

STATE DEPARTMENT OF HIGHWAYS

DIVISION OF HIGHWAYS - STATE OF COLORADO

PLAN AND PROFILE ~~OF PROPOSED~~ AS CONSTRUCTED

FEDERAL AID PROJECT NO. BRF 040-5(11)
STATE HIGHWAY NO. 40
LINCOLN COUNTY

TABULATION OF LENGTH & DESIGN DATA

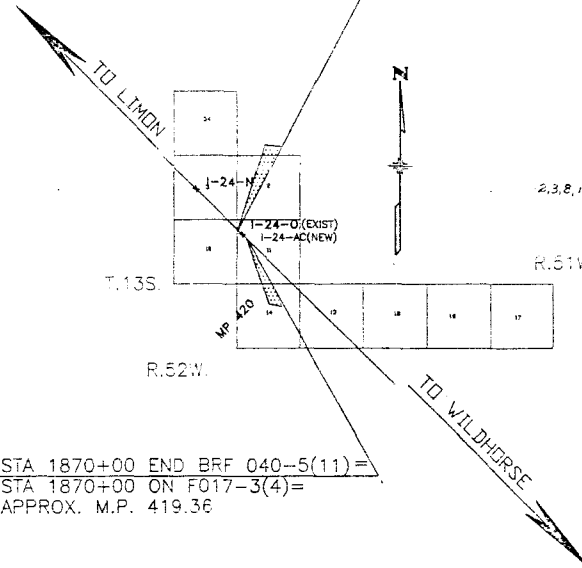
STATION	ROADWAY		MAJOR STRUCTURE	
	Lim. Ft.		Lim. Ft.	
1856+70 BEGIN BRF 040-5(11)= 1856+30 ON F017-3(4)= APPROX. M.P. = 419.10	709.98			
MAJOR STRUCTURE 1863+39.98 (BEGIN STR. NO. 1-24-AC)			60.04	
1863+70.02 (END STR. NO. 1-24-AC)	629.98			
1870+00 END BRF 040-5(11) = 1870+00 ON F017-3(4)= APPROX. M.P. = 419.36				
TOTALS	1339.96		60.04	
SUMMARY				
Roadway	Lim. Ft.		Miles	
Major Structure	1339.96		0.25	
	60.04		0.01	
GROSS AND NET LENGTH	1400.00		0.26	
DESIGN DATA				
Maximum Degree of Curve	TANGENT			
Maximum Grade	1.0711%			
Minimum S.S.D. Horizontal	625'			
Minimum S.S.D. Vertical	625'			
Maximum Design Speed	70MPH			
2010 Design Traffic Volume	ADT 2393			
	DHV 335			
DHV % Trucks	44			

SCALES OF ORIGINAL DRAWINGS

ON PLAN 1 IN=50 FT.

ON PROFILE { 1 IN = 50 FT. HORIZONTAL
1 IN = 5 FT. VERTICAL

STA 1856+00 BEGIN BRF 040-5(11)=
STA 1856+00 ON F017-3(4) =
APPROX. M.P.=419.10



STA 1870+00 END BRF 040-5(11)=
STA 1870+00 ON F017-3(4)=
APPROX. M.P. 419.36

SCALE IN MILES
0 0.5 1 2 3 4 5
SCALE IN KILOMETERS
0 0.5 1 2 3 4 5

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
VIII	COLORADO	BRF 040-5(11)	1

AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

REVISED		
R-1	8-7-91	G.L.M.

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- IMPACT ATTENUATOR DETAIL
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- TYPICAL CONSTRUCTION PHASING
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- PLAN AND PROFILE-DETOURS
- PLAN AND PROFILE-MAINLINE

2,3,8,10,11,13-18. NO REVISIONS

NEW AND REVISED

- M-606-12 GUARD RAIL-TYPE 4 CONCRETE BARRIER
FEBRUARY 18, 1983 (9 SHEETS)
- M-620-2 FIELD LABORATORY (CLASS 2)
MAY 25, 1988 (1 SHEET)

CONTRACTOR	DATE
PROJECT ENGINEER	DATE
(Project or Resident)	
PROJECT STARTED	
PROJECT COMPLETED	
AS CONSTRUCTED PLANS	
APPROVED	DATE

GLM/DIST.1

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THE STANDARD PLAN SHEETS INDICATED HEREON BY A
MARKED BOX ARE TO BE USED TO CONSTRUCT THIS
PROJECT.

AS CONSTRUCTED		
NO REVISIONS ☒ 0-7-22	REVISED ☐	VOID ☐

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	2	20

PLAN NO. TITLE PAGE

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DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

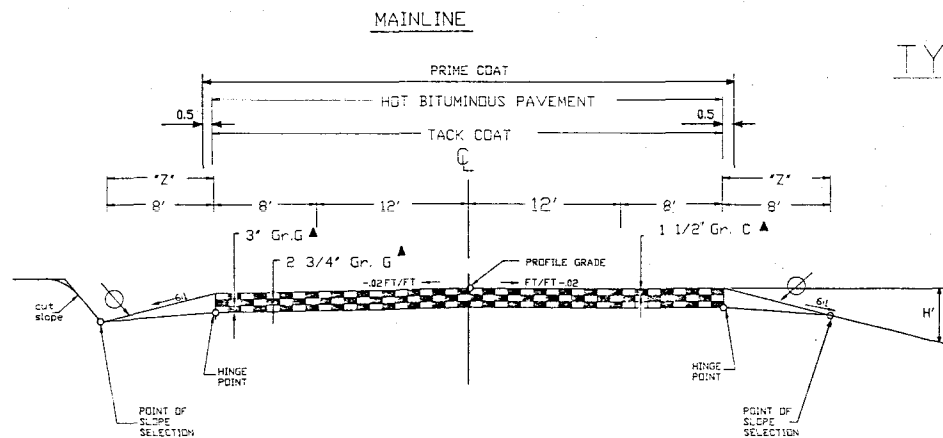
STANDARD PLANS LIST

M & S STANDARDS - JANUARY, 1962

AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRP 04U-0411	3	20

TYPICAL SECTIONS



STA. 1856+00 TO 1870+00

TYPICAL SECTION NOTES

The depth and width of the side ditch shall be varied where necessary in order to provide proper drainage. Material shall be placed in separate courses at the following approximate rates per 100 Lin. Ft. of roadway:

TYPICAL SECTION	BITUMINOUS PAVEMENT	TOP LAYER	37 TONS
		MIDDLE LAYER	67 TONS
		BOTTOM LAYER	73 TONS

DETOUR (EACH DIRECTION) BITUMINOUS PAVEMENT TOP LAYER 50 TONS

R 50 will be required for the top two feet of fill.

The rates shown have been determined from information available at the time of design. Rates should be adjusted during construction to obtain the required approximate thickness.

The Contractor will place Embankment Material to this line after completion of paving operation, to toe of slope.

Full Slopes (Roadway) and Detours

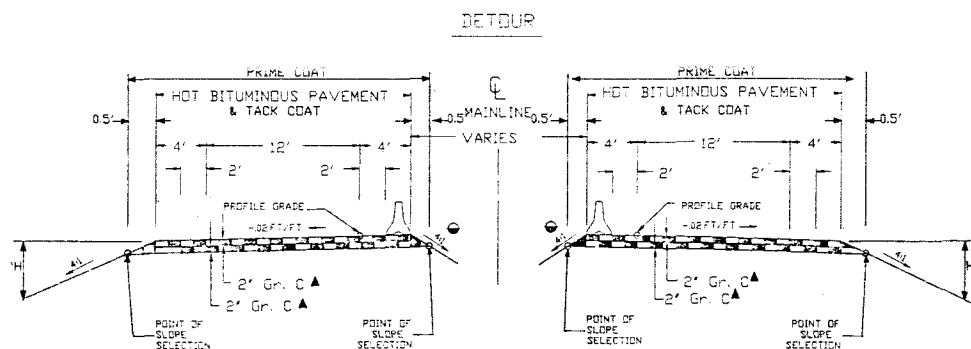
(Use applicable slopes for each typical section)
Slope 6:1 where 'H' is less than 4'
Slope 4:1 where 'H' is 4' to 15'
Slope 4:1 where 'H' is over 15'

Cut Slopes:
Slope 3:1 OR FLATTER

Break points on slopes and in bottom of ditches shall be rounded on construction for a pleasing appearance. See Standards for Details of Cut Slope Treatment, Flaring, and Widening.

Slopes 2:1 or steeper may be used in locations where Concrete Barrier (temp.) is required (See Guard Rail Tabulation).

▲ Approximate Thickness



LEFT DETOUR

100+00 TO 124+99.81

RIGHT DETOUR

100+00 TO 224+99.81

(R-1) ADDED NOTE FOR LEAD PAINT B-7-91 G.L.M.

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS	REVISED	VOID	VIII	COLD.	BRF 040-5(11)	4	20

GENERAL NOTES

(R-1)

FOR PRELIMINARY PLAN QUANTITIES OF PAVEMENT MATERIAL, THE FOLLOWING RATES OF APPLICATION WERE USED:

HOT BITUMINOUS PAVEMENT (GRADING C).....@ 110 LBS./SQ.YD./INCH
HOT BITUMINOUS PAVEMENT (GRADING G).....@ 113 LBS./SQ.YD./INCH
TACK COAT DIL. EMUL. ASPHALT (SLOW SETTING).....@ 0.10 GAL./SQ.YD.(DIL.)
PRIME COAT (MC-70).....@ 0.30 GAL./SQ.YD.

DILUTED EMULSIFIED ASPHALT FOR TACK COAT SHALL CONSIST OF 1 PART WATER AND 1 PART EMULSIFIED ASPHALT. IT IS ESTIMATED THAT 4000 GALLONS WILL BE REQUIRED FOR TACK COAT.

RATES OF APPLICATION SHALL BE DETERMINED BY THE ENGINEER AT THE TIME OF APPLICATION.

THE FOLLOWING SHALL BE FURNISHED WITH EACH BITUMINOUS PAYER.

1. A SKI TYPE DEVICE AT LEAST 30 FEET IN LENGTH.
2. A SHORT SKI OR SHOE.
3. TAPERED SHOE.
4. A PAVING LEVELER AT LEAST 55 FEET IN LENGTH

THE CONTRACTOR SHALL USE A TAPERED SHOE ON ALL LONGITUDINAL JOINT ON THE TOP LIFT. THE PAVING LEVELER SHALL BE USED ON THE BOTTOM LAYER (GRADING C).

THE CONTRACTOR SHALL ARRANGE HIS PAVING OPERATION FOR THE BOTTOM LAYER SO THAT THERE WILL BE NO EXPOSED LONGITUDINAL JOINTS BETWEEN ADJACENT TRAVEL LANES AT THE END OF A DAY'S RUN.

PRIOR TO PLACING HOT BITUMINOUS PAVEMENT, SWEEPING OF DIRT AND GRAVEL FROM THE EXISTING MAT WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN ITEM 403.

ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE A SUCCEEDING LAYER IS PLACED.

DEPTH OF MOISTURE-DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
FULL DEPTH OF ALL EMBANKMENTS
BASES OF CUTS AND FILL 0.5 FEET

TYPE OF COMPACTION FOR THIS PROJECT WILL BE AASHTO T99. EXCAVATION REQUIRED FOR COMPACTION BASES OF CUTS AND FILLS WILL BE CONSIDERED SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.

SOURCE OF EMBANKMENT MATERIAL (COMPLETE IN PLACE) IS CONTRACTOR'S SOURCE (NOT ON HIGHWAY R.O.V.). THE CONTRACTOR SHALL NOT ALLOW FILL MATERIAL TO BE PLACED IN THE ACTIVE STREAM CHANNEL DURING DETOUR CONSTRUCTION.

IT IS ESTIMATED THAT 12 HOURS OF BLADING WITH A MOTOR GRADER IN 125 TO 200 FLYWHEEL HORSEPOWER RANGE WILL BE REQUIRED.

THE CONTRACTOR WILL NOT REMOVE EXISTING STRUCTURE UNTIL THE TRAFFIC IS ACTIVE ON BOTH SIDES OF THE DETOUR.

IT IS ESTIMATED THAT 8 HOURS OF DOZING WITH A POWER CRAWLER TYPE TRACTOR IN THE 140 TO 160 HORSEPOWER RANGE WILL BE REQUIRED FOR CHANNEL MODIFICATION AS DIRECTED BY THE ENGINEER.

IT IS ESTIMATED THAT 5000 GAL OF LIQUID ASPHALTIC MATERIAL (MC-70) WILL BE REQUIRED FOR PRIME COAT.

IT IS ESTIMATED THAT 400 GALLONS OF EPOXY PAVEMENT MARKING PAINT WILL BE REQUIRED FOR THIS PROJECT AS FOLLOWS:

	CONSTRUCTION	FINAL	TOTAL
YELLOW	400	400	800
WHITE	400	400	800
TOTAL	800	800	1600

IT IS ESTIMATED THAT EACH OF EXISTING SIGN WILL BE RESET.
IT IS ESTIMATED THAT 20 EACH OF EXISTING SIGN WILL BE REQUIRED.

TESTS HAVE INDICATED THAT LEAD IS PRESENT IN PAINTS FOUND ON THE STRUCTURES AND ROADWAY WITHIN THIS PROJECT. THE CONTRACTOR SHALL FOLLOW ALL APPLICABLE LAWS AND REGULATIONS IN DEALING WITH THIS MATERIAL. THE CONTRACTOR SHALL ADVISE ALL PERSONNEL ON THIS PROJECT OF ANY SAFETY PRECAUTIONS THAT MAY BE REQUIRED DURING THE PROGRESS OF THE WORK. DURING DEMOLITION, DUST CONTROL MEASURES SHALL BE UNDERTAKEN. NO CONSTRUCTION DEBRIS CONTAINING PAINT SHALL BE DISPOSED OF ON SITE BUT SHALL BE HAULED TO A LEGALLY PERMITTED DUMP OR LANDFILL. NO CONSTRUCTION DEBRIS SHALL BE ALLOWED TO ENTER THE ACTIVE STREAM OR BE ALLOWED TO REMAIN WITHIN THE CHANNEL.

SEEDING, SOIL PREPARATION, FERTILIZING WITH COMMERCIAL FERTILIZER AND MULCHING WILL BE REQUIRED FOR APPROXIMATELY 4.5 ACRES FOR ROADWAY WITHIN RIGHT OF WAY LIMITS ON ALL DISTURBED AREAS NOT SURFACED.

THE FOLLOWING TYPES AND RATES SHALL BE USED.

SEEDING PLAN

COMMON NAME	SCIENTIFIC NAME	LB.-PLS./ACRE
WESTERN WHEATGRASS	AGROPYRON SMITHII	4
SMOOTH BROME V. LINCOLN	BROMUS INERMIS	5
PUBESCENT WHEATGRASS	AGROPYRON TRICHOPTERUM	6
SAND DROPSEED	SPOROBOLLUS CRYPTANDRUS	0.25
SIDEWAYS GRAMA	BOUTELOUA CURTIPENDULA	3
CRESTED WHEATGRASS	AGROPYRON DESERTORUM	1
TOTAL		19.25

SEED SHALL BE MECHANICALLY CRIMPED TO A DEPTH OF 0.25' TO 0.5' INTO TOPSOIL.

MULCHING REQUIREMENT AND APPLICATION, 1-1/2 TONS PER ACRE NATIVE HAY SHALL BE MECHANICALLY CRIMPED INTO THE SOIL.

COMMERCIAL FERTILIZER	%	LBS./ACRE
AVAILABLE N	18	27
AVAILABLE P	46	69
AVAILABLE K	0	0

*FOR INFORMATION ONLY

*FERTILIZER (AVAILABLE N) 40.50 LBS
*FERTILIZER (AVAILABLE P) 103.50 LBS
*FERTILIZER (AVAILABLE K) 0
*SOIL PREPARATION (NATIVE) 1.5 ACRES

PROJECT TOTALS

SEEDING (NATIVE) 6.4 4.5 ACRES
MULCHING 6.4 4.5 ACRES

SUMMARY OF ~~APPROXIMATE~~ ^{FINAL} QUANTITIES

AS CONSTRUCTED
NO REVISIONS ☐ REVISED 9-11-92 VOID ☐

C. FED. ROAD REGION DIVISION PROJ. NO. SHEET NO.
D. VIII COLO. BR# 040-5(11) 5

R-1 REVISED AND DELETED CONTRACT ITEMS 8-7-91 G.L.M.

INDEX	CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY			STR. 1-24-AC			ROADWAY			STR. 1-24-AC			PROJECT TOTALS	
				PLAN	AS CONST.		PLAN	AS CONST.		PLAN	AS CONST.		PLAN	AS CONST.		PLAN	AS CONST.
	201	CLEARING AND GRUBBING	LS	1	1					1						1	1
	202	REMOVAL OF DELINEATOR	EACH	22	22					22						22	22
	202	REMOVAL OF ASPHALT MAT	SY	12,961	12,960					12,961						12,960	12,960
	202	REMOVAL OF BRIDGE	EACH				1	1					1			1	1
	202	REMOVAL OF FENCE	LF	1,970	2,741					1,970						2,741	2,741
	203	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	CY	23,774	23,774					23,774						23,774	23,774
	203	BLADING	HR	30	12					30						12	12
	203	DOZING	HR	90	8					90						8	8
	206	STRUCTURE EXCAVATION	CY				412	412					412			412	412
	206	STRUCTURE BACKFILL (CLASS 2)	CY				371	371					371			371	371
	210	RESET GROUND SIGN	EACH	8	1					8						1	1
	212	SEEDING (NATIVE)	ACRE	1.5	6.4					1.5						6.4	6.4
	213	MULCHING	ACRE	1.5	6.4					1.5						6.4	6.4
	219	EROSION BALES (delete) (F-105)	EACH	20	0					20						0	0
	403	HOT BITUMINOUS PAVEMENT (GRABING C) (HAUL AND ASPHALT) (C.M.O. * 2)	TON	3,109	1,178.7					3,109						1,178.70	1,178.70
	403	HOT BITUMINOUS PAVEMENT (GRABING C) (HAUL AND ASPHALT)	TON	2,183	1,941.38					2,183						1,941.38	1,941.38
	403	STRUCTURED ASPHALT (S.M.O. * SETTING)	TON	1,868	1,868					1,868						1,868	1,868
	411	LIQUID ASPHALTIC MATERIAL (MC-70)	GAL	5,402	4,600					5,402						4,600	4,600
	601	CONCRETE CLASS A (BOX CULVERT)	CY				161	110					161			110	110
	601	CONCRETE CLASS B (BOX CULVERT)	CY				611	611					611			611	611
	602	REINFORCING STEEL	LB				116,550	121,568					116,550			121,568	121,568
	602	REINFORCING STEEL (EPOXY COATED)	LB				58,650	61,333					58,650			61,333	61,333
	607	END POST	EACH	4	9					4						9	9
	607	CORNER AND LINE BRACE POST	EACH	8	9					8						9	9
	607	FENCE BARBED WIRE WITH METAL POSTS	LF	2,420	2,380					2,420						2,380	2,380
	607	FENCE (TEMPORARY)	LF	3,000	3,000					3,000						3,000	3,000
	612	DELINEATOR (TYPE I)	EACH	18	12					18						12	12
	612	DELINEATOR (TYPE III)	EACH	4	2					4						2	2
	614	FLAGGING	HR	1,000	599.5					1,000						599.5	599.5
	614	TRAFFIC CONTROL SUPERVISOR	DAY	50	39					50						39	39
	614	BARICADE (TYPE 3 M-B) (TEMPORARY)	EACH	2	2					2						2	2
	614	CONSTRUCTIVE TRAFFIC SIGN (PANEL SIZE A)	EACH	10	10					10						10	10

SUMMARY OF ~~APPROXIMATE~~ ^{FINAL} QUANTITIES

AS CONSTRUCTED		C. FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS	REVISED 9-11-92	VOID	COLO.	BRF 640-5(11)	6

INDEX	CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY		STR. I-24-AC		ROADWAY		STR. I-24-AC		PROJECT TOTALS	
				PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.
614		CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	EACH	20	20			20				40 20	20
614		DRUM CHANNELIZING DEVICE	EACH	20	20			20				40 20	20
614		DRUM CHANNELIZING DEVICE (WITH LIGHT) (FLASHING)	EACH	4	4			4				4 4	4
614		DRUM CHANNELIZING DEVICE (WITH LIGHT) (STEADYBURN)	EACH	8	8			8				16 8	8
614		CONCRETE BARRIER (TEMPORARY)	LF	1,200	1,200			1,200				1,200 1,200	1,200
614		TRAFFIC CONE	EACH	60	60			60				120 60	60
614		IMPACT ATTENUATOR (SAND FILLED PLASTIC BARREL) (TEMPORARY)	EACH	8	8			8				16 8	8
620		FIELD OFFICE (CLASS 1)	EACH	1	1			1				2 1	1
620		FIELD LABORATORY (CLASS 2)	EACH	1	1			1				2 1	1
620		SANITARY FACILITY	EACH	1	1			1				2 1	1
626		MOBILIZATION	L S	00.5	0.5	00.5	0.5	00.5		00.5		150 150	35
627		PAVEMENT MARKING PAINT	GAL	150	35			150				150 150	35
900		FORCE ACCOUNT											
900		FOR MINOR CONTRACT REVISIONS (MCR # 1)	F A	0.5	0.5	0.5	0.5	0.5		0.5		1 1	1
900		MOVING IMPACT ATTENUATOR	EACH									1 1	1
900		FOR TRAILING LEAD BASE PAINT SURFACES (DAILY)	F A			1	0					1 1	0
403		CMO #2 - HOT SET (NO LIME)	TON	1870	1911.77							1870 1911.77	1911.77
614		CMO #3-CONCRETE BARRIER (EMB. SUPPORT)	LF	1000	1000							1000 1000	1000

TABULATION OF GUARD RAIL

LOCATION (STATION TO STATION)	LOCATION (STRUCTURE)	CONCRETE BARRIER (TEMPORARY)	IMPACT ATTENUATOR (SAND FILLED PLASTIC BARREL) (TEMPORARY)
		LIN. FT.	EACH
1861+70.30 TO 1862+45.3	I-24-D LT.		1
1864+34.10 TO 1865+84.10	I-24-D LT.		1
1860+95.30 TO 1862+45.30	I-24-D RT.		1
1864+34.1 TO 1865+09.10	I-24-D RT.		1
111+01.18 TO 114+01.18	RT.	300	1
111+01.18 TO 114+01.18	LT.	300	1
211+01.18 TO 214+01.18	RT.	300	1
211+01.18 TO 214+01.18	LT.	300	1
TOTAL		1200	8

NOTE: PRIOR TO CONSTRUCTION ACTIVITY, IMPACT ATTENUATOR WILL BE PLACED IN FRONT OF EXISTING BRIDGE RAIL.

TABULATION OF DELINEATORS

LOCATION (STATION TO STATION)	SIDE	SPACING	DELINEATORS - EACH								
			TYPE I			TYPE II			TYPE III		
			C	Y	R	C	Y	R	C	Y	R
1856+ TO 1860+	LT. & RT.	NORMAL	4								
1861+ TO 1863+	RT.	APPR. G.R.	4						1	2	
1863+ TO 1865+	LT	APPR. G.R.	4						1	2	
1865+ TO 1873+	LT. & RT.	NORMAL	4								
TOTAL			16						2	4	

IT IS ESTIMATED THAT 22 EA. DELINEATORS WILL BE REMOVED.

TOTAL REFLECTORS REQUIRED

CRYSTAL 18 1/2
YELLOW 12 6

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS	REVISED	VOID	VIII	COLD.	BRF 040-5(11)	7	20

SURFACING TABULATION

LOCATION (STATION TO STATION)	HOT BITUMINOUS PAVEMENT (HAUL & ASPHALT)						REMOVAL OF ASPHALT MAT	
	GRADING G			GRADING C				
	BOTTOM LAYER	MIDDLE LAYER	TOP LAYER	■	■	BOTTOM LAYER		TOP LAYER
	3'	2 3/4'	1 1/2'	2 3/4'	4 1/2'	2'		2'
	TONS	TONS	TONS	TONS	TONS	TONS	TONS	SQ. YDS.
<u>MAIN LINE</u>								
■ 1854+00 TO 1856+00 (APPR. TO PROJECT)	-302	-277	-147	-60	-220			
1856+00 TO 1860+00								4144
1860+00 TO 1870+00	-754	-691	-367					-4445
■ 1870+00 TO 1873+00 (APPR. TO PROJECT)				-101	-930			
<u>DETOUR</u>								
102+82 TO 121+98						-469	-469	4258
202+82 TO 221+98						-469	-469	4258
IRREGULARITIES (15%)	-159							
SUBTOTAL	-1245	-960	-514	-169	-550	-938	-938	-12,961
PROJECT TOTAL	-1245	-960	-514	-169	-550	-938	-938	-12,961

STABILIZATION BASED ON

MAIN LINE	DETOUR
1. 20 YEAR 18K ESAL.....3,928,000	1. 10 YEAR 18K ESAL.....1,838,000
2. RELIABILITY.....80%	2. RELIABILITY.....50%
3. PSI LOSS.....2.0	3. PSI LOSS.....2.0
4. OVERALL DEVIATION.....0.44	4. MINIMUM R-VALUE.....50
5. MINIMUM R-VALUE.....50	5. HBP THICKNESS.....4"
6. HBP THICKNESS.....7.25"	

TABULATION OF FENCE

LOCATION (STATION TO STATION)	SIDE	REMOVAL OF FENCE	FENCE OF BARBED WIRE WITH METAL POST
1857+00 TO 1862+10	RT	-510 172	
1865+15 TO 1870+00	RT	-485 163	
1857+00 TO 1861+35	LT	-435 162	
1864+60 TO 1870+00	LT	-540 227	
1857+00 TO 1862+65	LT		-565 193
1863+55 TO 1870+00	LT		-645 220
1857+00 TO 1863+40	RT		-640 221
1864+30 TO 1870+00	RT		-570 190
TOTAL		-2,150	-2,420

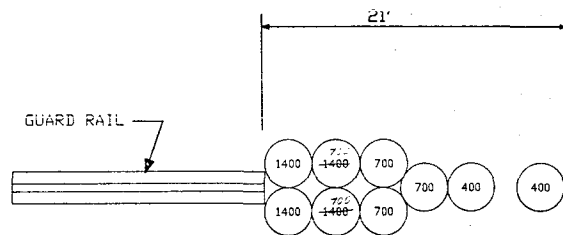
IT IS ESTIMATED THAT 8 EA. CORNER AND LINE BRACE POSTS, 4 EA. END POSTS AND 3000 LIN FT OF FENCE (TEMP.) WILL BE REQUIRED FOR THIS PROJECT.

SUMMARY OF EARTHWORK QUANTITIES

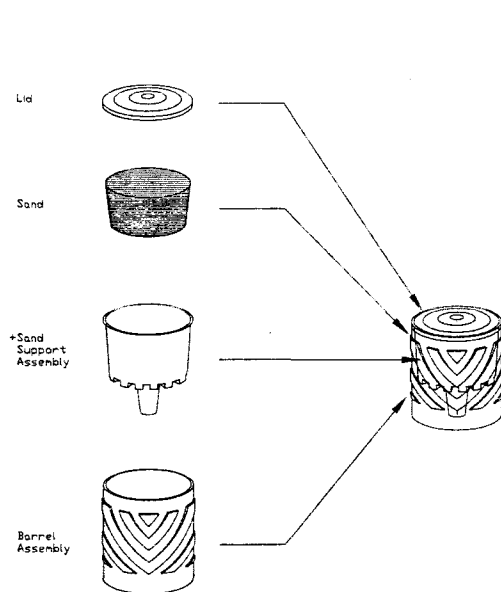
AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS	3-11-92	REVISED					
		VOID					
VIII	COLO.	SRF 040-5(11)	8	45			

EMBANKMENT MATERIAL (C.I.P.)	CUBIC YARDS
ROADWAY (FROM COMPUTER)	10,867
DETOUR-RT.(FROM COMPUTER)	8,407
DETOUR-LT.(FROM COMPUTER)	7,790
NEGATIVE QUANTITIES(STR. 1-24-AC) (ESTIMATED)	-3,692
SHOULDERING MATERIAL(ROADWAY AND DETOURS-LT.&RT.) (ESTIMATED)	402
TOTAL	23,774
WETTING (FOR INFORMATION ONLY)	M. GAL.
DUST PALLIATIVE	500
COMPACTION((ROADWAY AND DETOUR-LT.&RT.)	1,290
TOTAL	1,790
UNCLASSIFIED EXCAVATION (FOR INFORMATION ONLY)	
ROADWAY AND DETOURS (FROM COMPUTER)	96
REMOVAL OF DETOURS (LT.&RT.)	16,197
TOTAL	16,293
COMPACTION (AASHTO T99) (FOR INFORMATION ONLY)	CUBIC YARDS
ROADWAY (FROM COMPUTER)	10,867
DETOUR-RT.(FROM COMPUTER)	8,407
DETOUR-LT.(FROM COMPUTER)	7,790
NEGATIVE QUANTITIES (STR. 1-24-AC)(ESTIMATED)	-3,692
SHOULDER MATERIAL(ROADWAY AND DETOURS-LT.&RT.) (ESTIMATED)	402
BASE COMPACTION(ROADWAY AND DETOUR-LT.&RT.) (ESTIMATED)	6,389
TOTAL	30,163
ROADWAY QUANTITIES BALANCE (FOR INFORMATION ONLY)	
BORROW	29,622
TOTAL	29,622
EMBANKMENT X FACTOR 1.25 (FOR INFORMATION ONLY)	
ROADWAY (FROM COMPUTER)	13,584
DETOUR-RT. (FROM COMPUTER)	10,509
DETOUR-LT. (FROM COMPUTER)	9,737
NEGATIVE QUANTITIES (STR. 1-24-AC)(ESTIMATED)	-4,615
SHOULDER MATERIAL(ROADWAY AND DETOURS-LT.&RT.) (ESTIMATED)	503
TOTAL	29,718

IT IS ESTIMATED THAT 16,197 CU. YD. OF EMBANKMENT MATERIAL WILL BE REMOVED FROM DETOURS. THIS MATERIAL MAY BE HAULED AWAY OR THE CONTRACTOR MAY FLATTEN THE EXISTING SLOPE WITHIN THE PROJECT LIMIT OR DISPOSE AS DIRECTED BY THE ENGINEER. THE COST OF REMOVAL AND SLOPE FLATTENING WILL NOT BE PAID FOR SEPERATELY BUT SHALL BE INCLUDED IN THE COST OF EMBANKMENT MATERIAL (C.I.P.).



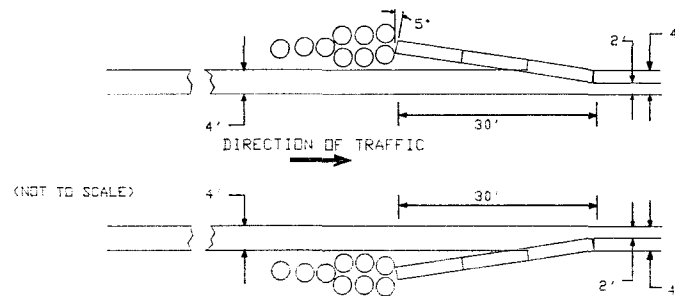
TYPICAL SAND BARREL ATTENUATOR LAYOUT



*Varies per Manufacture and weight of barrel required.

Note: Impact Attenuators shall be assembled in accordance with the Manufacturer's requirements. Barrels shall have anti-freeze agent added when freezing conditions could occur. Impact Attenuator assemblies shall be approved by the Engineer prior to installation.

(FOR CONSTRUCTION DETOUR)
SAND BARREL IMPACT ATTENUATOR
(TYPICAL)



(NOT TO SCALE)

NOTE: WIDENING OF DETOUR SHOULDER FOR IMPACT ATTENUATOR WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE DETOUR.

DESIGN DATA FOR
2000LB VEHICLE
AT 55 MPH

BARREL WEIGHT			
POUNDS	V ₀	V ₁	G's
400	80.1	67.1	4.95
400	67.1	55.9	7.19
700	55.9	41.4	7.30
1400	41.4	24.4	5.76
1400	24.4	14.3	2.02
2800	14.3	5.9	0.67
AVERAGE G's = 4.67			

V₀ = ORIGINAL VELOCITY IN FT/SEC

V₁ = VELOCITY AFTER IMPACTING ONE ROW OF BARRELS.

AS CONSTRUCTED		
NO REVISIONS	REVISED 7-11-75	VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	9	20

THE CONTRACTOR WILL BE REQUIRED TO PROVIDE CRASH ATTENUATOR BARRELS WITH THE FOLLOWING FEATURES TO PREVENT THE OCCURRENCE OF FROZEN SAND IN THE BARRELS.

1. BARRELS SHALL BE FILLED WITH DRY, FREE DRAINING SAND WITH A MOISTURE CONTENT OF 3 PERCENT OR LESS.
2. BARRELS SHALL HAVE POSITIVE DRAINAGE PATHWAYS FOR MOISTURE. SLOTS OR WEEP HOLES SHALL BE PROVIDED IN THE SIDES AND BOTTOMS OF THE BARRELS TO PREVENT COLLECTION OF MOISTURE. TO PREVENT THE LOSS OF SAND, HOLES SHALL BE COVERED WITH FILTER FABRIC ON THE INSIDE OF THE BARREL.
3. BARREL LIDS SHALL HAVE RAINPROOF VENTILATION PATHWAYS.
4. A SYSTEM SHALL BE PROVIDED WHICH WOULD SECURE LIDS TO THE BARRELS AND PREVENT DISLOCATION. THE CONTRACTOR SHALL REPLACE BROKEN OR CRACKED LIDS AND/OR BARRELS IMMEDIATELY.
5. IF REQUESTED BY THE ENGINEER THE CONTRACTOR MAY BE REQUIRED TO MIX AN ANTIFREEZE AGENT WITH THE SAND, OR USE PEA GRAVEL FOR THE INERTIAL MATERIALS AS FOLLOWS:
 - A. ANTIFREEZE AGENT-USE OF ROCK SALT (NaCl) MIXED AT THE RATE OF NO MORE THAN 5 PERCENT BY WEIGHT, SAND TO SALT.
 - B. PEA GRAVEL-ONE HUNDRED PERCENT OF THIS MATERIAL SHALL PASS 1/2 INCH SIEVE. NO MORE THAN 5 PERCENT SHALL PASS A NUMBER 50 SIEVE AND NO MORE THAN 2 PERCENT SHALL PASS A NUMBER 100 SIEVE.

ITEM	DESCRIPTION	UNIT	QUANTITY
614	IMPACT ATTENUATOR (SAND FILLED PLASTIC BARREL) (TEMPORARY)	EACH	8

SCHEDULE OF TRAFFIC CONTROL DEVICES

SIGN CODE	LEGEND	DIMENSIONS	PANEL SIZE QUANTITY EACH			
			A	B	C	OTHER
60G 20-2	END/CONSTRUCTION	60" X 24"	2			
48W 20-1	ROAD/CONSTR. (DIST.)	48" X 48"	2			
48W 20-7a	FLAGGER SYMBOL	48" X 48"	2			
36R 2-1(40)	SPEED LIMIT (40)	36" X 48"	2			
24R 2-1(55)	SPEED LIMIT (55)	24" X 50"	2			
48W 20-2	DETOUR (DIST.)	48" X 48"	2			
48R 11-2	ROAD/CLOSED	48" X 30"	2			
48M 4-10(R)	DETOUR/ARROW SYMBOL	48" X 18"	2			
36R 4-7	KEEP RIGHT SYMBOL	36" X 48"	2			
48W 1-4R	REVERSE CURVE SYMBOL	48" X 48"	2			
48W 1-4L	REVERSE CURVE SYMBOL	48" X 48"	2			
48W20-51	Give 'em a BRAKE	48" X 48"	2			
36W6-3	TWO WAY TRAFFIC SYMBOL	36" X 36"	2			
30R5-1	DO NOT ENTER	30" X 30"	2			
36R5-1a	WRONG/WAY	36" X 24"	2			
TOTAL			10	20		
BARRICADE (3M-B)(TEMP)			2 EA.			
TRAFFIC CONE (28")			60 EA.			
DRUM CHANNELIZING DEVICES			20 EA.			
DRUM DEVICE (LIGHT)(SB)			8 EA.			
DRUM DEVICE (LIGHT)(F)			4 EA.			
CONCRETE BARRIER (TEMP)			1200 LIN.FT.			

NOTE: ALL CONSTRUCTION SIGNS PROVIDED ON THIS PROJECT SHALL BE PROVIDED WITH HIGH BRIGHTNESS ENCAPSULATED TYPE REFLECTIVE SHEETING.
SEE SECTION 713.10 OF THE STANDARD SPECIFICATIONS.

* THIS SIGN SHALL BE COVERED DURING NON-WORKING HOURS

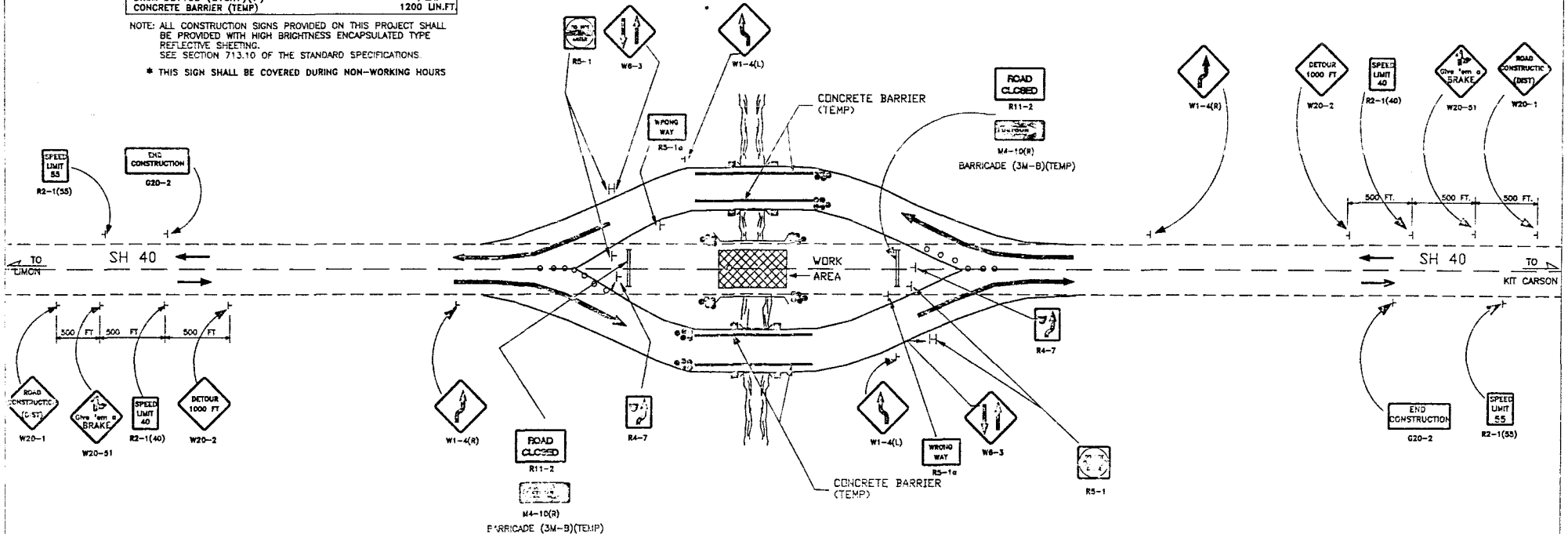
AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	10	21

TRAFFIC CONSTRUCTION PLAN

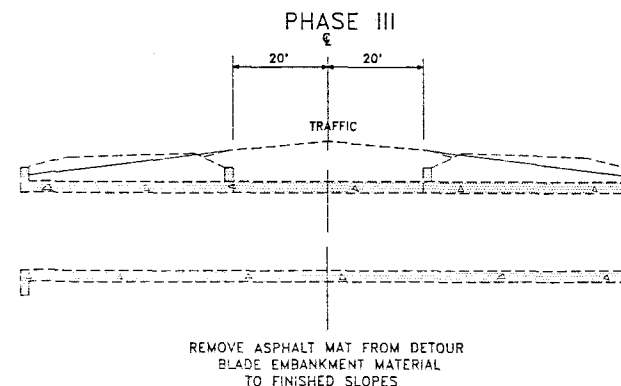
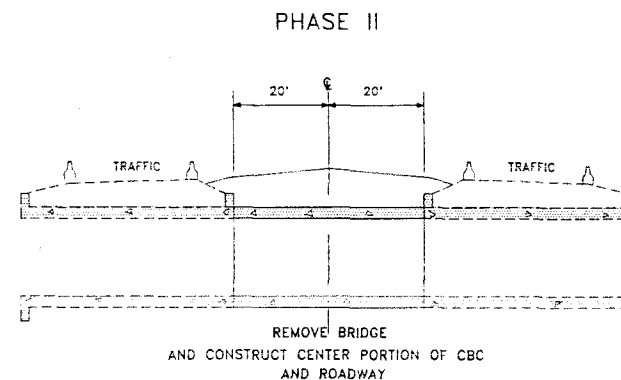
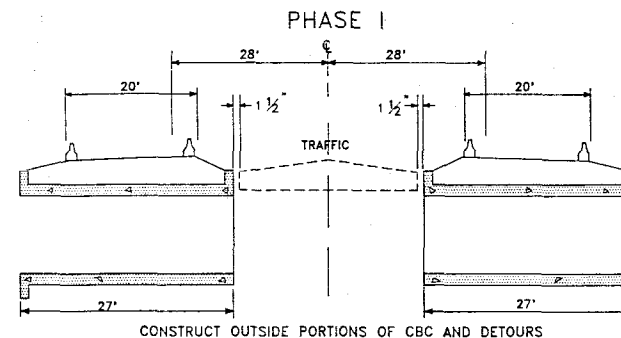
LEGEND

- DRUM DEVICES (LIGHT)(F)
- DRUM CHANNELIZING DEVICES
- SAND BARREL ATTENUATOR



AS CONSTRUCTED		
NO REVISIONS	3-11-12	REVISED
		VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	11	20



TYPICAL CONSTRUCTION PHASING FOR C.B.C.

NOTE:

CONTRACTOR WILL BE REQUIRED TO SHORE THE EMBANKMENT MATERIAL AROUND THE END OF THE C.B.C. AT NO COST TO THE PROJECT.

INITIAL	DATE	CHECKED BY	DATE
DESIGNED BY	10/1/92	12/90	
QUANTITIES BY	12/90		
PROPOSED BY	12/90		

D.A. = 45 sq. ft.
 C₄₀ = 1180.0 cfs
 CHW = 4717.4
 C₅₀ = 3900.0 cfs
 W = OVERTOPPING

NO. REVISIONS	REVISED	VOID
	9-11-92	

FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
13	COLORADO	BRF 40-5(11)	12

REVISIONS

SUMMARY OF QUANTITIES

Item No.	Description	Unit	Total
202	Removal of Bridge	Each	1
206	Structure Excavation	Cu.Yd.	472
206	Structure Backfill (Class 2)	Cu.Yd.	371
601	Concrete Class A (Box Culvert)	Cu.Yd.	110
601	Concrete Class D (Box Culvert)	Cu.Yd.	611
602	Reinforcing Steel	Lb.	121,568
602	Reinforcing Steel (Epoxy Coated)	Lb.	61,333

GENERAL NOTES

Structure excavation and backfill shall be in accordance with Standard M-206-1.

Expansion joint material shall meet AASHTO specification M-213.

All concrete shall be Concrete Class D (Box Culvert).

Grade 60 reinforcing steel is required.

The following table gives the minimum lap splice length for reinforcing bars:

Bar Size	#4	#5	#6	#7	#8	#9
Splice length for Class D Concrete	1'-3"	1'-7"	1'-10"	2'-3"	2'-11"	3'-7"

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

All construction joints not shown on the plans shall be approved by the Engineer.

(E) denotes epoxy coated reinforcing steel.

For wingwall and concrete apron details, see Standard M-801-20.

For structure number installation, see Standard S-614-12.

DESIGN CRITERIA

Given in Standard S-614-12, interpreted as virgin foundation.

DESIGN DATA

Current AASHTO Specifications, Fourteenth Edition, Working Stress Method.

Live Load: AASHTO HS-20-44 and Interstate Alternate. Live load surcharge on exterior walls = 2'-0" of earth.

Dead Load: Earth Load = 120 Lbs./Cu. Ft.
 Equivalent Fluid Pressure = 30 Lbs./Cu. Ft. (Min.)
 60 Lbs./Cu. Ft. (Max.)

Reinforced Concrete:

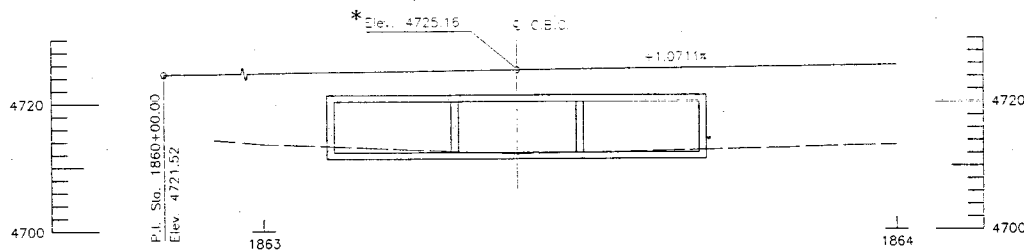
Class D Concrete: $f_c = 4,500$ psi, $f_t = 1,800$ psi, $n = 8$
 Reinforcing Steel: $f_y = 60,000$ psi, $f_u = 24,000$ psi

PLAN

DIVISION OF HIGHWAYS			
GENERAL LAYOUT			
Designer: J. DeLano	Structure: 1-24-80		
Detailer: S. Greene	Numbers:		
Drawn by: Number: B. J.	Drawings:		

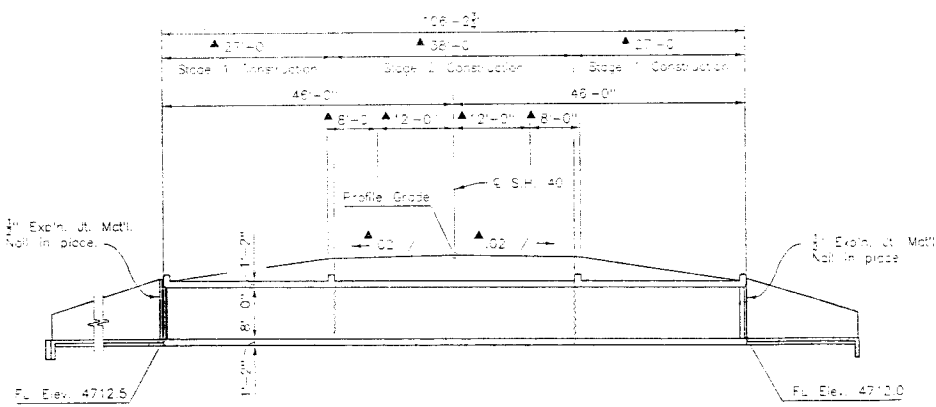
DATE	CHECKED BY	DATE	DESIGNED BY
7-91	DB	7-90	SS
7-90	DB	7-90	SS
7-90	DB	7-90	SS
7-90	DB	7-90	SS

AS CONSTRUCTED		FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
NO REVISIONS	2-11-92	REVISED	VOID	COLORADO	BRF 40-5111
REVISIONS					



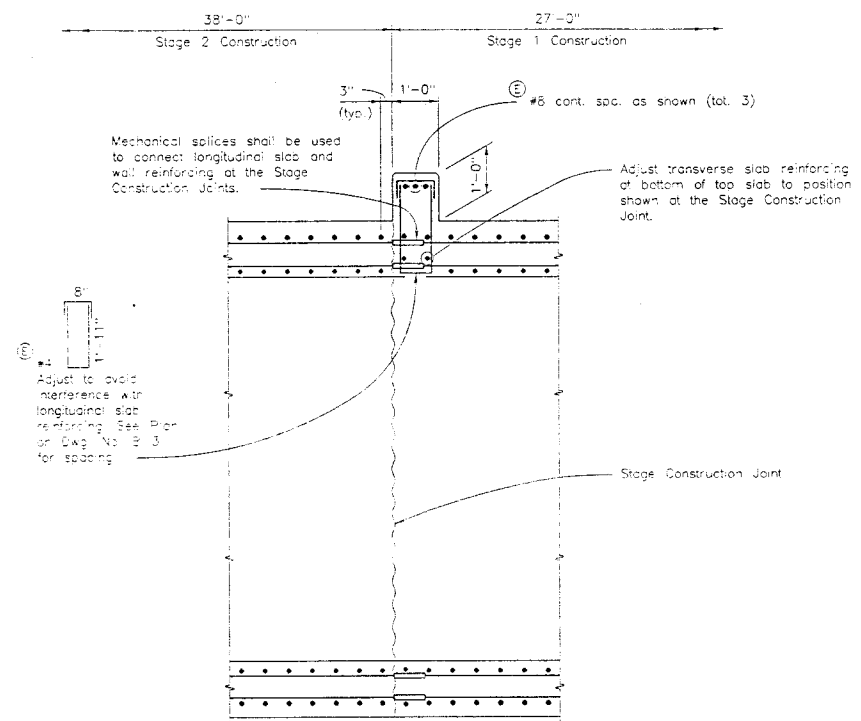
SECTION **B1 A**

Taken at S. Sht. 40
 Looking Upstream
 * Elevation shown, elevation



SECTION **B1 B**

Taken at C.B.C.
 A Perpendicular to S. Sht. 40

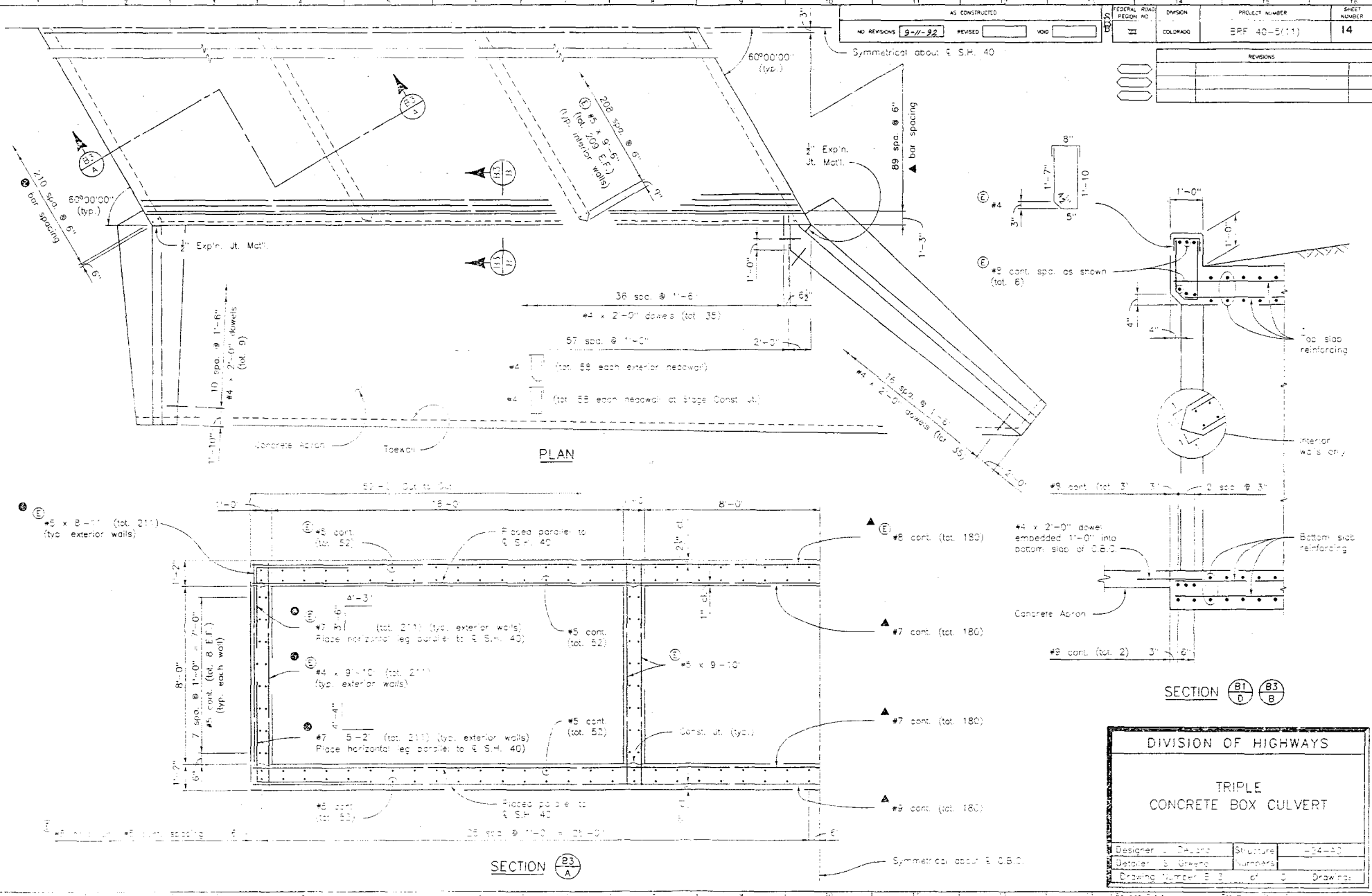


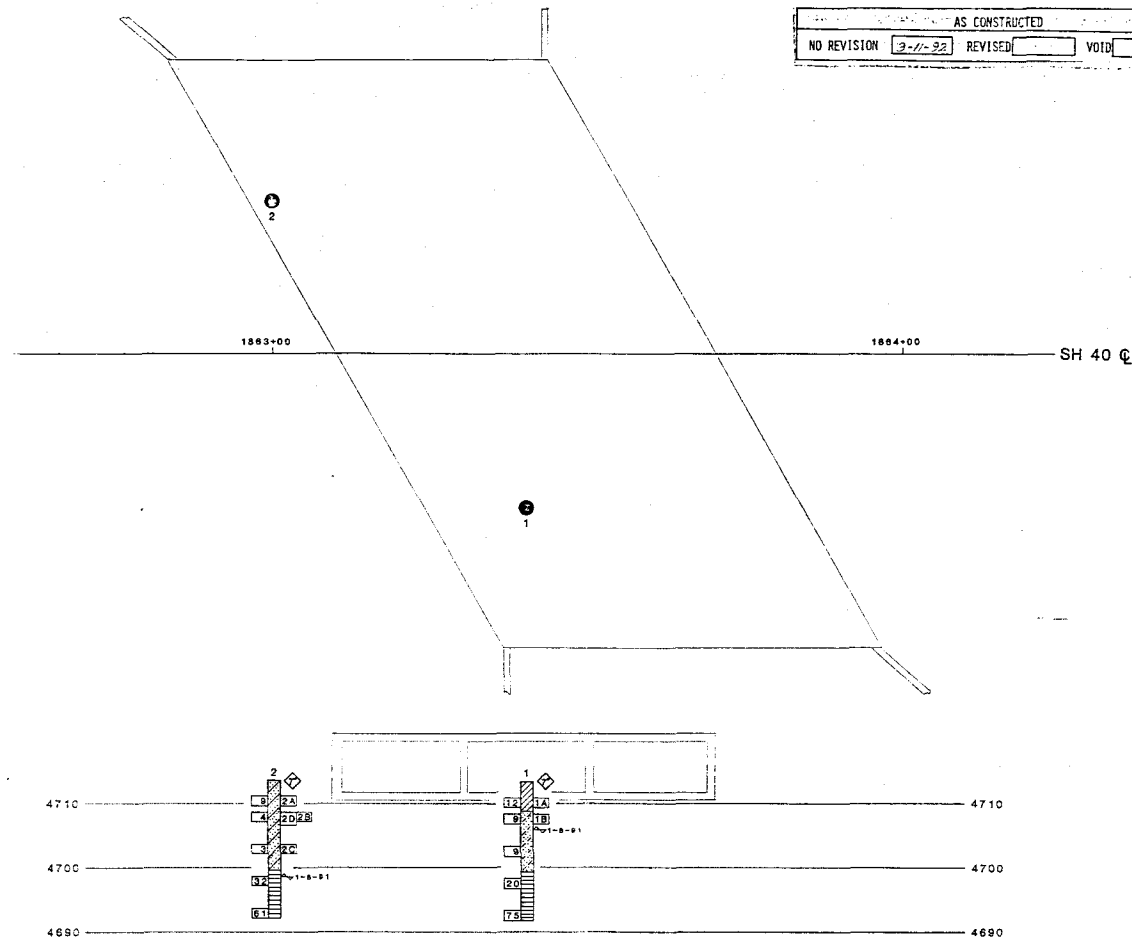
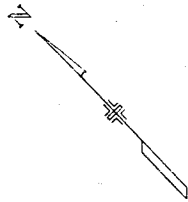
SECTION **B1 C**

DIVISION OF HIGHWAYS			
GENERAL LAYOUT			
Designer	J. Deland	Structure	-24-40
Checker	S. Greene	Numbers	
Drawing Number	B-2	of	3
Drawn by			

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03/28/91 00:30:49.77: user/01200/user/greens)section
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REVISIONS	





THE BORING LOGS OF THE ABOVE TEST HOLES ARE ON FILE IN THE GEOTECHNICAL SECTION OFFICE STAFF MATERIALS BRANCH - (303) 757-9750

[illegible]

TYPE OF MATERIAL	
	CLAY
	SANDY CLAY
	SILTY SAND
	CLAYEY SHALE

[illegible]

LEGEND

INSTRUMENTATION TEST

A Trace of Test

A Dutch Cone Penetration

B 2 in. Dial Drive Point
30 in. Penetration
140 Lb. Hammer

C Location of Test Boring

C Location of Continuous Penetration Test

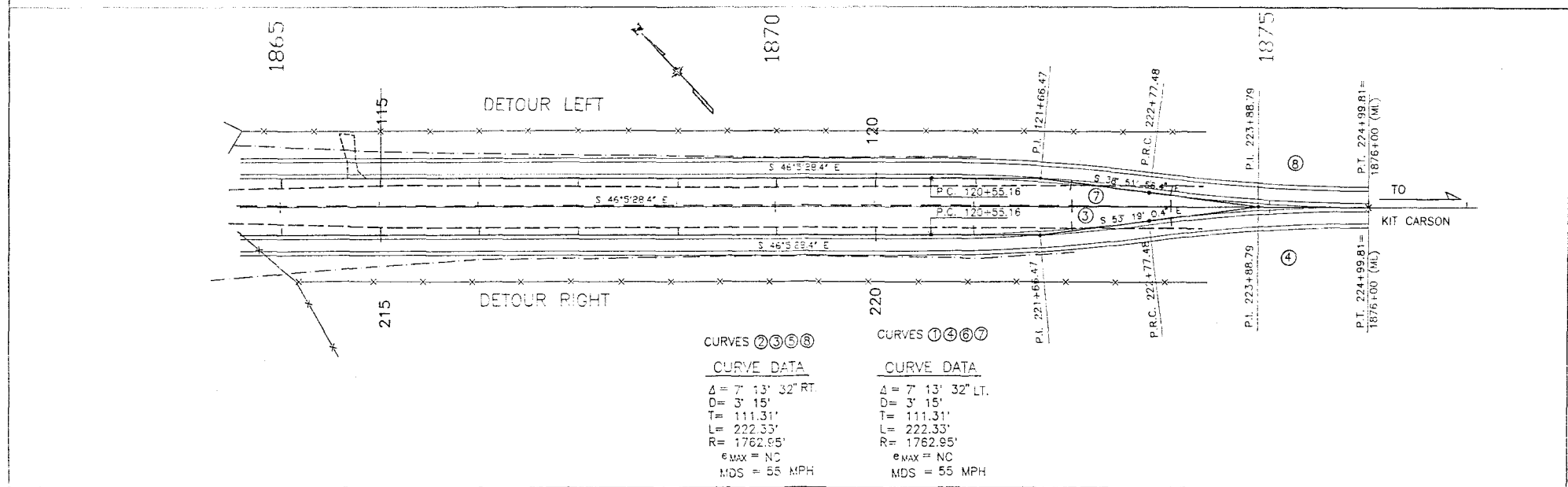
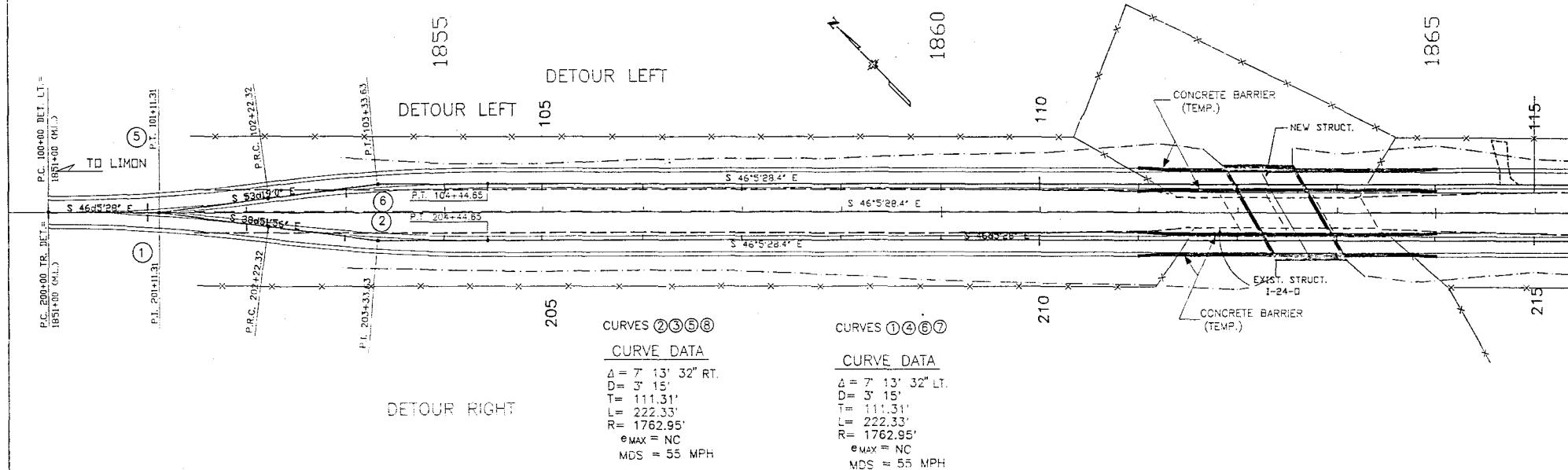
D Rotary Boring

E Auger Boring

50 100

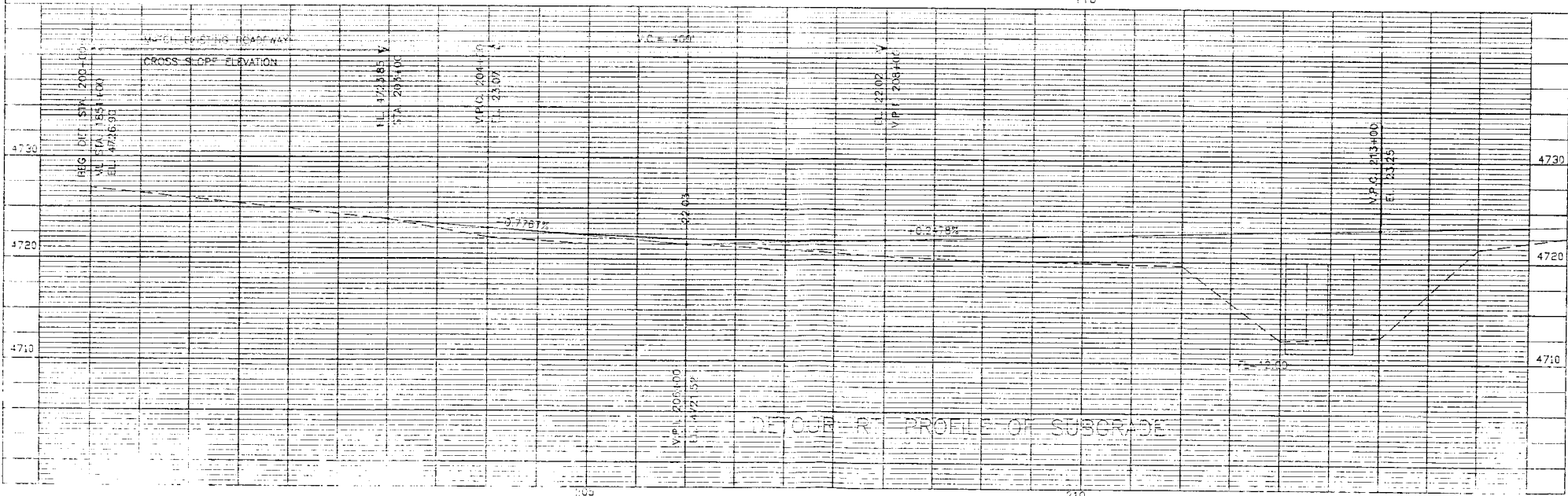
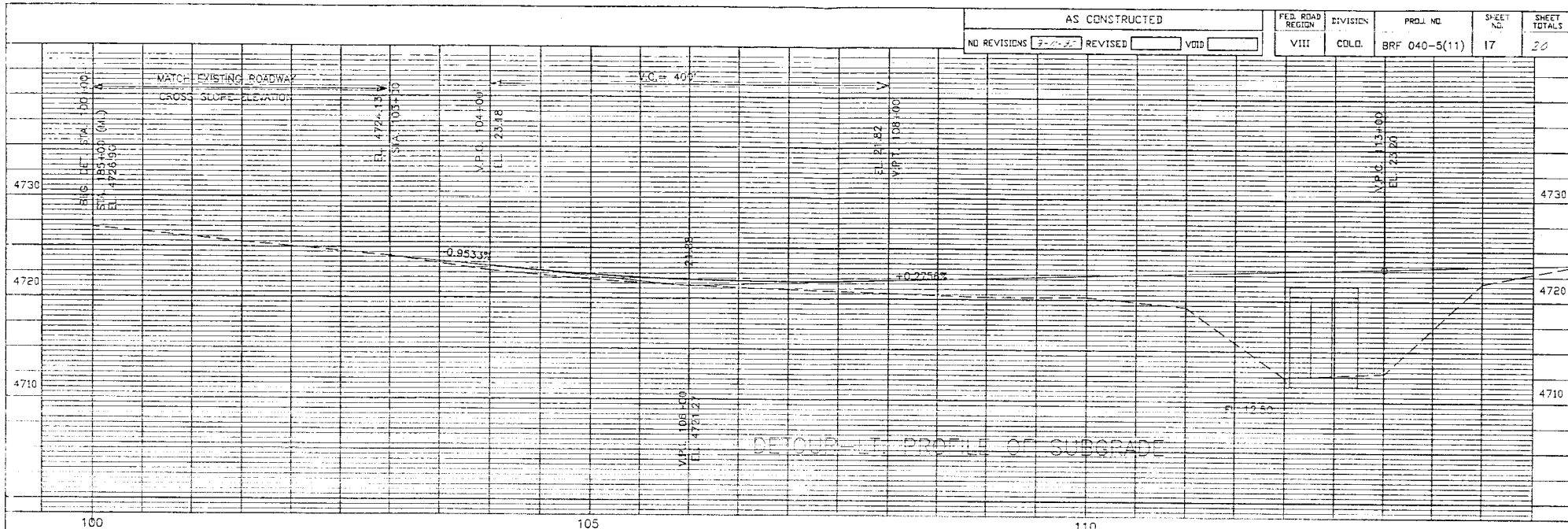
SP-115, NO. 1-2-2-AC

		AS CONSTRUCTED		FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS	9-11-82	REVISED	VOID	VIII	COLD.	BRF 040-5(11)	16	20



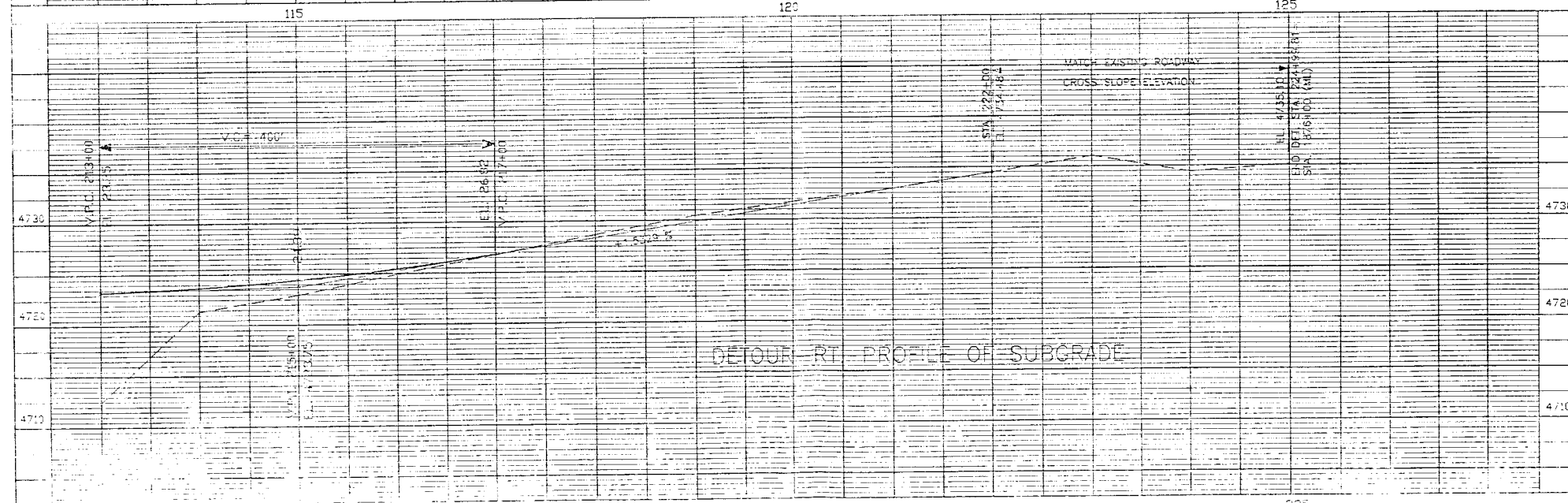
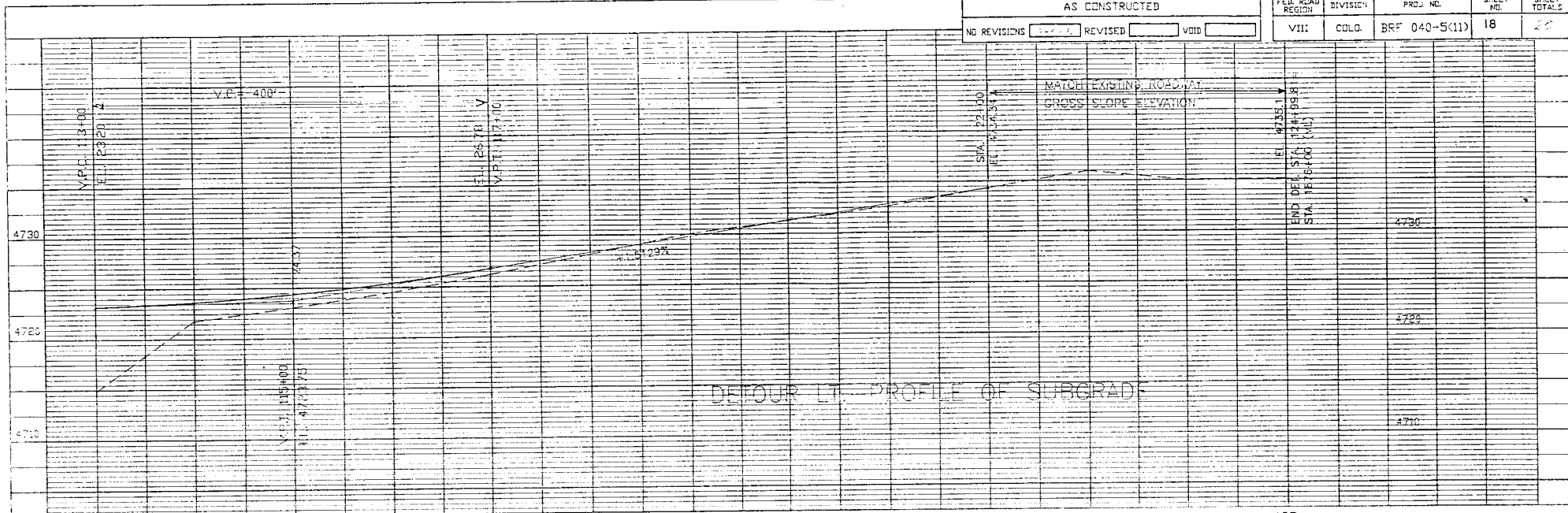
AS CONSTRUCTED
 NO REVISIONS ☒ REVISED ☐ VOID ☐

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	17	20



AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

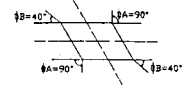
FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLG.	BRF 040-5(11)	18	20



WINGWALL DATA 1863+40

ϕA
 $M=9'-4"$
 $K=4'-0"$
 $L=18'-60"$
 $DA=50$
 $Z=81$

ϕB
 $M=9'-4"$
 $K=4'-0"$
 $L=27$
 $DB=40$
 $Z=81$



STA. 1854+00
 APPROACH TO PROJECT
 STA. 1856+00

1855

N 45° 19' E
100'

N 44° 41' W

1860

TO LIMON

UTILITIES
 EASTERN SLOPE TELE. CO.

STA. 1856+00 BEGIN BRG 040-3(1)
 STA. 1856+00 ON F017-3(4)
 APPROX. MP 419.10

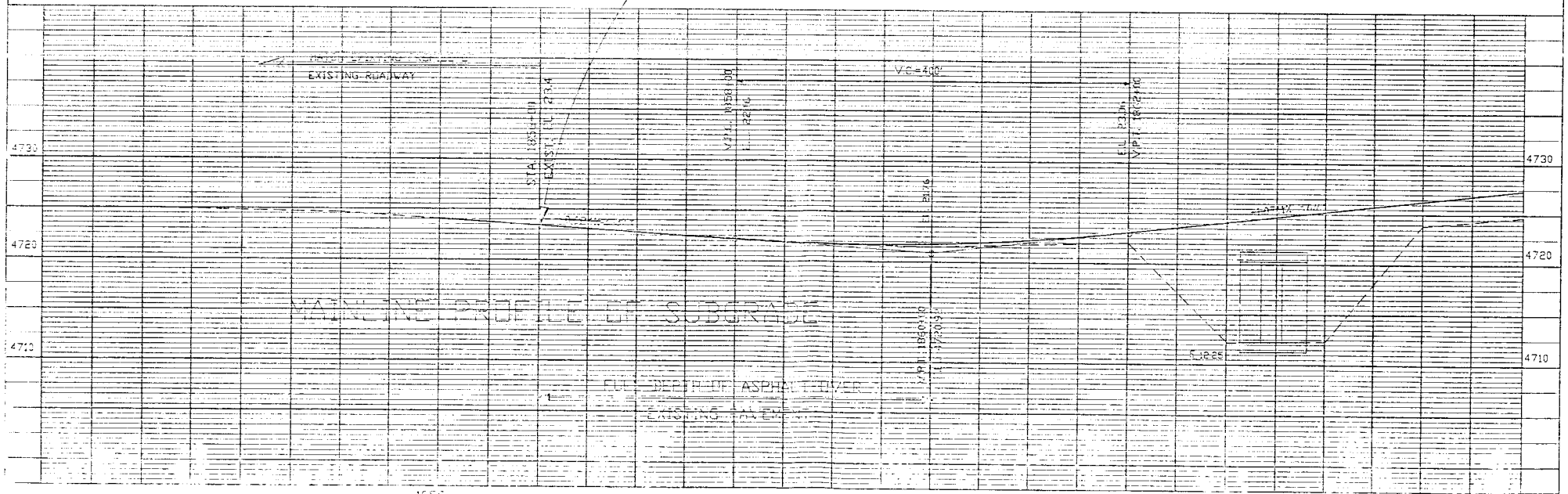
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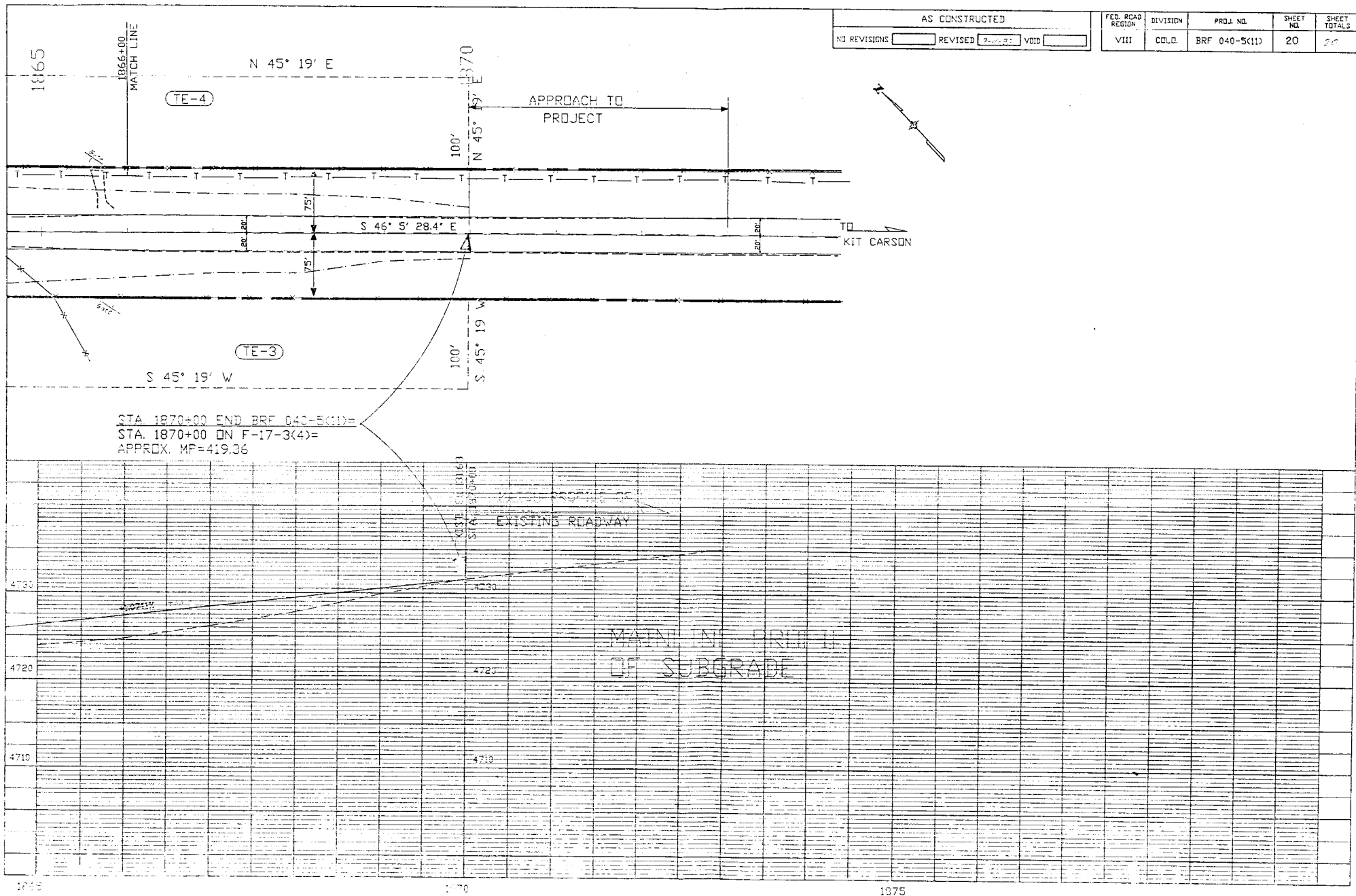
FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	CCLD	BRF 040-5(11)	19	20

1855

1866+00
MATCH LINE

1863+40- REMOVAL OF STRUCTURE
 REQ'D THREE CELL 16 X18'X108' C&G
 SKEW 60° RT.
 HEADWALL & WINGWALLS LT.&RT.
 APRON 21'x5'
 $DA=4.5$ SQ. YD.
 $Q_{10}=1180$ CFS
 $DHW=4717.40$
 $AHW=4721.90$
 $Q_{100}=3930$ CFS
 $HW=$ OVERTOPPING





AS CONSTRUCTED

NO REVISIONS REVISED VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLD.	BRF 040-5(11)	20	20