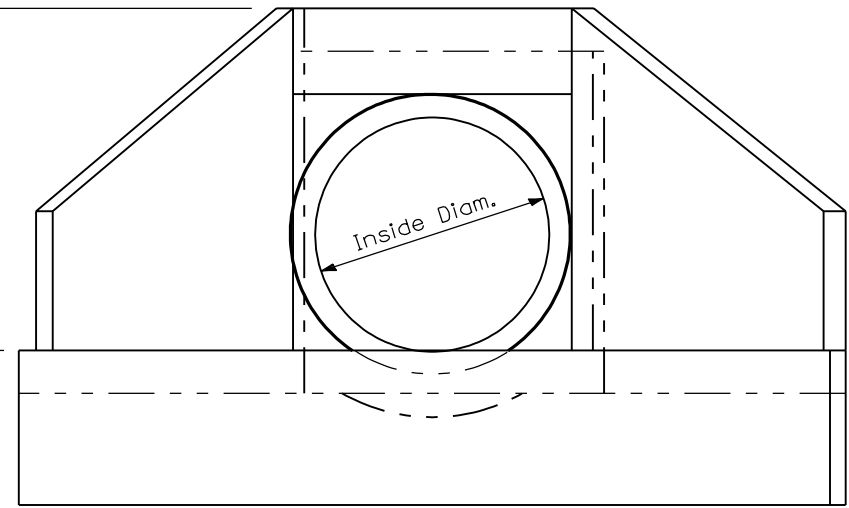
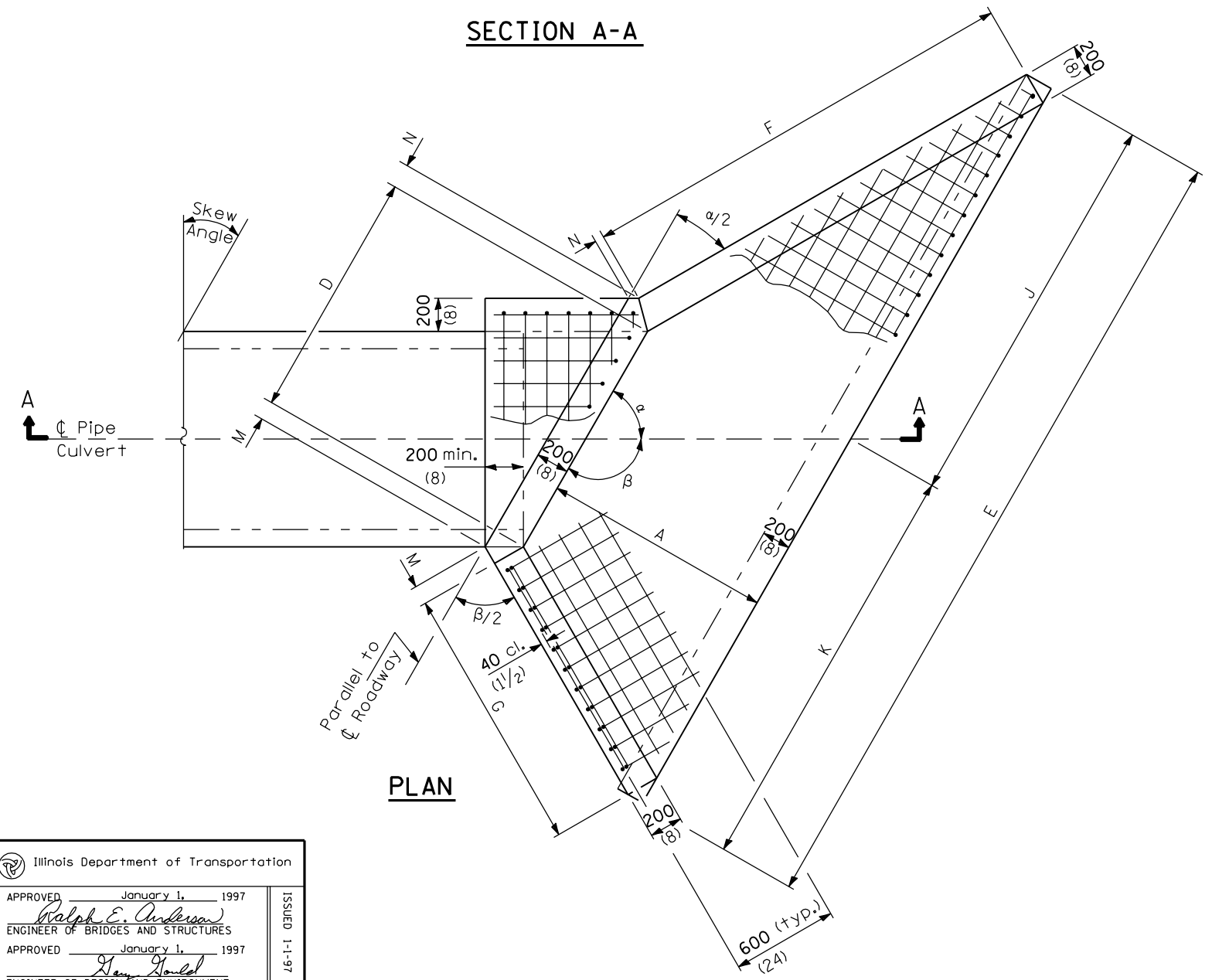


Welded wire fabric (typ.)  
152x152 - MW25.8xMW25.8  
(6x6 - W4.0xW4.0)

**SECTION A-A**



**END VIEW**



**PLAN**

**GENERAL NOTES**

- Build tops of headwalls parallel to grade line.
- \* If embankment slope above headwall is flatter than 1:2, provide wings for 1:2 slope.
- When lapping sheets of welded wire fabric, the overlap measured between the outermost cross wires of each fabric sheet shall not be less than 202 mm (8").
- 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.

**REINFORCED CONCRETE END SECTIONS  
FOR PIPE CULVERTS  
1050 mm (42") THRU 1500 mm (60") DIA.  
SKEWED WITH ROADWAY**  
(Sheet 1 of 5)

**STANDARD 542206**

DATE	REVISIONS
1-1-97	Renum. Standard 1998-2
6-15-94	Moved G.N. to Specs. Moved Bill of Mat'l. Added slope note & metric.

Illinois Department of Transportation

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

APPROVED January 1, 1997  
*Raymond H. Havel*  
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

### WINGS FOR 1:1/2 SLOPE


Skew Angle	Nominal Dia. For Pipe	DIMENSIONS FOR CONCRETE												Concrete 2 End Secs. m <sup>3</sup> (cu. yd.)	Wire Fabric 2 End Secs. m <sup>2</sup> (sq. yd.)	
		A	B	C	D	E	F	G	H	J	K	M	N			α
5°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.299 m (4'-3 1/4")	4.09 m (13'-5")	1.85 m (6'-0 1/2")	1.69 m (5'-6 1/2")	1.295 m (4'-3")	2.04 m (6'-8 1/4")	2.05 m (6'-8 3/4")	90 (3 1/2)	80 (3)	85°	4.6 (6.0)	38 (46)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.478 m (4'-10 1/4")	4.48 m (14'-10")	2.0 m (6'-8")	1.83 m (6'-1 1/4")	1.473 m (4'-10")	2.23 m (7'-4 3/4")	2.25 m (7'-5 1/4")	90 (3 1/2)	80 (3)	85°	5.5 (7.2)	44 (53)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.657 m (5'-5 1/4")	5.08 m (16'-3")	2.31 m (7'-3 1/4")	2.12 m (6'-8")	1.651 m (5'-5")	2.53 m (8'-1 1/4")	2.55 m (8'-1 3/4")	90 (3 1/2)	80 (3)	85°	6.4 (8.4)	55 (65)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	1.835 m (6'-0 1/4")	5.37 m (17'-8")	2.4 m (7'-10 3/4")	2.2 m (7'-2 3/4")	1.829 m (6'-0")	2.68 m (8'-9 3/4")	2.69 m (8'-10 1/4")	90 (3 1/2)	80 (3)	85°	7.5 (9.8)	59 (71)
10°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.314 m (4'-3 3/4")	4.13 m (13'-6 1/2")	1.94 m (6'-4 1/4")	1.63 m (5'-4")	1.295 m (4'-3")	2.05 m (6'-8 3/4")	2.08 m (6'-9 3/4")	100 (3 3/4)	80 (3)	80°	4.8 (6.3)	39 (47)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.495 m (4'-11")	4.52 m (15'-0")	2.1 m (7'-0")	1.77 m (5'-10 1/2")	1.473 m (4'-10")	2.25 m (7'-5 1/2")	2.27 m (7'-6 1/2")	100 (3 3/4)	80 (3)	80°	5.7 (7.5)	45 (54)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.676 m (5'-6")	5.13 m (16'-5")	2.43 m (7'-7 3/4")	2.04 m (6'-5")	1.651 m (5'-5")	2.55 m (8'-2")	2.58 m (8'-3")	100 (3 3/4)	80 (3)	80°	6.7 (8.8)	56 (66)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	1.857 m (6'-1")	5.43 m (17'-10 1/2")	2.52 m (8'-3 1/2")	2.12 m (6'-11 1/2")	1.829 m (6'-0")	2.7 m (8'-10 3/4")	2.73 m (8'-11 3/4")	100 (3 3/4)	80 (3)	80°	7.9 (10.3)	61 (73)
15°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.34 m (4'-4 3/4")	4.2 m (13'-9 1/2")	2.05 m (6'-8 1/2")	1.57 m (5'-1 3/4")	1.295 m (4'-3")	2.08 m (6'-10")	2.12 m (6'-11 1/2")	100 (4)	70 (2 3/4)	75°	5.0 (6.6)	40 (48)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.524 m (5'-0")	4.6 m (15'-3")	2.22 m (7'-4 3/4")	1.71 m (5'-8")	1.473 m (4'-10")	2.28 m (7'-6 3/4")	2.32 m (7'-8 1/4")	100 (4)	70 (2 3/4)	75°	6.0 (7.9)	46 (55)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.709 m (5'-7 1/4")	5.22 m (16'-8 3/4")	2.57 m (8'-1")	1.97 m (6'-2 1/4")	1.651 m (5'-5")	2.59 m (8'-3 3/4")	2.63 m (8'-5")	100 (4)	70 (2 3/4)	75°	7.1 (9.3)	57 (68)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	1.893 m (6'-2 1/2")	5.53 m (18'-2 1/4")	2.66 m (8'-9 1/4")	2.05 m (6'-8 3/4")	1.829 m (6'-0")	2.75 m (9'-0 1/2")	2.78 m (9'-1 3/4")	100 (4)	70 (2 3/4)	75°	8.3 (10.8)	62 (75)
20°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.378 m (4'-6 1/4")	4.31 m (14'-1 3/4")	2.17 m (7'-1 1/2")	1.52 m (4'-11 3/4")	1.295 m (4'-3")	2.13 m (7'-0")	2.18 m (7'-1 3/4")	105 (4 1/4)	70 (2 1/2)	70°	5.4 (7.0)	41 (49)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.567 m (5'-1 3/4")	4.72 m (15'-7 3/4")	2.36 m (7'-10 1/4")	1.65 m (5'-6")	1.473 m (4'-10")	2.34 m (7'-9")	2.38 m (7'-10 3/4")	105 (4 1/4)	70 (2 1/2)	70°	6.4 (8.4)	48 (57)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.756 m (5'-9 1/4")	5.36 m (17'-2")	2.72 m (8'-6 3/4")	1.91 m (6'-0")	1.651 m (5'-5")	2.65 m (8'-6")	2.7 m (8'-8")	105 (4 1/4)	70 (2 1/2)	70°	7.6 (9.9)	59 (70)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	1.946 m (6'-4 1/2")	5.68 m (18'-8")	2.83 m (9'-3 1/2")	1.98 m (6'-6 1/4")	1.829 m (6'-0")	2.82 m (9'-3")	2.86 m (9'-5")	105 (4 1/4)	70 (2 1/2)	70°	8.8 (11.5)	64 (77)
25°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.428 m (4'-8 1/4")	4.46 m (14'-7 1/2")	2.32 m (7'-7 1/4")	1.48 m (4'-10")	1.295 m (4'-3")	2.22 m (7'-2 1/2")	2.26 m (7'-5")	110 (4 1/2)	60 (2 1/4)	65°	5.7 (7.4)	43 (51)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.625 m (5'-4")	4.88 m (16'-2 1/4")	2.52 m (8'-4 1/2")	1.6 m (5'-4")	1.473 m (4'-10")	2.41 m (8'-0")	2.47 m (8'-2 1/4")	110 (4 1/2)	60 (2 1/4)	65°	6.8 (8.9)	49 (59)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.821 m (5'-11 3/4")	5.54 m (17'-9")	2.91 m (9'-1 3/4")	1.85 m (5'-10")	1.651 m (5'-5")	2.74 m (8'-9 1/4")	2.8 m (8'-11 3/4")	110 (4 1/2)	60 (2 1/4)	65°	8.0 (10.5)	61 (73)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.018 m (6'-7 1/2")	5.87 m (19'-3 3/4")	3.02 m (9'-11")	1.92 m (6'-4")	1.829 m (6'-0")	2.90 m (9'-6 3/4")	2.97 m (9'-9")	110 (4 1/2)	60 (2 1/4)	65°	9.3 (12.2)	67 (80)
30°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.495 m (4'-11")	4.65 m (15'-3")	2.49 m (8'-2")	1.44 m (4'-8 1/2")	1.295 m (4'-3")	2.29 m (7'-6")	2.36 m (7'-9")	120 (4 1/2)	60 (2 1/4)	60°	6.0 (7.9)	45 (53)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.7 m (5'-7")	5.1 m (16'-10 1/2")	2.7 m (9'-0")	1.56 m (5'-2 1/4")	1.473 m (4'-10")	2.51 m (8'-3 3/4")	2.59 m (8'-6 3/4")	120 (4 1/2)	60 (2 1/4)	60°	7.3 (9.5)	52 (62)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	1.906 m (6'-3")	5.79 m (18'-6 1/4")	3.12 m (9'-10")	1.8 m (5'-8")	1.651 m (5'-5")	2.85 m (9'-1 3/4")	2.92 m (9'-4 1/2")	120 (4 1/2)	60 (2 1/4)	60°	8.6 (11.2)	64 (77)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.111 m (6'-11 1/4")	6.13 m (20'-2")	3.24 m (10'-8")	1.87 m (6'-2")	1.829 m (6'-0")	3.03 m (9'-11 1/2")	3.1 m (10'-2 1/2")	120 (4 1/2)	60 (2 1/4)	60°	10.0 (13.1)	70 (84)

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.

**REINFORCED CONCRETE END SECTIONS  
FOR PIPE CULVERTS  
1050 mm (42") THRU 1500 mm (60") DIA.  
SKEWED WITH ROADWAY**  
(Sheet 2 of 5)

**STANDARD 542206**

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

### WINGS FOR 1:1/2 SLOPE

Skew Angle	Nominal Dia. For Pipe	DIMENSIONS FOR CONCRETE													Concrete 2 End Secs. m <sup>3</sup> (cu. yd.)	Wire Fabric 2 End Secs. m <sup>2</sup> (sq. yd.)
		A	B	C	D	E	F	G	H	J	K	M	N	α		
35°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.58 m (5'-2 1/4")	4.59 m (16'-0 3/4")	2.71 m (8'-10")	1.41 m (4'-7 1/4")	1.295 m (4'-3")	2.4 m (7'-10 3/4")	2.49 m (8'-2")	120 (4 3/4)	50 (2)	55°	6.5 (8.5)	47 (56)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.798 m (5'-10 3/4")	5.36 m (17'-9 1/2")	2.93 m (9'-9")	1.53 m (5'-1")	1.473 m (4'-10")	2.64 m (8'-9")	2.73 m (9'-0 1/2")	120 (4 3/4)	50 (2)	55°	7.8 (10.2)	55 (66)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	2.015 m (6'-7 1/4")	6.1 m (19'-6 1/4")	3.38 m (10'-7 3/4")	1.76 m (5'-6 1/2")	1.651 m (5'-5")	3.01 m (9'-7 1/2")	3.09 m (9'-10 3/4")	120 (4 3/4)	50 (2)	55°	9.2 (12.0)	68 (81)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.232 m (7'-4")	6.46 m (21'-3")	3.51 m (11'-6 1/2")	1.83 m (6'-0 1/4")	1.829 m (6'-0")	3.19 m (10'-5 3/4")	3.27 m (10'-9 1/4")	120 (4 3/4)	50 (2)	55°	10.8 (14.1)	74 (89)
40°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.69 m (5'-6 1/2")	5.21 m (17'-1 1/4")	2.95 m (9'-8")	1.38 m (4'-6")	1.295 m (4'-3")	2.56 m (8'-4 3/4")	2.65 m (8'-8 1/2")	130 (5)	50 (1 3/4)	50°	7.0 (9.1)	50 (60)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	1.922 m (6'-3 3/4")	5.72 m (18'-11 1/4")	3.2 m (10'-7 3/4")	1.49 m (4'-11 1/2")	1.473 m (4'-10")	2.81 m (9'-3 3/4")	2.91 m (9'-7 1/2")	130 (5)	50 (1 3/4)	50°	8.4 (11.0)	58 (70)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	2.155 m (7'-0 3/4")	6.5 m (20'-9 1/2")	3.69 m (11'-7 1/2")	1.72 m (5'-5")	1.651 m (5'-5")	3.2 m (10'-2 3/4")	3.3 m (10'-6 3/4")	130 (5)	50 (1 3/4)	50°	9.9 (13.0)	72 (86)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.387 m (7'-10")	6.89 m (22'-7 3/4")	3.84 m (12'-7 1/2")	1.79 m (6'-0")	1.829 m (6'-0")	3.4 m (11'-2")	3.49 m (11'-5 3/4")	130 (5)	50 (1 3/4)	50°	11.6 (15.2)	79 (95)
45°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	1.831 m (6'-0")	5.62 m (18'-5 1/4")	3.26 m (10'-8")	1.35 m (4'-5")	1.295 m (4'-3")	2.76 m (9'-0 1/2")	2.86 m (9'-4 3/4")	140 (5 1/4)	40 (1 1/2)	45°	7.6 (10.0)	54 (65)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	2.083 m (6'-10")	6.17 m (20'-5 1/4")	3.53 m (11'-9")	1.46 m (4'-10 1/2")	1.473 m (4'-10")	3.03 m (10'-0 1/2")	3.14 m (10'-4 3/4")	140 (5 1/4)	40 (1 1/2)	45°	9.2 (12.0)	63 (75)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	2.334 m (7'-8")	7.01 m (22'-5 1/4")	4.08 m (12'-10 1/4")	1.69 m (5'-5 3/4")	1.651 m (5'-5")	3.45 m (11'-0 1/2")	3.56 m (11'-4 3/4")	140 (5 1/4)	40 (1 1/2)	45°	10.9 (14.2)	78 (93)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.586 m (8'-5 3/4")	7.43 m (24'-5 1/4")	4.24 m (13'-11 1/4")	1.76 m (5'-9 1/4")	1.829 m (6'-0")	3.66 m (12'-0 1/2")	3.77 m (12'-4 3/4")	140 (5 1/4)	40 (1 1/2)	45°	12.8 (16.7)	86 (103)
50°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	2.014 m (6'-7 1/4")	6.15 m (20'-2")	3.64 m (11'-11 1/4")	1.33 m (4'-4 1/4")	1.295 m (4'-3")	3.01 m (9'-10 1/2")	3.14 m (10'-3 1/2")	140 (5 1/2)	40 (1 1/2)	40°	8.4 (11.0)	59 (71)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	2.291 m (7'-6 1/4")	6.75 m (22'-4 1/2")	3.95 m (13'-2")	1.44 m (4'-9 1/2")	1.473 m (4'-10")	3.31 m (10'-11 3/4")	3.44 m (11'-4 3/4")	140 (5 1/2)	40 (1 1/2)	40°	10.2 (13.3)	69 (82)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	2.568 m (8'-5")	7.68 m (24'-7")	4.56 m (14'-4 1/2")	1.66 m (5'-2 3/4")	1.651 m (5'-5")	3.78 m (12'-1")	3.9 m (12'-6")	140 (5 1/2)	40 (1 1/2)	40°	12.1 (15.8)	85 (102)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	2.845 m (9'-4")	8.15 m (26'-9 1/4")	4.72 m (15'-7 1/4")	1.73 m (5'-8")	1.829 m (6'-0")	4.02 m (13'-2 1/4")	4.13 m (13'-7")	140 (5 1/2)	40 (1 1/2)	40°	14.1 (18.5)	94 (112)
55°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	2.257 m (7'-5")	6.85 m (22'-5 3/4")	4.14 m (13'-7")	1.31 m (4'-3 1/2")	1.295 m (4'-3")	3.36 m (11'-0 1/4")	3.49 m (11'-5 1/2")	150 (5 3/4)	30 (1 1/4)	35°	9.4 (12.3)	66 (79)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	2.568 m (8'-5")	7.53 m (24'-11 1/2")	4.49 m (14'-11 1/2")	1.42 m (4'-8 1/2")	1.473 m (4'-10")	3.7 m (12'-3")	3.83 m (12'-8 1/2")	150 (5 3/4)	30 (1 1/4)	35°	11.4 (14.9)	77 (92)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	2.878 m (9'-5 1/4")	8.57 m (27'-5")	5.19 m (16'-4 1/4")	1.64 m (5'-1 3/4")	1.651 m (5'-5")	4.22 m (13'-6")	4.35 m (13'-11")	150 (5 3/4)	30 (1 1/4)	35°	13.5 (17.7)	95 (113)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	3.188 m (10'-5 1/2")	9.09 m (29'-10 3/4")	5.39 m (17'-8 3/4")	1.7 m (5'-7")	1.829 m (6'-0")	4.48 m (14'-8 3/4")	4.61 m (15'-2")	150 (5 3/4)	30 (1 1/4)	35°	15.9 (20.8)	104 (125)
60°	1050 (42)	1.25 m (4'-1")	660 (26)	1.49 m (4'-10 1/2")	2.59 m (8'-6")	7.82 m (25'-7 3/4")	4.81 m (15'-9 1/4")	1.29 m (4'-2 3/4")	1.295 m (4'-3")	3.84 m (12'-7")	3.98 m (13'-0 3/4")	160 (6 1/4)	30 (1)	30°	10.8 (14.1)	75 (89)
	1200 (48)	1.35 m (4'-6")	740 (29)	1.64 m (5'-5")	2.946 m (9'-8")	8.59 m (28'-5 3/4")	5.22 m (17'-4 3/4")	1.4 m (4'-8")	1.473 m (4'-10")	4.22 m (14'-0")	4.37 m (14'-5 3/4")	160 (6 1/4)	30 (1)	30°	13.0 (17.0)	87 (104)
	1350 (54)	1.56 m (4'-11")	810 (32)	1.85 m (5'-11 1/2")	3.302 m (10'-10")	9.79 m (31'-3 3/4")	6.03 m (19'-0")	1.62 m (5'-1")	1.651 m (5'-5")	4.82 m (15'-5")	4.97 m (15'-10 3/4")	160 (6 1/4)	30 (1)	30°	15.5 (20.3)	108 (129)
	1500 (60)	1.62 m (5'-4")	890 (35)	1.97 m (6'-6")	3.658 m (12'-0")	10.39 m (34'-1 3/4")	6.26 m (20'-7 1/4")	1.68 m (5'-6 1/4")	1.829 m (6'-0")	5.12 m (16'-10")	5.27 m (17'-3 3/4")	160 (6 1/4)	30 (1)	30°	18.2 (23.8)	119 (142)

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.

**REINFORCED CONCRETE END SECTIONS  
FOR PIPE CULVERTS  
1050 mm (42") THRU 1500 mm (60") DIA.  
SKEWED WITH ROADWAY**  
(Sheet 3 of 5)

**STANDARD 542206**

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

### WINGS FOR 1:2 SLOPE


Skew Angle	Nominal Dia. For Pipe	DIMENSIONS FOR CONCRETE													Concrete 2 End Secs. m <sup>3</sup> (cu. yd.)	Wire Fabric 2 End Secs. m <sup>2</sup> (sq. yd.)
		A	B	C	D	E	F	G	H	J	K	M	N	α		
5°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.299 m (4'-3 1/4")	4.92 m (16'-1")	2.46 m (8'-0 1/4")	2.26 m (7'-4 1/4")	1.295 m (4'-3")	2.45 m (8'-0 1/4")	2.47 m (8'-0 3/4")	90 (3 1/2)	80 (3)	85°	6.1 (8.0)	51 (61)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.478 m (4'-10 1/4")	5.38 m (17'-10")	2.67 m (8'-10 1/2")	2.44 m (8'-1 3/4")	1.473 m (4'-10")	2.68 m (8'-10 3/4")	2.7 m (8'-11 1/4")	90 (3 1/2)	80 (3)	85°	7.3 (9.6)	59 (71)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.657 m (5'-5 1/4")	6.12 m (19'-7")	3.08 m (9'-9")	2.82 m (8'-11 1/4")	1.651 m (5'-5")	3.05 m (9'-9 1/4")	3.07 m (9'-9 3/4")	90 (3 1/2)	80 (3)	85°	8.6 (11.3)	74 (88)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	1.835 m (6'-0 1/4")	6.46 m (21'-4 1/4")	3.2 m (10'-7 1/4")	2.93 m (9'-8 3/4")	1.829 m (6'-0")	3.22 m (10'-8")	3.24 m (10'-8 1/4")	90 (3 1/2)	80 (3)	85°	10.1 (13.2)	80 (96)
10°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.314 m (4'-3 3/4")	4.97 m (16'-3")	2.59 m (8'-5")	2.17 m (7'-0 3/4")	1.295 m (4'-3")	2.47 m (8'-1")	2.5 m (8'-2")	100 (3 3/4)	80 (3)	80°	6.3 (8.3)	52 (62)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.495 m (4'-11")	5.43 m (18'-0 1/2")	2.8 m (9'-4")	2.35 m (7'-10")	1.473 m (4'-10")	2.71 m (8'-11 3/4")	2.73 m (9'-0 3/4")	100 (3 3/4)	80 (3)	80°	7.6 (9.9)	60 (72)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.676 m (5'-6")	6.19 m (19'-9 3/4")	3.24 m (10'-3")	2.72 m (8'-7 1/4")	1.651 m (5'-5")	3.08 m (9'-10 1/2")	3.11 m (9'-11 1/4")	100 (3 3/4)	80 (3)	80°	8.9 (11.7)	75 (90)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	1.857 m (6'-1")	6.53 m (21'-7")	3.36 m (11'-1 3/4")	2.82 m (9'-4 1/4")	1.829 m (6'-0")	3.25 m (10'-9")	3.28 m (10'-10")	100 (3 3/4)	80 (3)	80°	10.5 (13.7)	82 (98)
15°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.34 m (4'-4 3/4")	5.06 m (16'-6 1/2")	2.73 m (8'-10 3/4")	2.1 m (6'-10")	1.295 m (4'-3")	2.51 m (8'-2 1/2")	2.55 m (8'-4")	100 (4)	70 (2 3/4)	75°	6.6 (8.6)	53 (64)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.524 m (5'-0")	5.54 m (18'-4 1/2")	2.96 m (9'-10 1/4")	2.27 m (7'-6 3/4")	1.473 m (4'-10")	2.75 m (9'-1 1/2")	2.79 m (9'-3")	100 (4)	70 (2 3/4)	75°	8.0 (10.4)	62 (74)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.709 m (5'-7 1/4")	6.3 m (20'-2")	3.42 m (10'-9 3/4")	2.63 m (8'-3 1/2")	1.651 m (5'-5")	3.13 m (10'-0 1/4")	3.17 m (10'-1 3/4")	100 (4)	70 (2 3/4)	75°	9.4 (12.3)	77 (92)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	1.893 m (6'-2 1/2")	6.65 m (21'-11 3/4")	3.55 m (11'-9 1/4")	2.73 m (9'-0 1/2")	1.829 m (6'-0")	3.31 m (10'-11 1/4")	3.34 m (11'-0 1/2")	100 (4)	70 (2 3/4)	75°	10.9 (14.3)	84 (100)
20°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.378 m (4'-6 1/4")	5.19 m (16'-11 3/4")	2.9 m (9'-5 1/4")	2.03 m (6'-7 1/4")	1.295 m (4'-3")	2.57 m (8'-5")	2.62 m (8'-6 3/4")	110 (4 1/4)	70 (2 1/2)	70°	6.9 (9.0)	55 (66)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.567 m (5'-1 3/4")	5.68 m (18'-10")	3.14 m (10'-5 1/2")	2.2 m (7'-4")	1.473 m (4'-10")	2.81 m (9'-4")	2.86 m (9'-6")	110 (4 1/4)	70 (2 1/2)	70°	8.3 (10.9)	64 (76)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.756 m (5'-9 1/4")	6.47 m (20'-8 1/2")	3.63 m (11'-5 3/4")	2.54 m (8'-0 1/2")	1.651 m (5'-5")	3.21 m (10'-3 1/4")	3.26 m (10'-5 1/4")	110 (4 1/4)	70 (2 1/2)	70°	9.9 (12.9)	79 (94)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	1.946 m (6'-4 1/2")	6.83 m (22'-6 3/4")	3.77 m (12'-6")	2.64 m (8'-9")	1.829 m (6'-0")	3.39 m (11'-2 1/2")	3.44 m (11'-4 1/4")	110 (4 1/4)	70 (2 1/2)	70°	11.5 (15.1)	86 (103)
25°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.428 m (4'-8 1/4")	5.37 m (17'-6 3/4")	3.09 m (10'-1")	1.64 m (6'-5")	1.295 m (4'-3")	2.65 m (8'-8 1/4")	2.72 m (8'-10 1/2")	110 (4 1/2)	60 (2 1/4)	65°	7.3 (9.5)	55 (65)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.625 m (5'-4")	5.88 m (19'-6")	3.35 m (11'-2")	2.14 m (7'-1 1/4")	1.473 m (4'-10")	2.91 m (9'-7 3/4")	2.97 m (9'-10 1/4")	110 (4 1/2)	60 (2 1/4)	65°	8.8 (11.5)	66 (79)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.821 m (5'-11 3/4")	6.69 m (21'-5")	3.87 m (12'-3")	2.47 m (7'-9 3/4")	1.651 m (5'-5")	3.31 m (10'-7 1/4")	3.37 m (10'-9 3/4")	110 (4 1/2)	60 (2 1/4)	65°	10.4 (13.6)	82 (98)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.018 m (6'-7 1/2")	7.06 m (23'-4 1/4")	4.02 m (13'-4")	2.56 m (8'-6")	1.829 m (6'-0")	3.5 m (11'-7")	3.56 m (11'-9 1/4")	110 (4 1/2)	60 (2 1/4)	65°	12.2 (15.9)	90 (107)
30°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.495 m (4'-11")	5.61 m (18'-4")	3.32 m (10'-10")	1.92 m (6'-3")	1.295 m (4'-3")	2.77 m (9'-0 1/2")	2.84 m (9'-3 1/2")	120 (4 1/2)	60 (2 1/4)	60°	7.7 (10.1)	59 (71)
	1200 (48)	1.8 m (6'-0")	740 (29)	1.64 m (5'-5")	1.7 m (5'-7")	6.13 m (20'-4 1/4")	3.6 m (12'-0")	2.08 m (6'-11 1/4")	1.473 m (4'-10")	3.03 m (10'-0 3/4")	3.1 m (10'-3 1/2")	120 (4 1/2)	60 (2 1/4)	60°	9.3 (12.2)	69 (82)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	1.906 m (6'-3")	6.99 m (22'-4 1/2")	4.16 m (13'-2")	2.41 m (7'-7 1/4")	1.651 m (5'-5")	3.46 m (11'-0 3/4")	3.53 m (11'-3 3/4")	120 (4 1/2)	60 (2 1/4)	60°	11.0 (14.4)	86 (102)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.111 m (6'-11 1/4")	7.38 m (24'-4 3/4")	4.32 m (14'-4")	2.45 m (8'-3 1/4")	1.829 m (6'-0")	3.65 m (12'-1")	3.73 m (12'-3 3/4")	120 (4 1/2)	60 (2 1/4)	60°	12.9 (16.9)	93 (112)

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.

**REINFORCED CONCRETE END SECTIONS  
FOR PIPE CULVERTS  
1050 mm (42") THRU 1500 mm (60") DIA.  
SKEWED WITH ROADWAY**  
(Sheet 4 of 5)

**STANDARD 542206**

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

WINGS FOR 1:2 SLOPE

Skew Angle	Nominal Dia. For Pipe	DIMENSIONS FOR CONCRETE													Concrete 2 End Secs. m <sup>3</sup> (cu. yd.)	Wire Fabric 2 End Secs. m <sup>2</sup> (sq. yd.)
		A	B	C	D	E	F	G	H	J	K	M	N	α		
35°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.58 m (5'-2 1/4")	5.91 m (19'-3 3/4")	3.6 m (11'-8 3/4")	1.87 m (6'-1 1/4")	1.295 m (4'-3")	2.91 m (9'-6 1/4")	3. m (9'-9 1/2")	120 (4 3/4)	50 (2)	55°	8.3 (10.8)	63 (75)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	1.798 m (5'-10 3/4")	6.47 m (21'-5 1/2")	3.9 m (13'-0")	2.03 m (6'-9 1/4")	1.473 m (4'-10")	3.19 m (10'-7")	3.28 m (10'-10 1/2")	120 (4 3/4)	50 (2)	55°	9.9 (13.0)	73 (87)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	2.015 m (6'-7 1/4")	7.37 m (23'-7")	4.51 m (14'-3")	2.35 m (7'-5")	1.651 m (5'-5")	3.64 m (11'-7 3/4")	3.73 m (11'-11 1/4")	120 (4 3/4)	50 (2)	55°	11.8 (15.4)	90 (108)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.232 m (7'-4")	7.78 m (25'-8 3/4")	4.68 m (15'-6 1/4")	2.44 m (8'-1")	1.829 m (6'-0")	3.85 m (12'-8 3/4")	3.93 m (13'-0")	120 (4 3/4)	50 (2)	55°	13.8 (18.1)	99 (118)
40°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.69 m (5'-6 1/2")	6.29 m (20'-7")	3.93 m (12'-9 3/4")	1.84 m (5'-11 3/4")	1.295 m (4'-3")	3.1 m (10'-1 1/2")	3.19 m (10'-5 1/2")	130 (5)	50 (1 3/4)	50°	8.9 (11.6)	67 (80)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	1.922 m (6'-3 3/4")	6.89 m (22'-10 1/4")	4.26 m (14'-2 1/4")	1.99 m (6'-7 1/2")	1.473 m (4'-10")	3.4 m (11'-3 1/4")	3.49 m (11'-7")	130 (5)	50 (1 3/4)	50°	10.7 (14.0)	77 (93)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	2.155 m (7'-0 3/4")	7.86 m (25'-1 3/4")	4.93 m (15'-7")	2.3 m (7'-3 1/4")	1.651 m (5'-5")	3.88 m (12'-5")	3.98 m (12'-8 3/4")	130 (5)	50 (1 3/4)	50°	12.8 (16.7)	96 (115)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.387 m (7'-10")	8.3 m (27'-5 1/4")	5.11 m (16'-11 1/2")	2.39 m (7'-11")	1.829 m (6'-0")	4.1 m (13'-6 3/4")	4.2 m (13'-10 1/2")	130 (5)	50 (1 3/4)	50°	14.9 (19.5)	105 (126)
45°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	1.831 m (6'-0")	6.79 m (22'-2 1/2")	4.34 m (14'-1 3/4")	1.8 m (5'-10 1/4")	1.295 m (4'-3")	3.34 m (10'-11")	3.45 m (11'-3 1/2")	140 (5 1/4)	40 (1 1/2)	45°	9.6 (12.6)	72 (86)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	2.083 m (6'-10")	7.44 m (24'-8 1/4")	4.7 m (15'-8 1/4")	1.95 m (6'-6")	1.473 m (4'-10")	3.67 m (12'-2")	3.77 m (12'-6 1/4")	140 (5 1/4)	40 (1 1/2)	45°	12.0 (15.2)	83 (100)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	2.334 m (7'-8")	8.48 m (27'-1 3/4")	5.44 m (17'-2 1/2")	2.25 m (7'-1 1/2")	1.651 m (5'-5")	4.19 m (13'-4 3/4")	4.29 m (13'-9")	140 (5 1/4)	41 (1 1/2)	45°	13.9 (18.2)	104 (124)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.586 m (8'-5 3/4")	9.86 m (29'-9 1/2")	5.65 m (18'-8 3/4")	2.34 m (7'-9")	1.829 m (6'-0")	4.43 m (14'-7 1/2")	4.53 m (15'-0")	140 (5 1/4)	40 (1 1/2)	45°	16.3 (21.3)	114 (136)
50°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	2.014 m (6'-7 1/4")	7.44 m (24'-3 3/4")	4.86 m (15'-10")	1.77 m (5'-9 1/4")	1.295 m (4'-3")	3.66 m (11'-11 1/2")	3.78 m (12'-4 1/4")	150 (5 1/2)	40 (1 1/2)	40°	10.6 (13.9)	78 (94)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	2.291 m (7'-6 1/4")	8.15 m (27'-0 1/2")	5.27 m (17'-6 1/2")	1.92 m (6'-4 1/2")	1.473 m (4'-10")	4.02 m (13'-3 3/4")	4.13 m (13'-8 3/4")	150 (5 1/2)	40 (1 1/2)	40°	12.8 (16.8)	91 (109)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	2.568 m (8'-5")	9.3 m (29'-9 1/4")	6.09 m (19'-3")	2.21 m (7'-0")	1.651 m (5'-5")	4.59 m (14'-8 1/4")	4.71 m (15'-1")	150 (5 1/2)	40 (1 1/2)	40°	15.3 (20.0)	113 (135)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	2.845 m (9'-4")	9.82 m (32'-5 3/4")	6.32 m (20'-11 1/2")	2.3 m (7'-7 1/2")	1.829 m (6'-0")	4.86 m (16'-0 1/2")	4.97 m (16'-5 1/4")	150 (5 1/2)	40 (1 1/2)	40°	18.0 (23.5)	124 (148)
55°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	2.257 m (7'-5")	8.3 m (27'-1 1/2")	5.52 m (18'-0 1/4")	1.74 m (5'-8 1/4")	1.295 m (4'-3")	4.08 m (13'-4 1/4")	4.22 m (13'-9 1/4")	150 (5 3/4)	30 (1 1/4)	35°	11.9 (15.5)	87 (104)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	2.568 m (8'-5")	9.1 m (30'-2 1/4")	5.99 m (19'-11 1/2")	1.89 m (6'-3 1/2")	1.473 m (4'-10")	4.48 m (14'-10 1/2")	4.62 m (15'-3 3/4")	150 (5 3/4)	30 (1 1/4)	35°	14.4 (18.8)	101 (121)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	2.878 m (9'-5 1/4")	10.39 m (33'-2 3/4")	6.92 m (21'-10 3/4")	2.18 m (6'-10 3/4")	1.651 m (5'-5")	5.13 m (16'-4 3/4")	5.26 m (16'-10")	150 (5 3/4)	30 (1 1/4)	35°	17.1 (22.4)	125 (150)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	3.188 m (10'-5 1/2")	10.97 m (36'-3 1/2")	7.18 m (23'-10")	2.27 m (7'-6 1/4")	1.829 m (6'-0")	5.42 m (17'-11 1/4")	5.55 m (18'-4 1/4")	150 (5 3/4)	30 (1 1/4)	35°	20.2 (26.4)	138 (165)
60°	1050 (42)	1.66 m (5'-5")	660 (26)	1.49 m (4'-10 1/2")	2.59 m (8'-6")	9.48 m (30'-11 3/4")	6.42 m (20'-11 1/4")	1.72 m (5'-7 1/4")	1.295 m (4'-3")	4.67 m (15'-3")	4.81 m (15'-8 3/4")	160 (6 1/4)	30 (1)	30°	13.5 (17.7)	98 (118)
	1200 (48)	1.80 m (6'-0")	740 (29)	1.64 m (5'-5")	2.946 m (9'-8")	10.39 m (34'-5 3/4")	6.96 m (23'-2 1/4")	1.87 m (6'-2 1/2")	1.473 m (4'-10")	5.12 m (17'-0")	5.27 m (17'-5 3/4")	160 (6 1/4)	30 (1)	30°	16.4 (21.5)	115 (137)
	1350 (54)	2.08 m (6'-7")	810 (32)	1.85 m (5'-11 1/2")	3.302 m (10'-10")	11.87 m (37'-11 3/4")	8.04 m (25'-5 1/4")	2.16 m (6'-9 3/4")	1.651 m (5'-5")	5.86 m (18'-9")	6.01 m (19'-2 3/4")	160 (6 1/4)	30 (1)	30°	19.6 (25.7)	142 (170)
	1500 (60)	2.16 m (7'-2")	890 (35)	1.97 m (6'-6")	3.658 m (12'-0")	12.55 m (41'-5 3/4")	8.35 m (27'-8 1/4")	2.24 m (7'-5")	1.829 m (6'-0")	6.2 m (20'-6")	6.35 m (20'-11 3/4")	160 (6 1/4)	30 (1)	30°	23.1 (30.2)	157 (187)

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

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REINFORCED CONCRETE END SECTIONS  
FOR PIPE CULVERTS  
1050 mm (42") THRU 1500 mm (60") DIA.  
SKEWED WITH ROADWAY  
(Sheet 5 of 5)

**STANDARD 542206**

Illinois Department of Transportation

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

APPROVED January 1, 1997  
*Ray Howell*  
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97