

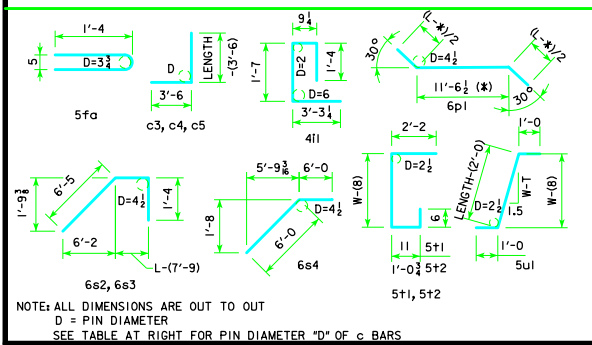
## BILL OF REINFORCING FOR ONE HEADWALL 30° SKEW CULVERT SPAN x CULVERT HEIGHT

LOCATION	SHAPE	10' x 12'				10' x 11'				10' x 10'				10' x 9'				10' x 8'				10' x 7'				10' x 6'				10' x 5'				10' x 4'			
		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.		BAR NO.	LENGTH	WT.	
FENCE ANCHOR (GALV.)	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	5fa	2	3'-1	6	
WINGWALL, F.F.H.	5b1	2	45'-10	100	5b1	2	42'-4	92	5b1	2	38'-11	81	5b1	2	35'-5	74	5b1	2	32'-0	67	5b1	2	28'-6	59	5b1	2	25'-1	52	5b1	2	21'-7	45	5b1	2	18'-1	38	
WINGWALL, F.F.H.	5b2	22 VAR	2 EACH 10'-1:44'-8	636	5b2	20 VAR	2 EACH 10'-1:41'-3	540	5b2	18 VAR	2 EACH 10'-1:34'-9	449	5b2	16 VAR	2 EACH 10'-1:34'-3	370	5b2	14 VAR	2 EACH 10'-1:30'-10	299	5b2	12 VAR	2 EACH 10'-1:27'-4	234	5b2	10 VAR	2 EACH 10'-0:23'-17	177	5b2	8 VAR	2 EACH 10'-0:20'-5	127	5b2	6 VAR	2 EACH 10'-0:17'-0	84	
WINGWALL, B.F.H.	4b3	2	46'-2	64	4b3	2	42'-8	60	4b3	2	39'-2	52	4b3	2	35'-8	48	4b3	2	32'-3	43	4b3	2	28'-8	38	4b3	2	25'-3	34	4b3	2	21'-9	29	4b3	2	18'-4	24	
WINGWALL, B.F.H.	4b4	20 VAR	2 EACH 13'-10:45'-0	398	4b4	18 VAR	2 EACH 13'-10:41'-6	335	4b4	16 VAR	2 EACH 13'-9:38'-0	277	4b4	14 VAR	2 EACH 13'-9:31'-1	226	4b4	12 VAR	2 EACH 13'-8:27'-7	180	4b4	10 VAR	2 EACH 13'-8:24'-1	138	4b4	8 VAR	2 EACH 13'-8:20'-7	101	4b4	6 VAR	2 EACH 13'-8:17'-2	69	4b4	4 VAR	2 EACH 13'-8:14'-0	41	
WINGWALL, F.F.V.	5c1	170 VAR	2 EACH 2'-8:14'-9	1544	5c1	156 VAR	2 EACH 2'-8:11'-9	1336	5c1	142 VAR	2 EACH 2'-8:8'-9	1128	5c1	128 VAR	2 EACH 2'-8:5'-9	920	5c1	114 VAR	2 EACH 2'-8:2'-9	712	5c1	100 VAR	2 EACH 2'-7:9'-9	504	5c1	86 VAR	2 EACH 2'-6:11'-9	296	5c1	72 VAR	2 EACH 2'-5:23'-9	88	5c1	58 VAR	2 EACH 2'-4:35'-9	18	
WINGWALL, F.F.V. (O)	5c2	2	14'-11	31	5c2	2	13'-11	29	5c2	2	12'-11	27	5c2	2	11'-11	25	5c2	2	10'-11	23	5c2	2	9'-11	21	4c2	2	8'-11	12	4c2	2	7'-11	11	4c2	2	6'-11	9	
WINGWALL, F.F.V. (A)	5c2	2	14'-11	31	5c2	2	13'-11	29	5c2	2	12'-11	27	5c2	2	11'-11	25	5c2	2	10'-11	23	5c2	2	9'-11	21	4c2	2	8'-11	12	4c2	2	7'-11	11	4c2	2	6'-11	9	
WINGWALL, B.F.V.	6c3	86 VAR	2 EACH 6'-3:18'-4	1588	6c3	78 VAR	2 EACH 6'-3:17'-2	1372	6c3	72 VAR	2 EACH 6'-3:16'-4	1221	6c3	64 VAR	2 EACH 6'-3:15'-2	715	6c3	58 VAR	2 EACH 6'-3:14'-4	623	6c3	50 VAR	2 EACH 6'-3:13'-2	506	6c3	44 VAR	2 EACH 6'-3:12'-3	425	6c3	36 VAR	2 EACH 6'-3:11'-2	471	6c3	30 VAR	2 EACH 6'-3:10'-3	372	
WINGWALL, B.F.V. (O)	6c4	1	18'-5	28	6c4	1	17'-5	26	6c4	1	16'-5	25	6c4	1	15'-5	16	6c4	1	14'-5	15	6c4	1	13'-5	14	6c4	1	12'-5	13	6c4	1	11'-5	17	6c4	1	10'-5	16	
WINGWALL, B.F.V. (A)	6c4	3	18'-5	83	6c4	3	17'-5	78	6c4	3	16'-5	74	6c4	3	15'-5	48	6c4	3	14'-5	45	6c4	3	13'-5	42	6c4	3	12'-5	39	6c4	3	11'-5	51	6c4	3	10'-5	47	
WINGWALL, B.F.V.	6c5	54	8'-6	689	6c5	50	8'-6	638	6c5	46	8'-6	587	6c5	42	8'-6	536	6c5	36	8'-6	485	6c5	30	8'-6	434	6c5	24	8'-6	383	6c5	18	8'-6	332	6c5	12	8'-6	281	
APRON, LONGIT., BOT.	4d1	9	45'-9	287	4d1	9	42'-3	266	4d1	9	38'-9	233	4d1	9	35'-4	212	4d1	9	31'-10	191	4d1	9	28'-5	171	4d1	9	24'-11	150	4d1	9	21'-6	129	4d1	9	18'-0	108	
APRON, LONGIT., TOP	6f1	11	45'-9	789	6f1	11	42'-3	731	6f1	11	38'-9	640	6f1	11	35'-4	584	6f1	11	31'-10	526	6f1	11	28'-5	470	6f1	11	24'-11	412	6f1	11	21'-6	355	6f1	11	18'-0	297	
PARAPET, VERTICAL	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	4l1	24	7'-0	112	
PARAPET, HORIZ.	7j1	4	13'-6	110	7j1	4	13'-6	110	7j1	4	13'-1	107	7j1	4	13'-1	107	7j1	4	13'-1	107	7j1	4	12'-11	106	7j1	4	12'-11	106	7j1	4	12'-11	106	7j1	4	12'-11	106	
APRON, TRANS., TOP	6m1	55	12'-2	1005	6m1	50	12'-2	914	6m1	45	11'-10	800	6m1	41	11'-10	729	6m1	36	11'-10	640	6m1	32	11'-8	561	6m1	27	11'-8	473	6m1	22	11'-8	386	6m1	18	11'-8	315	
APRON, TRANS., TOP	6m2	7 VAR	2'-1:9'-11	63	6m2	7 VAR	2'-7:10'-5	68	6m2	7 VAR	2'-11:10'-9	72	6m2	7 VAR	2'-1:9'-11	63	6m2	7 VAR	2'-7:10'-5	68	6m2	6 VAR	3'-0:9'-6	56	6m2	7 VAR	2'-3:10'-0	64	6m2	7 VAR	2'-9:10'-6	70	6m2	6 VAR	3'-3:9'-8	58	
APRON, TRANS., BOT.	5m3	73	10'-9	818	5m3	67	10'-9	751	5m3	61	10'-4	657	5m3	28	11'-2	470	5m3	25	10'-4	269	5m3	22	10'-2	233	4m3	19	9'-4	118	4m3	16	9'-4	100	4m3	13	9'-4	81	
CURTAIN, HORIZ.	6p1	6	13'-9	124	6p1	6	13'-9	124	6p1	6	13'-5	121	6p1	6	13'-5	121	6p1	6	13'-5	121	6p1	5	13'-3	100	6p1	5	13'-3	100	6p1	5	13'-3	100	6p1	5	13'-3	100	
WING SLOPE, BOTH F.	6s1	4	40'-3	254	6s1	4	36'-8	220	6s1	4	33'-1	199	6s1	4	29'-5	177	6s1	4	25'-10	155	6s1	4	22'-3	134	6s1	4	18'-8	112	6s1	4	15'-0	90	6s1	4	11'-5	69	
WING SLOPE, BOTH F. (O)	6s2	2	8'-4	25	6s2	2	8'-4	25	6s2	2	8'-5	25	6s2	2	8'-5	25	6s2	2	8'-5	25	6s2	2	8'-5	25	6s2	2	8'-4	25	6s2	2	8'-4	25	6s2	2	8'-4	25	
WING SLOPE, BOTH F. (A)	6s3	2	8'-10	27	6s3	2	8'-10	27	6s3	2	8'-10	27	6s3	2	8'-10	27	6s3	2	8'-10	27	6s3	2	8'-10	27	6s3	2	8'-9	26	6s3	2	8'-9	26	6s3	2	8'-9	26	
WING SLOPE, F. F.	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	6s4	2	12'-0	36	
WING SLOPE, F. F. (O)	6s5	2	38'-1	114	6s5	2	34'-6	104	6s5	2	30'-10	93	6s5	2	27'-3	82	6s5	2	23'-8	71	6s5	2	20'-0	60	6s5	2	16'-5	49	6s5	2	12'-10	39	6s5	2	9'-3	28	
CURTAIN, VERT.	5f1	12	7'-11	99	5f1	12	7'-8	96	5f1	12	7'-5	93	5f1	12	7'-2	90	5f1	12	6'-11	87	5f1	12	6'-8	83	5f1	12	6'-5	80	5f1	12	6'-5	80	5f1	12	6'-5	80	
CURTAIN, VERT., ENDS	5f2	4	8'-1	34	5f2	4	7'-10	33	5f2	4	7'-7	32	5f2	4	7'-4	31	5f2	4	7'-1	30	5f2	4	6'-10	29	5f2	4	6'-7	27	5f2	4	6'-7	27	5f2	4	6'-7	27	
BRACKET, VERT.	5ul	4	6'-8	28	5ul	4	6'-5	27	5ul	4	6'-2	26	5ul	4	6'-0	25	5ul	4	5'-9	24	5ul	4	5'-6	23	5ul	4	5'-4	22	5ul	4	5'-4	22	5ul	4	5'-4	22	

ESTIMATED QUANTITIES ONE HEADWALL	REINF. STEEL	9123 LBS.				8185 LBS.				6875 LBS.				5463 LBS.				4538 LBS.				3925 LBS.				3196 LBS.				2663 LBS.				2230 LBS.			
		CONCRETE	PARAPET Δ	1.7	53.5	CONCRETE	PARAPET Δ	1.7	47.9	CONCRETE	PARAPET Δ	1.6	38.7	CONCRETE	PARAPET Δ	1.6	34.2	CONCRETE	PARAPET Δ	1.6	29.9	CONCRETE	PARAPET Δ	1.5	24.5	CONCRETE	PARAPET Δ	1.5	20.8	CONCRETE	PARAPET Δ	1.5	17.6	CONCRETE	PARAPET Δ	1.5	14.5
		WINGWALLS	25.1		WINGWALLS	21.6		WINGWALLS	15.2		WINGWALLS	12.7		WINGWALLS	10.4		WINGWALLS	7.4		WINGWALLS	5.7		WINGWALLS	4.2		WINGWALLS	2.9		WINGWALLS	1.9		WINGWALLS	1.0		WINGWALLS	0.5	
		APRON	26.7		APRON	24.6		APRON	21.9		APRON	19.9		APRON	17.9		APRON	15.6		APRON	13.6		APRON	11.9		APRON	10.1		APRON	8.4		APRON	7.1		APRON	5.8	

INCLUDES TOP OF WINGWALL QUANTITIES. (A) - INDICATES BAR LOCATED AT ACUTE CORNER. (O) - INDICATES BAR LOCATED AT OBTUSE CORNER.  
 NOTE: WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE OF 2'-0 FOR LAP. REFER TO SHEET PWH 30-1-12 FOR ACUTE AND OBTUSE CORNER LOCATIONS.

### BENT BAR DETAILS



c BAR PIN DIAMETER	
BAR SIZE	D
4	3
5	3 1/2
6	4 1/2

### HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.  
 THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.  
 ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.  
 ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR 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.  
 CONCRE