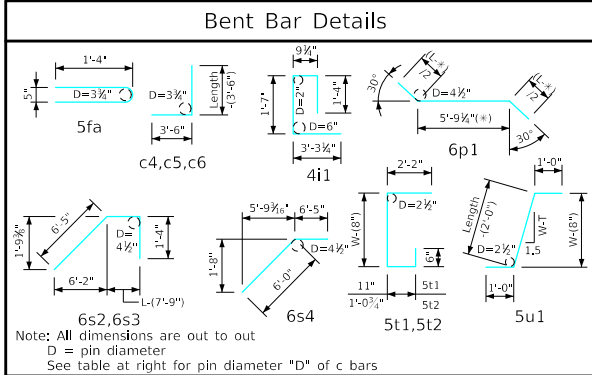


ENGLISH\FRDSIGNEDSINGLECULVERTS.DGN - PWH 30-11-20 - THIS SHEET ISSUED 07-2020.

Bill of Reinforcing for One Headwall 30° Skew Span x Culvert Height																						
Location	Shape	5' x 6'				5' x 5'				5' x 4'				5' x 3'								
		Bar No.	Length	Wt.		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	5fa	2	2'-10"	6					
Wingwall, F.F.H.		5b1	2	25'-5"	53	5b1	2	22'-0"	46	5b1	2	18'-6"	39	5b1	2	15'-0"	31					
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	5b2	4 Var.	2 Each 10'-0 to 13'-5"	49					
Wingwall, B.F.H.		4b3	2	25'-7"	34	4b3	2	22'-2"	30	4b3	2	18'-8"	25	4b3	2	15'-3"	20					
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	4b4	2	13'-8"	18					
Wingwall, F.F.V.		4c1	58 Var.	2 Each 2'-5 to 8'-6"	211	4c1	36 Var.	2 Each 2'-5 to 7'-4"	117	4c1	30 Var.	2 Each 2'-5 to 6'-5"	89	4c1	24 Var.	2 Each 2'-5 to 5'-7"	64					
Wingwall, F.F.V.		c2	-	--	--	c2	--	--	--	c2	--	--	--	c2	--	--	--					
Wingwall, F.F.V. (O)		4c3	2	8'-10"	12	4c3	2	7'-10"	10	4c3	2	6'-10"	9	4c3	2	5'-10"	8					
Wingwall, F.F.V. (A)		4c3	2	8'-10"	12	4c3	2	7'-10"	10	4c3	2	6'-10"	9	4c3	2	5'-10"	8					
Wingwall, B.F.V.		5c4	44 Var.	2 Each 6'-1 to 12'-2"	419	5c4	36 Var.	2 Each 6'-1 to 11'-0"	321	5c4	30 Var.	2 Each 6'-1 to 10'-2"	254	5c4	24 Var.	2 Each 6'-1 to 9'-3"	192					
Wingwall, B.F.V. (O)		5c5	1	12'-4"	13	5c5	1	11'-4"	12	5c5	1	10'-4"	11	5c5	1	9'-4"	10					
Wingwall, B.F.V. (A)		5c5	3	12'-4"	39	5c5	3	11'-4"	35	5c5	3	10'-4"	32	5c5	3	9'-4"	29					
Wingwall, B.F.V.		5c6	14	8'-6"	124	c6	--	--	--	c6	--	--	--	c6	--	--	--					
Apron, Longit. Bott.		4d1	6	25'-4"	102	4d1	6	21'-10"	88	4d1	6	18'-4"	73	4d1	6	14'-11"	60					
Apron, Longit. Top		6f1	6	25'-4"	228	6f1	6	21'-10"	197	6f1	6	18'-4"	165	6f1	6	14'-11"	134					
Parapet, Vertical		4i1	11	7'-0"	51	4i1	11	7'-0"	51	4i1	11	7'-0"	51	4i1	11	7'-0"	51					
Parapet, Horiz.		7j1	4	7'-1"	58	7j1	4	7'-1"	58	7j1	4	7'-1"	58	7j1	4	7'-1"	58					
Apron, Trans. Top		5m1	22	6'-8"	153	5m1	18	6'-8"	125	5m1	15	6'-8"	104	5m1	11	6'-8"	76					
Apron, Trans. Top		5m2	2 Var.	2'-6 to 4'-3"	7	5m2	2 Var.	2'-6 to 5'-3"	9	5m2	2 Var.	2'-8 to 4'-5"	7	5m2	2 Var.	3'-7 to 5'-4"	9					
Apron, Trans. Bott.		5m3	19	4'-1"	81	4m3	16	3'-3"	35	4m3	13	3'-3"	28	4m3	10	3'-3"	22					
Curtain, Horiz.		6p1	5	7'-5"	56	6p1	5	7'-5"	56	6p1	5	7'-5"	56	6p1	5	7'-5"	56					
Wing Slope, Both F.		6s1	4	18'-8"	112	6s1	4	15'-1"	91	6s1	4	11'-6"	69	6s1	4	7'-11"	48					
Wing Slope, Both F. (O)		6s2	2	8'-4"	25	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	6s3	2	8'-9"	26					
Wing Slope, F.F.		6s4	2	12'-5"	37	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	6s5	2	5'-5"	16					
Curtain, Vert.		5t1	6	6'-5"	40	5t1	6	6'-5"	40	5t1	6	6'-5"	40	5t1	6	6'-5"	40					
Curtain, Vert. Ends		5t2	4	6'-7"	27	5t2	4	6'-7"	27	5t2	4	6'-7"	27	5t2	4	6'-7"	27					
Bracket, Vert.		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	Parapet Δ	1.2	2273 LB				1.2	1707 LB				1.2	1414 LB				1.2	1142 LB			
	Concrete	Wingwalls	5.6	14.3 CY				4.1	11.8 CY				2.8	9.6 CY				1.7	7.5 CY			
		Apron *	7.5					6.5					5.6					4.6				

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 5'-0" Span 30° Skew	PWH 30-11-20