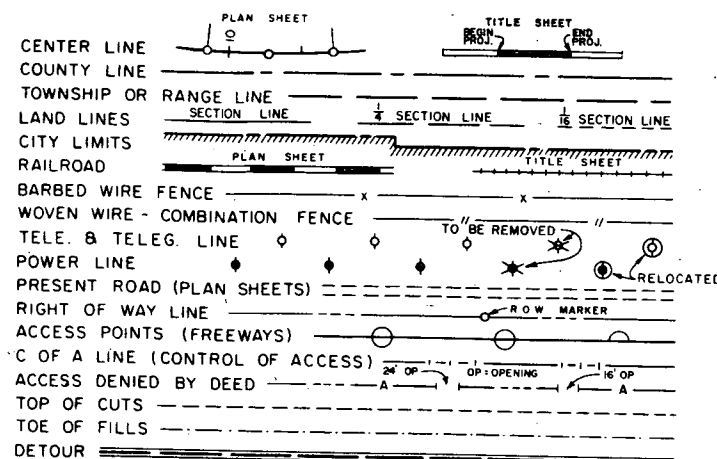


STATE DEPARTMENT OF HIGHWAYS

DIVISION OF HIGHWAYS—STATE OF COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	C 05-0012-25	1

CONVENTIONAL SIGNS



TABULATION OF LENGTH & DESIGN DATA

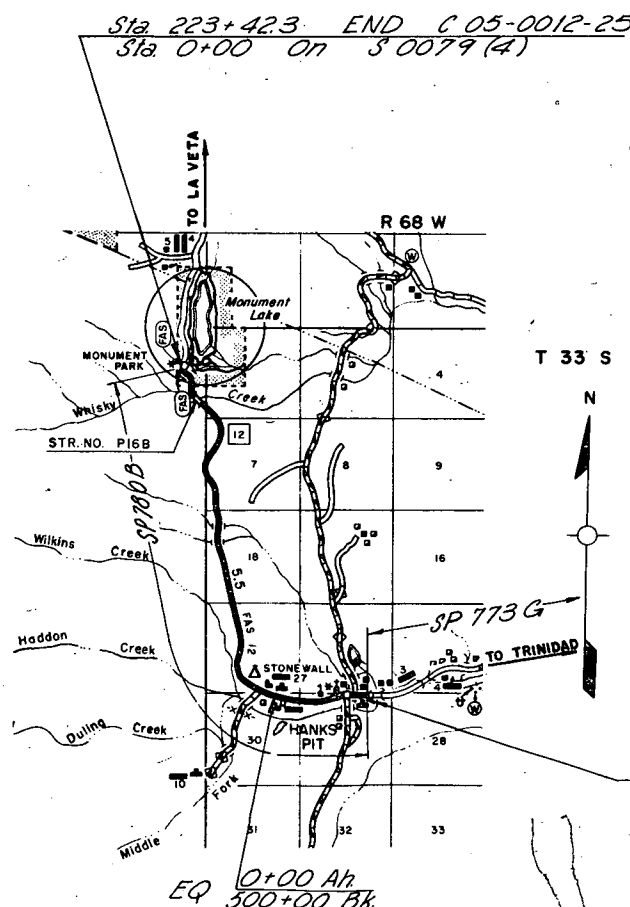
STATION	SURFACING LIN. FT.	MAJOR STRUCTS LIN. FT.	GRADING & SURFACING LIN. FT.
429+00.0 BEGIN C 05-0012-25			
500+00.0 BK } EQ	7,100.0		
0+00.0 AH } EQ			
91+50.0	9,150.0		
97+50.5 BK } EQ			600.5
97+54.5 AH } EQ			
118+00.0 BK } EQ	2,045.5		
117+00.0 AH } EQ			
192+00.0	7,500.0		
200+32.0			832.0
200+64.0 STRUCT. NO. P16B		*320	
219+00.0	1836.0		
223+42.3 END C 05-0012-25			442.3
0+00.0 BEGIN 50079(4)			
TOTALS	27,631.5	*32	1,874.8
SUMMARY	LIN. FT.	MILES	
ROADWAY SURFACING	27,631.5	5.299	
ROADWAY GRADING AND SURFACING	1,874.8	.355	
ROADWAY (NET LENGTH)	29,506.3	5.588	
MAJOR STRUCTURE (*NO WORK SECTION)	32.0	0.006	
C 05-0012-25 (GROSS LENGTH)	29,538.3	5.594	
DESIGN DATA			
MAXIMUM DEGREE OF CURVE	24° 00'		
MAXIMUM GRADE	7.7 %		
MINIMUM S.S.D. HORIZONTAL	225'		
MINIMUM S.S.D. VERTICAL	335'		
MAXIMUM DESIGN SPEED	30MPH		
1991 DESIGN TRAFFIC VOLUME { A.D.T. 510			
{ D.H.V. 82			

Information is for Line Sheets only.

PLAN AND PROFILE OF PROPOSED COLORADO PROJECT NO. C 05-0012-25 STATE HIGHWAY NO. 12 LAS ANIMAS COUNTY

SCALES OF ORIGINAL DRAWINGS
ON PLAN, 1 IN. = 50 FT.
ON PROFILE, 1 IN. = 50 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

AS CONSTRUCTED
REVISED DATE Aug. 24, 1971



SCALE OF MILES

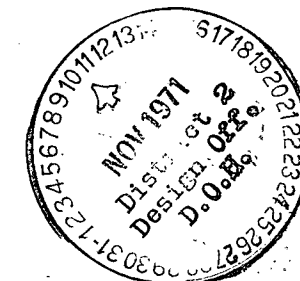
INDEX OF SHEETS

SHEET NO.	TITLE PAGE, SKETCH MAP AND TABULATION OF LENGTH AND DESIGN DATA
1.	TITLE PAGE, SKETCH MAP AND TABULATION OF LENGTH AND DESIGN DATA
2.	TYPICAL SECTIONS AND GENERAL NOTES
3.	SUMMARY OF APPROXIMATE QUANTITIES
4-5.	TABULATION OF ROAD APPROACHES & MISC. STRUCTURE QUANTITIES
6.	SURFACING PLAN, SUMMARY OF EARTHWORK QUANTITIES, TABULATION OF GUARDRAIL & CURB, DETAILS OF DITCH CHECKS & CONCRETE COLLAR.
7.	PIT SKETCH
8.	GUARD RAIL (TYPE 3) CONNECTION TO EXISTING STRUCTURE.
9-11.	PLAN AND PROFILE SHEETS.
12.	STRUCTURE CROSS SECTION
13-14.	CROSS SECTIONS (STRIPPING)
15.	CROSS SECTIONS (ROADWAY SIDE BORROW)
16-21.	CROSS SECTIONS (ROADWAY)
M-203-A	SUPERELEVATION & WIDENING OF CURVES CROWNED HIGHWAYS
M-203-B	APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, BRIDGE & CREST WIDENING
M-203-C	DITCH TYPES
M-206-AA	EXCAVATION AND BACKFILL FOR STRUCTURES
M-603M	METAL CULVERT PIPE H20 LOADING
M-606-AB	GUARD RAIL, TYPE 3
M-612-C	DELINEATORS
M-614-A	TIMBER BARRICADES
M-614-TB	TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION

AS CONSTRUCTED
REVISED DATE AUG. 24, 1971

As Constructed "No Revisions"
Sheets 8-11.

CONTRACTOR: I. W. AVERY
RESIDENT ENGINEER: LOUIS V. MANTELLI
PROJECT ENGINEER: JOHN H. BACICH
PROJECT STARTED: JUNE 1, 1971
PROJECT COMPLETED: AUGUST 24, 1971



SEE SPECIAL PROVISIONS FOR
NOTICE TO BIDDERS

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

FINAL APPROVAL AS
CONSTRUCTED PLANS

DIST. CONST. ENGR.

9-21-71
DATE

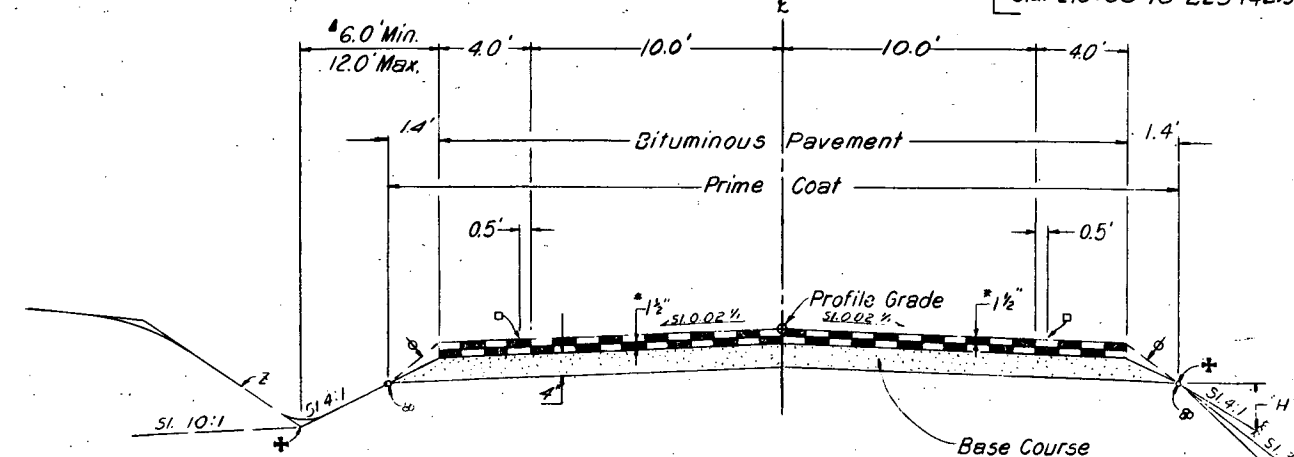
APPROVED:
CHIEF ENGINEER

NOTE: See standards for details of cut slope treatment, flaring and widening.

The depth and width of the side ditch shall be varied where necessary in order to provide proper drainage.

TYPICAL SECTIONS

SECTION A



† The Contractor will be required to place suitable material to this line after completion of paving operation.

‡ Slope to Suit

* Approximate thickness

⊙ Pivot Point

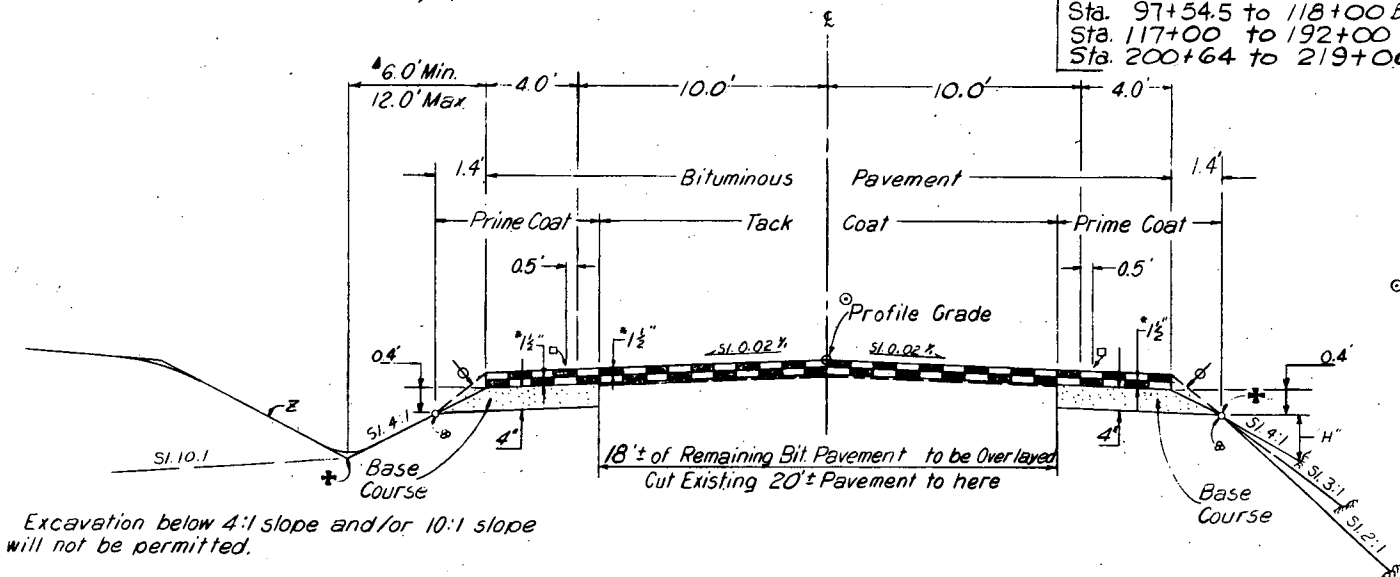
⊙ Location of 3" wide solid white painted stripe.

+ Point of Slope Selection

Break points on slopes and in bottoms of ditches shall be rounded on construction for a pleasing appearance.

▲ 6.0' feet used for Roadway Quantities

SECTION B



Excavation below 4:1 slope and/or 10:1 slope will not be permitted.

Material shall be placed in separate courses at the following rates per 100 lin. ft. of roadway

	SEC. A	SEC. B
Bituminous Pavement.....	Top Layer..... 26 Tons	26 Tons
	Bottom Layer..... 26 Tons	26 Tons
Base Course.....	4" Thickness..... 66 Tons	26 Tons

Fill Slopes:

where "H" is 3' or less Slope 4:1
where "H" is 3' to 8' Slope 3:1
where "H" is over 8' Slope 2:1

GENERAL NOTES

AS CONSTRUCTED
REVISED DATE AUG. 24, 1971

Road approaches which require bituminous pavement shall be primed and a 2" thickness of pavement placed as follows:

Public approaches and entrances to buildings or residences shall be paved 50 ft. out from edge of shoulder or to the Right of Way line whichever is less. Field entrances shall be paved 4 ft. out from edge of shoulder. Estimated No. of Apprs: 12 Comm., 25 Hse, 30 Fld, 2 Cwty.

Depth of Moisture-Density control for this project shall be as follows:

Full depth of all Embankments
Bases of cuts and fills 6 inches.

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 1,268~~ Hours of Flegging for controlling traffic ~~WERE~~ required for this project.

The type of compaction for Structure Backfill (Class 2) shall be A.A.S.H.O T99

For preliminary plan quantities of Bituminous Materials, the following rates of application were used:

Prime Coat MC.....	0.30 Gals. per sq. yd.
Tack Coat AC.....	0.425 Lbs. (0.05 Gals.) per sq. yd.

Rates of application shall be as determined by the Engineer at the time of application.

Plain water shall be used as a dust palliative where required. Locations shall be as ordered.

Guard Posts, Signs, and Delineators will be removed by State Forces.

~~It is estimated that 68~~ Hours of Blading ~~will be~~ required for this project.

Any layer of bituminous pavement that is to have a succeeding layer placed thereon shall be completed full width before succeeding layer is placed.

Ski-Type device at least 30 feet in length and short ski or short shoe shall be furnished with the automatic control system of each bituminous paver.

The Engineer will establish all terminal points for No-Passing zones on this project.

Clearing and Grubbing, is to be subsidiary to the Item "Unclassified Excavation." Contractor will not disturb vegetation outside slope stakes.

~~It is estimated that 40~~ Type I and 2-Type III delineators ~~will be~~ Required for this Project.

FEDERAL BOARD DIVISION NO.	DIVISION	PROJ. NO.	BUDGET NO.	TOTAL COSTS
9	COLORADO	C 05-0012-25	3	21

[illegible]

TABULATION OF ROAD APPROACHES AND MISC. STRUCTURE QUANTITIES

FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NO.	CHECK NO.
9	COLORADO	C 05-0012-25	4

INDEX			LOCATION	SIDE	UNCLASSIFIED EXCAVATION		STRUCTURE EXCAVATION		STRUCTURE BACKFILL		REMOVAL OF STRUCTURE		AGGREGATE BASE COURSE SURFACING (CLASS "6")		HOT BITUMINOUS PAVEMENT (GRADING "E")		CLASS "6"		H.B.P. GR. "E"		SIDE DRAINS										MISCELLANEOUS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
BOOK	PAGE	SHEET			CUBIC YARD		CUBIC YARD		CUBIC YARD		CUBIC YARD		EACH		TON		TON		FINAL		FINAL		CORRUGATED STEEL PIPE LINEAR FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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AS CONSTRUCTED
REVISED DATE AUG. 24, 76

FINAL TABULATION OF ROAD APPROACHES AND MISC. STRUCTURE QUANTITIES

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
1	COLORADO	C 05-0012-25	8

INDEX			LOCATION	SIDE	UNCLASSIFIED EXCAVATION		STRUCTURE EXCAVATION		STRUCTURE BACKFILL		AGGREGATE BASE COURSE SURFACING (CLASS 6)	HOT BITUMINOUS PAVEMENT (GRADING E)	CLASS "6"		H.B.P. GR. "E"	SIDE DRAINS				MISCELLANEOUS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
P.K.	PAGE	SHEET			CUBIC YARD		CUBIC YARD	CUBIC YARD	CL. 2	FINAL			FINAL	FINAL		FINAL	CORRUGATED STEEL PIPE LINEAR FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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AS CONSTRUCTED
REVISED DATE AUG. 24, 71

16
Cu. Yds. - Slope Mattress

19- Cu. Yds. - Slope Mattress

16
Cu. Yds. - Slope Mattress

28 L.F. 48" CSP ; 1- Removal Of Headwall

20- Reset Mailbox Structures

⊕ Included in Earthwork Quantities
Δ Included in Surfacing Plan
Ⓢ Req'd Approach To Project

Ⓢ Req'd 6 Ditch Checks, Lt.
Ⓢ Req'd 5 Ditch Check, Rt.
Ⓢ 5 Ditch checks, Lt.

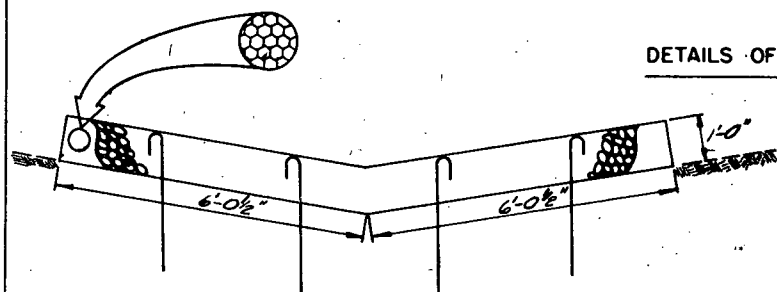
Ⓢ Remove Rock Headwall And Wingwalls Rt.
Req'd Extend 4'x4'x62' C.B.C. 28 Rt. With
48" C.S.P. And Concrete Collar.
(See Detail on Sheet No. 6)

FINAL BASE COURSE AND SURFACING COURSE PLAN REF. SCALE BOOKS & TON MILE CAL. SHEET

REF. SCALE BOOKS & TON MILE CAL. SHEET

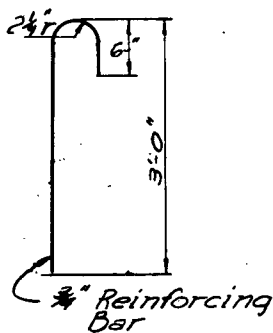
STATION TO STATION	SOURCE	QUANTITY - TONS						HAUL - TON MILE						INDEX		
		BASE COURSE		HOT BITUMINOUS PAVEMENT				BASE COURSE		HOT BITUMINOUS PAVEMENT						
		A.B.C. CLASS 6	FINAL	BOTTOM LAYER GRADING E	FINAL	TOP LAYER GRADING E	FINAL	A.B.C. CLASS 6	FINAL	BOTTOM LAYER GRADING E	FINAL	TOP LAYER GRADING E	FINAL	BOOK	PAGE	SHEET
429+00.0 ~ 476+25.0		1228	1,629.55	1228	1,184.25	1228	1,269.65	782	994.50	782	722.80	782	774.90			
476+25.0 ~ 500+00.0 BK		618	797.70	618	614.70	618	714.75	256	309.30	256	238.40	256	277.20			
0+00.0 Ah ~ 91+50.0		2379	3,223.15	2379	2,426.35	2379	2,504.95	3582	4,767.60	3582	3,589.00	3582	3,705.20			
91+50.0 ~ 97+50.0 BK		396	481.35	156	214.95	156	221.05	962	1,156.40	379	516.40	379	531.10			
97+54.5 Ah ~ 118+00.0 BK		532	858.10	532	438.90	532	547.65	1426	2,363.10	1426	1,164.40	1426	1,452.90			
117+00.0 Ah ~ 192+00.0		1950	3,060.65	1950	1,916.90	1950	1,999.50	6988	10,886.50	6988	6,818.20	6988	7,112.00			
192+00.0 ~ 200+32.0		549	645.35	216	301.15	216	318.95	2400	2,806.60	944	1,309.70	944	1,387.10			
No Work Section																
200+64.0 ~ 219+00.0		477	703.25	477	480.25	477	518.65	2209	3,238.20	2209	2,211.40	2209	2,388.20			
219+00.0 ~ 223+42.3		292	635.10	115	166.00	115	162.65	1415	3,061.40	557	800.20	557	785.00			
Est. For: Irregularities		842	*					2002	*							
Adjusting Super-elev.				200	*					446	*					
Approach To Proj.		26	*	26	*	26		28	*	28	*	28	*			
From Tab. Of Road. Appr.		1019	*			394		2423	*			879	*			
PROJECT TOTAL		10,308	12,044.20	7,897	7,743.45	8,091	8,258.00	24,473	29,523.60	17,597	17,370.50	18,030	18,413.60			

* INCLUDED IN ROADWAY QUANTITIES



— DETAIL OF DITCH CHECK —

Note: ARE
Mattress shall be pinned to slopes with 3 ft long stakes. All mattresses shall have a minimum of 4 stakes. Stakes shall be 3/4 inch reinforcing bar or equivalent.



— DETAILS OF STAKE —

DETAILS OF DITCH CHECKS

Note:
Stabilization Based On:

EDLA 18"
Regional Factor
Serviceability Index
Hot Bituminous Pavement
A.B.C. (Class 6)

8.
2.25
2.0
0.44 (R=97)
0.12 (R=84)

DIMENSIONS FOR DITCH CHECKS

INDEX	BOOK PAGE SHEET		LENGTH		WIDTH		DEPTH		PARTITIONS
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
		GABION	6'	6'-6"	3'	3'-3"	3'	3'-3"	1
			9'	9'-9"	3'	3'-3"	3'	3'-3"	2
			12'	13'-1"	3'	3'-3"	3'	3'-3"	3
		APRON	6'	6'-6"	3'	3'-3"	1'-6"	2'	1
			9'	9'-9"	3'	3'-3"	1'-6"	2'	2
			12'	13'-1"	3'	3'-3"	1'-6"	2'	3
		MATTRESS	6'	8'	3'	6'-6"	6"	1'	*1-3
			9'	10'	3'	6'-6"	6"	1'	*2-4
182			12'	13'-1"	3'	6'-6"	6"	1'	*3-5

* Quantities Based On These Maximum Dimensions

* Slope Mattresses shall be compartmented as recommended by the manufacturer of the mattress wire.

AS CONSTRUCTED
REVISED DATE AUG. 24, 71

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	C 05-0018-25	9	21

SUMMARY OF EARTHWORK QUANTITIES

INDEX	
SHEET 18 & 21	
SHEET 14	
SHEET 15 & 18	
BK.-2 PG. 60	

UNCLASSIFIED EXCAVATION (HAUL)

Roadway (From Cross Sections)
Structure Quantities as Emb.
Est. for Cut Slope Treatment
Stripping (Removing Overburden)
Stripping (Replacing Overburden)
ROADWAY BORROW
ROADWAY SHOULDERS

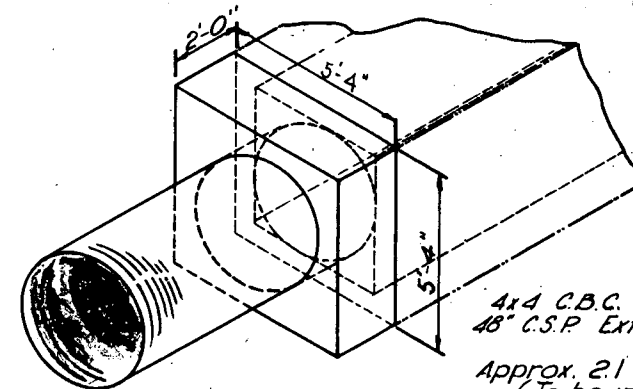
PLAN	FINAL
Cu. Yd.	Cu. Yd.
3,703	2,084
790	50
77	0
2,700	3,573
2,700	0
0	1,052
0	3,080
TOTAL FOR PAY QUANTITY	9,970

COMPACTION (AASHTO T-99)
(Moisture and Density Control)

SHEET 18 & 21
BK.-2 PG. 45
Sheet No. 5

Embankment (Net)
Base Of Cuts and Fills
Structure Quantities as Emb. (Net)

PLAN	FINAL
Cu. Yd.	Cu. Yd.
2,843	1,557
1,589	1,164
790	50
TOTAL FOR PAY QUANTITY	5,222



— CONCRETE COLLAR —

4x4 C.B.C. w/
48" C.S.P. Extension
Approx. 21 Cu. Yd. Conc.
(To be included in Cost of Pipe)

TABULATION OF GUARDRAIL

INDEX	BOOK PAGE SHEET	STATION	SIDE	LENGTH TANGENT FT.	FINAL	LENGTH FLARE	FINAL	TYPE	ANCHOR TYPE	
									R	T
		199+50 ~ 200+25	Rt.			75	75	3	1	1
2	44	199+59 ~ 200+34	Lt.	0	75	75	75	3		
		200+61 ~ 201+36	Rt.			75	75	3		1
2	44	200+68 ~ 202+18	Lt.	75	0	75	75	3	1	1
		PROJECT TOTAL		75	75	300	300		22	2

φ W = 4'

TABULATION OF CURB

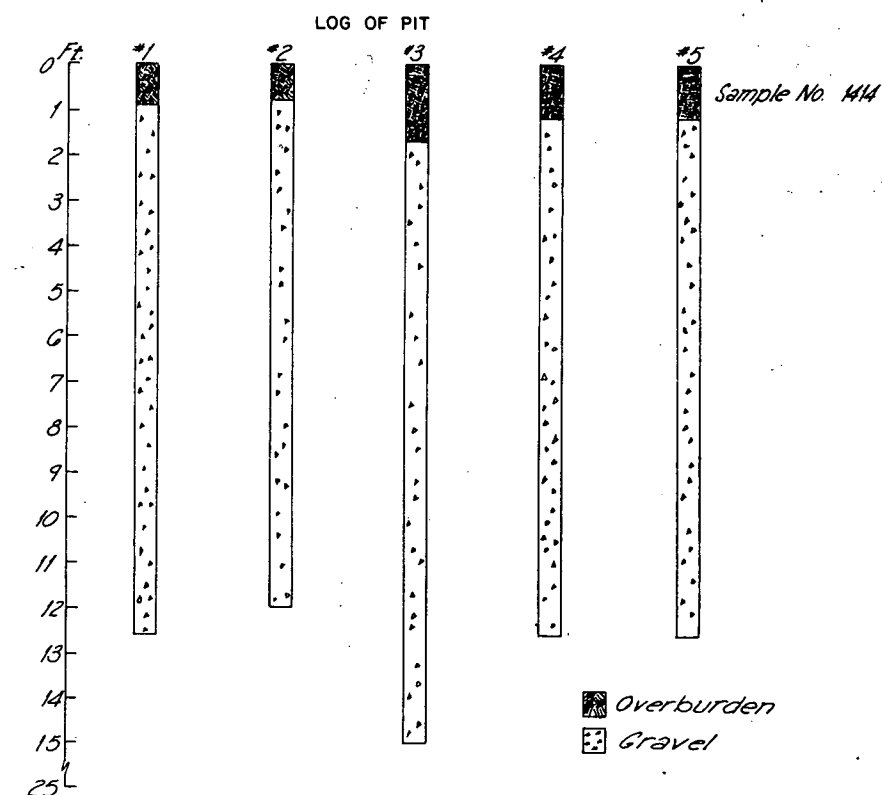
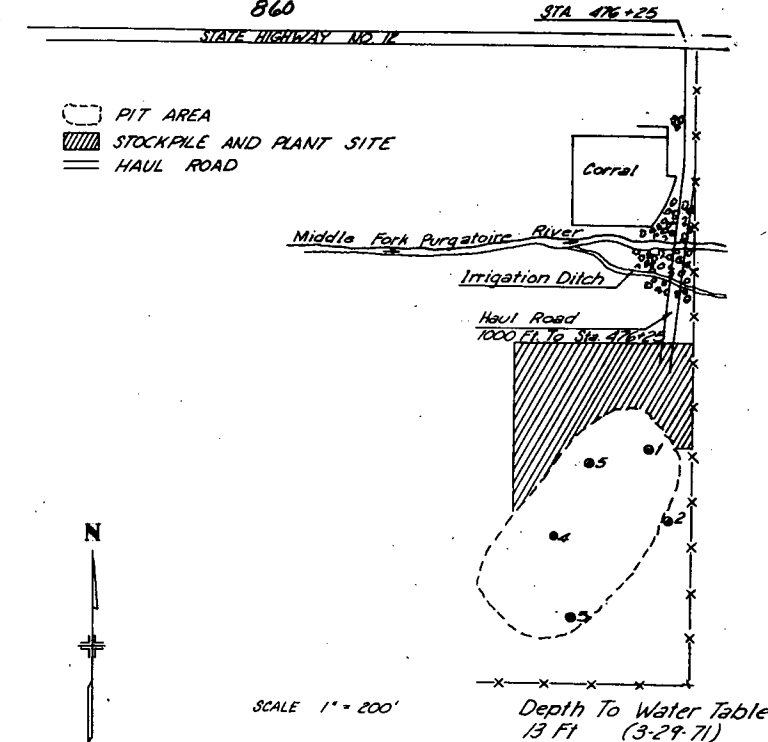
INDEX	BOOK PAGE SHEET	STATION	SIDE	CURB TYPE 2 (SECTION VARIABLE) LIN. FT.	FINAL LIN. FT.
		200+32	Rt. & Lt.	40	40
2	46	200+64	Rt. & Lt.	40	40
		TOTAL		80	80

AS CONSTRUCTED
REVISED DATE AUG. 24, 1971

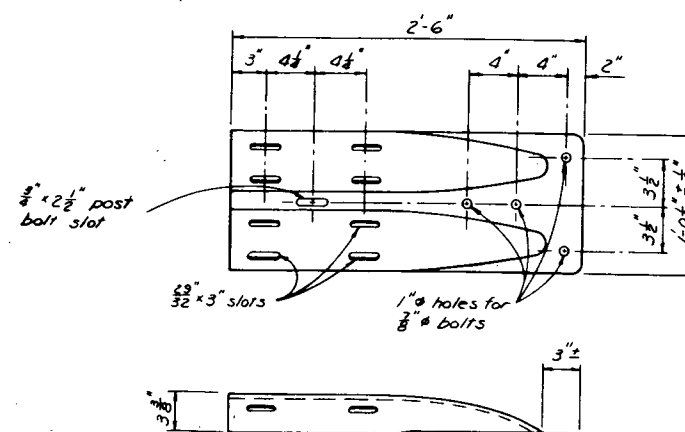
FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	C 05-0012-25	7	21

HANKS PIT

Owner: William T. & Louise Hanks, Star Route Storewell Inn, Weston, Colo. 81091
Location: Part Of SW 1/4 NE 1/4 Sec. 30, T33S, R28W.
Use: Base Course And Aggregate For Bituminous Pavement
Quantity Available: ~~57,300~~ Cu. Yds.
Stripping: Removing Overburden ~~2,000~~ Cu. Yds. 3,573 Cu. Yd.
Replacing Overburden ~~2,000~~ Cu. Yds. 0 " "
Haul Distance ~~1000~~ Ft. To Sta. 476+25
860



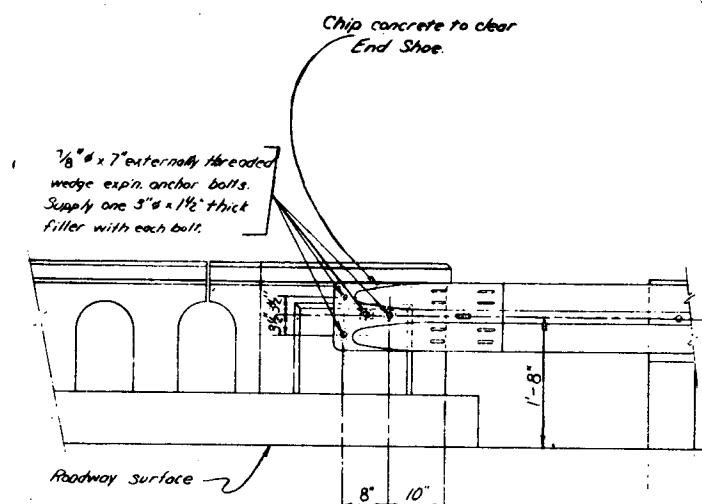
REVISIONS			



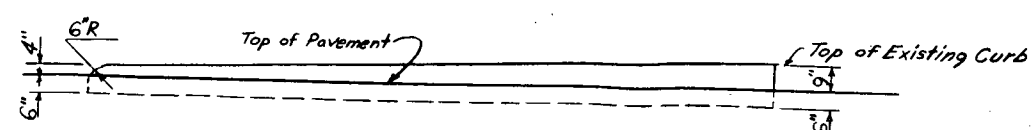
Gen. Notes
For additional details of guard rail and its installation not shown on these sheets see Std. M-606-AB.

All work necessary to accomplish the above shall be included in the bid price for Item No. 606, Guard Rail Type 3.

The special end shoe shall be 10 ga. steel and galvanized in accordance with ASTM Designation: A 93 or A 123 with coating class 250.



GUARD RAIL CONNECTION "A"
4 Reg'd. Ea. Structure



4 Reg'd. Each Structure
Concrete Class A req'd. for ea. Connection = 1.0 Cu. Yd.
Pay Item: Variable Curb.

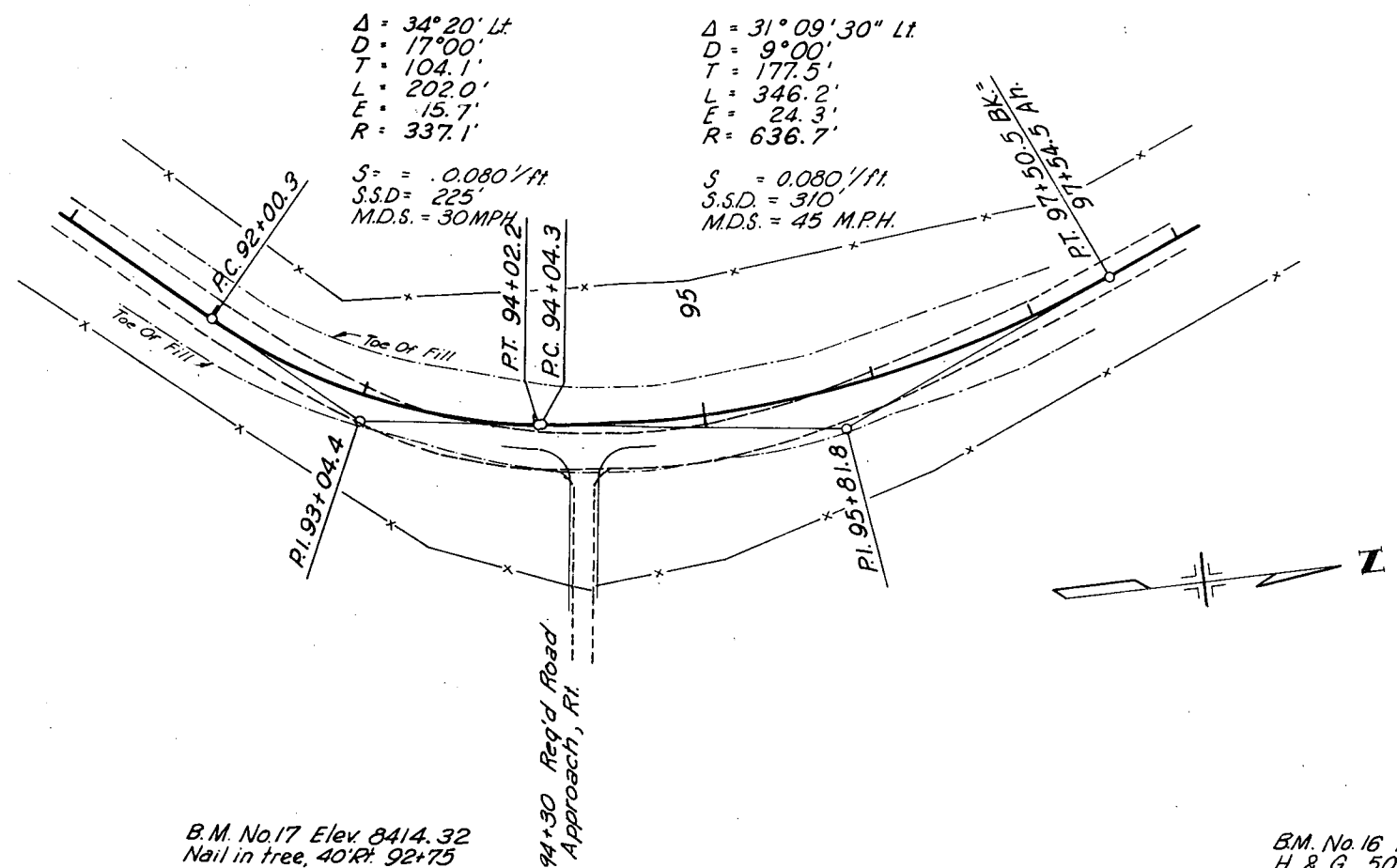
	INITIAL	DATE	CHECKED BY
DESIGNED BY			
CHECKED BY			QUANTITIES BY
DETAILED BY			CHECKED BY

DIVISION OF HIGHWAYS					
GUARD RAIL (TYPE 3) CONNECTION TO EXISTING STRUCTURE					
Approved: _____ Bridge Engineer _____ Date: _____	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;"> Designer: <i>L. Petersen</i> </td> <td style="width: 50%;"> Checker: <i>D. Skosh</i> </td> </tr> <tr> <td> Structures Numbers </td> <td> <i>4-16-B-1</i> </td> </tr> </table> DWG. No. 8 / of /	Designer: <i>L. Petersen</i>	Checker: <i>D. Skosh</i>	Structures Numbers	<i>4-16-B-1</i>
Designer: <i>L. Petersen</i>	Checker: <i>D. Skosh</i>				
Structures Numbers	<i>4-16-B-1</i>				

STATE OF COLORADO
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DISTRICT ENGINEER

FEDERAL ROAD DISTRICT	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	C 05-0012-25	9	

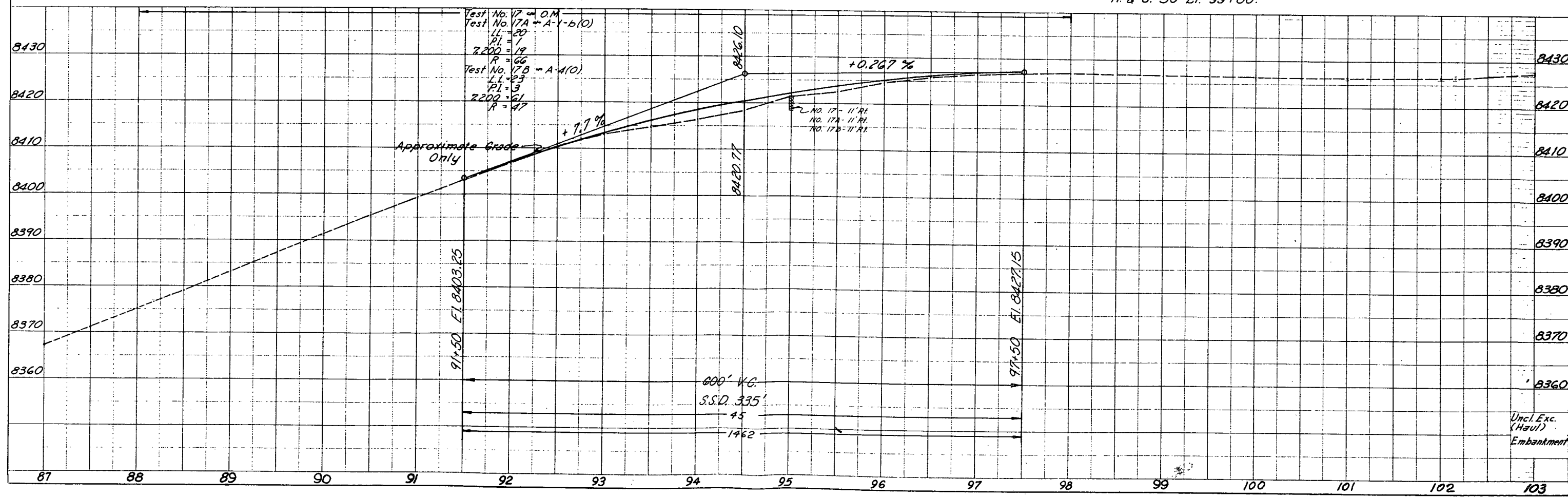
PLAN
NOTE BOOK
No. 1



B.M. No. 17 Elev. 8414.32
Nail in tree, 40' Rt. 92+75

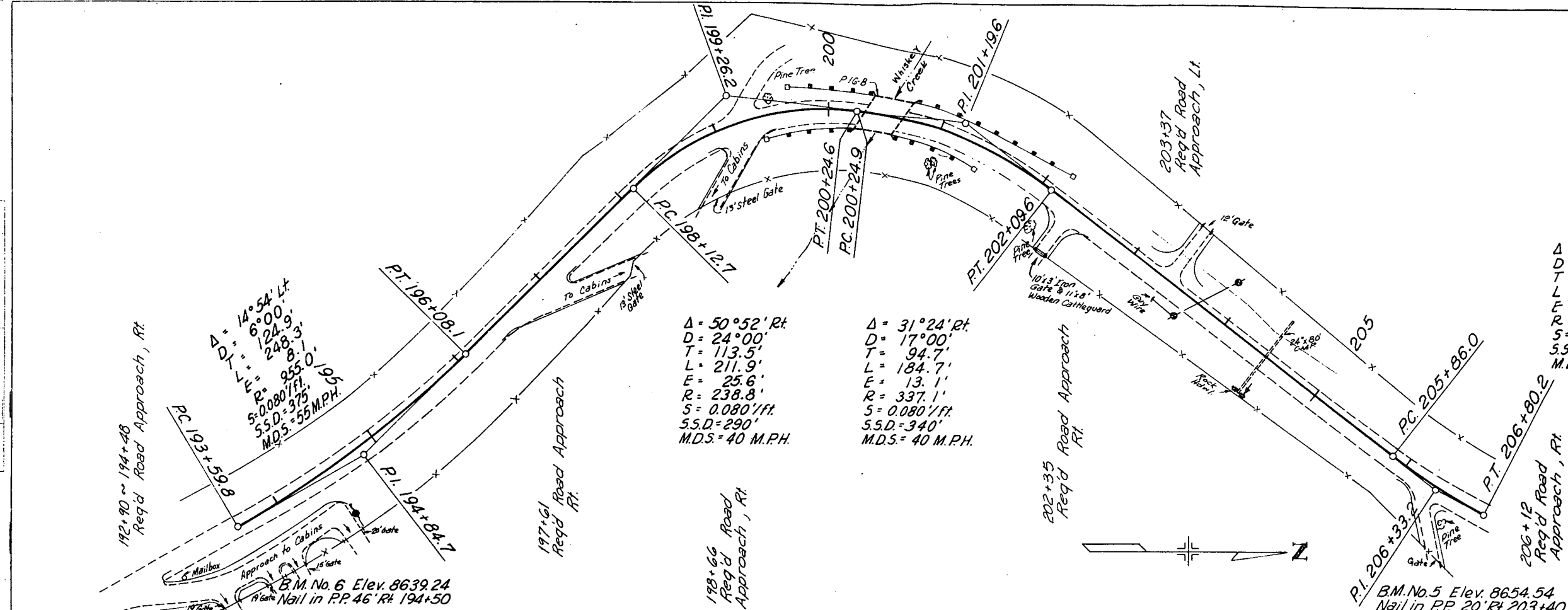
B.M. No. 16 Elev. 8426.74
H. & G. 50' Lt. 99+00.

PROFILE
NOTE BOOK
No. 2



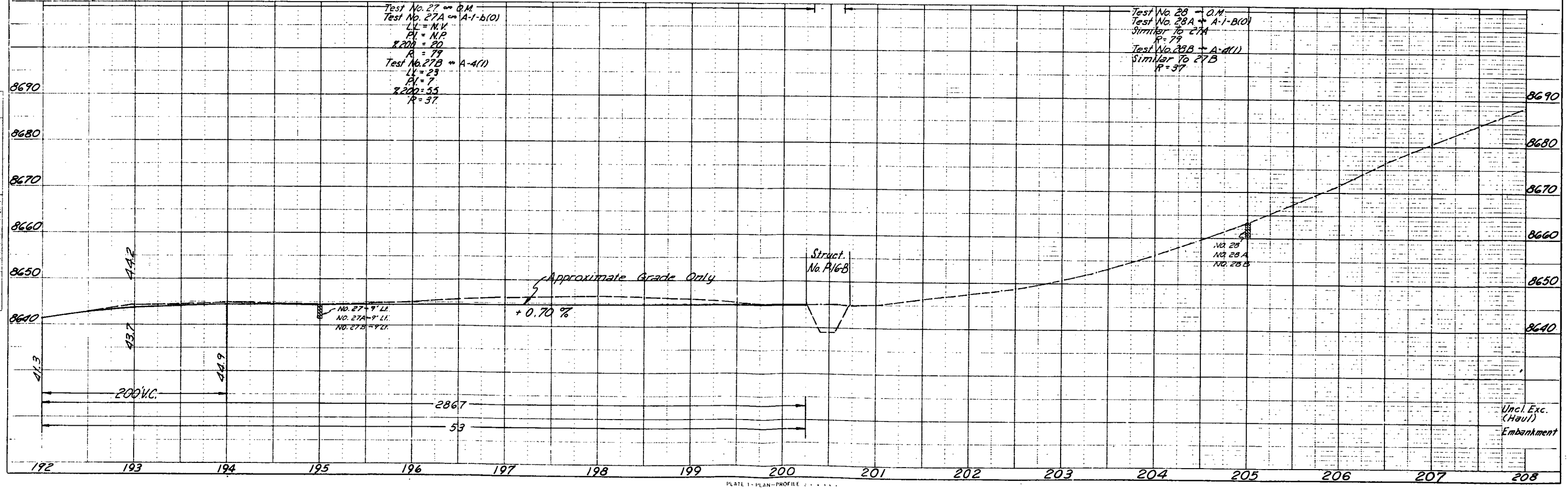
PROJECT NO.	C 05-0012-25	SHEET NO.	10
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PLAN
NOTES:
1. ALL DIMENSIONS IN FEET.
2. ALL ANGLES IN DEGREES.
3. ALL DISTANCES IN FEET.
4. ALL GRADES IN PERCENT.



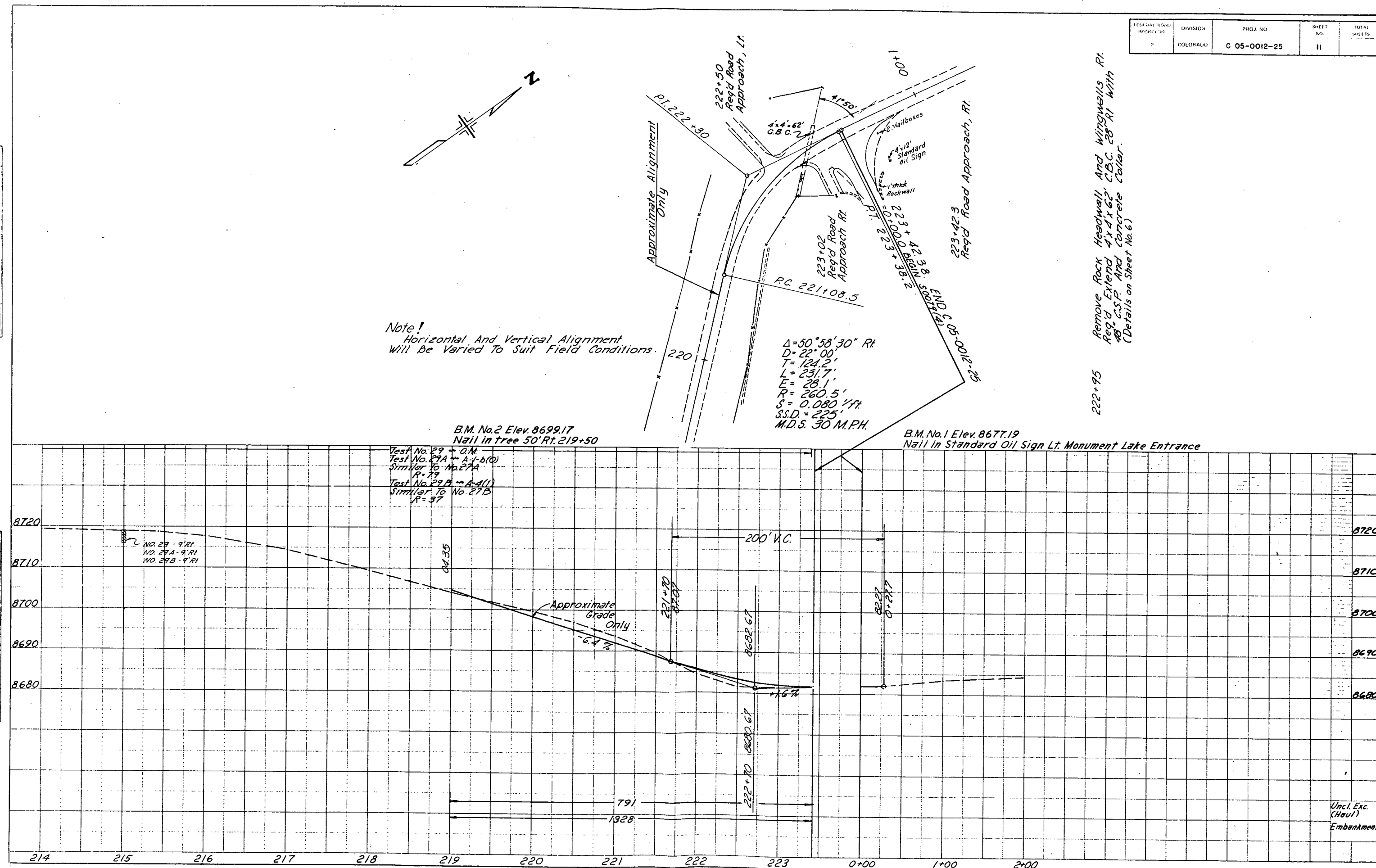
Note:
See Sht Nos 4 & 5 For
Tabulation Of Road Approaches
For Project.

PROFILE
NOTES:
1. ALL DIMENSIONS IN FEET.
2. ALL GRADES IN PERCENT.



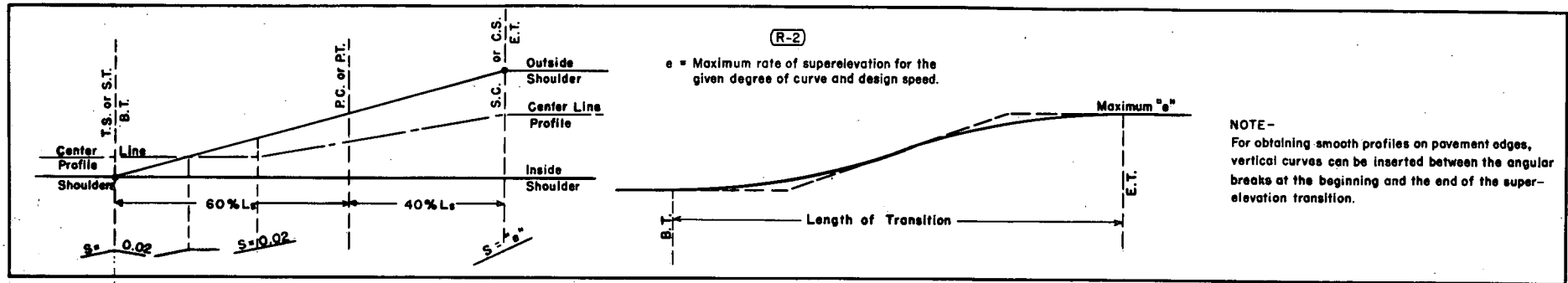
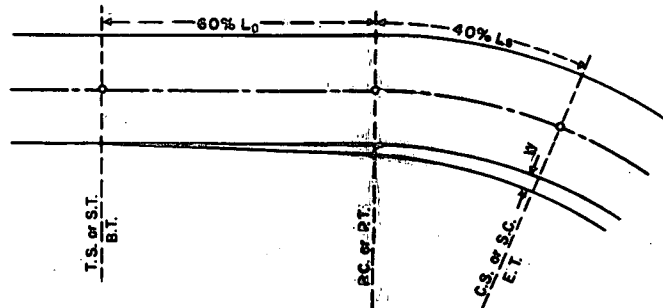
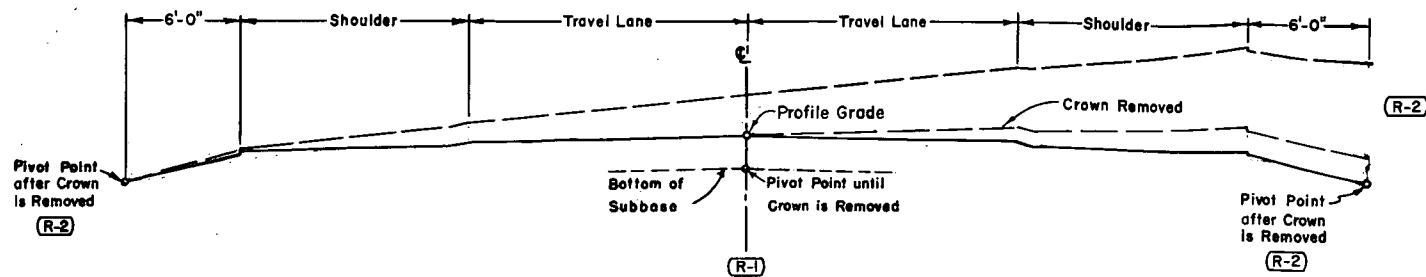
PLAN	NO.	DATE	BY	REMARKS
SCHEDULE	1	1/1/50	1	1
P-OTED	2	2/1/50	2	2
ATTACHMENTS	3	3/1/50	3	3
BY OF AAI CHECKED	4	4/1/50	4	4

PROFILE	BY	DATE
SUBJECT		
PROJECTED		
LIBRARY CHECKED		
B M S NOTED		
SERIALS TYPE NOTATIONS CHECKED		



STANDARD M-203-A
(JULY 1, 1965)

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



PAVEMENT WIDENING			
Pavement Width	20 Ft.	22 Ft.	24 Ft.
Degree of Curve			
0° - 3°	0 Ft.	0 Ft.	0 Ft.
4° - 6°	2.0 Ft.	0 Ft.	0 Ft.
7° - 10°	2.5 Ft.	0 Ft.	0 Ft.
11° - 17°	3.0 Ft.	2.0 Ft.	0 Ft.
18° - 21°	3.5 Ft.	2.5 Ft.	0 Ft.
22° - Up	4.0 Ft.	3.0 Ft.	2.0 Ft.

Widening is to be on the inside edge of the pavement and the transition is to extend over the same transition length as the superelevation.

REVISIONS		
R-1	5-26-67	Supersed Template M.R.H.
R-2	7-30-68	Template, Rate Tables and Dept. Name. M.R.H.

TABLE 1
SUPERELEVATION RATES FOR TWO LANE CROWNED HIGHWAYS

Degree of Curve	Maximum Superelevation = 0.08			Maximum Superelevation = 0.10		
	Super. Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length	Super. Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length
0°15'	.020	70	200'	.020	70	200'
0°30'	.020	70	200'	.020	70	200'
0°45'	.021	70	200'	.021	70	200'
1°00'	.028	70	200'	.028	70	200'
1°30'	.042	70	200'	.042	70	200'
2°00'	.056	70	200'	.055	70	200'
2°30'	.069	70	200'	.068	70	200'
3°00'	.076	70	250'	.083	70	250'
3°30'	.080	70	250'	.088	70	300'
4°	.080	65	250'	.100	65	300'
5°	.080	60	250'	.100	60	300'
6°	.080	55	200'	.100	55	250'
7°	.080	50	200'	.100	50	250'
8°	.080	45	200'	.100	45	250'
9°	.080	40	200'	.100	40	250'
10°	.080	35	150'	.100	35	200'
11°	.080	30	150'	.100	30	200'
12°	.080	30	150'	.100	30	200'
13°	.080	30	150'	.100	30	200'
14°	.080	30	150'	.100	30	200'
15°	.080	30	150'	.100	30	200'
16°	.080	30	150'	.100	30	200'
17°	.080	30	150'	.100	30	200'
18°	.080	30	150'	.100	30	200'
19°	.080	30	150'	.100	30	200'
20°	.080	30	150'	.100	30	200'
21°	.080	30	150'	.100	30	200'
22°	.080	30	150'	.100	30	200'
23°	.080	30	150'	.100	30	200'
24°	.080	30	150'	.100	30	200'
25°	.080	30	150'	.100	30	200'

NOTES—Plains Areas use 0.10 Maximum Superelevation Rate.
Mountainous Areas & areas where icing conditions frequently exist, use 0.08 Maximum Superelevation Rate.

TABLE 2
SUPERELEVATION RATES FOR SPECIAL CASES

Degree of Curve	30 M.P.H.		35 M.P.H.		40 M.P.H.		45 M.P.H.		50 M.P.H.		55 M.P.H.		60 M.P.H.		Degree of Curve
	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral	
0°15'	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0°15'
0°30'	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0°30'
0°45'	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0°45'
1°00'	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1°00'
1°30'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	1°30'
2°00'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	2°00'
2°30'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	.020	100'	2°30'
3°00'	.023	100'	.024	100'	.025	100'	.026	100'	.027	100'	.028	100'	.029	100'	3°00'
3°30'	.026	100'	.027	100'	.028	100'	.029	100'	.030	100'	.031	100'	.032	100'	3°30'
4°	.029	100'	.030	100'	.031	100'	.032	100'	.033	100'	.034	100'	.035	100'	4°
5°	.035	100'	.036	100'	.037	100'	.038	100'	.039	100'	.040	100'	.041	100'	5°
6°	.041	100'	.042	100'	.043	100'	.044	100'	.045	100'	.046	100'	.047	100'	6°
7°	.048	100'	.049	100'	.050	100'	.051	100'	.052	100'	.053	100'	.054	100'	7°
8°	.050	100'	.051	100'	.052	100'	.053	100'	.054	100'	.055	100'	.056	100'	8°
9°	.054	100'	.055	100'	.056	100'	.057	100'	.058	100'	.059	100'	.060	100'	9°
10°	.058	150'	.059	150'	.060	150'	.061	150'	.062	150'	.063	150'	.064	150'	10°
11°	.061	150'	.062	150'	.063	150'	.064	150'	.065	150'	.066	150'	.067	150'	11°
12°	.065	150'	.066	150'	.067	150'	.068	150'	.069	150'	.070	150'	.071	150'	12°
13°	.067	150'	.068	150'	.069	150'	.070	150'	.071	150'	.072	150'	.073	150'	13°
14°	.070	150'	.071	150'	.072	150'	.073	150'	.074	150'	.075	150'	.076	150'	14°
15°	.072	150'	.073	150'	.074	150'	.075	150'	.076	150'	.077	150'	.078	150'	15°
16°	.074	150'	.075	150'	.076	150'	.077	150'	.078	150'	.079	150'	.080	150'	16°
17°	.076	150'	.077	150'	.078	150'	.079	150'	.080	150'	.081	150'	.082	150'	17°
18°	.077	150'	.078	150'	.079	150'	.080	150'	.081	150'	.082	150'	.083	150'	18°
19°	.078	150'	.079	150'	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	19°
20°	.079	150'	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	20°
21°	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	.086	150'	21°
22°	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	.086	150'	22°
23°	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	.086	150'	23°
24°	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	.086	150'	24°
25°	.080	150'	.081	150'	.082	150'	.083	150'	.084	150'	.085	150'	.086	150'	25°

NOTES—Transition or Spiral Lengths are shown in the tables for 2 Lane Crowned Highways.
For 3 Lane Crowned Highways use 1.2 times the lengths shown, rounded to the nearest 50 feet.
Width of Crowned Highway to be figured for Superelevation—left pivot point to right pivot point.

Table 2 data may be used for City Streets & Interchanges.
NC=Normal Crown section.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

SUPERELEVATION &
WIDENING OF CURVES
CROWNED HIGHWAYS

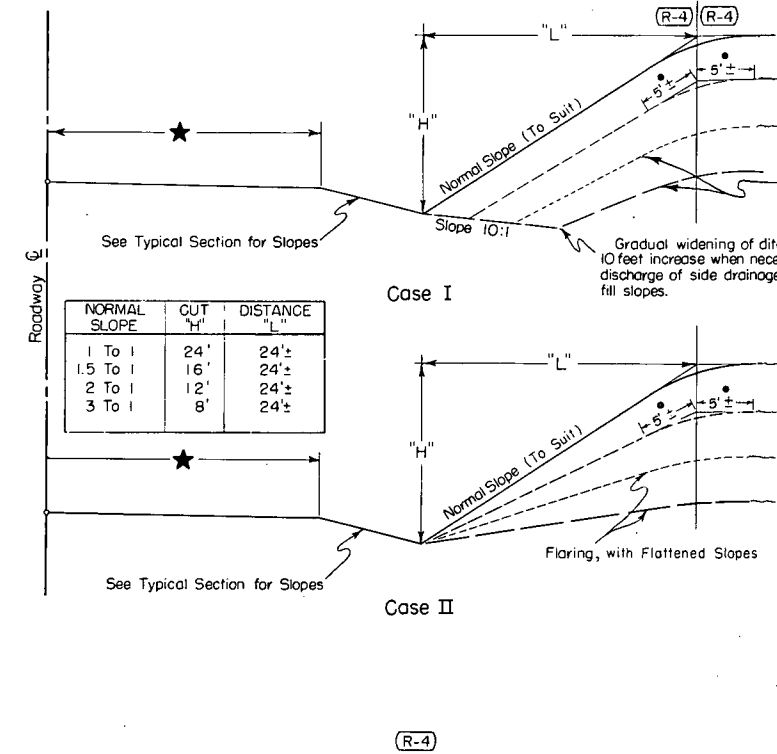
Designed by S.B.L. Approved by S.B.L.
Made by S.B.L. Staff Design Engr.
Checked by L.E.O. Date July 1, 1965

STANDARD SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES AND AT CREST OF GRADES

STANDARD M-203-B
(JULY 1, 1965)

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

GENERAL DETAILS FOR FLARING OF EARTH CUTS,
CUT SLOPE TREATMENT & WIDENING AT BRIDGES



FLARING OF EARTH CUTS: The backslopes of ends of all earth cuts shall be flattened & where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion & to improve appearance. The transition of flattened backslopes & widened ditch shall be constructed in such a manner that a uniform appearance of slope & ditch results. Backslopes shall be flared to the approximate "L" distance shown on Slope Table included with this detail. Rock cuts shall not be flared.

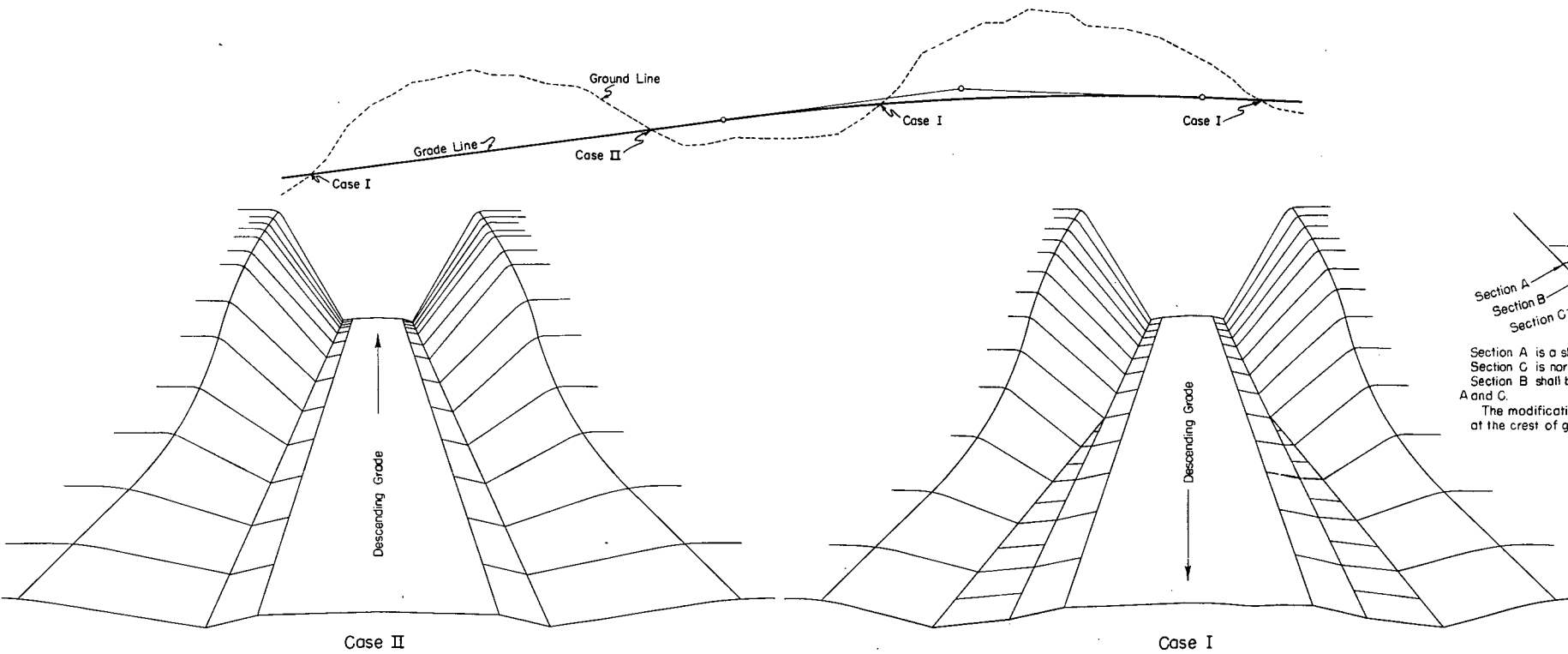
CUT SLOPE TREATMENT IN EARTH CUTS: The intersection of cut slopes with the existing ground shall be rounded in earth cuts, beginning outside the slope stake and extending down the cut slope. The exact dimension will be determined by the Engineer based on the type of material encountered.

Quantities shall be included in "Unclassified Excavation".

WIDENING AT BRIDGE APPROACHES: Roadway embankment at bridge approaches shall be so constructed that base of surfacing at shoulder point is a minimum of 2 ft. beyond the edge of bridge deck. Where widening is necessary to achieve this result it shall take place gradually over a distance of 300 ft.

WIDENING FOR BITUMINOUS CURB (Only where Guard Rail is required); See appropriate M-Standard for Guard Rail.

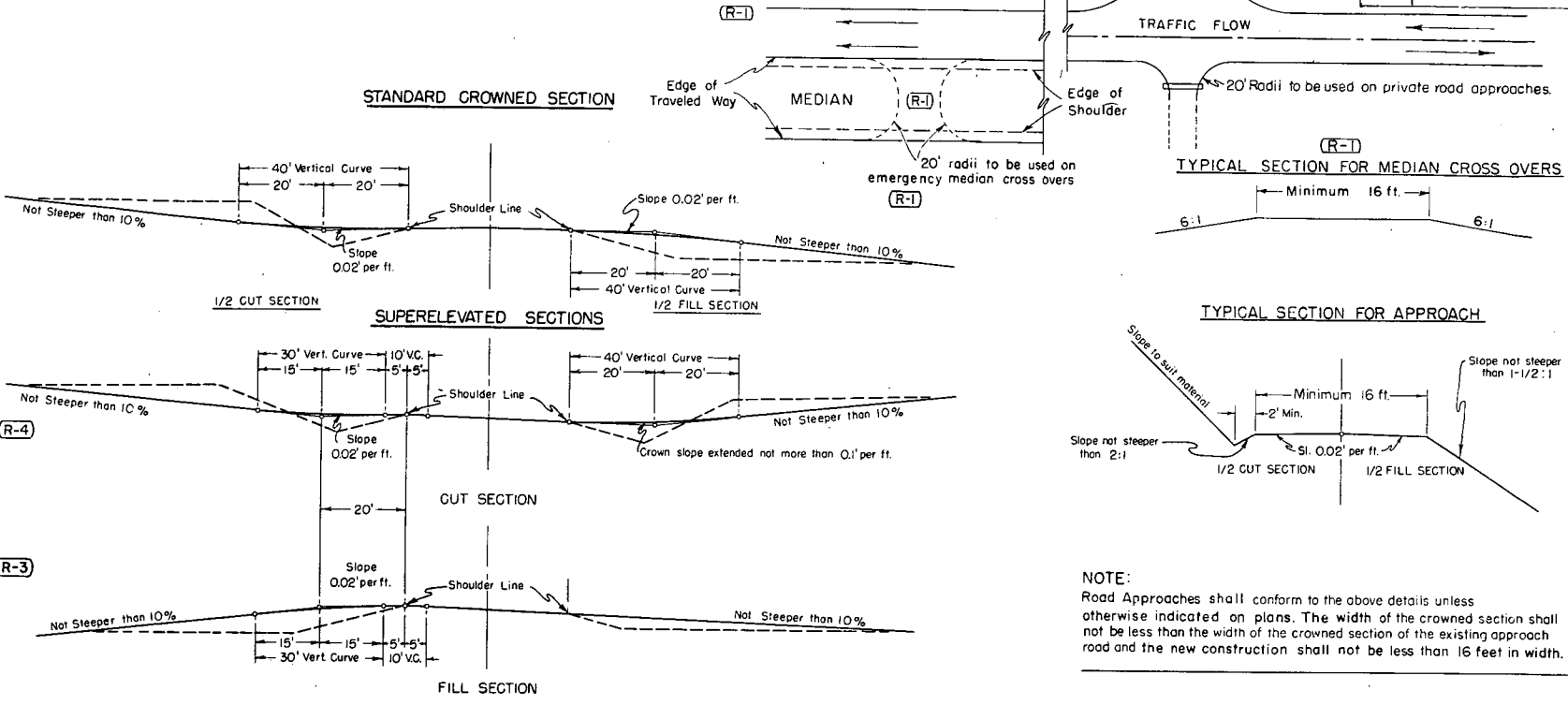
PLAN OF FLARING IN EARTH CUTS



TYPICAL PLANS FOR SIDE APPROACH
ROADS AND EMERGENCY MEDIAN CROSS OVERS

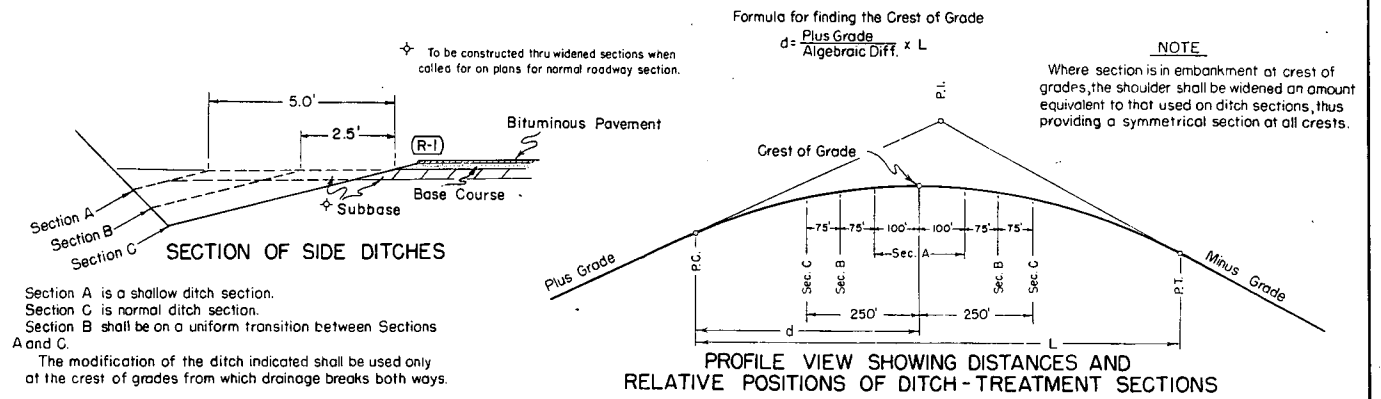
Where practical Side Drains are to be placed in line with the roadway ditches.

50' Radii to be used on all intersecting roads except private approaches. Radii may be varied to suit field conditions.



REVISIONS			
(R-1)	2-6-68	Median Cross Over	MRH
(R-2)	7-30-68	Dept. Name	MRH
(R-3)	4-1-69	Widening for Guard Rail	MRH
(R-4)	4-27-70	Cut Slope and Note	MRH

DETAILS FOR DITCH & WIDENED SHOULDERS AT CREST OF GRADES
(TO BE USED ONLY WHERE SIGHT DISTANCE AT CREST OF GRADE IS 600 FT. OR LESS)



GENERAL NOTES

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

All side approach roads to the Project shall be Gravel Surfaced with a 4 inch thickness of Aggregate Base Course extending approximately to the Right of Way Line. Estimated tonnage and class of material required for this operation are shown in the Aggregate Base Course Plan.

The maximum grades shown are to be the limiting grades for all road approaches. Modifications of grades will be permitted where adherence to the grades as shown would cause damage to property or create other unsatisfactory conditions. Grades flatter than the maximum shown are to be used wherever feasible.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

APPROACH ROADS,
FLARING, CUT SLOPE TREATMENT,
BRIDGE & CREST WIDENING

Designed by A. Z. [Signature]
Made by S.J.M. & A.B.H. Staff Design Engr.
Checked by C.R.S. Date: 5-14-65

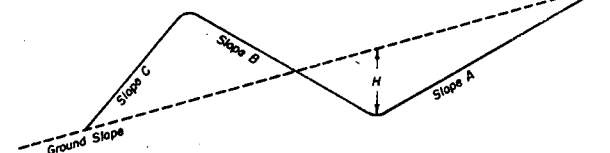
STANDARD TYPES *of* DITCHES *and* CONSTRUCTION METHODS

STANDARD M-203-C
(JULY 1, 1965)

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

DETAILS *for* CONTOUR INTERCEPTING DITCHES

Typical Section for Contour Intercepting Ditches



PURPOSE & USE OF THE TABLE

The primary purpose of the information for Contour and Intercepting Ditches shown on this sheet is to serve as a guide in construction and to readily arrive at yardages of excavation involved. Foremost consideration in constructing these ditches is given first to the natural ground line slope confronted in construction, thence to the other values shown on the Typical Section. By properly arriving at the combination of values shown on the Typical Section and in the Table for a specified condition, the number of cubic yards of excavation per 100 lin. ft. of ditch may be read under the appropriate column for this item.

Typical Construction Layouts

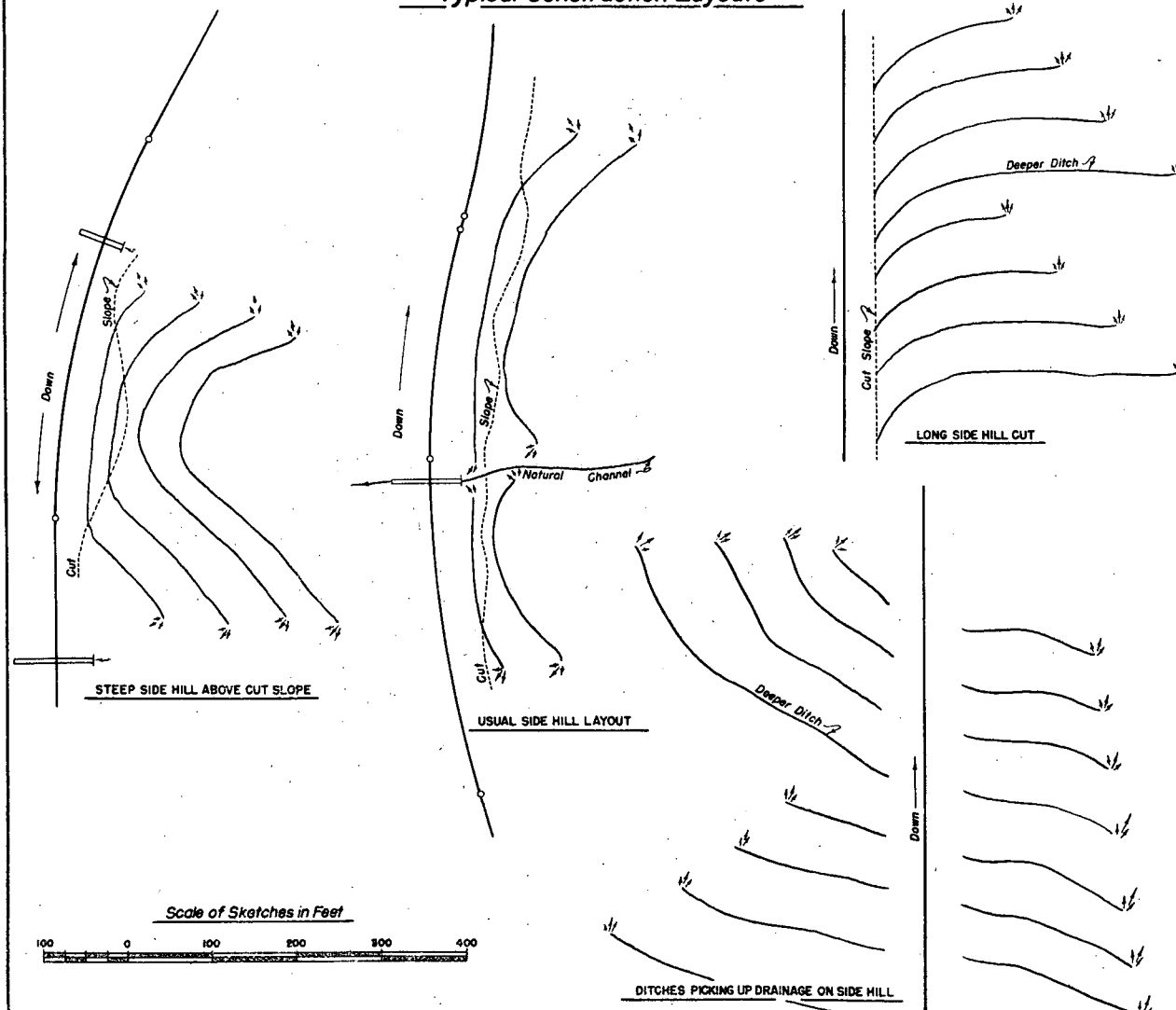
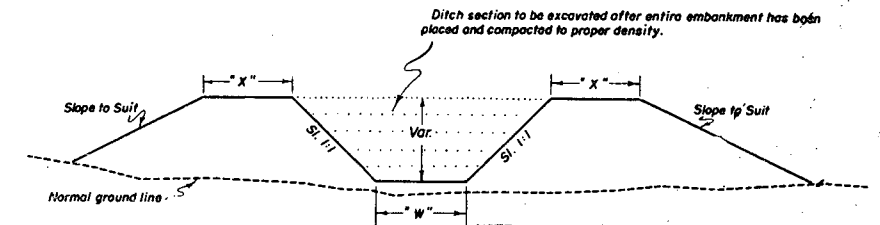


Table of Slopes and Yardages

SLOPES				H	Cubic Yards per 100 lin. ft. of Ditch
Ground	A	B	C		
5:1 Or Flatter	2:1	4:1	2:1	15"	16
				18"	23
				21"	32
				15"	15
				18"	22
				21"	30
	1-1/2:1	2:1	1-1/2:1	15"	14
				18"	20
				21"	27
				15"	13
				18"	19
				21"	25
4:1	2:1	4:1	2:1	15"	12
				18"	18
				21"	25
				15"	12
				18"	17
				21"	23
	1-1/2:1	3:1	1-1/2:1	15"	10
				18"	15
				21"	20
				15"	10
				18"	14
				21"	19
3:1	2:1	4:1	2:1	15"	17
				18"	25
				21"	34
				15"	17
				18"	24
				21"	32
	1-1/2:1	3:1	1-1/2:1	15"	15
				18"	22
				21"	30
				15"	13
				18"	21
				21"	29
2:1	1-1/2:1	4:1	1-1/2:1	15"	13
				18"	18
				21"	25
				15"	12
				18"	17
				21"	23
	1-1/2:1	3:1	1-1/2:1	15"	11
				18"	16
				21"	21
				15"	10
				18"	14
				21"	20
1-1/2:1	1:1	2:1	1:1	15"	9
				18"	13
				21"	17
				15"	8
				18"	12
				21"	16
	1-1/2:1	1-1/2:1	1-1/2:1	15"	11
				18"	16
				21"	21

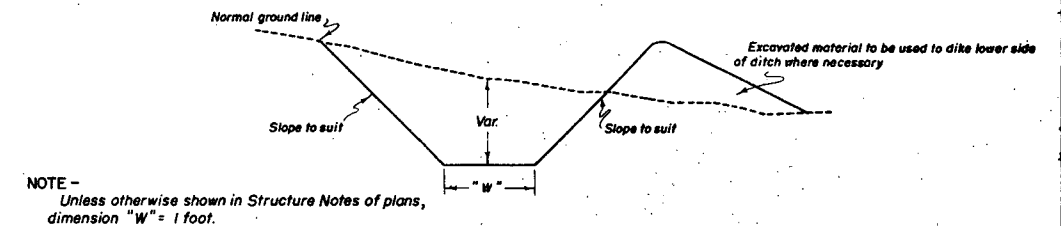
Slopes are approximate and may be varied to suit conditions encountered during construction.

TYPICAL SECTIONS *for* DRAINAGE, IRRIGATION DITCHES *and* CHANNEL CHANGES



NOTE—
See Structure Notes in plans for dimension "W"
Dimension "X" = $\frac{W}{2}$ with minimum of 2 feet.

For Embankment Sections (Generally for use in Irrigation Ditches & Channel Changes)



NOTE—
Unless otherwise shown in Structure Notes of plans,
dimension "W" = 1 foot.

For Cut Sections

REVISIONS		
(R-1)	7-23-68	Dept. Name M.R.H.

GENERAL NOTES

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

All ditches are to be constructed to lines and grades as staked by the Engineer using the ditch section shown on plans or as ordered by the Engineer.

CONTOUR INTERCEPTING DITCHES: Ditches are to be laid out along the ground contour on a grade of not over 1% (Type of soil shall govern the grade). Ends of ditches are to be lined up so that concentration of flow from a higher contour ditch into one of lower contour is, as far as possible avoided. The use of a deeper ditch is recommended where this condition is encountered.

The following horizontal spacing of ditches is recommended:
4% to 6% Approximately 70' Centers
8% to 10% Approximately 60' Centers
20% to 4:1 Slope Approximately 55' Centers
30% to 1-1/2:1 Slope Approximately 50' Centers

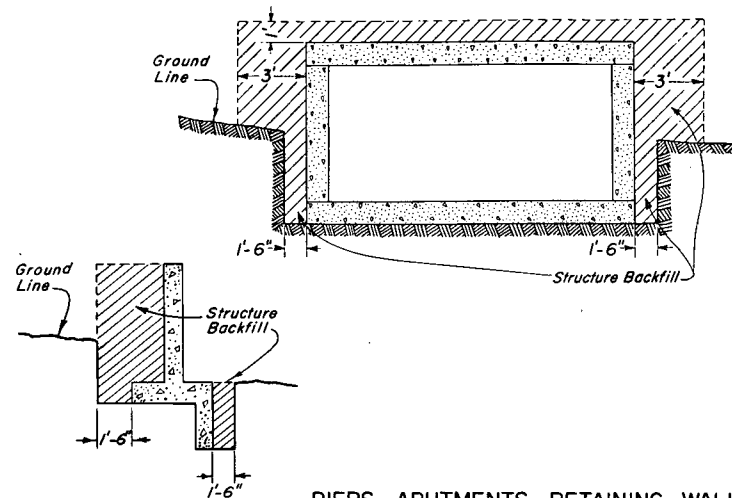
Where ditch checks are required the intervening ditch between one set of ditch checks shall not exceed a grade of 1.0%. Details of checks will be shown on plans when required.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

DITCH TYPES

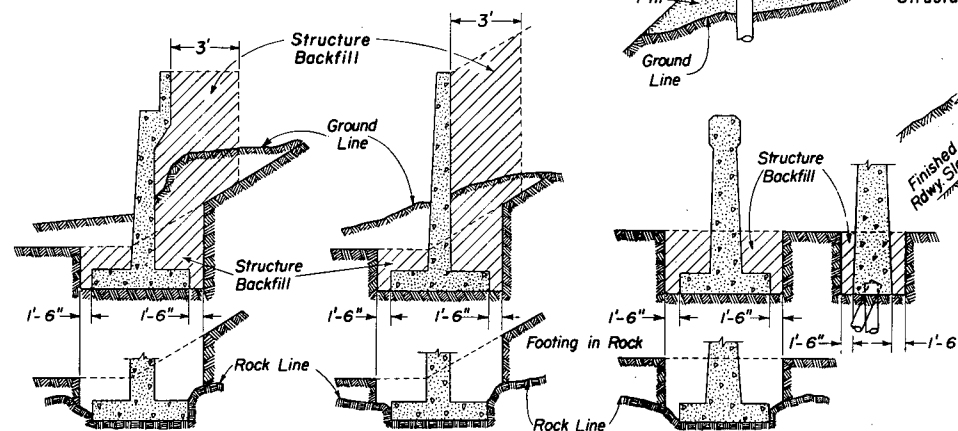
Designed by C.G.M. Approved by L.E. Olson
Made by C.G.M. Staff Design Engr.
Checked by Date: July 1, 1965

CONCRETE BOX CULVERTS & WINGWALLS

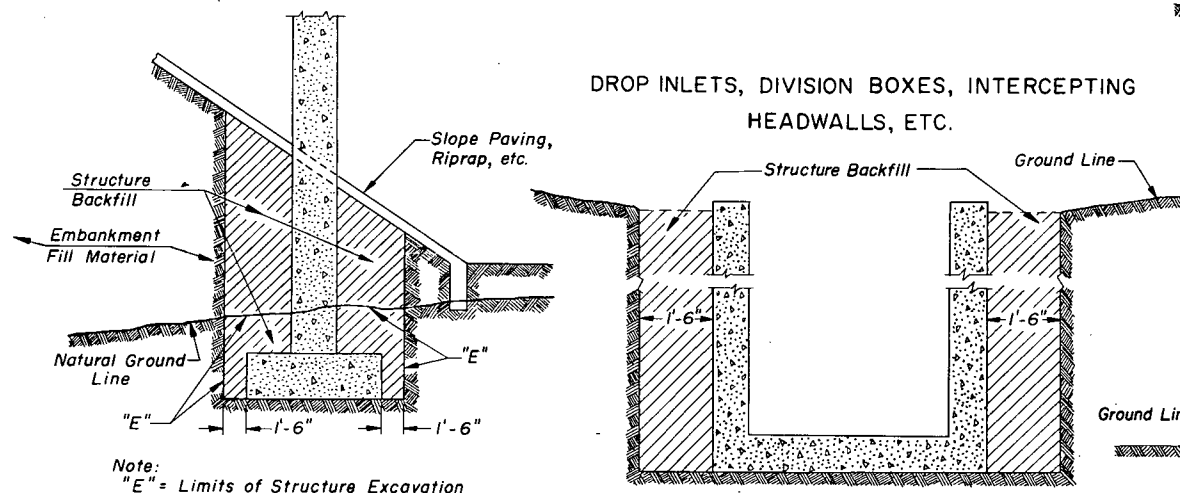


PIERS, ABUTMENTS, RETAINING WALLS ETC.

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.

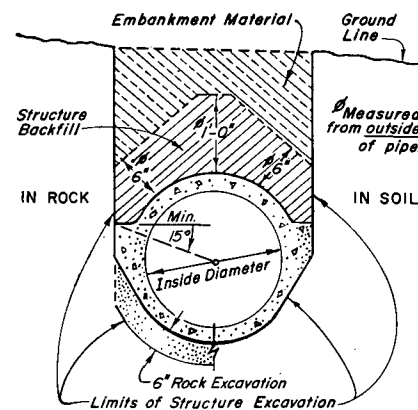


DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS, ETC.



Note: "E" = Limits of Structure Excavation

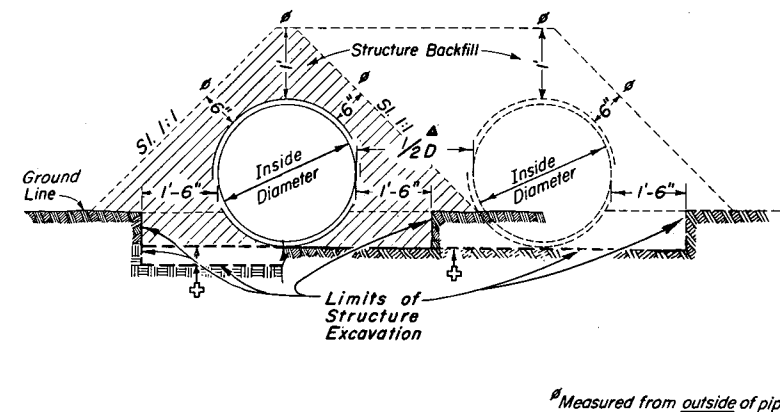
CAST IN PLACE CONDUIT



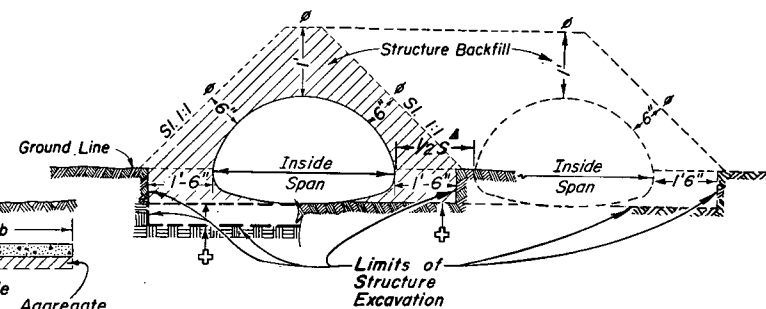
STANDARD M-206-AA

(MARCH 1, 1971)
(SHEET 1 OF 2)

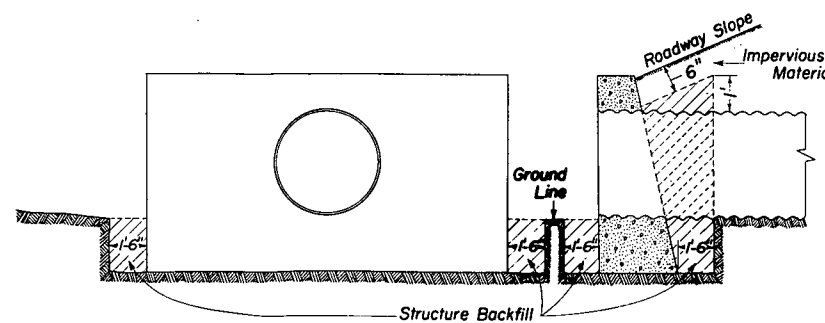
CIRCULAR CONDUIT



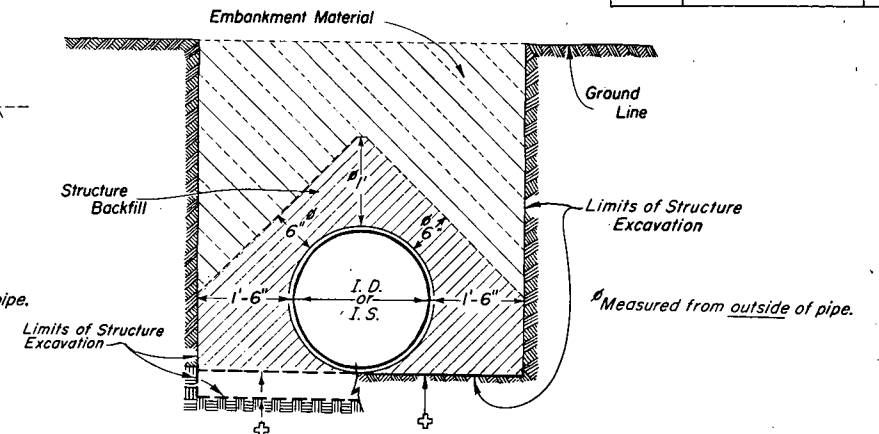
ELLIPTICAL OR ARCH CONDUIT



HEADWALLS AND END OF CULVERTS



SIPHONS OR CONDUIT IN TRENCH



NOTES:

- When two or more conduits are laid side by side they shall be spaced so that the adjacent pipes will be $\frac{1}{2}$ I.D., $\frac{1}{2}$ I.S. or 3 feet apart (including wall thickness), whichever is less. Minimum spacing shall be not less than 1 foot between outside walls of pipe.
- For additional culvert installation details see M Standards for metal, concrete, or structural plate pipe culverts.

- Bottom of trench as excavated. For applicable limits of Structure Excavation, see bedding details on standards for culverts.

GENERAL NOTES

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

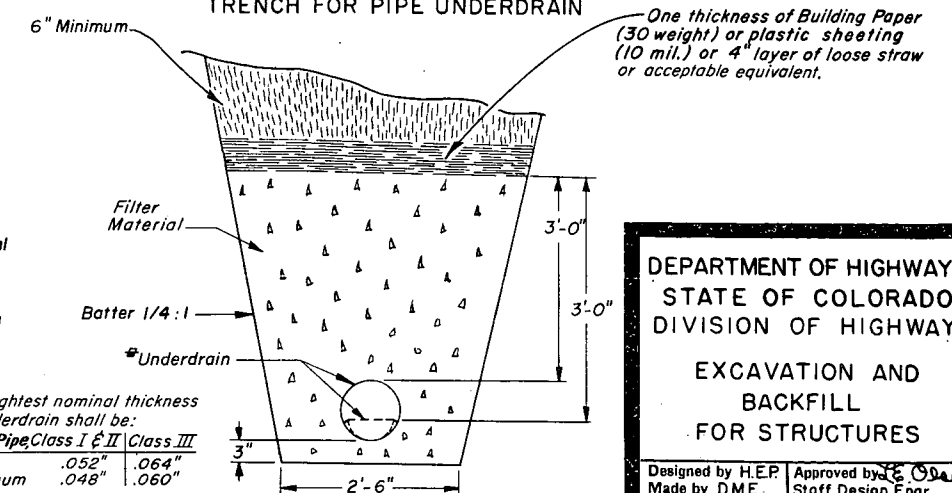
Where the roadway cross section is in fill, excavation for concrete footings (except those in rock or those on piles) and for box culverts shall be done according to the following:

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

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

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

TRENCH FOR PIPE UNDERDRAIN



The lightest nominal thickness for underdrain shall be:
Type III Pipe, Class I & II Class III
Steel .052" .064"
Aluminum .048" .060"

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS
EXCAVATION AND
BACKFILL
FOR STRUCTURES

Designed by H.E.P. Approved by E. O'Brien
Made by D.M.E. Staff Design Engr.
Checked by L.E.O. Date: March 1, 1971

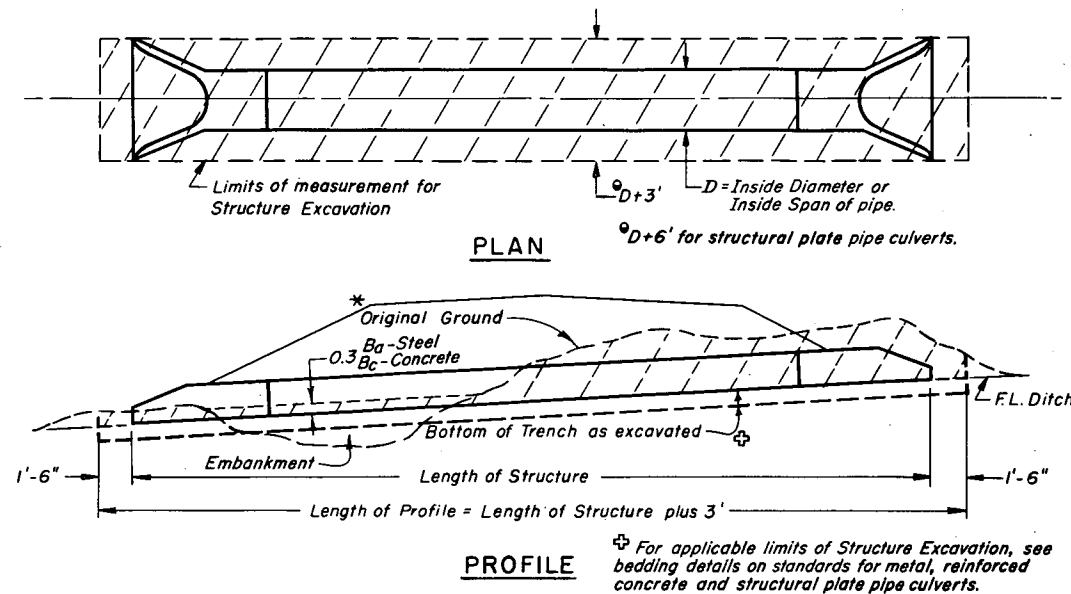
STANDARD M-206-AA

(MARCH 1, 1971)
(SHEET 2)

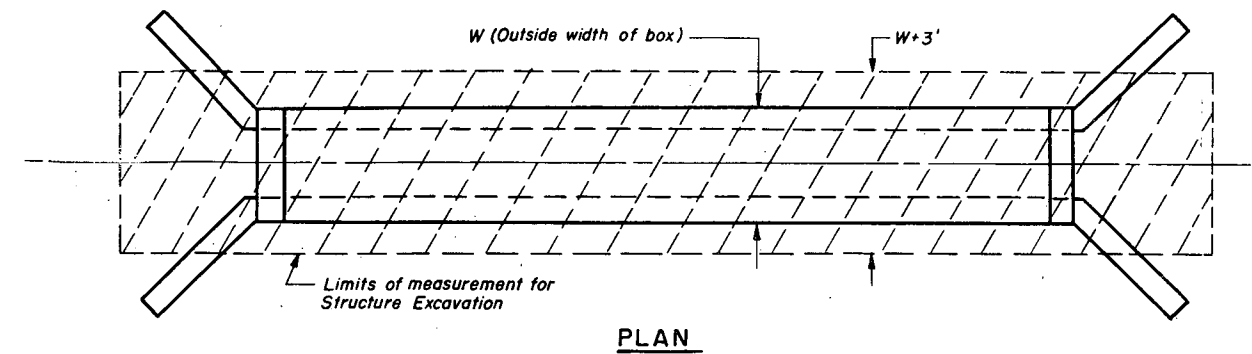
FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

REVISIONS:	

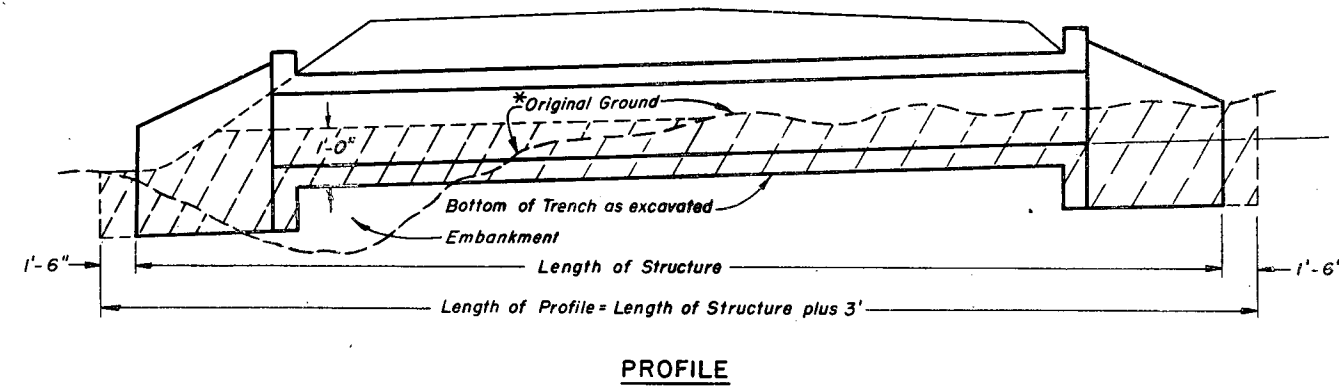
STRUCTURE EXCAVATION MEASUREMENT FOR PIPE CULVERTS



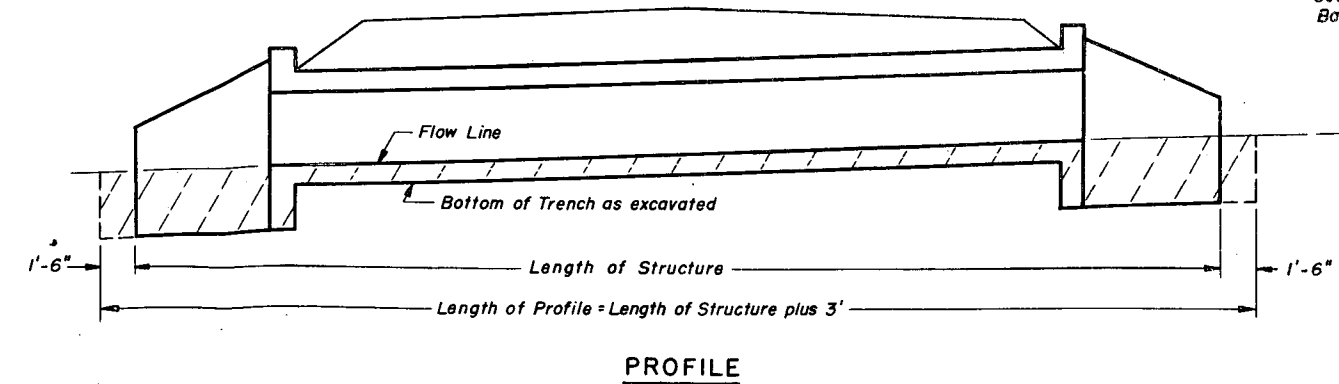
STRUCTURE EXCAVATION MEASUREMENT FOR CONCRETE BOX CULVERTS



Without Channel Change or Channel Improvement

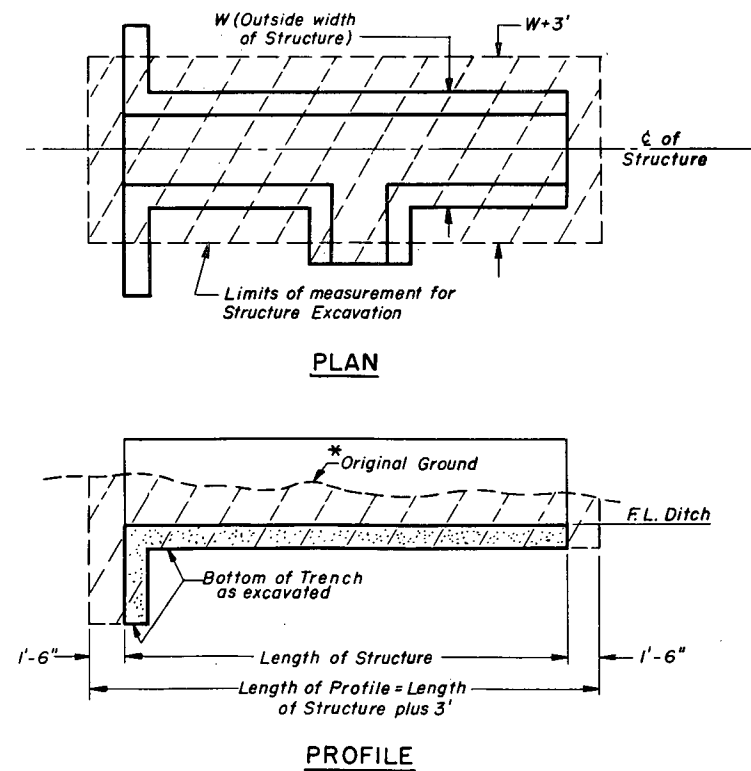


With Channel Change or Channel Improvement



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

STRUCTURE EXCAVATION MEASUREMENT FOR DIVERSION OR DIVISION BOXES



* Along Center of Structure

Areas to be used for Structure Excavation computations.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS
EXCAVATION AND
BACKFILL
FOR STRUCTURES

Designed by: M.R.H. Approved by: H.P.B.
Made by: H.P.B. Staff Design Engr.
Checked by: Date: March 1, 1971

STANDARD M-603-M

(MARCH 20, 1967)

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

REVISIONS			
(R-1)	4-5-68	Added notes.	M.R.H.
(R-2)	7-23-68	Dept. Name. & Ø Note	M.R.H.
(R-3)	2-11-71	Thickness Tables, General Notes.	M.R.H.

FILL HEIGHT & THICKNESS TABLES FOR METAL CULVERT PIPE (RIVETED, WELDED OR HELICAL FABRICATION)

TABLE I
CORRUGATED STEEL PIPE

(2" x 1/2") OR (2-2/3" x 1/2") CORRUGATIONS

PIPE SIZE (B _d) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET															
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80	80+ to 90	90+ to 100	
THICKNESS IN INCHES																	
12	0.8	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.079	.109	
15	1.2	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.064	.079	.109	.138	
18	1.8	.064	.064	.064	.064	.064	.064	.064	.064	.079	.079	.109	.109	.138	.168		
24	3.1	.064	.064	.064	.064	.064	.079	.109	.138	.168							
30	4.9	.064	.064	.064	.064	.079	.079	.109	.109	.168	.168						
36	7.1	.064	.064	.064	.064	.079	.109	.138	.168								
42	9.6	.064	.064	.064	.064	.064	.079	.079	.109								
48	12.6	.064	.064	.064	.064	.079	.079	.109	.168								
54	15.9	.079	.079	.079	.079	.079	.109	.109									
60	19.6	.109	.109	.109	.109	.109	.138	.168									
66	23.8	.109	.109	.109	.109	.138	.168										
72	28.3	.138	.138	.138	.168												
78	33.0	.168	.168	.168													
84	38.0	.168	.168														
----- See General Note.																	

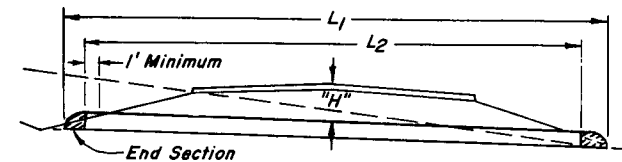
--- See General Note.

TABLE II
CORRUGATED STEEL PIPE ARCH

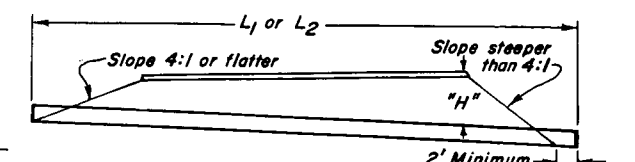
(2" x 1/2") OR (2-2/3" x 1/2") CORRUGATIONS

PIPE SIZE Span- Rise (Inches)	AREA (Sq.Ft.)	CORNER RADIUS (Inches)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET					
			1.5 to 7	7+ to 8	8+ to 9	9+ to 10	10+ to 12	12+ to 13
THICKNESS IN INCHES								
18 x 11	1.1	3 1/2	.064	.064	.064	.064	.064	.064
22 x 13	1.6	4	.064	.064	.064	.064	.064	.064
25 x 16	2.2	4	.064	.064	.064	.064		
29 x 18	2.8	4 1/2	.064	.064	.064			
36 x 22	4.4	5	.064	.064	.064			
43 x 27	6.4	5 1/2	.064					
50 x 31	8.7	6	.079					
58 x 36	11.4	7	.109					
65 x 40	14.3	8	.109					
72 x 44	17.6	9	.138					

METAL CULVERT WITH END SECTIONS



METAL CULVERT WITHOUT END SECTIONS



"H" = Maximum height of fill over top of Culvert, including pavement.

L₁ = Length of Culvert to be measured when placed in accordance with Section 617.

L₂ = Length of pipe to be measured when placed in accordance with Section 603.

(R-1) Length of extension, when placed in accordance with Section 617, shall be the actual number of feet of new culvert required.

TABLE III
CORRUGATED STEEL PIPE

3" x 1" CORRUGATIONS

RIVETED OR HELICAL FABRICATION																		
PIPE SIZE (B _d) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET																
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80				
		THICKNESS IN INCHES																
36	7.1	.064	.064	.064	.064	.064	.079	.079	.109	.109	.109	.109	.138	.168				
42	9.6	.064	.064	.064	.064	.079	.079	.079	.109	.109	.109	.109	.168					
48	12.6	.064	.064	.064	.079	.079	.079	.109	.109	.138	.168							
54	15.9	.064	.064	.064	.079	.079	.109	.109	.138	.168								
60	19.6	.064	.064	.064	.079	.109	.109	.109	.138									
66	23.8	.064	.064	.079	.079	.109	.109	.138										
72	28.3	.064	.064	.079	.109	.109	.138											
78	33.0	.064	.064	.079	.109	.138	.168											
84	38.0	.079	.079	.079	.109	.109												
90	44.0	.079	.079	.109	.109	.109												
96	50.3	.109	.109	.109	.109	.138												
102	57.0	.109	.109	.109	.109													
108	64.0	.109	.109	.109	.138													
114	70.9	.138	.138	.138	.168													
120	78.6	.138	.138	.138	.168													

----- See General Note.

--- See General Note.

TABLE IV
CORRUGATED STEEL PIPE

3" x 1" CORRUGATIONS

* SPOT WELDED OR BOLTED (1/2" ASTM A 325 BOLTS) FABRICATION																	
PIPE SIZE (B _d) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET															
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80	80+ to 90	90+ to 100	
		THICKNESS IN INCHES															
36	7.1	.064	.064	.064	.064	.064	.064	.064	.079	.079	.079	.109	.109	.109	.109	.138	
42	9.6	.064	.064	.064	.064	.064	.064	.064	.079	.079	.109	.109	.109	.138	.168		
48	12.6	.064	.064	.064	.064	.064	.079	.079	.079	.109	.109	.109	.138	.168			
54	15.9	.064	.064	.064	.064	.064	.079	.079	.109	.109	.138	.138					
60	19.6	.064	.064	.064	.064	.079	.079	.109	.109	.138	.168						
66	23.8	.064	.064	.064	.079	.079	.109	.109	.138	.168							
72	28.3	.064	.064	.064	.079	.079	.109	.109	.138								
78	33.0	.064	.064	.064	.079	.109	.109	.138	.168								
84	38.0	.079	.079	.079	.079	.109	.109	.138									
90	44.0	.079	.079	.079	.079	.109	.109	.138									
96	50.3	.109	.109	.109	.109	.109	.138	.168									
102	57.0	.109	.109	.109	.109	.109	.138	.168									
108	64.0	.109	.109	.109	.109	.109	.138										
114	70.9	.138	.138	.138	.138	.138	.168										
120	78.6	.138	.138	.138	.138	.138											

----- See General Note.

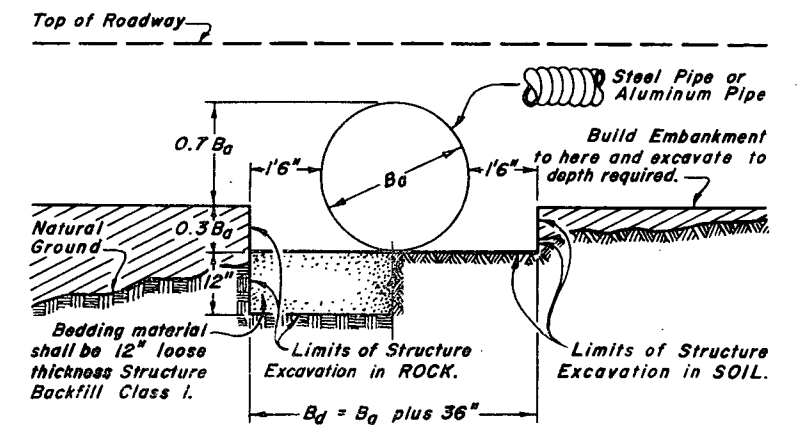
--- See General Note.

TABLE V
CORRUGATED STEEL PIPE ARCH

3" x 1" CORRUGATIONS

(R-2)			CORRUGATION					
PIPE SIZE Span- Rise (Inches)	AREA (Sq.Ft.)	CORNER RADIUS (Inches)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET					
			1.5 to 10	10+ to 11	11+ to 12	12+ to 14	14+ to 15	
THICKNESS IN INCHES								
43 x 27	6.4	7 3/4	.064	.064	.064			
50 x 31	8.7	9	.064	.064	.064			
58 x 36	11.4	10 1/2	.064	.064	.064			
65 x 40	14.3	12	.064	.064	.064			
72 x 44	17.6	13 1/4	.064	.064	.064			
73 x 55	22.0	18	.064	.064	.064	.064	.064	
81 x 59	26.0	18	.079	.079	.079	.079	.079	
87 x 63	31.0	18	.079	.079	.079	.079		
95 x 67	35.0	18	.109	.109	.109			
103 x 71	41.0	18	.109	.109				

INSTALLATION OF METAL CULVERT PIPE



NOTE: Spacing for multiple pipe installations shall conform to the details shown on M Standard for Excavation and Backfill for Structures.

GENERAL NOTES

- All work shall be done in accordance with the Standard Specifications applicable to the project.
- The tables on this sheet show minimum gages for structural requirements only. They are intended for use only where corrosive and/or abrasive conditions are negligible. Heavier metal and/or protective coatings shall be used where site investigations indicate corrosive and/or abrasive conditions.
- Pipe arch with equal periphery and with span and rise dimensions approximately equal to those required by plans will be permitted.
- During construction, adequate cover (4') shall be provided to protect the structure from damage.
- Pipe shall be placed with longitudinal seams at the sides or quarter points but not along top of vertical axis.
- The minimum depth of fill excluding pavement over corrugated metal pipe culverts shall be as stated by the Engineer but in no case shall it be less than shown in the following tabulation:

Diameter of Culvert (B _d)	Minimum Allowable Cover
96" and smaller	1 foot
102" and larger	2 feet
Pipe Arch	1.5 feet

Structural plate pipes of equal or larger diameter, conforming to Section 510 of the Standard Specifications, may be substituted for the pipes shown on this sheet at no additional cost to the State.

NOTES FOR TABLES

- Pipes with thickness to right of or below the heavy dashed line shown in the tables on this sheet, shall be elongated 5 percent on the vertical axis as installed. (Tables I, III, IV and VI)
- Maximum fill heights shown are for bearing pressures of 2 tons per square foot. (Tables II, V and VII)
- Fill heights greater than 90' shall be used only after thorough investigation of foundation material. (Tables I and IV)
- Variations from corner radii shown will be acceptable provided the pipe is of sufficient strength to support its designated fill height. (Tables II, V, and VII)

GENERAL NOTES (Continued)

- When a culvert is to be extended with pipe of different material, the connection shall conform to the detail on plans or be approved.
- Ø May not be available. The designer should contact supplier before calling for the sizes denoted by this symbol.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

METAL CULVERT PIPE
H-20 LOADING

Designed by M.R.H. Approved by J.C.V.
Made by J.R.B. Staff Design Engineer
Checked by R.S.M. Date: March 20, 1967

STANDARD M-606-AB

(MARCH 1, 1968)
(SHEET 1 OF 3)

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

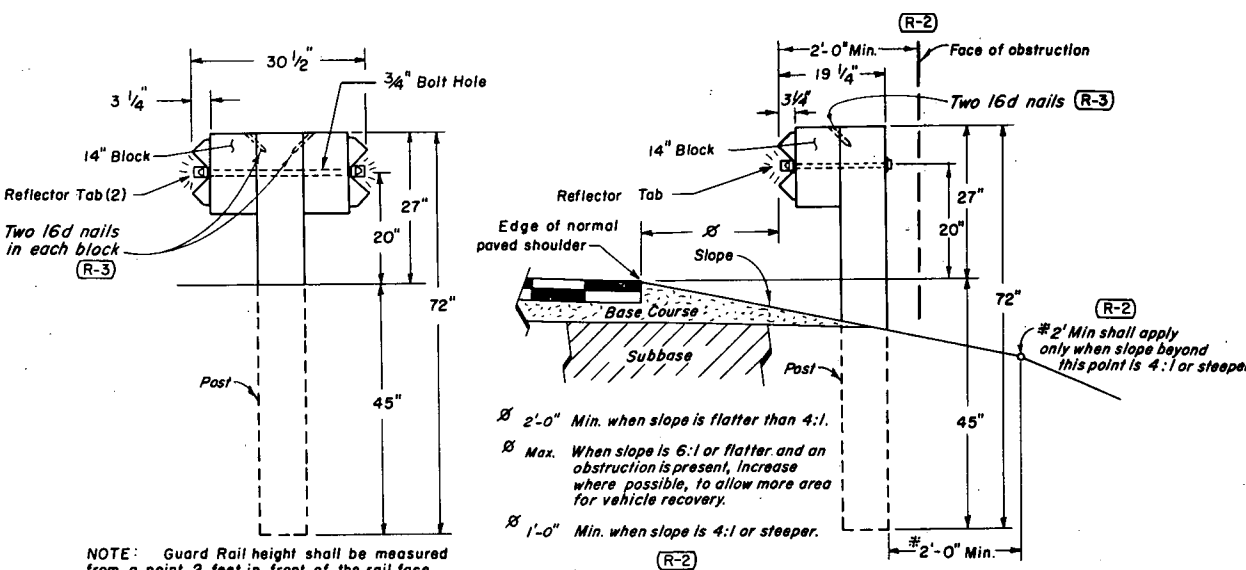
REVISIONS		
(R-1)	7-10-68	Add typical post & obstr.
(R-2)	4-1-69	Widening, Bevel, Gen. notes.
(R-3)	2-18-70	Pay length, Blocks, Gen. Notes.
(R-4)	11-25-70	Timber, Hole and Gen. Notes.

TABLE OF OFFSETS
FOR 75' PARABOLIC FLARES

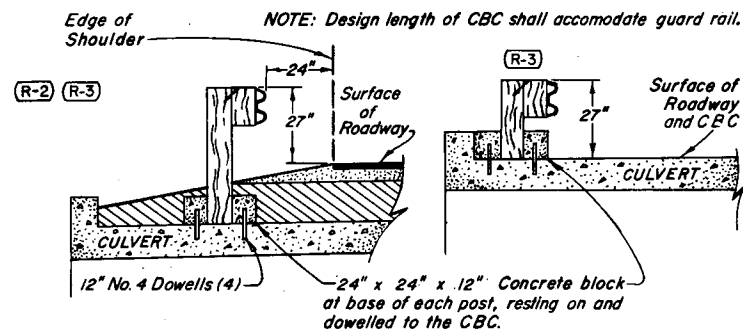
x	W=4'	W=5'	W=6'	W=8'	W=10'	W=12'	W=14'	W=16'
12'-6"	0.11	0.14	0.28	0.33	0.39	0.44		
25'-0"	0.44	0.55	1.11	1.33	1.56	1.78		
37'-6"	1.00	1.25	2.50	3.00	3.50	4.00		
50'-0"	1.78	2.22	4.44	5.33	6.23	7.11		
62'-6"	2.78	3.48	6.95	8.34	9.73	11.11		
75'-0"	4.00	5.00	10.00	12.00	14.00	16.00		

LEGEND

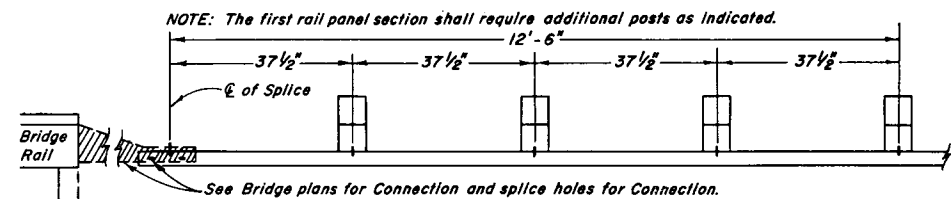
W = Full parabolic offset.
L = Length of parabolic transition.
X = Longitudinal dist. from beginning of flare.
Y = Offset = $W \cdot \frac{X^2}{L^2}$



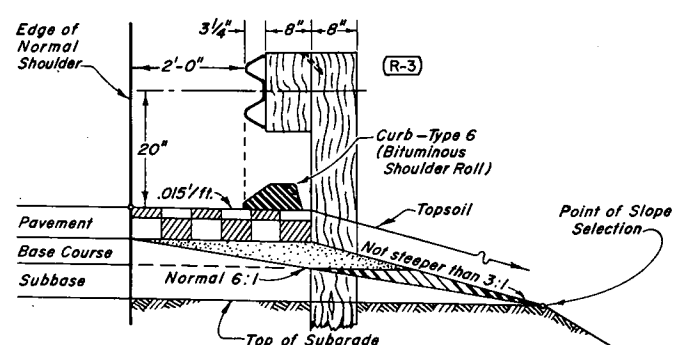
TYPICAL POST INSTALLATIONS
(See Table for Post & Block Cross Section)



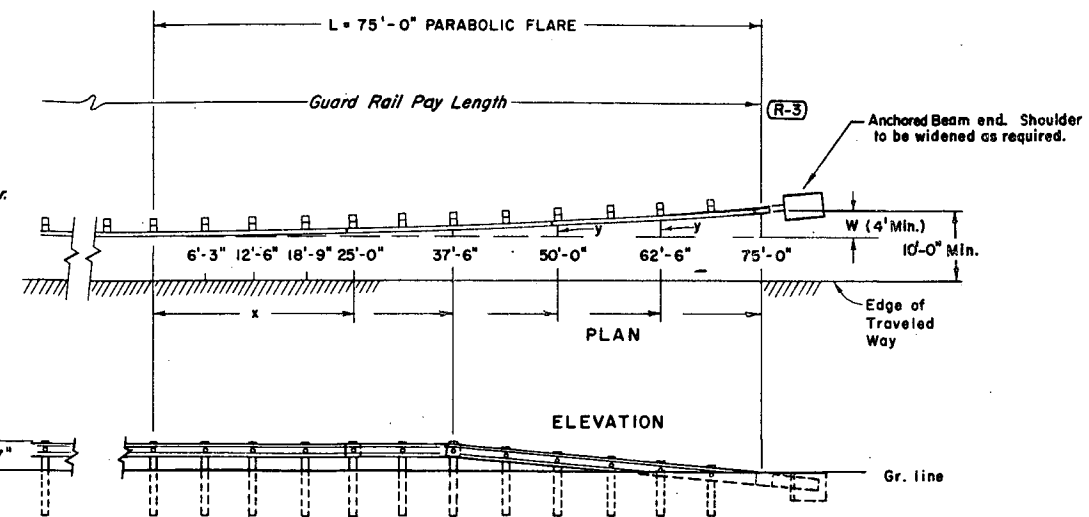
GUARD RAIL ACROSS CONCRETE BOX CULVERT



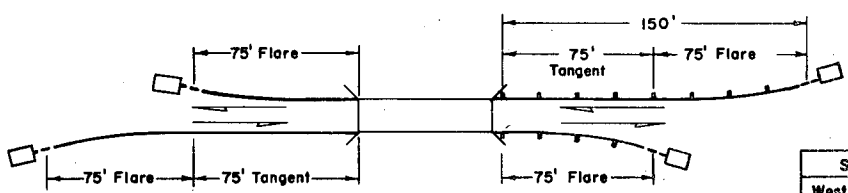
GUARD RAIL AT BRIDGES



GUARD RAIL WITH BITUMINOUS CURB
(Showing Typical Shoulder Widening)

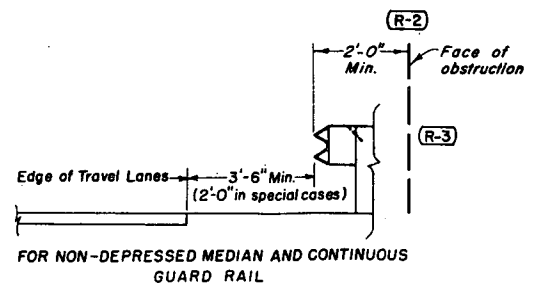


PARABOLIC TRANSITION & END TREATMENT



2-LANE HIGHWAY
BRIDGE APPROACH GUARD RAIL

NOTE: For divided highways see Sheet No. 2.



GUARD RAIL FOR OBSTRUCTIONS IN MEDIAN
(See Sheet No. 3)

GENERAL NOTES

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

All timber shall be close grained Douglas Fir of the Coast Region, Dense Longleaf or Shortleaf Southern Pine, Lodgepole Pine, Ponderosa Pine, Western Hemlock, or Larch, and shall conform to the following grading specifications and requirements:

SPECIES	POST & BLOCK CROSS SECTION	FOHC	GRADING RULES
West Coast D. F.	6" x 8"	Yes	WCLA Par. 125 b
West Coast Hemlock	6" x 8"	Yes	WCLA Par. 225 b
Larch	6" x 8"	Yes	WWPA Par. 80.11
Southern Pine	6" x 8"	No	SPA Par. 253
Lodgepole Pine	8" x 8"	No	WWPA Par. 80.11
Ponderosa Pine	8" x 8"	No	WWPA Par. 80.11

WCLA - Standard Grading Rule 15, Grading and Dressing rules of West Coast Douglas Fir, issued by the West Coast Lumber Inspection Bureau.

WWPA - Standard Grading Rules, published by Western Wood Products Association.

SPA - Standard Grading Rules for Southern Pine Lumber, issued by the Southern Pine Inspection Bureau.

FOHC - Free of Heart Centers. See paragraph 612 c of WCLA.

NOTE - 6" x 8" Posts and Blocks shall be installed with the 6" dimension parallel to the roadway.

All timber shall be rough, square cut and full sawn.

At the time the post or block is installed, any seasoning check which extends the full length of the piece shall not exceed one-quarter inch in width at its maximum width.

Blocks shall be cut from timber of the same cross section and species as the posts.

Timber shall be incised and pressure treated in accordance with AASHTO Designation M133, except that blocks need not be incised.

Post bolt holes are to be drilled before treatment is applied.

The preservative shall be either (a) Creosote or (b) Pentachlorophenol in a petroleum carrier (liquid or L.P. gas).

Posts shall be spaced at 6'-3" center-to-center except when otherwise designated on this Standard or in the guardrail tabulation on the plans.

Where pedestrian hazard exists and sidewalk is constructed on the roadway shoulder, guard rail shall be placed between the sidewalk and the edge of traffic lanes.

Guard rail plate shall not be lighter than No. 12 U.S. Standard Gage. 25' length of rail panels will be permitted.

Metal plate guard rail shall be painted in accordance with standard specifications or shall be galvanized in accordance with AASHTO Designation M-111 or with ASTM Designation A 525, Coating Class 2.50.

Posts used for vertical transition shall be adjusted in length so that a minimum of 45" will be buried.

Standard galvanized wrought steel washers shall be used under all bolt heads or nuts coming in contact with wood posts.

Concrete shall be Class "A" or Class "B".

Blocks shall be toenailed to posts with two 16 penny galvanized nails in the top of each block.

If posts are cut in the field, cut ends shall receive 2 coats of hot creosote.

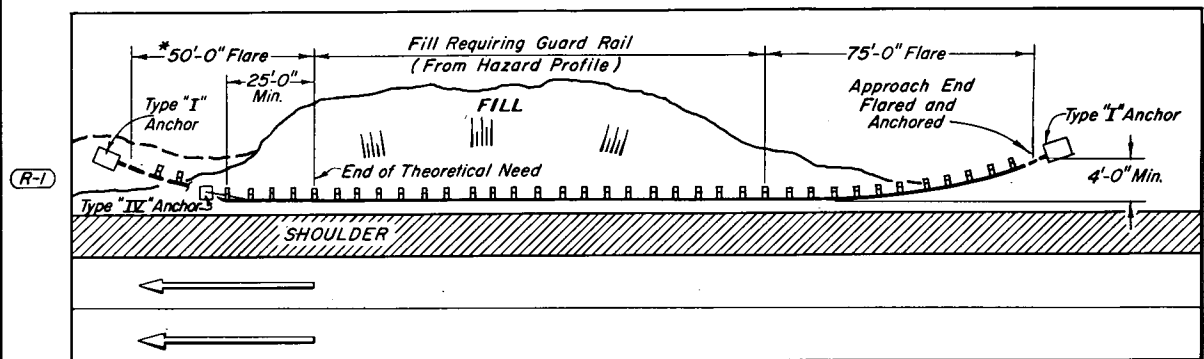
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS
GUARD RAIL
TYPE 3

Designed by M.R.H. Approved by J.R.B.
Made by J.R.B. Staff Design Engineer
Checked by R.S.M. Date: March 1, 1968

STANDARD M-606-AB

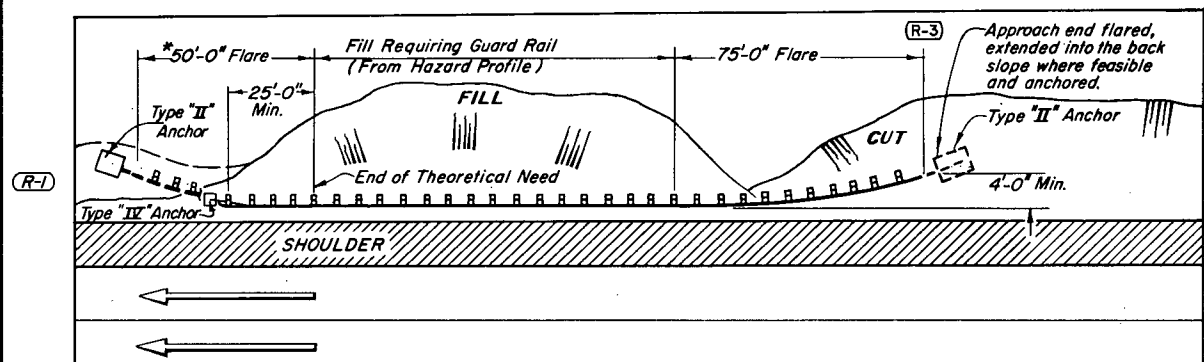
(MARCH 1, 1968)
(SHEET 2)

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			
REVISIONS				
(R-1)	7-10-68	Add end anchorage		M.R.H.
(R-2)	4-1-69	Bridge exit guard rail note		M.R.H.
(R-3)	2-18-70	Pay length		M.R.H.
(R-4)	11-25-70	Timber dimension.		M.R.H.

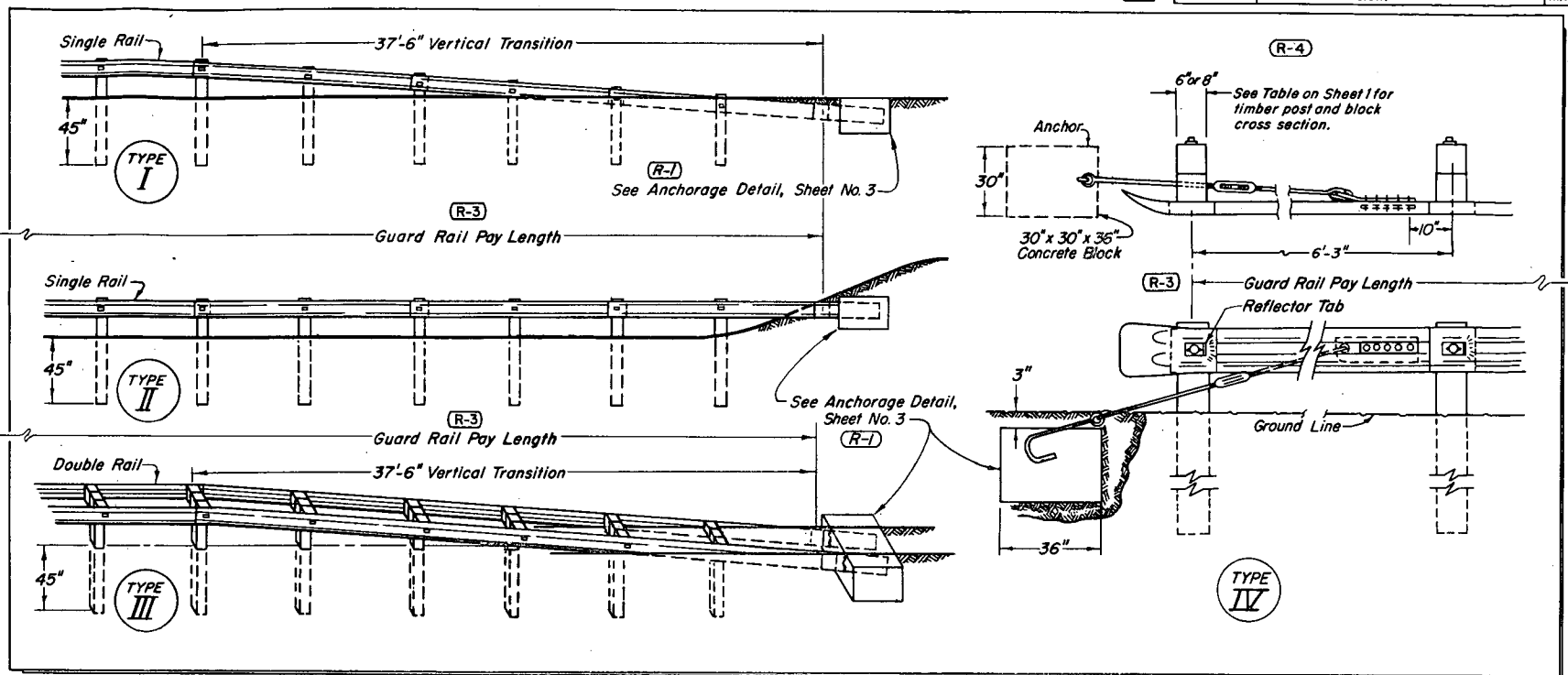


GUARD RAIL INSTALLATION ——— ROADSIDE FILL CONDITION

NOTES:
* 2-Lane Highways — The exit end of Guard Rail shall extend 50 feet past the end of theoretical need and shall be flared and anchored.



GUARD RAIL INSTALLATION ——— ROADSIDE CUT TO FILL CONDITION



TYPICAL END ANCHORAGE

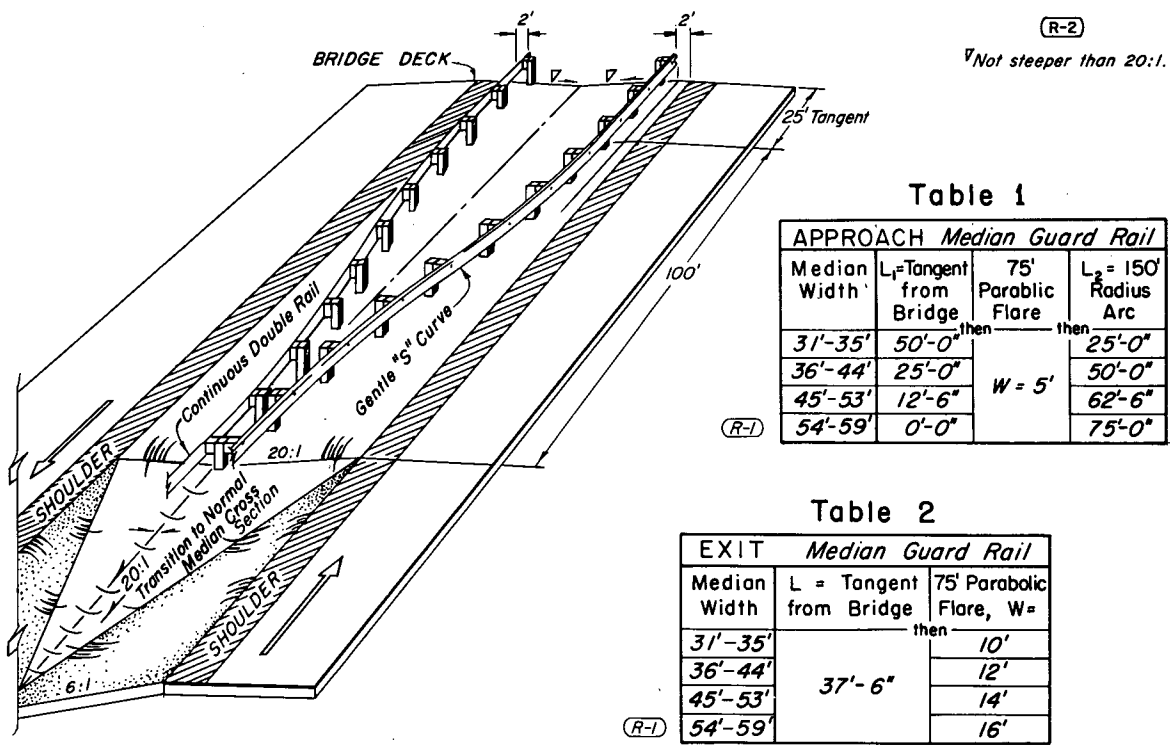


Table 1

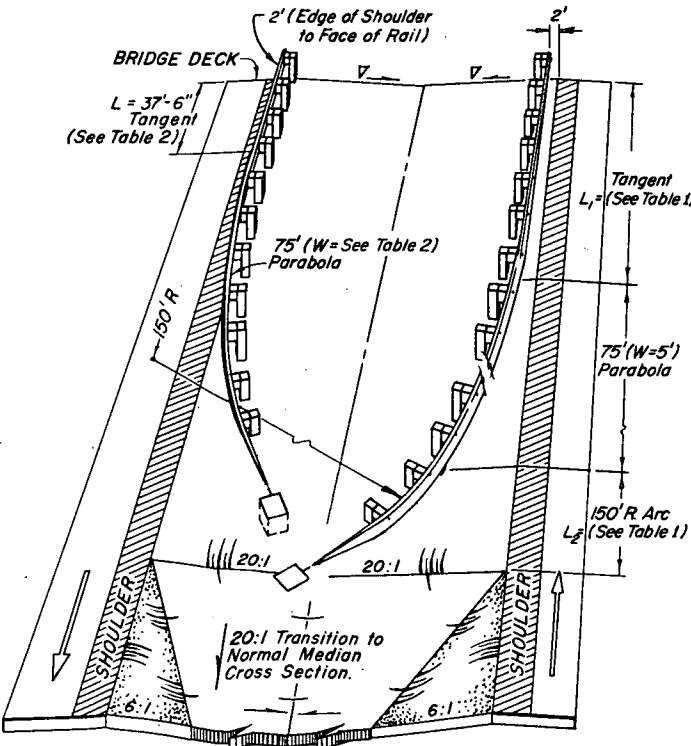
APPROACH Median Guard Rail			
Median Width	L = Tangent from Bridge	75' Parabolic Flare	L ₂ = 150' Radius Arc
31'-35'	50'-0"	then	25'-0"
36'-44'	25'-0"		50'-0"
45'-53'	12'-6"	W = 5'	62'-6"
54'-59'	0'-0"		75'-0"

Table 2

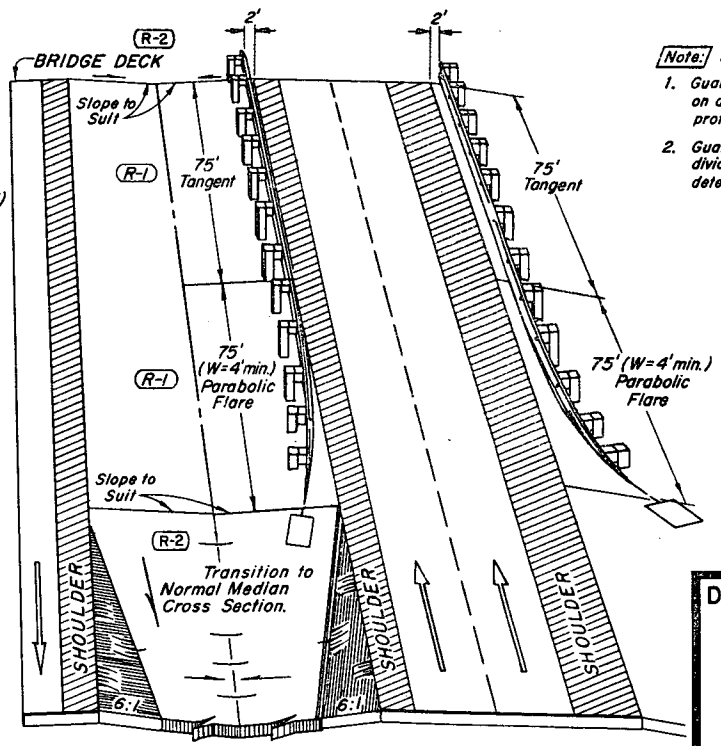
EXIT Median Guard Rail		
Median Width	L = Tangent from Bridge	75' Parabolic Flare, W =
31'-35'		10'
36'-44'	37'-6"	12'
45'-53'		14'
54'-59'		16'

21' to 30' MEDIAN

GUARD RAIL AT BRIDGE APPROACH



31' to 59' MEDIAN



MEDIAN 60' AND OVER

- NOTE: EXIT FROM BRIDGES:
- Guard rail for OUTSIDE shoulders at exit end of bridges on divided highways to be determined from hazard profile.
 - Guard rail for INSIDE shoulders at exit end of bridges on divided highways with medians 60' and over to be determined from hazard profile.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

**GUARD RAIL
TYPE 3**

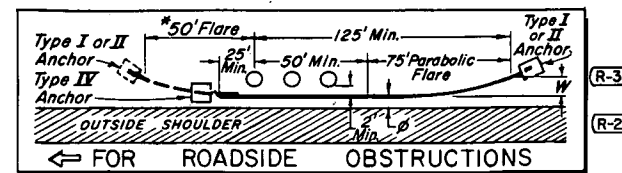
Designed by M.R.H. Approved by J.R.B.
Made by J.R.B. Staff Design Engineer
Checked by R.S.M. Date: March 1, 1968

STANDARD M-606-AB

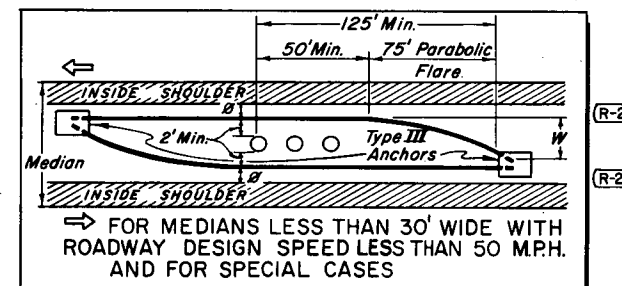
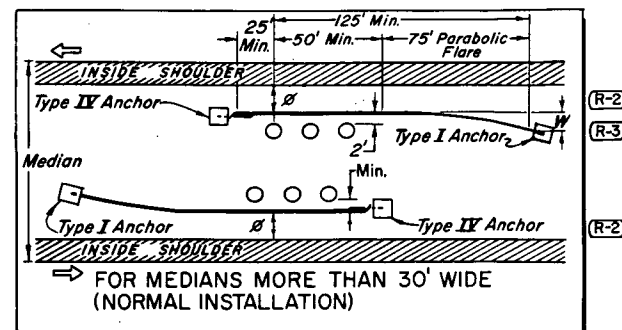
(MARCH 1, 1968)
(SHEET 3)

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

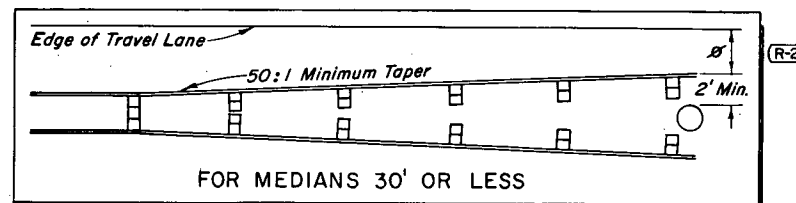
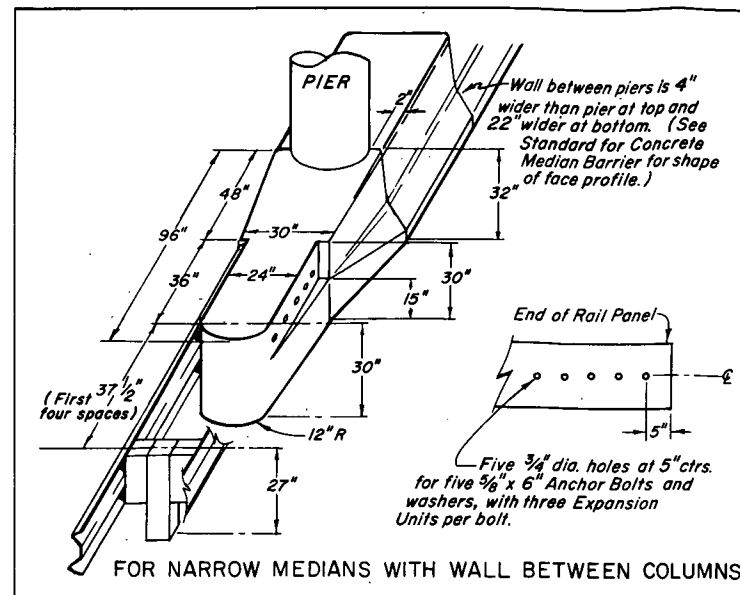
REVISIONS			
(R-1)	7-10-68	Entire sheet redrawn.	M.R.H.
(R-2)	4-1-69	Recovery area. Delete timber bevel. Refl. tab.	M.R.H.
(R-3)	2-18-70	Pay Length.	M.R.H.
(R-4)	11-25-70	Block at pier.	M.R.H.



*2-Lane Highways — The exit end of Guard Rail shall extend 50 ft. past the end of theoretical need and shall be flared and anchored.



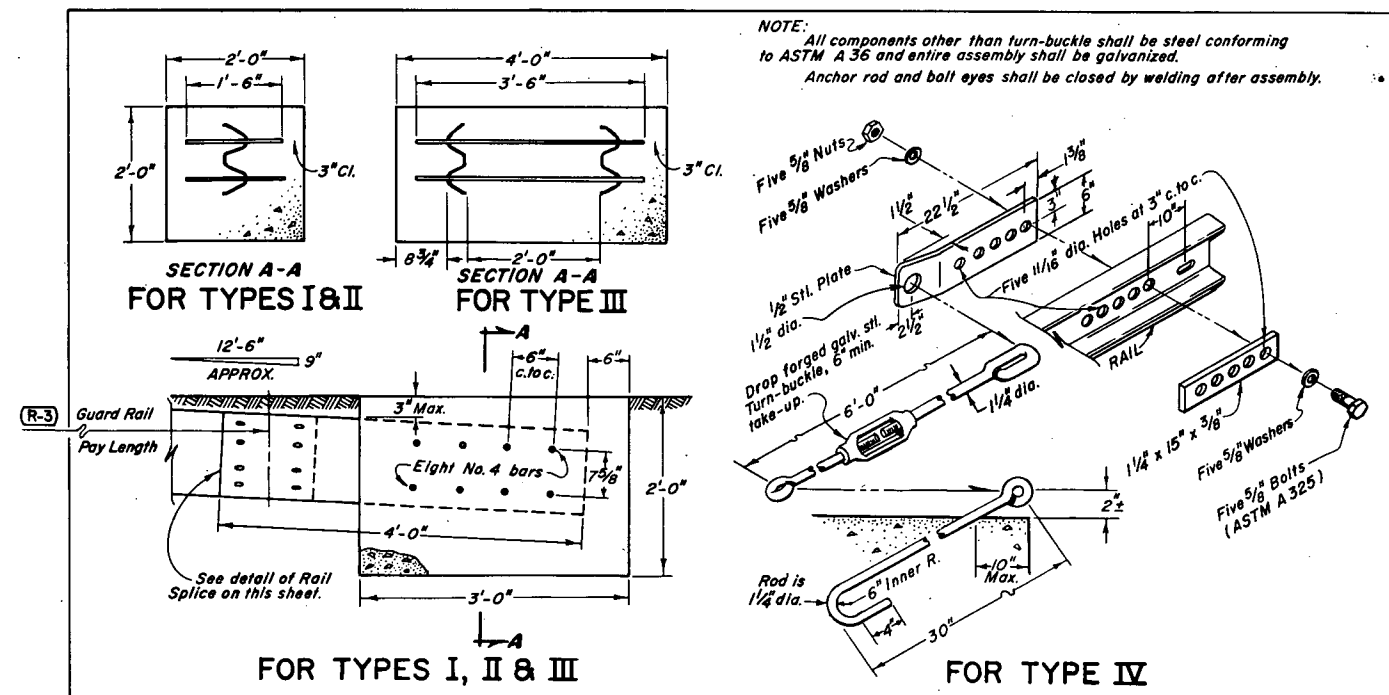
NON-CONTINUOUS RAIL



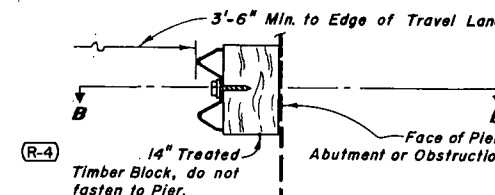
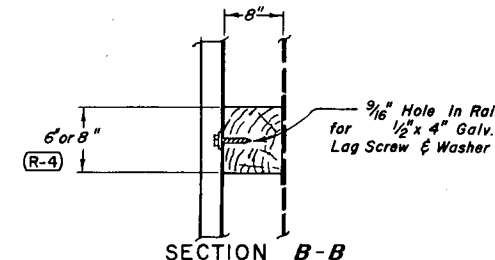
CONTINUOUS RAIL

When slope is 6:1 or flatter and an obstruction is present, increase where possible, to allow more area for vehicle recovery.

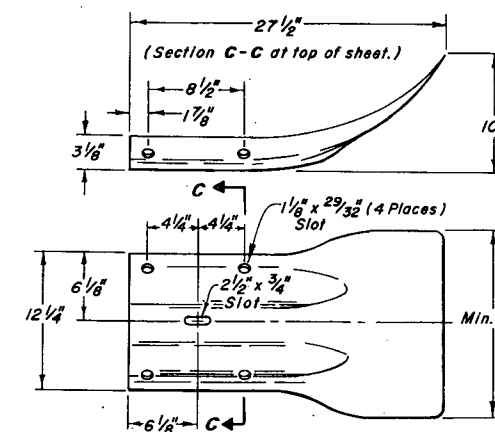
TYPICAL GUARD RAIL FOR OBSTRUCTIONS



DETAILS FOR TYPICAL END ANCHORAGE

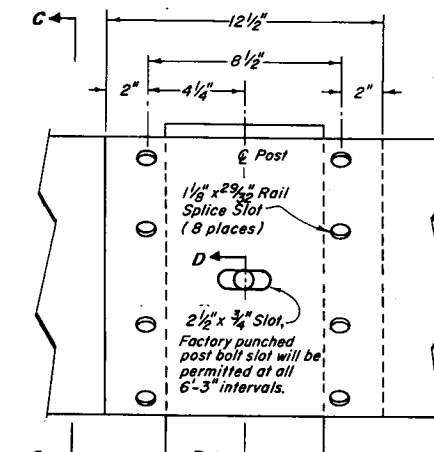


SEE TABLE ON SHEET 1 FOR TIMBER CROSS SECTION

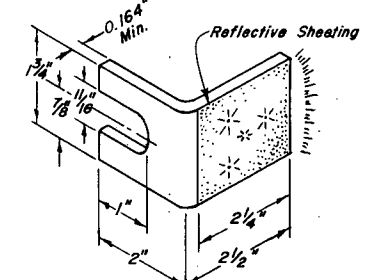
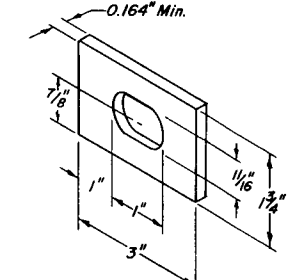
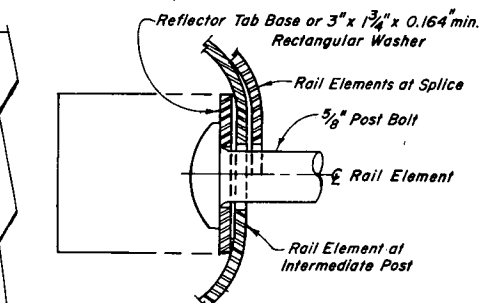


NOTE: Slots shown shall match outer 4 and center Rail-end slots.

DETAIL OF TERMINAL SECTION

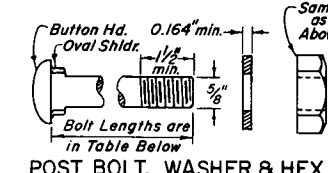
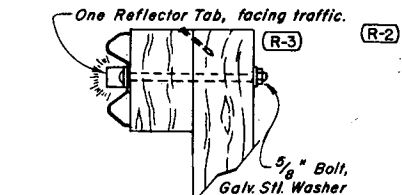
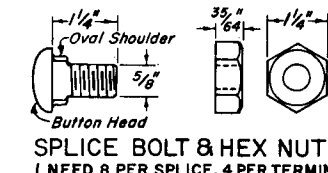


DETAIL OF RAIL AND SPLICE



RECTANGULAR WASHER DETAIL

REFLECTOR TAB DETAIL



 Block	 Post	RAIL	BOLT SIZE
		Double	5/8" x 2
		Single	5/8" x 1

NOTE: When 6" x 8" timber is used, the 8" dimension shall be perpendicular to the roadway.

NOTE: Reflector Tab shall be installed on alternate posts or at max. 12'-6" spacing, beginning at the 3rd post from the buried anchor.

INSTALLATION DETAIL OF REFLECTOR TAB

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

GUARD RAIL TYPE 3

Designed by M. R. H. Approved by J. R. B.
Made by J. R. B. Staff Design Engineer
Checked by R. S. M. Date: March 1, 1968

STANDARD M-612-C

(SHEET 1 OF 2 SHEETS)
JULY 1, 1965

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

REVISIONS			
R-2	1-9-68	Median Crossover, Gen'l. Note	M.R.H.
R-3	7-11-68	Division Name	M.R.H.

GENERAL NOTES

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

See tabulation in plans for delineator post requirements.

Spacing between Posts on acceleration and deceleration lanes and on relatively straight portions of interchange ramps shall be 100' on Interstate and 200' on Primary and Secondary Projects. Spacing between Posts on the outside of interchange ramp curves shall be as indicated in table for the appropriate degree of curve with a 24' min. spacing. Post spacing in advance and beyond curve shall not apply to ramp curves.

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.

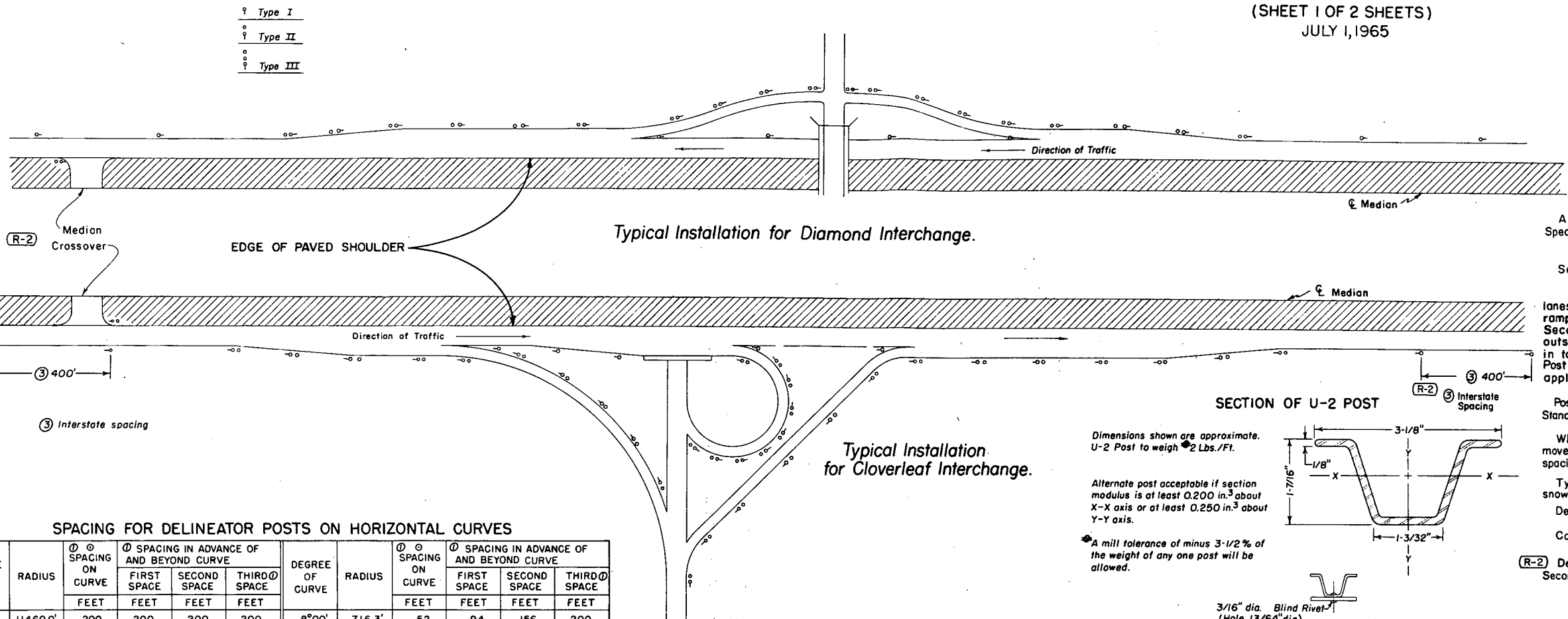
When normal delineator spacing falls on a road approach or crossroad, move delineator either direction a distance not to exceed 1/4 normal spacing.

Type, location and spacing of delineators for tunnels and snow sheds shall be as directed by the Engineer.

Delineator Posts are not to be placed along Frontage Roads.

Color of Posts shall be Interstate Green.

(R-2) Delineators will not be required on tangents for Primary and Secondary roadways.

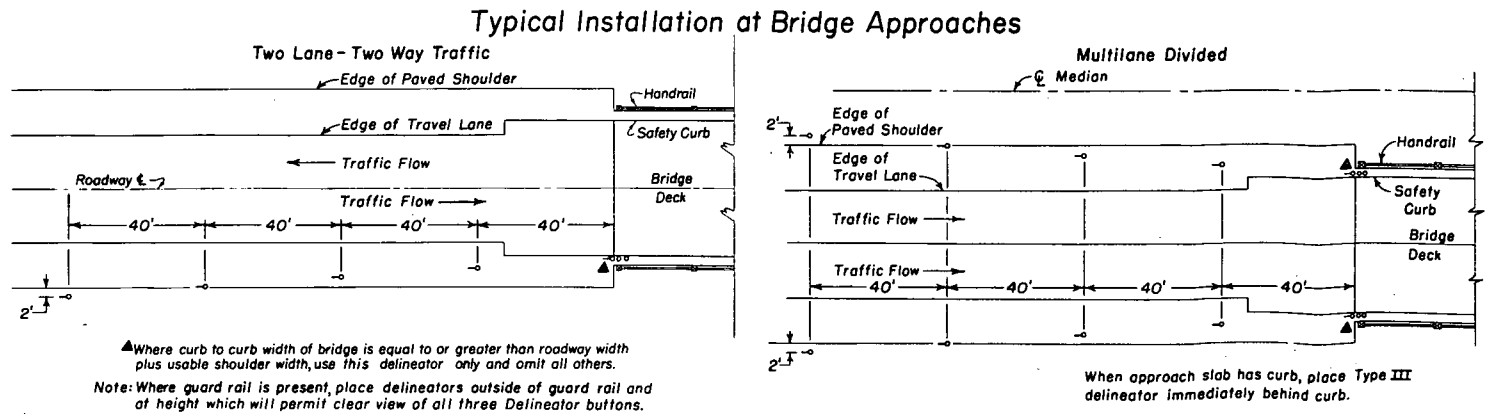


SPACING FOR DELINEATOR POSTS ON HORIZONTAL CURVES

DEGREE OF CURVE	RADIUS	Ø Ø SPACING ON CURVE	Ø SPACING IN ADVANCE OF AND BEYOND CURVE			DEGREE OF CURVE	RADIUS	Ø Ø SPACING ON CURVE	Ø SPACING IN ADVANCE OF AND BEYOND CURVE		
			FIRST SPACE	SECOND SPACE	THIRD Ø SPACE				FIRST SPACE	SECOND SPACE	THIRD Ø SPACE
0°30'	11460.0'	200	200	200	200	8°00'	716.3'	52	94	156	200
1°00'	5730.0'	151	200	200	200	8°30'	674.1'	50	90	150	200
1°30'	3820.0'	123	200	200	200	9°00'	636.7'	48	86	144	200
2°00'	2865.0'	106	191	200	200	9°30'	603.2'	47	85	141	200
2°30'	2292.0'	95	171	200	200	10°00'	573.0'	46	83	138	200
3°00'	1910.0'	86	155	200	200	10°30'	545.7'	45	81	135	200
3°30'	1637.1'	80	144	200	200	11°00'	520.9'	43	77	129	200
4°00'	1432.5'	74	133	200	200	11°30'	498.3'	42	76	126	200
4°30'	1273.3'	70	126	200	200	12°00'	477.5'	41	74	123	200
5°00'	1146.0'	66	119	198	200	15°00'	382.0'	36	65	108	200
5°30'	1041.8'	63	113	189	200	18°00'	318.3'	33	59	99	198
6°00'	955.0'	60	108	180	200	21°00'	272.9'	30	54	90	180
6°30'	881.5'	58	104	174	200	25°00'	229.2'	27	49	81	162
7°00'	818.6'	55	99	165	200	30°00'	191.0'	24	43	72	144
7°30'	764.0'	53	95	159	200						

Ø S = 2 √ R-50 1-ST. SPACE = 1.8 S 2-ND. SPACE = 3 S 3-RD. SPACE = 6 S
NO SPACES TO EXCEED 200 FT.

Ø Omit third space on Secondary and Primary Routes and double the distance on the curve and in advance of and beyond curve. For curves less than 2 degrees on Interstate through roadways use Interstate tangent spacing.

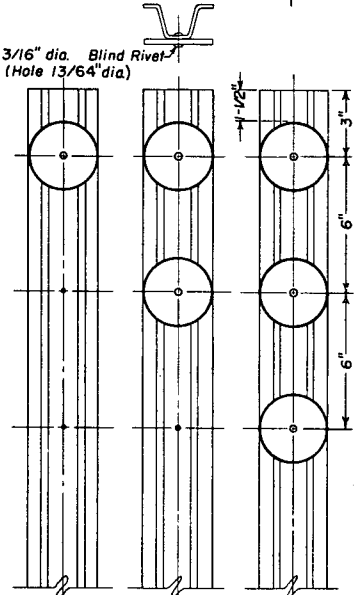
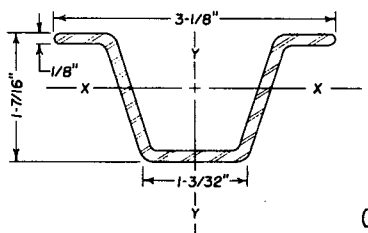


Dimensions shown are approximate.
U-2 Post to weigh 2 Lbs./Ft.

Alternate post acceptable if section modulus is at least 0.200 in.³ about X-X axis or at least 0.250 in.³ about Y-Y axis.

A mill tolerance of minus 3-1/2% of the weight of any one post will be allowed.

SECTION OF U-2 POST

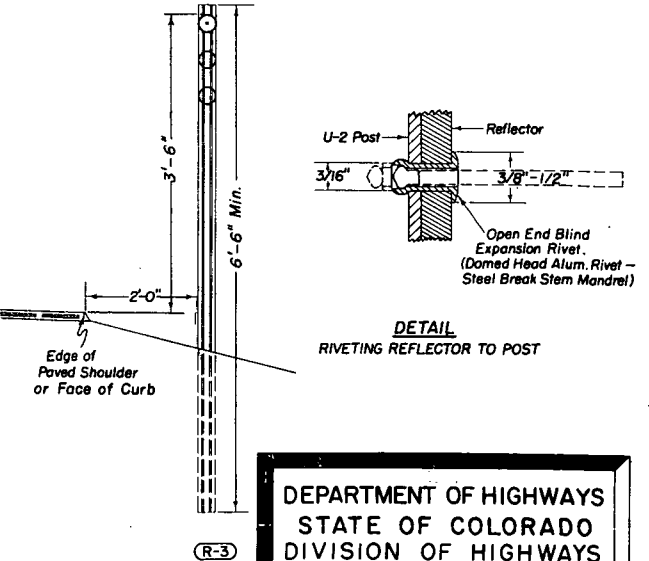


TYPE I
1-3" dia.
Crystal
Reflector
on U-2 Post

TYPE II
2-3" dia.
Yellow
Reflectors
on U-2 Post

TYPE III
3-3" dia.
Yellow
Reflectors
on U-2 Post

Min. 3 holes in all posts required as shown.



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

DELINEATORS

Designed by CKM
Made by WNC
Checked by LEO

Approved by E. Olson
Staff Design Engr.
Date: July 1, 1965

STANDARD M-612-C

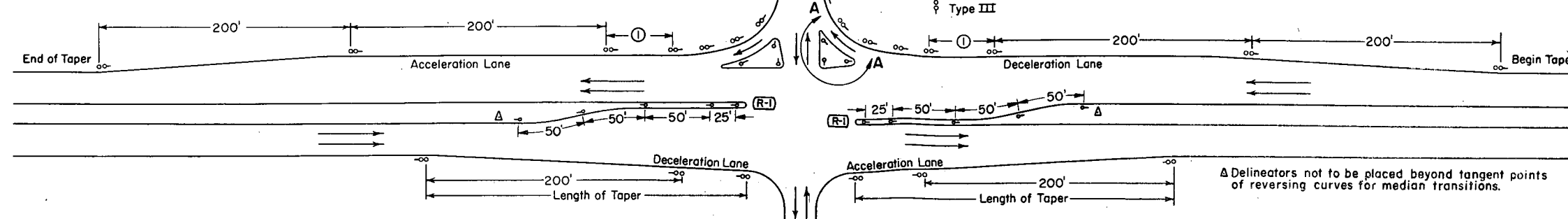
(SHEET 2)

(JULY 1, 1965)

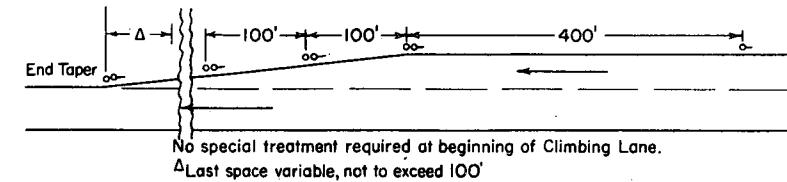
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
(R-1)	5-4-67	Median and Island Delineators M.R.H.
(R-2)	1-9-68	Median Crossover M.R.H.
(R-3)	7-11-68	Division Name M.R.H.

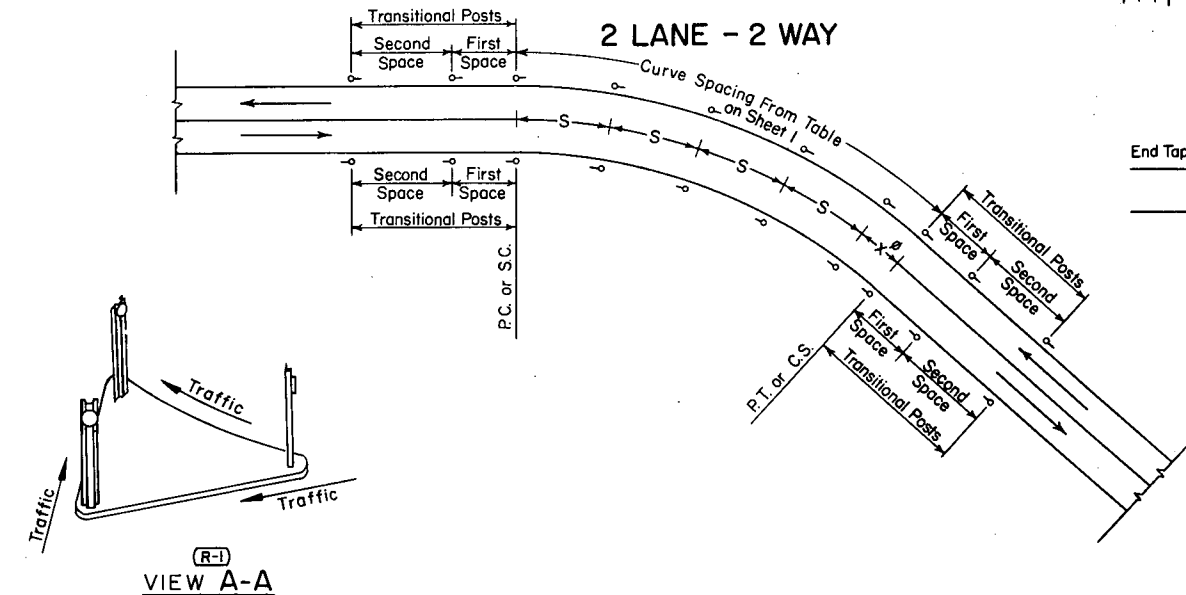
TYPICAL INSTALLATION FOR CHANNELIZED INTERSECTION



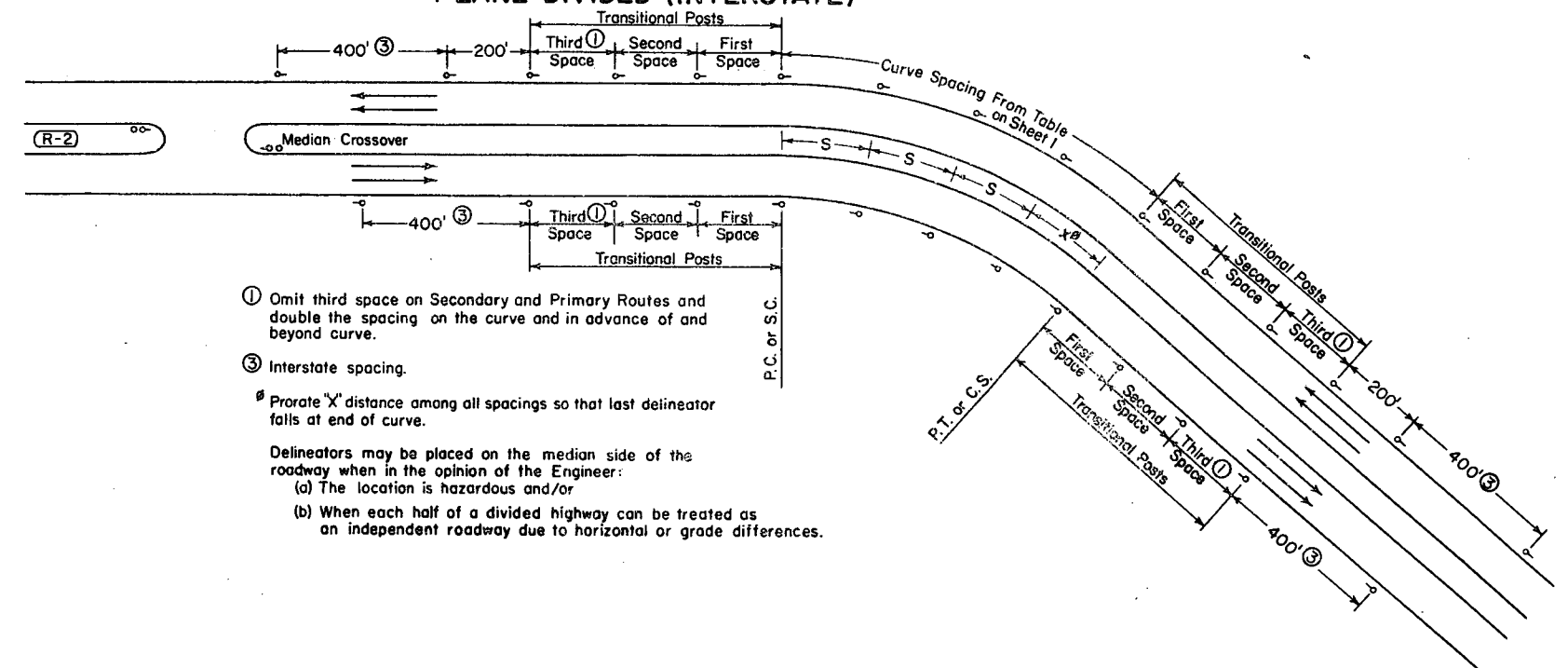
TYPICAL INSTALLATION FOR CLIMBING LANE TRANSITION



2 LANE - 2 WAY



4 LANE DIVIDED (INTERSTATE)



- ① Omit third space on Secondary and Primary Routes and double the spacing on the curve and in advance of and beyond curve.
 - ③ Interstate spacing.
 - Prorate "X" distance among all spacings so that last delineator falls at end of curve.
- Delineators may be placed on the median side of the roadway when in the opinion of the Engineer:
- (a) The location is hazardous and/or
 - (b) When each half of a divided highway can be treated as an independent roadway due to horizontal or grade differences.

GENERAL NOTES

For Radii greater than 200 Feet, use spacing from Table included on Sheet 1 of this Standard.

For additional General Notes, see Sheet 1 of this Standard.

Place face of button at 90° to $\bar{C}$ of roadway.

Lengths of speed change lanes including tapers shall be as shown on plans.

(R-1)
VIEW A-A

(R-2)

(R-3)

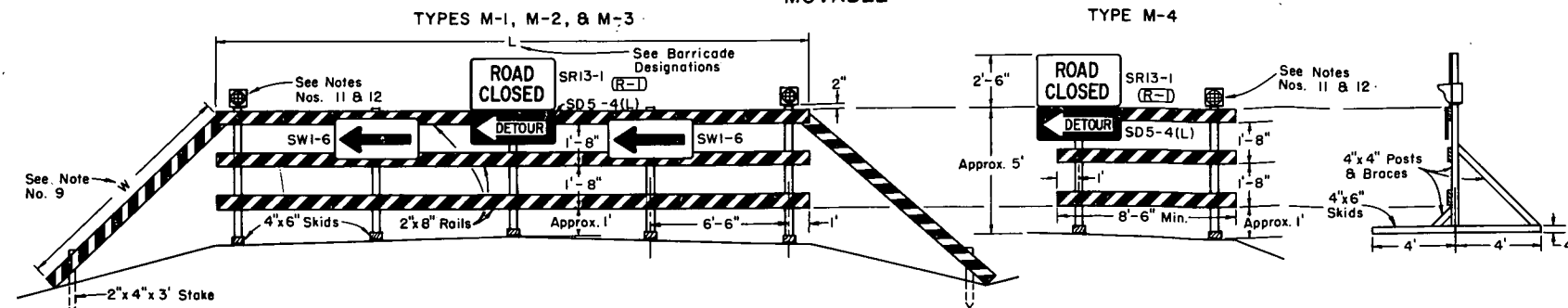
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

DELINEATORS

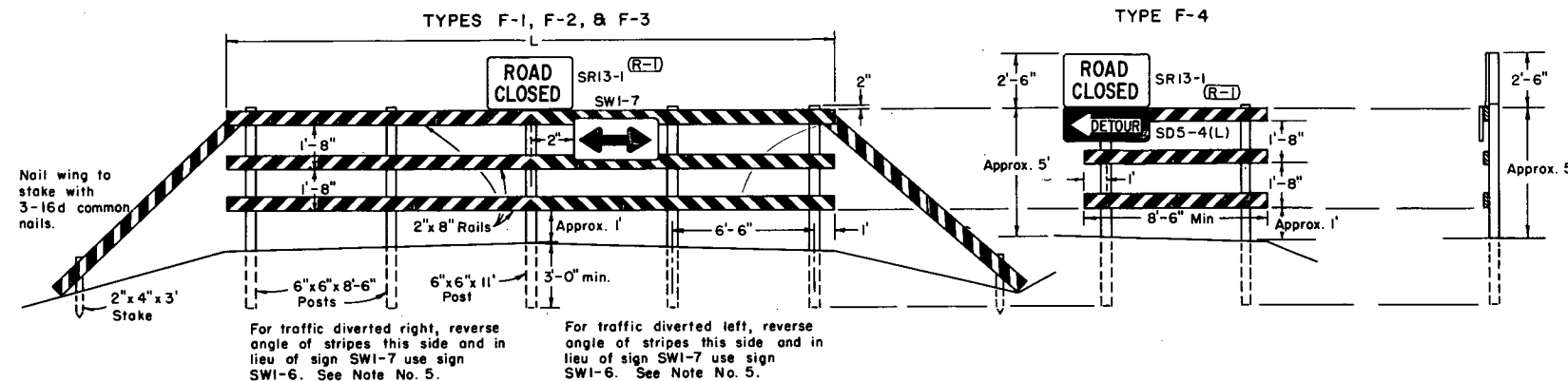
Designed by C.K.M. Approved by T.E.F.
Made by T.E.F. Staff Design Engr.
Checked by L.E.O. Date: July 1, 1965

CLASS I BARRICADES (3 RAILS)

MOVABLE

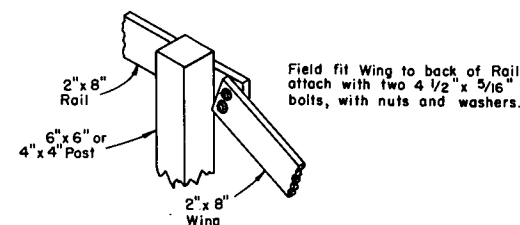
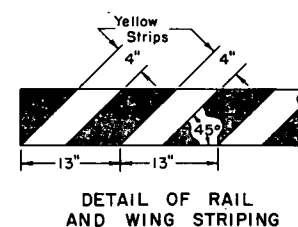
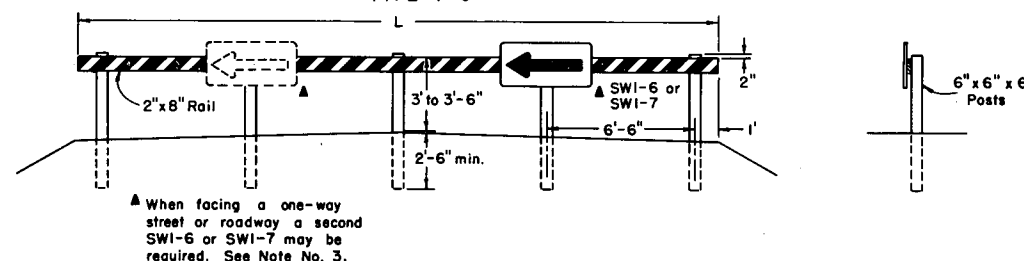


FIXED

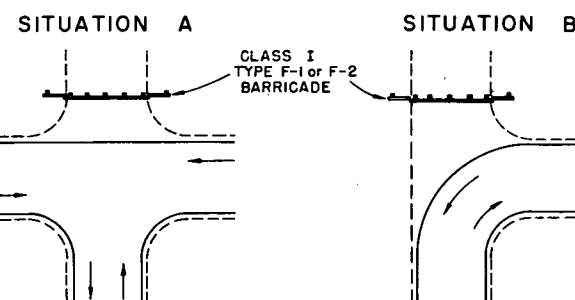
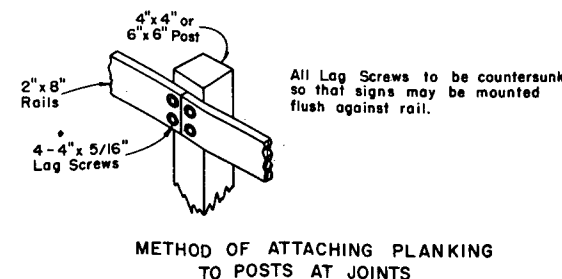


CLASS II BARRICADE (1 RAIL)

FIXED
TYPE F-6



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



INDICATES
DIRECTION OF
TRAFFIC FLOW.

STANDARD M-614-A

(JULY 1, 1965)

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

REVISIONS		
Rev. No.	Rev. Dept. Name & Code Nos.	JLS
(R-1)	11-15-68	JLS
(R-2)	4-23-69	JLS

GENERAL NOTES

- All work shall be done in accordance with the Standard Specifications applicable to the Project.
- 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 Division of Highways and this standard.
- 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.
- 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 Division.
- 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."
- 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."
- 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.
- All timber shall be Standard Grade or better, S4S, Douglas Fir or Larch, as described in the 1965 Standard Grading Rules published by the Western Wood Products Association, and shall conform to paragraph 123c for the rails and paragraphs 122c and 125c for the posts.
- 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.
- Alternate materials or other reflective elements on Traffic signs or Barricades will be permitted only after approval of such material by the Division in writing.
- 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).
- 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.
- Flashing Beacons and Flashers, when used, shall be positioned above the top rail of the barricades to produce the most effective results.
- Barricades used as "Traffic Controls for Highway Construction" are not to be paid for separately.
- Barricades will be paid for separately when designated on plans as bid items.
- 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 II, 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				
1	I	M-1	F-1	26'-34'	28'	Barricade complete with SR13-1 sign and SWI-6 or SWI-7 signs as required.
2	I	M-2	F-2	35'-44'	41'	Barricade complete with SR13-1 sign and SWI-6 or SWI-7 signs as required.
1	I	M-3	F-3	Variable	28'	Barricade (without extension wings) complete with SR13-1 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
DIVISION OF HIGHWAYS

TIMBER
BARRICADES

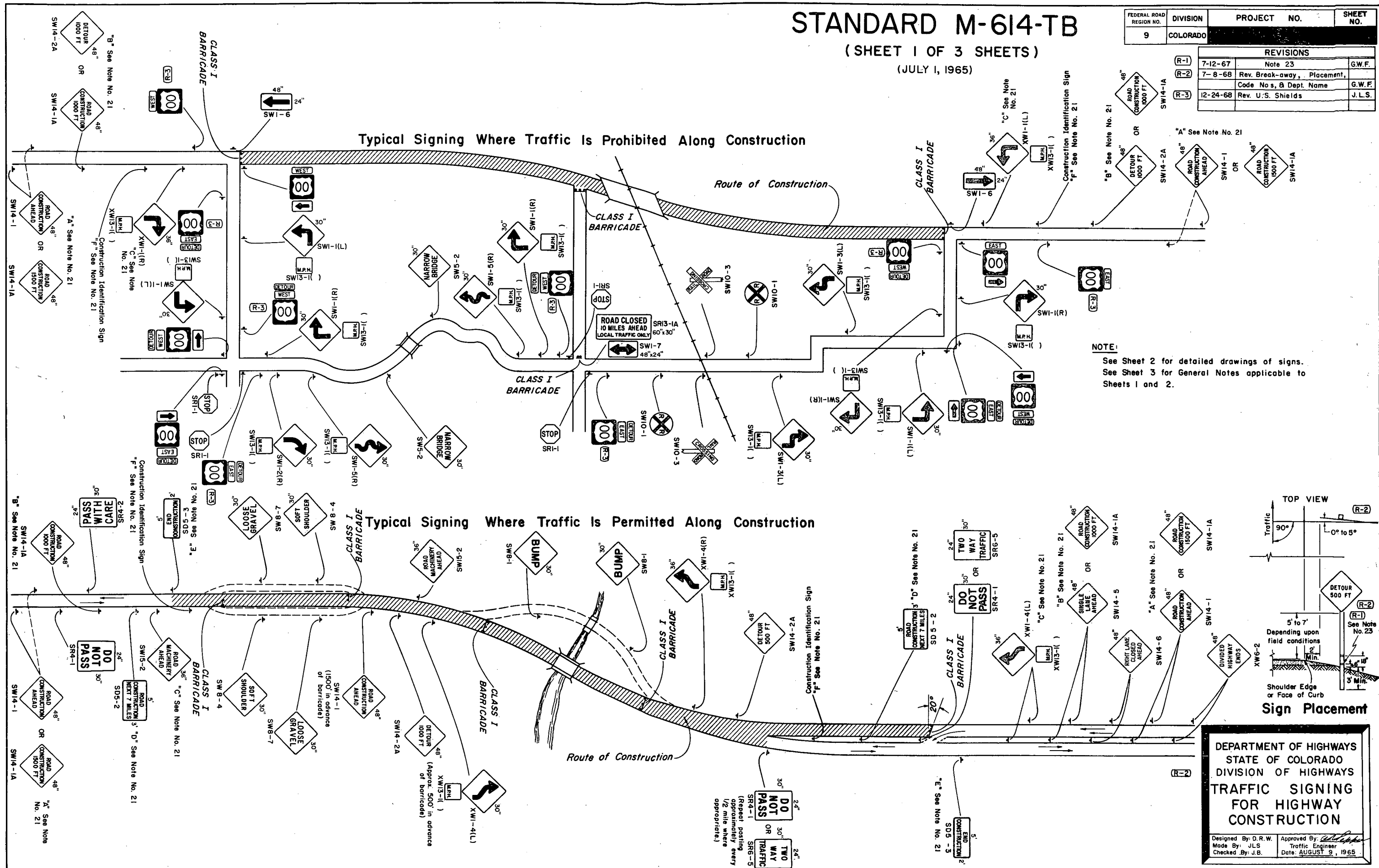
Designed By: D.R.W. Approved By: JLS
Made By: JLS Date: JULY 1, 1965
Checked By: J.B.

(JULY 1, 1965)

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

REVISIONS			
(R-1)	7-12-67	Note 23	G.W.F.
(R-2)	7-8-68	Rev. Break-away, Placement, Code No's, & Dept. Name	G.W.F.
(R-3)	12-24-68	Rev. U.S. Shields	J.L.S.

SW/4-1A



STANDARD M-614-TB

(SHEET 2 OF 3 SHEETS)

(JULY 1, 1965)

REGULATORY SIGNS

See Note No. 9



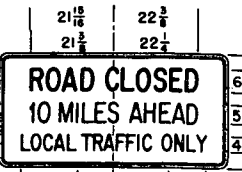
Margin: $\frac{3}{8}$
Border: $\frac{5}{8}$
Corner Radius: $1\frac{1}{2}$



Margin: $\frac{3}{8}$
Border: $\frac{5}{8}$
Corner Radius: $1\frac{1}{2}$



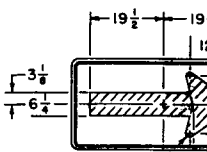
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Corner Radius: $1\frac{1}{2}$



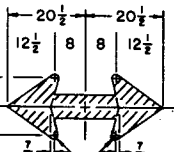
Margin: $\frac{1}{2}$
Border: $\frac{3}{4}$
Corner Radius: $1\frac{1}{2}$

WARNING SIGNS

See Note No. 10



Margin: $\frac{1}{2}$
Border: $\frac{3}{4}$
Corner Radius: $1\frac{1}{2}$



Margin: $\frac{1}{2}$
Border: $\frac{3}{4}$
Corner Radius: $1\frac{1}{2}$



Margin: $\frac{3}{8}$
Border: A
Corner Radius: $1\frac{1}{2}$

Panel	A	B	C	D	E	F	G	H	I	J
SW13-1	18"x18"	3	5	5	5	5	5	5	5	5
XW13-1	24"x24"	3	6	6	6	6	6	6	6	6

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

REVISIONS			
REV.	DATE	REVISION	BY
(R-1)	7-12-67		M.R.H.
(R-2)	7-8-68	Rev. Code No. & Dept. Name	G.W.F.
(R-3)	12-24-68	Added Notes	J.L.S.

S	A	B	C	D	E	F	G	H	I	J
SW14-3	48	11	12	12	12	12	12	12	12	12
CW14-3	36	8	8	8	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW14-3A	48	12	12	12	12	12	12
SW14-4A	48	12	12	12	12	12	12
CW14-3A	36	8	8	8	8	8	8
CW14-4A	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G	H	I	J
SW14-4	48	12	12	12	12	12	12	12	12	12
CW14-4	36	8	8	8	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW14-2	48	12	12	12	12	12	12
CW14-2	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW14-2A	48	12	12	12	12	12	12
CW14-2A	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G	H	I	J	K	L
SW14-7B	36	12	12	12	12	12	12	12	12	12	12	12

S	A	B	C	D	E	F	G	H	I	J
SW14-6(R)	48	12	12	12	12	12	12	12	12	12
CW14-6(R)	36	8	8	8	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW14-6A(R)	48	12	12	12	12	12	12
SW14-6A(L)	48	12	12	12	12	12	12
CW14-6A(R)	36	8	8	8	8	8	8
CW14-6A(L)	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G	H	I	J
SW14-6(L)	48	12	12	12	12	12	12	12	12	12
CW14-6(L)	36	8	8	8	8	8	8	8	8	8

S	A	B	C	D	E	F	G	H	I	J
SW14-5	48	12	12	12	12	12	12	12	12	12
CW14-5	36	8	8	8	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW14-5A	48	12	12	12	12	12	12
CW14-5A	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G	H	I	J
SW14-1	48	9	9	9	9	9	9	9	9	9
CW14-1	36	6	6	6	6	6	6	6	6	6

S	A	B	C	D	E	F	G
SW14-7	48	18	18	18	18	18	18
CW14-7	36	12	12	12	12	12	12

S	A	B	C	D	E	F	G
SW14-7A	48	12	12	12	12	12	12
CW14-7A	36	8	8	8	8	8	8

S	A	B	C	D	E	F	G
SW15-2A	48	12	12	12	12	12	12

PLATE DETAILS

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS
TRAFFIC SIGNING
FOR HIGHWAY
CONSTRUCTION

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

Approved By: [Signature]
Traffic Engineer
Date: AUGUST 9, 1965

STANDARD M-614-TB
(SHEET 3 OF 3 SHEETS)
(JULY 1, 1965)

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

REVISIONS			
(R-1)	7-12-67	Added Note 23	G.W.F.
(R-2)	7-8-68	Rev. Note 23 & Dept. Name -	G.W.F.
		Deleted Note	G.W.F.
(R-3)	12-24-68	Rev. Note No. 18	J.L.S.

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"x4" or 6"x6" 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.

(R-3) 18. Lanterns and Torches - Lanterns, with red globes, shall be used only in low speed urban areas. Open-flame torches shall not be used under any circumstances.

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": SD5-2 - 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": SD5-3 - 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 6"x6" timber sign post shall be provided with two 2" diameter holes through the neutral axis normal to the roadway, one hole at 6" and one hole at 18" above the ground level. The 4"x4" timber posts shall not be provided with any type of break-away device. The inside portion of each 2" diameter hole shall be painted white. The underground portion of each timber post shall be treated with creosote.

(R-2)

(R-2)

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS
TRAFFIC SIGNING
FOR HIGHWAY
CONSTRUCTION

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

Approved By: 
Traffic Engineer
Date: AUGUST 9, 1965