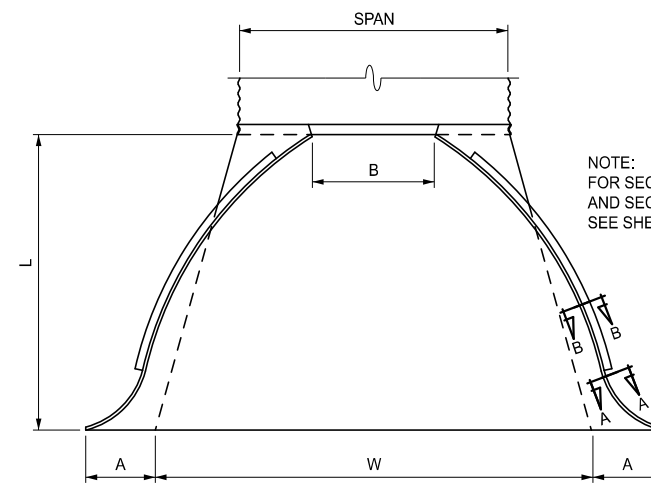


NOTE:  
FOR SECTION A-A  
AND SECTION B-B  
SEE SHEET 4 OF 4

PLAN VIEW

DIMENSIONS								
DIMENSIONS IN INCHES							APPROX SLOPE	BODY
PIPE DIAMETER	MIN. THK.	A ± 1"	B MAX.	H ± 1"	L ± 1 1/2"	W ± 2"		
12	0.064	6	6	6	21	24	2.50	1 Pc
15	0.064	7	8	6	26	30	2.50	1 Pc
18	0.064	8	10	6	31	36	2.50	1 Pc
21	0.064	9	12	6	36	42	2.50	1 Pc
24	0.064	10	13	6	41	48	2.50	1 Pc
30	0.079	12	16	8	51	60	2.50	1 Pc
36	0.079	14	19	9	60	72	2.50	2 Pc
42	0.109	16	22	11	69	84	2.50	2 Pc
48	0.109	18	27	12	78	90	2.25	2 Pc
54	0.109	18	30	12	84	102	2.00	2 Pc
* 60	0.109	18	33	12	87	114	1.75	3 Pc
* 66	0.109	18	36	12	87	120	1.50	3 Pc
* 72	0.109	18	39	12	87	126	1.33	3 Pc
* 78	0.109	18	42	12	87	132	1.25	3 Pc
* 84	0.109	18	45	12	87	138	1.16	3 Pc

\* ALL THREE PIECE BODIES HAVE 0.109" SIDES AND 0.138" CENTER PANELS.  
WIDTH OF CENTER PANEL TO BE GREATER THAN 20% OF THE PIPE PERIPHERY.  
MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY  
JOINED BY 3/8" DIAMETER GALVANIZED RIVETS OR BOLTS.

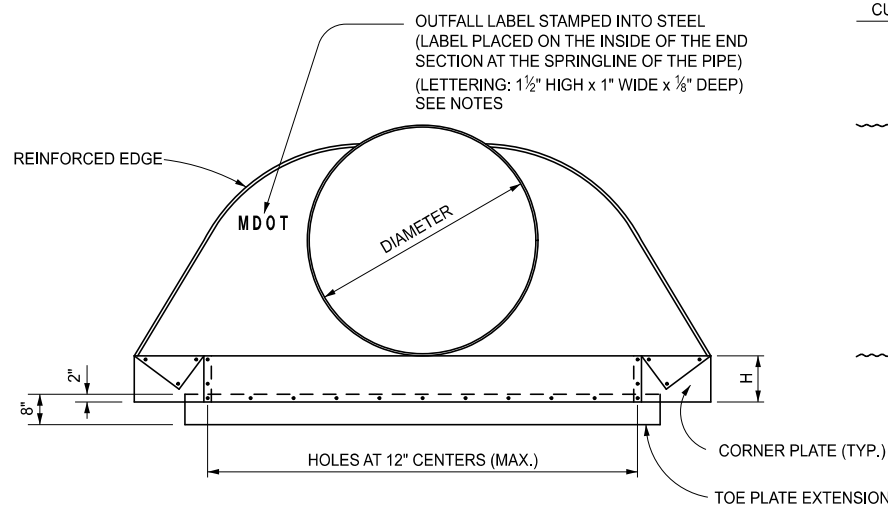


NOTE:  
FOR SECTION A-A  
AND SECTION B-B  
SEE SHEET 4 OF 4

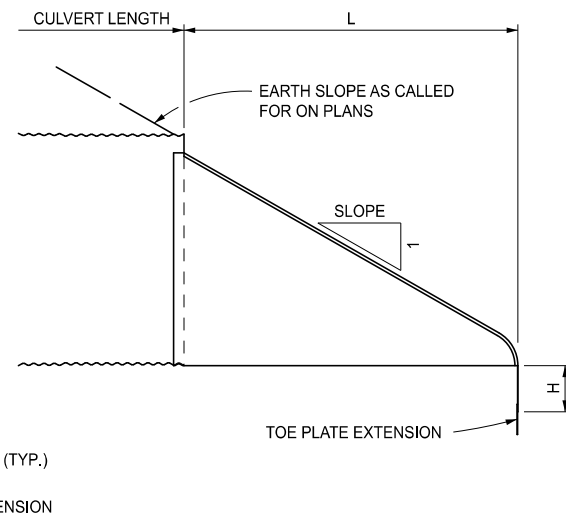
PLAN VIEW

DIMENSIONS								
DIMENSIONS IN INCHES							APPROX SLOPE	BODY
SPAN / RISE	MIN. THK.	A ± 1"	B MAX.	H ± 1"	L ± 1 1/2"	W ± 2"		
17 x 13	0.064	7	9	6	19	30	2.50	1 Pc
21 x 15	0.064	7	10	6	23	36	2.50	1 Pc
24 x 18	0.064	8	12	6	28	42	2.50	1 Pc
28 x 20	0.064	9	14	6	32	48	2.50	1 Pc
35 x 24	0.079	10	16	6	39	60	2.50	1 Pc
42 x 29	0.079	12	18	8	46	75	2.50	1 Pc
49 x 33	0.109	13	21	9	53	85	2.50	2 Pc
57 x 38	0.109	18	26	12	63	90	2.50	2 Pc
64 x 43	0.109	18	30	12	70	102	2.25	2 Pc
* 71 x 47	0.109	18	33	12	77	114	2.25	3 Pc
* 77 x 52	0.109	18	36	12	77	126	2.00	3 Pc
* 83 x 57	0.109	18	39	12	77	138	2.00	3 Pc

\* ALL THREE PIECE BODIES HAVE 0.109" SIDES AND 0.138" CENTER PANELS.  
WIDTH OF CENTER PANEL TO BE GREATER THAN 20% OF THE PIPE PERIPHERY.  
MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY  
JOINED BY 3/8" DIAMETER GALVANIZED RIVETS OR BOLTS.



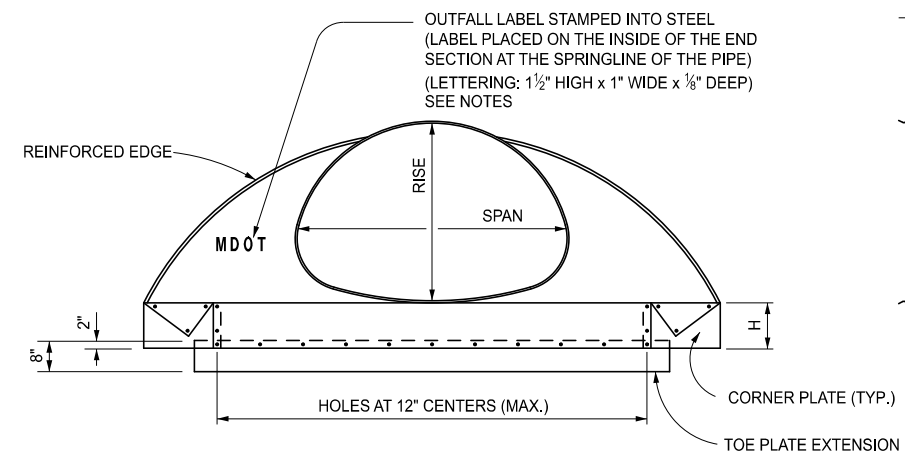
END VIEW



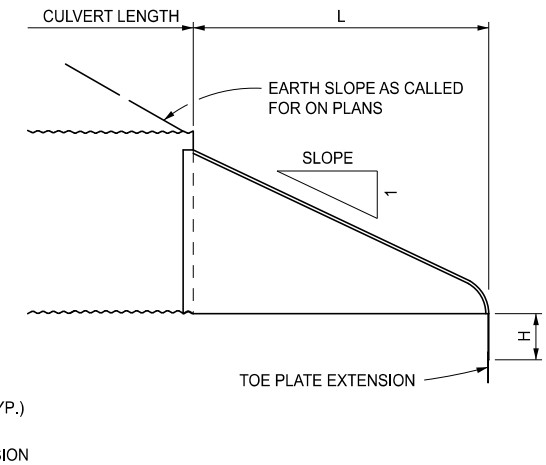
LONGITUDINAL VIEW

NOTE: SEE SHEET 3 FOR CONNECTION DETAILS

STEEL END SECTION FOR CORRUGATED STEEL CIRCULAR PIPE



END VIEW



LONGITUDINAL VIEW

NOTE: SEE SHEET 3 FOR CONNECTION DETAILS

STEEL END SECTION FOR CORRUGATED STEEL PIPE ARCHES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT

STANDARD PLAN FOR  
STEEL END SECTION

(SPECIAL DETAIL)  
FHWA APPROVAL

03/07/2023  
PLAN DATE

R-88-E

SHEET  
1 OF 4



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
STEEL END SECTION

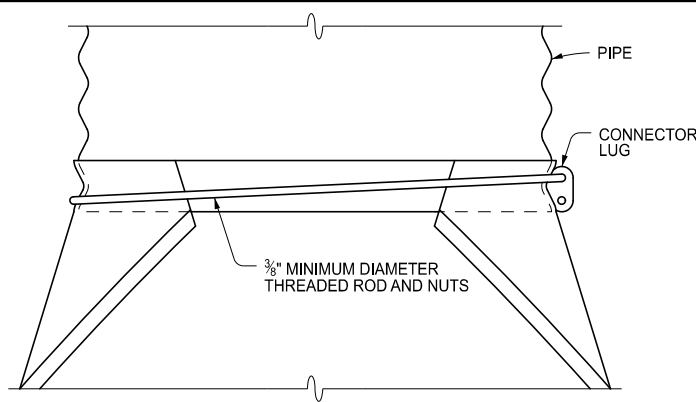
(SPECIAL DETAIL)  
FHWA APPROVAL

03/07/2023  
PLAN DATE

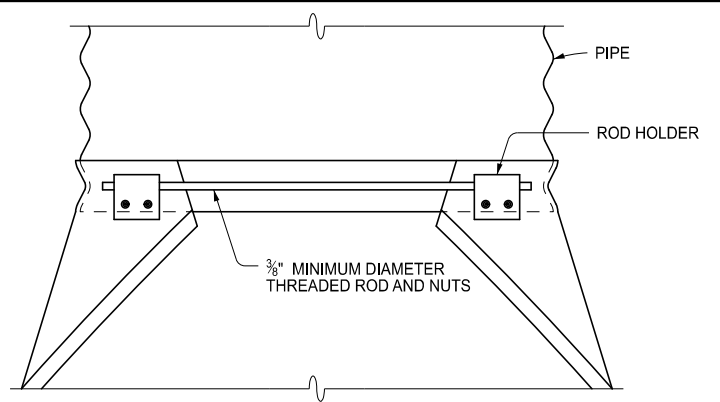
R-88-E

SHEET  
2 OF 4

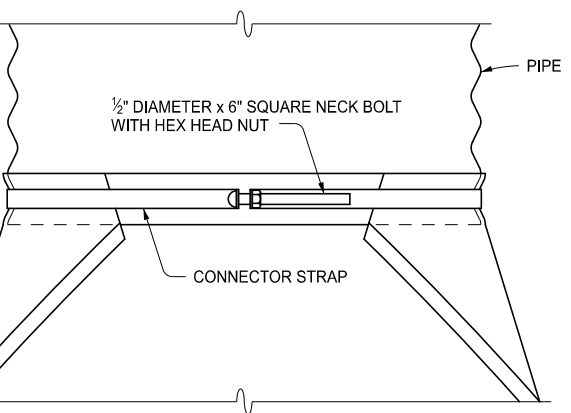
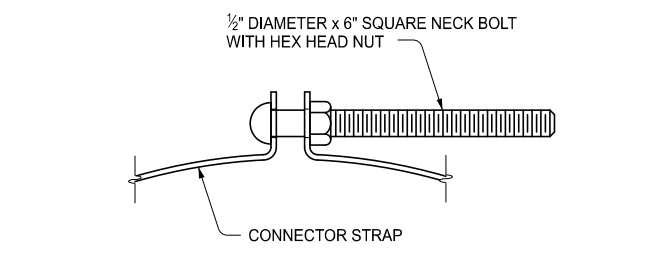
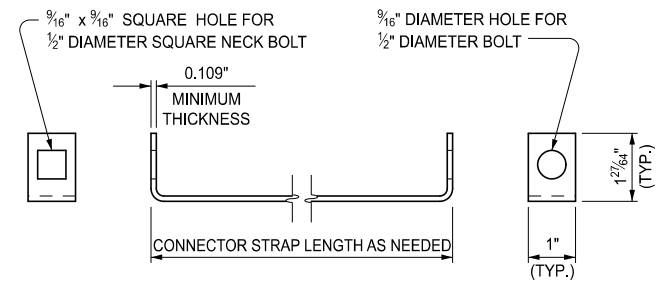
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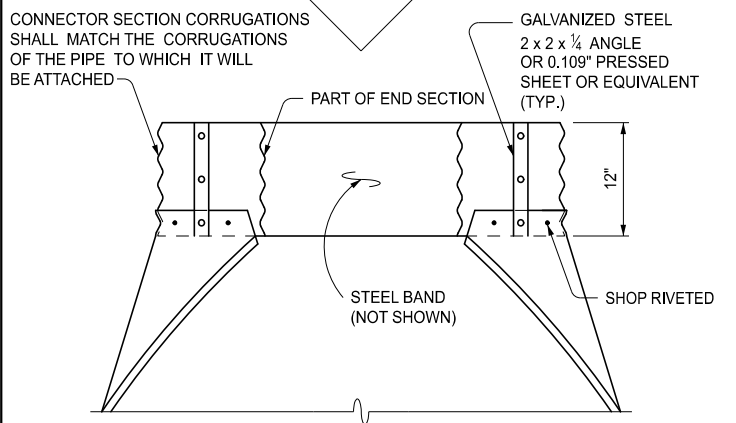
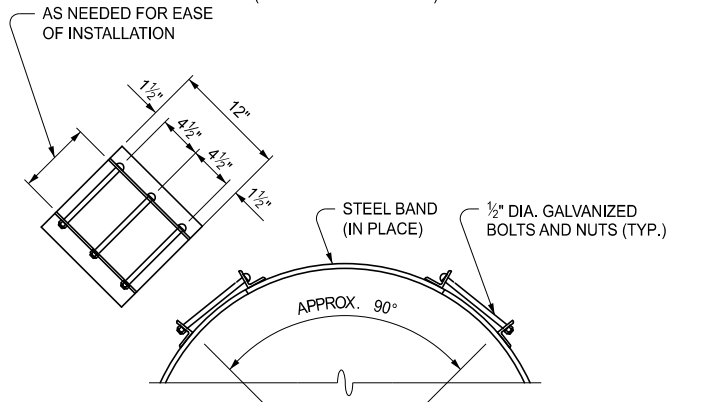
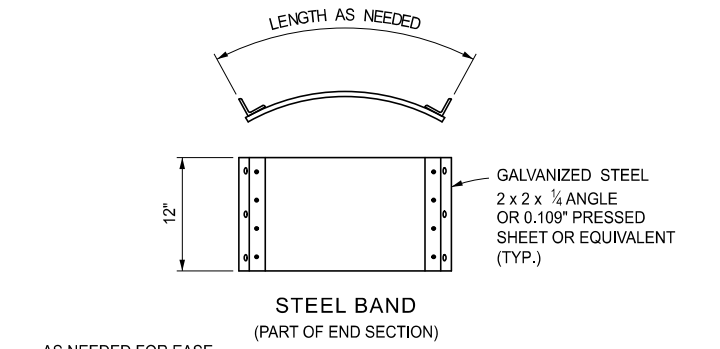
**TYPE 1 CONNECTOR**  
FOR USE ON CIRCULAR PIPE DIAMETERS 12" THROUGH 24"



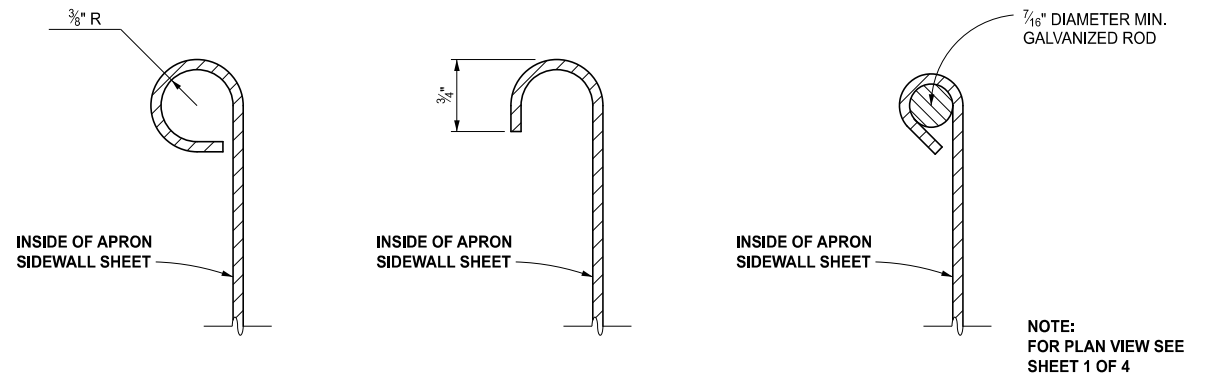
**TYPE 2 CONNECTOR**  
FOR USE ON CIRCULAR PIPE DIAMETERS 30" AND 36"  
AND FOR ARCH PIPE SIZES 35" x 24" AND 42" x 29"



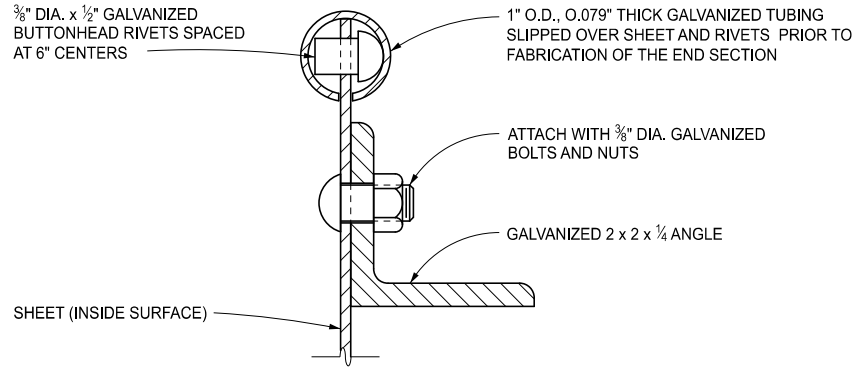
**TYPE 1A CONNECTOR**  
FOR USE ON CIRCULAR PIPE DIAMETERS 12" THROUGH 24"  
AND FOR ARCH PIPE SIZES 17" x 13" THROUGH 28" x 20"



**TYPE 3 CONNECTOR**  
FOR USE ON CIRCULAR PIPE DIAMETERS 42" THROUGH 84"  
AND FOR ARCH PIPE SIZES 49" x 33" THROUGH 83" x 57"



**SECTION A - A**  
REINFORCED EDGE ALTERNATIVES



**SECTION B - B**  
TO BE USED ON CIRCULAR PIPE DIAMETERS 60" THROUGH 84"  
AND FOR ARCH PIPE SIZES 77" x 52" AND 83" x 57"

- NOTES:**
- GALVANIZED STEEL SHALL MEET THE REQUIREMENTS SPECIFIED IN THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.
  - GALVANIZED TOE PLATE EXTENSIONS ARE REQUIRED ON STEEL END SECTIONS AS FOLLOWS:
    1. WHEN INDICATED ON THE PLANS.
    2. WHEN AUTHORIZED BY THE ENGINEER.
    3. WHEN THE HEIGHT OF FILL IS 10' OR MORE.
    4. WHEN THE CULVERT GRADE IS 10% OR MORE.
  - GALVANIZED TOE PLATE EXTENSIONS SHALL BE MATCH PUNCHED TO FIT HOLES IN THE TOE PLATE AND SUPPLIED LOOSE, COMPLETE WITH 3/8" DIAMETER GALVANIZED BOLTS. LENGTH OF THE TOE PLATE EXTENSION IS W + A FOR ALL SIZES.
  - CONNECTOR SECTIONS, TOE PLATE EXTENSIONS AND CORNER PLATES SHALL BE THE SAME THICKNESS AS THE APRON CENTER PANEL, AND SHALL BE GALVANIZED.
  - CONNECTOR TYPES DESIGNATED FOR LARGER CORRUGATED STEEL PIPES MAY BE USED ON SMALLER CORRUGATED IPES.
  - CIRCULAR AND ARCH PIPE SIZES SHOWN ON THIS PLAN HAVE 2 1/2" x 1/2" CORRUGATIONS; EQUIVALENT PIPE SIZES WITH 3" x 1" OR 5" x 1" CORRUGATIONS WILL BE ALLOWED.
  - ALTERNATE DESIGNS THAT HAVE PRIOR APPROVAL BY THE DEPARTMENT WILL BE ACCEPTED.
  - OUTFALL LABEL TO BE USED ONLY WHERE STORMWATER WILL DISCHARGE DIRECTLY TO THE WATERS OF THE STATE.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

(SPECIAL DETAIL)	03/07/2023	R-88-E	SHEET 3 OF 4
FHWA APPROVAL	PLAN DATE		



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

(SPECIAL DETAIL)	03/07/2023	R-88-E	SHEET 4 OF 4
FHWA APPROVAL	PLAN DATE		

SECT