

ENGLISH DESIGNED TWIN CULVERTS.DGN - TWH 15-7-12 - THIS SHEET ISSUED 04-12.

BILL OF REINFORCING FOR ONE HEADWALL 15° SKEW CULVERT SPAN x CULVERT HEIGHT

BAR	LOCATION	SHAPE	12' x 5'			12' x 4'			10' x 12'			10' x 11'			10' x 10'			10' x 9'			10' x 8'			BAR				
			NO.	LENGTH	WT.	NO.	LENGTH	WT.	NO.	LENGTH	WT.	NO.	LENGTH	WT.	NO.	LENGTH	WT.	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	2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	5fa	
4b1	WINGWALL, B.F.H. LONG		1	21'-0"	14	1	17'-7"	12	1	45'-0"	32	1	41'-7"	29	1	38'-2"	25	1	34'-9"	23	1	31'-4"	21	1	28'-1"	19	4b1	
4b2	WINGWALL, B.F.H. SHORT		1	18'-9"	13	1	15'-9"	11	1	39'-8"	26	1	36'-9"	25	1	33'-9"	23	1	30'-9"	21	1	27'-9"	19	1	24'-9"	17	4b2	
4b3	WINGWALL, B.F.H. LONG		3	12'-7 TO 19'-6	32	2	12'-7 TO 16'-0	19	10	12'-7 TO 43'-5	189	9	12'-7 TO 40'-0	158	8	12'-7 TO 36'-7	131	7	12'-7 TO 33'-2	107	6	12'-7 TO 29'-9	85	5	12'-7 TO 26'-6	63	4b3	
4b4	WINGWALL, B.F.H. SHORT		3	11'-4 TO 17'-4	29	2	11'-4 TO 14'-4	17	10	11'-4 TO 38'-4	166	9	11'-4 TO 35'-4	140	8	11'-4 TO 32'-4	117	7	11'-4 TO 29'-4	95	6	11'-4 TO 26'-4	75	5	11'-4 TO 23'-4	55	4b4	
5b5	WINGWALL, F.F.H. LONG		1	21'-1"	22	1	17'-8"	18	1	45'-1"	49	1	41'-8"	46	1	38'-3"	40	1	34'-10"	36	1	31'-4"	33	1	27'-9"	29	5b5	
5b6	WINGWALL, F.F.H. SHORT		1	18'-9"	20	1	15'-9"	16	1	39'-9"	41	1	36'-9"	38	1	33'-9"	35	1	30'-9"	32	1	27'-9"	29	1	24'-9"	25	5b6	
5b7	WINGWALL, F.F.H. LONG		4	9'-3 TO 19'-6	60	3	9'-2 TO 16'-1	40	11	9'-3 TO 43'-6	307	10	9'-3 TO 40'-1	260	9	9'-3 TO 36'-8	216	8	9'-3 TO 33'-3	177	7	9'-3 TO 29'-10	143	6	9'-3 TO 25'-7	109	5b7	
5b8	WINGWALL, F.F.H. SHORT		4	8'-5 TO 17'-5	54	3	8'-5 TO 14'-5	36	11	8'-5 TO 38'-5	269	10	8'-5 TO 35'-5	229	9	8'-5 TO 32'-5	192	8	8'-5 TO 29'-5	158	7	8'-5 TO 26'-5	127	6	8'-5 TO 23'-5	93	5b8	
5b9	INTERIOR WALL, BOTH F.H.		7	5'-5 TO 13'-7	69	5	5'-7 TO 11'-5	44	21	5'-1 TO 28'-1	363	19	5'-1 TO 26'-0	308	17	5'-1 TO 23'-1	257	15	5'-2 TO 21'-10	211	13	5'-2 TO 19'-9	169	11	5'-2 TO 17'-8	127	5b9	
4c1	WINGWALL, F.F.V. LONG		18	2'-10 TO 13'-7	64	15	2'-10 TO 6'-11	49	42	2'-9 TO 14'-9	245	39	2'-9 TO 13'-10	216	35	2'-9 TO 12'-8	180	32	2'-9 TO 11'-10	156	29	2'-9 TO 10'-11	132	26	2'-9 TO 9'-2	103	4c1	
4c2	WINGWALL, F.F.V. SHORT		16	2'-10 TO 7'-10	57	13	2'-10 TO 6'-10	42	37	2'-9 TO 14'-9	216	34	2'-9 TO 13'-9	187	31	2'-9 TO 12'-9	160	28	2'-9 TO 11'-9	136	25	2'-9 TO 10'-9	113	22	2'-9 TO 9'-9	86	4c2	
4c3	WINGWALL, F.F.V. LONG		---	---	---	---	---	---	19	9'-7 TO 14'-10	155	16	9'-7 TO 14'-0	126	12	9'-7 TO 12'-10	90	9	9'-7 TO 11'-11	65	---	---	---	---	---	---	4c3	
4c4	WINGWALL, F.F.V. SHORT		---	---	---	---	---	---	17	9'-7 TO 14'-11	139	14	9'-7 TO 14'-11	110	11	9'-7 TO 12'-11	83	8	9'-7 TO 11'-11	57	---	---	---	---	---	---	4c4	
4c5	WINGWALL, F.F.V. LONG		2	6'-9"	9	2	5'-9"	8	2	13'-8"	18	1	12'-8"	17	2	11'-8"	16	2	10'-8"	14	1	9'-8"	13	1	8'-8"	11	4c5	
4c6	INTERIOR WALL, BOTH F.V.		2	1'-9"	2	2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	4c6	
4c7	INTERIOR WALL, BOTH F.V.		20	1'-11 TO 5'-5	49	16	1'-10 TO 4'-5	33	49	1'-11 TO 12'-4	233	45	1'-10 TO 11'-4	198	41	1'-10 TO 10'-4	167	37	1'-10 TO 9'-5	139	33	1'-10 TO 8'-5	113	27	1'-10 TO 7'-5	86	4c7	
4c8	INTERIOR WALL, BOTH F.V.		2	5'-7"	7	2	4'-7"	6	2	12'-6"	17	2	11'-6"	15	2	10'-6"	14	2	9'-6"	13	2	8'-6"	11	1	7'-6"	9	4c8	
5c9	WINGWALL, B.F.V. LONG		9	2'-10 TO 5'-2	38	9	2'-10 TO 5'-2	38	9	2'-9 TO 5'-1	37	9	2'-9 TO 5'-1	37	9	2'-9 TO 5'-1	37	9	2'-9 TO 5'-1	37	9	2'-9 TO 5'-1	37	9	2'-9 TO 5'-1	37	5c9	
5c10	WINGWALL, B.F.V. SHORT		6	2'-10 TO 4'-6	23	6	2'-10 TO 4'-6	23	6	2'-9 TO 4'-5	22	6	2'-9 TO 4'-5	22	6	2'-9 TO 4'-5	22	6	2'-9 TO 4'-5	22	6	2'-9 TO 4'-5	22	6	2'-9 TO 4'-5	22	5c10	
5c11	WINGWALL, B.F.V. LONG		9	9'-6 TO 11'-10	100	6	9'-6 TO 10'-11	64	33	9'-5 TO 18'-9	485	30	9'-5 TO 17'-10	426	26	9'-5 TO 16'-8	354	23	9'-5 TO 15'-10	303	20	9'-5 TO 14'-11	254	17	9'-5 TO 13'-10	205	5c11	
5c12	WINGWALL, B.F.V. SHORT		10	8'-10 TO 11'-10	108	7	8'-10 TO 10'-10	72	31	8'-9 TO 18'-9	446	28	8'-9 TO 17'-9	387	25	8'-9 TO 16'-9	332	22	8'-9 TO 15'-9	281	19	8'-9 TO 14'-9	233	16	8'-9 TO 13'-9	184	5c12	
6c13	WINGWALL, B.F.V. LONG		---	---	---	---	---	---	27	10'-6"	425	24	10'-6"	379	20	10'-6"	315	17	10'-6"	268	14	10'-6"	221	11	10'-6"	174	6c13	
6c13	WINGWALL, B.F.V. SHORT		---	---	---	---	---	---	24	10'-6"	379	21	10'-6"	331	18	10'-6"	284	15	10'-6"	237	12	10'-6"	189	9	10'-6"	143	6c13	
5c14	WINGWALL, B.F.V. LONG		2	10'-9"	22	2	9'-9"	20	2	17'-8"	37	1	16'-8"	37	1	15'-8"	33	2	14'-8"	31	1	13'-8"	24	1	12'-8"	18	5c14	
5c14	WINGWALL, B.F.V. SHORT		2	10'-9"	22	2	9'-9"	20	2	17'-8"	37	2	16'-8"	35	2	15'-8"	33	2	14'-8"	31	2	13'-8"	29	1	12'-8"	25	5c14	
4d1	APRON, LONGIT., BOTT.		17	13'-11"	158	17	11'-11"	135	15	28'-5"	285	13	26'-4"	229	13	24'-4"	211	13	22'-3"	193	13	20'-2"	175	11	18'-1"	147	4d1	
4d2	APRON, LONGIT., BOTT. LONG		3	15'-11"	32	3	12'-7"	25	3	39'-7"	79	3	36'-2"	72	3	32'-9"	66	3	29'-5"	59	3	26'-0"	52	4d2				
4d3	APRON, LONGIT., BOTT. SHORT		3	14'-4"	29	3	11'-5"	23	3	35'-0"	70	3	32'-0"	64	3	29'-0"	58	3	26'-1"	52	3	23'-1"	46	4d3				
6f1	APRON, LONGIT., TOP		24	13'-11"	502	24	11'-11"	430	20	28'-5"	854	20	26'-4"	791	20	24'-4"	731	20	22'-3"	668	20	20'-2"	606	18	18'-1"	544	6f1	
6f2	APRON, LONGIT., TOP LONG		3	5'-11 TO 11'-1	38	2	6'-5 TO 9'-0	23	9	5'-5 TO 25'-7	210	8	5'-10 TO 23'-6	176	7	6'-0 TO 21'-7	145	6	6'-8 TO 19'-5	118	5	7'-2 TO 17'-4	92	6f2				
6f3	APRON, LONGIT., TOP SHORT		3	5'-3 TO 11'-2	37	2	6'-2 TO 9'-1	23	8	5'-5 TO 25'-8	187	7	6'-3 TO 23'-8	157	6	7'-0 TO 21'-7	129	6	7'-8 TO 19'-6	110	5	8'-9 TO 17'-5	87	6f3				
6f4	APRON, LONGIT., TOP LONG		1	21'-1"	32	1	17'-8"	27	1	45'-1"	71	1	41'-8"	66	1	38'-3"	57	1	34'-10"	52	1	31'-4"	47	1	28'-1"	42	6f4	
6f5	APRON, LONGIT., TOP SHORT		1	18'-9"	28	1	15'-9"	24	1	39'-9"	60	1	36'-9"	55	1	33'-9"	51	1	30'-9"	46	1	27'-9"	42	1	24'-9"	37	6f5	
4f1	PARAPET, VERTICAL		49	6'-2"	202	49	6'-2"	202	43	6'-2"	177	41	6'-2"	169	41	6'-2"	169	41	6'-2"	169	41	6'-2"	169	41	6'-2"	169	41	4f1
7j1	PARAPET, HORIZONTAL		4	26'-9"	219	4	26'-9"	219	4	23'-5"	191	4	23'-2"	189	4	22'-11"	187	4	22'-11"	187	4	22'-11"	187	4	22'-11"	187	7j1	
6m1	APRON, TRANS., TOP		6	27'-1 TO 28'-0	248	6	27'-1 TO 28'-0	248	5	23'-5 TO 24'-5	181	5	23'-5 TO 24'-2	179	5	23'-2 TO 23'-11	177	5	23'-2 TO 23'-11	177	5	23'-2 TO 23'-11	177	5	23'-2 TO 23'-11	177	6m1	
6m2	APRON, TRANS., TOP		6	28'-4 TO 30'-2	264	3	28'-4 TO 29'-1	129	27	24'-9 TO 34'-6	1201	24	24'-6 TO 24'-6	1038	21	24'-2 TO 31'-8	881	18	24'-2 TO 30'-7	740	16	24'-2 TO 29'-10	649	12	24'-2 TO 24'-2	509	6m2	
6m3	APRON, TRANS., TOP		8	5'-9 TO 24'-0	179	9	5'-9 TO 24'-2	185	27	8'-9 TO 24'-5	174	7	8'-8 TO 24'-5	174	8	6'-1 TO 24'-4	183	8	6'-2 TO 24'-5	184	7	6'-4 TO 22'-0	149	6m3				
6m4	APRON, TRANS., BOTT.		10	21'-2 TO 26'-1	359	8	21'-2 TO 25'-0	277	24	17'-4 TO 24'-5	847	22	17'-3 TO 28'-6	756	20	17'-2 TO 27'-5	670	18	17'-2 TO 26'-4	588	16	17'-2 TO 25'-3	510	12	17'-2 TO 24'-2	442	6m4	
6p1	CURTAIN, HORIZONTAL		4	25'-10"	155	4	25'-10"	155	4	22'-0"	132	4	21'-11"	132	4	21'-10"	131	4	21'-10"	131	4	21'-10"	131	4	21'-10"	131	6p1	
6p2	CURTAIN, HORIZONTAL LONG		4	11'-2"	67	4	9'-8"	58	4	21'-9"	131	4	20'-3"	122	4	18'-9"	113	4	17'-3"	104	4	15'-9"	95	4	14'-5"	86	6p2	
6p3	CURTAIN, HORIZONTAL SHORT		4	9'-1"	55	4	7'-11"	48	4	16'-10"	101	4	15'-9"	95	4	14'-7"	88	4	13'-6"	81	4	12'-5"	75	4	11'-1"	69	6p3	
6s1	WING SLOPE, BOTH F. LONG		2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"															