JUL 31 1968

INACTIVE

AS CONSTRUCTED

REVISED DATE DEC 4 1967

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-3(12)	1

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. F 017-3(12)
STATE HIGHWAY NO. 8
LINCOLN COUNTY

SCALES OF ORIGINAL DRAWINGS

ON PLAN, 1 IN. = 100 FT.

ON PROFILE, 1 IN. = 100 FT. HORIZONTAL; 1 IN. = 10 FT. VERTICAL

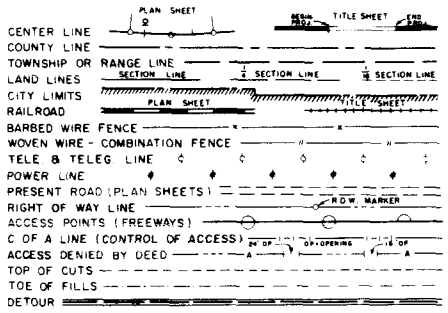
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

CONTRACTOR: FAST CONSTRUCTION CO.

RESIDENT ENGR: C. O. MYLES

DATE COMPLETED: DECEMBER 4, 1967

CONVENTIONAL SIGNS

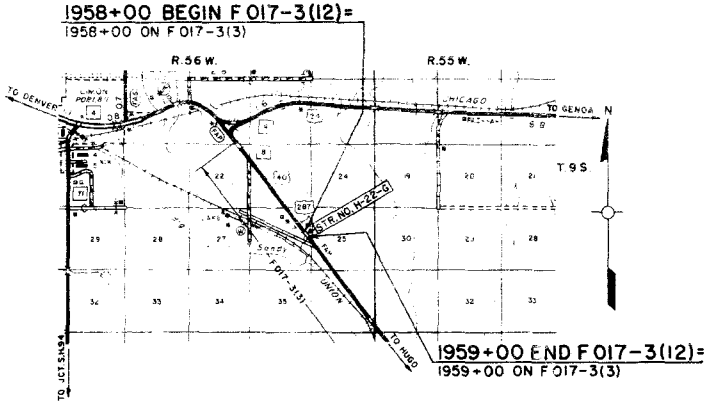


TABULATION OF LENGTH AND DESIGN DATA

STATION	ROADWAY LIN. FT.	MAJOR STR. NO. H-22-G LIN. FT.
1958+00 BEGIN F 017-3(12) = 1958+00 ON F 017-3(3)		
	24.0	
1958+24 STR. NO. H-22-G		32.0
1958+56	44.0	
1959+00 END F 017-3(12) = 1959+00 ON F 017-3(3)		
TOTALS	68.0	32.0

SUMMARY	LIN. FT.	MILES
ROADWAY	68.0	0.013
MAJOR STRUCTURE	32.0	0.006
NET & GROSS LENGTH	100.0	0.019

DESIGN DATA	TANGENT
MAXIMUM DEGREE OF CURVE	
MAXIMUM GRADE	0.057%
MINIMUM S.S.D. HORIZONTAL	>900'
MINIMUM S.S.D. VERTICAL	>1300'
MAXIMUM DESIGN SPEED	70 M.P.H.



SCALE OF MILES

0 1/2 1 2 3

INDEX OF SHEETS

M-206-A.	EXCAVATION AND BACKFILL FOR STRUCTURES. (2 SHEETS). 3-17-67.
M-500-A.	LETTERS AND FIGURES FOR STRUCTURE NUMBERS. 7-1-65.
M-601-C.	WINGWALLS FOR CONCRETE BOX CULVERTS - 4:1 SIDE SLOPES. (2 SHEETS), 7-17-67, 7-1-65.
M-607-A	WIRE FENCES AND GATES (2 SHEETS). 12-8-66, 2-6-67.
M-614-A	TIMBER BARRICADES. 7-1-65
M-614-1A	CONSTRUCTION IDENTIFICATION SIGNS. 6-19-67.
M-614-TB.	TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION. (3 SHEETS). 7-12-67, 7-1-65, 7-12-67.

SEE SPECIAL PROVISIONS FOR NOTICE TO BIDDERS

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

APPROVED: _____ 8-15-67

CHIEF ENGINEER DATE

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS

APPROVED: _____ DATE

DIVISION ENGINEER

T.A.L.

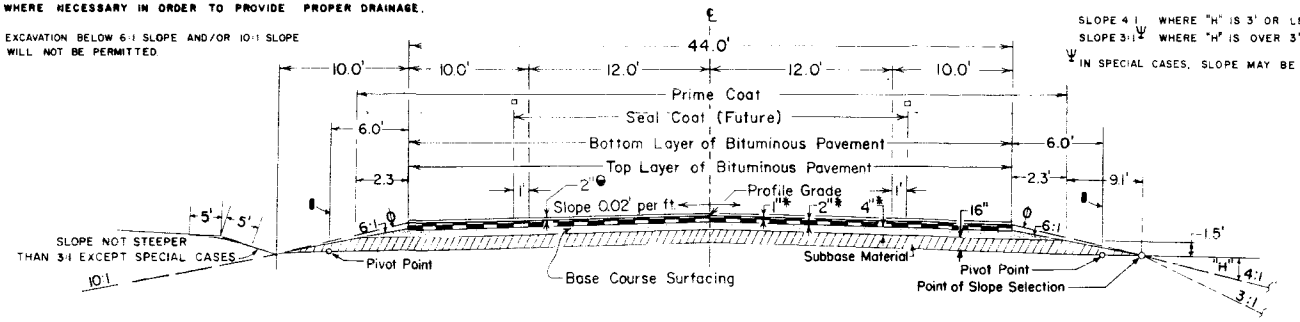
DEPARTMENT OF HIGHWAYS, STATE OF COLORADO
FORM D.O.H. 126
JUNE 1964

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO	TOTAL SHEETS
9	COLORADO	F 017-3(12)	2	

TYPICAL SECTION

THE DEPTH AND WIDTH OF THE SIDE DITCH SHALL BE VARIED WHERE NECESSARY IN ORDER TO PROVIDE PROPER DRAINAGE.

EXCAVATION BELOW 6:1 SLOPE AND/OR 10:1 SLOPE WILL NOT BE PERMITTED.



FILL SLOPES:

SLOPE 4:1 WHERE "H" IS 3' OR LESS
SLOPE 3:1 Ψ WHERE "H" IS OVER 3'

Ψ IN SPECIAL CASES, SLOPE MAY BE STEEPENED.

● FUTURE CONSTRUCTION
□ LOCATION OF 3" WIDE SOLID WHITE PAINTED STRIPE
* APPROXIMATE THICKNESS

Ⓒ CONTRACTOR WILL BE REQUIRED TO PLACE A.B.C. CLASS 7 TO THIS LINE AFTER COMPLETION OF PAVING OPERATION

● SUPERELEVATION CONTROL LINE

MATERIAL SHALL BE PLACED IN SEPARATE COURSES AT THE FOLLOWING RATES PER 100 LIN. FT. OF ROADWAY:

BITUMINOUS PAVEMENT	TOP COURSE	27 TONS
	BOTTOM COURSE	54 TONS
BASE COURSE		103 TONS

GENERAL NOTES

FOR PRELIMINARY PLAN QUANTITIES OF BITUMINOUS MATERIALS THE FOLLOWING RATES OF APPLICATION WERE USED:

PRIME COAT MC @ 0.40 GALS. PER SQ. YD.
HOT BITUMINOUS PAVEMENT @ 110 LBS. PER SQ. YD. PER INCH

RATES OF APPLICATION SHALL BE AS DETERMINED BY THE ENGINEER AT THE TIME OF APPLICATION.

ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.

TYPE OF COMPACTION FOR THIS PROJECT SHALL BE "STANDARD"

DEPTH OF MOISTURE-DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:

FULL DEPTH OF ALL EMBANKMENTS

BASE OF CUTS 1 FOOT.
BASE OF FILLS 1 FOOT

FULL DEPTH OF EMBANKMENT SECTIONS USED FOR DITCHES AND CHANNEL CHANGES

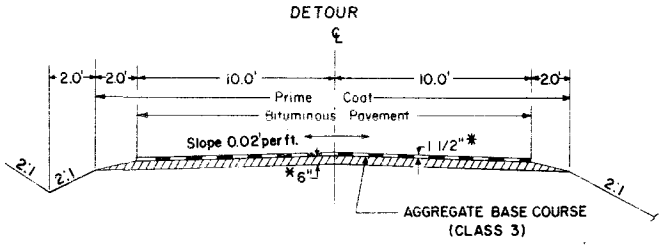
EXCAVATION REQUIRED FOR COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED AS SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY

EARTH SLOPES SHALL BE DISCED OR ROUGHENED BY OTHER APPROVED METHODS FOR MULCHING OR EROSION PROTECTION.

IT IS ESTIMATED THAT 250 HOURS OF FLAGGING FOR CONTROLLING TRAFFIC WILL BE REQUIRED FOR THIS PROJECT.

GUARD POSTS WILL BE REMOVED BY STATE FORCES.

DETOUR



SUMMARY OF APPROXIMATE QUANTITIES

FEDERAL ROAD REGION NO	DIVISION	PROJ. NO.	SHEET NO	TOTAL SHEETS
8	COLORADO	F 017-3(12)	3	

CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY	STR. NO. H-22-G	PROJECT TOTALS
202	Removal of Bridge	Each		1	1
202	Removal of Fence	Lin. Ft.	600		600
203	Unclassified Excavation (Complete in Place)	Cu. Yd.	800	200	1,000
206	Structure Excavation (Haul)	Cu. Yd.		120	120
206	Structure Backfill (Class 3) (Haul)	Cu. Yd.		140	140
210	Reset Fence	Lin. Ft.	600		600
304	Aggregate Base Course (Class 3) (Haul)	Ton	800		800
304	Aggregate Base Course (Class 7) (Haul)	Ton	400		400
403	Hot Bituminous Pavement (Grading F) (Haul Asphalt & Hydrated Lime)	Ton	300		300
411	Liquid Asphaltic Material (MC-70)	Gal.	1,000		1,000
601	Concrete (Class AX)	Cu. Yd.		262	262
602	Reinforcing Steel	Lb.		25,100	25,100
607	Corner and Line Brace Post	Each	2		2
607	Fence Combination Wire and Metal Posts	Lin. Ft	700		700
614	Flagging	Hour	250		250
620	Field Laboratory	Each	1		1
620	Sanitary Facility	Each	1		1
621	Maintenance of Detours	L. S.	●		●
626	Mobilization	L. S.	●		●
	FORCE ACCOUNT				
	Recondition Pit & Pit Area	L. S.	●		●
	STATE FORCES				
	Furnishing and Installing Identification Sign	Each	2		2
	Signing and Striping Entire Project (NON-FEDERAL AID)	L. S.	●		●
	RIGHT OF WAY				
	Easement (Non-Federal Aid)	L. S.	●		●

PARTMENT OF HIGHWAYS—STATE OF COLORADO
...RM D O H 136
...RCH 1964

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F017-3(12)	4	

SUMMARY OF EARTHWORK QUANTITIES

Unclassified Excavation (From Cross Sections)	170 Cu. Yd.
Additional Unclassified Excavation	500 Cu. Yd.
Estimate for Subsidence	67 Cu. Yd.
TOTAL	737 Cu. Yd.

For Information Only

Unclassified Excavation (From Cross Sections)	170 Cu. Yd.
Additional Excavation	500 Cu. Yd.
TOTAL	670 Cu. Yd.
Embankment (From Cross Sections)	515 Cu. Yd.
Embankment x Factor	670 Cu. Yd.

QUANTITIES FOR ROADWAY

Item	Unit	Quantity
Removal of Fence	Lin. Ft.	595
Unclassified Excavation (C.I.P.)	Cu. Yd.	670
Reset Fence	Lin. Ft.	595
Aggregate Base Course (Class 3) (Haul)	Ton	758
Aggregate Base Course (Class 7) (Haul)	Ton	391
Hot Bituminous Pavement (Grading F) (Haul Asphalt & Hydrated Lime)	Ton	282
Liquid Asphaltic Material (MC 70)	Gal.	963
Fence Combination Wire With Metal Posts	Lin. Ft	655
Corner and Line Brace Post	Each	2
Maintenance of Detours	L.S.	●

QUANTITIES FOR STR. NO. H-22-G

Item	Unit	Quantity
Removal of Bridge	Each	1
Unclassified Excavation (C.I.P.)	Cu. Yd.	150
Structure Excavation (Haul)	Cu. Yd.	115
Structure Backfill (Class 3) (Haul)	Cu. Yd.	135
Concrete Class AX	Cu. Yd.	261.65
Reinforcing Steel	Lb.	25,063

STANDARD M-601-A

(JULY 1, 1965)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-3 (12)	5

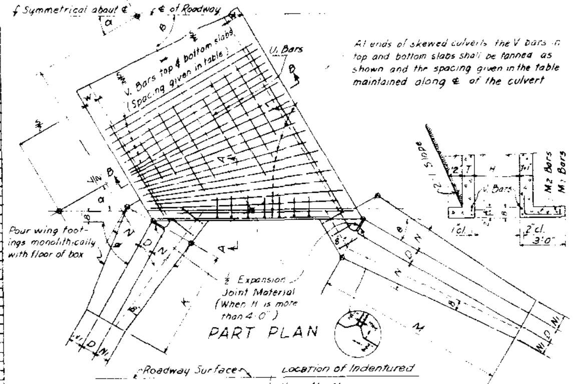
SINGLE CONCRETE BOX CULVERT

Dimensions & Quantities (see Wingwall Standard for Wings)

Height of Fill Allowed	Type	Span S	Height H	Slab T	Wall W	V_1 Size	V_1 Spa	W_1 Size	W_1 Spa	No. bars required U_1	M_1	Quantities for One Lin Ft of Box: Concrete Cu Yds	Steel Lbs	Quantities for Two Headwalls: Concrete Cu Yds	Steel Lbs
35'0"	2A	2'0	2'0	6"	8"	3/4"φ	12"	1/2"φ	12"	8	8 / Cos α	0.232	17.5	1.30	81
30'0	3A	3'0	2'0	7"	8	7/8"φ	12"	1/2"φ	12"	10		0.299	26.3	1.50	112
			3'0							12		0.349	29.0	1.65	123
20'0	4A	4'0	2'0	7½	8	7/8"φ	12	1/2"φ	12"	12	10 / Cos α	0.362	31.8	1.75	150
			3'0							14		0.412	34.6	1.90	154
			4'0							16		0.461	37.3	2.10	158
16'0	5A	5'0	3'0	8"	8	3/4"φ	8	1/2"φ	8	16	12 / Cos α	0.481	45.3	2.20	153
			4'0							18		0.530	48.7	2.40	157
			5'0							20		0.579	52.0	2.60	161
20'0	5B	5'0	3'0	8½	8"	3/4"φ	8	1/2"φ	8	16	12 / Cos α	0.500	45.5	2.20	153
			4'0							18		0.549	48.8	2.40	157
			5'0							20		0.598	52.2	2.60	161
14'0	6A	6'0	4'0	8½	8	3/4"φ	8"	1/2"φ	8"	20	14 / Cos α	0.605	54.7	2.65	180
			5'0							22		0.654	58.1	2.85	184
			6'0							24		0.704	61.4	3.00	188
			7'0							26		0.753	64.9	3.30	192
20'0	6B	6'0	4'0	10	8"	7/8"φ	8	5/8"φ	8	20	14 / Cos α	0.671	72.4	2.70	223
			5'0							22		0.720	76.9	2.90	228
			6'0							24		0.771	81.4	3.10	234
			7'0							26		0.820	85.9	3.35	239
12'0	7A	7'0	4'0	9	9	3/4"φ	7	1/2"φ	7	22	16 / Cos α	0.720	68.2	3.05	209
			5'0							24		0.776	71.9	3.25	212
			6'0							26		0.832	75.5	3.40	216
			7'0							28		0.887	79.2	3.70	220
15'0	7B	7'0	4'0	10	9"	7/8"φ	8	5/8"φ	8"	22	16 / Cos α	0.772	81.0	3.05	257
			5'0							24		0.827	85.5	3.25	262
			6'0							26		0.883	90.0	3.45	268
			7'0							28		0.938	94.5	3.75	273
20'0	7C	7'0	4'0	11	9"	7/8"φ	7	5/8"φ	7"	22	16 / Cos α	0.826	91.1	3.10	257
			5'0							24		0.881	96.0	3.30	263
			6'0							26		0.937	101.0	3.50	268
			7'0							28		0.992	106.0	3.75	274
10'0	8A	8'0	4'0	9½	10	3/4"φ	7	1/2"φ	7"	24	18 / Cos α	0.844	75.8	3.40	235
			5'0							26		0.905	79.5	3.60	239
			6'0							28		0.966	83.2	3.80	243
			7'0							30		1.027	86.8	4.10	247
			8'0							32		1.089	90.5	4.40	251
16'0	8B	8'0	4'0	11½	10	7/8"φ	7	5/8"φ	7"	24	18 / Cos α	0.963	100.9	3.50	292
			5'0							26		1.025	105.9	3.70	297
			6'0							28		1.086	110.8	3.90	303
			7'0							30		1.148	115.8	4.20	308
			8'0							32		1.210	120.8	4.45	314
20'0	8C	8'0	4'0	12½	10"	7/8"φ	6"	5/8"φ	6"	24	18 / Cos α	1.023	115.8	3.55	292
			5'0							26		1.084	121.4	3.75	298
			6'0							28		1.146	126.9	3.95	304
			7'0							30		1.208	132.5	4.25	309
			8'0							32		1.270	138.1	4.50	315
7'0	9A	9'0	5'0	10"	11"	7/8"φ	8"	5/8"φ	8"	28	20 / Cos α	1.040	102.7	4.00	326
			6'0							30		1.108	107.1	4.20	331
			7'0							32		1.176	111.6	4.50	337
			8'0							34		1.244	116.1	4.80	342
			9'0							36		1.311	120.7	5.15	348
14'0	9B	9'0	5'0	12	11"	7/8"φ	6"	5/8"φ	6"	28	20 / Cos α	1.174	131.9	4.10	327
			6'0							30		1.242	137.5	4.30	332
			7'0							32		1.310	143.1	4.60	338
			8'0							34		1.378	148.6	4.90	344
			9'0							36		1.445	154.2	5.25	349
20'0	9C	9'0	5'0	14"	11"	1"φ	7"	3/4"φ	[illegible]	28	20 / Cos α	1.309	150.4	4.20	401
			6'0							30		1.377	156.9	4.40	408
			7'0							32		1.444	163.4	4.70	416
			8'0							34		1.513	170.0	5.00	423
			9'0							36		1.581	176.6	5.35	430
5'0	10A	10'0	6'0	10½	12	7/8"φ	8	1/2"φ	8	32	22 / Cos α	1.260	107.7	4.60	355
			7'0							34		1.334	111.0	4.90	358
			8'0							36		1.408	114.4	5.20	363
			9'0							38		1.483	117.8	5.55	[illegible]
			10'0							40		1.558	121.1	5.95	371
10'0	10B	10'0	6'0	12	12"	7/8"φ	7"	5/8"φ	7"	32	22 / Cos α	1.369	130.4	4.70	367
			7'0							34		1.443	135.4	5.00	372
			8'0							36		1.517	140.4	5.30	378
			9'0							38		1.591	145.3	5.65	383
			10'0							40		1.665	150.3	6.05	388
16'0	10C	10'0	6'0	14	12"	1"φ	6"	3/4"φ	6"	32	22 / Cos α	1.518	150.7	4.80	442
			7'0							34		1.593	156.6	5.10	456
			8'0							36		1.666	162.5	5.40	464
			9'0							38		1.741	168.4	5.80	471
			10'0							40		1.815	174.3	6.15	478
5'0	11A	11'0	6'0	11"	12"	7/8"φ	7"	1/2"φ	7"	34	24 / Cos α	1.367	128.6	4.95	383
			7'0							36		1.441	132.2	5.25	387
			8'0							38		1.515	135.9	5.55	391
			9'0							40		1.589	139.6	5.90	395
			10'0							42		1.664	143.1	6.25	399
9'0	11B	11'0	6'0	12½	12"	1"φ	8"	5/8"φ	8	34	24 / Cos α	1.490	148.3	5.00	467
			7'0							36		1.564	152.8	5.30	472
			8'0							38		1.638	157.3	5.65	478
			9'0							40		1.712	161.8	6.00	483
			10'0							42		1.783	166.4	6.35	489
13'0	11C	11'0	6'0	14"	12"	7/8"φ	6"	5/8"φ	6"	34	24 / Cos α	1.608	159.5	5.10	396
			7'0							36		1.682	165.1	5.40	401
			8'0							38		1.756	170.7	5.70	407
			9'0							40		1.830	176.2	6.10	412
			10'0							42		1.904	181.8	6.45	418
5'0	12A	12'0	6'0	12"	12"	7/8"φ	7"	1/2"φ	7"	36	26 / Cos α	1.525	137.4	5.25	411
			7'0							38		1.599	141.0	5.60	415
			8'0							40		1.673	144.7	5.90	419
			9'0							42		1.747	148.4	6.25	423
			10'0							44		1.821	152.0	6.60	427
10'0	12B	12'0	6'0	14"	12"	1"φ	7"	5/8"φ	7"	36	26 / Cos α	1.697	177.7	5.40	502
			7'0							38		1.772	182.7	5.70	508
			8'0							40		1.846	187.7	6.00	513
			9'0							42		1.920	192.6	6.40	519
			10'0							44		1.994	197.6	6.70	524
4'0	13A	13'0	6'0	12½	12"	7/8"φ	7"	1/2"φ	7"	38	28 / Cos α	1.645	146.0	5.60	442
			7'0							40		1.720	149.7	5.90	446
			8'0							42		1.794	153.3	6.20	450
			9'0							44		1.868	157.0	6.55	454
			10'0							46		1.942	160.7	6.95	458
8'0	13B	13'0	6'0	14"	12"	1"φ	7	5/8"φ	7"	38	28 / Cos α	1.787	188.4	5.70	538
			7'0							40		1.861	193.3	6.00	543
			8'0							42		1.935	198.3	6.30	549
			9'0							44		2.009	203.3	6.65	555
			10'0							46		2.083	208.2	7.05	560
4'0	14A	14'0	6'0	13½	12"	1"φ	8"	5/8"φ	8"	40	30 / Cos α	1.827	177.2	5.95	571
			7'0							42		1.901	181.7	6.25	577
			8'0							44		1.975	186.2	6.55	582
			9'0							46		2.049	190.7	6.95	588
			10'0							48		2.123	195.2	7.30	593
8'0	14B	14'0	6'0	15"	12"	1"φ	7"	5/8"φ	7"	40	30 / Cos α	1.975	199.5	6.05	572
			7'0							42		2.049	204.5	6.40	578
			8'0							44		2.123	209.4	6.70	583
			9'0							46		2.198	214.4	7.05	589
			10'0							48		2.270	219.4	7.40	595

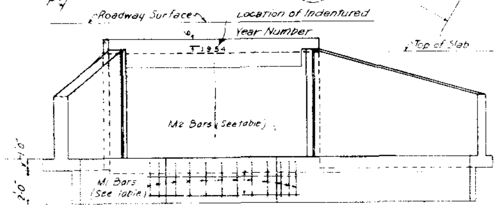
Quantities for one culvert shall be (quantity for one lin. ft of box times L) plus (quantity for two Head Walls) plus (quantities for four wings).

Note: This design not to be used when height of fill exceeds the allowed amount tabulated.



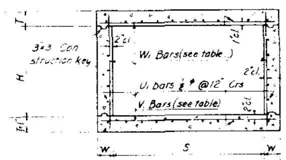
At ends of skewed culverts the V bars in top and bottom slabs shall be fanned as shown and the spacing given in the table maintained along ℄ of the culvert.

SECTION A-A



END ELEVATION

Note: All wing faces to receive Class I finish.



SECTION B-B

Bar dimensions are to ℄ of bar unless marked "cl" (clear).

Bar List for Culvert & Headwalls (See Wingwall Standard for Wings)

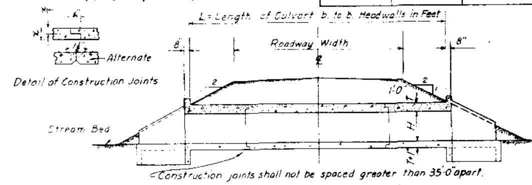
Mark	Size	No Req'd	Type	Length
V_1	See table	$10+\frac{24L}{Spa}$	I	S+2w-6"
W_1	See table	$6+\frac{24L}{Spa}$	I	H+2T-5"
U_1	1/2"φ	See table	I	L+1'-0"
M_1	1/2"φ	See table	II	3'6"
M_2	1/2"φ	4	I	$\frac{S+2w-6"}{Cos\ a}$

Type I: Straight. Type II: 2'6" × 1'0".

(Bar dimensions are out to out of bar)

Possible Combinations (Span & Height)

2×2	5×5	9×5	10×7	11×8	11×10
3×2	7×4	8×6	9×8	10×9	14×8
4×2	6×5	7×7	12×6	13×7	13×9
3×3	8×4	9×6	11×7	12×8	12×10
4×3	7×5	8×7	13×6	14×7	14×9
5×3	6×6	10×6	10×8	11×9	13×10
4×4	8×5	9×7	9×9	10×10	14×10
5×4	6×7	8×8	12×7	13×8	
6×4	7×6	11×6	14×6	12×9	



TYPICAL SECTION THROUGH CULVERT

Note: K, M, N, N1 and D are dimensioned on Wingwall Standard for the various heights of culverts.

REVISIONS

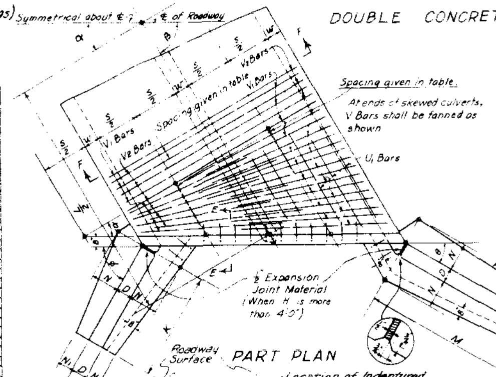
(R1)	THIS PROV. ONLY. JRE	7-21-67

DOUBLE CONCRETE BOX CULVERT

Dimensions & Quantities (see Wingwall Standard for Wings)

Height of Fill Allowed	Type	Span S	Height H	Slab T	Wall W	V_1	V_2	A_1 Size	Spac	No. Bars Required U_1	M_1	Quantities for One Lin Ft of Box: Concrete Cu Yds	Steel Lbs	Quantities for Two Headwalls: Concrete Cu Yds	Steel Lbs
10'0	6-6-A	6'0	3'0	8½	8	1/2"φ	5/8"φ 5½ Spa	1/2"φ	12"	48	32 / Cos α	1.000	112.3	3.85	327
			4'0						12"	52		1.073	117.7	4.60	335
			5'0						12"	56		1.148	123.1	4.85	343
			6'0						12"	60		1.222	128.5	5.05	351
15'0	6-6-B	6'0	3'0	9½	8"	1/2"φ	5/8"φ 5" Spa	1/2"φ	12"	48	32 / Cos α	1.087	120.3	4.45	329
			4'0						12"	52		1.161	125.7	4.65	337
			5'0						12"	56		1.235	131.1	4.90	346
			6'0						8	60		1.309	141.4	5.10	353
20'0	6-6-C	6'0	3'0	10½	8"	1/2"φ	5/8"φ 4½ Spa	1/2"φ	12"	48	32 / Cos α	1.173	130.0	4.50	331
			4'0						12"	52		1.247	135.4	4.75	339
			5'0						10"	56		1.321	142.5	4.95	347
			6'0						7"	60		1.395	152.4	5.15	355
10'0	8-8-A	8'0	3'0	10"	10"	5/8"φ	3/4"φ 6" Spa	1/2"φ	12"	60	40 / Cos α	1.477	174.4	5.80	506
			4'0						12"	64		1.569	179.8	6.05	514
			5'0						12"	68		1.662	185.2	6.30	522
			6'0						12"	72		1.755	190.6	6.55	531
15'0	8-8-B	8'0	3'0	11"	10"	5/8"φ	3/4"φ 5½ Spa	1/2"φ	12"	60	40 / Cos α	1.592	188.6	5.90	508
			4'0						12"	64		1.684	192.0	6.15	516
			5'0						12"	68		1.777	197.4	6.40	524
			6'0						8"	72		1.869	207.9	6.65	533
20'0	8-8-C	8'0	3'0	12½	10"	5/8"φ	3/4"φ 5" Spa	1/2"φ	12"	60	40 / Cos α	1.763	202.0	6.00	513
			4'0						12"	64		1.856	207.4	6.30	521
			5'0						10"	68		1.948	214.6	6.55	529
			6'0						7	72		2.041	225.7	6.75	537
5'0"	10-10-A	10'0	4'0	10"	12"	5/8"φ	7/8"φ 7" Spa	5/8"φ	15	78	48 / Cos α	1.935	228.3	7.40	714
			6'0						15	86		2.157	239.8	7.95	733
			8'0						12"	94		2.380	255.2	8.70	752
			10'0						9"	102		2.602	275.5	9.55	771
10'0"	10-10-B	10'0	4'0	12"	12"	5/8"φ	7/8"φ 7" Spa	5/8"φ	15	78	48 / Cos α	2.220	231.0	7.65	721
			6'0						15	86		2.442	242.5	8.20	740
			8'0						12	94		2.664	258.0	8.90	759
			10'0						8	102		2.886	282.6	9.75	778
15'0	10-10-C	10'0	4'0	14"	12"	5/8"φ	7/8"φ 6" Spa	5/8"φ	15"	78	48 / Cos α	2.503	260.8	7.85	727
			6'0						12	86		2.725	275.6	8.40	746
			8'0						9	94		2.947	295.0	9.15	765
			10'0						6"	102		3.170	325.5	10.00	784
5'0"	12-12-A	12'0	6'0	12"	12"	5/8"φ	7/8"φ 7" Spa	5/8"φ	15	98	56 / Cos α	2.751	278.9	9.35	857
			8'0						12"	106		2.973	294.5	10.05	876
			10'0						9"	114		3.195	315.0	10.90	895
10'0"	12-12-B	12'0	6'0	14"	12"	5/8"φ	7/8"φ 6" Spa	5/8"φ	15	98	56 / Cos α	3.083	313.5	9.60	864
			8'0						12"	106		3.305	329.8	10.30	883
			10'0						8"	114		3.528	354.1	11.15	902
15'0	12-12-C	12'0	6'0	16	12"	5/8"φ	7/8"φ 5" Spa	5/8"φ	12	98	56 / Cos α	3.416	365.1	9.85	870
			8'0						9	106		3.638	384.7	10.55	889
			10'0						6	114		3.860	415.7	11.40	908
(R1) 5'0"	14-14-S	14'0	5'0"	15"	12"	5/8"φ	7/8"φ 6" Spa	5/8"φ	15"	106	64 / Cos α	3.521	349.2	9.62	983 (R1)
10'0"	14-14-B	14'0	6'0"	16"	12"	5/8"φ	7/8"φ 5" Spa	5/8"φ	15	110	64 / Cos α	3.824	409.4	11.05	988
			9'0						12	118		4.046	425.2	11.75	1007
			10'0						8"	126		4.269	450.5	12.65	1026

Quantities for one culvert shall be (quantity for one lin. ft of box times L) plus (quantity for two head walls) plus (quantities for four wings).



Spacing given in table. At ends of skewed culverts, V Bars shall be fanned as shown.

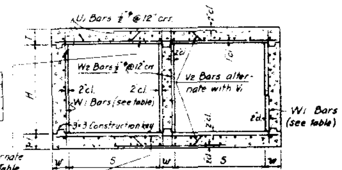
Bar dimensions are to ℄ of bar unless marked "cl." (clear).

Pour wing footings monolithically with floor of box.

Possible Combinations (Span & Height)

6×3	8×3	10×4	12×6	14×6
6×4	8×4	10×6	12×8	14×8
6×5	8×5	10×8	12×10	14×10
6×6	8×6	10×10		14×5

(R1)



V1 Bars alternate with V2. See Table for Spacing.

SECTION F-F

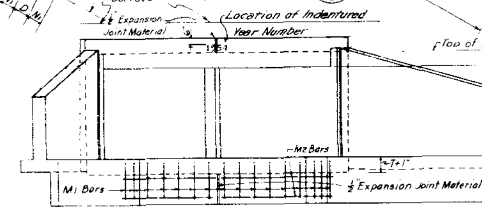
Bar List for Culvert and Two Headwalls (See Wingwall Std. for Wings)

Mark	Size	Number Required	Type	ℓ	Total Length
V_1	See Table	$\frac{24(L+2)}{Spacing}$	I	S+1.5w+4"	ℓ
V_2	See Table	$\frac{24(L+2)}{Spacing}$	II	0.75S+4"	2ℓ+m
W_1	See Table	$\frac{24(L+2)}{Spacing}$	I	H+2T-4"	ℓ
W_2	1/2"φ	2(L+2)	I	H+2T-4"	ℓ
U_1	1/2"φ	See Table	I	L+12"	ℓ
M_1	1/2"φ	See Table	III		3'-6"
M_2	1/2"φ	8	I	$\frac{S+1.5w}{Cos\ a}$	ℓ

Type I; Type II: n = T-5, m = 1.41n; Type III: 2'-6" × 1'-0".

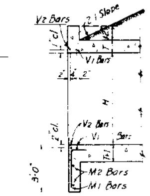
(Bar dimensions are out to out of bar.)

For General Notes Loading and Design Data, see Wingwall Std.



END ELEVATION

Note: All wing faces to receive Class I finish.



SECTION E-E

STR. Nº H-22-G (ONLY)

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
SINGLE AND DOUBLE CONCRETE BOX CULVERTS
(FOR SIZES SEE TABLE OF POSSIBLE COMBINATIONS)

Designed by: WWD	Approved by: [signature]
Made by: WWD	Bridge Engineer
Checked by: TJM	Date: July 1, 1965

WWD 5-1-54; WWD 5-1-54; TJM 5-4-54; TJM 5-18-54; MGD 5-6-54

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-3(12)	6	

N.E. 4 SEC. 26
T. 9S. R. 56W.

1952+00 to 1965+00 – Req'd Detour

1958+00 – Req'd. Identification Sign, Rt. (State Forces)

TIMBER BRIDGE
3-23' SPANS
29' CLEAR RDWY.

1959+00 END FO17-3(12) =
1959+ ON FO17-3(3)

1959+00 to 1962+00 – Req'd. Approach to Project

S.W. 4 SEC. 25
T. 9S. R. 56W.

AS CONSTRUCTED
REVISED DATE DEC 4 1967

1950 1955 1960 1965

DIKE
SNOW FENCE
STR. H-22-G
1958+24.0
1958+56.0
DIKE
TO LIMON
TO HUGO
75°
40'
+00
1958+02.5
GULCH
1958+73.1
Easement

1955+00 to 1958+00 – Req'd. Approach to Project

1955+ to 1960+ - Remove Fence, Rt. Required Fence For Detour Rt. Reset Fence, Rt.

1958+00 BEGIN FO17-3(12) =
1958+00 ON FO17-3(3)

1958+40 – Remove Timber Bridge Rd 14 & 14 x 5 x 68' CBC. (Type 14-14-S) & Channel Improvement (W = 34') D.A. - 3.5 Sq. Mi (See Details Sheet No. 5)

S.E. 4 SEC. 26
T. 9S. R. 56W.

1959+00 – Req'd Identification Sign Lt (State Forces)

B.M. - EL ~~100.00~~ 5277.95
BOLT ON N.W. CORNER OF BRIDGE ON WHEEL GUARD

NO. 1 – O.M.
NO. 1A – S.C.
NO. 1B – S.B.
NO. 1C – A-7-6(20)
L.L. =58
P.I. =39
%-200 =91
CBR =2.5

NO. 2 – D.M.
NO. 2A – S.C.
NO. 2B – S.B.
NO. 2C – SIMILAR TO TEST NO. 1C

~~ASSUMED ELEVATION~~

~~110~~ 110
~~100~~ 100
~~90~~ 90

+0.057%

24' RT.
NO. 1
NO. 1A
NO. 1B
NO. 1C

24' LT
NO. 2
NO. 2A
NO. 2B
NO. 2C

70.6

47	420	48	Uncl. Excav.
61	546	63	Embank.
56	381	63	Embank. x 1.3

Additional Uncl. Excav. - Source Undesign.

STANDARD M-206-A

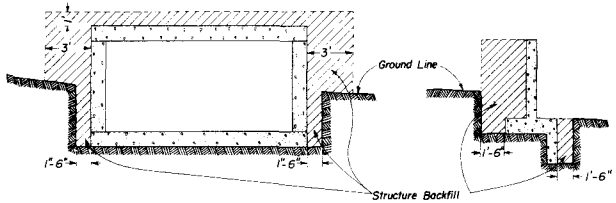
(JULY 1, 1965)

(SHEET 1 OF 2 SHEETS)

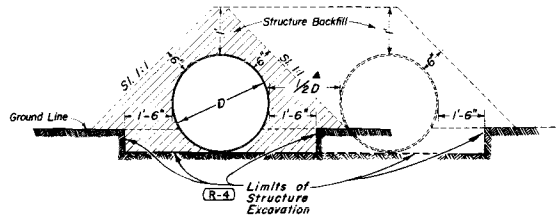
FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
8	COLO.		

REVISION			
R-1	10-20-65	ADDED PIER VIEW	M.R.H.
R-2	12-7-65	STR. EXCV.	M.R.H.
R-3	4-25-66	Class 2 Backfill (Trench)	M.R.H.
R-4	3-17-67	Conduit, Underdr'n, Box	M.R.H.

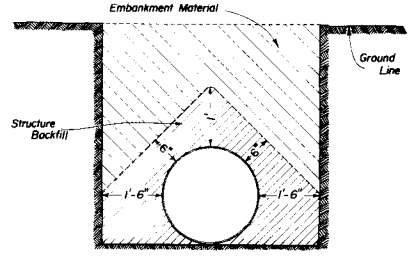
CONCRETE BOX CULVERTS & WINGWALLS



CIRCULAR CONDUIT

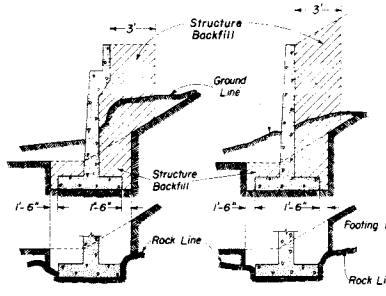


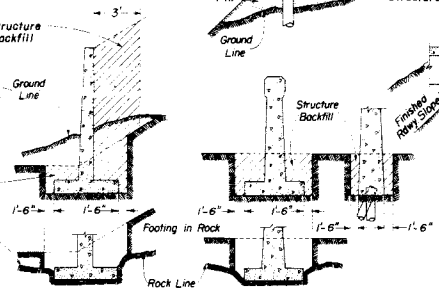
SIPHONS OR CONDUIT IN TRENCH



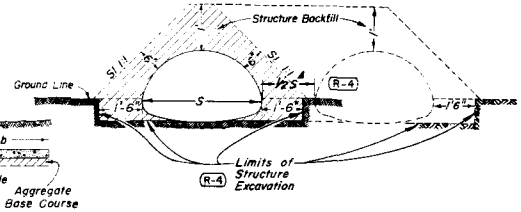
PIERS, ABUTMENTS, RETAINING WALLS ETC.

All material that is to be compacted shall be placed in horizontal layers not more than 6" inches in depth and compacted before the next layer is placed. For Arches, Rigid Frames and Box Culverts the fill shall be brought up uniformly on both sides of the center of structure to avoid stresses in the structure caused by unsymmetrical loading.





ELLIPTICAL OR ARCH CONDUIT

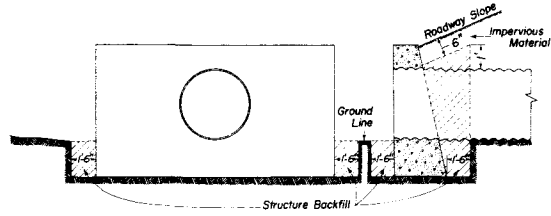


R-4 *NOTES:*

When two or more conduits are laid side by side they shall be spaced so that adjacent sides of pipe shall be ½ the Diameter or Span or 3 feet apart whichever is less. Minimum spacing shall not be less than 1 foot. R-4

For additional culvert installation details see M Standards for metal, concrete, or structural plate pipe culverts.

HEADWALLS AND END OF CULVERTS



GENERAL NOTES

All work shall be done according to the Standard Specifications applicable to the Project.

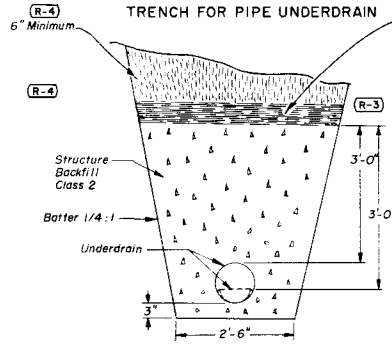
Where the roadway cross section is in fill, excavation for concrete footings (except those in rock or those on piles) and for box culverts shall be done according to the following:

Embankment shall be built up and compacted to a point one foot above the flowline of the box or the top of the footing. The trench shall then be excavated to accomodate construction of the box or footing.

Excavation and backfill patterns different from those indicated on these sheets will be shown elsewhere on the plans.

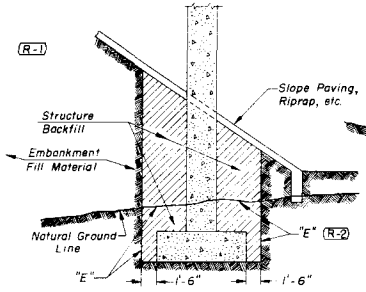
R-4 *Excavation for structure installation shall be classified as "Structure Excavation" unless otherwise shown on plans.*

TRENCH FOR PIPE UNDERDRAIN

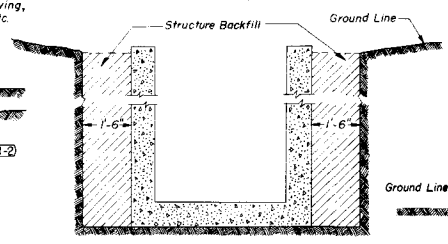


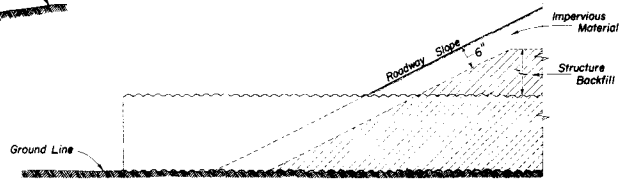
R-1

DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS, ETC.



Note:
"E" = Limits of Structure Excavation





DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

EXCAVATION AND BACKFILL FOR STRUCTURES

Designed by H.E.P.	Approved by [illegible]
Made by D.M.E.	Staff Design Engr.
Checked by L.E.O.	Date: July 1, 1965

STANDARD M-206-A

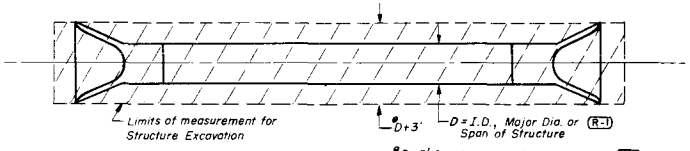
(SHEET 2)

(JULY 1, 1965)

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

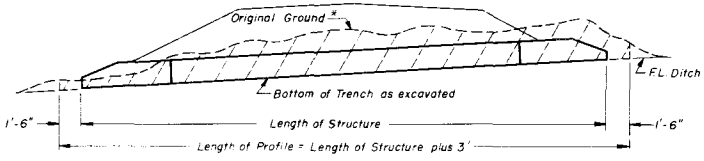
	REVISIONS:	
R-1	3-17-67	I. D. on Pipe Culvert Span or D. M.R.H.

STRUCTURE EXCAVATION MEASUREMENT FOR PIPE CULVERTS



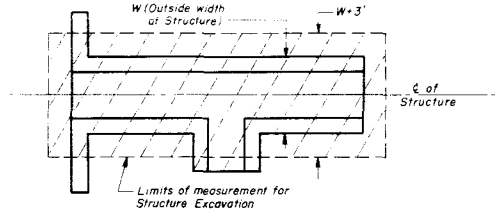
PLAN

*D+6' for structural plate structures. (R-1)

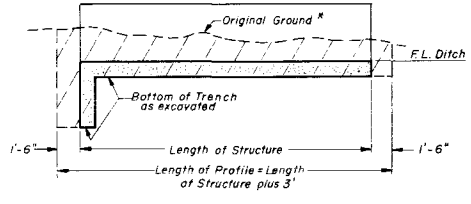


PROFILE

STRUCTURE EXCAVATION MEASUREMENT FOR DIVERSION OR DIVISION BOXES

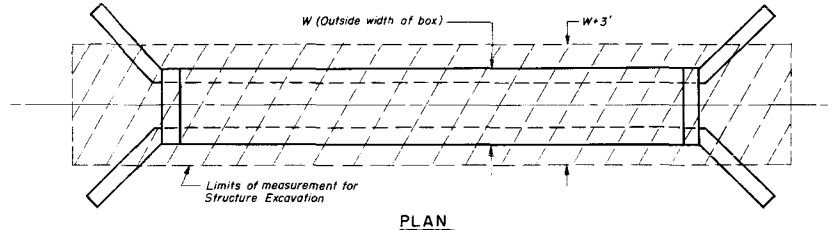


PLAN



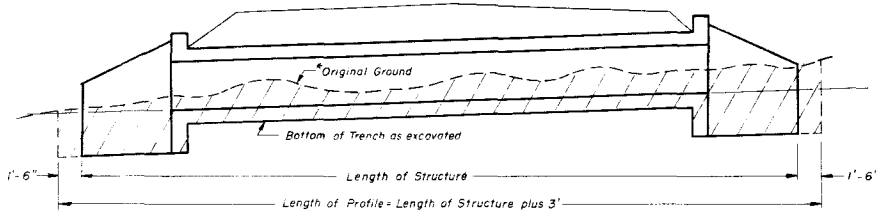
PROFILE

STRUCTURE EXCAVATION MEASUREMENT FOR CONCRETE BOX CULVERTS



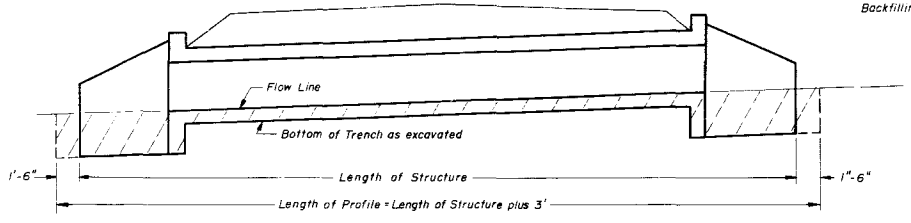
PLAN

Without Channel Change or Channel Improvement



PROFILE

With Channel Change or Channel Improvement



PROFILE

* Along ℄ of Structure

Areas to be used for Structure Excavation computations.

NOTE:
See Sheet 1 for General Notes and Backfilling Details.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

EXCAVATION AND BACKFILL FOR STRUCTURES

Designed by: M.R.H.	Approved by:
Made by: H.P.B.	Staff Design Engr.
Checked by:	Date: July 1, 1965

STANDARD M-500-A

(JULY 1, 1965)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

1 2 3 4 5 6 7 8 9 0 .

A B C D E F G H I J K L

M N O P Q R S T U V W

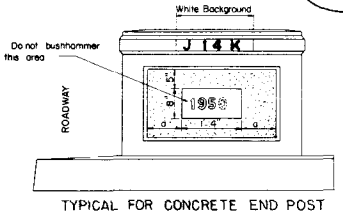
a f g l J 14 K 1950

Scale in inches

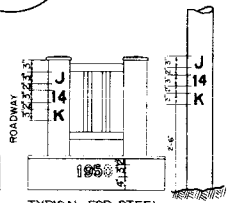
abcdefghijklmnopqrstuvwxyz

SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

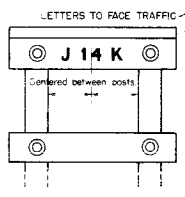


TYPICAL FOR CONCRETE END POST

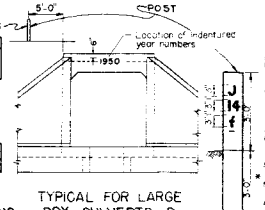


TYPICAL FOR STEEL HANDRAIL END POST

TYPICAL FOR SIGN POSTS



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX CULVERTS & STRUCTURES WITHOUT END POSTS

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS APPLICABLE TO THE PROJECT.

THE SIZE, SHAPE AND SPACING OF THE LETTERS AND FIGURES SHALL BE IN ACCORDANCE WITH THE FULL SIZE SHOWN ON THIS SHEET. ADDITIONAL COPIES OF THIS FULL SIZE SHEET CAN BE OBTAINED FROM THE DEPARTMENT WITHOUT CHARGE.

THE YEAR NUMBERS ARE RECESSED IN CONCRETE 3/8" MINIMUM AS SHOWN INTO THE PANEL OF THE ENDPOST ON THE RIGHT HAND SIDE OF EACH BRIDGE END AND INTO THE FACE OF THE DOWNSTREAM HEADWALL OF CULVERTS AS SHOWN ON PLAN DETAILS. NUMBERS TO BE MADE OF WOOD, METAL OR OTHER SUITABLE MATERIAL AND ATTACHED TO THE FORMS BEFORE CONCRETE IS POURED. THE YEAR NUMBER OF EACH STRUCTURE SHALL CORRESPOND WITH THE YEAR IN WHICH THE CONCRETE IS POURED.

THE STRUCTURE NUMBER SHALL BE STENCILED ON THE RIGHT HAND SIDE OF EACH BRIDGE END AS SHOWN ON THIS STANDARD AND AS SPECIFIED. WHERE THE STRUCTURE HAS NO END POSTS THE NUMBER SHALL BE PLACED ON A POST ON THE RIGHT HAND SIDE OF THE ROAD AS SHOWN. FOR SIGNS THE NUMBER SHALL BE PLACED ON SIGN POSTS ON THE RIGHT HAND SIDE OF THE ROADWAY.

THE CORRECT NUMBER FOR EACH BRIDGE OR SIGN IS SHOWN ON THE PLANS.

THE NUMBERS FOR MAJOR STRUCTURES OF OVER 20 FEET CLEAR SPAN SHALL BE UPPER CASE LETTERS. THE NUMBERS FOR MINOR STRUCTURES OF 12 TO 20 FEET CLEAR SPAN SHALL BE LOWER CASE LETTERS. SIGN BRIDGES SHALL BE CONSIDERED AS MAJOR STRUCTURES.

A PROPER WHITE BACKGROUND RECTANGULAR IN SHAPE AND EXTENDING THREE INCHES BEYOND THE LIMITS OF THE NUMBER SHALL BE PAINTED WITH TWO COATS OF ACCEPTABLE WHITE PAINT UNLESS AN APPROVED WHITE CONCRETE PAINT IS USED. BEFORE PAINTING, THE SURFACE MUST BE THOROLY DRIED, CLEANED AND PROPERLY SIZED ON TIMBER HANDRAILS. THE WHITE PAINT USED ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY, THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED WITH "EXTERIOR BLACK PAINT" AS SPECIFIED IN SECTION 708 - PAINTS, OR AN ACCEPTABLE EQUIVALENT. THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

SUFFICIENT TIME BETWEEN SUCCESSIVE COATS SHALL BE ALLOWED TO PERMIT THORO DRYING.

THE COST OF PAINTING OF STRUCTURE NUMBERS AND FURNISHING AND PLACING POSTS FOR STRUCTURE NUMBERS SHALL BE CONSIDERED SUBSIDIARY WORK AND SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT PAID FOR AS SEPARATE ITEMS.

THE LENGTH OF SPAN OF STRUCTURE SHALL BE MEASURED ALONG CENTER LINE OF ROADWAY. IN CASE OF DOUBLE OR MULTIPLE BOX CULVERTS THE CENTER WALL OR WALLS SHALL BE DISREGARDED AND CLEAR SPAN MEASURED FROM INSIDE OF END WALLS.

IN ADDITION TO THE REQUIREMENTS STATED ABOVE, STRUCTURE NUMBERS FOR HIGHWAYS PASSING UNDER CROSSROADS ARE TO BE PLACED AT THE FOLLOWING POINTS:

(A) FOR STRUCTURES OF 3 OR MORE SPANS, THE STRUCTURE NUMBER SHALL BE STENCILED, FACING TRAFFIC, ON THE OUTSIDE FACE OF THE END COLUMN OF THE RIGHT-HAND PIER.

(B) FOR 2-SPAN STRUCTURES, THE STRUCTURE NUMBER SHALL BE STENCILED, FACING TRAFFIC, ON THE OUTSIDE FACE OF EACH END COLUMN IN THE CENTER PIER.

STRUCTURE NO. _____

REVISIONS			

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

LETTERS AND FIGURES FOR STRUCTURE NUMBERS

Designed by	Approved by: A. D. Thornhill
Made by	Bridge Engineer
Checked by	Date: July 1, 1965

STANDARD M-601-C

(SHEET 1 OF 2 SHEETS)

(JULY 1, 1965)

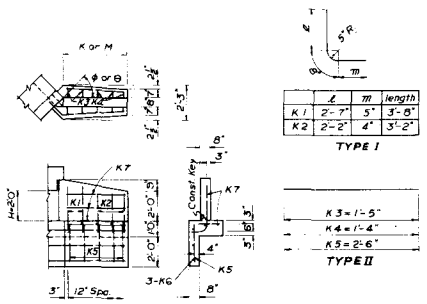
FED. ROAD REG. NO.	DIVISION	PROJECT. NO.	SHEET NO.
9	COLO.		

TABLE SHOWING VALUES OF K & M WHEN "B" & "H" ARE GIVEN

B	α	φ	θ	H= 2'-0" K	H= 2'-0" M	H= 3'-0" K	H= 3'-0" M	H= 4'-0" K	H= 4'-0" M	H= 5'-0" K	H= 5'-0" M	H= 6'-0" K	H= 6'-0" M
45°	45°	67°30'	22°30'	3'-3"	8'-0"	4'-6"	11'-0"	6'-0"	14'-9"	7'-6"	18'-0"	8'-9"	21'-0"
60°	30°	60°	30°	3'-6"	6'-0"	5'-0"	8'-6"	6'-8"	11'-3"	8'-0"	14'-0"	9'-3"	16'-0"
75°	15°	52°30	37°30'	3'-9"	5'-0"	5'-6"	7'-0"	7'-3"	9'-3"	8'-9"	11'-6"	10'-0"	13'-3"
90°	0°	45°	45°	4'-3"	4'-3"	6'-0"	6'-0"	8'-0"	8'-0"	10'-0"	10'-0"	11'-6"	11'-6"
105°	15°	37°30'	52°30'	5'-0"	3'-9"	7'-0"	5'-6"	9'-3"	7'-3"	11'-6"	8'-9"	13'-3"	10'-0"
120°	30°	30°	60°	6'-0"	3'-6"	8'-6"	5'-0"	11'-3"	6'-6"	14'-0"	8'-0"	16'-0"	9'-3"
135°	45°	22°30'	67°30'	8'-0"	3'-3"	11'-0"	4'-6"	14'-9"	6'-0"	18'-0"	7'-6"	21'-0"	8'-9"

B equals the angle between ℄ of culvert & ℄ of roadway. α equals the angle between ℄ of culvert and a normal to ℄ of roadway. φ and θ are angles between the wingwall and a line parallel with the ℄ of roadway.

EXAMPLE FOR USING THE ABOVE TABLE. Suppose a stream makes an angle of B=65° with the ℄ of roadway, then from the table, select the nearest angle. B=60°, then α, φ, & θ equal 30°, 60° & 30° respectively. If the desired height "H" of culvert is 6'-0", then K & M will be 9'-3" and 16'-0". Locate the WING DETAIL WHEN H=6'-0" on this sheet.



	ℓ	m	length
K1	2'-7"	5"	3'-8"
K2	2'-2"	4"	3'-2"

TYPE I

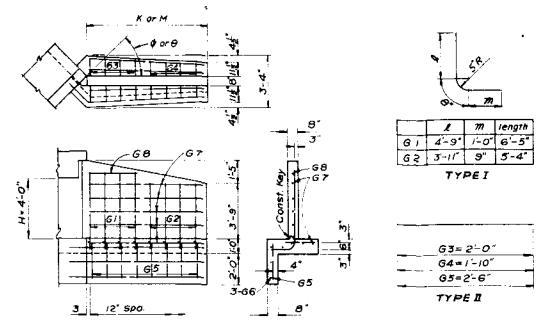
K3 = 1'-5"
K4 = 1'-4"
K5 = 2'-6"

TYPE II

BAR LIST & QUANTITIES FOR ONE WING WHEN H= 2'-0"

When φ or θ equals	Number of bars required K1 ℄ Type I	K2 ℄ Type I	K3 ℄ Type II	K4 ℄ Type II	K5 ℄ Type II	Length of bars 3-K6 ℄ Type II	4-K7 ℄ Type II	Quantities for One Wing Concrete Cu.Yd.	Steel Lb.
22°30'	4	4	4	4	8	9'-10"	7'-8"	1.47	80
30°	3	3	3	3	6	7'-4"	5'-8"	1.10	59
37°30'	3	2	3	2	5	6'-1"	4'-8"	0.92	50
45°	2	3	2	3	5	5'-2"	3'-11"	0.78	45
52°30'	2	2	2	2	4	5'-1"	3'-5"	0.69	39
60°	2	2	2	2	4	4'-6"	3'-2"	0.64	37
67°30'	2	2	2	2	4	4'-0"	2'-11"	0.60	36

WING DETAIL WHEN H= 2'-0"



	ℓ	m	length
G1	4'-9"	1'-0"	6'-5"
G2	3'-11"	9"	5'-4"

TYPE I

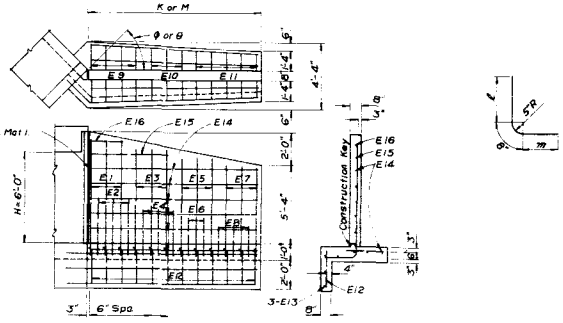
G3 = 2'-0"
G4 = 1'-10"
G5 = 2'-6"

TYPE II

BAR LIST & QUANTITIES FOR ONE WING WHEN H= 4'-0"

When φ or θ equals	Number of bars required G1 ℄ Type I	G2 ℄ Type I	G3 ℄ Type II	G4 ℄ Type II	G5 ℄ Type II	Length of bars 3-G6 ℄ Type II	8-G7 ℄ Type II	1-G8 ℄ Type II	Quantities for One Wing Concrete Cu.Yd.	Steel Lb.
22°30'	6	9	6	9	15	17'-4"	14'-5"	5'-2"	3.97	219
30°	5	7	5	7	12	13'-2"	10'-11"	4'-2"	3.03	170
37°30'	4	6	4	6	10	10'-10"	8'-11"	3'-2"	2.49	141
45°	4	4	4	4	8	9'-4"	7'-8"	3'-2"	2.15	118
52°30'	3	5	3	5	8	9'-0"	6'-11"	2'-2"	1.95	112
60°	3	4	3	4	7	7'-10"	6'-2"	2'-2"	1.75	99
67°30'	3	3	3	3	6	7'-0"	5'-8"	2'-2"	1.61	88

WING DETAIL WHEN H= 4'-0"



	ℓ	m	length
E1	7'-0"	1'-5"	9'-1"
E2	3'-4"	10"	4'-10"
E3	6'-6"	1'-4"	8'-6"
E4	2'-8"	9"	4'-1"
E5	6'-0"	1'-2"	7'-10"
E6	2'-2"	8"	3'-6"
E7	5'-6"	1'-1"	7'-3"
E8	1'-8"	7"	2'-11"

TYPE I

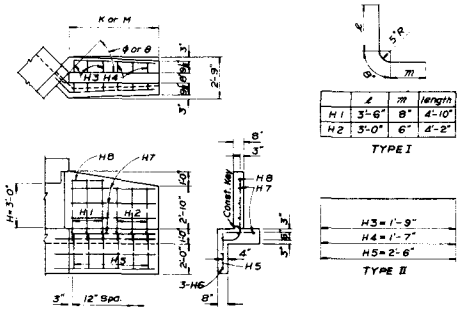
E9 = 2'-6"
E10 = 2'-4"
E11 = 2'-2"
E12 = 2'-6"

TYPE II

BAR LIST & QUANTITIES FOR ONE WING WHEN H= 6'-0"

When φ or θ equals	Number of bars required E1 ℄ Type I	E2 ℄ Type I	E3 ℄ Type I	E4 ℄ Type I	E5 ℄ Type I	E6 ℄ Type I	E7 ℄ Type I	E8 ℄ Type I	E9 ℄ Type II	E10 ℄ Type II	E11 ℄ Type II	E12 ℄ Type II	Length of bars 3-E13 ℄ Type II	9-E14 ℄ Type II	1-E15 ℄ Type II	1-E16 ℄ Type II	Quantities for One Wing Concrete Cu.Yd.	Steel Lb.
22°30'	6	5	5	5	5	5	5	6	7	8	21		24'-3"	20'-8"	10'-2"	5'-2"	7.30	430
30°	4	4	4	4	4	4	4	3	5	5	6	16	18'-5"	15'-8"	7'-2"	3'-2"	5.56	326
37°30'	4	3	3	3	3	3	4	4	4	5	5	14	15'-3"	12'-11"	6'-2"	3'-2"	4.60	278
45°	3	3	3	3	3	2	3	3	4	3	5	12	13'-2"	11'-2"	5'-2"	2'-2"	3.99	240
52°30'	3	2	2	3	3	2	2	2	3	4	3	10	12'-1"	9'-8"	4'-2"	2'-2"	3.47	202
60°	3	2	2	2	2	2	3	3	3	3	4	10	10'-10"	8'-11"	4'-2"	2'-2"	3.21	184
67°30'	3	2	2	2	2	2	2	2	3	3	3	9	9'-11"	8'-5"	4'-2"	2'-2"	3.04	180

WING DETAIL WHEN H= 6'-0"



	ℓ	m	length
H1	3'-6"	8"	4'-10"
H2	3'-0"	6"	4'-2"

TYPE I

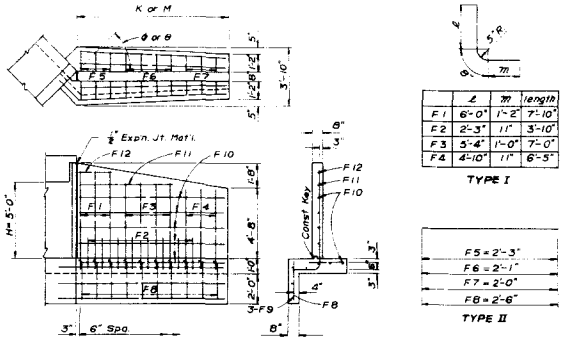
H3 = 1'-9"
H4 = 1'-7"
H5 = 2'-6"

TYPE II

BAR LIST & QUANTITIES FOR ONE WING WHEN H= 3'-0"

When φ or θ equals	Number of bars required H1 ℄ Type I	H2 ℄ Type I	H3 ℄ Type II	H4 ℄ Type II	H5 ℄ Type II	Length of bars 3-H6 ℄ Type II	5-H7 ℄ Type II	1-H8 ℄ Type II	Quantities for One Wing Concrete Cu.Yd.	Steel Lb.
22°30'	6	5	6	5	11	13'-2	10'-8	5'-2	2.47	131
30°	5	4	5	4	9	10'-2	8'-2	4'-2	1.91	104
37°30'	4	3	4	3	7	8'-4	6'-8	3'-2	1.57	82
45°	3	3	3	3	6	7'-1	5'-8	2'-2	1.35	70
52°30'	3	3	3	3	6	7'-0	5'-2	2'-2	1.23	68
60°	3	2	3	2	5	6'-2	4'-8	2'-2	1.12	59
67°30'	3	2	3	2	5	5'-4	4'-2	2'-2	1.01	56

WING DETAIL WHEN H= 3'-0"



	ℓ	m	length
F1	6'-0"	1'-2"	7'-10"
F2	2'-3"	11"	3'-10"
F3	5'-4"	1'-0"	7'-0"
F4	4'-10"	11"	6'-5"

TYPE I

F5 = 2'-3"
F6 = 2'-1"
F7 = 2'-0"
F8 = 2'-6"

TYPE II

BAR LIST & QUANTITIES FOR ONE WING WHEN H= 5'-0"

When φ or θ equals	Number of bars required F1 ℄ Type I	F2 ℄ Type I	F3 ℄ Type I	F4 ℄ Type I	F5 ℄ Type II	F6 ℄ Type II	F7 ℄ Type II	F8 ℄ Type II	Length of bars 3-F9 ℄ Type II	8-F10 ℄ Type II	1-F11 ℄ Type II	1-F12 ℄ Type II	Quantities for One Wing Concrete Cu.Yd.	Steel Lb.
22°30'	6	12	7	5	6	7	5	18	20'-11"	17'-8"	12'-2"	5'-2"	5.61	328
30°	5	11	5	4	5	5	4	14	16'-2"	13'-8"	9'-2"	4'-2"	4.36	254
37°30'	4	9	4	4	4	4	4	12	13'-3"	11'-2"	7'-2"	3'-2"	3.58	211
45°	3	8	4	3	3	4	3	10	11'-6"	9'-8"	6'-2"	2'-2"	3.11	180
52°30'	3	7	3	3	3	3	3	9	10'-8"	8'-5"	5'-2"	2'-2"	2.72	160
60°	3	6	2	3	3	2	3	8	9'-6"	7'-8"	4'-2"	2'-2"	2.49	143
67°30'	3	6	3	2	3	3	2	8	8'-7"	7'-2"	5'-2"	2'-2"	2.33	140

WING DETAIL WHEN H= 5'-0"

LOADING DATA INTERSTATE ALTERNATE
LIVE LOAD: A.A.S.H.O. (H 20 - 44)
DEAD LOAD: CONCRETE 150 POUNDS PER CUBIC FOOT
EARTH 64 POUNDS PER CUBIC FOOT

DESIGNING DATA
A.A.S.H.O. 1953 UNIT STRESS EXCEPT AS NOTED
Reinforcing Steel fs 20000 lbs. per sq. in.
Structural Steel fs 18000 lbs. per sq. in.
fc 1200 lbs. per sq. in.
n 10

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS APPLICABLE TO THE PROJECT.

ALL CONCRETE SHALL BE CLASS "A".
ALL WING SURFACES TO RECEIVE CLASS 1 FINISH.
WING FOOTINGS & FLOOR OF BOX SHALL BE POURED MONOLITHICALLY.
FOOTINGS IN ROCK SHALL BE POURED OUT TO ROCK AND NOT FORMED
SOUNDING AND DEPTH OF FOOTING SHOWN ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA AND WHEN DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF RE-DESIGN IS NECESSARY.
ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE STEEL OF A DEFORMED TYPE. EACH BAR SHALL BE TAGGED WITH THE NUMBER DESIGNATION AND THE STATION NUMBER OF THE PROJECT. SECONDARY BARS WHEN SPLICED SHALL LAP 17 DIAMETERS OF THE BAR. DIMENSIONS FOR REINFORCING STEEL NOT SHOWN AS CLEAR SHALL BE TO THE CENTER LINE OF THE BAR. CUT TO CUT DIMENSIONS SHALL BE USED ON BAR BENDING DETAILS.
SUPPORTING SOILS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNIFORM MATERIAL THROUGHOUT. HORIZONTAL CONSTRUCTION KEYS ARE NOT REQUIRED WHEN FOOTING AND WALL ARE POURED MONOLITHICALLY. ALL CONSTRUCTION KEYS SHOWN BETWEEN FOOTINGS AND WALLS ARE 3" X 3".

STEEL WEIGHTS INCLUDE 1% ± FOR OVERRUN.
EXPANSION JOINT MATERIAL IS TO BE INCLUDED IN THE PRICE OF CLASS "A" CONCRETE AND SHALL CONFORM TO A.A.S.H.O. SPECIFICATION M-153-52 TYPE III.
FOR CULVERTS REQUIRED AND GOVERNING DIMENSIONS SEE " LIST OF STRUCTURES".

(R-1) WHEN EXCAVATING FOR FOOTINGS THE FINAL SURFACE ELEVATION SHALL BE UNDISTURBED NATURAL OR COMPACTED SOIL.

STRUCTURE NO.

REVISIONS			
(R-1)	7-17-67	General Note	M.R.H.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
WINGWALLS FOR
CONCRETE BOX CULVERTS
4:1 SIDE SLOPES

Across
Near Sta. Sec. T. R.

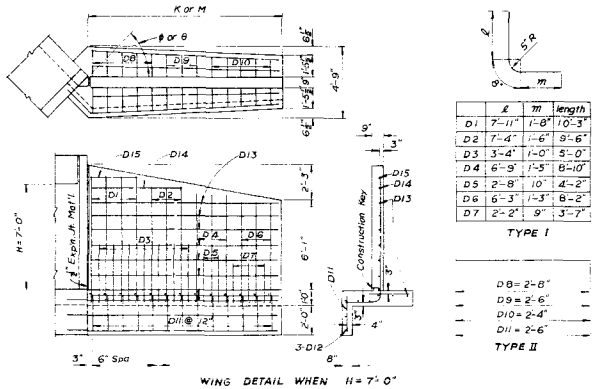
Designed by C.O.P. | Approved by [signature] Bridge Engineer
Made by W.M.P.R.L.S.
Checked by H.T.P. Date: July 1, 1965

STANDARD M-601-C

(SHEET 2)

(JULY 1, 1965)

FED. ROAD REG. NO	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		



	ℓ	m	length
D1	7'-11"	1'-8"	10'-3"
D2	7'-4"	1'-6"	9'-6"
D3	3'-4"	1'-0"	5'-0"
D4	6'-9"	1'-5"	8'-10"
D5	2'-8"	10"	4'-2"
D6	6'-3"	1'-3"	8'-2"
D7	2'-2"	9"	3'-7"

TYPE I

D8 = 2'-8"
D9 = 2'-6"
D10 = 2'-4"
D11 = 2'-6"

TYPE II

WING DETAIL WHEN H = 7'-0"

When ϕ or θ equals	Number of bars required											Length of bars				Quantities for One Wing	
	D1 Type I	D2 Type I	D3 Type I	D4 Type I	D5 Type I	D6 Type I	D7 Type I	D8 Type II	D9 Type II	D10 Type II	D11 Type II	3-D12 Type II	1-D13 Type II	1-D14 Type II	1-D15 Type II	Concrete Cu.Yd.	Steel Lb.
22°30'	7	6	12	6	6	5	5	8	7	9	24	27'-4"	23'-5"	12'-2"	6'-2"	9.62	592
30°	5	5	9	5	5	4	4	6	6	7	19	20'-11"	17'-11"	9'-2"	4'-2"	7.39	457
37°30'	4	4	8	4	3	3	3	5	5	5	15	17'-2"	14'-8"	7'-2"	3'-2"	6.07	368
45°	4	3	7	3	2	3	3	5	3	5	13	14'-10"	12'-8"	6'-2"	3'-2"	5.26	321
52°30'	3	3	6	3	2	3	3	4	4	4	12	13'-10"	11'-2"	5'-2"	2'-2"	4.66	287
60°	3	3	5	3	3	2	2	4	3	4	11	12'-3"	10'-2"	5'-2"	2'-2"	4.25	262
67°30'	3	3	5	2	3	2	2	4	3	3	10	11'-4"	9'-8"	5'-2"	2'-2"	4.05	245

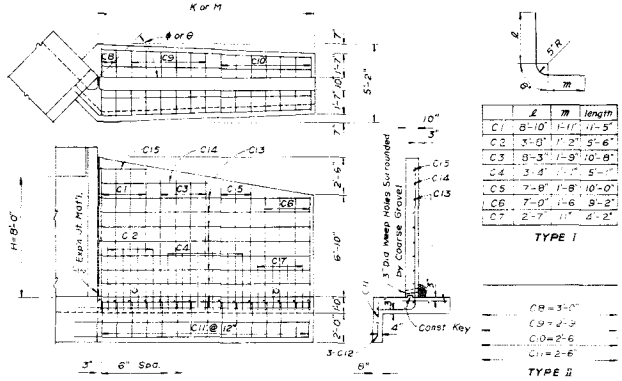
BAR LIST & QUANTITIES FOR ONE WING WHEN H = 7'-0"

TABLE SHOWING VALUES OF K & M WHEN β & H ARE GIVEN

β	α	ϕ	θ	H=7'-0" K	H=7'-0" M	H=8'-0" K	H=8'-0" M	H=9'-0" K	H=9'-0" M	H=10'-0" K	H=10'-0" M
45°	45°	67°30'	22°30'	10'-0"	23'-9"	11'-0"	26'-9"	12'-3"	29'-6"	13'-6"	32'-3"
60°	30°	60°	30°	10'-6"	18'-3"	11'-9"	20'-6"	13'-0"	23'-9"	14'-3"	24'-9"
75°	15°	52°30'	37°30'	11'-6"	15'-0"	13'-0"	16'-9"	14'-3"	18'-6"	15'-9"	20'-3"
90°	0°	45°	45°	13'-0"	13'-0"	14'-6"	14'-6"	16'-0"	16'-0"	17'-6"	17'-6"
105°	15°	37°30'	52°30'	15'-0"	11'-6"	16'-9"	13'-0"	18'-6"	14'-3"	20'-3"	15'-9"
120°	30°	30°	60°	18'-3"	10'-6"	20'-6"	11'-9"	23'-9"	13'-0"	24'-9"	14'-3"
135°	45°	22°30'	67°30'	23'-9"	10'-0"	26'-9"	11'-0"	29'-6"	12'-3"	32'-3"	13'-6"

β equals the angle between ℄ of culvert and ℄ of roadway, α equals the angle between ℄ of culvert and a normal to ℄ of roadway. ϕ and θ are angles between the wingwall and a line parallel with the ℄ of roadway.

EXAMPLE FOR USING THE ABOVE TABLE Suppose a stream makes an angle of β=65° with ℄ of roadway, then, from the table, select the nearest angle β=60°, then α, ϕ & θ equal 30°, 60° & 30° respectively. If the desired height "H" of culvert is 8'-0", then "K" & "M" will be 11'-9" & 20'-6". Locate the WING DETAIL WHEN H=8'-0" on this sheet.



	ℓ	m	length
C1	8'-10"	1'-11"	11'-5"
C2	3'-0"	1'-2"	5'-6"
C3	8'-3"	1'-9"	10'-8"
C4	3'-4"	1'-1"	5'-1"
C5	7'-8"	1'-8"	10'-0"
C6	7'-0"	1'-6"	9'-2"
C7	2'-7"	11"	4'-2"

TYPE I

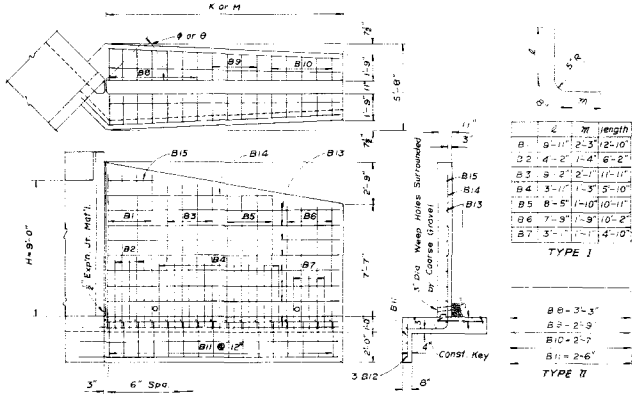
C8 = 3'-0"
C9 = 2'-9"
C10 = 2'-6"
C11 = 2'-6"

TYPE II

WING DETAIL WHEN H = 8'-0"

When ϕ or θ equals	Number of bars required											Length of bars				Quantities for One Wing	
	C1 Type I	C2 Type I	C3 Type I	C4 Type I	C5 Type I	C6 Type I	C7 Type I	C8 Type II	C9 Type II	C10 Type II	C11 Type II	3-C12 Type II	1-C13 Type II	1-C14 Type II	1-C15 Type II	Concrete Cu.Yd.	Steel Lb.
22°30'	8	7	6	2	6	7	7	5	10	2	27	30'-8"	26'-5"	13'-2"	7'-2"	2.53	172
30°	6	5	5	10	4	6	6	4	7	10	21	23'-5"	20'-2"	10'-2"	5'-2"	1.91	130
37°30'	5	4	4	8	4	5	5	3	6	8	17	19'-1"	16'-5"	8'-2"	4'-2"	1.84	187
45°	4	4	4	6	3	4	4	2	6	7	15	16'-6"	14'-2"	7'-2"	3'-2"	6.79	424
52°30'	4	3	3	6	3	4	3	2	5	6	13	15'-6"	12'-8"	6'-2"	3'-2"	5.04	374
60°	4	3	2	6	3	3	2	2	4	6	12	13'-8"	11'-5"	5'-2"	3'-2"	5.50	341
67°30'	3	3	3	5	2	3	2	2	4	5	11	12'-5"	10'-8"	5'-2"	2'-2"	3.5	315

BAR LIST & QUANTITIES FOR ONE WING WHEN H = 8'-0"



	ℓ	m	length
B1	9'-11"	2'-3"	12'-10"
B2	4'-2"	1'-4"	6'-2"
B3	9'-2"	2'-1"	11'-11"
B4	3'-11"	1'-3"	5'-10"
B5	8'-5"	1'-10"	10'-11"
B6	7'-9"	1'-9"	10'-2"
B7	3'-[illegible]	[illegible]	4'-10"

TYPE I

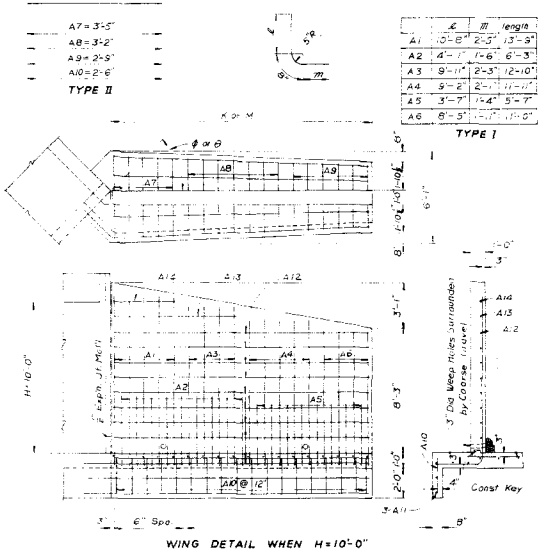
B8 = 3'-3"
B9 = 2'-9"
B10 = 2'-7"
B11 = 2'-6"

TYPE II

WING DETAIL WHEN H = 9'-0"

When ϕ or θ equals	Number of bars required											Length of bars				Quantities for One Wing	
	B1 Type I	B2 Type I	B3 Type I	B4 Type I	B5 Type I	B6 Type I	B7 Type I	B8 Type II	B9 Type II	B10 Type II	B11 Type II	3-B12 Type II	2-B13 Type II	1-B14 Type II	1-B15 Type II	Concrete Cu.Yd.	Steel Lb.
22°30'	7	6	8	16	5	[illegible]	7	13	8	9	30	33'-9"	28'-2"	22'-2"	6'-2"	5.93	930
30°	5	5	7	13	6	6	5	10	7	7	24	27'-0"	23'-5"	17'-2"	4'-2"	12.82	742
37°30'	4	4	5	10	5	5	4	8	5	6	19	21'-1"	18'-2"	13'-2"	3'-2"	9.98	580
45°	4	3	4	9	4	4	3	7	4	5	16	18'-2"	15'-8"	11'-2"	3'-2"	8.63	495
52°30'	3	3	4	8	4	4	3	6	4	5	15	17'-0"	13'-11"	10'-2"	2'-2"	7.69	453
60°	3	3	4	7	3	3	2	6	3	4	13	15'-1"	12'-8"	9'-2"	2'-2"	7.01	406
67°30'	3	2	3	7	4	3	3	5	3	5	3	13'-9"	11'-5"	9'-2"	2'-2"	6.61	385

BAR LIST & QUANTITIES FOR ONE WING WHEN H = 9'-0"



	ℓ	m	length
A1	10'-8"	2'-5"	13'-5"
A2	4'-1"	1'-6"	6'-3"
A3	9'-11"	2'-3"	12'-10"
A4	5'-2"	2'-1"	11'-11"
A5	3'-7"	1'-4"	5'-7"
A6	8'-5"	1'-10"	11'-0"

TYPE I

WING DETAIL WHEN H = 10'-0"

When ϕ or θ equals	Number of bars required												Length of bars					Quantities for One Wing	
	A1 Type I	A2 Type I	A3 Type I	A4 Type I	A5 Type I	A6 Type I	A7 Type II	A8 Type II	A9 Type II	A10 Type II	A11 Type II	3-A12 Type II	1-A13 Type II	1-A14 Type II	1-A15 Type II	1-A16 Type II	Concrete Cu.Yd.	Steel Lb.
22°30'	9	16	8	8	16	8	10	12	11	33	36'-10"	31'-11"	16'-2"	8'-2"	19.74	1224		
30°	7	12	6	6	12	6	7	10	8	25	28'-2"	24'-5"	12'-2"	6'-2"	15.14	930		
37°30'	6	10	5	5	10	5	6	8	7	21	23'-1"	19'-11"	10'-2"	5'-2"	12.39	775		
45°	5	9	4	5	8	4	5	7	6	18	19'-9"	17'-2"	8'-2"	4'-2"	10.71	665		
52°30'	5	8	3	4	7	4	5	6	5	16	18'-9"	15'-5"	7'-2"	4'-2"	9.63	597		
60°	4	7	4	3	7	4	4	6	5	15	16'-6"	13'-11"	7'-2"	3'-2"	8.72	543		
67°30'	4	7	3	4	6	3	4	5	5	14	15'-2"	13'-2"	6'-2"	3'-2"	8.26	515		

BAR LIST & QUANTITIES FOR ONE WING WHEN H = 10'-0"

REVISIONS

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

WINGWALLS FOR
CONCRETE BOX CULVERTS
4:1 SIDE SLOPES

Across
Sta.
Near
Sec. T R.

Designed by C.D.P.
Made by J.W.M.E.R.S
Checked by A.I.T.&O.S.M

Approved by [illegible]
Bridge Engineer
Date: July 1, 1965

STRUCTURE NO.

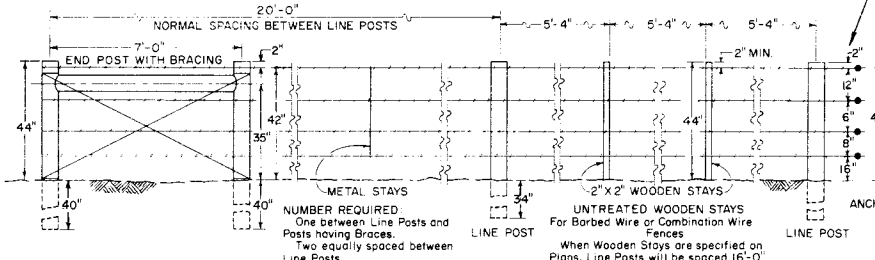
STANDARD M-607-A

(SHEET 1 OF 2 SHEETS)
(JULY 1, 1965)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

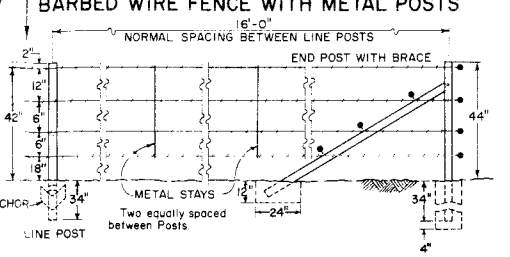
REVISIONS		
(R-1) 8-2-66	Vertical Dimensions and Note	M.R.H.
(R-2) 12-8-66	Vert. Dims., Std. and Alternate	M.R.H.

BARBED WIRE FENCE WITH WOODEN POSTS (R-1)

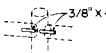


(R-2) STANDARD INSTALLATION — (R-2) ALTERNATE (For blow-sand and tumbleweed areas, if desired by landowner.)

BARBED WIRE FENCE WITH METAL POSTS (R-1)



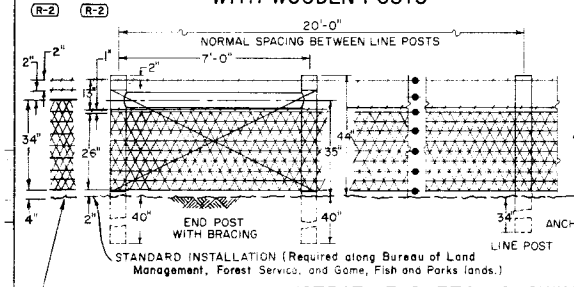
CROSS BRACE DOWELING DETAIL



Bore a 3/8" x 2" Hole in each Post and Brace to receive the Pins. Wrap the ends of the Braces tightly with several turns of 12 1/2 ga. smooth Galv. Wire to prevent splitting or Notch Post and Nail with 40 d Common Nails.

(R-1) NOTE: See Sheet 2 for General Notes.

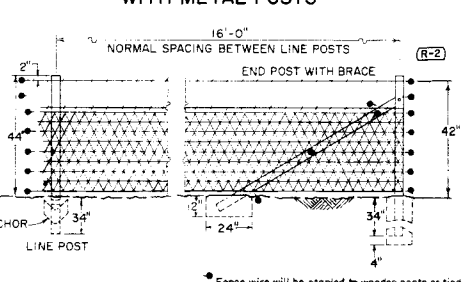
COMBINATION WIRE FENCE WITH WOODEN POSTS (R-1)



STANDARD INSTALLATION (Required along Bureau of Land Management, Forest Service, and Game, Fish and Parks lands.)

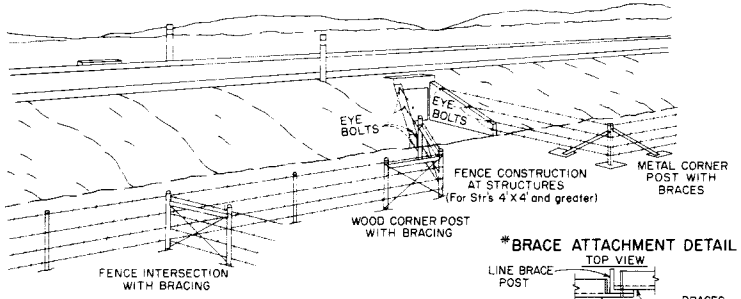
ALTERNATE (Where 26" mesh is not acceptable to landowner.)

COMBINATION WIRE FENCE WITH METAL POSTS (R-1)



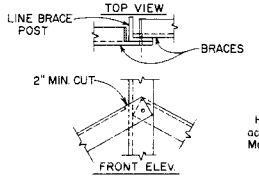
● Fence wire will be stapled to wooden posts or tied to metal posts as shown marked ● on barbed wire or combination wire fence details.

ILLUSTRATIVE SKETCH SHOWING TYPICAL EXAMPLES FOR CONSTRUCTING FENCES

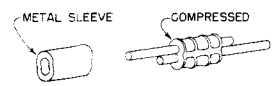


NOTE:
At all structures of 4'x4' and over, the fence shall be ended at eye-bolts in the wings of the structure. Where the type of structure prohibits the use of eye-bolts, an end post with brace shall be used.
Eye-bolts shall be made of 1/2" round bars with a minimum of six (6) inches of body length embedded in the concrete and a minimum of 1" inside eye diameter.
Eye-bolts shall be furnished and installed by the Contractor. Cost of eye bolts will be included in the contract price for fencing.

*BRACE ATTACHMENT DETAIL

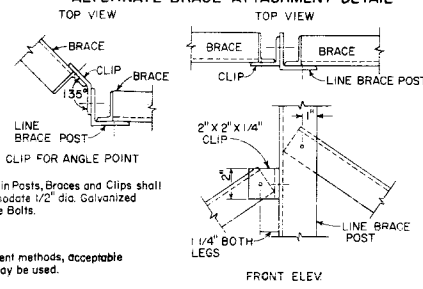


ACCEPTABLE WIRE SPLICE



Splicing Sleeve shall be approved by the Engineer.

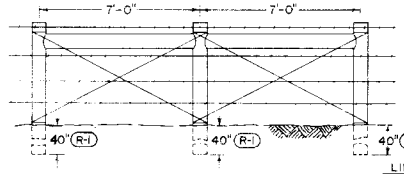
*ALTERNATE BRACE ATTACHMENT DETAIL



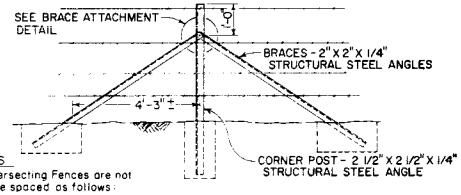
Holes in Posts, Braces and Clips shall accommodate 1/2" dia. Galvanized Machine Bolts.

*Alternate attachment methods, acceptable to the Engineer, may be used.

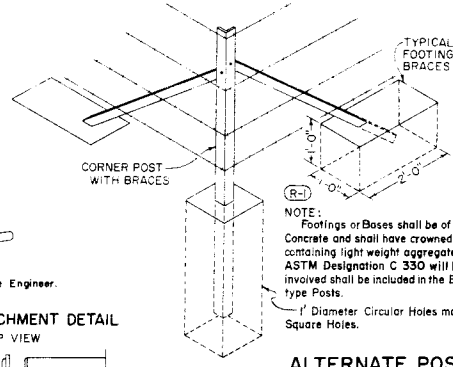
LINE BRACES



LINE BRACES
When Gates, Angles, Corners or Intersecting Fences are not specified therein, Line Braces shall be spaced as follows:
Metal Posts - 800' Intervals
Wooden Posts - 1,400' Intervals

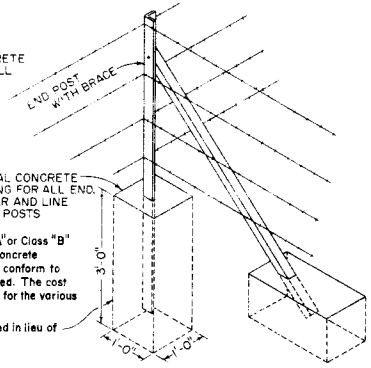


TYPICAL CORNER POST INSTALLATION



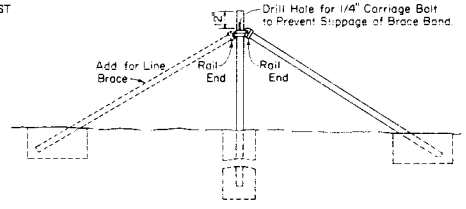
(R-1) NOTE:
Footings or Bases shall be of Class "A" or Class "B" Concrete and shall have crowned tops. Concrete containing light weight aggregates which conform to ASTM Designation C 330 will be allowed. The cost involved shall be included in the Bid Price for the various type Posts.
1' Diameter Circular Holes may be used in lieu of Square Holes.

TYPICAL INSTALLATION AT FENCE INTERSECTIONS



ALTERNATE POST

(FOR END, CORNER OR LINE BRACE POSTS)



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
WIRE FENCES
AND
GATES

(R-1)

Designed by	L.E.O.	Approved by	H. C. Olson
Made by	T.E.F.	Staff Des. Eng'r.	
Checked by	E.E.O.	Date:	July 1, 1965

STANDARD M-607-A

(SHEET 2)

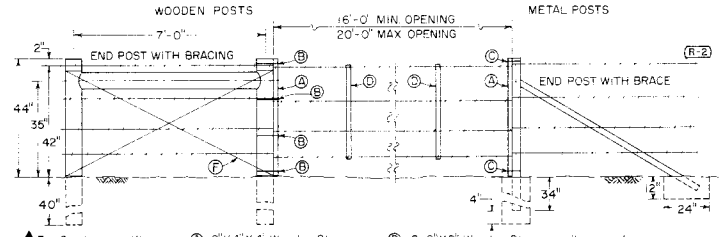
(JULY 1, 1965)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS

(R-1)	8-2-66	Vert. Dims. & Gen'l. Notes	M.R.H.
(R-2)	12-8-66	Vert. Dims., Std. and Alternate	M.R.H.
(R-3)	2-6-67	Gate and General Notes	M.R.H.

(R-1) ▲BARBED WIRE GATE



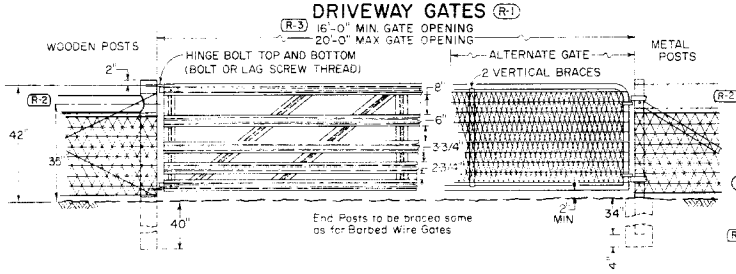
▲ For Combination Wire Gate use 34" Mesh and 1 strand of Barbed Wire Extend Wooden Stays to Ground. (R-1)

(A) 2"X4"X4' Wooden Stays. (D) 2-2"X2" Wooden Stays equally spaced.

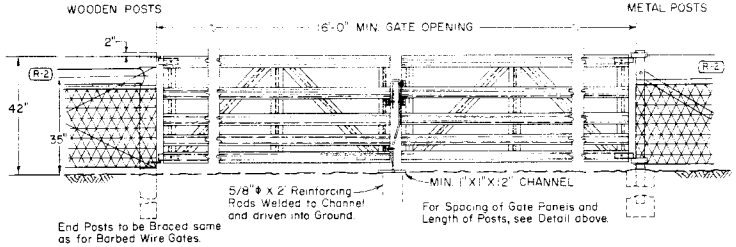
(B) 4 - No 12 1/2 Ga. Wire Loops to act as Hinges.

(C) No. 12 1/2 Ga. Wire Loops. (F) No. 12 1/2 Ga. Brace Wire.

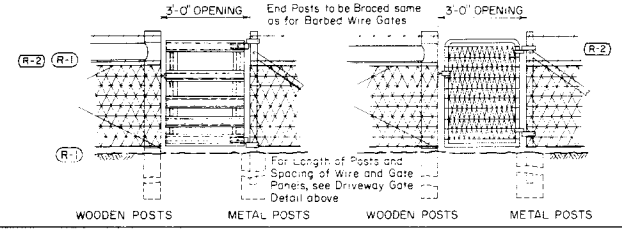
DRIVEWAY GATES (R-1)



TWIN DRIVEWAY GATES (R-1)

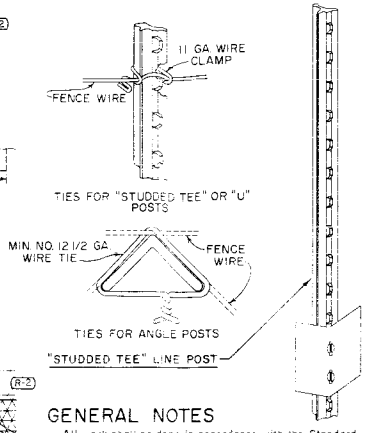


WALK GATE



ALTERNATE WALK GATE

FENCE WIRE TIES



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the Project.

(R-1) At each location where an electric transmission, distribution or secondary line crosses a wood post fence the Contractor shall furnish and install a ground conforming to Section 9 of the National Electric Safety Code.

(R-2) Dimensions shown for "Standard" and "Alternate" apply for both wooden and metal post fence.

Fence wire shall be looped, double wrapped and tied off at end posts, angle posts and line brace posts. Fence to be continued and shall be restarted in like manner.

Fence wire to be placed on either road or field side of posts depending on local conditions, i.e. on curves the wire should be placed on the side of the post which would prevent tension on fence ties. This will also apply where wind drift, tumble weeds or other conditions would exert unusual pressure against the wire.

WOOD POSTS:

All line posts shall have a min. dia. of four (4) inches & be 6'-6" long. All end, corner, intersection and brace posts shall have a minimum diameter of five (5) inches and be 7'-0" long.

Fence wire will be stapled to wooden posts or tied to metal posts as shown marked ● on barbed wire or combination wire fence details. Staples shall be No. 9 wire min. at least 1 1/2 inches long & shall be galvanized.

METAL POSTS:

All posts and braces shall be of the types and weights shown or acceptable equivalents.

Holes to be provided in end, corner and gate posts as detailed.

CORNER POSTS

Type - 2 1/2" X 2 1/2" X 1/4" Structural Steel Angles.
Weight - 3.81 lbs./lin. ft. Min.
Length - 6'-6" Min.
No. of Braces - 2

LINE POSTS:

Type - "Studded Tee" or "U".
Weight - 1.28 lbs./lin. ft. Min. (without Anchor)
Length - 6'-6" Min.
Anchor - Securely fastened, with bearing surface sufficient to resist movement of post. Weight - 0.57 lb. Min.

END POSTS

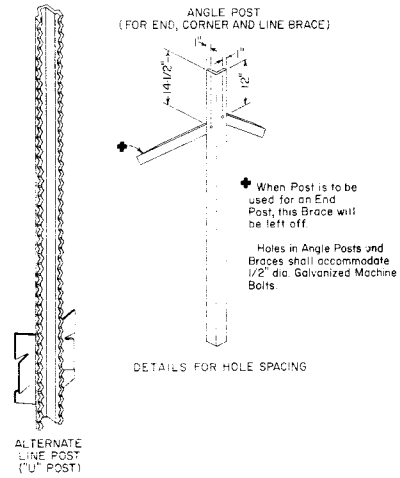
Type - 2 1/2" X 2 1/2" X 1/4" Structural Steel Angles.
Weight - 3.81 lbs./lin. ft. Min.
Length - 6'-6" Min.
No. of Braces - 1

BRACES: (For Corner, End or Line Brace Posts)

Type - 2" X 2" X 1/4" Structural Steel Angles.
Weight - 3.08 lbs./lin. ft. Min.
Length - Same as corner and end posts used.

Posts shall meet requirements of Par. 4.5 of U.S. Dept. of Commerce Commercial Standard 184-51. Acceptable material includes re-rolled railroad rails.

TYPICAL METAL POSTS



ALTERNATES:

END, CORNER AND LINE BRACE POSTS

Type - 2 1/2" Std. Galvanized Pipe.
Weight - 3.65 lbs./lin. ft. Min.

BRACES:

Type - 1 3/8" O.D. Tubular Steel with 2 1/2" Brace Band, Hinge Bolt and 1 3/8" I.D. Rail End; all Galvanized
Weight - 1.6 lbs./lin. ft. Min.
Length - 6'-6" Min.

(R-2) BARBED WIRE

Steel barbed wire shall conform to ASTM Designation A 121, 12 1/2 Gauge with Class I coating.

Aluminum barbed wire shall conform to ASTM Designation B 211, with alloy 5052-O for the line wire and alloy 5052-H38 for the barbs.

4' x 4" WIRE MESH

Wire mesh used in combination wire fence as shown shall be galvanized and conform to the following:

	STANDARD	ALTERNATE
(R-3) Width	26"	34"
(R-2) Weight - Lbs./Lin. Ft. Min.	0.54	0.76
Horizontal Wires	2 Strands, No. 12 1/2 gage.	
Cross Wires	1 Strand, No. 14 gage.	

Fabrication: cross wires to be woven with horizontal wires making a one piece fabric.

GATES:

DRIVEWAY GATES:

(R-3) Height - approximately 42" (5 panels) --- Width of gate opening - 16'-0" Min.
(R-1) Weight - Galvanized Steel, 75 lbs. Min --- Tempered Aluminum, 45 lbs. Min.
(R-1) ⓘ Gates to be of Riveted construction as follows: Min. 4 No. 10 rivets at each right angle connection and where diagonal braces connect to horizontal panels; Min. 3 No. 10 rivets where diagonal braces connect to top and bottom panels.

ALTERNATE DRIVEWAY GATES

Height - 42"
(R-1) Weight - Not less than 90 lbs. complete with latch and hinges
Width of gate opening - 16'-0"
Gate Frame - 1" I.D. Standard Galvanized Pipe or acceptable equivalent and shall be of all welded construction.
Mesh to be of same construction as shown for 4" x 4" wire mesh except it shall be 2" x 4" mesh 42" high.

ⓘ WALK GATES:

Height - approx. 42" (5 panels)
(R-1) Weight - {Galvanized Steel, 16 lbs. Min. / Tempered Aluminum, 10 lbs. Min.}
Width of gate opening - 3'-0"

ALTERNATE WALK GATES:

Height - 42"
(R-1) Weight - Not less than 18 lbs. complete with latch and hinges
Width of gate opening - 3'-0"
Gate Frame - 3/4" I.D. Standard Galvanized Pipe or acceptable equivalent and shall be of all welded construction.
Mesh to be of same construction as shown for Driveway Gate.

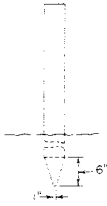
Alternate equivalent standard metal gates other than shown will be acceptable subject to the Engineer's approval.

In lieu of galvanized finish on gate frames, Cadmium Plated pipe or Aluminum painting will be considered to be equivalent.

LATCHES AND HINGES:

Galvanized steel or Aluminum of standard make.
Hinges shall be placed as shown, to prevent theft.
In lieu of standard make latches it will be permissible to use an electro-galvanized chain, eyebolt and snaphook type latch. Eyebolt, chain and snaphook assembly to be secured to latch side of gate. Gate closure effected by wrapping chain around end post and snapping hook into chain.

POST POINTING DETAILS



Where field conditions permit, Wooden Posts may be pointed and driven in lieu of setting and ramming, at the option of the Contractor.
Pointing shall be in conformity with details shown at left.
Driving methods shall not damage Post.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
WIRE FENCES
AND
GATES
(R-1)

Designed by	T. E. O.	Approved by	T. E. Chapman
Made by	T.E.F.	Staff Des. Engr.	
Checked by	E.E.O.	Date:	July 1, 1965

STANDARD M-614-A

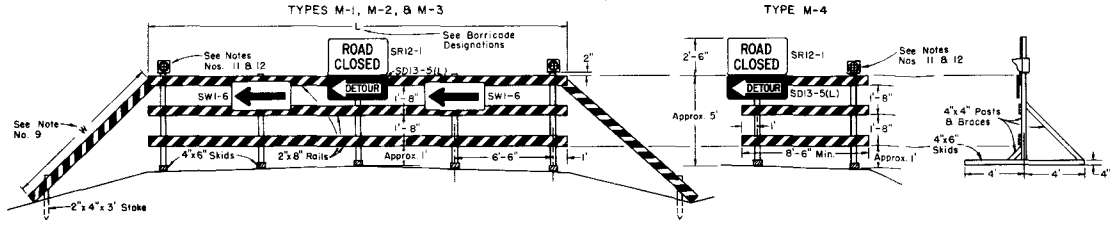
(JULY 1, 1965)

FEDERAL ROAD REGION NO.	DISTRICT	PROJECT NO.	SHEET NO.
9	COLORADO		

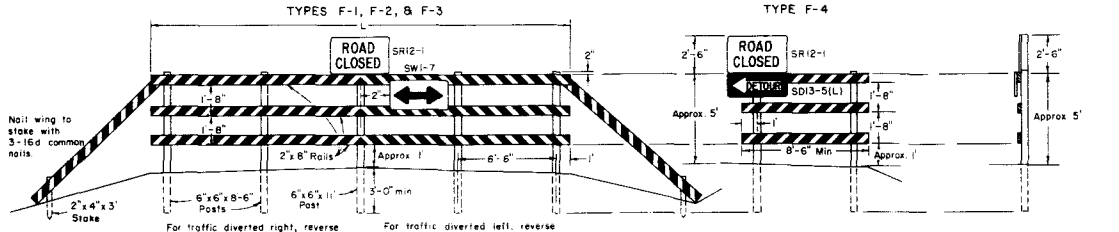
REVISIONS		

CLASS I BARRICADES
(3 RAILS)

MOVABLE

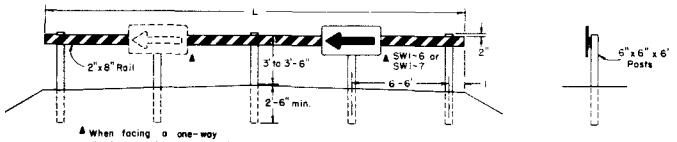


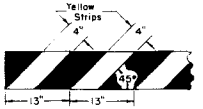
FIXED



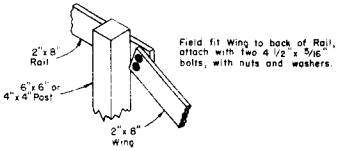
CLASS II BARRICADE
(1 RAIL)

FIXED
TYPE F-6

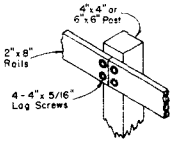




DETAIL OF RAIL AND WING STRIPING

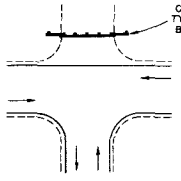


REAR VIEW OF BARRICADE SHOWING WING ATTACHED
(See Note No. 9)

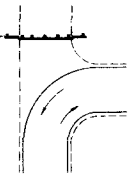


METHOD OF ATTACHING PLANKING TO POSTS AT JOINTS

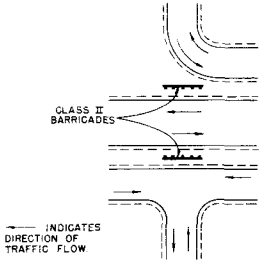
SITUATION A



SITUATION B



SITUATION C



GENERAL NOTES

1. All work shall be done in accordance with the Standard Specifications applicable to the Project.
2. All signs and sign materials shall conform to the standards set forth in the "Manual on Uniform Traffic Control Devices for *All Classes of Streets and Highways" published by the Department of Highways and this standard.*
3. The various types and combinations of approved Signs and Beacons for Barricades required for each project shall be governed by field conditions and subject to approval by the Engineer. All traffic controls shall be placed for best visibility and legibility and maintained in good condition at all times. Oversigning is to be avoided.
4. Painting shall conform with Subsection 508.08 of the Standard Specifications. All skids, braces, and posts shall be painted with 2 coats of "Exterior Black Paint." Planking and wings on all barricades shall be painted with 2 coats of "Exterior Black Paint" on all sides before adding reflective strips. Reflective strips shall be "cut from smooth surface yellow reflective sheeting" of a type approved by the Department.
5. Each barricade rail shall be striped on the face side only with reflective yellow strips slanting downward at a 45° angle toward the side to which traffic is to turn or pass. See "DETAIL OF RAIL AND WING STRIPING."
6. When barricades are designated on plans the portion of the posts below ground line shall either be dipped in or painted with hot creosote oil. The portion of the post above ground line shall be painted with 2 coats of "Exterior Black Paint."
7. All skids, braces, and posts shall be nailed together with No. 20d nails. All screws, bolts, nuts, and washers shall be galvanized or cadmium plated. Skids (bases) of movable barricades shall be weighted where necessary to provide stability.
8. All timber used shall conform to the Standard Specifications for Miscellaneous Untreated Timber S4S. Timber shall conform to Construction grade Paragraph 123B or 125B of Standard No. 15 Grading & Dressing Rule for West Coast Douglas Fir (1956) or Dense Structural 58 and LL Structural 58 Paragraph 284 or 285 of 1956 Grading Rules for Southern Pine.
9. Detachable extension wings for bypassing of construction equipment are permitted. "W" is variable, length shall be adequate to provide closing of borrow pit and/or shoulder as required.
10. Alternate materials or other reflective elements on Traffic signs or Barricades will be permitted only after approval of such material by the Department in writing.
11. A Flashing Beacon for use on Barricades is a section of a standard traffic signal head or a similar-type device having a yellow lens in the face, which is illuminated by intermittent flashes. Where commercial power is not available, the beacon may be adapted to operate from storage batteries. Each signal unit lens shall have a visible diameter of not less than 8 inches. Each unit complete shall be of such design as to render the lens when illuminated clearly visible to traffic facing the signal at all distances up to 1000 feet under all atmospheric conditions except dense fog. The color of the yellow lens for caution shall be in accordance with Technical Report No. 1 of the Institute of Traffic Engineers. All beacon flashers shall be equipped with filters for suppression of radio interference. The illuminating element in a flashing yellow beacon shall be flashed at a rate of not less than 50 times nor more than 60 times per minute. The illuminated period of each flash shall be not less than half and not more than two-thirds of the total cycle. The use of Flashing Beacons will be governed by field conditions. Flashing Beacons when warranted generally should be operated continuously throughout the 24 hours of the day. Warrant for Flashing Beacons may be found in Sec. 3G of the "Manual on Uniform Traffic Control Devices for Streets and Highways" published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision).
12. Flashers are portable, power-operated, lens-directed, enclosed lights, illuminated by rapid intermittent flashes of short duration. Flashers may be used in connection with barricades when approved by the Engineer. An array of random flashers which tends to obscure rather than delineate the traveled way will not be permitted. The use of flashers on a job will be governed by Sec. 5D of the "Manual on Uniform Traffic Control Devices for Streets and Highways" published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision). The color of the light emitted by a flasher shall be yellow.
13. Flashing Beacons and Flashers, when used, shall be positioned above the top rail of the barricades to produce the most effective results.
14. Barricades used as "Traffic Controls for Highway Construction" are not to be paid for separately.
15. *Barricades will be paid for separately when designated on plans as bid items.*
16. For additional general information on control of traffic through work areas refer to the "Manual on Uniform Traffic Control Devices for Streets and Highway", Part V, published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision).

BARRICADE DESIGNATIONS

Class	Type		Roadway Width	L	Description
	Movable	Fixed			
I	M-1	F-1	26'-34'	28'	Barricade complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-2	F-2	35'-44'	41'	Barricade complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-3	F-3	Variable	28'	Barricade (without extension wings) complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-4	F-4	Variable	Variable 8'-6" min.	Wing Barricade(signs only as appropriate).
II	—	F-6	Variable	28'	Barricade complete with appropriate signs.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TIMBER BARRICADES

Designed By: D.R.W.
Made By: J.L.S.
Checked By: J.B.

Approved By: [signature]
Date: JULY 1, 1965

M-142-AA

TYPICAL SIGNS

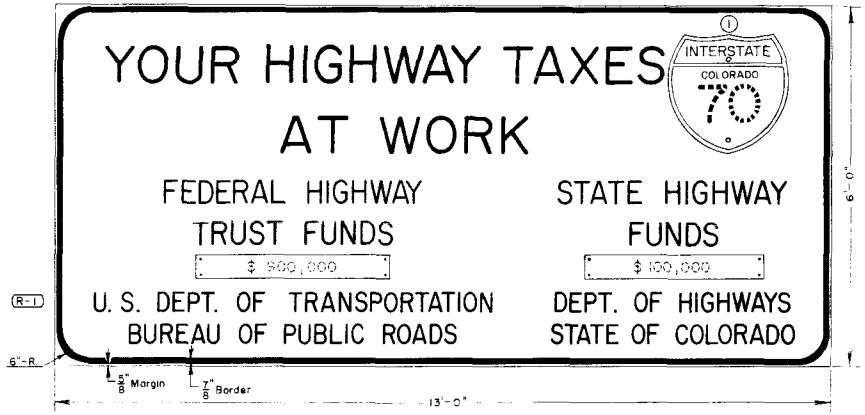
STANDARD M-614-IA

(JULY 1, 1965)

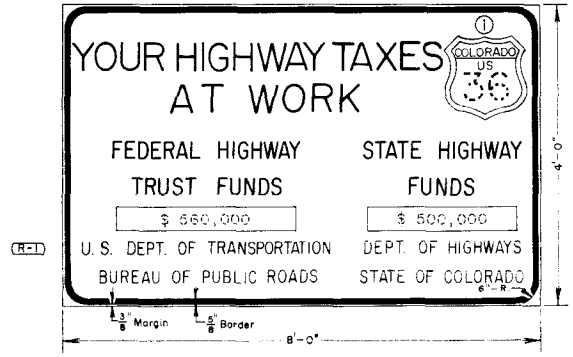
FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

REVISIONS			
(R-1)	5-25-67	Rev. Gen. Note 6 Sign Legend	G.W.F.
(R-2)	6-19-67	Note regarding timber posts	G.W.F.

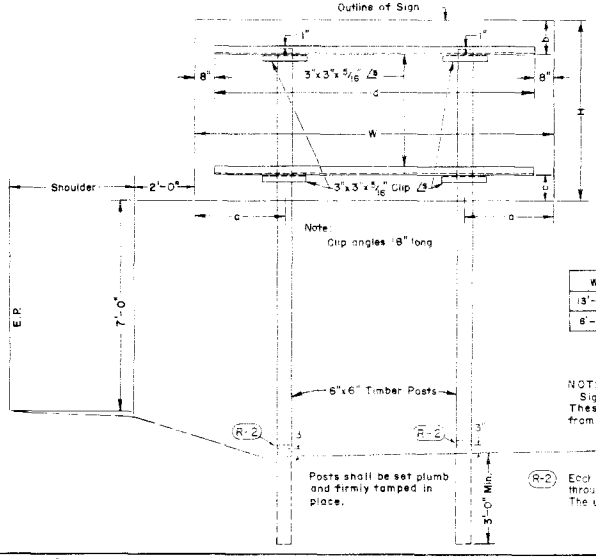
INTERSTATE SYSTEM



PRIMARY & SECONDARY SYSTEM



INSTALLATION DETAIL



W	h	a	b	c	d
13'-0"	6'-0"	2'-6"	1'-1 1/2"	0'-10 1/2"	11'-8"
8'-0"	4'-0"	1'-6"	1'-1 1/2"	0'-10 1/2"	6'-8"

NOTE:
Signs are to be placed facing traffic approaching the work. These signs should be so located as not to obscure or detract from the effectiveness of other official signs.

(R-2) Each timber post shall be provided with a single 1 1/4" Ø hole through the neutral axis, 3" above the ground level. The underground portion plus 6" shall be treated with creosote

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

Signs shall be made of 3/4" Plywood or other material approved by the Department.

When a third governmental agency is participating its official name should be included centrally in lines 6 and 7.

Posts shall be 6"X 6" S4S timber or other material approved by the Department and shall be painted white.

Signs are to be non-reflectorized, black letters, numerals, and border on plain white background. Route Marker plaques to be the appropriate standard colors, non-reflectorized.

(R-1) Layout of signs will be furnished by the Traffic Engineering Section indicating the details *as to letter size, symbols, spacing, figure for amount of funds, etc. which are required* for these signs.

These signs will be furnished and installed by State Forces.

(1) Applicable Interstate, U.S. Shield or State Route Shield.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
CONSTRUCTION IDENTIFICATION SIGNS

Designed by B.F.R. Approved by
Made by D.J.B. Traffic Engineer
Checked by M.R.H. Date: July 1, 1965

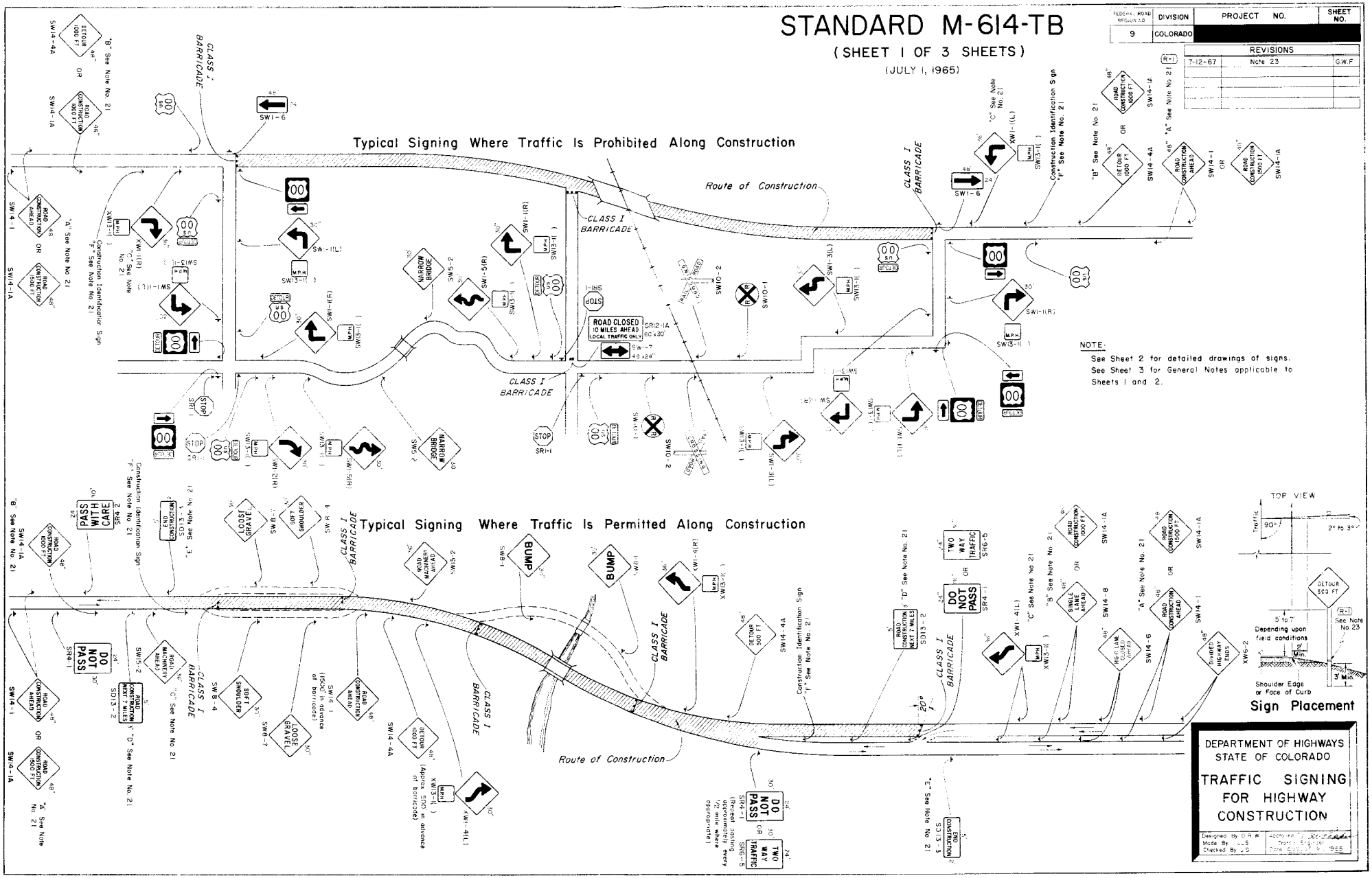
STANDARD M-614-TB

(SHEET 1 OF 3 SHEETS)

(JULY 1, 1965)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
7-12-67	Note 23	G.W.F



NOTE:

See Sheet 2 for detailed drawings of signs.

See Sheet 3 for General Notes applicable to Sheets 1 and 2.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION

Designed By D.H.W.	Approved	
Made By	Traffic Engineer	
Checked By	Date Approved	1965

STANDARD M-614-TB

(SHEET 2 OF 3 SHEETS)

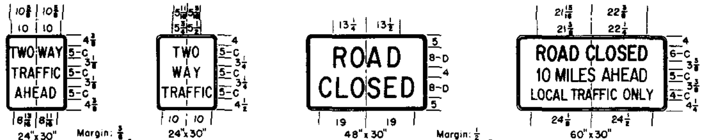
(JULY 1, 1965)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	[redacted]	

REVISIONS			

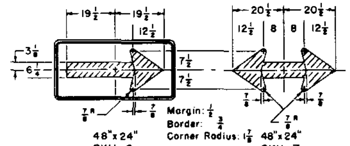
REGULATORY SIGNS

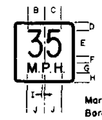
See Note No. 9



WARNING SIGNS

See Note No. 10

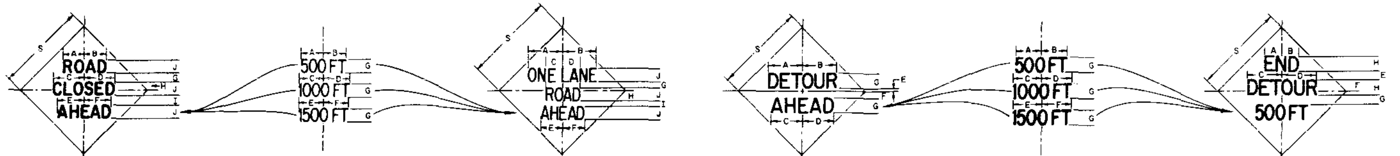


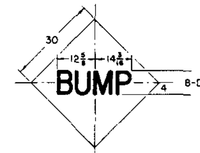


	Panel	A	B	C	D	E	F	G	H	I	J
SW13-1	18"x18"	3/8	5 1/2	5 5/16	2 1/4	8-C	2	3-E	2 3/4	3/4	5 3/16
XW13-1	24"x24"	5/8	6 5/8	6 9/16	3 1/4	10-C	2 3/4	4-E	4	13/16	6 7/8

WARNING SIGNS

See Note No. 10





	S	A	B	C	D	E	F	G	H	I	J
SW14-3	48	11 1/4	12 1/16	16 9/16	16 5/8	14 5/8	14 5/8	4 3/4	4 9/16	5 3/16	7-D
CW14-3	36	8 1/16	8 5/8	11 13/16	11 7/8	10 1/2	10 1/2	3 5/8	3 1/4	3 3/4	5-D

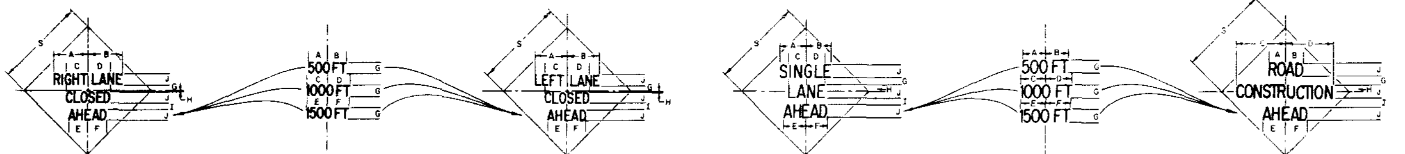
SW14-3A	S	A	B	C	D	E	F	G
SW14-5A	48	12	12 1/16	13 1/8	14 1/8	13 1/4	13 5/8	7-C
CW14-3A	36	8 9/16	8 5/8	9 3/8	10 1/8	9 1/2	9 3/4	5-C
CW14-5A								

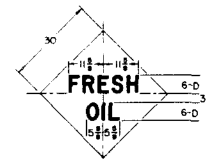
	S	A	B	C	D	E	F	G	H	I	J
SW14-5	48	18 1/2	17 7/8	9 3/16	9 3/8	11 7/8	11 7/8	3 1/8	5 1/4	3 1/8	7-C
CW14-5	36	13 3/16	12 3/4	6 9/16	6 1/2	8 1/2	8 1/2	2 1/4	3 3/4	2 1/4	5-C

	S	A	B	C	D	E	F	G
SW14-4	48	18 3/16	18 5/16	16 3/4	16 3/4	1 1/4	3 1/2	8-D
CW14-4	36	13 5/8	13 3/4	12 9/16	12 9/16	15/16	2 5/8	6-D

	S	A	B	C	D	E	F	G
SW14-4A, SW14-4B	48	13 3/4	13 3/4	15	16 3/16	15 1/8	15 9/16	8-C
CW14-4A, CW14-4B	36	10 5/16	10 5/16	11 1/4	12 1/8	11 3/8	11 11/16	6-C

	S	A	B	C	D	E	F	G	H
SW14-4B	48	9 1/8	9	18 3/16	18 5/16	4 1/2	6	5	8-D
CW14-4B	36	6 7/8	6 3/4	13 5/8	13 3/4	3 3/8	4 1/2	3 3/4	6-D





	S	A	B	C	D	E	F	G	H	I	J
SW14-6	48	18 3/16	18 7/16	11 3/4	11 3/4	10 1/4	10 1/4	2 7/8	7/16	3 5/16	6-C
CW14-6	36	15 3/16	15 3/8	9 13/16	9 13/16	8 9/16	8 9/16	2 3/8	3/8	2 3/4	5-C

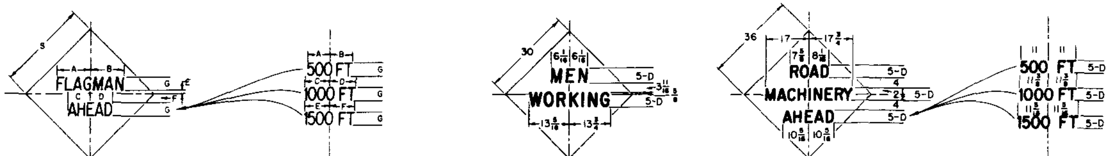
SW14-6A	S	A	B	C	D	E	F	G
SW14-7A	48	10 5/16	10 3/8	11 1/4	12 1/8	11 3/8	11 11/16	6-C
CW14-6A	36	8 5/8	8 5/8	9 3/8	10 1/8	9 1/2	9 3/4	5-C
CW14-7A								

	S	A	B	C	D	E	F	G	H	I	J
SW14-7	48	17 1/8	17 1/8	11 3/4	11 3/4	10 1/4	10 1/4	2 7/8	7/16	3 5/16	6-C
CW14-7	36	14 1/4	14 1/4	9 13/16	9 13/16	8 9/16	8 9/16	2 3/8	3/8	2 3/4	5-C

	S	A	B	C	D	E	F	G	H	I	J
SW14-8	48	13 13/16	13 9/16	9 7/16	10 1/16	11 7/8	11 7/8	3 11/16	3 1/2	3 9/16	7-C
CW14-8	36	11	10 3/4	8	8 1/4	10 7/8	10 7/8	2 5/8	2 1/2	2 9/16	5-D

SW14-1A	S	A	B	C	D	E	F	G
SW14-8A	48	12	12 1/16	13 1/8	14 1/8	13 1/4	13 5/8	7-C
CW14-1A	36	8 9/16	8 5/8	9 3/8	10 1/8	9 1/2	9 3/4	5-C
CW14-8A								

	S	A	B	C	D	E	F	G	H	I	J
SW14-1	48	9	9 3/16	26	25 3/16	11 7/8	11 7/8	4 13/16	3 1/2	4 13/16	7-C
CW14-1	36	6 3/4	6 7/8	19	18 1/2	8 1/2	8 1/2	3 3/4	2 1/2	3 3/4	5-C



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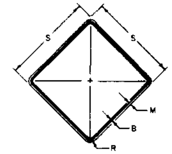
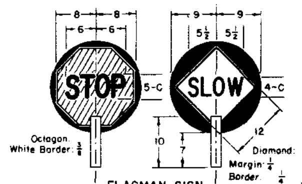
CW14-9	36	15 7/16	15 7/16	10 3/16	10 5/16	1 5/16	4 1/16	6-C

	S	A	B	C	D	E	F	G
SW14-9A	48	12	12 1/16	13 1/8	14 1/8	13 1/4	13 5/8	7-C
CW14-9A	36	10 5/16	10 5/16	11 1/4	12 1/8	11 3/8	11 11/16	6-C

PLATE DETAILS



S	M	B	R
30	1/2	3/4	1 7/8
36	5/8	7/8	2 1/4
48	3/4	1 1/4	3



FLAGMAN SIGN

See Notes No. 20 and 22

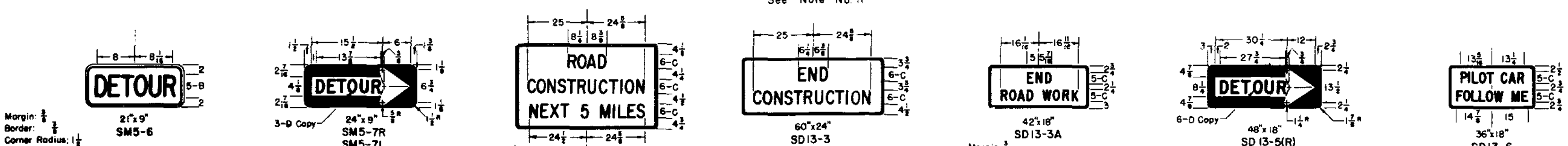
NOTES:

SEE SHEET 1 FOR TYPICAL SIGNING AND SIGN PLACEMENT. SEE SHEET 3 FOR GENERAL NOTES APPLICABLE TO SHEETS 1 AND 2.

ALL DIMENSIONS THAT ARE NOT LABELED ARE IN INCHES.

GUIDE SIGNS

See Note No. 11



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION

Designed By: D.R.W. Made By: H.B.D. Checked By: J.B.

Approved By: [signature] Date: AUGUST 9, 1965

STANDARD M-614-BA (SHEET 2)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

STANDARD M-614-TB

(SHEET 3 OF 3 SHEETS)

(JULY 1, 1965)

REVISIONS			
(R-1)	7-12-67	Added Note 23	G.W.F.

GENERAL NOTES

1. All work shall be done in accordance with: (a) the Standard Specifications applicable to the Project, and (b) the "Manual on Uniform Traffic Control Devices for all Classes of Streets and Highways" published by the Department of Highways.

2. Where traffic is maintained through or over any part of the Project the Contractor will be required to mark all hazards within the limits of the Project (including connecting roads) with well-maintained Barricades, Warning, and Guide Signs. All Barricades and Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when the Project is completed.

3. Where traffic is prohibited from the Project the Detour will be marked by the Department except that the Contractor shall provide, erect and maintain Barricades, complete, (when required) at the ends of the Project, ends of the Detour and connecting roads. All U.S. or State Route Markers required for the Project will be furnished and installed by the Department. The location and positioning of Warning Signs, Barricades, and Regulatory Signs shall be as recommended by the appropriate District Engineering Forces of the Department.

4. Work on the Project shall not be started until all required signs are in place and approved by the Engineer. Where speed control appears necessary such speed control shall be requested from the Engineer by the Contractor. Control of speed through a construction zone may be achieved by Advisory Speed plates in conjunction with Warning Signs (SW13-1 for use with 30" Warning Signs and XW13-1 for use with 36" and 48" Warning Signs). The Advisory Speed plate is to be posted only at those locations where the safe speed is lower than the imposed Regulatory speed limit.

5. All Signs and Barricades shall be placed for best visibility and legibility, maintained in good condition and kept clean and free of dirt at all times. Contractor's and Engineer's vehicles and equipment must be parked so that signs and barricades are visible to approaching traffic at all times.

6. Where two identical signs are used for dual posting they are to be staggered on the two sides of the roadway for a minimum distance of 75' to avoid a tunneling effect.

7. Examples for marking Projects, as shown on Sheet 1, are typical of signs required and are subject to alteration to fit actual conditions encountered in the field. Locations for control devices are to be staked by the Engineer. In all cases Warning signs are to be placed well in advance of the hazard, the distance depending on topography and existing approach speeds. Additional markings and any special signs required for the guidance and protection of traffic will be placed as required on the Project at the Contractor's expense.

8. Desirable sizes for signs are shown on Sheet 1 of this Standard. Larger or smaller signs shall be used where warranted. Detailed dimensions for signs normally used in connection with construction are shown on Sheet 2 of this Standard. For information on standard roadway signs not detailed on this Standard see the "Manual on Uniform Traffic Control Devices for all Classes of Streets and Highways" published by the Department of Highways.

9. Signs with the prefix "R" in the sign code are Regulatory signs and as such impose legal compulsions or restrictions on drivers and should only be used as authorized by the Engineer.

10. Signs with the prefix "W" in the sign code are Warning signs and are used to alert traffic to existing or potentially hazardous conditions.

11. Signs with the prefix "D" or "M" in the sign code are Guide signs. Those with the prefix "D" convey general information and those with the prefix "M" are used for marking the traffic route.

12. All signs shall be reflectorized unless otherwise specified on plans. Regulatory and Guide signs (unless otherwise specified) shall have a screen processed black legend and border on a white flexible reflective sheeting, non-exposed lens background. The back side of Regulatory and Guide signs shall be painted with two coats of "Exterior Sign White Paint." Warning signs shall have a screen processed black legend and border on a highway yellow flexible reflective sheeting, non-exposed lens background. The back side of Warning signs shall be painted with two coats of "Federal Yellow Synthetic Sign Enamel."

13. *Painting for wood surfaces shall conform with Section 508 of the Standard Specifications.*

14. Posts for regulatory, warning, and guide signs will normally be 4"x 4" or 6"x 6" and shall conform to the Standard Specifications for Untreated Timber-S4S. Timber shall conform to Construction grade Paragraph 123B or 125B of Standard No. 15 Grading & Dressing Rules for West Coast Douglas Fir (1956) or Dense Structural 58 and LL Structural 58 Paragraph 284 or 285 of 1956 Grading Rules for Southern Pine. Posts shall be painted with one coat of "White Wood Primer" and one coat of "Outside White Paint."

15. Sign panels furnished by the Contractor for use only during construction may be fabricated from plywood, aluminum, steel or other suitable material but shall be stable and durable enough to meet other requirements of this Standard.

16. All material shall be sound and durable. Barricades, signs, symbols, and lettering shall be of good workmanship. Uneven lettering will not be accepted.

17. Alternate methods of processing signs or the substitution of symbols or other reflecting elements for painted symbols will be permitted only after approval by the Department.

18. Torches and Lanterns shall be either of the fuel-burning or battery-powered type approved by the Department. Particular care shall be taken to protect all signs and barricades from smoke and smudge.

19. Barricades, Flashing Beacons and Flashers - Refer to appropriate "M" Standard (Timber Barricades) for details.

20. Flagman Sign - This sign shall have a black painted background on both sides to form a contrast for the octagonal Stop sign and the diamond Warning sign. The "STOP" sign shall be fabricated by reverse screen process using transparent red paint on smooth surface silver reflective sheeting. The "SLOW" side of the Flagman Sign shall be black process paint on smooth surface yellow reflective sheeting. Handle to be grooved on one side to indicate reading of sign to Flagman.

21. Sign "A": This is the first advance warning sign and shall be placed 1,500 feet ahead of Barricade or project terminal. Postings are required on both sides of the roadway on divided highways. Dual posting is required where warranted on two-lane, two-way highways.
Sign "B": This is the second advance warning sign and shall be placed 1,000 feet ahead of barricade or project terminal. Postings are required on both sides of the roadway on divided highways and singly on two-lane, two-way highways.
Sign "C": This is the third advance warning sign in cases where barricades are used and shall be placed 500 to 750 feet ahead of barricade or potentially hazardous condition. Postings are required on both sides of the roadway on divided highways and singly on two-lane, two-way highways.
Sign "D": SD13-2 - This sign shall be placed to mark the beginning of a Project of more than 2 miles in extent, where traffic is maintained through the project. It shall be placed singly and near the beginning of construction.
Sign "E": SD13-3 - This sign shall be placed to mark the end of the Project. It shall be placed singly and may be placed opposite barricade if desirable.
Sign "F": Construction identification signs shall be furnished and installed by the Department on all Federal-Aid and Forest Highway Projects where actual construction is in progress and visible to highway users. These signs should be located so as not to obscure or detract from the effectiveness of other official signs. Where two or more projects are contiguous the appropriate data may be included in one set of signs. Refer to appropriate "M" Standard (Identification Signs) for sign details.
Signs A through F shall be furnished, installed and maintained by the Department.

22. When Flags are used in lieu of the Flagman Sign, they shall be a minimum of 18"x18", made of a good grade of bright red material, and fastened securely to a staff of approximately 3 foot length. The free edge should be weighted to insure that the flag will hang vertically, even in heavy winds.

(R-1) 23. Each timber post shall be provided with a single hole drilled through the neutral axis normal to the roadway 3" above the ground level. The holes shall be 1¼" Ø for 6"x 6" and 1" Ø for 4"x 4" timber posts. The underground portion plus 6" shall be treated with creosote.

SPECIAL NOTE: Requirements of this Standard are optional to those of Standard M-614-TA through 12-31-65. Following that date Standard M-614-TA will be obsolete.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION

Designed By D.R.W.	Approved By: [signature] Traffic Engineer
Made By J.L.S.	
Checked By J.B.	Date AUGUST 9, 1965