

BILL OF REINFORCING FOR ONE HEADWALL 0° SKEW CULVERT SPAN x CULVERT HEIGHT

LOCATION	SHAPE	6' x 8'				6' x 7'				6' x 6'				6' x 5'				6' x 4'				6' x 3'			
		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.	
FENCE ANCHOR (GALV.)	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	
WINGWALL, F.F.H.	5b1	2	27'-10	58	5b1	2	24'-10	52	5b1	2	21'-10	46	5b1	2	18'-10	39	5b1	2	15'-10	33	5b1	2	12'-10	27	
WINGWALL, F.F.H.	5b2	14 VAR	2 EACH 8'-10x26'-10	260	5b2	12 VAR	2 EACH 8'-10x23'-10	204	5b2	10 VAR	2 EACH 8'-10x20'-10	155	5b2	8 VAR	2 EACH 8'-10x17'-10	111	5b2	6 VAR	2 EACH 8'-10x14'-10	74	5b2	4 VAR	2 EACH 8'-10x11'-10	43	
WINGWALL, B.F.H.	4b3	2	27'-10	37	4b3	2	24'-10	33	4b3	2	21'-10	29	4b3	2	18'-10	25	4b3	2	15'-10	21	4b3	2	12'-10	17	
WINGWALL, B.F.H.	4b4	12 VAR	2 EACH 11'-10x26'-10	155	4b4	10 VAR	2 EACH 11'-10x23'-10	119	4b4	8 VAR	2 EACH 11'-10x20'-10	87	4b4	6 VAR	2 EACH 11'-10x17'-10	59	4b4	4 VAR	2 EACH 11'-10x14'-10	36	4b4	2	11'-10	16	
WINGWALL, F.F.V.	5c1	50 VAR	2 EACH 2'-6x10'-6	339	5c1	44 VAR	2 EACH 2'-6x9'-6	275	4c1	38 VAR	2 EACH 2'-6x8'-6	140	4c1	32 VAR	2 EACH 2'-6x7'-6	107	4c1	26 VAR	2 EACH 2'-6x6'-6	78	4c1	20 VAR	2 EACH 2'-6x5'-6	53	
WINGWALL, F.F.V. (L)	5c2	2	10'-9	22	5c2	2	9'-9	20	4c2	2	8'-9	12	4c2	2	7'-9	10	4c2	2	6'-9	9	4c2	2	5'-9	8	
WINGWALL, F.F.V. (R)	5c2	2	10'-9	22	5c2	2	9'-9	20	4c2	2	8'-9	12	4c2	2	7'-9	10	4c2	2	6'-9	9	4c2	2	5'-9	8	
WINGWALL, B.F.V.	5c3	50 VAR	2 EACH 6'-1x14'-1	526	5c3	44 VAR	2 EACH 6'-1x13'-1	440	6c3	38 VAR	2 EACH 6'-1x12'-1	518	5c3	32 VAR	2 EACH 6'-1x11'-1	286	4c3	26 VAR	2 EACH 6'-1x10'-1	140	4c3	20 VAR	2 EACH 6'-1x9'-1	101	
WINGWALL, B.F.V. (L)	5c4	2	14'-3	30	5c4	2	13'-3	28	6c4	2	12'-3	37	5c4	2	11'-3	23	4c4	2	10'-3	14	4c4	2	9'-3	12	
WINGWALL, B.F.V. (R)	5c4	2	14'-3	30	5c4	2	13'-3	28	6c4	2	12'-3	37	5c4	2	11'-3	23	4c4	2	10'-3	14	4c4	2	9'-3	12	
WINGWALL, B.F.V.	5c5	34	8'-6	301	5c5	30	8'-6	266	c5	-	-	-	c5	-	-	-	c5	-	-	-	c5	-	-	-	
APRON, LONGIT., BOT.	4d1	6	27'-10	112	4d1	6	24'-10	100	4d1	6	21'-10	88	4d1	6	18'-10	75	4d1	6	15'-10	63	4d1	6	12'-10	51	
APRON, LONGIT., TOP	6f1	7	27'-10	293	6f1	7	24'-10	261	6f1	7	21'-10	230	6f1	7	18'-10	198	6f1	7	15'-10	166	6f1	7	12'-10	135	
PARAPET, VERTICAL	4l1	13	6'-5	56	4l1	13	6'-5	56	4l1	13	6'-5	56	4l1	13	6'-5	56	4l1	13	6'-5	56	4l1	13	6'-5	56	
PARAPET, HORIZ.	7j1	4	7'-4	60	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59	
APRON, TRANS., TOP	6m1	26	7'-10	306	6m1	23	7'-8	265	6m1	20	7'-8	230	6m1	17	7'-8	196	6m1	14	7'-8	161	6m1	11	7'-8	127	
APRON, TRANS., TOP	m2	-	-	-	m2	-	-	-	m2	-	-	-	m2	-	-	-	m2	-	-	-	m2	-	-	-	
APRON, TRANS., BOT.	5m3	25	4'-7	120	5m3	22	4'-5	101	4m3	19	3'-7	45	4m3	16	3'-7	38	4m3	13	3'-7	31	4m3	10	3'-7	24	
CURTAIN, HORIZ.	6p1	6	7'-10	71	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58	
WING SLOPE, BOTH F.	6s1	4	23'-0	138	6s1	4	19'-10	119	6s1	4	16'-8	100	6s1	4	13'-7	82	6s1	4	10'-5	63	6s1	4	7'-3	44	
WING SLOPE, BOTH F. (L)	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	
WING SLOPE, BOTH F. (R)	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	
WING SLOPE, F. F.	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	
WING SLOPE, F. F.	6s5	2	20'-9	62	6s5	2	17'-7	53	6s5	2	14'-5	43	6s5	2	11'-3	34	6s5	2	8'-1	24	6s5	2	4'-11	15	
CURTAIN, VERT.	5t1	7	6'-11	50	5t1	7	6'-8	49	5t1	7	6'-5	47	5t1	7	6'-5	47	5t1	7	6'-5	47	5t1	7	6'-5	47	
CURTAIN, VERT., ENDS	5t2	4	6'-11	29	5t2	4	6'-8	28	5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27	
BRACKET, VERT.	5u1	4	5'-8	24	5u1	4	5'-5	23	5u1	4	5'-3	22	5u1	4	5'-3	22	5u1	4	5'-3	22	5u1	4	5'-3	22	
ESTIMATED QUANTITIES ONE HEADWALL	REINF. STEEL	3186 LBS.				2742 LBS.				2163 LBS.				1670 LBS.				1290 LBS.				1047 LBS.			
	CONCRETE	PARAPET Δ	1.1	19.7	PARAPET Δ	1.0	15.7	PARAPET Δ	1.0	13.3	PARAPET Δ	1.0	11.0	PARAPET Δ	1.0	8.9	PARAPET Δ	1.0	7.1	PARAPET Δ	1.0	7.1	PARAPET Δ	1.0	7.1
		WINGWALLS	9.0	CU.YD.	WINGWALLS	6.4	CU.YD.	WINGWALLS	5.0	CU.YD.	WINGWALLS	3.7	CU.YD.	WINGWALLS	2.5	CU.YD.	WINGWALLS	1.6	CU.YD.	WINGWALLS	1.6	CU.YD.	WINGWALLS	1.6	CU.YD.
		APRON	9.6	CU.YD.	APRON	8.3	CU.YD.	APRON	7.3	CU.YD.	APRON	6.3	CU.YD.	APRON	5.4	CU.YD.	APRON	4.5	CU.YD.	APRON	4.5	CU.YD.	APRON	4.5	CU.YD.

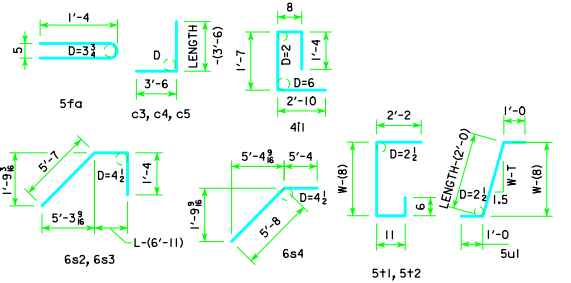
ENGLISH\FRDS\IGNEDSING\ECULVERTS.DGN - PWH 0-8-12 - THIS SHEET ISSUED 04-12-

Δ INCLUDES TOP OF WINGWALL QUANTITIES. (L) - INDICATES BAR LOCATED AT LEFT CORNER.
 NOTE: WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE OF 2'-0 FOR LAP. (R) - INDICATES BAR LOCATED AT RIGHT CORNER.
 REFER TO SHEET PWH 0-1-12 FOR LEFT AND RIGHT CORNER LOCATIONS.

HEADWALL NOTES:

- THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.
- THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
- ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.
- ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.
- CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.
- CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.
- HORIZONTAL TAILS OF BARS "b" & "s" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "4d1" AND "6f1" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

BENT BAR DETAILS



c BAR PIN DIAMETER	
BAR SIZE	D
4	3
5	3 1/2
6	4 1/2

NOTE: ALL DIMENSIONS ARE OUT TO OUT
 D = PIN DIAMETER
 SEE TABLE AT RIGHT FOR PIN DIAMETER "D" OF c BARS

LATEST REVISION DATE

Iowa Department of Transportation
Highway Division

STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS

PARALLEL WING HEADWALLS

APRIL, 2012

APPROVED BY BRIDGE ENGINEER

QUANTITY TABULATION

6'-0 SPAN
0° SKEW

PWH 0-8-12