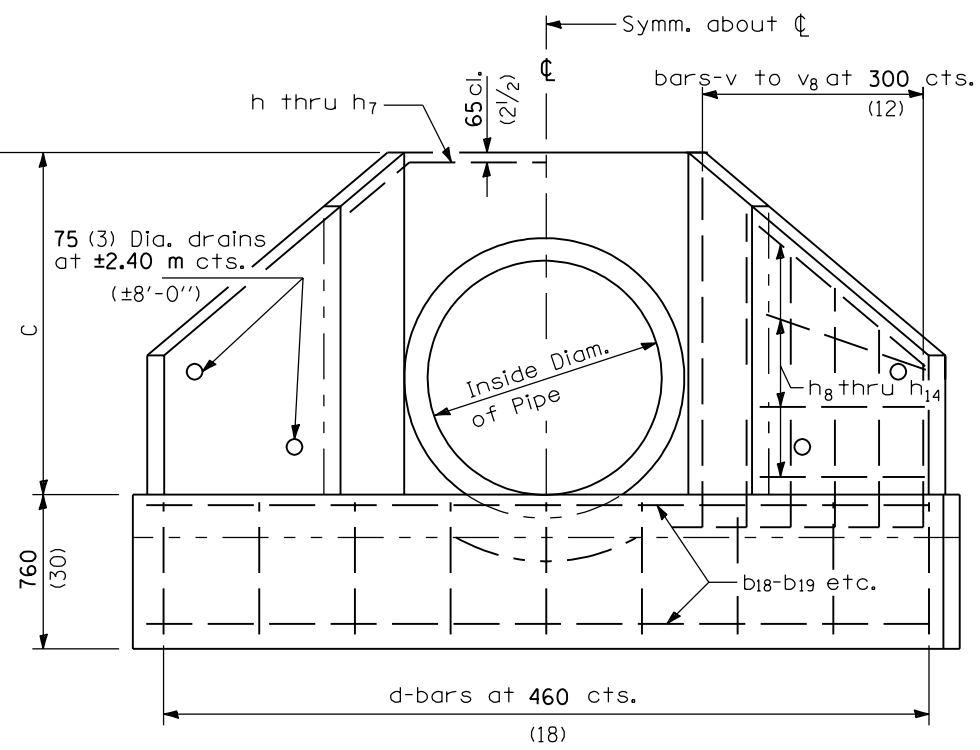
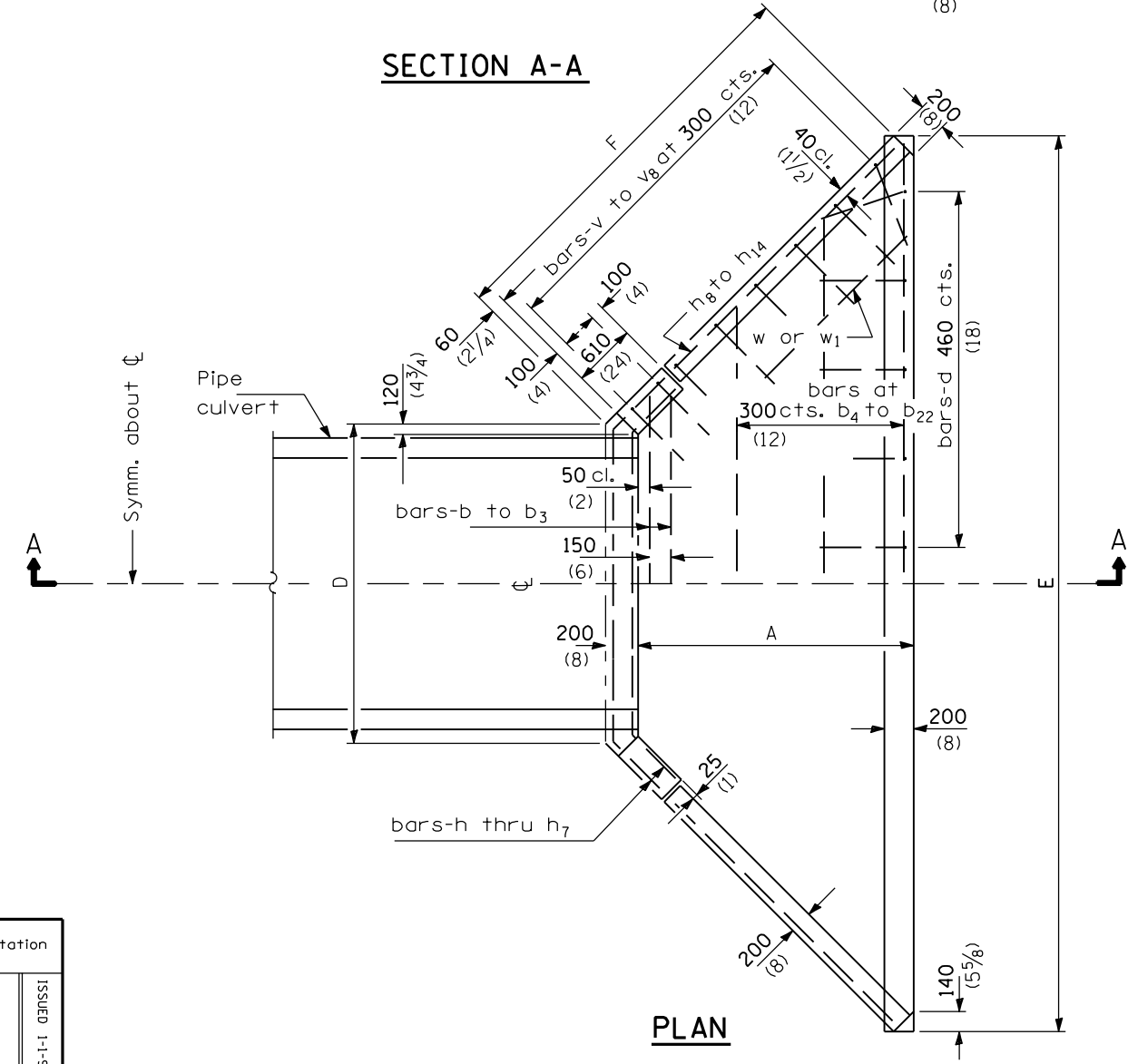


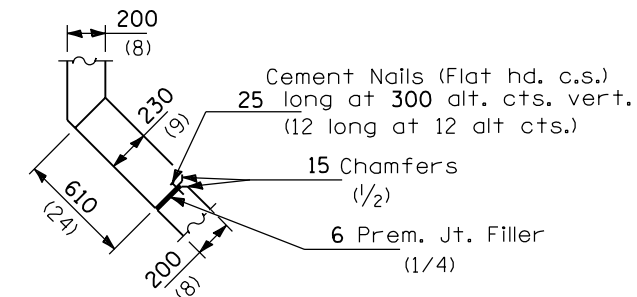
SECTION A-A



END ELEVATION



PLAN



CORNER DETAIL

GENERAL NOTES

* If embankment slope above headwall is flatter than 1:2, provide wings for 1:2 slope.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in millimeters (inches) unless otherwise shown.

DATE	REVISIONS
1-1-97	Renum. Standard 2093-2.
6-15-94	Moved G. N. to Specs. Added slope note and Metric.

REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS
1650 mm (66") THRU 2100 mm (84") DIA.
AT RIGHT ANGLES WITH ROADWAY
 (Sheet 1 of 2)
STANDARD 542111

Illinois Department of Transportation

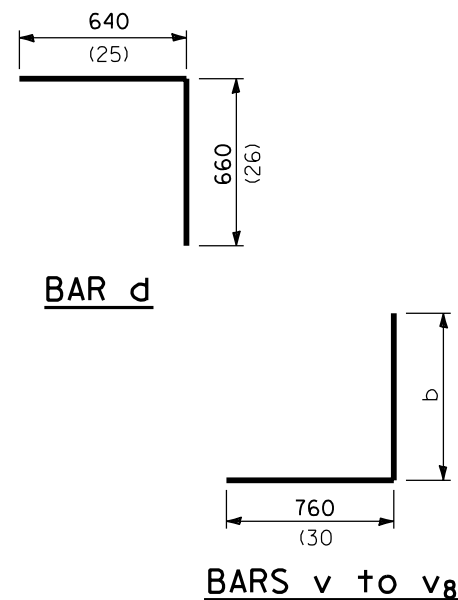
APPROVED January 1, 1997
Ralph E. Anderson
 ENGINEER OF BRIDGES AND STRUCTURES

APPROVED January 1, 1997
Raymond
 ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

DIMENSIONS OF STRAIGHT BARS

BARS	SIZE	LENGTH	BARS	SIZE	LENGTH
b	No. 15 (No. 5)	2.51 m (8'-3")	b ₁₆	No. 15 (No. 4)	6.17 m (20'-3")
b ₁	No. 15 (No. 5)	2.74 m (9'-0")	b ₁₇	No. 15 (No. 4)	6.4 m (21'-0")
b ₂	No. 15 (No. 5)	2.9 m (9'-6")	b ₁₈	No. 15 (No. 4)	6.86 m (22'-6")
b ₃	No. 15 (No. 5)	3.12 m (10'-3")	b ₁₉	No. 15 (No. 4)	7.32 m (24'-0")
b ₄	No. 15 (No. 4)	3.43 m (11'-3")	b ₂₀	No. 15 (No. 4)	7.54 m (24'-9")
b ₅	No. 15 (No. 4)	3.66 m (12'-0")	b ₂₁	No. 15 (No. 4)	8.23 m (27'-0")
b ₆	No. 15 (No. 4)	3.96 m (13'-0")	b ₂₂	No. 15 (No. 4)	8.99 m (29'-6")
b ₇	No. 15 (No. 4)	4.11 m (13'-6")	h ₈	No. 15 (No. 4)	1.6 m (5'-3")
b ₈	No. 15 (No. 4)	4.27 m (14'-0")	h ₉	No. 15 (No. 4)	1.98 m (6'-6")
b ₉	No. 15 (No. 4)	4.5 m (14'-9")	h ₁₀	No. 15 (No. 4)	2.29 m (7'-6")
b ₁₀	No. 15 (No. 4)	4.72 m (15'-6")	h ₁₁	No. 15 (No. 4)	2.67 m (8'-9")
b ₁₁	No. 15 (No. 4)	4.95 m (16'-3")	h ₁₂	No. 15 (No. 4)	2.82 m (9'-3")
b ₁₂	No. 15 (No. 4)	5.11 m (16'-9")	h ₁₃	No. 15 (No. 4)	3.28 m (10'-9")
b ₁₃	No. 15 (No. 4)	5.33 m (17'-6")	h ₁₄	No. 15 (No. 4)	3.73 m (12'-3")
b ₁₄	No. 15 (No. 4)	5.64 m (18'-6")	w	No. 15 (No. 4)	1.83 m (6'-0")
b ₁₅	No. 15 (No. 4)	5.94 m (19'-6")	w ₁	No. 15 (No. 4)	3.05 m (10'-0")

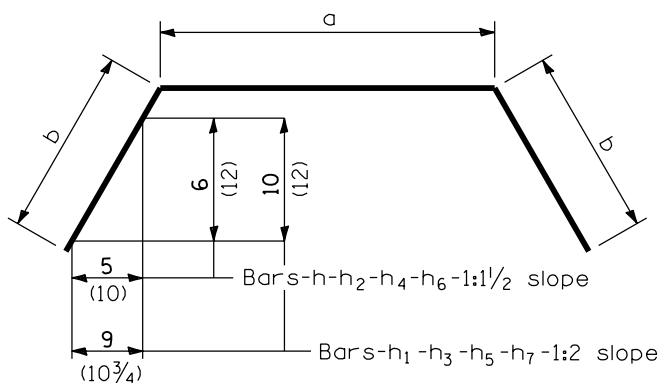


BARS IN ONE END SECTION

1650 Pipe (66)				1800 Pipe (72)				1950 Pipe (78)				2100 Pipe (84)			
1.65 -1/2 (66-1/2)		1.65 -2 (66-2)		1.8 -1/2 (72-1/2)		1.8 -2 (72-2)		1.95 -1/2 (78-1/2)		1.95 -2 (78-2)		2.1 -1/2 (84-1/2)		2.1 -2 (84-2)	
BARS	No.	BARS	No.	BARS	No.	BARS	No.	BARS	No.	BARS	No.	BARS	No.	BARS	No.
d	12	d	14	d	14	d	17	d	16	d	19	d	17	d	20
b	2	b	2	b ₁	2	b ₁	2	b ₂	2	b ₂	2	b ₃	2	b ₃	2
b ₄	1	b ₄	1	b ₅	1	b ₅	1	b ₅	1	b ₅	1	b ₆	1	b ₆	1
b ₇	1	b ₇	1	b ₈	1	b ₈	1	b ₈	1	b ₉	1	b ₉	1	b ₉	1
b ₁₀	1	b ₁₀	1	b ₁₁	1	b ₁₁	1	b ₁₁	1	b ₁₁	1	b ₁₂	1	b ₁₂	1
b ₁₃	2	b ₁₃	1	b ₁₄	1	b ₁₄	1	b ₁₄	1	b ₁₄	1	b ₁₄	1	b ₁₄	1
		b ₁₅	1	b ₁₆	2	b ₁₆	1	b ₁₆	1	b ₁₇	1	b ₁₇	1	b ₁₇	1
		b ₁₇	2			b ₁₈	1	b ₁₈	2	b ₁₈	1	b ₁₈	1	b ₁₈	1
						b ₁₉	2			b ₂₀	1	b ₁₉	2	b ₂₀	1
										b ₂₁	2			b ₂₁	1
														b ₂₂	2
h	2	h ₁	2	h ₂	2	h ₃	2	h ₄	2	h ₅	2	h ₆	2	h ₇	2
h ₈	8	h ₁₀	8	h ₉	10	h ₁₂	10	h ₁₀	12	h ₁₃	12	h ₁₁	12	h ₁₄	12
v	4	v	4	v	4	v	4	v	4	v	4	v	4	v	4
v ₁	4	v ₁	6	v ₁	4	v ₁	8	v ₁	4	v ₁	8	v ₁	4	v ₁	6
v ₂	4	v ₂	4	v ₂	4	v ₃	6	v ₂	4	v ₂	6	v ₂	4	v ₂	4
v ₄	8	v ₄	10	v ₄	10	v ₅	10	v ₄	8	v ₄	6	v ₄	4	v ₄	6
										v ₆	8	v ₆	4	v ₆	6
												v ₇	8	v ₇	8
h ₈	4	h ₉	4	h ₈	4	h ₁₀	4	h ₉	4	h ₁₁	4	h ₁₀	4	h ₁₂	4
w	2	w	2	w	2	w ₁	2	w	2	w ₁	2	w ₁	2	w ₁	2

DIMENSIONS OF BENT BARS

No. 15-bars v to v ₈ (No. 5)			No. 15-bars h to h ₇ (No. 5)			
BAR	b	TOTAL LENGTH	BAR	a	b	TOTAL LENGTH
v	990 (39)	1.75 m (5'-9")	h	2.13 m (7'-0")	610 (24)	3.35 m (11'-0")
v ₁	1.22 m (4'-0")	1.98 m (6'-6")	h ₁	2.13 m (7'-0")	610 (24)	3.35 m (11'-0")
v ₂	1.52 m (5'-0")	2.28 m (7'-6")	h ₂	2.31 m (7'-7")	600 (23 1/2)	3.51 m (11'-6")
v ₃	1.68 m (5'-6")	2.44 m (8'-0")	h ₃	2.31 m (7'-7")	600 (23 1/2)	3.51 m (11'-6")
v ₄	1.83 m (6'-0")	2.59 m (8'-6")	h ₄	2.49 m (8'-2")	580 (23)	3.65 m (12'-0")
v ₅	1.98 m (6'-6")	2.74 m (9'-0")	h ₅	2.49 m (8'-2")	580 (23)	3.65 m (12'-0")
v ₆	2.13 m (7'-0")	2.89 m (9'-6")	h ₆	2.67 m (8'-9")	610 (24)	3.89 m (12'-9")
v ₇	2.29 m (7'-6")	3.05 m (10'-0")	h ₇	2.67 m (8'-9")	610 (24)	3.89 m (12'-9")
v ₈	2.44 m (8'-0")	3.2 m (10'-6")				



BARS - h to h₇

DESIGN NO.	NOMINAL INSIDE DIAM. of PIPE	SLOPE of FILL	DIMENSIONS					Concrete 2 End Secs. m ³ (cu. yds.)	Reinf. Bars 2 End Secs. kg (lbs.)
			A	C	D	E	F		
D1.65 -1/2 (D66-1/2)	1650 (66)	1:1/2	1.65 m (5'-4")	1.99 m (6'-6 1/2")	2.25 m (7'-4 1/2")	5.63 m (18'-5")	2.39 m (7'-10")	7.8 (10.2)	370 (660)
D1.65 -2 (D66-2)	1650 (66)	1:2	2.18 m (7'-1")	2.0 m (6'-6 1/2")	2.25 m (7'-4 1/2")	6.69 m (21'-11")	3.14 m (10'-3 1/2")	10.3 (13.5)	470 (820)
D1.8 -1/2 (D72-1/2)	1800 (72)	1:1/2	1.9 m (6'-2")	2.16 m (7'-1")	2.43 m (7'-11 1/2")	6.3 m (20'-8")	2.74 m (9'-0")	9.5 (12.4)	450 (770)
D1.8 -2 (D72-2)	1800 (72)	1:2	2.51 m (8'-2")	2.16 m (7'-1")	2.43 m (7'-11 1/2")	7.54 m (24'-8")	3.61 m (11'-10")	12.6 (16.5)	600 (1020)
D1.95 -1/2 (D78-1/2)	1950 (78)	1:1/2	2.12 m (6'-11")	2.32 m (7'-7 1/2")	2.6 m (8'-6 1/2")	6.93 m (22'-9")	3.06 m (10'-0 1/2")	11.1 (14.5)	530 (910)
D1.95 -2 (D78-2)	1950 (78)	1:2	2.82 m (9'-3")	2.32 m (7'-7 1/2")	2.6 m (8'-6 1/2")	8.37 m (27'-5")	4.08 m (13'-4 1/2")	15.0 (19.6)	710 (1210)
D2.1 -1/2 (D84-1/2)	2100 (84)	1:1/2	2.38 m (7'-9")	2.49 m (8'-2")	2.78 m (9'-1 1/2")	7.63 m (25'-0")	3.43 m (11'-3")	13.1 (17.1)	640 (1090)
D2.1 -2 (D84-2)	2100 (84)	1:2	3.17 m (10'-4")	2.49 m (8'-2")	2.78 m (9'-1 1/2")	9.2 m (30'-2")	4.54 m (14'-10 3/4")	17.7 (23.2)	810 (1360)

All dimensions are in millimeters (inches) unless otherwise shown.

REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS
 1650 mm (66") THRU 2100 mm (84") DIA.
 AT RIGHT ANGLES WITH ROADWAY
 (Sheet 2 of 2)

STANDARD 542111

Illinois Department of Transportation

APPROVED January 1, 1997
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ISSUED 1-1-97