

Bill of Reinforcing for One Headwall 15° Skew Span x Culvert Height

Bar	Location	Shape	10' x 6'			10' x 5'			10' x 4'			Bar								
			No.	Length	Wt.	No.	Length	Wt.	No.	Length	Wt.									
5fa	Fence Anchor (Galv.)		2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	5fa								
4b1	Wingwall, B.F.H. Long		1	25'-1	17	1	21'-7	14	1	18'-2	12	4b1								
4b2	Wingwall, B.F.H. Short		1	22'-4	15	1	19'-4	13	1	16'-4	11	4b2								
4b3	Wingwall, B.F.H. Long		4 Var.	13'-2 to 23'-6	49	3 Var.	13'-2 to 20'-1	33	2 Var.	13'-2 to 16'-7	20	4b3								
4b4	Wingwall, B.F.H. Short		4 Var.	11'-11 to 20'-11	44	3 Var.	11'-11 to 17'-11	30	2 Var.	11'-11 to 14'-11	18	4b4								
5b5	Wingwall, F.F.H. Long		1	25'-1	26	1	21'-8	23	1	18'-3	19	5b5								
5b6	Wingwall, F.F.H. Short		1	22'-4	23	1	19'-4	20	1	16'-4	17	5b6								
5b7	Wingwall, F.F.H. Long		5 Var.	9'-10 to 23'-6	87	4 Var.	9'-10 to 20'-1	62	3 Var.	9'-9 to 16'-8	41	5b7								
5b8	Wingwall, F.F.H. Short		5 Var.	9'-0 to 21'-0	78	4 Var.	9'-0 to 18'-0	56	3 Var.	9'-0 to 15'-0	38	5b8								
4c1	Wingwall, F.F.V. Long		22 Var.	2'-9 to 8'-11	86	18 Var.	2'-9 to 7'-9	63	15 Var.	2'-9 to 6'-10	48	4c1								
4c2	Wingwall, F.F.V. Short		19 Var.	2'-9 to 8'-9	73	16 Var.	2'-9 to 7'-9	56	13 Var.	2'-9 to 6'-9	41	4c2								
4c3	Wingwall, F.F.V. Long		--	--	--	--	--	--	--	--	--	4c3								
4c4	Wingwall, F.F.V. Short		--	--	--	--	--	--	--	--	--	4c4								
4c5	Wingwall, F.F.V. Long		1	7'-8	5	2	6'-8	9	1	5'-8	4	4c5								
4c5	Wingwall, F.F.V. Short		2	7'-8	10	2	6'-8	9	2	5'-8	8	4c5								
5c6	Wingwall, B.F.V. Long		9 Var.	2'-9 to 5'-1	37	9 Var.	2'-9 to 5'-1	37	9 Var.	2'-9 to 5'-1	37	5c6								
5c7	Wingwall, B.F.V. Short		6 Var.	2'-9 to 4'-5	22	6 Var.	2'-9 to 4'-5	22	6 Var.	2'-9 to 4'-5	22	5c7								
6c8	Wingwall, B.F.V. Long		13 Var.	9'-5 to 12'-11	218	9 Var.	9'-5 to 11'-9	143	6 Var.	9'-5 to 10'-10	91	6c8								
6c9	Wingwall, B.F.V. Short		13 Var.	8'-9 to 12'-9	210	10 Var.	8'-9 to 11'-9	154	7 Var.	8'-9 to 10'-9	103	6c9								
6c10	Wingwall, B.F.V. Long		--	--	--	--	--	--	--	--	--	6c10								
6c10	Wingwall, B.F.V. Short		--	--	--	--	--	--	--	--	--	6c10								
6c11	Wingwall, B.F.V. Long		1	11'-8	18	2	10'-8	32	1	9'-8	15	6c11								
6c11	Wingwall, B.F.V. Short		2	11'-8	35	2	10'-8	32	2	9'-8	29	6c11								
4d1	Apron, LongR., Bott.		7	16'-5	77	7	14'-4	67	7	12'-4	58	4d1								
4d2	Apron, LongL., Bott. Long		3	19'-8	39	3	16'-3	33	3	12'-10	26	4d2								
4d3	Apron, LongL., Bott. Short		3	17'-5	35	3	14'-5	29	3	11'-5	23	4d3								
6f1	Apron, LongL., Top		9	16'-5	222	9	14'-4	194	9	12'-4	167	6f1								
6f2	Apron, LongL., Top Long		4 Var.	5'-6 to 13'-2	56	3 Var.	5'-11 to 11'-1	38	2 Var.	6'-5 to 9'-0	23	6f2								
6f3	Apron, LongL., Top Short		4 Var.	4'-5 to 13'-3	53	3 Var.	5'-3 to 11'-2	37	2 Var.	6'-2 to 9'-1	23	6f3								
6f4	Apron, LongL., Top Long		1	25'-1	38	1	21'-8	33	1	18'-3	27	6f4								
6f5	Apron, LongL., Top Short		1	22'-4	34	1	19'-4	29	1	16'-4	25	6f5								
4i1	Parapet, Vertical		21	6'-2	87	21	6'-2	87	21	6'-2	87	4i1								
7j1	Parapet, Horizontal, Top		4	11'-6	94	4	11'-6	94	4	11'-6	94	7j1								
6m1	Parapet, Horizontal, Bott.		3 Var.	11'-10 to 12'-2	54	3 Var.	11'-10 to 12'-2	54	3 Var.	11'-10 to 12'-2	54	6m1								
6m2	Apron, Trans., Top		14 Var.	12'-5 to 17'-4	313	11 Var.	12'-5 to 16'-2	236	8 Var.	12'-5 to 15'-1	165	6m2								
6m3	Apron, Trans., Top		4 Var.	4'-0 to 11'-10	48	4 Var.	4'-1 to 11'-11	48	4 Var.	4'-2 to 12'-0	49	6m3								
6m4	Apron, Trans., Top		12 Var.	5'-11 to 11'-10	160	10 Var.	5'-11 to 10'-9	125	8 Var.	5'-11 to 9'-8	94	6m4								
6p1	Apron, Trans., Bott.		4	10'-7	64	4	10'-7	64	4	10'-7	64	6p1								
6p2	Curtain, Horizontal		4	12'-8	76	4	11'-2	67	4	9'-8	58	6p2								
6p3	Curtain, Horizontal, Long		4	10'-2	61	4	9'-1	55	4	7'-11	48	6p3								
6s1	Curtain, Horizontal, Short		2	6'-11	21	2	6'-11	21	2	6'-11	21	6s1								
6s2	Wing Slope, Both F., Long		2	6'-6	20	2	6'-6	20	2	6'-6	20	6s2								
6s3	Wing Slope, Both F., Short		2	19'-10	60	2	16'-3	49	2	12'-8	38	6s3								
6s4	Wing Slope, Both F., Long		2	17'-11	54	2	14'-9	44	2	11'-7	35	6s4								
6s5	Wing Slope, Both F., Short		1	25'-0	38	1	21'-5	32	1	17'-10	27	6s5								
6s6	Wing Slope, F.F. Long		1	22'-8	34	1	19'-6	29	1	16'-4	25	6s6								
5t1	Wing Slope, F.F. Short		16	6'-5	107	14	6'-5	94	12	6'-5	80	5t1								
Curtain, Vertical Estimated Quantities One Headwall			Reinf. Steel	2904 LB		Concrete	21.5 CY		Reinf. Steel	2393 LB		Concrete	17.6 CY		Reinf. Steel	1911 LB		Concrete	14.1 CY	

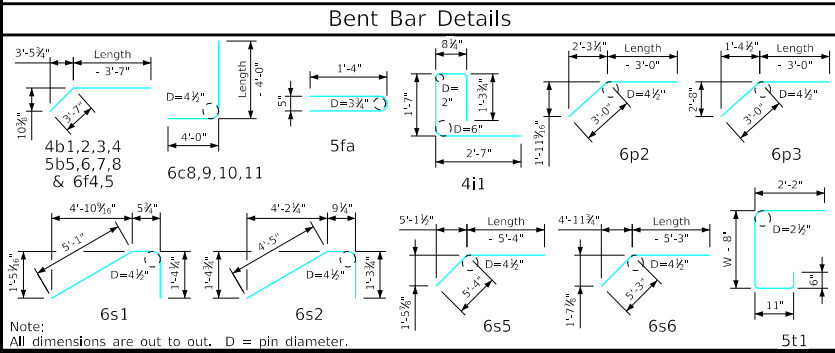
Δ Includes top of wingwall quantities.
 * Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap. Lengths shown for bars over 40'-0" long do not include lap.

"Short" Denotes Short Wingwall
 "Long" Denotes Long Wingwall

Headwall Notes:

- See Sheet FW H G2-21 for General Notes, Specifications, and Design Stresses.
- 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 "d", "6f1", "6f4" and "6f5" 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	IOWA DOT Highway Division	
		Standard Design - Single Reinforced Concrete Box Culverts	
		Flared Wing Headwalls	
		February, 2021	
		Quantity Tabulation	FWH 15-9-21
		10'-0" Span	
		15° Skew	Sheet 2 of 2