

ENGLISHLRFDDESIGNEDSINGLECULVERTS.DGN - PWH 15-11-20 - THIS SHEET ISSUED 07-2020.

Bill of Reinforcing for One Headwall 15° 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	23'-0"	48	5b1	2	19'-10"	41	5b1	2	16'-9"	35	5b1	2	13'-8"	29					
Wingwall, F,F,H.		5b2	10 Var.	2 Each 9'-2 to 21'-7"	160	5b2	8 Var.	2 Each 9'-2 to 18'-5"	115	5b2	6 Var.	2 Each 9'-2 to 15'-4"	77	5b2	4 Var.	2 Each 9'-2 to 12'-3"	45					
Wingwall, B,F,H.		4b3	2	23'-1"	31	4b3	2	19'-11"	27	4b3	2	16'-10"	22	4b3	2	13'-9"	18					
Wingwall, B,F,H.		4b4	8 Var.	2 Each 12'-4 to 21'-8"	91	4b4	6 Var.	2 Each 12'-4 to 18'-6"	62	4b4	4 Var.	2 Each 12'-4 to 15'-5"	37	4b4	2	12'-4"	16					
Wingwall, F,F,V.		4c1	52 Var.	2 Each 2'-5 to 8'-6"	190	4c1	34 Var.	2 Each 2'-5 to 7'-7"	114	4c1	26 Var.	2 Each 2'-5 to 6'-3"	75	4c1	20 Var.	2 Each 2'-5 to 5'-4"	52					
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	40 Var.	2 Each 6'-1 to 12'-3"	382	5c4	34 Var.	2 Each 6'-1 to 11'-3"	307	5c4	26 Var.	2 Each 6'-1 to 10'-0"	218	5c4	20 Var.	2 Each 6'-1 to 9'-0"	157					
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	2	12'-4"	26	5c5	2	11'-4"	24	5c5	2	10'-4"	22	5c5	2	9'-4"	19					
Wingwall, B,F,V.		5c6	12	8'-6"	106	c6	--	--	--	c6	--	--	--	c6	--	--	--					
Apron, Longit. Bott.		4d1	6	22'-11"	92	4d1	6	19'-10"	79	4d1	6	16'-8"	67	4d1	6	13'-7"	54					
Apron, Longit. Top		6f1	6	22'-11"	207	6f1	6	19'-10"	179	6f1	6	16'-8"	150	6f1	6	13'-7"	122					
Parapet, Vertical		4i1	11	6'-7"	48	4i1	11	6'-7"	48	4i1	11	6'-7"	48	4i1	11	6'-7"	48					
Parapet, Horiz.		7j1	4	6'-4"	52	7j1	4	6'-4"	52	7j1	4	6'-4"	52	7j1	4	6'-4"	52					
Apron, Trans. Top		5m1	20	6'-8"	139	5m1	17	6'-8"	118	5m1	14	6'-8"	97	5m1	11	6'-8"	76					
Apron, Trans. Top		5m2	1	4'-0"	4	5m2	1	3'-8"	4	5m2	1	3'-3"	3	5m2	1	2'-10"	3					
Apron, Trans. Bott.		5m3	19	3'-4"	66	4m3	16	2'-7"	28	4m3	13	2'-7"	22	4m3	10	2'-7"	17					
Curtain, Horiz.		6p1	5	6'-10"	51	6p1	5	6'-10"	51	6p1	5	6'-10"	51	6p1	5	6'-10"	51					
Wing Slope, Both F.		6s1	4	17'-1"	103	6s1	4	13'-10"	83	6s1	4	10'-7"	64	6s1	4	7'-4"	44					
Wing Slope, Both F. (O)		6s2	2	7'-10"	24	6s2	2	7'-10"	24	6s2	2	7'-10"	24	6s2	2	7'-10"	24					
Wing Slope, Both F. (A)		6s3	2	8'-0"	24	6s3	2	8'-0"	24	6s3	2	8'-0"	24	6s3	2	8'-0"	24					
Wing Slope, F.F.		6s4	2	11'-8"	35	6s4	2	11'-8"	35	6s4	2	11'-8"	35	6s4	2	11'-8"	35					
Wing Slope, F.F.		6s5	2	14'-8"	44	6s5	2	11'-4"	34	6s5	2	8'-1"	24	6s5	2	4'-10"	15					
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'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	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	1.0	2055 LB				1.0	1576 LB				1.0	1271 LB				1.0	1022 LB			
	Concrete	Wingwalls	5.0	12.7 CY				3.7	10.6 CY				2.5	8.5 CY				1.5	6.7 CY			
		Apron *	6.7					5.9					5.0					4.2				

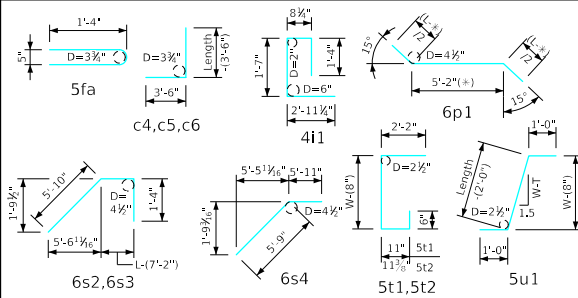
Δ Includes top of wingwall quantities.

* 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 15-1-20 for acute and obtuse corner locations.

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

Bent Bar Details



Headwall Notes:

1. This headwall is based on a 3:1 slope normal to centerline of roadway.
2. The sides of the apron are to be formed to ensure correct line and grade.
3. 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.
4. 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.
5. Concrete quantities are estimated from back of parapet.
6. 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.
7. Dimensions are in feet and inches unless otherwise noted.

LATEST REVISION DATE		Standard Design - Single Reinforced Concrete Box Culverts
	Parallel Wing Headwalls	July, 2020
	Quantity Tabulation	PWH
	5'-0" Span 15° Skew	15-11-20