed TRMs.
- DO NOT** make sharp turns on the TRM.



DO NOT drive tracked or heavy equipment over installed TRMs.

In-Stream Construction Practices

- DO** perform work during the dry season when working in or near ephemeral streams.
- DO** use the following techniques to minimize total suspended solids (TSS):
 - *Padding*—Padding laid in the stream below the work site may trap solids that are deposited in the stream during construction. After work is done, the padding is removed and placed on the bank to assist in re-vegetation.
 - *Clean, washed gravel*—Using clean, washed gravel decreases solid suspension, as there are fewer small particles.

- *Excavation using a large bucket*—Approximately the same amount of soil is suspended whether a small or large amount of soil is placed in the stream.
 - *Use of dozer for backfilling*—Using a dozer instead of a backhoe follows the same principles.
 - *Partially dewatering a stream with a pump*—reduces the amount of water that can suspend sediment.
- DO** use floating siltation barriers in streams under low-flow conditions, typically less than 2.5 feet per second and a maximum depth of six feet.
- DO** locate floating siltation barriers away from equipment to avoid damage to the barrier itself.
- DO NOT** use floating siltation barriers to stop, divert, or filter water.
-



***DO NOT** use floating siltation barriers to stop, divert, or filter water.*



***DO** construct during dry periods to minimize stream disturbance and reduce costs.*

Temporary Stream Crossings

- DO** place the temporary waterway crossing at right angles to the stream or as directed by the engineer.
- DO** construct during dry periods to minimize stream disturbance and reduce costs.

- DO** construct pipe inlet at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.
- DO** construct to minimize scour. Cobbles used for temporary water body crossings or encroachments should be clean, durable rock.
- DO** remove temporary crossings as soon as possible after the structure is no longer needed.
- DO NOT** introduce sediment or silt into the watercourse by placing temporary artificial obstructions within flowing water.



Fig. 5-5. Riprap with no fines should be installed at the approach to prevent sediment from entering the stream. If temporary, a silt fence could be used with sand bags anchoring the fabric on the culverts.

Source: Colorado DOT

Other Associated Work

Riparian vegetation, when removed pursuant to the provisions of the work, should be cut off no lower than ground level to promote re-growth. Access roads and work areas built over riparian vegetation should temporarily be covered by a sufficient layer of cobble to prevent damage to the soil and root structure.

Temporary Berms

General Description

A soil berm or diversion is a temporary compacted ridge of mulch, compost, or soil that slows and diverts stormwater or contains water or other fluids. Berms and ditches diverting clean uphill runoff around construction sites reduce erosion and sedimentation problems. Temporary berms help direct runoff to stormwater conveyances and are an effective means of protecting graded slopes during construction. A protective cover may be necessary to protect against wind or water erosion.



Fig. 5-6. This is an excellent berm. There are no breaks in the berm and the soil is compacted.

Source: Colorado DOT

Inspection and Maintenance

Inspect weekly, following rain events, or as dictated otherwise by local procedures or regulatory standards.

- Ensure berm is properly keyed and compacted to avoid washout.
- Rebuild berm if breaches or washout occurs.
- Remove sediment retained by the berm once it has reached one-half of the exposed height of the berm.
- If temporary, remove the berms only after other permanent BMPs are in place and the site is stabilized.

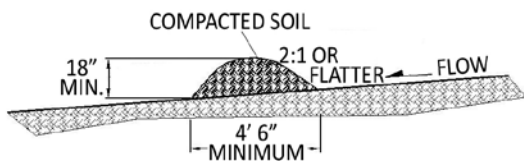


Fig. 5-7. This berm is not compacted.

Source: Colorado DOT

Other General Practices

- DO** follow applicable recommendations from the project geotechnical engineer regarding berm construction.
- DO** construct berms with a height between 18 inches and 3 feet, side slopes of 2:1 or flatter, and a minimum base width of 4.5 feet, unless specified otherwise by local standards.



TEMPORARY BERM

NOTES:

1. BERMS SHALL HAVE A HEIGHT OF 18 INCHES, SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM BASE WIDTH OF 4.5 FEET.
2. BERMS SHALL BE USED TO INTERCEPT AND DIVERT DRAINAGE TO A DESIGNATED OUTLET.
3. BERMS SHALL NOT BE USED WHERE DRAINAGE AREA EXCEEDS 10 ACRES.

Fig. 5-8. Temporary berm detail.

Source: Colorado DOT

- DO** locate berms so that stormwater flowing along their uphill face follows a gentle slope. Erosion control blankets or rock riprap might be needed for berms that channel water at an erosive rate.
 - DO** extend the downhill end of the berm so it directs overland flow to well established vegetated areas or flat surfaces to promote infiltration.
-



DO NOT use berms with sediment-laden water; use sediment traps instead.

- DO NOT** use berms in high-traffic areas where they will be continually subject to traffic.
 - DO NOT** run berms down a slope; watch for concentrated flows when the berm directs water to one area.
 - DO NOT** use sand and gravel or debris-laden material to build a berm.
 - DO NOT** use berms with sediment-laden water; use sediment traps instead.
-



DO NOT use berms in high traffic areas where they will be continually subject to traffic.

Storm Drain Inlet Controls

General Description

Inlet controls prevent sediment and debris from entering storm drain systems. Inlet protection is implemented at existing inlets prior to construction. New inlets are protected as they are installed and brought on-line. Inlets are commonly protected with gravel bags but other products may be used depending on conditions.



Fig. 5-9. Use of gravel bags is among the most common approaches to inlet protection.

Source: RBF Consulting

Inspection and Maintenance

Inspect weekly, following rain events, or as dictated otherwise by local procedures or regulatory standards.

- Check inlet protection during rain events to make sure they are not creating a flooding hazard.
- Remove accumulated sediment from curb inlet protection after each rain event.
- Inspect gravel bags for damage and snags.
- Check gravel bags for proper arrangement and displacement.



Fig. 5-10. Proper installation of stakes is critical to the performance of inlet protection measures such as silt fence. Also silt fence should not be placed in the path of concentrated flow, as shown here.

Source: RBF Consulting

Other General Practices

- DO** place inlet protection prior to activities when debris may enter storm drain inlets.
- DO** extend inlet protection one foot past each end of the inlet, unless specified otherwise by local standards.
- DO** remove inlet protection devices as soon as possible after the site is stabilized, or when the inlet protection is no longer needed.



Fig. 5-11. Gravel bags shown here are crushed, allowing leaves and other debris to build up. The filter fabric should not be used in this application.

Source: RBF Consulting

Gravel Bags

- DO** leave room upstream for water to pond and sediment to settle.
- DO** place several layers of gravel bags—overlapping the bags and packing them tightly together.
- DO** leave gap of one bag on the top row to serve as a spillway.



Fig. 5-12. This is a good installation of inlet protection using silt fence and straw bales.

Source: Colorado DOT



Fig. 5-13. Instead of filter fabric held in place by the grate, silt fence, sand bags or other sediment controls should be used to keep silt away from grate. Source: RBF Consulting



Fig. 5-14. The sock should extend at least one foot past each end of the inlet.

Source: Colorado DOT



Fig. 5-15. Notice the stormwater that is bypassing the erosion log.

Source: Colorado DOT

Slope Drains

General Description

A slope drain is a pipe used to intercept and direct surface runoff or groundwater into a stabilized area and to protect slopes.

Inspection and Maintenance

Inspect weekly and after runoff-producing events, or as dictated otherwise by local procedures or regulatory standards.

- Inspect for erosion due to slope drain failure by overtopping, piping, or pipe separation.
- Inspect outlet for erosion and downstream scour.
- Repair pipe leaks.
- Check pipe anchors to ensure that the pipe remains anchored to the slope.
- Inspect inlets and slope drainage for accumulations of debris and sediment; remove debris and sediment to maintain flows.
- Flush drains if necessary; capture and settle out sediment from discharge.



Fig. 5-16. The slope has eroded. This could have been prevented with the use of a slope drain.

Source: Colorado DOT

Other General Practices

- DO** securely anchor pipes on undisturbed or compacted soils.
- DO** use flexible pipe material that is at least 15 inches in diameter or larger, or as specified otherwise in local standards.
- DO** securely entrench and compact the soil around and under the entrance, outlet, and along the length of the pipe to prevent erosion.
- DO** install a flared end section at the inlet to improve flow into the slope drain and prevent erosion at the entrance.
- DO** fasten pipes to inlets and outlets with metal strap-pings or watertight collars.
- DO** protect the outlet with riprap or other energy dissipation device.
- DO** re-vegetate the area under and around the pipe to avoid erosion after pipe installation.



DO securely entrench and compact the soil around and under the entrance, outlet, and along the length of the pipe to prevent erosion.

- DO NOT** use on a slope greater than 2:1 (H:V) to maintain energy dissipation effectiveness.
- DO NOT** use a single slope drain for a drainage area larger than 10 acres. For larger areas, use a rock-lined channel or a series of pipes.



DO NOT use a single slope drain for a drainage area larger than 10 acres. For larger areas, use a rock-lined channel or a series of pipes.

Other Associated Work

- If erosion occurs, repair the damage and install additional energy dissipation measures. If downstream erosion is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented.
- Restore damaged slopes.
- Install additional anchors if pipe movement is detected.



Fig. 5-17. This is an excellent example of a slope drain being used as an effective erosion control.

Source: RBF Consulting



Fig. 5-18. Severe gully erosion such as this is a clear sign of the need for a temporary drainage system.
Source: Utah DOT

Temporary Check Dams

General Description

Check dams are small structures constructed across a swale. Temporary check dams slow down stormwater runoff, thereby reducing erosion and promoting settling of sediments. Check dams are typically constructed out of rock, silt dikes, or silt berms.

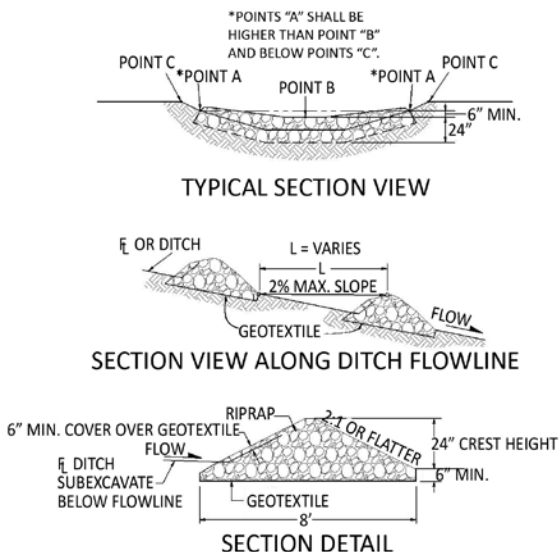


Fig. 5-19. Check dam detail. Source: Colorado DOT

Inspection and Maintenance

- Inspect for erosion and signs of undercutting.
- Where check dam components are spliced or abutted together, ensure that the joints prevent concentrated flow-through.
- Properly dispose of sediment when it has accumulated to one-half of the original height of the check dam, or as directed.
- Remove check dams at the end of their useful life.
- Flow around and scour at end of check dams indicates incorrect installation. Re-establish flow over the center of the check dam by lengthening the dam or selecting an alternative check dam design.
- If rock is displaced from the face of a rock check dam, either the stone size is too small or the face of the dam is too steep.
- If there is sediment loss through a rock check dam, then there is an inadequate layer of stone on the inside face or stone too coarse to restrict flow through the dam.



Fig. 5-20. This shows effective containment of water behind check dam and controlled spillover through the middle. Source: *Colorado DOT*

Other General Practices

- DO** use gravel bags in moderate-flow channels.
 - DO** install check dams before excavating, filling, or grading uphill areas.
-



Geotextile fabric below the rock is essential for proper function.

DO for rock check dams:

- The height of the check dam at the center should be a maximum of two feet or as specified otherwise by local standards. At the outside edges, the height should be a maximum of three feet or as specified otherwise by local standards.
 - The check dam shall be wide enough to reach from bank to bank of the ditch or swale. Key the check dam into the ditch a minimum of 18 inches or as specified otherwise by local standards.
 - Geotextile fabric below the rock is essential for proper function.
 - The maximum spacing between dams should be such that the toe of the upstream check dam is at the same elevation as the controlled release point of the downstream dam.
-



The check dam shall be wide enough to reach from bank to bank of the ditch or swale. Key the check dam into the ditch a minimum of 18 inches or as specified otherwise by local standards.

DO NOT place dams in grass-lined channels unless erosion is expected as the installation may damage vegetation.

DO NOT use straw bales or silt fence as check dams.



DO NOT use straw bales or silt fence as check dams.



Fig. 5-21. Silt fence should not be used as a temporary check dam. Source: Ohio DOT



Fig. 5-22. Excessive spacing between check dams in this ditch and poor design and construction is causing flow to outflank the sides.

Source: RBF Consulting



Fig. 5-23. This picture shows a good example of fiber roll check dams promoting settlement of fine sediment. Source: *Utah DOT*

Outlet Protection

General Description

Outlet protection, also known as velocity dissipation, prevents local scour and erosion at the outlet of a channel or conduit by reducing the speed of stormwater. Outlet protection is typically made up of geotextile fabric and riprap. For low flow conditions, sumps, sod or seed and RECPs may be used.

Inspection and Maintenance

Inspect weekly, after rain events, or as dictated otherwise by local procedures or regulatory standards.

- Inspect for signs of scour, erosion, and stone displacement. Inspect the area at the outlet and immediately downstream.
- Inspect for presence of standing water
- If sediment builds up within the crevices of the outlet structure, clean out the sediment or add stone.
- If erosion occurs around apron and scour holes appear at outlet, foundation may not be excavated widely or deeply enough.

- If erosion is occurring downstream:
 - Riprap apron may not be on a level grade.
 - Riprap stones may be too small or not graded well.
- Riprap may not extend far enough down slope
- If movement of stone is occurring:
 - Riprap stones may be too small or not graded well. Use larger stones and/or grout to provide stabilization. Use care applying grout. Create a rough finish in which the ends of the stone remain exposed.
 - Appropriate filter fabric may not be installed under riprap.
- If standing water is occurring, consider the use of grout and/or smaller stones, or regrade to drain.



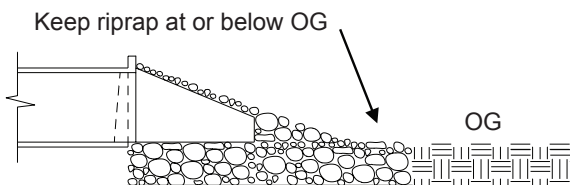
Fig. 5-24. A typical application is shown using riprap for erosion protection at a storm drain outlet.
Source: RBF Consulting



Fig. 5-25. Conditions near this outfall will create a condition of standing water and a potential for mosquito breeding. Source: RBF Consulting

Other General Practices

- DO** excavate sub grade below the design elevation to allow for filter fabric and riprap. The top of the riprap apron must be level with, or slightly lower than, the receiving channel. The creation of a plunge pool is an option.



The top of the riprap apron must be level with, or slightly lower than, the receiving channel.

- DO** construct the apron on flat grade.
- DO** compact the fill in the sub grade to the density of surrounding material and smooth out the surface.
- DO** protect the filter fabric from tearing while the riprap is installed with machinery.
- DO NOT** place stones higher than the finished grade.



DO construct the apron on flat grade.



DO NOT place stones higher than the finished grade.



Fig. 5-26. Stormwater is undercutting the existing rock. Geotextile should have been placed under the riprap, more rock could have been used, or the rock placed at or below finish grade. Source: *Colorado DOT*



Fig. 5-27. Riprap placement is incomplete and could result in erosion during a large event. Notice the lack of a filter fabric. Source: *RBF Consulting*



Fig. 5-28. The fiber roll above the culvert helps prevent debris and dirt from falling into the outlet.
Source: Colorado DOT



Fig. 5-29. Failure to effectively stabilize this pipe at the outlet, among other failures, leads to a larger slope erosion problem and sediment discharge into the gutter.
Source: RBF Consulting

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