TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

ENVIRONMENTAL FIELD OFFICE

3711 Middlebrook Pike
Knoxville, TN 37921

(865)594-6035 STATEWIDE 1-888-891-8332 (865)594-6105

Receipt: EAC-K-11550 **Date of Receipt:** 02-Sep-2021 7:27 am **Created By:** Petey Roach (BG57034)

County: Blount **EFO/Office:** Knoxville Field Office

Received From: Arconic Corp

Company/Affiliation: Arconic Corp

Recipient Address: PO Box 81282 5801 Postal Road
CLEVELAND, OH- 44181

Amount Received: $1,000.00 **Method of Payment:** CHECK **Check Number:** 260013443

Comments: Arconic South Plant UBC Bale Storage
MBI Project Expense

Division	Description	TDEC Code	Quantity	Unit Price	Line Total
WPC	WPC-NOI $1000 Permit Application	43.340.F02	1	$1,000.00	$1,000.00

Receipt Total: **$1,000.00**

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SEP 0 1 2021

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)

Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)

Site or Project Name: Arconic South Plant UBC Bale Storage	***NPDES Tracking Number: TNR***
Street Address or Location: 300 N. Hall Rd, Alcoa TN 37701	Construction Start Date: 10/01/2021
	Estimated End Date: 10/01/2022
Site Description: See Attached Drawings	Latitude (dd.dddd): 35.7793
	Longitude (-dd.dddd): -83.9757
County(ies): Blount / MS4 (if applicable):	Acres Disturbed: 7.08
Check box if a SWPPP is attached : ☑ / Check box if a site location map is attached: ☑	Total Acres: 172.05
Check the appropriate box(s) if there are streams and/or wetlands on or adjacent to the construction site:	Streams ☐ Wetlands ☐
Has a jurisdictional determination been made by the USACE or EPA identifying waters of the United States?: Note: If yes, attach the jurisdictional determination	Yes ☐ No ☑
If an Aquatic Resource Alteration Permit (ARAP) has been obtained for this site, what is the permit number? NR(S)	
Receiving waters: Pistol Creek	

Site Owner/Developer (Primary Permittee): (Provide person, company, or entity that has operational or design control over construction plans and specifications): Arconic			
For corporate entities only, provide correct Tennessee Secretary of State (SOS) Control Number: (an incorrect SOS control number may delay NOI processing) 001076240			
Site Owner or Developer Contact Name: (signs the certification below) Arconic		Title or Position:	
Mailing Address: 2300 North Wright Rd		City: Alcoa	State: TN / Zip: 37701
Phone: (800) 977-2869	Fax: ( )	E-mail:	
Optional Contact: Chris Triko		Title or Position: Civil Engineer	
Mailing Address: 299 N. Weisgarber Rd		City: Knoxville	State: TN / Zip: 37919
Phone: (865) 584-0999	Fax: ( )	E-mail: ctriko@mbicompanies.com	

Owner/Developer(s) Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Primary Permittee)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Owner/Developer Name (print/type): JEFFREY C. WEIDA	Signature: Jeffrey C. Weida	Date: 8/25/2021
Owner/Developer Name (print/type):	Signature:	Date:

Contractor Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Secondary Permittee)

I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16- 702(a)(4), this declaration is made under penalty of perjury.

Contractor name, address, and SOS control number (if applicable):	Signature:	Date:

OFFICIAL STATE USE ONLY

Received Date:	Reviewer:	Field Office:	Permit Tracking Number: TNR	Exceptional TN Water:
Fee(s):	T & E Aquatic Flora/Fauna:	SOS Corporate Status:	Waters with Unavailable Parameters:	Notice of Coverage Date:

SEP 0 1 2021

STORMWATER POLLUTION PREVENTION PLAN

South Plant UBC BaleStorage
300 N Hall Rd
Alcoa, TN 37701
MBI Project No: 190110-14

Prepared for:

Reviewed by:

Christopher B. Triko, P.E.
MBI Companies Inc.
299 N. Weisgarber Rd
Knoxville, TN 37919

Prepared by:
Aws M. Al hadeethi, E.I.T.

Date: 08-20-2021

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GENERAL INFORMATION

This Storm Water Pollution Prevention Plan (SWPPP) is developed in accordance with the State of Tennessee General NPDES Permit No. TNR 100000 for Discharges of Stormwater Associated with Construction Activities (CGP) and is prepared using sound engineering practices.

As instructed by section 1.4 and 2.7 of the CGP, this SWPPP and all attachments are hereby submitted to the local Environmental Field Office (EFO), along with the complete, correctly signed Notice of Intent (NOI) and permit application fee. Construction will not be initiated prior to the effective date listed on the Notice of Coverage (NOC) received from the Tennessee Department of Environment and Conservation (TDEC).

Owner/Developer (Referenced in this document as "Owner"):
Name: Atomic Tennessee Operations, LLC
Title: Plant Manager - TN Ops.
Company: Atomic
Address: 2300 N. Wright Rd, Alcon, TN 37701

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.		
Representative of owner/developer and title; print or type Jeffrey C. Weida	Signature (must be signed by president, V.P. or equivalent, or ranking elected official) Jeffrey C. Weida	Date 8/25/2021

Primary Contractor (Referenced in this document as "Contractor"):

I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements.		
Company name of primary contractor; print or type	Signature (must be signed by president, V.P. or equivalent)	Date

The individual responsible for installation, maintenance, and inspections of erosion and sediment control measures will be _____ of _____

As required in section 3.5.8 of the CGP, this individual is actively certified by completion

of the TDEC Fundamentals of Erosion Prevention and Sediment Control Level 1 course. A copy of the certification and/or training record for inspector certification is stored on site.

Current versions of this SWPPP, the NOI, and the NOC will be kept on the site for the duration of the project. These items will be available for the use of all operators and site personnel involved with erosion and sediment controls and be available to TDEC personnel visiting the site. A notice will be posted near the construction entrance when work begins, and then near entrances added during future phases, if applicable, containing the following:

1. A copy of the NOC with the tracking number assigned by the EFO.
2. The name, company name, telephone number, email address (if available) and address of the project site owner/operator or a local contact person.
3. A brief description of the project.
4. The location of the SWPPP on site.

The permittee shall also retain the following items/information in an appropriate location on-site:

1. A rain gauge.
2. A copy of the twice weekly inspection reports.
3. A documentation of quality assurance site assessments, if applicable as described in section 3.1.2 of the CGP and the inspection requirements section below.
4. A copy of the inspector's Fundamentals of Erosion Prevention and Sediment Control Level 1 certification.
5. Other logs and paperwork described in the SWPPP as necessary.

Prior to initiating earthwork in the areas designated as future phases, the site operator and/or owner/developer shall coordinate with MBI Companies, Inc., who will in turn make the appropriate document revisions and provide the information to the authority having jurisdiction in support of this document. Phase-specific plan drawings will be created at that time.

Any new contractor on the project that has responsibility to install, inspect, or maintain erosion or sediment control measures will sign the contractor's certification on a copy of the NOI (Appendix A) and will submit it to the authority having jurisdiction. Any correspondence with the authority having jurisdiction will reference the tracking number assigned to the project. The contractor will coordinate with the owner/developer and submit a correctly signed Notice of Termination (Appendix B) after the complete installation and successful establishment of the final stabilization activities at the site.

It is the intention and goal of the CGP and this SWPPP that any discharge from the property described in this document have no objectionable color contrast to the water body that receives it. The construction activity will be carried out in such a manner as to make every reasonable effort to prevent any discharge that would cause a condition in which visible solids, bottom deposits, or turbidity that impairs the usefulness of the waters on the property or downstream irrigation, navigation, or industrial or domestic water supply.

This plan may be amended for reasons described below, or for other reasons. When the plans are revised, the contractor will implement the changes to erosion protection and sediment controls within 48 hours after the need for modification is identified.

Erosion control measures shown on the plans are a minimum requirement. Contractor is responsible for maintaining, modifying and adding erosion control measures during construction to keep silt and airborne dust from exiting the site. The contractor is responsible for obtaining all applicable permits and complying with all local, state and federal regulations related to site grading and stormwater runoff. The contractor is responsible for all required inspections, record keeping, and reporting associated with the CGP and this SWPPP..

EXISTING SITE CONDITIONS

Location

The site is located on 300 N. Hall Rd.

Location Map (Sourced from Google Maps)

Current Use

Part of the site has not been previously graded, Presently the site is undeveloped. While the other part is used as storage area.

Aerial Map (Sourced from Google Maps)

Soil

Soil information was taken from the USDA Natural Resources Conservation Service Web Soil Survey website. The soil survey indicates that the soils present within the construction area are Farragut silty clay, and Farragut silty clay loam. Detailed soil boundary information can be found by referencing the soil maps (Appendix F).

Drainage

The site drains to the north into Pistol Creek.

Wetlands

The U.S. Fish & Wildlife Service National Wetlands Inventory website does not show the existence of wetland adjacent or on the proposed site. See Appendix E for map.

Project Description

The development will include erosion control, demolition of any existing obstructions, grading, the construction of storage area.

Construction Activities

Construction activities will include the installation of erosion control measures, site rough grading, and site drainage. Total project site acreage is 172.05 acres of which approximately 7.08 acres will be disturbed.

Erosion and sediment controls will include:

- Silt fence
- Construction exit
- Temporary and permanent soil stabilization
- Concrete washout
- Check dams
- Fiber Roll

EPSC measures must be in place and functional before earth moving operations begin and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the workday but must be replaced at the end of the workday. A sediment basin has been designed according to the Tennessee Erosion & Sediment Control Handbook 4th Edition. The calculations for their design can be referenced in Appendix M.

Record Keeping and Inspection Requirements

Inspections by the Contractor will be performed by an inspector appropriately certified as described above before anticipated storm events (or series of storm events such as intermittent showers over one or more days), within 24 hours after the end of a storm event of 0.5 inches or greater, and at least twice per week with at least 72 hours between inspections. Inspections will cover, at a minimum, all disturbed areas that have not undergone final stabilization, sediment control structures, outfall points, locations where vehicles enter or exit the site, and material storage areas exposed to precipitation. The inspections will be conducted with the purpose of determining whether erosion prevention and sediment control measures are effective in preventing impacts to receiving waters.

Inspections shall be documented and include the scope of the inspection, name(s) and title or qualifications of personnel making the inspection, the date(s) of the inspection, cease work dates, grading dates, stabilization dates, and major observations relating to the implementation of the SWPPP (including the location(s) of discharges of sediment or other pollutants from the site and of any control device that failed to operate as designed or proved inadequate for a particular location), and actions taken in accordance with the CGP. All inspections shall be documented on

the Construction Stormwater Inspection Certification form provided in Appendix C of both the CGP and the SWPPP.

If the controls are installed and maintained correctly but are found to provide an inadequate level of protection, the Contractor will coordinate with the owner/developer as well as MBI to ensure that controls are modified on site as necessary to achieve the required level of performance. The contractor shall coordinate to ensure that the necessary revisions of the site description and/or pollution prevention measures identified in the SWPPP based on the results of the inspection are made no later than 7 calendar days following the inspection. Such modifications shall provide for timely implementation on site of any changes to the SWPPP and/or plans but in no case later than 14 calendar days following the inspection.

The Contractor will maintain a rain gage and a daily log of readings.

The following records shall be maintained on site: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; the dates when stabilization measures are initiated; inspection and rainfall readings as described above. Standard EPA forms for the above records are included in the appendix as an aid.

The Contractor shall coordinate with MBI Companies, Inc. (MBI), to ensure that the project design engineer performs an initial site assessment within 1 month of the construction start date to inspect erosion pollution and sediment control measures as described in section 3.1.2 of the CGP. Because MBI is not necessarily aware of the construction schedule, it is the responsibility of the Contractor to ensure that this site assessment takes place on schedule. The site assessment will be documented by the engineer on the standard inspection form in Appendix C and can take the place of one of the required twice-weekly inspections. A record of the site assessment will be retained by the contractor onsite with the other twice-weekly inspection reports.

Site Assessment

Quality assurance of erosion prevention and sediment controls (EPSCs) shall be done by performing site assessments. The site assessment shall be conducted at each outfall draining 10 or more acres (see Subsection 3.5.3.3 below) or 4 or more acres if draining to waters with unavailable parameters or Exceptional Tennessee Waters (see Section 5.4.1 below). Site assessments shall cover the entire disturbed area and occur within 30 days of construction commencing at each portion of the site that drains the qualifying acreage. The site assessments shall be performed by individuals with one or more of the following qualifications:

A) A licensed professional engineer or landscape architect
B) A Certified Professional in Erosion and Sediment Control (CPESC).
C) A person who has successfully completed the "Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites" course.

At a minimum, site assessments should be performed to verify the installation, functionality, and performance of the EPSC measures described in the SWPPP. If structural BMPs (or equivalent EPSC measures) are not constructed or construction is in progress at the time of the site assessment, a follow-up monthly assessment(s) are required until the BMPs are constructed per the SWPPP. The site assessment should be performed with the inspector (as defined in Part 10 below) and should include a review and update (if applicable) of the SWPPP. Modifications of the plans and specifications for any building or structure, including the design of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations shall be prepared by a licensed professional engineer or landscape architect and stamped and certified in accordance with the Tennessee Code Annotated, Title 62, Chapter 2 (see Part 10 below) and the rules of the Tennessee Board of Architectural and Engineering Examiners.

The site assessment findings shall be documented, and the documentation kept with the field SWPPP at the site. At a minimum, the documentation shall include information required in the inspection form provided in Appendix C of this permit, an assessment of any failing or unmaintained EPSCs, causes of failure and any action necessary to bring the site into compliance with this permit. The documented quality assurance site assessments shall also indicate if all EPSCs have been installed as designed in the submitted SWPPP and EPSC plans; and, if not, measures that need to be taken so those EPSCs meet the design specifications in the field SWPPP and EPSC plans. The documentation must contain the printed name and signature of the individual performing the site assessment and the following certification:

> *"I certify under penalty of law that this report and all attachments are, 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."*

The site assessment can take the place of one of the twice weekly inspections required in Subsection 3.5.8.2 below if the entire site is inspected during the assessment. The division may require additional site assessments to be performed if site inspections by division personnel reveal site conditions that have potential of causing pollution to waters of the state.

Maintenance

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced, repaired, or modified before the next rain event, but in no case more than 7 days after the need is identified.

Documents

The permittee shall retain copies of the SWPPP and all reports required by this permit, and records of all data used to complete the Notice of Intent to by covered by this permit, for a period of at least three (3) years from the date the notice of termination is filed.

Basin and Trap Calculations

Sediment basins are required for on-site outfalls receiving drainage from 10 or more acres (5 or more acres for outfalls discharging to state waters 303d-listed as impaired or exceptional TN waters). Sediment basins and traps for this project, are sized for the 5-year storm. Minimum pond volumes are calculated according to the TDEC recommended method.

Safe Dams Act Information

The sediment basins in use for this project do not meet the definition of "dams" as found in Chapter 1200-5-7 of the Rules of the Department of Environment and Conservation, Division of Water Supply, concerning the Safe Dams Act of 1973. Therefore, no certificate is required for the construction of the basins.

Spills and Non-Storm Water Contingencies

All fueling of equipment and vehicles on site will be conducted near the construction entrance/staging area. Any spillage will be removed immediately. Contaminated soils will be placed on heavy plastic and covered or placed into approved containers to prevent contact with storm water. All fuel tanks will be in the containment area. Oils, other vehicle fluids, paints, and solvents will be stored in the construction trailer. Any spill will be reported to a representative of the Contractor.

If a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40CFR 117 or 40 CFR 302 occurs; then during a 24-hour period the contractor will immediately notify the permittee who shall then do the following: notify the National Response Center (NRC) at 800-424-8802 and the Tennessee Emergency Management Agency (TEMA) at 800-262-3300 (emergencies) or 800-262-3400 (non-emergencies); as well as the local Environmental Assistance Center. Also, the Contractor will coordinate with MBI to facilitate any plan revisions necessary to prevent the reoccurrence of such releases.

Within 14 days of knowledge of the discharge, the permittee will provide the authority having jurisdiction and the Environmental Field Office of TDEC of the following:

a. Description of type and estimated amount of release
b. Date of release
c. Circumstances leading to release
d. Actions taken to mitigate effects of release
e. Steps to be taken to minimize chance of future similar releases

Within 14 days of knowledge of this release, the SWPPP for the site will be reviewed and modified as needed to prevent reoccurrence of such releases and to document actions taken to this release.

Concrete trucks will wash out at the designated area near the construction entrance. Each contractor is responsible to provide litter control for trash generated by his crew. A dumpster for garbage will be located near the construction trailer and is limited to garbage and paper trash only. Paint cans, oil cans, used oil, and filters will be contained and disposed of by the Contractor by taking them to an approved local hazardous waste disposal center.

Phasing of Construction

Refer to the project Erosion Pollution and Sediment Control plan sheets for detailed phasing of erosion control measures.

1. Where noted the site plan incorporates a streamside buffer zone to help protect the quality of the riparian area and prevent pollution to the streams. High-visibility safety fencing will be installed as indicated on the Erosion Control Plan to indicate the boundary of the buffer zone. Care will be utilized to prevent the operation of equipment within, or otherwise disturbing the buffer zone. The same safety fencing will be used to identity trees to be protected on other parts of the property if applicable. Unless otherwise indicated in the construction documents, the Contractor will be responsible for all jobsite survey control and layout and will survey the limits of clearing and mark this boundary with flagging tape.
2. Pre-construction vegetative ground cover will not be destroyed, removed or disturbed more than 15 calendar days prior to grading or earth moving unless the area is seeded per the Stabilization Plan (Appendix D) or other temporary cover is installed.
3. Temporary sediment barriers will be installed down slope of the disturbance and moved further down slope as ground-disturbing activity is extended toward the creek. All erosion prevention and sediment control best management practices identified in this SWPPP will be installed as recommended in the Tennessee Erosion and Sediment Control Handbook.
4. Land-disturbing activity at the project site will begin with the installation of the construction entrance/exit and the staging/equipment storage area. The Contractor shall locate the staging/equipment storage area as necessary to provide the largest possible buffer between this area and waters of the State. If the site is located on a high-traffic street, a truck wash will be installed for the use of any vehicles leaving the site. The truck wash will recycle the wash water and will be self-contained so that no water can escape

to the street or toward the stream. In any event, the Contractor shall install adequate measures to ensure that mud is not carried into the street by jobsite traffic.

5. Construction of any sediment basins indicated on the plans and outfall structures, will be completed and they will be functional prior to any further grade work. Diversion ditches and berms will be constructed as needed to divert any runoff from the active construction areas into the basins.
6. Topsoil stripped from the footprint of the basin areas will be used to construct diversion ditches/berms to divert any storm waters from offsite around the proposed construction area. Diversions should be lined with clean non-erodible material, a good layer of rock, or sod, etc.
7. Seeding and mulching or other stabilization measure as identified per the Stabilization Plan (Appendix D) will occur after final grade is achieved at the basins and diversions, and before any further disturbance of the site. Slope drains will be used to convey storm water from the construction areas down slope to the sediment basins.
8. Topsoil in the area of the building, new drives and parking areas will be removed next, stockpiled and immediately seeded per the Stabilization Plan (Appendix D). Construction of the roadbed, parking, primary utilities, sidewalks, shoulders, and permanent storm sewer system will be initiated at this time. Clearing and grubbing will be kept to the minimum necessary to accomplish the grade work.
9. Work on the drives and parking lots will progress until the aggregate base or bituminous asphalt binder course are in place before disturbance of the building site is initiated.
10. Storm drain inlet protection will be installed when the permanent system is in place and functioning.
11. It is anticipated that all required fill materials will be available on site within the indicated disturbed area. Any offsite fill will be obtained from a properly permitted borrow area.
12. Sediment will be removed from sediment traps, silt fences, sedimentation ponds, and other sediment controls before the design capacity of the structure has been reduced by 50%. Litter, construction debris, and construction chemicals exposed to storm water will be picked up prior to anticipated storm events (e.g. forecast by local weather reports), or otherwise prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, daily pick-up, etc.). After use, silt fences will be removed or otherwise prevented from becoming a pollutant source for storm water discharges. Temporary measures may be removed at the beginning of the workday but will be replaced at the end of the workday.
13. If sediment escapes the construction site, off-site accumulations of sediment that have not reached a stream must be removed at a frequency sufficient to minimize offsite impacts (e.g. fugitive sediment that has escaped the construction site and has collected in street must be removed so that it is not subsequently washed into storm sewers and streams by the next rain and/or so that it does not pose a safety hazard to users of public streets). Permittees shall not initiate remediation/restoration of a stream without consulting TDEC first. This permit does not, however, authorize access to private property.
14. Stabilization measures will be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. Temporary or

permanent soil stabilization at the construction site (or phase of the project) must be completed no later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Slopes steeper than 3:1 shall be stabilized not later than 7 days after construction activity on the slope has temporarily or permanently ceased. Permanent stabilization with perennial vegetation or other permanently stable, non-eroding surface shall replace any temporary measures as soon as practicable. Unpacked gravel containing fines or crusher runs will not be considered a non-eroding surface. The dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated will be recorded and maintained on the site. Stabilization methods are outlined in the Stabilization Plan (Appendix D) and may include seed and mulch, or seed and erosion control blankets as identified on the Grading and Erosion Control Plans. Water removed from the temporary sediment ponds at the conclusion of the project shall be filtered using sediment controls acceptable to TDEC (Appendix M). Where indicated on the plans, temporary sediment ponds shall be converted to permanent stormwater detention ponds for post development water quality control

Basis of Design

In preparing this SWPPP, the **Tennessee Erosion & Sediment Control Handbook, Fourth Edition, August 2012** was used as the design guidelines. Any questions or clarification concerning the implementation, installation, or maintenance should be available within this manual.

The document is available at the following website:

https://tnepsc.org/TDEC_EandS_Handbook_2012_Edition4/TDEC%20EandS%20Handbook%204th%20Edition.pdf

Appendix A: Notice of Intent

Appendix B: Notice of Termination

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-TDEC (8332)

Notice of Termination (NOT) for General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

This form is required to be submitted when requesting termination of coverage from the CGP. The purpose of this form is to notify the TDEC that either all stormwater discharges associated with construction activity from the portion of the identified facility where you, as an operator, have ceased or have been eliminated; or you are no longer an operator at the construction site. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the local DWR Environmental Field Office (EFO) address (see table below). For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC).

Type or print clearly, using ink.

Site or Project Name:	**NPDES Tracking Number: TNR**
Street Address or Location:	County(ies):

Name of Permittee Requesting Termination of Coverage:			
Permittee Contact Name:	Title or Position:		
Mailing Address:	City:	State:	Zip:
Phone:	E-mail:		

Check the reason(s) for termination of permit coverage:

☐	Stormwater discharge associated with construction activity is no longer occurring and the permitted area has a uniform 70% permanent vegetative cover OR has equivalent measures such as rip rap or geotextiles, in areas not covered with impervious surfaces.
☐	You are no longer the operator at the construction site (i.e., termination of site-wide, primary or secondary permittee coverage).

Certification and Signature: (must be signed by president, vice-president or equivalent ranking elected official)

I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

For the purposes of this certification, elimination of stormwater discharges associated with construction activity means that all stormwater discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have been eliminated from the portion of the construction site where the operator had control. Specifically, this means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized, the temporary erosion and sediment control measures have been removed, and/or subsequent operators have obtained permit coverage for the site or portions of the site where the operator had control.

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Permittee name (print or type):	Signature:	Date:

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett, TN	38133	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305	Chattanooga	1301 Riverfront Parkway, Ste. 206	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

Appendix C: Twice-weekly Inspection Report Form

Copies of completed twice-weekly reports shall be kept onsite by the contractor at all times.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)
Division of Water Resources
6th Floor Annex, L&C Tower, 401 Church Street, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)
General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

Construction Stormwater Inspection Certification (Twice-Weekly Inspections)

Site or Project Name:			**NPDES Tracking Number: TNR**	
Primary Permittee Name:			Date of Inspection:	
Current approximate disturbed acreage:		Has rainfall been checked/documented daily? ☐Yes ☐ No	Name of Inspector:	
Current weather conditions:			Inspector's TNEPSC Certification Number:	

Please check the box if the following items are on-site:

☐ Notice of Coverage (NOC) ☐ Stormwater Pollution Prevention Plan (SWPPP) ☐ Twice-weekly inspection documentation

☐ Site contact information ☐ Rain Gage ☐ Off-site Reference Rain Gage Location: _____

Best Management Practices (BMPs):

Are the Erosion Prevention and Sediment Controls (EPSCs) functioning correctly: If "No," describe below in Comment Section		
1. Are all applicable EPSCs installed and maintained per the SWPPP?	☐Yes	☐No
2. Are EPSCs functioning correctly at all disturbed areas/material storage areas per section 4.1.5?	☐Yes	☐No
3. Are EPSCs functioning correctly at outfall/discharge points such that there is no objectionable color contrast in the receiving stream, and no other water quality impacts per section 5.3.2?	☐Yes	☐No
4. Are EPSCs functioning correctly at ingress/egress points such that there is no evidence of track out?	☐Yes	☐No
5. If applicable, have discharges from dewatering activities been managed by appropriate controls per section 4.1.4? If "No," describe below the measures to be implemented to address deficiencies.	☐Yes	☐No
6. If construction activity at any location on-site has temporarily/permanently ceased, was the area stabilized within 14 days per section 3.5.3.2? If "No," describe below each location and measures taken to stabilize the area(s).	☐Yes	☐No
7. Have pollution prevention measures been installed, implemented, and maintained to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters per section 4.1.5? If "No," describe below the measures to be implemented to address deficiencies.	☐Yes	☐No
8. If a concrete washout facility is located on site, is it clearly identified on the project and maintained? If "No," describe below the measures to be implemented to address deficiencies. ☐ N/A	☐Yes	☐No
9. Have all previous deficiencies been addressed? If "No," describe the remaining deficiencies in the Comments section. ☐ Check if deficiencies/corrective measures have been reported on a previous form.	☐Yes	☐No

Comment Section. If the answer is "No" for any of the above, please describe the problem and corrective actions to be taken. Otherwise, describe any pertinent observations:

Certification and Signature (must be signed by the certified inspector and the permittee per Sections 3.5.8.2 (g) and 7.7.2 of the CGP)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Inspector Name and Title:	Signature:	Date:
Primary Permittee Name and Title:	Signature:	Date:

Construction Stormwater Inspection Certification Form (Twice-Weekly Inspections)

Purpose of this form/ Instructions

An inspection, as described in section 3.5.8.2. of the General Permit for Stormwater Discharges from Construction Activities ("Permit"), shall be performed at least twice every calendar week and documented on this form. Inspections shall be performed at least 72 hours apart. Where sites or portion(s) of construction sites have been temporarily stabilized, or runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), such inspection only has to be conducted once per month until thawing results in runoff or construction activity resumes.

Inspectors performing the required twice weekly inspections must have an active certification by completing the "Fundamentals of Erosion Prevention and Sediment Control Level I" course. (http://www.tnepsc.org/). A copy of the certification or training record for inspector certification should be kept on site.

Qualified personnel, as defined in section 3.5.8.1 of the Permit (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.

Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description identified in the SWPPP in accordance with section 3.5.1 of the Permit and pollution prevention measures identified in the SWPPP in accordance with section 3.5.2 of the Permit, shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. Inspection documentation will be maintained on site and made available to the division upon request. Inspection reports must be submitted to the division within 10 days of the request.

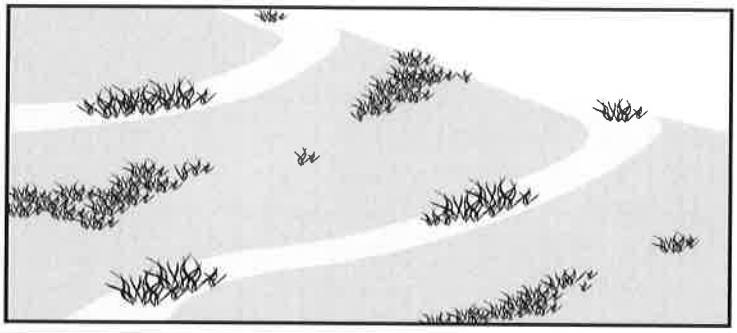
Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.

Appendix D: Stabilization Plan

Project contract document specifications shall govern; however, in the absence of project specifications for the establishment of turf grass the following specification is acceptable.

ACTIVITY: Seeding

ES – 08



Targeted Constituents

● Significant Benefit ◗ Partial Benefit ○ Low or Unknown Benefit

● Sediment	○ Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances	
◗ Nutrients	◗ Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes

Description

Temporary or permanent stabilization of soil, with rapidly growing annual or perennial grasses, is used to prevent erosion on disturbed areas. Temporary seeding is performed for graded areas that are not ready to receive permanent vegetation. Permanent seeding is performed for finished construction areas and for eroded areas that need a permanent vegetation cover.

Suitable Applications

- Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Apply temporary seeding to soil stockpiles.

- Apply permanent seeding whenever grading operations are completed and all construction operations will not impact the disturbed area. Apply permanent seeding to all non-construction areas which show signs of excessive erosion.

Approach

Sheet erosion, caused by the impact of rain on bare soil, is the source of most fine particles in sediment. To reduce this sediment load in runoff, the soil surface itself should be protected. The most efficient and economical means of controlling sheet and rill erosion is to establish vegetative cover.

Proper seedbed preparation and the use of quality seed are important in this practice. Failure to carefully follow sound agronomic recommendations will often result in an inadequate stand of vegetation that provides little or no erosion control.

Temporary seeding is essential to preserve the integrity of earthen structures used to control sediment, such as dikes, diversions, and the banks and dams of sediment basins. Temporary seeding may prevent costly maintenance operations on other erosion control systems. Annual plants which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover.

Permanent seeding is necessary to prevent long-term erosion of topsoil from the land surface. If performed correctly, permanent seeding will provide many benefits such as increased land value, aesthetics and animal habitats, in addition to reduced erosion and sedimentation.

General Seeding Guidelines

- Verify that erosion control devices are functioning. Prepare ground surface using methods in ES-05, Gradient Terraces, and ES-06, Surface Roughening.

- Select desired type of grasses. Consult a horticulturist or the UT Agricultural Extension Office, located on the 5th floor of the City County Building, or the website (http:www.utextension.utk.edu/knox/). This office has a wide variety of brochures and pamphlets for selecting all types of vegetation such as lawns, parks, or field crops.

- Analyze topsoil for fertilizer and lime requirements. Fertilizer and lime shall be uniformly incorporated into soil at a minimum depth of 1 inch, typically by rakes.

- A typical fertilizer application rate is anywhere from 5 to 20 pounds per 1000 square feet with commercial grades 6-12-12 and 10-10-10 being commonly used. Fertilizer should be free-flowing and uniform in composition. Fertilizer packaging should indicate weight, chemical analysis and date of production.

- Lime requirements are listed in Table ES-06-1 for soils with a pH less than 5.5. Requirements for crushed agricultural limestone are generally a minimum of 85% by weight calcium carbonate and magnesium carbonate.

- Purchase seed from a reputable dealer in original packaging that indicates percentage of seed mix, date of production, net weight, seed purity and germination rates.

- Apply selected seed at rate recommended for temporary or permanent seeding, using seeding package instructions or as directed by local experts (such as a horticulturist or agricultural extension agent). Seed should be sown uniformly by means of a rotary seed spreader, hydraulic equipment, or hand broadcasting.

- Apply straw mulch with tackifier, especially to seedlings in the fall for winter cover or on slopes that exceed 3:1 (H:V). See ES-07, Mulch, for additional description and methods.

- A tackifier should generally be used in conjunction with mulch for steep slopes. A tackifier is an inflammable, non-toxic, non-asphaltic, organically-formulated product which is capable of holding mulch and soil in place. Tackifier compound may contain a color additive to assist in the uniform application of product after mixing with water.

- Tackifier and water shall be blended and applied at a rate that is in accordance with the manufacturer's written instructions. Written instructions may give different application rates for revegetation (mulch tackifying) and for erosion control (soil stabilization). Application shall be performed with a fine spray immediately after each area is mulched.

- Do not seed during rainfall events or when heavy rain is predicted. No seeding shall be done during windy weather or when the ground surface is frozen, wet or otherwise unsuitable. Permanent seeding shall not be performed during December and January. Temporary seeding may be performed during the winter months with expectations that additional seeding is required in the spring.

- For slopes steeper than 3:1 or where surface water cannot be diverted from flowing over the face of slopes, install erosion control matting such as jute nets or excelsior mats (see ES-11, Erosion Control Matting). Mulch and tackifier are not required for areas that receive erosion control matting.

- Do not allow any equipment or material placed on any seeded areas. Erect suitable barricades and guards to prevent equipment, vehicles or labor from traveling onto or over any seeded areas.

- Maintain newly seeded areas until final acceptance of the construction project or until erosion problems have stopped. Restore areas which are washed out or which have settled. Reseed as necessary until an acceptable grass stand has been achieved.

Temporary Seeding

- All areas receiving temporary grass mixture shall receive an application of fertilizer and be protected with mulch or erosion control matting. Apply fertilizer at a minimum rate of 5 pounds per 1000 square feet. Uniformly incorporate into soil for a depth of 1 inch. Lightly water to aid dissipation of fertilizer.

- Apply seed mixture at recommended application rate evenly in two intersecting directions by the use of a mechanical spreader. Do not seed an area in excess of that which can be mulched on the same day. Do not sow immediately following rain, when ground is too dry, or during windy periods.

- Straw mulch shall be applied at a minimum rate of 100 pounds per 1000 ft^2 and traversed with mechanical roller or other device specially manufactured for crimping. Mulch shall be applied immediately after seeding. All mulched areas shall receive an application of tackifier.

- Roadside: Temporary mixtures for TDOT projects are listed in Table ES-08-1; these seed mixtures grow rapidly and are low-maintenance. Seeding rate is typically 1 pound per 1000 square feet.

- Lawns and parks: Apply the desired permanent grass mixture at reduced rates. Use straw mulch liberally, and use additional slope stabilization methods for steep grades. Typical seeding rate is 2 to 3 pounds per 1000 square feet.

- Fields and open spaces: Consult local agricultural extension office for recommended types of crops or grasses, and follow suggested seeding dates.

Permanent Seeding

- All areas receiving permanent grass mixture shall receive an application of fertilizer and be protected with mulch or erosion control matting. Apply fertilizer at a rate of not less than 10 pounds per 1000 square feet. Apply lime at rate based on pH of soil. For dry seeding, uniformly incorporate into soil for a depth of 1 inch and lightly water to aid the dissipation of fertilizer.

- Apply seed mixture at recommended rates evenly in two intersecting directions by the use of a mechanical spreader or hydroseeder. Do not seed area in excess of

that which can be mulched on same day. Do not sow immediately following rain, when ground is too dry, or during windy periods.

- Combined hydraulic application of seed, fertilizer, and mulch may be performed. Tackifier application may be within the combined mixture if allowed by manufacturer's recommendations. Hydraulic spraying equipment and mixture shall be designed so that when the grass mixture is sprayed over the area, the mixture components shall be equal in quantity to the specified rates.

- Wood fiber mulch shall be applied at a minimum rate of 35 pounds per 1000 square feet. As an option, straw mulch can be utilized at a rate of 100 pounds per 1000 square feet. Mulch shall be applied immediately after seeding or during seeding. All mulched areas shall receive an application of tackifier.

- Roadside: Permanent mixtures for TDOT projects are listed in Table ES-08-2; these seed mixtures (primarily fescue) grow rapidly and are low-maintenance. Seeding rate is typically 2 pounds per 1000 square feet.

- Lawns and parks: Tall fescue grasses (such as Kentucky 31) have good resistance to high temperatures, drought, and soil acidity. Bermudagrass is commonly used for lawns and for athletic fields; it does not fare well in shady areas. Shady lawns and parks may require a more specialized seed mixture. Plant in the late summer or early spring to take advantage of mild climate conditions in spring and autumn. Typical seeding rate is 5 to 8 pounds per 1000 square feet.

- Fields and open spaces: Consult the local UT Agricultural Extension Office, located on the 5th floor of the City County Building. This office has a wide variety of brochures and pamphlets for selecting field crops and planting dates.

Hydroseeding

Hydroseeding is the wet hydraulic spraying of seed, fertilizer, tackifier and usually mulch in a one-step process. Materials are mixed with water in a slurry tank to form a homogeneous slurry, which is then sprayed on the soil surface at a uniform rate in two intersecting directions by a hydraulic seeder.

Ordinary mulch is not suitable for hydroseeding. Mulch for hydroseeding is generally virgin wood fiber mulch at a rate of 35 pounds per 1000 square feet, manufactured to be uniformly suspended as a slurry. Alternatively, straw mulch can be applied after hydroseeding at a rate of 100 pounds per 1000 square feet.

Maintenance

- Inspect frequently within the first six weeks of planting to see if grass stands are uniform and dense and to assure that appropriate moisture levels are maintained. Make provisions to water as needed to penetrate to a depth of 6 inches.

- Check for damage caused by equipment or heavy rains. Damaged areas should be repaired, fertilized, seeded, and mulched. Tack or tie down mulch as necessary.

Limitations

- Annual rye grass and a few other types of annual grass may reseed the following year without assistance. This may make it difficult to establish a different type of grass as permanent vegetation.

- Uneven application of fertilizer, lime, seed or other materials may cause patchy growth and erosion. Overapplication of fertilizer or lime causes stormwater runoff pollution.

References **33, 34, 35, 115, 139, 172, 179** (see BMP Manual Chapter 10 for list)

Table ES-08-1
Temporary Seed Mixtures (TDOT)

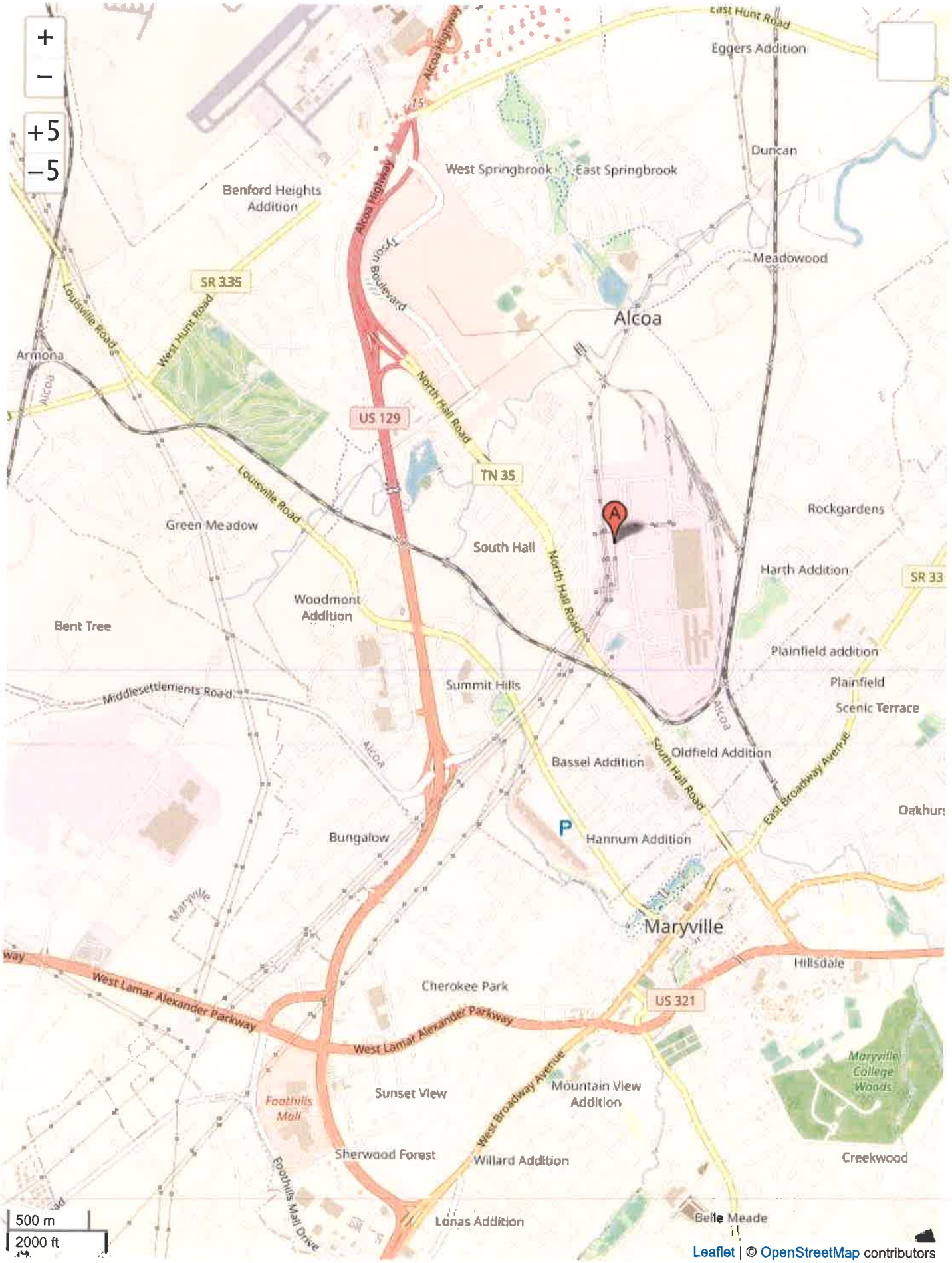
Groups	Seeding Dates	Grass Seeds	Percentages
D	January 1 to May 1	Italian Rye	33 %
		Korean Lespedeza	33 %
		Summer Oats	34 %
E	May 1 to July 15	Sudan-Sorghum	100 %
E	May 1 to July 15	Starr Millet	100 %
F	July 15 to January 1	Balboa Rye	67 %
		Italian Rye	33 %

Table ES-08-2
Permanent Seed Mixtures (TDOT)

Groups	Seeding Dates	Grass Seeds	Percentages
A	February 1 to July 1	Kentucky 31 Fescue	80 %
		Korean Lespedeza	15 %
		English Rye	5 %
B	June 1 to August 15	Kentucky 31 Fescue	55 %
		English Rye	20 %
		Korean Lespedeza	15 %
		German Millet	10%
B1	April 15 to August 15	Bermudagrass (hulled)	70%
		Annual Lespedeza	30%
C	August 1 to December 1	Kentucky 31 Fescue	70 %
		English Rye	20 %
		White Clover	10 %
C1	February 1 to December 1	Kentucky 31 Fescue	70 %
		Crown Vetch	25 %
		English Rye	5 %

Appendix E: Site Maps

SEP 0 1 2021



SEP 0 1 2021

U.S. Fish and Wildlife Service

National Wetlands Inventory

Arconic

August 16, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

SEP 0 1 2021

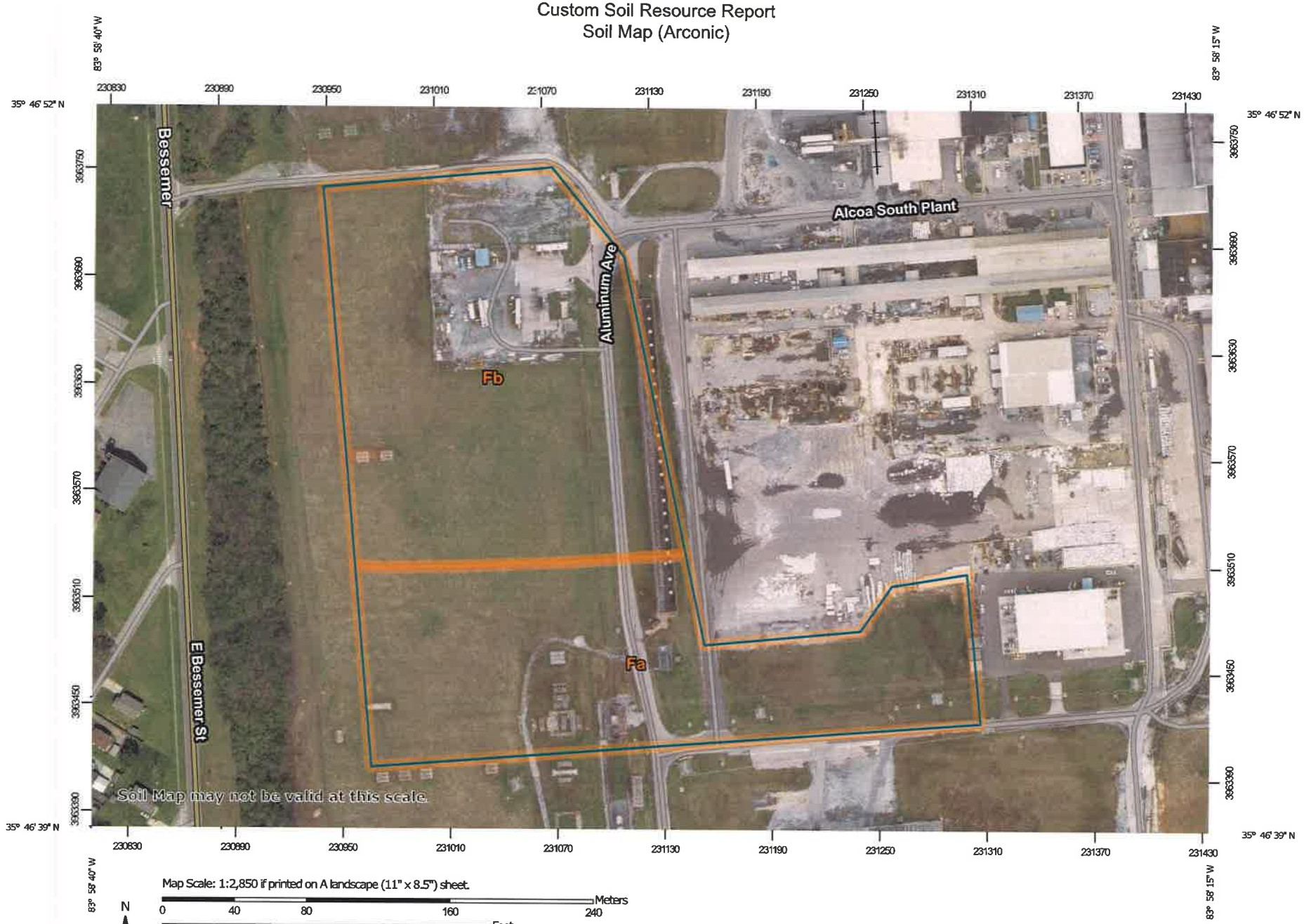
SEP 0 1 2021

Appendix F: Soils Map

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Arconic)



SEP 1 2021

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Blount County Area, Tennessee
Survey Area Data: Version 12, Jul 16, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 4, 2020—Apr 4, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

SEP 0 1 2021

Map Unit Legend (Arconic)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Fa	Farragut silty clay, severely eroded sloping phase	7.5	45.3%
Fb	Farragut silty clay loam, eroded gently sloping phase	9.1	54.7%
Totals for Area of Interest		**16.6**	**100.0%**

Map Unit Descriptions (Arconic)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Appendix G: Corrective Action Log

Appendix G – Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

Appendix H: SWPPP Amendment Log

Appendix H – SWPPP Amendment Log

Project Name:
SWPPP Contact:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Appendix I: Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix J: TDEC Grading and Stabilization Activities Log

Appendix J – Grading and Stabilization Activities Log

Project Name:
SWPPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

Appendix K: Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Erosion Control BMPs**
- ❑ **Emergency Procedures**
- ❑ **Sediment Control BMPs**
- ❑ **Good Housekeeping BMPs**
- ❑ **Non-Stormwater BMPs**

Specific Training Objective: _____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Appendix L: Delegation of Authority

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in _____ (Reference State Permit), and that the designee above meets the definition of a "duly authorized representative" as set forth in _____ (TNR 100000).

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.

Name: _____

Company: _____

Title: _____

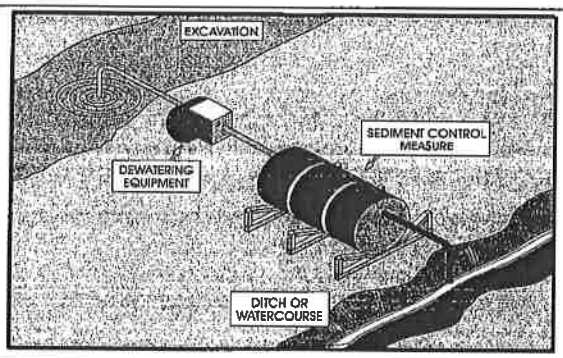
Signature: _____

Date: _____

Appendix M: Dewatering Devices

ACTIVITY: Dewatering Operations

AM – 12



Targeted Constituents

● Significant Benefit ◗ Partial Benefit ○ Low or Unknown Benefit

● Sediment	◗ Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances
○ Nutrients	◗ Toxic Materials	◗ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes

Description

Prevent or reduce the discharge of pollutants to stormwater systems and natural streams from dewatering operations by using sediment controls and by testing the groundwater for pollutant accumulation. This management practice is likely to create a significant reduction in sediment and may contribute to a partial reduction in toxic materials, heavy metals or petroleum products.

Approach

There are two general classes of pollutants that may result from dewatering operations: 1) sediment; and 2) toxic materials, petroleum products, or other dissolved pollutants. This BMP will only address sediment removal from dewatering operations.

Large amounts of sediment in dewatering discharges are common due to the nature of the operation. On the other hand, toxic materials and petroleum products are not commonly found in dewatering discharges unless the site or surrounding area has been used for industrial activities. A site assessment prior to construction or development will reveal whether the area has a history of groundwater contamination.

This BMP only addresses the capture of sediments through the use of filtering devices. If it is determined that dewatering will result in transfer or accumulation of toxic materials or petroleum products, then the Tennessee Department of Environment and Conservation (TDEC) must be consulted before any dewatering activities take place.

Use sediment controls to remove sediment from water generated by dewatering. This may include techniques presented in the attached figures, the use of sediment traps or sediment basins, or other filtering methods. Monitor discharge water continuously. Suspend operations immediately if sediment or other pollutants is being discharged.

Types of sediment filtration methods include:

- Portable sediment tank
- Filter box
- Straw bale / silt fence pit
- Commercially available geotextile filter products
- Filtration through aggregate and silt fence cloth

The minimum volume formula for sizing the filtration devices (except for the commercially available devices) is:

$V = 16\ Q$ where V = volume of required storage (cubic feet)
Q = pump discharge (gallons per minute)

Locate sediment filtration devices in locations to minimize interference with construction activities. Position filtration devices for easy cleanout and disposal of trapped sediment. A stable access path should be provided for vehicles to access the larger structural filtration devices, such as the portable sediment tank or the filter box.

Filter Box

- A typical filter box is shown in Figure AM-12-1. The box should be made of steel, sturdy wood or other materials suitable to handle the pressure requirements imposed by the water and sediment. A common application is 55-gallon drums welded top to bottom.
- Make bottom of the filter box porous by drilling holes. Place aggregate base in the bottom of the filter box to a minimum depth of 12 inches. Metal screens may be needed beneath the aggregate to retain the stone.
- Direct effluent over a well-vegetated strip with a flow path of at least 50 feet. The effluent discharge point may be relocated to discharge to other well-vegetated strips as needed.
- When water level nears the top of filter box, shut off pump while the filter box drains. Design filter box to allow for emergency flow through top of filter box.
- If the aggregate filter becomes clogged with sediment, the stones must be cleared from the inlet, cleaned, and then replaced. Clean out tank when one-third of the original capacity is depleted due to sediment accumulations. Clearly mark tank to show the cleanout point.

Portable Sediment Tank

- A typical portable sediment tank is shown in Figure AM-12-2. Construct with steel drums, sturdy wood or other material suitable for handling the pressure exerted by the water and sediment. The tank should be sturdy enough to enable transfer offsite under fully-loaded conditions.
- Design a system of baffles, using openings at the top or bottom sections of joined steel drums, so that sediment is captured from pumped water prior to reaching the last drum.
- Direct effluent over a well-vegetated strip with a flow path of at least 50 feet. The effluent discharge point may be relocated to discharge to other well-vegetated strips as needed.
- When water level nears the top of tank, shut off pump while the tank drains. Design tank to allow for emergency flow through top of tank.

- Sediment tank minimum depth is 24 inches. Clean out tank when one-third of the original capacity is depleted due to sediment accumulations. Clearly mark tank to show the cleanout point.

Straw Bale / Silt Fence Pit

- A typical straw bale / silt fence pit is shown in Figure AM-12-3. The excavated area should be a minimum of 3 feet below the base of the straw bales. Installation guidelines for straw bales should be in accordance with ES-15, Straw Bale Barrier. Silt fence fabric should be in accordance with ES-14, Silt Fence, and installed to cover the entire inside face of the straw bale dikes. Securely fasten silt fence above and below the straw bale barrier.

- The storage volume consists of two parts: the temporary filter volume and the wet storage pit. The temporary filter volume is essentially the working volume of the filtration device. The wet storage pit is intended for sediment storage and may be dewatered by pumping through a geotextile filter after a minimum of 6 hours time for sediment to settle.

- Direct effluent over a well-vegetated strip with a flow path of at least 50 feet. The effluent discharge point may be relocated to discharge to other well-vegetated strips as needed.

- When water level nears the crest of the stone weir (emergency overflow), shut off pump while the structure drains down to the top of wet storage pit. When the wet storage pit becomes filled to one-half of the excavated depth, accumulated sediment shall be removed and properly disposed.

Commercially Available Geotextile Filter Products

- There are many commercial products that are designed as filters for dewatering operations. Most products utilize geotextile material or fabric in the form of various-sized bags, tubes and packs.

- Design the filter bag, tube or pack according to the dewatering discharge requirements and manufacturer's recommendations. If it is determined that the filter bag, tube or pack is ineffective, then another type of filtration device may be required.

- Direct effluent over a well-vegetated strip with a flow path of at least 50 feet after leaving the filter. The effluent discharge point may be relocated to discharge to other well-vegetated strips as needed.

- The filters must be capable of being removed from the site without tearing or other accidental loss of material. Alternatively, the filter can be placed in a slotted grate or other containment that allows for additional drainage and easier site removal. If it is determined that the sediment does not contain pollutants, then the captured material may be used for grading and fill elsewhere on the site.

Other Sediment Filtration Designs

If there is sufficient space and volume, a dewatering impoundment may be constructed with structurally sound berms and control structures. A common method of filtration can be achieved using a perforated or slit standpipe with holes wrapped in filter fabric. The standpipe is surrounded by rock or aggregate which filters the water as it collects in the standpipe before being pumped out or discharged.

If the standpipe is being pumped out, then wrapping the standpipe in filter fabric may require an increased suction inlet area to avoid clogging and unacceptable pump operation. Alternatively, a floating suction hose in the impoundment will allow clean surface water to be pumped out after allowing time for settlement, typically overnight.

Direct discharged effluent over a well-vegetated strip with a flow path of at least 50 feet after leaving the filter. The effluent discharge point may be relocated from time to time to other well-vegetated strips as needed.

Toxic Materials and Petroleum Products

- In areas suspected of having groundwater pollution, sample the groundwater near the excavation site and have the water tested for known or suspected pollutants at a certified laboratory. Check with the TDEC for requirements for dewatering and water quality tests.

- It may be possible to treat pumped groundwater and discharge it to the municipal wastewater treatment plant via the sanitary sewer with written permission from Knoxville Utilities Board (KUB). KUB must be consulted prior to considering sanitary sewer as a disposal option.

Maintenance

- Inspect filtering device frequently. Repair or replace filtering device when sediment buildup prevents the structure from functioning as designed.

- Accumulated sediment removed from a dewatering device may generally be spread at the project site. Sediment that appears to be contaminated shall be stabilized and then disposed as hazardous waste at a licensed disposal site.

- Inspect excavated areas daily for signs of contaminated water as evidenced by discoloration, oily sheen, or odors. Notify TDEC and the City of Knoxville Engineering Department concerning the evidence of contaminated water. Promptly sample and test groundwater to determine nature and extent of pollutants.

Limitations

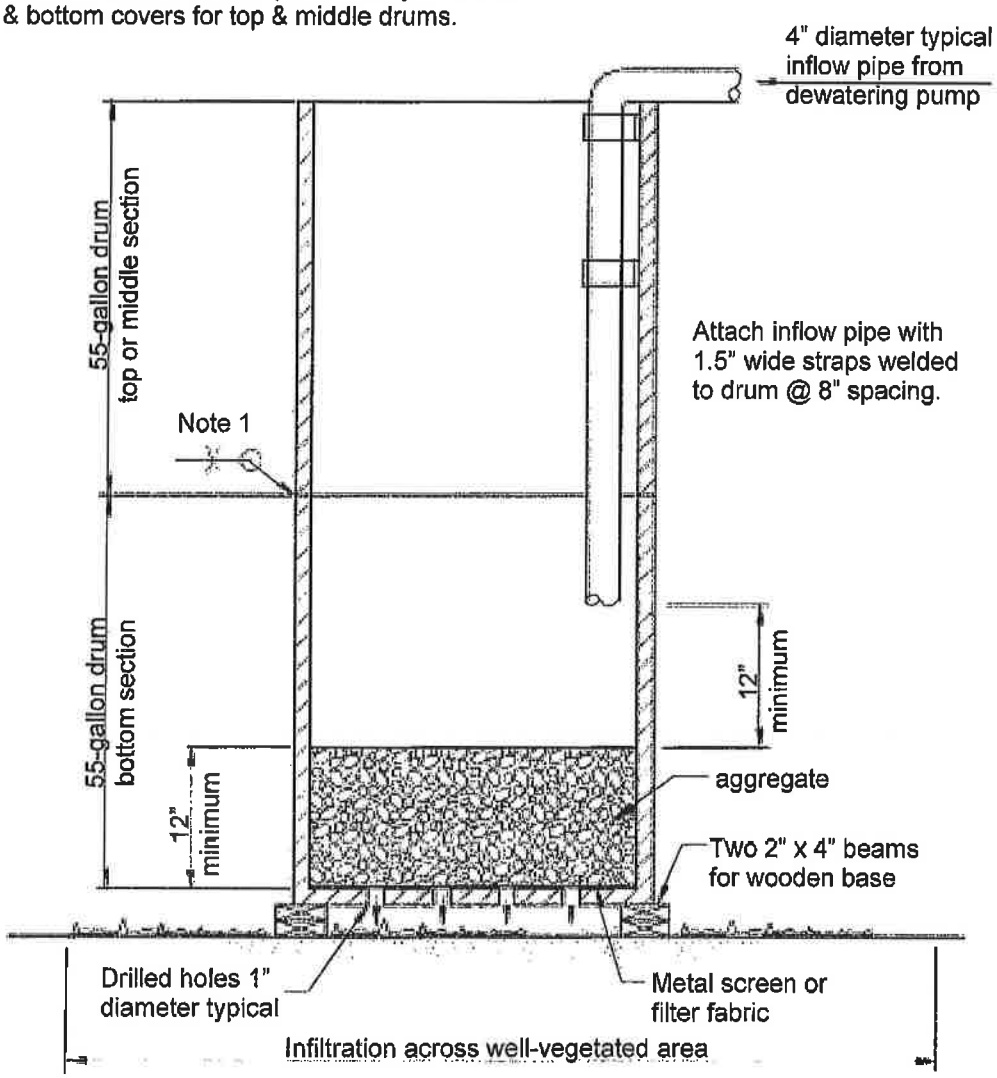
- The controls discussed in this BMP address sediment only. If the presence of polluted water is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water to be removed by dewatering is later determined by observation or testing to be polluted, the contractor shall notify the appropriate authorities.

References

30, 31, 33, 34, 35, 100, 137, 141 (see BMP Manual Chapter 10 for list)

NOTES:

1. Weld shall be designed for the capacity of the tank.
2. For bottom drum, remove top cover only. Remove top & bottom covers for top & middle drums.

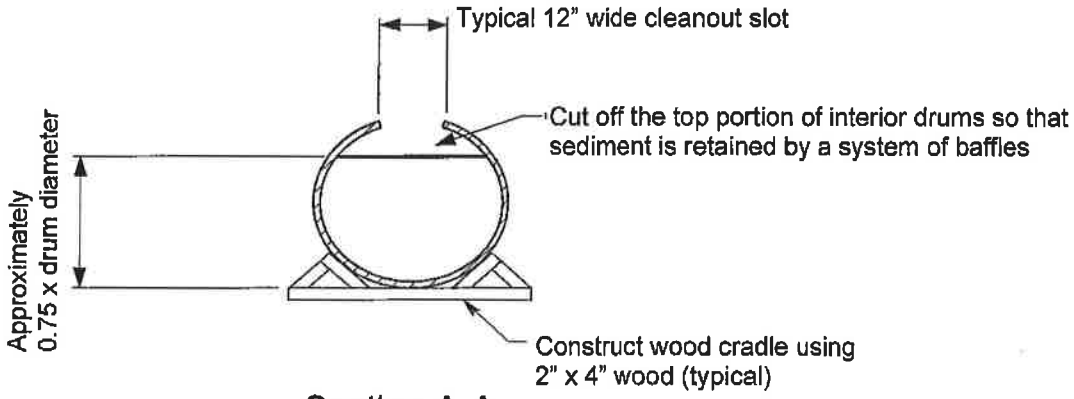


NOT TO SCALE

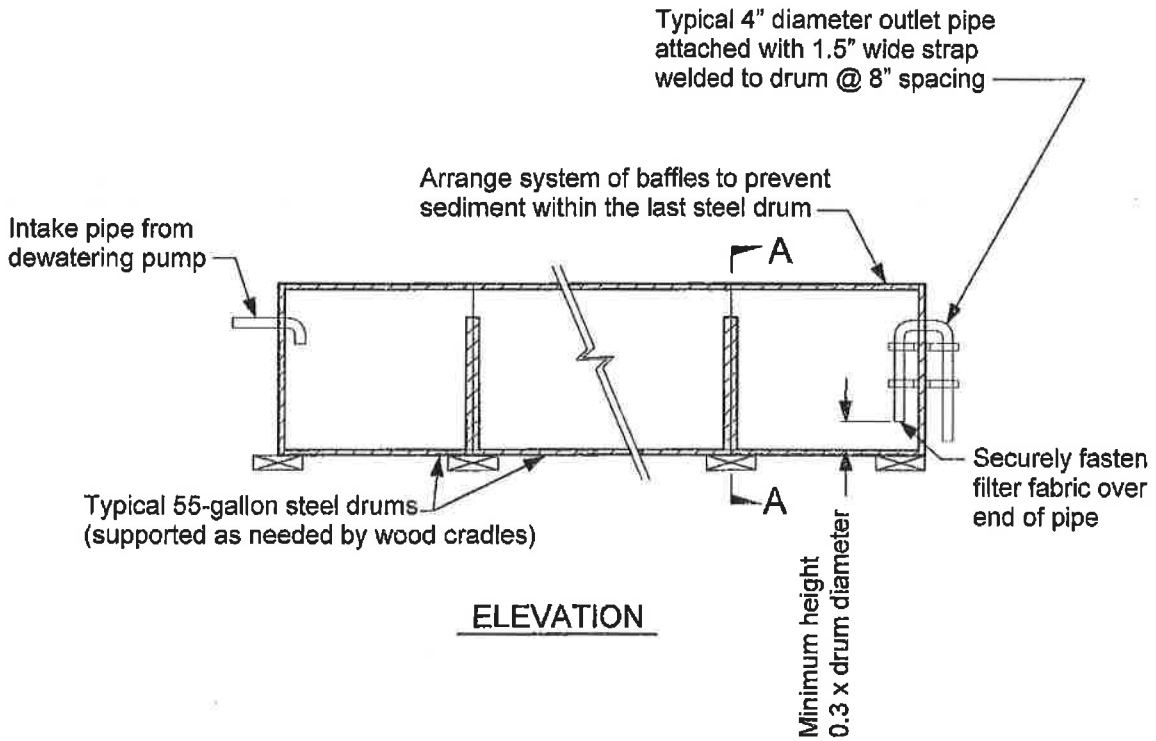
Figure AM-12-1
Typical Filter Box

NOTES:

1. Weld shall be structurally designed for the capacity of the tank and for transportation. Critical stress may occur during offloading and/or transportation.



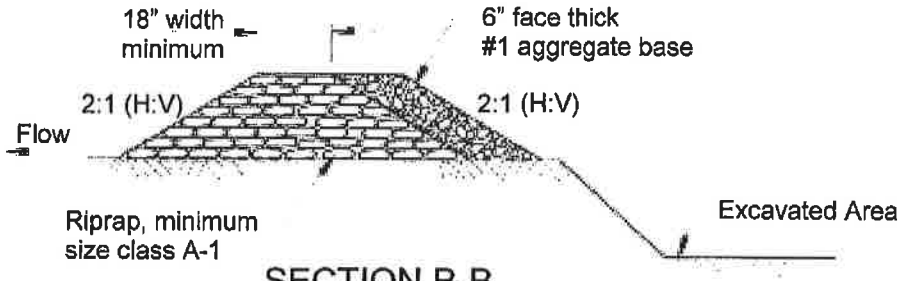
Section A-A



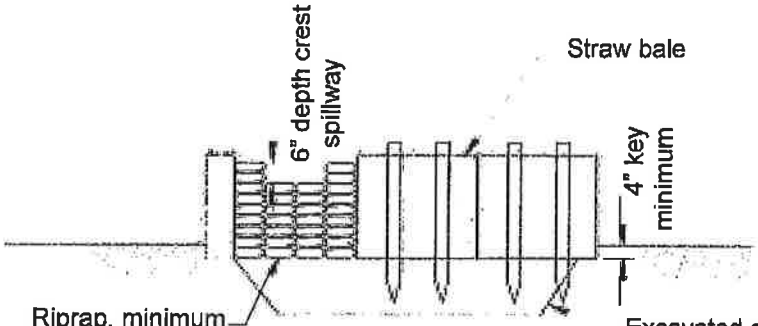
ELEVATION

NOT TO SCALE

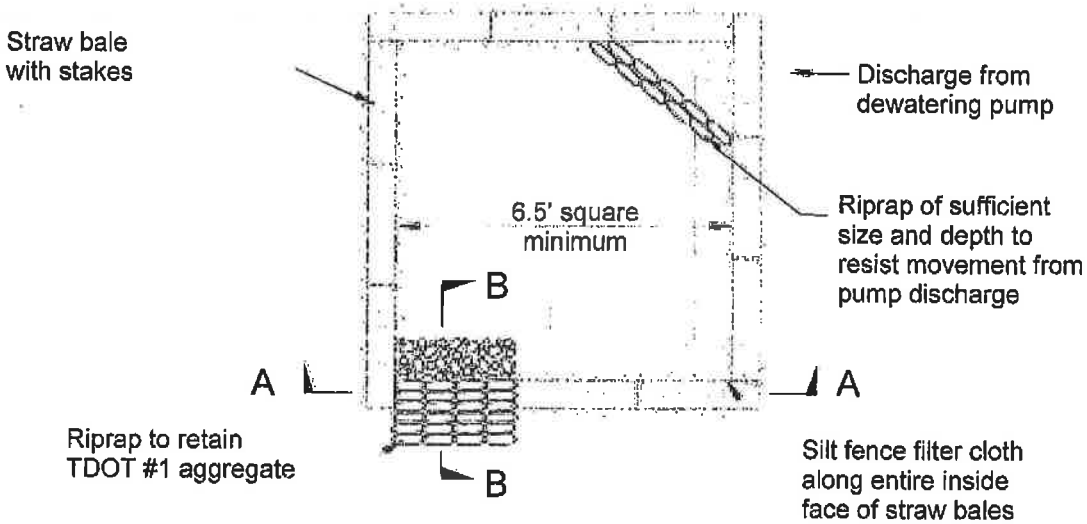
Figure AM-12-2
Typical Portable Sediment Tank



SECTION B-B



SECTION A-A



NOT TO SCALE

Figure AM-12-3
Typical Straw Bale / Silt Fence Pit

Appendix N: Documentation of Receiving Stream Research

Water Resources Permits | Monitoring Sites | Water Quality Assessment | Water Quality Assessment Waterbodies | Counties

Options | Filter by map extent | Zoom to | Clear selection | Refresh

Source_FeatureID	Name
TN06010201026_0400	Pistol Creek
TN06010201026_0410	Springfield Branch
TN06010201026_0420	Brown Creek

3 features 0 selected

Appendix O: Rain Gauge Log

Project Name: **Permit No.**

***Gauge Location:**

** Date/Time of gauge reading	**Total amount since last reading (inches)	***Duration: Apprx. Begin & End times	Gauge readings by (Name)

Notes:
** Off-site reference gages should be within 1.5 to 2 miles of construction site. Indicate latitude/longitude or street address if off-site reference gauge used.*
***Read rain gauge at the same time each day and record to nearest 0.1 inch. Record "0" if no rain and <0.1 inch if trace. Empty gauge at each reading. Try to arrange for gauge readings during non-work days, especially for forecasted storms.*
****Record the approximate duration & amount for rain events, especially significant short, intense storms exceeding 0.5 inch by noting the beginning and ending times. Short intense storms can produce high runoff from construction sites.*
-Mount gauge where trees and/or buildings will not obstruct rain (rule of thumb: locate gauge at a distance away from obstruction at least equal to its height). In freezing weather, check gauge for cracking. Replace damaged gauge.

Project Name: **Permit No.**

***Gauge Location:**

** Date/Time of gauge reading	**Total amount since last reading (inches)	***Duration: Apprx. Begin & End times	Gauge readings by (Name)

Notes:

** Off-site reference gages should be within 1.5 to 2 miles of construction site. Indicate latitude/longitude or street address if off-site reference gauge used.*

***Read rain gauge at the same time each day and record to nearest 0.1 inch. Record "0" if no rain and <0.1 inch if trace. Empty gauge at each reading. Try to arrange for gauge readings during non-work days, especially for forecasted storms.*

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***Gauge Location:**

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Notes:

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****Record the approximate duration & amount for rain events, especially significant short, intense storms exceeding 0.5 inch by noting the beginning and ending times. Short intense storms can produce high runoff from construction sites.*

-Mount gauge where trees and/or buildings will not obstruct rain (rule of thumb: locate gauge at a distance away from obstruction at least equal to its height). In freezing weather, check gauge for cracking. Replace damaged gauge.

Appendix Q: STRUCTURAL PRATICES

7.20 CHECK DAM

Definition A small temporary barrier, grade control structure or dam constructed across a swale, drainage ditch, or area of concentrated flow.

Purpose To minimize the erosion rate by reducing the velocity of stormwater in areas of concentrated flow. While check dams are primarily erosion control devices, they provide limited sediment control by slowing velocities and ponding runoff. Note that wattles and tubes installed as check dams are addressed in Section 7.25.

Conditions Where Practice Applies This practice is applicable for use in ditches and small open channels and **is not to be used in a stream**. Specific applications include:

- Temporary or permanent swales or ditches in need of protection during establishment of grass linings.
- Temporary or permanent swales or ditches that, due to their short length of service or for other reasons, cannot receive a permanent non-erodible lining for an extended period of time.
- Other locations where small localized erosion and sedimentation problems exist in areas of concentrated flow.

Planning Considerations Check dams are an expedient way to reduce gullying in the bottom of channels that will be filled or stabilized at a later date. The dams should only be used while permanent stabilization measures are being put into place.

Check dams installed in grass-lined channels may kill the vegetative lining if submergence after it rains is too long and/or silting is excessive. All stone and riprap must be removed if mowing is planned as part of vegetative maintenance.

The main function of a check dam is to decrease velocity, not to collect sediment, although sediment capture is an added benefit.

Design Criteria

The channel and check dam must be designed to adequately convey the design storm for the associated drainage area.

Spacing: Maximum spacing between dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam. Two or more check dams in series should be used when the drainage area exceeds the limitation for one dam.

Height: The height of the check dam from the bottom of the channel to the bottom of the weir should be a minimum of 1 foot above the ditch bottom.

Weir: The depth of flow on the center of the structure (weir) shall be computed for the peak flow rate generated by the 2-year, 24-hour storm in order to ensure that the top of the structure will not be overtopped. For sites draining to high quality streams or streams listed as impaired by sediment, the depth must be determined for the 5-year, 24-hour peak flow rate. The weir must be at least 9 inches deep.

Side Slopes: The side slopes should be 2:1 or flatter.

Materials: A geotextile should be used as a separator between the graded stone and the soil base and abutments. The geotextile will prevent the migration of soil particles from the subgrade into the graded stone. Geotextiles should be "set" into the subgrade soils. The geotextile should be placed immediately adjacent to the subgrade without any voids and extend three feet beyond the downstream toe of the dam to prevent scour.

Construction Specifications

- Rock check dams should be constructed out of machined riprap, Class A-1 (see Table 7.20-1 for stone size and d_{50}).
- Place stone to the lines and dimensions shown in the plan on a filter fabric foundation.
- Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.
- Set spacing between dams to assure that the elevation at the top of weir section of the lower dam is the same as the toe elevation of the upper dam.
- Extend geotextile fabric 3 feet down gradient from the toe of the check dam to prevent scour at the toe.
- Protect the channel after the lowest check dam from heavy flow that could cause erosion.
- Ensure that the channel reach above the most upstream dam is stable.
- Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.

Maintenance and Inspection Points

Sediment should be removed before it reaches a depth of one-half the original dam height.

Add rock as needed to maintain design height and cross section.

If the area is to be mowed, check dams must be removed once final stabilization has occurred. After removal, the disturbed area should be seeded and mulched immediately.

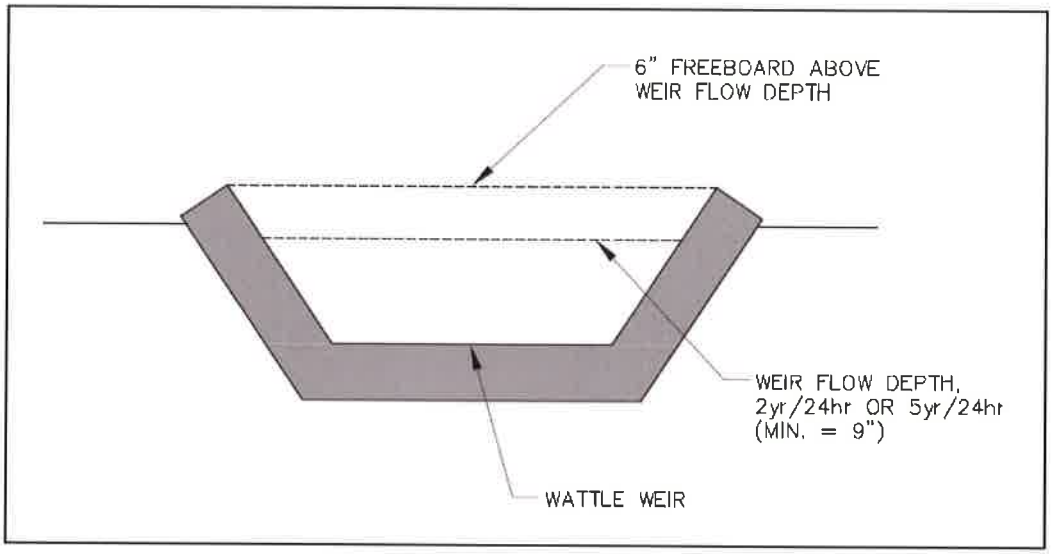


Figure 7.20-1. Wattle Check Dam

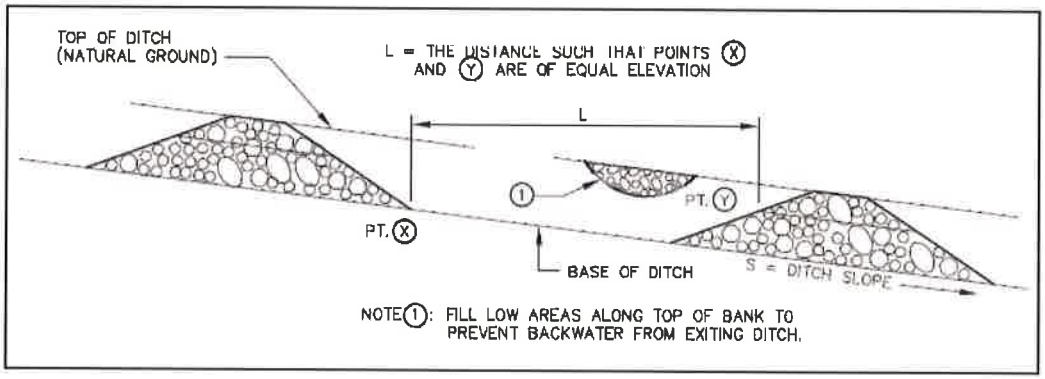


Figure 7.20-2 Spacing between check dams (Source: TDOT)

References

TDOT Design Division Drainage Manual

TDOT Erosion Control Standard Drawing EC-STR-6

North Carolina Erosion and Sediment Control Planning and Design Manual

POLLUTION PREVENTION

7.16 CONCRETE WASHOUT

CONCRETE WASHOUT

Definition

A designated area where concrete wash can harden, can be broken up, and can then be placed in the dumpster or backfilled.

Purpose

To prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite or performing onsite washout in a designated area.

Conditions Where Practice Applies

Concrete washout areas are applicable where:

- Concrete trucks and other concrete-coated equipment are washed onsite.
- Slurries containing portland cement concrete or asphalt concrete are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Washing of exposed aggregate concrete.
- Building or house construction mortar mixer waste

Planning Considerations

There are two main types of concrete washouts to be considered, prefabricated washout containers and site-built washouts.

PREFABRICATED WASHOUT CONTAINERS

Many private companies offer heavy-duty, prefabricated concrete washout containers that are delivered to the site. Some services provide only the containers while others also provide the maintenance and disposal of the materials. Utilizing full-service concrete washout companies removes much of the burden from the jobsite superintendent and tends to result in a more maintained washout facility. When selecting a company to handle concrete waste, ensure that they are properly disposing of all materials. If the project utilizes a concrete pump truck, the prefabricated container should have an adequate ramp to accommodate the concrete pump truck.

SITE-BUILT WASHOUTS

There are many design options for the site-built washout, but preference should be given to those built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structure can also be used if they are sized properly to avoid spillage, constructed properly to prevent leaks, and diligently maintained.

An important factor that dictates the success of concrete washout facilities is whether or not concrete truck drivers and subcontractors are educated on the use of the washout facilities. The site superintendent should educate all appropriate parties on proper use of concrete washout facilities. Signs should be posted indicating the location and designated use of the facilities.

Design Criteria

When using prefabricated washout containers, ensure containers can withstand heavy impacts and are watertight.

Site-built washouts should be constructed by providing a temporary pit or bermed area sized large enough to handle solids, wash slurry, and rainfall to prevent overflow and include a minimum of 4" freeboard. Above-grade washouts should allow adequate at least 4" of freeboard for structural stability of berms or containment walls. The temporary pit containing dry waste concrete may be incorporated into fill areas as needed. The waste concrete may be broken into smaller pieces to allow proper soil compaction. The storage area should be lined with geotextile fabric to allow water to infiltrate, further aiding the dewatering and drying process.

Consideration should be given to locating washout facilities. The designer should included suggested concrete washout areas on all applicable SWPPPs. Each facility should be located conveniently for concrete trucks, preferably near the area where concrete is being poured, and away from heavy volume construction traffic or access areas to prevent disturbance or tracking. Facilities should also be located a minimum of 50 feet away from storm drains, open ditches, and waterbodies. Appropriate gravel or rock should cover paths to concrete washout facilities if the facilities are located in undeveloped areas.

On large sites with extensive concrete work, concrete washouts should be located in multiple areas for ease of use.

Construction Specifications

- The storage pit area should be lined with a permeable geotextile fabric.
- Do not allow runoff from the storage area. Construct a temporary pit or bermed area large enough to contain anticipated slurry amount, solid waste, and direct rainwater.
- Wash out wastes into the temporary pit where the concrete can set, be broken up, and then disposed properly.
- Avoid creating runoff by draining water to a bermed or level area when washing concrete to remove fine particles and expose the aggregate.

Maintenance and Inspection Points

Ensure contractors avoid mixing excess amounts of fresh concrete and perform washout of concrete trucks offsite or in designated areas only. Do not allow concrete trucks to wash into storm drains, open ditches, streets, or streams. Do not allow excess concrete to be dumped onsite, except in designated areas. Do not wash sweepings from exposed aggregate concrete into the street or storm drains.

Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 inches for above grade facilities and 12 inches for below grade facilities. Inspect plastic linings and sidewalls of site-built washouts to ensure they have not been damaged during construction activities. Inspect all surfaces of prefabricated washouts to ensure the container is not leaking.

Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

Inspectors should note whether washout facilities are being used and maintained regularly. If inspector finds that concrete trucks are being washed out in locations other than designated washout areas, the inspector should notify the site superintendent immediately and the site superintendent should correct the issue.

References

California Stormwater BMP Handbook

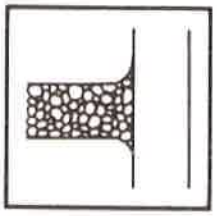
City of Knoxville Best Management Practices Manual

Hamilton County, TN BMP Manual

EPA National Pollutant Discharge Elimination System Concrete Washout

SEDIMENT CONTROL PRACTICES

7.28 CONSTRUCTION EXIT



GRAVEL CONSTRUCTION EXIT

Definition A stone pad on geotextile fabric or a rumble strip located at any point where traffic will be moving from a construction site onto a public roadway or other paved area.

Purpose To reduce or eliminate the transport of material from the construction area onto a public roadway by providing an area where mud and soil can be removed from the tires of construction vehicles.

Conditions Where Practice Applies This practice is applicable wherever construction traffic leaves a construction site and enters a public right of way.

Planning Considerations Construction exits should be planned and installed at any point that construction traffic exits the project. These stone pads should not be placed in areas with hydric or saturated soils.

Stormwater management must be considered around the construction exit as well.

Avoid steep grades and exits in or near curves in public roads.

Design Criteria Calculations are not required; however, a typical construction exit should conform to the specifications listed below.

- A layer of geotextile fabric is required to stabilize and support the aggregate. The geotextile fabric should extend the full length and width of the construction exit. The fabric should meet the requirements of the standard specifications for geotextiles, AASHTO designated M-288, erosion control.
- The stone pad should be constructed from clean, washed stone with a 2 inch to 4 inch gradation at a minimum thickness of 8 inches. At a minimum, the stone pad should be 50 feet long and 20 feet wide. In addition a turning radius of 20 feet should be provided on each side of the pad where it intersects with the public roadway. See Figures 7.28-1 and -2.
- The area where the pad is to be installed must be undercut at least 3 inches, and then the geotextile fabric should be installed before placing the stone.

- Stormwater management around the construction exit must be taken into consideration. If stormwater runoff flows across the stone pad and onto the public right of way, mud on the pad can be washed into the ROW as well. Diversions or waterbars should be installed at the upgradient end of the pad, directing runoff into sediment traps for treatment prior to discharging runoff into the ROW.

Construction Specifications

- Excavate areas where construction exits are to be constructed to a depth of at least 3 inches and clear the area of all vegetation, roots, and other objectionable material.
- Construction exit areas should be at minimum 50 feet in length by 20 feet in width.
- Install a geotextile underliner across the full width and depth of the construction exit to separate the rock from underlying soil.
- Provide clean, washed stone to a depth of 8 inches. Stone should vary in size from 2 to 4 inches. Rock must be clean rock with no fines. Crusher run and road base are not acceptable materials for a construction exit, as the fines can be tracked out onto the road.

Waterbar Diversion:

On sites where the grade toward the public roadway is greater than 2%, a waterbar diversion 6 to 8 inches in depth with 3:1 side slopes should be constructed at the upper end of the construction exit to prevent stormwater from washing sediment off the construction exit and into the public roadway or storm drain system. See Figure 7.28-1. Other devices, such as berms also may be used to divert stormwater from flowing down the construction exit and onto the pubic ROW.

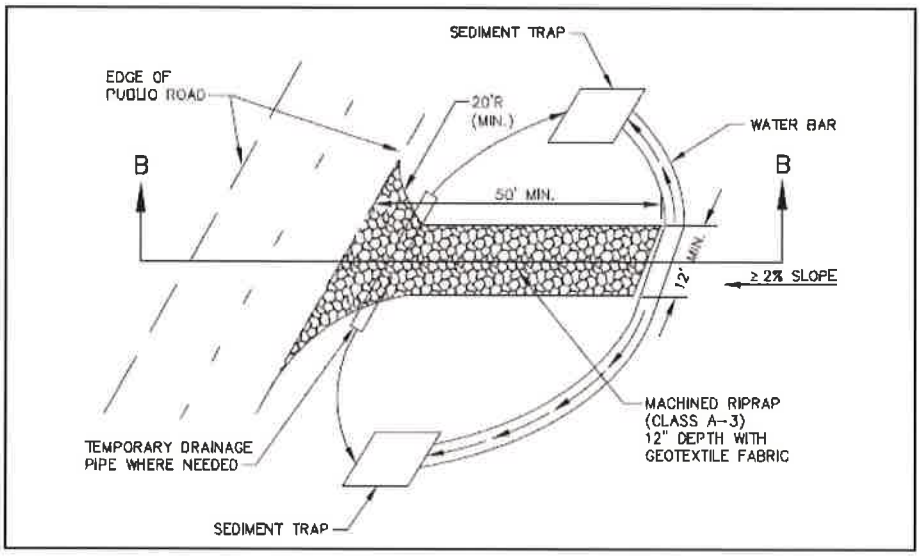


Figure 7.28-1 Construction Exit with Water Bars

Maintenance and Inspection Points

The exit must be maintained in a condition that will prevent tracking or flow of material onto public rights-of-way or into the storm drain system. This may require periodic top dressing with fresh stone or full replacement of stone as conditions demand, and repair and/or cleanout of any related diversions and sediment traps. All materials spilled, dropped, washed, or tracked from vehicles or site onto roadways or into storm drains must be removed by the end of the day.

References

TDOT Design Division Drainage Manual

North Carolina Erosion and Sediment Control Planning and Design Manual

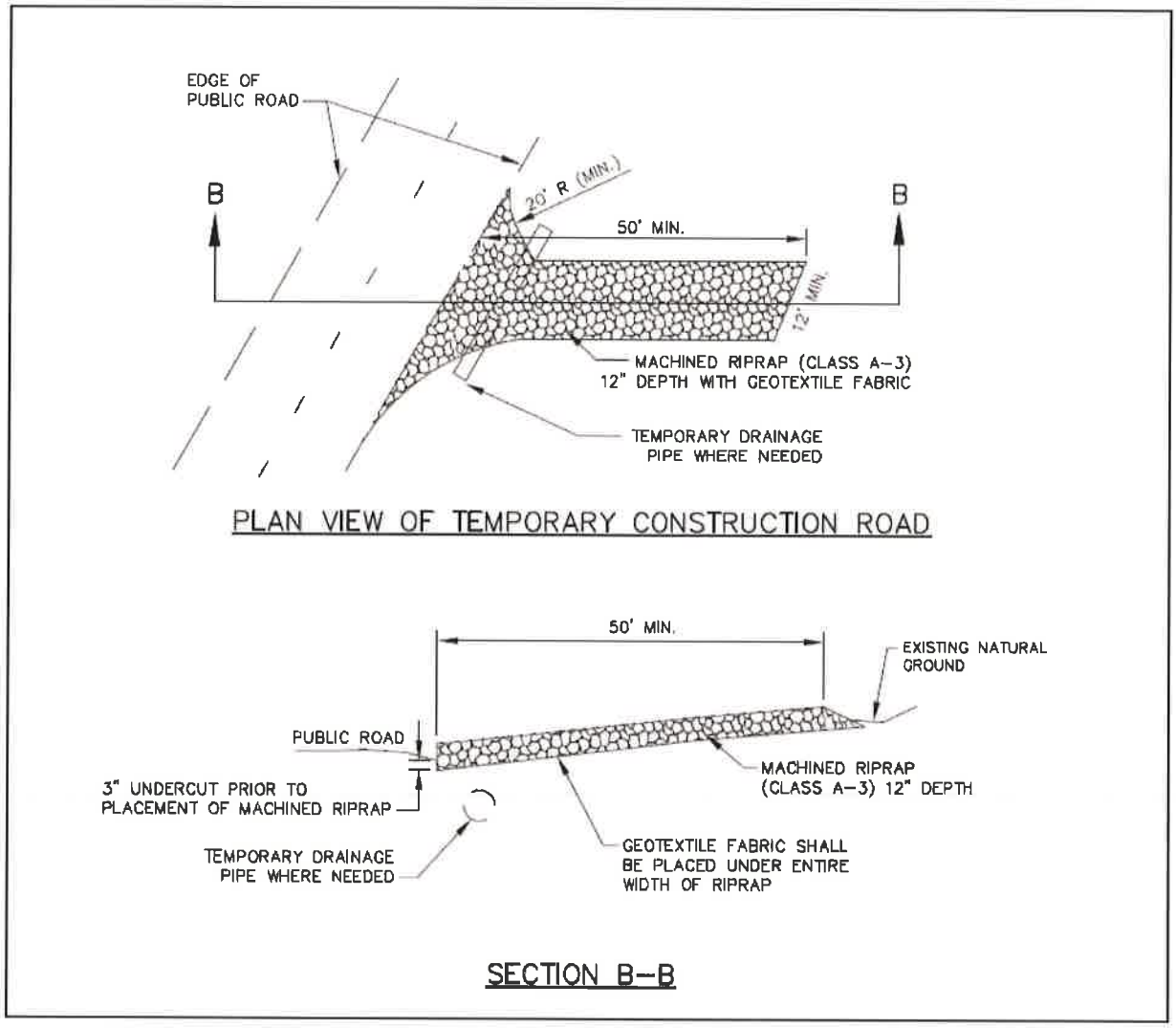


Figure 7.28-2 Construction Exit Detail

STABILIZATION PRACTICES

7.9 PERMANENT VEGETATION

PS STABILIZATION WITH PERMANENT VEGETATION

Definition The planting of native perennial vegetation such as ground covers, shrubs, vines, trees, and/or flowering plants (forbs) on exposed areas for erosion control and final stabilization. Permanent perennial vegetation is required to achieve final stabilization. Native perennial plants are preferred for erosion control because of the following reasons:

- In appropriate habitats, native plants are better adapted to environmental and site conditions, resulting in lower maintenance costs
- Natives are not typically aggressive and do not allow the site to become a source of exotic invasive plants that can spread to other locations and become costly to remove
- Unlike most non-natives, native plants support native insect, bird, and other wildlife for pollinations, food sources, and nesting
- Using native plants provides opportunities to educate and demonstrate various sustainable approaches for the public
- The Tennessee Exotic Pest Plant (TNEPPC) council has ranked non-native plants in Tennessee based on their invasiveness and threats to the natural environment. The following plants that have been used for erosion control ty TDEC and TDOT are listed in TNEPPC's publication **"Invasive Exotic Pest Plants in Tennessee – 2009"**:
  - Korean (and Kobe) lespedeza – "Severe Threat" Category (Kobe is not ranked but has same invasive characteristics as Korean)
  - Tall fescue – "Significant Threat" Category

- Foxtail millet – "Significant Threat" Category
- Crown vetch – "Alert" Category

We are providing native and non-invasive alternative species as the preferred choice for erosion control and soil stabilization for TDEC projects. (Table 7.9-1)

Purpose

To reduce stormwater runoff velocity, maintain sheet flow, protect the soil surface from erosion, promote infiltration of runoff into the soil, and improve aesthetics and provide diversity. Many native grasses have very deep and fibrous roots, a minimum of one foot and up to fifteen feet, and provide long-term erosion control.

Conditions Where Practice Applies

Apply to fine-graded areas on which permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding may also be used on rough-graded areas that will not be brought to final grade for a year or more. Areas to be seeded with permanent vegetation must be seeded or planted within 14 days after the construction activity in that portion of the site has permanently ceased.

Planning Considerations

The most common and economical means of stabilizing disturbed soils is by seeding a mixture of grasses and forbs. The advantages of seeding over other means of establishing plants include the smaller initial cost, lower labor input, and greater flexibility of method. The disadvantages of seeding include the potential for erosion during the establishment stage, the need to reseed areas that fail to establish, seasonal limitations on suitable seeding dates, and a need for water and appropriate temperatures during germination and early growth. The probability of successful plant establishment can be maximized through good planning, knowledge of the soil characteristics, selection of suitable plant materials for the site, good seedbed preparation, adequate liming and fertilization, and timely planting and maintenance.

Native grasses can be planted by drilling or seeding. The ground should be prepared by discing or rotovating prior to seeding in the spring or summer. Annual grains such as rye or oats can be planted prior to sowing the grass seed for erosion control. Grass seed can be planted in the dormant season as well.

Permanent perennial vegetation is used to provide a protective cover for exposed areas including cuts, fill, and other denuded areas that will not be regraded. Permanent stabilization should be applied where topsoil was never stripped, or has been returned and incorporated into the soil surface.

- When stripping a site, topsoil should be stockpiled for later use.
- Stockpiled topsoil should be stabilized using temporary vegetation.
- Where a suitable planting medium is not present, topsoil shall be imported and incorporated into the site.
- Block sod provides immediate cover; it is especially effective in controlling erosion adjacent to concrete flumes and other structures. .
- When mixed plantings are done during marginal planting periods, companion crops shall be used.
- No-till planting can be effective when planting is done following a summer or winter annual cover crop.
- Irrigation should be used when the soil is dry or when summer plantings are done.

- Native species are low maintenance plants and are preferred to ensure long-lasting erosion control.
- Wildlife plantings of native species should be included when applicable.

Wildlife Plantings: Commercially available plants beneficial to wildlife species include the following:

- Mast Bearing Trees: Beech, Black Cherry, Blackgum, Chestnut, Oak, Hackberry, Hickory, Honey Locust, Black Locust, and Persimmon.
- Shrubs and Small Trees: Serviceberry, Crabapple, Pawpaw, Spicebush, Hazelnut, Dogwood, Highbush and Lowbush Blueberries, native Holly, Red Cedar, Red Mulberry, Sumac, Wild Plum, Blackhaw and Blackberry. Plant shrubs in patches without tall trees to develop stable shrub communities. All produce fruit used by many kinds of wildlife.

Design Criteria

The state is divided into three planting regions designated I, II and III as shown in the figure below. Native seed mixes are preferred and the recommendations are shown in Table 7-9.1. Note that the rates are based upon Pure Live Seed (PLS).

Figure 7.9-1: TN Planting Regions

Table 7.9-1 Preferred seed mixes using natives or naturalized plants and planting dates.
**non-native but do not spread.*

Zone		Best	Marginal	Preferred Rate/Mix (lb/ac PLS)
Region I	Poorly drained soils	Feb 1 – Mar 20 Sept 1 – Sept 30	Mar 20 – Apr 30 Sept 30 – Oct 31	15 Browntop millet* (nurse crop) 2 switch grass 4 little bluestem 4 Virginia wild rye 4 purpletop 2 partridge pea 2 black-eyed susan
	Well drained soils	Apr 1 – July 15		15 Browntop millet* (nurse crop) 4 little blue stem 4 purpletop 2 sideoats gramma 2 partridge pea 2 black-eyed susan
	High maintenance	Apr 1 – July 15		15 Browntop millet* (nurse crop) 2 partridge pea 45 Red fescue* 45 hard fescue* 25 chewing fescue*
Region II	Low maintenance; Slopes and Poor, shallow soils	Aug 25 – Sept 15 **Feb 15 – May 30**	Sept 15 – Oct 25 Mar 21 – May 30	15 Browntop millet* (nurse crop) 5 little bluestem 2 switch grass 2 tall dropseed 5 sideoats gramma 2 black-eyed susan 2 partridge pea 1 greyheaded coneflower
	Low maintenance; Moderate slopes; soils >6 in. depth	Aug 25 – Sept 15 **Feb 15 – May 30**	Sept 15 – Oct 25 Mar 21 – Apr 15	15 Browntop millet* (nurse crop) 5 purpletop 5 little bluestem 5 Virginia wild rye 2 black-eyed susan 2 partridge pea 1 greyheaded coneflower
	High maintenance	Aug 30 – Oct 15	Feb 15 – Apr 15	15 Browntop millet* (nurse crop) 2 partridge pea 45 Red fescue* 45 hard fescue* 25 chewing fescue*
Region III	>2500 ft elevation; steep slopes	Mar 20 – Apr 30	Aug 15 – Aug 30 Mar 1 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 5 purpletop 10 little bluestem 10 Indian grass 2 black-eyed susan 0.5 monarda (bergamot) 4 Maryland senna
	<2500 ft elevation; steep slopes	Aug 15 – Sept 1 **Mar 1 – Apr 1**	Sept 1 – Sept 15 Apr 1 – June 10	

Region III *cont'd*	>2500 ft elev.; Shallow soils	Mar 20 – Apr 20	Aug 15 – Aug 30 Mar 5 – Mar 20 April 20 – June 15	15 Browntop millet* (nurse crop) 4 purpletop 10 little bluestem 10 broomsedge 2 partridge pea 2 black-eyed susan 0.5 monarda (bergamot)
	<2500 ft elev.; Shallow soils	Aug 15 – Sept 1 **Mar 1 – Apr 1**	Sept 1 – Sept 15 Apr 1 – June 10	
	>2500 ft. elev.; Moderate slopes	Mar 20 – Apr 20	Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 4 purpletop 10 little bluestem 10 Indian grass 2 black-eyed susan 0.5 monarda (bergamot) 4 Maryland senna
	<2500 ft. elev.; Moderate slopes	Aug 15 – Sept 1 **Mar 1 – Apr 1**	Sept 1 – Sept 15 Apr 1 – June 10	
	>2500 ft elev.; High maintenance	**Mar 20 – Apr 20**	Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 45 Red fescue* 45 hard fescue* 25 chewing fescue*
	<2500 ft elev.; High maintenance	Aug 15 – Sept 1 **Mar 1 – Apr 1**	Sept 1 – Sept 15 Apr 1 – June 10	

In Table 7.9-1, the bold dates are the preferred dates for seeding. Also, high maintenance areas include lawns and other grassed areas that will be maintained for aesthetics.

Table 7.9-2 Allowable seed mixes and planting dates.

Zone		Best	Marginal	Rate/Mix (lb/ac PLS)
Region I	Poorly drained soils	Feb 1 – Mar 20 Sept 1 – Sept 30	Mar 20 – Apr 30 Sept 30 – Oct 31	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Well drained soils	Apr 1 – July 15		50 Pensacola bahiagrass 15 Bermudagrass (hulled) 30 Korean lespedeza** 15 Foxtail millet**
	High maintenance	Apr 1 – July 15		40 Bermudagrass (hulled)
Region II	Low maintenance; Slopes and Poor, shallow soils	Aug 25 – Sept 15 **Feb 15 – Mar 21**	Sept 15 – Oct 25 Mar 21 – Apr 15	100 Pensacola bahiagrass 40 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Low maintenance; Moderate slopes; soils >6 in. depth	Aug 25 – Sept 15 **Feb 15 – Mar 21**	Sept 15 – Oct 25 Mar 21 – Apr 15	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	High maintenance	Aug 15 – Oct 15	Feb 15 – Apr 15	200 KY 31 fescue**

Region III	>2500 ft elevation; steep slopes	July 25 - Aug 15 **Mar 20 – Apr 20**	July 15 – July 25 Aug 15 – Aug 30 Mar 1- Mar 20 Apr 20 – May 15	100 KY 31 fescue** 20 Kobe lespedeza** 10 Korean lespedeza** 5 Redtop
	<2500 ft elevation; steep slopes	Aug 15 – Sept 1 **Mar 1 – Apr 1**	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft elev.; Shallow soils	July 25 - Aug 15 **Mar 20 – Apr 20**	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	40 KY 31 Fescue** 10 Korean lespedeza** 10 Redtop 10 Crown vetch**
	<2500 ft elev.; Shallow soils	Aug 15 – Sept 1 **Mar 1 – Apr 1**	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft. elev.; Moderate slopes	July 25- Aug 15 **Mar 20 – Apr 20**	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	60 KY 31 fescue** 15 Korean lespedeza** 15 Kobe lespedeza**
	<2500 ft. elev.; Moderate slopes	Aug 15 – Sept 1 **Mar 1 – Apr 1**	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft elev.; High maintenance	July 25 - Aug 15 **Mar 20 – Apr 20**	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	200 KY 31 fescue**
	<2500 ft elev.; High maintenance	Aug 15 – Sept 1 **Mar 1 – Apr 1**	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	

Roundstone Native Seed, LLC
9764 Raider Hollow Road, Upton, KY 42784

Kind: Switchgrass		*Lot No: 11074*	
Variety:	*Cave-in-Rock*	*Inert Matter:*	*1.78*
Origin:	*KY*	*Weed Seeds:*	*0.00*
Test Date:	*02/12*	*Crop Seeds:*	*0.00*
Pure Seed:	*98.22*	*Hard Seed:*	*0.00*
Total Germ:	*95.32*	*Germ:*	*95.32*
Pure Live Seed:	*93.62*	*Noxious:*	*0.00*

Figure 7.9-2 Typical Seed

Seeding rates: *Seed rates in Table 7.9-1 are based upon Pure Live Seed (PLS), which is the product of the purity shown on the seed tag multiplied by the germination. The PLS for the seed tag shown in Figure 7.9-2 would be 0.9362 X 0.95 = 0.89 Thus only 89% of the seed are considered live. If the plan calls for a seed rate of 2 lb/acre of switchgrass find the actual seed rate for the conditions shown on the tag. Actual seed rate required is 2 lb/ac / 0.95 PLS = 2.15 lb/acre. In other words, to get an actual rate of 2 lb. per acre it will require 2.15 lb. of seed.*

Temporary seed may be required when seeding outside of the preferred seeding dates. See Section 7.8 for more information on temporary seeding.

Construction Specifications

Grading and Shaping: Grading and shaping may not be required where hydraulic seeding and fertilizing equipment is to be used. Vertical banks shall be sloped to enable plant establishment.

When conventional seeding and fertilizing are to be done, grade and shape the slope, where feasible and practical, so that equipment can be used safely and efficiently during seedbed preparation, seeding, mulching, and maintenance of vegetation.

Concentrations of water that could cause excessive soil erosion should be diverted to a safe outlet. Diversions and other treatment practices must conform to the appropriate standards and specifications.

Plant Selection: Only certified seed shall be used. Refer to Table 7.9-1 for suggested species. Grass type should be selected on the basis of species characteristics; site and soil conditions; planned use and maintenance of the area; time of year of planting, method of planting; and the needs and desires of the land user.

Plant selection may also include annual companion crops. Annual companion crops should be used only when the perennial species are not planted during their optimum planting period. Care should be taken in selecting companion crop species and seeding rates because annual crops will compete with perennial species for water, nutrients, and growing space. A high seeding rate of the companion crop may prevent the establishment of perennial species.

Ryegrass shall not be used in any seeding mixtures containing permanent, perennial species due to its ability to out-compete desired species chosen for permanent perennial cover. However, crimson, clover, oats and winter wheat can be planted any time of the year and are recommended as a cover crop with native perennial species.

Topsoil: Topsoil should be replaced on all areas to be seeded. See Practice 7.3 for more information on the removal, storage and reapplication of topsoil.

Seedbed Preparation: When conventional seeding is to be used, topsoil should be applied to any area where the disturbance results in subsoil at the final grade surface. Figure 7.9-3 provides guidance on the volume of topsoil required to provide specific topsoil depths. Soil pH should be above 5 – preferably between 6.0 and 6.5. Soil on the site should be tested to determine lime and fertilizer rates. Soil should be submitted to a soils specialist or County Agricultural Extension agent for testing and soil amendment recommendations. In the absence of soil test results, the following application rates can be used:

- **Ground agricultural limestone:**
  Light-textured, sandy soils: 1- 1 1/2 tons/acre
  Heavy-textured, clayey soils: 2-3 tons/acre
- **Fertilizer:**
  Grasses: 800-1200 lb/acre of 10-10-10 (or the equivalent)
  Grass-legume mixtures: 800-1200 lb/acre of 5-10-10 (or the equivalent)

Broadcast Seeding:

- Seedbed preparation may not be required where hydraulic seeding equipment is to be used.
- Tillage, at a minimum, shall adequately loosen the soil to a depth of 4 to 6 inches; alleviate compaction; incorporate topsoil, lime, and fertilizer; smooth and firm the soil; allow for the proper placement of seed, sprigs, or plants; and allow for the anchoring of straw or hay mulch if a crimper is to be used.
- Tillage may be done with any suitable equipment.
- Tillage should be done parallel to the contour where feasible.
- On slopes too steep for the safe operation of tillage equipment, the soil surface shall be pitted or trenched across the slope with appropriate hand tools to provide consecutive beds, 6 to 8 inches apart, in which seed may lodge and germinate. Hydraulic seeding may also be used.

Depth (Inches)	Per 1,000 Square Feet	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806

7.9-3 Cubic yards of topsoil required to attain various soil depths

Inoculants: Native legume seeds do not need to be inoculated. All non-native legume seed shall be inoculated with appropriate nitrogen fixing bacteria. The inoculants shall be pure culture prepared specifically for the seed species and used within the dates on the container. A mixing medium recommended by the manufacturer shall be used to bond the inoculants to the seed. For conventional seeding, use twice the amount of inoculants recommended by the manufacturer.

No-Till Seeding: No-till seeding is permissible into annual cover crops when planting is done following maturity of the cover crop or if the temporary cover stand is sparse enough to allow adequate growth of the permanent (perennial) species. No-till seeding shall be done with appropriate no-till seeding equipment. The seed must be uniformly distributed and planted at the proper depth. Native grasses respond very well to drill seeding at a depth of one-fourth inch.

Mulch: Straw mulch is required for all permanent vegetation applications and must be applied immediately after the application of seed. The application rate for mulch is 2 tons per acre with overall uniform soil coverage of 70%. All mulch must be anchored. See Practice 7.6 for more information on straw mulch.

Maintenance and Inspection Points

Any areas that have washed out due to high stormwater flows, areas that have been disturbed by blowing wind, and areas that do not show good germination should be retreated.

Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

Reseeding: If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

References

North Carolina Erosion and Sediment Control Planning and Design Manual

SEDIMENT CONTROL PRACTICES

7.34 SILT FENCE

SILT FENCE

Definition A temporary sediment control measure, composed of woven geotextile fabric supported by steel or wood posts, used to intercept sediment transported from areas where runoff occurs as sheet flow.

Purpose To prevent sediment carried by sheet flow from leaving the site and entering natural drainage ways or storm drainage systems by slowing storm water runoff, causing ponding and the deposition of sediment at the structure. Silt fence does not filter sediment.

Conditions Where Practice Applies Silt fence may be used in a variety of locations including:

- at the toe of, or on, an exposed slope
- around the perimeter of an exposed construction site
- along the banks of ditches or swales
- around the perimeter of a soil stockpile
- around buffer areas

Silt fence shall not be installed across streams, ditches, waterways, or other concentrated flow areas.

Planning Considerations Silt fence is a system to retain sediment on the construction site. The fence retains sediment primarily by retarding flow and promoting deposition. In operation, the geotextile silt fence material ponds runoff behind it, as the flow rate through the geotextile is often much lower than the flow rate of the runoff coming to the silt fence. Ponding behind the silt fence is necessary to encourage sediment settling. The designer should anticipate ponding and provide sufficient storage areas and overflow outlets to prevent flows from overtopping the fence. Since silt fence is not designed to withstand high water levels, locate them so that only shallow pools can form. Tie the ends of silt fence into higher ground to prevent flow around the end of the fence before the pool reaches design level. Silt fence should be curled uphill

on each end of the fence in a "J" pattern to prevent end flow and scour. Provide stabilized outlets to protect the fence system and release storm flows that exceed the design storm.

Deposition occurs as the storage pool forms behind the fence. The designer can direct flows to specified deposition areas through appropriate positioning of the fence or by providing an excavated area behind the fence. Plan deposition areas at accessible points to promote routine cleanout and maintenance.

Silt fence serves no function along ridges or near drainage divides where there is little movement of water. Confining or diverting runoff unnecessarily with a sediment fence may create erosion and sedimentation problems that would not otherwise occur.

Anchoring of silt fence is critical. The toe of the fabric must be anchored in a trench backfilled with compacted earth. Mechanical compaction must be provided in order for the fence to effectively pond runoff.

Design Criteria

Silt fence should be installed along the contour, never up or down a slope. This is essential to ensure that the fence will not accidentally concentrate stormwater flows, thus creating worse erosion problems.

Silt fence can be installed without backing or with wire backing.

- The maximum drainage area for a continuous fence without backing shall be 1/4 acre per 100 linear feet of fence length, up to a maximum area of 2 acres. The maximum slope length behind the fence on the upslope side should be 110 feet (as measured along the ground surface).
- The maximum drainage area for a continuous silt fence with backing shall be 1 acre per 150 linear feet of fence length. The slope length above the silt fence with backing should be no more than 300 feet.

Silt fence should be installed so as to be as close as possible to the ground contour. The bottom of the fence at the ground line should be on a 0% grade, plus or minus 0.5%.

When used at the bottom of a slope, silt fence should be installed 5 feet to 7 feet away from the toe to allow extra space for the ponding of water and collection of sediments.

The expected life span of the silt fence is 6 to 12 months. Therefore, projects of long duration may require a complete replacement of the silt fence. The quantity for silt fence to be in place for a long period of time should be based on the assumption that the material will be replaced every 9 months, on the average.

Table 7.34-1 contains the fabric specifications for silt fence with and without backing. For silt fence without backing, posts shall be hardwood posts that are 2.25" (nominal) x 2.25" (nominal) x 58". T-type steel posts also may be used. Silt fence with backing shall be installed on a minimum of 1.25 lb/ft steel posts with 14 gauge wire backing that has a maximum mesh size of 6 inches. Ensure that steel posts have projections for fastening the fabric.

Table 7.34-1 Silt Fence Fabric Specifications

	Test Material	Without backing	With backing
Geotextile fabric type		Woven slit film	Woven monofilament
Apparent opening size	ASTM D4751	#30 to #70 standard sieve	#70 to #100 standard sieve
Water flux	ASTM D4491	≥ 4 gpm/ft^2	≥ 18 gpm/ft^2
Tensile strength	ASTM D4632	≥ 120 lb. (warp direction) 100 lb. (fill direction)	≥ 310 lb. (warp direction) 200 lb. (fill direction)
UV Stability (after 500 hrs)	ASTM D4355	≥ 70%	≥ 90%
Elongation	ASTM D4632	≤ 20% max.	---
Burst strength	ASTM D3786	≥ 250 PSI	≥ 400 psi
Puncture strength	ASTM D4833	≥ 60 lb.	≥ 105 lb.
Trapezoidal tear	ASTM D4533	≥ 50 lb (warp direction) 40 lb (fill direction)	≥ 100 lb (warp direction) 60 lb (fill direction)

Construction Specifications

- Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. Ponding water depth should not exceed 1.5 feet. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
- Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post or roll the fabric together and fasten to one post to create a stronger joint. Where joints are necessary, plan the roll layout so as not to have joints at low points.
- Do not attach filter fabric to trees.
- When silt fence is installed adjacent to streams, wetlands and other natural resources, silt fence with backing should be used.
- Install posts no more than 6 feet apart.
- Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.
- Securely attach the silt fence fabric to the posts on the **upstream** side of the posts. For steel posts, attach fabric to the posts using wire or plastic zip ties with a minimum 50 pound tensile strength, at least 5 to a post. Three ties should be installed in the upper 8 inches for top strength. Ties should be installed on the diagonal, as opposed to on the horizontal, to grab more strands. For hardwood posts, attach fabric with 17 gauge wire staples (3/4" wide x 1/2" long), at least 5 to a post. 3 staples should be installed in the upper 8 inches for top strength.
- Install J-hooks for confining the water behind the fence and maximizing the trapping efficiency. See Figure 7.34-1 below.

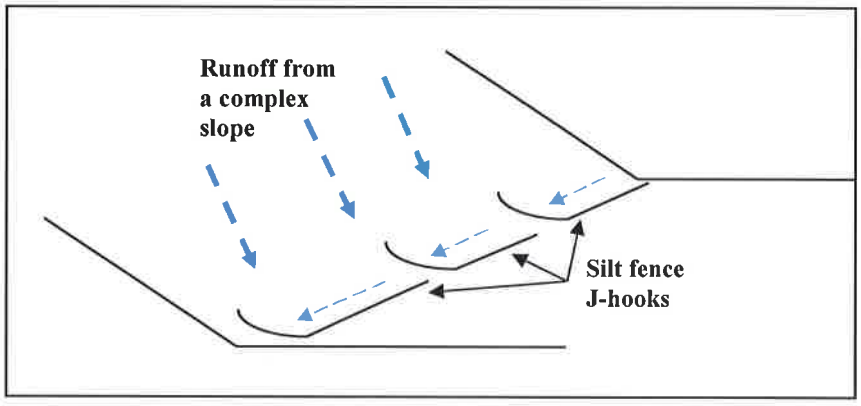


Figure 7.34-1 J-Hook Installation Example

Traditional silt fence trenching method for installation:

- Excavate a trench approximately 4 inches wide and 6 inches deep along the proposed line of posts and upslope from the barrier
- Place 10 inches of the fabric along the bottom and side of the trench. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance. Poor compaction can cause failure of the silt fence along the toe.
- The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level as necessary.

Slicing method for installation:

- A slicing machine can be used to install silt fence. This method of installation provides excellent compaction and joint integrity along the toe.
- Posts should be set a maximum of 6 feet apart.
- The geotextile fabric should be inserted in a slit in the soil 8-12 inches deep. The slit should be created such that a horizontal chisel point, at the base of a soil-slicing blade, slightly disrupts the soil upward as the blade slices through the soil. This upward disruption minimizes horizontal compaction and creates an optimal soil condition for mechanical compaction against the geotextile. The geotextile should be mechanically inserted directly behind the soil-slicing blade in a simultaneous operation, achieving consistent placement and depth. No turning over (plowing) of soil is allowed for the slicing method.

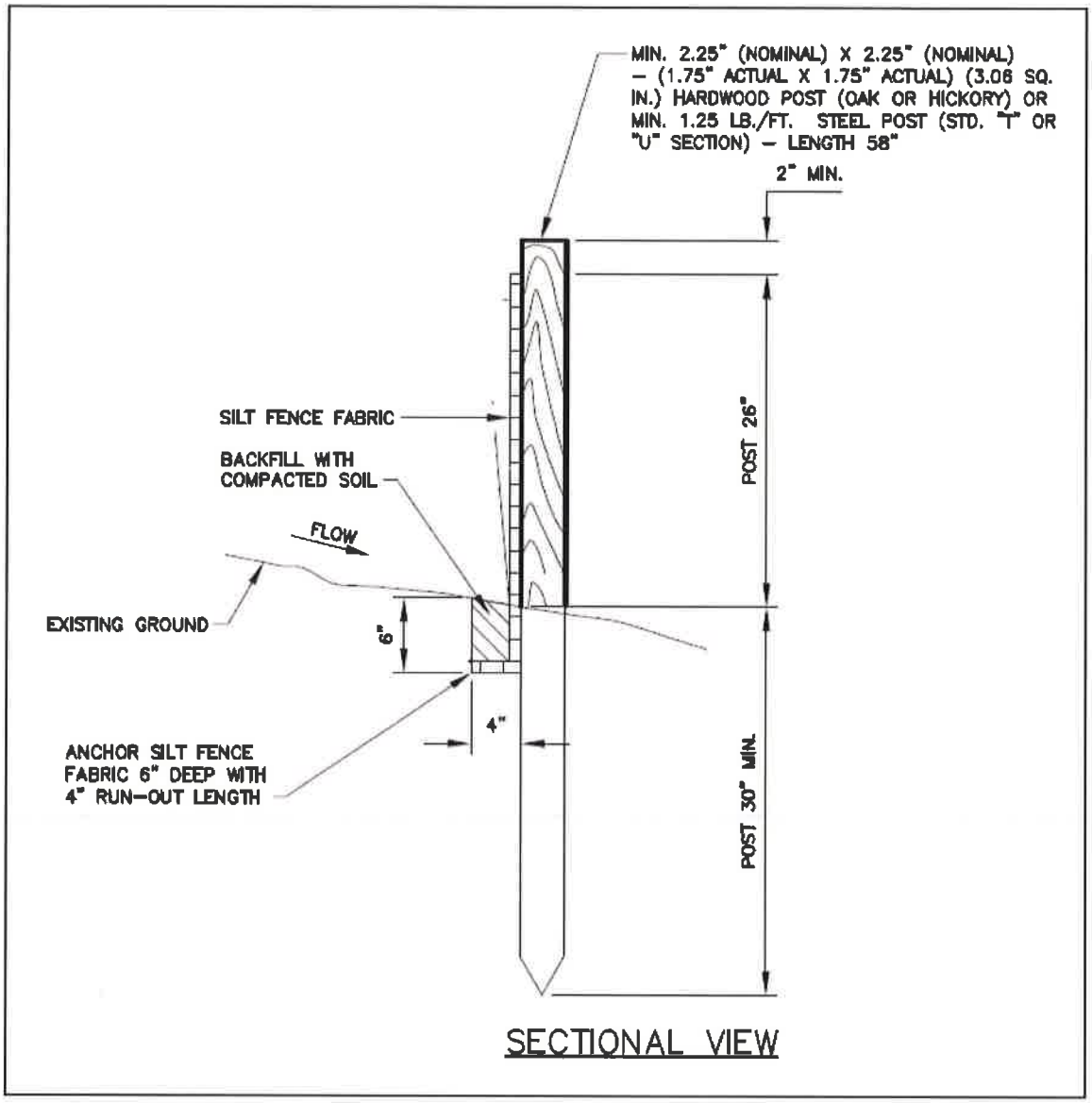


Figure 7.34-2 Silt fence details

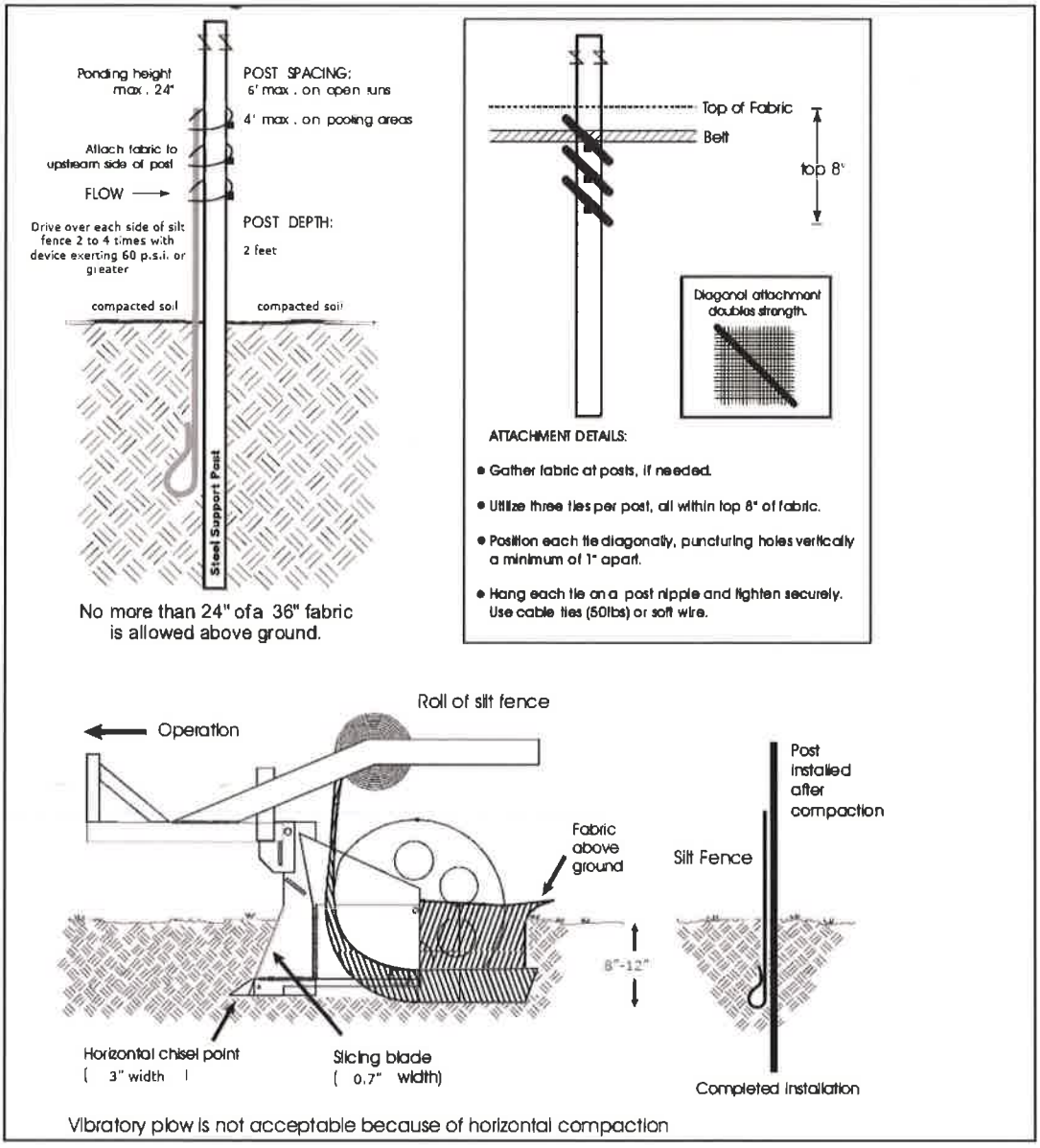


Figure 7.34-3 Silt Fence Slicer Installation Details (*Adapted from Silt Fence That Works)*

Maintenance and Inspection Points

Remove sediment once it has accumulated to ½ the original height of the barrier.

Replace filter fabric whenever it is worn or has deteriorated to such an extent so that the effectiveness of the fabric is reduced.

All sediment accumulated at the fence should be removed and properly disposed of before the fence is removed.

Repair sagging silt fence to prevent failure or overtopping.

Monitor the toe for evidence of piping or erosion along the toe. Install J-hooks wherever runoff flows along the toe of the fencing to prevent undermining.

Silt fence should remain in place until disturbed areas have been permanently stabilized.

References

TDOT Design Division Drainage Manual

TDOT Erosion Control Standard Drawing EC-STR-3B

North Carolina Erosion and Sediment Control Planning and Design Manual

Devon Distributing Corporation. http://www.tommy-sfm.com/index.html

Metropolitan Council (Minnesota) Minnesota Urban Small Sites BMP Manual

STABILIZATION PRACTICES

7.8 TEMPORARY VEGETATION

TS STABILIZATION WITH TEMPORARY VEGETATION

Definition The establishment of temporary vegetative cover with fast growing species for seasonal protection on disturbed or denuded areas.

Purpose To temporarily stabilize denuded areas that will not be brought to final grade for a period of more than 14 days.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. Seeding with a temporary groundcover provides temporary stabilization until permanent stabilization can be achieved. In addition, it provides residue for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction.

Conditions Where Practice Applies On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than 1 year.

For permanent seeding specifications, see Section 7.9.

Planning Considerations Annual plants that sprout and grow rapidly and survive for only one season are suitable for establishing initial or temporary vegetative cover. Temporary seeding preserves the integrity of earthen sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency of sediment basin cleanouts will be reduced if the watershed areas outside the active construction zone are stabilized.

Proper seedbed preparation, selection of appropriate species, and the use of quality seed are important. Failure to follow established guidelines and recommendations carefully may result in an inadequate or short-lived stand of vegetation that will not control erosion. Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.

Design Criteria

Complete grading before preparing seedbeds, and install all necessary erosion control practices such as dikes, waterways, and basins. Minimize steep slopes because they make seedbed preparation difficult and increase the erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow.

Construction Specifications

Grading and Shaping: Excessive water runoff shall be reduced by properly designed and installed erosion control practices such as ditches, dikes, diversions, and sediment basins. No shaping or grading is required if slopes can be stabilized by hand-seeded vegetation or if hydraulic seeding equipment is to be used.

Seedbed Preparation: Good seedbed preparation is essential to successful plant establishment. A good seedbed is well pulverized, loose and uniform. Where hydroseeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

Liming: Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate to 1 to 1½ tons/acre on coarse textured soils and 2-3 tons/acre on fine textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher do not need to be limed.

Fertilizer: Base application rates on soil tests. When soil tests are not possible, apply a 10-10-10 grade fertilizer at 700-1000lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before the application.

Surface Roughening: If recent tillage operations have resulted in a loose surface, additional roughening may not be necessary, except to break up large clods. If rainfall caused the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding.

Seeding: Select a non-invasive grass or grass-legume mixture suitable to the area and season of the year. See Figures 7.8-1 to 7.8-3 for suggestions of temporary seeding species. Although native plants are preferred, there are currently no available native species that are not cost prohibitive. Non-invasive annual plants are preferred. Seed shall be applied uniformly by hand, cyclone seeder, drill, cultipacker seeder, or hydraulic seeder. Drill or cultipacker seeders should normally place seed ¼ to ½ inches deep. Appropriate depth of planting is 10 times the seed diameter. Soil should be raked lightly to cover seed with soil if seeded by hand.

Mulching: The use of mulch will help ensure establishment under normal conditions, and is essential to seeding success under harsh site conditions. Harsh site conditions include:

- Seeding in fall for winter cover
- Slopes steeper than 3:1
- Excessively hot or dry weather
- Adverse soils (shallow, rocky, or high in clay or sand), and
- Areas receiving concentrated flow.

Irrigation: During times of drought, water shall be applied at a rate not causing runoff and erosion. The soil shall be thoroughly wetted to a depth that will ensure germination of the seed. Subsequent applications should be made as needed. Newly seeded areas require more water than more mature plants.

Species	**Rate (lb/acre)**
Rye	120

Seeding dates

East .....Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Middle ..... Jan. 1 - May 1
West ..... Dec. 1 - Apr. 15

Soil amendments

Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

Figure 7.8-1 Temporary Seeding Recommendation for Late Winter and Early Spring

Species	**Rate (lb/acre)**
Oats	60
Brown top millet	30

Seeding dates

East ..... May 15 - Aug. 15
Middle ..... May 1 - Aug. 15
West ..... Apr. 15 - Aug. 15

Soil amendments

Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

Figure 7.8-2 Temporary Seeding Recommendation for Summer

Species	Rate (lb/acre)
Oats	30
Winter wheat	30

Seeding dates

East ..... Aug 15 – Dec 15
Middle ..... Aug. 15 – Dec 30
West ..... Aug. 15 – Dec 30

Soil amendments

Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage. If necessary to extend temporary cover beyond June 15, overseed with 50 lb/ac crimson clover in late February or early March.

Figure 7.8-3 Temporary Seeding Recommendations for Fall

Maintenance and Inspection Points

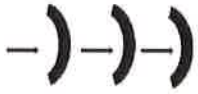
Reseed and mulch areas where seedling emergence is poor or where erosion occurs, as soon as possible. Do not mow.

References

North Carolina Erosion and Sediment Control Planning and Design Manual

RUNOFF CONTROL AND MANAGEMENT

7.25 TUBES AND WATTLES



TUBES AND WATTLES

Definition A small temporary barrier, grade control structure or dam constructed across a swale, drainage ditch, or area of concentrated flow.

Purpose To minimize the erosion rate by reducing the velocity of storm water in areas of concentrated flow, and to capture larger soil particles.

Conditions Where Practice Applies This practice is applicable in a ditch to help reduce the effects of soil erosion and aid in sediment retention. Sediment tubes and wattles should not be used in streams.

Planning Considerations The stability of tubes and wattles is very dependent upon proper staking. Thus, they may not be utilized on pavement, rocky soil or at any location where the stakes cannot be driven to the required depth.

Design Criteria The maximum drainage area to any given tube or wattle should be no more than 5 acres. When applied in a ditch, the same design requirements as rock check dams apply. The depth of flow on the center of the wattle or tube (weir) shall be computed for the peak flow rate generated by the 2-year, 24-hour storm in order to ensure that the top of the structure and ditch will not be overtopped. For sites draining to high quality streams or streams listed as impaired by sediment, the depth must be determined for the 5-year, 24-hour peak flow rate. The weir section must be at least 9 inches deep. See Table 7.25-1 for the minimum spacing for ditch applications.

Joints within a ditch section should be avoided. However, where joints are necessary, a second row of tubes or wattles is required with the joints staggered by a distance equal to half of the individual segment length.

Tube/wattle netting should be a knitted material with 1/8 to 3/8 inch openings and made of photodegradable (polypropylene, HDPE) or biodegradable (cotton, jute, coir) material. The minimum diameter for any tube or wattle applied in a ditch should be 12 inches. This will ensure that the tube will function effectively as a velocity control device.

Slope (%)	Maximum Tube/ Wattle Spacing (ft.)
< 2	125
2	100
3	75
4	50
5	40
6	30
> 6	25

Table 7.25-1 Maximum Spacing for Wattles/Tubes in Ditch Application *(Source: TDOT)*

Construction Specifications

Proper site preparation is essential to ensure tubes and wattles are in complete contact with the underlying soil surface. Remove all rocks, clods, vegetation or other obstructions so installed tubes and wattles have direct contact with the underlying soil surface.

Install tubes and wattles by laying them flat on the ground. Install stakes at spacings per the manufacturer's recommendation. Stakes should be installed on the downstream side of the wattles/tubes.

Install tubes so no gaps exist between the soil and the bottom of the tube.

Keep tubes in place until the contributing drainage area has been stabilized.

The ends of the wattle or tube must extend up the ditch side slopes at least 6" vertical above the weir flow depth (see Figure 7.25-1 below).

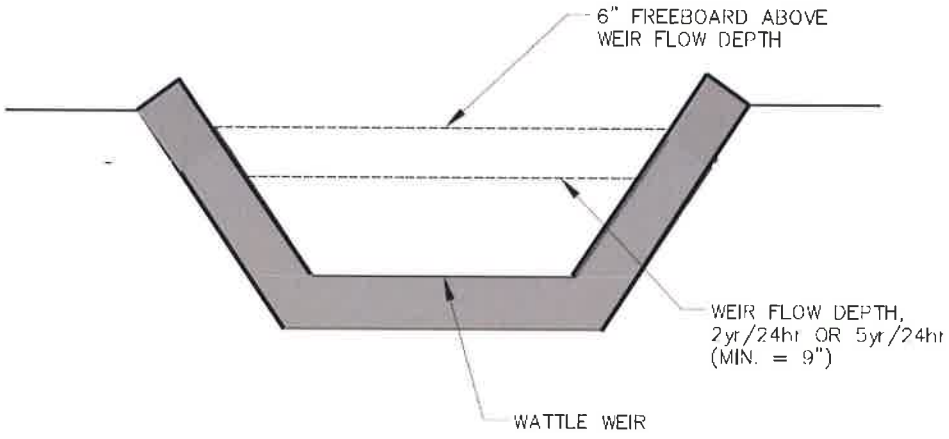


Figure 7.25-1 Cross sectional view of wattle installed in ditch

Maintenance and Inspection Points

- Inspect wattles and tubes after installation for gaps under the tubes and for gaps between the joints of adjacent ends of tubes. Ensure stakes are on the downstream side.
- Repair all rills, gullies, and undercutting near tubes.
- Remove all sediment deposits when the sediment reaches 1/3 the height of the exposed tube.
- Remove and/or replace installed sediment tubes as required to adapt to changing construction site conditions.
- Most tubes and wattles are filled with biodegradable materials. When the fill materials degrade and settle, the wattle should be replaced.
- At the end of the project, biodegradable wattles and tubes can be split open, the netting material and stakes removed, and the biodegradable material left in place to aid stabilization.

References

TDOT Design Division Drainage Manual

TDOT Erosion Control Standard Drawing EC-STR-31

South Carolina Department of Health & Environmental Control Stormwater Management BMP Handbook