

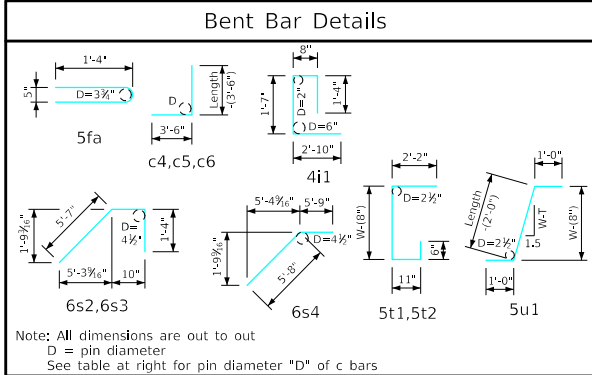
ENGLISHLRFDDESIGNEDSINGLECULVERTS.DGN - PWH 0-8-20 51 - THIS SHEET ISSUED 07-2020.

Bill of Reinforcing for One Headwall 0° 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.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	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	40'-3"	89	5b1	2	37'-3"	78	5b1	2	34'-3"	71	5b1	2	31'-3"	65	5b1	2	28'-3"	59	5b1	2	25'-3"	53
Wingwall, F.F.H.		5b2	22 Var.	2 Each 8'-10 to 38'-10	547	5b2	20 Var.	2 Each 8'-10 to 35'-10	466	5b2	18 Var.	2 Each 8'-10 to 32'-10	391	5b2	16 Var.	2 Each 8'-10 to 29'-10	323	5b2	14 Var.	2 Each 8'-10 to 26'-10	260	5b2	12 Var.	2 Each 8'-10 to 23'-10	204
Wingwall, B.F.H.		4b3	2	40'-3"	57	4b3	2	37'-3"	50	4b3	2	34'-3"	46	4b3	2	31'-3"	42	4b3	2	28'-3"	38	4b3	2	25'-3"	34
Wingwall, B.F.H.		4b4	20 Var.	2 Each 11'-10 to 38'-10	338	4b4	18 Var.	2 Each 11'-10 to 35'-10	287	4b4	16 Var.	2 Each 11'-10 to 32'-10	239	4b4	14 Var.	2 Each 11'-10 to 29'-10	195	4b4	12 Var.	2 Each 11'-10 to 26'-10	155	4b4	10 Var.	2 Each 11'-10 to 23'-10	119
Wingwall, F.F.V.		5c1	74 Var.	2 Each 2'-7 to 14'-7	662	5c1	68 Var.	2 Each 2'-7 to 13'-7	573	4c1	62 Var.	2 Each 2'-7 to 12'-7	314	4c1	56 Var.	2 Each 2'-7 to 11'-7	265	4c1	66 Var.	2 Each 2'-7 to 10'-7	290	4c1	58 Var.	2 Each 2'-7 to 9'-7	236
Wingwall, F.F.V.		5c2	36 Var.	2 Each 9'-1 to 14'-9	447	5c2	30 Var.	2 Each 9'-1 to 13'-9	357	4c2	24 Var.	2 Each 9'-1 to 12'-9	175	4c2	18 Var.	2 Each 9'-1 to 11'-9	125	c2	--	--	--	c2	--	--	--
Wingwall, F.F.V. (L)		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. (R)		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	74 Var.	2 Each 6'-3 to 18'-3	1362	5c4	68 Var.	2 Each 6'-3 to 17'-3	833	5c4	62 Var.	2 Each 6'-3 to 16'-3	727	5c4	56 Var.	2 Each 6'-3 to 15'-3	628	5c4	50 Var.	2 Each 6'-3 to 14'-3	535	5c4	44 Var.	2 Each 6'-3 to 13'-3	447
Wingwall, B.F.V. (L)		6c5	2	18'-6"	56	5c5	2	17'-6"	37	5c5	2	16'-6"	34	5c5	2	15'-6"	32	5c5	2	14'-6"	30	5c5	2	13'-6"	28
Wingwall, B.F.V. (R)		6c5	2	18'-6"	56	5c5	2	17'-6"	37	5c5	2	16'-6"	34	5c5	2	15'-6"	32	5c5	2	14'-6"	30	5c5	2	13'-6"	28
Wingwall, B.F.V.		6c6	50	8'-6"	638	5c6	44	8'-6"	390	5c6	38	8'-6"	337	5c6	32	8'-6"	284	5c6	26	8'-6"	231	5c6	20	8'-6"	177
Apron, LongR. Bott.		4d1	11	40'-3"	314	4d1	11	37'-3"	274	4d1	11	34'-3"	252	4d1	11	31'-3"	230	4d1	11	28'-3"	208	4d1	11	25'-3"	186
Apron, LongR. Top		6f1	11	40'-3"	705	6f1	11	37'-3"	615	6f1	11	34'-3"	566	6f1	11	31'-3"	516	6f1	11	28'-3"	467	6f1	11	25'-3"	417
Parapet, Vertical		4i1	21	6'-5"	90	4i1	21	6'-5"	90	4i1	21	6'-5"	90	4i1	21	6'-5"	90	4i1	21	6'-5"	90	4i1	21	6'-5"	90
Parapet, Horiz.		7j1	4	11'-8"	95	7j1	4	11'-8"	95	7j1	4	11'-4"	93	7j1	4	11'-4"	93	7j1	4	11'-4"	93	7j1	4	11'-2"	91
Apron, Trans. Top		5m1	51	12'-2"	647	5m1	47	12'-2"	596	5m1	43	11'-10"	531	5m1	39	11'-10"	481	5m1	35	11'-10"	432	5m1	31	11'-8"	377
Apron, Trans. Bott.		m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--
Apron, Trans. Bott.		5m3	73	8'-7"	654	5m3	67	8'-7"	600	6m3	31	9'-1"	423	5m3	28	8'-3"	241	5m3	25	8'-3"	215	5m3	22	8'-1"	185
Curtain, Horiz.		6p1	6	12'-2"	110	6p1	6	12'-2"	110	6p1	6	11'-10"	107	6p1	6	11'-10"	107	6p1	6	11'-10"	107	6p1	5	11'-8"	88
Wing Slope, Both F.		6s1	4	35'-8"	214	6s1	4	32'-7"	196	6s1	4	29'-5"	177	6s1	4	26'-3"	158	6s1	4	23'-1"	139	6s1	4	19'-11"	120
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'-5"	34	6s4	2	11'-5"	34	6s4	2	11'-5"	34	6s4	2	11'-5"	34	6s4	2	11'-5"	34	6s4	2	11'-5"	34
Wing Slope, F.F.		6s5	2	33'-2"	100	6s5	2	30'-0"	90	6s5	2	26'-10"	81	6s5	2	23'-8"	71	6s5	2	20'-6"	62	6s5	2	17'-4"	52
Curtain, Vert.		5t1	11	7'-11"	91	5t1	11	7'-8"	88	5t1	11	7'-5"	85	5t1	11	7'-2"	82	5t1	11	6'-11"	79	5t1	11	6'-8"	76
Curtain, Vert. Ends		5t2	4	7'-11"	33	5t2	4	7'-8"	32	5t2	4	7'-5"	31	5t2	4	7'-2"	30	5t2	4	6'-11"	29	5t2	4	6'-8"	28
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	7480 LB				6064 LB				4950 LB				4233 LB				3689 LB				3171 LB			
	Concrete	Parapet Δ	1.6			1.6				1.5			1.5			1.5			1.5			1.4			
		Wingwalls	21.5	46.4 CY		18.4	41.5 CY		13.0	33.6 CY		10.8	29.6 CY		8.8	25.9 CY		6.3			6.3		21.3 CY		
		Apron =	23.3			21.5			19.1		17.3		15.6												

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.
 (L) - Indicates bar located at left corner.
 (R) - Indicates bar located at right corner.
 Refer to Sheet PWH 0-1-20 for left and right corner locations.

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



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	 APPROVED BY BRIDGE ENGINEER	 Standard Design - Single Reinforced Concrete Box Culverts <h3 style="margin: 0;">Parallel Wing Headwalls</h3> July, 2020 <h2 style="margin: 0;">Quantity Tabulation</h2> <h3 style="margin: 0;">10'-0" Span</h3> <h3 style="margin: 0;">0° Skew</h3>	PWH 0-8-20 SHEET 1 OF 2
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