

**Forest Service Handbook
National Headquarters - Washington Office
Washington, DC**

**Forest Service Handbook 2309.18 – Trails Management Handbook
Chapter 5 - Construction and Maintenance Exhibits**

Amendment: 2309.18-1991-2

Effective date: November 08, 1991

Duration: This amendment is effective until superseded or removed.

Approved by: F. Dale Robertson, Chief

Date approved:

Responsible Staff:

Last Change: 2309.18-1991-1

Superseded Document(s): 2309.18-91-1, March 21, 1991; 1, June 1987; New, June 1985

Digest: Following is an explanation of the changes throughout the directive by section.

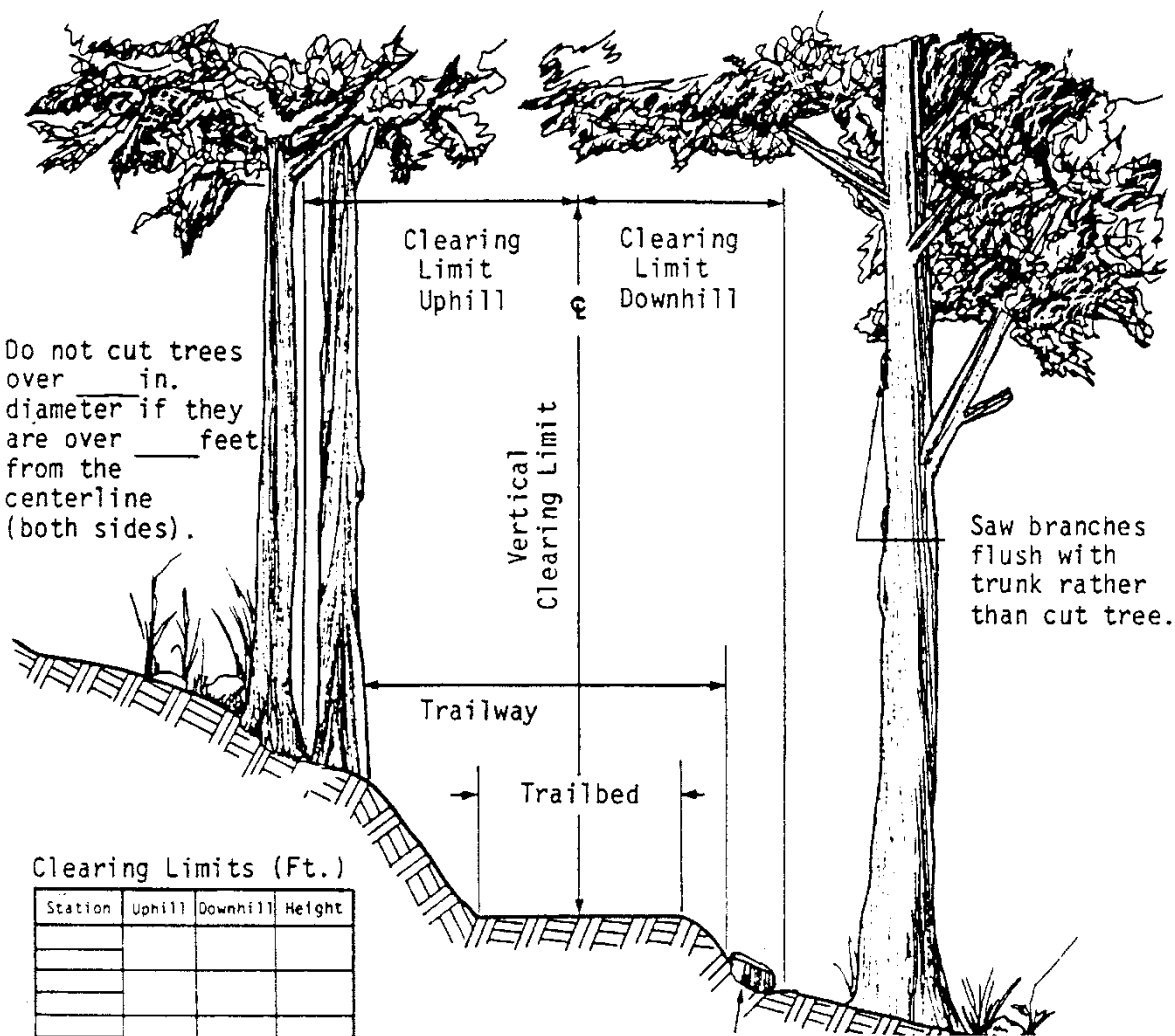
This amendment is a reissuance of FSH 2309.18 to conform the format and structure of the Handbook to the requirements of electronic directive issuance.

This amendment makes no substantive changes to the text. The only changes made are those necessary to meet new format requirements or to correct spelling, punctuation, unit names or coding errors.

This Handbook is now available electronically in the National Information Center in the same format as the paper copy. Henceforth, amendments to this Handbook will be issued to Forest Service units electronically on a document basis.

5 - Exhibit 01

Clearing Limits



Do not cut trees over ___ in. diameter if they are over ___ feet from the centerline (both sides).

Clearing Limit Uphill

Clearing Limit Downhill

Vertical Clearing Limit

Trailway

Trailbed

Saw branches flush with trunk rather than cut tree.

Clearing Limits (Ft.)

Station	Uphill	Downhill	Height

All trees ___ in. or less in diameter shall be cut if they are within ___ feet of centerline (both sides).

Stump Height Requirements* (Inches)

Stump Position	Side Slope	Uphill	Downhill
Stumps left in place between the trailway and clearing limits	Side slope less than 10%		
	Side slope over 10%		
Stumps outside the clearing limits	Side slope less than 10%		
	Side slope over 10%		

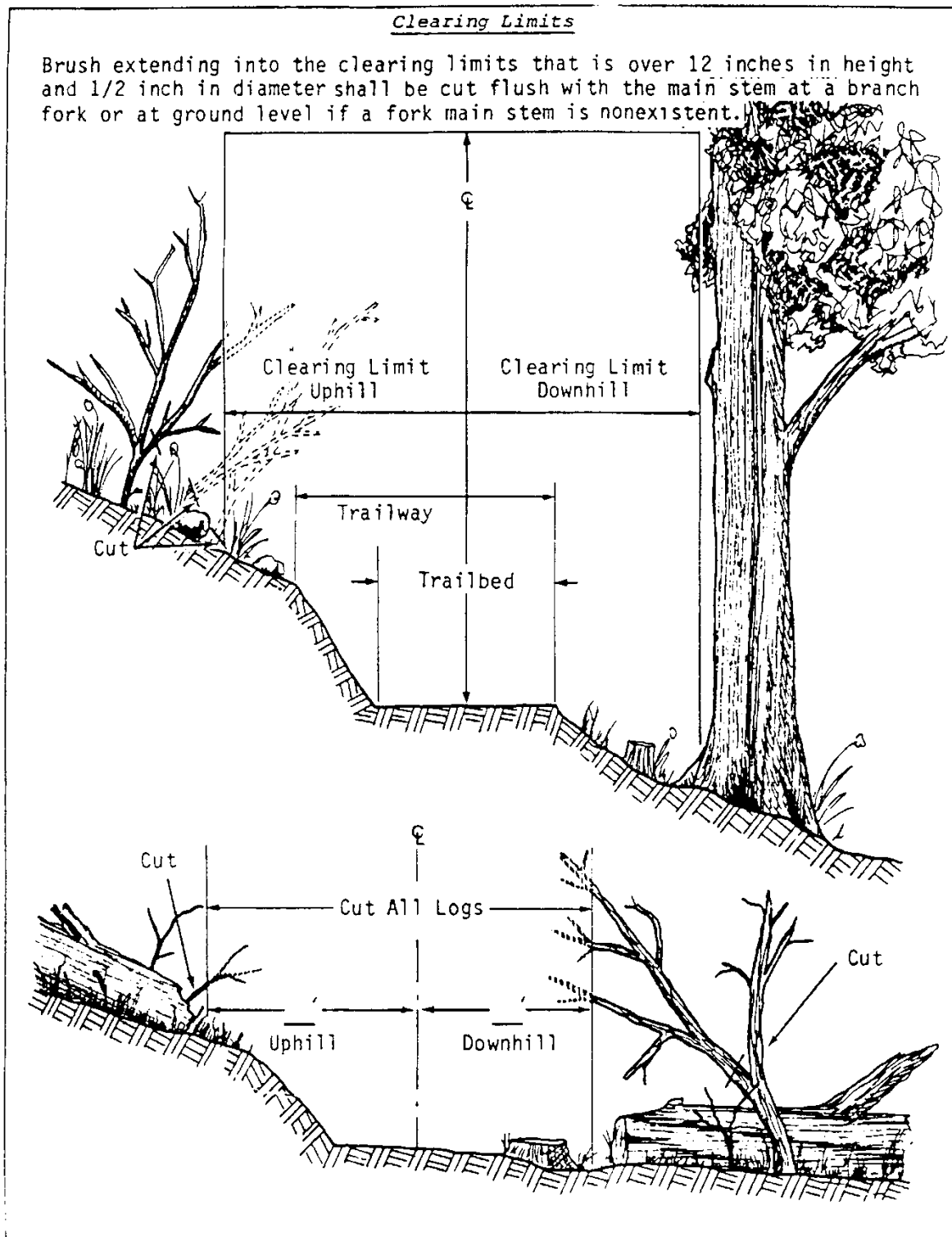
Trail Name _____

Trail Number _____

*All heights measured from uphill side of stumps.

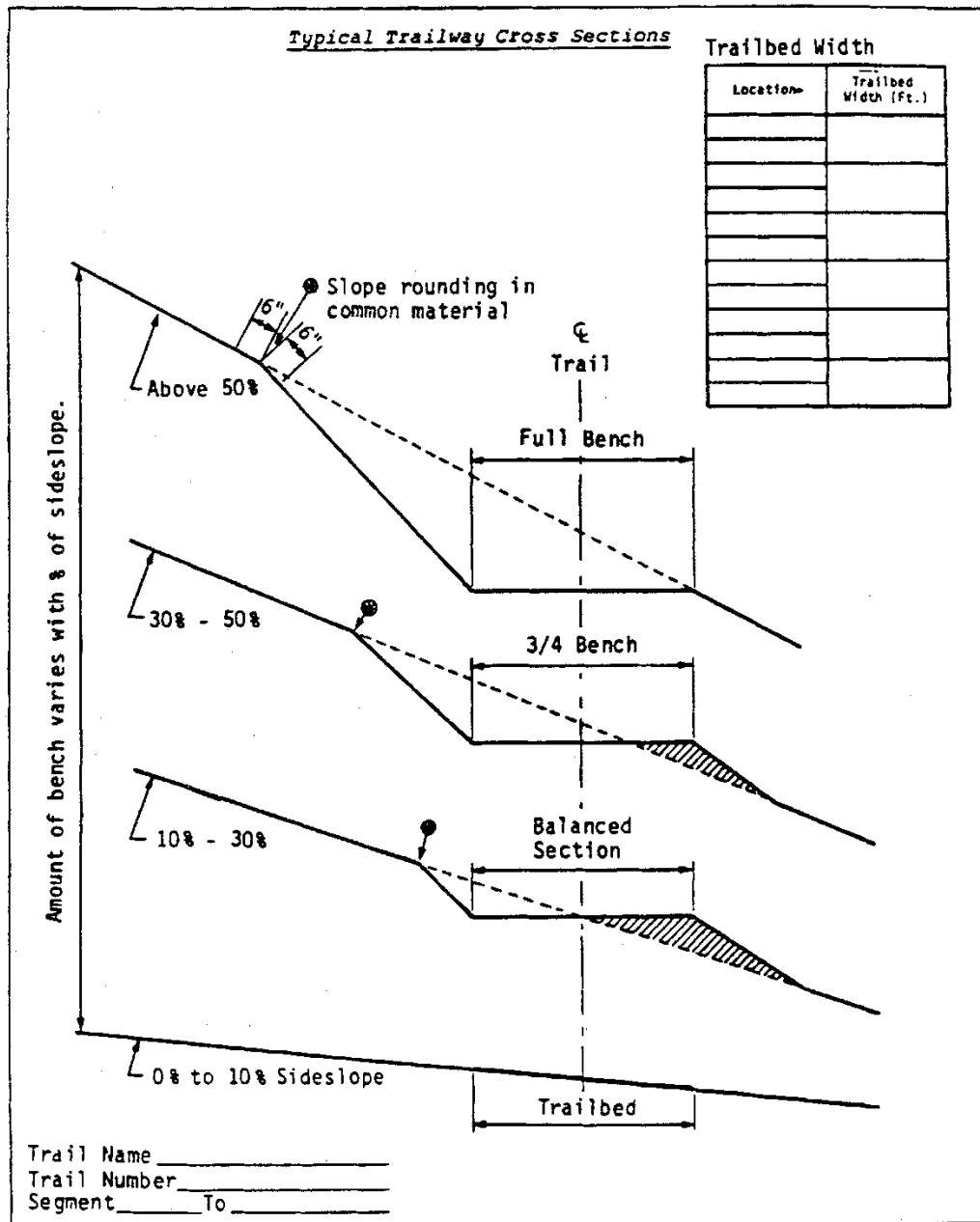
FS-7700-61 (6/84)

5 - Exhibit 02



FS-7700-62 (6/84)

5 - Exhibit 03



FS-7700-63 (6/84)

5 - Exhibit 04

Slope Finish	Trailbed Finish
Remove roots over _____ inches in diameter that protrude from the backslope.	Remove loose rock and stone on the trailbed surface over _____ inches in the smallest dimension.
	Remove embedded rock and stone that protrude more than _____ inches above the trailbed.
	Remove roots which protrude more than _____ inches above the trailbed.

Backslope Ratio
 Rock _____:1
 Common _____:1

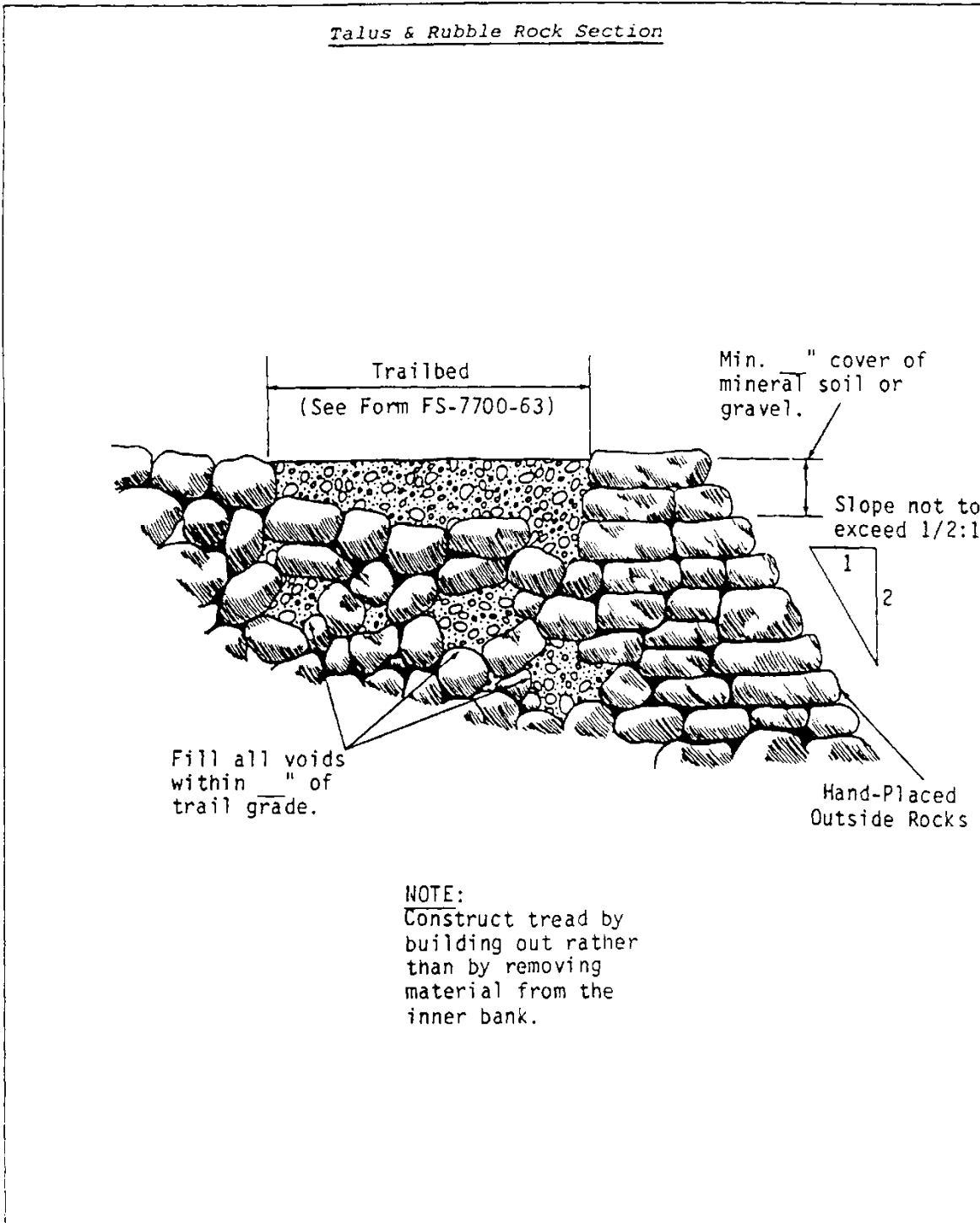
The diagram shows a cross-section of a trail. On the left is a dashed line representing the backslope. A vertical line with arrows indicates a height of 'n'. A horizontal line with arrows indicates a width of 'l'. The trailbed is a rectangular area in the center, labeled 'Trailbed (See Form FS-7700-63 for trailbed width.)'. A vertical dashed line with a circle at the top is labeled 'C'. To the right of the trailbed is a solid line representing the fill slope. A vertical line with arrows indicates a height of 'n'. A horizontal line with arrows indicates a width of 'l'. A note points to the top of the trailbed: 'For surfacing or paving details see Form FS-7700-94 or Form FS-7700-95.'

Fill Slope Ratio
 Rock _____:1
 Common _____:1

Trail Name _____
 Trail Number _____
 Segment _____ To _____

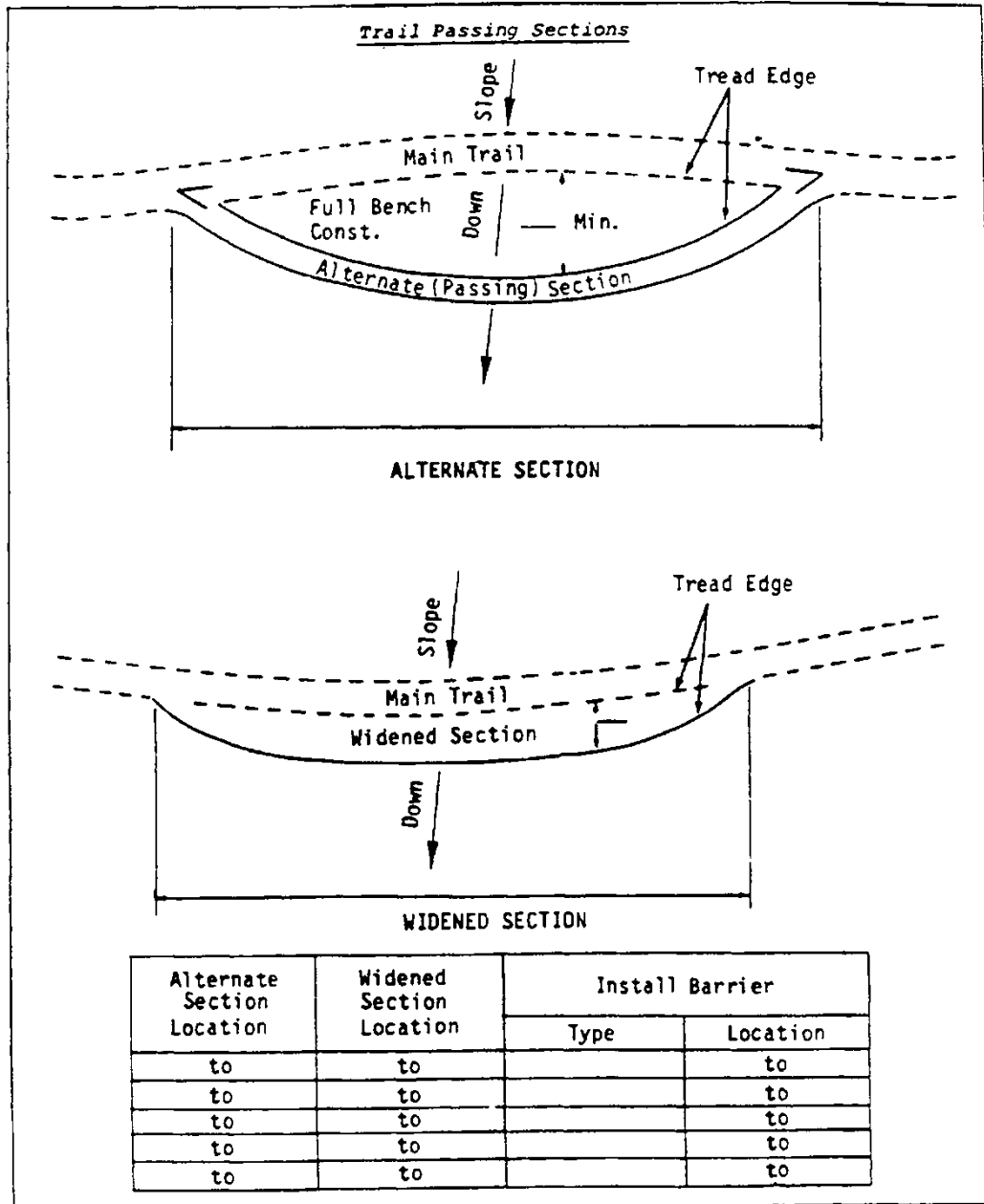
FS-7700-64 (6/84)

5 - Exhibit 05



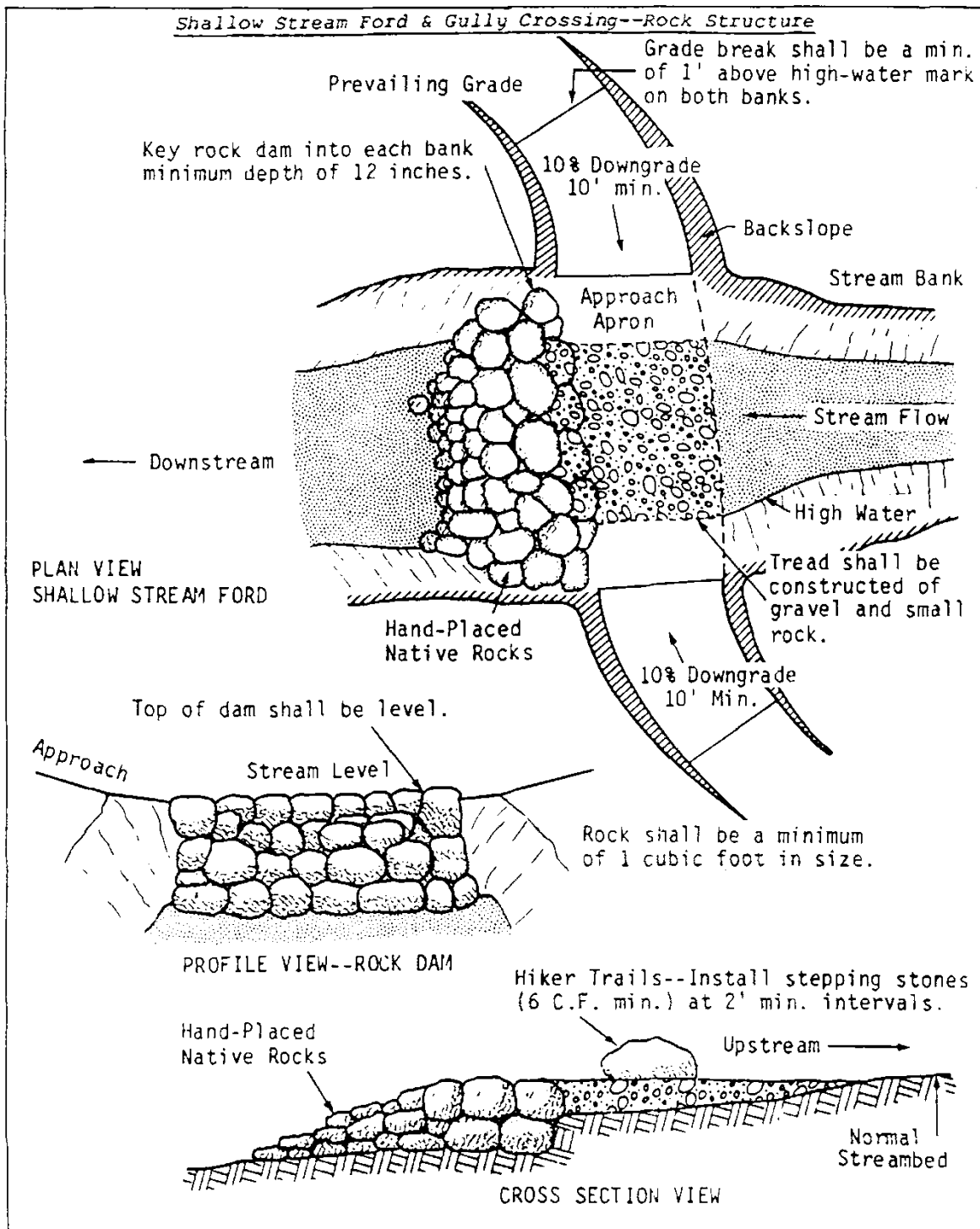
FS-7700-65 (6/84)

5 - Exhibit 06



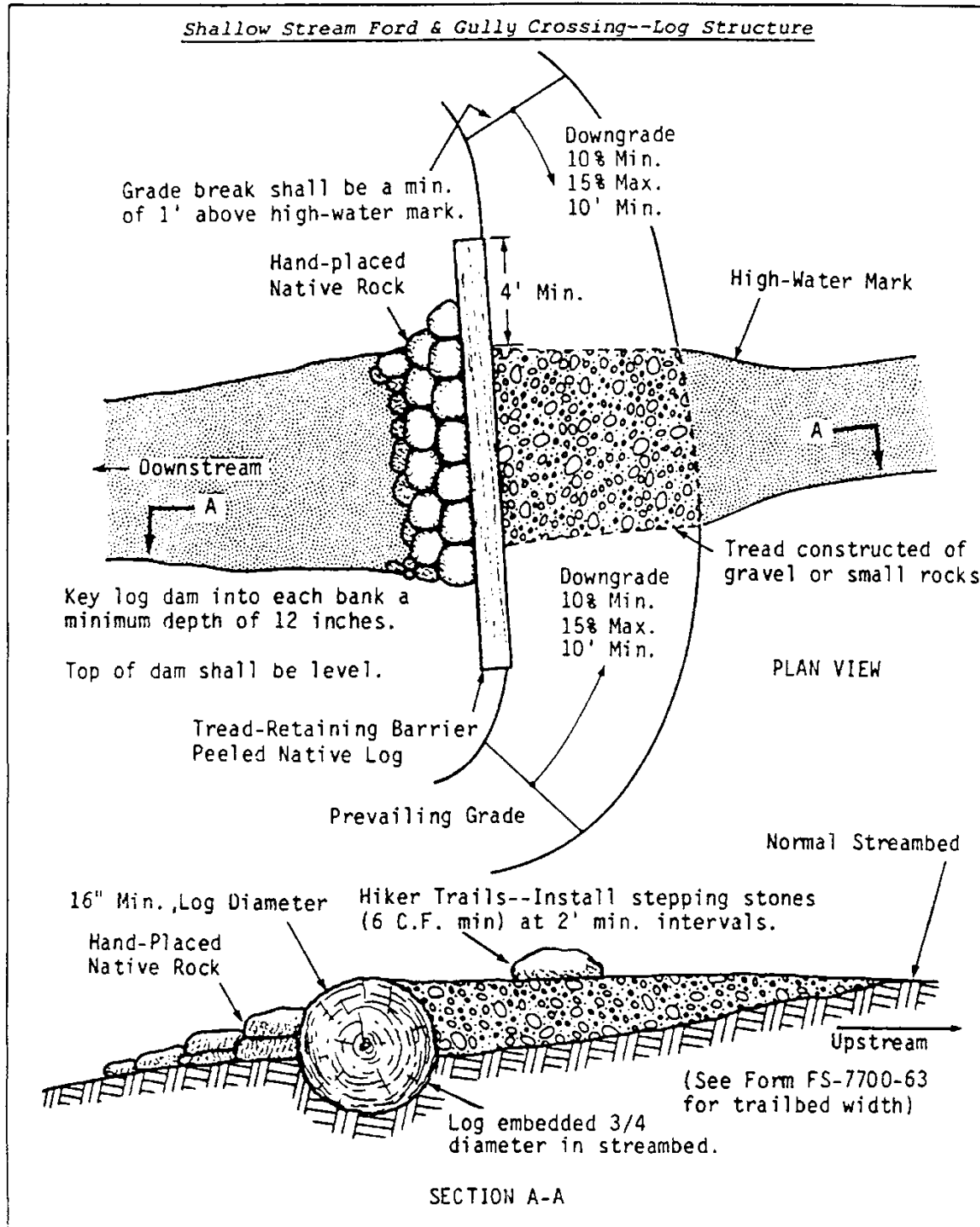
FS-7700-67 (6/84)

5 - Exhibit 07



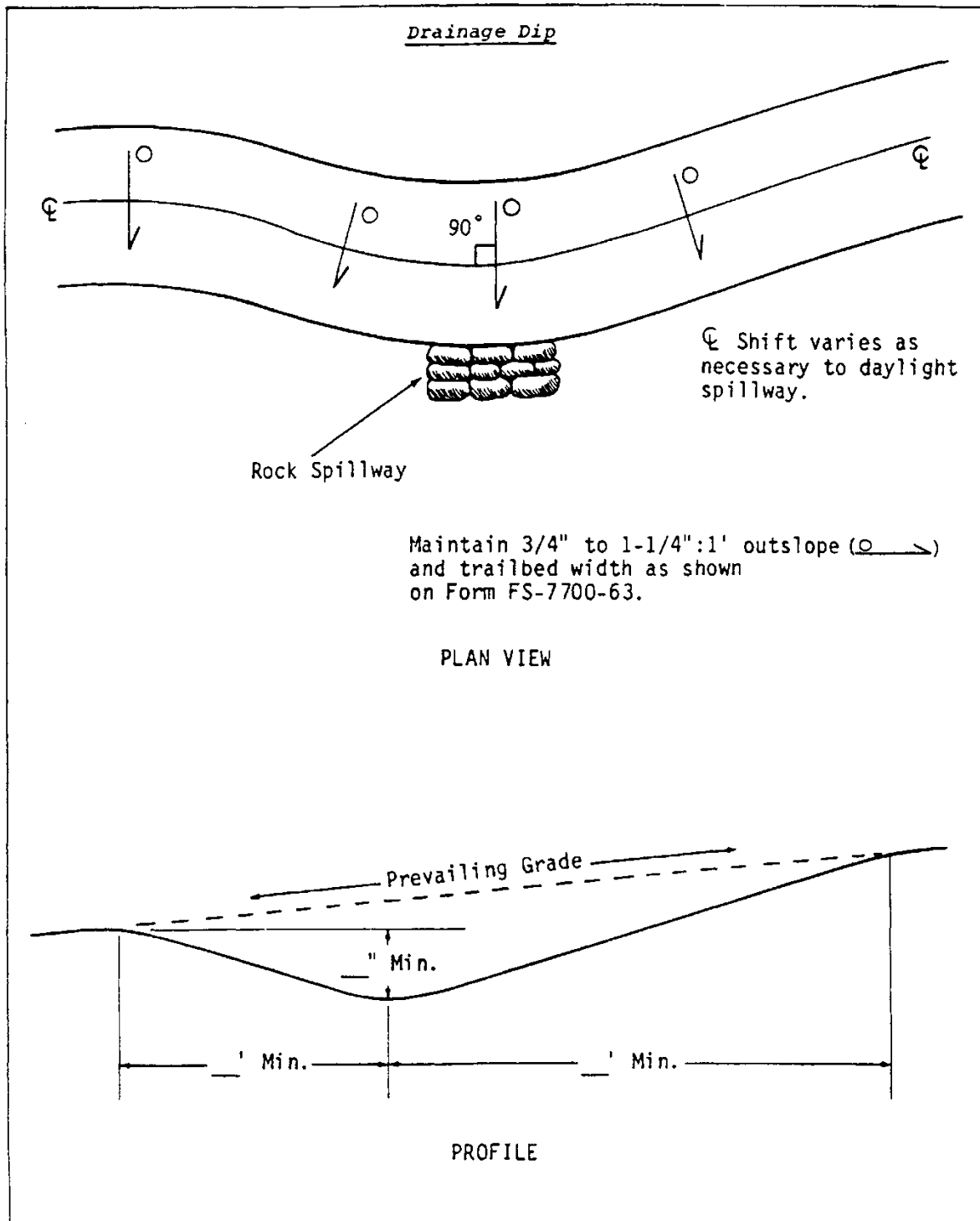
FS-7700-68 (6/84)

5 - Exhibit 08



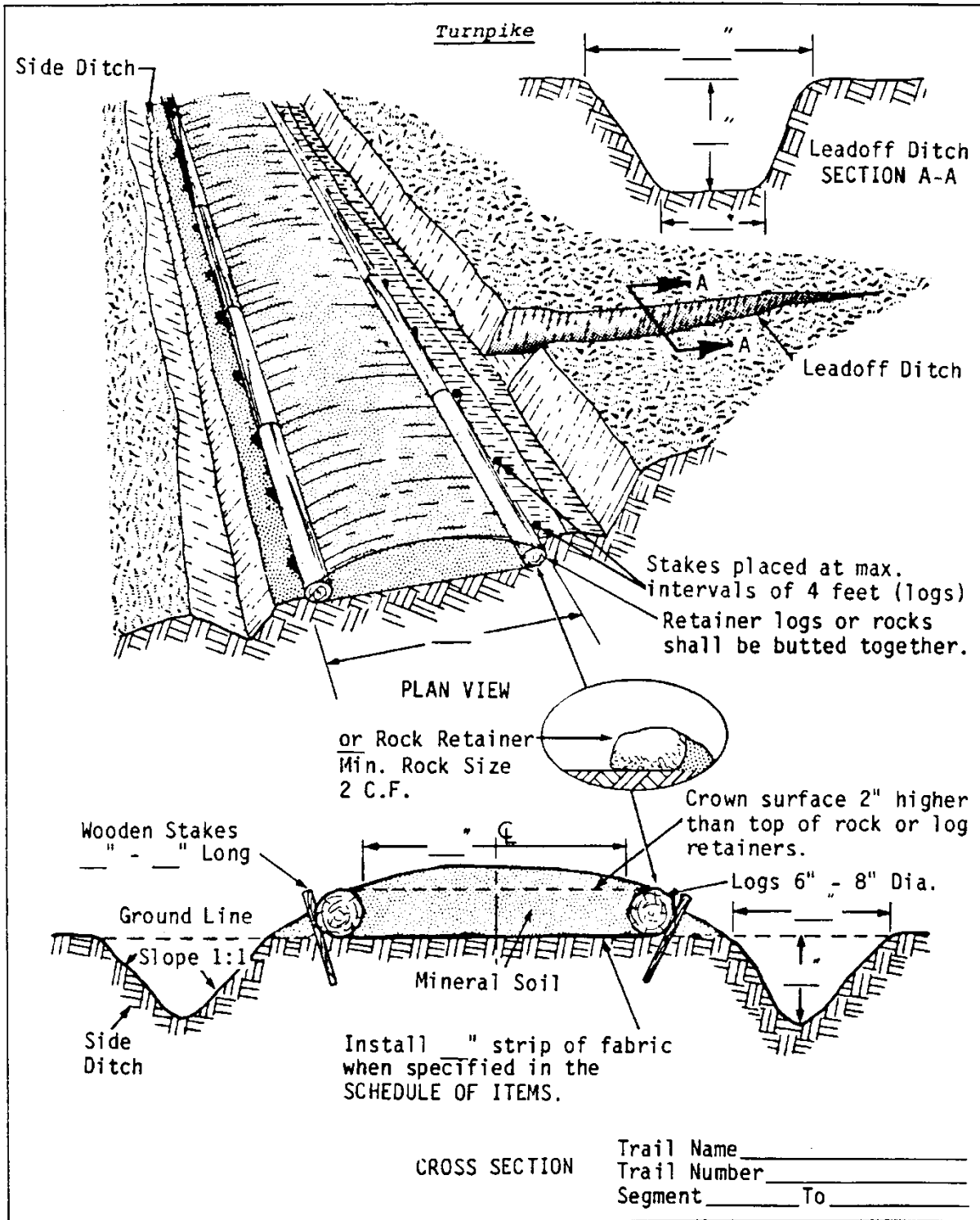
FS-7700-69 (6/84)

5 - Exhibit 09



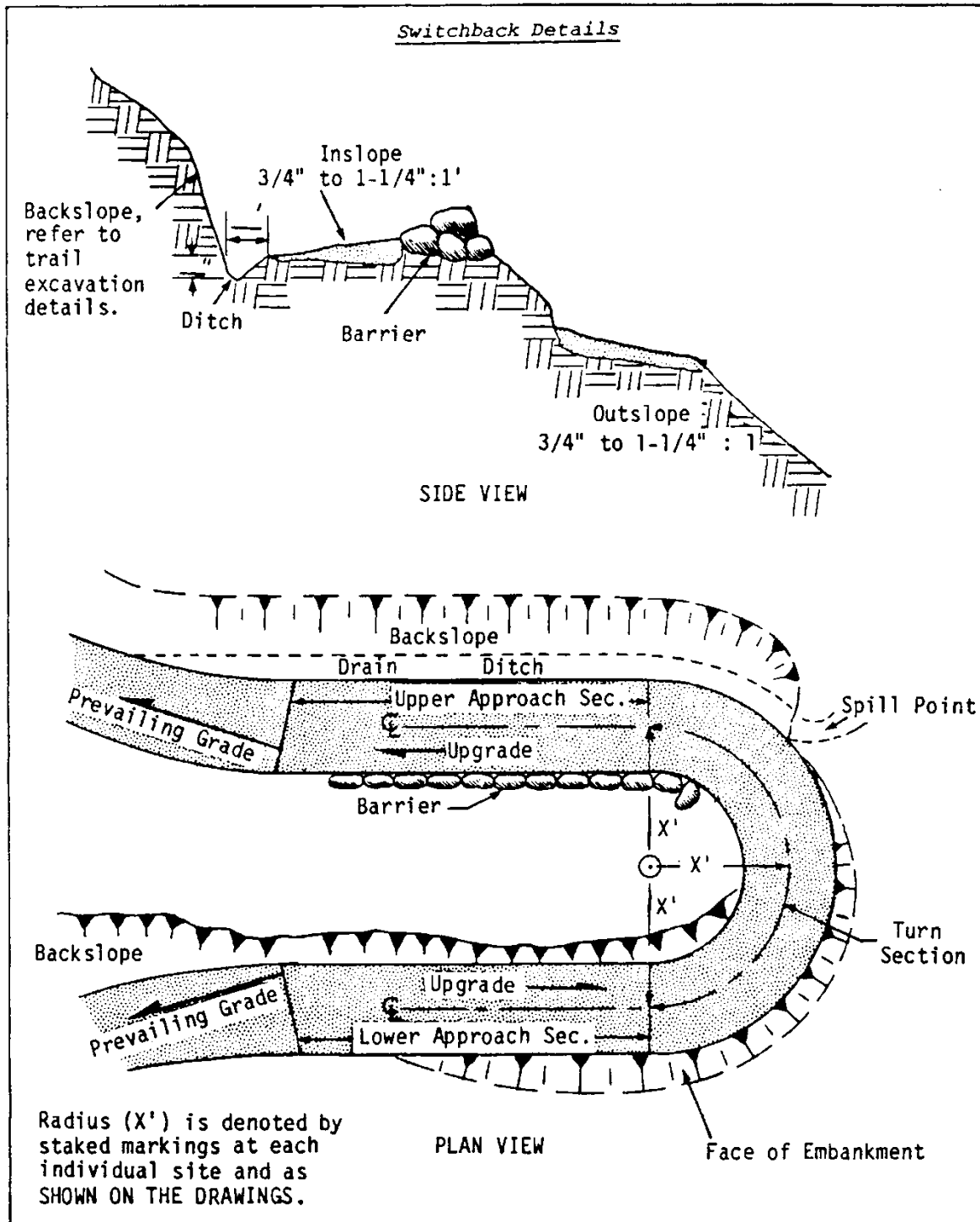
FS-7700-66 (6/84)

5 - Exhibit 10



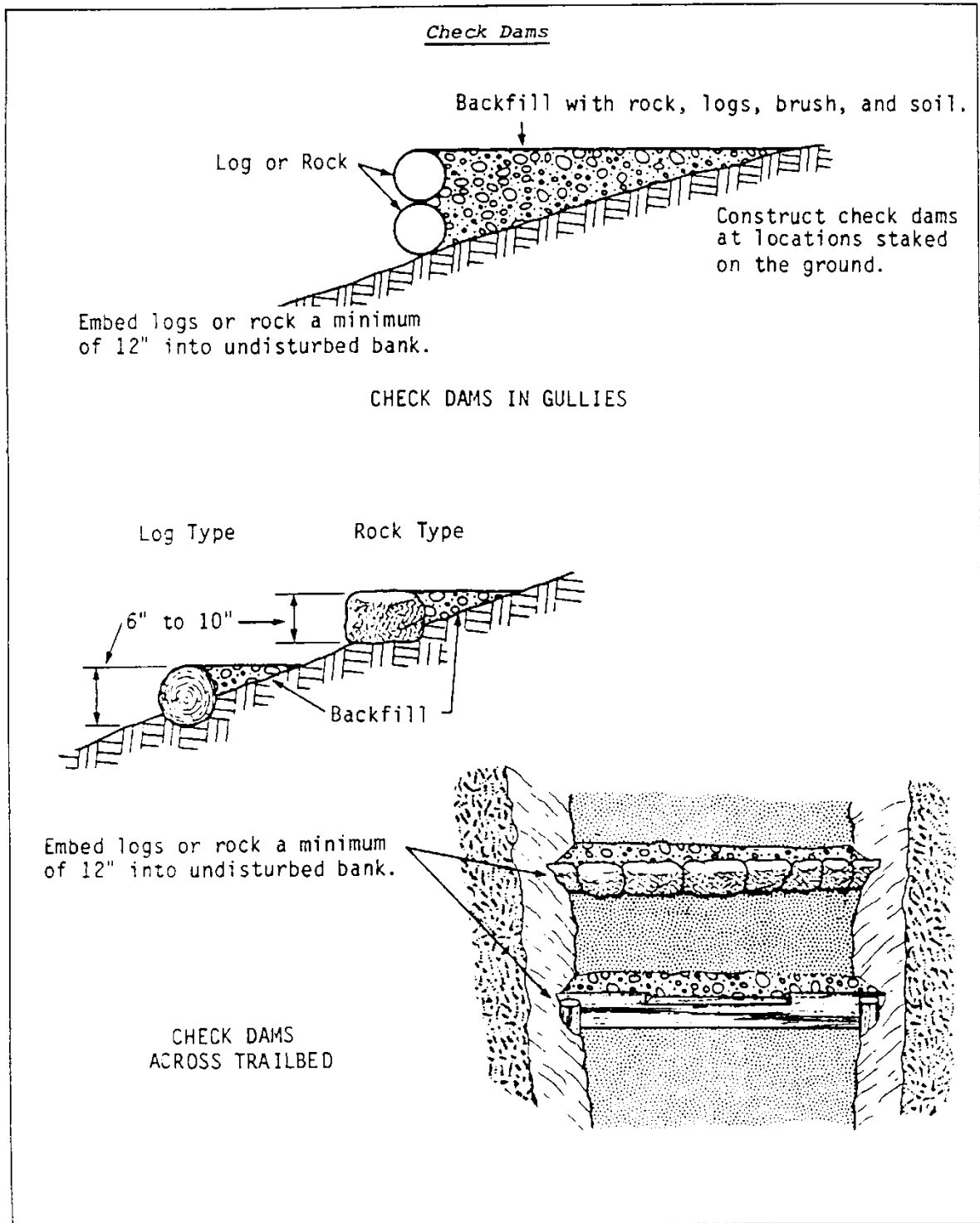
FS-7700-70 (6/84)

5 - Exhibit 11



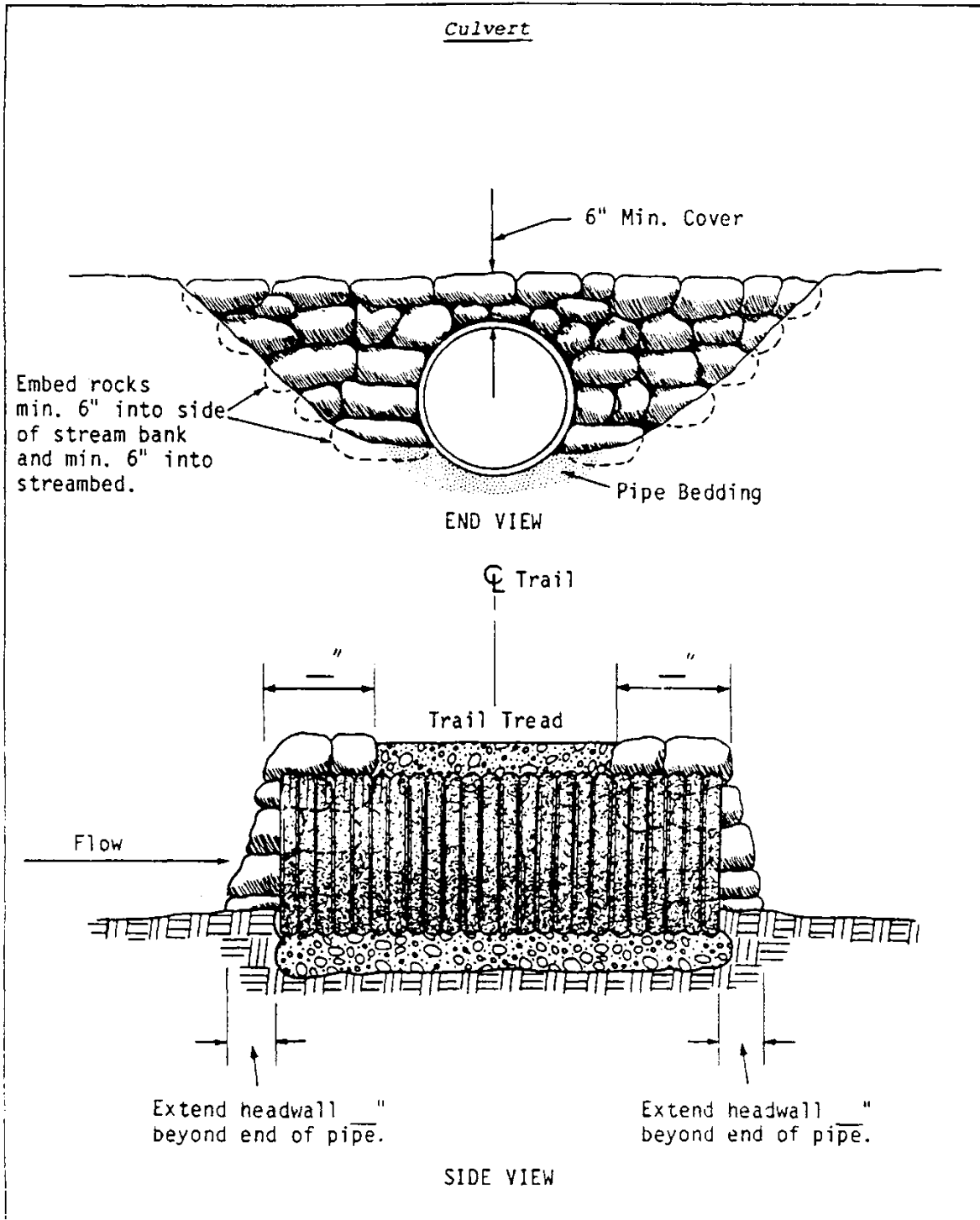
FS-7700-71 (6/84)

5 - Exhibit 12



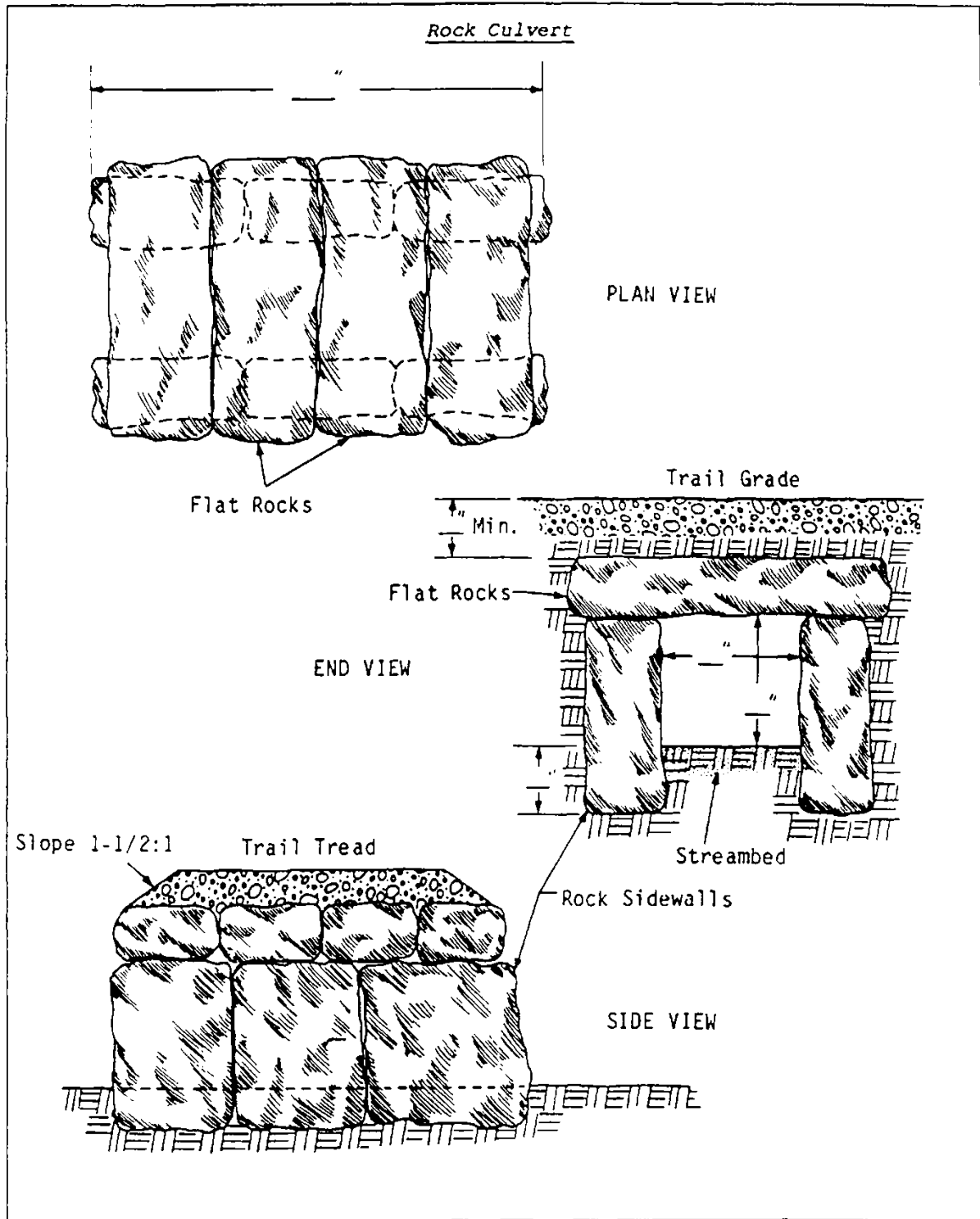
FS-7700-75 (6/84)

5 - Exhibit 13



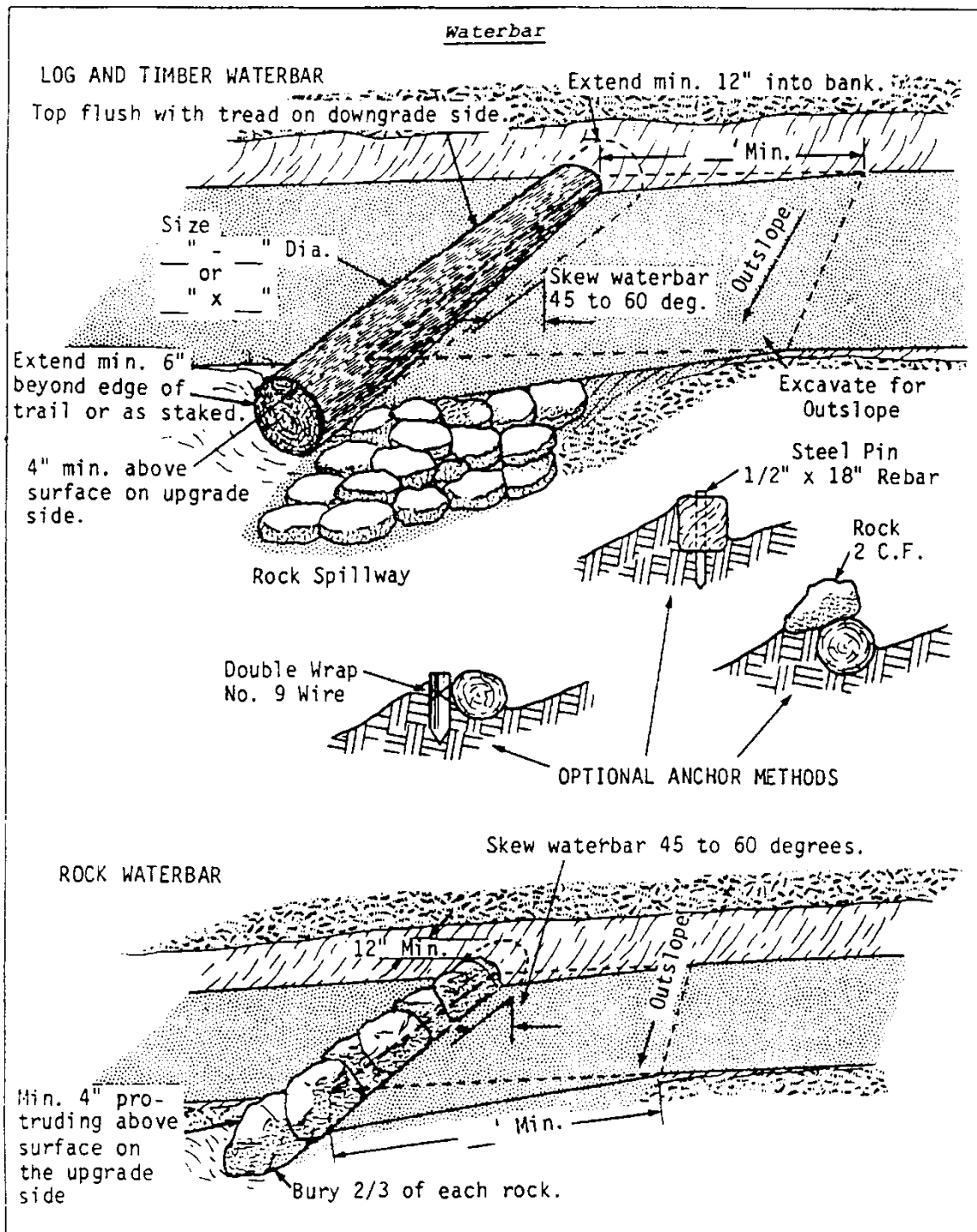
FS-7700-76 (6/84)

5 - Exhibit 14



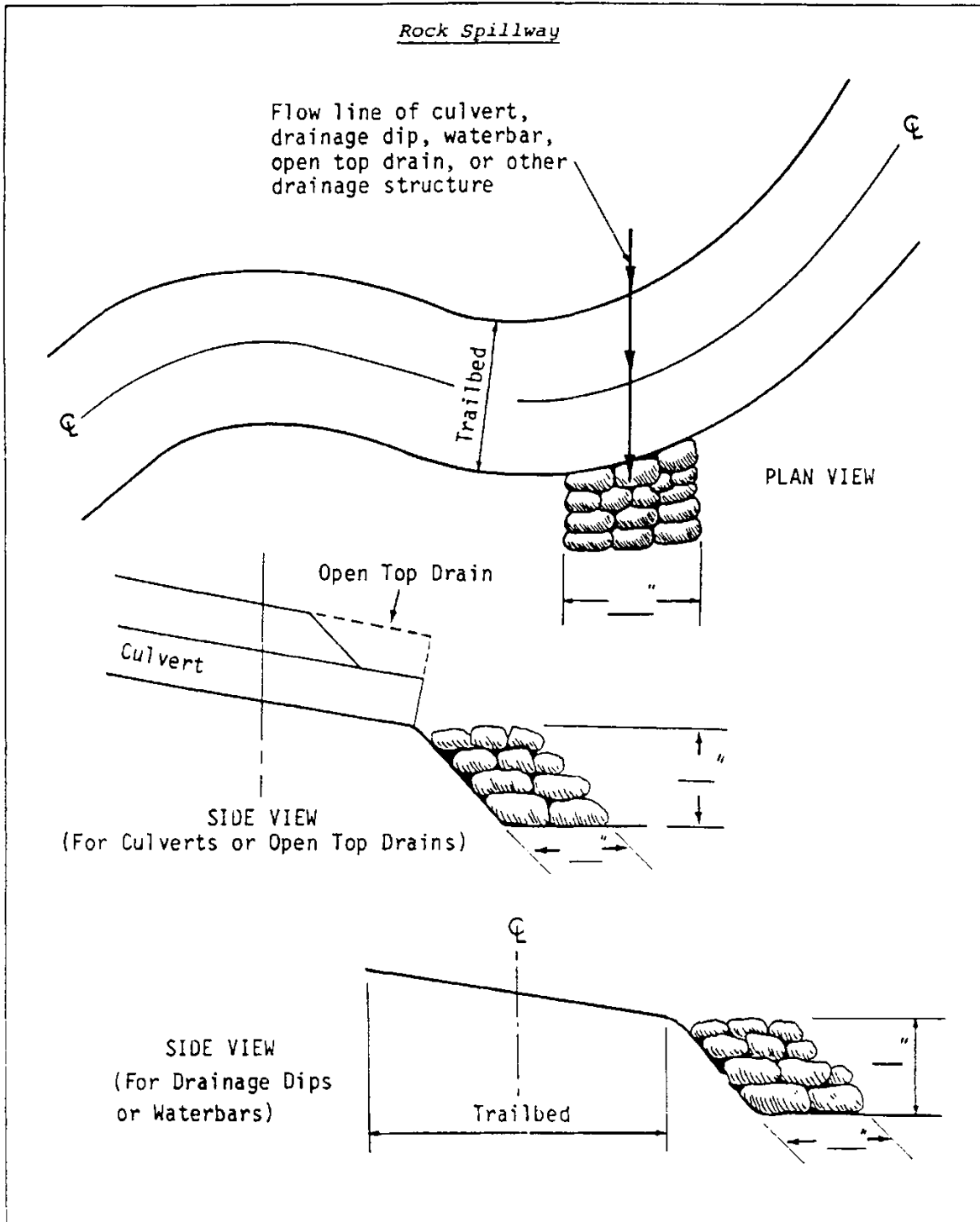
FS-7700-77 (6/84)

5 - Exhibit 15



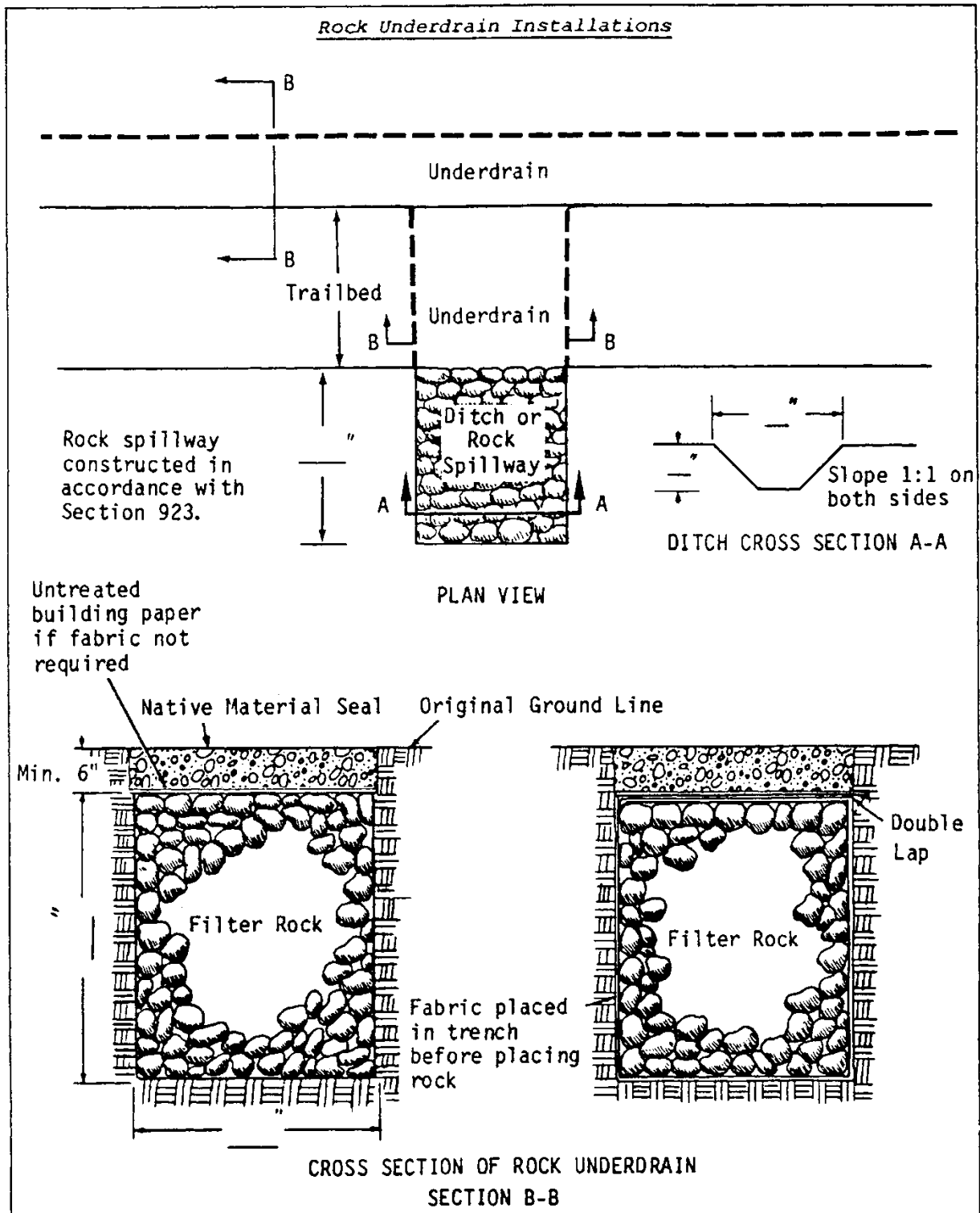
FS-7700-78 (6/84)

5 - Exhibit 16



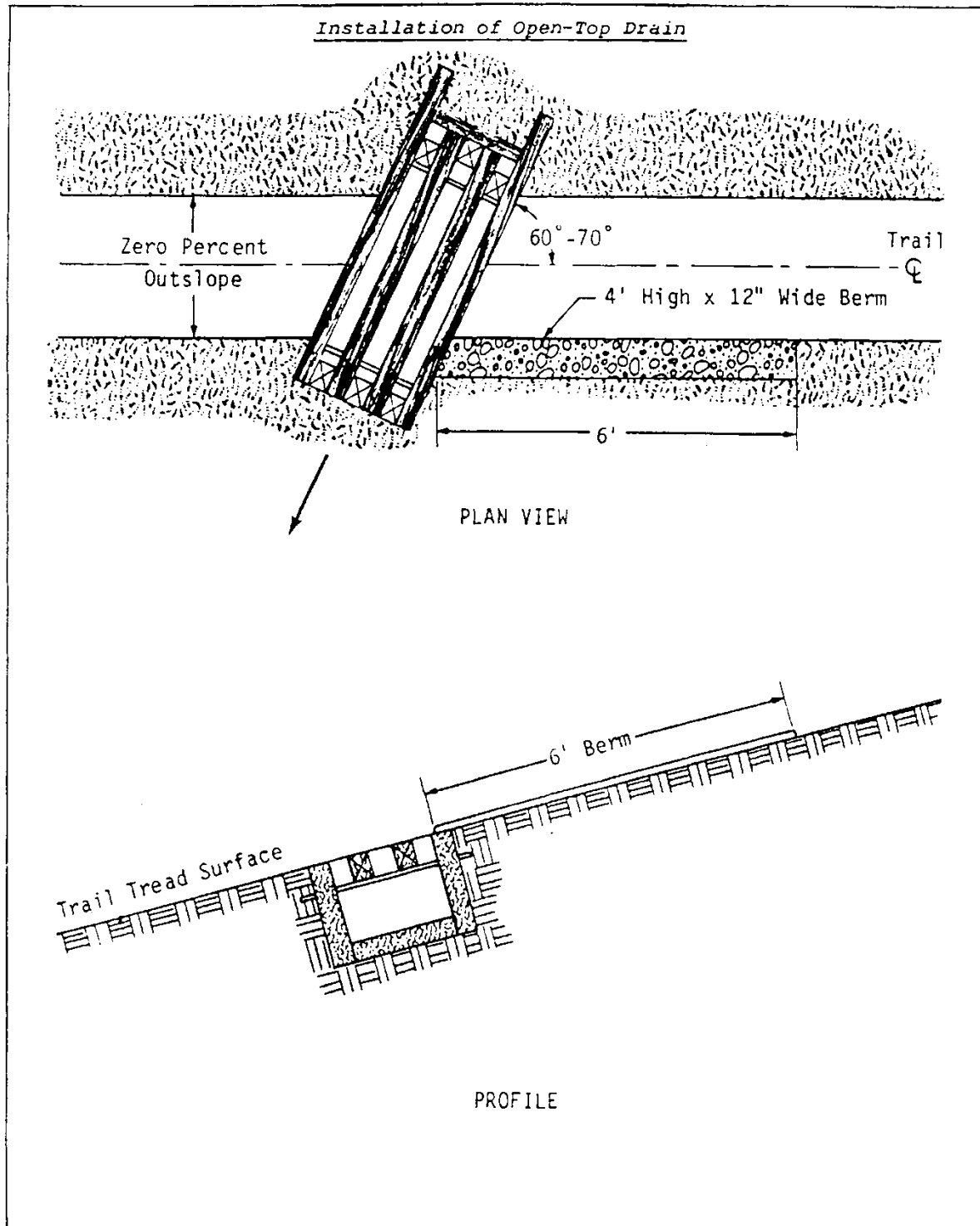
FS-7700-79 (6/84)

5 - Exhibit 17



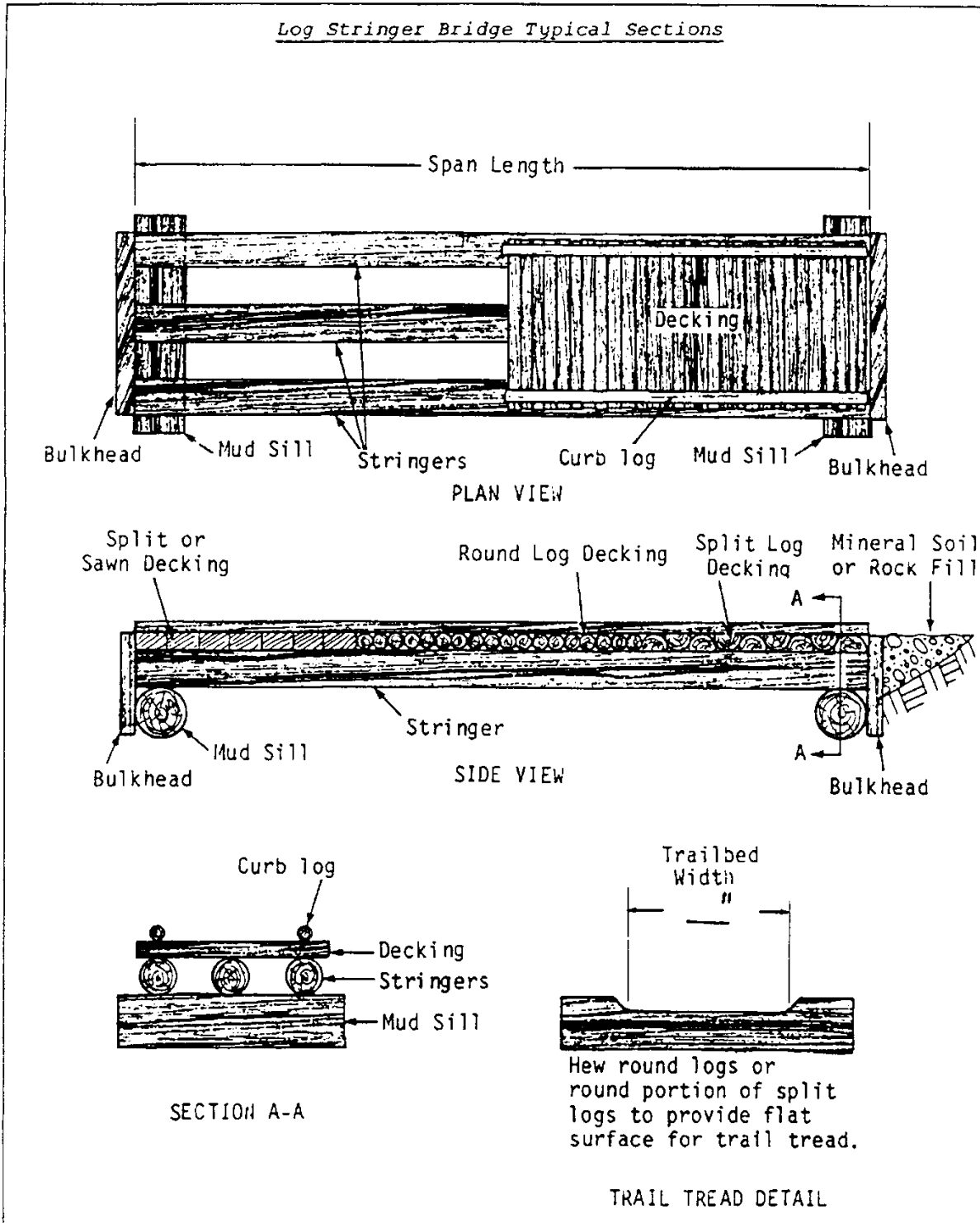
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5 - Exhibit 18



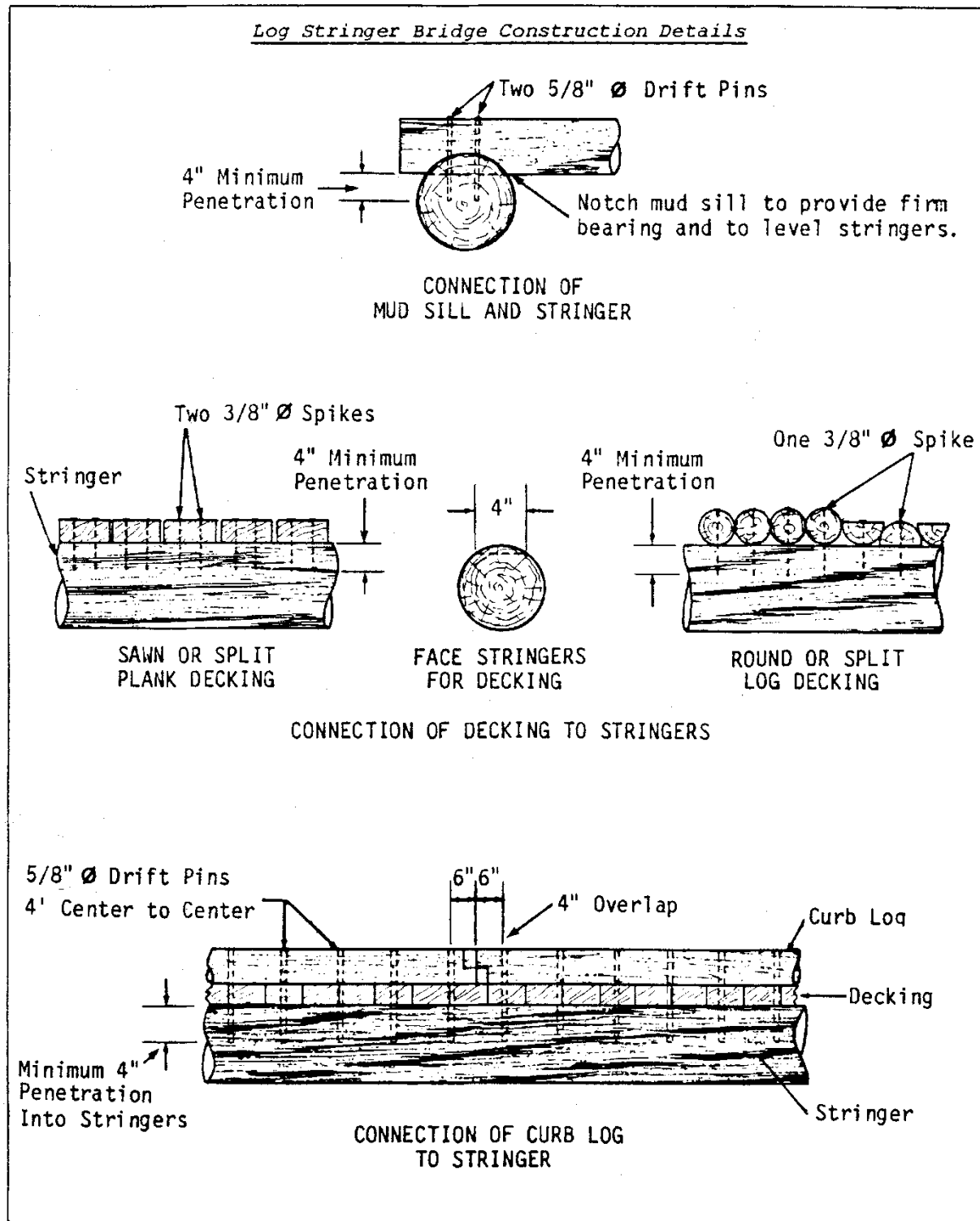
FS-7700-82 (6/84)

5 - Exhibit 19



FS-7700-84 (6/84)

5 - Exhibit 20



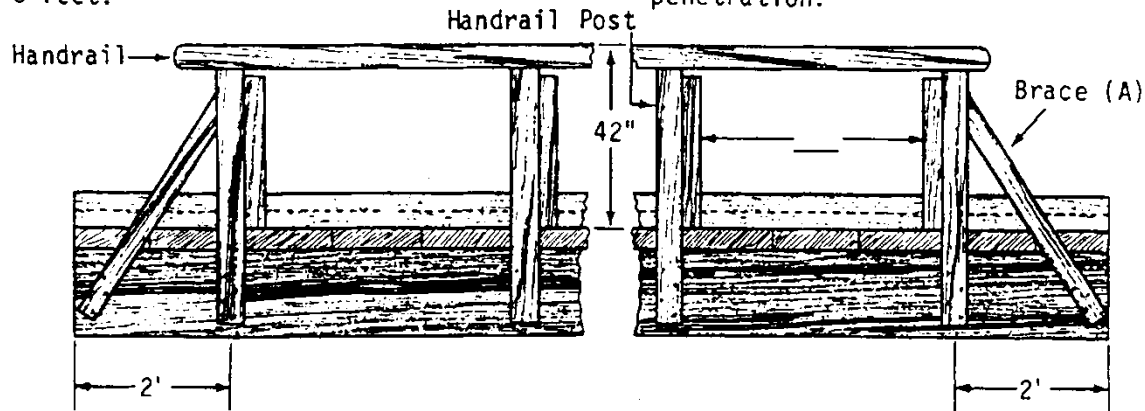
FS-7700-85 (6/84)

5 - Exhibit 21

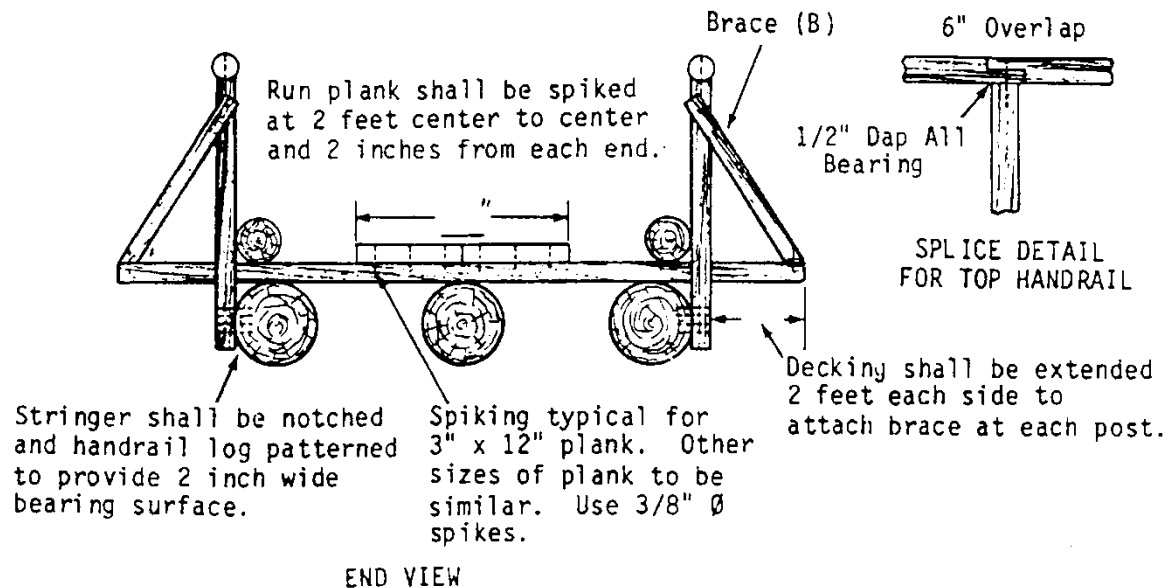
Log Stringer Bridge Handrail & Running Plank

Handrail posts shall be equally spaced throughout the span so as not to exceed 8 feet.

All handrail logs 3 to 4 inches in diameter shall be attached at joints with 3/8-inch \emptyset spikes and with 3-inch minimum penetration.

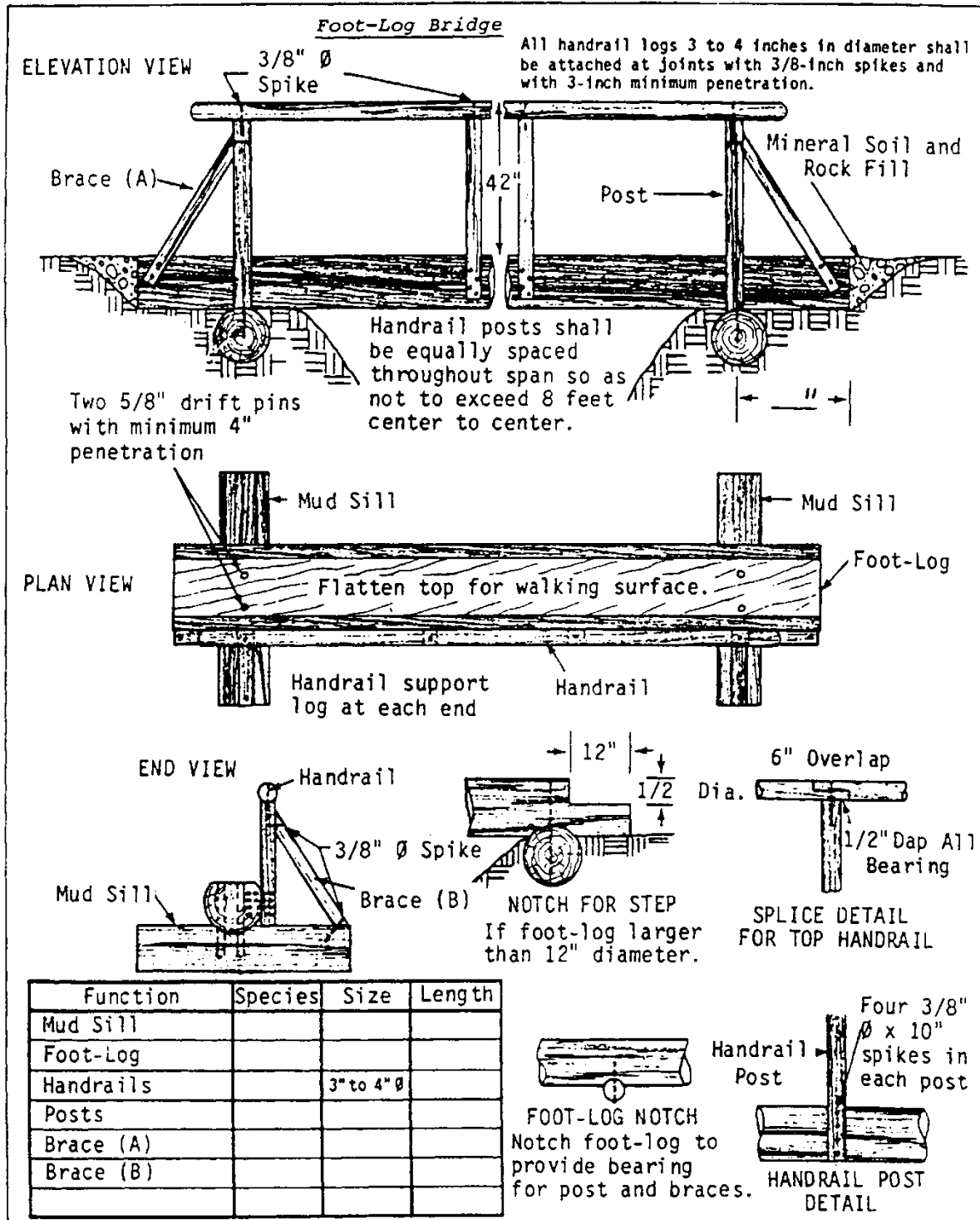


ELEVATION VIEW



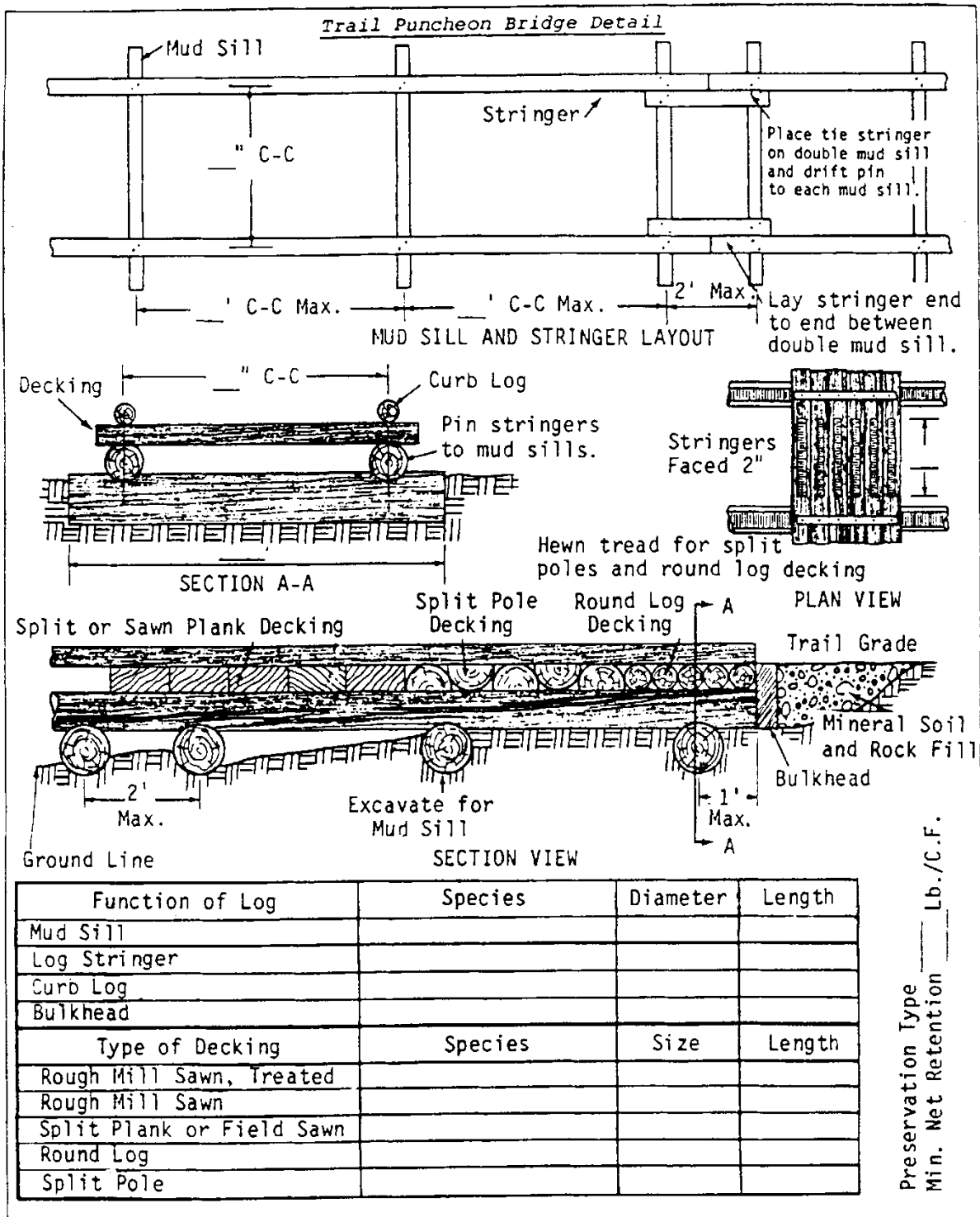
FS-7700-86 (6/84)

5 - Exhibit 22



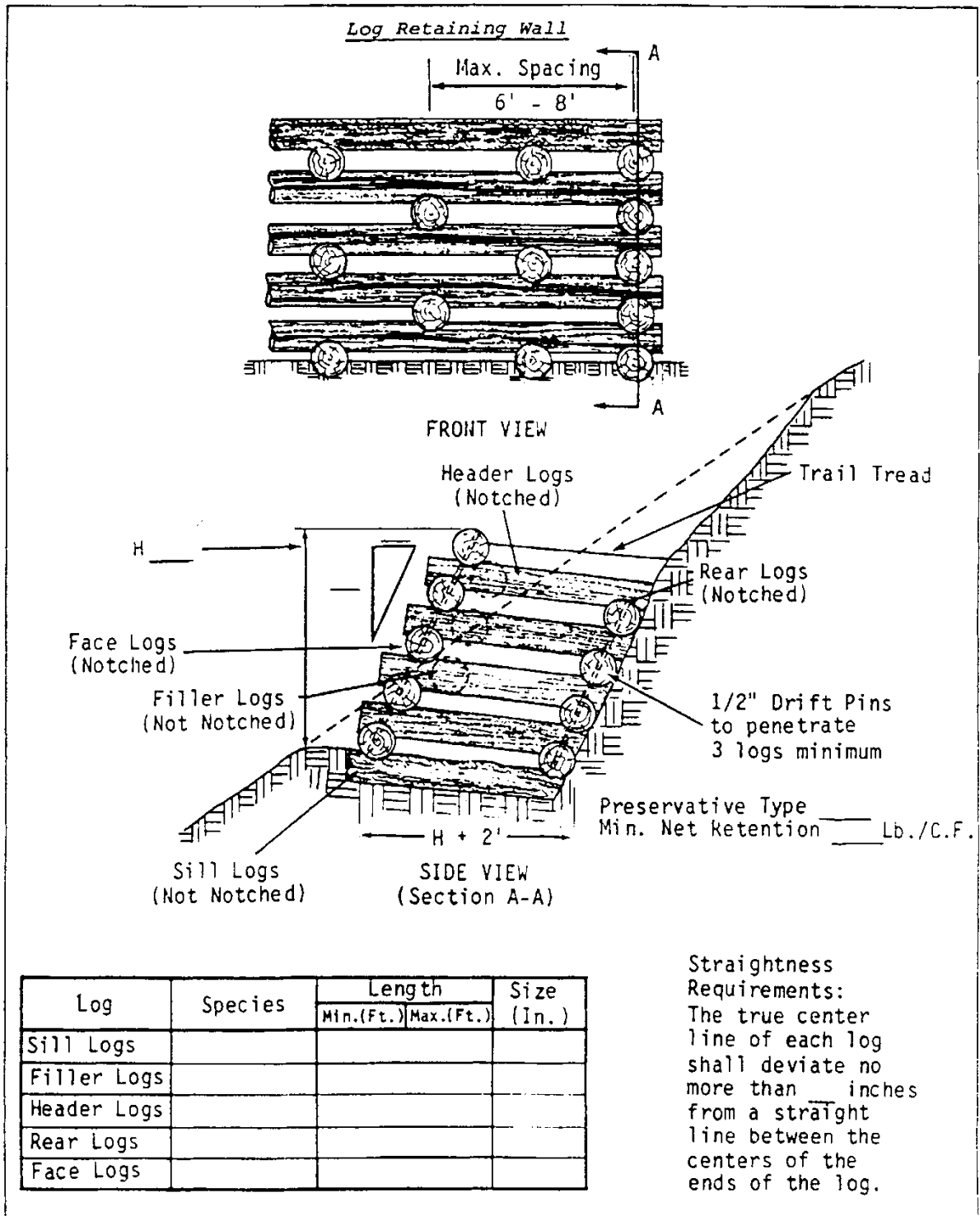
FS-7700-87 (6/84)

5 - Exhibit 23



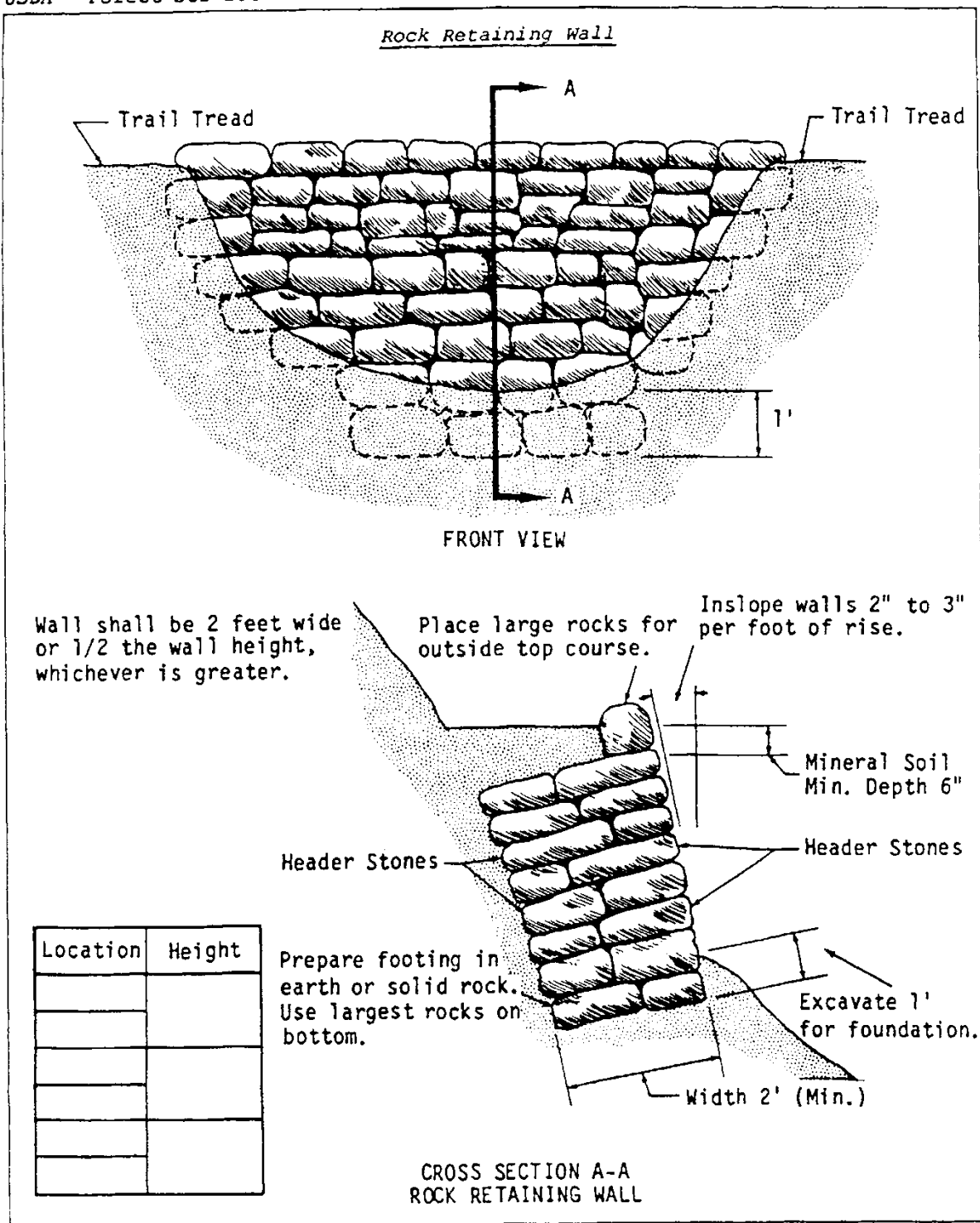
FS-7700-88 (6/84)

5 - Exhibit 24



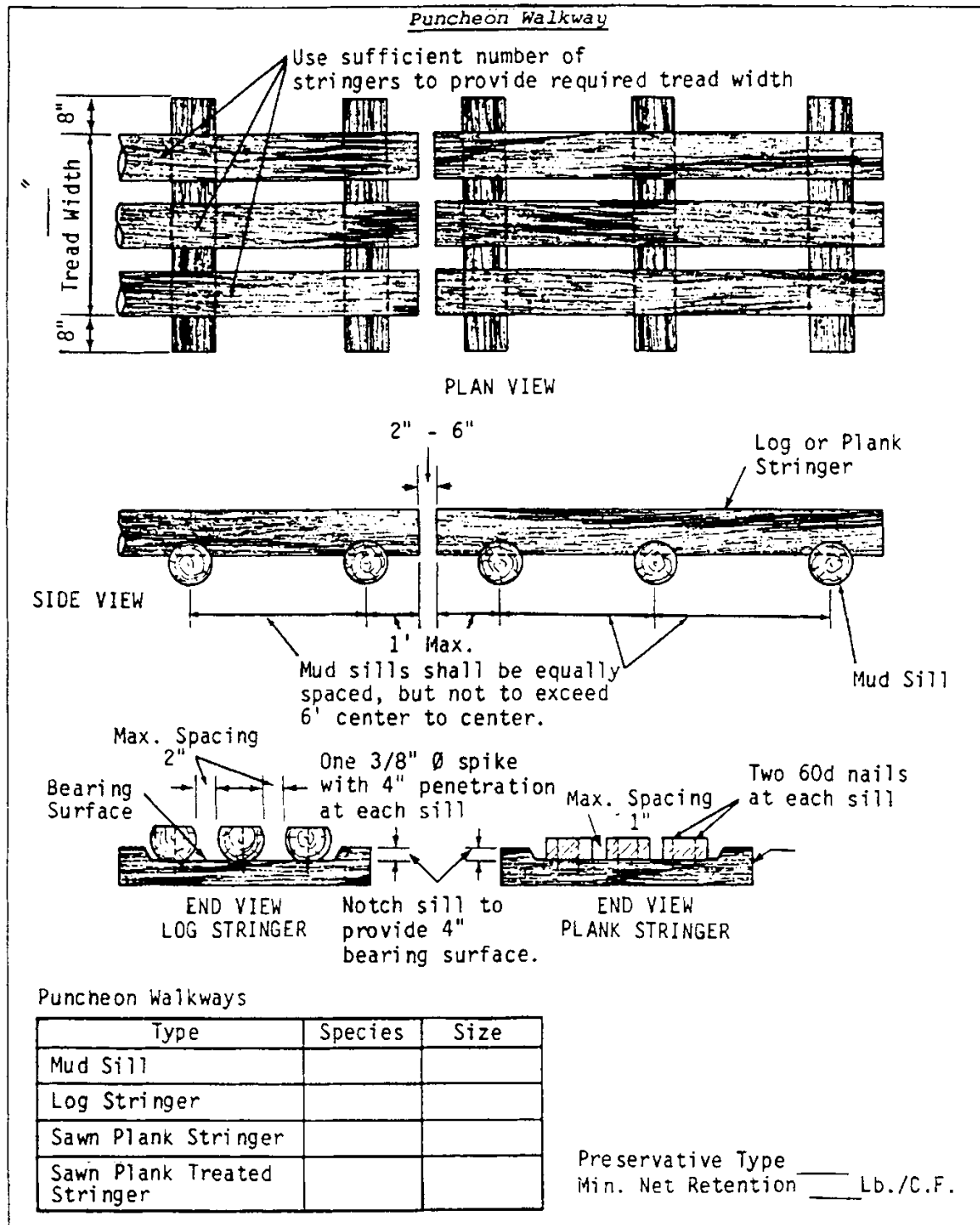
FS-7700-89 (6/84)

5 - Exhibit 25



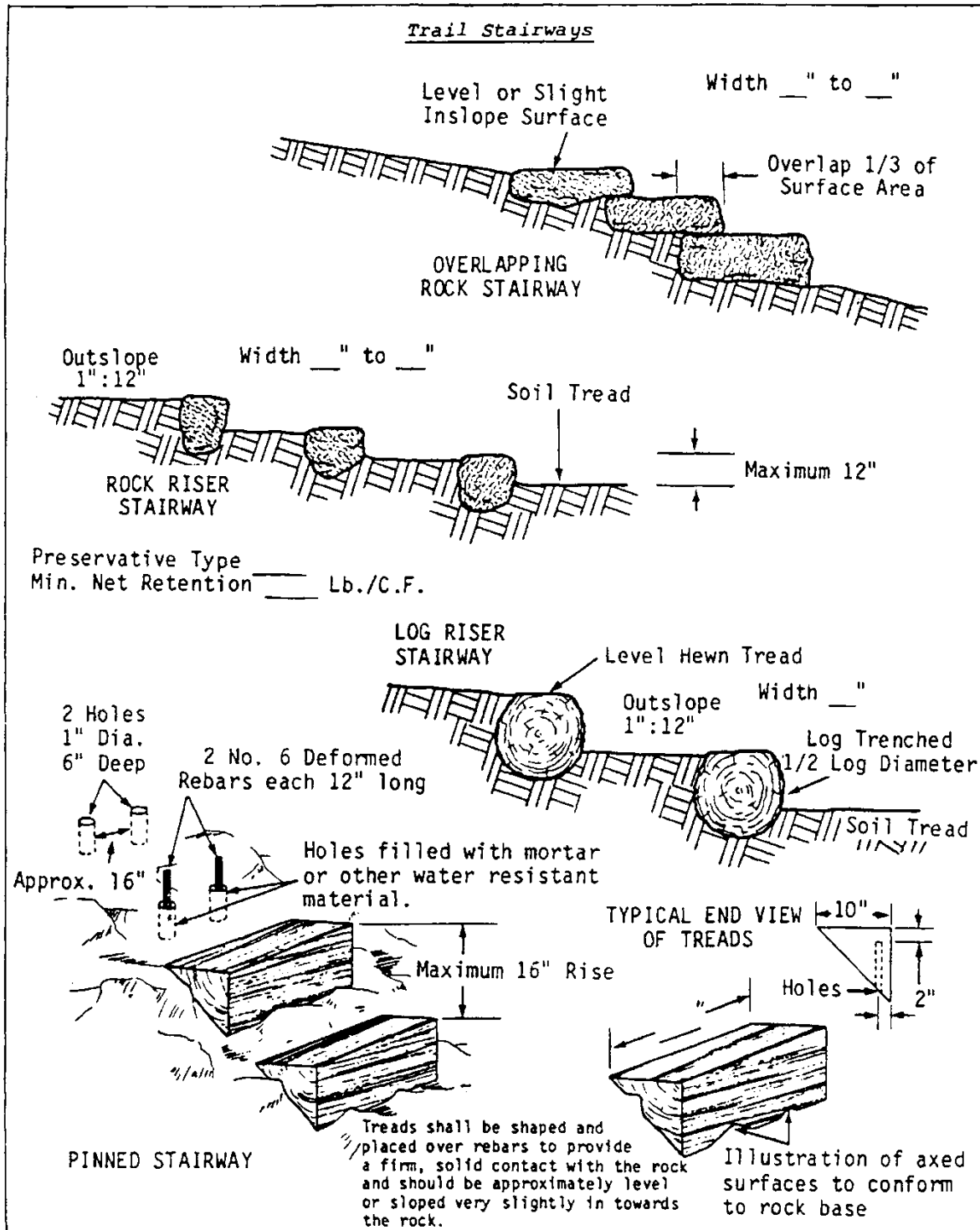
PS-7700-90 (6/84)

5 - Exhibit 26



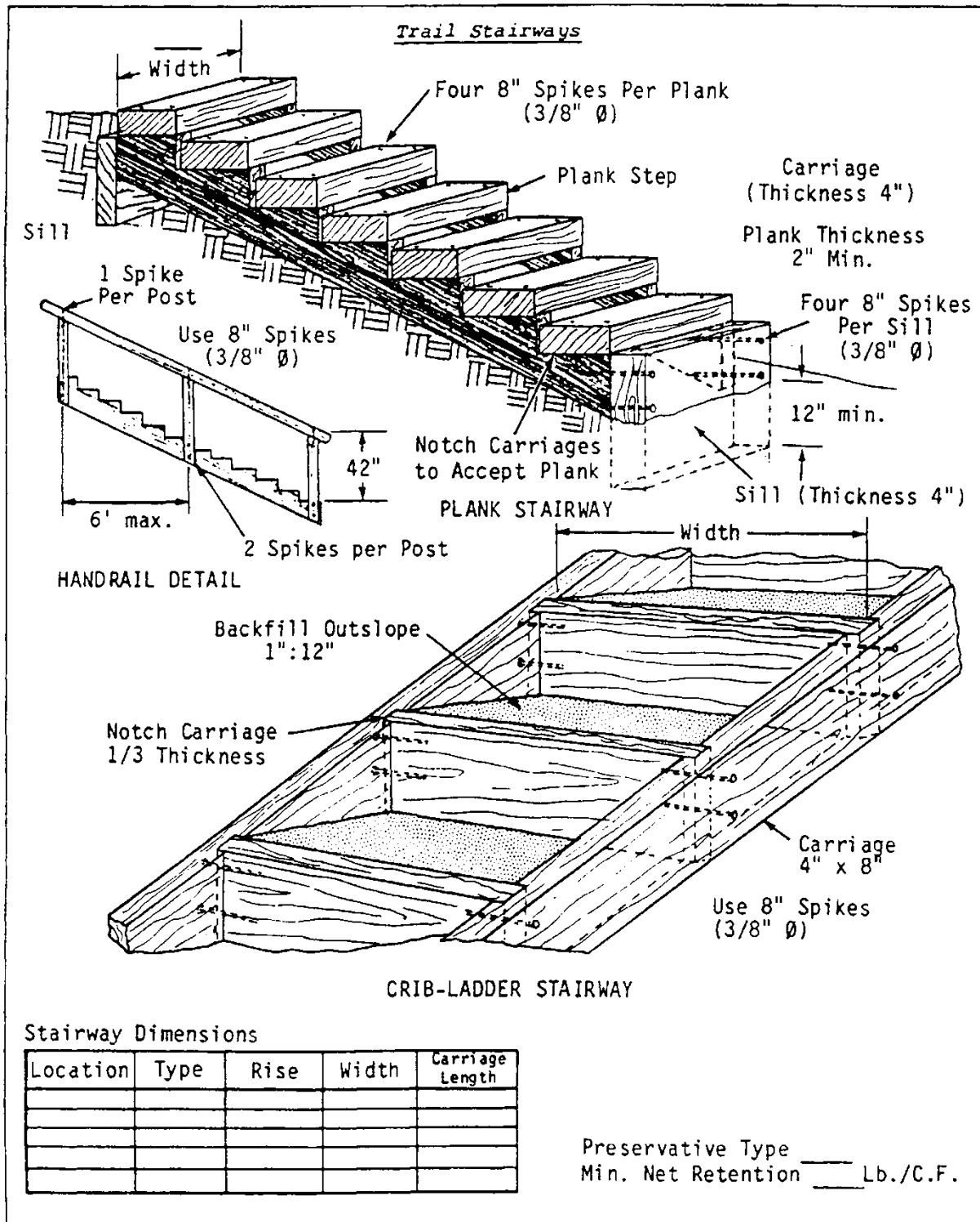
FS-7700-93 (6/84)

5 - Exhibit 27



FS-7700-91 (6/84)

5 - Exhibit 28

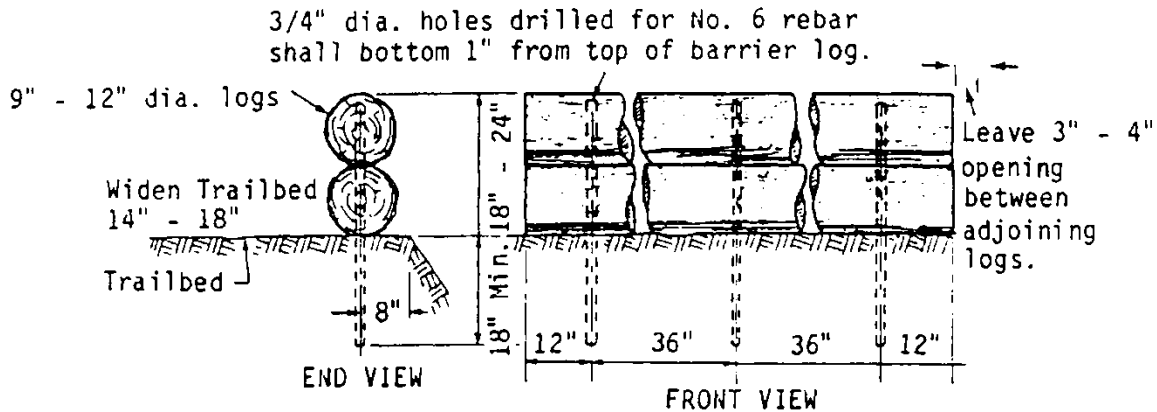


FS-7700-92 (6/84)

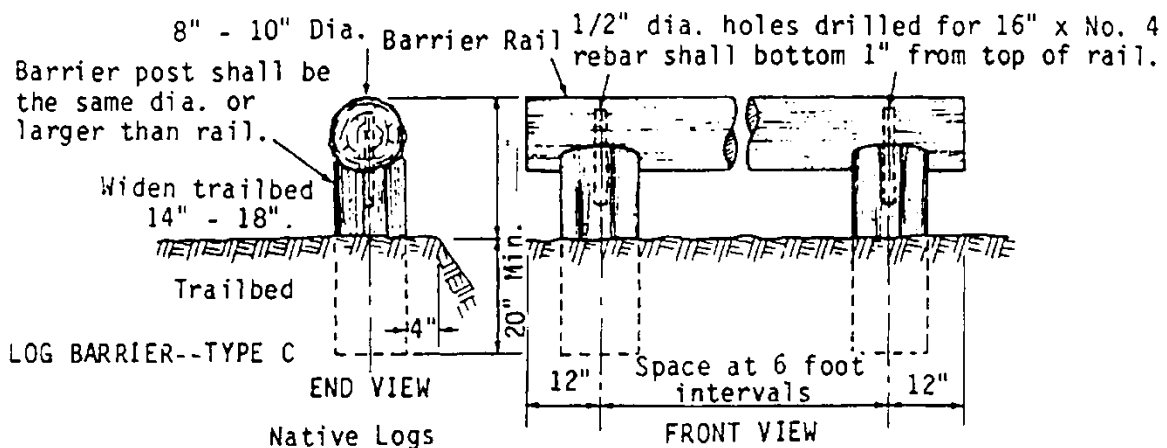
5 - Exhibit 29

Log Barriers

LOG BARRIER--TYPE A - Identical to Type B except single log
18" - 24" diameter laid on ground.
Drilling details same as for top log in Type B.



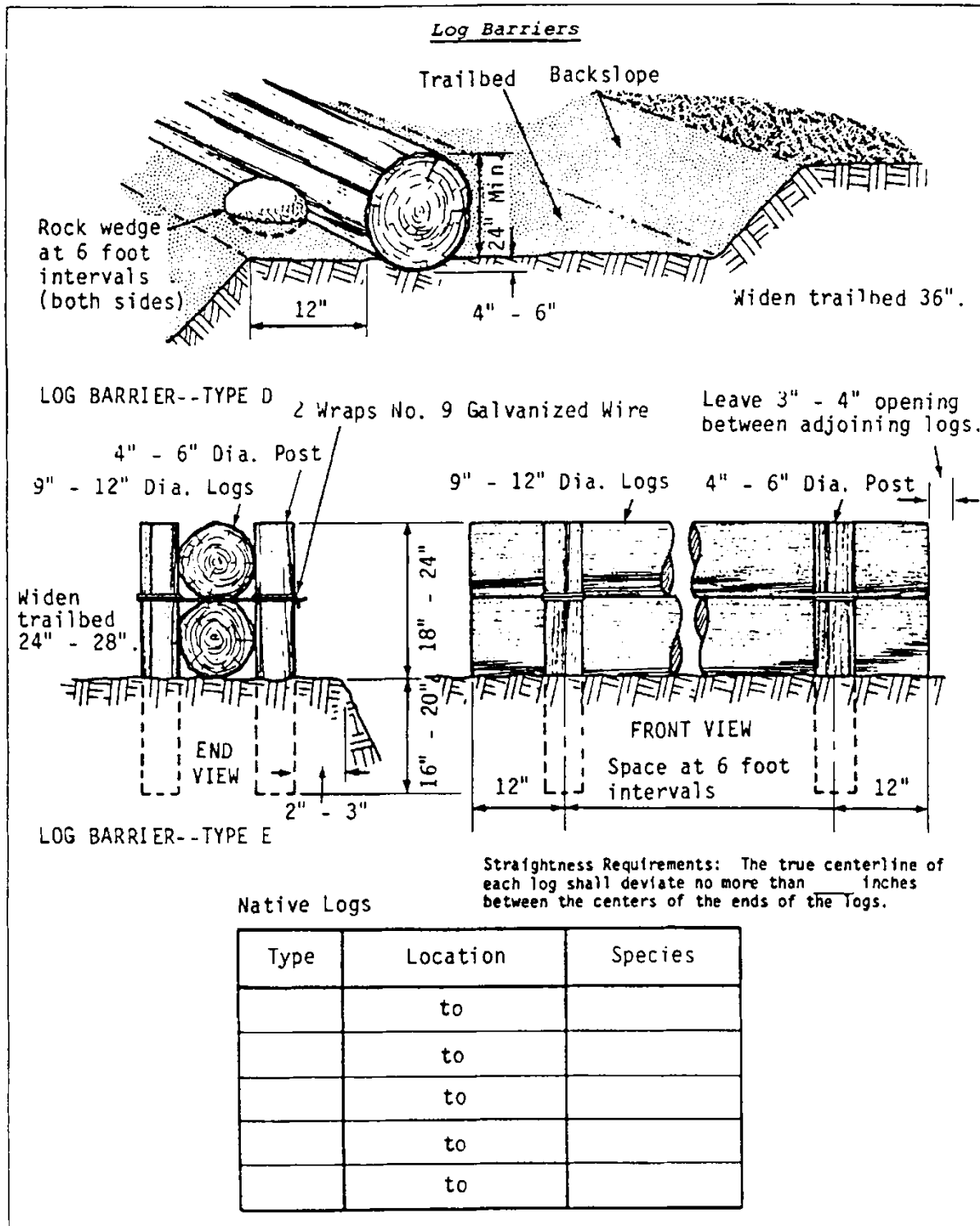
LOG BARRIER--TYPE B



Type	Location	Species
	to	
	to	
	to	
	to	
	to	

FS-7700-98 (6/84)

5 - Exhibit 30

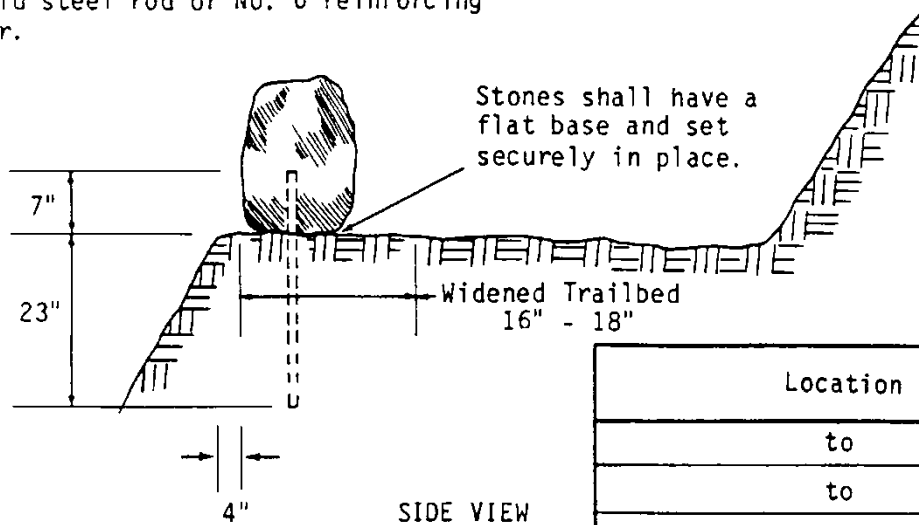


FS-7700-99 (6/84)

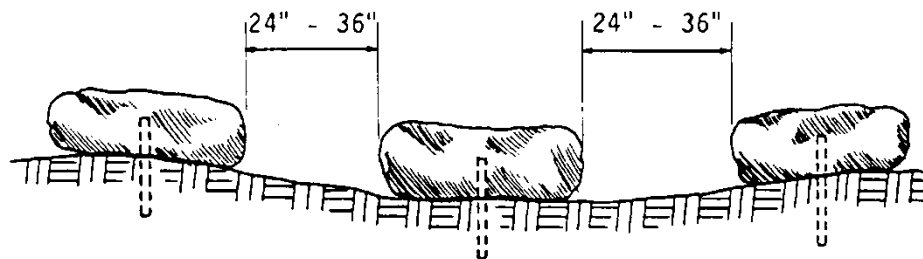
5 - Exhibit 31

Rock Barrier Type G

Steel rod used to pin barrier stones to trailbed shall be 3/4" Ø by 30" mild steel rod or No. 6 reinforcing bar.



Location
to
to
to
to
to



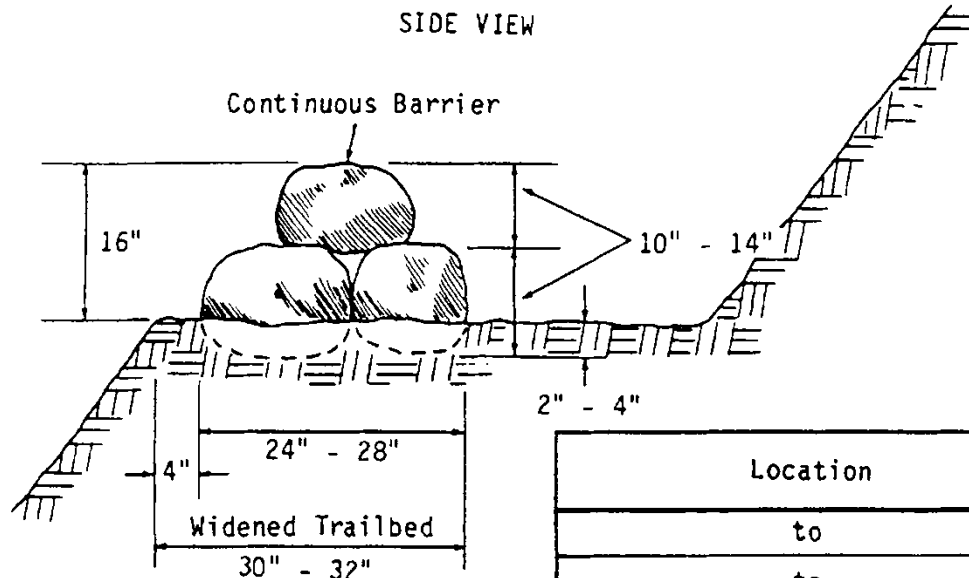
Size of barrier stones shall be (approx.) 14" in height and width and 24" long. Minimum dimension shall not be less than 12" for height and width and 18" for length.

FRONT VIEW SHOWING SPACING
BETWEEN STONES

FS-7700-101 (6/84)

5 - Exhibit 32

Rock Barrier Type H



Location

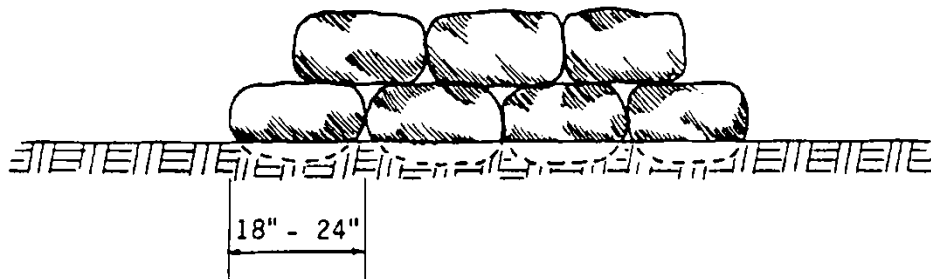
to

to

to

to

to

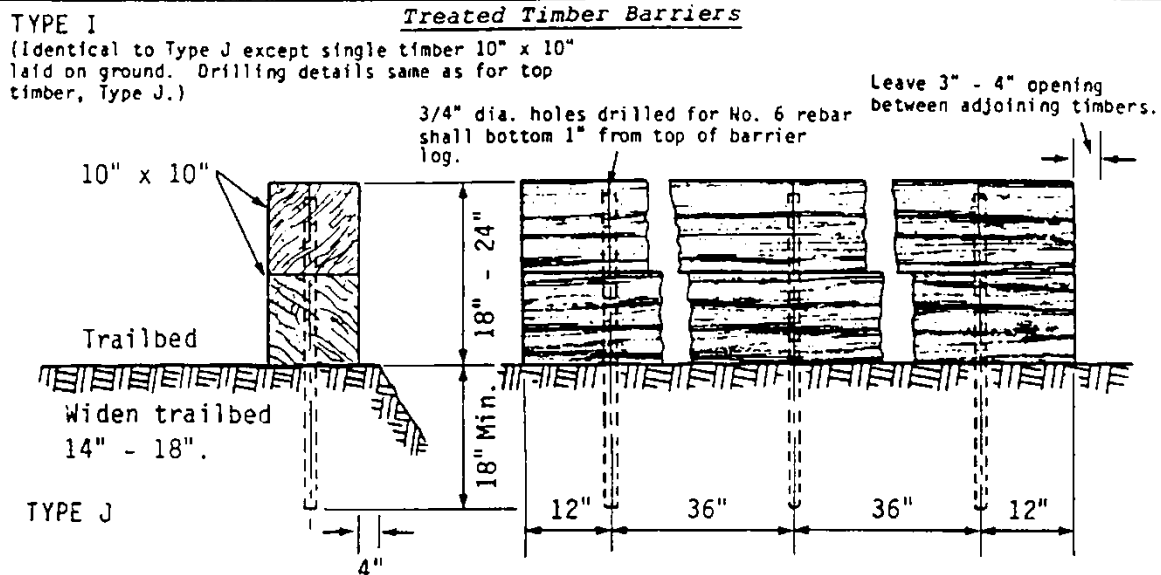


Size of barrier stones shall be (approx.) 14" in height and width and 24" long. Minimum dimension shall not be less than 12" for height and width and 18" for length.

FRONT VIEW

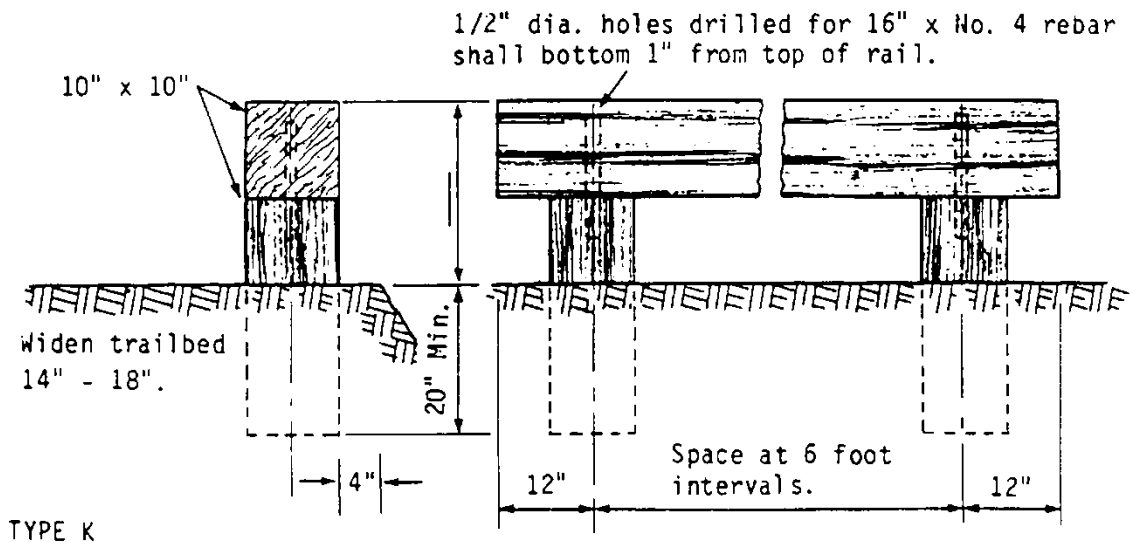
FS-7700-102 (6/84)

5 - Exhibit 33



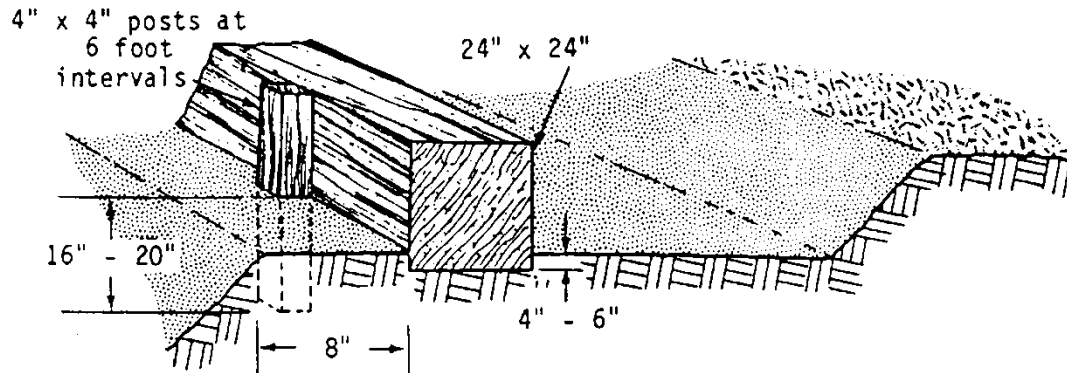
Treated Timber

Type	Location	Species	Treatment Type	Min. Retention (Lb./C.F.)
	to			
	to			
	to			



FS-7700-103 (6/84)

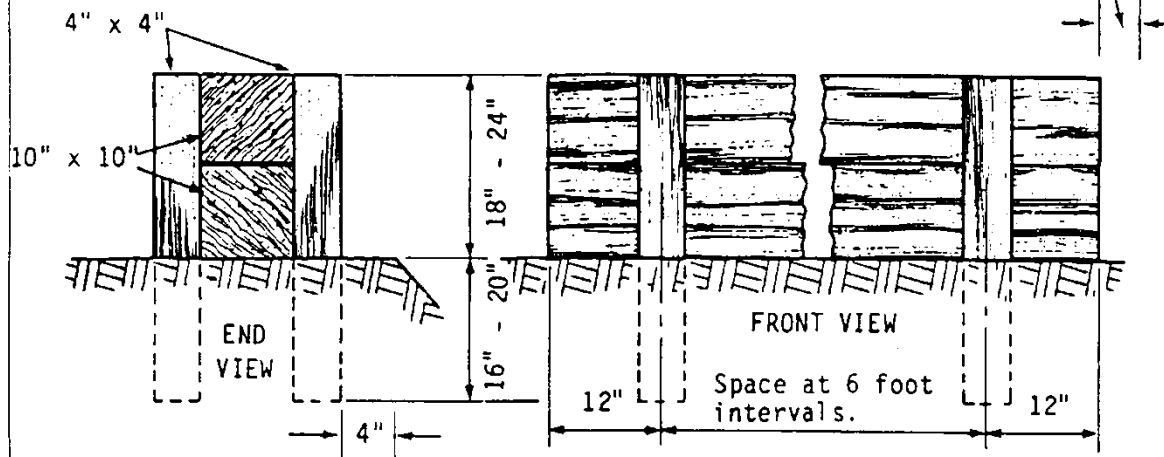
5 - Exhibit 34

Treated Timber Barriers

TYPE L
Widen Trailbed 36".
Treated Timber

Type	Location	Species	Treatment Type	Min. Retention (Lb./C.F.)
	to			
	to			
	to			

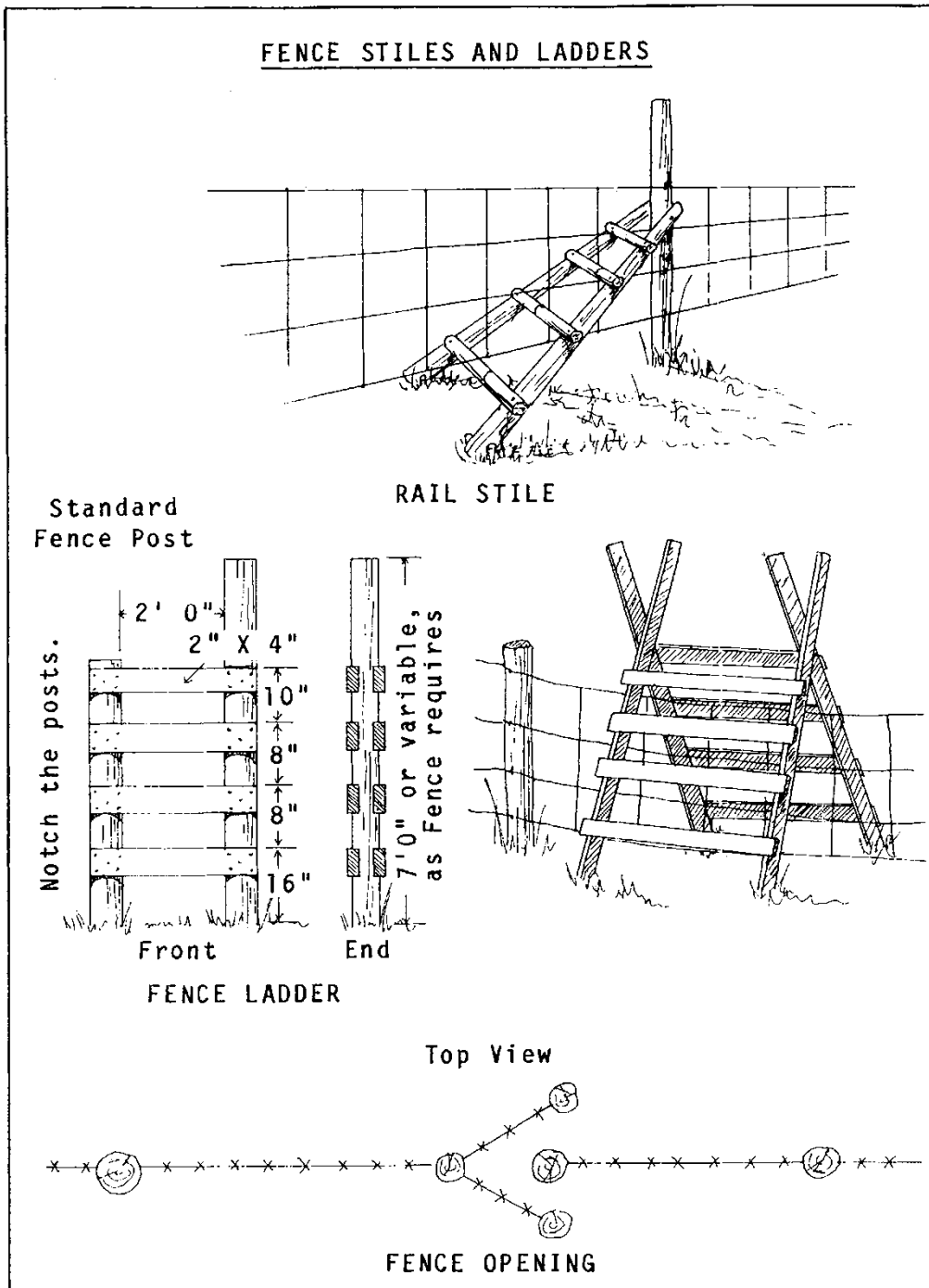
Leave 3" - 4" opening
between adjoining timbers



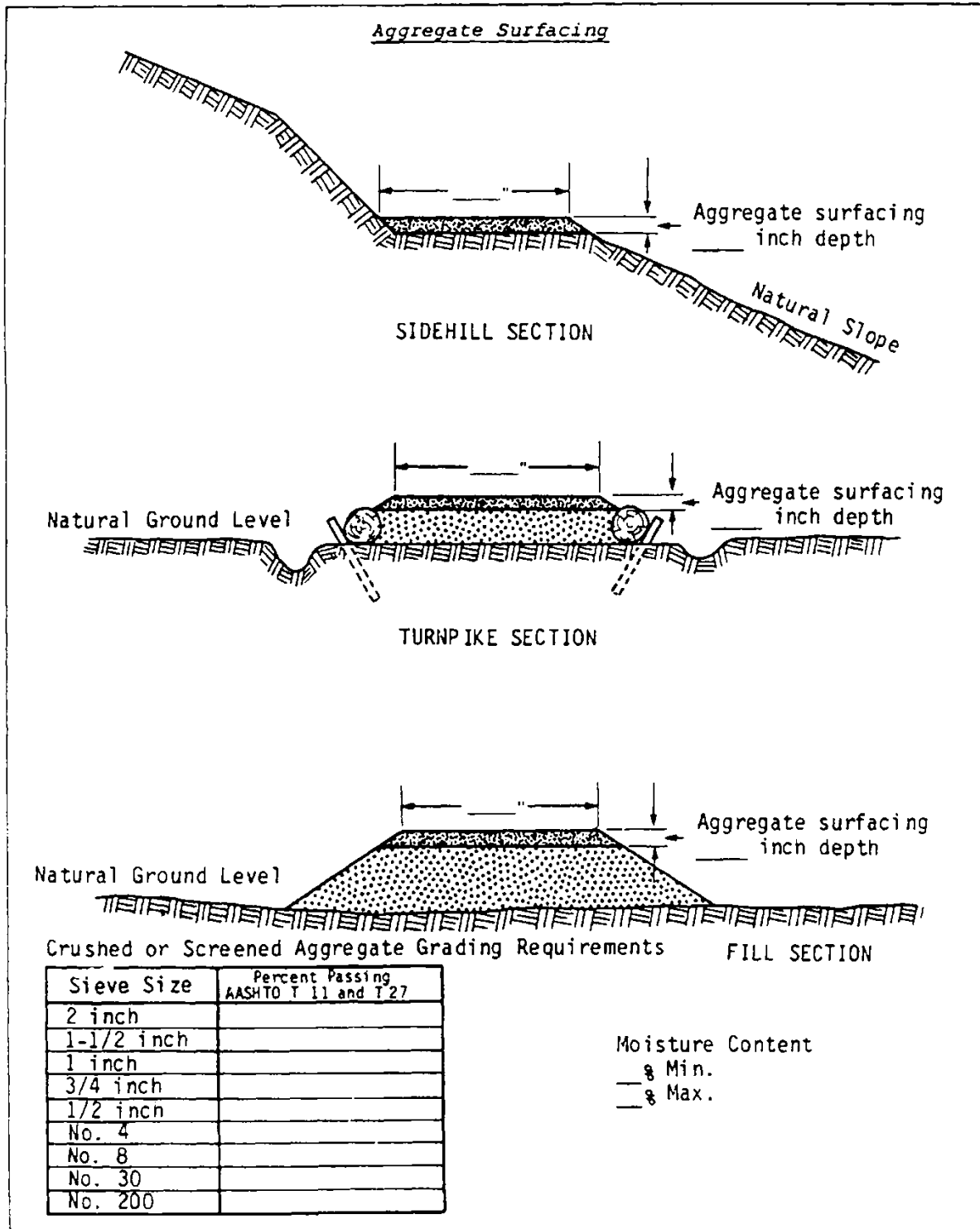
TYPE M
Widen trailbed 24".

FS-7700-104 (6/84)

5 - Exhibit 35

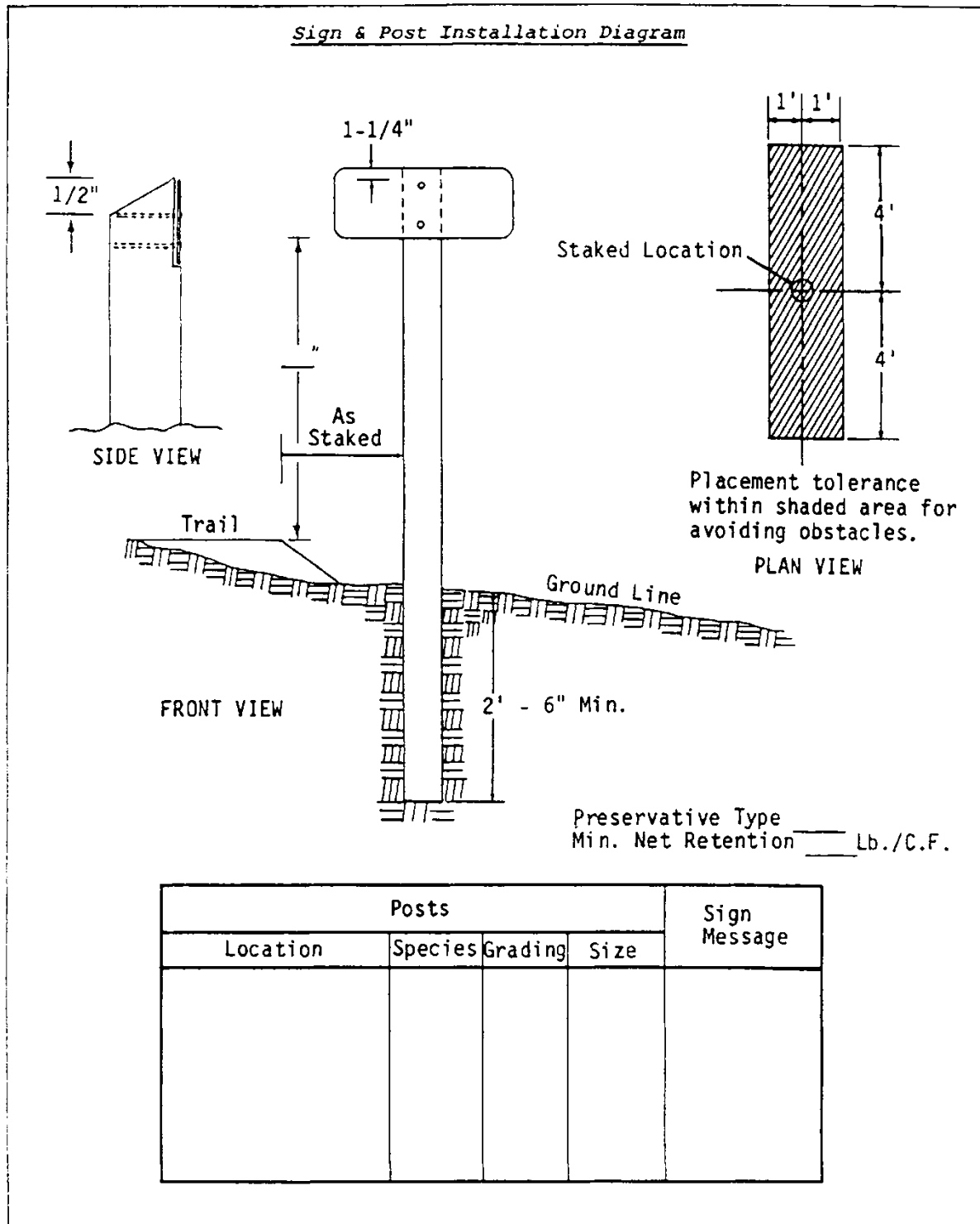


5 - Exhibit 36



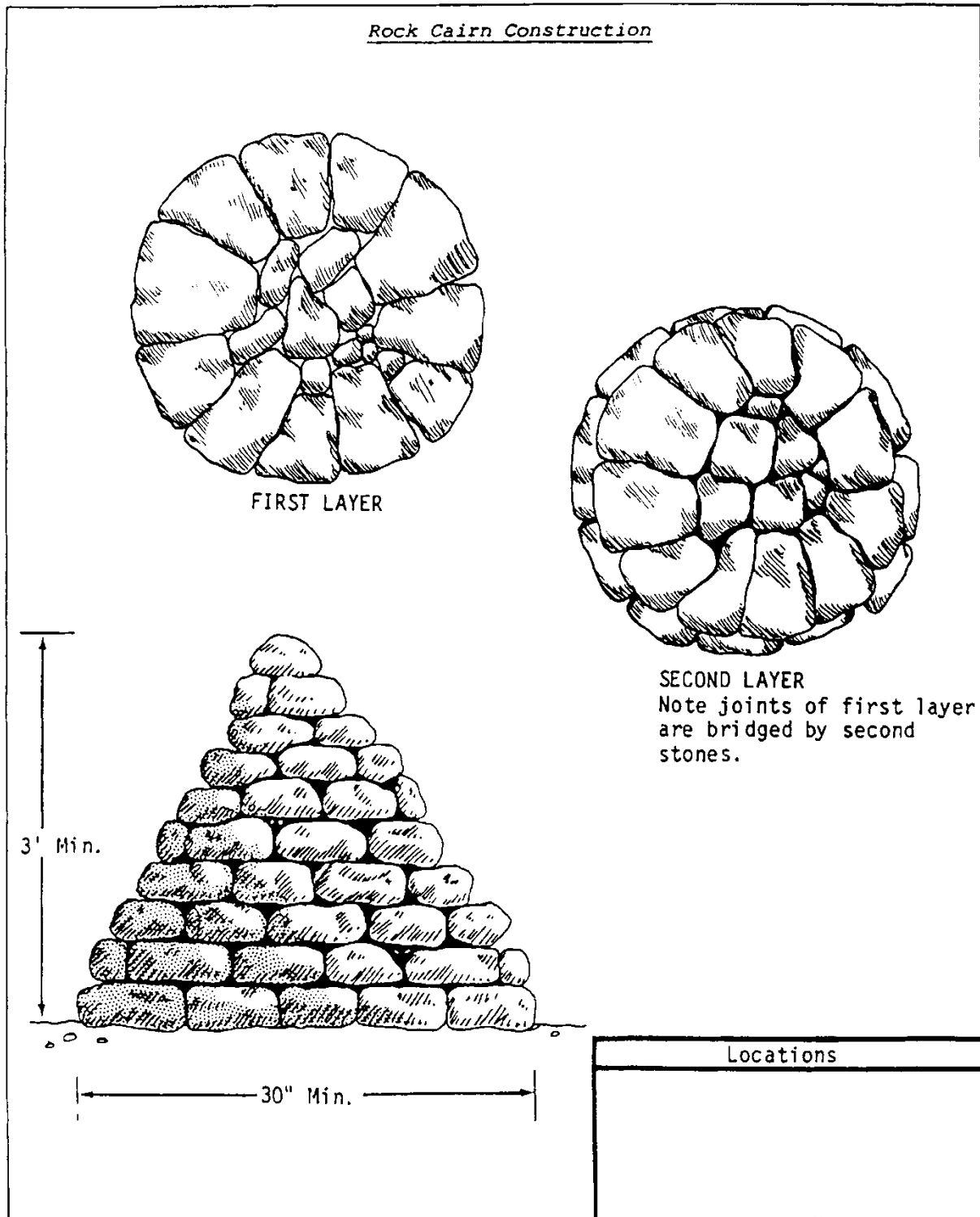
FS-7700-94 (6/84)

5 - Exhibit 37



FS-7700-96 (6/84)

5 - Exhibit 38



FS-7700-97 (6/84)