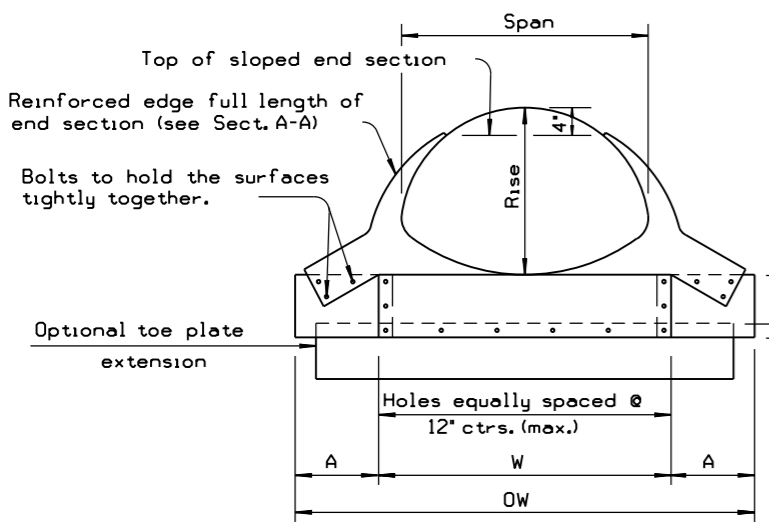
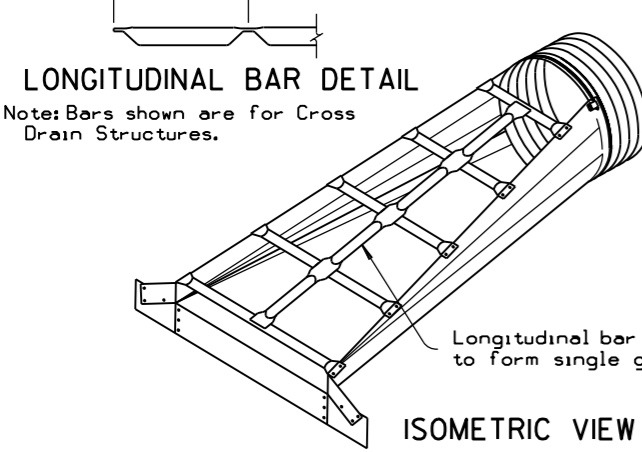


FRONT VIEW CIRCULAR PIPE

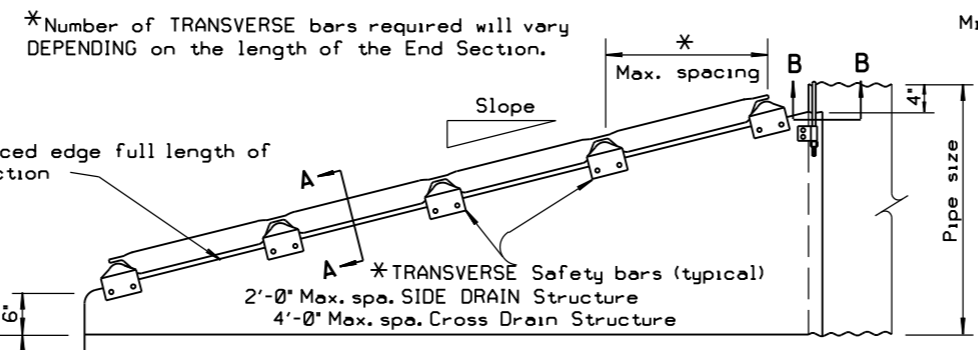


FRONT VIEW ARCH PIPE

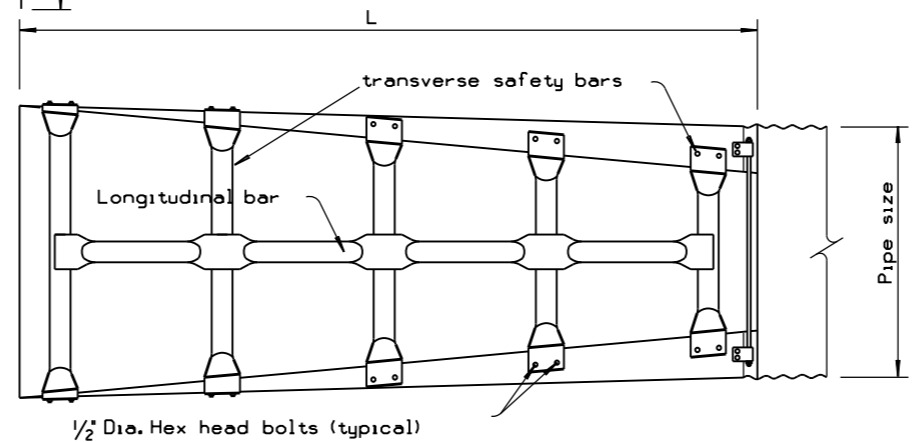


LONGITUDINAL BAR DETAIL
Note: Bars shown are for Cross Drain Structures.

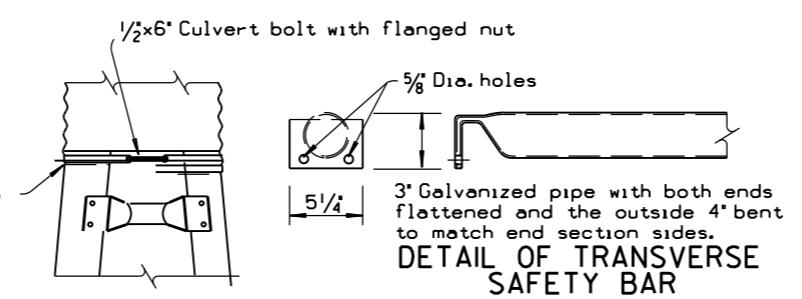
ISOMETRIC VIEW



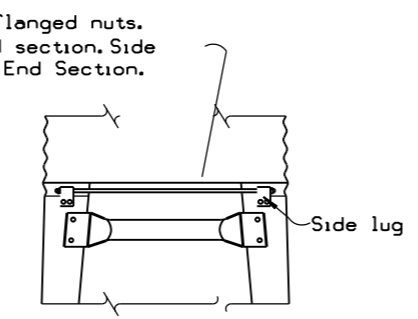
SIDE ELEVATION CIRCULAR OR ARCH SECTION



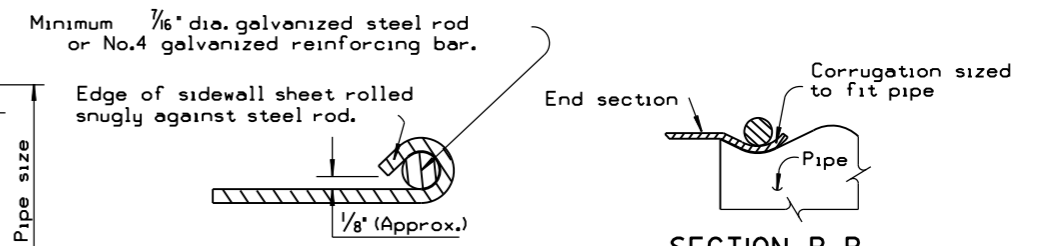
TOP VIEW CIRCULAR OR ARCH SECTION



TYPE #1 CONNECTOR DETAIL
For 15' thru 24' pipe

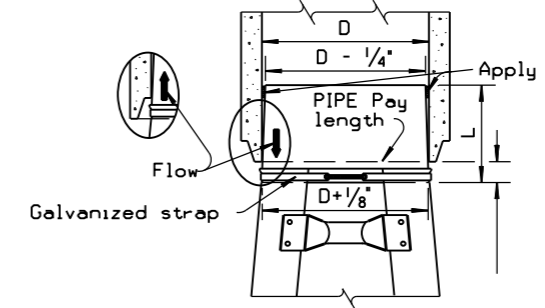


TYPE #2 CONNECTOR DETAIL
For 30" and larger round pipes & 21'x15' thru 64'x43' arch pipes



SECTION A-A

SECTION B-B



Note: Metal end section to be firmly wedged INTO PIPE END BEFORE BACKFILLING PIPE.
D - 12" to 24" L = 12"
D - 30" & Larger L = 16"
STEEL END SECTION FOR CONCRETE PIPE
(Alternate for Concrete End Section)

GENERAL NOTES
End sections shall be fabricated from galvanized steel meeting the requirements of SUBSECTION 606.02(c)(1) OF THE STANDARD SPECIFICATIONS. When specified optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high. Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs. Safety bars shall be fabricated from steel pipe meeting the requirements of ASTM A-53 Schedule 40 Specifications. Safety bars shall be hot dipped galvanized after fabrication. All work and materials required for construction and installation of safety end section shall be included in the PRICE BID EACH FOR SAFETY END SECTIONS FOR PIPE CULVERTS. Longitudinal and transverse bars will be required for cross drain structures when span is greater than 30". no safety bars will be REQUIRED FOR 30" SPAN OR LESS WHEN USED ON CROSS DRAIN STRUCTURES. Transverse bars will be required for all sizes of side drain structures. Class 1 safety end sections shall be end sections with a 4:1 slope. Class 2 safety end sections shall be end sections with a 6:1 slope.

SAFETY END SECTIONS FOR ARCH PIPES												
Equiv. Dia.	Nom. W.W. Area Sq Ft	Pipe Arch Span (In.)	Pipe Arch Rise (In.)	Min. Gauge End Sect.	Dimensions in Inches				Slope	L (In)	L (In)	
					A	H	W	OW				
18"	1.6	21	15	16	8	6	27	43	4:1	20	30	
21"	2.2	24	18	16	8	6	30	46	4:1	32	48	
24"	2.9	28	20	16	8	6	34	50	4:1	40	60	
30"	4.5	35	24	14	12	9	41	65	4:1	56	84	
36"	6.5	42	29	12	12	9	48	72	4:1	76	114	
42"	8.9	49	33	12	16	12	55	87	4:1	92	138	
48"	11.6	57	38	12	16	12	63	95	4:1	112	168	
54"	14.7	64	43	12	16	12	70	102	4:1	132	198	
60"	18.1	71	47	12	16	12	77	109	4:1	148	222	
72"	26.0	83	57	12	16	12	89	121	4:1	188	282	

SAFETY END SECTIONS FOR CIRCULAR PIPES												
Pipe Dia.	Min. Gauge Ends	Dimensions in Inches				L Dimensions in Inches						
		A 1" Tol	H 1" Tol	W 2" Tol	OW	Slope	L	Slope	L			
15"	16	8	6	21	37	4:1	20	6:1	30			
18"	16	8	6	24	40	4:1	32	6:1	48			
21"	16	8	6	27	43	4:1	44	6:1	66			
24"	16	8	6	30	46	4:1	56	6:1	84			
30"	12	12	9	36	60	4:1	80	6:1	120			
36"	12	12	9	42	66	4:1	104	6:1	156			
42"	12	16	12	48	80	4:1	128	6:1	192			
48"	12	16	12	54	86	4:1	152	6:1	228			
54"	12	16	12	60	92	4:1	176	6:1	264			
60"	12	16	12	66	98	4:1	200	6:1	300			

10-18-96	REVISED ASTM REF. TO AASHTO	
8-15-91	DRAWN & ISSUED	
DATE	REVISION	DATE FILMED

ARKANSAS STATE HIGHWAY COMMISSION
SAFETY END SECTION FOR CIRCULAR AND ARCH PIPES
STANDARD DRAWING SES-1