FED. ROAD DIST. NO.	STATE	FAGM PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A (1)	1	

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID GRADE CROSSING PROJECT NO. F.A.G.M. 19-A(1)
(NOT ON FEDERAL AID SYSTEM)
STATE HIGHWAY NO. 340
MESA COUNTY

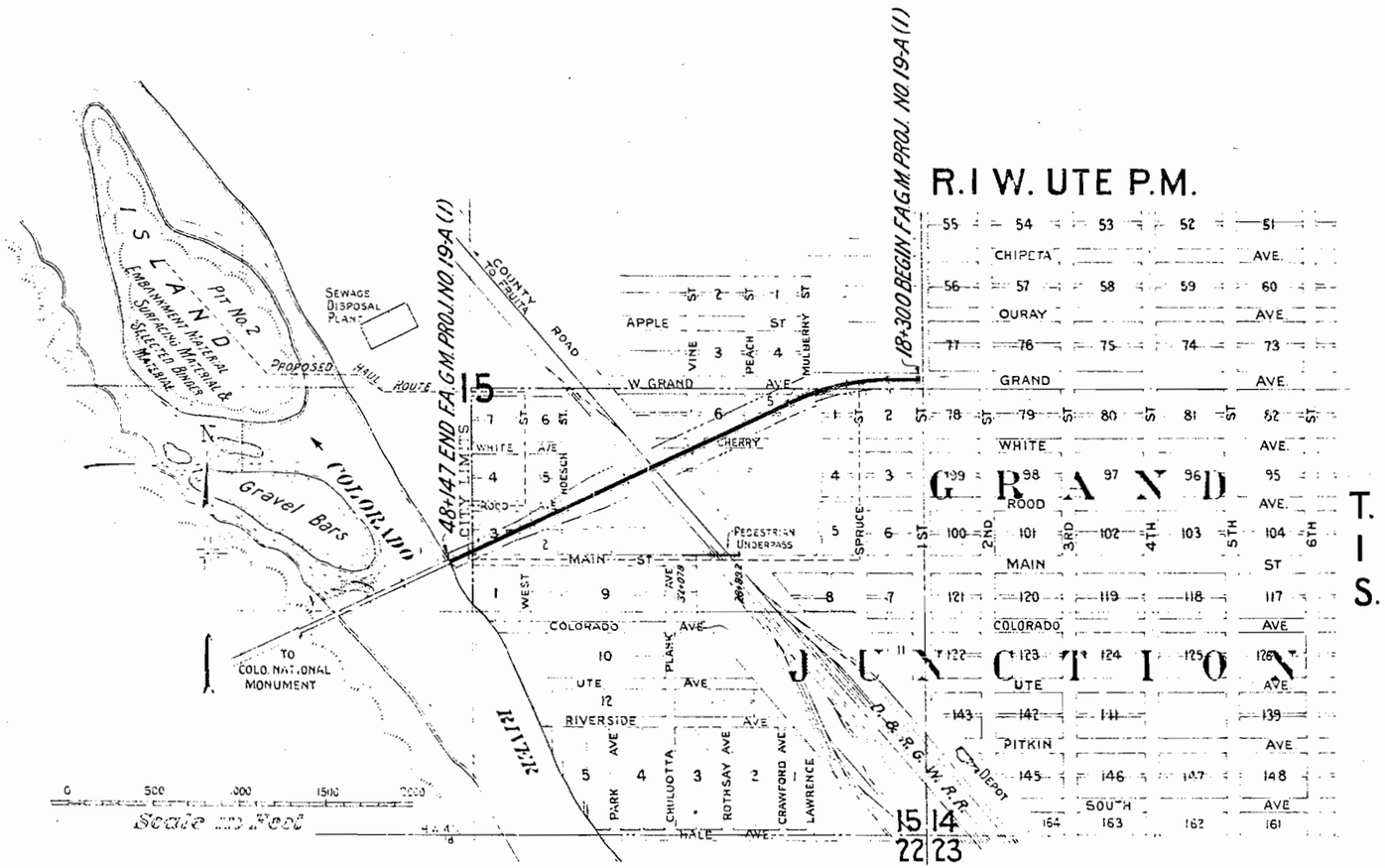
INDEX OF SHEETS

Sheet No. 1 - Title Sheet
" " 2 - Typical Section & Summary
" 3-12 - Viaduct, Sta 33+32 to 36+73
" 13-15 - Pedestrian Underpass, Main St
" No 16 - Standard Name Plate — M-6-D
" " 17 - " Headwalls for C.M.P. Culverts — M-102-E
" " 18 - " Timber Guard Posts — M-19-A
" " 19 - " Wire Fences (Untr. Wood Posts) — M-24-FX
" " 20 - " Chain Link Wire Mesh (School) Fence — M-26-A
" " 21 - " Structure Number Lettering — M-10-A
" " 22 - " Methods for Superelev. & Widening — M-1-B
" " 23 - " Typical Side Appr. Roads - Signs — M-2-B
" No 24-25 - Plan & Profile Sheets
" " 26-47 - Cross Section Sheets

CONVENTIONAL SIGNS

Center Line of Survey
Right of Way Line
Section Line
One Quarter Sect. Line
City Limits
Barbed Wire Fence
Combination Wire Fence
Board Fence
Pole Lines
Water Pipe Line
Sewer Pipe Line
Railroads

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 } 2984.7 FT. = 0.565 MI.
NET LENGTH OF PROJECT }



NOTE:- It is recommended that bidders on this Project go over the plan details with one of the following field representatives of this Department.
J. J. Vandemoer, Division Engineer, located at Grand Jct.
A. H. Batten, Resident Engineer, located at Grand Jct.

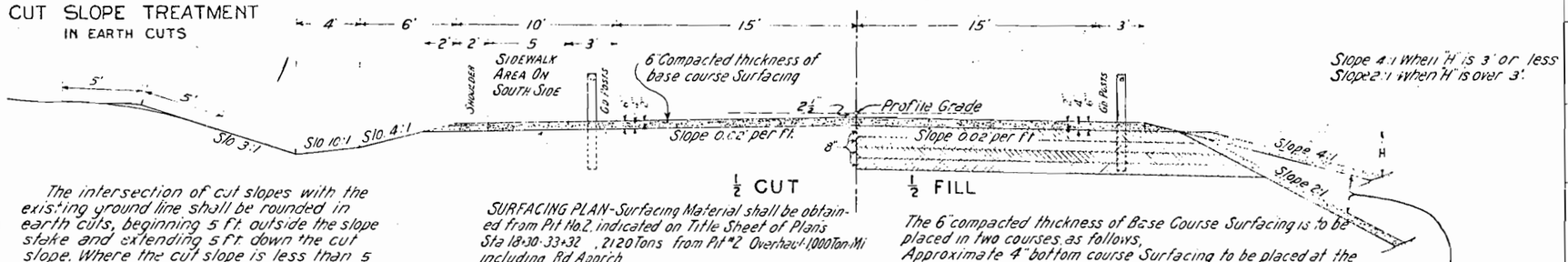
RECOMMENDED FOR APPROVAL
ASSISTANT ENGINEER
APPROVED
STATE HIGHWAY ENGINEER
RECOMMENDED FOR APPROVAL
DIST. ENG. BUREAU PUBLIC ROADS
RECOMMENDED FOR APPROVAL
CHIEF ENG. BUREAU PUBLIC ROADS
APPROVED
DIRECTOR BUREAU PUBLIC ROADS

FED. ROAD DIST. NO	STATE	F.A.G.M. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	19 A (1)	2	

Revised 11-19-38 S.B.L.
Revised 12-20-38 A.F.F.
Revised 1-4-39 S.B.L.
Revised 1-14-39 S.B.L.

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

TYPICAL SECTION



The intersection of cut slopes with the existing ground line 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 involved in slope treatment shall be included in Unclassified Excavation.

SURFACING PLAN-Surfacing Material shall be obtained from Pit No.2, indicated on Title Sheet of Plans

Sta 18+30-33+32	2120 Tons	from Pit #2	Overhaul-1000 Ton-Mi including Rd Approch
Sta 36+93-48+15	1680 Tons	from Pit #2	incl 2 Rd approchs
Total	3800 Tons	" " "	Overhaul-1000 Ton-Mi

SELECTED BINDER MATERIAL for plating fill slopes as indicated on Typical Section shall be obtained from Pit No 2

Sta 18+30-33+32	1530 Cu Yd.	Pit #2, Overhaul-16900	Sta Yd.	3400 Yd Mi.
Sta 36+93-48+15	1500 " "	" " "	16500 " "	820 " "
Total	3030 " "	" " "	33400 " "	2660 " "

The 6" compacted thickness of Base Course Surfacing is to be placed in two courses, as follows,
Approximate 4" bottom course Surfacing to be placed at the rate of 93 tons per 100 lin ft of Roadway
Approximate 2" Top course Surfacing to be placed at the rate of 45 tons per 100 lin ft of Roadway.

The 4 upper 8-inch lifts of Embankment as shown on the Typical Section, throughout the Project shall be wetted and rolled as specified
The material in these 4 lifts shall contain approximately 20% of binder material which shall be thoroly incorporated with other "Borrow" material to form a hard, dense and well compacted embankment
Material is available at or in the vicinity of Pit No 2 and may be mixed at the pit or on the Roadway.
Fill slopes shall be covered with a layer of Selected Binder Material, approx. 6" in thickness as indicated on the Typical Section.
This material shall be classified and paid for as "Unclassified Excavation."

6" Approx thickness of Selected Binder Mat'l.

GENERAL NOTES

This project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted June 1st 1937

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 ditch as shown on Typical Section, either noted on Profile as "Borrow," or on 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 Embankment requirements actually encountered during construction.

All C.M.P. Cross Culverts are to be provided with one headwall on the inlet end, unless otherwise noted on the plans.

All side approach roads to the Project shall be gravel surfaced with a 4" thickness of "Gravel or Crushed Rock Surfacing" extending a minimum distance of 30 feet from edge of Highway. Estimated tonnage of Surfacing Material required in this operation is shown on "List of Structures."

All Curves are to be Superelevated in accordance with the methods shown on the "Standard Superelevation" sheet included with the plans

During construction of this Project traffic will use the present traveled Roadway. At all places where Construction encroaches on present road, traffic must be adequately provided for by the Contractor at his own expense. Also, all temporary approaches to and crossings of intersecting roads shall be constructed and maintained by the Contractor at his own expense

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

Embankment Material required for this Project shall be obtained from Pit No.2 indicated on Title Sheet of plans.

R.O.W. MARKERS

Station	Side	No.
18+45 (Outside C. Limits)	R	1
21+13	L	1
24+55	R	1
24+60	L	1
24+70	L	1
28+73 (Inside City Limits)	L	1
28+85	L	1
29+00	R	1
34+42	L	1
34+95	R	1
37+35	L & R	2
39+00	L & R	2
43+35	L	1
43+65	R	1
44+20	L	1
44+44	L	1
44+62	L	1
48+15 (Outside C.L.)	L & R	2
TOTAL		21

FENCING REQUIREMENTS

Stations	Side	Remove Fence	Build BW Fence	Build School Fen
18+45-34+30 (Outside C.L.)	R		1,640	
20+75-23+35	L & R	515		
21+45	L & X	355		
24+70-33+78 (Inside City Limits)	L		10	
29+80-32+05	L & R	1050	910	
32+25-34+15	L & R	515		
34+25	R		65	
37+30-38+55	L		130	
37+35	X	200		
37+40-46+65	R		930	
38+00-38+55	L	85		
38+55-40+55	L			200
40+55-43+50	L		300	
40+80-43+05	L & R	540		
TOTALS		3260	3985	200

* Items Not Receiving Federal Aid

SUMMARY OF APPROXIMATE QUANTITIES

Item	Description	Unit	Inside City Limits Sta. 24+80-46+90 Roadway	Underpass	Overpass	Totals	Outside City Limits Sta 18+30-24+80 & 46+90-48+14.7 Proj. Roadway	Totals
10a	Clearing & Grubbing entire Proj	Lmp Sum	•			•	•	•
11b	Removal of 2 structures	" "					•	•
11c	Adjusting Manhole Ring & Cover	Each	1			1		1
12a	Removing fence	Lin Ft.	2390	440		2830	870	3700
13c	Unclassified Excavation	Cu Yd	121500			121,600	4400	126,000
14a	Dry Rock Excavation (Struct)	Cu Yd	5	70	10	85		85
14b	" Common Excavation "	" "	15	610	330	955	5	960
14c	Wet Rock Excavation "	" "	5	100	10	115		115
14d	" Common " "	" "	30	910	510	1450		1450
15x	Wetting Fills	M Gals.	185			185	26	211
15y	Rolling Fills	Hour	90			90	14	104
15z	Furnishing Roller	Lmp Sum	•			•	•	•
18a	Station-Yard Overhaul	Sta-Yd	1,104,700			1,104,700	249,300	1,353,000
18b	Yard-Mile Overhaul	Yd-Mi	88,700			88,700	19,300	108,000
26a	Gravel or Crushed Rock Surfacing	Tons	2675			2675	1125	3,800
26c	Overhaul of Surfacing	Ton-Mi	615			615	385	1,000
42a	Untreated Bridge Timber	M Ft B.M.			0.4	0.4		0.4
46a	Class 'A' Concrete	Cu Yd		496	871	1367		1,367
46b	Class 'B' Concrete	" "	1.5			1.5	0.5	2
46px	Waterproof Cement Paint	Lbs.		490		490		490
46r	Class 'A' Concrete (Handrails)	Cu Yd			22	22		22
47	Reinforcing Steel	Lbs.		42,100	141,400	183,500		183,500
48	Structural Steel	Lbs.			478,800	478,800		478,800
53a	15" Corr Metal Culvert Pipe	Lin Ft					50	50
53b	18" " " "	" "	136			136		136
70x	4" Vit Tile Underdrain	" "		510		510		510
71x	6" Vit. Clay Pipe Drain	" "		150		150		150
74x	Timber Guard Posts	Each	170			170	28	198
76b *	Barbed Wire Fence (Unt Wd. Posts)	Lin Ft	2350	440		2790	1650	4440
78a *	Chain Link Wire Mesh Fence	" "	200			200		200
79a	Water-Gas Tar Waterproofing	Sq Yd		790	485	1275		1275
79b	Membrane Waterproofing	" "		475		475		475
80b	Bronze Name Plates	Each			1	1		1
80c	Sheet Copper	Lbs.		2510	172	2682		2682
81a	Project Markers	Each					2	2
81b	Right of Way Markers	"	14			14	7	21
86	Concrete Sidewalks	Sq Ft		200		200		200
89a	Drain Pipe (Conc Floor) (8" x 5'-0")	Each			25	25		25
90	Elec. Conduit with Junction Boxes	Lin Ft		255	970	1225		1225
90b	Pit Lights	Each		7		7		7
91x	2½" Pipe Railing with ¾" Vert Bars	Lin Ft		200		200		200
91y	1¼" Pipe Railing	" "		225		225		225
98a	Electric Lighting Unit (Mercury Vapor)	Each			5	5		5

LIST OF STRUCTURES

Location Stations	Description		Remove Struct Each	Excav. Cu. Yds. Uncl.	Excav. Cu. Yds. Emb.	* Struct Excav Cu. Yds.	Corr Met Culv L.F. 15"	Corr Met Culv L.F. 18"	Cl "B" Conc., Cu. Yd.	Rd. Appr. Surf. Tons	Miscell.
18+45 (Outside City Limits)	Project Marker										1-Project Marker
20+60-27+30	Waste Ditch	R			70						
21+85	Road Approach	L			25					29	
24+75	C.M.P. side dr. Hdwall	L					5	50	0.45		
" "	Remove Flume & Hd Box Culv		2								
28+66 (Inside City Limits)	C.M.P. Cross Culv. 69° skew						50	136	1.10		
33+32-36+92.71	R.R. Overpass					Quantities in Summary					
43+70	Road approch, L.									100	
43+80	Adjust Manhole Ring & Cover				1600						Adjust Manhole Ring & Cover.
47+50 (Outside C.L.)	Road approach	R			700					17	
48+14.7	Project Marker										1-Project Marker
	Totals		2		2395		55	50	136	1.55	146

* Structural Excavation is estimated to be 10% Rock & 90% Common, each of which is estimated to be 40% Dry and 60% Wet

SUMMARY OF APPROXIMATE QUANTITIES (CONTINUED)

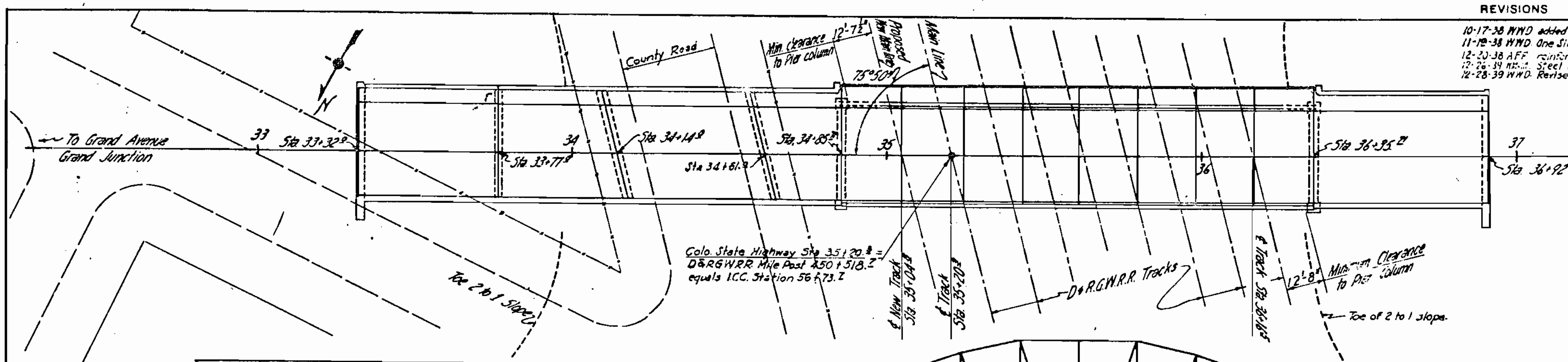
Item	Description	Unit	Roadway	Overpass Sta 33+	Underpass Main St	Totals
	Force Account Items					
	Moving Pole Line (Wes. Union Forces)	Lmp Sum		•		•
	Work by R.R. Co Forces	" "			•	•

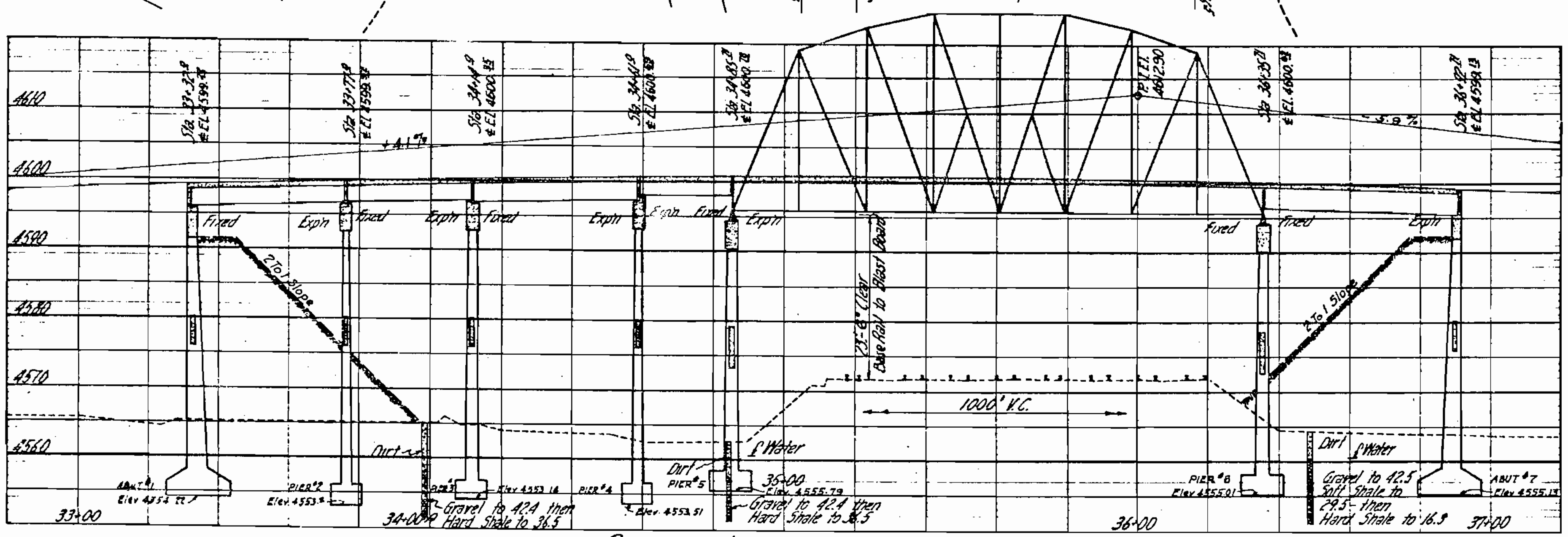
	Initial	Date
Designed By	MFM	9-27-38
Checked By	BR	
Drawn By	MFM	
Checked By	WWD	
Traced By	A.J.C.	9-29-38
Checked By		

REVISIONS

10-17-38 WWD added waterproofing
11-12-38 WWD One Sidewalk
12-20-38 AFF reinforcing steel summary
12-26-39 [illegible] Steel quantities
12-28-39 WWD Revised as constructed.

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	3	





GENERAL LAYOUT

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	SUPRSTR. APP. SPANS	150' THRU TRUSS	ABUT #1	PIER #2	PIER #3	PIER #4	PIER #5	PIER #6	ABUT. #7	TOTAL
14a	Dry Rock Excavation (Structural)	Cu. Yd.										0
14b	Dry Common " "	" "			75.8	33.1	29.3	17.4	19.6	78.4	85.9	339.5
14c	Wet Rock " "	" "										0
14d	Wet Common " "	" "			102.2	55.6	54.8	51.8	50.1	40.6	65.8	420.9
42a	Untreated Bridge Timber	M.ft.bm.			0.180						0.180	0.360
46a	Class "A" Concrete	Cu. Yd.	230	148	85	54	55	57	73	73	98	873
46r	" " " (Handrail)	" "	22									22
♦ 47	Reinforcing Steel (Incl. 1% ± for over'n)	Lb.	42686	25670 ♦	14,225	7,490	7,620	7,620	9160	9160	16385	140016
† 48	Structural Steel (Incl. 1½% ± over'n 2½% Truss)	"	173,050	332,425	† 30	55	55	55			60	506,230 ●
80b	Bronze Name Plate	Each	1									1
80c	Sheet Copper 38 oz.	Lb.	172									172
79a	Water-Gas Tar Waterproofing	Sq. Yds.			86.58	57.3	56.14	56.14	68.34	71.62	85.08	481.2
89a	Drain Pipe (Conc. floor) 3" Diam	Each	9	16								25
90	Elec. Conduit with Junction Boxes.	Lin. Ft.	1015									1015
98a	Elec. Lighting Unit (Mercury Vapor)	Each	5									5
*	No. 16 Ga. Galv. Sheet Metal	Lb.	285									285
*	¾" Exp'n Joint Material	Sq. Ft.	86									86
*	¼" " "	" "	66									66

* To be included in bid price of Class "A" Concrete.
† Includes 45,000 lbs. Structural Steel for Blast Board 39,000 lbs. of which is Wrought Iron, U.S.S. Cor-Ten Alloy Steel, or B.S. Maryari R Alloy Steel.
♦ Includes 550 lbs. reinforcing steel for lamp standards, see Sheet No. 6a.
● Pay weight (From shop drwgs)

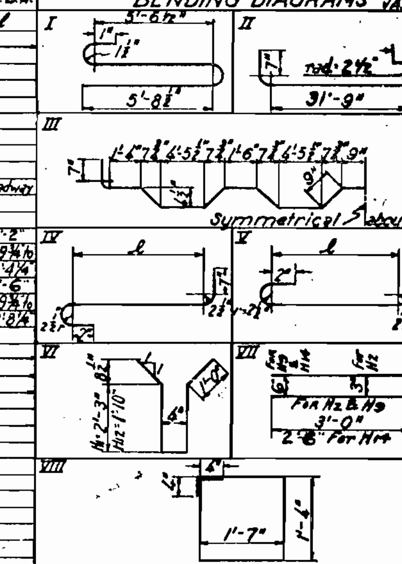
BAR LIST FOR SUPERSTRUCTURE SPANS 1-2-3-4 & 6.

BAR LIST

Mark	Size	No.	Length	Type	ℓ
D1	5/8"φ	84	29'-4"	Str.	
D2			19'-9"		
to	5/8"φ	2 Ea.	by 5" to	Str.	
D22			28'-1"		
D23	5/8"φ	84	24'-6"	Str.	
D24			32'-6"		
to	5/8"φ	2 Ea.	by 5" to	Str.	
D44			40'-10"		
D45	5/8"φ	84	23'-4"	Str.	
E1, E2	& E3	Used	in 150'-0"	Truss	Roadway
E4	5/8"φ	560	33'-6"	II	
E5	5/8"φ	142	32'-10"	III	
E6			3'-11"		2'-2"
to	5/8"φ	4 Ea.	by 1'-9¾" to	IV	by 1'-9¾" to
E21			31'-1¼"		29'-4¼"
E22			4'-7"		2'-6"
to	5/8"φ	4 Ea.	by 1'-9¾" to	V	by 1'-9¾" to
E37			31'-9¼"		29'-8¼"
H1	½"φ	266	6'-10"	VI	
H2	½"φ	4	6'-3"	VII	
H3	½"φ	56	14'-8"	Str.	
H4	½"φ	32	16'-2"	Str.	
H5	½"φ	8	7'-6"	Str.	
H6	½"φ	104	1'-10"	Str.	
H7	½"φ	32	6'-6"	VIII	
H8	½"φ	60	3'-2"	Str.	
H9	½"φ	10	6'-6"	VII	
H10	½"φ	26	2'-8"	Str.	
H11	½"φ	6	4'-8"	Str.	
H12	½"φ	2	6'-0"	VI	
H13	½"φ	16	2'-4"	Str.	
H14	½"φ	4	5'-6"	VII	
S1 & S2	·	Used	in 150'-0"	Truss	Sidewalk
S3	3/8"φ	421	12'-0"	I	
S4	3/8"φ	16	23'-1"	Str.	
S5	3/8"φ	16	17'-2"	Str.	
S7	3/8"φ	16	24'-1"	Str.	
S8	3/8"φ	16	15'-7"	Str.	
S10	3/8"φ	16	29'-0"	Str.	

• P.D.W.

BENDING DIAGRAMS



BAR SUMMARY

34,733 Lin. ft. 5/8"φ @ 1.043 #/1' = 36,227 lb.
4,024 " " ½"φ @ 0.850 " = 3,420 "
6,795 " " 3/8"φ @ 0.376 " = 2,555 "
Plus 1% ± for Overrun = 428 "
TOTAL = 42,630 "

This total does not include bars for 150' Truss Span floor and sidewalk, E1, E2, E3, S1 & S2.

REFERENCE DRAWINGS

Sheet No. 4 Details of Superstructure Spans 1, 2, & 3.
Sheet No. 5 Details of Superstructure Spans 3, 4 & 6.
Sheet No. 6 & 6a Details of Superstructure.
Sheet Nos. 7 & 8 Details of 150' Truss.
Sheet No. 9 Details of Abutment No. 1.
Sheet No. 10 Details of Piers 2, 3 & 4.
Sheet No. 11 Details of Piers 5 & 6 and Blast Board.
Sheet No. 12 Details of Abutment No. 7.

APPROVED Oct. 10, 1938
DATE
BY [signature]
CHIEF ENGINEER D&RGWRR

GENERAL NOTES

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

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.
HANDRAIL TO BE BUILT ACCURATELY TO LINE AND GRADE.

LOADING DATA.
LIVE LOAD - A. A. S. H. O. 1935 CLASS A. (H-15)
DEAD LOAD - ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ¾ INCH CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

DESIGNING DATA.
A.A.S.H.O. 1935 EXCEPT CONCRETE UNIT STRESSES PER A.A.S.H.O. AUG. 1936

STRUCTURE NO. H-2-N

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE VIADUCT
GENERAL LAYOUT
SUMMARY OF QUANTITIES
SUPERSTRUCTURE BAR LIST

Across D & R.G.W.R.R.
Sta. 33+32.0 to 36+92.71
Near GRAND JCT. Sec. 15 T. 1-S R. 1 W.

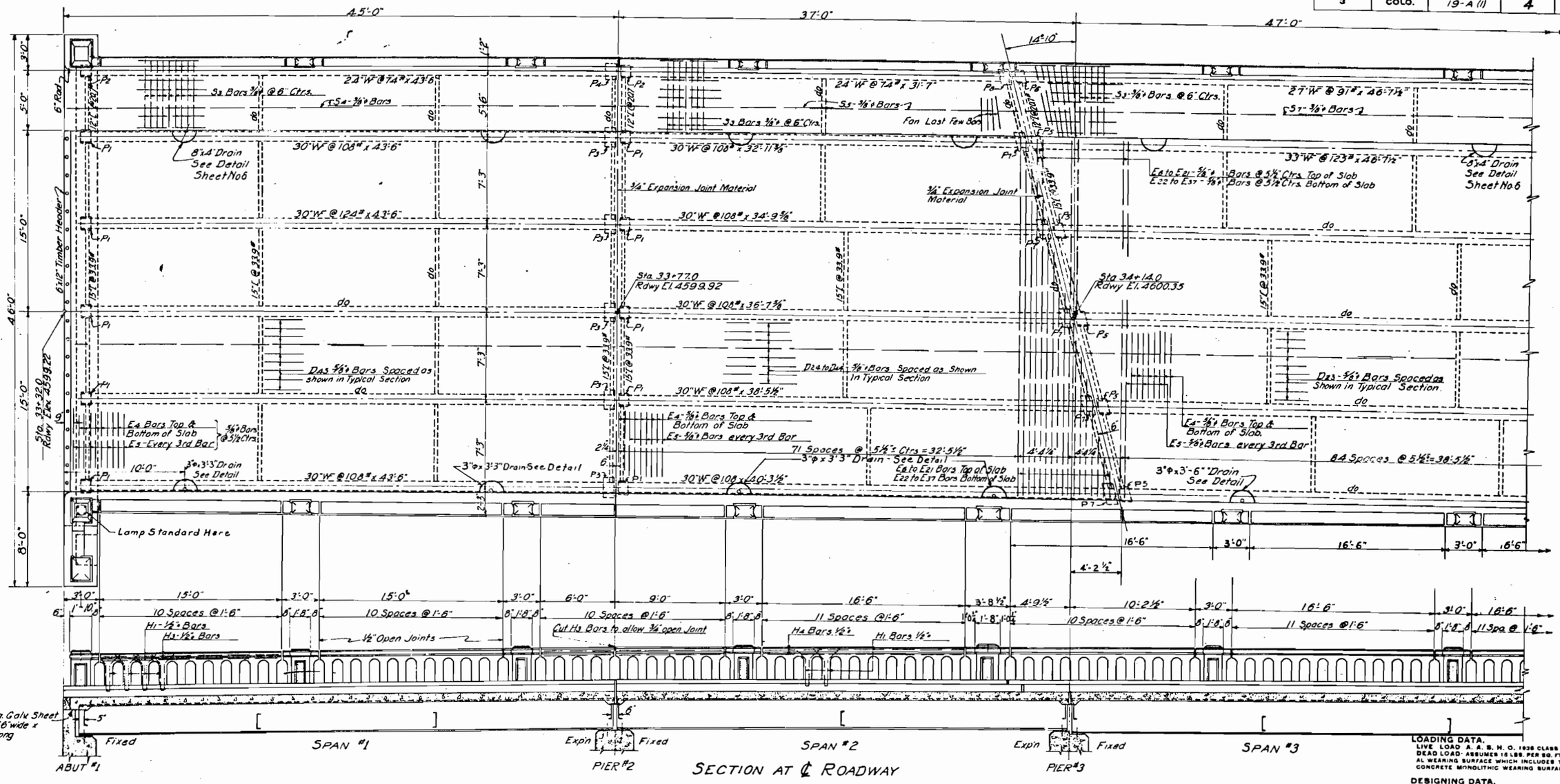
Designed by MFM	Approved by [signature]
Made by A.J.C.	Bridge Engineer
Checked by B.R.	Date: Oct 5th, 1938

TRIM LINE

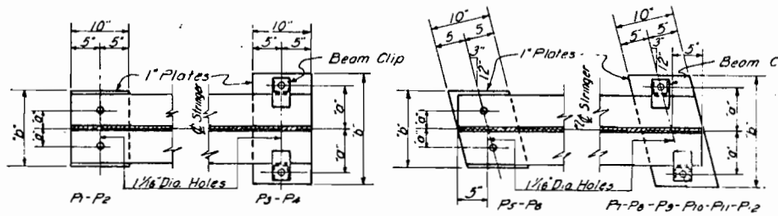
REVISIONS

Revised 11-19-38. Changed Handrail & Posts. Removed Sidewalk on North Side. H.A.L.F.

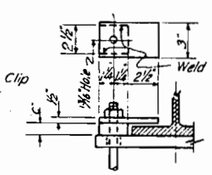
FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A (1)	4	



SECTION AT ℄ ROADWAY



BEARING PLATES



BEAM CLIPS

Furnish 2-3/8"φ x 1'-4" Anchor Bolts with each Bearing Pl.

BEARING PLATES					BEAM CLIPS	
Mark	Reqd	"a"	"b"	Location	Reqd	"c"
P1	5	3 1/2"	1'-0"	Abut #1	—	—
P2	1	3"	10"	" 1	—	—
P3	5	6 3/4	1'-5"	Pier 2	10	1 1/8"
P4	1	6"	1'-3"	" 2	2	7/8"
P1	5	3 1/2"	1'-0"	" 2	—	—
P2	1	3"	10"	" 2	—	—
P5	5	4 1/4"	1'-1"	" 3	—	—
P6	1	3 1/2"	11"	" 3	—	—
P7	5	6 3/4	1'-5"	" 3	10	7/8"
P8	1	6"	1'-3"	" 3	2	7/8"
P9	5	7 1/2"	1'-6"	" 4	10	1"
P10	1	6 1/2"	1'-4"	" 4	2	7/8"
P11	5	6"	1'-3"	" 4	10	7/8"
P12	1	5 1/4"	1'-2"	" 4	2	5/8"

LOADING DATA.
LIVE LOAD A. A. S. H. O. 1935 CLASS A. (M-18)
DEAD LOAD - ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ¾ INCH CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

DESIGNING DATA.
A.A.S.H.O. 1935 EXCEPT CONCRETE UNIT STRESSES PER A.A.S.H.O. AUG. 1928.

REFERENCE DRAWINGS
For List see Sheet No. 3

	Initial	Date
Designed By	B. R.	8-38
Checked By	W.W.D.	8-38
Drawn By	W.W.D.	8-38
Checked By	A.T.K.	8-38
Traced By	A.O.C.	8-38
Checked By	A.T.K.	9-1-38

COLORADO
STATE HIGHWAY DEPARTMENT

GRAND AVE. VIADUCT
DETAILS OF SPANS #1, 2 & 3

Across D. & R.G.W. R.R.
Sta. 33+32.0 to 36+92.71
Near Grand Junction Sec. 15 T. 1 S. R. 1 W

Designed by B. R.
Made by W.W.D.
Checked by W.W.D.

Approved by C. D. Carle
Bridge Engineer
Date: Oct. 5th 1938.

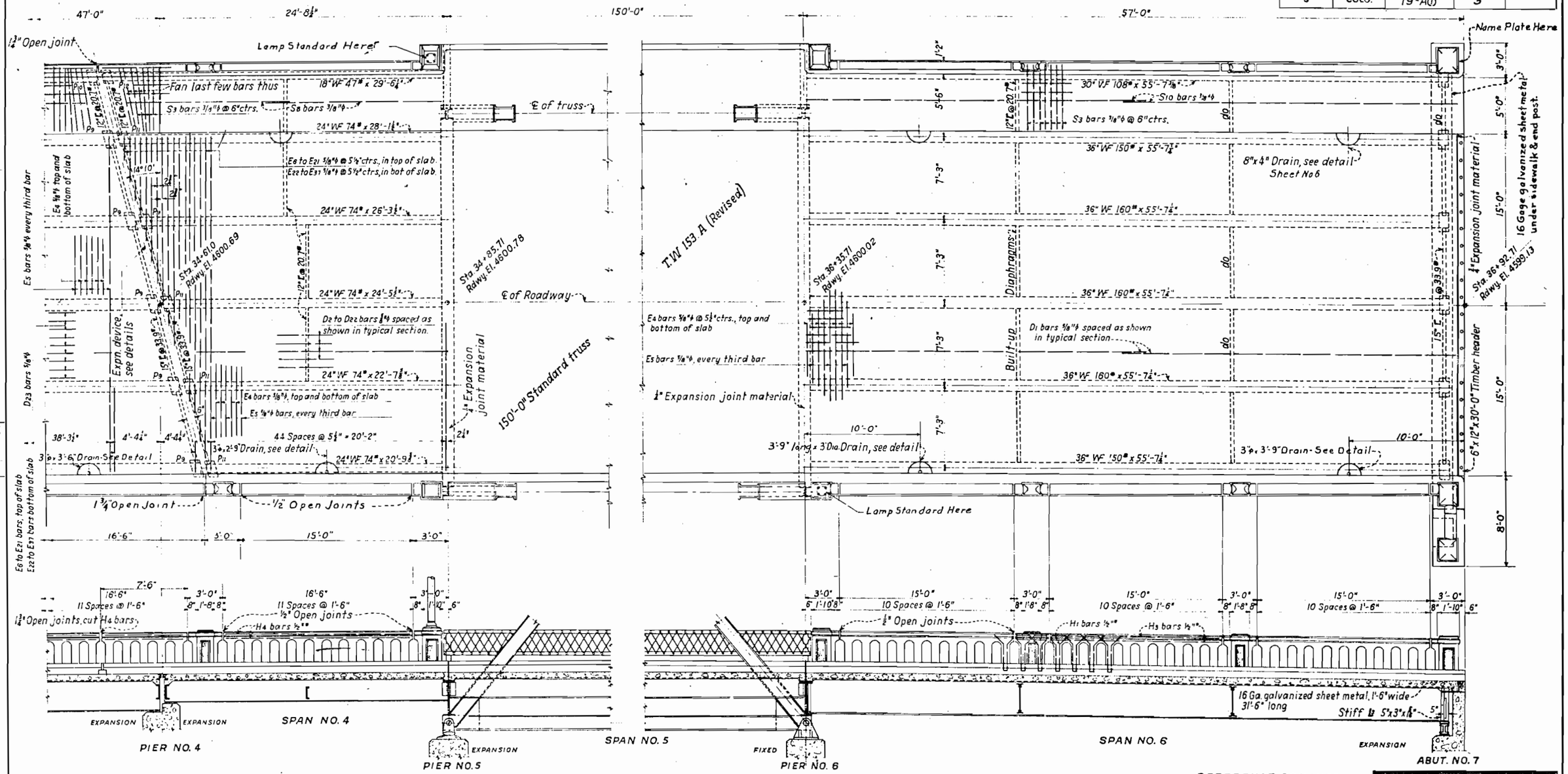
STRUCTURE NO. H-2-N

TRIM LINE

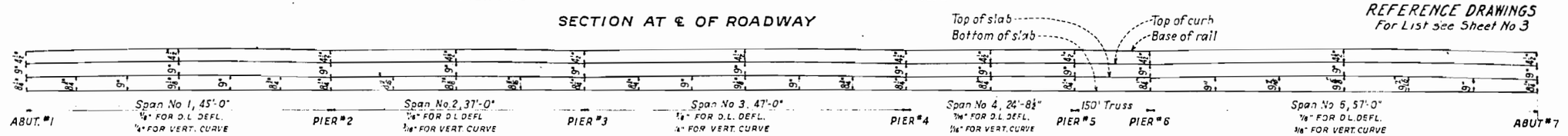
REVISIONS

Revised 11-19-38. Changed handrail, posts, lights & removed sidewalk on North side. H.A.L.F.

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	5	



SECTION AT ℄ OF ROADWAY



CAMBER DIAGRAM

REFERENCE DRAWINGS
For List See Sheet No 3

	Initial	Date
Designed By	B.R.	8-38
Checked By	NWD	"
Drawn By	W.W.D.	"
Checked By	A.T.K.	"
Traced By	A.V.F.	"
Checked By	A.T.K.	"

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE. VIADUCT
DETAILS OF SPANS NO. 3, 4, AND 6

Across D. AND R.G.W.R.
Sta. 33+32.0 TO 36+92.71
Near GRAND JCT. Sec. 15 T. 1S R. 1W.

Designed by B.R.
Made by NWD
Checked by NWD

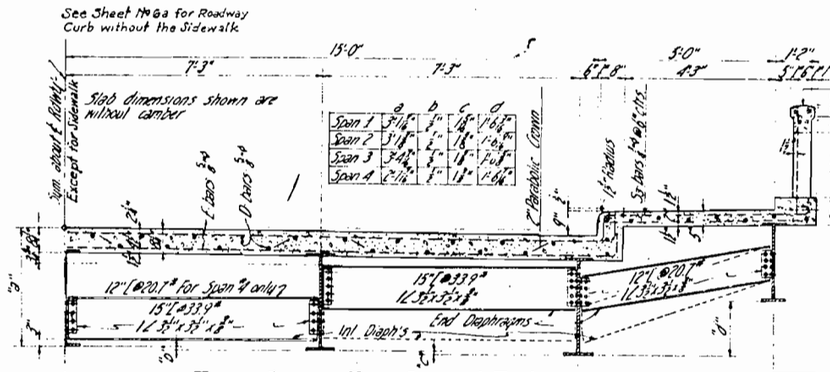
Approved by G. A. Bailey
Bridge Engineer
Date: Oct 5th 1938.

STRUCTURE NO. H-2-N

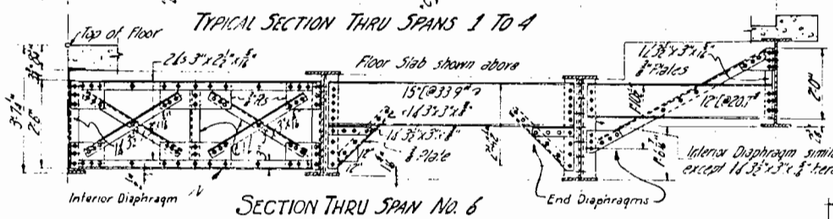
REVISIONS

10-26-38 HWD added conduit
11-19-38 HWD Drs & Sidewalk

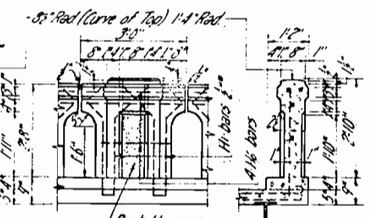
FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	6	



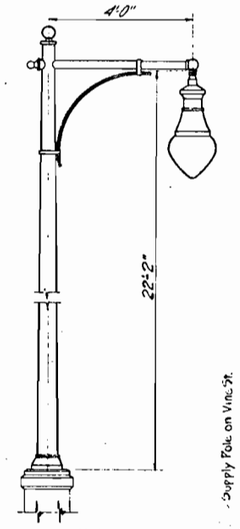
TYPICAL SECTION THRU SPANS 1 TO 4



SECTION THRU SPAN NO. 6

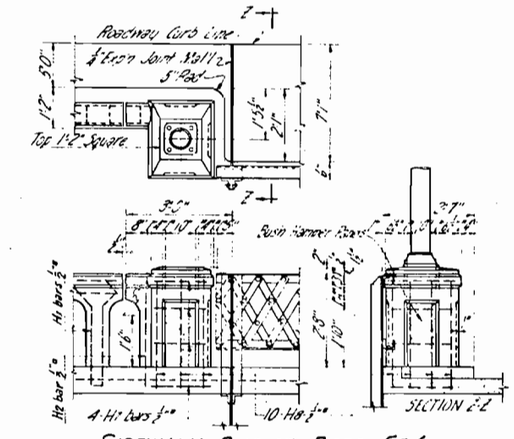


SIDEWALK HANDRAIL POST

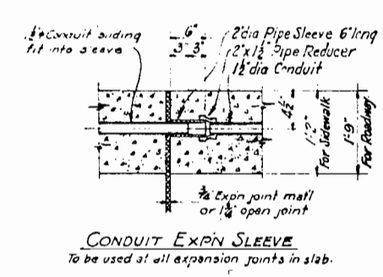


LIGHTING UNIT

Union Metal lamp standard No 6221 Y3 with Gen. Elec. Co. Form 810 Cat. A3G9 Pendent Mercury Vapor Luminaire with self contained reactor and capacitor, suitable for use on 115/230 Volt 3 wire multiple circuit. Each unit to be used with 1-400 Watt Type H-1 base down Mercury Vapor lamp and 2-100 Watt 115 Volt incandescent lamps. 5 Units required as shown above or equivalent.

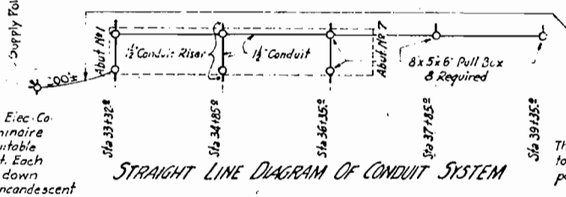


SIDEWALK POST AT PIERS 5 & 6



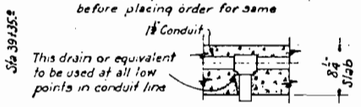
CONDUIT EXP'N SLEEVE

To be used at all expansion joints in slab.



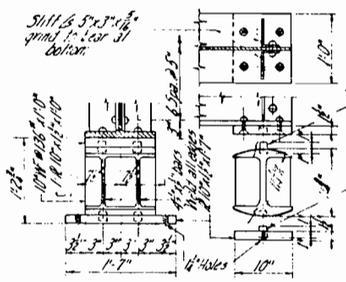
Underground run of 1 1/2" conduit to the supply pole terminating in 2 sweeps conduit about 20 feet up the pole. Contractor to verify this 200' length of conduit in field before placing order for same

STRAIGHT LINE DIAGRAM OF CONDUIT SYSTEM

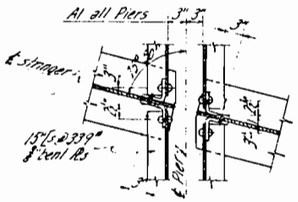


This drain or equivalent to be used at all low points in conduit line

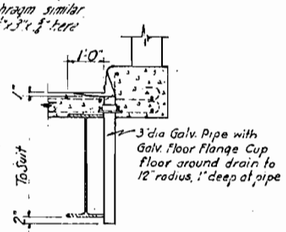
DRAIN TEE



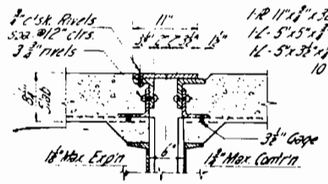
EXP'N BEARING-6 REQ'D SPAN 6



DIAPHRAGM CONN. AT PIER 3 & 4



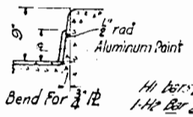
ROADWAY FLOOR DRAINS FOR SPANS 1,2,3,4 & 6

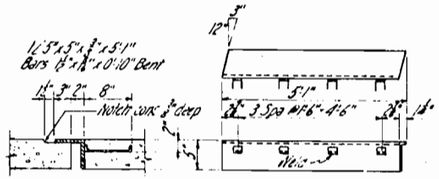


EXP'N DEVICE AT PIER 4

1-Req'd

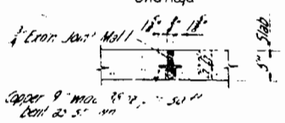
1-R 11"x3/8"x32'-0" ends bent up at curb
12-5"x5"x3/8"x31'-0" } bent to crown of Rdwy
12-5"x3"x3/8"x31'-0"
10 Clip 5"x5"x3/8"x0'-9"



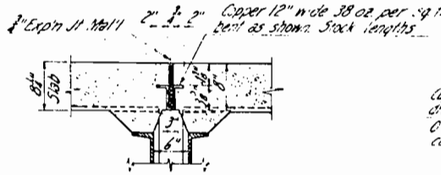


SIDEWALK EXP'N DEVICE AT PIER 4

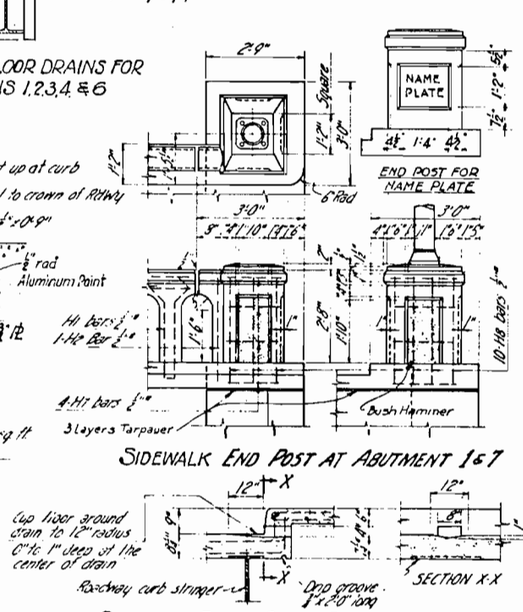
One Req'd



SIDEWALK EXP'N JOINT AT PIERS 2 & 3

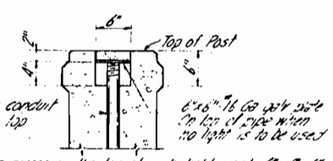


EXP'N JOINT AT PIERS 2 & 3



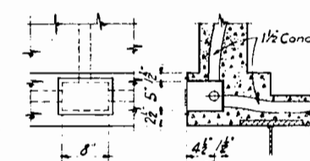
SIDEWALK END POST AT ABUTMENT 1 & 7

SIDEWALK FLOOR DRAIN FOR SPANS 1,2,3,4, & 6

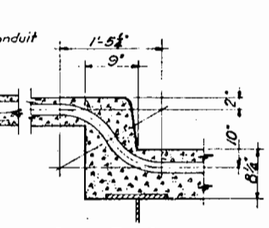


Make a recess in the top of each light post 6"x6"x6" conduit projects 4". Where no lighting standards are used place #16 ga plate on top of conduit and fill recess above plate with concrete flush with top of the post. This construction prepares for future lighting.

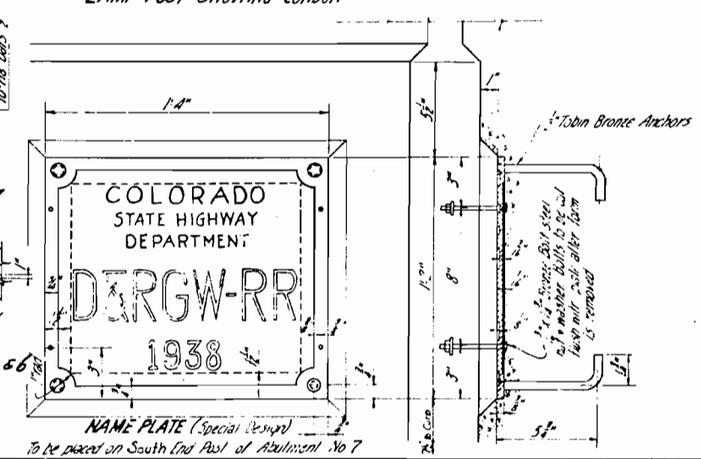
LAMP POST SHOWING CONDUIT



8"x5"x6" PULL BOX



BEND FOR CROSSOVER



NAME PLATE (Special Design)

To be placed on South End Post of Abutment No 7

REFERENCE DRAWINGS

For List see Sheet No. 3

LOADING DATA.
LIVE LOAD A. A. S. H. O. 1938 CLASS A. H-15.
DEAD LOAD ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE 4 INCH CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

DESIGNING DATA.
A.A.S.H.O. 1938 EXCEPT CONCRETE UNIT STRESSES PER A.A.S.H.O. AUG. 1928

	Initial	Date
Designed By	HWD	9-38
Checked By	AJC	9-38
Drawn By	HWD	9-38
Checked By	AJC	9-38
Traced By	HWD	9-38
Checked By	CBM	9-13-38

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE. VIADUCT
DETAILS OF SUPERSTRUCTURE

Across D&RGW RR
Sta. 33+320 To 38+82.71
Near GRAND JCT Sec. 13 T 1 S R 1 W.

Designed by HWD
Made by AJC
Checked by HWD

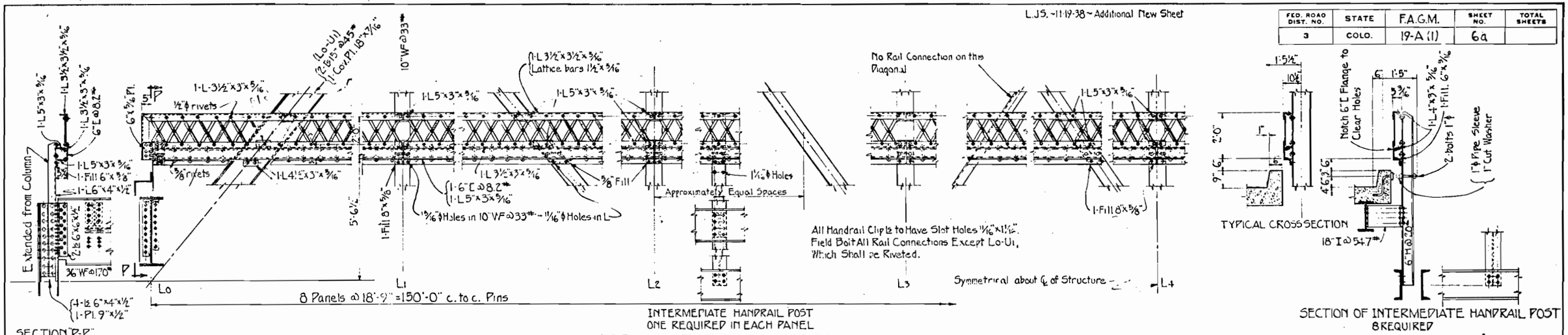
Approved by G. A. Bailey
Bridge Engineer
Date: Oct 5th, 1938.

STRUCTURE NO. H-2-N

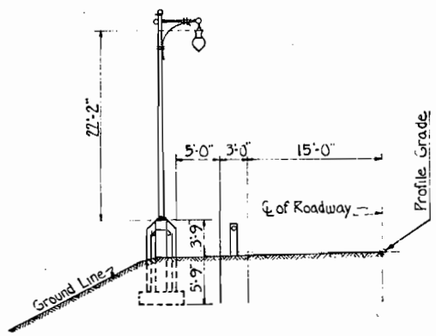
REVISIONS

L.J.S. ~11-19-38 ~ Additional New Sheet

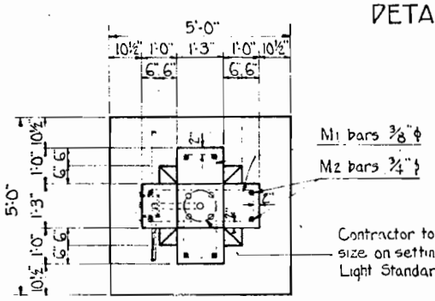
FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A (1)	6a	

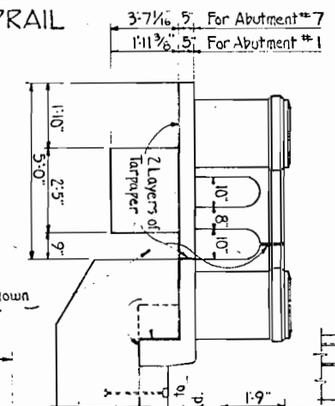


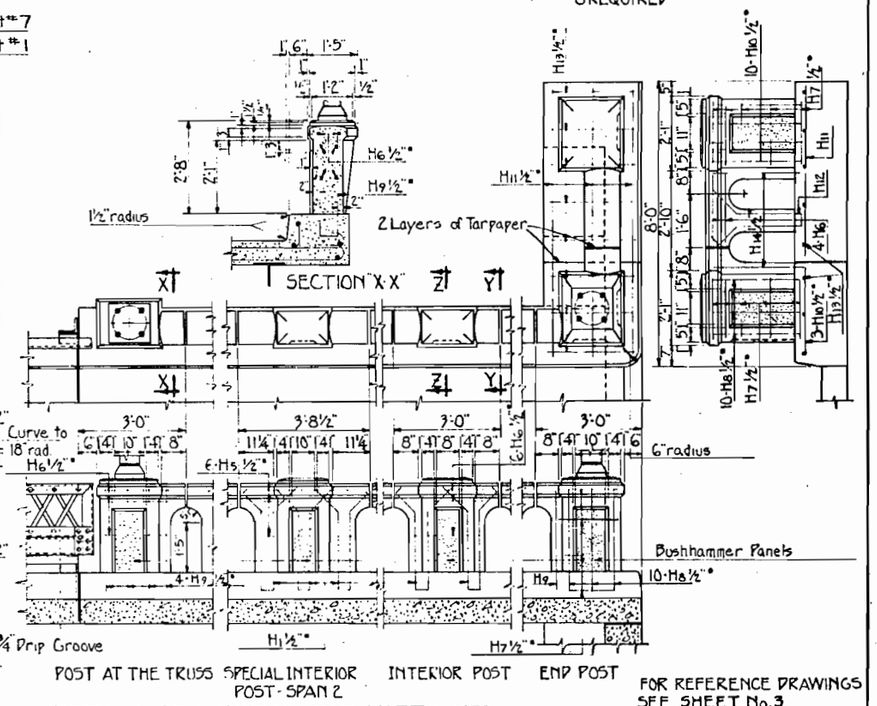
DETAILS OF NORTH HANDRAIL



GENERAL LAYOUT OF INDEPENDENT LIGHTING UNIT
ONE REQUIRED STA. 37+85.0 } 23'-0" Left of ℄ Roadway
" " " 39+35.0 }

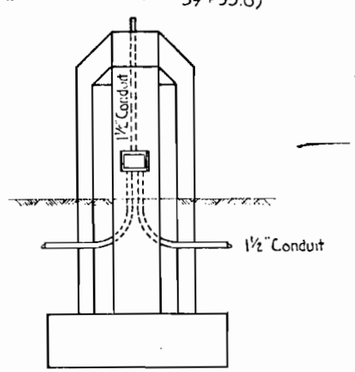




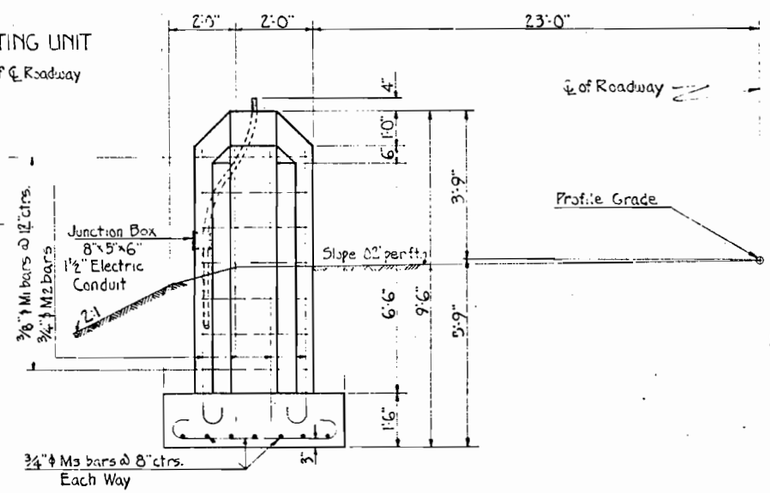


FOR REFERENCE DRAWINGS SEE SHEET No. 3

DETAILS OF HANDRAIL FOR NORTH SIDE



END ELEVATION



PLAN AND ELEVATION OF INDEPENDENT LIGHT STANDARD PEDESTALS ~ 2 REQUIRED
FOR DETAILS OF LIGHT STANDARD, LIGHT FIXTURE, AND JUNCTION BOX; SEE SHEET NO. 6.

BAR LIST FOR 2 INDEPENDENT LIGHT STANDARD PEDESTALS

Mark	Size	Type	No. Req'd	Length	Bending Diagrams
M1	⅜" ϕ	I	28	8'-6"	I: 2'-11"
M2	¾" ϕ	II	16	8'-6"	II: 2½", r=3", 7'-6"
M3	¾" ϕ	III	28	6'-0"	III: 2½", r=3", 4'-0"

Summary

238 Lin. ft. ⅜" ϕ bars @ 0.376 Lbs. per Lin. ft.	=	89 Lbs.
304 " " ¾" ϕ " @ 1.502 " " " "	=	457 "
+1% ± for Overrun	=	4 "
Total	=	550 "

STRUCTURE NO. H-2-N

	Initial	Date
Designed By	W.W.P.	11-38
Checked By		
Drawn By	F.R.W.	11-38
Checked By	L.J.S.	11-38
Traced By	L.J.S.	11-38
Checked By	W.W.P.	11-38

COLORADO
STATE HIGHWAY DEPARTMENT
DETAILS OF HANDRAIL FOR NORTH SIDE

Across D+R.G.W.R.R.
Sta. 33+32.0 to 36+92.71
Near GRAND JCT. Sec. 15 T. 1-S R. 1W

Designed by W.W.P.
Made by L.J.S.
Checked by W.W.P.

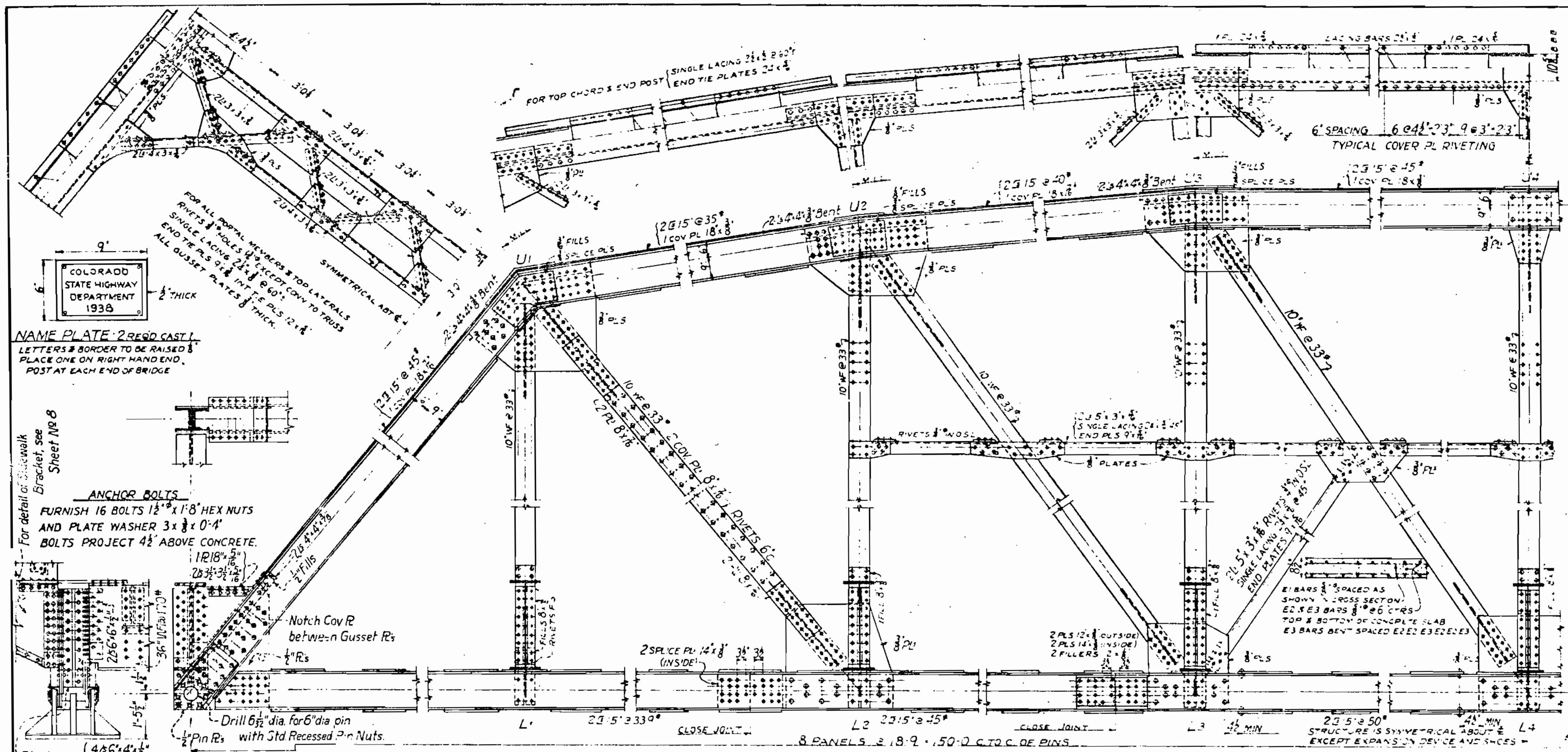
Approved by Pat Bailey
Bridge Engineer
Date: Nov. 21st 1938.

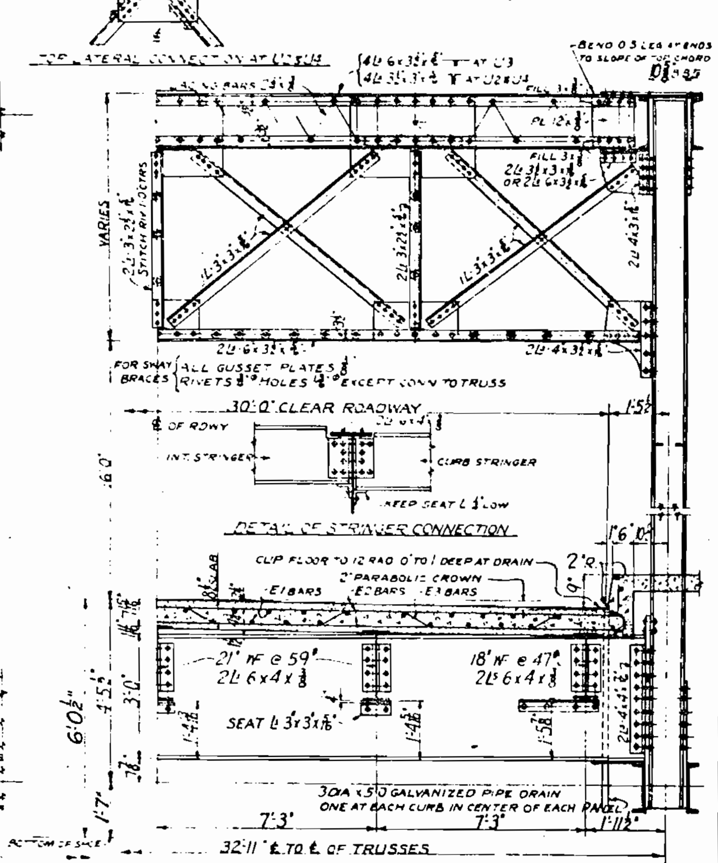
TRIM LINE

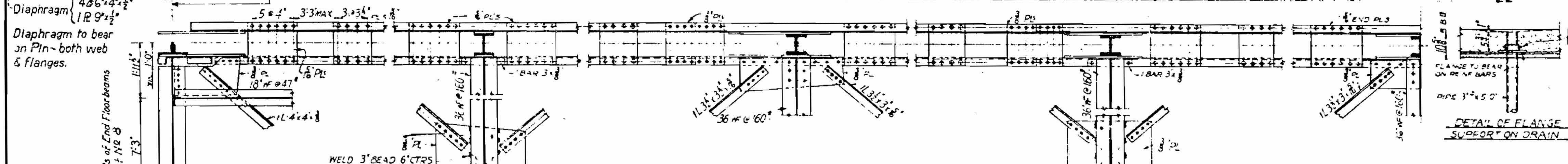
TW·153·A
(SHEET 1 OF 2)

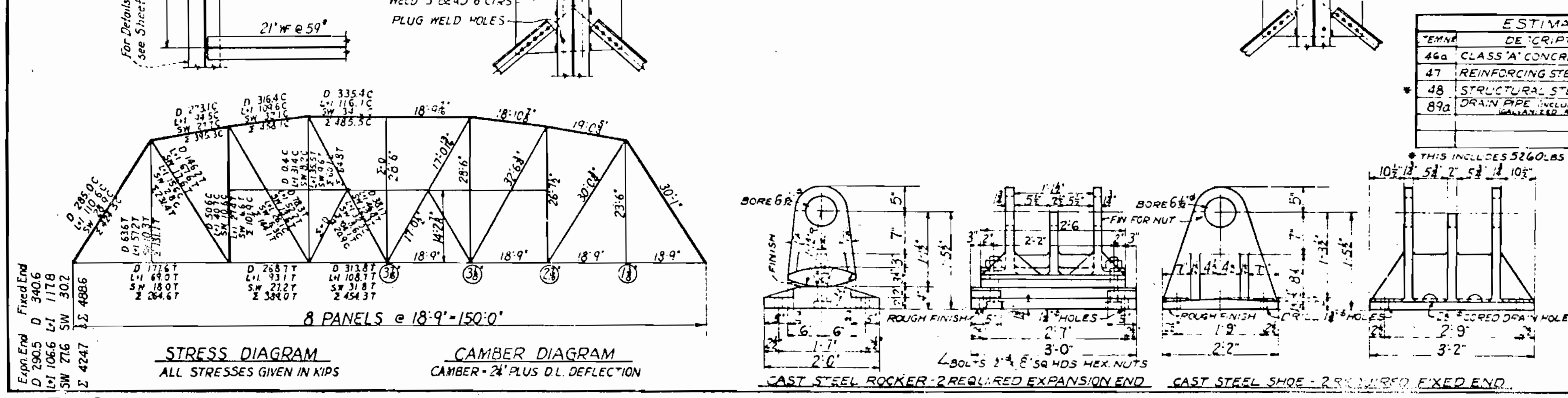
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	F.A.G.M.19A(1)	7	

Special Revision for F.A.G.M. 19A(1) M.S.R. 8·31·38
Revised 10·27·38 B.R.-Added Splice Ls to top chord joints.
Revised 11·19·38 WWD One Sidewalk
Revised 12·26·39 WMK Steel quantities









GALV FLOOR FLANGE SLIP TYPE WITH 2 SET SCREWS THREADS MAY BE USED IF DESIRED

BAR LIST FOR ONE SPAN OF SUPERSTRUCTURE ·B.R.

MARK	NO	SIZE	LENGTH	BENDING DIAGRAM
E1	336	⅝"φ	18'·6"	STRAIGHT
E2	406	⅝"φ	32'·0"	2¼"R 2" 30'·4"
E3	97	⅝"φ	32'·8"	7" 2¼"R 1'·3 8¼ 4'·4½" 8¼ 1'·6" 8¼ 4'·4½" 8¼ 9" SYMM ABOUT ℄

22377 LIN FT OF ⅝"φ BARS @ 1.043 LBS PER LIN FT = 23339 LBS
PLUS 1% FOR OVERRUN = 261 LBS
TOTAL = 23600 LBS

ESTIMATED QUANTITIES (INCLUDES 1 WALK)

ITEM NO	DESCRIPTION	UNIT	TRUSS	1 WALK	TOTAL
46a	CLASS 'A' CONCRETE	CU YD	129	19	148
47	REINFORCING STEEL (INCLUDES 1% FOR OVERRUN)	LBS	23600	2400	26000
* 48	STRUCTURAL STEEL (INCLUDES 2½% FOR OVERRUN)	LBS	316,980	16200	333,180
89a	DRAIN PIPE (INCLUDES FLANGE) (GALVANIZED IRON)	EACH	16		16

* THIS INCLUDES 5260 LBS FOR CAST STEEL SHOES & 4000 LBS BLAST BOARDS

REFERENCE DRAWINGS SEE SHEET No 3

LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG 1935 CLASS A (H-15)
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ¾ IN CONCRETE MONOLITHIC WEARING SURFACE
DESIGN DATA - AASHO 1935 - CONC UNIT STRESSES AUG 1928

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JUNE 1 1937.
ALL RIVETS SHALL BE ⅞"φ EXCEPT AS NOTED
ALL FIELD CONNECTIONS SHALL BE POWER RIVETED
FABRICATOR SHALL FURNISH ONE PILOT NUT AND ONE DRIVING NUT AS PER SPECIFICATIONS PAGE 196.
STRUCTURAL STEEL QUANTITIES ARE CALCULATED FROM DESIGN PLANS AND ARE THEREFORE APPROXIMATE ONLY
ROADWAY FLOOR SLAB AS SHOWN INCLUDES ¾" MONOLITHIC WEARING SURFACE
A VERTICAL CONSTRUCTION JOINT IS REQUIRED TRANSVERSLY IN THE CONCRETE FLOOR OVER EACH FLOOR BEAM.
ALL HOLES IN TOP AND BOTTOM CHORD SPLICES SHALL BE SUB-PUNCHED 11/16"φ AND REAMED. ALL HOLES IN FLOOR BEAM AND STRINGER FIELD CONNECTIONS SHALL BE SUB-PUNCHED AND REAMED TO AN IRON TEMPLATE.
FOR GENERAL NOTES ON CONCRETE AND DETAILS OF SUBSTRUCTURE SEE SHT No 3
FIELD PAINT · TWO COATS OF ALUMINUM.

COLORADO
STATE HIGHWAY DEPARTMENT
150 FT. x 30 FT. STANDARD
STEEL THRU TRUSS
ONE 5 FT. SIDEWALK
Across D.& R.G.W. RR
Sta. 33+32 To 36+92.71
Near Grand Junction

Designed by K.B.	Approved by R. L. Bailey
Made by W.M.M.	Bridge Engineer
Checked by B.R.	Date July 14th, 1938

STRUCTURE NO H-2-N

TW·153·A

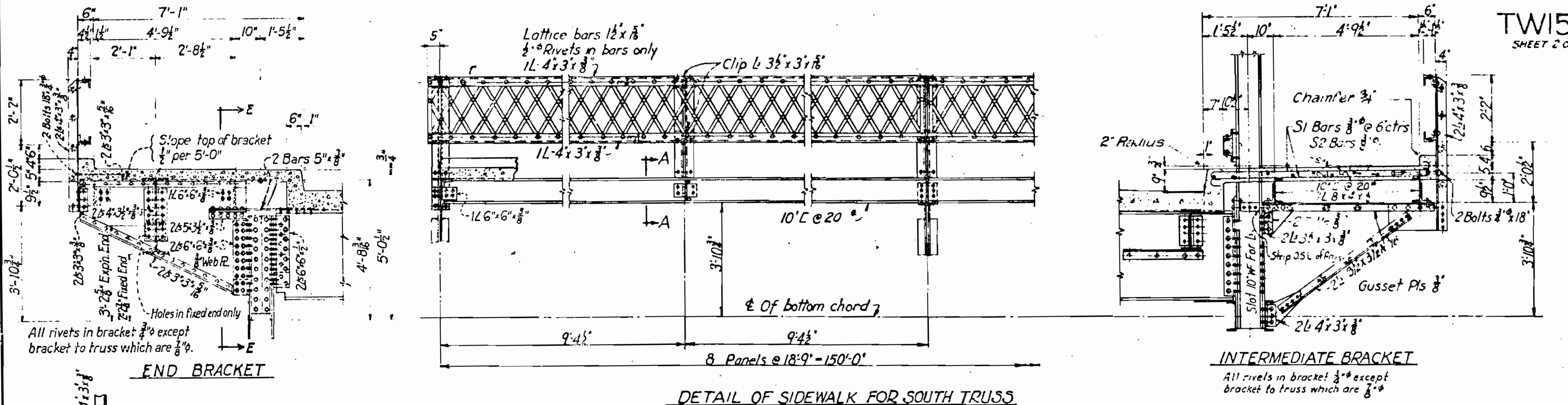
REVISIONS

FED. ROAD DIST. NO	STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS
3	COLO.	F.A.G.M. 19-A(1)	8	

TW153A

SHEET 2 OF 2.

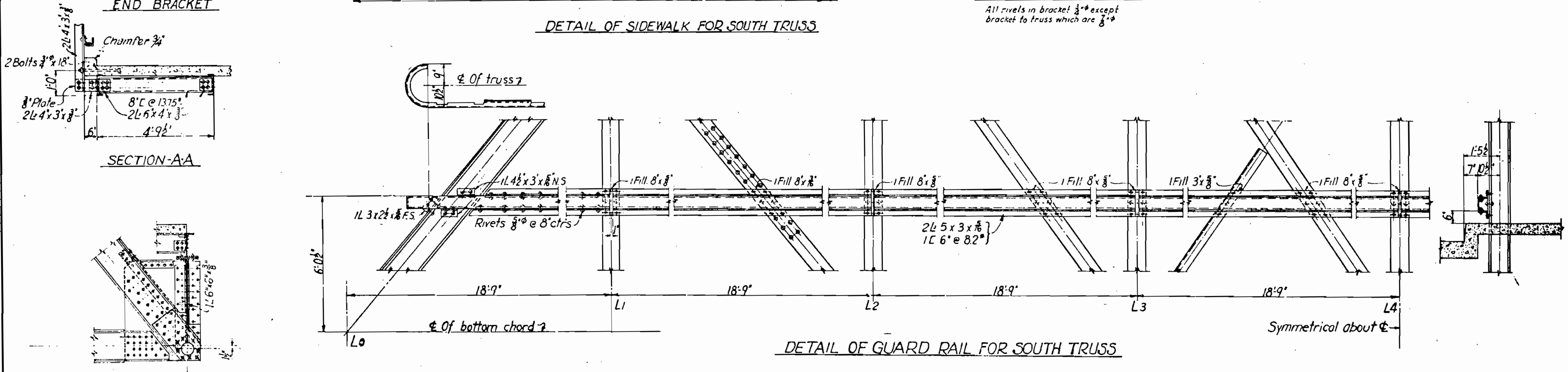
Special Revision for F.A.G.M. 19-A(1) M.S.R. 8-31-38
Revised 10-27-38 B.R. Changed Cover Plate on Floorbeam to 12"x½"
Revised 11-19-38 W.H.D. One Sidewalk

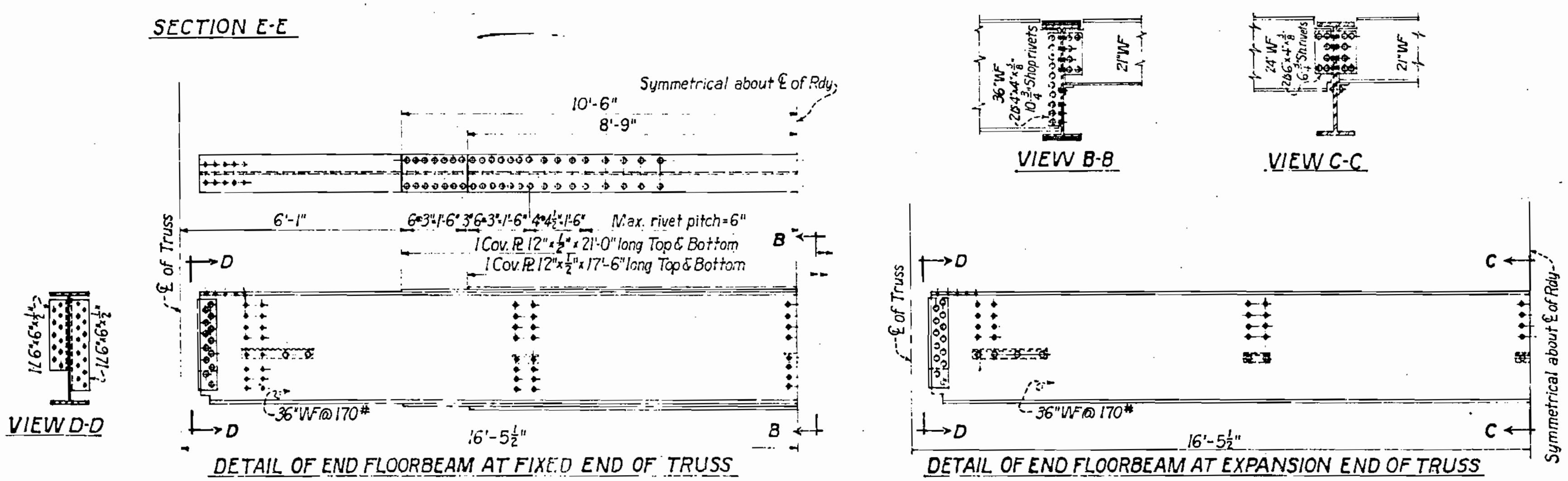


BAR LIST FOR ONE SIDEWALK - ONE 150 FT. SPAN

MARK	SIZE	REQD	LENGTH	BENDING DIAGRAM
S1	⅜"φ	596	7'-11"	1½" R, 1", 6'-11"
S2	⅜"φ	80	18'-6"	STRAIGHT

6199 LIN. FT. OF ⅜"φ BARS @ 0.376 LBS PER LIN. FT. = 2331 LBS.
PLUS 1% ± FOR OVERRUN = 69 LBS.
TOTAL = 2400 LBS.





Rivets ⅞"φ except as noted.
All handrail and guard rail field connections to be ¾"φ bolts in 13/16"x1¼" slotted holes.
A ¾" space shall be left around all truss members in concrete sidewalk.
A vertical construction joint is required transversly in concrete sidewalk and curb over each bracket.

Exposed concrete edges shall be chamfered.

REFERENCE DRAWINGS SEE SHEET NO 3

LOADING DATA.
LIVE LOAD A.A.S.H.O. 1935 CLASS A H-15. DEAD LOAD ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ INCH CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

DESIGNING DATA.
A.A.S.H.O. 1935 EXCEPT CONCRETE UNIT STRESSES PER A.A.S.H.O. AUG. 1936

COLORADO
STATE HIGHWAY DEPARTMENT
150 FT. SPAN STEEL THRU TRUSS
30 FT. CLEAR ROADWAY
ONE 5 FT. SIDEWALK

Across D & RGW RR
Sta. 33+32 To 36+92.71
Near Grand Junction Sec. 15 T. 1S R. 1W.

Designed by M.F.M. Made by W.M.M. Checked by B.R.	Approved by [signature] Bridge Engineer Date: July 14th, 1938

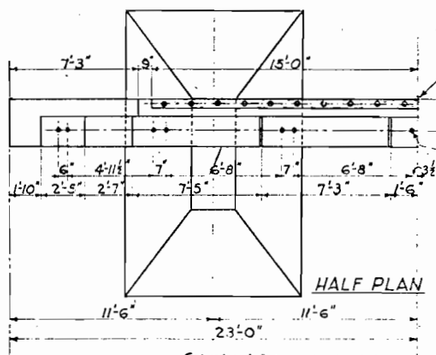
TW153A

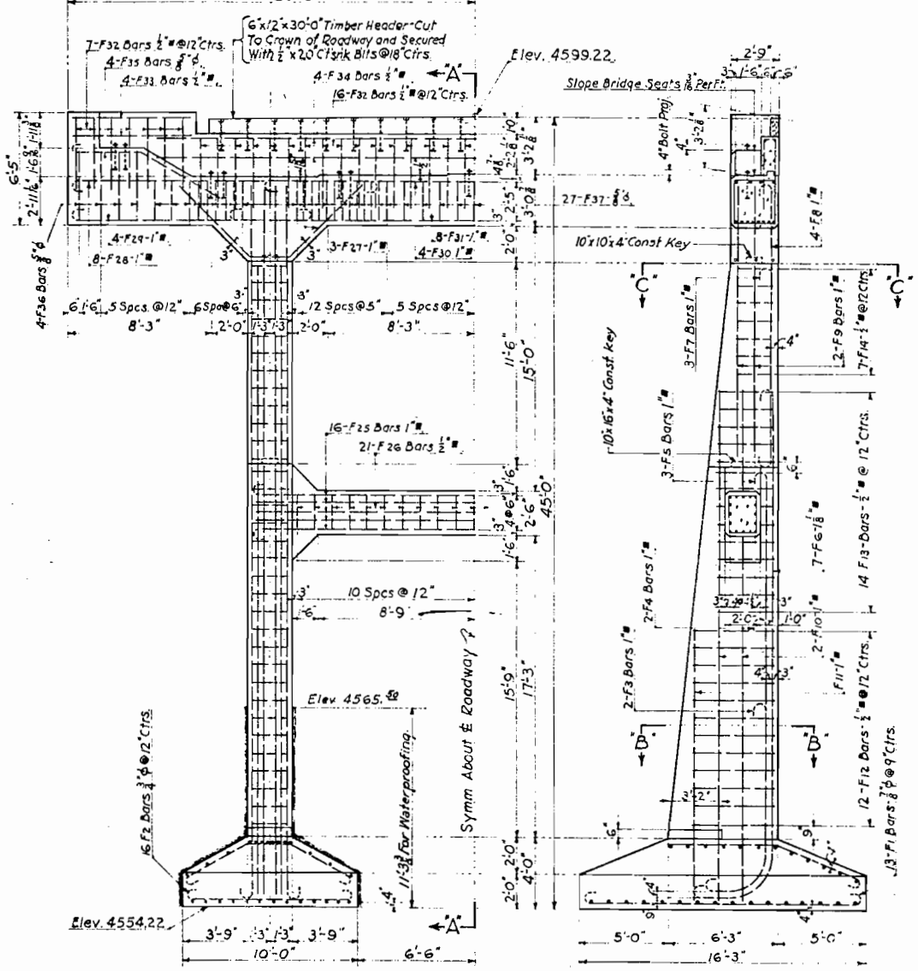
STRUCTURE NO. H-2-N

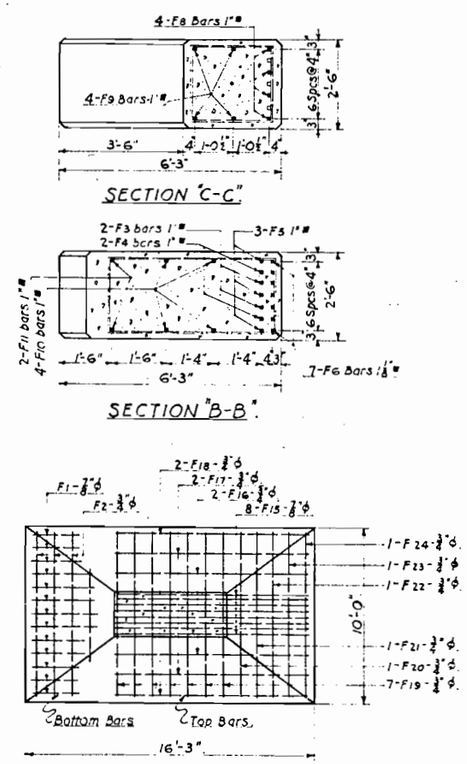
REVISIONS

10-17-38 W.W.D. added waterproofing

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	9	





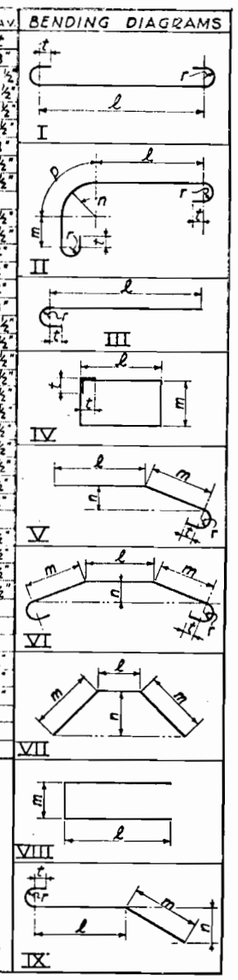


Designed By	W.W.D.	9/21/38
Checked By		
Drawn By	W.W.D.	9/21/38
Checked By	A.L.F.	9/24/38
Traced By	J.A.V.	9/29/38
Checked By	R.S.S.	9/30/38

BAR LIST FOR ABUTMENT No. 1. J.A.V.

Mark	Size	No Req.	Length	Type	l	m	n	p	r	t
F 1	⅛" ϕ	26	17'-4"	I	15'-0"				3½"	3"
F 2	¾" ϕ	32	10'-10"	I	8'-10"				3"	2½"
F 3	1" ■	4	15'-2"	II	8'-3"	1'-0"	2'-1"	3'-3"	4"	3½"
F 4	1" ■	4	20'-2"	II	13'-3"	1'-0"	2'-1"	3'-3"	4"	3½"
F 5	1" ■	6	28'-5"	II	21'-6"	1'-0"	2'-1"	3'-3"	4"	3½"
F 6	1⅛" ■	14	34'-10"	II	26'-3"	1'-9"	2'-5"	3'-10"	4½"	4"
F 7	1" ■	6	13'-3"	I	10'-7"				4"	3½"
F 8	1" ■	8	18'-0"	I	15'-4"				4"	3½"
F 9	1" ■	8	16'-0"	—						
F 10	1" ■	8	30'-0"	III	28'-8"				4"	3½"
F 11	1" ■	4	16'-2"	III	14'-10"				4"	3½"
F 12	½" ■	24	14'-2"	IV	4'-7½"	2'-1½"				4"
F 13	½" ■	28	11'-2"	IV	3'-1½"	2'-1½"				4"
F 14	½" ■	14	9'-4"	IV	2'-2½"	2'-1½"				4"
F 15	⅞" ϕ	16	12'-3"	V	6'-2"	4'-11"	1'-10"		3½"	3"
F 16	¾" ϕ	4	12'-0"	V	7'-8½"	3'-3½"	1'-2½"		3"	2½"
F 17	¾" ϕ	4	11'-10"	V	9'-3"	1'-7½"	7"		3"	2½"
F 18	¾" ϕ	4	11'-8"	III	10'-8"				3"	2½"
F 19	¾" ϕ	14	12'-0"	VI	2'-4"	3'-9⅜"	1'-9⅜"		3"	2½"
F 20	¾" ϕ	2	11'-10"	VI	3'-8"	3'-0¾"	1'-4½"		3"	2½"
F 21	¾" ϕ	2	11'-7"	VI	5'-0"	2'-3½"	1'-1"		3"	2½"
F 22	¾" ϕ	2	11'-5"	VI	6'-4"	1'-6½"	0'-8⅜"		3"	2½"
F 23	¾" ϕ	2	11'-2"	VI	7'-8"	0'-9⅜"	0'-4½"		3"	2½"
F 24	¾" ϕ	2	10'-10"	I	8'-10"				3"	2½"
F 25	1" ■	16	26'-8"	I	24'-0"				4"	3½"
F 26	½" ■	21	8'-2"	IV	1'-7½"	2'-1½"				4"
F 27	1" ■	6	13'-9"	VIII	2'-3"	5'-9"				
F 28	1" ■	16	19'-4"	I	16'-8"				4"	3½"
F 29	1" ■	8	15'-6"	I	12'-10"				4"	3½"
F 30	1" ■	4	25'-8"	I	23'-0"				4"	3½"
F 31	1" ■	8	29'-8"	I	27'-0"				4"	3½"
F 32	½" ■	46	9'-3"	VIII	4'-4"	7"				
F 33	½" ■	8	6'-10"	—						
F 34	½" ■	4	36'-0"	—						
F 35	⅝" ϕ	8	9'-10"	IX	3'-9"	5'-3"	2'-8⅜"		2½"	2"
F 36	⅝" ϕ	8	13'-8"	IV	4'-1"	2'-5"				4"
F 37	⅝" ϕ	53	10'-8"	IV	2'-7"	2'-5"				4"

BENDING DIAGRAMS



BAR SUMMARY FOR ABUTMENT No. 1.

488	Lin. Ft.	– 1⅛" ■	@ 4.303 Lbs.	Per Ft.	= 2100	Lbs.
2252	"	" – 1" ■	@ 3.400 "	" "	= 7657	"
648	"	" – ⅞" ϕ	@ 2.044 "	" "	= 1325	"
770	"	" – ¾" ϕ	@ 1.502 "	" "	= 1157	"
754	"	" – ⅝" ϕ	@ 1.043 "	" "	= 786	"
1580	"	" – ½" ■	@ 0.850 "	" "	= 1343	"
					14368	"
			Plus 1% ± For Overrun	=	132	"
				TOTAL =	14500	LBS.

REFERENCE DRAWINGS
For List See Sheet No. 3.

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE. VIADUCT
DETAILS OF ABUTMENT No. 1.

Across D & R.G. W.R.R.
Sta. 33+32.0 To 36+92.71.
Near GRAND JCTN. Sec. 15 T. 1-S. R. 1-W.

Designed by W.W.D.
Made by J.A.V.
Checked by R.S.S.
Approved by [signature] Bridge Engineer
Date: Oct 5th, 1938.

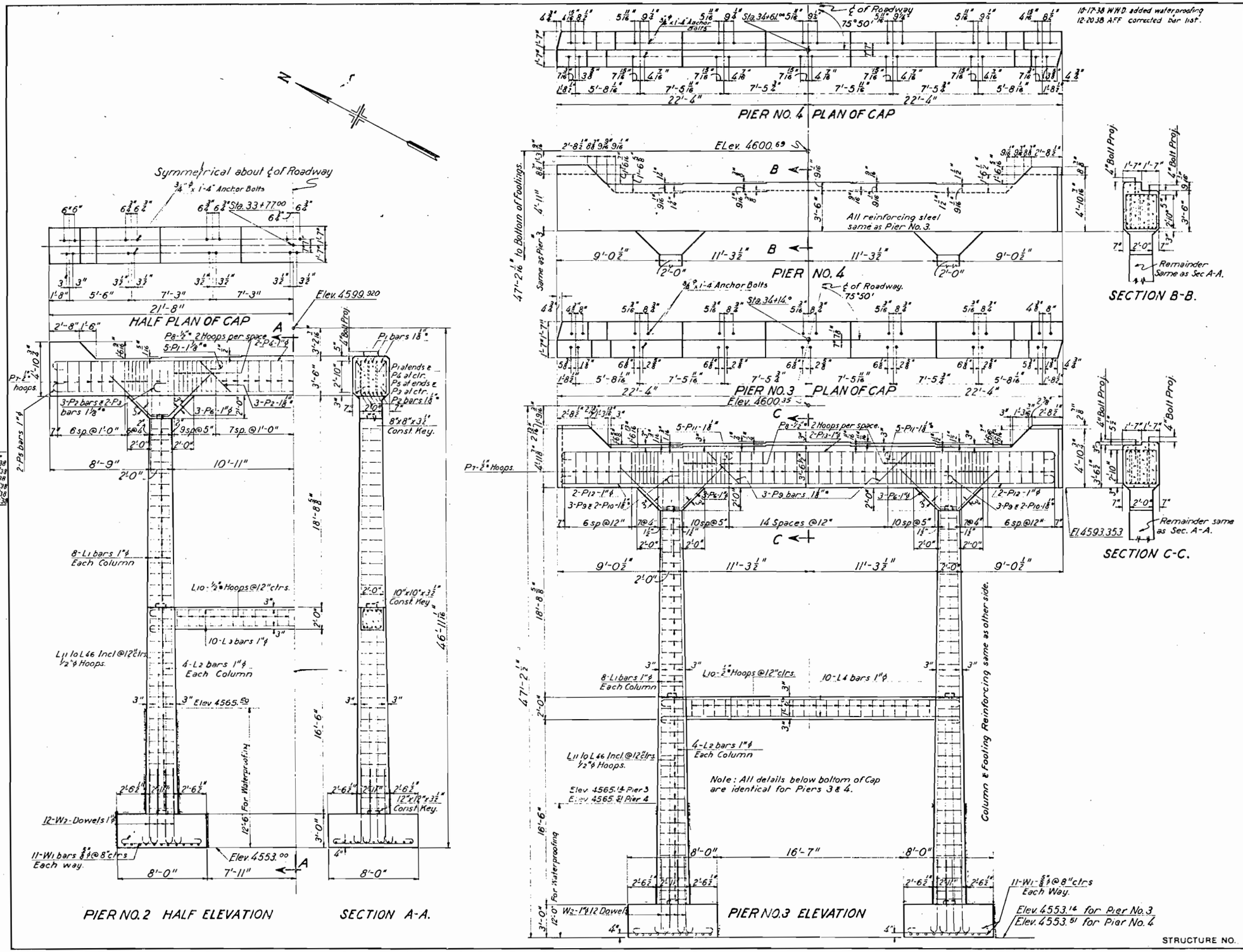
STRUCTURE NO. H-2-N.

TRIM LINE

REVISIONS

10-17-38 W.H.D. added waterproofing
12-20-38 A.F.F. corrected bar list.

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A-1	10	

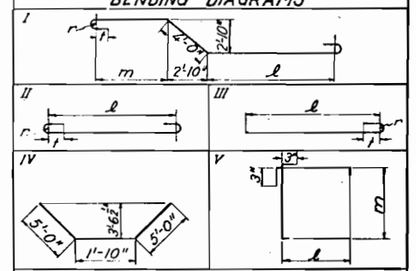


	Initial	Date
Designed By	K.B.	9-'38
Checked By	A.L.F.	9-2038
Drawn By	K.B.	9-'38
Checked By	A.L.F.	9-2038
Traced By	D.M.D.	9-26-38
Checked By	C.B.M.	9-28-38

BAR LIST FOR PIERS No. 2, 3 & 4.

Mark	Size	No. Req'd	Length	Type	ℓ	m	r	t
P1	1⅛"φ	10	17'-5"	II	14'-5"		4½"	4"
P2	1⅛"φ	6	37'-2"	I	17'-9"	12'-5"	4½"	4"
P3	1⅛"φ	2	26'-10"	II	23'-10"		4½"	4"
P4	1"φ	2	25'-8"	—				
P5	1"φ	4	14'-8"	III	13'-4"		4"	3½"
P6	1"φ	18	11'-10"	—				
P7	½"φ	127	12'-0"	V	2'-11½"	2'-9½"		
P8	½"φ	128	10'-6"	V	2'-11½"	2'-0½"		
P9	1⅛"φ	12	38'-2"	I	18'-4"	12'-10"	4½"	4"
P10	1⅛"φ	4	27'-7"	II	24'-7"		4½"	4"
P11	1⅛"φ	20	17'-10"	II	14'-10"		4½"	4"
P12	1"φ	8	14'-11"	III	13'-7"		4"	3½"
P13	1"φ	4	26'-1"	—				
W1	⅝"φ	132	8'-7"	II	6'-11"		2½"	2"
W2	1"φ	72	7'-11"	III	6'-7"		4"	3½"
L3	1"φ	10	27'-9"	II	25'-1"		4"	3½"
L1	1"φ	48	40'-0"	—				
L2	1"φ	24	16'-0"	—				
L10	½"φ	66	7'-0"	V	1'-7½"	1'-7½"		
L11 to L46 Incl.	½"φ	6 Each	7'-0" by 3/16" to 9'-2⅛"	V	1'-7½" by 3/16" to 2'-2⅛"	1'-7½" by 3/16" to 2'-2⅛"		
L4	1"φ	20	28'-6"	II	25'-10"		4"	3½"

BENDING DIAGRAMS



BAR SUMMARY FOR PIER NO. 2

451	Lin ft. of 1⅛"φ	@ 4.303 lb. per lin. ft.	=	1 941 lb.
1 417	" " " 1"φ	@ 2.670 " " " "	=	3 783 "
378	" " " ⅝"φ	@ 1.043 " " " "	=	394 "
1 066	" " " ½"φ	@ 0.850 " " " "	=	906 "
583	" " " ½"φ	@ 0.668 " " " "	=	389 "
	Plus 1% for Overrun		=	77 "
	Total			7 490 lb.

BAR SUMMARY FOR PIER NO. 3 PIER NO. 4 THE SAME.

463	Lin ft. of 1⅛"φ	@ 4.303 lb. per lin. ft.	=	1 992 lb.
1426	" " " 1"φ	@ 2.670 " " " "	=	3 807 "
378	" " " ⅝"φ	@ 1.043 " " " "	=	394 "
1 132	" " " ½"φ	@ 0.850 " " " "	=	962 "
583	" " " ½"φ	@ 0.668 " " " "	=	389 "
	Plus 1% for Overrun		=	76 "
	Total		=	7620 lb.

For REFERENCE DRAWINGS
See Sheet No. 3

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE
VIADUCT
DETAILS OF PIERS NO. 2, 3 & 4.

Across D & R.G.W.R.R.
Sta. 33+32.00 to 36+92.71
Near GRAND JCT. Sec. 15 T 1-S R 1 W.

Designed by K.B.
Made by D.M.D.
Checked by

Approved by [signature]
Bridge Engineer
Date: Oct 5th, 1938.

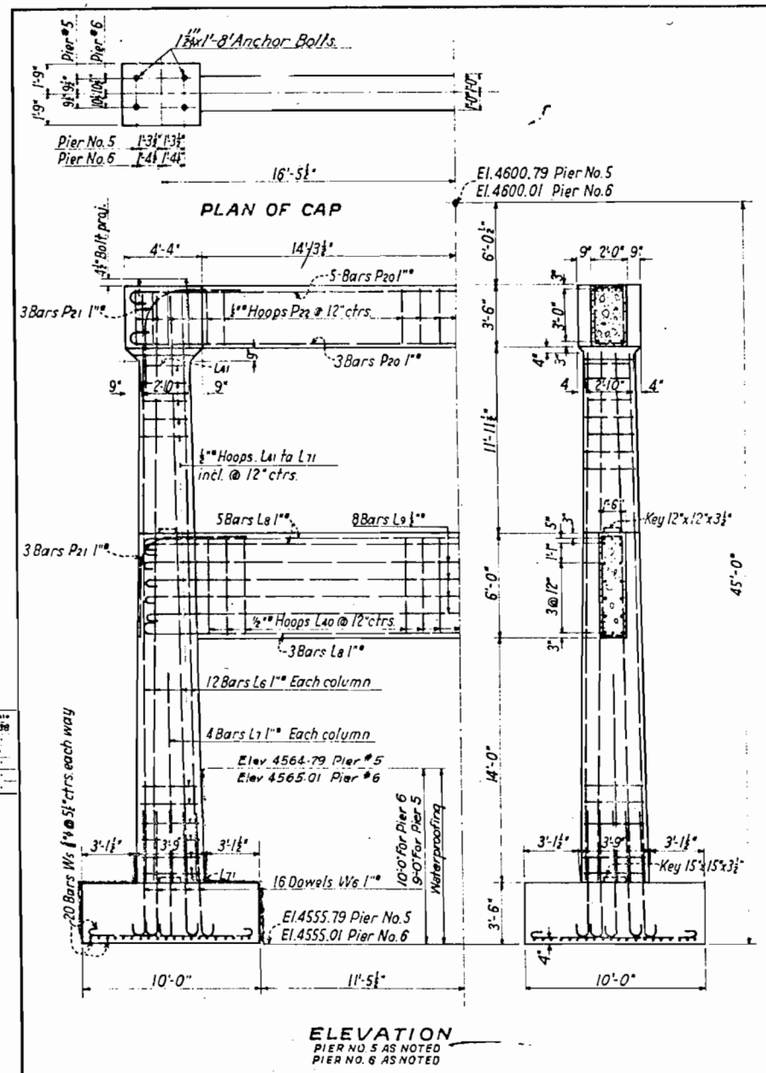
STRUCTURE NO. H-2-N.

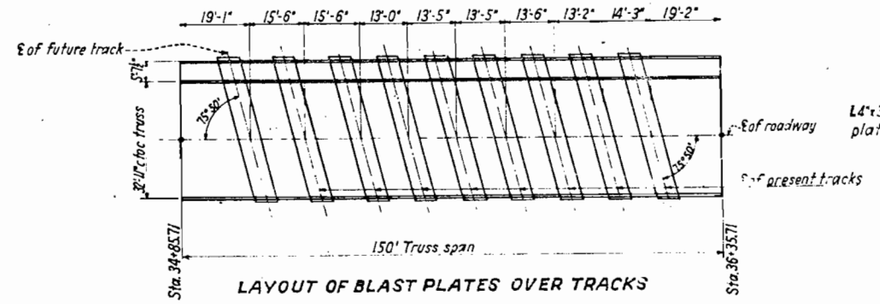
TRIM LINE

REVISIONS

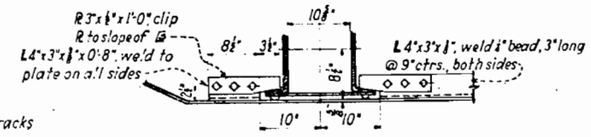
10-17-38 H.W.D. added waterproofing
11-19-38 H.W.D. One Sidewalk

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	11	

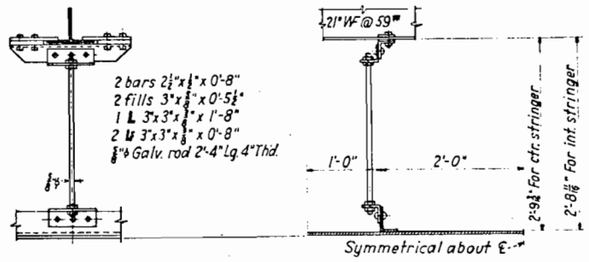




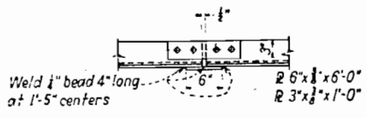
LAYOUT OF BLAST PLATES OVER TRACKS



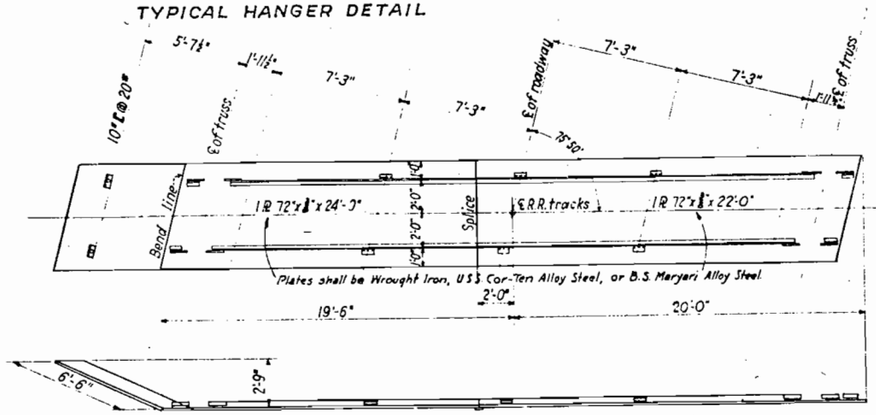
BLAST PLATE CONN. TO TRUSS



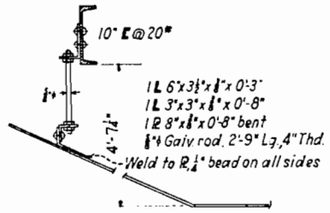
TYPICAL HANGER DETAIL



SPLICE DETAIL



TYPICAL DETAIL OF BLAST PLATES-NINE REQUIRED



CONN. TO SIDEWALK STRINGER

	Initial	Date
Designed By	K.B.	9-38
Checked By		"
Drawn By	K.B.	"
Checked By	A.O.C.	"
Traced By	A.Y.F.	"
Checked By	H.W.P.	"

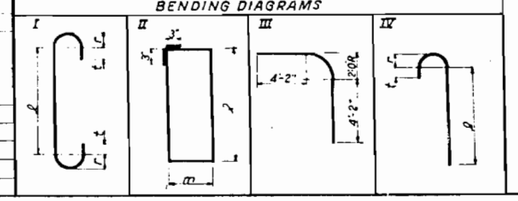
BAR LIST FOR PIER NO. 5 (PIER NO. 6 IS SAME) A.O.C.

MARK	SIZE	NO. REQD.	LENGTH	ℓ	m	r	t	TYPE
L6	1"ø	24	35'-0"					Str.
L7	1"ø	8	12'-0"					Str.
L8	1"ø	8	37'-8"	35'-0"		4"	3½"	I
L9	½"ø	8	36'-4"	35'-0"		2"	2"	I
L40	½"ø	29	14'-0"	5'-7½"	1'-1½"			II
L41			10'-4"	2'-5½"	2'-5½"			
to	½"ø	2 Each	by 1½" to	by ⅜" to	by ⅜" to			II
L71			14'-1"	3'-4¾"	3'-4¾"			
P20	1"ø	8	38'-9"	36'-1"		4"	3½"	I
P21	1"ø	12	11'-6"					III
P22	½"ø	37	10'-0"	3'-1½"	1'-7½"			II
W5	⅝"ø	80	10'-7"	8'-11"		2½"	2"	I
W6	1"ø	32	8'-4"					IV

SUMMARY FOR PIER NO. 5 (PIER NO. 6 IS SAME)

1952 Lin. Ft. of 1"ø bars @ 3.400 Lb. per Lin. Ft.	=	6637 Lb.
847 " " " ⅝"ø " " 1.043 " " " "	=	883 "
1824 " " " ½"ø " " 0.850 " " " "	=	1550 "
+1% ± For over run	=	90 "
TOTAL	=	9160 "

BENDING DIAGRAMS



REFERENCE DRAWINGS
For list of reference drawing see sheet No. 3

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE. VIADUCT
DETAILS OF
PIER NO. 5 & PIER NO. 6
DETAILS OF BLAST BOARDS

Across D & R G W R R
Sta. 33+32.0 to 36+92.71
Near GRAND JCT. Sec. 15 T. 1 S R. 1 W

Designed by K.B. H.W.P.
Made by A.Y.F.
Checked by H.W.P.

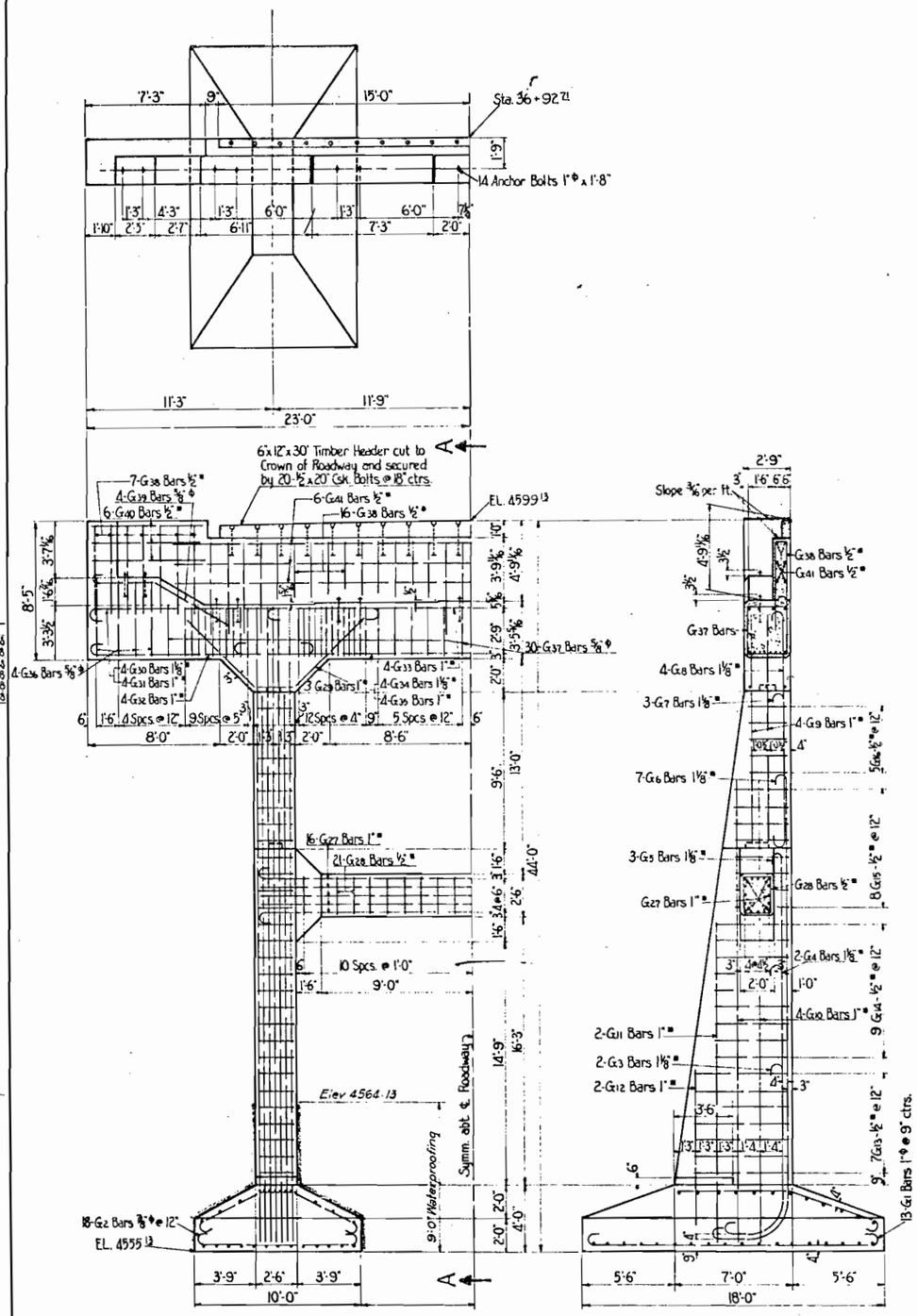
Approved by C. H. Bailey
Bridge Engineer
Date: Oct. 5th, 1938.

STRUCTURE NO. H-2-N

REVISIONS

10-17-38 W.H.D. added waterproofing

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19A(1)	12	

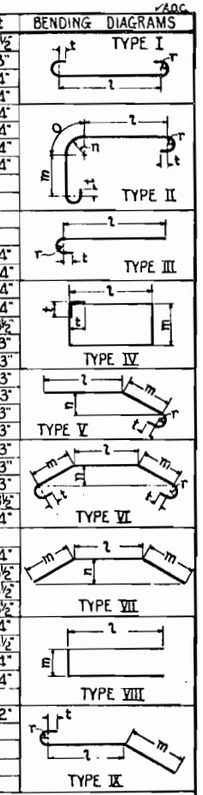


	Initial	Date
Designed By	W.W.D.	9-10-38
Checked By	H.W.P.	9-21-38
Drawn By	W.W.D.	9-16-38
Checked By	H.W.P.	9-21-38
Traced By	C.B.M.	9-27-38
Checked By	H.W.P.	9-28-38

BAR LIST FOR ABUTMENT Nº 7

MARK	SIZE	Nº REQD	LENGTH	TYPE	l	m	n	o	r	t
G1	1"Φ	26	19'-4"	I	16'-8"				4"	3½"
G2	⅞"Φ	36	11'-1"	I	8'-9"				3½"	3"
G3	1⅛"■	4	15'-0"	II	7'-9"	1'-0"	2'-1"	3'-3"	4½"	4"
G4	1⅛"■	4	21'-0"	II	13'-9"	1'-0"	2'-1"	3'-3"	4½"	4"
G5	1⅛"■	6	27'-9"	II	20'-6"	1'-0"	2'-1"	3'-3"	4½"	4"
G6	1⅛"■	14	33'-10"	II	25'-3"	1'-9"	2'-5"	3'-10"	4½"	4"
G7	1⅛"■	6	11'-6"	I	8'-6"				4½"	4"
G8	1⅛"■	8	16'-6"	I	13'-6"				4½"	4"
G9	1"■	8	14'-0"	STR.						
G10	1"■	8	28'-0"	"						
G11	1"■	4	19'-6"	"						
G12	1"■	4	10'-6"	"						
G13	½"■	14	16'-2"	IV	5'-7½"	2'-1½"				4"
G14	½"■	18	13'-8"	IV	4'-4½"	2'-1½"				4"
G15	½"■	16	11'-2"	IV	3'-1½"	2'-1½"				4"
G16	½"■	10	9'-4"	IV	2'-2½"	2'-1½"				4"
G17	1"Φ	16	13'-4"	V	6'-9"	5'-3"	1'-9"		4"	3½"
G18	⅞"Φ	4	13'-2"	V	8'-6"	3'-6"	1'-2"		3½"	3"
G19	⅞"Φ	4	13'-2"	V	10'-3"	1'-9"	0'-7"		3½"	3"
G20	⅞"Φ	4	13'-2"	III	12'-0"				3½"	3"
G21	⅞"Φ	14	11'-11"	VI	2'-3"	3'-8"	1'-9"		3½"	3"
G22	⅞"Φ	2	11'-10"	VI	3'-8"	2'-11"	1'-5"		3½"	3"
G23	⅞"Φ	2	11'-7"	VI	4'-11"	2'-2"	1'-1"		3½"	3"
G24	⅞"Φ	2	11'-5"	VI	6'-3"	1'-5"	0'-8"		3½"	3"
G25	⅞"Φ	2	11'-5"	VI	7'-7"	0'-9"	0'-4"		3½"	3"
G26	⅞"Φ	2	11'-1"	I	8'-9"				3½"	3"
G27	1"■	16	27'-4"	I	24'-8"				4"	3½"
G28	½"■	21	8'-2"	IV	1'-7½"	2'-1½"				4"
G29	1"■	6	13'-9"	VII	2'-3"	5'-9"	4'-0¾"			
G30	1⅛"■	8	19'-8"	I	16'-8"				4½"	4"
G31	1"■	8	19'-4"	I	16'-8"				4"	3½"
G32	1"■	8	15'-6"	I	12'-10"				4"	3½"
G33	1"■	4	26'-2"	I	23'-6"				4"	3½"
G34	1⅛"■	4	30'-6"	I	27'-6"				4½"	4"
G35	1"■	4	30'-2"	I	27'-6"				4"	3½"
G36	⅝"Φ	8	14'-6"	IV	4'-6"	2'-5"				4"
G37	⅝"Φ	60	11'-4"	IV	2'-11"	2'-5"				4"
G38	½"■	46	11'-7"	VIII	5'-6"	0'-7"				
G39	⅝"Φ	8	9'-4"	IX	3'-6"	5'-0"			2½"	2"
G40	½"■	12	6'-9"	STR.						
G41	½"■	6	36'-0"	"						

BENDING DIAGRAMS



1265	Lin. Ft.	1⅛"■ @ 4.303#/Ft.	=	5443 Lbs.
1480	" "	1"■ @ 3.400#/Ft.	=	5032 "
716	" "	1"Φ @ 2.670#/Ft.	=	1912 "
839	" "	⅞"Φ @ 2.044#/Ft.	=	1715 "
871	" "	⅝"Φ @ 1.043#/Ft.	=	908 "
1746	" "	½"■ @ 0.850#/Ft.	=	1484 "
		1% Overrun	=	166 "
		TOTAL	=	16660 Lbs.

REFERENCE DRAWINGS

FOR REFERENCE DRAWINGS SEE SHEET 3

STRUCTURE NO. H-2-N

COLORADO
STATE HIGHWAY DEPARTMENT
GRAND AVE. VIADUCT
DETAILS OF ABUTMENT Nº 7

Across D. & R.G.W. RR
Sta. 33+32.0 to 36+92.71
Near GRAND JUNCTION Sec. 15 T. 1S R. 1W

Designed by W.W.D.
Made by C.B.M.
Checked by

Approved by P. L. Bailey
Bridge Engineer
Date: Oct. 5th, 1938.

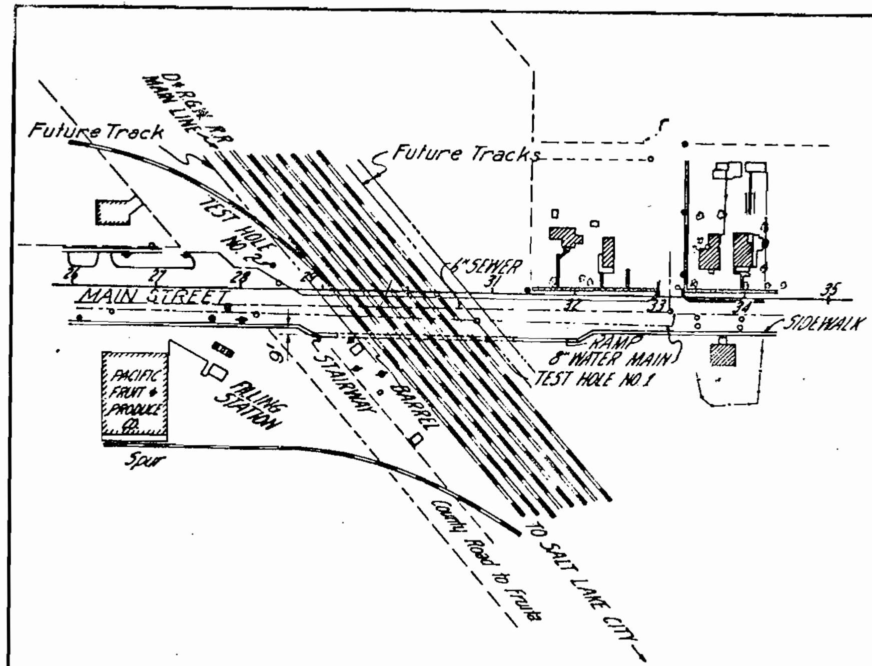
TRIM LINE

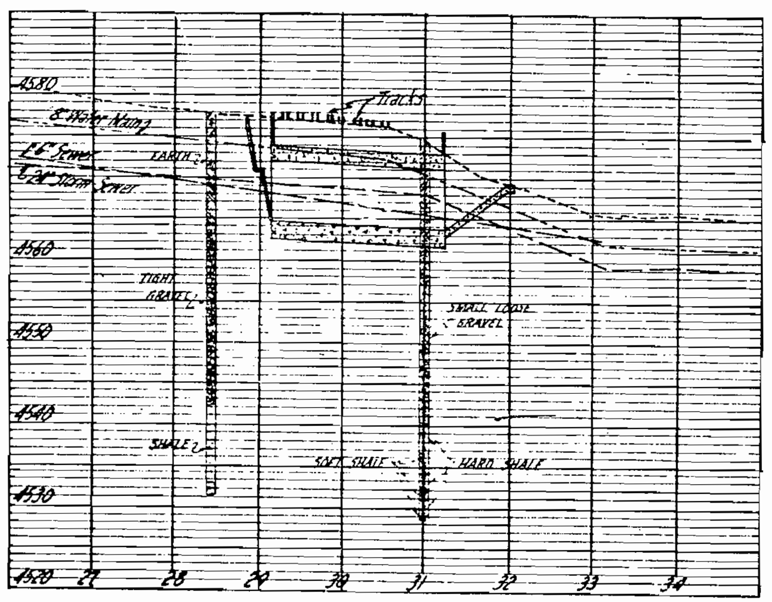
REVISIONS

10-26-38 W.W.D. Concrete Quantities
11-30-38 W.W.D. added paint notes.

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	13	

Revised as constructed 12-28-39 W.W.D.





GENERAL LAYOUT

Designed By	H.W.P.	8-38
Checked By		
Drawn By		
Checked By	A.D.C.	8-38
Traced By	A.J.C.	9-17-38
Checked By	A.O.C.	9-17-38

BAR LIST FOR STAIRS & RAMP

MARK	SIZE	NO.	LENGTH	TYPE	l	r	t
U1			2'-6"				
to	⅝"φ	2 each	by 1'-9" to	Str.			
U6			11'-3"				
U7			16'-0"				
to	⅝"φ	2 each	by 1'-1" to	Str.			
U13			26'-6"				
U14	⅝"φ	16	31'-4"	Str.			
U17	⅝"φ	6	6'-0"	Str.			
U18	⅝"φ	6	15'-0"	Str.			
U19	⅝"φ	8	28'-0"	Str.			
U20	⅝"φ	46	38'-6"	Str.			
V1			11'-0"		0'-8"		
to	¾"φ	1 each	by 1'-1" to	II	by 6½" to		
V11			21'-10"		6'-3"		
V12	¾"φ	5	22'-10"	II	6'-9"		
V13			23'-4"		7'-0"		
to	1"φ	1 each	by 6½" to	II	by 3¼" to		
V36			35'-9½"		13'-2¾"		
V37	½"φ	163	9'-6"	III	8'-2"	2"	2"
V39			32'-8"		11'-8"		
to	¾"φ	4 each	by 8" to	II	by 4" to		
V50			25'-4"		8'-0"		
V51			24'-8"		7'-8"		
to	¾"φ	3 each	by 9" to	II	by 4½" to		
V60			17'-11"		4'-3½"		
V61			17'-4"		4'-0"		
to	⅝"φ	2 each	by 8" to	II	by 4" to		
V72			10'-0"		0'-4"		
H1	⅜"φ	52	9'-1"	IV			
H2	½"φ	104	2'-10"	V			

BAR LIST FOR BARREL

✓A.T.K.

MARK	SIZE	NO.	LENGTH	TYPE	l	r	t
U15	½"φ	8	8'-9"	I	5'-2"	2"	2"
U16	½"φ	300	23'-6"	Str.			
U21	½"φ	8	7'-1"	I	3'-6"	2"	2"
V38	⅞"φ	938	10'-3"	III	7'-11"	3½"	3"
W1	¾"φ	470	12'-4"	III	10'-4"	3"	2½"

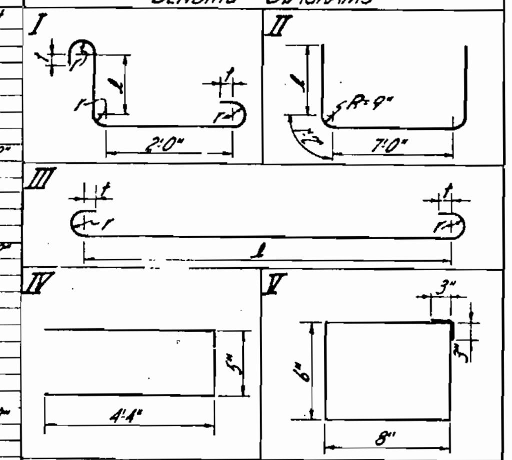
SUMMARY FOR STAIRS & RAMP

3035 Lin. Ft. ¾"φ @ 1.502 #/ft = 4559#
328 " " ⅝"φ @ 1.043 " = 342#
472 " " 9/16"φ @ 0.850 " = 401#
4551 " " ½"φ @ 0.668 " = 3040#
291 " " ⅜"φ @ 0.376 " = 109#
+1% Overrun = 89#
TOTAL = 8540 Lbs.

SUMMARY FOR BARREL

9615 Lin. Ft. ⅞"φ @ 2.044 #/ft = 19 653#
5795 " " ¾"φ @ 1.502 " = 8704#
7177 " " ½"φ @ 0.668 " = 4794#
+1% Overrun = 329#
TOTAL = 33,480 Lbs

BENDING DIAGRAMS



SUMMARY OF QUANTITIES

✓A.J.C. ✓T.B.

ITEM	DESCRIPTION	UNIT	STRWY & RAMP	BARREL	TOTAL
14b	Structural Excavation Dry Common	Cu. Yd.	245.7	1,249.7	1,495.4
14d	do do Wet Common	Cu. Yds.	28.4	233.1	261.5
46a	Class "A" Concrete	Cu. Yd.	93.24	404.7	497.94
⊖ 46px	Waterproof Cement Paint (Mastertex or equal)	Lbs	100	340	440
47	Reinforcing Steel (Includes 1% Overrun)	Lb	8 570	33 450	42 020
† 70x	4" Vitrified Tile Underdrain	Lin. Ft.		510	510
71x	6" Vitrified Clay Pipe Drain	Lin. Ft.	150		150
79a	Water-Gas Tar Waterproofing	Sq. Yd.	118.8	647	765.8
79b	Membrane Waterproofing	"	145	330	475
80c	Sheet Copper (38 oz per sq. ft.)	Lb	550	1 946.5	2496.5
90	¾"φ Electric Conduit	Lin. Ft.	60	230	290
90b	Pit Lights - No. 5720 Benjamin or equal	Each	2	5	7
91x	2½" Pipe Railing with ¾" vertical bars	Lin. Ft.	211.44		211.44
91y	1¼" Pipe Railing	Lin. Ft.	224.52		224.52
*	¾" Expansion Joint Mat'l	Sq. Ft.		205	205
*	3 Ply Roofing Paper	"	15		15

* To be included in bid price of Class "A" Concrete
† Includes 6-4" Tile elbows and 6-4" Tile Tees for floor Drains with Gratings.

⊖ The paint must contain correct ingredients to properly combine the foreign lime salts insuring preservation of the original paint color and protect the surface from corrosion.

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department Adopted June 1, 1937.

All concrete shall be Class "A".

All exposed surfaces shall be rubbed free of form marks.

All walls shall have forms on both sides. Inside walls and ceiling of the underpass and approaches must be formed with Panel Board or Plywood, and receive a class I surface finish.

All construction joints shall be thoroughly cleaned before fresh concrete is poured.

All reinforcing bars shall be deformed.

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

Secondary bars when spliced shall be given a lap of 30 diameters.

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 engineer will inspect and determine if redesign is necessary.

The use of additional construction joints undesirable. Should field conditions require construction joints may be made on a vertical plane perpendicular to the centerline of the underpass, and shall have keys as shown.

Supporting soils for the underpass must be of firm and uniform material throughout.

All backfilling in approaches to and over underpass shall be laid in layers not exceeding 6" in depth and each Layer shall be rolled or hand tamped where inaccessible to roller; also moisten when necessary.

REFERENCE DRAWINGS
Sheet No. 14 Details of Underpass.
Sheet No. 15 Temporary R.R. Trestle.

APPROVED Oct 10, 1938
DATE
BY Arthur Ridgway
CHIEF ENGINEER D.&R.G.W. R.R.

A.R.E.A. SPECIFICATIONS - 1935
E-75 Loading Impact 75%
Allowable Stresses (2000# Concrete)
f_c = 650#/□" u = 120
f_s = 16000 v = 60

STRUCTURE NO. H-2-a

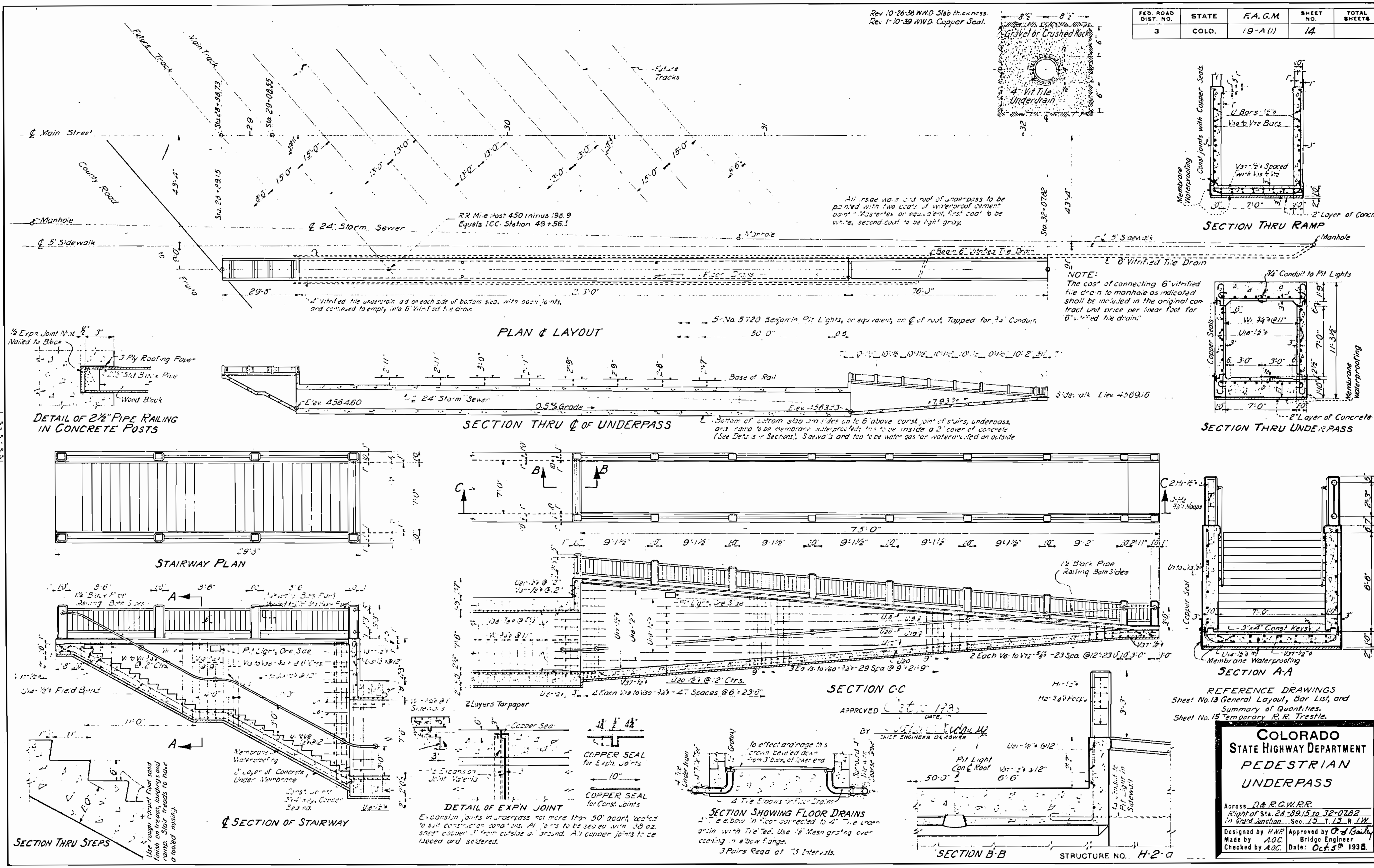
COLORADO
STATE HIGHWAY DEPARTMENT

PEDESTRIAN UNDERPASS

Under D.&R.G.W. R.R. Tracks
Right of Sta. 28+89.15 to 32+08.82
In GRAND JUNCTION Sec. 15 T. 1 S. R. 1 W.

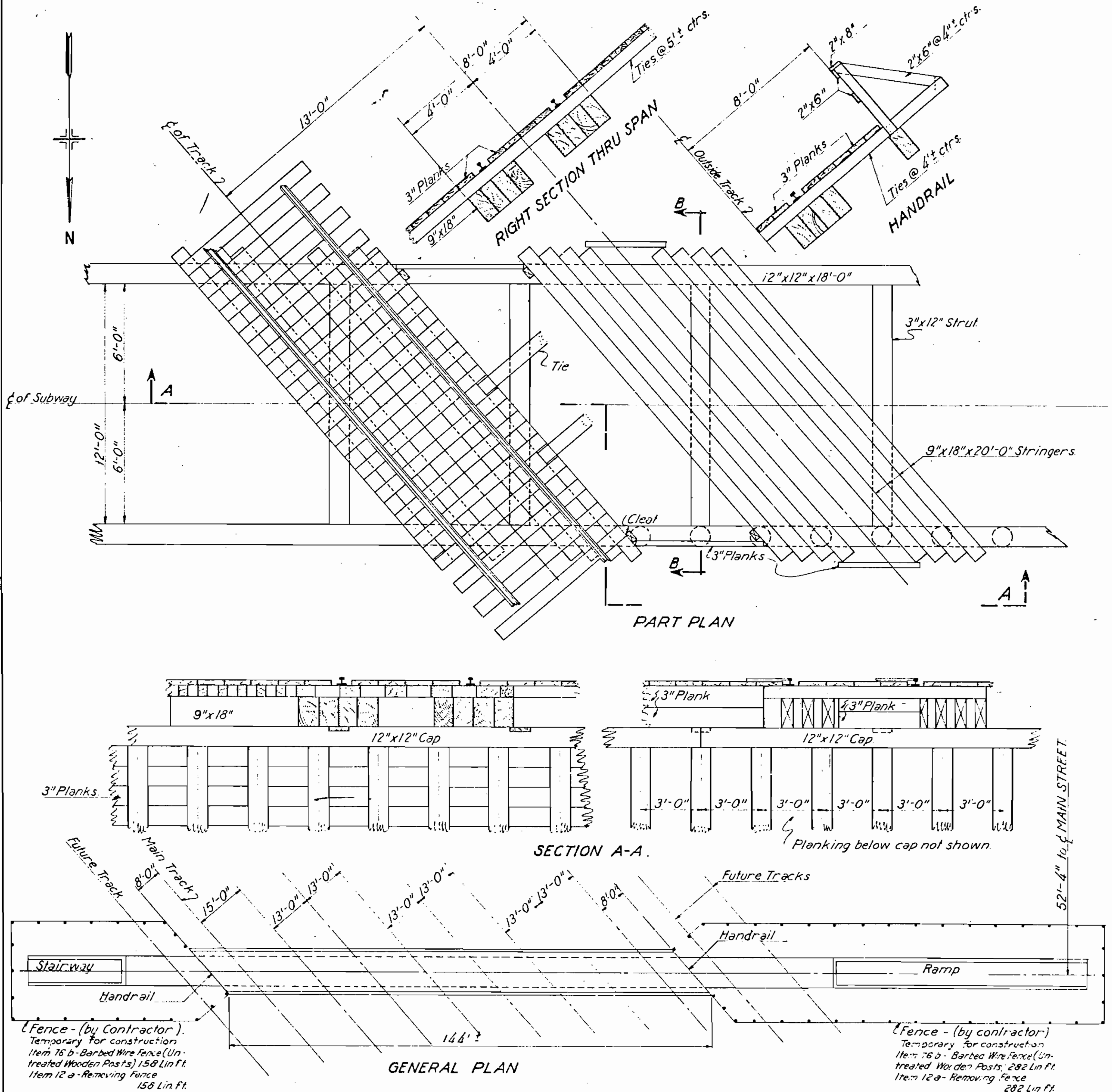
Designed by	Approved by O.J. Bailey
Made by	Bridge Engineer
Checked by	Date: Oct. 5th, 1938.

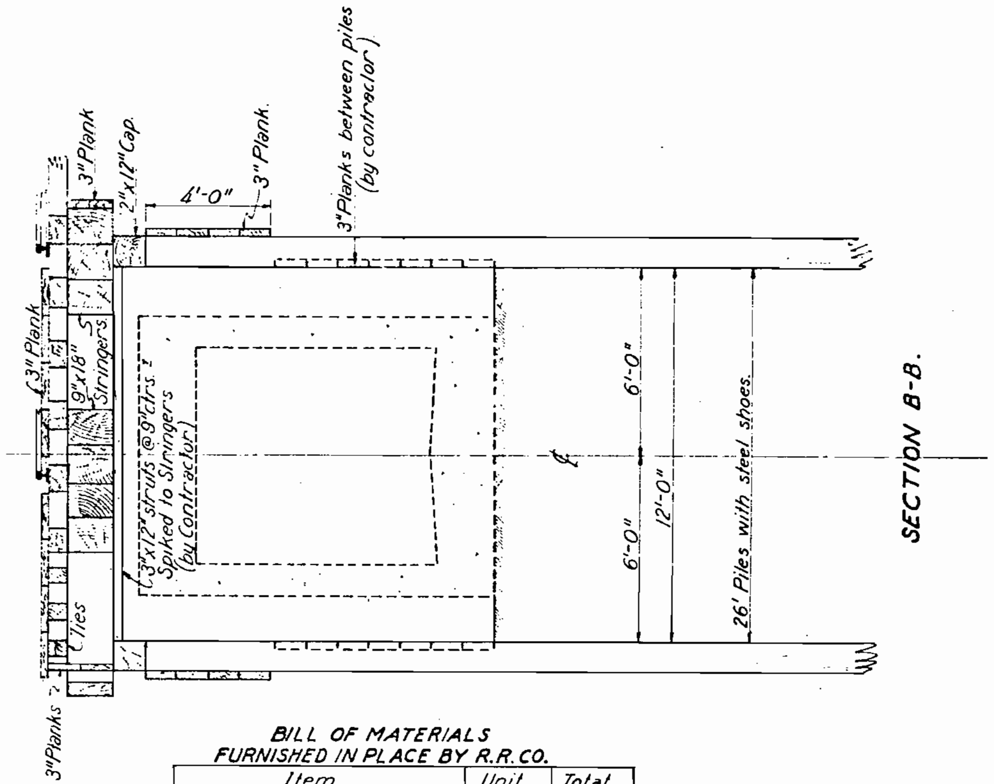
TRIM LINE


REVISIONS
Rev. 10-26-38 W.W.D. Slab thickness.
Rev. 1-10-39 W.W.D. Copper Seal.
FED. ROAD DIST. NO. 3 | STATE COLO. | F.A.G.M. 19-A(1) | SHEET NO. 14 | TOTAL SHEETS
Future Track
Main Track
Future Tracks
℄ Main Street
County Road
Manhole
℄ 24" Storm Sewer
℄ 5' Sidewalk
R.R. Mile Post 450 minus 198.9 Equals ICC Station 49+56.1
Gravel or Crushed Rock
4" Vit Tile Underdrain
All inside walls and roof of underpass to be painted with two coats of waterproof cement paint - "Vossertex" or equivalent, first coat to be white, second coat to be light gray.
NOTE: The cost of connecting 6" vitrified tile drain to manhole as indicated shall be included in the original contract unit price per linear foot for 6" vitrified tile drain.
4" Vitrified tile underdrain laid on each side of bottom slab, with open joints, and continued to empty into 6" Vitrified tile drain.
5-No. 5720 Benjamin Pit Lights, or equivalent, on ℄ of roof, Tapped for 3/4" Conduit.
PLAN ℄ LAYOUT
SECTION THRU RAMP
Membrane Waterproofing
Const. joints with Copper Seals
2" Layer of Concrete
3/4" Conduit to Pit Lights
Copper Seals
SECTION THRU UNDERPASS
DETAIL OF 2½" PIPE RAILING IN CONCRETE POSTS
3 Ply Roofing Paper
Wood Block
Base of Rail
24" Storm Sewer
Elev. 4564.60
0.5% Grade
Elev. 4563.53
Sidewalk Elev. 4569.16
SECTION THRU ℄ OF UNDERPASS
Bottom of bottom slab and sides up to 6" above const. joint of stairs, underpass, and ramp to be membrane waterproofed; this to be inside a 2" cover of concrete (See Details in Sections). Sidewalls and top to be water gas tar waterproofed on outside.
STAIRWAY PLAN
1½" Black Pipe Railing Both Sides
SECTION C-C
SECTION A-A
Membrane Waterproofing
Copper Seal
℄ SECTION OF STAIRWAY
SECTION THRU STEPS
Use rough carpet float sand finish on treads, landings and ramp. Stair treads to have a tooled nosing.
2 Layers Tarpaper
Copper Seal
DETAIL OF EXP'N JOINT
Expansion joints in underpass not more than 50' apart, located to suit construction conditions. All joints to be sealed with 16 oz. sheet copper 3" from outside all around. All copper joints to be lapped and soldered.
COPPER SEAL for Exp'n Joints
COPPER SEAL for Const. Joints
SECTION SHOWING FLOOR DRAINS
4" Tile Elbows for Floor Drains
3 Pairs Req'd at 75 Intervals.
Pit Light on ℄ Roof
SECTION B-B
STRUCTURE NO. H-2-a
APPROVED
CHIEF ENGINEER
REFERENCE DRAWINGS
Sheet No. 13 General Layout, Bar List, and Summary of Quantities.
Sheet No. 15 Temporary R.R. Trestle.
COLORADO
STATE HIGHWAY DEPARTMENT
PEDESTRIAN UNDERPASS
Across D.& R.G.W.R.R.
Right of Sta. 28+89.15 to 32+07.82
in Grand Junction Sec. 15 T. 1S R. 1W
Designed by H.W.P.
Made by A.O.C.
Checked by A.O.C.
Approved by Bridge Engineer
Date: Oct. 5th 1938.

REVISIONS

FED. ROAD DIST. NO.	STATE	F.A.G.M.	SHEET NO.	TOTAL SHEETS
3	COLO.	19A-1	15	





BILL OF MATERIALS
FURNISHED IN PLACE BY R.R. CO.

Item	Unit	Total
100 Timber Piles 26' long	Lin. Ft.	2600
Oregon Untreated rough	M.ft.b.m.	18
Colorado " "	M.ft.b.m.	12
100 Steel Pile Point	Each	100
Spikes, Drift pins, etc	lb.	1200

APPROVED [signature] DATE
BY [signature] CHIEF ENGINEER D&RGWRR

REFERENCE DRAWINGS
Sheet No. 13 General Layout, Bar List, Summary of Quantities.
Sheet No. 14 Details of Underpass.

NOTES

Caps and Stringers untreated Oregon fir. All other timber untreated Colorado.
Piles and all timber above 7 ft. below base of rail, except 3"x12" Struts, furnished in place by R.R. Co.

Initial		Date
Designed By	H.W.P.	9-15-38
Checked By		
Drawn By	H.W.P.	9-15-38
Checked By		
Traced By	D.McD.	9-20-38
Checked By	A.O.C.	9-20-38

STRUCTURE NO. H-2-a

COLORADO
STATE HIGHWAY DEPARTMENT

PEDESTRIAN UNDERPASS
FALSE WORK

Across D.&R.G.W.R.R.
Sta. 28+89.15 to 32+06.82
Near GRAND JCT. Sec 15 T 1 S R 1 W.

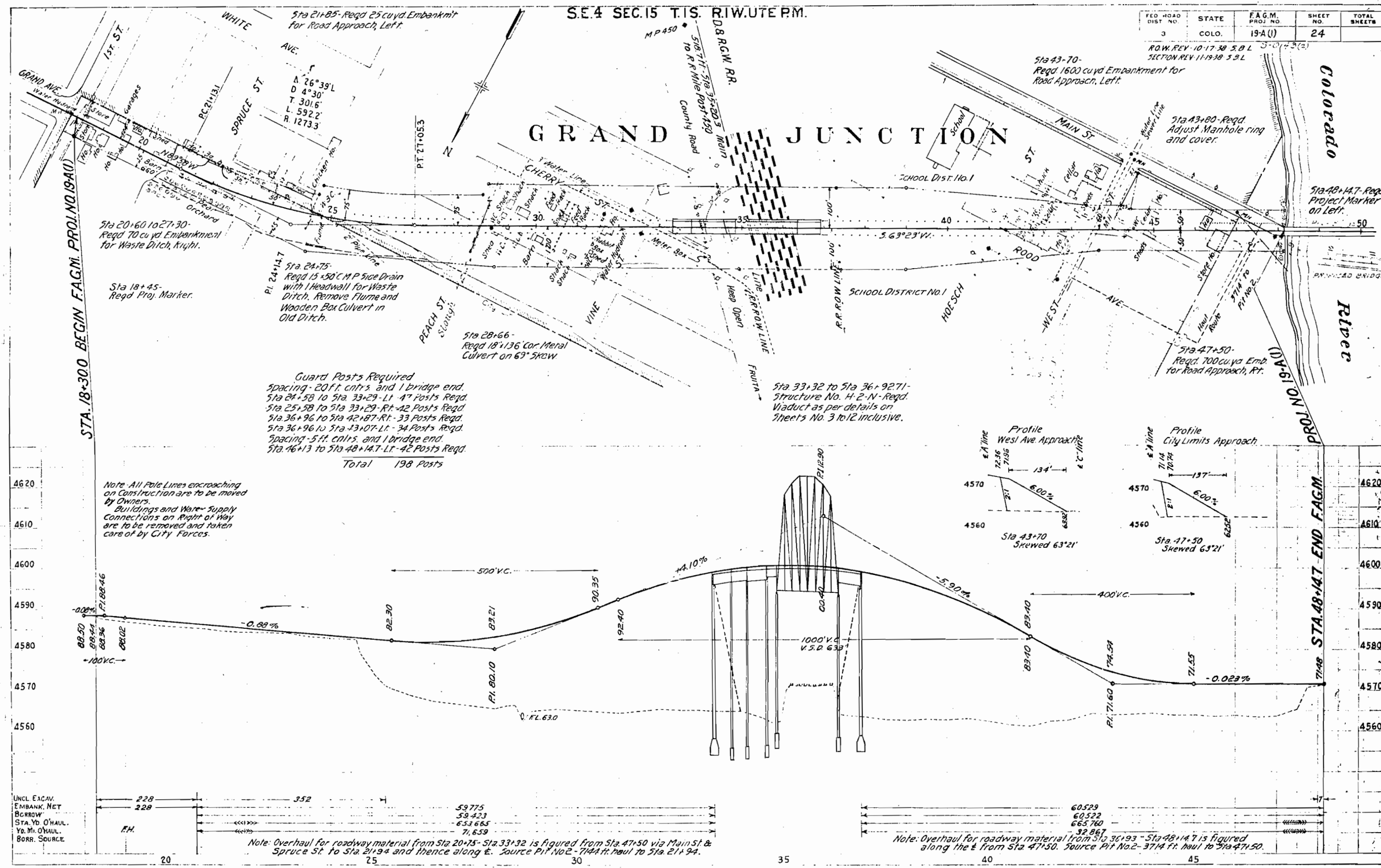
Designed by H.W.P. Approved by G.J. Bailey
Made by D.McD. Bridge Engineer
Checked by Date: Oct 5th, 1938.

TRIM LINE

S.E.4 SEC.15 T.1S. R.1W.UTE P.M.

FED. ROAD DIST. NO.	STATE	F.A.G.M. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	19-A(1)	24	

R.O.W. REV. 10-17-38 S.B.L.
SECTION REV. 11-19-38 S.B.L.



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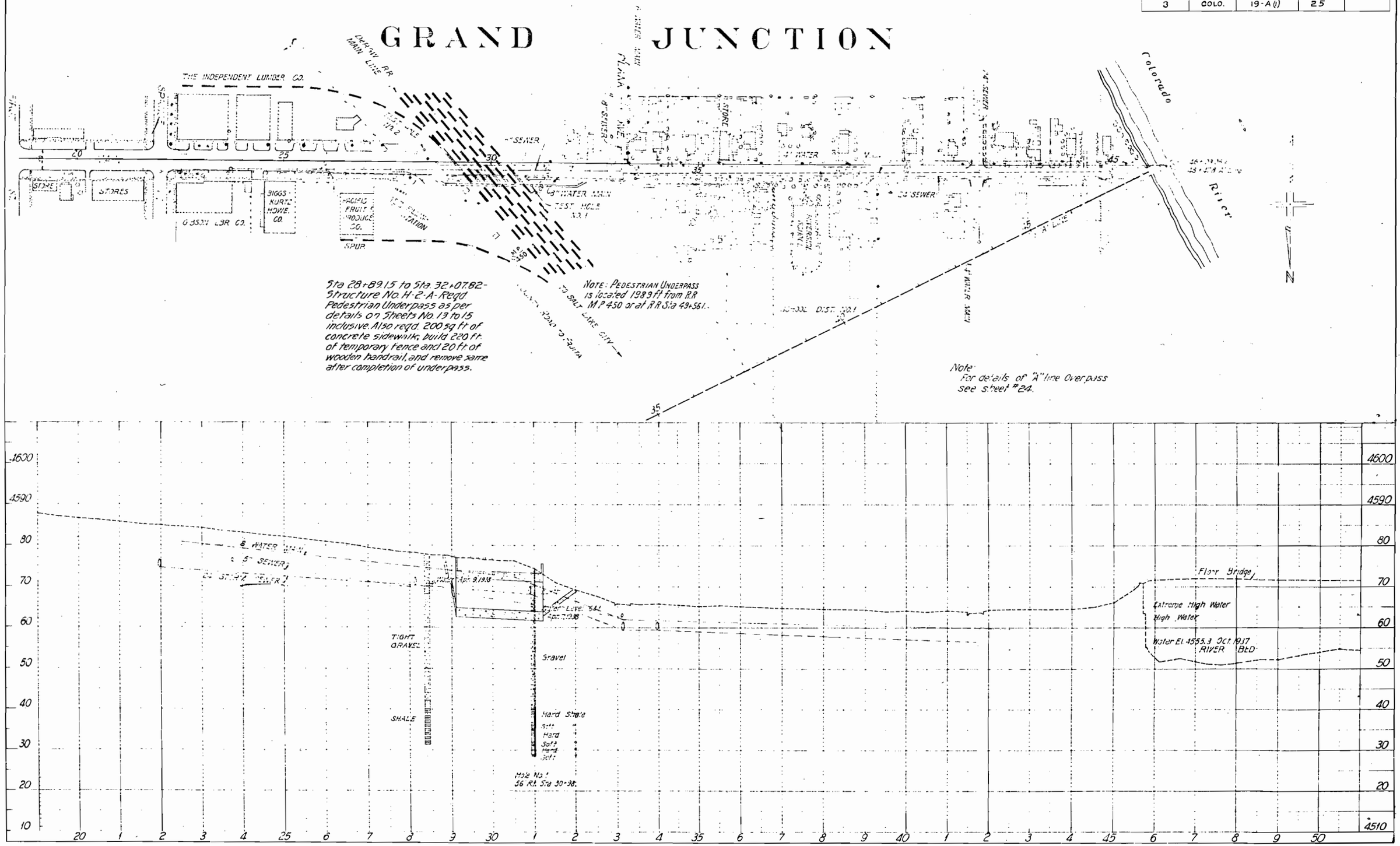
GRAND JUNCTION