

### Bill of Reinforcing for One Headwall 0° Skew Span x Culvert Height

Location	Shape	12' x 6'				12' x 5'				12' 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	22'-3"	46	5b1	2	19'-3"	40	5b1	2	16'-3"	34																		
Wingwall, F.F.H.		5b2	10 Var.	2 Each 8'-10 to 20'-10	155	5b2	8 Var.	2 Each 8'-10 to 17'-10	111	5b2	6 Var.	2 Each 8'-10 to 14'-10	74																		
Wingwall, B.F.H.		4b3	2	22'-3"	30	4b3	2	19'-3"	26	4b3	2	16'-3"	22																		
Wingwall, B.F.H.		4b4	8 Var.	2 Each 11'-10 to 20'-10	87	4b4	6 Var.	2 Each 11'-10 to 17'-10	59	4b4	4 Var.	2 Each 11'-10 to 14'-10	36																		
Interior Wall, Both F.H.		5b5	9 Var.	6'-7 to 21'-10	133	5b5	7 Var.	6'-9 to 18'-9	93	5b5	5 Var.	7'-1 to 15'-9	60																		
Wingwall, F.F.V.		4c1	50 Var.	2 Each 2'-8 to 8'-8	189	4c1	32 Var.	2 Each 7'-8 to 7'-8	110	4c1	26 Var.	2 Each 2'-8 to 6'-8	81																		
Wingwall, F.F.V.		c2	--	--	--	c2	--	--	--	c2	--	--	--																		
Wingwall, F.F.V. (L)		4c3	2	9'-1	12	4c3	2	8'-1	11	4c3	2	7'-1	9																		
Wingwall, F.F.V. (R)		4c3	2	9'-1	12	4c3	2	8'-1	11	4c3	2	7'-1	9																		
Wingwall, B.F.V.		5c4	38 Var.	2 Each 6'-4 to 12'-4	370	5c4	42 Var.	2 Each 6'-4 to 11'-4	387	5c4	26 Var.	2 Each 6'-4 to 10'-4	226																		
Wingwall, B.F.V. (L)		5c5	2	12'-7	26	5c5	2	11'-7	24	5c5	2	10'-7	22																		
Wingwall, B.F.V. (R)		5c5	2	12'-7	26	5c5	2	11'-7	24	5c5	2	10'-7	22																		
Wingwall, B.F.V.		5c6	14	8'-6	124	c6	--	--	--	c6	--	--	--																		
Interior Wall, Both F.V		4c7	2	3'-10"	5	4c7	2	3'-10"	5	4c7	2	3'-10"	5																		
Interior Wall, Both F.V		4c8	37 Var.	1'-7 to 6'-4	98	4c8	31 Var.	1'-7 to 5'-4	72	4c8	25 Var.	1'-6 to 4'-4	49																		
Interior Wall, Both F.V		4c9	2	6'-7	9	4c9	2	5'-7	7	4c9	2	4'-7	6																		
Apron, Longit., Bott.		4d1	26	22'-3"	386	4d1	26	19'-3"	334	4d1	26	16'-3"	282																		
Apron, Longit., Top		6f1	26	22'-3"	869	6f1	26	19'-3"	752	6f1	26	16'-3"	635																		
Parapet, Vertical		4i1	49	6'-5	210	4i1	49	6'-5	210	4i1	49	6'-5	210																		
Parapet, Horizontal		7j1	4	25'-11	212	7j1	4	25'-11	212	7j1	4	25'-11	212																		
Apron, Trans., Top		5m1	27	26'-5	744	5m1	23	26'-5	634	5m1	19	26'-5	523																		
Apron, Trans., Top		m2	--	--	--	m2	--	--	--	m2	--	--	--																		
Apron, Trans., Batt.		4m3	19	22'-1	280	4m3	21	22'-1	310	4m3	13	22'-1	192																		
Curtain, Horiz.		6p1	5	26'-5	198	6p1	5	26'-5	198	6p1	5	26'-5	198																		
Wing Slope, Both F.		6s1	4	16'-9	101	6s1	4	13'-7	82	6s1	4	10'-5	63																		
Wing Slope, Both F. (L)		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																		
Wing Slope, F.F.		6s4	2	11'-5	34	6s4	2	11'-5	34	6s4	2	11'-5	34																		
Wing Slope, F.F.		6s5	2	14'-2	43	6s5	2	11'-0	33	6s5	2	7'-10	24																		
Interior Wall, Both F.		6s6	2	22'-10	69	6s6	2	19'-8	59	6s6	2	16'-7	50																		
Curtain, Vert.		5t1	25	6'-5	167	5t1	25	6'-5	167	5t1	25	6'-5	167																		
Curtain, Vert, Ends		5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27																		
Bracket, Vert.		5u1	4	5'-4	22	5u1	4	5'-4	22	5u1	4	5'-4	22																		
Estimated Quantities		Reinf. Steel				4736 LB				4106 LB				3346 LB																	
One Headwall		Concrete		Parapet Δ		2.5		Wingwalls		6.5		Apron ⇐		27.4		36.4 CY		2.5		4.7		30.9 CY		2.5		3.2		20.1		25.8 CY	

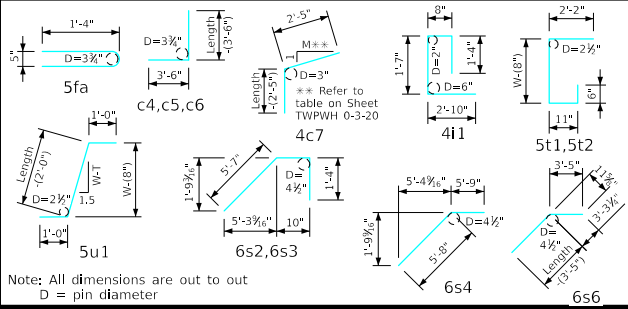
Δ Includes top of wingwall quantities.  
 \* Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.  
 (L) - Indicates bar located at left corner.  
 (R) - Indicates bar located at right corner.  
 Refer to Sheet TWPWH 0-1-20 for left and right corner locations.

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

#### Headwall Notes:

- 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.

#### Bent Bar Details



LATEST REVISION DATE	
	Standard Design - Twin Reinforced Concrete Box Culverts
	Parallel Wing Headwalls
	July, 2020
Quantity Tabulation	TWPWH
12'-0" Span	0-6-20
0° Skew	Sheet 2 of 2