

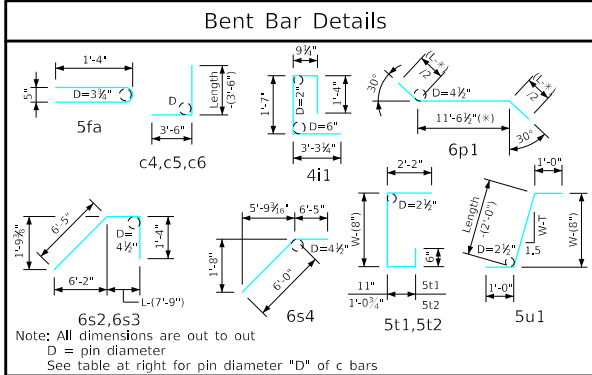
ENGLISHLRFDDESIGNEDSINGLECULVERTS.DGN - PWH 30-8-20 S2 - THIS SHEET ISSUED 07-2020.

Bill of Reinforcing for One Headwall 30° Skew Span x Culvert Height

Location	Shape	10' x 6'				10' x 5'				10' x 4'							
		Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.				
Fence Anchor (Galv.)		5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6				
Wingwall, F.F.H.		5b1	2	25'-5"	53	5b1	2	22'-0"	46	5b1	2	18'-6"	39				
Wingwall, F.F.H.		5b2	10 Var.	2 Each 10'-0" to 23'-10"	176	5b2	8 Var.	2 Each 10'-0" to 20'-5"	127	5b2	6 Var.	2 Each 10'-0" to 16'-11"	84				
Wingwall, B.F.H.		4b3	2	25'-7"	34	4b3	2	22'-2"	30	4b3	2	18'-8"	25				
Wingwall, B.F.H.		4b4	8 Var.	2 Each 13'-7" to 24'-0"	100	4b4	6 Var.	2 Each 13'-7" to 20'-7"	68	4b4	4 Var.	2 Each 13'-7" to 17'-1"	41				
Wingwall, F.F.V.		4c1	58 Var.	2 Each 2'-7" to 8'-8"	218	4c1	36 Var.	2 Each 2'-7" to 7'-6"	121	4c1	30 Var.	2 Each 2'-7" to 6'-7"	92				
Wingwall, F.F.V.		c2	--	--	--	c2	--	--	--	c2	--	--	--				
Wingwall, F.F.V. (O)		4c3	2	9'-0"	12	4c3	2	8'-0"	11	4c3	2	7'-0"	9				
Wingwall, F.F.V. (A)		4c3	2	9'-0"	12	4c3	2	8'-0"	11	4c3	2	7'-0"	9				
Wingwall, B.F.V.		5c4	44 Var.	2 Each 6'-3" to 12'-4"	426	5c4	48 Var.	2 Each 6'-3" to 11'-3"	438	5c4	30 Var.	2 Each 6'-3" to 10'-4"	259				
Wingwall, B.F.V. (O)		5c5	1	12'-6"	13	5c5	1	11'-6"	12	5c5	1	10'-6"	11				
Wingwall, B.F.V. (A)		5c5	3	12'-6"	39	5c5	3	11'-6"	36	5c5	3	10'-6"	33				
Wingwall, B.F.V.		5c6	14	8'-6"	124	c6	--	--	--	c6	--	--	--				
Apron, Longit. Bott.		4d1	11	23'-4"	186	4d1	11	21'-10"	160	4d1	11	18'-4"	135				
Apron, Longit. Top		6f1	11	25'-4"	419	6f1	11	21'-10"	361	6f1	11	18'-4"	303				
Parapet, Vertical		4i1	21	7'-0"	98	4i1	21	7'-0"	98	4i1	21	7'-0"	98				
Parapet, Horiz.		7j1	4	12'-10"	105	7j1	4	12'-10"	105	7j1	4	12'-10"	105				
Apron, Trans., Top		5m1	27	11'-8"	329	5m1	22	11'-8"	268	5m1	17	11'-8"	207				
Apron, Trans., Top		5m2	7 Var.	2'-0" to 9'-10"	43	5m2	7 Var.	2'-6" to 10'-4"	47	5m2	7 Var.	3'-0" to 10'-10"	50				
Apron, Trans., Bott.		4m3	19	9'-1"	115	4m3	16	9'-1"	97	4m3	13	9'-1"	79				
Curtain, Horiz.		6p1	5	13'-2"	99	6p1	5	13'-2"	99	6p1	5	13'-2"	99				
Wing Slope, Both F.		6s1	4	18'-8"	112	6s1	4	15'-1"	91	6s1	4	11'-6"	69				
Wing Slope, Both F. (O)		6s2	2	8'-4"	25	6s2	2	8'-4"	25	6s2	2	8'-4"	25				
Wing Slope, Both F. (A)		6s3	2	8'-9"	26	6s3	2	8'-9"	26	6s3	2	8'-9"	26				
Wing Slope, F.F.		6s4	2	12'-5"	37	6s4	2	12'-5"	37	6s4	2	12'-5"	37				
Wing Slope, F.F.		6s5	2	16'-3"	49	6s5	2	12'-8"	38	6s5	2	9'-0"	27				
Curtain, Vert.		5t1	12	6'-5"	80	5t1	12	6'-5"	80	5t1	12	6'-5"	80				
Curtain, Vert. Ends		5t2	4	6'-7"	27	5t2	4	6'-7"	27	5t2	4	6'-7"	27				
Bracket, Vert.		5u1	4	5'-4"	22	5u1	4	5'-4"	22	5u1	4	5'-4"	22				
Estimated Quantities One Headwall	Reinf. Steel		2985 LB				2487 LB				1997 LB						
	Concrete	Parapet Δ	1.6	20.9 CY				1.6	17.6 CY				1.6	14.5 CY			
		Wingwalls	5.6					4.1					2.8				
		Apron *	13.7					11.9					10.1				

Δ Includes top of wingwall quantities.
 * Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.
 (A) - Indicates bar located at acute corner.
 (O) - Indicates bar located at obtuse corner.
 Refer to Sheet PWH 30-1-20 for acute and obtuse corner locations.

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap.



Headwall Notes:

- This headwall is based on a 3:1 slope normal to centerline of roadway.
- The sides of the apron are to be formed to ensure correct line and grade.
- All apron 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'-5" 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'-5" beyond back of parapet. The "length" column reflects total number of feet necessary to meet these requirements.
- Dimensions are in feet and inches unless otherwise noted.

LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER	IOWADOT Highway Division	
		Standard Design - Single Reinforced Concrete Box Culverts	
		Parallel Wing Headwalls	
		July, 2020	
Quantity Tabulation		PWH 30-8-20	SHEET 2 OF 2
10'-0" Span 30° Skew			