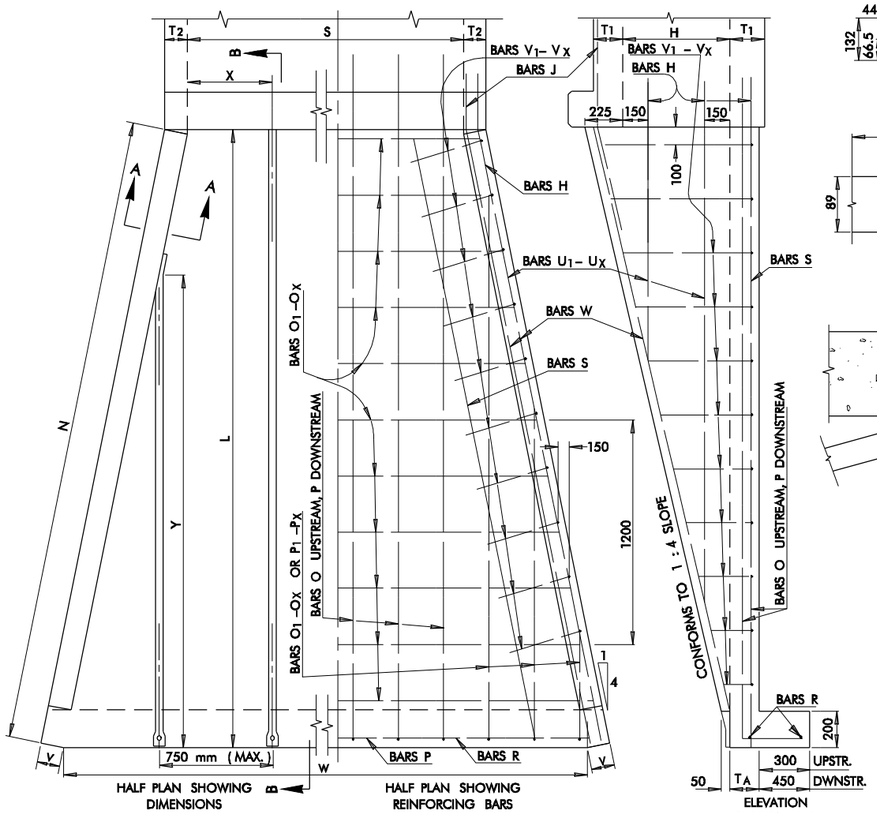
DESCRIPTION	REVISIONS	DATE
RE-ISSUE W/METRIC 1999 SPECS.		7/99
Add Curb Dimensions		lgc 11/02
Gen. Notes 11,12, Add Cl. AA Conc.		lgc 6/05

SPECIAL WINGWALL FOR MULTI-CELL REINFORCED CONCRETE BOXES

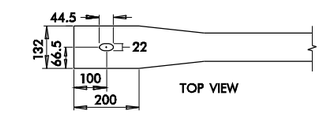
TABLE OF REINFORCING STEEL FOR 4 WINGS, 2 APRONS & 2 CURTAINWALLS

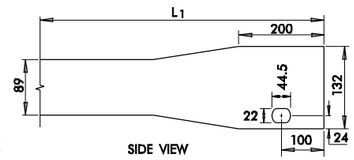
NO. OF CELLS	CULVERT SIZE	TABLE OF DIMENSIONS							TOTAL QUANTITIES 4 WINGS / 2 APRONS 2 CURTAIN WALLS			BARS H #13M @ 750 LG. @300 C/C		BARS J #19M @ 1200 LG.		BARS O #13M @ 300 C/C			BARS O_1 – O_X #13M @ 300 C/C			BARS P #13M @ 300 C/C			BARS P_1 – P_X #13M @ 300 C/C			BARS Q_1 – Q_X #13M @ 300 C/C			BARS R 4 – #13M		BARS S 8 – #13M		BARS U_1 – U_X #13M			BARS V_1 – V_X #13M @ 300 C/C			8 BARS W			PIPE RUNNERS HEADWALL PIPE		PIPE RUNNERS WINGWALL PIPE	
	SPAN x RISE (mm x mm)	L (m)	N (m)	V (mm)	W (m)	T_A (mm)	X (mm)	Y (m)	CONC. (m^3)	STEEL (kg)	PIPE (m)	NO.	(kg)	NO.	(kg)	NO.	LENGTH (m)	WT. (kg)	NO.	AVE. LENGTH (m)	WT. (kg)	NO.	AVE. LENGTH (m)	WT. (kg)	NO.	AVE. LENGTH (m)	WT. (kg)	NO.	LENGTH (m)	WT. (kg)	LENGTH (m)	WT. (kg)	LENGTH (m)	WT. (kg)	NO.	AVE. LENGTH (m)	WT. (kg)	NO.	AVE. LENGTH (m)	WT. (kg)	SIZE	LENGTH (m)	WT. (kg)	NO.	L_0 (m)	NO.	L_1 (m)
2	1200 x 600	3.353	3.418	150	4.343	175	572	2.591	6.193	425	32.474	12	9	8	21	18	4.063	73	8	1.651	13	18	4.213	75	8	2.413	19	22	3.632	79	3.353	13	3.277	26	8	1.994	16	40	0.978	39	#16M	3.353	42	6	3.429	4	2.975
2	1200 x 900	4.572	4.674	175	4.928	175	191	2.235	9.351	590	47.117	16	12	8	21	18	5.282	95	8	2.261	18	18	5.432	97	8	3.023	24	30	3.912	117	4.572	18	4.521	36	12	2.616	31	56	1.130	63	#16M	4.648	58	8	4.686	4	2.407
2	1200 x 1200	5.791	5.925	175	5.537	200	191	3.454	14.488	833	62.192	20	15	8	21	18	6.501	116	12	2.870	34	18	6.651	119	12	3.632	43	38	4.216	159	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	8	5.944	4	3.661
2	1500 x 600	3.353	3.418	150	4.953	175	191	2.285	7.019	472	37.262	12	9	8	21	22	4.063	89	8	1.651	13	22	4.213	92	8	2.413	19	22	4.242	93	3.353	13	3.277	26	8	1.994	16	40	0.978	39	#16M	3.353	42	8	3.429	4	2.457
2	1500 x 900	4.572	4.674	175	5.537	175	483	3.454	10.444	651	52.134	16	12	8	21	22	5.282	116	8	2.261	18	22	5.432	119	8	3.023	24	30	4.521	135	4.572	18	4.521	36	12	2.616	31	56	1.130	63	#16M	4.648	58	8	4.686	4	3.661
2	1500 x 1200	5.791	5.925	175	6.147	200	102	3.150	15.933	908	72.835	20	15	8	21	22	6.501	142	12	2.870	34	22	6.651	145	12	3.632	43	38	4.826	182	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	10	5.944	4	3.350
2	1500 x 1500	7.010	7.182	175	6.756	200	483	4.369	20.918	1155	94.437	24	18	8	21	22	7.720	169	16	3.480	55	22	7.870	172	16	4.242	67	46	5.131	235	7.010	28	7.036	56	20	3.861	77	88	1.461	128	#19M	7.239	129	8	7.201	8	4.604
2	1800 x 600	3.353	3.418	150	5.563	175	38	0.000	7.776	518	41.148	12	9	8	21	26	4.063	105	8	1.651	13	26	4.213	109	8	2.413	19	22	4.851	106	3.353	13	3.277	26	8	1.994	16	40	0.978	39	#16M	3.353	42	12	3.429	0	0.000
2	1800 x 900	4.572	4.674	175	6.147	200	406	3.150	12.745	712	60.262	16	12	8	21	26	5.282	137	8	2.261	18	26	5.432	140	8	3.023	24	30	5.131	153	4.572	18	4.521	36	12	2.616	31	56	1.156	64	#16M	4.648	58	10	4.686	4	3.350
2	1800 x 1200	5.791	5.925	175	6.756	200	51	2.845	17.539	984	83.464	20	15	8	21	26	6.501	168	12	2.870	34	26	6.651	172	12	3.632	43	38	5.436	205	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	12	5.944	4	3.035
2	1800 x 1500	7.010	7.182	175	7.366	200	406	4.064	11.377	1244	106.324	24	18	8	21	26	7.720	200	16	3.480	55	26	7.870	203	16	4.242	67	46	5.740	262	7.010	28	7.036	56	20	3.861	77	88	1.461	128	#19M	7.239	129	10	7.201	8	4.289
2	2100 x 900	4.572	4.674	175	6.756	200	356	2.819	13.403	768	67.958	16	12	8	21	30	5.282	158	8	2.261	18	30	5.432	162	8	2.413	19	30	5.740	171	4.572	18	4.521	36	12	2.616	31	56	1.156	64	#16M	4.648	58	12	4.686	4	2.931
2	2100 x 1200	5.791	5.925	175	7.366	200	356	4.039	19.068	1052	88.062	20	15	8	21	30	6.501	194	12	2.870	34	30	6.651	198	12	3.023	36	38	6.045	228	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	12	5.944	4	4.185
2	2400 x 900	4.572	4.674	175	7.366	200	254	2.540	14.053	834	76.492	16	12	8	21	34	5.282	179	8	2.261	18	34	5.432	184	8	3.023	24	30	6.350	189	4.572	18	4.521	36	12	2.616	31	56	1.156	64	#16M	4.648	58	14	4.686	4	2.721
2	2400 x 1200	5.791	5.925	175	7.976	200	254	3.759	20.597	1135	99.111	20	15	8	21	34	6.501	220	12	2.870	34	34	6.651	225	12	3.632	43	38	6.655	251	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	14	5.944	4	3.975
2	2400 x 1500	7.010	7.182	175	8.585	200	635	4.978	26.094	1424	128.270	24	18	8	21	34	7.720	261	16	3.480	55	34	7.870	266	16	4.242	67	46	6.960	318	7.010	28	7.036	56	20	3.861	77	88	1.461	128	#19M	7.239	129	12	7.201	8	5.232
3	1200 x 900	4.572	4.674	175	5.436	175	432	3.251	10.237	626	51.308	16	12	8	21	20	5.282	105	8	2.261	18	20	5.432	108	8	3.023	24	30	4.420	132	4.572	18	4.521	36	12	2.616	31	56	1.130	63	#16M	4.648	58	8	4.686	4	3.454
3	1200 x 1200	5.791	5.925	175	6.960	200	127	3.251	18.487	992	85.141	20	15	8	21	26	6.501	168	12	2.870	34	26	6.651	172	12	3.632	43	38	5.639	213	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	12	5.944	4	3.454
3	1500 x 900	4.572	4.674	175	7.264	200	203	2.337	15.001	809	75.654	16	12	8	21	32	5.282	168	8	2.261	18	32	5.432	173	8	3.023	24	30	6.248	186	4.572	18	4.521	36	12	2.616	31	56	1.156	64	#16M	4.648	58	14	4.686	4	2.511
3	1500 x 1200	5.791	5.925	175	7.874	200	203	3.556	20.345	1106	98.323	20	15	8	21	32	6.501	207	12	2.870	34	32	6.651	212	12	3.632	43	38	6.553	248	5.791	23	5.766	46	16	3.239	52	72	1.384	99	#19M	5.944	106	14	5.944	4	3.778
3	1500 x 1500	7.010	7.182	175	8.484	200	432	4.775	26.110	1389	126.492	24	18	8	21	32	7.720	246	16	3.480	55	32	7.870	250	16	4.242	67	46	6.858	314	7.010	28	7.036	56	20	3.861	77	88	1.461	128	#19M	7.239	129	12	7.201	8	5.010
3	1800 x 900	4.572	4.674	175	8.179	200	279	2.642	16.835	901	86.284	16	12	8	21	38	5.282	200	8	2.261	18	38	5.432	205	8	3.023	24	30	7.163	214	4.572	18	4.521	36	12	2.616	31	56	1.156	64	#16M	4.648	58	16	4.686	4	2.826

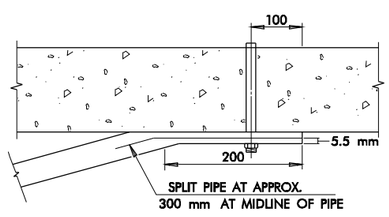


ALL DIMENSIONS MEASURED IN THE PLANE OF THE SLAB

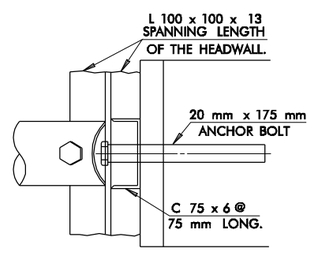
SINGLE OR DOUBLE CELL R. C. BOX



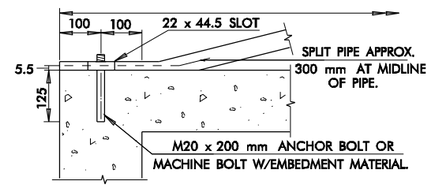




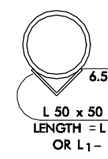
SECTION THRU WINGWALL



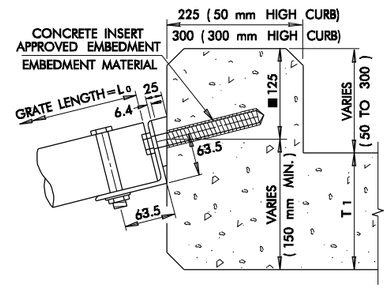
TOP VIEW OF HEADWALL



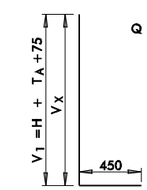
SECTION THRU TOEWALL



NOTE:
WHERE L_0 OR L_1 IS GREATER THAN 4.5 m THE PIPE RUNNERS SHALL BE STRENGTHENED OVER THE MIDSPAN AS SHOWN.

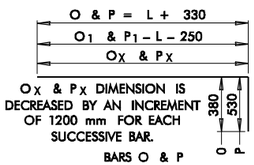


SIDE VIEW OF HEADWALL
SEE RDY. STD. RCB1, RCB2 FOR T1 DIM
OR SEE BRIDGE STD. RCB–C1 FOR EQUIV. DIM



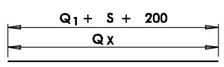
V_X DIMENSION IS DECREASED BY AN INCREMENT OF 75 mm FOR EACH SUCCESSIVE BAR.

BARS V



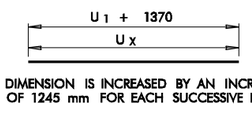
O_X & P_X DIMENSION IS DECREASED BY AN INCREMENT OF 1200 mm FOR EACH SUCCESSIVE BAR.

BARS O & P



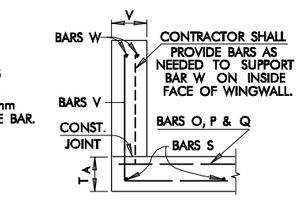
Q DIMENSION IS INCREASED BY AN INCREMENT OF 150 mm FOR EACH SUCCESSIVE BAR.

BARS Q

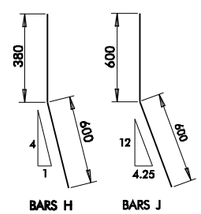


U DIMENSION IS INCREASED BY AN INCREMENT OF 1245 mm FOR EACH SUCCESSIVE BAR.

BARS U



SECTION A–A



BARS H BARS J

GENERAL NOTES

1. PIPE RUNNERS SHALL BE 75 mm SCHEDULE 40 STEEL PIPE, ASTM A–53, A–120, BOLTS AND NUTS SHALL CONFORM TO ASTM A307.
2. HOLES SHALL BE 1.6 mm OVERSIZE UNLESS OTHERWISE NOTED.
3. STEEL PLATE SHALL CONFORM TO ASTM A36.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. STEEL COVER TO BE 50 mm FROM CENTER OF OUTSIDE LAYER OF STEEL TO FACE OF CONCRETE. CHAMFER EXPOSED CORNERS 20 mm EXCEPT AS OTHERWISE NOTED.
6. ALL EXPOSED STEEL SHALL BE GALVANIZED UNLESS OTHERWISE SHOWN ON PLANS. GALVANIZING DAMAGED DURING TRANSPORT AND CONSTRUCTION, SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIFICATIONS.
7. QUANTITIES SHOWN DO NOT INCLUDE QUANTITIES FOR CURB.
8. OVERALL LENGTH OF HEADWALL PIPE (L_0) INCLUDING BENDS.
9. OVERALL LENGTH OF WINGWALL PIPE (L_1) INCLUDING BENDS.
10. ■ DESIRABLE DIMENSION, HOWEVER THIS DIMENSION SHOULD NOT BE LESS THAN 150 mm, IF ANCHOR BOLT HOLE IS DRILLED HORIZONTALLY. VALUE OF T_1 COULD MAKE THIS DIMENSION SLIGHTLY MORE OR LESS. T_1 & T_2 DIMENSIONS TO BE SHOWN ELSEWHERE ON PLANS.
11. ALL BOLTS, NUTS, WASHERS, BRACKETS, BRACE ANGLE FOR PIPE STRENGTH, SUPPORT ANGLES AT HEADWALL AND PIPE RUNNERS, SHOWN ON THIS DETAIL SHEET, ARE TO BE INCLUDED IN THE PRICE BID FOR CLASS A OR CLASS AA CONCRETE.
12. WINGWALLS, CURB AND APRON CONSTRUCTION SHALL CONSIST OF SAME CLASS OF CONCRETE USED FOR REINFORCED CONCRETE BOX.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
509.06 (A)	CLASS AA CONCRETE	CU. METER
509.06 (B)	CLASS A CONCRETE	CU. METER
511.06 (A)	REINFORCING STEEL	KILOGRAM

APPROVED BY ROADWAY ENGINEER DATE

OKLAHOMA DEPT. OF TRANSPORTATION
ROADWAY STANDARD (METRIC)

SAFETY GRATED WINGWALL
FOR MULTI–CELL REINFORCED CONCRETE BOX

1999 SPECIFICATIONS	(1 : 4 SAFETY SLOPE)	MCGW–2	02M
ALL DIMENSIONS ON THIS SHEET IN MILLIMETERS UNLESS OTHERWISE NOTED.			R–142M