

ENGLISHLRFDDESIGNEDSINGLECULVERTS.DGN - PWH 30-8-20 S1 - THIS SHEET ISSUED 07-2020.

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

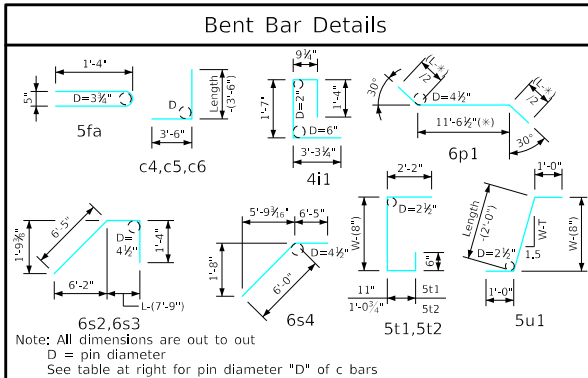
Location	Shape	10' x 12'				10' x 11'				10' x 10'				10' x 9'				10' x 8'				10' x 7'			
		Bar No.	Length	Wt.		Bar No.	Length	Wt.		Bar No.	Length	Wt.		Bar No.	Length	Wt.		Bar No.	Length	Wt.		Bar No.	Length	Wt.	
Fence Anchor (Galv.)		5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6
Wingwall, F.F.H.		5b1	2	46'-2"	101	5b1	2	42'-9"	94	5b1	2	39'-3"	82	5b1	2	35'-10"	75	5b1	2	32'-4"	67	5b1	2	28'-11"	60
Wingwall, F.F.H.		5b2	22 Var.	2 Each 10'-0 to 44'-7"	636	5b2	20 Var.	2 Each 10'-0 to 41'-2"	539	5b2	18 Var.	2 Each 10'-0 to 37'-8"	447	5b2	16 Var.	2 Each 10'-0 to 34'-3"	369	5b2	14 Var.	2 Each 10'-0 to 30'-9"	298	5b2	12 Var.	2 Each 10'-0 to 27'-4"	234
Wingwall, B.F.H.		4b3	2	46'-6"	65	4b3	2	43'-1"	61	4b3	2	39'-6"	53	4b3	2	36'-1"	48	4b3	2	32'-7"	44	4b3	2	29'-1"	39
Wingwall, B.F.H.		4b4	20 Var.	2 Each 13'-9 to 44'-11"	398	4b4	18 Var.	2 Each 13'-9 to 41'-6"	335	4b4	16 Var.	2 Each 13'-8 to 37'-11"	276	4b4	14 Var.	2 Each 13'-8 to 34'-5"	225	4b4	12 Var.	2 Each 13'-8 to 31'-0"	179	4b4	10 Var.	2 Each 13'-7 to 27'-6"	137
Wingwall, F.F.V.		5c1	86 Var.	2 Each 2'-7 to 14'-8"	774	5c1	78 Var.	2 Each 2'-7 to 13'-7"	658	4c1	72 Var.	2 Each 2'-7 to 12'-8"	367	4c1	64 Var.	2 Each 2'-7 to 11'-6"	301	4c1	76 Var.	2 Each 2'-7 to 10'-7"	334	4c1	68 Var.	2 Each 2'-7 to 9'-9"	280
Wingwall, F.F.V.		5c2	40 Var.	2 Each 9'-1 to 14'-7"	494	5c2	34 Var.	2 Each 9'-1 to 13'-8"	403	4c2	26 Var.	2 Each 9'-1 to 12'-6"	187	4c2	20 Var.	2 Each 9'-1 to 11'-8"	139	c2	--	--	--	c2	--	--	--
Wingwall, F.F.V. (O)		5c3	2	15'-0"	31	5c3	2	14'-0"	29	4c3	2	13'-0"	17	4c3	2	12'-0"	16	4c3	2	11'-0"	15	4c3	2	10'-0"	13
Wingwall, F.F.V. (A)		5c3	2	15'-0"	31	5c3	2	14'-0"	29	4c3	2	13'-0"	17	4c3	2	12'-0"	16	4c3	2	11'-0"	15	4c3	2	10'-0"	13
Wingwall, B.F.V.		6c4	86 Var.	2 Each 6'-3 to 18'-5"	1593	5c4	78 Var.	2 Each 6'-3 to 17'-3"	956	5c4	72 Var.	2 Each 6'-3 to 16'-4"	848	5c4	64 Var.	2 Each 6'-3 to 15'-3"	718	5c4	58 Var.	2 Each 6'-3 to 14'-4"	623	5c4	50 Var.	2 Each 6'-3 to 13'-2"	506
Wingwall, B.F.V. (O)		6c5	1	18'-6"	28	5c5	1	17'-6"	18	5c5	1	16'-6"	16	5c5	1	15'-6"	16	5c5	1	14'-6"	15	5c5	1	13'-6"	14
Wingwall, B.F.V. (A)		6c5	3	18'-6"	83	5c5	3	17'-6"	55	5c5	3	16'-6"	52	5c5	3	15'-6"	48	5c5	3	14'-6"	45	5c5	3	13'-6"	42
Wingwall, B.F.V.		6c6	56	8'-6"	715	5c6	50	8'-6"	443	5c6	42	8'-6"	372	5c6	36	8'-6"	319	5c6	28	8'-6"	248	5c6	22	8'-6"	195
Apron, LongR. Bott.		4d1	11	46'-1"	356	4d1	11	42'-7"	331	4d1	11	39'-2"	288	4d1	11	35'-8"	262	4d1	11	32'-3"	237	4d1	11	28'-9"	211
Apron, LongR. Top		6f1	11	46'-1"	801	6f1	11	42'-7"	743	6f1	11	39'-2"	647	6f1	11	35'-8"	589	6f1	11	32'-3"	533	6f1	11	28'-9"	475
Parapet, Vertical		4i1	21	7'-0"	98	4i1	21	7'-0"	98	4i1	21	7'-0"	98	4i1	21	7'-0"	98	4i1	21	7'-0"	98	4i1	21	7'-0"	98
Parapet, Horiz.		7j1	4	13'-5"	110	7j1	4	13'-5"	110	7j1	4	13'-1"	107	7j1	4	13'-1"	107	7j1	4	13'-1"	107	7j1	4	12'-10"	105
Apron, Trans., Top		5m1	54	12'-2"	685	5m1	50	12'-2"	634	5m1	45	11'-10"	555	5m1	41	11'-10"	506	5m1	36	11'-10"	444	5m1	31	11'-8"	377
Apron, Trans., Top		5m2	7 Var.	3'-2 to 11'-0"	52	5m2	7 Var.	2'-5 to 10'-2"	46	5m2	7 Var.	2'-8 to 10'-6"	48	5m2	6 Var.	3'-3 to 9'-8"	40	5m2	7 Var.	3'-2 to 10'-2"	46	5m2	7 Var.	2'-10 to 10'-7"	49
Apron, Trans., Bott.		6m3	73	11'-2"	1224	6m3	67	11'-2"	1124	6m3	61	10'-10"	993	6m3	55	10'-10"	895	5m3	25	10'-0"	261	5m3	22	9'-10"	226
Curtain, Horiz.		6p1	6	13'-8"	123	6p1	6	13'-8"	123	6p1	6	13'-4"	120	6p1	6	13'-4"	120	6p1	6	13'-4"	120	6p1	5	13'-2"	99
Wing Slope, Both F.		6s1	4	40'-4"	257	6s1	4	36'-9"	221	6s1	4	33'-2"	199	6s1	4	29'-6"	177	6s1	4	25'-11"	156	6s1	4	22'-4"	134
Wing Slope, Both F. (O)		6s2	2	8'-3"	25	6s2	2	8'-3"	25	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	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	6s4	2	12'-5"	37	6s4	2	12'-5"	37
Wing Slope, F.F.		6s5	2	37'-11"	114	6s5	2	34'-3"	103	6s5	2	30'-8"	92	6s5	2	27'-1"	81	6s5	2	23'-5"	70	6s5	2	19'-10"	60
Curtain, Vert.		5t1	12	7'-11"	99	5t1	12	7'-8"	96	5t1	12	7'-5"	93	5t1	12	7'-2"	90	5t1	12	6'-11"	87	5t1	12	6'-8"	83
Curtain, Vert. Ends		5t2	4	8'-1"	34	5t2	4	7'-10"	33	5t2	4	7'-7"	32	5t2	4	7'-4"	31	5t2	4	7'-1"	30	5t2	4	6'-10"	29
Bracket, Vert.		5u1	4	6'-7"	27	5u1	4	6'-4"	26	5u1	4	6'-2"	26	5u1	4	5'-11"	25	5u1	4	5'-8"	24	5u1	4	5'-6"	23
Estimated Quantities One Headwall	Reinf. Steel	Parapet Δ	1.9	9023 LB		1.9	7402 LB		1.7	6127 LB		1.7	5405 LB		1.7	4190 LB		1.6	3596 LB						
	Concrete	Wingwalls	24.8	53.6 CY		21.3	48.0 CY		15.0	38.7 CY		12.5	34.2 CY		10.2	29.9 CY		7.3	24.6 CY						
		Apron *	26.9			24.8			22.0			20.0			18.0			15.7							

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	
	Standard Design - Single Reinforced Concrete Box Culverts
	Parallel Wing Headwalls
	July, 2020
Quantity Tabulation	PWH 30-8-20 SHEET 1 OF 2
10'-0" Span 30° Skew	