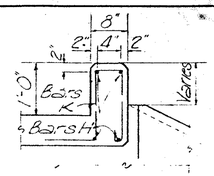
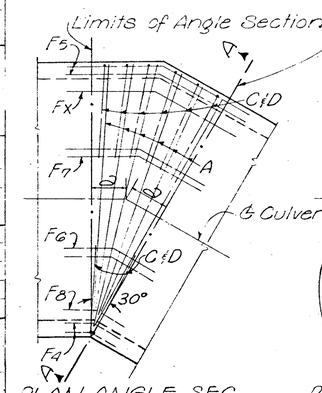
BILL OF STEEL ~ END SECTION

CULVERT SIZE S	H	DIM b	TOTAL QUANTITIES CONC	STEEL	BARS A ~ Ax IN TOP & BOTTOM SLAB No	SIZE	SPA	A	Ax	AV LGTH	WT	BARS C WALLS & TOP CORNER No	SIZE	SPA	LGTH	WT	BARS D IN BOTTOM CORNER No	SIZE	SPA	LGTH	WT	*4 BARS E @ 18" C to C No	LGTH	WT	NUMBER OF "4 BARS F LENGTH SHOWN IN TABLE F5	F6	F7	F8-X	WT	4 ~ "5 BARS H No	LGTH	WT	"4 BARS K @ 12" C to C 3'-1" LONG No.	WT	"4 BARS M3 ~ Mx IN TOP SLAB & WALLS No	SPA	LGTH M3	LGTH M4	LGTH Mx	AV LGTH	WT	"4 BARS N3 ~ Nx IN BOTTOM SLAB No	SPA	LGTH N3	LGTH N4	LGTH Nx	AV LGTH	WT
3	2	1'-7½"	37	30	3*	4	7"	2'-8"	2'-8"	5												1	1'-11"	1	4	1	1	6	19	4'-4"	18	5	18	2	6"	3'-7"	4'	4'-1"	4'-3"	2	2	1'-0"	2'-9"	4'-1"	3'-5"	5
	3	1'-1⅞"	37	29	3*	4	7"	3'-3"	3'-3"	5												1	2'-11"	2	4	1	1	6	19	4'-4"	18	5	18	2	9"	4'-7"	5'-1"	5'-3"	7	2	2'-0"	2'-9"	4'-1"	3'-5"	5
4	2	1'-5 5/16"	52	92	4*	4	6	1'-3"	3'-10"	2'-6"	7											1	1'-11"	1	4	1	1	8	20	5'-6"	23	6	16	4	1"	5'-7"	6'-7"	5'-11"	14	4	1'-7"	2'-9"	5'-9"	4'-5"	11
	3	1'-5 5/16"	57	95	4*	4	6	1'-3"	3'-11"	2'-6"	7											1	2'-11"	2	4	1	1	8	20	5'-6"	23	6	16	4	7"	4'-7"	7'-1"	6'-1"	16	4	1'-7"	2'-9"	5'-9"	4'-5"	11
	4	1'-5 5/16"	62	101	4*	4	6	1'-3"	3'-3"	2'-6"	7											1	3'-11"	3	4	1	1	8	20	5'-6"	23	6	16	4	1'-7"	5'-7"	6'-7"	7'-1"	19	4	1'-7"	2'-9"	5'-9"	4'-5"	11
5	2	1'-8 9/16"	68	144	8	5	8"	1'-5"	4'-8"	2'-11"	24	6	4	8"	4'-10"	9	5	4	8	4'-1"	16	1	1'-11"	1	4	2	2	10	35	6'-8"	28	8	21																
	3	1'-8 9/16"	75	149	8	5	8"	1'-3"	4'-8"	2'-11"	24	5	4	8"	5'-10"	28	6	4	8	4'-1"	16	1	2'-11"	2	4	2	2	10	35	6'-8"	28	8	21																
	4	1'-8 9/16"	81	157	8	5	8"	1'-3"	4'-8"	2'-11"	24	6	4	8"	6'-10"	27	6	4	8	4'-1"	16	1	3'-11"	3	5	2	2	10	38	6'-8"	28	8	21																
	5	1'-9 3/8"	97	186	8	5	8"	1'-3"	4'-8"	2'-11"	24	6	4	8"	7'-10"	31	6	4	8	4'-1"	16	1	4'-11"	3	10	2	2	10	52	6'-10"	29	8	21																
6	3	2'-0 1/16"	95	183	10	5	8"	1'-3"	5'-8"	3'-6"	37	8	4	6"	5'-10"	31	8	4	6	4'-1"	22	1	2'-11"	2	4	2	2	10	39	7'-10"	33	9	24																
	4	2'-0 1/4"	1.02	199	10	5	8"	1'-3"	5'-8"	3'-6"	37	8	4	6"	6'-10"	37	8	4	6	4'-1"	22	1	3'-11"	3	5	2	2	10	43	7'-10"	33	9	24																
	5	2'-0 5/16"	1.20	230	10	5	8"	1'-3"	5'-9"	3'-6"	37	8	4	6"	7'-10"	42	8	4	6	4'-1"	22	4	4'-11"	13	10	2	2	10	59	8'-0"	33	9	24																
	6	2'-0 5/16"	1.29	247	10	5	8"	1'-3"	5'-9"	3'-6"	37	9	4	5½"	8'-10"	58	9	4	6½"	4'-1"	25	4	5'-11"	16	10	2	2	10	59	8'-0"	33	9	24																
7	3	2'-3 1/16"	1.23	261	14	5	7"	1'-3"	7'-10"	4'-2"	61	8	5	7½"	6'-2"	51	8	5	7½"	4'-10"	40	1	2'-11"	2	4	2	2	10	43	9'-0"	38	10	26																
	4	2'-3 1/16"	1.31	260	14	5	6½"	1'-3"	6'-8"	4'-0"	58	7	5	8"	7'-2"	52	7	5	8	4'-10"	35	1	3'-11"	3	5	2	2	10	48	9'-0"	38	10	26																
	5	2'-4 5/16"	1.51	312	16	5	6½"	1'-3"	7'-3"	4'-8"	71	7	5	8"	8'-2"	60	7	5	8	4'-10"	35	5	4'-11"	16	10	2	2	10	66	9'-2"	38	10	26																
	6	2'-4 5/16"	1.62	328	16	5	6½"	1'-3"	7'-3"	4'-8"	71	7	5	8"	9'-2"	67	7	5	8	4'-10"	35	5	5'-11"	20	10	2	2	10	66	9'-2"	38	10	26																
	7	2'-4 5/16"	1.72	357	16	5	6½"	1'-3"	7'-3"	4'-8"	71	8	5	7½"	10'-2"	85	8	5	7½"	4'-10"	40	5	6'-11"	23	12	2	2	10	74	9'-2"	38	10	26																
8	4	2'-7 3/16"	1.72	329	12	6	8"	1'-3"	7'-10"	4'-7"	96	6	5	7½"	7'-3"	60	6	5	7½"	4'-11"	41	1	3'-11"	3	5	2	2	12	58	10'-2"	42	11	29																
	5	2'-7 3/4"	1.96	371	14	6	8"	1'-3"	7'-11"	4'-7"	96	8	5	8"	8'-3"	69	8	5	8"	4'-11"	41	5	4'-11"	16	10	2	2	12	77	10'-4"	43	11	29																
	6	2'-7 3/4"	2.01	383	14	6	8"	1'-3"	7'-11"	4'-7"	96	8	5	8"	9'-3"	77	8	5	8"	4'-11"	41	5	5'-11"	20	10	2	2	12	77	10'-4"	43	11	29																
	7	2'-7 3/4"	2.18	421	14	6	8"	1'-3"	7'-11"	4'-7"	96	9	5	7½"	10'-3"	96	9	5	7½"	4'-11"	46	5	6'-11"	23	12	2	2	12	88	10'-4"	43	11	29																
	8	2'-8 5/16"	2.29	457	14	6	8"	1'-3"	8'-0"	4'-8"	98	9	5	7"	11'-3"	106	9	5	7"	4'-11"	46	5	7'-11"	26	12	2	2	12	88	10'-6"	44	11	29																
9	5	2'-11 3/16"	2.40	476	18	6	7"	1'-3"	9'-0"	5'-2"	140	11	5	6½"	8'-4"	96	11	5	6½"	5'-0"	57	6	4'-11"	20	10	2	2	12	84	11'-6"	48	12	31																
	6	2'-11 3/16"	2.52	491	18	6	7"	1'-3"	9'-0"	5'-2"	140	11	5	6½"	9'-4"	107	11	5	6½"	5'-0"	57	6	5'-11"	24	10	2	2	12	84	11'-6"	48	12	31																
	7	2'-11 3/16"	2.65	534	20	6	6½"	1'-3"	9'-2"	5'-3"	158	11	5	6½"	10'-4"	119	11	5	6½"	5'-0"	57	6	6'-11"	28	12	2	2	12	93	11'-6"	48	12	31																
	8	2'-11 3/16"	3.00	550	20	6	6½"	1'-3"	9'-3"	5'-3"	158	11	5	6½"	11'-4"	130	11	5	6½"	5'-0"	57	6	7'-11"	32	12	2	2	12	93	11'-8"	49	12	31																
	9	2'-11 3/16"	3.14	593	20	6	6½"	1'-3"	9'-3"	5'-3"	158	12	5	6"	12'-4"	154	12	5	6"	5'-0"	63	6	8'-11"	36	14	2	2	12	102	11'-8"	49	12	31																
10	5	3'-2 1/16"	2.90	598	16	7	6½"	1'-3"	9'-11"	5'-7"	182	10	6	8"	8'-6"	128	10	6	8	5'-5"	81	6	4'-11"	20	10	2	2	14	100	12'-8"	53	13	34																
	6	3'-2 1/16"	3.04	644	18	7	8"	1'-3"	10'-1"	5'-8"	209	10	6	8"	9'-6"	143	10	6	8	5'-5"	81	6	5'-11"	24	10	2	2	14	100	12'-8"	53	13	34																
	7	3'-2 1/16"	3.18	673	18	7	8"	1'-3"	10'-1"	5'-8"	209	10	6	8"	10'-6"	158	10	6	8"	5'-5"	81	6	6'-11"	28	12	2	2	14	110	12'-8"	53	13	34																
	8	3'-3 1/4"	3.56	699	18	7	8"	1'-3"	10'-2"	5'-9"	212	10	6	8"	11'-6"	173	10	6	8	5'-5"	81	6	7'-11"	32	12	2	2	14	110	12'-10"	54	14	37																
	9	3'-3 1/4"	3.72	753	18	7	8"	1'-3"	10'-2"	5'-9"	212	11	6	7½"	12'-6"	207	11	6	7½"	5'-5"	89	6	8'-11"	36	14	2	2	14	118	12'-10"	54	14	37																
	10	3'-3 1/4"	3.88	778	18	7	7½"	1'-3"	9'-11"	5'-7"	205	11	6	7"	13'-6"	223	11	6	7"	5'-5"	89	6	9'-11"	40	16	2	2	14	130	12'-10"	54	14	37																

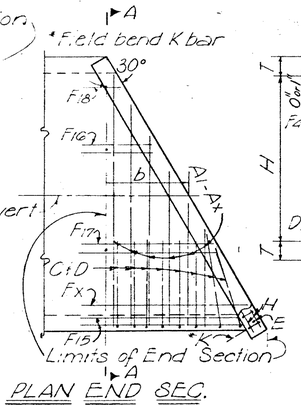


SECTION THRU CURB

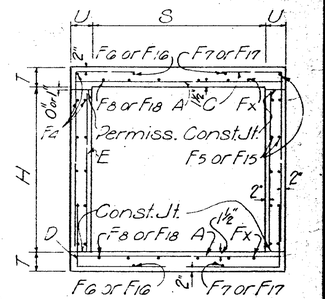
NOTE: It is desirable to have at least one foot of straight extension before beginning Angle Section. Bars F may be eliminated from this one foot section



PLAN ANGLE SEC.



PLAN END SEC.



TYPICAL SECTION A-A

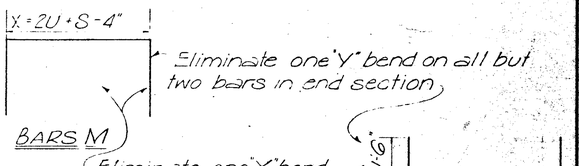
*Bars A in top slab only

BILL OF STEEL ~ ANGLE SECTION

CULVERT SIZE S	H	DIM a	TOTAL QUANTITIES CONC.	STEEL	BARS A IN Top & BOTTOM SLAB No	SIZE	SPA	LGTH	WT	BARS C WALLS & TOP CORNER No.	SIZE	SPA	LGTH	WT	BARS D IN BOTTOM CORNER No	SIZE	SPA	LGTH	WT	*4 BARS E @ 18" C to C No	LGTH	WT	NUMBER OF "4 BARS (LENGTH SHOWN IN TABLE) F4	F5	F6	F7	F8-X	WT	"4 BARS M IN TOP SLAB & WALLS No	LGTH M1 & M5	LGTH M2 & M4	LGTH M3	TOT WT.	"4 BARS N IN BOTTOM SLAB No	LGTH N1 & N5	LGTH N2 & N4	LGTH N3	TOT WT.
3	2	6'-7 1/16"	24	18	*4	4	7"	3'-8"	10															4	4	1	1	6	33	2	5'-4"	2	6'-0"	19	2	6'-8"	2	5'-2"	16
	3	6'-7 1/16"	28	32	*4	4	7"	3'-8"	10															4	4	1	1	6	33	2	10'-4"	2	7'-0"	23	2	7'-8"	2	5'-2"	16
4	2	8 1/16"	35	99	* 5	4	6"	4'-8"	16															4	4	1	1	8	40	2	9'-4"	2	7'-0"	22	2	7'-8"	2	6'-2"	18
	3	8 1/16"	40	103	* 5	4	6"	4'-8"	16															4	4	1	1	8	40	2	11'-4"	2	8'-0"	26	2	7'-8"	2	6'-2"	18
	4	8 1/16"	45	112	* 5	4	6"	4'-8"	16															5	5	1	1	8	45	2	13'-4"	2	9'-0"	30	2	7'-8"	2	6'-2"	18
5	2	9 5/8	48	125	10	5	8"	5'-8"	59	7	4	8"	4'-10"	23	7	4	8	4'-1"	19					4	4	2	2	10	53																			
	3	9 5/8	54	129	10	5	8"	5'-8"	59	7	4	8"	5'-10"	27	7	4	8	4'-1"	19					4	4	2	2	10	53																			
	4	9 5/8	60	139	10	5	8"	5'-8"	59	7	4	8"	6'-10"	32	7	4	8"	4'-1"	19					5	5	2	2	10	58																			
	5	9 5/8	73	177	10	5	8"	5'-10"	61	7	4	8"	7'-10"	37	7	4	8"	4'-1"	19	3	4'-11"	10	10	10	2	2	10	82																			
6	3	1'-1 1/4"	69	165	12	5	8"	6'-8"	83	10	4	6"	5'-10"	39	10	4	6"	4'-1"	27					4	4	2	2	10	57																			
	4	1'-1 1/4"	76	177	12	5	8"	6'-8"	83	10	4	6"	6'-10"	46	10	4	6"	4'-1"	27					5	5	2	2	10	62																			
	5	1'-1 1/2"	92	221	12	5	8"	6'-10"	85	10	4	6"	7'-10"	52	10	4	6"	4'-1"	27	3	4'-11"	10	10	10	2	2	10	89																			
	6	1'-1 1/2"	1.01	239	12	5	8"	6'-10"	85	11	4	5½"	8'-10"	65	11	4	6½"	4'-1"	30	3	5'-11"	12	10	10	2	2	10	89																			
7	3	1'-0 7/8"	93	229	14	5	7"	1'-3"	7'-8"	112	9	5	7½"	6'-2"	58	9	5	7½"	4'-10"	45					4	4	2	2	10	62																			
	4	1'-0 7/8"	1.01	244	14	5	6½"	1'-3"	7'-8"	112	9	5	8"	7'-2"	67	9	5	8"	4'-10"	45					5	5	2	2	10	68																			
	5	1'-1 1/8"	1.19	302	14	5	6½"	1'-3"	7'-10"	114	9	5	8"	8'-2"	77	9	5	8"	4'-10"	45	3	4'-11"	10	10	10	2	2	10	90																			
	6	1'-1 1/8"	1.28	313	14	5	6½"	1'-3"	7'-10"	114	9	5	8"	9'-2"	86	9	5	8"	4'-10"	45	3	5'-11"	12	10	10	2	2	10	96																			
	7	1'-1 1/8"	1.38	352	14	5	6½"	1'-3"	7'-10"	114	10	5	7½"	10'-2"	106	10	5	7½"	4'-10"	50	3	6'-11"	14	12	12	2	2	10	108																			
8	4	1'-2 1/2"	1.36	309	14	6	8"	1'-3"	8'-8"	182	10	5	7½"	7'-3"	76	10	5	7½"	4'-11"	51					5	5	2	2	12	78																			
	5	1'-2 3/4"	1.57	364	14	6	8"	1'-3"	8'-10"	186	10	5	8"	8'-3"	86	10	5	8"	4'-11"	51	4	4'-11"	13	10	10	2	2	12	108																			
	6	1'-2 3/4"	1.68	377	14	6	8"	1'-3"	8'-10"	186	10	5	8"	9'-3"	96	10	5	8"	4'-11"	51	4	5'-11"	16	10	10	2	2	12	108																			
	7	1'-2 3/4"	1.79	402	14	6	8"	1'-3"	8'-10"	186	10	5	7½"	10'-3"	107	10	5	7½"	4'-11"	51	4	6'-11"	18	12	12	2	2	12	120																			
	8	1'-3"	2.07	434	14	6	8"	1'-3"	9'-0"	189	11	5	7"	11'-3"	129	11	5	7"	4'-11"	56	4	7'-11"	21	12	12	2	2	12	120																			
9	5	1'-4 1/8"	1.96	457	18	6	7"	1'-3"	9'-10"	266	13	5	6½"	8'-4"	113	13	5	6½"	5'-0"	68	4	4'-11"	13	10	10	2	2	12	115																			
	6	1'-4 3/8"	2.07	474	18	6	7"	1'-3"	9'-10"	266	13	5	6½"	9'-4"	127	13	5	6½"	5'-0"	68	4	5'-11"	16	10	10	2	2	12	115																			
	7	1'-4 3/8"	2.19	514	20	6	6½"	1'-3"	9'-10"	295	13	5	6½"	10'-4"	140	13	5	6½"	5'-0"	68	4	6'-11"	18	12	12	2	2	12	126																			
	8	1'-4 3/8"	2.51	534	20	6	6½"	1'-3"	10'-0"	300	13	5	6½"	11'-4"	154	13	5	6½"	5'-0"	68	4	7'-11"	21	12	12	2	2	12	126																			
	9	1'-4 3/8"	2.64	582	20	6	6½"	1'-3"	10'-0"	300	14	5	6"	12'-4"	180	14	5	6"	5'-0"	73	4	8'-11"	24	14	14	2	2	12	140																			
10	5	1'-5 5/16"	2.40	570	16	7	6½"	1'-3"	10'-10"	354	11	6	8"	8'-6"	140	11	6	8"	5'-5"	89	4	4'-11"	13	10	10	2	2	14	129																			
	6	1'-5 5/16"	2.53	590	16	7	8"	1'-3"	10'-10"	354	11	6	8"	9'-6"	157	11	6	8"	5'-5"	89	4	5'-11"	16	10	10	2	2	14	129																			
	7	1'-5 5/16"	2.66	622	16	7	8"	1'-3"	10'-10"	354	11	6	8"	10'-6"	173	11	6	8"	5'-5"	89	4	6'-11"	18	12	12	2	2	14	143																			
	8	1'-6 1/4"	3.01	699	18	7	8"	1'-3"	11'-0"	404	12	6	8"	11'-6"	207	12	6	8"	5'-5"	98	5	7'-11"	20	12	12	2	2	14	143																			
	9	1'-6 1/4"	3.16	754	18	7	8"	1'-3"	11'-0"	404	12	6	7½"	12'-6"	225	12	6	7½"	5'-5"	98	5	8'-11"	30	14	14	2	2	14	156																			
	10	1'-6 1/4"	3.31	798	18	7	7½"	1'-3"	11'-0"	404	13	6	7"	13'-6"	264	13	6	7"	5'-5"	106	5	9'-11"	33	16	16	2	2	14	170																			

*Bars A in top Slab only

Bars M & N replace Bars C & D when shown. Bars F6, F7, F16 & F17 are not used in bottom slab when Bars M & N are used. When only 1-Bar E is shown it shall be placed in wall at end of barrel.



BARS N

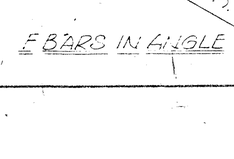
M & N Bars @ Spacing Shown for End Sec.

LENGTH OF F BARS IN ANGLE SECTION

CULVERT S	F4 LGTH	F5 LGTH	F6 LGTH	F7 LGTH	SPA. F8-Fx	F8 LGTH	Fx LGTH
3	2'-2"	4'-0½"	2'-6½"	3'-7½"	12"	2'-6½"	F10 - 3'-7½"
4	2'-2"	4'-7"	2'-9½"	3'-10½"	12"	2'-6½"	F11 - 3'-10½"
5	2'-2"	5'-1½"	3'-4"	3'-10½"	12"	2'-6½"	F12 - 4'-8"
6	2'-2"	5'-8"	3'-4"	4'-5"	16"	2'-5½"	F12 - 5'-3½"
7	2'-2½"	6'-4"	3'-6"	4'-10½"	18"	2'-7"	F12 - 5'-9½"
8	2'-2½"	6'-10"	3'-6"	5'-4½"	18"	2'-5½"	F13 - 6'-5½"
9	2'-2½"	7'-4½"	3'-6"	5'-11"	18"	2'-8½"	F13 - 6'-5½"
10	2'-3"	8'-0"	3'-7½"	6'-5½"	18"	2'-7½"	F14 - 7'-5½"

LENGTH OF F BARS IN END SECTION

CULVERT S	F15 LGTH	F16 LGTH	F17 LGTH	SPA F18-Fx	F18 LGTH	Fx LGTH
3	3'-0½"	1'-5"	2'-7"	12"	1'-5"	F20 - 2'-7"
4	3'-7½"	1'-8½"	2'-10"	12"	1'-5"	F21 - 3'-1½"
5	4'-2½"	2'-3½"	2'-10"	12"	1'-5"	F22 - 3'-8½"
6	4'-9½"	2'-3½"	3'-5"	16"	1'-4"	F22 - 4'-4½"
7	5'-5½"	2'-5½"	3'-11"	18"	1'-5½"	F22 - 4'-11"
8	6'-3½"	2'-5½"	4'-6"	18"	1'-4"	F23 - 5'-7½"
9	6'-7½"	2'-5½"	5'-1"	18"	1'-7"	F23 - 5'-11"
10	7'-3½"	2'-7"	5'-7½"	18"	1'-6"	F24 - 6'-8½"



F BARS IN ANGLE SEC.

GENERAL NOTES :

This Design is adopted from Texas Highway Department Standard for Lengthening Details Single Box Culverts SCL. Refer to this Standard for details not shown on this sheet.

Chamfer exposed corners ¾".

Refer to Standard SCL for straight sections of culvert.

All dimensions relating to reinforcing steel are to centers of bars.

TEXAS HIGHWAY DEPARTMENT
· BRIDGE DIVISION ·

LENGTHENING DETAILS
SINGLE BOX CULVERTS
30° SKEW
SCL 30°

ORIGINAL DRAWING DATE: 4 - '62
FED. RD. DIST. NO. | STATE | FEDERAL PROJ. NO | SHEET NO.
DN: T.H.D. | CK: T.H.D. | DW: R.D.K. | CK: H.W.
REVISIONS
Rev. 1964
Rev. Nov. 1967
Rev. JAN. 1973
STATE | DIST. NO. | COUNTY | CONT. | SECT. | JOB | HIGHWAY NO.