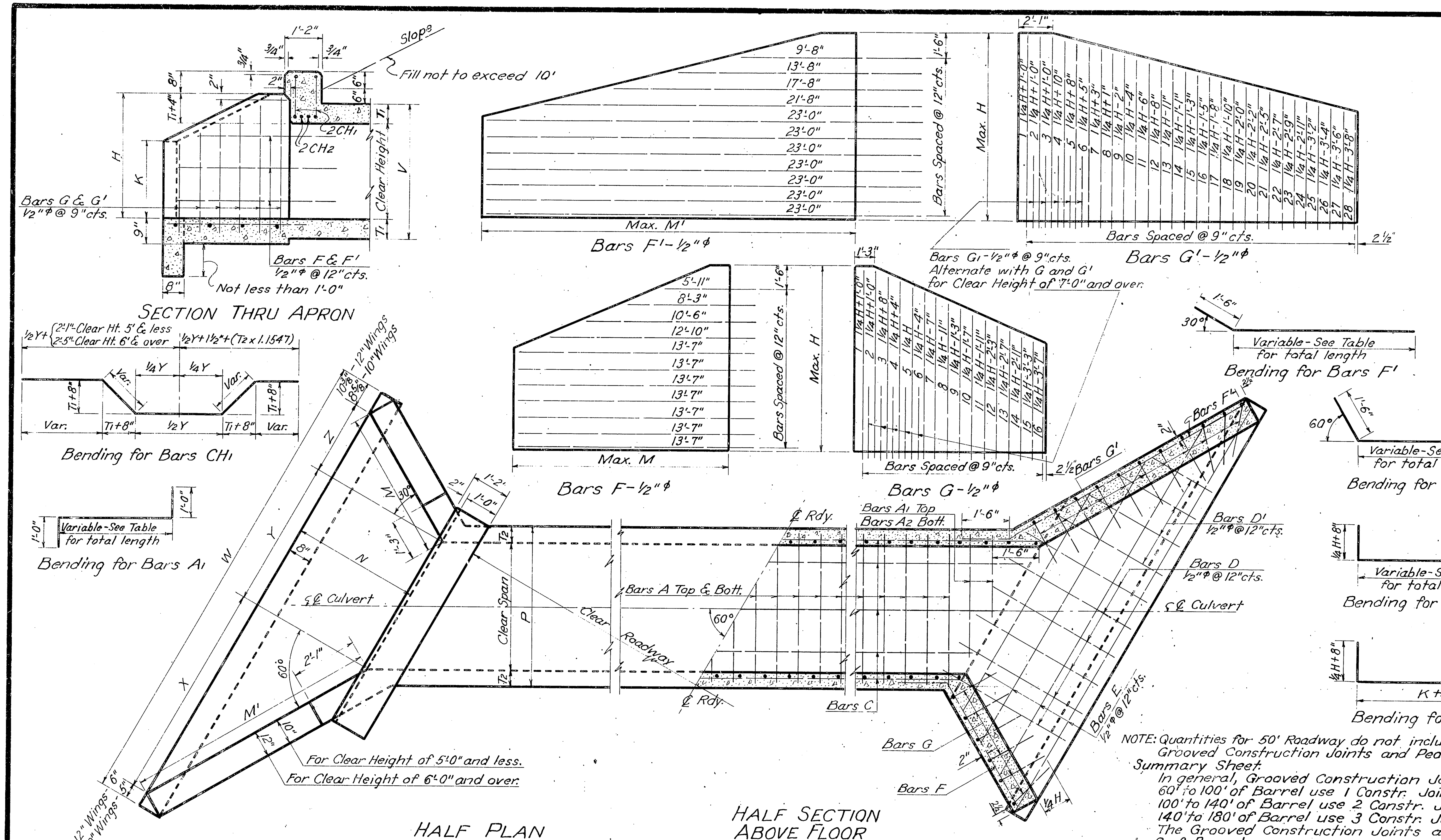
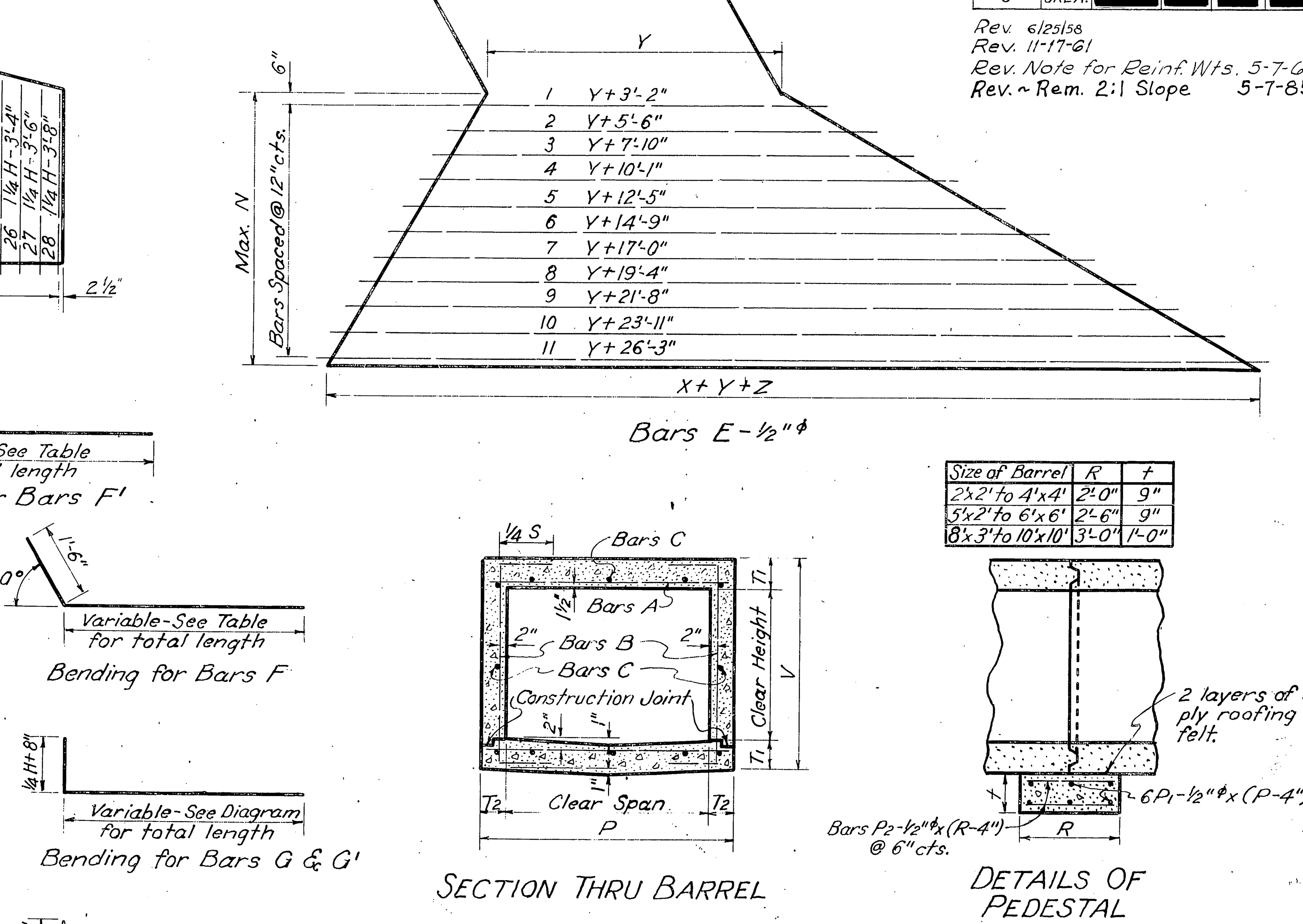
FED. ROAD DIST. NO.	STATE	[redacted] AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.	[redacted]	[redacted]	[redacted]	[redacted]

Rev. 6/25/58
Rev. 11-17-61
Rev. Note for Reinf. Wts. 5-7-63
Rev. ~ Rem. 2:1 Slope 5-7-85





Size of Barrel	R	t
2'x2' to 4'x4'	2'-0"	9"
5'x2' to 6'x6'	2'-6"	9"
8'x3' to 10'x10'	3'-0"	1'-0"

Design Data:
Design is sufficient for H20-S16-53 and PPM 20-4 Loading

Joint to be painted with a coat of bitminous material.

T_1 or T_2	a	b	c
6" to 8"	2"	2"	1"
9" to 11"	2"	3"	1"
12" to 14½"	3"	4"	2"

DETAILS OF GROOVED CONSTRUCTION JOINT

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.

NOTE: Quantities for 50' Roadway do not include Pedestal quantities.
Grooved Construction Joints and Pedestals shall be used when and where noted on Summary Sheet.
In general, Grooved Construction Joints and Pedestals shall be placed as follows:
60' to 100' of Barrel use 1 Constr. Joint and Pedestal.
100' to 140' of Barrel use 2 Constr. Joint and Pedestal.
140' to 180' of Barrel use 3 Constr. Joint and Pedestal.
The Grooved Construction Joints and Pedestal shall be constructed perpendicular to C.L. of Barrel.
Design is sufficient for H-20-S16-53 and PPM 20-4 Loading.

BARREL OF CULVERT

Design No.	Waterway: Clear Span	Clear Height	Area of Opening - Sq. Ft.	Dimensions: T_1	T_2	V	P	Bars A, A1, & A2: Size & Spacing	A Length	A1, A2 No.	A1 Length	A2 Length	Bars B: Size & Spacing	Length	Bars C ½"φ @ 18"cts. No.	Quants.: Steel per Lin. Ft. Lbs.	Conc. per Lin. Ft. Cu. Yds.
1	2	2'-0"	4.0	6"	6"	3'-0"	3'-0"	½"φ@6"	2'-8"				½"φ@9"	3'-8"	8	19.34	0.185
2	3	2'-0"	6.0	6"	6"	3'-0"	4'-0"	½"φ@6"	3'-8"	2	4'-6"	2'-6"	½"φ@9"	4'-2"	8	22.97	0.222
3		2'-6"	7.5	6"	6"	3'-6"	4'-0"	½"φ@6"	3'-8"	2	4'-6"	2'-6"	½"φ@9"	4'-8"	8	23.88	0.241
4		3'-0"	9.0	6"	6"	4'-0"	4'-0"	½"φ@6"	3'-8"	2	4'-6"	2'-6"	½"φ@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"	4	4'-6" to 5'-8"	2'-6" to 3'-8"	½"φ@9"	4'-10"	10	30.40	0.290
6		2'-6"	10.0	7"	6"	3'-8"	5'-0"	⅝"φ@8"	4'-8"	4	4'-6" to 5'-8"	2'-6" to 3'-8"	½"φ@9"	5'-4"	10	31.31	0.308
7		3'-0"	12.0	7"	6"	4'-2"	5'-0"	⅝"φ@8"	4'-8"	4	4'-6" to 5'-8"	2'-6" to 3'-8"	½"φ@9"	5'-10"	12	33.58	0.327
8		4'-0"	16.0	7"	8"	5'-2"	5'-4"	⅝"φ@8"	5'-0"	4	4'-8" to 5'-10"	2'-8" to 3'-10"	½"φ@9"	6'-10"	12	36.45	0.428
9	5	2'-0"	10.0	8"	6"	3'-4"	6'-0"	⅝"φ@7"	5'-8"	6	4'-6" to 6'-6"	2'-6" to 4'-6"	½"φ@9"	5'-6"	12	38.72	0.370
10		3'-0"	15.0	8"	6"	4'-4"	6'-0"	⅝"φ@7"	5'-8"	6	4'-6" to 6'-6"	2'-6" to 4'-6"	½"φ@9"	6'-6"	14	41.90	0.407
11		4'-0"	20.0	8"	8"	5'-4"	6'-4"	⅝"φ@7"	6'-0"	6	4'-8" to 6'-8"	2'-8" to 4'-8"	½"φ@9"	7'-6"	14	44.92	0.511
12		5'-0"	25.0	8"	10"	6'-4"	6'-8"	⅝"φ@7"	6'-4"	6	4'-10" to 6'-10"	2'-10" to 4'-10"	½"φ@9"	8'-6"	16	49.30	0.638
13		6'-0"	30.0	8"	10"	7'-4"	6'-8"	⅝"φ@7"	6'-4"	6	4'-10" to 6'-10"	2'-10" to 4'-10"	½"φ@9"	9'-6"	18	52.47	0.700
14		7'-0"	35.0	8"	10"	8'-4"	6'-8"	⅝"φ@7"	6'-4"	6	4'-10" to 6'-10"	2'-10" to 4'-10"	½"φ@9"	10'-6"	18	54.30	0.761
15	6	2'-0"	12.0	9"	6"	3'-6"	7'-0"	⅝"φ@6"	6'-8"	8	4'-6" to 7'-2"	2'-6" to 5'-2"	½"φ@9"	6'-2"	12	47.61	0.463
16		3'-0"	18.0	9"	8"	4'-6"	7'-4"	⅝"φ@6"	7'-0"	8	4'-8" to 7'-4"	2'-8" to 5'-4"	½"φ@9"	7'-2"	14	52.19	0.556
17		4'-0"	24.0	9"	8"	5'-6"	7'-4"	⅝"φ@6"	7'-0"	8	4'-8" to 7'-4"	2'-8" to 5'-4"	½"φ@9"	8'-2"	14	54.01	0.605
18		5'-0"	30.0	9"	10"	6'-6"	7'-8"	⅝"φ@6"	7'-4"	8	4'-10" to 7'-6"	2'-10" to 5'-6"	½"φ@9"	9'-2"	16	58.59	0.734
19		6'-0"	36.0	9"	10"	7'-6"	7'-8"	⅝"φ@6"	7'-4"	8	4'-10" to 7'-6"	2'-10" to 5'-6"	½"φ@9"	10'-2"	18	61.76	0.796
20	8	3'-0"	24.0	12"	8"	5'-0"	9'-4"	¾"φ@6½"	9'-0"	12	4'-8" to 9'-4"	2'-8" to 7'-4"	½"φ@9"	8'-8"	18	78.46	0.839
21		4'-0"	32.0	12"	8"	6'-0"	9'-4"	¾"φ@6½"	9'-0"	12	4'-8" to 9'-4"	2'-8" to 7'-4"	½"φ@9"	9'-8"	18	80.27	0.889
22		5'-0"	40.0	12"	10"	7'-0"	9'-8"	¾"φ@6½"	9'-4"	12	4'-10" to 9'-6"	2'-10" to 7'-6"	½"φ@9"	10'-8"	20	85.32	1.025
23		6'-0"	48.0	12"	10"	8'-0"	9'-8"	¾"φ@6½"	9'-4"	12	4'-10" to 9'-6"	2'-10" to 7'-6"	½"φ@9"	11'-8"	22	88.49	1.086
24		7'-0"	56.0	12"	10"	9'-0"	9'-8"	¾"φ@6½"	9'-4"	12	4'-10" to 9'-6"	2'-10" to 7'-6"	½"φ@9"	12'-8"	22	90.30	1.148
25		8'-0"	64.0	12"	11"	10'-0"	9'-10"	¾"φ@6½"	9'-6"	12	4'-11" to 9'-7"	2'-11" to 7'-7"	⅝"φ@8"	13'-8"	24	113.10	1.272
26	10	6'-0"	60.0	14½"	10"	8'-5"	11'-8"	¾"φ@5"	11'-4"	22	4'-10" to 12'-0"	2'-10" to 10'-0"	½"φ@9"	13'-1"	24	122.72	1.415
27		7'-0"	70.0	14½"	10"	9'-5"	11'-8"	¾"φ@5"	11'-4"	22	4'-10" to 12'-0"	2'-10" to 10'-0"	½"φ@9"	14'-1"	24	124.54	1.477
28		8'-0"	80.0	14½"	11"	10'-5"	11'-10"	¾"φ@5"	11'-6"	22	4'-11" to 12'-1"	2'-11" to 10'-1"	⅝"φ@8"	15'-1"	26	149.55	1.603
29		9'-0"	90.0	14½"	12"	11'-5"	12'-0"	¾"φ@5"	11'-8"	22	5'-0" to 12'-2"	3'-0" to 10'-2"	⅝"φ@7"	16'-1"	28	162.61	1.741
30		10'-0"	100.0	14½"	12"	12'-5"	12'-0"	¾"φ@5"	11'-8"	22	5'-0" to 12'-2"	3'-0" to 10'-2"	¾"φ@8"	17'-1"	28	182.06	1.815

TWO WINGS AND ONE APRON

Design No.	Dimensions: H	K	M	M'	N	W	X	Y	Z	Bars D No.	Bars D Length	Bars D' No.	Bars D' Length	Bars E No.	Bars E Length	Bars F No.	Length	No.	Length	Bars F' No.	Length	No.	Length	Bars G No.	Bars G Length	Bars G' No.	Bars G' Length	Bars G1 No.	Bars G1 Length	Quantities: Steel Lbs.	Conc. Cu. Yds.
1	2'-10"	1'-10½"	3'-5"	5'-11"	2'-11½"	10'-3⅜"	5'-1½"	2'-3¾"	1'-8½"	4	3'-5"	3	1'-8" to 2'-10"	3	Variable See Diagram	2	4'-11"			2	8'-0"			5	Variable See Diagram	8	Variable See Diagram			84	1.39
2	2'-10"	1'-10½"	3'-5"	5'-11"	2'-11½"	11'-5¼"	5'-1½"	3'-5⅝"	1'-8½"	5	3'-5"	3	1'-9" to 2'-11"	3		2	4'-11"			2	8'-0"			5		8				89	1.48
3	3'-4"	2'-2"	3'-10¾"	6'-9"	3'-4½"	12'-4¾"	5'-10⅛"	3'-5⅝"	1'-11⅜"	5	3'-10"	3	2'-1" to 3'-3"	3		2	5'-5"			2	8'-10"			5		9				100	1.87
4	3'-10"	2'-5½"	4'-5⅛"	7'-8"	3'-10"	13'-5½"	6'-7⅝"	3'-5⅝"	2'-2⅝"	5	4'-3"	4	2'-0" to 3'-9"	4		3	5'-11"			3	9'-9"			6		10				139	2.33
5	2'-11"	1'-11"	3'-6⅞"	6'-1"	3'-0½"	12'-9⅜"	5'-3¼"	4'-7⅜"	1'-9⅞"	6	3'-6"	3	1'-10" to 3'-0"	3		2	5'-0"			2	8'-2"			5		8				95	1.65
6	3'-5"	2'-2½"	3'-11⅞"	6'-11"	3'-5½"	13'-8⅞"	5'-11⅞"	4'-7⅜"	2'-0"	6	3'-11"	4	1'-8" to 3'-5"	3		2	5'-6"			2	9'-0"			5		9				109	2.06
7	3'-11"	2'-6"	4'-5¾"	7'-9"	3'-10½"	14'-8⅜"	6'-8½"	4'-7⅜"	2'-2⅞"	6	4'-4"	4	2'-2" to 3'-11"	4		1	5'-11"	2	6'-0"	1	9'-8"	2	9'-10"	6		10				147	2.51
8	4'-11"	3'-1"	5'-5¾"	9'-6"	4'-9"	16'-8⅝"	8'-2¾"	4'-7⅜"	2'-8⅞"	6	5'-2"	6	1'-10" to 4'-9"	5		1	5'-11"	3	7'-0"	1	9'-8"	3	11'-7"	7		13				212	3.54
9	3'-0"	2'-0"	3'-6¾"	6'-2"	3'-1"	14'-0⅜"	5'-4⅛"	5'-9¼"	1'-9⅜"	7	3'-6"	3	2'-0" to 3'-2"	3		2	5'-1"			2	8'-3"			5		8				102	1.80
10	4'-0"	2'-6½"	4'-6⅞"	7'-11"	3'-11½"	16'-0⅝"	6'-10¼"	5'-9¼"	2'-3½"	7	4'-5"	5	1'-9" to 4'-1"	4		1	5'-11"	2	6'-1"	1	9'-8"	2	10'-0"	6		10				157	2.73
11	5'-0"	3'-1½"	5'-7"	9'-8"	4'-10"	18'-0⅞"	8'-4½"	5'-9¼"	2'-9½"	7	5'-3"	6	2'-0" to 4'-11"	5		1	5'-11"	3	7'-1"	1	9'-8"	3	11'-9"	7		13				222	3.80
12	6'-0"	3'-8½"	6'-6½"	11'-4"	5'-8"	19'-11⅞"	9'-9¾"	5'-9¼"	3'-3¼"	7	6'-1"	8	1'-9" to 5'-9"	6		1	5'-11"	4	8'-0"	1	9'-8"	4	13'-5"	9		15				301	5.01
13	7'-0"	4'-3"	7'-6⅝"	13'-1"	6'-6½"	22'-3"	11'-4"	5'-9¼"	3'-9⅜"	7	7'-0"	9	2'-2" to 6'-10"	7		2	Var.	4	9'-0"	2	Var.	4	15'-2"	10		17				385	7.28
14	8'-0"	4'-10"	8'-6¾"	14'-10"	7'-5"	24'-3⅛"	12'-10⅛"	5'-9¼"	4'-3⅜"	7	7'-10"	11	1'-11" to 7'-8"	8		2	Var.	5	10'-1"	2	Var.	5	16'-11"	11		20		29	8'-1"	644	9.15
15	3'-1"	2'-0½"	3'-7⅞"	6'-4"	3'-2"	15'-4⅝"	5'-5⅞"	6'-11⅛"	1'-10"	8	3'-7"	3	2'-2" to 3'-4"	3		2	5'-2"			2	8'-5"			5		8				108	1.98
16	4'-1"	2'-7"	4'-8"	8'-1"	4'-0½"	17'-4¾"	7'-0"	6'-11⅛"	2'-4"	8	4'-6"	5	1'-11" to 4'-3"	4		1	5'-11"	2	6'-2"	1	9'-8"	2	10'-2"	6		11				168	2.92
17	5'-1"	3'-2"	5'-7½"	9'-9"	4'-10½"	19'-3⅞"	8'-5⅜"	6'-11⅛"	2'-9¾"	8	5'-4"	6	2'-2" to 5'-1"	5		1	5'-11"	3	7'-1"	1	9'-8"	3	11'-10"	8		13				236	4.03
18	6'-1"	3'-9"	6'-7⅝"	11'-6"	5'-9"	21'-4⅛"	9'-11½"	6'-11⅛"	3'-3⅞"	8	6'-2"	8	1'-10" to 5'-11"	6		1	5'-11"	4	8'-1"	1	9'-8"	4	13'-7"	9		15				313	5.32
19	7'-1"	4'-3½"	7'-7¾"	13'-3"	6'-7½"	23'-7⅛"	11'-5¾"	6'-11⅛"	3'-9⅞"	8	7'-1"	10	1'-10" to 7'-0"	7		2	Var.	4	9'-2"	2	Var.	4	15'-4"	10		18				406	7.65
20	4'-4"	2'-9"	4'-10⅞"	8'-6"	4'-3"	20'-2⅜"	7'-4⅜"	9'-2⅞"	2'-5½"	11	4'-8"	5	1'-8" to 4'-0"	4		1	5'-11"	2	6'-5"	1	9'-8"	2	10'-7"	7		11				192	3.46
21	5'-4"	3'-3½"	5'-11"	10'-3"	5'-1½"	22'-2½"	8'-10½"	9'-2⅞"	2'-11½"	11	5'-7"	6	2'-0" to 4'-11"	5		1	5'-11"	3	7'-5"	1	9'-8"	3	12'-4"	8		14				266	4.70
22	6'-4"	3'-10½"	6'-10½"	11'-11"	5'-11½"	24'-1⅝"	10'-3⅞"	9'-2⅞"	3'-5¼"	11	6'-5"	8	1'-8" to 5'-9"	6		2	Var.	3	8'-4"	2	Var.	3	14'-0"	9		16				348	6.05
23	7'-4"	4'-5½"	7'-10⅝"	13'-8"	6'-10"	26'-4⅝"	11'-10"	9'-2⅞"	3'-11⅜"	11	7'-3"	10	1'-8" to 6'-10"	7		2	Var.	4	9'-4"	2	Var.	4	15'-9"	11		18				444	8.55
24	8'-4"	5'-0½"	8'-10¼"	15'-4"	7'-8"	28'-3¾"	13'-3⅜"	9'-2⅞"	4'-5⅛"	11	8'-1"	11	1'-11" to 7'-8"	8		2	Var.	5	10'-4"	2	Var.	5	17'-5"	12		20		30	8'-5"	716	10.51
25	9'-4"	5'-7"	9'-10⅜"	17'-1"	8'-6½"	30'-4"	14'-9½"	9'-2⅞"	4'-11¼"	11	9'-0"	13	1'-8" to 8'-7"	9		3	Var.	5	11'-4"	3	Var.	5	19'-2"	13		23		34	9'-2"	874	12.69
26	7'-6½"	4'-7"	8'-1"	14'-0"	7'-0"	29'-1"	12'-1½"	11'-6⅝"	4'-0½"	13	7'-5"	10	2'-0" to 7'-2"	7		2	Var.	5	9'-7"	2	Var.	5	16'-1"	11		19				499	9.39
27	8'-6½"	5'-1½"	9'-1⅛"	15'-9"	7'-10½"	31'-1¼"	13'-7⅝"	11'-6⅝"	4'-6⅝"	13	8'-4"	12	1'-8" to 8'-0"	8		3	Var.	5	10'-7"	3	Var.	5	17'-10"	12		21		31	8'-6"	785	11.49
28	9'-6½"	5'-8½"	10'-0⅝"	17'-5"	8'-8½"	33'-0⅜"	15'-1"	11'-6⅝"	5'-0⅜"	13	9'-2"	13	1'-11" to 8'-10"	9		3	Var.	6	11'-6"	3	Var.	6	19'-6"	13		23		34	9'-4"	937	13.71
29	10'-6½"	6'-3½"	11'-0¾"	19'-2"	9'-7"	35'-0½"	16'-7⅛"	11'-6⅝"	5'-6⅜"	13	10'-0"	15	1'-8" to 9'-9"	10		3	Var.	7	12'-7"	3	Var.	7	21'-3"	15		25		38	10'-2"	1119	16.21
30	11'-6½"	6'-10"	12'-0⅞"	20'-11"	10'-5½"	37'-0⅞"	18'-1⅜"	11'-6⅝"	6'-0½"	13	10'-11"	16	1'-11" to 10'-7"	11		4	Var.	7	13'-7"	4	Var.	7	23'-0"	16		28		42	11'-0"	1314	18.93

TWO CURBS / TOTAL QUANTS.

Design No.	Two Curbs: Reinf. Steel same size as Bars A: 4CH1 Length	4CH2 Length	Quants.: Steel Lbs.	Concrete Cu. Yds.	Conc. in One Curtain Wall-Cu. Yds. per foot of depth	Total Quants. 50' Roadway: Reinf. Steel Lbs.	Cl. "A" Conc. Cu. Yds.	Quants. in One Pedestal: Reinf. Steel Lbs.	Cl. "A" Conc. C.Y.	Design No.
1	6'-1"	3'-1"	25	.41	.254	1354	14.81	25	.167	1
2	7'-3"	4'-3"	31	.52	.282	1590	17.37	33	.222	2
3	7'-3"	4'-3"	31	.52	.306	1666	19.34	33	.222	3
4	7'-3"	4'-3"	31	.52	.332	1882	21.40	33	.222	4
5	8'-5"	5'-5"	59	.60	.316	2078	21.95	42	.278	5
6	8'-5"	5'-5"	59	.60	.339	2160	23.89	42	.278	6
7	8'-5"	5'-5"	59	.60	.363	2374	25.98	42	.278	7
8	8'-7"	5'-9"	61	.62	.413	2676	34.23	45	.296	8
9	9'-8"	6'-7"	69	.70	.346	2607	27.21	59	.417	9
10	9'-8"	6'-7"	69	.70	.396	2909	31.39	59	.417	10
11	9'-10"	6'-11"	71	.72	.446	3221	39.89	63	.440	11
12	10'-0"	7'-4"	74	.73	.494	3645	50.05	64	.463	12
13	10'-4"	7'-4"	75	.76	.549	4006	58.45	64	.463	13
14	10'-4"	7'-4"	75	.76	.599	4633	65.95	64	.463	14
15	10'-10"	7'-8"	79	.79	.380	3161	33.31	69	.486	15
16	11'-1"	8'-1"	81	.81	.430	3557	40.89	73	.509	16
17	11'-1"	8'-1"	81	.81	.477	3802	46.15	73	.509	17
18	11'-3"	8'-6"	84	.83	.527	4234	56.60	74	.532	18
19	11'-7"	8'-6"	85	.85	.583	4613	65.11	74	.532	19
20	13'-7"	10'-5"	146	1.00	.499	5261	59.30	106	1.037	20
21	13'-7"	10'-5"	146	1.00	.548	5518	64.88	106	1.037	21
22	13'-9"	10'-9"	149	1.02	.596	5986	75.86	107	1.074	22
23	14'-1"	10'-9"	151	1.04	.651	6373	84.65	107	1.074	23
24	14'-1"	10'-9"	151	1.04	.699	7025	92.39	107	1.074	24
25	14'-3"	11'-0"	154	1.05	.749	8714	104.30	111	1.093	25
26	16'-7"	13'-1"	180	1.23	.718	8576	106.41	130	1.296	26
27	16'-7"	13'-1"	180	1.23	.768	9256	114.43	130	1.296	27
28	16'-8"	13'-3"	182	1.24	.816	11064	126.54	134	1.315	28
29	16'-9"	13'-6"	184	1.25	.865	12220	139.94	135	1.333	29
30	16'-9"	13'-6"	184	1.25	.915	13772	149.92	135	1.333	30

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. When necessary, reinforcing bars shall be lapped 40 diameters. Total quantities for 50' Rdy. include lap of 1'-8" on C bars.

All exposed concrete surfaces shall have a carborundum finish and this shall be included in the unit price bid per Cu. Yd. for Concrete.

All exposed concrete edges shall have a ¾" chamfer.

DESIGN DATA: Dead Load 1,000 Lbs
Live Load None
Impact None

Designed by M. W. Hefley & W. Jones
Supervised by H. X. White & D. I. McCullough
Detailed by C. H. D. April 1941
Traced by E. M. A. May, 1941
Checked by G. L. M.

OKLAHOMA STATE HIGHWAY COMMISSION STANDARD
CONCRETE BOX CULVERTS SKEWED 60°
SPANS 2 TO 10 FEET FOR FILLS 3 TO 10 FEET

35

BC-6S4 RF

Sheet No. [redacted]