FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0146(1)	1	

Palisade Bridge

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID SECONDARY PROJECT NO. S 0146(1)
STATE HIGHWAY NO. 340
MESA COUNTY

INDEX OF SHEETS

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5-14	DETAILS OF BRIDGE, STA. 15+.	
15	TYPICAL STANDARD NAME PLATE.	M 6 E
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23	STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS.	M 2 D
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32	SUMMARY OF EARTHWORK QUANTITIES & TABULATION OF INTERCEPTING DITCHES.	

SCALES OF ORIGINAL TRACINGS

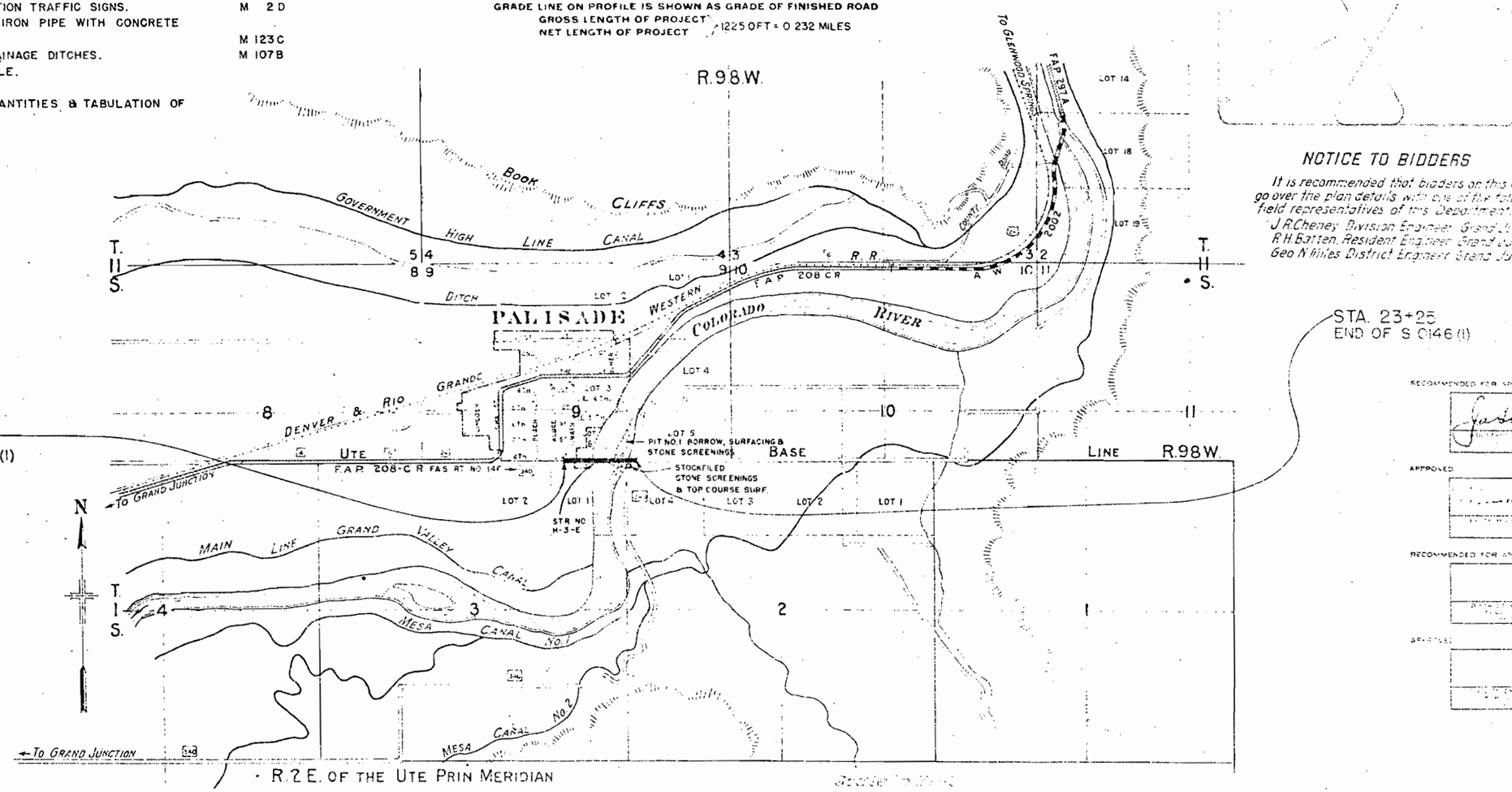
ON PLAN, 1 IN. = 100 FT.
ON PROFILE 1 IN. = 100 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL

GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

GROSS LENGTH OF PROJECT 1225 OFT = 0.232 MILES
NET LENGTH OF PROJECT

CONVENTIONAL SIGNS

CENTER LINE OF SURVEY
RIGHT OF WAY LINES
ONE QUARTER SECTION LINES
SECTION LINES
TOWNSHIP OR RANGE LINES
CITY LIMITS LINE
BARBED WIRE FENCE
COMBINATION WIRE FENCE
POLE LINES



NOTICE TO BIDDERS

It is recommended that bidders on this Project go over the plan details with one of the following field representatives of this Department.

J. R. Cheney, Division Engineer, Grand Junction
R. H. Batten, Resident Engineer, Grand Junction
Geo. N. Miles, District Engineer, Grand Junction

RECOMMENDED FOR APPROVAL

APPROVED

RECOMMENDED FOR APPROVAL

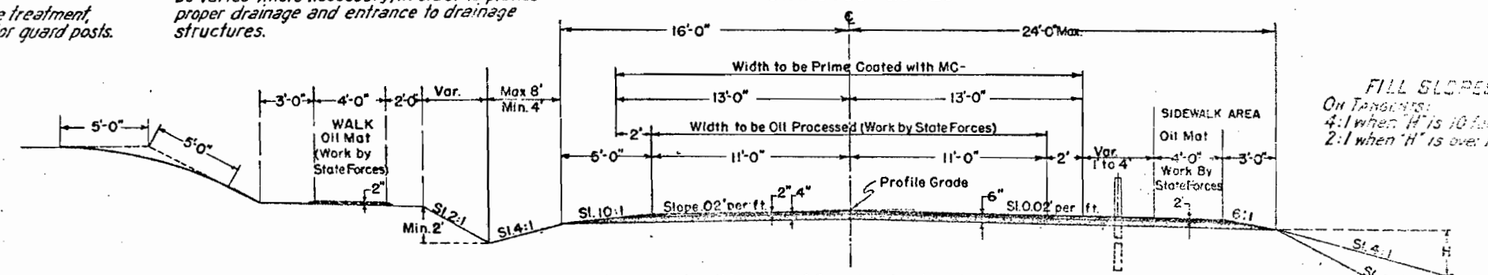
APPROVED

TYPICAL CROSS SECTION OF IMPROVEMENT

NOTE
See Standard M-2-C for details of Cut Slope treatment, showing cut widening for guard fence and/or guard posts.

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

TYPICAL SECTION
STA.13+00 - 23+25



FILL SLOPES
On Tangents:
4:1 when "H" is 10 feet or less.
2:1 when "H" is over 10 feet.

6" compacted thickness of Gravel or Crushed Rock Surfacing is to be placed in two courses:

Approximate 2" Top Course Surfacing is to be Stockpiled at the rate of Tons per Station shown in the Surfacing Plan below. Approximate 4" Bottom Course Surfacing is to be placed at the rate of Tons per Station shown in the Surfacing Plan below.

At Bridge Approaches, the Oil Processing shall be widened to meet the curbed width of the Bridge and shall take place gradually over a distance of 300 ft. each way from the Bridge ends.

Asphaltic Road Material MC is to be used for Prime Coat over the width of Roadway indicated on the Typical Sections, previous to placing of Oil Processed Material Grade of MC oil to be determined by the Engineer.

Asphaltic Road Material MC-3 is to be used for Processing oil mat on this Project.

Asphaltic Road Material RC is to be used for Seal Coat over the entire processed area. Grade of RC oil to be determined by the Engineer.

All Side Approach Roads to the Project shall be Oil Processed approximately to the Right of Way line.

GENERAL NOTES

This Project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted Jan. 1, 1948.

All quantities on preliminary plans are to be considered approximate only.

All Roadway Excavation required to construct this Project is to be obtained as indicated on the plans. Quantities involved beyond the limits of the ditch as shown on the Typical Section, either noted on the Profile as "Borrow" or on the List of Structures as "Embankment", are to be classified and paid for as "Unclassified Excavation." These quantities are to be staked as part of the original excavation at locations indicated on the plans. Slope stakes, beyond the limits of the Typical Section as shown, are subject to change by the Engineer to fit conditions actually met in construction.

All poles encroaching on construction are to be moved by the owners.

Except as otherwise noted on the plans, payment for Overhaul will be based on measurement along the centerline of the Project.

The entire Project shall be cleared in conformity with the requirements of the Standard Specifications, except that such trees or shrubs as the Engineer may designate, shall be left in place and protected from damage during construction operations.

Right of Way fences, including line posts, shall be constructed approximately six (6) inches inside the boundary of the Highway Right of Way as shown on the plans.

Intercepting ditches shall be placed on light grades (not over 1%) following the ground contour, and where possible shall be so constructed that the direction of flow will be away from the Roadway, in order to spread runoff and thereby avoid erosion. This work shall be done in accordance with the methods shown on Standard sheet included in the plans. These ditches shall be constructed at locations staked by the Engineer. Approximate location and quantities are tabulated on Summary of Earthwork Quantities sheet.

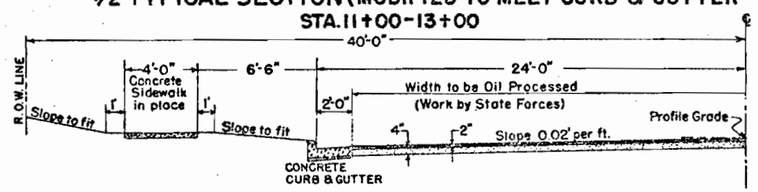
If excavation operations develop material which will stand on slopes steeper than slope stake lines, the Department reserves the right to change cut slopes during the progress of such excavations.

The Detour for this Project lies along the present traveled road. At all places on the Project where the new work lies along the present traveled road, the Contractor shall, at his own expense, prosecute construction in such manner that traffic may readily pass over the road. Also, the Contractor shall maintain, in safe condition and at his own expense, all temporary approaches to and crossings of intersecting roads.

All Concrete on this Project shall be air entrained Concrete.

All Buildings and appurtenances encroaching on the Right of Way, are to be moved by the owners.

1/2 TYPICAL SECTION (MODIFIED TO MEET CURB & GUTTER
STA.11+00-13+00



SURFACING PLAN

It is estimated that material for Gravel Surfacing for the project is available in the vicinity of the pit indicated in the following tabulation. Estimated quantities involved in this operation are shown below.

Alteration of the Surfacing Plan as here outlined will be allowed only on written permission from the Department.

MATERIAL TO BE PLACED	SOURCE	QUANTITY					OVERHAUL
		AVAILABLE	RATE-TONS PER STATION		TONS USED		
			TOP COURSE	BOTTOM COURSE	TOP COURSE GRADING-C	BOTTOM COURSE GRADING-B	TON MILE
11+00 to 11+87.5	PIT NO. 1 (Inside Palisade)		38	81	33	71	Free Haul
11+87.5 to 13+70.0			35	81	70	142	
13+70.0 to 14+12.5			26	64	11	27	
14+12.5 to 15+66.0	River Channel & Island, Pt. & Lt. of Sta. 20+ On Right of Way (No Purchase Cost)		26	64	40	98	
15+66.0 to 20+50.0			48	102	Bridge 132	281	
20+50.0 to 22+25.0							
Road Approaches & Approaches to Project (Inside Palisade)					34	146	
[illegible] Palisade					70	60	
[illegible]					7	13	
[illegible]					[illegible]	[illegible]	
[illegible]					[illegible]	[illegible]	
TOTALS					[illegible]	[illegible]	

TABULATION OF LENGTH & DESIGN DATA

STATION		INSIDE PALISADE ROADWAY LIN. FT.	OUTSIDE PALISADE ROADWAY LIN. FT.	OUTSIDE PALISADE BRIDGE LIN. FT.
11+00	Beginning of S 0146(1)			
11+87.5	City Limits	225.0	87.5	
14+12.5	City Limits		153.5	
15+66.0	BRIDGE			484.0 Main 418.50
20+50.0			275.0	
23+25.0				
TOTALS S 0146(1)		225.0	516.0	484.0

SUMMARY

	LIN. FT.	MILES
ROADWAY - Inside Palisade	225.0	[illegible]
ROADWAY - Outside Palisade	516.0	[illegible]
TOTAL ROADWAY S 0146(1)	741.0	[illegible]
BRIDGES S 0146(1)	484.0	[illegible]
TOTAL S 0146 (1)	1225.0	[illegible]

DESIGN DATA

Maximum Degree of Curve	No [illegible]
Maximum Grade	2.1%
Minimum N.P.S.D., horizontal	No [illegible]
Minimum N.P.S.D., vertical	4.25
Maximum Design Speed	50 [illegible]

Rev. 7-6-48 Unit Name. N.D.W.

FED. ROAD DIST. NO.	STATE	[illegible]	[illegible]	[illegible]
3	OHIO	[illegible]	[illegible]	[illegible]

LIST OF STRUCTURES

STATION	DESCRIPTION	REMOVE STR. NO.	EXCAVATION UNCLASS CU. YDS. EXC.	EXCAVATION UNCLASS CU. YDS. EMB.	EXCAVATION UNCL. DITCH CUYDS	STRUCTURAL ★ EXCAVATION CUBIC YARDS				GRAVEL OR CRUSHED ROCK SUR. TON	CORRUGATED METAL CULVERT PIPE LIN. FT. 18"	24"	36"	CONG. CUYDS CL"A"	REINF. STEEL LBS.	MISCELLANEOUS
[illegible]	Project Marker & Approach to Project		30							60						1-Project Marker (State Forces)
[illegible] to 12+70	Remove & Rebuild Fence, Rt.															Remove & Rebuild 170 Lin. Ft. Fence
[illegible]	Road Approach & Side Drain, Rt.			10					5	20	30					
[illegible] to 13+	Remove Conc. Sidewalk, Curb & Gutter, Lt.															Remove 200 °Ft. of Concrete Sidewalk
	4' Conc. Sidewalk & Conc. Curb & Gutter, Lt.															Remove 375 Lin. Ft. of Conc. Curb & Gutter
																160 °Ft. of Concrete Sidewalk
																375 Lin. Ft. of Conc. Curb & Gutter
																82 Lin. Ft. C.M. Siphon Pipe
[illegible]	Remove & 8" Wood Stave Pipe.								60					37	323	Remove 68 Lin. Ft. of 8" Wood Stave Pipe
	Replace Private Irrigation System.													4		6 - 1" of 6" Galv. Pipe; 12' of 4" Galv. Drain Pipe;
	(Details on Sheet No. 4)															4" Valve & Valve Box; 114 ft. bm. Misc. Unt. Timber.
[illegible]	Side Drain & Catch Basins, Lt.										80					2 - [illegible]" Inlet Gratings & Frames
	Road Approach, Lt.		250						50	30				[illegible]	[illegible]	
[illegible]	Road Approach & Side Drain, Rt.		15						5	20	30					
[illegible]	Road Approach & Side Drain, Rt.		20						5	20	[illegible]					
[illegible]	Side Drains, Rt. & Lt. Remove 16' 21" Wd. Stave Pipe	1							10		[illegible]					
[illegible] to 20+50	Bridge Concrete & Plate Girder Bridge			Quantities in Summary												
	(Details on Sheets No. 5-14)															
[illegible]	Remove [illegible]			1000												
[illegible]	Single Culvert								35				[illegible]			50 Cu. Yds. Sel. Backfill; 15 Hrs. Mech. Tamping.
[illegible]	Rd. 1 Approach, Rt.			50						50						
[illegible]	Remove 16' x 42' C.M.P. 16" x 14' C.M.P. &															
	1' x 1' x 15' Wood Box Culvert, Rt.	3														Remove 150 Lin. Ft. Fence
[illegible] to [illegible]	Remove & Remove & Rebuild Fence, Rt.															Remove & Rebuild 150 Lin. Ft. Fence
[illegible]	Road Approach, Lt.			50						50						
[illegible]	Project Marker & Approach to Project			100						50						1-Project Marker (State Forces)
[illegible] to 13+50	Side Drain & 4' x 4' x 5' Conc. Well, Rt.								50		180			3.4	234	78 Ft. bm. Misc. Untreated Timber
[illegible]	Class Culvert & Ditches (Well)				50				15			50				20 Cu. Yds. Sel. Backfill; 5 Hrs. Mech. Tamping
[illegible]	Remove 10" x 52' C.M.P.	1														
TOTALS – INSIDE PALISADE		-	265	10	-				120	130	40	-	-	5.5	523	
TOTALS – OUTSIDE PALISADE		5	50	1200	50				25	336	310	50	126	3.4	234	
PROJECT TOTALS		5	315	1210	50				145	466	350	50	126	8.9	817	

★ Structural Excavation is estimated to be [illegible] % Earth and [illegible] % Rock which is estimated to be [illegible] % Solid & [illegible] % Vol.

TIMBER GUARD POSTS

STATION	SPACING	NUMBER LEFT	NUMBER RIGHT
INSIDE PALISADE			
15+86	BRIDGE	5	5
[illegible]+50	BRIDGE	5	5
[illegible]+00 to 22+50	25 ft	6	6
INSIDE PALISADE		–	–
OUTSIDE PALISADE		16	16
TOTAL		[illegible]	

R.O.W. MARKERS

STATION	NUMBER LEFT	NUMBER RIGHT
INSIDE PALISADE		
13+50		2
OUTSIDE PALISADE		
11+00		1
22+80		1
23+22	1	
23+72	1	1
INSIDE PALISADE	–	2
OUTSIDE PALISADE	2	–
TOTAL	2	2

SUMMARY OF APPROXIMATE QUANTITIES (CONTINUED)

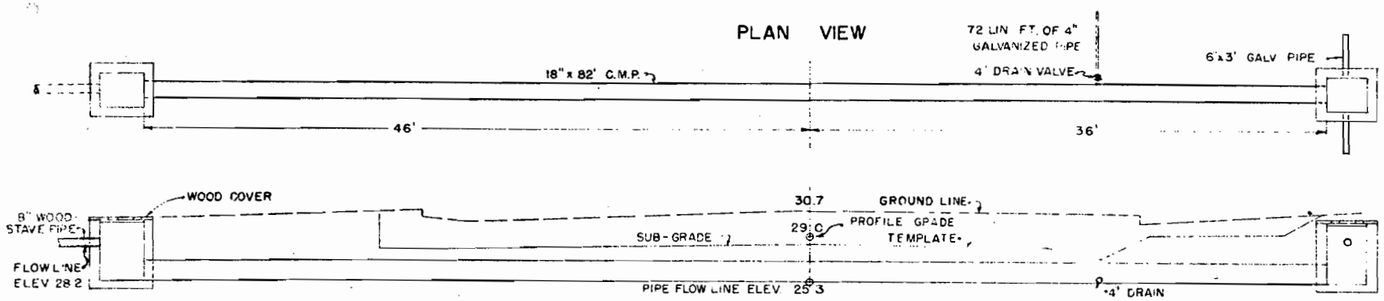
ITEM NO.	ITEM	UNIT	PALISADE ROADWAY INSIDE	PALISADE ROADWAY OUTSIDE	BRIDGE STA. 15 +	PROJECT TOTALS
[illegible]	[illegible]					
170	Rolling with [illegible] Roller	Hour	5	5		10
170	Rolling with Rubber Tired Roller	Hour	4	6		10
170	Furnishing Pneumatic Roller	Lump Sum	Prorated			•
17[illegible]	Furnishing Tubular Tired Roller	" "	Prorated			•
17g	Watering	M. Gal.	8	12		20
17y	Placing Stockpile Material	Ton	175	325		500
20x	Asphaltic Road Material [illegible]	Gal.	400	600		1000
20y	Asphaltic Road Material MC	Gal.	600	1100		1700
20j	Asphaltic Road Material MC-3	Gal.	1200	2200		3400
21a	Road Mix O.T. Processing	Sq. Yd.	1275	2325		3600
21v	Stone Screenings (Distribute)	Ton	15	25		40
61a	Project Markers	Each		2		2
87	Oil Processed Sidewalk	Sq. Yd.	125	375		500

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	PALISADE ROADWAY INSIDE	PALISADE ROADWAY OUTSIDE	BRIDGE STA. 15 +	PROJECT TOTALS
10a	Clearing & Grubbing Inside Palisade	[illegible]	•			•
10b	Clearing & Grubbing Outside Palisade	[illegible]		•		•
11b	Removal of Structures	[illegible]				•
11c	Removal of Concrete Sidewalk	Sq. Ft.	100			[illegible]
11d	Removal of Concrete Curb & Gutter	Lin. Ft.	[illegible]	22		[illegible]
11e	Removal of 8" Wood Stave Pipe	Lin. Ft.	5			[illegible]
12a	Removing Fence	Lin. Ft.		[illegible]		[illegible]
12b	Removing & Rebuilding Fence	Lin. Ft.	100	[illegible]		[illegible]
12c	Line Posts (Treated Wood)	Each	5	5		[illegible]
13c	Unclassified Excavation	[illegible]	2000	[illegible]		[illegible]
13d	Unclassified Lift Excavation	[illegible]		46		[illegible]
14a	Dry Rock Excavation (Structural)	"	23	[illegible]	[illegible]	[illegible]
14b	Dry Common Excavation "	"	[illegible]	[illegible]	[illegible]	[illegible]
14c	Wet Rock Excavation "	"	20	[illegible]		[illegible]
14d	Wet Common Excavation "	"	50	[illegible]		[illegible]
16a	Structure Backfill (Class 1)	[illegible]		[illegible]	[illegible]	[illegible]
16d	Mechanical Tamping	[illegible]		[illegible]	[illegible]	[illegible]
17a	Rolling with Tamping Roller	[illegible]	5	[illegible]		[illegible]
17i	Furnishing Tamping Roller	[illegible]	[illegible]	[illegible]		
17j	Watering	M. Gal.	[illegible]	[illegible]		
17y	Station Yard Overhaul	[illegible]		[illegible]		
18b	Yard Mile Overhaul	M. Mile		[illegible]		
26b	Gravel or Crushed Rock Surfacing (Grading)	Ton	250	[illegible]		
26c	Stockpile Surfacing (Crushed)	[illegible]	[illegible]	[illegible]		
31c	Stone Screenings (Type 1) (Stockpile)	[illegible]	15	[illegible]		
37c	Sand Cushion	[illegible]	8	2		
42b	Untreated Timber	[illegible]			[illegible]	
44a	Miscellaneous Untreated Timber	[illegible]	[illegible]	[illegible]		
46a	Class A Concrete	[illegible]	[illegible]	[illegible]	[illegible]	
47	Reinforcing Steel	Lb.	200	[illegible]	[illegible]	[illegible]
48	Structural Steel	Lb.			[illegible]	[illegible]
53b	18" Corrugated Metal Culvert Pipe	Lin. Ft.	145	[illegible]		
53c	24" " " " "	" "		[illegible]		
53d	36" " " " "	" "		[illegible]		
53b	18" " " Siphon "	" "	82			
61a	Steel Piling (12" @ 53 Lbs.)	Lin. Ft.			[illegible]	[illegible]
80b	Bronze Name Plate	Each			2	
60c	Sheet Copper (Seal)	[illegible]			[illegible]	
61b	Right of Way Markers	Each	2	5		
84a	Concrete Combination Curb & Gutter	[illegible]	[illegible]	[illegible]		
86	Concrete Sidewalk	Sq. Ft.	100			
89a	Drain Pipe (Concrete Flume [illegible]" x [illegible]")	Each			[illegible]	
90a	Electrical Conduit with Junction Boxes (1½")	Lin. Ft.			[illegible]	
92	Timber Guard Posts	Each		2		
98a	Light Standard	Each			2	
98c	Highway Luminaire	Each			2	
110vb	4" Cast Iron Valve & Valve Box	Each	1			
110pc	4" Metal Drain Pipe	Lin. Ft.	72			
121c	6" Standard Galvanized Pipe	Lin. Ft.	6			
132g	No. 12 Inlet Grating & Frame	Each	2			
	Force Account					
	Moving Power Poles (Work by Public Service Co.)					
	Adjust Water & Sewer Lines (Work by City of Palisade Forces).		•	•		

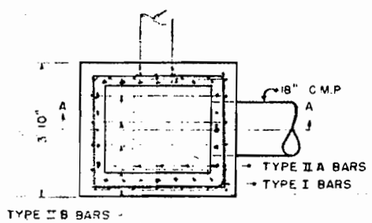
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0146(1)	4	

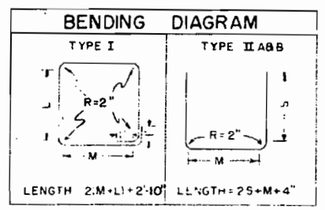
PLAN VIEW



NOTE FOR DETAILS OF VALVE CONNECTION SEE STD. NO. M-123-C INCLUDED IN PLANS

STA 13+ CROSS-SECTION OF SIPHON





QUANTITY LISTING FOR SIPHON

SIZE	TYPE	NO. REQ'D	LENGTH	DIMENSIONS S	M	L	COMBINED LENGTH
½"ϕ	I	10	15'-2"	–	2'-10"	3'-4"	106'-2"
½"ϕ	II A	4	14'-10"	4'-4"	2'-10"	–	59'-2"
½"ϕ	II B	8	12'-4"	4'-4"	3'-4"		74'-0"
VOL. OF CLASS "A" CONCRETE FOR SIPHON BOXES = 3.63 CU. YDS.					TOTAL LENGTH		239'-4"
					WEIGHT = 161.5 LBS.		
					FOR BOTH BOXES 323.0 LBS.		

QUANTITY LISTING FOR WELL

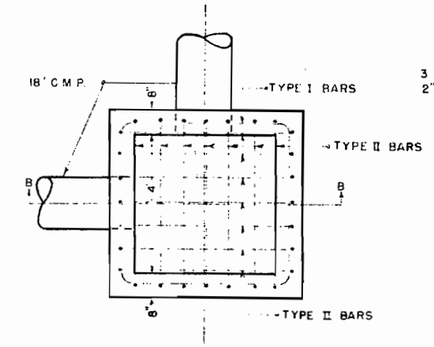
½"ϕ	I	10	20'-2"	–	4'-4"	4'-4"	201'-8"
½"ϕ	II	4	16'-8"	6'-0"	4'-4"	–	233'-4"
VOL. OF CLASS "A" CONCRETE FOR WELL BOX = 3.38 CUBIC YARDS					TOTAL LENGTH		435'-0"
					WEIGHT = 293.5 LBS.		

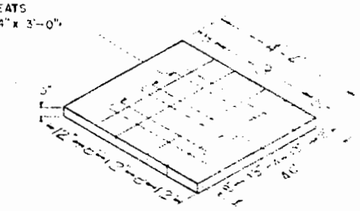
All reinforcing rods to be ½" round at 8" centers

* Includes 1% allowance for overrun.

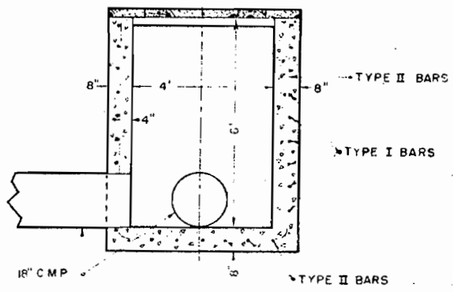
114 Board feet of misc. untreated timber for two siphon box lids

78 Board feet of misc. untreated timber for well box lid



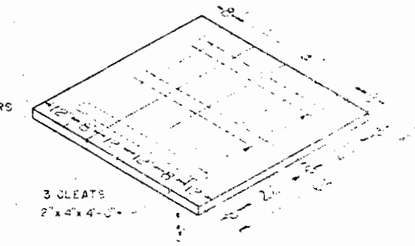


WOODEN LID DETAILS FOR SIPHON BOX

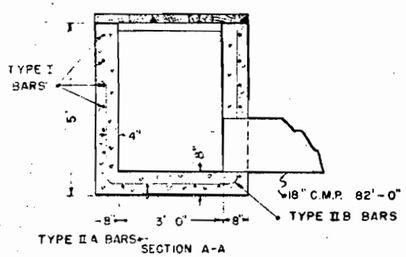


SECTION B-B

DETAILS OF WELL, STA. 23+



WOODEN LID DETAILS FOR WELL BOX, STA. 23+

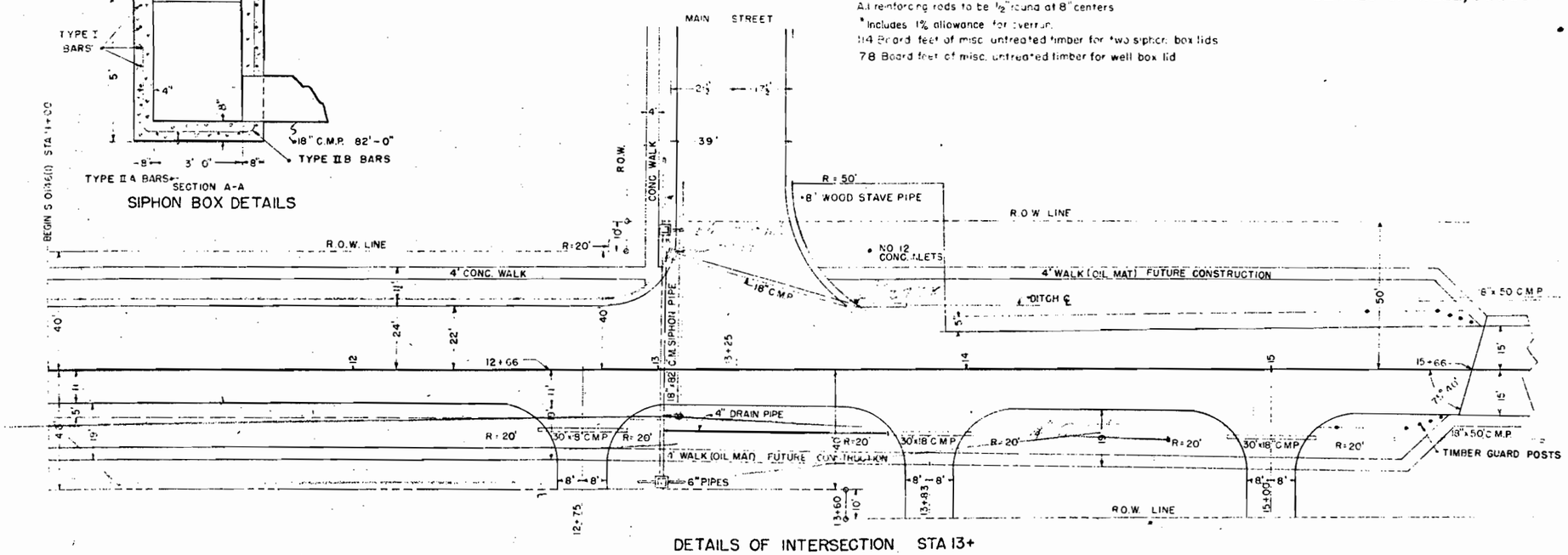


SECTION A-A

SIPHON BOX DETAILS

DETAILS OF CONCRETE CURB AND GUTTER

DETAILS OF CONCRETE SIDEWALK

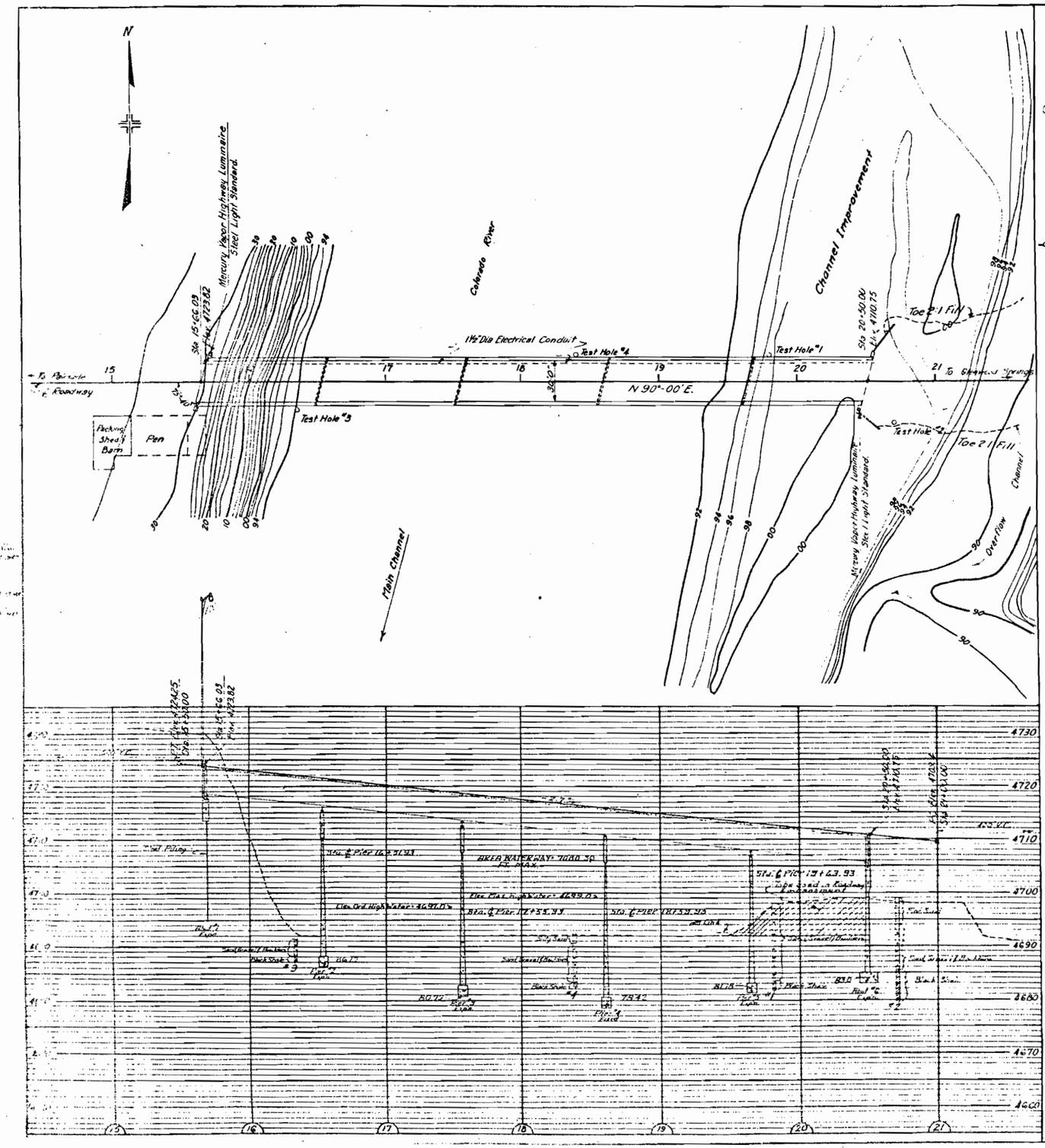


DETAILS OF INTERSECTION STA 13+

REVISIONS

REV 12 15 48 CBW Wing Walls

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
3	COLO.	S-014G(11)	5



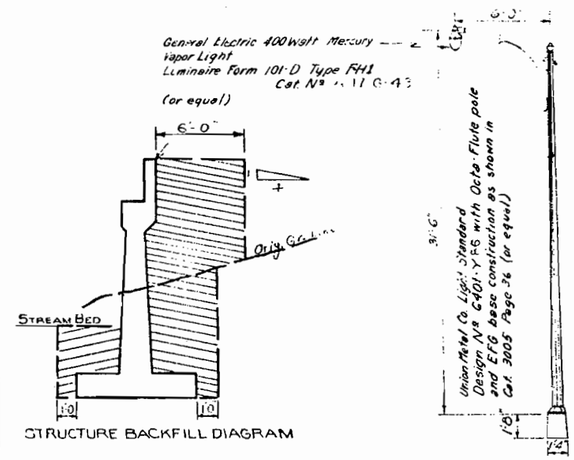
SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	SUPERSTR.	ABUT #1	PIER #2	PIER #3	PIER #4	PIER #5	ABUT #6	TOTAL
◑ 13c	UNCLASSIFIED EXCAVATION	CU.YD.								[illegible]
14a	DRY ROCK EXCAVATION (STR.)	CU.YD.		5					5	10
14b	DRY COMMON EXCAVATION (STR.)	CU.YD.		100					850	[illegible]
14c	WET ROCK EXCAVATION (STR.)	CU.YD.			27	47	79	42	[illegible]	[illegible]
14d	WET COMM. EXCAVATION (STR.)	CU.YD.			56	110	115	150	[illegible]	[illegible]
16a	STRUCTURE BACKFILL	CU.YD.		32	53	103	131	121	530	[illegible]
16d	MECHANICAL TAMPING	HR.		8	13.25	25.75	32.75	30.25	[illegible]	[illegible]
42a	UNTREATED BRIDGE TIMBER	M.F.B.M.		.124					.124	[illegible]
46a	CLASS "A" CONCRETE	CU.Y.	465	35	75	89	94	79	[illegible]	[illegible]
47	REINFORCING STEEL	LB.	32 200	1940	5970	6510	6900	5900	[illegible]	[illegible]
✧ 48	STRUCTURAL STEEL	LB.	591 200	2450	450	450	450	450	[illegible]	[illegible]
61a	STEEL PILING (12" @ 53 LBS.)	Lin. Ft.		166						[illegible]
80b	BRONZE NAME PLATES	EA.		1					1	[illegible]
80c	SHEET COPPER (38 OZ.)	LB.	4							[illegible]
89	DRAIN PIPES (CONC. FLOOR) 4"Φ x 2'-0"	EA.	48							[illegible]
90a	ELECTRICAL CONDUIT 1½" & JUNCTION BOXES	Lin. Ft.	540	5					5	[illegible]
98c	HIGHWAY LUMINAIRE	EA.		1					1	[illegible]
98d	LIGHT STANDARD (COMPLETE)	EA.		1					1	[illegible]
*	½" EXP'N. JT. MATERIAL	SQ. FT.	146	6					100	[illegible]

* INCLUDED IN BID PRICE FOR CLASS "A" CONCRETE

Φ STRUCTURAL STEEL INCLUDES: LBS HANDRAIL STEEL FOR ABUT #1 : 450
" " " " #6 : 450
" " " " SUPERSTRUCTURE : 33 472
TOTAL HANDRAIL STEEL : 34 370

◑ INCLUDED IN ROADWAY QUANTITIES, TO BE USED IN ROADWAY EMBANKMENT.



STRUCTURE BACKFILL DIAGRAM

REFERENCE DRAWINGS

SHEET No. 6 DETAILS OF SUPERSTR. [illegible]
SHEET No. 7 " " " [illegible]
SHEET No. 8 " " " [illegible]
SHEET No. 9 DETAILS OF GIRDERS
SHEET No. 10 DETAILS OF ABUT. #1 & BAR LISTS
SHEET No. 11 DETAILS OF PIER #2 & #3
SHEET No. 12 " " " #4 & #5
SHEET No. 13 DETAILS OF ABUT. #6
SHEET No. 14 " " " [illegible]

LOADING DATA
LIVE LOAD [illegible]
DEAD LOAD [illegible]
AL WEARING SURFACE [illegible]
CONCRETE MONOLITHIC [illegible]

DESIGNING DATA
[illegible]

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, JAN. 1, 1948.

ALL CONCRETE SHALL BE CLASS "A."

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER S3S UNLESS FACED WITH PANEL BOARD.

CONCRETE GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.

FOOTINGS IN ROCK SHALL BE POURED OUT TO THE ROCK AND NOT FORMED.

ALL REINFORCING BARS SHALL BE DEFORMED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

ALL RIVETS TO BE ¾" DIA. ALL RIVETS TO BE POWER DRIVEN.

ALL CONCRETE TO BE AIR-ENTRAINED.

ALL STRUCTURAL STEEL SHALL RECEIVE ONE (1) SHOP COAT OF ZINC CHROMATE AND TWO (2) FIELD COATS OF ALUMINUM PAINT.

ALL REINFORCING STEEL STEEL SHALL BE OF INTERMEDIATE GRADE.

ALL [illegible] AS SHOWN ON THE PLANS EXCEPT THE [illegible] SLOPE OF THE FLOOR SLAB BETWEEN STRINGERS SHALL [illegible] SLAB AT FINISH.

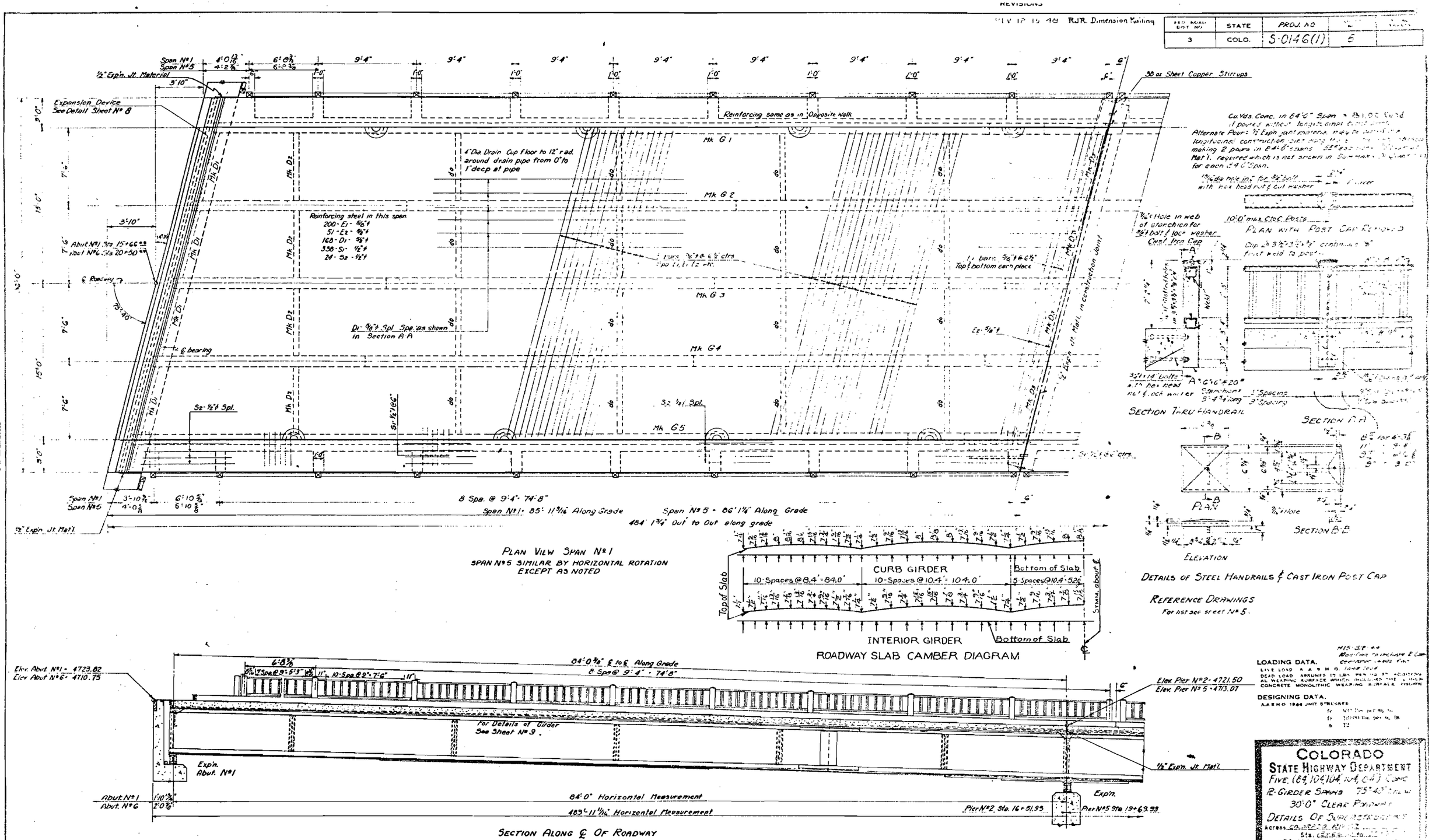
STRUCTURE No. 11-3-E

COLORADO
STATE HIGHWAY DEPARTMENT
Five (184'-104'-104'-104'-184') 18" Girder Spans
30'-0" Clear [illegible]
GENERAL [illegible]
[illegible]
[illegible]
[

REVISIONS

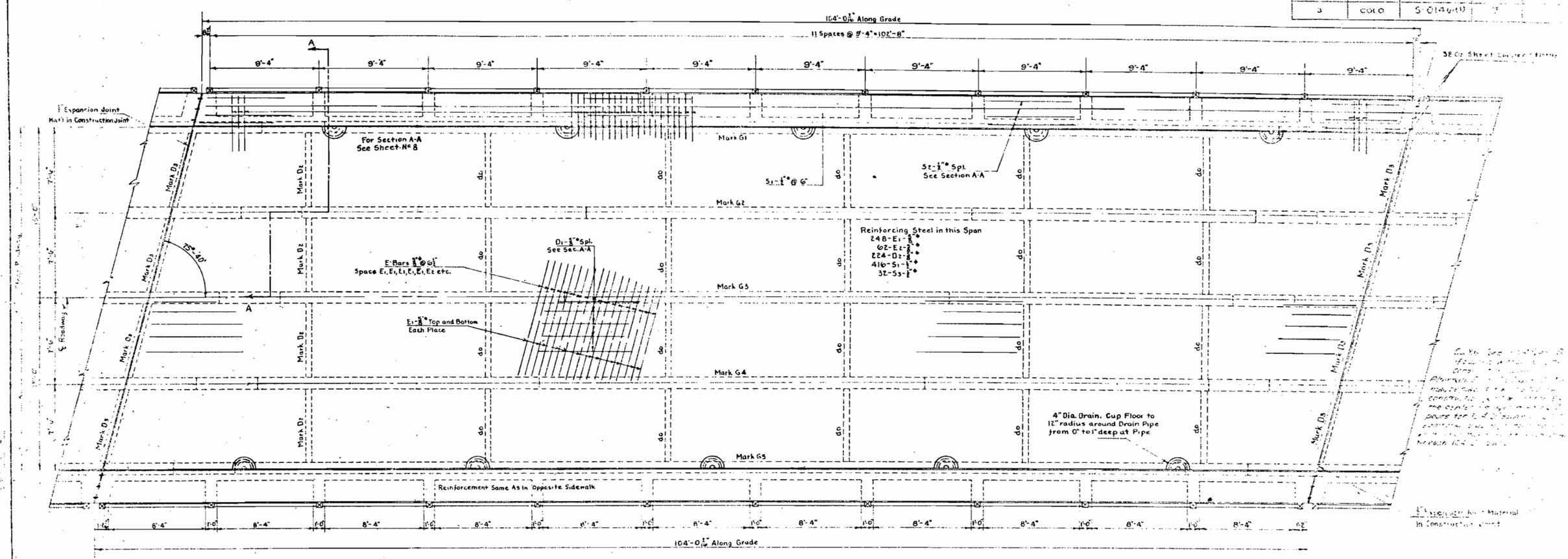
NOV 17 15 49 RJR. Dimension Railing

FED. ROAD DIST. NO.	STATE	PROJ. NO		
3	COLO.	S-0146(1)	5	

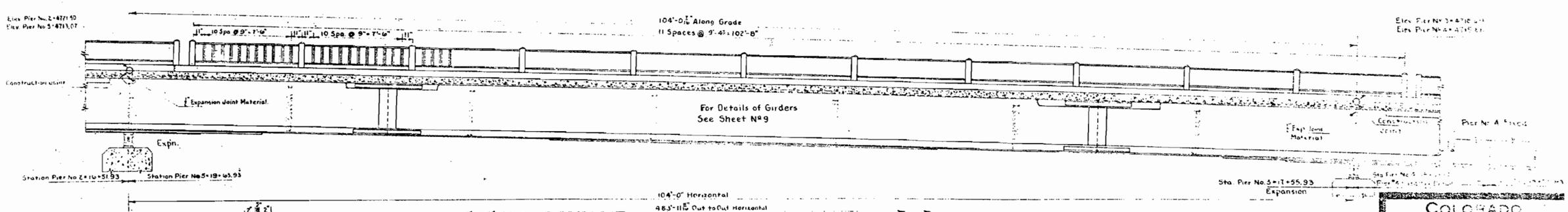


REVISIONS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	
3	COLO.	S-0143-(1)	



PLAN VIEW OF SPAN No 2



SECTION ALONG ℄ OF ROADWAY

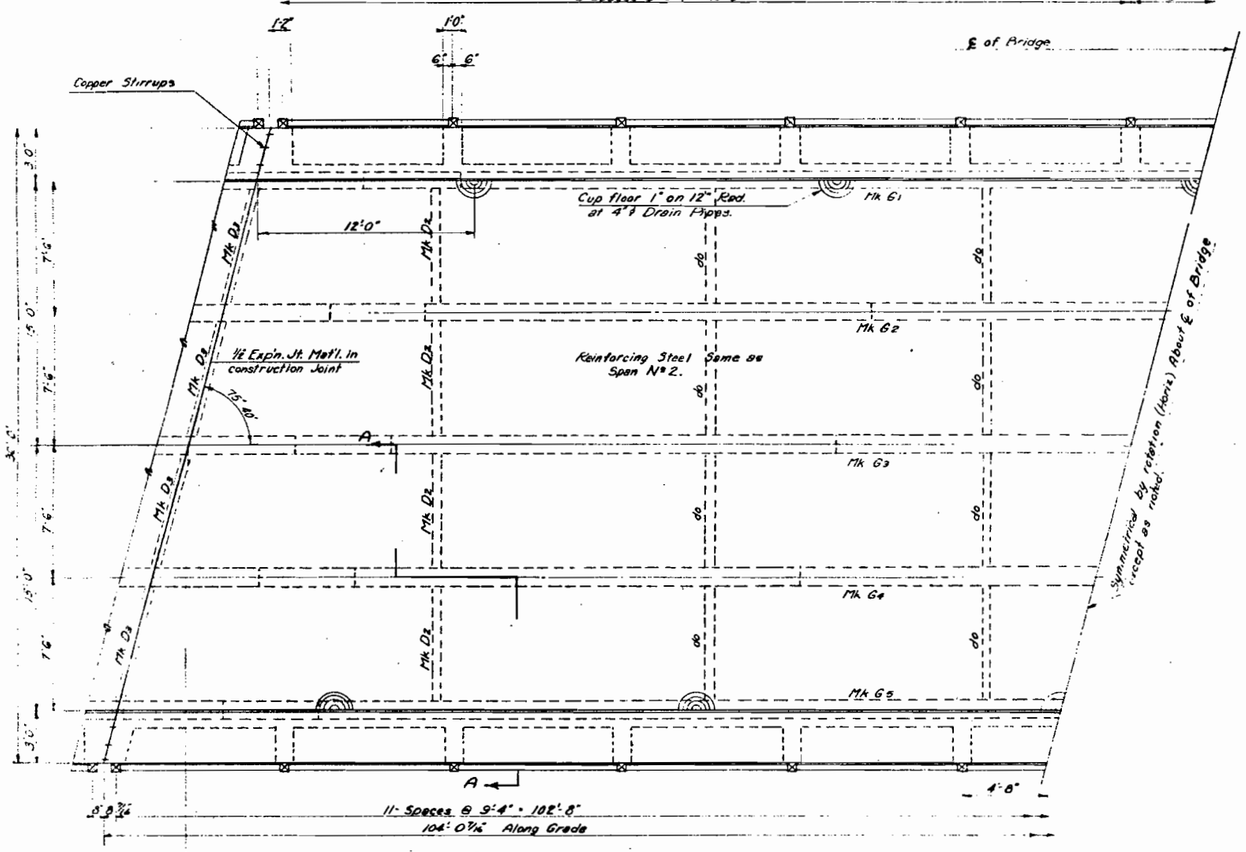
Reference Drawings
For Sheet Nos, See Sheet No. 5

DETAIL OF 38 OZ. SHEET COPPER STIRRUP

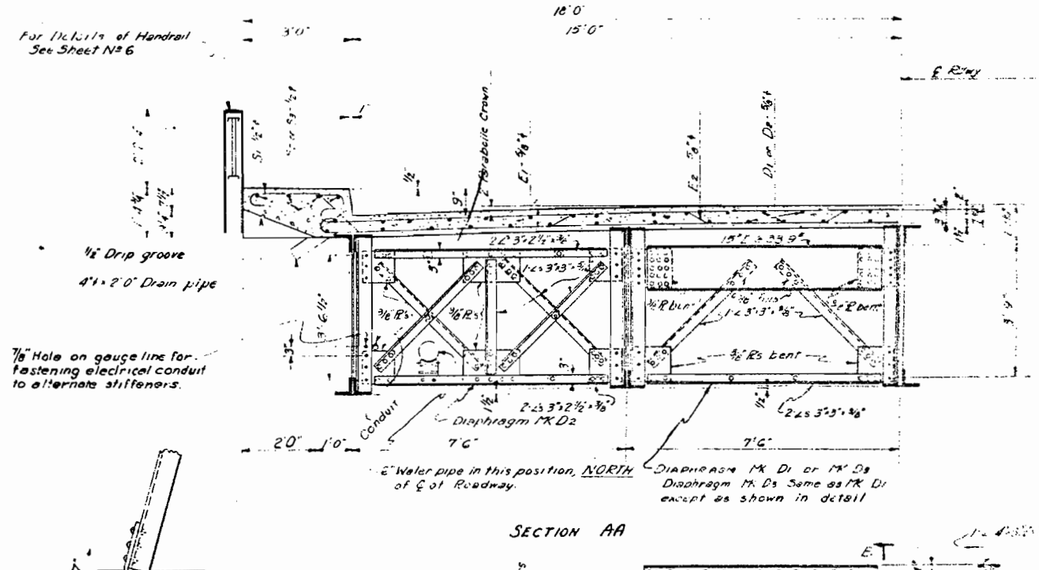
COLORADO
STATE HIGHWAY DEPARTMENT
FIVE [illegible]
RE-GIRDER SPANS [illegible]
30'-0" CLEAR ROADWAY
DETAILS OF SUPERSTRUCTURE
Across [illegible]
Sta. [illegible]
Near [illegible]
Designed by
Made by
Checked by
Date

STRUCTURE NO H-3-E

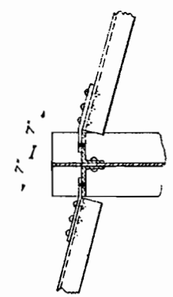
	STATE		
3	COLO	50146(1)	8



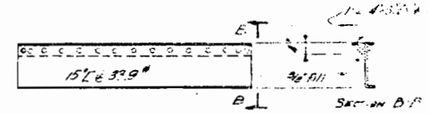
HALF PLAN OF SPAN No 3



SECTION AA

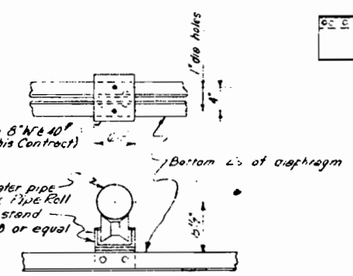


DETAIL OF END DIAPHRAGM CONNECTION



DIAPHRAGM Mk D3

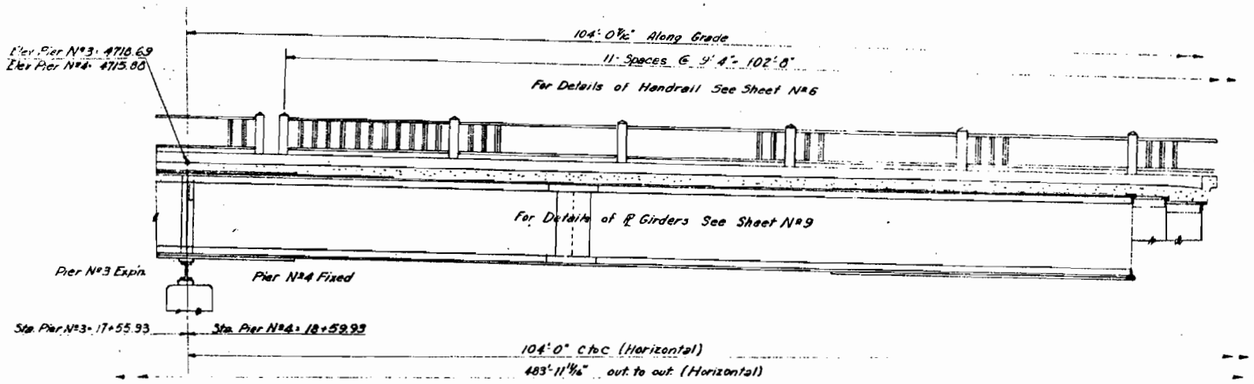
Parts not shown are the same as in diaphragm Mk D1



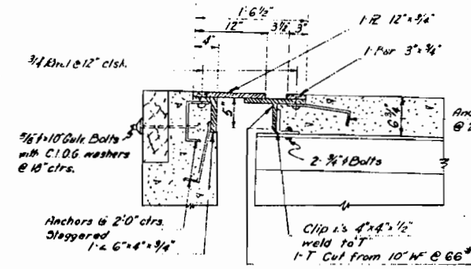
DETAIL OF 6" WATER PIPE SUPPORT

REFERENCE DRAWINGS

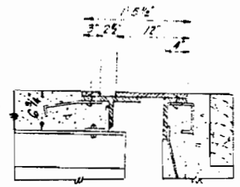
For list see sheet No 5.



SECTION ALONG ℄ OF ROADWAY

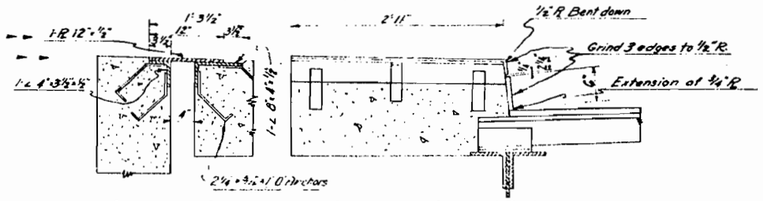


Details of Exp'n. Device at Abut. No 1



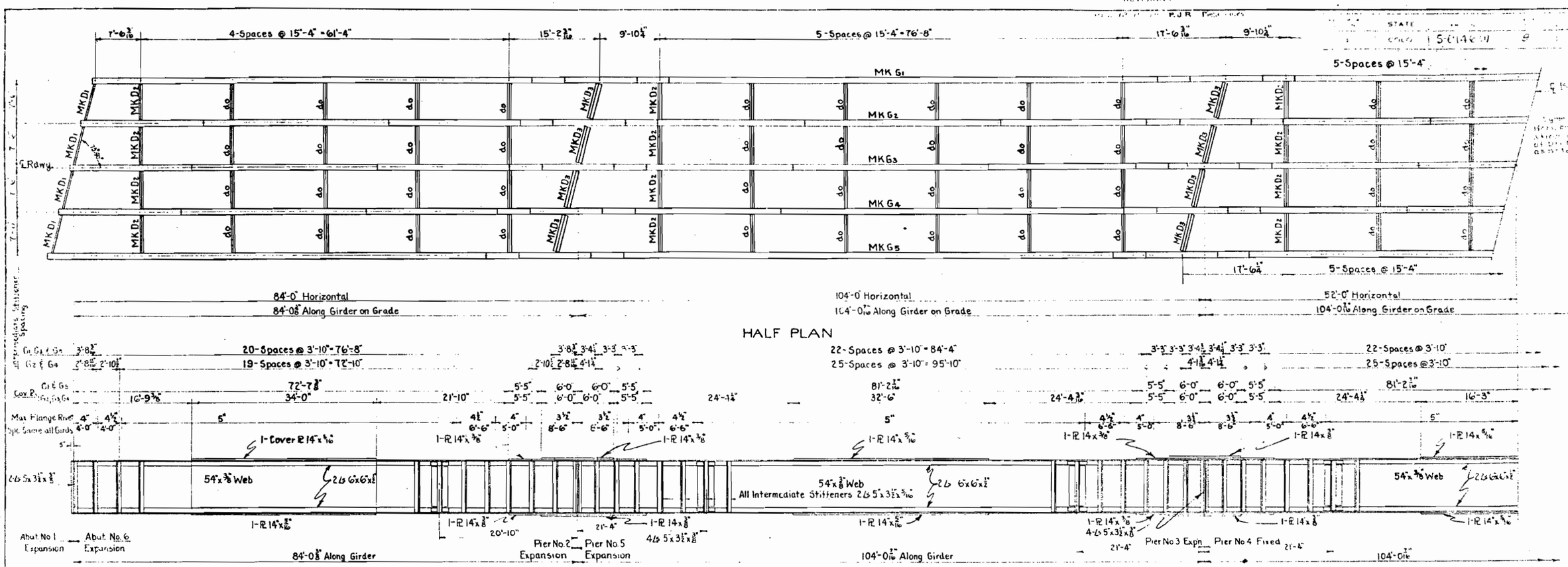
DETAIL OF EXP'N. DEVICE

at Abut No 6. Same as Abut. No 1 except as shown.



DETAIL OF SIDEWALK EXP'N. JT. AT EACH ABUT. 4 Req'd.

COLORADO
STATE HIGHWAY DEPARTMENT
FIVE (64) (104) (104) (84) [illegible]
℞ GIRDER SPAN [illegible]
30'-0" CLEAR ROADWAY
DETAILS OF SUPERSTRUCTURE
ACROSS [illegible]
[illegible]
Checked by [illegible] Date [illegible]

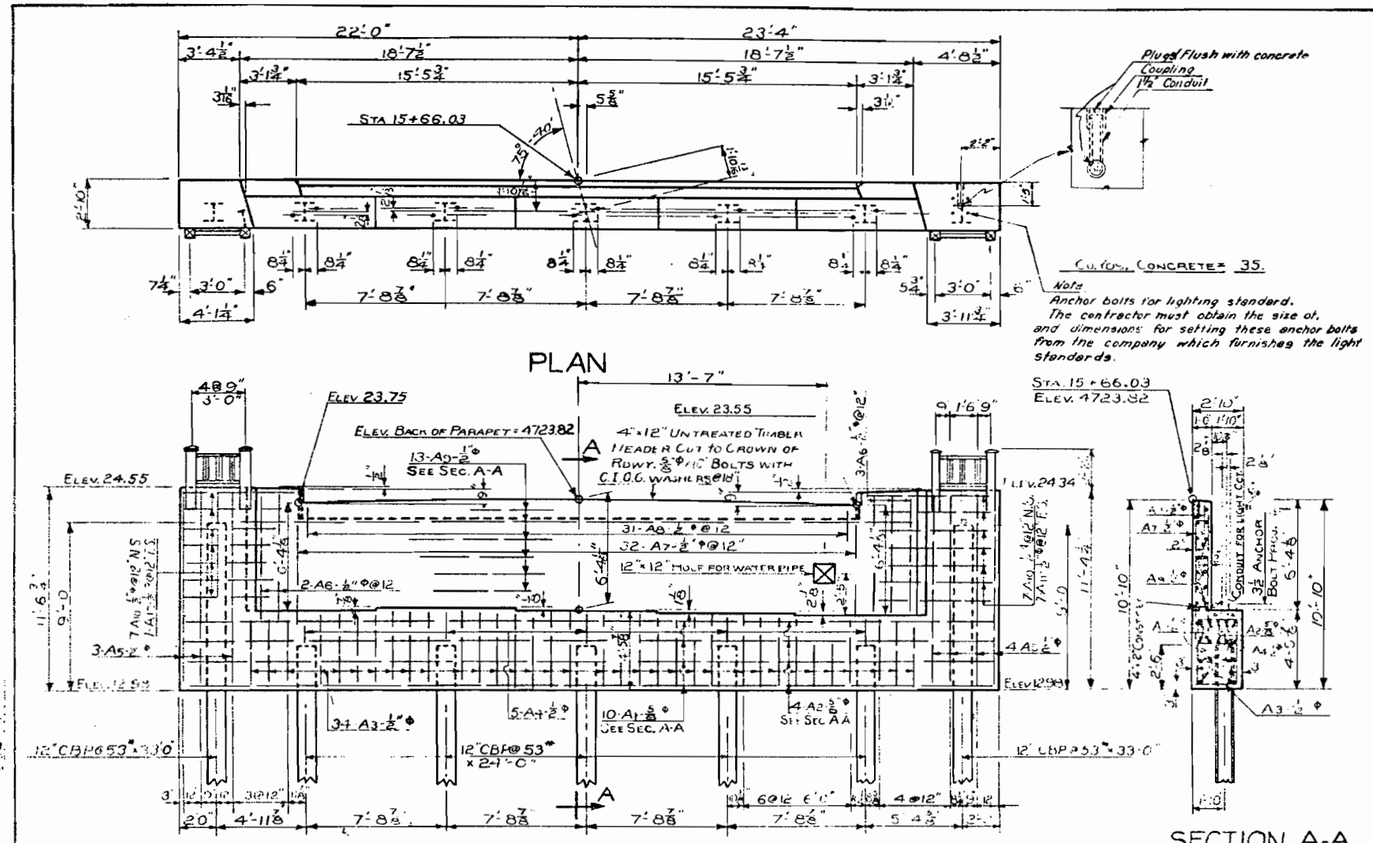


COLORADO
STATE HIGHWAY DEPARTMENT

STRUCTURE NO. H-3-E

REVISIONS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
3	COLO.	S 014-(1)	10



DETAILS OF ABUTMENT Nº 1

BAR LIST FOR ABUTMENT Nº 1								ABUT. FL.
MARK	SIZE	NO. REQ'D.	LENGTH	TYPE	ℓ	m		
A1	⅝"Φ	10	45'-0"	STR.				
A2	⅝"Φ	4	40'-0"	STR.				
A3	½"Φ	34	13'-2"	IV	2'-5"	3'-10"		
A4	½"Φ	5	8'-2"	IV	2'-5"	1'-4"		
A5	½"Φ	7	27'-2"	IV	2'-5"	10'-10"		
A6	½"Φ	5	18'-6"	V	8'-11"	0'-8"		
A7	½"Φ	32	5'-0"	V	1'-2"	0'-8"		
A8	½"Φ	31	2'-0"	STR.				
A9	½"Φ	13	37'-0"	STR.				
A10	½"Φ	14	3'-7"	STR.				
A11	½"Φ	7	5'-6"	STR.				
A12	½"Φ	7	5'-2"	STR.				

BAR SUMMARY FOR ABUT. Nº 1	FL
1926 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	1287.00 LBS.
610 " " ⅝"Φ BARS @ 1.043 #/LIN. FT. =	636.00 "
PLUS 1% ±	17.00 "
TOTAL =	1940.00 LBS.

BAR SUMMARY FOR ABUT. Nº 6	FL
5332 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	3562.00 LBS.
1134 " " ⅝"Φ @ 1.043 " " =	1183.00 "
371 " " ¾"Φ @ 1.502 " " =	557.00 "
1398 " " ⅞"Φ @ 2.044 " " =	2735.00 "
2381 " " 1"Φ @ 2.670 " " =	6357.00 "
842 " " 1"□ @ 3.400 " " =	2829.00 "
1602 " " 1¼"□ @ 4.303 " " =	6893.00 "
PLUS 1% ±	244.00 "
TOTAL =	24300.00 LBS.

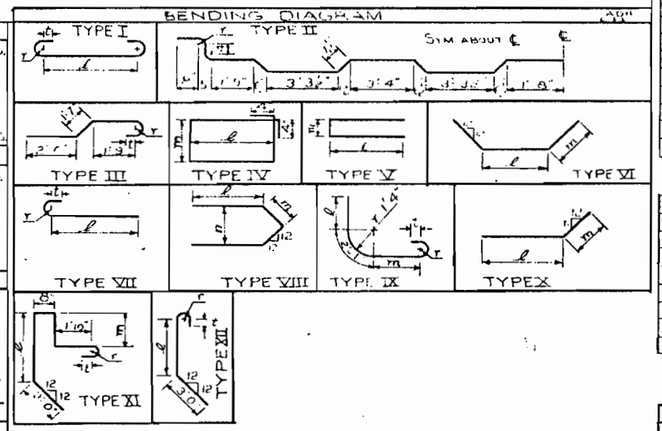
BAR SUMMARY FOR PIER Nº 2	FL
2096 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	1399.00 LBS.
1253 " " ⅝"Φ @ 1.043 " " =	1307.00 "
75 " " ⅞"Φ @ 2.044 " " =	153.00 "
530 " " 1"Φ @ 2.670 " " =	1415.00 "
484 " " 1"□ @ 3.400 " " =	1646.00 "
PLUS 1% ±	56.00
TOTAL =	5977.00 LBS.

BAR SUMMARY FOR PIER Nº 3	FL
2368 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	1582.00 LBS.
1625 " " ⅝"Φ @ 1.043 #/LIN. FT. =	1695.00 "
58 " " ¾"Φ @ 2.044 " " =	119.00 "
525 " " 1"Φ @ 2.670 " " =	1402.00 "
484 " " 1"□ @ 3.400 " " =	1646.00 "
PLUS 1% ±	66.00 "
TOTAL =	6510.00 LBS.

BAR SUMMARY FOR PIER Nº 4	FL
2535 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	1693.00 LBS.
2014 " " ⅝"Φ @ 1.043 " " =	2101.00 "
520 " " 1"Φ @ 2.670 " " =	1388.00 "
484 " " 1"□ @ 3.400 " " =	1646.00 "
PLUS 1% ±	72.00
TOTAL =	6900.00 LBS.

BAR SUMMARY FOR PIER Nº 5	FL
2141 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	1430.00 LBS.
1574 " " ⅝"Φ @ 1.043 " " =	1641.00 "
419 " " 1"Φ @ 2.670 " " =	1119.00 "
484 " " 1"□ @ 3.400 " " =	1646.00 "
PLUS 1% ±	64.00
TOTAL =	5900.00 LBS.

BENDING DIAGRAM



BAR LIST FOR PIERS Nº 2, Nº 3, Nº 4 & Nº 5												ABUT. FL.
MARK	SIZE	Nº REQ'D. PIER 2	PIER 3	PIER 4	PIER 5	LENGTH	TYPE	ℓ	m	n	r	t
P1	1"□	7	7	7	7	37'-8"	I	35'-0"			4"	3½"
P2	1"□	2	2	2	2	28'-8"	I	26'-0"			4"	3½"
P3	1"□	4	4	4	4	11'-5"	I	8'-9"			4"	3½"
P4	1"□	8	8	8	8	14'-8"	I	12'-0"			4"	3½"
P5	⅝"Φ	60	60	60	60	11'-8"	IV	1'-4½"	4'-1½"			
P6	⅝"Φ	6	6	6	6	9'-6"	VI	1'-6"	4'-0"			
P7	⅝"Φ	3	3	3	3	7'-4"	IV	1'-8"	1'-8"			
P8	⅝"Φ	3	3	3	3	7'-6"	IV	1'-8"	1'-8"			
P9	⅝"Φ	3	3	3		7'-8"	IV	1'-9"	1'-9"			
P10	⅝"Φ	3	3	3		7'-10"	IV	1'-9½"	1'-9½"			
P11	⅝"Φ	3	3	3		8'-0"	IV	1'-10"	1'-10"			
P12	⅝"Φ	3	3	3		8'-2"	IV	1'-10½"	1'-10½"			
P13	⅝"Φ	3	3			8'-4"	IV	1'-11"	1'-11"			
P14	⅝"Φ	3	3			8'-6"	IV	1'-11½"	1'-11½"			
P15	⅝"Φ	3				8'-8"	IV	2'-0"	2'-0"			
P16	⅝"Φ	3				8'-10"	IV	2'-0½"	2'-0½"			
P17	⅝"Φ	3				9'-0"	IV	2'-1"	2'-1"			
P18	1"Φ	12				26'-5"	STR.					
P19	⅝"Φ	6				12'-5"	VII	11'-3"			3"	3"
P20	1"Φ	6				21'-9"	VII	20'-5"			4"	3½"
P21	⅝"Φ	24	34	40	32	28'-0"	IR.					
P22	⅝"Φ	46				14'-0"	VII	13'-2"			2½"	2"
P23	1"Φ	12	12	12	12	6'-10"	VII	5'-6"			4"	3½"
P24	⅝"Φ		46			17'-1"	STR.					
P25	1"Φ		12			27'-11"	STR.					
P26	1"Φ		6			18'-0"	VII	16'-8"				
P27	⅞"Φ		6			9'-8"	VII	8'-6"				
P28	⅝"Φ			46		19'-6"	STR.					
P29	⅝"Φ		46	46	46	5'-0"	VII	4'-0"				
P30	1"Φ			12		28'-5"	STR.					
P31	1"Φ			6		16'-1"	VII	14'-9"				
P32	⅝"Φ				46	16'-6"	STR.					
P33	1"Φ				12	21'-11"	STR.					
P34	1"Φ				6	12'-4"	VII	11'-0"				
P35	⅝"Φ				4	5"	VIII	2'-6"	1'-0"	1'-8"		
P36	⅝"Φ				1	7'-7"	VIII	2'-0"	1'-3"	1'-9"		
P37	⅝"Φ		2	4	1	7'-8"	VIII	2'-6"	1'-4"	1'-10"		
P38	⅝"Φ		4	4	4	7'-9"	VIII	2'-6"	1'-5"	1'-11"		
P39	⅝"Φ	4	4	4	4	7'-11"	VIII	2'-6"	1'-5"	2'-3"		
P40	⅝"Φ	4	4	4	4	8'-0"	VIII	2'-6"	1'-6"	2'-3"		
P41	⅝"Φ	4	4	4	4	8'-1"	VIII	2'-6"	1'-6"	2'-3"		
P42	⅝"Φ	4	4	4	4	8'-3"	VIII	2'-6"	1'-7"	2'-3"		
P43	⅝"Φ	4	4	4		8'-4"	VIII	2'-6"	1'-8"	2'-4"		
P44	⅝"Φ	4	4	4		8'-6"	VIII	2'-6"	1'-9"	2'-5"		
P45	⅝"Φ		4	4		8'-7"	VIII	2'-6"	1'-9½"	2'-6"		
P46	⅝"Φ			4		8'-8"	VIII	2'-6"	1'-10"	2'-6"		
F1	⅝"Φ	72	72			7'-8"	I	6'-0"			2½"	2"
F2	½"Φ	7	7	7		35'-6"	STR.					
F3	⅝"Φ			108		7'-10"	I	6'-2"			2½"	2"
F4	⅝"Φ				72	7'-4"	I	5'-8"			2½"	2"

BAR LIST FOR SUPERSTRUCTURE									ABUT. FL.
MARK	SIZE	NO. REQ'D.	LENGTH	TYPE	ℓ		r	t	
E1	⅝"Φ	1144	33'-9"	I	32'-1"		2½"	2"	
E2	⅝"Φ	288	35'-0"	II			2½"		
D1	⅝"Φ	336	29-10"	STR.					
D2	⅝"Φ	672	28-0"	STR.					
S1	½"Φ	1924	6'-0"	III			2"	2"	
S2	½"Φ	48	29-5"	STR.					
S3		96	27'-6"	STR.					

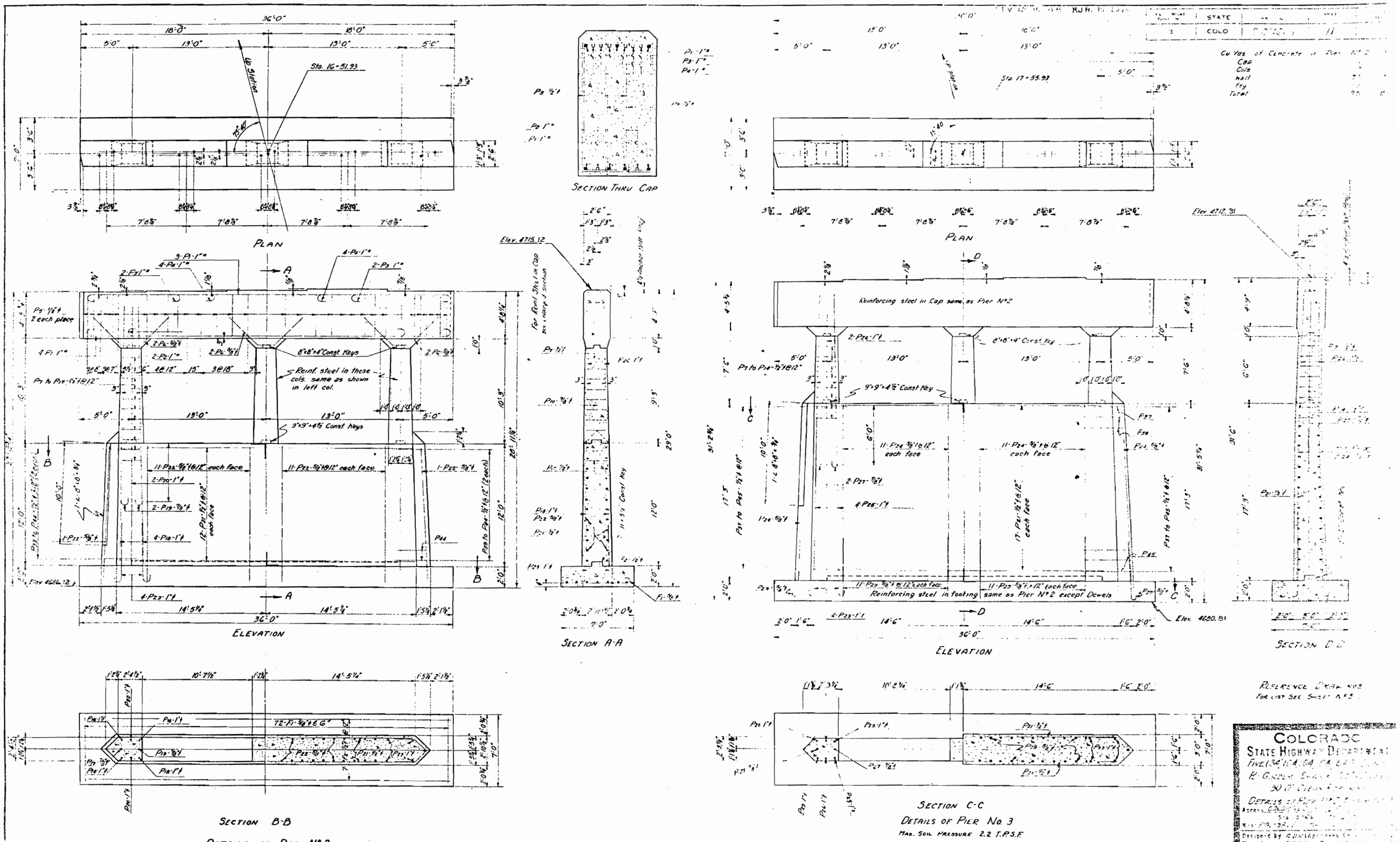
BAR SUMMARY FOR SUPERSTRUCTURE	FL
15,996 LIN. FT. ½"Φ BARS @ 0.668 #/LIN. FT. =	10,418.00 LBS.
77530 " " ⅝"Φ @ 1.043 " " =	80864.00 "
PLUS 1% ±	9.00 "
TOTAL =	92,200 LBS.

BAR LIST FOR ABUTMENT

MARK	SIZE	NO. REQ'D.	LENGTH	TYPE	ℓ	m		
[illegible]								

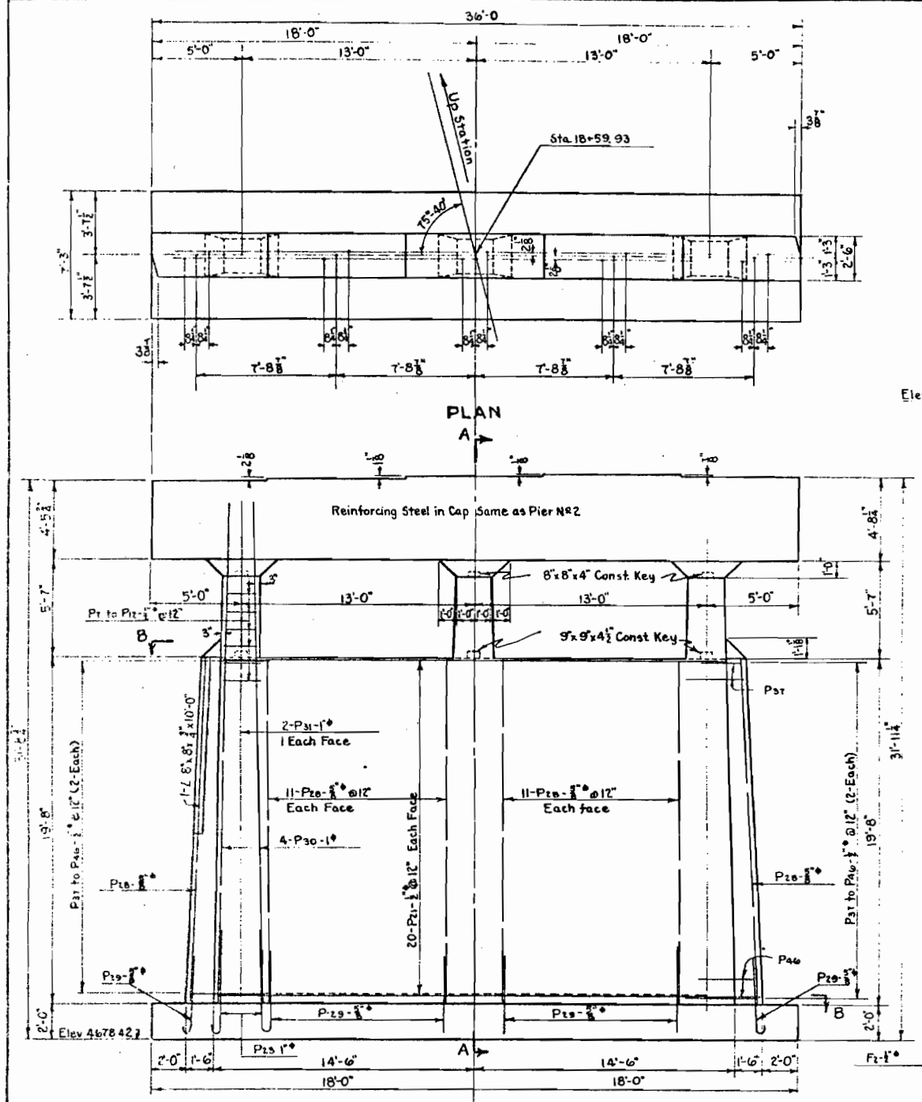
REF. DWG.
SEE SHT. 5 FOR LIST

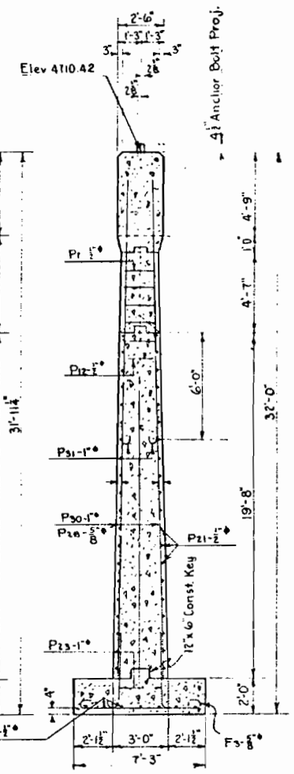
COLORADO
STATE HIGHWAY DEPARTMENT
5-(64)(1)-4.10-[illegible]
PL GIRDER SPANS [illegible]
SKEW - 30° [illegible]
[illegible]
BAR LIST AND [illegible]
[illegible]

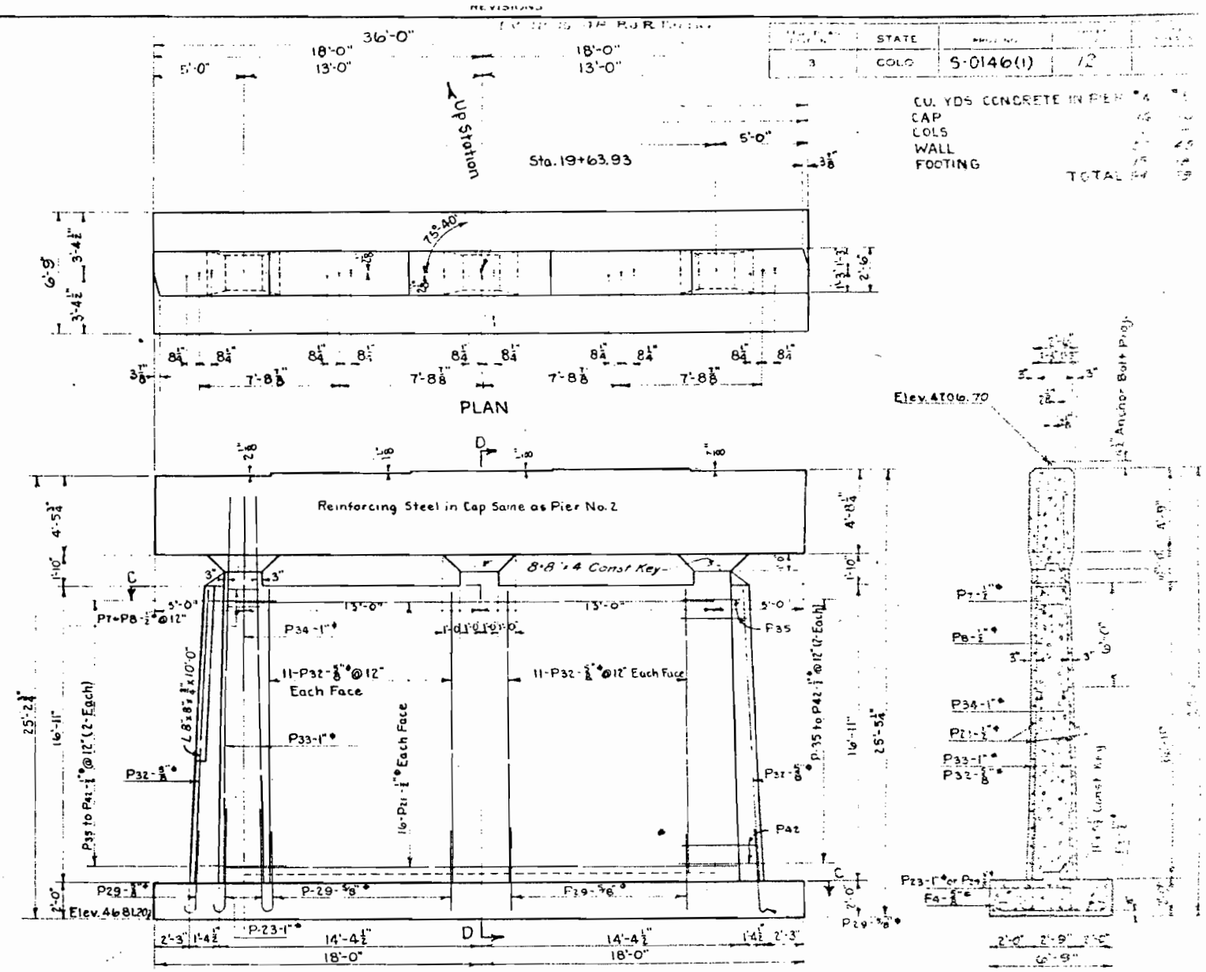

PLAN
SECTION THRU CAP
ELEVATION
SECTION A-A
SECTION B-B
DETAILS OF PIER Nº 2
MAX. SOIL PRESSURE = 2.0 T.P.S.F.
PLAN
ELEVATION
SECTION D-D
SECTION C-C
DETAILS OF PIER No 3
MAX. SOIL PRESSURE 2.2 T.P.S.F.
Reinforcing steel in Cap same as Pier Nº2
Reinforcing steel in footing same as Pier Nº2 except Dowels
Reinf. steel in these cols. same as shown in left col.
8'-8"×4' Const Keys
9'-9"×4½' Const Key
3'×9'×4½' Const Keys
STATE
COLO
STRUCTURE NO H-3-E
COLORADO
STATE HIGHWAY DEPARTMENT

	STATE		
3	COLO	S-0146(1)	12

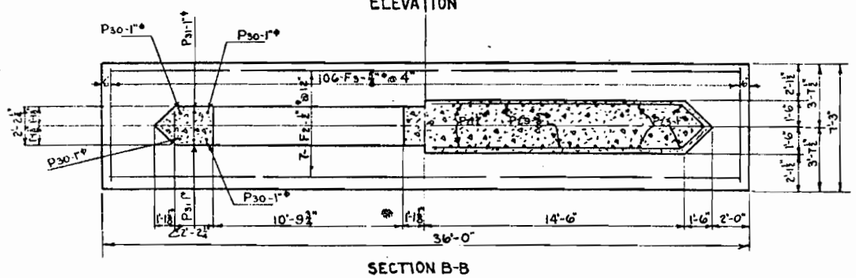
CU. YDS CONCRETE IN PER "A"
CAP
COLS
WALL
FOOTING
TOTAL



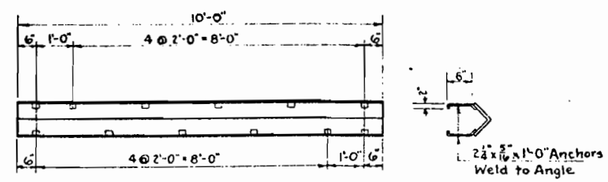




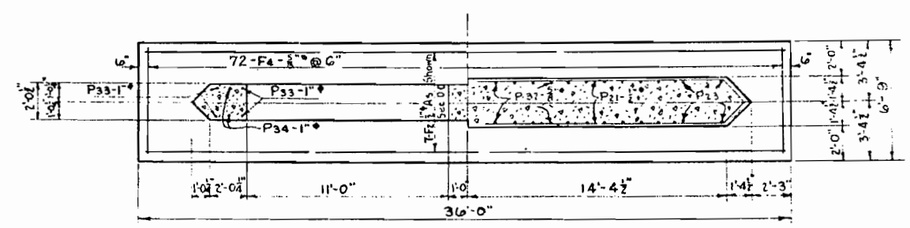
Reference Drawings
For List See Sheet No. 5



DETAILS OF PIER No. 4
Max. Soil Pressure = 3.6 T.P.S.F.



DETAILS OF 8"x8"x⅝"x10'-0" ∠ IN UP-STREAM PIER NOSE
4-REQ'D



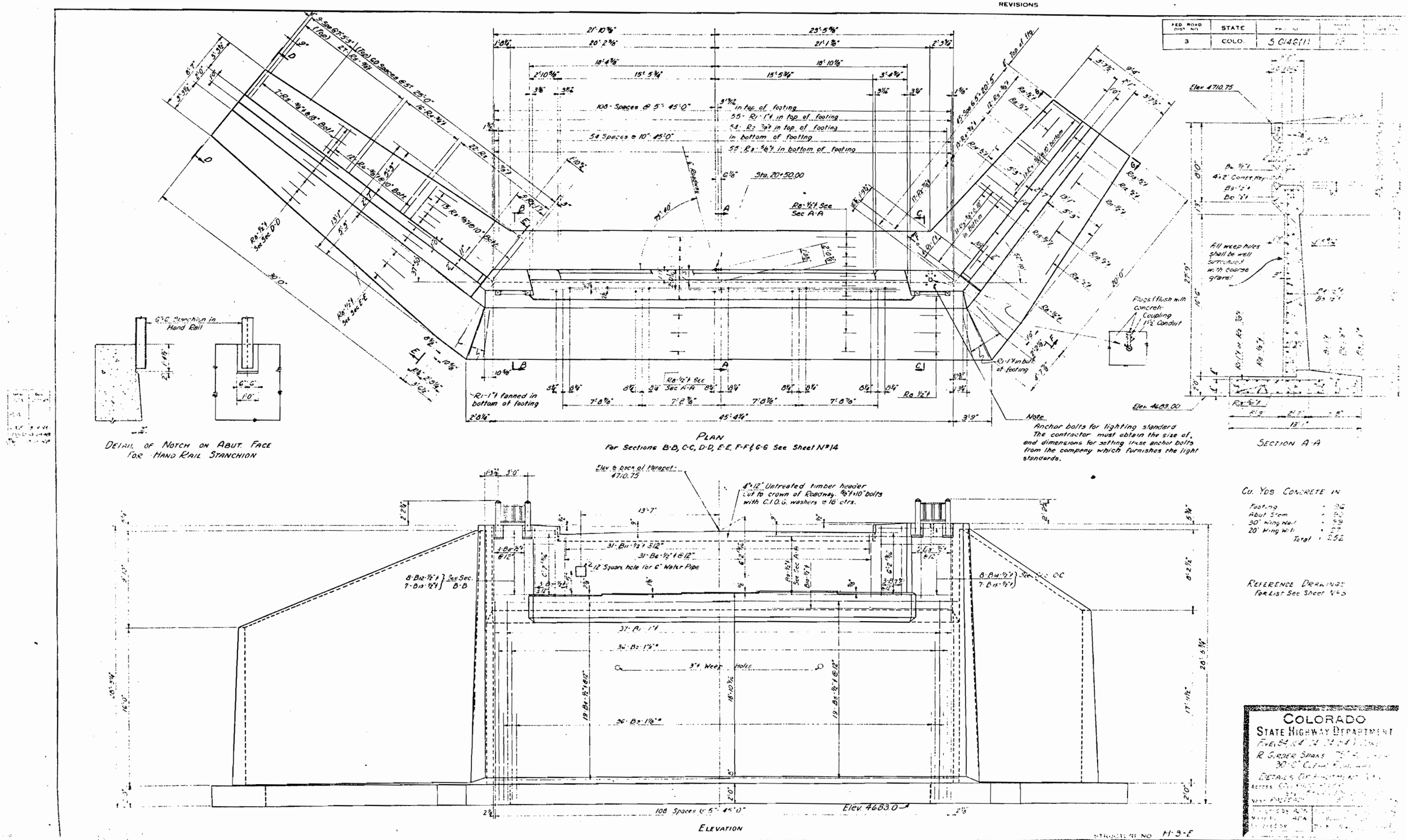
DETAILS OF PIER No. 5
Max. Soil Pressure = 2.2 T.P.S.F

COLORADO
STATE HIGHWAY DEPARTMENT
5(24,124,104,106 [illegible]
PLATE GIRDER SPAN 75' [illegible]
30'-0" ROADWAY
DETAILS OF
PIER NO 4 AND PIER NO 5
Across COLE [illegible]
Made For [illegible]
Drawn By [illegible]
Checked By [illegible]
Checked By [illegible]

STRUCTURE NO. H-3-F

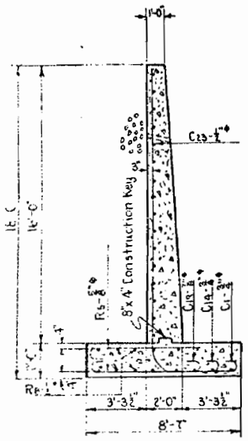
REVISIONS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
3	COLO.	S 0142(1)	12

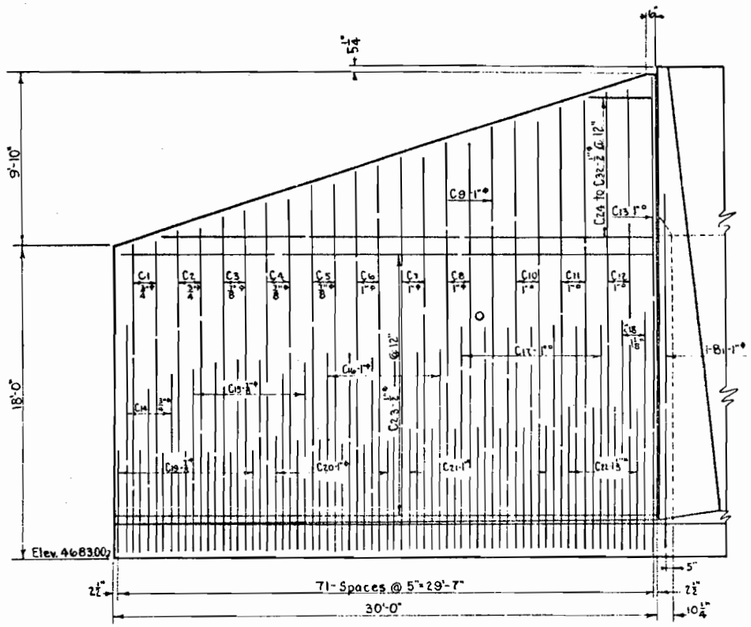


REVISIONS

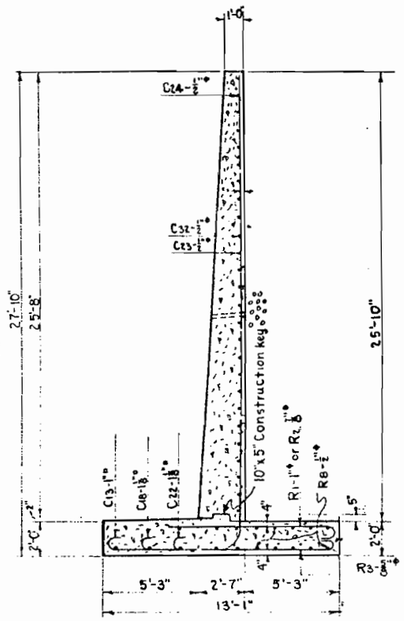
FED. ROAD DIV.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S-0146(1)	4	



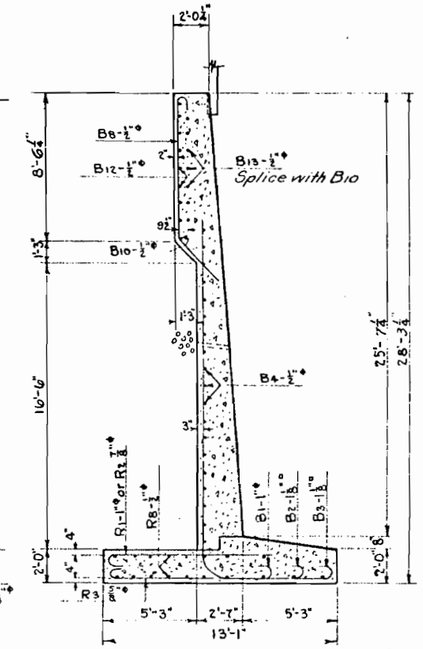
SECTION D-D



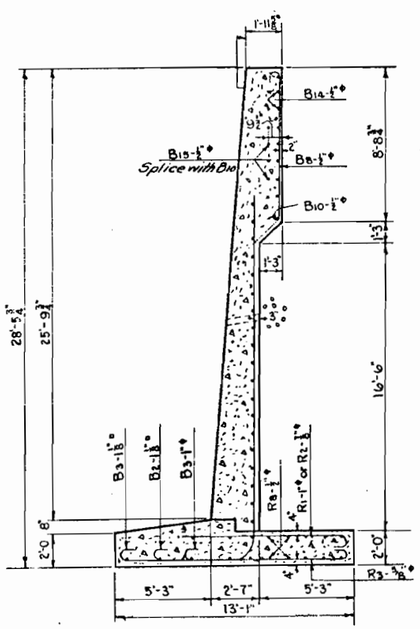
TRUE ELEVATION OF 30'-0 WING WALL



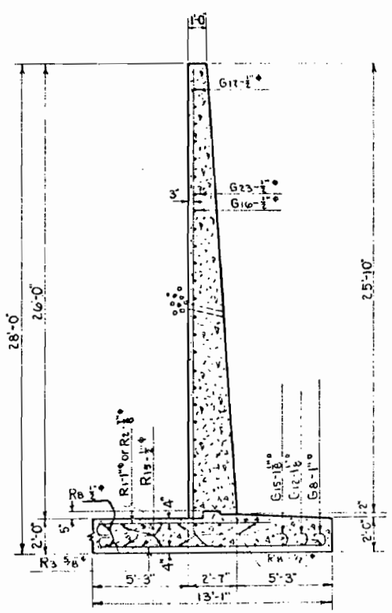
SECTION E-E



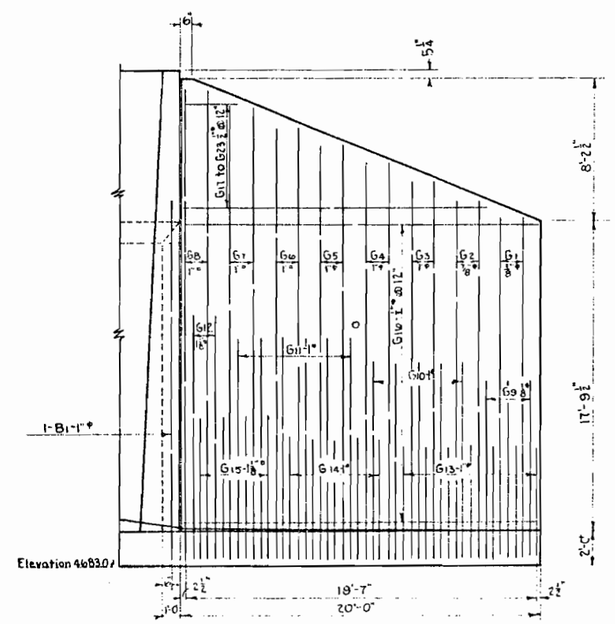
SECTION B-B



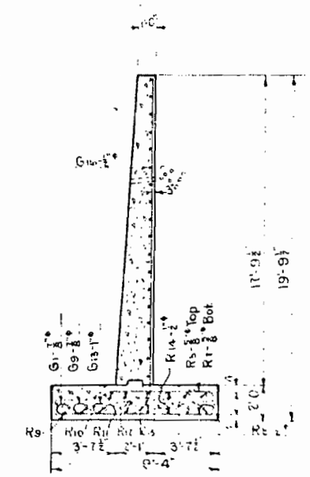
SECTION C-C



SECTION F-F



TRUE ELEVATION OF 20'-0" WING WALL



SECTION G-G

Reference Drawing
For List See Sheet 1-B

COLORADO
STATE HIGHWAY DEPARTMENT
SUBSTRUCTURE
CONCRETE
50' OF ROAD
DETAILS OF ABUTMENTS
across Colorado River
near Palisade

Made by A.J.N.
Checked by
Bridge Engineer
Date

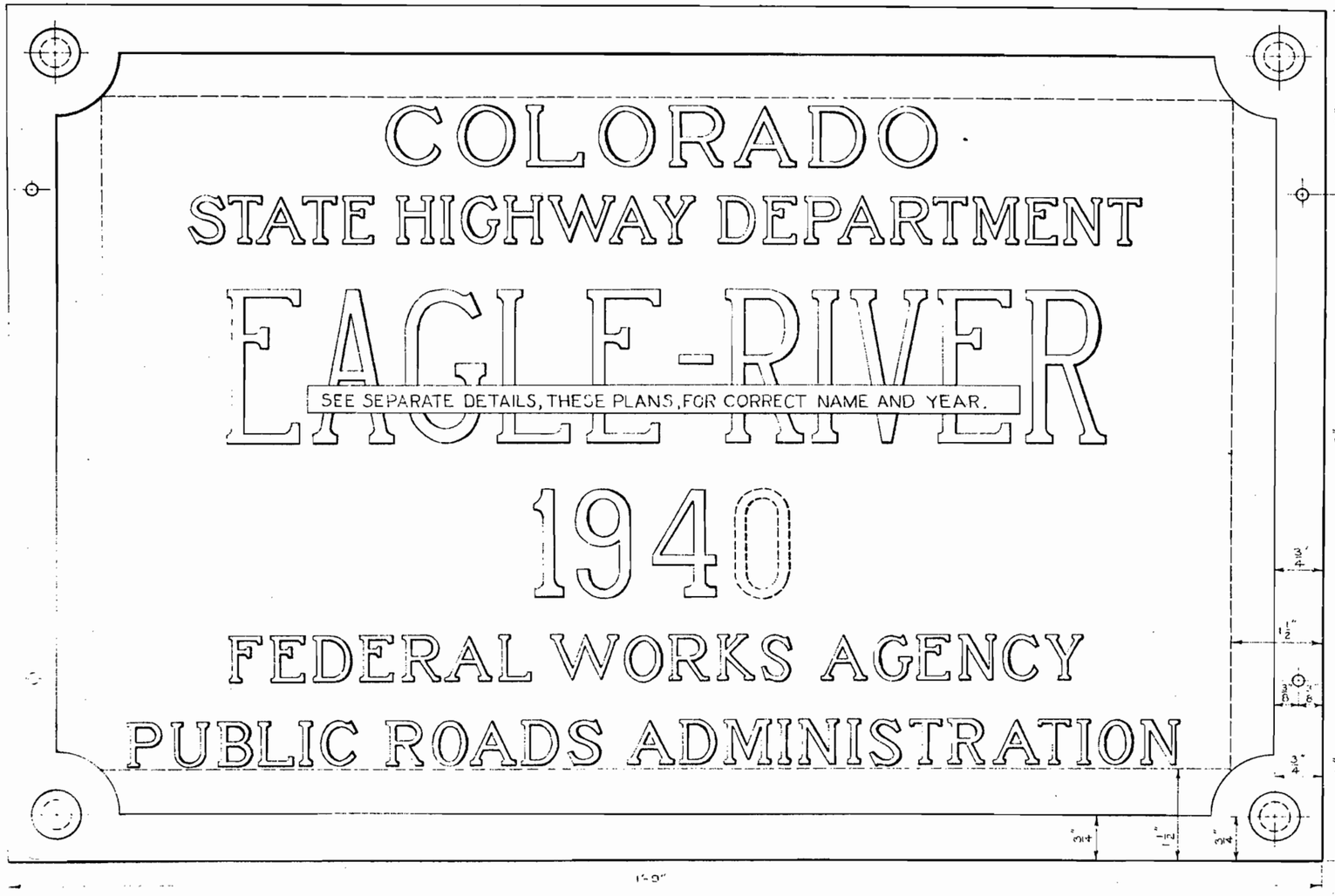
STRUCT. NO. H-3-E

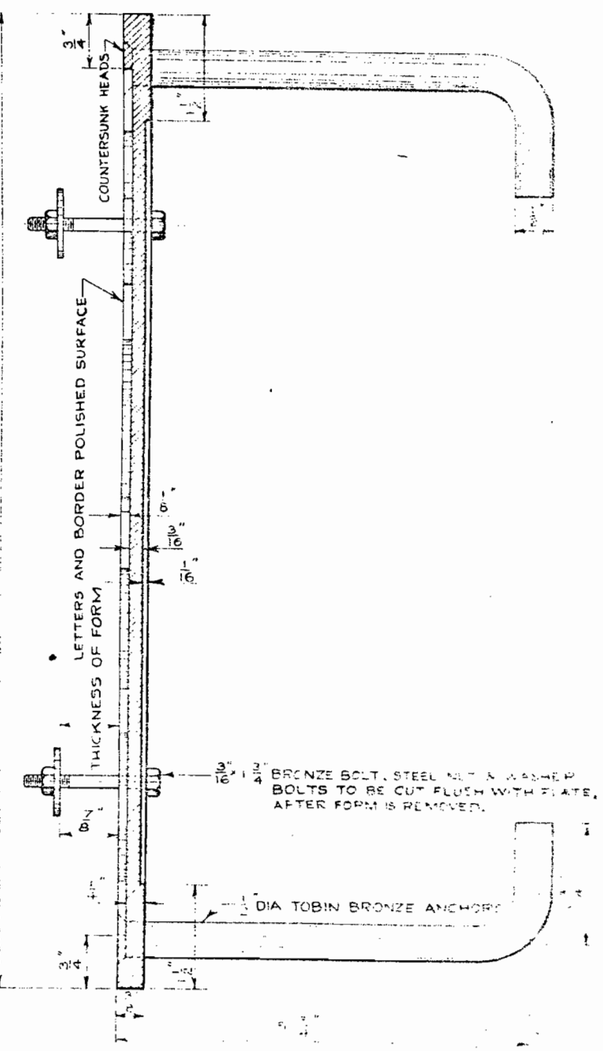
REVISIONS

FED. ROAD DIST. NO.	STATE
3	COLO.

Rev 12-13-47 JPK

STANDARD M-6-E





BRONZE NAME PLATE
ITEM № 80b

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JANUARY 1, 1945

COLORADO
STATE HIGHWAY DEPARTMENT
TYPICAL
STANDARD
NAME PLATE

APPROVED _____ STA. _____

DATE _____ DRAWN BY _____ CHECKED BY _____

STRUCTURE NO.

REVISIONS

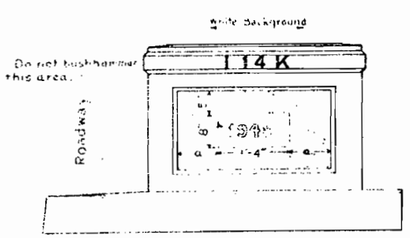
Rev 12-13-47 J.P.K.

STANDARD M-10-B.

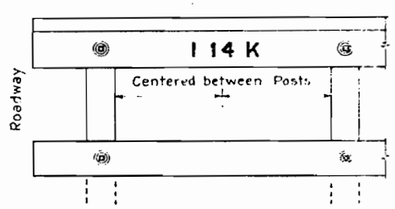
FED. ROAD DIST. NO.	STATE
3	COLO.

SAMPLE BRIDGE NUMBER

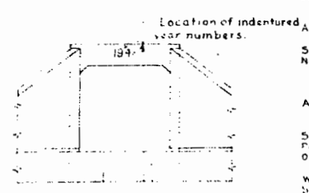
SAMPLE YEAR NUMBER



TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX CULVERTS

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 1ST 1948.

COMPENSATION FOR THIS WORK SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT BE PAID FOR AS A SEPARATE ITEM.

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.

THE CORRECT NUMBER FOR EACH BRIDGE IS SHOWN IN THE LOWER RIGHT HAND CORNER OF THE DETAIL SHEETS FOR THAT BRIDGE.

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 ACCEPTABLE WHITE PAINT IS NOT FOUND ON THE BRIDGE. PRIOR TO PAINTING THE SURFACE MUST BE THOROUGHLY DRILD, CLEANED AND PROPERLY SIZED. ON TIMBER SURFACES THE WHITE PAINT MUST BE ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY THE CORRECT STRUCTURE NUMBER SHALL BE APPLIED TO THE BRIDGE WITH TWO COATS OF ACCEPTABLE LOW DARK OR LETTERING PAINT (MAINT) AS SPECIFIED UNDER ITEM MISCELLANEOUS AND USING THE BRACKETS AND STENCILED LETTERS AND FIGURES. SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE THEM A SOLID LINE.

SUFFICIENT TIME BETWEEN SUCCESSIVE COATS SHALL BE ALLOWED TO PERMIT THEM TO DRY.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
LETTERS AND FIGURES
FOR
YEAR NUMBERS AND
STRUCTURE NUMBERS

STRUCTURE NO.

STANDARD M-10-B

REVISIONS

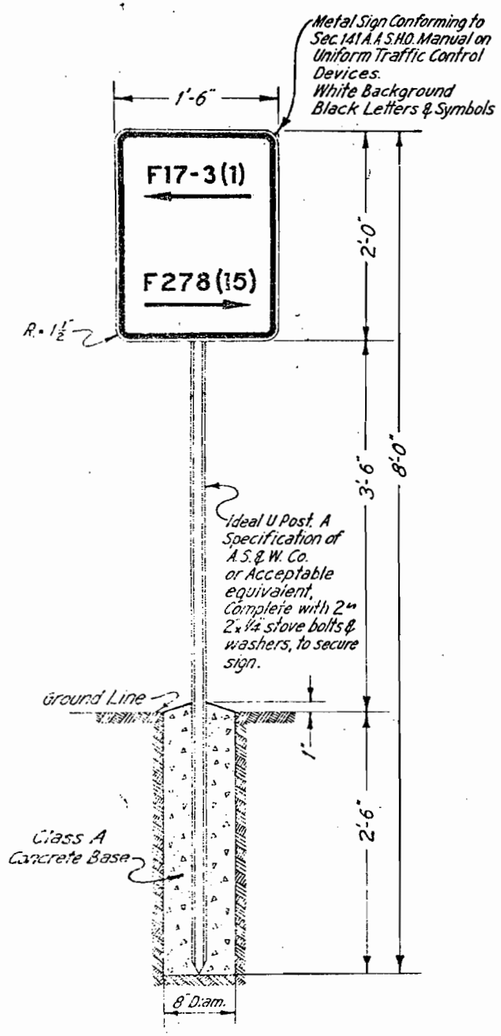
Rev. 6-28-40, A.Z. 1940 Specs.
Rev. 1-2-46, C.S.D. Item 81a
Rev. 8 Jan. 46 P.S.B. 1/2" ⌀ to 1/2" ϕ
Rev. June 10 '46, W.E.M. Bronze Tablet
Rev. Mar. 21-1947, W.H.M. – Project Marker Post.
Rev. Nov 20-1947, J.P.K. re Metal Project Marker
Rev. Dec. 13-1947, J.P.K. re Concrete Base for Metal Project Marker

STANDARD M-7-B

FED. ROAD DIST. NO.	STATE	SHEET NO.
3	COLO.	

PROJECT MARKER POST

ITEM Nº 81a



NOTES FOR PROJECT MARKER POSTS

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948

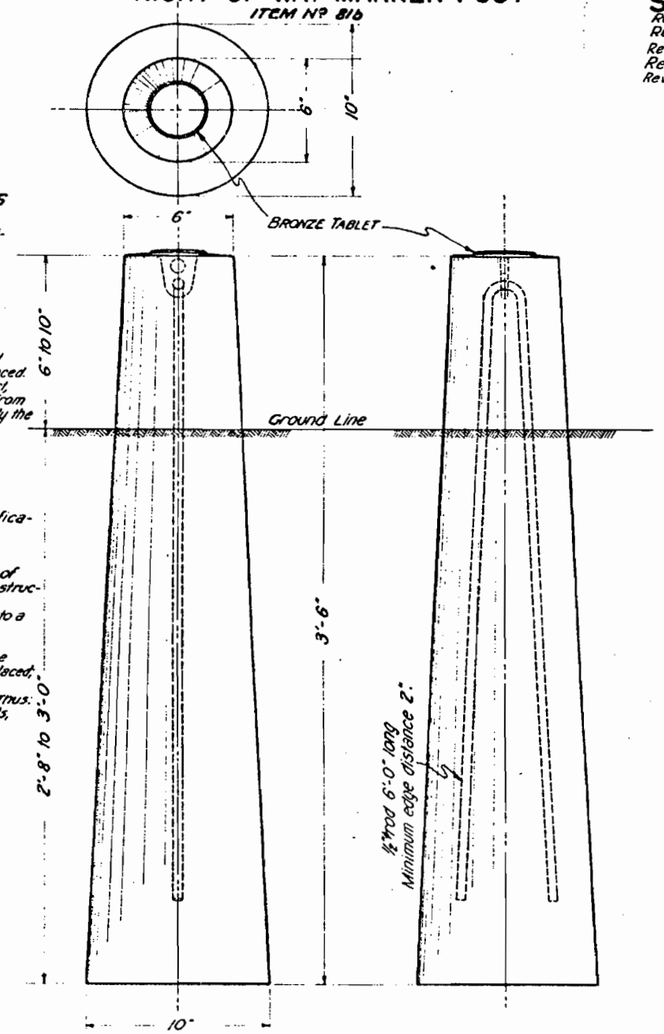
Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed. Post to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will indicate properly the projects to which it refers.

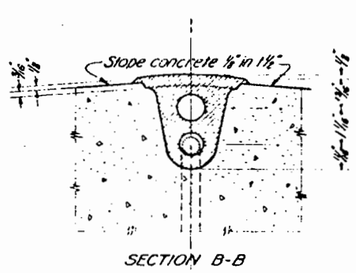
NOTES FOR R.O.W. MARKER POSTS

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948
Posts shall be made of Class "A" Concrete.
The upper 12 inches of marker posts shall be rubbed free of form marks, and the top surface of the post must be constructed to drain thoroughly.
All exposed surfaces of the bronze tablet are to be ground to a smooth surface.
All letters are to be depressed a minimum of 1/8 inch.
Information on the bronze tablet indicated by pin lines is to be stamped in the field by the engineering party after post is placed.
3/8 inch letters and figures to be used.
Project designations on tablets shall be properly shown. Thus: "F.A.P. Nº" for Federal Aid Projects, "S.P. Nº" for State Projects, P.W.A. Nº for P.W.A. Projects, etc.

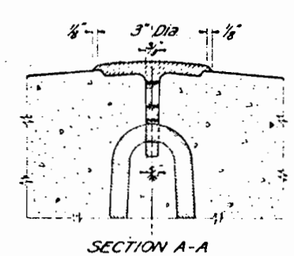
RIGHT OF WAY MARKER POST

ITEM Nº 81b





SECTION B-B



SECTION A-A

DETAIL OF BRONZE TABLET
FOR RIGHT OF WAY MARKER POST

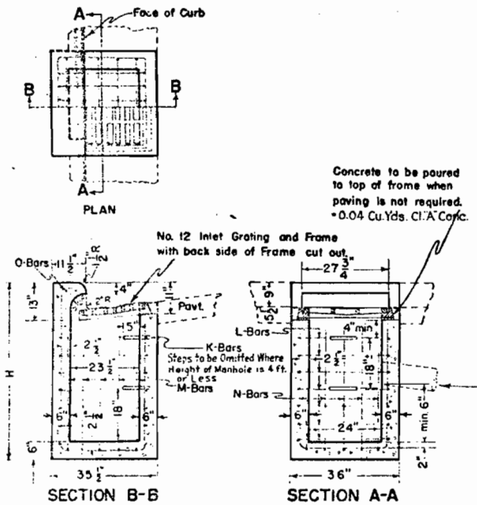
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
MARKER POSTS

STANDARD M-12-C 13

FED. ROAD DIST. NO.	STATE	SHEET	TOTAL SHEETS
3	COLO.		

Revision 1-10-46 B.B. Changed Standard No.
Revised 12-13-47 J.P.N.
Rev. 2-11-48 Extended tables to H=8' GRB

NO. 12 CONCRETE INLET



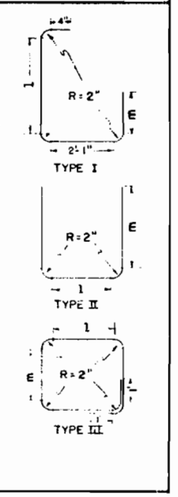
BAR LIST FOR H = 3' 0"

MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS l	DIMENSIONS m
K	3/4"ø	*Note	2' 6"	II	0' 8"	0' 8"
L	1/2"ø	3	12' 0"	III	2' 2"	2' 2"
M	1/2"ø	5	5' 5"	II	2' 1"	*1' 5"
N	1/2"ø	5	6' 11"	I	*2' 3"	*1' 6"
O	1/2"ø	2	2' 7"	STR	—	—

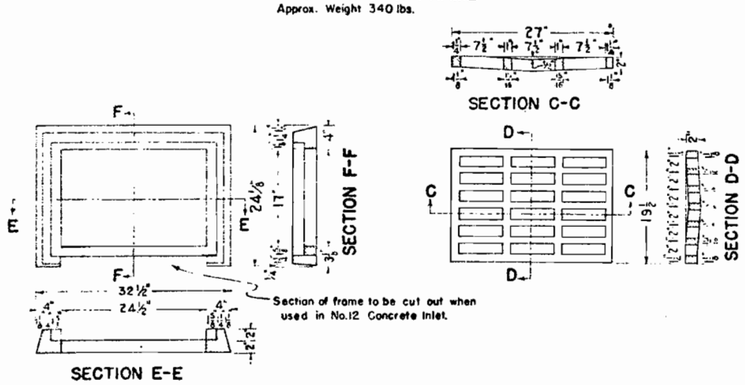
* Omit K bars when H is 4'-0" or less.

• These dimensions to be increased in increments of 6" for H above 3'-0"
Add 1 L bar for each 6" additional height above 3'-0"
K bars required as follows:
H= 4'-6" to 5'-6" - 1 bar; H= 9'-0" to 10'-0" - 4 bars
H=6'-0" to 7'-0" - 2 bars;
H= 7'-6" to 8'-6" - 3 bars;
Cut or bend bars around pipes as required.

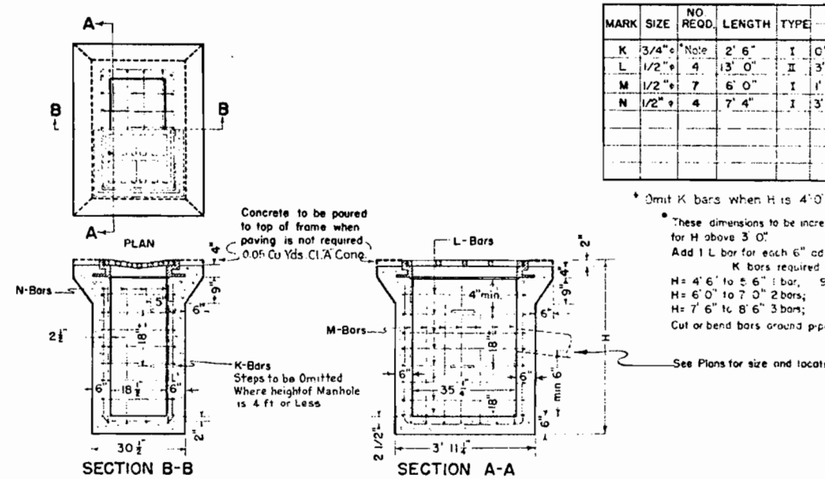
BENDING DIAGRAM



NO. 12
INLET GRATING & FRAME
Approx. Weight 340 lbs.



NO. 13 CONCRETE INLET



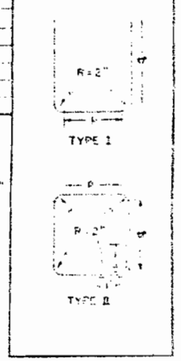
BAR LIST FOR H= 3'0"

MARK	SIZE	NO REQD.	LENGTH	TYPE	DIMENSIONS p	DIMENSIONS q
K	3/4"ø	*Note	2' 6"	I	0' 6"	0' 8"
L	1/2"ø	4	13' 0"	II	3' 1"	1' 9"
M	1/2"ø	7	6' 0"	I	1' 8"	*1' 11"
N	1/2"ø	4	7' 4"	I	3' 0"	*1' 11"

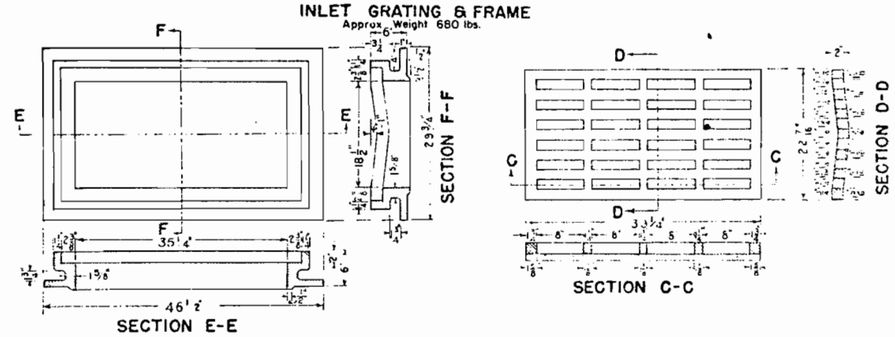
* Omit K bars when H is 4'-0" or less

• These dimensions to be increased in increments of 6" for H above 3'-0"
Add 1 L bar for each 6" additional height above 3'-0"
K bars required as follows:
H= 4'-6" to 5'-6" - 1 bar, 5'-0" to 10'-0" - 4 bars
H= 6'-0" to 7'-0" - 2 bars;
H= 7'-6" to 8'-6" - 3 bars;
Cut or bend bars around pipes as required

BENDING DIAGRAM



NO. 13
INLET GRATING & FRAME
Approx. Weight 680 lbs.



QUANTITIES

H	CLASS "A" CONCRETE CU. YDS.	REINFORCING STEEL
3' 0"	0.54	70 lbs
3' 6"	0.63	85 "
4' 0"	0.72	100 "
4' 6"	0.81	119 "
5' 0"	0.90	137 "
5' 6"	0.99	152 "
6' 0"	1.08	166 "
6' 6"	1.17	185 "
7' 0"	1.27	200 "
7' 6"	1.36	215 "
8' 0"	1.45	233 "
8' 6"	1.54	248 "
9' 0"	1.63	263 "
9' 6"	1.73	282 "
10' 0"	1.82	297 "

* Volume for inlet - volume occupied by pipes to be deducted for pay quantity of concrete.

* Includes 1% allowance for overrun.

QUANTITIES

H	CLASS "A" CONCRETE CU. YDS.	REINFORCING STEEL
3' 0"	.76	[illegible]
3' 6"	.96	120
4' 0"	1.08	[illegible]
4' 6"	1.16	134 "
5' 0"	1.26	151 "
5' 6"	1.36	172 "
6' 0"	1.46	192 "
6' 6"	1.57	[illegible]
7' 0"	1.67	[illegible]
7' 6"	1.77	[illegible]
8' 0"	1.87	[illegible]
8' 6"	1.97	[illegible]
9' 0"	2.07	[illegible]
9' 6"	2.17	[illegible]
10' 0"	2.28	[illegible]

* Volume for inlet - volume occupied by pipes to be deducted for pay quantity of concrete.

* Includes 1% allowance for overrun.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948
All reinforced concrete shall be class "A".
All concrete walls shall be formed on both sides.
All exposed concrete corners shall be beveled to a 1" face.
All reinforcing bars shall be deformed, of intermediate grade, and shall be tagged with mark designation and station number.
All castings shall be painted with two coats of asphalt or coal tar and oil.
All surfaces exposed to view on the box shall receive class 1 surface finish.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
NO. 12 AND NO. 13
CONCRETE INLETS

Designed by A.P.G. Approved by [illegible]
Made by A.P.G. Bridge Engineer
Check Design A.Z.
Check Design C.R.S. Date January 1st 1948

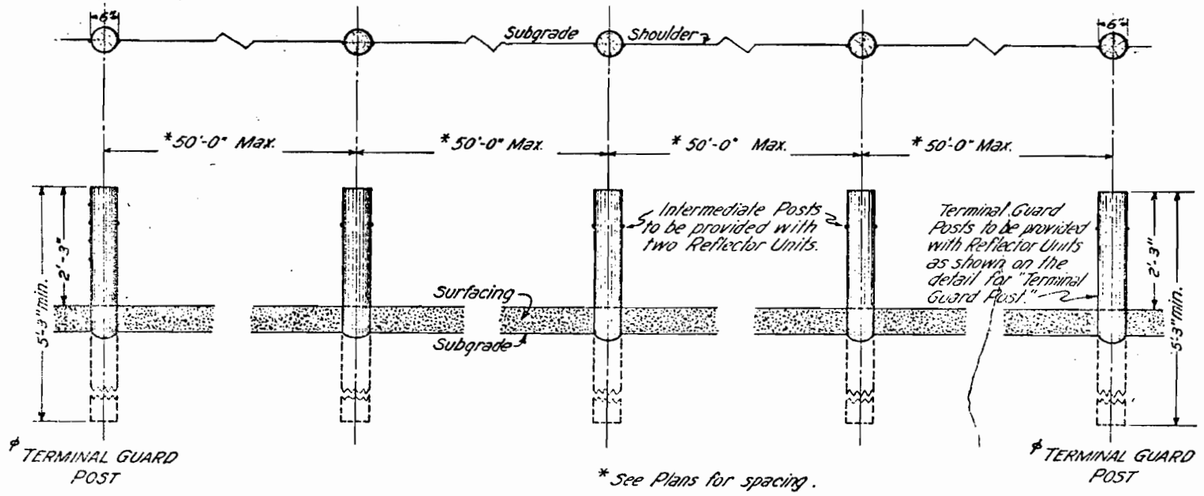
REVISIONS

Rev. 11-24-39 P.B.B. Reflector Units (Min. Size)
Rev. 12-19-39 P.B.B. Length and treatment of posts.

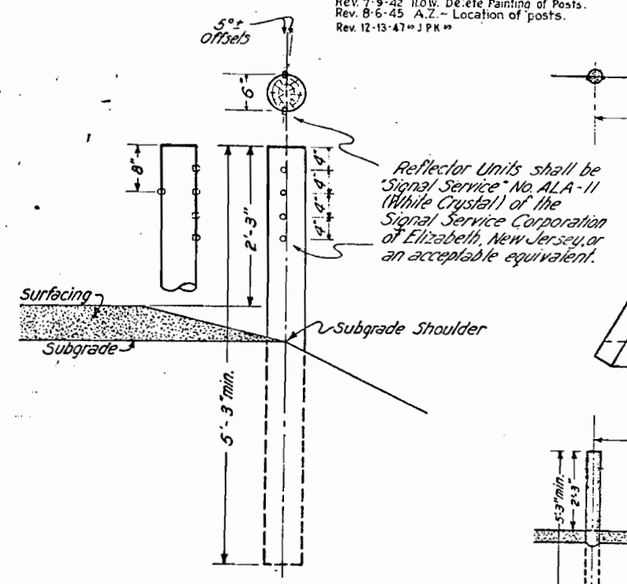
STANDARD M-19-B

Rev. 6-28-40 - A.Z. - 1940 Specs. & Location of posts.
Rev. 10-9-40 - P.B.B. - Painting & Refl. Units.
Rev. 2-24-41 - P.B.B. - Terminal Guard Post Placement.
Rev. 7-7-41 - P.B.B. - White Light.
Rev. 7-9-42 H.O.V. Delete Painting of Posts.
Rev. 8-6-45 A.Z. - Location of posts.
Rev. 12-13-47 - J.P.K.

FED. ROAD DIST. NO.	STATE
3	COLO.

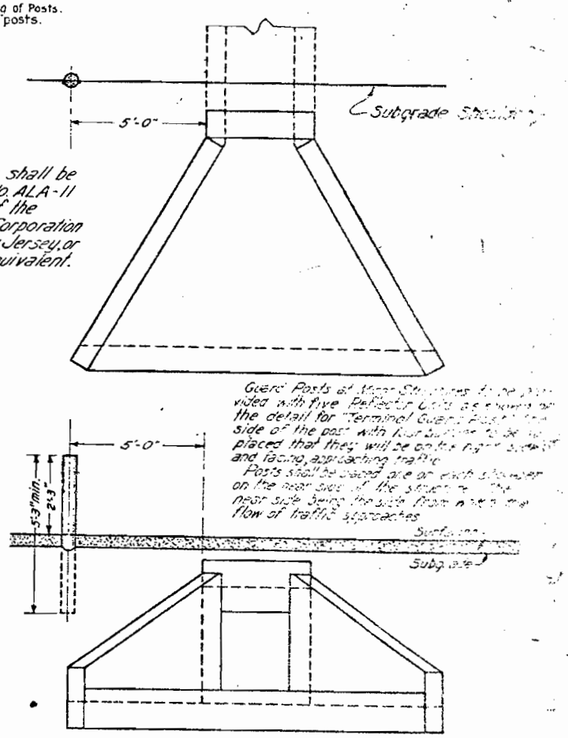


SHOWING PLACEMENT ON NORMAL ROADWAY FILLS



℄ TERMINAL GUARD POST

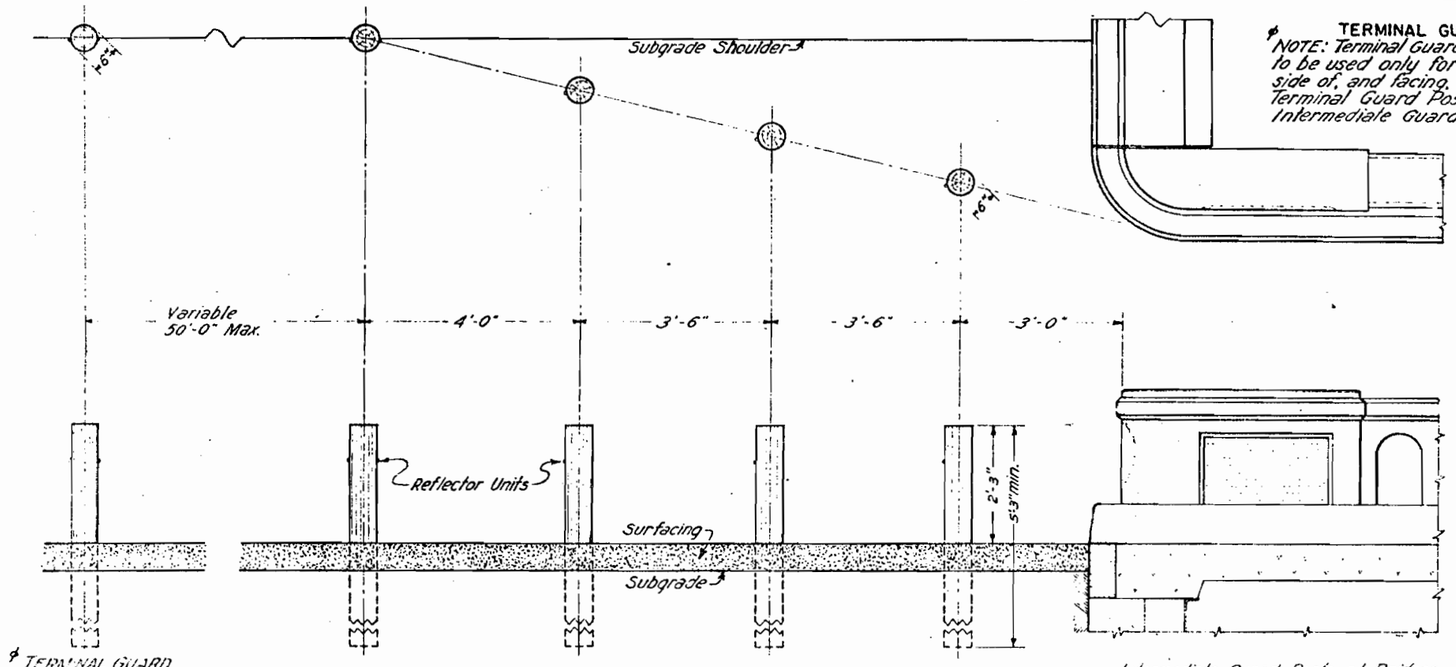
NOTE: Terminal Guard Posts as detailed above to be used only for the near Post on the right side of, and facing, approaching traffic. All other Terminal Guard Posts to be identical with Intermediate Guard Posts.



Guard Posts at Minor Structures to be provided with five Reflector Units as shown on the detail for "Terminal Guard Post" on the side of the post with four Units to be placed that they will be on the right side and facing approaching traffic.

Posts shall be placed one on each shoulder on the near side of the structure, the near side being the side from which the flow of traffic approaches.

SHOWING PLACEMENT AT MINOR STRUCTURES



SHOWING PLACEMENT AT BRIDGE APPROACHES

Intermediate Guard Posts at Bridges to be provided with Reflector Units as shown: that is, one Unit each on the three Posts nearest the bridge end and two Units on the fourth Post.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

All wood posts shall be made from seasoned, straight, sound Lodgepole Pine, Southern Yellow Pine, or West Coast Douglas Fir.

No section of wood posts shall be less than 6" in diameter.

All wood posts shall be entirely peeled and shaved, thoroughly seasoned and dry, with square tops.

All wood posts shall be set and tamped in plumb and firm, to the lines and grades as directed by the Engineer.

Reflector Units in all posts shall be placed in such position that the units will function at a distance of 300 feet.

On tangents the Reflector Units shall be placed at an angle of approximately five degrees to a line parallel to the centerline of the highway.

In all instances a test shall be made to assure the position of the Reflector Units to be the most effective possible.

The diameter of holes drilled in the posts shall be drilled approximately one-sixteenth of inch less than the outside of the signal button base. In all instances the hole shall be enough undersize that the button when driven into the post shall have complete bond with the post and be securely locked in correct position.

Posts shall be given a standard pressure Creosote treatment and then be thoroughly steam-cleaned in accordance with requirements of specifications.

COLORADO
STATE HIGHWAY DEPARTMENT

STANDARD

TIMBER GUARD POSTS

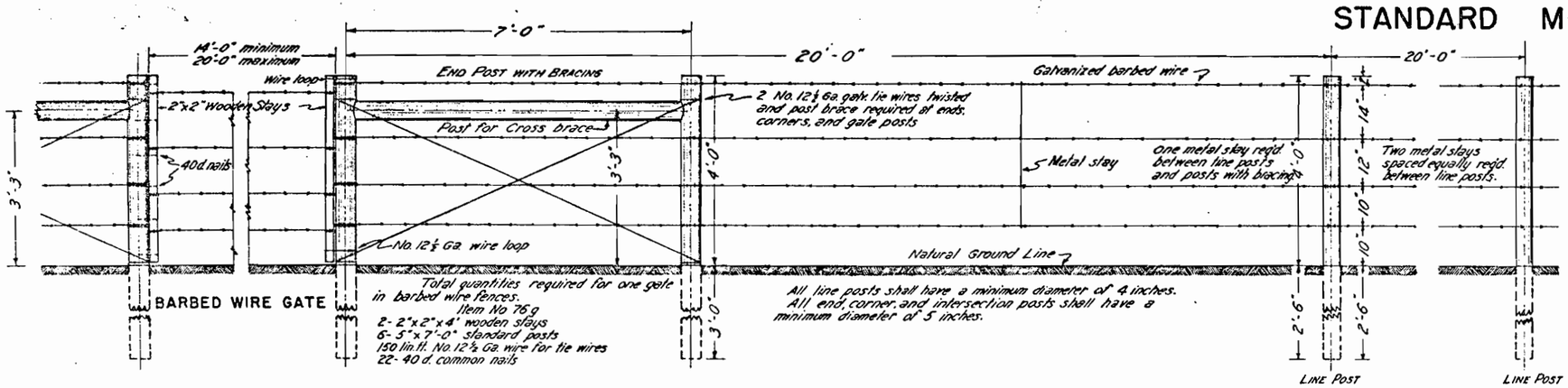
Designed by R.E.
Made by P.E.
Checked by

REVISIONS

STANDARD M-24-G

FED. ROAD DIST. NO.	STATE	SHEET
3	COLO.	

Rev. 6-20-40 - A.Z. - 1960 Specs.
Rev. 9-30-47 - A.Z. - Wire mesh finish in Drive & Walk Gates
Rev. 12-13-47 - J.P.K.



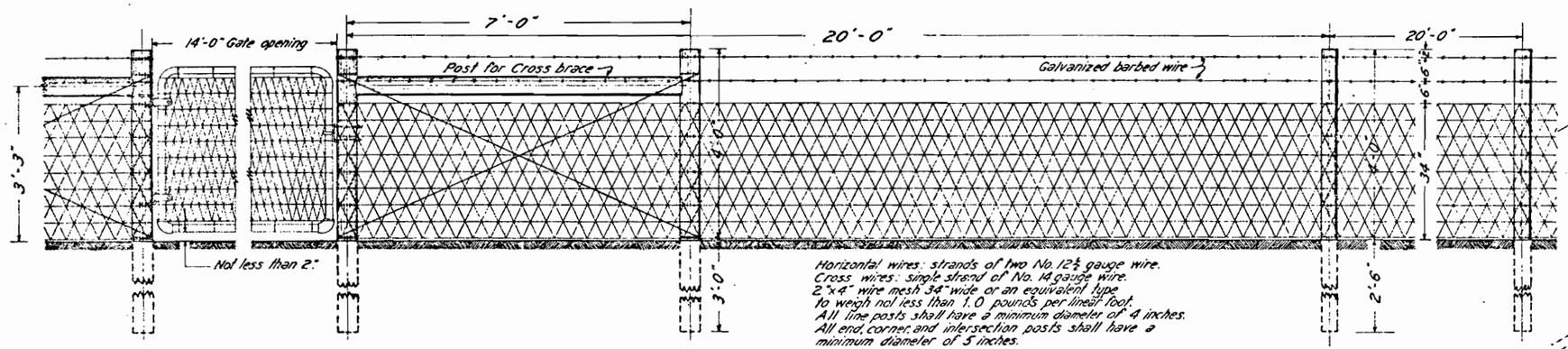
BARBED WIRE GATE

Total quantities required for one gate in barbed wire fences.
Item No. 76 g
2- 2"x2"x4' wooden stays
6- 5"x7'-0" standard posts
150 lin. ft. No. 12½ Ga. wire for tie wires
22- 40 d. common nails

All line posts shall have a minimum diameter of 4 inches.
All end, corner, and intersection posts shall have a minimum diameter of 5 inches.

BARBED WIRE FENCE WITH WOODEN POSTS

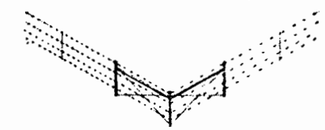
Item No. 76 a



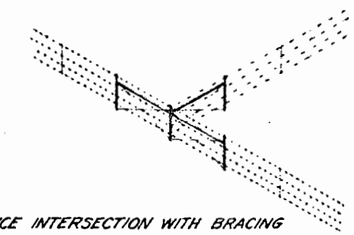
Horizontal wires: strands of two No. 12½ gauge wire.
Cross wires: single strand of No. 14 gauge wire.
2"x4" wire mesh 34" wide or an equivalent type
to weigh not less than 1.0 pounds per linear foot.
All line posts shall have a minimum diameter of 4 inches.
All end, corner, and intersection posts shall have a minimum diameter of 5 inches.

COMBINATION WIRE FENCE WITH WOODEN POSTS

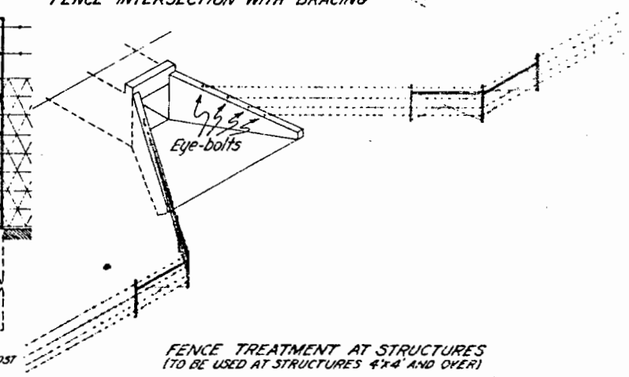
Item No. 76 d



CORNER POST WITH BRACING

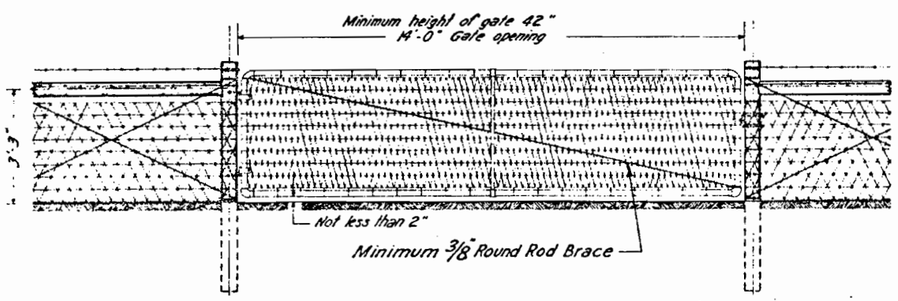


FENCE INTERSECTION WITH BRACING



FENCE TREATMENT AT STRUCTURES
(TO BE USED AT STRUCTURES 4'x4' AND OVER)

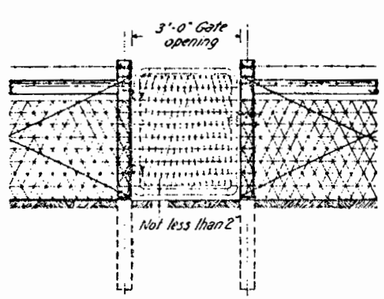
End post with bracing shall conform to details shown above. (Three posts required.)
Corner post with bracing shall consist of two end posts with bracing except that the post at the intersection of the two fence lines shall be common to both lines. (Five posts required.)
Fence intersection with bracing shall consist of three end posts with bracing except that the post at the intersection of the three fence lines shall be common to all three lines. (Seven posts required.)



DRIVEWAY GATE

Item No. 76 h

Gate complete with hinges and latch to weigh not less than 70 lbs.
2"x4" single strand wire mesh filler or an equivalent type.
Width of mesh approximately 40 inches.
Horizontal wires No. 10 gauge.
Cross wires No. 12½ gauge.
Galvanized metal latch and hinges.
Minimum 1" dia. galv. pipe frame or an equivalent.



WALK GATE

Item No. 76 i

Gate complete with hinges and latch to weigh not less than 19 pounds.
2"x4" single strand wire mesh filler or an equivalent.
Width of mesh approximately 40 inches.
Horizontal wires No. 10 gauge.
Cross wires No. 12½ gauge.
Galvanized metal latch and hinges.
Minimum ¾" dia. galv. pipe frame or an equivalent.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948.

Barbed wire shall be of standard make, not lighter than No. 12½ gauge, galvanized, with two point barb spaced not more than five inches apart.

Wire mesh must be galvanized and not lighter than shown and noted on this plan.

Wire mesh used in driveway and walk gates, unless galvanized, shall be painted with an approved waterproof asphalt or mineral paint.

Staples shall be at least 1½" long, made of No. 9 ga. wire base galvanized. 8 staples required per post for barbed wire fence and 14 staples per post for combination wire fence.

Cross braces to be securely nailed with four 40d. nails at each post.

End post with bracing to be used at all gates and fence ends.

Corner post with bracing to be used at all corners and angles in fences.

Fence intersection with bracing to be used at all intersecting fences.

At all structures of 4'x4' or over the fence shall be ended at eye-bolts in the wings of the structure. Where the type of construction prohibits the use of eye-bolts, an end post with bracing shall be used.

Eye-bolts are to be made from ½" round iron bars with a minimum of 6" of body length embedded in the concrete and a minimum of 1" inside eye diameter.

All wooden posts shall be made from seasoned, straight, sound Lodgepole Pine or Southern Yellow Pine, to be peeled and tops to be sawed off square before pressure treatment.

All posts shall be pressure treated with creosote in conformity with requirements given in the Specifications.

COLORADO
STATE HIGHWAY DEPARTMENT

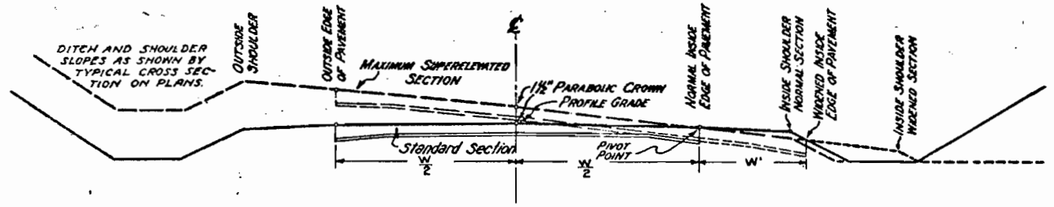
STANDARD
WIRE FENCES
TREATED
WOODEN POSTS

Designed by A.Z.
Made by
Checked by J.P.K.
Approved by
Date

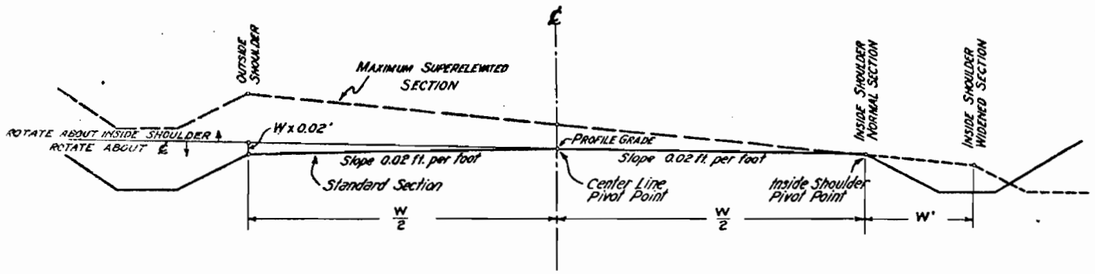
REVISIONS

STANDARD M-I-B

FED. ROAD DIST. NO.	STATE
3	COLO.



PAVEMENT SECTION

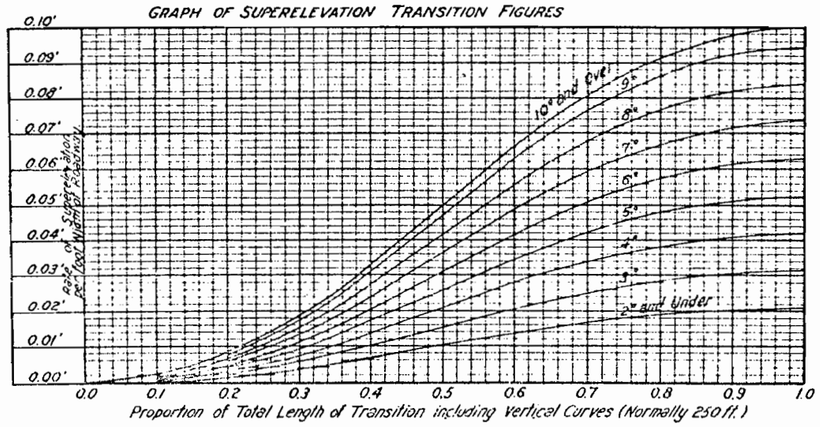


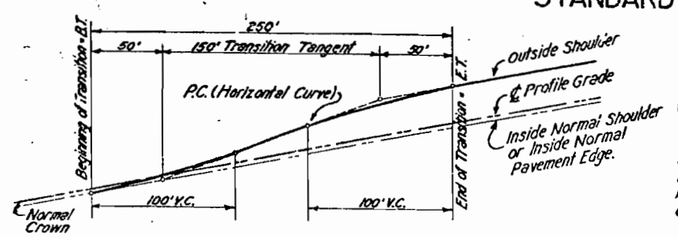
GRADED OR SURFACED SECTION

SUPERELEVATION AND WIDENING TABLES

DISTANCE FROM B.T. (PROPORTION)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Max. 1.0
Degree of Curvature	RATE OF SUPERELEVATION (IN FEET) PER FOOT WIDTH OF ROADWAY									
2° and Under	0.00044	0.00175	0.00394	0.00700	0.01050	0.01400	0.01706	0.01925	0.02056	0.02100
3°	0.00066	0.00263	0.00591	0.01050	0.01575	0.02100	0.02559	0.02888	0.03084	0.03150
4°	0.00088	0.00350	0.00788	0.01400	0.02100	0.02800	0.03413	0.03850	0.04113	0.04200
5°	0.00109	0.00438	0.00984	0.01750	0.02625	0.03500	0.04266	0.04813	0.05141	0.05250
6°	0.00131	0.00525	0.01181	0.02100	0.03150	0.04200	0.05119	0.05775	0.06169	0.06300
7°	0.00153	0.00613	0.01378	0.02450	0.03675	0.04900	0.05972	0.06738	0.07197	0.07350
8°	0.00175	0.00700	0.01575	0.02800	0.04200	0.05600	0.06825	0.07700	0.08225	0.08400
9°	0.00197	0.00788	0.01772	0.03150	0.04725	0.06300	0.07678	0.08663	0.09253	0.09450
10° and Over	0.00208	0.00833	0.01875	0.03333	0.05000	0.06667	0.08125	0.09166	0.09792	0.10000
	OFFSETS FOR WIDENING - W'- (IN FEET)									
Over 10°- Under 12°	0.03	0.12	0.27	0.48	0.75	1.08	1.47	1.92	2.43	3.00
12° - " 15°	0.04	0.16	0.36	0.64	1.00	1.44	1.96	2.56	3.24	4.00
15° - " 20°	0.05	0.20	0.45	0.80	1.25	1.80	2.45	3.20	4.05	5.00
20° and Over	0.06	0.24	0.54	0.96	1.50	2.16	2.94	3.84	4.86	6.00

GRAPH OF SUPERELEVATION TRANSITION FIGURES

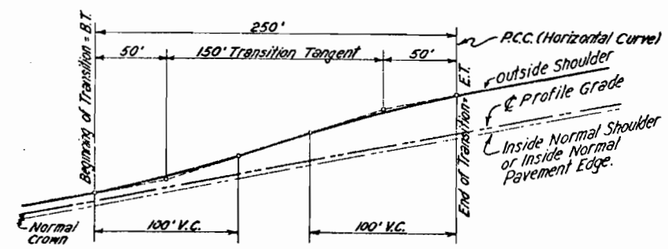




CASE I: SIMPLE CURVE WITH UNLIMITED TANGENT APPROACH

NOTE: CASE I

The transition in this case, from crowned section to superelevated section, shall proceed uniformly by raising the outside shoulder, over a distance of 250 ft. as shown, beginning at a point on the tangent 150 ft. from the end of the curve and acquiring full superelevation at a point 100 ft. inside the curve.



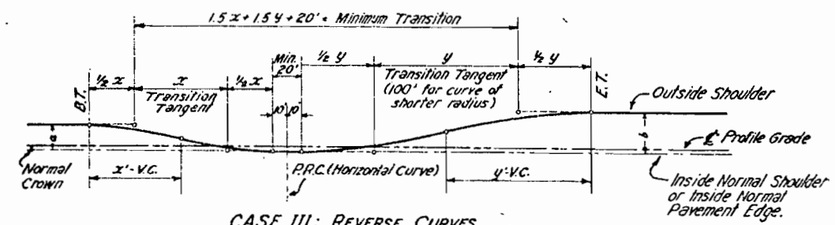
CASE II: COMPOUND CURVE

NOTE: CASE II

Superelevation transitions at the outside ends of compound curves shall be constructed in accordance with rules given under CASE I.

Superelevation transition between the arcs of different radii shall be made as in CASE I, except that the entire transition shall lie within the limits of the curve of the longer radius.

In cases where curves in the same direction have a tangent distance of less than 300 ft. between points of curve, the intervening tangent shall be superelevated an amount equal to that of the curve of greater radius and the transition shall be made as in the case of a true compound curve.



CASE III: REVERSE CURVES

NOTE: CASE III

Transitions between true reverse curves shall be accomplished as shown on the above diagram.

Transition tangents shall be directly proportional to the amount of superelevation of the respective curves.

EXAMPLE: Let a represent the amount of superelevation on 1st curve;
" b " " " " " 2nd " ;
" x " " " " transition tangent on 1st " ;
" y " " " " " " 2nd " ;

then, $a : b = x : y$.

The transition tangent of the curve having the shorter radius shall be set at 100 ft.

A normal crowned section 20 ft. long, 10 ft. on each side of the P.R.C. shall be used.

In cases where curves in opposite directions are in such proximity that a standard transition can not be had, the practice outlined for true reversing curves shall be used.

The total distance between the P.T. of the first curve and the P.C. of the succeeding curve shall be prorated into the transition distance of the respective curves until a maximum of 150 ft. of transition tangent for each curve is achieved.

GENERAL NOTES

Curves on projects using the Sections shown are to be superelevated and widened as indicated in the accompanying drawings and tables.

The normal inside edge of the Pavement slab is to remain at the standard elevation of 0.125 ft below the profile grade, and the outside edge of the slab is to be superelevated at the rate per foot width of roadway given in the table. The Section is to be rotated about the normal inside edge of the Pavement, with a 1½" parabolic crown for curves of 10° and under, and a full crown for widened Sections.

The normal inside edge of the Graded or Surfaced Section is to remain at the standard elevation of 0.02 ft per foot width of roadway below the profile grade, or as shown on the Typical Section for the Project. Also, the center-line pivot point is to be used until the superelevation equals 0.02 ft per foot width of roadway, but when this elevation is exceeded the normal inside shoulder pivot point is to be used.

When the degree of curvature exceeds 10°, the inside edge of the Pavement slab or the inside shoulder of the Graded or Surfaced Section is to be widened from the normal inside edge or shoulder, respectively, as shown by the table and plan or by cross-sections. Curves of 10° or less are not to be widened.

The slope of the shoulders and widened sections shall conform to the rate per foot width of roadway required, except that the inside shoulder of paved sections shall maintain the Typical Section slope until this slope is exceeded by the required superelevation slope.

The outside ditch on superelevated Sections is to be modified, where necessary to provide drainage. Otherwise, this ditch shall conform to normal ditch section shown for Project.

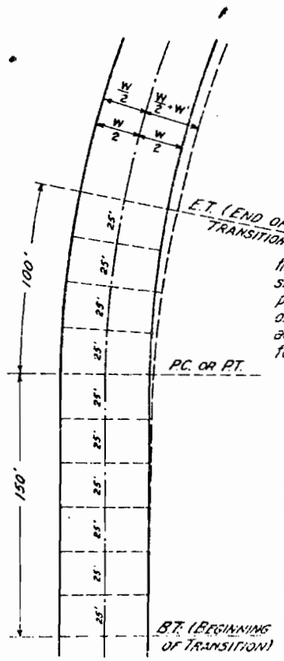
The rate of superelevation per foot width of roadway to be applied at the outside shoulder of the roadway is computed as follows:

The full superelevation per foot width of roadway rate for a given degree of curvature is

0.0105 ft. x Degree of Curvature.

The maximum superelevation of 0.10 ft per foot width, applying to curves of 10° and over, is not to be exceeded.

Special transition problems not covered by this standard sheet shall be covered by appropriate notes included with curve data on plans.



Curves of over 10° are to have the inside portion of the pavement slab and shoulder, or the inside portion and shoulder in a graded or surfaced section, widened in accordance with the plan, details for widening, and cross sections.

GENERAL PLAN OF WIDENING

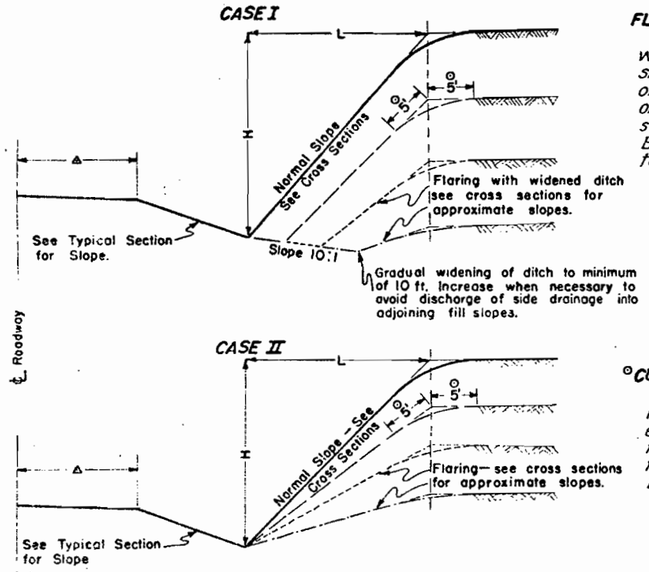
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
METHODS FOR
SUPERELEVATION &
WIDENING OF CURVES

STANDARD M-2-C

FED. ROAD DIST. NO.	STATE
3	COLO.

Rev. for 50'R. on Type [illegible]
Rev. Genl. Notes - Appr. Surf. [illegible]
Rev. Type I Road Approach [illegible]
Rev. Guard Fence [illegible]
Rev. Date Dist. [illegible]
Rev. [illegible]

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



FLARING OF EARTH CUTS:

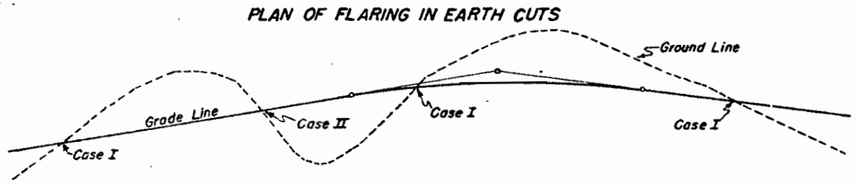
The backslopes at ends of all earth cuts shall be flattened and where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion and to improve appearance. The transition of flattened backslopes and widened ditch shall be constructed in such a manner that a uniform appearance of slope and ditch results. Backslopes shall be flared to the approximate L distance shown in table below. Rock cuts shall not be flared.

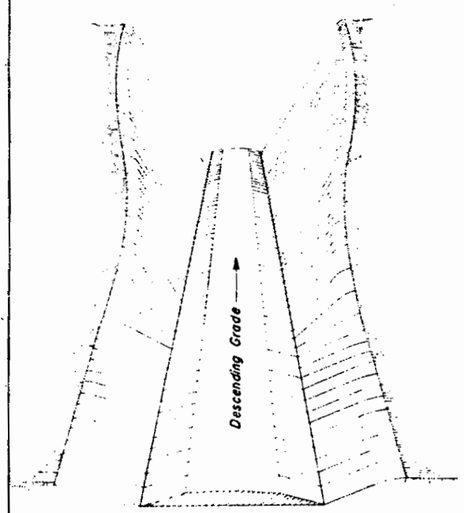
NORMAL SLOPE	CUT H	DISTANCE L
1 To 1	24'	24'±
1.5 To 1	16'	24'±
2 To 1	12'	24'±
3 To 1	8'	24'±

⊙CUT SLOPE TREATMENT IN EARTH CUTS:

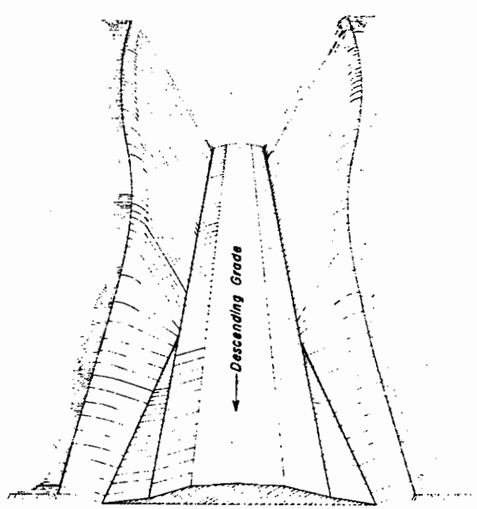
The intersection of Cut Slopes with the existing ground shall be rounded in earth cuts, beginning 5 ft. outside the slope stake and extending 5 ft. down the cut slope. Where the cut slope is less than 5 ft., reduce each of the above widths of slope treatment to the actual slope distance. Quantities shall be included in "Unclassified Excavation."

PLAN OF FLARING IN EARTH CUTS





CASE II



CASE I

▲WIDENING AT BRIDGE APPROACHES:

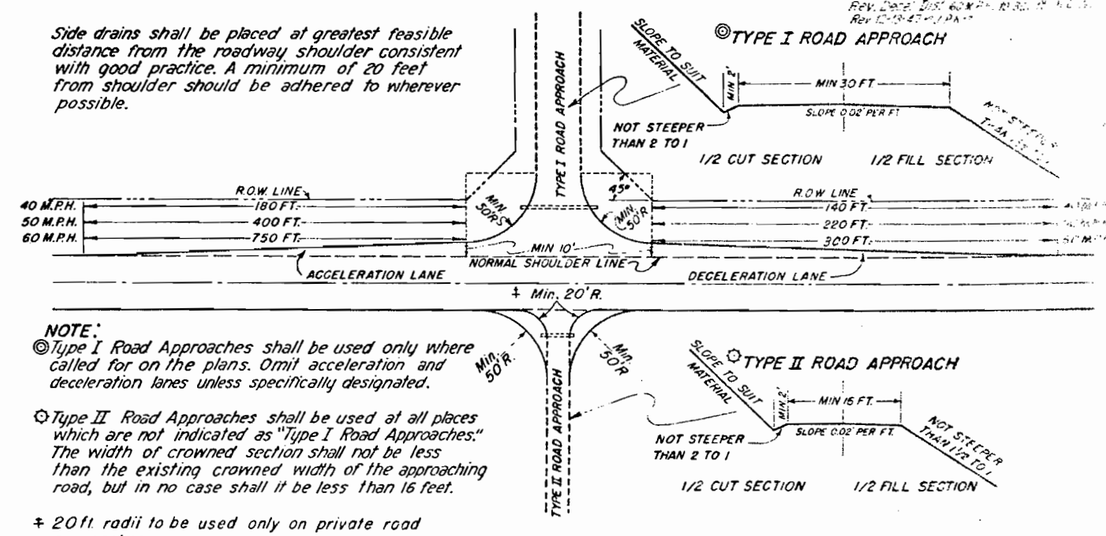
Roadway Embankment at Bridge Approaches shall be so constructed that the finish point of the subgrade shoulder is a minimum of 2 ft. beyond the outside edge of bridge deck. Where widening of the section is necessary to achieve this result, it shall take place gradually over a distance of 300 ft. This is done to accommodate Guard Fence and/or Guard Posts at Bridge Approaches. (See additional requirements for Guard Fences below.)

WIDENING TO ACCOMMODATE GUARD FENCES:

At all locations on the project (except as provided above for bridge approaches) where guard fence is to be constructed the shoulders shall be widened 2 feet to provide additional lateral support for guard fence posts.

TYPICAL PLANS FOR SIDE APPROACH ROADS

Side drains shall be placed at greatest feasible distance from the roadway shoulder consistent with good practice. A minimum of 20 feet from shoulder should be adhered to wherever possible.



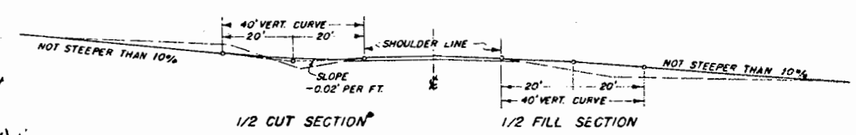
NOTE:

⊙Type I Road Approaches shall be used only where called for on the plans. Omit acceleration and deceleration lanes unless specifically designated.

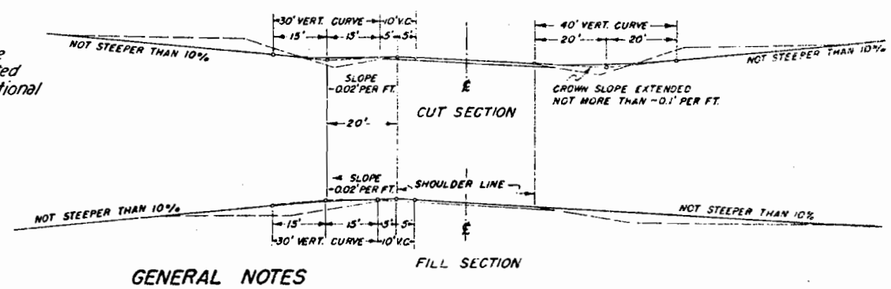
⊙Type II Road Approaches shall be used at all places which are not indicated as "Type I Road Approaches." The width of crowned section shall not be less than the existing crowned width of the approaching road, but in no case shall it be less than 16 feet.

‡ 20 ft. radii to be used only on private road approaches.

STANDARD CROWNED SECTION



SUPERELEVATED SECTIONS



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colo. State Highway Dep't. applicable to the Project.

All side approach roads to the Project shall be gravel surfaced with a 4 inch thickness of "Gravel or Crushed Rock Surfacing" extending approximately to the right of way line. Estimated tonnage and type of material required for this operation are shown in the surfacing 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 less than the maximum shown are to be used wherever feasible.

COLORADO
STATE HIGHWAY DEPARTMENT

STANDARD
SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES.

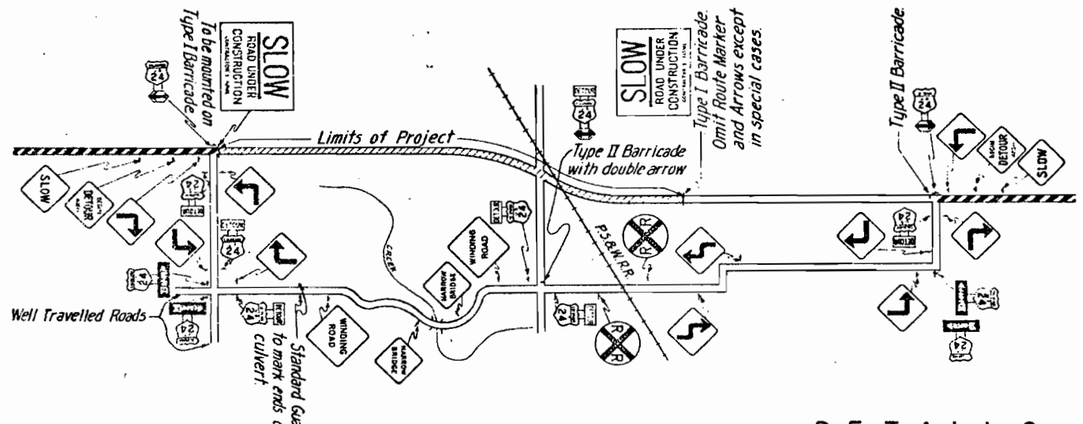
Designed by [illegible] Approved by [illegible]
Made by [illegible]
Checked by [illegible] Date [illegible]

STANDARD M-2-D

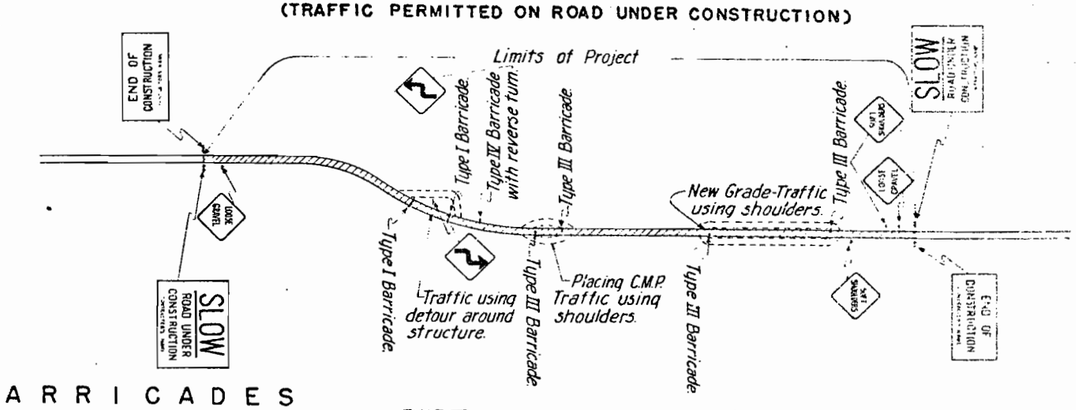
FED. ROAD DIST. NO.	STATE	SHEET
3	COLO.	

Rev. 9-10-46 Slow Signs PBP Rev. 12-13-47 [illegible]

TYPICAL METHOD OF MARKING DETOUR
(TRAFFIC PROHIBITED ON ROAD UNDER CONSTRUCTION)

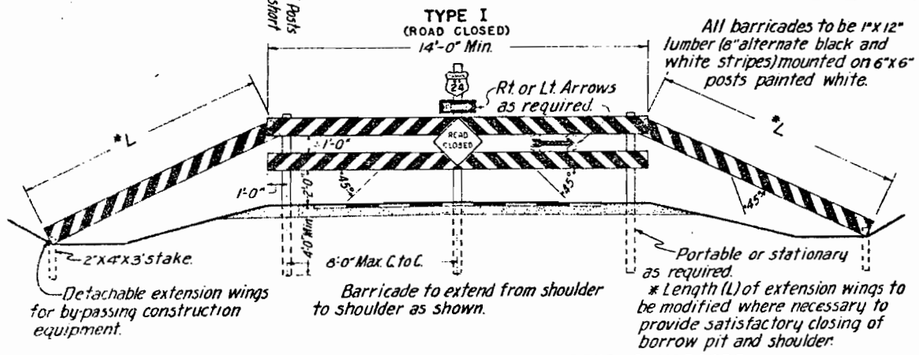


TYPICAL METHOD OF MARKING HIGHWAY
(TRAFFIC PERMITTED ON ROAD UNDER CONSTRUCTION)

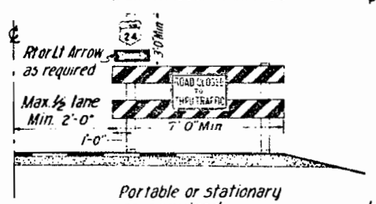


DETAILS OF BARRICADES

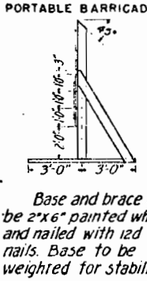
TYPE I
(ROAD CLOSED)



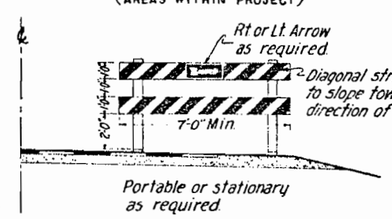
TYPE II
(BEGINNING OF DETOUR FOR THROUGH TRAFFIC)



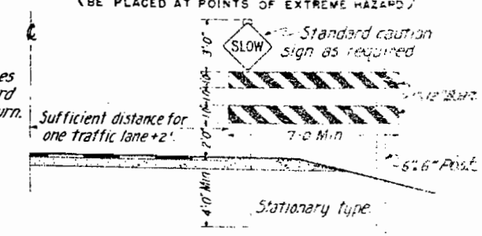
END VIEW OF PORTABLE BARRICADE



TYPE III
(BOTH ENDS OF BY-PASS AREAS WITHIN PROJECT)

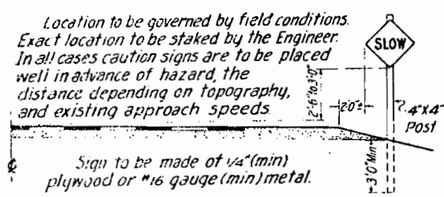


TYPE IV
(SUPPLEMENT TO ADVANCE WARNING SIGNS TO BE PLACED AT POINTS OF EXTREME HAZARD)

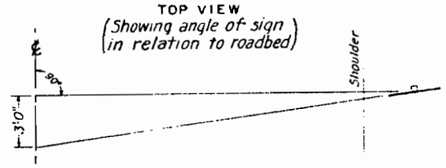


POSITION OF SIGNS RELATIVE TO ROADBED & HAZARDS

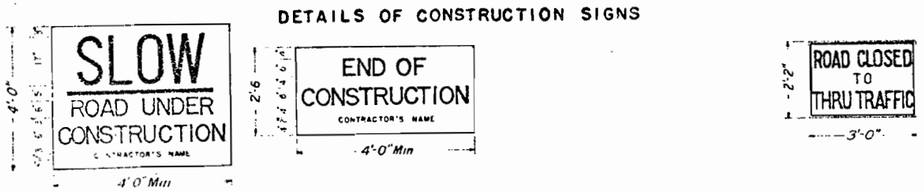
Location to be governed by field conditions. Exact location to be staked by the Engineer. In all cases caution signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds.



TOP VIEW
(Showing angle of sign in relation to roadbed)



DETAILS OF CONSTRUCTION SIGNS



Signs to be of ¼" material with at least three cleats in back. Background to be white. SLOW and underline to be red, and all other lettering to be black. Sign to be set on 2"-4"x4" posts 4 feet in the ground, except when mounted on face of Type I barricades (opposite side from reflectorized arrow) at limits of project. Not required on Type I barricades inside limits of project.

Above sign to be furnished and installed by the Department where required.

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT APPLICABLE TO THE PROJECT.

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 WITH WELL PAINTED, WELL MAINTAINED BARRICADES AND STANDARD CAUTION SIGNS, WARNING SIGNS, AND DIRECTIONAL TYPE SIGNS. BARRICADES AND SIGNS SHALL BE MOVED, ADDED TO, CHANGED OR REMOVED AS REQUIRED DURING THE PROGRESS OF CONSTRUCTION TO MEET CHANGING CONDITIONS.

THE CONTRACTOR SHALL FURNISH AND INSTALL THE FOLLOWING AS REQUIRED WITHIN THE LIMITS OF THE PROJECT:

1. ALL BARRICADES.
2. APPROVED REFLECTORIZED DIRECTIONAL ARROW FOR EACH TYPE I BARRICADE
3. SLOW - ROAD UNDER CONSTRUCTION (CONTRACTOR'S NAME) SIGNS - MINIMUM 2.
4. "END OF CONSTRUCTION (CONTRACTOR'S NAME)" SIGNS - MINIMUM 2.
5. STANDARD CAUTION, WARNING AND DIRECTIONAL TYPE SIGNS AS REQUIRED.
6. FLARES OR TORCHES AS FOLLOWS:
   A. TYPE I BARRICADES - MINIMUM 3 EACH
   B. TYPE III OR IV BARRICADES - MINIMUM 1 EACH
   C. STANDARD CAUTION OR WARNING SIGNS - MINIMUM 1 EACH

NOTE: FLARES OR TORCHES SHALL BE OF AN OIL BURNING TYPE APPROVED BY THE STATE OF COLORADO AND SHALL BE PLACED FROM 3 TO 5 FEET AHEAD OF THE SIGN OR OBJECT TO BE ILLUMINATED. IN ALL CASES FLARES OR TORCHES SHALL BE PLACED A SUFFICIENT DISTANCE AWAY, WITHIN THE ABOVE RANGE, TO AVOID DAMAGE TO FACE OF SIGN FROM SMOKE OR FLAME AND SHALL BE KEPT BURNING FROM SUNSET TO SUNRISE

ALL LUMBER USED IN BARRICADES AND SIGNS SHALL BE SOUND, DURABLE MATERIAL AND SHALL BE KEPT WELL PAINTED WITH NEAT, UNIFORM LETTERS AND SYMBOLS CONFORMING TO STYLE SHOWN FOR THE VARIOUS SIGNS. UNEVEN OR SMEARED LETTERING WILL NOT BE PERMITTED.

WHERE TRAFFIC IS PROHIBITED FROM THE PROJECT, THE DETOUR WILL BE MARKED BY THE DEPARTMENT, EXCEPT THAT TYPE I BARRICADES, COMPLETE WITH NECESSARY ARROWS AND SIGNS, SHALL BE PROVIDED, ERECTED, PAINTED AND MAINTAINED BY THE CONTRACTOR AT BOTH ENDS OF THE PROJECT AND AT ALL INTERSECTING ROADS REQUIRED TO BE LEFT OPEN FOR CROSS TRAFFIC.

US AND/OR STATE ROUTE MARKERS DEEMED NECESSARY FOR GUIDANCE OF TRAFFIC OVER THE PROJECT OR FOR USE ON TYPE I BARRICADES WILL BE FURNISHED BY THE DEPARTMENT TO BE INSTALLED BY THE CONTRACTOR.

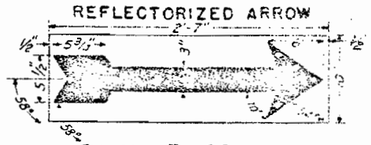
THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL SIGNS FURNISHED HIM BY THE DEPARTMENT AND SHALL RETURN SAME UPON COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE REQUIRED TO REIMBURSE THE DEPARTMENT FOR ANY SIGNS FURNISHED HIM WHICH HAVE BECOME DAMAGED OR LOST DURING HIS OPERATIONS

THE TYPICAL METHOD OF MARKING AS SHOWN ILLUSTRATES THE MINIMUM ACCEPTABLE SIGNING PROCEDURE. MODIFICATIONS AND ADDITIONAL REQUIREMENTS WILL BE DETERMINED BY LOCATION, TRAFFIC VOLUME AND OTHER PERTINENT CONDITIONS AFFECTING THE PUBLIC CONVENIENCE AND SAFETY

ANY SPECIAL SIGNS DEEMED NECESSARY FOR THE GUIDANCE AND PROTECTION OF TRAFFIC OVER THE PROJECT OR DETOUR WILL BE FURNISHED AND INSTALLED BY THE DEPARTMENT.

ALL COSTS INCIDENTAL TO THE FOREGOING REQUIREMENTS WILL NOT BE PAID FOR AS A SEPARATE ITEM BUT SHALL BE INCLUDED IN THE ORIGINAL CONTRACT PRICES FOR THE PROJECT

DETAILS OF REFLECTORIZED ARROW



For use on Type I Barricades at ends of project and/or inside of project where needed.
Reflector buttons shall be Signal Service ALA 31 (white crystal) or suitable equivalent. Minimum thickness of lumber to be 1".

COLORADO
STATE HIGHWAY DEPARTMENT

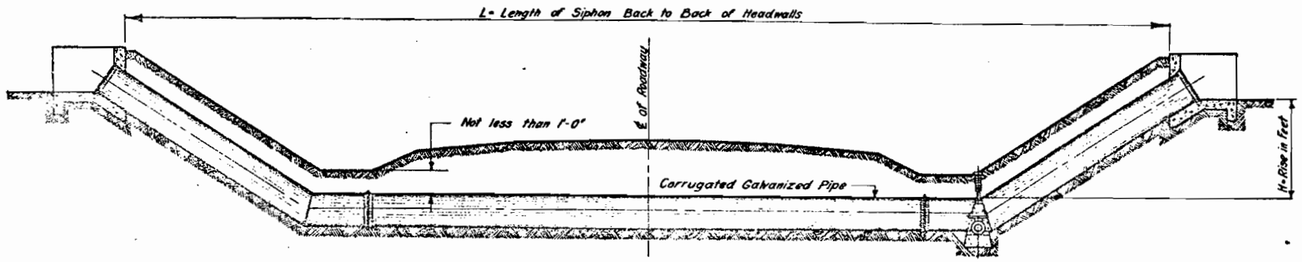
STANDARD
ROADWAY CONSTRUCTION
TRAFFIC SIGNS

Designed by	Approved by
Made by	
Checked by	Date

REVISIONS

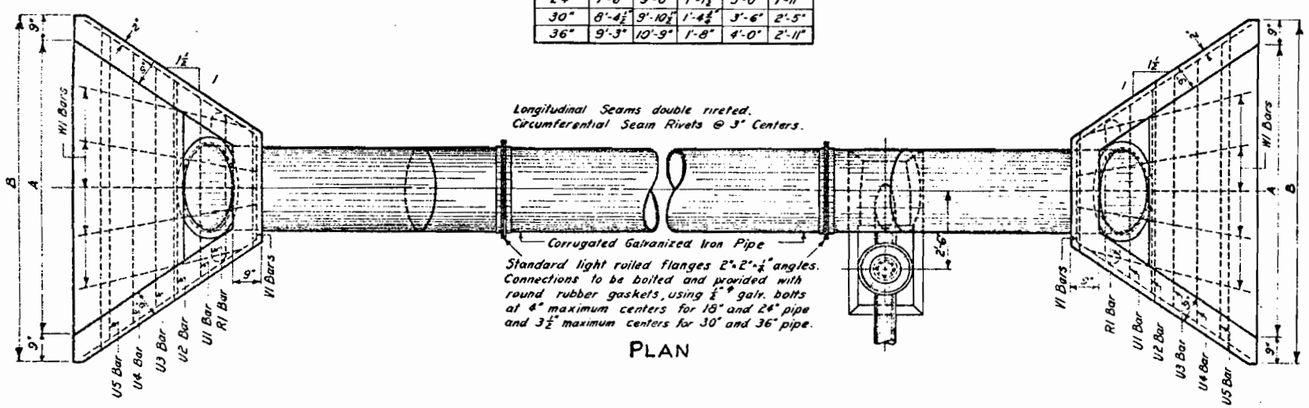
STANDARD M-123-C

FED. ROAD DIST. NO	STATE
3	COLO.



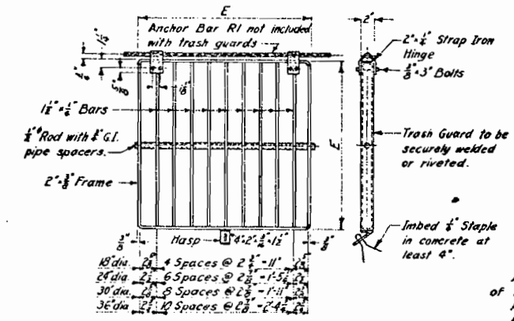
SECTIONAL ELEVATION OF SIPHON

TABLE OF DIMENSIONS					
Diameter of Siphon	A	B	C	F	E
18"	6'-7½"	8'-1½"	0'-10"	2'-6"	1'-5"
24"	7'-6"	9'-0"	1'-1½"	3'-0"	1'-11"
30"	8'-4½"	9'-10½"	1'-4½"	3'-6"	2'-5"
36"	9'-3"	10'-9"	1'-8"	4'-0"	2'-11"



PLAN

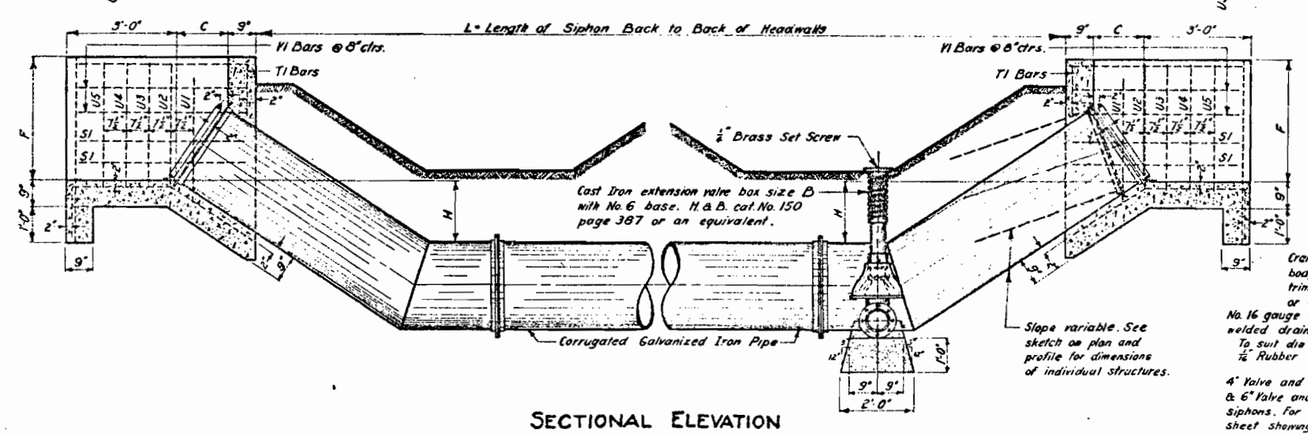
QUANTITIES FOR ONE SIPHON					
	Item No 55	Item No 46a	Item No 47	Item No. 85	
Siphon Sizes	Pipe Gauge U.S. Std.	Concrete Class "A"	Reinforcing Steel	Trash Guards	Size Drain
18" Dia.	16	3.50 Cu.Yd.	308 Lb.	2 @ 30 Lb. Each	4"
24" Dia.	14	4.25 Cu.Yd.	320 Lb.	2 @ 40 Lb. Each	4"
30" Dia.	14	5.25 Cu.Yd.	380 Lb.	2 @ 60 Lb. Each	6"
36" Dia.	12	6.25 Cu.Yd.	390 Lb.	2 @ 80 Lb. Each	6"
Item No. 46a. Class "A" Concrete for one siphon drain - 0.4 Cu.Yd.					
Item No. 110v Valve and Valve Box					Each



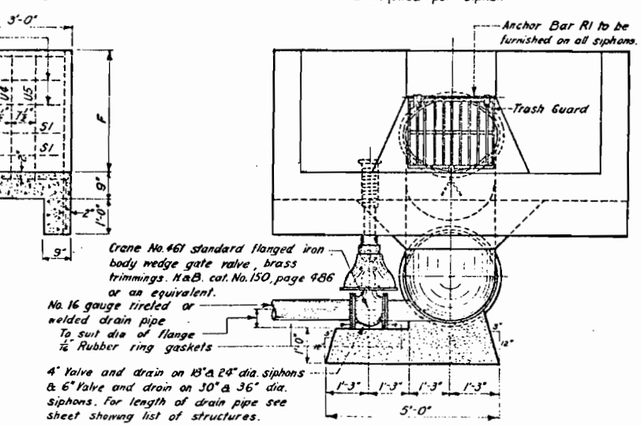
DETAIL OF TRASH GUARD

2 Required per Siphon

Diameter 18" and 24"			BAR LIST FOR 1 SIPHON			
Mark	Number	Length	BENDING DIAGRAM All Bars ½"ϕ except Anchor Bar R1			
18" R1	2	4'-11"	2½ 2½ ½"ϕ Bar	5'-0"	2	
24" R1	2	5'-5"	18"-2'-11" 24"-3'-5" 30"-3'-11" 36"-4'-5"	5'-5"	2	
18" S1	8	4'-2"	18"-4'-2" 24"-4'-5" 30"-4'-9" 36"-5'-10"	4'-2"	8	
24" S1	8	4'-5"		5'-0"	8	
18" T1	4	4'-0"	18"-4'-0" 24"-4'-6" 30"-5'-4" 36"-5'-10"	5'-6"	4	
24" T1	4	4'-6"		5'-10"	4	
18"a 24" U1 to U5	2 Each	8'-6" to 11'-10" Increase by 10"		8'-6" to 11'-10" Increase by 10"		
18" V1	6	12'-0"	18"-2'-0" 24"-2'-6" 30"-3'-0" 36"-3'-6"	14'-0"	6	
24" V1	6	13'-0"		15'-0"	6	
18"a 24" W1	10	5'-6"	2'-6" All Sizes Bend in field	6'-0"	10	



SECTIONAL ELEVATION



FRONT ELEVATION

GENERAL NOTES

All work shall be done according to the Standard Specifications of The Colorado State Highway Department. Adopted Jan. 1, 194[illegible]

All concrete shall be Class "A"

All walls shall have forms on both sides.

All reinforcing bars shall be deformed.

All reinforcing bars shall be tagged with the Station number and letter designation

All exposed corners in concrete shall be beveled to a 2" face.

All corrugated pipe to conform to the Colorado State Highway Specifications.

All flanges to be 2"×2"×¼" standard light rolled, securely rivetted to corrugated pipe.

Trash guards to be furnished only when called for on plans.

For siphons required and governing dimensions see plans.

Trash guards to be painted as per specifications for structural steel

Siphon Drains" & "Valve and Valve Boxes" are to be provided only when called for on plans and tabulated in the List of Structures.

Backfill of areas inaccessible to rollers shall be compacted with Mechanical Tampers in accordance with Item 16 of the Specification

All surfaces exposed to view on the head walls shall receive clean surface finish.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD SIPHON
CORRUGATED GALVANIZED IRON PIPE WITH CONCRETE INLET & OUTLET BOXES
SIZES 18"-24"-30"-36"

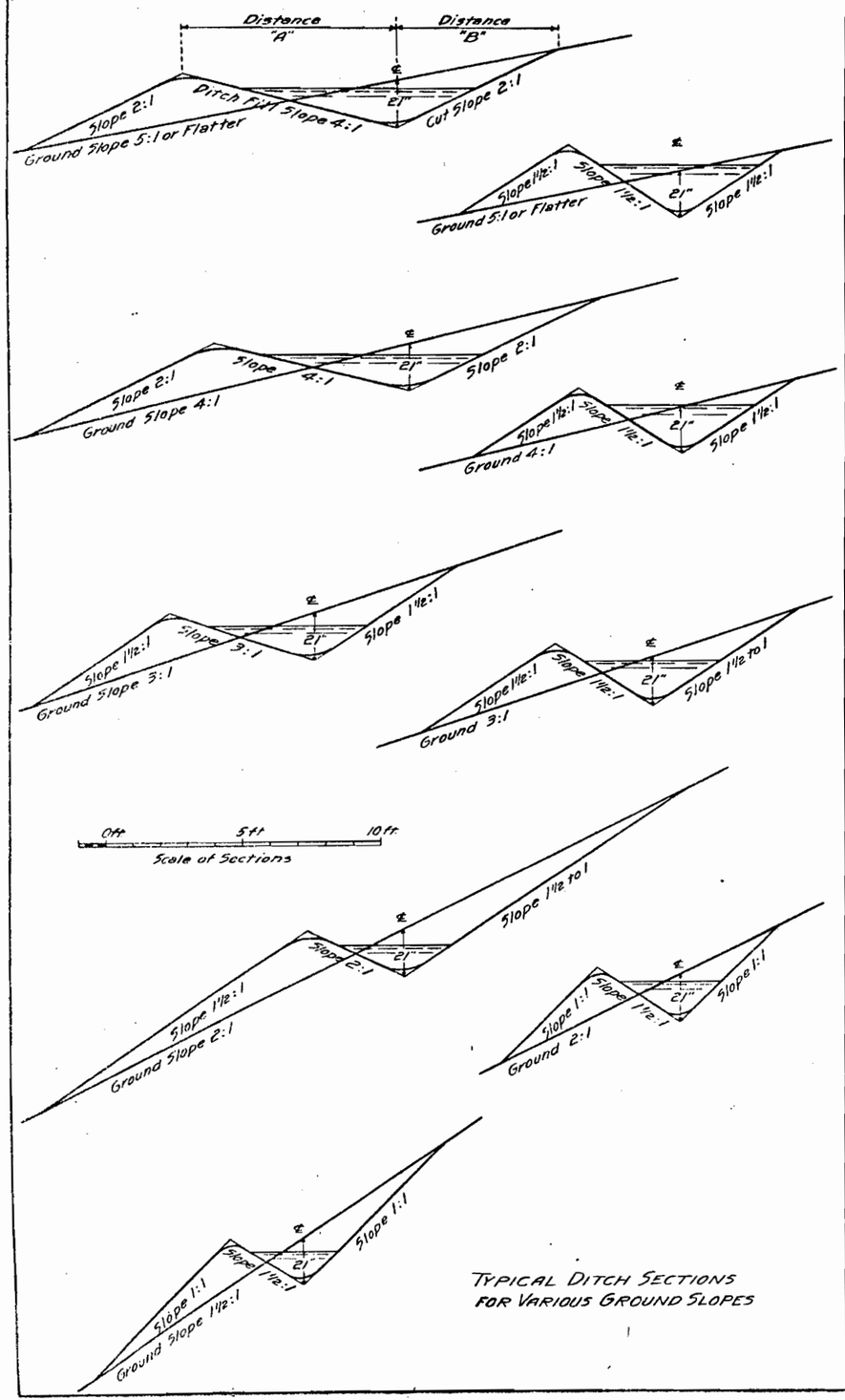
Designed by A.D.K.	Approved by [illegible]
Made by A.D.K.	Bridge Engineer
Checked by W.M.K.	Date: June [illegible] 194[illegible]

M-123-C

STANDARD M-107-B

FED. ROAD DIST. NO.	STATE	SHEET OF
3	COLO.	

Rev. 12-13-47 J.P.K.

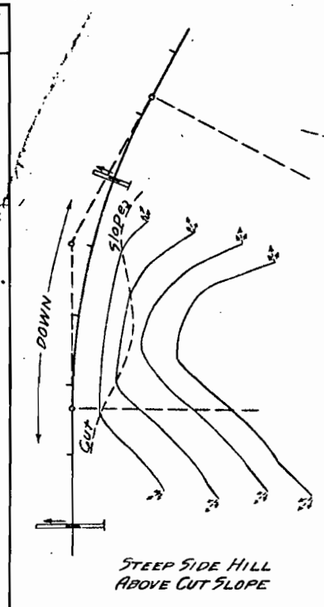


TYPICAL DITCH SECTIONS FOR VARIOUS GROUND SLOPES

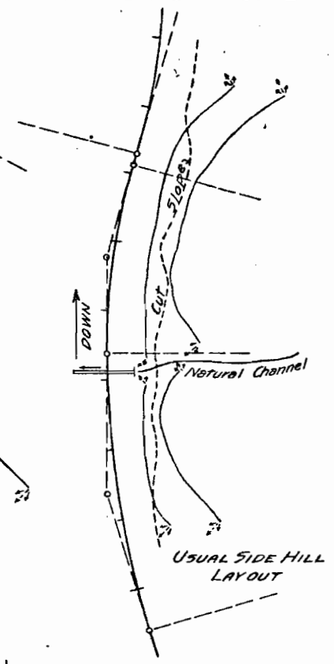
DETAILS OF DITCH SECTIONS

Ground Slope	Cut Slope	Ditch Fill Slope	℄ Cut	Cut Area Sq.Ft.	Cu.Yd. per Sta of Cut	Ditch Area Sq.Ft.	Dist "A" Ft.	Dist "B" Ft.
5:1	2:1	4:1	15"	4.9	15.8	3.7	4.2	5.6
			18"	6.2	22.9	5.9	5.0	6.7
			• 21"	8.5	31.5	8.5	5.8	7.8
		3:1	15"	4.1	15.1	4.1	4.2	4.7
			18"	5.8	21.6	6.5	5.0	5.6
			21"	8.0	29.5	9.3	5.8	6.6
		2:1	15"	3.7	13.8	4.6	4.2	3.6
			18"	5.3	19.8	7.0	5.0	4.3
			21"	7.3	27.0	10.0	5.8	5.0
		1½:1	15"	3.5	13.0	4.8	4.2	2.9
			18"	5.0	18.6	7.3	5.0	3.5
			21"	6.9	25.4	10.3	5.8	4.0
5:1	1½:1	4:1	15"	3.3	12.4	3.4	2.7	5.6
			18"	4.8	17.9	5.4	3.2	6.7
			21"	6.7	24.7	7.8	3.7	7.8
		3:1	15"	3.1	11.6	3.8	2.7	4.7
			18"	4.5	16.7	5.8	3.2	5.6
			21"	6.2	22.8	8.3	3.7	6.6
		2:1	15"	2.8	10.3	4.0	2.7	3.6
			18"	4.0	14.8	6.1	3.2	4.3
			21"	5.5	20.2	8.8	3.7	5.0
		1½:1	15"	2.6	9.5	4.1	2.7	2.9
			18"	3.7	13.7	6.3	3.2	3.5
			• 21"	5.1	18.7	8.8	3.7	4.0
4:1	2:1	4:1	15"	4.7	17.4	2.8	5.0	5.0
			18"	6.7	24.8	4.5	6.0	6.0
			• 21"	9.2	34.0	6.6	7.0	7.0
		3:1	15"	4.5	16.5	3.3	5.0	4.3
			18"	6.4	23.6	5.2	6.0	5.1
			21"	8.8	32.4	7.5	7.0	6.0
		2:1	15"	4.2	15.4	3.9	5.0	3.3
			18"	6.0	22.1	6.0	6.0	4.0
			21"	8.2	30.2	8.5	7.0	4.7
		1½:1	15"	4.0	14.7	4.2	5.0	2.7
			18"	5.7	21.0	6.4	6.0	3.3
			21"	7.7	28.5	9.1	7.0	3.8
4:1	1½:1	4:1	15"	3.4	12.7	2.6	3.0	5.0
			18"	4.9	18.3	4.1	3.6	6.0
			21"	6.7	24.9	6.0	4.2	7.0
		3:1	15"	3.2	11.9	3.0	3.0	4.3
			18"	4.6	17.0	5.9	3.6	5.1
			21"	6.3	23.3	6.8	4.2	6.0
		2:1	15"	2.9	10.8	3.4	3.0	3.3
			18"	4.2	15.5	5.3	3.6	4.0
			21"	5.7	21.1	7.5	4.2	4.7
		1½:1	15"	2.7	10.1	3.6	3.0	2.7
			18"	3.9	14.3	5.5	3.6	3.3
			• 21"	5.3	19.5	7.8	4.2	3.8
3:1	2:1	3:1	15"	5.9	21.7	2.3	7.5	3.8
			18" ∘	8.4	31.1	3.8	9.0	4.5
			21" •	11.5	42.6	5.5	10.5	5.3
		2:1	15"	5.6	20.8	3.0	7.5	3.0
			18" ∘	8.1	29.9	4.7	9.0	3.6
			21" •	11.0	40.8	6.7	10.5	4.2
		1½:1	15"	5.5	20.3	3.4	7.5	2.5
			18" ∘	7.8	29.0	5.3	9.0	3.0
			21" ∘	10.7	39.6	7.5	10.5	3.5
3:1	1½:1	3:1	15"	3.5	13.1	2.1	3.8	3.8
			18"	5.0	18.7	3.4	4.5	4.5
			• 21"	6.9	25.6	4.9	5.3	5.3
		2:1	15"	3.3	12.1	2.6	3.8	3.0
			18"	4.7	17.4	4.1	4.5	3.6
			21"	6.4	23.8	5.9	5.3	4.2
		1½:1	15"	3.1	11.6	2.9	3.8	2.5
			18"	4.5	16.6	4.5	4.5	3.0
			• 21"	6.1	22.7	6.4	5.3	3.5
2:1	1½:1	2:1	15"	5.5	20.3	1.6	7.5	2.5
			18" ∘	7.8	29.0	2.6	9.0	3.0
			• 21" ∘	10.7	39.7	3.8	10.5	3.5
		1½:1	15"	5.4	19.8	2.0	7.5	2.1
			18" •	7.7	28.4	3.1	9.0	2.6
			21" ∘	10.5	38.9	4.5	10.5	3.0
2:1	1:1 ♦	2:1	15"	2.4	8.7	1.4	2.5	2.5
			18"	3.4	12.5	2.3	3.0	3.0
			21"	4.6	17.0	3.3	3.5	3.5
		1½:1	15"	2.2	8.3	1.7	2.5	2.1
			18"	3.2	11.9	2.6	3.0	2.6
			• 21"	4.4	16.2	3.8	3.5	3.0
1½:1	1:1 ♦	1½:1	15"	2.9	10.8	1.2	3.8	1.9
			18"	4.2	15.6	1.9	4.5	2.3
			• 21"	5.8	21.3	2.7	5.3	2.6

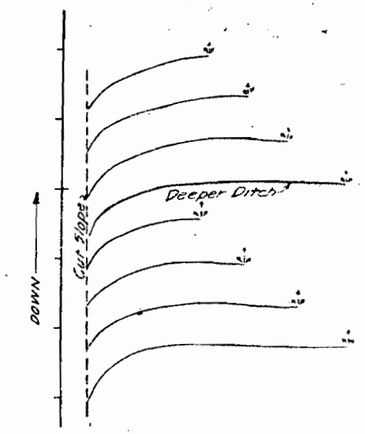
• Section shown at left
♦ 1:1 Slopes are difficult to seed
∘ Cut Slope exceeds a 10 ft. length



STEEP SIDE HILL ABOVE CUT SLOPE

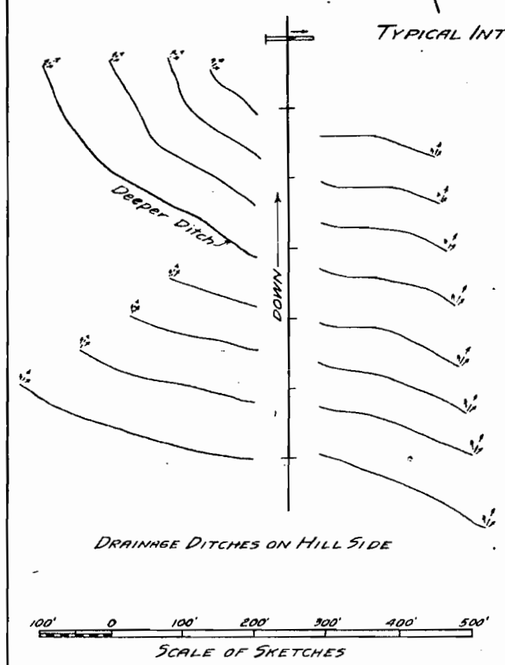


USUAL SIDE HILL LAYOUT



LONG SIDE HILL CUT

TYPICAL INTERCEPTING DITCH ARRANGEMENTS



DRAINAGE DITCHES ON HILL SIDE

GENERAL NOTES

Contour Intercepting and Drainage Ditches on this Project are to be constructed to the line and grade staked by the Engineer using the Ditch Section called for on the Plans or ordered by the Engineer.

Ends of Intercepting and Drainage 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. Use a deeper ditch when any such flow might be picked up.

The following horizontal spacing of ditches is recommended:

Slope % or Slope Ratio	Horizontal Spacing of Ditches
4% to 6%	70 ft. centers
8% to 10%	60 ft. centers
20% to 4:1	55 ft. centers
30% to 1½:1	50 ft. centers

Ditches are to be laid out along the ground contour on a grade of not over -1%. (Type of soil and volume of flow shall govern the grade.)

Ditch checks may be required for drainage which cannot be diverted as shown. Ditch checks and ditches shall be set in such a manner that the grade of the ditch from the downstream side of the check to the lip of the adjacent downstream check shall not exceed -0.5%. The checks shall conform to standard plans of the Department.

Grasses are to be planted to stabilize the slope and ditch banks whenever conditions permit.

COLORADO STATE HIGHWAY DEPARTMENT

CONTOUR INTERCEPTING AND DRAINAGE DITCHES

Designed by S.B.L.	Approved by [signature]
Made by S.B.L.	Chief Engineer
Checked by	Date January [illegible]