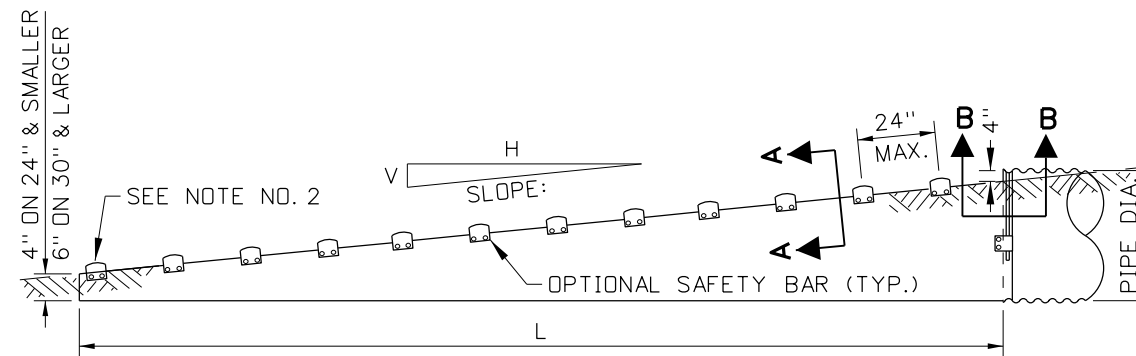
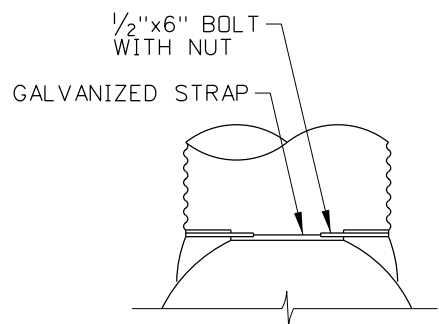


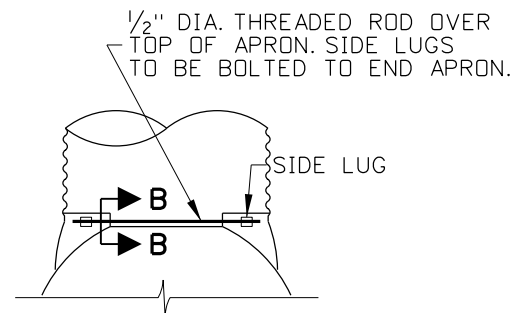
SIDE VIEW OF CROSS DRAINAGE STRUCTURE



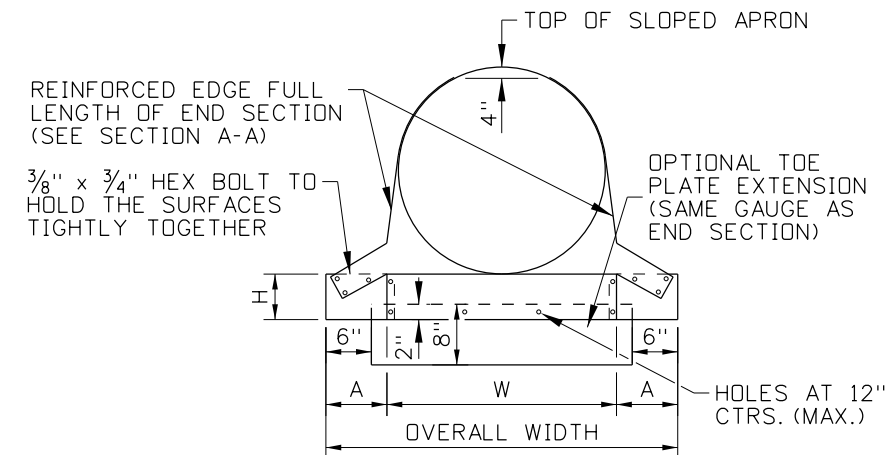
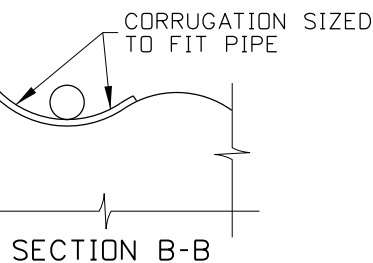
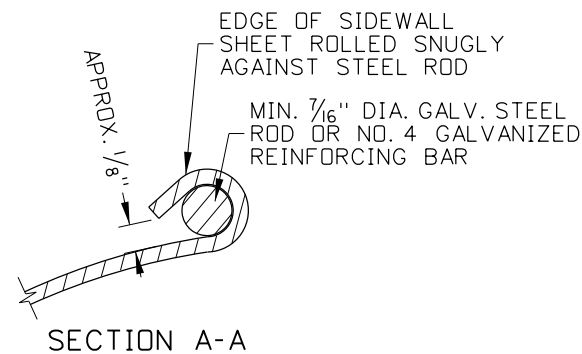
SIDE VIEW OF PARALLEL DRAINAGE STRUCTURE



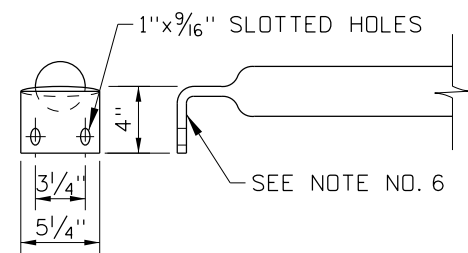
TYPE 1 CONNECTOR DETAIL
CIRCULAR PIPES 15" THROUGH 24"



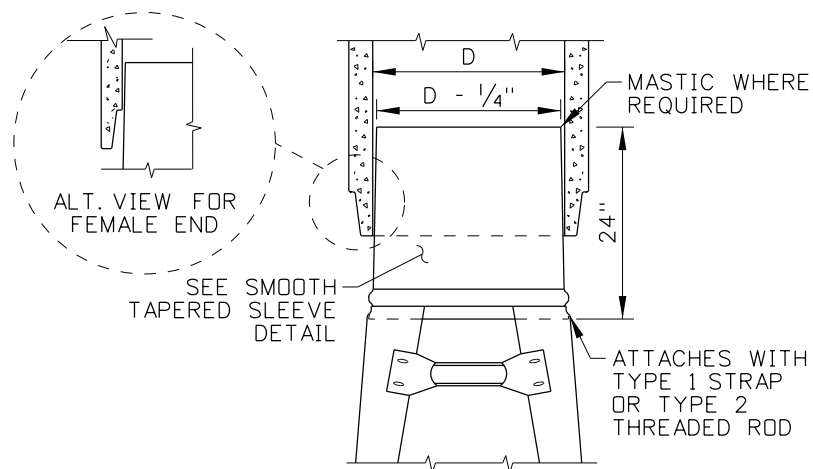
TYPE 2 CONNECTOR DETAIL
USE WITH 30" AND LARGER CIRCULAR PIPES
AND ALL ARCHED PIPES



FRONT VIEW - ROUND PIPE

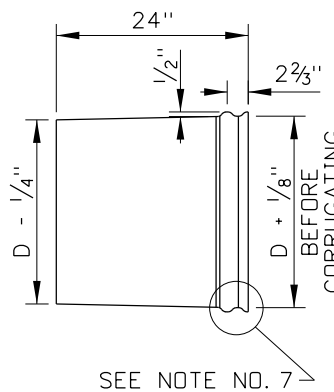


SAFETY BAR DETAIL

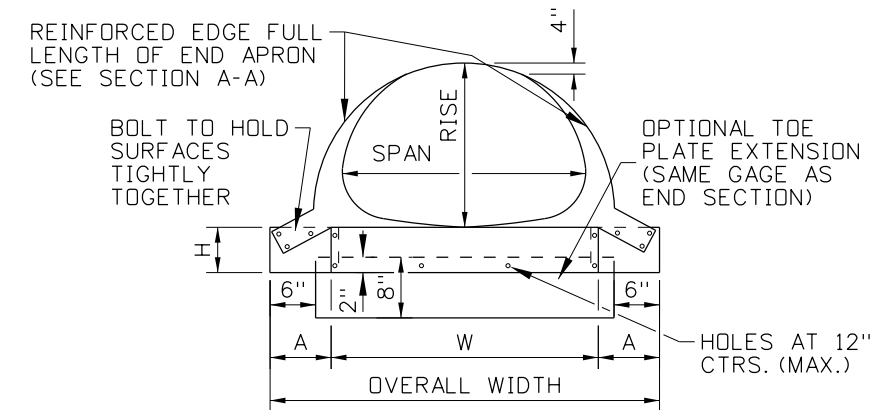


TAPERED SLEEVE FOR ATTACHING STEEL END SECTIONS TO CONCRETE OR SMOOTH PIPE

END SECTION WITH OPTIONAL SAFETY BAR SHOWN FOR ILLUSTRATION ONLY



SMOOTH TAPERED SLEEVE DETAIL



FRONT VIEW - ARCHED PIPE

LONGITUDINAL BAR DETAIL

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	05-16	RDL			
2	6-97	MSM						
3	11-00	MSM						
4	3-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY
CADD FILE NAME: 608-3_0516.dgn
DRAWING DATE: NOVEMBER, 1990

IDAHO TRANSPORTATION DEPARTMENT



BOISE IDAHO

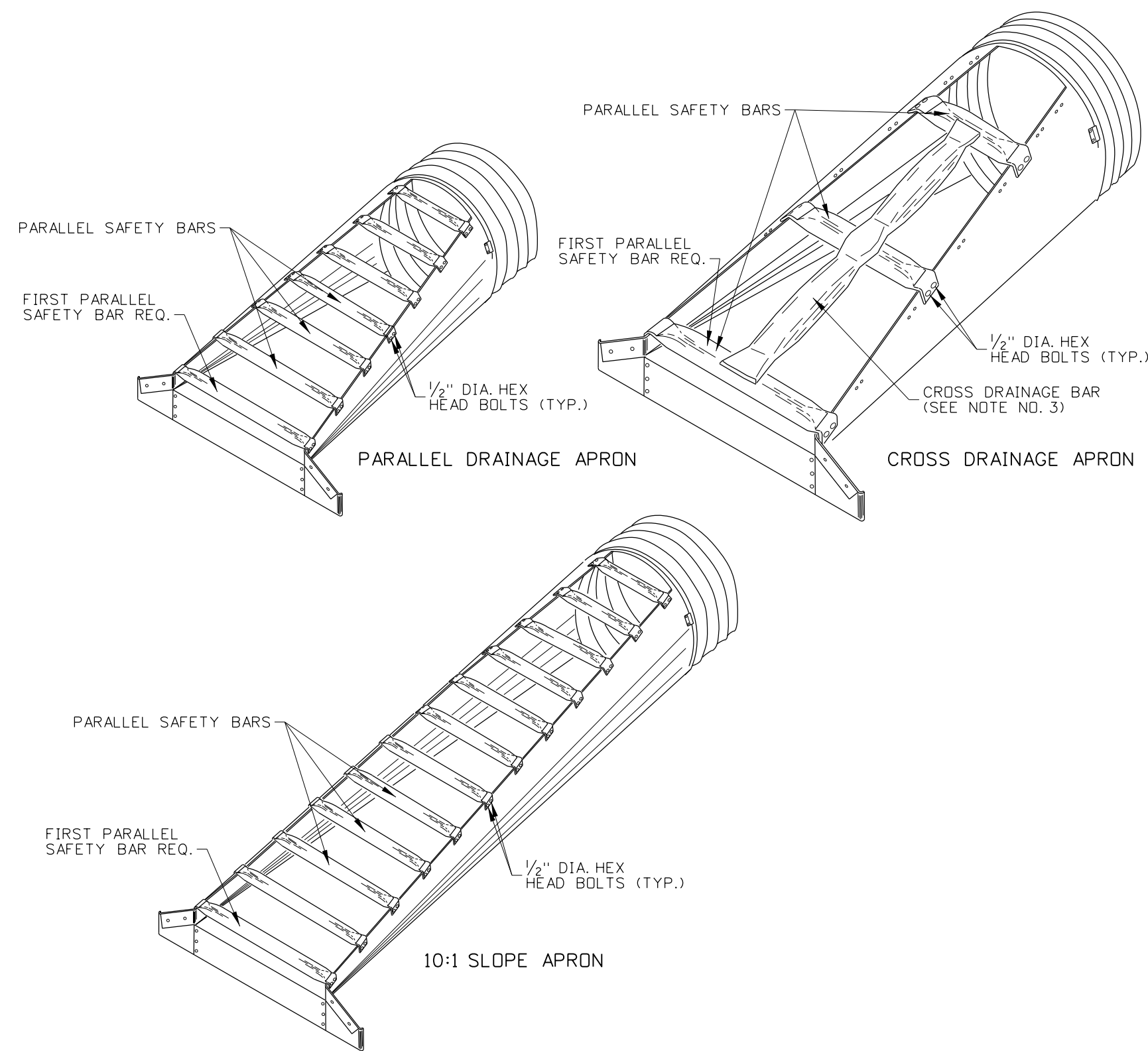
ORIGINAL SIGNED BY: JESSE BARRUS
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING
METAL SAFETY SLOPE APRON

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

English
STANDARD DRAWING NO. 608-3
SHEET 1 OF 2

PROFESSIONAL ENGINEER
LICENSED
13683
RYAN D. LANCASTER
STATE OF IDAHO



PERSPECTIVE VIEWS - APRONS

APRONS FOR CIRCULAR PIPES												
PIPE DIA. (IN.)	MIN. THICK.		DIMENSIONS (±2")				L DIMENSIONS (±2") (SEE NOTE NO. 5)					
	IN.	GAGE	A	H	W	OVERALL WIDTH	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)
15	.064	16	8	6	21	37	4:1	20	6:1	30	10:1	70
18	.064	16	8	6	24	40	4:1	32	6:1	48	10:1	100
21	.064	16	8	6	27	43	4:1	44	6:1	66	10:1	130
24	.064	16	8	6	30	46	4:1	56	6:1	84	10:1	160
30	.109	12	12	9	36	60	4:1	80	6:1	120	10:1	220
36	.109	12	12	9	42	66	4:1	104	6:1	156	10:1	280
42	.109	12	16	12	48	80	4:1	128	6:1	192		N/A
48	.109	12	16	12	54	86	4:1	152	6:1	228		N/A
54	.109	12	16	12	60	92	4:1	176	6:1	264		N/A
60	.109	12	16	12	66	98	4:1	200	6:1	300		N/A

APRONS FOR ARCHED PIPES														
EQUIV. DIA. (IN.)	(INCHES)		MIN. THICK.		DIMENSIONS (±2")			L DIMENSIONS (±2") (SEE NOTE NO. 5)						
	SPAN	RISE	IN.	GAGE	A	H	W	OVERALL WIDTH	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)
18	21	15	.064	16	8	6	27	43	4:1	20	6:1	30	10:1	70
21	24	18	.064	16	8	6	30	46	4:1	32	6:1	48	10:1	100
24	28	20	.064	16	8	6	34	50	4:1	40	6:1	60	10:1	120
30	35	24	.079	14	12	9	41	65	4:1	56	6:1	84	10:1	160
36	42	29	.109	12	12	9	48	72	4:1	76	6:1	114	10:1	210
42	49	33	.109	12	16	12	55	87	4:1	92	6:1	138		N/A
48	57	38	.109	12	16	12	63	95	4:1	112	6:1	168		N/A
54	64	43	.109	12	16	12	70	102	4:1	132	6:1	198		N/A
60	71	47	.109	12	16	12	77	109	4:1	148	6:1	222		N/A
72	83	57	.109	12	16	12	89	121	4:1	188	6:1	282		N/A

NOTES

1. PROVIDE SLOTTED HOLES FOR PARALLEL SAFETY BAR ATTACHMENT.
2. USE AT LEAST ONE PARALLEL SAFETY BAR AT THE STRUCTURE OPENING. USE PARALLEL SAFETY BARS AT THE SPACING SHOWN WHEN THE PIPE DIAMETER IS GREATER THAN 18". THE NUMBER OF BARS WILL VARY DEPENDING ON THE STRUCTURE LENGTH (L).
3. USE CROSS DRAINAGE BAR WHEN THE PIPE DIAMETER IS GREATER THAN 30". WELD CROSS DRAINAGE BAR TO PARALLEL SAFETY BARS FOR SINGLE PIECE STRUCTURE.
4. LARGE END SECTIONS MAY BE PROVIDED IN MULTIPLE PANELS. WHEN MULTIPLE PANELS ARE USED, JOIN THE PANELS WITH BOLTS AND NUTS.
5. FOR 10:1 SLOPE END SECTIONS, USE 0.109" THICK (12 GAUGE) MATERIALS.
6. USE SCHEDULE 40 3" GALVANIZED STEEL PIPE FOR SAFETY BARS. FLATTEN END, THEN BEND OUTSIDE 4" TO MATCH STRUCTURE SIDES.
7. FORM 1/2"x2 3/8" CORRUGATIONS. MAINTAIN INSIDE DIAMETER OF SLEEVE. FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER.
8. DRAWINGS NOT TO SCALE.

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	05-16	RDL			
2	6-97	MSM						
3	11-00	MSM						
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