FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E-9D	1	

COLORADO
STATE HIGHWAY DEPARTMENT

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

INDEX OF SHEETS

CONVENTIONAL SIGNS

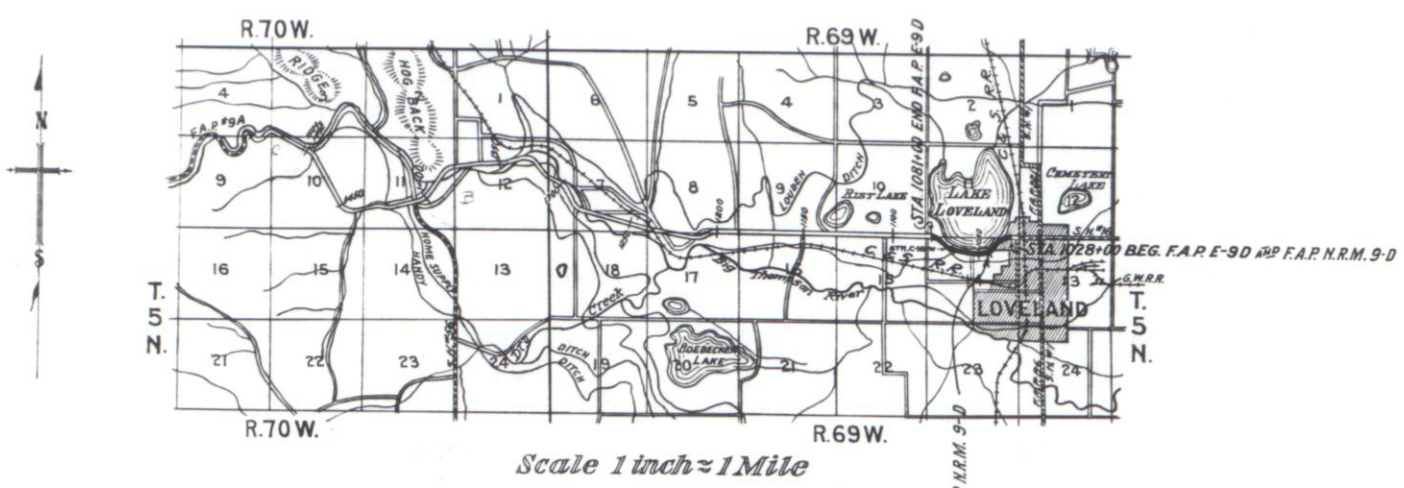
CENTER LINE OF SURVEY 1025
RIGHT OF WAY LINE
TOWNSHIP LINE
SECTION LINE
ONE QUARTER SECTION LINE
BARBED WIRE FENCE
WIRE CABLE GUARD FENCE
RAILROAD
POLE LINES

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 } 5,270.8 FT. = 0.998 MI.
NET LENGTH OF PROJECT }



Scale 1 inch = 1 Mile

RECOMMENDED FOR APPROVAL 1/12/32
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

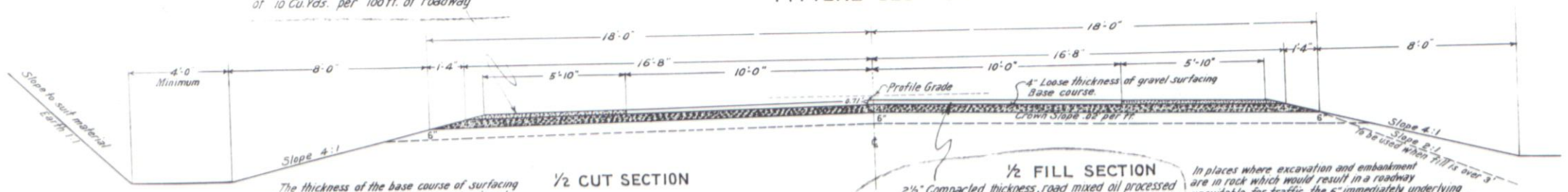
F.A.S. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E-9 D N.R.M.9-D	2	

Rev. 1-18-33 Rpl.
Rev. 9-18-33 for N.R.M. 9-D. H.O.W.

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

N.R.M. 9-D Shoulder surfacing is to be placed at the rate of 10 Cu.Yds. per 100 ft. of roadway

TYPICAL SECTION



The thickness of the base course of surfacing material is to be considered as approximate only. Surfacing material is to be placed at the rate of 60 Tons per 100 feet of Road.

½ CUT SECTION

½ FILL SECTION

2½" Compacted thickness, road mixed oil processed surfacing is to be constructed under F.A.P. № N.R.M. 9-D 33 Tons of surfacing per 100 ft. of roadway are to be used.

In places where excavation and embankment are in rock which would result in a roadway unsuitable for traffic, the 6" immediately underlying the subgrade, as shown on the Typical Section, is to be constructed of selected material which is to be classified and paid for as "Unclassified Excavation".

GENERAL NOTES

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

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

All curves are to be superelevated and widened as provided for by the Standard Superelevation Sheet included with the plans.

All Roadway excavations required to construct this Project are to be obtained as indicated on the plans. Quantities involved beyond the limits of the ditch as shown on the Typical Section, either noted on 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.

The entire Project is to be cleared for the full width of the Right of Way, and the cost thereof is to be included in the lump sum price for Clearing and Grubbing the entire Project. Notes on the plans indicate the approximate location and character of the Clearing and Grubbing required.

All poles encroaching on Construction are to be removed by the owners.

All Embankment material obtained from Borrow Pits in the bed of Lake Loveland is to be taken in such a manner that no vertical banks will be left in Borrow Pits and said Pits are to be neatly trimmed and sloped to drain. No Borrow shall be obtained near the toe of present dam and the rip-rap on Dam must not be disturbed.

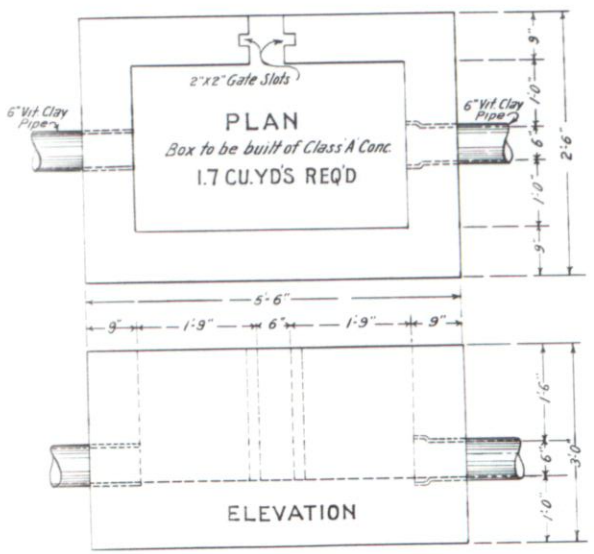
Except as limited by the Special Provisions, power equipment may be used on this Project.

Oil Processed Top Course is to be constructed under Federal Aid Project № N.R.M. 9-D.

ORIGINAL PROJECT E-9-D
SUMMARY OF APPROXIMATE QUANTITIES

ITEM	DESCRIPTION	UNIT	ROADWAY	BRIDGE-1 Spec 23 STA. 1064+	TOTAL
10a	Clearing & Grubbing entire Project	Lump Sum	•		•
11a	Removing 20 structures	" "	•		•
11b	Moving structs. from R of W, Sta. 1030+	" "	•		•
12a	Removing fence	Lin. Ft.	4,300		4,300
13c	Unclass. Excavation	Cu. Yds	23,000		23,000
14a	Dry Rock Excavation (Struct.)	" "	5	234 -5	10
14b	" Comm. "	" "	70	450	520
14c	Wet Rock "	" "	5	95	100
14d	" Comm. "	" "	70	230	300
18a	Sta.-Yard Overhaul	Sta-Yd	79,000		79,000
30x	Gravel or Crushed Rock Surfacing	Ton	3,140		3,140
42a	Untreated Bridge Timber	M. B. M.		0.300	0.300
46a	Class "A" Concrete	Cu. Yd	2	247.3 -245	247
47	Reinforcing Steel	Lbs		25,600	25,600
48	Structural Steel	"		30,100	30,100
53a	15" Corr. Met. Culv. Pipe	Lin. Ft.	56		56
53b	18" " " " "	" "	426		426
53c	24" " " " "	" "	62		62
65	Dry Rubble Slope Pav., 1½' thick	Sq. Yds	1,900		1,900
72	Wire Cable Guard Fence	Lin. Ft.	3,320		3,320
75x	Galv. Barbed Wire Fence. Metal posts	" "	4,900		4,900
75y	Gates in barbed wire fence	Each	5		5
78	Project Markers	"	2		2
79	Right of Way Markers	"	10		10
82	Sheet Copper	Lbs.		50	50
84	Removing Disused Bridge, St. 1064+	Lump Sum		•	•
89	Drain Pipes	Each		2	2
95x	Comb. Wire Fence with metal posts	Lin. Ft.	1,700		1,700
95y	Driveway Gates	Each	4		4
	MATERIALS TO BE FURNISHED & WORK TO BE DONE BY STATE FORCES				
	Moving Hydrants Sta. 1049+ & 1051+ and Stand pipe at Sta. 1057+	Lump Sum	•		
	Replacing Structs. Sta. 1030+	" "	•	(No Fed. Aid)	

174.8
275
650.3



DETAILS OF CONC. DIVISION BOX-STA. 1054+20

FENCING REQUIREMENTS

STATIONS	SIDE	REMOVE LIN. FT.	BUILD: LIN. FT. BARBED WIRE	COMB. WIRE
1028+00 to 1041+40	L.			1,340
1034+90 to 1038+75	R. & X	530		
1041+60	X	110		
1041+40 to 1053+40	L.		1,200	
1042+00 to 1051+50	R.		950	
1047+75 to 1064+00	L.	1,800		
1054+00 to 1081+00	L.		2,700	
1066+00 to 1081+00	L. R. & X	1,860		
1077+50 to 1081+00	R.			350
TOTALS		4,300	4850	1690

GATES

STATIONS	SIDE	BARB. WIRE	DRIVEWAY
1038+60	L.		1
1049+20	L.	1	
1049+60	L.		1
1057+30	L.	1	
1064+00	L.	1	
1069+60	L.	1	
1077+50	R.		1
1078+00	R.		1
1080+50	L.	1	
TOTAL		5	4

RIGHT OF WAY MARKERS

STATIONS	SIDE	NUMBER
1028+00	R. & L.	2
1030+00	R.	1
1053+40	L.	1
1054+00	L.	2
1061+45	L.	2
1081+00	R. & L.	2
TOTAL		10

ORIGINAL PROJECT E-9-D.
LIST OF STRUCTURES

STATIONS	DESCRIPTION	REMOVE STRUCT. Each	UNCLASS. EXCAV Cu. Yds	EMBANK Cu. Yds	STRUCT. EXCAVATION * Cu. Yds	CLASS 'A' CONCRETE Cu. Yds	CORRUGATED METAL PIPE Lin. Ft. 15"	18"	24"	30"	DRY RUBB. SL. PAV'MT. Sq. Yds	WIRE CAB. GD FENCE Lin. Ft.	MISC.
1028+00	Project Marker & Approach			40									Proj. Mrkr
1028+34	Cross Culv. & remove wood box	1				16		78'					
1028+75-1031+25	Ditch change		25										Rem. structs from R/w at Sta. 1030+
1030+00	Road approach			200									
1031+55	Removing Building												
1033+25	" swings					16		60					
1035+89	Cross Culvert							50					
1038+60	Side drain, Rd appr. & Rem wood box	1		50		8			62				
1039+81	Cross Culvert					15		60					
1045+42	Cross Culvert & Channel excav.		20										
1048+60	Remove Concrete walk	1					28						
1049+60	Side drain & Road approach			50									
1049+90	Move Hydrant (State Forces)												
1051+00	" " " "											300	
1050+50-1053+50	Wire Cable Guard Fence on left											1380	
1050+50-1064+30	" " " " " right												
1053+50	Remove Sign	1											
1053+75	R'd approach. Remove Gd fence	1		500									
1053+90	Remove Sign	1											
1054+00	Remove Mail Box	1										980	
1054+10-1064+30	Wire Cable Guard Fence on left					15 1.7							
1054+20	Division Box. Rem. present strict	1											
1056+40	Remove sign	1											
1057+10	" "	1											
1057+25	Remove Stand-pipe (State Forces)	1									960		
1061+50-1064+30	Slope paving on R'y					25							
1062+20	Remove Sign	1											
1063+35	" "	1											
1064+15	" Mail Box	1											
1064+40-1064+83	Conc. I-beam Br. Remove timb. Br.				Quantities in Summary							100	
1064+90-1065+90	Wire Cable Guard Fence on left											560	
1064+90-1070+50	" " " " R'y					25					940		
1064+90-1068+00	Slope Paving on R'y												
1065+75	Road approach			40		5		56					
1068+60	Cross Culvert. Remove 8" tile pipe	1											
1068+90	Remove Sign	1											
1069+20	" "	1											
1069+40	" Mail Box	1						28					
1069+60	Side drain & R'd approach			100									
1072+00	Road approach			40		5		66					
1075+00	Cross Culvert							28					
1077+35	Side drain & R'd appr. Move Mail Box	1		40				28					
1078+00	" " " "			40									Proj. Mrkr
1081+00	Project Marker & Approach		50										
1049+70	Remove Sign	1											
1057+25	Move Stand pipe (State Forces)												
	TOTALS	20	95	1,100		130 1.7		56	426	62		1,900	3,320	

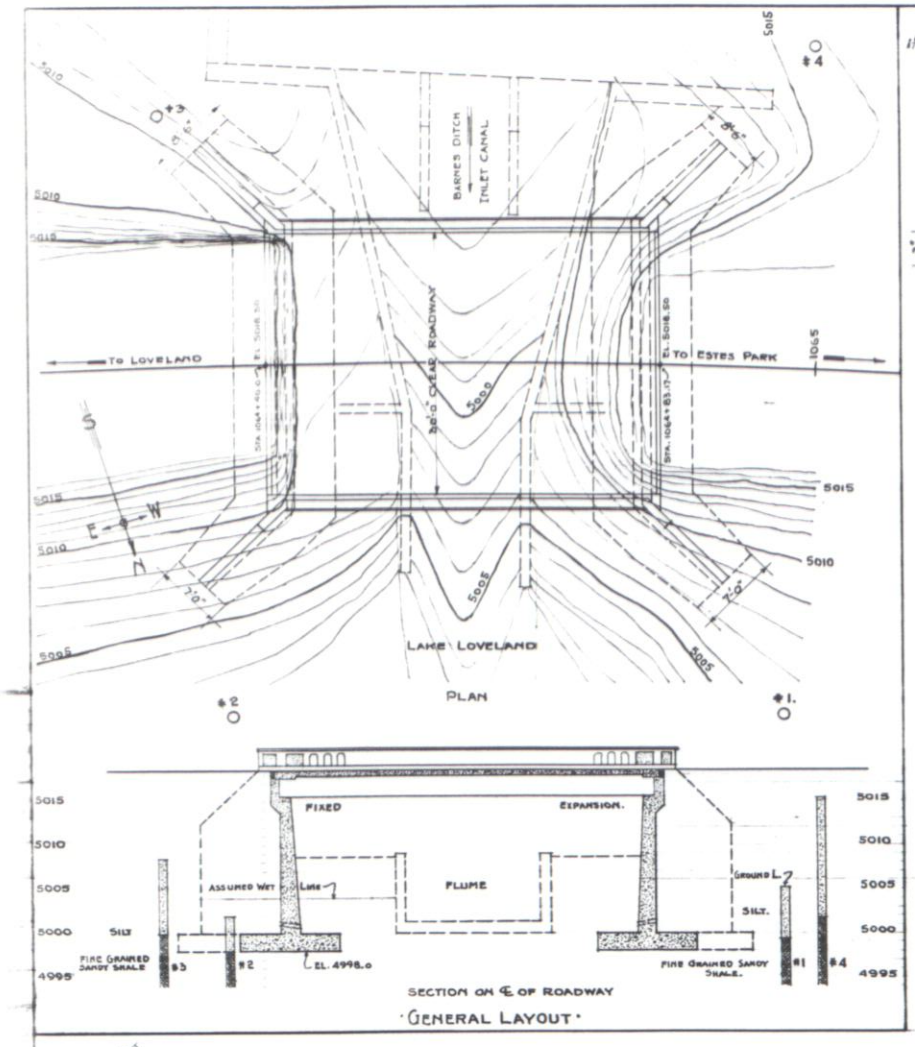
* Structural Excavation is estimated to be 95% Common and 5% Rock, each of which is estimated to be 50% Dry and 50% Wet.

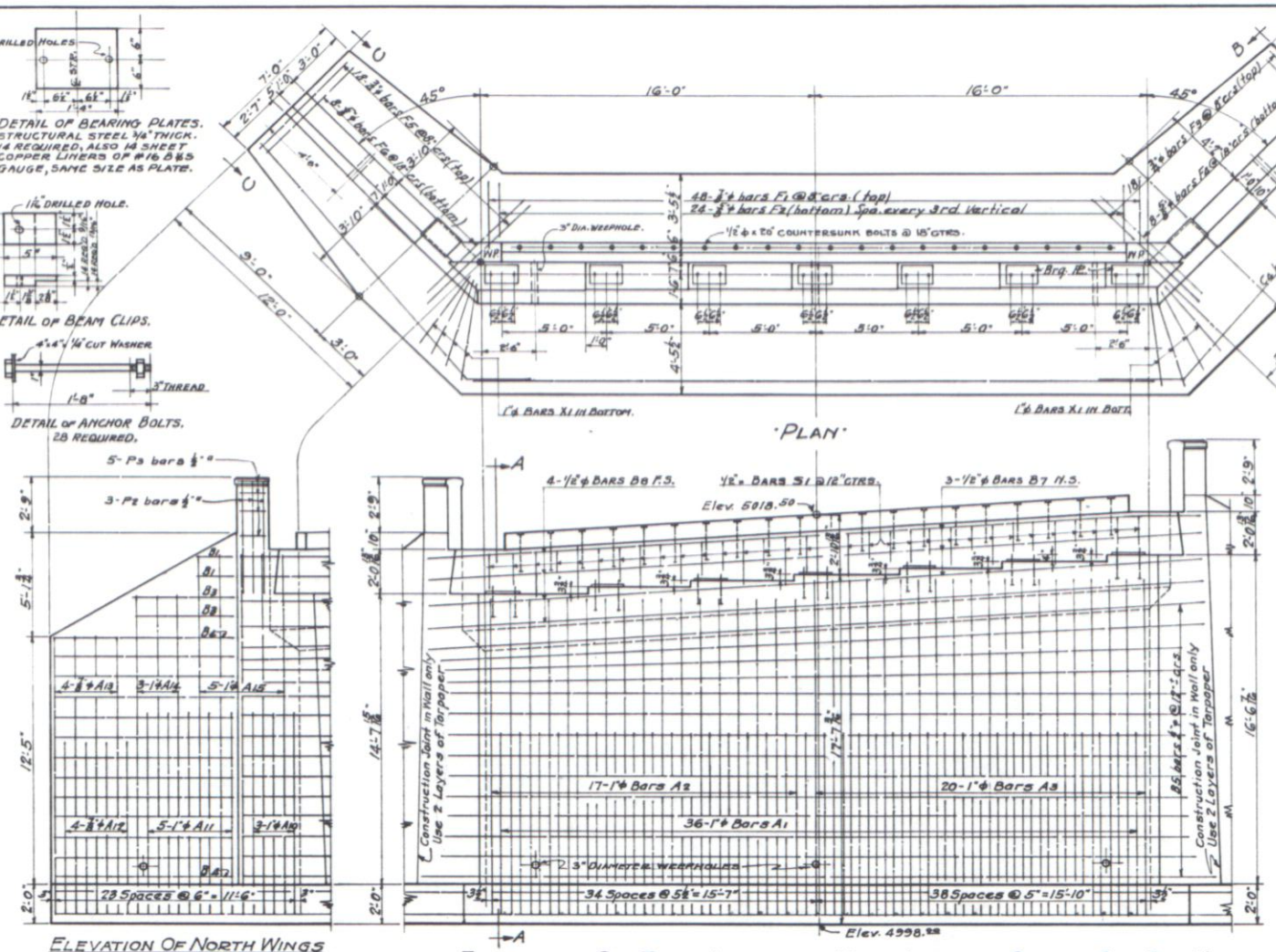
SUMMARY OF APPROXIMATE QUANTITIES N.R.M. 9-D.

Item	Description	Unit	Quantity
31a	Road Mix Oil Processing	Sq. Yd.	3200
31S	Shoulder Surfacing	Cu. Yd.	200
31X	Gravel or Crushed Rock Surfacing (Top.)	Ton.	480
31y	S-C-3 Asphaltic Road Oil	Gal.	7000

Rev. Quantities As Const. 5-18-38 R.A.D.

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





Summary Of Quantities For Entire Structure

D.H.D.

ITEM	DESCRIPTION	EAST ABUTMENT	WEST ABUTMENT	SUPER-STRUCTURE	UNIT	TOTALS
14a	Dry Rock Excavation	119.5	114.5		Cu Yds	234.0
14b	Dry Common "	263.7	212.3		"	476.0
14c.	Wet Rock "				"	—
14d.	Wet Common "				"	—
42a	Untreated Bridge Timber			0.300	M. Ft bm	0.300
46a	Class "A" Concrete	100.5	100.5	44.0	Cu. Yds.	245.0 ♦
47	Reinforcing Steel (1% Overrun Incl)	9330	9330	6900	Lbs.	25444 *
48	Structural Steel (1½% Overrun Incl)	87	87	29941	"	30115
89	Drain Pipes Galv. Iron. 3"x3'-6" Long			2	Pcs.	2
82	Sheet Copper #16 Ga. B.&S.			50	Lbs	50
84	Removing Disused Bridge (Timber)				Lump Sum	
	Expn Joint Mat'l 7/8"x10"			30	Lin. Ft.	30

♦ 2.5 Cu. Yd. Under Floor of Flume Inlet to Lake Loveland.

Bar List For One Abutment

K.B.

Mark	Size	Number	Length	Type	c	m	r	t
A1	1" ♦	36	18'-5"	I	1'-6"	3'-11½"	4"	3½"
A2	1" ♦	17	22'-3"	I	14'-4"	3'-11½"	4"	3½"
A3	1" ♦	20	23'-3"	I	15'-4"	3'-11½"	4"	3½"
A4	1" ♦	4	14'-11½"	I	8'-6"	2'-6"	4"	3½"
A5	1" ♦	3	16'-5"	I	9'-6"	2'-11½"	4"	3½"
A6	1" ♦	3	16'-10⅝"	I	9'-6"	3'-5"	4"	3½"
A7	1" ♦	6	25'-6"	I	18'-4"	3'-0½"	4"	3½"
A8	1" ♦	3	24'-3"	I	17'-4"	2'-11½"	4"	3½"
A9	1" ♦	4	21'-11⅝"	I	15'-6"	2'-6"	4"	3½"
A10	1" ♦	3	15'-3⅜"	I	8'-6"	2'-10"	4"	3½"
A11	1" ♦	5	14'-7⅛"	I	8'-6"	2'-2"	4"	3½"
A12	⅞" ♦	4	12'-3"	I	7'-0"	1'-5⅝"	3½"	3"
A13	⅞" ♦	4	17'-6"	I	12'-3"	1'-5⅝"	3½"	3"
A14	1" ♦	3	20'-4½"	I	14'-4"	2'-1"	4"	3½"
A15	1" ♦	5	23'-0"	I	16'-5"	2'-7⅛"	4"	3½"
F1	⅞" ♦	48	8'-10"	II	7'-6"		3½"	3"
F2	⅞" ♦	24	7'-4"	II	6'-6"		2½"	2"
F3	⅞" ♦	18	7'-8"	II	6'-8"		3"	2½"
F4	⅞" ♦	8	7'-0"	II	6'-2"		2½"	2"
F5	⅞" ♦	18	7'-4"	II	6'-6"		3"	2½"
F6	⅞" ♦	8	6'-8"	II	5'-10"		2½"	2"
S1	1/2" ♦	27	11'-2"	III			2'-0"	2'-0"

Mark	Size	Number	Length	Type	c	m
P2	½" ♦	6	5'-6"	—		
P3	½" ♦	10	1'-3"	—		
B1	½" ♦	2	1'-9"	—		
B2	½" ♦	1	2'-2"	—		
B3	½" ♦	4	4'-9"	—		
B5	½" ♦	14	37'-11"	IV	32'-3"	2'-10"
B6	½" ♦	1	33'-0"	—		
B7	½" ♦	3	38'-2"	IV	34'-8"	1'-9"
B8	½" ♦	4	36'-9"	IV	34'-8"	1'-3"
C1	½" ♦	8	32'-0"	—		
C2	½" ♦	4	12'-0"	—		
C3	½" ♦	4	15'-0"	—		
C4	½" ♦	2	18'-6"	—		

2276 Lin ft 1" ♦ bar @ 2.670 Lbs/Lin ft. = 6077 Lbs

543	- ⅛" ♦	- 2.044	- - -	= 1110 -
270	- ¼" ♦	- 1.502	- - -	= 406 -
283	- ⅜" ♦	- 1.043	- - -	= 297 -
403	- ½" ♦	- 0.850	- - -	= 343 -
1503	- ⅝" ♦	- 0.668	- - -	= 1004 -

Bending Diagrams.

Bar List for Superstructure.

K.B.

MARK	SIZE	NO	LENGTH	BENDING DIAGRAM
E1	⅞" ♦	134	34'-0"	
E2	⅞" ♦	96	22'-1"	STRAIGHT.
D1	⅞" ♦	34	33'-10"	
H1	⅞" ♦	26	10'-2"	STRAIGHT
H2	⅞" ♦	8	4'-9"	STRAIGHT
H3	⅞" ♦	8	4'-4"	STRAIGHT.
P1	⅞" ♦	54	6'-6"	

2160 Lin. Ft. ⅞" ♦ Bars @ 0.668 Lbs. per Lin. Ft. = 1416 Lbs.
6374 Lin. Ft. ⅞" ♦ Bars @ 0.850 Lbs. per Lin. Ft. = 5410 Lbs.
1% ± for Overrun = 66 Lbs.
TOTAL = 6900 Lbs.

General Notes

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 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. FLOOR SLAB AND CURB SHALL BE POURED MONOLITHICALLY. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS PLACED. FOOTINGS IN ROCK SHALL BE PLUGGED OUT TO THE ROCK AND NOT FORMED. STRUCTURE IS DESIGNED FOR A ¼" CONCRETE WEARING SURFACE. ALL REINFORCING BARS SHALL BE BENT OR SPACED, AS SHOWN AND NOTED. ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION SECURELY BEFORE WHICH SHALL BE PLACED. 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

* Scale Weight.

Loading Data.

L.L. A.A.S.H.O. CLASS "A" (H 15) AUGUST 1926.
D.L. ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE, WHICH INCLUDES THE ¼" CONCRETE MONOLITHIC WEARING SURFACE.

COLORADO
STATE HIGHWAY DEPARTMENT

CONCRETE I BEAM BRIDGE
40'-0" SPAN 30'-0" ROADWAY.

Across BARNES DITCH INLET CANAL.
Sta. 1064 + 40.00 to 1064 + 83.17
Near LOVELAND. Sec. 14 T. 5N. R. 69 W.

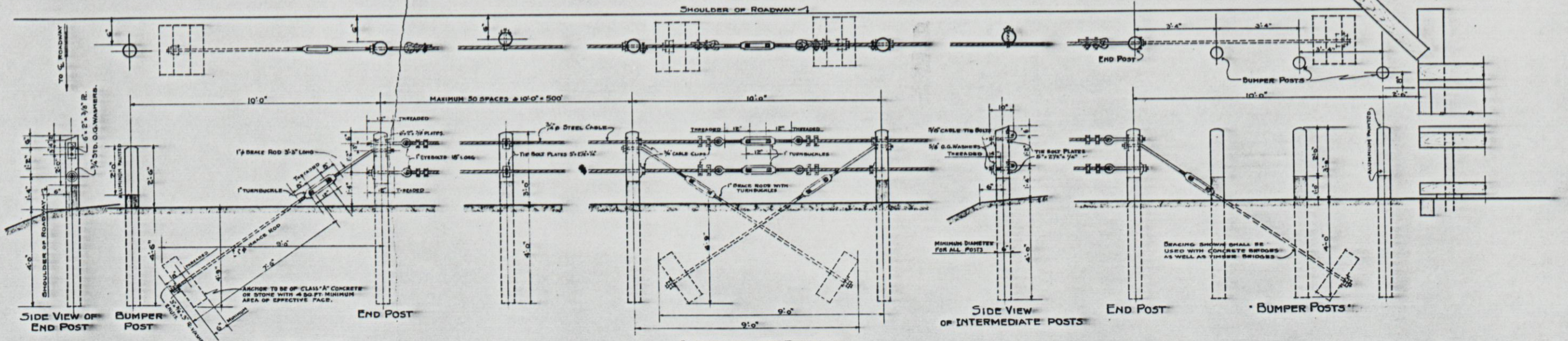
Designed by H.W.D.	Approved by [illegible]
Made by H.W.D.-O.H.D.	Bridge Engineer
Checked by [illegible]	Date: [illegible] 1938

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

STANDARD
M-20-F.

STANDARD WIRE CABLE GUARD FENCE WITH TIMBER POSTS.

ITEM Nº 72



GENERAL NOTES.

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 1, 1930.

THE LENGTH OF GUARD FENCE TO BE PAID FOR AND DESIGNATED ON SHEET M-12 SHALL BE MEASURED FROM END POST TO END POST.

THE PRICE PER LINEAR FOOT SHALL BE AS SPECIFIED IN ITEM M-72 OF THE STANDARD SPECIFICATIONS AND SHALL INCLUDE THE NECESSARY BUMPER POSTS AND BRACINGS COMPLETE.

WHEN CONTINUOUS FENCE IS MORE THAN 500 FT. IN LENGTH, IT SHALL HAVE INTERMEDIATE SPLICES AND ANCHORS.

ALL POSTS SHALL BE MADE FROM SEASONED, STRAIGHT, SOUND LODGE POLE PINE, SOUTHERN YELLOW PINE OR [redacted]

NO SECTION OF POSTS SHALL BE LESS THAN 6" IN DIAMETER.

ALL POSTS SHALL BE ENTIRELY PEELED AND SHAVED, THOROLY SEASONED AND DRY, TOPS BEVELED AND ALL HOLES DRILLED BEFORE TREATMENT IS APPLIED.

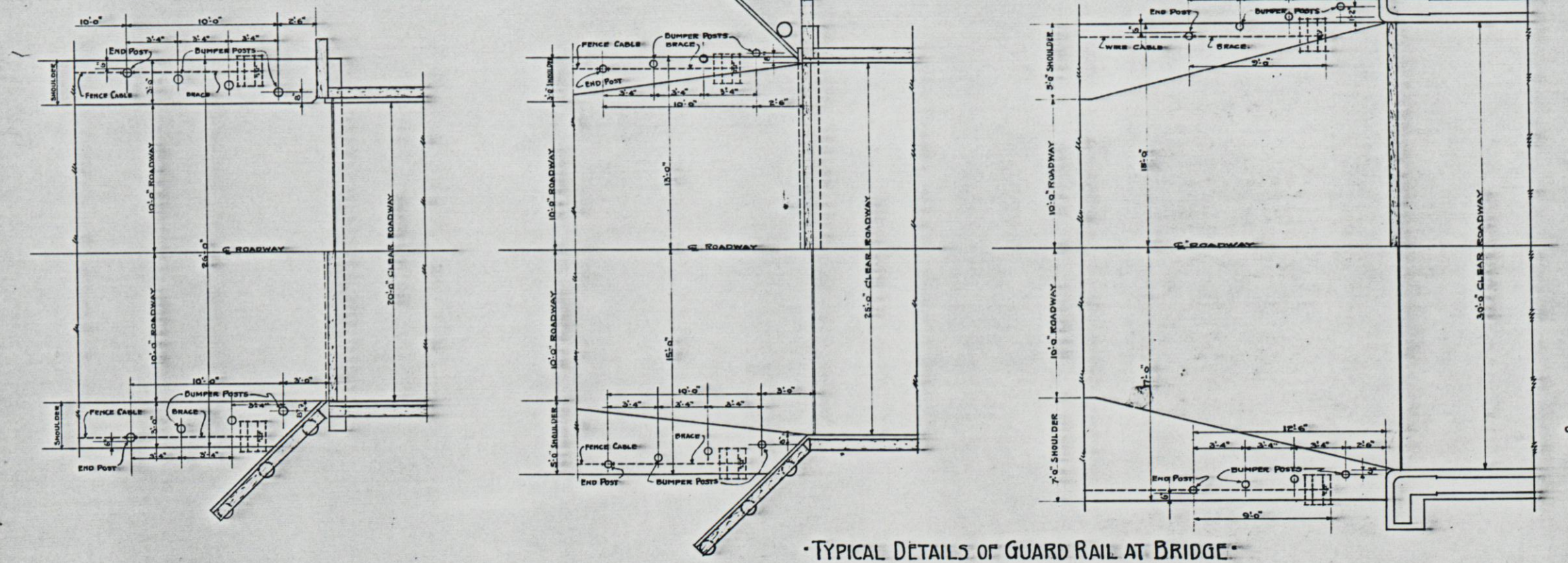
ALL POSTS SHALL BE PRESSURE TREATED WITH CREOSOTE FOR THE FULL LENGTH OF POSTS, AS PROVIDED FOR IN THE SPECIFICATIONS. THE TOP TWO (2) FEET OF EACH POST SHALL BE GIVEN TWO (2) COATS OF APPROVED ALUMINUM PAINT.

ALL POSTS SHALL BE SET AND TAMPED IN PLUMB AND FIRM, TO THE LINES AND GRADES DIRECTED BY THE ENGINEER.

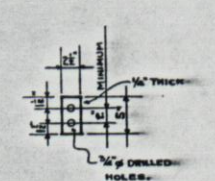
ALL FITTINGS SHALL BE HOT DIP GALV. STEEL, WITH SIZES AS NOTED AND LOCATED AS SHOWN.

EYE BOLTS SHALL BE WELDED OR DROP FORGED.

STANDARD CAST IRON O.G. WASHERS SHALL BE USED UNDER ALL NUTS AND CABLE CLIPS IN CONTACT WITH WOOD POSTS.



TYPICAL DETAILS OF GUARD RAIL AT BRIDGE.



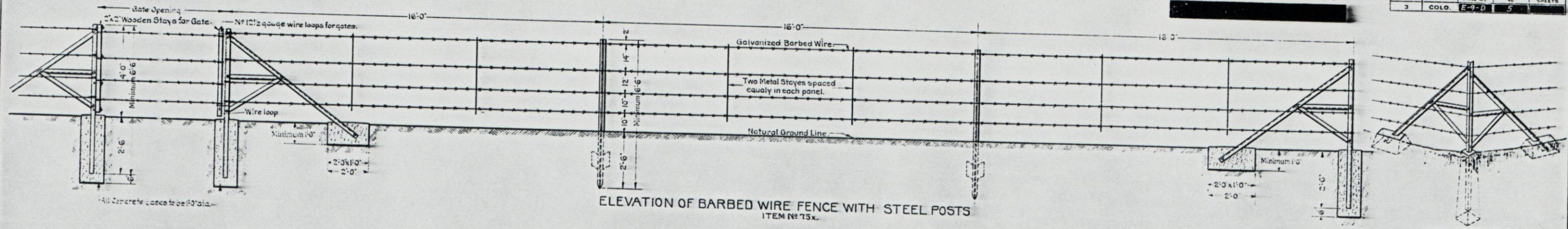
DETAIL OF TIE BOLT PLATE.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
WIRE CABLE GUARD FENCE

Designed by G.H.D.	Approved by Rol Conley
Made by G.H.D.	Bridge Engineer
Checked by E.B.W.	Date: Nov. 20th 1931.

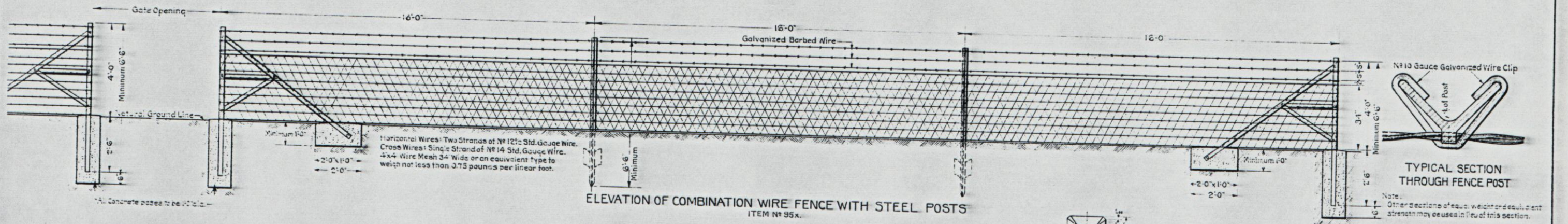
STANDARD M-27-A

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E-9-D	5	



ELEVATION OF BARBED WIRE FENCE WITH STEEL POSTS
ITEM № 73x.

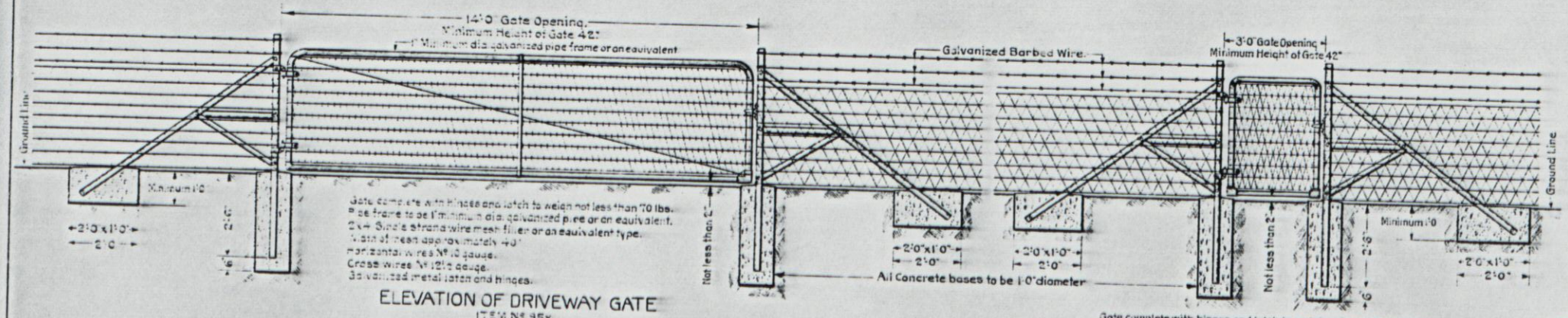
CORNER POST



ELEVATION OF COMBINATION WIRE FENCE WITH STEEL POSTS
ITEM № 95x.

TYPICAL SECTION THROUGH FENCE POST

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



ELEVATION OF DRIVEWAY GATE
ITEM № 95y.

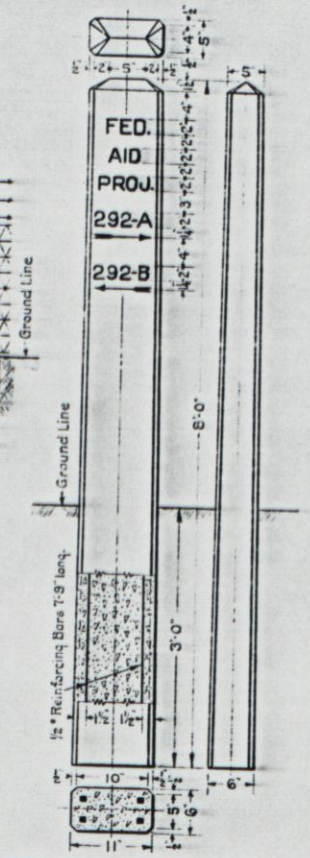
Gate complete with hinges and latch to weigh not less than 70 lbs.
Pipe frame to be 1" minimum dia. galvanized pipe or an equivalent.
2x4 Single strand wire mesh filler or an equivalent type.
Width of mesh approximately 40"
Horizontal wires № 10 gauge.
Cross wires № 12½ gauge.
Galvanized metal latch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

ELEVATION OF WALK GATE
ITEM № 95z.

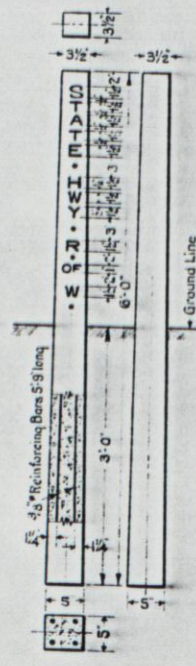
Gate complete with hinges and latch to weigh not less than 19 lbs.
Pipe frame to be ¾" minimum dia. galvanized pipe or an equivalent.
2"x4" Single Strand wire mesh filler or an equivalent type.
Width of mesh approximately 40".
Horizontal wires № 10 gauge.
Cross wires № 12½ gauge.
Galvanized metal latch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

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 № 12½ gauge galvanized and with two point barbs 4 spaces not more than 5" apart.
Wire mesh must be galvanized and not lighter than shown and noted on this plan.
Wire mesh used in driveway gates shall be painted with an approved waterproof asphalt or mineral paint.
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 wire 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 2x2"x¼" angles to weigh not less than 3.18 lbs. per lineal foot, and to be painted with an approved waterproof asphalt or mineral paint or hot dip galvanized.
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.



PROJECT MARKER POST
ITEM № 78.



RIGHT OF WAY MARKER POST
ITEM № 79.

NOTES FOR PROJECT MARKER POSTS

All letters and numbers shall be 2" plain upright block, painted or stenciled on the concrete with a good quality of black paint. See Item № 41 "Second Field Coat Work".
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.

NOTES FOR RIGHT OF WAY MARKER POSTS

All letters shall be 1½" plain and depressed ¼ inch.
Post shall be set with lettering facing the road at points indicated on the plans.

GENERAL NOTES FOR MARKER POSTS

All work shall be done in accordance with the Standard Specifications of The Colorado State Highway Department, Adopted January 1-1930.
Posts shall be made of class "D" concrete (slump 3 to 6") except use White Portland Cement.
Reinforcing Bars shall be round or square, plain or deformed as shown and noted.
All exposed surfaces shall be rubbed free of form marks.

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

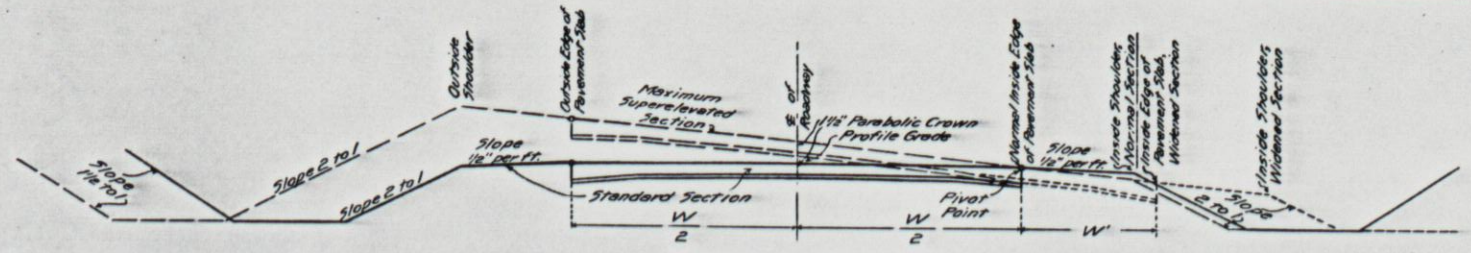
Designed by A.G.K.	Approved by C. D. Barley
Made by A.G.K.	Bridge Engineer
Checked by	Date: Dec. 6th 1932.

M-27-A.

STRUCTURE NO._____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E-7-D	6	

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 0.04 ft. per foot width until the superelevation rate exceeds this standard slope.

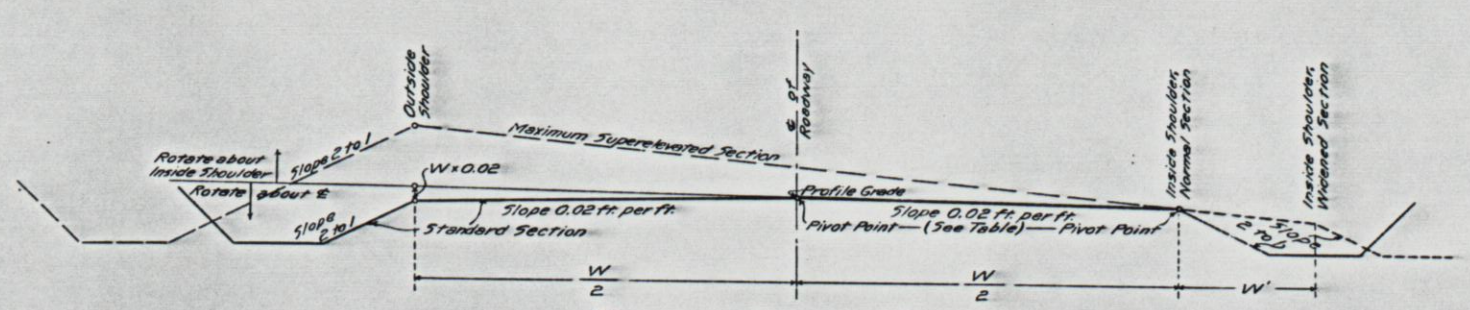
The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

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 = P.C.	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	0.0258	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.

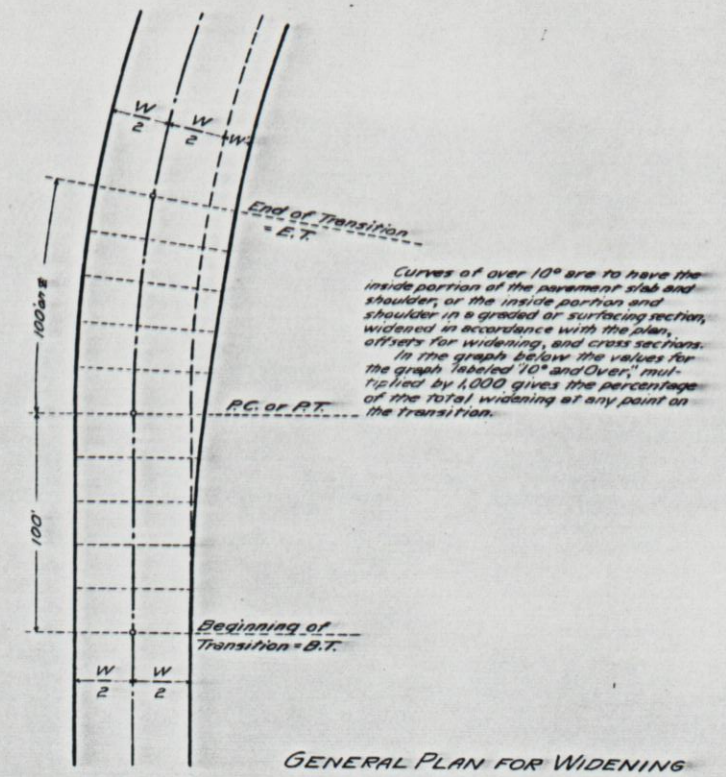
The center line pivot point is to be used as long as the superelevation does not exceed 0.02 feet per foot width of roadway. The normal inside shoulder pivot point is to be used for a superelevation rate in excess of 0.02 ft. per foot width of roadway.

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

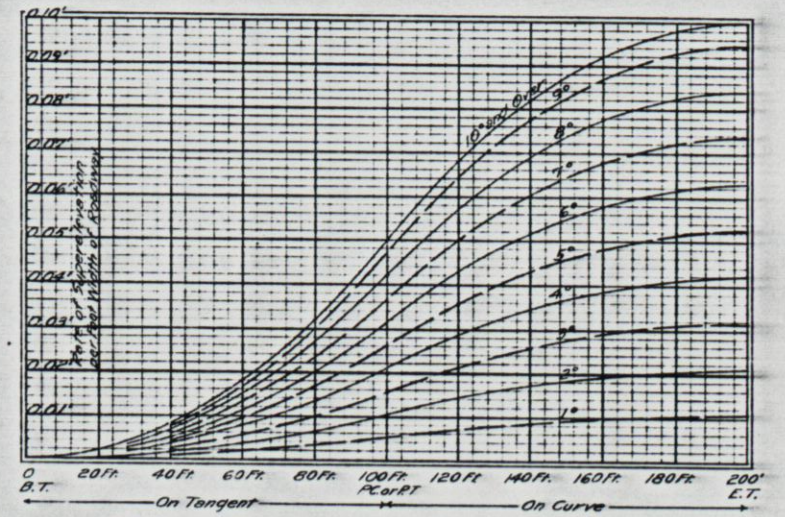
Distance from B.T.	20 Ft.	40 Ft.	60 Ft.	80 Ft.	100 Ft = P.C.	120 Ft.	140 Ft.	160 Ft.	180 Ft.	200' = E.T.	On Curve	Length of Transition Rotated about	
Factor	0.02	0.08	0.18	0.32	0.50	0.68	0.82	0.92	0.98	1.00	1.00	Center Line	Inside Shoulder
Degree of Curve	Rate of Superelevation (in Feet) per Foot Width 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	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	113 "	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	0.0580	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		



GENERAL PLAN FOR WIDENING

Curves of over 10° are to have the inside portion of the pavement slab and shoulder, or the inside portion and shoulder in a graded or 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.



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.

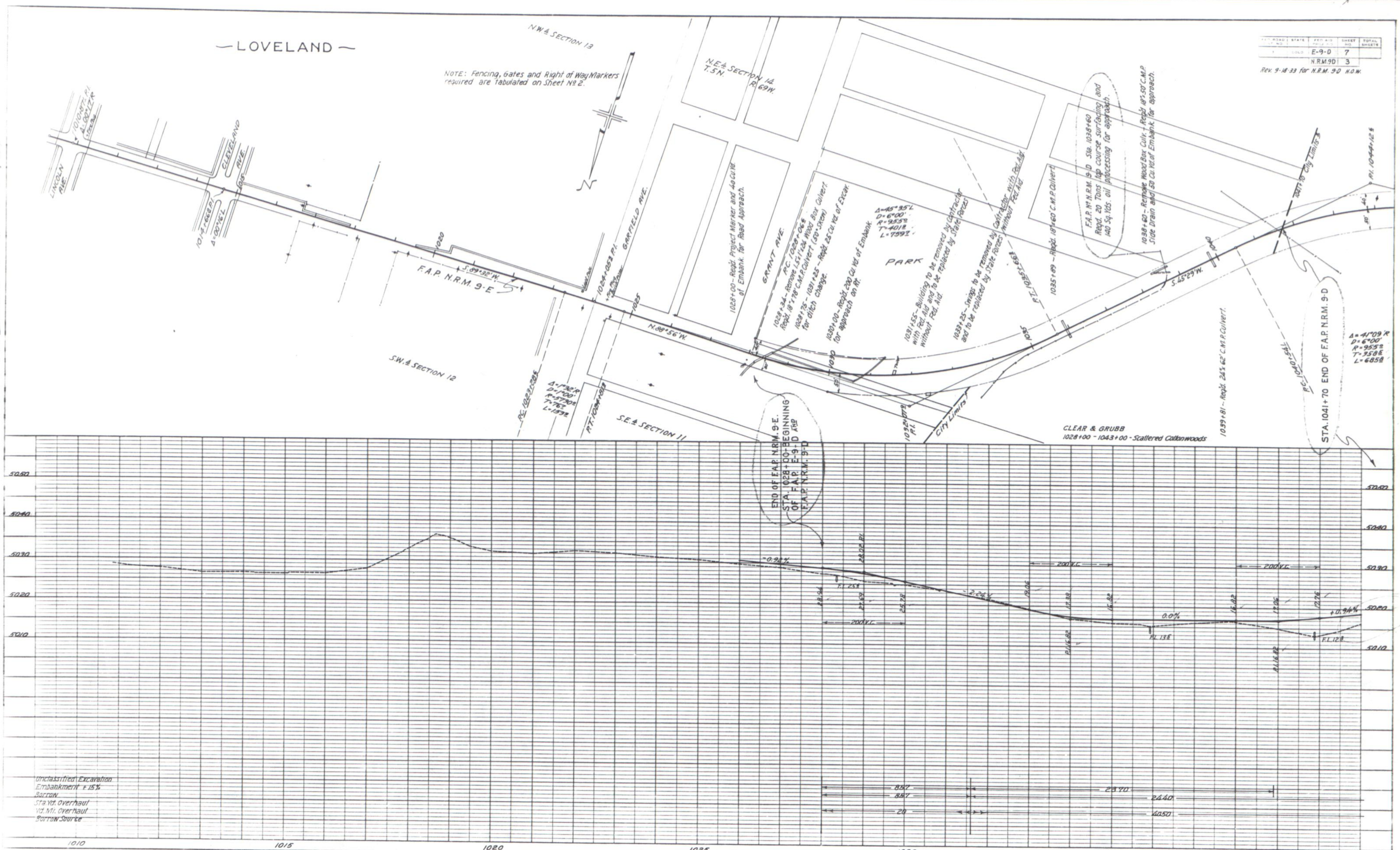
The maximum superelevation of 0.10 ft. per foot width, applying to curves of 10° and over, is not to be exceeded.

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.	Approved by
Made by S.B.L.	
Checked by [illegible]	Date: Aug. 17, 1932.



Fed. Road Dist. No.	State	Fed. Aid Project No.	Sheet No.	Total Sheets
	COLO.	E-9-D	7	
		N.R.M. 9D	3	

Rev. 9-18-33 for N.R.M. 9-D R.O.W.

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
1	COLO	E-9-D	8	

Rev. 1-18-33 — Rel.

N.E.¼ SECTION 14. T. 5 N. R. 69 W.

N.W.¼ SECTION 14

1045+42 – Regd. 18"x40' C.M.P. Culvert and 20 Cu Yd. of Channel excavation

1048+60 – Remove Conc. Walk

1049+70 – Remove Sign

1049+90 – Hydrant to be moved by State Forces.

1057+00 – Hydrant to be moved by State Forces

1053+50 – Remove Sign

1053+90 – Remove Sign

1054+80 – Remove Mail Box

P.I. 1054+46.2

1056+40 – Remove Sign

1057+10 – Remove Sign

1057+25 – Standpipe to be moved by State Forces.

1062+20 – Remove Sign

1063+35 – Remove Sign

1064+15 – Remove Mail Box

Barnes Tract

1065+35 – Regd. 40 Cu Yd. of Embank. for approach on Lt.

P.I. 1065+95.8

1068+60 – Remove 8" Tile Culv. – Regd. 18"x 60' C.M.P. Culv.

1068+90 – Remove Sign.

1069+20 – Remove Sign.

1069+40 – Remove Mail Box

1069+60 – Regd. 15"x 28' C.M.P. Side Drain and 100 Cu Yd. of Embank. for approach.

1072+00 – Regd. 40 Cu Yd. of Embank. for approach.

P.C. 1072+14.6 (6° Left)

Fd. 1041+ 1.2 W.

1045

S. 86°38' W.

Valve House to remain in place.

N. 78°55' W.

1060

N. 49°09' W.

1070

City Limit

Loveland

1040

S. 45°09' W.

Δ=4°09' R
D=6°00'
R=955.8
T=358.5
L=685.8

P.C. 1040+82.2

P.T. 1047+39.8

Reconstruct High Water Line

1049+60 – Regd. 15"x 28' C.M.P. Drain and 50 Cu Yd. of Embank. for approach on Lt.

CLEAR & GRUBB. – 1043+00 – 1072+00 – Scattered Cottonwood and Apple Trees.

P.C. 1053+01.8

1053+75 – Regd. 500 Cu Yd. of Embank. for approach on Lt. – Remove Guard Fence on Rt.

1054+20 – Remove Division Box. Regd. New Division Box as per details on Sheet No 2.

Δ=14°27'R
D=5°00'
R=1146.2
T=145.2
L=289.2

P.T. 1055+90.8

1061+50 – 1064+20 – Regd. 960 Sq. Yd. of Dry Rubble Slope Paving 18" thick on Rt.

1050+50	– 1053+50	Regd. 300 Lin. Ft. of Guard Fence on	Lt.
1050+50	– 1064+30	" 1380 " " "	" Rt.
1054+10	– 1064+30	" 980 " " "	" Lt.
1064+90	– 1065+90	" 100 " " "	" Lt.
1064+90	– 1070+50	" 560 " " "	" Rt.

P.C. 1063+40.2

1064+40.4 to 1064+89.4 – Remove Timber Bridge. Regd. Conc. I Beam Bridge as per details on Sheet No 3.

Δ=29°43'R
D=10°00'
R=573.9
T=152.4
L=297.5

1064+90 – 1068+00 – Regd. 960 Sq. Yd. of Dry Rubble Slope Paving 18" thick on Rt.

P.T. 1068+37.6 Back
1068+35.8 Ahead

P.C. 1072+14.6 (6° Left)

1072+00 – Regd. 40 Cu Yd. of Embank. for approach.

LAKE LOVELAND

EQUATION

STRUCTURE NOTES

PRESENT STRUCTURE:
Span – 60'
Clear Roadway – 20'
" Waterway –
Type of superstruct. – Timb. Trestle & Spans
" " substruct. – Timb. Framed Bents
Requirements as to removal – Complete

STREAM DATA:
Drainage area in sq. miles – None
Velocity during high water –
Elevation of Max. High Water — Low Water 0.0'
Normal Stage — Stream Bed
Drift – None
Scour – None

PROPOSED STRUCTURE:
Position referred to present struct. – Same
Span – 40'
Clear Roadway – 20'
" Waterway –
Type of superstruct. – Conc. I Beam
" substruct. – Reinf. Conc. Cant. abuts
Detour structure requirements – None
R.R. Siding – LOVELAND Haul to bridge Site – 1 mi.

NEARBY STRUCTURES ON SAME STREAM:
Location –
Waterway –
Recent flowing floods:

Bridge Grade is on Superelevation on ¢ for Future Pavement.

1065+ 37.6 Back
1065+ 35.8 Ahead

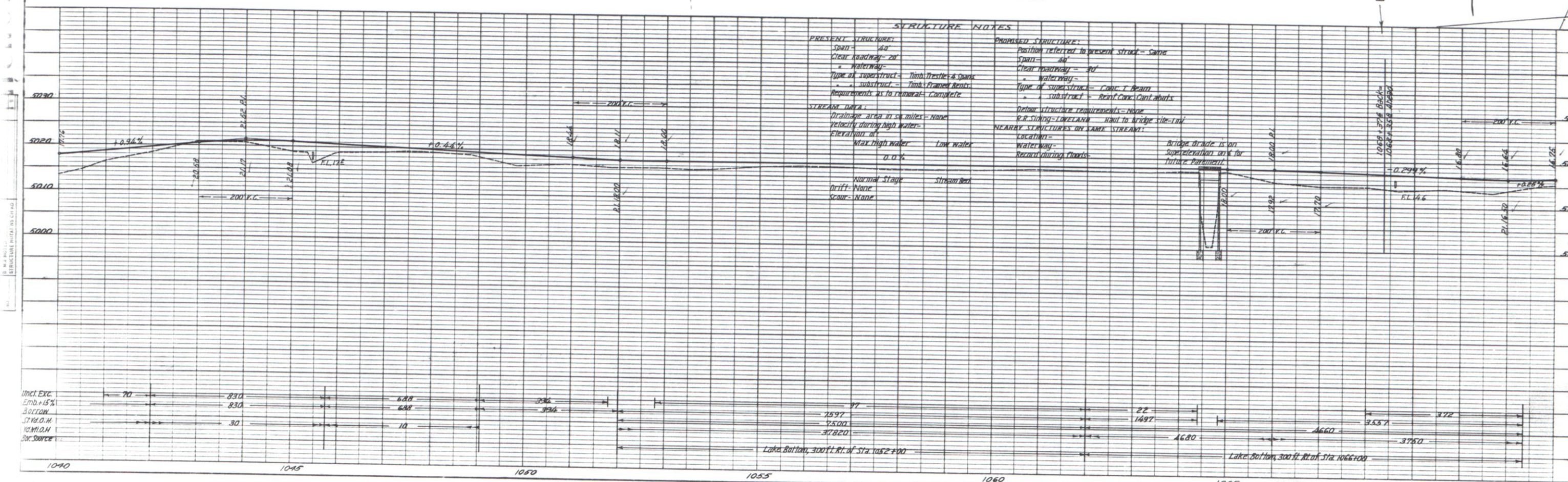


PLATE 1 – PLAN-PROFILE C. F. R. & R. E. STANDARD
KUFFEL & ESSER CO., NEW YORK.

Road / State	Fed. Aid Proj. No.	Sheet No.	Total Sheets
COLO.	E-9-D	9