987

FED. ROAD DIST. NO.	STATE	FED. A.D. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	1	

REV. ENDS OF PROJECT AND LENGTH 7/2/47 - E.E.C.

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. F 92 (2)
STATE HIGHWAY NO. ~~6~~ 50
PUEBLO COUNTY

INDEX OF SHEETS

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 9811 FEET = 0.185 MILES
NET LENGTH OF PROJECT 480.2 FEET = 0.090 MILES

CONVENTIONAL SIGNS

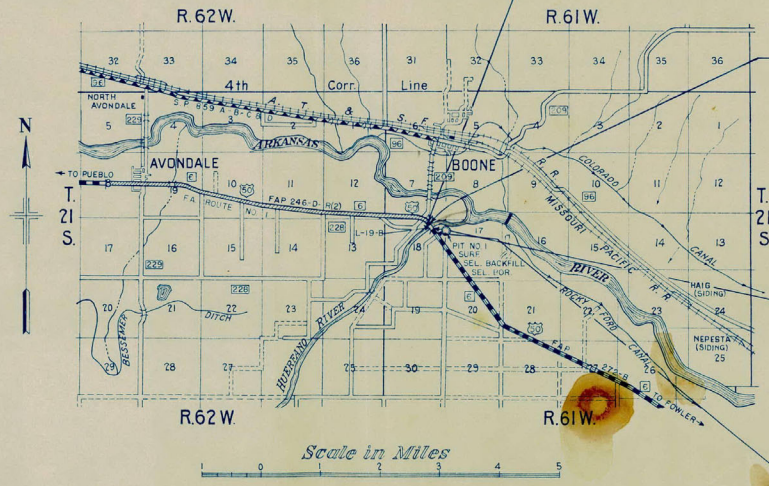
CENTER LINE OF SURVEY
RIGHT OF WAY LINES
TOWNSHIP LINES
SECTION LINES
ONE QUARTER SECTION LINES
BARBED WIRE FENCE
POLE LINES

Dr. 20

STA. 1036 + 00
BEGINNING OF APPROACH
STA. 1036 + 00 TO STA. 1038 + 26.3
NON-FEDERAL AID

NOTICE TO BIDDERS

It is recommended that bidders on this Project go over the plan details with the following Field Representative of the Department.
George N. Miles, Division Engineer, Pueblo.



STA. 1038 + 26.3
BEGINNING OF F 92(2)
OPPOSITE SAME STATION OF F.A.P. 246-D R(2) AND OPPOSITE STA. 0 + 00 BEGINNING OF F.A.P. 92 (ORIGINAL PROJECT)

STA. 1043 + 25.4
END OF F 92 (2)
OPPOSITE STA. 795 + 04.4 OF F.A.P. 272-B AND OPPOSITE STA. 4 + 80.2 END OF F.A.P. 92 (ORIGINAL PROJECT)

STA. 1043 + 25.4 TO STA. 1046 + 00
NON-FEDERAL AID
STA. 1046 + 00
END OF APPROACH

RECOMMENDED FOR APPROVAL
Jas. A. Bell
ASSISTANT ENGINEER — DATE 5-16-47

APPROVED
Mark R. Watson
STATE HIGHWAY ENGINEER — DATE 5-16-47

RECOMMENDED FOR APPROVAL
DISTRICT ENGINEER, PUBLIC ROADS ADMINISTRATION, FEDERAL WORKS AGENCY — DATE

APPROVED
DIVISION ENGINEER, PUBLIC ROADS ADMINISTRATION, FEDERAL WORKS AGENCY — DATE

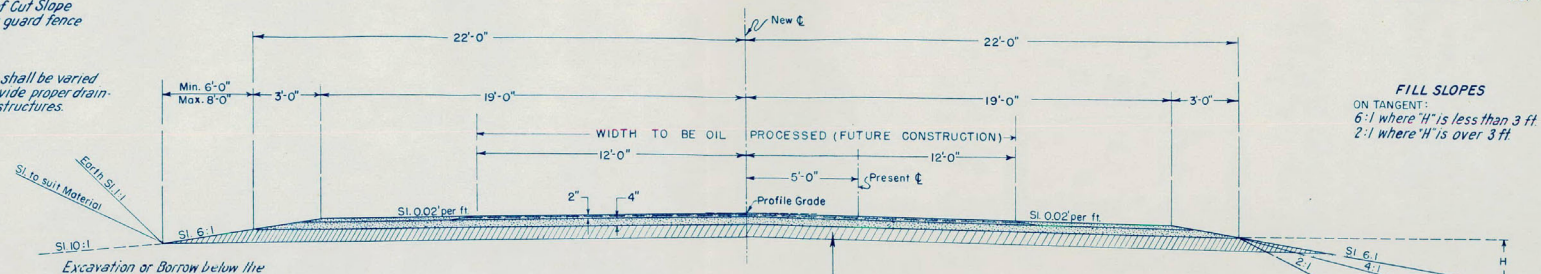
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	2	

REV. TAB. OF LENGTH 7/2/47, E.E.O.

TYPICAL CROSS SECTION OF IMPROVEMENT

NOTE-
See Standard M-2-C for details of Cut Slope Treatment, flaring & widening for guard fence and/or guard posts.

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



FILL SLOPES
ON TANGENT:
6:1 where "H" is less than 3 ft.
2:1 where "H" is over 3 ft.

Excavation or Borrow below the 6:1 Slope and/or 10:1 Slope will not be permitted.

6" Compacted thickness of Gravel or Crushed Rock Surfacing is to be placed in two courses at the following approximate rates per 100 linear feet of Roadway.

STATIONS	COURSES 2" TOP	COURSES 4" BOTTOM
	TONS	
1036+00 - 1038+52 Back (Roadway)	41	89
1038+70.9 Ahead - 1043+10.6 (Bridge)	32 (30 wide)*	28 (13' wide)*
1043+10.6 - 1046+00 (Roadway)	41	89

*See Bridge Sheet No. 4 for widening of Surfacing on Bridge.

The upper 12" portion of subgrade is to be constructed of Selected Borrow at locations designated in Selected Borrow Tabulation. Estimated quantities involved in this operation and thickness of material required are tabulated on Sheet No. 3.

GENERAL NOTES

This Project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted June 1, 1940.

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 center line 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.

All Curves are to be Superelevated as provided by the Standard Superelevation sheet included with the plans.

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 & bridge. 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.

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	TONS AVAILABLE	TONS USED ROADWAY TOP COURSE	TONS USED ROADWAY BOTTOM COURSE	TONS USED BRIDGE TOP COURSE	TONS USED BRIDGE BOTTOM COURSE	OVERHAUL TON MILE
1036+00 To 1038+26.3	200' NE of the East End of Bridge in the N½ of NW¼ Sec. 17, & NE¼ of NE¼ Sec. 18, T 21 S, R 61 W.	AMPLE	93	202			
1038+26.3 To 1038+52 BK.					11	23	F.H.
1038+70.9 Ahd. To 1043+10.6					141	124	F.H.
1043+10.6 To 1043+25.4					6	14	F.H.
1043+25.4 To 1046+00			113	245			
ROAD APPROACH			82	178			F.H.
WIDENING SHOULDERS 1032+00 To 1036+00 / 1046+00 To 1049+00			28	52			F.H.
SUB-TOTALS			316	677	158	161	
TOTALS			993		319		Free Haul

TABULATION OF LENGTH & DESIGN DATA

STATION	ROADWAY LIN. FT.	BRIDGES LIN. FT.	BRIDGES LOADING	NON FED. AID ROADWAY LIN. FT.
1036+00 Beg. (Non-Part)				226.3
1038+26.3 Begin F 92(2) = 0+00 Begin F.A.P. 92 1038+52.0 Back =	25.7			
EQUATION				
1038 + 70.9 Ahead				
Huerfano River Bridge		439.7	H-20	
1043+10.6	14.8			
1043+25.4 End F 92(2) = 4+80.2 End F.A.P. 92 1046+00 End (Non-Part)				274.6
TOTALS	40.5	439.7		500.9

SUMMARY	LIN. FT.	MILES
F 92(2) Roadway	405	0.007
F 92(2) Bridges	439.7	0.083
TOTAL F 92(2) (Fed. Aid)	480.2	0.090
F 92(2) Approaches (Non-Fed. Aid)	500.9	0.095
TOTAL F 92(2)	981.1	0.185

DESIGN DATA	
Maximum Degree of Curve	1°
Maximum Grade	2.204 %
Minimum N.P.S.D. - horizontal	over 900'
Minimum N.P.S.D. - vertical	540'
Maximum Design Speed	50 M.P.H.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	3	

REV. SUMMARY FOR NON-FED. AID QUANTITIES 7/2/47, E.E.O.

TIMBER GUARD POSTS

STATION	SIDE	SPACING	NUMBER REMOVE & RESET	NUMBER NEW
1043 + 14 To 1043 + 25	R. & L.	Bridge		6
1043+25 To 1043+78	R. & L.	Bridge		# 4
1034 + 90 To 1038 + 26	R. & L.	Standard	# 27	
1038 + 26 To 1038 + 50	R. & L.	Standard	8	
TOTALS			# 27 8	# 4 6

QUANTITIES SO MARKED ARE NON-FEDERAL AID.

*SELECTED BORROW PLAN

It is estimated that material for Selected Borrow 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.

No alterations of the Selected Borrow Plan as here outlined will be allowed without written permission from the Department.

MATERIAL TO BE PLACED	AVAILABLE	SOURCE	CU. YDS. USED	OVERHAUL STA. YDS.
1043+11 To 1043+25 1043+25 To 1045+00	AMPLE	200' NE of the East End of Bridge in the N½ of NW¼ Sec. 17 & NE¼ of NE¼ Sec. 18, T21S, R61W.	26 # 324	F. H. F. H.
TOTALS			# 324 26	Free Haul

* Selected Borrow Material is to be classified and paid for as "Unclassified Excavation". Included in quantities on "Summary of Earthwork Quantities" sheet.

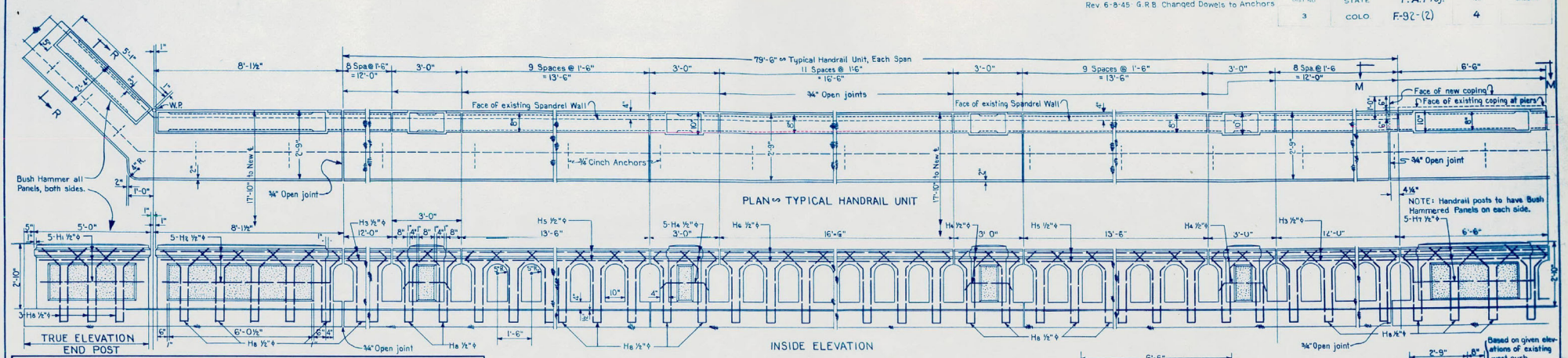
SUMMARY OF APPROXIMATE QUANTITIES

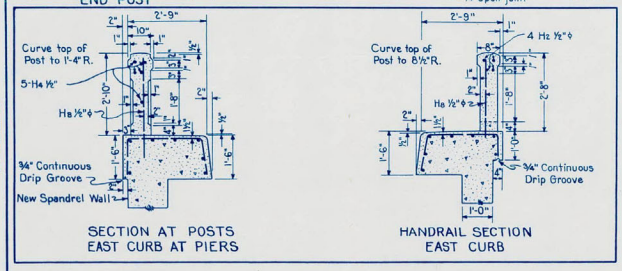
ITEM NO.	ITEM	UNIT	FED. AID ROADWAY	FED. AID BRIDGE STA. 1038+	NON FED. AID APPROACHES	PROJECT TOTALS
10a	Clearing & Grubbing entire Project	Lump Sum			•	•
11x	Removal of parts of Present Structure, Sta. 1038+	" "		•		•
11y	Remove & Reset Name Plate	" "		•		•
11c	Remove & Reset Guard Posts	Each	8		27	35
13c	Unclassified Excavation	Cu. Yd.	100		2900	3000
14a	Dry Rock Excavation (Structural)	Cu. Yd.		180		180
14b	Dry Common Excavation "	" "		220		220
14c	Wet Rock Excavation "	" "		150		150
14d	Wet Common Excavation "	" "		500		500
15a	Rolling Embankments & Cuts	Unit Hr.	10		20	30
15b	Furnishing Roller	Roller Unit	0.3		1.7	2
15c	Wetting Embankments & Cuts	M. Gal.	15		85	100
15d	Rolling with Finishing Roller	Roller Hour	3		7	10
15e	Furnishing Finishing Roller	Lump Sum	Prorated		Prorated	•
15y	Selected Backfill	Cu. Yd.		2160		2160
18a	Station Yard Overhaul	Sta-Yd	100		3900	4000
26a	Gravel or Crushed Rock Surfacing	Ton	100	300	1000	1400
44b	Miscellaneous Treated Timber	M. ft. bm		0.6		0.6
46a	Class "A" Concrete	Cu. Yd.		1168		1168
46r	Class "A" Concrete (Handrails)	" "		37		37
47	Reinforcing Steel	Lb.		101,200		101,200
60a	Treated Timber Piling	Lin. Ft.		960		960
66	Rip Rap enclosed in wire netting	Cu. Yd.		180		180
79b	Membrane Water-proofing (2 Ply)	Sq. Yd.		102		102
80b	Bronze Name Plates	Each		2		2
89a	Drain Pipe (Concrete Floor) (4"x 4'-6")	Each		16		16
92	Timber Guard Posts	Each	6		4	10

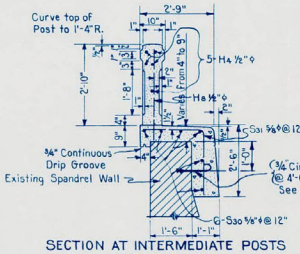
REVISIONS

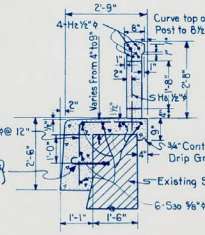
Rev. 9-18-44 I.M.R. Added Dowels W. Curb & Des. Data.
Rev. 6-8-45 G.R.B. Changed Dowels to Anchors

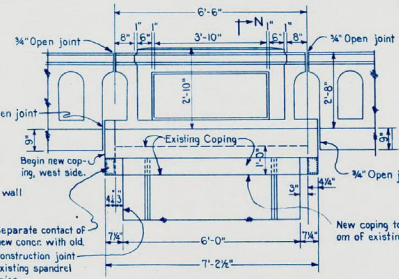
FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F-92-(2)	4	

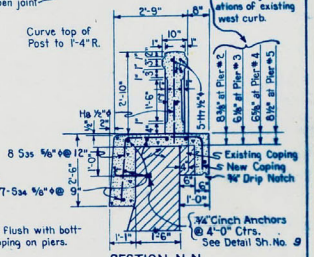


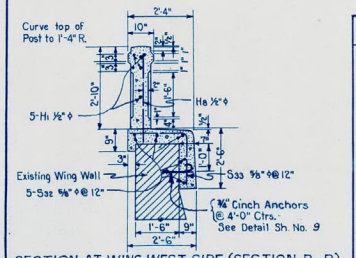








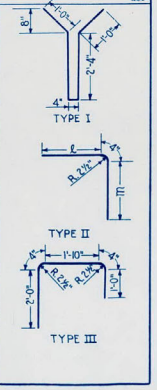




REINFORCEMENT BAR LIST
EAST & WEST HANDRAILS & W. CURB

MARK	SIZE	No. REQD.	LENGTH	TYPE	DIMENSIONS ℓ	m	n
H1	½"φ	20	4'-6"	Str.			
H2	½"φ	20	7'-8"	"			
H3	½"φ	80	11'-8"	"			
H4	½"φ	200	2'-8"	"			
H5	½"φ	80	13'-2"	"			
H6	½"φ	40	16'-2"	"			
H7	½"φ	40	6'-2"	"			
H8	½"φ	594	7'-0"	I			
S30	⅝"φ	60	40'-0"	Str.			
S31	⅝"φ	415	4'-4"	II	2'-0"	2'-0"	
S32	⅝"φ	10	13'-6"	Field Bend			
S33	⅝"φ	12	4'-1"	II	1'-9"	2'-0"	
S34	⅝"φ	28	6'-10"	Str.			
S35	⅝"φ	32	5'-6"	III			

BENDING DIAGRAMS



BAR SUMMARY

7815 Lin. Ft. ½"φ @ 0.668#/' = 5220 Lbs.
4750 Lin. " ⅝"φ @ 1.043#/' = 4954 "
10,174 "
‡ 1% Overrun 106 "
TOTAL = 10,280 "

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department adopted June 1, 1940.
All Concrete shall be Class "A".
Forms for concrete surface exposed in the finished work shall be constructed of shiplap or tongue and groove lumber S 3S unless faced with panel board.
All reinforcing bars shall be deformed. Intermediate grade steel tagged with station number and 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.

SUMMARY OF QUANTITIES FOR ENTIRE STRUCTURE

ITEM No.	DESCRIPTION	UNIT	ARCHES	EAST SPANDREL WALL	ABUT. No. 6	PIERS No. 2,3,4 & 5	ABUT. No. 1	E. & W. HANDR. & W. CURB	ROCKFILLED BULKHEAD	TOTAL
11x	Removal of Parts of Present Structure	" "								Lump Sum
14a	Dry Rock Excavation (Str.)	Cu. Yd.			180					180
14b	Dry Comm. " "	" "		10	10	60	100		40	220
14c	Wet Rock " "	" "			50	40	20			150
14d	Wet Comm. " "	" "				250	160		90	500
15y	Selected BackFill	Cu. Yd.	1450		350	150	210			2,160
44b	Miscellaneous Treated Timber	M. Ft. - B. M.							0.530	0.530
46a	Class "A" Concrete	Cu. Yd.	408	199	109	202	190	60		1,168
46r	Class "A" Concrete (Handrails)	Cu. Yd.						37		37
47	Reinforcing Steel	Lb.	61,920	16,940	5,610		6410	10,280		101,160
60a	Treated Timber Piling	Lin. Ft.							960	960
66	Rip Rap Enclosed in Wire Netting	Cu. Yd.							180	180
79b	Membrane Waterproofing (2 Ply)	Sq. Yd.	94		1	6	1			102
80b	Bronze Name Plate	Ea.			1		1			2
11y	Remove & Reset Name Plate	Lump Sum								Lump Sum
89a	Drain Pipe, (Concrete Floor) (4"x 4'-6")	Ea.				16				16
‡	Cinch Anchors ¾"φ	Ea.					100	116		216
‡	Tie Rods 1"φ	Ea.	40							40
✳	1" Expansion Joint Material	Sq. Ft.		210						210
	✳ To be included in bid price of Class "A" Concr.		See Schedule	on Sheet # 5	For pieces Reqd.					

‡ To be included in bid price of Class "A" Concrete

STRUCTURE NO. L-19-B

REFERENCE DRAWINGS

Sheet No. 5 General Layout and Details.
" " 6 Spandrel Wall and Details.
" " 7 Arch Construction & Reinforcement.
" " 8 New Construction at Abut. No. 6.
" " 9 New Construction at Abut. No. 1.
" " 10 New Construction at Abut. No. 1. and order of pour for arch ribs.
" " 11 Details of RockFilled Bulkhead and Nameplate.

DESIGN DATA
A.A.S.H.O. 1941-H-20
fs 18,000# in²
fc 833# in²

COLORADO
STATE HIGHWAY DEPARTMENT

SUMMARY OF QUANTITIES
HANDRAIL DETAILS
AND REINF. BAR LIST.

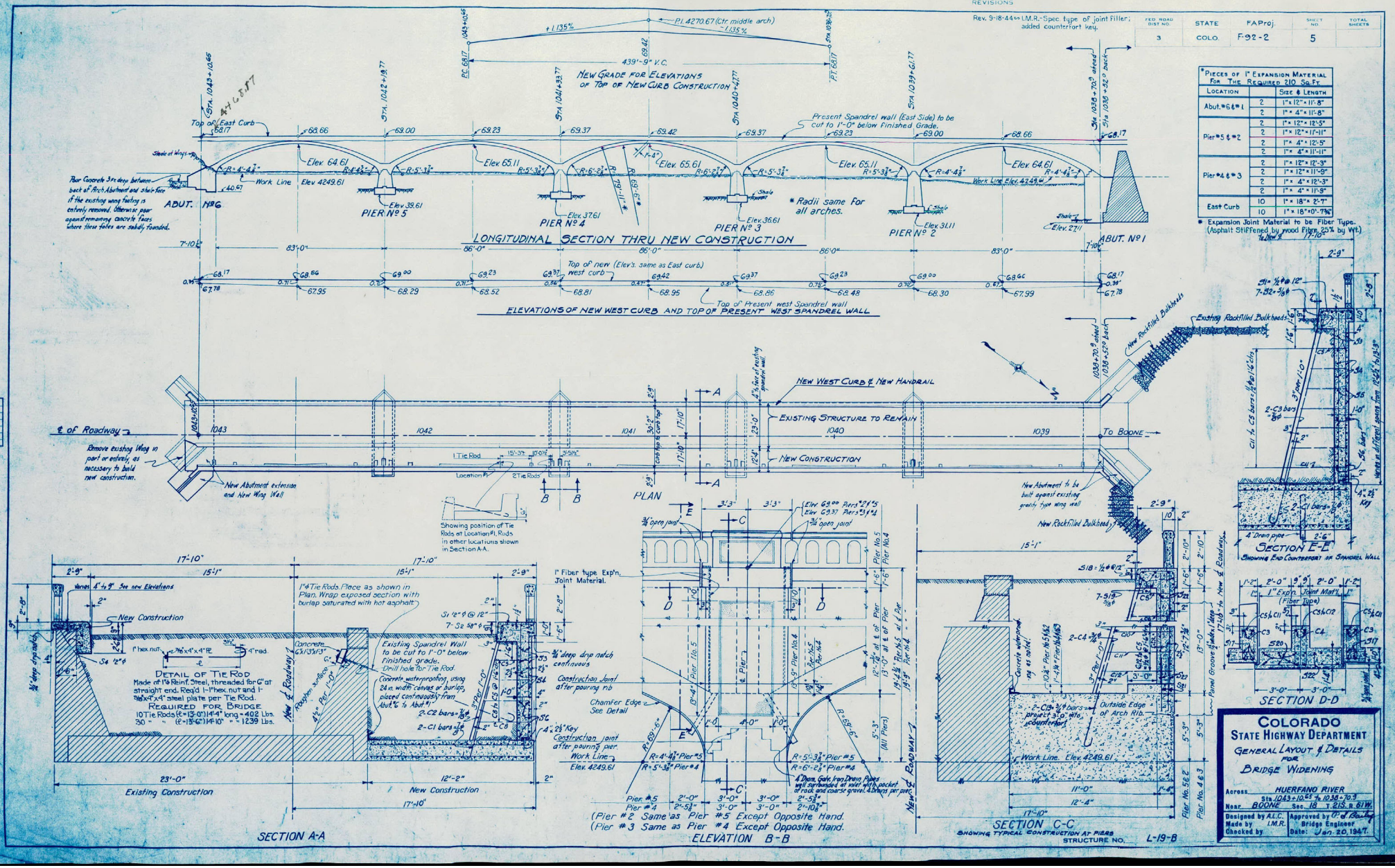
Across HUERFANO RIVER
Sta. 1043+10.65 to 1038+70.9
Near BOONE Sec. 18 T. 21 S. R. 61 W.

Designed by I.M.R.
Made by I.M.R.
Checked by A.L.C.
Approved by C. J. Bailey Bridge Engineer
Date: Jan. 20, 1947.

REVISIONS

Rev. 9-18-44 L.M.R.-Spec. type of joint filler; added counterfort key.

FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F-92-2	5	



* Pieces of 1" Expansion Material For The Required 210 Sq. Ft.		
Location		Size & Length
Abut. #6 & #1	2	1" × 12" × 11'-8"
	2	1" × 4" × 11'-8"
Pier #5 & #2	2	1" × 12" × 12'-5"
	2	1" × 12" × 11'-11"
	2	1" × 4" × 12'-5"
	2	1" × 4" × 11'-11"
Pier #4 & #3	2	1" × 12" × 12'-3"
	2	1" × 12" × 11'-9"
	2	1" × 4" × 12'-3"
	2	1" × 4" × 11'-9"
East Curb	10	1" × 18" × 2'-7"
	10	1" × 18" × 0'-7 3/8"

* Expansion Joint Material to be Fiber Type. (Asphalt Stiffened by wood Fiber, 25% by Wt.)

	Initial	Date
Designed by	A.L.C.	1941
Made by	L.M.R.	1941
Checked by	A.L.C.	1941
	L.M.R.	1941

COLORADO
STATE HIGHWAY DEPARTMENT
GENERAL LAYOUT & DETAILS FOR BRIDGE WIDENING

Across HUERFANO RIVER
Near BOONE Sta. 1043+10.65 to 1038+70.9 Sec. 18 T. 21S. R. 61W.

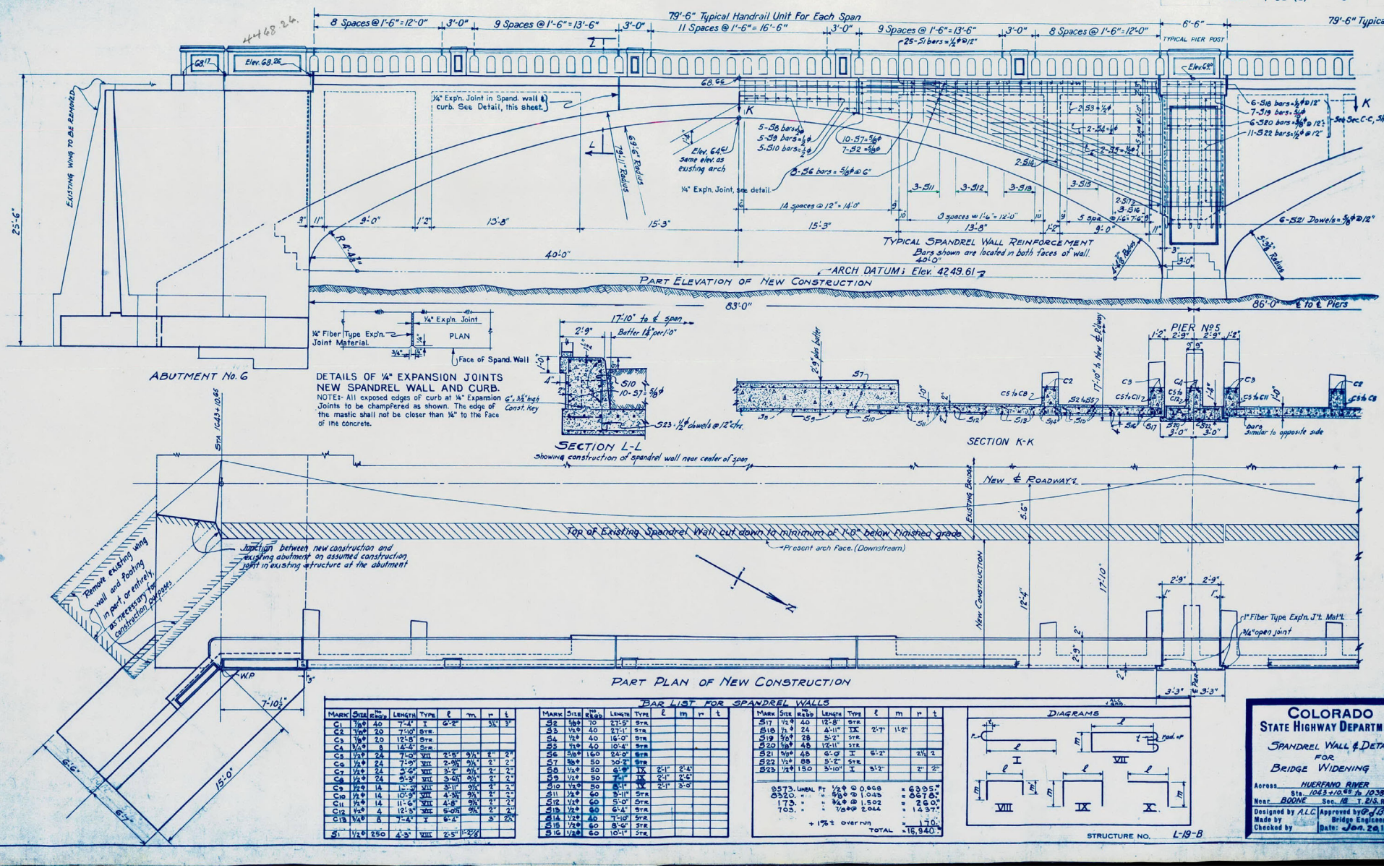
Designed by A.L.C.
Made by L.M.R.
Checked by

Approved by [illegible]
Bridge Engineer
Date: Jan. 20, 1947.

REVISIONS

Rev. 9-18-44 M. R. - Added ¼" Exp'n. joints in Spand. & curb, with details.
Rev. 7-14-44 Removed strut at piers G.R.B.

F.D. ROAD DIST. NO.	STATE	FA Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92-(2)	6	



BAR LIST FOR SPANDREL WALLS

Mark	Size	No. Reqd.	Length	Type	ℓ	m	r	t
C1	⅞"φ	40	7'-4"	I	6'-2"		5¾"	3"
C2	⅞"φ	20	7'-10"	STR.				
C3	⅞"φ	20	12'-8"	STR.				
C4	½"φ	8	14'-4"	STR.				
C5	½"φ	24	7'-0"	VII	2'-5"	9¼"	2"	2"
C6	½"φ	24	7'-9"	VII	2-9¼"	9¼"	2"	2"
C7	½"φ	24	5'-6"	VII	3'-2"	9¼"	2"	2"
C8	½"φ	24	5'-3"	VII	3'-6¼"	9¼"	2"	2"
C9	½"φ	14	12'-3"	VII	3'-11"	9¼"	2"	2"
C10	½"φ	14	10'-9"	VII	4'-3½"	9¼"	2"	2"
C11	½"φ	14	11'-6"	VII	4'-8"	9¼"	2"	2"
C12	½"φ	4	12'-3"	VII	5'-0¼"	9¼"	2"	2"
C13	½"φ	8	7'-4"	I	6'-4"		3"	2¼"
S1	½"φ	250	4'-3"	VIII	2'-5"	11-2¼"		

Mark	Size	No. Reqd.	Length	Type	ℓ	m	r	t
S2	⅝"φ	10	27'-5"	STR.				
S3	½"φ	40	27'-1"	STR.				
S4	½"φ	40	16'-0"	STR.				
S5	½"φ	40	10'-4"	STR.				
S6	⅝"φ	160	24'-0"	STR.				
S7	⅝"φ	50	30'-2"	STR.				
S8	½"φ	50	6'-9"	IX	2'-1"	2'-4"		
S9	½"φ	50	7'-1"	IX	2'-1"	2'-6"		
S10	½"φ	50	8'-1"	IX	2'-1"	3'-0"		
S11	½"φ	60	3'-11"	STR.				
S12	½"φ	60	5'-0"	STR.				
S13	½"φ	60	6'-4"	STR.				
S14	½"φ	40	7'-10"	STR.				
S15	½"φ	60	8'-6"	STR.				
S16	½"φ	60	10'-1"	STR.				

Mark	Size	No. Reqd.	Length	Type	ℓ	m	r	t
S17	½"φ	40	12'-8"	STR.				
S18	½"φ	24	4'-11"	IX	2'-7"	1'-2"		
S19	⅝"φ	28	5'-2"	STR.				
S20	⅝"φ	48	12'-11"	STR.				
S21	⅝"φ	48	6'-0"	I	6'-2"		2¼"	2
S22	½"φ	88	5'-2"	STR.				
S23	½"φ	150	3'-10"	I	3'-2"		2"	2"

8573.	LINEAL FT.	½"φ @ 0.668	= 5395.#
8320.	" "	⅝"φ @ 1.045	= 8678.#
173.	" "	¾"φ @ 1.502	= 260.#
703.	" "	1⅛"φ @ 2.044	= 1437.#
		+ 1% t overrun	= 170.#
		TOTAL	= 16,940.#

DIAGRAMS

STRUCTURE NO. L-19-8

COLORADO STATE HIGHWAY DEPARTMENT

SPANDREL WALL & DETAILS FOR BRIDGE WIDENING

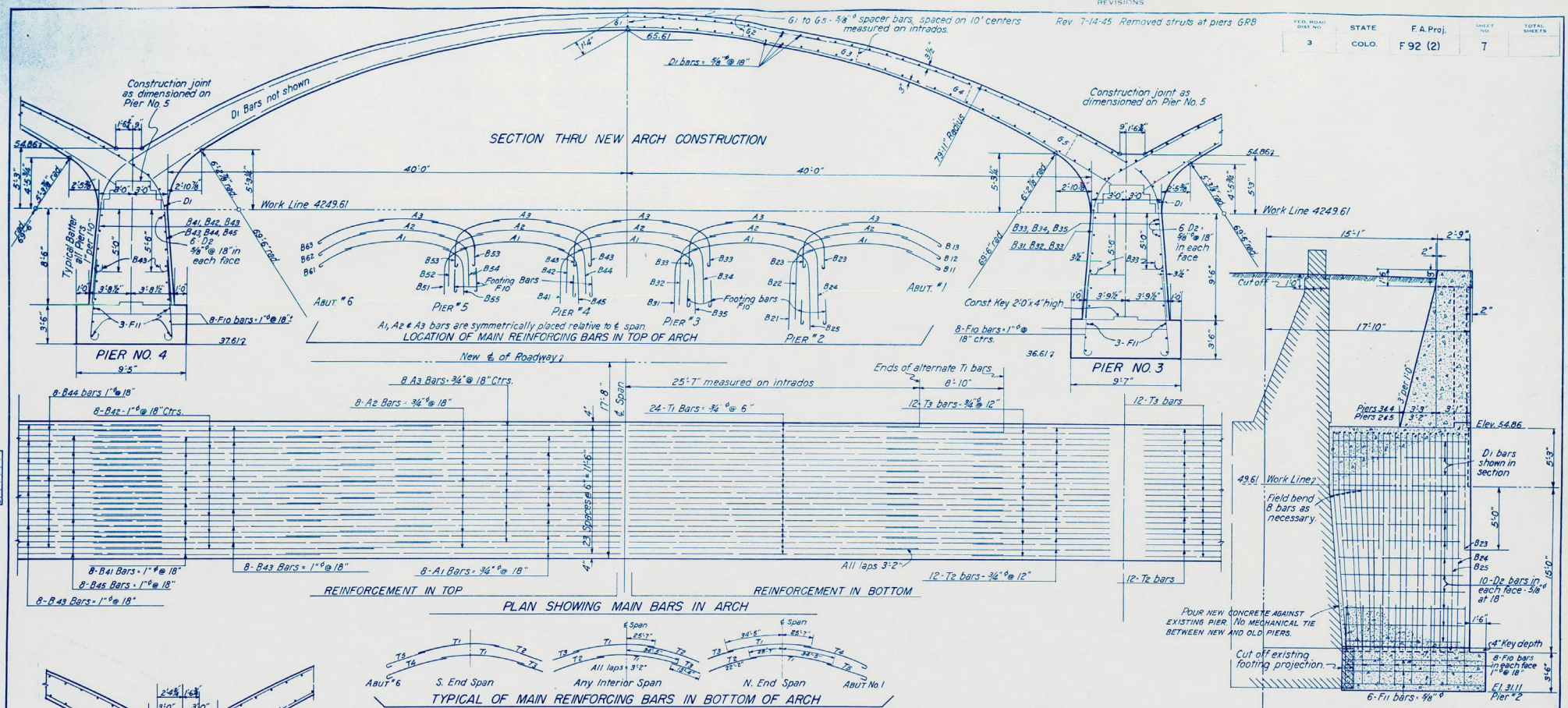
Across HUERFANO RIVER
Near BOONE Sta. 1043+10.65 to 1038+70.9 Sec. 18 T. 21 S. R. 61 W.

Designed by A.L.C. Approved by G. J. Bailey
Made by Bridge Engineer
Checked by Date: Jan. 20, 1947.

REVISIONS

Rev. 7-14-45 Removed struts at piers GRB

FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	7	



BAR LIST FOR ARCH SPANS AND PIERS (INCLUDES ARCH BARS TO ABUTMENTS)

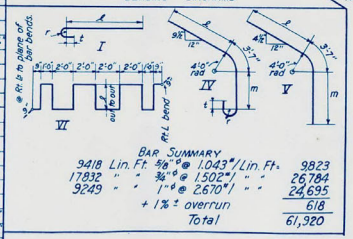
GRB ALC

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
A1	3/4" ϕ	40	60'-0"	Str.				
A2	3/4" ϕ	40	50'-0"	Str.				
A3	3/4" ϕ	40	40'-0"	Str.				
B11	1" ϕ	8	25'-7"	I	24'-3"		4"	3½"
B12	1" ϕ	8	30'-7"	I	29'-3"		4"	3½"
B13	1" ϕ	8	35'-7"	I	34'-3"		4"	3½"
B21	1" ϕ	8	38'-3"	V	19'-8"	15'-0"		
B22	1" ϕ	8	43'-3"	V	24'-8"	15'-0"		
B23	1" ϕ	16	39'-9"	IV	29'-8"	5'-2"	4"	3½"
B24	1" ϕ	8	43'-9"	V	24'-8"	15'-6"		
B25	1" ϕ	8	38'-9"	V	19'-8"	15'-6"		
B31	1" ϕ	8	33'-3"	V	19'-8"	10'-0"		
B32	1" ϕ	8	38'-3"	V	24'-8"	10'-0"		
B33	1" ϕ	16	40'-3"	IV	29'-8"	5'-8"	4"	3½"
B34	1" ϕ	8	38'-9"	V	24'-8"	10'-6"		

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
B35	1" ϕ	8	33'-9"	V	19'-8"	10'-6"		
B41	1" ϕ	8	32'-9"	V	19'-8"	9'-6"		
B42	1" ϕ	8	37'-9"	V	24'-8"	9'-6"		
B43	1" ϕ	16	40'-3"	IV	29'-8"	5'-8"	4"	3½"
B44	1" ϕ	8	37'-3"	V	24'-8"	9'-0"		
B45	1" ϕ	8	32'-3"	V	19'-8"	9'-0"		
B51	1" ϕ	8	30'-3"	V	19'-8"	7'-0"		
B52	1" ϕ	8	35'-3"	V	24'-8"	7'-0"		
B53	1" ϕ	16	39'-9"	IV	29'-8"	5'-2"	4"	3½"
B54	1" ϕ	8	34'-9"	V	24'-8"	6'-6"		
B55	1" ϕ	8	29'-9"	V	19'-8"	6'-6"		
B61	1" ϕ	8	25'-7"	I	24'-3"		4"	3½"
B62	1" ϕ	8	30'-7"	I	29'-3"		4"	3½"
B63	1" ϕ	8	35'-7"	I	34'-3"		4"	3½"

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
D1	5/8" ϕ	640	11'-10"	Str.				
D2	5/8" ϕ	52	10'-10"	Str.				
F10	1" ϕ	64	9'-4"	I	8'-0"		4"	3½"
F11	5/8" ϕ	24	12'-4"	Str.				
G1	5/8" ϕ	5	18'-1"	VI	0'-8¾"			
G2	5/8" ϕ	10	18'-8"	VI	0'-9¾"			
G3	5/8" ϕ	10	20'-5"	VI	1'-0¾"			
G4	5/8" ϕ	10	23'-3"	VI	1'-5½"			
G5	5/8" ϕ	10	27'-2"	VI	2'-0¾"			
T1	3/4" ϕ	120	60'-0"	Str.				
T2	3/4" ϕ	96	22'-2"	Str.				
T3	3/4" ϕ	96	13'-4"	Str.				
T4	3/4" ϕ	24	29'-11"	I	28'-11"		3"	2½"
T5	3/4" ϕ	24	21'-1"	I	20'-1"		3"	2½"

BENDING DIAGRAMS



BAR SUMMARY

9418 Lin. Ft. 5/8" ϕ @ 1.043#/Lin. Ft.		9823
17832 " " 3/4" ϕ @ 1.502#/ " "		26,784
9249 " " 1" ϕ @ 2.670#/ " "		24,695
		618
+ 1% ± overrun	Total	61,920

STRUCTURE NO. L-19-B

COLORADO
STATE HIGHWAY DEPARTMENT

ARCH CONSTRUCTION AND REINFORCEMENT

Across HUERFANO RIVER Sta. 1043+10.65 to 1038+70.9
Near BOONE Sec. 18 T. 21 S. R. 61 W.

Designed by ALC
Made by ALC
Checked by GRB

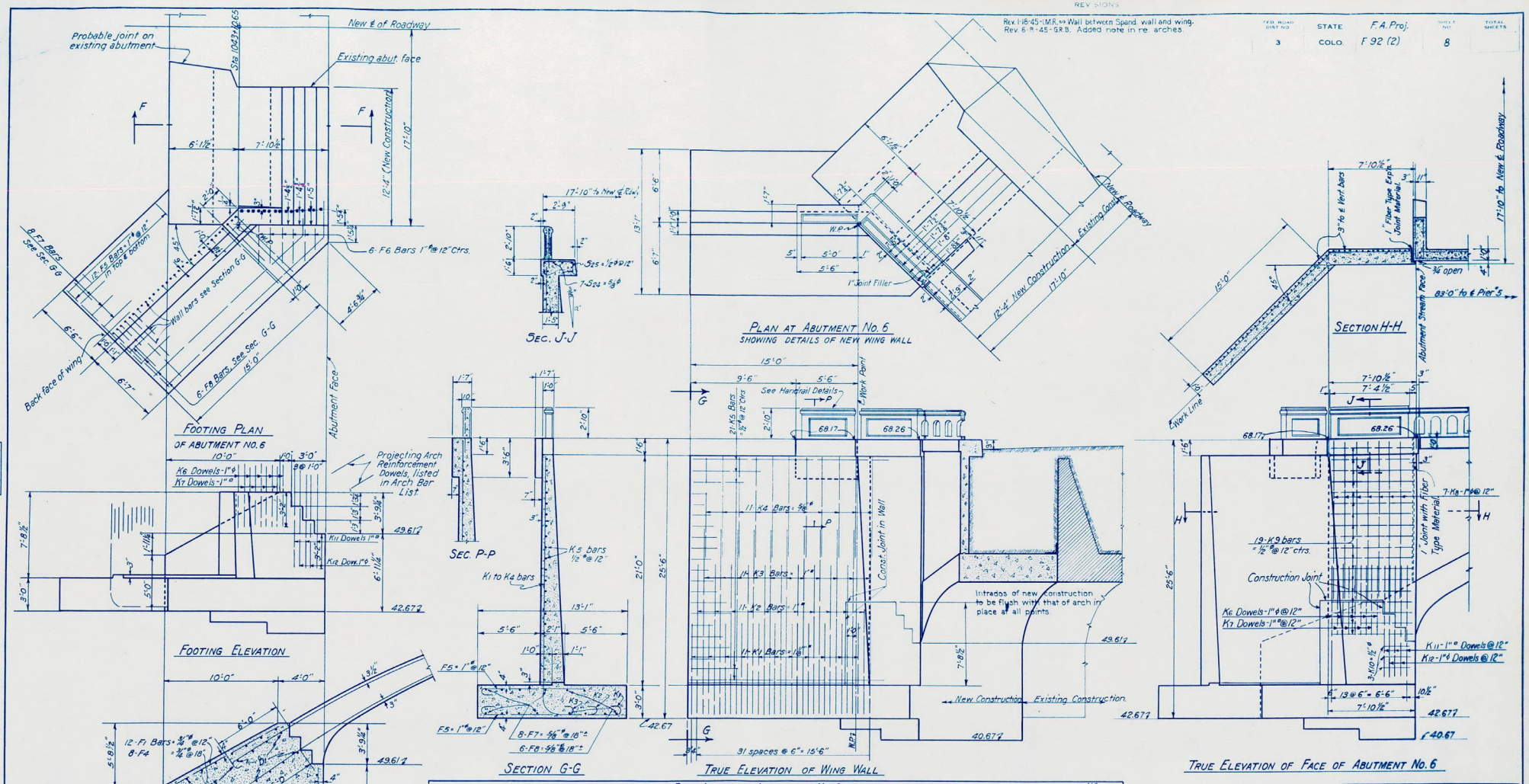
Approved by C. J. Bailey
Bridge Engineer
Date: Jan. 20, 1947.

	Initial	Date
Made By	ALC	
Chk By		
Chk By	ALC	
Made By	GRB	6-8-44
Chk By	GRB	6-11-44
Made By	ALC	6-29-44

REVISIONS

Rev. 1-16-45 - M.R. to Wall between Spand. wall and wing.
Rev. 6-8-45 - G.R.B. Added note in re arches.

FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	8	



	Initial	Date
ed By	ALC	5-44
ed By		
By	ALC	5-44
ed By	GRB	5-17-44
By	GRB	6-1-44
ed By	ALC	6-12-44

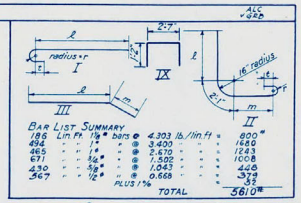
BAR LIST AT ABUTMENT NO. 6.

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
F1	¾"⌀	12	11'-6"	STR				
F2	¾"⌀	12	13'-6"	STR				
F3	¾"⌀	12	8'-3"	STR				
F4	¾"⌀	23	11'-10"	STR				
F5	1"⌀	24	10'-4"	I	9'-0"		4"	3½
F6	1"⌀	6	8'-8"	I	7'-4"		4"	3½
F7	⅝"⌀	8	16'-4"	STR				
F8	⅝"⌀	6	22'-6"	STR				
K11	1"⌀	3	16'-5"	"				
K12	1"⌀	2	16'-5"	"				
K1	1⅛"⌀	11	16'-11"	II	8'-0"	5'-4"	4½	4"
K2	1"⌀	11	19'-0"	II	12'-5"	3'-2"	4"	3½

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
K3	1"⌀	11	20'-0"	II	15'-7"	1'-0"	4"	3½
K4	⅝"⌀	11	9'-8"	STR				
K5	½"⌀	21	17'-11	III	15'-10"	2'-1"		
K6	1"⌀	5	8'-6"	STR				
K7	1"⌀	4	8'-6"	STR				
K8	1"⌀	7	14'-7"	STR				
K9	½"⌀	19	7'-3"	STR				
K10	½"⌀	3	3'-0"	STR				
S24	⅝"⌀	7	9'-3"	STR				
S25	½"⌀	5	4'-11"	STR				

Note: Arch bars B, D & T for Abutment are listed with Bar List for Arch Span & Piers.

ALC GRB



BAR LIST SUMMARY

186	Lin Ft	1⅛"⌀ bars	@	4.303 lb./lin.ft.	=	800#
494	" "	1"⌀	" @	3.400 "	" =	1680
465	" "	1"⌀	" @	2.670 "	" =	1243
671	" "	⅞"⌀	" @	1.502 "	" =	1008
430	" "	¾"⌀	" @	1.043 "	" =	446
367	" "	½"⌀	" @	0.668 "	" =	329
						83
			PLUS 1%	TOTAL		5610#

STRUCTURE NO. L-19-B

COLORADO
STATE HIGHWAY DEPARTMENT

NEW CONSTRUCTION AT ABUTMENT NO. 6.

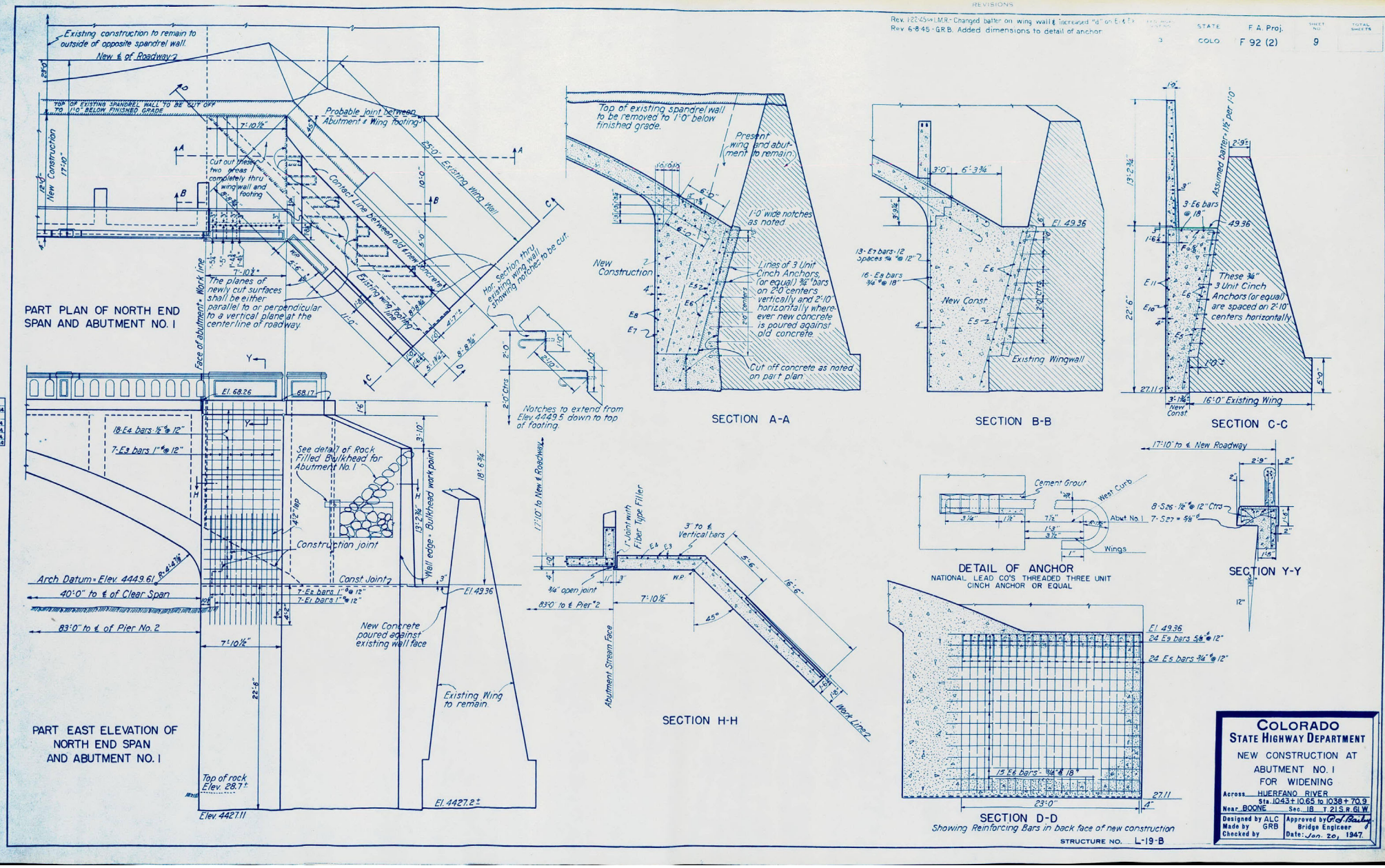
Across HUERFANO RIVER
Sta. 1045+10.65 to 1038+70.9
Near BOONE Sec. 18 T. 21S R. 61W

Designed by A.L.C. Approved by P. J. Raisby
Made by G.R.B. Bridge Engineer
Checked by G.R.B. Date: Jan. 20, 1947

REVISIONS

Rev. 1-22-45 - L.M.R. - Changed batter on wing wall & increased "d" on E1 & E2
Rev. 6-8-45 - G.R.B. Added dimensions to detail of anchor

FED. ROAD DIST. NO.	STATE	F. A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	9	



Signed By	Initial	Date
Detailed By	ALC	-44
Checked By	GRB	6-30-44
Revised By	ALC	1-5-44
Checked By	GRB	1-8-44
Revised By	ALC	1-10-44

COLORADO
STATE HIGHWAY DEPARTMENT

NEW CONSTRUCTION AT ABUTMENT NO. 1 FOR WIDENING

Across HUERFANO RIVER
Sta. 1043+10.65 to 1038+70.9
Near BOONE Sec. 18 T. 21 S. R. 61 W.

Designed by ALC
Made by GRB
Checked by

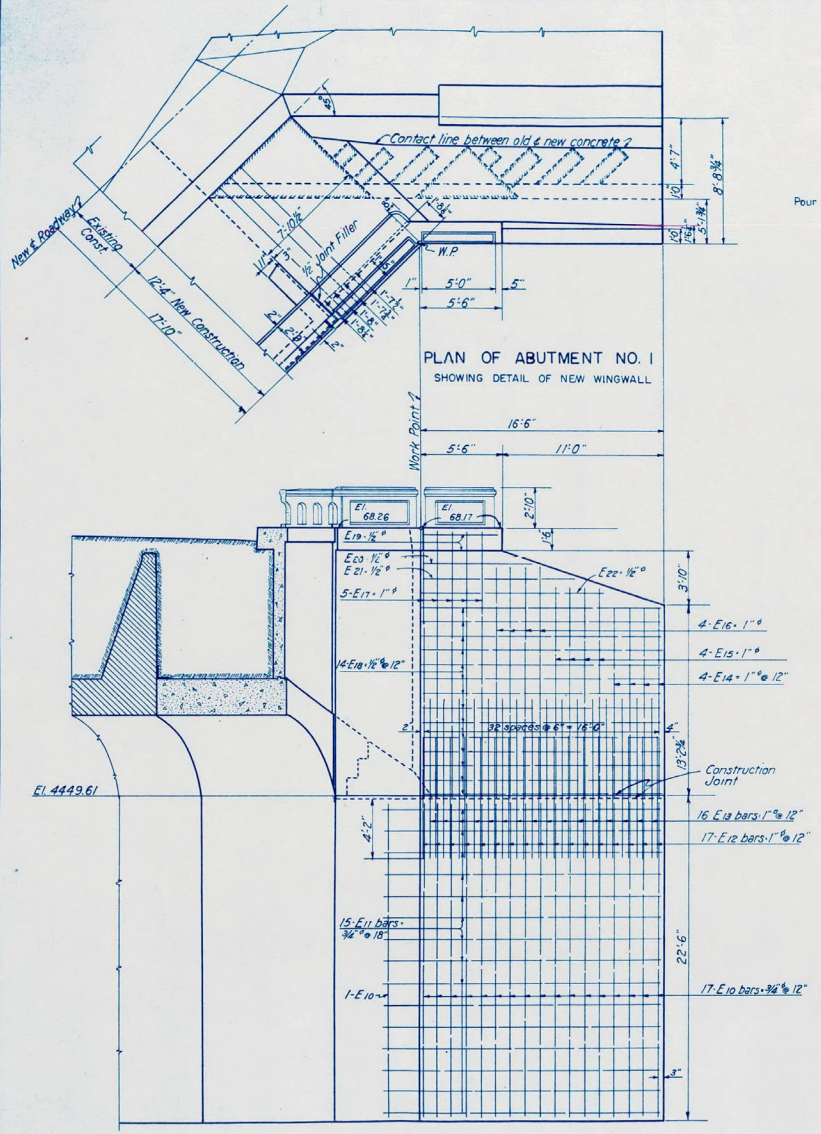
Approved by Chas. L. Bailey
Bridge Engineer
Date: Jan. 20, 1947

STRUCTURE NO. L-19-B

REVISIONS

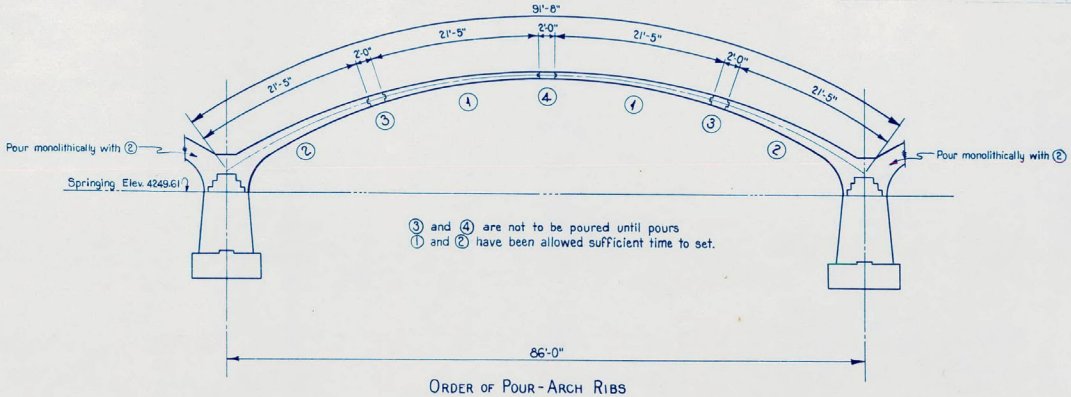
Rev. 1-23-45 - I.M.R.ᵉᵃ Dim's.: base of wall between Spand. wall & wing; & order of pour, - arch rib.

FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	10	



PLAN OF ABUTMENT NO. 1
SHOWING DETAIL OF NEW WINGWALL

TRUE ELEVATION OF WINGWALL

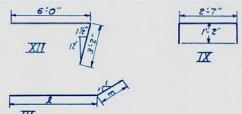


ORDER OF POUR-ARCH RIBS

BAR LIST FOR ABUTMENT NO. 1

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t	'	MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
E1	1"⌀	7	12'-0"	Str.						E13	1"⌀	16	11'-2"	Str.				
E2	1"⌀	7	12'-0"	Str.						E14	1"⌀	4	13'-3"	Str.				
E3	1"⌀	7	14'-8"	Str.						E15	1"⌀	4	14'-9"	Str.				
E4	½"⌀	18	7'-3"	Str.						E16	1"⌀	4	16'-0"	Str.				
E5	¾"⌀	24	22'-0"	Str.						E17	1"⌀	5	18'-6"	Str.				
E6	¾"⌀	18	25'-0"	Str.						E18	½"⌀	14	19'-8"	III	16'-6"	3'-2"		
E7	¾"⌀	13	23'-6"	Str.						E19	½"⌀	2	8'-5"	III	5'-3"	3'-2"		
E8	¾"⌀	16	11'-6"	Str.						E20	½"⌀	1	10'-11	III	7'-9"	3'-2"		
E9	⅝"⌀	24	9'-2"	XII						E21	½"⌀	1	13'-8"	III	10'-6"	3'-2"		
E10	¾"⌀	18	22'-0"	Str.						E22	½"⌀	1	16'-8"	III	13'-6"	3'-2"		
E11	¾"⌀	15	19'-6"	Str.						S26	½"⌀	8	4'-11	IX				
E12	1"⌀	17	8'-4"	Str.						S27	⅝"⌀	7	7'-9"	Str.				

BENDING DIAGRAMS — GRB / ALC



BAR SUMMARY

503 Lin. Ft.	½"⌀ @ 0.668 # / Lin. Ft.	=	336
274 " "	⅝"⌀ @ 1.043 # / " "	=	286
2156 " "	¾"⌀ @ 1.502 # / " "	=	3238
597 " "	1"⌀ @ 2.670 # / " "	=	1594
263 " "	1"⌀ @ 3.400 # / " "	=	894
	+ 1% ± for overrun		62
	Total		6410

STRUCTURE NO. L-19-B

COLORADO
STATE HIGHWAY DEPARTMENT
NEW CONSTRUCTION AT
ABUTMENT NO. 1
FOR WIDENING

Across HUERFANO RIVER
Sta. 1043 + 10.65 to 1038 + 70.9
Near BOONE Sec. 18 T. 21 S. R. 61 W.

Designed by ALC
Made by GRB
Checked by

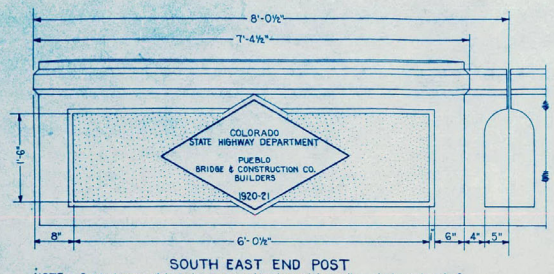
Approved by Ed Bailey
Bridge Engineer
Date: Jan. 20, 1947

	Initial	Date
ed By	ALC	4-4
ed By		
By	GRB	6-30-46
ed By	ALC	7-5-46
By	GRB	7-10-46
ed By	ALC	7-11-46

REVISIONS

Rev. Name Plate & Wire Netting 1-23-47 G.R.B.

FED. ROAD DIST. NO.	STATE	F.A. Proj.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	11	



SOUTH EAST END POST

NOTE:- Original name-plate to be preserved and re-set in south-easterly end-post of new handrail as shown.

The Front Face of the name-plate shall be set Flush with the panel of the post and the upper and lower corners shall have a one-inch bevel from the outside plane of the post to the plane of the panel.

Panel shall be bush-hammered and all work shall be done to present a neat and Finished appearance.

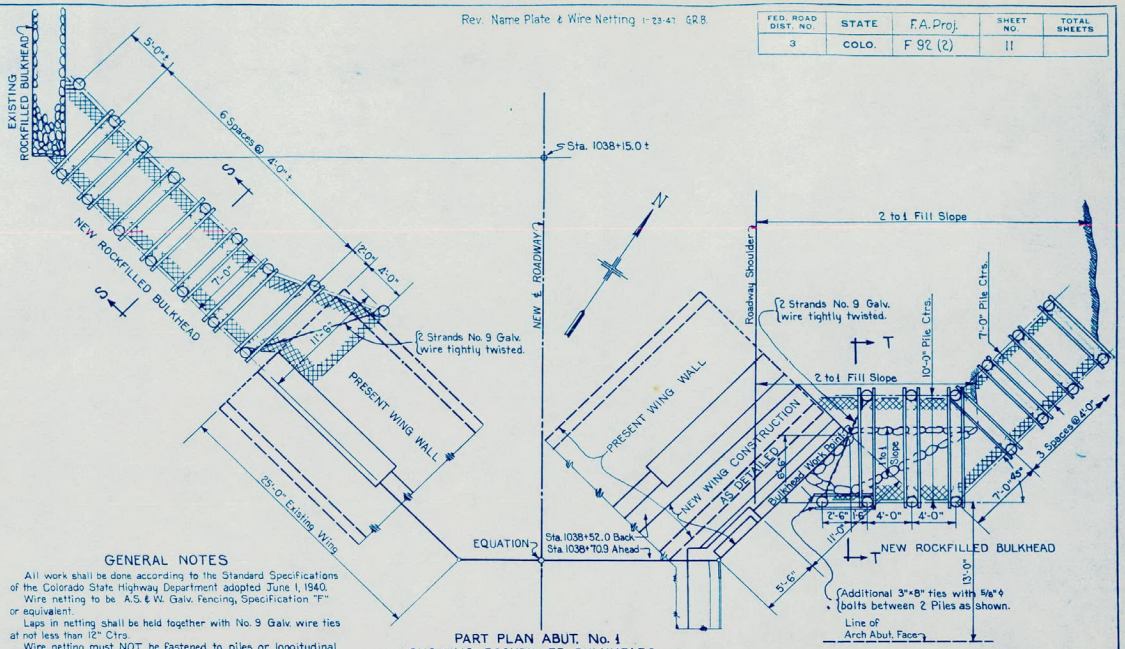
BRONZE NAME PLATE

(2 Reqd.)

NOTE:- Information to be as shown above. See Standard Sheet M-6-E, these plans, for other details.

One plate to be placed on each R.H. wing post.

	Initial	Date
Designed By	A.L.C.	7-44
Checked By	L.M.R.	"
Drawn By	A.L.C.	"
Checked By	L.M.R.	"
Checked By	L.M.R.	"
Checked By	A.L.C.	"



GENERAL NOTES

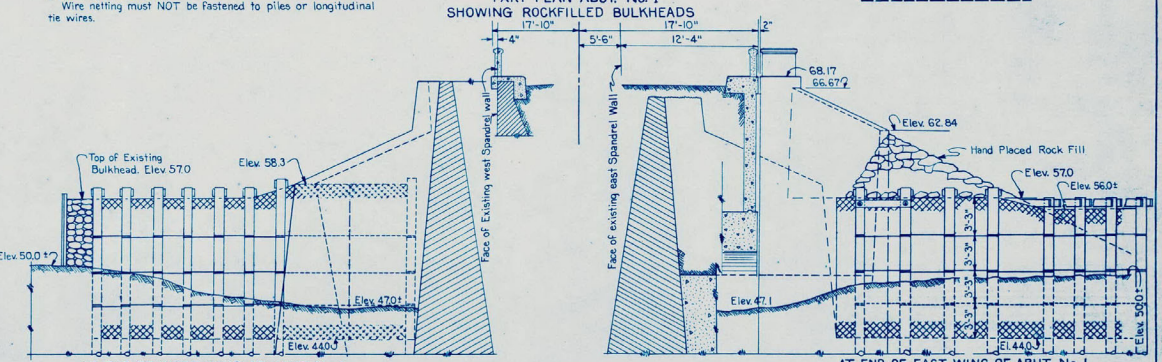
All work shall be done according to the Standard Specifications of the Colorado State Highway Department adopted June 1, 1940.

Wire netting to be A.S. & W. Galv. Fencing, Specification "F" or equivalent.

Laps in netting shall be held together with No. 9 Galv. wire ties at not less than 12" Ctrs.

Wire netting must NOT be fastened to piles or longitudinal tie wires.

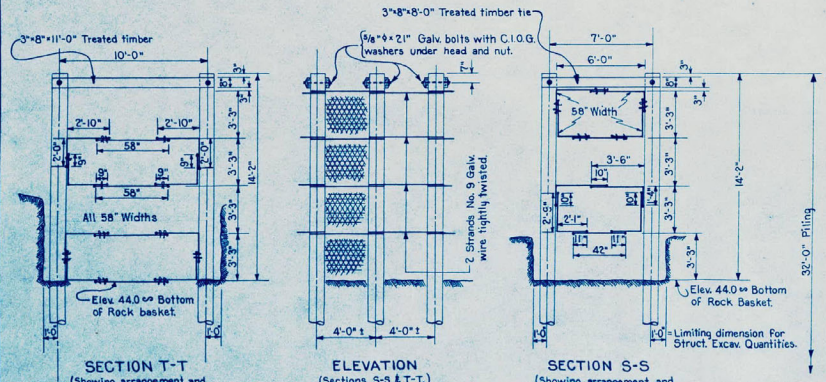
PART PLAN ABUT. No. 1 SHOWING ROCKFILLED BULKHEADS



AT END OF WEST WING OF ABUT. No. 1

PART ELEVATION ⇔ ROCKFILLED BULKHEAD OFF WING ENDS OF ABUT. No. 1

AT END OF EAST WING OF ABUT. No. 1



SECTION T-T (Showing arrangement and Lap of wire Netting.)

ELEVATION (Sections S-S & T-T.)

SECTION S-S (Showing arrangement and Lap of wire Netting.)

SUMMARY OF QUANTITIES FOR ROCKFILLED BULKHEAD

ITEM No.	DESCRIPTION	UNIT	TOTAL
14b	Dry Common Excavation (Str.)	Cu. Yd.	40
14d	Wet " " "	" "	90
44b	Miscellaneous Treated Timber	M. Ft. B.M.	0.530
60a	Treated Timber Piling	Lin. Ft.	960
66	Riprap Enclosed in Wire Netting *	Cu. Yd.	180

* INCLUDES:-
260 Lin. Ft. Wire Netting 42" width
1250 " " " 58" "
30 5/8"ϕ Galv. bolts, 21" @ 196# = 59#
60 C.I.O.G. Washers @ 0.75# = 45#
1000 Lin. Ft. Galv. wire No. 9 = 59#
4 Cu. Yds. Hand Placed Rock Fill

STRUCTURE NO. L-19-B

COLORADO STATE HIGHWAY DEPARTMENT

DETAILS AND SUMMARY OF ROCKFILLED BULKHEAD AND NAMEPLATE

Across HUERFANO RIVER

Sta. 1038+30

Near BOONE Sec. 18 T. 21 S. R. 61 W.

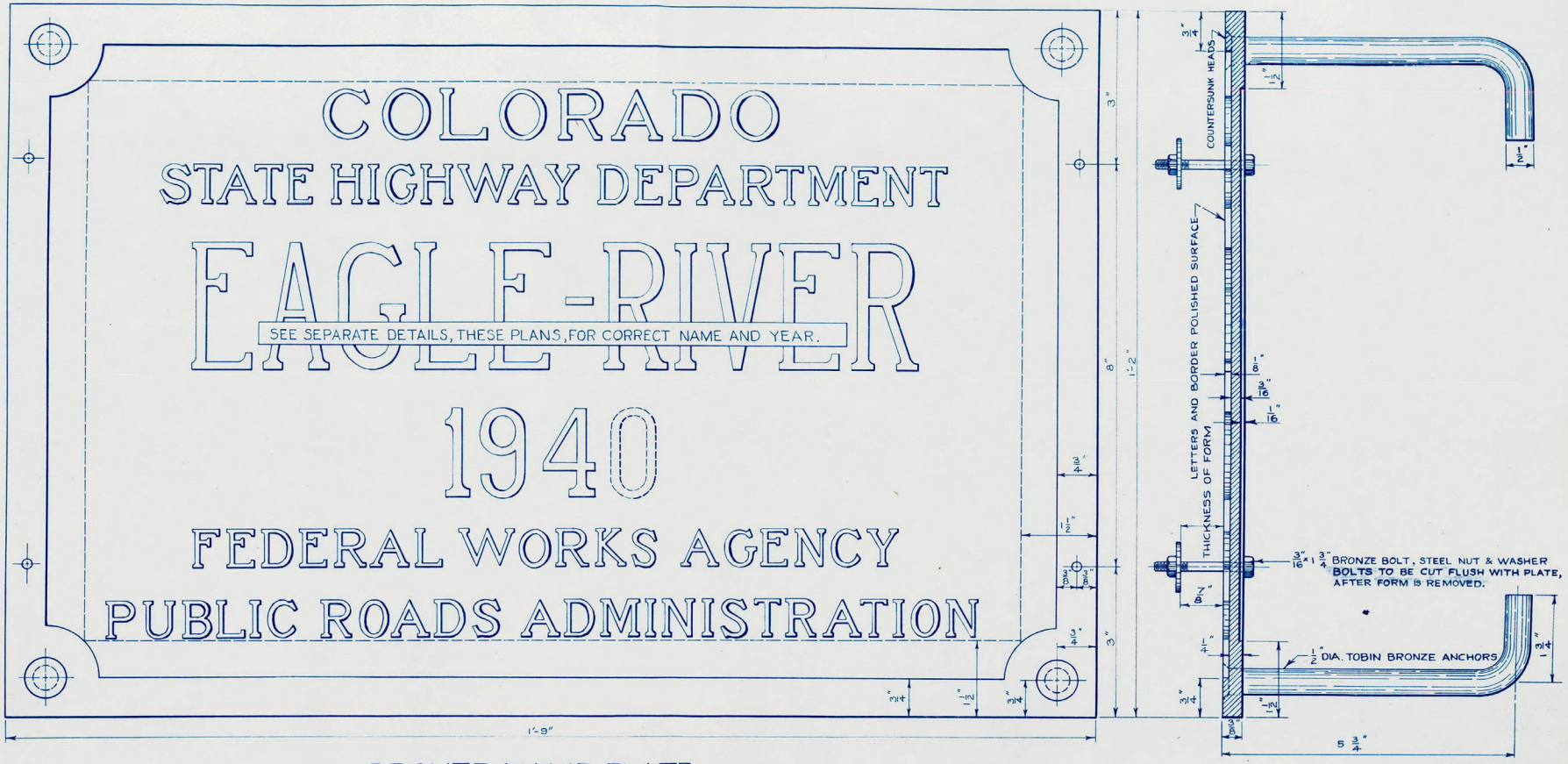
Designed by A.L.C. Approved by C. J. Bailey

Made by A.L.C. & I.R. Bridge Engineer

Checked by L.M.R. Date: Jan. 20, 1947

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92(2)	12	

STANDARD M-6-E



BRONZE NAME PLATE
ITEM Nº 80 b

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE LATEST STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT.

COLORADO STATE HIGHWAY DEPARTMENT
TYPICAL STANDARD NAME PLATE

Across_____ Sta._____
Near_____ Sec._____ T._____ R._____

Designed by G.K.D.
Made by J.E.R.
Checked by

Approved by C. J. Bailey
Bridge Engineer
Date: Sept 27 1946

STRUCTURE NO.

REVISIONS

	Initial	Date
Designed By	G.H.D.	1-1-35
Revised By	W.P.M.	6-1-46
Revised By		
Revised By	W.P.M.	6-1-46
Revised By		

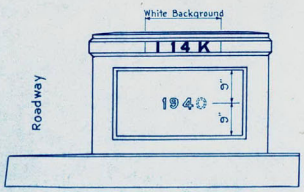
STANDARD M-10-B.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F-926(6) 13		

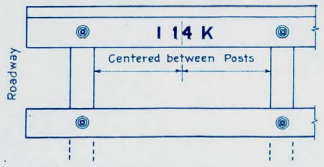
SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

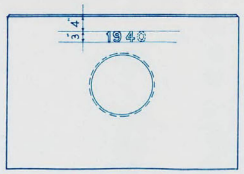
SECTION



TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR CULVERT HEADWALL SYPHON, RETAINING WALL, ETC.
(Downstream Headwall)

General Notes

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JUNE 1, 1940.

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 ⅜" 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, SIPHONS, CATTLE PASSES, RETAINING WALL, ETC.. 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 APPROVED WHITE CONCRETE PAINT IS USED. BEFORE PAINTING THE SURFACE MUST BE THOROLY DRIED, CLEANED AND PROPERLY SIZED. ON TIMBER HANDRAILS THE WHITE PAINT USED ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY, THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED ON IT, WITH TWO COATS OF STANDARD "C. SECOND FIELD COAT DARK" AS SPECIFIED UNDER ITEM 41 "STEEL BRIDGES". THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

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

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

Designed by G.H.D.
Made by W.P.M.
Checked by

Approved by Ed Bailey
Bridge Engineer
Date: 1 June, 1946.

STRUCTURE NO.

STANDARD M-10-B

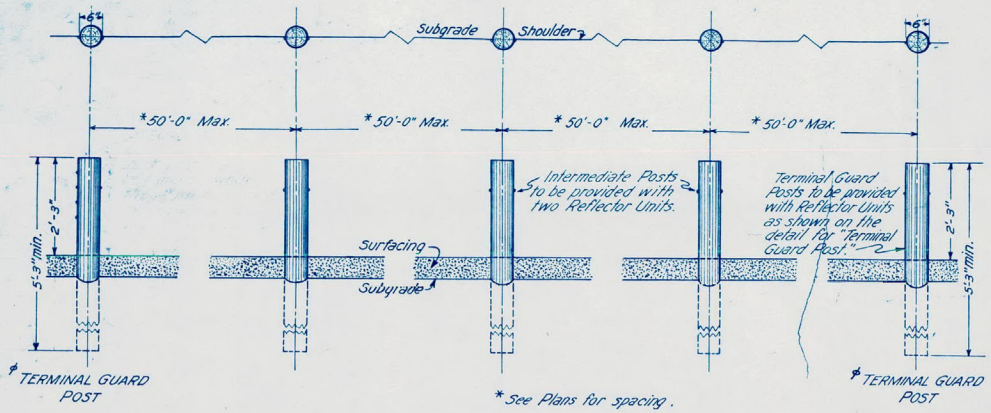
REVISIONS

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

STANDARD M-19-B

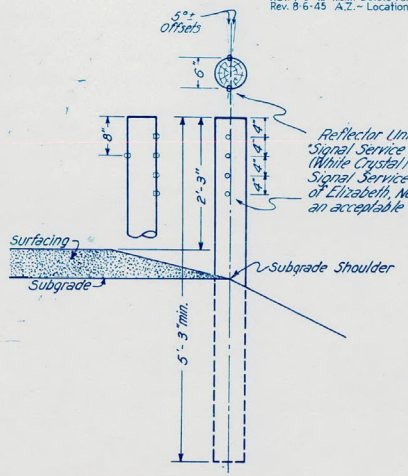
Rev. 6-28-40 - A.Z. - 1040 Specs. & Location of posts.
Rev. 10-9-40 - P.B.B. - Painting & Refl. Units.
Rev. 2-24-41 - P.B.B. - Terminal Guard Post Placement.
Rev. 2-2-41 - P.B.B. - White Paint.
Rev. 7-9-42 H.O.W. Delete Painting of Posts.
Rev. 8-6-45 A.Z. - Location of posts.

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO.	F-926	14



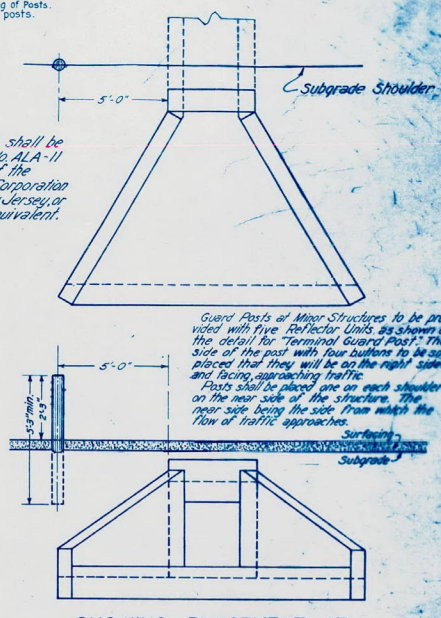
*See Plans for spacing.

SHOWING PLACEMENT ON NORMAL ROADWAY FILLS



ϕ TERMINAL GUARD POST

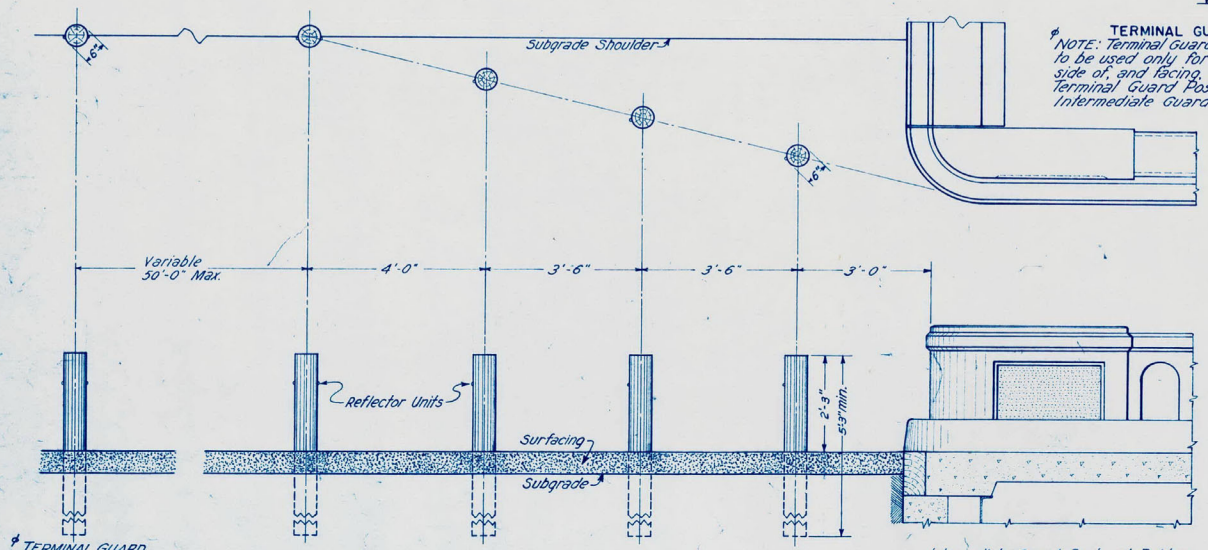
NOTE: Terminal Guard Posts as detailed above to be used only for the near Post on the right side of, and facing, approaching traffic. All other Terminal Guard Posts to be identical with Intermediate Guard Posts.



Guard Posts at Minor Structures to be provided with five Reflector Units as shown on the detail for "Terminal Guard Post." The side of the post with four buttons to be so placed that they will be on the right side of, 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 500 feet.

On tangents the Reflector Units shall be placed at an angle of approximately five degrees to a line parallel to the center-line 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 (1/16) inch less than the diameter 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.

Signed By	Initial	Date
Checked By		
Approved By		
Checked By		
Checked By		

COLORADO STATE HIGHWAY DEPARTMENT

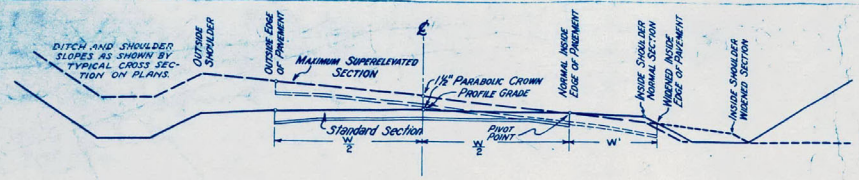
STANDARD TIMBER GUARD POSTS

Designed by R.E.L.
Made by P.B.B.
Checked by
Approved by O.H. Marshall
Chief Engineer
Date: Feb. 15, 1939

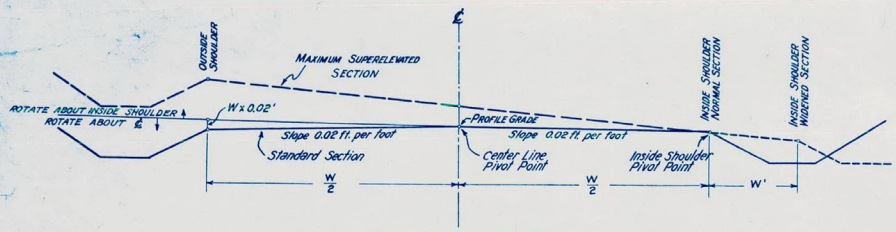
STANDARD M-1-B

FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	F-92(2)	15	

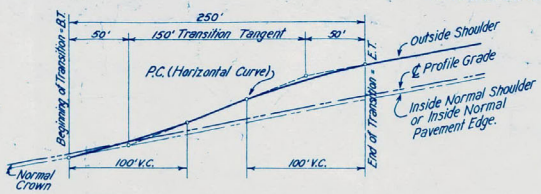
Rev. 11-2-38 P.R.B. Widening Transition.



PAVEMENT SECTION



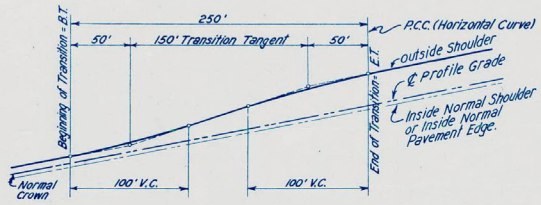
GRADED OR SURFACED SECTION



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.



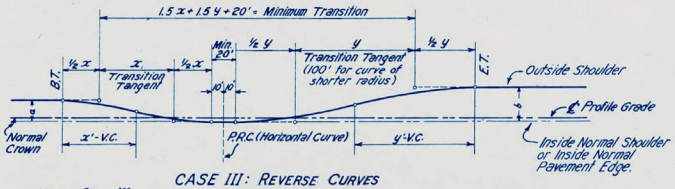
CASE II: COMPOUND CURVE

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 flat 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.

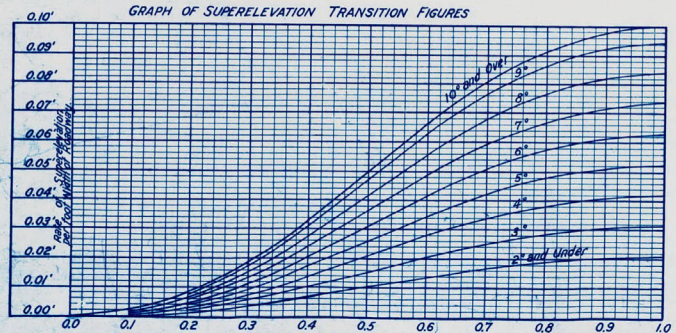
The maximum superelevation of 0.10 ft. per foot width, applying to curves of 10° and over, is not to be exceeded.

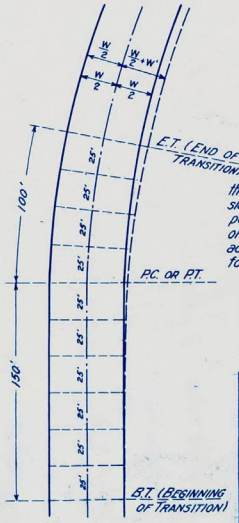
Special transition problems not covered by this standard sheet shall be covered by appropriate notes included with curve data on plans.

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





GENERAL PLAN OF WIDENING

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, offsets for widening, and cross sections.

COLORADO STATE HIGHWAY DEPARTMENT

STANDARD METHODS FOR SUPERELEVATION & WIDENING OF CURVES

Designed by R.E.L. Made by P.R.B. Checked by F.S.K./W.M. Approved by C. H. Marshall Date FEB. 23RD 1937

Initial	Date
Designed By	
Made By	
Checked By	
Approved By	
Revised By	
Revised By	
Revised By	

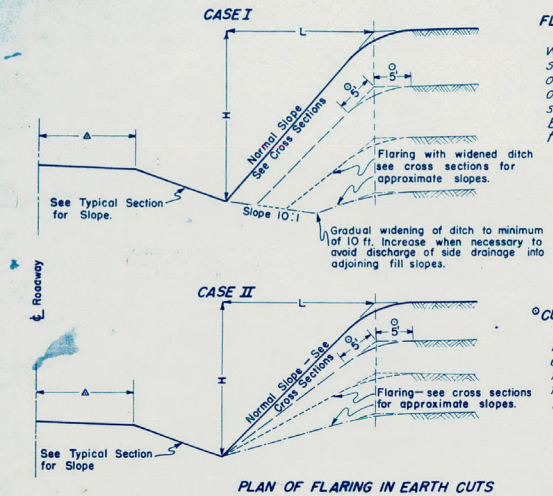
M-1-B

STANDARD M-2-C

FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	F-92(2)	16	

Rev. for 50' R. on Type II Rd. Appr. 3/5/46 J.R.L.
Rev. Genl. Notes - Appr. Surf. 4-5-46 - A.Z.

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



FLARING OF EARTH CUTS:

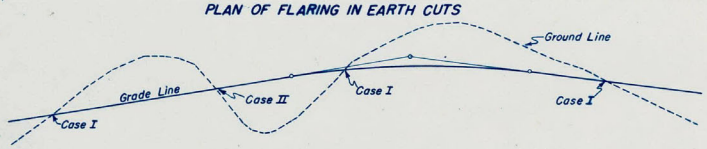
The backslopes at ends of all earth cuts shall be flattened and where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion and to improve appearance. The transition of flattened backslopes and widened ditch 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.

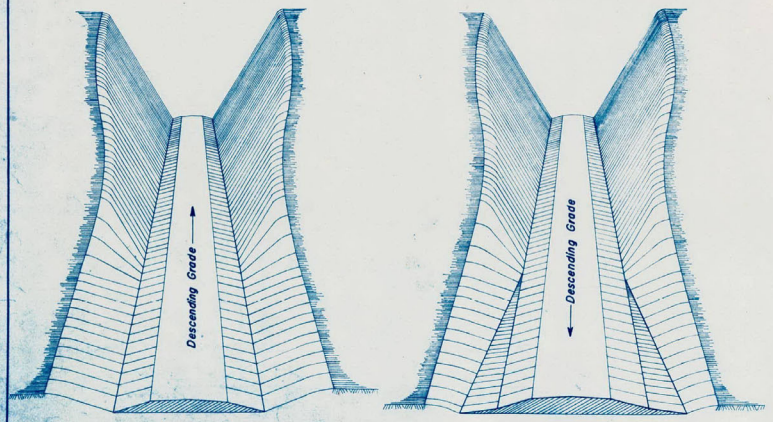
NORMAL SLOPE	CUT H	DISTANCE L
1 To 1	24'	24'±
1.5 To 1	16'	24'±
2 To 1	12'	24'±
3 To 1	8'	24'±

◎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.)

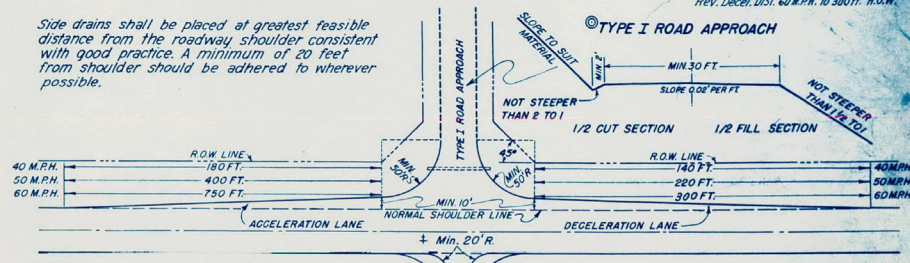
WIDENING TO ACCOMMODATE GUARD FENCES:

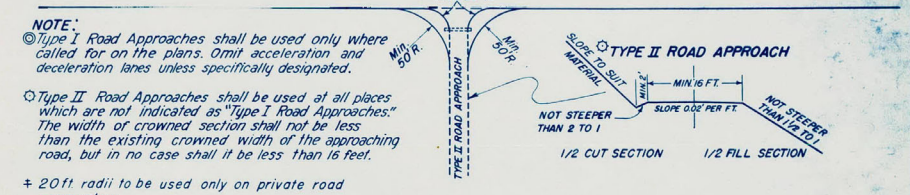
At all locations on the project (except as provided above for bridge approaches) where guard fence is to be constructed the shoulders shall be widened 2 feet to provide additional lateral support for guard fence posts.

TYPICAL PLANS FOR SIDE APPROACH ROADS

Rev. Type I Road Approach, 7-31-46 J.P.K.
Rev. Guard Fence - Note 10-16-46 C.R.S.
Rev. Decel. Dist. 60 M.P.H. to 300 ft. H.O.W.

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.





+ Min. 20' R.

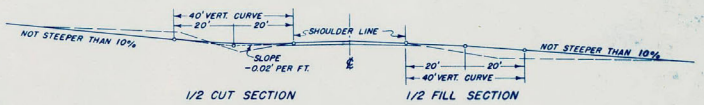
NOTE:

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

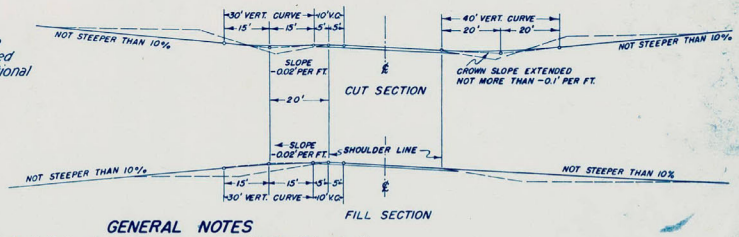
✡Type II Road Approaches shall be used at all places which are not indicated as "Type I Road Approaches." The width of crowned section shall not be less than the existing crowned width of the approaching road, but in no case shall it be less than 16 feet.

+ 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.

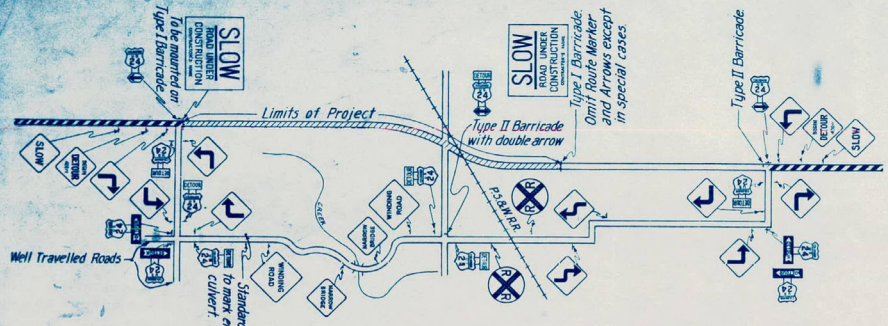
Designed by A.Z.	Approved by R.E.L.
Made by C.R.S.	
Checked by	Date Sept. 25 1945

STANDARD M-2-D

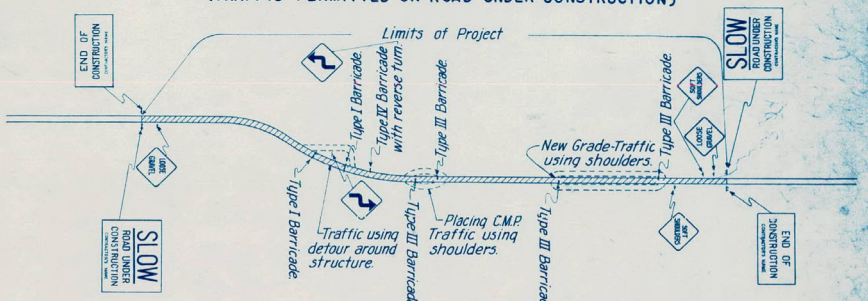
FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	F-92(2)	17	

Rev. 9-10-46 Slow Signs RBR

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

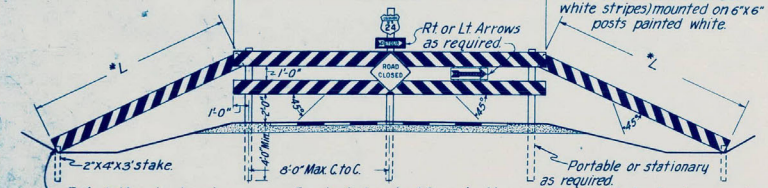


TYPICAL METHOD OF MARKING HIGHWAY (TRAFFIC PERMITTED ON ROAD UNDER CONSTRUCTION)



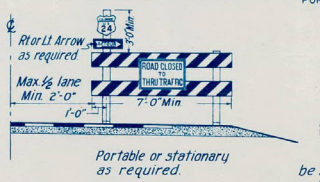
DETAILS OF BARRICADES

TYPE I (ROAD CLOSED)

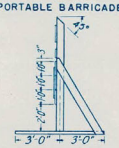


All barricades to be 1"x 12" lumber (8" alternate black and white stripes) mounted on 6"x 6" posts painted white.

TYPE II (BEGINNING OF DETOUR FOR THROUGH TRAFFIC)

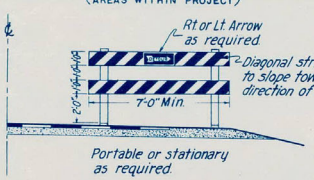


END VIEW OF PORTABLE BARRICADE

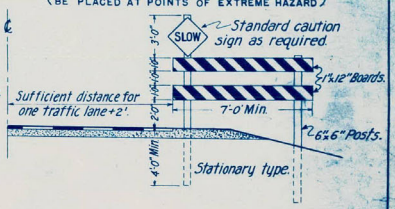


Base and brace to be 2"x 6" painted white and nailed with 12d nails. Base to be weighted for stability.

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

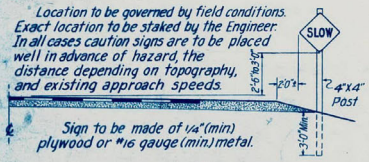


TYPE IV (SUPPLEMENT TO ADVANCE WARNING SIGNS TO BE PLACED AT POINTS OF EXTREME HAZARD)



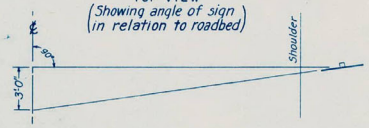
POSITION OF SIGNS RELATIVE TO ROADBED & HAZARDS

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.

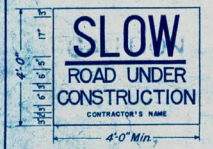


Sign to be made of 1/4" (min) plywood or #16 gauge (min.) metal.

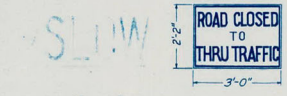
TOP VIEW (Showing angle of sign in relation to roadbed)



DETAILS OF CONSTRUCTION SIGNS



Signs to be of 1" 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.

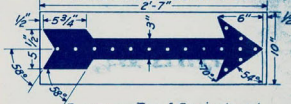
THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL SIGNS FURNISHED HIM BY THE DEPARTMENT AND SHALL RETURN SAME UPON COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE REQUIRED TO REIMBURSE THE DEPARTMENT FOR ANY SIGNS FURNISHED HIM WHICH HAVE BECOME DAMAGED OR LOST DURING HIS OPERATIONS.

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 A.R.P. / Made by B.D.C. / Checked by A.Z. — Approved by R.E.L. — Date: Sept. 25 1945

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 92 (2)	18	

REV. BEGINNING & END OF PROJECT 7/2/47, E.E.O.

STA. 1036+00 & 1046+00 REQ'D. APPROACHES TO PROJECT QUANTITIES INCLUDED IN PROFILE.

STA. 1038+70.9 TO 1043+10.6 REQ'D TO WIDEN PRESENT CONCRETE ARCH BRIDGE 10' LEFT, AND REPLACE HANDRAILS. DETAILS ON SHEETS NO. 4 TO 11

S.E.¼ Sec. 7

S.W.¼ Sec. 7

N.E.¼ Sec. 18 T. 21 S., R. 61 W.

S.H. NO. 209

TO BOONE

TO AVONDALE AND PUEBLO

COUNTY ROAD

REV. P.I. 1025+62.8

ORIG. P.I. 1028+89.9

Rev. P.I. 1032+07.8

S.61°02'E

S.89°45'E

P.C. 1022+09.4

Barn

Cistern

Well

Store

Gas Pumps

Shed

House

Pump House

REV. P.C. 1029+02.3

Cellar

Frame Bldg.

GUARD POSTS

POWER POLES

S.37°56'E

STA. 1035+60 REQ'D 500 CY. EMBANKMENT AND 260 TONS SURFACING FOR ROAD APPROACH LT. (EMB. TO BE OBTAINED FROM ROADWAY EXCAV. STA. 1043+50 TO 1047+40)

STA. 1034+90 TO 1038+50 REMOVE AND RESET 35 TIMBER GUARD POSTS RT. AND LT.

ORIG. Δ 50°49' R D 4°00' T. 680.5 L. 1270.4 R. 1432.5

REV. Δ 27°43' R. D. 4°00' T. 353.4' L. 692.9' R. 1432.5' H.S.D. > 900'

REV. Δ 23°06' R. D. 3°50' T. 305.5' L. 602.6' R. 1494.8' H.S.D. > 900'

ORIG. P.T. 1034+79.8 REV. P.T. 1035+04.3 (BACK) = 1035+04.3 (AHEAD)

1036+00

ROCK FILLED WIRE BASKET PROTECTION - STEEL PAL PILING TO REMAIN IN PLACE

APPROACH NON-FED. AID

℄ of Present Bridge

℄ of Widened Bridge

Huerfano River

ABANDONED CONCRETE BRIDGE PILLAR

EQUATION

EQUATION

APPROACH NON-FED. AID

P.I. 1045+50

1045+00

P.C. 1036+78.3 Δ 1°26' L D 1°00' T. 71.7' L. 143.3' R. 5730.0' H.S.D. > 900'

P.T. 1048+21.6

1043+25.4

PROJECT MARKER

TELEPHONE POLE

6" x 160' PERF. PIPE

S.36°30'E

S.37°56'E TO FOWLER

15" x 30' CMP.

P.I. 1047+50

P.C. 1043+78.3 Δ 1°26' R D 1°00' T. 71.7' L. 143.3' R. 5730.0' H.S.D. > 900'

P.T. 1046+21.6

NOTE:

Alignment and Grade as shown are subject to modification during Construction after approval by the Denver Office.

The soil data shown on the plans is obtained from the best available testing laboratory information. This information is shown for the convenience of the Contractor and the Department does not guarantee the accuracy of these tests. If materials not conforming to the data on plans are encountered during construction, necessary modifications of the grading plan shown on plans will be made to secure dense, stable embankments.

Timber Guard Posts are tabulated on Sheet No. 3.

STA. 1038+26.3 BEGINNING OF F 92 (2) OPPOSITE SAME STATION OF FAP 246 D-R-2 AND OPPOSITE STA. 0+00 OF FAP 92 (ORIGINAL PROJECT)

STA. 1038+52.0 BACK
STA. 1038+70.9 AHEAD
END OF FAP 246 D-R-2

STA. 795+14.6 END OF FAP 272 B OPPOSITE STA. 1043+15.2 OF F 92 (2)

STA. 1043+25.4 END OF F 92 (2) OPPOSITE STA. 4+80.2 END OF FAP 92 (ORIGINAL PROJECT) AND OPPOSITE STA. 795+04.4 OF FAP 272 B

1035+04.9 (BACK)
1035+04.3 (AHEAD)

1038+52.0 BACK
1038+70.9 AHEAD

340' V.C.

360' V.C.
N.P.S.D. 540

140' V.C.

160' V.C.
N.P.S.D. 685'

-0.64%

+2.204%

+1.0%

-1.0%

+2.1%

+90

+40

69.04
62.76
62.89
66.43
P.I. 67.19
66.95
67.99
68.10
P.I. 61.68
P.I. 69.90
69.00
68.10
P.I. 67.40
67.94
68.87

*1, A2.4(6)
*1A, A7.6(12)
14.44
*1, A2.4(0)
LL. 21.9
P.I. 6.9
-200, 17.22%
*1A, A7.6(12)
LL. 40.9
P.I. 19.2
-200, 8.94%
10.1+
*2, A-1.6(0)
LL. 19.8
P.I. N.P.
-200, 21.8%

PROFILE OF RIVER BED

5 SPANS @ 80'-0" (CLEAR)

SCALE

4280
4270
4260
4250
4240

1020
1025
1030
1035
1040
1045

BRIDGE DATA

STRUCTURE NO.- L-19-B
STREAM: HUERFANO RIVER
SKEW ANGLE- 90°

PRESENT STRUCTURE
SPAN- 5 @ 80'
CLEAR ROADWAY- 20'
CLEAR WATERWAY-
TYPE OF SUPERSTRUCTURE- FILLED SPANDREL ARCH
TYPE OF SUBSTRUCTURE- GRAVITY CONCRETE
REQUIREMENTS FOR REMOVAL-
R.R. SIDING- BOONE

STREAM DATA
DRAINAGE AREA IN SQ. MILES- 1890 ± MI.

ELEVATIONS
MAXIMUM HIGH WATER- 4152.8
NORMAL STAGE
DRIFT
LOW WATER- 4249
STREAM BED- 4247
SCOUR-

STATION- 1038+70.9 TO 1043+10.6
COUNTY- PUEBLO
POSITION REFERRED TO PRESENT STRUCTURE- SAME

PROPOSED STRUCTURE - WIDEN PRESENT BRIDGE
5 @ 80'
30'

FILLED SPANDREL ARCH
GRAVITY CONCRETE
DETOUR STRUCTURE REQ'D- NONE
HAUL TO BRIDGE SITE- 2 MILES

NEARBY STRUCTURES ON SAME STREAM
LOCATION-
WATERWAY-

EXCAVATION
EMBANKMENT + 20%
BORROW
STATION YARD OVERHAUL
BORROW SOURCE

92
88.7
242
27
34
51
125.3
2
40
341.9

EXCESS EXCAV. TO BE USED FOR ROAD APPROACH STA. 1036+60

PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
R.T. OF WAY CHECKED
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
GRADES CHECKED
B.M. NOTED
STRUCTURE NOTATIONS CHKD.
NOTE BOOK
NO.
BY
DATE

PLATE 1-PLAN-PROFILE R.F.P.R. STANDARD
EUGENE DIETZGEN CO. Chicago New York