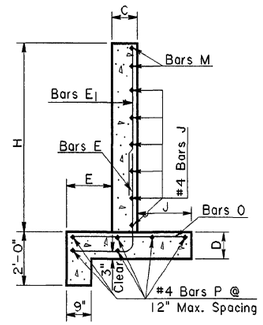
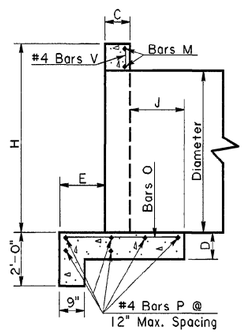
OPENING			H	E	C	J	D	L	M	S	BARS E						BARS E1				#4 BARS J		BARS O				#4 BARS P		#4 BARS H		#4 BARS V		BARS M		#4 BARS TH		#4 BARS TH1		#4 BARS TV		#4 BARS TV1		CONC.	STEEL
Dia. in.	No.	Area sq.ft.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Lgth. ft.-in.	Size	No.	Lgth. ft.-in.	Spc. in.	X ft.-in.	Y in.	Z ft.-in.	Size	No.	Lgth. ft.-in.	Spc. in.	No.	Lgth. ft.-in.	Size	No.	Lgth. ft.-in.	Spc. in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	No.	Lgth. ft.-in.	CU. YDS.	LBS.
60	1	19.6	6-0	0-11	0-8	4-6	1-0	13-10	33-5	1-11	4	48	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	37	5-9	11.0	10	33-1	0	0-0	5	8	4	2	33-1	0	0-0	0	0-0	0	0-0	0	0	12.85	748
60	2	39.3	6-0	0-11	0-8	4-6	1-0	13-10	41-6	1-11	4	52	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	46	5-9	11.0	10	41-2	5	1-11	10	8	4	2	41-2	0	0-0	0	0-0	0	0-0	0	0	15.53	877
60	3	58.9	6-0	0-11	0-8	4-6	1-0	13-10	49-6	1-11	4	56	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	55	5-9	11.0	10	49-2	10	1-11	15	8	4	2	49-2	0	0-0	0	0-0	0	0-0	0	0	18.18	1005
60	4	78.5	6-0	0-11	0-8	4-6	1-0	13-10	57-6	1-11	4	60	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	63	5-9	11.0	10	57-2	15	1-11	20	8	4	2	57-2	0	0-0	0	0-0	0	0-0	0	0	20.83	1129
60	5	98.1	6-0	0-11	0-8	4-6	1-0	13-10	65-6	1-11	4	64	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	72	5-9	11.0	10	65-2	20	1-11	25	8	4	2	65-2	0	0-0	0	0-0	0	0-0	0	0	23.48	1257
60	6	117.7	6-0	0-11	0-8	4-6	1-0	13-10	73-7	1-11	4	68	7-9	7.0	1-2	2	6-5	4	0	0-0	0.0	10	13-6	4	81	5-9	11.0	10	73-3	25	1-11	30	8	4	2	73-3	0	0-0	0	0-0	0	0-0	0	0	26.16	1386
66	1	23.7	6-6	1-0	0-8	4-9	1-0	15-0	36-4	2-0	4	60	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	49	6-1	9.0	10	36-0	0	0-0	6	8	4	2	36-0	0	0-0	0	0-0	0	0-0	0	0	14.80	922
66	2	47.5	6-6	1-0	0-8	4-9	1-0	15-0	45-0	2-0	4	65	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	61	6-1	9.0	10	44-8	5	2-0	12	8	4	2	44-8	0	0-0	0	0-0	0	0-0	0	0	17.81	1078
66	3	71.2	6-6	1-0	0-8	4-9	1-0	15-0	53-9	2-0	4	70	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	72	6-1	9.0	10	53-5	10	2-0	18	8	4	2	53-5	0	0-0	0	0-0	0	0-0	0	0	20.86	1230
66	4	95.0	6-6	1-0	0-8	4-9	1-0	15-0	62-5	2-0	4	75	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	84	6-1	9.0	10	62-1	15	2-0	24	8	4	2	62-1	0	0-0	0	0-0	0	0-0	0	0	23.87	1385
66	5	118.7	6-6	1-0	0-8	4-9	1-0	15-0	71-1	2-0	4	80	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	95	6-1	9.0	10	70-9	20	2-0	30	8	4	2	70-9	0	0-0	0	0-0	0	0-0	0	0	26.89	1536
66	6	142.5	6-6	1-0	0-8	4-9	1-0	15-0	79-9	2-0	4	85	8-4	6.0	1-3	2	6-11	4	0	0-0	0.0	10	14-8	4	107	6-1	9.0	10	79-5	25	2-0	36	8	4	2	79-5	0	0-0	0	0-0	0	0-0	0	0	29.90	1692
72	1	28.3	7-0	1-1	0-8	5-0	1-0	16-2	39-3	2-0	4	78	4-6	5.0	1-4	2	3-0	4	39	5-5	10.0	12	15-10	4	59	6-5	8.0	11	38-11	0	0-0	6	8	4	2	38-11	0	0-0	0	0-0	0	0-0	0	0	16.88	1096
72	2	56.5	7-0	1-1	0-8	5-0	1-0	16-2	48-6	2-0	4	84	4-6	5.0	1-4	2	3-0	4	42	5-5	10.0	12	15-10	4	73	6-5	8.0	11	48-2	6	2-0	12	8	4	2	48-2	0	0-0	0	0-0	0	0-0	0	0	20.24	1276
72	3	84.8	7-0	1-1	0-8	5-0	1-0	16-2	57-9	2-0	4	90	4-6	5.0	1-4	2	3-0	4	45	5-5	10.0	12	15-10	4	87	6-5	8.0	11	57-5	12	2-0	18	8	4	2	57-5	0	0-0	0	0-0	0	0-0	0	0	23.60	1456
72	4	113.0	7-0	1-1	0-8	5-0	1-0	16-2	67-1	2-0	4	96	4-6	5.0	1-4	2	3-0	4	48	5-5	10.0	12	15-10	4	101	6-5	8.0	11	66-9	0	2-0	24	8	4	2	66-9	0	0-0	0	0-0	0	0-0	0	0	27.00	1636
72	5	141.3	7-0	1-1	0-8	5-0	1-0	16-2	76-4	2-0	4	102	4-6	5.0	1-4	2	3-0	4	51	5-5	10.0	12	15-10	4	115	6-5	8.0	11	76-0	24	2-0	30	8	4	2	76-0	0	0-0	0	0-0	0	0-0	0	0	30.36	1816
72	6	169.6	7-0	1-1	0-8	5-0	1-0	16-2	85-7	2-0	4	108	4-6	5.0	1-4	2	3-0	4	54	5-5	10.0	12	15-10	4	129	6-5	8.0	11	85-3	30	2-0	36	8	4	2	85-3	0	0-0	0	0-0	0	0-0	0	0	33.73	1996
84	1	38.5	8-0	1-2	0-9	5-5	1-0	18-6	45-1	3-0	4	112	4-11	4.0	1-6	2	3-3	4	56	6-3	8.0	14	18-2	4	91	7-0	6.0	11	44-9	0	0-0	7	8	4	2	44-9	0	0-0	0	0-0	0	0-0	0	0	22.28	1588
84	2	76.9	8-0	1-2	0-9	5-5	1-0	18-6	56-8	3-0	4	123	4-11	4.0	1-6	2	3-3	4	62	6-3	8.0	14	18-2	4	114	7-0	6.0	11	56-4	7	3-2	14	8	4	2	56-4	0	0-0	0	0-0	0	0-0	0	0	27.09	1876
84	3	115.4	8-0	1-2	0-9	5-5	1-0	18-6	68-3	3-0	4	134	4-11	4.0	1-6	2	3-3	4	68	6-3	8.0	14	18-2	4	137	7-0	6.0	11	67-11	14	3-2	21	8	4	2	67-11	0	0-0	0	0-0	0	0-0	0	0	31.89	2163
84	4	153.9	8-0	1-2	0-9	5-5	1-0	18-6	79-10	3-0	4	145	4-11	4.0	1-6	2	3-3	4	74	6-3	8.0	14	18-2	4	160	7-0	6.0	11	79-6	21	3-2	28	8	4	2	79-6	0	0-0	0	0-0	0	0-0	0	0	36.70	2450
84	5	192.3	8-0	1-2	0-9	5-5	1-0	18-6	91-5	3-0	4	156	4-11	4.0	1-6	2	3-3	4	80	6-3	8.0	14	18-2	4	183	7-0	6.0	11	91-1	28	3-2	35	8	4	2	91-1	0	0-0	0	0-0	0	0-0	0	0	41.51	2737
84	6	230.8	8-0	1-2	0-9	5-5	1-0	18-6	103-0	3-0	4	167	4-11	4.0	1-6	2	3-3	4	86	6-3	8.0	14	18-2	4	206	7-0	6.0	11	102-8	35	3-2	42	8	4	2	102-8	0	0-0	0	0-0	0	0-0	0	0	46.32	3024
96	1	50.2	9-0	1-5	0-11	5-10	1-0	20-9	50-9	3-0	5	92	5-9	5.5	1-10	3	3-8	5	46	7-0	11.0	16	20-5	4	135	7-10	4.5	12	50-5	0	0-0	9	8	5	4	50-5	10	20-5	0	0-0	30	8-8	5	8	30.29	2743
96	2	100.5	9-0	1-5	0-11	5-10	1-0	20-9	63-6	3-0	5	100	5-9	5.5	1-10	3	3-8	5	50	7-0	11.0	16	20-5	4	169	7-10	4.5	12	63-2	8	3-2	18	8	5	4	63-2	10	20-5	5	3-2	33	8-8	10	8	36.43	3205
96	3	150.7	9-0	1-5	0-11	5-10	1-0	20-9	76-3	3-0	5	108	5-9	5.5	1-10	3	3-8	5	54	7-0	11.0	16	20-5	4	203	7-10	4.5	12	75-11	16	3-2	27	8	5	4	75-11	10	20-5	10	3-2	36	8-8	15	8	42.57	3666
96	4	201.0	9-0	1-5	0-11	5-10	1-0	20-9	88-11	3-0	5	116	5-9	5.5	1-10	3	3-8	5	58	7-0	11.0	16	20-5	4	237	7-10	4.5	12	88-7	24	3-2	36	8	5	4	88-7	10	20-5	15	3-2	39	8-8	20	8	48.65	4127
96	5	251.2	9-0	1-5	0-11	5-10	1-0	20-9	101-8	3-0	5	124	5-9	5.5	1-10	3	3-8	5	62	7-0	11.0	16	20-5	4	271	7-10	4.5	12	101-4	32	3-2	45	8	5	4	101-4	10	20-5	20	3-2	42	8-8	25	8	54.79	4589
96	6	301.4	9-0	1-5	0-11	5-10	1-0	20-9	114-5	3-0	5	132	5-9	5.5	1-10	3	3-8	5	66	7-0	11.0	16	20-5	4	305	7-10	4.5	12	114-1	40	3-2	54	8	5	4	114-1	10	20-5	25	3-2	45	8-8	30	8	60.92	5050
108	1	63.6	10-0	1-9	1-0	6-2	1-0	23-1	56-7	3-0	5	112	6-4	5.0	2-3	3	3-10	5	56	7-10	10.0	18	22-9	4	170	8-7	4.0	14	56-3	0	0-0	10	8	5	4	56-3	12	22-9	0	0-0	32	9-8	6	8	38.49	3603
108	2	127.2	10-0	1-9	1-0	6-2	1-0	23-1	70-5	3-0	5	121	6-4	5.0	2-3	3	3-10	5	61	7-10	10.0	18	22-9	4	211	8-7	4.0	14	70-1	9	3-2	20	8	5	4	70-1	12	22-9	6	3-2	35	9-8	12	8	45.85	4183
108	3	190.8	10-0	1-9	1-0	6-2	1-0	23-1	84-4	3-0	5	130	6-4	5.0	2-3	3	3-10	5	66	7-10	10.0	18	22-9	4	253	8-7	4.0	14	84-0	18	3-2	30	8	5	4	84-0	12	22-9	12	3-2	38	9-8	18	8	53.27	4771
108	4	254.3	10-0	1-9	1-0	6-2	1-0	23-1	98-3	3-0	5	139	6-4	5.0	2-3	3	3-10	5	71	7-10	10.0	18	22-9	4	295	8-7	4.0	14	97-11	27	3-2	40	8	5	4	97-11	12	22-9	18	3-2	41	9-8	24	8	60.68	5359
108	5	317.9	10-0	1-9	1-0	6-2	1-0	23-1	112-2	3-0	5	148	6-4	5.0	2-3	3	3-10	5	76	7-10	10.0	18	22-9	4	337	8-7	4.0	14	111-10	36	3-2	50	8	5	4	111-10	12	22-9	24	3-2	44	9-8	30	8	68.10	5946
108	6	381.5	10-0	1-9	1-0	6-2	1-0	23-1	126-0	3-0	5	157	6-4	5.0	2-3	3	3-10	5	81	7-10	10.0	18	22-9	4	378	8-7	4.0	14	125-8	45	3-2	60	8	5	4	125-8	12	22-9	30	3-2	47	9-8	36	8	75.45	6527
120	1	78.5	11-0	2-2	1-1	6-7	1-1	25-5	62-5	3-0	5	152	7-2	4.0	2-9	3	4-2	5	76	8-8	8.0	20	25-1	5	150	9-6	5.0	15	62-1	0	0-0	11	8	6	4	62-1	14	25-1	0	0-0	36	10-8	7	8	50.12	5140
120	2	157.0	11-0	2-2	1-1	6-7	1-1	25-5	77-5	3-0	5	163	7-2	4.0	2-9	3	4-2	5	82	8-8	8.0	20	25-1	5	186	9-6	5.0	15	77-1	10	3-2	22	8	6	4	77-1	14	25-1	7	3-2	39	10-8	14	8	59.40	5939
120	3	235.5	11-0	2-2	1-1	6-7	1-1	25-5	92-6	3-0	5	174	7-2	4.0	2-9	3	4-2	5	88	8-8	8.0	20	25-1	5	222	9-6	5.0	15	92-2	20	3-2	33	8	6	4	92-2	14	25-1	14	3-2	42	10-8	21	8	68.76	6740
120	4	314.0	11-0	2-2	1-1	6-7	1-1	25-5	107-5	3-0	5	185	7-2	4.0	2-9	3	4-2	5	94	8-8	8.0	20	25-1	5	258	9-6	5.0	15	107-2	30	3-2	44	8	6	4	107-2	14	25-1	21	3-2	45	10-8	28	8	78.04	7539
120	5	392.5	11-0	2-2	1-1	6-7	1-1	25-5	122-7	3-0	5	196	7-2	4.0	2-9	3	4-2	5	100	8-8	8.0	20	25-1	5	294	9-6	5.0	15	122-3	40	3-2	55	8	6	4	122-3	14	25-1	28	3-2	48	10-8	35	8	87.40	8340
120	6	471.0	11-0	2-2	1-1	6-7	1-1	25-5	137-7	3-0	5	207	7-2	4.0	2-9	3	4-2	5	106	8-8	8.0	20	25-1	5	330	9-6	5.0	15	137-3	50	3-2	66	8	6	4	137-3	14	25-1	35	3-2	51	10-8	42	8	96.68	9139
132	1	95.0	12-0	2-7	1-2	7-0	1-2	27-9	68-2	3-0	6	122	8-2	5.5	3-3	4	4-8	6	61	9-5	11.0	22	27-5	5	164	10-5	5.0	17	67-10	0	0-0	12	8	6	4	67-10	14	27-5	0	0-0	38	11-8	8	8	63.84	6285
132	2	190.0	12-0	2-7	1-2	7-0	1-2	27-9	84-5	3-0	6	130	8-2	5.5	3-3	4	4-8	6	65	9-5	11.0	22	27-5	5	203	10-5	5.0	17	84-1	11	3-2	24	8	6	4	84-1	14	27-5	7	3-2	41	11-8	16	8	75.45	7216
132	3	285.0	12-0	2-7	1-2	7-0	1-2	27-9	100-7	3-0	6	138	8-2	5.5	3-3	4	4-8	6	69	9-5	11.0	22	27-5	5	242	10-5	5.0	17	100-3	22	3-2	36	8	6	4	100-3	14	27-5	14	3-2	44	11-8	24	8	86.98	8146
132	4	379.9	12-0	2-7	1-2	7-0	1-2	27-9	116-10	3-0	6	146	8-2	5.5	3-3	4	4-8	6	73	9-5	11.0	22	27-5	5	281	10-5	5.0	17	116-6	33	3-2	48	8	6	4	116-6	14	27-5	21	3-2	47	11-8	32	8	98.59	9077
132	5	474.9	12-0	2-7	1-2	7-0	1-2	27-9	133-0	3-0	6	154	8-2	5.5	3-3	4	4-8	6	77	9-5	11.0	22	27-5	5	319	10-5	5.0	17	132-8	44	3-2	60	8	6	4	132-8	14	27-5	28	3-2	50	11-8	40	8	110.11	9996
132	6	569.9	12-0	2-7	1-2	7-0	1-2	27-9	149-3	3-0	6	162	8-2	5.5	3-3	4	4-8	6	81	9-5	11.0	22	27-5	5	358	10-5	5.0	17	148-11	55	3-2	72	8	6	4	148-11	14	27-5	35	3-2	53	11-8	48	8	121.72	10927
144	1	113.0	13-0	3-1	1-3	7-5	1-3	30-0	73-10	3-0	6	160	9-0	4.5	3-10	4	4-11	6	80	10-3	9.0	24	29-8	5	197	11-5	4.5	18	73-6	0	0-0	13	8	6	4	73-6	16	29-8	0	0-0	42	12-8	8	8	80.09	8225
144	2	226.1	13-0	3-1	1-3	7-5	1-3	30-0	91-0	3-0	6	169	9-0	4.5	3-10	4	4-11	6	85	10-3	9.0	24	29-8	5	243	11-5	4.5	18	90-11	12	3-2	26	8	6	4	90-11	16	29-8	8	3-2	45	12-8	16	8	94.36	9363
144	3	339.1	13-0	3-1	1-3	7-5	1-3	30-0	108-7	3-0	6	178	9-0	4.5	3-10	4	4-11	6	90	10-3	9.0	24	29-8	5	290	11-5	4.5	18	108-3	24	3-2	39	8	6	4	108-3	16	29-8	16	3-2	48	12-8	24	8	108.54	10511
144	4	452.2	13-0	3-1	1-3	7-5	1-3	30-0	125-11	3-0	6	187	9-0	4.5	3-10	4	4-11	6	95	10-3	9.0	24	29-8	5	336	11-5	4.5	18	125-7	36	3-2	52	8	6	4	125-7	16	29-8	24	3-2	51	12-8	32	8	122.72	11648
144	5	565.2	13-0	3-1	1-3	7-5	1-3	30-0	143-3	3-0	6	196	9-0	4.5	3-10	4	4-11	6	100	10-3	9.0	24	29-8	5	382	11-5	4.5	18	142-11	48	3-2	65	8	6	4	142-11	16	29-8	32	3-2	54	12-8	40	8	136.90	12784
144	6	678.2	13-0	3-1	1-3	7-5	1-3	30-0	160-8	3-0	6	205	9-0	4.5	3-10	4	4-11	6	105	10-3	9.0	24	29-8	5	429	11-5	4.5	18	160-4	60	3-2	78	8	6	4	160-4	16	29-8	40	3-2	57	12-8	48	8	151.17	13934

FEDERAL PROJECT	STATE PROJECT	PARISH	SHEET NO.



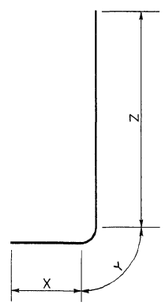
SECTION A-A

STEEL SHOWN IN BACK FACE OF WALL

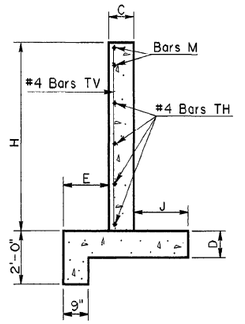


SECTION B-B

STEEL SHOWN IN BACK FACE OF WALL

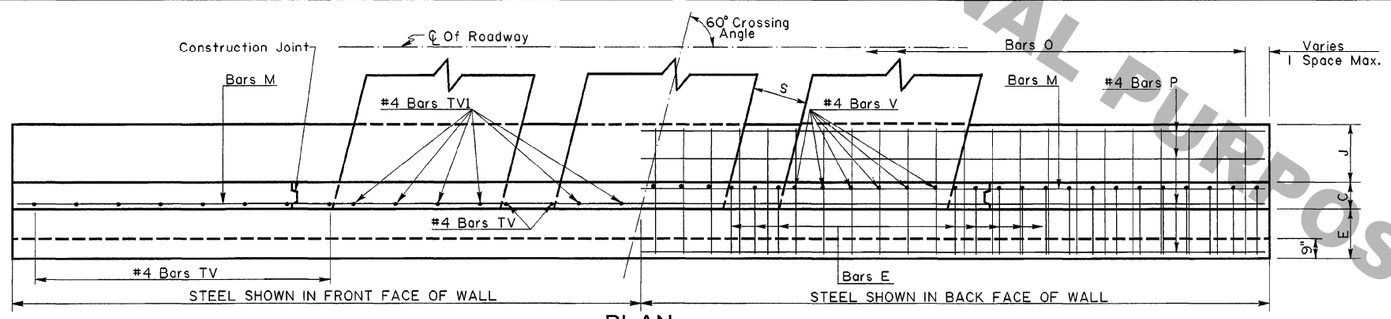


BARS E

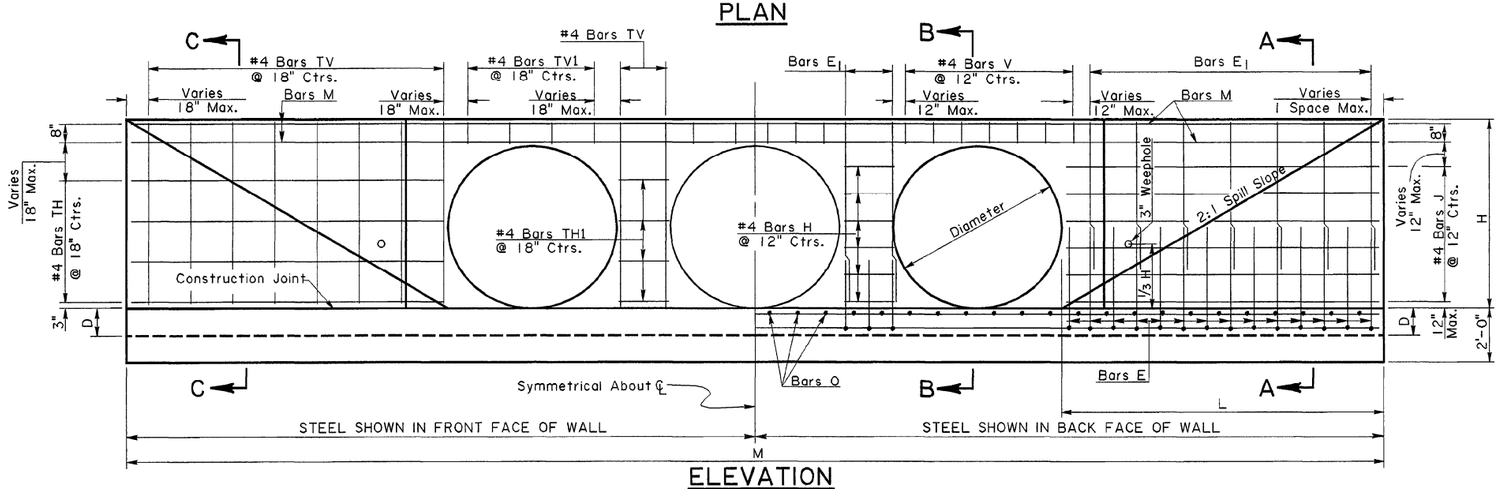


SECTION C-C

STEEL SHOWN IN FRONT FACE OF WALL



PLAN



ELEVATION

GENERAL NOTES

DESIGN: Method- Headwalls are designed as retaining walls according to current AASHTO working stress procedures. Walls are designed for a lateral earth pressure of 40 psf with 2.0 feet of surcharge. Overturning- A minimum safety factor of 2.0 is provided against overturning. The resultant of loads is within the middle third of the footing. Sliding - A minimum safety factor of 1.5 is provided against sliding. The coefficient of friction between the footing and soil is 0.5. Foundation - The design soil bearing pressure is 1800 psf. When strength of the soil at the site is less than 1800 psf, bedding material shall be added under the footing as directed.

MATERIALS: Concrete- All concrete shall be class A. All exposed edges shall be ¾ inch chamfered. Reinforcing Steel - Reinforcement shall be Grade 60. Bar spacing dimensions are to bar centers. Steel required for lap splices not detailed shall not be measured for payment. Reinforcing steel shall have 2" cover unless otherwise specified. Steel and concrete quantities shown in table are for one headwall.

A 1'-6" square of geotextile fabric (see Section 1019 of the LA DOTD Standard Specifications) shall be placed in contact with concrete behind each weephole in addition to approximately 2 cu.ft. of concrete sand (see Section 1003.02 of the LA DOTD Standard Specifications).

CONSTRUCTION JOINTS: All construction joints shown are optional. For details of keyed construction joints see Standard Plan CM-49. For construction joints without key, the joint surface shall be roughened. Hardened surface shall be cleaned. Immediately before new concrete is placed, joint surface shall be saturated with water.

STATE OF LOUISIANA
WILLIAM M. RAY
REG. No. 24936
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
William M. Ray
7-26-01

DATE	DESCRIPTION	BY
11-14-97	Revised General Notes And Assigned Name HW60CMP2	JCM

REVISIONS

SPECIAL DETAIL NO. HW60CMP2 — SHEET 1 OF 1

STRAIGHT HEADWALL FOR CMP ON A 60° CROSSING 60" THRU 144"

DATED January 6, 1993

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

DESIGNED PAA	DETAILED KAJ	DIR. spdetail/headwall/
CHECKED	CHECKED PAA	FILE HW60cmp.dgn

HYDRAULICS SECTION

PRELIMINARY PLANS FOR INFORMATIONAL PURPOSES ONLY