FED. ROAD DIST. NO	STATE	F.A. PROJ. NO	SHEET NO	TOTAL SHEETS
3	COLO.	113-H	1	

113-C

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED

FEDERAL AID PROJECT 113-H

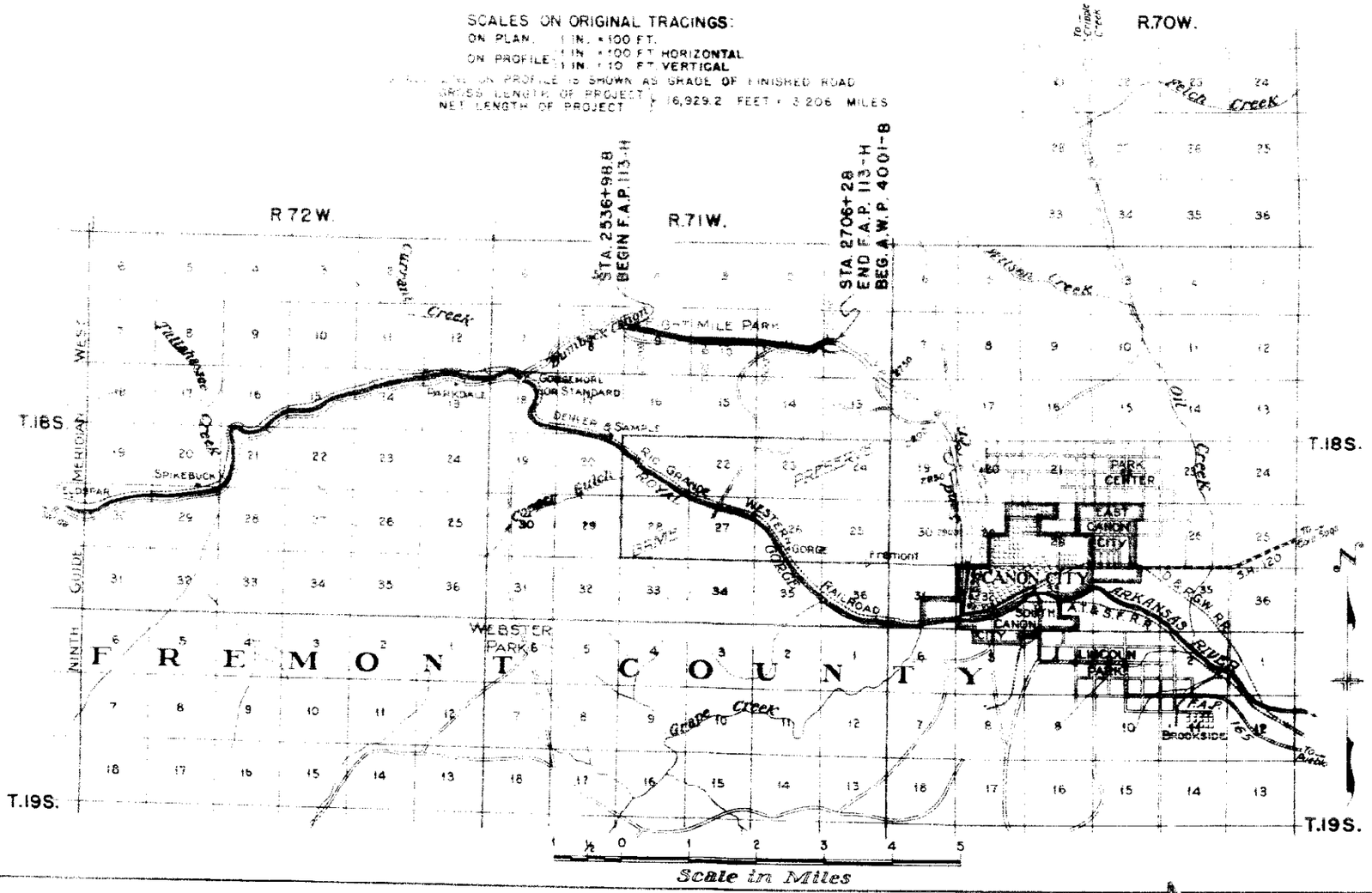
STATE HIGHWAY NO. 6
FREMONT COUNTY

INDEX OF SHEETS

CONVENTIONAL SIGNS

CENTER LINE OF SURVEY 2800
RIGHT OF WAY LINES
TOWNSHIP OR RANGE LINES
SECTION LINES
ONE QUARTER SECTION LINES
BARBED WIRE FENCE
TELEPHONE LINES
POWER LINES

SCALES ON 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 = 16,929.2 FEET = 3.206 MILES
NET LENGTH OF PROJECT



NOTE
It is recommended that Engineers of the Bureau of Public Roads go over the plan details with one of the Colorado representatives of this department.

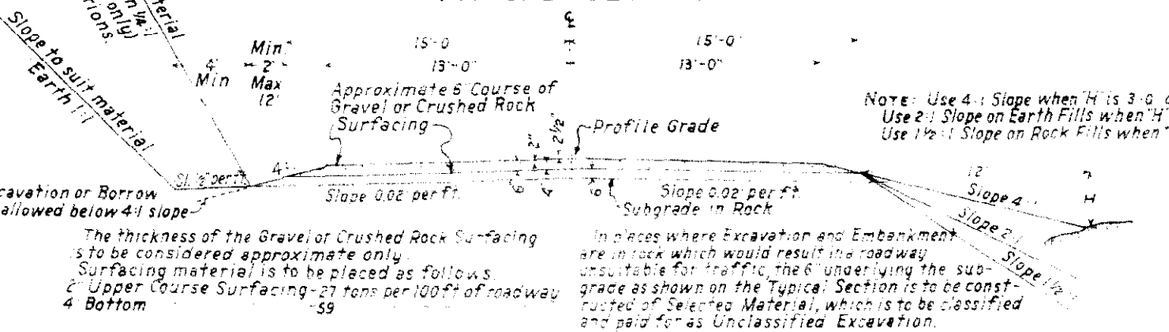
J.D. Bell — Division Engineer — Pueblo
P.S. Tilson — Resident Engineer — Pueblo

RECOMMENDED FOR APPROVAL
ASSISTANT ENGINEER
APPROVED
STATE HIGHWAY ENGINEER
RECOMMENDED FOR APPROVAL
DIVISION ENGINEER, BUREAU PUBLIC ROADS
RECOMMENDED FOR APPROVAL
DIVISION ENGINEER, BUREAU PUBLIC ROADS
APPROVED
DIRECTOR, BUREAU PUBLIC ROADS

FED. ROAD DIST. NO.	STATE	F.A. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	113-H	2	

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

TYPICAL SECTION



The thickness of the Gravel or Crushed Rock Surfacing is to be considered approximate only. Surfacing material is to be placed as follows.
2" Upper Course Surfacing - 27 tons per 100 ft. of roadway
4" Bottom - 59

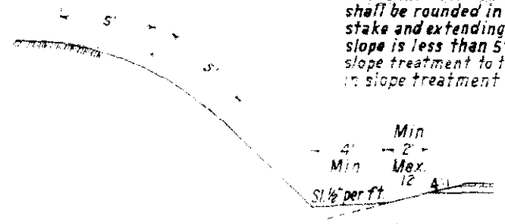
½ CUT SECTION

NOTE: Use 4:1 Slope when "H" is 3'-0" or less
Use 2:1 Slope on Earth Fills when "H" is over 3'-0"
Use 1½:1 Slope on Rock Fills when "H" is over 3'-0

In places where Excavation and Embankment are in rock which would result in the roadway unsuitable for traffic, the 6" 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.

½ FILL SECTION

CUT SLOPE TREATMENT IN EARTH CUTS



The intersection of cut slopes with the existing ground shall be rounded in earth cuts, begining 5' outside the slope stake and extending 5' down the cut slope. Where the cut slope is less than 5', reduce each of the above widths of slope treatment to the actual slope distance. Quantities involved in slope treatment shall not be included in Unclassified Excavation.

GENERAL NOTES

This Project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted Aug 1 1935

All quantities on preliminary plans are to be considered approximate only

All roadway excavation required to construct this Project is to be obtained as indicated on the Plans. Quantities involved beyond the limits of the ditch as shown on the Typical Section, either noted on the Profile as "Borrow" or on the List of Structures as "Embankment" are to be classified and paid for as "Unclassified Excavation"

These quantities will be determined by the Engineer or by cross sections indicated on the plans. Slope stakes beyond the limits of the Typical Section, as shown, are subject to change by the Engineer to fit conditions actually met in construction

All curves are to be superelevated as constructed according to the standard Superelevation Sheet.

All poles encroaching on construction are to be moved by owners

The entire project is to be cleared to the widths which shall be held to the minimum required for the construction of the road, borrow pits, change of grades and widths required to improve visibility. Generally the clearing shall not extend more than eight (8) feet beyond the toes of fills or tops of cut banks and the cost thereof included in the "Lump sum price for "Clearing and Grubbing the Entire Project"

All corrugated metal pipe culverts shall be provided with one headwall on the inlet end unless otherwise noted on the plans.

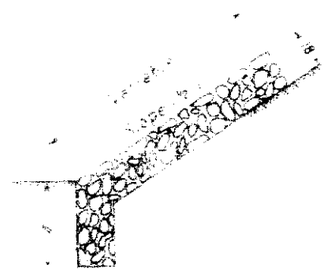
The detour for this Project lies along the present traveled road. At all places on the project where the new work lies along the present traveled road, the Contractor shall, at his own expense, prosecute construction in such a manner that traffic may safely and readily pass over the road. Also the Contractor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

Except where noted on plans, payment for overhaul will be based on measurement along centerline of project

All side approach roads to the Project shall be gravel surfaced with a thickness of "Gravel or Crushed Rock Surfacing" extending approximately 5 ft from the edge of the highway. Estimated tonnage of surfacing material required in this operation in List of Structures

DETAILS OF DRY RUBBLE SLOPE PAVING

STA 2699+00 TO 2699+60 ON LEFT



R.O.W. MARKERS

Station	Side	No.
2538 + 98.6	R & L	2
2562 + 80	L	1
2568 + 96	R	1
2589 + 46	L	1
2589 + 57	R	1
2616 + 62	R & L	2
2644 + 22	L	1
2644 + 31	R	1
2670 + 00	L	2
2671 + 48	L	1
2671 + 64	R	1
2674 + 50	L	2
2685 + 00	R	2
2691 + 53.5	R	2
2695 + 00	R	2
2698 + 72	R	1
2699 + 12	L	1
TOTAL		24

SUMMARY OF APPROXIMATE QUANTITIES

No.	Item	Unit	Totals
10a	Clearing and Grubbing Entire Project	Lump Sum	•
11b	Removal of 11 Structures	" "	•
30a	Removing Fence	Lin. Ft.	9400
130	Unclassified Excavation	Cu. Yd.	80,000
130a	Cut Slope Treatment	Mile	3.9
140a	Dry Rock Excavation (Str.)	Cu. Yd.	870
140b	Dry Common Excavation (Str.)	" "	870
140c	Wet Rock Excavation (Str.)	" "	100
140d	Wet Common Excavation (Str.)	" "	100
188a	Sta. Yard Overhaul	Sta. Yd.	82000
188b	Yard Mile Overhaul	Yd. Mi.	1100
260a	Gravel or Crushed Rock Surfacing	Ton	14770
462a	Class A Concrete	Cu. Yd.	749
462b	" B "	" "	39
471	Reinforcing Steel	Lb.	66800
530	18" Corrugated Metal Culvert Pipe	Lin. Ft.	48
530	24" " " "	" "	976
530	36" " " "	" "	232
651	Dry Rubble Slope Paving (18" thick)	Sq. Yd.	120
741	White Cable Guard Fence	Lin. Ft.	3024
760	Barbed Wire Fence with Untreated Wood Posts	" "	33800
760	Barbed Wire Gates	Each	10
760	Driveway Gates	"	1
810	Project Markers	"	1
810	Right of Way Markers	"	24
820	Cattle Guards (16' Roadway)	"	2
	FORCE ACCOUNT:		
	Obliterating Old Road	Lump Sum	•
	Moving Outhouse off R.O.W. Sta. 2591+	" "	•
	Moving Gas Pumps and Tank off R.O.W. Sta. 2612+	" "	•
	Moving Telephone Line - Sta. 2601 to 2651, 2658 to 2673 and 2681 to 2682. (Work to be done by Telephone Co. Forces.)	" "	•

FED. ROAD DIST. NO.	STATE	F.A.P.	SHEET NO.	TOTAL SHEETS
3	COLO.	113-H	3	

FENCING REQUIRMENTS

STATION	SIDE	REMOVE FENCE LIN. FT.	BUILD B.W. FENCE LIN. FT.	GATES B.W. No.	GATES DRIVEWAY No.
2537+40	X	150			
2544+32	X	110			
2562+92	X	110			
2589+53	X	110			
2589+83	X	110			
2589+83 to 2590+73	R	90			
2590+74 to 2591+79	L	120			
2591+79 to 2592+50	R	80			
2601+10 to 2604+70	R	365			
2604+70 to 2645+50	L	4080			
2605+75 to 2608+75	R	300			
2617+00 to 2647+40	R	3040			
2647+40 to 2650+00	L	260			
2650+00	X	65			
2701+50 to 2702+70	L	120			
2705+40	X	200			
2536+99 to 2589+50	L		5250		
2536+99 to 2589+65	R		5265		
2589+70 to 2706+28	L		11736		
2589+85 to 2706+28	R		11508		
2550+00	R&L			2	
2564+35	L				1
2591+50	L			1	
2600+75	R			1	
2613+70	L			1	
2618+40	R			1	
2628+00	R			1	
2630+80	R			1	
2644+37	R			1	
2653+00	L			1	
TOTALS		9310	33759	10	1

WIRE CABLE GUARD FENCE

STATION	LEFT SIDE LIN. FT.	RIGHT SIDE LIN. FT.
2668+94 to 2672+22	328	
2672+24 to 2675+52	328	
2669+00 to 2674+04		504
2681+60 to 2689+60	200	
2684+52 to 2687+00	248	
2682+04 to 2684+68		264
2684+70 to 2687+34		264
2696+00 to 2698+48		248
2696+30 to 2700+70	440	
2699+50 to 2701+50		200
TOTALS	3024	

TABULATION OF STRUCTURES

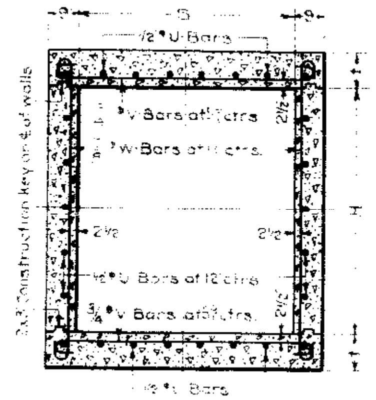
STATION	DESCRIPTION	REMOVE STRUCT. No.	EXCAVATION Cu. Yds. EXCAV.	EXCAVATION Cu. Yds. EMBANK.	STRUCTURAL EXCAV. Cu. Yds. *	CONCRETE Cu. Yds. CL."A"	CONCRETE Cu. Yds. CL."B"	REINF STEEL LBS.	CORR. METAL CULVERT PIPE LIN. FT. 18"	24"	30"	36"	48"	DRY RUBBLE SLOPE PAV. (18" THICK) Sq. Yds.	GRAVEL OR CR. ROCK SURFACING TONS	MISC.
2536+98.8	Project Marker															Project Marker
	Road Approaches, Lt. & Rt.			300											100	
2537+40	Remove 24"x36' C.M.P. Culvert	1														
2538+49	C.M.P. Cross Culvert				5		1.65			64						
2548+00	" " "				5		1.65			60						
2555+80	" " "				5		1.65			46						
2561+30	" " "				15		1.65			56						
2564+35	Road Approaches & Cattle Guard Lt. & Rt.			200											20	2-16' Cattle Guards
2564+50	C.M.P. Cross Culvert				5		1.65			46						
2573+15	" " " & Ditches		60		40		3.00					52				
2579+45	" " "				10		1.65			56						
2582+60	" " "				10		1.65			48						
2588+68	Road Approaches Lt. & Rt.			100											40	
2589+82	C.M.P. Cross Culvert & Ditches		20		15		1.65			48						
2591+53	Remove Outhouse from R.O.W. (FORCE ACCOUNT)															Remove Building from R.O.W. (FORCE ACCOUNT)
2599+00	5'x4'x52' Concrete Box Culvert				55	49.5		4095								
2605+72	5'x4'x48' " " "				110	47.0		3856								
2605+75	Remove 36"x22' Concrete Pipe	1														
2611+78	" 18" Tile Pipe	1														
2611+87	" 18" " "	1														
2612+00-2613+25	Road Approach Rt.		60												20	
2612+35	Remove Gas Pumps & Tank from R.O.W. Rt. (FORCE ACCOUNT)															Remove Gas Pumps & Tank from R.O.W. (FORCE ACCOUNT)
2613+50	5'x4'x36' Concrete Box Culvert & Channels		325		155	39.6		3141								
	Remove 42"x26' Concrete Pipe	1														
2615+62	" 36"x32' " "	1														
	5'x4'x48' Concrete Box Culvert (Skew 60°)				105	47.0		3858								
	Inlet & Outlet Ditches		15													
2619+70	C.M.P. Cross Culvert & Ditches		10		25		1.65			48						
2618+74	Remove 18"x30' C.M.P.	1														
2627+50	" 30"x24' Concrete Pipe	1														
2627+58	8'x5'x36' Concrete Box Culvert & Inlet		75		130	54.6		3812								
2629+00	Road Approach & C.M.P. Side Drain Rt.		20		1					24					10	
2630+80	" " Rt.		10												10	
2633+15	Remove 36"x25' Concrete Pipe	1														
2633+35	10'x4'x36' Concrete Box Culvert & Channels (Type 10-I)		200		155	12.3		6678								
2640+68	Remove Culvert {18"x16' C.M.P. / 12"x20' Concrete Pipe}	1														
2641+20	C.M.P. Cross Culvert & Ditches		10		10		1.65			48						
2647+90	" " " " "		10		15		1.65			48						
2649+29	Remove 18"x28' C.M.P.	1														
2653+00	Road Approach & C.M.P. Side Drain Lt.		75		1					24					10	
2657+20	C.M.P. Cross Culvert & Outlet		100		30		1.65			50						
2660+90	" " " & Ditches		30		10		1.65			62						
2666+15	" " " " Inlet		10		20		1.65			50						
2670-50-2673+60	Channel Change on Lt.		2085													
2673+00	Spec. 6'x7'x96' C.B.C. (Skew) & Ditches		150		400	135.9		13,382								
2675+35	C.M.P. Cross Culvert & Inlet		5		10		1.65			46						
2677+20	" " " & Ditches		60		35		3.00					60				
2677+20-2683+00	Intercepting Ditch Rt.		200													
2685+06	Spec. 8'x6'x79' C.B.C. (Skew) & Ditches		100		220	128.0		11,600								
2685+96	C.M.P. Cross Culvert				10		1.65			104						
2693+10	" " "				30		3.00					120				
2697+15	" " " & Outlet		25		30		1.65			54						
2699+00-2699+60	Slope Paving Lt.				35									120		
2700+00	8'x8'x88' Concrete Box Culvert (Type 8-II) (45° Skew) and Channel Improvement		300		165	174.9		16346								
2705+35	C.M.P. Cross Culvert & Inlet		60		15		1.65			42						
TOTALS		11	4195	600	1902	749	387	66,766	48	976		232		120	210	

*Structural Excavation is estimated to be 50% Common and 50% Rock; each of which is estimated to be 90% Dry and 10% Wet.

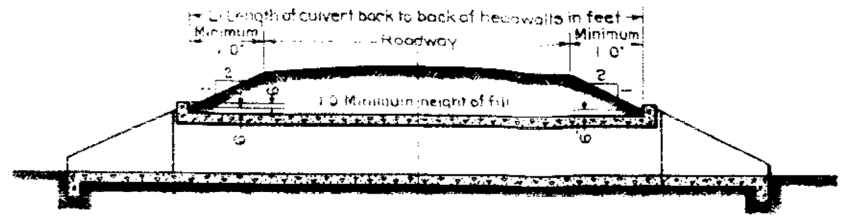
STANDARD M-103-D

REVISED 6x7 FOR F.A.P. [illegible] H

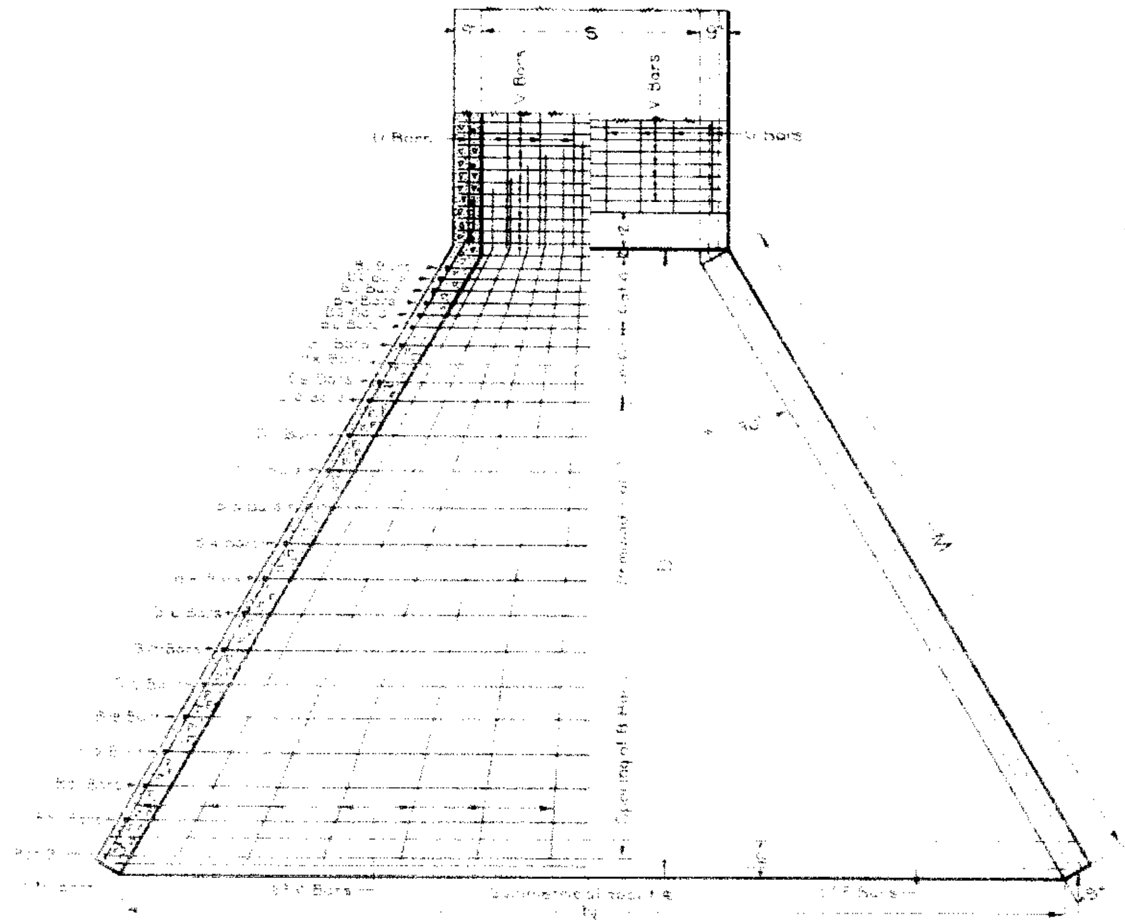
FED. ROAD DIST. NO.	STATE	F.A.P.	SHEET NO.	TOTAL SHEETS
3	COLO.	[illegible] 3 H	4	



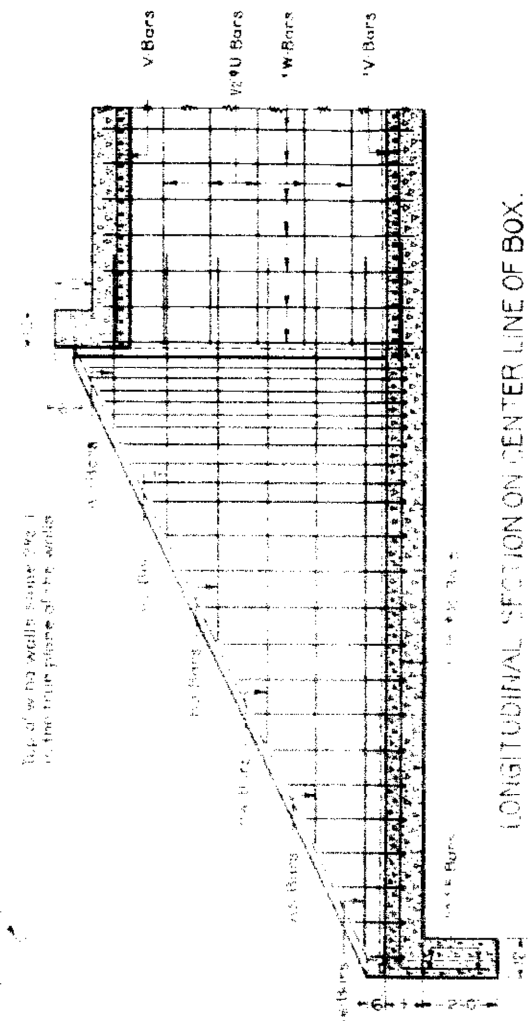
TYPICAL SECTION THRU BOX



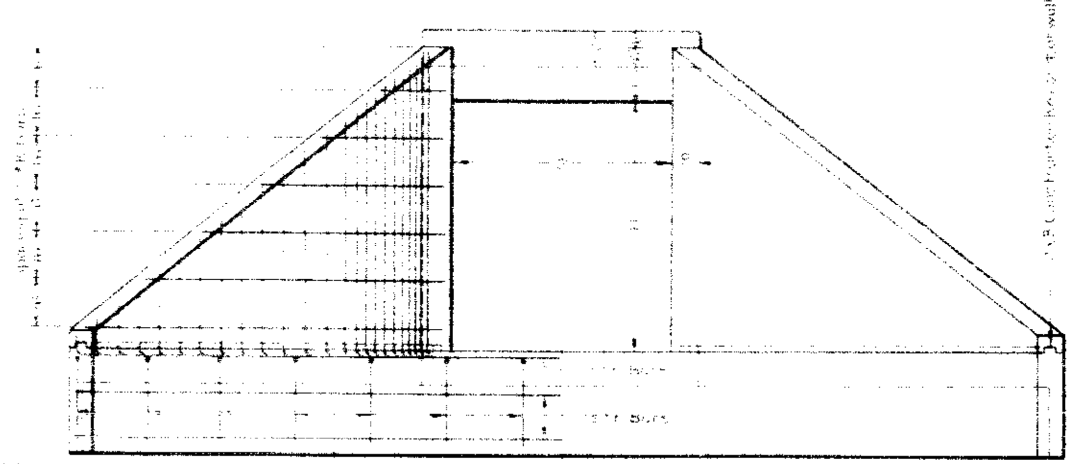
TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY.



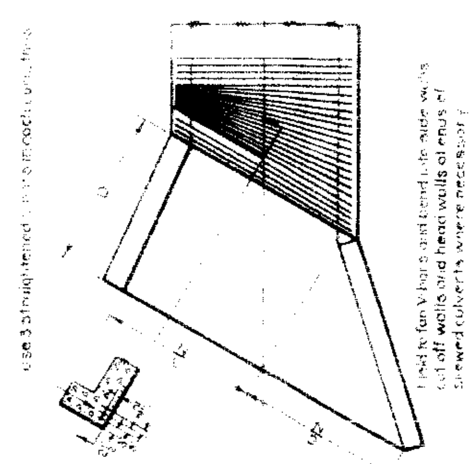
PART PLAN



LONGITUDINAL SECTION ON CENTER LINE OF BOX.



END VIEW.



PART PLAN FOR SKEWED HEADWALLS.

REINFORCEMENT BAR LIST

USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION P	DIMENSION Q	TOTAL LENGTH	BENDING DIAGRAM ALL DIMENSIONS ARE TO ℄ OF BARS
All Sizes	V	¾"ø	424	S +		8-6	
" "	A	⅞"ø	[illegible]	H + 10		10-2	
" "	F	½"ø	4			N + 0-3	
" "	U	½"ø	★			L + 1-8	
" "	K 1	½"ø	4		3-4	5-4	
H=2-0 or more	K 2	½"ø	4		6-8	8-8	
H=3-0 "	K 3	½"ø	4		10-0	12-0	
H=5-0 "	K 4	½"ø	4		13-4	15-4	
H=6-0 "	K 5	½"ø	4		16-8	18-8	
H=7-0 "	K 6	½"ø	4		20-0	22-0	
All Sizes	B 1	½"ø	2	S + [illegible] 6	H + 1-3	P+Q+Q+2'	
	B 2	½"ø	2	S + [illegible]	H + 1		
	B 3	½"ø	2	S + 2-3	H + 0-11		
	B 4	½"ø	2	S + 2-8	H + 0-9		
	B 5	½"ø	2	S + 3-0	H + 0-8		
	B 6	½"ø	2	S + 3-5	H + 0-6		
	B 7	½"ø	2	S + 4-0	H + 0-3		
	B 8	½"ø	2	S + 4-7	H + 0-0		
	B 9	½"ø	2	S + 5-2	H - 0-3		
H=[illegible] or more	B 10	½"ø	2	S + 5-9	H - 0-5		
H=2-0	B 11	½"ø	2	S + 6-[illegible]	H - 0-11		
H=3-0	B 12	½"ø	2	S + 6-1	H - 1-4		
H=3-0	B 13	½"ø	2	S + 9-9	H - 1-10		
H=3-0	B 14	½"ø	2	S + [illegible]	H - 2-3		
H=4-0	B 15	½"ø	2	S + [illegible]	H - 2-9		
H=4-0	B 16	½"ø	2	S + [illegible] 9	H - 3-3		
H=5-0	B 17	½"ø	2	S + [illegible]	H - 3-8		
H=5-0	B 18	½"ø	2	S + [illegible]	H - 4-2		
H=6-0	B 19	½"ø	2	S + [illegible]	H - 4-7		
H=6-0	B 20	½"ø	2	S + [illegible]	H - 4-11		
H=6-0	B 21	½"ø	2	S + [illegible]	H - 5-6		
H=7-0	B 22	½"ø	2	S + [illegible]	H - 6-0		
H=7-0	B 23	½"ø	2	S + [illegible]	H - 6-5		
All Sizes	M	½"ø	[illegible]4	S + 3-0		D + 5-3	

★ [illegible]

TABLE OF DIMENSIONS AND QUANTITIES

STEEL QUANTITIES GIVEN BELOW INCLUDE ALLOWANCE FOR OVERRUN OF 1%.

[illegible] QUANTITIES FOR ONE BOX EQUAL THE QUANTITY FOR TWO HEADWALLS PLUS L x QUANTITY FOR ONE LINEAL FT. OF BOX

SPAN S	HEIGHT H	HEIGHT OF FILL ALLOWED	DIMENSION M	DIMENSION N	DIMENSION D	THICKNESS OF SLAB t	NUMBER OF BARS PER BOX	ONE LINEAL FT. OF BOX: CONCRETE CU. YDS.	ONE LINEAL FT. OF BOX: STEEL LBS.	TWO HEADWALLS: CONCRETE CU. YDS.	TWO HEADWALLS: STEEL LBS.	STRUCTURAL EXCAVATION: TWO HEADWALLS SQ. FT.	STRUCTURAL EXCAVATION: TWO CUT OFF WALLS CU. YDS.
1-6	[illegible]	[illegible]	[illegible]	7-2⅝	[illegible]	[illegible]	5	0.24	[illegible]	[illegible]	[illegible]	[illegible] 6.9	[illegible] 40
2-0	2-0	[illegible]	[illegible]	8-[illegible]	6-2⅞	[illegible]	[illegible]	0.299	[illegible]	[illegible]	[illegible]	[illegible] 44	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 3⅝	4-4⅛	[illegible]	[illegible]	0.332	[illegible]	[illegible] 0	36[illegible]	[illegible]	4.65
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 3⅝	6-[illegible]	[illegible]	[illegible]	0.[illegible]	40.[illegible]	[illegible]	495	78.[illegible]	5.76
[illegible]	[illegible]	8-0	[illegible]	2-9⅝	5-6⅛	[illegible]	[illegible]	0.444	43.6	[illegible] 0	[illegible]	250.85	6.87
4-0	[illegible]	[illegible]	[illegible]	[illegible] 3⅝	6-6⅛	[illegible]	[illegible]	0.450	47.[illegible]	[illegible]	56[illegible]	[illegible]	6.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	13-3⅝	8-6⅛	[illegible]	[illegible]	0.506	50.[illegible]	[illegible]	[illegible]	272.2[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	6-3⅝	10-10⅛	[illegible]	[illegible]	0.[illegible]	53.[illegible]	6.0	910	[illegible]	8.42
[illegible]	[illegible]	[illegible] 6	[illegible]	4-3⅝	[illegible] 6⅛	[illegible]	[illegible]	0.56[illegible]	56.[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 76
[illegible]	4-[illegible]	[illegible] 6	[illegible]	17-3⅝	10-10⅛	[illegible]	[illegible]	0.[illegible]	59.[illegible]	[illegible]	[illegible]	385.43	8.57
[illegible]	5-0	[illegible]	[illegible]	[illegible] 3⅝	[illegible]	[illegible]	[illegible]	0.[illegible]	6[illegible]	[illegible]	[illegible]	468.[illegible]	9.98
6-0	[illegible]	[illegible]	[illegible] 4¾	[illegible] ⅞	6-9⅝	[illegible]	[illegible]	0.645	6[illegible]	[illegible]	705	[illegible]	[illegible] 23
6-0	[illegible]	[illegible]	[illegible] 10¾	[illegible] ⅞	[illegible]	[illegible]	8	0.699	6[illegible]	[illegible]	8[illegible]	[illegible]	8.34
6-0	4-0	10-0	[illegible] 4¾	[illegible] ⅞	[illegible]	[illegible]	[illegible]	0.[illegible]	66.[illegible]	[illegible]	[illegible]	[illegible] 95	[illegible]
6-0	[illegible]	[illegible]	[illegible] 10¾	2[illegible] ⅞	13-3¼	[illegible] ½	[illegible]	[illegible]	66.[illegible]	[illegible]	1090	[illegible]	9.45
6-0	[illegible]	[illegible]	[illegible] 4¾	23 ⅞	15-5¼	[illegible] ½	[illegible]	0.810	69.[illegible]	33.6	1320	532.02	10.56
6-0	6-[illegible]	[illegible]	[illegible] 10¾	26 ⅞	[illegible] 7¼	[illegible] ½	24	0.866	72.[illegible]	[illegible]	1620	65[illegible].48	11.67
6-0	[illegible]	10-0	13-10¾	26 ⅞	[illegible] 7¼	11½	26	0.923	75.3	38.5	1900	781.58	12.79
6-0	7-0	13-0	19-10¾			13½	26	1.014	119.6	38.5	1900	781.58	12.79

[illegible] 2613-30-40 [illegible]

GENERAL NOTES

[illegible] Standard Specifications of the Colorado State Highway Department Adopted August 1, 1935.
All concrete shall be class "A".
All exposed surfaces shall be rubbed free of form marks.
All [illegible] forms on both sides.
Minimum distance between center line of bar and edge of concrete to be 2½".
All construction joints shall be thoroughly cleaned before fresh concrete is poured.
[illegible] shall be poured out to the rock and not formed.
[illegible] to required culvert and dimensions see sheet No 2.
[illegible] reinforcing bars shall be deformed.
All reinforcing bars shall be tagged with the station number and letter designation.
[illegible] bars when spliced shall be given a lap of 50 diameters.
Main bars shall not be spliced.
[illegible] 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.
Pour wing footings monolith [illegible] with floor of box.
The use of additional construction joints undesirable, should field conditions require, construction joints may be made on a vertical plane perpendicular to center line of culvert and shall have a 2x3 Key.
This design not to be used when height of fill exceeds the allowable fill stated.
Supporting soils for all culverts must be composed of firm and uniform material throughout.
All [illegible] in approaches, to and over culverts, shall be laid in layers not exceeding 6 inches in depth and each layer shall be rolled or hand tamped where inaccessible to roller, and moistened when necessary.

LOADING DATA
[illegible] A.A.S.H.O. Aug. 1928 Class "A" (H 15)

COLORADO STATE HIGHWAY DEPARTMENT

[illegible]

1½x1½	4x2	5x4	6x4
2x2	4x3	5x5	6x5
3x1	4x4	6x2	6x6
3x2	5x3	6x3	6x7
3x3	[redacted]	[redacted]	[redacted]

Designed by A.G.K.
Made by [illegible]
Check Design
Check Detail H.E.C.
Approved by [illegible]
Bridge Engineer
Date: April 25th 1936

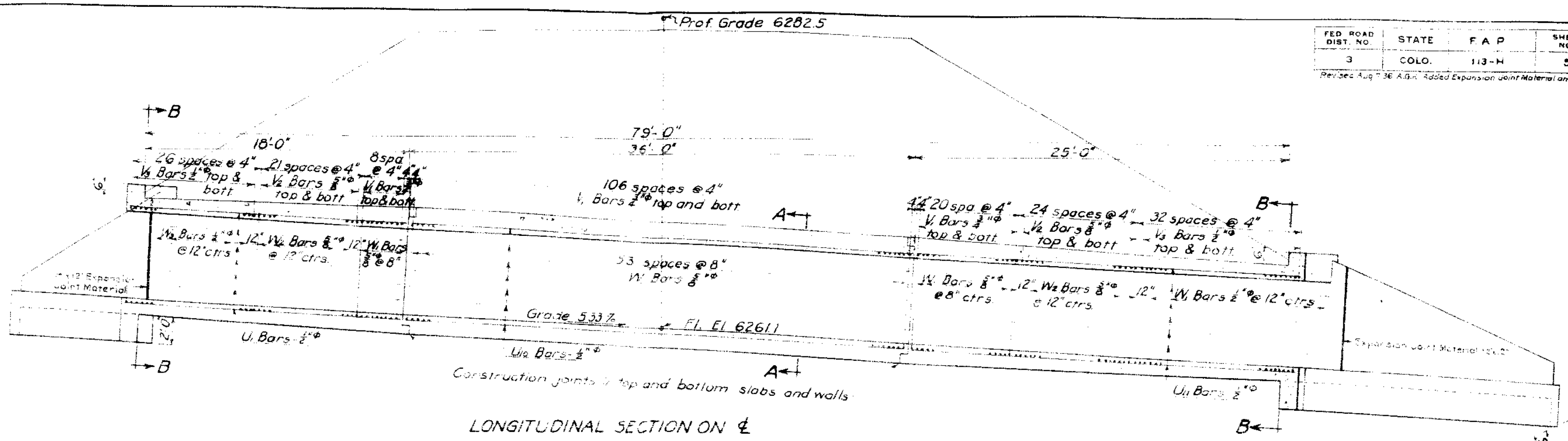
	INITIAL	DATE
ORIGINAL BY	[redacted]	[redacted]
CHECKED BY	[redacted]	[redacted]
VANDYKES BY	[redacted]	[redacted]
CHECKED BY	[redacted]	[redacted]

STANDARD M-103-D

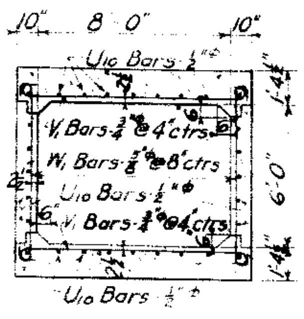
STRUCTURE NO.

FED. ROAD DIST. NO.	STATE	F.A.P.	SHEET NO.	TOTAL SHEETS
3	COLO.	113-H	5	

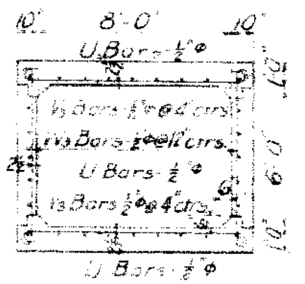
Revised Aug 1936 A.G.H. Added Expansion Joint Material and C33 Bars.



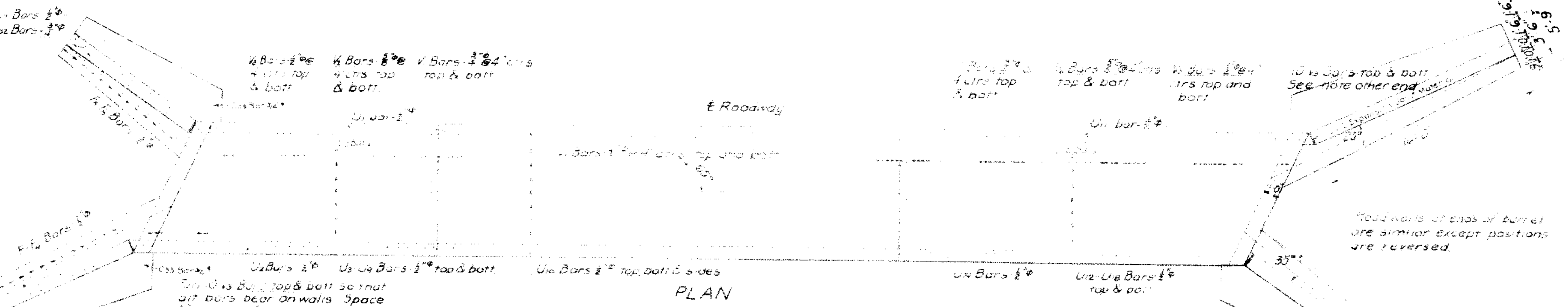
LONGITUDINAL SECTION ON ℄



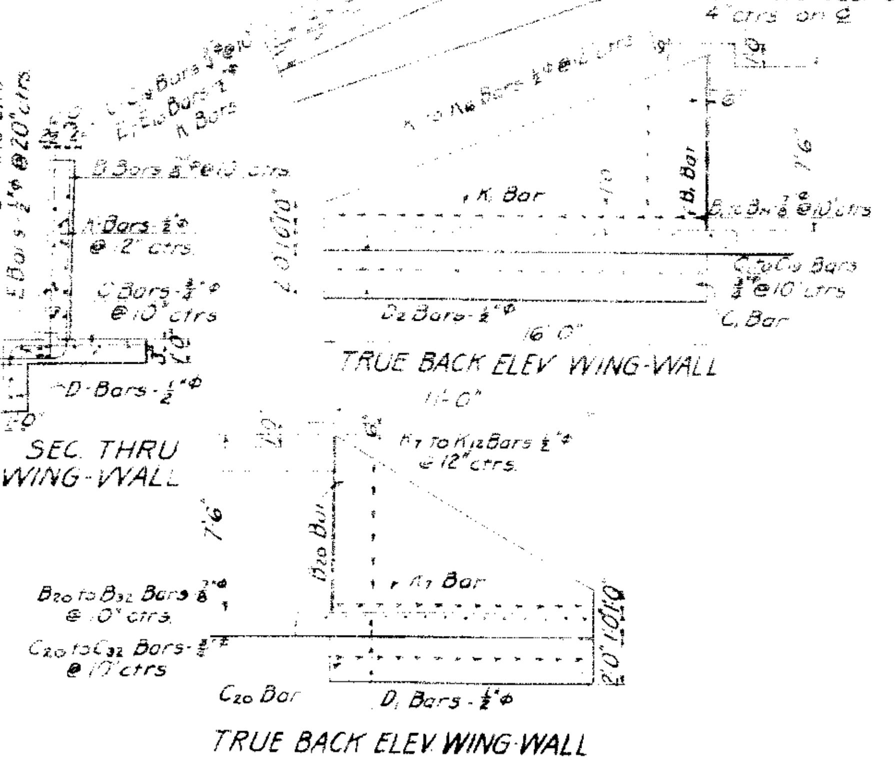
SECTION A-A



SECTION B-B



PLAN



TRUE BACK ELEV. WING-WALL

SEC. THRU WING-WALL

TRUE BACK ELEV. WING-WALL

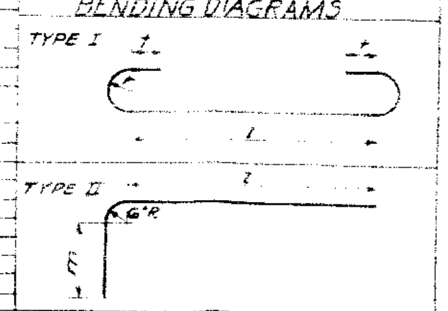
REINFORCEMENT BAR LIST

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	[illegible]	[illegible]	[illegible]	[illegible]
U_1	1/2"	7	16'-9"	Str				
U_2	1/2"	"	20'-					
U_3			17'3"					
to	1/2"	2EA	To 20'3"					
U_8			by 6"					
U_{10}	1/2"	28	35'6"					
U_{11}	1/2"	7	27'7"					
U_{12}			27'4"					
to	1/2"	2EA	To 26'4"					
U_{18}			by 6"					
U_{19}	1/2"	7	25'4"					
V_1	3/4"	274	10'8"	I	8'8"		3"	2½"
V_2	5/8"	90	10'5"	I	8'9"		2½"	2"
V_3	1/2"	116	10'2"	I	8'10"		2"	2"
W_1	3/8"	140	8'6"	I	6'10"		2½"	2"
W_2	5/8"	30	8'6"	I	6'10"		2½"	2"
W_3	1/2"	40	8'2"	I	6'10"		2"	2"
B_1			9'0"		7'3"	1'9"		
to	7/8"	2EA	To 3'1"	II	To 1'3"	1'8"		
B_{19}			by 4½"		by 4	by ½"		
B_{20}			9'10"		7'3"	1'9"		
to	7/8"	2EA	To 3'1"	II	To 3'	1'8"		
B_{32}			by 6½"		by 6	by ½"		
C_1			7'7"		4'9"			
to	3/4"	2EA	To 5'4"	II	2'6"	2'0"		
C_{19}			by 1½"		by 1½"			
C_{20}			7'7"		4'9"			
to	3/4"	2EA	To 5'4"	II	2'6"	2'0"		
C_{32}			by 7¼"		by 2½"			
D_1	1/2"	18	10'6"	Str				
D_2	1/2"	18	15'6"	"				
K_1			15'3"					
to	1/2"	2EA	To 2'9"	"				
K_6			by 2'6"					
K_7			10'4"					
to	1/2"	2EA	To 1'7"					
K_{12}			by 1'9"					

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	[illegible]	[illegible]
E_1			7'9"			
to	1/2"	2EA	To 1'9"	Str		
E_{10}			by 8"			
E_{11}			7'9"			
to	1/2"	2EA	To 1'9"			
E_{20}			by 12"			
F_1			15'3"			
to	1/2"	2EA	To 4'0"			
F_4			by 3'9"			
F_5			10'6"			
to	1/2"	2EA	To 2'0"			
F_8			by 2'6"			
C_{33}	3/4"	4	6'0"	II	4'0"	2'0"

4685 Lin. ft. 1/2" bars @ 0.668 lb per ft - 3129 lb
2331 " 5/8" " 1.043 " " " 2432 "
3415 " 3/4" " 1.502 " " " 5129
413 " 7/8" " 2.044 " " " 844 "
1% additional for overrun 66 "
TOTAL WEIGHT - 11,600 lbs

BENDING DIAGRAMS



SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
14	Structural Exc.	225 C.Y.
46c	Class A Conc.	128 C.Y.
47	Reinf. Steel	11,600 LB
	Expansion Joint Mat'l ½x12	30 Lin Ft

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED AUG. 1, 1935.
ALL CONCRETE SHALL BE CLASS "A".
ALL WALLS SHALL HAVE FORMS ON BOTH SIDES.
ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
ALL BARS SHALL BE DEFORMED.
MINIMUM DISTANCE FROM CENTERLINE OF BARS TO EDGE OF CONCRETE TO BE 2½".
LONG. BARS WHEN SPLICED SHALL BE LAPPED TWO FEET.
ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION.
THIS DESIGN NOT TO BE USED WHEN HEIGHT OF FILL OVER BOX EXCEEDS THAT SHOWN.
POUR WING FOOTINGS MONOLITHICALLY WITH FLOOR OF BOX.
POUR WINGS INDEPENDENT OF SIDES OF BOX.
THE USE OF ADDITIONAL CONSTRUCTION JOINTS UNDESIRABLE. SHOULD FIELD CONDITIONS REUIRE, CONSTRUCTION JOINTS MAY BE MADE ON A VERTICAL PLANE PERPENDICULAR TO CENTERLINE OF CULVERT AND SHALL HAVE KEYS AS SHOWN.
SUPPORTING FILLS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNIFORM MATERIAL THROUGHOUT.
ALL BACKFILLING TO AND OVER CULVERTS SHALL BE LAID IN LAYERS NOT EXCEEDING SIX INCHES IN DEPTH AND EACH LAYER SHALL BE ROLLED OR HAND TAMPED WHERE INACCESSIBLE TO ROLLER. ALSO MOISTENED WHEN NECESSARY.

LOADING DATA

[illegible]

DESIGNING DATA

[illegible]

COLORADO
STATE HIGHWAY DEPARTMENT
SPECIAL
8FT×6FT C.B.C.

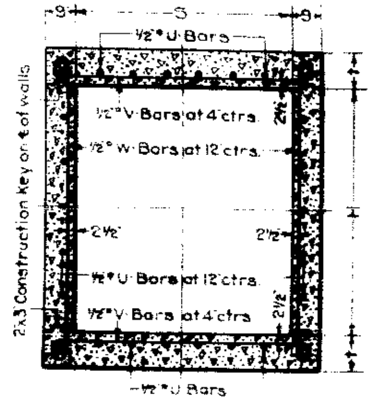
Across ARROYO
Sta. 2683+06
Near ____ Sec. 11 T. 18S R. 7W

Designed by T.O. | Approved by [signature]
Made by C.R.M. | Bridge Engineer
Checked by | Date July 25th 1936

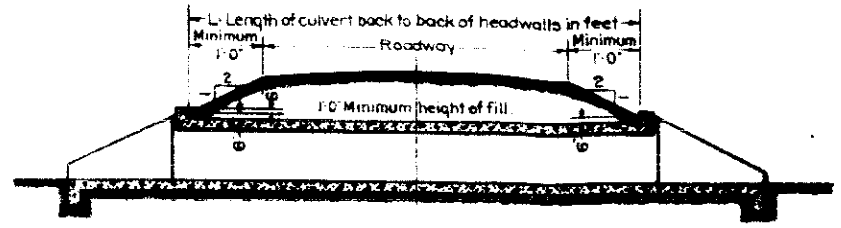
STANDARD M-103-D

[redacted]

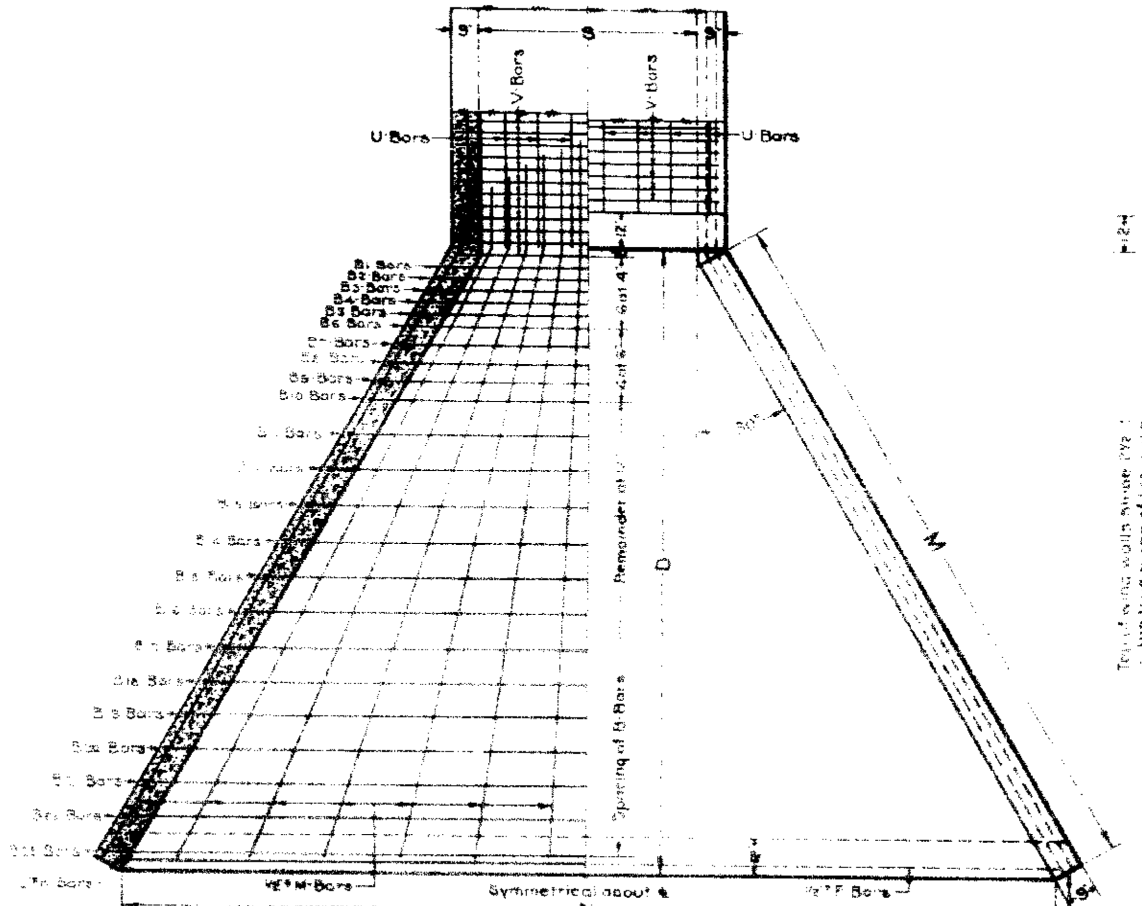
FED. ROAD DIST. NO.	STATE	F.A.P.	SHEET NO.	TOTAL SHEETS
3	COLO	113H	6	



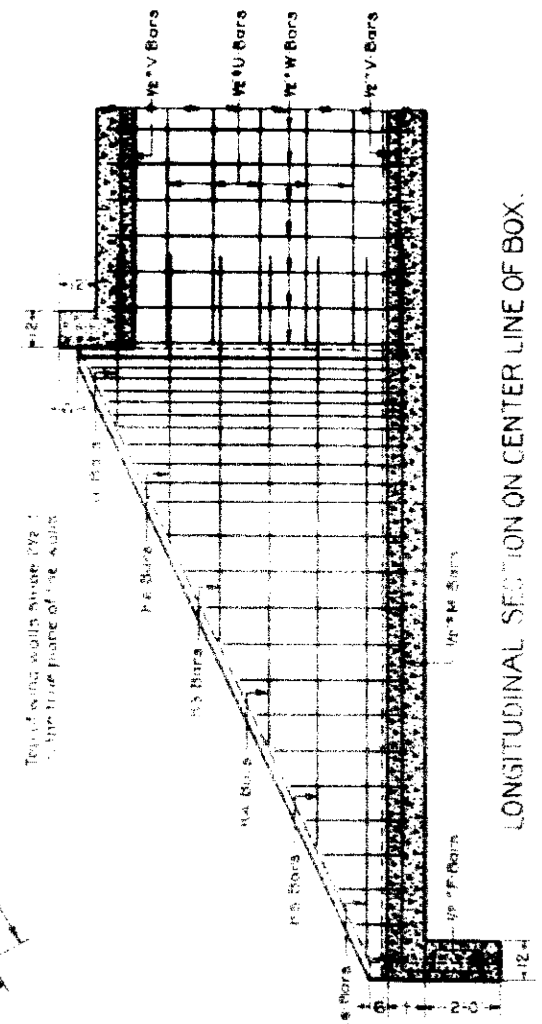
TYPICAL SECTION THRU BOX.

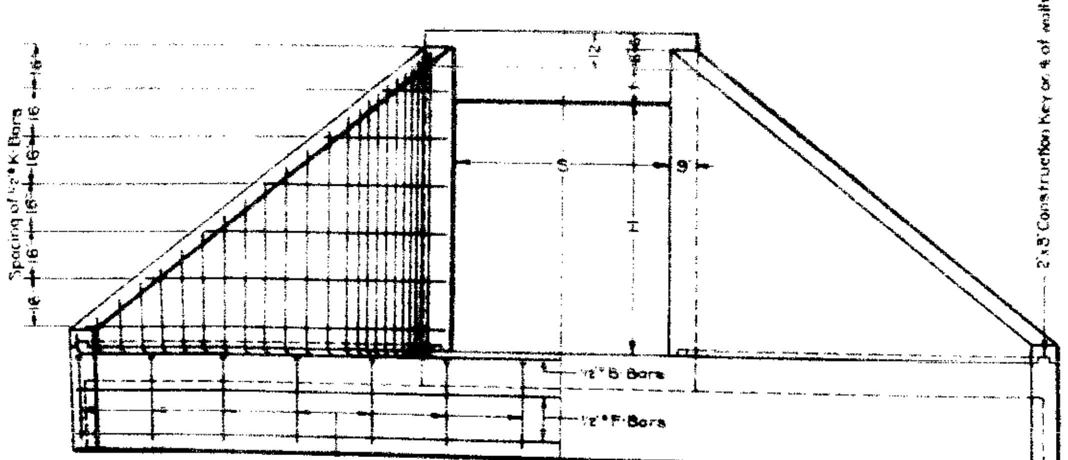


TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY.

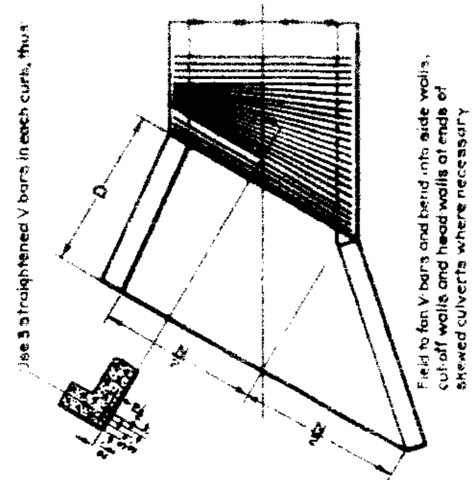


PART PLAN





END VIEW.



PART PLAN FOR SKEWED HEADWALLS.

REINFORCEMENT BAR LIST							
USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION P	DIMENSION Q	TOTAL LENGTH	BENDING DIAGRAM ALL DIMENSIONS ARE TO ℄ OF BARS
All Sizes	V	½"	(6×L)+14	S + 10"		S + 2'-2"	
" "	W	½"	(2×L)+6	H + 10"		H + 2'-2"	
" "	F	½"	4			N + 0'-3"	
" "	U	½"	*			L + 1'-8"	
" "	K 1	½"	4		3'-4"	5'-4"	
H = 2'-0" or more	K 2	½"	4		6'-6"	8'-8"	
H = 3'-0" " "	K 3	½"	4		10'-0"	12'-0"	
H = 5'-0" " "	K 4	½"	4		13'-4"	15'-4"	
H = 6'-0" " "	K 5	½"	4		16'-8"	18'-8"	
H = 7'-0" " "	K 6	½"	4		20'-0"	22'-0"	
All Sizes	B 1	½"	2	S + 1'-6"	H + 1'-3"	P+(2×Q)-2'	
" "	B 2	½"	2	S + 1'-11"	H + 1'-1"		
" "	B 3	½"	2	S + 2'-3"	H + 0'-11"		
" "	B 4	½"	2	S + 2'-8"	H + 0'-9"		
" "	B 5	½"	2	S + 3'-0"	H + 0'-8"		
" "	B 6	½"	2	S + 3'-5"	H + 0'-6"		
" "	B 7	½"	2	S + 4'-0"	H + 0'-3"		
" "	B 8	½"	2	S + 4'-7"	H + 0'-0"		
" "	B 9	½"	2	S + 5'-2"	H - 0'-3"		
H = 1'-6" or more	B 10	½"	2	S + 5'-9"	H - 0'-5"		
H = 2'-0" " "	B 11	½"	2	S + 6'-11"	H - 0'-11"		
H = 3'-0" " "	B 12	½"	2	S + 8'-1"	H - 1'-4"		
H = 3'-0" " "	B 13	½"	2	S + 9'-3"	H - 1'-10"		
H = 3'-0" " "	B 14	½"	2	S + 10'-5"	H - 2'-3"		
H = 4'-0" " "	B 15	½"	2	S + 11'-7"	H - 2'-9"		
H = 4'-0" " "	B 16	½"	2	S + 12'-9"	H - 3'-3"		
H = 5'-0" " "	B 17	½"	2	S + 13'-11"	H - 3'-8"		
H = 5'-0" " "	B 18	½"	2	S + 15'-1"	H - 4'-2"		
H = 6'-0" " "	B 19	½"	2	S + 16'-3"	H - 4'-7"		
H = 6'-0" " "	B 20	½"	2	S + 17'-5"	H - 5'-1"		
H = 6'-0" " "	B 21	½"	2	S + 18'-7"	H - 5'-6"		
H = 7'-0" " "	B 22	½"	2	S + 19'-9"	H - 6'-0"		
H = 7'-0" " "	B 23	½"	2	S + 20'-11"	H - 6'-5"		
All Sizes	M	½"	(S+1)×4	D + 3'-0"		D + S + 3"	

* See table of Dimensions and Quantities

TABLE OF DIMENSIONS AND QUANTITIES

STEEL QUANTITIES GIVEN BELOW INCLUDE ALLOWANCE FOR OVERRUN OF 1%.

TOTAL QUANTITIES FOR ONE BOX EQUALS THE QUANTITY FOR TWO HEADWALLS PLUS (L) QUANTITY FOR ONE LINEAL FT OF BOX

SPAN S	HEIGHT H	HEIGHT OF FILL ALLOWED	DIMENSION M	DIMENSION N	DIMENSION D	THICKNESS OF SLAB t	NUMBER OF U BARS PER BOX	QUANTITIES FOR ONE LINEAL FT. OF BOX: CONCRETE CU. YDS.	STEEL LBS.	QUANTITIES FOR TWO HEADWALLS: CONCRETE CU. YDS.	STEEL LBS.	STRUCTURAL EXCAVATION: TWO HEADWALLS SQ. FT.	TWO CUT-OFF WALLS CU. YDS.
1'-6"	1'-6"	29'-6"	5'-6¼"	7'-2⅝"	3'-7⅛"	8½"	8	0.241	30.6	4.5	320	169.1	4.43
2'-0"	2'-0"	22'-6"	6'-9¼"	8'-1⅝"	5'-2⅞"	8½"	8	0.281	34.0	6.1	430	153.44	5.18
3'-0"	1'-0"	19'-0"	4'-7"	7'-9⅝"	4'-4⅛"	10"	8	0.332	37.5	5.0	560	118.50	4.65
3'-0"	2'-0"	19'-0"	7'-1"	10'-3⅝"	6'-6⅛"	10"	10	0.388	40.5	7.7	495	178.11	5.76
3'-0"	3'-0"	19'-0"	9'-7"	12'-9⅝"	8'-8⅛"	10"	12	0.444	43.6	11.0	650	250.86	6.87
4'-0"	2'-0"	15'-0"	7'-1"	11'-3⅝"	6'-6⅛"	10"	12	0.450	47.0	8.5	565	195.13	6.19
4'-0"	3'-0"	15'-0"	9'-7"	13'-9⅝"	8'-8⅛"	10"	14	0.506	50.0	12.0	755	272.24	7.31
4'-0"	4'-0"	15'-0"	12'-1"	16'-3⅝"	10'-10⅛"	10"	16	0.562	53.1	16.0	910	359.71	8.42
5'-0"	3'-0"	11'-6"	9'-7"	14'-9⅝"	8'-8⅛"	10"	18	0.567	56.6	12.8	835	293.60	7.76
5'-0"	4'-0"	11'-6"	12'-1"	17'-3⅝"	10'-10⅛"	10"	18	0.623	59.6	17.1	995	385.42	8.87
5'-0"	5'-0"	11'-6"	14'-7"	19'-9⅝"	13'-0"	10"	20	0.679	62.7	21.5	1220	466.0	9.98
6'-0"	2'-0"	10'-0"	7'-4⅝"	13'-7⅛"	6'-9⅝"	11½"	16	0.645	60.0	11.3	705	235.50	7.23
6'-0"	3'-0"	10'-0"	9'-10⅝"	16'-1⅛"	8'-11¼"	11½"	18	0.699	63.0	15.2	920	325.95	8.34
6'-0"	4'-0"	10'-0"	12'-4⅝"	18'-7⅛"	11'-1¼"	11½"	20	0.755	66.2	20.1	1090	423.57	9.45
6'-0"	5'-0"	10'-0"	14'-10⅝"	21'-1⅛"	13'-3¼"	11½"	22	0.810	69.2	25.6	1320	532.02	10.56
6'-0"	6'-0"	10'-0"	17'-4⅝"	23'-7⅛"	15'-5¼"	11½"	24	0.866	72.3	31.7	1620	651.46	11.67
6'-0"	7'-0"	10'-0"	19'-10⅝"	26'-1⅛"	17'-7¼"	11½"	26	0.925	75.3	38.5	1900	781.58	12.79

[redacted]

GENERAL NOTES.

All work shall be done according to the Standard Specifications of the Colorado State Highway Department, Adopted August 1, 1935.

All concrete shall be class 'A'.

All exposed surfaces shall be rubbed free of form marks.

All walls shall have forms on both sides.

Minimum distance between center line of bar and edge of concrete to be 2½".

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.

For culverts required and governing dimensions see sheet Nº 2

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 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 engineer will inspect and determine if redesign is necessary.

Pour wing footings monolithically with floor of box.

The use of additional construction joints undesirable, should field conditions require, construction joints may be made on a vertical plane perpendicular to center line of culvert and shall have a 2x3" key.

This design not to be used when height of fill exceeds the allowable tabulated.

Supporting soils for all culverts must be composed of firm and uniform material throughout.

All backfilling in approaches, to and over culverts, shall be laid in layers not exceeding 6 inches in depth and each layer shall be rolled or hand tamped where inaccessible to roller, also moistened when necessary.

LOADING DATA
LL = A.A.S.H.O. Aug. 1928 Class 'A' (H-15)

COLORADO
STATE HIGHWAY DEPARTMENT
CONCRETE BOX CULVERTS

1½×1½	4×2	5×4	6×4
2×2	4×3	5×5	6×5
3×1	4×4	6×2	6×6
3×2	5×3	6×3	6×7
3×3	[redacted]	[redacted]	[redacted]

Designed by A.G.K.
Made by A.G.K.
Check Design
Check Detail H.E.S.

Approved by P. Bailey
Bridge Engineer
Date April 25th 1936

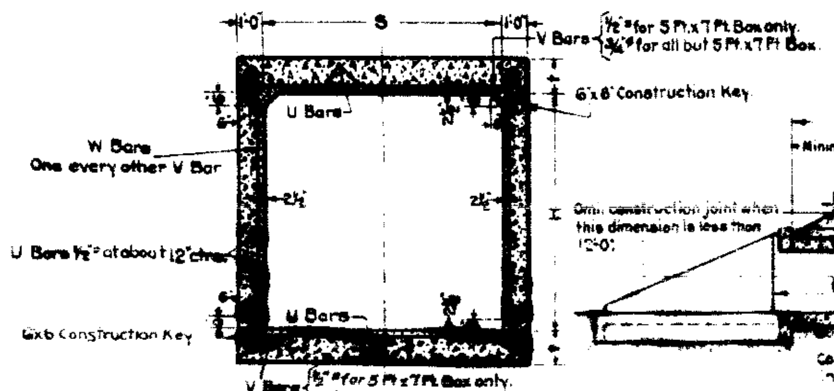
	INITIAL	DATE
ORIGINAL BY	[redacted]	
CHECKED BY		
VANDYKE BY		
CHECKED BY		

STANDARD M-103-D

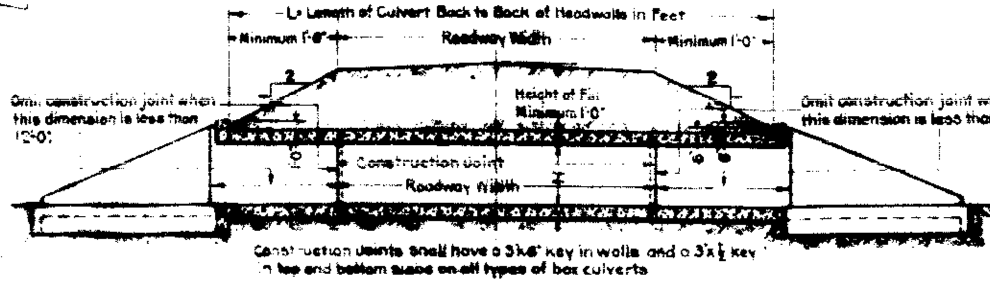
STRUCTURE NO.

Revised 3-1-36 A.S.K. 1935 Specifications

Revised 7-15-38 A.S.K. Changed Length of B and E Bars.

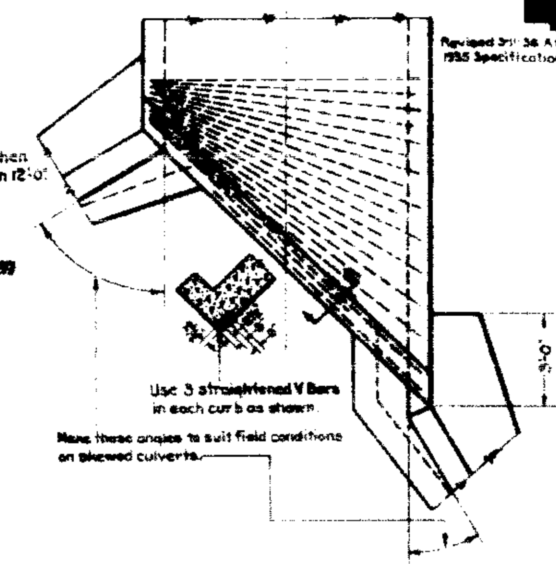


TYPICAL SECTION THRU BOX

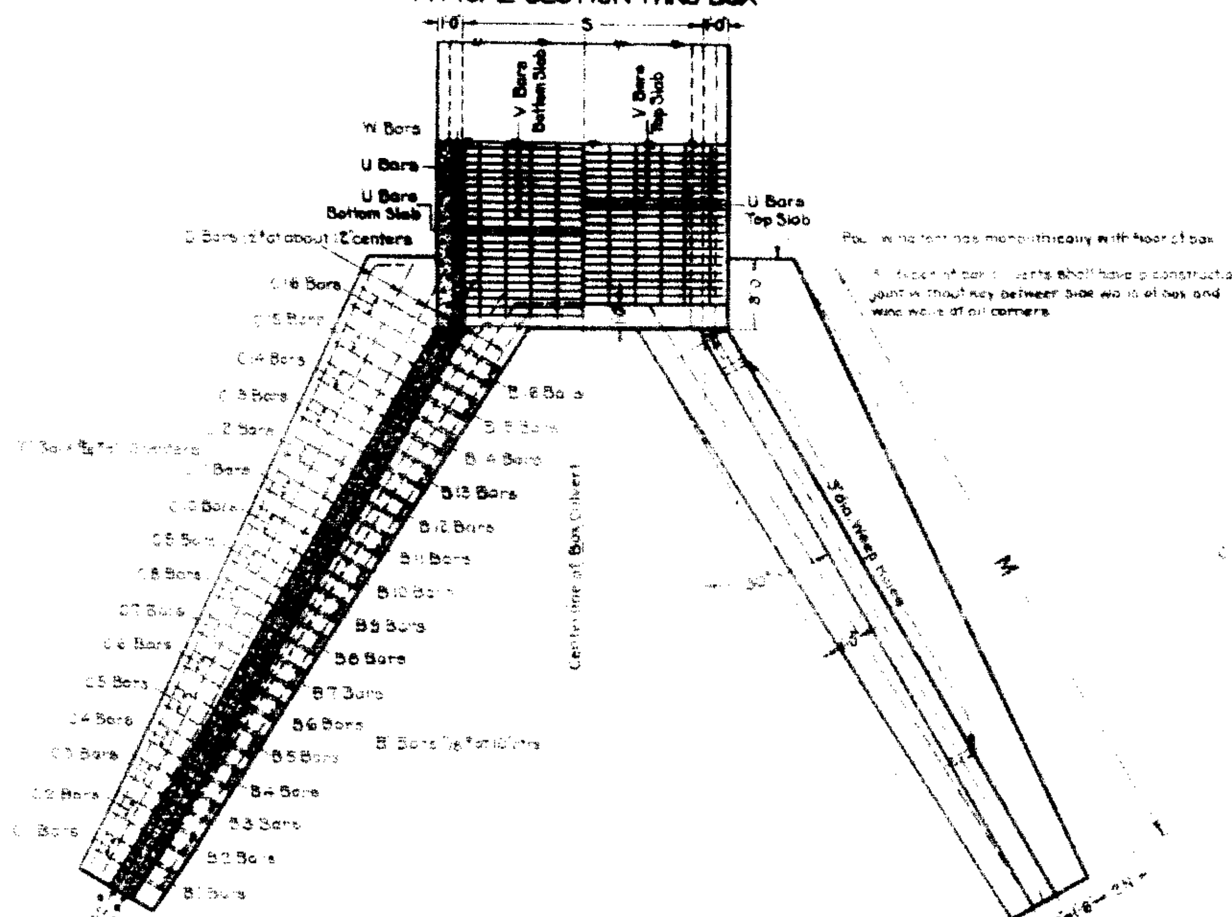


SECTION SHOWING RELATION OF CULVERT TO ROADWAY

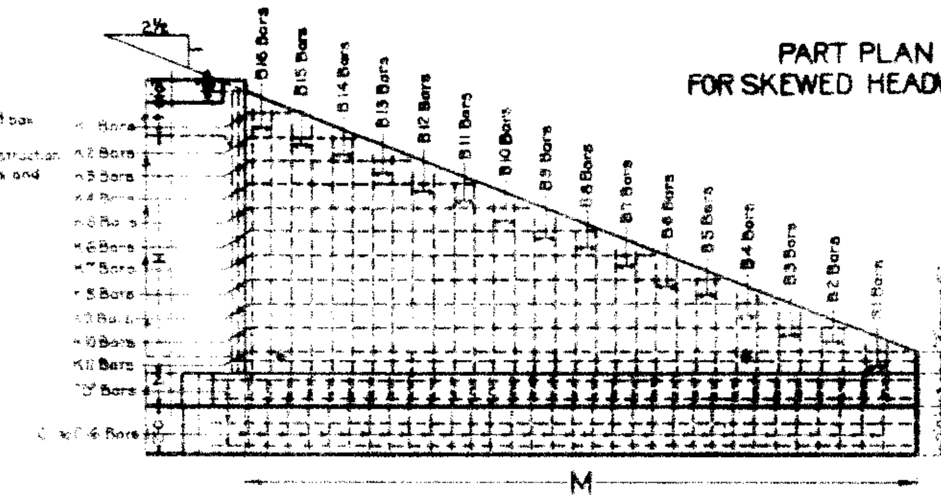
Field to fan V Bars as shown placing alternate bars to bearing on outside walls at ends of skewed boxes.



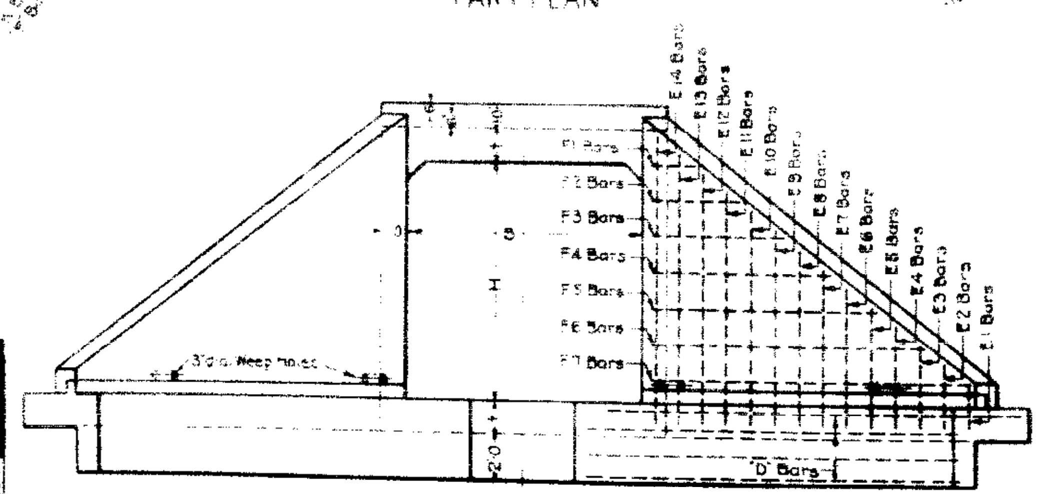
PART PLAN FOR SKEWED HEADWALLS



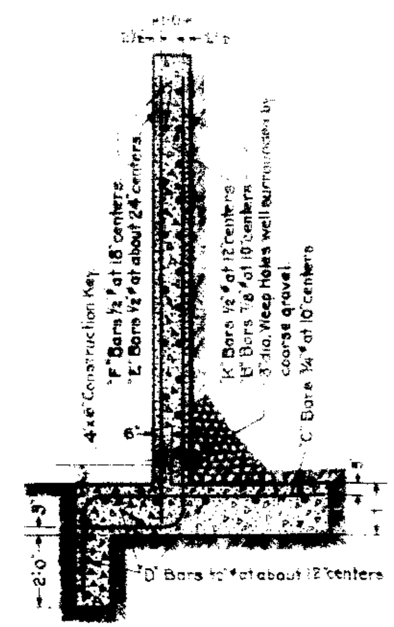
PART PLAN



TRUE SIDE ELEVATION OF WINGWALL



END VIEW



TYPICAL SECTION THRU WINGWALL

REINFORCEMENT BAR LIST

USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION P	TOTAL LENGTH
All Boxes but 5'x7'	V	[illegible]	2(L+2) divided by Spacing	[illegible]	[illegible]
5'x7' Box only	V	[illegible]		[illegible]	[illegible]
All Sizes	W	[illegible]	½ No. of V Bars	[illegible]	[illegible]
All Sizes	U	[illegible]	★		[illegible]
All Sizes	U	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

★ SEE TABLE OF DIMENSIONS AND QUANTITIES.

BENDING DIAGRAM — ALL DIMENSIONS ARE TO ℄ OF BARS

NOTE FOR "E" BARS ONLY

Where t=10" thick slabs use lengths as shown.

t=11½"	add 3"
t=12½"	5"
t=13"	6"
t=13½"	7"
t=14"	8"
t=15½"	11"
t=17"	14"

TABLE OF DIMENSIONS AND QUANTITIES

STEEL QUANTITIES GIVEN BELOW INCLUDE ALLOWANCE OF 1% FOR OVERRUN.

TOTAL QUANTITIES FOR ONE BOX EQUALS THE QUANTITY FOR TWO HEADWALLS PLUS (L x QUANTITY FOR ONE LIN. FT. BOX)

HEIGHT OF FILL ALLOWABLE	TYPE	SPAN S	HEIGHT H	THICKNESS OF SLAB t	SPACING OF BARS V	SIZE OF BARS W	NUMBER OF U BARS PER BOX	LENGTH OF WINGWALL M	DIMENSION N	ONE LIN. FT. OF BOX CONCRETE CU. YDS.	ONE LIN. FT. OF BOX STEEL LBS.	TWO HEADWALLS CONCRETE CU. YDS.	TWO HEADWALLS STEEL LBS.
11'-6"		5'-0"	7'-0"	10"	4"	[illegible]	24	20'-0"	10"	0.960	[illegible]	35.5	3260
[illegible]	8 I	8'-0"	4'-0"	11½"	5½"	[illegible]	24	[illegible]	[illegible]	1.016	100	[illegible]	[illegible]
			5'-0"	11½"	[illegible]	[illegible]	26	15'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	11½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			8'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8'-6"	8 II	8'-0"	4'-0"	[illegible]	[illegible]	[illegible]	24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			5'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			8'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10'-6"	8 III	8'-0"	4'-0"	[illegible]	4½"	[illegible]	24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			5'-0"	[illegible]	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	[illegible]	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			8'-0"	[illegible]	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4'-0"	10 I	10'-0"	4'-0"	13"	5"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	13"	5"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			8'-0"	13"	5"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			10'-0"	13"	5"	[illegible]	40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6'-0"	10 II	10'-0"	4'-0"	14"	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	14"	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	143	[illegible]	[illegible]
			8'-0"	14"	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	151	[illegible]	[illegible]
			10'-0"	14"	4½"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	170	[illegible]	[illegible]
9'-0"	10 III	10'-0"	4'-0"	15½"	4"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	15½"	4"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			8'-0"	15½"	4"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			10'-0"	15½"	4"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12'-0"	10 IV	10'-0"	4'-0"	17"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			6'-0"	17"	[illegible]	[illegible]	32	[illegible]	[illegible]	1.714	[illegible]	420	3240
			8'-0"	17"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.867	[illegible]	510	4610
			10'-0"	17"	[illegible]	[illegible]	40	[illegible]	[illegible]	2.010	[illegible]	[illegible]	[illegible]

[redacted]

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED [illegible]
ALL CONCRETE SHALL BE CLASS "A".
ALL WALLS SHALL HAVE FORMS ON BOTH SIDES.
ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
ALL BARS SHALL BE DEFORMED.
MINIMUM DISTANCE FROM CENTERLINE OF BARS TO EDGE OF CONCRETE TO BE 2½".
LONG BARS WHEN SPLICED SHALL BE LAPPED TWO FEET.
FOR CULVERTS REQUIRED AND GOVERNING DIMENSIONS SEE SHEET NO. 1.
ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION.
THIS DESIGN NOT TO BE USED WHEN HEIGHT OF FILL OVER BOX EXCEEDS THAT TABULATED AS ALLOWABLE.
POUR WING FOOTINGS MONOLITHICALLY WITH FLOOR OF BOX.
POUR WINGS INDEPENDENT OF SIDES OF BOX.
THE USE OF ADDITIONAL CONSTRUCTION JOINTS UNDESIRABLE, SHOULD FIELD CONDITIONS REQUIRE, CONSTRUCTION JOINTS MAY BE MADE ON A VERTICAL PLANE PERPENDICULAR TO CENTERLINE OF CULVERT, AND SHALL HAVE KEYS AS SHOWN.
SUPPORTING SOILS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNIFORM MATERIAL THROUGHOUT.
ALL BACKFILLING TO AND OVER CULVERTS SHALL BE LAID IN LAYERS NOT EXCEEDING SIX INCHES IN DEPTH AND EACH LAYER SHALL BE ROLLED OR HAND TAMPED WHERE INACCESSIBLE TO ROLLER. ALSO MOISTENED WHEN NECESSARY.

LOADING DATA

LL = A.A.S.H.O. AUG. 1928 CLASS "A" (H-15)

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
CONCRETE BOX CULVERT
8 FT. x 4 FT. 5 FT. x 7 FT. 10 FT. x 6 FT.
8 FT. x 5 FT. 8 FT. x 8 FT. 10 FT. x 8 FT.
8 FT. x 6 FT. 10 FT. x 4 FT. 10 FT. x 10 FT.

[redacted]

Designed by A.G.K.	Approved by [illegible]
Made by A.S.K.	Bridge Engineer
Checked by A.L.C.	Date: 7-20, 1932

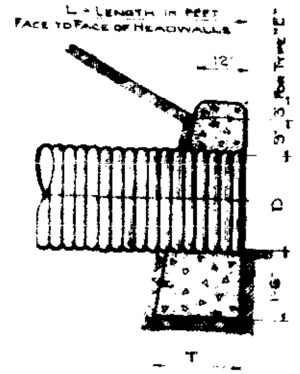
[redacted]

STANDARD M-102-E

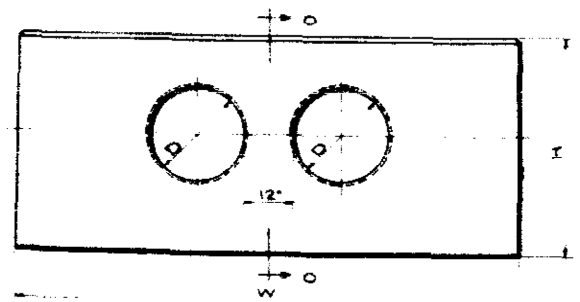
[redacted]

FED. ROAD DIST No.	STATE	Federal PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO	113 H	8	

Revised 10-24-33 A.G.K. Corrected Gauge on 24" & 36" Type "E" Culverts
Revised 3-15-35 W.W.C. Deformed Bars
Revised 3-1-36 A.S.K. Changed to 1935 Specifications.
Revised 6-24-36 A.G.R. Extended table on intercepting headwalls and added Standard Cement Rubble Apron for C.M.P. Culverts.



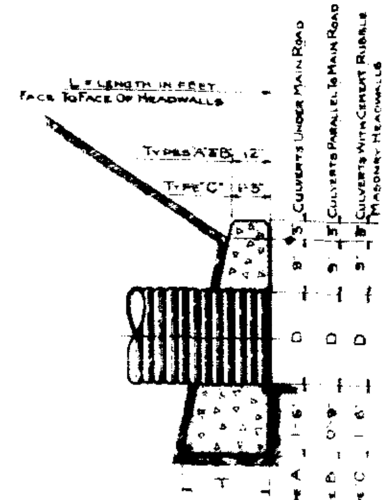
Sectional Elevation "O-O"



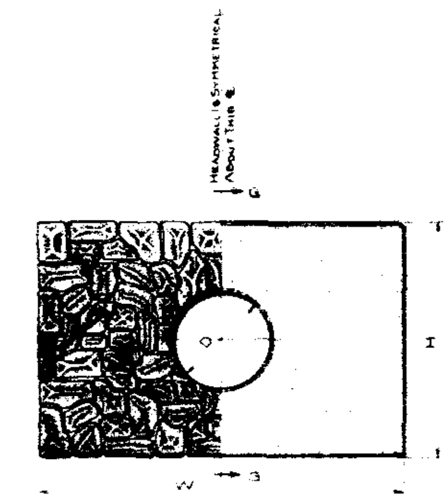
Front Elevation

TABLE OF DIMENSIONS & QUANTITIES FOR DOUBLE CORRUG. METAL PIPE CULVERT & HEADWALLS								
	D	W	H	T	Cu. Yds. Concrete For 2 Headwalls	Corrugated Metal Pipe		Cement Rubble Masonry
Type "E"	15"	7'-4"	3'-9"	1'-6"	2.2 Cu. Yds.	16 Gage	2×L = Lin. Ft.	
	18"	8'-6"	4'-0"	1'-7"	3.[illegible] do	16 do	2×L = do	
	24"	10'-6"	4'-6"	1'-10"	4.[illegible] do	14 do	2×L = do	
	30"	12'-6"	5'-0"	2'-0"	6.5 do	14 do	2×L = do	
	36"	14'-6"	5'-6"	2'-2"	7.6 do	12 do	2×L = do	
Type "F"								

Std. Headwalls for Double Corrugated Metal Pipe Culverts.



Sectional Elevation "G-G"



Half Front Elevation Type "C"

Half Front Elevation Types "A" & "B"

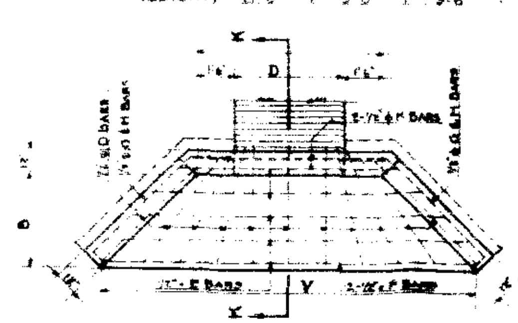
TABLE OF DIMENSIONS & QUANTITIES FOR CORRUGATED METAL PIPE CULVERTS & HEADWALLS								
	D	W	H	T	Cu. Yds. Concrete For 2 Headwalls	Corrugated Metal Pipe		Cement Rubble Masonry
Type "A"	12"	4'-6"	3'-6"	1'-3"	1.4 Cu. Yds.	16 Gage	L = Lin. Ft.	
	15"	5'-6"	3'-9"	1'-4"	1.6 do	16 do	L = do	
	18"	5'-0"	4'-0"	1'-7"	2.2 do	16 do	L = do	
	24"	7'-0"	4'-6"	1'-10"	3.3 do	14 do	L = do	
	30"	9'-3"	5'-0"	2'-0"	4.5 do	14 do	L = do	
	36"	[illegible]	5'-6"	2'-2"	6.[illegible] do	12 do	L = do	
	42"	12'-0"	6'-0"	2'-5"	8.0 do	10 do	L = do	
	48"	[illegible]	[illegible]	[illegible]	[illegible] do	[illegible] do	L = do	
Type "B"	12"	4'-0"	2'-9"	1'-6"	0.8 Cu. Yds.	16 Gage	L = Lin. Ft.	
	15"	4'-5"	3'-0"	1'-2"	0.9 do	16 do	L = do	
	18"	4'-[illegible]	3'-3"	[illegible]	[illegible] do	16 do	L = do	
	24"	5'-[illegible]	3'-9"	[illegible]	1.2 do	14 do	L = do	
	30"	5'-6"	[illegible]	[illegible]	1.6 do	14 do	L = do	
Type "C"	12"	[illegible]	[illegible]	2'-0"		16 Gage	L = Lin. Ft.	1.6 Cu. Yds.
	15"	[illegible]	3'-6"	2'-0"		16 do	L = do	2.2 do
	18"	6'-0"	4'-0"	2'-1"		16 do	L = do	2.8 do
	24"	7'-8"	4'-6"	2'-4"		14 do	L = do	4.1 do
	30"	9'-0"	[illegible]	2'-6"		14 do	L = do	5.5 do
	36"	10'-6"	[illegible]	2'-5"		12 do	L = do	7.4 do

D	W	H	V	B	C	Unit	Concrete Class "A"	Corrugated Metal Pipe		Unit	Reinforcing Steel
54"	7'-6"	7'-6"	15'-6"	4'-[illegible]	3'-6"	Cu. Yds.	12.[illegible] ✱	8 Gage	L = Lin. Ft.	Lbs.	446 ▲
60"	8'-[illegible]	[illegible]	16'-0"	4'-0"	4'-0"	do	13.[illegible] ✱	do	L = do	do	482 ▲
66"	8'-0"	5'-6"	16'-5"	4'-0"	4'-6"	do	14.4 ✱	do	L = do	do	498 ▲
72"	9'-0"	7'-0"	19'-0"	5'-0"	4'-6"	do	17.9 ✱	do	L = do	do	610 ▲
78"	9'-6"	7'-6"	19'-6"	5'-0"	5'-0"	do	18.9 ✱	do	L = do	do	630 ▲
84"	10'-0"	8'-0"	20'-0"	5'-0"	5'-6"	do	20.0 ✱	do	L = do	do	684 ▲

▲ Reinforcing steel quantities are for two headwalls. ✱ Concrete quantities are for two headwalls.

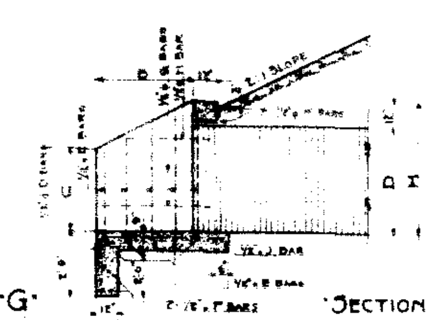
Bar List for Type "G"

Type "G"	Size of Pipe	54"	60"	66"	72"	78"	84"	Bending Diagram
D Bars	Spacing	18"	18"	18"	18"	18"	18"	
	Number	[illegible]	11	11	12	12	13	
	Length	7'-7"	7'-7"	7'-7"	8'-7"	8'-7"	8'-7"	B + 3'-3"
E Bars	Spacing	12"	12"	12"	12"	12"	12"	
	Number	1 Each	1 Each	1 Each	1 Each	1 Each	1 Each	
	Length	24'-6" to 22'-0"	25'-6" to 23'-6"	27'-0" to 24'-6"	29'-6" to 26'-6"	[illegible] to 25'-6"	30'-6" to 27'-6"	
	Decrease	By 12"	By 12"	By 12"	By 12"	By 12"	By 12"	
F Bars	Spacing	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	
	Number	2	2	2	2	2	2	
	Length	15'-6"	16'-0"	16'-6"	19'-0"	19'-6"	20'-0"	V
G Bars	Spacing	18"	18"	18"	18"	18"	18"	
	Number	4	6	6	6	6	6	
	Length	7'-0"	7'-0"	7'-0"	8'-5"	8'-5"	8'-5"	
H Bars	Spacing	18"	18"	18"	18"	18"	18"	
	Number	2	2	2	2	2	2	
	Length	5'-11"	5'-11"	5'-11"	5'-11"	5'-11"	5'-11"	
J Bars	Spacing	12"	12"	12"	12"	12"	12"	
	Number	1	1	1	1	1	1	
	Length	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	
K Bars	Spacing	8"	8"	8"	8"	8"	8"	
	Number	2	2	2	2	2	2	
	Length	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	W + 1'-6"



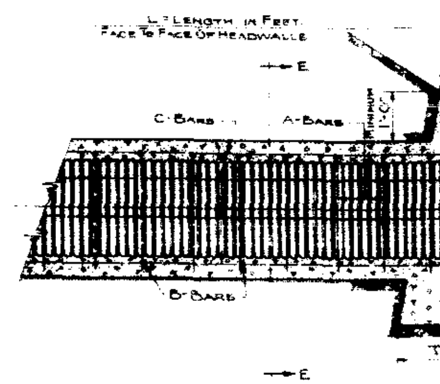
Plan of Headwall

Type "G"

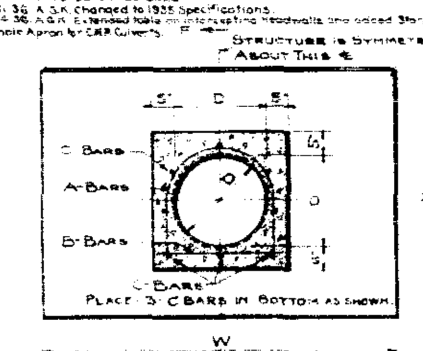


Section K-K

Standard Headwalls for Corrugated Metal Pipe Culverts



Longitudinal Section "F-F"



Sectional Elevation "E-E"

TABLE OF DIMENSIONS & QUANTITIES FOR INCASED PIPE CULVERT								
Diameter of Pipe		D	12"	15"	18"	24"	30"	Bending Diagram
Width of Headwall		W	4'-6"	5'-3"	6'-0"	7'-6"	9'-0"	
Height of Headwall		H	4'-2"	4'-5"	4'-8"	5'-2"	5'-8"	
Width of Headwall Base		T	1'-7"	1'-8"	1'-9"	2'-0"	2'-3"	
A-Bars	Spacing		12"	12"	12"	12"	12"	D + 2"
	Number		L-1	L-1	L-1	L-1	L-1	D + 4"
	Length		3'-8"	4'-5"	5'-[illegible]	6'-4"	7'-7"	
B-Bars	Spacing		2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	
	Number		.5L	.5L	.5L	.5L	.5L	
	Length		1'-7"	1'-10"	2'-[illegible]	2'-7"	3'-[illegible]	D + 7"
C-Bars	Spacing							
	Number		8	8	8	8	8	
	Length		L-(2'-0")	L-(2'-0")	L-(2'-0")	L-(2'-0")	L-(2'-0")	L-(2'-0")

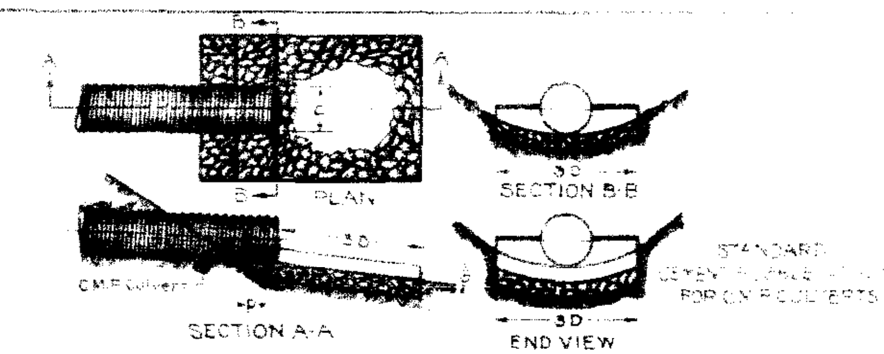
Item №	Description	Unit	12"	15"	18"	24"	30"
46 A	Concrete Class "A"	✱ Cu. Yds.	1.4+0.10L	1.6+0.12L	2.2+0.145L	3.2+0.19L	4.5+0.235L
47	Reinforcing Steel	Lbs.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
55	[illegible] Corr. Metal Pipe	Lin. Ft.	L	L	L	L	L

✱ [illegible]
[illegible]
[illegible]

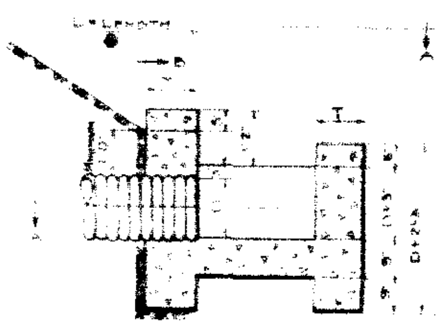
Special Notes

[illegible]

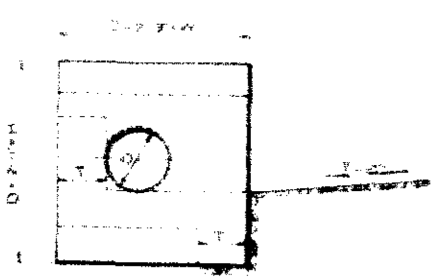
Incased Pipe Culverts.



SQUARE YARDS CEMENT RUBBLE PAVING "1 FOOT THICK"														
Fill	D	15"	18	24	30	36	42	48	54	60	66	72	78	84
Slope	P / Q	7½"	9	12	12	12	12	12	12	12	12	12	12	12
1½ : 1	2'-0"	3	4	6	9	12	17	27	27	33	39	46	54	62
2 : 1	2'-0"	3	4	7	10	13	18	22	28	34	41	49	57	66
3 : 1	3'-0"	3	4	7	11	15	20	25	31	38	45	54	63	72
4 : 1	4'-0"	3	5	8	12	16	22	28	34	42	50	59	69	79

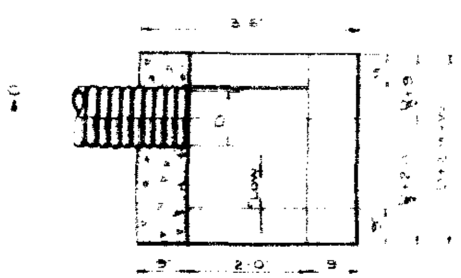


Sectional Elevation "C-C"



Sectional Elevation "B-B"

Size of Pipe	Width of Wall	Height of Wall	Thickness of Wall	Cu. Yds. Conc. in One Headwall
D	W	H	T	Cu. Yds.
12"	3'-8"	3'	9"	[illegible]
15"	4'-0"	4'-1"	9"	[illegible]2
18"	4'-3"	4'-3"	9"	[illegible]3
24"	4'-9"	4'-[illegible]	9"	[illegible]6
30"	5'-3"	5'-5"	9"	[illegible]9
36"	5'-9"	5'-[illegible]	9	2.2



Sectional Plan "A-A"

Intercepting Headwalls.

GENERAL NOTES FOR ALL STRUCTURES

All work shall be done according to the standard specifications of the Colorado State Highway Department adopted August 1, 1935.
All concrete shall be Class A except Types A & B which shall be Class "B".
All exposed surfaces shall be rubbed free of form marks.
All exposed corners shall be beveled to a 2" face.
All construction joints shall be thoroughly cleaned before fresh concrete is poured.
All walls shall have forms on both sides.
All reinforcing bars shall be deformed.
All reinforcing bars shall be tagged with the station number and letter designation.
Secondary bars when spliced shall be given a lap of 30 diameters.
Main bars shall not be spliced.
Minimum fill over top of culverts shall be 1'-0".
When culvert is skewed headwalls shall be placed parallel to ℄ of roadway.
Minimum grade of pipe shall be 1%.
For size and location of culverts see sheet № 2.
Footings in rock shall be poured out to the rock and not formed.

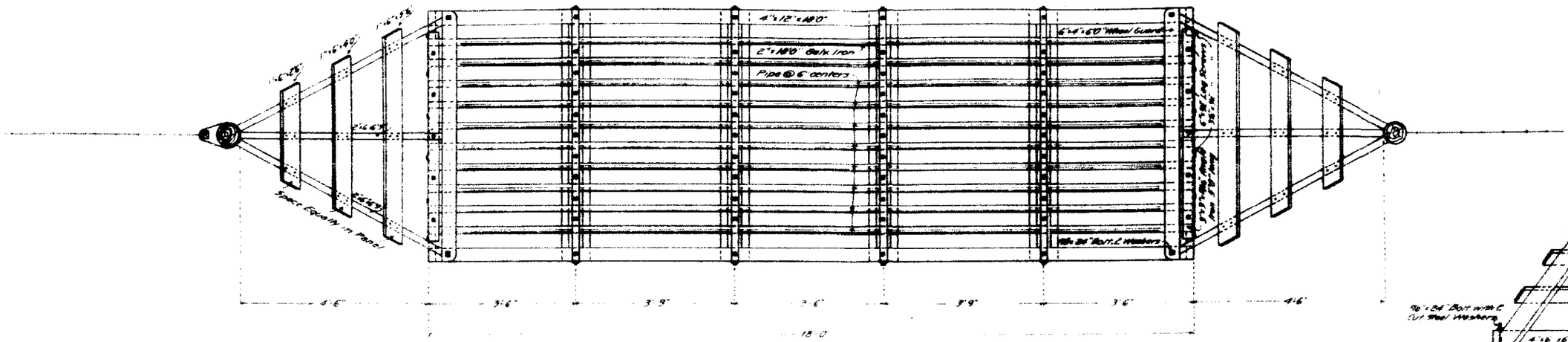
COLORADO
State Highway Department
STANDARD HEADWALLS
INTERCEPTING HEADWALLS
INCASED METAL PIPE CULVERT
WITH HEADWALLS
FOR
CORRUGATED METAL PIPE CULVERTS

Designed by P.L.B.-G.N.D.	Approved by [signature] Bridge Engineer
Made by G.N.D.-W.W.D.	
Checked G.N.D. & W.W.N.	Date April 30th 1932

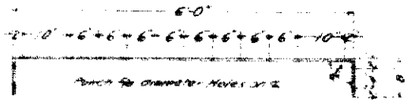
STANDARD M-16-A

FED. ROAD DIST. No.	STATE	PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO	113 A	7	

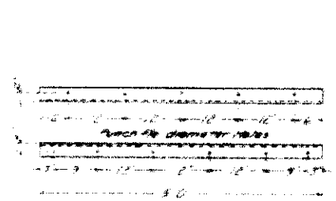
Revised 3-14-36 W.H.L. (1935 Specifications)



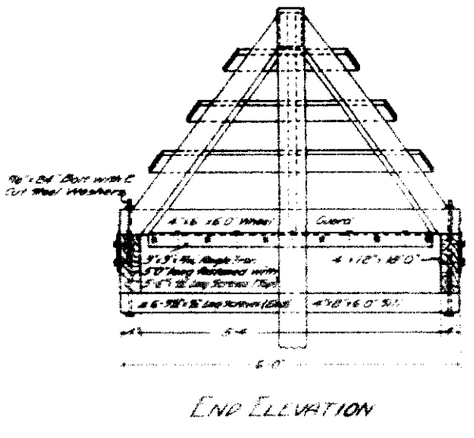
PLAN



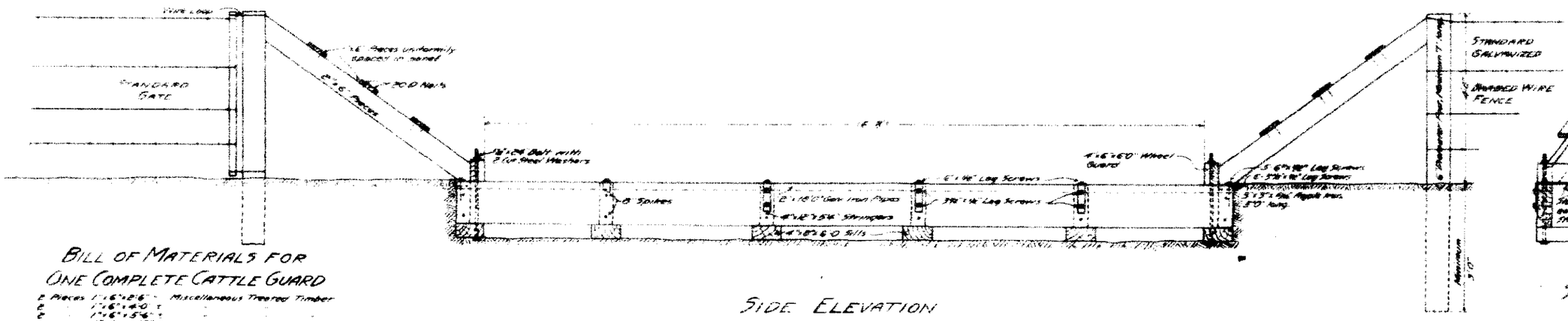
DETAIL OF 2"x1¼"x7'-4" STRAP IRON 4 PCS. REQUIRED PER STRUCTURE



DETAIL OF 9"x3"x⅜"x5'-0" ANGLE IRON 2 PCS REQUIRED PER STRUCTURE



END ELEVATION



SIDE ELEVATION

SECTIONAL ELEVATION

BILL OF MATERIALS FOR ONE COMPLETE CATTLE GUARD

2	Pieces	1"x6"x12'-6"	Miscellaneous Treated Timber
2	"	1"x6"x4'-0"	" " "
2	"	1"x6"x5'-6"	" " "
4	"	2"x6"x6'-9"	" " "
2	"	2"x6"x6'-3"	" " "
4	"	4"x6"x6'-0"	" " "
4	"	4"x8"x6'-0"	" " "
2	"	4"x12"x18'-0"	" " "
6	"	6" diameter x 7'-0"	Posts
2	"	3"x3"x¼"x5'-0"	Angle Iron - See Detail for Punching
4	"	2"x1¼"x7'-4"	Strap Iron - See Detail for Punching & Bending
24	"	⅞"x6"	Lag Screws (1.48 lbs.)
28	"	⅜"x4"	" " (6.1lbs.)
4	"	⅞"x24"	Bolts (10.1lbs.)
8	"		Cut Steel Washers for ⅞" Bolts (1.1lb.)
10	"	2"	Galvanized Pipe 18'0" long
2	Lbs.	20D	Nails
2	"	60D	"
7	"	8"	Spikes

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the COLORADO STATE HIGHWAY DEPARTMENT adopted August 1, 1935.

All quantities are to be considered approximate only.

All timber shall fulfill the specifications for Standard Timber Structures except Bridges, and shall be "treated."

All hardware to be galvanized except angle irons, which shall be painted 2 coats' field coat - dark as per specifications Item 41.

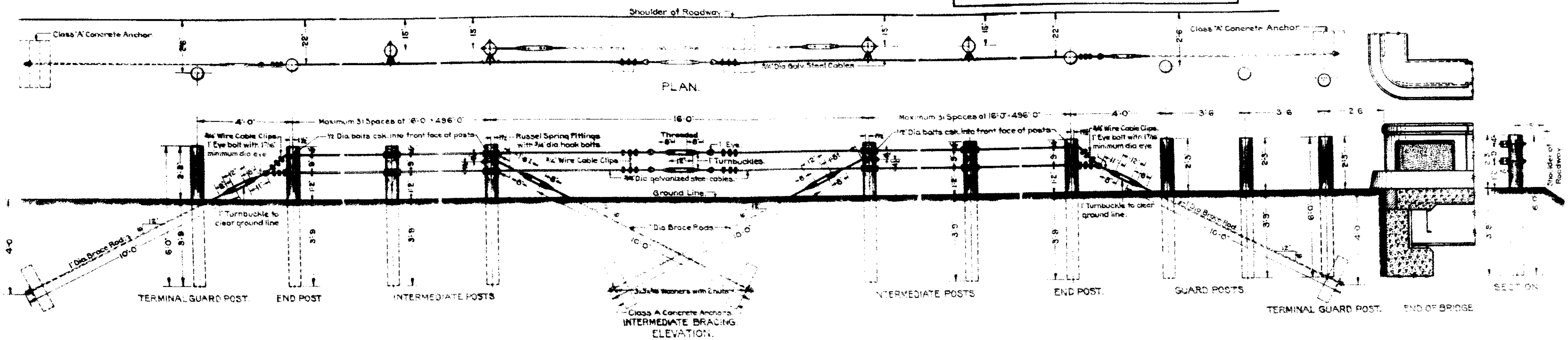
Holes for lag screws shall be subdrilled to ¾" diameter.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
CATTLE GUARD
16 FT. ROADWAY

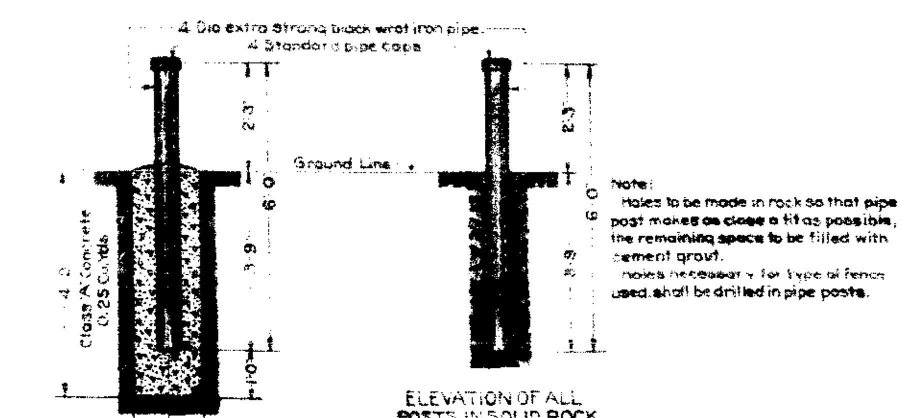
Designed by S.M.L.	Approved by
Made by S.M.L.	Bridge Engineer
Checked by	Date: 193

STANDARD M-20-A

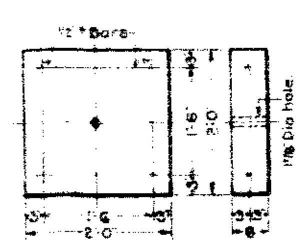
FED. ROAD DIST. NO.	STATE	F.A.P.	SHEET NO.	TOTAL SHEETS
3	COLO.	113 H.	10	



STANDARD WIRE CABLE GUARD FENCE WITH TIMBER POSTS.



DETAILS FOR WROT IRON PIPE POSTS.



DETAIL OF ANCHORS

GENERAL NOTES.

All work shall be done in accordance with the Standard Specifications of The Colorado State Highway Department adopted August 1, 1935.

The length of guard fence to be paid for and designated on plans shall be measured from terminal guard post to terminal guard post.

When continuous wire cable fence is more than 500 Ft. in length it shall have intermediate bracing complete with turnbuckles.

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

No section of wood posts shall be less than 8" diameter.

All wood posts shall be entirely peeled and shaved, thoroly seasoned and dry, with square tops and all holes to be drilled 1/32" larger than diameter of bolt or rod before treatment is applied.

All wood posts shall be pressure treated with creosote for the full length of posts, as provided for in the specifications.

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

All fittings, cables and hardware shall be hot dip galvanized steel with sizes as noted and located as shown.

Eye bolts shall be welded or drop forged.

Standard galvanized cast iron O.G. or galvanized malleable cast washers shall be used under all bolt heads and nuts coming in contact with wood posts.

Way lock fittings or other fittings equivalent to those shown on plans and approved by the engineer may be used in lieu of offset fittings, turnbuckles, eye bolts and clips as shown.

Only one style of offset fittings, turnbuckles, eye bolts and clips may be used on a project.

COLORADO
STATE HIGHWAY DEPARTMENT

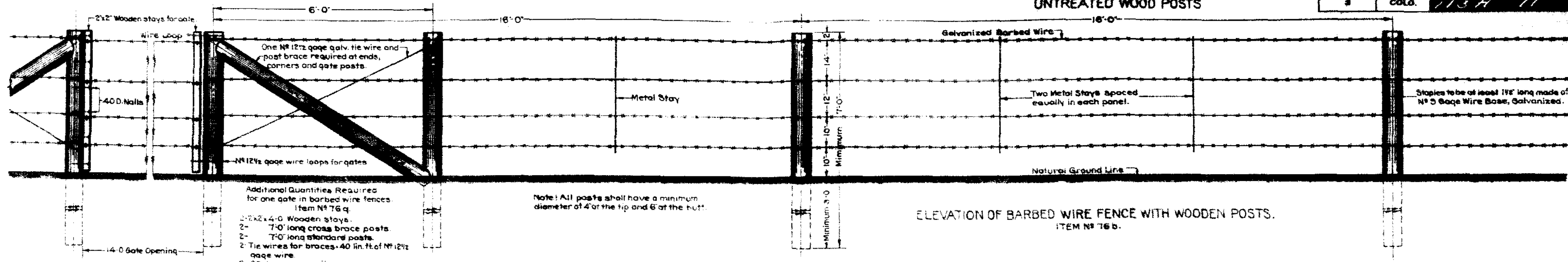
STANDARD
WIRE CABLE GUARD FENCE

Designed by A.G.K.	Approved by [signature]
Made by A.G.K.	Bridge Engineer
Check Design	Date: March 10th 1936
Check Detail	

STANDARD M 20-A

STANDARD M-24-FX.
UNTREATED WOOD POSTS

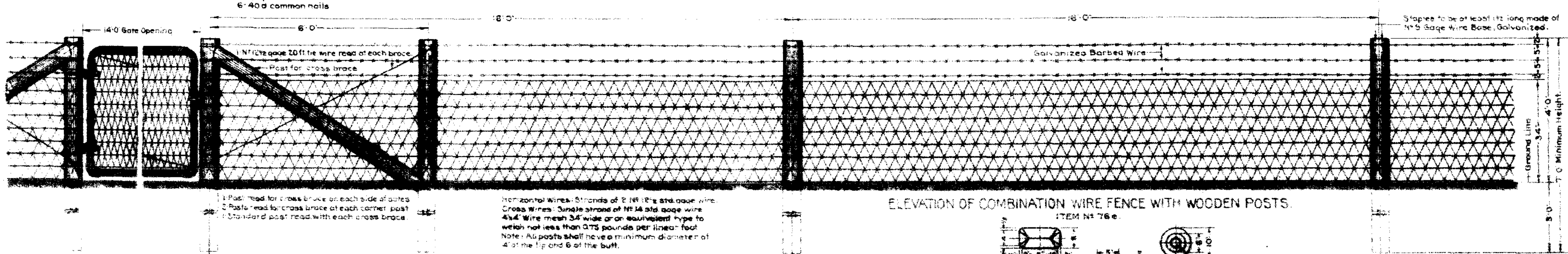
FED. ROAD DIST. NO.	STATE	F.H.P.	SHEET NO.	TOTAL SHEETS
3	COLO.	113 H	11	



Additional Quantities Required for one gate in barbed wire fences. Item Nº 76 q.
2-2"x2"x4'-0 Wooden stays.
2- 7'-0" long cross brace posts.
2- 7'-0" long standard posts.
2 Tie wires for braces-40 lin. ft. of Nº 12½ gage wire.
6-40 d common nails

Note: All posts shall have a minimum diameter of 4" at the tip and 6" at the butt.

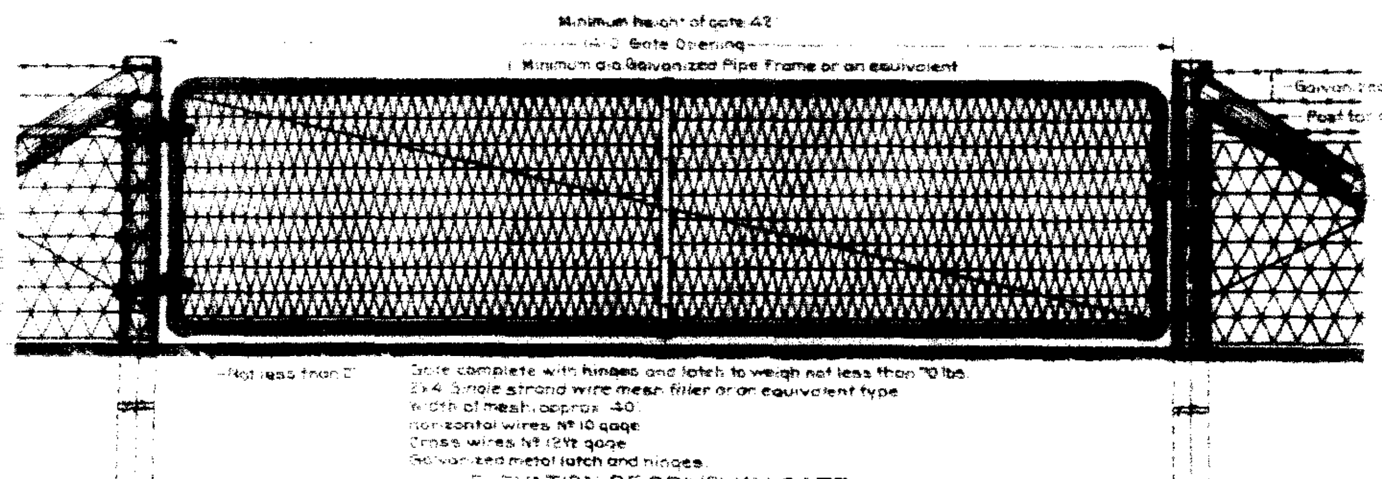
ELEVATION OF BARBED WIRE FENCE WITH WOODEN POSTS.
ITEM Nº 76 b.



1 Post read for cross brace on each side of gates.
2 Posts read for cross brace at each corner post.
1 Standard post read with each cross brace.

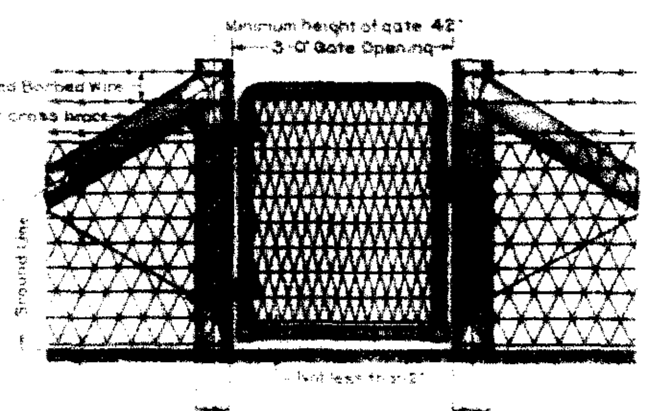
Horizontal wires: Strands of 2 Nº 12½ std. gage wire.
Cross Wires: Single strand of Nº 14 std. gage wire.
4"x4" Wire mesh 34" wide or an equivalent type to weigh not less than 0.75 pounds per linear foot.
Note: All posts shall have a minimum diameter of 4" at the tip and 6" of the butt.

ELEVATION OF COMBINATION WIRE FENCE WITH WOODEN POSTS.
ITEM Nº 76 e.



Gate complete with hinges and latch to weigh not less than 70 lbs.
2"x4" Single strand wire mesh filler or an equivalent type
Width of mesh, approx. 40".
Horizontal wires Nº 10 gage
Cross wires Nº 12½ gage
Galvanized metal latch and hinges.

ELEVATION OF DRIVEWAY GATE.
ITEM Nº 76 h.



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

ELEVATION OF WALK GATE
ITEM Nº 76 i.

GENERAL NOTES FOR WIRE FENCES.

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, Adopted August 1-1935.

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

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

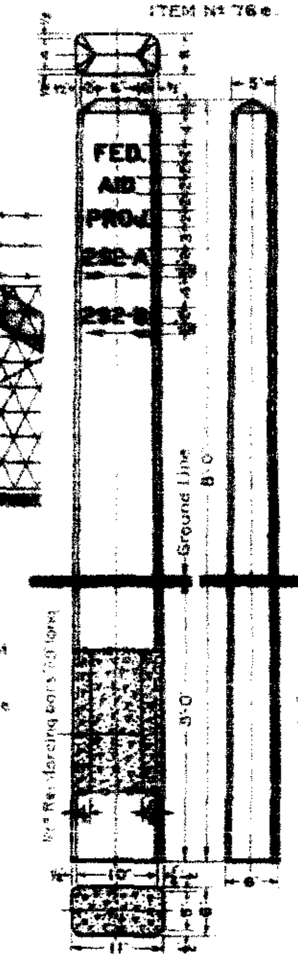
Wire mesh used in driveway gates shall be painted with an approved waterproof asphalt or mineral paint.

Staples shall be at least 1½" long, made of Nº 9 gage wire base galvanized, 5 staples read. per post for barbed wire fence and 14 staples per post for combination wire fence.

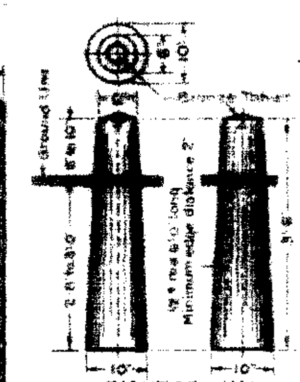
All wooden posts shall be made from seasoned, straight, sound Native Cedar, peeled.

Cross braces, brace posts and tie wires are to be used at all places where intersecting fences are encountered.

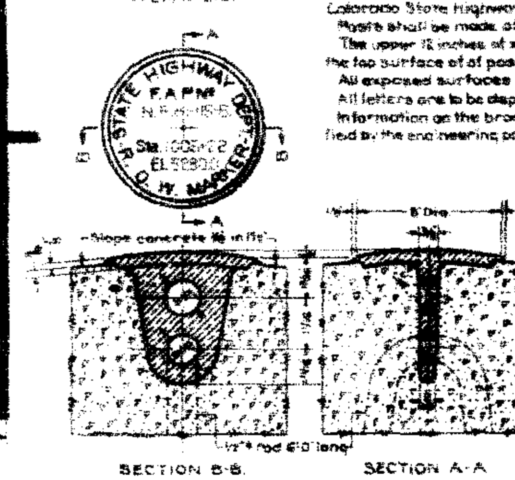
Four corner posts with brace and supplemental posts and four end posts shall be used at each structure over 4 ft. x 4 ft. in size and fence turned in and ended at wings.



PROJECT MARKER POST.
ITEM Nº 81 a.



RIGHT OF WAY MARKER POST.
ITEM Nº 81 E.



DETAIL OF BRONZE TABLET FOR RIGHT OF WAY MARKER POST

NOTES FOR PROJECT MARKER POSTS.

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted August 1-1935.

Posts shall be made of Class "A" Concrete, except use White Portland Cement.

All exposed surfaces shall be rubbed free of form marks.

All letters and numbers shall be 3" 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 to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will indicate properly the projects to which it refers.

NOTES FOR R.O.W. MARKER POSTS.

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted August 1-1935.

Posts shall be made of Class "A" Concrete.

The upper 12 inches of marker posts shall be rubbed free of form marks, and the top surface of of post must be constructed to drain thoroughly.

All exposed surfaces of the bronze tablet are to be ground to a smooth surface.

All letters are to be depressed a minimum of 1/16 inch.

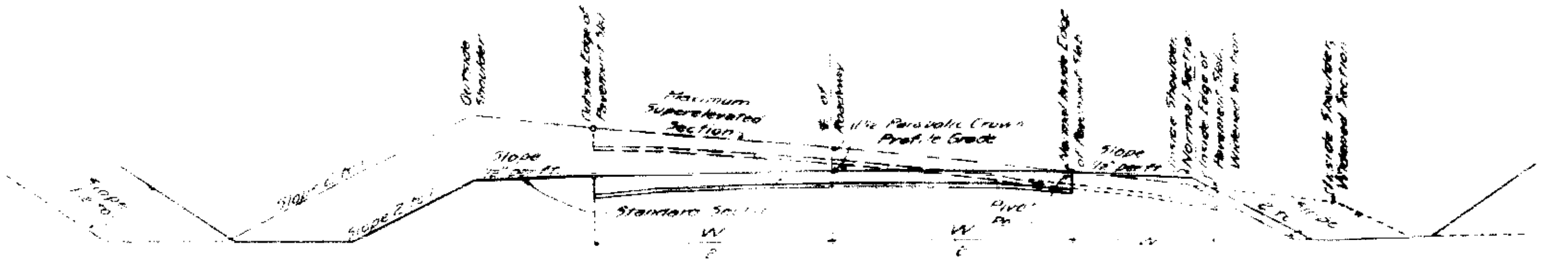
Information on the bronze tablet indicated by pin lines is to be stamped in the field by the engineering party, after post is placed, 1/4" letters and figures to be used.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD WIRE FENCES
-UNTREATED WOOD POSTS-
AND
MARKER POSTS

Designed by A&K Made by A&K Check Design Check Detail P.O.W.	Approved by [signature] Bridge Engineer Date: April 25, 1936

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	SHEET No.	TOTAL SHEETS
3	COLO.	113 H	12	

Revised [illegible] S.B.L. ([illegible] Length)
Revised [illegible] S.B.L.
Revised 2-[illegible] S.B.L.
Revised [illegible] S.B.L. (Special Cases)
Revised 3-[illegible] R.G.K. (1935 Specifications)
Revised 6-9-36 S.B.L. (Notes on Special Cases)



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 [illegible] used for curves of 10° and under. The widened section is to have a flat [illegible].

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.

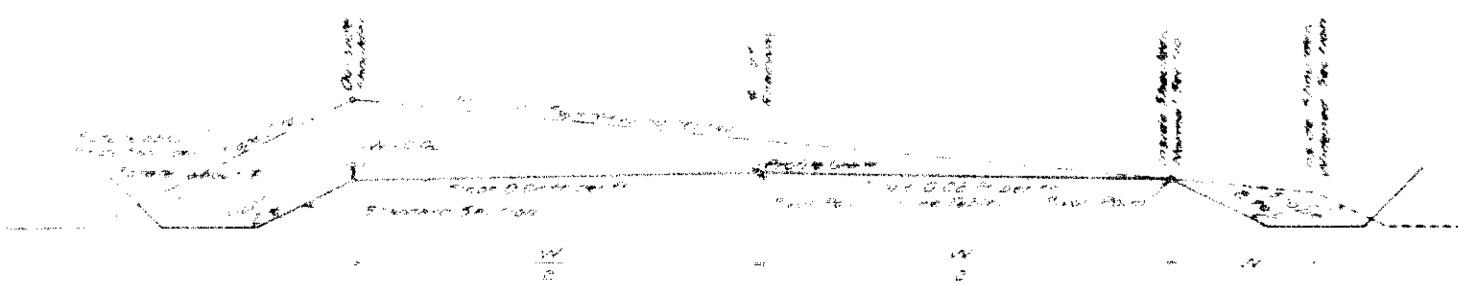
The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

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	[illegible]	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	[illegible]	0.0172	[illegible]	0.0206	0.0210	0.0210
3°	0.0006	0.0025	0.0057	0.0101	0.0158	[illegible]	0.0258	[illegible]	0.0309	0.0315	0.0315
4°	0.0008	0.0034	0.0076	0.0134	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0420
5°	0.0010	0.0042	0.0094	0.0168	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0525	0.0525
6°	[illegible]	0.0050	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0630
7°	0.0015	0.0059	[illegible]	[illegible]	0.0368	[illegible]	[illegible]	[illegible]	[illegible]	0.0735	0.0735
8°	0.0017	0.0067	[illegible]	[illegible]	0.0420	[illegible]	[illegible]	[illegible]	[illegible]	0.0840	0.0840
9°	[illegible]	0.0076	[illegible]	0.0302	0.0472	0.0643	[illegible]	[illegible]	0.0926	[illegible]	0.0945
10° and Over	0.0020	0.0080	[illegible]	0.0320	0.0500	0.0680	[illegible]	[illegible]	0.0980	[illegible]	0.1000
	Offsets for Widening W (in Feet)										
Over 10° Under 12°	0.06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.00	3.00
12° 15°	[illegible]	[illegible]	[illegible]	[illegible]	2.00	[illegible]	[illegible]	[illegible]	[illegible]	4.00	4.00
15° 20°	[illegible]	[illegible]	[illegible]	[illegible]	2.50	3.40	[illegible]	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

[illegible] projects using the graded or surfacing section [illegible] widened as [illegible] indicated [illegible] drawings [illegible] table.

The normal inside shoulder [illegible] the typical section shown on sheet [illegible]. The outside shoulder is to be [illegible] 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.

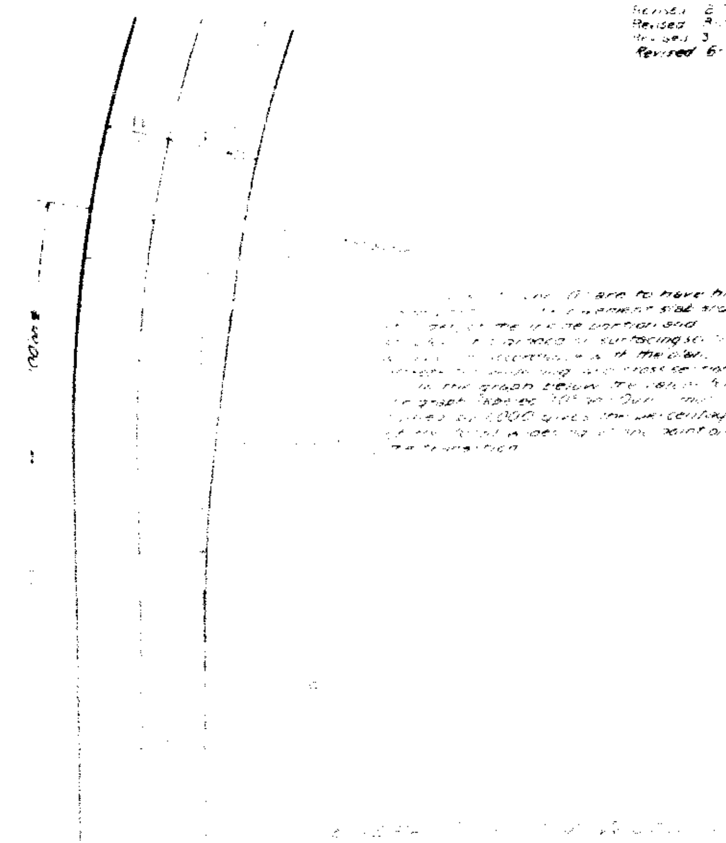
The center line pivot point is to be used [illegible] as the superelevation [illegible] per foot width of roadway. The normal inside [illegible] per foot width of roadway.

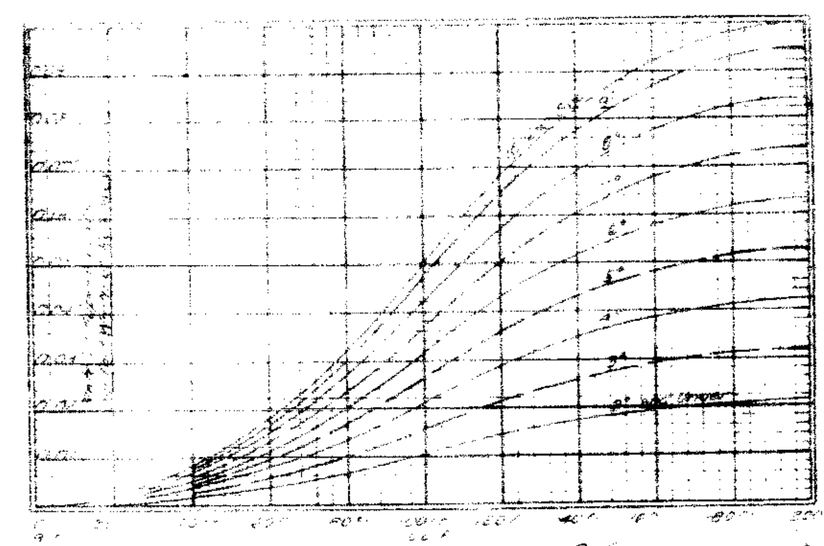
When the degree of curvature exceeds 10° the inside shoulder is to be widened from the normal inside shoulder line as shown by the table. [illegible] curves of 10° and less are not to be widened.

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: Center Line	Inside Shoulder
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	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	[illegible]	85
4°	0.0008	0.0034	0.0076	0.0134	0.0210	0.0286	0.0344	0.0386	0.0412	0.0420	0.0420	96	102
5°	0.0010	0.0042	0.0094	0.0168	0.0262	0.0357	0.0430	0.0483	0.0514	0.0525	0.0525	[illegible]	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	[illegible]	126
8°	0.0017	0.0067	0.0151	0.0269	0.0420	0.0571	0.0689	0.0773	0.0823	0.0840	0.0840	[illegible]	131
9°	0.0019	0.0076	0.0170	0.0302	0.0472	0.0643	0.0775	0.0869	0.0926	0.0945	0.0945	[illegible]	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	[illegible]
	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		





GRAPH OF SUPERELEVATION TRANSITION FACTORS

[illegible] superelevation per foot width of roadway to be applied at [illegible] the pavement slab or 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 × Degree of Curvature

The maximum superelevation of 0.10 ft per foot width [illegible] is not to be exceeded.

[illegible] been prepared from the [illegible] shown [illegible].

[illegible] 0.525 [illegible] the roadway [illegible] the required [illegible] 200 ft [illegible] shall be used between the points of [illegible].

Where the length of the curve is less than 200 ft, the rate of superelevation and the widening required for a distance of one half the length of the curve [illegible] 100 ft) as shown for the regular 200 ft transition for the degree of curve shall be used. This maximum of superelevation and widening [illegible] the center of the curve.

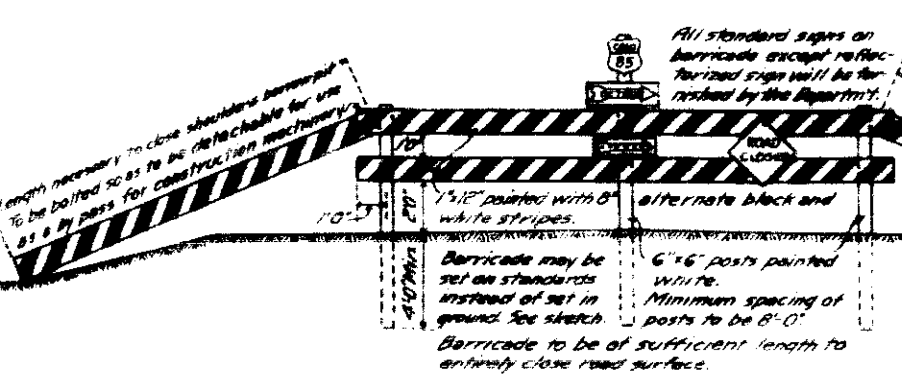
[illegible] the tangent distance between two curves in the same direction is less [illegible] the superelevation and widening required by the curve of lesser degree [illegible] be carried across the connecting tangent in such a way that good appearance and riding qualities will be maintained.

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

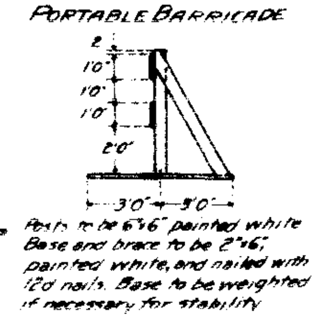
STANDARD M-2-B

FED. ROAD DIST. NO.	STATE	[illegible] PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	113 H	13	

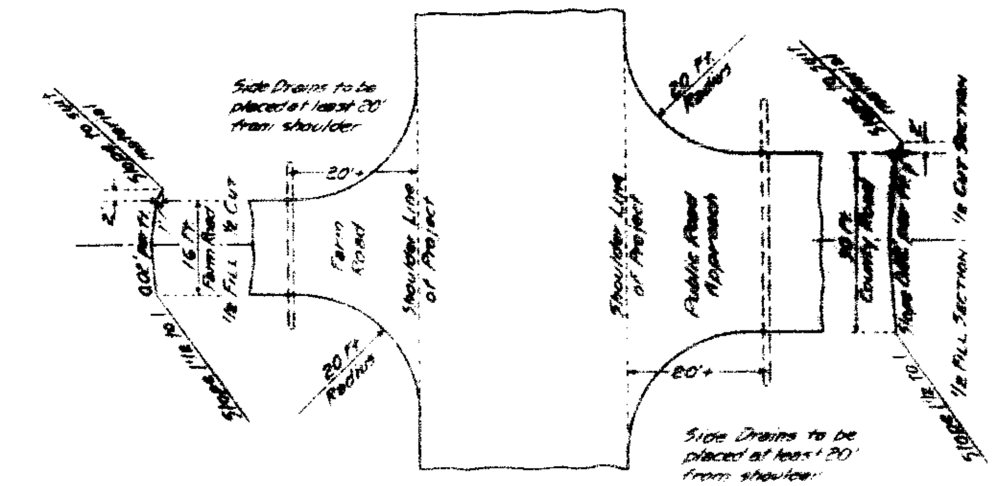
Details of Permanent Barricade



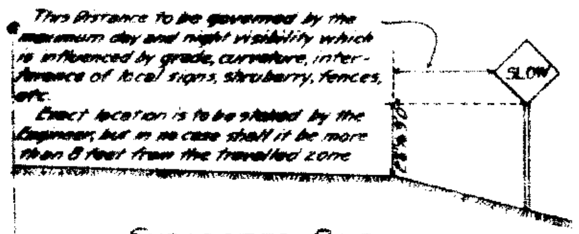
End View of Portable Barricade



Typical Plan for Side Approach Roads

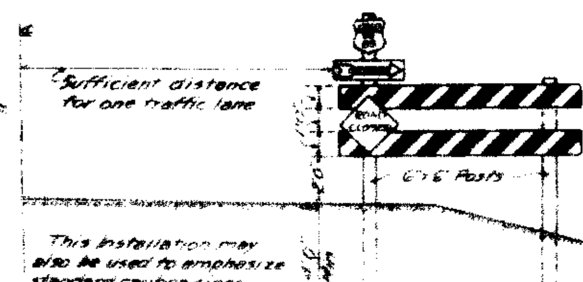


Position of Signs Relative Road Bed

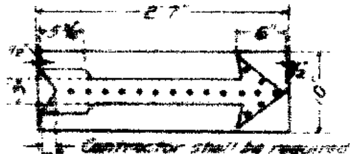


Barricades to be placed as construction conditions require.

Details of Partial Barricade

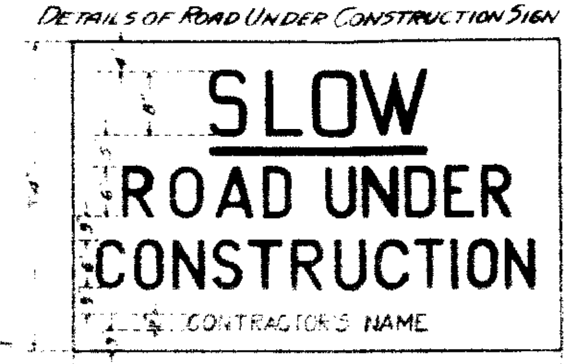


Suggested Detail of Reflectorized Arrow



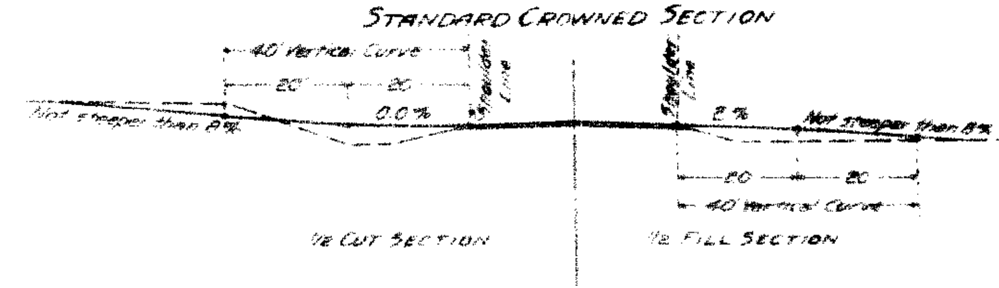
Contractor shall be required to have at least two such arrows for use on barricades at the ends of each project. Reflector Buttons shall be of a type and size, and the sign shall be subject to Department approval.

Details of Road Under Construction Sign

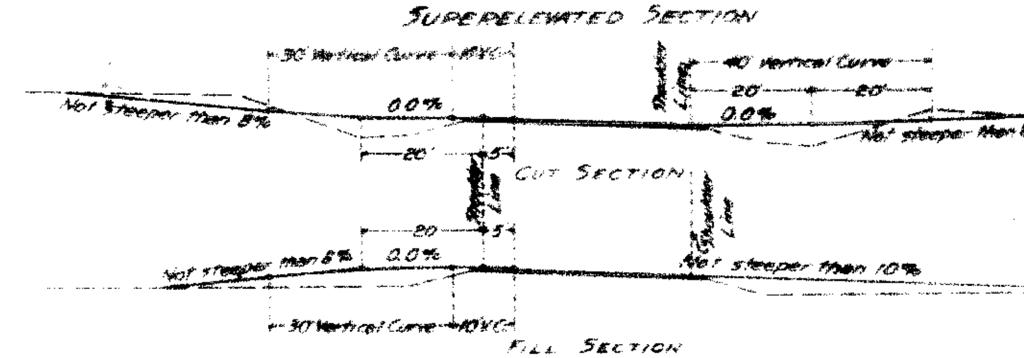


Sign to be made on 1" material with at least three cleats on the back. Background to be white, SLOW and underline to be red, and other lettering to be black. Sign to be set on 2-6"x6" posts 4 ft in the ground.

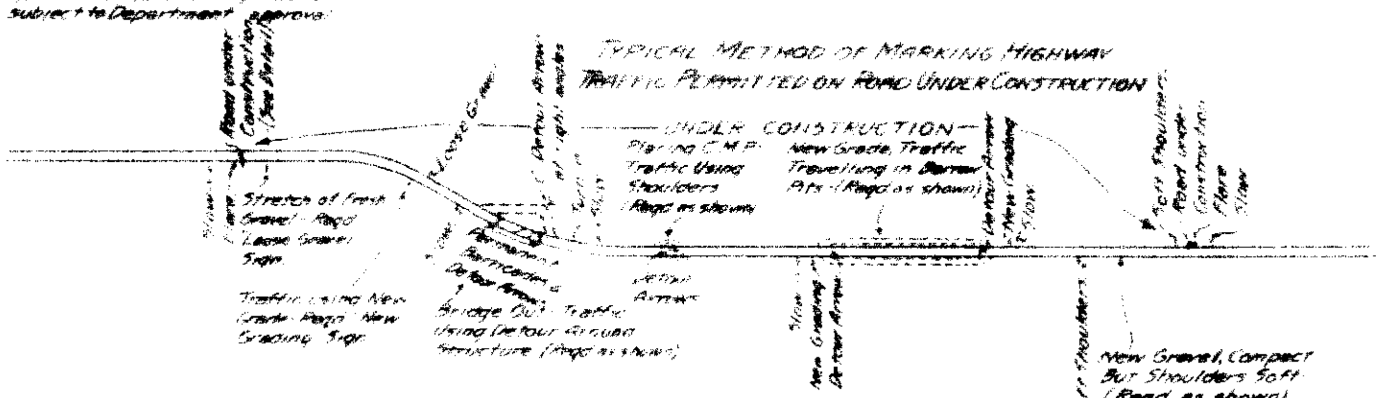
Standard Crowned Section



Superelevated Section



Typical Method of Marking Highway Traffic Permitted on Road Under Construction



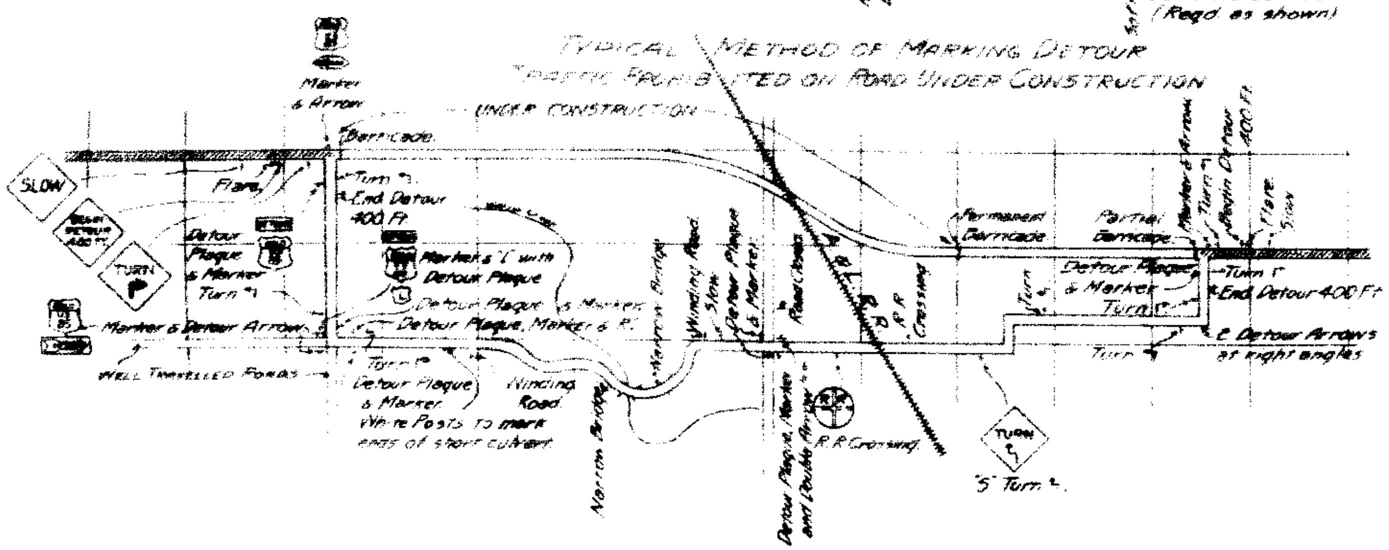
General Notes on Approaches

The maximum grades shown are to be the limiting grades for all except extreme cases.

When the length of the approach as determined by the intersection of these grades with the natural ground is such as to damage the Property so served, or cause unreasonable conditions, the grades may be modified.

In such cases, methods used, and maximum grades, shall be as indicated on the plans, or provided by work order.

Typical Method of Marking Detour Traffic Prohibited on Road Under Construction



General Notes for Roadway Construction Traffic Signs

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department adopted August 1, 1935.

Whenever traffic is permitted on a road while under construction, the Contractor shall at all times adequately and appropriately mark any and all hazards on the Project with well painted, well maintained barricades, and standard caution and warning signs. The Contractor shall also mark with standard directional signs any places where the direction of the flow of traffic is not plain.

Whenever traffic is prohibited from a Project under construction, the Detour will be marked by the Department and the barricades at either end of the Project shall be erected and maintained by the Contractor.

All signs and barricades shall be immediately moved, added to, removed, or changed to appropriately mark hazards, or conditions altered, corrected, or changed by construction progress.

The Contractor shall furnish:

(1) All barricade material. It shall always be well painted, as per sketch, and well maintained.
(2) A reflectorized arrow of an approved type for each barricade at the ends of the Project, and at other barricades required where traffic is permitted on road under construction.
(3) "SLOW-ROAD UNDER CONSTRUCTION" signs as required.
(4) Any special signs the Department may deem necessary for the protection of traffic over the Project.
(5) At least three (3) flares or torches for each barricade, and other flares to illuminate such signs as are called for on these plans, or as the Department may direct.

Flares or torches shall be placed between 3 and 5 feet ahead of the sign or object to be illuminated, and shall be kept burning from sunset to sunrise.

Costs of all of the foregoing materials and work by the Contractor shall be included in the original contract prices for the Project.

The Highway Department will furnish all standard signs not required to be furnished by the Contractor.

COLORADO
STATE HIGHWAY DEPARTMENT
TYPICAL
SIDE APPROACH ROADS
ROADWAY CONSTRUCTION
TRAFFIC SIGNS

Designed by [illegible]
Made by [illegible]
Check [illegible]
Check [illegible]
Approved by [illegible]
Date Aug. [illegible] 1935

M-2-B

NOTE:

Right-of-Way Fencing and Gates are tabulated on sheet No. 3
Guard Fence is tabulated on sheet No. 3.
Right-of-Way Markers are tabulated on sheet No. 2.
All Poles encroaching on Right-of-Way are to be moved by the owners.
Alignment and Grades as shown are subject to modification.

N.W. 1/4 SEC. 9, T. 18 S., R. 71 W.

N.E. 1/4 SEC. 9

F.A. 113-H 14

STA. 2536+98.8
EQ. OF F.A.P. 113-H

Sta 2535+27.5
1568 to W. 1/4 Cor
SEC. 9, T.18S., R.71W

POT 2536+98.8

Sta 2536+98.8-Regd. Project Marker and 300 cu.yds. Embank for Road Approaches, Lt & Rt.

Sta 2538+49-Regd. 24'x64' CMP Cross Culvert

POT 2542+80

Sta 2550 - 4450.10 to NE Cor. (Calc) Sec. 9, T.18S., R.71W

S83°48'E

POT 2554+00

POT 2559+00

FARM ROAD

Sta 2564+50-Regd. 24'x46' CMP Cross Culvert

Excav (Net)	
Excav x Factor	
Emb.	3625
Borrow	3154
Sta. Yd. Overhaul	3162
Yd. Mi. Overhaul	290
Borrow Source	

	2832
	1942
	1942
	144
	133

	1500
	1305
	1161
	160

	257
	659

	7
	6
	3662

Pl 6245.60

Pl 6264.50

Pl 6293.10

FL 418

FL 597

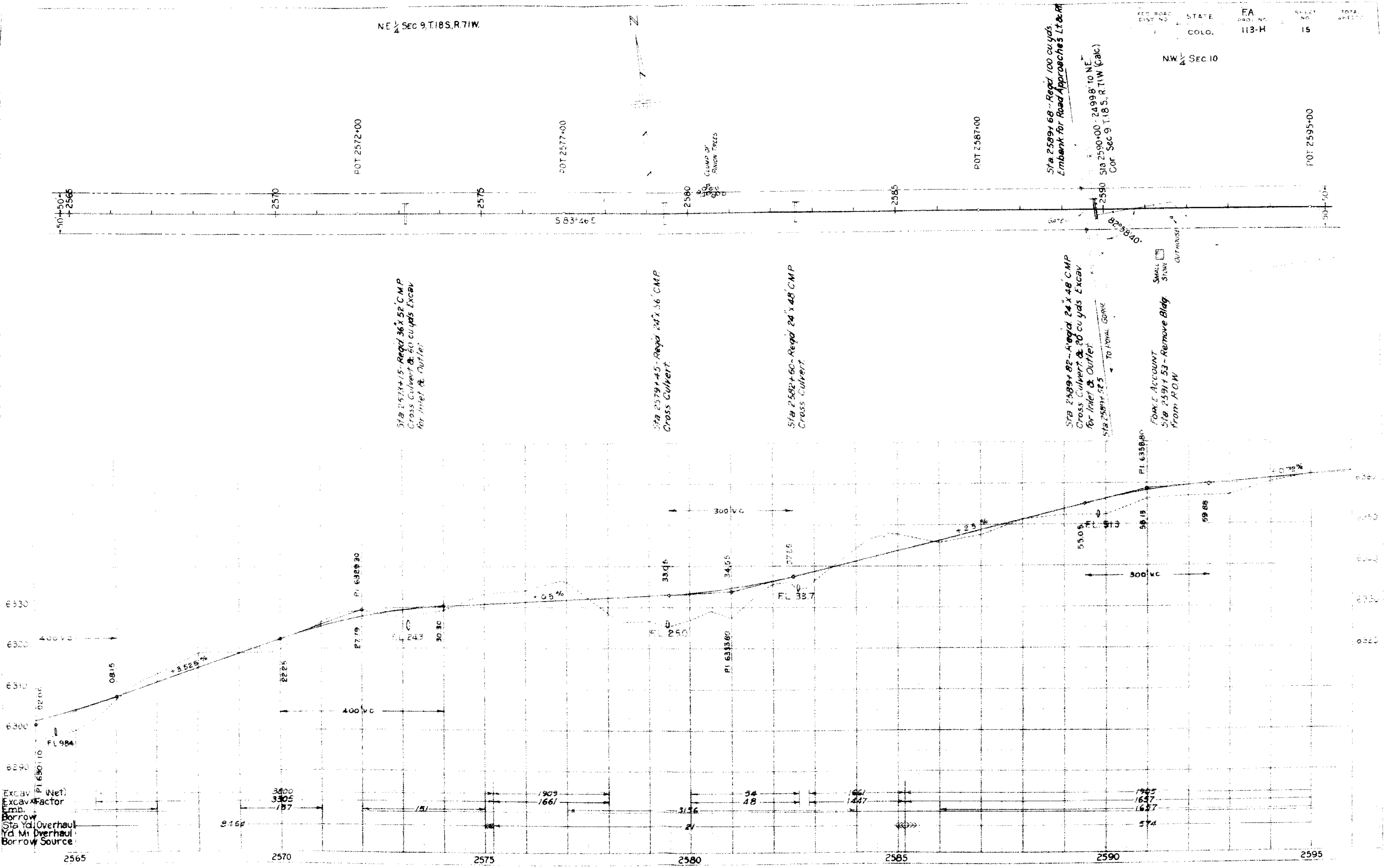
FL 810

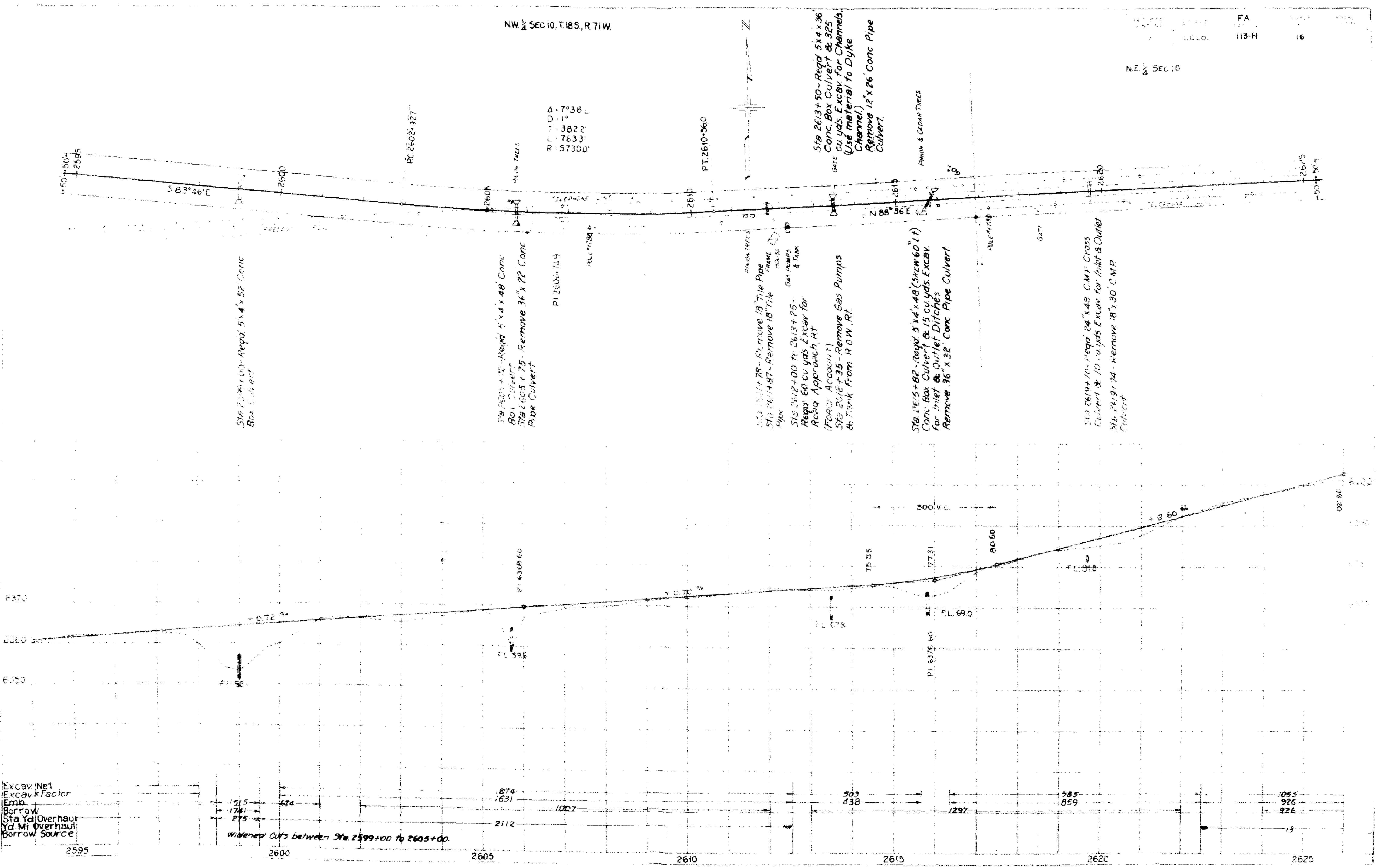
FL 991

FL 984

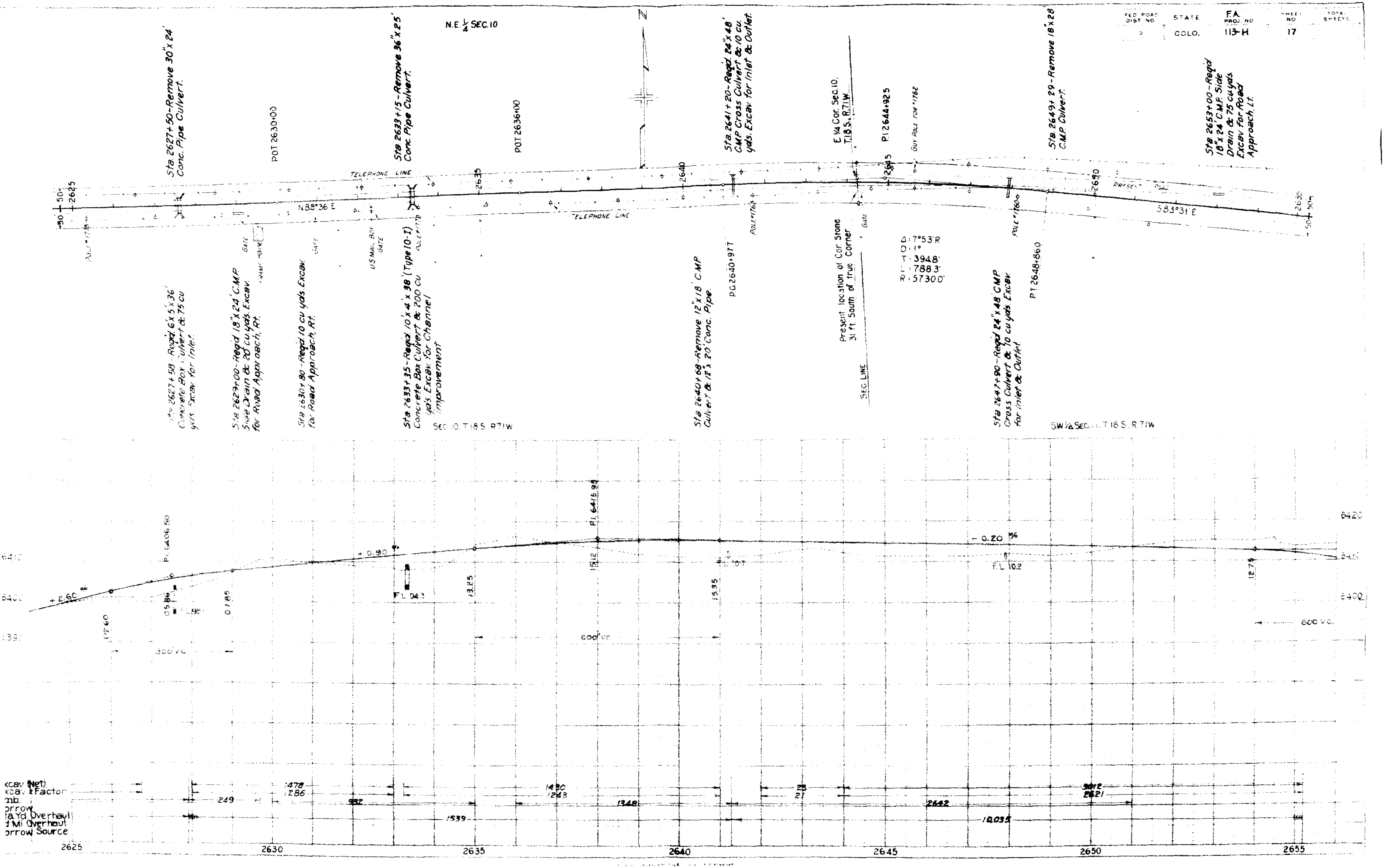
6270
6260
6250
6240

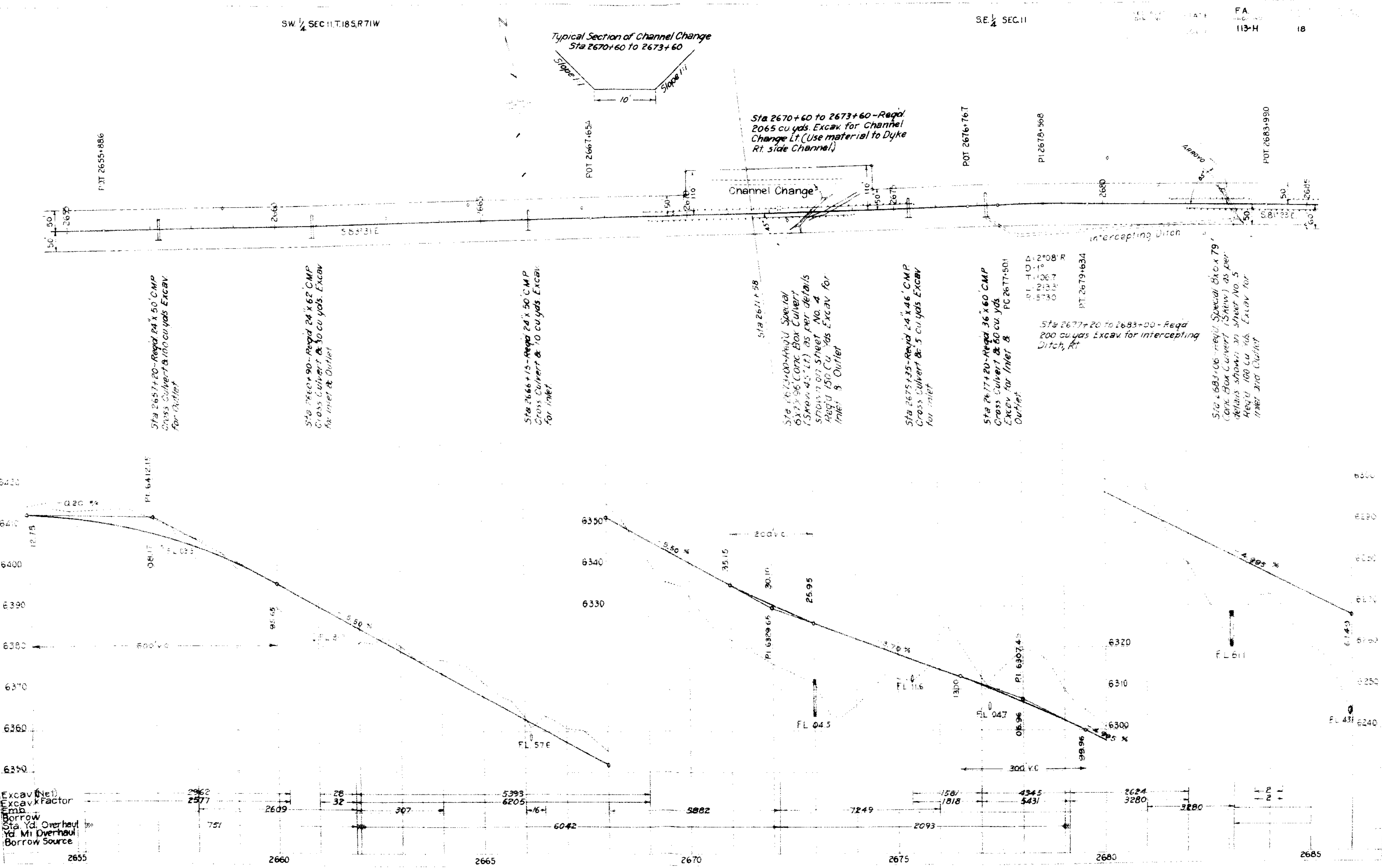
2535 2540 2545 2550 2555 2560 2565

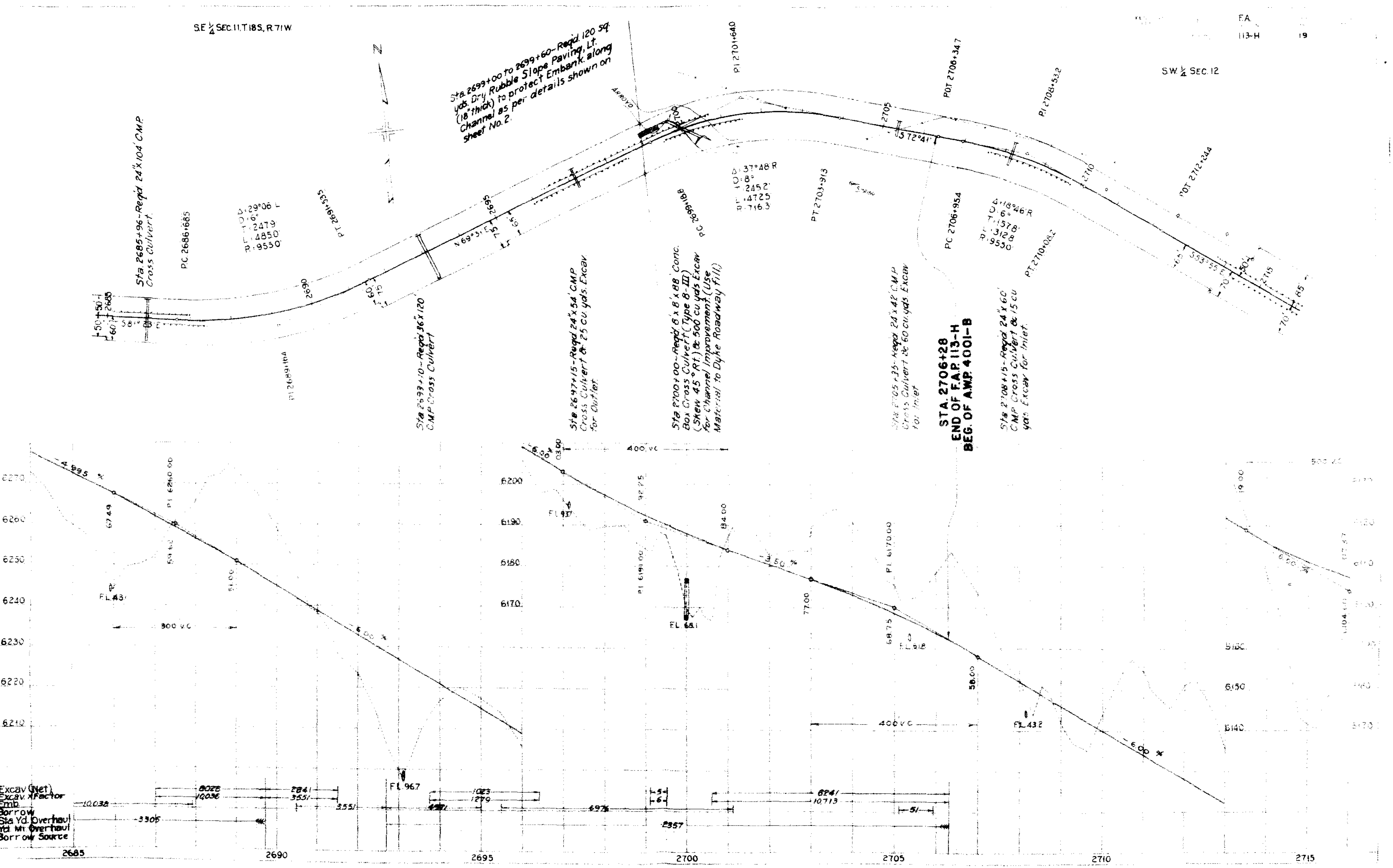

FED. ROAD DIST. NO. | STATE | F.A. PROJ. NO. | SHEET NO. | TOTAL SHEETS
3 | COLO. | 113-H | 15
N.E. 1/4 SEC 9, T.18 S., R.71 W.
N.W. 1/4 SEC. 10
POT 2572+00
POT 2577+00
POT 2587+00
POT 2595+00
S 83°46' E
CLUMP OF PINION TREES
Sta 2589+68 - Reqd 100 cu yds. Embank for Road Approaches Lt & Rt
Sta 2590+00 - 24998' to NE. Cor. Sec 9, T.18 S., R.71 W. (Calc.)
GATE
82°58'40"
OUTHOUSE
SMALL STORE
TO ROYAL GORGE
Sta 2573+15 - Reqd 36" X 52' C.M.P. Cross Culvert & 50 cu yds Excav for Inlet & Outlet
Sta 2579+45 - Reqd 24" x 56' C.M.P. Cross Culvert
Sta 2582+60 - Reqd 24" x 48' C.M.P. Cross Culvert
Sta 2589+82 - Reqd 24" x 48' C.M.P. Cross Culvert & 20 cu yds Excav for Inlet & Outlet
Sta 2589+58.5
FORCE ACCOUNT Sta 2591+53 - Remove Bldg from R.O.W.
400' V.C.
+3.525%
400' V.C.
+0.5%
300' V.C.
+2.5%
300' V.C.
+0.78%
P.I. 6301.10
02.05
08.15
22.25
P.I. 6329.30
27.79
30.30
33.05
34.55
P.I. 6333.80
37.55
55.05
P.I. 6358.80
58.15
59.88
FL 98.4
FL 24.3
FL 25.0
FL 33.7
FL 51.3
6290
6300
6310
6320
6330
6340
6350
6360
Excav. (Net)
Excav. x Factor
Emb.
Borrow
Sta. Yd. Overhaul
Yd. Mi. Overhaul
Borrow Source
3400
3305
157
8458
151
1909
1661
3156
21
54
48
1661
1447
1985
1657
1657
574
2565
2570
2575
2580
2585
2590
2595



FA
COLO.
113-H
16
N.W. 1/4 SEC 10, T.18S., R.71W.
N.E. 1/4 SEC 10
Δ = 7°38' L
D = 1°
T = 382.2'
L = 763.3'
R = 5730.0'
PC 2602+92.7
PT 2610+56.0
PI 2606+71.9
S 83°46' E
N 88°36' E
TELEPHONE LINE
PINON TREES
PINON & CEDAR TREES
GATE
FRAME HOUSE
GAS PUMPS & TANK
Sta 2613+50 - Reqd 5'x4'x36' Conc. Box Culvert & 325 cu yds Excav. for Channels. (Use material to Dyke Channel.) Remove 12"x26' Conc Pipe Culvert.
Sta 2599+00 - Reqd 5'x4'x52' Conc Box Culvert
Sta 2605+75 - Reqd 5'x4'x48' Conc Box Culvert
Sta 2605+75 - Remove 36"x22' Conc Pipe Culvert
Sta 2611+78 - Remove 18" Tile Pipe
Sta 2611+87 - Remove 18" Tile Pipe
Sta 2612+00 to 2613+25 - Reqd 60 cu yds Excav for Road Approach, Rt (Force Account)
Sta 2612+35 - Remove Gas Pumps & Tank from R.O.W. Rt.
Sta 2615+82 - Reqd 5'x4'x48' (Skew 60° Lt) Conc Box Culvert & 15 cu yds Excav. for Inlet & Outlet Ditches. Remove 36"x32' Conc Pipe Culvert
Sta 2619+10 - Reqd 24"x48' CMP Cross Culvert & 10 cu yds Excav for Inlet & Outlet
Sta 2619+14 - Remove 18"x30' CMP Culvert
PI 6368.60
PI 6376.60
+0.72%
+0.76%
+2.60%
300' V.C.
75.55
77.31
80.50
F.L. 56
F.L. 59.6
F.L. 67.8
F.L. 69.0
F.L. 81.0
6350
6360
6370
Excav. Net
Excav. x Factor
Emb.
Borrow
Sta Yd Overhaul
Yd. Mi. Overhaul
Borrow Source
1515
1741
275
624
1874
1631
1007
2112
503
438
1297
585
659
1065
926
926
13
Widened Cuts between Sta. 2599+00 to 2605+00.
2595
2600
2605
2610
2615
2620
2625


FED ROAD DIST NO
STATE
F.A. PROJ. NO
SHEET NO
TOTAL SHEETS
COLO.
113-H
17
N.E. 1/4 SEC. 10
Sta. 2627+50-Remove 30"x 24' Conc. Pipe Culvert.
POT 2630+00
Sta. 2633+15-Remove 36"x 25' Conc. Pipe Culvert.
POT 2636+00
Sta. 2641+20-Reqd. 24"x 48' CMP Cross Culvert & 10 cu. yds. Excav. for Inlet & Outlet.
E 1/4 Cor. Sec. 10, T18S., R71W.
P.I. 2644+92.5
GUY POLE FOR #1762
Sta. 2649+29-Remove 18"x 28' C.M.P. Culvert.
Sta. 2653+00-Reqd. 18"x 24' C.M.P. Side Drain & 75 cu yds Excav. for Road Approach, Lt.
TELEPHONE LINE
N88°36'E
PRESENT ROAD
S83°31'E
GATE
FRAME HOUSE
US MAIL BOX
POLE #1764
POLE #1760
Δ: 7°53'R
D: 1°
T: 394.8'
L: 788.3'
R: 5730.0'
P.C. 2640+97.7
Present location of Cor. Stone 31 ft. South of true Corner
SEC. LINE
P.T. 2648+86.0
Sta. 2627+58-Reqd. 6'x 5'x 36' Concrete Box Culvert & 75 cu yds. Excav. for Inlet.
Sta. 2629+00-Reqd. 18"x 24' C.M.P. Side Drain & 20 cu. yds. Excav. for Road Approach, Rt.
Sta. 2630+80-Reqd. 10 cu yds. Excav. for Road Approach, Rt.
Sta. 2633+35-Reqd. 10'x 4'x 38' (Type 10-I) Concrete Box Culvert & 200 cu. yds. Excav. for Channel Improvement
Sta. 2640+68-Remove 12"x 18' C.M.P. Culvert & 12"x 20' Conc. Pipe.
Sta. 2647+90-Reqd. 24"x 48' CMP Cross Culvert & 10 cu yds Excav. for Inlet & Outlet
SEC. 10, T18S, R71W
SW 1/4 Sec. 11, T18S, R71W
P.I. 6406.50
P.I. 6416.95
+2.60%
+0.90%
-0.20%
F.L. 04.3
F.L. 10.2
05.86
07.85
07.60
13.25
15.35
12.75
300' V.C.
600' V.C.
600' V.C.
6420
6410
6400
Excav. (Net)
Excav. x Factor
Emb.
Borrow
Sta. Yd. Overhaul
Yd. Mi. Overhaul
Borrow Source
249
1478
1286
932
1539
1480
1243
1348
25
21
2642
10,035
3012
2621
2625
2630
2635
2640
2645
2650
2655


S.W. 1/4 SEC 11, T.18S, R.71W
S.E. 1/4 SEC. 11
Typical Section of Channel Change
Sta 2670+60 to 2673+60
Slope 1:1
10'
Sta 2670+60 to 2673+60 - Reqd 2065 cu yds. Excav. for Channel Change Lt. (Use material to Dyke Rt. side Channel)
POT 2655+886
POT 2667+654
POT 2676+767
PI 2678+568
PT 2683+990
Channel Change
Intercepting Ditch
Sta 2657+20 - Reqd 24" x 50' CMP Cross Culvert & 100 cu yds Excav for Outlet
Sta 2660+90 - Reqd 24" x 62' CMP Cross Culvert & 30 cu yds. Excav for Inlet & Outlet
Sta 2666+15 - Reqd 24" x 50' CMP Cross Culvert & 10 cu yds Excav for Inlet
Sta 2671+58
Sta 2675+35 - Reqd 24" x 46' CMP Cross Culvert & 5 cu yds Excav for Inlet
Sta 2677+20 - Reqd 36" x 60' CMP Cross Culvert & 60 cu. yds. Excav for Inlet & Outlet
PC 2677+50
PT 2679+634
Sta 2677+20 to 2683+00 - Reqd 200 cu yds Excav. for Intercepting Ditch, Rt.
0.20 %
PI 6412.15
5.50 %
800' V.C.
FL 57.6
6350
5.50 %
PI 6329.65
FL 04.5
3.70 %
FL 11.6
FL 04.7
PI 6307.45
300' V.C.
4.385 %
FL 43
Excav (Net)
Excav x Factor
Emb
Borrow
Sta Yd. Overhaul
Yd. Mi Overhaul
Borrow Source
2962
2577
2609
751
28
32
307
5393
6205
16
6042
5882
7249
2093
1561
1818
4545
5431
2624
3280
3280
2
2
2655
2660
2665
2670
2675
2680
2685


F.A.
113-H 19
S.E.¼ SEC.11, T.18S, R.71W.
S.W.¼ SEC.12
N
Sta. 2699+00 to 2699+60 - Req'd. 120 sq. yds. Dry Rubble Slope Paving, Lt. (18" thick) to protect Embank. along Channel as per details shown on sheet No. 2.
Sta. 2685+96 - Req'd 24"x104' C.M.P. Cross Culvert.
P.C. 2686+685
Δ: 29°06' L
D: 6°
T: 2479
L: 4850
R: 9550
P.T. 2691+535
P.I. 2689+164
Sta. 2693+10 - Req'd 36"x120' C.M.P. Cross Culvert
N 69°31' E
Sta. 2697+15 - Req'd 24"x54' C.M.P. Cross Culvert & 25 cu yds. Excav for Outlet.
P.C. 2699+188
Sta. 2700+00 - Req'd 8'x8'x88' Conc. Box Cross Culvert (Type 8-III) (Skew 45° Rt.) & 500 cu yds Excav for Channel Improvement. (Use Material to Dyke Roadway Fill.)
P.I. 2701+640
Δ: 37°48' R
D: 8°
T: 2452
L: 4725
R: 7163
P.T. 2703+913
S 72°41' E
Sta. 2705+35 - Req'd 24"x42' C.M.P. Cross Culvert & 60 cu. yds. Excav for Inlet.
P.O.T. 2706+34.7
STA. 2706+28
END OF F.A.P. 113-H
BEG. OF A.W.P. 4001-B
P.C. 2706+954
Δ: 18°46' R
D: 6°
T: 1578
L: 3128
R: 9550
P.I. 2708+53.2
P.T. 2710+08.2
Sta. 2708+15 - Req'd 24"x60' C.M.P. Cross Culvert & 15 cu yds Excav for Inlet.
P.O.T. 2712+24.4
S 53°55' E
-4.995%
P.I. 6260.00
300' V.C.
FL 43
-6.00%
FL 96.7
400' V.C.
FL 93.7
P.I. 6191.00
FL 68.1
-3.50%
P.I. 6170.00
FL 61.8
400' V.C.
FL 43.2
-6.00%
500' V.C.
6270
6260
6250
6240
6230
6220
6210
6200
6190
6180
6170
6160
6150
6140
Excav. (Net)
Excav. X Factor
Emb.
Borrow
Sta. Yd. Overhaul
Yd. Mi. Overhaul
Borrow Source
10,038
3305
8028
10,036
2841
3551
3551
1023
1279
6974
5
6
6241
10,713
2357
51
2685
2690
2695
2700
2705
2710
2715