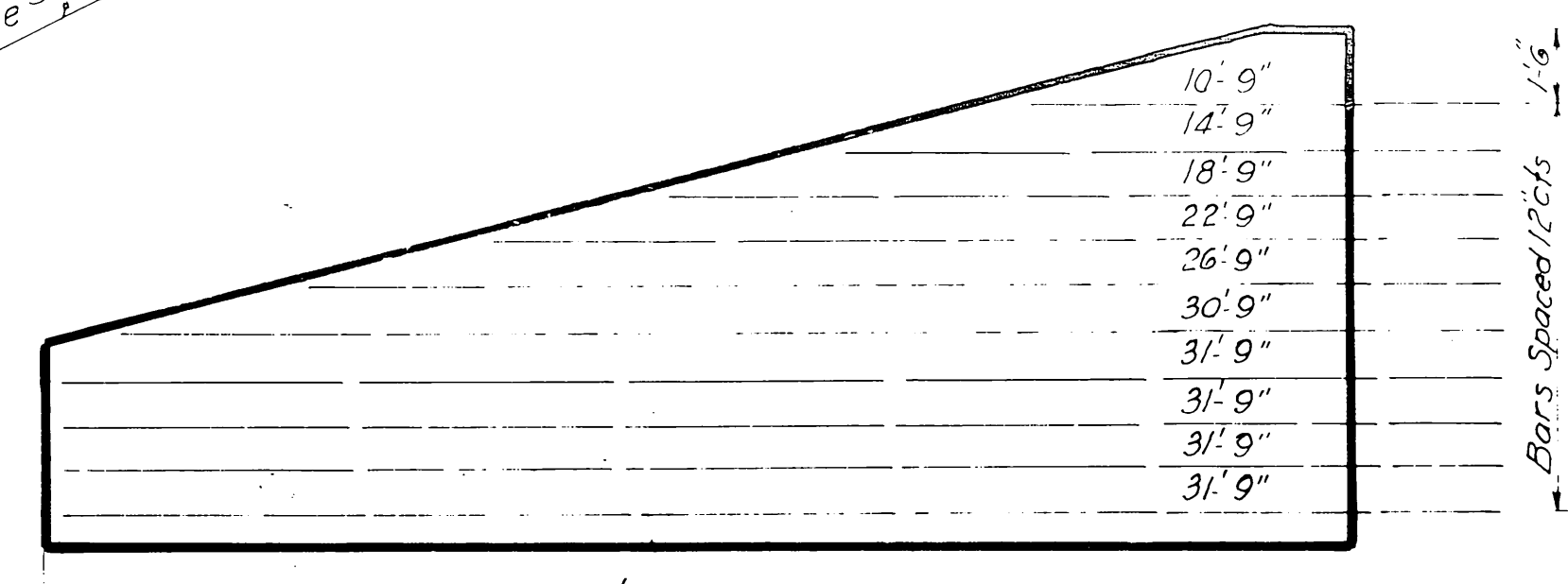
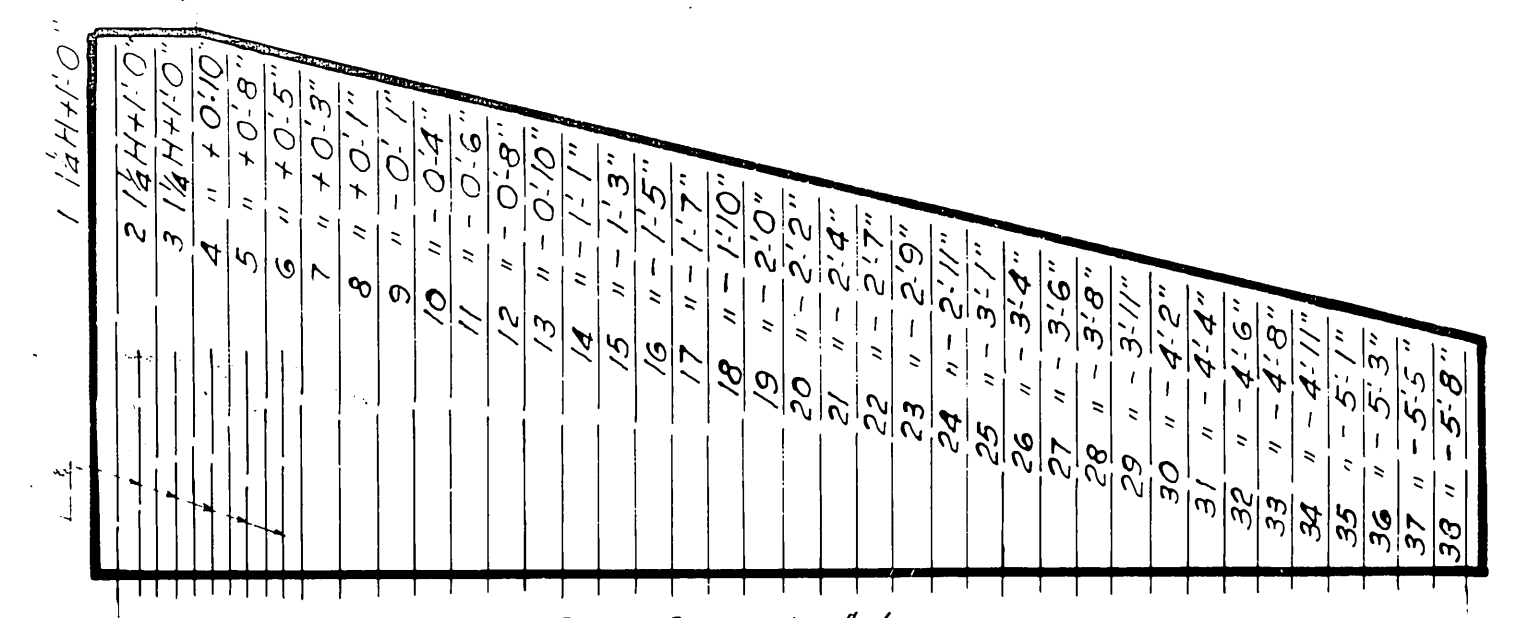


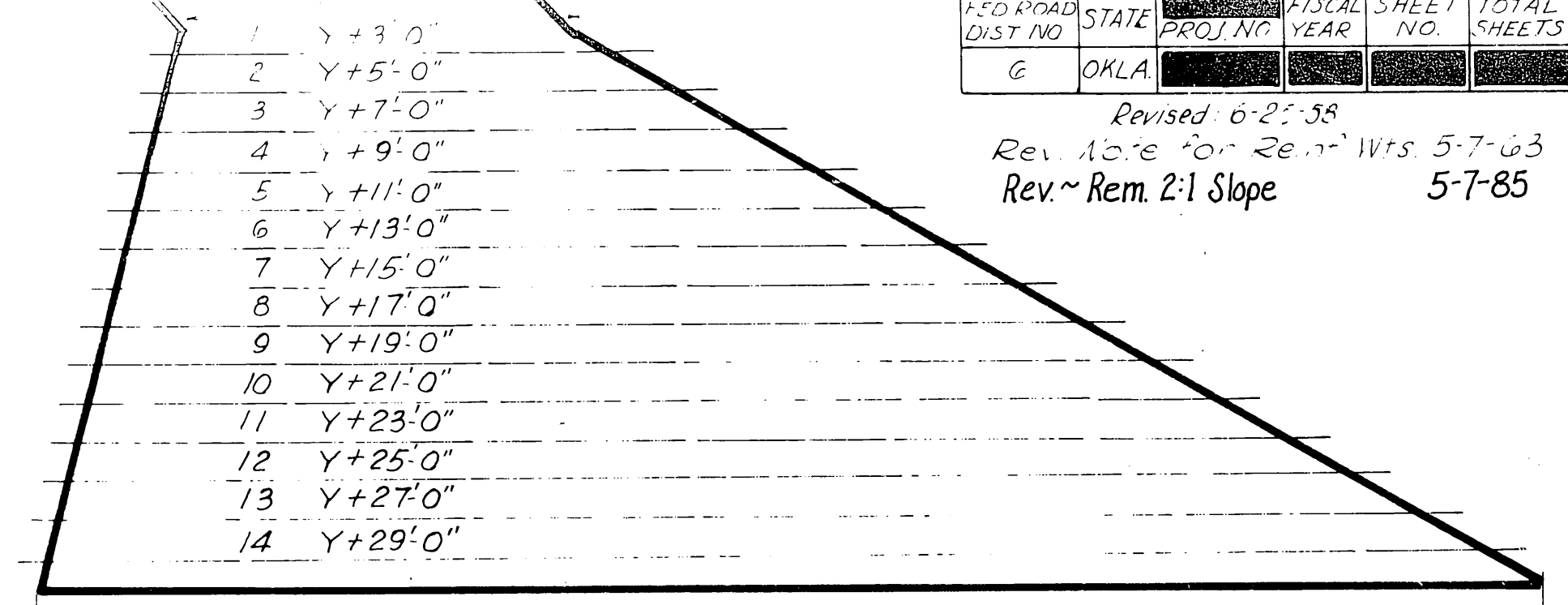
SECTION THRU APRON



BARS F'



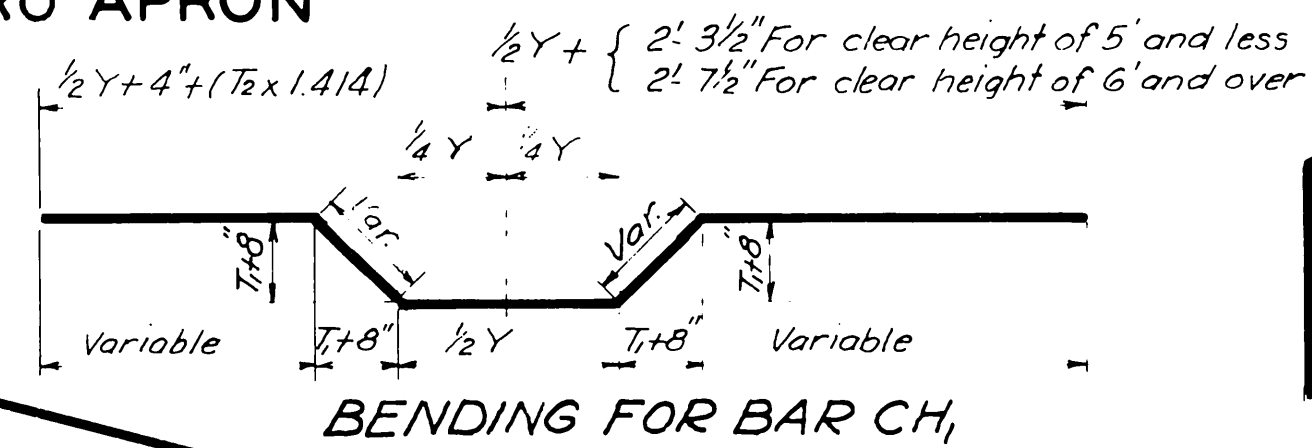
BARS G'



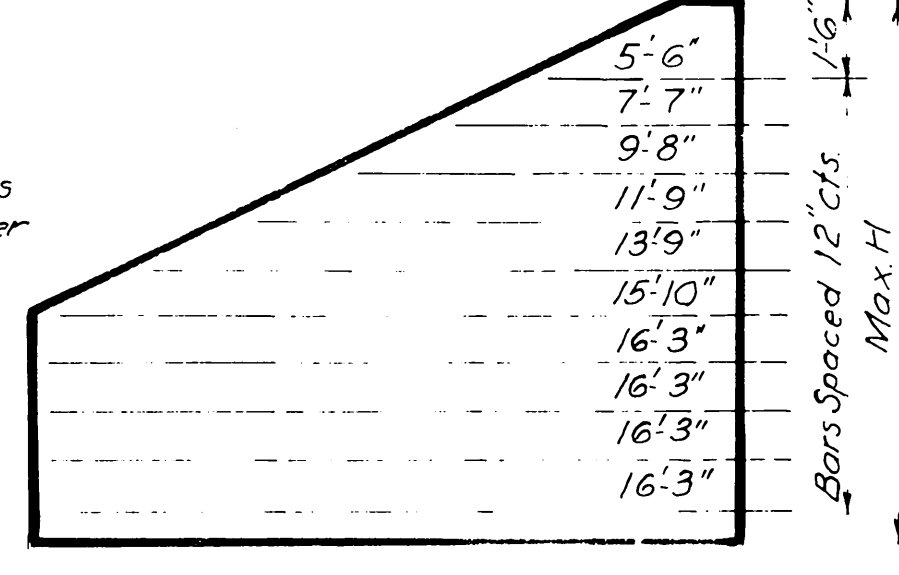
BARS E

DESIGN DATA

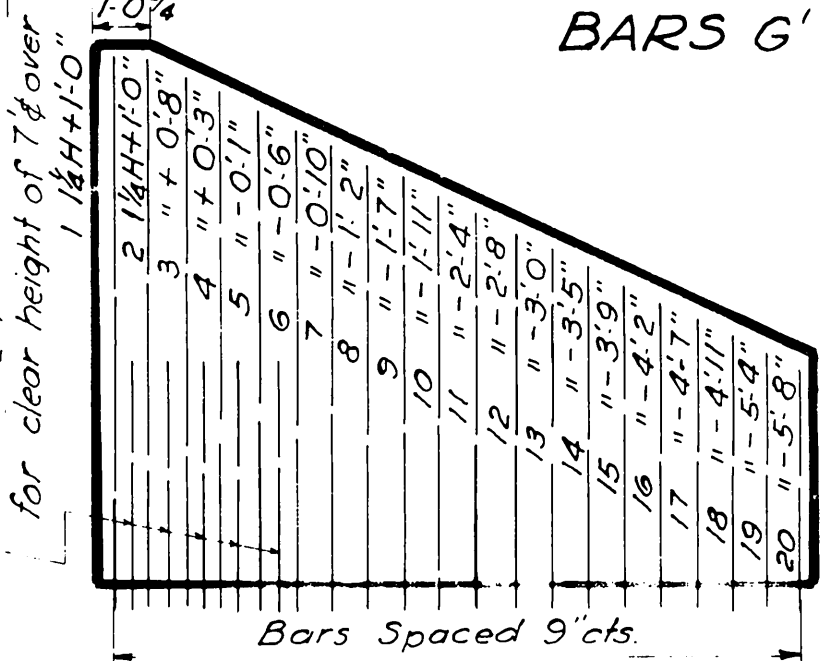
Concrete Slab L.L.M. = 909 x 40 = 36,360 in/lbs
 6" Span 8 1/2" 106 lbs. I = 30% L.L.M. = 10,910 "
 Dirt Fill 100 lbs. D.L.M. = 1/8 WL²
 Paving 7" 87 lbs = 1/8 x 293 x 6.67 x 12 = 19,550 "
 Total D.L. 293 " 66,820 "
 L.L. 1818 " 5.5 10,000 "
 909 6'8" 909 1,818



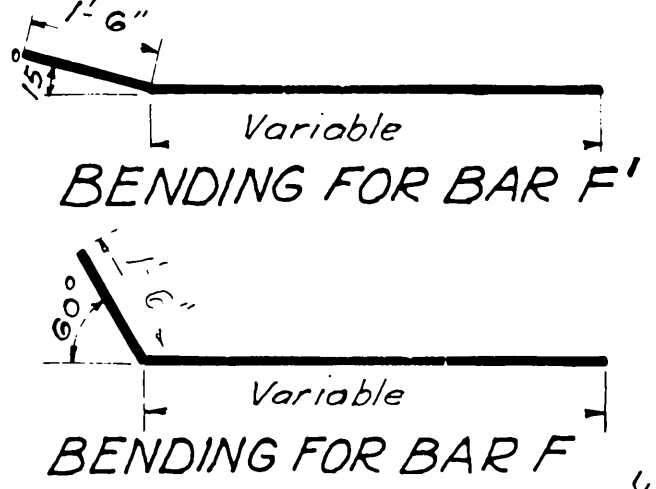
BENDING FOR BAR CH1



BARS F

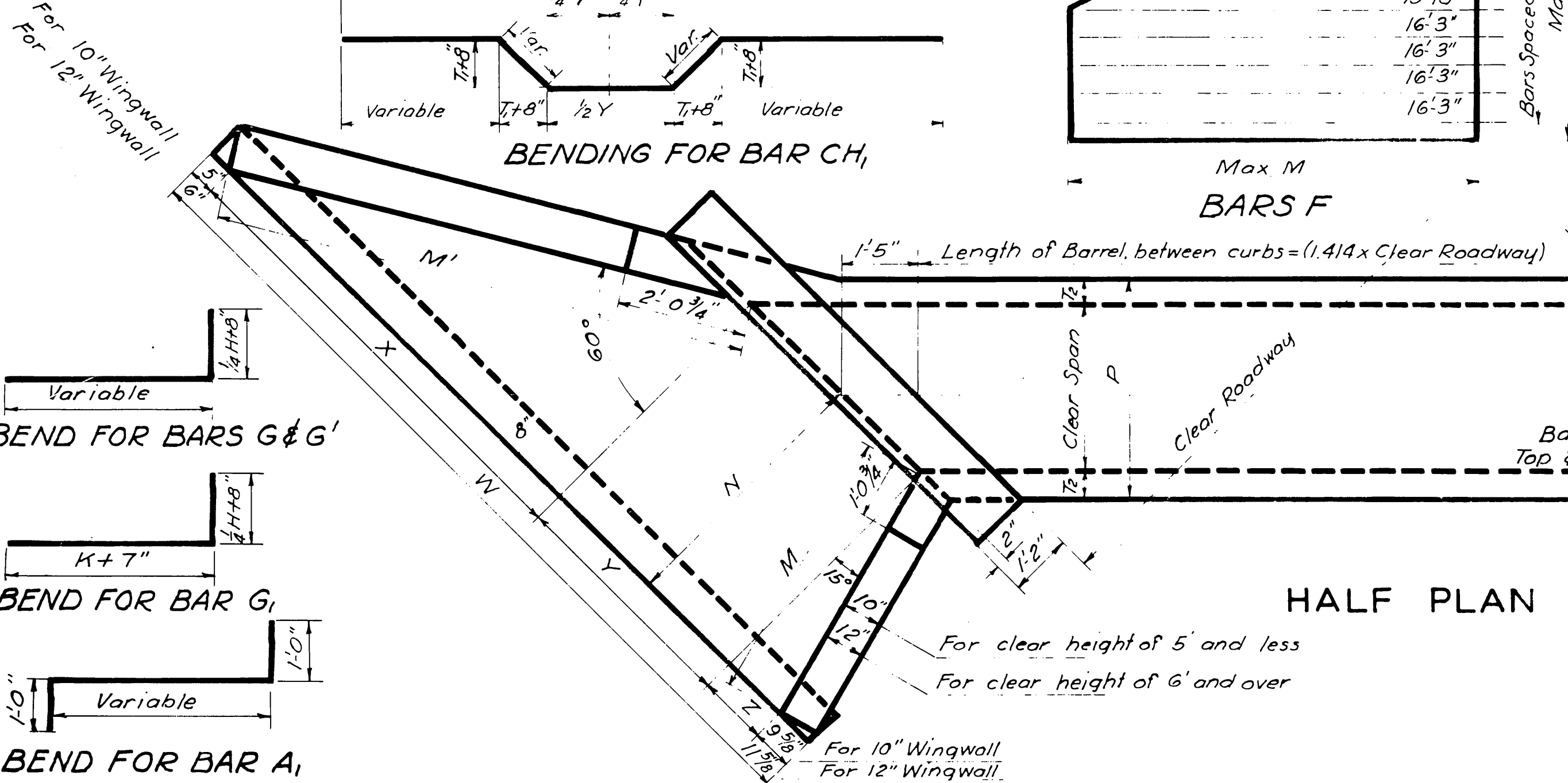


BARS G

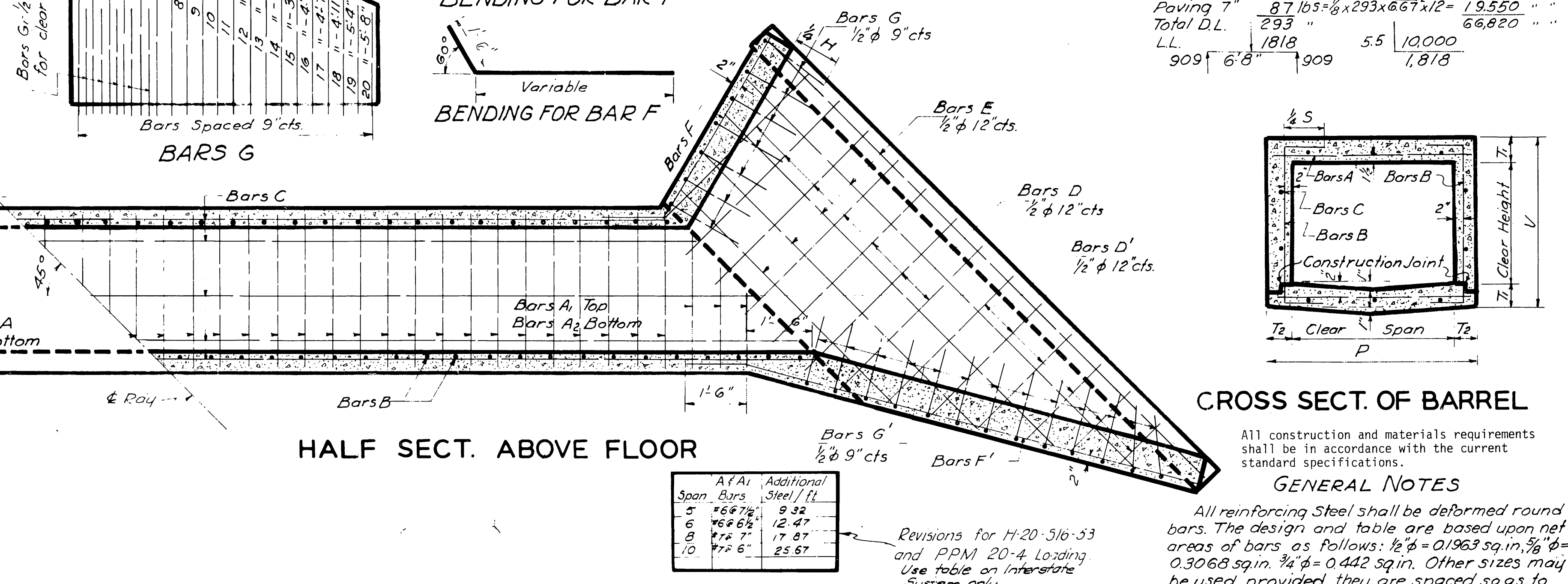


BENDING FOR BAR F'

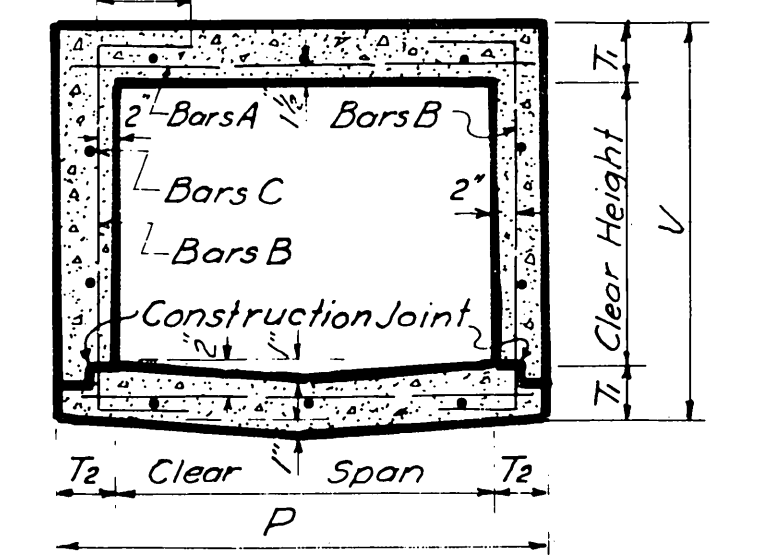
BENDING FOR BAR F



HALF PLAN



HALF SECT. ABOVE FLOOR



CROSS SECT. OF BARREL

All construction and materials requirements shall be in accordance with the current standard specifications.

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 ft. width of slab. Plans 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.

All exposed edges to have 3/4 chamfer.

Span	Bars	Additional Steel / ft
5	667%	9.32
6	766%	12.47
8	774%	17.87
10	772%	25.87

Revisions for H-20-516-53 and PPM 20-4 Loading Use table on Interstate System only.

DESIGN NO.	WATERWAY	BARREL OF CULVERT												TWO WINGS AND ONE APRON												TWO CURBS				TOTAL		DESIGN NO.										
		DIMENSION				REINFORCING STEEL				QUANTS.				DIMENSIONS				REINFORCING STEEL				QUANTS.				QUANTS.																
		T	T/2	V	P	Size & Spacing	A	A1 & A2	A1	A2	Size & Spacing	B BENT	C	No.	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 G1	Reinf. same size as A Bars	Rein. Length	Steel	Class A Concrete	Concrete in One Curbin Wall Cu Yds. Per Ft. of depth	Steel	Class A Conc.
1	2	2'0"	4'0"	6"	6"	3'0"	3'0"	1/2" φ-6"	2'8"	4	4'0"	2'0"	1/2" φ-9"	3'8"	1/2" φ-18"	8	19.34	0.185	2'10"	12'7"	3'8"	7'2"	3'7"	11'3"	6'2"	2'10"	0'11"	4	1'0"	5	3'10"	4	107	1.69	7'2"	4'5"	31	0.50	0.278	1,295	14.38	1
2	2	2'0"	6'0"	6"	6"	3'0"	4'0"	1/2" φ-6"	3'8"	8	4'0"	3'0"	1/2" φ-9"	4'2"	1/2" φ-18"	8	22.97	0.222	2'10"	11'7"	3'8"	7'2"	3'7"	12'8"	6'2"	4'2"	0'11"	6	1'0"	5	3'10"	4	115	1.83	8'7"	5'10"	39	0.61	0.313	1,516	16.83	2
3	3	2'6"	7'5"	6"	6"	3'6"	4'0"	1/2" φ-6"	3'8"	8	5'0"	3'0"	1/2" φ-9"	4'2"	1/2" φ-18"	8	33.69	0.241	3'4"	1'9"	4'4"	8'6"	4'3"	13'11"	7'4"	4'2"	0'11"	6	4'8"	6	4'8"	4	135	2.35	8'7"	5'10"	39	0.61	0.345	1,615	18.95	3
4	4	3'0"	9'0"	6"	6"	4'0"	4'0"	1/2" φ-6"	3'8"	8	5'0"	3'0"	1/2" φ-9"	5'2"	1/2" φ-18"	10	26.14	0.259	3'10"	1'11"	5'0"	9'8"	4'10"	15'1"	8'4"	4'2"	0'11"	6	5'3"	7	4'9"	5	160	2.94	8'7"	5'10"	39	0.61	0.373	1,817	21.16	4
5	2	2'0"	8'0"	7"	6"	3'2"	5'0"	3/8" φ-8"	4'8"	8	5'0"	3'0"	1/2" φ-9"	4'10"	1/2" φ-18"	10	30.40	0.290	2'11"	1'7"	3'9"	7'4"	3'8"	14'3"	6'1"	5'7"	0'11"	7	4'1"	5	3'10"	4	124	2.04	10'0"	7'3"	73	0.73	0.352	1,982	21.10	5
6	6	2'6"	10'0"	7"	6"	3'8"	5'0"	1/2" φ-6"	4'8"	8	5'0"	3'0"	1/2" φ-9"	5'2"	1/2" φ-18"	10	31.31	0.308	3'5"	1'9"	4'5"	8'8"	4'4"	15'6"	7'6"	4'2"	0'11"	7	4'9"	6	4'8"	4	147	2.62	10'0"	7'3"	73	0.73	0.368	2,078	23.29	6
7	4	3'0"	12'0"	7"	6"	4'2"	5'0"	1/2" φ-6"	4'8"	8	5'0"	3'0"	1/2" φ-9"	5'10"	1/2" φ-18"	12	33.58	0.327	3'11"	1'11"	5'1"	9'11"	4'11"	16'10"	8'7"	4'2"	0'11"	7	5'5"	7	4'8"	5	193	3.26	10'0"	7'3"	73	0.73	0.416	2,284	25.66	7
8	4	4'0"	16'0"	7"	8"	5'2"	5'4"	1/2" φ-6"	5'0"	8	5'0"	3'0"	1/2" φ-9"	6'10"	1/2" φ-18"	12	36.45	0.428	4'11"	2'4"	6'5"	12'5"	6'2"	19'3"	10'9"	4'2"	0'11"	7	6'8"	9	6'4"	6	275	4.65	10'3"	7'6"	75	0.75	0.476	2,614	34.00	8
9	2	2'0"	10'0"	7 1/2"	6"	3'3"	6'0"	3/8" φ-7 1/2"	5'8"	12	6'0"	4'0"	1/2" φ-9"	5'5"	1/2" φ-18"	12	37.20	0.352	2'11"	1'7"	3'10"	7'8"	3'10"	17'4"	6'7"	7'0"	0'11"	9	4'2"	5	3'10"	4	136	2.24	11'6"	8'11"	88	0.87	0.390	2,393	25.03	9
10	3	3'0"	15'0"	7 1/2"	6"	4'3"	6'0"	1/2" φ-6"	5'8"	12	6'0"	4'0"	1/2" φ-9"	6'5"	1/2" φ-18"	14	40.36	0.389	3'11"	1'11"	5'2"	10'1"	5'0"	18'4"	8'8"	4'2"	0'11"	9	5'6"	7	4'8"	5	206	3.52	11'6"	8'8"	86	0.85	0.454	2,706	29.70	10
11	5	4'0"	20'0"	7 1/2"	8"	5'3"	6'4"	1/2" φ-6"	6'0"	12	6'0"	4'0"	1/2" φ-9"	7'5"	1/2" φ-18"	14	43.32	0.490	4'11"	2'4"	6'5"	12'6"	6'3"	20'10"	10'10"	4'2"	0'11"	9	6'8"	9	6'4"	6	292	4.96	11'9"	8'11"	88	0.87	0.514	3,038	38.15	11
12	5	5'0"	25'0"	7 1/2"	10"	6'3"	6'8"	1/2" φ-6"	6'4"	12	7'0"	5'0"	1/2" φ-9"	8'5"	1/2" φ-18"	15	47.62	0.617	5'1"	2'8"	7'0"	15'2"	7'7"	23'5"	13'14"	4'2"	0'11"	9	8'0"	11	7'6"	8	407	6.72	11'11"	9'1"	89	0.89	0.579	3,502	48.65	12
13	7	7'0"	35'0"	7 1/2"	10"	8'3"	6'8"	1/2" φ-6"	6'4"	12	7'0"	5'0"	1/2" φ-9"	8'5"	1/2" φ-18"	18	52.61	0.741	7'11"	3'5"	10'5"	20'2"	10'14"	26'9"	17'6"	4'2"	0'11"	9	10'6"	15	10'3"	10	523	12.23	12'3"	9'6"	92	0.91	0.710	4,608	66.61	13
14	2	2'0"	12'0"	8 1/2"	6"	3'5"	7'0"	3/8" φ-6 1/2"	6'8"	18	8'0"	6'0"	1/2" φ-9"	6'1"	1/2" φ-18"	12	45.28	0.441	3'11"	1'8"	3'11"	7'8"	3'10"	17'4"	6'7"	8'5"	0'11"	10	4'3"	5	4'8"	4	147	2.48	13'0"	9'10"	97	0.97	0.429	2,891	30.39	14
15	3	3'0"	18'0"	8 1/2"	8"	4'5"	7'4"	1/2" φ-6"	7'0"	18	8'0"	6'0"	1/2" φ-9"	7'1"	1/2" φ-18"	14	49.76	0.533	4'0"	2'0"	5'3"	10'3"	5'11"	19'11"	11'0"	7'4"	0'11"	10	5'7"	7	5'4"	5	220	3.79	13'3"	10'1"	99	0.99	0.493	3,281	38.20	15
16	4	4'0"	24'0"	8 1/2"	8"	5'5"	7'4"	1/2" φ-6"	7'0"	18	8'0"	6'0"	1/2" φ-9"	7'1"	1/2" φ-18"	14	51.57	0.582	5'0"	2'4"	6'1"	12'10"	6'1"	22'6"	11'3"	7'4"	0'11"	10	6'10"	9	6'8"	7	325	5.39	13'3"	10'1"	99	0.99	0.557	3,592	44.16	16
17	5	5'0"	30'0"	8 1/2"	10"	6'5"	7'8"	1/2" φ-6"	7'4"	18	8'0"	6'0"	1/2" φ-9"	8'1"	1/2" φ-18"	16	56.04	0.711	6'0"	2'9"	7'11"	15'3"	7'11"	25'0"	13'2"	7'4"	0'11"	10	8'1"	11	7'6"	8	425	7.15	13'5"	10'3"	100	1.01	0.617	4,033	54.75	17
18	6	6'0"	36'0"	8 1/2"	10"	7'5"	7'8"	1/2" φ-6"	7'4"	18	8'0"	6'0"	1/2" φ-9"	10'1"	1/2" φ-18"	18	59.22	0.772	7'0"	3'1"	9'3"	17'11"	8'11"	27'10"	15'6"	7'4"	0'11"	10	9'5"	13	8'3"	9	525	10.27	13'9"	10'6"	103	1.03	0.688	4,434	64.43	18
19	3	3'0"	24'0"	10"	8"	4'8"	9'4"	3/8" φ-7"	9'0"	24	10'0"	8'0"	1/2" φ-9"	8'4"	1/2" φ-18"	18	74.24	0.724	4'2"	2'1"	5'5"	10'6"	5'3"	23'0"	9'1"	11'3"	0'11"	13	5'8"	7	5'8"	5	247	4.39	16'2"	12'11"	177	1.21	0.570	4,752	50.04	19
20	4	4'0"	32'0"	10"	8"	5'8"	9'4"	1/2" φ-6"	9'0"	24	10'0"	8'0"	1/2" φ-9"	9'4"	1/2" φ-18"	18	76.06	0.773	5'2"	2'5"	6'10"	13'3"	6'8"	25'7"	11'4"	8'1"	0'11"	13	7'0"	9	6'8"	8	359	6.11	16'2"	12'11"	177	1.21	0.633	5,073	56.24	20
21	5	5'0"	40'0"	10"	10"	6'8"	9'8"	1/2" φ-6"	9'4"	24	10'0"	8'0"	1/2" φ-9"	10'2"	1/2" φ-18"	20	80.96	0.905	6'0"	2'9"	8'0"	15'7"	7'9"	28'1"	13'6"	8'1"	0'11"	13	8'3"	11	7'8"	8	466	7.98	16'4"	13'1"	179	1.24	0.694	5,551	67.22	21
22	6	6'0"	48'0"	10"	10"	7'8"	9'8"	1/2" φ-6"	9'4"	24	10'0"	8'0"	1/2" φ-9"	11'4"	1/2" φ-18"	22	94.14	0.967	7'2"	3'2"	9'4"	18'2"	9'1"	30'11"	15'8"	8'1"	0'11"	13	9'6"	13	8'3"	9	588	11.27	16'8"	13'4"	182	1.26	0.764	5,974	77.30	22
23	7	7'0"	56'0"	10"	10"	8'8"	9'8"	1/2" φ-6"	9'4"	24	10'0"	8'0"	1/2" φ-9"	12'4"	1/2" φ-18"	22	85.55	1.028	8'2"	3'6"	10'9"	20'9"	10'4"	36'6"	18'10"	8'1"	0'11"	13	10'10"	15	8'3"	9	938	14.06	16'8"	13'4"	182	1.27	0.829	6,7		