FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	NRM9E	1	

Rev. 11-7-33-R.L.

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NRM 9 E
STATE HIGHWAY NO. 16
LARIMER COUNTY

INDEX OF SHEETS

Sheet No 1. - Title Sheet.
" " 2. - Typical Section and Summary
" 3 to 5. - Details for R.R. Overpass
" No. 6. - " " Retaining Wall
" " 7 - Wire Cable Guard Fence & Details of East Abutment.
" " 8 - Standard Superelevation Method M-1-A
" " 9 - " Wire Fences M-27-A
" " 10 - Plan & Profile Sheet
" 11 to 14 - Cross Sections

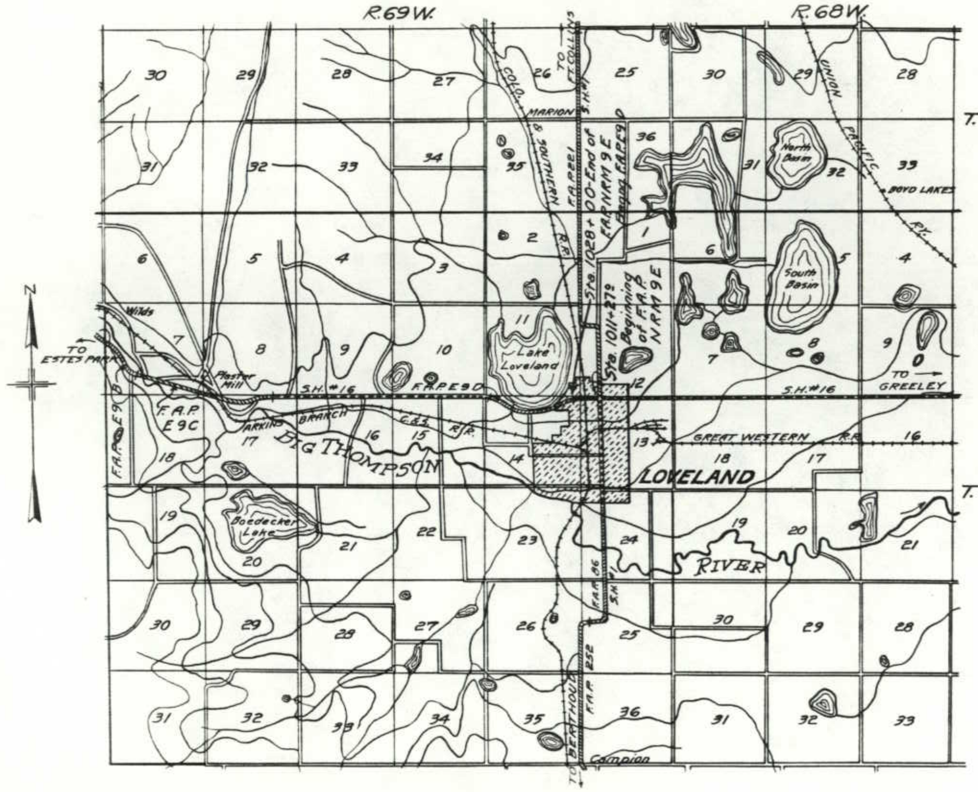
CONVENTIONAL SIGNS

Survey Line 1025
Right of Way Line
Section Line
Fence Line
Railroad
Pole Line

SCALES

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 : 1673.0 FT. = 0.316 MI.
NET LENGTH OF PROJECT : 1593.0 FT. = 0.301 MI.



Scale 1 Inch = 1 Mile

RECOMMENDED FOR APPROVAL 10/4/33

J.E. Maloney
ASSISTANT ENGINEER

APPROVED

Chas. D. Vail
STATE HIGHWAY ENGINEER

RECOMMENDED FOR APPROVAL

[redacted]
DIST. ENG. BUREAU PUBLIC ROADS

RECOMMENDED FOR APPROVAL

[redacted]
CHIEF ENG. BUREAU PUBLIC ROADS

APPROVED

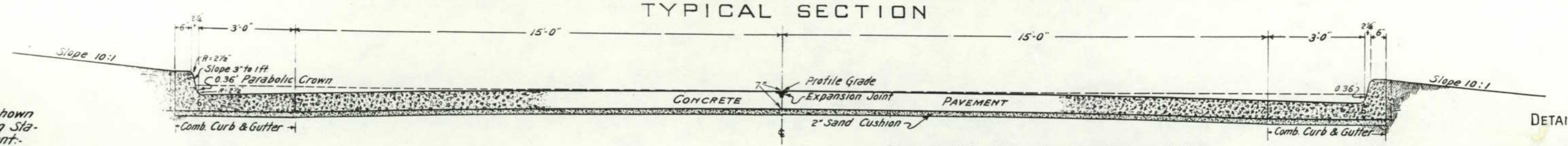
[redacted]
DIRECTOR BUREAU PUBLIC ROADS

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
1	COLO	N.R.M. 9 E	2	

Revised 11/7/33 by BR - R.R. Overpass Quantities
Rev. 37a, 42a, 46a, 47, 71C 3-27-34 H.O.W.

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

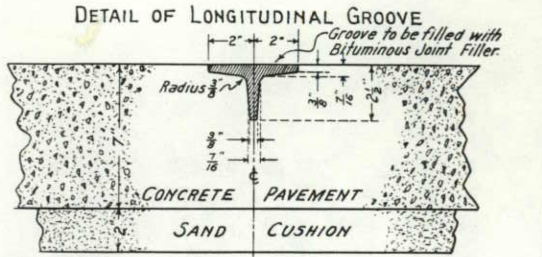
TYPICAL SECTION



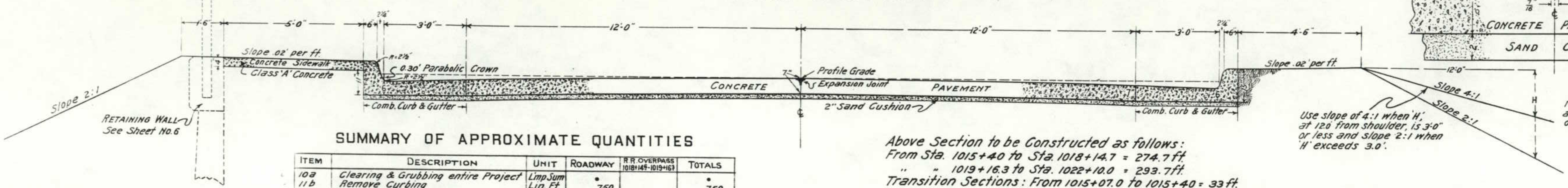
Note: The pavement sections as shown are to be modified near the following Stations to meet the existing pavement:-
STA. 1011+27; Sta. 1014+27; Sta. 1015+07.

Above Section to be Constructed as follows:
From Sta. 1011+27 to Sta. 1014+27 = 300 ft.
" " 1023+75 to " 1028+00 = 425 ft.

DETAIL OF LONGITUDINAL GROOVE



TYPICAL SECTION



Note:- ½" Expansion Joints are required to be placed 60 ft. apart, at right angles to the center line of the pavement.

Above Section to be Constructed as follows:
From Sta. 1015+40 to Sta. 1018+14.7 = 274.7 ft.
" " 1019+16.3 to Sta. 1022+10.0 = 293.7 ft.
Transition Sections: From 1015+07.0 to 1015+40 = 33 ft.
and from 1022+10.0 to 1023+75 = 165 ft.

GENERAL NOTES

This Project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted January 1, 1930.

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 Typical Section either noted on Profile as "Borrow" or on Structure Tabulation 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 met in construction.

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

Excavation required in the construction of "Conc. Combination Curb & Gutter" and "Concrete Gutter" is included in the Cross Section quantities and is to be classified and paid for as "Unclassified Excavation."

Except as limited by the "Special Provisions", power equipment may be used on this Project.

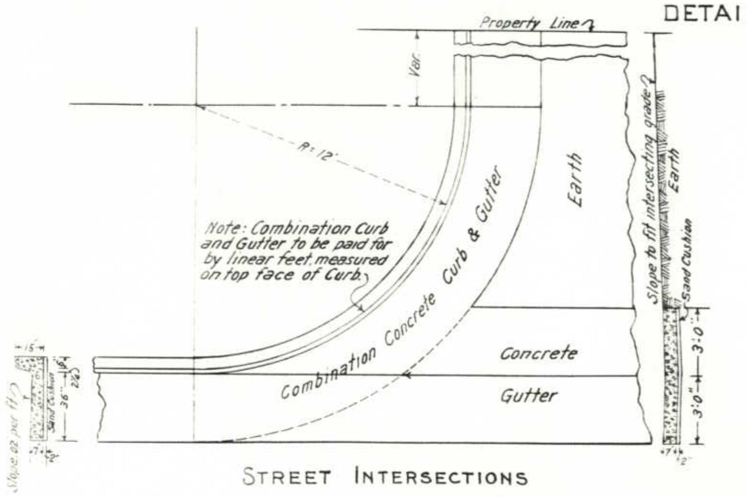
SUMMARY OF APPROXIMATE QUANTITIES

ITEM	DESCRIPTION	UNIT	ROADWAY	R.R. OVERPASS 1018+14⁷-1019+16³	TOTALS
10a	Clearing & Grubbing entire Project	Lmp Sum	•		•
11b	Remove Curbing	Lin. Ft.	750		750
11c	Removing 5-Mail Boxes	Lmp Sum	•		•
11d	Removing sidewalk, Sta. 1016+ & 1020+	" "	•		•
12a	Removing fence	Lin. Ft.	700		700
13c	Unclassified Excavation	Cu. Yds.	11,000		11,000
14a	Dry Rock Excavation, (Struct.)	Cu. Yds.		0 ~~25~~	25
14b	" Common " "	" "	480	469.0 ~~375~~	855
14c	Wet Rock " "	" "		0 ~~5~~	5
14d	" Common " "	" "		0 ~~5~~	5
18a	Station-Yard Overhaul	Sta. Yd.	97,000		97,000
18b	Yard Mile	Yd. Mi.	100		100
37a	Concrete Pavement	Sq. Yd.	4,370		4,370
37b	Sand Cushion	Cu. Yd.	425		425
42a	Untreated Bridge Timber	M.Ft.B.M.		—	—
46a	Class 'A' Concrete	Cu. Yd.	398	430.5 ~~426~~	824
47	Reinforcing Steel	Lbs	19,200	59040 ~~57,100~~	76300
48	Structural Steel	Lbs		73140 ~~76,100~~	76,100
62a	Precast Concrete Piling	Lin. Ft.		576	576
71b	Concrete Gutter	" "	340		340
71c	Conc. Combin. Curb and Gutter	" "	2,700		2,700
72x	Wire Cable Guard Fence, in Fill.	" "	660		660
72y	" " " " , in Wall	" "	416		416
75x	Galv. Barbed Wire Fence (Met. Posts)	" "	600		600
82	Sheet Copper	Lbs		184 ~~180~~	180
84	Removal of Disused Bridge	Lmp Sum		•	•
88a	Asbestos Wood Blast Protect. Board	Sq. Ft.		480	480
89	Drain Pipe	Each		4	4
91	Electrical Conduit, 1" diam.	Lin. Ft.		360	360
92	Junction Boxes	Each		5	5
94a	Electric Light Posts	"		4	4
94b	Elec. Switch Control	"		1	1
95z	Walk Gates	"	2		2
101b	Boring holes to facilitate Pile driving	Lin. Ft.		266.8 ~~156~~	156

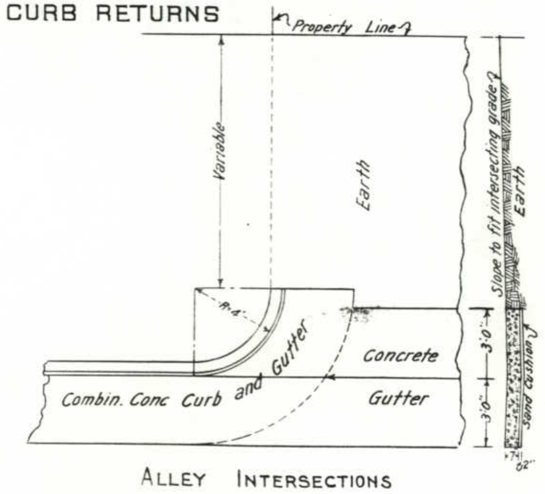
LIST OF STRUCTURES

LOCATION	DESCRIPTION	REMOVE STRUCTS.	REMOVE CURBING	STRUCT. EXCAV. Cu. Yds.				EMBANK.	Class 'A' CONC.	REINF. STEEL	COMB. CONC. Curb & Gutt.	CONC. GUTTER	W. CABLE G'D FENCE	REMOVE FENCE	BUILD B.W. FENCE	MISCELL.
STATIONS			Lin. Ft.					Cu. Yds.	Cu. Yd.	Lbs	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	
1011+27 to 1014+27	Comb. Curb & Gutter & Conc. Gutter										293	17				
" "	Remove Curbing		300													
1011+27 to 1014+27	Comb. Curb & Gutter & Conc. Gutter										228	75				
" "	Remove Curbing		300													
1015+07 to 1016+45	Remove Curbing		138													
1015+07 to 1018+14.7	Concrete sidewalk, 5'x310								19.2							
1015+07 to 1018+14.7	Comb. Curb & Gutter										555					
1015+44 to 1018+14	Wire Cable Guard fence, in fill.												270			
1016+65	Remove sidewalk	Rem. Sdwalk														
1016+65 to 1017+90	Barbed wire fence													135	120	
1016+65 to 1018+10	" " "													150	140	
1018+14⁷ to 1019+16³	Overpass - C. & S. Ry.			Quantities in Summary												
1018+15	Remove wire fence													30		
1019+16³ to 1020+39	Conc. comb. curb & Gutter: 138' sidewalk								8.6		118					
1019+16³ to 1022+30	Barbed wire fence													345	325	
1019+16³ to 1022+32	Conc. Comb. Curb & Gutter										290					
1019+17 to 1020+17	Wire Cable Guard fence, in fill												100			
1020+60	Conc. Gutter: Road approach							1,000				42				
1020+80 to 1020+90	Remove sidewalk	Rem. Sdwalk														
1020+80 to 1022+15	Conc. Sidewalk, 5'x140'								8.7							
1020+81 to 1022+32	Conc. Comb. Curb & Gutter										165					
1022+40	Conc. Gutter; Road approach							25				34				
1022+48 to 1023+84	Conc. Comb. Curb & Gutter										310					
1024+10	Conc. Gutter											104				
1024+36 to 1025+87	Conc. Comb. Curb & Gutter										165					
1024+36 to 1028+00	" " " "										389					
1025+95	" Gutter											17				
1026+03 to 1027+54	" Comb. Curb & Gutter										165					
1027+75	" Gutter; R'd approach							25				42				
1027+96 to 1028+00	" Comb. Curb & Gutter										19					
1015+40 to 1018+14⁷ 1020+82 to 1022+10	Conc. Wall and Gd. fence in wall						480		361.0	19,200						416' G'd fence in wall
1019+17 to 1022+07	Wire Cable Guard fence in fill.												290			
TOTALS			738				480	1,050	397.5	19,200	2697	331	660	660	585	416 G'd fence

DETAILS FOR CURB RETURNS



STREET INTERSECTIONS

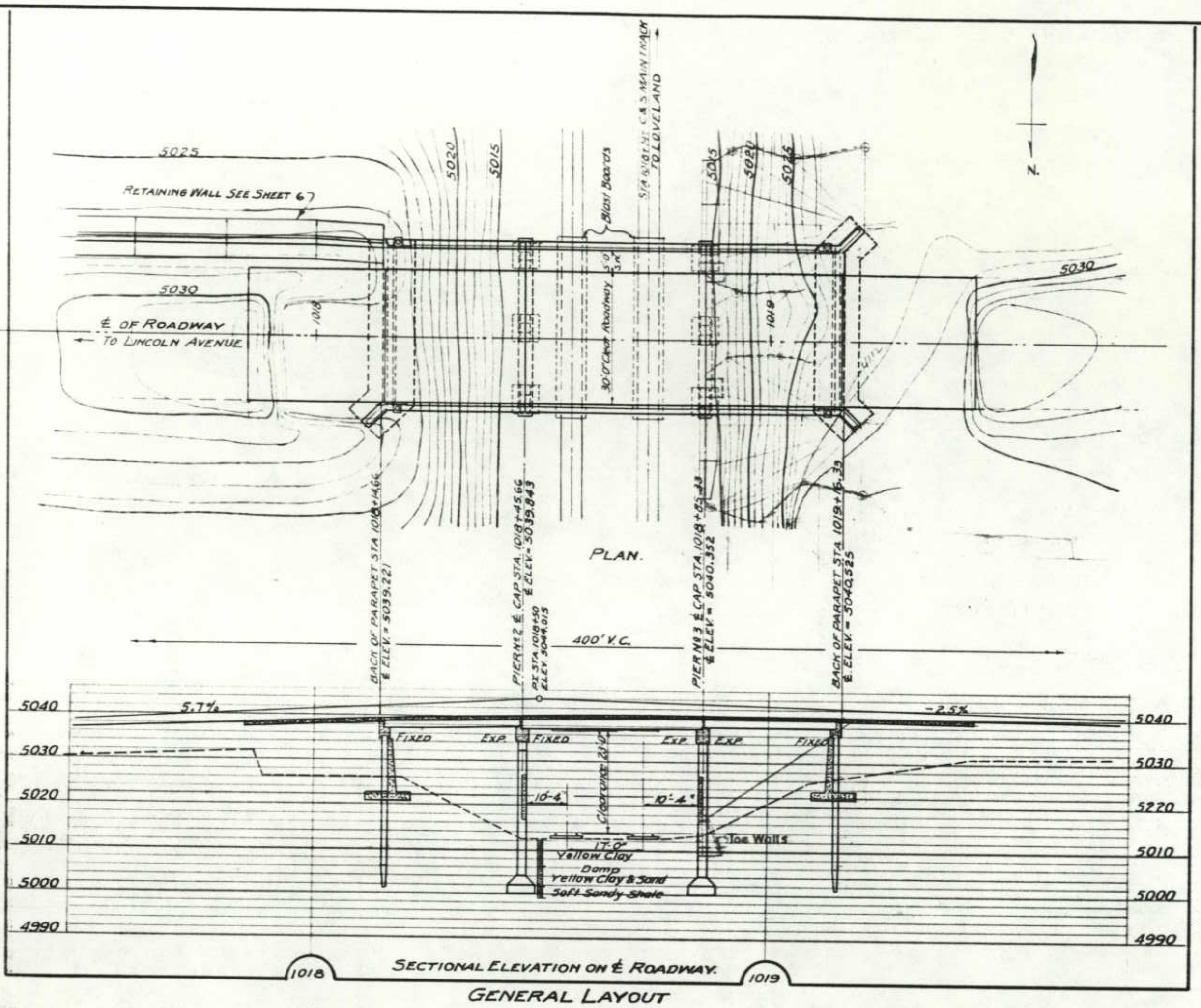


ALLEY INTERSECTIONS

Revised Quantities As Constructed. 5-17-38 R.A.D.

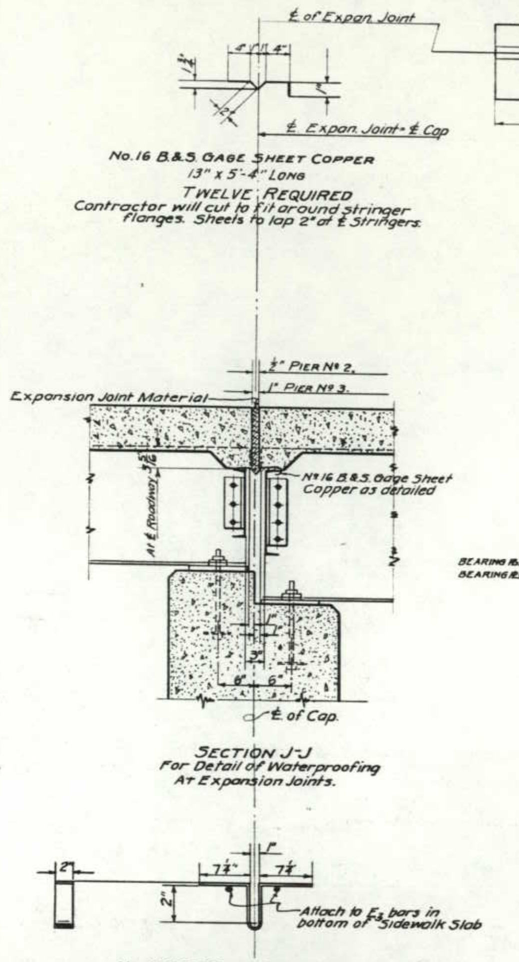
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO.	NRM. 9-E	3	

Revised 11/7/33 by B.R.-Abutments & Abut. Quantities Changed.
Revised 12-21-33 by W.B.M. End Dimensions on blast board frame
Revised 1-26-34 by H.E.S. Cl."A," Superstructure Quantities.
Revised 3-21-34 A.G.K. Added Approach Slabs
Revised 4-10-34 R.M.A. Shorten " Slabs, add Toe walls.



SECTIONAL ELEVATION ON ℄ ROADWAY.

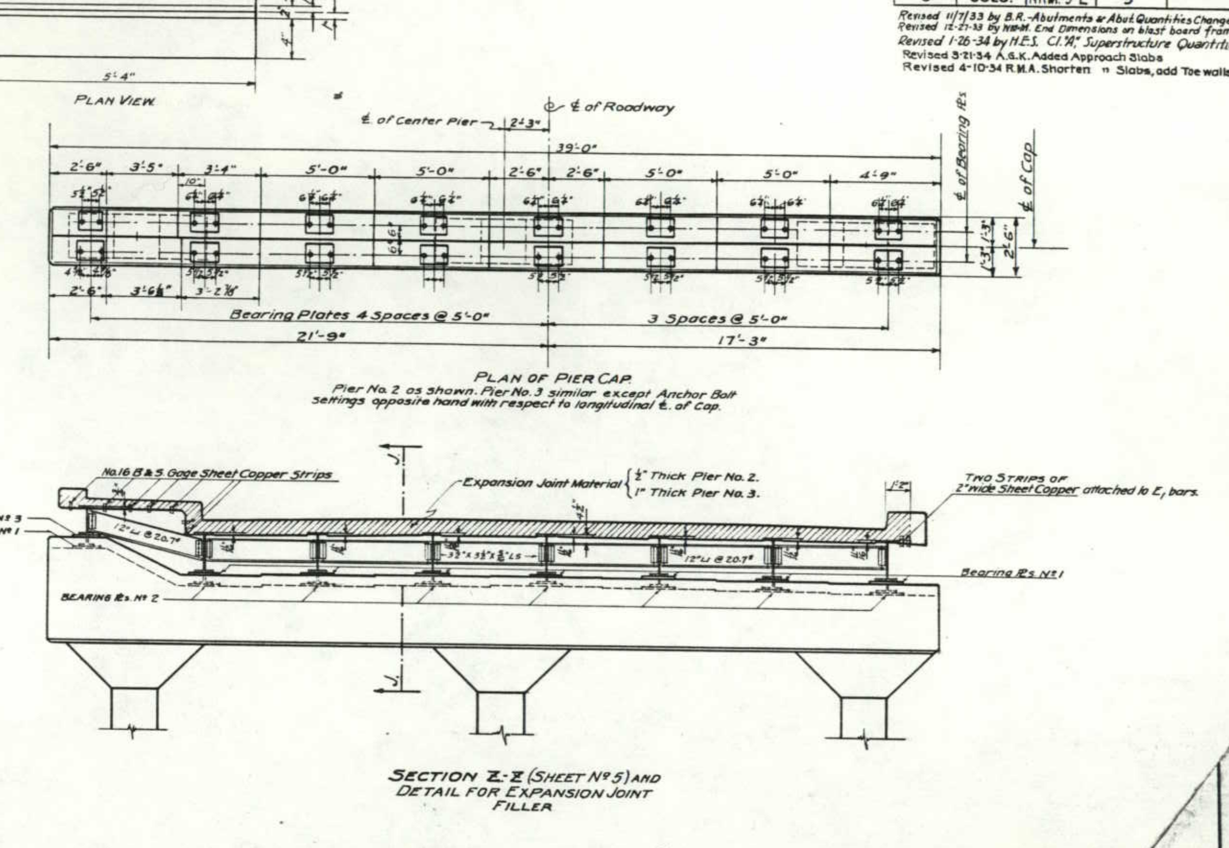
GENERAL LAYOUT



No. 16 B.&S. GAGE SHEET COPPER
13" x 5'-4" LONG
TWELVE REQUIRED
Contractor will cut to fit around stringer flanges. Sheets to lap 2" at ℄ Stringers.

SECTION J-J
For Detail of Waterproofing At Expansion Joints.

No. 16 B.&S. GAGE SHEET COPPER
STRIPS 2" x 1'-8" LONG
18 REQD. BENT AS SHOWN.



PLAN OF PIER CAP.
Pier No. 2 as shown. Pier No. 3 similar except Anchor Bolt settings opposite hand with respect to longitudinal ℄ of Cap.

SECTION Z-Z (SHEET No. 5) AND DETAIL FOR EXPANSION JOINT FILLER

REFERENCE DRAWINGS.
Abutments Nos. 1 & 4 Details – Sheet 5
Superstructure & Piers Nos. 1 & 2 – Sh

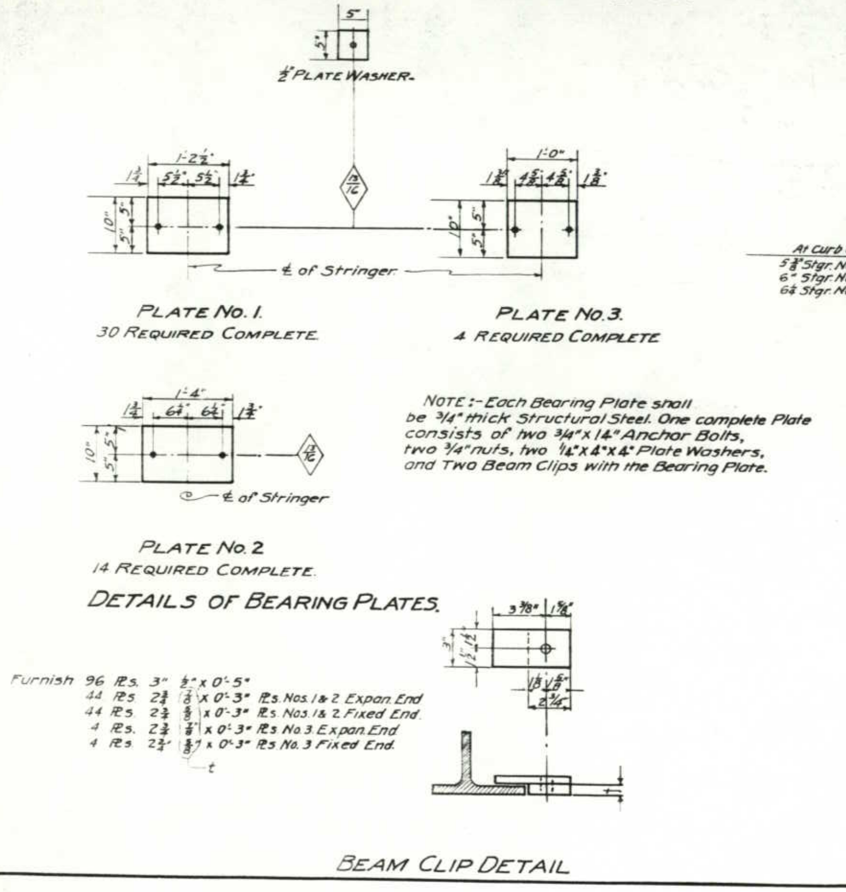


PLATE No. 1.
30 REQUIRED COMPLETE.

PLATE No. 3.
4 REQUIRED COMPLETE.

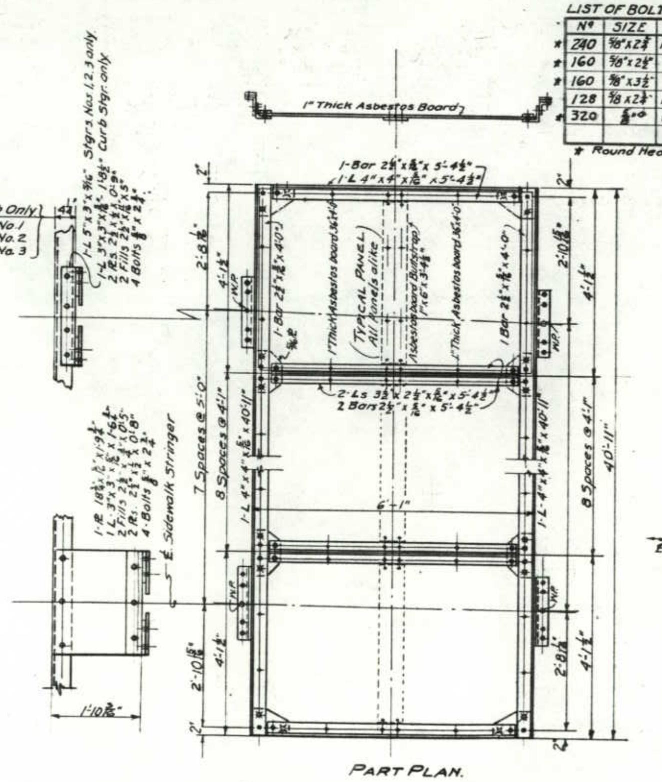
NOTE:- Each Bearing Plate shall be ¾" thick Structural Steel. One complete Plate consists of two ¾"x 14" Anchor Bolts, two ¾" nuts, two ⅛"x 4"x 4" Plate Washers, and Two Beam Clips with the Bearing Plate.

PLATE No. 2
14 REQUIRED COMPLETE.

DETAILS OF BEARING PLATES.

Furnish 96 Pls. 3" ½" x 0'-5"
44 Pls. 2¾ ⅜ x 0'-3" Pls. Nos. 1 & 2 Expan. End
44 Pls. 2¾ ⅜ x 0'-3" Pls. Nos. 1 & 2 Fixed End.
4 Pls. 2¾ ⅜ x 0'-3" Pls. No. 3 Expan. End
4 Pls. 2¾ ⅜ x 0'-3" Pls. No. 3 Fixed End.

BEAM CLIP DETAIL



PART PLAN.

DETAILS FOR ASBESTOS-WOOD BLAST PROTECTION BOARD.
TWO COMPLETE BOARDS REQUIRED.

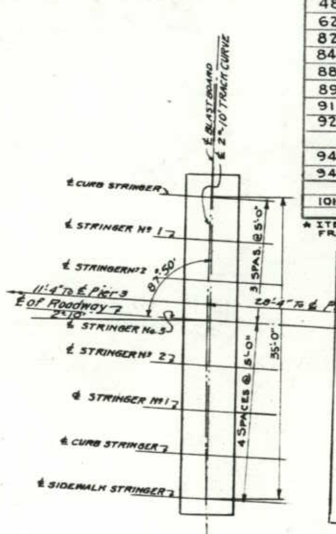
LIST OF BOLTS REQUIRED FOR TWO BLAST BOARDS

	No.	SIZE	DESCRIPTION		NUMBER HEX NUTS
*	240	⅝"x 2¾"	Round Head Dardelet Bolts	or equivalent	
*	160	⅝"x 2½"	do.	do.	
*	160	⅝"x 3½"	do.	do.	
	128	⅝ x 2¾"	Machine Bolts		128.
*	320	⅝" ф	Wrought Washers		

* Round Heads only to be Galvanized.

RELATIVE STRINGER ELEVATIONS

Bottom of Curb Stringer	0'-0"
Bottom " Stringers Nos. 1	0'-1⅛"
Bottom " " Nos. 2	0'-1¾"
Bottom " " No. 3	0'-2"
Bottom of Sidewalk Stringer	1'-5¹³⁄₁₆"



GENERAL PLAN
FOR PROTECTION BOARD IN RELATION TO BRIDGE.

SUMMARY OF QUANTITIES FOR ENTIRE VIADUCT.

ITEM No.	DESCRIPTION.	UNIT	3 SPANS SUPERSTRUCTURE	ABUTMENTS Nos. 1 & 4.	PIERS Nos. 2	TWO APPROACH SLABS	TOTALS
14 a	Dry Rock Structural Excavation	Cu.Yd.					—
14 b	Dry Common " "	" "		222.1	[illegible].9		469.0
14 c	Wet Rock " "	" "					—
14 d	Wet Common " "	" "					—
42 a.	Untreated Bridge Timber	M.Ft.B.M.					—
46 a.	Class "A" Concrete	Cu.Yd.	105 + 5.5	147	100+27	46	430.5
47	Reinforcing Steel overrun included (Piling Reinforcement not included)	Lbs.	18460	16300	12180	8140	~~[illegible]~~ 55080
48	* Structural Steel " "	Lbs.	72570	190	380		73140
62 a	Precast Concrete Piling.	Lin.Ft.		57			576
82	Sheet Copper No. 16 B.&S. Gage	Lbs.	184				184
84	Removal of disused bridge	L.S.					Lump Sum
88 a	Asbestos Wood Blast Protection Board and Galvd. Bolts.	Sq.Ft.	480				480
89	Drain Pipe 3" diam. Galv. (with flange) 3'-0" long.	Pcs.	4				4
91	Electrical Conduit 1" Diam. (Includes 7 Lead Expansion Sleeves.)	Lin.Ft.	360				360
92	Junction Boxes 3"x 5"x 6"	Each	5				5
	Expansion Joint Material ½"x 12" / 1"x 12"	Lin.Ft.	36/36				36/36
94 a	Electric Light Posts	Pcs.	4				4
94 b	Electric Switch Control	Pcs.		1			1
101-b	Boring Holes to facilitate Concrete Pile Driving	Lin.Ft.		266.8			266.8

* ITEM INCLUDES STRUCTURAL STEEL FRAME FOR TWO COMPLETE BLAST BOARDS.

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JAN. 1, 1930.

ALL CONCRETE SHALL BE CLASS "A."

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS.

ALL EXPOSED CORNERS, EXCEPT ON HANDRAILS, SHALL BE BEVELED TO A 2" FACE.

GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.

ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ¾" CONCRETE WEARING SURFACE.

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE, PLAIN OR DEFORMED AS SHOWN AND NOTED.

ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION.

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 50 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 BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

ALL RIVETS TO BE ¾" ф EXCEPT AS NOTED FOR BLAST BOARD.

FIELD CONNECTIONS TO BE POWER RIVETED.

CONCRETE PILES MUST BE DRIVEN IN LINE WITHOUT JACKING OR BENDING.

FOR DRIVING THE CONCRETE PILING THE STEAM HAMMER SHALL DEVELOP AT EACH FULL STROKE AN ENERGY PER BLOW OF NOT LESS THAN 15000 FT. LBS.

FIXED LEADS REQUIRED.

DROP HAMMER SHALL NOT BE USED.

PILE REINFORCEMENT PERMITS PICKING UP AT ONE THIRD POINTS ONLY.

DETAILS SHOWN FOR STRUCTURE ARE BASED ON THE CARNEGIE SECTION. IF BETHLEHEM SECTIONS ARE USED DIMENSIONS DO NOT APPLY.

MAXIMUM PILE LOAD 40000 LBS.

CAMBER ALL CURBS AND HANDRAILS WITH A PARABOLIC CROWN EQUAL TO ONE INCH AT CENTER OF EACH SPAN.

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

NO HOLES SHALL BE DRILLED FOR PILING UNTIL PERMISSION IS OBTAINED FROM THE BRIDGE ENGINEER.

LOADING DATA.

LIVE LOAD = A. A. S. H. O. AUG. 1928. CLASS A. (H-15)

DEAD LOAD = ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE, WHICH INCLUDES THE ¾ IN. CONCRETE MONOLITHIC WEARING SURFACE.

COLORADO
STATE HIGHWAY DEPARTMENT
GENERAL LAYOUT AND
SUMMARY OF QUANTITIES FOR
I-BEAM CONCRETE VIADUCT
Across C.&S. RAILROAD
Sta. 1018+14⁶⁶ to 1019+16³³
Near LOVELAND Sec. 12/13 T. 5 N. R. 69 W.

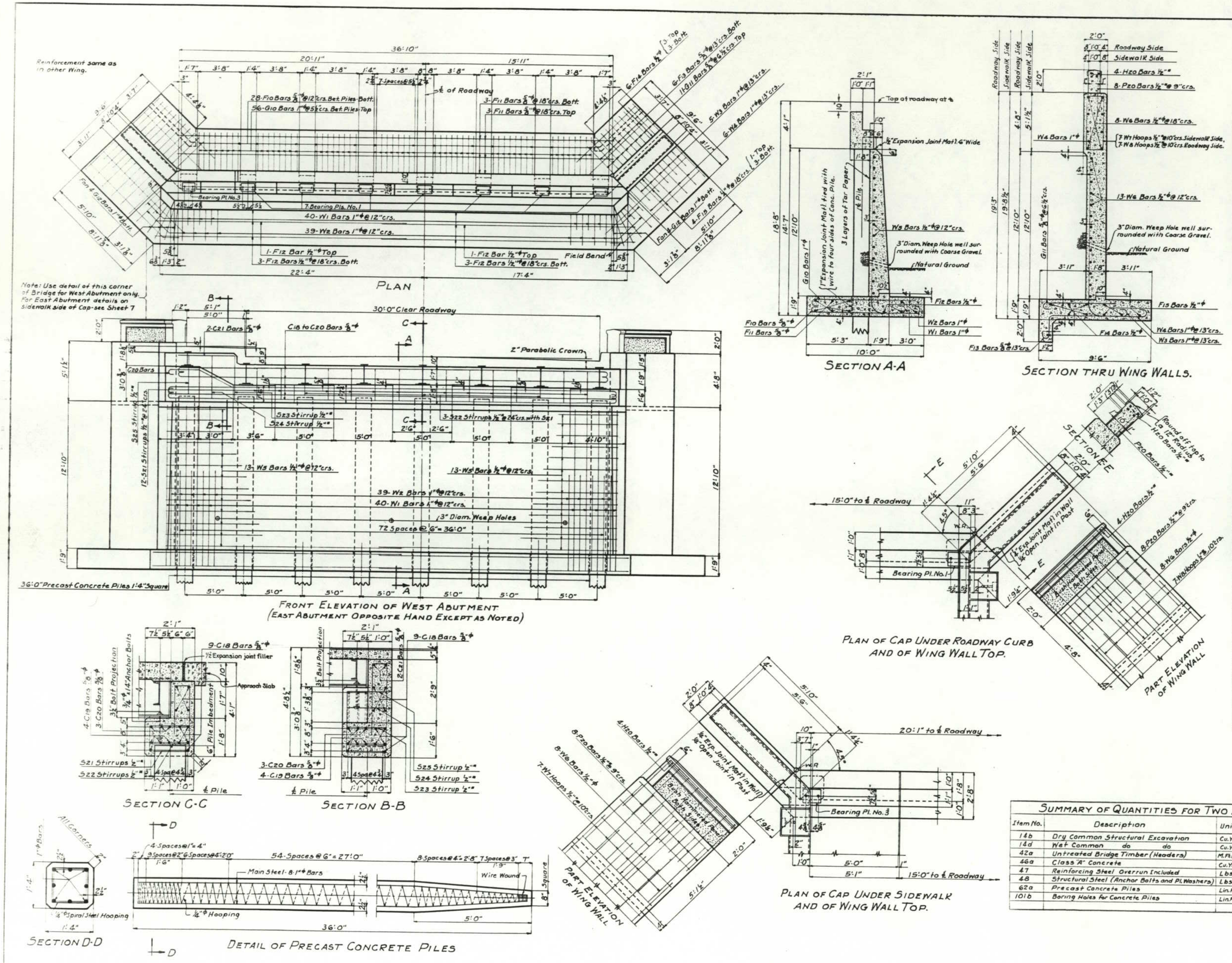
Designed by RMA Made by RMA. Checked by ALC	Approved by P. S. Bailey Bridge Engineer Date: Sept. 30th 1933

STRUCTURE NO. C-16-AK.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	NRM-9E	4	

New Sheet - Rev. 11/7/33 by B.R.
Revised 3-21-34, A.G.K. Added Approach Slabs

Revised Quantities As Constructed. 5-17-38 R.A.D.



BAR LIST FOR WEST ABUTMENT W.W.D.									
MARK	SIZE	NUMBER	LENGTH	TYPE	ℓ	m	n	r	t
W1	1"ϕ	40	18'1"	I					
W2	1"ϕ	39	13'0"	II	7'3"	2'10"		4"	3½"
W5	½"ϕ	26	20'7"	IV					
F10	⅝"ϕ	28	8'2"	V	7'4"			2½"	2
G10	1"ϕ	56	10'1"	V	8'9"			4"	3½"
G12	1"ϕ	8	6'3"	III	3'7"			4"	3½"
F11	⅝"ϕ	6	37'0"	—					
F12	½"ϕ	8	21'6"	—					
W3	1"ϕ	10	11'0"	II	6'2"	1'11"		4"	3½"
W4	1"ϕ	12	21'10"	II	15'3"	3'8"		4"	3½"
G11	⅝"ϕ	22	6'10"	V	6'0"			2½"	2"
F13	⅝"ϕ	12	8'3"	VI					
F14	½"ϕ	12	7'0"	—					
F15	½"ϕ	8	10'0"	—					
W6	½"ϕ	42	5'6"	—					
W7	½"■	14	13'6"	VII	4'9"	1'8"			
W8	½"■	14	12'8"	VII	4'4"	1'8"			
H20	½"■	8	5'0"	—					
P20	½"■	16	8'8"	VIII					
S21	½"■	12	10'0"	IX	2'10"	2'1"	1'1¼"		
S22	½"■	3	9'4"	IX	2'6"	2'1"	9¼"		
S23	½"■	1	12'0"	IX	3'10"	3'1"	1'1¼"		
S24	½"■	1	12'10"	IX	3'10"	3'1"	1'11½"		
S25	½"■	1	12'10"	IX	3'6"	3'1"	2'3¼"		
C18	⅝"ϕ	9	38'3"	III	36'7"			2½"	2"
C19	⅝"ϕ	4	39'5"	III	37'9"			2½"	2"
C20	⅝"ϕ	3	39'10"	X					
C21	⅝"ϕ	2	4'6"	—					

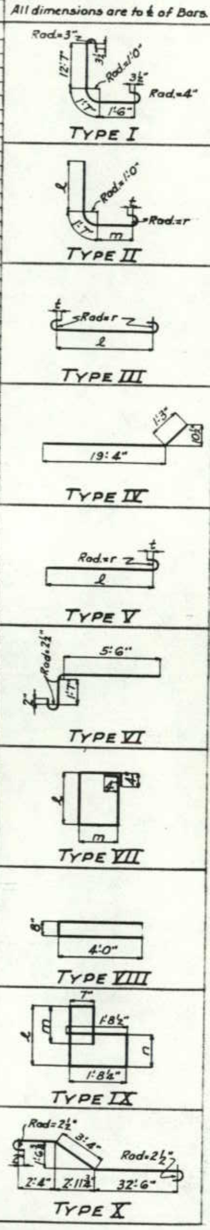
1102 lin. ft. ½"ϕ bars @ 0.668 lbs. per lin. ft. = 736 Lbs.
731 - - ½"■ - @ 0.850 - - - - = 621 -
1331 - - ⅝"ϕ - @ 1.043 - - - - =1388 -
2217 - - 1"ϕ - @ 2.670 - - - - =5920 -
Plus 1%± for Overrun = 85 -
Total = 8750 Lbs.

BAR LIST FOR EAST ABUTMENT W.W.D.									
MARK	SIZE	NUMBER	LENGTH	TYPE	ℓ	m	n	r	t
W1	1"ϕ	38	18'1"	I					
W2	1"ϕ	38	13'0"	II	7'3"	2'10"		4"	3½"
W5	½"ϕ	26	20'7"	IV					
F10	⅝"ϕ	28	8'2"	V	7'4"			2½"	2"
G10	1"ϕ	56	10'1"	V	8'9"			4"	3½"
G12	1"ϕ	4	6'3"	III	3'7"			4"	3½"
F11	⅝"ϕ	6	37'0"	—					
F12	½"ϕ	8	21'6"	—					
W3	1"ϕ	5	11'0"	II	6'2"	1'11"		4"	3½"
W4	1"ϕ	6	21'10"	II	15'3"	3'8"		4"	3½"
G11	⅝"ϕ	11	6'10"	V	6'0"			2½"	2"
F13	⅝"ϕ	6	8'3"	VI					
F14	½"ϕ	6	7'0"	—					
F15	½"ϕ	4	10'0"	—					
W6	½"ϕ	21	5'6"	—					
W7	½"■	7	13'6"	VII	4'9"	1'8"			
W8	½"■	7	12'8"	VII	4'4"	1'8"			
H20	½"■	4	5'0"	—					
P20	½"■	8	8'8"	VIII					
S21	½"■	12	10'0"	IX	2'10"	2'1"	1'1¼"		
S22	½"■	3	9'4"	IX	2'6"	2'1"	9¼"		
S23	½"■	1	12'0"	IX	3'10"	3'1"	1'1¼"		
S24	½"■	1	12'10"	IX	3'10"	3'1"	1'11¼"		
S25	½"■	1	12'10"	IX	3'6"	3'1"	2'3¼"		
C18	⅝"ϕ	9	38'3"	III	36'7"			2½"	2"
C19	⅝"ϕ	4	39'5"	III	37'9"			2½"	2"
C20	⅝"ϕ	3	39'10"	X					
C21	⅝"ϕ	2	4'6"	—					

905 lin. ft. ½"ϕ bars @ 0.668 lbs. per lin. ft. = 605 Lbs.
458 - - ½"■ - @ 0.850 - - - - = 389 -
1206 - - ⅝"ϕ - @ 1.043 - - - - = 1258 -
1957 - - 1"ϕ - @ 2.670 - - - - = 5225 -
Plus 1%± for Overrun 73 -
Total = 7550 Lbs.

BENDING DIAGRAMS

All dimensions are to ℄ of Bars.



Reference Drawings
For General Layout, Summary of Quantities for entire Structure, General Notes, Details for Waterproofing, Bearing Plates, Blast Protection & Pier No.3 Cap see sheet No. 3.
For Superstructure Details and Pier Details see sheet No. 5.
For additional Details for East Abutment and Light Fixtures see sheet No. 7.

SUMMARY OF QUANTITIES FOR TWO ABUTMENTS W.W.D.					
Item No.	Description	Unit	West Abutment	East Abutment	Total
14b	Dry Common Structural Excavation	Cu.Yd.	118.1	104.0	222.1
14d	Wet Common do do	Cu.Yd.			—
42a	Untreated Bridge Timber (Headers)	M.Ft.B.M.			—
46a	Class "A" Concrete	Cu.Yd.	81.0	66.0	147.0
47	Reinforcing Steel Overrun Included	Lbs.	8750	7550	16300
48	Structural Steel (Anchor Bolts and Pl. Washers)	Lbs.	95	95	190
62a	Precast Concrete Piles	Lin.Ft.	288	288	576
101b	Boring Holes for Concrete Piles	Lin.Ft.	140.8	126.0	266.8

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

COLORADO
STATE HIGHWAY DEPARTMENT
DETAILS FOR ABUTMENTS

ACROSS C.&S. RAILROAD
Sta.1018+14⁶⁶ TO 1019+16³³
Near LOVELAND Sec. 12/13 T.5N. R.69W.

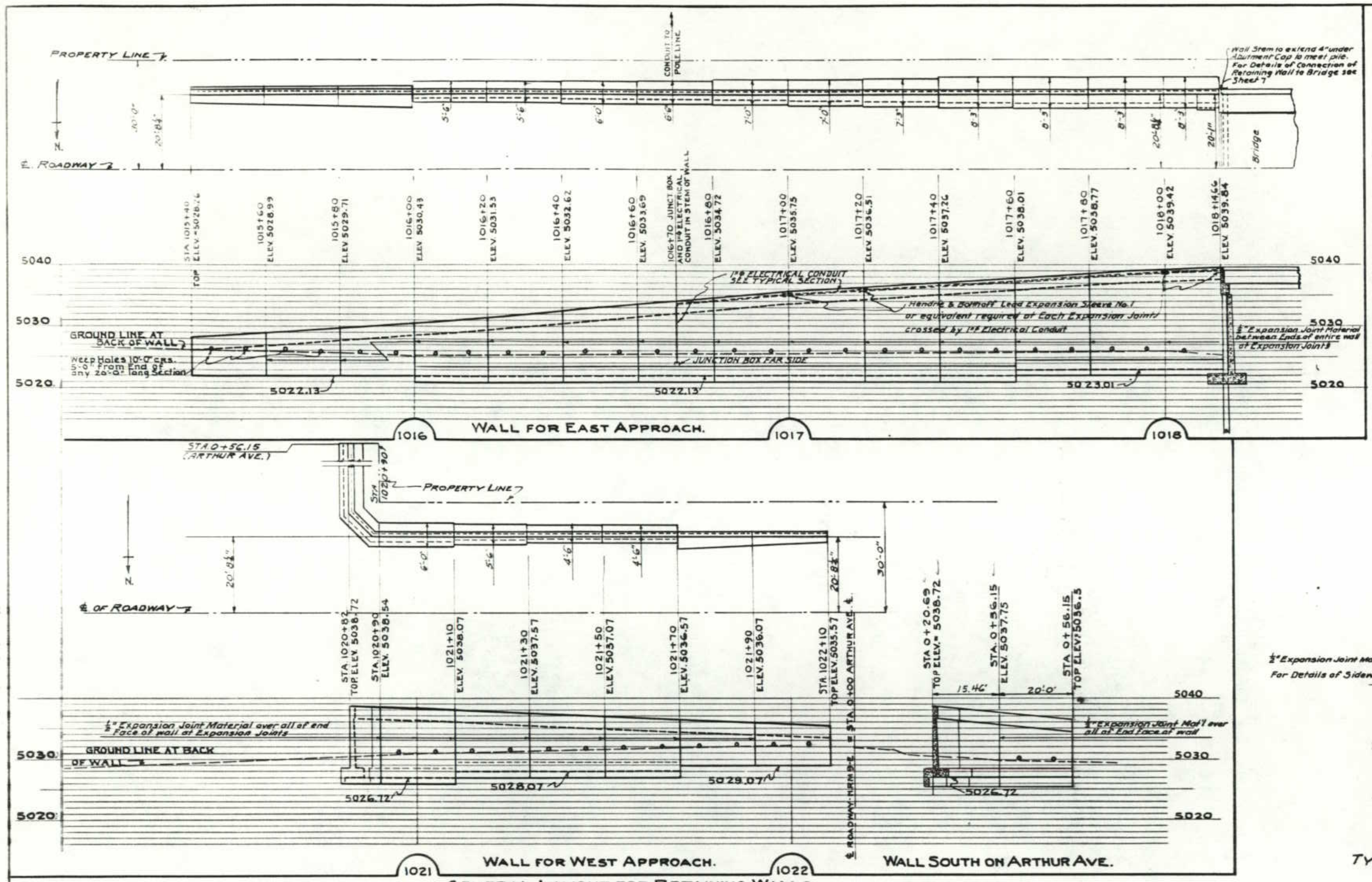
Designed by A.L.C. Made by B.R. Checked by W.W.D.	Approved by P.S. Bailey Bridge Engineer Date: Nov. 8th, 1933

STRUCTURE NO. C-16-AK.

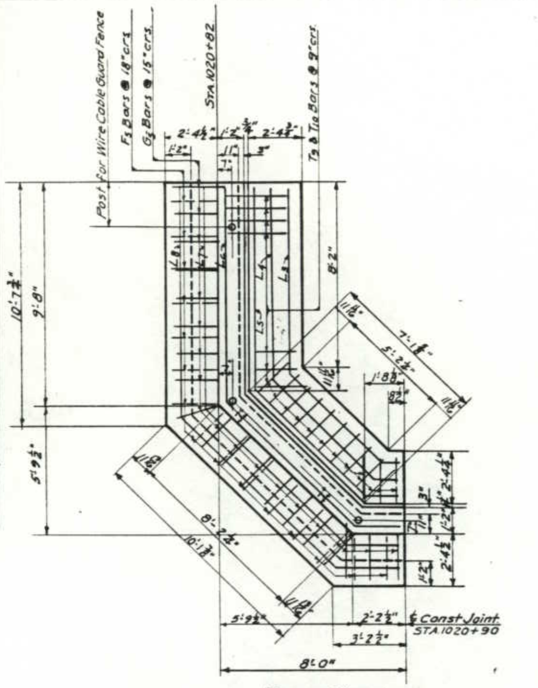
Revised Quantities As Constructed. 5-17-38 R.A.D.

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO.	NRM 9-E	6.	

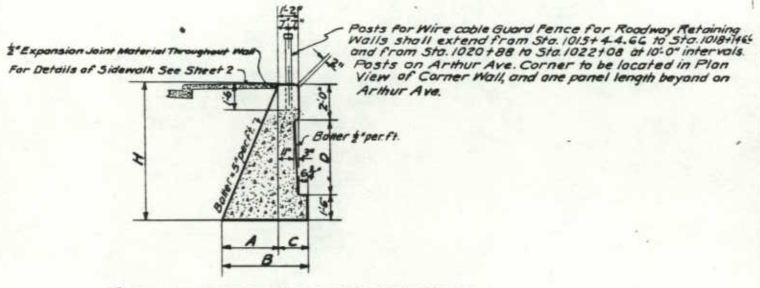
REVISED 10/24/33 by ALC T1 BARS CHANGED FROM 7/8"φ to 1"φ
Revised 11/7/33 by B.R. {G1 Bars Changed from 21 Req'd to 22 Req'd. Abutment Changed.



GENERAL LAYOUT FOR RETAINING WALLS.



PLAN VIEW.
ARTHUR AVE. CORNER.



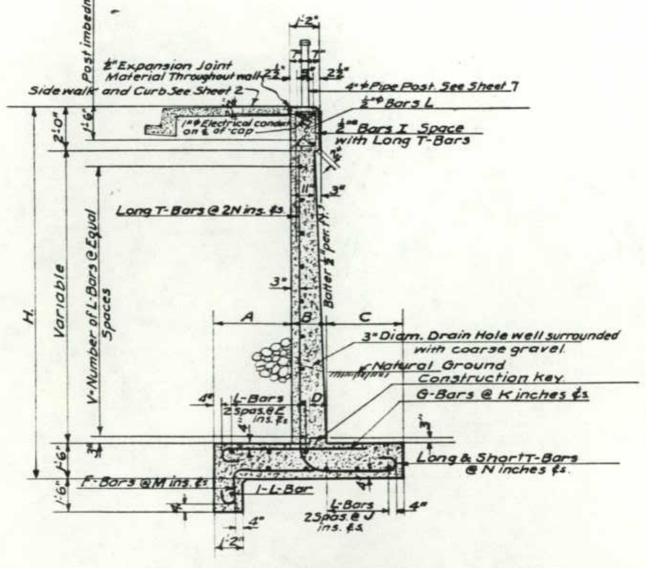
TYPICAL SECTION FOR GRAVITY TYPE RETAINING WALL.

TABLE OF DIMENSIONS AND BAR-SPACING FOR SECTIONS OF WALLS AT INTERVALS SHOWN BY STATIONS.

NOTE:- Footing Dimensions shown opposite a station are for that Station (West side of Expansion Joint) and up to next Station given.

LOCATION OF 20'-0" SECTION OF WALL FOR DIMENSIONS GIVEN.	TYPE OF WALL	DIMENSIONS OF SHAPE SEE TYPICAL SECTION H	A	B	C	D	BAR SPACING IN INCHES (SEE TYPICAL SECTION) E	J	K	M	N	NUMBER OF L-BARS IN STEM. V*	SPACING OF LONG T-BARS = I. BARS	EDGE DISTANCE FROM BAR TO END OR TO EXPANSION JOINT STEM BARS	G-BARS	F-BARS
1015+40	GRAVITY	6'-1½"	2'-6⅝"	4'-1⅝"	1'-7"	2'-7½"										
1016+00	GRAVITY	8'-3⅜"	3'-5½"	5'-1⅝"	1'-8⅝"	4'-9⅝"										
1016+00	CANTL'R.	8'-3⅜"	2'-2"	1'-1⅜"	2'-2⅝"	6⅝"										
1016+20	CANTIL'R	9'-4¾"	2'-2"	1'-2"	2'-2"	7"	9"	9"	18"	18"	9"	5	18"	3"	3"	3"
1016+40	DO	10'-5⅞"	2'-5"	1'-2½"	2'-4½"	7¼"										
1016+60	DO.	11'-6¾"	2'-7½"	1'-3"	2'-7½"	7½"	11"	11"	15"	18"	9"	6	18"	3"	7½"	3"
1016+80	DO.	12'-7⅛"	2'-10"	1'-3½"	2'-10½"	7¾"	12"	12"	15"	18"	8"	6	16"	4"	7½"	3"
1017+00	DO.	13'-7½"	2'-10"	1'-4"	2'-10"	8"	13"	14"	12"	18"	6"	7	12"	3"	6"	3"
1017+20	DO	14'-4½"	2'-11"	1'-4½"	2'-11½"	8¼"										
1017+40	DO	15'-1½"	3'-5"	1'-4¾"	3'-5¼"	8⅜"	14"	15"	8"	18"	6"	8	12"	3"	4"	3"
1017+60	DO	15'-10½"	3'-5"	1'-5¼"	3'-4¾"	8⅝"										
1017+60	DO	15'-0"	3'-5"	1'-4¾"	3'-5¼"	8⅜"	17"	18"	8"	18"	6"	9	12"	3"	4"	3"
1017+80	DO	15'-9⅛"	3'-5"	1'-5⅛"	3'-4⅞"	8½"										
1018+00	DO.	16'-4⅞"	3'-5"	1'-5½"	3'-4½"	8¾"										
1018+14.66	DO	16'-10"	3'-5"	1'-5⅝"	3'-4⅜"	8¾"	17"	18"	8"	18"	6"	9	12"	4"	4"	7"
1020+90	DO	11'-9⅞"	2'-5"	1'-3⅞"	2'-3⅝"	7⅝"										
1021+10	DO	11'-4¼"	2'-5"	1'-2⅞"	2'-4⅛"	7½"	10½"	11½"	15"	18"	9"	6	18"	3"	7½"	3"
1021+10	DO.	10'-0"	2'-2"	1'-2¼"	2'-1¾"	7"	9"	9"	18"	18"	9"	5	18"	3"	3"	3"
1021+30	DO.	9'-6"	1'-8"	1'-2"	1'-8"	7"										
1021+50	DO	9'-0"	1'-8"	1'-1½"	1'-8¼"	7"	6"	6"	18"	18"	9"	4	18"	3"	3"	3"
1021+70	DO	8'-6"	1'-8"	1'-1½"	1'-8½"	6¾"										
1021+70	GRAVITY	7'-6"	3'-1½"	4'-9¼"	1'-7¾"	4'-0"										
1022+10	GRAVITY	6'-6"	2'-8½"	4'-3½"	1'-7¼"	3'-0"										
0+56.15	CANTL'R	9'-9⅝"	2'-2"	1'-2¼"	2'-1⅝"	7⅛"	9"	9"	18	18	9"	5	18"	3"	3"	3"
ARTHUR AVE CORNER	CANTL'R	12'-0"	2'-4½"	1'-3¼"	2'-4¼"	7¾"	11"	11"	15"	18"	9"	6	18"	5"	5½"	9½"

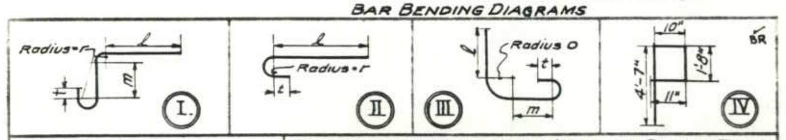
* This number does not include the 4-L Bars in Cap.



TYPICAL SECTION OF CANTILEVER TYPE RETAINING WALL.

USE TABLE OF DIMENSIONS FOR SECTIONS AT STATIONS GIVEN.

BAR BENDING DIAGRAMS



WALL LENGTHS BY STATION LOCATION &	LIN. FT.	BAR LIST FOR LENGTHS OF WALL BY STAS. IN TABLE. MARK	SIZE	NUMBER	LENGTH	TYPE	l	m	o	r	t
STA. 1018+00 TO 1018+14.66	14'-8"	F1	5/8"φ	10	7'-3"	I.	5'-0"	1'-1"		2½"	2"
		G1	5/8"φ	22	6'-4"	II.	5'-6"			2½"	2"
		I1	1/2"■	15	8'-0"	IV.					
		L1	1/2"φ	22	14'-0"	—					
		T1	7/8"φ	15	19'-2"	III.	13'-5½"	2'-11½"	12"	3½"	3"
		T2	1φ	14	10'-5"	III.	6'-6"	1'-0"	12"	3½"	3"
STA. 1017+40 TO 1018+00	3@20'-0"	F1	5/8"φ	42	7'-3"	I.	5-0"	1'-1"		2½"	2"
		G1	5/8"φ	90	6-4"	II.	5'-6"			2½	2"
		I1	1/2"■	60	8'-0"	IV.					
		L2	1/2"φ	68	19'-6"	—					
		T1	7/8"φ	60	19'-2"	III.	13'-5½"	2'-11½"	12"	3½"	3"
		T2	7/8"φ	60	10'-3"	III.	6'-6"	1'-0"	12"	3½"	3"
STA. 1017+20 TO 1017+40	20'-0"	F2	5/8"φ	14	6'-10"	I.	4'-7"	1'-1"		2½"	2"
		G2	5/8"φ	30	5-10	II.	5-0"			2½"	2"
		I1	1/2"■	20	8'-0"	IV.					
		L2	1/2"φ	21	19'-6"	—					
		T3	7/8"φ	20	18'-0"	III.	12'-9½"	2'-5½"	12	3½	3
		T4	7/8"φ	20	8'-7"	III.	4'-10"	1'-0"	12"	3½	3
STA. 1016+80 TO 1017+20	2@20'-0"	F3	5/8"φ	28	6'-9"	I.	4'-6"	1'-1"		2½"	2"
		G2	5/8"φ	40	5'-10"	II.	5'-0"			2½"	2"
		I1	1/2"■	40	8'-0"	IV.					
		L2	1/2"φ	40	19'-6"	—					
		T5	3/4"φ	40	16'-1"	III	11'-0"	2'-4"	12"	3"	2½"
		T6	3/4"φ	40	9'-1"	III.	5'-4"	1'-0"	12"	3"	2½"
STA. 1016+60 TO 1016+80	20'-0"	F4	5/8"φ	14	6'-5"	I.	4'-2"	1'-1"		2½"	2"
		G4	5/8"φ	16	5'-7"	II.	4'-9"			2½"	2"
		I1	1/2"■	15	8'-0"	IV					
		L2	1/2"φ	19	19'-6"	—					
		T7	3/4"φ	15	14'-7"	III.	9'-11½"	2'-0½"	12"	3"	2½"
		T8	3/4"φ	15	9'-4"	III.	4'-8½"	2'-0½"	12"	3"	2½"
STA. 1016+40 TO 1016+60 1020+90 TO 1021+10	2@20'-0"	F5	5/8"φ	28	6'-3"	I.	4'-0"	1'-1"		2½"	2"
		G5	5/8"φ	32	5'-4"	II.	4'-6"			2½"	2"
		I1	1/2"■	28	8'-0"	IV.					
		L2	1/2"φ	38	19'-6"	—					
		T9	3/4"φ	28	13'-3"	III.	8'-11"	1'-9"	12"	3"	2½"
		T10	3/4"φ	26	8'-4"	III.	4'-0"	1'-9"	12"	3"	2½"
STA. 1016+00 TO 1016+40 1021+10 TO 1021+30 ARTHUR AVE.	4@20'-0"	F6	5/8"φ	56	6'-0"	I.	3'-9"	1'-1"		2½"	2"
		G6	5/8"φ	56	5'-1"	II.	4'-3"			2½"	2"
		I1	1/2"■	56	8'-0"	IV					
		L2	1/2"φ	72	19'-6"	—					
		T11	5/8"φ	56	10'-8"	III.	6'-8½"	1'-6½"	12"	2½"	2"
		T12	5/8"φ	52	8'-5"	III	4'-5½"	1'-6½"	12"	2½"	2"
STA. 1021+30 TO 1021+70 = 2@20'-0"		F7	5/8"φ	28	5'-5"	I.	3'-2"	1'-1"		2½"	2"
		G7	5/8"φ	28	4'-7"	II.	3'-9"			2½"	2"
		I1	1/2"■	28	8'-0"	IV.					
		L2	1/2"φ	34	19'-6"	—					
		T13	5/8"φ	28	10'-5"	III.	6'-11½"	1'-0½"	12"	2½"	2"
		T14	5/8"φ	26	6'-10"	III.	3'-4½"	1'-0½"	12"	2½"	2"
ARTHUR AVE CORNER	19'-7"	F5	5/8"φ	15	6'-3"	I	4'-0"	1'-1"		2½"	2"
		G5	5/8"φ	19	5'-4"	II.	4'-6"			2½"	2"
		I1	1/2"■	13	8'-0"	IV.					
		L3	1/2"φ	1	14'-7"	—					
		L4	1/2"φ	1	16'-0"	—					
		L5	1/2"φ	1	17'-7"	—					
		L6	1/2"φ	12	19'-3"	—					
		L7	1/2"φ	2	20'-9"	—					
		L8	1/2"φ	2	22'-3"	—					
		T9	3/4"φ	13	13'-3"	III.	8'-11"	1'-9"	12"	3"	2½"
		T10	3/4"φ	13	8'-4	III.	4'-0"	1'-9"	12"	3"	2½"

6328 LIN. FT. 1/2"φ BARS @ 0.668 LBS. PER FT. = 4227 LBS
2200 LIN. FT. 1/2"■ " @ 0.850 " " " = 1870 "
4904 LIN. FT. 5/8"φ " @ 1.043 " " " = 5115 "
2234 LIN. FT. 3/4"φ " @ 1.502 " " " = 3355 "
2584 LIN. FT. 7/8"φ " @ 2.044 " " " = 5282 "
146 LIN. FT. 1φ " @ 2.670 " " " 390 "
1% ± ADDITIONAL FOR OVERRUN = 201 "
TOTAL 20440 LBS.

REFERENCE DRAWINGS.
GENERAL LAYOUT FOR BRIDGE, GENERAL NOTES & SUMMARY OF QUANTITIES FOR STRUCTURE ...... SHEET 3.
DETAILS OF WIRE CABLE GARD FENCE AND SOUTH EAST CORNER OF EAST ABUTMENT SHEET 7.

SUMMARY OF QUANTITIES FOR ROADWAY RETAINING WALLS & NOT INCLUDED IN QUANTITIES FOR VIADUCT.

ITEM No.	DESCRIPTION	UNIT	AMOUNT
14-b	DRY COMMON STRUCTURAL EXCAVATION	CU.YD.	440
46-a	CLASS "A" CONCRETE	CU.YD.	361
47	REINFORCING STEEL OVERRUN INCLUDED	LBS	20440
72y	WIRE CABLE GUARD FENCE ON RETAINING WALLS	LIN.FT.	425.6

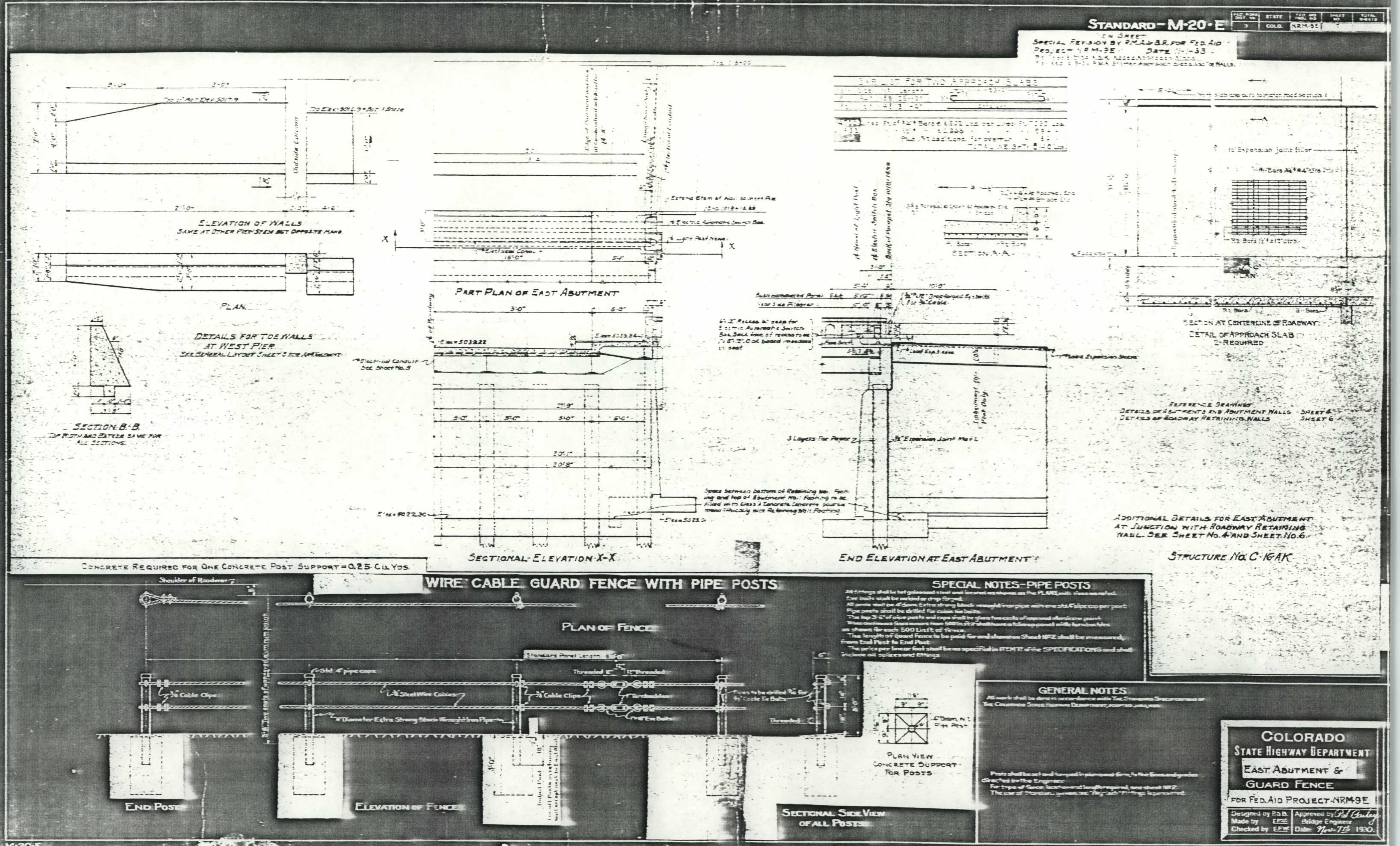
COLORADO
STATE HIGHWAY DEPARTMENT
DETAILS FOR RETAINING WALLS FOR SOUTH SIDE OF APPROACHES TO VIADUCT

Across C.&S. RAILROAD TRACKS.
Stas. AS SHOWN ON WALL LAYOUT
Near Loveland Sec. 12/13 T.5 N. R.69 W.

Designed by RMA
Made by RMA
Checked by ALC

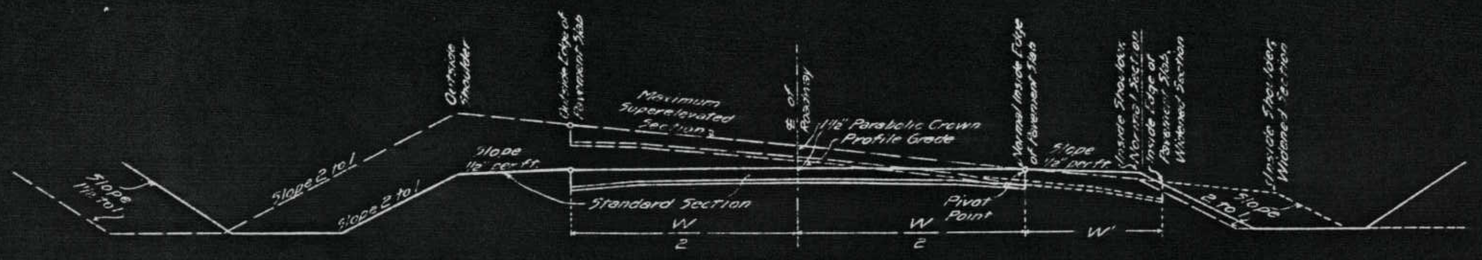
Approved by P. S. Bailey
Bridge Engineer
Date: Sept. 30th 1933

STRUCTURE NO. C-16-AK.


STANDARD-M-20-E
FED. ROAD DIST. NO.
STATE
FED. AID PROJ. NO.
SHEET NO.
TOTAL SHEETS
3
COLO.
NRM-9E
7
New Sheet
Special Revision by P.M.A. & B.R. for Fed. Aid Project NRM-9E Date 11-1-33
ELEVATION OF WALLS
SAME AT OTHER PIER STEM BUT OPPOSITE HAND
Outside Column
PLAN
DETAILS FOR TOE WALLS AT WEST PIER.
SEE GENERAL LAYOUT SHEET 3 FOR ARRANGEMENT.
SECTION B-B
TOP WIDTH AND BATTER SAME FOR ALL SECTIONS.
PART PLAN OF EAST ABUTMENT
Elev. 5039.22
Elev. 5039.84
Electrical Conduit See Sheet No. 5
Electric Automatic Switch Box
Light Post Here
X
SECTIONAL ELEVATION X-X
Elev. 5022.30
Elev. 5023.0
Space between bottom of Retaining Wall Footing and top of Abutment Wall Footing to be filled with Class A Concrete. Concrete poured monolithically with Retaining Wall Footing.
BAR LIST FOR TWO APPROACH SLABS
TOTAL WEIGHT 840 Lbs.
SECTION A-A
Back of Parapet Sta 1018+14.4
Electric Switch Box
Bush hammered Panel
3 Layers Tar Paper
Expansion Joint Material
Embankment Fill
Fill Expansion Joint
END ELEVATION AT EAST ABUTMENT
Expansion Joint filler
PLAN
SECTION AT CENTERLINE OF ROADWAY
DETAIL OF APPROACH SLAB
2-REQUIRED
REFERENCE DRAWINGS
DETAILS OF ABUTMENTS AND ABUTMENT WALLS - SHEET 4
DETAILS OF ROADWAY RETAINING WALLS - SHEET 6
ADDITIONAL DETAILS FOR EAST ABUTMENT AT JUNCTION WITH ROADWAY RETAINING WALL. SEE SHEET No. 4 AND SHEET No. 6.
STRUCTURE No. C-16AK
CONCRETE REQUIRED FOR ONE CONCRETE POST SUPPORT = 0.25 CU. YDS.
WIRE CABLE GUARD FENCE WITH PIPE POSTS
Shoulder of Roadway
PLAN OF FENCE
Standard Panel Length
Std. 4" pipe caps
Cable Clips
Steel Wire Cables
Threaded
Turnbuckles
Eye Bolts
4" Diameter Extra Strong Black Wrought Iron Pipe
Holes to be drilled for Cable Tie Bolts
END POST
ELEVATION OF FENCE
SECTIONAL SIDE VIEW OF ALL POSTS
PLAN VIEW CONCRETE SUPPORT FOR POSTS
SPECIAL NOTES-PIPE POSTS
GENERAL NOTES
COLORADO
STATE HIGHWAY DEPARTMENT
EAST ABUTMENT &
GUARD FENCE
FOR FED. AID PROJECT-NRM-9E
Designed by P.S.B.
Made by E.F.W.
Checked by E.F.W.
Approved by
Bridge Engineer
Date: Nov-7th 1930.
M-20-E

FED. ROAD DIST. No.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	NRM9E	8	[illegible]

Revised 8-17-32-S.B.L.-(200' Length)
" 8-31-32-S.B.L.



PAVEMENT SECTION

SUPERELEVATION AND WIDENING NOTES FOR PAVEMENT SECTION

Curves on projects using the pavement section are to be superelevated and widened as indicated in the accompanying drawings and table.

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 or graph. The section is to be rotated about the normal inside edge of the pavement.

When the degree of curvature exceeds 10, the inside portion of the pavement slab is to be widened from the normal inside edge as per the table below. Curves of 10° or less are not to be widened. The 1½" parabolic crown is to be used for curves of 10° and under. The widened section is to have a flat crown.

The slope of the shoulders shall conform to the rate per foot width of roadway required except that the inside shoulder shall maintain the standard slope of 0.0417 ft. per foot width until the superelevation rate exceeds this standard slope.

The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

Details of plans for superelevating and widening are shown on the General Plan for Widening and the Graph of Superelevation Factors.

The subgrade for future pavement is to be constructed to conform to the superelevation and widening requirements for the pavement section.

SUPERELEVATION FACTORS AND OFFSETS FOR WIDENING FOR PAVEMENT SECTION

Distance from B.T.	20 Ft.	40 Ft.	60 Ft.	80 Ft.	100 Ft.=PC	120 Ft.	140 Ft.	160 Ft.	180 Ft.	200 Ft.=E.T.	On Curve
Factor	0.02	0.08	0.18	0.32	0.50	0.68	0.82	0.92	0.98	1.00	1.00
Degree of Curve	Rate of Superelevation (in Feet) per Foot Width of Roadway										
2° and Under	0.0004	0.0017	0.0038	0.0067	0.0105	0.0143	0.0172	0.0193	0.0206	0.0210	0.0210
3°	0.0006	0.0025	0.0057	0.0101	0.0158	0.0214	0.0259	0.0290	0.0309	0.0315	0.0315
4°	0.0008	0.0034	0.0076	0.0134	0.0210	0.0286	0.0344	0.0386	0.0412	0.0420	0.0420
5°	0.0010	0.0042	0.0094	0.0168	0.0262	0.0357	0.0430	0.0483	0.0514	0.0525	0.0525
6°	0.0013	0.0050	0.0113	0.0202	0.0315	0.0428	0.0517	0.0580	0.0617	0.0630	0.0630
7°	0.0015	0.0059	0.0132	0.0235	0.0368	0.0500	0.0603	0.0676	0.0720	0.0735	0.0735
8°	0.0017	0.0067	0.0151	0.0269	0.0420	0.0571	0.0689	0.0773	0.0823	0.0840	0.0840
9°	0.0019	0.0076	0.0170	0.0302	0.0472	0.0643	0.0775	0.0869	0.0926	0.0945	0.0945
10° and Over	0.0020	0.0080	0.0180	0.0320	0.0500	0.0680	0.0820	0.0920	0.0980	0.1000	0.1000
	Offsets for Widening-W'-(in Feet)										
Over 10°-Under 12°	0.06	0.24	0.54	0.96	1.50	2.04	2.46	2.76	2.94	3.00	3.00
12° - " 15°	0.08	0.32	0.72	1.28	2.00	2.72	3.28	3.68	3.92	4.00	4.00
15° - " 20°	0.10	0.40	0.90	1.60	2.50	3.40	4.10	4.60	4.90	5.00	5.00
Over 20°	0.12	0.48	1.08	1.92	3.00	4.08	4.92	5.52	5.88	6.00	6.00

GRADED OR SURFACING SECTION

SUPERELEVATION AND WIDENING NOTES FOR GRADED OR SURFACING SECTIONS

Curves on projects using the graded or surfacing section are to be superelevated and widened as indicated in the accompanying sketches and table.

The normal inside shoulder and ditch are to remain as shown in the typical section shown on sheet #2. The outside shoulder is to be the high point of the section.

The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

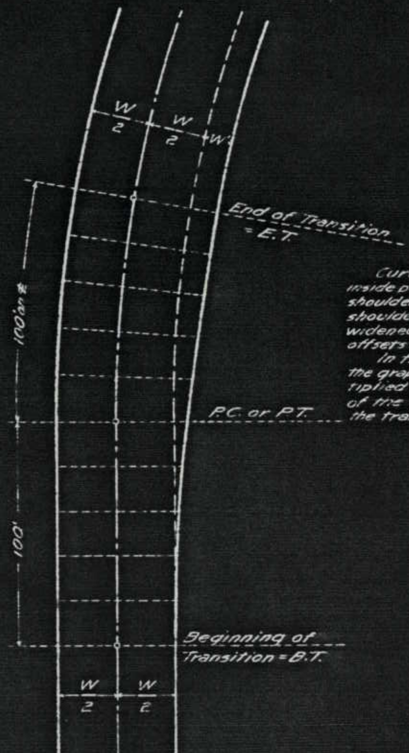
The center line pivot point is to be used as long as the superelevation does not exceed 0.02 feet per foot width of roadway. The normal inside shoulder pivot point is to be used for a superelevation rate in excess of 0.02 ft. per foot width of roadway.

When the degree of curvature exceeds 10° the inside shoulder is to be widened from the normal inside shoulder line as shown by the table and cross section. Curves of 10° and less are not to be widened.

Details of plans for superelevation and widening are shown on the General Plan for Widening and the Graph of Superelevation Factors.

SUPERELEVATION FACTORS AND OFFSETS FOR WIDENING FOR GRADED OR SURFACING SECTIONS

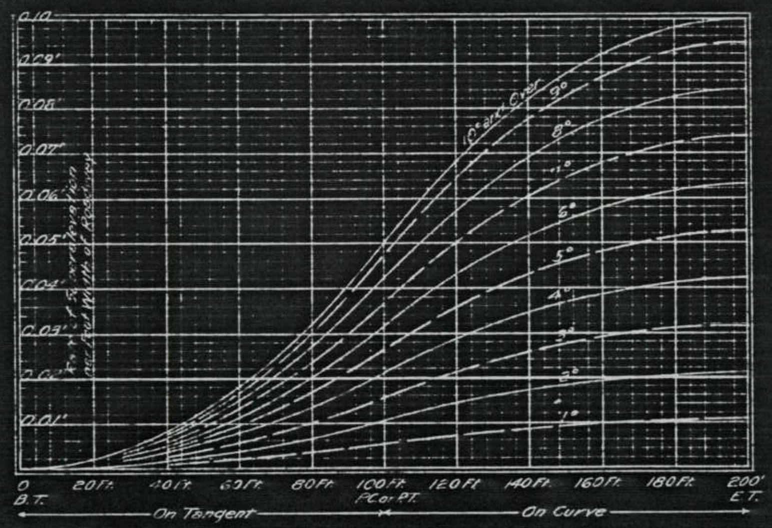
Distance from B.T.	20 Ft.	40 Ft.	60 Ft.	80 Ft.	100 Ft.=PC.	120 Ft.	140 Ft.	160 Ft.	180 Ft.	200'=E.T.	On Curve	Length of Transition Rotated about	
Factor	0.02	0.08	0.18	0.32	0.50	0.68	0.82	0.92	0.98	1.00	1.00		
Degree of Curve	Rate of Superelevation (in Feet) per Foot Width of Roadway											Center Line	Inside Shoulder
2° and Under	0.0004	0.0017	0.0038	0.0067	0.0105	0.0143	0.0172	0.0193	0.0206	0.0210	0.0210	169 Ft.	31 Ft.
3°	0.0006	0.0025	0.0057	0.0101	0.0158	0.0214	0.0258	0.0290	0.0309	0.0315	0.0315	115 "	85 "
4°	0.0008	0.0034	0.0076	0.0134	0.0210	0.0286	0.0344	0.0386	0.0412	0.0420	0.0420	98 "	102 "
5°	0.0010	0.0042	0.0094	0.0168	0.0262	0.0357	0.0430	0.0483	0.0514	0.0525	0.0525	87 "	113 "
6°	0.0013	0.0050	0.0113	0.0202	0.0315	0.0428	0.0517	0.0560	0.0617	0.0630	0.0630	80 Ft.	120 Ft.
7°	0.0015	0.0059	0.0132	0.0235	0.0368	0.0500	0.0603	0.0676	0.0720	0.0735	0.0735	74 "	126 "
8°	0.0017	0.0067	0.0151	0.0269	0.0420	0.0571	0.0689	0.0773	0.0823	0.0840	0.0840	69 "	131 "
9°	0.0019	0.0076	0.0170	0.0302	0.0472	0.0643	0.0775	0.0869	0.0926	0.0945	0.0945	65 "	135 "
10° and Over	0.0020	0.0080	0.0180	0.0320	0.0500	0.0680	0.0820	0.0920	0.0980	0.1000	0.1000	63 "	137 "
	Offsets for Widening-W'-(in Feet)												
Over 10°-Under 12°	0.06	0.24	0.54	0.96	1.50	2.04	2.46	2.76	2.94	3.00	3.00		
12° - " 15°	0.08	0.32	0.72	1.28	2.00	2.72	3.28	3.68	3.92	4.00	4.00		
15° - " 20°	0.10	0.40	0.90	1.60	2.50	3.40	4.10	4.60	4.90	5.00	5.00		
Over 20°	0.12	0.48	1.08	1.92	3.00	4.08	4.92	5.52	5.88	6.00	6.00		



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 surfacing section, widened in accordance with the plan, offsets for widening, and cross sections.

In the graph below the values for the graph labeled "10° and Over," multiplied by 1,000 gives the percentage of the total widening at any point on the transition.

GENERAL PLAN FOR WIDENING



GRAPH OF SUPERELEVATION TRANSITION FACTORS

The rate of superelevation per foot width of roadway to be applied at the outside edge of the pavement slab, and 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.

The above graph has been prepared from the rates of superelevation shown in the tabulations.

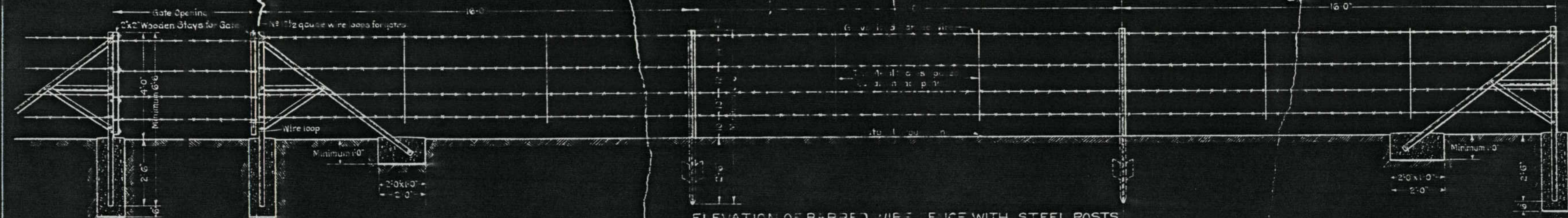
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD METHODS
FOR SUPERELEVATION AND
WIDENING OF CURVES

Designed by S.B.L.
Made by S.B.L.
Checked by C.S.M.
Approved by
Date: Aug. 17, 1932.

STANDARD M-27-A

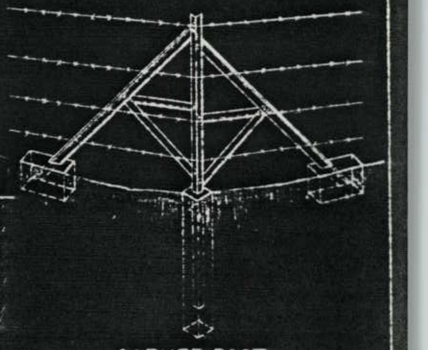
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO	NRM 9E	9	

Revised 1-28-32 A.G.K. Changed notes for gate, end & corner posts.

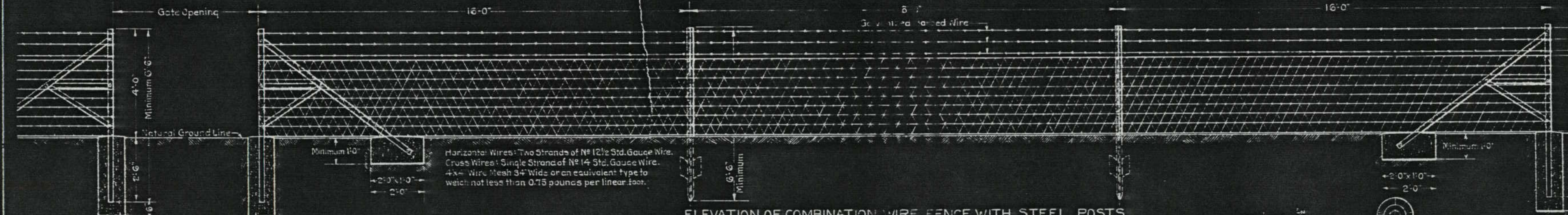


ELEVATION OF BARBED WIRE FENCE WITH STEEL POSTS

ITEM Nº 15



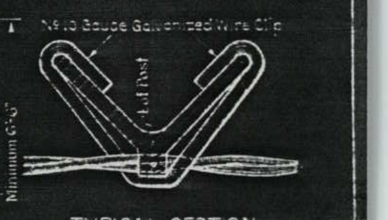
CORNER POST



Horizontal Wires: Two Strands of Nº 12½ Std. Gauge Wire.
Cross Wires: Single Strand of Nº 14 Std. Gauge Wire.
4x4" Wire Mesh 34" Wide or an equivalent type to weigh not less than 0.75 pounds per linear foot.

ELEVATION OF COMBINATION WIRE FENCE WITH STEEL POSTS

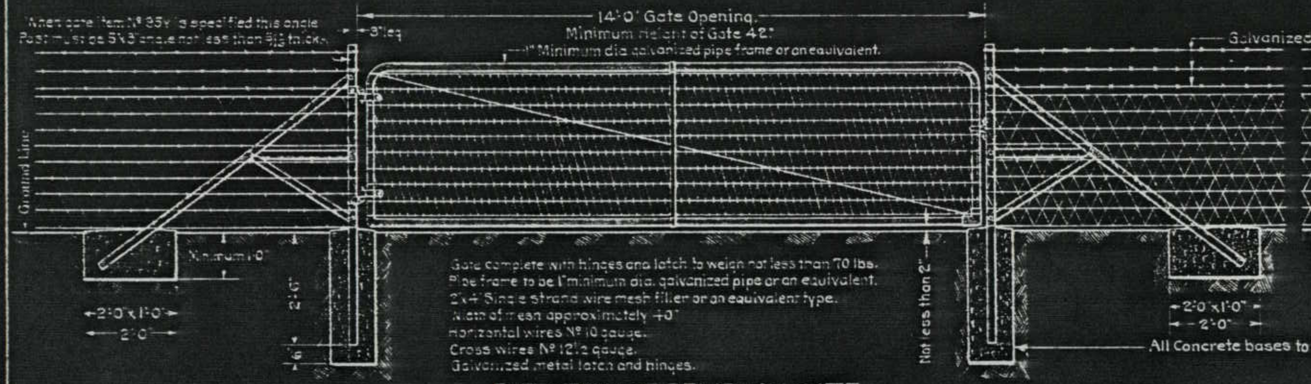
ITEM Nº 15X



TYPICAL SECTION THROUGH FENCE POST

Note: Other sections of equal weight and equivalent strength may be used in lieu of this section.

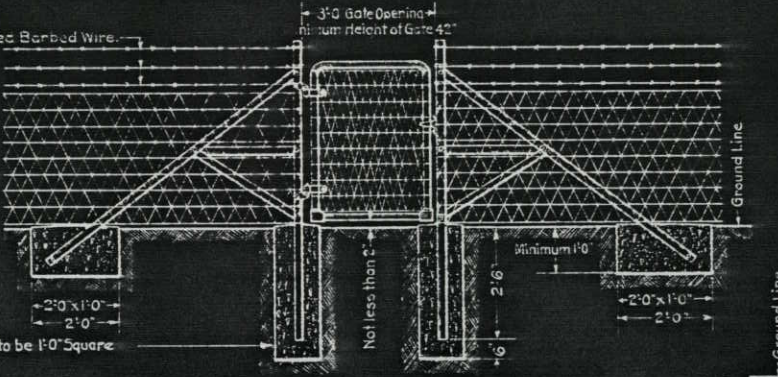
When gate Item Nº 35Y is specified this angle Post must be 5"x3" angle not less than 5/16" thick.



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

ELEVATION OF DRIVEWAY GATE

ITEM Nº 35Y.



Gate complete with hinges and latch to weigh not less than 19 lbs.
Pipe frame to be ¾" minimum dia. galvanized pipe or an equivalent.
2"x4" Single strand wire mesh filler or an equivalent type.
Width of mesh approximately 40".
Horizontal wires Nº 10 gauge.
Cross wires Nº 12½ gauge.
Galvanized metal latch and hinges.

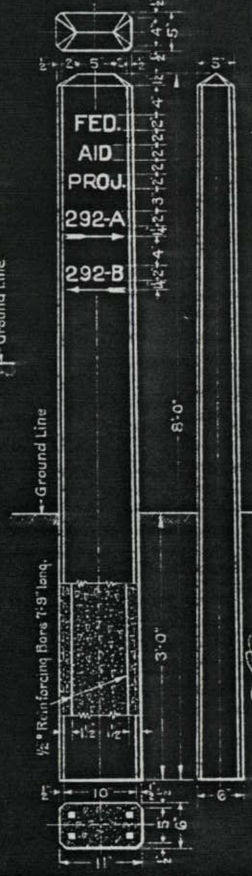
ELEVATION OF WALK GATE

ITEM Nº 95z.

GENERAL NOTES FOR WIRE FENCES

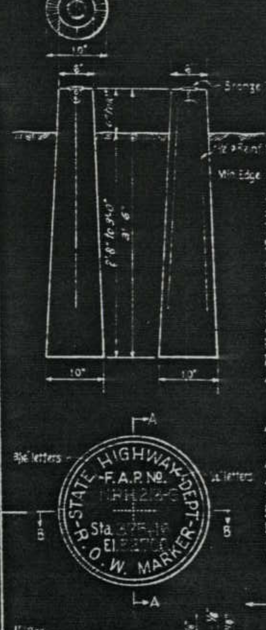
All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department. Adopted January 1-1930.
Barbed wire shall be of standard make, not lighter than Nº 12½ gauge galvanized and with two point barbs spaced not more than 5" apart.
Wire mesh must be galvanized and not lighter than shown and noted on this plan.

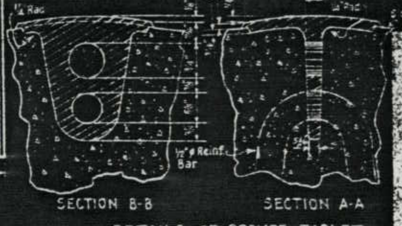
All line posts to be structural steel to weigh not less than 2.00 lbs. per lineal foot.
Suitable anchor plates shall be securely riveted or welded to each line post.
All line posts to be painted with an approved waterproof asphalt or mineral paint or hot dip galv.
All corner, end and gate posts including braces are to be structural steel 2"x2"x¼" angles to weigh not less than 3.19 lbs. per lineal foot, and to be painted with an approved waterproof asphalt or mineral paint or hot dip galvanized, except post supporting driving gate item Nº 35Y.
At all places where intersecting fences are encountered an end post is to be placed with the angle arm at right angles to the line of fence.
All footings or bases shall be of Class "A" concrete with crowned tops and shall be included in the price bid per lineal foot of fence with metal posts.
If knee braces are omitted from end, corner and gate posts the vertical post must be at least 2½"x2½"x¼".



PROJECT MARKER POST

ITEM Nº 78.





DETAILS OF BRONZE TABLET.

RIGHT OF WAY MARKER POST

ITEM Nº 79

NOTES FOR PROJECT MARKER POSTS

All letters and numbers shall be 2½" plain upright block, painted or stenciled on the concrete with a good quality of black paint. See Item Nº 41 "Second Field Coat Dark".
Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed.
Post is to be set with sign facing the road at the end of the project five feet beyond edge of shoulder in such a position that the sign will properly indicate the projects to which it refers.
All work shall be done in accordance with Standard Specifications of the Colorado State Highway Department, adopted on Jan. 1, 1930.
Posts shall be made of Class "D" Concrete (Slump 3" to 6") except use White Portland Cement.
All exposed surfaces shall be rubbed free of form marks.

NOTES FOR R.O.W. MARKER POSTS

All work shall be done in accordance with Standard Specifications of the Colorado State Highway Department, adopted on Jan. 1, 1930.
All exposed surfaces of the Bronze Tablet are to be ground to a smooth surface.
All letters are to be depressed a minimum of 1/16 inch.
Information on the Bronze Tablet indicated by pin lines is to be stamped in the field by the engineering party, after post is placed, 3/16" letters & figures to be used.
Posts shall be made of Class "A" Concrete.
The upper 12 inches of marker shall be rubbed free of form marks, and the top surface of marker must be constructed to drain thoroughly.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD WIRE FENCES
WITH STEEL POSTS
AND
MARKER POSTS

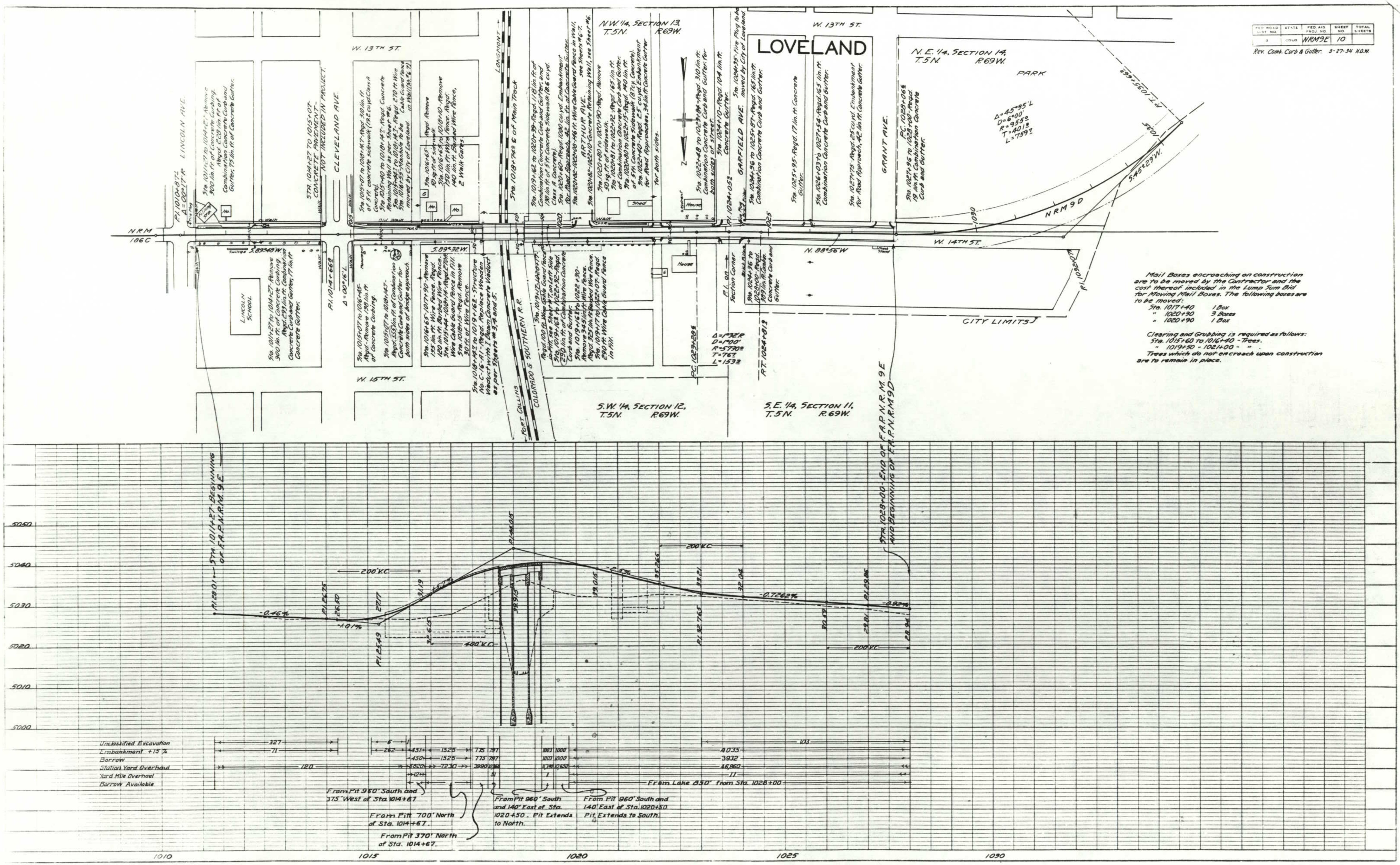
Designed by A.G.K.	Approved by Ed Bailey
Made by A.G.K.	Bridge Engineer
Checked by	Date: Dec. 6th 1932

M-27-A.

STRUCTURE NO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	NRM9E	10	

Rev. Comb. Curb & Gutter. 3-27-34 H.O.W.



Mail Boxes encroaching on construction are to be moved by the Contractor and the cost thereof included in the Lump Sum Bid for Moving Mail Boxes. The following boxes are to be moved:

Sta. 1017+40	1 Box
" 1020+30	3 Boxes
" 1020+90	1 Box

Clearing and Grubbing is required as follows:
Sta. 1015+60 to 1016+40 - Trees.
" 1019+50 - 1021+00 - " .

Trees which do not encroach upon construction are to remain in place.

PLATE 1 - PLAN-PROFILE. C. P. R. & I. E. STANDARD
KEUFFEL & ESSER CO. NEW YORK