Rev. INDEX - JRW 4/29/53
Extended Proj. (W.O. No. 17009) CJW 10-28-53
Rev. Conv Signs - 8-19-59 - DCW

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1 (11)	1	

UNIT 1

COLORADO
DEPARTMENT OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. F 006-1(11) UNIT 1
STATE HIGHWAY NO. 3
ADAMS COUNTY

INDEX OF SHEETS

SCALES OF ORIGINAL DRAWINGS

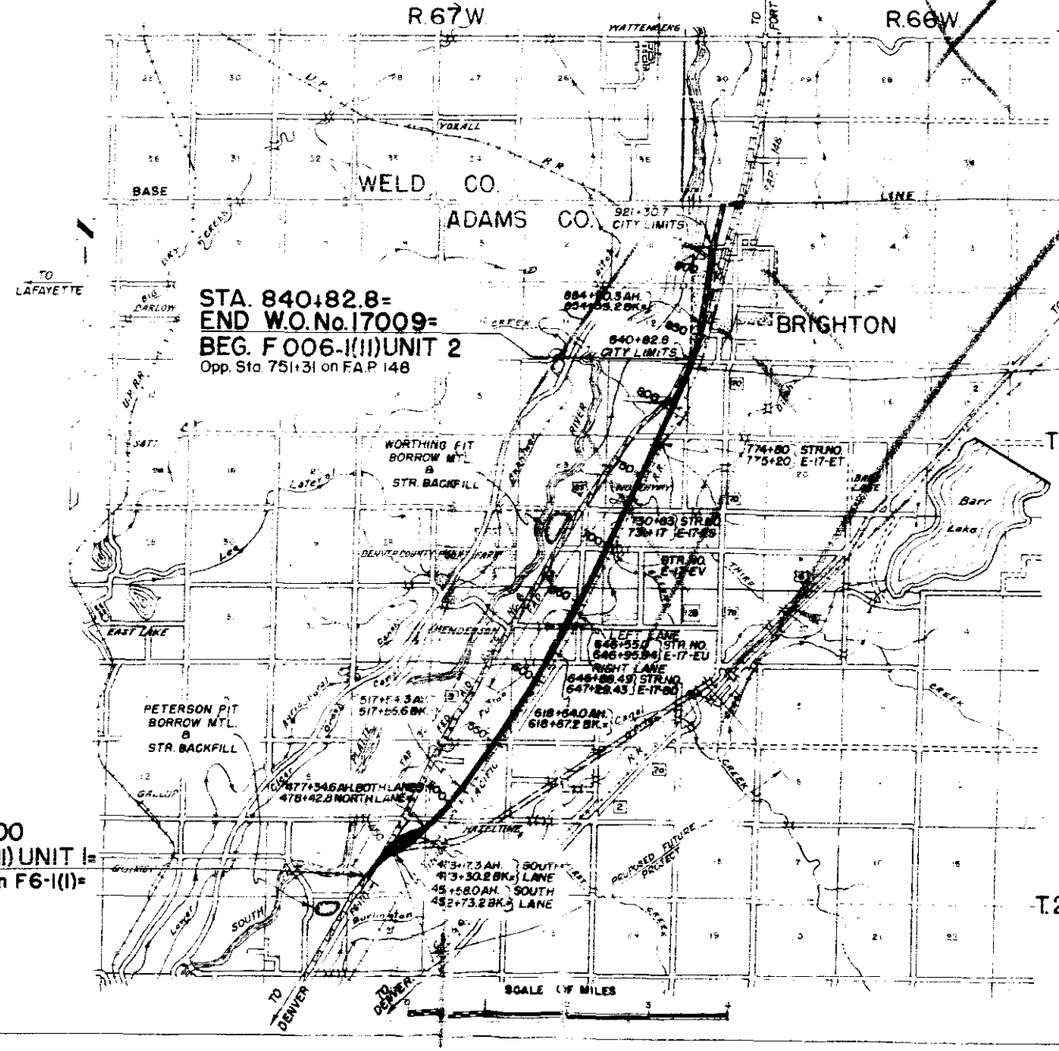
ON PLAN 1 IN. = 100 FT.
ON PROFILE 1 IN. = 100 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL

GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

	W.O. NO. 17009	TOTALS
GROSS AND NET LENGTH OF PROJECT	282.8 FT. = 0.053 Mi.	51,882.8 FT. = 9.826 Mi.
GROSS AND NET LENGTH OF UNIT 1		41,223.7 FT. = 7.808 MILES PROJ.

CONVENTIONAL SIGNS

CENTER LINE	
RIGHT OF WAY LINE	R.O.W. MARKER
COUNTY LINE	
TOWNSHIP OR RANGE LINE	
LAND LINES	SECTION LINE, 1/4 SECTION LINE, 1/16 SECTION LINE
RAILROAD	
BARBED WIRE FENCE	
COMBINATION WIRE FENCE	
SNOW FENCE	
TELEPHONE & TELEGRAPH LINES	
POWER LINE	
DETOUR	
PRESENT ROAD (Plan Sheets)	
CONTOUR DITCHES (APPROX. LOCATION)	
C. of A. (Control of Access)	
Access denied by Deed	C = COMMERCIAL, NC = NON-COMMERCIAL



STA. 840+82.8= END W.O. No. 17009= BEG. F 006-1(11) UNIT 2
Opp. Sta. 751+31 on F.A.P. 148

STA. 427+00 BEG. F 006-1(11) UNIT 1= STA. 427+00 on F6-1(1)= END F 6-1(1)

STA. 944+54.2 END F 006-1(11) UNIT 2
Opposite (along County Line) Sta. 24+10 on FAP 148.

STA. 838+00 END F 006-1(11) UNIT 1 (Orig. Proj.)= BEG. W.O. No. 17009
Opposite Sta. 748+21 on FAP 148

NOTICE TO BIDDERS

IT IS RECOMMENDED THAT BIDDERS ON THIS PROJECT CONFER THE PLAN DETAILS WITH ONE OF THE FOLLOWING REPRESENTATIVES OF THIS DEPARTMENT:

GLEN McELDOWNEY, Construction Engineer, Denver, Colorado
IVAN JOHNSON, Resident Engr., Denver, Colorado

COLORADO DEPARTMENT OF HIGHWAYS

APPROVED:

CHIEF ENGINEER — DATE 11-19-59

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

RECOMMENDED FOR APPROVAL:

DISTRICT ENGINEER — DATE

APPROVED:

DIVISION ENGINEER — DATE

Rev. Fencing - JRW 4/30/53
Rev. Tab. Length (W.O. No. 17009) C.J.W. 10-28-53

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1(11)	2	

UNIT 1

TABULATION OF LENGTH AND DESIGN DATA

STATION	ROADWAY	R.O.W. INSIDE CITY	R.O.W. OUTSIDE CITY	MAJOR STRUCTURES		W.O. NO. 17009
	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LOADING	Lin. Ft.
NORTH LANE						
427+00 = BEGIN F 006-1(11) UNIT 1 = STA. 427+00 on F 6-1(1) = End F 6-1(1)	5,142.8					
478+42.8 Bk. = 477+34.6 Ah. So. Lane = 477+34.6 Ah. Both Lanes						
SOUTH LANE						
427+00 = BEGIN F 006-1(11) UNIT 1 = STA. 427+00 on F 6-1(1) = End F 6-1(1)	2,573.3					
452+73.3 Bk. = Equation						
451+58.0 Ah.	2,172.2					
473+30.2 Bk. = Equation						
473+17.3 Ah.	417.3					
477+34.6 Ah. = 478+42.8 Bk. No. Lane = 477+34.6 Ah. Both Lanes						
AVERAGE, NORTH & SOUTH LANE	5,152.8					
BOTH LANES						
477+34.6						
517+56.6 Bk. = Equation	4,022.0					
517+54.3 Ah.						
618+67.2 Bk. = Equation	10,112.9					
618+64.0 Ah.						
646+71.8 Bridge End	2,807.8					
Bridge (Fulton Canal)				40.9	H20-S16-44	
647+12.7 Bridge End						
730+83 Bridge End	8,370.3					
C.B.C. (Second Creek)				34.0	H20-S16-44	
731+17 Bridge End						
774+80 Bridge End	4,363.0					
C.B.C. Third Creek				40.0	H20-S16-44	
775+20 Bridge End						
838+00 END F 006-1(11) UNIT 1 (Orig.) Opposite Sta. 748+21 on FAP 148	6,280.0					282.8
TOTALS UNIT 1	41,108.8			114.9		282.8
840+82.8 BEGIN F 006-1(11) UNIT 2 = End W.O. No. 17009 = City Limits BRIGHTON						
854+55.2 Bk. = Equation		1,372.4				
854+50.3 Ah.						
921+30.7 City Limits BRIGHTON		6,680.4				
944+54.2 END F 006-1(11) UNIT 2 Opposite Sta. 24+10 on FAP 148 (County Line)			2,323.5			
TOTALS UNIT 2		8,052.8	2,323.5			

SUMMARY

	LIN. FT	MILES
MAJOR STRUCTURES F 006-1(11) UNIT 1	114.9	0.022
ROADWAY F 006-1(11) UNIT 1 (Orig. Proj.)	41,108.8	7.786
TOTAL F 006-1(11) UNIT 1 (Orig. Proj.)	41,223.7	7.808
ROADWAY W.O. No. 17009	282.8	0.053
TOTAL UNIT 1 (Including W.O.)	41,506.5	7.861
RIGHT OF WAY F 006-1(11) UNIT 2 (INSIDE BRIGHTON)	8,052.8	1.525
RIGHT OF WAY F 006-1(11) UNIT 2 (OUTSIDE BRIGHTON)	2,323.5	0.440
TOTAL RIGHT OF WAY F 006-1(11) UNIT 2	10,376.3	1.965
TOTAL F 006-1(11)	51,882.8	9.826

DESIGN DATA

MAXIMUM DEGREE OF CURVE	3°00'
MAXIMUM GRADE	1.137%
MINIMUM N.P.S.D. (horizontal)	>1300'
MINIMUM N.P.S.D. (vertical)	745'
MAXIMUM DESIGN SPEED	70 M.P.H.

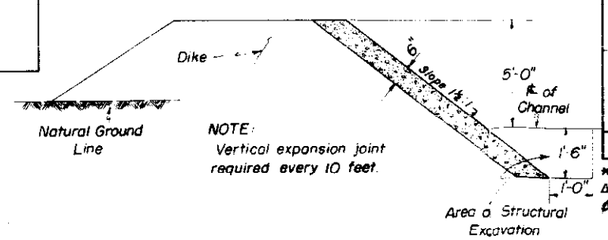
838+00 = BEG. W.O. No. 17009
840+82.8 = END W.O. No. 17009 = OPP. STA. 751+31 ON F.A.P. 148 = BEG. F 006-1(11) UNIT NO. 2

R.O.W. MARKERS

STATION	SIDE	REMOVE AND RESET	NEW
		EACH	EACH
*433+05	RT. & LT.	2	
*443+00	LT.		1
453+00	RT.		1
*469+40	LT.		1
473+25	RT.		1
482+60	RT.		1
495+80	LT.		1
509+00	RT.		1
522+20	LT.		1
535+40	RT.		1
548+00	LT.		1
561+80	RT.		1
575+00	LT.		1
588+20	RT.		1
601+40	LT.		1
614+60	RT.		1
627+80	LT.		1
641+00	RT.		1
654+20	LT.		1
667+40	RT.		1
680+60	LT.		1
693+80	RT.		1
707+00	LT.		1
720+20	RT.		1
733+40	LT.		1
746+60	RT.		1
759+80	LT.		1
773+00	RT.		1
787+00	LT.		1
799+40	RT.		1
812+60	LT.		1
825+80	RT.		1
837+00	LT.		1
TOTALS		2	32

*Indicates North Lane Stationing.

DETAILS OF CONCRETE SLOPE PAVING



FENCING REQUIREMENTS

STATION	SIDE	REMOVE FENCE	Δ REMOVE AND REBUILD FENCE	BUILD BARBED WIRE FENCE	BUILD COMBINATION WIRE FENCE	GATES BARBED WIRE
		LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH
431+25 - 434+70	RT.		₵345			
433+00 - *440+00	LT.	720				
434+70 - 446+10	RT.				1120	
446+10 - 473+00	RT.			2520		
*440+00 - 483+70	LT.			4520		
444+65	X	420				
447+25	RT.					1
475+50	X	300				
474+40 - 485+75	RT.			1140		
484+85	X	310				
484+50 - 542+60	LT.			5830		
542+80 - 549+20	LT.			640		
485+55	X	330				
486+75 - 540+20	RT.			5405		
540+40 - 550+60	RT.			1025		
491+15 - 491+85	RT.	100				
519+40	X	175				
533+00	RT. & LT.					2
535+00	X	180				
549+90 - 611+15	LT.			6130		
550+30 - 552+25	RT. & LT.	490				
551+35 - 612+50	RT.			6130		
593+90	X	155				
611+80	X	280				
611+85 - 640+30	LT.			2880		
612+45	X	270				
613+00 - 620+60	RT.			790		
618+15 - 621+50	RT. & LT.	530				
622+15 - 623+95	RT. & LT.	300				
624+50	LT.					1
626+60	X	170				
640+90	X	215				
641+00 - 646+25	LT.			540		
641+00 - 646+90	RT. & LT.	830				
642+80 - 646+90	RT.			520		
646+90 - 654+80	LT.			800		
657+50 - 698+00	LT.			4120		
647+30 - 657+50	RT. & LT.	1330				
647+60 - 699+40	RT.			5270		
652+00	RT.					1
681+00	RT. & LT.					2
684+50	X	165				
698+50 - 727+00	LT.			2860		
700+25 - 728+10	RT.			3090		
713+30	X	165				
714+50	RT. & LT.					2
727+50	X	310				
727+70 - 730+70	LT.			310		
728+60 - 730+70	RT.			220		
731+30 - 774+70	LT.			4340		
731+30 - 771+40	RT.			4010		
756+70	X	165				
757+50	RT. & LT.					2
771+00	X	165				
774+70 - 775+40	RT.	70				
775+40 - 784+70	LT.			940		
780+80 - 785+80	RT.			500		
780+80 - 785+80	RT. & LT.	690				
785+40 - 826+80	LT.			4150		
785+80	X	260				
786+30 - 838+00	RT.			5530		
818+25 - 826+80	RT. & LT.	985				
835+20	LT.					1
509+00	RT. & LT.					2
805+75	RT. & LT.					2
TOTALS		10,080	345	74,210	1,120	16

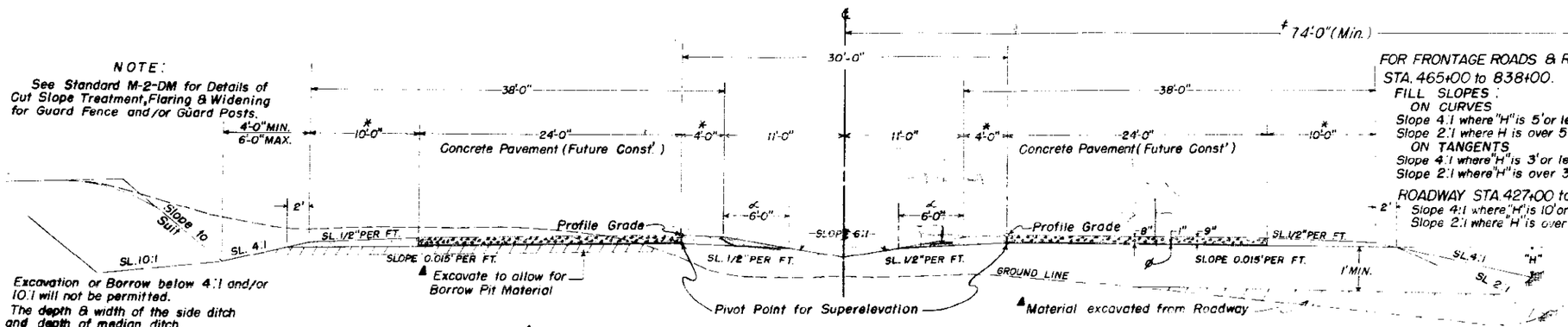
*Indicates North Lane stationing.
Δ It is estimated that 4 Treated Wooden Line Posts will be reqd. for Remove and Rebuild Fence.
₵ Includes resetting driveway gate from Lt. of 435+ to Rt. of 435+50.

Rev. JRW - 4/30/53

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1 (11) UNIT 1	3	

TYPICAL CROSS SECTION OF IMPROVEMENT

TYPICAL SECTION



NOTE:
See Standard M-2-DM for Details of Cut Slope Treatment, Flaring & Widening for Guard Fence and/or Guard Posts.

Excavation or Borrow below 4:1 and/or 10:1 will not be permitted.
The depth & width of the side ditch and depth of median ditch, shall be varied where necessary in order to provide proper drainage and/or entrance to drainage structures.

Excavate to allow for Borrow Pit Material

▲ The upper 1-Ft. of the subgrade is to be constructed with material from the Borrow Pits (Ave. "R" over 65). Material excavated to allow for this, along with any other material excavated from the roadway having a C.B.R. less than 10, shall be placed in the roadway fill 1 ft. or more below the top of subgrade

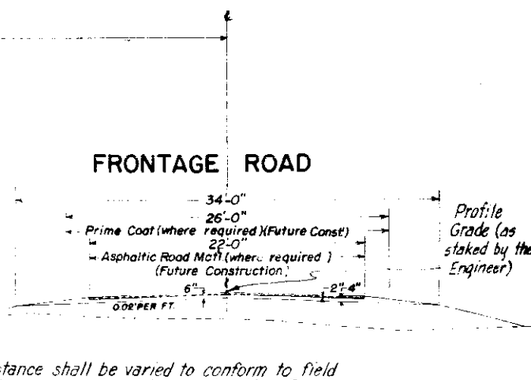
▲ Material excavated from Roadway

℄ Variable where Superelevation is involved
℄ 36 ft. Sta. 835+60 to Sta. 839+80.

ø Sand Cushion (Future Const.)
* Shoulder Surfacing (Future Const.)

FOR FRONTAGE ROADS & ROADWAY
STA. 465+00 to 838+00.
FILL SLOPES:
ON CURVES
Slope 4:1 where "H" is 5' or less
Slope 2:1 where H is over 5'
ON TANGENTS
Slope 4:1 where "H" is 3' or less
Slope 2:1 where "H" is over 3'

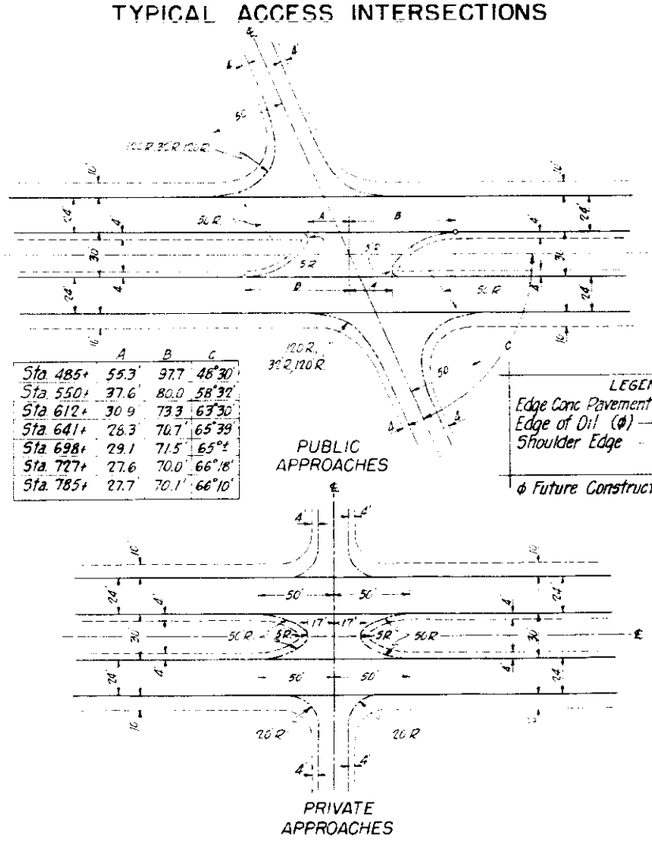
ROADWAY STA. 427+00 to 465+00
Slope 4:1 where "H" is 10' or less
Slope 2:1 where "H" is over 10'



* This distance shall be varied to conform to field conditions encountered in constructing Frontage Roads.

Note:
Sta. 430+ to Sta. 477+, where North & South lanes are shown separately on line sheets, ½ of typical section shown above is used on each lane with ℄ being in same relative position to the ½ section as it is above.

TYPICAL ACCESS INTERSECTIONS



	A	B	C
Sta. 485+	55.3'	97.7'	48°30'
Sta. 550+	37.6'	80.0'	58°32'
Sta. 612+	30.9'	73.3'	63°30'
Sta. 641+	28.3'	70.7'	65°39'
Sta. 698+	29.1'	71.5'	65°12'
Sta. 727+	27.6'	70.0'	66°16'
Sta. 785+	27.7'	70.1'	66°10'

GENERAL NOTES

This project is to be constructed in conformity with the Standard Specifications of the Colorado Department of Highways adopted June 1, 1952.

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

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

All Corrugated Metal Pipe Cross Culverts, including Arch Culverts, shall be laid with Metal Aprons on each end unless otherwise noted on the plans.

All concrete used on this project shall be "Air Entrained Concrete".

Culverts projecting from embankments shall be covered with approximately 6 inches of embankment material in such a manner that a minimum of pipe shall be exposed in the completed work. This shall be accomplished by warping embankment slopes around and adjacent to the culvert.

Payment for overhaul will be based on measurement along the centerline of the project.

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

Approximate location and quantities involved in construction of intercepting ditches are tabulated on Summary of Earthwork Quantities Sheet.

"The force-account item, 'Clearing of Building Sites, including Removal of Foundation and Appurtenances,' shall include removal of all foundations, wells, outhouses and other appurtenances not removed by the owner, and any necessary backfilling of cellars, cess pools, wells, etc., to provide neat road-side conditions. It is estimated that this item applies at the following locations: Sta. 551+, Sta. 600+ and Sta. 803+.

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	ROADWAY	MAJOR STRUCTURES				PROJECT TOTALS
				BRIDGES STA. 646+	BRIDGE RT. OF STA. 728+	TRIPLE C. B. C. STA. 730+	TRIPLE C. B. C. STA. 775+	
10a	Clearing & Grubbing Entire Project	Lump Sum	•					•
11a	Removal of Steel Bridge, Sta. 646+	Lump Sum		•				•
11b	Removal of 12 Structures	Lump Sum	•					•
11c	Remove and Reset R.O.W. Markers	Each	2					2
12a	Removing Fence	Lin. Ft.	10,100					10,100
12b	Removing and Rebuilding Fence	Lin. Ft.	400					400
12c	Line Posts (Treated Wood)	Each	5					5
13c	Unclassified Excavation	Cu. Yd.	599,400	600				600,000
13d	Unclassified Ditch Excavation	Cu. Yd.	5,400					5,400
14a	Dry Rock Excavation (Str.)	Cu. Yd.	60	5		20	15	100
14b	Dry Common Excavation (Str.)	Cu. Yd.	1,120	120	40	360	300	1,940
14c	Wet Rock Excavation (Str.)	Cu. Yd.	25	5		10	10	50
14d	Wet Common Excavation (Str.)	Cu. Yd.	485	630	50	155	130	1,450
16a	Structure Backfill (Class 1)	Cu. Yd.	2,565	555	60	45	35	3,260
16c	Mechanical Tamping	Hour	270	86	6	31	31	430
17a	Rolling with Tamping Roller (Two (2) Unit)	Hour	2,040					2,040
17b	Rolling with Tamping Roller (Four (4) Unit)	Hour	340					340
17d	Rolling with Flat Wheeled Roller (Three (3) Wheel)	Hour	140					140
17e	Rolling with Rubber Tired Roller	Hour	50					50
17f	Furnishing Tamping Roller (Two (2) Unit)	Each	1					1
17g	Furnishing Tamping Roller (Four (4) Unit)	Each	1					1
17i	Furnishing Flat Wheeled Roller (Three (3) Wheel)	Each	1					1
17j	Furnishing Rubber Tired Roller	Each	1					1
17k	Wetting	M Gal.	16,980					16,980
18a	Station Yard Overhaul	Sta. Yd.	6,182,300	6,200	650	475	375	6,190,000
18b	Yard Mile Overhaul	Yd. Mi.	1,048,360	1,135	30	25	50	1,049,600
42a	Untreated Bridge Timber	M Ft. bm.		1.0	1.1			2.1
42b	Treated Bridge Timber	M Ft. bm.			21.0			21.0
43	Asphalt Plank Wearing Surface	Sq. Ft.			1,126			1,126
44b	Miscellaneous Treated Timber	M Ft. bm.	2.1					2.1
46a	Class "A" Concrete	Cu. Yd.	148	400		365	457	1,370
47x	Reinforcing Steel - Transport and Place	Lb.	13,400	33,520		40,110	51,270	138,300
48x	Structural Steel - Transport and Erect	Lb.		71,800				71,800
53y	12" Corrugated Metal Culvert Pipe	Lin. Ft.	24					24
53b	18" Corrugated Metal Culvert Pipe	Lin. Ft.	1,920	4				1,924
53c	24" Corrugated Metal Culvert Pipe	Lin. Ft.	3,405					3,405
53d	30" Corrugated Metal Culvert Pipe	Lin. Ft.	116					116
53g	48" Corrugated Metal Culvert Pipe	Lin. Ft.	110					110
55b	18" Corrugated Metal Siphon Pipe	Lin. Ft.	284					284
59a	Treated Sheet Piling	Lin. Ft.	6,980					6,980
60a	Treated Timber Piling	Lin. Ft.	624		676			1,300
65	Concrete Slope and Ditch Paving (6" Thick)	Sq. Yd.	910					910
76c	Barbed Wire Fence with Metal Posts	Lin. Ft.	74,300					74,300
76f	Combination Wire Fence with Metal Posts	Lin. Ft.	1,200					1,200
76g	Barbed Wire Gates	Each	16					16
81b	Right of Way Markers	Each	32					32
85b	Trash Guards - 18" Siphon	Each	4					4
89a	Drain Pipe (Concrete Floor) (4"ϕ x 2'-0")	Each		2				2
89b	Drain Pipe (Timber Floor) (3"ϕ x 2'-4")	Each			4			4
95b	Metal Aprons for 18" Corrugated Metal Pipe Culverts	Each	26					26
95by	Metal Aprons for 18" Corrugated Metal Culvt Pipes (for Siphons)	Each	4					4
95c	Metal Aprons for 24" Corrugated Metal Pipe Culverts	Each	54					54
95d	Metal Aprons for 30" Corrugated Metal Pipe Culverts	Each	2					2
95g	Metal Aprons for 48" Corrugated Metal Pipe Culverts	Each	2					2
95xb	Metal Aprons for 22"x 13" Corrugated Metal Pipe Arch Culverts	Each	8					8
95xc	Metal Aprons for 29"x 18" Corrugated Metal Pipe Arch Culverts	Each	18					18
110pa	4" Metal Drain Pipe	Lin. Ft.	550					550
110va	4" Cast Iron Valve and Valve Box	Each	2					2
121k	5" Standard Galvanized Pipe	Lin. Ft.	202					202
132qb	No. 13 Inlet Grating and Frame	Each					1	1
132qx	Inlet Grating	Each	28					28
132qy	Inlet Grating and Frame (To fit 24" C.M.P.)	Each	1					1
134b	22"x 13" Corrugated Metal Pipe Arch Culverts	Lin. Ft.	478					478
134c	29"x 18" Corrugated Metal Pipe Arch Culverts	Lin. Ft.	1046					1,046
	STATE FORCES							
81a	Project Markers	Each	1					1
	Reflectorized R.R. Advance Warning Signs	Each	2					2
	Reflectorized R.R. Crossbuck Signs	Each	2					2
	FORCE ACCOUNT							
	Relocate Telephone Line (Work by M.S.T.&T. Co. Forces)	Lump Sum	•					•
*	Relocate R.E.A. Power Line (Work by Power Co. Forces)	Lump Sum	•*					•*
	Relocate Public Service Line (Work by Public Service Co. Forces)	Lump Sum	•					•
	Relocate Telegraph Line, R.R. Grade Crossing & Structures (Work by U.P.R.R. Co. Forces)	Lump Sum	•					•
*	Encase Gas Line (Work by Colo.-Wyo. Gas Co. Forces)	Lump Sum	•*					•*
	Clearing of Building Sites, including Removal of Foundations and Appurtenances	Lump Sum	•					•
	RIGHT OF WAY							
	Right of Way, entire project, including removal of Buildings & Appurtenances.	Lump Sum						•
	STATE FURNISHED MATERIAL							
47	Reinforcing Steel	Lb.	13,400	33,520		40,110	51,270	138,300
48	Structural Steel	Lb.		71,800				71,800

* Non Federal Aid

Rev. JRW 4/30/59

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1(11)	4	

UNIT 1

Rev. JRW 4/30/53

Fed. Road Division No.	District	Project No.	Sheet No.	Total Sheets
9.	COLO.	F006-1(11)	5	

UNIT I

LIST OF STRUCTURES

Location	Description	Remove Structure No.	Remove Structure Kind	Excavation (Cubic Yards) Uncl.	Excavation (Cubic Yards) Emb.	Excavation (Cubic Yards) Uncl. Ditch	Structural Excavation (Cubic Yards) ø	Structure Backfill (Cubic Yards) Cl. I	Mech. Tamping Hours	‡ Gravel or Crushed Rock Surfacing (Future Constr.) Tons		Concrete (Cubic Yards) Cl. A	Concrete (Cubic Yards) Cl. B	Reinforcing Steel Lbs.	Inlet Grating ▲ No.	Corrugated Metal Culvert Pipe (Linear Feet) 12"	18"	24"	30"	48"	C.M.P. Arch Culverts (Lin. Ft.) 22"x13"	29"x18"	Metal Aprons for C.M.P. Arch Culverts (No.) 22"x13"	29"x18"	Metal Aprons for C.M.P. Culverts (No.) 18"	24"	30"	48"	Miscellaneous
427+ to 435+	Frontage Road, Rt				850																								
428+ to 432+	Adjust Median & Borrow Ditch, Rt to Drain Ahead				*																								
431+ to 432+	Ditch Change, Rt with 1-2ft Conc. Drop					20	4	2				1.06																	
431+ to 435+	Ditch Change, Rt with 1-2ft Conc. Drop					60	4	2				1.06																	
432+48	Cross Culvert under both Lanes and Rt Frontage Road & Ditches, Type A Concrete Inlet in Borrow Ditch, Rt (H-4.0')											1.06		104	1			64 (Rt) 66 (Lt)								1			
	Type A Concrete Inlet in Median (H-5.0')					75	125	70				1.32		126	1			58 (Front)								1			
432+55	Cross Culvert under both Lanes and Rt Frontage Road, Ditches, Conc. Division Box, Rt					40	72	64				1.44						194								2			
432+88	Remove Conc. Division & Drop Box, Lt	1																											
433+ to 434+	Adjust Median & Borrow Ditch, Rt to Drain Back				*																								
435+	Median Crossing, Road Approach, Rt & Lt & Side Drain in Irrigation Ditch, Lt				50		20	16		120							60												
435+50	Approach to Frontage Road, Rt				10					8																			
435+ to 447+	Frontage Road, Rt				900																								
435+70	Remove 6'x12' Plank Bridge & 15"x12' C.M.P., Lt	2																											
446+	Concrete Division Box, Rt						4	2				1.44																	
South Lane Stations: 460+ to 470+	Adjust Borrow Ditch, Rt to Drain Ahead			50																									
444+70	Cross Culvert under both Lanes and Frontage Road, Ditches					10	102	113										342								2			
473+ to 474+	Adjust Borrow Ditch, Lt to Drain Ahead			5																									
474+00	Cross Culvert under South Lane & Outlet Ditch					5	14	19										58								2			
474+ to 475+	Adjust Borrow Ditch, Lt to Drain Back			5																									
474+ to 476+	Ditch Change, Rt					10																							
476+50	Cross Culvert under both Lanes & Ditches					15	15	31									116								2				
476+ to 478+	Adjust Median to Drain Back				*																								
North Lane Stations: 459+ to 471+	Adjust Borrow Ditch Lt to Drain Ahead			650																									
475+09	Cross Culvert under North Lane & Inlet Ditch					5	8	18										54								2			
480+00	Arch Cross Culvert under both Lanes & Ditches					5	5	37														112		2					
485+ to 487+	Adjust Median to Drain Ahead				*																								
485+40	Cross Culvert under both Lanes & Ditches					50	40	39										122								2			
485+	Median Crossing & Road Approach Rt & Lt				50					100																			
487+00	Cross Culverts under both Lanes, Ditches, Type A Concrete Inlet in Median (H-4.0')					25	20	38				1.06		104	1			{56, 54								2			
487+ to 491+	Adjust Median to fit Median Drain				*																								
492+88	18"x147' C.M. Siphon with Metal Aprons & Trash Guards, (H-4.0' Rt & Lt), Siphon Drain & Ditches					10	175	152																					150' of 18" C.M. Siphon Pipe; 380' of 4" Metal Drain Pipe; 1-4" Valve & Valve Box; 2-18" Metal Trash Guards; 2 Metal Aprons for 18" C.M.P. Siphon Pipe
496+ to 498+	Ditch Change, Rt					80																							
499+00	Channel Change, Rt & Lt (W=12') and Spl. 6'x7'x110' C.B.C. for Stock Pass under both Lanes			550			25	50	20			102.85		10359															
499+25	Cross Culvert under Rt Lane, Type A Concrete Inlet in Median (H-4.0')						10	20				1.12		104	1			56								1			
511+ to 514+	Ditch Change, Lt					160																							
509+00	Median Crossing & Road Approach, Rt & Lt				70					100																			
514+70	Cross Culvert under both Lanes						40	47											116								2		
514+90	Concrete Division Box, Lt						8	2				1.62																	
509+ to 515+	Adjust Median to Drain Ahead				*																								
519+11	C.M.P. Under Irrigation Ditch, Lt						2	2								12													
519+48	Arch Cross Culvert under both Lanes						15	51														154		2					

Cont'd on Sheet No. 6

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FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9.	COLO.	F 006-1(11) UNIT I	6	

LIST OF ST

Cont'd from Sheet No. 5

LOCATION	DESCRIPTION	REMOVE STRUCTURE NO.	REMOVE STRUCTURE KIND	EXCAVATION CUBIC YARDS UNCL.	EXCAVATION CUBIC YARDS EMB.	EXCAVATION CUBIC YARDS UNCL. DITCH	STRUCTURAL EXCAVATION CUBIC YARDS ø	STRUCTURE BACKFILL CUBIC YARDS CL.	MECH. TAMPING HOURS	†GRAVEL OR CRUSHED ROCK SURFACING (FUTURE CONSTR.) TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	INLET GRATING ▲ NO.	CORRUGATED METAL CULVERT PIPE LIN. FEET 12"	18"	24"	30"	48"	C.M.P. ARCH CULVERTS LIN. FT. 22"x13"	29"x18"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 22"x13"	29"x18"	METAL APRONS FOR C.M.P. CULVERTS NO. 18"	24"	30"	48"	MISCELLANEOUS
519+85	C.M.P. Under Irrigation Ditch, Rt.						2	2						12													
526+00	Cross Culverts under both Lanes & Ditches, Type A Concrete Inlet in Median, (H-5.5')					5	5	39			1.44	132	1			{54 58								2			
528+50	Arch Cross Culvert under both Lanes						2	36												112		2					
534+	Fill Well, Lt.				20																						
533+00	Median Crossing & Road Approach, Rt. & Lt.				30					30																	
540+00	Std. Galvanized Pipe thru C.M.P. under Roadway & C.M.P. under R.R. Rt. with Connections																										202' of 5" Std. Galvanized Pipe
536+	Fill Wells, Rt.				40																						
540+00	Cross Culverts under both Lanes & Inlet Ditch, Type A Concrete Inlet in Median, (H-6.0')					5	20	41			1.57	149	1			{56 58								2			
541±	R.R. Advance Warning & Crossbuck Signs																										{2-Reflect. R.R. Adv. Wrng. Signs / 2-Reflect. R.R. Crossbuck Signs} STATE FORCES
540+ to 541+	Adjust Median to Drain Back				*																						
541+ to 543+	Adjust Median to Drain Ahead				*																						
543+10	Cross Culvert under Lt. Lane & Outlet Ditch, Type A Concrete Inlet in Median, (H-4.0')					5	12	20			1.12	104	1			56								1			
546+00	Cross Culvert under both Lanes to encase sprinkling system. No Metal Aprons.						15	32							124												
550+35	Median Crossing & Road Approach, Rt. & Lt.				140					100																	
553+50	Cross Culvert under both Lanes & Outlet Ditch					5	10	29							112								2				
551+80	18"x132' C.M. Siphon with Metal Aprons & Trash Guards (H-2.5' Rt. & Lt.) Siphon Drain & Ditches					5	80	70																			134' of 18" C.M. Siphon Pipe; 170' of 4" Metal Drain Pipe; 1-4" Valve & Valve Box, 2-18" Metal Trash Guards; 2-M'tl. Aprons for 18" C.M.P. Siphon Pipe
558+00	Cross Culvert under Rt. Lane, Type A Concrete Inlet in Median, (H-4.5')						10	19			1.25	110	1			56								1			
566+30	Arch Cross Culvert under both Lanes & Ditches Remove 18"x10' C.M.P., Rt.	1				5	23	30											114		2						
566+ to 568+	Ditch Change, Lt.					20																					
571+00	Arch Cross Culvert under Lt. Lane Type A Concrete Inlet in Median (H-4.0') & Outlet Ditch					15	10	16			1.12	104	1							54		1					
584+00	Arch Cross Culvert under Rt. Lane & Outlet Ditch Type A Concrete Inlet in Median (H-4.0')					5	8	16			1.12	104	1							56		1					
594+00	Cross Culvert under both Lanes with C.M.P. "T" Connection for Median Drain, Inlet Grating & Frame and Concrete Support						15	73			0.24					∂1		∂110								2	1-Inlet Grating & Frame (To fit 24" C.M.P.)
594+ to 604+	Adjust Median to Drain Back				*																						
600+70	Cross Culvert under both Lanes & Ditches					5	12	29							110								2				
604+55	Arch Cross Culvert under both Lanes Raised Ditches at Inlet & Outlet				20	5	11	31											116		2						
604+ to 607+	Raised Ditch Change, Lt.				110	15																					
610+	C.M.P. Under Irrigation Ditch, Lt.						5	3							12												
611+00	Cross Culverts under both Lanes & Ditches, Type A Concrete Inlet in Median, (H-4.0')					100	20	40			1.06	104	1			{56 54								2			
612+20	Median Crossing & Road Approach, Rt. & Lt.				80					100																	
612+ to 619+	Ditch Change with 2-2 ft. Conc. Drops, Lt.					65	8	4			2.12																
613+00	Arch Cross Culvert under both Lanes & Ditches					10	5	33											124		2						
621+00	Cross Culverts under both Lanes & Ditches Type A Concrete Inlet in Median, (H-4.0')					10	15	39			1.06	104	1			{56 56								2			
621+ to 624+	Adjust Median to Drain Back				*																						
624+00	Median Crossing & Road Approach, Lt.				30					15																	
631+ to 633+	Adjust Median to Drain Ahead				*																						
633+00	Cross Culvert under Rt. Lane & Outlet Ditch Type A Concrete Inlet in Median, (H-4.0')					5	5	20			1.12	104	1			54								1			

Cont'd on Sheet No. 7

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FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9.	COLO.	F 006-1(11) UNIT 1	7	

Cont'd from Sheet No. 6

LOCATION	DESCRIPTION	REMOVE STRUCTURE NO.	REMOVE STRUCTURE KIND	EXCAVATION CUBIC YARDS UNCL.	EXCAVATION CUBIC YARDS EMB.	EXCAVATION CUBIC YARDS STRUCTURE EXCAVATION INCL. BORROW	STRUCTURAL EXCAVATION CUBIC YARDS ∅	STRUCTURE BACKFILL CUBIC YARDS CL. 1	MECH. TAMPING HOURS	† GRAVEL OR CRUSHED ROCK SURFACING (FUTURE CONSTR.) TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	INLET GRATING ▲ NO.	CORRUGATED METAL CULVERT PIPE LINEAR FEET 12"	18"	24"	30"	48"	C.M.P. ARCH CULVERTS LIN. FT. 23"x15"	29"x18"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 25"x15"	29"x18"	METAL APRONS FOR C.M.P. CULVERTS NO. 18"	24"	30"	48"	MISCELLANEOUS
641+16	Median Crossing & Road Approach, Rt. & Lt.				550					100																	
641+ to 646+	Frontage Road, Rt.			20																							
641+ to 646+	Adjust Median to Drain Ahead				*																						
646+	Bridge & Remove Bridge						(Quantities in Summary)																				
647+55	Cross Culvert under both Lanes & Ditches					5	35	43								160								2			
648+	Remove 18"x 26' C.M.P., Rt.	1																									
651+75	Cross Culvert under both Lanes & Ditches					5	20	40									120							2			
651+ to 654+	Ditch Change, Lt.					25																					
652+	Remove 20"x 52' Conc. Pipe, Rt.	1																									
652+00	Road Approach, Rt.				320					30																	
652+ to 656+	Ditch Change, Rt.					25																					
655+	Side Drain & Road Appr. off of County Road, Lt.				5		2	7		12						26											
656+00	Cross Culvert under both Lanes, Ditches & Type A Conc. Inlet in Median (H-4.0')					5	8	30			1.12	104	1			{54 54								2			
657+00	Side Drain in Irrigation Ditch Median Crossing & Road Approach, Lt.				300		5	18		85						68											
665+90	Cross Culvert under both Lanes						7	30								114											
670+30	Arch Cross Culvert under both Lanes						10	33											124		2			2			
674+ to 677+	Adjust Median to fit Median Drain				*																						
677+00	Arch Cross Culverts under both Lanes & Ditches Type A Concrete Inlet in Median (H-4.0)					5	8	38			1.06	104	1						{34 34		2						
677+ to 680+	Adjust Median to Drain Back				*																						
680+65	Cross Culvert under both Lanes & Ditches					5	9	31								116								2			
681+00	Median Crossing & Road Approach, Rt. & Lt.				60					30																	
681+ to 685+	Adjust Median to Drain Ahead				*																						
684+55	Cross Culvert under both Lanes						5	33								128								2			
667+00	Arch Cross Culvert under Lt. Lane, Outlet Ditch & Type A Concrete Inlet in Median (H-4.0')					5	5	20			1.12	104	1						56		1						
685+00	Arch Cross Culvert under Lt. Lane & Outlet Ditch, Type A Concrete Inlet in Median (H-4.0')					5	8	19			1.12	104	1						56		1						
685+ to 693+	Adjust Median to fit Median Drain				*																						
694+00	Cross Culverts under both Lanes & Outlet Ditch, Type A Concrete Inlet in Median (H-4.0')					5	10	38			1.06	104	1			{54 54								2			
694+ to 698+	Adjust Median to Drain Back				*																						
697+50	Cross Culvert under both Lanes & Ditches					15	38	39								118								2			
697+60	Cross Culvert under both Lanes & Ditches					20	60	40								122								2			
698+70	Median Crossing & Road Approach, Rt. & Lt. Side Drain, Rt. Remove 24"x 54' C.M.P., Rt.	1			580		8	12		100						36											
699+70	Cross Culvert under both Lanes & Ditches					5	12	40								122								2			
699+ to 702+	Ditch Change, Rt.					40																					
702+30	Cross Culvert under both Lanes & Ditches					10	35	37								112								2			
702+ to 704+	Ditch Change, Lt.					10																					
702+ to 706+	Ditch Change, Rt.					25																					
706+50	Arch Cross Culvert under both Lanes & Ditches					10	20	39											118		2						
709+00	Cross Culvert under Rt. Lane & Outlet Ditch, Type A Concrete Inlet in Median (H-4.0')					5	10	20			1.12	104	1			54								1			
713+38	Cross Culvert under both Lanes						8	34								130								2			
714+50	Median Crossing & Road Approach Rt. & Lt.				175					30																	
717+	Remove 12"x 12"x 70' Wood Flume, Rt.	1																									768 Bd. Ft. Misc. Tr. Timber; 2700 Lin. Ft. Treated Sheet Piling, 240 Lin. Ft. Tr. Timber Piling; 585.50 Yds. Concrete Slope Paving (6" Thick)
717+ to 731+	Channel Change, Rt. (W-41') with 3 Timber Checks, Conc. Slope Paving Rt. of Sta. 717+ & Sta. 730+				^7000		772																				

Cont'd on Sheet No. 8

LIST OF STRUCTURES

Cont'd from Sheet No. 7

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FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
8	COLO.	F 006-1(11)	8	

UNIT 1

LOCATION	DESCRIPTION	REMOVE STRUCTURE NO.	EXCAVATION CUBIC YARDS UNCL.	EXCAVATION CUBIC YARDS LMS.	EXCAVATION CUBIC YARDS UNCL. DITCH	STRUCTURAL EXCAVATION CUBIC YARDS	STRUCTURE BACKFILL CUBIC YARDS CL. 1	MECH. TAMPING HOURS	# GRAVEL OR CRUSHED ROCK SURFACING (FED. LINE CONSTR.) TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS	INLET GRATING ▲ NO.	CORRUGATED METAL CULVERT PIPE LINEAR FEET 12"	18"	24"	30"	48"	C.M.P. ARCH CULVERTS LIN. FT. 28"X 13"	29"X 18"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 28"X 13"	29"X 18"	METAL APRONS FOR C.M.P. CULVERTS NO. 18"	24"	30"	48"	MISCELLANEOUS
727+00	C.M.P. Through Dike, Rt.					1	4							14											
727+00	Cross Culvert under Rt. Lane, Type A Concrete Inlet in Median (H-4.0')					9	20			1.12	104	1		56								1			
727+85	Median Crossing & Road Approach, Rt. & Lt.			230					125																
728+31	Cross Culvert under both Lanes					20	36							140								2			
728+	Bridge, Rt.					(Quantities in Summary)																			
728+	Remove 2-18" C.M.P.s, Rt.	2																							
730+	(9-12-9)x6'x106' Triple C.B.C. (Type 9A)		Major Structure Quantities			(530)	(43)	(31)		(3644.0)	(40108)														
731+91	Cross Culvert under both Lanes & Ditches				5	26	29							114								2			
731+91	Concrete Division Box, Lt.																								
	Remove Conc. Division Box, Lt.	1				4	2			2.24															
731+ to 748+	Ditch Change, Lt. (Portion-Raised Ditch)			35	50																				
731+ to 732+	Ditch Change, Lt.				10																				
737+00	Cross Culvert under Lt. Lane & Outlet Ditch, Type A Concrete Inlet in Median, (H-4.0')				10	3	20			1.12	104	1		54								1			
744+00	Concrete Division Box, Lt.					2	1			1.44															
748+07	Cross Culvert under both Lanes					5	34							130								2			
748+50	C.M.P. Across Irrigation Ditch, Lt.					2	4							16											
749+00	Cross Culvert under both Lanes & Ditches				5	25	39									118						2			
749+ to 752+	Ditch Changes, Lt.				90																				
749+40	Cross Culvert under both Lanes & Ditches				5	25	35									118						2			
752+ to 756+	Adjust Median to fit Median Drain			*																					
756+00	Arch Cross Culvert under Rt. Lane & Outlet Ditch, Type A Concrete Inlet in Median (H-4.0')				10	8	20			1.12	104	1							54	1					
756+ to 757+	Adjust Median to Drain Back			*																					
757+50	Median Crossing & Road Approach, Rt. & Lt.			70					30																
758+ to 775+	Channel Change, Rt. (W-50') with 4 Timber Checks, Conc. Slope Paving Rt. of Sta 759+ & Sta 773+		△10000			40																			(1280 bd. Ft. Misc. Tr. Timber, 4280 Lin. Ft. Treated Sheet Piling, 384 Lin. Ft. Tr. Timber Piling, 325 Sq. Yds Conc. Slope Paving (6" Thick)
762+00	Arch Cross Culvert under Rt. Lane, Type A Concrete Inlet in Median, (H-4.0')					8	20			1.12	104	1							56	1					
762+	Remove 12" Pipe Flume over Third Creek, Rt.	1																							
770+ to 774+	Drain Ditch, Lt.				50																				
775±	(11-14-11)x6'x105' Triple C.B.C. (Type 11A) with No. 13 Inlet Grating & Frame in Median		Major Structure Quantities			(448)	(32)	(31)		(456.77)	(5127C)														(1-No.13 Inlet Grating & Frame)
775+ to 784+	Adjust Median to Drain Back			*																					
780+75	Cross Culvert under both Lanes & Ditches				5	15	37									112						2			
785+48	Median Crossing & Road Approach, Rt. & Lt.			360					100																
787+38	Arch Cross Culvert under both Lanes					5	36												110	2					
795+00	Cross Culvert under Lt. Lane, Type A Concrete Inlet in Median, (H-4.0)					9	19			1.12	104	1		54								1			
803+00	Cross Culverts under both Lanes, Outlet Ditch, Type A Concrete Inlet in Median, (H-4.5')				10	6	39			1.19	110	1		{56 54								2			
803+ to 805+	Adjust Median to Drain Back			*																					

Cont'd on Sheet No. 9

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LIST OF STRUCTURES

Cont'd from Sheet No. 8

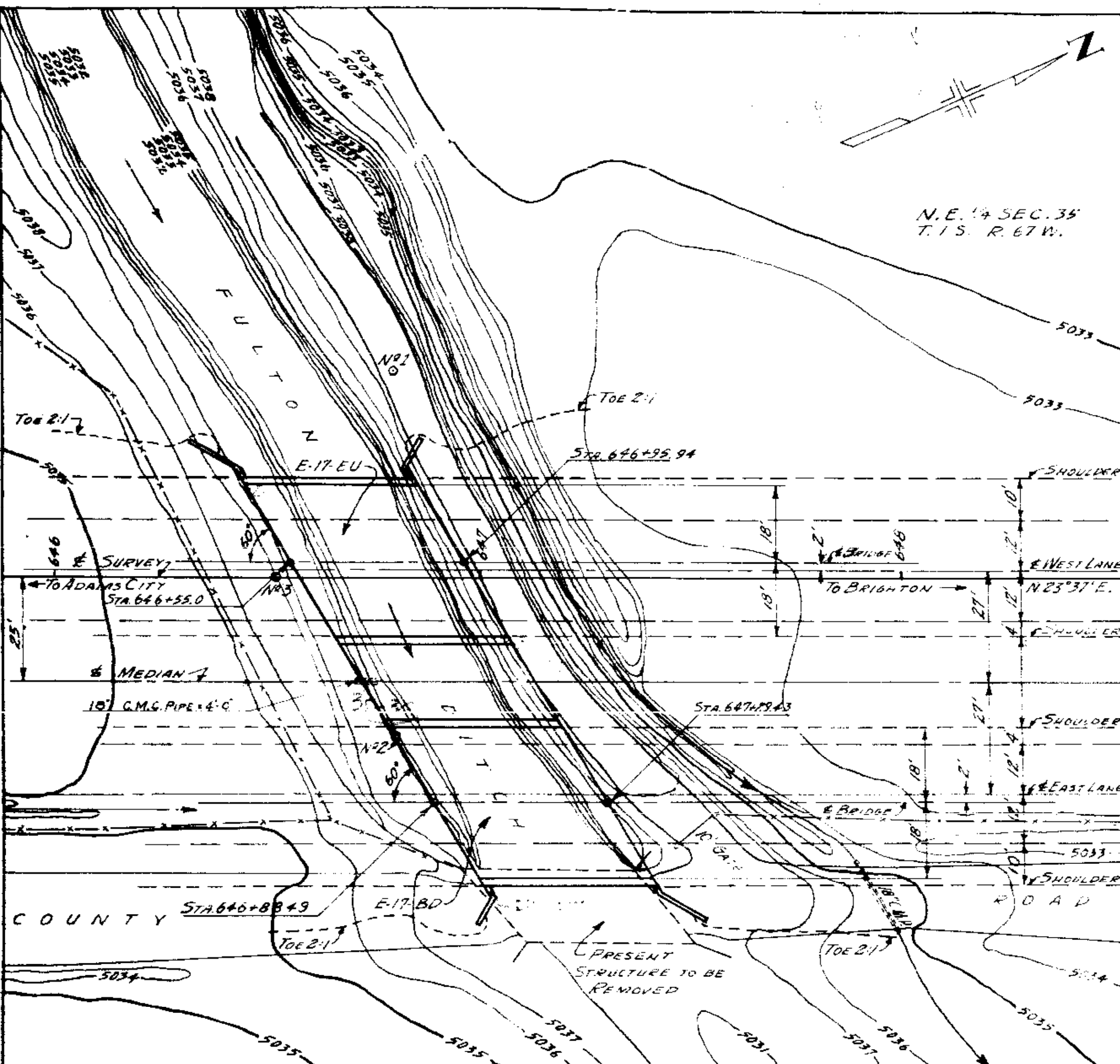
FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9.	COLO.	F 006-1(11) UNIT 1	9	

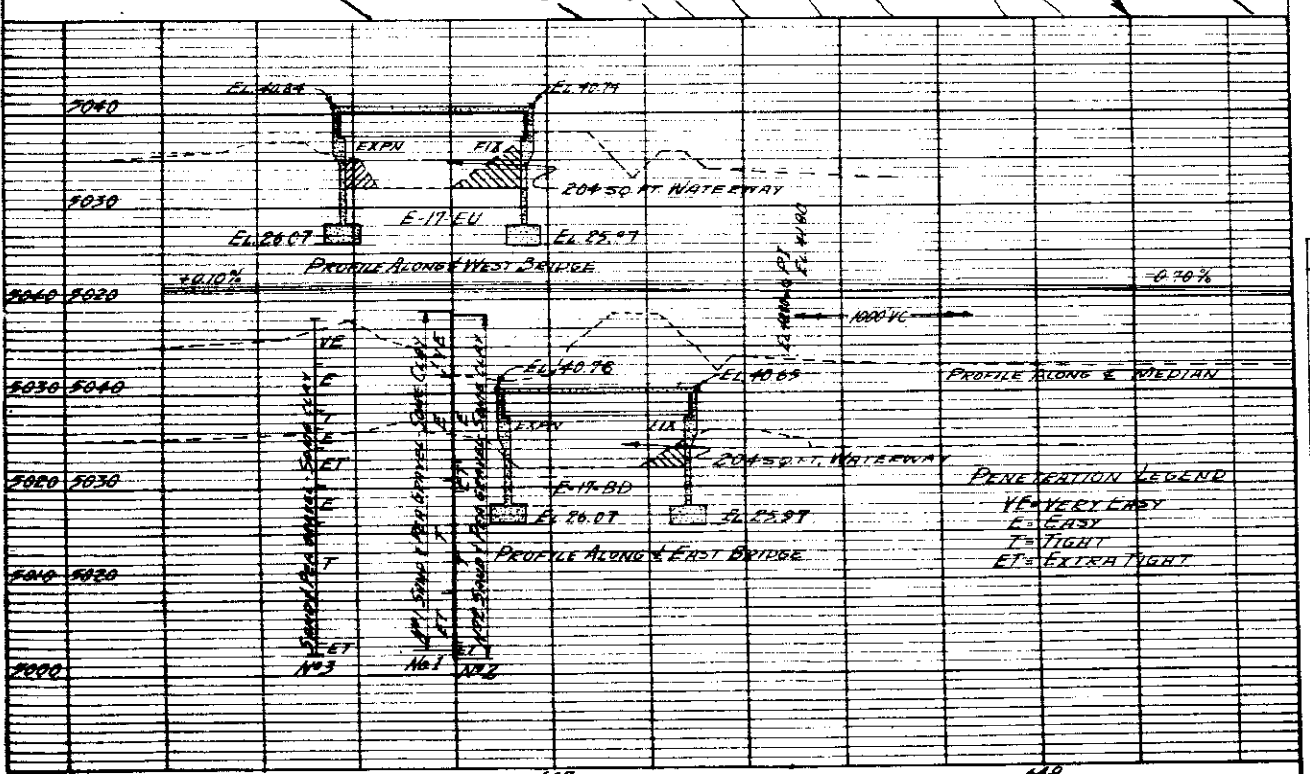
LOCATION	DESCRIPTION	REMOVE STRUCTURE NO.	REMOVE STRUCTURE KIND	EXCAVATION CUBIC YARDS UNCL.	EXCAVATION CUBIC YARDS EMB.	EXCAVATION CUBIC YARDS UNCL. (STR.)	STRUCTURAL EXCAVATION CUBIC YARDS ϕ	STRUCTURE BACKFILL CUBIC YARDS CL. 1	MECH. TAMPING HOURS	‡ GRAVEL OR CRUSHED ROCK SURFACING (FUTURE CONSTR.) TONS	CONCRETE CUBIC YARDS CL. "A"	CONCRETE CUBIC YARDS CL. "B"	REINFORCING STEEL LBS.	INLET GRATING ▲ NO.	CORRUGATED METAL CULVERT PIPE LINEAR FEET 12"	18"	24"	30"	48"	C.M.P. ARCH CULVERTS LIN. FT. 22"X13"	28"X16"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 22"X13"	28"X18"	METAL APRONS FOR C.M.P. CULVERTS NO. 18"	24"	30"	48"	MISCELLANEOUS
803+60	Cross Culvert under both Lanes. Raised Ditches at Inlet & Outlet				15	5	6	32							122									2				
803+80	C.M.P. under Irrigation Ditch, Rt.						7	6								20												
805+76	Median Crossing & Road Approach, Rt. & Lt.				130					100																		
810+00	Cross Culvert under Rt. Lane & Outlet Ditch, Type A Concrete Inlet in Median (H-4.0')					5	8	21			1.12		104	1		60								1				
826+00	Cross Culvert under Rt. Lane & Outlet Ditch, Type A Concrete Inlet in Median, (H-4.0')					5	10	22			1.12		104	1		58								1				
838+00	Cross Culverts under both Lanes & Ditches, Type A Concrete Inlet in Median (H-4.0')					10	40	41			1.06		104	1		{60 54								2				
838+00	Project Marker, Rt.																											1-Project Marker (State Forces)
Entire Project	Mechanical Tamping for All Minor Structures except 6'x7' C.B.C.								256																			
TOTALS		12		18,280	5,230	1,360	1,680	2,555	276	1,315	147.62		13,378	28	24	1,920	3,405	116	110	478	1,046	8	18	26	54	2	2	

ϕ Structural Excavation is estimated to be 95% Common & 5% Rock, each of which is estimated to be 70% Dry & 30% Wet.
* Included in Profile Quantities. ‡ Gravel Quantities are for future Road Appr's. only & do not include Median Crossings.
Δ To be used to fill old Channel & build Dikes. ⊄ "T" Connection - see details on sheet #19
▲ Standard M-46-A.

FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FC06-1(1)	10	

UNIT 1





ABUTMENTS NO. 1 & 2 BAR LIST — EAST AND WEST LANES

P.C. R.L.M. J.V.G.

MARK	SIZE	NO. REQ'D #1	NO. REQ'D #2	LENGTH	TYPE	DIMENSIONS l	DIMENSIONS m
401	1/2"φ	12	12	15'-0"	STR		
402	1/2"φ	24	24	40'-0"	STR		
403	1/2"φ	12	12	24'-0"	STR		
404	1/2"φ	2	2	21'-3"	STR		
405	1/2"φ	2	2	23'-9"	STR		
406	1/2"φ	2	2	26'-3"	STR		
407	1/2"φ	2	2	27'-9"	STR		
408	1/2"φ	2	2	30'-0"	STR		
409	1/2"φ	1	1	31'-9"	STR		
410	1/2"φ	1	1	33'-3"	STR		
411	1/2"φ	72	72	27'-3"	STR		
412	1/2"φ	1	1	4'-3"	STR		
413	1/2"φ	1	1	6'-3"	STR		
414	1/2"φ	10	10	7'-2"	STR		
415	1/2"φ	1	1	4'-0"	STR		
416	1/2"φ	1	1	8'-0"	STR		
417	1/2"φ	1	1	11'-7"	STR		
418	1/2"φ	9	9	12'-2"	STR		
419	1/2"φ	2	2	9'-0"	II		
420	1/2"φ	13	13	11'-3"	STR		
421	1/2"φ	92	92	11'-0"	III	3'-9"	2'-1"
422	1/2"φ	17	17	14'-8"	III	5'-7"	3'-11"
423	1/2"φ	2	2	3'-1"	STR		
424	1/2"φ	2	2	4'-2"	STR		
425	1/2"φ	2	2	3'-8"	STR		
426	1/2"φ	2	2	3'-7"	STR		
501	5/8"φ	141	141	4'-0"	STR		
502	5/8"φ	107	102	5'-5"	STR		
503	5/8"φ	2	2	7'-9"	STR		
504	5/8"φ	2	2	14'-5"	I	10'-7"	1'-9"
505	5/8"φ	4	4	13'-3"	I	9'-7"	1'-7"
506	5/8"φ	5	5	6'-6"	I	3'-5"	1'-0"
507	5/8"φ	2	2	14'-0"	I	10'-3"	1'-8"
601	3/4"φ	55	55	14'-0 1/2"	I	9'-7"	2'-4 1/2"
602	3/4"φ	55	55	13'-10"	I	9'-4 1/2"	2'-4 1/2"
603	3/4"φ	12	12	17'-11 1/2"	I	13'-4"	2'-6 1/2"
604	3/4"φ	1	1	16'-10"	I	12'-6"	2'-3"
605	3/4"φ	2	2	15'-7"	I	11'-6"	2'-0"
606	3/4"φ	2	2	8'-5"	I	5'-1"	1'-3"
607	3/4"φ	3	3	7'-5"	I	4'-2"	1'-2"
608	3/4"φ	2	2	16'-8"	I	12'-4"	2'-3"
609	3/4"φ	2	2	15'-11"	I	11'-5"	2'-1"
610	3/4"φ	2	2	15'-4"	I	11'-3"	2'-0"
611	3/4"φ	2	2	14'-6"	I	10'-9"	1'-10"
612	3/4"φ	2	2	8'-4"	I	5'-0"	1'-3"
613	3/4"φ	2	2	7'-7"	I	4'-4"	1'-2"
614	3/4"φ	2	2	7'-2"	I	3'-11"	1'-2"
615	3/4"φ	2	2	6'-6"	I	3'-4"	1'-1"
701	7/8"φ	120	120	8'-2"	I	4'-10"	1'-3"
702	7/8"φ	2	2	10'-6"	I	6'-1"	2'-4"
703	7/8"φ	1	1	8'-7"	I	5'-3"	1'-3"

SUPERSTRUCTURE BAR LIST — EAST AND WEST LANES

P.C. B.M.P. R.L.M.

MARK	SIZE	NO. REQ'D EAST LANE	NO. REQ'D WEST LANE	LENGTH	TYPE	DIMENSIONS l	DIMENSIONS m
430	1/2"φ	75	75	39'-3"	STR		
431	1/2"φ	8	8	40'-5"	STR		
432	1/2"φ	20	20	3'-10"	IV	1'-1"	0'-6"
510	5/8"φ	30	30	47'-5"	V		
511	5/8"φ	30	30	44'-0"	STR		
512	5/8"φ	29	29	45'-2"	VI		
513	5/8"φ	20	20	4'-10"	VII		

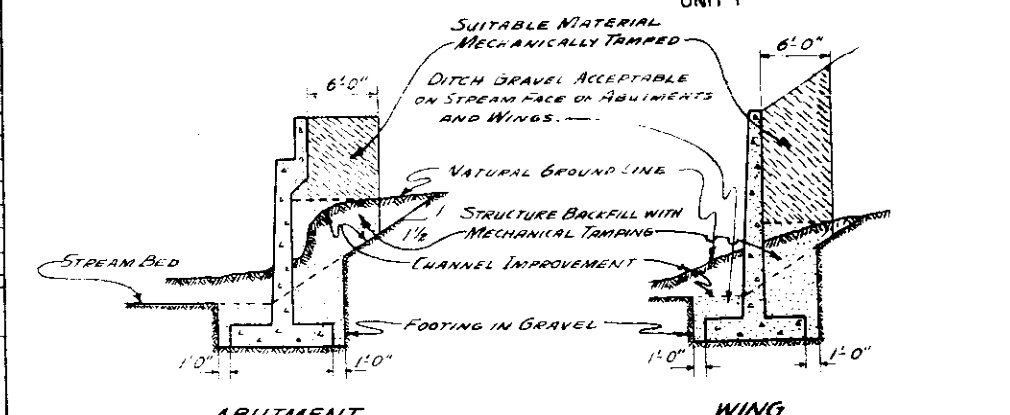
SUMMARY SUPERSTRUCTURE — EAST AND WEST LANES

3344 LIN. FT. 1/2"φ @ 0.668 #/LIN. FT. = 2234 LBS.
4149 LIN. FT. 5/8"φ @ 1.043 #/LIN. FT. = 4327 LBS.
±1% OVERRUN = 64 LBS.
TOTAL EAST LANE = 6625 LBS.
TOTAL WEST LANE = 6625 LBS.

SUMMARY ABUTMENTS NO. 1 AND 2 — EAST AND WEST LANES

5383 LIN. FT. 1/2"φ @ 0.668 #/LIN. FT. = 3596 LBS.
1274 LIN. FT. 5/8"φ @ 1.043 #/LIN. FT. = 1329 LBS.
2020 LIN. FT. 3/4"φ @ 1.502 #/LIN. FT. = 3034 LBS.
1010 LIN. FT. 7/8"φ @ 2.044 #/LIN. FT. = 2064 LBS.
±1% OVERRUN = 106 LBS.
TOTAL ABUT. NO. 1 = 10130 LBS.
TOTAL ABUT. NO. 2 = 10130 LBS.

Rev. Untr. Bridge Timber Quan. P.C. 4/30/53



ALL MATERIAL THAT IS TO BE MECHANICALLY TAMPED, SHALL BE PLACED IN HORIZONTAL LAYERS NOT MORE THAN 6 INCHES IN DEPTH AND TAMPED BEFORE THE NEXT LAYER IS PLACED.

REFERENCE DRAWINGS

GENERAL LAYOUT, BAR LISTS, SUMMARY & TAMPING DIAGRAM — SHEET NO. 10
DETAILS OF SUPERSTRUCTURE EAST AND WEST LANES — SHEET NO. 11
DETAILS OF ABUTMENT NO. 1, EAST LANE — SHEET NO. 12
DETAILS OF ABUTMENT NO. 1, WEST LANE — SHEET NO. 13
DETAILS OF ABUTMENT NO. 2, EAST LANE — SHEET NO. 14
DETAILS OF ABUTMENT NO. 2, WEST LANE — SHEET NO. 15

SUMMARY OF QUANTITIES

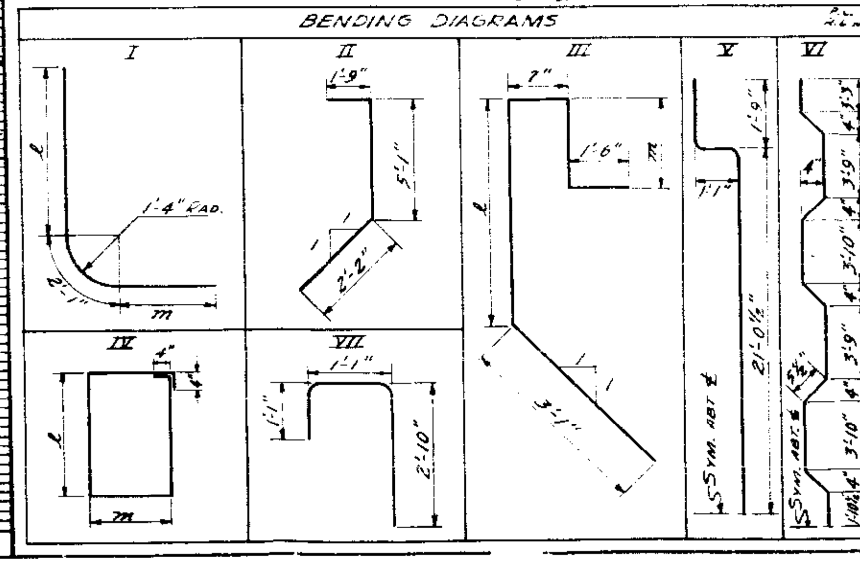
J.V.G. R.L.M. W.B. B.D.E. E.N.H. B.M.P. J.R.I.

ITEM	DESCRIPTION	UNIT	E-17-BD, EAST LANE: SUPER STRUCTURE	E-17-BD: ABUT. NO. 1	E-17-BD: ABUT. NO. 2	E-17-BD: TOTALS	E-17-EU, WEST LANE: SUPER STRUCTURE	E-17-EU: ABUT. NO. 1	E-17-EU: ABUT. NO. 2	TOTALS
13c	Unclassified Excavation									515.0
14a	DRY ROCK EXCAV (STR)	CU. YD.								5
14b	DRY COMMON EXCAV (STR)	CU. YD.		50	50	100		12	5	17
14c	WET ROCK EXCAV (STR)	CU. YD.								5
14d	WET COMMON EXCAV (STR)	CU. YD.		140	150	290		170	170	340
16a	STRUCTURE BACKFILL	CU. YD.		157	120	277		92	186	278
16c	MECHANICAL TAMPING	HRS.		25	20	45		18	23	41
42a	UNTR. BRIDGE TIMBER	MFBM		0.255	0.255	0.510		0.255	0.255	0.510
46a	CLASS "A" CONCRETE *	CU. YD.	39.6	70.1	75.5	185.2	39.6	89.6	85.0	214.2
47	REINFORCING STEEL ▲	LBS.					13250	10130	10130	33510
48	STRUCTURAL STEEL ■	LBS.	34740 ⊙	580 ⊙	580 ⊙	35900	34740 ⊙	580 ⊙	580 ⊙	35900
89a	DRAIN PIPE (4"φ x 2'-0")	EACH	1			1	1			1
18a	STA. YARD OVERHAUL	STA. YD.				3052				3053
18b	YARD MILE OVERHAUL	YD. MI.				567				567
‡	1/2" EXP'N JOINT MAT'L	SQ. FT.	49	14	14	77	49	59	58	166
‡	#16 GA. GALV. SHEET METAL	SQ. FT.	162			162	162			162
53b	18" C.M. CULVERT PIPE	LIN. FT.						4		4
11a	Removal of Bridge	Lump Sum								Lump Sum

* RETAINING WALL TO BE INCLUDED WITH WEST LANE BRIDGE.
▲ ALL REINFORCING STEEL INCLUDED WITH WEST LANE BRIDGE QUANTITIES.
‡ INCLUDED IN BID PRICE OF CLASS "A" CONCRETE.
⊙ INCLUDES 8500 LBS. HANDRAIL STEEL; SUPERSTRUCTURE 6180 LBS., ABUT No. 1-1,160 LBS., ABUT. No. 2-1,160 LBS.
■ INCLUDES + 1/2% ± FOR PAINT ▲ Includes + 1% ± Overrun

BENDING DIAGRAMS

P.C. R.L.M.



NOTE FOR STATIONING:
646+88.49 TO 647+29.43 (EAST LANE)
646+55.000 TO 646+95.94 (WEST LANE)

GENERAL NOTES

ALL CONCRETE SURFACES EXPOSED TO VIEW SHALL RECIEVE CLASS "1" SURFACE FINISH; EXCEPT UNDERSIDE OF FLOOR SLAB AND ABUTMENT FACES BETWEEN OUTSIDE STRINGERS.

HANDRAIL BOLTS SHALL HAVE HEX HEADS AND NUTS WITH LOCK WASHERS UNLESS OTHERWISE SPECIFIED.

ALL STRUCTURAL STEEL SHALL RECIEVE ONE SHOP COAT ZINC CHROMATE AND TWO FIELD COATS OF ALUMINUM PAINT.

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JUNE 1, 1952.

ALL CONCRETE SHALL BE CLASS A AIR ENTRAINED AS SPECIFIED.

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER [illegible] PANEL BOARD.

CONCRETE GIRDERS, FLOOR SLABS AND CURB SHALL BE [illegible]

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

ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.

ALL REINFORCING BARS SHALL BE DEFORMED AND TAGGED WITH THE [illegible] AND BAR DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 20 DIAMETERS.

REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATIONS A-305-50T OR LATEST REVISION THEREOF.

ROLLING EQUIPMENT SHALL NOT BE USED WITHIN 6 FEET OF WALL.

Dimensions for reinforcing steel shall be out to out of bar.

LOADING DATA
[illegible] H20-S16-44
[illegible]

DESIGNING DATA
[illegible] UNIT STRESSES
1000 [illegible]
(REINFORCING) 20000 [illegible]
(STRUCTURAL) fs = 18000 lbs per sq in.
n = 10

COLORADO
DEPARTMENT OF HIGHWAYS
2 CONC. & WF-BEAM BRIDGES
37 FT. SPAN, 36 FT. RDWY
GENERAL LAYOUT, BAR LISTS, SUMMARY & TAMPING DIAGRAM

Across FULTON DITCH
Sta. (SEE NOTE)
Near HENDERSON Sec. 35 T. 1 S. R. 67 W.

Designed by PC	Approved by [illegible]
Made by PC	Bridge Engineer
Checked by	Date: 8-5-1952.

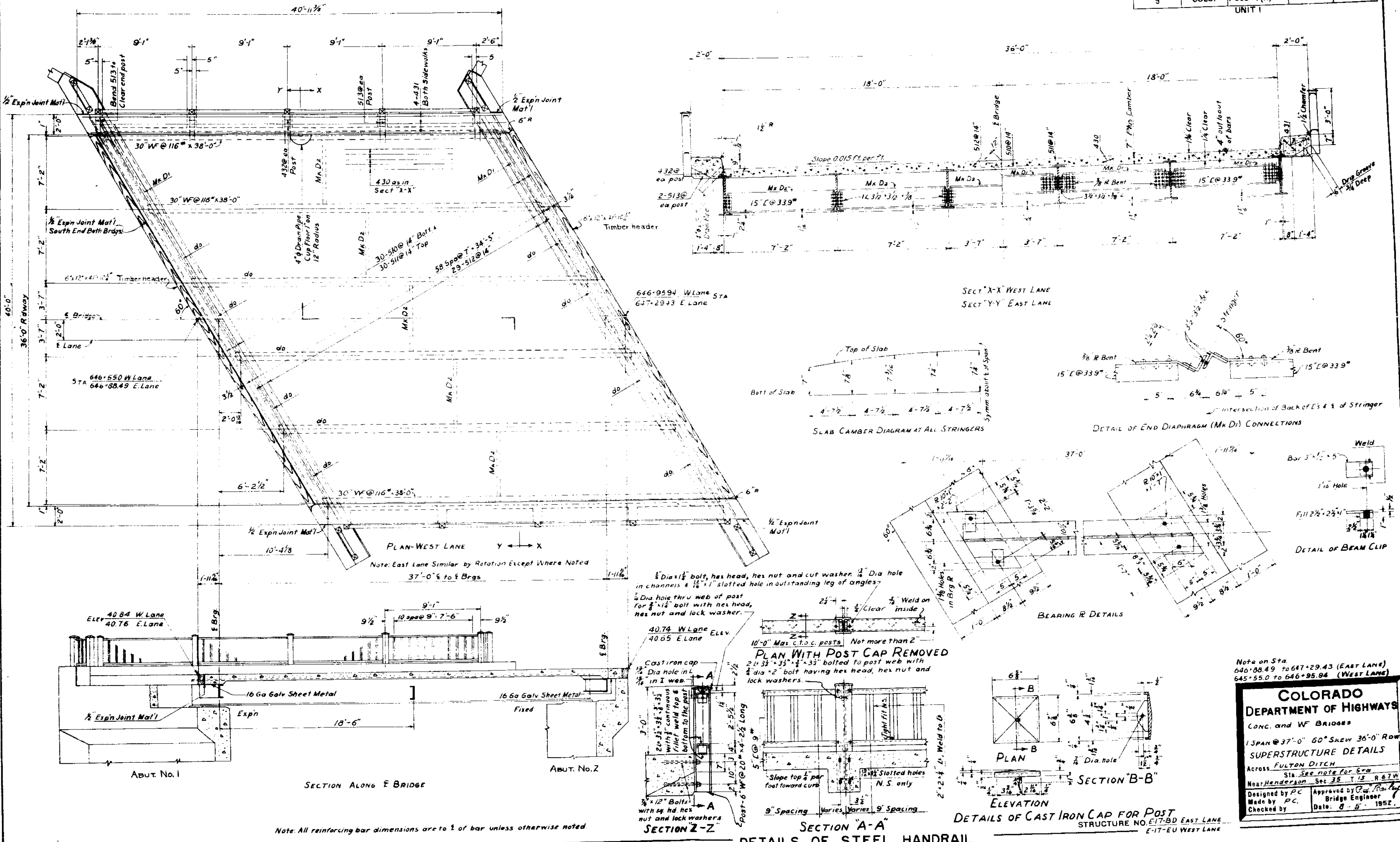
STRUCTURE NO. E-17-BD (EAST LANE) E-17-EU (WEST LANE)

REVISIONS

4/30/53

FED. ROAD DIVISION NO.	DISTRICT	PROJECT No.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11)	11	

UNIT 1



Note on Sta.
646+88.49 to 647+29.43 (East Lane)
645+55.0 to 646+95.94 (West Lane)

STRUCTURE NO. E-17-BD East Lane
E-17-EU West Lane

COLORADO
DEPARTMENT OF HIGHWAYS

Conc. and WF Bridges

1 Span @ 37'-0" 60° Skew 36'-0" Rdwy

SUPERSTRUCTURE DETAILS

Across Fulton Ditch

Sta. See note for Sta

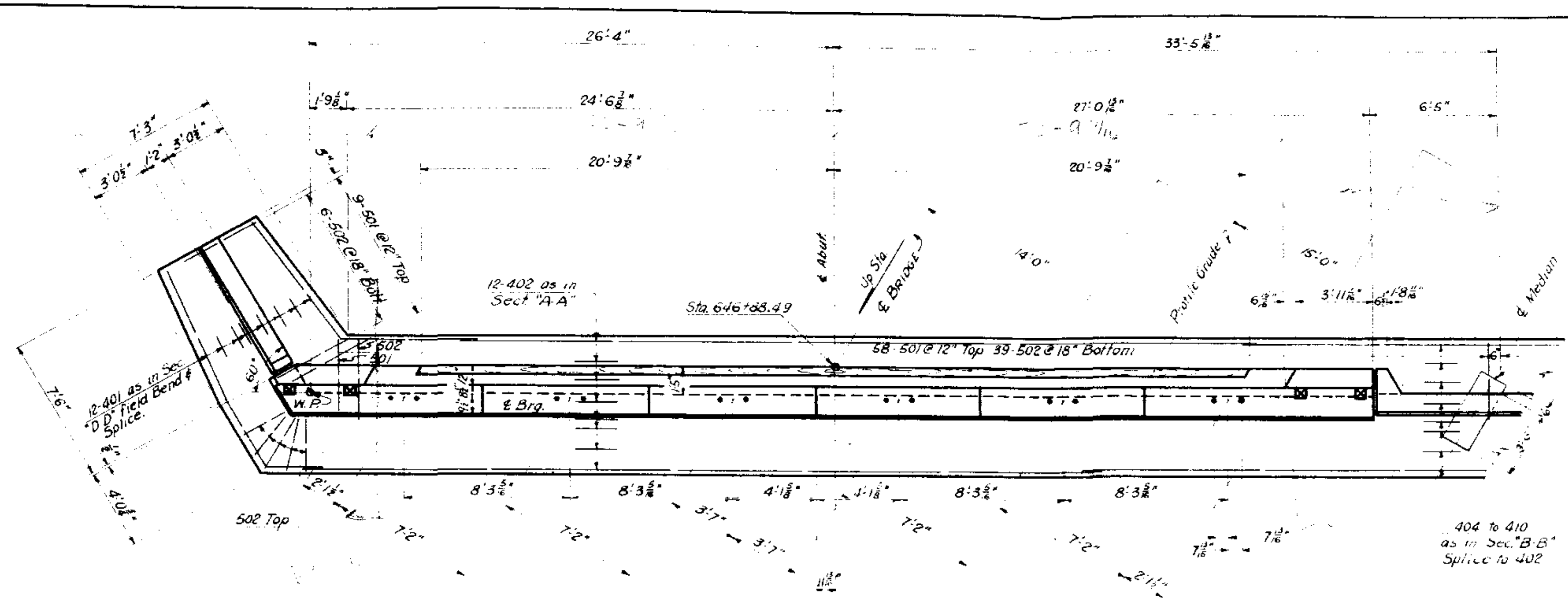
Near Henderson Sec. 35 T. 1S R. 67W

Designed by P.C.	Approved by [illegible]
Made by P.C.	Bridge Engineer
Checked by	Date: 8-5-1952.

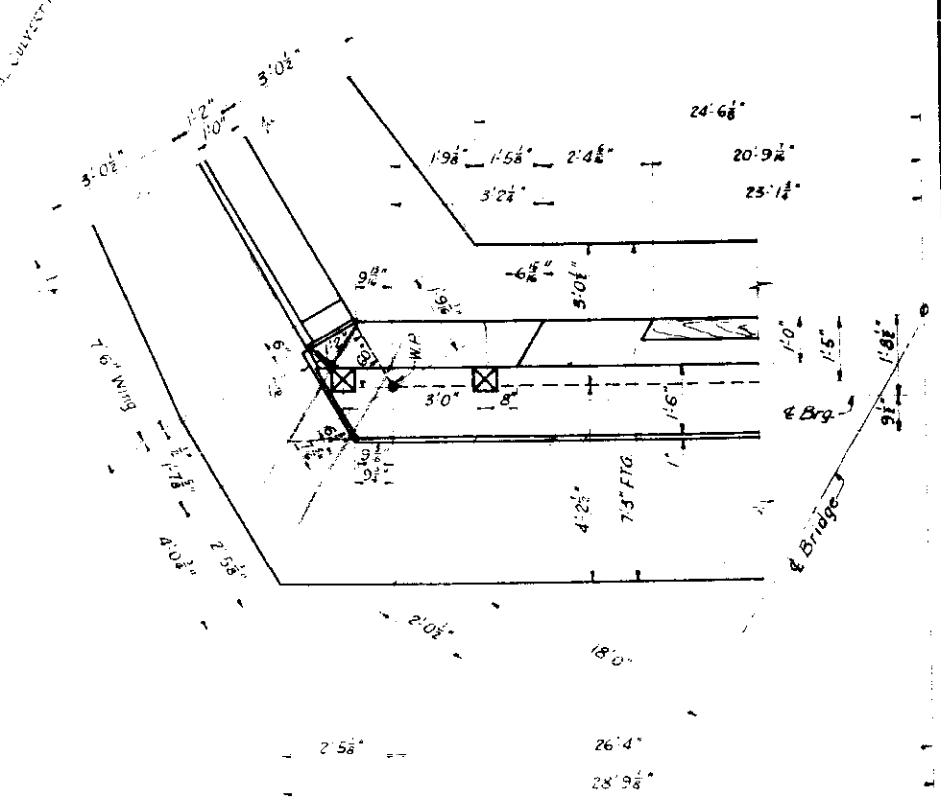
REVISIONS

FED. ROAD DIVISION NO.	DISTRICT	Proj No.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11)	12	

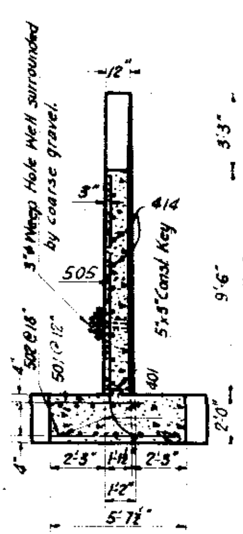
UNIT 1



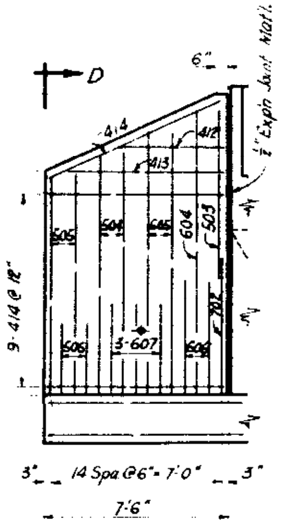
PLAN - ABUT. No. 1 EAST LANE



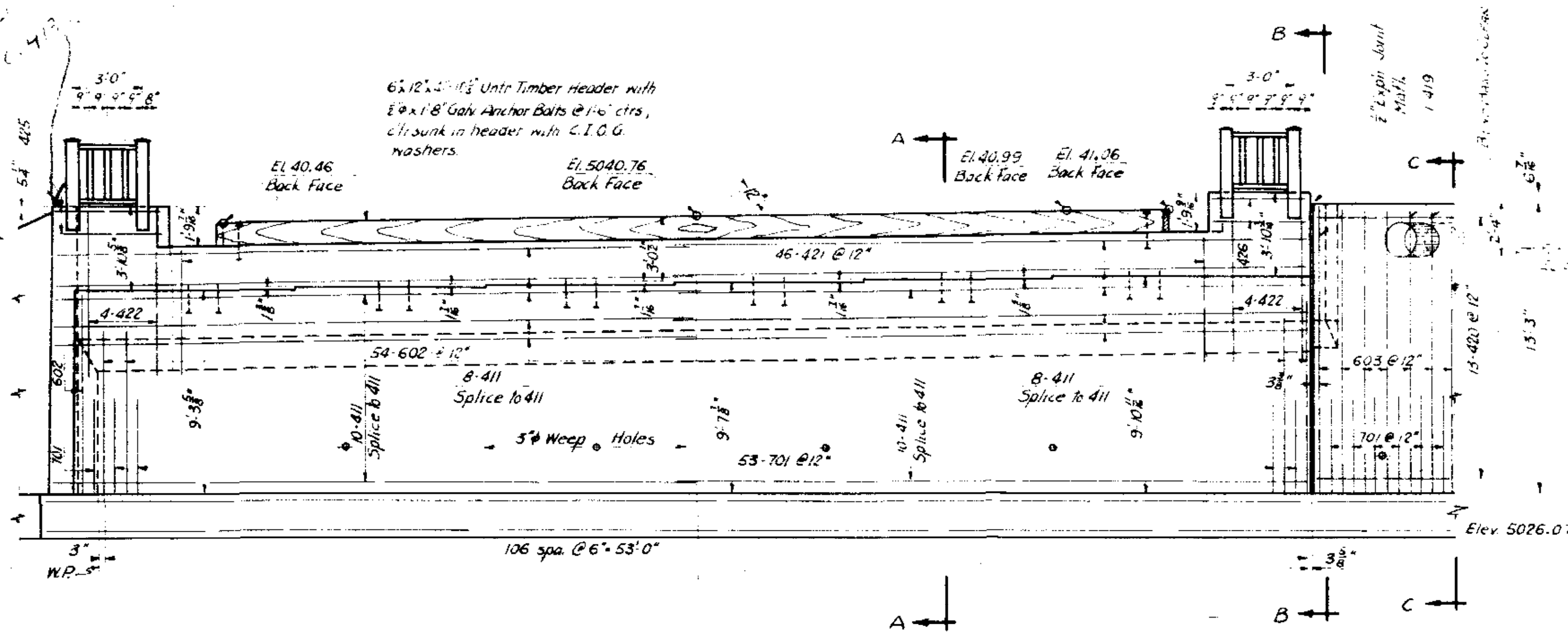
S.E. CORNER DETAILS



SEC. D-D

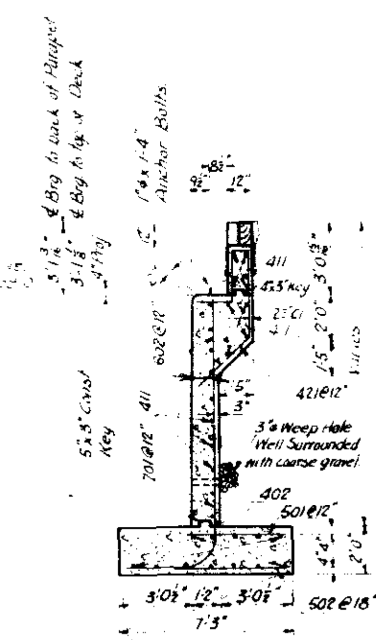


TRUE ELEV. S.E. WING

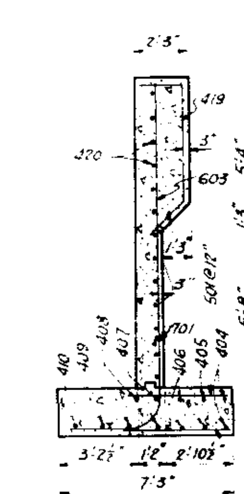


ELEV. ABUT No. 1 EAST LANE

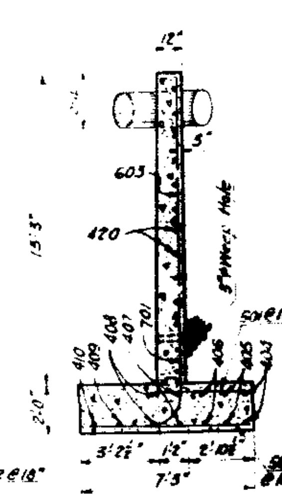
MAX. FTG. PRESSURE = 3250 #/SQ. FT.



SEC. A-A



SEC. B-B



SEC. C-C

CONCRETE POURING SCHEDULE ABUT No. 1 EAST LANE	
FOOTING	33.5 CU.YD.
ABUT WALL	28.5 CU.YD.
PARAPET	4.7 CU.YD.
S.E. WING WALL	3.3 CU.YD.
TOTAL	70.0 CU.YD.

NOTE: Reinforcing bar dimensions are to ℄ of bar unless otherwise noted.

E-17-BO EAST LANE
STRUCTURE NO. E-17-EU WEST LANE

COLORADO
DEPARTMENT OF HIGHWAYS

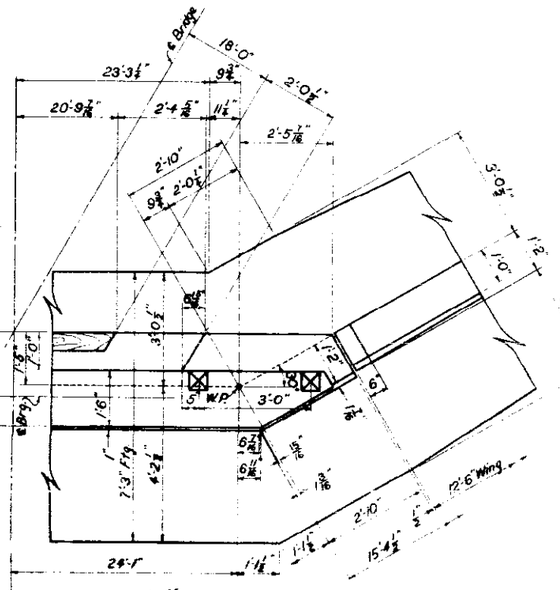
CONC. & WF BEAM BRIDGES
1-SPAN @ 37'-0" 60° SKEW 36'-0" RDWY.
DETAILS OF ABUT. No. 1 EAST LANE
Across Fulton Ditch

East Lane Sta. 646+88.49 to 647+29.43
West Lane Sta. 646+55.00 to 646+95.94
Near Henderson Sec. 35 T. 1 S. R. 67 W.

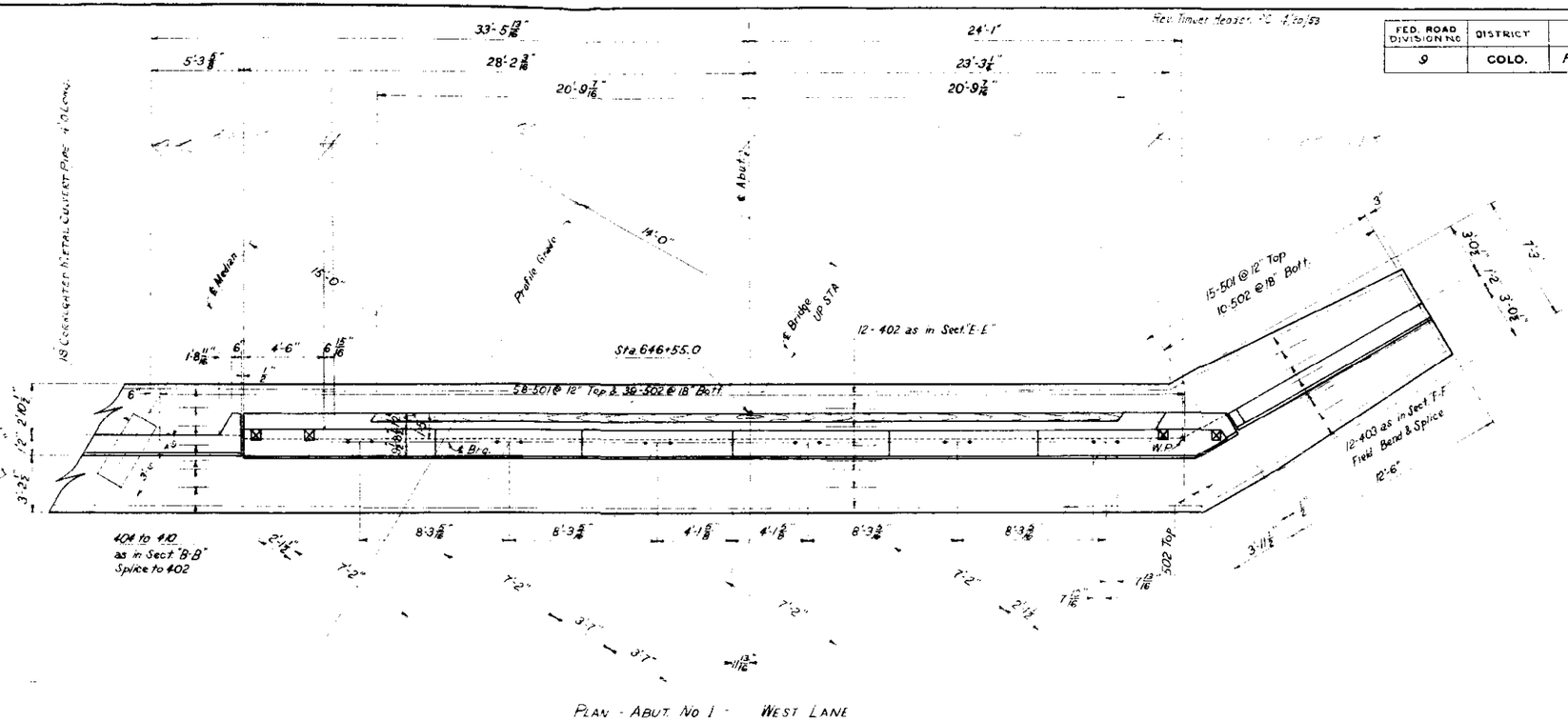
Designed by P.C. Made by P.C. Checked by	Approved by [signature] Bridge Engineer Date: 8 - 5 - 1962

FED. ROAD DIVISION NO.	DISTRICT	PROJ.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11)	13	

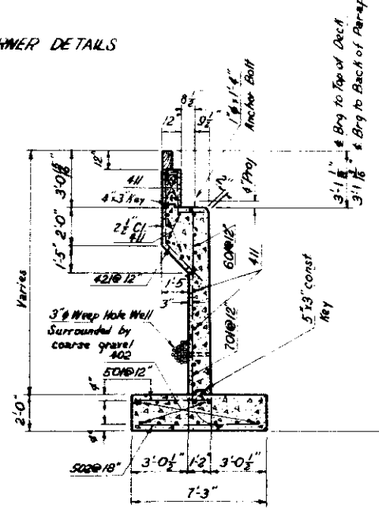
UNIT 1



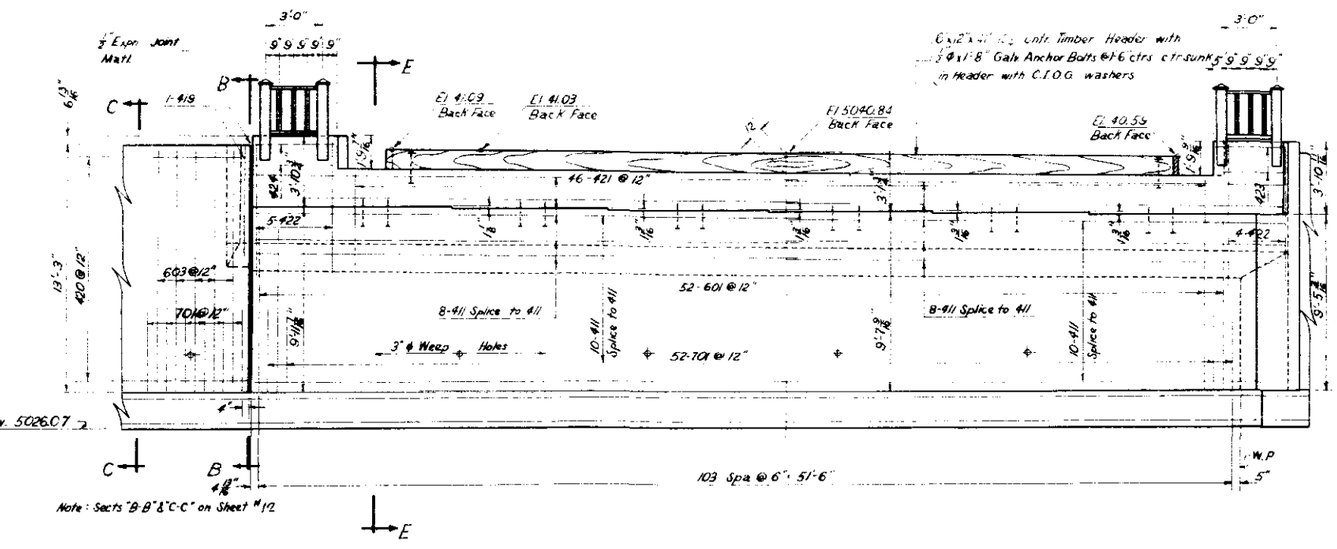
S.W. CORNER DETAILS



PLAN - ABUT. NO 1 - WEST LANE

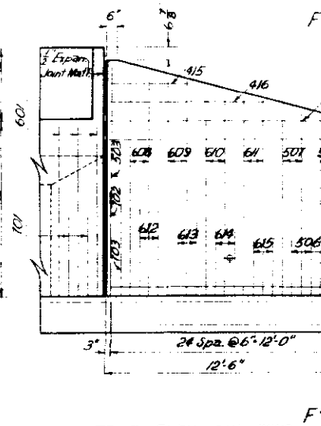


SECT. "E-E"

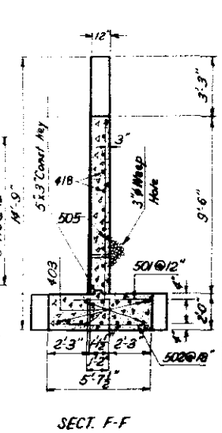


ELEV. ABUT. NO. 1 - WEST LANE

MAX. FTG. PRESSURE - 3250 #/SQ. FT.



TRUE ELEV. S.W. WING



SECT. F-F

POURING SCHEDULE

ABUTMENT NO 1 WEST LANE	
Footing	41.8 Cu. Yd.
Abutment Wall	30.1 Cu. Yd.
Parapet	4.9 Cu. Yd.
Wing Wall	5.9 Cu. Yd.
Retaining Wall	6.9 Cu. Yd.
Total	89.6 Cu. Yd.

Note: All Reinforcing bar dimensions are to the ℄ of the bar unless otherwise noted.

E-17-BD EAST LANE

STRUCTURE NO. E-17-EU WEST LANE

COLORADO
DEPARTMENT OF HIGHWAYS

CONC. & WF BRIDGES
1 SPAN @ 37'-0" 60° SKEW 36'-0" ROWY.
DETAILS OF ABUT. NO.1 WEST LANE
ACROSS - FULTON DITCH
STA. 646+88.49 to 647+29.49 (EAST LANE)
STA. 646+55.0 to 646+95.84 (WEST LANE)
Near HENDERSON Sec. 35 T. 1S R. 67W

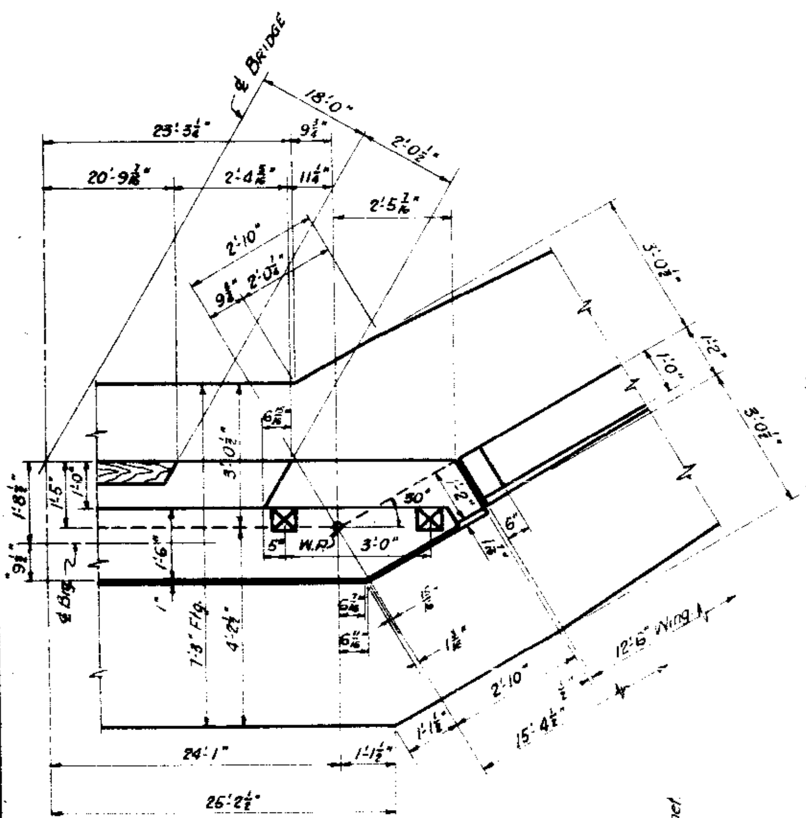
Designed by PC
Made by PC.
Checked by

Approved by [signature]
Bridge Engineer
Date: 8 - 5 - 1962.

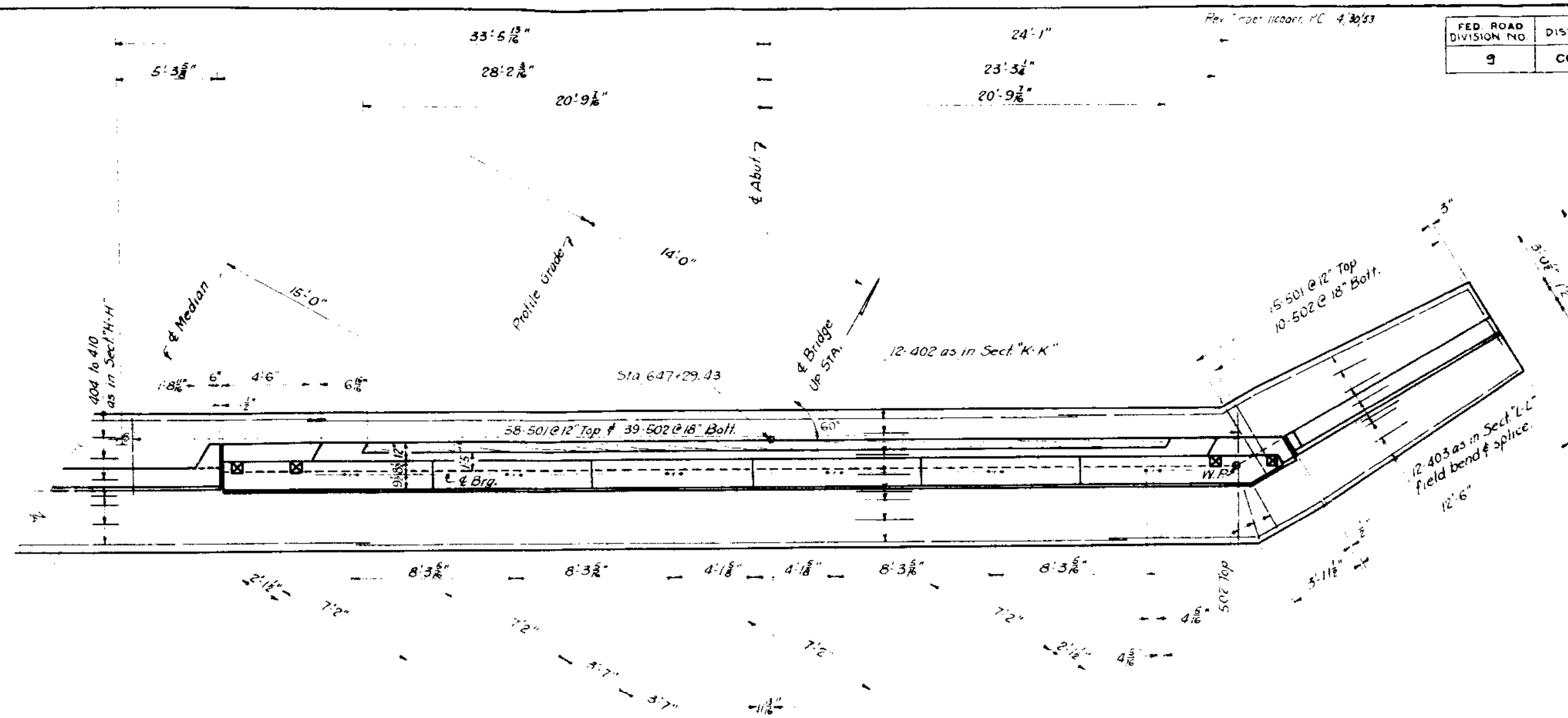
REVISIONS

Rev. Timber Header, P.C. 4/30/53

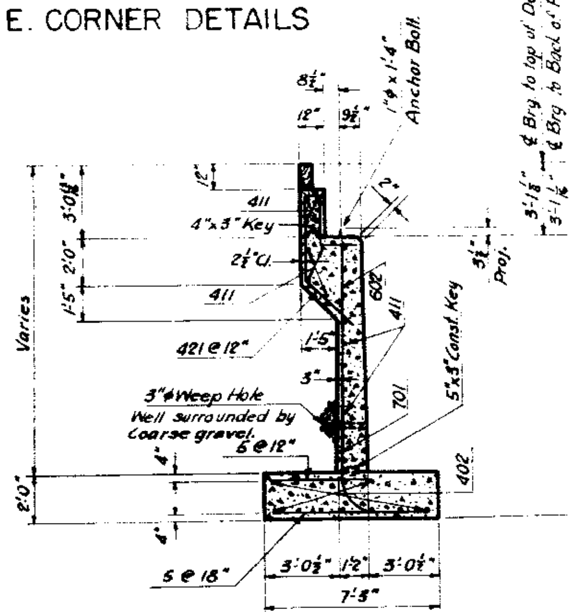
FED. ROAD DIVISION NO.	DISTRICT	Proj. No.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11) UNIT 1	14	



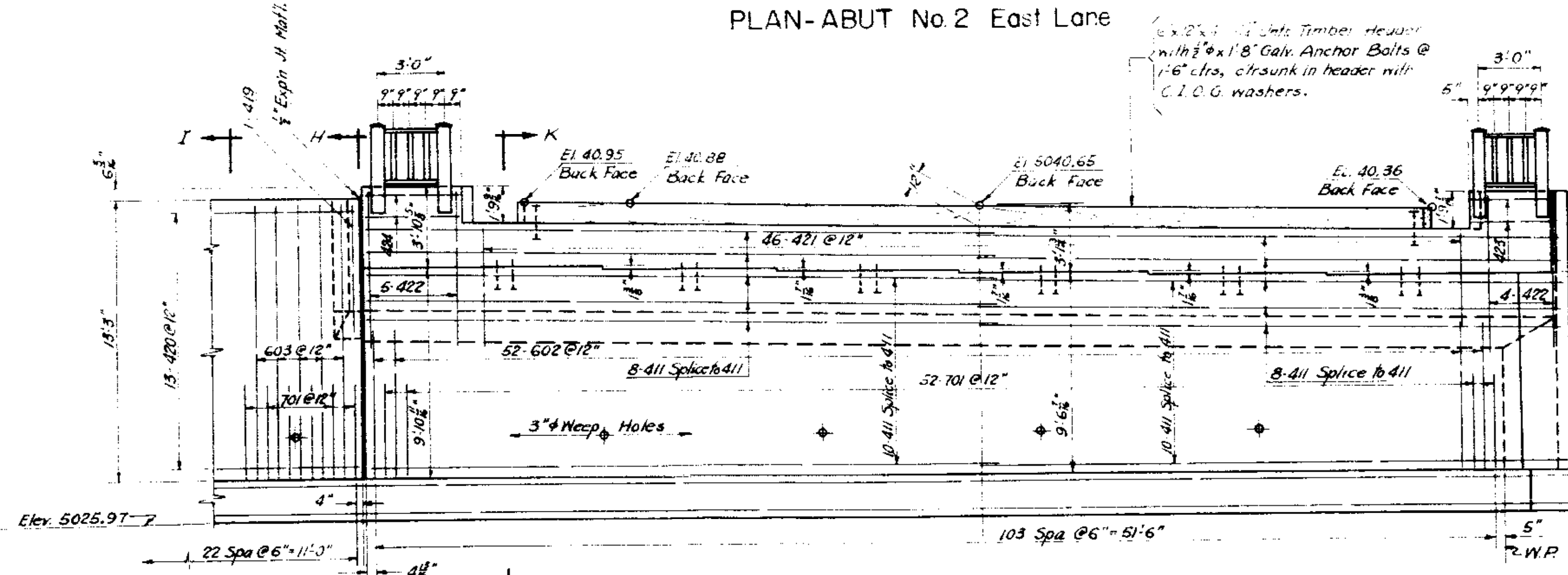
N.E. CORNER DETAILS



PLAN- ABUT No. 2 East Lane



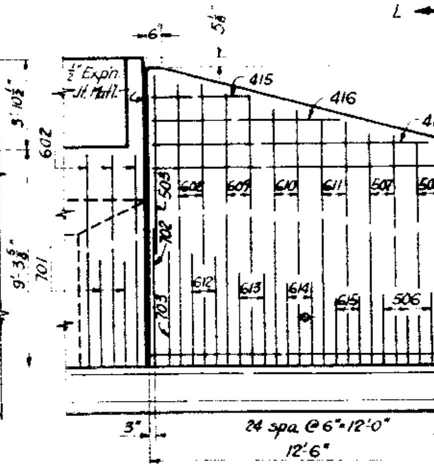
SECT. K-K



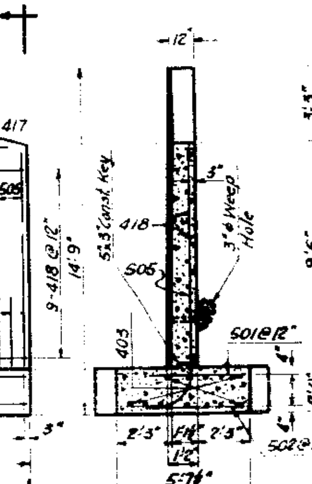
Note: Sects "H-H" & "I-I" on Sheet #15

ELEV. ABUT. No. 2 East Lane

MAX. FTG. PRESSURE = 3250#/SQ. FT.



TRUE ELEV. N.E. WING



SECT. L-L

CONCRETE POURING SCHEDULE ABUT. No 2 EAST LANE	
FOOTING	35.8 cu. yd.
ABUT. WALL	28.9 cu. yd.
PARAPET	5.3 cu. yd.
N.E. WING WALL	5.5 cu. yd.
TOTAL	75.5 cu. yd.

Note: All Reinforcing bar dimensions are to the ℄ of the bar unless otherwise noted.

STRUCTURE NO. E-17-BD EAST LANE
E-17-EU WEST LANE

COLORADO
DEPARTMENT OF HIGHWAYS

CONC. & WF BRIDGES

DETAILS OF ABUT. No 2 - EAST LANE
1 SPAN @ 37'0" 50° SKEW 36'0" RDWY.

Across Fulton Ditch
East Lane Sta. 646+88.49 to 647+23.84
West Lane Sta. 646+55.00 to 646+95.38
Near Henderson Sec. 36 T 1 S R 67 W

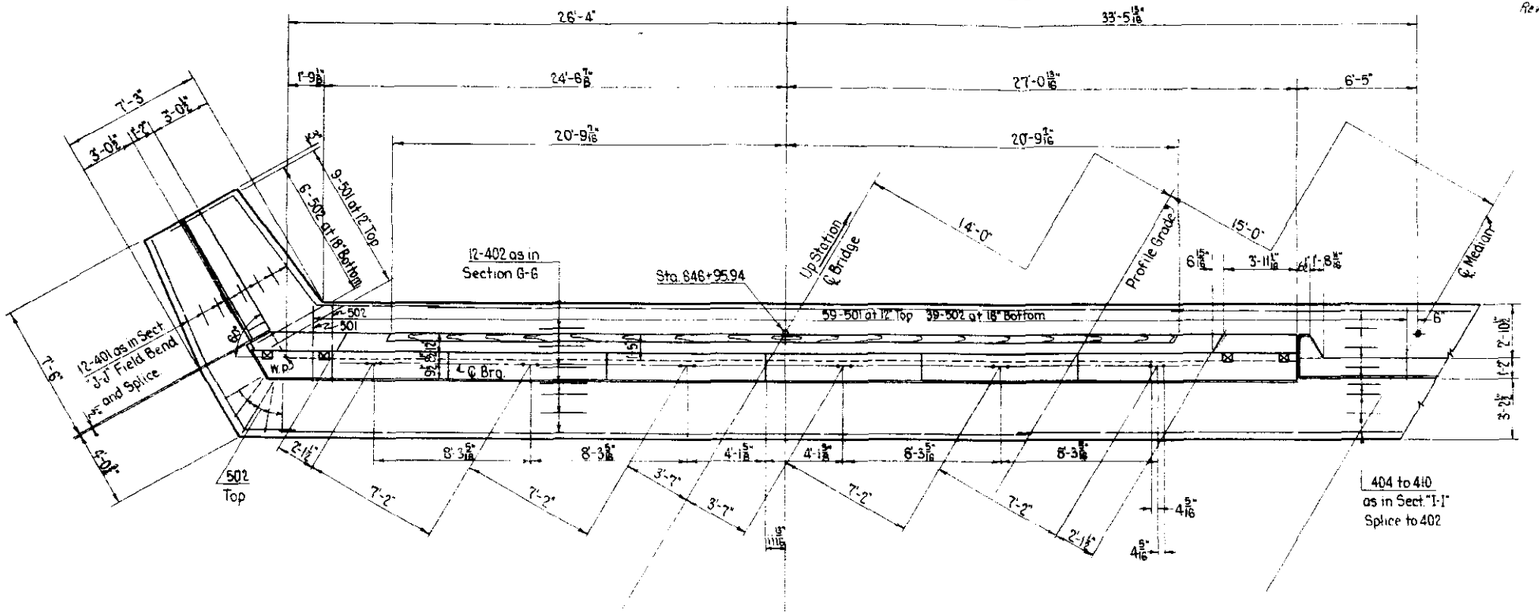
Designed by P.C.	Approved by O.J. Bailey
Made by P.C.	Bridge Engineer
Checked by	Date: 8-5-1952

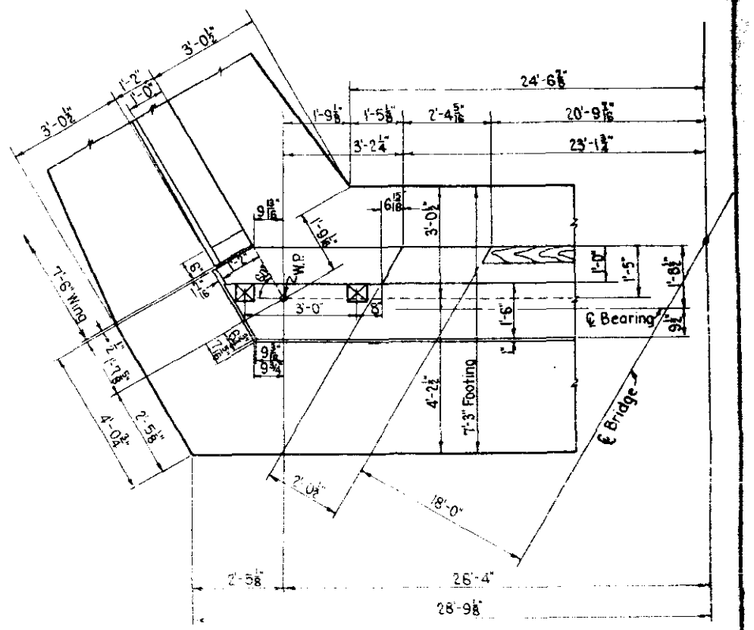
REVISIONS

Rev. Timber Header F.C. 4/30/59

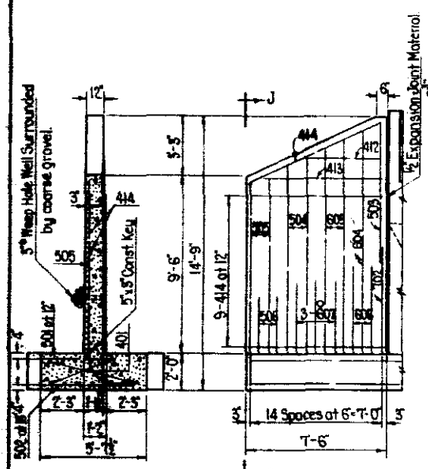
FED. ROAD DIVISION NO.	DISTRICT	Project No.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11)	18	

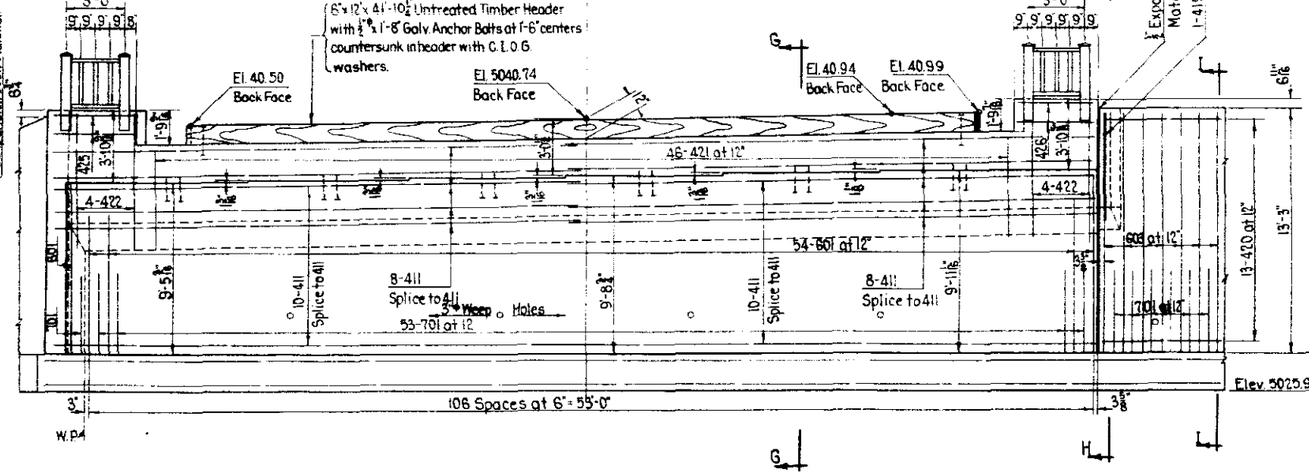
UNIT 1

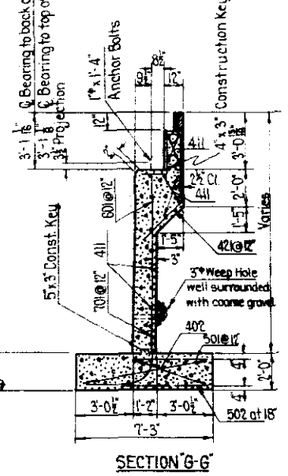


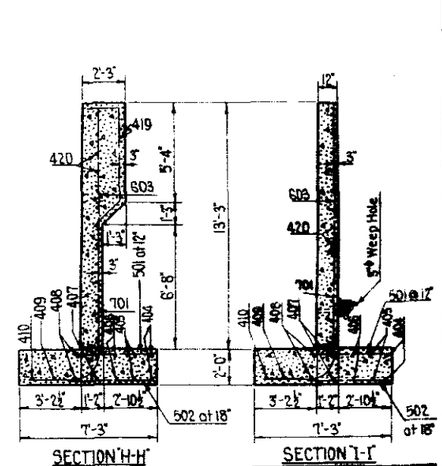


N.W CORNER DETAILS









Pouring Schedule B2E 2X6

Abutment No. 2 (West Lane)	
Footing	39.8 Cubic Yards
Wingwall	3.4 Cubic Yards
Retaining Wall	6.9 Cubic Yards
Abutment Wall	30.2 Cubic Yards
Parapet	4.7 Cubic Yards
Total	85.0 Cubic Yards

Note: Reinforcing bar dimensions are to ℄ of bar unless otherwise noted.

Note for Stationing
646+88.49 to 647+29.43 (East Lane)
646+55.0 to 646+95.94 (West Lane)

E-17-BD East Lane
STRUCTURE NO. E-17-EU West Lane

COLORADO
DEPARTMENT OF HIGHWAYS
CONCRETE AND WF BEAM BRIDGES
1 SPAN AT 37'-0" 60° SKEW 36'-0" ROADWAY
DETAILS OF ABUTMENT NO. 2
WEST LANE
Across Fulton Ditch
Sta. See Note for Stationing
Near Henderson Sec. 35 T. 1S R. 67W

Designed by P.C.
Made by P.C.
Checked by

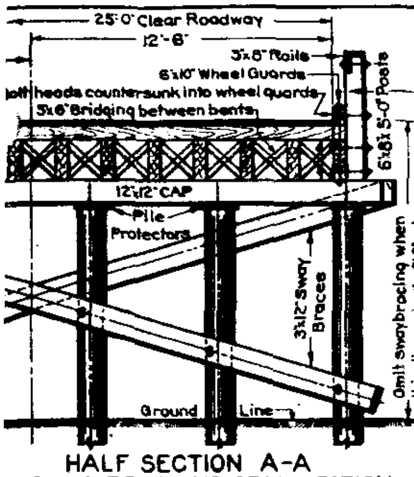
Approved by [illegible]
Bridge Engineer
Date: 6-5-1962

STANDARD P-20-25-BH-60

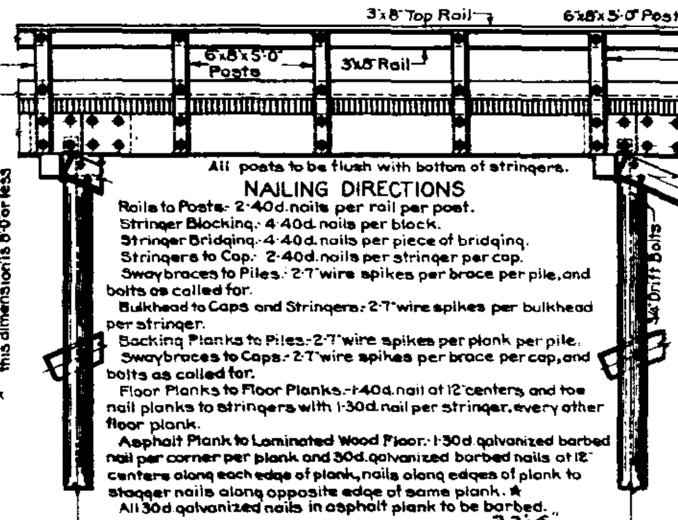
SPECIAL REVISION FOR PROJECT № F006-1(11).

FED. ROAD DIV. №	DISTRICT	PROJECT №	SHEET №	TOTAL SHEETS
9	COLO.	F006-1(11) UNIT I	16	

Rev. 6-30-62 Changed for 1962 Specifications. J.R.J.



HALF SECTION A-A
TYPICAL BENT AND SPAN SECTION



All posts to be flush with bottom of stringers.

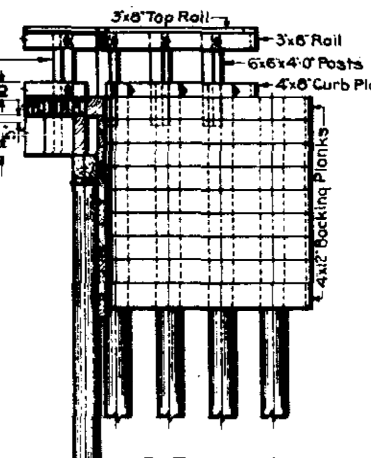
NAILING DIRECTIONS

Rails to Posts.- 2-40d. nails per rail per post.
Stringer Blocking.- 4-40d. nails per block.
Stringer Bridging.- 4-40d. nails per piece of bridging.
Stringers to Cap.- 2-40d. nails per stringer per cap.
Swaybraces to Piles.- 2-7" wire spikes per brace per pile, and bolts as called for.
Bulkhead to Caps and Stringers.- 2-7" wire spikes per bulkhead per stringer.
Backing Planks to Piles.- 2-7" wire spikes per plank per pile.
Swaybraces to Caps.- 2-7" wire spikes per brace per cap, and bolts as called for.
Floor Planks to Floor Planks.- 1-40d. nail at 12" centers and toe nail planks to stringers with 1-30d. nail per stringer, every other floor plank.
Asphalt Plank to Laminated Wood Floor.- 1-30d. galvanized barbed nail per corner per plank and 30d. galvanized barbed nails at 12" centers along each edge of plank, nails along edges of plank to stagger nails along opposite edge of same plank. ★
All 30d galvanized nails in asphalt plank to be barbed.

SPAN LENGTH "L" = 22'-6"

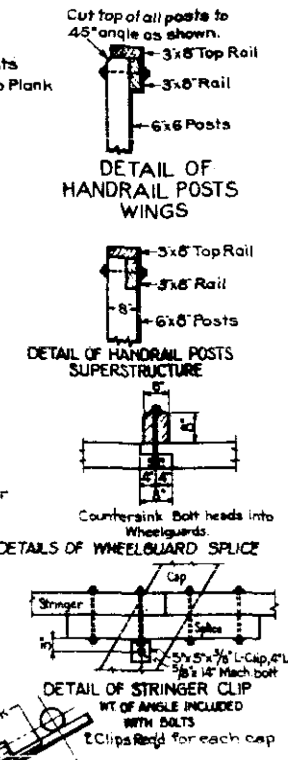
TYPICAL ELEVATION OF SPAN

★ Based on 8"x6'-0" size planks.



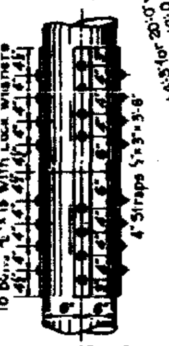
SECTION B-B

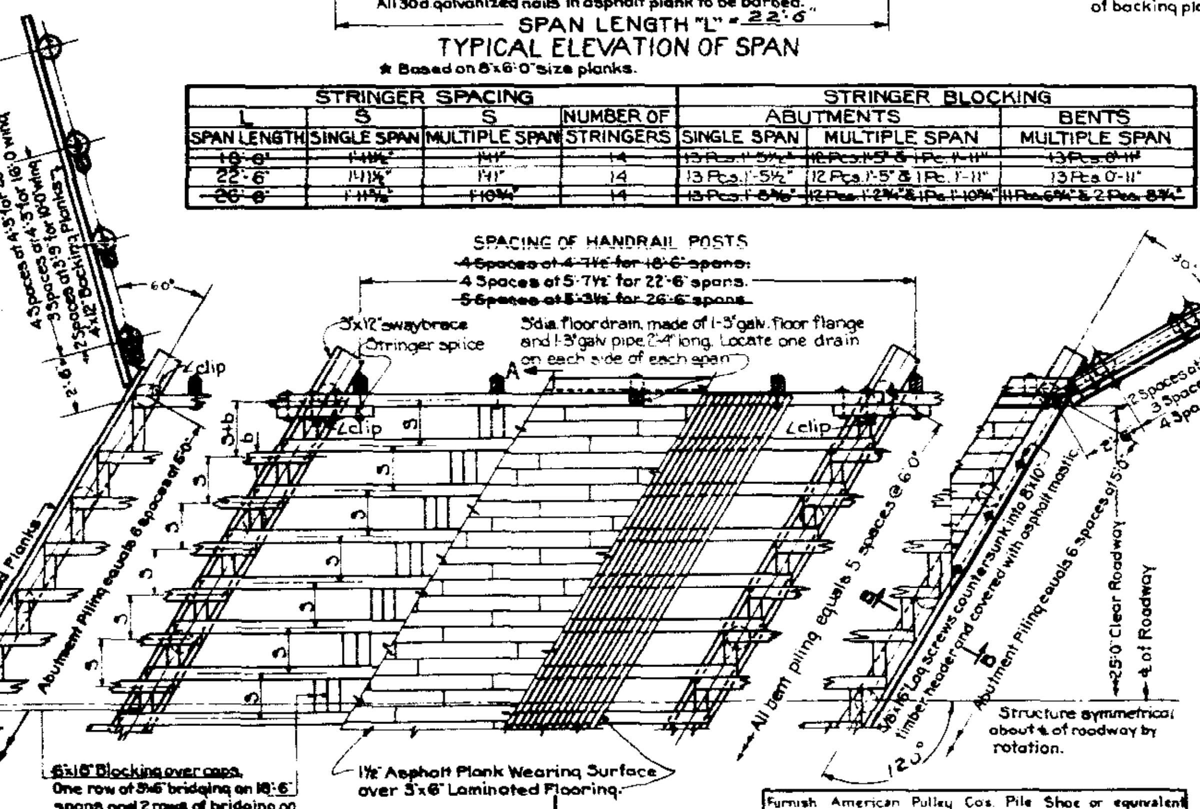
See bill of material for number of backing planks required



STRINGER SPACING				STRINGER BLOCKING		
L	S	S	NUMBER OF	ABUTMENTS		BENTS
SPAN LENGTH	SINGLE SPAN	MULTIPLE SPAN	STRINGERS	SINGLE SPAN	MULTIPLE SPAN	MULTIPLE SPAN
~~18'-6"~~	~~1'-4½"~~	~~1'-1"~~	~~14~~	~~13 Pcs. 1'-5½"~~	~~12 Pcs. 1'-5" & 1 Pc. 1'-11"~~	~~13 Pcs. 0'-11"~~
22'-6"	1'-1⅜"	1'-1"	14	13 Pcs. 1'-5½"	12 Pcs. 1'-5" & 1 Pc. 1'-11"	13 Pcs. 0'-11"
~~26'-6"~~	~~1'-1⅝"~~	~~1'-0¾"~~	~~14~~	~~13 Pcs. 1'-8⅝"~~	~~12 Pcs. 1'-2¾" & 1 Pc. 1'-10¾"~~	~~11 Pcs. 6¾" & 2 Pcs. 8¾"~~

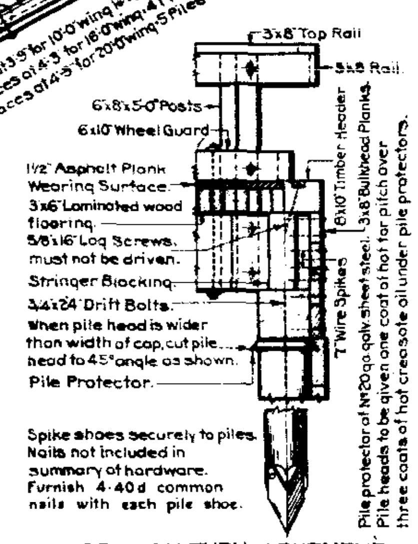
SPACING OF HANDRAIL POSTS
~~4 Spaces at 4'-7½" for 18'-6" spans.~~
4 Spaces at 5'-7½" for 22'-6" spans.
~~5 Spaces at 5'-3¼" for 26'-6" spans.~~



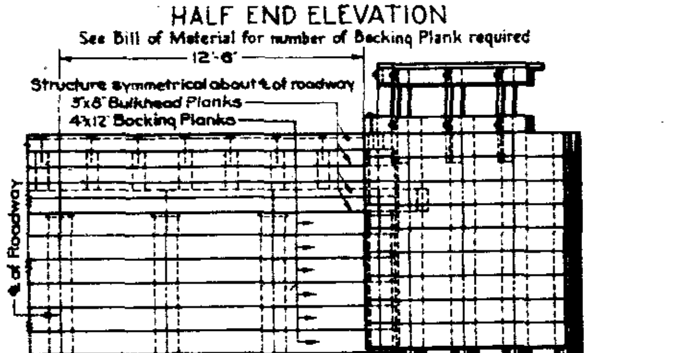


TYPICAL SECTIONAL HALF PLAN OF SPANS AND ABUTMENTS

Furnish American Pulley Co's. Pile Shoe or equivalent. Where pile shoes are specified use № 1½ shoe for pile tips ≦ 9" and № 2 shoe for pile tips > 9". Wt. № 1½, 8 lbs., Wt. № 2, 13¼ lbs.



SECTION THRU ABUTMENT



HALF END ELEVATION

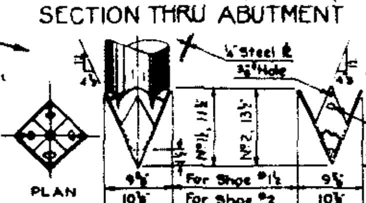
GENERAL NOTES.

All work shall be done according to the Standard Specifications of The Colorado Dept of Highways applicable to the project.
All timber and piling to be treated or untreated as shown in bills of material.
All timber and piling shall be dense southern yellow pine or west coast douglas fir.
All caps shall be edged to an even depth before treatment. The ends of all stringers shall be dapped on one edge before treatment to obtain an even depth over caps.
All cut surfaces or bored holes in treated timber or piles shall be thoroly saturated with hot creosote oil.
All piling supporting caps shall be covered with galvanized pile protectors as specified, all other piling tops shall be saturated with hot creosote oil and covered with a thick layer of heavy asphalt or tar.
Joints in top handrail must be staggered with joints in side rail.
All handrailing and posts above the wheel guards shall be painted white and all handrail posts below the top of wheel guards shall be painted black as specified.
All bolts more than 12 inches long must be threaded not less than 4 inches.
Bolts in the finished structure shall not project more than one half inch beyond the nut.
All bolts must have std. C.I.O.G. or Malleable Cast Washers under each head and nut.
Bolt lengths are calculated assuming std. C.I.O.G. washers will be used.
The contractor is cautioned to check bolt lengths before ordering because of variations in thickness of lumber and piling.
The entire exposed surface of all untreated timber shall be painted one coat as specified immediately after the material is delivered to the project.
Before placing handrailing the contact surfaces shall receive the second coat of paint.
When contractor is permitted to drill holes to facilitate pile driving, these holes must be drilled so piling will stand in vertical position after final driving.
Bid price for asphalt plank shall include galvanized barbed nails and necessary asphalt mop.
All hardware except nails shall be galvanized. Weights as shown are for ungalvanized material.
All necessary blocking for swaybracing shall be treated timber.
All caps must be surfaced on vertical grain face.
The preservative for all treated timber and piling shall be creosote oil.
Bulkhead planks when spliced shall have joints alternated at the stringers.

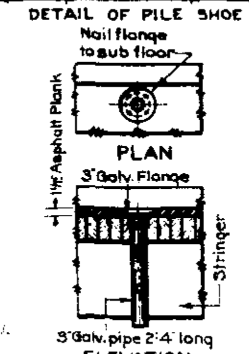
GENERAL NOTES (CONT.)

Contractors attention is called to Specifications covering Mechanical Tamping. Special care must be used to prevent deflection of abutments and wings by wedging action. Backfill in 6 in. earth layers shall be Mechanically tamped beginning at the wall and proceeding outward. Below channel elevation mechanically tamp uniformly on both sides. Above original ground line mechanically tamp out to 6ft. from the wall. Rolling equipment shall not be used within 6ft of any wall. Flooring may be random lengths, providing the joints are placed over stringers and not closer than every fourth plank.

	INITIAL	DATE
ORIGINAL BY	J.K.B	7-18-52
CHECKED BY	WR	7-25-52
VANDYKE BY	J.K.B	7-23-52
CHECKED BY	WR	7-25-52



DETAIL OF PILE SHOE



DETAIL OF FLOOR DRAIN

BOLTS AND WASHERS FOR ONE SPAN OF SUPERSTRUCTURE

LOCATION	SIZE	~~18'-6" SPAN~~ NO.	LENGTH	TOTAL	22'-6" SPAN NO.	LENGTH	TOTAL	~~26'-6" SPAN~~ NO.	LENGTH	TOTAL
POSTS TO RAILS	5/8"	6	10"	7.0 LBS.	6	10"	7.0 LBS.	8	10"	9.0 LBS.
POSTS TO WHEEL GUARDS	3/4"	6	14"	12.7 LBS.	6	14"	12.7 LBS.	8	14"	17.0 LBS.
POSTS TO STRINGERS	3/4"	12	16"	28.3 LBS.	12	16"	28.3 LBS.	16	16"	42.0 LBS.
WHEEL GUARDS TO STRINGERS	3/4"	6	38"	29.0 LBS.	6	38"	30.0 LBS.	8	38"	40.0 LBS.
WASHERS - STD. C.I.O.G. 5/8 & 3/4"		12/48		69.0 LBS.	12/48		69.0 LBS.	16/64		92.0 LBS.
TOTAL WEIGHT				146.0 LBS.			147.0 LBS.			200.0 LBS.

BOLTS AND WASHERS FOR ONE ABUTMENT

LOCATION	ITEM	SIZE	NO.	LENGTH	WT. EACH	TOTAL WT.
POSTS TO RAILS	BOLTS	5/8"	2	10"	1.08 LBS.	2.2 LBS.
ANGLE CLIP TO STRINGER & CAP	BOLTS	5/8"	2/2	10"/14"	7.00 LBS.	14.0 LBS.
POSTS TO STRINGERS	BOLTS	3/4"	4	18"	2.60 LBS.	10.4 LBS.
POSTS TO WHEEL GUARDS	BOLTS	3/4"	2	14"	2.12 LBS.	4.1 LBS.
WHEEL GUARDS TO STRINGERS	BOLTS	3/4"	2	38"	5.00 LBS.	10.0 LBS.
TIMBER HEADER TO STRINGERS	LAG SCREWS	5/8"	14	16"	1.36 LBS.	19.0 LBS.
					LBS.	LBS.
WASHERS - STD. C.I.O.G.	WASHERS 5/8-3/4	22/16			0.75 / 1.25 LBS.	36.4 LBS.
CAP TO PILES	DRIFT BOLTS	3/4"	7	24"	3.00 LBS.	21.0 LBS.
TOTAL WEIGHT						117.0 LBS.

BOLTS AND WASHERS FOR ONE WING

LOCATION	ITEM	SIZE	NO.	LENGTH	WT. EACH	TOTAL WT.
POSTS TO RAILS	BOLTS	5/8"	3	11"	1.16 LBS.	3.4 LBS.
POSTS TO PILES	BOLTS	3/4"	6	20"	2.84 LBS.	17.0 LBS.
PILES TO CURB PLANK	BOLTS	5/8	3	18"	1.74 LBS.	5.2 LBS.
					LBS.	LBS.
WASHERS - STD. C.I.O.G.	WASHERS 5/8-3/4	12/12			0.75 / 1.25 LBS.	24.4 LBS.
TOTAL WEIGHT						50.0 LBS.

BOLTS AND WASHERS FOR ONE BENT

LOCATION	ITEM	SIZE	NO.	LENGTH	WT. EACH	TOTAL WT.
POSTS TO RAILS	BOLTS	5/8"	2	10"	1.08 LBS.	2.3 LBS.
POSTS TO WHEEL GUARDS	BOLTS	3/4"	2	14"	2.12 LBS.	4.5 LBS.
ANGLE CLIP TO CAP	BOLTS	5/8"	2	14"	5.50 LBS.	11.0 LBS.
WHEEL GUARDS TO STRINGERS	BOLTS	3/4"	2	38"	5.00 LBS.	10.0 LBS.
POSTS TO STRINGERS TO SPLICES	BOLTS	3/4"	4	24"	3.32 LBS.	13.5 LBS.
SPLICES TO STRINGERS	BOLTS	5/8"	12	16"	1.57 LBS.	18.9 LBS.
	BOLTS				LBS.	LBS.
~~SWAYBRACES TO CAP~~	~~BOLTS~~	~~5/8"~~	~~2~~	~~14"~~	~~1.66 LBS.~~	~~3.0 LBS.~~
~~SWAYBRACES TO PILES~~	~~BOLTS~~					~~20.0 LBS.~~
					LBS.	LBS.
WASHERS - STD. C.I.O.G. NO SWAYS.	WASHERS 5/8-3/4	28/16			0.75 / 1.25 LBS.	41.0 LBS.
~~WASHERS - STD. C.I.O.G. WITH SWAYS.~~	~~WASHERS 5/8-3/4~~	~~56/16~~			~~0.75 / 1.25 LBS.~~	~~62.0 LBS.~~
CAP TO PILES	DRIFT BOLTS	3/4"	6	24"	3.00 LBS.	18.0 LBS.
TOTAL WEIGHT - WITHOUT SWAYBRACES						119.0 LBS.
~~TOTAL WEIGHT - WITH SWAYBRACES~~						~~163.0 LBS.~~

NAILS

LOCATION	ITEM	~~18'-6" SPAN~~	22'-6" SPAN	~~26'-6" SPAN~~
ONE SPAN OF SUPERSTRUCTURE	30D. COMMON	23 LBS.	27 LBS.	31 LBS.
	30D. GALV. BARBED	105 LBS.	125 LBS.	150 LBS.
	40D. COMMON	155 LBS.	167 LBS.	196 LBS.
ONE ABUTMENT	40D. COMMON	5 LBS.	5 LBS.	5 LBS.
	7" WIRE SPIKES	LBS.	31 LBS.	LBS.
ONE WING	40D. COMMON	1 LB.	1 LB.	1 LB.
	7" WIRE SPIKES	LBS.	8 LBS.	LBS.
ONE BENT	40D. COMMON	5 LBS.	5 LBS.	5 LBS.
	7" WIRE SPIKES	LBS.	LBS.	LBS.

SUMMARY OF HARDWARE

BOLTS AND WASHERS	2 SPANS	AT	147 LBS. PER SPAN	294 LBS.
	2 ABUTMENTS	AT	117 LBS. PER ABUTMENT	234 LBS.
	4 WINGS	AT	50 LBS. PER WING	200 LBS.
	1 BENTS WITHOUT SWAYBRACES	AT	119 LBS. PER BENT	119 LBS.
	~~BENTS WITH SWAYBRACES~~	~~AT~~	~~LBS. PER BENT~~	LBS.
	TOTAL WEIGHT			847 LBS.

NAILS: LOCATION	UNIT	30D. COMMON EACH	30D. COMMON TOTAL	30D. GALV. BARBED EACH	30D. GALV. BARBED TOTAL	40D. COMMON EACH	40D. COMMON TOTAL	7" WIRE SPIKES EACH	7" WIRE SPIKES TOTAL
2 SPANS	LBS.	27	54	125	250	167	334	—	—
2 ABUTMENTS	LBS.	—	—	—	—	5	10	31	62
4 WINGS	LBS.	—	—	—	—	1	4	8	32
1 BENTS	LBS.	—	—	—	—	5	5		
TOTAL WEIGHT - LBS.			54		250		353		94

SUMMARY OF QUANTITIES

STRUCTURAL EXCAVATION				
ITEM 14a. DRY ROCK				CU. YDS.
ITEM 14b. DRY COMMON				38 CU. YDS.
ITEM 14c. WET ROCK				CU. YDS.
ITEM 14d. WET COMMON				50 CU. YDS.
ITEM 42a. UNTREATED BRIDGE TIMBER				
2 SPANS	AT	312 BD. FT. EACH	=	624 BD. FT.
2 ABUTMENTS	AT	40 BD. FT. EACH	=	80 BD. FT.
4 WINGS	AT	76 BD. FT. EACH	=	304 BD. FT.
1 BENTS	AT	40 BD. FT. EACH	=	40 BD. FT.
		TOTAL	=	1048 BD. FT.
ITEM 42b. TREATED BRIDGE TIMBER				
2 SPANS END	AT	7797 BD. FT. EACH	=	15594 BD. FT.
SPANS	AT	BD. FT. EACH	=	BD. FT.
2 ABUTMENTS	AT	1684 BD. FT. EACH	=	3368 BD. FT.
4 WINGS	AT	347 BD. FT. EACH	=	1388 BD. FT.
1 BENTS	AT	620 BD. FT. EACH	=	620 BD. FT.
		TOTAL	=	20970 BD. FT.
ITEM 43 ASPHALT PLANK WEARING SURFACE				
2 SPANS	AT	563 SQ. FT. EACH		1126 SQ. FT.
● ITEM 16a STRUCTURE BACKFILL (CLASS 1)			=	59 CU. YD.
ITEM 16c MECHANICAL TAMPING				5.9 HOURS
ITEM 60a PILING-TREATED				
2 ABUTMENTS	AT	140 LIN. FT. EACH	=	280 LIN. FT.
4 WINGS	AT	69 LIN. FT. EACH	=	276 LIN. FT.
1 BENTS	AT	120 LIN. FT. EACH	=	120 LIN. FT.
		TOTAL	=	676 LIN. FT.
ITEM 60e. METAL PILE SHOES				
				NONE SHOES
ITEM 89b. DRAIN PIPE (3"φ x 2'-4")				
2 PIECES 3" DIA. GALV. PIPE 2'-4" LONG WITH ONE 3" GALV. FLANGE ON EACH PIPE				
2 SPANS	AT	2 COMPLETE PER SPAN	=	4 PIECES

● FOR OVERHAUL ON STRUCTURE BACKFILL SEE PROJECT SUMMARY

ONE SPAN OF SUPERSTRUCTURE

UNTREATED TIMBER

DESCRIPTION	SIZE	~~18'-6" SPAN~~ NO.	LENGTH	TOTAL	22'-6" SPAN NO.	LENGTH	TOTAL	~~26'-6" SPAN~~ NO.	LENGTH	TOTAL
HANDRAILS S4S.	3"x8"	4	20'-0"	160 BD. FT.	4	24'-0"	192 BD. FT.	4	28'-0"	224 BD. FT.
HANDRAIL POSTS S4S.	6"x8"	6	5'-0"	120 BD. FT.	6	5'-0"	120 BD. FT.	8	5'-0"	160 BD. FT.
TOTAL UNTREATED TIMBER				280 BD. FT.			312 BD. FT.			384 BD. FT.

TREATED TIMBER

DESCRIPTION	SIZE	~~18'-6"~~ NO.	LENGTH	TOTAL	22'-6" NO.	LENGTH	TOTAL	~~26'-6"~~ NO.	LENGTH	TOTAL
FLOORING S4S.	3"x6"	75	30'-0"	3375 BD. FT.	90	30'-0"	4050 BD. FT.	106	30'-0"	4770 BD. FT.
BRIDGING	3"x6"	4	14'-0"	84 BD. FT.	8	14'-0"	168 BD. FT.	8	14'-0"	168 BD. FT.
WHEEL GUARDS ▼	6"x10"	2	20'-0"	200 BD. FT.	2	24'-0"	240 BD. FT.	2	28'-0"	280 BD. FT.
STRINGERS OUTSIDE INTERMEDIATE SPAN	6"x18"	2	18'-6"	333 BD. FT.						
	6"x20"				~~2~~	~~22'-6"~~	~~450 BD. FT.~~			
	8"x20"							2	26'-6"	707 BD. FT.
STRINGERS OUTSIDE END SPANS	6"x18"	2	18'-11"	341 BD. FT.						
	6"x20"				2	22'-11"	459 BD. FT.			
	8"x20"							2	26'-10"	716 BD. FT.
STRINGERS INSIDE INTERMEDIATE AND END SPANS	6"x18"	12	20'-0"	2160 BD. FT.						
	6"x20"				12	24'-0"	2880 BD. FT.			
	8"x20"							12	28'-0"	4480 BD. FT.
STRINGERS SINGLE SPAN	6"x18"	14	19'-4"	2436 BD. FT.						
	6"x20"				~~14~~	~~23'-4"~~	~~3267 BD. FT.~~			
	8"x20"							14	27'-3"	5087 BD. FT.
TOTAL TREATED TIMBER SINGLE SPAN				~~6095 BD. FT.~~			~~7775 BD. FT.~~			10305 BD. FT.
TOTAL TREATED TIMBER END SPAN				~~6168 BD. FT.~~			7797 BD. FT.			10414 BD. FT.
TOTAL TREATED TIMBER INTER. SPAN				~~6152 BD. FT.~~			~~7766 BD. FT.~~			10405 BD. FT.
ASPHALT PLANK WEARING SURFACE				~~463 SQ. FT.~~			563 SQ. FT.			663 SQ. FT.

ONE ABUTMENT

UNTREATED TIMBER			
HANDRAIL POSTS S4S.	2 PCS.	6"x8"x5'-0"	40 BD. FT.
TOTAL UNTREATED TIMBER			40 BD. FT.
TREATED TIMBER			
TIMBER HEADER	1 PC.	8"x10"x30'-0" FINISH TO 7"x9"	200 BD. FT.
CAP	1 PC.	12"x12"x34'-0"	408 BD. FT.
BULKHEAD PLANKS	4 PCS.	3"x8"x32'-0"	256 BD. FT.
BACKING PLANKS	5 PCS.	4"x12"x32'-0"	640 BD. FT.
STRINGER BLOCKING ~~18'-6"~~ & 22'-6" SPANS, Cut before treatment	1 PC.	6"x18"x20'-0" (180)	180 BD. FT.
~~26'-6" SPANS~~	~~1 PC.~~	~~6"x18"x18'-0"~~ ~~(162)~~	BD. FT.
TOTAL TREATED TIMBER			1684 BD. FT.
PILING TREATED		7 PIECES AT 20 LINEAL FT. EACH	140 LIN. FT.

ONE WING

UNTREATED TIMBER

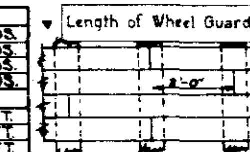
DESCRIPTION	SIZE	10'-0" WING NO.	LENGTH	TOTAL	~~16'-0" WING~~ NO.	LENGTH	TOTAL	~~20'-0" WING~~ NO.	LENGTH	TOTAL
HANDRAILS S4S.	3"x8"	1	10'-0"	20 BD. FT.	1	12'-0"	24 BD. FT.	1	12'-0"	24 BD. FT.
	3"x8"	1	10'-0"	20 BD. FT.	1	12'-0"	24 BD. FT.	1	12'-0"	24 BD. FT.
HANDRAIL POSTS S4S.	6"x6"	3	4'-0"	36 BD. FT.	3	4'-0"	36 BD. FT.	3	4'-0"	36 BD. FT.
TOTAL UNTREATED TIMBER				76 BD. FT.			84 BD. FT.			84 BD. FT.

TREATED TIMBER

DESCRIPTION	SIZE	10'-0" NO.	LENGTH	TOTAL	~~16'-0"~~ NO.	LENGTH	TOTAL	~~20'-0"~~ NO.	LENGTH	TOTAL
CURB PLANK	4"x8"	1	10'-0"	27 BD. FT.	1	12'-0"	32 BD. FT.	1	12'-0"	32 BD. FT.
BACKING PLANKS	4"x12"	8	10'-0"	320 BD. FT.		16'-0"	BD. FT.		20'-0"	BD. FT.
TOTAL TREATED TIMBER				347 BD. FT.			BD. FT.			BD. FT.
PILING TREATED		3	23	69 LIN. FT.	4		LIN. FT.	5		LIN. FT.

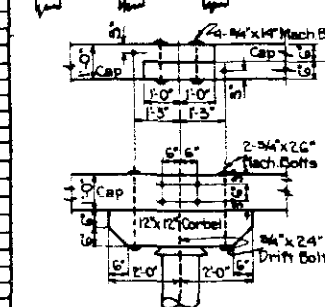
ONE BENT

UNTREATED TIMBER			
HANDRAIL POSTS S4S.	2 PCS.	6"x8"x5'-0"	40 BD. FT.
TOTAL UNTREATED TIMBER			40 BD. FT.
TREATED TIMBER			
STRINGER SPLICES	2 PCS.	6"x18"x4'-0"	72 BD. FT.
CAP	1 PC.	12"x12"x34'-0"	408 BD. FT.
~~SWAYBRACES~~	~~2 PCS.~~	~~3"x12"x~~	BD. FT.
STRINGER BLOCKING ~~18'-6"~~ & 22'-6" SPANS, Cut before treatment	1 PC.	6"x18"x14'-0" (126)	126 BD. FT.
~~26'-6" SPANS~~	~~1 PC.~~	~~6"x18"x8'-0"~~ ~~(72)~~	BD. FT.
SHIMS	14 PCS.	2"x6"x1'-0" (14)	14 BD. FT.
			BD. FT.
TOTAL TREATED TIMBER			620 BD. FT.
PILING-TREATED		6 PIECES AT 20 LINEAL FT. EACH	120 LIN. FT.



▼ Length of Wheel Guards

SPANS	~~18'-6"~~	22'-6"	~~26'-6"~~
SINGLE	18'-10"	~~22'-10"~~	26'-10"
END	17'-6"	~~21'-6"~~	25'-6"
END	20'-0"	24'-0"	28'-0"
INTERMEDIATE	19'-2"	~~23'-2"~~	27'-2"



NOTE: Two piece caps may be used when spliced as shown.

DETAIL OF CAP SPLICE

Note: (37) Dating nails to be installed by Engineering Forces.

ONE STRUCTURE REQUIRED
TWO SPANS AT 22'-6"

LOADING DATA.
LIVE LOAD: A.A.S.H.O. 1944. H-20-44.
DEAD LOAD: Assumes 25 lbs. per sq. ft. additional wearing surface. This includes 1½" asphalt plank wearing surface.

COLORADO DEPARTMENT OF HIGHWAYS
TREATED TIMBER PILE TRESTLE WITH 6" LAMINATED FLOOR AND 1½" ASPHALT PLANK WEARING SURFACE 25 FT. CLEAR ROADWAY
Across SECOND CREEK
Sta. 728+30(116'R) To 728+65.75(652.68)
Near BRIGHTON Sec. 24/25 T. 1 S R. 67 W.

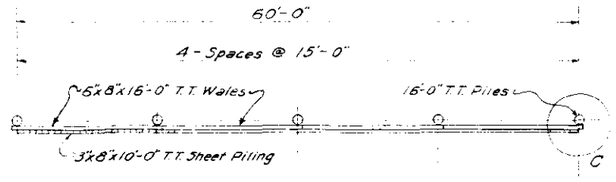
Designed by A.F.H. — Made by A.G.K. & A.L.P. — Check Design A.L.P. — Check Detail J.F.R.
Approved by P. J. Bailey, Bridge Engineer
Date: October 30, 1946.

STRUCTURE NO. E-17-EV.

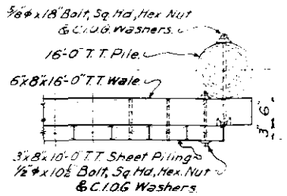
REVISIONS

FED. ROAD DIV. NO.	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 006-1(11)	17	

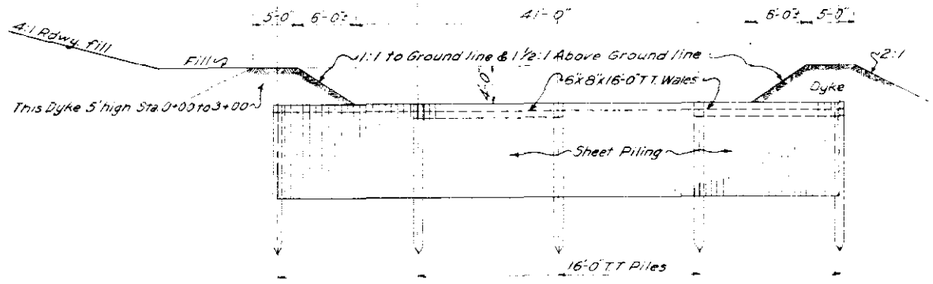
UNIT 1

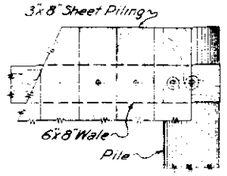


PLAN



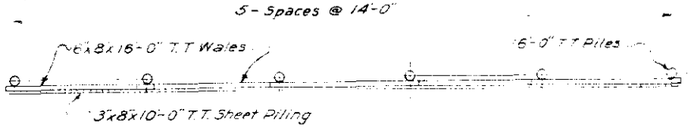
PLAN DETAIL C



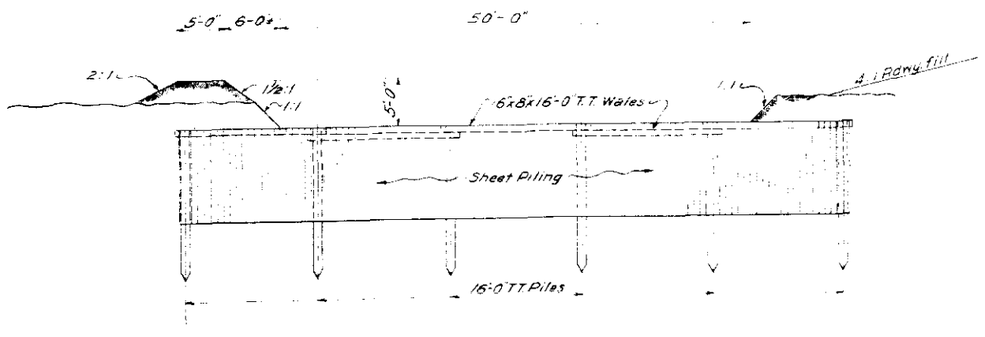


ELEV. DETAIL C

ELEVATION
PLAN & TYPICAL SECTION THRU
CHANNEL CHANGE 101 FT. RIGHT OF STA. 722
SHOWING STREAM CHECKS



PLAN



ELEVATION
PLAN & TYPICAL SECTION
THRU CHANNEL CHANGE 150 FT. RIGHT
OF STA. 768 SHOWING STREAM CHECKS

BOLTS AND WASHERS FOR ONE 60 FT. CHANNEL CHECK

LOCATION	ITEM	SIZE	NO.	LENGTH	WT. EACH	TOTAL WT.
WALES TO PILES	BOLTS	5/8"	8	18"	1.75	14.0 LBS.
SHEET PILING TO WALES	BOLTS	½"	180	10½"	.68	144.2 LBS.
WALES TO PILES	STD. C.I.O.G WASHERS	5/8"	16		.75	12.0 LBS.
SHEET PILING TO WALES	STD. C.I.O.G WASHERS	½"	360		.50	180.0 LBS.
TOTAL WEIGHT						350.2 LBS.

3 - CHECKS Required for 41 Ft. CHANNEL.

BOLTS AND WASHERS FOR ONE 70 FT. CHANNEL CHECK

LOCATION	ITEM	SIZE	NO.	LENGTH	WT. EACH	TOTAL WT.
WALES TO PILES	BOLTS	5/8"	10	18"	1.75	17.5 LBS.
SHEET PILING TO WALES	BOLTS	½"	212	10½"	.68	217.6 LBS.
WALES TO PILES	STD. C.I.O.G WASHERS	5/8"	20		.75	15.0 LBS.
SHEET PILING TO WALES	STD. C.I.O.G WASHERS	½"	424		.50	212.0 LBS.
TOTAL WEIGHT						462.1 LBS.

4 - CHECKS Required for 50 Ft. CHANNEL.

TREATED TIMBER FOR ONE 60 FT. CHANNEL CHECK

DESCRIPTION	SIZE	NO.	LENGTH	TOTAL
WALES	6"x8"	4	16'-0"	256 BD. FT.
PILING - TREATED		5	16'-0"	80 LIN. FT.
SHEET PILING-TR. TIMBER	3"x8"	90	10'-0"	900 LIN. FT.

TREATED TIMBER FOR ONE 70 FT. CHANNEL CHECK

DESCRIPTION	SIZE	NO.	LENGTH	TOTAL
WALES	6"x8"	5	16'-0"	320 BD. FT.
PILING - TREATED		6	16'-0"	96 LIN. FT.
SHEET PILING-TR. TIMBER	3"x8"	107	10'-0"	1070 LIN. FT.

GENERAL NOTES.

All work shall be done according to the standard specifications of The Colorado Department of Highways applicable to the project.

All timber and piling shall be treated and the preservative for treatment shall be creosote oil.

All timber and piling shall be southern yellow pine or west coast douglas fir.

All timber shall be full sawn and cut surfaces or bored holes in treated timber or piles shall be thoroughly saturated with hot creosote oil.

All piling tops shall be saturated with hot creosote oil and covered with a thick layer of heavy asphalt or tar.

All hardware shall be galvanized and bolts must be threaded not less than 3 inches.

All bolts must have Std. C.I.O.G. or malleable cast washers under each head and nut.

COLORADO
DEPARTMENT OF HIGHWAYS

CHANNEL CHANGE AND
STREAM CHECK DETAILS
101 FT. RIGHT OF STA. 722
150 FT. RIGHT OF STA. 768

Across Second & Third Creeks.

Near Brighton Sec 24 & 25 T 1 S. R 67 W.

Designed by E.J.S. | Approved by O. J. Bailey
Made by E.J.S. | Bridge Engineer
Checked by W.W.D. | Date: Sept. 29, 1952.

STRUCTURE NO.

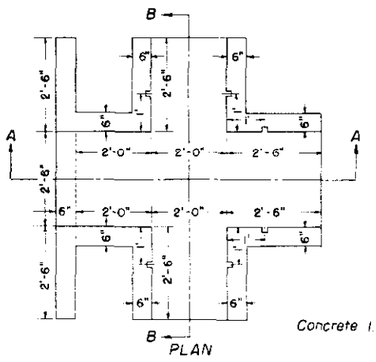
Dates
9-8-52
9-10-52
9-15-52
9-18-52

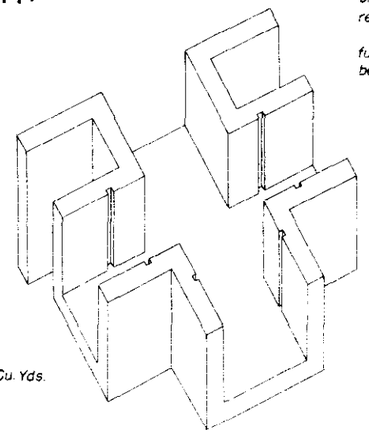
DETAILS OF MISCELLANEOUS CONCRETE STRUCTURES

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1(11)	18	

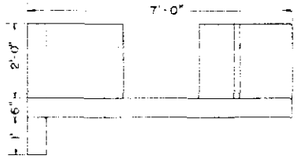
UNIT 1

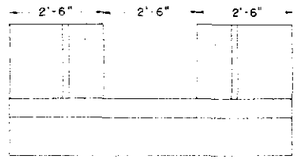
CONCRETE DIVISION BOX
STA. 514+





Concrete 1.62 Cu. Yds.



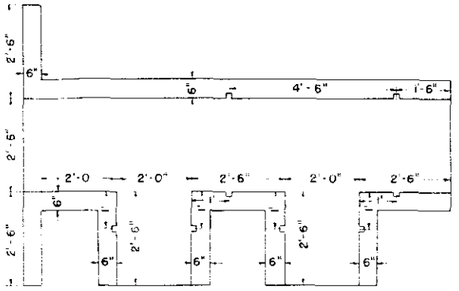


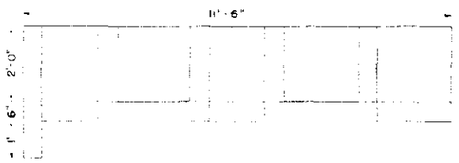
NOTE

Slots to be constructed in walls of structures to accomodate flash boards, shall be 2" in width and shall be recessed into walls 1 3/4".

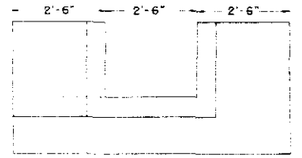
Timber flash boards to fit shall be furnished by the Contractor and shall be included in the price of Concrete.

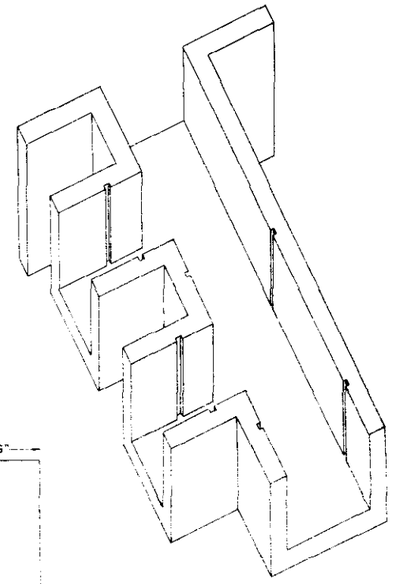
CONCRETE DIVISION BOX
STA. 731+





Concrete 2.24 Cu. Yds.

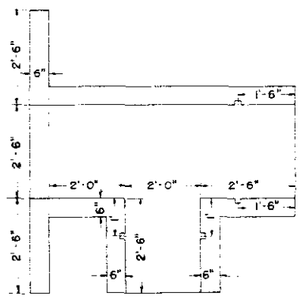


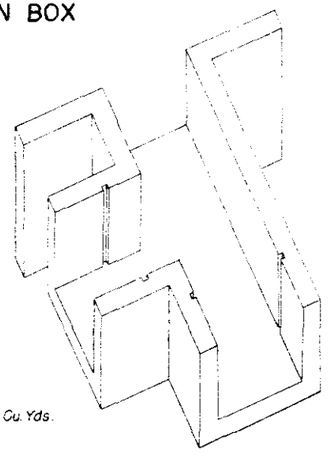


NOTE

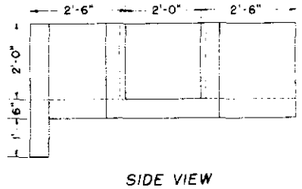
Division outlet on left side of box Sta. 432+ and Sta. 744+

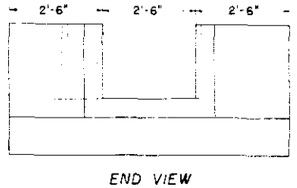
CONCRETE DIVISION BOX
STA. 432+
STA. 446+
STA. 744+



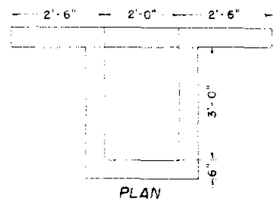


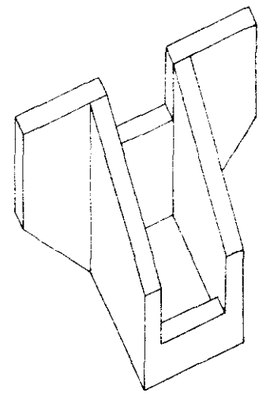
Concrete 1.44 Cu. Yds.



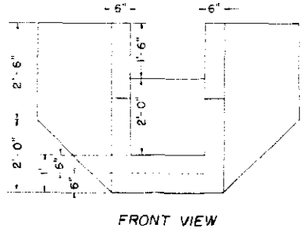


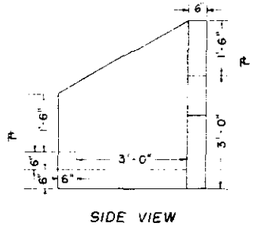
CONCRETE DITCH CHECK



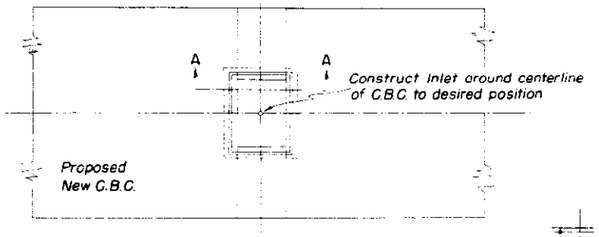


Concrete 1.06 Cu. Yds.

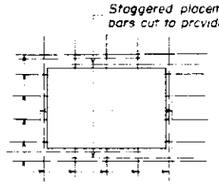




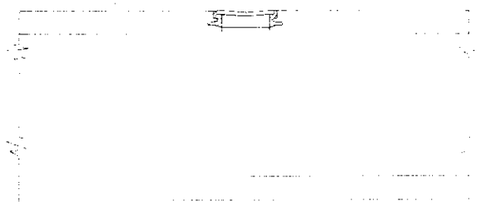
DETAILS OF NO. 13 INLET GRATING AND FRAME IN TOP OF TRIPLE C.B.C., STA. 775+



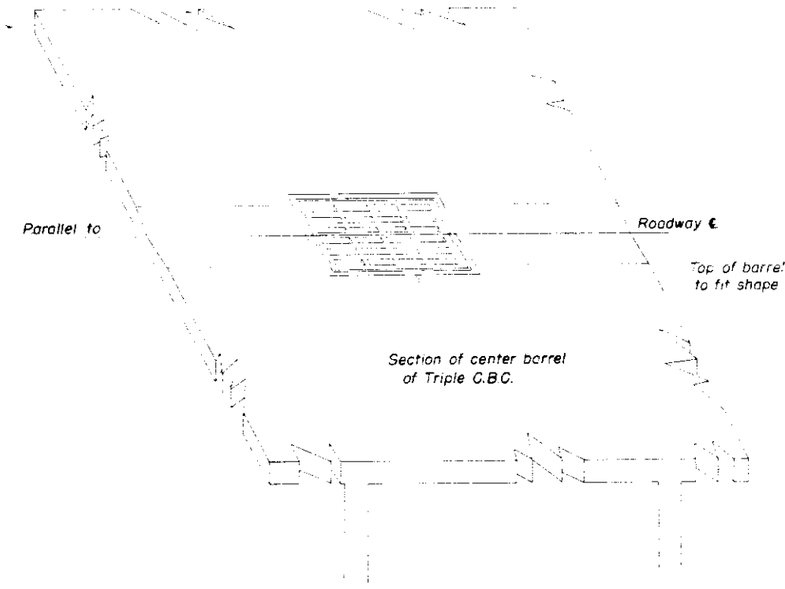
PLAN



DETAIL OF OPENING



SECTION A-A

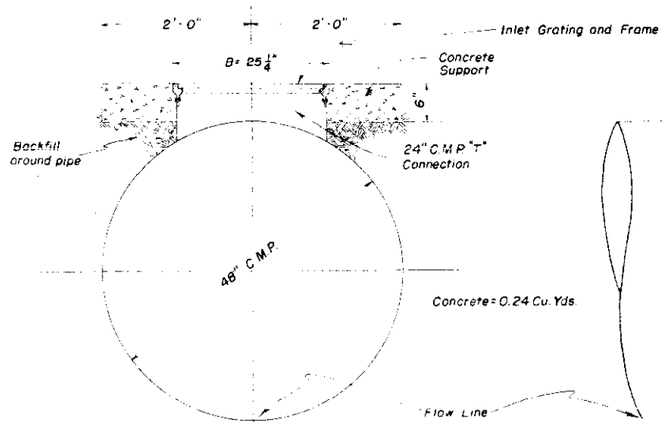


Sketch of typical instalation of no. 13 Inlet Grating and Frame in top of Triple C.B.C., Sta. 775+

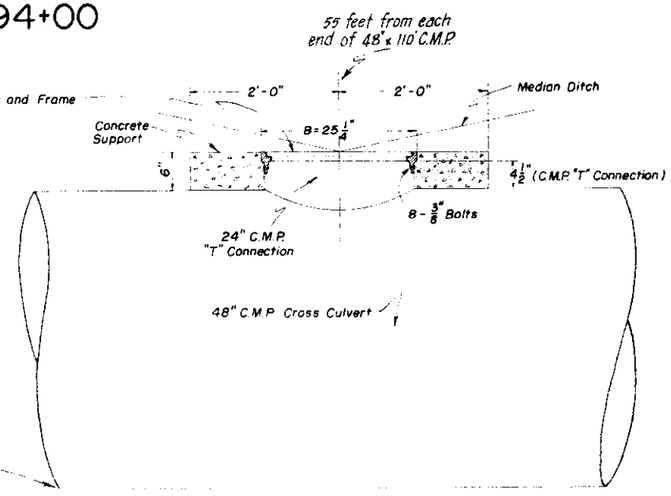
FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1(11)	19	

UNIT 1

DETAILS OF MEDIAN INLET STA. 594+00



END VIEW

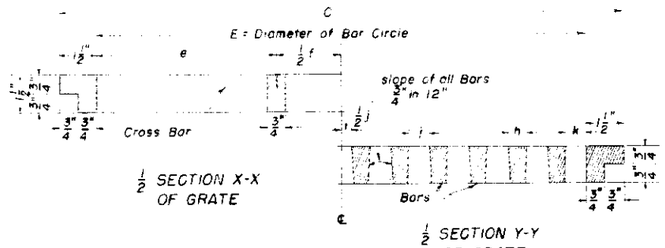


SIDE VIEW

NOTE
"T" Connection shall be securely welded to 48" C.M.P. with a full weld. Damaged spelter coating due to welding operations shall be repaired as provided in Paragraph 53.2.5 of the Standard Specifications. (To be included in price bid for C.M.P.)

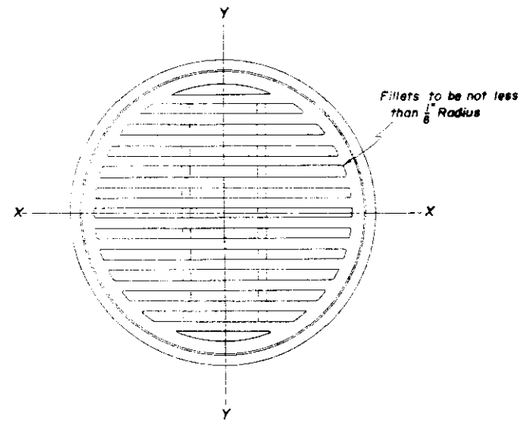
DETAILS OF INLET GRATING & FRAME

DIMENSIONS OF FRAME AND GRATE (inches)							
B	C	E	h	j	k	e	f
25 1/4	23 5/16	20 5/16	3/4	7/8	27/32	7 1/2	5 5/16

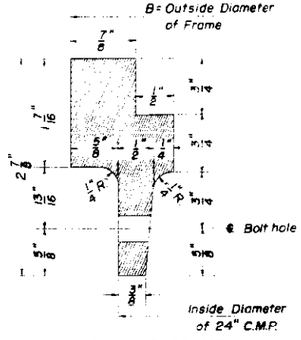


1/2 SECTION X-X OF GRATE

1/2 SECTION Y-Y OF GRATE



PLAN OF FRAME & GRATE



SECTION OF FRAME

NOTE
Grating & Frame to conform to Paragraph 132.2.5 of the Standard Specifications.

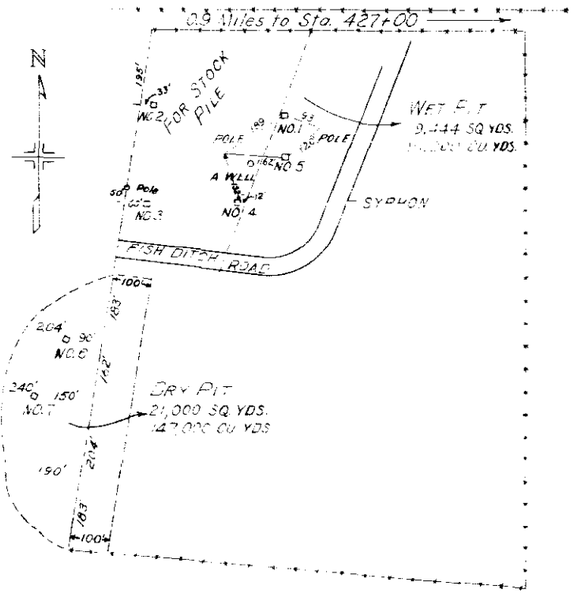
FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	F006-1(11)	20	

UNIT 1

PIT LOCATIONS

PIT NO. (Sample 202)

Location: N.E. ¼ Sec. 20, T 2 S, R 67W
Owner: Ella Peterson
Quantity Available: (Wet) 97,200 (Dry) 147,000 Cu. Yds.
Proposed Use Borrow Material and Structure Backfill.
Haul Distance: 0.9 Miles to Sta. 427+00

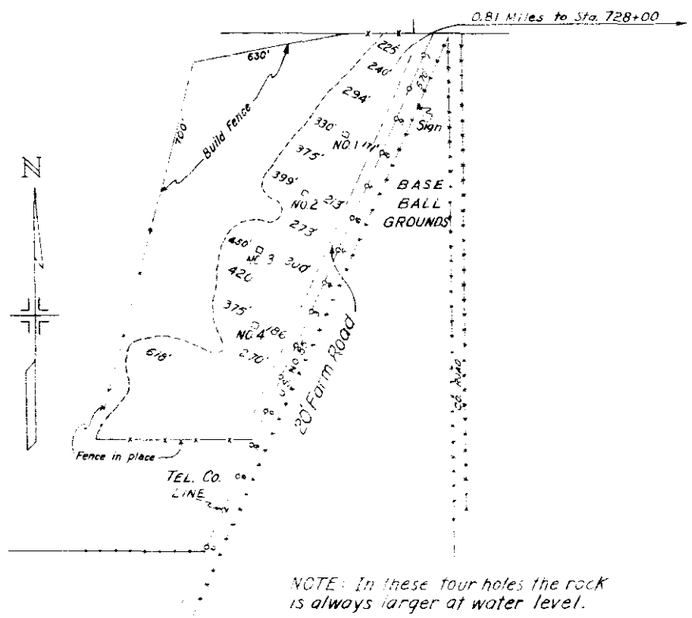


TEST NO.	DEPTH	DESCRIPTION
		HOLE No. 1
1	0.0 To 6.0	O.B.
	6.0 To 7.0	Clay - No Sample
		Water at 7.0'
		HOLE No. 2
1	0.0 To 8.0	Sample
	8.0 To 12.0	Sample
		Water at 8.0'
		HOLE No. 3
1	0.0 To 6.0	Water at 4.0'
		HOLE No. 4
1	0.0 To 8.5	Sample
1A	8.5 To 12.0	Sim. Test No. 1 but more clay & sand. Water at 8.5' Flooded at 12.0'
		HOLE No. 5
1	0.0 To 1.0	O.B.
1A	1.0 To 8.0	

TEST NO.	DEPTH	DESCRIPTION
1B	8.0 To 15.0	Sample Lens of Clay in it Water at 8.0'
		HOLE No. 6
1	0.0 To 2.0	O.B.
1A	2.0 To 11.0	S. & G.
1B	11.0 To 14.0	Sandy Loam
1C	14.0 To 22.0	S. G. & Rock No Water - Owner says Test No. 1C is 21' to B.R.
		HOLE No. 7
1	0.0 To 1.0	O.B.
1A	1.0 To 9.0	Pea Gravel
1B	9.0 To 15.0	Sandy Loam
1C	15.0 To 22.0	S. & G. No Water 6" Max. Size Owner says 1C 21' thick.

PIT NO. (Sample 201)

Location: N ½ Sec. 26, T 1 S, R 67W
Owner: Jack Worthing
Quantity Available: 466,585 + Cu. Yds.
Proposed Use: Borrow Material and Structure Backfill.
Haul Distance: 0.81 Miles to Sta. 728+00



NOTE: In these four holes the rock is always larger at water level.

TEST NO.	DEPTH	DESCRIPTION
		HOLE No. 1
1	0.0 To 5.0	O.B.
1A	5.0 To 7.0	Sand
1B	7.0 To 21.0	S. & G. Free Water at 20' Max. Size 4"
		HOLE No. 2
1	0.0 To 1.25	O.B.
1A	1.25 To 7.0	S. & G.
1B	7.0 To 21.0	S. G. & R. Free Water at 21' Max. Size 3"
		HOLE No. 3
1	0.0 To 2.0	O.B.
1A	2.0 To 10.0	S. & G.
1B	10.0 To 22.0	S. G. & R. No Water at 21' Max. Size 4"

TEST NO.	DEPTH	DESCRIPTION
		HOLE No. 4
1	0.0 To 2.5	O.B.
1A	2.5 To 7.5	S. & G.
1B	7.5 To 15.0	S. & G.
1C	15.0 To 22.0	S, G. & R. Water at 22.0' raised 1.0' ft. during 30 min. period. Clay Lens at 10.0'± from 0.0'-2.0' in thickness.

REVISIONS
Rev 12-13-47 J.P.K.
Rev 7-1-49 J.R.E.
Rev 9-14-50 J.E.R.
Rev 7-10-52 T.M.C.

STANDARD M-10-B.

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1(11) UNIT 1	21

1 2 3 4 5 6 7 8 9 0 .

A B C D E F G H I J K L

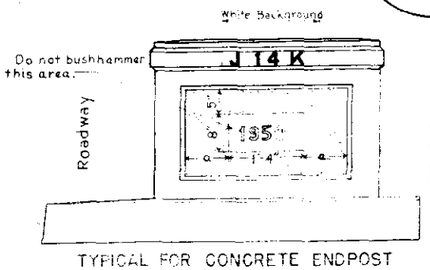
M N O P Q R S T U V W

a f g l J 14 K 1950

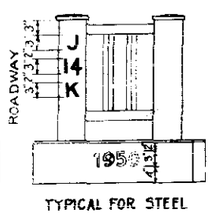
abcdefghijklmnopqrstuvwxyz

SAMPLE BRIDGE NUMBER

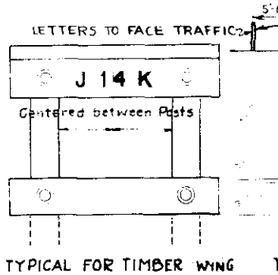
SAMPLE YEAR NUMBER



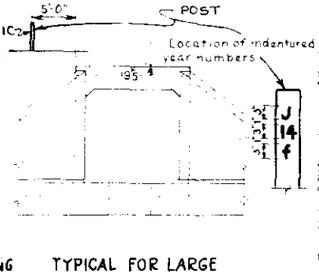
TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR STEEL HANDRAIL END POST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX GULVERTS

General Notes

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS APPLICABLE TO THE PROJECT.

COMPENSATION FOR THIS WORK SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT BE PAID FOR AS A SEPARATE ITEM.

THE SIZE, SHAPE AND SPACING OF THE LETTERS AND FIGURES SHALL BE IN ACCORDANCE WITH THE FULL SIZE SHOWN ON THIS SHEET.

ADDITIONAL COPIES OF THIS FULL SIZE SHEET CAN BE OBTAINED FROM THE DEPARTMENT WITHOUT CHARGE.

THE YEAR NUMBERS ARE RECESSED IN CONCRETE ⅜ MINIMUM AS SHOWN INTO THE PANEL OF THE ENDPOST ON THE RIGHT HAND SIDE OF EACH BRIDGE END AND INTO THE FACE OF THE DOWNSTREAM HEADWALL OF CULVERTS AS SHOWN ON PLAN DETAILS. NUMBERS TO BE MADE OF WOOD, METAL OR OTHER SUITABLE MATERIAL AND ATTACHED TO THE FORMS BEFORE CONCRETE IS POURED.

THE YEAR NUMBER OF EACH STRUCTURE SHALL CORRESPOND WITH THE YEAR IN WHICH THE CONCRETE IS POURED.

THE STRUCTURE NUMBER SHALL BE STENCILED ON THE RIGHT HAND SIDE OF EACH BRIDGE END AS SHOWN ON THIS STANDARD AND AS SPECIFIED FOR MAJOR STRUCTURES OVER 20'-0" CLEAR SPAN.

THE CORRECT NUMBER FOR EACH BRIDGE IS SHOWN IN THE LOWER RIGHT HAND CORNER OF THE DETAIL SHEETS FOR THAT BRIDGE.

A PROPER WHITE BACKGROUND RECTANGULAR IN SHAPE AND EXTENDING THREE INCHES BEYOND THE LIMITS OF THE NUMBER SHALL BE PAINTED WITH TWO COATS OF ACCEPTABLE WHITE PAINT UNLESS AN APPROVED WHITE CONCRETE PAINT IS USED. BEFORE PAINTING THE SURFACE MUST BE THOROLY DRIED, CLEANED AND PROPERLY SIZED. ON TIMBER HANDRAILS THE WHITE PAINT USED ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY, THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED ON IT, WITH TWO COATS OF SECOND FIELD COAT DARK OR EXTERIOR BLACK PAINT (MAINT.) AS SPECIFIED UNDER ITEM 38 PAINTS AND PAINTING. THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

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

MINOR STRUCTURES WITH CLEAR SPANS 12 TO 20 FEET INCLUSIVE SHALL BE STENCILED WITH STRUCTURE NUMBER THUS W-18-E ON 3" STEEL MARKER POSTS WHERE PROVIDED AND AS SHOWN ON STATE HIGHWAY STD. M-23-A

STRUCTURE NO.

COLORADO
DEPARTMENT OF HIGHWAYS
STANDARD
LETTERS AND FIGURES FOR YEAR NUMBERS AND STRUCTURE NUMBERS

Designed by G.H.D.	Approved by [signature]
Made by W.P.M.	Bridge Engineer
Checked by	Date: June 1, 1948

Scale in Inches

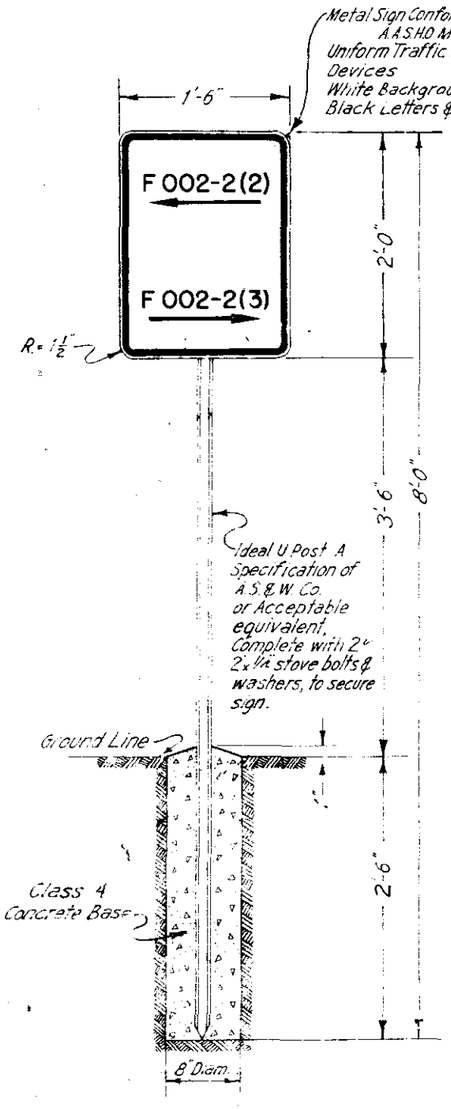
REVISIONS

Rev. 5-28-40, A.Z. 1940 Specs.
Rev. 1-2-46, C.S.C. Item 81a
Rev. 9 Jan. 46 P.S.B. 1/2" to 1/2"ø
Rev June 10 '46. W.E.M. Bronze Tablet
Rev. Mar. 21-1947, W.M.M. ~ Project Marker Post.
Rev. Nov. 21-1947 J.P.K. ~ Metal Project Marker
Rev. Dec. [illegible] 1947 [illegible] Metal Project Marker
Rev. July 5-1950, C.S.C. ~ Rev. Note Re Metal Sign for Project Marker, & R.O.W. Marker Markings.
Rev. July 7, 1952, W.E.M. ~ 1952 Specs.

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1 (11) UNIT 1	22

STANDARD M-7-B

PROJECT MARKER POST
ITEM Nº 818



NOTES FOR PROJECT MARKER POSTS

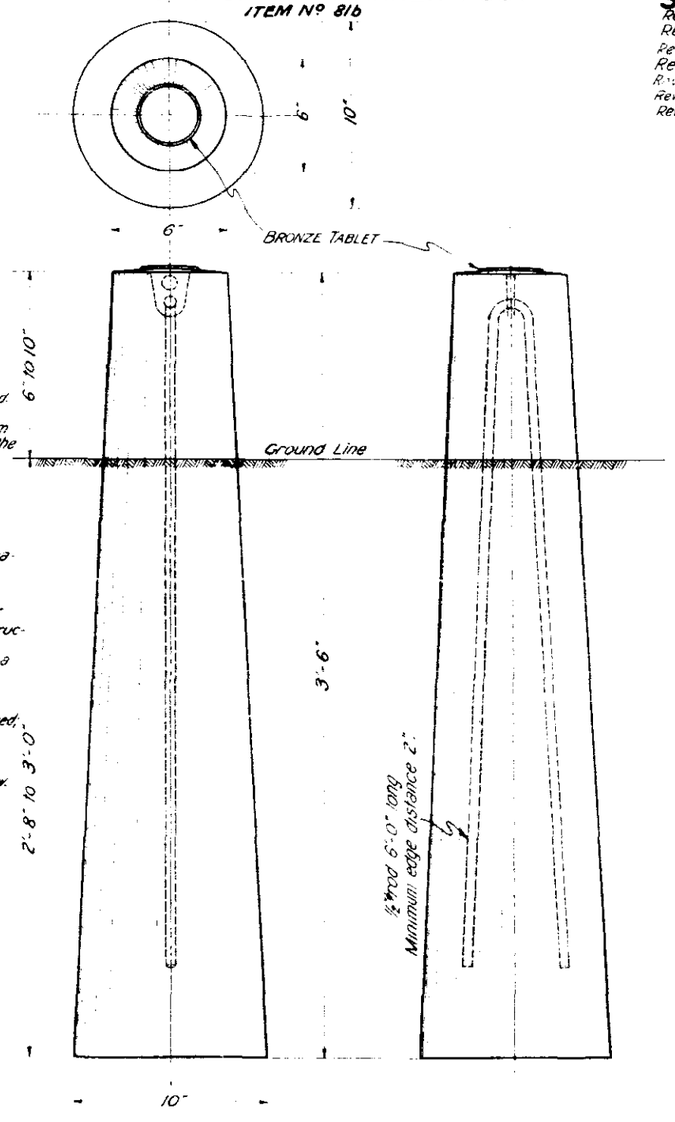
All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the project.

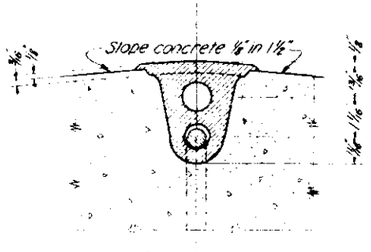
Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed. Post to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will indicate properly the projects to which it refers.

NOTES FOR R.O.W. MARKER POSTS

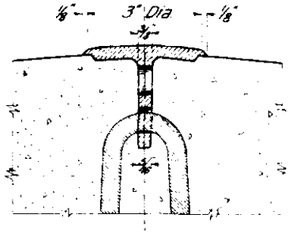
All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the project.
Posts shall be made of Class "A" concrete
The upper 12 inches of marker posts shall be rubbed free of form marks, and the top surface of the post must be constructed 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 1/8 inch.
Information on the bronze tablet indicated by pin lines is to be stamped in the field by the engineering party after post is placed.
3/8 inch letters and figures to be used.
Project designations on tablets shall be properly shown.
I.E., F.I. for Fed. Aid Interstate, F. for Fed. Aid Primary, S. for Fed. Aid Secondary etc. & S.P. Nos. for State Projects, See detail below.

RIGHT OF WAY MARKER POST
ITEM Nº 818





SECTION B-B



SECTION A-A

DETAIL OF BRONZE TABLET FOR RIGHT OF WAY MARKER POST

COLORADO
DEPARTMENT OF HIGHWAYS
STANDARD
MARKER POSTS

Designed by R.E.L.
Made by F.F.S.
Checked by R.E.L.
Approved by [signature]
Date January 1st 1948

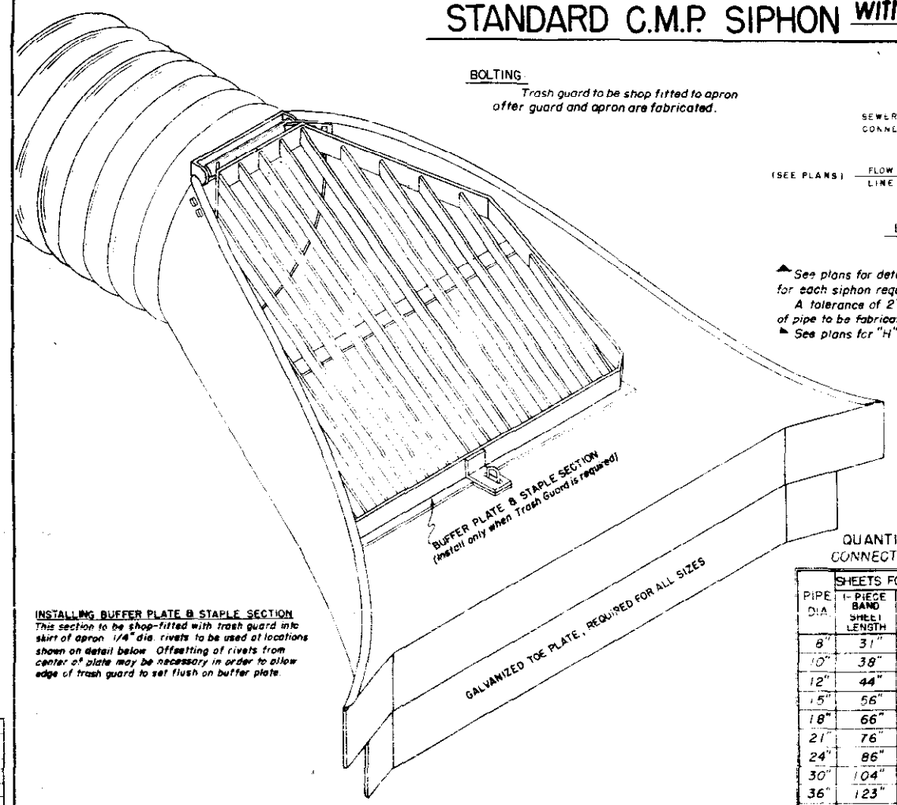
REVISIONS

STANDARD C.M.P. SIPHON *with* METAL APRONS *for* INLETS & OUTLETS

STANDARD M-124-A

FED. ROAD DIVISION NO.	DISTRICT	F006-1 (11)	SHEET NO.	TOTAL SHEETS
9	COLO.	UNIT 1	24	

Rev. 8-10-51, C.G.M., Added "H" Dimension, Note, and Flow Line to Cross Sectional View.
Rev. 9-5-52, J.C.R., Revised Connecting Bands



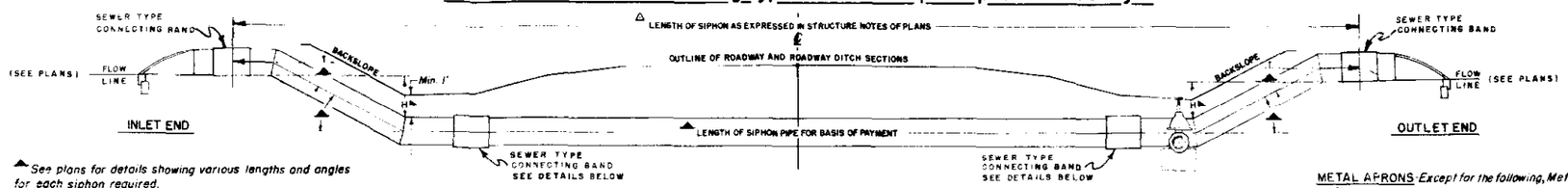
BOLTING

Trash guard to be shop fitted to apron after guard and apron are fabricated.

INSTALLING BUFFER PLATE & STAPLE SECTION

This section to be shop-fitted with trash guard into skirt of apron. 1/4" dia. rivets to be used at locations shown on detail below. Offsetting of rivets from center of plate may be necessary in order to allow edge of trash guard to set flush on buffer plate.

Cross Sectional View Showing Typical Relationship of Siphon to Roadway

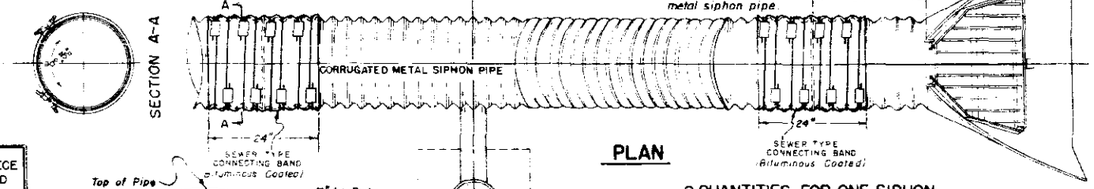


▲ *See plans for details showing various lengths and angles for each siphon required.*
A tolerance of 2"± will be permitted in angles of sections of pipe to be fabricated.
■ *See plans for "H" value at inlet and outlet for each siphon.*

△ *A maximum tolerance of 4 inches will be allowed in total length of siphon.*

CONNECTING BAND NOTES

1. *Rivet siphon pipe complete, standard practice, then flatten outside rivet heads to 1/8"± (See detail this sheet)*
2. *Roll band sheet to one inch larger diameter than siphon pipe. Deform to fit strutted pipe shape.*
3. *Before installing band, paint inside of asphalt coated band and outside of asphalt coated siphon pipe with kerosene or distillate as this makes them slippery and allows the band to be pulled up tight.*
4. *Use sewer type connecting bands, corrugations of connecting bands must mesh with corrugations of metal siphon pipe.*

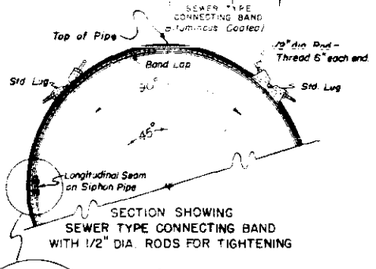


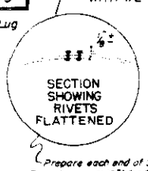
PLAN

QUANTITIES FOR CONNECTING BANDS

PIPE DIA.	SHEETS FOR BANDS 1-PIECE BAND SHEET LENGTH	1-PIECE BAND NOMINAL LAP	1-PIECE ROD LENGTH
8"	31"	3"	3'-3"
10"	38"	3"	3'-10"
12"	44"	3"	4'-4"
15"	56"	5½	5'-1"
18"	66"	6"	5'-11"
21"	76"	6"	6'-8"
24"	86"	6"	7'-6"
30"	104"	6"	9'-0"
36"	123"	6"	10'-8"
42"	143"	6"	12'-3"

■ *Rod length computed for Std 3" Lug*





Prepare each end of Siphon Pipes (minimum 12") for Sewer Type Bands by flattening rivet heads on outside to 1/8"± thickness.

⊙ QUANTITIES FOR ONE SIPHON

DIAMETER OF SIPHON		Item 55 CORR. METAL SIPHON PIPE	Item 85 TRASH GUARDS	Item 95 METAL APRONS FOR C.M.P. CULVERTS	Item 110p METAL DRAIN PIPE	Item 110v CAST IRON VALVE & VALVE BOX
		LIN. FT.	EACH	EACH	LIN. FT.	EACH
18"		16 Ga. as req'd.	2 - 62 lbs. Each	2 - 18"	4" dia. as req'd.	1 - 4"
24"		14 Ga. as req'd.	2 - 98 lbs. Each	2 - 24"	4" dia. as req'd.	1 - 4"
30"		14 Ga. as req'd.	2 - 130 lbs. Each	2 - 30"	6" dia. as req'd.	1 - 6"
36"		12 Ga. as req'd.	2 - 187 lbs. Each	2 - 36"	6" dia. as req'd.	1 - 6"

⊙ *Items shown include all items required to install one complete siphon, except for Structural Excavation, Structure Backfill, Mechanical Tamping and Unclassified Ditch Excavation when required.*

METAL APRONS - *Except for the following, Metal Aprons used on C.M.P. Siphons shall be of the same specifications as those shown on the Standard Sheet included in plans for Metal Aprons.*

1. *Dimension V on Standard M-102-G shall be 24" for all sizes for Siphons*
2. *Circular Section to be close riveted and soldered to Apron to prevent leakage, also the Circular Section is to be Asphalt Coated.*
3. *Galvanized Toe Plates will be required on all sizes.*
4. *The galvanized Top Finish Plate normally required on all Metal Aprons will not be required. This unit is eliminated to facilitate installation of the Trash Guard Hinge. Use only when Trash Guard is not required.*

TRASH GUARDS - *Structural Steel Trash Guards conforming to details shown on this sheet shall be painted as per specifications for Structural Steel. These specifications may be found under the item "Paints and Painting".*

CAST IRON VALVE & VALVE BOX - *Cast Iron Extension Valve Box, Size B, with No. 6 Base as shown in Hendrie & Bolthoff Catalog No. 150 (Pg 387), or an acceptable equivalent will be used.*
Valves used shall be Crane No. 461 Standard Body Wedge Gate Valve with brass seats and stem or an acceptable equivalent.

METAL DRAIN PIPE - *Metal Drain Pipe conforming to specifications shall be used in the following sizes:*
18" & 24" Dia. Siphon - 4" Dia. Drain Pipe with 4" Valve & Drain
30" & 36" Dia. Siphon - 6" Dia. Drain Pipe with 6" Valve & Drain

CORRUGATED METAL SIPHON PIPE - *Siphon Pipe conforming to specifications shall be double riveted along the longitudinal seams and riveted at three (3) inch centers along circumferential seams.*

Illustrative Sketch of Metal Apron with Trash Guard Installed

NOTE

Sections shown below to be furnished and installed as part of Trash Guard Unit. The cost of all assemblies, installing, drilling, bolts, washers, rivets, painting, labor and equipment necessary shall be included for payment in bid price for Item 85, Trash Guards.

Details of Parts for Trash Guard Assembly

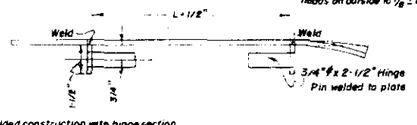
TABLE OF DIMENSIONS

DIA OF SIPHON	A	B	C	D	E	F	G	H	J	K	L	P	R	S
18"	6"	25"	1"	10	2-1/2"	30"	15"	11"	12"	3"	9"	26"	6-1/2"	1"
24"	8"	34-1/2"	1/2"	14	2-1/2"	39"	23"	12"	17"	6"	10"	37"	5"	1"
30"	12"	41"	1-1/4"	15	2-1/2"	43"	27"	19"	20"	7"	18"	39"	6-1/2"	1"
36"	14"	51"	1-1/4"	21	2-1/2"	58"	32"	23"	24"	8"	20"	54"	6"	1"

NOTE

All dimensions shown above to have 1/2"± tolerance except dimensions A & L.

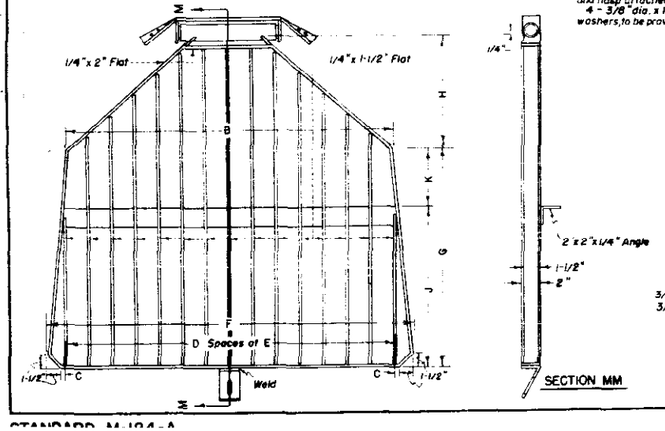
TRASH GUARD HINGE

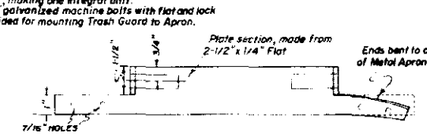


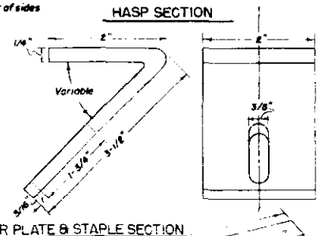
NOTE

Trash Guard to be of all welded construction with hinge section and hasp attached, making one integral unit.
4 - 3/8" dia. x 1" galvanized machine bolts with flat and lock washers, to be provided for mounting Trash Guard to Apron.

TRASH GUARD







NOTE - *Plate to be made of 1/4"x 2" Flat, paint same as trash guard.*

Details for Installing Valve, Valve Box, Metal Drain Pipe & Metal Apron at Outlets

ELEVATION

END ELEVATION

■ *Additional Structure Backfill required when Cast Iron Valve & Valve Box is called for on plans. See plans for quantities and Class*

A - *Notching of trash guard hinge plate may be necessary so that trash guard when open will rest on an angle of 45° with the siphon pipe.*

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the Project.

Trash Guards, Metal Drain Pipe and Cast Iron Valve and Valve Boxes will be furnished when called for on plans.

Alternate equivalent hardware and fittings will be accepted subject to the Engineers approval.

COLORADO
DEPARTMENT OF HIGHWAYS

Standard C.M.P. Siphon with Metal Aprons for Inlets & Outlets

Designed by T.G.V.	Approved by [illegible]
Made by C.G.M.	Engineer, Surveys & Plans
Checked by M.R.H.	Date: Sept. 18, 1950

REVISIONS

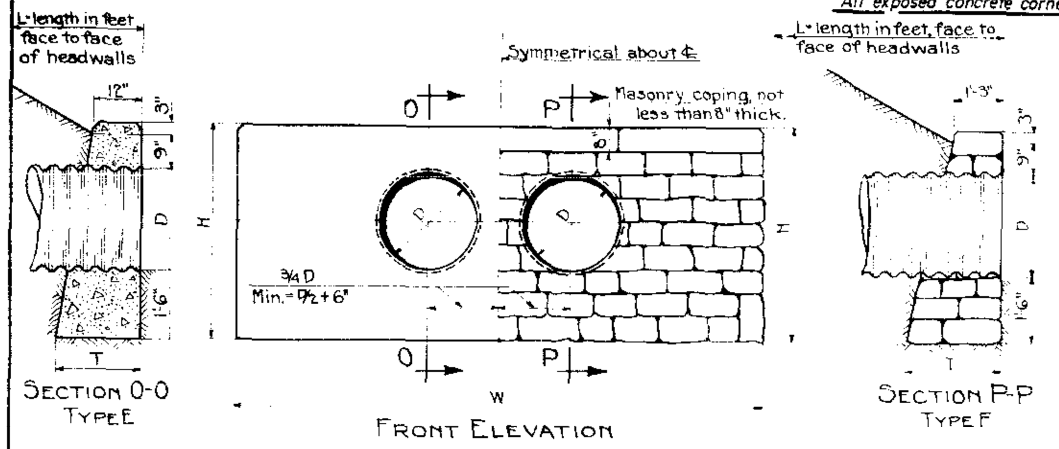
STANDARD M-102-G

Rev. 8-28-50, C.G.M.- Dimension B, Line 7, Type L
Rev. 7-21-52, H.W.M.

FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1 (11) UNIT 1	23	

Rev. Types K&L Jan. 17, 1946; A.L.P. *Rev. 3-7-47 Type K&L. H.O.M.*
Rev. Types C&F June 11, 1946; A.L.P. *Rev. 12-13-47 J.P.K.*
Rev. Types K&L Nov. 6, 1946; A.L.P. *Rev. 2-25-49 R.E.M.*
Rev. Types A, E, K & L, July 10, 1950; J.C.R.

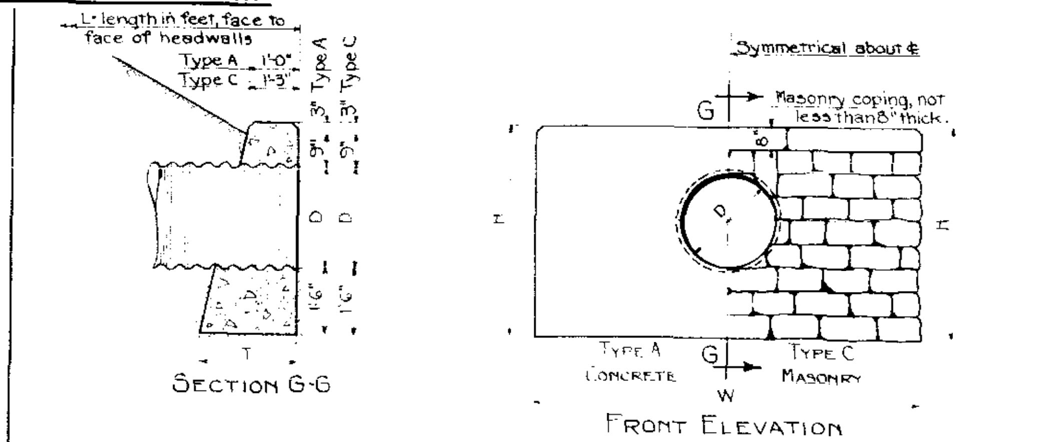
All exposed concrete corners shall be beveled to a 2" face



STANDARD HEADWALLS FOR DOUBLE CORRUG. METAL PIPE CULVERTS

TABLE OF DIMENSIONS AND QUANTITIES

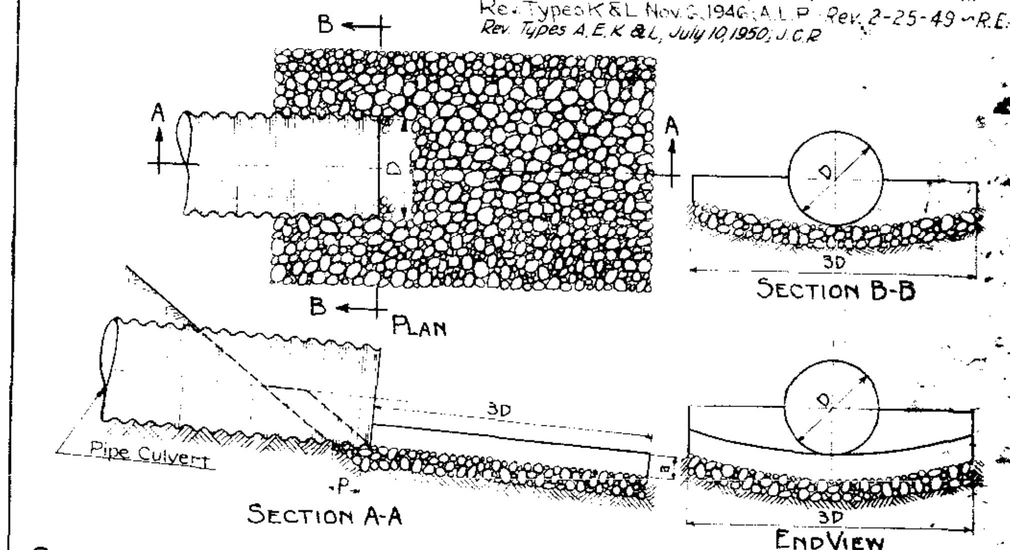
Type E			Both Types				Type F		
D Diam.	T	Class B Concrete in Two Headwalls	W	H	Corrugated Metal Pipe		Cement Rubble Masonry in Two Headwalls	T	D Diam.
15"	1'-6"	2.4 Cu. Yds.	7'-6"	3'-9"	16 Gage	2xL= Lin. Ft.	3.1 Cu. Yds.	2'-0"	15"
18"	1'-7"	3.0 Do	8'-6"	4'-0"	16 Do	2xL= Do	3.8 Do	2'-1"	18"
24"	1'-10"	4.4 Do	10'-6"	4'-6"	14 Do	2xL= Do	5.5 Do	2'-4"	24"
30"	2'-0"	6.1 Do	12'-9"	5'-0"	14 Do	2xL= Do	7.5 Do	2'-6"	30"
36"	2'-2"	8.1 Do	15'-0"	5'-6"	12 Do	2xL= Do	10.0 Do	2'-8"	36"
42"	2'-5"	10.8 Do	17'-3"	6'-0"	12 Do	2xL= Do	12.8 Do	2'-10"	42"
48"	2'-7"	13.6 Do	19'-6"	6'-6"	12 Do	2xL= Do	16.3 Do	3'-0"	48"



STANDARD HEADWALLS FOR SINGLE CORRUG. METAL PIPE CULVERTS

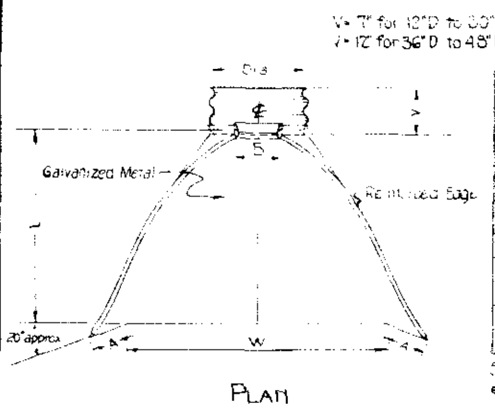
TABLE OF DIMENSIONS AND QUANTITIES

Type A			Both Types				Type C		
D Diam.	T	Class B Concrete in Two Headwalls	W	H	Corrugated Metal Pipe		Cement Rubble Masonry in Two Headwalls	T	D Diam.
15"	1'-6"	1.8 Cu. Yds.	5'-3"	3'-9"	16 Gage	L= Lin. Ft.	2.2 Cu. Yds.	2'-0"	15"
18"	1'-7"	2.2 Do	6'-0"	4'-0"	16 Do	L= Do	2.8 Do	2'-1"	18"
24"	1'-10"	3.3 Do	7'-6"	4'-6"	14 Do	L= Do	4.1 Do	2'-4"	24"
30"	2'-0"	4.5 Do	9'-0"	5'-0"	14 Do	L= Do	5.6 Do	2'-6"	30"
36"	2'-2"	6.0 Do	10'-6"	5'-6"	12 Do	L= Do	7.4 Do	2'-8"	36"
42"	2'-5"	8.0 Do	12'-0"	6'-0"	12 Do	L= Do	9.2 Do	2'-10"	42"
48"	2'-7"	10.0 Do	13'-6"	6'-6"	12 Do	L= Do	11.5 Do	3'-0"	48"



STANDARD GROUTED RUBBLE APRON FOR PIPE CULVERTS

Square Yards Grouted Rubble Slope and Ditch Paving 1 Foot Thick														
Fill Slope	D	15"	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
	p / a	7½"	9"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
1½:1	2'-0"	3	4	6	9	12	17	21	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

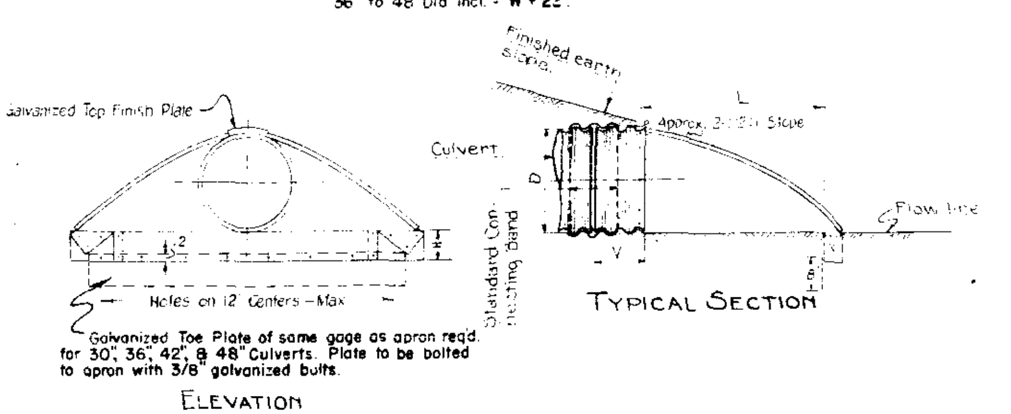


TYPE K

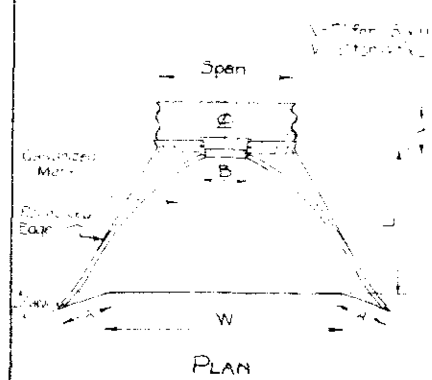
Culv. Diam. D▲	Gage	Dimensions: A 1" Tol.	B Max	L 1½" Tol.	W 2" Tol.	H 1" Tol.	Remarks
15"	16	6"	8"	26"	30	6"	One piece skirt
18"	16	7	9"	31"	36	6"	One piece skirt
24"	14	9½	12	42"	48	6"	One piece skirt
30"	14	12"	15"	52½"	60"	7½	Two piece skirt ⊕
36"	12	14"	18"	63"	72"	9"	Two piece skirt ⊕
42"	12	16"	21"	73½"	84"	10½"	Two piece skirt ⊕
48"	12	18"	27"	84"	90	12"	Two piece skirt ⊕

Splices to be the lap riveted type.
⊕ One splice on ℄ made by either riveting or bolting
Galvanized Connector Section, Corner Plate & Toe Plate to be same gage as Skirt Section
▲ Culvert diameter is equal to dimension D of connector section

NOTE. Length of Toe Plate for Culverts 15" to 30" Dia. incl. ="W"+10".
36" to 48" Dia. incl. ="W"+22".



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K

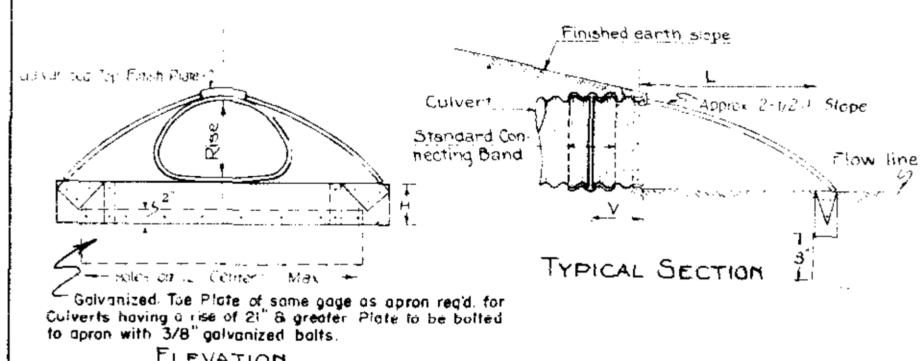


TYPE L

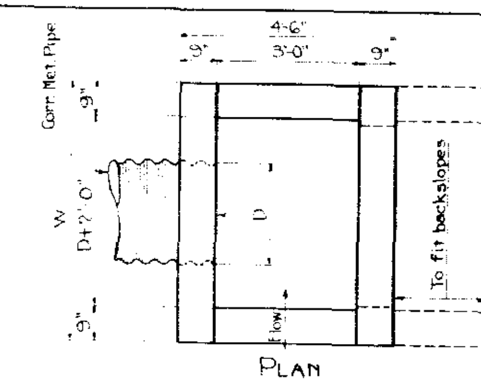
Normal Culvert Diam.	Arch Dimensions: Span	Rise	Gage	Dimensions: A 1" Tol.	B Max	L 1" Tol.	W 2" Tol.	H 1" Tol.	Remarks
15"	18"	[illegible]	16	4½	[illegible]	19"	30"	6"	One piece skirt
18"	22"	13"	16	5¼	10	23"	36"	6"	One piece skirt
24"	29"	18"	14	7"	14	31½	48	6"	One piece skirt
30"	36"	[illegible]	14	8¾	[illegible]	38½	60"	6"	One piece skirt
36"	43"	27"	12	10¾	17½	47"	75"	7⅝	Two piece skirt ▲
42"	50"	31"	12	12¼	20"	54"	85"	9⅛	Two piece skirt ▲
48"	58"	36"	12	14"	26"	63"	96"	10⅝	Two piece skirt ▲
54"	65"	40"	12	15¾	23"	70"	112"	10⅝	Three piece skirt ⊕
60"	72"	44"	10	17¼	24"	77"	128"	12⅛	Three piece skirt ⊕

▲ Splices to be the lap riveted or bolted on ℄.
⊕ Sections to be joined by riveting or bolting equal distance from ℄.
Galvanized Connector Section, Corner Plate & Toe Plate to be same gage as skirt section

NOTE. Length of Toe Plate for Pipe-Arch Culverts with rise of 11" to 27" incl. ="W"+10"
31" to 44" incl. ="W"+18".



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L

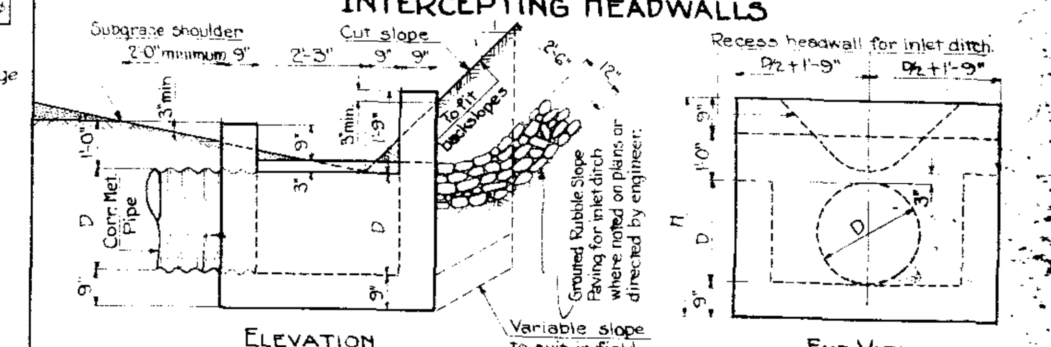


QUANTITIES OF CLASS B CONCRETE OR CEMENT RUBBLE MASONRY

Size of Pipe	Width of Wall	Height of Wall	Quantities in One Headwall
D	W	H	Cu. Yds.
15"	4'-9"	3'-9"	1.48
18"	5'-0"	4'-0"	1.64
24"	5'-6"	4'-6"	1.99
30"	6'-0"	5'-0"	2.34
36"	6'-6"	5'-6"	2.72

NOTE: Backwall to be eliminated and end walls connected to back slope where ordered by the Engineer. Floor slab is to be extended with side walls if in common material and is to be omitted when inlet is in rock. Actual quantities involved in such operation shall be allowed and paid for. Increases in plan quantities must be covered by work order.

INTERCEPTING HEADWALLS



GENERAL NOTES FOR ALL STRUCTURES

All work shall be done according to the standard specifications of the Colorado Department of Highways applicable to the Project.
All exposed concrete surfaces shall receive class 1 surface finish.

All construction joints shall be thoroughly cleaned before fresh concrete is poured.
All walls shall have forms on both sides.
The 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 plan sheets for project.
Footings in rock shall be poured out to rock and not formed.
Mechanical Tamping, as provided under Item No. 16 of the specifications, shall be applied over such areas as shown on the plans or as ordered by the Engineer.

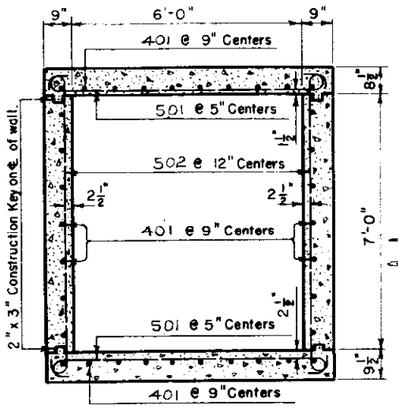
COLORADO DEPARTMENT OF HIGHWAYS
STANDARD HEADWALLS
INTERCEPTING HEADWALLS
GALVANIZED METAL APRONS
GROUTED RUBBLE APRONS
FOR CORR. MET. PIPE CULVERTS

Designed by P.S.B.-G.H.R.	Approved by [signature]
Made by A.L.P.	Bridge Engineer
Checked by H.W.P.	Date December 15, 1945

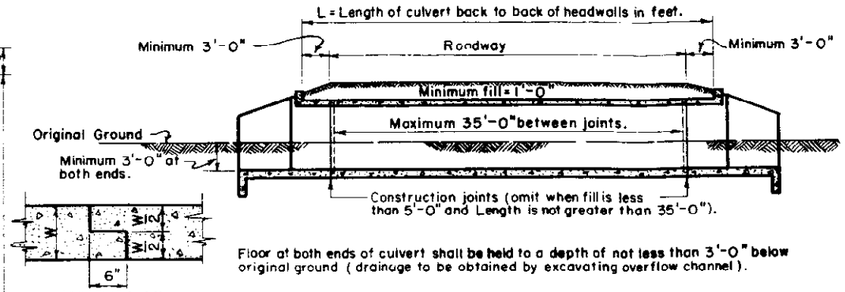
STANDARD M-101-D

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1(11) UN. 1	24

Revised - 8-7-52 - C.J.W.
Revised - 3-25-53 - J.L.C., Backfill.



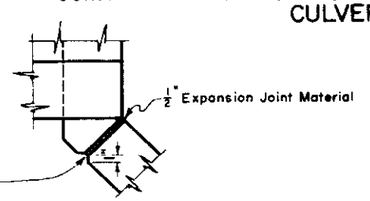
TYPICAL SECTION THRU BOX



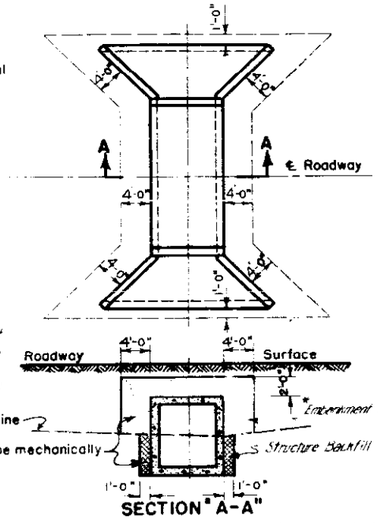
Floor at both ends of culvert shall be held to a depth of not less than 3'-0" below original ground (drainage to be obtained by excavating overflow channel).

HALF LAP CONSTRUCTION JOINT

TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY



All Wing Walls shall be separated from sidewalks of box by ½" expansion joint material. Chamfer corners ½" of concrete as shown.

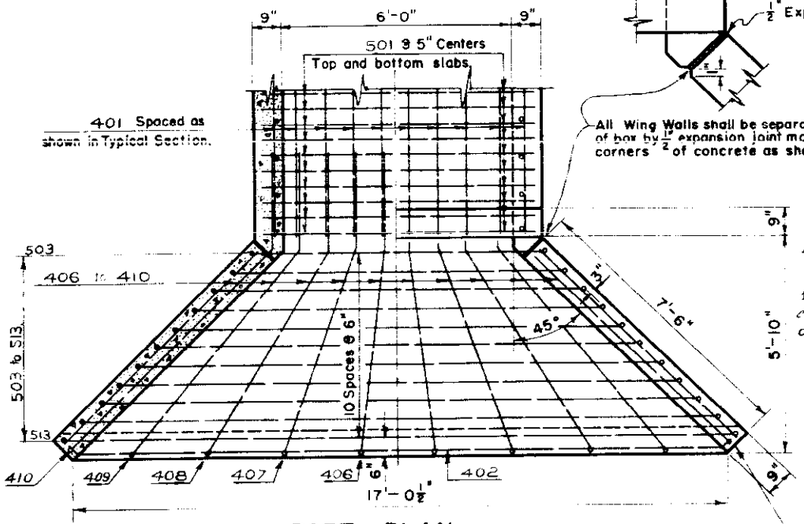


SECTION "A-A"

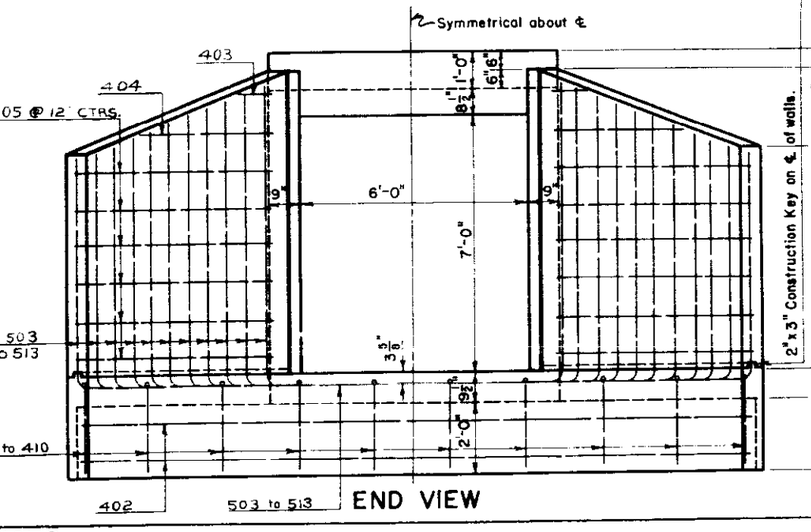
*NOTE Regular Embankment Material (Unless otherwise designated on plans or ordered by the Engineer.)

Contractors attention is called to specifications covering Mechanical Tamping. Special care shall be taken to prevent deflection of the wing walls by wedging action.

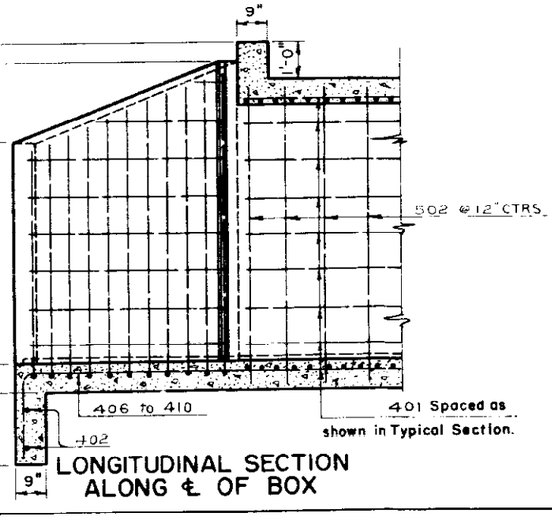
MECHANICALLY TAMPED BACKFILL



PART PLAN



END VIEW



LONGITUDINAL SECTION ALONG ℄ OF BOX

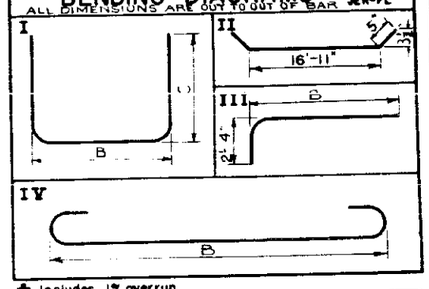
BAR LIST

PG JER-FL

MARK	SIZE	No REQ'D.	LENGTH	BEND	DIMENSIONS B	DIMENSIONS C
503 to 513	⅝" ♦	2 Each	23'-9" by 7" to 29'-7"	I	7'-5" by 1'-0" to 17'-5"	8'-3" by 2½" to 6'-2"
402	½" ♦	4	17'-9"	II		
403	½" ♦	4	1'-9"	STR.		
404	½" ♦	4	5'-1"	STR.		
405	½" ♦	24	7'-2"	STR.		
406 to 410	½" ♦	4 Each	10'-0" by 6" to 12'-0"	III	7'-8" by 6" to 9'-8"	FIELD BEND WHERE NECESSARY
401	½" ♦	34	L+1'-2"	STR.		
501	⅝" ♦	(48xL)+8	8'-3"	IV	7'-1"	
502	⅝" ♦	(2xL)+4	9'-3"	IV	8'-1"	

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT OF BAR JER-FL



♦ Includes 1% overrun.

SUMMARY OF QUANTITIES

JER-FL BOZ

ITEM No.	DESCRIPTION	UNIT	FOR ONE LINEAR FT. OF BOX	FOR TWO HEADWALLS
46a	CLASS "A" CONCRETE	Cu.Yd.	.81	13.78
47	REINFORCING STEEL	Lb.	♦ 84.3	♦ 1086

NOTE: TO BE USED AS STOCK PASS ONLY.

MINIMUM FILL = 1'-0", MAXIMUM FILL NOT TO EXCEED 13'-0".

GENERAL NOTES

All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the Project.
All concrete shall be class "A", AND AIR ENTRAINED AS SPECIFIED.
Horizontal construction keys not required when floor and side walls are poured monolithically.
All walls shall have forms on both sides.
Minimum distance between center line of bar and edge of concrete shall be one and one-half inch.
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 "List of Structures."
All reinforcing bars shall be deformed.
All reinforcing bars shall be tagged with the station number and BAR designation.
Secondary bars when spliced shall be given a lap of 35 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 footing 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 the centerline of culvert and shall be half-lap joints as shown in detail.
This design not to be used when height of fill exceeds 13'-0".
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 six inches in depth and each layer shall be compacted in accordance with the diagram for mechanically tamped backfill shown on this drawing.
All surfaces exposed to view on the box and wing walls shall receive class I surface finish, except culvert barrel.
ALL DIMENSIONS NOT SHOWN AS CLEAR ARE TO THE ℄ OF THE BAR.
ALL REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATION A-305-50T OR LATEST REVISION THEREOF.

LOADING DATA
LIVE LOAD: A.A.S.H.O. 1944 H20-S16

DEAD LOAD:
Earth = 120 lbs. per cu. ft.
Concrete = 150 lbs. per cu. ft.

DESIGN DATA
fc = 1,000 lbs. per sq.in.
fs = 20,000 lbs. per sq.in.
n = 10

COLORADO
DEPARTMENT OF HIGHWAYS
SPECIAL 6 FT. x 7 FT.
CONCRETE BOX CULVERT
FOR STOCK PASS

Sta. _____
Near _____ Sec. _____ T. _____ R. _____

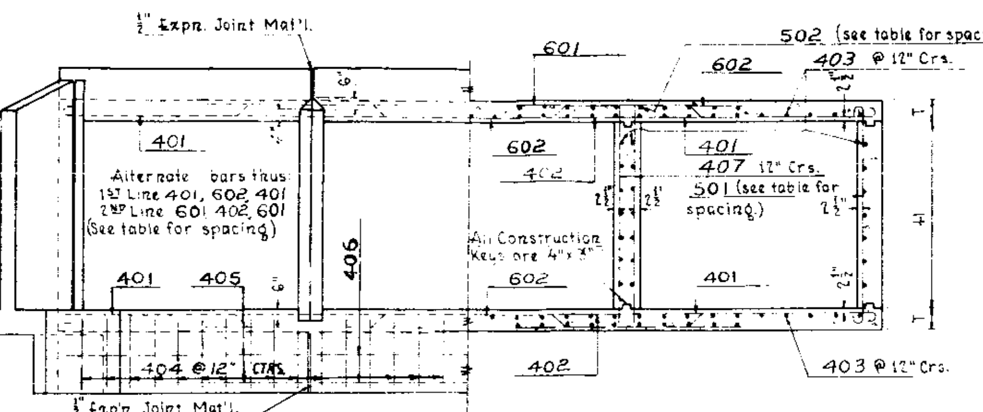
Designed by W.W.D.
Made by P.C.
Checked by

Approved by C.J. Bailey
Bridge Engineer
Date: JUL 10 1953

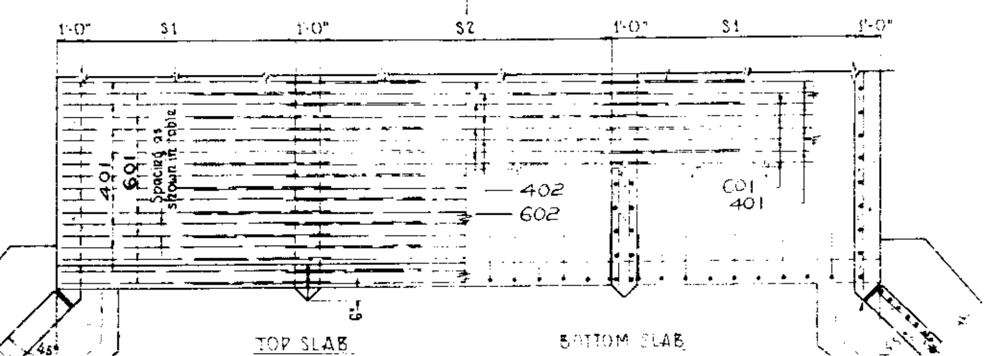
STANDARD M-111-D

FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1 (11) UNIT 1	25	

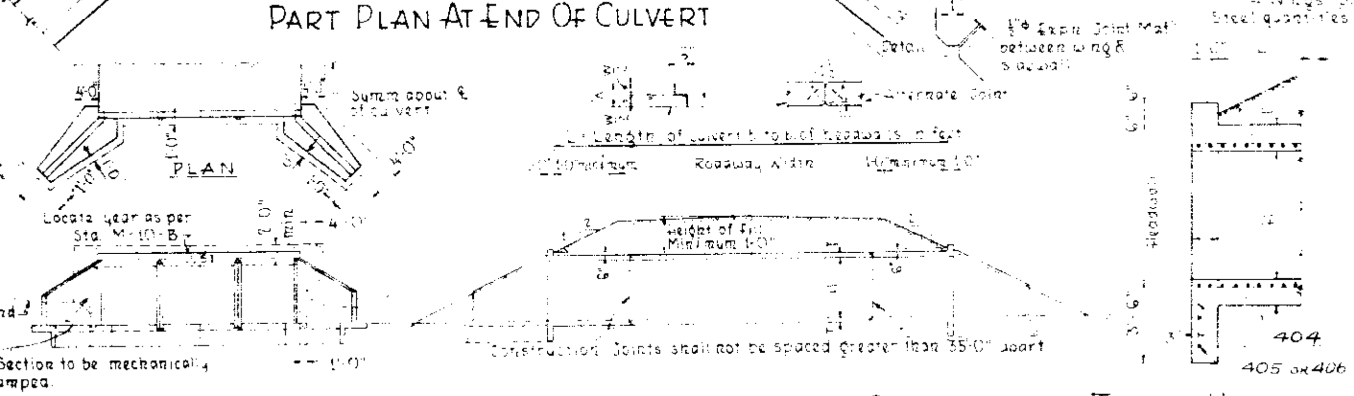
Rev. Concrete quantities 5-20-52 W.W.D.
Rev. 7-21-52 H.W.M.



END ELEVATION — TYPICAL SECTION



PART PLAN AT END OF CULVERT



MECHANICALLY TAMPED BACKFILL — TYPICAL SECTION THRU CULVERT — TYPICAL HEADWALL

TABLE OF DIMENSIONS & QUANTITIES

HEIGHT OF FILL ALLOW'D	TYPE	CLEAR SPAN LENGTHS S1	CLEAR SPAN LENGTHS S2	CLEAR HGT. H	SLAB DIMENSIONS T		BAR SPACING 501	BAR SPACING 401 402 601 602	BAR SPACING 502	Nº BARS REQUIRED 403	Nº BARS REQUIRED 502	Nº BARS REQUIRED 404	QUANTITIES FOR 2 HEADWALLS CONCRETE CU.YD.	QUANTITIES FOR 2 HEADWALLS STEEL LBS.	QUANTITIES FOR 4 WINGS CONCRETE CU.YD.	QUANTITIES FOR 4 WINGS STEEL LBS.	QUANTITIES FOR ONE LIN. FT. OF BOX CONCRETE CU.YD.	QUANTITIES FOR ONE LIN. FT. OF BOX STEEL LBS.
5'-0"	9A	9'-0"	12'-0"	6'-0"	10½"		15"	6"	12"	96	40	66	15.31	1090	21.35	1070	3.092	358
				8'-0"			12"			108			15.90	1120	31.66	1740	3.389	379
				10'-0"			9"			120			16.50	1150	44.18	2850	3.685	406
10'-0"	9B	9'-0"	12'-0"	6'-0"	12"		15"	5½"	12"	96	40	66	15.63	1090	21.35	1070	3.407	379
				8'-0"			12"			108			16.22	1130	31.66	1740	3.704	400
				10'-0"			8"			120			16.81	1160	44.18	2850	4.000	432
15'-0"	9C	9'-0"	12'-0"	6'-0"	13½"		12"	4½"	10"	96	48	66	15.94	1110	21.35	1070	3.722	466
				8'-0"			9"			108			16.54	1140	31.66	1740	4.019	487
				10'-0"			6"			120			17.13	1180	44.18	2850	4.315	505
5'-0"	11A	11'-0"	14'-0"	6'-0"	12½"		15"	5"	12"	108	48	78	[illegible]	1270	21.35	1070	3.975	466
				8'-0"			12"			120			18.79	1310	31.66	1740	4.272	487
				10'-0"			9"			132			19.38	1340	44.18	2850	4.568	514
10'-0"	11B	11'-0"	14'-0"	6'-0"	14½"		15"	4½"	10"	108	60	78	18.69	1300	21.35	1070	4.469	517
				8'-0"			12"			120			19.28	1330	31.66	1740	4.765	538
				10'-0"			9"			132			19.88	1360	44.18	2850	5.062	569
15'-0"	11C	11'-0"	14'-0"	6'-0"	16½"		12"	4"	9"	108	64	78	19.18	1310	21.35	1070	4.962	572
				8'-0"			9"			120			19.78	1340	31.66	1740	5.259	597
				10'-0"			6"			132			20.37	1370	44.18	2850	5.555	634
5'-0"	13A	13'-0"	16'-0"	6'-0"	14"		15"	5"	12"	120	52	90	21.09	1430	21.35	1070	4.864	519
				8'-0"			12"			132			21.68	1460	31.66	1740	5.160	540
				10'-0"			9"			144			22.27	1490	44.18	2850	5.457	566
10'-0"	13B	13'-0"	16'-0"	6'-0"	16"		15"	4"	10"	120	64	90	21.65	1460	21.35	1070	5.432	613
				8'-0"			12"			132			22.25	1490	31.66	1740	5.728	644
				10'-0"			8"			144			22.84	1520	44.18	2850	6.025	675
15'-0"	13C	13'-0"	16'-0"	6'-0"	18½"		12"	3½"	9"	120	68	90	22.36	1470	21.35	1070	6.142	700
				8'-0"			9"			132			22.96	1500	31.66	1740	6.438	725
				10'-0"			6"			144			23.55	1530	44.18	2850	6.734	762

Total quantities for one box equals the quantities for (2 headwalls) plus 4 wings plus L times quantity for one lin ft. of box).
Steel quantities above include allowance of 1% for overrun.

BAR LIST FOR CULVERT & TWO HEADWALLS

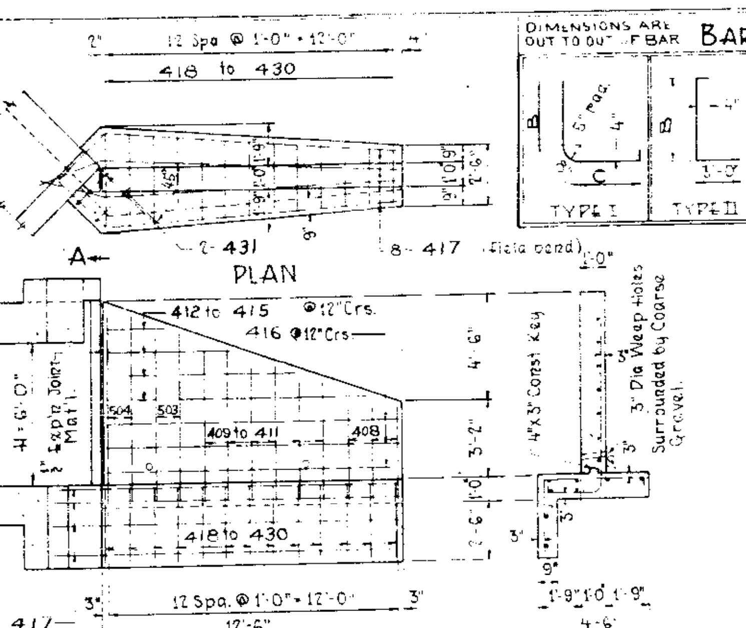
MARK	SIZE	NUMBER REQ'D	TYPE	TOTAL LENGTH
401	½"Φ	See Table for Spacing		L+6"
601	¾"Φ			L+m+2'-8"
501	⅝"Φ			m+2'-7"
602	¾"Φ			2(L+m+P)
402	½"Φ	Spacing	Stra.	S2+24"
403	½"Φ	See Table	Stra.	L+(1'-8")
502	⅝"Φ		Stra.	L+(1'-8")
404	½"Φ		VI	5'-0"
405	½"Φ	16	Stra.	S1+(1'-2")
406	½"Φ	8	Stra.	S2+8"
407	½"Φ		Stra.	H+18

BENDING DIAGRAM: TYPE III — TYPE VII (3'-0") — TYPE VI — TYPE IV (P=1.4m, n=T-5") — TYPE V (P=1.4m, n=T-5)

S1	P	m
9'-0"	7'-7"	7'-0"
11'-0"	9'-3"	8'-3"
13'-0"	10'-10"	9'-0"

S2	P	m
9'-0"	3'-9"	7'-0"
11'-0	4'-6	8'-3
13'-0	5'-3"	9'-0"

DIMENSIONS ARE OUT TO OUT OF BAR



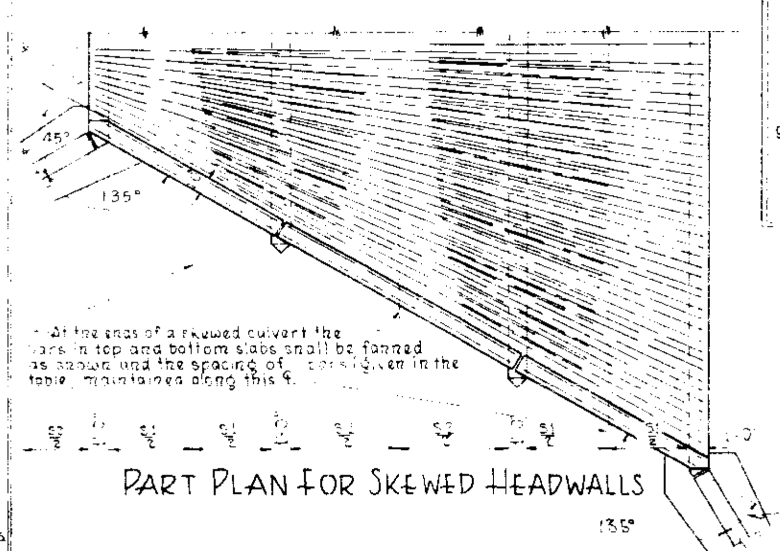
PLAN — ELEVATION OF WING WHEN H = 6'-0" — SECTION A-A

BAR LIST & SUMMARY FOR 4 WINGS

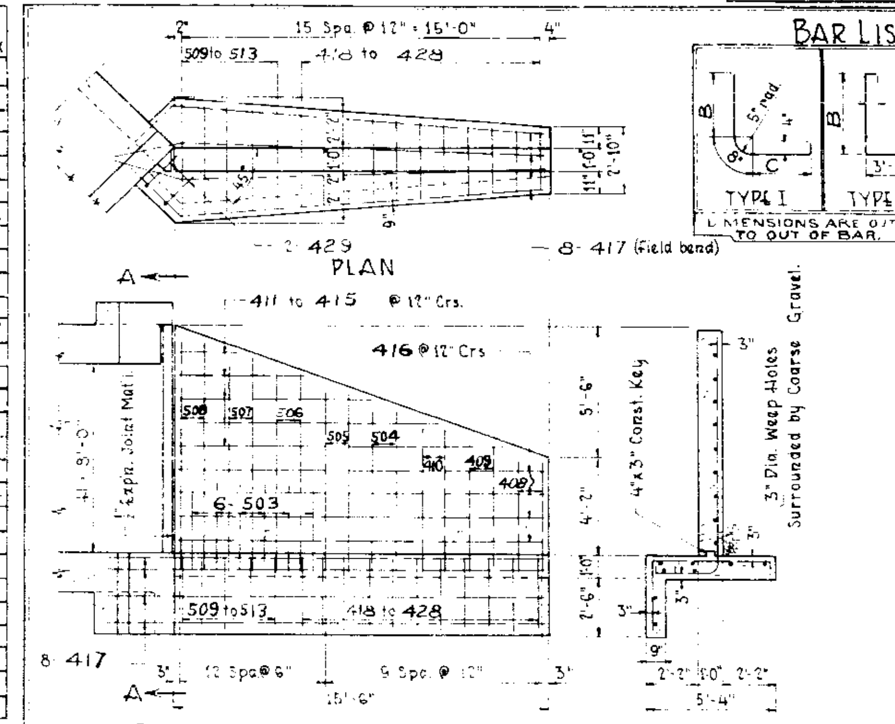
MARK	SIZE	NO. REQ'D	LENGTH	TYPE	B	C
408	½"Φ	12	5'-2"	I	3'-4"	10"
409	½"Φ	8	6'-7"	I	4'-5"	1'-2"
410	½"Φ	8	7'-6"	I	5'-2"	1'-4"
411	½"Φ	8	8'-4"	I	5'-10"	1'-6"
503	⅝"Φ	8	9'-2"	I	6'-7"	1'-8"
504	⅝"Φ	8	10'-1"	I	7'-4"	1'-10"
412		4	2'-6"			
to	½"Φ	of	to 10'-9"	Stra.		
415		each	by 2'-9"			
416	½"Φ	12	10'-2"	Stra.		
417	½"Φ	32	15'-0"	Stra.		
418		4	5'-4"		2'-1" to	
to	½"Φ	of	to 7'-4"	II	4'-1"	
430		each	by 2"		by 2"	
431	½"Φ	8	5'-3"	II	2'-0"	

1345 Lin. Ft. of ½"Φ Bars @ 0.668#/' = 898 Lbs.
154 " " " ⅝"Φ " @ 1.043#/' = 161 "
Plus 1% Overrun = 11 "
Total = 1070 Lbs.

Class A Concrete for 4 Wings = 21.35 Cu. Yds.



PART PLAN FOR SKEWED HEADWALLS



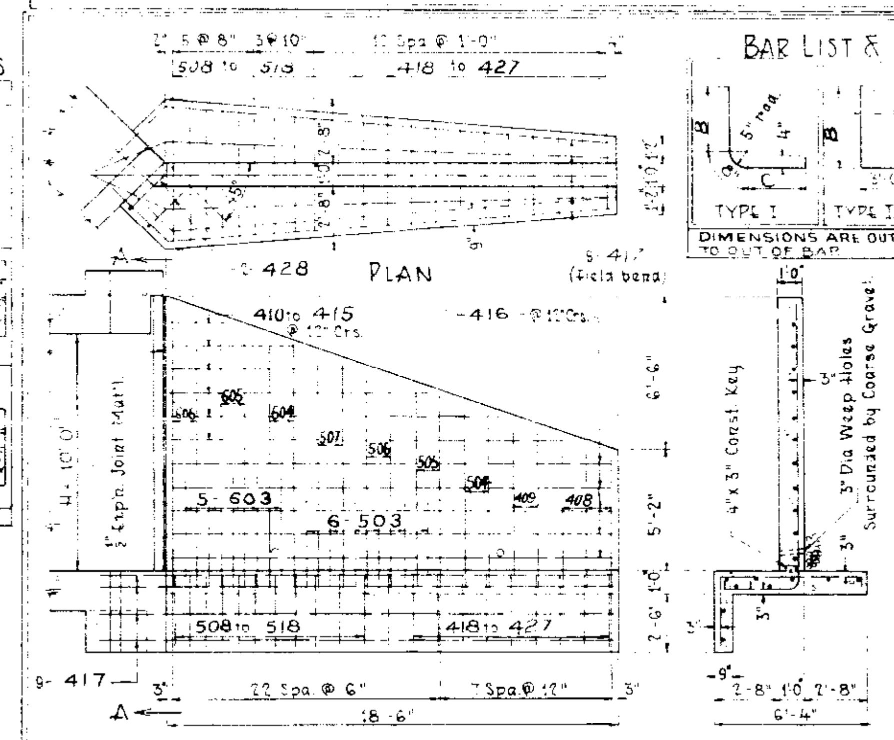
PLAN — ELEVATION OF WING WHEN H = 8'-0" — SECTION A-A

BAR LIST & SUMMARY FOR 4 WINGS

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	B	C
503	⅝"Φ	24	5'-7"	I	3'-4"	1'-4"
408	½"Φ	8	6'-4"	I	4'-4"	1'-0"
409	½"Φ	8	7'-2"	I	5'-0"	1'-2"
410	½"Φ	8	8'-1"	I	5'-9"	1'-4"
504	⅝"Φ	8	8'-10"	I	6'-5"	1'-6"
505	⅝"Φ	8	9'-9"	I	7'-2"	1'-8"
506	⅝"Φ	8	10'-7"	I	7'-10"	1'-10"
507	⅝"Φ	8	11'-6"	I	8'-7"	2'-0"
508	⅝"Φ	8	12'-4"	I	9'-3"	2'-2"
411		4	2'-5" to			
to	½"Φ	of	13'-5"	Stra.		
415		each	by 2'-9"			
416	½"Φ	16	15'-2"	Stra.		
417	½"Φ	32	18'-0"	Stra.	(Field bend)	
418		4	5'-7" to		2'-4" to	
to	½"Φ	of	7'-3"	II	4'-0"	
428		each	by 2"		by 2"	
509		4	7'-4" to		4'-2" to	
to	⅝"Φ	of	8'-0"	II	4'-10"	
513		each	by 2"		by 2"	
429	½"Φ	8	4'-11"	II	1'-8"	

1472 Lin. Ft. of ½"Φ Bars @ 0.668#/' = 983 Lbs.
711 " " " ⅝"Φ " @ 1.043#/' = 742 "
Plus 1% Overrun = 15 "
Total = 1740 Lbs.

Class A Concrete for 4 Wings = 31.66 Cu. Yds.



PLAN — ELEVATION OF WING WHEN H = 10'-0" — SECTION A-A

BAR LIST & SUMMARY FOR 4 WINGS

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	B	C
503	⅝"Φ	24	5'-7"	I	3'-4"	1'-4"
603	¾"Φ	20	6'-9"	I	4'-4"	1'-6"
408	½"Φ	12	7'-6"	I	5'-3"	1'-3"
409	½"Φ	8	8'-10"	I	6'-4"	1'-6"
504		8	9'-3" to		7'-0" to	1'-8" to
to	⅝"Φ	of	12'-1"	I	9'-0"	2'-2"
507		each	by 10"		by 8"	by 2"
604		8	13'-1" to		9'-10" to	2'-4" to
to	¾"Φ	of	14'-9"	I	11'-2"	2'-8"
606		each	by 10"		by 8"	by 2"
410		4	2'-2 to			
to	½"Φ	of	16-4	Stra.		
415		each	by 2-10"			
416	½"Φ	20	18'-2"	Stra.		
417	½"Φ	36	21'-6"	Stra.	(Field bend)	
418		4	6'-2 to		2'-11 to	
to	½"Φ	of	7'-8"	II	4'-5"	
427		each	by 2"		by 2"	
508		4	7'-9" to		4'-7" to	
to	⅝"Φ	of	9'-0"	II	5'-10"	
518		each	by 1⅛"		by 1⅛"	
428	½"Φ	8	5'-3"	II	2'-0"	

1839 Lin. Ft. of ½"Φ Bars @ 0.668#/' = 1228 Lbs.
849 " " " ⅝"Φ " @ 1.043 " = 886 "
469 " " " ¾"Φ " @ 1.502 " = 704 "
Plus 1% Overrun = 32 "
Total = 2850 Lbs.

Class A Concrete for 4 Wings = 44.18 Cu. Yds.

LOADING DATA: A.A.S.H.O. - H20 - S16 - 44.
DESIGN DATA: f_c = 1000#/□" - f_s = 20,000#/□" n=10

~ GENERAL NOTES ~

All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the Project.

All concrete shall be Class "A", and the exposed corners shall be beveled to a 1" face. Horizontal construction keys are not required when floors and sidewalls are poured monolithically. Construction joints must be thoroughly cleaned before fresh concrete is poured. All concrete surfaces exposed to view, (except the barrel of the culvert) shall receive a Class I Surface Finish.

Footings in rock shall be poured out to rock and not formed, but all walls shall have forms on both sides. The supporting soils for culverts must be composed of firm and uniform material throughout. Pour wing footings monolithically with floor of box.

All reinforcing bars are deformed and shall be tagged with the station and BAR designation.

All backfilling to and over culverts shall be laid in layers not exceeding six (6) inches in depth and each layer shall be compacted in accordance with the illustration for "MECHANICALLY TAMPED BACKFILL" shown on this sheet.

This design is not to be used when height of fill exceeds that given in the table as allowable.

ALL CONCRETE TO BE AIR ENTRAINED AS SPECIFIED.
ALL DIMENSIONS NOT SHOWN AS CLEAR ARE TO THE ℄ OF BAR.
ALL REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATION A-305-50T OR LATEST REVISION THEREOF.
SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 35 DIAMETERS.

COLORADO
DEPARTMENT OF HIGHWAYS
STANDARD TRIPLE
CONCRETE BOX CULVERT
9'-0" & 12'-0" x(6', 8' & 10')
11'-0" & 14'-0" x(6', 8' & 10')
13'-0" & 16'-0" x(6', 8' & 10')

Across ______
Sta. ______
Near ______ Sec. ____ T. ____ R. ____

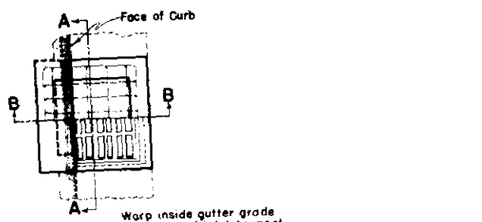
Designed by W.W.D. — Approved by [signature] Bridge Engineer
Made by P.C.
Checked by — Date: JUL. 1 6, 1951.

FED. ROAD DIVN. NO.	DISTRICT	F006-1(11)	SHEET NO.	TOTAL SHEETS
9	COLO.	UNIT 1	26	

Rev. 7-7-52 S.J.M. 1952 Specifications

STANDARD M-12-D-13

NO. 12 CONCRETE INLET



* These dimensions for 6" curb. Dimensions to be modified as required for other heights of curb

BAR LIST FOR H = 3'0"

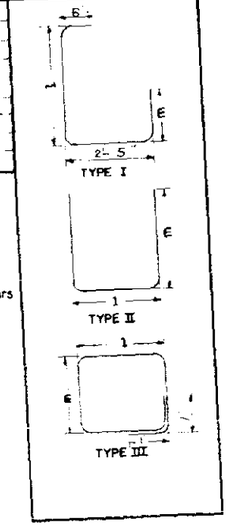
MARK	SIZE	NO REQD	LENGTH	TYPE	DIMENSIONS l	DIMENSIONS m
601	3/4"ø	*Note	2' 6"	II	1'-0"	0'-10"
401	1/2"ø	3	11'-10"	III	2'-6"	2'-6
402	1/2"ø	5	5'-6"	II	2'-5	*1'-7"
403	1/2"ø	5	7'-1"	I	*2'-7"	*1'-8
404	1/2"ø	2	2' 7"	STR	—	—

* Omit 601 when H is 4'-0" or less

* These dimensions to be increased in increments of 6" for H above 3'-0"
Add 1-401 for each 6" additional height above 3'0"
601 required as follows;
H= 4'6" to 5'6" - 1 bar; H= 9'0" to 10'0"- 4 bars
H= 6'0" to 7'0" - 2 bars;
H= 7'6" to 8'6" - 3 bars;
Cut or bend bars around pipes as required.

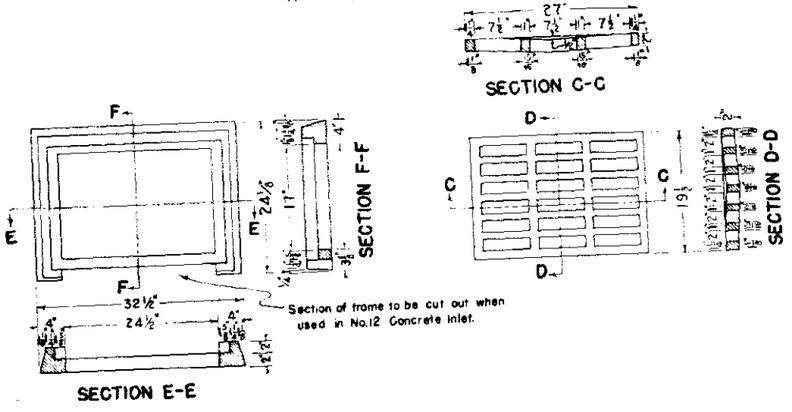
See Plans for size and locations of outlets

BENDING DIAGRAM ALL DIMENSIONS ARE OUT TO OUT OF BAR



NO. 12 INLET GRATING & FRAME

Approx. Weight 340 lbs.



NO. 13 CONCRETE INLET

BAR LIST FOR H= 3'0"

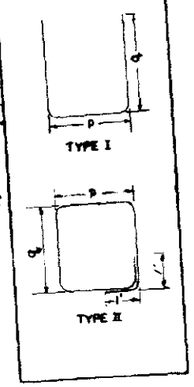
MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS p	DIMENSIONS q
601	3/4"ø	*Note	2' 6"	I	1'-0"	0'-10"
401	1/2"ø	4	12'-10"	II	3'-5"	2'-1"
402	1/2"ø	7	6'-1"	I	2'-0"	*2'-1"
403	1/2"ø	4	7'-5"	I	3'-4"	*2'-1"

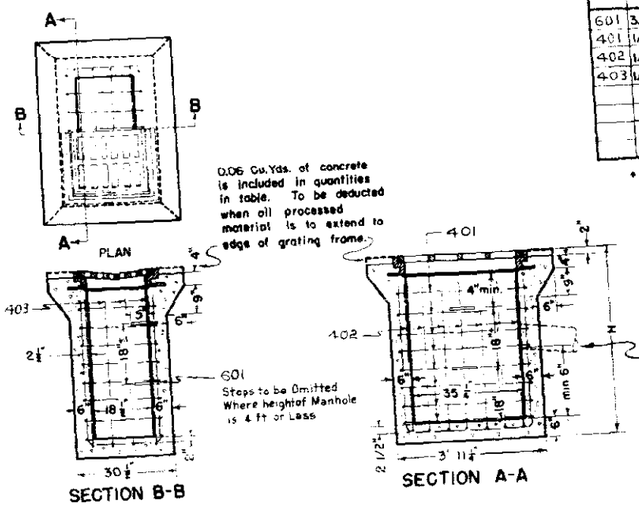
* Omit 601 when H is 4'-0" or less.

* These dimensions to be increased in increments of 6" for H above 3'-0"
Add 1-401 for each 6" additional height above 3'0"
601 required as follows;
H= 4'6" to 5'6" 1 bar; 9'0" to 10'0"- 4 bars.
H= 6'0" to 7'0" 2 bars;
H= 7'6" to 8'6" 3 bars;
Cut or bend bars around pipes as required

See Plans for size and locations of outlets.

BENDING DIAGRAM ALL DIMENSIONS ARE OUT TO OUT OF BAR.

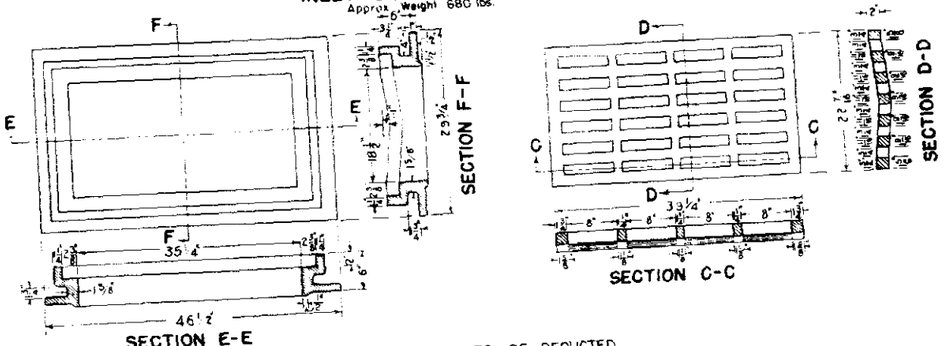




601 Steps to be Omitted Where height of Manhole is 4 ft or Less

NO.13 INLET GRATING & FRAME

Approx. Weight 680 lbs.



QUANTITIES

H	CLASS "A" CONCRETE *CU. YDS	* REINFORCING STEEL
3' 0"	0.54	70 lbs
3' 6"	0.63	85 "
4' 0"	0.72	100 "
4' 6"	0.81	119 "
5' 0"	0.90	137 "
5' 6"	0.99	152 "
6' 0"	1.08	166 "
6' 6"	1.17	185 "
7' 0"	1.27	200 "
7' 6"	1.36	215 "
8' 0"	1.45	233 "
8' 6"	1.54	248 "
9' 0"	1.63	263 "
9' 6"	1.73	282 "
10' 0"	1.82	297 "

* Volume for inlet - volume occupied by pipes to be deducted for pay quantity of concrete.

* Includes 1% allowance for overrun.

* VOLUME TO BE DEDUCTED FOR EACH OPENING

	C.M.P.	R.C.P.
18"	0.03	0.05
24"	0.06	0.09
30"	0.09	0.14
36"	0.13	—

QUANTITIES

H	CLASS "A" CONCRETE *CU. YDS	* REINFORCING STEEL
3' 0"	.86	84 lbs
3' 6"	.96	100 "
4' 0"	1.06	116 "
4' 6"	1.16	136 "
5' 0"	1.26	156 "
5' 6"	1.36	172 "
6' 0"	1.46	192 "
6' 6"	1.57	208 "
7' 0"	1.67	225 "
7' 6"	1.77	245 "
8' 0"	1.87	261 "
8' 6"	1.97	277 "
9' 0"	2.07	297 "
9' 6"	2.17	313 "
10' 0"	2.28	329 "

* Volume for inlet - volume occupied by pipes to be deducted for pay quantity of concrete.

* Includes 1% allowance for overrun.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the project
All reinforced concrete shall be class "A", AND AIR ENTRAINED AS SPECIFIED.
All concrete walls shall be formed on both sides.
All exposed concrete corners shall be beveled to a 1" face.
All reinforcing bars shall be deformed, of intermediate grade, and shall be tagged with BAR designation and station number.
All castings shall be painted with two coats of asphalt or coal tar and oil.
All surfaces exposed to view on the box shall receive class 1 surface finish.
ALL DIMENSIONS NOT SHOWN AS CLEAR ARE TO ℄ OF BAR.
ALL REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATION A-305-50T Or LATEST REVISION THEREOF.

COLORADO DEPARTMENT OF HIGHWAYS STANDARD NO.12 AND NO.13 CONCRETE INLETS

Designed by A.R.G. Made by A.P.G. Check Design A.Z. Check Detail C.R.S.

Approved by O. L. Bailey, Bridge Engineer

Date JUL. 10, 1953

REVISIONS

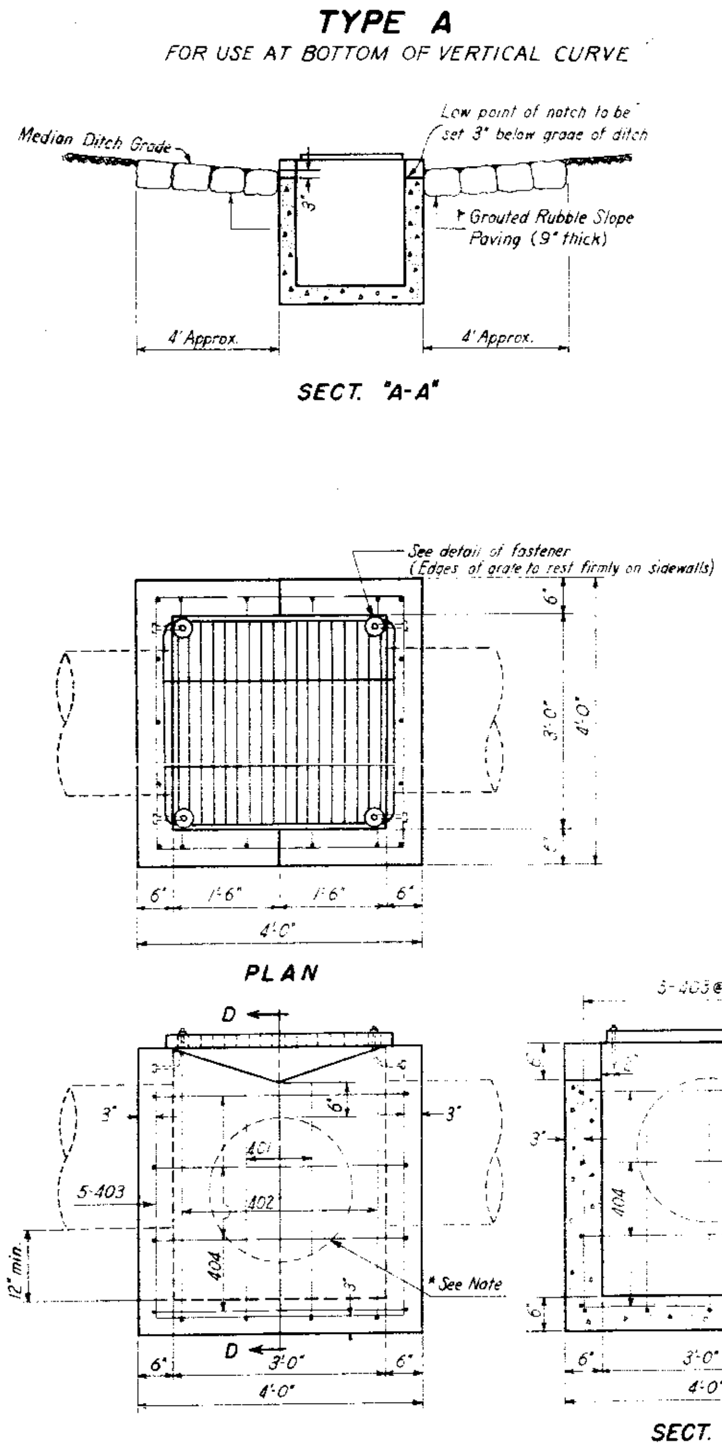
STANDARD M-46-A

Rev. P.C. 9-18-52. Added 18" pipe.

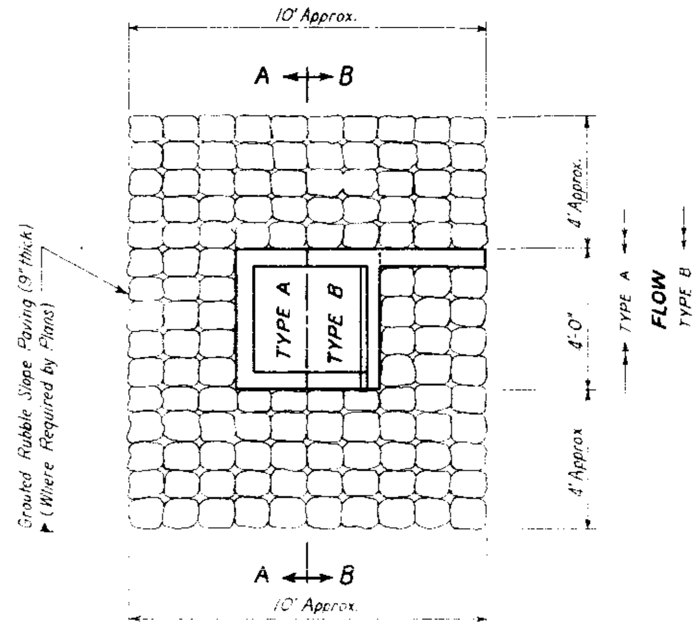
FED. ROAD DIVISION NO.	DISTRICT	F006-1(11)	
9	COLO.	UNIT 1	27

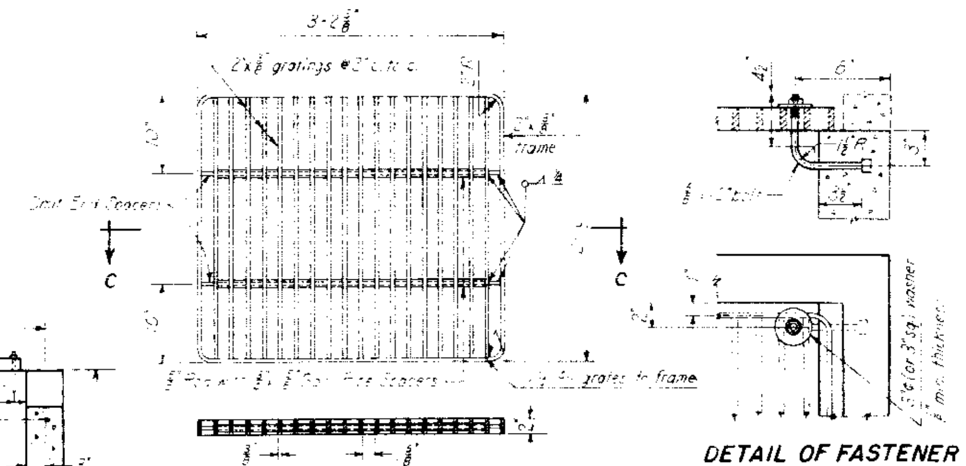
TYPE A

FOR USE AT BOTTOM OF VERTICAL CURVE



*Note for Longitudinal Pipe: 6" minimum between bottom of Inlet Opening and top of Longitudinal Pipe.





‡ DETAIL OF GRATING

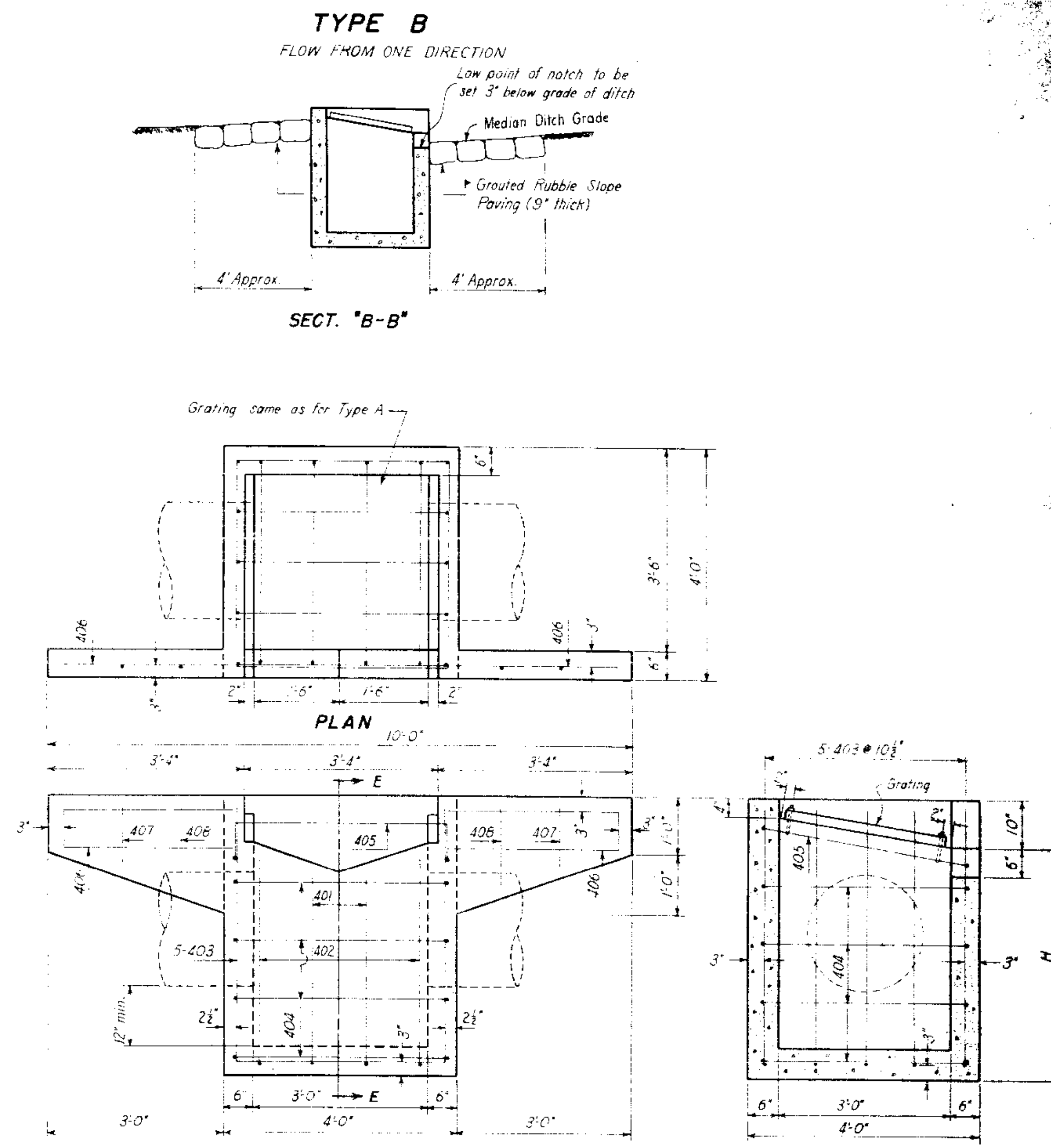
MATERIAL LIST FOR GRATING AND FASTENERS

Strap Iron Frame	1 pc.	2"x3/8"x11'-9 5/16"	@ 2.55 lb. per ft.	= 30.0 lb.
Strap Iron Gratings	18 pcs.	2"x3/8"x2'-9 1/4"	@ 2.55 lb. per ft.	= 127.2 lb.
Galv. Iron Pipe Spacers	34 pcs.	3/4"x 5/8"	@ 1.13 lb. per ft.	= 5.2 lb.
Tie Rods	2 pcs.	5/8"x3'-1 5/8"	@ 1.04 lb. per ft.	= 6.5 lb.
Bolts	4 pcs.	5/8"x10"	@ 1.03 lb. ea.	= 4.1 lb.
Washers	4 pcs.		@ 0.23 lb. ea.	= 0.9 lb.

‡ Note: Acceptable equivalent Gratings maybe substituted after approval by the Engineer.

TYPE B

FLOW FROM ONE DIRECTION



BAR LIST FOR H=4'-0"

MARK	NO. REQD	KIND	TYPE A DIMENSIONS M	TYPE A DIMENSIONS N	TYPE A DIMENSIONS O	TYPE A LENGTH	TYPE B DIMENSIONS M	TYPE B DIMENSIONS N	TYPE B DIMENSIONS O	TYPE B LENGTH
401	2	I	3'-5"	3'-3" ◆	3'-3" ◆	9'-10"	3'-5"	3'-3" ◆	4'-5" ◆	11'-0"
402	2	I	3'-5"	3'-6" ◆	3'-6" ◆	10'-4"	3'-5"	3'-6" ◆	4'-5" ◆	11'-3"
403	5	I	3'-6"	3'-7" ◆	3'-7" ◆	10'-7"	3'-7"	4'-5" ◆	4'-5" ◆	12'-4"
404	4 ◆	II	3'-7"	3'-7"		15'-4"	3'-8"	3'-6"		15'-4"
405	1	I					3'-8"	3'-7"	3'-7"	10'-9"
406	2	I					0'-8"	2'-10"	2'-10"	6'-3"
407	2	Str.								1'-1"
408	2	Str.								1'-5"

All reinforcing bars to be 1/2" ϕ.

QUANTITIES FOR ONE INLET

H	CLASS A CONCRETE ▲ CU. YDS. TYPE A	CLASS A CONCRETE ▲ CU. YDS. TYPE B	REINFORCING STEEL ● LBS. TYPE A	REINFORCING STEEL ● LBS. TYPE B
4'-0"	1.18	1.49	104	133
4'-6"	1.31	1.62	110	139
5'-0"	1.44	1.75	126	155
5'-6"	1.56	1.88	132	161
6'-0"	1.69	2.01	149	178
6'-6"	1.82	2.13	155	184

● Includes 1½ % for overrun.

▲ Volume occupied by pipes to be deducted for pay quantity of concrete.

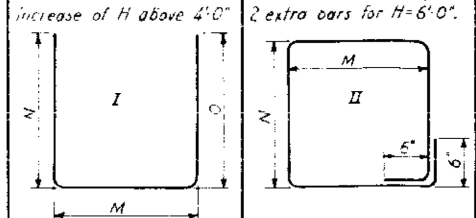
SIZE	C.M.P.	CONC. PIPE
18"	0.03 cu.yd./pipe	0.05 cu.yd./pipe
24"	0.06 " " "	0.09 " " "
30"	0.09 " " "	0.14 " " "
36"	0.13 " " "	0.20 " " "

▲ BENDING DIAGRAMS (SAME FOR TYPES A & B)

All dimensions out to out of bars

◆ Note for 401, 402 & 403 bars. Increase dimensions N & O 6" for each additional 6" increase of H above 4'-0".

◆ Note for 404 bar. Dimensions to remain constant. Add 1 extra bar for H=5'-0", & 2 extra bars for H=6'-0".



▲ Note: Cut or bend bars to fit around pipes as required

GENERAL NOTES

All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the project.
All concrete shall be Class "A" and air entrained as specified.
All walls shall have forms on both sides. Bevel all exposed corners to a 1" face.
All reinforcing bars shall be deformed, of intermediate grade, and shall be tagged with the station number and bar designation.
All reinforcing steel bars shall conform to ASTM specification A305-50T or latest revision thereof.
All edge distances not marked clear are to the ℄ of the bar.
Inlet grating to be painted as per specifications for structural steel.

COLORADO DEPARTMENT OF HIGHWAYS

TYPES A & B CONCRETE INLETS FOR MEDIAN DITCH

18", 24", 30" and 36" [illegible]

Designed by W.McL. Made by P.C. Checked by T.C.B. Approved by [illegible] Date: [illegible]

REVISIONS

Rev. 7-3-51, C.G.M., Alternate Gate Note

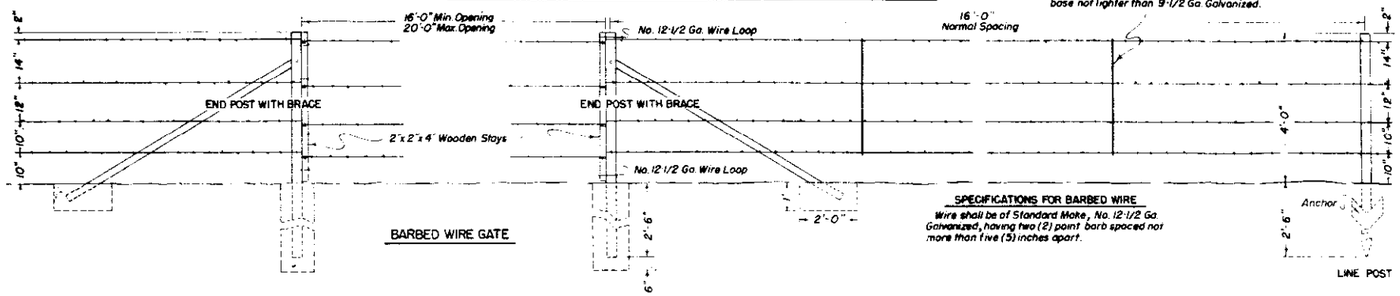
FED. ROAD DIVISION NO.	DISTRICT	FOOS-1(11)	SHEET NO.	TOTAL SHEETS
9	COLO.	UNIT 1	28	

Rev. 5-9-50, C.G.M., Specs. for Driveway Gates & Posts and Walk Gates.
Rev. 6-7-50, C.G.M., Rev. detail & specs. for Tee & Angle Post Clips.
Rev. 6-21-50, J.L.C., Ties, Holes for Fastening Fence Wire.

Standard Wire Fence With Metal Posts

STANDARD M-27-C

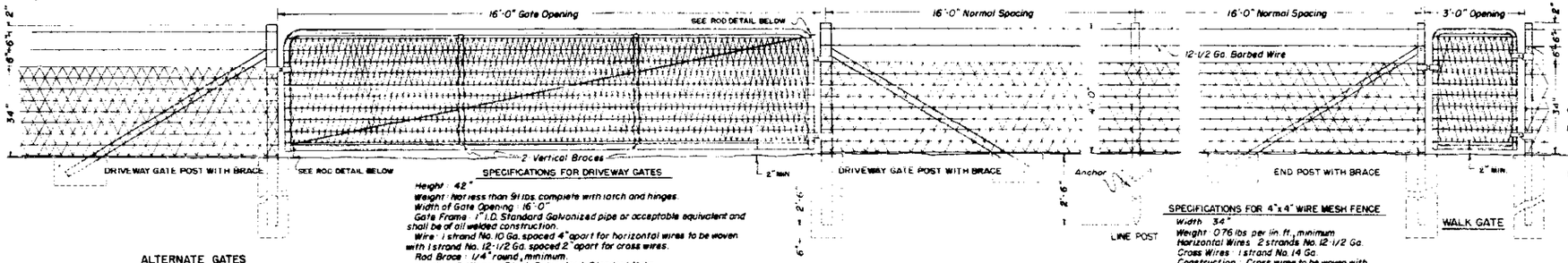
BARBED WIRE FENCE WITH METAL POSTS



METAL STAYS
2 Equally spaced between posts.
Metal stays to be manufactured from wire base not lighter than 9-1/2 Ga. Galvanized.

SPECIFICATIONS FOR BARBED WIRE
Wire shall be of Standard Make, No. 12-1/2 Ga. Galvanized, having two (2) point barb spaced not more than five (5) inches apart.

COMBINATION WIRE FENCE WITH METAL POSTS

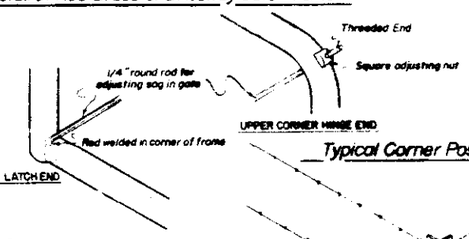


SPECIFICATIONS FOR DRIVEWAY GATES
Height: 42"
Weight: Not less than 9# lbs. complete with latch and hinges.
Width of Gate Opening: 16'-0"
Gate Frame: 1" I.D. Standard Galvanized pipe or acceptable equivalent and shall be of all welded construction.
Wire: 1 strand No. 10 Ga. spaced 4" apart for horizontal wires to be woven with 1 strand No. 12-1/2 Ga. spaced 2" apart for cross wires.
Rod Brace: 1/4" round, minimum.
Latches & Hinges: Steel, Galvanized, Standard Make

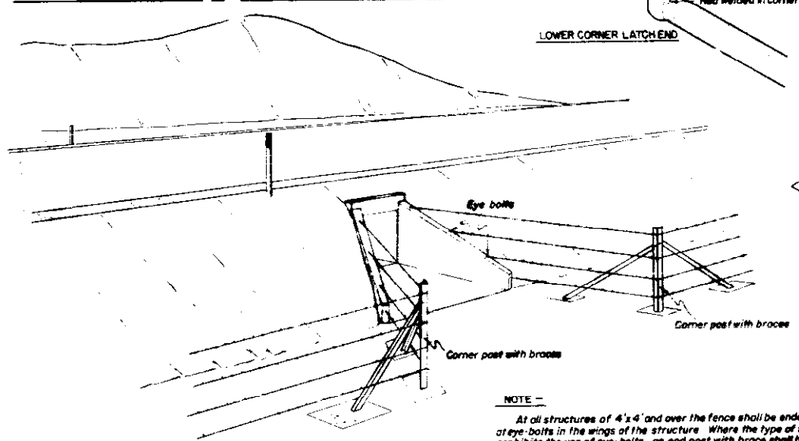
SPECIFICATIONS FOR 4'x4' WIRE MESH FENCE
Width: 34"
Weight: 0.76 lbs. per lin. ft., minimum
Horizontal Wires: 2 strands No. 12-1/2 Ga.
Cross Wires: 1 strand No. 14 Ga.
Construction: Cross wires to be woven with horizontal wires making a one piece fabric.

ALTERNATE GATES
Alternate equivalent standard metal gates other than shown will be acceptable subject to the Engineer's approval.

Detail of Rod Brace & Driveway Gate Frame

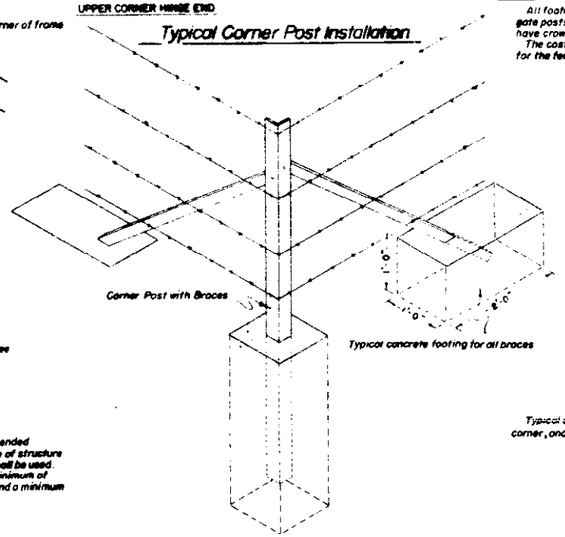


Pictorial Sketch Showing Typical Fence Installation At Structures



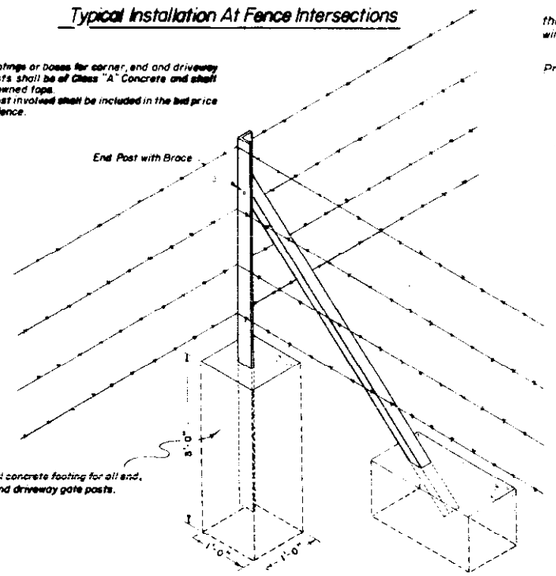
NOTE -
At all structures of 4'x4' and over the fence shall be ended at eye-bolts in the wings of the structure. Where the type of structure prohibits the use of eye-bolts, an end post with brace shall be used.
Eye-bolts shall be made of 1/2" round bars with a minimum of six (6) inches of body length embedded in the concrete and a minimum of 1" inside eye diameter.

Typical Corner Post Installation

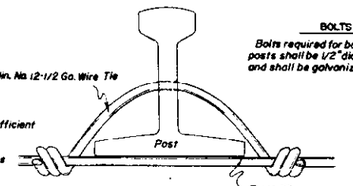


NOTE -
All footings or bases for corner, end and driveway gate posts shall be of Class "A" Concrete and shall have crowned tops.
The cost involved shall be included in the bid price for the fence.

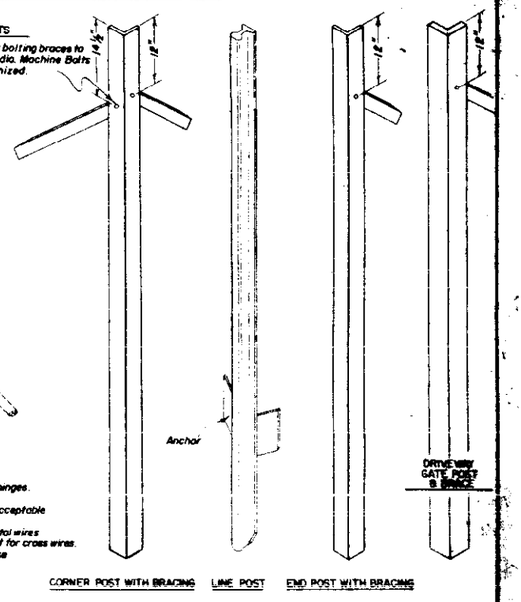
Typical Installation At Fence Intersections



Typical Metal Posts & Fence Clamps



BOLTS
Bolts required for bolting braces to posts shall be 1/2" dia. Machine Bolts and shall be galvanized.



CORNER POST WITH BRACING | LINE POST | END POST WITH BRACING

SPECIFICATIONS

CORNER POSTS -
TYPE - 2-1/2"x2-1/2"x1/4" Structural Steel Angles
WGT. - 4.1 lbs./lin. ft., Min.
LENGTH - 6'-6" Min.
NO. BRACES - 2

LINE POSTS -
TYPE - Structural Steel "Tees"
WGT. - 1.4 lbs./lin. ft., Min.
LENGTH - 6'-6" Min.
ANCHOR - Securely fastened, with bearing surface sufficient to resist movement of post.

END POSTS -
TYPE - 2-1/2"x2-1/2"x1/4" Structural Steel Angles
WGT. - 4.1 lbs./lin. ft.
LENGTH - 6'-6" Min.
NO. BRACES - 1

DRIVEWAY GATE POSTS -
TYPE - 2-1/2"x2-1/2"x3/8" Structural Steel Angles
WGT. - 5.9 lbs./lin. ft.
LENGTH - 6'-6" Min.
NO. BRACES - 1

BRACES -
TYPE - 2"x2"x1/4" Structural Steel Angles
WGT - 3.19 lbs./lin. ft.
LENGTH - Same as corner and end posts used

TEE & ANGLE POST TIES
Min. No. 12-1/2 ga. Galvanized wire or acceptable equivalent
Min. 4 ties per post for Comb. Wire.
Min. 1 tie per Barbed Wire per post.

SPECIFICATIONS FOR WALK GATES
Height: 42"
Weight: Not less than 19 lbs. complete with latch and hinges.
Width of Gate Opening: 3'-0"
Gate Frame: 3/4" I.D. Standard Galvanized pipe or acceptable equivalent and shall be of all welded construction.
Wire: 1 strand No. 10 Ga. spaced 4" apart for horizontal wires to be woven with 1 strand No. 12-1/2 Ga. spaced 2" apart for cross wires.
Latches & Hinges: Steel, Galvanized, Standard Make

General Notes

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

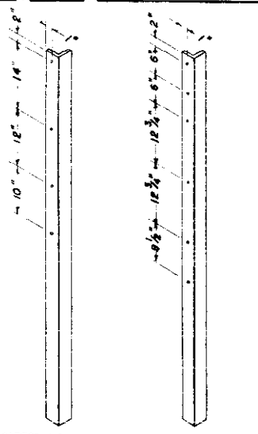
All posts and braces shall be of the types and weights as shown on this sheet or acceptable equivalents. Posts and braces to be of structural steel hot dip galvanized or painted with an approved waterproof asphalt or mineral paint. Holes to be provided in end, corner and gate posts as detailed hereon.

Wire mesh used in Combination Wire Fence as shown above shall be galvanized. Wire mesh used in walk & and driveway gates shall be galvanized or painted with an approved waterproof asphalt or mineral paint.

Fence wire to be placed on either road or field side of posts depending on local conditions, ie. On curves the wire should be placed on side of post which would prevent tension on fence ties. This will also apply where wind drift, tumble weeds or other conditions would exert unusual pressure against the wire.

In lieu of Galvanized Finish on Gate Frames, Cadmium Plated Pipe or Aluminum Painting with zinc chromate Primer as per specifications will be considered to be equivalent.

Spacing of Holes for Fastening Fence Wire to End, Corner, & Gate Posts



NOTE -
All holes to be 1/4" Diameter. Fence wire to be securely fastened with No. 12 1/2 ga. (Min.) Galvanized Wire bound around fence wire and passed through hole in post.
Holes may be in either leg of angle post. For convenience, the department will approve the use of angle posts with holes spaced for barbed wire fence on one leg and combination wire fence on the other leg.

COLORADO
STATE HIGHWAY DEPARTMENT

Standard Wire Fence With Metal Posts

Designed by C.G.M.	Approved by [illegible]
Made by C.G.M.	Engineer, Surveys & Plats
Checked by	Date: Mar 1, 1950

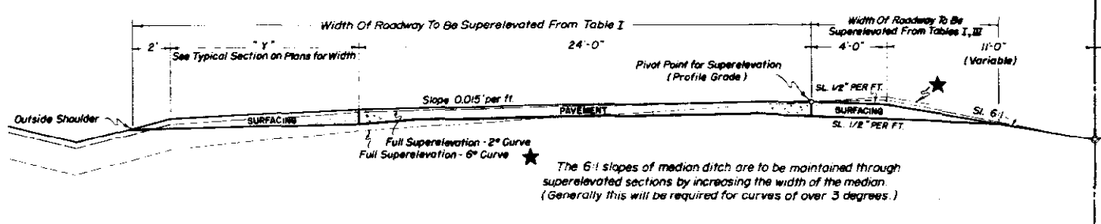
REVISIONS

STANDARD M-1-C.1

FED. ROAD DIVISION NO.	DISTRICT	FOOC-1(11)	SHEET NO.
9	COLO.	UNIT 1	29

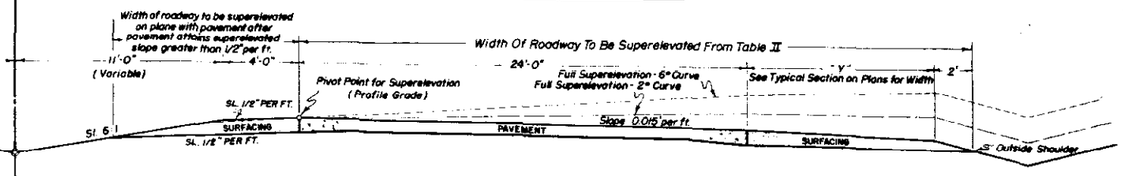
Standard Methods for Superelevating Curves on Divided Highways

Roadway On Inside Of Curve



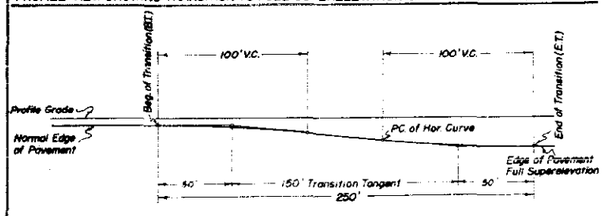
The 6:1 slopes of median ditch are to be maintained through superelevated sections by increasing the width of the median. (Generally this will be required for curves of over 3 degrees.)

Roadway On Outside Of Curve



Superelevation Tables

PROFILE VIEW SHOWING TRANSITION TO FULL SUPERELEVATION ON ROADWAY INSIDE OF CURVE



Circular Curve with Unlimited Tangent Approach

The Transition shown above illustrates the effect of Superelevation on the outside edge of the pavement by gradually lowering the outside shoulder over a distance of 250 ft. The beginning of this transition takes place at a point 150 feet back of the end of the curve and acquires full Superelevation at a point 100 feet inside of the curve.

The Transition for Superelevating the inside shoulder on roadway inside of curve shall start at a point 50 feet back of the B.T. as described above, and by using rates in Table III, shall reach a superelevation equal to the normal crown slope of 0.015 ft. per foot at the B.T. From this point the shoulder shall be raised on a plane with the roadway pavement.

TABLE I - FOR ROADWAY ON INSIDE OF CURVE

(Figures in columns are Rates of Superelevation per Foot of Roadway Width)

Percent Of Transition Distance	Distance From B.T. in Feet	DEGREE OF CURVE				
		-2°&+2°	3°&+3°	4°&+4°	5°&+5°	6°&+6°
2	5	.0000	.0000	.0000	.0000	.0000
4	10	.0000	.0001	.0001	.0001	.0002
6	15	.0000	.0001	.0002	.0003	.0004
8	20	.0001	.0002	.0004	.0005	.0006
10	25	.0001	.0003	.0006	.0008	.0010
12	30	.0002	.0005	.0008	.0011	.0014
14	35	.0002	.0007	.0011	.0015	.0020
16	40	.0003	.0009	.0014	.0020	.0026
18	45	.0004	.0011	.0018	.0025	.0032
20	50	.0005	.0014	.0023	.0031	.0040
22	55	.0006	.0017	.0027	.0038	.0048
24	60	.0007	.0020	.0032	.0045	.0058
26	65	.0008	.0024	.0038	.0053	.0068
28	70	.0010	.0027	.0044	.0061	.0078
30	75	.0011	.0031	.0051	.0071	.0090
32	80	.0013	.0035	.0058	.0080	.0102
34	85	.0014	.0040	.0065	.0091	.0116
36	90	.0016	.0045	.0073	.0101	.0130
38	95	.0018	.0050	.0081	.0113	.0144
40	100	.0020	.0055	.0090	.0125	.0160
42	105	.0022	.0061	.0099	.0138	.0176
44	110	.0024	.0066	.0108	.0150	.0192
46	115	.0026	.0072	.0117	.0163	.0208
48	120	.0028	.0077	.0126	.0175	.0224
50	125	.0030	.0083	.0135	.0188	.0240
52	130	.0032	.0088	.0144	.0200	.0256
54	135	.0034	.0094	.0153	.0213	.0272
56	140	.0036	.0099	.0162	.0225	.0288
58	145	.0038	.0105	.0171	.0238	.0304
60	150	.0040	.0110	.0180	.0250	.0320
62	155	.0042	.0116	.0189	.0263	.0336
64	160	.0044	.0120	.0197	.0274	.0350
66	165	.0046	.0126	.0205	.0285	.0364
68	170	.0047	.0130	.0212	.0295	.0378
70	175	.0049	.0135	.0219	.0305	.0390
72	180	.0050	.0138	.0226	.0314	.0402
74	185	.0052	.0142	.0232	.0323	.0412
76	190	.0053	.0145	.0238	.0330	.0422
78	195	.0054	.0149	.0243	.0338	.0432
80	200	.0055	.0151	.0247	.0344	.0440
82	205	.0056	.0154	.0252	.0350	.0448
84	210	.0057	.0156	.0256	.0355	.0454
86	215	.0058	.0158	.0259	.0360	.0460
88	220	.0058	.0160	.0262	.0364	.0466
90	225	.0059	.0162	.0264	.0367	.0470
92	230	.0059	.0163	.0266	.0370	.0474
94	235	.0060	.0164	.0268	.0372	.0476
96	240	.0060	.0164	.0269	.0374	.0478
98	245	.0060	.0165	.0270	.0375	.0480
Full Super	250	.0060	.0165	.0270	.0375	.0480

TABLE III - FOR INSIDE SHOULDER OF ROADWAY INSIDE OF CURVE

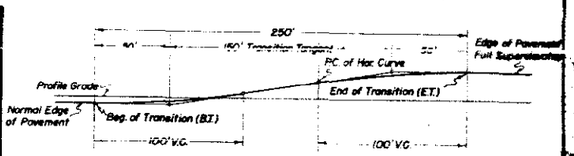
Percent Of Transition Distance	Distance Back Of B.T.	Rate Of Superelevation Per Foot Of Shoulder Width	
100	B.T.	.05666	
80	10	.04533	
60	20	.03400	
40	30	.02266	
20	40	.01133	
0	50	.00000	

TABLE II - FOR ROADWAY ON OUTSIDE OF CURVE

(Figures in columns are Rates of Superelevation per Foot of Roadway Width)

Percent Of Transition Distance	Distance From B.T. in Feet	DEGREE OF CURVE				
		-2°&+2°	3°&+3°	4°&+4°	5°&+5°	6°&+6°
2	5	.0000	.0000	.0000	.0001	.0001
4	10	.0001	.0002	.0002	.0002	.0003
6	15	.0003	.0004	.0004	.0005	.0006
8	20	.0005	.0006	.0008	.0009	.0010
10	25	.0008	.0010	.0012	.0014	.0016
12	30	.0011	.0014	.0017	.0020	.0023
14	35	.0015	.0019	.0023	.0028	.0032
16	40	.0019	.0025	.0030	.0036	.0042
18	45	.0024	.0031	.0038	.0046	.0053
20	50	.0030	.0039	.0048	.0056	.0065
22	55	.0036	.0047	.0057	.0069	.0079
24	60	.0043	.0056	.0068	.0081	.0094
26	65	.0051	.0066	.0080	.0096	.0110
28	70	.0059	.0076	.0093	.0110	.0127
30	75	.0068	.0088	.0107	.0127	.0146
32	80	.0077	.0099	.0122	.0144	.0166
34	85	.0087	.0113	.0137	.0163	.0188
36	90	.0097	.0126	.0154	.0182	.0211
38	95	.0108	.0140	.0171	.0204	.0235
40	100	.0120	.0155	.0190	.0225	.0260
42	105	.0132	.0171	.0209	.0248	.0286
44	110	.0144	.0186	.0228	.0270	.0312
46	115	.0156	.0202	.0247	.0293	.0338
48	120	.0168	.0217	.0266	.0315	.0364
50	125	.0180	.0233	.0285	.0338	.0390
52	130	.0192	.0248	.0304	.0360	.0416
54	135	.0204	.0264	.0323	.0383	.0442
56	140	.0216	.0279	.0342	.0405	.0468
58	145	.0228	.0295	.0361	.0428	.0494
60	150	.0240	.0310	.0380	.0450	.0520
62	155	.0252	.0326	.0399	.0472	.0545
64	160	.0263	.0339	.0416	.0493	.0569
66	165	.0273	.0353	.0433	.0513	.0592
68	170	.0283	.0366	.0448	.0531	.0614
70	175	.0292	.0378	.0463	.0549	.0634
72	180	.0301	.0389	.0477	.0565	.0653
74	185	.0309	.0400	.0490	.0580	.0670
76	190	.0317	.0409	.0502	.0594	.0686
78	195	.0324	.0419	.0513	.0607	.0701
80	200	.0330	.0426	.0522	.0619	.0715
82	205	.0336	.0434	.0532	.0629	.0727
84	210	.0341	.0440	.0540	.0639	.0738
86	215	.0345	.0446	.0547	.0647	.0748
88	220	.0349	.0451	.0553	.0655	.0757
90	225	.0352	.0455	.0558	.0661	.0764
92	230	.0355	.0459	.0562	.0666	.0770
94	235	.0357	.0461	.0566	.0670	.0774
96	240	.0359	.0463	.0568	.0673	.0777
98	245	.0360	.0465	.0570	.0674	.0779
Full Super	250	.0360	.0465	.0570	.0675	.0780

PROFILE VIEW SHOWING TRANSITION TO FULL SUPERELEVATION ON ROADWAY OUTSIDE OF CURVE



Circular Curve with Unlimited Tangent Approach

The Transition shown above illustrates the effect of Superelevation on the outside edge of the pavement by gradually raising the outside shoulder over a distance of 250 feet. The beginning of this transition takes place at a point 150 feet back of the end of the curve and acquires full Superelevation at a point 100 feet inside of the curve.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

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

In cases where spiral curves are used, the transition from normal crowned section to full superelevation shall take place over the full length of spiral curve.

The use of this Standard Sheet is restricted to Divided Highways having a normal crown slope of 0.015' per foot on pavements and a normal crown slope of 1/2" per foot on the inside shoulders.

COLORADO
STATE HIGHWAY DEPARTMENT

Standard Methods For Superelevating Curves On Divided Highways

Designed by C.G.M.
Made by C.G.M.
Checked by M.R.H.

Approved by [signature]
Engineer, Surveys & Plans
Date: Feb. 8, 1950

REVISIONS

Rev 10-25-50 C.G.M., Accel Lanes, Ballast note re widen crest grades

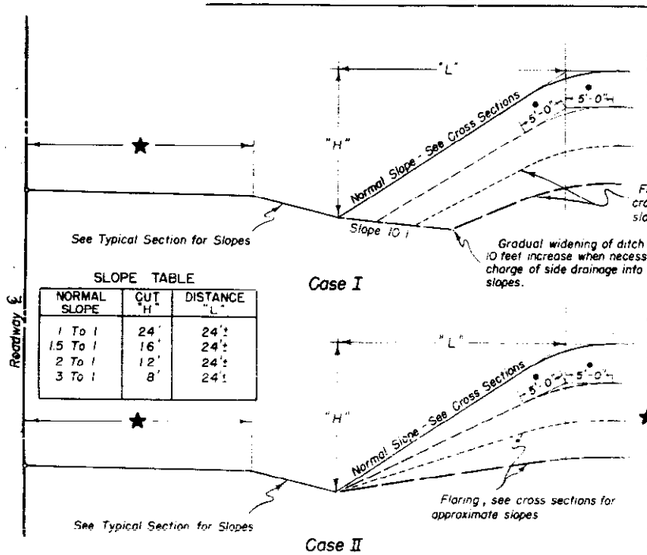
STANDARD SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES AND AT CREST OF GRADES

STANDARD M-2-DM

Rev 7-12-49, C.G.M., Details for widening at Crest of Grades
Rev 12-7-49, C.G.M., Rev notes re Type I Rd. Apprs. & widen at Bridge Apprs., added note re accell & decell. lanes

FED. ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.
9	COLO.	UNIT 1	30

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



SLOPE TABLE

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

FLARING OF EARTH CUTS: The backslopes at ends of all earth cuts shall be flattened & where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion & to improve appearance. The transition of flattened backslopes & widened ditch shall be constructed in such a manner that a uniform appearance of slope & ditch results. Backslopes shall be flared to the approximate "L" distance shown on Slope Table included with this detail. Rock cuts shall not be flared.

Flaring with widened ditch, see cross sections for approximate slopes

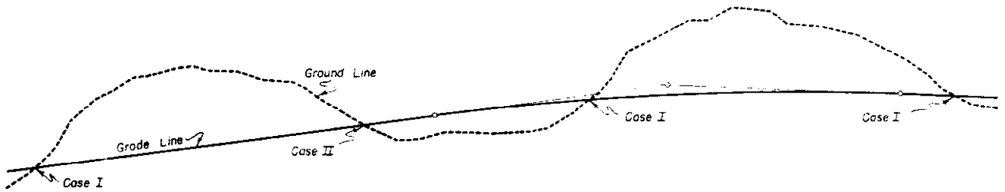
Gradual widening of ditch to minimum of 10 feet increase when necessary to avoid discharge of side drainage into adjoining fill slopes.

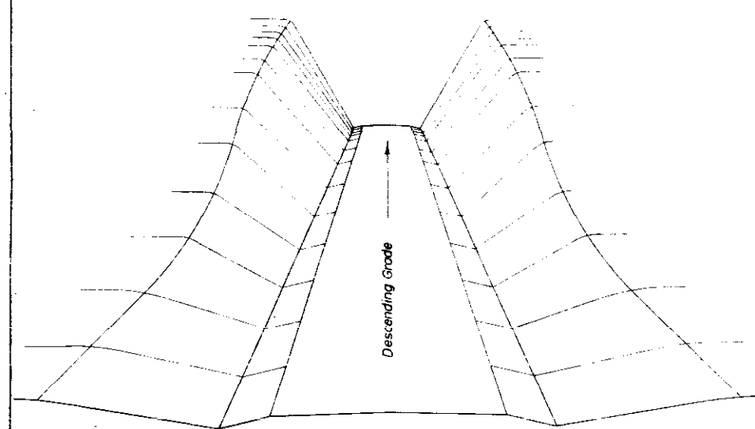
• CUT SLOPE TREATMENT IN EARTH CUTS: The intersection of cut slopes with the existing ground shall be rounded in earth cuts, beginning 5 ft. outside the slope stake and extending 5 ft. down the cut slope. Where the cut slope is less than 5 ft. reduce each of the above widths of slope treatment to the actual slope distance. Quantities shall be included in "Unclassified Excavation."

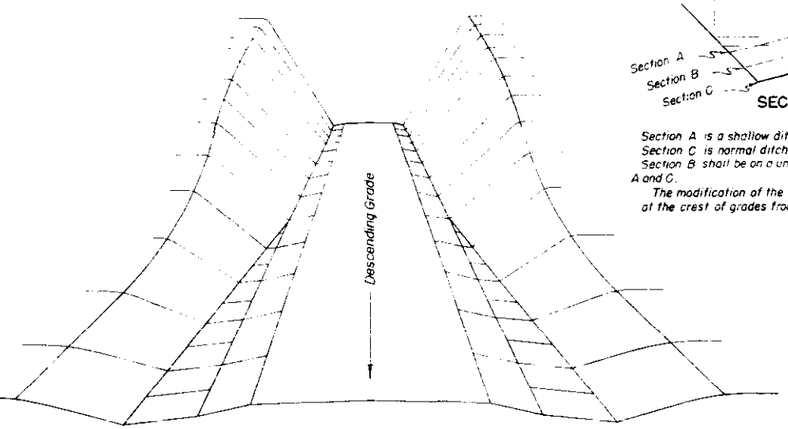
★ WIDENING AT BRIDGE APPROACHES: Roadway embankment at bridge approaches shall be so constructed that the finish point of the subgrade shoulder is a Min. of 2 ft. beyond the outside edge of bridge deck. Where widening of the section is necessary to achieve this result it shall take place gradually over a distance of 300 ft. This is done to accomodate guard fence and/or guard rail or marker posts at bridge approaches. (See additional requirements for Guard Fences below.)

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

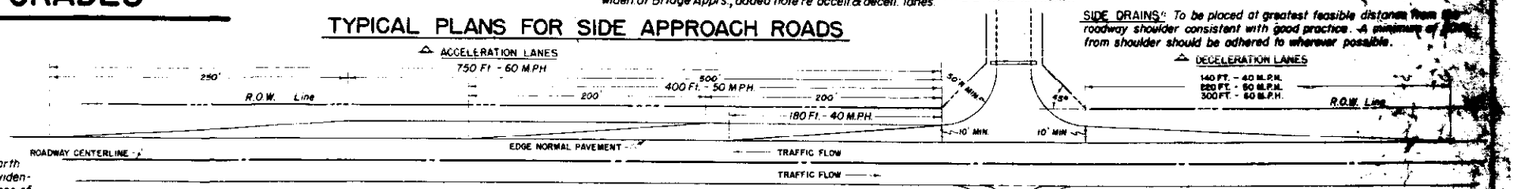
PLAN OF FLARING IN EARTH CUTS







TYPICAL PLANS FOR SIDE APPROACH ROADS



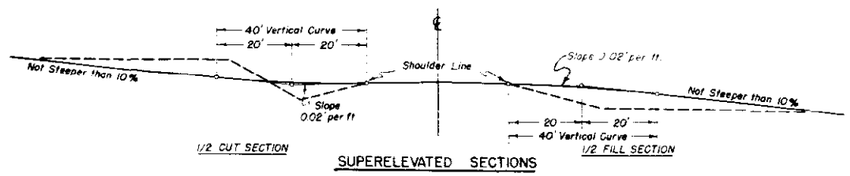
TYPE I ROAD APPROACH

SIDE DRAINS: To be placed at greatest feasible distance from the roadway shoulder consistent with good practice. A minimum of 10 ft. from shoulder should be adhered to wherever possible.

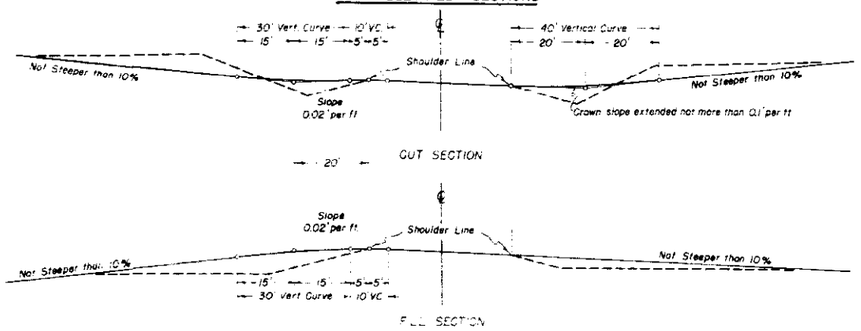
DECELERATION LANES
140 FT. - 40 M.P.H.
220 FT. - 50 M.P.H.
300 FT. - 60 M.P.H.

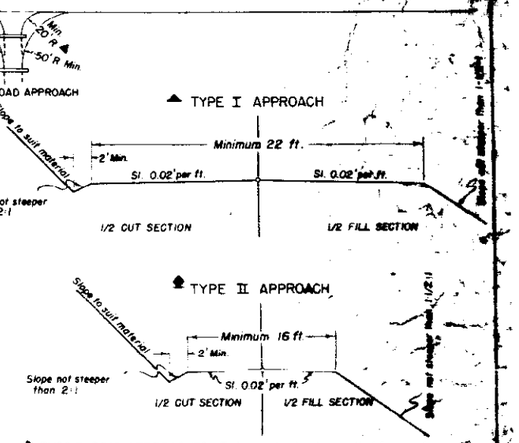
△ Values shown are general, see plans for specific requirements of each Type I Road Approach.

STANDARD CROWNED SECTION



SUPERELEVATED SECTIONS





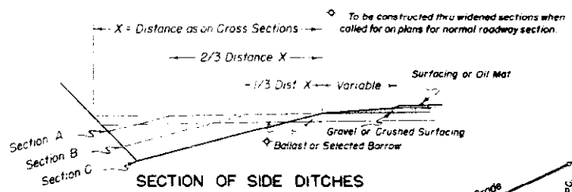
▲ TYPE I ROAD APPROACHES: To be used only when called for on plans. The width of crowned section shall not be less than the existing crowned width of the approaching road but in no case shall be less than twenty-two (22) feet.

▲ TYPE II ROAD APPROACHES: To be used at all places which are not indicated as "Type I Road Approaches." The width of crowned section shall not be less than the existing crowned width of the approaching road but in no case shall be less than sixteen (16) feet.

▲ 20 FT. RADII: To be used only on private road approaches.

DETAILS FOR DITCH & WIDENED SHOULDERS AT CREST OF GRADES

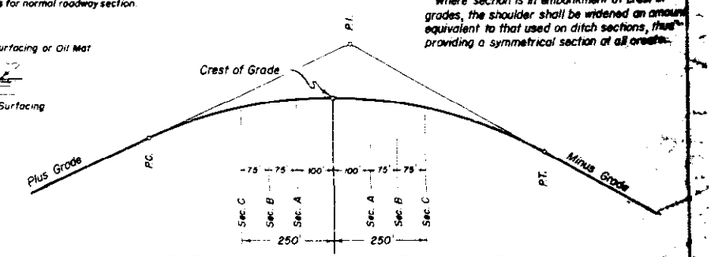
(TO BE USED ONLY WHERE SIGHT DISTANCE AT CREST OF GRADE IS 600 FT. OR LESS)



SECTION OF SIDE DITCHES

Section A is a shallow ditch section
Section C is normal ditch section
Section B shall be on a uniform transition between Sections A and C.
The modification of the ditch indicated shall be used only at the crest of grades from which drainage breaks both ways.

NOTE
Where section is in embankment at crest of grades, the shoulder shall be widened an amount equivalent to that used on ditch sections, thus providing a symmetrical section at all crests.



PROFILE VIEW SHOWING DISTANCES AND RELATIVE POSITIONS OF DITCH-TREATMENT SECTIONS

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

All side approach roads to the Project shall be Gravel Surfaced with a four (4) inch thickness of "Gravel or Crushed Rock Surfacing" extending approximately to the Right of Way Line. Estimated tonnage & type of material required for this operation are shown in the Surfacing Plan.

The maximum grades shown are to be the limiting grades for all road approaches. Modifications of grades will be permitted where adherence to the grades as shown would cause damage to property or create other unsatisfactory conditions. Grades less than the maximum shown are to be used wherever feasible.

COLORADO
STATE HIGHWAY DEPARTMENT

STANDARD
SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, & WIDENING AT BRIDGES AND AT CREST OF GRADES

Designed by A.Z.	Approved by [signature]
Made by C.G.M.	Engineer, Surveys & Plans
Checked by [illegible]	Date: April 20th, 1949

Traffic Signs

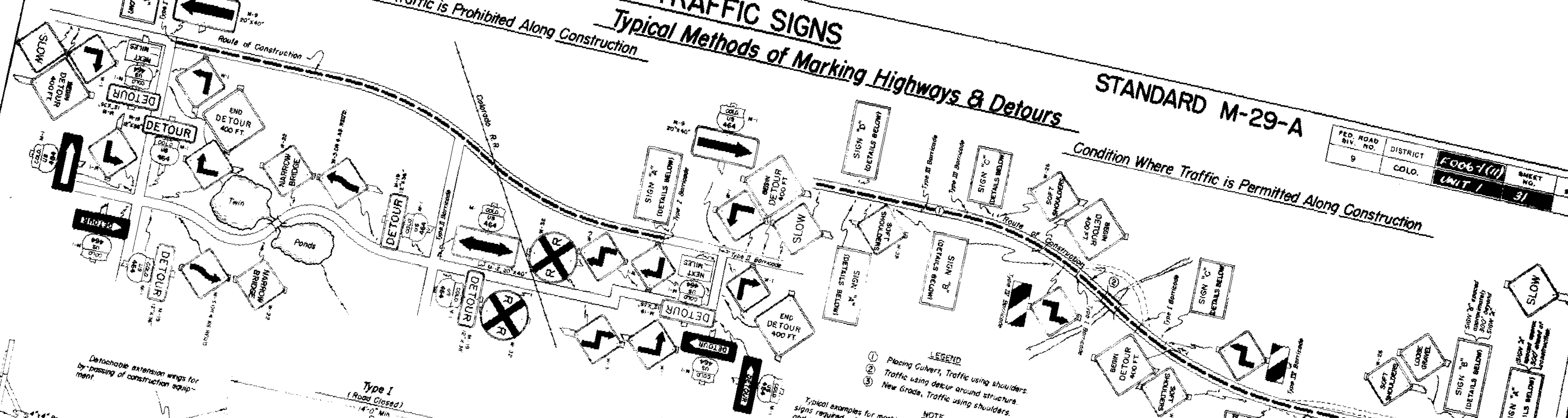
Typical Methods of Marking Highways & Detours

STANDARD M-29-A

FED. ROAD DIV. NO.	DISTRICT		SHEET NO.
9	COLO.	F 006-1(11) UNIT 1	31

Condition Where Traffic is Prohibited Along Construction

Condition Where Traffic is Permitted Along Construction



Route of Construction
DETOUR
NEXT MILES
END DETOUR 400 FT.
BEGIN DETOUR 400 FT.
NARROW BRIDGE
SLOW
Twin
Ponds
Colorado R.R.
SIGN "A" (DETAILS BELOW)
SIGN "B" (DETAILS BELOW)
SIGN "C" (DETAILS BELOW)
SIGN "D" (DETAILS BELOW)
SOFT SHOULDERS
LOOSE GRAVEL
Type I Barricade
Type II Barricade
Type III Barricade
Type IV Barricade

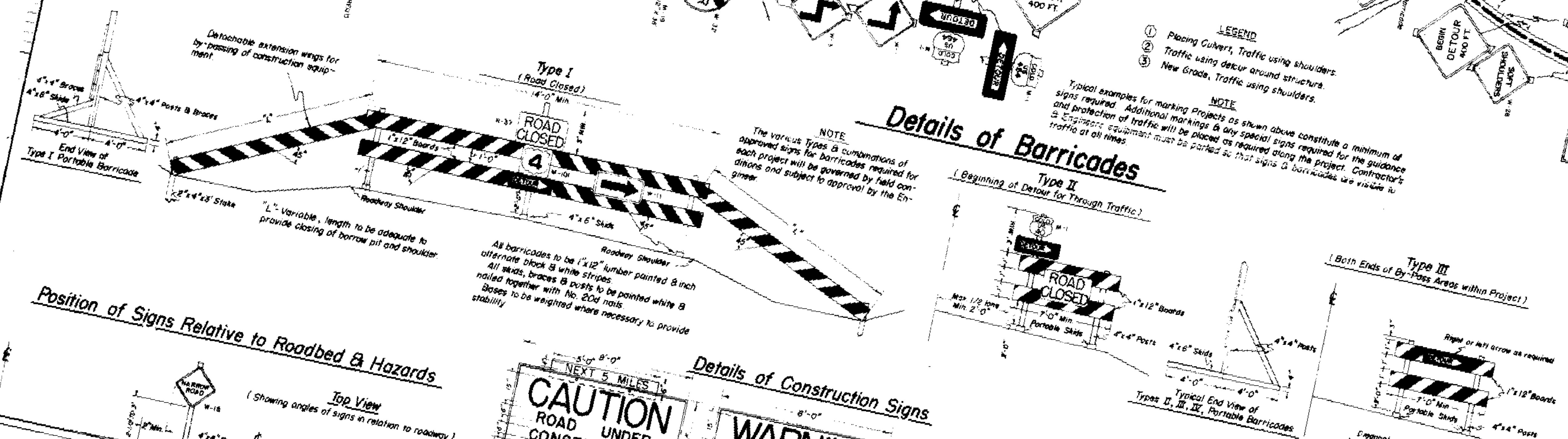
LEGEND

1. Placing Culvert, Traffic using shoulders.
2. Traffic using detour around structure.
3. New Grade, Traffic using shoulders.

NOTE

Typical examples for marking Projects as shown above constitute a minimum of signs required. Additional markings & any special signs required for the guidance and protection of traffic will be placed as required along the project. Contractor's & Engineers equipment must be parked so that signs & barricades are visible to traffic at all times.

Details of Barricades



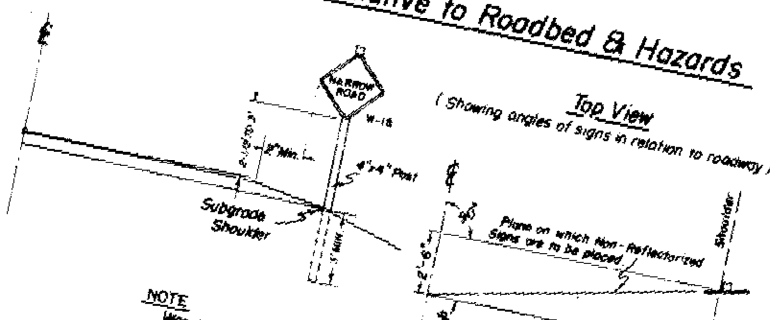
Type I
(Road Closed)
ROAD CLOSED
Detachable extension wings for by-passing of construction equipment.
End View of Type I Portable Barricade
"L"-Variable, length to be adequate to provide closing of borrow pit and shoulder
Roadway Shoulder
4"x6" Skids
Type II
(Beginning of Detour for Through Traffic)
Type III
(Both Ends of By-Pass Areas within Project)
Type IV
Supplement to Advance Warning Signs, to be placed at points of Extreme Hazards
Typical End View of Types II, III, IV, Portable Barricades
Diagonal stripes to slope in direction traffic is to travel.
1"x12" Boards
4"x4" Posts
Portable Skids

NOTE

The various Types & combinations of approved signs for barricades required for each project will be governed by field conditions and subject to approval by the Engineer.

All barricades to be 1"x12" lumber painted 8 inch alternate black & white stripes. All skids, braces & posts to be painted white & nailed together with No. 20d nails. Bases to be weighted where necessary to provide stability.

Position of Signs Relative to Roadbed & Hazards

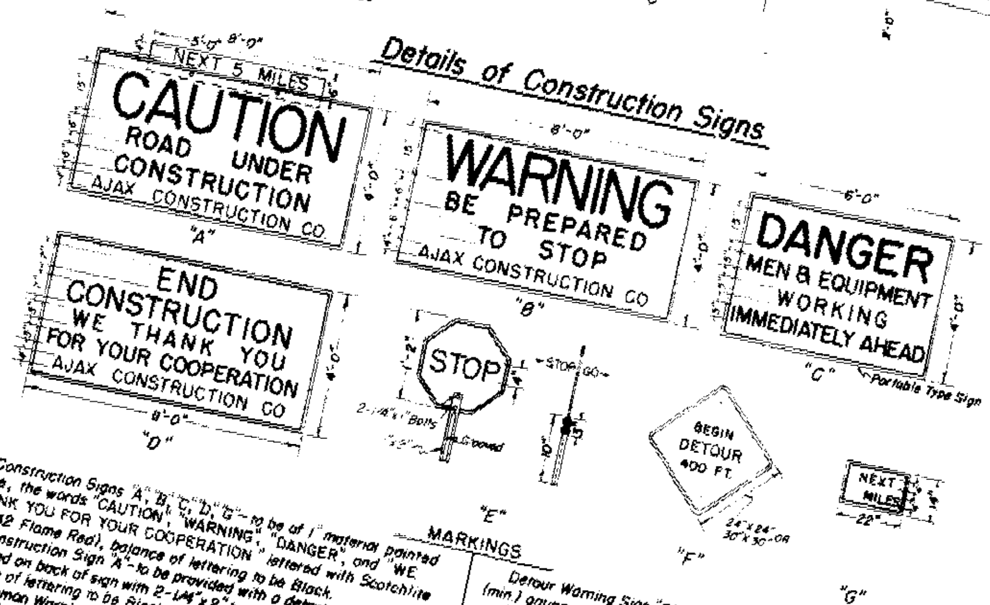


NOTE

Warning Signs to be made of 1/4" (Min.) plywood or No. 10 Gauge (Min.) metal.

Location to be governed by field conditions. Exact location to be staked by the Engineer. In all cases warning signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds.

Details of Construction Signs



NEXT 5 MILES
CAUTION ROAD UNDER CONSTRUCTION
AJAX CONSTRUCTION CO
"A"
WARNING BE PREPARED TO STOP
AJAX CONSTRUCTION CO
"B"
DANGER MEN & EQUIPMENT WORKING IMMEDIATELY AHEAD
"C"
Portable Type Sign
END CONSTRUCTION WE THANK YOU FOR YOUR COOPERATION
AJAX CONSTRUCTION CO
"D"
STOP
STOP GO
Grooved
"E"
BEGIN DETOUR 400 FT.
"F"
NEXT MILES
22"
"G"

MARKINGS

Construction Signs "A", "B", "C", "D", "G" – to be of 1" material painted White, the words "CAUTION", "WARNING", "DANGER", and "WE THANK YOU FOR YOUR COOPERATION" lettered with Scotchlite (No. 32 Flame Red), balance of lettering to be Black.

Construction Sign "A" – to be provided with a detachable board mounted on back of sign with 2–1/4"x2" bolts. 1" material painted White, balance of lettering to be Black. (Miles indicated to the nearest Mile)

Flagman Warning Sign "E" – to be of plastic or other light weight material, painted Red with White lettering on the stop side & painted Green with White lettering on the go side. Handle to be grooved on one side to indicate reading of sign to the flagman. To be used whenever flagmen are necessary. Sign to be reflectorized if used to stop traffic at night.

Detour Warning Sign "F" – to be of 1/4" (min.) plywood or No. 10 (min.) gauge metal, painted Yellow, all lettering to be Black.

Construction Sign "G" – 3/4" x 9" metal slides to be placed between words "NEXT — MILES", spaced so as to accommodate appropriate size numerals. Required numerals to be furnished by the Department and to be installed by the Contractor. Numerals calculated to nearest mile.

Signs to be fastened to 2–4"x4" posts set 4 ft. in the ground with a minimum of 3–1"x4" nailing strips on the back. Bottom of sign to be 24" above ground.

GENERAL NOTES

All work shall be done in accordance with the Standard Specification of the Colorado Department of Highways applicable to the project.

Where traffic is maintained through or over any part of the Project, the Contractor will be required to mark all hazards within the limits of the Project with well painted, well maintained Barricades, Warning Signs and Directional Type Signs. All Barricades & Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when project is completed.

All Warning & Directional Type Signs will be "Reflectorized" with "Scotchlite" Reflective Sheeting or a suitable equivalent. Except for variations noted on this sheet all signs will be in conformity with the specifications outlined in "Manual on Uniform Traffic Control Devices for Streets & Highways" issue of August 1948 by the U.S. Public Roads Administration. U.S. or State Route Markers required for the Project will be furnished by the Department and installed by the Contractor. Numbers adjacent to signs refer to Standards in the Manual.

The Contractor shall furnish & install the following as required within the limits of the Project:

1. All Barricades .... As Required
2. "CAUTION, ROAD UNDER CONSTRUCTION, NEXT — MILES, CONTRACTORS NAME" .... Minimum 2
3. Standard Warning & Directional Signs .... As Required
4. "WARNING, BE PREPARED TO STOP, CONTRACTORS NAME" .... Minimum 2
5. Approved Directional Arrows for Barricades .... As Required
6. "DANGER, MEN & EQUIPMENT WORKING IMMEDIATELY AHEAD." .... Minimum 2
7. "END CONSTRUCTION, WE THANK YOU FOR YOUR COOPERATION, CONTRACTORS NAME"
8. Torches and Flares as follows:
   - Type I Barricades .... Minimum 2
   - Type III, IV Barricades .... Minimum 3
   - Standard Warning Signs .... Minimum 1
   - .... Minimum 1

Where traffic is prohibited from the Project, the Detour will be marked by the Department except for Barricades complete with approved Warning Signs & Arrows which will be provided, erected & maintained by the Contractor at ends of Project and intersecting roads.

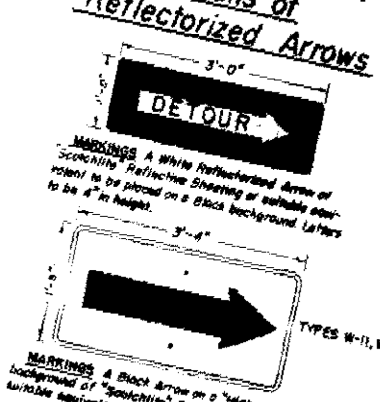
All lumber used shall be of sound durable material. Barricades, Signs, Symbols & Lettering conforming to styles noted hereon will be well painted & maintained. Uneven or smeared lettering will not be accepted.

Flares and Torches shall be of the Oil Burning Type approved by the Department and placed 3 ft. to 5 ft. ahead of the object to be illuminated. Particular care shall be taken ... codes from smoke and smudge arising from torches and flares.

All signs are to be in clear view of traffic and ... wise.

Speed control ...

Details of Reflectorized Arrows



MARKINGS: A White Reflectorized Arrow of "Scotchlite" Reflective Sheeting or suitable equivalent to be placed on a Black background. Letters to be 4" in height.

MARKINGS: A Black Arrow on a "Highway Yellow" background of "Scotchlite" Reflective Sheeting or suitable equivalent.

COLORADO DEPARTMENT OF HIGHWAYS

Standard ...

M-29-A

Standard Types of Railroad Warning Signs

STANDARD M-18-B

FED. ROAD DIVISION NO.	DISTRICT	F006-1(4)	SHEET NO.	TOTAL SHEETS
9	COLO.	UNIT 1	32	

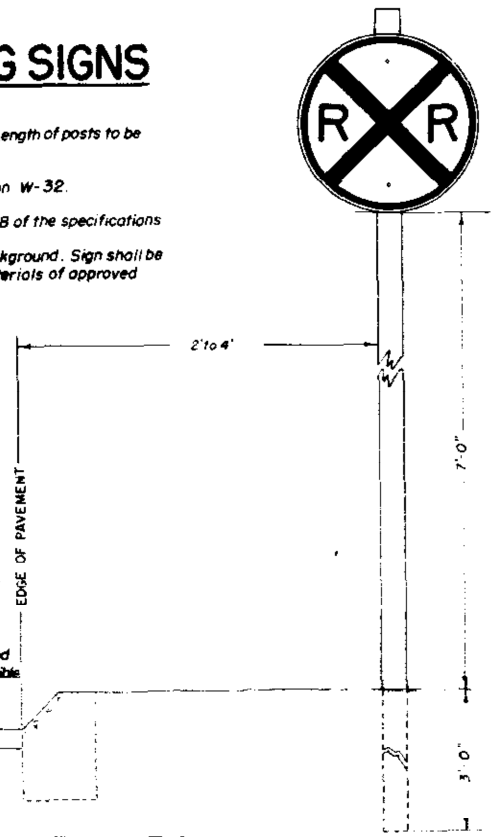
RAILROAD ADVANCE WARNING SIGNS

SPECIFICATIONS

POSTS : 4"x 4" Untreated Wood conforming to Item 42 of the Specifications. Length of posts to be determined from typical section on plans and local conditions.

SIGN : 16 ga. steel plate or acceptable equivalent. Type - A.A.S.H.O. designation W-32.

PAINTING & MARKING : Wood posts shall be painted in accordance with Item 38 of the specifications using one (1) coat of primer and two (2) coats of outside white.
Metal sign to have a black crossbuck and letters on a "Highway Yellow" background. Sign shall be reflectorized with reflective sheeting, reflector buttons or other reflective materials of approved types acceptable to the Department.



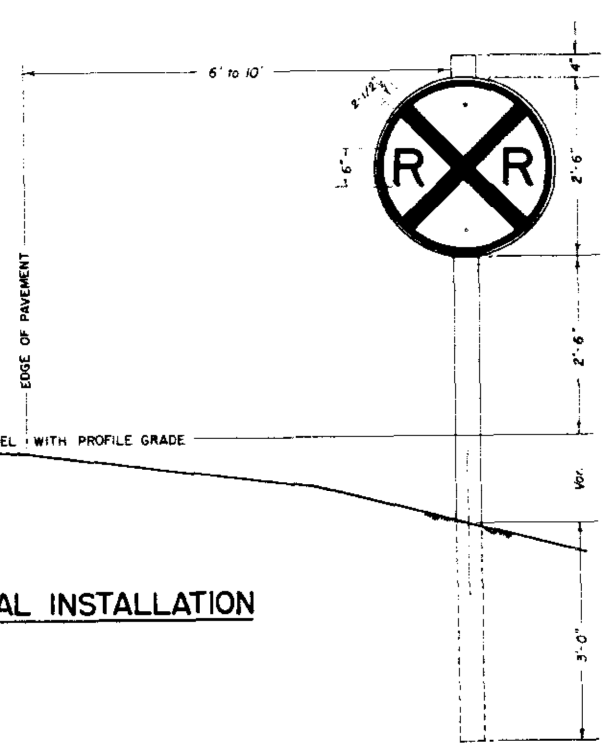
URBAN INSTALLATION

INSTALLATION - URBAN :

Signs shall be placed on right side of road or street facing approaching traffic.
In resident or business districts where low speeds are prevalent, signs are to be placed a minimum distance of 100 feet from the crossing. In all cases signs shall be placed at a distance from the crossing great enough to provide adequate stopping distance for the prevailing speed of traffic thru that area.
Consideration shall be given to intersecting roads or streets and local conditions whereby additional signs may be required.
Signs shall be placed in advance of every railroad crossing regardless of other controls present except for the following conditions.
a. At a minor siding or spur which is infrequently used and which is guarded by a member of the train crew when in use.
b. In business districts of large cities where crossings are fully protected and the physical conditions are such that even a partial display of the sign is impossible

NOTE

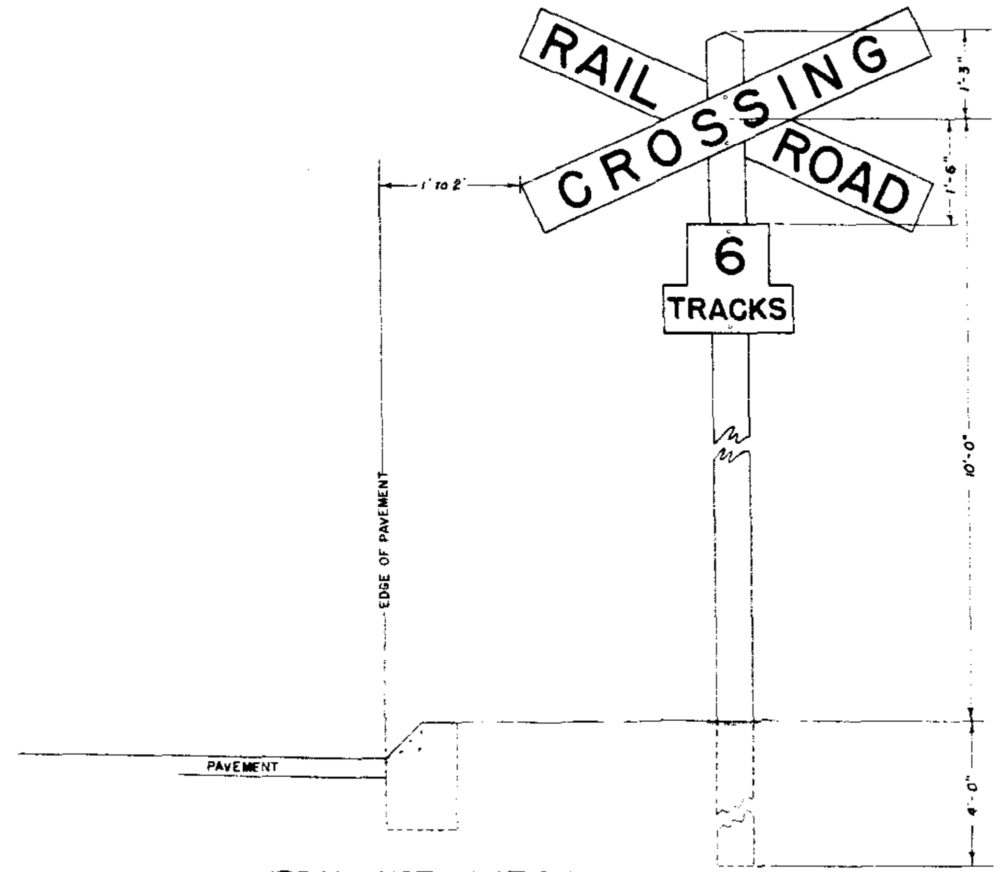
On sign installations where roadway grades are not level it may be desirable to place signs out of plumb either forward or rearward depending on the grade, so as to keep the angle of view close to 90°.



RURAL INSTALLATION

INSTALLATION - RURAL :

Signs shall be placed on right side of road facing approaching traffic.
Sign to be placed normally 500 feet in advance of crossing although local conditions such as grades, curves and limited sight distance might make some intermediate distance between 300 and 500 feet more satisfactory.
In all cases the distance shall be great enough to permit traffic to be brought to a complete halt before the crossing is reached.
Roadway intersections within minimum placement distance should be considered for additional signs.
Signs shall be placed in advance of every railroad crossing regardless of other controls present except for the following condition :
a. At a minor siding or spur which is infrequently used or when used is guarded by a member of the train's crew.



URBAN INSTALLATION

RAILROAD CROSSBUCK SIGNS

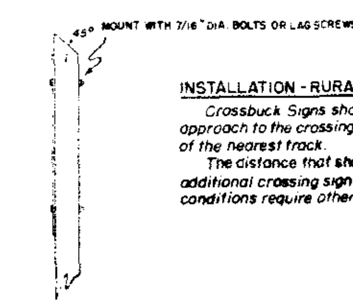
SPECIFICATIONS

POSTS : 6"x 6" Untreated Wood conforming to Item 42 of the Specifications. Length of posts to be determined from typical section on plans and local conditions.

CROSSBUCKS : 1/4" Boiler Plate or acceptable equivalent. Type - A.A.S.H.O. designation W-33

TRACK SIGN : 14 ga. flat steel or acceptable equivalent

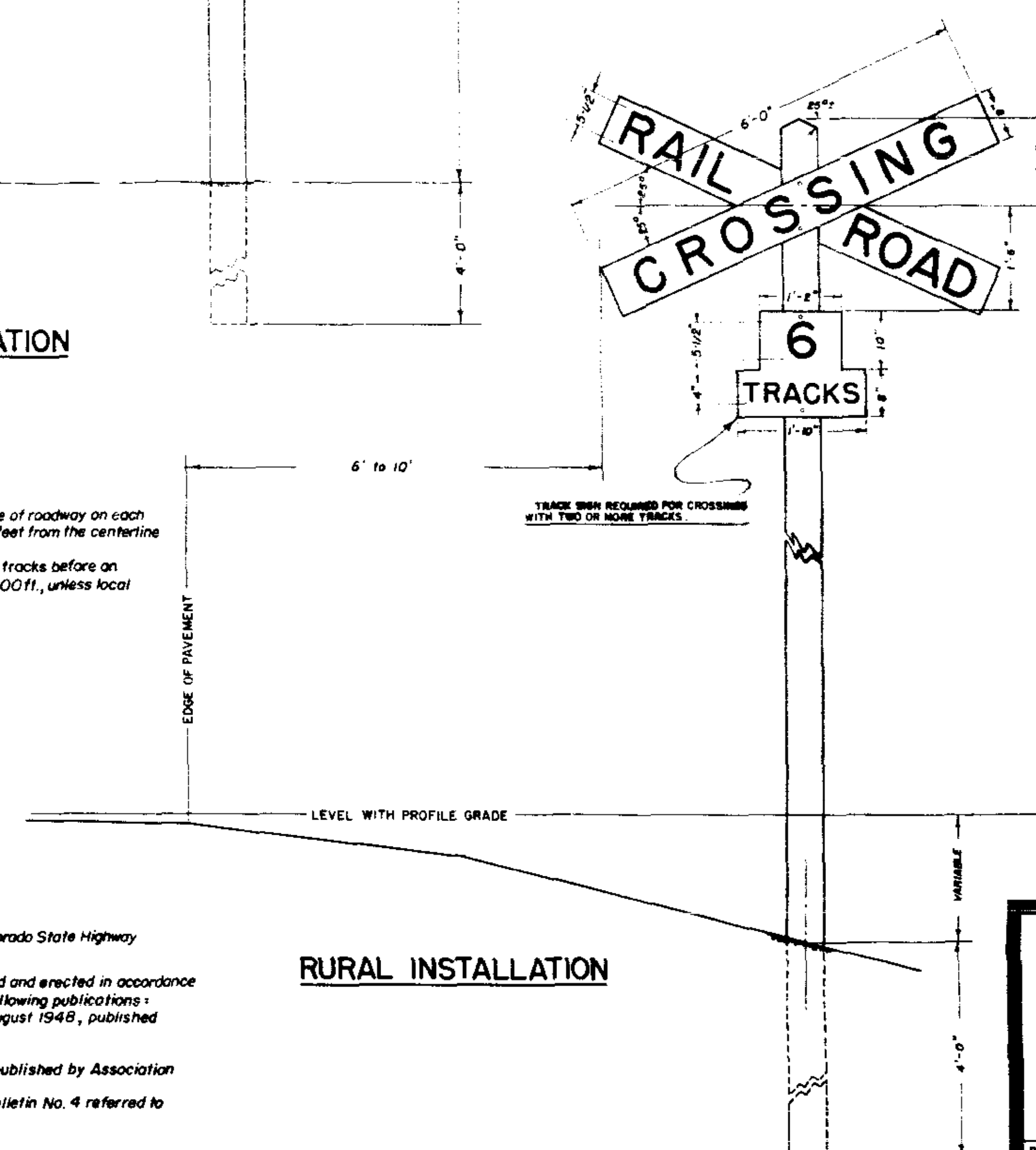
PAINTING & MARKING : Wood posts shall be painted in accordance with Item 38 of the specifications using one (1) coat of primer and two (2) coats of outside white.
Crossbuck and track signs shall be white with all lettering and numerals black. All signs are to be reflectorized with reflective sheeting, reflector buttons or reflective materials of approved types.



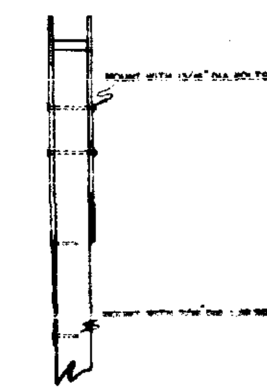
SIDE VIEW

INSTALLATION - RURAL & URBAN

Crossbuck Signs shall be erected on the right side of roadway on each approach to the crossing, not less than fifteen (15) feet from the centerline of the nearest track.
The distance that should be assumed to separate tracks before an additional crossing sign is considered necessary is 100 ft., unless local conditions require otherwise.



RURAL INSTALLATION



SIDE VIEW

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

All Crossbuck and Advance Warning Signs shall be constructed, painted, marked and erected in accordance with details shown on this sheet and in conformity with data set forth under the following publications :
"Manual on Uniform Traffic Control Devices for Streets and Highways" dated August 1948, published by Public Roads Administration.
Section 88 - Page 51 , Section 89 - Page 52
"Bulletin No. 4, Railroad - Highway Grade Crossing Protection" dated 1949, published by Association of American Railroads.
Details shown on this sheet take precedence over conflicting details shown in Bulletin No. 4 referred to above.

Wood posts as detailed above shall not be placed in the ground set in concrete.

COLORADO
STATE HIGHWAY DEPARTMENT

Standard Types Of Railroad Warning Signs

Designed by Made by C.G.M. Checked by	Approved by A. Z[illegible] Engineer, Surveys & Plans Date: July 20 1951

REVISIONS

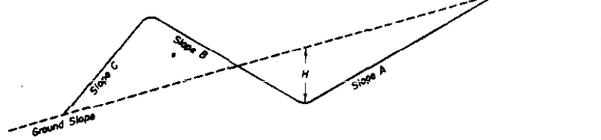
STANDARD TYPES of DITCHES and CONSTRUCTION METHODS

STANDARD M-107-C

FED. ROAD DIVISION NO.	DISTRICT	PROJECT NO.	SHEET NO.
9	COLO.	F006-1(11) UNIT 1	33

DETAILS for CONTOUR INTERCEPTING DITCHES

Typical Section for Contour Intercepting Ditches



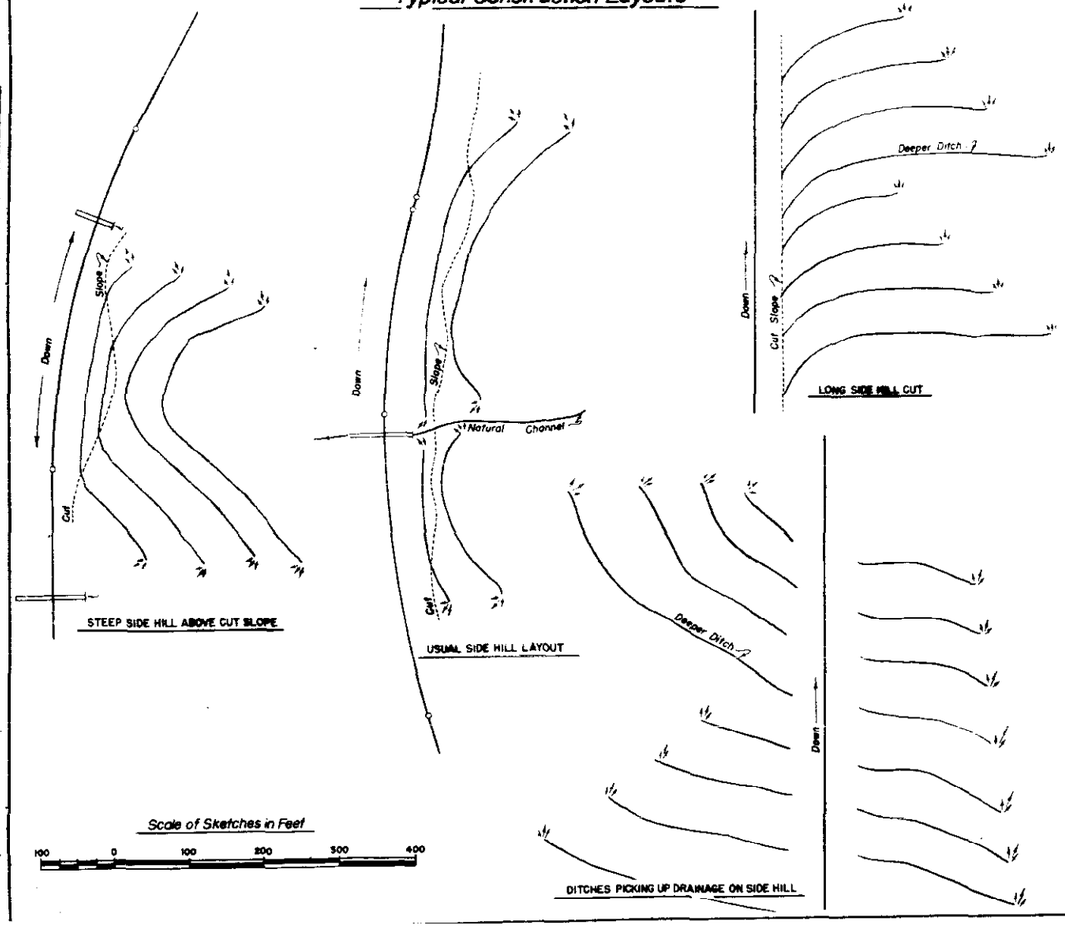
PURPOSE & USE OF THE TABLE

The primary purpose of the information for Contour and Intercepting Ditches shown on this sheet is to serve as a guide in construction and to readily arrive at yardages of excavation involved.

Foremost consideration in constructing these ditches is given first to the natural ground line slope confronted in construction, thence to the other values shown on the Typical Section.

By properly arriving at the combination of values shown on the Typical Section and in the Table for a specified condition, the number of cubic yards of excavation per 100 lin. ft. of ditch may be read under the appropriate column for this item.

Typical Construction Layouts



Scale of Sketches in Feet

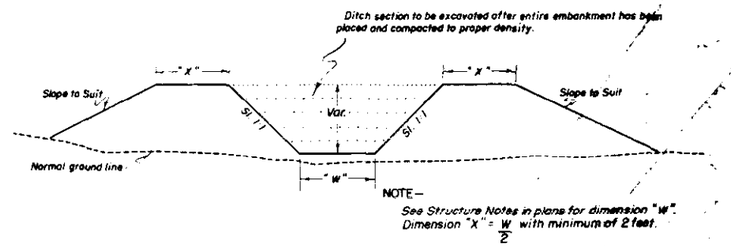
100 0 100 200 300 400

Table of Slopes and Yardages

▲ SLOPES Ground	A	B	C	H	Cubic Yards per 100 lin. ft. of Ditch
5:1 Or Flatter	2:1	4:1	2:1	15"	16
				18"	23
				21"	32
		3:1		15"	15
				18"	22
				21"	30
		2:1		15"	14
				18"	20
				21"	27
		1-1/2:1		15"	13
				18"	19
				21"	25
	1-1/2:1	4:1	1-1/2:1	15"	12
				18"	18
				21"	25
		3:1		15"	12
				18"	17
				21"	23
		2:1		15"	10
				18"	15
				21"	20
		1-1/2:1		15"	10
				18"	14
				21"	19
4:1	2:1	4:1	2:1	15"	17
				18"	25
				21"	34
		3:1		15"	17
				18"	24
				21"	32
		2:1		15"	15
				18"	22
				21"	30
		1-1/2:1		15"	15
				18"	21
				21"	29
	1-1/2:1	4:1	1-1/2:1	15"	13
				18"	18
				21"	25
		3:1		15"	12
				18"	17
				21"	23
		2:1		15"	11
				18"	16
				21"	21
		1-1/2:1		15"	10
				18"	14
				21"	20
3:1	2:1	3:1	2:1	15"	22
				18"	31
				21"	43
		2:1		15"	21
				18"	30
				21"	41
		1-1/2:1		15"	20
				18"	29
				21"	40
	1-1/2:1	3:1	1-1/2:1	15"	13
				18"	19
				21"	26
		2:1		15"	12
				18"	17
				21"	24
		1-1/2:1		15"	12
				18"	17
				21"	23
2:1	1-1/2:1	2:1	1-1/2:1	15"	20
				18"	29
				21"	40
		1-1/2:1		15"	20
				18"	28
				21"	39
	1:1	2:1	1:1	15"	9
				18"	13
				21"	17
		1-1/2:1		15"	8
				18"	12
				21"	16
1-1/2:1	1:1	1-1/2:1	1:1	15"	11
				18"	16
				21"	21

▲ *Slopes are approximate and may be varied to suit conditions encountered during construction.*

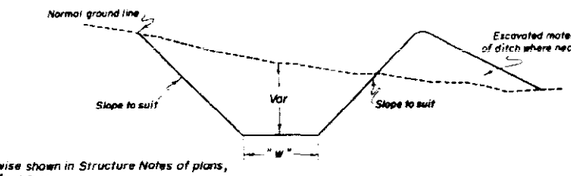
TYPICAL SECTIONS for DRAINAGE, IRRIGATION DITCHES and CHANNEL CHANGES



NOTE –
See Structure Notes in plans for dimension "W". Dimension "X" = W/2 with minimum of 2 feet.

For Embankment Sections

(Generally for use in Irrigation Ditches & Channel Changes)



NOTE –
Unless otherwise shown in Structure Notes of plans, dimension "W" = 1 foot.

For Cut Sections

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.

All ditches are to be constructed to lines and grades as staked by the Engineer using the ditch section shown on plans or as ordered by the Engineer.

CONTOUR INTERCEPTING DITCHES: *Ditches are to be laid out along the ground contour on a grade of not over 1% (Type of soil shall govern the grade).*

Ends of ditches are to be lined up so that concentration of flow from a higher contour ditch into one of lower contour is, as far as possible avoided. The use of a deeper ditch is recommended where this condition is encountered.

The following horizontal spacing of ditches is recommended:

4% to 6%	Approximately 70' Centers
8% to 10%	Approximately 60' Centers
20% to 4:1 Slope	Approximately 55' Centers
30% to 1-1/2:1 Slope	Approximately 50' Centers

Where ditch checks are required the intervening ditch between one set of ditch checks shall not exceed a grade of 1.0%. Details of checks will be shown on plans when required.

COLORADO
STATE HIGHWAY DEPARTMENT

Standard Types of Ditches and Construction Methods

Designed by C.G.M.	Approved by [signature]
Made by C.G.M.	Engineer, Surveys & Plans
Checked by	Date: Aug. 18, 1950

Rev. R.O.W. JRW 4/30/53
Added Accel. Lane, etc. 7/9/53 JRW

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 006-1 (11)	34	

UNIT 1

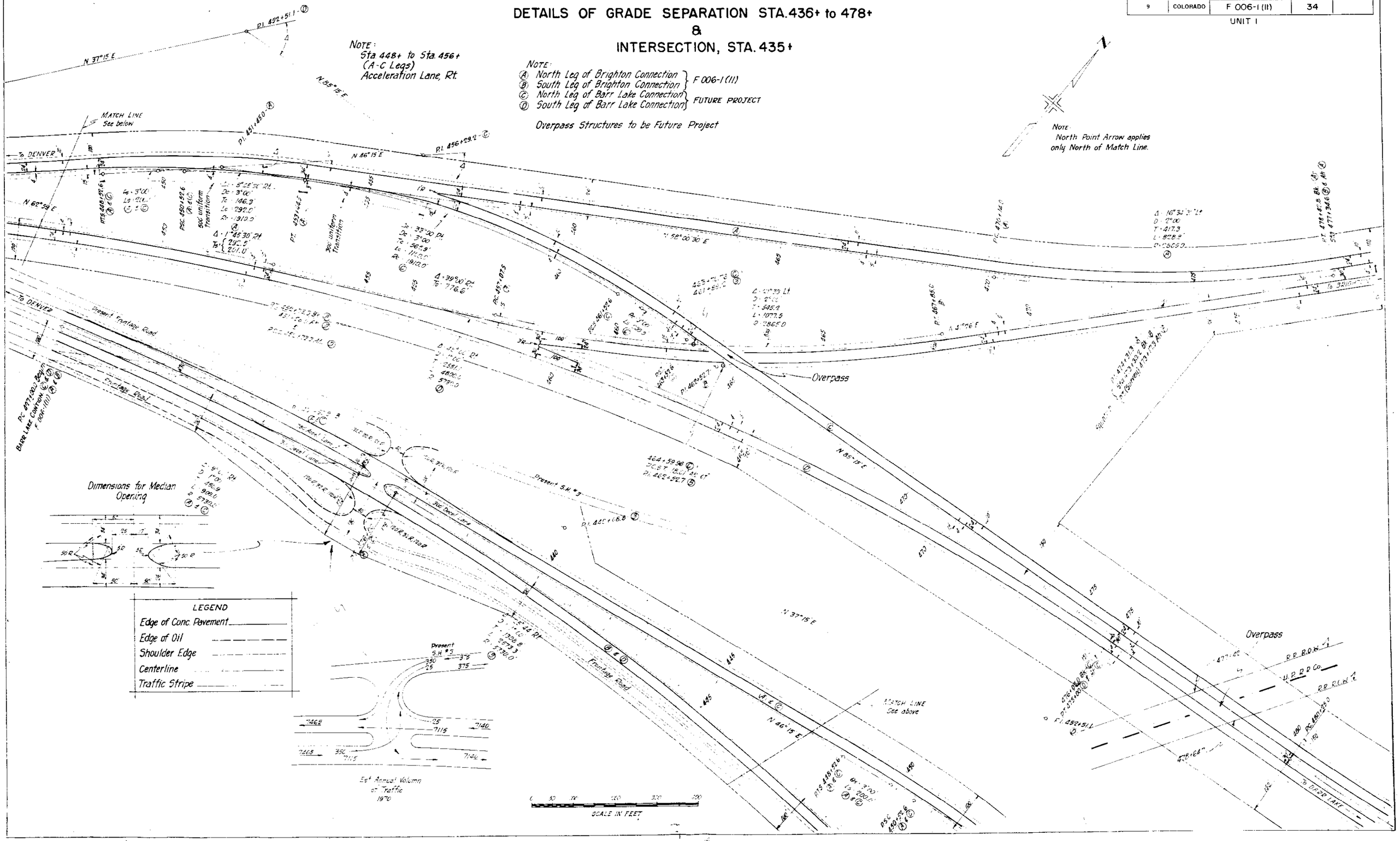
DETAILS OF GRADE SEPARATION STA. 436+ to 478+
&
INTERSECTION, STA. 435+

NOTE:
Sta 448+ to Sta 456+
(A-C Legs)
Acceleration Lane, Rt.

NOTE:
(A) North Leg of Brighton Connection } F 006-1 (11)
(B) South Leg of Brighton Connection }
(C) North Leg of Barr Lake Connection } FUTURE PROJECT
(D) South Leg of Barr Lake Connection }

Overpass Structures to be Future Project

NOTE:
North Point Arrow applies only North of Match Line.



FED. ROAD DIST. NO.	DIST.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11) UNIT I	35	

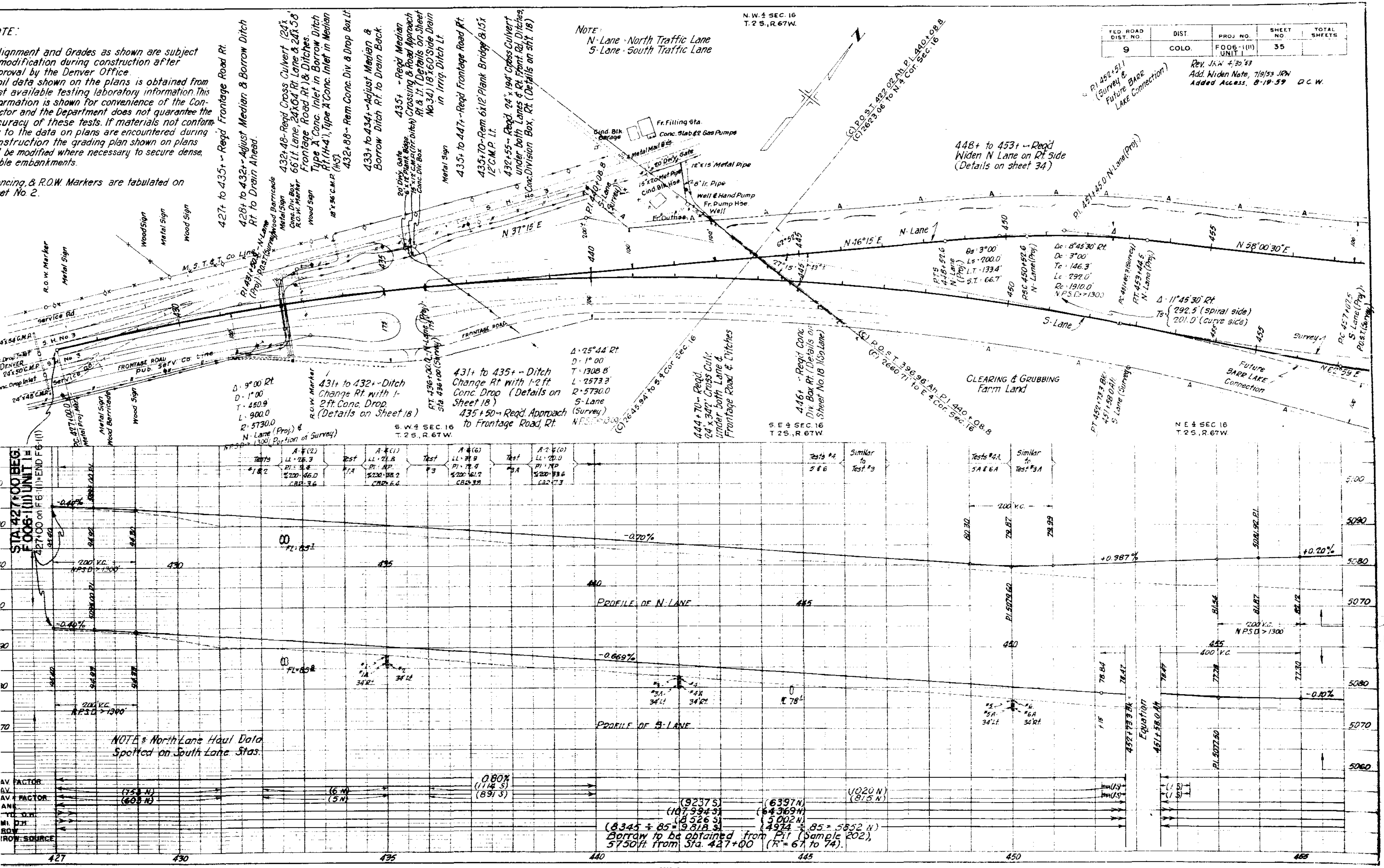
Rev. JKW 4/30/53
Add. Widen Note, 7/9/53 JRW
Added Access. 8-19-59 D.C.W.

NOTE:

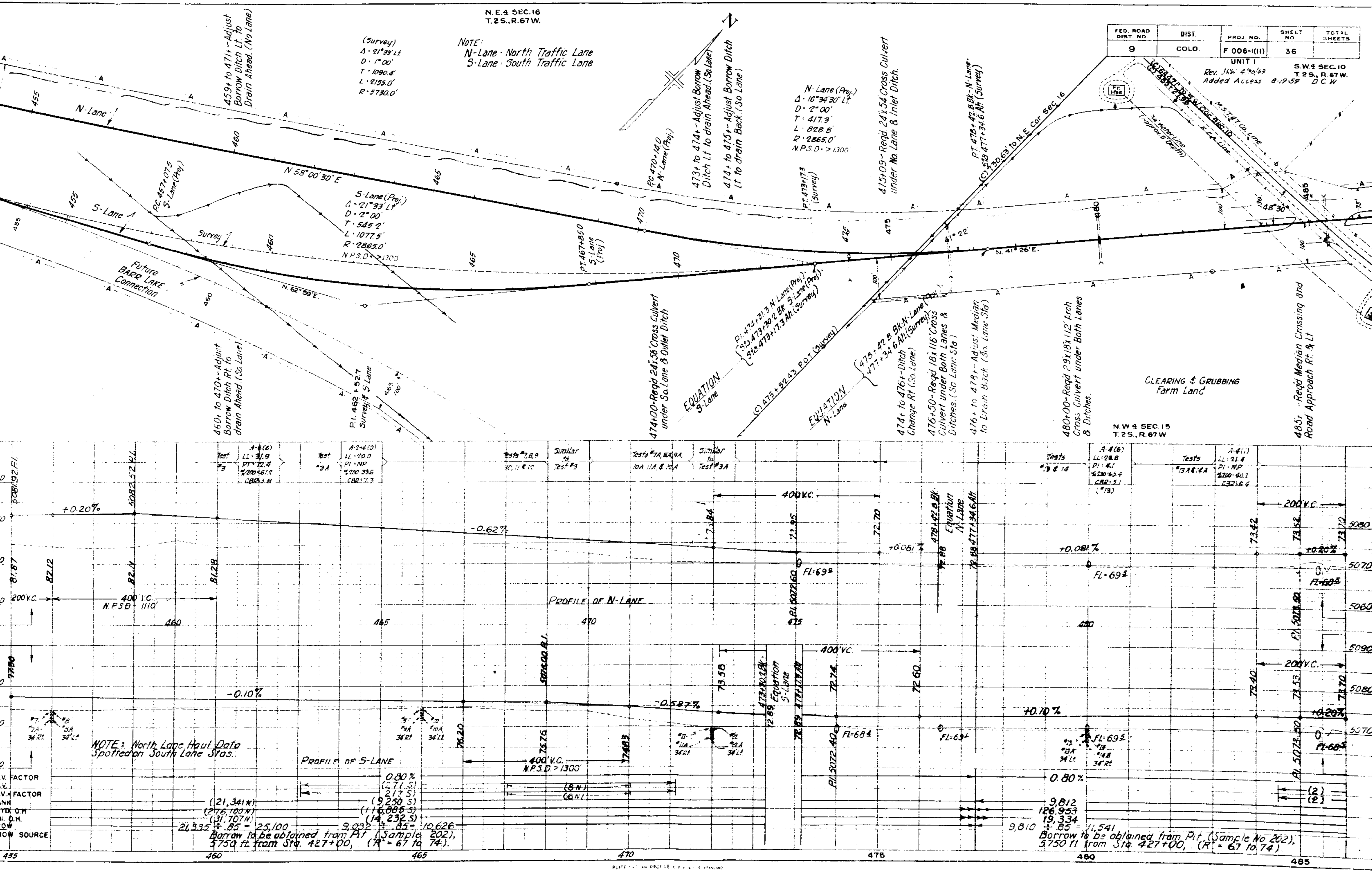
Alignment and Grades as shown are subject to modification during construction after approval by the Denver Office.
Soil data shown on the plans is obtained from best available testing laboratory information. This information is shown for convenience of the Contractor and the Department does not guarantee the accuracy of these tests. If materials not conforming to the data on plans are encountered during construction the grading plan shown on plans will be modified where necessary to secure dense, stable embankments.

Fencing, & R.O.W. Markers are tabulated on Sheet No. 2.

NOTE:
N-Lane - North Traffic Lane
S-Lane - South Traffic Lane

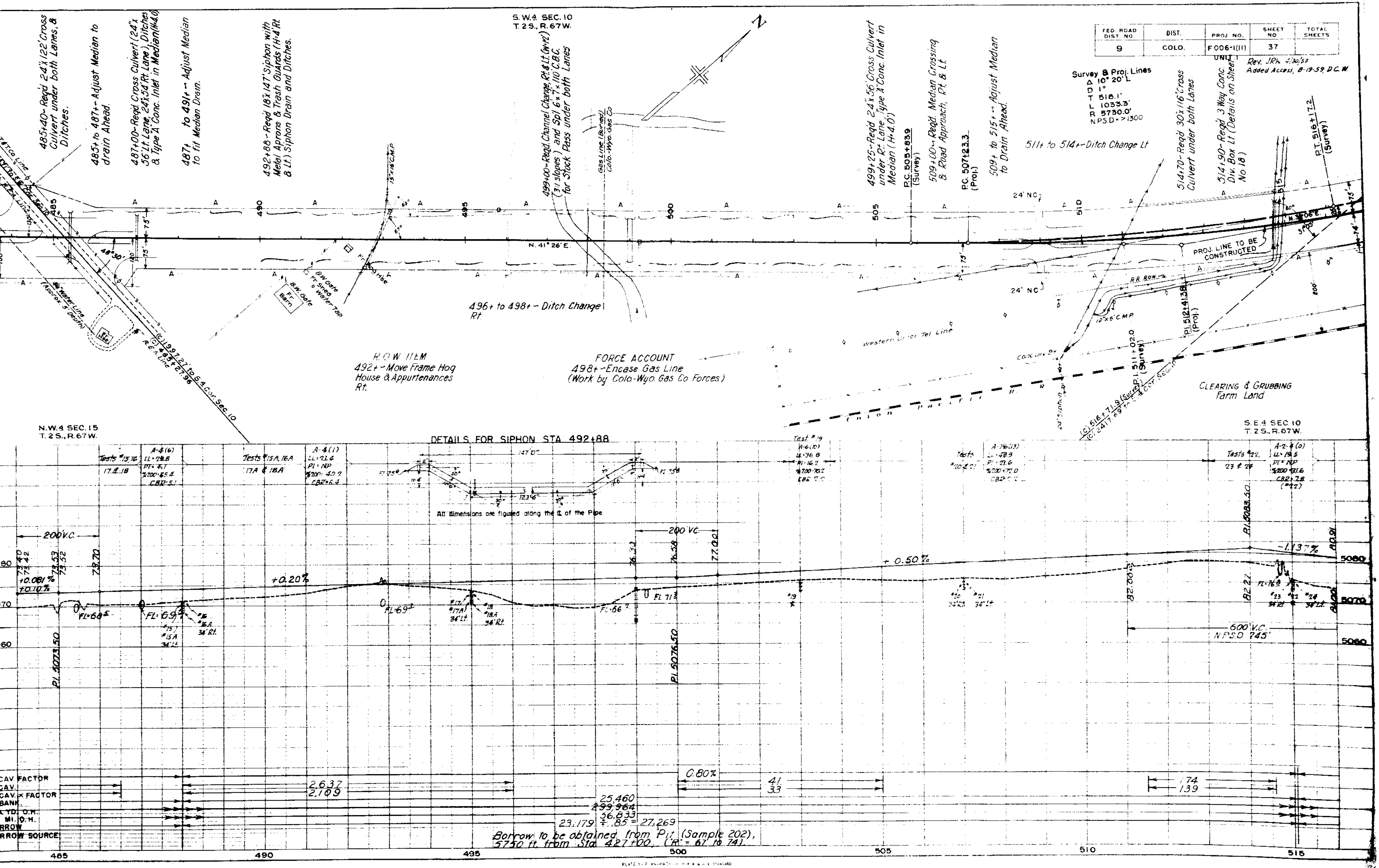


FED. ROAD DIST. NO.	DIST.	PROJ. NO.	SHEET NO	TOTAL SHEETS
9	COLO.	F 006-1(11) UNIT I	36	



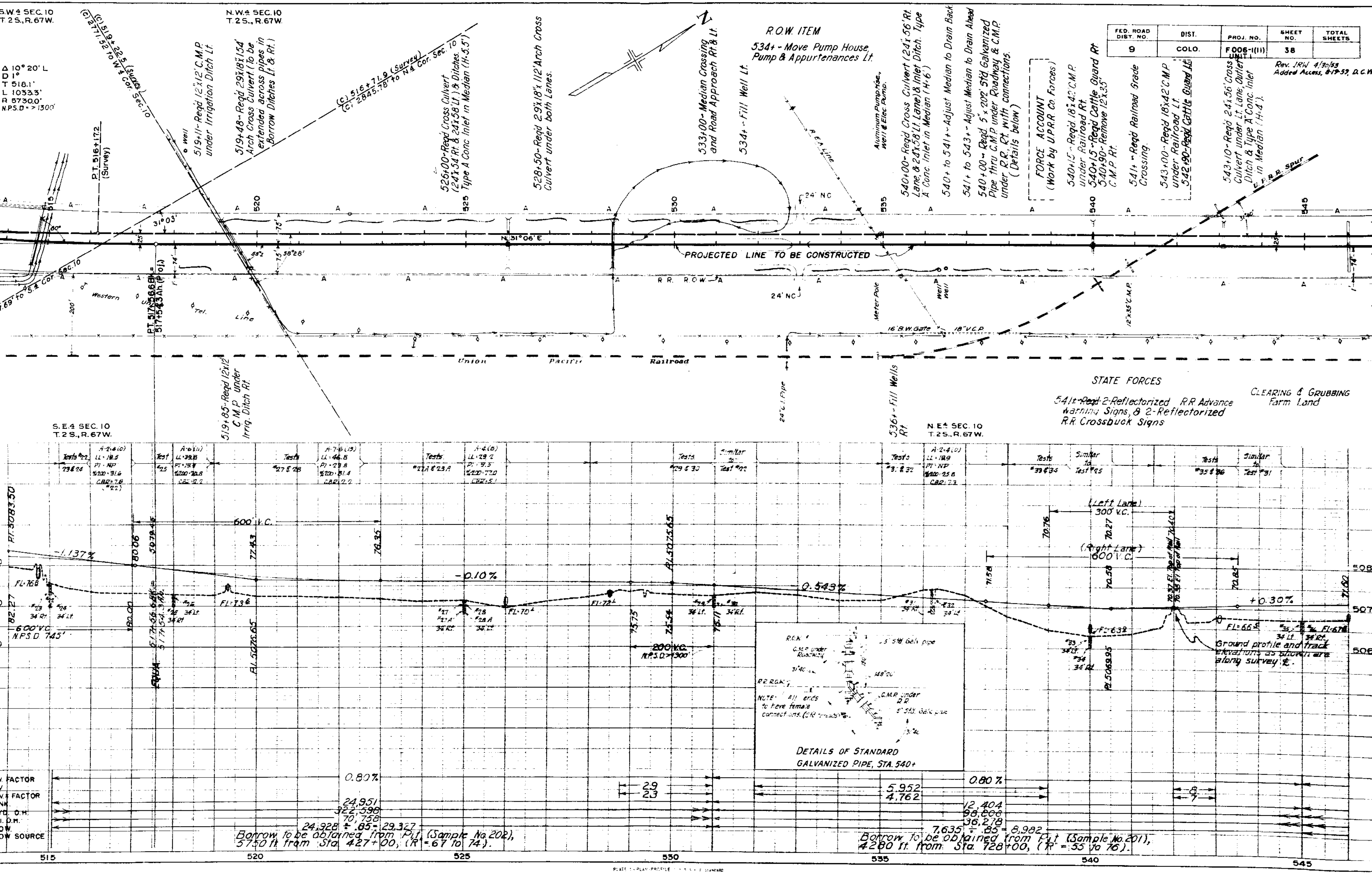
FED. ROAD DIST. NO.	DIST.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 006-1(11) UNIT 1	37	

Rev. JRW 4/30/58
Added Access, 8-19-59, D.C.W.



FED. ROAD DIST. NO.	DIST.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F006-1(11) UNIT 1	38	

Rev. JRW 4/30/53
Added Access, 8-19-59, D.C.W.



FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	39	

UNIT 1

Rev. JRW 4/30/58
Added Access. 8-19-59. D.C.W.

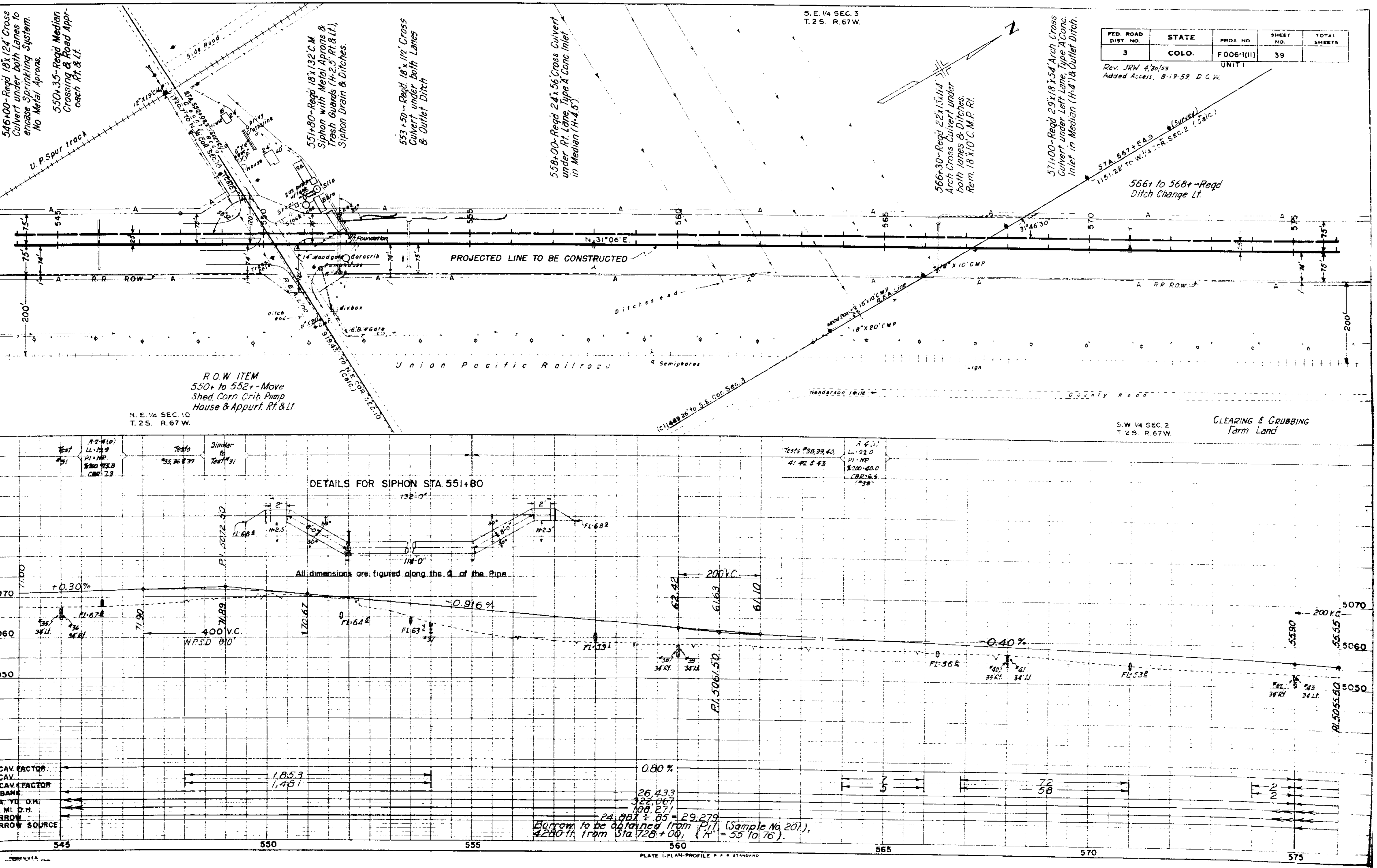
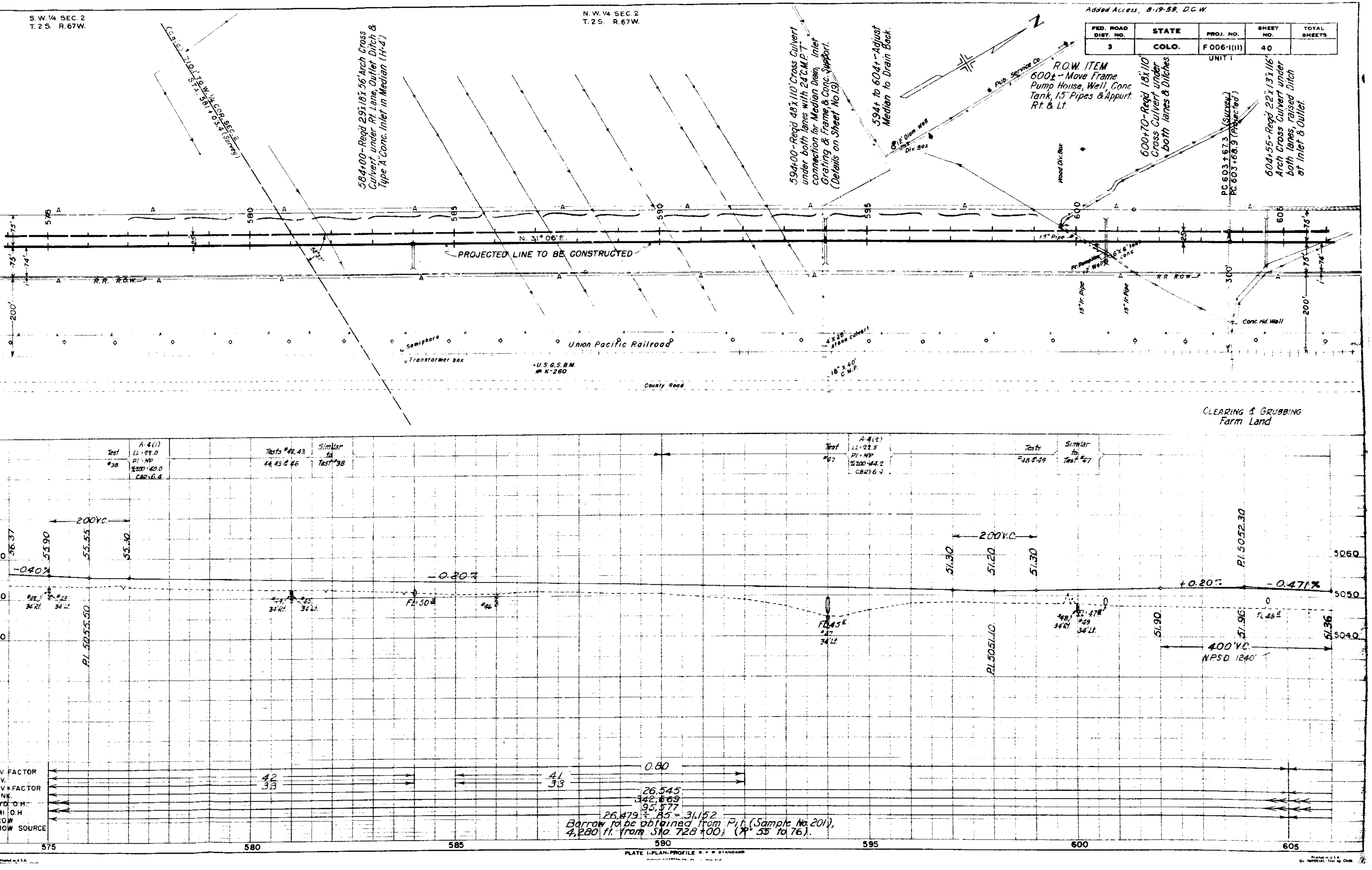


PLATE 1-PLAN-PROFILE

Added Access, 8-19-59, D.C.W.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	40	

UNIT I

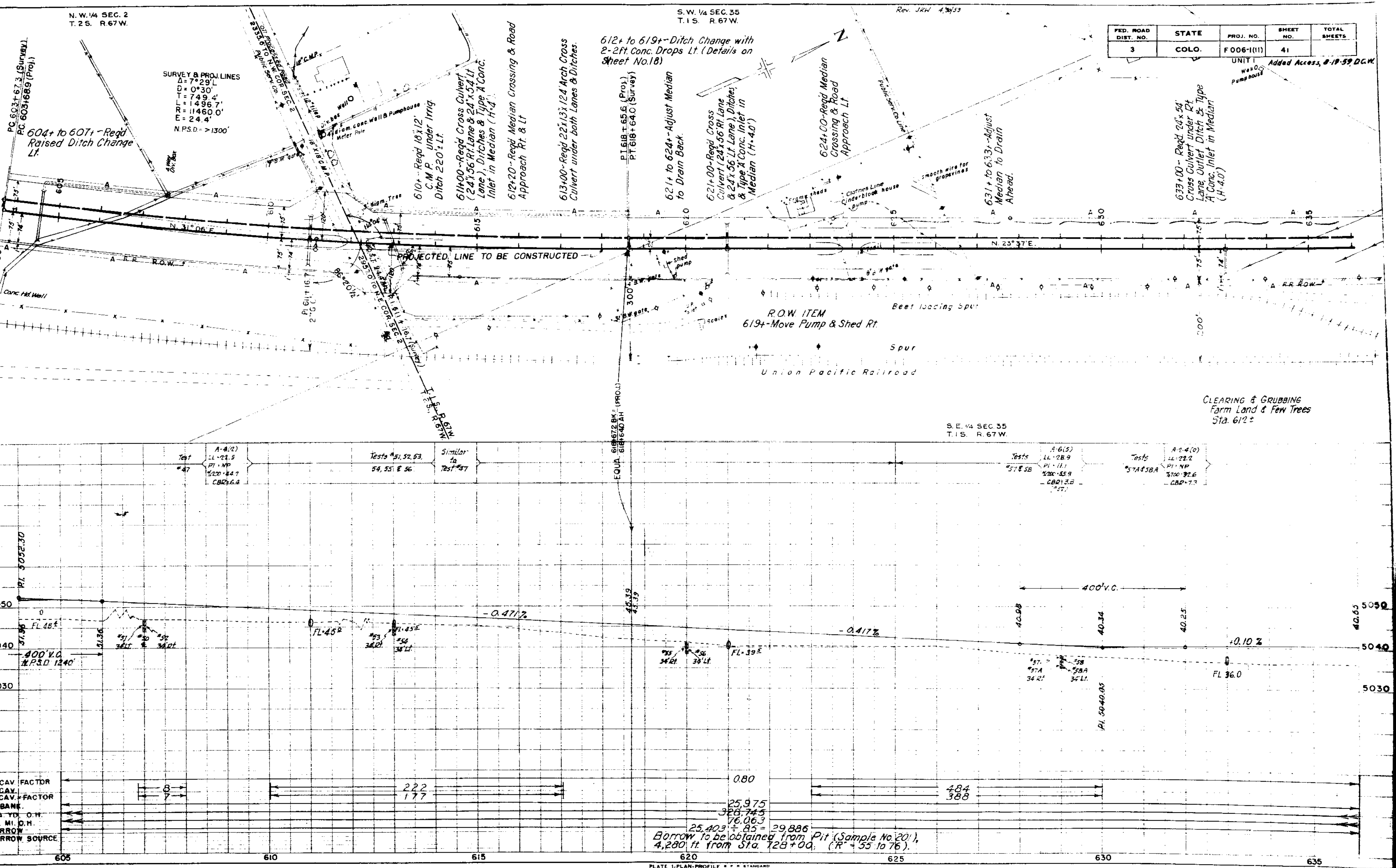


FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	41	

UNIT I

Added Access, 8-19-59 D.G.W.

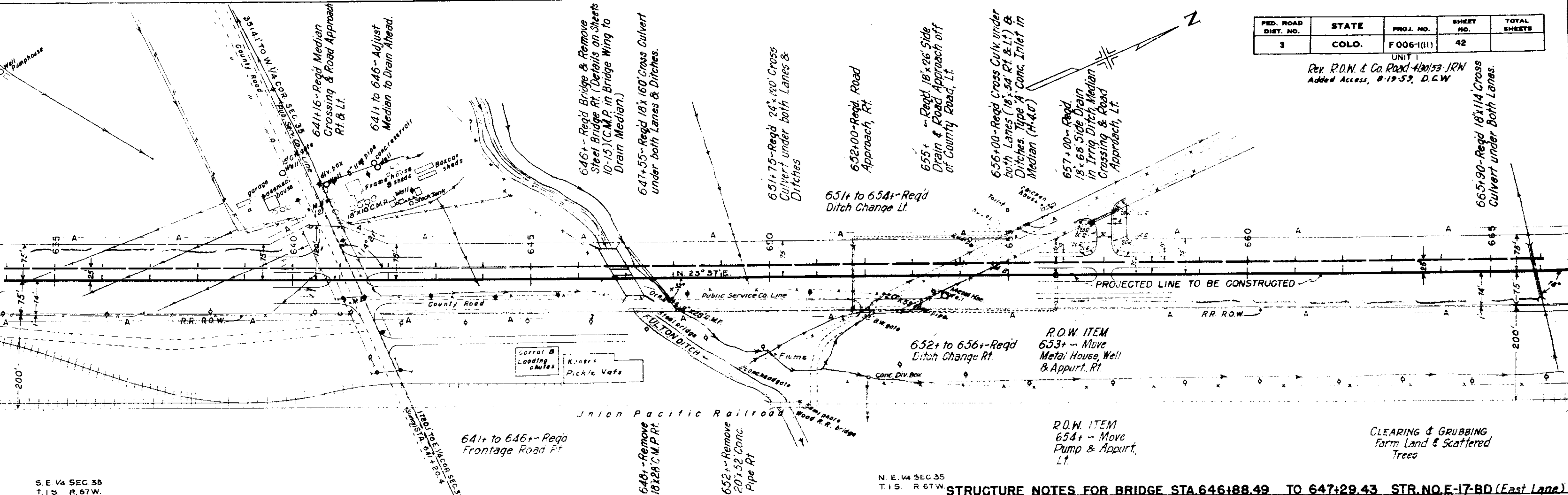
Rev. JRW 4/30/59



FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	42	

UNIT I

Rev. R.O.W. & Co. Road 4/30/53 JRW
Added Access, 8-19-59, D.G.W



STRUCTURE NOTES FOR BRIDGE STA. 646+55.0 TO 646+95.94 STR. NO. E-17-EU (West Lane)

PRESENT STRUCTURE:
SPAN -
CLEAR ROADWAY -
CLEAR WATERWAY -
TYPE OF SUPERSTRUCTURE -
TYPE OF SUBSTRUCTURE -
REQUIREMENTS AS TO REMOVAL -
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER - LOW WATER -
NORMAL STAGE - STREAM BED - 5032
DRIFT -
SCOUR -

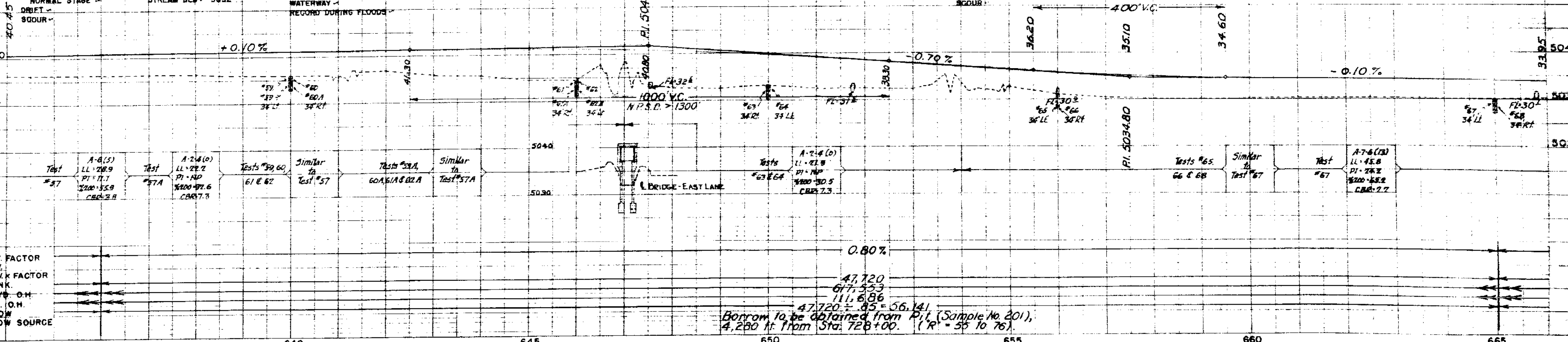
New Alignment

PROPOSED STRUCTURE:
POSITION REFERRED TO PRESENT STRUCTURE - NEW ALIGNMENT
SPAN - 1 @ 37'-0"
CLEAR ROADWAY - 36'-0"
CLEAR WATERWAY - 160 SQ. FT.
TYPE OF SUPERSTRUCTURE - CONC. & WF BEAMS
TYPE OF SUBSTRUCTURE - CONC. CANTILEVER ABUT'S.
DETOUR STRUCTURE REQUIREMENTS - NONE
R.R. SIDING - HENDERSON
HAUL TO BRIDGE SITE - 1 MILE
NEARBY STRUCTURES ON SAME STREAM:
LOCATION -
WATERWAY -
RECORD DURING FLOODS -

STRUCTURE NOTES FOR BRIDGE STA. 646+88.49 TO 647+29.43 STR. NO. E-17-BD (East Lane)

PRESENT STRUCTURE
SPAN - 1 @ 41'-0"
CLEAR ROADWAY - 18'-0"
CLEAR WATERWAY - 205 SQ. FT.
TYPE OF SUPERSTRUCTURE - CONC. & I BEAMS
TYPE OF SUBSTRUCTURE - CONC. GRAVITY ABUTS
REQUIREMENTS AS TO REMOVAL - REMOVE
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER - LOW WATER -
NORMAL STAGE - STREAM BED - 5032
DRIFT -
SCOUR -

PROPOSED STRUCTURE
POSITION REFERRED TO PRESENT STRUCTURE - 85' UPSTREAM
SPAN - 1 @ 37'-0"
CLEAR ROADWAY - 36'-0"
CLEAR WATERWAY - 160 SQ. FT.
TYPE OF SUPERSTRUCTURE - CONC. & WF BEAMS
TYPE OF SUBSTRUCTURE - CONC. CANTILEVER ABUTS
DETOUR STRUCTURE REQUIREMENTS - NONE
R.R. SIDING - HENDERSON HAUL TO BRIDGE SITE - 1 MILE
NEARBY STRUCTURES ON SAME STREAM:
LOCATION -
WATERWAY -
RECORD DURING FLOODS -



FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11) UNIT 1	43	

Rev. JRH 4/30/59
Added Access, 8-19-59, D.C.W.

667+00 - Reqd. 29"x18"x56' Arch Cross Culvert under Lt. Lane, Outlet Ditch & Type 'A' Conc. Inlet in Median (H=4.0')

670+30 - Reqd 22"x13"x124' Arch Cross Culvert under Both Lanes.

674+ to 677+ - Adjust Median to fit Median Drain.

677+00 - Reqd Arch Cross Culvert (29"x18"x54' Lt Lane), 29"x18"x54' Rt. Lane), Ditches & Type 'A' Conc Inlet in Median (H=4.0')

677+ to 680+ - Adjust Median to Drain Back.

680+65 - Reqd 18"x116' Cross Culvert under Both Lanes & Ditches.

681+00 - Reqd Median Crossing & Road Approach Rt & Lt.

681+ to 685+ - Adjust Median to Drain Ahead.

684+55 - Reqd 18"x128' Cross Culvert under Both Lanes.

685+00 - Reqd 29"x18"x56' Arch Cross Culvert under Lt Lane, Outlet Ditch & Type 'A' Conc. Inlet in Median (H=4.0')

685+ to 693+ - Adjust Median to fit Median Drain.

694+00 - Reqd Cross Culvert (24"x54" Rt. Lane, 24"x54" Lt Lane), Outlet Ditch & Type 'A' Conc. Inlet in Median (H=4.0')

694+ to 698+ - Adjust Median to Drain Back.

S. E. 1/4 SEC. 26 T. 1 S. R. 67 W.

N. 23° 37' E.

PROJECTED LINE TO BE CONSTRUCTED

24' NC

R.R. R.O.W.

Conc. Div. Box

12" x 12" 118 pipe

Union Pacific Railroad

Conc Check 18"x5' V.C.P.

5' diam Well & Pump

5' diam conc reservoir

2 Conc. Checks

18" cast iron pipe

Public Service Co. Line

Semaphore

CLEARING & GRUBBING
Farm Land

N. E. 1/4 SEC. 35 T. 1 S. R. 67 W.

S. W. 1/4 SEC. 25 T. 1 S. R. 67 W.

Well

Test #67 — A-7-6(13) LL = 65.8 PI = 28.2 %200 = 65.2 CBR = 2.2

Tests #68, 69, 70, 71, 72, 73 & 74 — Similar to Test #67

Test #75 — A-7-6(15) LL = 46.9 PI = 24.1 %200 = 88.4 CBR = 2.0

Tests #76, 77 & 78 — Similar to Test #75

-0.10%

+0.10%

-0.10%

200' V.C.

200' V.C. NPSD = 1300'

CAV. FACTOR	0.80%
CAV	8
CAV. X FACTOR	7
BANK	33,181
TO. O.H.	421,649
MI. O.H.	52,283
ROW	33,164 + .85 = 39,016
ROW SOURCE	Borrow to be obtained from P.I. (Sample No 201), 4,280 ft. from Sta. 728+00, (R = 35 'a 76)

665 670 675 680 685 690 695

PLATE I. PLAN-PROFILE B. P. R. STANDARD

EUGENE DIETZGEN CO. Chicago New York

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F006-1(11)	44	

Added Access, 8-19-59, D.C.W. UNIT-1

697+50- Reqd 24'x118' Cross Culvert under Both Lanes & Ditches.

697+60- Reqd 24'x122' Cross Culvert under Both Lanes & Ditches

698+70- Reqd Median Crossing & Road Approach Rt & Lt, 24'x36' Side Drain Rt & Remove 24'x54' C.M.P. Rt.

6.99+70- Reqd 24'x122' Cross Culvert under Both Lanes & Ditches.

702+30- Reqd 24'x112' Cross Culvert under Both Lanes & Ditches.

702+ to 704+- Reqd Ditch Change Lt.

706+50- Reqd 29'x18'x118' Arch Cross Culvert under Both Lanes & Ditches.

709+00- Reqd 24'x54' Cross Culvert under Rt. Lane, Outlet Ditch & Type 'A' Conc. Inlet in Median (H-4.8')

713+38- Reqd 18'x130' Cross Culvert under Both Lanes.

714+50- Reqd Median Crossing & Road Approach Rt. & Lt.

699+ to 702+- Reqd Ditch Change Rt.

702+ to 706+- Reqd Ditch Change Rt.

717+ Remove 12'x12'x70' Wood Flume Rt.

717+ to 731+- Reqd- Channel Change Rt. (W=41') with 3-Timber Ditch Checks. Conc. Slope Paving Rt of Sta 717+ & 730+. (Details on Sheets No. 2 & 17)

CLEARING & GRUBBING
Farm Land, Light Brush & Scattered Trees

Union Pacific Railroad

R.R. ROW

PROJECTED LINE TO BE CONSTRUCTED

N 23° 37' E

S.W. 1/4 SEC. 25 T. 1 S. R. 67 W.

N.W. 1/4 SEC. 25 T. 1 S. R. 67 W

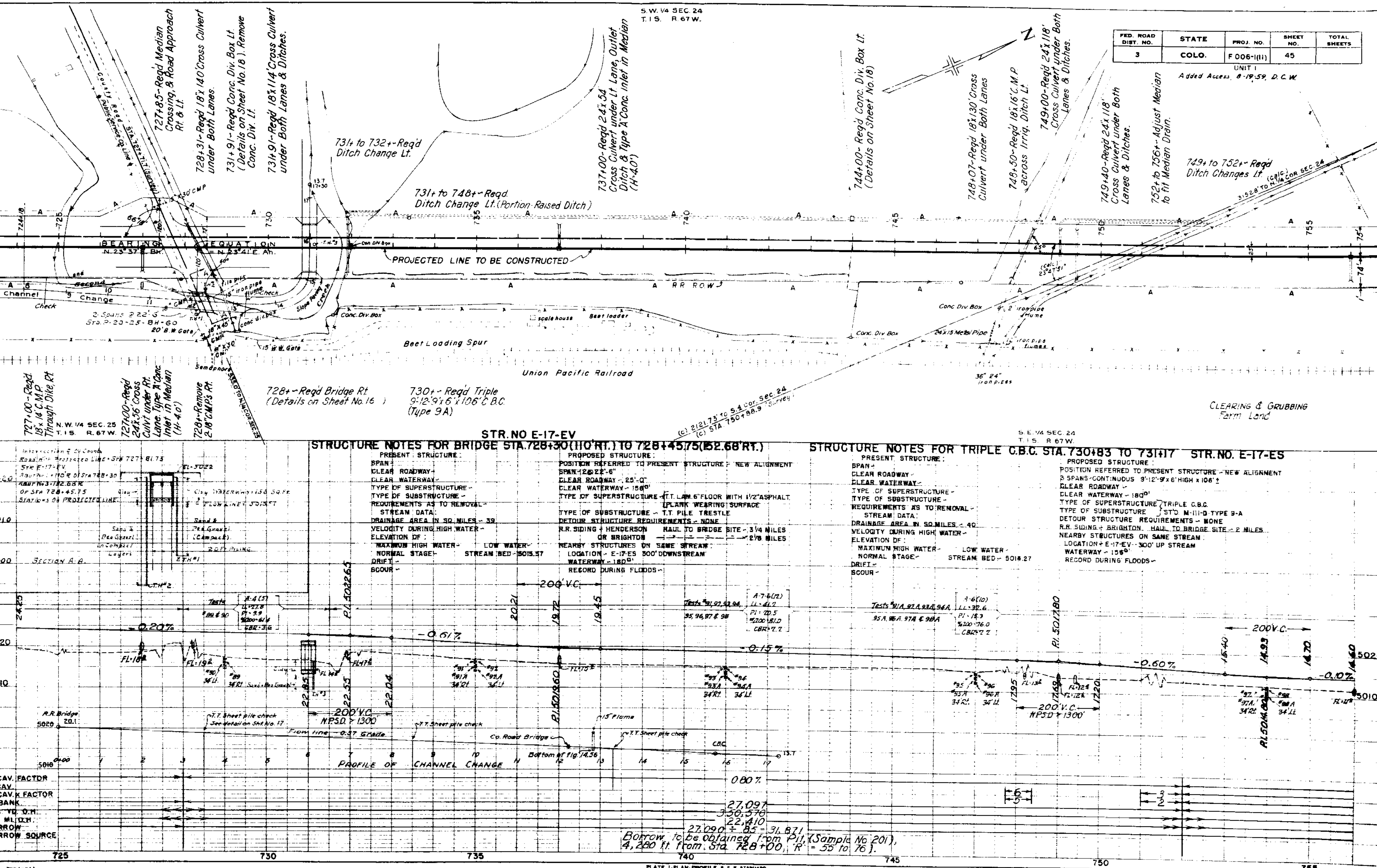
Borrow to be obtained from Pit (Sample No. 201), 4,280 ft from Sta. 728+00, (R = 55 to 76).

PLATE I-PLAN-PROFILE B.P.R. STANDARD

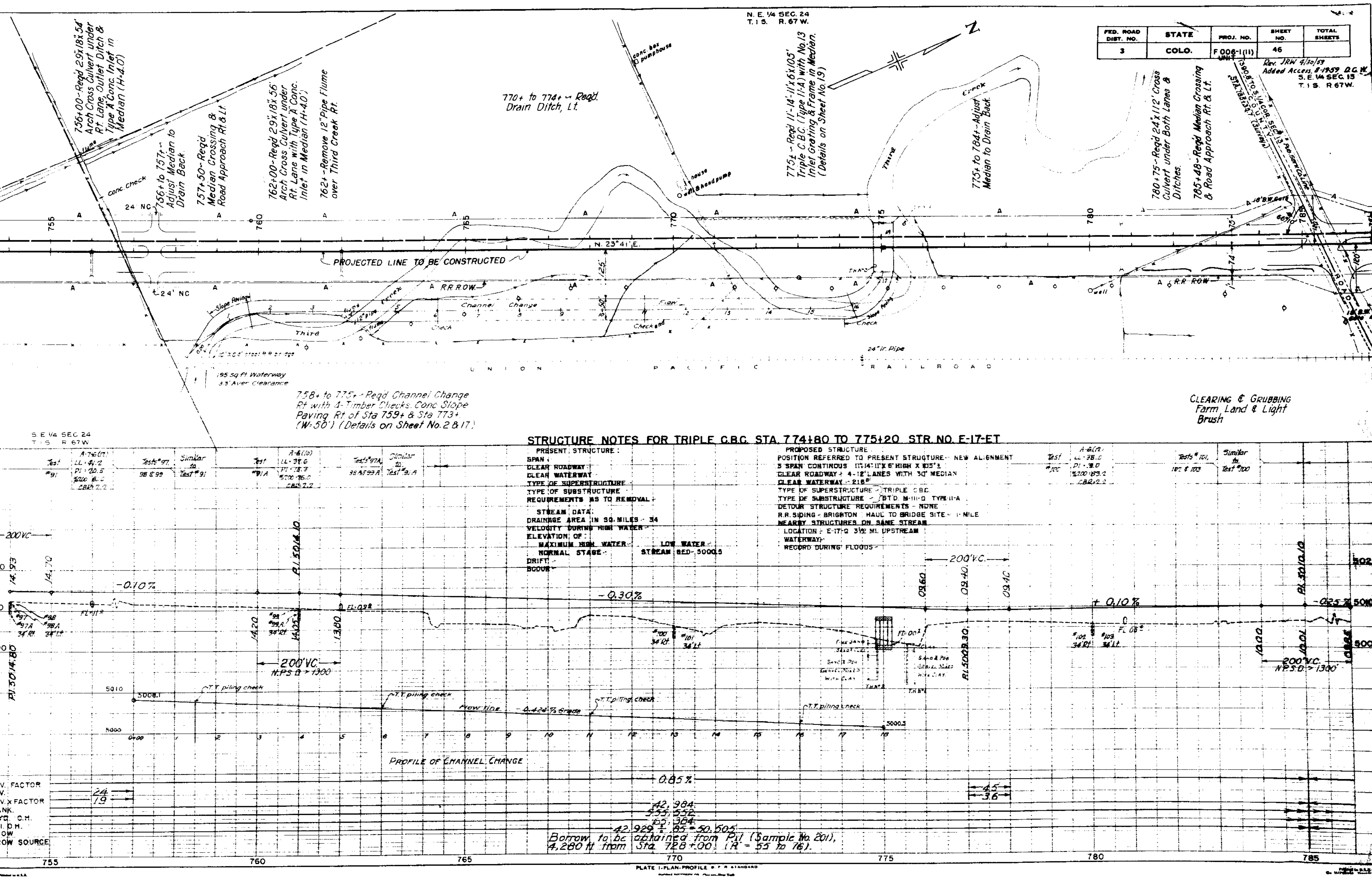
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	45	

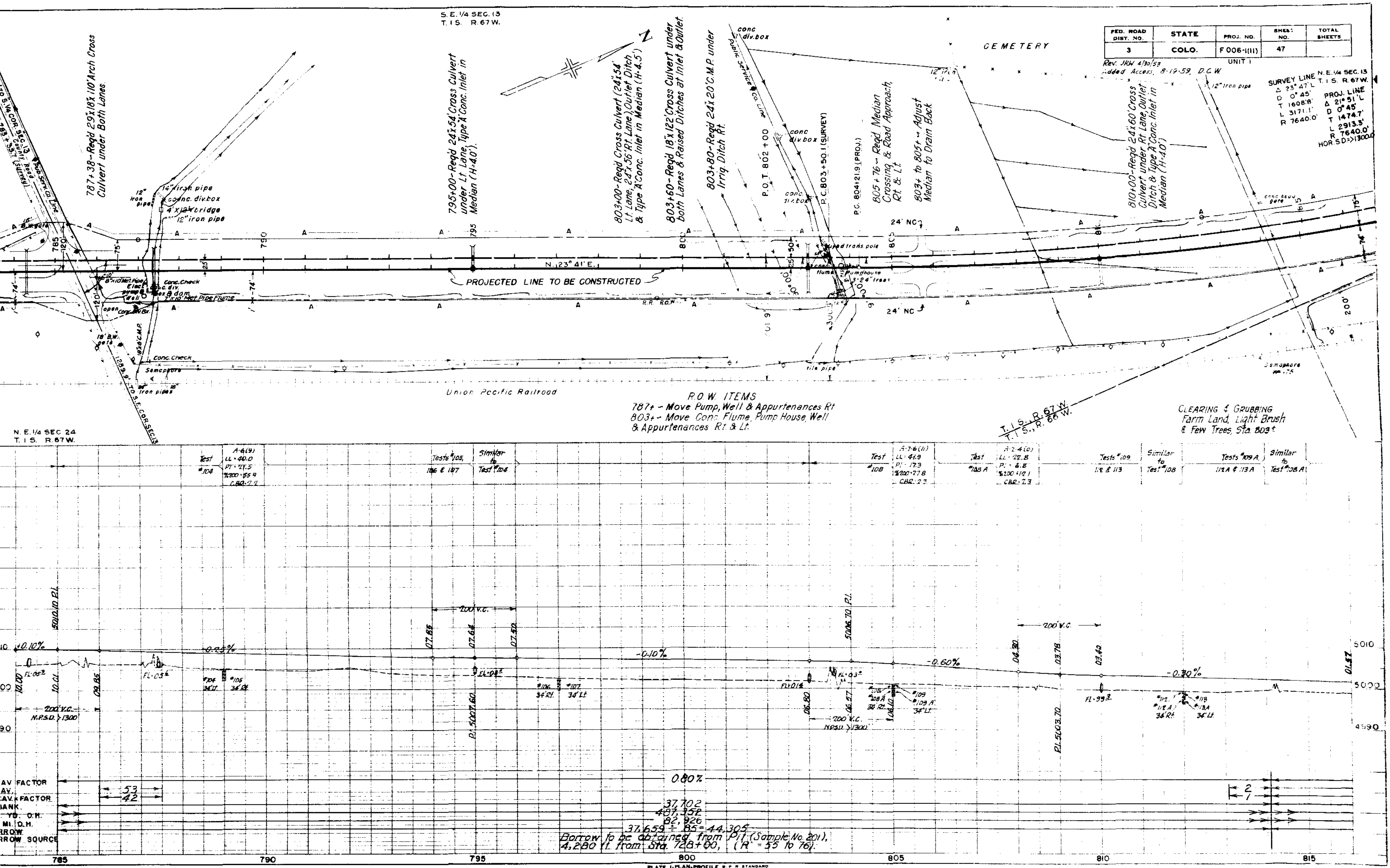
UNIT I

Added Access, 8-19-59, D.C.W.



FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11) UNIT	46	

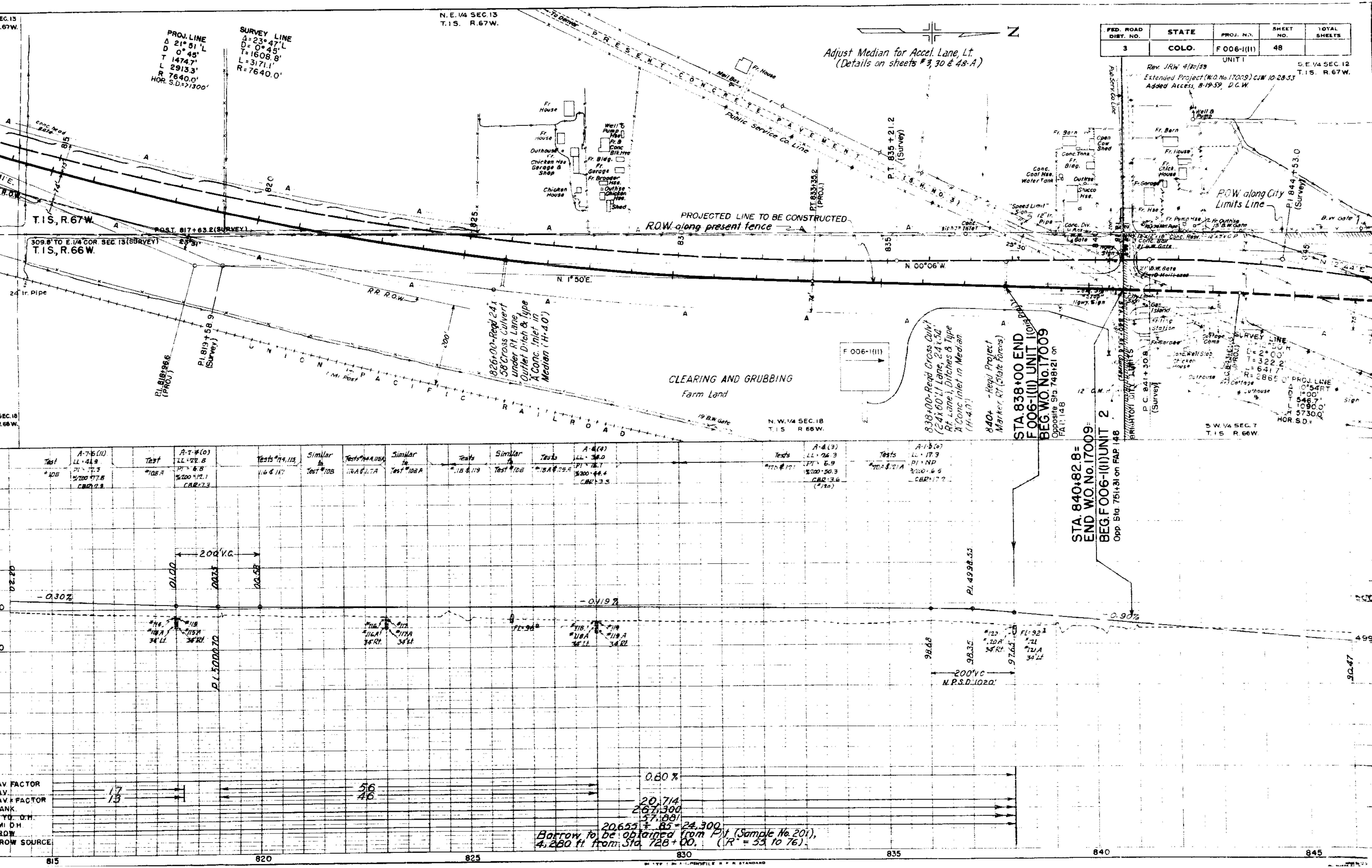




FED. ROAD DIST. NO. 3
STATE COLO.
PROJ. NO. F 006-1(11)
SHEET NO. 47
UNIT I
Rev. JRW 4/30/53
Added Access 8-19-59 D.C.W.
S.E. 1/4 SEC. 13 T.1 S. R.67 W.
CEMETERY
SURVEY LINE
Δ 23° 47' L
D 0° 45'
T 1608.8'
L 3171.1'
R 7640.0'
PROJ. LINE
Δ 21° 51' L
D 0° 45'
T 1474.7'
L 2913.3'
R 7640.0'
HOR. S.D.>1300
N.E. 1/4 SEC. 13 T.1 S. R.67 W.
787+38 - Req'd 29'x18'x110' Arch Cross Culvert under Both Lanes
795+00 - Req'd 24"x54' Cross Culvert under Lt. Lane, Type 'A' Conc. Inlet in Median (H-4.0')
803+00 - Req'd Cross Culvert (24"x54' Lt. Lane, 24"x56' Rt. Lane) Outlet Ditch & Type 'A' Conc. Inlet in Median (H-4.5')
803+60 - Req'd 18"x122' Cross Culvert under both Lanes & Raised Ditches at Inlet & Outlet
803+80 - Req'd 24"x20' C.M.P. under Irrig. Ditch Rt.
P.O.T. 802+00
P.C. 803+50.1 (SURVEY)
P.C. 804+21.9 (PROJ.)
805+76 - Req'd Median Crossing & Road Approach Rt. & Lt.
803+ to 805+ - Adjust Median to Drain Back
810+00 - Req'd 24"x60' Cross Culvert under Rt. Lane Outlet Ditch & Type 'A' Conc. Inlet in Median (H-4.0')
N. 23° 41' E.
PROJECTED LINE TO BE CONSTRUCTED
24' NC
R.R. R.O.W.
Union Pacific Railroad
R.O.W. ITEMS
787+ - Move Pump, Well & Appurtenances Rt.
803+ - Move Conc. Flume, Pump House, Well & Appurtenances Rt. & Lt.
CLEARING & GRUBBING
Farm Land, Light Brush & Few Trees, Sta. 803+
T.1 S., R.67 W.
T.1 S., R.66 W.
N.E. 1/4 SEC. 24 T.1 S. R.67 W.
Test #104 A-6(9) LL-40.0 PI-21.5 %200-55.9 CBR-2.2
Tests #105, 106 & 107
Similar to Test #104
Test #108 A-7-6(11) LL-41.9 PI-17.3 %200-77.8 CBR-2.2
Test #108A A-2-4(0) LL-22.8 PI-6.8 %200-12.1 CBR-2.3
Tests #109, 112 & 113
Similar to Test #108
Tests #109A, 112A & 113A
Similar to Test #108A
+0.10%
-0.25%
-0.10%
-0.60%
-0.30%
200' V.C.
M.P.S.D.>1300
P.I. 5010.10
P.I. 5007.60
P.I. 5006.70
P.I. 5003.70
0.80%
37,702
497,352
82,926
37,659 + 85 = 44,305
Borrow to be obtained from Pit (Sample No. 201), 4,280 ft. from Sta. 728+00, (R = 55 to 76).
5010
5000
4990
785
790
795
800
805
810
815
PLATE 1-PLAN-PROFILE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 006-1(11)	48	

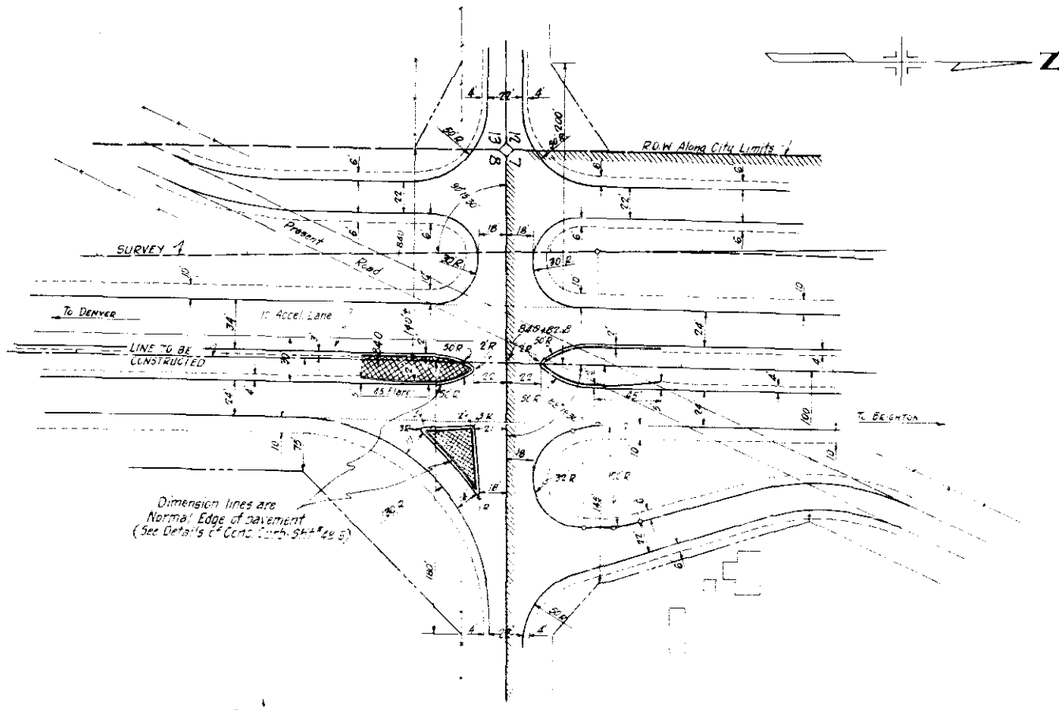
UNIT I

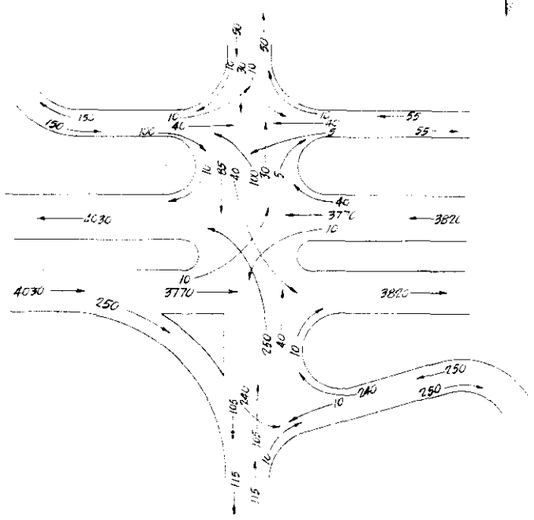


FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	F 006-1 (11)	48-A	

Added Sheet JRW 4/30/53
Rev. Median Opening & Heading JRW 10/28/53

DETAILS OF INTERSECTION
STA. 840+
(Ultimate Design)





Estimated Volume of Traffic per day for 1970

LEGEND

- Edge of Pavement
- Edge of Traffic Lane
- Shoulder Edge
- Curbed Island
- Right of Way
- City Limits
- Present Fence
- Direction of Traffic (25)
- Concrete Curb

0 50 100 150
Scale in Feet

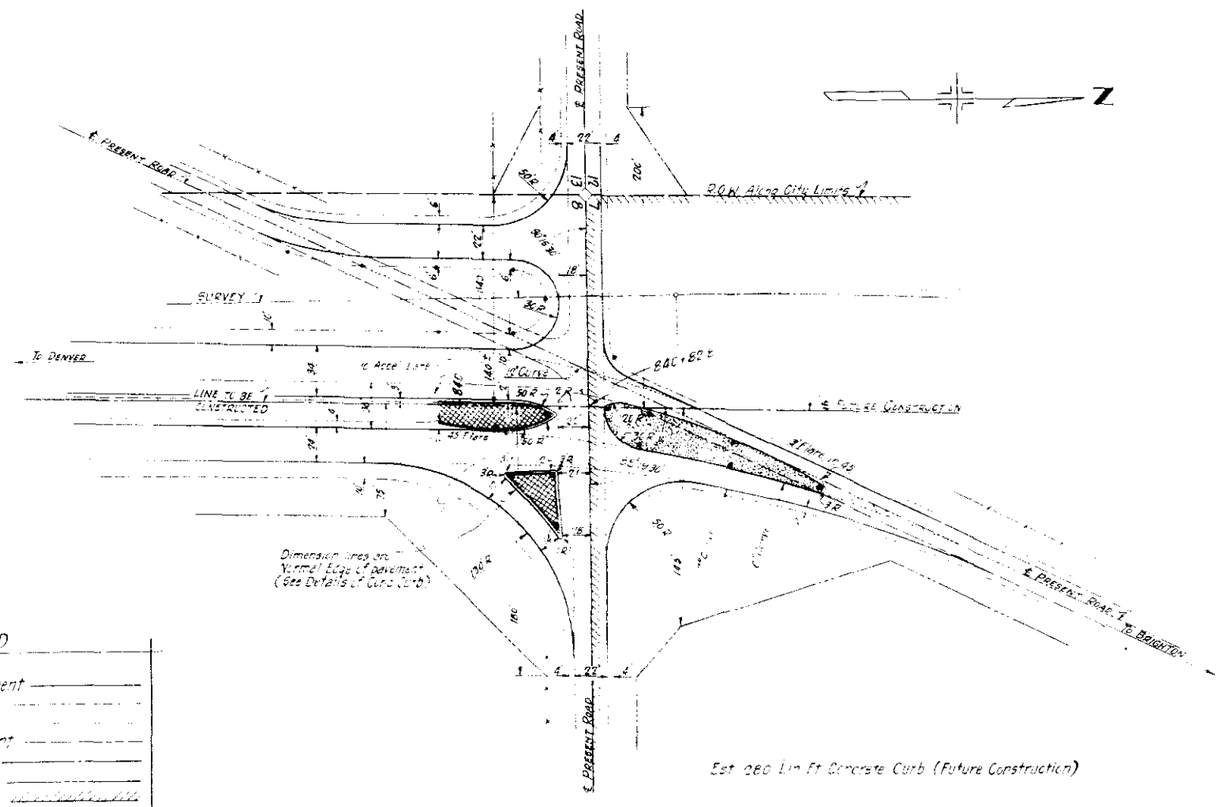
OF HIGHWAYS

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	F 006-1(11)	48-B	

Added sheet (W.O. No. 17009) JRW 10/28/53

DETAILS OF APPROACH TO PROJECT, STA. 840+

(For Ultimate Design see sheet #48A)



Est 280 Lin Ft Concrete Curb (Future Construction)

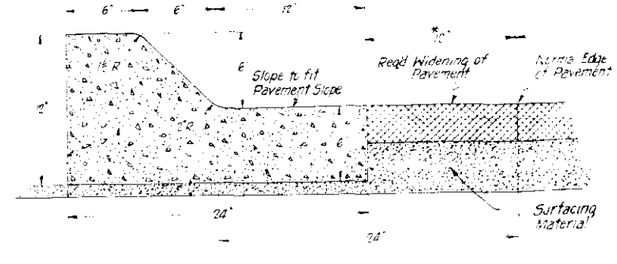
LEGEND

- Edge of Proposed Pavement
- Edge of Shoulder
- Edge of Traffic Lane
- Edge of Present Pavement
- Centerline of Project
- Right of Way
- City Limits
- Concrete Curb
- Curbed Island
- Present Fence
- Denied to Traffic
- Uncurbed Island
- Guard Posts

SCALE IN FEET

NOTE:
Pavement, Conc. Curb, Guard Posts, material in islands and removing present conc. pavement to be future construction.

DETAILS OF CONCRETE CURB



* Variable in areas marked Flare

Excavation Cu. Yds.	Excavation Area	Embankment Area	Embankment Cu. Yds.

SUMMARY OF E

EXCAVATION

FROM CROSS SECTIONS	5
BORROW	
LIST OF STRUCTURES AS EXCAVATION	
" " " " EMBANKMENT	
ESTIMATED FOR CUT SLOPE TREATMENT	
ESTIMATED FOR OVERBREAK AND SUBSIDENCE	
ESTIMATED FOR COVERING ENDS OF CULVERTS	
TOTAL	5

EXCAVATION × FACTOR

BORROW × FACTOR

	TL
	131,8
TOTAL	445,84

EMBANKMENT

FROM CROSS SECTIONS	13, 84

STATION YARD OVERHAUL

FROM MASS DIAGRAM	5,588,220
ESTIMATED FOR OVERBREAK AND SUBSIDENCE	558,822
ESTIMATED FOR MANIPULATION OF MATERIAL	9,359
ESTIMATED FOR STRUCTURE BACKFILL	25,806
TOTAL	6 182 207

YARD MILE OVERHAUL

FROM MASS DIAGRAM	949, 757
ESTIMATED FOR OVERBREAK AND SUBSIDENCE	94,576
ESTIMATED FOR MANIPULATION OF MATERIAL	367
ESTIMATED FOR STRUCTURE BACKFILL	4 317
TOTAL	1 049 317