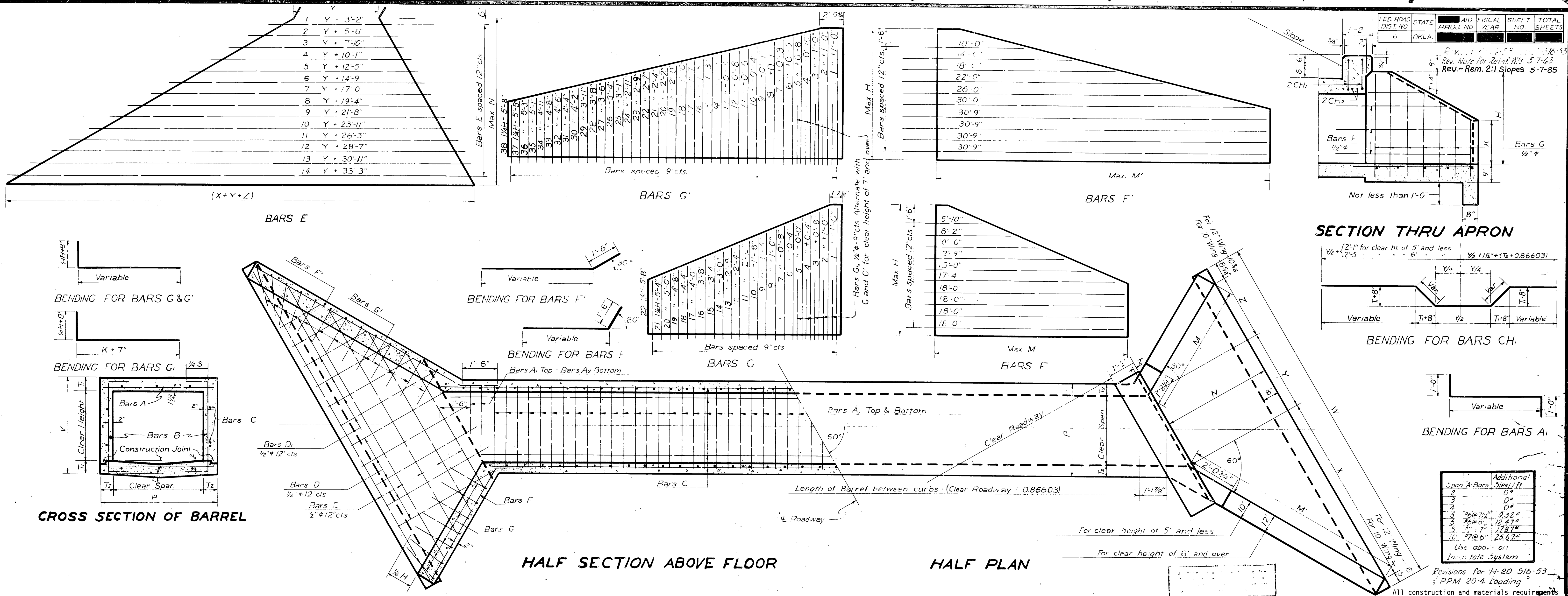


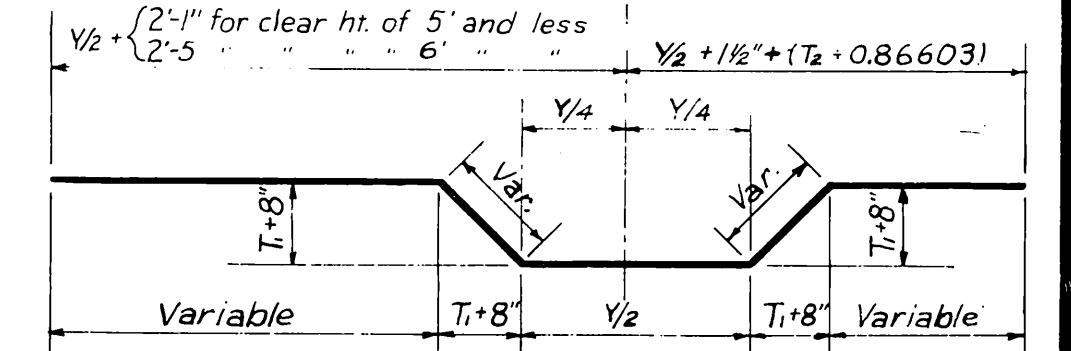
4

rw

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



SECTION THRU APRON



Span, A-Bars	Additional Steel, ft.
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.00
10	0.00

Revisions for H-20 516-53
PPM 20-4 Loading
All construction and materials requirements shall be in accordance with the current standard specifications.

DESIGN NO.	WATERWAY	BARREL OF CULVERT													TWO WINGS AND ONE APRON													TWO CURBS				TOTAL		DESIGN NO.		
		DIMENSIONS						REINFORCING STEEL							DIMENSIONS						REINFORCING STEEL							QUANTITIES				QUANTITIES				
		Span	Clear Height	Area of Opening	T1	T2	V	Size and Spacing	A	A1 and A2	BARS B BENT	BARS C	Steel Per Lin Ft	Concrete Per Lin Ft	Cu. Yds.	H	K	M	M'	N	W	X	Y	Z	BARS D	BARS D'	BARS E	BARS F	BARS F'	BARS G	BARS G'	BARS G''	Steel Lbs		Concrete Cu. Yds.	Rein. Bars same size as A bars
1	2	2'-0"	4.0	6'	6'	3'-0"	3'-0"	1/2"φ-6"	2'-8"	19.34	0.185	2'-0"	1'-7"	4'-2"	7'-2"	3'-7"	11'-9"	6'-2"	2'-3"	2'-1"	4	4	0'	5'	3'-8"	4	108	1.72	6'-1"	3'-5"	26	0.41	0.291	12.55	1097	1
2	3	2'-0"	6.0	6'	6'	3'-0"	4'-0"	1/2"φ-6"	3'-8"	22.97	0.222	2'-10"	1'-7"	4'-2"	7'-2"	3'-7"	12'-11"	6'-2"	3'-5"	2'-1"	5	4	0'	5'	3'-8"	4	114	1.83	7'-3"	4'-6"	32	0.52	0.319	14.56	1,273	2
3	4	2'-6"	7.5	6'	6'	3'-6"	4'-0"	1/2"φ-6"	3'-8"	23.88	0.241	3'-4"	1'-9"	4'-10"	8'-6"	4'-5"	14'-5"	7'-4"	3'-5"	2'-5"	5	4	8"	6'	4'-4"	4	133	2.39	7'-3"	4'-6"	32	0.52	0.356	16.58	1,350	3
4	5	3'-0"	9.0	6'	6'	4'-0"	4'-0"	1/2"φ-6"	3'-8"	26.14	0.259	3'-10"	1'-11"	5'-7"	9'-8"	4'-10"	15'-9"	8'-4"	3'-5"	2'-9"	5	5	3"	7'	5'-1"	5	179	2.98	7'-3"	4'-6"	32	0.52	0.389	18.62	1,514	4
5	6	2'-0"	10.0	7'	6'	3'-2"	5'-0"	3/8"φ-8"	4'-8"	30.40	0.290	2'-11"	1'-7"	4'-3"	7'-4"	3'-8"	14'-4"	6'-6"	4'-7"	2'-1"	6	4	1"	5'	3'-8"	4	122	2.02	8'-5"	5'-7"	59	0.60	0.352	18.06	1,649	5
6	7	2'-6"	18.0	7'	6'	3'-8"	5'-0"	3/8"φ-8"	4'-8"	31.31	0.308	3'-5"	1'-9"	5'-0"	8'-8"	4'-4"	15'-9"	7'-6"	4'-7"	2'-6"	6	4	1"	6'	4'-6"	4	142	2.61	8'-5"	5'-7"	59	0.60	0.389	20.1	1,728	6
7	8	3'-0"	20.0	7'	6'	4'-2"	5'-0"	3/8"φ-8"	4'-8"	33.58	0.327	3'-11"	1'-11"	5'-9"	9'-11"	4'-11"	17'-3"	8'-7"	4'-7"	2'-10"	6	5	1"	6'	5'-2"	4	190	3.27	8'-5"	5'-7"	59	0.60	0.426	22.34	1,927	7
8	9	4'-0"	25.0	7'	6'	5'-2"	5'-4"	3/8"φ-8"	5'-0"	36.45	0.428	4'-11"	2'-4"	7'-2"	12'-5"	6'-2"	20'-1"	10'-9"	8'-7"	3'-7"	6	6	1"	6'	6'-8"	4	274	4.72	8'-7"	5'-10"	62	0.62	0.496	29.83	2,222	8
9	10	2'-0"	30.0	7 1/2"	6'	3'-3"	6'-0"	3/8"φ-8"	5'-8"	37.20	0.352	2'-11"	1'-7"	4'-4"	7'-6"	3'-9"	15'-6"	6'-6"	5'-9"	2'-2"	7	4	2"	5'	4'-6"	4	130	2.19	9'-8"	6'-9"	70	0.70	0.385	21.30	1,978	9
10	11	3'-0"	30.0	7 1/2"	6'	4'-3"	6'-0"	3/8"φ-8"	5'-8"	40.38	0.389	3'-11"	1'-11"	5'-9"	10'-1"	5'-10"	18'-10"	8'-8"	5'-9"	2'-10"	7	5	2"	5'	4'-6"	4	200	3.50	9'-8"	6'-9"	70	0.70	0.458	25.69	2,260	10
11	12	4'-0"	24.0	8 1/2"	8'	5'-3"	6'-4"	3/8"φ-8"	6'-0"	43.32	0.490	4'-11"	2'-4"	7'-2"	12'-6"	6'-3"	21'-4"	10'-9"	9'-9"	3'-7"	7	6	2"	6'	6'-8"	4	286	4.99	9'-10"	7'-0"	71	0.72	0.528	33.26	2,560	11
12	13	5'-0"	25.0	7 1/2"	10'	6'-3"	6'-8"	3/8"φ-8"	6'-4"	47.62	0.617	5'-1/2"	2'-9"	8'-10"	15'-3"	7'-7"	24'-5"	3'-18"	5'-9"	4'-4"	7	8	0"	12'	8'-0"	4	403	6.82	10'-0"	7'-3"	73	0.73	0.603	42.65	2,886	12
13	14	7'-0"	35.0	7 1/2"	10'	8'-3"	6'-8"	3/8"φ-8"	6'-4"	52.60	0.741	7'-1/2"	3'-5"	11'-8"	20'-2"	10'-11"	30'-5"	17'-6"	5'-9"	5'-10"	7	10	6"	16'	8'-0"	4	471	8.31	10'-4"	7'-3"	75	0.76	0.753	59.90	4,065	13
14	15	2'-0"	12.0	8 1/2"	6'	3'-5"	7'-0"	3/8"φ-8"	6'-8"	45.28	0.441	3'-0"	1'-8"	4'-5"	7'-8"	3'-10"	16'-10"	6'-7"	6'-11"	2'-2"	8	4	3"	5'	4'-6"	4	138	2.41	10'-0"	8'-0"	80	0.79	0.417	25.79	2,360	14
15	16	3'-0"	18.0	8 1/2"	6'	4'-3"	6'-0"	3/8"φ-8"	7'-0"	49.76	0.533	4'-0"	2'-0"	5'-11"	10'-3"	5'-12"	19'-10"	8'-10"	6'-11"	2'-1"	8	5	7"	5'	4'-6"	4	272	3.74	10'-0"	8'-0"	82	0.81	0.491	32.66	2,707	15
16	17	4'-0"	24.0	8 1/2"	8'	5'-5"	7'-4"	3/8"φ-8"	7'-4"	51.57	0.582	5'-0"	2'-4"	7'-4"	12'-10"	6'-5"	22'-10"	11'-13"	6'-11"	3'-8"	8	6	10"	9'	6'-8"	4	316	5.37	10'-0"	8'-0"	82	0.81	0.565	38.22	2,996	16
17	18	5'-0"	30.0	8 1/2"	10'	6'-5"	7'-8"	3/8"φ-8"	7'-4"	56.04	0.711	6'-2"	2'-9"	8'-10"	15'-3"	7'-7"	25'-8"	8'-12"	6'-11"	4'-5"	8	8	0"	12'	8'-0"	4	420	7.20	11'-3"	8'-5"	83	0.83	0.635	47.70	3,403	17
18	19	6'-0"	36.0	8 1/2"	10'	7'-5"	7'-8"	3/8"φ-8"	7'-4"	59.22	0.772	7'-0"	3'-1"	10'-4"	17'-1"	8'-11"	28'-8"	9'-6"	6'-11"	5'-2"	8	9	5"	14'	8'-0"	4	540	10.44	11'-7"	8'-7"	85	0.85	0.716	57.03	3,787	18
19	20	3'-0"	24.0	10'	8'	4'-8"	9'-4"	3/4"φ-7"	9'-0"	74.24	0.724	4'-2"	2'-1"	6'-1"	10'-6"	5'-3"	22'-6"	9'-12"	9'-2"	3'-0"	11	5	8"	11'	5'-8"	4	235	4.26	13'-5"	10'-6"	145	1.00	0.557	42.40	3,899	19
20	21	4'-0"	32.0	10'	8'	5'-8"	9'-4"	3/4"φ-7"	9'-0"	76.06	0.773	5'-2"	2'-5"	7'-6"	13'-1"	6'-3"	25'-6"	11'-4"	9'-2"	3'-9"	11	7	0"	10'	6'-8"	4	346	6.0	13'-5"	10'-6"	145	1.00	0.631	48.20	4,200	20
21	22	5'-0"	40.0	10'	10'	6'-8"	9'-8"	3/4"φ-7"	9'-4"	80.96	0.905	6'-2"	2'-9"	9'-0"	15'-7"	7'-9"	28'-4"	13'-6"	9'-2"	4'-6"	11	8	3"	11'	8'-3"	4	454	7.93	13'-8"	10'-8"	148	1.02	0.701	57.99	4,633	21
22	23	6'-0"	48.0	10'	10'	7'-8"	9'-8"	3/4"φ-7"	9'-4"	84.14	0.967	7'-2"	3'-2"	10'-2"	18'-2"	9'-1"	31'-6"	15'-8"	9'-2"	5'-2"	11	9	4"	10'	6'-8"	4	576	11.32	14'-0"	10'-11"	152	1.04	0.780	67.67	5,026	22
23	24	7'-0"	56.0	10'	10'	8'-8"	9'-8"	3/4"φ-7"	9'-4"	85.95	1.028	8'-2"	3'-6"	12'-0"	20'-9"	10'-4"	34'-7"	18'-0"	9'-2"	6'-0"	11	10	6"	11'	10'-16"	4	672	12.08	16'-4"	13'-2"	160	1.23	0.842	78.11	5,763	23
24	25	8'-0"	64.0	10'	11'	9'-0"	9'-0"	3/4"φ-7"	9'-6"	89.99	1.150	9'-2"	3'-10"	13'-5"	23'-3"	11'-7"	37'-5"	20'-1"	9'-2"	6'-8"	11	12	8"	18'	11'-8"	4	810	14.04	17'-8"	14'-0"	173	1.19	0.895	92.78	6,382	24
25	26	3'-0"	30.0	11'	8'	4'-10"	11'-4"	3/4"φ-6"	11'-0"	97.70	0.917	4'-3"	2'-1"	6'-3"	10'-1"	5'-25'-2"	9'-4"	11'-6"	3'-1/2"	3'-1/2"	13	5	10"	8'	6'-6"	4	780	4.72	15'-0"	12'-0"	173	1.19	0.622	52.23	5,049	25
26	27	4'-0"	40.0	11'	8'	5'-10"	11'-4"	3/4"φ-6"	11'-0"	99.52	0.967	5'-3"	2'-5"	7'-8"	13'-3"	6'-11"	28'-0"	11'-6"	3'-10"	3'-10"	13	7	0"	10'	6'-8"	4	372	6.56	15'-0"	12'-0"	173	1.19	0.692	58.12	5,314	26
27	28	5'-0"	50.0	11'	10'	6'-10"	11'-8"	3/4"φ-6"	11'-4"	102.77	1.101	6'-3"	2'-10"	9'-2"	15'-0"	7'-17'-3"	30'-0"	13'-9"	4'-7"	3'-5"	14	8	0"	12'	8'-0"	4	485	8.68	16'-0"	13'-0"	176	1.21	0.766	68.41	5,763	27
28	29	6'-0"	60.0	11'	10'	7'-10"	11'-8"	3/4"φ-6"	11'-4"	107.89	1.163	7'-3"	3'-2"	10'-7"	18'-4"	9'-2"	34'-7"	15'-10"	11'-6"	5'-2"	14	9	0"	12'	8'-0"	4	672	12.08	16'-4"	13'-2"	180	1.23	0.842	78.11	5,763	28
29	30	7'-0"	70.0	11'	10'	8'-10"	11'-8"	3/4"φ-6"	11'-4"	109.70	1.224	8'-3"	3'-6"	12'-0"	20'-11"	10'-5"	37'-4"	16'-1"	6'-2"	6'-2"	15	10	0"	16'	8'-0"	4	810	14.04	17'-8"	14'-0"	173	1.19	0.895	92.78	6,382	29
30	31	8'-0"	80.0	11'	11'	9'-10"	11'-8"	3/4"φ-6"	11'-8"	113.89	1.347	9'-3"	3'-11"	13'-6"	23'-6"	11'-9"	40'-0"	20'-4"	11'-6"	6'-9"	3	12	18"	18'	11'-8"	4	972	16.20	18'-0"	15'-0"	180	1.25	0.915	86.83	6,965	30
31	32	9'-0"	90.0	11'	12'	10'-10"	12'-0"	3/4"φ-6"	11'-8"	118.05	1.482	10'-3"	4'-3"	15'-0"	26'-0"	13'-0"	42'-11"	22'-8"	11'-6"	7'-6"	13	13	5"	20'	13'-5"	4	1134	19.90	19'-0"	16'-0"	180	1.25	1.061	111.98	8,191	31
32	32	10'-0"	100.0	11'	12'	11'-0"	12'-0"	3/4"φ-6"	11'-8"	119.89	1.556	11'-3"	4'-7"	16'-6"	28'-7"	14'-3"	45'-10"	24'-9"	11'-6"	8'-3"	13	14	9"	22'	14'-9"	4	1350	23.00	20'-0"	17'-0"	180	1.25	1.134	123.07	8,740	32

GENERAL NOTES

All reinforcing steel shall be deformed round bars. The design and table are based upon net areas of bars as follows: 1/2"φ=0.1963 sq. in., 3/8"φ=0.3068 sq. in., 3/4"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 as shown showing such changed sizes and spacing must be approved. Bars when lapped shall be lapped 50 diameters.

Unless otherwise specified, all exposed concrete surfaces shall have a finish in accordance with the current standard specifications.

DESIGN DATA

Concrete slab	LL.M. = 909' x 40" = 36,360 in.
6-span 8 1/2" 106 Lbs	1 = 30% LL.M. = 10,910
Drt 11" 100 "	DL.M. = 1/8" Wt = 19,550
Paing 7" 81 "	1/8" 293 x 667 x 12 = 66,820
Total D.L. 293 "	
5.510,000	LL = 1818
1,818	909' 6'-8" 909'

**KANSAS DEPARTMENT OF TRANSPORTATION
STATE STANDARD
CONCRETE BOX CULVERTS
SKEWED 60°
SPANS 2 TO 10 FT.
FOR FILLS NOT OVER 3 FT.**

OBsolete

Redrawn by S.G.W.
Checked by L.R.

Designed by H.K.White and D.L.McCullough
Drawn by G.B.H.
Checked by H.B.S.