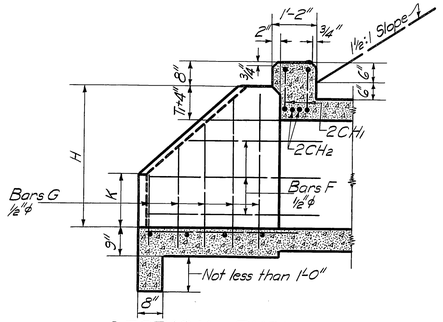
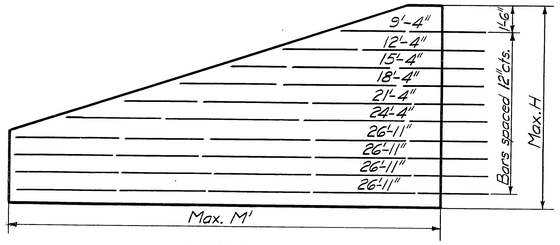
FED. ROAD DIST. NO.	STATE	AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA				

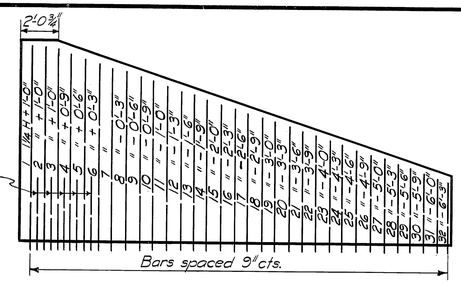
Rev - Note for Reinf. w/s. 5-7-03



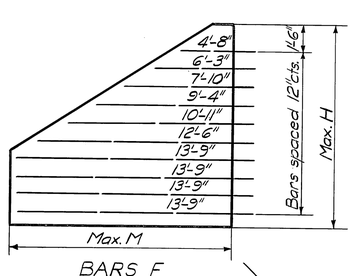
SECTION THRU APRON



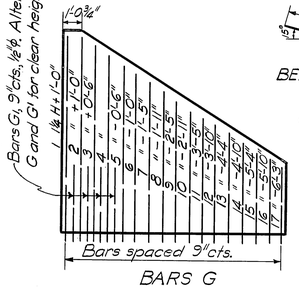
BARS F'



BARS G'

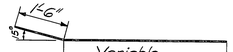


BARS F



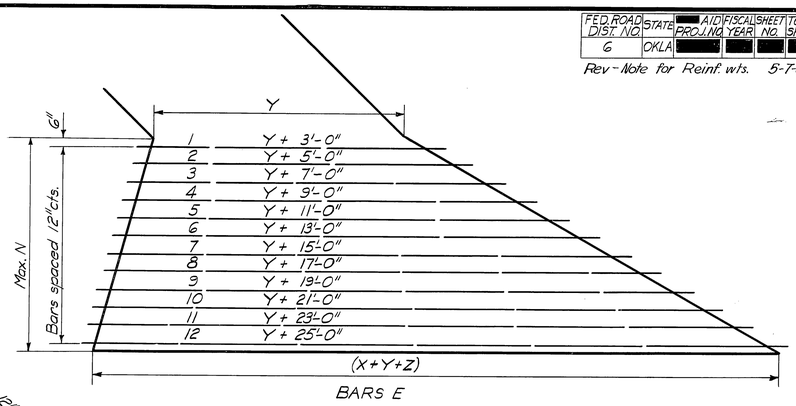
BARS G

Bars G, 9"cts, ½"ϕ. Alternate with G and G' for clear height of 7'and over.

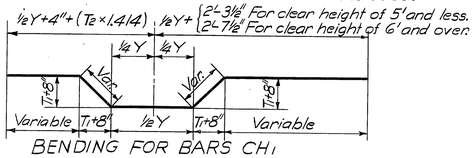


BENDING FOR BARS F'

BENDING FOR BARS F

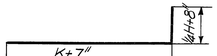


BARS E

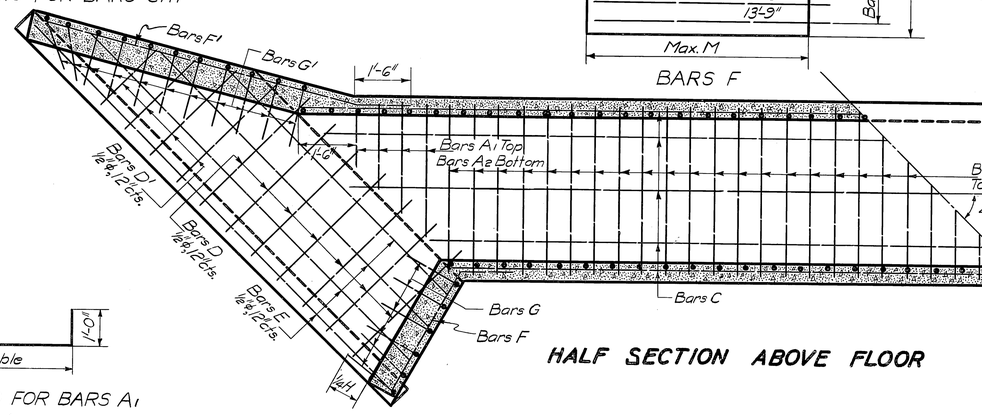


BENDING FOR BARS CH1

BENDING FOR BARS G & G'

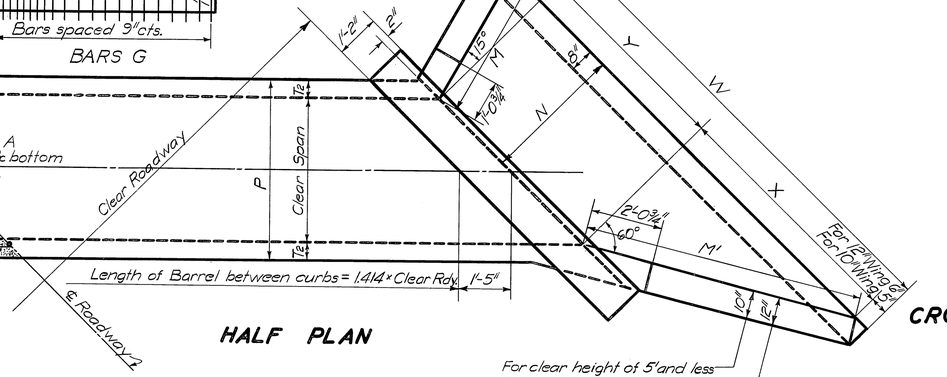


BENDING FOR BARS G1

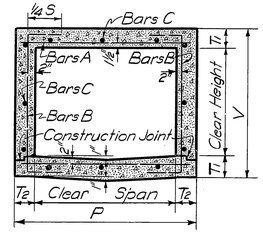


HALF SECTION ABOVE FLOOR

BENDING FOR BARS A1



HALF PLAN



CROSS SECTION OF BARREL

GENERAL NOTES

All reinforcing steel shall be deformed round bars. The design and table are based upon net areas of bars as follows: ½"ϕ=0.1963 sq.in., ⅝"ϕ=0.3068 sq.in., ¾"ϕ=0.442 sq.in. Other sizes may be used provided they are spaced so as to give as much net sectional area per foot width of slab. Plans showing such changed sizes and spacing must be approved. Bars when lapped shall be lapped 50 diameters.

All exposed surfaces to have carborundum finish and this shall be included in price bid per cubic yard for concrete.

All exposed edges shall have ¾" chamfer.

DESIGN	DATA
Dead Load	1000 Lbs.
Live Load	None
Impact	None

Quantities shown for reinforcing steel shall be reduced by 1½% (.015) to comply with approved C.R.S.I. weights per foot for reinforcing bars.

OKLAHOMA STATE HIGHWAY COMMISSION
STANDARD CONC. BOX CULVERTS SKEWED 45° LEFT FORWARD SPANS 2 TO 10 FT. FOR FILLS 3 TO 10 FT.

DESIGN NO.	WATERWAY Clear Span	Clear Height	Area of Opening	BARREL OF CULVERT DIMENSIONS T1	T2	V	P	REINFORCING STEEL Bars A, A1 and A2 Size and Spacing	A Length	A1 and A2 No.	A1 Length	A2 Length	Bars B Bent Size and Spacing	B Length	Bars C Size and Spacing	C No.	QUANT'S Steel per Lin.Ft. Lbs.	C.I.Conc. per Lin.Ft. Cu.Yds.
1	2	2'-0"	4.0	6"	6"	3'-0"	3'-0"	½"ϕ-6"	2'-8"	4	4'-1"/5'-9"	3'-7"/5'-9"	½"ϕ-9"	3'-8"	½"ϕ-18"	8	19.34	0.185
2		2'-0"	6.0	6"	6"	3'-0"	4'-0"	½"ϕ-6"	3'-8"	8	5'-1"/5'-9"	3'-7"/5'-9"	½"ϕ-9"	4'-2"	½"ϕ-18"	8	22.97	0.222
3	3	2'-6"	7.5	6"	6"	3'-6"	4'-0"	"	3'-8"	8	5'-1"/5'-9"	3'-7"/5'-9"	"	4'-8"	"	8	23.88	0.241
4		3'-0"	9.0	6"	6"	4'-0"	4'-0"	"	3'-8"	8	5'-1"/5'-9"	3'-7"/5'-9"	"	5'-2"	"	10	26.14	0.259
5	4	2'-0"	8.0	7"	6"	3'-2"	5'-0"	⅝"ϕ-8"	4'-8"	8	5'-7"/5'-9"	3'-7"/5'-9"	½"ϕ-9"	4'-10"	½"ϕ-18"	10	30.40	0.290
6		2'-6"	10.0	7"	6"	3'-8"	5'-0"	"	4'-8"	8	5'-7"/5'-9"	3'-7"/5'-9"	"	5'-4"	"	10	31.31	0.308
7		3'-0"	12.0	7"	6"	4'-2"	5'-0"	"	4'-8"	8	5'-7"/5'-9"	3'-7"/5'-9"	"	5'-10"	"	12	33.58	0.327
8		4'-0"	16.0	7"	8"	5'-2"	5'-4"	"	5'-0"	8	5'-7"/5'-9"	3'-7"/5'-9"	"	6'-10"	"	12	36.45	0.428
9	5	2'-0"	10.0	8"	6"	3'-4"	6'-0"	⅝"ϕ-7"	5'-6"	14	7'-1"/7'-9"	3'-7"/5'-9"	½"ϕ-9"	5'-6"	½"ϕ-18"	12	38.72	0.370
10		3'-0"	15.0	8"	6"	4'-4"	6'-0"	"	5'-6"	14	7'-1"/7'-9"	3'-7"/5'-9"	"	6'-6"	"	14	41.30	0.407
11		4'-0"	20.0	8"	6"	5'-4"	6'-0"	"	6'-0"	14	7'-1"/7'-9"	3'-7"/5'-9"	"	7'-6"	"	14	44.92	0.511
12		5'-0"	25.0	8"	10"	6'-4"	6'-8"	"	6'-0"	14	7'-3"/7'-9"	3'-7"/5'-9"	"	8'-6"	"	16	49.30	0.638
13		6'-0"	30.0	8"	10"	7'-4"	6'-8"	"	6'-0"	14	7'-3"/7'-9"	3'-7"/5'-9"	"	9'-6"	"	18	52.47	0.700
14	6	2'-0"	12.0	9"	6"	3'-6"	7'-0"	⅝"ϕ-6"	6'-8"	20	8'-3"/8'-9"	6'-1"/6'-9"	½"ϕ-9"	6'-2"	½"ϕ-18"	12	47.61	0.463
15		3'-0"	18.0	9"	8"	4'-6"	7'-0"	"	7'-0"	20	8'-3"/8'-9"	6'-1"/6'-9"	"	7'-2"	"	14	52.19	0.556
16		4'-0"	24.0	9"	8"	5'-6"	7'-4"	"	7'-0"	20	8'-3"/8'-9"	6'-1"/6'-9"	"	8'-2"	"	14	54.01	0.605
17		5'-0"	30.0	9"	10"	6'-6"	7'-8"	"	7'-4"	20	8'-3"/8'-9"	6'-1"/6'-9"	"	9'-2"	"	16	58.59	0.734
18		6'-0"	36.0	9"	10"	7'-6"	7'-8"	"	7'-4"	20	8'-3"/8'-9"	6'-1"/6'-9"	"	10'-2"	"	18	61.76	0.796
19	8	3'-0"	24.0	12"	8"	5'-0"	9'-4"	¾"ϕ-6½"	9'-0"	26	8'-3"/9'-3"	6'-1"/6'-9"	½"ϕ-9"	8'-8"	½"ϕ-18"	18	78.46	0.839
20		4'-0"	32.0	12"	8"	6'-0"	9'-4"	"	9'-0"	26	10"-3"/9'-3"	8'-1"/6'-9"	"	10'-8"	"	20	80.47	0.889
21		5'-0"	40.0	12"	10"	7'-0"	9'-8"	"	9'-4"	26	10"-3"/9'-3"	8'-1"/6'-9"	"	11'-8"	"	22	85.32	1.025
22		6'-0"	48.0	12"	10"	8'-0"	9'-8"	"	9'-4"	26	10"-3"/9'-3"	8'-1"/6'-9"	"	12'-8"	"	22	88.49	1.086
23		7'-0"	56.0	12"	10"	9'-0"	9'-8"	"	9'-4"	26	10"-3"/9'-3"	8'-1"/6'-9"	"	13'-8"	"	24	90.31	1.148
24		8'-0"	64.0	12"	10"	10'-0"	9'-10"	"	9'-6"	26	10"-3"/9'-3"	8'-1"/6'-9"	"	14'-8"	"	24	90.41	1.272
25	10	6'-0"	60.0	14½"	10"	8'-5"	11'-8"	⅜"ϕ-5"	11'-4"	42	12"-2"/11'-3"	10"-2"/9'-3"	½"ϕ-9"	13'-1"	½"ϕ-18"	24	122.72	1.415
26		7'-0"	70.0	14½"	10"	9'-5"	11'-8"	"	11'-4"	42	12"-2"/11'-3"	10"-2"/9'-3"	"	14'-1"	"	24	124.54	1.477
27		8'-0"	80.0	14½"	11"	10'-5"	11'-10"	"	11'-6"	42	12"-2"/11'-3"	10"-2"/9'-3"	"	15'-1"	"	26	128.93	1.603
28		9'-0"	90.0	14½"	12"	11'-5"	12'-0"	"	11'-8"	42	12"-2"/11'-3"	10"-2"/9'-3"	"	16'-1"	"	28	133.32	1.741
29		10'-0"	100.0	14½"	12"	12'-5"	12'-0"	"	11'-8"	42	12"-2"/11'-3"	10"-2"/9'-3"	"	17'-1"	"	28	135.13	1.815
30	5	7'-0"	35.0	8"	10"	8'-4"	6'-8"	⅝"ϕ-7"	6'-4"	14	7'-3"/8'-1"	5'-5"/5'-9"	½"ϕ-9"	10'-6"	½"ϕ-18"	18	54.30	0.761

DESIGN NO.	TWO WINGS AND ONE APRON DIMENSIONS H	K	M	M'	N	W	X	Y	Z	REINFORCING STEEL Bars D No.	Bars D Length	Bars D' No.	Bars D' Length	Bars E No.	Bars E Length	Bars F No.	Bars F Length	Bars F' No.	Bars F' Length	Bars G No.	Bars G Length	Bars G' No.	Bars G' Length	Bars G1 No.	Bars G1 Length	QUANTITIES Reinf. Steel Lbs.	Class A Concrete Cu.Yds.	TWO CURBS Reinf. bars same size as A bars. 4CH1 Length	4CH2 Length	QUANT'S Reinf. Steel Lbs.	C.I.Conc. Curbs & Curtainwall Cu.Yds. per foot of depth.	TOTAL QUANT'S 38' Clear Rdy. Reinf. Steel Lbs.	Class A Conc. Cu.Yds.	DESIGN NO.
1	2'-10"	1'-8"	2'-10⅛"	5'-6"	2'-9"	3'-6⅝"	4'-9⅛"	2'-10"	0'-8⅜"	4	3'-2"	4	3'-0"/3'-3"	3		2	4'-2"			2	8'-6"			4		7									1
2	2'-10"	1'-8"	2'-10⅛"	5'-6"	2'-9"	10'-11⅛"	4'-9⅛"	4'-2⅛"	0'-8⅜"	6	3'-2"	3	2'-8"/3'-3"	3		1	4'-2"							4		7									2
3	3'-4"	1'-10"	3'-5⅛"	6'-8"	3'-1"	12'-1⅛"	5'-9⅛"	"	0'-10⅜"	6	3'-9"	4	3'-5"/3'-9"	3		1	4'-8"	1	4'-10"	1	8'-6"	1	9'-8"	5		9									3
4	3'-10"	1'-11"	4'-0⅛"	7'-9⅛"	3'-10⅛"	13'-3"	6'-9"	"	1'-0⅛"	6	4'-4"	5	3'-10"/4'-3"	3		1	4'-8"	2	5'-5"	1	9'-4"	2	10'-10"	6		10									4
5	2'-1"	1'-3"	2'-10⅛"	5'-6"	2'-9"	12'-4⅛"	4'-9⅛"	5'-7⅛"	0'-8⅜"	7	3'-2"	3	2'-8"/3'-3"	3		2	4'-2"			2	8'-6"			4		7									5
6	2'-11"	1'-5"	3'-5⅛"	6'-8"	3'-4"	13'-6⅛"	5'-9⅛"	"	1'-0⅜"	7	3'-9"	4	3'-5"/3'-9"	3		1	4'-8"	1	4'-10"	1	8'-6"	1	9'-8"	5		9									6
7	3'-4"	1'-7"	4'-0⅛"	7'-9⅛"	3'-10⅛"	14'-8"	6'-9"	"	1'-0⅜"	7	4'-4"	5	3'-10"/4'-3"	3		1	4'-8"	2	5'-5"	1	9'-4"	2	10'-10"	6		10									7
8	3'-11"	2'-0"	4'-5⅛"	8'-9⅛"	4'-3⅛"	15'-9⅜"	7'-0⅛"	"	1'-0⅜"	7	5'-0"	6	4'-6"/4'-9"	3		2	Var.	2	6'-7"	2	Var.	2	13'-1"	7		13									8
9	2'-0"	1'-0"	2'-10⅛"	5'-6"	2'-9"	13'-5⅛"	4'-9⅛"	7'-0⅛"	0'-8⅜"	9	3'-2"	3	2'-8"/3'-3"	3		2	4'-2"			2	8'-6"			4		7									9
10	3'-0"	1'-4"	3'-5⅛"	6'-8"	3'-4"	14'-8"	6'-9"	"	1'-0⅜"	9	4'-4"	4	3'-8"/3'-9"	3		1	4'-8"	2	5'-5"	1	9'-4"	2	10'-10"	6		10									10
11	3'-11"	2'-0"	4'-5⅛"	8'-9⅛"	4'-3⅛"	15'-9⅜"	7'-0⅛"	"	1'-0⅜"	9	5'-6"	6	4'-6"/4'-9"	3		2	Var.	2	6'-7"	2	Var.	2	13'-1"	7		13									11
12	4'-11"	2'-4"	5'-5⅛"	10'-1"	5'-0⅛"	18'-4⅛"	8'-3⅜"	"	1'-1⅜"	9	6'-8"	8	5'-6"/5'-9"	3		2	Var.	3	7'-9"	2	Var.	3	15'-5"	9		16									12
13	6'-0"	3'-0"	6'-5⅛"	12'-5"	6'-2⅛"	20'-8⅜"	10'-5"	"	1'-1⅜"	9	7'-9"	10	6'-7"/6'-9"	3		2	Var.	3	9'-0"	3	Var.	3	17'-5"	11		20									13
14	2'-0"	1'-0"	2'-10⅛"	5'-6"	2'-9"	15'-2⅛"	4'-9⅛"	8'-5⅛"	0'-8⅜"	10	3'-2"	3	2'-8"/3'-3"	3		2	4'-2"			2	8'-6"			4		7									14
15	3'-0"	1'-8"	3'-5⅛"	6'-8"	3'-4"	16'-3⅜"	6'-9"	"	1'-0⅜"	10	4'-4"	5	3'-8"/3'-9"	3		1	4'-8"	2	5'-5"	1	9'-4"	2	10'-10"	6		10									15
16	4'-0"	2'-4"	5'-5⅛"	10'-1"	5'-0⅛"	19'-3⅛"	8'-3⅜"	"	1'-1⅜"	10	5'-6"	7	4'-6"/4'-9"	3		2	Var.	2	6'-7"	2	Var.	2	13'-1"	7		13									16
17	5'-0"	3'-0"	6'-5⅛"	12'-5"	6'-2⅛"	22'-2⅜"	10'-5"	"	1'-1⅜"	10	6'-8"	9	5'-6"/5'-9"	3		2	Var.	3	7'-9"	2	Var.	3	15'-5"	9		16									17
18	6'-0"	3'-6"	7'-5⅛"	14'-8"	7'-1⅛"	25'-1⅜"	12'-1⅜"	"	1'-1⅜"	10	7'-9"	11	7'-0"/7'-3"	3		3	Var.	3	9'-0"	3	Var.	3	17'-5"	11		20									18
19	4'-8"	2'-5"	4'-10⅛"	7'-9⅛"	3'-10⅛"	20'-3⅜"	6'-9"	11'-3⅛"	1'-0⅛"	13	4'-4"	5	3'-10"/4'-3"	4		2	Var.	2	6'-5"	2	Var.	2	13'-1"	7		13									19
20	4'-11"	2'-7"	5'-5⅛"	10'-1"	5'-0⅛"	22'-1⅜"	8'-3⅜"	"	1'-1⅜"	13	5'-6"	7	4'-6"/4'-9"	4		2	Var.	2	6'-7"	2	Var.	2	13'-1"	7		13									20
21	6'-0"	3'-3"	6'-5⅛"	12'-5"	6'-2⅛"	24'-11⅜"	10'-5"	"	1'-1⅜"	13	6'-8"	9	5'-6"/5'-9"	4		2	Var.	3	7'-9"	2	Var.	3	15'-5"	9		16									21
22	7'-0"	3'-9"	7'-5⅛"	14'-8"	7'-1⅛"	27'-9⅜"	12'-1⅜"	"	1'-1⅜"	13	7'-9"	11	7'-0"/7'-3"	4		3	Var.	3	9'-0"	3	Var.	3	17'-5"	11		20									22
23	8'-0"	4'-0"	8'-5⅛"	16'-7"	8'-1⅛"	30'-3⅜"	14'-1⅜"	"	1'-1⅜"	13	8'-11"	13	8'-0"/8'-3"	4		3	Var.	3	10'-2"	4	Var.	3	20'-0"	12		24									23
24	8'-11"	4'-6"	9'-5⅛"	18'-6"	9'-1⅛"	33'-9⅜"	16'-1⅜"	"	1'-1⅜"	13	9'-11"	14	9'-0"/9'-3"	4		3	Var.	3	11'-4"	5	Var.	3	22'-4"	14		26									24
25	7'-6"	3'-3"	7'-7⅛"	14'-8"	7'-1⅛"	30'-3⅜"	12'-8⅜"	14'-1⅜"	1'-1⅛"	16	7'-9"	10	7'-0"/7'-3"	4		3	Var.	3	9'-0"	3	Var.	3	17'-5"	11		20									25
26	8'-6"	3'-9"	8'-7⅛"	16'-7"	8'-1⅛"	33'-9⅜"	14'-8⅜"	"	1'-1⅛"	16	8'-11"	12	8'-0"/8'-3"	5		3	Var.	3	10'-2"	4	Var.	3	20'-0"	12		24									26
27	9'-6"	4'-3"	9'-7⅛"	18'-6"	9'-1⅛"	37'-3⅜"	16'-8⅜"	"	1'-1⅛"	16	9'-11"	13	9'-0"/9'-3"	5		3	Var.	3	11'-4"	5	Var.	3	22'-4"	14		26									27
28	10'-6"	4'-9"	10'-7⅛"	20'-5"	10'-1⅛"	41'-3⅜"	18'-3⅜"	"	1'-1⅛"	16	10'-11"	14	10'-0"/10'-3"	5		3	Var.	4	12'-7"	6	Var.	4	24'-8"	15		28									28
29	11'-6"	5'-3"	11'-7⅛"	22'-4"	11'-1⅛"	45'-3⅜"	19'-10⅜"	"	1'-1⅛"	16	12'-5"	15	11'-0"/11'-3"	6		3	Var.	4	13'-9"	6	Var.	4	26'-11"	17		32									29
30	8'-0"	3'-0"	8'-9⅜"	17'-0"	8'-6"	25'-6⅛"	12'-8⅜"	7'-0⅜"	2'-3⅜"	3	8'-11"	12	8'-6"/8'-9"	3		4	Var.	3	10'-2"	4	Var.	3	20'-0"	12		23									30

DESIGN NO.	WATERWAY Clear Span	Clear Height	Area of Opening	TWO CURBS QUANTITIES Reinf. Steel Lbs.	Class A Concrete Cu.Yds.	Reinf. bars same size as A bars. 4CH1 Length	4CH2 Length	QUANT'S Reinf. Steel Lbs.	C.I.Conc. Curbs & Curtainwall Cu.Yds. per foot of depth.	TOTAL QUANT'S 38' Clear Rdy. Reinf. Steel Lbs.	Class A Conc. Cu.Yds.	DESIGN NO.
1	2	2'-0"	4.0									1
2		2'-0"	6.0									2
3	3	2'-6"	7.5									3
4		3'-0"	9.0									4
5	4	2'-0"	8.0	73	0.73	1'-2"	4'-5"	31	0.50	1294	13.93	5
6		2'-6"	10.0	85	1.35	1'-8"	5'-10"	39	0.61	1525	16.21	6
7		3'-0"	12.0	104	1.80	1'-7"	5'-10"	39	0.61	1617	18.44	7
8		4'-0"	16.0	142	2.29	1'-7"	5'-10"	39	0.61	1824	20.45	8
9	5	2'-0"	10.0	91	1.46	1'-0"	7'-3"	73	0.73	2001	20.70	9
10		3'-0"	15.0	110	1.96	1'-0"	7'-3"	73	0.73	2090	22.73	10
11		4'-0"	20.0	150	2.46	1'-0"	7'-3"	73	0.73	2301	24.91	11
12		5'-0"	25.0	218	3.60	1'-0"/1'-3"	7'-6"	75	0.75	2601	33.00	12
13		6'-0"	30.0	98	1.61	1'-6"	8'-8"	86	0.85	2499	25.68	13
14	6	2'-0"	12.0	159	2.66	1'-6"	8'-8"	86	0.85	2803	29.98	14
15		3'-0"	18.0	229	3.84	1'-9"	8'-11"	88	0.87	3102	38.36	15
16		4'-0"	24.0	313	5.25	1'-11"	9'-1"	89	0.89	3532	48.50	16
17		5'-0"	30.0	413	7.70	1'-2"/1'-3"	9'-6"	92	0.91	3917	57.05	17
18		6'-0"	36.0	105	1.75	1'-3"/1'-6"	9'-10"	97	0.97	3038	31.41	18
19	8	3'-0"	24.0	169	2.80	1'-3"/1'-6"	10'-1"	99	0.99	3428	38.90	19
20		4'-0"	32.0	241	4.06	1'-3"/1'-6"	10'-1"	99	0.99	3675	44.31	20
21		5'-0"	40.0	329	5.54	1'-3"/1'-5"	10'-3"	100	1.01	4112	54.70	21
22		6'-0"	48.0	430	8.05	1'-3"/1'-6"	10'-6"	103	1.03	4499	63.38	22
23		7'-0"	56.0	188	3.19	1'-2"/1'-3"	11'-1"	177	1.21	5012	56.05	23
24		8'-0"	64.0	266	4.57	1'-2"/1'-3"	11'-1"	177	1.21	5331	61.76	24
25	10	6'-0"	60.0	357	6.19	1'-2"/1'-4"	11'-1"	179	1.24	5801	72.83	25
26		7'-0"	70.0	466	8.82	1'-2"/1'-4"	11'-1"	182	1.27	6279	81.70	26
27		8'-0"	80.0	746	11.09	1'-2"/1'-4"	11'-1"	182	1.27	6205	81.70	27
28		9'-0"	90.0	911	13.57	1'-2"/1'-3"	11'-1"	182	1.27	6868	89.86	28
29		10'-0"	100.0							7434	101.96	29
30	5	7'-0"	35.0	497	9.56	1'-3"/1'-6"	9'-10"	219	1.50	8236	102.16	30
31		8'-0"	40.0	791	11.94	1'-3"/1'-6"	9'-10"	219	1.50	8927	110.54	31
32		9'-0"	45.0	959	14.53	1'-3"/1'-6"	10'-0"	221	1.51	9515	122.97	32
33		10'-0"	50.0	1,135	17.38	1'-3"/1'-6"	10'-1"	222	1.52	10118	136.60	33
34		11'-0"	55.0	1,334	20.41	1'-3"/1'-6"	10'-1"	222	1.52	10620	146.96	34
35		12'-0"	60.0	674	9.80	1'-3"/1'-6"	9'-6"	92	0.91	4545	64.81	35

Drawn By J.L. Forbis Oct. 1933
Checked By T.F.T. Oct. 1934