APRON QUANTITIES FOR CONCRETE BOX CULVERTS

S	H	SINGLE - 90 °			SINGLE - 75 °			SINGLE - 60 °			SINGLE - 45 °		
		W (FT.)	CU.YDS CONC	LBS STEEL	W (FT.)	CU.YDS CONC.	LBS STEEL	W (FT.)	CU.YDS. CONC.	LBS. STEEL	W (FT.)	CU.YDS. CONC.	LBS. STEEL
4'	4	13.183	1.70	138	14.468	1.91	155	16.469	2.28	183	23.238	3.17	249
	5	15.000	2 23	173	16 458	2.49	193	19.025	2 96	228	25.958	3.97	300
	6	16.733	2 57	202	18.318	2 86	226	21.091	3.47	271	29.387	4.72	364
5'	4	14.183	1.89	152	15.502	2.11	169	17.616	2.52	200	24,648	3.46	271
	5	15.983	2.34	185	17 487	2.62	207	20.171	3.19	249	28.002	4.31	333
	6	17.783	2 80	219	19.353	3.12	244	22.236	3.77	293	30.798	5.08	390
6'	4	15.183	2 09	166	16 537	2.32	184	18.763	2.77	218	26.060	3.76	292
	5	16.983	2 55	200	18 521	2.84	223	21.318	3.46	269	29.414	4.64	357
	6	18.783	3 05	238	20 388	3.37	262	23.382	4.08	315	32.209	5.44	416
7'	4	17.933	2 75	215	18.173	2.69	211	21.285	3.36	261	29.037	4.44	341
	5	19.733	3.28	253	20.158	3.25	253	23.447	4.03	310	31.943	5.30	405
	6	21.533	3 84	295	21 845	3.75	289	25.414	4.63	355	34.627	6.07	463
	7	23.333	4 44	339	24.551	4.64	355	28.559	5.73	436	39.099	7.55	572
8'	4	18.933	2.97	230	19.450	2.96	231	22.431	3.62	280	31.463	4.96	379
	5	20.733	3.51	270	21.374	3.54	273	24.987	4.41	338	33.802	5.74	437
	6	22.533	4.10	314	23.299	4.16	319	27.149	5.17	394	36.709	6.71	509
	7	24.333	4.72	360	25.830	5.00	381	30.101	6.19	470	40.959	8.08	610
	8	26.133	5.39	409	27 752	5.72	434	32.262	7.07	535	43.865	9.21	693
9'	4	20.533	3 36	259	20 904	3 31	256	24.170	4.08	314	32.978	5.39	411
	5	22.333	3.95	302	22.409	3.78	290	26.133	4.70	359	35.214	6.08	462
	6	24.133	4.57	348	24.514	4.47	342	28.296	5.49	417	38.568	7.20	544
	7	25.933	5 23	396	27 048	5.34	406	31.246	6.55	496	42.819	8.62	649
	8	27.733	5.93	448	28.970	6 09	461	33.407	7.46	562	45.724	9.79	735
	9	28.933	6 42	484	31.516	7 06	532	36.737	8.73	656	48.818	11.01	824
	10	31.033	7.32	550	33.435	7.91	595	39.297	9.89	742	51.724	12.32	921
10'	4	22.133	3.78	290	22.542	3.73	287	25.976	4.59	350	34.468	5.83	442
	5	23.933	4.40	335	24 349	4.35	332	28.141	5.37	408	37.868	6.97	526
	6	25.733	5 06	383	26 272	4.99	380	30.101	6 08	460	40.502	7.83	590
	7	26.933	5.52	417	28.805	5.92	448	33.047	7.20	543	44.750	9.32	700
	8	28.733	6.24	470	30.606	6.67	503	35.603	8.27	622	47 657	10.54	789
	9	30.533	7.01	526	32 172	7.15	538	37.176	8.99	674	50.340	11.61	868
	10	32.333	7.81	585	34 108	8 11	609	39 145	9.86	738	53.024	12.73	950
	11	34.133	8.65	647	35.906	8.98	673	41.703	11.10	829	55.930	14.14	1053
	12	35.933	9.54	712	37 707	9.88	739	43.863	12.25	914	58.837	15.61	1161

S	H	DOUBLE - 90°			DOUBLE 75°			DOUBLE 60°			DOUBLE 45°		
		W (FT.)	CU.YDS. CONC.	LBS. STEEL	W (FT)	CU.YDS. CONC.	LBS. STEEL	W (FT)	CU.YDS. CONC.	LBS. STEEL	W (FT.)	CU YDS CONC.	LBS. STEEL
4'	4	17.800	2.59	202	19.297	2.87	223	21.828	3 42	264	29.850	4.67	351
	5	19.600	3.16	243	21.280	3.51	270	24.380	4.26	327	33.250	5.45	408
	6	-	-	-	-	-	-	-	-	-	-	-	-
5'	4	19.800	2.97	230	21.366	3.28	253	24.129	3.91	299	32.649	5.13	390
	5	21.600	3.54	271	23.352	3.92	300	26.678	4.75	362	36.003	6.19	468
	6	-	-	-	-	-	-	-	-	-	-	-	-
6'	4	21.800	3.35	257	23.436	3.69	282	26.431	4.40	335	35.474	5.72	433
	5	23.683	3.98	303	25 508	4 40	334	29.074	5.33	404	38.945	6.88	518
	6	25.483	4.63	351	27.373	5.07	384	31.134	6.13	462	41.740	7.88	592
7'	4	25.766	4.43	335	26.280	4.36	331	30.281	5.39	407	40.097	6 86	516
	5	27.566	5.13	387	28.266	5.11	386	32.447	6.29	473	43.006	7.99	598
	6	29.366	5.87	441	29.950	5.76	434	34.403	7.08	531	45.686	8.98	672
	7	31.166	6.64	498	32.658	6.91	518	37.547	8.51	636	50.158	10.84	808
8'	4	27.766	4.86	366	28.590	4.86	367	32.583	5.91	445	43.366	7.60	569
	5	29.566	5.60	420	30.516	5.65	425	35.131	7.00	524	46.275	8.80	657
	6	31,366	6.38	478	32.442	6.48	486	37.297	8.01	598	49.185	10.07	750
	7	33.166	7.21	538	34.970	7.58	567	40.232	9.36	698	53.428	11.82	879
	8	35.133	8.12	605	37.067	8.56	639	42.589	10.56	785	56.573	13.32	989
9'	4	30.366	5.54	416	31.082	5.49	412	35.481	6.72	503	46.865	8.56	638
	5	32.166	6.34	474	32.586	6.13	459	37.432	7.58	566	49.101	9.49	707
	6	33.966	7.18	536	34.692	7.07	529	39.598	8.65	645	52.455	10.97	815
	7	35.766	8.06	600	37.221	8.23	614	42.531	10.07	749	56.698	12.81	950
	8	37.733	9.04	671	39.318	9.27	690	44.888	11.33	841	59.843	14.39	1066
	9	38.933	9.68	718	41.856	10.52	781	48.182	12.99	963	62.934	15 94	1179
	10	41.033	10.84	803	43.777	11.60	861	50.737	14.48	1072	65.843	17.58	1299
10'	4	32.966	6.26	468	33 756	6.21	465	38.445	7.59	566	49.778	9.38	697
	5	34.766	7.12	531	35.564	7.07	529	40.612	8.69	647	53.178	10 92	810
	6	36.566	8.02	596	37.485	7.95	592	42.560	9.66	718	55.804	12.18	866
	7	37.766	8 64	642	40.013	9.19	683	45.489	11.18	829	60.047	14.03	1038
	8	39.733	9.66	716	41.990	10.24	760	48.231	12.68	938	63.193	15.69	1159
	9	41.533	10.67	789	43.555	11.09	822	49.803	13.61	1007	65.873	17.06	1260
	10	43.333	11.72	866	45.485	12.13	898	51.761	14.75	1090	68.554	18.49	1364
	11	45.133	12.80	945	47.287	13.25	980	54.314	16.35	1207	71.463	20.26	1494
	12	46.933	13.93	1028	49.090	14.40	1064	56.478	17.83	1315	74.372	22.11	1628

S	H	TRIPLE 90°			TRIPLE 75°			TRIPLE 60°			TRIPLE 45°		
		W (FT.)	CU.YDS CONC.	LBS. STEEL	W (FT.)	CU.YDS. CONC.	LBS. STEEL	W (FT.)	CU.YDS. CONC.	LBS. STEEL	W (FT)	CU.YDS. CONC.	LBS. STEEL
4'	4	22.466	3.48	266	24.125	3.83	292	27.198	4.56	346	36.415	5.92	447
	5	-	-	-	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-	-	-	-
5'	4	25.466	4.06	308	27.230	4.44	337	30.654	5.29	399	40.654	6.80	510
	5	27.266	4.75	358	29.216	5.22	394	33.198	6.32	475	44.007	8.06	603
	6	-	-	-	-	-	-	-	-	-	-	-	-
6'	4	28.466	4.63	349	30.336	5.06	381	34.111	6.02	451	44.893	7.69	574
	5	30.433	5.43	407	32.495	5.95	446	36.846	7.20	538	48.483	9.11	679
	6	32.233	6.23	466	34.360	6.77	506	38.903	8.17	609	51.277	10.33	767
7'	4	33.600	6.11	456	34.388	6.03	451	39.301	7.43	554	51.165	9.29	690
	5	35.400	6.98	520	36.374	6.97	520	41.468	8.55	636	54.076	10.68	792
	6	37.200	7.89	586	38.058	7.77	579	43.416	9.54	708	56.754	11.89	881
	7	39.000	8.84	656	40.765	9.18	682	46.558	11.29	836	61.225	14.13	1045
8'	4	36.600	6.75	502	37.733	6.76	504	42.758	8.21	610	55.847	10.37	768
	5	38.400	7.69	571	39.659	7.76	577	45.301	9.58	717	58.758	11.86	877
	6	40.200	8.67	642	41.586	8.80	653	47.468	10.85	803	61.669	13.43	991
	7	42.000	9.69	716	41.111	9.98	740	50.392	12.52	925	65.907	15.56	1148
	8	44.133	10.85	801	46.382	11.41	843	52.942	14.04	1036	69 288	17.44	1284
9'	4	40.200	7.72	572	41.261	7.66	569	46.814	9.36	693	60.762	11.73	866
	5	42 000	8.74	647	42.765	8.48	628	48.757	10.46	773	62.998	12.90	952
	6	43.800	9.80	724	44.870	9.67	715	50.925	11.82	872	66.351	14.74	1086
	7	45.600	10.90	804	47.397	11.12	822	53.846	13.60	1003	70.589	17.01	1252
	8	47.733	12.14	895	49.668	12.45	918	56.396	15.21	1120	73.970	18.99	1397
	9	48.933	12.93	952	52.201	13.98	1030	59 666	17.25	1269	77.060	20.86	1533
	10	51.033	14.35	1055	54.124	15.30	1127	62.217	19.07	1402	79.970	22.84	1678
10'	4	43.800	8.75	646	44.970	8.69	643	50.935	10.60	782	65.094	12.92	951
	5	45.600	9.84	726	46.779	9.79	723	53.102	12.02	885	68.494	14.88	1094
	6	47.400	10.98	809	48.698	10.91	805	55.043	13.25	975	71.121	16.31	1199
	7	48.600	11.76	866	51.225	12.47	919	57.961	15.16	1115	75 356	18.73	1377
	8	50.733	13.07	961	53.376	13.82	1017	60.889	17.08	1255	78.738	20.84	1530
	9	52.533	14.33	1053	54.940	14.87	1094	62.460	18.24	1340	81.415	22.52	1652
	10	54.333	15.62	1147	56.867	16.15	1188	64.411	19.65	1443	84.094	24.24	1778
	11	56.133	16.95	1244	58.671	17.52	1287	66.959	21.61	1585	87.004	26.38	1934
	12	57.933	18.33	1344	60.476	18.92	1389	69.125	23.40	1716	89.915	28.60	2095

NOTE: THE QUANTITIES SHOWN ABOVE ARE FOR OUTLET END APRONS WITH BAFFLES. IF APRONS ARE NEEDED AT INLETS (NOT USUAL), REDUCE THE ABOVE QUANTITIES FOR NO. BAFFLES AS FOLLOWS·
CONCRETE: REDUCE QUANTITY BY W × 0.0092 CU.YDS/FT.
STEEL: REDUCE QUANTITY BY W × 0.334 LBS/LIN.FT.

S = CLEAR SPAN OF BOX CULVERT (IN FT)
H = CLEAR HEIGHT (RISE) OF BOX CULVERT (IN FT.)

GENERAL NOTES:

1. SPECIFICATIONS : GEORGIA STANDARD; CURRENT EDITION, AND SUPPLEMENTS THERETO
2. CONCRETE APRONS AND BAFFLES ARE REQUIRED AT ALL OUTLETS OF ALL BOX CULVERT DRAINS. APRON IS NOT TO BE OMITTED AT OULETS UNLESS THE ENGINEER DETERMINES THAT BED ROCK WILL PREVENT EROSION AND MAKE THE APRON DIFFICULT TO CONSTRUCT. APRONS (WITHOUT BAFFLES) ARE USED AT INLETS ONLY IF PLANS SPECIFY.
3. DETAILS HERESHOWN APPLY TO BOTH STANDARD AND SPECIAL DESIGN BOX CULVERTS, UNLESS OTHERWISE NOTED.
4. WHERE CONCRETE APRONS ARE REQUIRED, THE TOEWALL OF THE BOX CULVERT MAY BE REDUCED AS SHOWN IN SECTION B-B OR MAY BE AS SHOWN ON APPLICABLE STANDARDS FOR THE BOX CULVERTS. WHERE APRON IS NOT REQUIRED, DO NOT USE TOEWALL AS SHOWN IN SECTION B-B, BUT SEE BOX CULVERT STANDARD TOEWALL.
5. ALL CONCRETE SHALL BE CLASS A CONCRETE.

NOTE· SEE SEPARATE STANDARD DETAILS AND/OR SPECIAL DESIGNS, AS APPLICABLE FOR DETAILS OF BOX CULVERTS, WINGWALLS, PARAPETS, ETC

BY	REVISION	DATE
G.J.P.	REDRAWN	6-30-98
R.M.U.	ADD ABUTTING JT - TYP PLAN V	7-24-85
R.M.U.	ADD 4'X 5' QUANTITIES	8-14-84

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

STANDARD
CONCRETE BOX CULVERT APRONS, BAFFLES, AND INLET BEVELING DETAIL & ADJACENT BOX CULVERTS JOINT DETAIL

NO SCALE — JULY, 1983

REV. R.M.U. (SUBMITTED)
TRA G.M.E. STATE ROAD & AIRPORT DESIGN ENGR
CHK. J.M.W. (APPROVED)
R.K.C. STATE HIGHWAY ENGINEER

NUMBER 2332
SHEET 2 OF 2