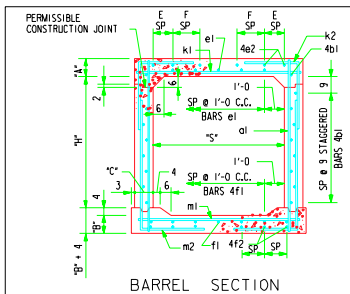
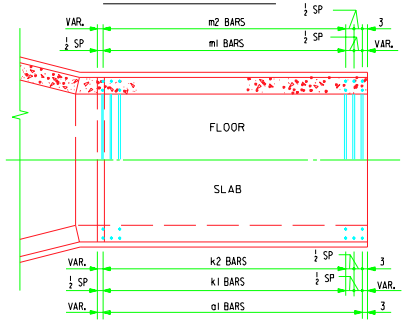
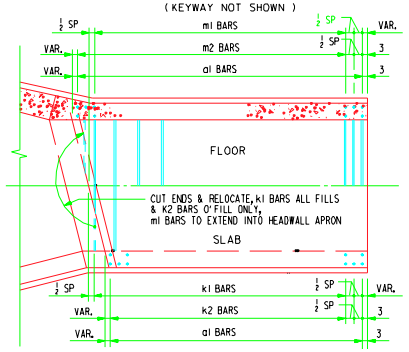


BARREL SECTION



PLAN - 0° SKEW

(KEYWAY NOT SHOWN)



PLAN - SKEW TYPICAL

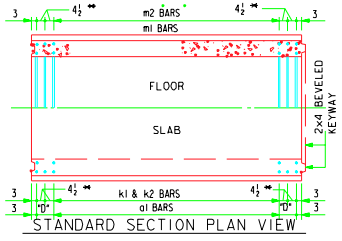
(KEYWAY NOT SHOWN)

NOTE : ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.

NOTE:
TYPICAL FOR LENGTHS OF 38', 35', 32', 29', AND 26'.
THESE LENGTHS ARE SHOWN AS TYPICAL BECAUSE ALL TRANSVERSE AND VERTICAL REINFORCING STEEL SPACING REPEATS IN 3' INTERVALS.
* 9" FOR THE 10'X12', 1' FILL CULVERT; m2 AND K2 BARS ONLY.

VARIABLE DIMENSIONS AND QUANTITIES FOR BARREL SECTIONS

DIMENSIONS							BAR LIST																																				QUANTITIES				
							a1			b1			e1			e2			f1			f2			k1			m1			k2						m2						CONCRETE YD³/FT				STEEL
FILL	S	H	A	B	C	D	SIZE	SP	L	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	SPACING	NO.	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	SP	L	SIZE	SP	L	h	v	SIZE	SP	L	h	v	SLAB	FLOOR	WALLS	TOTAL	LBS/FT
0	10	4	12	10.5	9	9	4	12	5'-9	4	9	12	4	12	9	4	15	15	9	4	12	11	4	16	6	6	9	11'-2	5	9	11'-8	6	9	10'-0	6'-7	3'-5	6	9	8'-4	3'-10	4'-6	.458	.426	.201	1.085	156.18
1	10	4	11	10.5	9	9	4	12	5'-8	4	9	12	5	12	9	4	11	11	6	4	12	11	4	16	6	8	12	11'-2	6	12	11'-8	6	9	6'-1	2'-9	3'-4	6	9	8'-2	3'-8	4'-6	.423	.426	.201	1.050	151.03
2	10	4	9	10	9	9	6	9	5'-6	4	9	12	5	12	9	4	13	13	6	4	12	11	4	14	6	8	12	11'-2	6	9	11'-8	6	9	6'-2	3'-0	3'-2	6	9	7'-7	3'-2	4'-5	.352	.408	.201	.961	168.89
3	10	4	8	10	9	9	4	12	5'-5	4	9	12	4	12	9	4	13	13	6	4	12	11	4	13	6	6	9	11'-2	6	9	11'-8	6	9	6'-1	3'-0	3'-1	6	9	7'-5	3'-0	4'-5	.316	.408	.201	.925	140.97
4 - 6	10	4	8	10.5	9	9	5	12	5'-5	4	9	12	4	12	9	4	11	11	6	4	12	11	4	16	4	6	9	11'-2	6	9	11'-8	6	9	5'-10	2'-9	3'-1	6	9	7'-2	2'-8	4'-6	.316	.426	.201	.943	141.74
7 - 10	10	4	8	10.5	9	9	6	9	5'-5	4	9	12	4	12	9	4	11	11	6	4	12	11	4	16	4	8	12	11'-2	8	12	11'-8	6	9	5'-10	2'-9	3'-1	6	9	7'-2	2'-8	4'-6	.316	.426	.201	.943	169.89
11 - 15	10	4	9	11.5	9	9	4	9	5'-7	4	9	12	4	12	9	4	16	-	4	4	12	11	4	16	4	6	6	11'-2	9	12	11'-8	7	9	7'-4	2'-7	4'-9	7	9	6'-2	2'-6	3'-8	.352	.463	.201	1.016	190.24
16 - 20	10	4	11	13	9	9	4	11	5'-11	4	9	12	4	12	9	4	16	-	4	4	12	11	4	16	4	8	9	11'-2	7	6	11'-8	7	9	7'-2	2'-3	4'-11	7	9	6'-1	2'-3	3'-10	.423	.519	.201	1.143	202.55
21 - 25	10	4	13	15	9.5	9	5	12	6'-3	4	9	12	4	12	9	4	14.5	-	4	4	12	11	4	15.5	4	7	6	11'-3	7	6	11'-9	6	6	7'-2	2'-1	5'-1	6	6	5'-5	2'-2	3'-3	.499	.598	.212	1.309	211.74
0	10	5	12.5	10.5	9	9	4	9	6'-10	4	9	14	4	12	9	4	15	15	9	4	12	11	4	16	6	6	9	11'-2	5	9	11'-8	5	9	9'-11	6'-5	3'-6	6	9	9'-3	3'-9	5'-6	.476	.426	.257	1.159	152.66
1	10	5	11	11.5	9	9	4	9	6'-9	4	9	14	5	12	9	4	16	-	4	4	12	11	4	16	6	8	12	11'-2	6	12	11'-8	6	9	6'-0	2'-8	3'-4	6	9	9'-1	3'-6	5'-7	.423	.463	.257	1.143	158.84
2	10	5	9	10	9	9	6	9	6'-6	4	9	14	5	12	9	4	12	12	6	4	12	11	4	14	6	8	12	11'-2	8	12	11'-8	6	9	6'-1	2'-11	3'-2	6	9	8'-7	3'-2	5'-5	.352	.408	.257	1.017	187.26
3	10	5	8	10	9	9	4	12	6'-5	4	9	14	4	12	9	4	12	12	6	4	12	11	4	12	6	6	9	11'-2	6	9	11'-8	6	9	6'-0	2'-11	3'-1	6	9	8'-4	2'-11	5'-5	.316	.408	.257	.981	147.13
4 - 6	10	5	8	10	9	9	5	12	6'-5	4	9	14	4	12	9	4	11	11	6	4	12	11	4	11	6	6	9	11'-2	8	12	11'-8	6	9	5'-10	2'-9	3'-1	6	9	8'-2	2'-9	5'-5	.316	.408	.257	.981	159.84
7 - 10	10	5	8	10	9	9	6	9	6'-5	4	9	14	4	12	9	4	16	-	4	4	12	11	4	16	4	8	12	11'-2	6	6	11'-8	6	9	5'-9	2'-8	3'-1	6	9	8'-1	2'-8	5'-5	.316	.408	.257	.981	179.29
11 - 15	10	5	9	11	9	9	4	9	6'-7	4	9	14	4	12	9	4	16	-	4	4	12	11	4	16	4	9	12	11'-2	8	9	11'-8	7	9	7'-4	2'-7	4'-9	7	9	7'-3	2'-7	4'-8	.352	.445	.257	1.054	207.21
16 - 20	10	5	11	13	9	9	4	9	6'-11	4	9	14	4	12	9	4	16	-	4	4	12	11	4	16	4	7	6	11'-2	7	6	11'-8	7	9	7'-2	2'-3	4'-11	7	9	7'-1	2'-3	4'-10	.423	.519	.257	1.199	216.03
21 - 25	10	5	13	15	9.5	9	4	9	7'-3	4	9	14	4	12	9	4	11	11	6	4	12	11	4	11	6	7	6	11'-3	9	9	11'-9	8	12	7'-11	2'-10	5'-1	8	12	8'-8	2'-10	5'-10	.499	.598	.271	1.368	241.29
0	10	6	10.5	11	9	9	6	12	7'-8	4	9	16	5	12	9	4	12	12	11	4	12	11	4	16	6	8	12	11'-2	5	9	11'-8	6	12	9'-11	6'-7	3'-4	6	12	10'-3	3'-9	6'-6	.405	.445	.312	1.162	176.58
1	10	6	11	11	9	9	6	4	6	7'-9	4	9	16	5	12	9	4	16	-	4	4	12	11	4	16	6	8	12	11'-2	6	9	11'-8	6	9	6'-0	2'-8	3'-4	6	9	10'-0	3'-6	6'-6	.423	.445	.312	1.180	178.18
2	10	6	8.5	10	9	9	6	9	7'-5	4	9	16	5	12	9	4	12	12	6	4	12	11	4	13	6	6	6	11'-2	8	12	11'-8	6	9	6'-1	2'-11	3'-2	6	9	9'-6	3'-1	6'-5	.334	.408	.312	1.054	197.95
3	10	6	8	10	9	9	4	12	7'-5	4	9	16	4	12	9	4	12	12	6	4	12	11	4	12	6	5	6	11'-2	6	9	11'-8	6	9	6'-0	2'-11	3'-1	6	9	9'-4	2'-11	6'-5	.316	.408	.312	1.036	154.24
4 - 6	10	6	8	10	9	9	5	12	7'-5	4	9	16	4	12	9	4	16	-	4	4	12	11	4	11	6	6	9	11'-2	8	12	11'-8	6	9	5'-9	2'-8	3'-1	6	9	9'-2	2'-9	6'-5	.316	.408	.312	1.036	165.82
7 - 10	10	6	8	10	9	9	6	9	7'-5	4	9	16	4	12	9	4	16	-	4	4	12	11	4	16	4	8	12	11'-2	9	12	11'-8	6	9	5'-8	2'-7	3'-1	6	9	9'-1	2'-8	6'-5	.316	.408	.312	1.036	195.79
11 - 15	10	6	9	11.5	9	9	4	9	7'-7	4	9	16	4	12	9	4	11	11	6	4	12	11	4	11	6	9	12	11'-2	8	9	11'-8	8	12	9'-4	2'-9	6'-7	8	12	7'-6	2'-9	4'-9	.352	.463	.312	1.127	226.79
16 - 20	10	6	11	13	9	9	4	9	7'-11	4	9	16	4	12	9	4	16	-	4	4	12	11	4	16	4	7	6	11'-2	7	6	11'-8	7	9	7'-2	2'-3	4'-11	7	9	8'-1	2'-3	5'-10	.423	.519	.312	1.254	224.84
21 - 25	10	6	13	15	9.5	9	4	9	8'-3	4	9	16	4	12	9	4	11	11	6	4	12	11	4	11	6	7	6	11'-3	9	9	11'-9	8	12	7'-11	2'-10	5'-1	8	12	9'-8	2'-10	6'-10	.499	.598	.329	1.426	250.18
0	10	8	10.5	10.5	9	9	4	12	9'-8	4	9	22	5	12	9	4	15	15	9	4	12	11	4	16	6	8	12	11'-2	6	9	11'-8	6	9	9'-11	6'-7	3'-4	6	9	12'-4	3'-10	8'-6	.405	.426	.423	1.254	204.21
1	10	8	11	11	9	9	4	12	9'-9	4	9	22	5	12	9	4	12	12	6	4	12	11	4	16	6	8	12	11'-2	6	9	11'-8	6	9	6'-2	2'-10	3'-4	6	9	12'-0	3'-6	8'-6	.423	.445	.423	1.291	185.24
2	10	8	8.5	10	9	9	6	9	9'-5	4	9	22	5	12	9	4	13	13	6	4	12	11	4	13	6	9	12	11'-2	8	12	11'-8	6	9	6'-2	3'-0	3'-2	6	9	11'-6	3'-1	8'-5	.334	.408	.423	1.165	225.71
3	10	8	8	10	9	9	4	12	9'-5	4	9	22	4	12	9	4	12	12	6	4	12	11	4	12	6	8	12	11'-2	5	6	11'-8	6	9	6'-0	2'-11	3'-1	6	9	11'-4	2'-11	8'-5	.316	.408	.423	1.147	178.11
4 - 6	10	8	8	10	9	9	5	12	9'-5	4	9	22	4	12	9	4	11	11	6	4	12	11	4	11	6	5	6	11'-2	8	12	11'-8	6	9	5'-10	2'-9	3'-1	6	9	11'-2	2'-9	8'-5	.316	.408	.423	1.147	184.37
7 - 10	10	8	8	10.5	9	9	6	9	9'-5	4	9	22	4	12	9	4	16	-	4	4	12	11	4	16	4	7	9	11'-2	9	12	11'-8	6	9	5'-9	2'-8	3'-1	6	9	11'-1	2'-7	8'-6	.316	.426	.423	1.165	216.26
11 - 15	10	8	9	11	9	9	4	9	9'-7	4	9	22	4	12	9	4	16	-	4	4	12	11	4	16	4	9	12	11'-2	7	6	11'-8	7	9	7'-3	2'-6	4'-9	7	9	10'-3	2'-7	7'-8	.352	.445	.423	1.220	239.39
16 - 20	10	8	11	13.5	9	9	4	9	9'-11	4	9	22	4	12	9	4	16	-	4	4	12	11	4	16	4	7	6	11'-2	7	6	11'-8	7	9	7'-2	2'-3	4'-11	7	9	10'-1	2'-3	7'-10	.423	.537	.423	1.383	243.84
21 - 25	10	8	13	15	9.5	9	5	12	10'-3	4	9	22	4	12	9	4	15.5	-	4	4	12	11	4	16	4	7	6	11'-3	9	9	11'-9	6	6	7'-3	2'-2	5'-1	6	6	9'-6	2'-3	7'-3	.499	.598	.447	1.544	259.34
0	10	10	10.5	10.5	10	9	4	9	11'-8	4	9	28	5	12	9	4	15	18	8	4	12	11	4	16	6	8	12	11'-4	6	9	11'-10	6	9	10'-9	6'-8	4'-1	6	9	13'-9	4'-0	9'-9	.413	.434	.594	1.441	225.45
1	10	10	11	11.5	10	6	4	6	11'-9	4	9	28	5	12	9	4	16	16	6	4	12	11	4	16	6	8	12	11'-4	6	9	11'-10	6	9	7'-10	3'-9	4'-1	6	9	13'-7	3'-9	9'-10	.431	.471	.594	1.496	221.68
2	10	10	8.5	10	10	9	6	9	11'-5	4	9	28	5	12	9	4	14	14	6	4	12	11	4	15	6	6	6	11'-4	8	12	11'-10	6	9	6'-5	3'-3	3'-2	6	9	13'-10	3'-5	10'-5	.341	.415	.594	1.350	242.55
3	10	10	8	10	10	9	5	12	11'-5	4	9	28	4	12	9	4	13	13	6	4	12	11	4	13	6	8	12	11'-4	5	6	11'-10	6	9	6'-3	3'-2	3'-1	6	9	13'-7	3'-2	10'-5	.323	.415	.594	1.332	204.95
4 - 6	10	10	8	10	10	9	6	9	11'-5	4	9	28	4	12	9	4	12	12	6	4	12	11	4	12	6	6	9	11'-4	8	12	11'-10	6	9	6'-10	3'-0	3'-10	6	9	12'-8	3'-0	9'-8	.323	.415	.594	1.332	225.29
7 - 10	10	10	8	10	10	9	7	12	11'-5	4	9	28	4	12	9	4	12	12	6	4	12	11	4	12	6	8	12	11'-4	9	12	11'-10	7	12	6'-10	3'-0	3'-10	7	12	13'-5	3'-0	10'-5	.323	.415	.594	1.332	253.03
11 - 15	10	10	9	11.5	10	9	4	9	11'-7	4	9	28	4	12	9	4	11	11	6	4	12	11	4	16	4	9	12	11'-4	8	9	11'-10	7	9	7'-7	2'-10	4'-9	7	9	12'-5	2'-9	9'-8	.359	.471	.594	1.424	258.87
16 - 20	10	10	11	13.5	10	6	4	6	11'-11	4	9	28	4	12	9	4	11	11	6	4	12	11	4	11	6	7	6	11'-4	7	6	11'-10	8	12	7'-9	2'-10	4'-11	8	12	13'-6	2'-10	10'-8	.431	.546	.594	1.571	289.97
21 - 25	10	10	13	15.5	10	9	7	12	12'-3	4	9	28	4	12	9	4	16	-	4	4	12	11	4	16	4	7	6	11'-4	9	9	11'-10	6	6	5'-11	2'-5	3'-6	6	6	13'-5	2'-6	10'-11	.503	.621	.594	1.718	309.24
0	10	12	12	11.5	12	9	6	9	13'-10	4	9	32	4	12	9	4	15	18	8	4	12	11	4	16	6	6	9	11'-8	5	9	12'-2	6	9	11'-10	6'-10	5'-0	6	9	15'-2	4'-3	10'-11	.485	.486	.862	1.833	254.74
1	10	12	13	11.5	12	9	6	9	13'-11	4	9	32	4	12	9	4	15	18	8	4	12	11	4	13	8	6	9	11'-8	6	9	12'-2	8	18	12'-9	7'-8	5'-1	8	18	16'-10	4'-4	12'-6	.522	.486	.862	1.870	267.45
2	10	12	8.5	10	12	9	6	9	13'-5	4	9	32	5	12	9	4	16	16	6	4	12	11	4	16	6	7	9	11'-8	8	12	12'-2	6	9	7'-2	4'-0	3'-2	6	9	16'-2	3'-9	12'-5	.355	.428	.862	1.645	265.89
3	10	12	8	10	12	9	5	12	13'-5	4	9	32	4	12	9	4	15	15	6	4	12	11	4	14	6	6	9	11'-8	6	9	12'-2	5	6	8'-4	3'-8	4'-8	5	6	14'-0	3'-6	10'-6	.336	.428	.862	1.626	215.45
4 - 6	10	12	8	10	12	9	5	12	13'-5	4	9	32	4	12	9	4	13	13	6	4	12	11	4	13	6	6	9	11'-8	8	12	12'-2	5	6	6'-4	3'-3	3'-1	5	6	15'-4	3'-3	12'-1	.336	.428	.862	1.626	222.16
7 - 10	10	12	8	10.5	12	9	4	9	13'-5	4	9	32	4	12	9	4	14	14	6	4	12	11	4	14	6	8	12	11'-8	6	6	12'-2	8	12	8'-2	3'-6	4'-8	8	12	15'-11	3'-6	12'-5	.336	.447	.862	1.645	275.82
11 - 15	10	12	9	12	12	9	5	12	13'-8	4	9	32	4	12	9	4	12	12	6	4	12	11	4	11	6	6	6	11'-8	9	12	12'-2	6	6	7'-10	3'-1	4'-9	6	6	14'-0	3'-0	11'-0	.374	.505	.862	1.741	284.66
16 - 20	10	12	11	14	12	9	6	12	14'-0	4	9	32	4	12	9	4	16	-	4	4	12	11	4	16	4	9	12	11'-8	8	9	12'-2	6	6	7'-10	2'-11	4'-11	6	6	14'-1	2'-11	11'-2	.448	.582	.862	1.892	304.42
21 - 25	10	12	13	15.5	12	9	8	12	14'-3	4	9	32	4	12	9	4	16	-	4	4	12	11	4	16	4	7	6	11'-8	7	6	12'-2	6	6	8'-0	2'-11	5'-1	6	6	14'-2	2'-11	11'-3	.522	.640	.862	2.024	351.47

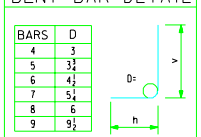


STANDARD SECTION PLAN VIEW

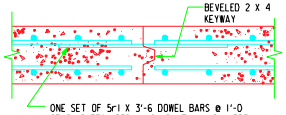
(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)

BENT BAR DETAIL

BARS	D
4	3
5	3½
6	4½
7	5½
8	6
9	9½



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.



TOP SLAB CONSTRUCTION JOINT DETAIL

NOTES:

1. SEE DRAWING RCB-GI-87 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.

LATEST REVISION DATE : 8-1-89

APPROVED BY : William A. Knudsen

STANDARD DESIGN

CULVERT BARREL DETAILS

FOR

REINFORCED CONCRETE BOX CULVERTS

HIGHWAY DIVISION

IOWA DEPARTMENT OF TRANSPORTATION

MAY , 1987

RCB 10-1-87

REVISED: 8/89; "F" SPCG. FOR e2 BAR CHANGED KEYWAY DETAIL & NOTE ADDED. LONGITUDINAL BARREL STEEL NOTE ADDED.
RCB10.SOI

XXXXXXXXXXSYSTEMTIME XXXXXXXXUSERNAME XXXXXXXXXX