Sediment Barrier - Silt Fence Design Guide

This design guide is intended provide guidance on the purpose, design, material selection, installation, and maintenance of a silt fence when used as a temporary sediment control barrier for sheet flow applications to minimize sediment transport from a disturbed area susceptible to erosion. This design guide serves as a supplement to the IECA Sediment Barrier – Silt Fence Design Standard.

Keywords: silt fence, sediment barrier, perimeter control, sediment control, erosion

1. INTRODUCTION

Silt fence is a temporary sediment barrier used downstream of a disturbed area consisting of a geotextile material anchored into the soil and supported by posts. Silt fence is used to intercept sediment-laden runoff from a disturbed area and facilitate sediment capture by reducing the velocity of sheet flow runoff and promoting deposition. Interception and containment of sediment-laden runoff forms impoundment pools that convert kinetic, overland flow energy to potential energy, allowing suspended soil particles to settle out of suspension. For successful implementation, silt fence must be designed and installed in a manner that creates a structurally-sound containment system, allowing suspended particles to be deposited (*1*). Research has shown that silt fence has the ability to capture large, rapidly-settable solids, however does not have the ability to substantially reduce turbidity levels in runoff (*2*). This fact sheet is intended to provide an overview of design and installation criteria for the proper application and use of silt fence as a sediment barrier.

2. DESIGN

To adequately design temporary sediment control practices used on construction sites, designers must account for local precipitation, frequency, intensity, and duration, as well as expected flows, soil type, and range of soil particle sizes expected to be present on-site. Designers must furthermore ensure practices are designed and installed in accordance with good engineering practices (*3*).

2.1 Hydrology and Capacity

Engineers design hydraulic systems based on the allowable risk of failure. The UESPA Construction General Permit provides sizing guidance for the design of a sediment basin or impoundment area, where the designer is to provide storage for either: (1) the calculated volume of runoff from a 2-yr, 24-hr storm; or (2) a volume sizing factor (VSF) of 3,600 ft^3/ac drained (*3*). Depending on regional considerations, there can be vast differences in hydrologic sizing when comparing the two design approaches (*4*, *5*). Silt fence segments must be designed to impound runoff from the 2-yr, 24-hr design storm event and create favorable conditions for sediment to settle out of suspension. The design storm sizing approach provides a method to size practices based on site specific conditions.

To size silt fence segments based on runoff quantity, the area upstream of the silt fence segment should be delineated to determine a design treatment volume for the design storm. Eq. 1 can be used to determine the treatment volume based on the contributing area, design rainfall depth, and curve number.

$$V = \frac{nA\left[P - 0.2\left(\frac{1000}{CN} - 10\right)\right]^2}{12\left[P + 0.8\left(\frac{1000}{CN} - 10\right)\right]} \qquad \text{Eq. 1}$$

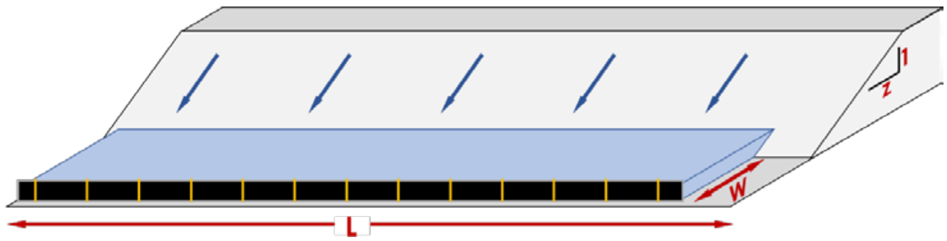
where,

V = runoff volume, m^3 (ft^3)
n = constant, 1.86 for m^3 (1.0 for ft^3)
A = area, m^2 (ft^2)
P = 2-yr, 24-hr rainfall depth, cm (in.)
CN = Curve Number

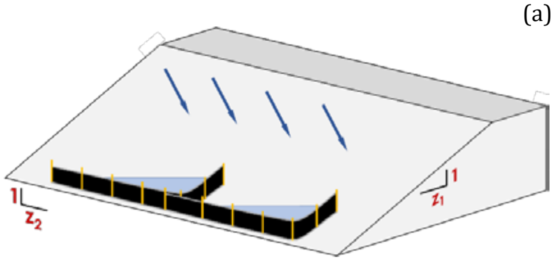
Silt fence segments should retain the entire volume of the design storm runoff without overtopping, flow bypass, or dewatering. To reduce risk of failure, the impounded depth should not exceed 0.61 m (2 ft). Effectively designing, sizing, and configuring silt fence segments to satisfy the capacity required by the upslope drainage area, can help reduce the occurrence of failures. In the case that the 2-yr, 24-hr runoff volume exceeds the storage capacity of the silt fence, the area draining to each silt fence installation should be divided into manageable areas based on site hydrology or alternative upstream practices should be used.

2.2 Placement

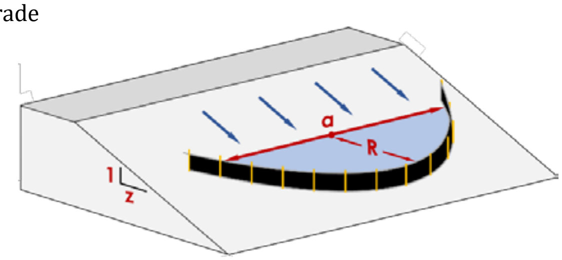
Silt fence should only be used downstream of a disturbed area that will generating sheet flow. Silt fence should only be used for its intended purpose of capturing sediment from runoff. Therefore, the use of silt fence to create a flow diversion or to delineate project limits is discouraged. Segments should be installed in a manner to maximize the impoundment volume of sediment-laden runoff. Appropriate segments include Linear, "J" Hook, and "C" shaped segments (Fig. 1).



(a) linear installation at grade



(b) "J" Hook



(c) "C" Configuration

Fig. 1: Silt fence installation configurations.

Linear Segments

Segments should be placed on level runs, parallel to the contour with each end of the fence turned upslope higher than the runoff impoundment elevation to ensure that runoff ponds to provide a favorable environment for settlement to occur. To maximize impoundment, a flat section at the toe of the slope should be provided as shown in Fig. 1(a). In areas where level placement is infeasible, J-hooks or C-shaped configurations may be employed to impound runoff. Eq. 2 can be used to estimate impoundment volumes for linear silt fence segments.

$$V = hL(W + \frac{z}{2}) \quad \text{Eq. 2}$$

where,

V = impoundment volume, m³ (ft³)
L = silt fence length, m (ft)
W = width of level area, m (ft)
z = horizontal slope, m/m (ft/ft)

"J" Hook Segments

Tying silt fence installations back into the contour (i.e., creating a J-shaped hook) to form temporary detention that can trap sediment is an effective way to improve conventional silt fence designs (*6–8*). Studies have shown that approximately 75 to 90% of suspended solids can be removed by impounding water behind "J" hooks (*9*, *10*). "J" hook installations create intermittent breaks in a longitudinal run of silt fence that reduce the velocity of concentrated flow along the toe of the fence, minimizing erosive forces. "J" hooks must be properly anchored into the slope at the proper elevation equal to the top of the silt fence at the toe, to prevent stormwater from bypassing the end of the fence. The volume for a "J" Hook configuration can be calculated using Eq. 3:

$$V = \frac{h^3 z_1 z_2}{2} \quad \text{Eq. 3}$$

where,

V = impoundment volume, m^3 (ft^3)
h = installed height of silt fence, m (ft)
z_1 = horizontal slope, m/m (ft/ft)
z_2 = longitudinal slope, m/m (ft/ft)

"C" Configuration Segments

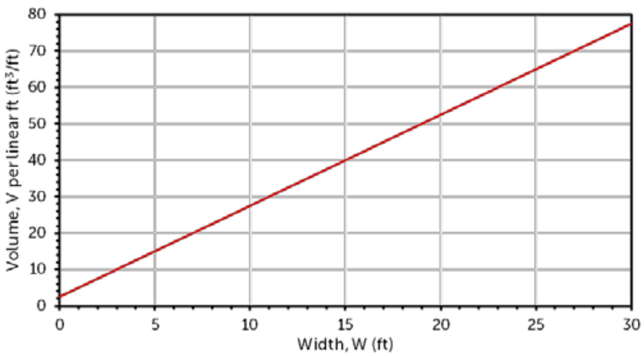
The volume for a "C" configuration can be calculated using Eq. 4:

$$V = \frac{ahR}{3} \qquad \text{Eq. 4}$$

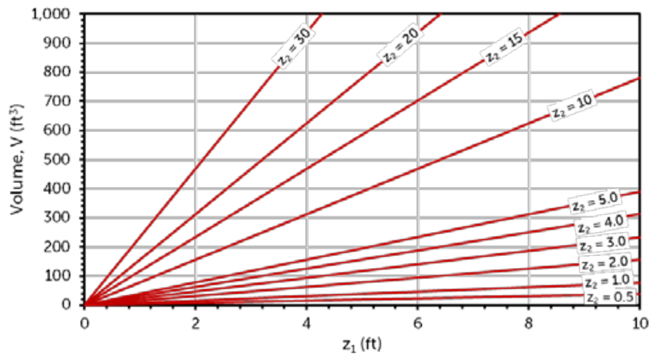
where,

V = impoundment volume, m³ (ft³)
a = width of installation at maximum impoundment, m (ft)
h = installed height of silt fence, m (ft)
R = radius of impoundment, $R = h \times z$, m (ft)
z = horizontal slope, m/m (ft/ft)

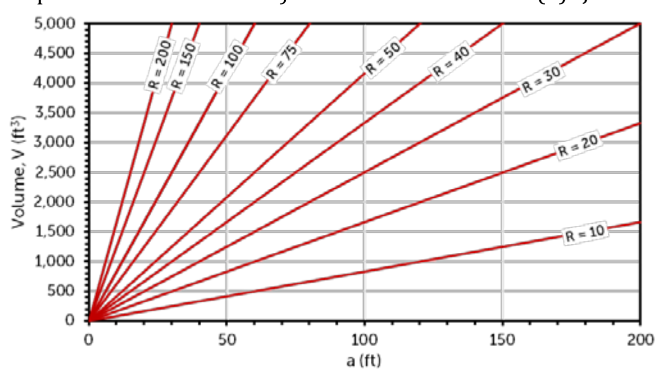
In many cases, it may be more practical to rely on design charts for determining the storage volume upstream of a silt fence segment. Fig. 2 provides a graphical representation of storage volume for (a) linear, (b) "J" hook, and (c) "C" configurations. This example is for an installed silt fence height of 76 cm (30 in.), however similar charts could be developed for various heights.



(a) linear configuration (volume per linear ft of silt fence)



(b) "J" hook configuration



(c) "C" configuration

Fig. 2: Volume estimates for 76 cm (30 in.) silt fence.

To aid in design simplicity, typical silt fence segment dimensions can be developed for regional or state-wide applications, using average or maximum design rainfall depths and conservative curve number values.

2.3 Dewatering and Overflow Outlets

Due to the potential for geotextile blinding, or clogging, after one or more storm events, an effective means for dewatering must be included to prepare the silt fence for subsequent storms and minimize the chance of overtopping or periods of excessive ponding. The silt fence, at full storage capacity, should dewater in 4 to 12 hours. In addition, overflow outlet(s) must be included to allow runoff that exceeds the 2-yr, 24-hr design storm to safely pass through the segment. The overflow outlet must convey the peak flow rate (Q_p) for the 2-yr, 24-hr design storm event. Downstream of the dewatering and overflow outlet, proper erosion control should be provided to prevent scour. A geotextile apron or riprap can be used to act as a splash pad.

To determine the peak flow rate for silt fence segments, Eq. 5 and 6 can be used.

$$Q_p = \frac{q_u A (P - I_a)^2}{n^2 (P + 4I_a)} \qquad \text{Eq. 5}$$

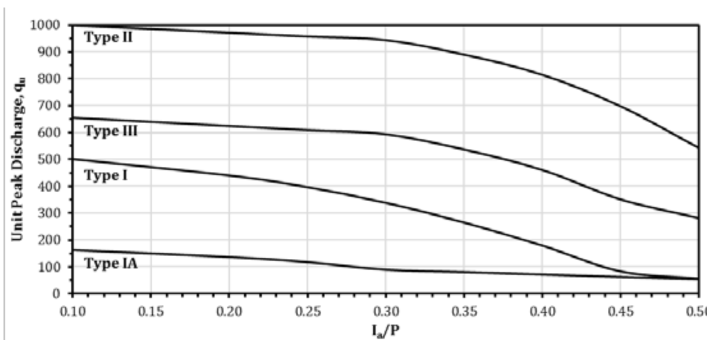
where,

Q_p = peak flow rate, m^3/s (ft^3/s)
q_u = unit peak discharge, refer to Fig. 3
A = contributing drainage area, m^2 (ft^2)
P = 2-yr, 24-hr rainfall depth, cm (in.)
I_a = initial abstraction, cm (in.), refer to Eq. (6)
n = constant, 2,566 for m^3/s (5,280 for ft^3/s)

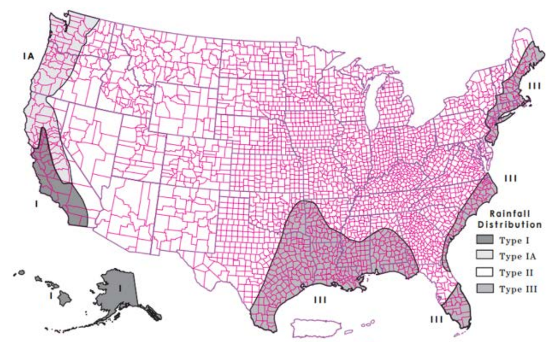
$$I_a = 0.2n\left(\frac{1000}{CN} - 10\right) \qquad \text{Eq. 6}$$

where,

I_a = initial abstraction, cm (in.)
n = constant, 2.54 for cm (1.0 for in.)
CN = Curve Number



(a) unit peak discharge for time of concentration (Tc) ≤ 0.1 hrs.



(b) approximate geographic boundaries for NRCS (SCS) rainfall distributions (*11*).

Fig. 3: Unit peak discharge for rainfall distributions.

One outlet option that has been well tested is a perforated board with a weir. This is installed in a break along the silt fence, which is sealed to the board. The dewatering board is made up of a series of 2.5 cm (1 in.) diameter orifices spaced at 7.6 cm (3 in.) apart. The dewatering board is to be installed at the lowest elevation of a silt fence segment. A v-notch weir at the top of the board, placed 46 cm (18 in.) from the bottom, to maintain volumetric storage acts as an overflow outlet. Examples of a perforated board with weir installation is shown in Fig. 4 (*12*).

(a) design schematic (b) front of outlet (b) back of outlet

Fig. 4: Dewatering Board with Weir Installation.

Table 1 can be used to select a v-notch weir dimension to match the peak flow rate for the designed silt fence segment.

Table 1: V-notch Weir Dimensions and Capacities

Weir Dimension (Height x Width) in.	cm	Weir Capacity ft³/s	m³/s
6 x 6	15.2 x 15.2	0.22	0.006
6 x 12	15.2 x 30.4	0.44	0.012
12 x 6	30.4 x 15.2	0.64	0.018
6 x 18	15.2 x 45.7	0.67	0.019
18 x 6	45.7 x 15.2	1.18	0.033
12 x 12	30.4 x 30.4	1.25	0.035
12 x 18	30.4 x 45.7	1.86	0.053
18 x 12	45.7 x 30.4	2.32	0.066
18 x 18	45.7 x 45.7	3.43	0.097

The flow chart presented in Fig. 5 provides an overview to the silt fence design approach.

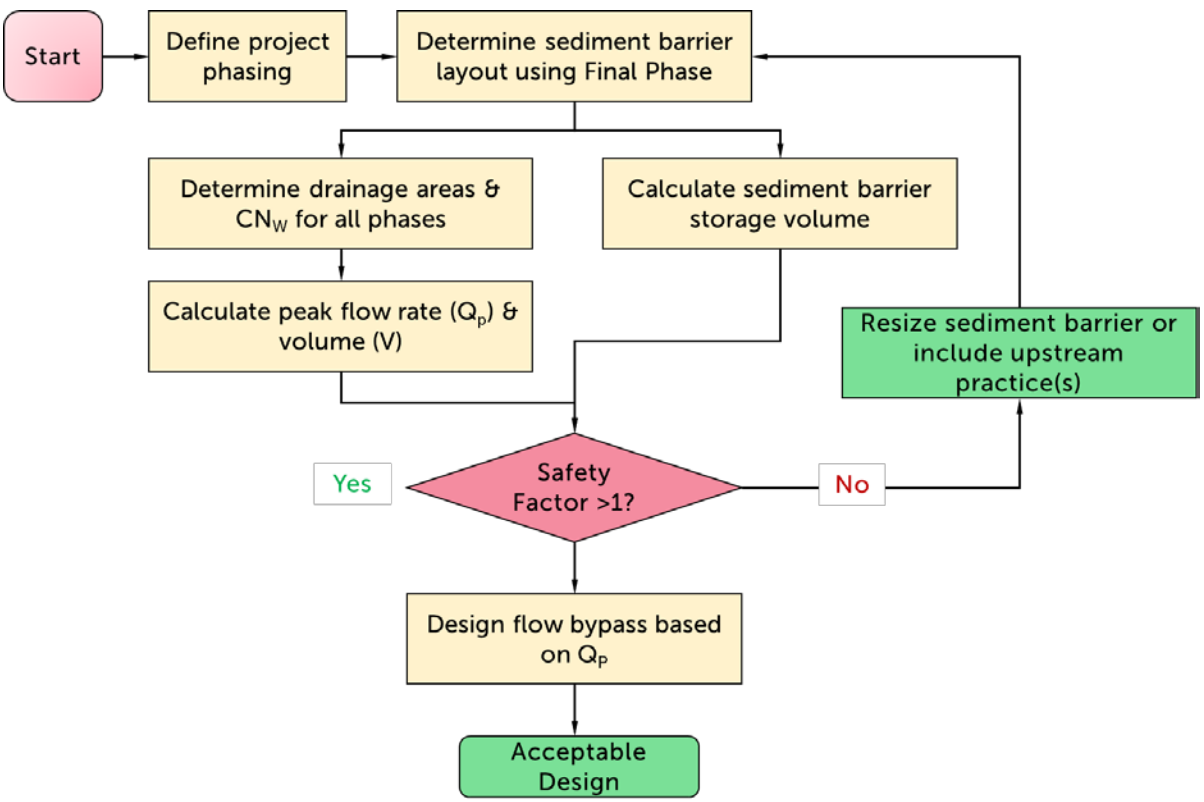


Fig. 5: Silt fence design approach.

3. MATERIALS

Silt fence geotextile, anchoring, and support materials shall be of strength and dimensions to withstand hydrostatic and hydrodynamic forces imposed by the captured and impounded runoff of the design storm. Silt fence geotextile should be comprised of a minimum 119 g/m² (3.5 oz/yd²) non-woven, equivalent woven, or alternative material. Supplemental support of the geotextile may be needed at the discretion of the designer. Support could entail a minimum 14-ga. steel wire fencing with mesh spacing not to exceed 15 x 15 cm (6 x 6 in.), or equivalent alternative. Posts such as studded steel posts of 1.98 kg/m (1.33 lb./ft), hardwood posts of 5.1 x 5.1 cm (2 x 2 in.), or equivalent alternative must be used to support the silt fence geotextile material.

4. INSTALLATION

Installed silt fence heights should be, at a minimum, 61 cm (24 in.) above ground. The installed height should not exceed 81 cm (32 in.). Posts should be driven into the ground a minimum depth of 46 cm (18 in.), with the height extending above ground meets or exceeds the silt fence height. Silt fence geotextile material should be secured to the posts and reinforcement using staples, ring clips, wire ties, UV-stabilized zip ties, or an equivalent alternative. Post spacing should be a function of installed silt fence height and reinforcing material. Spacing should be minimized to provide adequate structural stability, with a recommended spacing of 1.2 to 2.4 m (4 to 8 ft). Silt fence geotextile material must be anchored into the ground by burying it in a trench and backfilling with compacted soil or by static slicing. Embedment depth of the geotextile shall be a minimum of 15 cm (6 in.), with at least 30 cm (12 in.) buried within the trench. Consider additional entrenchment depth in soils with lower unconfined compressive strength. Offsetting the trench 15 cm (6 in.) upstream from the silt fence is recommended to improve post stability, as shown in Fig. 6. This installation allows posts to be located in undisturbed soil for greater failure resistance. A static slicing anchoring installation technique, as described in EPA's Silt Fence Factsheet (*13*), or approved mechanical alternative, may be used. Installers should refer to the equipment manufacturer's specification for proper installation. Silt fence should be installed in continuous segments to avoid creating joints. When joints are unavoidable, end posts, geotextile materials, and any reinforcement backing, shall be wrapped around each other to provide a secure and seamless joint.

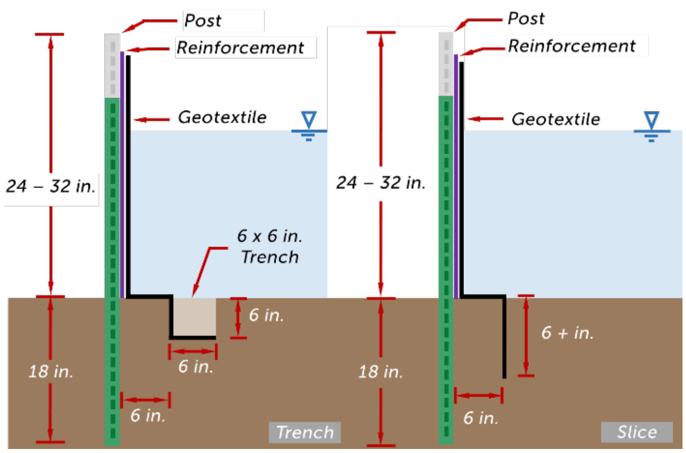


Fig. 6: Typical offset trenched and sliced methods.

5. INSPECTION & MAINTENANCE

Sediment should be removed once accumulation reaches half of the height of the silt fence. Silt fence should be inspected regularly and after significant runoff events for signs of damage or deterioration. Common failure mechanisms include: (1) structural failure of the posts and/or geotextile due to a storm that exceeds the design capacity; (2) undercutting of silt fence toe due to insufficient anchoring, allowing flow to migrate underneath the practice; (3) downstream scour due to high overflow velocity; (4) improper contour tie-in leading to flow bypass around end of fence; (5) lack of regular sediment removal, causing overtopping and/or structural failure; and (6) inadvertent tears or holes in the fabric that release the water too quickly. Immediate repair, per manufacturer's guidance, or replacement is required if there is evidence of damage or undercutting. All sediment collected and silt fence shall be removed and disposed of properly once the site has achieved final stabilization and the project is complete.

6. DESIGN TOOL

To assist and streamline the developed design approach, a Microsoft Excel® spreadsheet-based tool (SILTspread) was developed. The tool is made available for download free of charge at: http://www.eng.auburn.edu/research/centers/auesctf/tools/siltspread.html. This spreadsheet tool can be used by designers to size silt fence sediment barriers while determining the design volume and design peak flow rates. In addition, the tool allows for estimating the number of maintenance cycles expected for each segment of silt fence. The tool is divided into multiple 'Drainage Area' (DA) sheets and a single 'Summary' sheet. The tool allows users to develop individual drainage area worksheets for each silt fence segment, accommodating up to 30 drainage areas. For large projects, multiple workbooks may be used.

The 'DA' sheets allow designers to input hydrologic characteristics of the contributing drainage area for up to three phases of construction. The sheet calculates runoff volume and peak flow rates using the NRCS TR-55 methodology (11). In addition, Revised University Soil Loss Equation (RUSLE) analyses, Fig. 7(a), is incorporated into the 'DA' sheets to calculate annual soil loss for each drainage area. The slope length factor (LS-factor) is calculated based on inputs of slope length, slope gradient, and information about mulching or established vegetation. The cover-management factor (C-factor) is selected from a drop-down list corresponding to different erosion control practices. The soil erodibility factor (K-factor) and support practice factor (P-factor) are manual entries. The rainfall-runoff erosivity factor (R-factor) is determined based on geographic area. Results of the hydrologic and RUSLE analyses (i.e., runoff volume, peak flow, and annual soil loss) are automatically transferred to the 'Summary' sheet.

The 'Summary' sheet includes project information including location, phasing schedule, and design rainfall depths. In addition, the sheet provides summary of the individual 'DA' sheets embedded within the workbook. This sheet allows a user to select the type of silt fence installation configuration used and input corresponding design dimensions for each drainage area. The storage volume for each silt fence segment is automatically calculated with these input design parameters. The tool then compares against the drainage area runoff volume and determines the corresponding safety factor for each segment. If a silt fence segment has a safety factor less than 1.0, a red marker prompts the user to make modifications. These modifications may include resizing or adding upstream practices to reduce the contributing drainage area. The 'Summary' sheet is also used to design overflow weirs for each silt fence segment. The designed height of silt fence is used to determine the weir height from which the weir flow rate capacity is calculated. The user is prompted in the event that the weir capacity does not meet the required peak flow conditions. Using the phasing calendar included in the 'Summary' sheet, the workbook determines the interval of maintenance schedules required to remove captured sediment from the silt fence segments. Maintenance requirements are triggered once 50% of the storage volume upstream of the silt fence is occupied. Output results of the tool are exportable as a printable report, which can be supplied as a reference for both designers and contractors, and can assist in the communications during the implementation on the jobsite.

Hydrologic Analysis: DB 1 *Units: U.S.*

Phase I					
Land Cover Type	Description	HSG	CN	Area	Unit
Newly_Graded_Areas	Pervious areas only no vegetation	B	86	0.11	ac
-Select Land Cover Type-					ac
-Select Land Cover Type-					ac

Phase II					
Land Cover Type	Description	HSG	CN	Area	Unit
Newly_Graded_Areas	Pervious areas only no vegetation	B	86	0.11	ac
-Select Land Cover Type-					ac
-Select Land Cover Type-					ac

Phase III					
Land Cover Type	Description	HSG	CN	Area	Unit
Newly_Graded_Areas	Pervious areas only no vegetation	B	86	0.11	ac
-Select Land Cover Type-					ac
-Select Land Cover Type-					ac

Hydrologic Calcualtions				
Parameter	Phase I	Phase II	Phase III	Unit
Total Area	0.11	0.11	0.11	ac
Weighted CN	86	86	86	-
Pot. Max. Retention after Runoff, S	1.6	1.6	1.6	in.
Initial Abstraction, I_a	0.3	0.3	0.3	in.
Rainfall Depth, P	4.2	4.2	4.2	in.
Runoff, Q	2.7	2.7	2.7	in.
Runoff Vol.	**1,136**	**1,136**	**1,136**	ft^3
I_a/P	0.1	0.1	0.1	-
Rainfall Distribution	Type III	Type III	Type III	-
Est. Unit Peak Discharge, q_u	650	650	650	$ft^3/s/mi^2/in.$
Peak Discharge, Q_P	**0.32**	**0.32**	**0.32**	ft^3/s

Soil Loss Analysis: DB 1 *Units: U.S.*

Phase I					
Type	Description	Application (tons/ac)	Land Slope (%)	Length Limit (ft)[1]	C
Construction Site Mulching	Straw or hay, tied down by anchoring and tacking equipment	1.5	1-5	300	0.12
Type	Description	Cover (%)	Plant Type	% surface covered by residue in contact with soil:	C
Established Plants					

Phase II					
Type	Description	Application (tons/ ac)	Land Slope (%)	Length Limit (ft)[1]	C
Select a C Factor Type					
Type	Description	Cover (%)	Plant Type	% surface covered by residue in contact with soil:	C
Established Plants	Grass, grasslike plants, or decaying compacted plant litter.	0	Grass	95+	0.003

Phase III					
Type	Description	Application (tons/ac)	Land Slope (%)	Length Limit (ft)1	C
Select a C Factor Type					
Type	Description	Cover (%)	Plant Type	% surface covered by residue in contact with soil:	C
Established Plants	Grass, grasslike plants, or decaying compacted plant litter.	0	Grass	95+	0.003

RUSLE Calcualtions				
Parameter	Phase I	Phase II	Phase III	Unit
Total Area	0.11	0.11	0.11	ac
Rainfall Erosibility, R	350	350	350	
Soil Erodibility Factor, K	0.2	0.2	0.2	
Soil Bulk Density	83.0	83.0	83.0	lb/ft^3
Slope Length	36.0	36.0	36.0	ft
Slope Gradient	5.0	5.0	5.0	
Topographic Factor, LS	0.1	0.1	0.1	
Cover and Management Factor, C	0.120	0.003	0.003	
Erosion Control Practice Factor, P	1.0	1.0	1.0	
Annual Soil Loss, A	0.0723	0.0018	0.0018	tons/yr
Total Soil Loss (Vol.)	**0.0001**	**0.0000**	**0.0000**	ft^3

(a) DA sheet

Design Summary Sheet - Pg. 1 *Units: U.S.*

Project Information		Rainfall Parameters		
Project:	PI 0001	SCS Distribution Type:	Type III	
State:	AL	2-yr, 24-hr rainfall:	4.20	in.
County:	Lee		NOAA ATLAS 14	
Designer:	Test			

Design Parameters									
Area ID	Installation Configuration	h	W	L	a	z_1	z_2	R	Storage Vol.
		ft.	ft.	ft.	ft.	ft/ft	ft/ft	ft.	ft^3
1	Linear	2.5	0	140		17			2,975
2	J Hook	2.5				17	12		1,625
3	J Hook	2.5				15	7		839
4	J Hook	2.5				23	4		703
5	Half C Shape	2.5			35			18	263
6	Half C Shape	2.5			12			2	10
7	C Shape	2.5			98			14	1,143
8	C Shape	2.5			92			7	537
9	Linear	2.5	0	400		6			3,000
10	Linear	2.5	0	48		42			2,520
11	Linear	2.5	15	40		14			2,200
12	Linear	2.5	8	30		18			1,256
13	J Hook	2.5				3	16		375
14	J Hook	2.5				20	4		625
15	C Shape	2.5			71			21	1,243
16	Half C Shape	2.5			20			13	106
17									
18									

Design Summary Sheet - Pg. 2

Phasing Schedule					
Phase	Description	Start	End	Days	Maint. Cycles
I	Predeveloped (existing) contours, cleared and grubbed.	1/1/20	2/28/20	58	0.0
II	Final contours/ building pads, no parking lots, no vegetation	2/29/20	7/1/20	123	0.0
III	Final grading, permanent features installed, no vegetation.	7/2/20	12/31/20	182	0.0

Hydrologic Analysis Summary															
Area ID	Phase I					Phase II					Phase III				
	Area	Vol.	Q_p	Soil Loss	Maint. Cycles	Area	Vol.	Q_p	Soil Loss	Maint. Cycles	Area	Vol.	Q_p	Soil Loss	Maint. Cycles
	ac	ft^3	ft^3/s	tons	#	ac	ft^3	ft^3/s	tons	#	ac	ft^3	ft^3/s	tons	#
1	0.11	1,136	0.32	0.01	0.0	0.11	1,136	0.32	0.00	0.0	0.11	1,136	0.32	0.04	0.0
2	0.11	1,114	0.31	0.03	0.0	0.11	1,114	0.31	0.00	0.0	0.11	1,327	0.37	0.08	0.0
3	0.10	983	0.27	0.03	0.0	0.10	983	0.27	0.00	0.0	0.10	1,193	0.33	0.08	0.0
4	0.08	751	0.21	0.02	0.0	0.08	751	0.21	0.00	0.0	0.09	1,035	0.29	0.07	0.0
5	0.25	2,522	0.71	0.07	0.0	0.02	197	0.06	0.00	0.0	0.02	286	0.08	0.02	0.0
6	0.17	1,213	0.34	0.04	0.0	0.00	36	0.01	0.00	0.0	0.00	52	0.01	0.00	0.0
7	0.16	1,625	0.45	0.03	0.0	0.05	518	0.14	0.00	0.0	0.05	629	0.18	0.03	0.0
8	0.08	817	0.23	0.02	0.0	0.06	564	0.16	0.00	0.0	0.06	728	0.20	0.04	0.0
9	0.10	951	0.27	0.01	0.0	0.09	905	0.25	0.00	0.0	0.09	1,315	0.37	0.04	0.0
10	0.07	730	0.20	0.02	0.0	0.07	674	0.19	0.00	0.0	0.07	818	0.23	0.05	0.0
11	0.20	1,995	0.56	0.05	0.0	0.05	475	0.13	0.00	0.0	0.05	577	0.16	0.04	0.0
12	0.15	1,466	0.41	0.04	0.0	0.07	684	0.19	0.00	0.0	0.07	830	0.23	0.06	0.0
13	0.31	3,040	0.85	0.09	0.0	0.33	3,393	0.95	0.00	0.0	0.33	4,414	1.23	0.29	0.0
14	0.44	4,329	1.21	0.12	0.0	0.19	1,865	0.52	0.00	0.0	0.19	2,525	0.71	0.16	0.0
15	0.03	266	0.07	0.01	0.0	0.03	266	0.07	0.00	0.0	0.03	386	0.11	0.02	0.0
16	0.04	416	0.12	0.01	0.0	0.04	416	0.12	0.00	0.0	0.04	605	0.17	0.03	0.0
17															
18															

(b) Summary sheet

Fig. 7: SILTspread Tool.

7. IMPLEMENTATION PATHWAY

Even through the use of SILTspread, conducting a hydrologic analysis for each silt fence segment across three phases on a construction site may not be practical, especially for large projects. One approach that can be taken by state agencies is to apply the principals of the developed silt fence sediment barrier design methodology to create state-specific silt fence design guidelines. Standardized silt fence dimensions along with spacing guidelines can be used to develop design charts to quickly determine the storage capacity of a silt fence segment. Average 2-yr, 24-hr rainfall depths and typical soil CN's could be used to simplify the hydrologic analysis process. Geographically larger states, or those with diverse climates, could be divided by region or Department of Transportation (DOT) regions/areas/districts to allow for several zones. Simplified VSF and Peak Flow Sizing Factors (Q_PSF) can be determined using average rainfall conditions, soil type, and cover characteristics, Fig. 8. An example of a proposed simplified Alabama silt fence design standard using Alabama DOT (ALDOT) regions and CN of 91, representative of newly graded areas with hydrologic soil group of C, typical of highly compacted soils. The VSF and Q_PSF can be multiplied against the contributing drainage area in acres (ha) to determine the volume and peak flow as shown in Table 2. Additionally, standard weir dimensions and capacities can also be provided in design guidance.

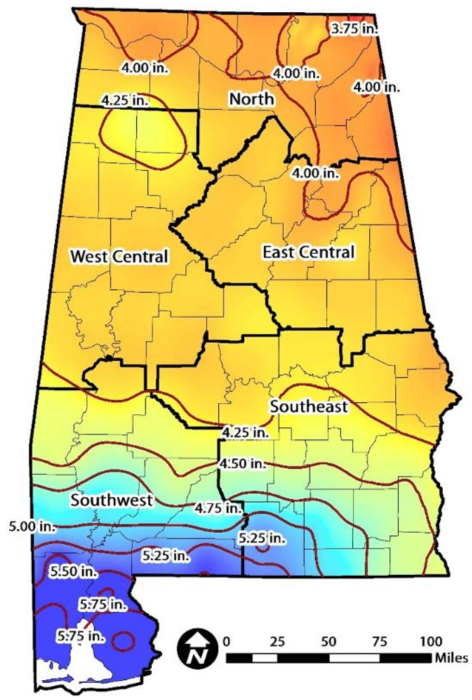


Fig. 8: 2-yr, 24-hr rainfall analysis by ALDOT region.

Table 2: Sizing factors as a function of contributing drainage area.

ALDOT Region	Avg. $P_{2\text{-yr, 24-hr}}$ in. (cm)	SCS Storm Distribution	VSF ft^3 (m^3)	Q_PSF ft^3/s (m^3/s)
North	4.01 (10.19)	Type II	10,988A	4.73A
East Central	4.10 (10.41)	Type III	11,301A	3.19A
West Central	4.17 (10.59)	Type III	11,545A	3.25A
Southeast	4.44 (12.28)	Type III	12,488A	3.52A
Southwest	4.98 (12.65)	Type III	14,385A	4.06A

Note: A indicates area in ac (ha)

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