FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F 004-1 (12)	1	

4.0112 D

INDEX OF SHEETS

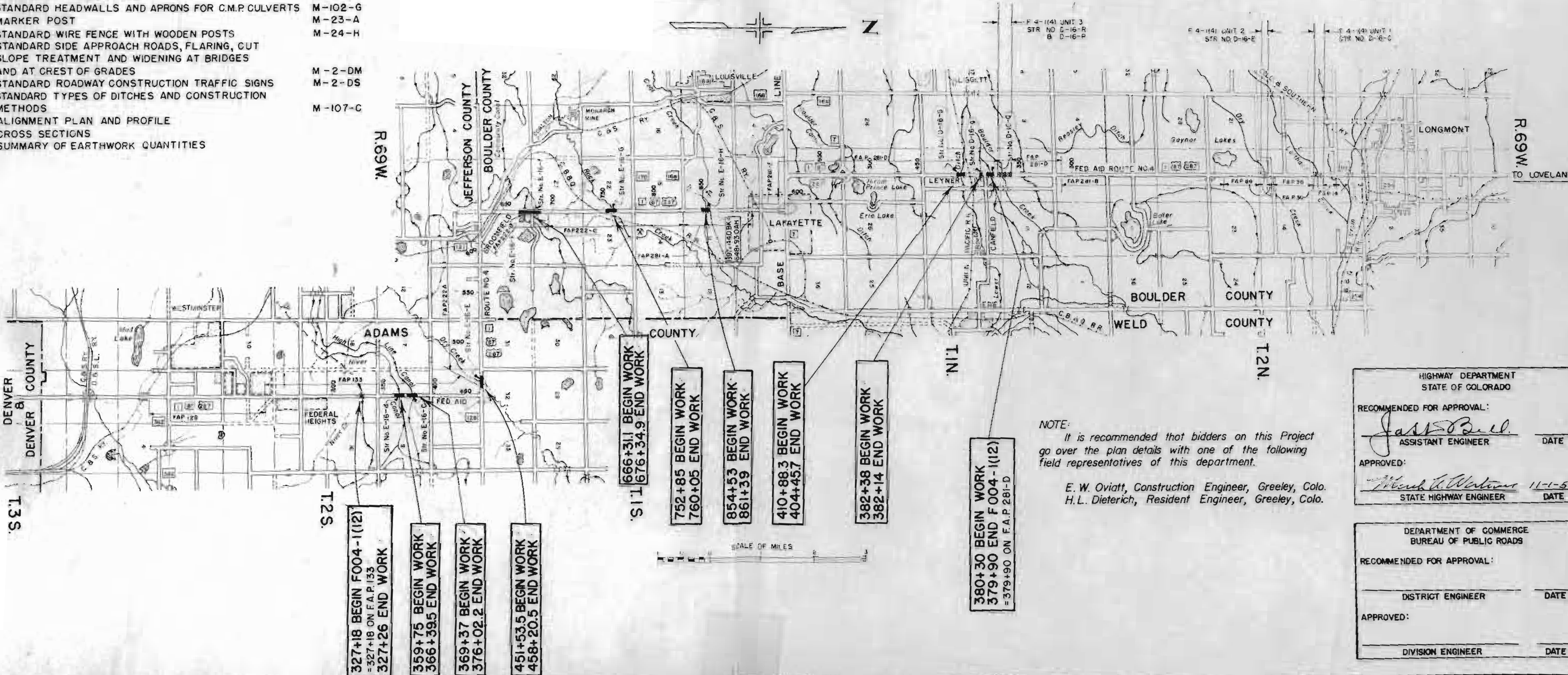
COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. F004-1(12)
STATE HIGHWAY NO. 1
ADAMS AND BOULDER COUNTIES

CONVENTIONAL SIGNS

CENTER LINE — TITLE SHEET
RIGHT-OF-WAY LINE
COUNTY LINE
TOWNSHIP OR RANGE LINE — T. 6 S. R. 89 W. / T. 7 S. R. 89 W.
SECTION LINE
QUARTER SECTION LINE
PROPERTY OR TRACT LINE
RAILROAD
BARBED WIRE FENCE
WOVEN WIRE-COMBINATION FENCE
BOARD FENCE
TELEPH. & TELEG. LINE
POWER LINE

SCALES OF ORIGINAL TRACINGS
ON PLAN, 1 IN. - 100 FT.
ON PROFILE 1 IN. - 100 FT. HORIZONTAL
1 IN. - 10 FT. VERTICAL
GROUND LINE ON PROFILE IS SHOWN AS GRADE OF PRESENT ROAD
GROSS LENGTH OF PROJECT 83,774.9 FT. = 15.866 MI.
NET LENGTH OF PROJECT 5121.1 FT. = 0.970 MI.



NOTE: *It is recommended that bidders on this Project go over the plan details with one of the following field representatives of this department.*

E. W. Oviatt, Construction Engineer, Greeley, Colo.
H. L. Dieterich, Resident Engineer, Greeley, Colo.

HIGHWAY DEPARTMENT
STATE OF COLORADO

RECOMMENDED FOR APPROVAL:
J. S. Bell — ASSISTANT ENGINEER — DATE

APPROVED:
Mark U. Watrous — STATE HIGHWAY ENGINEER — 11-1-50 — DATE

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

RECOMMENDED FOR APPROVAL:
DISTRICT ENGINEER — DATE

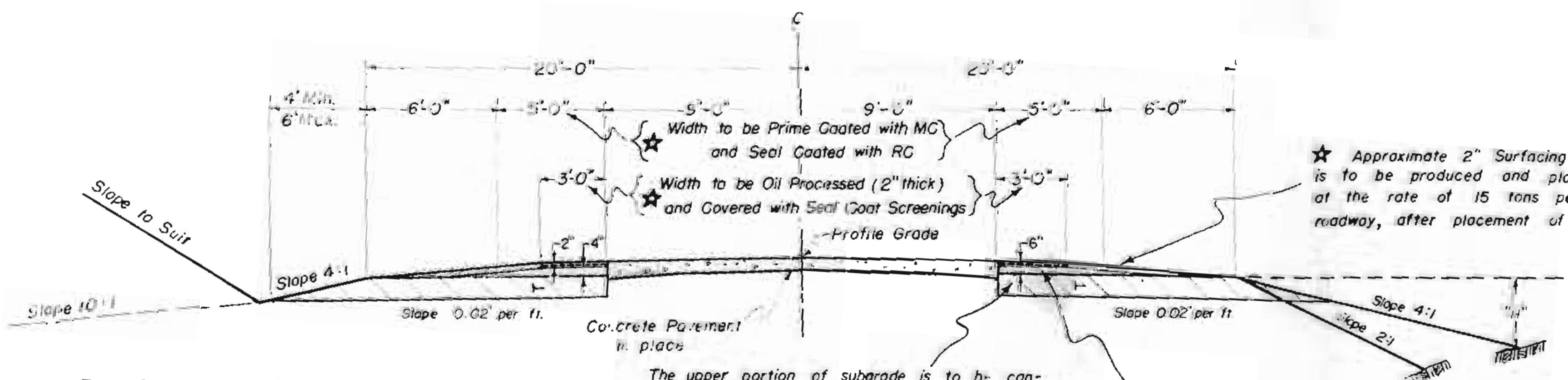
APPROVED:
DIVISION ENGINEER — DATE

FED. ROAD DIV. NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 004-1(E)	2	

NOTE: See Standard M-2 DM for details of cut slope treatment, flaring, and widening for guard fence and / or marker posts.

TYPICAL CROSS SECTION

FILL SLOPES
4:1 When "H" is 3 ft. or less.
2:1 When "H" is over 3 ft.



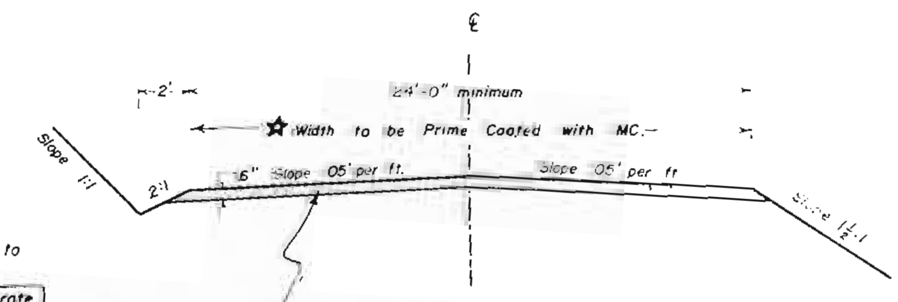
☆ Approximate 2" Surfacing for shoulder areas is to be produced and placed by State Forces at the rate of 15 tons per 100 lin. ft. of roadway, after placement of the Oil Mat.

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

The upper portion of subgrade is to be constructed of Ballast Material at locations designated in Ballast Material Tabulation. Estimated quantities involved in this operation and thickness of material required are tabulated on sheet No. 8.

6" Compacted Thickness of Gravel or Crushed Rock Surfacing to be placed in two courses.
☆ Approximate 2" Top Course Surfacing to be placed at the rate of 0.10 tons per square yard of Roadway.
Approximate 4" Bottom Course Surfacing to be placed at the rate of 0.20 tons per square yard of Roadway.

TYPICAL CROSS SECTION FOR DETOURS



6" compacted thickness of Detour Surfacing to be placed at the rate of approximately ☆ Cu. Yds. per 100 lin. ft. of roadway

GENERAL NOTES

This Project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted January 1, 1948.

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

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

All corrugated Metal Pipe Cross Culverts shall be laid without Headwalls or Metal Aprons unless otherwise noted on the plans.

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

Culverts projecting from embankments shall be covered with approximately 6 inches of embankment material in such a manner that a minimum of pipe shall be exposed in the completed work. This shall be accomplished by warping embankment slopes around and adjacent to the culvert. This operation does not apply to detour structures.

Right of Way fences, including line posts, shall be constructed approximately 6 inches inside the boundary of the Highway Right of Way as shown on the plans.

No overhaul will be allowed or paid for as a separate item on this project. The cost of all hauling shall be included in the contract bid prices of the items involved.

During construction of project traffic will be served by detour roadways in accordance with details indicated on plans. Items of work in detour will be measured and paid for in accordance with plan details.

☆ STATE FORCES

It is estimated that rolling of the Oil Processed Material with a Flat Wheeled Roller will be necessary on this project after compaction with a Rubber Tired Roller.

At Bridge Approaches, the Oil Processing shall be widened to meet the curbed width of the bridge and shall take place gradually over a distance 300 ft. each way from the concrete approach slabs at the bridge ends or when necessary, within the limits of the work.

Asphaltic Road Material MC is to be used for prime coat over the width shown on the Typical Section previous to placing of Oil Processed Material. Grade of MC oil is to be determined by the Engineer.

Asphaltic Road Material MC-3 is to be used for processing oil mat on this project.

Asphaltic Road Material RC is to be used for Seal Coat over the entire processed area. Grade of RC oil is to be determined by the Engineer.

All side approach roads to the project shall be primed and seal coated to approximately 50 ft. out from edge of the oil mat or to the Right of Way line, whichever is less.

Stone Screenings for this project shall conform to the requirements for Stone Screenings (Type I) of the Specifications.

When bridges are opened to traffic, the detour surfacing shall be taken off and used to widen the roadway at the bridge approaches as per Standard M-2-DM, see sheet No 33 of the plans. Any extra surfacing not needed for this widening shall be disposed of along the shoulder of the present road as directed by the Engineer. The payment for this operation will be at the contract unit price for "Unclassified Excavation".

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Rev. 11-29-50 [illegible] Item 10a deleted

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	ROADWAY	BRIDGE STA 372+	BRIDGE STA 454+	BRIDGE STA 756+	BRIDGE STA 857+	BRIDGE STA 407+			PROJECT TOTALS
	CONTRACT ITEMS										
11a	Removal of Portions of Present Str. Sta. 327+	Lump Sum	●								●
11b	Removal of Portions of Present Str. Sta. 362+	Lump Sum	●								●
11c	Removal of Portions of Present Str. Sta. 372+	Lump Sum		●							●
11d	Removal of Portions of Present Str. Sta. 454+	Lump Sum			●						●
11e	Removal of Portions of Present Str. Sta. 756+	Lump Sum				●					●
11f	Removal of Portions of Present Str. Sta. 857+	Lump Sum					●				●
11g	Removal of Portions of Present Str. Sta. 407+	Lump Sum						●			●
11h	Removal of Portions of Present Str. Sta 380+	Lump Sum	●								●
11j	Removal of Bridge, Sta. 669+	Lump Sum	●								●
11k	Removal of Bridge, Sta. 673+	Lump Sum	●								●
11m	Remove Headwall and Cut Keyway	Each	2								2
11n	Removal of 19 Structures	Lump Sum	●								●
11p	Removing Guard Posts	Each	48								48
12x	Removing Guard Fence	Lin. Ft.	214								214
11q	Removing Concrete Pavement	Sq. Yd.	170								170
12a	Removing Fence	Lin. Ft.	9400								9400
12b	Removing and Rebuilding Fence	Lin. Ft.	100								100
13c	Unclassified Excavation	Cu. Yd.	21,100		100	800					22,000
13d	Unclassified Ditch Excavation	Cu. Yd.	300								300
14a	Dry Rock Excavation (Str.)	Cu. Yd.	95	10	10	10	10	5			140
14b	Dry Common Excavation (Str.)	Cu. Yd.	360	70	170	130	180	50			960
14c	Wet Rock Excavation (Str.)	Cu. Yd.	30	10	10	10	10	10			80
14d	Wet Common Excavation (Str.)	Cu. Yd.	120	85	85	55	670	25			1040
16a	Structure Backfill (Class 1)	Cu. Yd.	485	80	180	25	730	90			1590
16d	Mechanical Tamping	Hour	85	8	20	3	75	9			200
17ax	Rolling with Tamping Roller (2 Unit)	Hour	30								30
17ay	Rolling with Tamping Roller (4 Unit)	Hour	20								20
17b	Rolling with Flat Wheeled Roller	Hour	50								50
17dx	Furnishing Tamping Roller (2 Unit)	Each	1								1
17dy	Furnishing Tamping Roller (4 Unit)	Each	1								1
17e	Furnishing Flat Wheeled Roller	Each	1								1
17g	Wetting	M. Gal.	540								540
23a	Ballast (Class 1)	Ton	3300								3300
23b	Ballast (Class 2)	Ton	10,800								10,800
26c	Gravel or Crushed Rock Surfacing (Grading C)	Ton	1500								1500
26x	Detour Surfacing	Cu. Yd.	1000								1000
37a	Concrete Pavement	Sq. Yd.	70								70
37c	Sand Cushion	Cu. Yd.	30								30
44a	Miscellaneous Untreated Timber	M ft bm	0.1								0.1
46a	Class "A" Concrete	Cu Yd	394	100	108	81	248	46			977
46b	Class "B" Concrete	Cu. Yd.	1								1
47	Reinforcing Steel	Lb	40,440	9190	7930	8600	26,380	3860			96,400
48	Structural Steel	Lb.	9700	3220	12,300	7400	4680	3500			40,800
48a	Present Steel Reused Sta. 362+	Lump Sum	●								●
53a	15" Corrugated Metal Culvert Pipe	Lin. Ft.	32								32
53b	18" Corrugated Metal Culvert Pipe	Lin. Ft.	156								156
53c	24" Corrugated Metal Culvert Pipe	Lin. Ft.	36								36
53d	30" Corrugated Metal Culvert Pipe	Lin. Ft.	26								26
53g	48" Corrugated Metal Culvert Pipe	Lin. Ft.	344								344
60a	Treated Timber Piling	Lin. Ft.			880						880
60e	Metal Pile Shoes	Each			44						44
60x	Drilling Holes to Facilitate Pile Driving	Lin. Ft.			100						100
61a	Steel Piling 8P-12@53#	Lin. Ft.				560					560
67a	Riprap	Cu. Yd.				140					140
76a	Barbed Wire Fence with Treated Wooden Posts	Lin. Ft.	8700								8700
76d	Combination Wire Fence with Treated Wooden Posts	Lin. Ft.	700								700
76g	Barbed Wire Gates	Each	9								9
80c	Sheet Copper	Lb.				1.0					1.0
89a	Drain Pipe (Concrete Floor) (4"ø x 2'-0")	Each	2		4	8	4	4			22
89ax	Drain Pipe (Concrete Floor) (4"ø x 3'-0")	Each		4							4
94	Marker Posts	Each	128								128
126a	15" Slide Headgates (6' Frame)	Each	1								1
	WORK BY STATE FORCES										
17b	Rolling with Flat Wheeled Roller	Hour	10								10
17c	Rolling with Rubber Tired Roller	Hour	10								10
17e	Furnishing Flat Wheeled Roller	Each	1								1
17f	Furnishing Rubber Tired Roller	Each	1								1
17g	Wetting	M Gal.	10								10
26c	Gravel or Crushed Rock Surfacing (Grading C)	Ton	1300								1300
30j	Asphaltic Road Material MC-3	Gal.	9700								9700
30x	Asphaltic Road Material MC	Gal.	5500								5500
30y	Asphaltic Road Material RC	Gal.	2000								2000
31a	Road Mix Oil Processing	Sq. Yd.	4730								4730
31c	Stone Screenings (Type 1)	Ton	60								60
81a	Project Markers	Each	2								2
	FORCE ACCOUNT										
	2-Reflectorized R.R. Crossbuck signs Sta 859+ (Work by C.B. & Q. R.R. Co Forces)	Lump Sum	●								●
	RIGHT OF WAY (NON FED. AID)										
	Right-of-Way Entire Project	Lump Sum	●								●

FED. ROAD DIV. NO.	DISTRICT	PROJ. NO.	SHEET NO	TOTAL SHEETS
9	COLO.	F 004-1 (12)	4	

TABULATION OF MARKER POSTS

STATION TO STATION			SIDE	SPACING	NO.
362 +31.0	to	362 +92.0	Rt. & Lt.	Bridge	10
363 +22.5	to	363 +83.5	Rt. & Lt.	Bridge	10
371 +91.0	to	372 +52.0	Rt. & Lt.	Bridge	10
372 +87.2	to	373 +48.2	Rt. & Lt.	Bridge	10
454 +07.5	to	454 +68.5	Rt. & Lt.	Bridge	10
455 +05.5	to	455 +66.5	Rt. & Lt.	Bridge	10
669 +38.5			Rt. & Lt.	Culvert	2
673 +22.0			Rt. & Lt.	Culvert	2
755 +41.0	to	756 +02.0	Rt. & Lt.	Bridge	10
756 +88.0	to	757 +49.0	Rt. & Lt.	Bridge	10
857 +09.0	to	857 +70.0	Rt. & Lt.	Bridge	10
858 +22.0	to	858 +83.0	Rt. & Lt.	Bridge	10
408+42.3	to	407 +81.3	Rt. & Lt.	Bridge	10
407 +52.7	to	406 +91.7	Rt. & Lt.	Bridge	10
382 +26.0			Rt. & Lt.	Culvert	2
380 +10.0			Rt. & Lt.	Culvert	2
PROJECT TOTAL					128

TABULATION OF LENGTH AND DESIGN

STATION	ROADWAY	BRIDGES		NO-WORK SECTIONS
	LIN. FT.	LIN. FT.	LOADING	LIN. FT.
327+18 BEGIN F.004-1(12) = 327+18 on F.A.P.133				
327+26 End Work	8.0			
359+75 Begin Work				3249.0
366+39.5 End Work	664.5			
369+37 Begin Work				297.5
372+55 } Bridge	318.0			
372+84.2 }		29.2	H-20-44	
376+02.2 End Work	318.0			
451+53.5 Begin Work				7551.3
454+71.5 } Bridge	318.0			
455+02.5 }		31.0	H-20-44	
457+00 = End F.A.P. 133 = Begin F.A.P. 222-A	197.5			
458+20.5 = End Work	120.5			
601+50 = End F.A.P. 222-A = Begin F.A.P. 222-B				14,329.5
619+92.6 Bk. = 620+00 Ah. } EQUATION				1842.6
633+10.9 Bk. = 633+14.0 Ah. } EQUATION				1310.9
639+64.3 Bk. = 639+92.4 Ah. } EQUATION				650.3
640+07.7 Bk. = 640+38.6 Ah. } EQUATION				15.3
666+31.1 Begin Work				2592.5
676+34.9 End Work	1003.6			
681+97.9 Bk End F.A.P 222-B = 682+00 Ah. Begin F.A.P. 222-C } EQ				563.0
752+85 Begin Work				7085.0
756+05 } Bridge	320.0			
756+85 }		80.0	H-20-44	
760+05 End Work	320.0			
831+40 = End F.A.P. 222-C Begin F.A.P 281-A				7135.0
854+53 Begin Work				2313.0
857+73 } Bridge	320.0			
858+19 }		46.0	H-20-44	

STATION	ROADWAY	BRIDGES		NO-WORK SECTIONS
	LIN FT	LIN FT.	LOADING	LIN. FT.
861+39.0 End Work	3200			3605.0
897+44 Bk. = 648+93.0 Ah End F.A.P.281-A = End F.A.P. 281-E				3423.8
614+69.2 Ah. = 614+25.9 Bk. } EQUATION				875.9
605+50.0 = Begin F.A.P 281-E = End F.A.P. 281-D				2084.0
584+66.0 Ah. = 584+26.8 Bk. } EQUATION				17338.5
410+88.3 Begin Work	310.0			
407+78.3 } Bridge		22.6	H-20-44	
407+55.7 }	310.0			
404+45.7 End Work				2207.7
382+38.0 Begin Work	24.0			
382+14.0 End Work				184.0
380+30.0 Begin Work	40.0			
379+90.0 END F.004-1(12) = 379+90.0 on F.A.P. 281-D				
TOTALS	4912.3	208.2		78,653.8

SUMMARY

	LIN FT.	MILES
F.004-1(12) Roadway	4912.3	0.930
F.004-1(12) Bridges	208.8	0.040
SUB TOTAL – Roadway and Bridges	5121.1	0.970
No-Work Sections	78,653.8	14.896
TOTAL F.004-1(12) Roadway, Bridges and No-Work Section	83,774.9	15.866

DESIGN DATA

Maximum Degree of Curve	None
Maximum Grade	5.00%
Minimum N.P.S.D. Horizontal	>1300'
Minimum N.P.S.D. Vertical	570'
Maximum Design Speed	60 M.P.H.

FENCING REQUIREMENTS

STATION	SIDE	REMOVE FENCE	☆ BUILD BARB. WIRE FENCE	☆ BUILD COMB. FENCE	REMOVE & REBUILD FENCE	GATES		
						BARBED WIRE		
		LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.			
362+85 to 372+65	Lt.	995						
371+50	Lt.					1		
373+15 to 376+00	Lt.	310						
373+35	Lt.					1		
362+85 to 373+15	Lt.		980					
	Lt.							
373+15 to 376+00	Lt.		285					
360+80 to 369+80	Rt.	975						
369+80 to 369+80	Rt.		975					
452+00 to 458+00	Lt.	600						
432+00 to 458+00	Lt.		640					
454+50 to 458+00	Rt.	335						
454+50 to 454+85	Rt.			50				
454+85 to 458+00	Rt.		310					
667+00 to 669+60	Lt.	240						
669+80 to 670+50	Lt.				70			
670+85 to 672+10	Lt.		125					
672+10 to 673+80	Lt.	150						
673+50	Lt.					1		
667+00 to 669+60	Lt.		240					
670+85 to 672+10	Lt.			130				
672+10 to 673+60	Lt.		150					
667+00 to 672+10	Rt.	575						
667+00 to 672+10	Rt.			510				
670+00	Rt.					1		
673+70 to 676+00	Rt.	230						
673+70 to 676+00	Rt.		230					
752+00 to 761+00	Lt.	920						
752+00 to 761+00	Lt.		905					
752+00 to 761+00	Rt.	900						
752+00 to 761+00	Rt.		905					
856+50 to 857+70	Lt.	175						
856+20 to 857+70	Lt.		145					
858+35 to 859+40	Lt.	130						
858+20 to 859+40	Lt.		120					
859+85 to 861+00	Lt.	135						
859+90 to 861+00	Lt.		110					
856+60 to 861+00	Rt.	485						
856+60 to 861+00	Rt.		455					
860+30	Rt.					1		
410+60 to 409+10	Lt.	150						
408+80 to 404+50	Lt.	470						
408+70	Lt.					1		
407+15	Lt.					1		
410+60 to 409+10	Lt.		155					
408+80 to 404+50	Lt.		475					
410+60 to 404+50	Rt.	610						
410+60 to 404+50	Rt.		620					
408+70	Rt.					1		
407+25	Rt.					1		
383+20 to 377+00	Lt.	620	605					
380+05 to 378+60	Rt.	145						
		X	X	X	X			
PROJECT TOTALS		9330	8630	690	70	9☆		

☆ Estimated 50 Date Nails furnished and installed State Forces.

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LIST OF STRUCTURES

STATION	DESCRIPTION	REMOVE STRUCTURE NO.	REMOVE STRUCTURE KIND	REMOVE CONCRETE PAVEMENT SQ. YDS.	EXCAVATION CU. YDS. UNCL.	EXCAVATION CU. YDS. EMBANK	EXCAVATION CU. YDS. UNCL. DITCH	CONCRETE PAVEMENT SQ. YDS.	STRUCTURAL EXCAVATION CU. YDS.	STRUCTURE BACKFILL CLASS 1 CU. YDS.	MECH. TAMP. HR.	GRAVEL OR CRUSHED ROCK SURF. TON	STRUCTURAL STEEL LBS.	CONCRETE CU. YDS. CLASS "A"	CONCRETE CU. YDS. CLASS "B"	REINFORCING STEEL LBS.	SAND CUSHION CU. YDS.	CORRUGATED METAL CULVERT PIPE LIN. FT. 15"	18"	24"	30"	48"	DETOUR SURFACING CU. YDS.	MISCELLANEOUS
327+18	Project Marker Rt.																							1-Project Marker Rt. (State Forces)
327+18 to 327+26	Remove Headwalls on 8'x20' C.B.C. & Fill Old Channel					20																		Remove Portions of Present Structure
361+00 to 365+00	Detour Rt.					790																	205	
	Remove Detour Rt.				995																			
363+	Double Cross Culvert for Detour Rt.																							
	Remove Double 48"x50' C.M.P. Rt.	2	C.M.P.																			50		
																						50		
362+75 to 362+95	Concrete Approach Slabs Lt. & Rt. (Details on Sh. 9 & 10)								10					6.5		980	1.5							
362+95 to 363+19.5	Remove Portions of Present Structure. Widen Bridge (Details on Sheets 9 & 10)								230	180	18		5400	85		6780								Reuse 11.300" Present Steel Remove Portions of Present Structure 2-Drain Pipes (Concrete Floor) 4'ϕx2'-0"
363+19.5 to 363+39.5	Concrete Approach Slabs Lt. & Rt. Details on Sh. 9 & 10)								10					6.5		980	1.5							
363+	Remove Headgate Rt.	1	Hdgate																					
363+ to 366+	Irrigation Ditch Change Rt. (W=2')					310	67																	
363+30	Remove 15"x28' V.C.P. Rt.	1	V.C.P.																					
	C.M.P. Rt. with Type "A" Headwall and 15" Slide Headgate at Inlet (Frame Height 6'-0")								6		2				090				32					15" Slide Headgate (Frame Height 6'-0") Calco No. 101 or Equivalent
363+80	Remove Weir Rt.	1	Weir																					
	Weir in Irrigation Ditch Rt. (Details on Sheet 26)								2	2	1			1.24		127								
371+00 to 375+00	Detour Rt.					650																	190	
	Remove Detour Rt.				840																			
372+37 to 372+55	Concrete Approach Slabs Lt. & Rt. (Details on Sh. 11 & 12)								5					6.08		801	1.3							
372+55 to 372+84.2	Remove Portions of Present Structure Widen Bridge (Details on Sheets 11 & 12)								(Quantities in Summary)															
372+50	Cross Culvert For Detour Rt.																							
	Remove 48" x 44' C.M.P. Rt.	1	C.M.P.																			44		
372+84.2 to 373+02.2	Concrete Approach Slab (Details on Sh 11 & 12)								13					16.92		2229	3.7							
	Remove Concrete Pavement			36																				
373+34	Cross Culvert & Ditches For Detour Rt.						10												36					
	Remove 18" x 36' C.M.P. Rt.	1	C.M.P.																					
454+53.5 to 454+71.5	Concrete Approach Slabs Lt. & Rt. (Details on Sh. 13 & 14)								7	1				5.50		880	1.5							
454+71.5 to 455+02.5	Remove Portions of Present Structure. Widen Bridge. Channel Improvement (Details on Sheets 13 & 14)								(Quantities in Summary)															
455+02.5 to 455+20.5	Concrete Approach Slabs Lt. & Rt. (Details on Sh. 13 & 14)								6	1				5.50		880	1.5							
666+ to 669+	Irrigation Ditch Change Rt. (W=2')					70	50																	
668+50 to 674+00	Detour Rt.					1100																	260	
	Remove Detour Rt.				1360																			
669+50	Double Cross Culvert For Detour Rt.																							
	Remove Double 48" x 48' C.M.P. Rt.	2	C.M.P.																			48		
669+	Remove 12 Guard Posts Lt. & Rt.																					48		Remove 12 Guard Posts
669+27.1 to 669+31.1	Remove Concrete Pavement			8																				
	Concrete Pavement (Details on Sheet 15)							8									0.5							
669+31.1 to 669+46.0	Remove Bridge																							Remove Bridge
	Concrete Box Culvert (Details on Sheet 15)								75	65	7		2190	75.00		6385								
669+46.0 to 669+50.0	Remove Concrete Pavement			8													0.5							
	Concrete Pavement (Details on Sheet 15)							8																

(CONT'D ON SHEET 7)

FED. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F004-1(12)	7	

LIST OF STRUCTURES

(CONT'D FROM SHEET 6)

STATION	DESCRIPTION	REMOVE STRUCTURE NO.	REMOVE STRUCTURE KIND	REMOVE CONCRETE PAVEMENT SQ. YDS.	EXCAVATION CU. YDS. UNCL.	EXCAVATION CU. YDS. EMBANK.	EXCAVATION CU. YDS. UNCL. DITCH.	CONCRETE PAVEMENT SQ. YDS.	STRUCTURAL EXCAVATION CU. YDS.	STRUCTURE BACKFILL CLASS I CU. YDS.	MECH. TAMP. HR.	GRAVEL OR CRUSHED ROCK SURF. TON	STRUCTURAL STEEL LBS.	CONCRETE CU. YDS. CLASS 'A'	CONCRETE CU. YDS. CLASS 'B'	REINFORCING STEEL LBS.	SAND CUSHION CU.YDS.	CORRUGATED METAL CULVERT PIPE LIN. FT. 15"	18"	24"	30"	48"	DETOUR SURFACING CU. YDS.	MISCELLANEOUS
669+70	Remove 12"x 18' V.C.T. Lt.	1	V.C.T.																					
	Side Drain & Road Approach Lt.					5			2	7	1	10							26					
670+00	Remove 15"x 20' C.M.P. Rt.	1	C.M.P.																					
	Side Drain & Road Approach Rt.					35			3	7	1	10							34					
670+70	Remove 15"x 20' C.M.P. Lt.	1	C.M.P.																					
	Side Drain & Road Approach Lt.					10			4	7	1	10							30					
672+10	Remove 10"x 12' V.C.P. Rt.	1	V.C.P.																					
	Remove Weir Rt.	1	Weir																					
	Weir Rt (Details on Sheet 26)								2	2	1			1.34		140								.007 M.ft.bm. of Misc. Untr. Timber
	Division Box Rt. (Details on Sheet 27)								2	2	1			1.22		116								.007 M.ft. bm. of Misc. Untr. Timber
672+10	Cross Culvert For Detour Rt.																							
	Remove 24"x 36' C.M.P. Rt.	1	C.M.P.																		36			
672+40	Road Approach Rt.					95						55												
673+09.1 to 673+15.1	Remove Concrete Pavement			12										2.25		490	0.5							
	Concrete Approach Slab (Details on Sh. 16)																							
673+15.1 to 673+28.9	Remove Bridge																							Remove Bridge
	Concrete Box Culvert (Details on Sheet 16)								45	30	3		2110	56.00		5230								
673+28.9 to 673+34.9	Remove Concrete Pavement			12										2.25		490	0.5							
	Concrete Approach Slab (Details on Sheet 16)																							
673+40	Cross Culvert For Detour Rt.																					38		
	Remove 48"x 38' C.M.P. Rt.	1	C.M.P.																					
673+55	Remove 15"x 22' C.M.P. Lt.	1	C.M.P.																					
	Side Drain & Road Approach Lt.					10			4	7	1	10							30					
755+85 to 756+05	Remove Concrete Pavement			40										17.50		2528	3.6							
756+05 to 756+85	Concrete Approach Slab (Details on Sh. 17 & 18)								14															
	Remove Portions of Present Structure and Cut Keyways. Widen Bridge Channel Improvement. (Details on Sheets 17 & 18)								(Quantities in Summary)															
756+85 to 757+05	Concrete Approach Slabs Lt. & Rt. (Details on Sheets 17 & 18)								6					7.00		1012	1.4							
857+53 to 857+73	Concrete Approach Slabs Lt. & Rt. (Details Sh 19,20,21)								8					5.50		835	1.5							
857+73 to 858+19	Remove Portions of Present Structure Widen Bridge (Details on Sheets 19,20 & 21)								(Quantities in Summary)															
858+19 to 858+39	Concrete Approach Slabs Lt. & Rt. (Details on Sh. 19,20,21)								7					5.50		835	1.5							
857+ to 858+	Remove 214 lin ft of Guard Fence Lt. & Rt.																							Remove 214 lin. ft. of Guard Fence
410+50 to 407+80	Irrigation Ditch Change Rt. (W=2')						110																	
407+	Remove 20 Guard Posts Lt. & Rt.																							Remove 20 Guard Posts
408+88	Road Approach Lt.					15						10												
408+70	Remove 24"x 20' C.M.P. & 15"x 20' C.M.P. Rt.	2	C.M.P.																					
	Side Drain & Road Approach Rt.					15			5	9	1	10									26			
407+45.7 to 407+55.7	Concrete Approach Slabs Lt. & Rt. (Details on Sheets 22 & 23)								3					4.25		505	1							
407+55.7 to 407+78.3	Remove Portions of Present Structure. Widen Bridge. (Details on Sheets 22 & 23)								(Quantities in Summary)															
407+78.3 to 407+88.3	Concrete Approach Slabs Lt. & Rt. (Details on Sheets 22 & 23)								4					4.25		505	1							
407+33.5	Remove Headwalls, Cut Keyways & Extend 18"x 18"x 30' C.B.C. 4' Lt. & 4' Rt. (Details on Sheet 22)								33	30	3			6.00		670								Remove 2 Headwalls & Cut Keyways

(CONT'D. ON SHEET 8)

FED. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F004-(112)	8	

LIST OF STRUCTURES

(CONT'D. FROM SHEET 7)

STATION	DESCRIPTION	REMOVE STRUCTURE NO	REMOVE STRUCTURE KIND	REMOVE CONCRETE PAVEMENT SQ. YDS.	EXCAVATION CU. YDS. UNCL.	EXCAVATION CU. YDS. EMBANK	EXCAVATION CU. YDS. UNCL. DITCH	CONCRETE PAVEMENT SQ. YDS.	STRUCTURAL EXCAVATION CU. YDS. ✪	STRUCTURE BACKFILL CLASS ? CU. YDS.	MECH. TAMP HR.	GRAVEL OR CRUSHED ROCK SURF. TON	STRUCTURAL STEEL LBS.	CONCRETE CU. YDS. CLASS "A"	CONCRETE CU. YDS. CLASS "B"	REINFORCING STEEL LBS.	SAND CUSHION CU.YDS.	CORRUGATED METAL CULVERT PIPE LIN. FT. 15"	18"	24"	30"	48"	DETOUR SURFACING CU. YDS.	MISCELLANEOUS
384+ to 381+	Detour Rt					740																		
	Remove Detour Rt.				885																		145	
382+ to 378+	Detour Rt.					300																		
	Remove Detour Rt.				495																		195	
382+14 to 382+38	Remove Concrete Pavement			48																				
	Concrete Pavement (Details on Sheet 24)							48									3							
382+26	Concrete Box Culvert & Ditches (W=12)(Details on Sheet 24)				300				62	100	10			72.00		7020								
380+ to 379+	Remove 16 Guard Posts																							Remove 16 Guard Posts
380+30 to 379+90	Remove Portions of Present Structure & Fill Old Channel (Details on Sheet 25)					270					30													Remove Portions of Present Structure
380+10	Cross Culvert & Ditches (W=2')						10		29	34	3											66		
379+	Project Marker Rt.																							1-Project Marker (State Forces)
TOTALS		19		184	4875	4435	247	64	597	484	84	115	9700	39330	0.90	40,418	26	32	156	36	26	344	995	

✪ Structural Excavation is estimated to be 80% Common and 20% Rock; Each of which is estimated to be 75% Dry and 25% Wet.

SURFACING PLAN

Surfacing Material for the project shall be placed as indicated in the tabulation below. It shall be the Contractor's sole responsibility to furnish and place Material conforming to the specifications for the project. No Overhaul will be allowed or paid for on this item. Alteration of the plan as here outlined will be allowed only on written permission from the Department.

MATERIAL TO BE PLACED			TONS USED ✪ TOP COURSE GRADING "C"	☆ SHOULDER COURSE GRADING "C"	BOTTOM COURSE GRADING "C"
327+18.0	to	327+26.0	1	1	2
359+75.0	to	362+75.0	30	48	88
363+39.5	to	366+39.5	30	48	88
369+37.0	to	372+37.0	30	48	88
373+02.2	to	376+02.2	30	48	88
451+53.5	to	454+53.5	30	48	88
455+20.5	to	458+20.5	30	48	88
666-31.1	to	669+31.1	30	46	88
669+46.0	to	673+15.1	50	59	124
673+34.9	to	676+34.9	30	47	88
752+85.0	to	755+85.0	30	48	88
757+05.0	to	760+05.0	30	48	88
854+53.0	to	857+53.0	30	48	88
858+39.0	to	861+39.0	30	48	88
410+88.3	to	407+88.3	30	47	88
407+45.7	to	404+45.7	30	47	88
382+34.0	to	382+18.0	1	2	4
380+30.0	to	379+90.0	3	6	10
Estimated for Road Approaches					115
TOTALS			475	734	1487

☆ To be produced and placed by State Forces

BALLAST PLAN

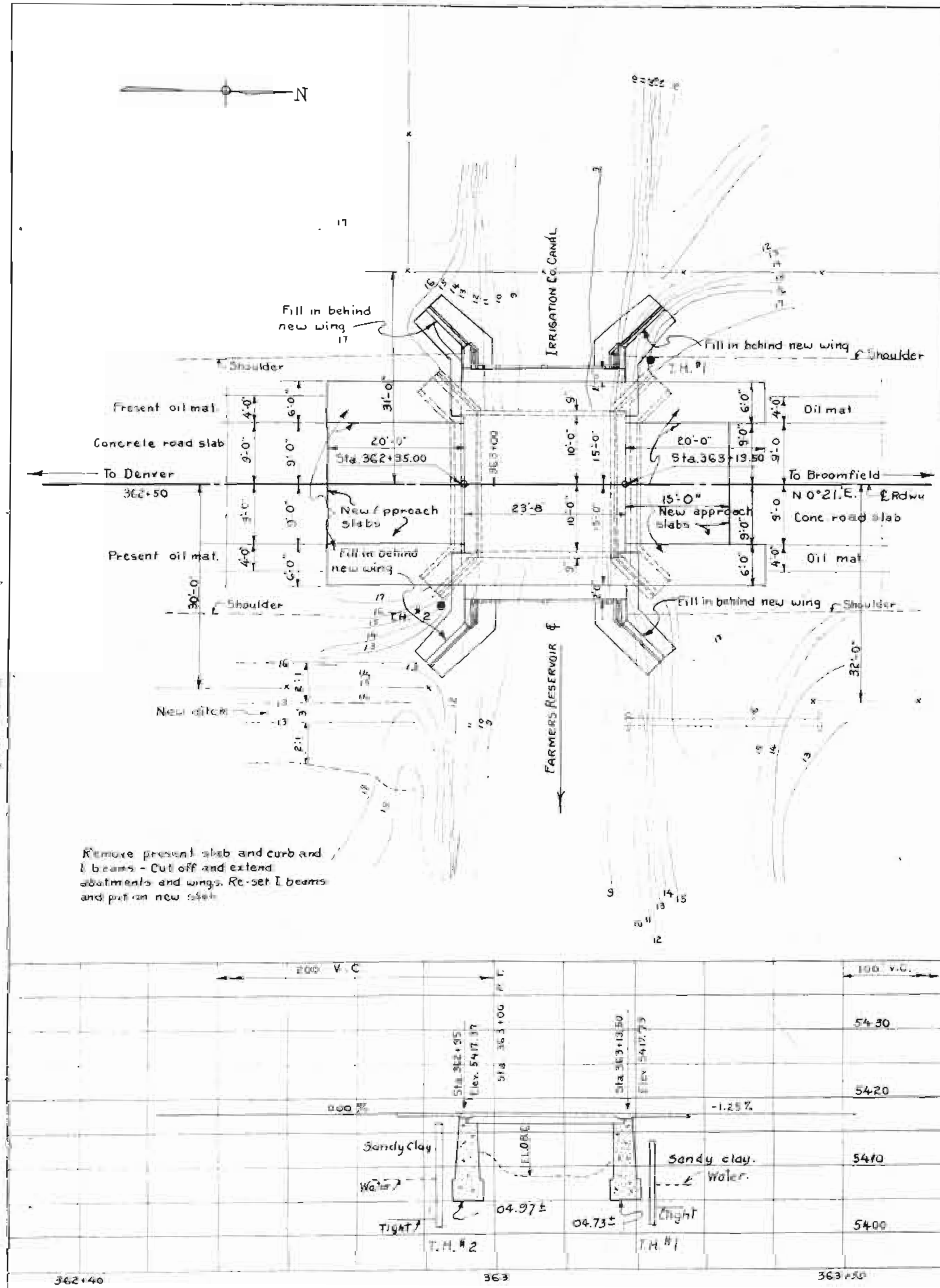
Ballast Material for the project shall be placed as indicated in the tabulation below. It shall be the Contractor's sole responsibility to furnish and place Material conforming to the Specifications for the project. No Overhaul will be allowed or paid for on this item. Alteration of the plan as here outlined will be allowed only on written permission from the Department.

MATERIAL TO BE PLACED			QUANTITY AND THICKNESS ▲ THICKNESS "T"	CLASS 1 THICKNESS	CLASS 1 TONS	CLASS 2 THICKNESS	CLASS 2 TONS
327+18.0	to	327+26.0	18"	4"	4	14"	20
359+75.0	to	362+95.0	18"	4"	205	14"	794
363+20.0	to	366+39.5	18"	4"	205	14"	743
369+37.0	to	372+55.0	18"	4"	166	14"	810
372+84.0	to	376+02.2	18"	4"	173	14"	752
451+53.5	to	454+71.5	18"	4"	185	14"	767
455+02.5	to	458+20.5	18"	4"	185	14"	706
666+31.1	to	669+31.1	18"	4"	153	14"	791
669+46.0	to	673+15.1	18"	4"	279	14"	1163
673+28.9	to	676+34.9	18"	4"	160	14"	716
752+85.0	to	756+05.0	18"	4"	171	14"	713
756+85.0	to	760+05.0	18"	4"	176	14"	655
854+53.0	to	857+73.0	18"	4"	178	14"	700
858+19.0	to	861+39.0	10"	4"	180	6"	308
410+88.3	to	407+78.3	8"	8"	387		
407+59.7	to	404+45.7	8"	8"	372		
382+34.0	to	382+18.0	18"	4"	16	14"	58
380+30.0	to	379+90.0	18"	4"	16	14"	90
Allowance for Irregularities					76		978
TOTALS					3287		10754

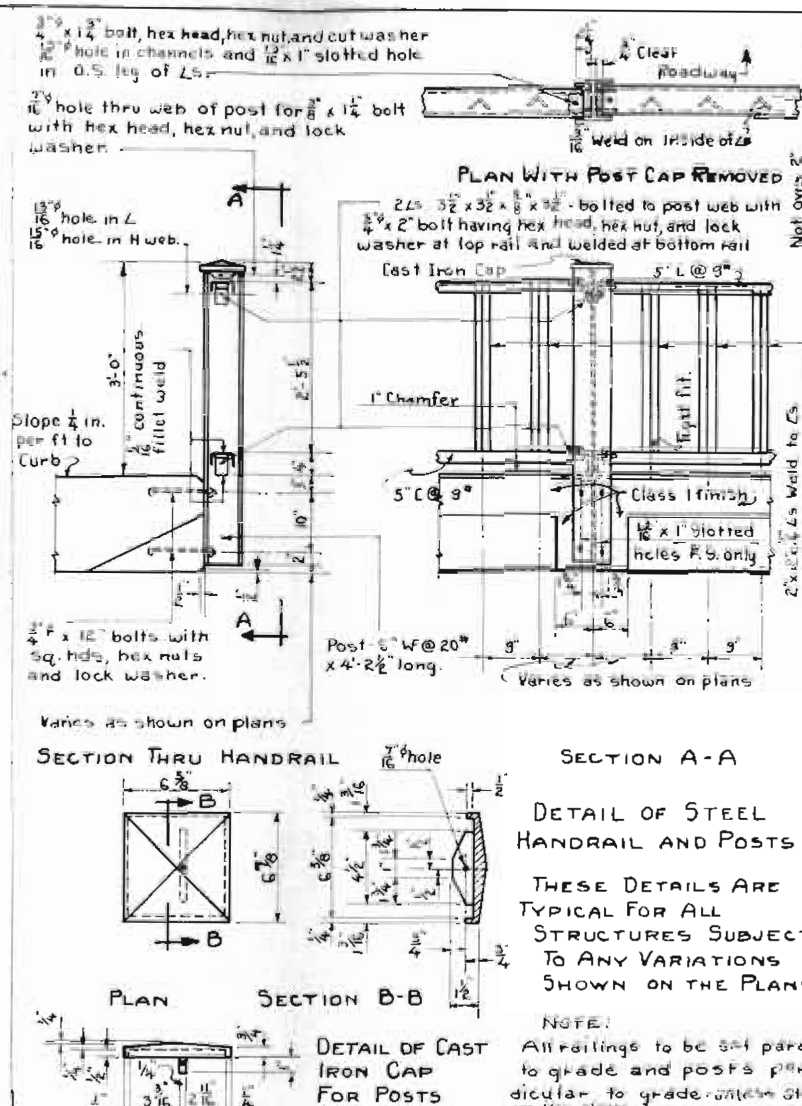
▲ Based on Thickness Curve "D" S.H.D. Design 12

Fed. Road Div. No.	State	Proj. No.	Sheet No.	Total Sheets
	Colo.	F 004 - 1 (12)	9	

Rev - H.W.V. - 3-2-51 - Changed Approach Slabs, Bar Lists and Quantities. and added seat and parapet to present Abutment.



General Layout



Note: All railings to be set parallel to grade and posts perpendicular to grade unless otherwise noted on the plans

Bar List Superstructure

Mark	No. Req'd	Size	Length	Type	ℓ	m	r	t
E 1	48	1/2"φ	32'-10"	I	31'-6"		2"	2"
E 2	48	1/2"φ	35'-2"	II				
D 1	49	1/2"φ	23'-5"	Str.				
S 1	8	1/2"φ	23'-5"	Str.				
S 2	12	1/2"φ	4'-0"	VII				
S 3	12	5/8"φ	5'-0"	VIII			2 1/2"φ	2"

Bar Summary Superstructure

4,695 Lin. ft. 1/2"φ bar @ 0.668#/' = 3136 Lbs
60 " " 5/8"φ " @ 1.043#/' = 63 "
3199 "
1% Overrun = 31 "
Total = 3220 "

Bar List Approach Slabs

Mark	No. Req'd	Size	Length	Type	ℓ	m	r	t
J 1	84	3/4"φ	20'-5"	VI	19'-5"		3"	2 1/2"
J 2	80	5/8"φ	5'-8"	Str.				
J 3	35	5/8"φ	17'-8"	Str.				
J 4	36	3/4"φ	15'-5"	VI	14'-5"		3"	2 1/2"

Bar Summary Approach Slabs

1072 Lin. ft. 5/8"φ bar @ 1.043#/' 1118 Lbs
2270 " " 3/4"φ " @ 1.502#/' 3410 "
4528 "
Plus 1% Overrun = 42 "
Total = 4570 "

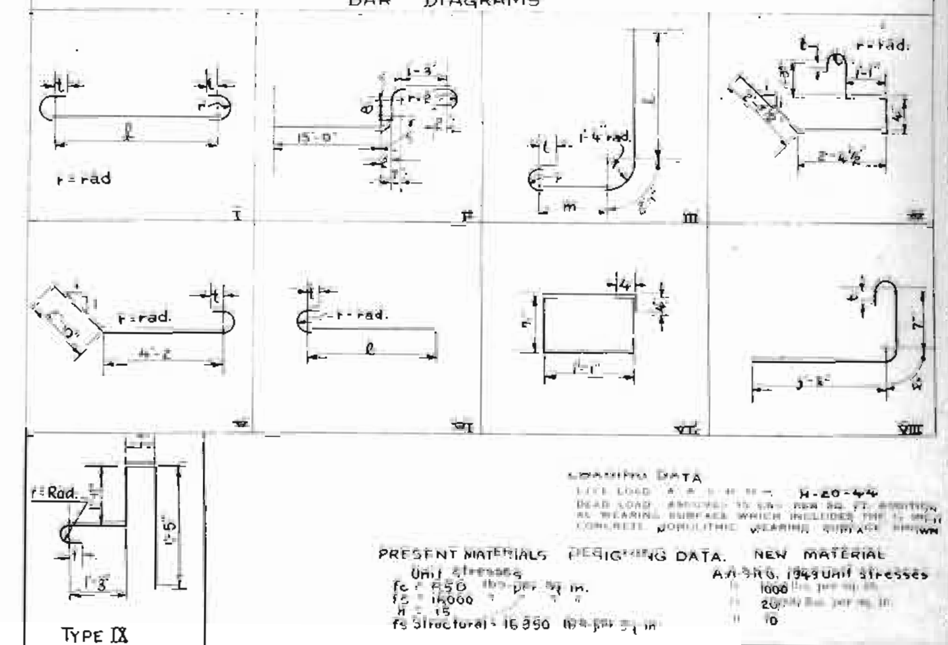
Bar List Abutment No. 1 and No. 2

Abut #2 Mark	Abut #2 Req'd	Abut #1 Mark	Abut #1 Req'd	Size	Length	Type	ℓ	m	r	t
K 1	24	A 1	24	5/8"φ	13'-2"	III	8'-6"	1'-5"	2 1/2"	2"
K 2	16	A 2	16	1/2"φ	9'-8"	Str.	field bend			
K 3	14	A 3	14	1/2"φ	6'-0"	Str.				
K 4	14	A 4	14	5/8"φ	8'-4"	IV			2 1/2"	2"
K 5	8	A 5	8	5/8"φ	7'-0"	V			2 1/2"	2"
K 6	10	A 6	10	1/2"φ	2'-9"	Str.				
K 7	4	A 7	4	5/8"φ	12'-11"	III	8'-6"	1'-6"	2 1/2"	2"
M 1	10	B 1	10	5/8"φ	15'-1"	III	10'-8"	1'-6"	2 1/2"	2"
M 2	10	B 2	10	5/8"φ	14'-4"	III	10'-2"	1'-3"	2 1/2"	2"
M 3	8	B 3	8	5/8"φ	7'-7"	III	4'-0"	0'-8"	2 1/2"	2"
M 4	10	B 4	10	5/8"φ	7'-8"	III	3'-6"	0'-7"	2 1/2"	2"
M 5	20	B 5	20	1/2"φ	7'-8"	Str.				
R 1	2	F 1	2	1/2"φ	19'-10"	Str.	field bend			
R 2	4	F 2	4	1/2"φ	18'-6"	Str.	field bend			
R 3	4	F 3	4	1/2"φ	17'-3"	Str.	field bend			
R 4	4	F 4	4	1/2"φ	15'-6"	Str.	field bend			
R 5	56	F 5	56	5/8"φ	4'-10"	VI	4'-0"		2 1/2"	2"
R 6	6	F 6	6	5/8"φ	5'-2"	VI	4'-4"		2 1/2"	2"
K 8	21	A 8	21	5/8"φ	5'-2"	IX			2 1/2"	2"
K 9	6	A 9	6	1/2"φ	21'-0"	Str.				
K 10	7	A 10	7	3/4"φ	2'-6"	Str.				

Bar Summary Abutment No. 1 and No. 2

790 Lin. Ft. 1/2"φ bar @ 0.668#/' = 528 Lbs
1376 " " 5/8"φ " @ 1.043#/' = 1435 "
18 " " 3/4"φ " @ 1.502#/' = 27 "
1990
1% Overrun = 20 "
Total Abutment No 1 = 2010 "
" " No 2 = 2010 "

Bar Diagrams



Summary of Quantities

Item	Description	Unit	Superst.	Abut #1	Abut #2	Appr. Slabs	Total
11 b	Remove portions of present struct.	Lump Sum					L.S.
14	Structural Excavation	Cu. Yd.		115	115	20	250
16a	Structure Backfill (Class I)	Cu. Yd.		90	90		180
16 d	Mechanical Tamping	Hr.		9	9		18
37c	Sand Cushion	Cu. Yd.				7	7
46a	Class "A" Concrete	"	18	36.0	36.0	30.5	120.5
47	Reinforcing Steel (Incl. 1% Overrun)	Lb.	3220	2010	2010	4570	11810
‡48	Structural Steel (Incl. 1% Overrun)	"	4340	530	530		5400
48a	Present Steel Reused (11,300)	Lump Sum	L.S.				L.S.
89a	Drain Pipes (Conc. Floor) 2'-0" long	Ea.	2				2
11a	Remove Present Conc. Pavem't.	Sq. Yd.				70	70
*	16 Ga. Galv. Sheet Metal	Sq. Ft.					
	1/2" Exp'n Jt. Mat'l.	"	7	22	22	83	134
	3/4" " " "	"	45				45

* Included in bid price of Class "A" Concrete
‡ Included handrail steel. Superst. 1730 Lbs, Abut #1 530 Lbs, Abut #2 530 Lbs
" " Total = 2790 Lbs.

Reference Drawing
Sheet No. 10 Details of superstructure, Abutments, and Wings

Structure No. E-16-d (Minor)

Loading Data
Live Load A.A.S.H.O. H-20-44

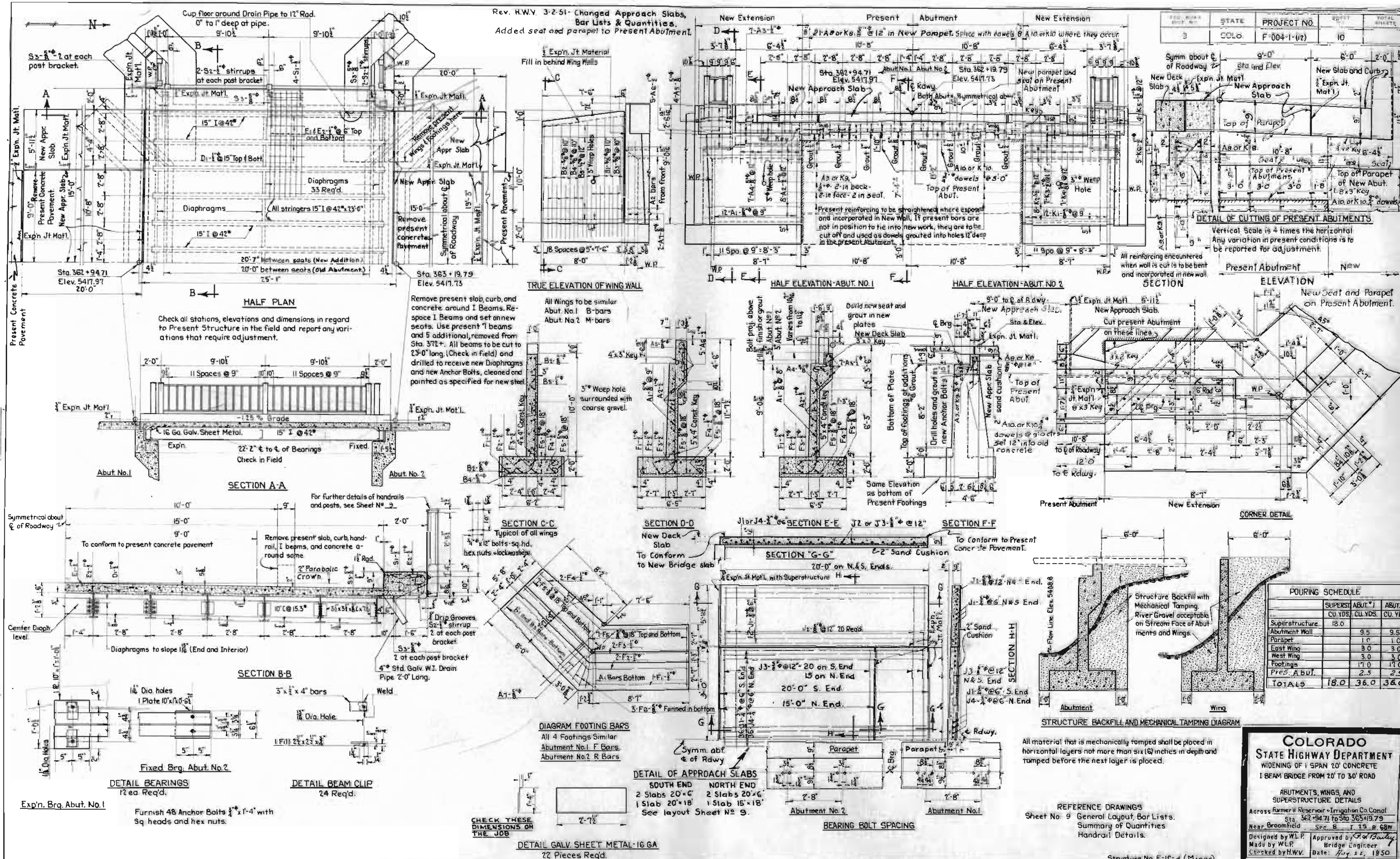
Present Materials Designing Data. New Material
Unit Stresses
fc = 850 lbs. per sq. in.
fs = 18000 " " " "
n = 15
fs Structural = 16 350 lbs. per sq. in.
AASHO, 1949 Unit Stresses
fc 1000 lbs. per sq. in.
fs 20000 lbs. per sq. in.
n 10

General Notes
All rivets to be 7/8" dia. All rivets to be power driven.

Colorado
State Highway Department
Widening Of One Span 20'-0 Concrete I Beam Bridge From 20' To 30' Roadway
General Layout - Handrail Detail
Bar List - Summary of Quantities
Across Farmer's Reservoir & Irrigation Co. Canal
Sta. 362+35.00 to 363+19.50
Near Broomfield Sec. 8 T. 2S R. 68W
Designed by W.L.P. Made by W.L.P. Checked by H.W.Y.
Approved by [signature] Bridge Engineer
Date Aug. 22, 1950

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F-004-1-(12)	10	

Rev. H.W.V. 3-2-51- Changed Approach Slabs, Bar Lists & Quantities.
Added seat and parapet to Present Abutment.



POURING SCHEDULE	SUPERST.	ABUT. #1	ABUT. #2
	CU. YDS.	CU. YDS.	CU. YDS.
Superstructure	18.0		
Abutment Wall		9.5	9.5
Parapet		1.0	1.0
East Wing		3.0	3.0
West Wing		3.0	3.0
Footings		17.0	17.0
Pres. Abut.		2.5	2.5
TOTALS	18.0	36.0	36.0

REFERENCE DRAWINGS
Sheet No. 9 General Layout, Bar Lists, Summary of Quantities, Handrail Details.

Structure No. E-16-d (Minor)

COLORADO
STATE HIGHWAY DEPARTMENT
WIDENING OF 1 SPAN 20' CONCRETE I BEAM BRIDGE FROM 20' TO 30' ROAD

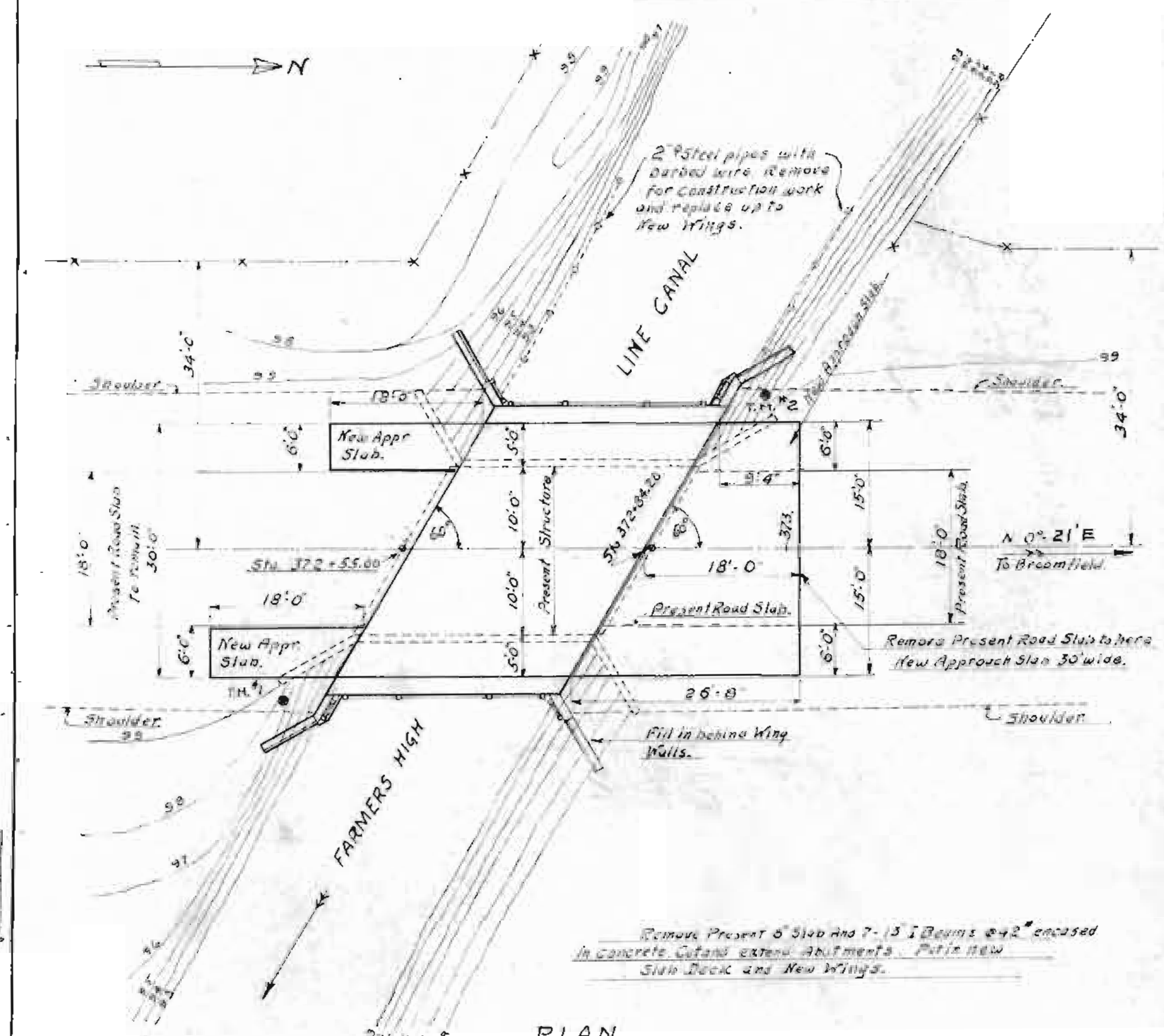
ABUTMENTS, WINGS, AND SUPERSTRUCTURE DETAILS

Across Farmer's Reservoir & Irrigation Co. Canal
Sta. 362+94.71 to Sta. 363+19.79
Near Broomfield Sec. 8 T. 2S R. 68W

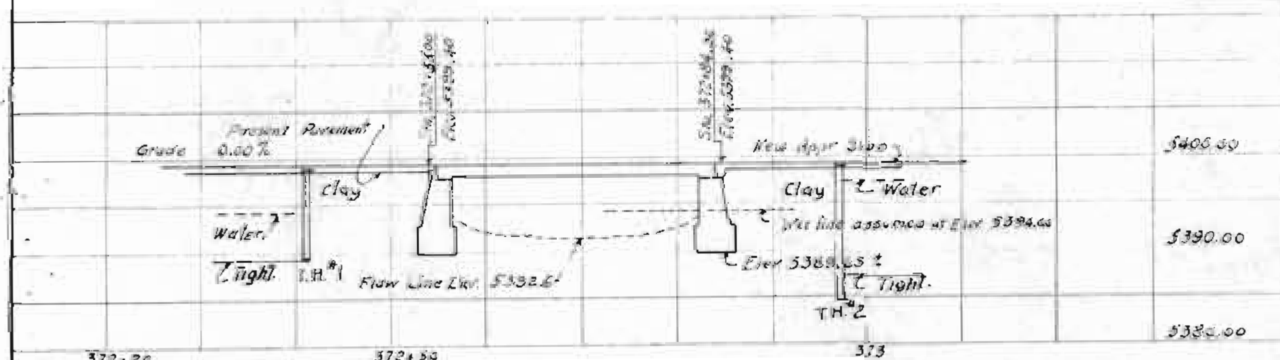
Designed by W.L.P.
Made by W.L.P.
Checked by H.W.V.

Approved by P. L. Bailey
Bridge Engineer
Date: Aug. 22, 1950

FED. ROAD DIST. NO.	STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS
3	COLO.	F904-1(12)	11	



PLAN



PROFILE

GENERAL LAYOUT.

SUMMARY OF QUANTITIES							
ITEM	DESCRIPTION	UNIT	SUPERSTRUCT	ABUT No 1	ABUT No 2	BRIDGE TOTALS	APPROACH SLABS
11a	Remove Present Conc. Pavement	Sq. Yd.					36
11c	Remove Part Of Present Str.	Lump Sum				LS	
14a	Dry Rock Exc. (Str.)	Cu. Yd.		5	5	10	
14b	Dry Common Exc. (Str.)	Cu. Yd.		32	32	64	18
⊕ 14c	Wet Rock Exc. (Str.)	Cu. Yd.		5	5	10	
⊕ 14d	Wet Common Exc. (Str.)	Cu. Yd.		42	42	84	
16a	Structure Backfill	Cu. Yd.		40	40	80	
16d	Mechanical Tamping	Hours		4	4	8	
46a	Class "A" Concrete	Cu. Yd.	55.0	22.5	22.5	100	23
47	Reinforcing Steel	Lbs.	7010	1090	1090	9190	3030
‡ 48	Structural Steel	Lbs.	2155	530	530	3215	
89ax	Drain Pipe (Conc. Floor) 3"	Ea.	4			4	
*	1/2" Expn. Joint Material	Sq. Ft.	11	13.5	13.5	38	38
*	3/4" Expn. Joint Material	Sq. Ft.	124			124	
37c	Sand Cushion	Cu. Yd.					5

⊕ Wet Line Assumed At Elev. 5394.
‡ All Handrail Steel
* Included In Bid Of Class "A" Concrete.

BAR LIST FOR ABUTMENTS No 1 AND No 2										
ABUT. No 1 Mark	ABUT. No 1 Req'd	ABUT. No 2 Mark	ABUT. No 2 Req'd	SIZE	LENGTH	TYPE	DIMENSIONS ℓ	m	r	t
A1	19	K1	19	5/8"φ	9'-8"	V	4'-8"	10"	2 1/2"	2"
A2	8	K2	8	1/2"φ	11'-0"	Str	Field Bend			
A3	10	K3	10	5/8"φ	5'-4"	VI	1'-2"	1'-4"	2 1/2"	2"
A4	6	K4	6	5/8"φ	4'-4"	VI	8"	10"	2 1/2"	2"
A5	5	K5	5	1/2"φ	2'-9"	Str				
A6	4	K6	4	5/8"φ	12'-10"	V	8'-3"	10"	2 1/2"	2"
A7	3	K7	3	1/2"φ	2'-9"	Str				
A8	6	K8	6	1/2"φ	9'-0"	Str	Field Bend			
A9	3	K9	3	5/8"φ	6'-2"	VII			2 1/2"	2"
A10	3	K10	3	1/2"φ	0'-6"	Str	Field Bend			
A11	3	K11	3	1/2"φ	6'-6"	Str	Field Bend			
F1	51	R1	51	5/8"φ	4'-2"	VIII	3'-4"		2 1/2"	2"
F2	2	R2	2	1/2"φ	16'-0"	Str	Field Bend			
F3	2	R3	2	1/2"φ	17'-8"	Str	"	"		
F4	2	R4	2	1/2"φ	15'-6"	Str	"	"		
F5	1	R5	1	1/2"φ	15'-0"	Str	"	"		
F6	2	R6	2	1/2"φ	14'-5"	Str	"	"		
F7	2	R7	2	1/2"φ	16'-5"	Str	"	"		
F8	2	R8	2	1/2"φ	18'-4"	Str	"	"		
F9	1	R9	1	1/2"φ	18'-9"	Str	"	"		
B1	6	M1	6	5/8"φ	11'-2"	V	7'-5"	10"	2 1/2"	2"
B2	8	M2	8	5/8"φ	10'-5"	V	6'-10"	8"	2 1/2"	2"
B3	14	M3	14	1/2"φ	6'-8"	Str				
B4	2	M4	2	1/2"φ	2'-6"	Str				

BAR SUMMARY ABUTMENTS	No 1	No 2
529 Lineal Ft. 1/2"φ @ 0.668 Lb.	353 Lb.	353 Lb.
697 " " 5/8"φ @ 1.043 "	727 "	727 "
Overrun 1% ±	10 "	10 "
Total Weight	1090 "	1090 "

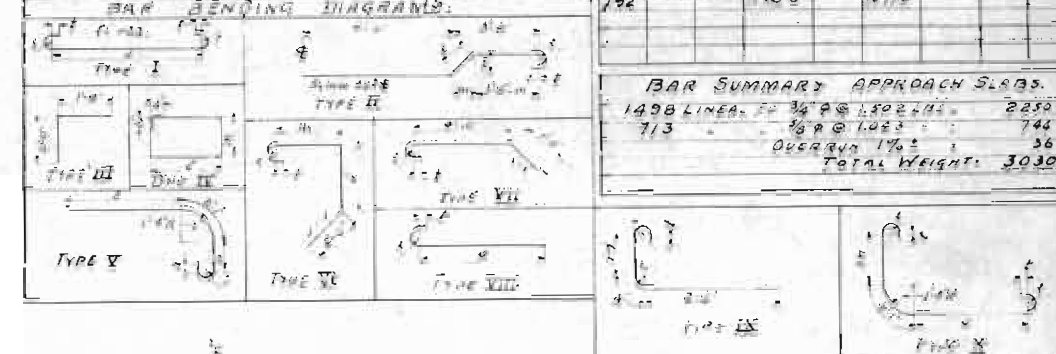
BAR LIST SUPERSTRUCTURE								
Mark	Size	No Req'd	Length	Type	DIMENSIONS ℓ	m	r	t
E1	7/8"φ	61	28'-9"	I	26'-3"		3 1/2"	3"
E2	7/8"φ	40	29'-9"	II	1'-9"	1'-3"	3 1/2"	3"
D1	5/8"φ	30	35'-10"	Str				
S1	5/8"φ	28	3'-9"	III				
S2	1/2"φ	6	27'-0"	Str				
S3	5/8"φ	16	[illegible]	IX			2 1/2"	2"
S4	1"φ	4	29'-0"	I	25'-4"		4"	3 1/2"
S5	1"φ	2	30'-7"	II	2'-9 1/2"	1'-11"	4"	3 1/2"
S6	1/2"φ	10	5'-0"	IX	2'-0"	7"		

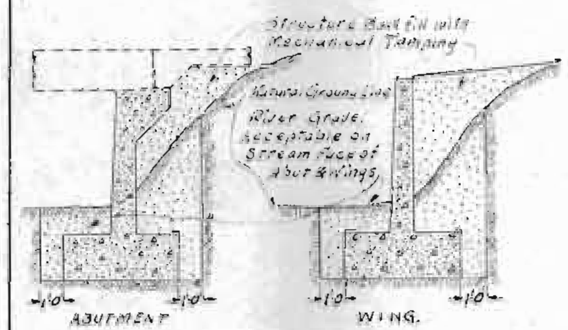
BAR SUMMARY SUPERSTRUCTURE	
255 Lineal Ft. 1/2"φ @ 0.668 Lbs. =	170 Lbs.
1402 " " 5/8"φ @ 1.043 " =	1462 "
2347 " " 7/8"φ @ 2.044 " =	4797 "
116 " " 1"φ @ 2.670 " =	310 "
61 " " 1"□ @ 3.400 " =	207 "
Overrun 1% ±	69 "
Total Weight	7010 "

BAR LIST APPROACH SLABS								
Mark	Size	No Req'd	Length	Type	DIMENSIONS ℓ	m	r	t
J1			2'-1"					
to	3/4"φ	1 Ea.	by 1'-8 3/4"	Str				
J16			to 28'-8 3/4"					
J17	3/4"φ	10	29'-6"	Str				
J18			9'-8 1/2"		8'-0 1/2"			
to	3/4"φ	1 Ea.	by 3 1/2"	VIII	by 3 1/2"		3"	2 1/2"
J76			to 26'-11"		to 25'-11"			
J78	3/4"φ	30	5'-6"	Str				
J79	5/8"φ	6	3'-10"	Str				
J80	5/8"φ	2	2'-1"	Str				
J81			15'-3 1/2"		13'-8"			
to	3/4"φ	2 Ea.	by 3 1/2"	VIII	by 3 1/2"		3"	2 1/2"
J92			18'-3"		to 17'-5"			

BAR SUMMARY APPROACH SLABS.	
1498 Lineal Ft. 3/4"φ @ 1.502 Lbs.	2250 Lb.
713 " " 5/8"φ @ 1.043 "	744 "
Overrun 1% ±	36 "
Total Weight:	3030 "

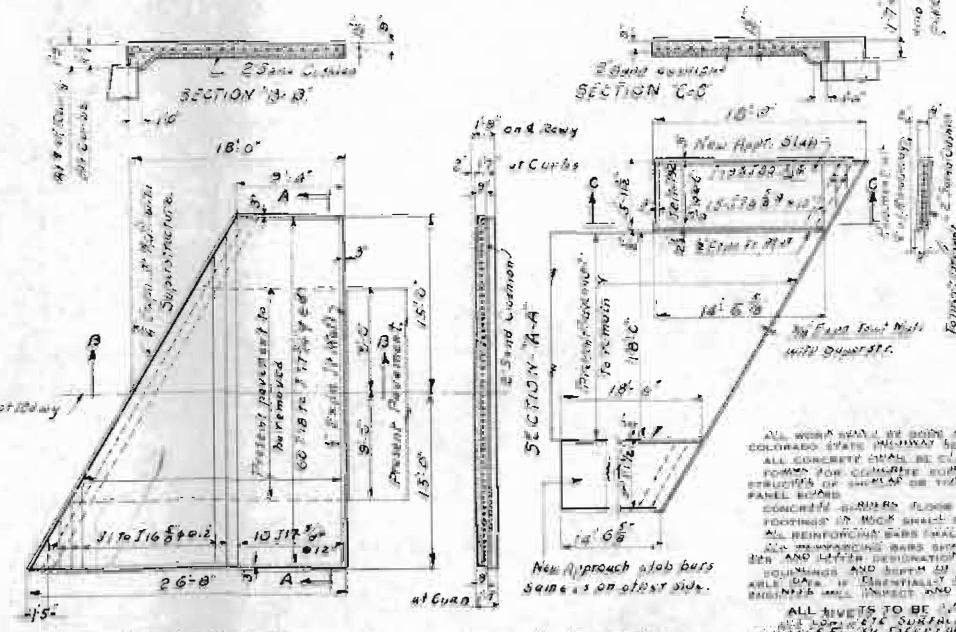
BAR BENDING DIAGRAMS:





STRUCTURE BACKFILL & MECHANICAL TAMPING DIAGRAM.

All material that is to be mechanically tamped shall be placed in horizontal layers not more than 6 inches in depth and tamped before the next layer is placed. Rolling equipment shall not be used within 4 ft of wall.



DETAILS OF APPROACH SLABS.

REFERENCE DRAWINGS.
Sheet No 12 Details of Superstructure & Abutments.
Sheet No 9 Details of Handrail.

LOADING DATA
Live Load H-20-44.
Dead Load assumed in lbs. per sq. ft. ... Concrete monolithic wearing surface ...

DESIGNING DATA.

Present Materials Unit Stresses	New Materials AASHO 1949 Unit Stresses
f'c = 650 lbs. per sq. in.	fc = 1000 lbs. per sq. in.
fs = 18000 "	fs = 20000 lbs. per sq. in.
n = 15	n = 10
fs Structural = 16350 P.S.I.	fs Structural = 18000 P.S.I.

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department adopted Jan. 1, 1948.

All concrete shall be Class "A" Air Entrained as specified.

Forms for concrete surfaces exposed in the finished work shall be constructed of shiplap or tongue and groove lumber ... unless faced with panel board.

Concrete girders, floor slabs and curb shall be poured monolithically.

Footings on rock shall be poured out to the rock and not formed.

All reinforcing bars shall be intermediate grade.

All reinforcing bars shall be deformed and tagged with the station number and letter designation. Main bars shall not be spliced.

Soundings and depth of footings shown are according to the best available data. If essentially different conditions are encountered the bridge engineer will inspect and determine if revision is necessary.

All rivets to be 3/4" dia. All rivets to be power driven.

All concrete surfaces exposed to view shall receive Class 1 surface finish, except underside of floor slab and abutment faces between outside stringers.

STRUCTURE No E-16-C.

COLORADO
STATE HIGHWAY DEPARTMENT
WIDENING OF CONCRETE I BEAM ONE SPAN BRIDGE TO 1-24' SPAN-30' ROADWAY-CONCRETE SPAN.
GENERAL LAYOUT
APPROACH SLABS - BAR LISTS
SUMMARY of QUANTITIES.
Across FARMERS HIGH LINE CANAL
Sta. 372+55 & 372+84.20
Near Broomfield Sec. 7 T.2S R.68W.

Designed by W.L.P. Made by W.L.P. Checked by H.W.V.	Approved by P.S. Bailey Bridge Engineer Date: Aug 22, 1950.

FED. ROAD DIST. NO.	STATE	PROJECT No.	SHEET NO.	TOTAL SHEETS
3	COLO.	F004-1(12)	12	

PLAN.

Symmetrical by Rotation about ℄ of Roadway.

DETAIL OF N.W. & S.E. CORNERS.

DETAIL OF N.E. & S.W. CORNERS.

Check all Stations Elevations and dimensions in regard to present Structure in the field and report any variations that require adjustment.

ABUT No 1. SECTION "A-A" ABUT No 2

SECTION "B-B"

SECTION "C-C"

SECTION "D-D"

SECTION "E-E"

SECTION "F-F" ABUT No 2.

SECTION G-G ABUT No 1.

TYPICAL WING SECTION FOR ALL FOUR WINGS. ABUT No 1 - BARS B & F. ABUT No 2 BARS M & R.

Extension. PLAN OF ABUTMENT No 1 AT TOP OF FOOTINGS. BARS - A, B & F. ABUTMENT No 2 IS SIMILAR BARS - K, M & R. Extension.

ELEVATION.

TRUE ELEV OF WINGS. ABUT No 1 - B bars - ABUT No 2 - M bars.

TRUE ELEV OF POST. STRUCTURE No E-16-C.

POURING SCHEDULE - CONCRETE.				
	SUPERSTRUCTURE	ABUT. No 1	ABUT. No 2	TOTAL
SUPERSTRUCTURE	55.0 Cu Yds			55.0 Cu Yds
ABUT WALLS		6.3 Cu Yds	6.3 Cu Yds	12.6 " "
ABUT POSTS		0.5 " "	0.5 " "	1.0 " "
EAST WING		1.6 " "	1.6 " "	3.2 " "
WEST WING		1.6 " "	1.6 " "	3.2 " "
FOOTINGS		12.5 " "	12.5 " "	25.0 " "
SUB TOTAL	55.0 " "	22.5 " "	22.5 " "	100.0 " "
APPROACH SLABS		6.0 " "	17.0 " "	23.0 " "
GRAND TOTAL				123.0 " "

REFERENCE DRAWINGS.
Sheet No. 9 Details of Handrails
Sheet No. 11 General Layout. Approach Slabs. Bar Lists and Summary of Quantities

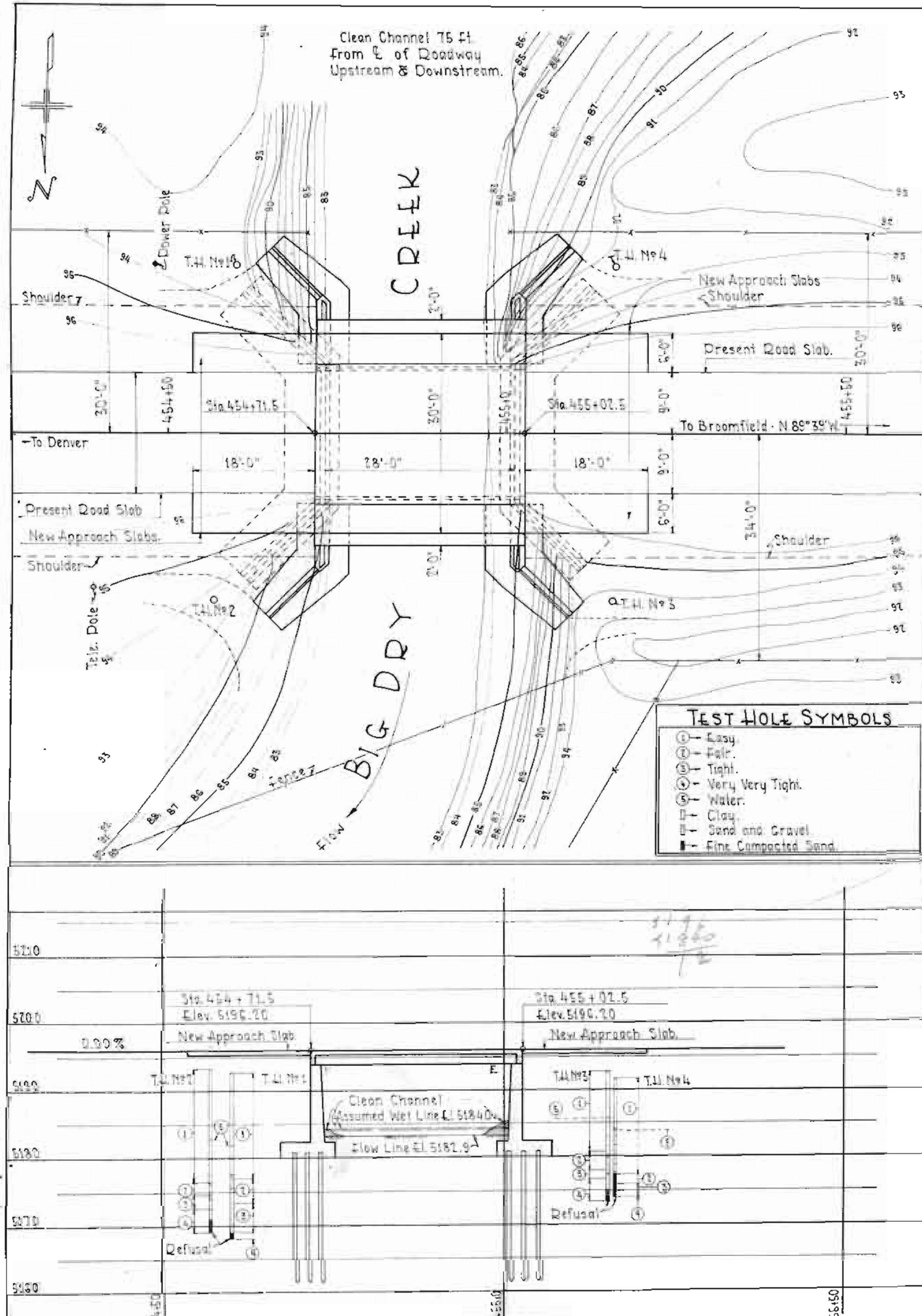
COLORADO STATE HIGHWAY DEPARTMENT

WIDENING OF CONCRETE I BEAM ONE SPAN BRIDGE TO 24'-2" SPAN. 30' ROADWAY CONCRETE I SPAN. DETAILS OF SUPERSTRUCTURE AND ABUTMENTS.

Across FARMERS HIGH LINE CANAL
Sta. 372+55.00 Sta. 372+84.20
Near Fort Morgan Sec. 7 T. 2 N. R. 58 W.

Designed by W.L.P.
Made by W.L.P.
Checked by H.W.V.

Approved by P. A. Bailey Bridge Engineer
Date: Aug 22, 1950.



GENERAL LAYOUT

BAR LIST FOR ABUT. Nº 1 (ABUT. Nº 2 SAME)

MARK	SIZE	Nº REQ'D	LENGTH	TYPE	DIMENSIONS ℓ	m	r	t
A1	[illegible]	18	16'-6"	I	11'-3"	2'-8"	3"	2½"
A2	[illegible]	12	10'-8"	I	6'-6"	1'-8"	3"	2½"
A3	[illegible]	14	6'-8"	I	3'-5"	0'-8"	3"	2½"
A4	[illegible]	22	10'-0"	Stra.	Field Bend			
A5	[illegible]	14	8'-8"	II			2½"	2"
A6	[illegible]	16	6'-4"	Stra.				
A7	[illegible]	8	7'-4"	III			2½"	2"
A8	[illegible]	12	2'-8"	Stra.				
A9	[illegible]	2	11'-6"	IV	10'-6"		3"	2½"
C1	[illegible]	4	18'-1"	I	13'-1"	2'-5"	3"	2½"
C2	[illegible]	4	16'-11"	I	12'-2"	2'-2"	3"	2½"
C3	[illegible]	4	15'-5"	I	11'-1"	1'-11"	2½"	2"
C4	[illegible]	4	14'-1"	I	10'-0"	1'-8"	2½"	2"
C5	[illegible]	4	12'-9"	I	9'-0"	1'-4"	2½"	2"
C6	[illegible]	12	8'-8"	I	4'-10"	1'-3"	3"	2½"
C7	[illegible]	4	7'-3"	I	3'-10"	1'-0"	2½"	2"
C8	[illegible]	6	5'-11"	I	2'-10"	0'-8"	2½"	2"
C9	[illegible]	16	9'-8"	Stra.				
C10	[illegible]	2	7'-4"	Stra.				
C11	[illegible]	2	5'-4"	Stra.				
C12	[illegible]	2	3'-4"	Stra.				
C13	[illegible]	2	1'-4"	Stra.				
F1	[illegible]	4	22'-9"	Stra.	Field Bend			
F2	[illegible]	4	12'-6"	Stra.	Field Bend			
F3	[illegible]	4	21'-9"	Stra.	Field Bend			
F4	[illegible]	4	20'-0"	Stra.	Field Bend			
F5	[illegible]	4	18'-6"	Stra.	Field Bend			
F6	[illegible]	4	17'-0"	Stra.	Field Bend			
F7	[illegible]	52	5'-6"	IV	4'-8"		2½"	2"
F8	[illegible]	36	3'-0"	Stra.				
F9	[illegible]	6	6'-0"	IV	5'-6"		3"	2½"
F10	[illegible]	16	4'-8"	IV	3'-10"		2½"	2"

BAR LIST SUMMARY ABUTMENT Nº 1

947 Lin. Ft. of ½"φ Bars @ 0.668 Lbs. per Lin. Ft.	=	633 Lbs.
949 do. ⅝"φ do. @ 1.043 do.	=	990 do.
824 do. ¾"φ do. @ 1.502 do.	=	1298 do.
Plus 1% ± for Overrun	=	29 do.
Total	=	2950 Lbs.

BAR LIST SUMMARY ABUTMENT Nº 2

947 Lin. Ft. of ½"φ Bars @ 0.668 Lbs. per Lin. Ft.	=	633 Lbs.
949 do. ⅝"φ do. @ 1.043 do.	=	990 do.
864 do. ¾"φ do. @ 1.502 do.	=	1298 do.
Plus 1% ± for Overrun	=	29 do.
Total	=	2950 Lbs.

BAR LIST FOR APPROACH SLABS

MARK	SIZE	Nº REQ'D	LENGTH	TYPE	DIMENSIONS ℓ	m	r	t
J1	[illegible]	72	5'-8"	Stra.				
J2	[illegible]	48	18'-3"	IV	17'-3"		3"	2½"

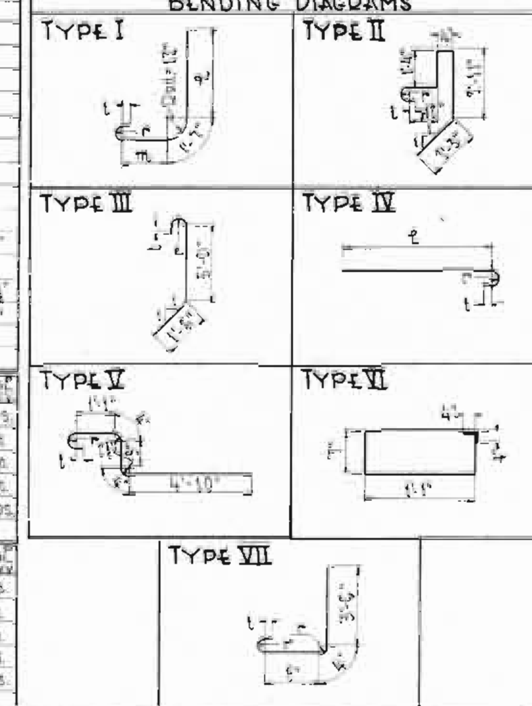
BAR LIST FOR SUPERSTRUCTURE

MARK	SIZE	Nº REQ'D	LENGTH	TYPE	DIMENSIONS ℓ	m	r	t
E1	½"φ	126	6'-2"	IV	5'-6"		2"	2"
E2	½"φ	126	8'-0"	V			2"	2"
D1	[illegible]	16	31'-0"	Stra.				
S1	½"φ	8	31'-0"	Stra.				
S2	½"φ	16	4'-0"	VI				
S3	⅝"φ	16	6'-6"	VII			2½"	2"

BAR LIST SUMMARY - SUPERSTRUCTURE

2097 Lin. Ft. of ½"φ Bars @ 0.668 Lbs. per Lin. Ft.	=	1401 Lbs.
583 do. ⅝"φ do. @ 1.043 do.	=	608 do.
Plus 1% ± for Overrun	=	21 do.
Total	=	2030 Lbs.

BENDING DIAGRAMS



BAR LIST SUMMARY APPROACH SLABS

408 Lin. Ft. of ⅝"φ Bars @ 1.043 Lbs. per Lin. Ft.	=	426 Lbs.
876 do. ¾"φ do. @ 1.502 do.	=	1316 do.
Plus 1% ± for Overrun	=	18 do.
Total	=	1760 Lbs.

FED. ROAD DIST. NO.	STATE	PROJ. Nº	SHEET NO.	TOTAL SHEETS
3	COLO.	F 004-1(12)	13	

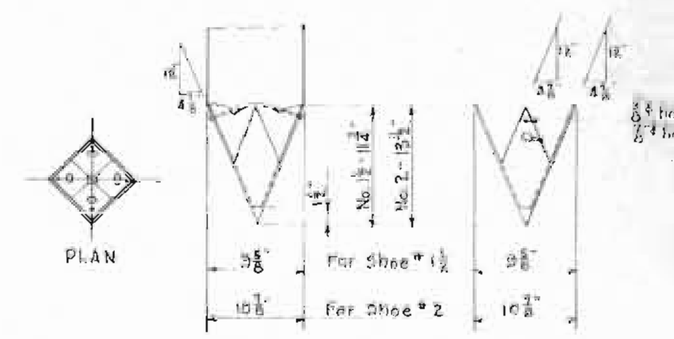
SUMMARY OF QUANTITIES

Item	Description	Unit	Super-structure	Abut. Nº 1	Abut. Nº 2	Bridge Totals	Approach Slabs
13c	Unclassified Excavation	Cu. Yd.				100	
14a	Dry Rock Excavation (Str.)	Cu. Yd.		5	5	10	
14b	Dry Common Excavation (Str.)	Cu. Yd.		83	83	166	13
14c	Wet Rock Excavation (Str.)	Cu. Yd.		5	5	10	
14d	Wet Common Excavation (Str.)	Cu. Yd.		42	42	84	
16a	Structure Backfill.	Cu. Yd.		88	88	176	2
16d	Mechanical Tamping.	Hrs.		9	9	18	
46a	Class "A" Concrete.	Cu. Yd.	12	48	48	108	11
47	Reinforcing Steel (Including 1% for Overrun)	Lbs.	2030	2950	2950	7930	1760
48	Structural Steel (Including 1% for Overrun)	Lbs.	★11120	★530	★630	12,280	
60a	Treated Timber Piling	Lin. Ft.		440	440	880	
89a	Drain Pipe (Concrete Fl.) 2'-0" long	Each	4			4	
✳	½" Expansion Joint Material	Sq. Ft.		32	32	64	53
✳	½" Expansion Joint Material	Sq. Ft.	24			24	
✳	16 Ga. Galv. Sheet Metal	Sq. Ft.	24			24	
60e	Pile Shoes	Each		22	22	44	
11d	Removal of Portions of Present Str.	Lump Sum				L.S.	
37c	Sand Cushion	Cu. Yd.					3
⌖60x	Boring Holes for Piles	Lin. Ft.		50	50	100	

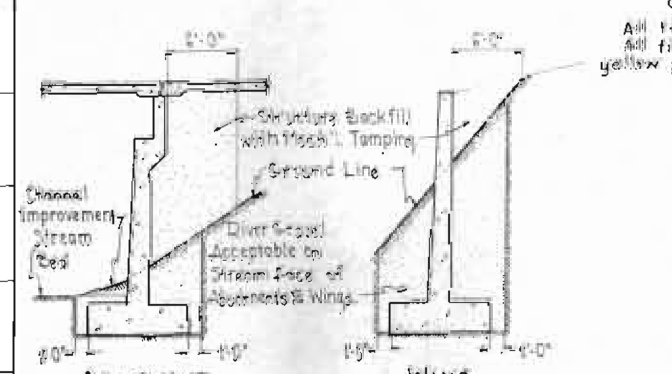
★ Including Handrail Steel, Plus 1% ± for Overrun = 3420 Lbs.
✳ To be included in bid price of Class "A" Concrete.
Assumed Wet Line Elevation 5184.0.
⌖ Holes to be drilled only as required by the Engineer.

REFERENCE DRAWINGS

Sheet Nº 14 ... Details of Superstructure & Abutments
Sheet Nº 9 ... Details of Handrail.



DETAIL OF PILE SHOE



All material that is to be mechanically tamped, shall be placed in horizontal layers not more than 6 inches in depth and tamped before next layer is placed.

STRUCTURE BACKFILL AND MECHANICAL TAMPING DIAGRAM

GENERAL NOTES (CONT'D)

All timber piling to be treated.
All timber piling shall be dense southern yellow pine or west coast douglas fir.

DESIGNING DATA: PRESENT MATERIAL

UNIT STRESSES.
Concrete – f_c = 650 lbs. per sq. in.
Str. Steel – f_s = 16,000 lbs. per sq. in.
n = 15

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JANUARY 1, 1948.
ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED.
[illegible]
ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.
ALL REINFORCING BARS SHALL BE DEFORMED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.
[illegible]
ALL RIVETS TO BE ¾" DIA. ALL RIVETS TO BE POWER DRIVEN.
PAINT - ALL STRUCTURAL STEEL SHALL RECEIVE ONE SHOP COAT ZINC CHROMATE AND TWO FIELD COATS OF ALUMINUM PAINT.
ALL CONCRETE SURFACES EXPOSED TO VIEW SHALL RECEIVE A CLASS "2" SURFACE FINISH, EXCEPT UNDERSIDE OF FLOOR SLABS AND ABUTMENT FACES BETWEEN OUTSIDE STRINGERS AND BELOW FLOOR SLAB.

STRUCTURE Nº E-16-E

STRUCTURE Nº E-16-E

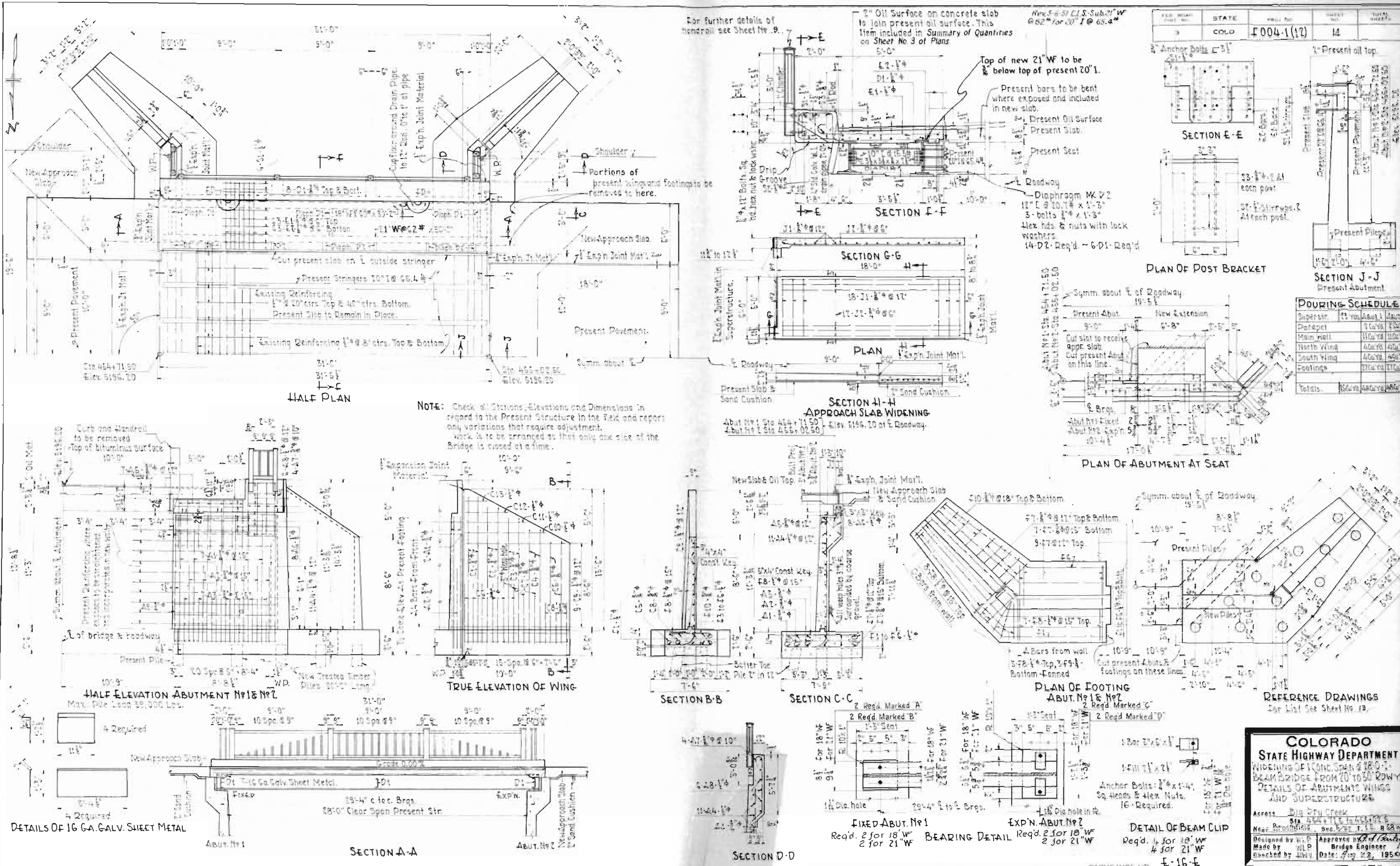
LOADING DATA
H-20-44

DESIGNING DATA: NEW MATERIAL
Concrete — 1000, 20, 10
Structural Steel – f_s = 18000 Lbs. per sq. in.

COLORADO
STATE HIGHWAY DEPARTMENT
WIDENING OF 1-CONC. SPAN @ 28'-0" I BEAM BRIDGE FROM 20' TO 30' ROADWAY
LAYOUT - BAR LISTS & QUANTITIES
Across Big Dry Creek
Sta. 454+71.5 to 455+02.5
Near Broomfield Sec. 5/32 T. 1S R. 68W.

Designed by W.L.P.	Approved by G. J. Bailey
Made by W.L.P.	Bridge Engineer
Checked by H.W.V.	Date: Aug. 22, 1950.

Fed. Road Dist. No.	State	Proj. No.	Sheet No.	Total Sheets
3	COLO	F 004-1(12)	14	



Half Plan
Half Elevation Abutment Nº 1 & Nº 2
Max. Pile Load 39,000 Lbs.
True Elevation Of Wing
Details Of 16 Ga. Galv. Sheet Metal
Section A-A
Section B-B
Section C-C
Section D-D
Section E-E
Section F-F
Section G-G
Section H-H
Approach Slab Widening
Section J-J
Present Abutment.
Plan Of Post Bracket
Plan Of Abutment At Seat
Plan Of Footing
Abut. Nº 1 & Nº 2
Bearing Detail
Fixed Abut. Nº 1
Exp'n. Abut. Nº 2
Detail Of Beam Clip
For further details of handrail see Sheet Nº 9.
Top of new 21" WF to be ⅛" below top of present 20" I.
Present bars to be bent where exposed and included in new slab.
Portions of present wing and footing to be removed to here.
Cut present slab on ℄ outside stringer
Present Slab to Remain in Place.
Present Pavement
New Approach Slab
Abut Nº 1 Sta 454+71.50, Abut Nº 2 Sta 456+02.50, Elev. 5196.20 at ℄ Roadway.
Reference Drawings
For List See Sheet Nº 13.
E-16-E

NOTE: Check all Stations, Elevations and Dimensions in regard to the Present Structure in the field and report any variations that require adjustment. Work is to be arranged so that only one side of the Bridge is closed at a time.

Pouring Schedule

Superstr.	23 Yds.	Abut 1	Abut 2
Parapet		2 Cu Yd	2 Cu Yd
Main Wall		11 Cu Yd	11 Cu Yd
North Wing		4 Cu Yd	4 Cu Yd
South Wing		4 Cu Yd	4 Cu Yd
Footings		27 Cu Yd	27 Cu Yd
Totals.	156 Cu Yd	48 Cu Yd	48 Cu Yd

COLORADO
State Highway Department

Widening Of 1 Conc. Span @ 28'-0" I-Beam Bridge From 20' to 30' Rdwy. Details Of Abutments Wings And Superstructure

Across Big Dry Creek
Sta. 454+71.5 to 456+02.5
Near Broomfield, Sec. 5/32, T. 1 S., R 68 W.

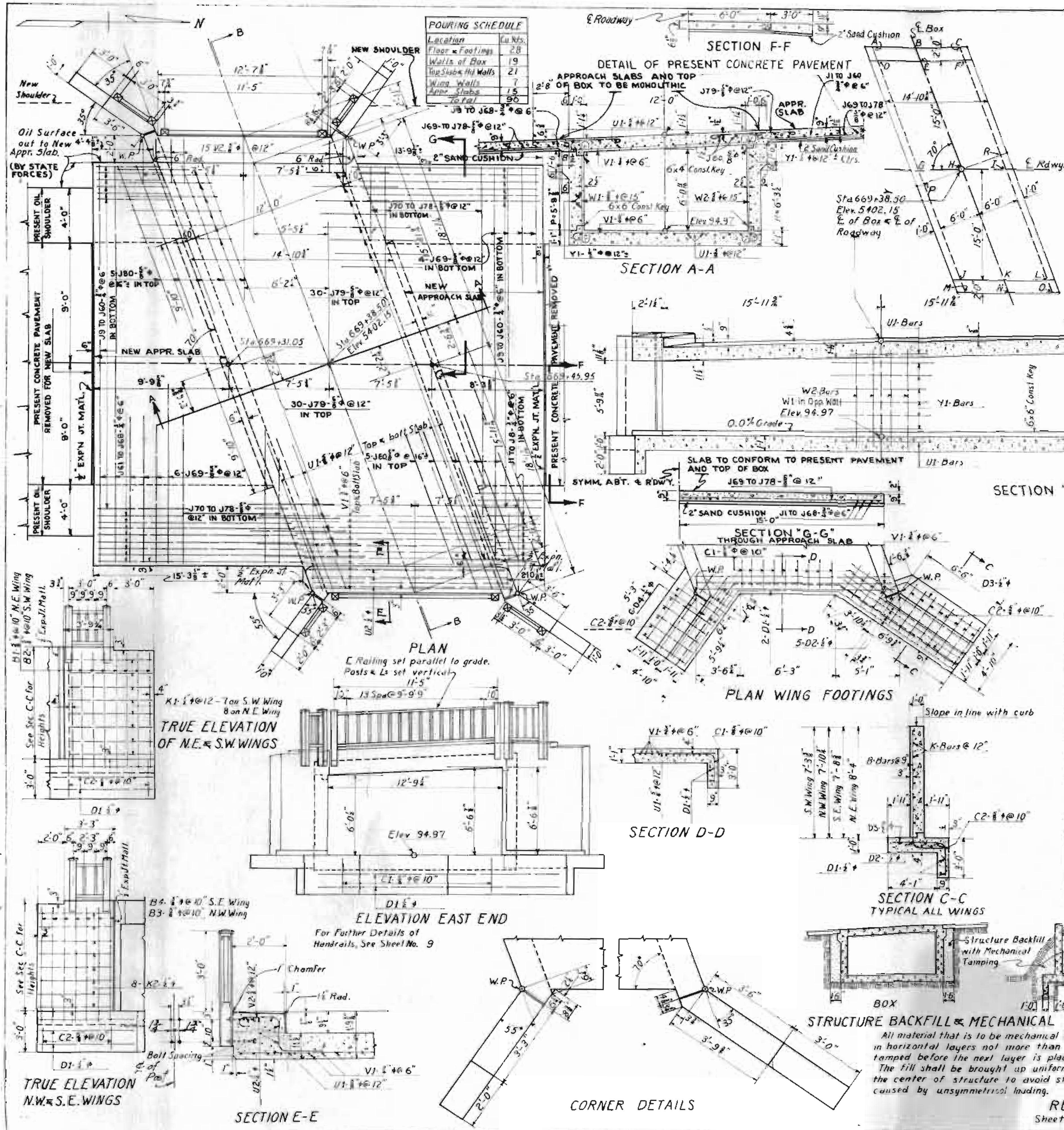
Designed by WLP
Made by WLP
Checked by JWV

Approved by [signature]
Bridge Engineer
Date: Aug 22, 1950

Structure No. E-16-E

FED. ROAD DIV. NO.	STATE	Proj. No.	SHEET NO.
9	COLO.	F 004-1(12)	15

REV.-H.W.V.-3-2-51-CHANGED APPROACH SLABS BAR LISTS AND QUANTITIES



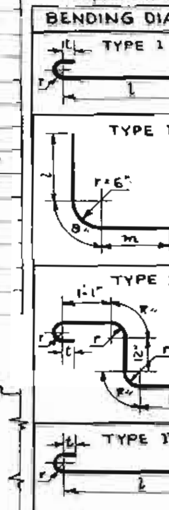
POURING SCHEDULE	
Location	Cu. Yds.
Floor & Footings	28
Walls of Box	19
Top Slabs & Hd Walls	21
Wing Walls	7
Appr. Slabs	15
Total	90

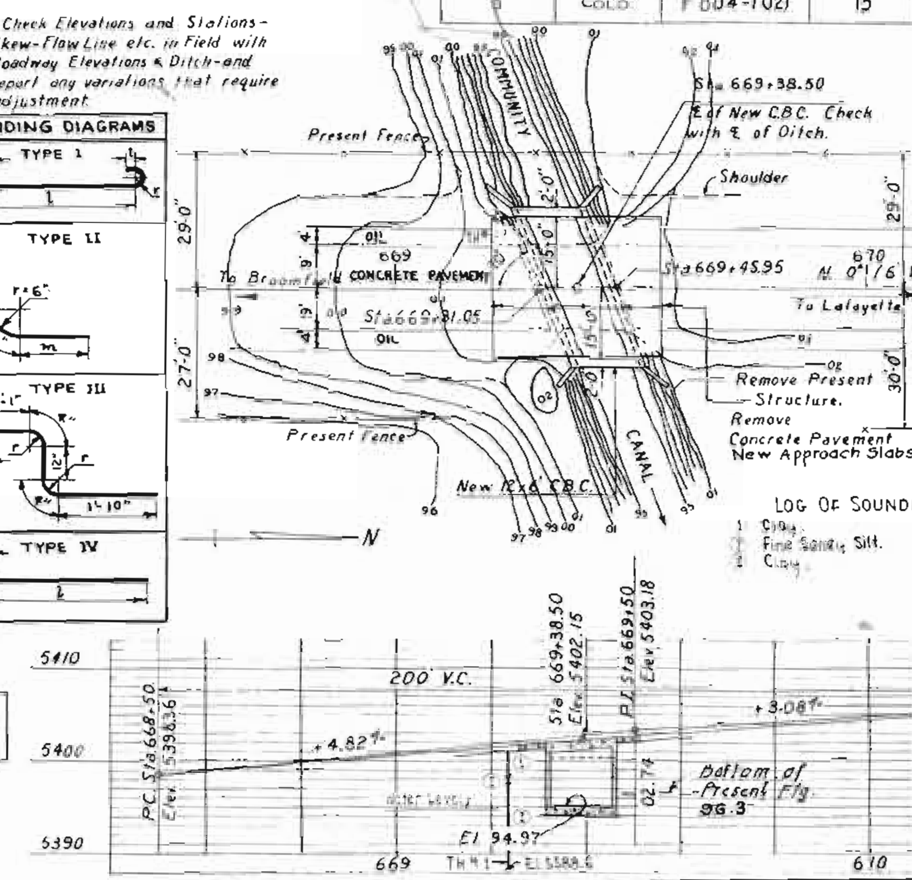
Measurements Inside Box

Location	Thickness Top Slab	Height of Wall	Elevation Top of Slab
A	1'-9½"	5'-6½"	
B	1'-9½"	5'-9¾"	
C	1'-9½"	6'-0¼"	
D	11½"		5401.50
E	11½"		01.77
F	11½"		02.03
G	13½"	5'-9½"	01.89
H	13½"	6'-0¾"	02.15
I	13½"	6'-3½"	02.42
J	11½"		01.94
K	11½"		02.20
L	11½"		02.47
M	1'-8½"	6'-0½"	
N	1'-8½"	6'-3¾"	
O	1'-8½"	6'-6½"	
P	1'-1½"	5'-9¾"	
R	1'-1½"	6'-3½"	

Check Elevations and Stations - Skew-Flow Line etc. in Field with Roadway Elevations & Ditch-and report any variations that require adjustment.

BENDING DIAGRAMS





SUMMARY OF QUANTITIES			
Item	Description	Unit	Total
11g	Remove Present Concrete Pavement	Sq. Yd.	36
11h	Remove Present Structure	L.S.	
14	Structural Excavation	Cu. Yd.	80
16a	Structure Backfill	Cu. Yd.	65
16d	Mechanical Tamping	Hr.	7
37c	Sand Cushion	Cu. Yd.	3.5
46a	Class "A" Concrete	Cu. Yd.	90
47	Reinforcing Steel (Incl. 1% ± Overrun)	Lb.	9625
48†	Structural Steel (Incl. 1½% ± Overrun)	Lb.	2190
*	½" Expansion Joint Material	Sq. Ft.	60

* Include in Bid Price of Class "A" Concrete.
† All Handrail Steel.

BAR SUMMARY	
1040 Ft. ½" ⌀ Bar @ 0.668 Lb. =	695 Lbs.
3665 Ft. ⅝" ⌀ Bar @ 1.043 Lb. =	3823 Lbs.
3337 Ft. ¾" ⌀ Bar @ 1.502 Lb. =	5012 Lbs.
1% ± Overrun	95 Lbs.
Total	9625 Lbs.

BAR LIST

Mark	Size	No. Reqd	Length	Type	l	m	r	t
V1	¾" ⌀	136	15'-10"	I	13'-10"		3"	2½"
V2	½" ⌀	30	5'-5"	III			2½"	2"
U1	⅝"	28	35'-9"	Str.				
U2	½" ⌀	10	14'-4"	Str.				
Y1	½" ⌀	12	35'-9"	Str.				
W1	⅝" ⌀	30	8'-4"	I	6'-8"		2½"	2"
W2	⅝" ⌀	30	8'-10"	I	7'-2"		2½"	2"
B1	⅝" ⌀	8	10'-7"	II	8'-0"	1'-10"		
B2	⅝" ⌀	8	9'-6"	II	6'-11"	1'-10"		
B3	⅝" ⌀	7	10'-1"	II	7'-6"	1'-10"		
B4	⅝" ⌀	7	9'-11"	II	7'-4"	1'-10"		
C1	⅝" ⌀	32	4'-5"	II	1'-10"	1'-10"		
C2	⅝" ⌀	28	6'-4"	II	3'-9"	1'-10"		
D1	½" ⌀	4	24'-4"	Str.	Field Bend			
D2	½" ⌀	10	10'-6"	Str.				
D3	½" ⌀	2	8'-0"	Str.	Field Bend			
D4	½" ⌀	12	6'-6"	Str.				
K1	½" ⌀	15	6'-2"	Str.				
K2	½" ⌀	16	4'-11"	Str.				

Mark	Size	No. Req'd	Length	Type	l	m	r
J1 TO J8	¾" ⌀	1 EA.	3'-7" BY 2¼" TO 4'-10½"	IV	2'-7" BY 2¼" TO 3'-10½"		3'
J9 TO J60	¾" ⌀	2 EA.	5'-1" BY 2¼" TO 14'-7¾"	IV	4'-1" BY 2¼" TO 13'-7¾"		3'
J61 TO J68	¾" ⌀	1 EA.	14'-10" BY 2¼" TO 16'-1½"	IV	13'-10" BY 2¼" TO 15'-1½"		3
J69	⅝" ⌀	10	29'-8"	STR.			
J70 TO J78	⅝" ⌀	2 EA.	27'-8" BY 2'-9" TO 5'-8"	STR.			
J79	⅝" ⌀	60	7'-8"	I	6'-0"		2
J80	⅝" ⌀	10	31'-6"	STR.			

LOADING DATA.

DESIGNING DATA.

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN. 1, 1948

ALL CONCRETE SHALL BE CLASS A

ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.

ALL CONCRETE SURFACES EXPOSED TO VIEW ON THE CULVERT AND WING WALLS SHALL RECEIVE CLASS I SURFACE FINISH, EXCEPT CULVERT BARREL.

REFERENCE DRAWINGS

Sheet No. 9 Detail of Handrail

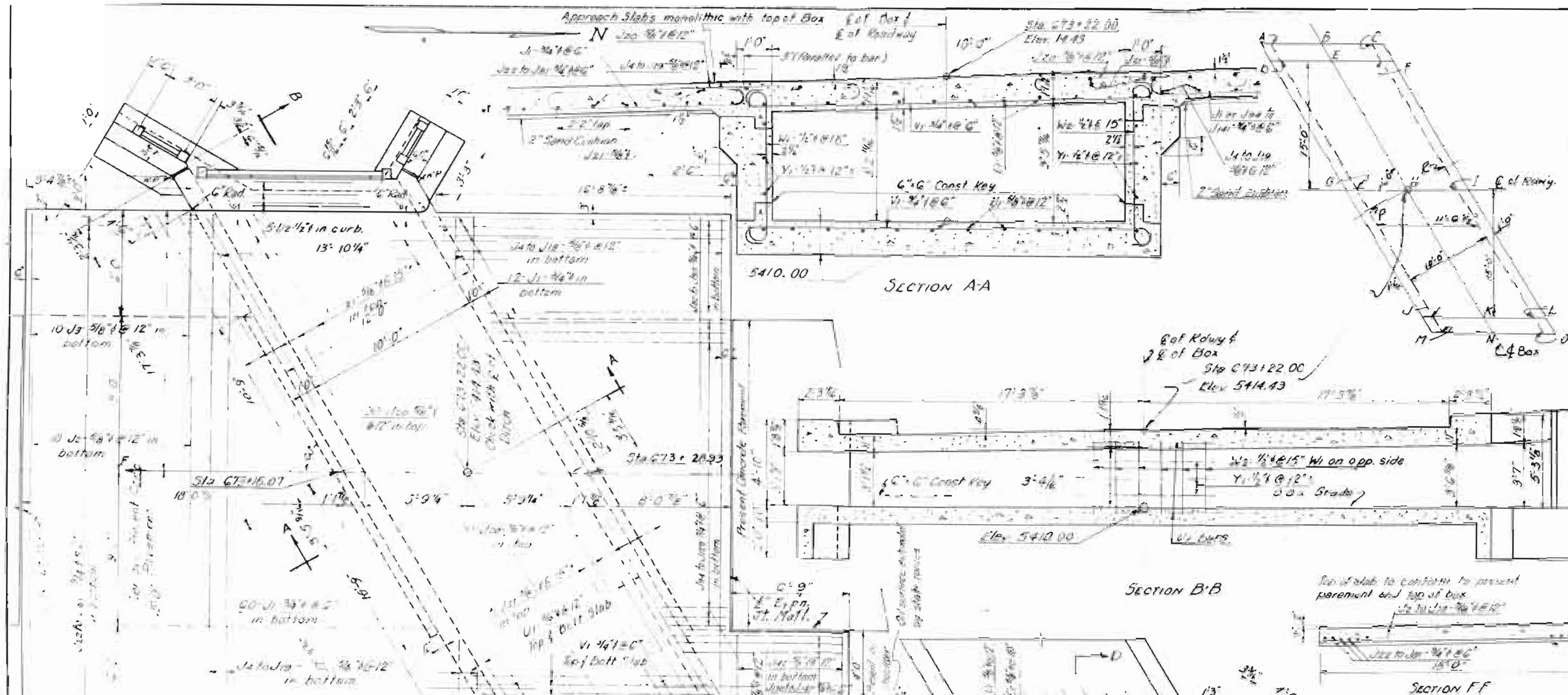
COLORADO
STATE HIGHWAY DEP
CONCRETE BOX CULV
12'-0" x 6'-0" ±
30'-0" ROADWAY - 2'-0" S
STEEL HANDRA
PLAN-DETAILS-SITUATIO
Across COMMUNITY CANA
Sta. 669+31.05 To 6
Near Broomfield Sec. 34/35

Designed by W.L.P.	Approved
Made by W.L.P.	Bridge
Checked by H.W.V.	Date:

	Initials	Date
Designed By	HWV	4-24-50
Drawn By	WT	5-10-50
Traced By	J	5-20-50
Checked By	H	5-30-50
[illegible] By	JRS	8-4-50
[illegible] By	WLP	8-8-50

J.W.B. 8-28-50

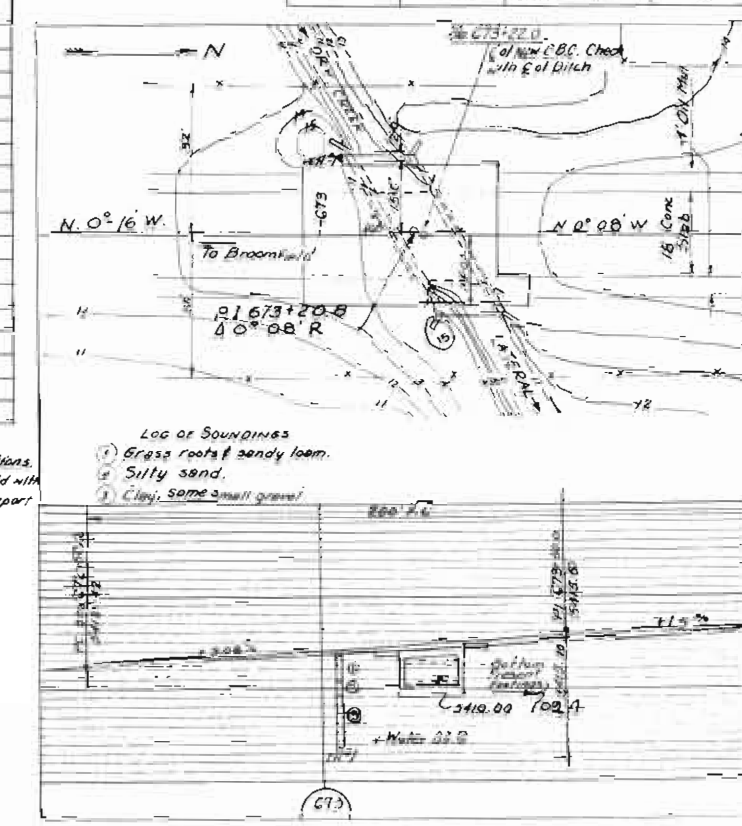
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
3	COLO.	F004-1(12)	16

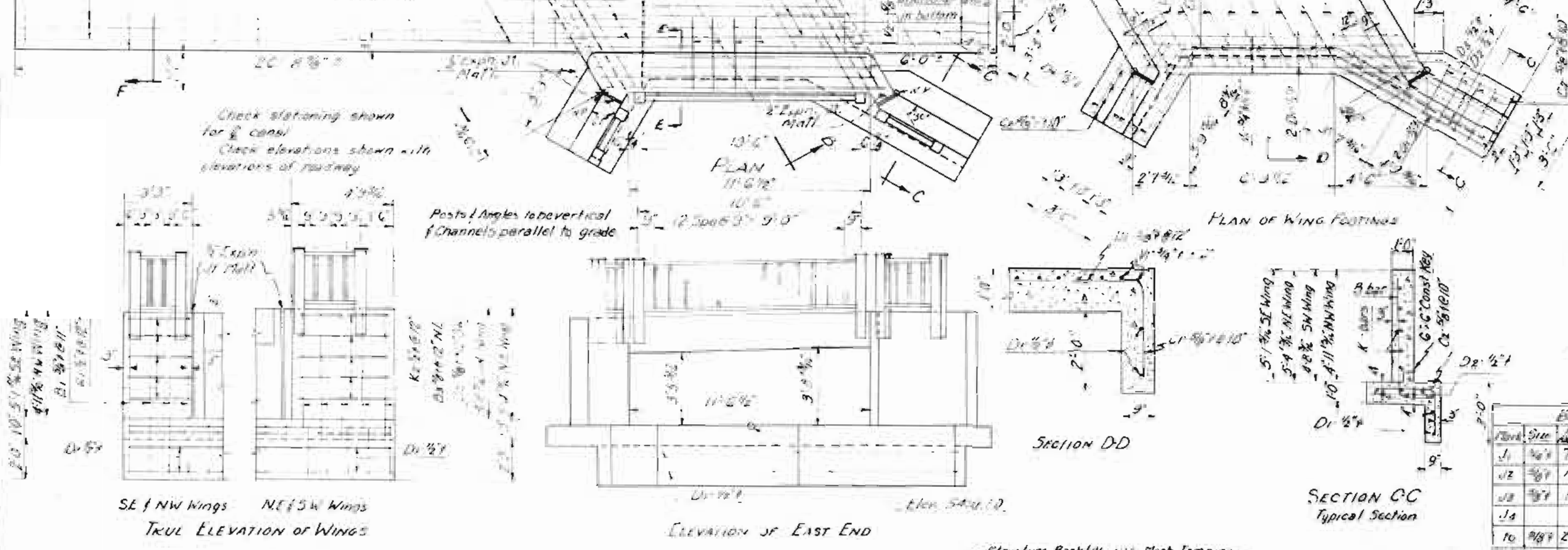


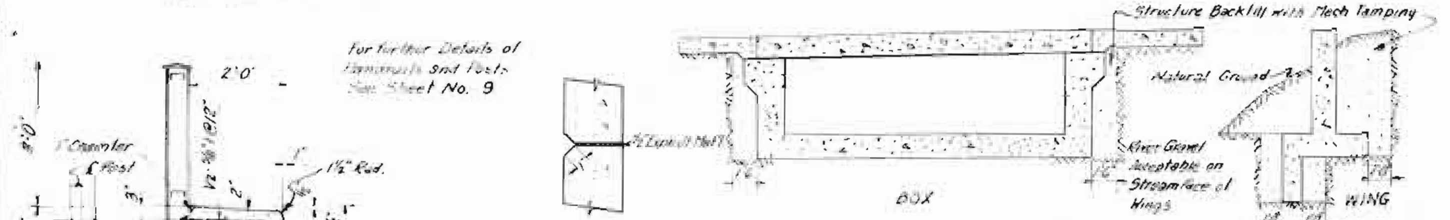
Check Elevations, Stations, Skew, Flowline in field with roadway & ditch & report any variations for adjustment

Measurements Inside Box			
Location	Height of Wall	Thickness of Slab	Elevation Top of Slab
A	2'11¾"	1'-8⅞"	
B	3'-1⅞"	1'-8⅝"	
C	3'-2⅞"	1'-8⅝"	
D	2'11⅜"	11"	5413.89
E	3'-1⅜"	11"	
F	3'-3⅞"	11"	5414.19
G	3'-2⅝"	1'-1⅝"	5414.28
H	3'-4⅝"	1'-1⅝"	5414.43
I	3'-5⅞"	1'-1⅝"	5414.58
J	3'-1⅞"	11"	5414.32
K	3'-6⅞"	11"	
L	3'-8⅞"	11"	5414.62
M	3'-5⅞"	1'-8⅞"	
N	3'-7"	1'-8⅝"	
O	3'-8¹³⁄₁₆"	1'-8⅝"	
P	3'-2⅞"	1'-8⅝"	
R	3'-5⅞"	1'-0⅝"	

For 7-2-[illegible] [illegible] Change [illegible] Appr. slabs [illegible] & Quantities







STRUCTURE BACKFILL & MECHANICAL TAMPING DIAGRAM

All material that is to be mechanically tamped, shall be placed in horizontal layers not more than 6" in depth and tamped before the next layer is placed.

For 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.

POURING SCHEDULE	
Location	Cu Yds
Floor & Footings	22.5
Walls	11.0
Top Slab	19.0
Wings	3.5
TOTAL	56.0
Appr. Slabs	23.0

SUMMARY OF QUANTITIES

Item	Description	Unit	Box Culvert	Appr. Slab	Total
11e	Remove Present Conc Pavement	Sq Yd		53	53
11k	Remove Present Structure	Lump Sum			L.S.
14	Structural Excavation	Cu Yd	45	10	55
16a	Structure Backfill Class I	" "	30		30
16d	Mechanical Tamping	Hours	3		3
37c	Sand Cushion	Cu Yd		5	5
46a	Class "A" Concrete	" "	56	23	79
47	Reinf. Steel (1½% Overrun Incl.)	Lbs	5230	4760	9990
‡ 48	Struct Steel (1½% Overrun Incl)	"	2110		2110
*	½" Exp'n Jt Mat'l.	Sq Ft	21	32	53

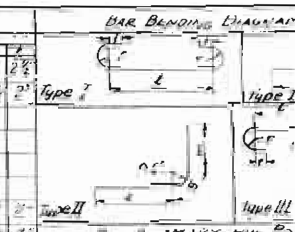
* Included in bid price of Class "A" Conc.
‡ Includes 2110 Lbs Handrail Steel

BAR LIST FOR CONCRETE BOX CULVERT

Mark	Size	No. Req'd	Length	Type	Dimensions			r	t
V1	5/8"ϕ	136	14'-10"	I	13'-10"			3"	2½"
V2	5/8"ϕ	26	5'-4"	III	1'-1"	1'-10"		2½"	2"
U1	5/8"ϕ	24	38'-10"	Str					
U2	5/8"ϕ	10	15'-6"	Str					
W1	½"ϕ	32	5'-4"	I	4'-2"			2"	2"
W2	½"ϕ	32	5'-10"	I	4'-6"			2"	2"
Y1	½"ϕ	6	38'-10"	Str					
B1	5/8"ϕ	8	7'-0"	II	5'-0"	1'-3"			
B2	5/8"ϕ	5	6'-7"	II	4'-7"	1'-3"			
B3	3/8"ϕ	5	7'-5"	II	5'-5"	1'-3"			
C1	5/8"ϕ	30	3'-9"	II	1'-2"	1'-10"			
C2	5/8"ϕ	18	5'-0"	II	2'-6"	1'-10"			
D1	5/8"ϕ	4	19'-8"	Str	Field Bend				
D2	½"ϕ	10	8'-4"	Str					
D3	½"ϕ	2	5'-6"	Str	Field Bend				
D4	5/8"ϕ	12	4'-6"	Str					
K1	5/8"ϕ	10	2'-11"	Str					
K2	½"ϕ	10	4'-5"	Str					

BAR LIST FOR 2 APPROACH SLABS

Mark	Size	No. Req'd	Length	Type	Dimensions			r	t
J1	3/4"ϕ	72	7'-0"	I	5'-0"			3"	2½"
J2	5/8"ϕ	10	20'-4"	Str					
J3	5/8"ϕ	10	11'-2"	Str					
J4			29'-8"						
to	5/8"ϕ	2 ea	by 1'-9" to	Str					
J19			3'-6"						
J20	5/8"ϕ	20	7'-4"	I	5'-8"			2½"	2"
J21	5/8"ϕ	10	34'-3"	Str					
J22			23'-9"						
to	3/4"ϕ	1 ea	by 3½" to	Str					
J31			6'-6½"						
J32			13'-7"						
to	3/4"ϕ	1 ea	by 3½" to	Str					
J33			10'-4½"						
J34			14'-0"		13'-0"				
to	3/4"ϕ	1 ea	by 3½" to	III	by 3½" to			3"	2½"
J129			3'-9½"		2'-9½"				
J130			10'-5"		9'-5"				
to	3/4"ϕ	1 ea	by 3½" to	II	by 3½" to			3"	2½"
J149			7'-2½"		6'-2½"				
J150	5/8"ϕ	7	5'-0"	Str					



BAR SUMMARY FOR BOX

1031 Lin. Ft. ½"ϕ Bars @ 0.668 Lbs
1399 " " 5/8"ϕ " " 1.043 "
2017 " " 3/4"ϕ " " 1.502 "
1½% Overrun
TO[illegible]

BAR SUMMARY FOR 2 APPR. [illegible]

1007 Lin. Ft. 5/8"ϕ Bar @ 1.043 Lbs
1983 " " 3/4"ϕ " " 1.502 "
1½% Overrun
TO[illegible]

LOADING DATA
[illegible]

DESIGNING DATA
[illegible]
1000[illegible]
20[illegible]
10

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JANUARY 1, 1948.
ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED.
FORMS FOR CONCRETE SURFACES EXPOSED TO THE FINISHED WORK SHALL BE [illegible] OF SHIPLAP OR TONGUE AND GROOVE LUMBER [illegible] PANEL BOARD.
[illegible] GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.
FOOTINGS IN ROCK SHALL BE POURED OUT TO THE ROCK AND [illegible].
ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.
ALL REINFORCING BARS SHALL BE DEFORMED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.
SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

All concrete surfaces exposed to view on the culvert & wing walls shall receive a Class I Surface Finish, except Culvert barrel.

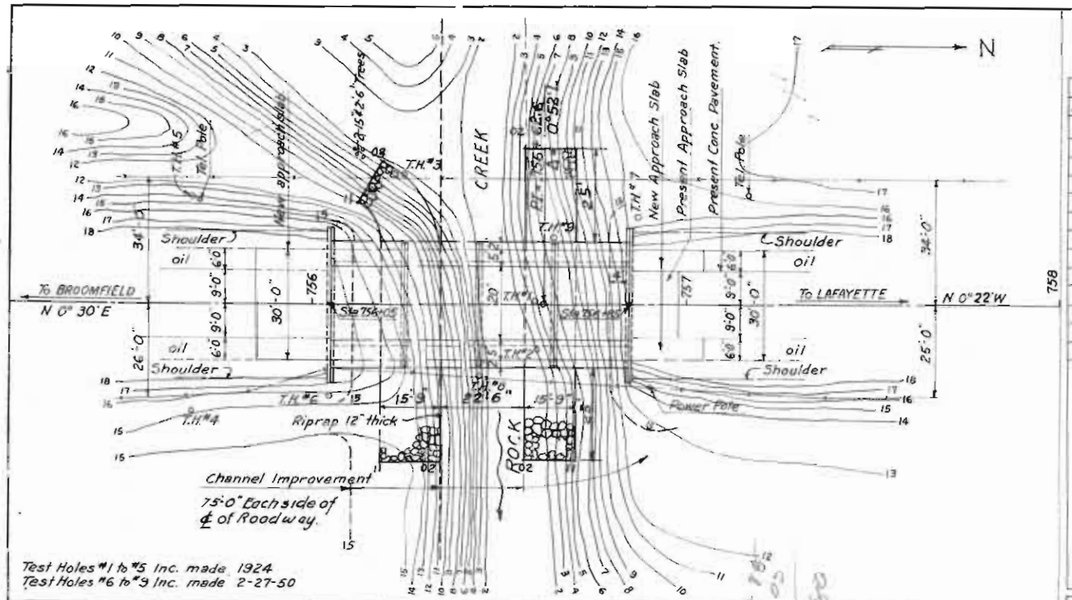
Str. No. E-16-f

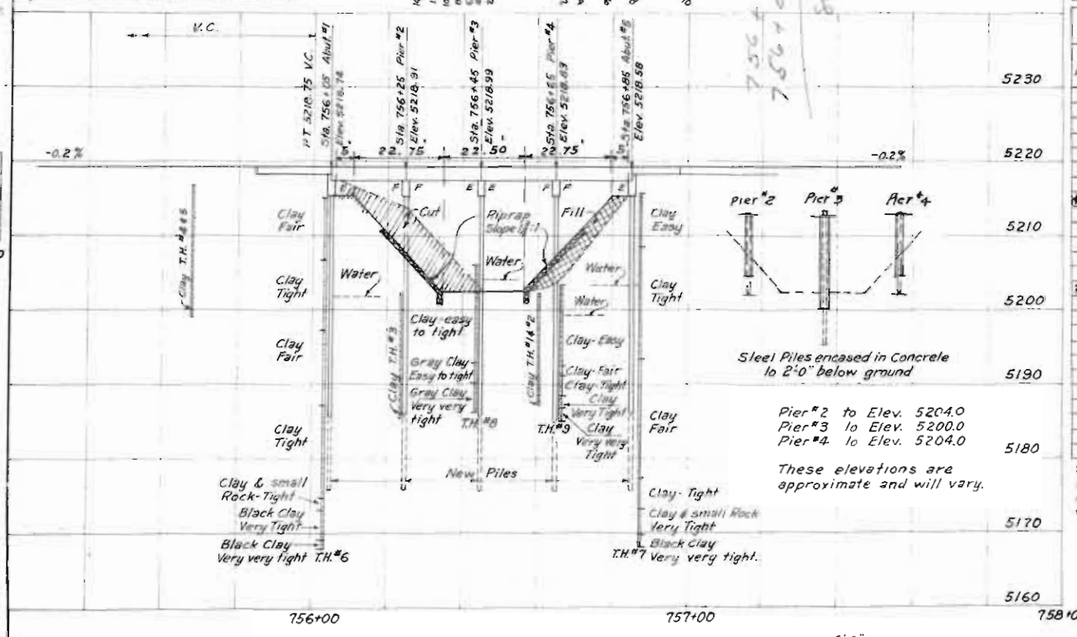
COLORA[DO]
STATE HIGHWAY DE[PARTMENT]
CONCRETE BOX [CULVERT]
10'-0" x 3'-0"
30'-0" ROADWAY 2'-0" [illegible]
STEEL HANDR[AIL]
SITUATION PLAN - PLAN [illegible]

Across DRY CREEK LATE[RAL]
Sta. 673+16.07
Near BROOMFIELD Sec. [illegible]

Designed by HWV	Approved [illegible]
Made by WLP	Bridg[e] [illegible]
Checked by HLP	Date: [illegible]

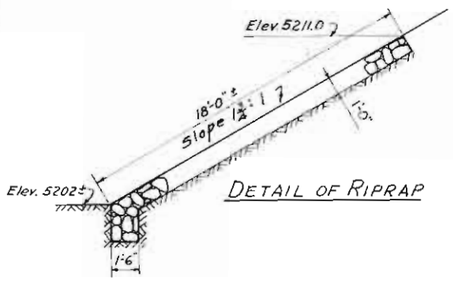
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
3	COLO	F 004-1(12)	17



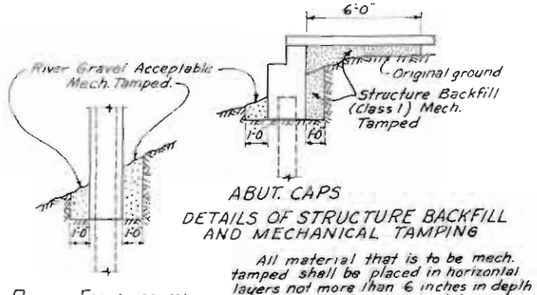


Pier #2 to Elev. 5204.0
Pier #3 to Elev. 5200.0
Pier #4 to Elev. 5204.0

These elevations are approximate and will vary.



DETAIL OF RIPRAP



PILES ENCASED IN CONCRETE AT PIERS

ABUT. CAPS
DETAILS OF STRUCTURE BACKFILL AND MECHANICAL TAMPING

All material that is to be mech. tamped shall be placed in horizontal layers not more than 6 inches in depth and tamped before the next layer is placed.

BAR LIST

SUPERSTRUCTURE

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	ℓ	m	r	t
E1	¾"ϕ	56	21'-0"	I	19'-0"		3"	2½"
E2	¾"ϕ	48	21'-11"	II			3"	2½"
D1	⅝"ϕ	192	5'-9"	Str.				
S1	⅞"ϕ	16	21'-4"	I	19'-0"		3½"	3"
S2	⅞"ϕ	8	22'-3"	II			3½"	3"
S3	⅝"ϕ	168	3'-6"	III				
S4	½"ϕ	16	10'-6"	Str.				
S5	½"ϕ	36	5'-9"	IV	1'-10½"	8"		
S6	½"ϕ	16	20'-6"	Str.				
S7	⅝"ϕ	36	4'-11"	VIII			2½"	2"

SUMMARY FOR SUPERSTRUCTURE

847 Lin.Ft of ½"ϕ @ 0.668 #/ft = 565 #
1869 Lin.Ft of ⅝"ϕ @ 1.043 #/ft = 1949 #
2228 Lin.Ft. of ¾"ϕ @ 1.502 #/ft = 3346 #
519 Lin.Ft. of ⅞"ϕ @ 2.044 #/ft = 1061 #
Overrun 1%± = 69 #
TOTAL = 6990 #

ABUTMENT No.1 AND ABUTMENT No.5

MARK	SIZE	NO. REQ'D Abut.1	Abut.5	LENGTH	TYPE	ℓ	m	r	t
K1	⅝"ϕ	6	6	24'-8"	V	11'-7"	1'-6"		
K2	½"ϕ	8	8	3'-6"	Str.				
K3	½"ϕ	8	8	13'-10"	VI	4'-9½"			
K4	½"ϕ	8	8	1'-0"	Str.				
K5	½"ϕ	12	12	1'-8"	Str.				
K6	⅝"ϕ	2	2	4'-6"	V	1'-6"	1'-6"		
K7	½"ϕ	4	4	5'-1"	IV	2'-7"	1'-7½"		
K8	½"ϕ	4	4	10'-11"	VI	3'-4"			
K9	⅝"ϕ	8	8	9'-10"	I	7'-2"		2½"	2"
K10	½"ϕ	4	4	7'-6"	Str.				

SUMMARY FOR ABUTMENT No.1 (ABUT No.5 SAME)

277 Lin Ft. of ½"ϕ @ 0.668 #/ft = 185 #
228 Lin Ft of ⅝"ϕ @ 1.043 #/ft = 238 #
Overrun 1%± = 7 #
TOTAL = 430 #

APPROACH SLABS

J1	⅜"ϕ	84	21'0"	I	19'-0"		3"	2½"
J2	⅜"ϕ	40	5'-8"	Str.				
J3	⅜"ϕ	20	29'-8"	Str.				

SUMMARY FOR APPROACH SLABS

820 Lin Ft of ⅝"ϕ @ 1.043 #/ft = 855 #
1764 Lin Ft. of ¾"ϕ @ 1.502 #/ft = 2650 #
Overrun 1%± = 44 #
TOTAL = 3549 #

PIER No.2, PIER No.3, AND PIER No.4

MARK	SIZE	NO. REQUIRED Pier No.2	Pier No.3	Pier No.4	LENGTH	TYPE	ℓ	m
P1	⅝"ϕ	6	6	6	14'-8"	V	6'-7"	1'-6"
P2	⅜"ϕ	8	8	8	5'-1"	I	3'-5"	2"
P3	½"ϕ	10	10	10	9'-1"	IV	2'-7"	1'-7½"
P4	⅝"ϕ	12		12	2'-0"	Str.		
P5	½"ϕ	8	8	8	1'-8"	Str.		
P6	⅝"ϕ	2	2	2	4'-6"	V	1'-6"	1'-6"
P7	½"ϕ	8	8	8	1'-0"	Str.		
P8	½"ϕ	4	4	4	3'-10"	Str.		

SUMMARY FOR PIER No.2 (PIER No.4 SAME)

128 Lin Ft of ½"ϕ @ 0.668 #/ft = 86 #
162 Lin Ft of ⅝"ϕ @ 1.043 #/ft = 169 #
Overrun 1%± = 5 #
TOTAL = 260 #

SUMMARY FOR PIER No.3

128 Lin Ft of ½"ϕ @ 0.668 #/ft = 86 #
138 Lin Ft of ⅝"ϕ @ 1.043 #/ft = 144 #
Overrun 1%± = 0 #
TOTAL = 230 #

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	SUPER-STRUCT.	ABUT NO.1	PIER NO.2	PIER NO.3	PIER NO.4	ABUT NO.5	CHANNEL IMPROVEMENT	BRIDGE TOTALS	APPROACH SLABS
11a	Rem. Present Conc. Pavement	SQ.YD									40
11e	Rem. Portion of Present Struct	LUMP								L.S.	
	℄ Cut Key in Deck Slab	SUM									
13c	Unclassified Excavation	CU.YD							800	800	
14a	Dry Rock Excav. (Str.)	CU.YD		5			5			10	
14b	Dry Common Excav. (Str.)	CU.YD		10	5	5	10		100	130	20
14c	Wet Rock Excav. (Str.)	CU.YD		5			5			10	
ϕ14d	Wet Common Excav. (Str.)	CU.YD				5			50	55	
16a	Structure Backfill (Class 1)	CU.YD		8	3	3	3	8		25	
16d	Mechanical Tamping	HOUR		0.8	0.3	0.3	0.3	0.8		2.5	
37c	Sand Cushion	CU.YD									5
46a	Class "A" Concrete	CU.YD	63	5	2.5	2.5	2.5	5		80.5	24.5
47	Reinf. Steel (Includes 1%% Overrun)	LBS	6990	430	260	230	260	430		8600	3540
‡48	Struct Steel (Includes 1½% Overrun)	LBS	6320	530				530		7380	
61a	Steel Piling (BP-12-53#)	LIN FT		160	80	80	80	160		560	
67a	Rip Rap (12" Thick)	CU.YD.							140	140	
80c	Sheet Copper (32 oz)	LBS	0.5							0.5	
89a	Drain Pipe (Conc Floor) 2'0" Long	EACH	8							8	
*	½" Exp. Joint Material	SQ FT	100							100	75
ϕ	Cl "A" Conc (Pile Encasement)	CU.YD			1.5	2.0	1.5			5	
ϕ	Wire Mesh (Pile Encasement)	LBS			15	20	15			50	

* Included in Bid Price of Class "A" Concrete
‡ All handrail Steel
ϕ Included in Bid Price of Steel Piling
✤ Wet Line assumed at Elev. 5204.00

POURING SCHEDULE

	Span No.1	Span No.2	Span No.3	Span No.4	Total
Superstructure	16.0	15.5	15.5	16.0	63
	Abut No.1	Pier No.2	Pier No.3	Pier No.4	Abut No.5
Parapet & Wing Posts	0.75				0.75
Cap	4.25	2.5	2.5	2.5	4.25
Total	5.0	2.5	2.5	2.5	5.0

REFERENCE DRAWINGS
Sheet No. 9 Details of Handrails
Sheet No. 18 Details of Superstructure-Piers-and Abutments.

GENERAL NOTES (CONT'D.)

All concrete surfaces exposed to view shall receive Class 1 surface finish; except underside of floor slabs and abutment faces between outside stringers and below floor slabs.

Paint- All structural steel shall receive one shop coat zinc chromate and two field coats of aluminum paint, except unexposed steel piling need not be painted.

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JAN. 1, 1948.

ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED.

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER OR UNLESS FACED WITH PANEL BOARD.

CONCRETE GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.

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

ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.

ALL REINFORCING BARS SHALL BE DESIGNED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.

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

ALL RIVETS TO BE ⅞" DIA. ALL RIVETS TO BE POWER DRIVEN.

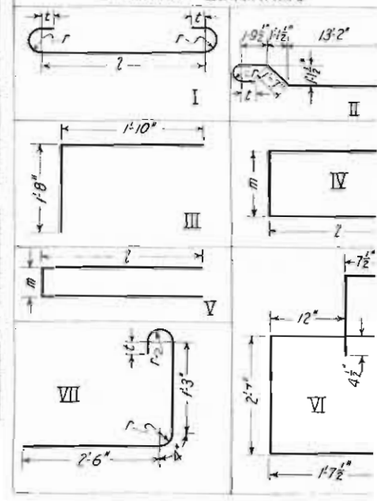
LOADING DATA

STEEL LOAD A.A.S.H.O. H-20-44
DEAD LOAD ALLOWED IS 150 PER SQ. FT.
ALL WEARING SURFACES WHICH INCLUDE CONCRETE MONOLITHIC WEARING SURFACE

DESIGNING DATA NEW MATERIALS A.A.S.H.O. 1949

PRESENT MATERIALS	A.A.S.H.O. 1949
fc = 650 lbs. per sq. in.	fc = 1000 lbs. per sq. in.
fs = 16000 lbs. per sq. in.	fs = 20000 lbs. per sq. in.
n = 15	n = 10

BENDING DIAGRAMS



COLORADO
STATE HIGHWAY DEPARTMENT

WIDENING & SPANS @ 20' CONCRETE PILE BRIDGE FROM 20' TO 30'. SH
GENERAL LAYOUT- BAR SUMMARY OF QUANTI

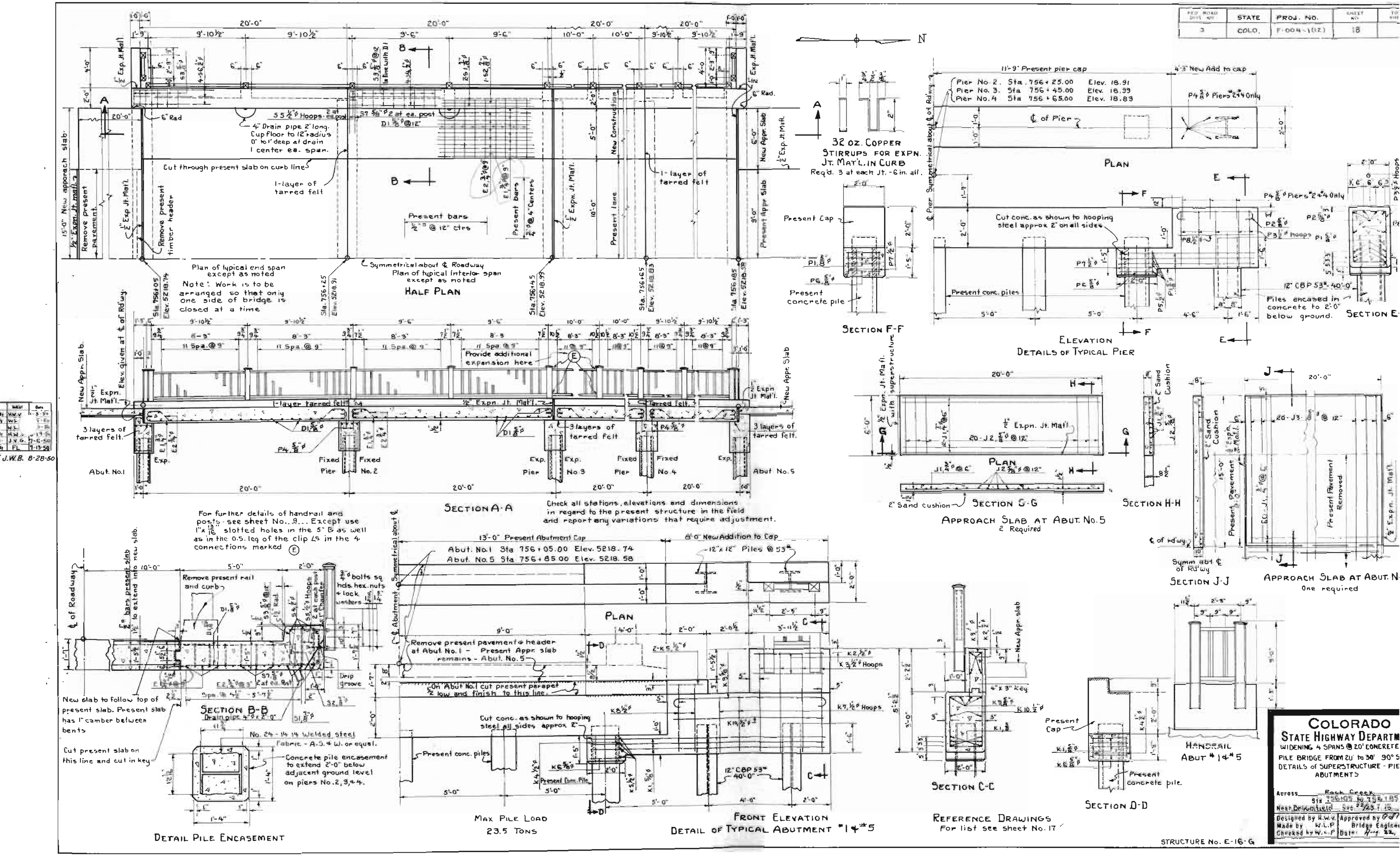
Across Rock Creek
Sta. 756+05 to 756+
Near Broomfield Sec. 22-2S-7

Designed by H.W.V.	Approved by
Made by W.L.P.	Bridge Engi
Checked by W.L.P.	Date Aug 22,

STRUCTURE No. E-16-G

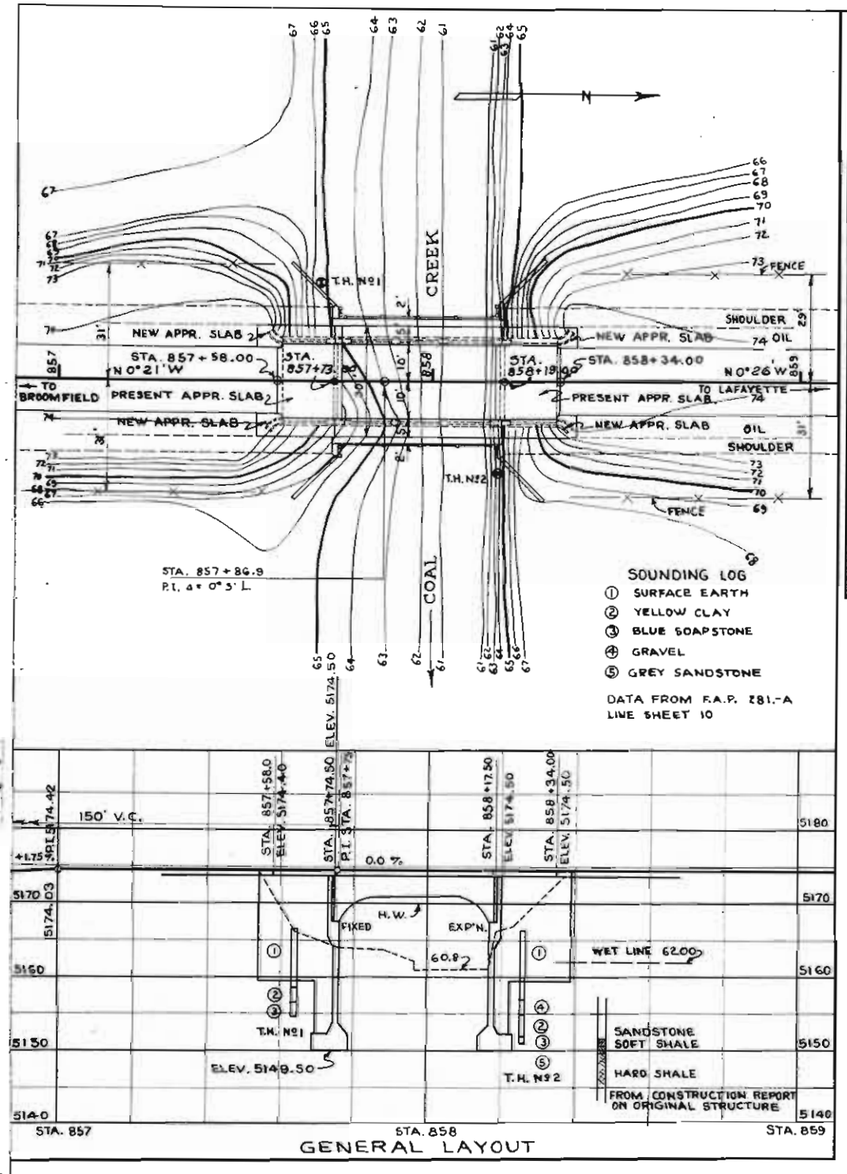
Accepted By	Initial	Date
Revised By	H.W.V.	1-3-50
Revised By	?	1-8-50
Revised By	?	1-8-50
Revised By	W.L.P.	6-19-50
Revised By	H. W.V.	7-7-50
Revised By	PC	8-2-50

J.W.B. 8-28-50



STATE
PROJ. NO.
3
COLO.
F-004-1(12)
18
N
HALF PLAN
Plan of typical end span except as noted
Symmetrical about ℄ Roadway
Plan of typical interior span except as noted
Note: Work is to be arranged so that only one side of bridge is closed at a time
Cut through present slab on curb line
1-layer of tarred felt
Present bars ½" @ 12" ctrs
4" Drain pipe 2' long. Cup floor to 12" radius 0" to 1" deep at drain 1 center ea. span.
15'-0" New approach slab
Remove present pavement.
Remove present timber header
New Construction
Present lane
New Appr. Slab
Present Appr. Slab
32 oz. COPPER STIRRUPS FOR EXPN. JT. MAT'L. IN CURB
Req'd. 3 at each Jt. - 6 in. all.
Pier No. 2. Sta. 756+25.00 Elev. 18.91
Pier No. 3. Sta. 756+45.00 Elev. 18.99
Pier No. 4 Sta. 756+65.00 Elev. 18.83
11'-9" Present pier cap
4'-3" New Add to cap
℄ of Pier
PLAN
Cut conc. as shown to hooping steel approx 2" on all sides
Present conc. piles
12" CBP 53# - 40'-0"
Piles encased in concrete to 2'-0" below ground.
ELEVATION
DETAILS OF TYPICAL PIER
SECTION F-F
SECTION E-E
Present Cap
Present concrete pile
SECTION A-A
Abut. No. 1
Fixed Pier No. 2
Exp. Pier No. 3
Fixed Pier No. 4
Abut. No. 5
3 layers of tarred felt.
Provide additional expansion here
Check all stations, elevations and dimensions in regard to the present structure in the field and report any variations that require adjustment.
For further details of handrail and posts - see sheet No. 8... Except use 1"x½" slotted holes in the 5" ⊏ as well as in the O.S. leg of the clip ∠s in the 4 connections marked (E)
APPROACH SLAB AT ABUT. NO. 5
2 Required
SECTION G-G
SECTION H-H
SECTION J-J
APPROACH SLAB AT ABUT. NO. 1
One required
2" Sand cushion
½" Expn. Jt. Mat'l
SECTION B-B
New slab to follow top of present slab. Present slab has 1" camber between bents
Cut present slab on this line and cut in key
Remove present rail and curb
DETAIL PILE ENCASEMENT
No. 24 - 14 14 Welded steel Fabric - A.S.&W. or equal.
Concrete pile encasement to extend 2'-0" below adjacent ground level on piers No. 2, 3 & 4.
13'-0" Present Abutment Cap
6'-0" New Addition to Cap
Abut. No. 1 Sta 756+05.00 Elev. 5218.74
Abut. No. 5 Sta 756+85.00 Elev. 5218.58
12"x12" Piles @ 53#
PLAN
Remove present pavement & header at Abut. No. 1 - Present Appr. slab remains - Abut. No. 5
On Abut No. 1 cut present parapet ½" low and finish to this line.
Cut conc. as shown to hooping steel all sides approx 2"
Present conc. piles
12" CBP 53# 40'-0"
MAX PILE LOAD 23.5 TONS
FRONT ELEVATION
DETAIL OF TYPICAL ABUTMENT #1 & #5
SECTION C-C
REFERENCE DRAWINGS
For list see sheet No. 17
SECTION D-D
HANDRAIL ABUT #1 & #5
STRUCTURE No. E-16-G
COLORADO
STATE HIGHWAY DEPARTM
WIDENING 4 SPANS @ 20' CONCRETE PILE BRIDGE FROM 20' to 30' 90°
DETAILS of SUPERSTRUCTURE - PIE ABUTMENTS
Across Rock Creek
Sta 756+05 to 756+85
Near Broomfield
Designed by H.W.V.
Made by W.L.P.
Checked by W.L.P.
Bridge Engineer
J.W.B. 8-28-50

	STATE	PROJECT Nº	SHEET	TOTAL SHEETS
3	COLO.	F004-1-(12)	19	



GENERAL LAYOUT

SUMMARY OF QUANTITIES

ITEM Nº	DESCRIPTION	UNIT	SUPER-STRUCTURE	ABUT. Nº1	ABUT. Nº2	BRIDGE TOTALS	APPROACH SLABS
11f	REMOVE PORTIONS OF PRESENT BRIDGE	L.S.				LUMP SUM	
14a	DRY ROCK EXCAVATION (STR.)	CU. YD.		5	5	10	
14b	DRY COMMON EXCAVATION (STR.)	CU. YD.		115	65	180	15
14c	WET ROCK EXCAVATION (STR.)	CU. YD.		5	5	10	
14d	WET COMMON EXCAVATION (STR.)	CU. YD.		335	335	670	
16a	STRUCTURE BACKFILL (CLASS 1)	CU. YD.		390	340	730	
16d	MECHANICAL TAMPING	HOUR		39	34	73	
37c	SAND CUSHION	CU. YD.					3
46a	CLASS "A" CONCRETE	CU. YD.	41	103.5	103.5	248	11
47	REINFORCING STEEL (INCL. 1⅓% OVERRUN)	LB.	8140	5180	9060	26,380	1670
48 *	STRUCTURAL STEEL (INCL. 1½% OVERRUN)	LB.	3610	530	530	4670	
89a	DRAIN PIPE (CONCRETE FLOOR) 2-0" LONG	EACH	4			4	
*	½" EXPANSION JOINT MATERIAL	SQ. FT.	26	110	110	246	

*INCLUDE IN BID PRICE CLASS "A" CONCRETE

* STRUCTURAL STEEL INCLUDES-

	SUPERSTRUCTURE	ABUT Nº1	ABUT. Nº2
HANDRAILS	3420 LBS.	530 LBS.	530 LBS.
BOLTS & WASHERS	190 LBS.		

BAR LIST FOR 4 APPROACH SLABS

MARK	SIZE	Nº REQ'D.	LENGTH	TYPE	ℓ	r	t
J1	½"Φ	40	20'-2"	II	19'-2"	3"	2½"
J2	½"Φ	4	3'-6"	STR.			
J3	½"Φ	4	3'-0"	STR.			
J4	½"Φ	64	4'-8"	STR.			
J5	½"Φ	16	5'-8"	STR.			

BAR SUMMARY FOR 4 APPROACH SLABS

833 LIN. FT. ½"Φ @ 1.502 LBS. PER LIN. FT. = 1251 LBS
389 " " ⅝"Φ @ 1.043 " " " " = 406 "
PLUS 1% ± OVERRUN = 13 "
TOTAL = 1670 "

JER & W.L.P.

Ⓣ DENOTES TEST BARS 2-Q1

REFERENCE DRAWINGS

SHEET Nº	9	HANDRAIL DETAILS
SHEET Nº	20	SUPERSTRUCTURE DETAILS, BACKFILL DIAGRAMS.
SHEET Nº	21	ABUTMENT DETAILS & BAR LISTS

BAR LIST FOR SUPERSTRUCTURE

MARK	SIZE	Nº REQ'D.	LENGTH	TYPE	ℓ	m	n	P	r	t
Q1	½"Φ	18	41'-6"	STR.						
E1	⅝"Φ	126	6'-9"	I					2½"	2"
E2	⅝"Φ	126	5'-6"	II	4'-8"				2½"	2"
Q1	1"Φ	12 Ⓣ	3'-0"	STR.	DOWELS					
S1	1"Φ	4	44'-8"	IV	MAY BE BENT IN FIELD				4"	3½"
S2	1"Φ	4	46'-3"	III	16'-6"	4'-8½"	1'-7"	3'-4"	4"	3½"
S3	1"Φ	2	46'-3"	III	12'-6"	4'-8½"	4'-7"	3'-4"	4"	3½"
S4	1"Φ	2	46'-3"	III	9'-6"	4'-8½"	7'-7"	3'-4"	4"	3½"
S5	½"Φ	42	9'-5"	V	3'-9"	0'-7½"				
S6	½"Φ	4	9'-6"	V	3'-9½"	0'-7½"				
S7	½"Φ	4	9'-7"	V	3'-10"	0'-7½"				
S8	½"Φ	4	9'-10"	V	3'-11½"	0'-7½"				
S9	½"Φ	4	10'-1"	V	4'-1"	0'-7½"				
S10	½"Φ	4	10'-5"	V	4'-3"	0'-7½"				
S11	½"Φ	4	10'-8"	V	4'-4½"	0'-7½"				
S12	½"Φ	4	11'-0"	V	4'-6½"	0'-7½"				
S13	½"Φ	4	11'-5"	V	4'-9"	0'-7½"				
S14	½"Φ	4	11'-11"	V	5'-0"	0'-7½"				
S15	½"Φ	4	12'-5"	V	5'-3"	0'-7½"				
S16	½"Φ	4	12'-11"	V	5'-6"	0'-7½"				
S17	½"Φ	4	13'-5"	V	5'-9"	0'-7½"				
S18	½"Φ	20	0'-9"	STR.						
S19	½"Φ	20	4'-6"	V	1'-3"	0'-8"				
S20	½"Φ	20	4'-8"	VI						
S21	½"Φ	10	45'-6"	STR.						
S22	½"Φ	12	6'-4"	V	1'-8"	1'-2"				
S23	½"Φ	66	4'-0"	STR.						
S24	½"Φ	6	6'-0"	V	2'-2"	0'-6"				
S25	½"Φ	12	14'-4"	V	6'-4"	0'-6"				
V1	1"■	4	45'-0"	IV					4"	4"
V2	1"■	4	46'-0"	III	15'-6"	3'-8"	2'-4"	2'-7"	4"	4"
V3	1"■	2	46'-0"	III	12'-6"	3'-8"	5'-4"	2'-7"	4"	4"
V4	1"■	2	46'-0"	III	9'-6"	3'-8"	8'-4"	2'-7"	4"	4"
V5	½"Φ	42	7'-11"	V	3'-0"	0'-7½"				
V6	½"Φ	4	8'-0"	V	3'-0½"	0'-7½"				
V7	½"Φ	4	8'-1"	V	3'-1"	0'-7½"				
V8	½"Φ	4	8'-4"	V	3'-2½"	0'-7½"				
V9	½"Φ	4	8'-7"	V	3'-4"	0'-7½"				
V10	½"Φ	4	8'-11"	V	3'-6"	0'-7½"				
V11	½"Φ	4	9'-2"	V	3'-7½"	0'-7½"				
V12	½"Φ	4	9'-6"	V	3'-9½"	0'-7½"				
V13	½"Φ	4	9'-11"	V	4'-0"	0'-7½"				
V14	½"Φ	4	10'-5"	V	4'-3"	0'-7½"				
V15	½"Φ	4	10'-11"	V	4'-6"	0'-7½"				
V16	½"Φ	4	11'-5"	V	4'-9"	0'-7½"				
V17	½"Φ	4	12'-11"	V	5'-0"	0'-7½"				
V18	½"Φ	20	0'-9"	STR.						
V19	½"Φ	24	4'-0"	X						

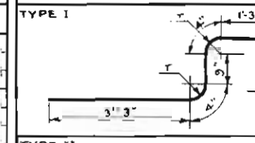
BAR SUMMARY SUPERSTRUCTURE

3083	LIN. FT. ½"Φ @ 0.668 LBS. PER LIN. FT. =	2059	LBS.
1997	" " ⅝"Φ @ 1.043 " " " " =	2083	"
585	" " 1"Φ @ 2.670 " " " " =	1562	"
548	" " 1⅛"■ @ 4.303 " " " " =	2358	"
	PLUS 1% ± OVERRUN =	78	"
	TOTAL =	8140	"

M.G.O. & W.L.P.

BENDING DIAGRAMS

TYPE I



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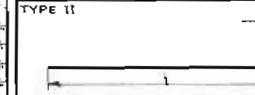

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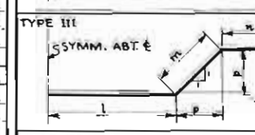

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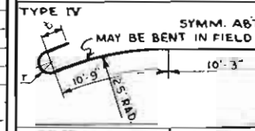

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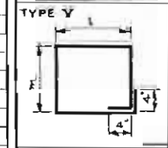

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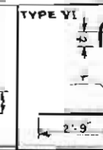

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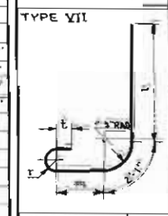

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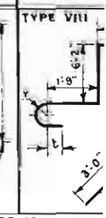
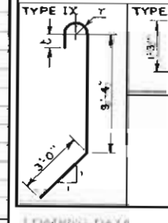


TYPE IX



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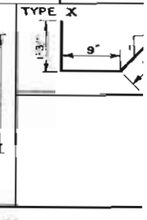


LOADING DATA

DESIGNING DATA

REINF. 1000 2000 10

GENERAL NOTES (CONT'D)

ALL CONCRETE SURFACES EXPOSED TO VIEW SHALL RECEIVE CLASS "1" SURFACE FINISH, EXCEPT UNDERSIDE OF FLOOR SLABS, INSIDE FACES OF GIRDERS AND ABUTMENT FACES BELOW GIRDERS BETWEEN VERTICAL JOINTS IN WINGWALLS. CONCRETE GIRDER PANELS SHALL RECEIVE CLASS "4" SURFACE FINISH.

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

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JAN. 1, 1948.

ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED.

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SMOOTH OR TONGUE AND GROOVE LUMBER OR PLYWOOD PANEL BOARD.

CONCRETE GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.

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

ALL REINFORCING BARS SHALL BE KEPT CLEAN OF GREASE.

ALL REINFORCING BARS SHALL BE DETAILED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. HAND BENT SHALL NOT BE SPLICED.

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

COLORADO STATE HIGHWAY DEPARTMENT

DETAILS OF WIDENING
1-40'-0" SPAN CONCRETE GIRDE
GENERAL LAYOUT
SUMMARY OF QUANTI
BAR LISTS

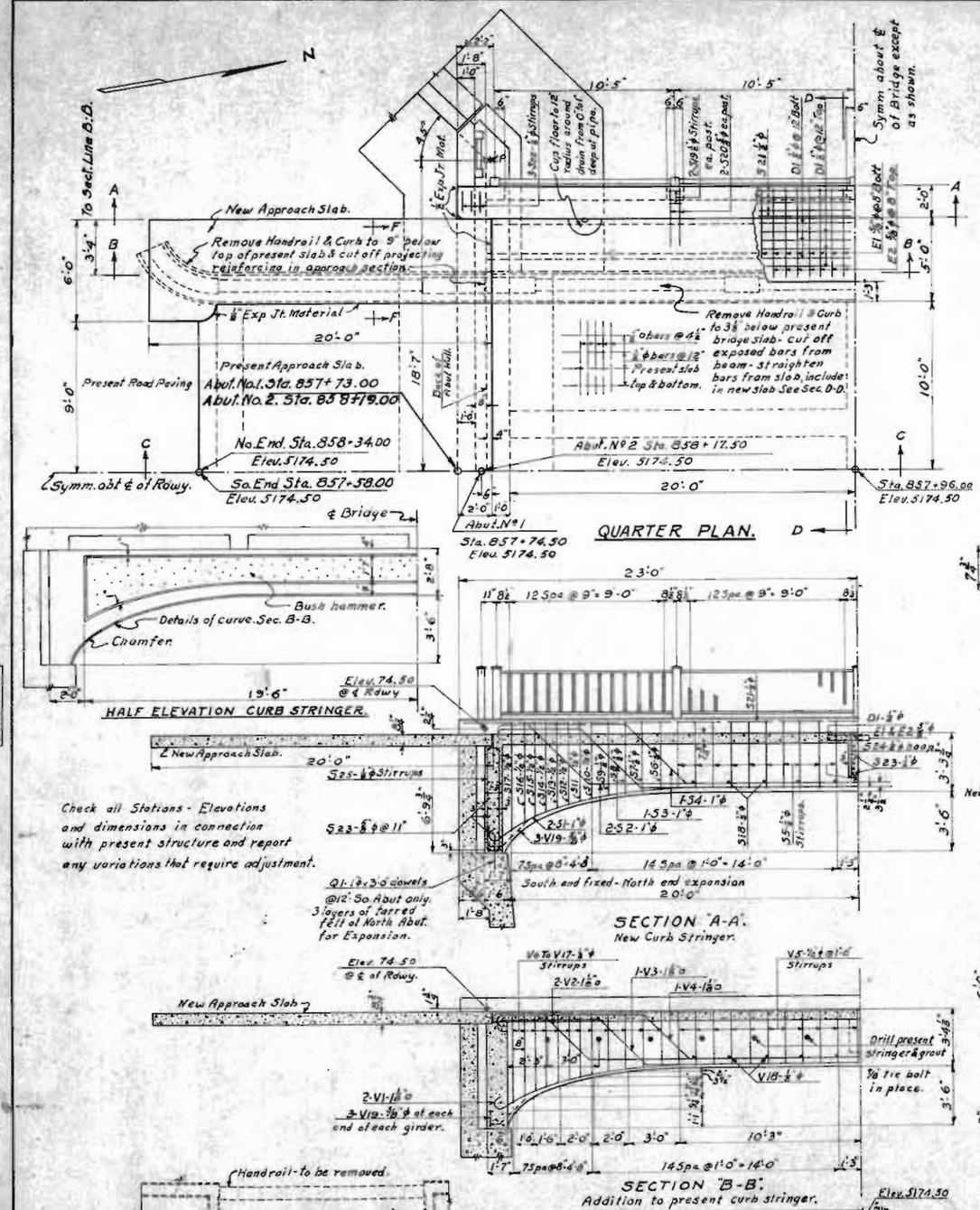
APPROX. COAL CREEK
STA. 857+73.50 to 858+1
NEAR LAFAYETTE STA. 10 + 15

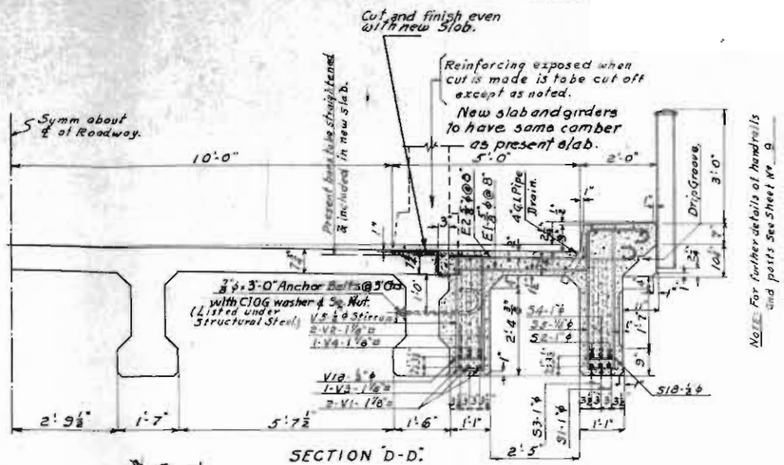
Designed by H.W.V.	Approved by
Made by H.W.V.	Bridge Engr.
Checked by W.L.P.	Date: July 22,

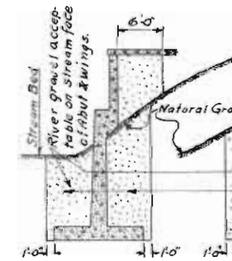
STRUCTURE Nº E-16-H

Revised 11-8-50 L.W.F. (Finish Note)

FED. ROAD DIST. NO.	STATE	PROJECT Nº	SHEET NO.
3	COLO.	F004-1 (12)	20

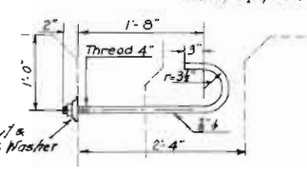






STRUCTURE BACKFILL & MECHANICAL TAMPING DIAGRAM.

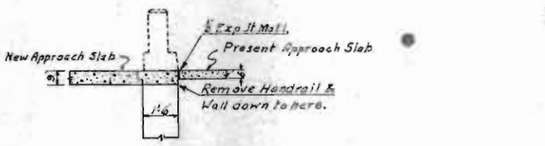
All material that is to be mechanically tamped shall be placed in horizontal layers not more than 6 inches in depth, and well tamped before next layer is placed.
Rolling equipment shall not be used within 6 feet



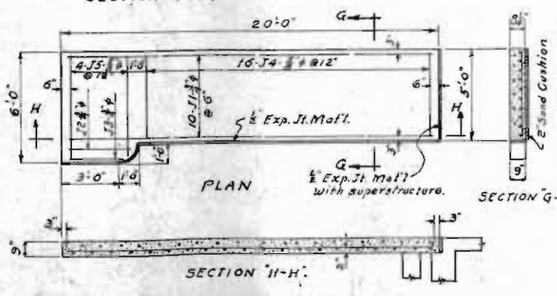
DETAIL ANCHOR BOLTS
24 Reqd.
7/8" x 3'-0"

NOTE

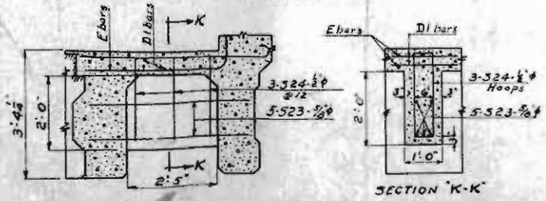
Traffic to be maintained across bridge at all times during construction. Widening to be done on one side at a time.



SECTION "F-F."

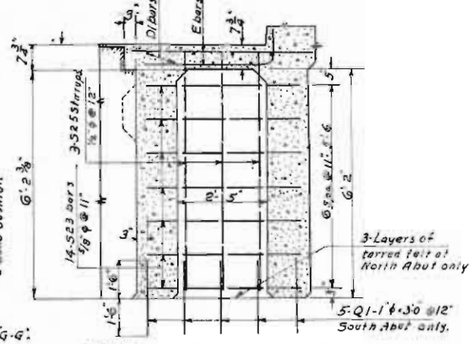


TYPICAL APPROACH SLAB ADDITION.
4 - REQ'D.



SECTION "K-K"

ELEVATION & SECTION CENTER CROSS BEAM.



ELEVATION END CROSS BEAM.

REFERENCE DRAWINGS.

No. 19	General Layout - Bar Lists & Summary of Quantities.
No. 9	Hand Rail Details
No. 21	Abutment & Wing Details & Abut Bar List.

DESIGNING DATA- PRESENT MATERIAL.

UNIT STRESSES.	
	fc = 650 Lbs per sq. in
Reinforcing Steel	fs = 18000 Lbs per sq. in
	n = 15.
Structural Steel	fs = 16350 Lbs. per sq. in.

LOADING DATA.
LIVE LOAD - A. A. S. H. O. H-20-44
DEAD LOAD - ASSUMES 15 LBS PER SQ. FT. FOR FUTURE WEARING SURFACE WHICH INCLUDES CONCRETE MONOLITHIC WEARING SUR

DESIGNING DATA.
A.A.S.H.O. 1949 UNIT STRESSES

	fc = 1000 lbs. per sq. in
Reinforcing Steel	fs = 20000 lbs. per sq. in
	n = 10
Structural Steel	fs = 18000 lbs. per sq. in.

COLORADO
STATE HIGHWAY DEPART

DETAILS FOR WIDENIN
CONCRETE GIRDER BR
ONE SPAN AT 40'
SUPERSTRUCTURE DET

Across COAL CREEK
Sta. 857+73.00 on Sta
Near Lafayette Sec. 10 T. 1

Designed by H.W.V.	Approved by C
Made by W.L.P.	Bridge Engi
Checked by W.L.P.	Date: Aug. 2

STRUCTURE Nº E-16-H.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO	F-004-1-(12)	23	

SECTION B-B

SECTION THRU POST HAUNCH

SECTION E-E

SECTION D-D

SECTION F-F

SECTION G-G

SECTION H-H

TRUE ELEVATION OF S.E. & S.W. WING

HALF PLAN OF ABUT. Nº2 & S.E. WING
S.W. WING ABUT. Nº2 & S.E. WING ABUT Nº2 SIMILAR

TRUE ELEVATION OF N.W. & N.E. WINGS

PLAN

S.W. CORNER ABUT. Nº2
ALL CORNERS SIMILAR
N.W. & S.E. OPPOSITE HAND

SECTION K-K

CHECK ALL STATIONS, ELEVATIONS AND DIMENSIONS IN CONNECTION WITH PRESENT STRUCTURE ROADWAY AND DITCH AND REPORT ANY VARIATION FOR ADJUSTMENT

FOR FURTHER DETAILS OF POSTS & HANDRAILS SEE SHEET Nº 9
POSTS AND ANGLES TO BE VERTICAL AND ℄ RAILS TO BE PARALLEL TO CURB GRADE.

SECTIONAL ELEVATION A-A
REINFORCING APPLIES TO PRESENT STRUCTURE

SECTION L-L

NOTE: WIDENING TO BE CARRIED OUT SO THAT ONLY ONE SIDE OF BRIDGE IS CLOSED AT A TIME.

DETAIL OF CUTS IN PRESENT WING

SECTION J-J

POURING SCHEDULE	SUPER	ABUT Nº1	ABUT Nº2
SUPERSTRUCTURE	21.0		
ABUT. WALL		1.5	1.5
E. WING		2.0	2.0
W. WING		2.0	2.0
FOOTING		5.0	7.0
TOTAL	21.0	10.5	12.5

REFERENCE DRAWINGS

SHEET Nº 22 GENERAL LAYOUT, BAR LIST AND SUMMARY OF QUANTITIES.

SHEET Nº 9 HANDRAIL DETAILS

COLORADO
STATE HIGHWAY DEPARTMENT
WIDENING OF STRUTTED SLAB CULVERT
DETAILS OF SUPERSTRUCTURE AND ABUTMENTS

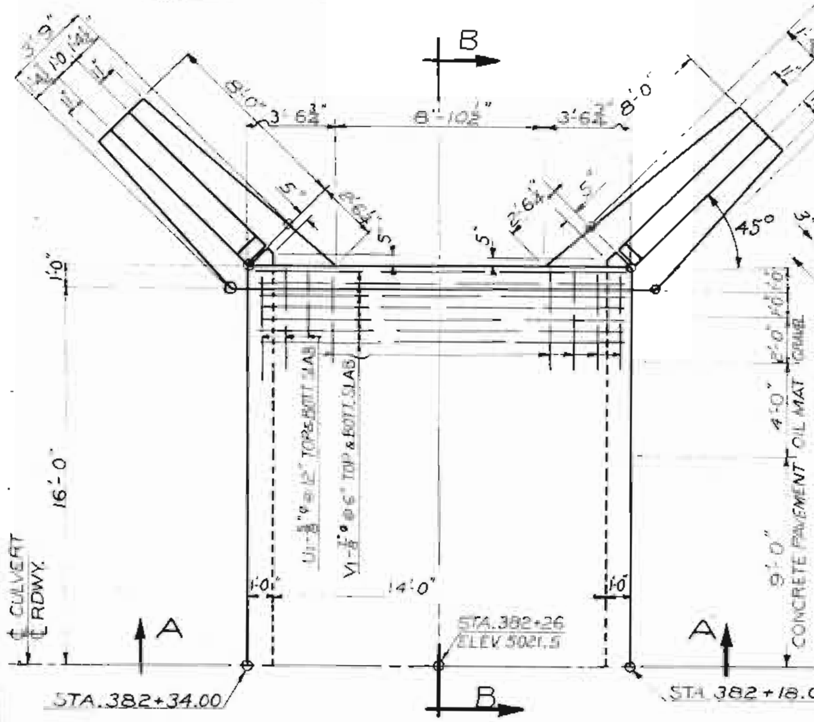
Across LOWER BOULDER IRRIGATION DITCH
Sta. 407+55.71 & 407+78.29
Near LAFAYETTE Sec. 15 T 1 N R 70 W

Designed by H.W.V.
Made by W.L.
Checked by W.L.P.

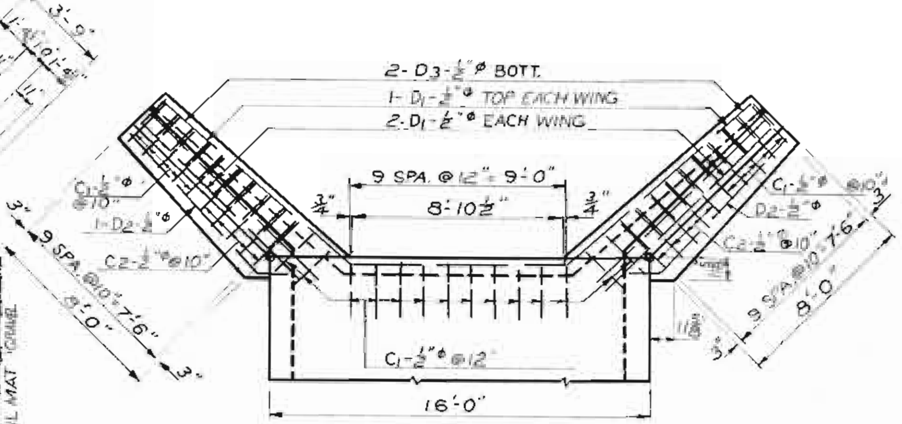
Approved by [illegible]
Bridge Engineer
Date: Aug. 22, 1950

STRUCTURE Nº D-16-S

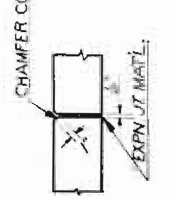
FED. ROAD DIST. NO.	STATE	PROJ. Nº	SHEET NO.	TO. SH.
3	COLO	F-004-1 (12)	24	



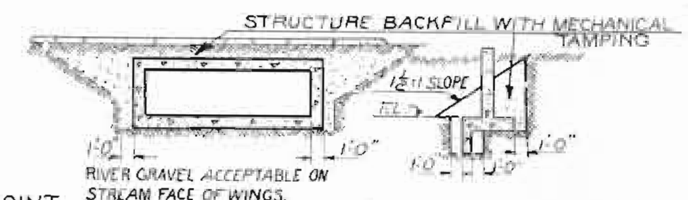
HALF PLAN



PLAN WING FOOTING & CUTOFF WALL



EXPANSION JOINT

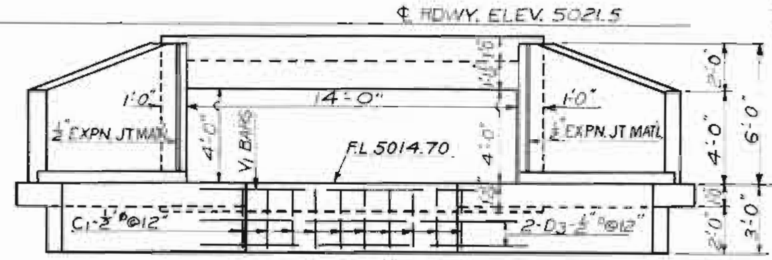


STRUCTURE BACKFILL (MECHANICAL TAMPING DIAGRAM)

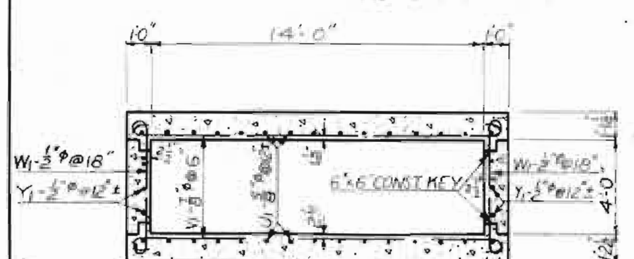
PRESENT ROAD SLAB TO BE REMOVED TO 4 FT. EACH SIDE OF CULVERT AND IS TO BE REPLACED WHEN CULVERT HAS BEEN COMPLETED.

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

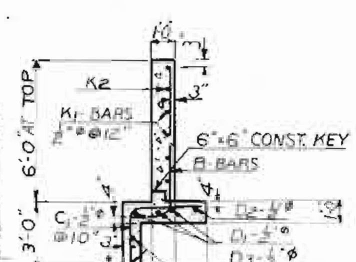
CHECK STATIONS AND ELEVATIONS WITH PRESENT PAVEMENT AND WITH DITCH AND REPORT ANY VARIATIONS FOR ADJUSTMENT.



END ELEVATION

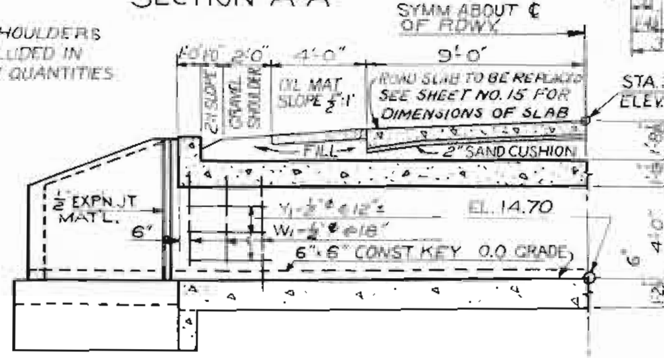


SECTION A-A

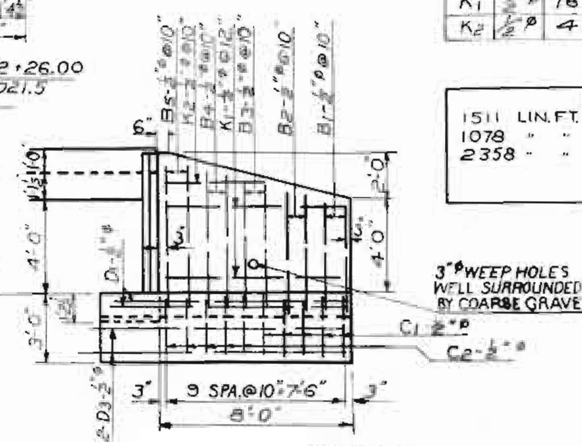


TYPICAL WING SECTION

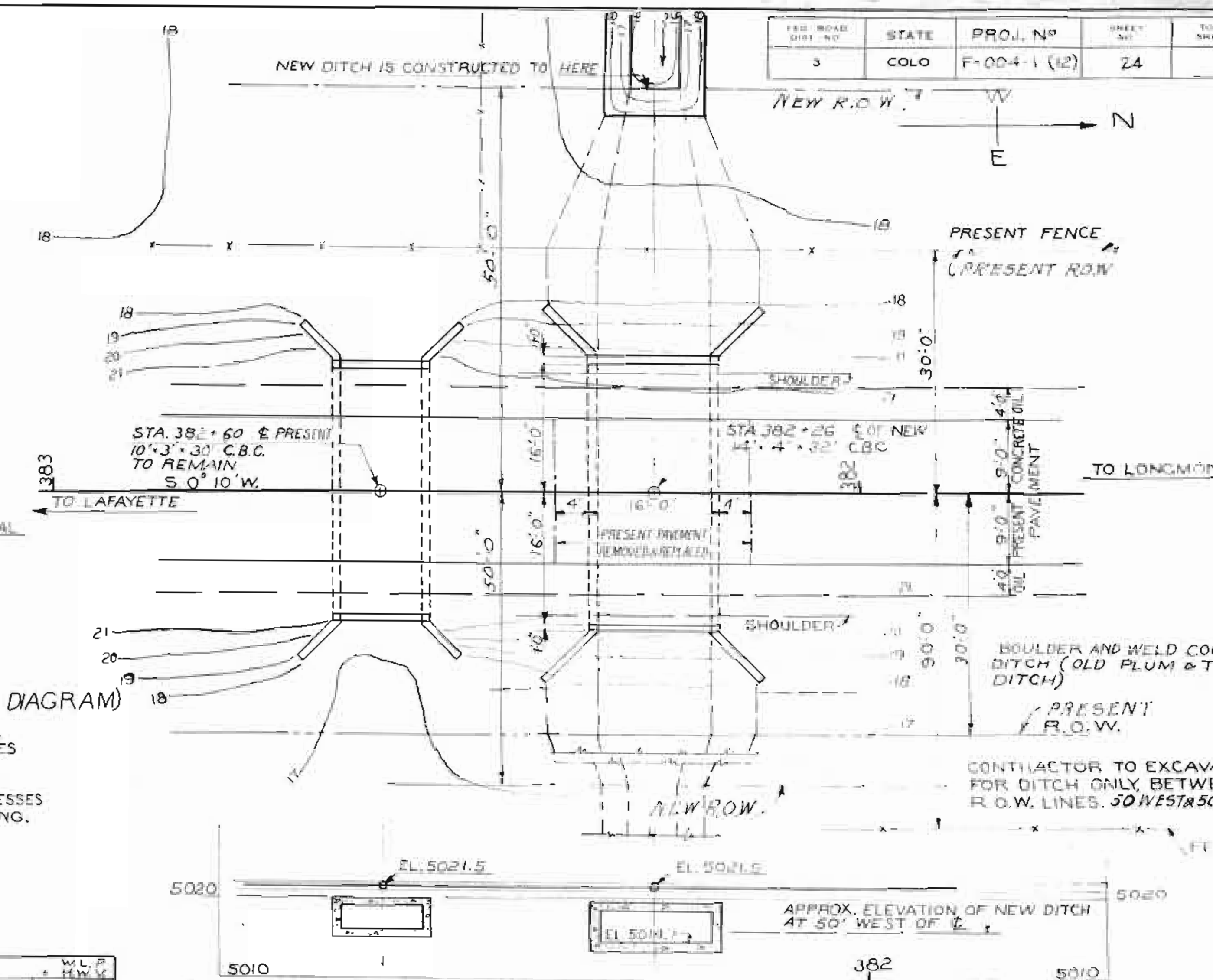
OILED SHOULDERS TO BE INCLUDED IN ROADWAY QUANTITIES



SECTION B-B



TRUE ELEVATION WINGWALL



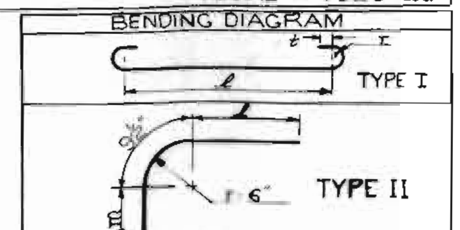
GENERAL LAYOUT

BAR LIST									W.L.P.	H.W.V.
MARK	SIZE	NO. REQ'D.	LENGTH	TYPE	ℓ	m			T	t
V1	⅝"Ø	136	17'-4"	I	15'-0"				3½"	3"
U1	⅝"Ø	32	33'-8"	STR.						
W1	½"Ø	46	6'-10"	I	5'-6"				2"	2"
Y1	½"Ø	6	33'-8"	STR.						
C1	½"Ø	48	4'-4"	II	1'-8½"	1'-10"				
C2	½"Ø	20	4'-9"	II	2'-1½"	1'-10"				
D1	½"Ø	12	10'-6"	STR.						
D2	½"Ø	4	9'-0"	STR.	FIELD BEND					
D3	½"Ø	4	29'-10"	STR.	FIELD BEND					
B1	½"Ø	8	5'-8"	II	3'-11½"	0'-11"				
B2	½"Ø	8	6'-3"	II	4'-5½"	1'-0"				
B3	½"Ø	8	6'-10"	II	4'-11½"	1'-1"				
B4	½"Ø	8	7'-3"	II	5'-3½"	1'-2"				
B5	½"Ø	8	7'-8"	II	5'-7½"	1'-3"				
K1	½"Ø	16	7'-8"	STR.						
K2	½"Ø	4	4'-5"	STR.						

BAR SUMMARY

1511 LIN. FT. ½"Ø BARS @ 0.668 LBS. PER LIN. FT. = 1009 LBS.
1078 " " ⅝"Ø " @ 1.043 " " " " = 1125 "
2358 " " ⅞"Ø " @ 2.044 " " " " = 4820 "
PLUS 1% FOR OVERRUN = 66 "
TOTAL = 7020 LBS.

BENDING DIAGRAM



SUMMARY OF QUANTITIES		W.L.P. EFF.	H.W.V.
ITEM	DESCRIPTION	UNIT	TOTAL
11g	REMOVE PRESENT PAVEMENT	SQ.YD.	48
13c	UNCLASSIFIED EXCAVATION FOR DITCH	CU.YD.	300
14	STRUCTURAL EXCAVATION	CU.YD.	62
16a	STRUCTURE BACKFILL	CU.YD.	100
16d	MECHANICAL TAMPING	HRS.	10
37a	CONCRETE PAVEMENT	SQ.YD.	48
37c	SAND CUSHION	CU.YD.	3
46a	CLASS "A" CONCRETE	CU.YD.	72
*	½" EXP'N. JOINT MATERIAL	SQ.FT.	24
47	REINFORCING STEEL (INCL. 1% OVERRUN)	LB.	7020

* TO BE INCLUDED IN BID PRICE FOR CLASS "A" CONCRETE

POURING SCHEDULE	
Floor Footing & Cutoff walls	32.0 Cu Yds
Box Walls	10.0 Cu Yds
Slab & Headwalls	24.0 Cu Yds
Wing Walls	6.0 Cu Yds
Total	72.0 Cu Yds

LOADING DATA
LIVE LOAD A.A.S.H.O. 1949 H-20

DESIGNING DATA
1000 lbs. per sq. in.
20000 lbs. per sq. in.
10

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JAN. 1, 1948.
ALL CONCRETE SHALL BE CLASS A AND AIR-ENTRAINED AS SPECIFIED.
FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER S1S UNLESS FACED WITH PANEL BOARD.
CONCRETE GIRDERS, FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY.
FOOTINGS IN ROCK SHALL BE POURED OUT TO THE ROCK AND NOT FORMED.
ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE.
ALL REINFORCING BARS SHALL BE DEFORMED AND TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION. MAIN BARS SHALL NOT BE SPLICED.
SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.
ALL CONCRETE SURFACES EXPOSED TO VIEW ON THE CULVERT AND WING WALLS SHALL RECEIVE CLASS I SURFACE FINISH, EXCEPT CULVERT BARREL.

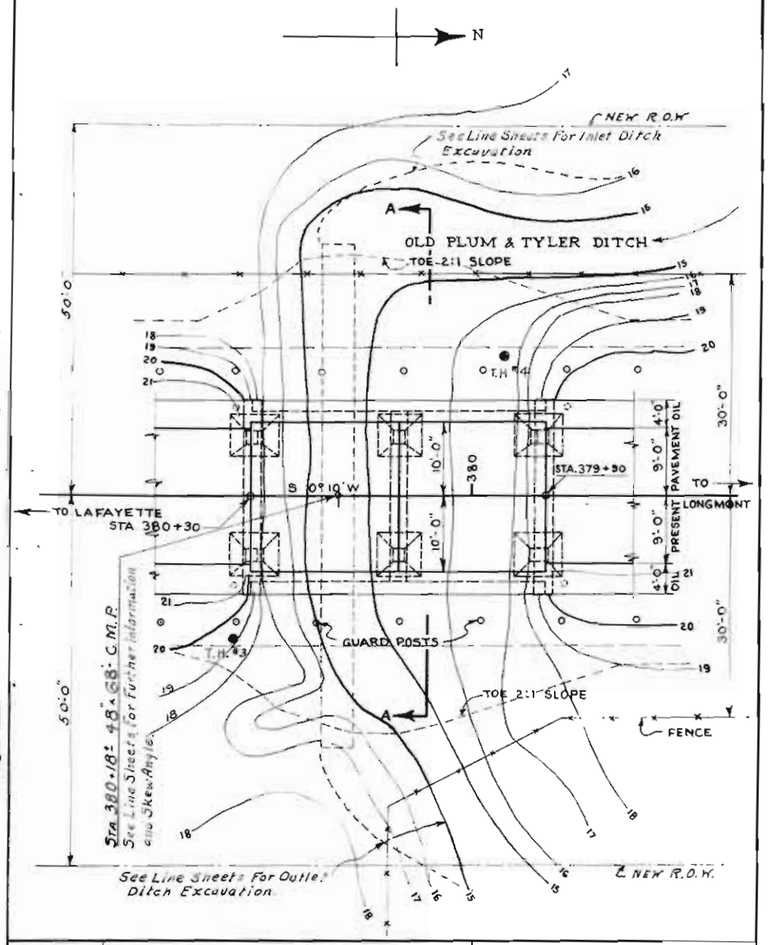
STRUCTURE Nº D-16-9

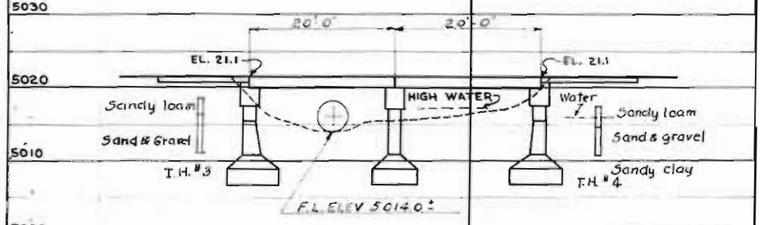
COLORADO
STATE HIGHWAY DEPART
CONCRETE BOX CULVE
14'-0" x 4'-0" x 32'-0"
SITUATION PLAN
PLAN-DETAILS-BAR LIS
QUANTITY SUMMAR
Across BOULDER & WELD CO. D
Sta. 382+18 to 38
Near LAFAYETTE Sec. 15 T. 1 N.

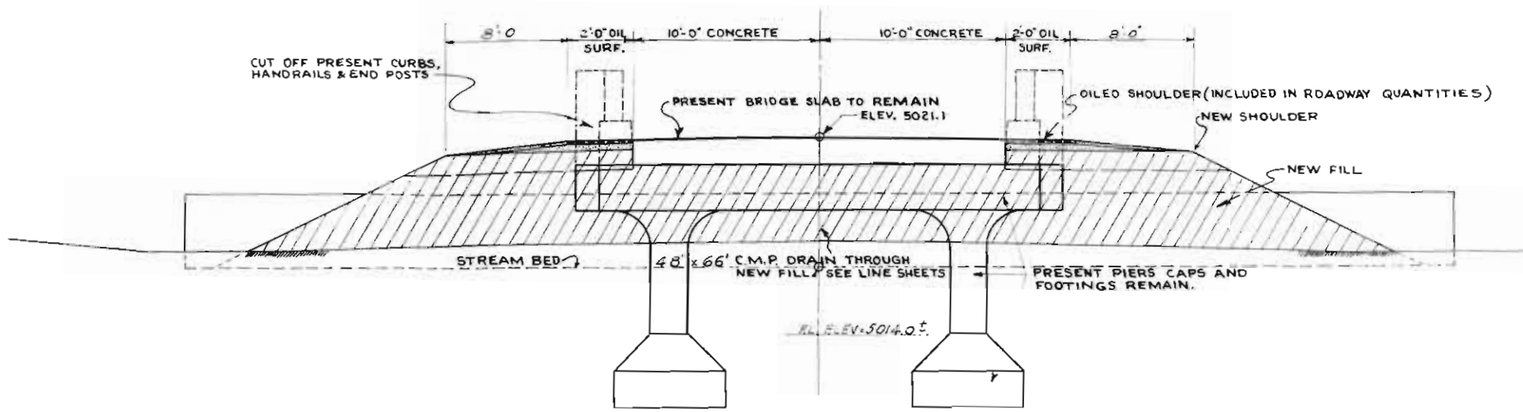
Designed by W.L.P.	Approved by
Made by W.L.P.	Bridge Engr.
Checked by H.W.V.	Date: Aug. 22,

Initial	Date
WLP	7-50
HWV	-50
WLP	
HWV	7-14-50
F.L.	7-25-50
WLP	7-27-50
J.K.B.	9-5-50

FED. ROAD PROJ. NO.	STATE	PROJECT Nº	SHEET Nº
3	COLO	F 004-1(12)	25







SECTION "A-A"

SUMMARY OF QUANTITIES

ITEM Nº	DESCRIPTION	UNIT	TOTAL
11 h	REMOVING PORTIONS OF PRESENT STRUCTURE	LUMP SUM	L.S.
13 c	UNCLASSIFIED EXCAVATION FOR FILL (FILL +15%)	CU. YD.	270
16 d	MECHANICAL TAMPING	HOUR	30

NOTE: SEE ROADWAY LINE SHEETS FOR C.M.P. FOR DRAINAGE.

STRUCTURE Nº D-16-Q

COLORADO
STATE HIGHWAY DEPAR

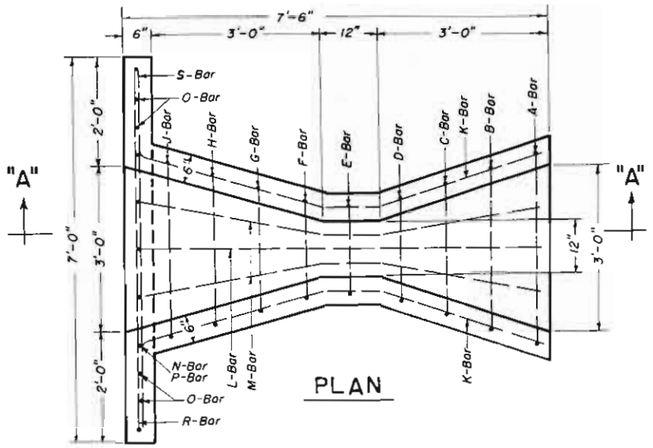
FILLING IN OF TWO
@ 20' BRIDGE

Across OLD PLUM & TYLER D
Sta. 379+90 TO 38
Near LAFAYETTE Sec. 15 T 1

Designed by H.W.V. | Approved by O.
Made by E.F.F. | Bridge Eng
Checked by W.L.F. | Date: Aug.

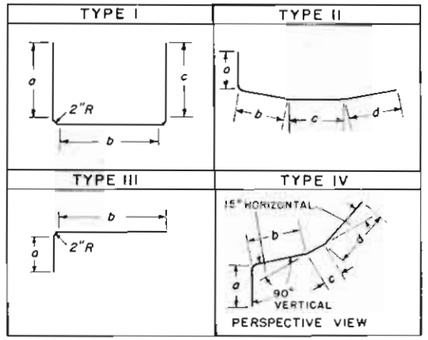
FED. ROAD DIV. NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOT. SHEETS
9	COLO.	F 004-1(12)	26	

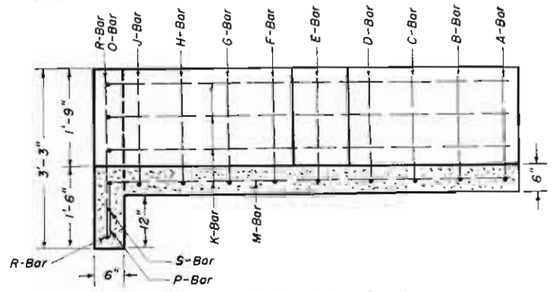
CONCRETE WEIR STA. 363+



PLAN

BENDING DIAGRAM





SECTION A-A

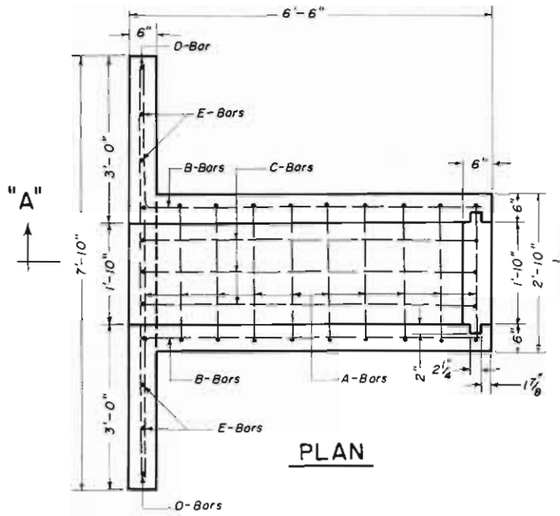
BAR LIST

MARK	TYPE	DIMENSIONS a	b	c	d	LENGTH OF BENDS	LENGTH OF ONE BAR	NO. REQ'D	TOTAL LENGTH OF BARS	SPACING
A	I	1'-8"	3'-0"	1'-8"		6"	6'-10"	9	52'-7"	10"
B	I	1'-8"	2'-6"	1'-8"		6"	6'-4"			
C	I	1'-8"	1'-11"	1'-8"		6"	5'-9"			
D	I	1'-8"	1'-4"	1'-8"		6"	5'-2"			
E	I	1'-8"	1'-2"	1'-8"		6"	5'-0"			
F	I	1'-8"	1'-4"	1'-8"		6"	5'-2"			
G	I	1'-8"	1'-10"	1'-8"		6"	5'-8"			
H	I	1'-8"	2'-3"	1'-8"		6"	6'-1"			
J	I	1'-8"	2'-9"	1'-8"		6"	6'-7"			
K	II	1'-6"	3'-3"	1'-0"	3'-0"	3"	9'-0"	8	72'-0"	7"
L	III	0'-11"	6'-11"			3"	8'-1"	1	8'-1"	See Detail
M	IV	0'-11"	3'-2"	1'-0"	2'-11"	3"	8'-3"	2	16'-6"	See Detail
N	I	1'-8"	3'-2"	1'-8"		6"	7'-0"	1	7'-0"	See Detail
O	STR	2'-11"					2'-11"	4	11'-8"	
P	STR.	1'-2"					1'-2"	2	2'-4"	
R	I	2'-8"	6'-2"	2'-8"		6"	12'-0"	1	12'-0"	See Detail
S	STR	6'-8"						1	6'-8"	
							TOTAL		188'-10"	

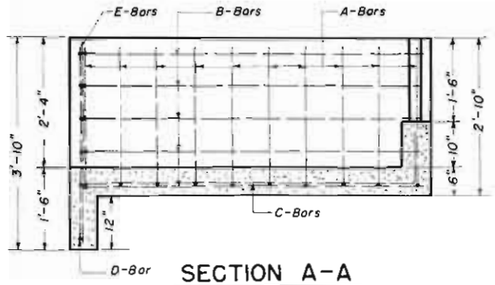
All bars $\frac{1}{2}$" ϕ at 0.668 lbs. per lin. ft.
188'-10" x 0.668 lbs per lin. ft. = 126 lbs
Plus 1% for Overrun = 1 lb.
Total Reinforcing Steel = 127 lbs

1.24 Cu. Yds. of Class "A" Concrete

CONCRETE WEIR STA. 672+

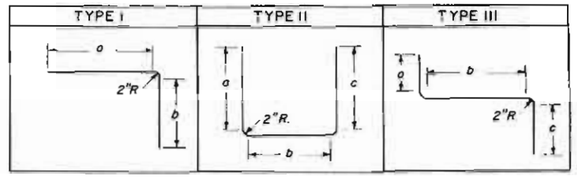


PLAN



SECTION A-A

BENDING DIAGRAM



BAR LIST

MARK	TYPE	DIMENSIONS a	b	c		LENGTH OF BENDS	LENGTH OF ONE BAR	NO. REQ'D	TOTAL LENGTH OF BARS	SPACING
A	II	2'-3"	2'-3"	2'-3"		6"	7'-3"	10	72'-6"	8"
B	I	5'-11"	2'-5"			3"	8'-7"	10	85'-10"	7"
C	III	0'-9"	5'-8"	0'-11"		6"	7'-4"	3	22'-0"	7"
D	II	3'-3"	7'-0"	3'-3"		6"	14'-0"	1	14'-0"	See Detail
E	STR.	—	—	—			3'-6"	4	14'-0"	10
							TOTAL		208'-4"	

All bars $\frac{1}{2}$" ϕ at 0.668 lbs. per lin. ft
208'-4" x 0.668 lbs per lin. ft = 139 lbs.
Plus 1% for Overrun = 1 lb
Total Reinforcing Steel = 140 lbs.

3 pcs. 2" x 6" x 2'-1½" Misc Untr. Timber for Flash Boards = 6.4 Bd. Ft.
1.34 Cu. Yds. Class "A" Concrete.

GENERAL NOTES FOR BOTH STRUCTURES

Where practicable all bars shall be placed in the center of walls and floors.

All dimensions shown in bar lists are measured along the centerline of the walls and floors.

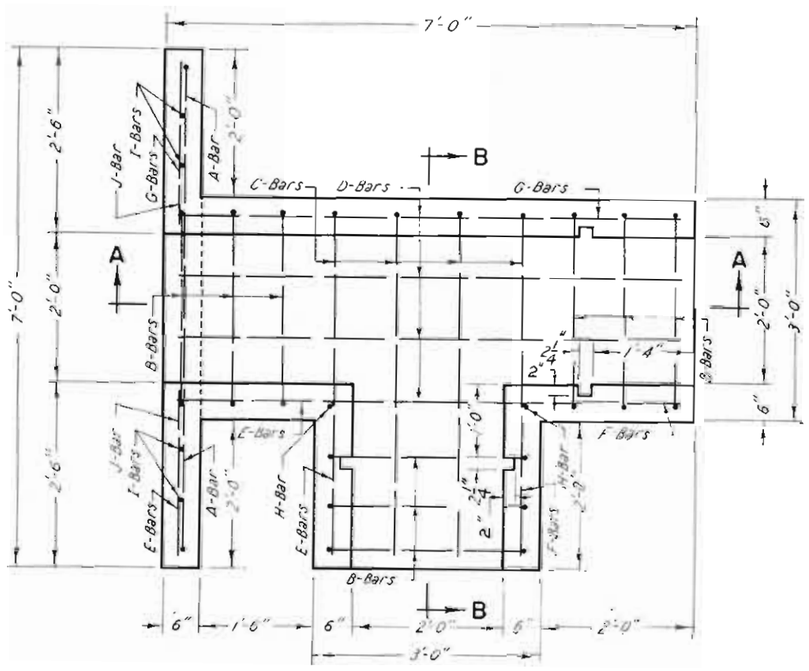
Bending radius for reinforcing steel = two (2) inches

Slots in walls required for Flash Boards shall be formed to a depth of 2 inches into walls and shall be 2 ¼" inches wide

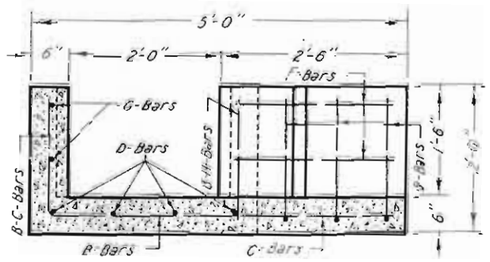
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
3	COLO.	F 004-1(12)	27

DETAILS OF CONCRETE DIVISION BOX

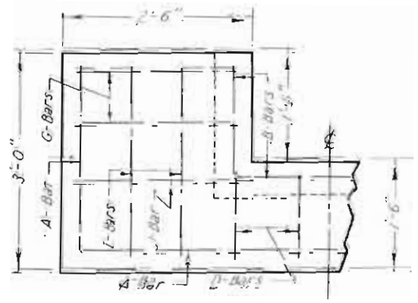
RT. STA. 672+



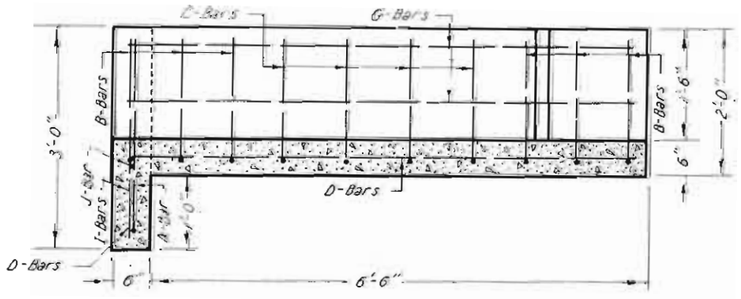
PLAN



SECTION B—B



1/2 ELEVATION OF HEADWALL



SECTION A—A

GENERAL NOTES

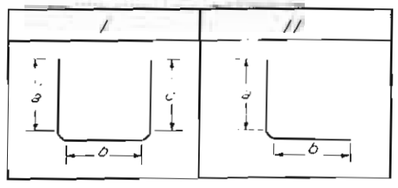
Where practicable all bars shall be placed in the center of walls and floors.

All dimensions shown in bar lists are measured along the centerline of the bars.

Bending radius for reinforcing steel = two (2) inches.

Slots in walls required for Flash Boards shall be formed to a depth of 2 inches into walls and shall be 2 1/4 inches wide.

BENDING DIAGRAM



BAR LIST

All dimensions are to ℄ of bars

MARK	TYPE	DIMENSIONS a	DIMENSIONS b	DIMENSIONS c	LENGTH OF ONE BAR	NO. REQ'D	TOTAL LENGTH OF BARS	SPACING
A	I	2'-5"	6'-2"	2'-5"	11'-6"	1	11'-6"	See Detail
B	I	1'-5"	2'-2"	1'-3"	5'-6"	9	49'-6"	8"
C	II	1'-5"	4'-5"		6'-1"	4	24'-4"	10"
D	II	0'-11"	6'-5"		7'-7"	4	30'-4"	16"
E	I	1'-11"	1'-8"	1'-11"	6'-0"	2	12'-0"	9"
F	II	1'-11"	1'-11"		4'-1"	2	8'-2"	9"
G	II	1'-11"	6'-5"		8'-7"	2	17'-2"	9"
H	Straight				1'-8"	2	3'-4"	See Detail
I	Straight				2'-8"	4	10'-8"	8"
J	Straight				2'-2"	2	4'-4"	See Detail

All bars ½"ϕ @ 0.668 lbs. per lin. ft. Total = 171'-4"
174'-4" x 0.668 lbs. per lin. ft = 115 lbs.
Plus 1% ± for over-run = 1 lb.
Total Reinforcing Steel = 116 lbs.

3 pcs. 2"x 6"x 2'-3" Misc. Untr. Timber for Flash Boards = 6.75 Bd. Ft.
1.22 Cu. Yds. Class "A" Concrete

All bars are to be placed in center of Walls and Slabs.

Rev 12-13-47 J.P.K.
Rev 7-1-49 J.R.E.
Rev 9-14-50 J.E.R

STANDARD M-10-B.

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO.	F004-1(17)	28

1 2 3 4 5 6 7 8 9 0 .

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

M N O P Q R S T U V W

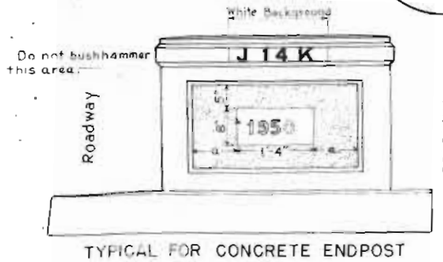
a f g l

abcdefghijklmnopqrstuvwxyz

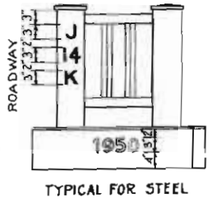
J 14 K 1950

SAMPLE BRIDGE NUMBER

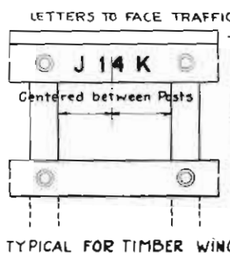
SAMPLE YEAR NUMBER



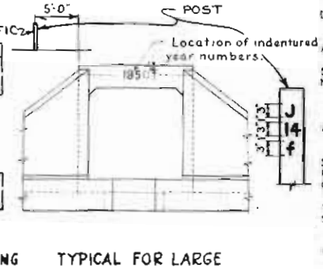
TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR STEEL HANDRAIL END POST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX GULVERTS

General Notes

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 15th 1948.

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

THE SIZE, SHAPE AND SPACING OF THE LETTERS AND FIGURES SHALL BE IN ACCORDANCE WITH THE FULL SIZE SHOWN ON THIS SHEET. ADDITIONAL COPIES OF THIS FULL SIZE SHEET CAN BE OBTAINED FROM THE DEPARTMENT WITHOUT CHARGE.

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

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

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

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

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY, THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED ON IT, WITH TWO COATS OF "SECOND FIELD COAT-DARK" OR "EXTERIOR BLACK PAINT (MAINT)" AS SPECIFIED UNDER ITEM 36 "PAINTS AND PAINTING". THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

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

MINOR STRUCTURES WITH CLEAR SPANS 12 TO 20 FEET INCLUSIVE SHALL BE STENCILED WITH STRUCTURE NUMBER THUS W-18-2 ON 3" STEEL MARKER POSTS WHERE PROVIDED AND AS SHOWN ON STATE HIGHWAY STD M-23-A

COLORADO
STATE HIGHWAY DEPARTM
STANDARD
LETTERS AND FIGUR
FOR
YEAR NUMBERS AN
STRUCTURE NUMBE

Designed by G.H.D.	Approved by
Made by W.P.M.	Bridge Engine
Checked by	Date: June 1, 1

STRUCTURE NO.

Initial	Date
G.H.D.	1-1-35
W.P.M.	6-1-46

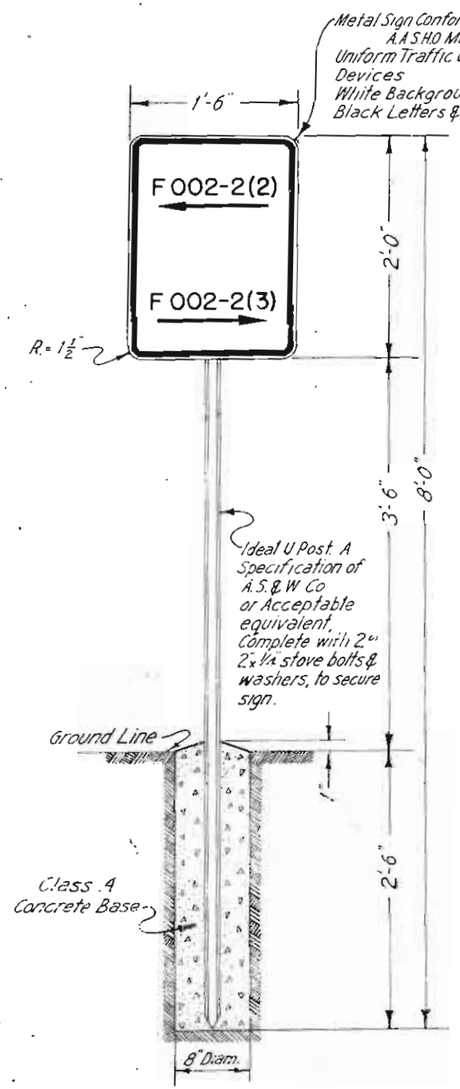
Rev. 6-28-40, A.Z. 1940 Specs.
Rev. 1-2-46, C.S.D. Item 818

STANDARD M-7-B

Rev. 8 Jan. 46 P.S.B. 1/2" ø to 1/2" ø
Rev. June 10 '46, W.E.M. Bronze Tablet
Rev. Mar. 21-1947, W.H.M. – Project Marker Post
Rev. Nov. 20-1947, J.P.K. – Metal Project Marker
Rev. Dec. 15-1947, J.P.K. – Concrete Base for Metal Project Marker
Rev. July 5-1950, J.C.R. – Rev. Note Re. Metal Sign for Project Marker, & R.O.W. Marker Markings

FED. ROAD DIST. NO.	STATE	SHEET NO.
3	COLO	[redacted] 004-1(12) 27

PROJECT MARKER POST
ITEM No 818



NOTES FOR PROJECT MARKER POSTS

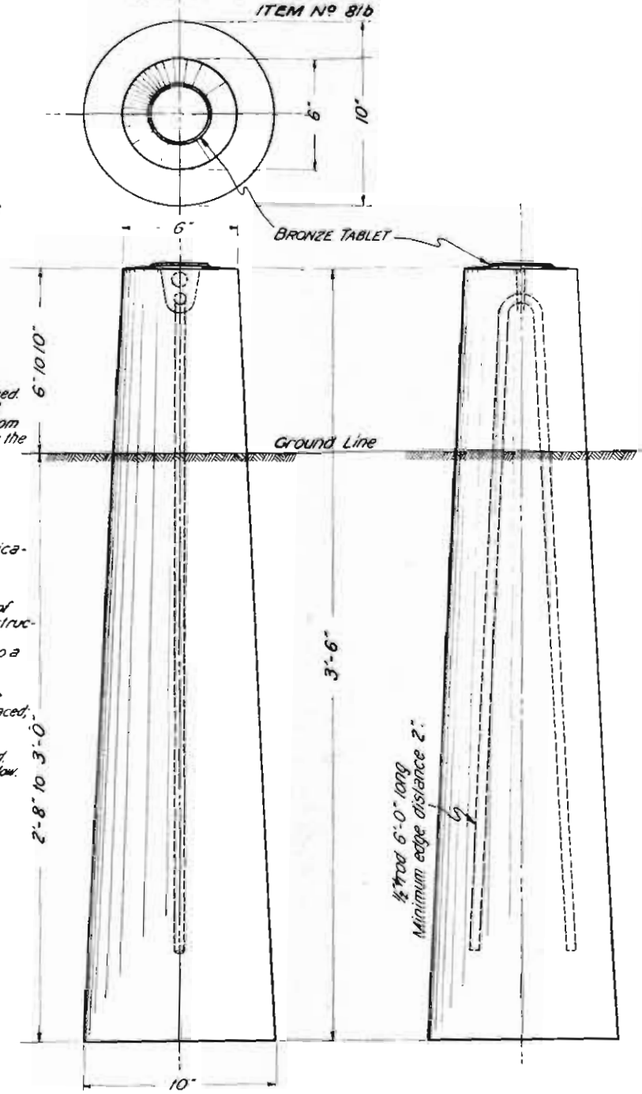
All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948

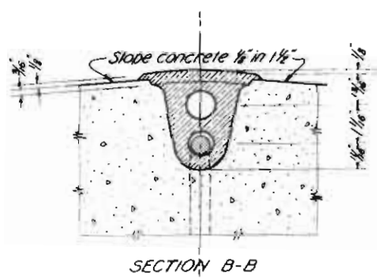
Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed. Post to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will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

NOTES FOR R.O.W. MARKER POSTS

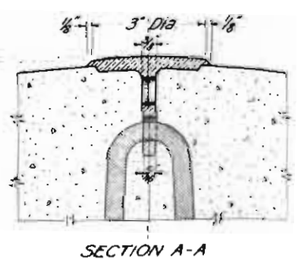
All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted January 1st 1948.
Posts shall be made of Class "A" Concrete.
The upper 12 inches of marker posts shall be rubbed free of form marks, and the top surface of the post must be constructed 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 the 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., F.I. for Fed. Aid Interstate, F. for Fed. Aid Primary, S. for Fed. Aid Secondary etc. & S.P. No. for State Projects, See detail below.

RIGHT OF WAY MARKER POST
ITEM No 818





SECTION B-B



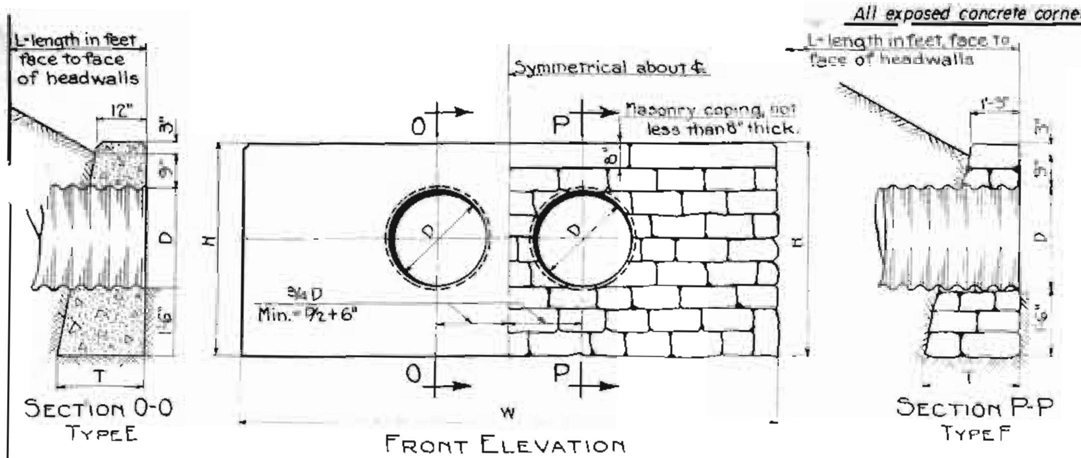
SECTION A-A

DETAIL OF BRONZE TABLET FOR RIGHT OF WAY MARKER POST

COLORADO
STATE HIGHWAY DEPA
STANDAR
MARKER PO

Designed by R.E.L.
Made by F.F.S.
Checked by R.E.L.
Approved by
Date: Janua

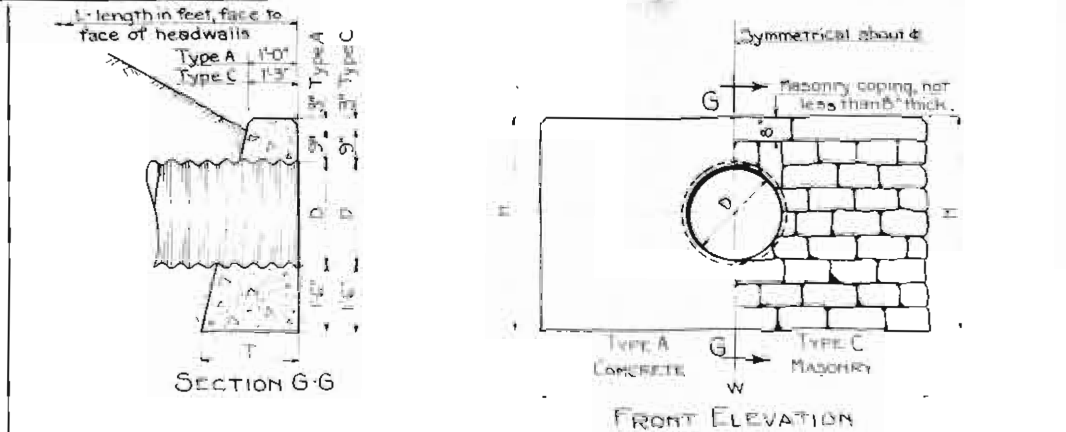
All exposed concrete corners shall be beveled to a 2" face



STANDARD HEADWALLS FOR DOUBLE CORRUG. METAL PIPE CULVERTS

TABLE OF DIMENSIONS AND QUANTITIES

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



STANDARD HEADWALLS FOR SINGLE CORRUG. METAL PIPE CULVERTS

TABLE OF DIMENSIONS AND QUANTITIES

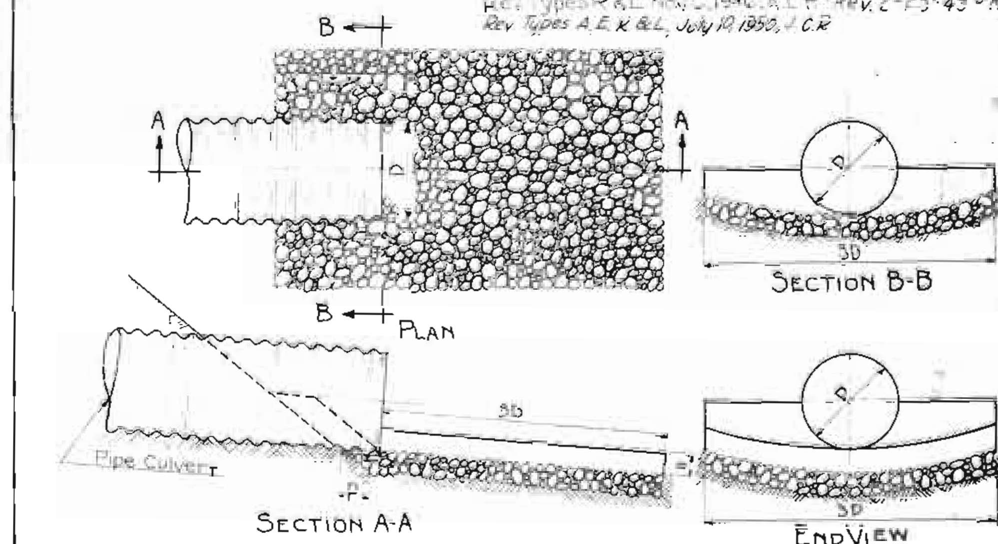
Type A			Both Types				Type C		
D Diam.	T	Class B Concrete in Two Headwalls	W	H	Corrugated Metal Pipe		Cement Rubble Masonry in Two Headwalls	T	D Diam.
15"	1'-6"	1.8 Cu. Yds.	5'-3"	3'-9"	16 Gage	L = Lin. Ft.	2.2 Cu. Yds.	2'-0"	15"
18"	1'-7"	2.2 Do	6'-0"	4'-0"	16 Do	L = Do	2.8 Do	2'-1"	18"
24"	1'-10"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

STANDARD M-102-G

Rev. 8-28-50, CGM - Dimension B, Line 7, Type L

No.	State	[redacted]	Sheet No.	Total Sheets
?	COLO	5004-1(2)	50	

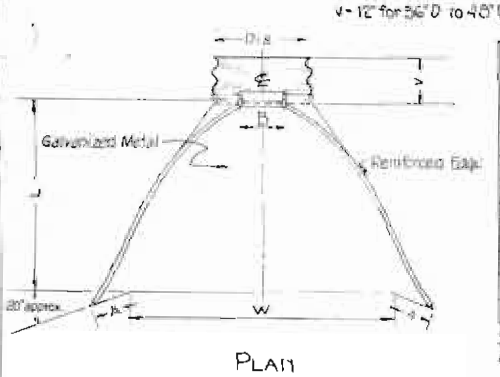
Rev. Types K&L Jan. 17, 1946, A.L.P. *Rev. 3-7-47 Type K&L*
Rev. Types C&F June 11, 1946, A.L.P. *Rev. 10-13-47 J.P.K.*
Rev. Types K&L Nov. 6, 1946, A.L.P. *Rev. 2-25-49 R.E.*
Rev. Types A, E, K & L, July 10, 1950, J.C.R.



STANDARD GROUTED RUBBLE APRON FOR PIPE CULVERTS

Square Yards Grouted Rubble Slope and Ditch Paving 1 Foot Thick														
Fill / Slope	D / B	15" / 7½"	18" / 9"	24" / 12"	30" / 12"	36" / 12"	42" / 12"	48" / 12"	54" / 12"	60" / 12"	66" / 12"	72" / 12"	78" / 12"	84" / 12"
1½:1	1'-0"	3	4	6	9	12	17	21	27	33	39	46	54	62
2:1	2'-0"	3	4	7	10	13	18	22	28	34	41	49	57	66
3:1	3'-0"	3	4	7	11	15	20	25	31	38	45	54	63	72
4:1	4'-0"	3	5	8	12	16	22	28	34	42	50	59	69	79

V = 7" for 12" D to 30" D
V = 12" for 36" D to 48" D

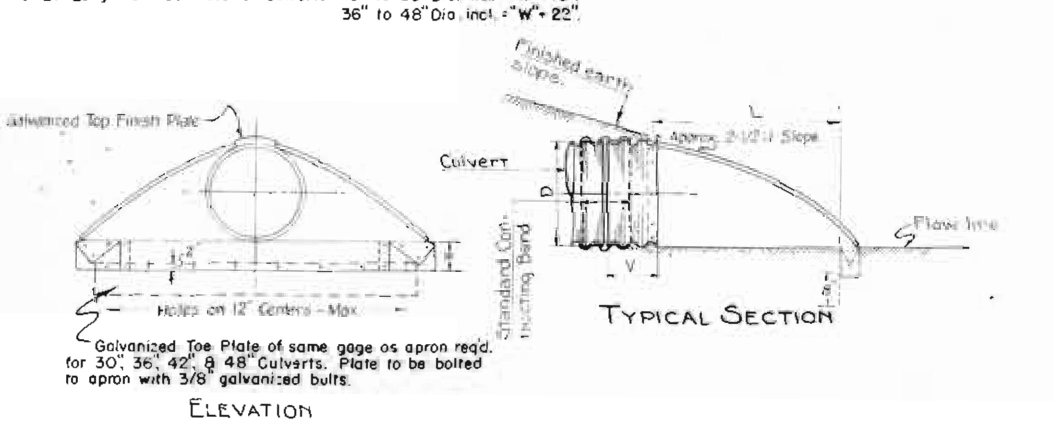


TYPE K

Culv. Diam. D▲	Gage	Dimensions: A 1" Tol.	B Max	L ½" Tol.	W 2" Tol.	H 1" Tol.	Remarks
15"	16	6"	8"	26"	30"	6"	One piece skirt
18"	16	7"	9"	31"	36"	6"	One piece skirt
24"	14	9½"	12"	42"	48"	6"	One piece skirt
30"	14	12"	15"	52½"	60"	7½"	Two piece skirt ●
36"	12	14"	18"	63"	72"	9"	Two piece skirt ●
42"	12	16"	21"	73½"	84"	10½"	Two piece skirt ●
48"	12	18"	27"	84"	90"	12"	Two piece skirt ●

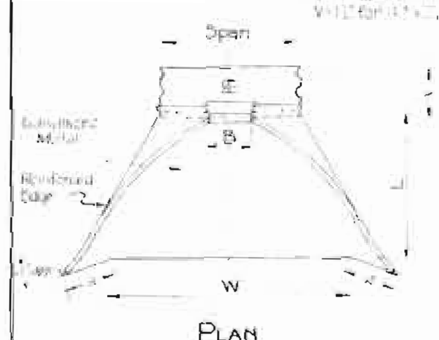
Splices to be the lap riveted type.
● One splice on ℄ made by either riveting or bolting.
Galvanized Connector Section, Corner Plate & Toe Plate to be same gage as skirt section.
▲ Culvert diameter is equal to dimension D of connector section.

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



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K

V = 7" for ... PIPE ARCHES
V = 12" for ... PIPE ARCHES

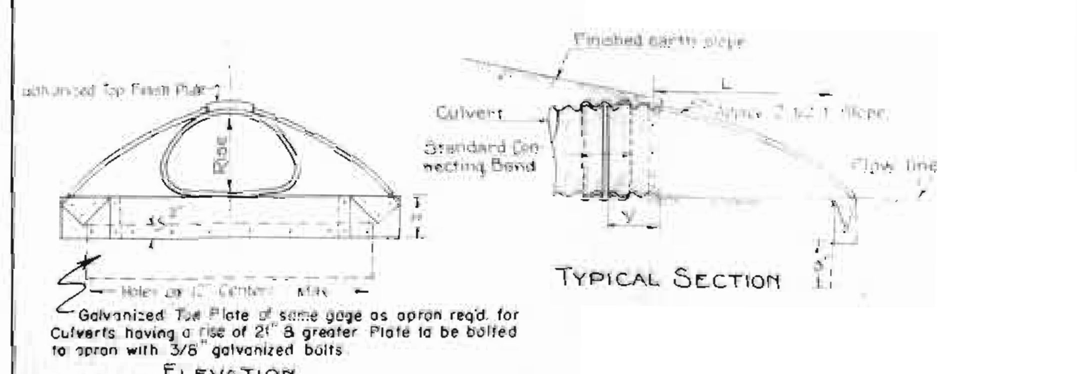


TYPE L

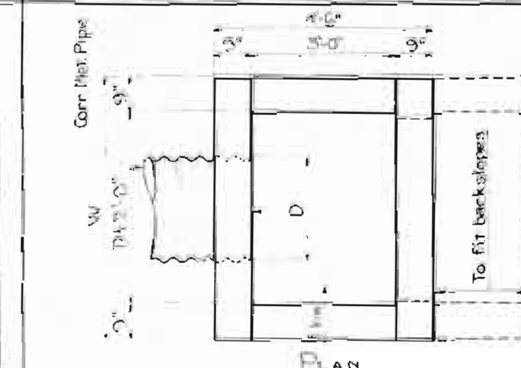
Normal Culvert Diam.	Arch Dimension: Span	Rise	Gage	Dimensions: A 1" Tol.	B Max	L	W 2" Tol.	H 1" Tol.	Remarks
15"	18"	11"	16	4½	[illegible]	19"	[illegible]	[illegible]	One piece skirt
18"	22"	13"	16	5¾	[illegible]	23"	[illegible]	[illegible]	One piece skirt
24"	29"	18"	14	7"	14	31½	[illegible]	[illegible]	One piece skirt
30"	36"	22"	14	8¾	[illegible]	38½	[illegible]	[illegible]	One piece skirt
36"	43"	27"	12	10¾	[illegible]	47"	75"	7⅞	Two piece skirt ▲
42"	50"	31"	12	12¼	[illegible]	54"	85"	9⅛	Two piece skirt ▲
48"	58"	36"	12	14"	20"	63	96"	10⅜	Two piece skirt ▲
54"	65"	40"	12	15¼	[illegible]	70"	112	10⅝	Three piece skirt #
60"	72"	44"	10	17¼	[illegible]	77"	[illegible]	[illegible]	Three piece skirt #

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

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



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L

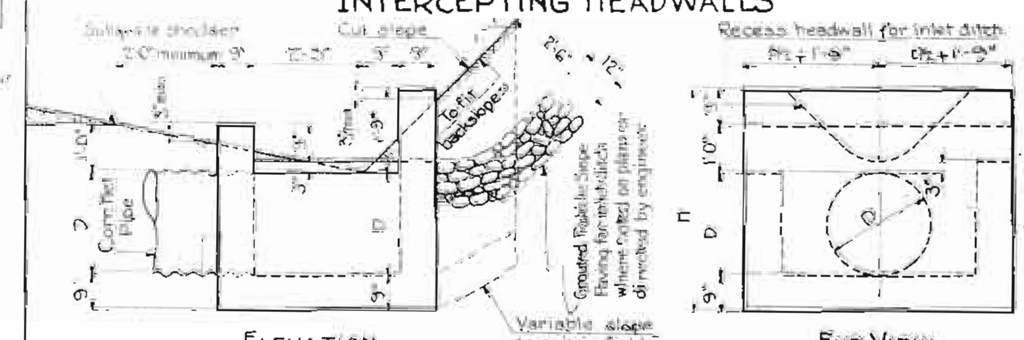


QUANTITIES OF CLASS B CONCRETE OR CEMENT RUBBLE MASONRY

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

NOTE: Backwall to be eliminated and end walls connected ... back slope where ordered by the Engineer. Floor sl... is to be extended with side walls if in common materi... is to be omitted when inlet is in rock. Actual quantitie... volved in such operation shall be allowed and paid for ... creases in plan quantities must be covered by work or...

INTERCEPTING HEADWALLS



GENERAL NOTES FOR ALL STRUCTURES

All work shall be done according to the standard specifications of the Colorado State Highway Department, adopted January 1st 1948.
All exposed concrete surfaces shall receive class 1 surface finish.

All construction joints shall be thoroughly cleaned before fresh concrete is poured.
All walls shall have forms on both sides.
The minimum fill over top of culverts shall be 1'-0".
When culvert is skewed, headwalls shall be placed parallel to ℄ of roadway.
Minimum grade of pipe shall be 1%.
For size and location of culverts see plan sheets for project.
Footings in rock shall be poured out to rock and not formed.
Mechanical Tamping, as provided under Item No. 16 of the specifications, shall be applied over such areas as shown on the plans or as ordered by the Engineer.

COLORADO
STATE HIGHWAY DEPARTME...

STANDARD HEADWALL...
INTERCEPTING HEADWA...
GALVANIZED METAL APR...
GROUTED RUBBLE APRO...
FOR CORR. MET. PIPE CULVE...

Designed by P.S.E.	Approved by [signature] Bridge Engineer
Made by A.L.P.	
Checked by H.W.P.	Date December 15, ...

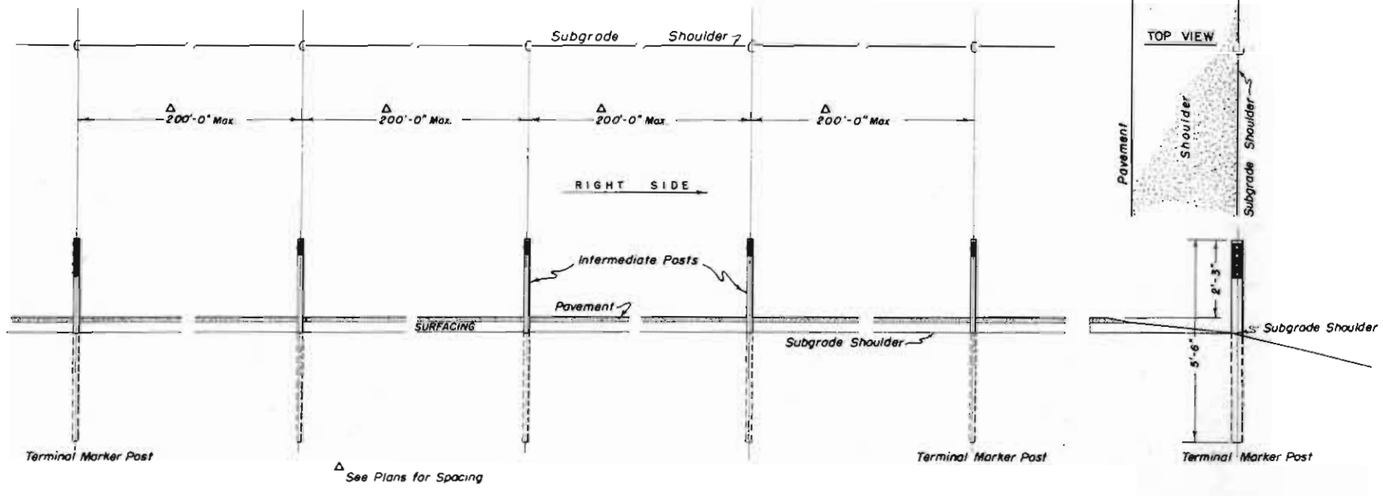
FED. ROAD DIVISION NO.	DISTRICT		SHEET NO.	TOTAL SHEETS
9.	COLO.	1063-16	37	

STANDARD M-23-A

Rev. "9-15-49" J.P.K. "Details for Marker Posts
Rev. 1-30-50-E.A.R. - Details for Marker Posts

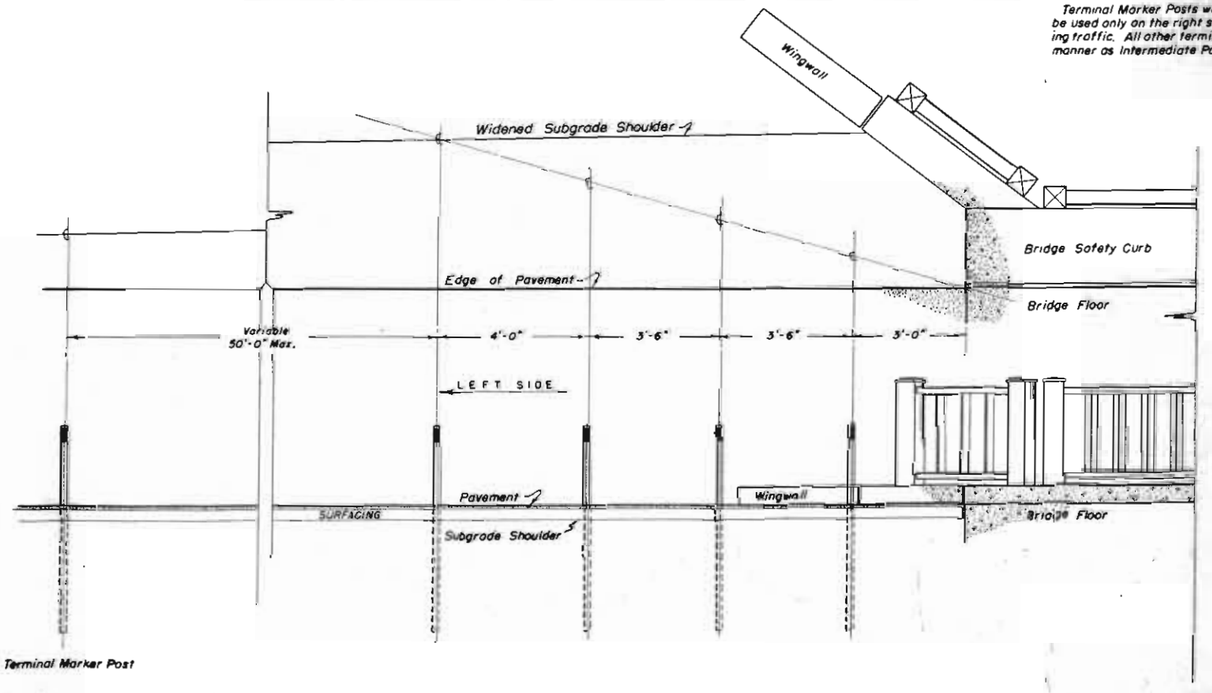
MARKER POST

Layout Showing Placement on Normal Roadway Fills



△ See Plans for Spacing

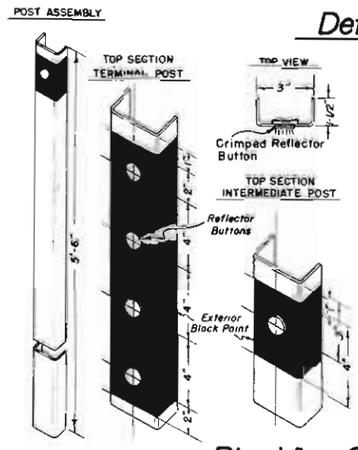
Layout Showing Placement at Bridge Approaches



NOTE

Terminal Marker Posts with four (4) Reflector Units will be used only on the right side of the roadway facing approaching traffic. All other terminal posts to be marked in the same manner as Intermediate Posts.

Details for Marker Post



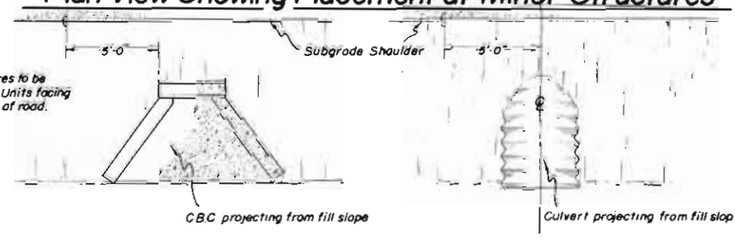
POSTS- Channel Type Metal Post weighing not less than 2.3 lbs per linear foot, 7/8" diameter holes for reflector buttons shall be made as indicated on post detail

REFLECTOR BUTTONS- "No. 1 Stimsonite" Reflector Buttons or an acceptable equivalent to be attached to post by crimping the button in hole as indicated on post detail

MARKINGS- Posts to receive Zinc Chromate Shop Coat and painted with two (2) coats of Aluminum Paint above the ground line. One (1) coat of Exterior Black Paint to be applied at reflector button area as shown in detail.

DIMENSION TOLERANCES: Cross-Section dimensions shall have not more than 1/16" tolerance.

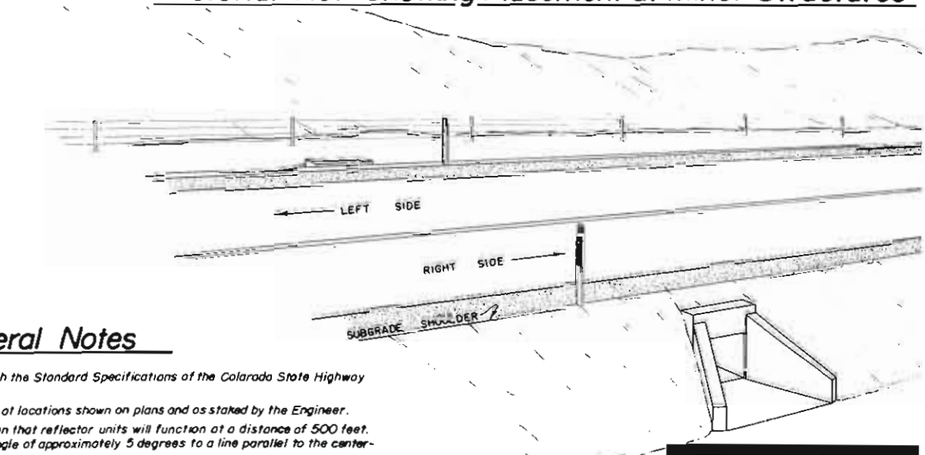
Plan View Showing Placement at Minor Structures



NOTE

Marker Posts at minor structures to be provided with four (4) Reflector Units facing approaching traffic on right side of road.

Pictorial View Showing Placement at Minor Structures



General Notes

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

All posts shall be securely set or driven at locations shown on plans and as staked by the Engineer.

All posts shall be placed in such position that reflector units will function at a distance of 500 feet. On tangents posts shall be placed at an angle of approximately 5 degrees to a line parallel to the centerline of the roadway.

In all instances a test shall be made to assure the maximum effect from reflector units.

COLORADO
STATE HIGHWAY DEPARTMENT

Marker Post

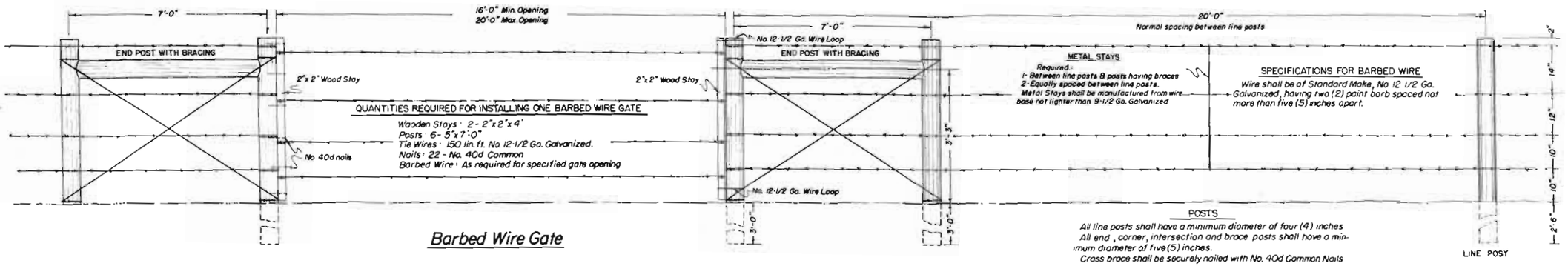
Designed by C.G.M. Made by G.G.M. Checked by [illegible]	Approved by [illegible] Engineer, Surveys & Date: 9-15-1

Standard Wire Fence With Wooden Posts

STANDARD M-24-H

FED. ROAD DIVISION NO.	DISTRICT	[redacted]	SHEET NO.	[illegible]
9	COLO.	7004-1(13)	22	

Rev. 3-1-50, C.G.M., Post spacing, Driveway gate, Added Gen. Note



QUANTITIES REQUIRED FOR INSTALLING ONE BARBED WIRE GATE

Wooden Stays: 2 - 2"x2"x4'
Posts: 6 - 5"x7'-0"
Tie Wires: 150 lin. ft. No. 12-1/2 Ga. Galvanized.
Nails: 22 - No. 40d Common
Barbed Wire: As required for specified gate opening

METAL STAYS

Required:
1- Between line posts & posts having braces
2- Equally spaced between line posts.
Metal Stays shall be manufactured from wire base not lighter than 9-1/2 Ga. Galvanized

SPECIFICATIONS FOR BARBED WIRE

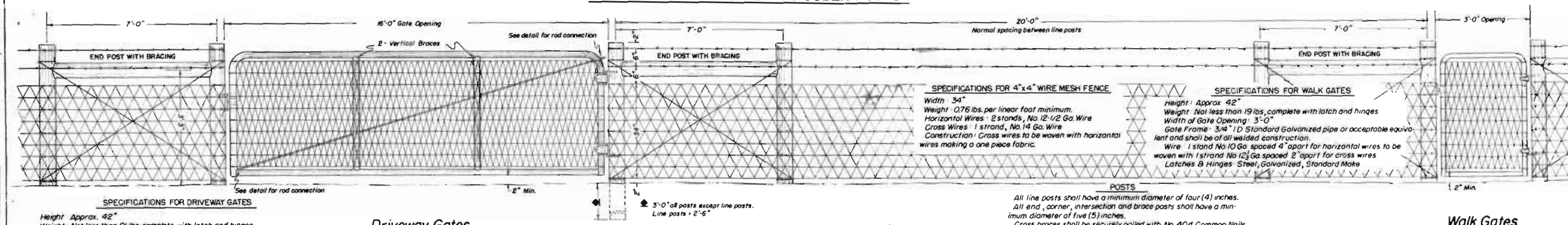
Wire shall be of Standard Make, No. 12 1/2 Ga. Galvanized, having two (2) point barb spaced not more than five (5) inches apart.

POSTS

All line posts shall have a minimum diameter of four (4) inches
All end, corner, intersection and brace posts shall have a minimum diameter of five (5) inches.
Cross brace shall be securely nailed with No. 40d Common Nails

Barbed Wire Gate

BARBED WIRE FENCE WITH WOODEN POSTS



SPECIFICATIONS FOR DRIVEWAY GATES

Height: Approx. 42"
Weight: Not less than 91 lbs. complete with latch and hinges.
Width of Gate Opening: 16'-0"
Gate Frame: 1" I.D Standard Galvanized pipe or acceptable equivalent and shall be of all welded construction
Wire: 1 strand No. 10 Ga. spaced 4" apart for horizontal wires to be woven with 1 strand No. 12½ Ga. spaced 2" apart for cross wires
Rod Brace: 1/4" round, minimum
Latches & Hinges: Steel, Galvanized, Standard Make

Driveway Gates

SPECIFICATIONS FOR 4"x4" WIRE MESH FENCE

Width: 34"
Weight: 0.76 lbs. per linear foot minimum.
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.

SPECIFICATIONS FOR WALK GATES

Height: Approx. 42"
Weight: Not less than 19 lbs, complete with latch and hinges
Width of Gate Opening: 3'-0"
Gate Frame: 3/4" I.D Standard Galvanized pipe or acceptable equivalent and shall be of all welded construction.
Wire: 1 strand No. 10 Ga. spaced 4" apart for horizontal wires to be woven with 1 strand No. 12½ Ga. spaced 2" apart for cross wires
Latches & Hinges: Steel, Galvanized, Standard Make

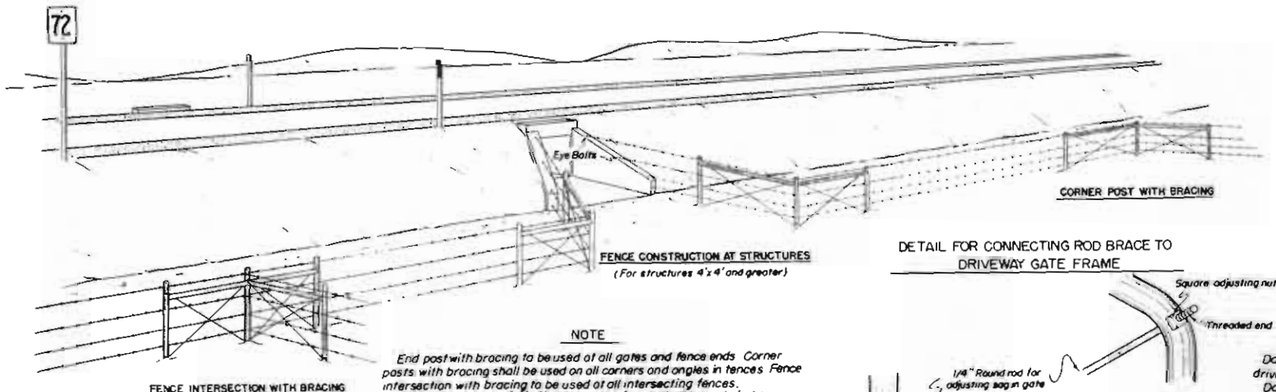
POSTS

All line posts shall have a minimum diameter of four (4) inches.
All end, corner, intersection and brace posts shall have a minimum diameter of five (5) inches.
Cross braces shall be securely nailed with No. 40d Common Nails

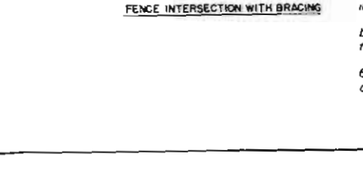
Walk Gates

COMBINATION WIRE FENCE WITH WOODEN POSTS

Illustrative Sketch Showing Typical Examples For Constructing Fences



FENCE CONSTRUCTION AT STRUCTURES
(For structures 4'x4' and greater)



FENCE INTERSECTION WITH BRACING

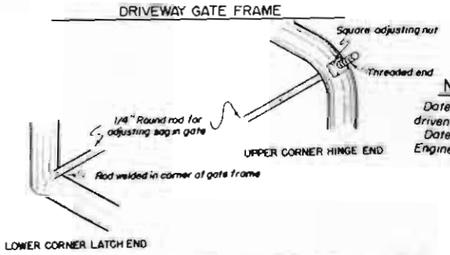
NOTE

End post with bracing to be used at all gates and fence ends. Corner posts with bracing shall be used on all corners and angles in fences. Fence intersection with bracing to be used at all intersecting fences.

At all Structures of 4'x4' and over the fence shall be ended at eye-bolts in the wings of the structure. Where the type of construction prohibits the use of eye-bolts, an end post with bracing shall be used.

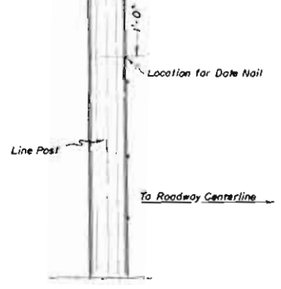
Eye-bolts are to be made from 1/2" round iron bars with a minimum of 6" of body length embedded in the concrete and a minimum of 1" inside eye diameter.

DETAIL FOR CONNECTING ROD BRACE TO DRIVEWAY GATE FRAME



DETAILS FOR PLACING DATE NAILS

(To be installed on Treated Wooden Posts only)



NOTE

Date Nails shall be placed on every tenth (10th) post and shall be driven flush.

Date Nails to be furnished and installed by State Forces as part of Engineering Costs.

General Notes

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

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

Fence Staples shall be galvanized and at least 1-1/2" in length and shall be made from wire base not less than No. 9 Ga. wire fence shall have eight (8) staples per line post, Combination wire fence shall have fourteen (14) staples per line post

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

POSTS

Posts shall be treated or untreated as specified on plans and shall conform to the following
Untreated posts shall be made of seasoned, straight native cedar. The tops of posts shall be sawed off square and peeling of the posts will not be required. Split posts will not be acceptable for use unless specifically permitted in the Special Provisions of plans
Treated posts shall be made of seasoned, straight, sound Ladgepole Pine or Southern Pine, to be peeled and tops to be cut off square before pressure treatment. Posts shall be pressure treated in conformity with requirement of the Specifications

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

COLORADO
STATE HIGHWAY DEPART

Standard Wire Fen
With
Wooden Posts

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

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

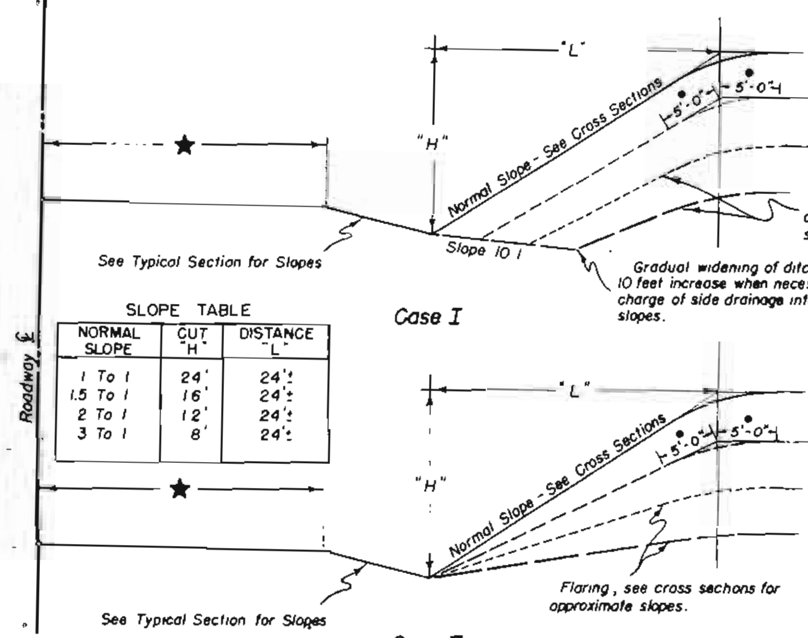
Rev. 10-25-50-C.G.M., Accel. Lanes, Ballast note re widen crest grades

STANDARD M-2-DM

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

FED. ROAD DIVISION NO.	DISTRICT	[redacted]	SHEET NO.	TOTAL SHEETS
9.	COLO.	[redacted]	[redacted]	[redacted]

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



SLOPE TABLE

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

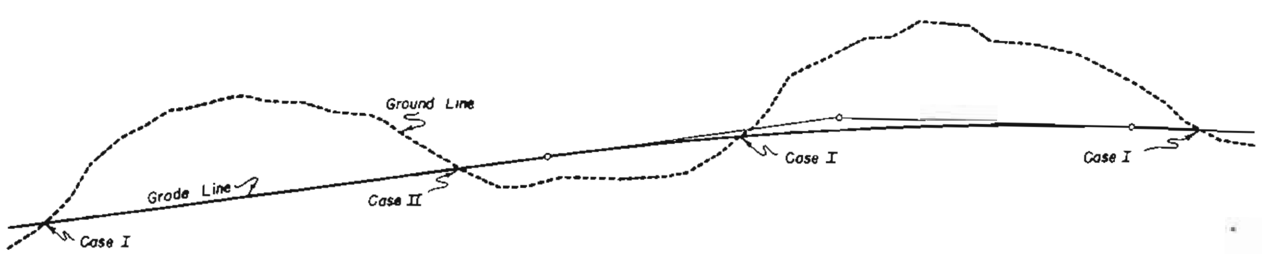
FLARING OF EARTH CUTS: The backslopes at ends of all earth cuts shall be flattened & where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion & to improve appearance. The transition of flattened backslopes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

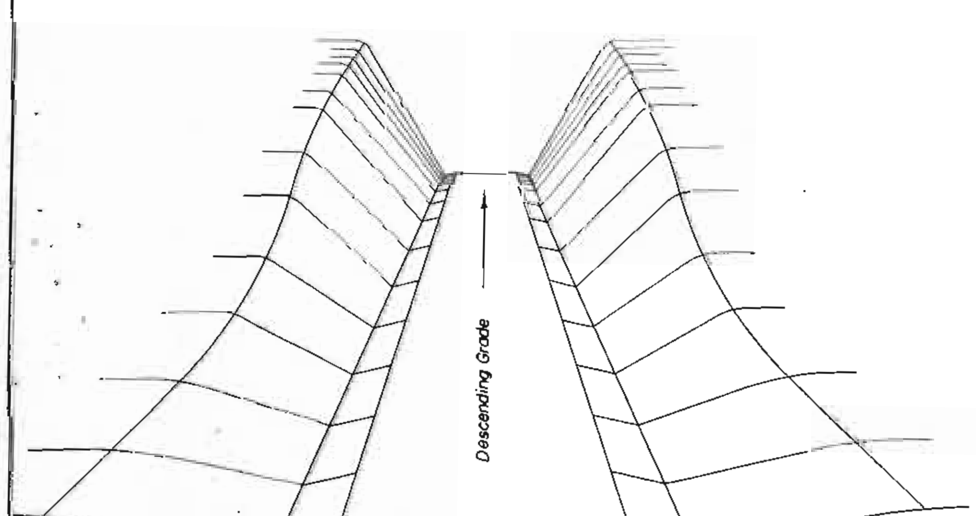
• CUT SLOPE TREATMENT IN EARTH CUTS. The intersection of cut slopes with the existing ground shall be rounded in earth cuts, beginning 5 ft outside the slope stake and extending 5 ft. down the cut slope. Where the cut slope is less than 5 ft. reduce each of the above widths of slope treatment to the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

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

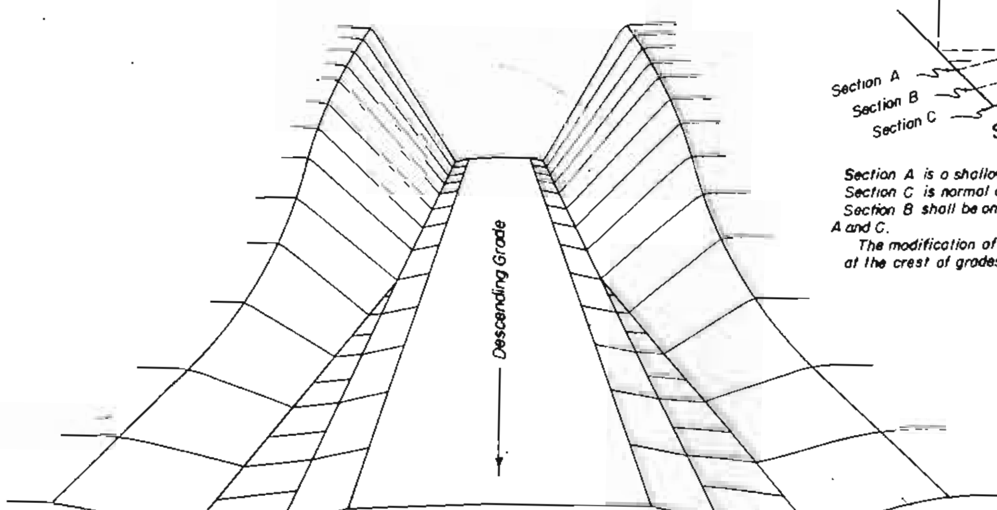
WIDENING TO ACCOMODATE GUARD FENCES: At all locations on the project (except as provided above for bridge approaches) where guard fence is to be constructed the shoulders shall be widened 2 ft. to provide additional lateral support for guard fence posts.

PLAN OF FLARING IN EARTH CUTS



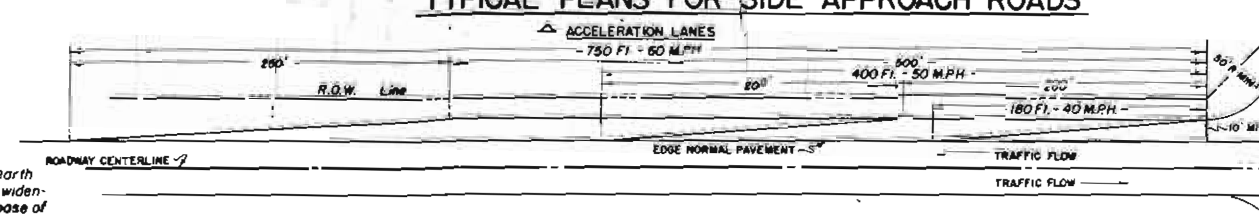


Case II



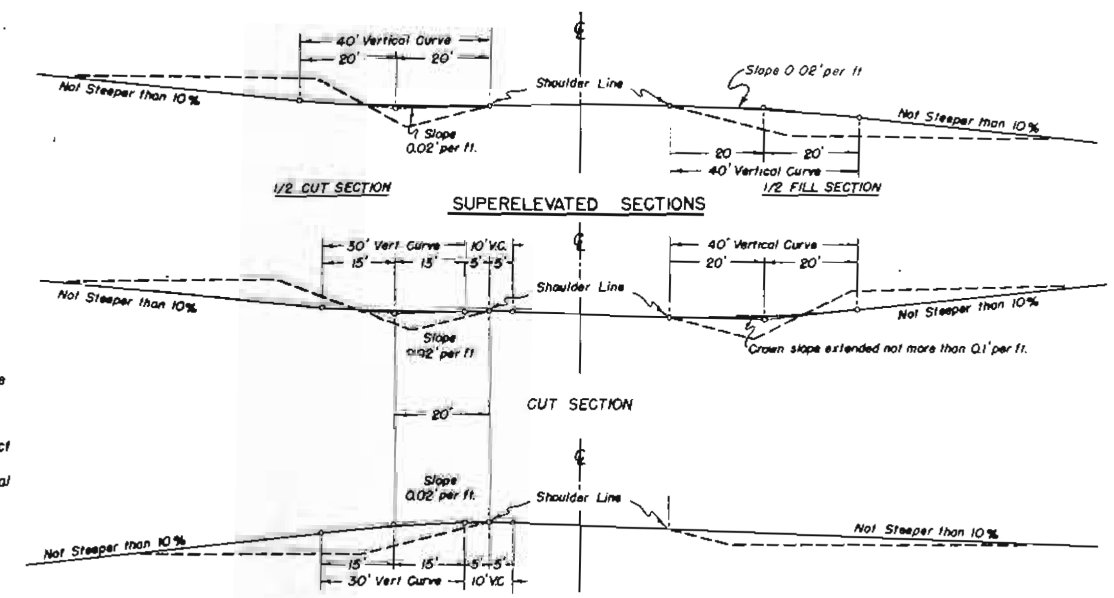
Case I

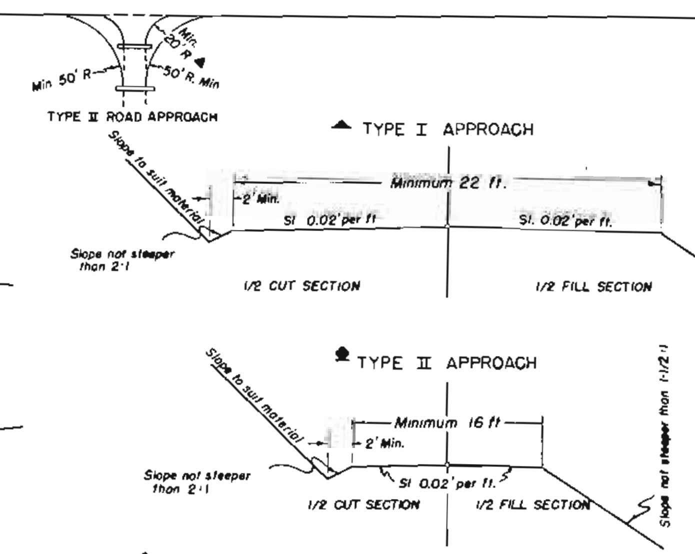
TYPICAL PLANS FOR SIDE APPROACH ROADS



SIDE DRAINS: To be placed at greatest feasible distance from the roadway shoulder consistent with good practice. A minimum of 2... from shoulder should be adhered to wherever possible.

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





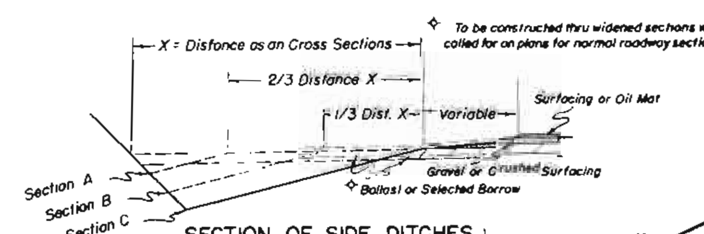
▲ TYPE I ROAD APPROACHES: To be used only when called for on plans. The width of crowned section shall not be less than the existing crowned width of the approaching road but in no case shall be less than twenty ... (22) feet.

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

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

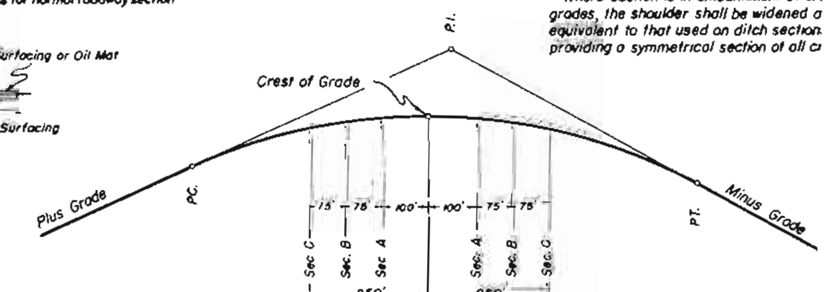
DETAILS FOR DITCH & WIDENED SHOULDERS AT CREST OF GRADES

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



SECTION OF SIDE DITCHES

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



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

NOTE

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

GENERAL NOTES

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

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

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

COLORADO
STATE HIGHWAY DEPARTMENT

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

Designed by A.Z.
Made by C.G.M.
Checked by
Approved by
Engineer, Surveys & ...
Date: April 20th, ...

STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

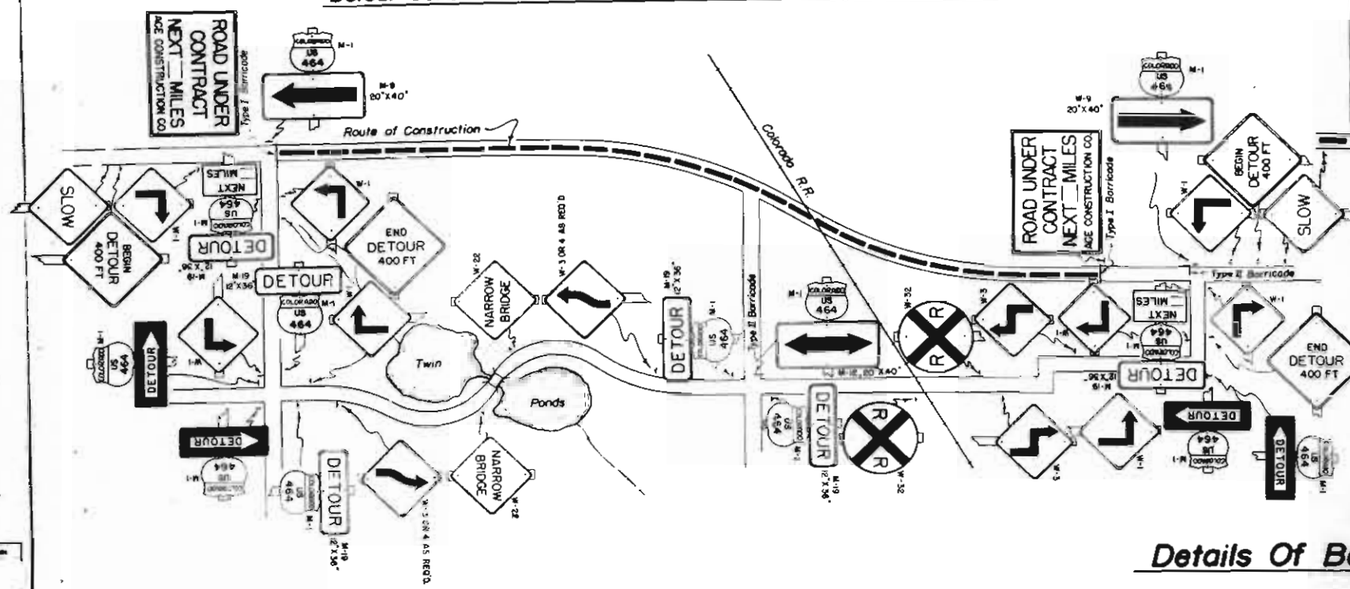
STANDARD M-2-DS

FED. ROAD DIVISION NO.	DISTRICT		SHEET NO.
9	COLO.	3004-1(1)	324

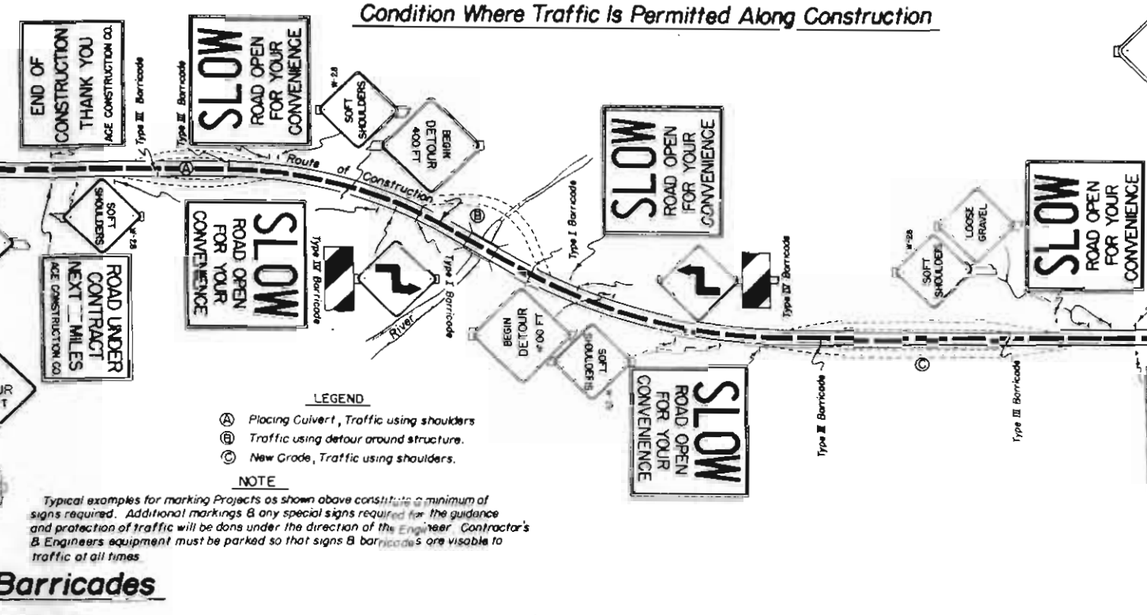
REV. - 8/16/49. - E.E.O.
REV. - 2/3/50 - E.A.R.

Typical Methods Of Marking Highways & Detours

Detour Condition Where Traffic Is Prohibited Along Construction



Condition Where Traffic Is Permitted Along Construction



LEGEND

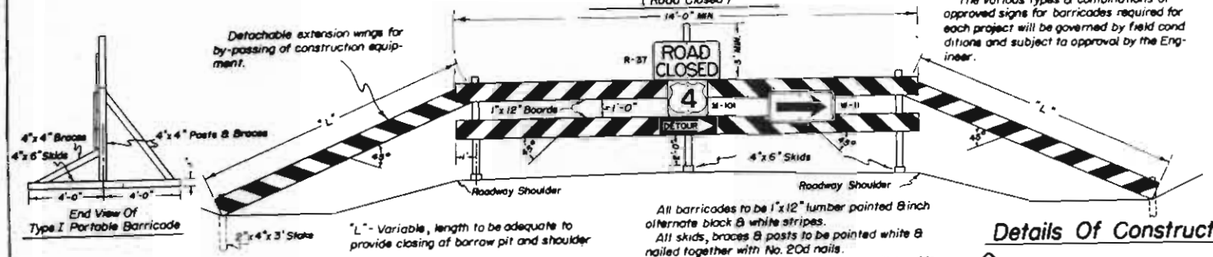
- (A) Placing Culvert, Traffic using shoulders
- (B) Traffic using detour around structure.
- (C) New Grade, Traffic using shoulders.

NOTE

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

Details Of Barricades

Type I
(Road Closed)

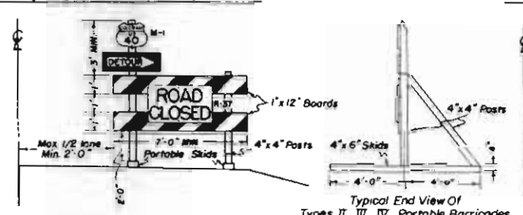


NOTE

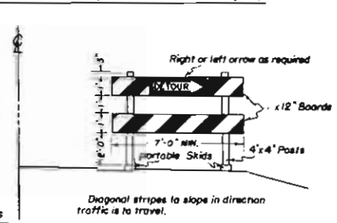
The various types & combinations of approved signs for barricades required for each project will be governed by field conditions and subject to approval by the Engineer.

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

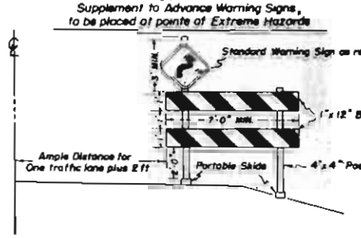
Type II
(Beginning of Detour for Through Traffic)



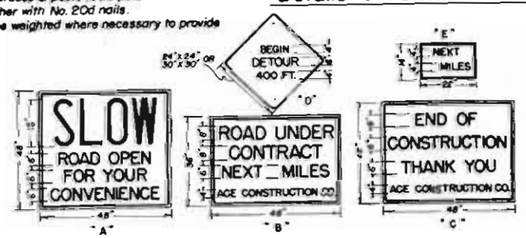
Type III
(Both Ends of By-Pass Areas within Project)



Type IV
Supplement to Advance Warning Signs, to be placed at points of Extreme Hazards



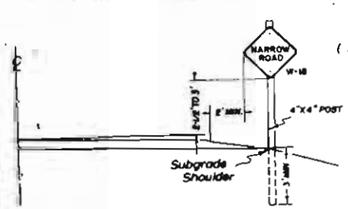
Details Of Construction Signs



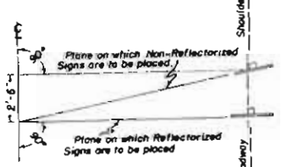
MARKINGS

Construction Sign "A" - to be of 1" material painted White, the word "SLOW" lettered in Red, balance of lettering to be Black.
Construction Signs "B", "C", "E" - to be of 1" material painted White, all lettering to be Black.
Detour Warning Sign "D" to be of 1/4" (min.) plywood or No. 10 (min.) gauge metal, painted Yellow, all lettering to be Black.
Construction Signs - "B", "E" - 3/4"x 9" metal slides to be placed between words "Next & Miles", spaced so as to accomodate appropriate size numerals. Required numerals to be furnished by the Department and to be installed by the Contractor.
Signs to be fastened to 2- 4"x 4" posts set 4 ft. in the ground with a minimum of 3 cleats on the back

Position Of Signs Relative To Roadbed & Hazards



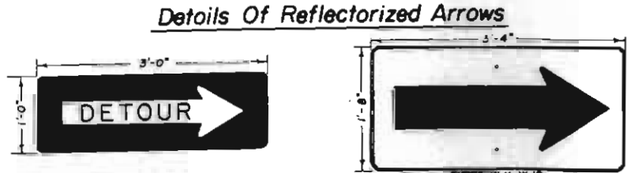
Top View
(Showing angles of signs in relation to roadway)



NOTE

Warning Signs to be made of 1/4" (Min.) plywood or No 10 Gauge (Min.) metal.
Location to be governed by field conditions. Exact location to be staked by the Engineer. In all cases warning signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds

Details Of Reflectorized Arrows



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

TYPES W-11, W-12

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

GENERAL NOTES

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

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

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

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

1	All Barricades	As Required
2	"SLOW, ROAD OPEN FOR YOUR CONVENIENCE" Signs	Minimum-2
3.	Standard Warning & Directional Signs	As Required
4.	"ROAD UNDER CONTRACT, NEXT ___ MILES, CONTRACTORS NAME" Signs	Minimum 2
5.	Approved Directional Arrows for Barricades	As Required
6.	"END OF CONSTRUCTION, THANK YOU, CONTRACTORS NAME" Signs	Minimum-2
7.	Torches and Flares as follows: Type I Barricades	Minimum 3
	Type III, IV Barricades	Minimum-1
	Standard Warning Signs	Minimum-1

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

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

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

COLORADO
STATE HIGHWAY DEPART

Standard Roadwo
Construction Traffic

Designed by	Approved
Made by C.G.M.	Engineer
Checked by	Date 7-4

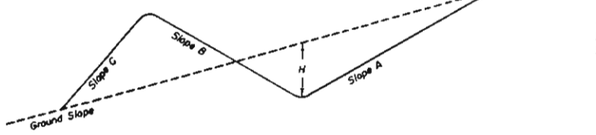
STANDARD TYPES of DITCHES and CONSTRUCTION METHODS

STANDARD M-107-C

FED. ROAD DIVISION NO.	DISTRICT		SHEET NO.	TOTAL SHEETS
9.	COLO.	7004-10	26	

DETAILS for CONTOUR INTERCEPTING DITCHES

Typical Section for Contour Intercepting Ditches



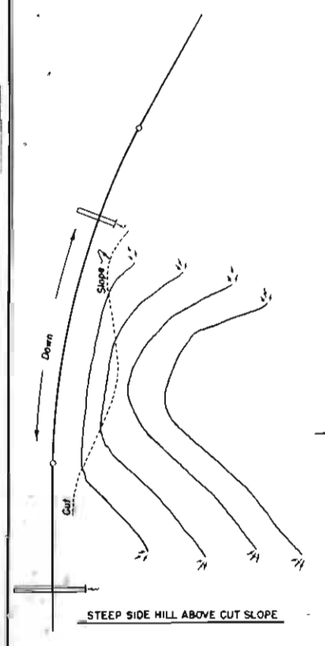
PURPOSE & USE OF THE TABLE

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.

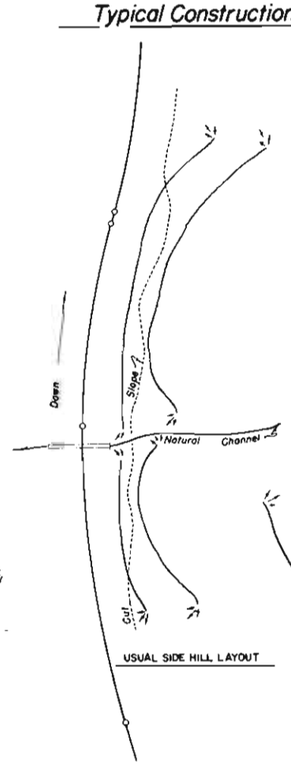
Foremost consideration in constructing these ditches is given first to the natural ground line slope confronted in construction, thence to the other values shown on the Typical Section.

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.

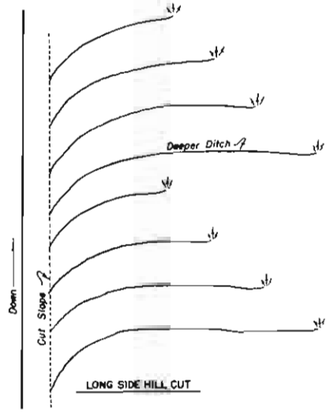
Typical Construction Layouts



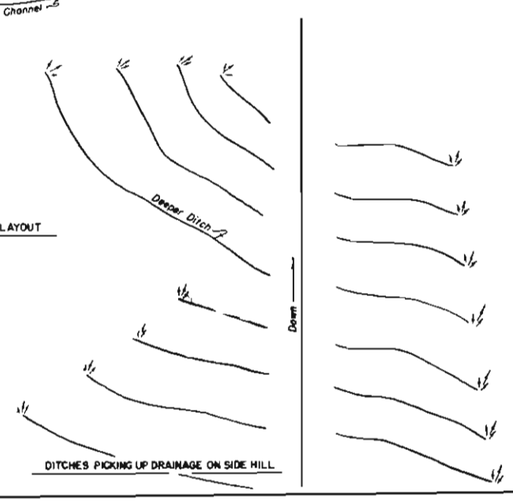
STEEP SIDE HILL ABOVE CUT SLOPE



USUAL SIDE HILL LAYOUT



LONG SIDE HILL CUT



DITCHES PICKING UP DRAINAGE ON SIDE HILL

Scale of Sketches in Feet

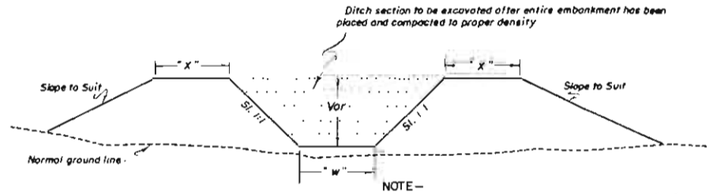
100 0 100 200 300 400

Table of Slopes and Yardages

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

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

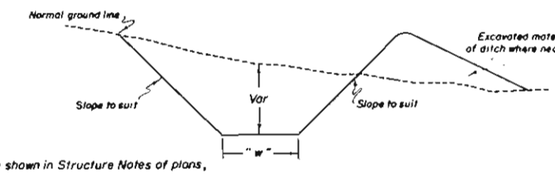
TYPICAL SECTIONS for DRAINAGE, IRRIGATION DITCHES and CHANNEL CHANGES



NOTE –
See Structure Notes in plans for dimension "W". Dimension "X" = $\frac{W}{2}$ with minimum of 2 feet.

For Embankment Sections

(Generally for use in Irrigation Ditches & Channel Changes)



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

For Cut Sections

GENERAL NOTES

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

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

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

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

The following horizontal spacing of ditches is recommended

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

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

COLORADO
STATE HIGHWAY DEPARTMENT

Standard Types of Ditches and Construction Methods

Designed by C.G.M.	Approved by [illegible]
Made by C.G.M.	Engineer of Surveys & Plans
Checked by	Date: Aug. 18, 19[illegible]

FED. ROAD DIV. NO.	DIST.	PROJ. NO.	SHEET NO.
9	COLO.	F004-1(12)	36

NOTE:

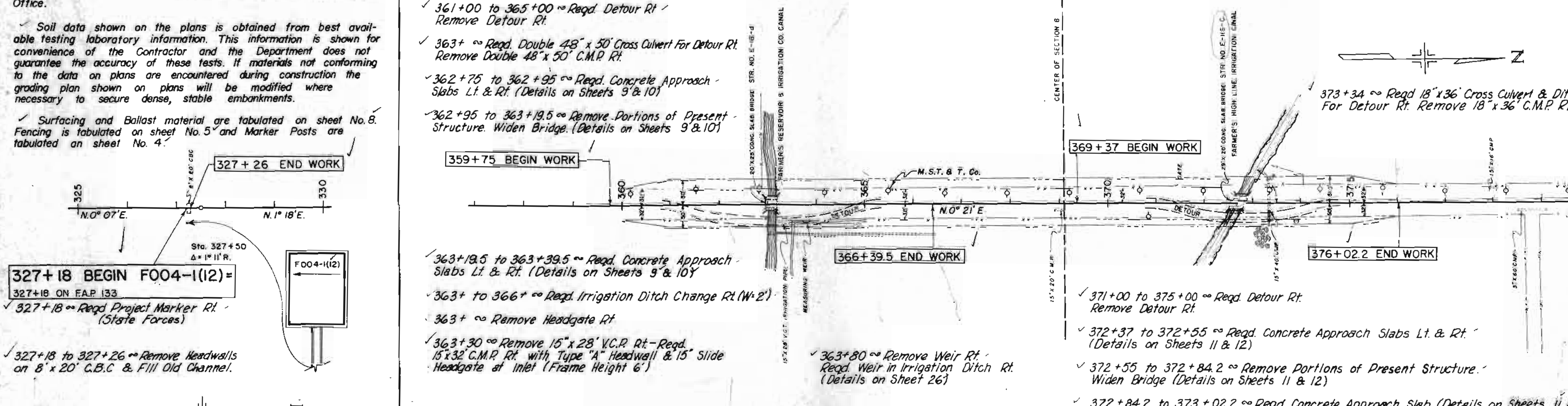
✓ Alignment and Grades as shown are subject to modification during construction after approval by the Denver Office.

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

✓ Surfacing and Ballast material are tabulated on sheet No. 8. Fencing is tabulated on sheet No. 5 and Marker Posts are tabulated on sheet No. 4.

S.W. 1/4 SEC. 8
T. 2 S., R. 68 W.

N.W. 1/4 SEC. 8
T. 2 S., R. 68 W.



✓ 327+18 ∞ Reqd. Project Marker Rt. (State Forces)

✓ 327+18 to 327+26 ∞ Remove Headwalls on 8' x 20' C.B.C. & Fill Old Channel.

✓ 361+00 to 365+00 ∞ Reqd. Detour Rt. Remove Detour Rt.

✓ 363+ ∞ Reqd. Double 48" x 50' Cross Culvert For Detour Rt. Remove Double 48" x 50' C.M.P. Rt.

✓ 362+75 to 362+95 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 9 & 10)

✓ 362+95 to 363+19.5 ∞ Remove Portions of Present Structure. Widen Bridge. (Details on Sheets 9 & 10)

✓ 363+19.5 to 363+39.5 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 9 & 10)

✓ 363+ to 366+ ∞ Reqd. Irrigation Ditch Change Rt. (W=2')

✓ 363+ ∞ Remove Headgate Rt.

✓ 363+30 ∞ Remove 15" x 28' V.C.P. Rt. - Reqd. 15" x 32' C.M.P. Rt. with Type "A" Headwall & 15" Slide Headgate at Inlet (Frame Height 6')

✓ 363+80 ∞ Remove Weir Rt. Reqd. Weir in Irrigation Ditch Rt. (Details on Sheet 26)

✓ 373+34 ∞ Reqd. 18" x 36' Cross Culvert & Ditches For Detour Rt. Remove 18" x 36' C.M.P. Rt.

✓ 371+00 to 375+00 ∞ Reqd. Detour Rt. Remove Detour Rt.

✓ 372+37 to 372+55 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 11 & 12)

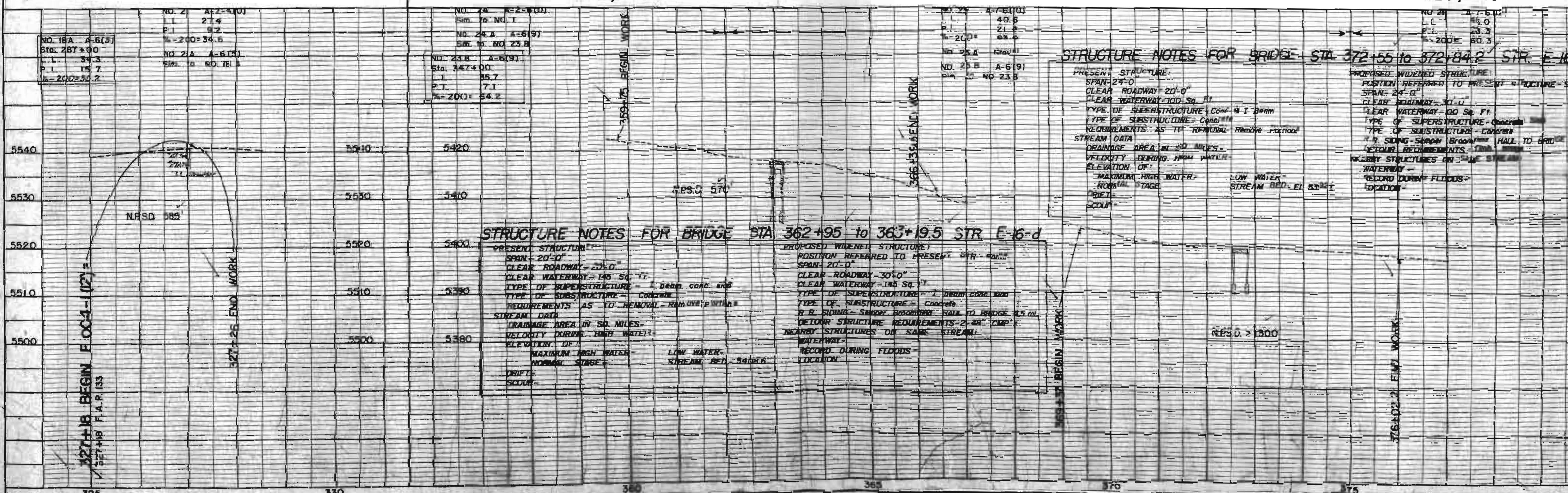
✓ 372+55 to 372+84.2 ∞ Remove Portions of Present Structure. Widen Bridge (Details on Sheets 11 & 12)

✓ 372+84.2 to 373+02.2 ∞ Reqd. Concrete Approach Slab (Details on Sheets 11 & 12) Remove Concrete Pavement

✓ 372+50 ∞ Reqd. 48" x 44' Cross Culvert For Detour Rt. Remove 48" x 44' C.M.P. Rt.

S.E. 1/4 SEC. 8
T. 2 S., R. 68 W.

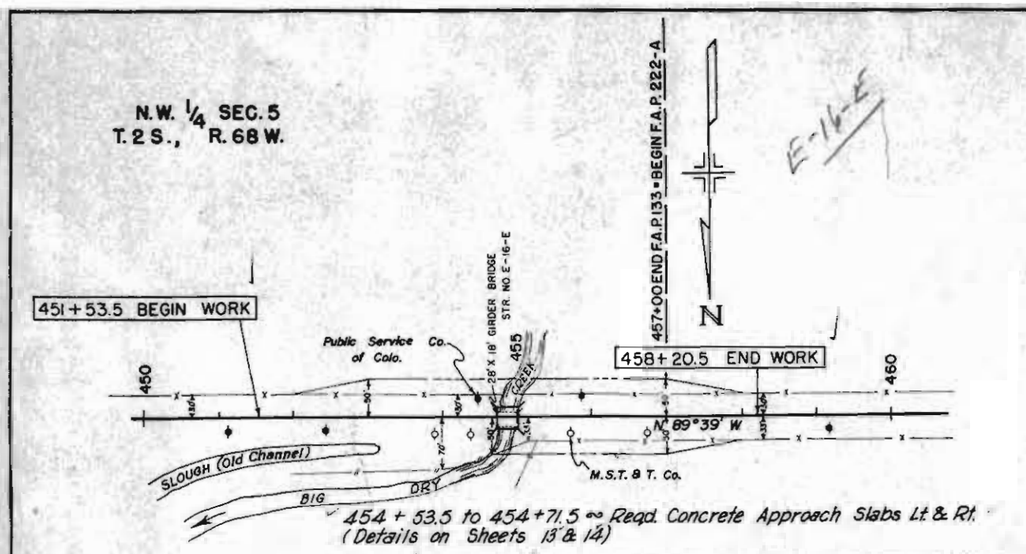
N.E. 1/4 SEC. 8
T. 2 S., R. 68 W.



NO. 18A A-6(5)
Sta. 287+00
L.L. 34.3
P.I. 15.7
%-200 = 50.2
NO. 21 A-2-4(0)
L.L. 27.4
P.I. 9.2
%-200 = 34.6
NO. 21A A-6(5)
Sim. to NO. 18A
NO. 24 A-2-4(0)
Sim. to NO. 1
NO. 24A A-6(9)
Sim. to NO. 23B
NO. 23B A-6(9)
Sta. 347+00
L.L. 35.7
P.I. 7.1
%-200 = 64.2
NO. 25 A-7-6(11)
L.L. 40.6
P.I. 21.6
%-200 = 67.6
NO. 25A Gravel
NO. 25B A-6(9)
Sim. to NO. 23B
NO. 26 A-7-6(12)
L.L. 46.0
P.I. 23.3
%-200 = 60.3
5540
5530
5520
5510
5500
5410
5420
5400
5390
5380
N.R.S.D. 585
P.S.C. 570
359+75 BEGIN WORK
366+39.5 END WORK
327+18 BEGIN F004-1(12) =
327+18 F.A.P. 133
327+26 END WORK
369+37 BEGIN WORK
376+02.2 END WORK
N.E.S.D. > 1300
STRUCTURE NOTES FOR BRIDGE STA. 362+95 to 363+19.5 STR. E-16-d
PRESENT STRUCTURE
SPAN - 20'-0"
CLEAR ROADWAY - 23'-0"
CLEAR WATERWAY - 145 Sq. Ft.
TYPE OF SUPERSTRUCTURE - I beam conc. slab
TYPE OF SUBSTRUCTURE - Concrete
REQUIREMENTS AS TO REMOVAL - Remove portions
STREAM DATA
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER -
NORMAL STAGE -
LOW WATER -
STREAM BED - 5406.6
DRIFT -
SCOUR -
PROPOSED WIDENED STRUCTURE
POSITION REFERRED TO PRESENT STR. - Same
SPAN - 20'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 145 Sq. Ft.
TYPE OF SUPERSTRUCTURE - I beam conc. slab
TYPE OF SUBSTRUCTURE - Concrete
R.R. SIDING - Stoner Broomfield HAUL TO BRIDGE 4.5 mi.
DETOUR STRUCTURE REQUIREMENTS - 2-48" CMP's
NEARBY STRUCTURES ON SAME STREAM -
WATERWAY -
RECORD DURING FLOODS -
LOCATION -
STRUCTURE NOTES FOR BRIDGE STA. 372+55 to 372+84.2 STR. E-16-c
PRESENT STRUCTURE
SPAN - 24'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 100 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Conc. & I Beam
TYPE OF SUBSTRUCTURE - Concrete
REQUIREMENTS AS TO REMOVAL - Remove Portions
STREAM DATA
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER -
NORMAL STAGE -
LOW WATER -
STREAM BED - El. 5392.1
DRIFT -
SCOUR -
PROPOSED WIDENED STRUCTURE
POSITION REFERRED TO PRESENT STRUCTURE - Same
SPAN - 24'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 100 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Concrete
TYPE OF SUBSTRUCTURE - Concrete
R.R. SIDING - Semper Broomfield HAUL TO BRIDGE
DETOUR REQUIREMENTS -
NEARBY STRUCTURES ON SAME STREAM -
WATERWAY -
RECORD DURING FLOODS -
LOCATION -
325
330
360
365
370
375

FED. ROAD DIV. NO.	DIST.	PROJ. NO.	SHEET NO.	TOT. SHEETS
9	COLO.	F 004-1(12)	37	

N.W. 1/4 SEC. 5
T. 2 S., R. 68 W.



✓ 454+53.5 to 454+71.5 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 13 & 14)

✓ 454+71.6 to 455+02.5 ∞ Remove Portions of Present Structure Widen Bridge. Channel Improvement (Details on Sheets 13 & 14)

✓ 455+02.5 to 455+20.5 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 13 & 14)

S.W. 1/4 SEC. 32
T. 1 S., R. 68 W.

SEC. 34, T. 1 S., R. 69 W.

✓ 666+ to 669+ ∞ Reqd. Irrigation Ditch Change Rt. (W=2')

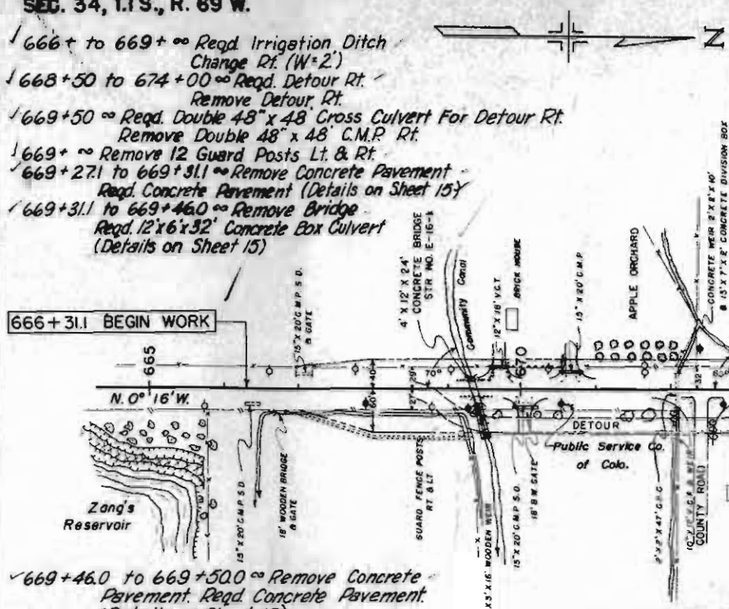
✓ 668+50 to 674+00 ∞ Reqd. Detour Rt. Remove Detour Rt.

✓ 669+50 ∞ Reqd. Double 48" x 48" Cross Culvert For Detour Rt. Remove Double 48" x 48" C.M.P. Rt.

✓ 669+ ∞ Remove 12 Guard Posts Lt. & Rt.

✓ 669+27.1 to 669+31.1 ∞ Remove Concrete Pavement Reqd. Concrete Pavement (Details on Sheet 15)

✓ 669+31.1 to 669+46.0 ∞ Remove Bridge Reqd. 12'x6'x32' Concrete Box Culvert (Details on Sheet 15)



✓ 669+46.0 to 669+50.0 ∞ Remove Concrete Pavement. Reqd. Concrete Pavement. (Details on Sheet 15)

✓ 669+70 ∞ Remove 12" x 18" V.C.T. Lt. Reqd. 18"x 26' Side Drain & Road Approach Lt.

✓ 670+00 ∞ Remove 15" x 20' C.M.P. Rt. Reqd. 18" x 34' Side Drain & Road Approach Rt.

✓ 670+70 ∞ Remove 15" x 20' C.M.P. Lt. Reqd. 18" x 30' Side Drain & Road Approach Lt.

SEC. 27, T. 1 S., R. 69 W.

✓ 672+10 ∞ Remove 10" x 12' V.C.P. & Weir Rt. Reqd Weir Rt. (Details on Sheet 26)

✓ 672+10 ∞ Reqd. Division Box Rt. (Details on Sheet 27)

✓ 672+10 ∞ Reqd 24" x 36' Cross Culvert For Detour Rt. Remove 24" x 36' C.M.P. Rt.

✓ 672+40 ∞ Reqd. Road Approach Rt.

✓ 673+08.1 to 673+15.1 ∞ Remove Concrete Pavement Reqd. Concrete Approach Slab (Details on Sheet 16)

✓ 673+15.1 to 673+28.9 ∞ Remove Bridge Reqd. 10' x 3' x 34' Concrete Box Culvert (Details on Sheet 16)

Clearing & Grubbing 669+ to 672+ Remove Trees Rt.

✓ 673+28.9 to 673+34.9 ∞ Remove Concrete Pavement. Reqd. Concrete Approach Slab (Details on Sheet 16)

✓ 673+40 ∞ Reqd. 48" x 38' Cross Culvert For D... Rt. - Remove 48" x 38' C.M.P. Rt.

✓ 673+55 ∞ Remove 15" x 22' C.M.P. Lt. - Reqd. 18" x 30' Side Drain & Road Approach L...

SEC. 26, T. 1 S., R. 69 W.

SEC. 35, T. 1 S., R. 69 W.

NO. 33 A-6 (5)
Sim. to NO. 23
NO. 33 A Gravel
NO. 33 B A-6 (6)
L.L. 33.6
P.I. 13.9
%-200= 56.2

NO. 54 A-7-6 (11)
Sim. to NO. 52 A

NO. 52 A A-7-6 (11)
Sta. 642+00
L.L. 42.7
P.I. 19.2
%-200= 69.8

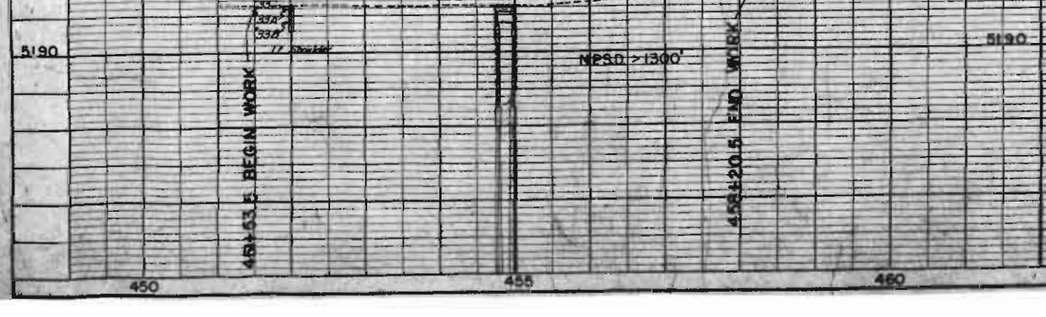
NO. 55 OR Mat'l

NO. 55 A A-7-6 (11)
Sim. to NO. 52 A

STRUCTURE NOTES FOR BRIDGE STA. 454+71.5 to 455+02.5 STR. E-16-E

PRESENT STRUCTURE:
SPAN - 28'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 380 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Concrete Slab - I Beam
TYPE OF SUBSTRUCTURE - Concrete on T.T. Piles
REQUIREMENTS AS TO REMOVAL - Remove Portions
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER -
NORMAL STAGE -
DRIFT -
SCOUR -
LOW WATER -
STREAM BED - 5183.1±

PROPOSED WIDENED STRUCTURE
POSITION REFERRED TO PRESENT STRUCTURE - Same
SPAN - 28'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 580 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Concrete Slab - I Beam
TYPE OF SUBSTRUCTURE - Concrete on T.T. Piles
R.R. SIDING - Broomfield HAUL TO BRIDGE SITE - 2.75 Miles
DETOUR STRUCTURE REQUIREMENTS - None
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY -
RECORD DURING FLOOD -
LOCATION -



STRUCTURE NOTES FOR BRIDGE STA. 669+31.1 to 669+46.0 STR. E-16-F

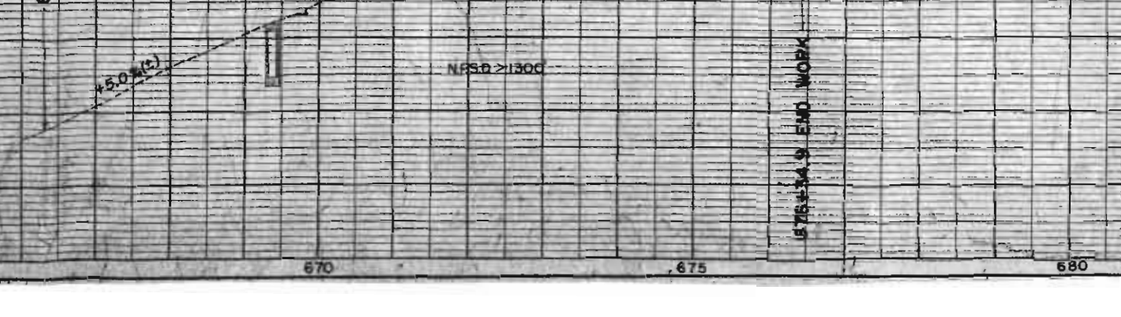
PRESENT STRUCTURE:
SPAN - 12'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 60 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Conc. Slab
TYPE OF SUBSTRUCTURE - Conc. (Gravity)
REQUIREMENTS AS TO REMOVAL - Remove Entirely
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
MAXIMUM HIGH WATER -
NORMAL STAGE -
DRIFT -
SCOUR -
LOW WATER -
STREAM BED - 5395.±

PROPOSED STRUCTURE
POSITION REFERRED TO PRESENT STRUCTURE - Same
SPAN - 12'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 72 Sq. Ft.
TYPE OF SUPERSTRUCTURE - C.B.C. - 12'x6'
TYPE OF SUBSTRUCTURE -
R.R. SIDING - Broomfield HAUL TO BRIDGE SITE - 1 Mi.
DETOUR STRUCTURE REQUIREMENTS - Double 48" C.M.P.
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY -
RECORD DURING FLOODS -
LOCATION -

STRUCTURE NOTES FOR BRIDGE STA. 673+15.1 to 673+28.9 STR. E-16-F

PRESENT STRUCTURE:
SPAN - 11'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 29 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Conc. Slab
TYPE OF SUBSTRUCTURE - Conc. Gravity
REQUIREMENTS AS TO REMOVAL - Remove Entirely
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER -
NORMAL STAGE -
DRIFT -
SCOUR -
LOW WATER -
STREAM BED - 5410.5 ±

PROPOSED STRUCTURE:
POSITION REFERRED TO PRESENT STRUCTURE - Same
SPAN - 11'-6.5"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 33 Sq. Ft.
TYPE OF SUPERSTRUCTURE - C.B.C. 10'X3'-6"
TYPE OF SUBSTRUCTURE -
R.R. SIDING - Broomfield HAUL TO BRIDGE SITE - 1 Mi.
DETOUR STRUCTURE REQUIREMENTS - 48" C.M.P.
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY -
RECORD DURING FLOODS -
LOCATION -

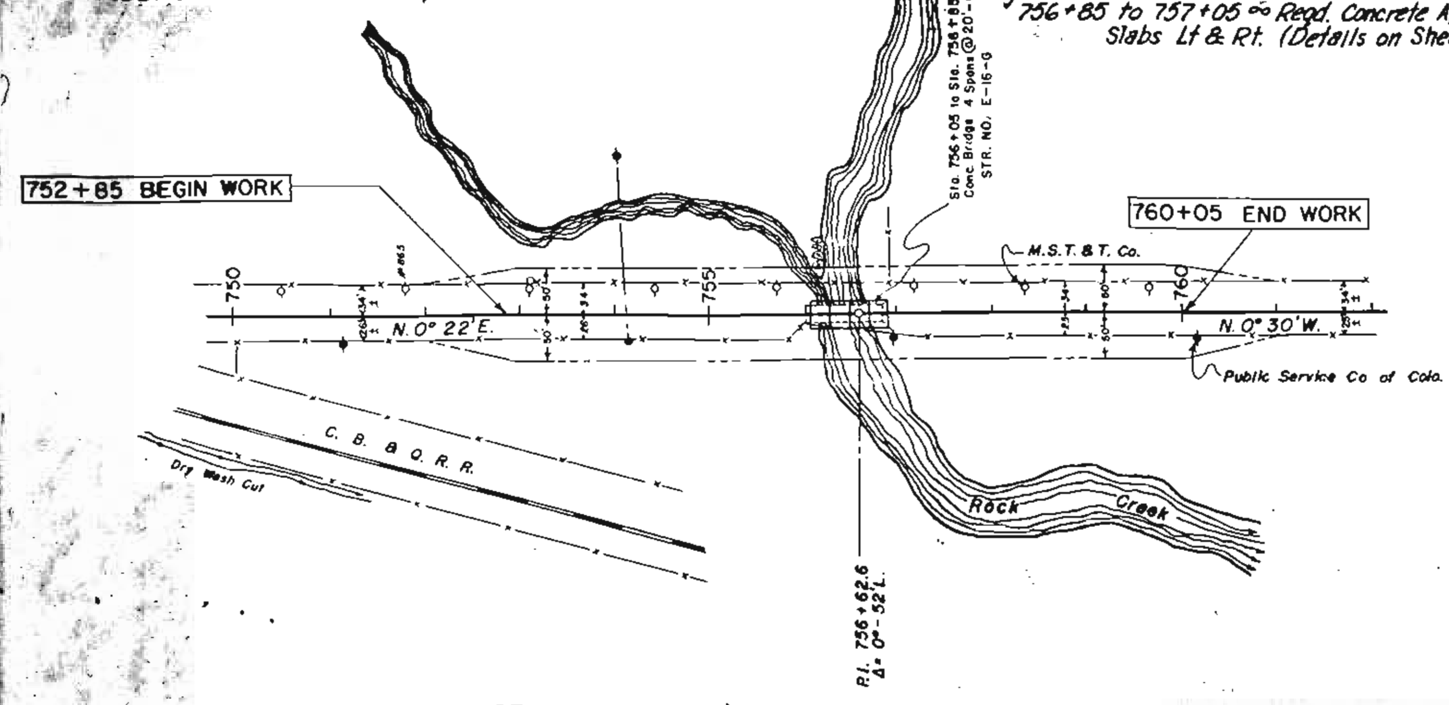


SEC. 22
T.1S., R.69 W.

755+85 to 756+05 ∞ Remove Concrete Pavement
Reqd. Concrete Approach Slab (Details on Sheets 17 & 18)

756+05 to 756+85 ∞ Remove Portions of Present Structure & Cut Keyways. Reqd. Widen Bridge. Channel Improvement. (Details on Sheets 17 & 18)

756+85 to 757+05 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 17 & 18)



SEC. 23
T.1S., R.69W.

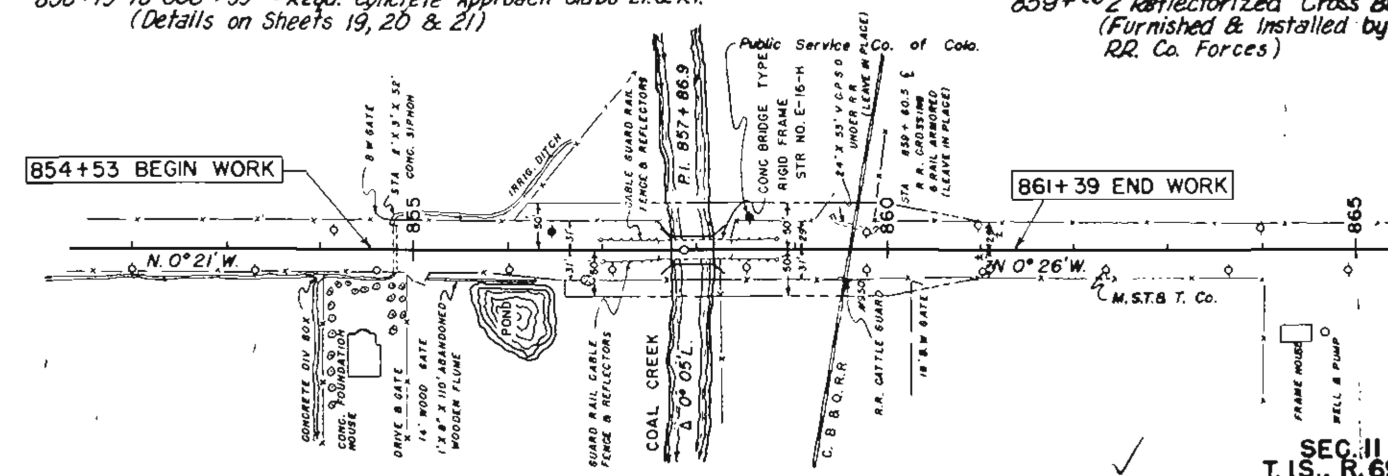
857+53 to 857+73 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 19, 20 & 21)

857+73 to 858+19 ∞ Remove Portions of Present Structure. Reqd. Widen Bridge (Details on Sheets 19, 20 & 21)

858+19 to 858+39 ∞ Reqd. Concrete Approach Slabs Lt. & Rt. (Details on Sheets 19, 20 & 21)

SEC. 10
T.1S., R.69 W.

FORCE ACCOUNT
859+ ∞ 2 Reflectorized Cross Buck Sign (Furnished & Installed by C.B.& Q. RR. Co. Forces)



SEC. 11
T.1S., R.69W.

857+ to 858+ ∞ Remove 214 lin. ft. of Guard Fence Lt. & Rt.

859+ ∞ R.R. Cattle Guard Rt. to be Relocated by C.B.&Q. RR. Co. Forces at No Expense to the Project

NO. 63 Oil Mat
NO. 63 A Gravel
NO. 63 B A-6(12)
Sim. to NO. 58 B

NO. 64 Oil Mat
NO. 64 A Gravel
NO. 64 B A-6(12)
Sim. to NO. 58 B

NO. 65 A A-7-6(14)
Sta. 772+00
L.L. 42.6
P.I. 24.9
%-200# 74.4

NO. 73 Oil Mat
NO. 73 A A-7-6(14)
Sim. to NO. 65 A

NO. 74 Oil Mat
NO. 74 A A-6(3)
L.L. 28.7
P.I. 10.7
%-200# 46.7

STRUCTURE NOTES FOR BRIDGE STA. 756+05 to 756+85 STR. E-16-G

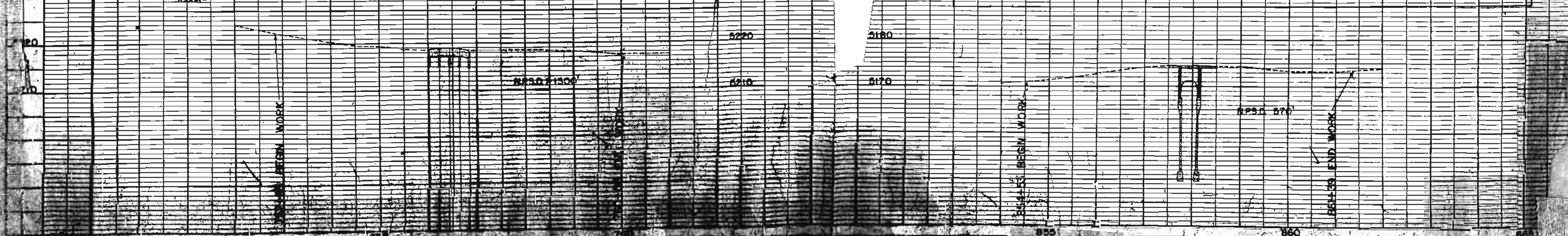
PRESENT STRUCTURE:
SPAN = 4 @ 20'-0"
CLEAR ROADWAY = 20'-0"
CLEAR WATERWAY = 340 Sq. Ft.
TYPE OF SUPERSTRUCTURE = Concrete Slab
TYPE OF SUBSTRUCTURE = Conc. Pile, Conc. Cap
REQUIREMENTS AS TO REMOVAL = Remove Portions
STREAM DATA:
DRAINAGE AREA IN SQ. MILES = 10
VELOCITY DURING HIGH WATER =
ELEVATION OF:
MAXIMUM HIGH WATER = LOW WATER =
NORMAL STAGE = STREAM BED = 5202 ±
DRIFT =
SCOUR =

PROPOSED WIDENED STRUCTURE:
POSITION REFERRED TO PRESENT STRUCTURE = Same
SPAN = 4 @ 20'-0"
CLEAR ROADWAY = 30'-0"
CLEAR WATERWAY = 340 Sq. Ft.
TYPE OF SUPERSTRUCTURE = Concrete Slabs
TYPE OF SUBSTRUCTURE = Steel Piles, Concrete Caps
R.R. SIDING = Broomfield HAUL TO BRIDGE SITE = 2.5 Mi.
DETOUR STRUCTURE REQUIREMENTS = None
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY =
RECORD DURING FLOODS =
LOCATION =

STRUCTURE NOTES FOR BRIDGE STA. 857+73 to 858+19 STR. E-16-H

PRESENT STRUCTURE:
SPAN = 40'-0"
CLEAR ROADWAY = 20'-0"
CLEAR WATERWAY = 300 Sq. Ft.
TYPE OF SUPERSTRUCTURE = Conc. Slab, Conc. Beams
TYPE OF SUBSTRUCTURE = Concrete U Type
REQUIREMENTS AS TO REMOVAL = Remove Portions
STREAM DATA:
DRAINAGE AREA IN SQ. MILES =
VELOCITY DURING HIGH WATER =
ELEVATION OF:
MAXIMUM HIGH WATER = LOW WATER =
NORMAL STAGE = STREAM BED = 5160.8
DRIFT =
SCOUR =

PROPOSED WIDENED STRUCTURE:
POSITION REFERRED TO PRESENT STRUCTURE =
SPAN = 40'-0"
CLEAR ROADWAY = 30'-0"
CLEAR WATERWAY = 300 Sq. Ft.
TYPE OF SUPERSTRUCTURE = Conc. Slab, Conc. Beams
TYPE OF SUBSTRUCTURE = Concrete, Columns
R.R. SIDING = Lafayette HAUL TO BRIDGE SITE = 1 Mi.
DETOUR STRUCTURE REQUIREMENTS = None
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY = 130 Sq. Ft.
RECORD DURING FLOODS =
LOCATION =

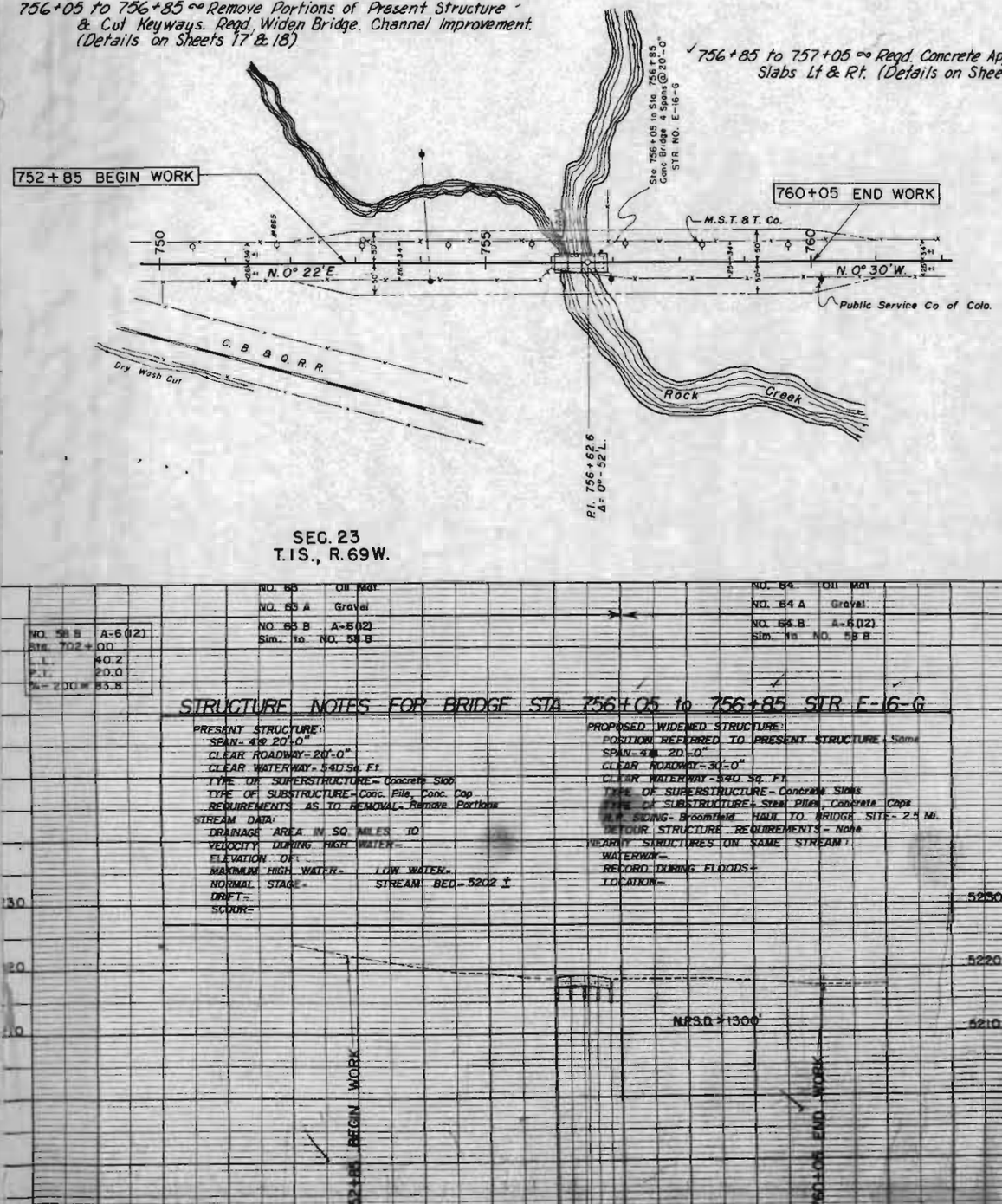


SEC. 22
T. 1 S., R. 69 W.

✓ 755+85 to 756+05 ∞ Remove Concrete Pavement
Reqd. Concrete Approach Slab (Details on Sheets 17 & 18)

756+05 to 756+85 ∞ Remove Portions of Present Structure
& Cut Keyways. Reqd. Widen Bridge. Channel Improvement.
(Details on Sheets 17 & 18)

✓ 756+85 to 757+05 ∞ Reqd. Concrete Approach
Slabs Lt & Rt. (Details on Sheets 17 & 18)



SEC. 23
T. 1 S., R. 69 W.

DIST.	PROJ NO	SHEET NO.
COLO.	F 004-1(12)	38

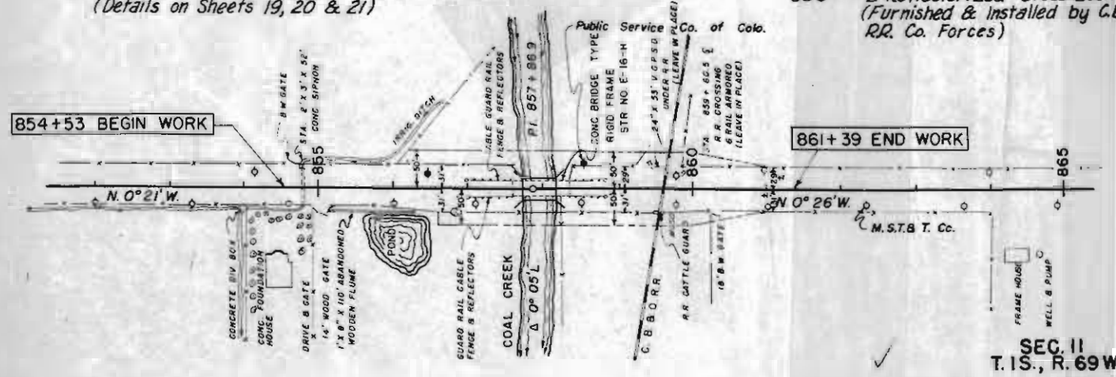
SEC. 10
T. 1 S., R. 69 W.

✓ 857+53 to 857+73 ∞ Reqd. Concrete Approach Slabs Lt. & Rt.
(Details on Sheets 19, 20 & 21)

857+73 to 858+19 ∞ Remove Portions of Present Structure
Reqd. Widen Bridge (Details on Sheets 19, 20 & 21)

✓ 858+19 to 858+39 ∞ Reqd. Concrete Approach Slabs Lt. & Rt.
(Details on Sheets 19, 20 & 21)

FORCE ACCOUNT
859+ ∞ 2 Reflectorized Cross Buck
(Furnished & Installed by C.
RR. Co. Forces)



857+ to 858+ ∞ Remove 214 lin. ft. of Guard Fence Lt. & Rt.

SEC. 11
T. 1 S., R. 69 W.

859+ ∞ R.R. Cattle Guard Rt. to
Relocated by C.B. & Q. RR.
Forces at No Expense to
Project

NO. 58 B A-6 (12)
Sta 752+00
L.L. 40.2
P.I. 20.0
%-200 = 33.8

NO. 63 Oil Mat
NO. 63 A Gravel
NO. 63 B A-6 (12)
Sim. to NO. 58 B

NO. 64 Oil Mat
NO. 64 A Gravel
NO. 64 B A-6 (12)
Sim. to NO. 58 B

STRUCTURE NOTES FOR BRIDGE STA 756+05 to 756+85 STR. E-16-G

PRESENT STRUCTURE:
SPAN - 4 @ 20'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 540 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Concrete Slab
TYPE OF SUBSTRUCTURE - Conc. Pile, Conc. Cap
REQUIREMENTS AS TO REMOVAL - Remove Portions
STREAM DATA:
DRAINAGE AREA IN SQ. MILES - 10
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER - LOW WATER -
NORMAL STAGE - STREAM BED - 5202 ±
DRIFT -
SCOUR -

PROPOSED WIDENED STRUCTURE:
POSITION REFERRED TO PRESENT STRUCTURE - Same
SPAN - 4 @ 20'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 540 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Concrete Slabs
TYPE OF SUBSTRUCTURE - Steel Piles, Concrete Caps
R.R. SIDING - Broomfield HAUL TO BRIDGE SITE - 2.5 Mi.
DETOUR STRUCTURE REQUIREMENTS - None
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY -
RECORD DURING FLOODS -
LOCATION -

NO. 73 Oil Mat
NO. 73 A A-7-5 (14)
Sim. to NO. 65 A

65 A A-7-6 (14)
772+00
42.6
24.9
G = 74.4

NO. 74 Oil Mat
NO. 74 A A-6 (3)
L.L. 28.7
P.I. 10.7
%-200 = 66.7

STRUCTURE NOTES FOR BRIDGE STA 857+73 to 858+19 STR. E-16-H

PRESENT STRUCTURE:
SPAN - 40'-0"
CLEAR ROADWAY - 20'-0"
CLEAR WATERWAY - 300 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Conc. Slab, Conc. Beams
TYPE OF SUBSTRUCTURE - Concrete U Type
REQUIREMENTS AS TO REMOVAL - Remove Portions
STREAM DATA:
DRAINAGE AREA IN SQ. MILES -
VELOCITY DURING HIGH WATER -
ELEVATION OF:
MAXIMUM HIGH WATER - LOW WATER -
NORMAL STAGE - STREAM BED - 5160.8
DRIFT -
SCOUR -

PROPOSED WIDENED STRUCTURE
POSITION REFERRED TO PRESENT STRUCTURE -
SPAN - 40'-0"
CLEAR ROADWAY - 30'-0"
CLEAR WATERWAY - 300 Sq. Ft.
TYPE OF SUPERSTRUCTURE - Conc. Slab, Conc. Beams
TYPE OF SUBSTRUCTURE - Concrete - Cantilever
R.R. SIDING - Lafayette HAUL TO BRIDGE SITE - 1 Mi.
DETOUR STRUCTURE REQUIREMENTS - None
NEARBY STRUCTURES ON SAME STREAM:
WATERWAY - 130 Sq. Ft.
RECORD DURING FLOODS -
LOCATION -