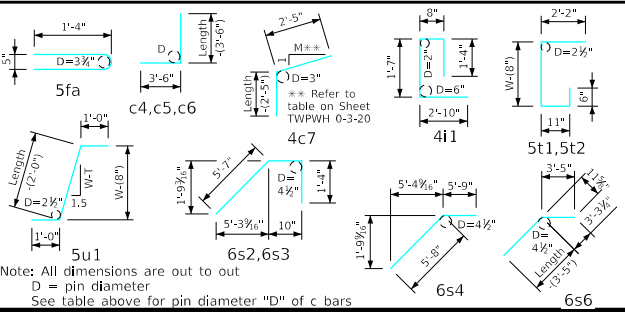


Bill of Reinforcing for One Headwall 0° Skew Span x Culvert Height

Location	Shape	12' x 12'				12' x 11'				12' x 10'				12' x 9'				12' x 8'				12' 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
Interior Wall, Both F.H.		5b5	21 Var.	6'-3 to 39'-10	505	5b5	19 Var.	6'-3 to 36'-10	427	5b5	17 Var.	6'-4 to 33'-10	356	5b5	15 Var.	6'-4 to 30'-10	291	5b5	13 Var.	6'-5 to 27'-10	232	5b5	11 Var.	6'-6 to 24'-10	180
Wingwall, F.F.V.		5c1	74 Var.	2 Each 2'-8 to 14'-8	669	5c1	68 Var.	2 Each 2'-8 to 13'-8	579	4c1	62 Var.	2 Each 2'-8 to 12'-8	318	4c1	56 Var.	2 Each 2'-8 to 11'-8	268	4c1	66 Var.	2 Each 2'-8 to 10'-8	294	4c1	58 Var.	2 Each 2'-8 to 9'-8	239
Wingwall, F.F.V.		5c2	36 Var.	2 Each 9'-2 to 14'-10	451	5c2	30 Var.	2 Each 9'-2 to 13'-10	360	4c2	24 Var.	2 Each 9'-2 to 12'-10	176	4c2	18 Var.	2 Each 9'-2 to 11'-10	126	c2	--	--	--	c2	--	--	--
Wingwall, F.F.V. (L)		5c3	2	15'-1"	31	5c3	2	14'-1"	29	4c3	2	13'-1"	17	4c3	2	12'-1"	16	4c3	2	11'-1"	15	4c3	2	10'-1"	13
Wingwall, F.F.V. (R)		5c3	2	15'-1"	31	5c3	2	14'-1"	29	4c3	2	13'-1"	17	4c3	2	12'-1"	16	4c3	2	11'-1"	15	4c3	2	10'-1"	13
Wingwall, B.F.V.		6c4	74 Var.	2 Each 6'-4 to 18'-4	1371	5c4	68 Var.	2 Each 6'-4 to 17'-4	839	5c4	62 Var.	2 Each 6'-4 to 16'-4	733	5c4	56 Var.	2 Each 6'-4 to 15'-4	633	5c4	50 Var.	2 Each 6'-4 to 14'-4	539	5c4	44 Var.	2 Each 6'-4 to 13'-4	451
Wingwall, B.F.V. (L)		6c5	2	18'-7"	56	5c5	2	17'-7"	37	5c5	2	16'-7"	35	5c5	2	15'-7"	33	5c5	2	14'-7"	30	5c5	2	13'-7"	28
Wingwall, B.F.V. (R)		6c5	2	18'-7"	56	5c5	2	17'-7"	37	5c5	2	16'-7"	35	5c5	2	15'-7"	33	5c5	2	14'-7"	30	5c5	2	13'-7"	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
Interior Wall, Both F.V		4c7	2	3'-10"	5	4c7	2	3'-10"	5	4c7	2	3'-10"	5	4c7	2	3'-10"	5	4c7	2	3'-10"	5	4c7	2	3'-10"	5
Interior Wall, Both F.V		4c8	73 Var.	1'-7 to 12'-4	339	4c8	67 Var.	1'-7 to 11'-4	289	4c8	61 Var.	1'-7 to 10'-4	243	4c8	55 Var.	1'-7 to 9'-4	201	4c8	49 Var.	1'-7 to 8'-4	162	4c8	43 Var.	1'-7 to 7'-4	128
Interior Wall, Both F.V		4c9	2	12'-7"	17	4c9	2	11'-7"	15	4c9	2	10'-7"	14	4c9	2	9'-7"	13	4c9	2	8'-7"	11	4c9	2	7'-7"	10
Apron, Longit., Bott.		4d1	26	40'-3"	741	4d1	26	37'-3"	647	4d1	26	34'-3"	595	4d1	26	31'-3"	543	4d1	26	28'-3"	491	4d1	26	25'-3"	439
Apron, Longit., Top		6f1	26	40'-3"	1666	6f1	26	37'-3"	1455	6f1	26	34'-3"	1338	6f1	26	31'-3"	1220	6f1	26	28'-3"	1103	6f1	26	25'-3"	986
Parapet, Vertical		4i1	51	6'-5"	219	4i1	51	6'-5"	219	4i1	49	6'-5"	210	4i1	49	6'-5"	210	4i1	49	6'-5"	210	4i1	49	6'-5"	210
Parapet, Horizontal		7j1	4	26'-8"	218	7j1	4	26'-8"	218	7j1	4	26'-2"	214	7j1	4	26'-2"	214	7j1	4	26'-2"	214	7j1	4	25'-11"	212
Apron, Trans., Top		5m1	51	27'-2"	1445	5m1	47	27'-2"	1332	5m1	43	26'-8"	1196	5m1	39	26'-8"	1085	5m1	35	26'-8"	973	5m1	31	26'-5"	854
Apron, Trans., Top		m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--
Apron, Trans., Bott.		5m3	73	23'-7"	1796	5m3	67	23'-7"	1648	6m3	31	23'-11"	1114	5m3	28	23'-1"	674	5m3	25	23'-1"	602	5m3	22	22'-10"	524
Curtain, Horiz.		6p1	6	27'-2"	245	6p1	6	27'-2"	245	6p1	6	26'-8"	240	6p1	6	26'-8"	240	6p1	6	26'-8"	240	6p1	5	26'-5"	198
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
Interior Wall, Both F.		6s6	2	41'-10"	133	6s6	2	38'-8"	116	6s6	2	35'-6"	107	6s6	2	32'-4"	97	6s6	2	29'-2"	88	6s6	2	26'-0"	78
Curtain, Vert.		5t1	26	7'-11"	215	5t1	26	7'-8"	208	5t1	25	7'-5"	193	5t1	25	7'-2"	187	5t1	25	6'-11"	180	5t1	25	6'-8"	174
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'-5"	27	5u1	4	6'-2"	26	5u1	4	5'-11"	25	5u1	4	5'-9"	24	5u1	4	5'-6"	23
Estimated Quantities One Headwall	Reinf. Steel	12,338 LB				10,436 LB				8641 LB				7384 LB				6517 LB				5666 LB			
	Concrete	Parapet Δ	2.7			2.7				2.6			2.6			2.6			2.6			2.5			2.5
		Wingwalls	30.0		85.7 CY	25.6		77.2 CY	17.9		64.3 CY	14.8		57.2 CY	12.0		50.4 CY	8.5		42.4 CY					
		Apron *	53.0		48.9			43.8					39.8						31.4						

Bar Size	D
5	3 3/4"
6	4 1/2"

Bent Bar Details



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.

LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER		
		Standard Design - Twin Reinforced Concrete Box Culverts	
		Parallel Wing Headwalls	
		July, 2020	
		Quantity Tabulation	
		12'-0" Span	
		0° Skew	
			TWPWH 0-6-20 Sheet 1 of 2