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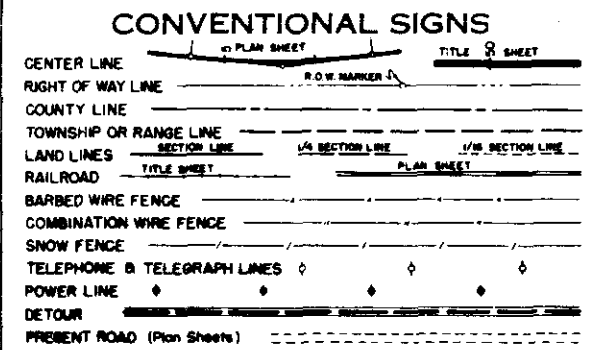
TITLE SHEET

COLORADO DEPARTMENT OF HIGHWAYS

ROW PURCHASED UNDER
PROJECT NO. F004-1(27)

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 004-1(32)	1	

Added New Sheet-Work Order No. 2829, 8-20-64 J.R.W.



PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO. F 004-1(32) STATE HIGHWAY NO. 1 JEFFERSON AND BOULDER COUNTIES

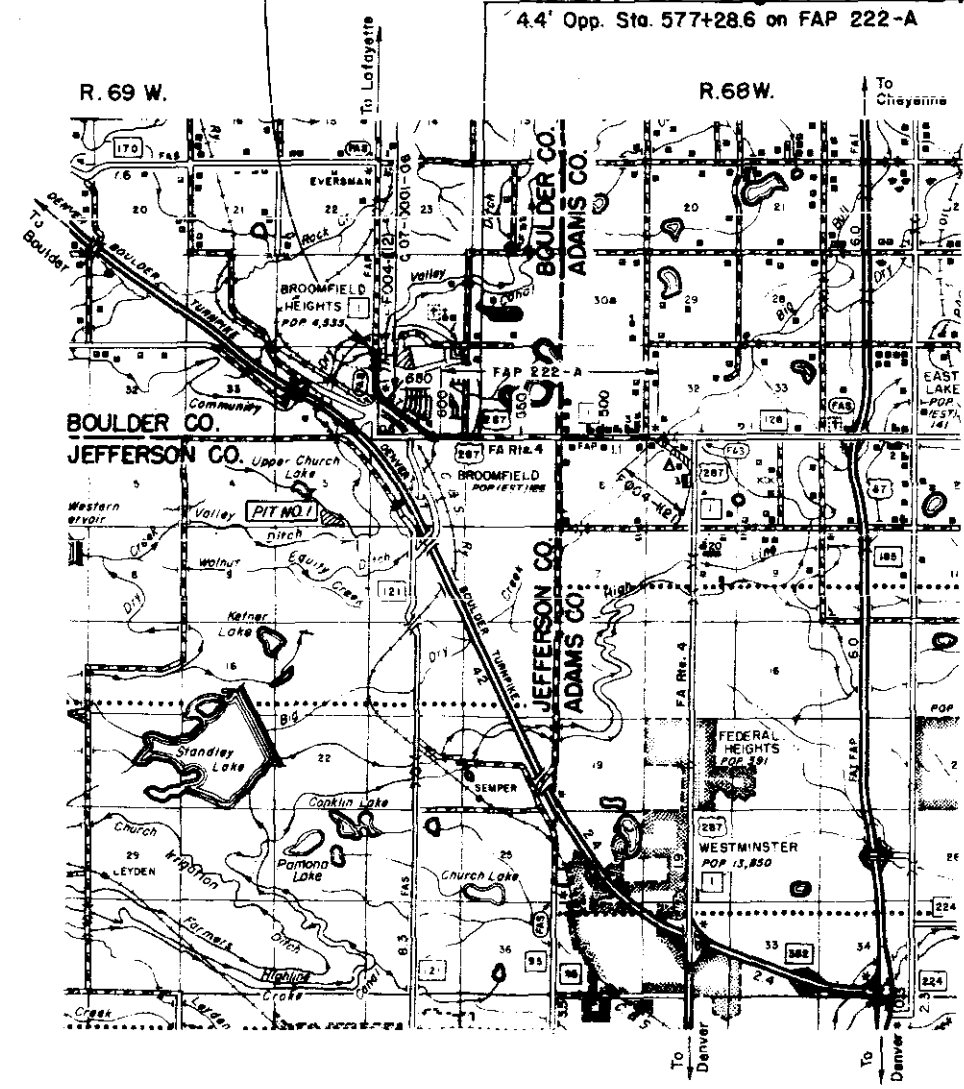
SCALES OF ORIGINAL DRAWINGS
ON PLAN. 1 IN. = 100 FT. & 50 FT.
ON PROFILE 1 IN. = 100 FT. HORIZONTAL (50 FT. IN BROOMFIELD)
1 IN. = 10 FT. VERTICAL (5 FT. IN BROOMFIELD)
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

Sta. 673+74.0 End F 004-1(32)=
27' Opp. Sta. 673+66.9 on F 004-1(12)

Sta. 577+20 Begin F 004-1(32)=
4.4' Opp. Sta. 577+28.6 on FAP 222-A

TABULATION OF LENGTH AND DESIGN DATA

STATION	58 FT. ROADWAY	48 FT. ROADWAY
	LIN. FT.	LIN. FT.
Sta. 577+20 BEGIN F004-1(32)=BEGIN 58' Rdwy. 4.4' Opp. Sta. 577+28.6 on FAP 222-A		
PT. 579+11.5 Bk.= EQUA. POT. 579+20 Ah.	1915	
PT. 596+23.8 Bk.= EQUA. Sta. 596+23.7 Ah.	17038	
ST. 605+99.7 Bk.= EQUA. Sta. 606+03.9 Ah. Sta. 633+010 END 58' Rdwy BEGIN 48' Rdwy.	9760	
POT. 644+491 (N.B.L.) Bk.= EQUA. ST. 644+700 (S.E.L.) Bk.= EQUA. Sta. 645+10.8 Ah.	26971	
Sta. 673+74 END F004-1(32)=END 48' Rdwy. 27' Opp. Sta. 673+66.9 on F004-1(12)		Avg. 1158.6
TOTAL	55684	40218
SUMMARY		
58 FT. ROADWAY	Lin. Ft. 55684	Miles 105.4
48 FT. ROADWAY	40218	0762
ROADWAY (Net & Gross Length)	95902	1.816
DESIGN DATA		
	58' RDWY	48' RDWY
MAXIMUM DEGREE OF CURVE	10°00'	10°00'
MAXIMUM GRADE	3.00%	4.92%
MINIMUM S.S.D. HORIZONTAL	500'	550'
MINIMUM S.S.D. VERTICAL	420'	455'
MAXIMUM DESIGN SPEED	45 M.P.H.	45 M.P.H.
	(40 M.P.H. City Speed Limit)	



INDEX OF SHEETS

SHEET NO.	DESCRIPTION	REMARKS
2-3	SKETCH MAP, TITLE PAGE AND TABULATION OF LENGTH AND DESIGN DATA.	
4-10	TYPICAL SECTIONS AND GENERAL NOTES.	
11-16	SUMMARY OF APPROXIMATE QUANTITIES.	
17-20	STRUCTURE QUANTITIES.	
21-27	PIT LOCATION, SUBBASE AND SURFACING PLANS, TABULATIONS OF DELINEATORS AND R.O.W. MARKERS.	
28-30	TABULATIONS OF CURB AND GUTTER AND FENCING REQUIREMENTS.	
31-33	DETAILS OF CONCRETE DIVISION BOXES STA. 576+578+582+; STA. 600+, CONCRETE HEADWALL & SLIDE HEADGATE, STA. 579+; AND HEADWALL REMOVAL, STA. 669+.	
34-35	DETAILS OF C.B.C. & DIVISION BOXES, STA. 600+.	
36-37	SINGLE AND DOUBLE CONCRETE BOX CULVERTS (SPECIAL REV.)	
38-40	DETAILS OF CHANNEL PAVING & C.B.C. EXTENSION STA. 649+; TYPE "A" INLETS FOR C.B.C. OPENINGS, STA. 653+ & 659+.	
41-42	DETAILS OF PLACEMENT OF CURB & GUTTER & MINOR INTERSECTION ON ROAD APPROACH.	
43-44	ALIGNMENT PLAN AND PROFILE.	
45-46	DETAILS OF FUTURE INTERCHANGE, STA. 635+.	
47-48	CROSS-SECTIONS.	
49-50	SUPERELEVATION OF CURVES-DIVIDED HIGHWAYS	(5-1-62)
51-52	APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, BRIDGE & CREST WIDENING	(4-22-63)
53-54	LETTERS AND FIGURES FOR STRUCTURE NUMBERS	(5-1-62)
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59-60	DITCH TYPES	(5-1-62)
61-62	BACKFILL AROUND STRUCTURES	(5-2-63)
63-64	NO. 12 AND NO. 13 CONCRETE INLETS	(7-2-63)
65-66	CONCRETE MEDIAN INLETS	(7-2-63)
67-68	WINGWALLS FOR CONCRETE BOX CULVERTS	(5-1-62)
69-70	REINFORCED CONCRETE PIPE	(5-1-62)
71-72	METAL PLATE GUARD FENCE	(6-7-63)
73-74	WIRE FENCES AND GATES	(7-25-63)
75-76	MARKER POSTS AND BENCH MARKS	(5-1-62)
77-78	CURBS AND GUTTERS	(3-25-63)
79-80	HEADWALLS AND APRONS FOR C.M.P. CULVERTS	(5-1-62)
81-82	CONCRETE END AND ANGLE SECTIONS	(5-1-62)
83-84	DELINEATORS	(9-5-53)
85	ALIGNMENT PLAN AND PROFILE AND SUMMARY OF EARTHWORK QUANTITIES	
86	NEW SHEET-WORK ORDER NO. 2829	

SEE SPECIAL PROVISIONS FOR NOTICE TO BIDDERS

COLORADO
DEPARTMENT OF HIGHWAYS

APPROVED: *[Signature]* 12-12-63
CHIEF ENGINEER DATE

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED: _____ DATE _____
DIVISION ENGINEER

TYPICAL SECTIONS

TYPICAL SECTION A

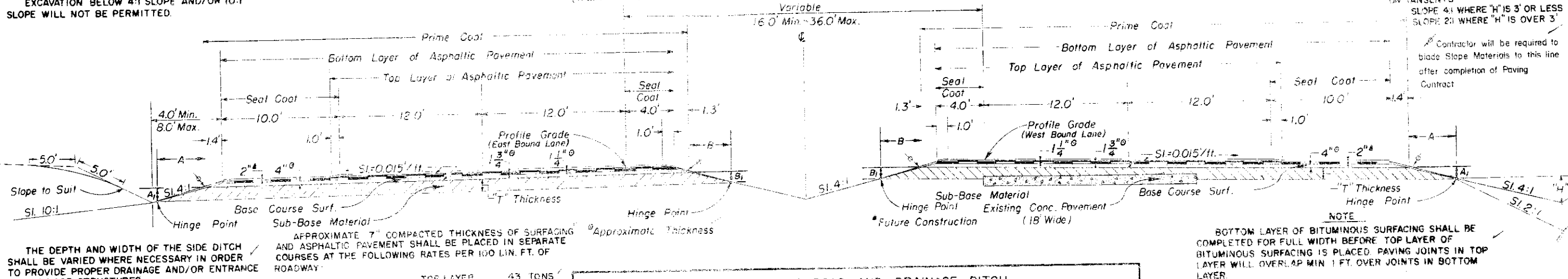
STA. 645+ TO STA. 673+
(Transition from Section "B" at Sta. 633+ to Section "A" at Sta. 645+)

NOTE
SEE STANDARD M-2-A FOR DETAILS
OF CUT SLOPE TREATMENT, FLARING AND
WIDENING.
EXCAVATION BELOW 4:1 SLOPE AND/OR 10:1
SLOPE WILL NOT BE PERMITTED.

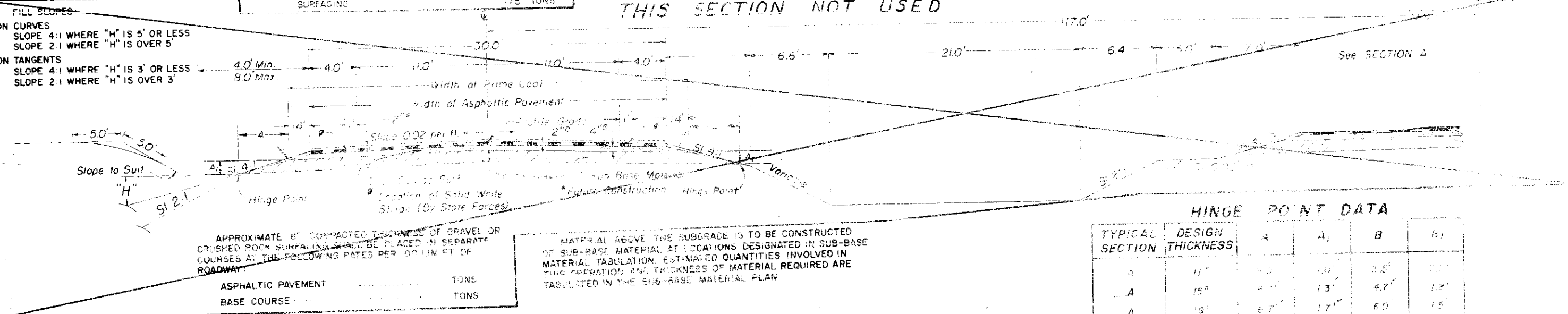
REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F004-1(32)	2	

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'

Contractor will be required to
blade Slope Materials to this line
after completion of Paving
Contract



TYPICAL SECTION OF FRONTAGE ROAD AND DRAINAGE DITCH THIS SECTION NOT USED



GENERAL NOTES

THIS PROJECT IS TO BE CONSTRUCTED IN CONFORMITY WITH THE
STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS,
ADOPTED JANUARY 1, 1958.

ALL QUANTITIES ON PRELIMINARY PLANS ARE TO BE CONSIDERED
APPROXIMATE ONLY.

ALL POLES ENCRDACHING ON CONSTRUCTION ARE TO BE MOVED BY
THE OWNERS.

APPLICATION METHODS, FOR LIQUID ASPHALTIC ROAD MATERIAL, WHICH
RESULT IN THE DISCOLORATION OF CONCRETE PAVEMENT CURBS OR GUTTERS
WILL NOT BE PERMITTED.

THICKNESS OF SUB-BASE, SURFACING AND ASPHALTIC PAVEMENT
MATERIALS AS SHOWN ON PLANS IS APPROXIMATE ONLY. THESE MATERIALS
ARE TO BE PLACED ON THE BASIS OF TONNAGES SHOWN ON PLANS.

FOR PRELIMINARY PLAN QUANTITIES OF ASPHALTIC ROAD MATERIALS
AND STONE SCREENINGS, THE FOLLOWING RATES OF APPLICATION WERE USED.

PRIME COAT MC @ 0.40 GALS. PER SQ. YD.

SEAL COAT RC @ 0.35 GALS. PER SQ. YD.
STONE SCREENING TYPE I @ 25 LBS. PER SQ. YD.

RATE OF APPLICATION AND GRADE OF ASPHALTIC MATERIAL SHALL BE AS
DETERMINED BY THE ENGINEER AT TIME OF APPLICATION.

WHEN ORDERED BY THE ENGINEER A TACK COAT IS TO BE APPLIED
BETWEEN PAVEMENT COURSES TO IMPROVE BOND TACK COAT WILL BE
PLACED AT THE APPROXIMATE RATE OF 0.07 TO 0.10 GALLON PER SQUARE
YARD IF REQUIRED.

DURING CONSTRUCTION OF THIS PROJECT, TRAFFIC WILL USE THE
PRESENT TRAVELED ROADWAY EXCEPT WHERE DETOURS ARE SHOWN
ON PLANS.

THE FORCE ACCOUNT ITEM, "CLEARING OF BUILDING SITES ETC." 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.
583+ , 594+ , 597+ , 601+ , 639+ , 642+ , and 673+.

ROAD APPROACHES WHICH REQUIRE PLANT BEDS ASPHALTIC SURFACING
IN THE "STRUCTURE LIST" SHALL BE PRIMED AND 4" 3/4" THICKNESS OF
ASPHALTIC SURFACING PLACED AS FOLLOWS:
PUBLIC APPROACHES AND ENTRANCES TO BUILDINGS OR RESIDENCES
TO BE SURFACED 50 FT. OUT FROM EDGE OF SHOULDER OR TO ROW
LINE WHICHEVER IS LESS. FIELD ENTRANCES SHALL BE SURFACED 4 FT.
OUT FROM EDGE OF SHOULDER.

TYPICAL SECTIONS

GENERAL ROAD SECTION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	FOO 4-1(32)	3	

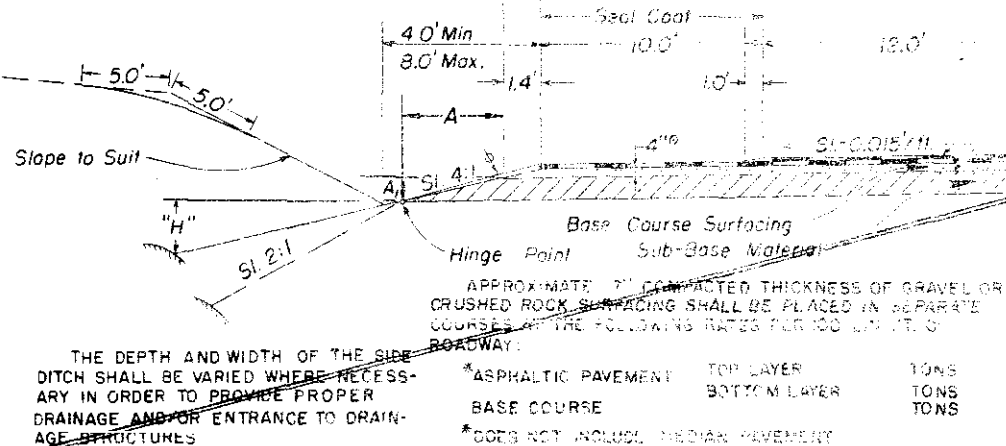
NOTE

SEE STANDARD M-2-EN FOR DETAILS OF CUT SLOPE TREATMENT, FLARING AND WIDENING.

EXCAVATION BELOW 4:1 SLOPE AND/OR 10:1 SLOPE WILL NOT BE PERMITTED.

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'

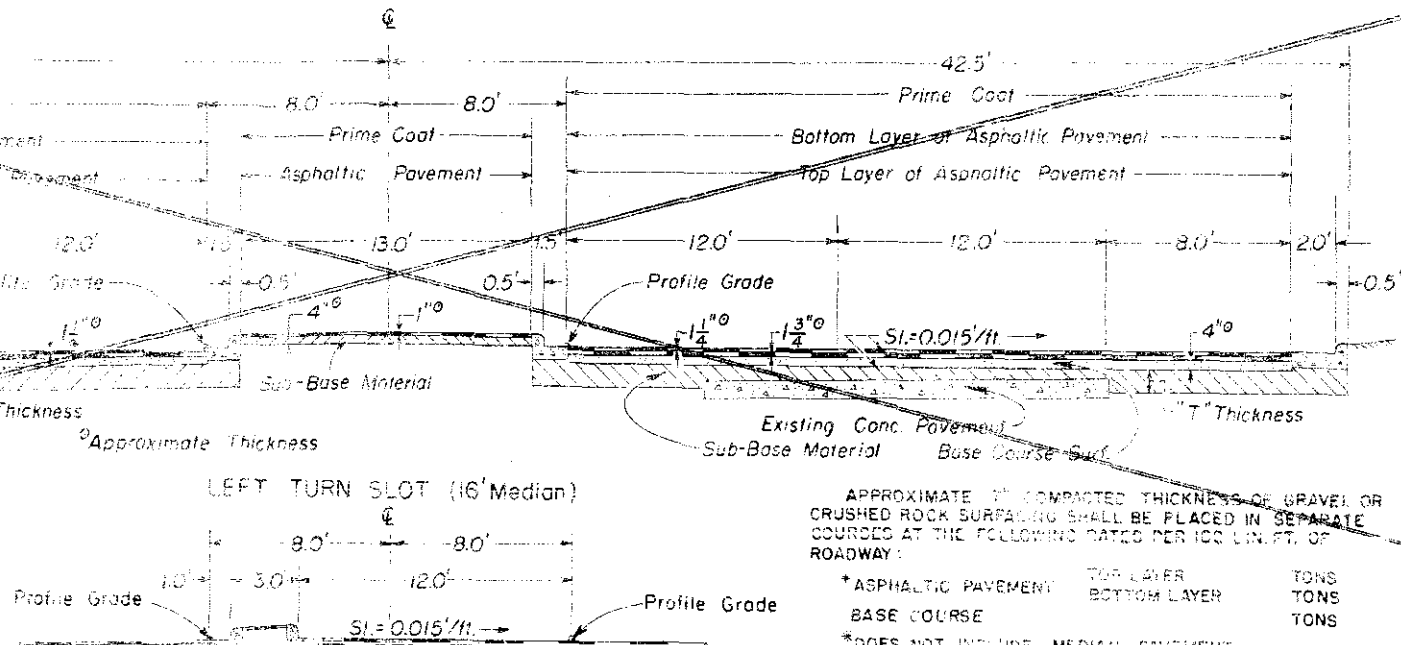


THIS SECTION NOT USED

1/2 TYPICAL SECTION C

NOTE

BOTTOM LAYER OF BITUMINOUS SURFACING SHALL BE COMPLETED FOR FULL WIDTH BEFORE TOP LAYER OF BITUMINOUS SURFACING IS PLACED. PAVING JOINTS IN TOP LAYER WILL OVERLAP MIN. 1 FT. OVER JOINTS IN BOTTOM LAYER.



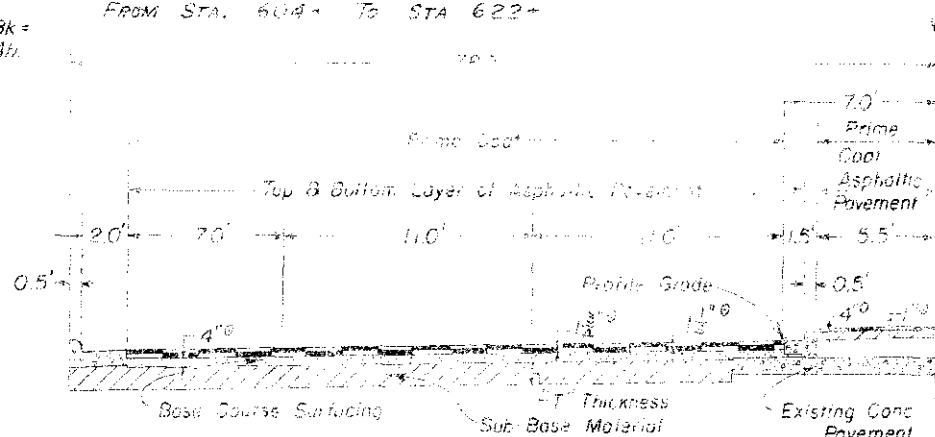
CONTRACTOR WILL BE REQUIRED TO BLADE SLOPE MATERIAL TO THIS LINE AFTER COMPLETION OF PAVING CONTRACT.

1/2 TYPICAL SECTION D

TRANSITIONS:

From Section "D" at Sta. 593+ to Section "E" at Sta. 596+23.8 Bk. (596+23.7 Ah)
From Section "D" at Sta. 622+ to Section "E" at Sta. 625+

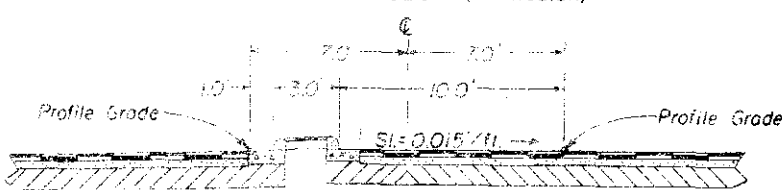
FROM STA. 573+1.5 Bk. (Profile) To Sta. 593+
FROM STA. 604+ To Sta. 622+
FROM STA. 625+ To Sta. 633+



APPROXIMATE 7" COMPACTED THICKNESS OF SURFACING AND ASPHALTIC PAVEMENT SHALL BE PLACED IN SEPARATE COURSES AT THE FOLLOWING RATES PER 100 LIN. FT. OF ROADWAY:

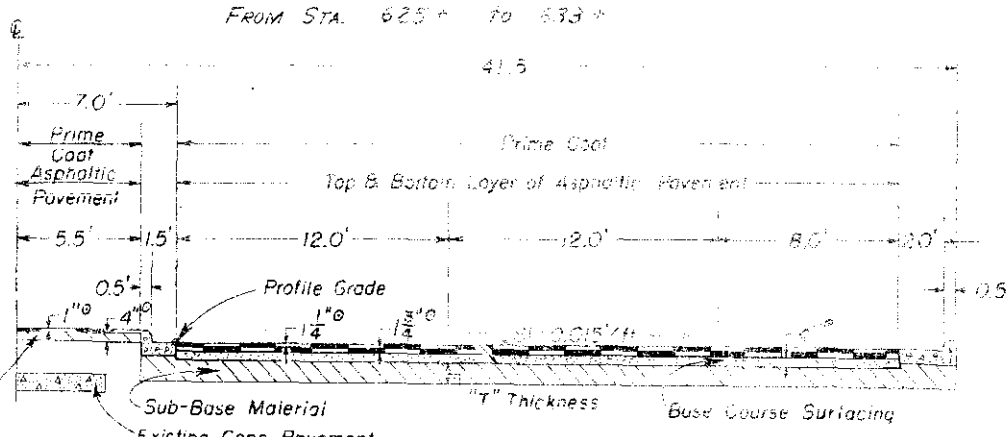
ASPHALTIC PAVEMENT	TOP LAYER	43 TONS
SURFACING	BOTTOM LAYER	62 TONS
*DOES NOT INCLUDE MEDIAN PAVEMENT		

LEFT TURN SLOT (14' Median)



1/2 TYPICAL SECTION E

FROM STA. 596+23.8 Bk. (Profile) To Sta. 602+
FROM STA. 625+ To Sta. 633+



APPROXIMATE 7" COMPACTED THICKNESS OF SURFACING AND ASPHALTIC PAVEMENT SHALL BE PLACED IN SEPARATE COURSES AT THE FOLLOWING RATES PER 100 LIN. FT. OF ROADWAY:

ASPHALTIC PAVEMENT	TOP LAYER	43 TONS
SURFACING	BOTTOM LAYER	62 TONS
*DOES NOT INCLUDE MEDIAN PAVEMENT		

TRANSITIONS:

From Section "E" at Sta. 602+ to Section "D" at Sta. 604+
From Section "E" at Sta. 633+ to Section "D" at Sta. 635+

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 004-1(32)	4	

④ Added Work Order No. 2829 8-20-64, J.R.W.

SUMMARY OF APPROXIMATE QUANTITIES

SPECIFICATION ITEM NO.	ITEM	UNIT	58 FT. ROADWAY				48 FT. ROADWAY		④ WORK ORDER No. 2829	*PROJECT TOTALS			
10	Clearing and Grubbing Entire Project	Lump Sum	Prorated				Prorated			•			
11	Adjust Manhole Ring and Cover	Each	1							1			
11	Removal of Headwalls	Each					1			1			
11	Plug Culverts	Each					3			3			
11	Removal of C.B.C., Sta. 600+	Each	1							1			
11	Reset Irrigation Gates & Mechanisms, Sta. 600+	Lump Sum	•							•			
11	Reset Mailbox Structures	Each	8				2			10			
11	Reset No. 13 Inlet Grating and Frame	Each	1							1			
11	Removing Guard Posts	Each	13				47			60			
11	Crush Top of C.B.C., Sta. 673+	Lump Sum					•			•			
11	Removing Concrete Curb	Lin. Ft.	407							407			
11	Removing Concrete Combination Curb and Gutter	Lin. Ft.					1340			1340			
11	Removing Concrete Combination Curb, Gutter and Sidewalk	Lin. Ft.	97							97			
11	Removing Concrete Pavement	Sq. Yd.	31				1108			1139			
11	Removal of Structures	Each	51				11			62			
12	Reset Gates	Each	1							1			
12	Removing Fence	Lin. Ft.	750				5250			6000			
12	Removing and Rebuilding Fence	Lin. Ft.	800							800			
13	Unclassified Excavation	Cu. Yd.	11,300				31,700			43,000			
13	Unclassified Ditch Excavation	Cu. Yd.	50				100			150			
13	Stripping	Cu. Yd.	500				500			1000			
14	Unclassified Structural Excavation - Miscellaneous	Cu. Yd.	125				385			510			
16	Structure Backfill (Class X)	Cu. Yd.	95				255			350			
17	Compaction (Standard)	Cu. Yd.	18,600				30,400			49,000			
17	Wetting	M Gal.	1310				2030			3340			
17	Water (Diluted Emulsified Asphalt)	M Gal.	145				145			290			
18	Station Yard Overhaul	Sta. Yd.	55,000				118,000			173,000			
18	Yard Mile Overhaul	Yd. Mi.	2900				1200			4100			
18	Ton Mile Overhaul	Ton Mi.	105,000				128,100			233,100			
23	Sub-Base Material (Class 2)	Ton	29,650				45,850			75,500			
26	Gravel or Crushed Rock Surfacing (Grading C)	Ton	8900				9100			18,000			
29	Asphalt (120-150 Penetration) (Tack Coat)	Ton	18				14			32			
30	Asphaltic Road Material MC (Prime)	Gal.	18,000				19,800			37,800			
30	Asphaltic Road Material RC (Seal)	Gal.					4700			4700			
31	Stone Screenings (Type I)	Ton					170			170			
32	Plant Mixed Asphaltic Surfacing	Ton	7570				6590	200		14,160			
37	Concrete Pavement (6 inches thick)	Sq. Yd.	70							70			
46	Class "A" Concrete	Cu. Yd.	72				231			303			
47	Reinforcing Steel	Lb.	6600				19,500			26,100			
52	18" Reinforced Concrete Culvert Pipe (Class II)	Lin. Ft.	16				328			344			
65	Concrete Slope and Ditch Paving (Wire Mesh)	Cu. Yd.					3			3			
75	Metal Plate Guard Fence (Beam Type)	Lin. Ft.	25							25			

* Does not include Work Order Totals.

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 004-1(32)	4a	

Added Work Order No. 2829 8-20-64, J.R.W.

SUMMARY OF APPROXIMATE QUANTITIES

SPECIFICATION ITEM NO.	ITEM	UNIT	58 FT. ROADWAY				48 FT. ROADWAY		WORK ORDER No. 2829		*PROJECT TOTALS			
76	Barbed Wire Fence with Metal Posts	Lin. Ft.					2500				2500			
76	Combination Wire Fence with Metal Posts	Lin. Ft.					2100				2100			
76	Driveway Gates	Each					1				1			
76	Corner and Line Brace Posts	Each					14				14			
76	End Posts	Each					9				9			
81	Right of Way Markers	Each					6				6			
84	Concrete Curb (Type I)	Lin. Ft.	94				269				363			
84	Concrete Gutter (4-Foot)	Lin. Ft.	140								140			
84	Concrete Combination Curb and Gutter (Type I)	Lin. Ft.	10,013				352		750		10,365			
84	Concrete Combination Curb and Gutter (Type II)	Lin. Ft.	10,445						200		10,445			
84	Concrete Combination Curb Gutter & Sidewalk (Type II-M)	Lin. Ft.	100								100			
95	22"x13" Metal Aprons for Corrugated Metal Pipe Arch Culverts	Each					7				7			
126	12" Slide Headgate (5 Ft. Frame)	Each	1								1			
132	12" Reinforced Concrete Pipe Sewer (Class II)	Lin. Ft.	612								612			
132	15" Reinforced Concrete Pipe Sewer (Class II)	Lin. Ft.	584								584			
132	18" Reinforced Concrete Pipe Sewer (Class II)	Lin. Ft.	3574								3574			
132	No. 12 Inlet Grating and Frame	Each	12								12			
132	Inlet Grating and Frame (Median)	Each					2				2			
132	Inlet Grate (Special) (4'-7" x 5'-5"), Sta 600+	Each	1								1			
134	22"x13" Corrugated Metal Pipe Arch Culverts	Lin. Ft.					304				304			
152	18" Flared End Sections for Reinforced Concrete Culvert Pipe	Each	3				1				4			
192	Delineators (Type I)	Each					39				39			
192	Delineators (Type II)	Each					85				85			
192	Delineators (Type III)	Each					19				19			
	FORCE ACCOUNT													
	Clearing of Building Sites, etc.	Lump Sum	Prorated				Prorated				•			
	Soil Sterilant	Lump Sum	•				•				•			
11	Reset Water Services	Lump Sum	•				•				•			
	Relocate Telephone Poles (Work by M.S.T. & T.Co. Forces)	Lump Sum					•				•			
	Remove Asphalt at Islands	Lump Sum							•					
	STATE FORCES													
	Signing and Striping Entire Project (Non-Federal Aid)	Lump Sum									•			
	Reset Flashing Yellow Warning Lights (Non-Federal Aid)	Each									2			

*Does not include Work Order Totals.

STRUCTURE QUANTITIES

PROJECT NUMBER		SHEET NO
F004-1(32)		5

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES NO.	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC	NO. 12 INLET GRATING & FRAME EACH	STRUCTURE BACKFILL CUBIC YARDS CL. X	GRAVEL OR CRUSHED ROCK SURFACING TONS	PLANT MIXED ASPHALTIC SURFACING TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH CULVERT LIN. FT. 22" x 13"	REINFORCED CONCRETE CULVERT PIPE LIN. FT. 18"	REINFORCED CONCRETE PIPE SEWER LIN. FT. 12" 15" 18"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 22" x 13"	MISCELLANEOUS	
			CUBIC YARDS															
			UNCL.	EMB.	UNCL. DITCH													
573+00 to 577+20	Req'd Approach to Project		*	*					*	*								
576+35	Reset Flashing Yellow Warning Light (From Sta. 634+)																	1 - Reset Flashing Yellow Warning Light (State Forces)
576+74	Remove Conc. Division Box Rt. Req'd Conc. Division Box Rt. (Details on Sheet No. 13) Outlet Ditches	1			3	4		3			147							
576+74 to 579+55 Ah	Remove 15" x 120' C.M.P. with Hdwl. and 15" x 32' C.M.P. with 2 Hdwl. Rt. Req'd 18" R.C.P. Sewer with Conc. Flared End Section Rt. and 18" x 12" x 18" Tee at Sta. 578+78 with Conc. Hdwl. & 12" Slide Headgate (Details on Sheet No. 13)	2				2		1			049					266		1 - 18" Flared End Sections for R.C.P. 1 - 12" Slide Headgate (5 ft. Frame)
577+75	Req'd Road Appr. Rt.			5					14	3								
578+67	Reset Water Meter Rt. (FORCE ACCOUNT)																	Reset Water Meter (FORCE Acc)
578+80	Req'd Division Box Lt. (Details on Sheet No. 13)		5			6		3			129							
578+80 to 596+95	Req'd 18" x 784' R.C.P. Sewer under Lt. Curb.															784		
579+20 Ah	Remove 15" x 20' C.M.P. Side Drain with Hdwl. Rt. and 18" x 35' C.M.P. with Hdwl. and No. 13 Conc. Inlet Lt. (Reset No. 13 Grate & Frame at Sta. 582+36) Req'd Aprons to Parson St. Lt. and Main St. Rt. adjust Manhole Ring & Cover Lt.	3		15					26	20								1 - Adjust Manhole Ring & Cover
579+40 to 582+35	Remove Concrete Curb, 2 Conc. Inlets & 21' x 152' C.M.P. Lt.	3																65 Lin. Ft. of Removal of Concrete Curb
579+55	Req'd No. 12 Conc. Inlet (H=5'-0") Lt.					5	1	3			090	137						
580+17 to 581+20	Remove 15" x 103' V.C.T. Rt.	1																
579+55 to 582+46	Relocate Irrig. Ditch Outside R.O.W. Rt.				15													
580+95 to 582+46	Relocate Irrig. Ditch Outside R.O.W. Rt.				7													
580+60	Req'd Curb Cut and Road Appr. Rt. 18" x 12' R.C.C.P. Side Drain with Conc. Flared End Sections Rt.		3			8		4	2	7				12				2 - 18" Flared End Sections for R.C.C.P.
582+36	Req'd No. 13 Conc. Inlet (H=6'-0") in Valley Gutter Lt. Reset No. 13 Grate & Frame from Sta. 579+20 Ah					6		4			146	192						1 - Reset No. 13 Inlet Grating and Frame
582+46	Req'd No. 12 Conc. Inlet (H=4'-6") in Rt. Curb. Conc. Division Box Rt. (Details on Sheet No. 13) 18" x 4' Reinf. C.C. Pipe (to connect No. 12 Inlet with Division Box)					8	1	5			5081 210	119		4				

58' ROADWAY

STRUCTURE QUANTITIES

FED. ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NO.
9	COLO.	FC04-1(32)	6

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES NO.	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC.	NO. 12 INLET GRATING & FRAME EACH	STRUCTURE BACKFILL CUBIC YARDS CL. X	GRAVEL OR CRUSHED ROCK SURFACING TONS	PLANT MIXED ASPHALTIC SURFACING TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH. CULVERT LIN. FT. 24" X 15"	REINFORCED CONCRETE CULVERT PIPE LIN. FT. 18"	REINFORCED CONCRETE PIPE SEWER LIN. FT. 18" 10" 15"	METAL APRONS FOR C.M.P. ARCH. CULVERTS NO. 24" X 15"	MISCELLANEOUS
			UNCL.	EMB.	UNCL. DITCH												
582+46 to 594+78	Reqs 16" x 12.35' R.C.P. Sewer under Rt. Curb.														1230		
582+55 582+60	Remove 18"x40' C.M.P. Lt. Reqd. Appr. to Quay St. Lt. Reqd. Curb Cut and Road Appr. Rt.	1	13	5					9 4	8 2							
583+10	Remove Conc. Base, Wall Housing & Stop Boxes Rt.	4															
583+10 583+73 583+75	Reset Water Meter Rt. (FORCE ACCOUNT) Reset Gate Rt. Remove 12"x18" V.C.T. Rt. Reqd. Curb Cut and Road Appr. Rt.	1		2					4	2							Reset Water Meter (FORCE ACCOUNT) 1 - Reset Gate
585+60	Reqd. No. 12 Conc. Inlet (H=5'-6") in Lt. Curb.					5	1	4			0.99	152					
585+70	Remove 15"x20' R.C.P. Rt. Reqd. Curb Cut and Road Appr. Rt.	1		8					8	3							
585+90	Remove 21"x36' C.M.P. Lt. Reqd. Appr. to Reed St. Lt.	1	11						13	10							
586+10	Remove 18"x40' C.M.P. Lt.	1															
586+90	Remove 21"x10' Iron Pipe Culv. Rt. Reqd. Curb Cut and Road Appr. Rt.	1		11					8	3							
587+25	Remove Double 12"x10' Iron Culvert Road Cut and Road Appr. Rt.	2		12					4	3							
588+85	Reqd. 2-No. 12 Conc. Inlets (H=5'-6") in Rt. & Lt. Curb.					9	2	6			1.62	238					
589+15	Remove 21"x36' C.M.P. Lt. Reqd. Appr. to Salisbury St. Lt.	1	17						13	10							
589+95 590+20	Remove Buried Garbage Can Lt. Reset Water Shut-off Valve Lt. (FORCE ACCOUNT)	1															Reset Water Shut-off Valve Lt.
591+35	Remove 2-12"x12' V.C.T. Culverts Rt. Reqd. Curb Cut and Road Appr. Rt.	2		13					8	10							
591+82	Remove 6"x20' C.M.P. with Hdws. Lt. Reqd. Curb Cut and Road Appr. Lt.	1		8					4	3							
592+15	Reqd. No. 12 Conc. Inlet (H=4'-6") Lt.					4	1	3			2.81	119					
592+45	Remove 18"x36' C.M.P. Lt. Reqd. Appr. to Teller St. Lt.	1	13						13	10							
592+60	Remove 12"x8' C.M.P. Rt.	1															
592+86 to 595+57	Remove Conc. Inlet, 18"x270' C.M.P. Culv. 67 ft. Conc. Curb, & Conc. Sign Base Lt.	3															67 Lin. Ft. Removing Conc. Curb

STRUCTURE QUANTITIES

FED. ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NO.
9	10.0	P 004-H(32)	7

58' ROADWAY

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION	NO. 12 INLET GRATING	STRUCTURE BACKFILL	GRAVEL OR CRUSHED ROCK SURFACING	PLANT MIXED ASPHALTIC SURFACING	CONCRETE CUBIC YARDS	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH CULVERT LIN. FT.	REINFORCED CONCRETE CULVERT PIPE LIN. FT.	REINFORCED CONCRETE PIPE SEWER LIN. FT.	METAL ARCHES FOR C.V.P. ARCH CULVERTS NO.	ARCH CULVERTS NO.
		NO.	UNCL.	EMB.	UNCL. DITCH	MISC. CUBIC YARDS	8 FRAME EACH	CUBIC YARDS CL. X	TONS	TONS	CL. A						
593+50	Remove 2' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	2		14					7	3							
593+70 593+95	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	2		2					3								
594+40	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	1		5					10	10							
594+60	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut																
594+75	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut																
594+75	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut					5	1	3			990	137					
594+75 to 595+91	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut					7		1									
595+85	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut					4	1	2			972	100					
596+85 to 597+25	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut																
596+85 to 597+25	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut																
597+25 to 598+75	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	4															
598+80	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut			4					2	2							
600+85	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	2	160			48	2	45			5633	3110					
600+85 to 603+75	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut																
601+30	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	1		10					7	3							
603+50	Remove 1' x 6" V.C. 1. and 2' x 10 V.C. 1. with 1' x 6" R. Right Curb Cut & 1' x 6" R. Left Curb Cut	1		10					3	0							

STRUCTURE QUANTITIES

FED. ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NO.
9	COLO.	F004-1 (32)	8

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES NO.	EXCAVATION			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC.	NO 12 INLET GRATING & FRAME EACH	STRUCTURE BACKFILL CUBIC YARDS CL. X	GRAVEL OR CRUSHED ROCK SURFACING TONS	PLANT MIXED ASPHALTIC SURFACING TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH CULVERT LIN. FT. 12"x15"	REINFORCED CONCRETE CULVERT PIPE LIN. FT. 18"	REINFORCED CONCRETE PIPE SEWER LIN. FT. 12" 15" 18"	METAL APRONS FOR C.M.P. ARCH CULVERTS NO. 12"x15"	MISCELLANEOUS	
			CUBIC YARDS															
			UNCL.	EMB.	UNCL. DITCH													
603+75	Req'd No. 12 Conc. Inlet Lt. (H=5'-0")				5	1	3				0.90	137						
603+75 to 605+20	Req'd 15"x174' R.C.P. Sewer Lt.														174			
604+35	Remove 18"x40' C.M.P. Cross Culv. with Hdws.	1																
604+ to 605+	Req'd Intersection (Details on Sheet No. 19)		20						*	*								
604+90	Remove 12"x33' C.M.P. Lt.	1																
605+20	Req'd No. 12 Conc. Inlet (H=5'-0") Lt., 15"x12' R.C.P. Sewer (to extend back of Curb) Inlet Ditch.				2	5	1	3			0.90	137			12			
605+ to 606+	Remove Conc. Curbs Lt.																	250 Lin. Ft. - Removing Conc. Curb
606+80	Remove 15"x20' C.M.P. with Hdws. & 30"x20' C.M.P. with Hdws. Rt.	2																
609+00	Remove Conc. Comb. Curb, Gutter & Sidewalk Rt. Req'd Appr. to Hemlock Way Rt. Curb Cut Lt.			6					9	10								40 Lin. Ft. - Removing Conc. Comb. Curb, Gutter & Sidewalk
617+	Curb Cut Lt.								2	2								
621+10	Remove 40' Conc. Comb. Curb, Gutter & Sidewalk Rt. Req'd Apprs. to Laurel St. Rt. & Shopping Center Lt.		5						18	20								40 Lin. Ft. - Removing Conc. Curb, Gutter & Sidewalk
621+	Curb Cut Rt.			3					7	3								
622+	Curb Cut Rt.			4					7	3								
631+70	Req'd Appr. to Nicholls St. Rt.			5					13	10								
58' Roadway 58' Roadway	Reset 8 Mailbox Structures. Remove 13 Guard Posts.																	8 - Reset Mailbox Structures 13 - Removing Guard Posts
633+40	Remove 2- 36"x22" Arch Extensions from C.B.C. & Extend 3"x8"x40' C.B.C. 29' Lt. & 40' Rt. Ditches (W=4') (Details on Sheets No. 13 & 16).	2		22	46			32			2441	2077						
633+40 to 644+50	Req'd Channelized Intersection (Details on Sheet No. 20). Remove Comb. Curb & Gutter Rt. & Lt.			*					*	*								1340 Lin. Ft. - Removing Conc. Comb. Curb & Gutter.
636+	Req'd Appr. to Intersection. (Far Lt. on R.R. ROW - See Sheet No. 20)		30						180	13								
636+	Reset Flashing Yellow Warning Light. (From Sta. 643+)																	1 - Reset Flashing Yellow Warning Light (State Form)
641+00 (Surv.)	Req'd 22"x13"x52" C.M.P. Arch Median Drain with Metal Apron in Median.				27			12					52				1	

58' ROADWAY

48' ROADWAY

STRUCTURE QUANTITIES

FED. ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NO.
9	COLO.	F 004-1 (32)	9

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES NO.	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC.	NO. 12 INLET GRATING & FRAME EACH	STRUCTURE BACKFILL CUBIC YARDS CL. X	GRAVEL OR CRUSHED ROCK SURFACING TONS	PLANT MIXED ASPHALTIC SURFACING TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH. CULVERT LIN. FT. 22"x15"	REINFORCED CONCRETE CULVERT PIPE LIN. FT. 18"	REINFORCED CONCRETE PIPE SEWER LIN. FT. 12" 18" 24"	METAL APRONS FOR C.M.P. ARCH. CULVERTS NO. 22"x15"	MISCELLANEOUS
			UNCL.	EMB.	UNCL. DITCH												
642+ to 647+	Reg'd Road Appr. Far Lt. (to W. Midway Blvd.)		210						140								
640+ to 645+ 645+75	Remove Conc. Pavement. Remove Conc. Siphon	1															1100 Sq. Yd. - Remove Conc. Pavement
647+87	Reg'd Appr. to Midway Blvd. Lt. with 22"x13"x38" C.M.P. Arch. Side Drain Lt. & 22"x13"x70" C.M.P. Arch. Median Drain with Metal Aprons, under Median Crossing.		40		33			18	25	6			338 70			2	
653+03	Extend 3'x3'x36" C.B.C. 16' Rt. & 72' Lt. Median Inlet (Details on Sheets No. 13, 16 & 17) Ditches (W=3')				15	31		40			36.04	2923					1 - Inlet Grating & Frame (Median)
654+72	Remove 12"x42" C.M.P. with Hdwl. Reg'd 18"x30" R.C.C.P. Side Drain & Road Appr. Lt. Ditches. Road Appr. 90± Lt.	1	36	2	17			7	19	6				30			
659+75	Extend 4'x3'x36" C.B.C. 72' Lt. and 21' Rt. Median Inlet, Outlet Ditch (W=4') (Details on Sheets No. 13, 16 & 17)				10	32		41			44.25	3646					1 - Inlet Grating & Frame (Median)
660+94	Remove 15"x36" C.M.P. with Hdwl. Rt. Reg'd 18"x90" R.C.C.P. Side Drain Rt., 18"x30" R.C.C.P. Side Drain Lt. & 22"x13"x72" C.M.P. Arch. Median Drain with 2 Metal Aprons under Median Crossing, Appr. to 6th Ave. Rt. & Road Appr. Lt. (Details on Sheet No. 20)	1	13		55			30	16	6			72	30 30		2	
665+00	Reg'd 18"x58" R.C.C.P. Median Drain with Conc. Flared End Section, Outlet Ditch, Dike in Median		2	16	22			12						58			8 Sq. Yd. - Removing Conc. Pavement 1 - 18" Flared End R.C.C.P.
666+44	Remove 15"x20" C.M.P. with Hdwl. Rt.	1															
667+13	Remove 15"x20" C.M.P. with Hdwl. Lt. Reg'd 18"x30" R.C.C.P. Side Drain & Road Appr. Lt.	1	31		13			5	16	6				30			
669+	Remove Handrails, Rt. Curb & Wingwalls from Present Structure & Extend 12'x6'x32" C.B.C. 16' Rt. (See Standard M-46-E and Details on Sheets 13, 16 & 17) Reg'd 12'x6'x48" C.B.C. for Southbound Lanes, Channel Paving and Conc. Slope & Ditch Paving in Median Channel Improvement (W=12')	1	30		60			28			125.87	10,816					1 - Removal of Handrails, 3 Curb & Wingwalls in Conc. Slope & Ditch Paving (Wire Mesh)
669+75	Plug 18"x26" C.M.P. Lt. Reg'd 18"x30" R.C.C.P. Side Drain & Road Appr. Lt., Ditches.		20	5	9			6	15	6				30			1 - Plug Culverts.
670+66	Plug 18"x30" C.M.P. Lt. Reg'd 18"x30" R.C.C.P. Side Drain & Road Appr. Lt., Ditches.		40	2	6			6	18	6				30			1 - Plug Culverts.
672+09	Plug 2'x2'x48" C.B.C. Remove Windmill Lt.	1															1 - Plug Culverts.

48' ROADWAY

STRUCTURE QUANTITIES

FED. ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NO.
9	COLO.	F 004-1 (32)	10

LOCATION	DESCRIPTION	REMOVAL OF STRUCTURES NO.	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC.	NO. 12 INLET GRATING & FRAME EACH	STRUCTURE BACKFILL CUBIC YARDS CL. X	GRAVEL OR CRUSHED ROCK SURFACING TONS	PLANT MIXED ASPHALTIC SURFACING TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	CORRUGATED METAL PIPE ARCH. CULVERT LIN. FT. 22" x 15"	REINFORCED CONCRETE CULVERT PIPE LIN. FT. 16"	REINFORCED CONCRETE PIPE SEWER LIN. FT. 12" 15" 18"	METAL APRONS FOR C.M.P. ARCH. CULVERTS NO. 22" x 15"	MISCELLANEOUS
			UNCL.	EMB.	UNCL. DITCH												
672+20	Remove Conc. Ditch Check Lt.	1															
672+40	Reqd 22"x13"x72' C.M.P. Arch Median Drain with Metal Aprons, under Median Crossing, and Appr. to 10th St. Rt. (Details on Sheet No. 20)			8		22		12	13	8			72			2	
673+29	Remove Handrails and Crush top of C.B.C.																Crush Top of C.B.C., Sta. 673+
673+34	Remove 18"x30' C.M.P. Lt. Reqd 18"x30' R.C.C.P. Side Drain & Road Appr. Lt.	1		10		9		6	15	2				30			
673+ to 685+	Reqd Approach to Project		*	*					*	*							
48' Roadway 45' Roadway	Reset 2 Mailbox Structures Remove 47 Guard Posts																2 - Reset Mailbox Structures 47 - Remove Guard Posts
TOTALS	58' ROADWAY	51	245	140	27	125	12	93	228	184	7169	6,578	0	16	612	584	3574
TOTALS	48' ROADWAY	11	270	200	72	382	0	255	457	59	22057	13,462	304	323	0	0	0
PROJECT TOTALS		62	515	340	99	507	12	348	685	223	33226	25,040	304	344	612	584	3574

* Included in Roadway and Surfacing Quantities
† Includes 1" 18" x 12" x 18" Tee
‡ Includes 2" 45° Angle Sections

* Includes 2" 30° Angle Sections

* Class II

DELINEATORS

STATION TO STATION	SIDE	SPACING	NUMBER		
			TYPE I	TYPE II	TYPE III
633+ - 635+	Lt.	10° Curve	6		
633+ - 638+	Rt.	10° Curve	10		
636+	Rt. & Lt.	Intersection	8	7	8
639+ - 644+	Rt.	2° Curve	5		
640+ - 642+	Lt.	2° Curve	3		
647+ (Midway Blvd.)	Rt. & Lt.	Apprs. Med. Open.		25	4
653+	Rt.	Tangent	1		
654+ (Farm Appr.)	Lt.	Appr.		4	
660+ (W. 6th Ave.)	Rt. & Lt.	Apprs. Med. Open.		20	3
667+ (Farm Appr.)	Lt.	Appr.		3	
669+ (" ")	Lt.	Appr.		2	
670+ (" ")	Lt.	Appr.		2	
672+ (W. 10th Ave.)	Rt.	Appr. Med. Open.		16	2
673+ (Farm Appr.)	Lt.	Appr.		3	
673+ - 685+	Rt. & Lt.	Appr. to Proj.	6	3	2
TOTALS 48' Roadway			39	85	19

RIGHT OF WAY MARKERS

STATION	SIDE	NO.
TS 633+01	Lt.	1
638+75.1	Far Lt.	1
ST 645+10.8Ah.	Lt.	1
658+00	Lt.	1
671+00	Lt.	1
683+88.6	Lt.	1
TOTAL 48' Roadway		6

SURFACING AND SUB-BASE MATERIAL PLANS

It is estimated that Surfacing and Sub-Base Material for the project is available in the vicinity of the pit indicated in the following tabulations. Estimated quantities involved in these operations are shown below.

Alteration of the plan as here outlined will be allowed only on written permission from the Department.

SURFACING MATERIAL PLAN

MATERIAL TO BE PLACED	SOURCE & "R" VALUE	TONS USED		TON MILE OVERHAUL
		TOP LAYER PLANT MIX	BOTTOM LAYER PLANT MIX	
577+20 To 579+11.5 Bk.	PIT NO. 1 R=79	67	132	866
579+20.4h To 593+19.8		630	868	5,314
593+19.8 To 596+23.8		143	199	1,149
596+23.7 To 602+73		318	448	2,500
602+73 To 604+99.7		107	148	803
604+99.7 To 620+00		673	928	4,718
620+00 To 622+50		118	164	775
622+50 To 633+00		515	725	3,239
633+00 To 636+00 (Surv.)		114	219	943
636+00 To 644+49.1 Bk.		395	649	2,845
645+10.8Ah To 673+74	ESTIMATED FOR: Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. From List of Structures	1,231	2,348	12,196
Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. From List of Structures		141	276	1,504
Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. From List of Structures		506	295	1,564
Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. From List of Structures		164	—	562
Appr. to Proj. 673+ to 685+ Median Openings - Storage Lanes and Islands and Accel. & Decel. Lanes From List of Structures		430	513	3,082
Sub Total 58' Roadway		3,382	4,183	22,994
Sub Total 48' Roadway		2,532	4,057	21,905
TOTALS		5,914	8,240	44,899

SUB-BASE MATERIAL PLAN

MATERIAL TO BE PLACED	SOURCE & "R" VALUE	*DESIGN THICKNESS INCHES	SUB-BASE		OVERHAUL
			CLASS 2 TONS	TON MILE	
577+20 To 615+00	PIT NO. 1 R=70	13	14,773	40,692	
615+00 To 625+00		10	3,261	7,510	
625+00 To 633+00		15	3,599	9,116	
633+00 To 636+00		15	2,540	3,801	
636+00 To 643+00		15	4,560	9,422	
643+00 To 650+00		19	6,749	14,807	
650+00 To 660+00		11	4,841	11,377	
660+00 To 673+74		19	13,147	33,853	
ESTIMATED FOR: Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. Correcting Irregularities		13	1,613	5,098	
Appr. to Proj. 572+ to 577+ Median Openings - Storage Lanes and Islands. Correcting Irregularities		13	3,685	12,131	
Appr. to Proj. 673+ to 685+ Median Openings - Storage Lanes and Islands and Accel. & Decel. Lanes Correcting Irregularities		15	2,693	7,455	
Sub Totals 58' Roadway			5,749	16,164	
Sub Totals 48' Roadway			4,060	7,068	
TOTALS			4,165	9,649	
Sub Totals 58' Roadway			29,624	82,002	
Sub Totals 48' Roadway			45,811	106,141	
TOTALS			75,435	188,143	

*Approximate Thickness Based on Design Curve "E".

PIT NO. 1

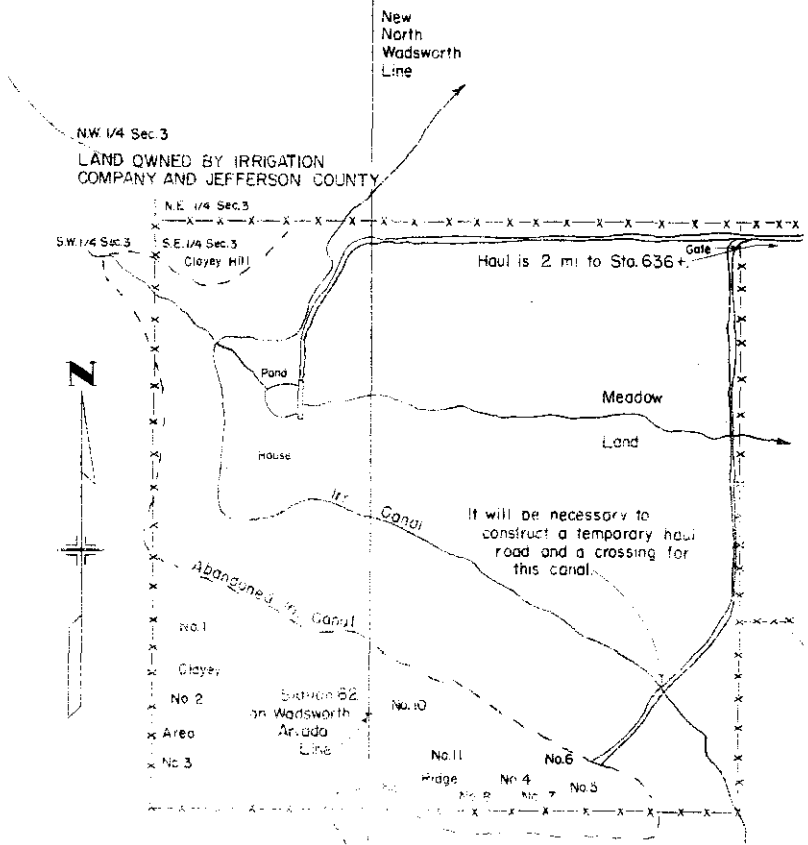
LOCATION: S 1/2 of SE 1/4 Sec. 3 T. 2S, R. 69W.

OWNERS: LEWIS J. ISAACSON, CHAUNCEY S. DUNN, ARTHUR SAMUELSON
& SIDNEY LANGSON, C.S. DUNN, AGENT

USE: SUB-BASE AND SURFACING MATERIAL

AVAILABLE: 60,000 CU. YDS.

STRIPPING: 1,000 CU. YDS.



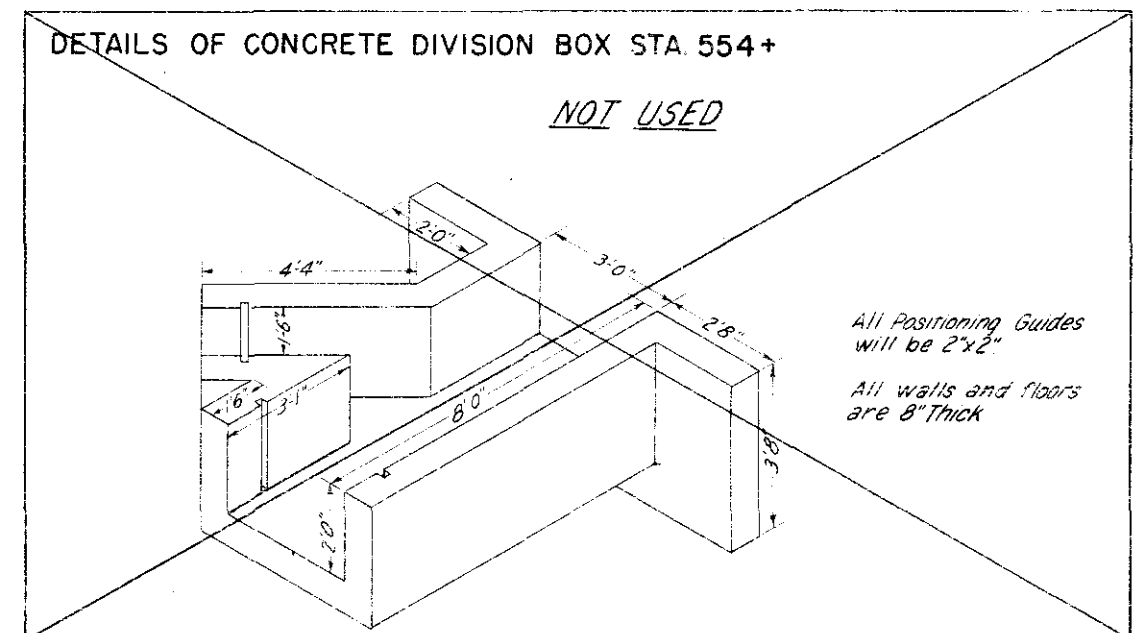
LOG OF THE PIT

SAMPLE NO. 2809

TEST NO.	DEPTH		DESCRIPTION OF TEST HOLE MATERIAL	TEST NO.	DEPTH		DESCRIPTION OF TEST HOLE MATERIAL
	FROM	TO			FROM	TO	
1	0'	6'	Gravel & white calcareous silt	7	0'	15'	O.B.
2A	6'	15'	Clay	7A	15'	5'	S & G
2A	0'	8'	Clay	7B	5'	10'	Sand Sim. to No. 5A
3	0'	3'	Rock - Too hard to drill.	8	0'	55'	Rock Sim. to No. 5
3A	0'	3'	Calcareous S & G.	8A	55'	11'	Clean Sand Sim. to No. 5A
4	0'	12'	Gravel & calcareous silt	9	0'	5'	Plastic S & G.
5	0'	4'	Clean S & G	9A	5'	5'	Shale
5A	0'	10'	Silt & Gravel	10	0'	6'	Rock Sim. to No. 5
6	0'	7'	Clean white & brown sand.	10A	6'	6'	Shale
6A	0'	7'	Clay	11	0'	3'	O.B.
				11A	3'	7'	Rock Sim. to No. 5 (Very tightly packed)

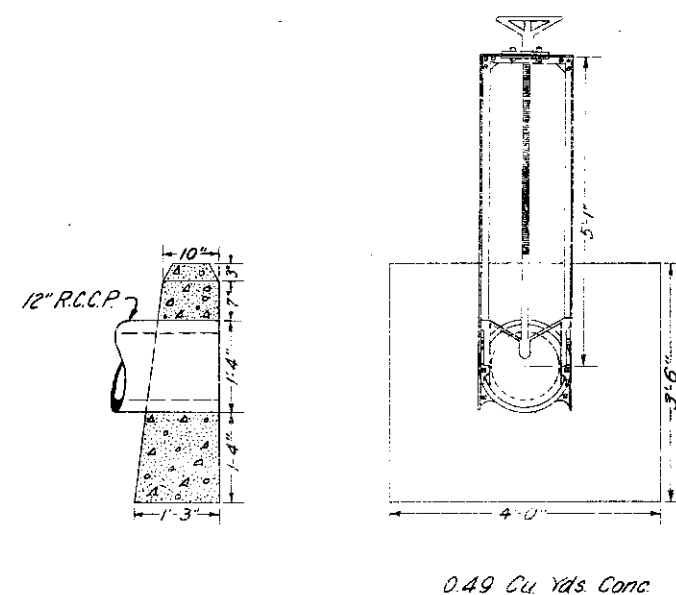
FENCING REQUIREMENTS

STATION TO STATION	SIDE	REMOVE & FENCE	REMOVE & REBUILD FENCE	BUILD FENCE WITH METAL POSTS		DRIVEWAY GATES	CORNER & LINE BRACE POSTS	END POSTS
		LIN. FT.	LIN. FT.	B.W.	COMB.			
572+29 - 578+81	Lt.		650					
579+50	Rt.	15						
582+50	Rt.	10						
584+40 to 585+40	Rt.	110						
585+60	Rt.	20						
586+90	Rt.	30						
590+	Lt.		90					
591+40 to 592+96	Rt.	185						
600+ to 601+	Lt.	120						
601+90 to 603+25	Lt.	155						
607+78 to 608+54	Lt.	75						
640+	Lt.	85						
640+30 to 641+85	Lt.	370						
642+00 to 654+58	Lt.	1,430						
654+75 to 669+60	Lt.	1,690						
669+75 to 670+52	Lt.	195						
670+78 to 684+00	Lt.	1,440						
638+40 (Surk) to 647+60 (Proj)	Lt.				975		6	1
648+00 to 654+60	Lt.				660		2	1
654+85 to 659+10	Lt.				425		1	1
659+10 to 669+55	Lt.			1,045		1	1	4
670+80 to 684+00	Lt.			1,380			4	2
Sub Totals 58' Roadway		720	740	—	—	—	—	—
Sub Totals 48' Roadway		5,210	—	2,425	2,060	1	14	7
PROJECT TOTALS		5,930	740	2,425	2,060	1	14	7

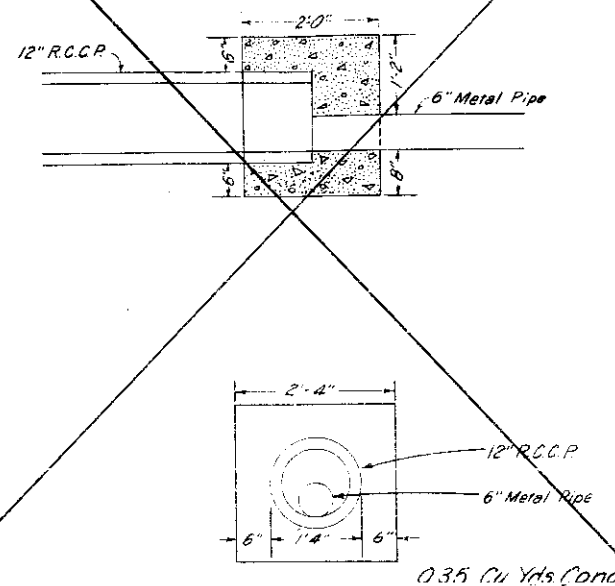


FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	FOO4-1(32)	13	

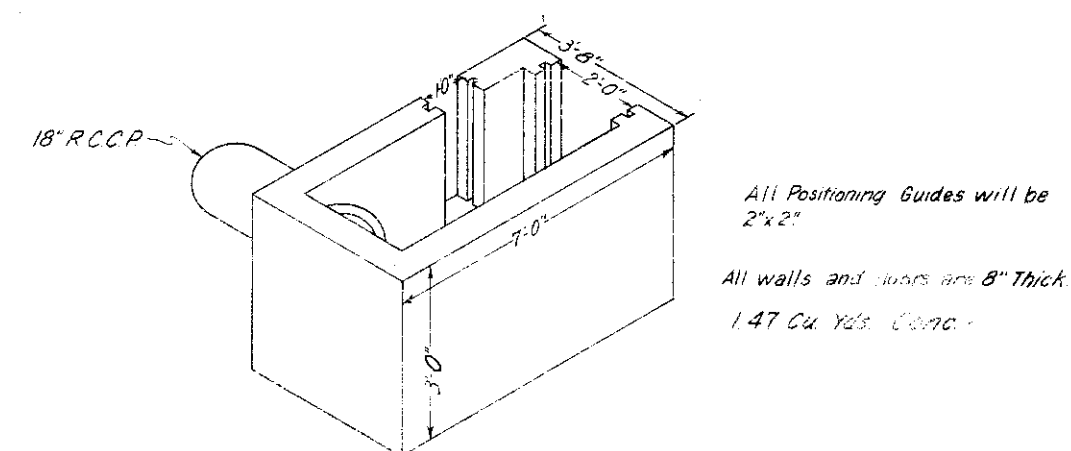
DETAIL OF CONCRETE HEADWALL
& SLIDE HEADGATE STA. 579+



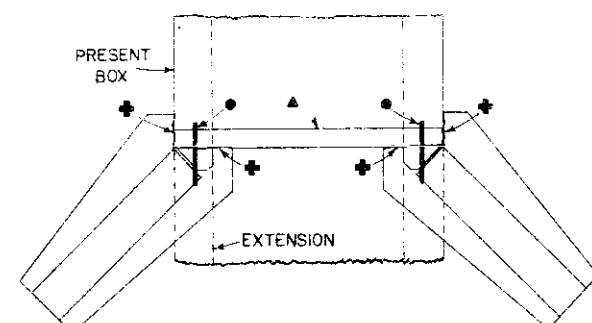
DETAIL OF CONCRETE COLLAR
STA. 600+
NOT USED



DETAIL OF CONCRETE DIVISION BOX
STA. 576+

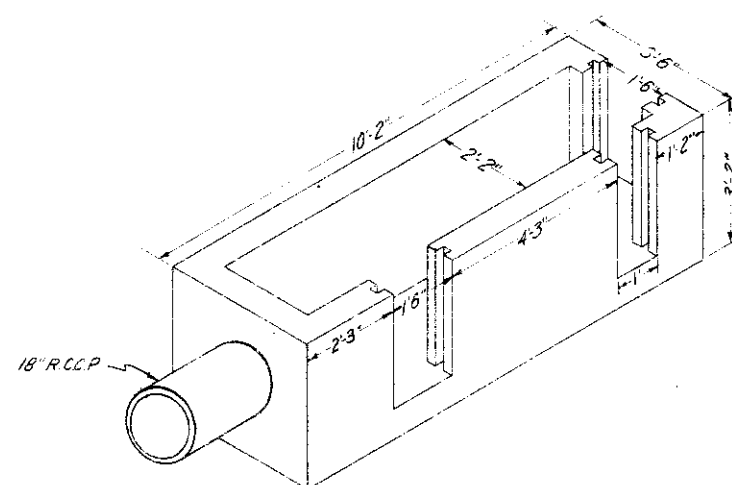


DETAIL FOR HEADWALL REMOVAL
STA. 669+

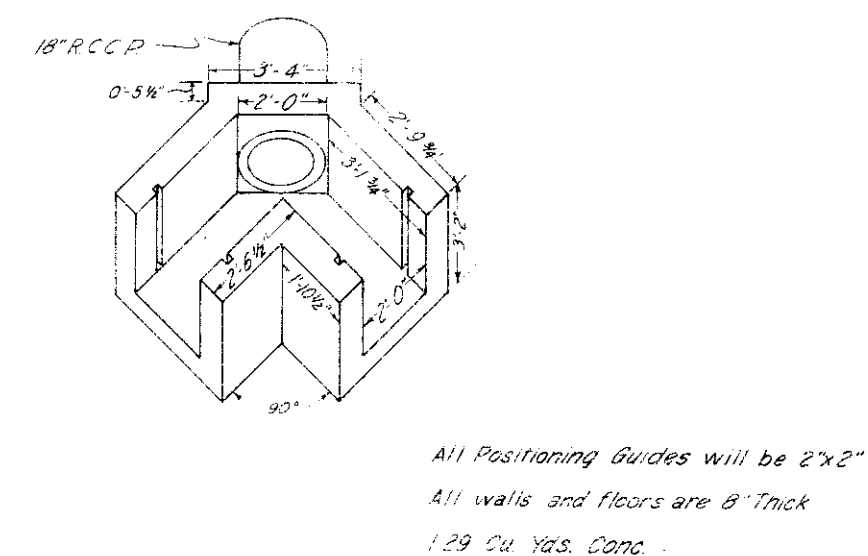


- * REMOVE ALONG THESE LINES.
- △ THIS HEADWALL IS TO BE REMOVED WHEN FILL OVER HEADWALL IS LESS THAN 1 FT.
- 2 FT. REINFORCING BARS TO BE PLACED AT EVERY LONGITUDINAL BAR SHOWN ON THE STANDARD. SIZE TO BE SAME AS LONGITUDINAL BARS.
- THE BARS ARE TO BE GROUTED IN PLACE BY A CEMENT GROUT COMPOSED OF ONE PART CEMENT AND TWO PARTS CLEAN, WELL-GRADED SAND.
- THE COST OF DRILLING HOLES AND PLACING TIE BARS IS TO BE INCLUDED IN PAYMENT FOR "REMOVAL OF HEADWALLS".
- WHERE EXISTING BOX HAS NO HEADWALLS TO BE REMOVED, THE COST OF DRILLING HOLES AND PLACING TIE BARS SHALL BE INCLUDED IN THE COST OF ITEM 47.

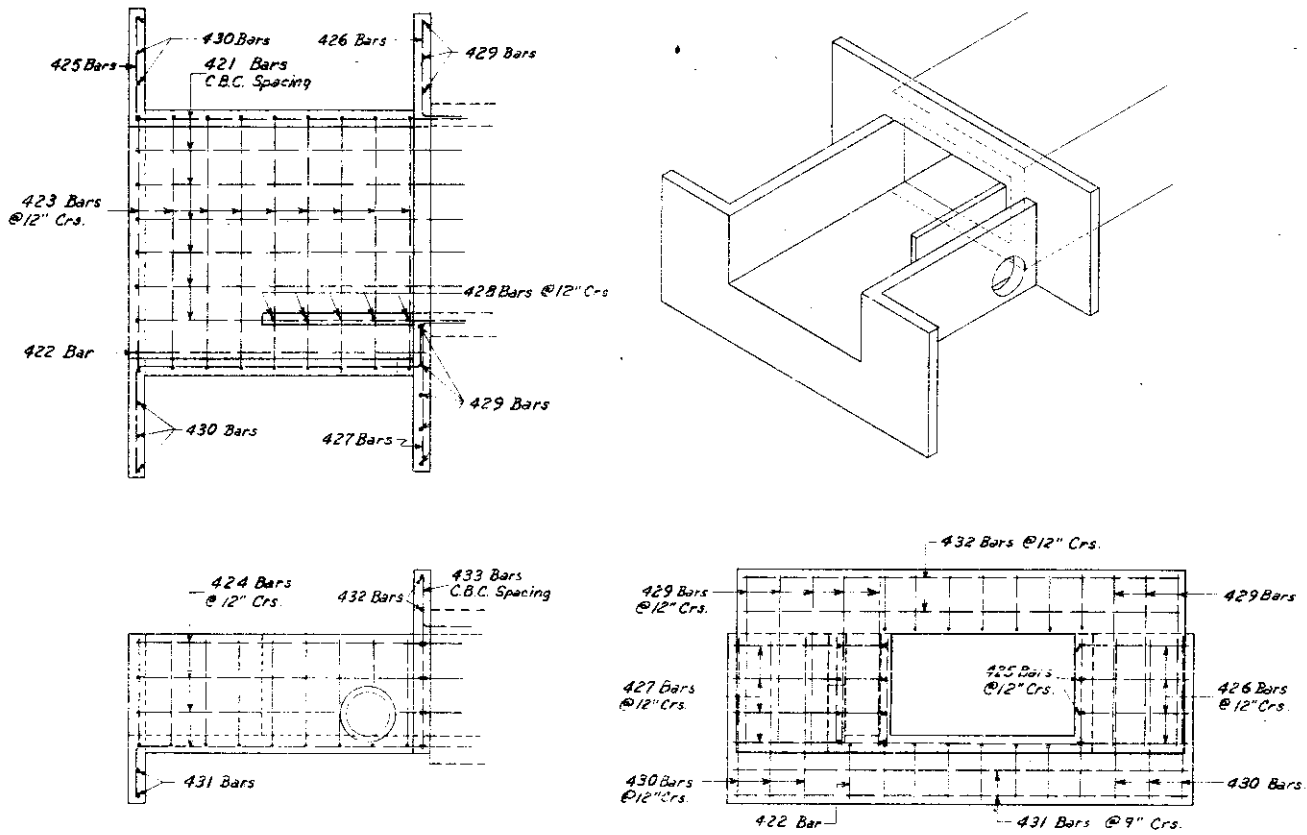
DETAIL OF CONCRETE DIVISION BOX
STA. 582+



DETAIL OF CONCRETE DIVISION BOX
STA. 578+

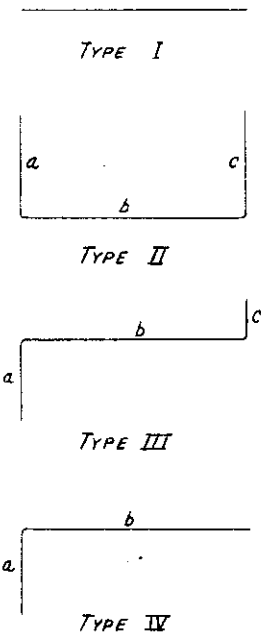


DIVISION BOX LT. STA. 600+



BENDING DIAGRAMS

All dimensions are out to out of bars.

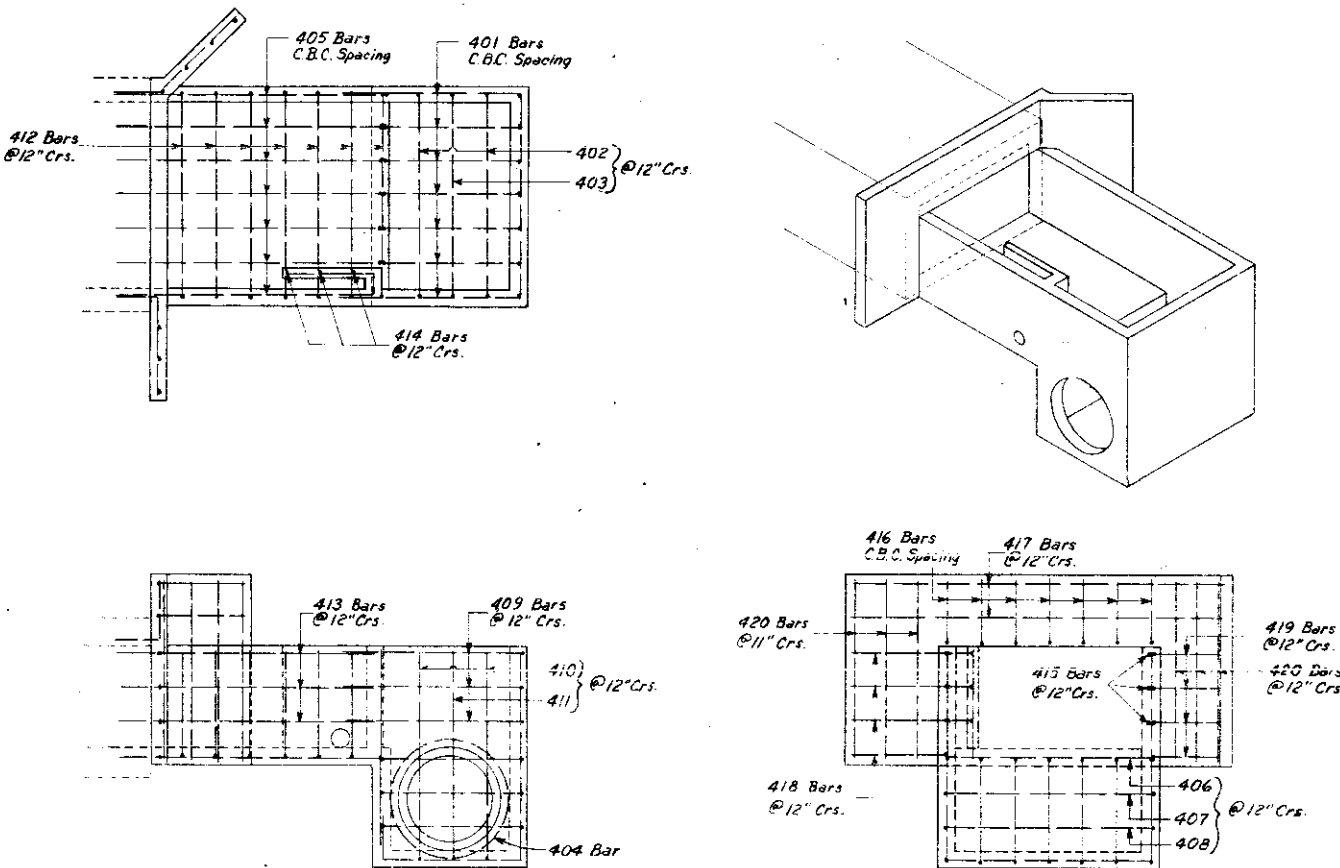


BAR LIST

TYPE	MARK	NO. REQD.	LENGTH	DIMENSIONS		
				a	b	c
IV	421	1	11'-3"	1'-6"	9'-9"	—
IV	422	1	10'-0"	1'-6"	8'-6"	—
II	423	9	13'-4"	3'-0"	7'-4"	3'-0"
III	424	4	12'-6"	3'-0"	8'-6"	1'-0"
IV	425	4	12'-9"	3'-0"	9'-9"	—
IV	426	4	4'-0"	1'-3"	2'-9"	—
IV	427	4	5'-4"	1'-3"	4'-1"	—
I	428	5	3'-0"	—	—	—
I	429	8	5'-0"	—	—	—
I	430	6	4'-6"	—	—	—
I	431	2	13'-4"	—	—	—
I	432	2	12'-9"	—	—	—
IV	433	7	2'-9"	1'-3"	1'-6"	—

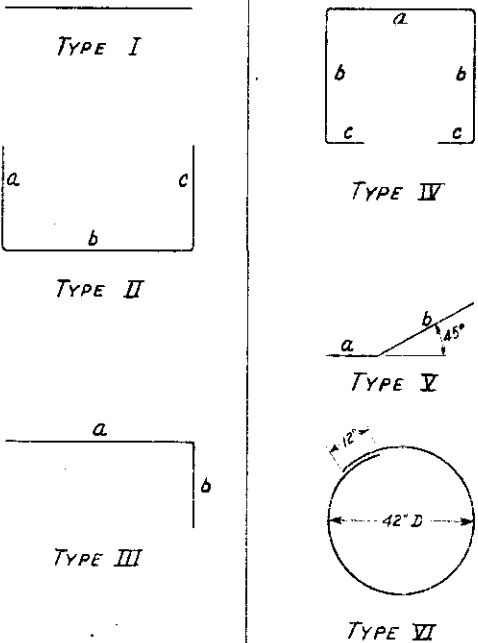
Cut or bend bars to fit around pipe as required.
All reinforcing bars to be 1/2" ϕ .
335 Lbs. Reinforcing Steel includes 1% $\pm$ Over-run.
4.19 Cu. Yds. Class "A" Concrete.

DIVISION BOX RT. STA. 600+



BENDING DIAGRAMS

All dimensions are out to out of bars.



BAR LIST

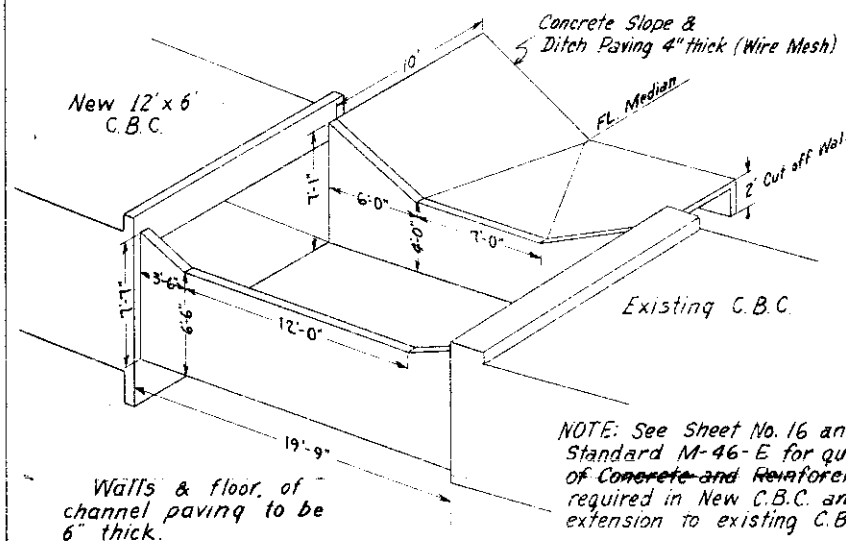
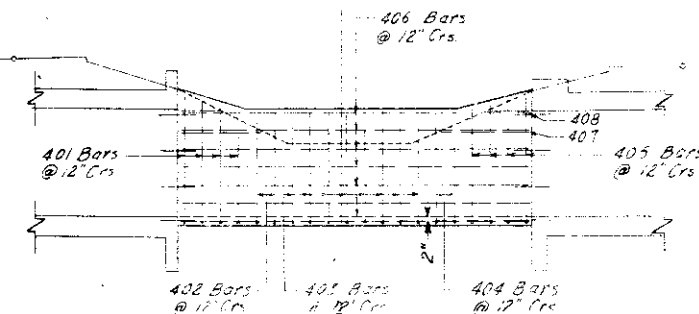
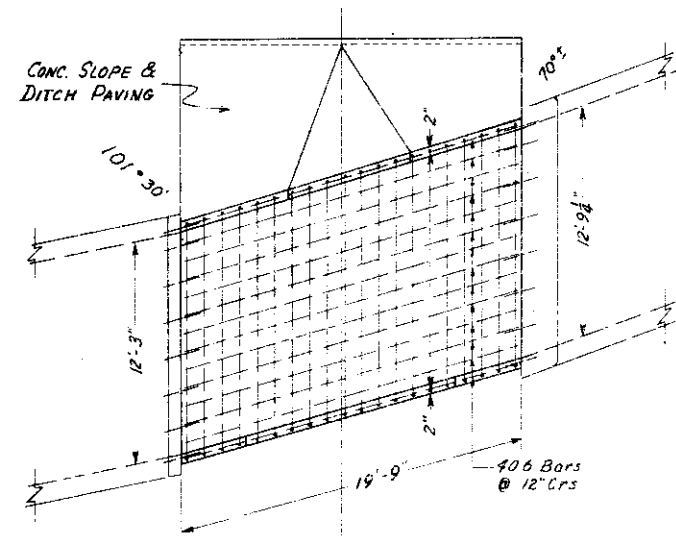
TYPE	MARK	NO. REQD.	LENGTH	DIMENSIONS		
				a	b	c
II	401	7	11'-4"	1'-3"	4'-1"	6'-0"
II	402	2	12'-6"	0'-6"	6'-0"	6'-0"
III	403	1	12'-0"	6'-0"	6'-0"	—
VI	404	1	13'-0"	—	—	—
III	405	7	10'-6"	7'-9"	2'-9"	—
IV	406	1	17'-11"	4'-1"	6'-0"	0'-11"
IV	407	1	16'-11"	4'-1"	6'-0"	0'-5"
IV	408	1	17'-3"	4'-1"	6'-0"	0'-7"
II	409	3	16'-6"	5'-3"	6'-0"	5'-3"
I	410	2	3'-1"	—	—	—
I	411	1	2'-8"	—	—	—
II	412	7	12'-0"	3'-0"	6'-0"	3'-0"
II	413	3	10'-11"	7'-7"	0'-9"	2'-6"
I	414	4	3'-0"	—	—	—
I	415	3	7'-7"	—	—	—
III	416	7	3'-0"	1'-9"	1'-3"	—
V	417	2	11'-9"	8'-9"	3'-0"	—
III	418	4	4'-0"	2'-9"	1'-3"	—
V	419	4	4'-3"	1'-3"	3'-0"	—
I	420	7	5'-1"	—	—	—

All reinforcing bars to be 1/2" ϕ .
390 Lbs. Reinforcing Steel includes 1% $\pm$ Over-run.
4.75 Cu. Yds. Class "A" Concrete.

FEDERAL ROAD DISTRICT NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F004-1(32)	17	

DETAILS OF CHANNEL PAVING & C.B.C. EXTENSION STA. 669+

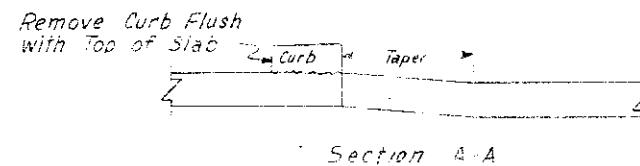
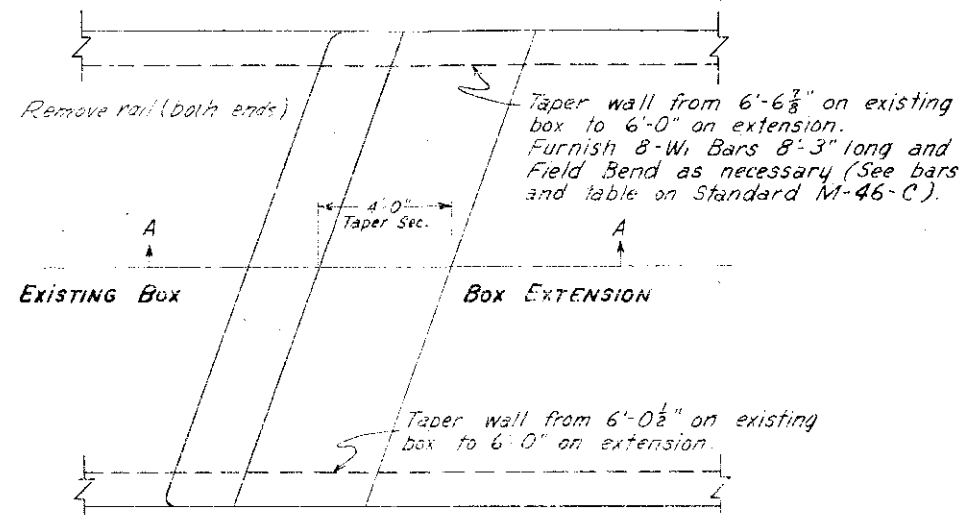
CHANNEL PAVING



NOTE: See Sheet No. 16 and Standard M-46-E for quantities of concrete and reinforcing steel required in New C.B.C. and in extension to existing C.B.C.

C.B.C. EXTENSION

See Sheet No. 13 For Details For Removing Portions Of Existing Wings, Cutting Keyway, And Grouting Dowel Bars



BAR LIST FOR CHANNEL PAVING

TYPE	MARK	NO. REQD	LENGTH	DIMENSIONS		
				a	b	c
II	401	4	26'-0" - 24'-5"	7'-0" - 6'-0"	12'-11" - 13'-0"	7'-0" - 5'-6"
II	402	2	24'-0" - 23'-1"	6'-0"	13'-0" - 13'-0"	5'-0" - 4'-6"
II	403	8	23'-1" - 23'-3"	6'-0"	13'-0" - 13'-3"	4'-0"
II	404	2	23'-3" - 24'-4"	5'-0"	13'-3" - 13'-4"	4'-6" - 5'-0"
II	405	4	24'-4" - 27'-5"	6'-0" - 7'-0"	13'-4" - 13'-5"	5'-6" - 7'-0"
I	406	24	19'-5"			
I	407	2	4'-6"			
I	Dowel	28	2'-0"			
I	408	2	2'-0"			

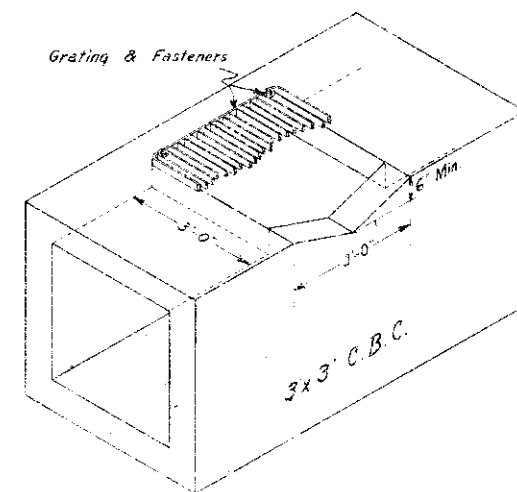
All dimensions are out to out of bar.
All reinforcing bars to be 1/2" #.
688 Lbs. Reinforcing Steel includes 1% ± over-run.
8.81 Cu. Yds. Class "A" Concrete
2.27 Cu. Yds. Concrete Slope & Ditch Paving (Wire Mesh).

BENDING DIAGRAM

TYPE I

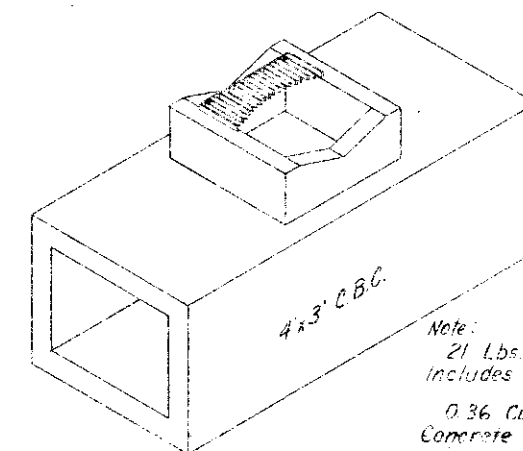
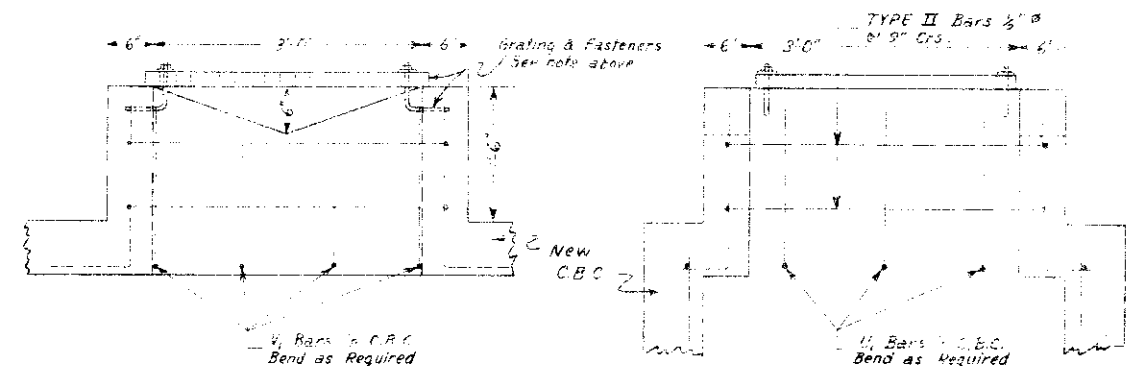
TYPE II

TYPE "A" CONCRETE INLETS FOR C.B.C. OPENINGS STA. 653+ & 659+



Note: Cut or bend Reinforcing Steel as required to accommodate C.B.C. opening. See Standard M-46-B for details of Inlet Grating, Fasteners and List of Materials.

INLET STA. 653+

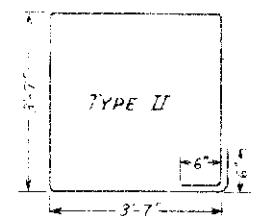


Note: 21 Lbs. Reinforcing Steel includes 1% ± over-run.
0.36 Cu. Yds. Class "A" Concrete Required

INLET STA. 659+

BENDING DIAGRAM

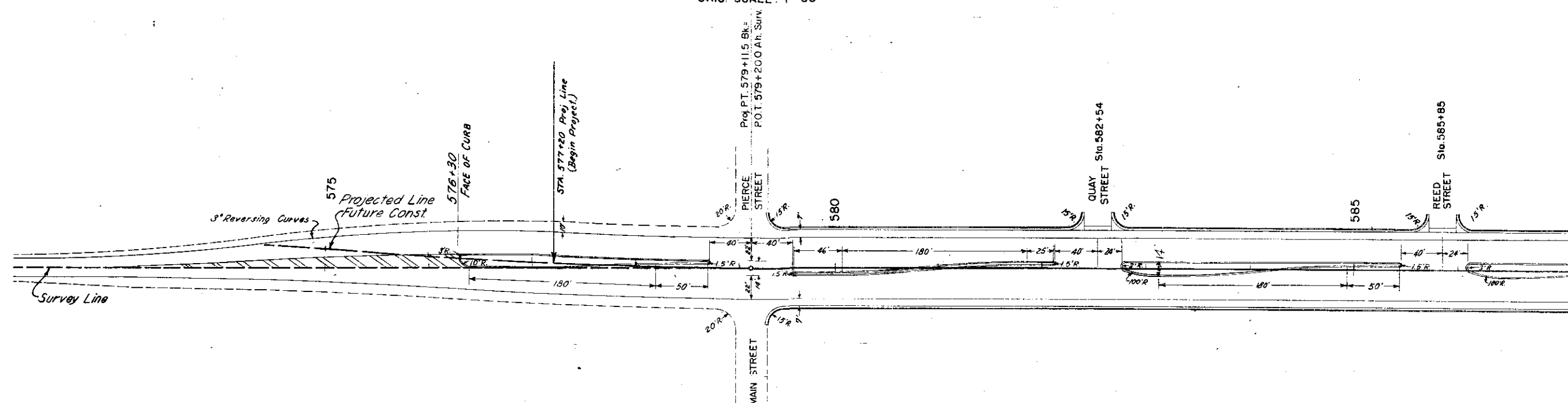
All dimensions are out to out of bars



FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F004-1(32)	18	

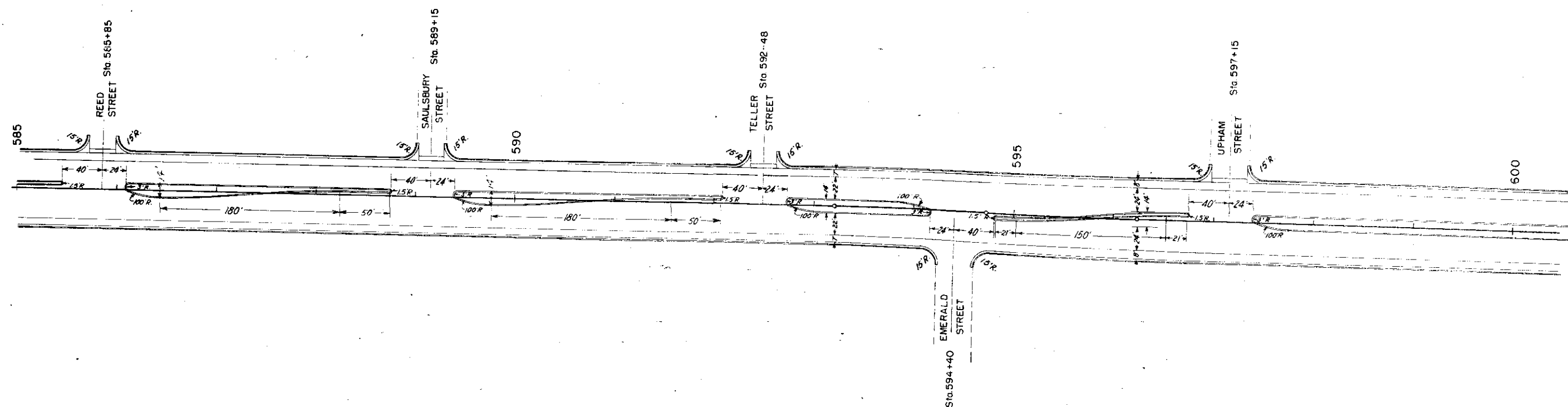
DETAILS OF CURB & GUTTER STA. 576+ to STA. 585+

ORIG. SCALE: 1"=50'



DETAILS OF CURB & GUTTER STA. 585+ to STA. 600+

ORIG. SCALE: 1" = 50'

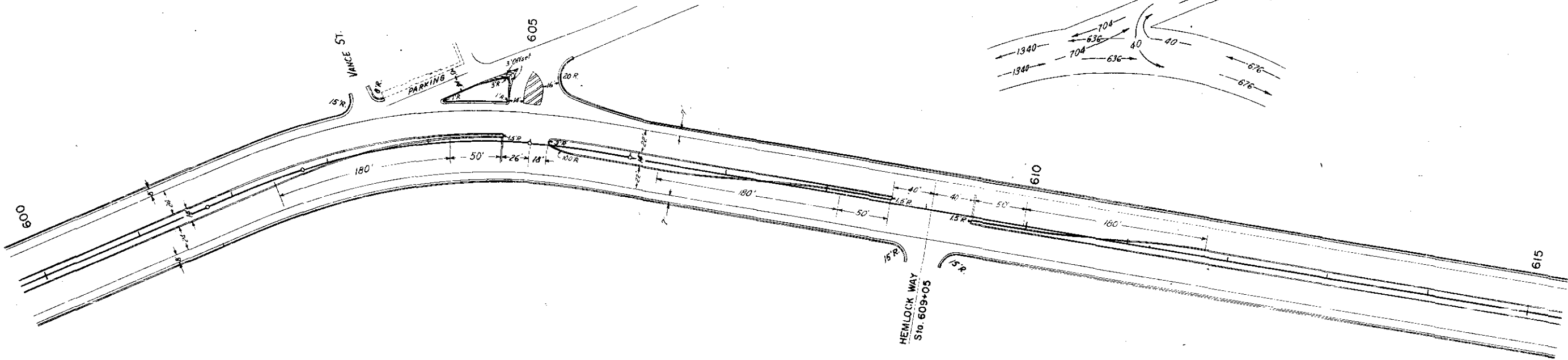


FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F004-1(32)	19	

DETAILS OF CURB & GUTTER STA. 600+ to STA. 615+

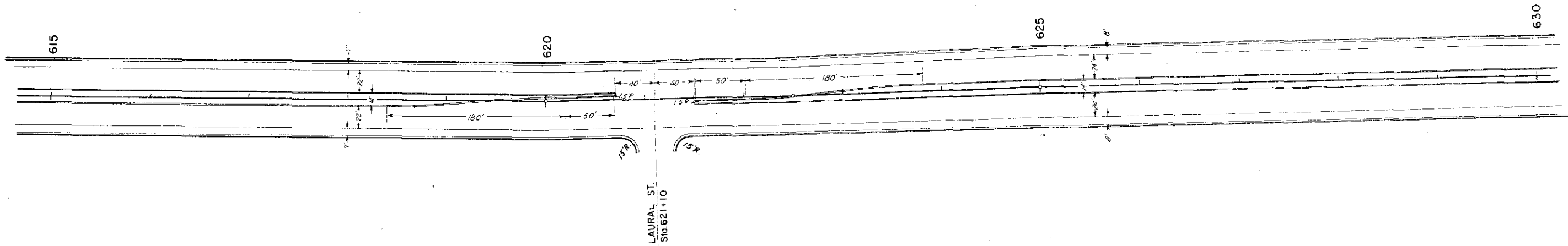
ORIG. SCALE: 1"=50'

Turning Movement Count
1340-DHV 20 Years Hence



DETAILS OF CURB & GUTTER STA. 615+ to STA. 630+

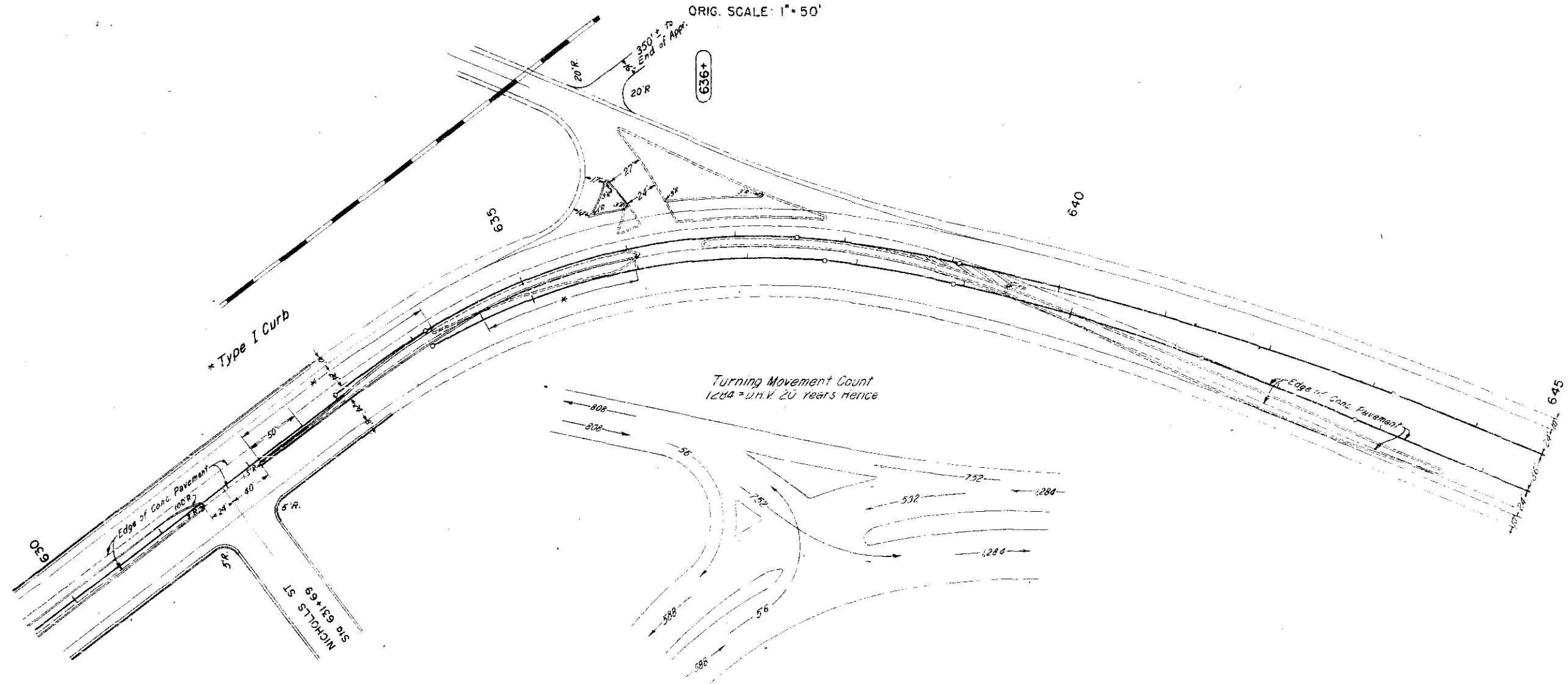
ORIG. SCALE: 1"=50'



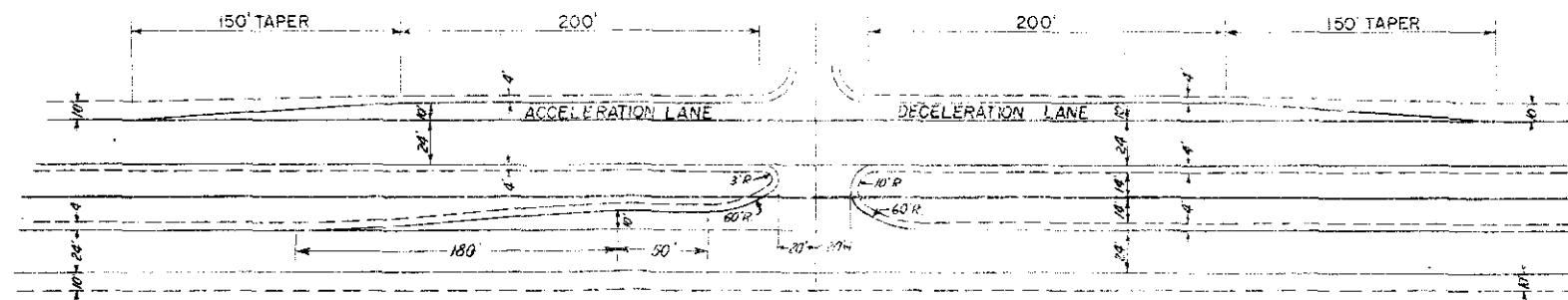
FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F004-1(32)	20	

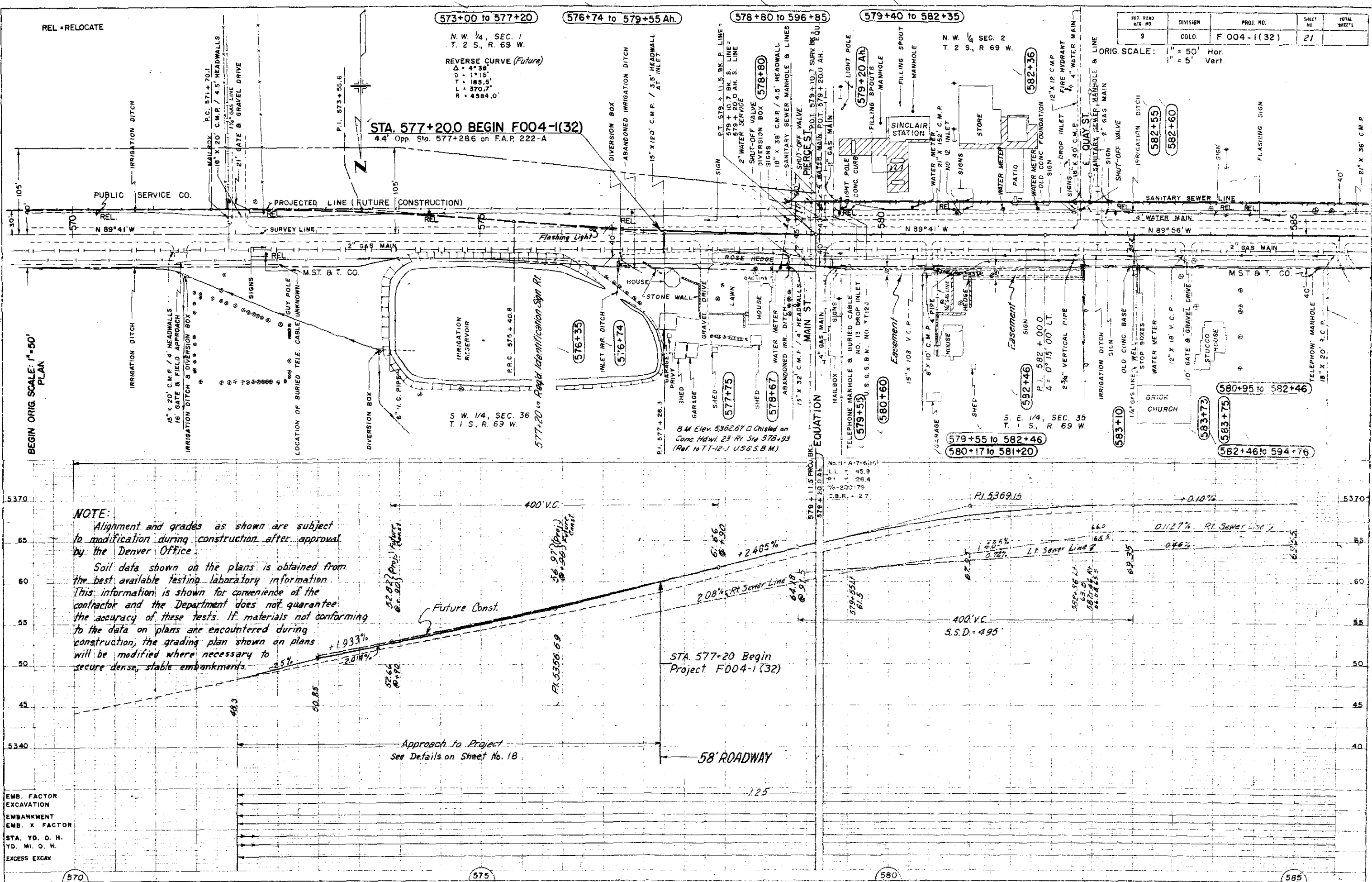
DETAILS OF CURB & GUTTER STA. 630+ to STA. 637+

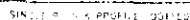
ORIG. SCALE: 1" = 50'

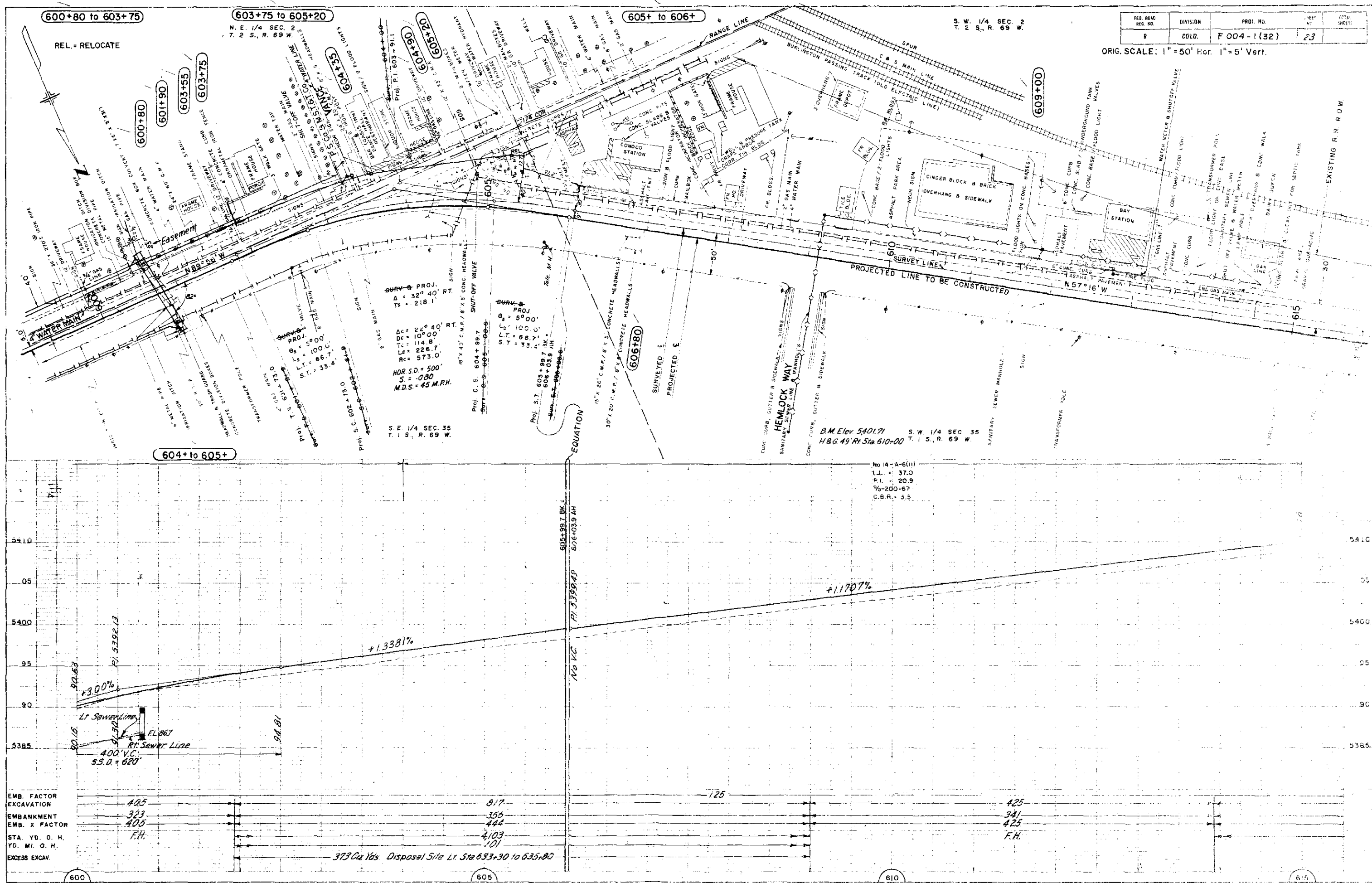


TYPICAL MINOR INTERSECTION OR ROAD APPROACH & MEDIAN OPENING



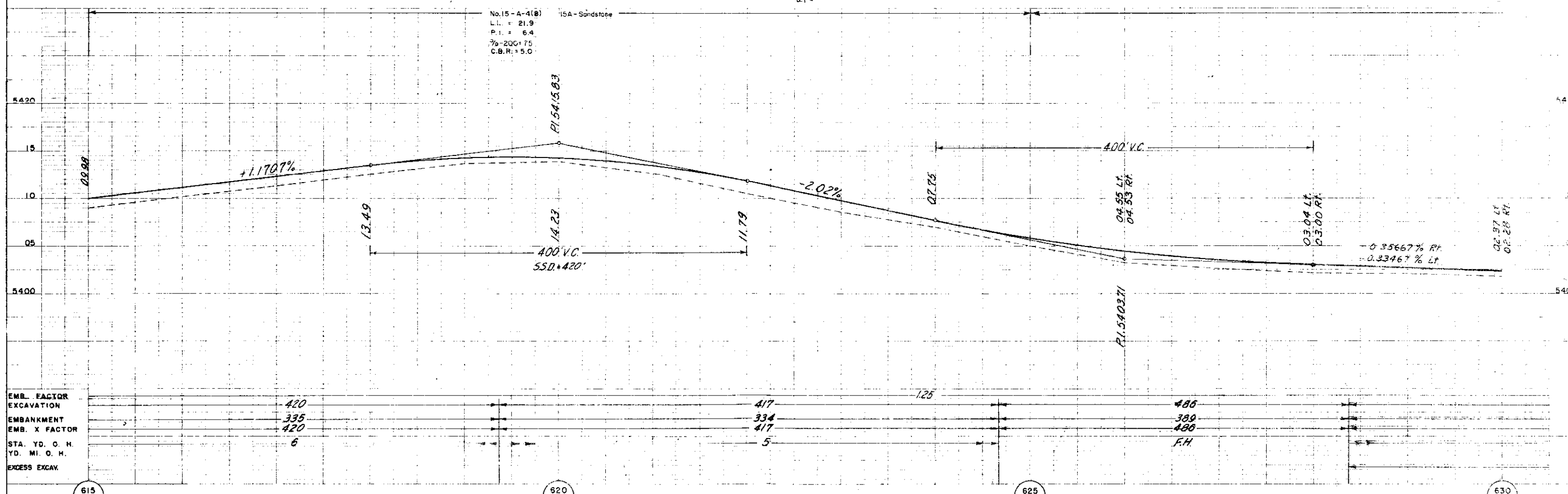
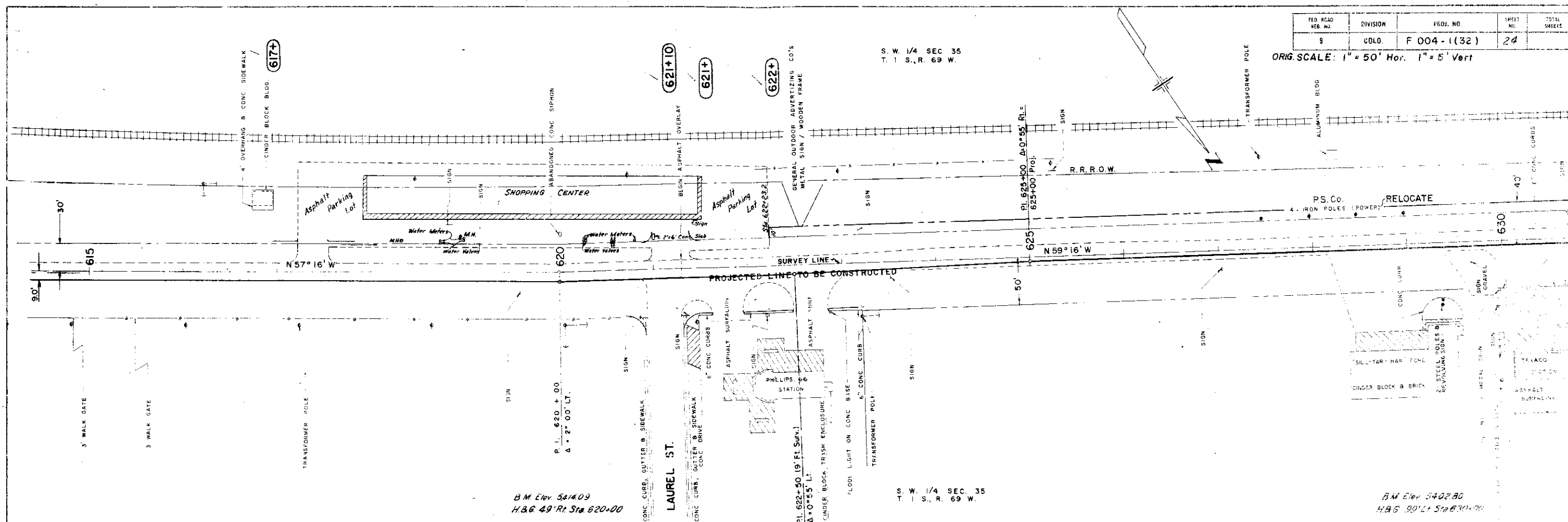






FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLD.	F 004 - 1 (32)	24	

ORIG. SCALE: 1" = 50' Hor. 1" = 5' Vert



REL = RELOCATE

633+40 to 644+50

S. E. 1/4 SEC. 34
T. 1 S. R. 69 W.

(RD) Rev ROW - 9-13-68 - J.L.C.

FILE NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COL'D	F 004 - 1(32)	25

ORIG. SCALE: 1" = 50' Hor. 1" = 5' Vert.

642+ to 647+

640+ to 645+

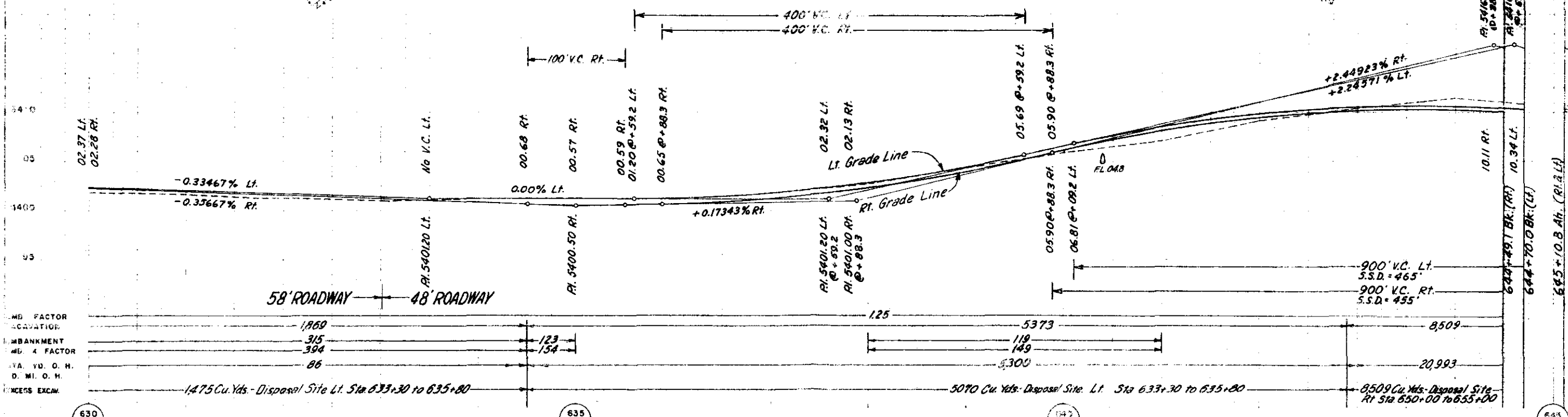
Lt. Grade Line Curve		Rt. Grade Line Curve	
$L_1 = 100'$	$T_1 = 66.7'$	$L_1 = 150'$	$T_1 = 70.7'30"$
$\Delta_1 = 59'22"$	$ST = 33.4'$	$\Delta_1 = 59'22"$	$ST = 80.1'$
$\Delta_2 = 35'36'34"$	$R_1 = 206.8'$	$\Delta_2 = 35'27'07"$	$R_2 = 191.0'$
$D_1 = 10'$	$L_2 = 150'$	$D_1 = 9'30"$	$L_3 = 150'$
$T_2 = 91.8'$	$ST = 50.0'$	$T_2 = 72.4'$	$ST = 50.0'$
Transition for Compound Curve		Transition for Compound Curve	

NOR. S.D. = 550'
S = .080
M.D.S. = 45 M.P.H.

Curve	PI ₁	SC	PI ₂	CS	PI ₃
Lt. Gr. Line	633+677	634+010	635+580	637+571	638+156
Rt. Gr. Line	633+481	633+980	635+928	637+712	638+190
Curve	SC	PI ₄	CS	PI ₅	
Lt. Gr. Line	639+071	641+139	643+200	643+700	
Rt. Gr. Line	638+912	640+087	641+259	641+759	

No. 16-A-7-6(7)
P.L. = 44.7
% = 200+45
C.B.R. = 3.0

No. 17-A-7-6(1)
Similar to No. 16



EMB. FACTOR
CUTTING
EMBANKMENT
EMB. FACTOR
V.A. VD. O. H.
D. MI. O. H.
EXCESS EXCAV.

1,475 Cu. Yds. Disposal Site Lt. Sta 633+30 to 635+00

5070 Cu. Yds. Disposal Site Lt. Sta 633+30 to 635+00

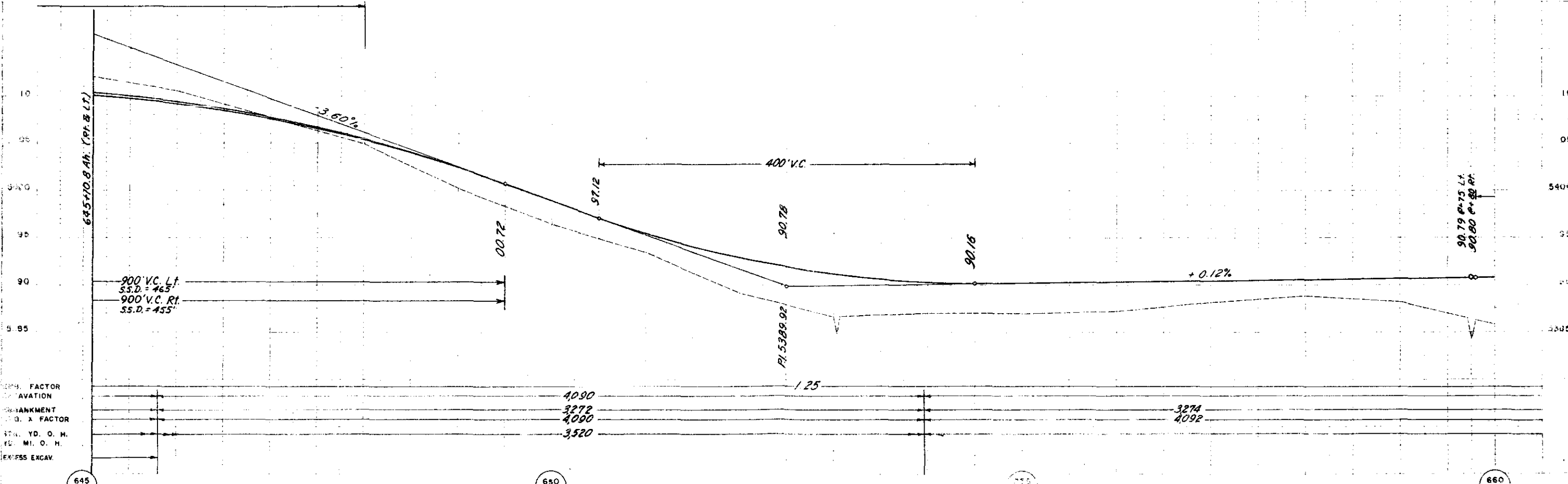
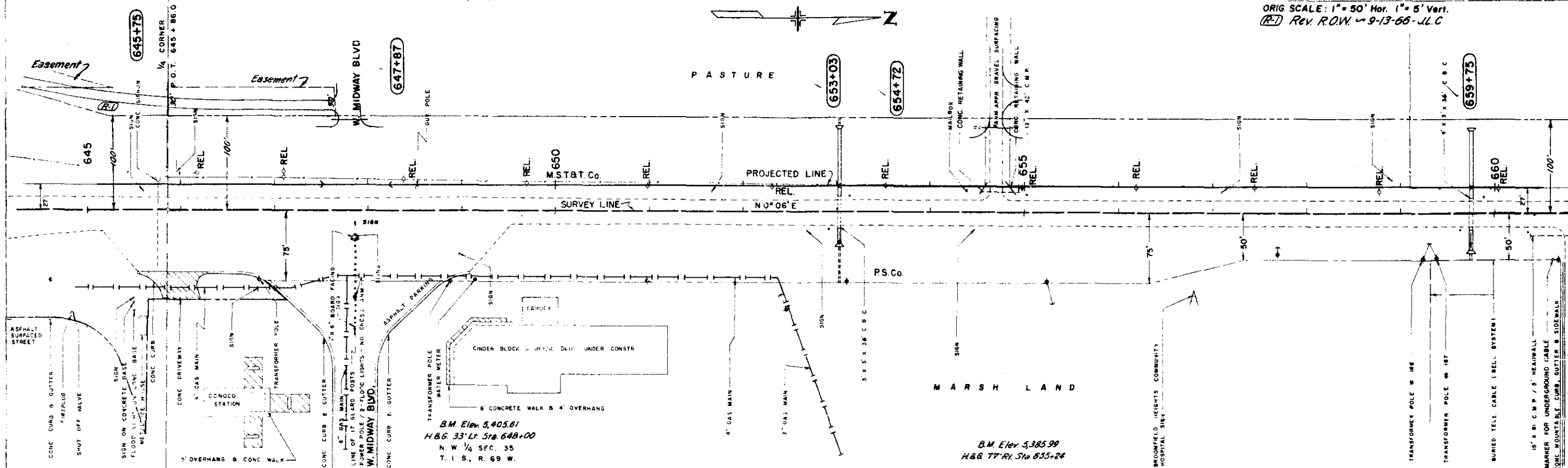
8,509 Cu. Yds. Disposal Site Rt. Sta 650+00 to 655+00

REL=RELOCATE

N. E. 1/4 SEC. 34
T. 1 S., R. 69 W.

FED. ROAD DIST. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLD.	F 004-1(32)	26	

ORIG SCALE: 1" = 50' Hor. 1" = 5' Vert.
(P-7) REV. R.O.W. - 9-13-66-J.L.C.

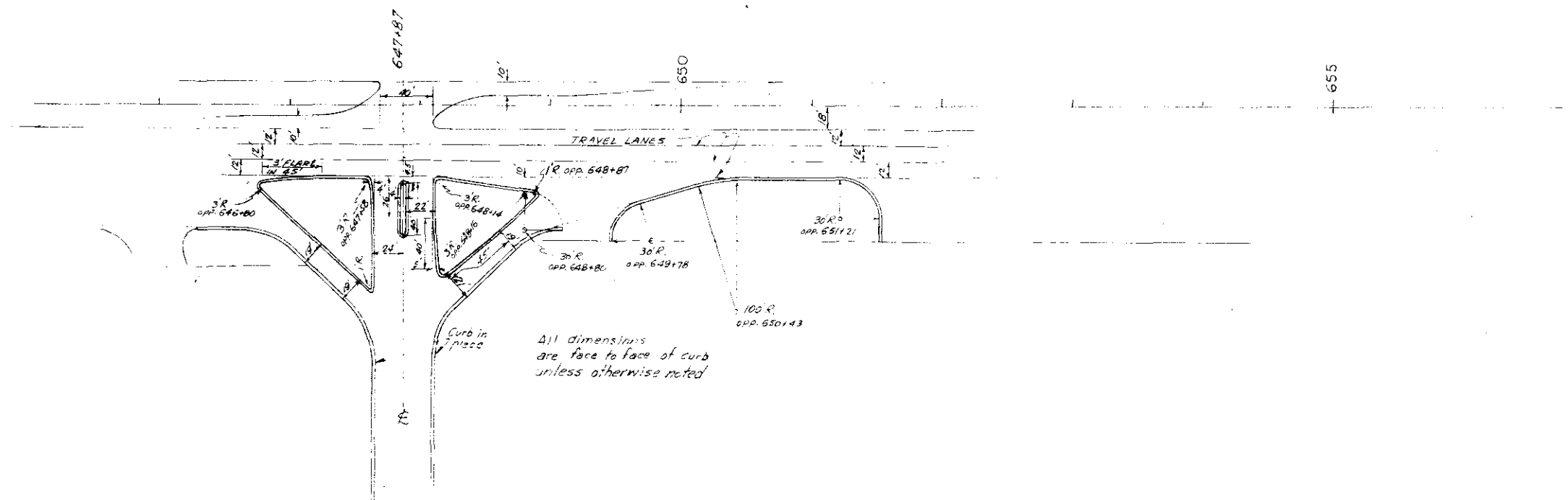


TRANS. FACTOR
AVIGATION
BANKMENT
G. B. X FACTOR
ST. YD. O. H.
ST. MI. O. H.
EXCESS EXCAV.

FED. ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 004-1(32)	26 a	

New Sheet, Work Order No. 2829 8-20-64 J.R.W.

Details of Intersection
W. Midway Blvd.



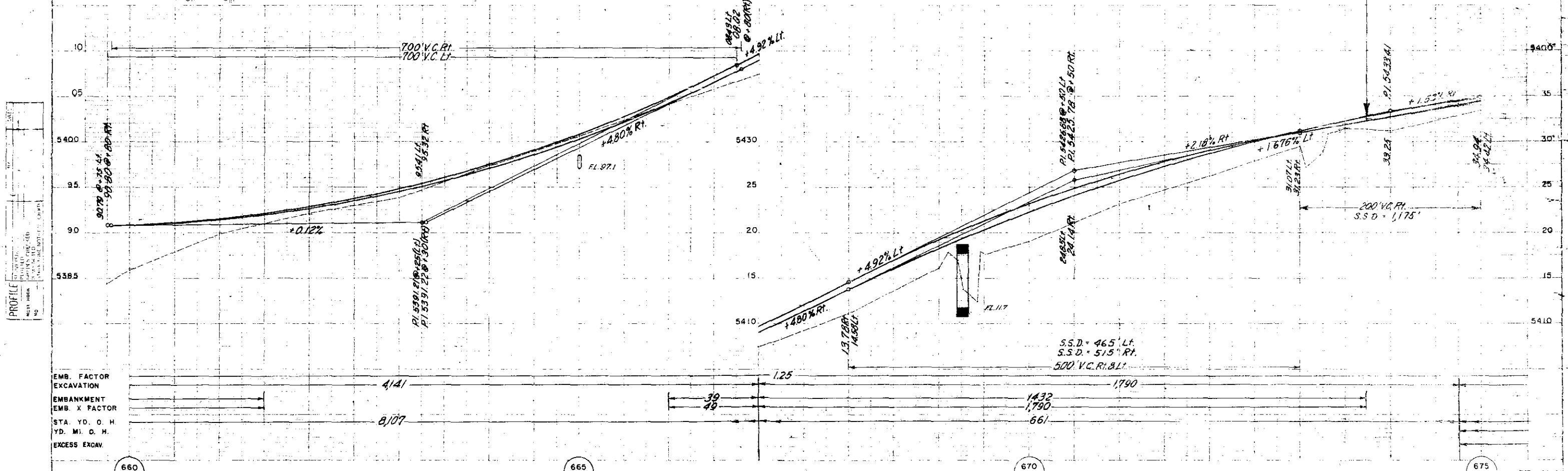
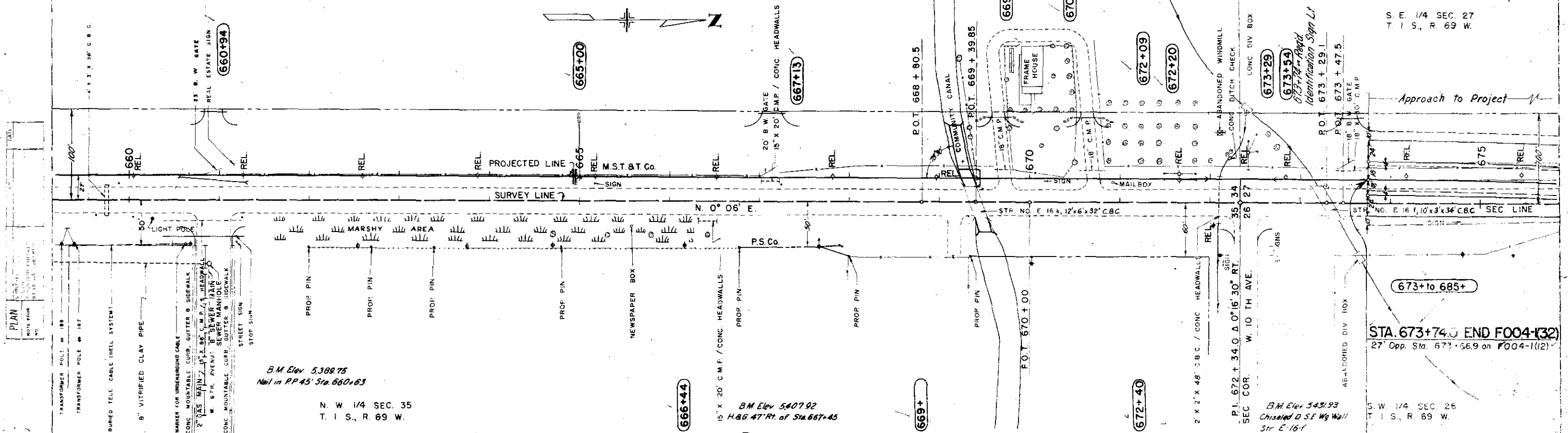
REL. = RELOCATE

N. E. 1/4 SEC. 34
T. 1 S., R. 69 W.

F&R ROAD M.C. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 004-1(32)	27	

ORIG. SCALE: 1" = 50' Hor. 1" = 5' Vert.

S. E. 1/4 SEC. 27
T. 1 S., R. 69 W.



EMB. FACTOR
EXCAVATION
EMBANKMENT
EMB. X FACTOR
STA. YD. O. H.
YD. MI. O. H.
EXCESS EXCAV.

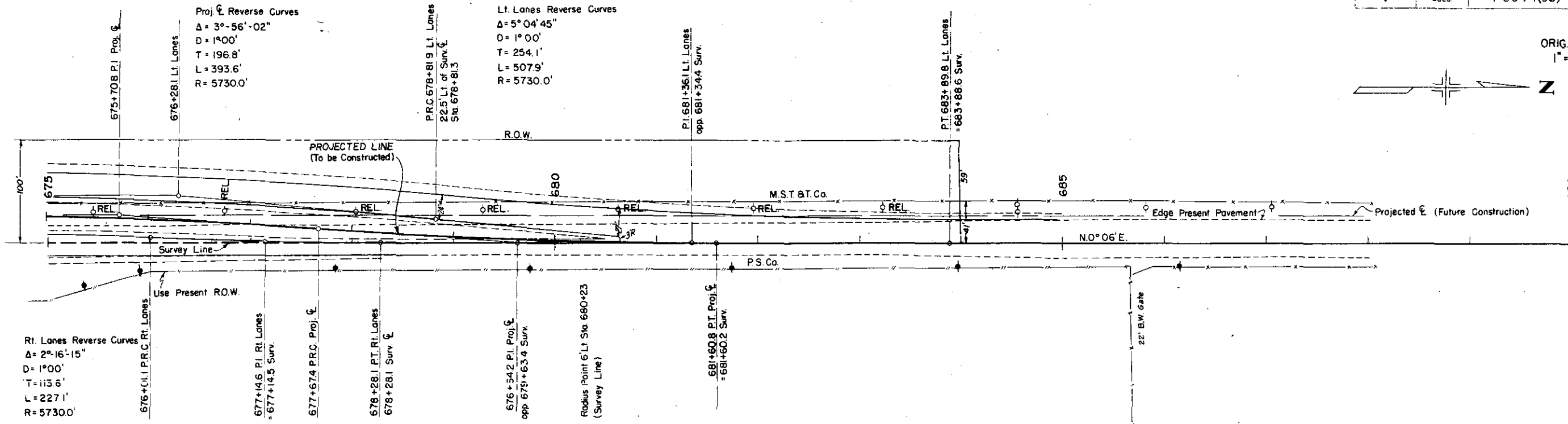
REL. = RELOCATE

Proj. & Reverse Curves
 $\Delta = 3^\circ 56' 02''$
 $D = 1^\circ 00'$
 $T = 196.8'$
 $L = 393.6'$
 $R = 5730.0'$

Lt. Lanes Reverse Curves
 $\Delta = 5^\circ 04' 45''$
 $D = 1^\circ 00'$
 $T = 254.1'$
 $L = 507.9'$
 $R = 5730.0'$

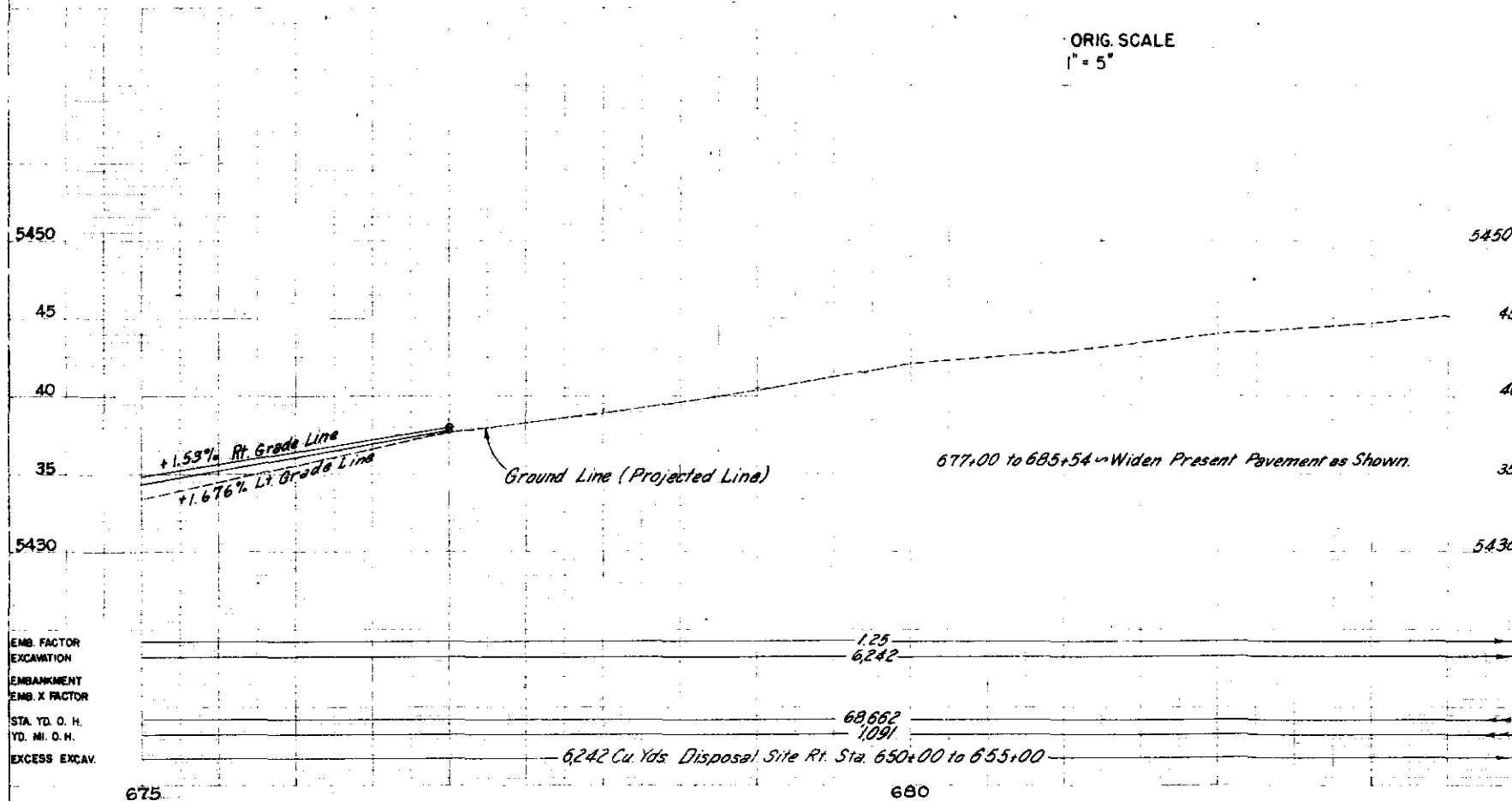
REG. ROAD REF. NO.	DIVISION	PRJ. NO.	SHEET NO.	TOTAL SHEETS
5	COLL.	F 004-1(32)	28	

ORIG. SCALE
1" = 50'



SUMMARY OF EARTHWORK QUANTITIES

ORIG. SCALE
1" = 5'



	58' Rdwy.	48' Rdwy.	Project Totals
EXCAVATION			
From Cross Sections	*10,385	*30,145	*40,530
Est. for Subsidence	439	1,032	1,471
List of Structures as Excavation	245	270	515
List of Structures as Embankment	140	200	340
Totals	11,209	31,647	42,856 Cu. Yds.
* Includes Excess Excavation which will not require Wetting & Compaction in stockpile			
EXCAVATION			
From Cross Sections	10,385	30,145	40,530
Less Excess Excavation	6,000	19,821	25,821
Totals	4,385	10,324	14,709 Cu. Yds.
EMBANKMENT			
From Cross Sections	3,508	8,259	11,767 Cu. Yds.
EMBANKMENT X FACTOR	4,385	10,324	14,709 Cu. Yds.
STATION YARD OVERHAUL			
From Mass Diagram	49,872	107,243	157,115
Est. for Subsidence	4,987	10,724	15,711
Totals	54,859	117,967	172,826 Sta. Yds.
YARD MILE OVERHAUL			
From Mass Diagram	2,632	1,091	3,723
Est. for Subsidence	263	109	372
Totals	2,895	1,200	4,095 Yd. Mi.
COMPACTION			
Total Unclassified Excavation - Base of Cuts & Fills	5,209	11,826	17,035
	13,313	18,467	31,780
Totals	18,522	30,293	48,815 Cu. Yds.

DETAILS INTERCHANGE STA. 635+ (FUTURE)

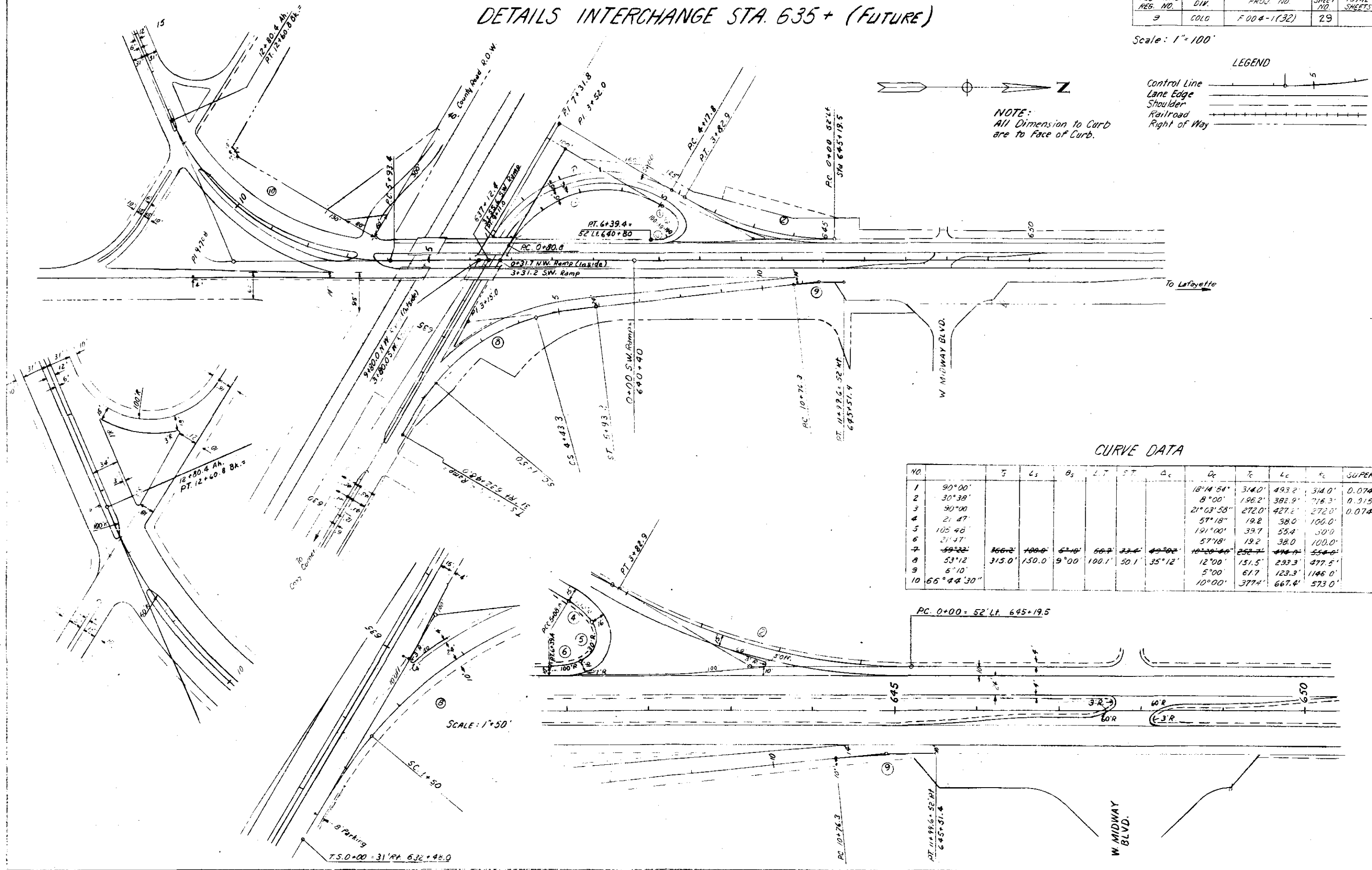
FED. ROAD RES. NO.	DIV.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 004-1(32)	29	

Scale: 1"=100'

LEGEND

Control Line	
Lane Edge	
Shoulder	
Railroad	
Right of Way	

NOTE:
All Dimension to Curb
are to Face of Curb.



CURVE DATA

NO.	Δ	Ts	Ls	Rs	Lt	St	Δc	Dc	Tc	Lc	Rc	SUPER
1	90°00'							18°14'54"	314.0'	493.2'	314.0'	0.074
2	30°38'							8°00'	196.2'	382.9'	716.3'	0.915
3	90°00'							21°03'58"	272.0'	427.2'	272.0'	0.074
4	21°47'							57°18'	19.2	38.0	100.0'	
5	105°48'							191°00'	39.7	55.4	50.0'	
6	21°47'							57°18'	19.2	38.0	100.0'	
7	59°22'	366.2'	100.0'	62°10'	66.7	33.4	42°00'	10°20'44"	252.7'	474.1'	554.0'	
8	53°12'	315.0'	150.0'	9°00'	100.1'	50.1'	35°12'	12°00'	151.5'	293.3'	477.5'	
9	6°10'							5°00'	61.7	123.3'	1146.0'	
10	66°44'30"							10°00'	377.4'	667.4'	573.0'	

SCALE: 1"=50'

T.S. 0+00 = 31' RA 632+48.0

PC 0+00 = 52' LT 645+19.5

W MIDWAY BLVD.

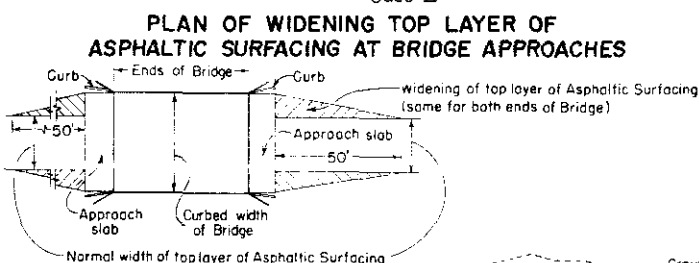
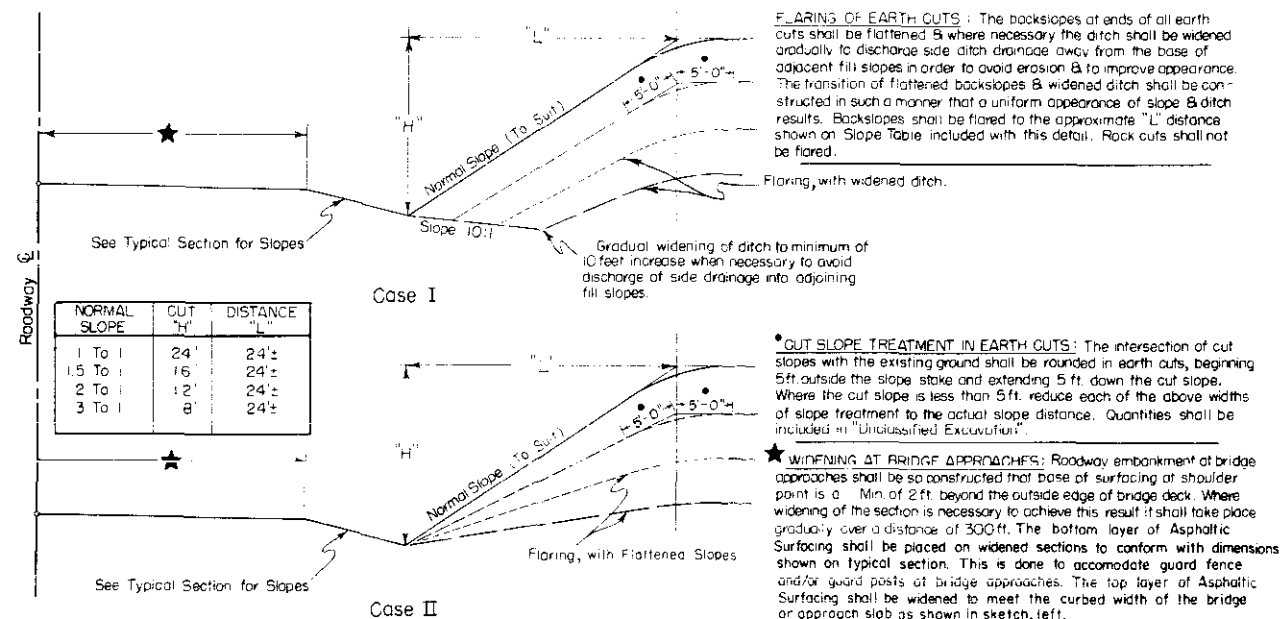
STANDARD SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES AND AT CREST OF GRADES

STANDARD M-2-A
(MAY 1, 1962)

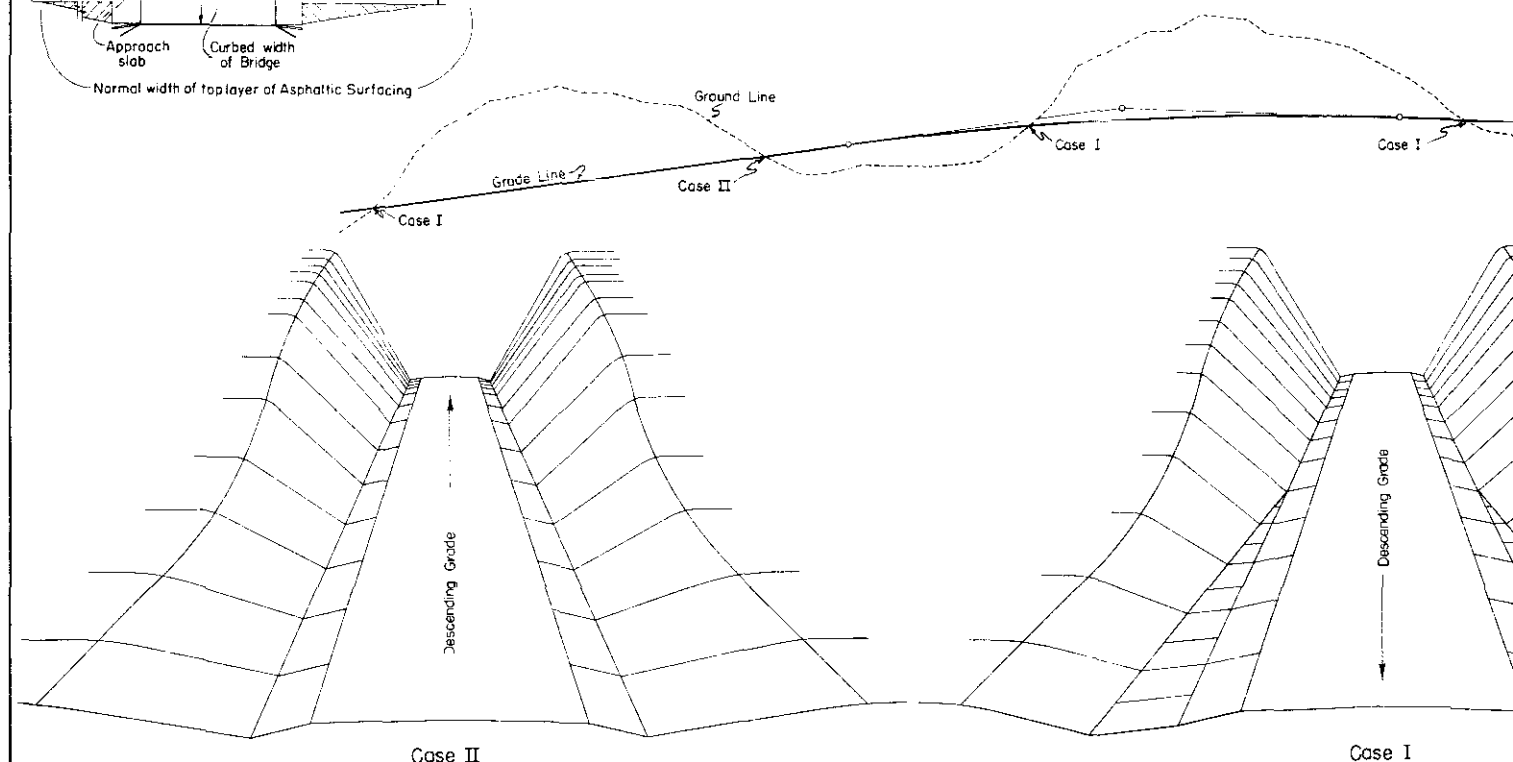
FED. ROAD RES. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS	
4-22-63 Rev Bridge Approaches	LEO

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



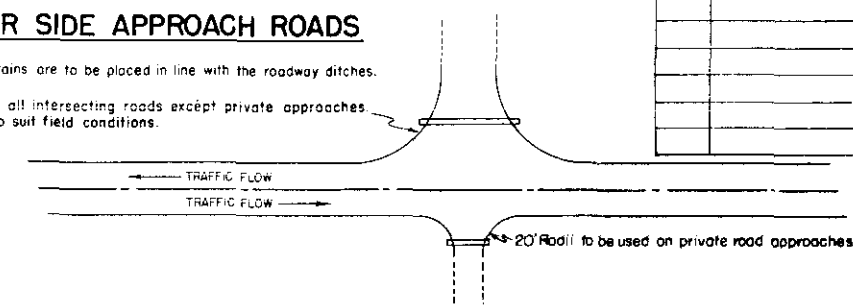
PLAN OF FLARING IN EARTH CUTS



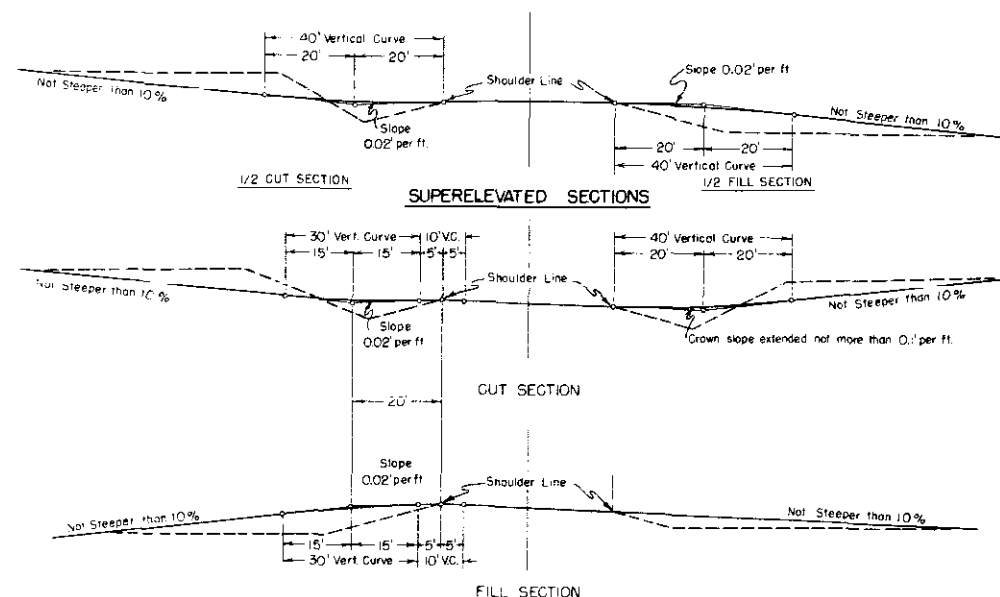
TYPICAL PLANS FOR SIDE APPROACH ROADS

Where practical Side Drains are to be placed in line with the roadway ditches.

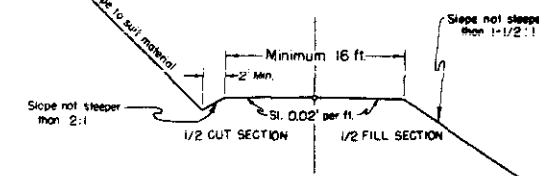
50' Radii to be used on all intersecting roads except private approaches. Radii may be varied to suit field conditions.



STANDARD CROWNED SECTION

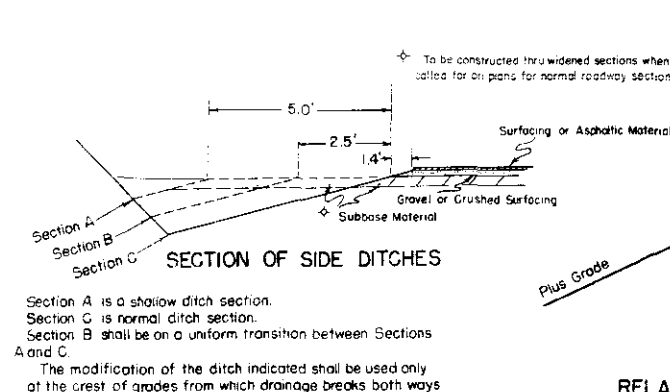


TYPICAL SECTION FOR APPROACH

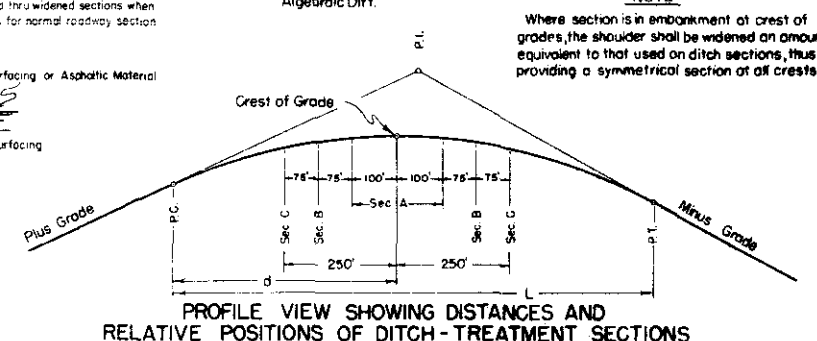


NOTE:
ROAD APPROACHES To conform to the above details unless otherwise indicated on plans by Special Details. The width of the crowned section shall be not less than the width of the crowned section of the existing approach road and in no case shall the new construction be less than sixteen (16) feet in width.

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)



Formula for finding the Crest of Grade
 $d = \frac{\text{Plus Grade}}{\text{Algebraic Diff.}} \times L$



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.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways 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
DEPARTMENT OF HIGHWAYS

APPROACH ROADS,
FLARING, CUT SLOPE TREATMENT,
BRIDGE & CREST WIDENING

Designed by A. Z. Made by S.J.M. & A.B. Checked by C.R.S. Approved by A. Julian Date: November 1, 1953

STANDARD M-5-A
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

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

Scale in inches
0 1 2 3

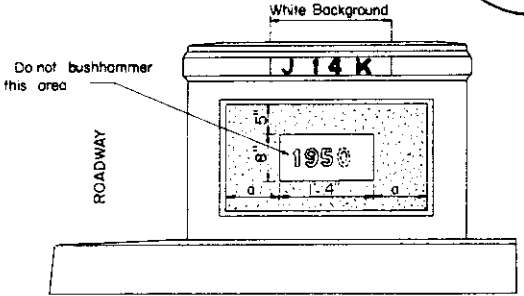
a b c d e f g h i j k l m n o p q r s t u v w x y z
J 14 K 1950

abcdefghijklmnopqrstuvwxyz

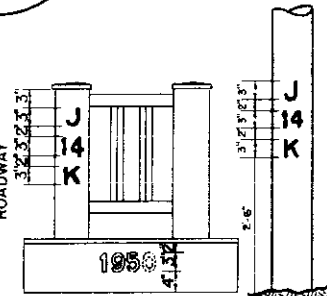
SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

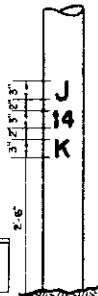
SECTION



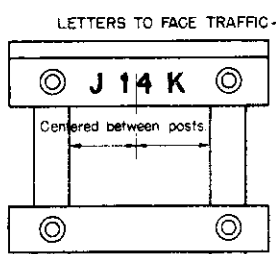
TYPICAL FOR CONCRETE ENDPOST



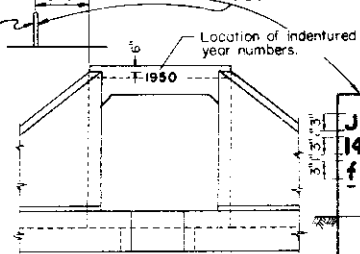
TYPICAL FOR STEEL HANDRAIL END POST



TYPICAL FOR SIGN POSTS



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX CULVERTS & STRUCTURES WITHOUT END POSTS

GENERAL NOTES
ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS APPLICABLE TO THE PROJECT.
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. MINIMUM AS SHOWN IN 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 WHERE THE STRUCTURE HAS NO END POSTS THE NUMBER SHALL BE PLACED ON A POST ON THE RIGHT HAND SIDE OF THE ROAD AS SHOWN FOR SIGNS THE NUMBER SHALL BE PLACED ON SIGN POSTS ON THE RIGHT HAND SIDE OF THE ROADWAY.
THE CORRECT NUMBER FOR EACH BRIDGE OR SIGN IS SHOWN ON THE PLANS.
THE NUMBERS FOR MAJOR STRUCTURES OF OVER 20 FEET CLEAR SPAN SHALL BE UPPER CASE LETTERS. THE NUMBERS FOR MINOR STRUCTURES OF 12 TO 20 FEET CLEAR SPAN SHALL BE LOWER CASE LETTERS. SIGN BRIDGES SHALL BE CONSIDERED AS MAJOR STRUCTURES.
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 THOROUGHLY 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 COATS" DARK OR EXTERIOR BLACK PAINT (PAINT) 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.
THE COST OF PAINTING OF STRUCTURE NUMBERS AND FURNISHING AND PLACING POSTS FOR STRUCTURE NUMBERS SHALL BE CONSIDERED SUBSIDIARY WORK AND SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT PAID FOR AS A SEPARATE ITEM.
* THE LENGTH OF SPAN OF STRUCTURE SHALL BE MEASURED ALONG CENTER LINE OF ROADWAY. IN CASE OF DOUBLE OR MULTIPLE BOX CULVERTS THE CENTER WALL OR WALLS SHALL BE DISREGARDED AND CLEAR SPAN MEASURED FROM INSIDE OF END WALLS.

COLORADO
DEPARTMENT OF HIGHWAYS

LETTERS AND FIGURES
FOR
STRUCTURE NUMBERS

Designed by
Made by
Checked by

Approved by
Bridge Engineer
Date: Feb 17, 1958

STRUCTURE NO. _____

STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

STANDARD M-6-B

(SHEET 1 OF 2 SHEETS)

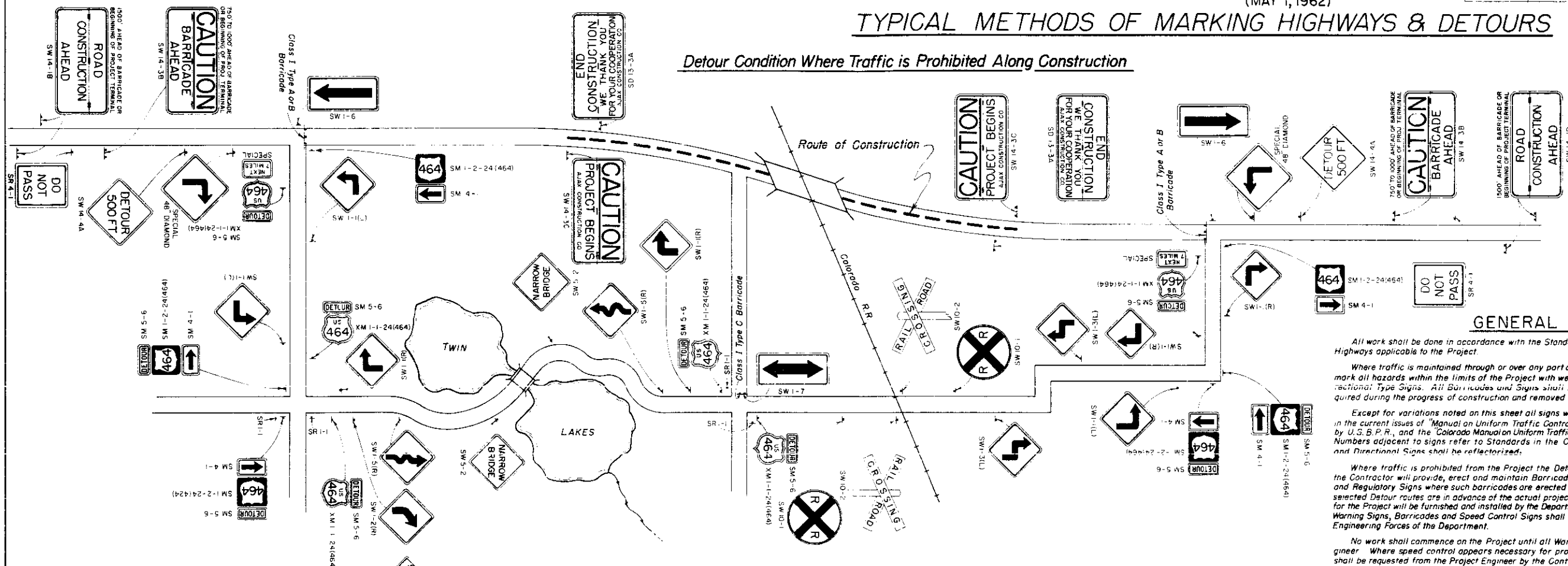
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
8	COLORADO		

TYPICAL METHODS OF MARKING HIGHWAYS & DETOURS

REVISIONS		
1-14-63	GENERAL REV.	L.E.O.

Detour Condition Where Traffic is Prohibited Along Construction



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications 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 maintained Barricades, Warning Signs and Directional Type Signs. All Barricades and Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when project is completed.

Except for variations noted on this sheet all signs will be in conformity with the specification outlined in the current issues of "Manual on Uniform Traffic Control Devices for Streets & Highways," issued by U.S.B.P.R., and the "Colorado Manual on Uniform Traffic Control Devices for Streets & Highways." Numbers adjacent to signs refer to Standards in the Colorado manual. Standard Warning, Regulatory and Directional Signs shall be reflectorized.

Where traffic is prohibited from the Project the Detour will be marked by the Department except that the Contractor will provide, erect and maintain Barricades complete with approved Directional Arrows and Regulatory Signs where such barricades are erected and maintained at the ends of the Project or where selected detour routes are in advance of the actual project terminal. U.S. or State Route Markers required for the Project will be furnished and installed by the Department. The location and positioning of Advance Warning Signs, Barricades and Speed Control Signs shall be as recommended by the appropriate District Engineering Forces of the Department.

No work shall commence on the Project until all Warning Signs are in place and approved by the Engineer. Where speed control appears necessary for protection of the travelling public, such speed control shall be requested from the Project Engineer by the Contractor.

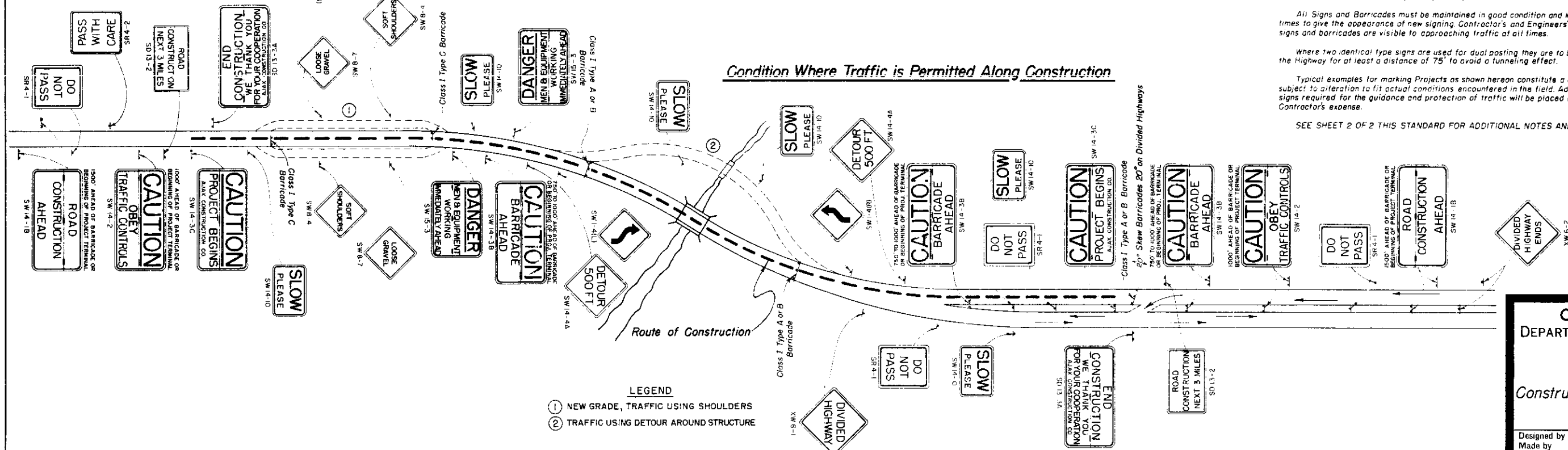
All Signs and Barricades must be maintained in good condition and kept clean and free of dirt at all times to give the appearance of new signing. Contractor's and Engineers' equipment must be parked so that signs and barricades are visible to approaching traffic at all times.

Where two identical type signs are used for dual posting they are to be staggered on the two sides of the Highway for at least a distance of 75' to avoid a tunneling effect.

Typical examples for marking Projects as shown hereon constitute a minimum of signs required and are subject to alteration to fit actual conditions encountered in the field. Additional markings and any special signs required for the guidance and protection of traffic will be placed as required on the project at the Contractor's expense.

SEE SHEET 2 OF 2 THIS STANDARD FOR ADDITIONAL NOTES AND DETAILS.

Condition Where Traffic is Permitted Along Construction



LEGEND

- ① NEW GRADE, TRAFFIC USING SHOULDERS
- ② TRAFFIC USING DETOUR AROUND STRUCTURE

COLORADO
DEPARTMENT OF HIGHWAYS

Construction Traffic Signs

Designed by J.C.R. Approved by J.C.R.
Made by J.C.R. Engineer, Survey & Plans
Checked by Date: July 22, 1955

STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

STANDARD M-6-B

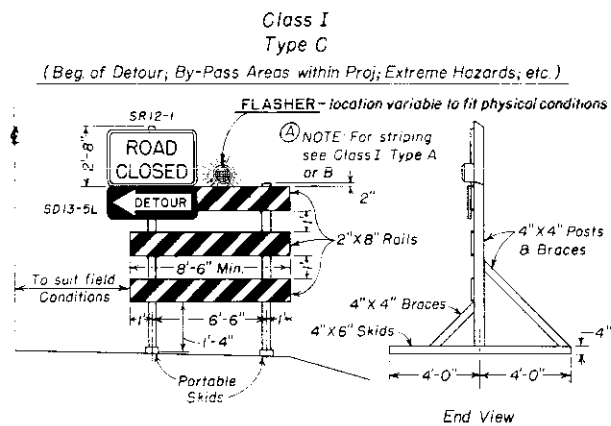
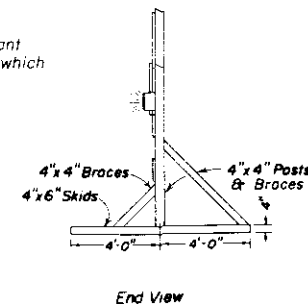
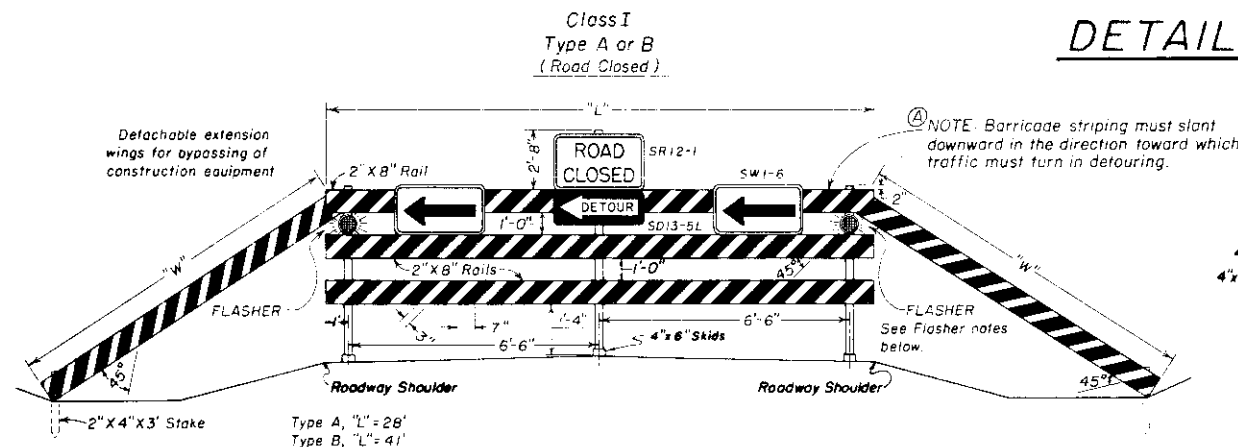
(SHEET 2 OF 2 SHEETS)

(MAY 1, 1962)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
5-16-62	Rev Margin & Border Color	L.E.O.
1-14-63	General Rev	L.E.O.

DETAILS OF BARRICADES



End View

End View

"W" Variable, length to be adequate to provide closing of borrow pit and shoulder.

NOTE
The various types & combinations of approved Signs and Beacons for Barricades required for each project will be governed by field conditions and subject to approval by the Engineer.

NOTE: Alternate materials or other reflective elements on Construction Traffic Signs and Barricades will be permitted only after approval of such material by the Department.

- SPECIFICATIONS**
- PAINT** - All paint and methods of painting shall be in conformity with Item 38 of the Standard Specifications
- STRIPING** - Planking and Wings on all Barricades shall be painted with Maintenance Flat Black on both sides before adding Reflective Strips. Reflective Strips shall be "Cutout Smooth Surface Yellow," of a type approved by the Department, 3" wide and spaced 7" apart as shown in the detail.
- Division of traffic will be accomplished as follows:
- 1- Stripes for Barricades diverting traffic to the left shall start on the left hand side of the lower plank and progress up to the right with the stripes making an angle of 45 degrees with the horizontal axis of the board as shown in the detail. Traffic diversion to the right will be just the opposite.
 - 2- Stripes on Barricades diverting traffic in both directions shall begin at the center of the lower plank and progress down in both directions
- TIMBER** - All Timber used shall conform to the Standard Specifications for Miscellaneous (Untreated) Timber.
- | | | |
|--------------------|--------------------|-------|
| Planking | 2" x 8" | S 4 S |
| Posts (Barricades) | 4" x 4" | S 4 S |
| Posts (Signs) | 4" x 4" or 6" x 6" | S 4 S |
- Barricades may be either portable as shown or fixed with posts set into the ground.
- All skids, braces and posts to be painted yellow and nailed together with No 20d nails.
- Bases to be weighted where necessary to provide stability.

DETAILS OF CONSTRUCTION SIGNS



MARGIN AND BORDER COLOR

Signs "A" through "F"
Upper Portion - Margin - Same as Background
Lower Portion - Border - Same as Legend
Margin - Same as Background
Border - Same as Legend

Signs "G" and "I"
Margin - ReflectORIZED "Smooth Surface Yellow"
Border - Painted Black

Signs "J" and "K"
Margin - ReflectORIZED White
Border - Painted Black

- NOTES**
1. Signs "A" through "F" shall be of the hinge and fold type to facilitate the closing down of the sign when the need is not prevalent. These signs shall be hinged with 3-4" Butt Hinges (tight pin) mortised into the face surface of the sign.
 2. The reflective sheeting used on the sign background shall be placed over the leaves of the hinges.
 3. Hinges shall be fastened to the sign with flat head stove bolts having a flat washer under the nut on back of sign.
 4. All hinges, bolts, nuts and washers to be rust resistant.
 5. Sign panels to be held in the open position with hooks and eyes or other approved fastening devices.
 6. 90° Countersunk Steel or Aluminum Lock Bolt Fasteners with Collars suitable for use on wood may be used in lieu of stove bolts.

DETAILS OF SIGN AND BEACON FABRICATION AND USAGE

Construction Signs "A" through "G" and "K" shall be made of 5/8" Plywood or other material approved by the Department and as per details above.

Signs having reflectORIZED Yellow or Red surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Non-Exposed Lens" type approved by the Department. Signs having reflectORIZED White surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Exposed Lens" type approved by the Department.

Construction Sign "A" - ReflectORIZED Yellow background with painted Black lettering.

Construction Signs "B" through "D" - Top background to be reflectORIZED "Smooth Surface Red" with the legend and "I" Underline to be a White process paint. Balance of lettering to be painted Black over a reflectORIZED Yellow background.

Construction Sign "E" - The word "DANGER" and the "I" Underline only are to be of a White process paint over a reflectORIZED "Smooth Surface Red". Balance of lettering to be painted Black over a reflectORIZED Yellow background.

Construction Sign "F" - The words "End Construction" and "Contractors Name" shall be painted Black over a reflectORIZED White background. Balance of lettering to be painted with a White process paint over a reflectORIZED "Smooth Surface Red" background.

Construction Sign "G" - The legend to be painted Black over a reflectORIZED "Smooth Surface Yellow" background.

Flagman Warning Sign "H" - This sign shall be made of Plastic or other lightweight material, approved by the Department, having a painted Red background with White lettering on the "Stop" side and a painted Green background with White lettering on the "Go" side. Handle to be grooved on one side to indicate reading of sign to Flagman. This sign will be used whenever Flagmen are necessary. Sign to be reflectORIZED if used to stop traffic at night.

Detour Warning Sign "I" - This sign shall be made of 3/8" (Min.) Plywood or other material suitable to the Department. Legend to be painted Black on a reflectORIZED "Smooth Surface Yellow" background.

Construction Sign "J" - This sign shall be made of 3/8" (Min.) Plywood or other suitable material. Legend to be painted Black on a reflectORIZED White background. 3/4" x 9" metal slides to be placed between "NEXT MILES", spaced so as to accommodate appropriate sized numerals. Numerals calculated to the nearest Mile.

Construction Sign "K" - ReflectORIZED White background with painted Black lettering.

Signs "A" through "E" and "G" shall be painted on the backside with one coat of white primer and one coat of yellow enamel.

Signs "F", "J" and "K" shall be given 2 coats of white paint on the backside.

Construction Signs shall be placed as follows:

Sign "A" - This is the first advance warning sign and shall be placed 1,500 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way in all cases.

Sign "B" - This is the second advance warning sign and shall be placed 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.

Sign "C" - This is the third advance warning sign in cases where barricades are used and shall be placed 750 to 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.

Sign "D" - This sign shall be placed to mark the beginning of the Project. It shall be placed singly and may be placed opposite barricade if desirable.

Sign "E" - This sign shall be placed 500 feet ahead of the situation being advised of.

Sign "F" - This sign shall be placed to mark the end of the Project. It shall be placed singly and may be placed opposite barricade if desirable.

Sign "G" - This sign shall be used frequently within the limits of the Project.

Sign "H" - This sign shall be erected at the limits of any project more than 2 miles in extent, where traffic is maintained through the job.

Flares and Torches shall be either of the oil burning or electrical type approved by the Department and shall be placed 3 to 5 feet ahead of the object to be illuminated. Particular care shall be taken to protect all signs and barricades from smoke and smudge arising from the use thereof.

Flashers used on the Barricades shall be of the Battery or Electrical Type and shall have no less than a 4" diameter lens. The illuminating element in a flashing yellow beacon or signal shall be flashed continuously at a rate between 50 to 70 flashes per minute with the "on" time being at least 25% of the cycle and which will be clearly distinguishable to traffic. The duration in which Flashers will be left in operation will be governed by field conditions and subject to approval by the Engineer.

All material shall be sound and durable. Barricades, signs, symbols and lettering shown herein will be of good workmanship and well maintained. Uneven lettering will not be accepted.

Alternate methods of processing signs or the substitution of symbols or other reflecting elements for painted symbols will be permitted only after approval of such methods or materials by the Department.

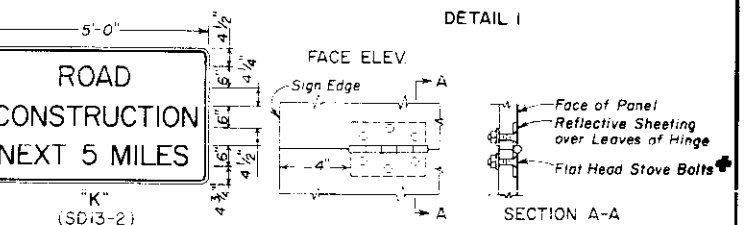
The Department shall furnish and install the following as required OUTSIDE THE LIMITS of the Project:

1. "ROAD CONSTRUCTION AHEAD" Minimum 4
2. "CAUTION OBEY TRAFFIC CONTROLS" Minimum 2
3. "CAUTION BARRICADE AHEAD" As Required
4. Standard Warning, Guide & Directional Signs As Required
5. "ROAD CONSTRUCTION NEXT 5 MILES" As Required

The Contractor shall furnish and install the following as required WITHIN THE LIMITS of the Project:

1. All Barricades As Required
2. "CAUTION PROJECT BEGINS" Minimum 2
3. "DANGER MEN & EQUIPMENT WORKING IMMEDIATELY AHEAD" As Required
4. "END CONSTRUCTION WE THANK YOU FOR YOUR COOPERATION" Minimum 2
5. "SLOW PLEASE" As Required
6. Standard Warning & Directional Signs As Required
7. Approved Directional Arrows & Regulatory Signs for Barricades As Required
8. Torches and Flares as follows: Class I Type A or B Barricade Minimum 3
Class I Type C Barricade Minimum 1
9. Flashers - Class I Type A or B Barricade Minimum 2
Class I Type C Barricade As Required

At the request of the Contractor layouts of signs will be furnished by the Traffic Operations Section indicating the details as to letter size, symbols, spacing, etc. which are required for these signs.



Position of Signs Relative to Roadbed & Hazards

- NOTE:**
- Warning Signs to be made of 3/8" (Min.) plywood or other material suitable to the Department and shall be reflectORIZED.
- 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.
- For all signs prefixed with the letters "R," "M" or "W" refer to the "Colorado Manual on Uniform Traffic Control Devices for Streets and Highways" of current issue.

COLORADO
DEPARTMENT OF HIGHWAYS

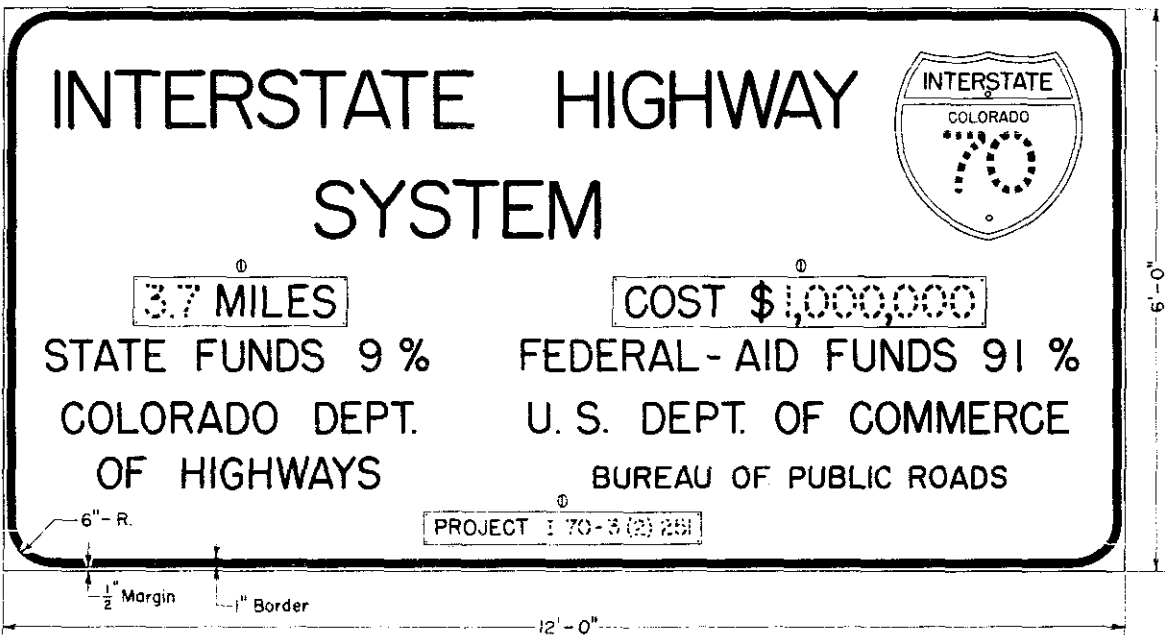
Construction Traffic Signs

Designed by J.C.R. Approved by J. J. Johnson
Made by J.C.R. Engineer, Surveys & Plans
Checked by J.C.R. Date: July 22, 1955

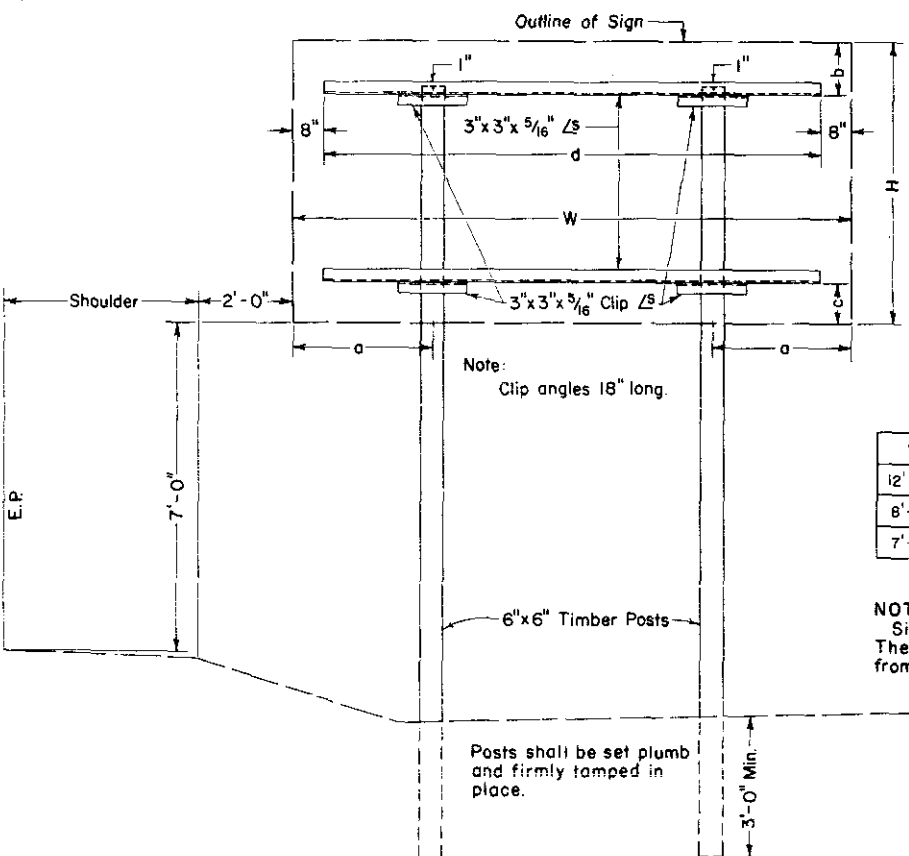
TYPICAL SIGNS

STANDARD M-6-C
(MAY 1, 1962)
INSTALLATION DETAIL

INTERSTATE SYSTEM



① Plaque length variable, as determined by message.
24" Standard Interstate Shield, for dimensions see "Interstate Signing Manual." Background, letters and numerals plain (nonreflective - Red, White and Blue). (Removable Plaque)



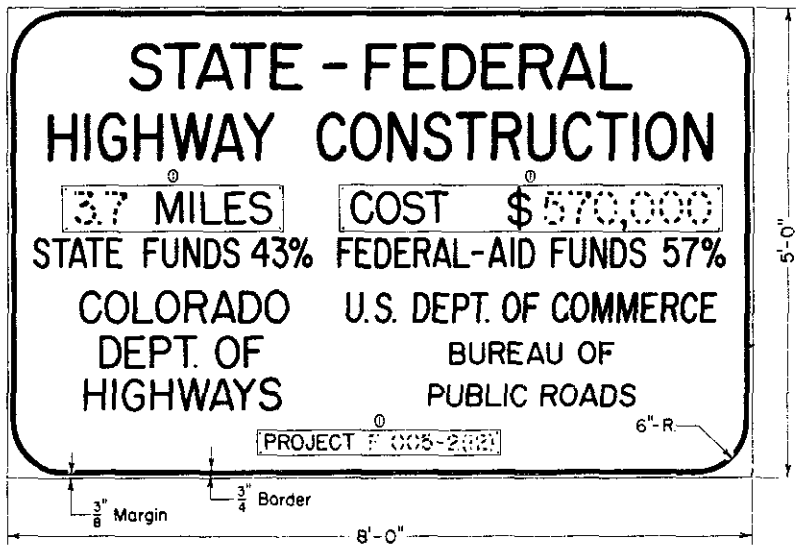
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS		

W	H	a	b	c	d
12'-0"	6'-0"	3'-0"	1'-1 1/2"	0'-10 1/2"	10'-8"
8'-0"	5'-0"	2'-0"	1'-1 1/2"	0'-10 1/2"	6'-8"
7'-0"	4'-0"	1'-9"	1'-1 1/2"	0'-10 1/2"	5'-8"

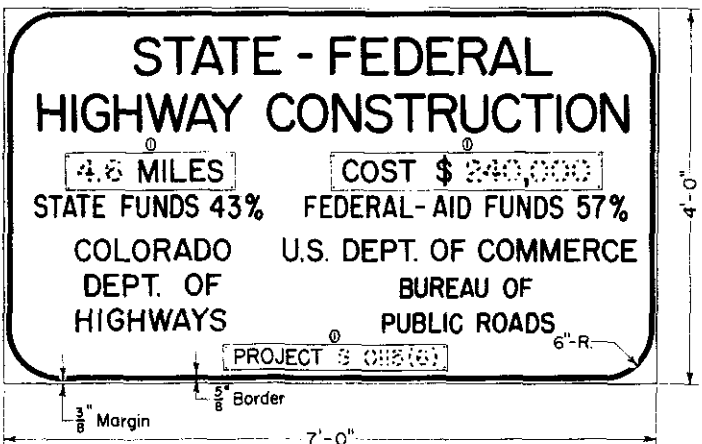
NOTE:
Signs are to be placed facing traffic approaching the work. These signs should be located so as not to obscure or detract from the effectiveness of other official signs.

PRIMARY SYSTEM



① Plaque length variable, as determined by message.

SECONDARY SYSTEM



① Plaque length variable, as determined by message.

GENERAL NOTES

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

Signs shall be made of 3/4" Plywood or other material approved by the Department.

Background to be painted plain white with stencil black letters, numerals and border.

Posts shall be 6"x6" S4S timber or other material approved by the Department and shall be painted white.

Layout of signs will be furnished the Contractor by the Traffic Operations Section indicating the details as to letter size, symbols, spacing, etc. which are required for these signs.

Figure for cost of project to be furnished contractor by Department.

If signs are for a single structure or interchange, name will be used in lieu of mileage. Such as: COLORADO RIVER BRIDGE or ARAPAHOE INTERCHANGE.

COLORADO
DEPARTMENT OF HIGHWAYS

IDENTIFICATION
SIGNS

Designed by V.H. Approved by R. J. Wilson
Made by D.M.E. Engr. Surveys & Plans
Checked by E.E.O. Date: 15 1960

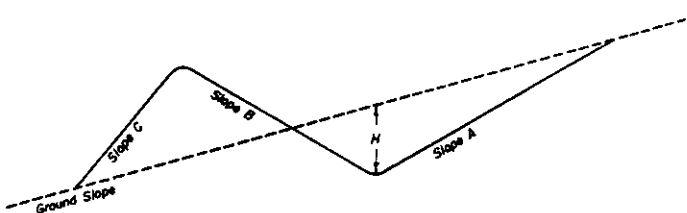
STANDARD TYPES of DITCHES and CONSTRUCTION METHODS

STANDARD M-13-A
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9.	COLO.		

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

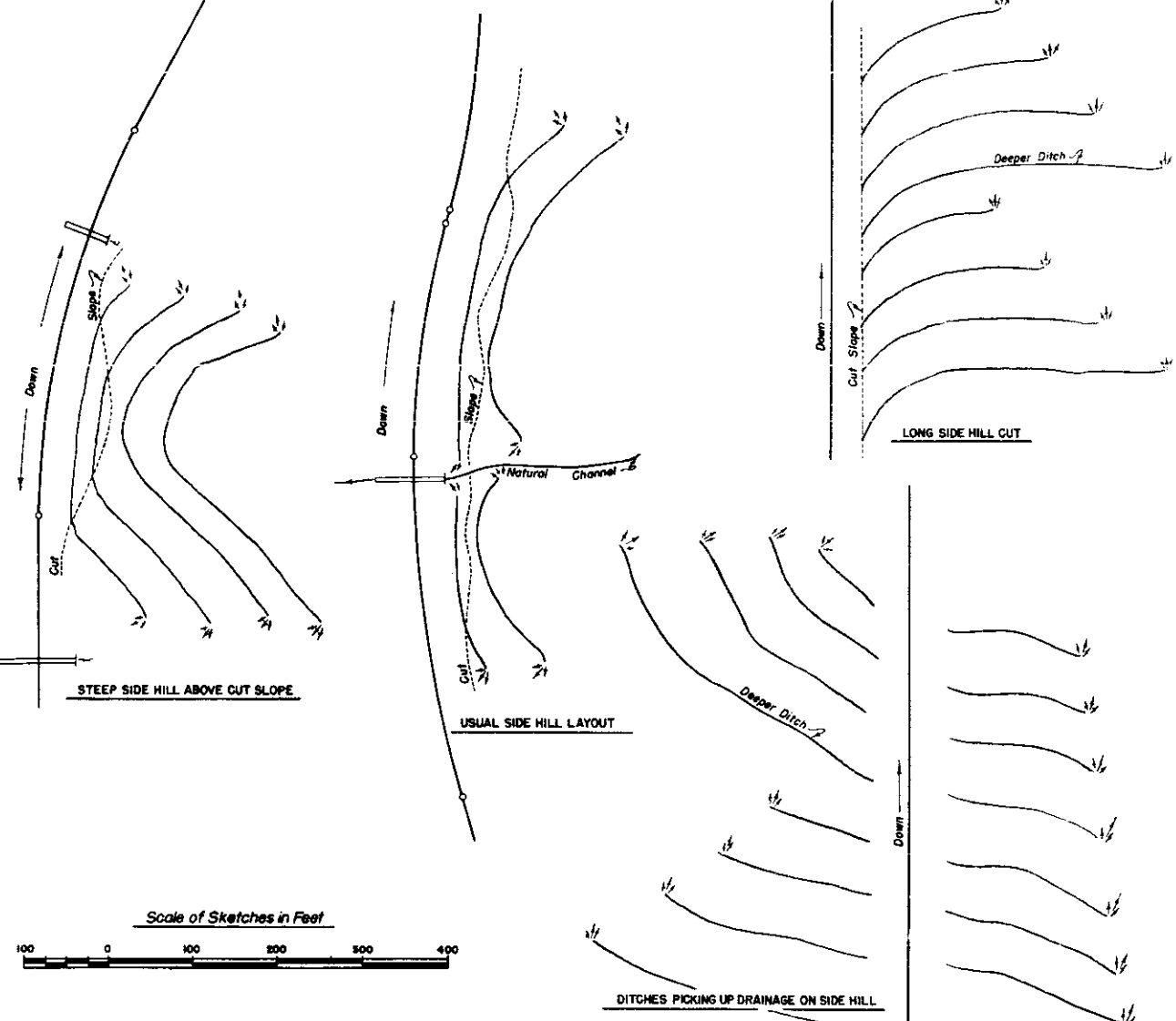
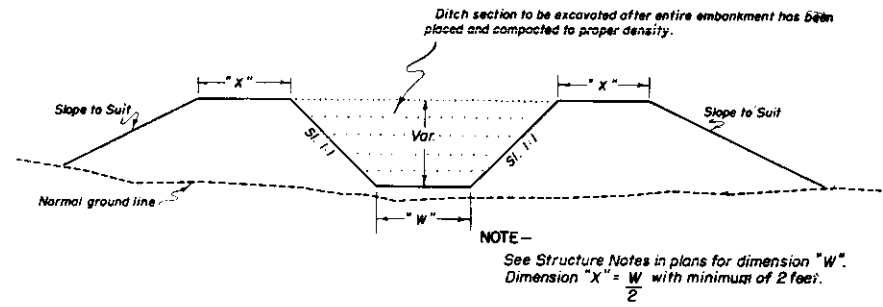


Table of Slopes and Yardages

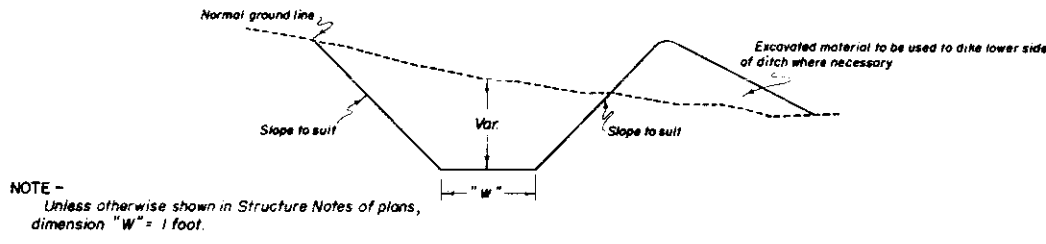
▲ SLOPES				H	Cubic Yards per 100 lin. ft. of Ditch
Ground	A	B	C		
5:1 Or Flatter	2:1	4:1	2:1	15"	16
				18"	23
				21"	32
		3:1		15"	15
				18"	22
				21"	30
	1-1/2:1	2:1		15"	14
				18"	20
				21"	27
		1-1/2:1		15"	13
				18"	19
				21"	25
4:1	2:1	4:1	1-1/2:1	15"	12
				18"	18
				21"	25
		3:1		15"	12
				18"	17
				21"	23
	1-1/2:1	2:1		15"	10
				18"	15
				21"	20
		1-1/2:1		15"	10
				18"	14
				21"	19
3:1	2:1	4:1	2:1	15"	17
				18"	25
				21"	34
		3:1		15"	17
				18"	24
				21"	32
	1-1/2:1	2:1		15"	15
				18"	22
				21"	30
		1-1/2:1		15"	15
				18"	21
				21"	29
2:1	1-1/2:1	4:1	1-1/2:1	15"	13
				18"	18
				21"	25
		3:1		15"	12
				18"	17
				21"	23
	1-1/2:1	2:1		15"	11
				18"	16
				21"	21
		1-1/2:1		15"	10
				18"	14
				21"	20
1-1/2:1	1-1/2:1	3:1	2:1	15"	22
				18"	31
				21"	42
		2:1		15"	21
				18"	30
				21"	41
	1-1/2:1	1-1/2:1		15"	20
				18"	29
				21"	40
		3:1	1-1/2:1	15"	13
				18"	19
				21"	26
1:1	1:1	2:1		15"	12
				18"	17
				21"	24
		1-1/2:1		15"	12
				18"	17
				21"	23
	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	1-1/2:1	1:1	15"	9
				18"	13
				21"	17
	1-1/2:1	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



For Embankment Sections
(Generally for use in Irrigation Ditches & Channel Changes)



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.

REVISIONS

COLORADO
DEPARTMENT OF HIGHWAYS

DITCH TYPES

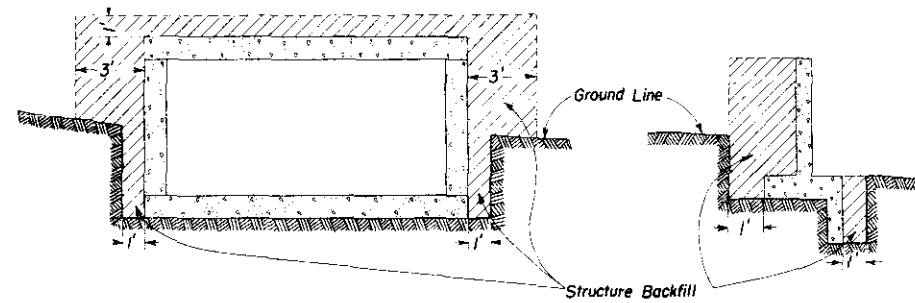
Designed by C.G.M. Approved by *E. J. ...*
Made by C.G.M. Engineer, Surveys & Plans
Checked by Date: *Apr. 17, 1962*

STANDARD M-16-A (MAY 1, 1962)

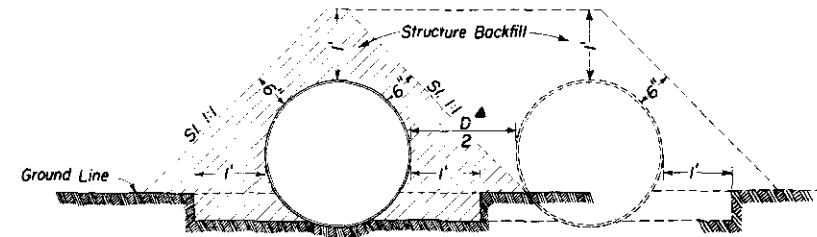
FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLD.		

REVISION	
5-2-63 Rev. Backfill	L.E.O.

CONCRETE BOX CULVERTS & WINGWALLS



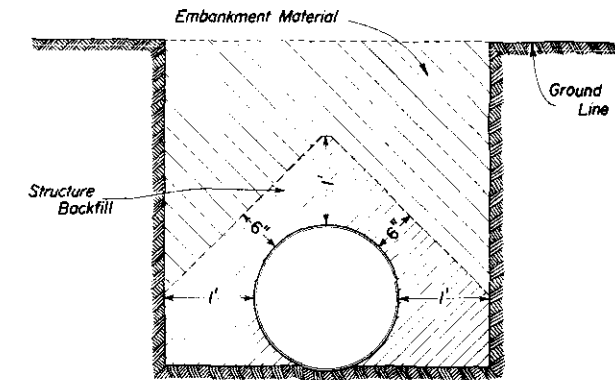
CIRCULAR CONDUIT



When two or more conduits are laid side by side, the distance between conduits shall be 1/2 the conduit diameter but not less than 1'-0".

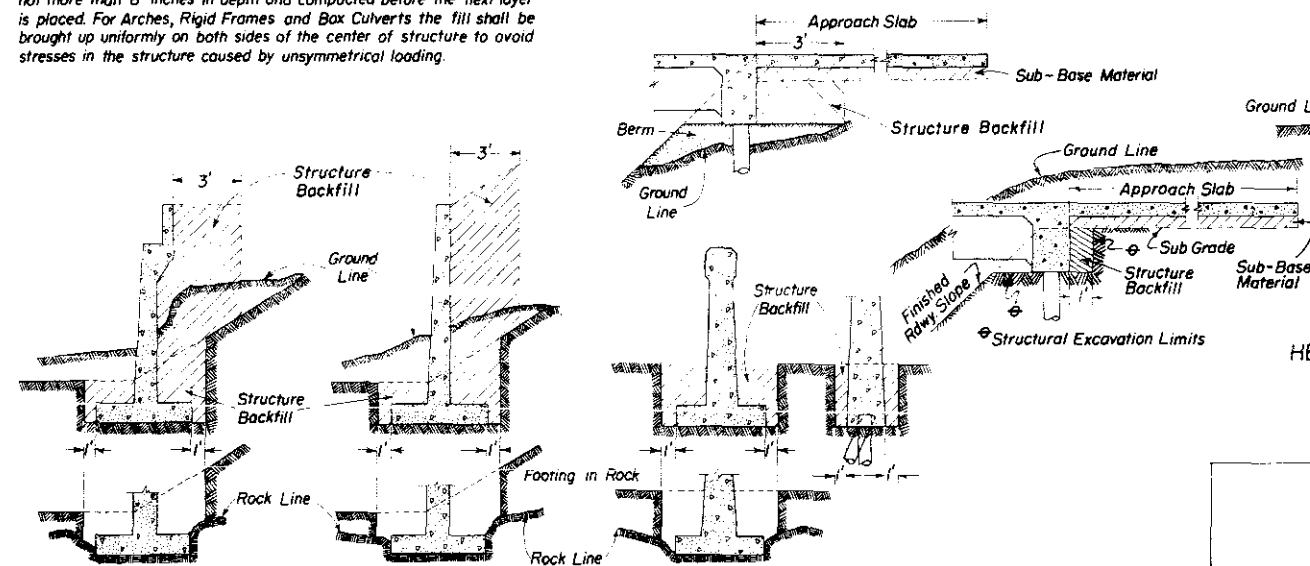
See Design Aid No. 16, 16a or 16b for computation of quantities.

SIPHONS OR CONDUIT IN TRENCH

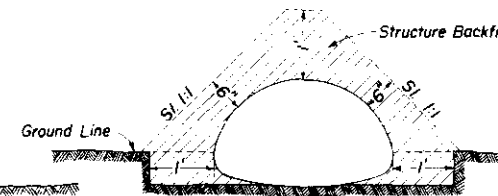


PIERS, ABUTMENTS, RETAINING WALLS ETC.

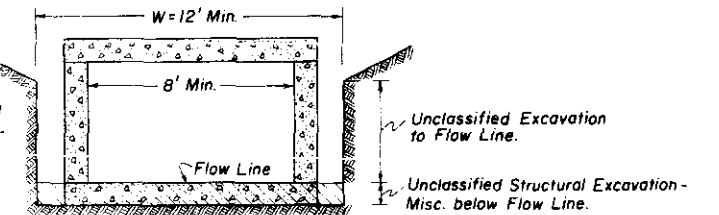
All material that is to be compacted shall be placed in horizontal layers not more than 6" inches in depth and compacted before the next layer is placed. For Arches, Rigid Frames and Box Culverts the fill shall be brought up uniformly on both sides of the center of structure to avoid stresses in the structure caused by unsymmetrical loading.



ELLIPTICAL OR ARCH CONDUIT



On all structures of 8' span or over including extensions of old structures, excavation for structures shall be classified and paid for as "Unclassified Excavation" to Flow Line and "Unclassified Structural Excavation - Misc." below the Flow Line of box.



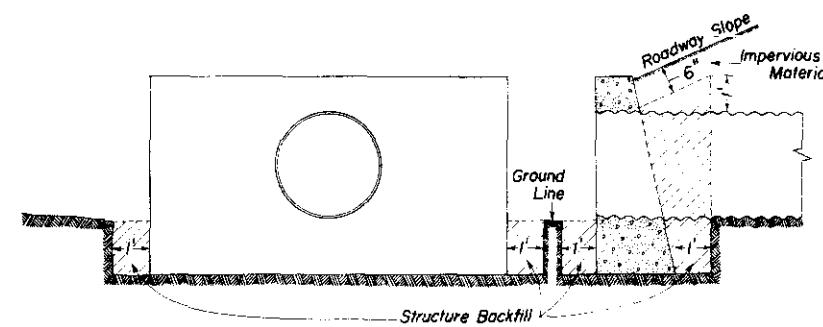
GENERAL NOTES

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

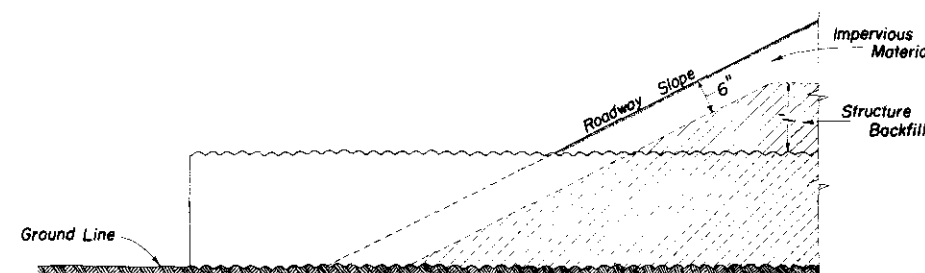
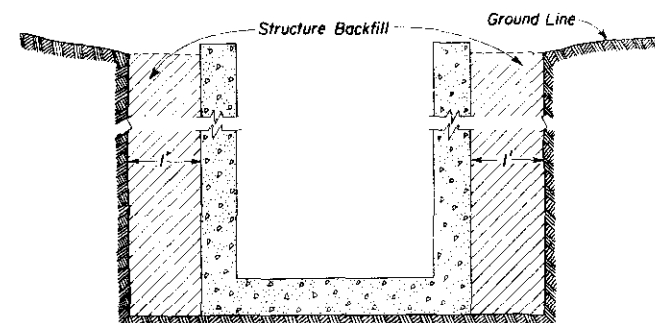
If, in the opinion of the Engineer, the material beneath the Structure is of such character as to cause unequal settlement along the length of the Structure, the material shall be removed to such a depth ordered, and backfilled with gravel or Structure Backfill and compacted in accordance with Item 16 of the Standard Specifications.

For concrete box culverts located where roadway cross section is in Fill, embankment shall be built up and compacted to a point one (1) ft above flow line of box. The trench shall then be excavated as shown to accommodate construction of the box.

HEADWALLS AND END OF CULVERTS



DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS ETC.



STANDARD M-46-A

(MAY 1, 1962)

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

NO. 12 CONCRETE INLET

NO. 13 CONCRETE INLET

BAR LIST FOR H = 3' 0"

MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS	BENDING DIAGRAM
Steps	+	Note	3'-4"	+		
401	1/2"	3	11'-10"	II	3'-5" 2'-1"	
402	1/2"	5	5'-6"	I	2'-5" 2'-1"	
403	1/2"	5	7'-1"	I	2'-7" 2'-1"	
404	1/2"	2	2'-7"	STR.		

▲ Omit Steps 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".
 Steps required as follows:
 H = 4'-6" to 5'-6" 1 Step 9'-0" to 10'-0" 4 Steps
 H = 6'-0" to 7'-0" 2 Steps
 H = 7'-6" to 8'-6" 3 Steps
 Cut or bend bars around pipes as required.

See Plans for size and locations of outlets.

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 occupied by pipes not to be deducted from Structure.

* 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 this Project.
 All concrete shall be class "A".
 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 DIMENSIONS NOT SHOWN AS CLEAR ARE TO FACE OF BAR.

REVISIONS		
4-19-63	Rev. Steps	L.E.O.
7-2-63	Rev. Step Dimension	L.E.O.

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

Designed by A.P.G.
 Made by A.P.G.
 Check Design A.Z.
 Check Detail C.R.S.
 Approved by *[Signature]*
 Date May 1, 1962

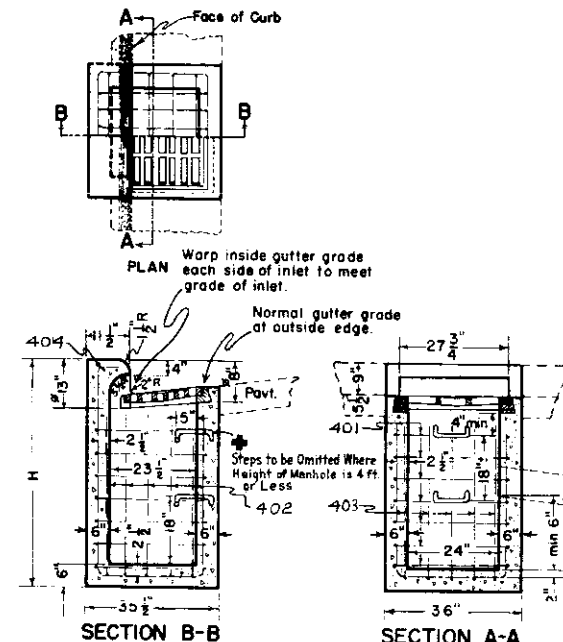
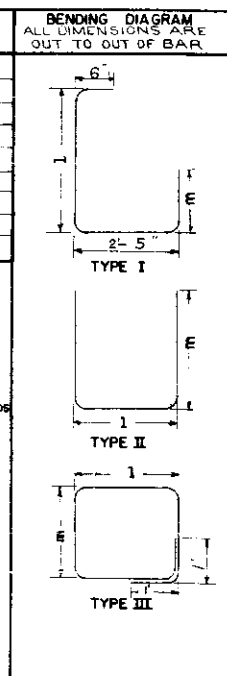
BAR LIST FOR H = 3' 0"

MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS	BENDING DIAGRAM
Steps	+	Note	3'-4"	+		
401	1/2"	3	11'-10"	II	2'-6" 2'-6"	
402	1/2"	5	5'-6"	I	2'-5" 2'-7"	
403	1/2"	5	7'-1"	I	2'-7" 2'-8"	
404	1/2"	2	2'-7"	STR.		

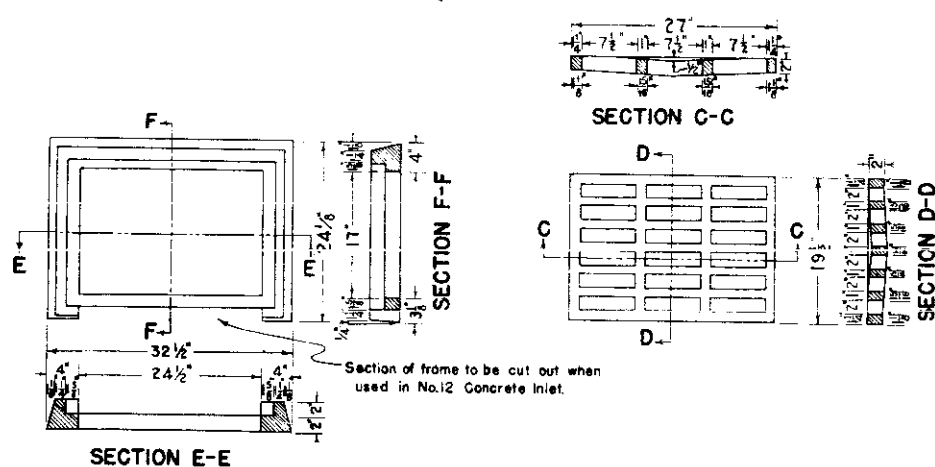
▲ Omit Steps when H is 4'-0" or less.

* 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".
 Steps required as follows:
 H = 4'-6" to 5'-6" 1 Step H = 9'-0" to 10'-0" 4 Steps
 H = 6'-0" to 7'-0" 2 Steps
 H = 7'-6" to 8'-6" 3 Steps
 Cut or bend bars around pipes as required.

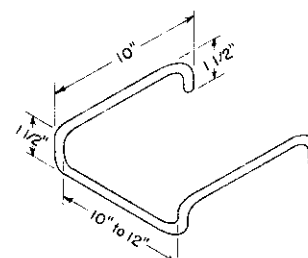
See Plans for size and locations of outlets.



NO. 12
 INLET GRATING & FRAME
 Approx. Weight 340 lbs.

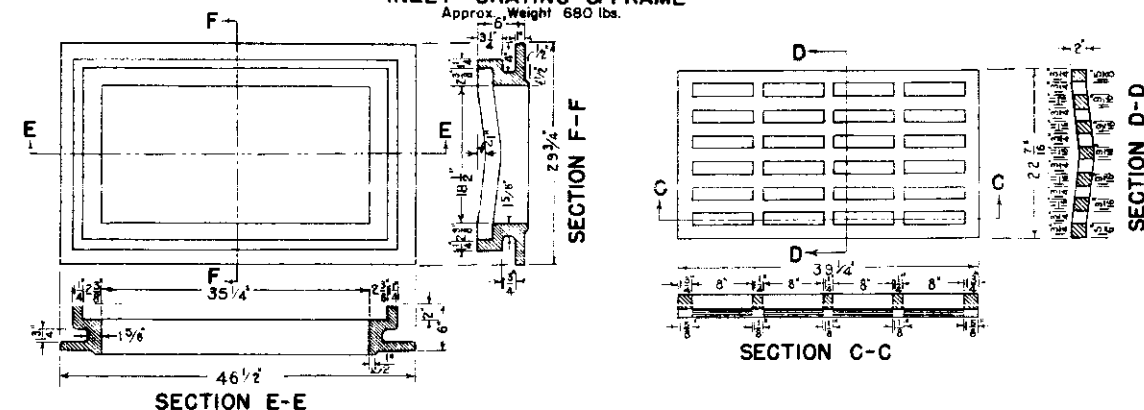


DETAIL OF INLET STEP



* All Steps shall be 3/4" # A-7 Steel Bars and shall be galvanized per ASTM Designation A123-59. Steps for inlets shall be included for payment under "Reinforcing Steel."

NO. 13 INLET GRATING & FRAME Approx. Weight 680 lbs.



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 "

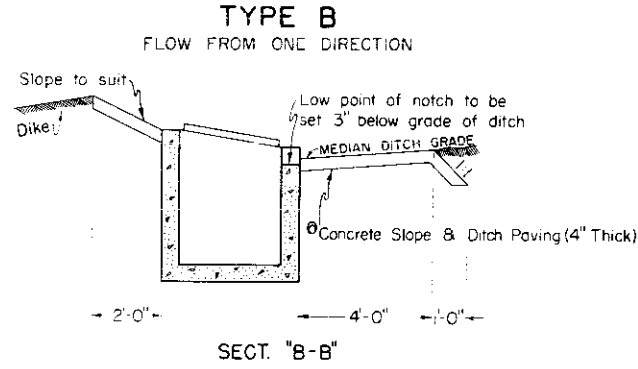
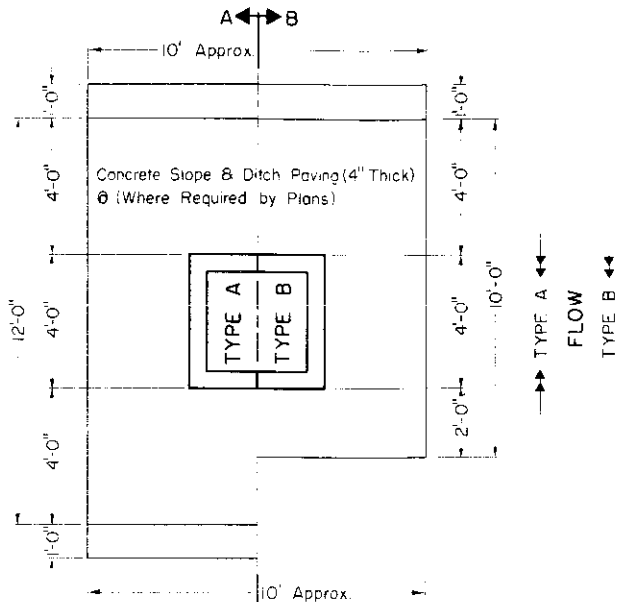
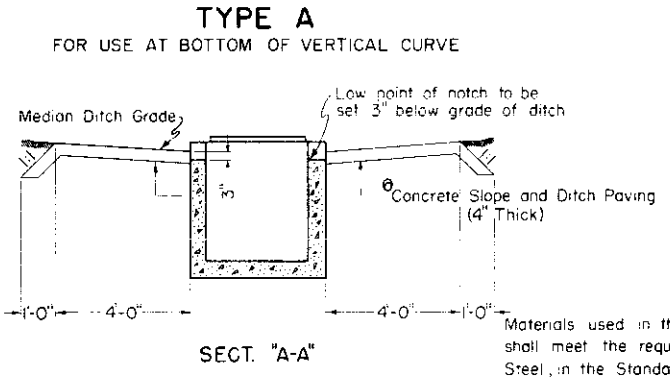
* Volume occupied by pipes not to be deducted from Structure.

* Includes 1% allowance for overrun.

STANDARD M-46-B
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

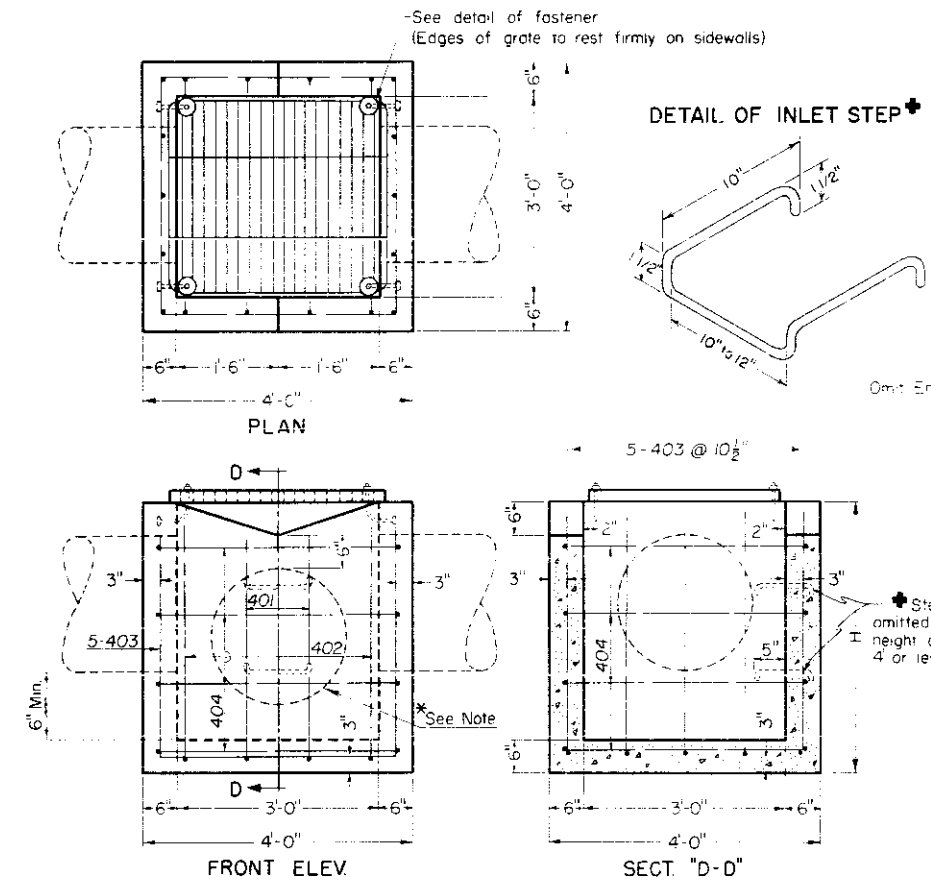
REVISIONS	
4-18-63 Rev. Steps	L.E.O.
7-2-63 Rev. Step Dimension	L.E.O.



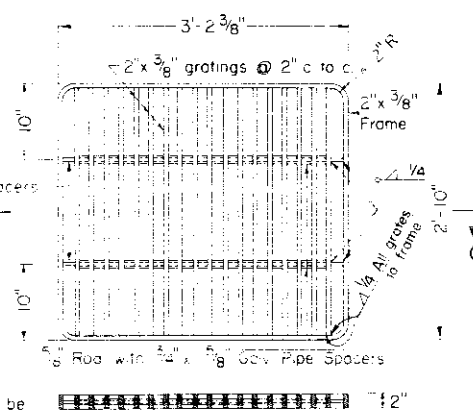
QUANTITIES FOR ONE INLET

H	CLASS "A" CONCRETE		REINFORCING STEEL	
	CU. YDS.		O. LBS.	
	TYPE A	TYPE B	TYPE A	TYPE B
3'-0"	0.91	1.00	83	93
3'-6"	1.04	1.13	89	100
4'-0"	1.17	1.26	105	116
4'-6"	1.30	1.39	115	126
5'-0"	1.43	1.52	136	146
5'-6"	1.56	1.65	142	153
6'-0"	1.69	1.78	158	169
6'-6"	1.82	1.91	168	179
7'-0"	1.95	2.04	185	195
7'-6"	2.08	2.17	191	202
8'-0"	2.21	2.30	211	222
8'-6"	2.34	2.43	217	228
9'-0"	2.47	2.56	234	244
9'-6"	2.60	2.69	244	255
10'-0"	2.73	2.82	260	271
10'-6"	2.86	2.95	266	277
11'-0"	2.99	3.08	287	297
11'-6"	3.12	3.21	293	304
12'-0"	3.25	3.34	309	320

Ø includes 1% for overrun
Volume occupied by pipes not to be deducted from quantities.



LAYOUT OF INLET IN MEDIAN DITCH



DETAIL OF FASTENER
4 REQ'D FOR EACH INLET

SECT. "C-C"
DETAIL OF GRATING

MATERIAL LIST FOR GRATING AND FASTENERS

Strap Iron Frame	1 pc.	2" x 3/8" x 11'-9 5/8"	@ 2.55 lb. per ft. = 30.0 lb.
Strap Iron Gratings	18 pcs.	2" x 3/8" x 2'-9 1/4"	@ 2.55 lb. per ft. = 127.2 lb.
Galv. Iron Pipe Spacers	34 pcs.	3/4" x 1 1/8"	@ 1.13 lb. per ft. = 5.2 lb.
Tie Rods	2 pcs.	5/8" x 3'-15 5/8"	@ 1.04 lb. per ft. = 6.5 lb.
Bolts	4 pcs.	5/8" x 10"	@ 1.03 lb. ea. = 4.1 lb.
Washers	4 pcs.	5/8" x 10"	@ 0.23 lb. ea. = 0.9 lb.

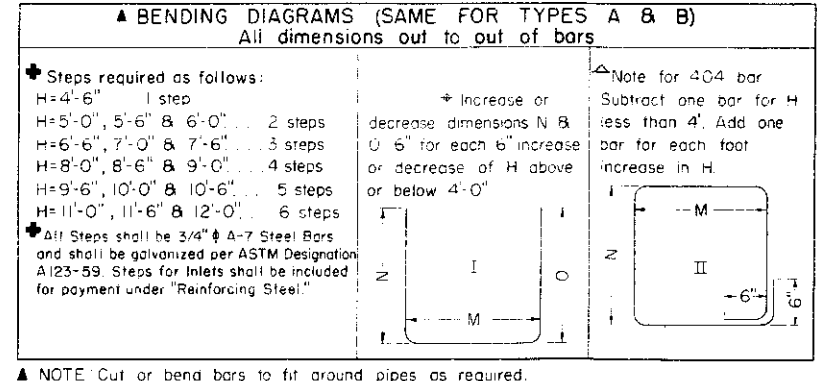
NOTE: Acceptable equivalent Gratings may be substituted after approval by the Engineer.

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

BAR LIST FOR H=4'-0"

MARK	NO. REQ'D	KIND	TYPE A			TYPE B		
			M	N	O	M	N	O
401	2	I	3'-6"	3'-3"	3'-3"	10'-0"	3'-6"	3'-3"
402	2	I	3'-6"	3'-6"	3'-6"	10'-6"	3'-6"	3'-6"
403	5	I	3'-6"	3'-7"	3'-7"	10'-8"	3'-6"	3'-7"
404	4	II	3'-7"	3'-7"		15'-4"	3'-7"	3'-7"
405	1	I				10'-9"	3'-7"	3'-7"
406	1	I				11'-6"	3'-6"	4'-1"
407	1	I				11'-6"	3'-6"	4'-0"
408	1	I				11'-2"	3'-6"	3'-10"
409	1	I				10'-10"	3'-6"	3'-8"
410	1	I				10'-8"	3'-6"	3'-7"

All reinforcing bars to be 1/2" Ø.



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".
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 edge distances not marked clear are to the C of the bar.
Inlet grating to be painted as per specifications for structural steel. One shop coat of Zinc Chromate primer and two field coats of Aluminum.

COLORADO
DEPARTMENT OF HIGHWAYS
CONCRETE MEDIAN INLETS

Designed by
Made by
Checked by
Approved by
Date: May 17, 1962

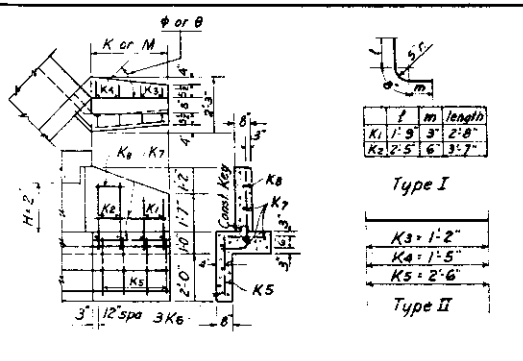
STANDARD M-46-E (MAY 1, 1962)

FED. ROAD RES. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

TABLE SHOWING VALUES OF K AND M WHEN "B" AND "H" ARE GIVEN

B	α	φ	θ	H=2'-0"	H=3'-0"	H=4'-0"	H=5'-0"	H=6'-0"	H=7'-0"	H=8'-0"	H=9'-0"	H=10'-0"
45°	45°	67°30'	22°30'	2'-4"	6'-2"	3'-7"	8'-7"	4'-10"	11'-7"	5'-11"	4'-2"	6'-10"
60°	30°	60°	30°	2'-9"	4'-9"	3'-10"	6'-7"	5'-2"	8'-10"	6'-3"	10'-10"	7'-3"
75°	15°	52°30'	37°30'	3'-0"	3'-11"	4'-2"	5'-5"	5'-7"	7'-3"	6'-10"	8'-11"	7'-11"
90°	0°	45°	45°	3'-4"	4'-8"	4'-8"	6'-3"	6'-3"	7'-8"	7'-8"	8'-11"	8'-11"
105°	15°	37°30'	52°30'	3'-11"	3'-0"	5'-5"	4'-2"	7'-3"	5'-7"	6'-10"	10'-10"	7'-11"
120°	30°	30°	60°	4'-9"	2'-9"	6'-7"	3'-10"	10'-10"	6'-3"	12'-7"	7'-3"	14'-5"
135°	45°	22°30'	67°30'	6'-2"	2'-4"	8'-7"	3'-7"	11'-7"	4'-10"	14'-2"	5'-11"	16'-5"

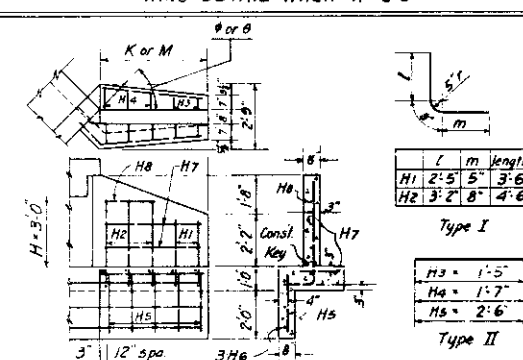
B EQUALS THE ANGLE BETWEEN "B" OF CULVERT AND "E" OF ROADWAY. α EQUALS THE ANGLE BETWEEN "E" OF CULVERT AND A NORMAL TO "E" OF ROADWAY. φ AND θ ARE ANGLES BETWEEN THE WINGWALL AND A LINE PARALLEL WITH THE CENTER LINE OF ROADWAY. EXAMPLE FOR USING THE ABOVE TABLE. SUPPOSE A STREAM MAKES AN ANGLE OF B=65° WITH THE CENTER LINE OF ROADWAY, THEN, FROM THE TABLE, SELECT THE NEAREST ANGLE B=60°, THEN α, φ AND θ EQUAL 30°, 60° AND 30° RESPECTIVELY. IF THE DESIRED HEIGHT "H" OF CULVERT IS 8'-0", THEN "K" AND "M" WILL BE 9'-5" AND 16'-0". LOCATE THE WING DETAIL WHEN H=8'-0" ON THIS SHEET.



BAR LIST & QUANTITIES FOR ONE WING WHEN H=2'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

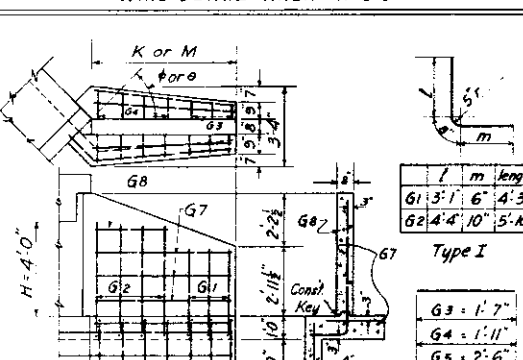
WING DETAIL WHEN H=2'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=3'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

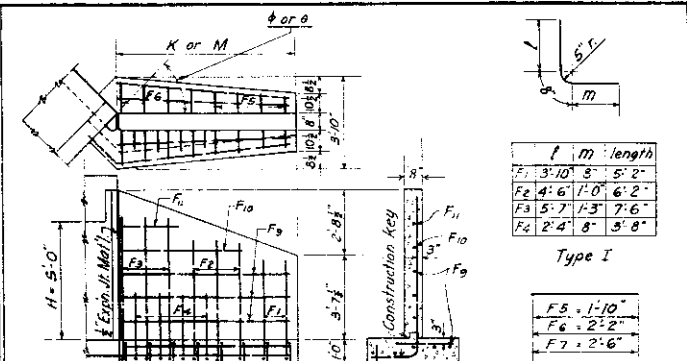
WING DETAIL WHEN H=3'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=4'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

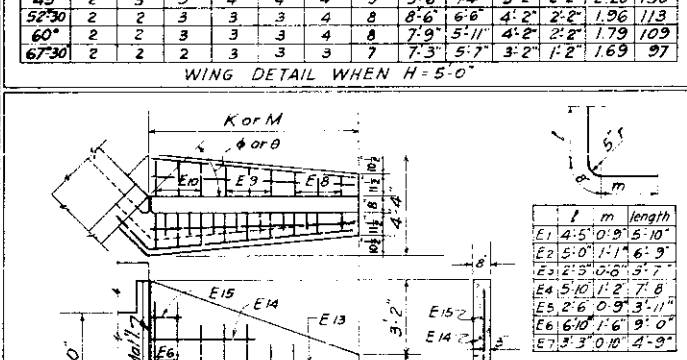
WING DETAIL WHEN H=4'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=5'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

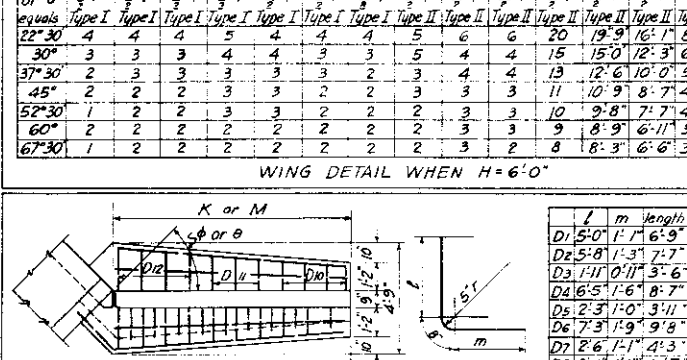
WING DETAIL WHEN H=5'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=6'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

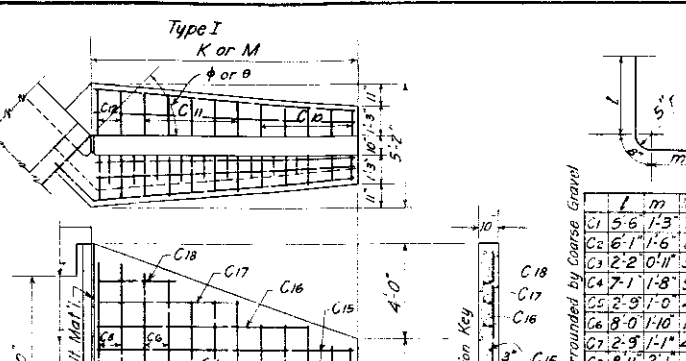
WING DETAIL WHEN H=6'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=7'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

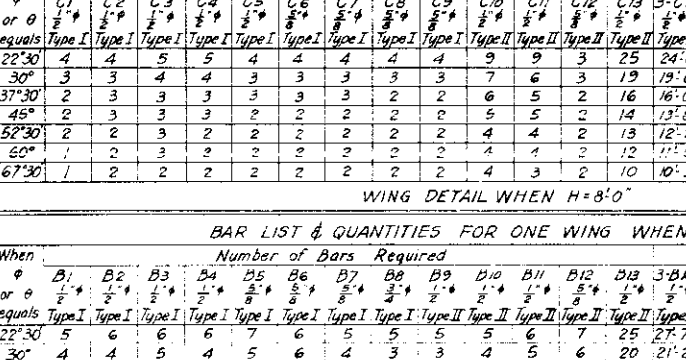
WING DETAIL WHEN H=7'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=8'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

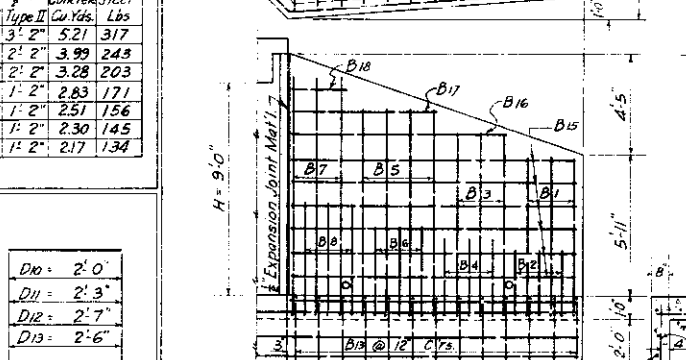
WING DETAIL WHEN H=8'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=9'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

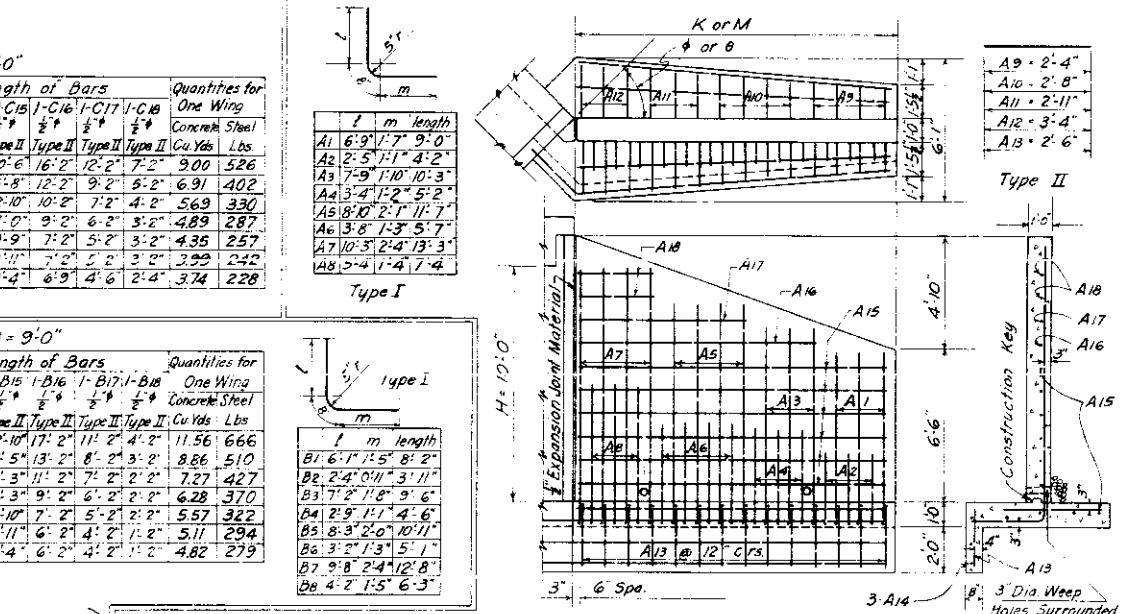
WING DETAIL WHEN H=9'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=10'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

WING DETAIL WHEN H=10'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=10'-0"

When or θ	Number of Bars Required	Length of Bars	Quantities for One Wing
22°30'	4	3'-4"	107 64
30°	3	2'-2"	0.82 47
37°30'	2	2'-2"	0.68 40
45°	2	2'-2"	0.57 36
52°30'	2	2'-2"	0.52 33
60°	2	1'-2"	0.48 28
67°30'	2	1'-2"	0.40 26

WING DETAIL WHEN H=10'-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".

ALL WING SURFACES TO RECEIVE ORDINARY SURFACE FINISH.

WING FOOTINGS AND FLOOR OF BOX SHALL BE POURED MONOLITHICALLY.

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

SEPARATION OF FOOTINGS SHOWN ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA AND WHEN DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE STEEL OF A DEFORMED TYPE. EACH BAR SHALL BE TAGGED WITH THE NUMBER DESIGNATION AND THE STATION NUMBER OF THE PROJECT.

17 DIAMETERS OF THE BAR DIMENSIONS FOR REINFORCING STEEL NOT SHOWN AS CLEAR SHALL BE TO THE CENTER LINE OF THE BAR OUT TO OUT DIMENSIONS SHALL BE USED ON BAR BENDING DETAILS.

SUPPORTING SOILS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNIFORM MATERIAL THROUGHOUT.

HORIZONTAL CONSTRUCTION KEYS ARE NOT REQUIRED WHEN FOOTINGS AND WALL ARE POURED MONOLITHICALLY.

ALL CONSTRUCTION KEYS SHOWN BETWEEN FOOTINGS AND WALLS ARE 3" X 3".

WHEN EXCAVATING FOR FOOTINGS THE FINAL ONE FOOT IN DEPTH SHALL BE DONE BY HAND LABOR METHODS.

LOADING DATA INTERSTATE ALTERNATE

LIVE LOAD: 1. AASHTO 140-100-80-40.

DEAD LOAD: CONCRETE 150 POUNDS PER CUBIC FOOT.

EARTH 84 POUNDS PER CUBIC FOOT.

DESIGNING DATA

AASHTO 1953 UNIT STRESSES EXCEPT AS NOTED

Reinforcing Steel fs 20000 lbs per sq in

Structural Steel fs 18000 lbs per sq in

fc 12000 lbs per sq in

n 10

COLORADO DEPARTMENT OF HIGHWAYS

WINGWALLS FOR CONCRETE BOX CULVERTS

Designed by: W.W.D. Approved by: J. J. Thompson

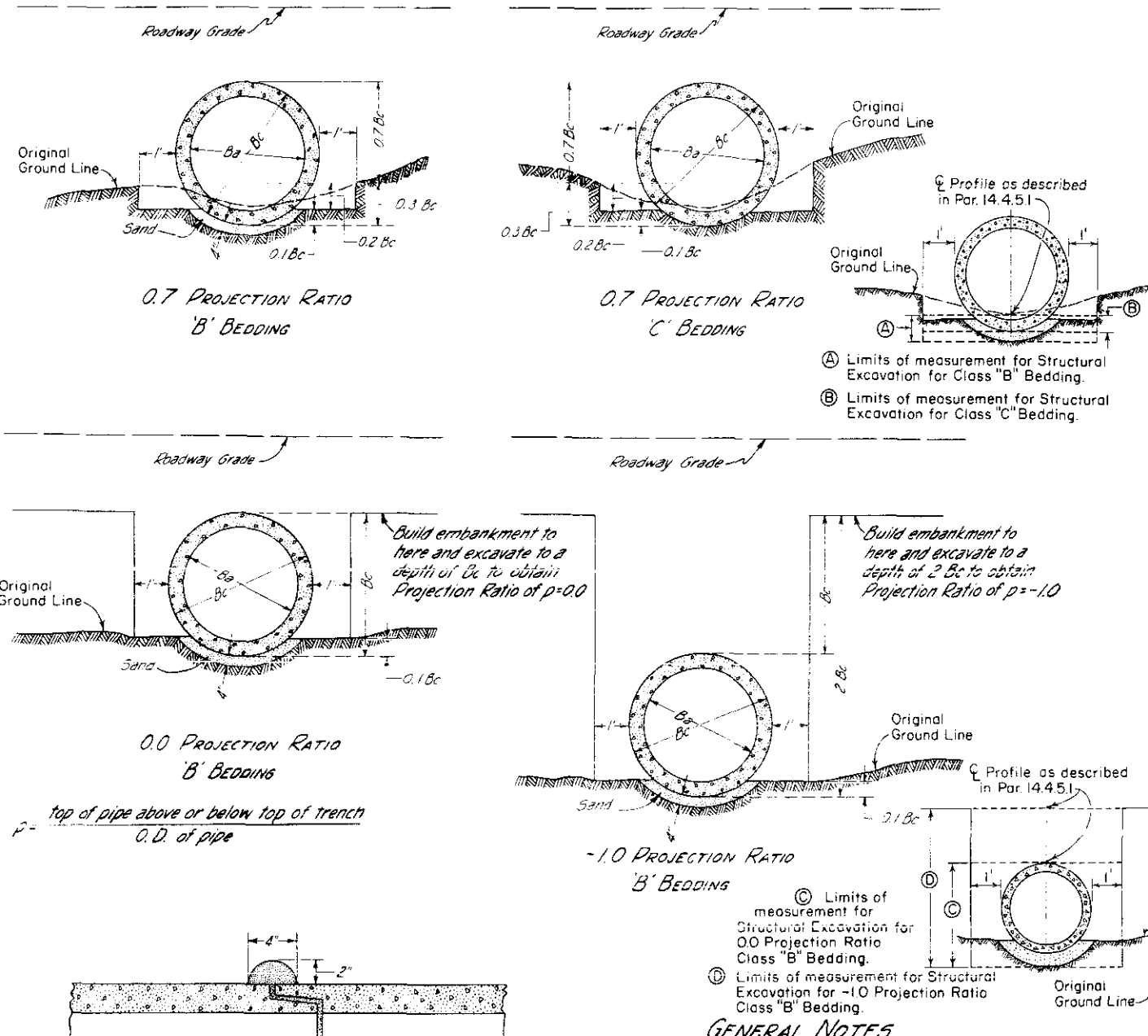
Made by: W.W.D. Bridge Engineer

Checked by: T.J.M. Date: Dec 30, 1954

STANDARD M-52-A

(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		



GENERAL NOTES

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

The Height of Fill for each culvert shall determine the bedding and class of concrete pipe to be used (See table herewith). Location, length and inside diameter of pipe, and class of pipe required shall be shown on plans.

Type 'B' bedding is to be used in solid rock.

Details for placement of structure backfill materials are shown elsewhere in plans.

When projection ratios of 0.0 or -1.0 are used, backfilling above structure backfill material shall be made with materials excavated in order to produce the projection ratio. Cost of this backfilling is to be included in the contract unit price for Item 52.

If material does not stand with a vertical face when attempting to produce 0.0 or -1.0 projection ratios, this standard is not applicable.

APPROVED COMBINATIONS OF HEIGHT OF FILL - PROJECTION RATIO - BEDDING - CLASS

Ba	HEIGHT OF FILL	PROJECTION RATIO	BEDDING	CLASS
12"	*-7'	0.7	C	II
	7'-10'	0.7	C	III
	10'-15'	0.7	C	IV
	15'-19'	0.7	B	IV
	19'-29'	0.0	B	IV
15"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-16'	0.7	C	IV
	16'-20'	0.7	B	IV
	20'-30'	0.0	B	IV
18"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-16'	0.7	C	IV
	16'-20'	0.7	B	IV
	20'-30'	0.0	B	IV
21"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-17'	0.7	C	IV
	17'-21'	0.7	B	IV
	21'-31'	0.0	B	IV
24"	*-9'	0.7	C	II
	9'-12'	0.7	C	III
	12'-17'	0.7	C	IV
	17'-22'	0.7	B	IV
	22'-31'	0.0	B	IV
27"	*-9'	0.7	C	II
	9'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-22'	0.7	B	IV
	22'-32'	0.0	B	IV
30"	*-9'	0.7	C	II
	9'-12'	0.7	C	III
	12'-18'	0.7	C	IV
	18'-22'	0.7	B	IV
	22'-32'	0.0	B	IV
33"	*-9'	0.7	C	II
	9'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-23'	0.7	B	IV
	23'-33'	0.0	B	IV
36"	*-10'	0.7	C	II
	10'-13'	0.7	C	III
	13'-19'	0.7	C	IV
	19'-23'	0.7	B	IV
	23'-34'	0.0	B	IV
42"	*-10'	0.7	C	II
	10'-13'	0.7	C	III
	13'-19'	0.7	C	IV
	19'-22'	0.7	B	IV
	22'-34'	0.0	B	IV
48"	*-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-19'	0.7	C	IV
	19'-24'	0.7	B	IV
	24'-34'	0.0	B	IV

* Height above Top of Pipe

* Minimum cover with concrete pavement shall be 1.25' and with asphalt or gravel 1.75'.

Minimum cover on Side Drains shall be 1.0'.

Ba	HEIGHT OF FILL	PROJECTION RATIO	BEDDING	CLASS
34"	*-10'	0.7	C	II
	10'-14'	0.7	C	III
	14'-19'	0.7	C	IV
	19'-23'	0.7	B	IV
	23'-34'	0.0	B	IV
60"	*-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-20'	0.7	C	IV
	20'-24'	0.7	B	IV
	24'-35'	0.0	B	IV
66"	*-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-20'	0.7	C	IV
	20'-24'	0.7	B	IV
	24'-34'	0.0	B	IV
72"	*-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-21'	0.7	C	IV
	21'-25'	0.7	B	IV
	25'-35'	0.0	B	IV
78"	*-11'	0.7	C	II
	11'-15'	0.7	C	III
	15'-20'	0.7	C	IV
	20'-25'	0.7	B	IV
	25'-34'	0.0	B	IV
84"	*-11'	0.7	C	II
	11'-15'	0.7	C	III
	15'-21'	0.7	C	IV
	21'-26'	0.7	B	IV
	26'-35'	0.0	B	IV
90"	*-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-18'	0.7	C	IV
	18'-22'	0.0	B	IV
	22'-25'	-1.0	B	IV
96"	*-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-19'	0.7	C	IV
	19'-23'	0.0	B	IV
	23'-25'	-1.0	B	IV
102"	*-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-18'	0.7	C	IV
	18'-23'	0.0	B	IV
	23'-25'	-1.0	B	IV
108"	*-13'	0.7	C	II
	13'-16'	0.7	C	III
	16'-19'	0.7	C	IV
	19'-23'	0.0	B	IV
	23'-25'	-1.0	B	IV

REVISIONS	

COLORADO
DEPARTMENT OF HIGHWAYS

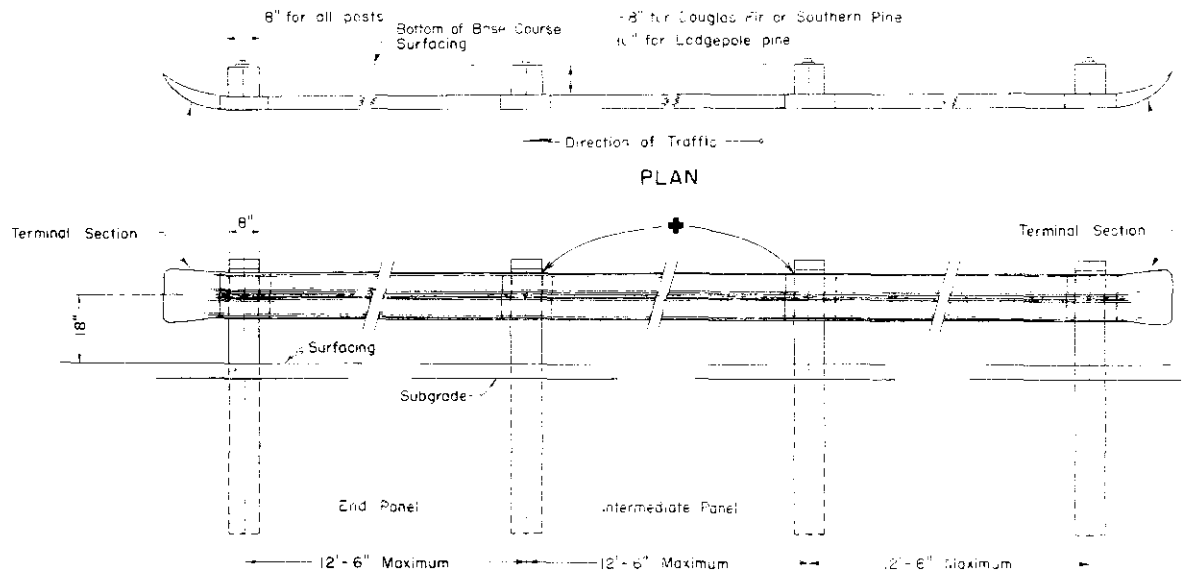
REINFORCED CONCRETE
PIPE

Designed by *[Signature]* Approved by *[Signature]*
Made by *D.M.E.* Bridge Engineer
Checked by *LEO* Date: *May 16, 1960*

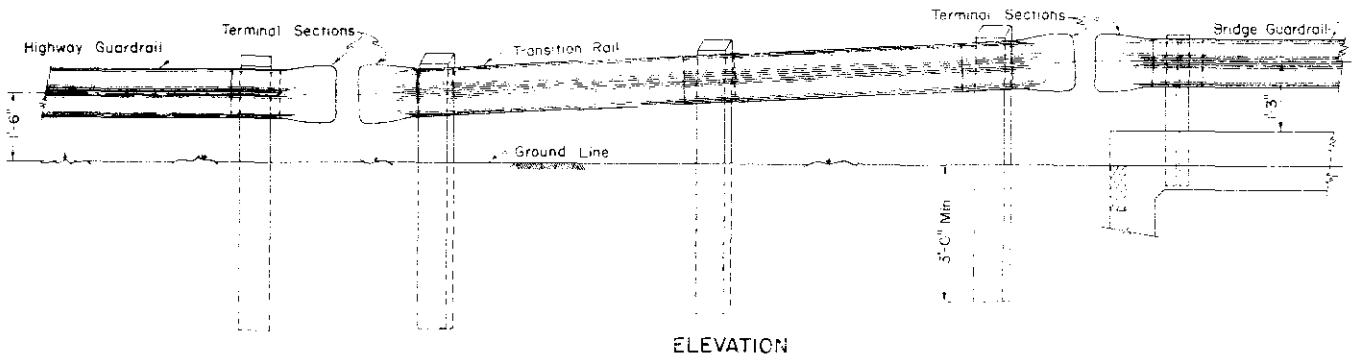
STANDARD M-75-A
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

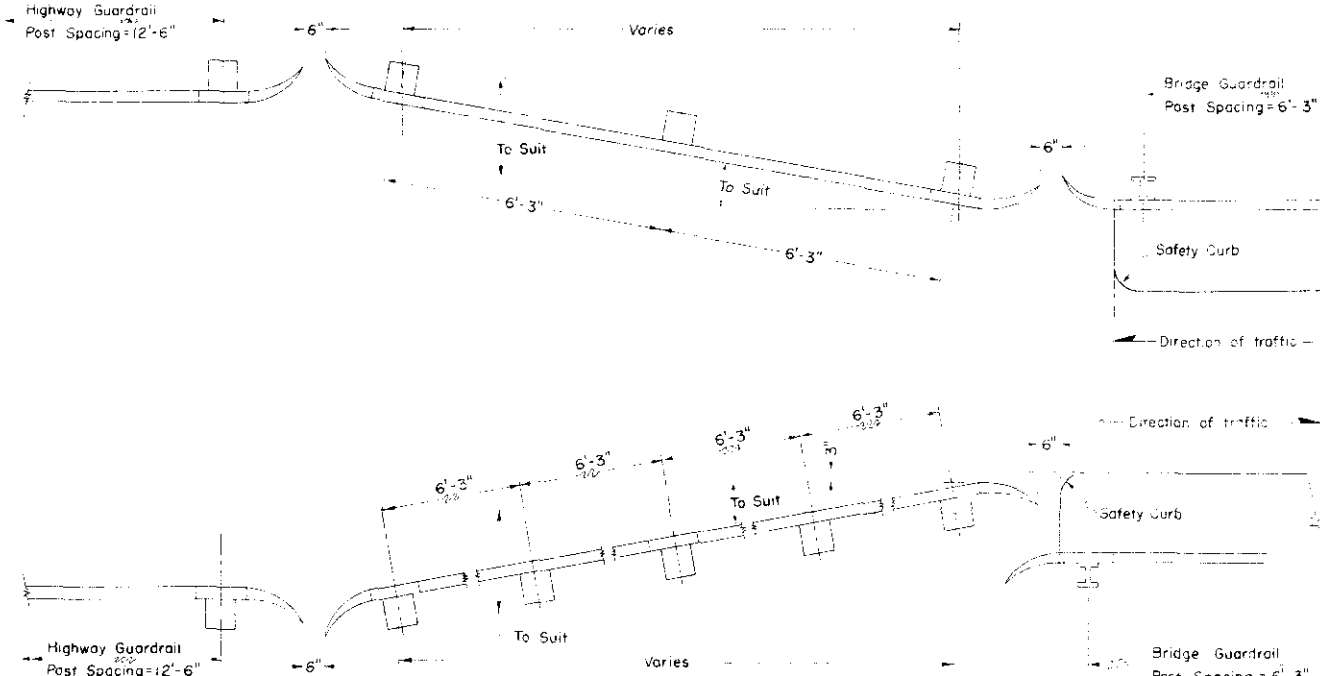
REVISIONS	
1-3-63 Add 25' Sect 8 Rect Washer	LEO
7-1-63 Add Coating Class	LEO
8-7-63 Rev General Note	LEO



TYPICAL METAL PLATE GUARD RAIL

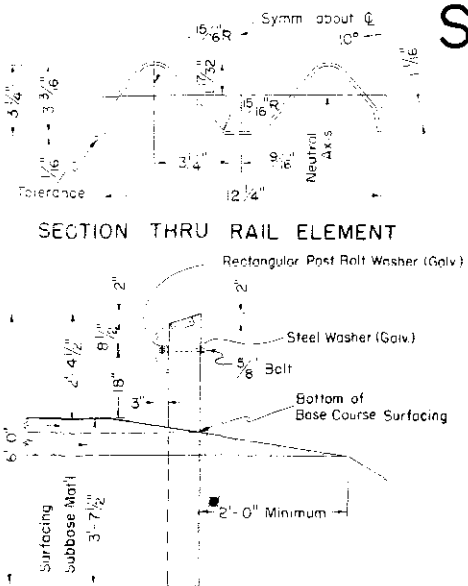


ELEVATION



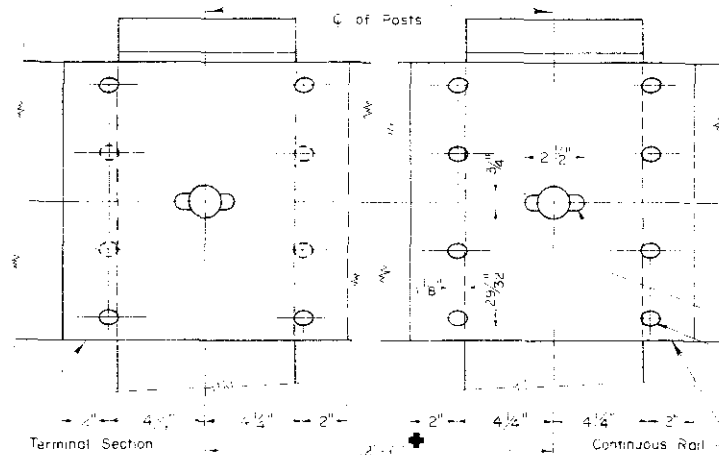
(Work by State Forces)

TRANSITION RAIL AT BRIDGES ONLY

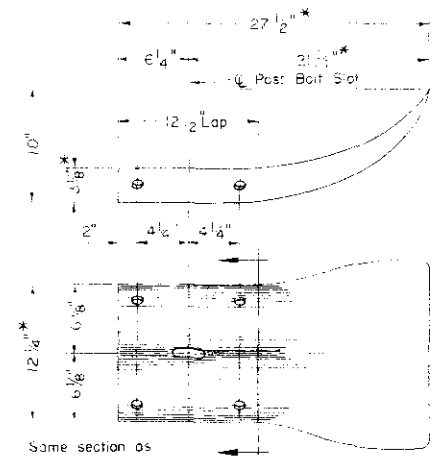


Where Subbase width does not give the two feet, subgrade shall be widened for lateral support

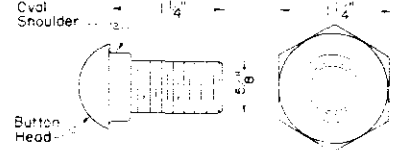
DETAIL SHOWING TYPICAL LOCATION OF GUARD FENCE



DETAIL OF RAIL SPLICE
(Rectangular Post Bolt Washer not shown in this detail)



DETAIL OF INTERMEDIATE POST CONNECTION FOR 25' RAIL SECTION



DETAIL OF TERMINAL SECTION

GENERAL NOTES

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

All wood posts shall be close grained Douglas Fir of the Coast Region, Dense Leaflet or Shortleaf Southern Pine or Lodgepole Pine.

All wood posts shall be square edged, full sawn, with tops beveled as shown. All bolt holes are to be drilled 1/8 inch larger than diameter of bolt before treatment is applied. All wood posts shall be pressure treated for the full length of the posts with "Creosote Oil" as provided for in the Specifications.

Timber posts fabricated from Douglas Fir or Southern Pine shall be 8" x 8" square. Timber posts fabricated from Lodgepole Pine shall be 8" x 10" and shall be installed with the 8" face parallel to the center line of the roadway.

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

Where sidewalks are constructed adjacent to the lane for traffic, guard fence shall be placed in such a manner that the fence lies on the line between the sidewalk area and the normal roadway shoulder.

Where guard fences are constructed on the approaches to bridges with sidewalks, the fence at bridge shall be placed in line with the face of the curbing on the bridge.

METAL PLATE GUARD FENCE (STEEL) SPECIFICATIONS

Metal plate guard rail shall be painted in accordance with standard specifications.

Metal plate guard rail galvanized in accordance with Coating Class 2.50 of Table I of ASTM A-93 may be furnished in lieu of painting requirements.

Metal plates shall not be lighter than No. 12 U.S. standard gauge.

Standard galvanized wrought steel washers shall be used under all bolt heads and nuts coming in contact with wood posts.

METAL PLATE GUARD FENCE (ALUMINUM) SPECIFICATIONS

Aluminum plates shall have a nominal thickness of not less than 0.125 inches.

No painting of the aluminum guard rail elements, end sections or fasteners will be required.

MATERIAL SPECIFICATIONS The following members shall be of the alloy and temper specified, and shall conform to the ASTM specification listed below.

Member	Alloy	ASTM Specification
Rail elements	2024-T3	B 209
Terminal Sections	2024-T42	B 209
Bolts	2024-T4	B 211
Nuts	6061-T6	B 211
Washers	2024-T4	B 211

Dimensions marked by (*) may vary by no more than 1/2 inch

All rail elements, terminal sections and appurtenances shall be treated to prevent oxidation

COLORADO
DEPARTMENT OF HIGHWAYS

METAL PLATE GUARD FENCE

Designed by	Approved by
Made by	Bridge Engineer
Checked by	Date: May 15 1956

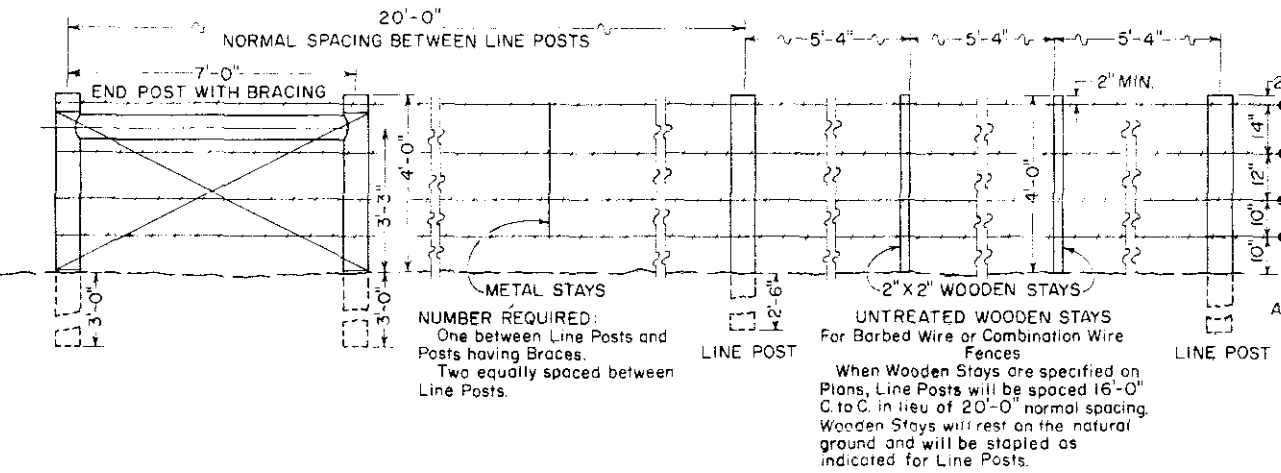
STANDARD M-76-A

(SHEET 1 OF 2 SHEETS)
(MAY 1, 1962)

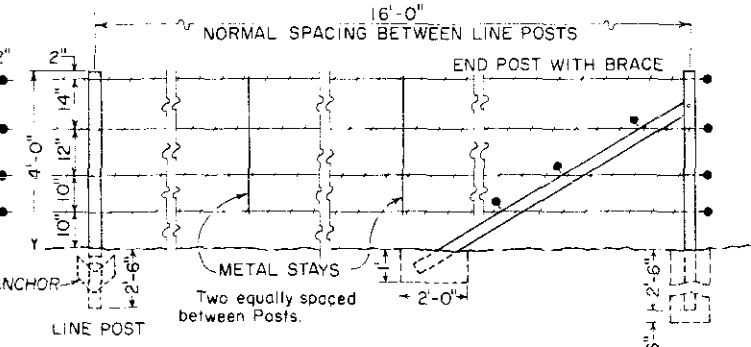
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
5-23-62	Rev. Line Brace Detail For Metal Post	L.E.O.
6-6-62	Rev. Fc. Int. for Wood Posts	L.E.O.
8-9-62	Rev. Line Brace Detail For Metal Post	J.C.R.
9-18-62	Add Alternate Brace Attach. Detail	L.E.O.
2-11-63	Rev. Bolt Holes in Posts & Braces	L.E.O.
4-15-63	Rev. Note on Wire Splice	J.C.R.
7-25-63		L.E.O.

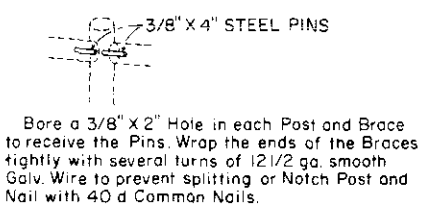
BARBED WIRE FENCE WITH WOODEN POSTS



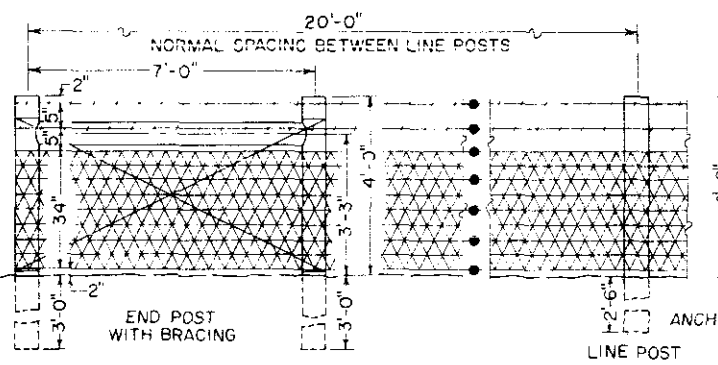
BARBED WIRE FENCE WITH METAL POSTS



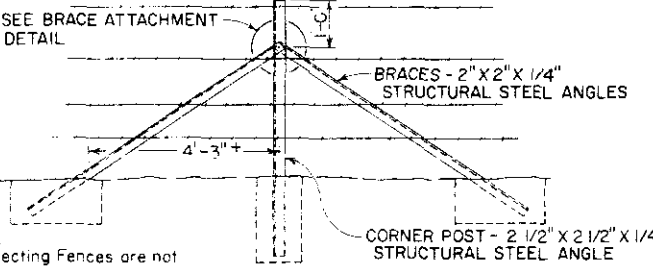
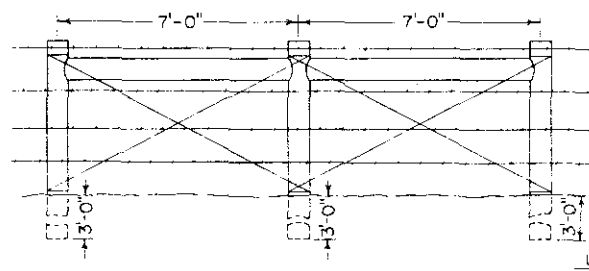
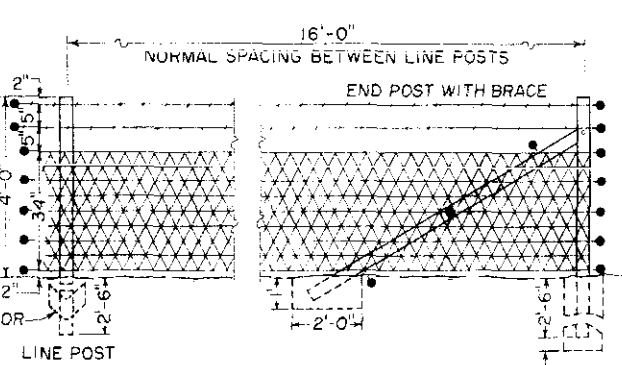
CROSS BRACE DOWELING DETAIL



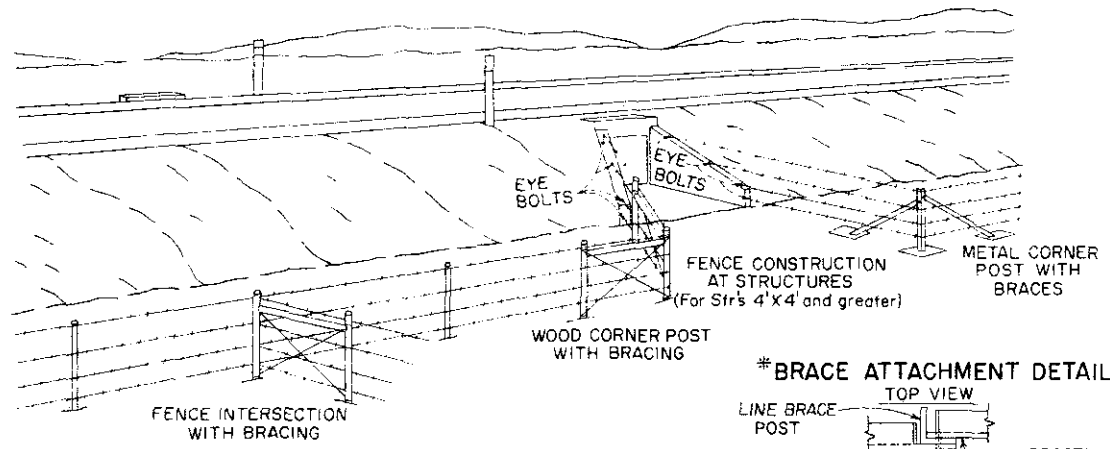
COMBINATION WIRE FENCE WITH WOODEN POSTS



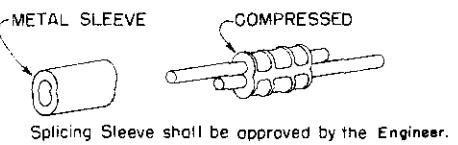
COMBINATION WIRE FENCE WITH METAL POSTS



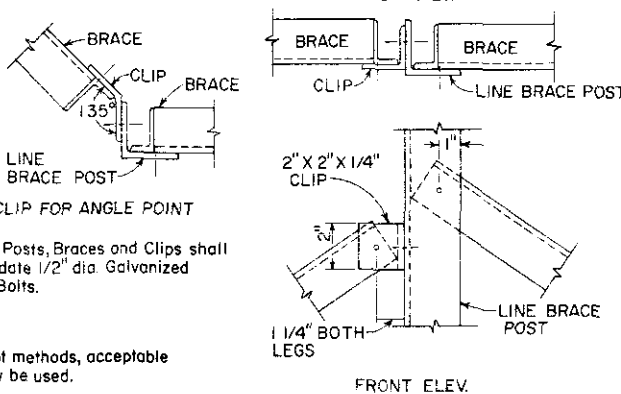
ILLUSTRATIVE SKETCH SHOWING TYPICAL EXAMPLES FOR CONSTRUCTING FENCES



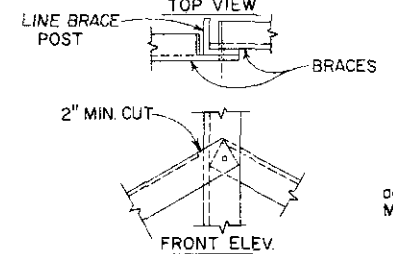
ACCEPTABLE WIRE SPLICE



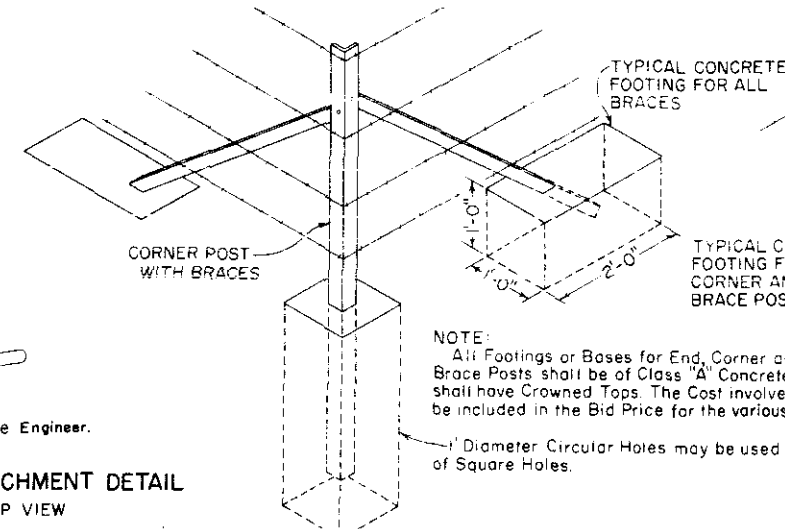
* ALTERNATE BRACE ATTACHMENT DETAIL TOP VIEW



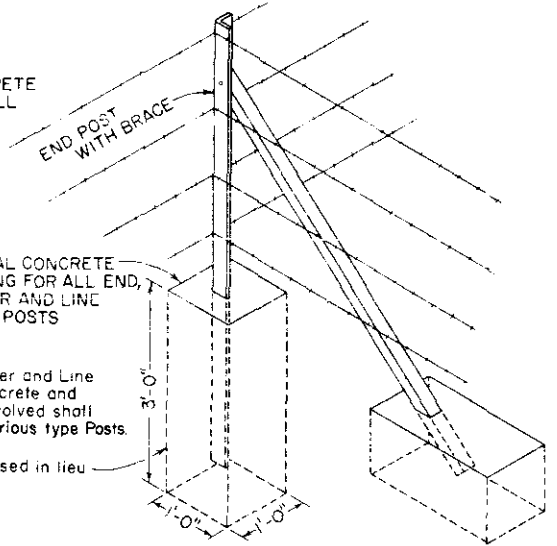
* BRACE ATTACHMENT DETAIL TOP VIEW



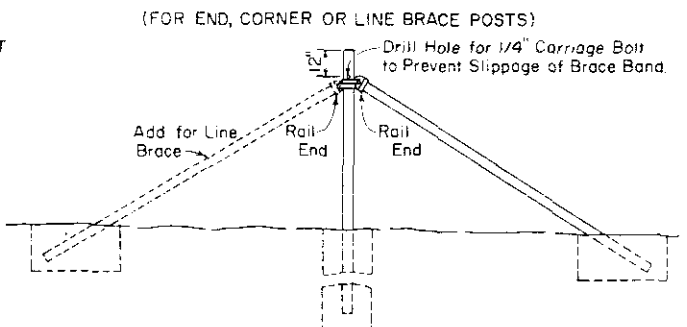
TYPICAL CORNER POST INSTALLATION



TYPICAL INSTALLATION AT FENCE INTERSECTIONS



ALTERNATE POST (FOR END, CORNER OR LINE BRACE POSTS)



COLORADO
DEPARTMENT OF HIGHWAYS
WIRE FENCES
AND
GATES

Designed by L.E.O. Approved by J. E. Sullivan
Made by T.E.F. Engr. Surveys & Plans
Checked by E.E.O. Date: 6-12-1961

STANDARD M-76-A

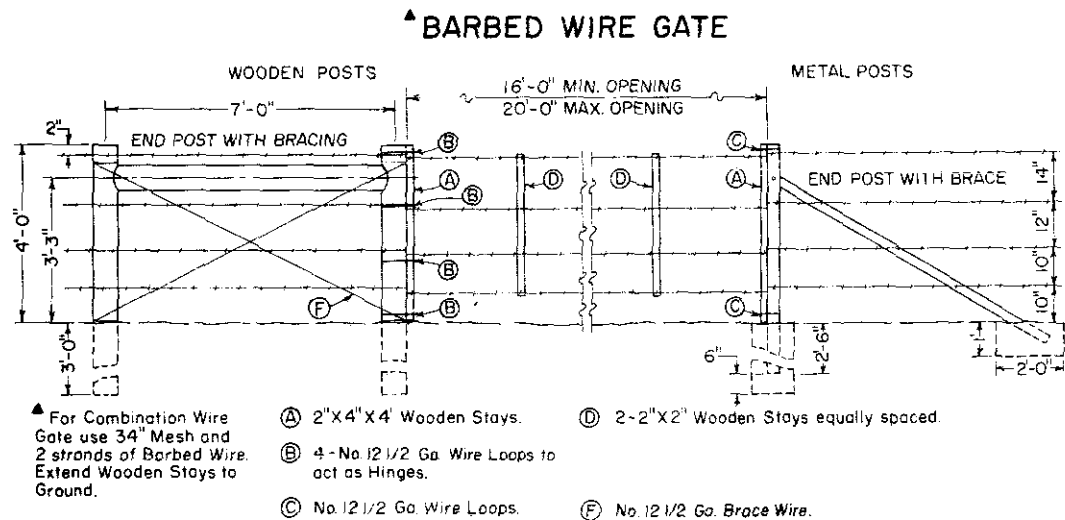
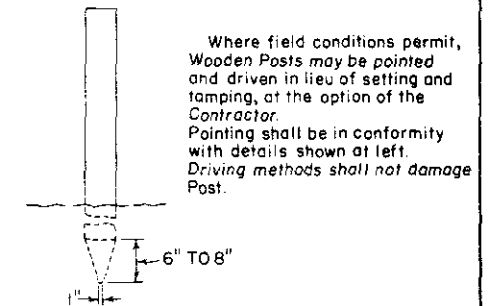
(SHEET 2 OF 2 SHEETS)

(MAY 1, 1962)

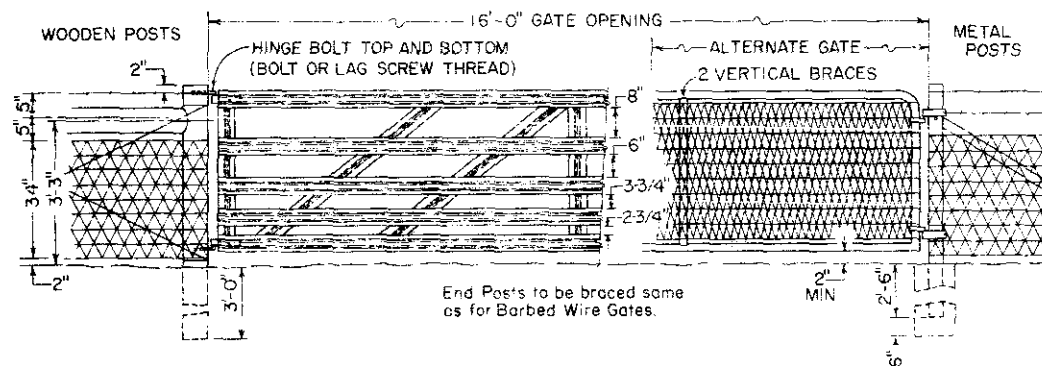
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLD.		

REVISIONS		
5-23-62	Tie For Angle Post	L.E.O.
8-9-62	Brace Bolt Size	J.C.R.
9-21-62	Rev. Angle Post & Ties	L.E.O.
2-11-63	Rev. Gates & Posts	L.E.O.
4-15-63		J.C.R.
7-25-63	Rev. Ref. to Commercial Std. 184-51	L.E.O.

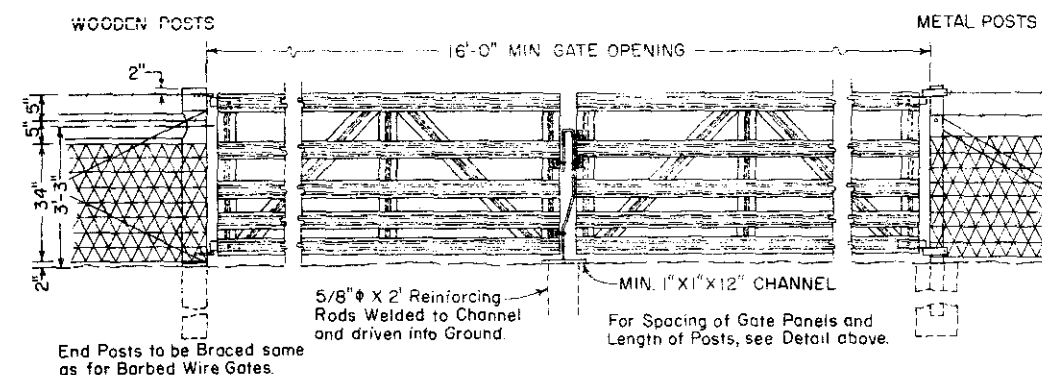
POST POINTING DETAILS



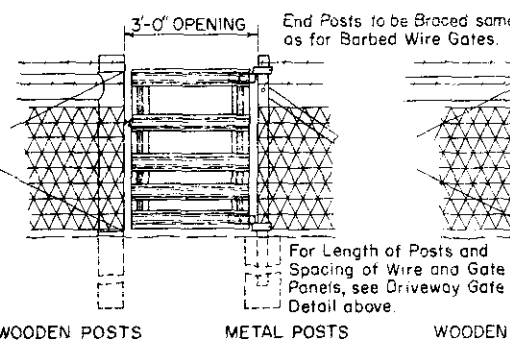
DRIVEWAY GATES



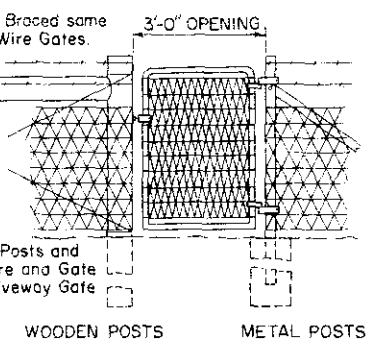
TWIN DRIVEWAY GATES



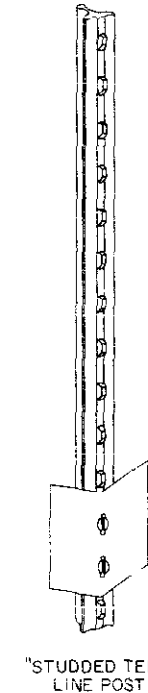
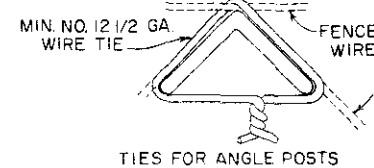
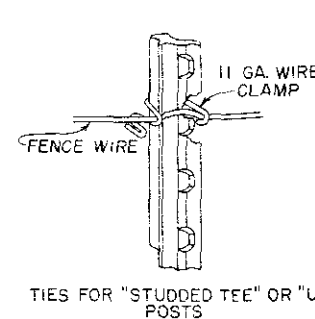
WALK GATE



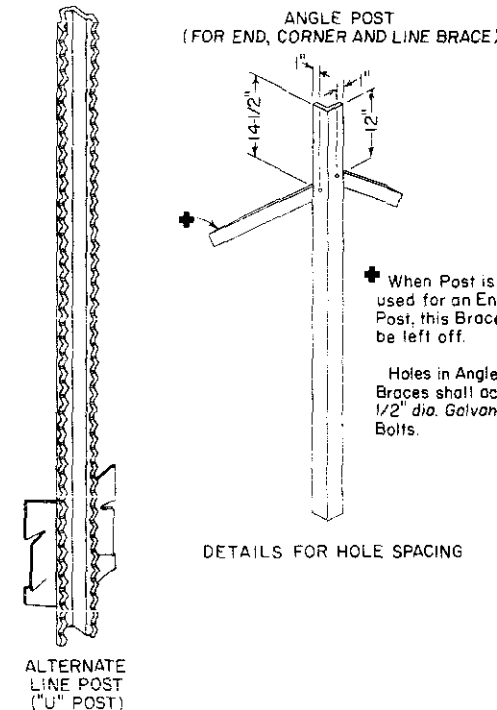
ALTERNATE WALK GATE



FENCE WIRE TIES



TYPICAL METAL POSTS



GENERAL NOTES

ALTERNATES:

END, CORNER AND LINE BRACE POSTS
Type - 2 1/2" O.D. Galvanized Tubular Steel.
Weight - 3.47 lbs./lin. ft. Min.

BRACES:
Type - 1 3/8" O.D. Tubular Steel with 2 1/2" Brace Band, Hinge Bolt and 1 3/8" I.D. Rail End; all Galvanized.
Weight - 16 lbs./lin. ft. Min.
Length - 6'-6" Min.

BARBED WIRE:

Barbed wire shall conform to Standard Specifications and shall have No. 14 Gauge Galvanized double wrapped barbs. 80 rod reels shall weigh a min. of 78 lbs. net & shall meet ASTM A121-57, Class I.

4" X 4" WIRE MESH:

Wire mesh used in combination wire fence as shown shall be galvanized and conform to the following:
Width - 34"
Weight - 0.76 lbs./lin. ft. Min.
Horizontal Wires - 2 strands, No. 12 1/2 ga. wire.
Cross Wires - 1 strand, No. 14 ga. wire.
Construction - cross wires to be woven with horizontal wires making a one piece fabric.
Shall meet ASTM A116-57, Class I.

GATES:

DRIVEWAY GATES:
Height - approximately 42" (5 panels) --- Width of gate opening - 16'-0"
Weight - Galvanized Steel, 90 lbs. Min. --- Tempered Aluminum, 45 lbs. Min.
Gates to be of Riveted construction as follows: Min. 4 No. 10 rivets at each right angle connection and where diagonal braces connect to horizontal panels; Min. 3 No. 10 rivets where diagonal braces connect to top and bottom panels.
ALTERNATE DRIVEWAY GATES:
Height - 42"
Weight - Not less than 79 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.
Mesh to be of same construction as shown for 4" X 4" wire mesh except it shall be 2" X 4" mesh 42" high.

WALK GATES:

Height - approx. 42" (5 panels)
Weight - Galvanized Steel, 18 lbs. Min.
Weight - Tempered Aluminum, 10 lbs. Min.
Width of gate opening - 3'-0"

ALTERNATE WALK GATES:

Height - 42"
Weight - Not less than 16 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.
Mesh to be of same construction as shown for Driveway Gate.

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

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.

LATCHES AND HINGES:

Galvanized steel or Aluminum of standard make
Hinges shall be placed as shown, to prevent theft.
In lieu of standard make latches it will be permissible to use an electro-galvanized chain, eyebolt and snaphook type latch.
Eyebolt, chain and snaphook assembly to be secured to latch side of gate. Gate closure effected by wrapping chain around end post and snapping hook into chain.

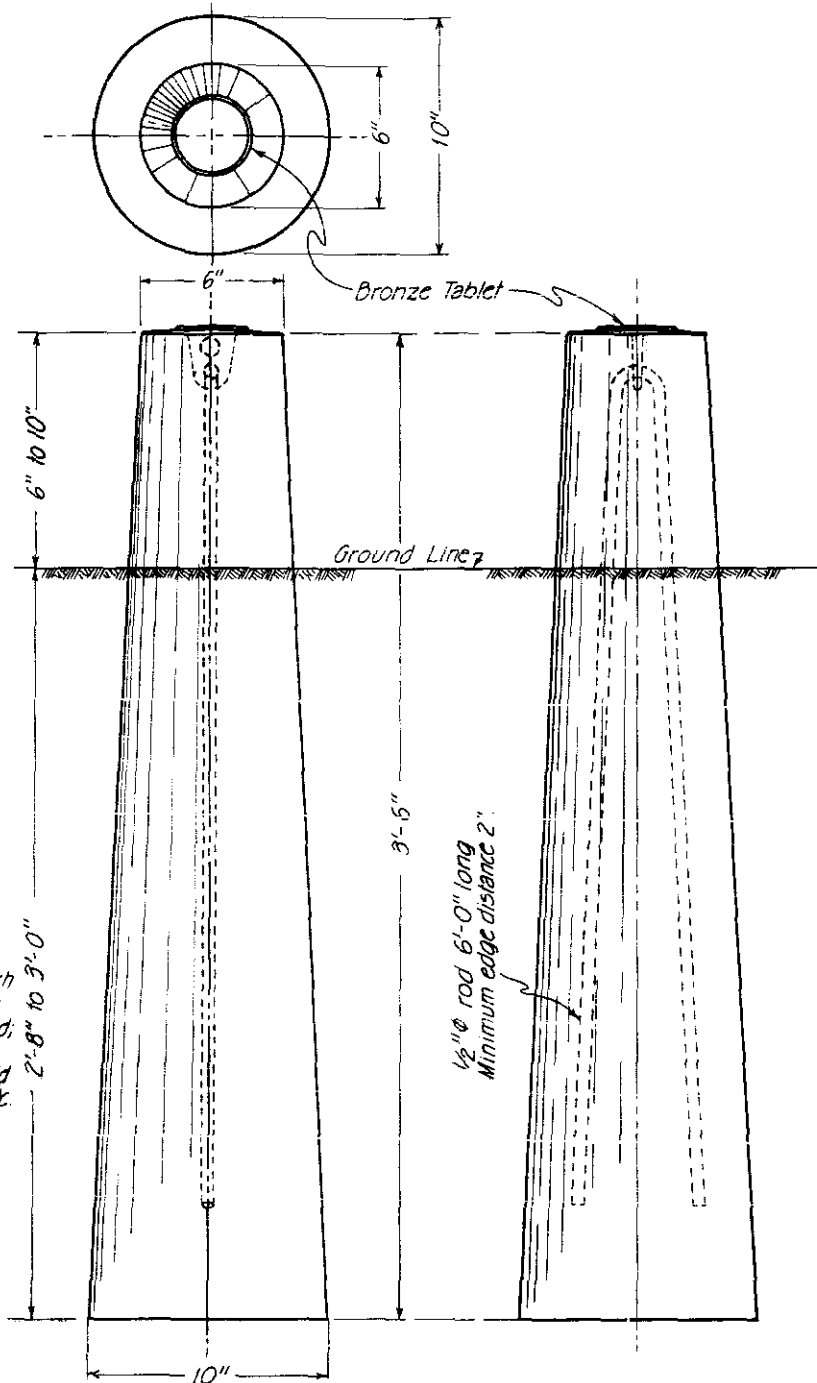
COLORADO
DEPARTMENT OF HIGHWAYS
WIRE FENCES
AND
GATES

Designed by L.E.O. Approved by J. C. R.
Made by T.E.F. Engr. Surveys & Plans
Checked by E.E.O. Date: 6-12-1961

RIGHT OF WAY MARKER POST STANDARD M-81-A
(MAY 1, 1962)

FEDERAL ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
5	COLORADO		

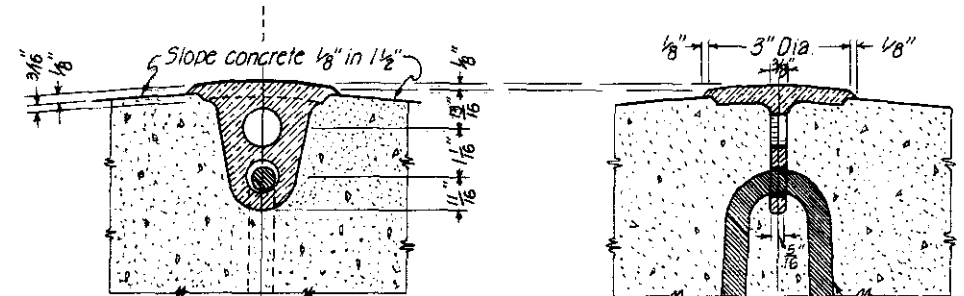
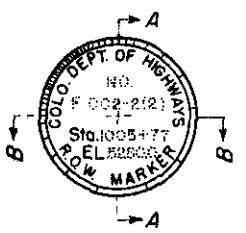
REVISIONS		



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 1/16 inch. Information on the bronze tablet indicated by pin lines is to be stamped in field by the engineering party after post is placed. 3/16 inch letters and figures to be used. Project designations on tablets shall be properly shown (i.e.; I for Fed. Aid Interstate; F for Fed. Aid Primary; S for Fed. Aid Secondary, etc. R. C. for State Projects, see detail below.)



SECTION B-B
SECTION A-A
DETAIL OF BRONZE TABLET
FOR RIGHT OF WAY MARKER POST AND BENCH MARK
Omit and use 12"x1/2" φ bar for Bench Mark Tablet

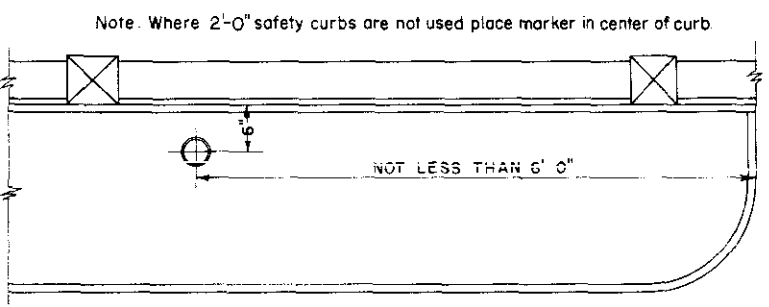
BENCH MARK

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

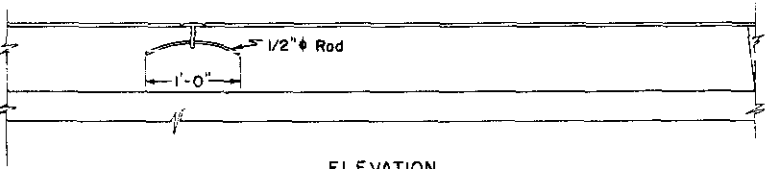
All exposed surfaces of the bronze tablet are to be ground to a smooth surface. All letters are to be depressed a minimum of 1/16 inch. Information on the bronze tablet indicated by pin lines is to be stamped in field by the engineering party after marker is placed. 3/16 inch letters and figures to be used. Project designation on tablets shall be properly shown (i.e.; I for Fed. Aid Interstate, F for Fed. Aid Primary, S for Fed. Aid Secondary, etc. R. C. for State Projects. See details below).

Bronze Bench Mark Tablets will be furnished by the Department at no expense to the Contractor.

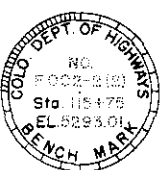
Installation of Bronze Bench Mark Tablets will not be paid for directly, but shall be included in the price bid for Concrete



PLAN



ELEVATION



One marker to be placed on Bridges as shown. The station shown on marker shall be the center-line stationing directly opposite the marker.

COLORADO
DEPARTMENT OF HIGHWAYS

MARKER POSTS
AND
BENCH MARKS

Designed by R.E.L. Approved by
Made by E.E.O. A. Julian
Checked by R.E.L. Date: Nov. 12, 1953

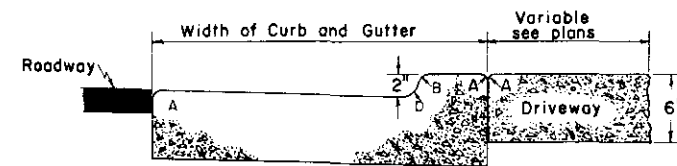
STANDARD CURBS AND GUTTERS

STANDARD M-84-A
(MAY 1, 1962)

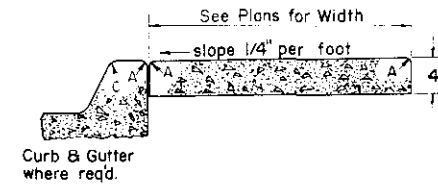
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLC		

REVISIONS		
3-25-63	Added Approach Slab Curbs.	C.R.S.

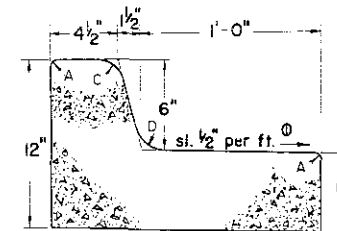
CONCRETE PAVEMENT (DRIVEWAYS)



CONCRETE SIDEWALKS

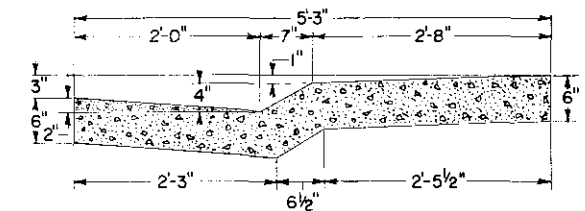


CONCRETE COMBINATION CURB AND GUTTER (6" Barrier-1' Gutter) (Type I)

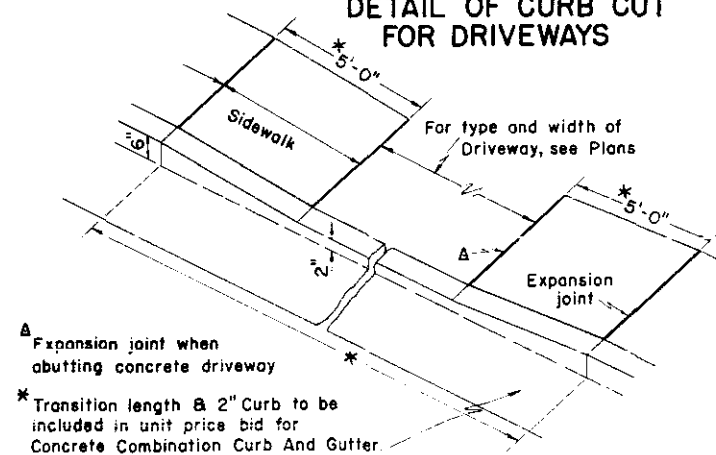


LEGEND FOR RADII	
A	= 1/8"
B	= 1"
C	= 1 1/2"
D	= 1 1/2" to 2"

CONCRETE COMBINATION CURB, GUTTER AND SIDEWALK (TYPE II-M)

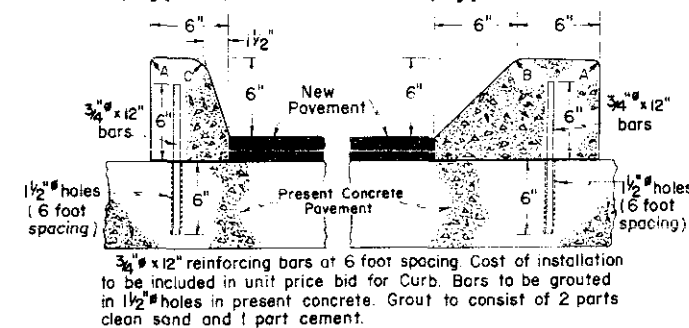


DETAIL OF CURB CUT FOR DRIVEWAYS

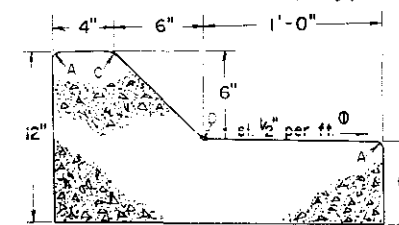


CONCRETE CURB (6" Barrier-Doweled) (Type I)

CONCRETE CURB (6" Mountable-Doweled) (Type I-M)

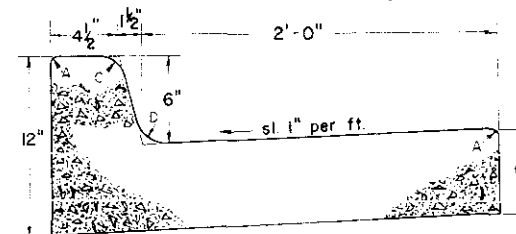


CONCRETE COMBINATION CURB AND GUTTER (6" Mountable-1' Gutter) (Type I-M)

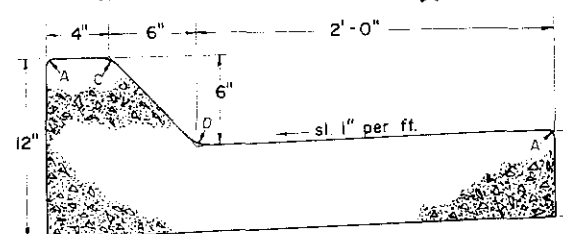


Slope in opposite direction when required for curves or warped pavement sections.

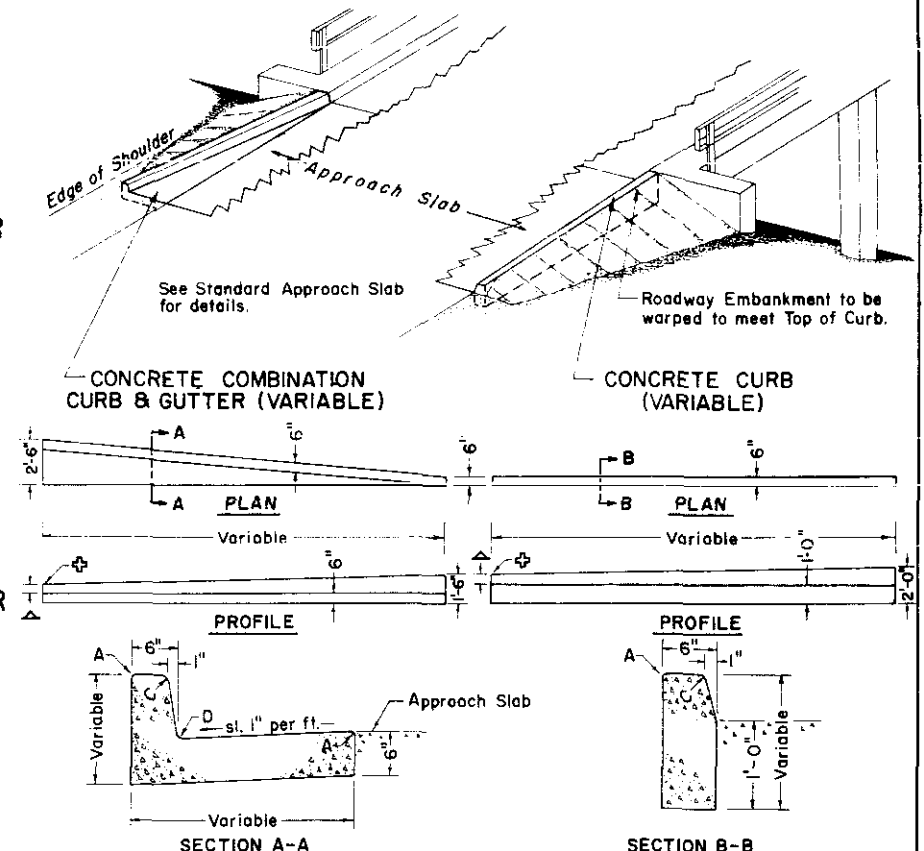
CONCRETE COMBINATION CURB AND GUTTER (6" Barrier-2' Gutter) (Type II)



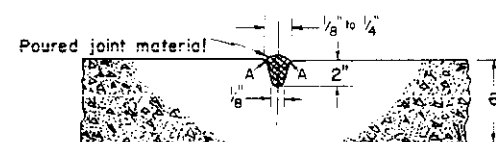
CONCRETE COMBINATION CURB AND GUTTER (6" Mountable-2' Gutter) (Type II-M)



DETAILS OF CONCRETE COMBINATION CURB & GUTTER (VARIABLE) AND CONCRETE CURB (VARIABLE)

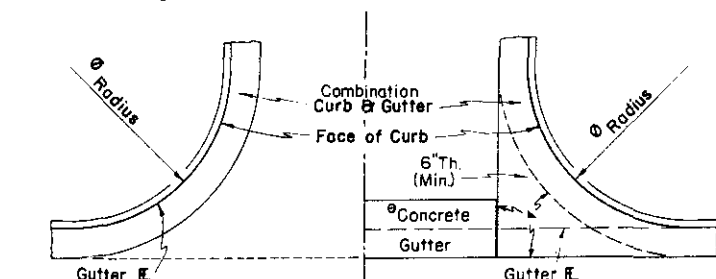


TRANSVERSE WEAKENED PLANE JOINT FOR CONCRETE PAVEMENT (DRIVEWAYS)



This joint required where length of slab exceeds 15 feet.

CONSTRUCTION OF CONCRETE GUTTERS AT INTERSECTIONS

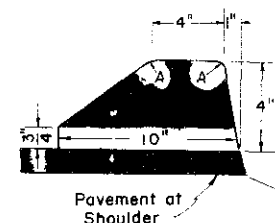


Length of Radius as shown elsewhere on Plans.

This section to be built when Concrete Gutter is not required.

This section to be built when Concrete Gutter is required.

ASPHALTIC SHOULDER ROLL



NOTE:
0.647 x Specific Gravity of Asphalt = Tons per Station.

GENERAL NOTES

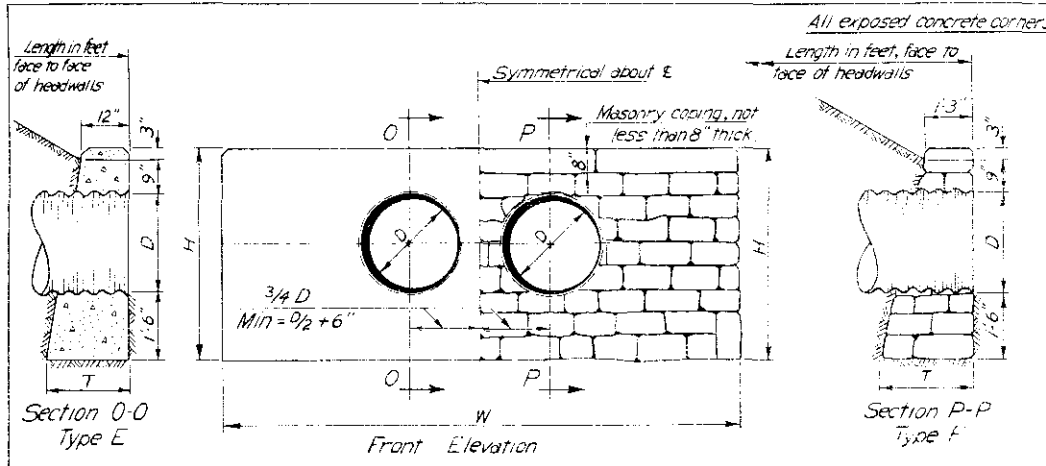
All work shall be done in accordance with the Specifications of the Colorado Department of Highways.

On Curves 3 degrees and sharper, Curbs and/or Gutters are to be placed on the Arc of the Curve unless otherwise noted on plans. A maximum chord length of 10 feet may be used when the degree of curve is less than 3 degrees.

COLORADO
DEPARTMENT OF HIGHWAYS

CURBS AND GUTTERS

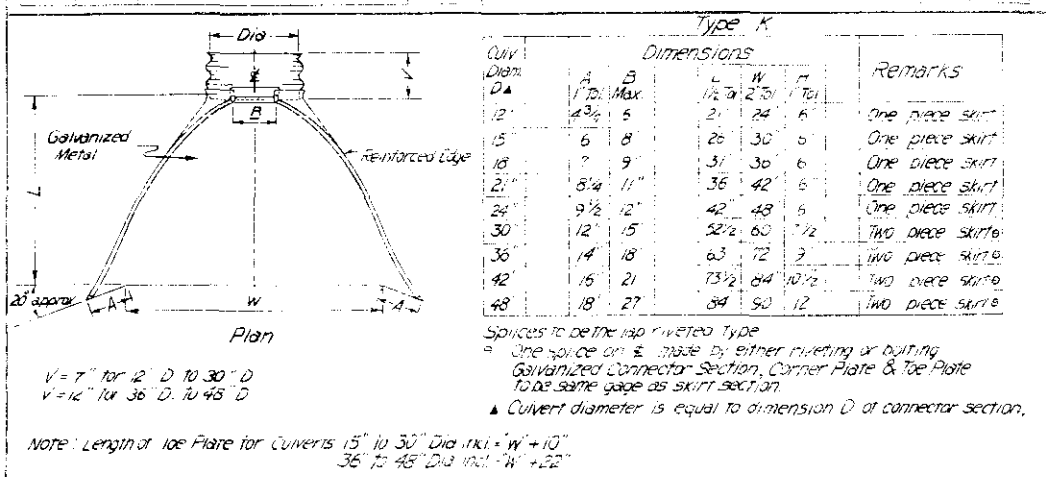
Designed by *W.D.*
Made by *W.D.*
Checked by *C.R.S.*
Approved by *C.R.S.*
Date: *Sept 29 19 58*



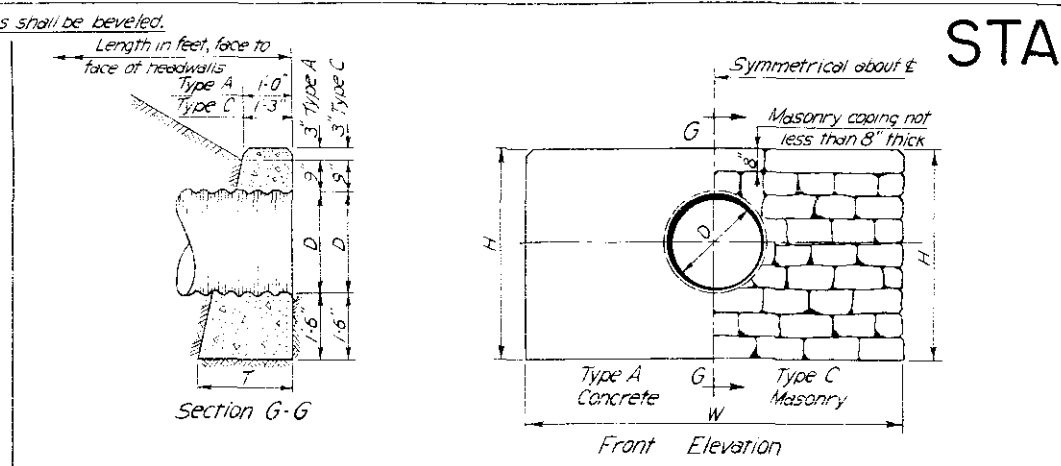
STANDARD HEADWALLS FOR DOUBLE CORRUGATED METAL PIPE CULVERTS

Table of Dimensions and Quantities

Type E				Both Types				Type F			
D	T	*Concrete in Two Headwalls		W	H			Cement Rubble Masonry in Two Headwalls	T	D	
15"	1'-6"	2.4 Cu. Yds.		7'-6"	3'-9"			3.1 Cu. Yds.	2'-0"	15"	
18"	1'-7"	3.0 DO		8'-6"	4'-0"			3.8 DO	2'-1"	18"	
24"	1'-10"	4.4 DO		10'-6"	4'-6"			5.5 DO	2'-4"	24"	
30"	2'-0"	6.1 DO		12'-9"	5'-0"			7.5 DO	2'-6"	30"	
36"	2'-2"	8.1 DO		15'-0"	5'-6"			10.0 DO	2'-8"	36"	
42"	2'-5"	10.8 DO		17'-3"	6'-0"			12.8 DO	2'-10"	42"	
48"	2'-7"	13.6 DO		19'-6"	6'-6"			16.3 DO	3'-0"	48"	



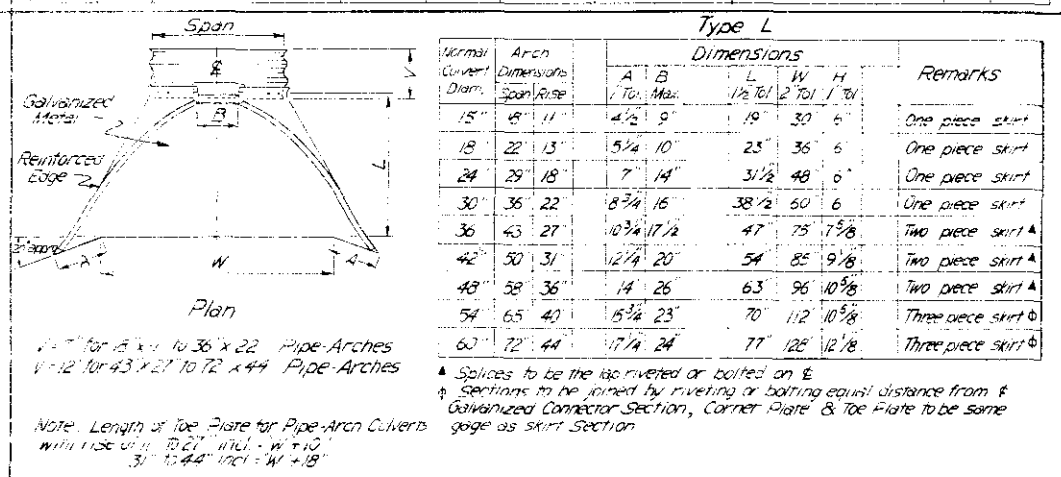
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K



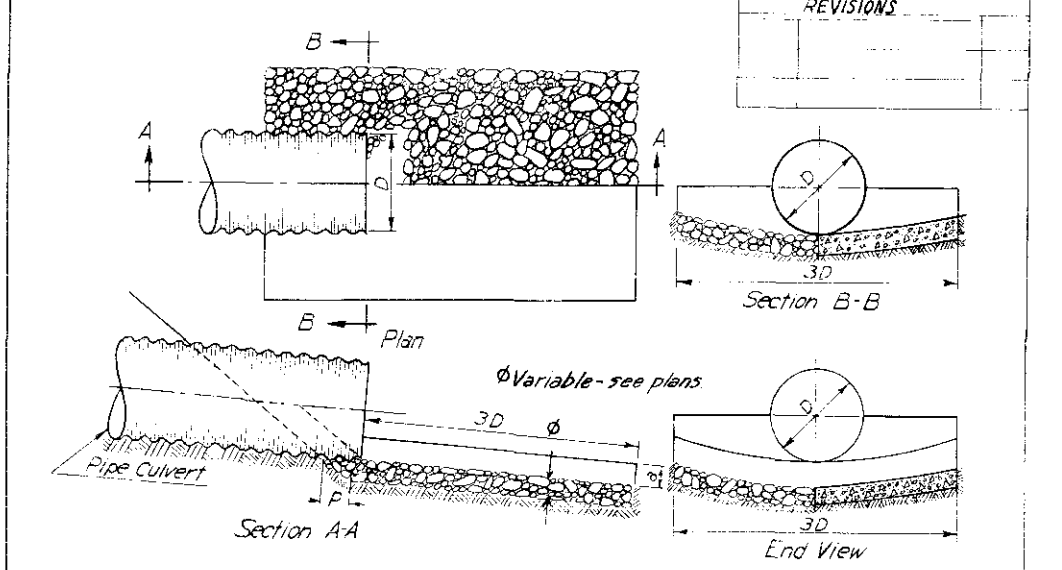
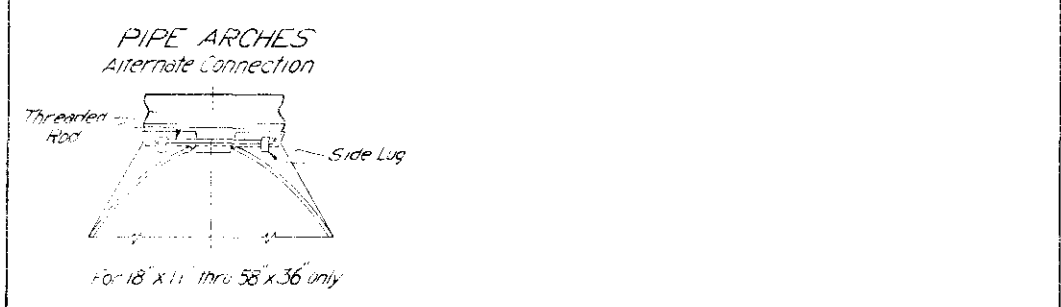
STANDARD HEADWALLS FOR SINGLE CORRUGATED METAL PIPE CULVERTS

Table of Dimensions and Quantities

Type A				Both Types				Type C			
D	T	*Concrete in Two Headwalls		W	H			Cement Rubble Masonry in Two Headwalls	T	D	
15"	1'-6"	1.8 Cu. Yds.		5'-3"	3'-9"			2.2 Cu. Yds.	2'-0"	15"	
18"	1'-7"	2.2 DO		6'-0"	4'-0"			2.8 DO	2'-1"	18"	
24"	1'-10"	3.3 DO		7'-6"	4'-6"			4.1 DO	2'-4"	24"	
30"	2'-0"	4.5 DO		9'-0"	5'-0"			5.6 DO	2'-6"	30"	
36"	2'-2"	6.0 DO		10'-6"	5'-6"			7.4 DO	2'-8"	36"	
42"	2'-5"	8.0 DO		12'-0"	6'-0"			9.2 DO	2'-10"	42"	
48"	2'-7"	10.0 DO		13'-6"	6'-6"			11.5 DO	3'-0"	48"	



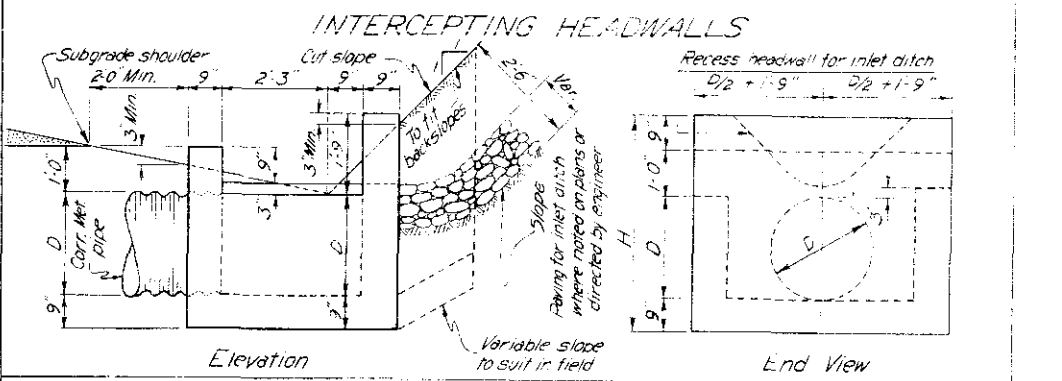
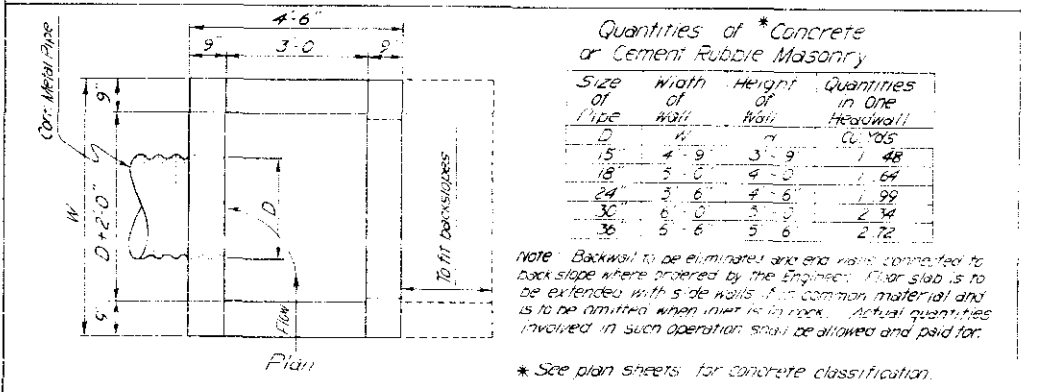
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L



CONCRETE OR GROUTED RUBBLE APRON FOR PIPE CULVERT

Square Yards of Slope and Ditch Paving

Fill Slope	D	15"	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
1 1/2:1	2'-0"	3	4	6	9	12	15	18	21	24	27	30	33	36
2:1	2'-0"	3	4	6	9	12	15	18	21	24	27	30	33	36
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



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

When culvert is skewed, headwalls shall be placed parallel to E of roadway.

COLORADO DEPARTMENT OF HIGHWAYS

HEADWALLS AND APRONS FOR C.M.P. CULVERTS

Designed by PJB-GMD Approved by R.W. Newland
Made by HGP Bridge Engineer
Checked by M.W.M. Date June 1, 1962

STANDARD M-152-A

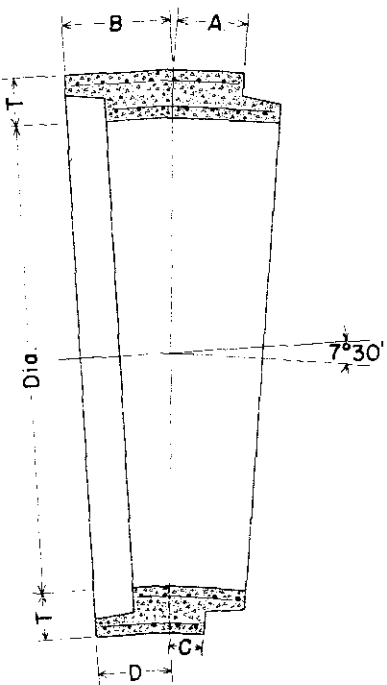
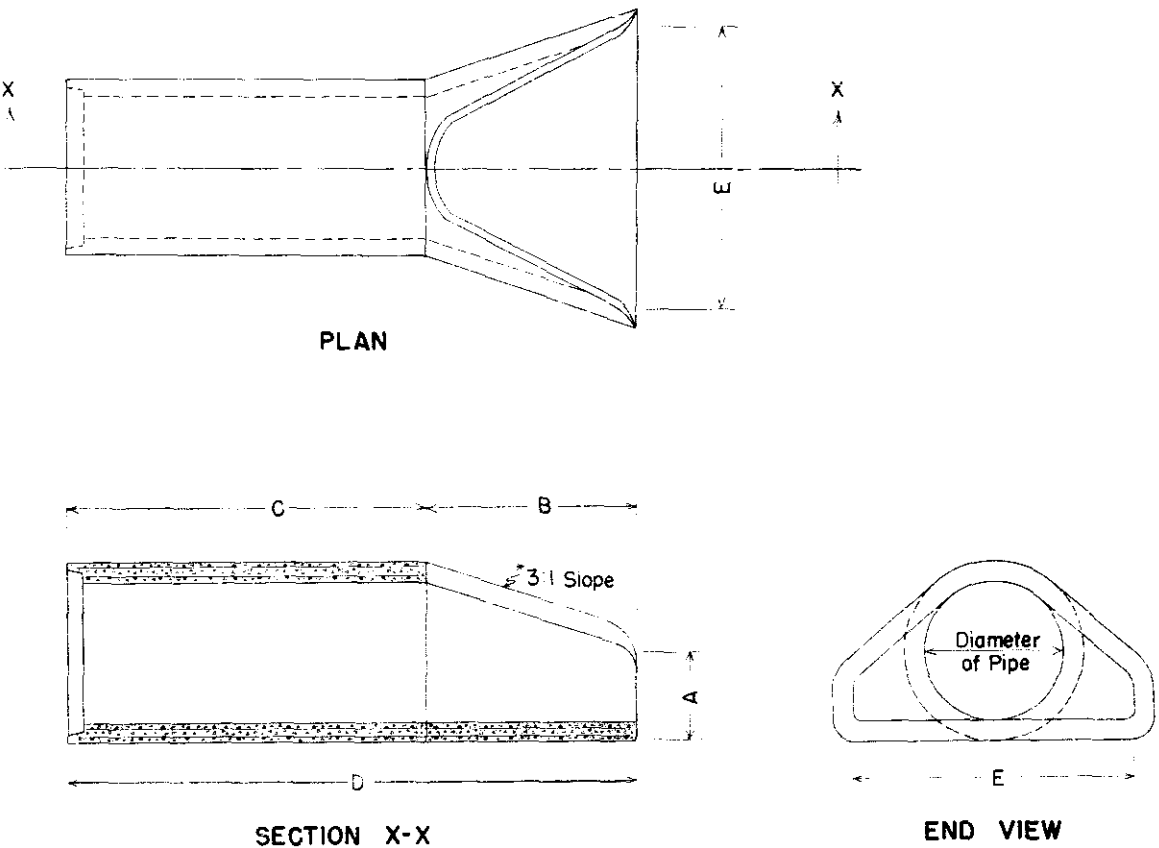
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS		

FLARED END SECTION FOR CONCRETE PIPE

7°30' ANGLE SECTION FOR CONCRETE PIPE



DIMENSIONS FOR FLARED END SECTIONS

DIAMETER	A	B	C	D	E
12"	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"
15"	6"	2'-3"	3'-10"	6'-1"	2'-6"
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"
24"	9 1/2"	3'-7 1/2"	4'-6"	8'-1 1/2"	4'-0"
30"	1'-0"	4'-6"	3'-7 3/4"	8'-1 3/4"	5'-0"
36"	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"
42"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"
48"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"
54"	2'-6"	6'-0"	2'-3"	8'-3"	7'-6"
*60"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"

*60" end section is based on a slope of 2:1

NOTE:

Alternate equivalent designs for flared end sections may be submitted to the Department for approval. Payment for "Flared End Sections" will be based on the lengths as shown in Column D. Any additional culvert pipe required to provide the lengths as shown in Column D will be included in the unit price bid for "Flared End Sections" of the several sizes.

DIMENSIONS FOR 7°30' ANGLE SECTIONS

DIAMETER OF PIPE	LENGTH ON OUTSIDE OF PIPE				AVERAGE LAYING LENGTH ON E.
	A	B	C	D	
12"	4 1/2"	4 1/2"	3 1/2"	3 1/2"	8"
15"	5 1/2"	5 1/8"	4 1/4"	3 7/8"	9 3/8"
18"	3 1/2"	6 1/2"	2"	5"	8 1/2"
24"	4"	6 1/2"	2"	4 9/16"	8 1/2"
30"	4 1/2"	7"	2"	4 1/2"	9"
36"	4 7/8"	8 7/16"	2"	5 3/16"	10 7/16"
42"	6"	9 1/2"	2 9/8"	6 1/8"	12 1/8"
48"	7"	11"	3 1/16"	7 3/16"	14 3/16"
54"	8 1/8"	12 1/8"	4"	8"	16 1/8"
60"	9 1/8"	14"	4 3/8"	9 1/4"	18 3/8"

A, B, C and D apply to Tongue and Groove type of Joint only and can be varied for other types of Joints.

GENERAL NOTES

Joints other than Tongue and Groove may be used for Flared End Sections, 7°30' Angle but all joints for any one pipe structure must be uniform.

Concrete, wall thickness and reinforcing steel in Flared End Sections and 7°30' Angle Sections must conform with the requirements of the pipe with which they are used.

Flared end sections are to be furnished with tongue or groove, and/or bell or spigot as required, in order that joints may be laid with the bell or groove end upstream.

COLORADO
DEPARTMENT OF HIGHWAYS

CONCRETE END
AND ANGLE
SECTIONS

Designed by R.S.M. Approved by J.M.K.
Made by J.M.K.
Checked by R.S.M. Date: January 14, 1949

STANDARD M-192-A

(NOV. 1, 1962)

FED. ROAD RES. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
11-15-62	Rev. Location	L.E.O.
2-26-63	Posts & Bridge Approach	L.E.O.
5-15-63	Reflector Height	J.C.R.
7-5-63	Rev. Post Spacing, Tolerance & Reflect. H.	L.E.O.
9-5-63	Rev. Height of Bridges	L.E.O.

GENERAL NOTES

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

See tabulation in plans for delineator post requirements.

Spacing between Posts on acceleration and deceleration lanes and on relatively straight portions of interchange ramps shall be 200'. Spacing between Posts on the outside of interchange ramp curves shall be as indicated in table for the appropriate degree of curve with a 24' min. spacing. Post spacing in advance and beyond curve shall not apply to ramp curves.

Posts shall meet requirements of Par. 4.5 of U.S. Dept. of Commerce Commercial Standard 184-51. Acceptable material includes re-rolled railroad rails.

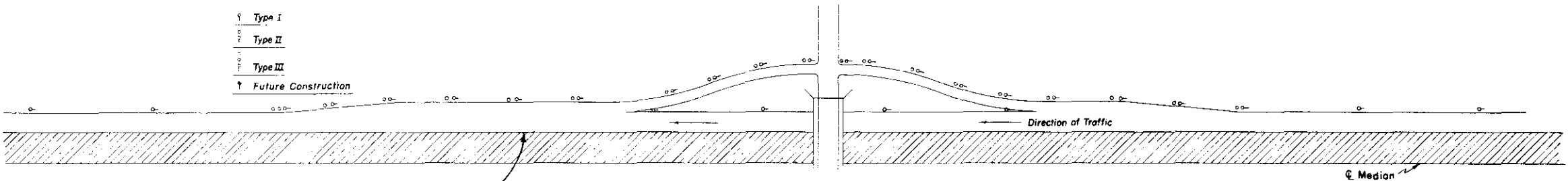
When normal delineator spacing falls on a road approach or crossroad, move delineator either direction a distance not to exceed 1/4 normal spacing.

② 100' on Interstate and 200' on Primary and Secondary Projects.

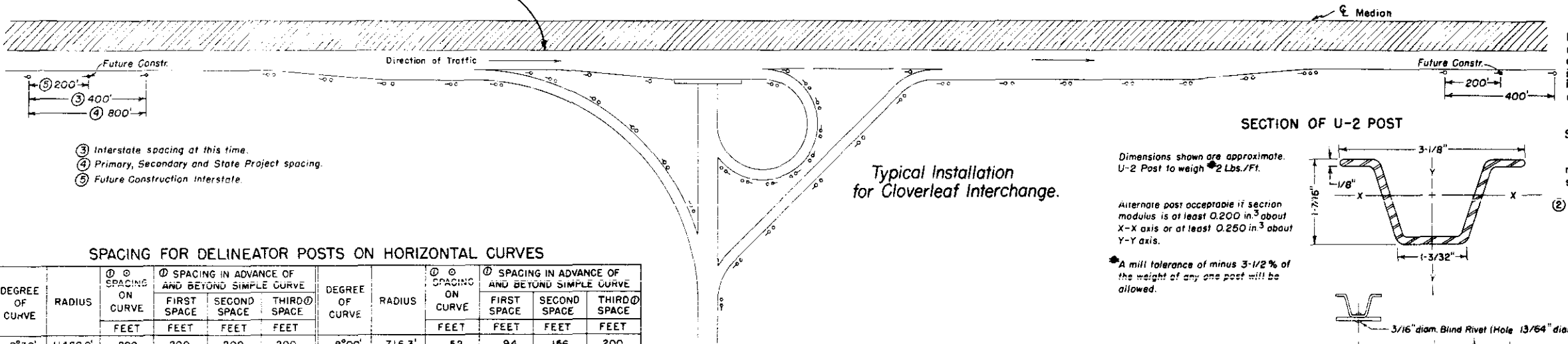
Delineator Posts are not to be placed along Frontage Roads.

Color of Posts shall be Interstate Green.

- Type I
- Type II
- Type III
- Future Construction



Typical Installation for Diamond Interchange.



Typical Installation for Cloverleaf Interchange.

- ③ Interstate spacing at this time.
- ④ Primary, Secondary and State Project spacing.
- ⑤ Future Construction Interstate.

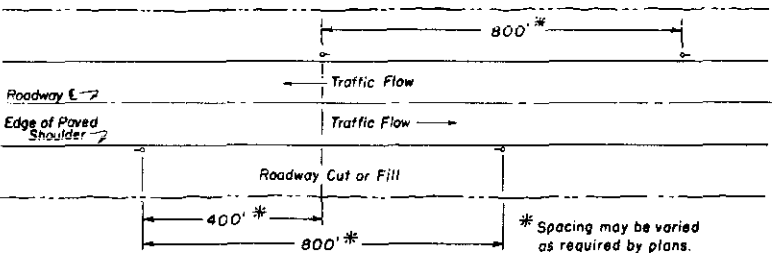
SPACING FOR DELINEATOR POSTS ON HORIZONTAL CURVES

DEGREE OF CURVE	RADIUS	① SPACING ON CURVE			② SPACING IN ADVANCE OF AND BEYOND SIMPLE CURVE			DEGREE OF CURVE	RADIUS	① SPACING ON CURVE			② SPACING IN ADVANCE OF AND BEYOND SIMPLE CURVE		
		FIRST SPACE	SECOND SPACE	THIRD SPACE	FIRST SPACE	SECOND SPACE	THIRD SPACE			FIRST SPACE	SECOND SPACE	THIRD SPACE	FIRST SPACE	SECOND SPACE	THIRD SPACE
0°30'	11460.0'	200	200	200	200			8°00'	716.3'	52	94	156	200		
1°00'	5730.0'	151	200	200	200			8°30'	674.1'	50	90	150	200		
1°30'	3820.0'	123	200	200	200			9°00'	636.7'	48	86	144	200		
2°00'	2865.0'	106	191	200	200			9°30'	603.2'	47	85	141	200		
2°30'	2292.0'	95	171	200	200			10°00'	573.0'	46	83	138	200		
3°00'	1910.0'	86	155	200	200			10°30'	545.7'	45	81	135	200		
3°30'	1637.1'	80	144	200	200			11°00'	520.9'	43	77	129	200		
4°00'	1432.5'	74	133	200	200			11°30'	498.3'	42	76	126	200		
4°30'	1273.3'	70	126	200	200			12°00'	477.5'	41	74	123	200		
5°00'	1146.0'	66	119	198	200			15°00'	382.0'	36	65	108	200		
5°30'	1041.8'	63	113	189	200			18°00'	318.3'	33	59	99	198		
6°00'	955.0'	60	108	180	200			21°00'	272.9'	30	54	90	180		
6°30'	881.5'	58	104	174	200			25°00'	229.2'	27	49	81	162		
7°00'	813.6'	55	99	165	200			30°00'	181.0'	24	43	72	144		
7°30'	764.0'	53	95	159	200										

① $S = 2 \sqrt{R - 50}$ 1-ST. SPACE = 185 2-ND. SPACE = 35 3-RD. SPACE = 65
NO SPACES TO EXCEED 200 FT.

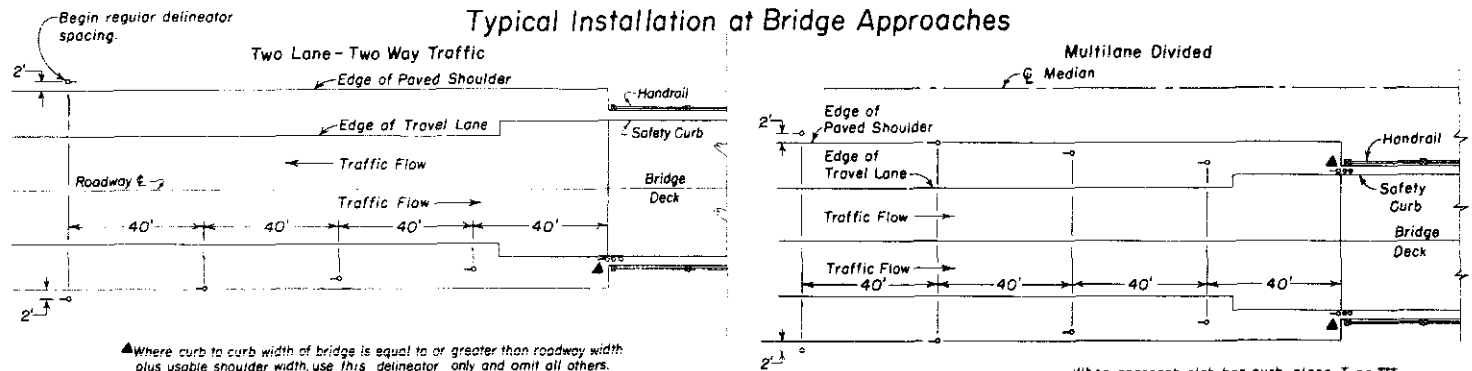
② Omit third space on Secondary and Primary Routes and double the distance on the curve and in advance of and beyond curve.

Spacing for Delineator Posts on Tangents
(Two Lane - Two Way Traffic)



* Spacing may be varied as required by plans.

Typical Installation at Bridge Approaches

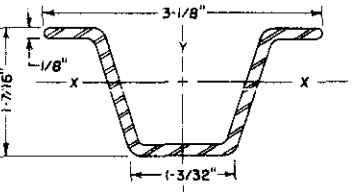


Where curb to curb width of bridge is equal to or greater than roadway width plus usable shoulder width, use this delineator only and omit all others.
Note: Where guard rail is present, place delineators outside of guard rail and at height which will permit clear view of all three Delineator buttons.

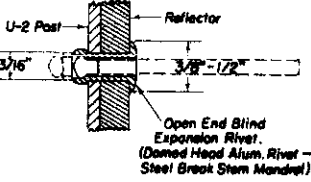
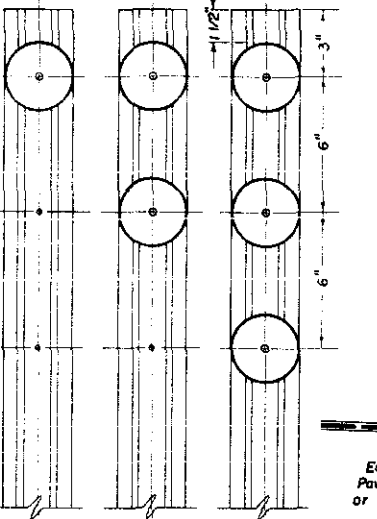
When approach slab has curb, place Type III delineator immediately behind curb.

SECTION OF U-2 POST

Dimensions shown are approximate.
U-2 Post to weigh 2 Lbs./Ft.
Alternate post acceptable if section modulus is at least 0.200 in.³ about X-X axis or at least 0.250 in.³ about Y-Y axis.
A mill tolerance of minus 3-1/2% of the weight of any one post will be allowed.



3/16" diam. Blind Rivet (Hole 13/64" diam.)



DETAIL
RIVETING REFLECTOR TO POST

- TYPE I
1-3" diam. Crystal Reflectors on U-2 Post
- TYPE II
2-3" diam. Yellow Reflectors on U-2 Post
- TYPE III
3-3" diam. Yellow Reflectors on U-2 Post

Min. 3 holes in all posts required as shown.

COLORADO
DEPARTMENT OF HIGHWAYS

DELINEATORS

Designed by CKM
Made by WNC
Checked by LEO

Approved by J. E. Zuber
Engineer, Surveying Plans
Date: October 19, 1962