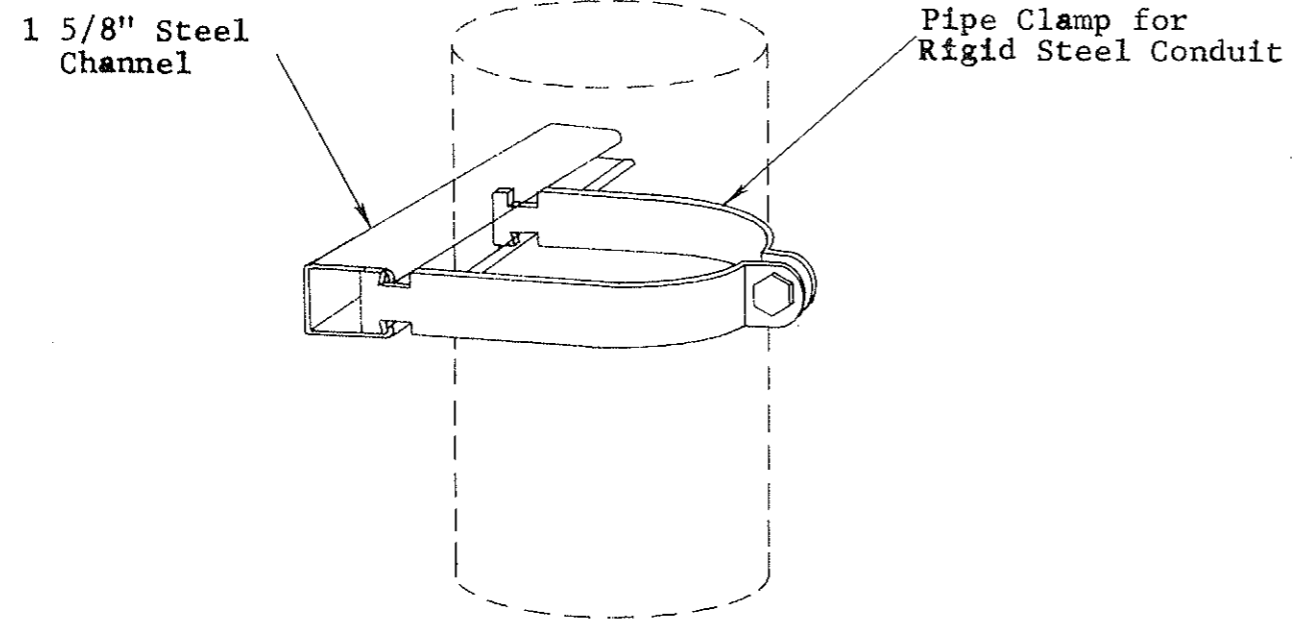
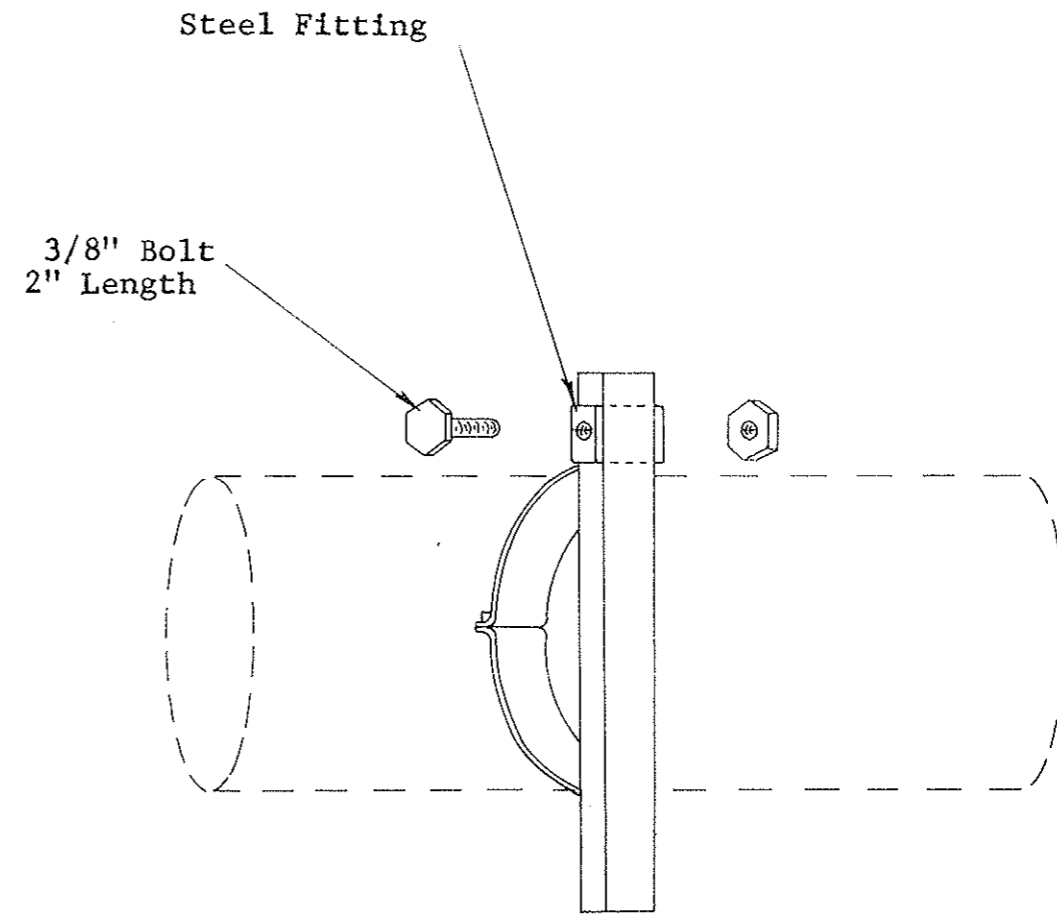


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ALTERNATE POST & MAST ARM SIGN MOUNTING DETAILS



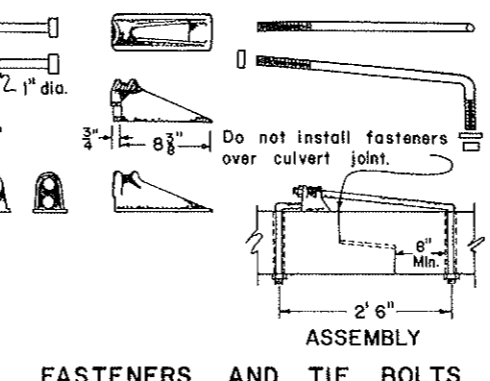
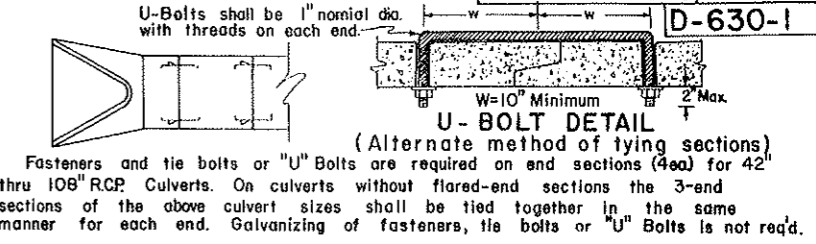
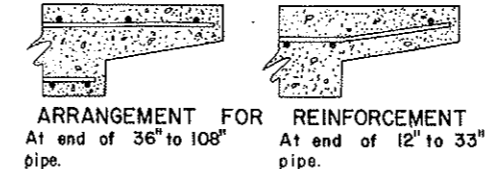
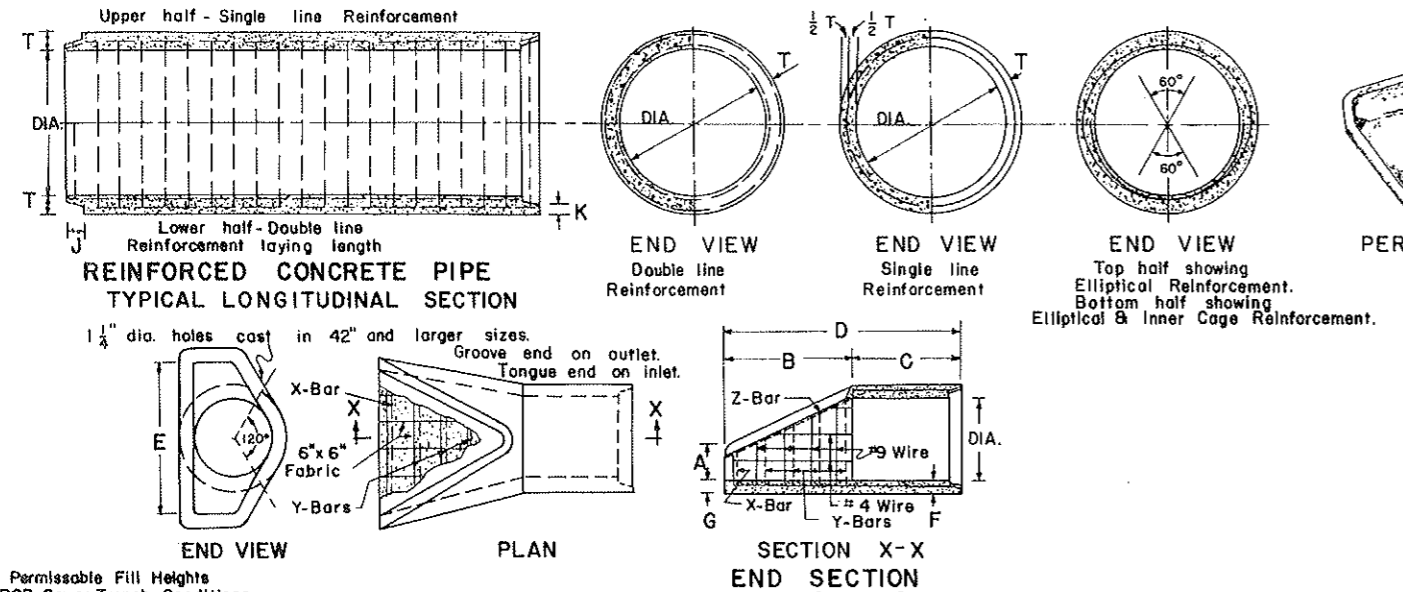
VERTICAL MOUNTING



HORIZONTAL MOUNTING

REINFORCED CONCRETE PIPE CULVERT AND END SECTIONS

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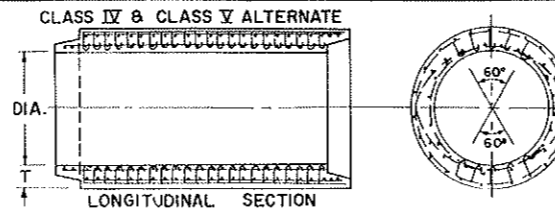
DIA.	TERMINAL DIMENSIONS						REINFORCING STEEL			
	A	B	C	D	E	F	G	X	Y	Z
12	0.4	2.0	4.0	6.0	2.0	2.0	2.0	2 1/4 x 2	6-3/4 x 2	@ 6" c.c.
15	0.6	2.3	3.10	6.1	2.6	2 1/4	2 1/2	2 1/4 x 2 1/2	6-3/4 x 2 1/2	@ 6" c.c.
18	0.9	2.3	3.10	6.1	3.0	2 1/4	2 1/2	2 3/4 x 3	6-3/4 x 3	@ 6" c.c.
21	0.9	3.0	3.12	6.1 1/2	3.6	2 3/4	2 3/4	2 3/4 x 3 1/2	8-3/8 x 3 1/2	@ 6" c.c.
24	0.9 1/2	3.7	2.6	6.1 1/2	4.0	3	3	2 3/4 x 4	8-3/8 x 4	@ 6" c.c.
27	0.10 1/2	4.1 1/2	2.0	6.1 1/2	4.6	3 1/4	3 1/4	2 3/4 x 5	8-3/8 x 5	@ 9" c.c.
30	1.0	4.6	3.7 3/4	8.1 3/4	5.0	3 1/2	3 1/2	2 3/4 x 5	12-3/8 x 5	@ 8" c.c.
36	1.3	5.3	2.10	8.1 3/4	6.0	4	4	2 1/2 x 6	18-3/8 x 6	@ 6" c.c.
42	1.9	5.3	2.11	8.2	6.6	4 1/2	4 1/2	2 1/2 x 7	12-3/8 x 7	@ 9" c.c.
48	2.0	6.0	2.2	8.2	7.0	5	5	2 1/2 x 8	16-3/8 x 8	@ 8" c.c.
54	2.3	5.5	2.9	8.2 1/2	7.6	5 1/2	5 1/2	2 1/2 x 8	16-3/8 x 8	@ 7" c.c.
60	2.1	5.0	3.3	8.3	8.0	6	5	2 1/2 x 9	16-3/8 x 9	@ 6" c.c.
66	2.6	6.0	2.3	8.3	8.6	6 1/2	5 1/2	2 1/2 x 9	22-3/8 x 9	@ 6" c.c.
72	3.0	6.6	1.9	8.3	9.0	7	6	2 1/2 x 10	24-3/8 x 10	@ 6" c.c.
78	3.0	7.6	1.9	9.3	9.6	7 1/2	6 1/2	2 1/2 x 10	28-3/8 x 10	@ 6" c.c.
84	3.0	7.6	1.9	9.3 1/2	10.0	8	6 1/2	4 1/2 x 10	28-3/8 x 10	@ 6" c.c.
90	3.5	7.3	2.0	9.3 1/2	11.0	8 1/2	6 1/2	4 1/2 x 11	28-3/8 x 11	@ 6" c.c.

Permissible Fill Heights
RCP Sewer Trench Conditions
Other than Class I

PIPE SIZE	CLASS			
	II	III	IV	V
2" thru 36"	3-9	1-3 9-13	13-23	23+
60" thru 108"	1-9	9-13	13-23	23+

Internal Dia. of Pipe in. inches	REINFORCED CONCRETE PIPE																													
	CLASS I			CLASS II			CLASS III			CLASS IV			CLASS V																	
	D-LOAD TO PRODUCE A 0.01 INCH CRACK																													
	800						1000						1350						2000						3000					
	D-LOAD TO PRODUCE ULTIMATE LOAD																													
1200		1500				2000				3000				3750																
4000 PSI.		4000 PSI.				4000 PSI.				4000 PSI.				5000 PSI.				6000 PSI.				5000 PSI.								
Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe		Circular rein. in circular pipe								
Inner cage		Outer cage		Inner cage		Outer cage		Inner cage		Outer cage		Inner cage		Outer cage		Inner cage		Outer cage		Inner cage		Outer cage								
Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness		Minimum Wall Thickness								
In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in								
In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in		In.		Sq.in								
12	0.79	92																												
15	1.23	127																												
18	1.77	168																												
21	2.40	214																												
24	3.14	265																												
27	3.98	322																												
30	4.91	384																												
33	5.94	452																												
36	7.07	524																												
42	9.62	685																												
48	12.57	867																												
54	15.90	1070																												
60	19.63	1296																												
66	23.76	1542																												
72	28.27	1810																												
78	33.18	2098																												
84	38.48	2410																												
90	44.18	2585																												
96	50.27	2910																												
102	56.75	3075																												
108	63.62	3690																												

NOTES: All reinforcement shall be electrically welded cold drawn steel wire fabric.
Circular reinforcement shall lap in accordance to A.A.S.H.O. M170.
All circular, longitudinal and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
Laying length of pipe: 12" to 66" (incl.) = Not less than 4 feet.
66" to 108" (incl.) = Not less than 6 feet.
Furnishing and installing fasteners and tie bolts shall be included in price bid for RCP Culverts.



At, A_e, A_o = Minimum circumferential reinforcement required in square inches per lineal foot of pipe.
Ar = Minimum radial reinforcement required in square inches per square foot of pipe.
N = Minimum number of rows of radial reinforcing at top and bottom of pipe.
S = Maximum circumferential spacing of rows of radial reinforcing.

1-1-75 REVISIONS		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGE	
		Submitted: <i>...</i> Design Engineer
		Recommended: <i>...</i> Asst. Chief Engineer Pre-Construction
		Approved: <i>...</i> Chief Engineer