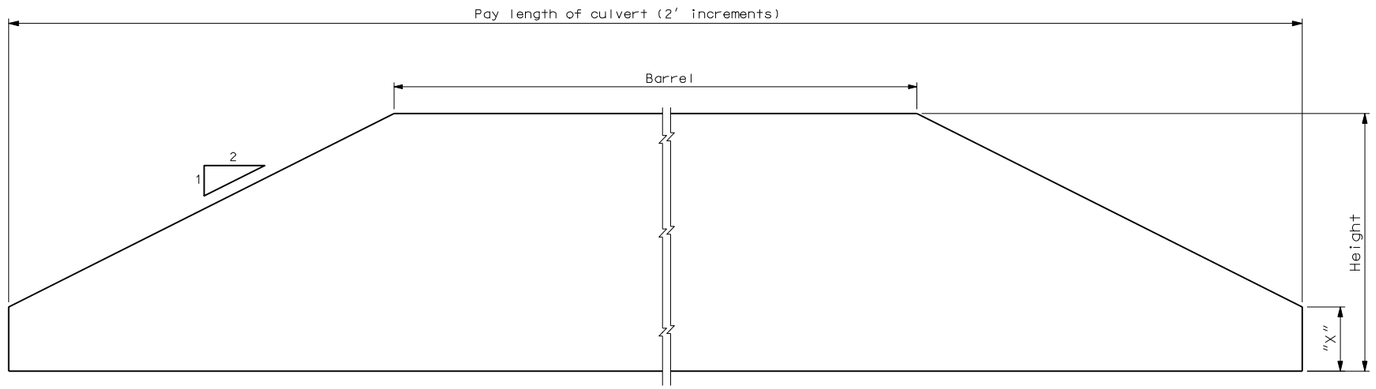
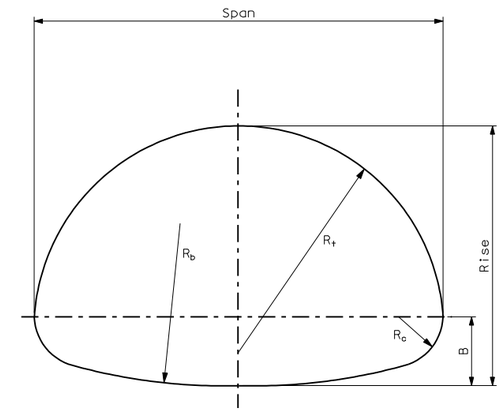
STEEL STRUCTURAL PLATE PIPE ARCHES
(SLOPED ENDS)

D-638-4



LONGITUDINAL VIEW OF CULVERT



END VIEW

MAXIMUM FILL HEIGHT CHART

18" CORNER RADIUS (Rc)									
						LAYOUT DIMENSIONS			
SPAN FT-IN	RISE FT-IN	WATERWAY AREA SQ FT	MIN. COVER IN	GALV. METAL THICKNESS MIN. IN.	MAX. FILL HEIGHT FT	DIM. "X" IN	B IN	Rt FT	Rb FT
6-1	4-7	22	18	0.109	15	27	21.0	3.07	6.36
6-4	4-9	24	18	0.109	15	25	20.5	3.18	8.22
6-9	4-11	26	18	0.109	15	29	22.0	3.42	6.96
7-0	5-1	28	18	0.109	14	27	21.4	3.53	8.68
7-3	5-3	31	18	0.109	13	25	20.8	3.63	11.35
7-8	5-5	33	18	0.109	13	28	22.4	3.88	9.15
7-11	5-7	35	18	0.109	12	26	21.7	3.98	11.49
8-2	5-9	38	18	0.109	12	28	20.9	4.08	15.24
8-7	5-11	40	18	0.109	11	28	22.7	4.33	11.75
8-10	6-1	43	24	0.109	11	26	21.8	4.42	14.89
9-4	6-3	46	24	0.109	10	29	23.8	4.68	12.05
9-6	6-5	49	24	0.109	10	28	22.9	4.78	14.79
9-9	6-7	52	24	0.109	10	26	21.9	4.86	18.98
10-3	6-9	55	24	0.109	9	29	24.0	5.13	14.86
10-8	6-11	58	24	0.109	9	33	26.1	5.41	12.77
10-11	7-1	61	24	0.109	9	31	25.1	5.49	15.03
11-5	7-3	64	24	0.109	8	34	27.4	5.78	13.16
11-7	7-5	67	24	0.109	8	32	26.3	5.85	15.27
11-10	7-7	71	24	0.109	8	30	25.2	5.93	18.03
12-4	7-9	74	24	0.109	8	34	27.5	6.23	15.54
12-6	7-11	78	24	0.109	8	32	26.4	6.29	18.07
12-8	8-1	81	24	0.109	8	30	25.2	6.37	21.45
12-10	8-4	85	24	0.109	8	28	24.0	6.44	26.23
13-5	8-5	89	24	0.109	7	31	26.4	6.73	21.23
13-11	8-7	93	24	0.109	7	35	28.9	7.03	18.39
14-1	8-9	97	24	0.109	7	33	27.6	7.09	21.18
14-3	8-11	101	24	0.109	7	31	26.3	7.16	24.80
14-10	9-1	105	24	0.109	6	35	28.9	7.47	21.19

31" CORNER RADIUS (Rc)									
						LAYOUT DIMENSIONS			
SPAN FT-IN	RISE FT-IN	WATERWAY AREA SQ FT	MIN. COVER IN	GALV. METAL THICKNESS MIN. IN.	MAX. FILL HEIGHT FT	DIM. "X" IN	B IN	Rt FT	Rb FT
13-3	9-4	97	24	0.109	13	46	38.5	6.68	16.05
13-6	9-6	102	24	0.109	12	45	37.7	6.78	18.33
14-0	9-8	105	24	0.109	12	48	39.6	7.03	16.49
14-2	9-10	109	24	0.109	12	47	38.8	7.13	18.55
14-5	10-0	114	24	0.109	11	44	37.9	7.22	21.38
14-11	10-2	118	24	0.109	11	48	39.8	7.48	18.98
15-4	10-4	123	24	0.138	11	51	41.8	7.76	17.38
15-7	10-6	127	24	0.138	11	50	40.9	7.84	19.34
15-10	10-8	132	24	0.138	11	47	40.0	7.93	21.72
16-3	10-10	137	36	0.138	11	51	42.1	8.21	19.67
16-6	11-0	142	36	0.138	10	49	41.1	8.29	21.93
17-0	11-2	146	36	0.138	10	52	43.3	8.58	20.08
17-2	11-4	151	36	0.138	10	50	42.3	8.65	22.23
17-5	11-6	157	36	0.168	9	48	41.3	8.73	24.83
17-11	11-8	161	36	0.168	9	52	43.5	9.02	22.55
18-1	11-10	167	36	0.168	9	49	42.4	9.09	24.98
18-7	12-0	172	36	0.168	9	54	44.7	9.38	22.88
18-9	12-2	177	36	0.168	9	52	43.6	9.46	25.19
19-3	12-4	182	36	0.168	9	55	45.9	9.75	23.22
19-6	12-6	188	36	0.168	9	53	44.8	9.83	25.43
19-8	12-8	194	36	0.168	9	51	43.7	9.90	28.04
19-11	12-10	200	36	0.168	8	49	42.5	9.98	31.19
20-5	13-0	205	36	0.188	8	53	44.9	10.27	28.18
20-7	13-2	211	36	0.188	8	51	43.7	10.33	31.13

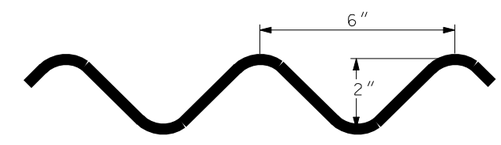
NOTES:

Structural Plate Pipe Arches shall conform to the requirements listed and shown on this sheet and to the American Association of State Highway and Transportation Officials "Standard Specifications for Highway Bridges"

For any required area, small variations in the dimensions for span, height and dimension "X" will be acceptable. However, the manufactured product shall comply with the listed thickness for the various fills and all other AASHTO Specifications for Structural Plate Pipe Arches.

When it is specified on the plans that the beveled ends are to be of a greater thickness than the barrel of the culvert, all plates outside of the barrel or that have a portion extending outside of the barrel shall be of the greater thickness.

Fill height chart is based on the following criteria:
1. Embankment weight = 120 lb./cu. ft.
2. Max. pipe deflection = 5%
3. Bedding - class C
4. Compaction = 95% proctor density
5. HS-20 live load
6. Modulus of passive soil resistance (E') = 1400 psi
7. Corner bearing pressure = 2 ton/sq. ft.



6" x 2" CORRUGATIONS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
07-22-93	Notes
06-03-03	Layout revision
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation