

CITY OF BELLE MEADE, TENNESSEE
SUPPLEMENTAL
BEST MANAGEMENT PRACTICES
(BMP)
MANUAL



Prepared by:

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BMP Manual Supplement

City of Belle Meade, Tennessee

Introduction & Purpose

This Best Management Practice (BMP) Manual supplement is provided to meet the following objectives:

- provide an introduction to the two BMP Manuals produced by the Tennessee Department of Environment and Conservation and the Tennessee Water Resources Research Center and adopted by the City;
- provide specific information regarding the City's Construction Stormwater Runoff Control Program through a Land Disturbance Permit Application checklist;
- provide additional BMPs that have specific application to smaller lot development which is the most anticipated type of development within the City.

The goal of the stormwater ordinance, the two BMP Manuals, and this Supplemental BMP Manual is to improve the quality of stormwater runoff in the City by regulating construction and long-term maintenance activities and providing the tools necessary for meeting the regulations.

The first BMP Manual, *the Tennessee Erosion and Sediment Control Handbook, 2nd Edition* available at http://www.state.tn.us/environment/wpc/sed_ero_controlhandbook/, provides detailed procedures for controlling erosion and preventing sediment runoff from construction sites. These structural and non-structural procedures can be adapted to individual construction sites for compliance with the Tennessee Construction General Permit (TCGP). Prior to March 10, 2003, construction sites disturbing five (5) or more acres were required to comply with the TCGP; however, since March 10, 2003, the area requirement has been lowered to one (1) acre. Individual Municipal Separate Storm Sewer Systems (MS4s) like the City of Belle Meade had the option of lowering this requirement to less than one (1) acre. The stormwater ordinance included as an attachment to this supplement details the specific requirements of the City of Belle Meade regarding what size area of disturbance among other site conditions may require a land disturbance permit from the City.

The second BMP Manual, *the Guide to Selection and Design of Stormwater Best Management Practices, March 2003* available at <http://eerc.ra.utk.edu/divisions/wrrc/BMP/bmp.htm>, is a guide for post-construction practices. Phase II of the National Pollution Discharge and Elimination System (NPDES) requires an emphasis be placed upon the long-term maintenance of post-construction BMPs. This manual provides detailed information about various structural and non-structural practices to enhance water quality and mitigate excessive water quantity from developed sites.

The City of Belle Meade adopted a stormwater ordinance on September 15, 2004 to comply with Phase II of the NPDES program as administered by the Tennessee Division of Water Pollution Control. The ordinance provides for a Construction/Post-Construction Runoff Control Program development requiring specific erosion and sediment control practices for disturbed areas greater than one (1) acre or as otherwise specified in Section 3 of the stormwater ordinance. Following is a summary of the requirements for obtaining a land disturbance permit for regulated land disturbing activities within the City of Belle Meade. A completed copy of this checklist shall accompany each land disturbance permit application.

City of Belle Meade, Tennessee Land Disturbance Permit Checklist

Item	Description	Provided (Y or N)
1	Provide a copy of the Notice of Intent (NOI) submitted to the Tennessee Division of Water Pollution Control (TDWPC) if one was required according to the Tennessee Construction General Permit.	
2	If an NOI was required, provide a copy of the Stormwater Pollution Prevention Plan (SWPPP).	
3	Provide all information including maps, calculations, narrative descriptions, etc. required by <i>Section 3 Land disturbance permits (4) Application for a land disturbance permit</i> of the City of Belle Meade's Stormwater Ordinance. The requirements of <i>Section 3(4)</i> overlap with those for a SWPPP; therefore, submittal of the SWPPP with attachments to demonstrate compliance with any additional requirements of the stormwater ordinance is acceptable.	
4	Grading permit review fee of \$250.00.	
5	Provide a copy of any other environmental permit such as an Aquatic Resource Alteration Permit (ARAP) that is required by other authorities for the disturbance of the site.	

Supplemental Best Management Practices (SBMPs)

Small-lot development is expected to be the primary form of land-disturbing activity within the City of Belle Meade. There are applicable BMPs in both BMP Manuals for this type of development; however, there are additional BMPs specifically designed for small-lot developments that are listed below:

SBMP #	Description	Comments
SBMP-1	Curb and Gutter Sediment Barrier	Drawing and commentary provided below.
SBMP-2	Curb Inlet Sediment Barrier	Drawing and commentary provided below.
SBMP-3	Silt Fence	Drawing and commentary provided below.
SBMP-4	Straw Rolls	Drawing and commentary provided below.
SBMP-5	Temporary Silt Fence with Backing	Drawing and commentary provided below.
SBMP-6	Enhanced Silt Fence	Drawing and commentary provided below.
SBMP-7	Temporary Erosion Ditch Check Using Enhanced Silt Fence	Drawing and commentary provided below.
SBMP-8	Erosion Control Fabric Joining Details	Drawing and commentary provided below.
SBMP-9	Disconnected Roof Drains	Commentary provided below.

SBMP-1 & 2

Curb and Gutter Sediment Barrier & Curb Inlet Sediment Barrier

These BMPs will require special consideration in their application due to the potential for ponding water within a roadway should they not be consistently maintained. If at all possible, discharge of filtered construction runoff should be directed to open swales, not directly to the storm sewer system via a catch basin; however, sometimes this may not be possible.

SBMP-3

Silt Fence

Silt fence is probably the most extensively used BMP for controlling construction runoff. This detail provides an acceptable alternative to the typical trenching method of anchoring the fabric. Installation of silt fence without anchoring the fabric is useless as an erosion and sedimentation control structure.

SBMP-4

Straw Rolls

Straw rolls or wattles are an alternative to typical silt fence in most situations. They have particular advantages for stabilizing small disturbed areas including ease of installation and ability to remain in place since they degrade over time.

**SBMP-5
Temporary Silt Fence with Backing**

This BMP is applicable in situations where the normal non-reinforced silt fence is not structurally capable of withstanding the forces placed upon it, typically in situations where the fence is installed along the toe of a fill slope greater than 15 feet in height. It may also have application along a floodplain or wetland boundary or other environmentally sensitive area in which a sediment release would have greater consequences.

**SBMP-6 & SBMP-7
Enhanced Silt Fence & Temporary Erosion Ditch Check Using Enhanced Silt Fence**

SBMP-6 is the only silt fence type BMP applicable for concentrated flow. SBMP-7 provides detail for its most common application as a substitute for rock check dams. It has the advantages of being easier to install and remove than stone check dams.

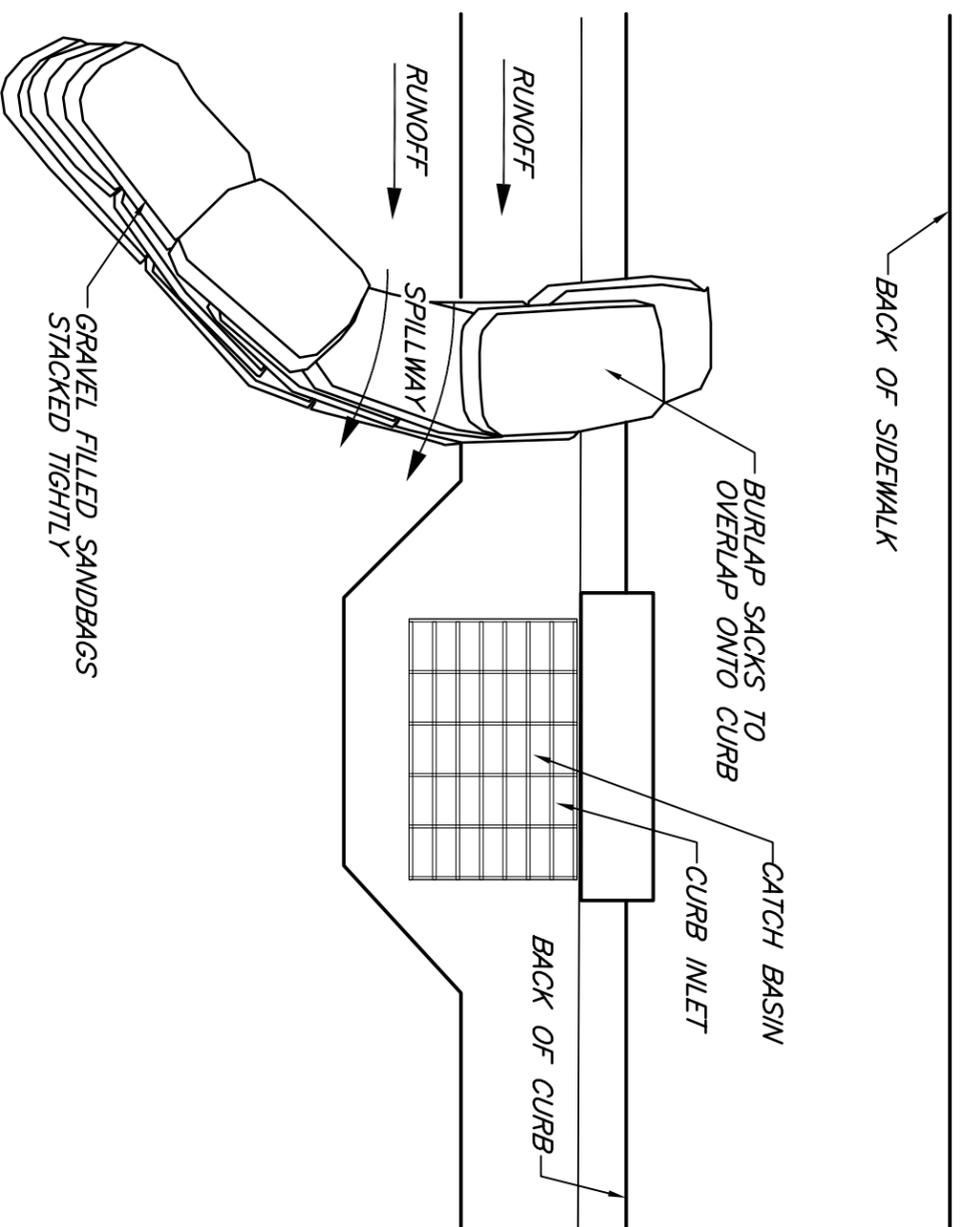
**SBMP-8
Erosion Control Fabric Joining Details**

The secure joining of silt fence fabrics is of paramount importance. Following this BMP will help to ensure a successful installation by eliminating an inherent weak spot in the silt fence.

**SBMP-9
Disconnected Roof Drains**

The 2nd BMP Manual provides a detail of a disconnected roof drain in Figure I-01-3 in which the roof drain is diverted to an underground infiltration trench. However, as page I-01-1 of the same Manual states, "Infiltration rates in many areas of the state are typically poor due to clay soils and bedrock;" therefore, this form of disconnecting roof drains is not necessarily feasible within the City of Belle Meade due to the widespread presence of clay soils within Middle Tennessee.

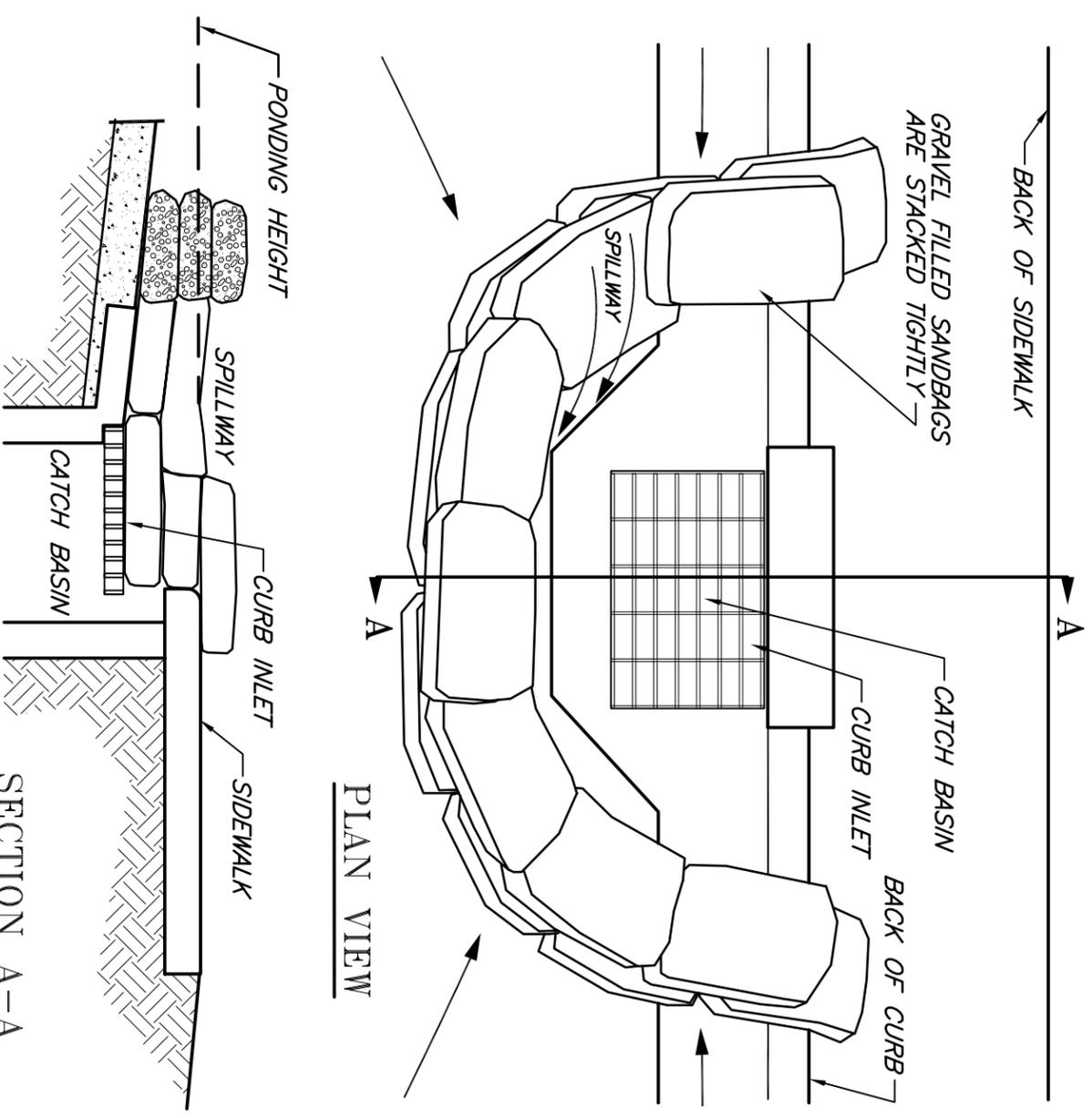
An alternative to this practice is to simply direct roof downspout drains over grassy areas and through grassy swales prior to entering the City maintained storm sewer system or blue-line stream. Another alternative is to capture roof drainage in barrels or other suitable containers for later use as irrigation water. Storing the drainage water would also require mitigation of mosquito breeding through the use of larvae inhibitors or other form of mosquito control.



PLAN VIEW

- NOTES:
1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
 2. SANDBAGS OR FABRIC TUBES OF EITHER BURLAP OR WOVEN 'GEOTEXTILE' FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY. NONWOVEN FABRIC CAN ALSO BE USED IF COMPARABLE FILTERING AND FLOW THROUGH CHARACTERISTICS ARE PROVIDED.
 3. LEAVE A ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
 4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
 5. DO NOT STACK BAGS OVER 12 INCHES HIGH.

SBMP-1
CURB AND GUTTER SEDIMENT BARRIER



PLAN VIEW

SECTION A-A

- NOTES:
1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
 2. SANDBAGS, OR FABRIC TUBES OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY. NONWOVEN FABRIC CAN ALSO BE USED IF COMPARABLE FILTERING AND FLOW-THROUGH CHARACTERISTICS ARE PROVIDED.
 3. LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
 4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
 5. DO NOT STACK BAGES OVER 12 INCHES HIGH.

SBMP-2
CURB INLET SEDIMENT BARRIER (SANDBAGS)

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040-655

DATE: 7-19-04
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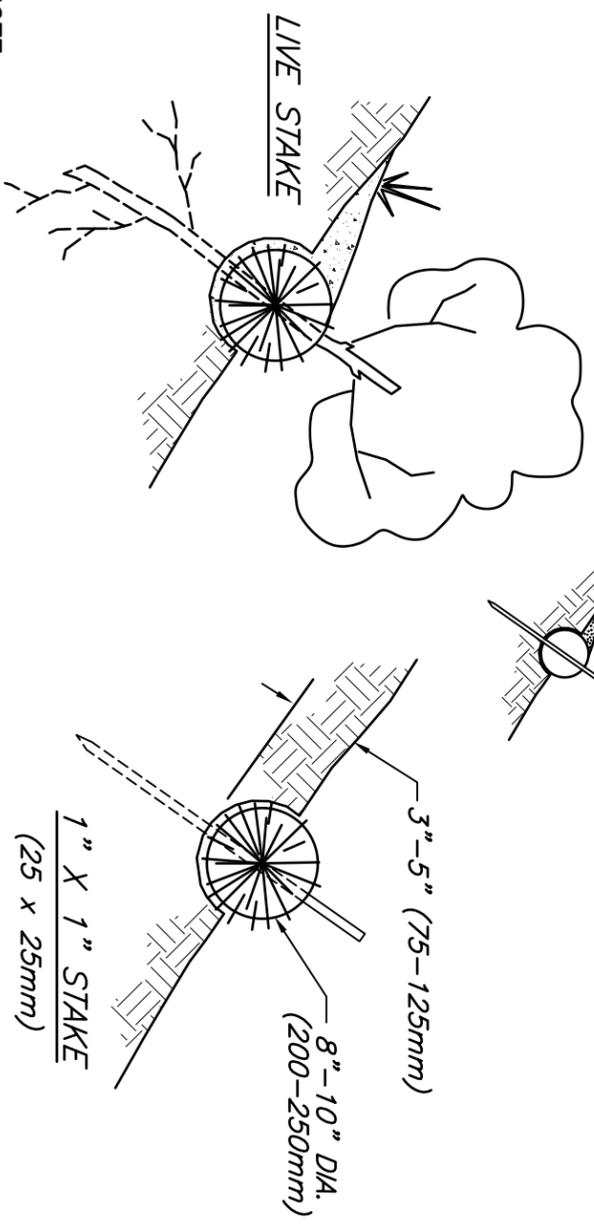
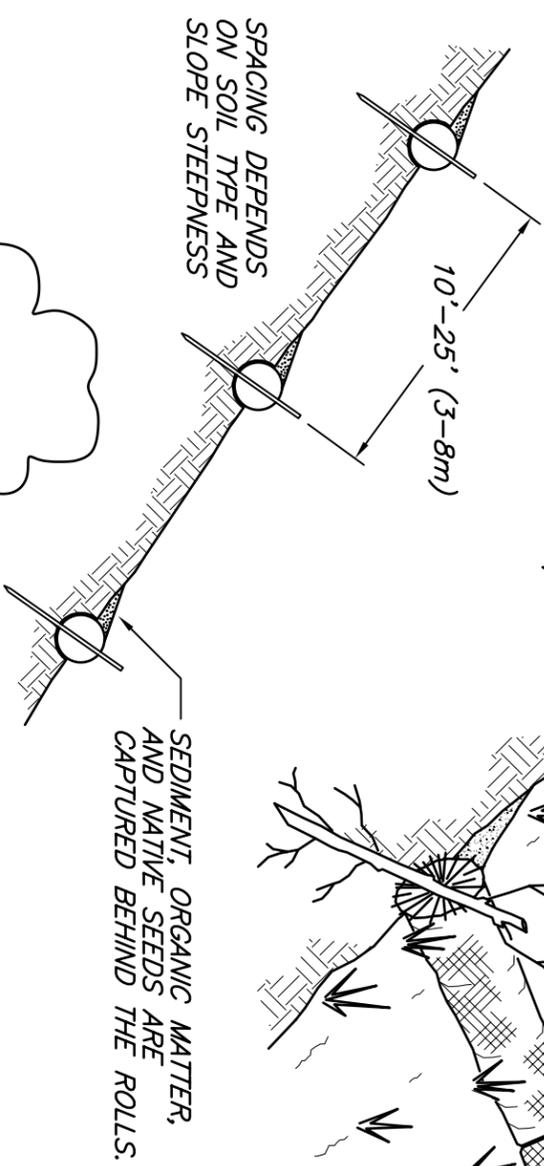
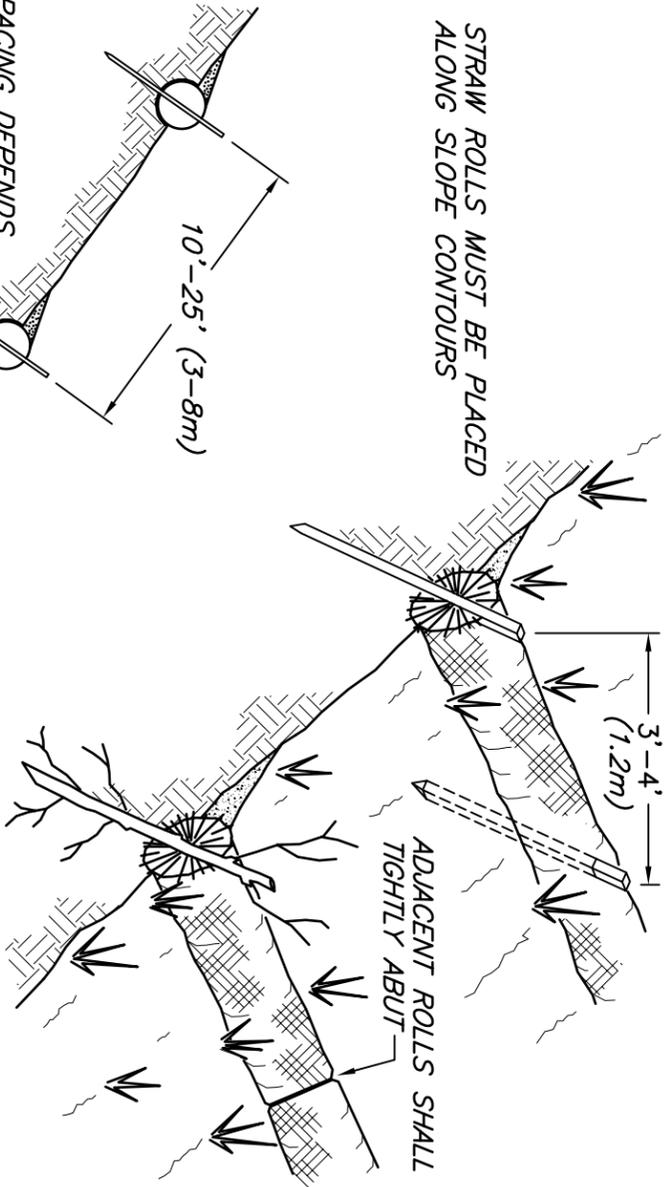
SBMP-1&2

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- NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
 2. STRAW/COIR ROLLS CAN ALSO BE USED.

SBMP-4
STRAW ROLLS

DEC PROJECT NUMBER
040-655

SBMP-4

DATE: 7-19-04
DWN. BY: KLU

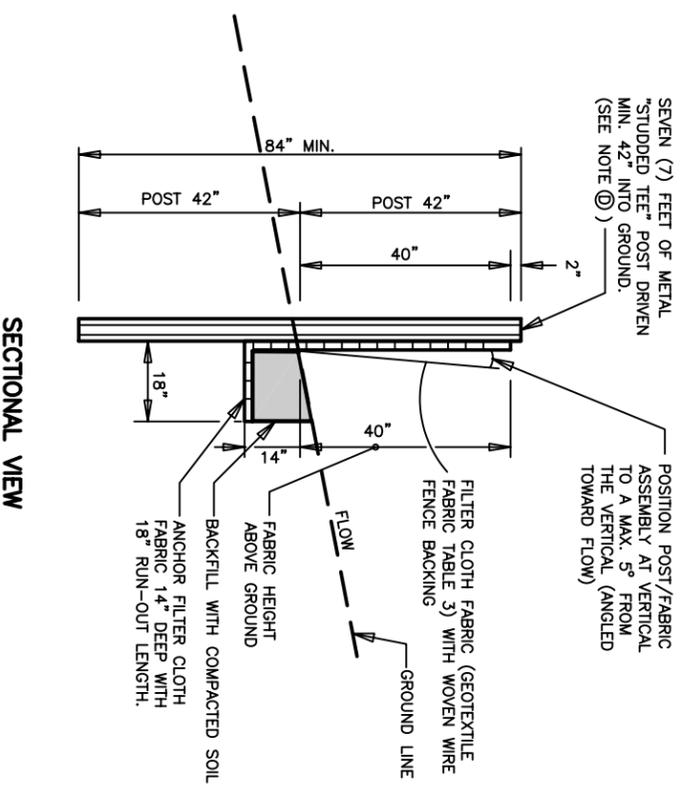
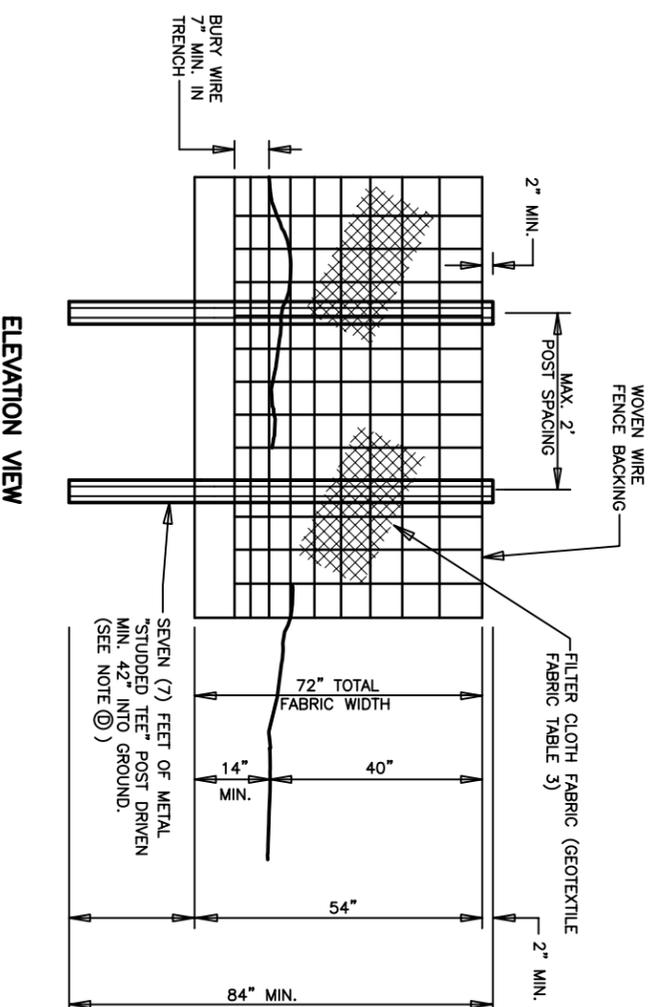
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TEMPORARY ENHANCED SILT FENCE



EROSION CONTROL PLAN LEGEND: * ESF * ESF * ESF * ESF * (ENHANCED SILT FENCE)

SBMP-6 TEMPORARY ENHANCED SILT FENCE

TABLE 3 ENHANCED SILT FABRIC SPECIFICATIONS	
FABRIC PROPERTY AND TEST METHODS	REQUIRED PHYSICAL PROPERTIES (MEAN VALUES OF TEST DATA)
FABRIC TYPE	WOVEN MONOFILAMENT
APPEARANT OPENING SIZE (ASTM D4751)	#30 TO #80 STANDARD SIEVE
PERCENT OPEN AREA (POA)	≥ 130 GPM/FT ²
WATER FLUX (ASTM D4491)	≥ 390 LB. (WARP DIRECTION) × 260 LB. (FILL DIRECTION)
TENSILE STRENGTH (ASTM D4632)	≥ 90%
ULTRAVIOLET STABILITY (AFTER 500 HRS PER ASTM D4355)	≥ 530 PSI
BURST STRENGTH (ASTM D3786)	≥ 140 LB.
PUNCTURE STRENGTH (ASTM D4833)	≥ 120 LB. (WARP DIRECTION) × 80 LB. (FILL DIRECTION)
TRAPEZOIDAL TEAR (ASTM D4533)	≥ 0.04 INCHES/SEC
PERMEABILITY (ASTM D4491)	≤ 30 MILS
THICKNESS (ASTM D5199)	

ENHANCED SILT FENCE GENERAL NOTES

- (A)** ENHANCED SILT FENCE IS TO BE USED WHERE INTERCEPTION OF CONCENTRATED FLOWS (e.g. SWALES, DITCHES, RUTS ALONG SLOPE) ARE ANTICIPATED. LIMITS OF FLOW APPLICATIONS FOR USE OF ENHANCED SILT FENCE ARE GIVEN IN TABLE 4 SBMP-7.
- (B)** WHEN TWO SECTIONS OF ENHANCED SILT FABRIC ADJOIN EACH OTHER THEY SHALL BE JOINED ACCORDING TO SBMP-8.
- (C)** MAINTENANCE SHALL BE PERFORMED AS NEEDED: CAPTURED SOIL MATERIAL SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE, AND /OR WHEN EVIDENCE OF FILTER BLINDING IS NOTED.
- (D)** STEEL POSTS SHALL BE 1.33 LB./FT. ROLLED FROM HIGH CARBON STEEL AND SHALL BE GALVANIZED OR HOT-DIPPED AND PAINTED WITH ONE OR MORE COATS OF HIGH-GRADE WEATHER RESISTANT STEEL PAINT. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED TO AID IN THE ATTACHMENT OF WIRE.
- (E)** STEEL POSTS SHALL HAVE A PROJECTION FOR FASTENING WIRE TO THEM. WOVEN WIRE FENCE BACKING TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. THE WIRE FASTENERS SHOULD BE EVENLY SPACED WITH AT LEAST SIX PER POST.
- (F)** WIRE FENCE FABRIC SHALL MEET THE REQUIREMENTS FOR ASTM A-116 FOR NO. 11 FARM, DESIGN NO. 1047-6-11, CLASS 3 COATING.
- (G)** FILTER FABRIC SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE BACKING WITH TIES SPACED EVERY 24 INCHES ALONG TOP AND MID SECTION.
- (H)** FOR TRENCH-BASED INSTALLATIONS, FENCING SHALL BE INSTALLED PER THE FOLLOWING STEPS AND IN THE FOLLOWING ORDER:
 - EXCAVATE TRENCH A MAXIMUM OF 18 INCHES WIDE AND AT THE SPECIFIED DEPTH AS SHOWN ON THE APPLICABLE DETAIL. THE TRENCH SHALL BE HAND-CLEANED FOLLOWING EXCAVATION TO REMOVE BULKY DEBRIS SUCH AS ROCKS, STICKS, AND SOIL CLODS FROM THE TRENCH.
 - INSTALL FABRIC IN TRENCH.
 - BACKFILL TRENCH (OVER-FILL) WITH SOIL PLACED AROUND FABRIC.
 - COMPACT SOIL BACKFILL WITH MECHANICAL EQUIPMENT. DO NOT DAMAGE THE FABRIC DURING COMPACTION (DAMAGED FABRIC SHALL BE REPLACED).
 - DRIVE AND SET SUPPORT POSTS PER SPACING REQUIREMENTS GIVEN ON THE APPLICABLE FENCE DETAIL.
 - ATTACH WOVEN WIRE FENCE BACKING TO POSTS AND FABRIC TO THE WIRE BACKING USING WIRE TIES. SPACING AND DENSITY OF TIES SHALL BE INSTALLED AS GIVEN ON THE APPLICABLE DETAIL.

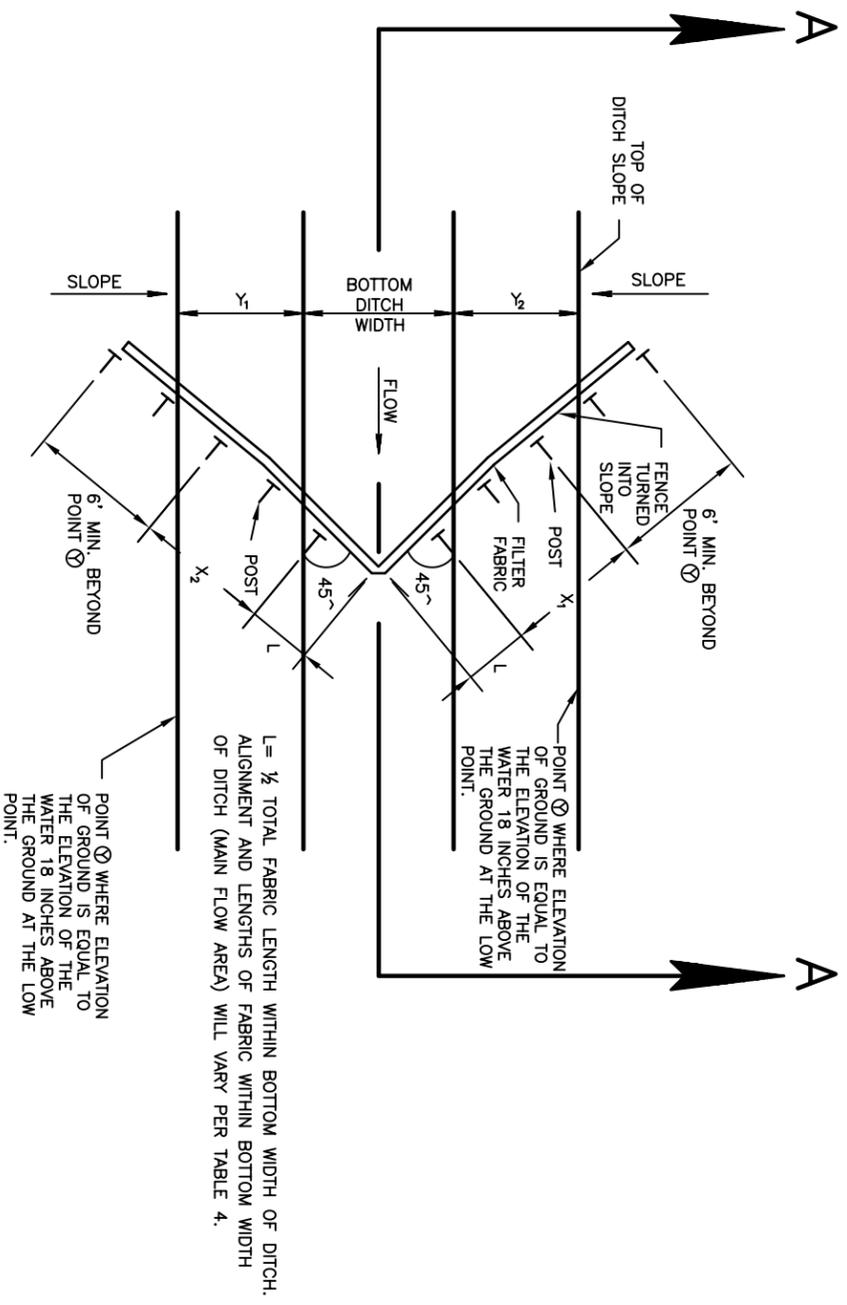
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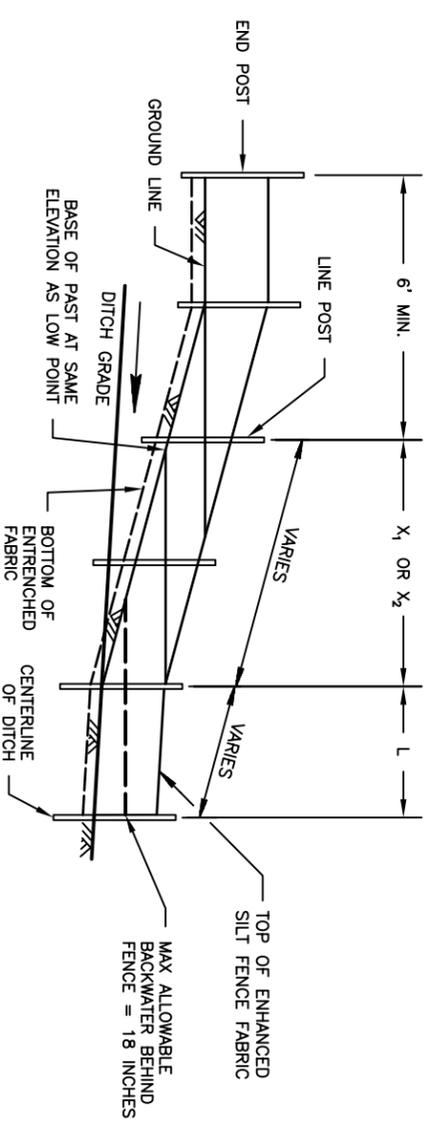


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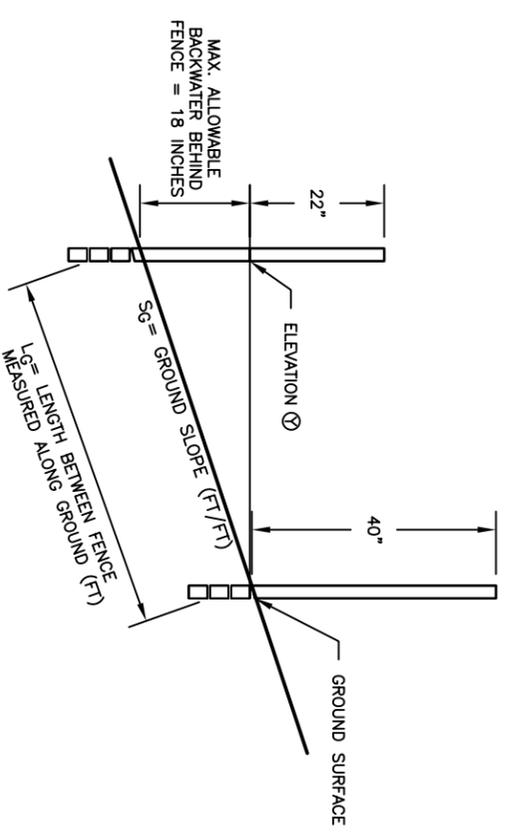
PLAN VIEW

EROSION CONTROL PLAN LEGEND: > ⊕ TEMPORARY TYPE EC 1 FILTER BARRIER DITCH CHECK



SECTIONAL VIEW A-A

(USE ENHANCED FILTER FABRIC AS DITCH CHECK AND FILTER)



SPACING FOR ENHANCED SILT FENCE

GROUND SLOPE S _G (FT/FT)	⊕ RECOMMENDED SPACING, BETWEEN ENHANCED SILT FENCE (FT)
0.01	150
0.02	75
0.03	50
0.04	40
0.05	30
0.06 & STEEPER	25

TABLE 4

DITCH WIDTH BOTTOM (FT.)	TOTAL ENHANCED SILT FABRIC LENGTH (2L) WITHIN FLAT-BOTTOM ZONE OF DITCH, (PER LINEAR FOOT)	*MAX. ALLOWABLE DESIGN PEAK FLOW FROM WATERSHED (CFS)
3	4.5	1.8
4	6.0	2.1
5	7.0	2.5
6	8.5	2.9
7	10.0	3.3
8	11.5	3.7
9	13.0	4.0
10	14.5	4.5
12	17.0	5.3
15	21.5	6.5

* BASED ON 60 GPM/FT² ENHANCED SILT FENCE FABRIC. SEE TABLE 3 FOR ENHANCED SILT FENCE FABRIC SPECIFICATION ON DETAIL SBMP-8.

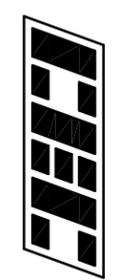
GENERAL NOTES

- Ⓐ A DITCH WITH A TRAPEZOIDAL CROSS-SECTION IS ASSUMED WITH 1:1 SIDESLOPES UNLESS OTHERWISE NOTED.
- Ⓑ FENCE LENGTH DESIGNATED INCLUDES THE LENGTH OF FENCE STAKED WITHIN THE BOTTOM WIDTH OF DITCH (2L).
- Ⓒ IF ANTICIPATED DITCH FLOWS EXCEED THE VALUES SHOWN IN THE TABLE FOR THE GIVEN BOTTOM DITCH WIDTH, THEN PROVIDE A DESIGNED SPILLWAY OR BYPASS FOR OVERFLOW, OTHERWISE, ALTERNATE CHECK OR FILTER STRUCTURES MUST BE USED (E.G., ROCK CHECK/FILTERS).
- Ⓓ ANCHOR AND INSTALL TEMPORARY ENHANCED SILT FENCE PER DETAILS AND SPECIFICATIONS SHOWN ON DETAIL SBMP-8.

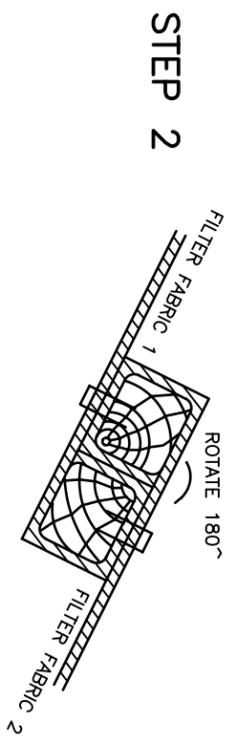
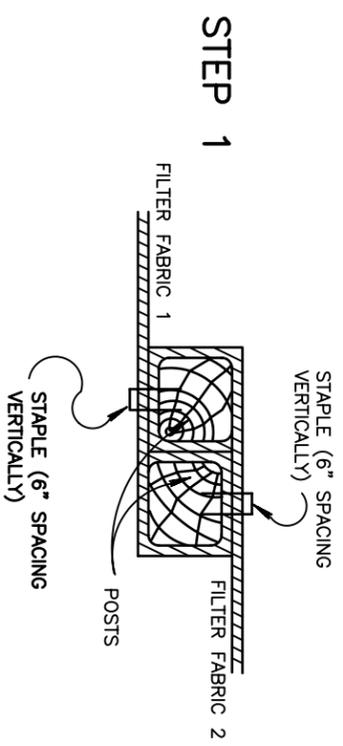
**SBMP-7
TEMPORARY EROSION DITCH CHECK USING ENHANCED SILT FENCE**

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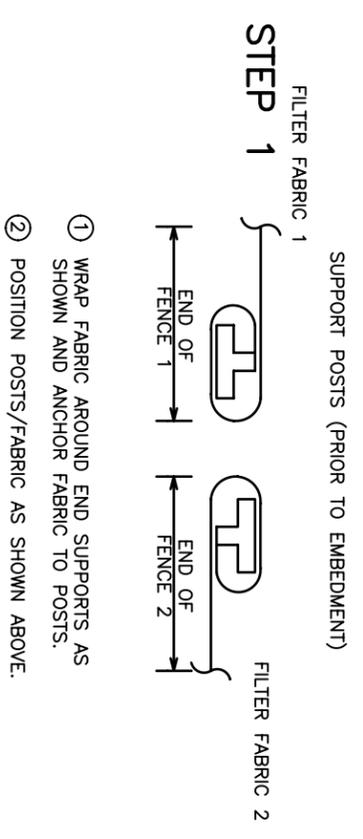


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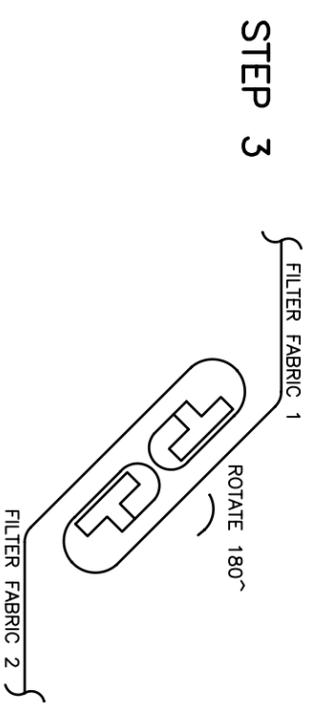


- ① ROTATE BOTH POSTS WITH FABRIC CLOCKWISE AT LEAST 180°.
- ② EMBED BOTH POSTS INTO GROUND PER APPLICABLE FILTER FENCE SPECIFICATIONS.

PLAN VIEW
JOINING EROSION CONTROL
FABRIC SECTIONS (WOOD POSTS)



- ① POSITION THE FILTER FABRIC 2 POST INSIDE OF THE FILTER FABRIC 1 POST AS SHOWN ABOVE.



- ① ROTATE BOTH POSTS WITH FABRIC CLOCKWISE AT LEAST 180°.
- ② EMBED BOTH POSTS INTO GROUND PER APPLICABLE FILTER FENCE SPECIFICATIONS.

PLAN VIEW
JOINING EROSION CONTROL
FABRIC SECTIONS (STEEL POSTS)

SBMP-8
EROSION CONTROL FABRIC JOINING DETAILS

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Appendix C
Land Disturbance Permit Information Handout

LAND DISTURBANCE PERMIT INFORMATION HANDOUT

FOR LAND DISTURBING ACTIVITIES WITHIN THE CITY OF BELLE MEADE, TENNESSEE

Land disturbing activities within the City of Belle Meade, Tennessee are now regulated by the comprehensive stormwater ordinance adopted on September 15, 2004.

Following is an excerpt from that stormwater ordinance which details which activities are now regulated. Please see the stormwater ordinance and the Best Management Practice (BMP) Manuals adopted by the City for further information.

Section 3. Land disturbance permits. (1). When required.

- (a) Every person will be required to obtain a land disturbance permit from the City of Belle Meade in the following cases:
 - (1) Land disturbing activity disturbs one-quarter (0.25) or more acres of land;
 - (2) Land disturbing activity of less than one (1) acre of land if such activity is part of a larger common plan of development that affects one (1) or more acre of land;
 - (3) Land disturbing activity of less than one (1) acre of land, if in the discretion of the City of Belle Meade such activity poses a unique threat to water, or public health or safety;
 - (4) The creation and use of borrow pits.
- (2). Building permit. No building permit shall be issued until the applicant has obtained a land disturbance permit where the same is required by this ordinance.
- (3). Exemptions. The following activities are exempt from the permit requirement:
 - (a) Any emergency activity that is immediately necessary for the protection of life, property, or natural resources.
 - (b) Existing nursery and agricultural operations conducted as a permitted main or accessory use.
 - (c) Any logging or agricultural activity that is consistent with an approved farm conservation plan or a timber management plan prepared or approved by the appropriate federal or state agency.
 - (d) Additions or modifications to existing single family structures provided that the land to be disturbed measures less than one-quarter (0.25) acre and poses no unique threat to water, or public health or safety.