

ENGLISH DESIGNED TWIN CULVERTS.DGN - TWH 15-8-12 - THIS SHEET ISSUED 04-12.

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

BAR	LOCATION	SHAPE	10' x 7'			10' x 6'			10' x 5'			10' x 4'			8' x 10'			8' x 9'			8' 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	27'-11"	19	1	24'-6"	16	1	21'-0"	14	1	17'-7"	12	1	38'-2"	25	1	34'-9"	23	1	31'-4"	21	1	4b1	4b1	
4b2	WINGWALL, B.F.H. SHORT		1	24'-9"	17	1	21'-9"	15	1	18'-9"	13	1	15'-9"	11	1	33'-9"	23	1	30'-9"	21	1	27'-9"	19	1	4b2	4b2	
4b3	WINGWALL, B.F.H. LONG		5	12'-7 TO 26'-4 VAR.	65	4	12'-7 TO 22'-11 VAR.	47	3	12'-7 TO 19'-6 VAR.	32	2	12'-7 TO 16'-0 VAR.	19	8	12'-7 TO 36'-7 VAR.	131	7	12'-7 TO 33'-2 VAR.	107	6	12'-7 TO 29'-9 VAR.	85	4	4b3	4b3	
4b4	WINGWALL, B.F.H. SHORT		5	11'-4 TO 23'-4 VAR.	58	4	11'-4 TO 20'-4 VAR.	42	3	11'-4 TO 17'-4 VAR.	29	2	11'-4 TO 14'-4 VAR.	17	8	11'-4 TO 32'-4 VAR.	117	7	11'-4 TO 29'-4 VAR.	95	6	11'-4 TO 26'-4 VAR.	75	4	4b4	4b4	
5b5	WINGWALL, F.F.H. LONG		1	27'-11"	29	1	24'-6"	26	1	21'-1"	22	1	17'-8"	18	1	38'-3"	40	1	34'-10"	36	1	31'-4"	33	5b5	5b5		
5b6	WINGWALL, F.F.H. SHORT		1	24'-9"	26	1	21'-9"	23	1	18'-9"	20	1	15'-9"	16	1	33'-9"	35	1	30'-9"	32	1	27'-9"	29	5b6	5b6		
5b7	WINGWALL, F.F.H. LONG		6	9'-3 TO 26'-4 VAR.	111	5	9'-3 TO 22'-11 VAR.	84	4	9'-3 TO 19'-6 VAR.	60	3	9'-2 TO 16'-1 VAR.	40	9	9'-3 TO 36'-8 VAR.	216	8	9'-3 TO 33'-3 VAR.	177	7	9'-3 TO 29'-10 VAR.	143	5b7	5b7		
5b8	WINGWALL, F.F.H. SHORT		6	8'-5 TO 23'-5 VAR.	100	5	8'-5 TO 20'-5 VAR.	75	4	8'-5 TO 17'-5 VAR.	54	3	8'-5 TO 14'-5 VAR.	36	9	8'-5 TO 32'-5 VAR.	192	8	8'-5 TO 29'-5 VAR.	158	7	8'-5 TO 26'-5 VAR.	127	5b8	5b8		
5b9	INTERIOR WALL, BOTH F.H.		11	5'-3 TO 17'-9 VAR.	132	9	5'-4 TO 15'-8 VAR.	99	7	5'-5 TO 13'-7 VAR.	69	5	5'-7 TO 11'-5 VAR.	44	17	5'-1 TO 33'-11 VAR.	257	15	5'-2 TO 21'-10 VAR.	211	13	5'-2 TO 19'-9 VAR.	169	5b9	5b9		
4c1	WINGWALL, F.F.V. LONG		25	2'-9 TO 9'-9 VAR.	104	22	2'-9 TO 8'-11 VAR.	86	18	2'-9 TO 7'-9 VAR.	63	15	2'-9 TO 6'-10 VAR.	48	35	2'-8 TO 12'-7 VAR.	178	32	2'-8 TO 11'-9 VAR.	154	29	2'-8 TO 10'-10 VAR.	131	4c1	4c1		
4c2	WINGWALL, F.F.V. SHORT		22	2'-9 TO 9'-9 VAR.	92	19	2'-9 TO 8'-9 VAR.	73	16	2'-9 TO 7'-9 VAR.	56	13	2'-9 TO 6'-9 VAR.	41	31	2'-8 TO 12'-8 VAR.	159	28	2'-8 TO 11'-8 VAR.	134	25	2'-8 TO 10'-8 VAR.	111	4c2	4c2		
4c3	WINGWALL, F.F.V. LONG		---	---	---	---	---	---	---	---	---	---	---	---	12	9'-6 TO 12'-9 VAR.	89	9	9'-6 TO 11'-10 VAR.	64	---	---	---	---	4c3	4c3	
4c4	WINGWALL, F.F.V. SHORT		---	---	---	---	---	---	---	---	---	---	---	---	11	9'-6 TO 12'-10 VAR.	82	8	9'-6 TO 11'-10 VAR.	57	---	---	---	---	4c4	4c4	
4c5	WINGWALL, F.F.V. LONG		2	8'-8"	12	1	7'-8"	5	2	6'-8"	9	2	5'-8"	8	2	11'-7"	15	2	10'-7"	14	1	9'-7"	13	4c5	4c5		
4c6	INTERIOR WALL, BOTH F.V.		2	1'-8"	2	2	1'-8"	2	2	1'-8"	2	2	1'-7"	2	2	1'-7"	2	2	1'-7"	2	2	1'-7"	2	4c6	4c6		
4c7	INTERIOR WALL, BOTH F.V.		28	1'-10 TO 7'-3 VAR.	85	24	1'-10 TO 6'-3 VAR.	65	20	1'-10 TO 5'-4 VAR.	48	16	1'-9 TO 4'-4 VAR.	33	41	1'-9 TO 10'-3 VAR.	164	37	1'-9 TO 9'-4 VAR.	137	33	1'-9 TO 8'-4 VAR.	111	4c7	4c7		
4c8	INTERIOR WALL, BOTH F.V.		2	7'-6"	10	2	6'-6"	9	2	5'-6"	7	2	4'-6"	6	2	10'-5"	14	2	9'-5"	13	2	8'-5"	11	4c8	4c8		
5c9	WINGWALL, B.F.V. LONG		9	2'-9 TO 5'-1 VAR.	37	9	2'-9 TO 5'-1 VAR.	37	9	2'-9 TO 5'-1 VAR.	37	9	2'-9 TO 5'-1 VAR.	37	9	2'-9 TO 5'-0 VAR.	36	9	2'-8 TO 5'-0 VAR.	36	9	2'-8 TO 5'-0 VAR.	36	5c9	5c9		
5c10	WINGWALL, B.F.V. SHORT		6	2'-9 TO 4'-5 VAR.	22	6	2'-9 TO 4'-5 VAR.	22	6	2'-9 TO 4'-5 VAR.	22	6	2'-9 TO 4'-5 VAR.	22	6	2'-8 TO 4'-4 VAR.	22	6	2'-8 TO 4'-4 VAR.	22	6	2'-8 TO 4'-4 VAR.	22	5c10	5c10		
5c11	WINGWALL, B.F.V. LONG		16	9'-5 TO 13'-9 VAR.	193	13	9'-5 TO 12'-11 VAR.	151	9	9'-5 TO 11'-9 VAR.	99	6	9'-5 TO 10'-10 VAR.	63	26	9'-4 TO 16'-7 VAR.	351	23	9'-4 TO 15'-9 VAR.	301	20	9'-4 TO 14'-10 VAR.	252	5c11	5c11		
5c12	WINGWALL, B.F.V. SHORT		16	8'-9 TO 13'-9 VAR.	188	13	8'-9 TO 12'-9 VAR.	146	10	8'-9 TO 11'-9 VAR.	107	7	8'-9 TO 10'-9 VAR.	71	25	8'-8 TO 16'-8 VAR.	330	22	8'-8 TO 15'-8 VAR.	279	19	8'-8 TO 14'-8 VAR.	231	5c12	5c12		
6c13	WINGWALL, B.F.V. LONG		10	10'-6"	158	7	10'-6"	110	---	---	---	---	---	---	20	10'-6"	315	17	10'-6"	268	14	10'-6"	221	6c13	6c13		
6c14	WINGWALL, B.F.V. SHORT		9	10'-6"	142	6	10'-6"	95	---	---	---	---	---	---	18	10'-6"	284	15	10'-6"	237	12	10'-6"	189	6c14	6c14		
5c14	WINGWALL, B.F.V. LONG		2	12'-8"	26	1	11'-8"	12	2	10'-8"	22	2	9'-8"	20	2	15'-7"	33	2	14'-7"	30	1	13'-7"	14	5c14	5c14		
5c14	WINGWALL, B.F.V. SHORT		2	12'-8"	26	2	11'-8"	24	2	10'-8"	22	2	9'-8"	20	2	15'-7"	33	2	14'-7"	30	2	13'-7"	28	5c14	5c14		
4d1	APRON, LONGIT., BOTT.		13	18'-1"	157	13	16'-0"	139	13	13'-11"	121	13	11'-11"	103	11	24'-4"	179	11	22'-3"	163	11	20'-2"	148	4d1	4d1		
4d2	APRON, LONGIT., BOTT. LONG		3	22'-7"	45	3	19'-3"	39	3	15'-11"	32	3	12'-7"	25	3	32'-9"	66	3	29'-5"	59	3	26'-0"	52	4d2	4d2		
4d3	APRON, LONGIT., BOTT. SHORT		3	20'-2"	40	3	17'-3"	35	3	14'-4"	29	3	11'-5"	23	3	29'-0"	58	3	26'-1"	52	3	23'-1"	46	4d3	4d3		
6f1	APRON, LONGIT., TOP		20	18'-1"	543	20	16'-0"	481	20	13'-11"	418	20	11'-11"	358	16	24'-4"	585	16	22'-3"	535	16	20'-2"	485	6f1	6f1		
6f2	APRON, LONGIT., TOP LONG		4	7'-7 TO 15'-3 VAR.	69	4	5'-6 TO 13'-2 VAR.	56	3	5'-11 TO 11'-1 VAR.	38	2	6'-5 TO 9'-0 VAR.	23	7	6'-3 TO 21'-5 VAR.	145	6	6'-8 TO 19'-5 VAR.	118	5	7'-2 TO 17'-4 VAR.	92	6f2	6f2		
6f3	APRON, LONGIT., TOP SHORT		4	6'-7 TO 15'-4 VAR.	66	4	4'-5 TO 13'-3 VAR.	53	3	5'-3 TO 11'-2 VAR.	37	2	6'-2 TO 9'-1 VAR.	23	6	7'-0 TO 21'-7 VAR.	129	6	4'-11 TO 19'-6 VAR.	110	5	5'-9 TO 17'-5 VAR.	87	6f3	6f3		
6f4	APRON, LONGIT., TOP LONG		1	27'-11"	42	1	24'-6"	37	1	21'-1"	32	1	17'-8"	27	1	38'-3"	57	1	34'-10"	52	1	31'-4"	47	6f4	6f4		
6f5	APRON, LONGIT., TOP SHORT		1	24'-9"	37	1	21'-9"	33	1	18'-9"	28	1	15'-9"	24	1	33'-9"	51	1	30'-9"	46	1	27'-9"	42	6f5	6f5		
4j1	PARAPET, VERTICAL		41	6'-2"	169	41	6'-2"	169	41	6'-2"	169	41	6'-2"	169	33	6'-2"	136	33	6'-2"	136	33	6'-2"	136	4j1	4j1		
7j1	PARAPET, HORIZONTAL		4	22'-8"	185	4	22'-8"	185	4	22'-8"	185	4	22'-8"	185	4	18'-9"	153	4	18'-9"	153	4	18'-9"	153	7j1	7j1		
6m1	APRON, TRANS., TOP		5	22'-11 TO 23'-8 VAR.	175	5	22'-11 TO 23'-8 VAR.	175	5	22'-11 TO 23'-8 VAR.	175	5	22'-11 TO 23'-8 VAR.	175	4	19'-0 TO 19'-7 VAR.	116	4	19'-0 TO 19'-7 VAR.	116	4	19'-0 TO 19'-7 VAR.	116	6m1	6m1		
6m2	APRON, TRANS., TOP		13	23'-11 TO 28'-5 VAR.	511	10	23'-11 TO 27'-4 VAR.	385	7	23'-11 TO 26'-2 VAR.	263	5	23'-11 TO 25'-5 VAR.	185	23	19'-10 TO 28'-1 VAR.	828	20	19'-10 TO 26'-11 VAR.	702	17	19'-10 TO 25'-10 VAR.	583	6m2	6m2		
6m3	APRON, TRANS., TOP		7	6'-3 TO 22'-11 VAR.	148	8	3'-9 TO 22'-2 VAR.	155	8	3'-11 TO 22'-2 VAR.	157	7	4'-0 TO 22'-2 VAR.	124	6	6'-10 TO 19'-11 VAR.	121	6	6'-11 TO 19'-11 VAR.	121	6	7'-1 TO 20'-1 VAR.	122	6m3	6m3		
6m4	APRON, TRANS., BOTT.		14	17'-1 TO 24'-1 VAR.	433	12	17'-1 TO 23'-0 VAR.	361	10	17'-1 TO 21'-11 VAR.	293	8	17'-1 TO 20'-10 VAR.	228	20	13'-0 TO 23'-3 VAR.	544	18	13'-0 TO 22'-2 VAR.	475	16	13'-0 TO 21'-1 VAR.	410	6m4	6m4		
6p1	CURTAIN, HORIZONTAL		4	21'-9"	131	4	21'-9"	131	4	21'-8"	130	4	21'-8"	130	4	17'-8"	106	4	17'-8"	106	4	17'-8"	106	6p1	6p1		
6p2	CURTAIN, HORIZONTAL LONG		4	14'-2"	85	4	12'-8"	76	4	11'-2"	67	4	9'-8"	58	4	18'-9"	113	4	17'-3"	104	4	15'-9"	95	6p2	6p2		
6p3	CURTAIN, HORIZONTAL SHORT		4	11'-3"	68	4	10'-2"	61	4	9'-1"	55	4	7'-11"	48	4	14'-7"	88	4	13'-6"	81	4	12'-5"	75	6p3	6p3		
6s1	WING SLOPE, BOTH F. LONG		2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	6s1	6s1		
6s2	WING SLOPE, BOTH F. SHORT		2	6'-6"	20	2	6'-6"	20	2	6'-6"	20	2	6'-6"	20	2	6'-6"	20	2	6'-6"	20	2	6'-6"	20	6s2	6s2		
6s3	WING SLOPE, BOTH F. LONG		2	23'-10"	72	2	20'-3"	61	2	16'-9"	50	2	13'-2"	40	2	34'-7"	104	2	31'-0"	93	2	27'-5"	82	6s3	6s3		
6s4</																											