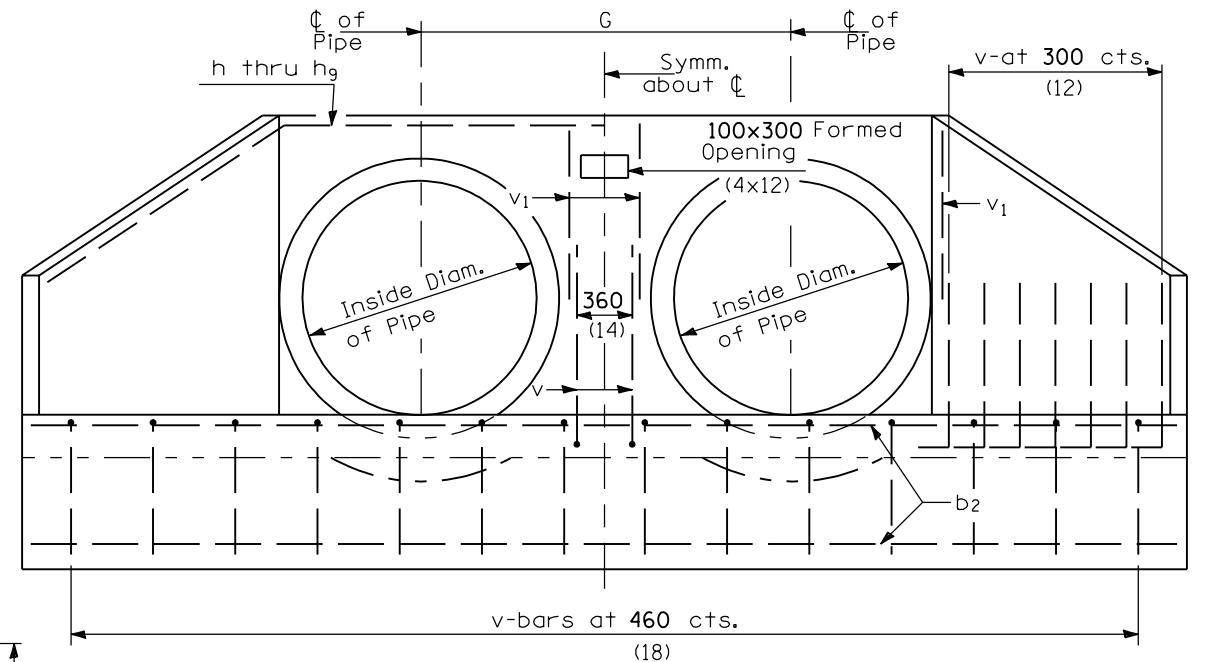
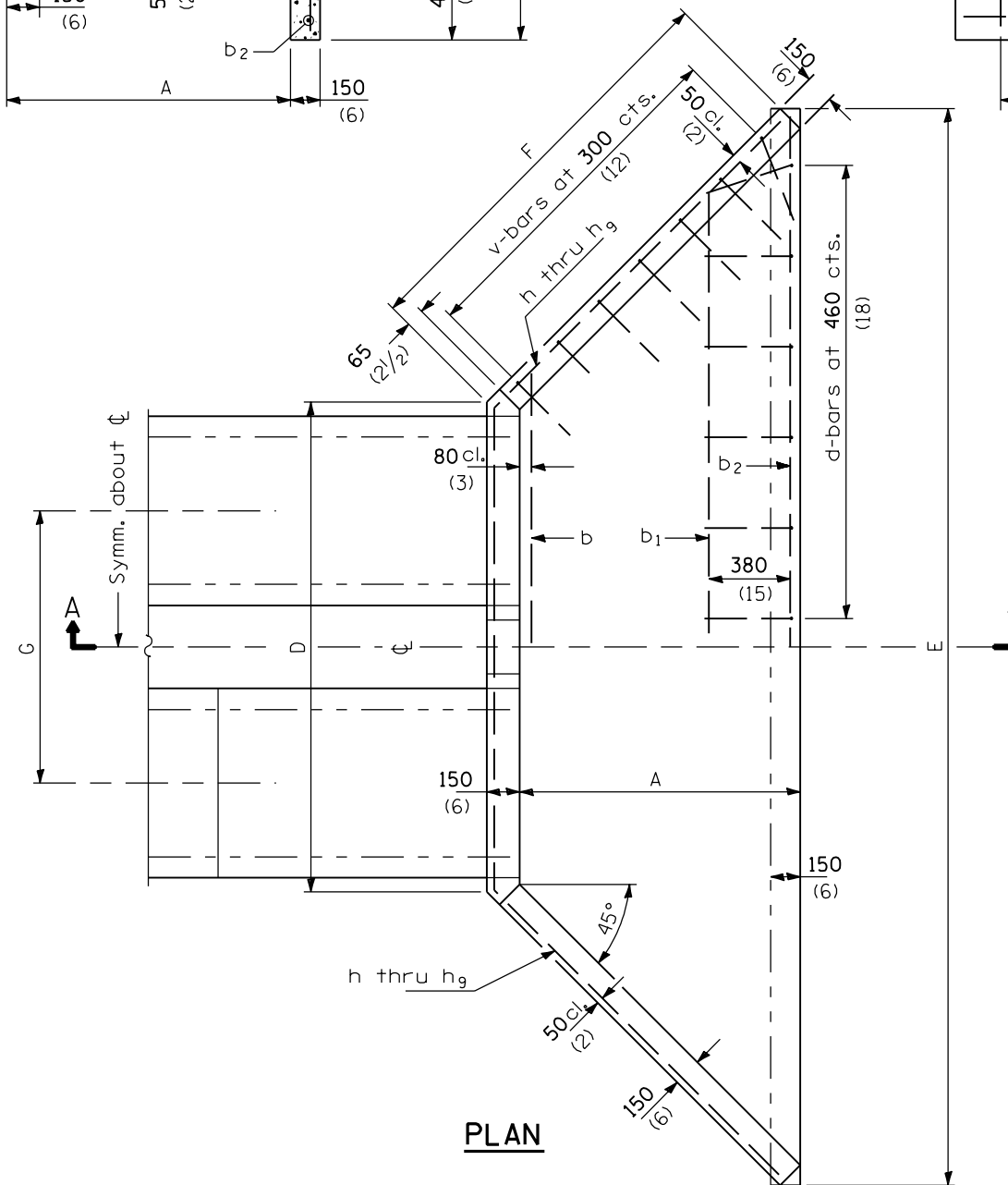


SECTION A-A



END ELEVATION



PLAN

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 2102-2.
6-15-94	Moved G.N. to Specs. Added slope note. Added Metric.

REINFORCED CONCRETE END SECTIONS FOR MULTIPLE (2 & 3) PIPE CULVERTS 375 mm (15") THRU 900 mm (36") DIA. AT RIGHT ANGLES WITH ROADWAY

(Sheet 1 of 3)

STANDARD 542116

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

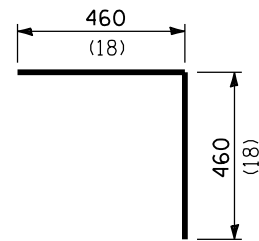
ISSUED 1-1-97

**DIMENSIONS FOR
No. 15 BARS-h to h₉
(No. 4)**

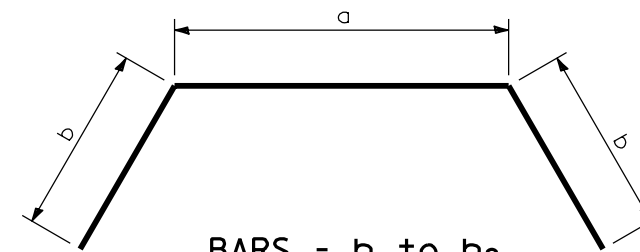
MARK	2 PIPES		3 PIPES	
	a	b	a	b
h	1.5 m (4'-11")	740 (29)	2.44 m (8'-0")	760 (30)
h ₁	1.5 m (4'-11")	1.0 m (3'-3 1/2")	2.44 m (8'-0")	990 (39)
h ₂	1.65 m (5'-5")	740 (29)	2.67 m (8'-9")	760 (30)
h ₃	1.65 m (5'-5")	1.0 m (3'-3 1/2")	2.67 m (8'-9")	990 (39)
h ₄	2.06 m (6'-9")	990 (39)	3.28 m (10'-9")	990 (39)
h ₅	2.06 m (6'-9")	1.3 m (4'-3")	3.28 m (10'-9")	1.3 m (4'-3")
h ₆	2.36 m (7'-9")	1.18 m (3'-10 1/2")	3.74 m (12'-3")	1.18 m (3'-10 1/2")
h ₇	2.36 m (7'-9")	1.49 m (4'-10 1/2")	3.74 m (12'-3")	1.49 m (4'-10 1/2")
h ₈	2.75 m (9'-0")	1.45 m (4'-9")	4.27 m (14'-0")	1.45 m (4'-9")
h ₉	2.75 m (9'-0")	1.75 m (5'-9")	4.27 m (14'-0")	1.75 m (5'-9")

TABLE OF DIMENSIONS

DESIGN NO.	NOMINAL DIAM. of PIPE	SLOPE of FILL	DIMENSIONS SAME FOR ALL MULTIPLES					DIMENSIONS			
								FOR 2 PIPES		FOR 3 PIPES	
			A	B	C	F	G	D	E	D	E
D375-1 1/2 (D15-1 1/2)	375 (15)	1:1 1/2	495 (19)	260 (10)	590 (23)	750 (29 1/2)	940 (37)	1.55 m (5'-1")	2.61 m (8'-6 1/2")	2.49 m (8'-2")	3.55 m (11'-7 1/2")
D375-2 (D15-2)	375 (15)	1:2	660 (26)	260 (10)	590 (23)	1.0 m (3'-3 1/4")	940 (37)	1.55 m (5'-1")	2.96 m (9'-8 1/2")	2.49 m (8'-2")	3.9 m (12'-9 1/2")
D450-1 1/2 (D18-1 1/2)	450 (18)	1:1 1/2	495 (19)	330 (13)	660 (26)	750 (29 1/2)	1.02 m (3'-4")	1.71 m (5'-7")	2.77 m (9'-0 1/2")	2.73 m (8'-11")	3.79 m (12'-4 1/2")
D450-2 (D18-2)	450 (18)	1:2	660 (26)	330 (13)	660 (26)	1.0 m (3'-3 1/4")	1.02 m (3'-4")	1.71 m (5'-7")	3.12 m (10'-2 1/2")	2.73 m (8'-11")	4.14 m (13'-6 1/2")
D600-1 1/2 (D24-1 1/2)	600 (24)	1:1 1/2	640 (25)	410 (16)	840 (33)	965 (38)	1.22 m (4'-0")	2.11 m (6'-11")	3.47 m (11'-4 1/2")	3.33 m (10'-11")	4.69 m (15'-4 1/2")
D600-2 (D24-2)	600 (24)	1:2	860 (34)	410 (16)	840 (33)	1.28 m (4'-2 1/2")	1.22 m (4'-0")	2.11 m (6'-11")	3.92 m (12'-10 1/2")	3.33 m (10'-11")	5.14 m (16'-10 1/2")
D750-1 1/2 (D30-1 1/2)	750 (30)	1:1 1/2	760 (30)	485 (19)	990 (39)	1.14 m (3'-9")	1.37 m (4'-6")	2.41 m (7'-11")	4.02 m (13'-2 1/2")	3.78 m (12'-5")	5.39 m (17'-8 1/2")
D750-2 (D30-2)	750 (30)	1:2	1.01 m (3'-4")	485 (19)	990 (39)	1.5 m (4'-11")	1.37 m (4'-6")	2.41 m (7'-11")	4.53 m (14'-10 1/2")	3.78 m (12'-5")	5.9 m (19'-4 1/2")
D900-1 1/2 (D36-1 1/2)	900 (36)	1:1 1/2	915 (36)	560 (22)	1.17 m (3'-10")	1.36 m (4'-5 1/2")	1.57 m (5'-2")	2.75 m (9'-0")	4.67 m (15'-6 1/2")	4.32 m (14'-5")	6.24 m (20'-8 1/2")
D900-2 (D36-2)	900 (36)	1:2	1.22 m (4'-0")	560 (22)	1.17 m (3'-10")	1.79 m (5'-10 1/2")	1.57 m (5'-2")	2.75 m (9'-0")	5.28 m (17'-6 1/2")	4.32 m (14'-5")	6.85 m (22'-8 1/2")



BAR v



BARS - h to h₉

Bend in field
One required in each headwall

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

**REINFORCED CONCRETE END SECTIONS
FOR MULTIPLE (2 & 3) PIPE CULVERTS
375 mm (15") THRU 900 mm (36") DIA.
AT RIGHT ANGLES WITH ROADWAY
(Sheet 2 of 3)**

STANDARD 542116

<p>Illinois Department of Transportation</p>	<p>APPROVED January 1, 1997 <i>Ralph E. Anderson</i> ENGINEER OF BRIDGES AND STRUCTURES</p> <p>APPROVED January 1, 1997 <i>Raymond</i> ENGINEER OF DESIGN AND ENVIRONMENT</p>	<p>ISSUED 1-1-97</p>
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TABLE OF QUANTITIES

DESIGN NO.	FOR 2 PIPES												TOTAL Qty. 2 End Secs. kg (lbs.)
	Concrete 2 End Secs. m ³ (cu. yds.)	REINFORCEMENT BARS IN ONE END SECTION										No. 15 -v ₂ (No. 4)	
		No. 15-h Bars (No. 4)		No. 15-b ₂ Bars (No. 4)		No. 15-b ₁ Bars (No. 4)		No. 15-b Bars (No. 4)		No. 15 -v ₁ Bars (No. 4)			
MARK	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	
D375-1/2 (D15-1/2)	1.1 (1.4)	h	2.98 m (9'-9")	2	2.5 m (8'-3")			1	1.9 m (6'-3")			14	70 (100)
D375-2 (D15-2)	1.4 (1.8)	h ₁	3.5 m (11'-6")	2	2.82 m (9'-3")	1	2.21 m (7'-3")	1	1.9 m (6'-3")			17	90 (130)
D450-1/2 (D18-1/2)	1.3 (1.7)	h ₂	3.13 m (10'-3")	2	2.59 m (8'-6")			1	2.06 m (6'-9")			14	70 (100)
D450-2 (D18-2)	1.5 (2.0)	h ₃	3.65 m (12'-0")	2	2.97 m (9'-9")	1	2.36 m (7'-9")	1	2.06 m (6'-9")			17	90 (130)
D600-1/2 (D24-1/2)	1.8 (2.4)	h ₄	4.04 m (13'-3")	2	3.35 m (11'-0")	1	2.74 m (9'-0")	1	2.44 m (8'-0")	4	790 (31)	18	110 (160)
D600-2 (D24-2)	2.3 (3.0)	h ₅	4.66 m (15'-3")	2	3.81 m (12'-6")	1	3.2 m (10'-6")	1	2.44 m (8'-0")	4	790 (31)	21	130 (180)
D750-1/2 (D30-1/2)	2.3 (3.0)	h ₆	4.72 m (15'-6")	2	3.89 m (12'-9")	1	3.12 m (10'-3")	1	2.51 m (8'-3")	4	790 (31)	19	120 (170)
D750-2 (D30-2)	2.9 (3.8)	h ₇	5.34 m (17'-6")	2	4.42 m (14'-6")	1	3.73 m (12'-3")	1	2.51 m (8'-3")	4	790 (31)	22	140 (190)
D900-1/2 (D36-1/2)	3.0 (3.9)	h ₈	5.65 m (18'-6")	2	4.57 m (15'-0")	1	3.81 m (12'-6")	1	2.97 m (9'-9")	4	1,070 (3'-6")	22	150 (200)
D900-2 (D36-2)	3.8 (5.0)	h ₉	6.25 m (20'-6")	2	5.18 m (17'-0")	1	4.42 m (14'-6")	1	2.97 m (9'-9")	4	1,070 (3'-6")	26	170 (230)
DESIGN NO.	FOR 3 PIPES												TOTAL Qty. 2 End Secs. kg (lbs.)
	Concrete 2 End Secs. m ³ (cu. yds.)	REINFORCEMENT BARS IN ONE END SECTION										No. 15 -v ₂ (No. 4)	
		No. 15-h Bars (No. 4)		No. 15-b ₂ Bars (No. 4)		No. 15-b ₁ Bars (No. 4)		No. 15-b Bars (No. 4)		No. 15 -v ₁ Bars (No. 4)			
MARK	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	LENGTH	QTY.	
D375-1/2 (D15-1/2)	1.5 (2.0)	h	3.96 m (13'-0")	2	3.43 m (11'-3")			1	2.82 m (9'-3")			18	100 (130)
D375-2 (D15-2)	1.9 (2.5)	h ₁	4.42 m (14'-6")	2	3.74 m (12'-3")	1	3.35 m (11'-0")	1	2.82 m (9'-3")			21	120 (170)
D450-1/2 (D18-1/2)	1.8 (2.3)	h ₂	4.19 m (13'-9")	2	3.66 m (12'-0")			1	3.05 m (10'-0")			19	100 (140)
D450-2 (D18-2)	2.0 (2.7)	h ₃	4.65 m (15'-3")	2	3.96 m (13'-0")	1	3.58 m (11'-9")	1	3.05 m (10'-0")			21	120 (190)
D600-1/2 (D24-1/2)	2.4 (3.2)	h ₄	5.26 m (17'-3")	2	4.57 m (15'-0")	1	4.11 m (13'-6")	1	3.65 m (12'-0")	6	790 (31)	22	150 (210)
D600-2 (D24-2)	3.0 (3.9)	h ₅	5.88 m (19'-3")	2	5.03 m (16'-6")	1	4.72 m (15'-6")	1	3.65 m (12'-0")	6	790 (31)	25	170 (230)
D750-1/2 (D30-1/2)	3.1 (4.1)	h ₆	6.1 m (20'-0")	2	5.26 m (17'-3")	1	4.5 m (14'-9")	1	3.96 m (13'-0")	6	790 (31)	24	170 (230)
D750-2 (D30-2)	3.8 (5.0)	h ₇	6.72 m (22'-0")	2	5.79 m (19'-0")	1	5.11 m (16'-9")	1	3.96 m (13'-0")	6	790 (31)	27	180 (250)
D900-1/2 (D36-1/2)	4.1 (5.3)	h ₈	7.17 m (23'-6")	2	6.1 m (20'-0")	1	5.33 m (17'-6")	1	4.5 m (14'-9")	6	1,070 (3'-6")	28	190 (270)
D900-2 (D36-2)	5.0 (6.5)	h ₉	7.77 m (25'-6")	2	6.71 m (22'-0")	1	5.94 m (19'-6")	1	4.5 m (14'-9")	6	1,070 (3'-6")	31	210 (290)

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

**REINFORCED CONCRETE END SECTIONS
FOR MULTIPLE (2 & 3) PIPE CULVERTS
375 mm (15") THRU 900 mm (36") DIA.
AT RIGHT ANGLES WITH ROADWAY**
(Sheet 3 of 3)

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 Illinois Department of Transportation	APPROVED January 1, 1997 <i>Ralph E. Anderson</i> ENGINEER OF BRIDGES AND STRUCTURES	ISSUED 1-1-97
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