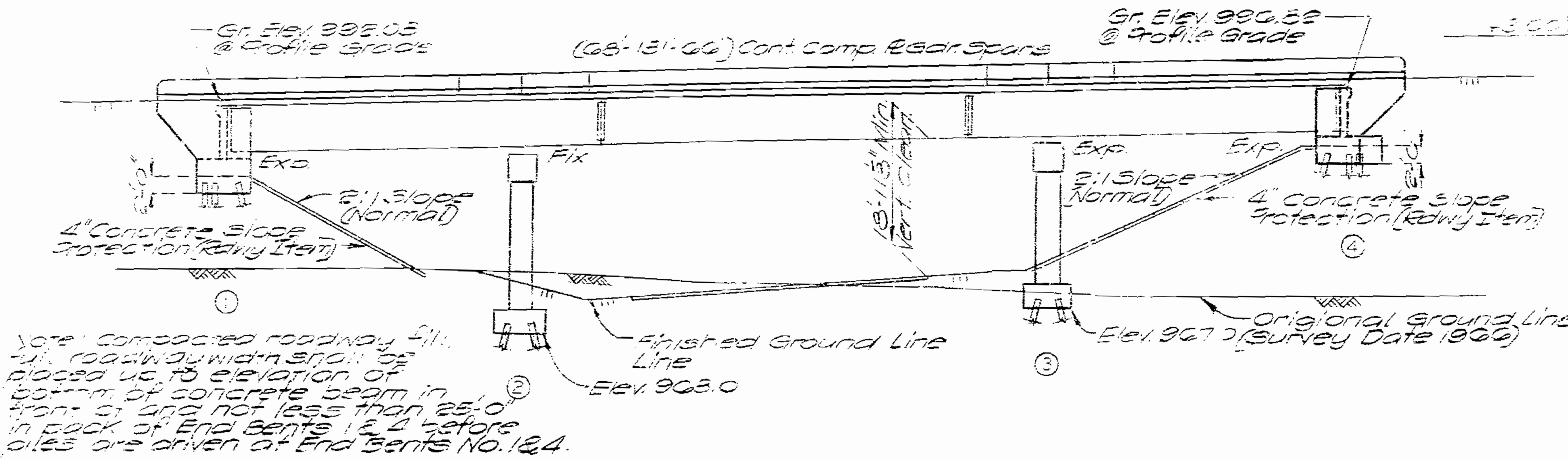
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19		



GENERAL NOTES

Design Specifications: A.A.S.H.T.O. - 1973

Design Loading: HS20-44 (Mod. ...)
35#/Sq. Ft. Future wearing surface
Earth 120# Equivalent Fluid Pressure 30#
Fatigue Stress-Case II ('74 Interim)

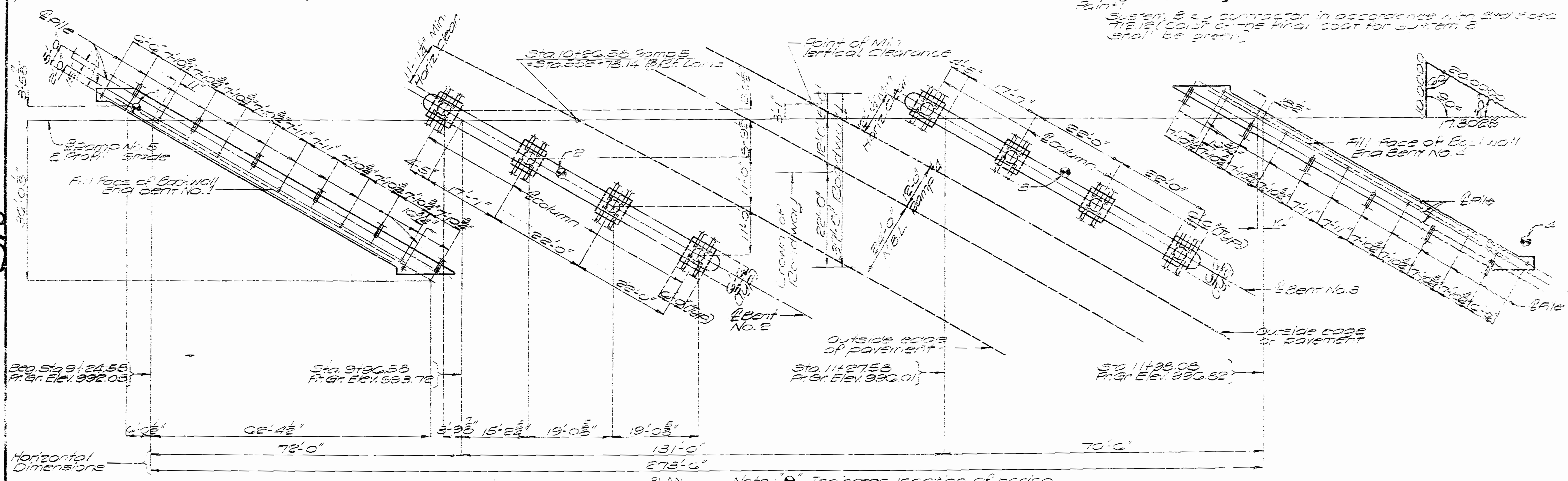
Design Unit Stresses:
Class B Concrete (Substructure) f'c=3000 psi
Class B1 Concrete (Superstructure) f'c=4000 psi
Reinforcing Steel fy=40,000 psi

Structural Carbon Steel fs=20,000 psi
Steel Pile: fb=9000 psi

Fabricated Steel:
Field connections High Strength Bolts 3/4"ø, holes 13/16"ø except as noted

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.
All reinforcing steel in top of substructure beams or caps shall be spaced to clear anchor bolts by at least 1½".

Paint:
System B by contractor in accordance with Sec. 712.12 (Color of the final coat for System B shall be green.)



Note: "⊖" - Indicates location of boring. For boring data see Sheet No. 2.

PILE DATA					
BENT NO.		1	2	3	4
Pile Type and Size		HP10x42	HP10x42	HP10x42	HP10x42
Number		13	16	16	13
Approximate Length	Ft.	32	12	15	35
Design Bearing	Tons	52	53	53	52
Hammer Energy Req'd	Ft. Lbs.	12800	12800	12800	12800

Minimum energy requirement of hammer based on plan length and design bearing value of piles.
All piles shall be driven to practical refusal.
Piling at Int. Bent No. 2 shall be pre-bored to Elev. 955.0 (See ... Special Provisions).

Retain. Wall (A-2327)
Sta. 10+26.58 Ramp 5 = Sta. 552+78.14 NBL Lane
Beg. Sta. 9+24.58
℄ Ramp No. 5
Proposed Structure
60°

B.M. #4 Elev. 978.8 ... 220' Rt. Sta. 553+00 ℄ Survey

BRIDGE: NBL I-470 UNDER RAMP 5
STATE ROAD FROM RTE. 50 TO VELMA ROAD
ROUTE I-470; ROUTE ... INTERCHANGE
PROJECT NO. I-470-... **STA.** 9+24.55
JOB NO. 4-I470-45 **RTE** I-470
COUNTY
DATE ...
STD.
STD.

DESIGNED Apr. 1974
DETAILED June 1975
CHECKED Aug. 1975

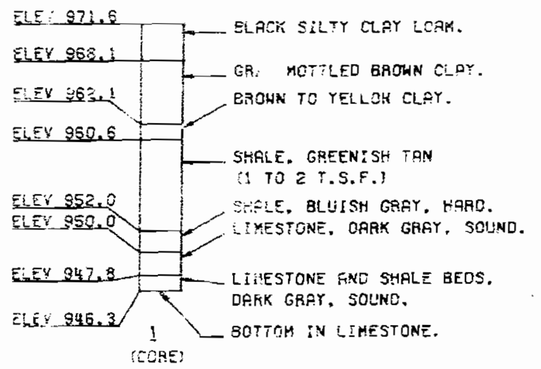
Note: This drawing is not to scale. Follow dimensions.

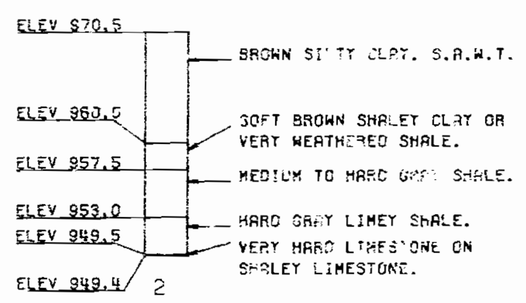
Sheet No. ... of ...

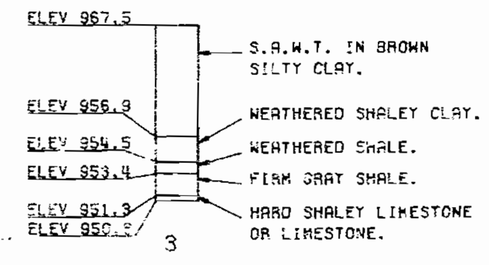
518

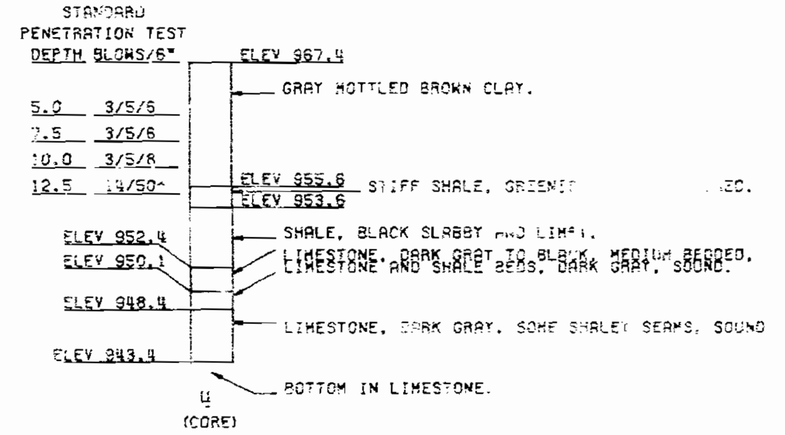
MISSOURI STATE HIGHWAY DEPARTMENT

FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		19	9	



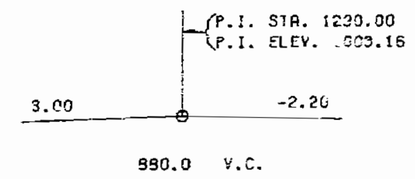


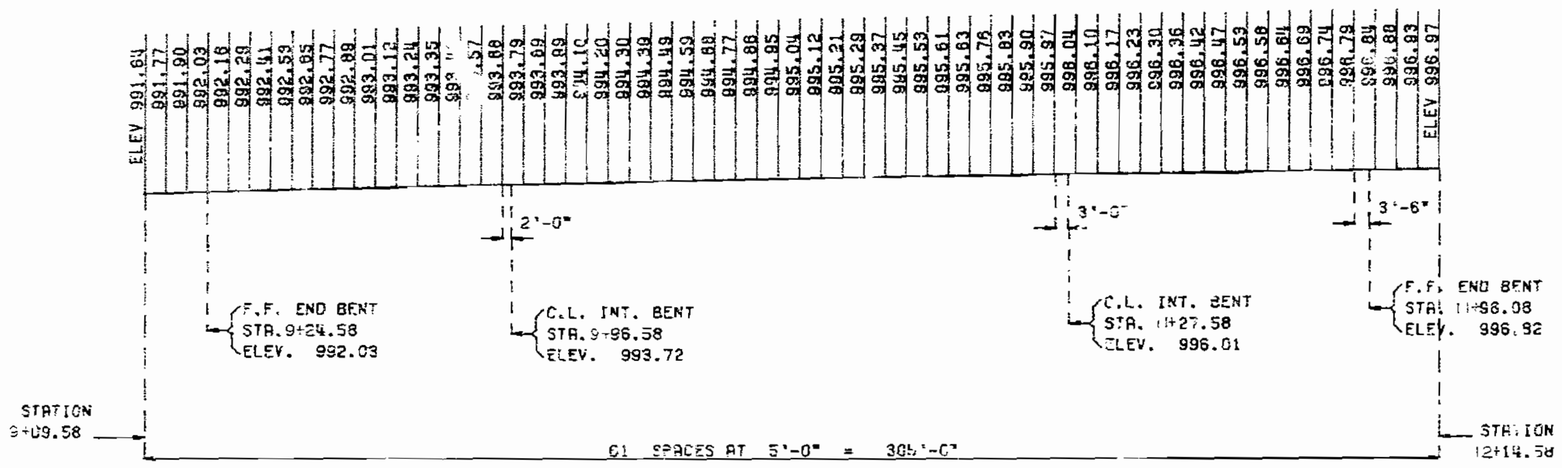




BORING DATA

Note: For location of Borings see Sheet No. 1.





PROFILE GRADE ELEVATIONS

ESTIMATED QUANTITIES

ITEM		SUBSTR	SUPER	TOTAL
Class I Excavation	Cu. Yd.	170		170
Structural Steel Pile (10")	Lin. Ft.	1303		1303
Class "B" Concrete	Cu. Yd.	344.4		344.4
Class B-1 Concrete	Cu. Yd.		389.9	389.9
Elastomeric Exp. Jt. Seal (2.5" in.)	Lin. Ft.		79	79
Reinforcing Steel (Grade 60)	Lbs.	43,740	57,260	101,000
Reinforcing Steel (Epoxy)	Lbs.		47,080	47,080
Fabricated Structural Carbon Steel	Lbs.		30,810	30,810
Painting (System B) Steel	Tons		52.5	158.5
Slab Drains	Each		20	20
Pre-Bore for Piling	Lin. Ft.	130		130

Note: All concrete and reinforcement in safety curb is included with superstructure quantities.

DETAILED July 1978
CHECKED Aug. 1978

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 12 Sheets

JACKSON COUNTY

A-21201

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		75	5	

5220

ELEVATION

PLAN

PLAN OF BEAM
(BELOW LOWER CONSTRUCTION JOINT)

DETAILS OF END BENT NO. 1

DETAILED JUNE 19[illegible]
CHECKED [illegible] 19[illegible]

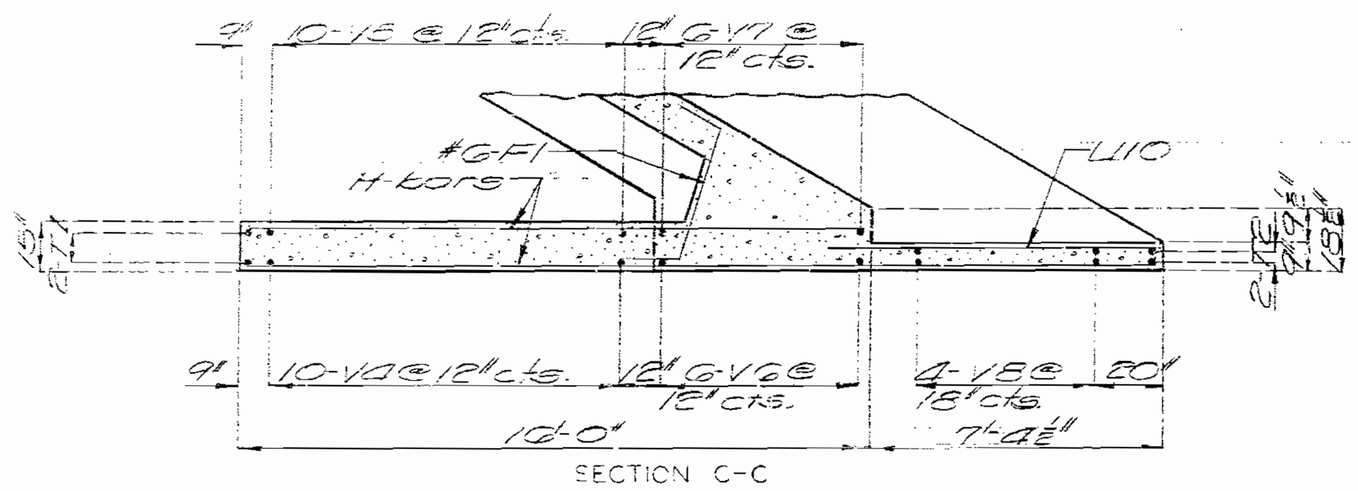
Note: This drawing is not to scale. Follow dimensions.

Sheet No. [illegible] of [illegible] Sheets

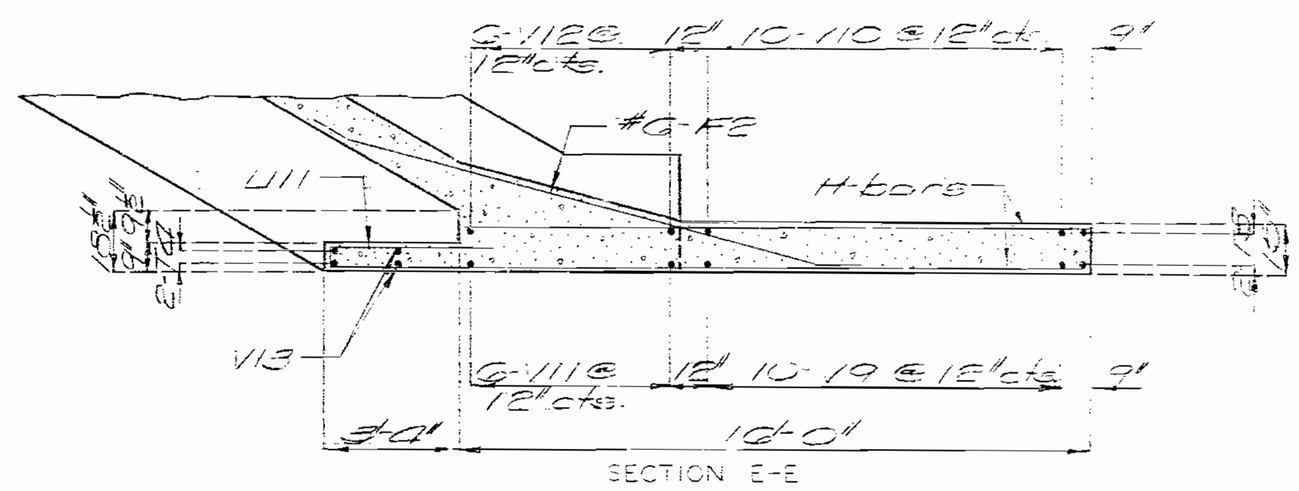
JACKSON COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

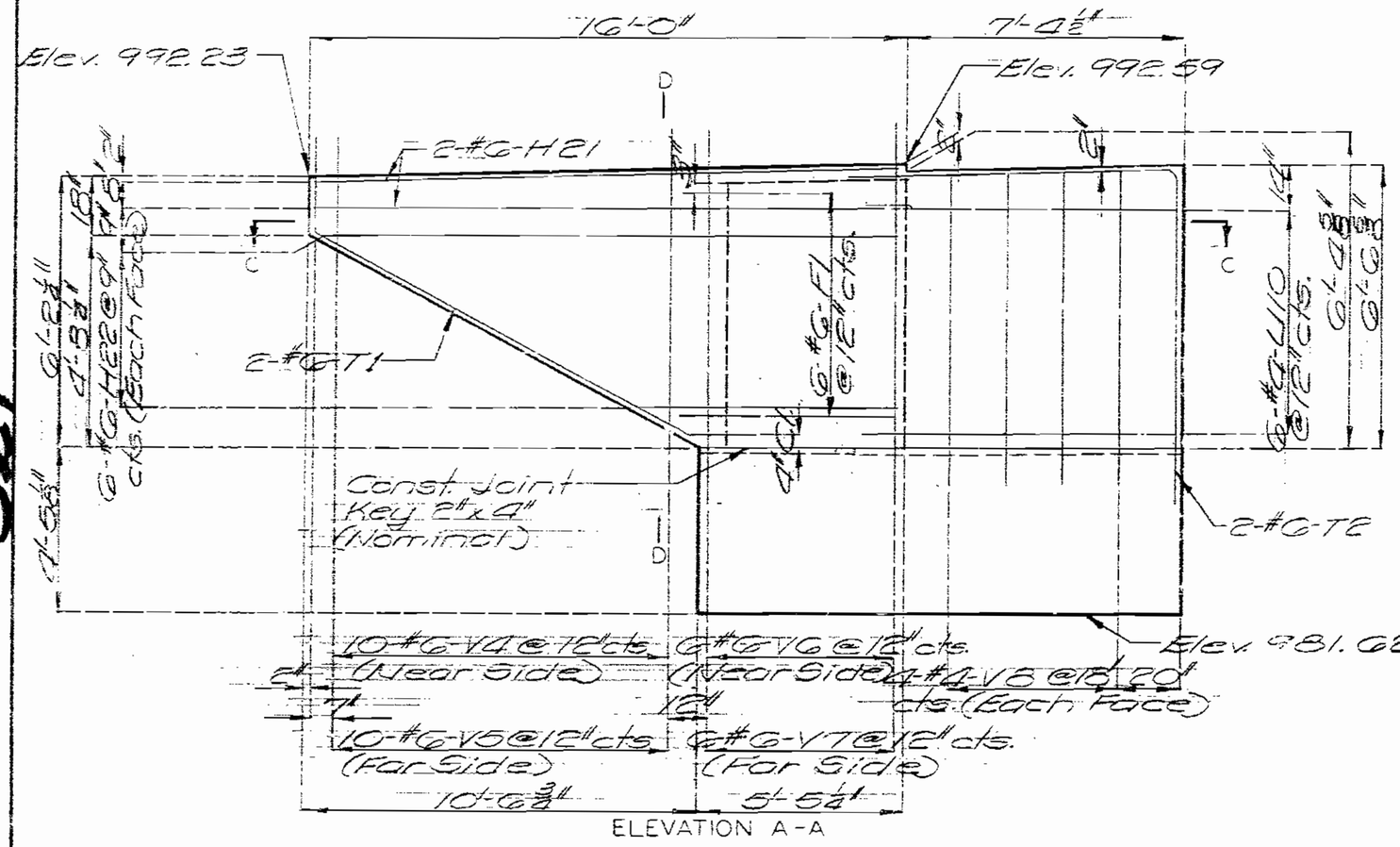
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	53	



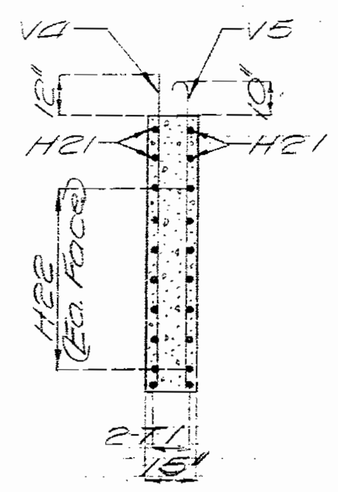
SECTION C-C



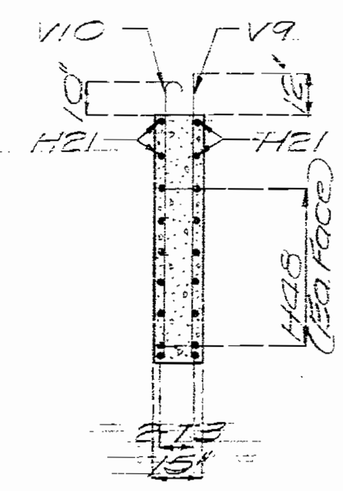
SECTION E-E



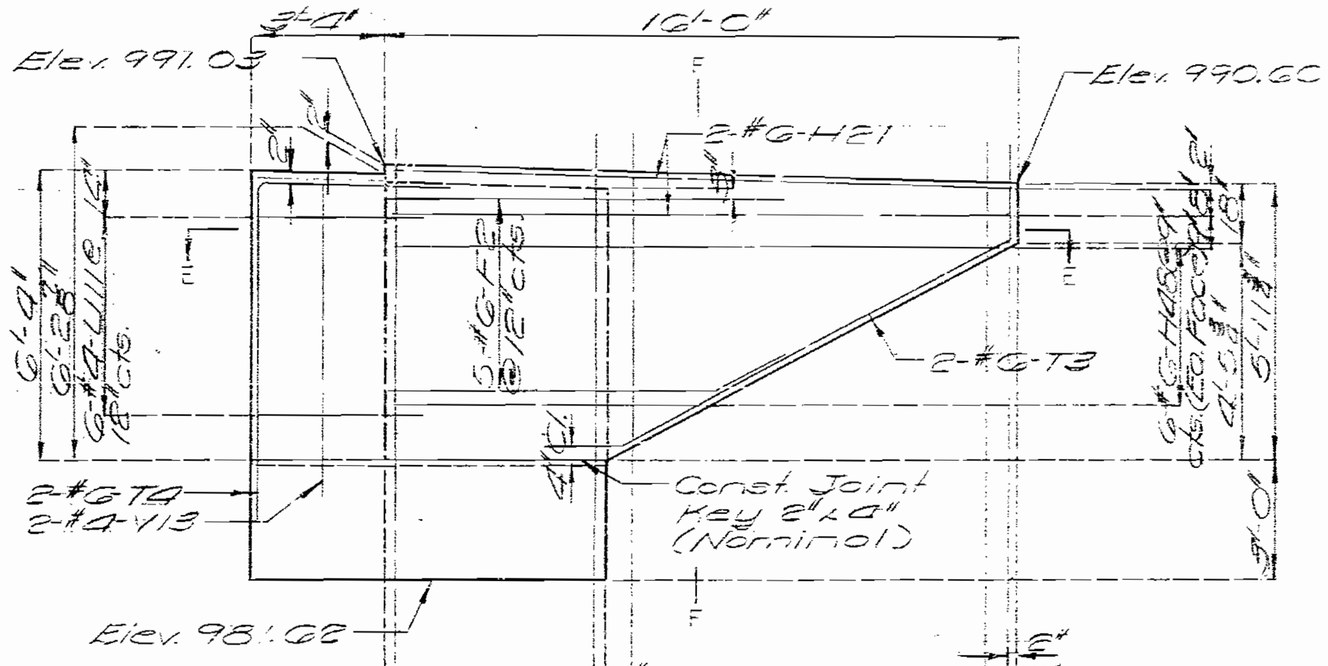
ELEVATION A-A



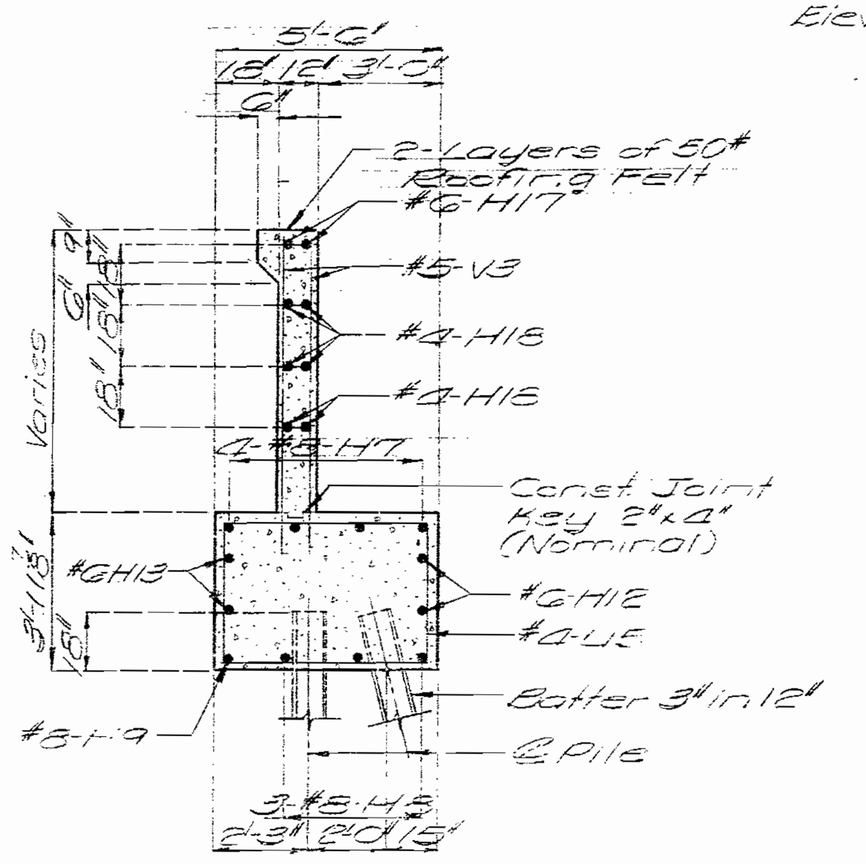
SECTION D-D



SECTION F-F



ELEVATION B-B



SECTION G-G

Note: For location of Elev. A-A, Elev. B-B and Section G-G see Sht. No. 3.

DETAILED JUNE 1973
CHECKED AUG 1975

Note: This drawing is not to scale. Follow dimensions.

DETAILS OF END BENT NO. 1

Sheet No. 4 of 10.

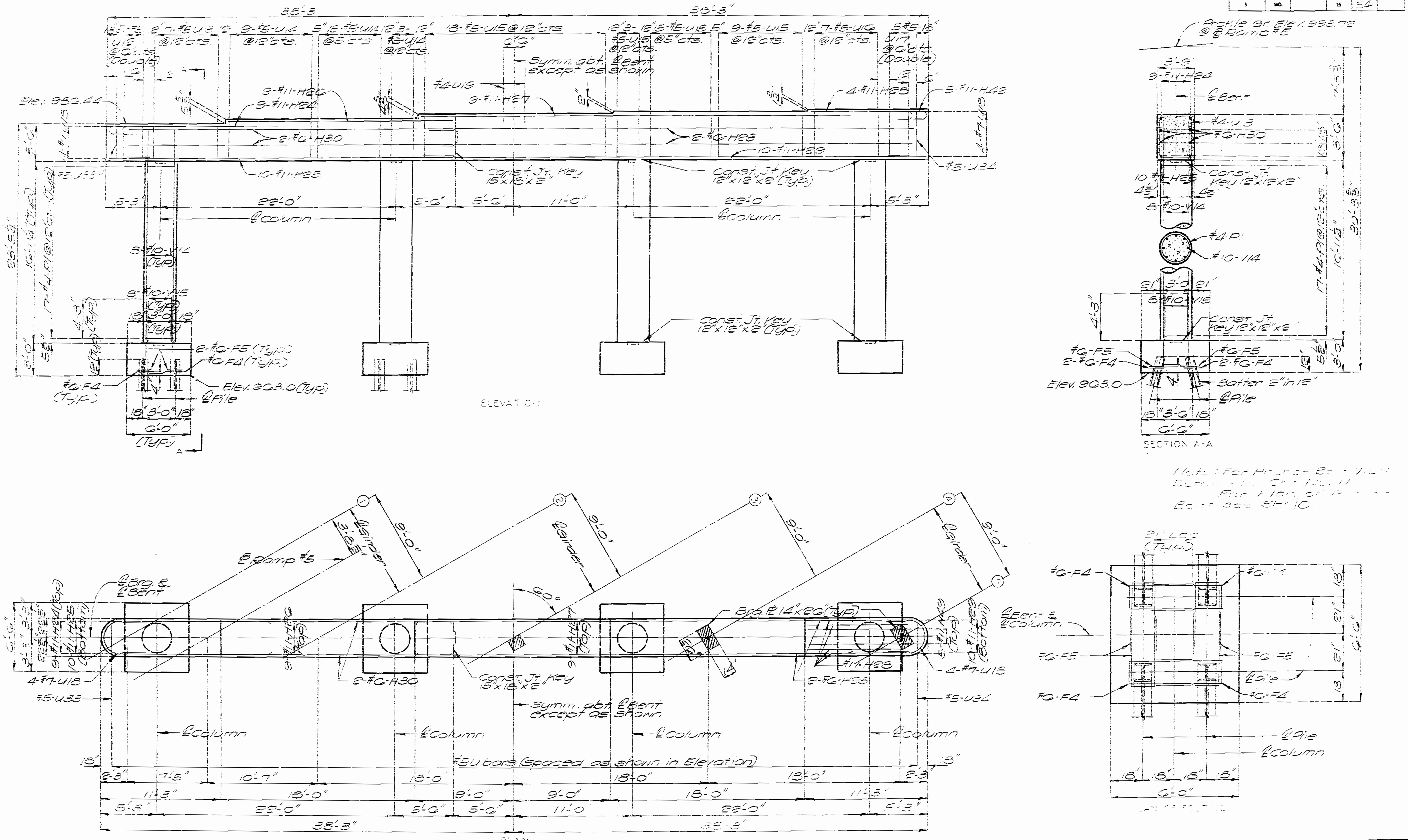
JACKSON COUNTY

A-21121

FOR INFORMATION ONLY **A21201, Sht. 12**

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		15	54	



DETAILED JUNE 197_
CHECKED 197_

Note: This drawing is not to scale. Follow dimensions.

INTERMEDIATE BENT NO. 2

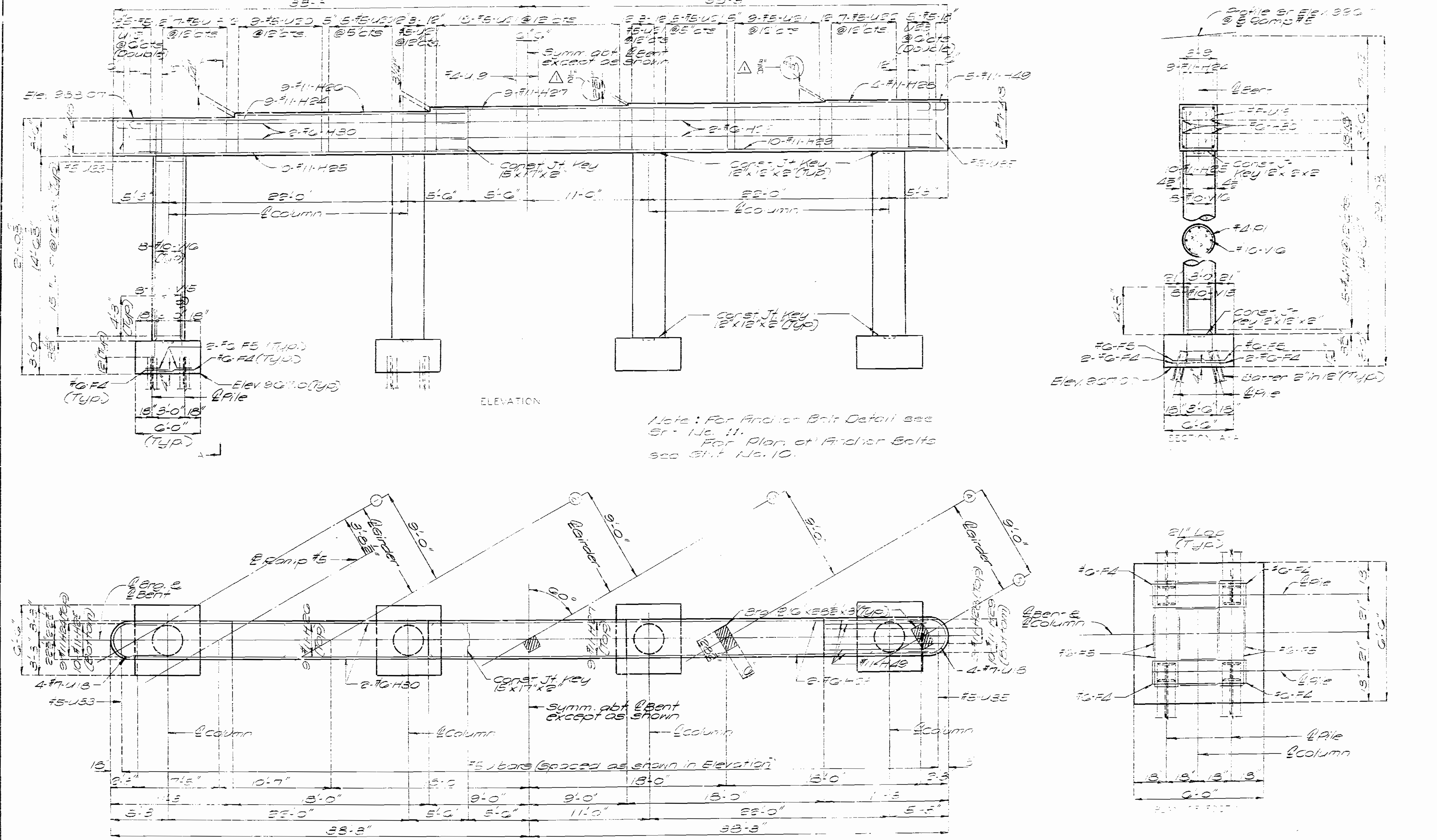
Sheet No. of

JACKSON COUNTY

522

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		35	54	



DETAILED June 1976
CHECKED Aug. 1976

Note: This drawing is not to scale. Follow dimensions.

INTERMEDIATE BENT NO. 3

Sheet No. of Revised 3-23-79

COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	55	

ELEVATION

PLAN

PLAN OF BEAM
BELOW LOWER CONSTRUCTION JT.

Note: For details & reinforcement not shown see Sht. No 6
For Plan of Anchor Bolt see Sht. No. 10.
Field Welding shall be required at wings for #6 H36 bars in backwall [illegible] and for #6 H36 bars where necessary to conform to slope of wing.
See Sheet No. 17 for reinforcement of safety barrier & rip rap on top of backwall and rip rap apron for Elev. B. No. 6 to conform to crown of roadway slab. Backwall above upper construction joint shall not be poured until the superstructure steel has been covered in the manner specified.

DETAILED JCH 1978
CHECKED AJ 1978

Note: This drawing is not to scale. Follow dimensions.

DETAILS OF END BENT NO. 6

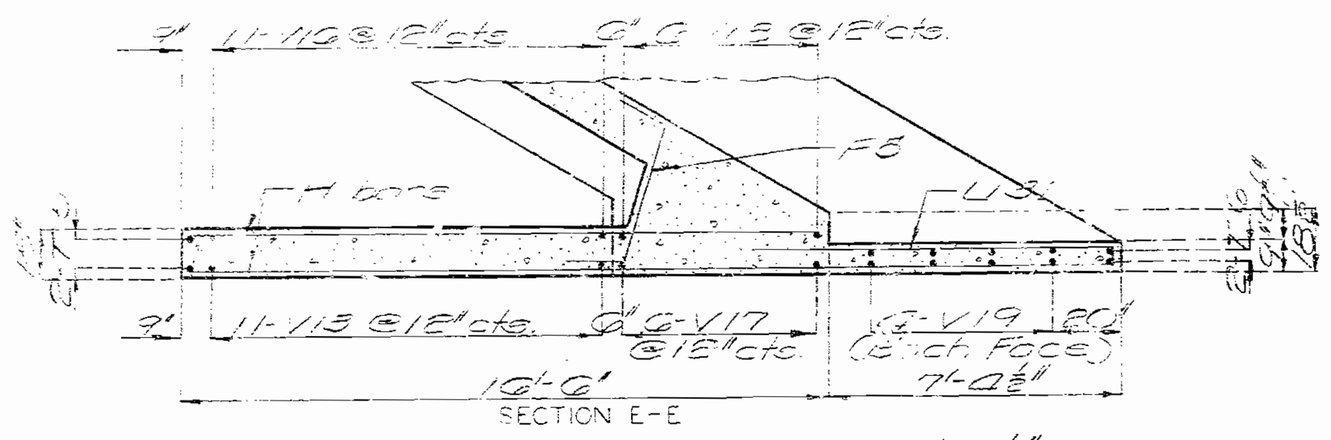
Sheet No. [illegible] of [illegible]

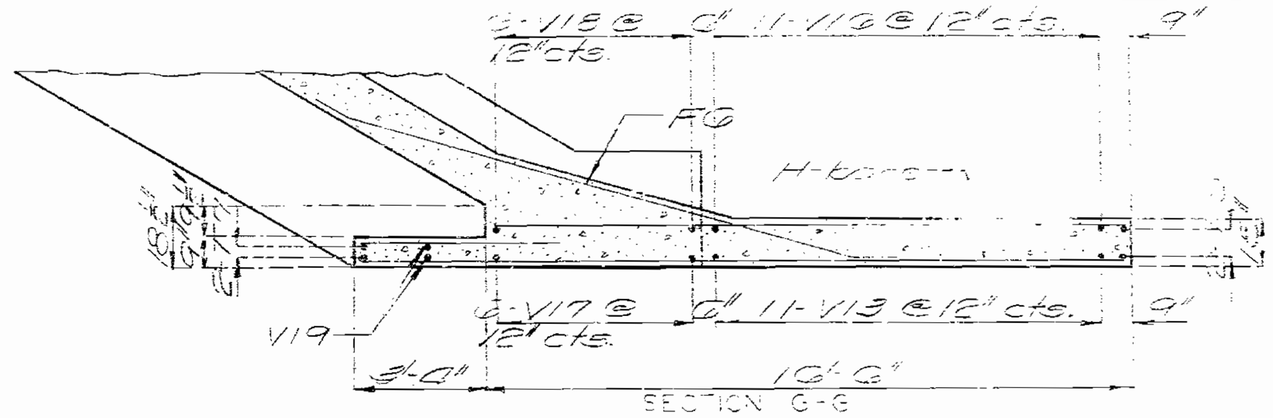
JACKSON COUNTY

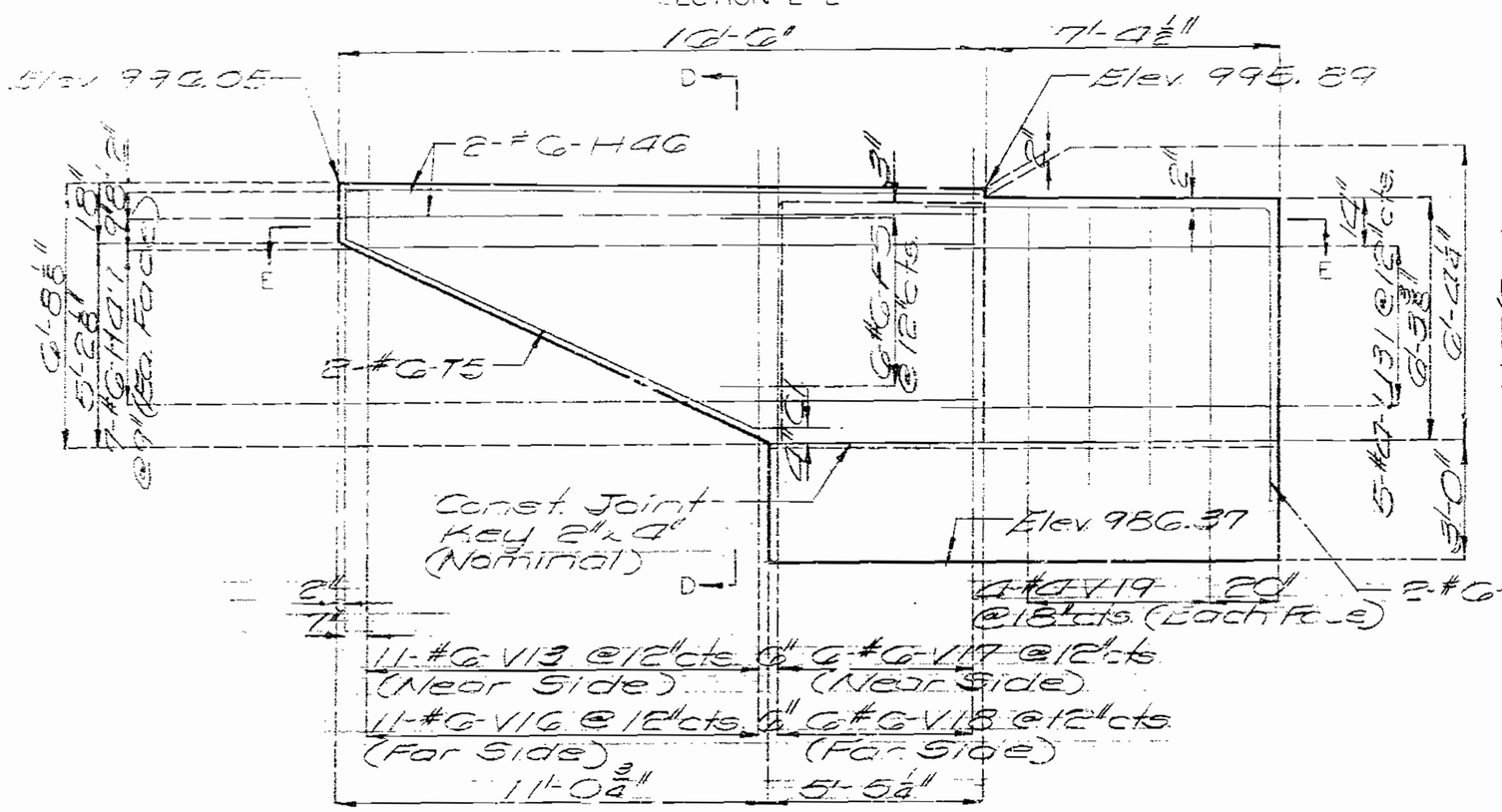
A-21201

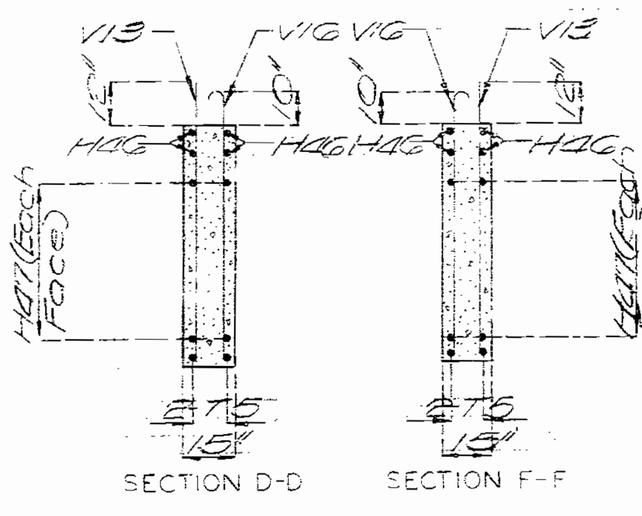
MISSOURI STATE HIGHWAY DEPARTMENT

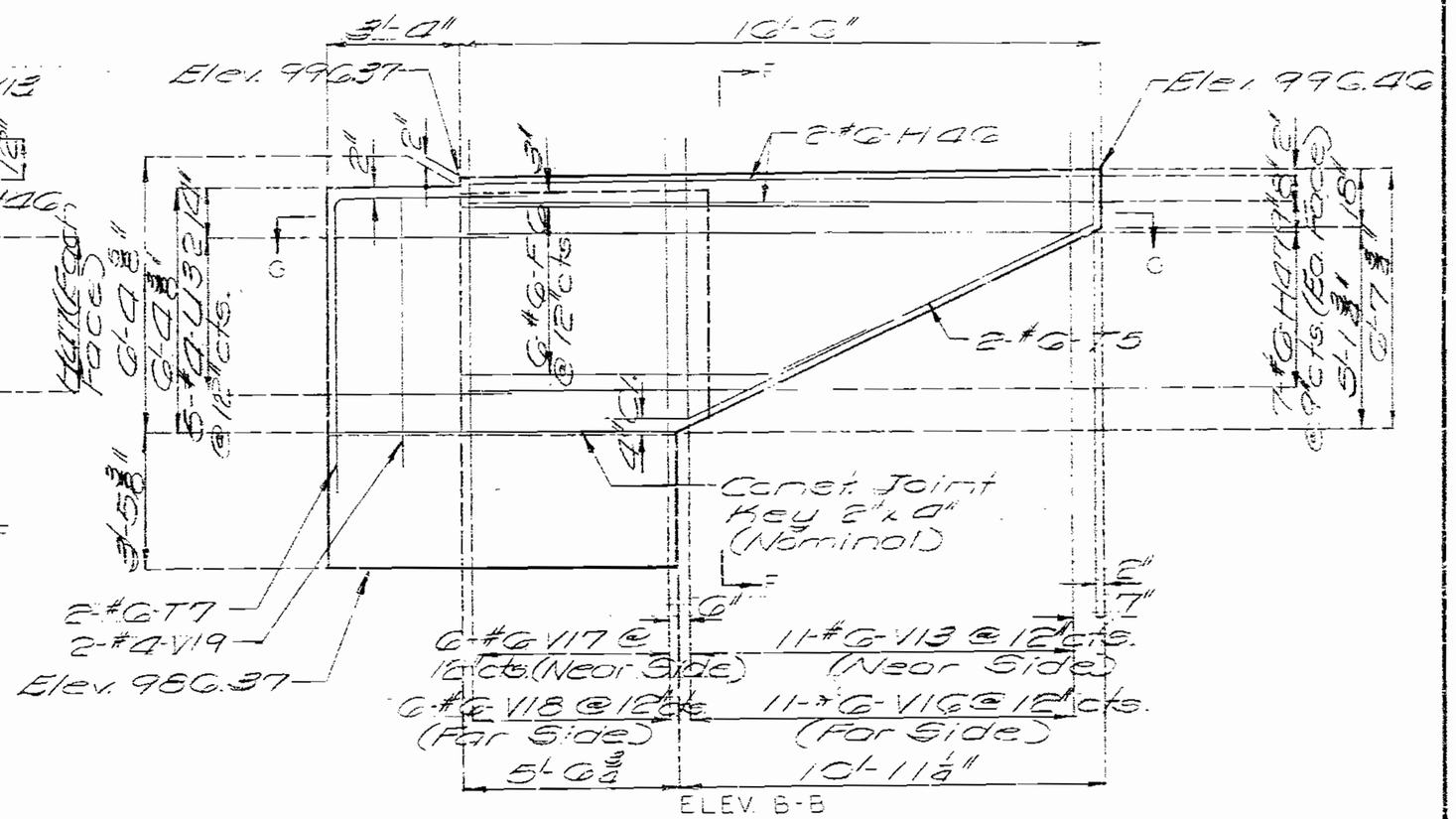
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	37	

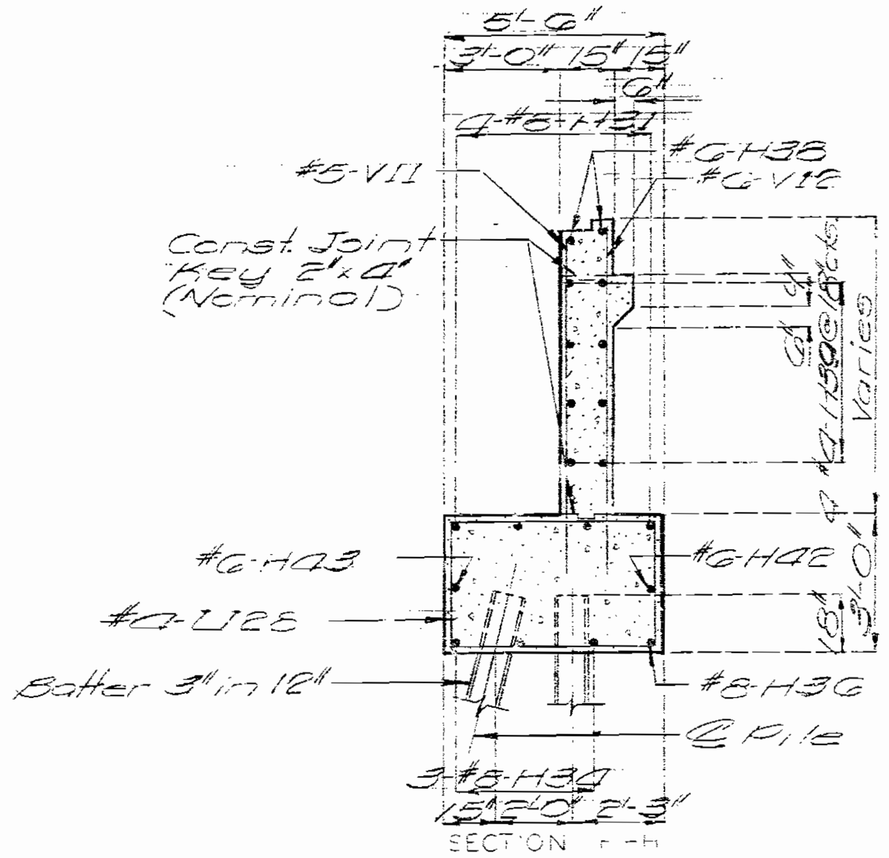












Note: For location of "Elev. A-A" "Elev. B-B" and "Section F-F" see Sht. No. 7

DETAILED JULY 1974
CHECKED AUG. 1975

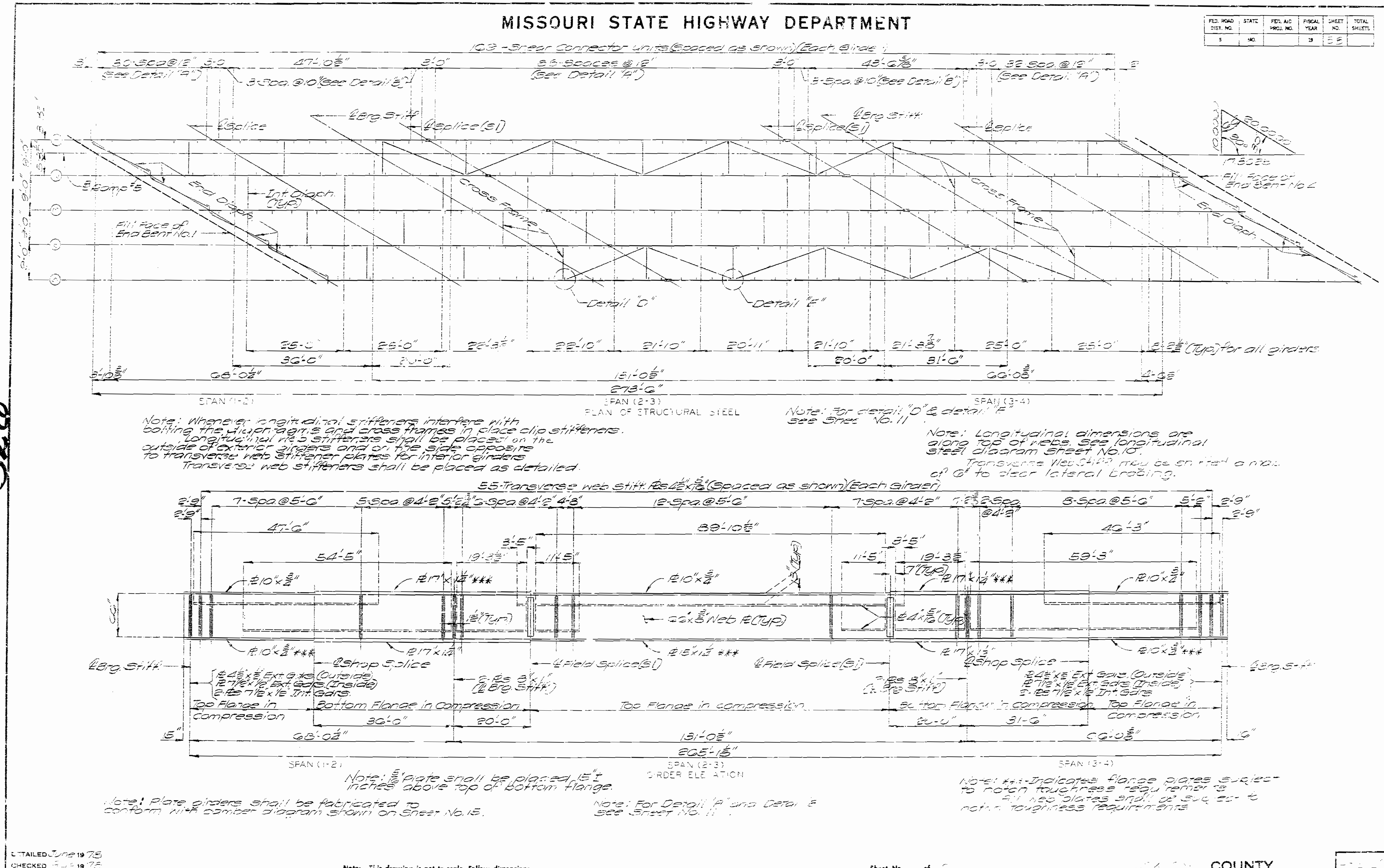
Note: This drawing is not to scale. Follow dimensions.

DETAILS OF END BENT NO. 4

Sheet No. 8 of 10.

JACKSON COUNTY

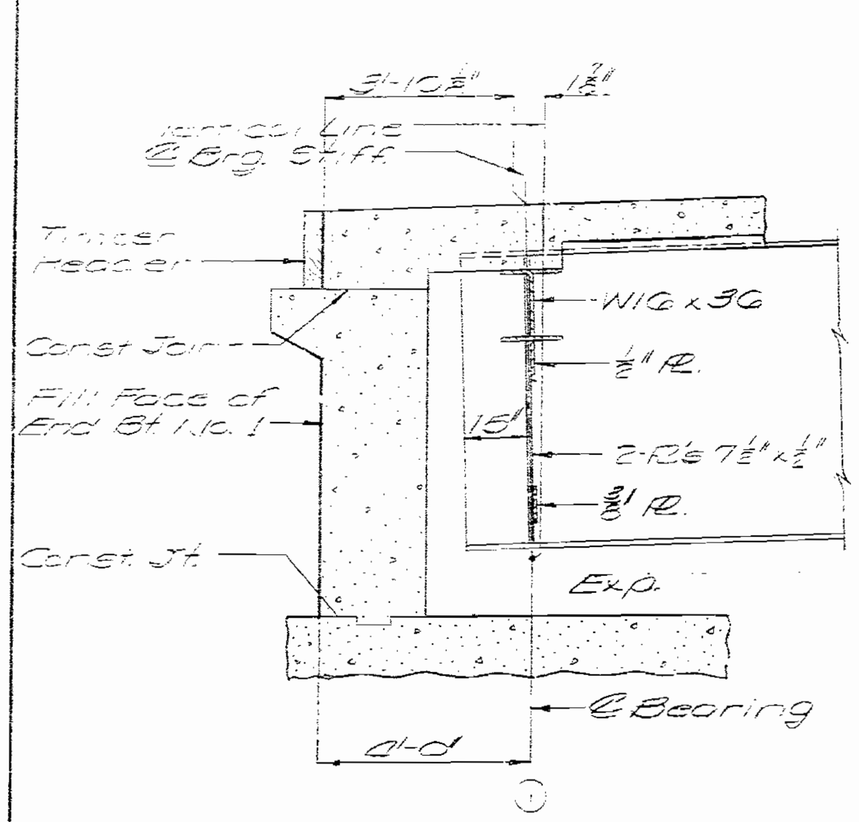
A-21-10


MISSOURI STATE HIGHWAY DEPARTMENT
163 - Shear Connector units (Spaced as shown) (Each Girder)
PLAN OF STRUCTURAL STEEL
SPAN (1-2)
SPAN (2-3)
SPAN (3-4)
Detail "D"
Detail "E"
Cross Frame
End Diaph.
Int. Diaph. (Typ)
Fill Face of End Bent No. 1
Fill Face of End Bent No. 4
Note: Whenever longitudinal stiffeners interfere with bolting the diaphragms and cross frames in place clip stiffeners.
Longitudinal web stiffeners shall be placed on the outside of exterior girders and on the side opposite to transverse web stiffener plates for interior girders.
Transverse web stiffeners shall be placed as detailed.
Note: For detail "D" & detail "E" see Sheet No. 11.
Note: Longitudinal dimensions are along top of webs. See longitudinal steel diagram Sheet No. 10.
55-Transverse web stiff. (Spaced as shown) (Each girder)
GIRDER ELEVATION
Top Flange in Compression
Bottom Flange in Compression
Top Flange in compression
Note: Plate shall be placed 15" inches above top of bottom flange.
Note: Plate girders shall be fabricated to conform with camber diagram shown on Sheet No. 15.
Note: For Detail "A" and Detail "B" see Sheet No. 11.
Note: *** Indicates flange plates subject to notch toughness requirements.
DETAILED June 1973
Note: This drawing is not to scale. Follow dimensions.
Sheet No.
COUNTY

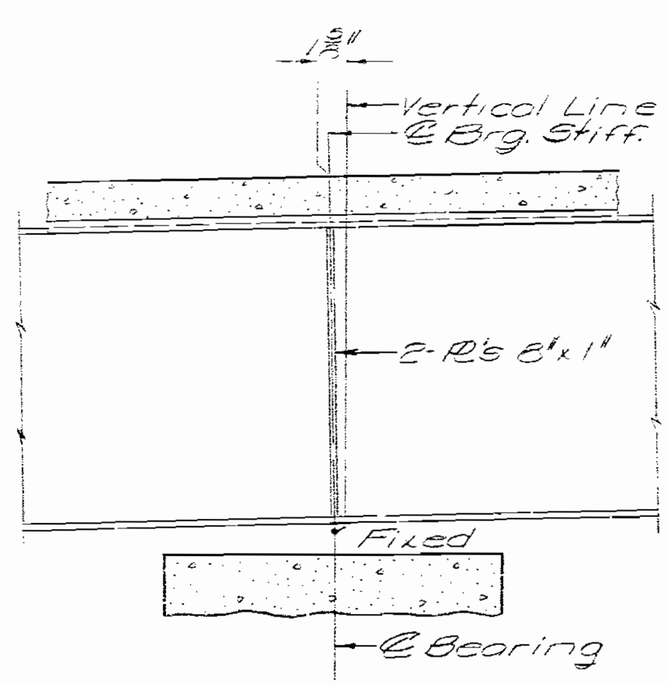
526

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	59	



①



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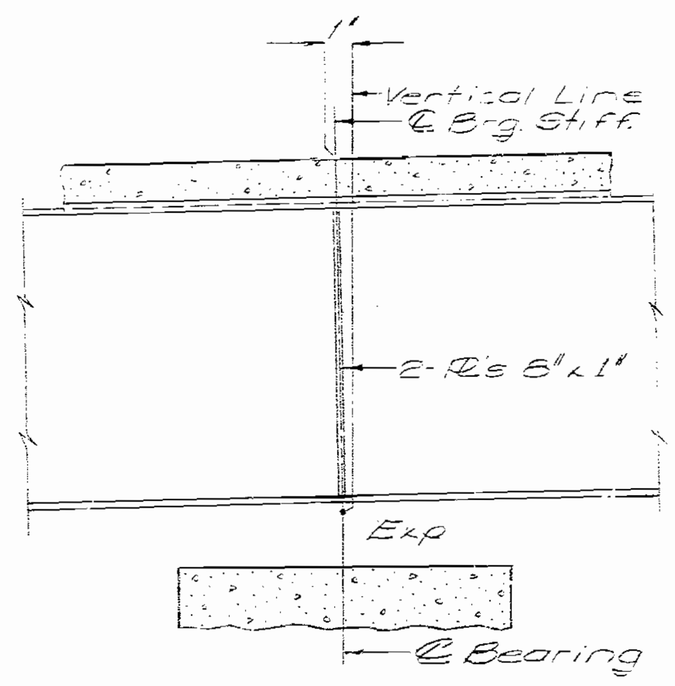
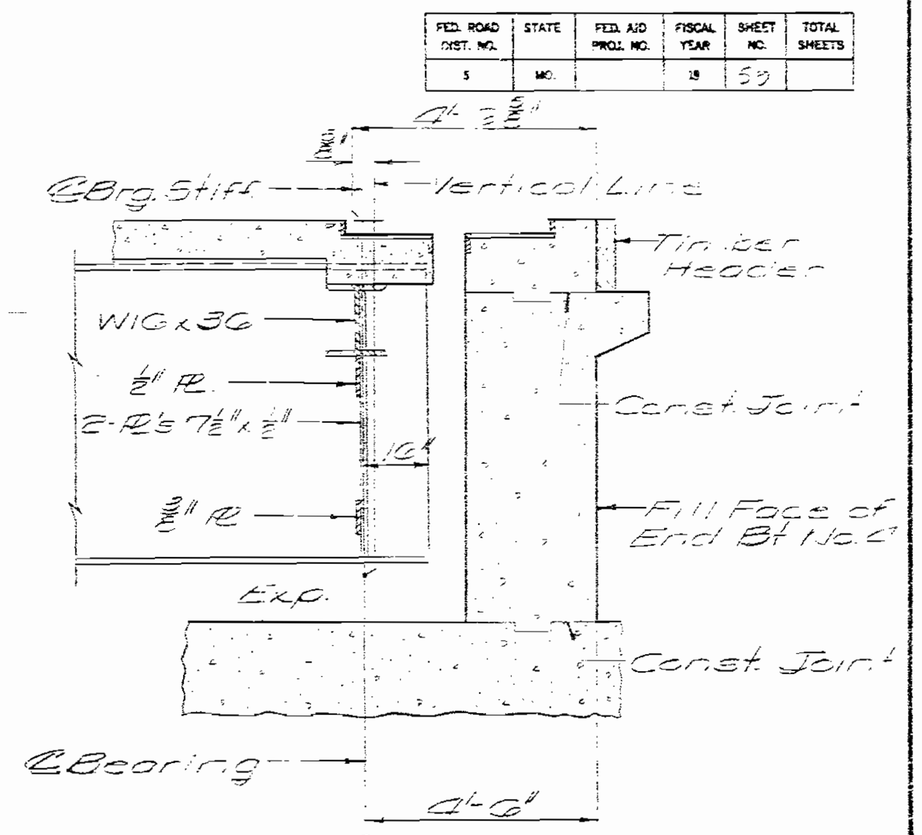
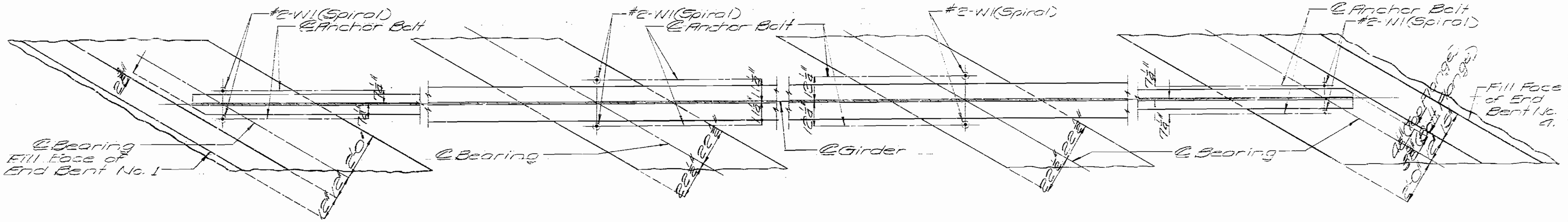


③



④

PART LONGITUDINAL SECTION ALONG GIRDER NO. 3



PLAN OF ANCHOR BOLTS

527

DETAILED JUNE 1978
CHECKED AUG 1978

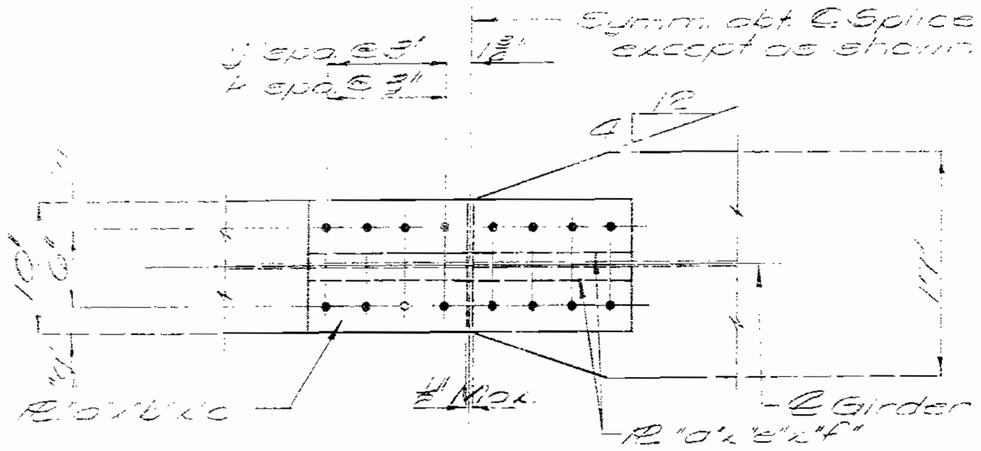
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 60.

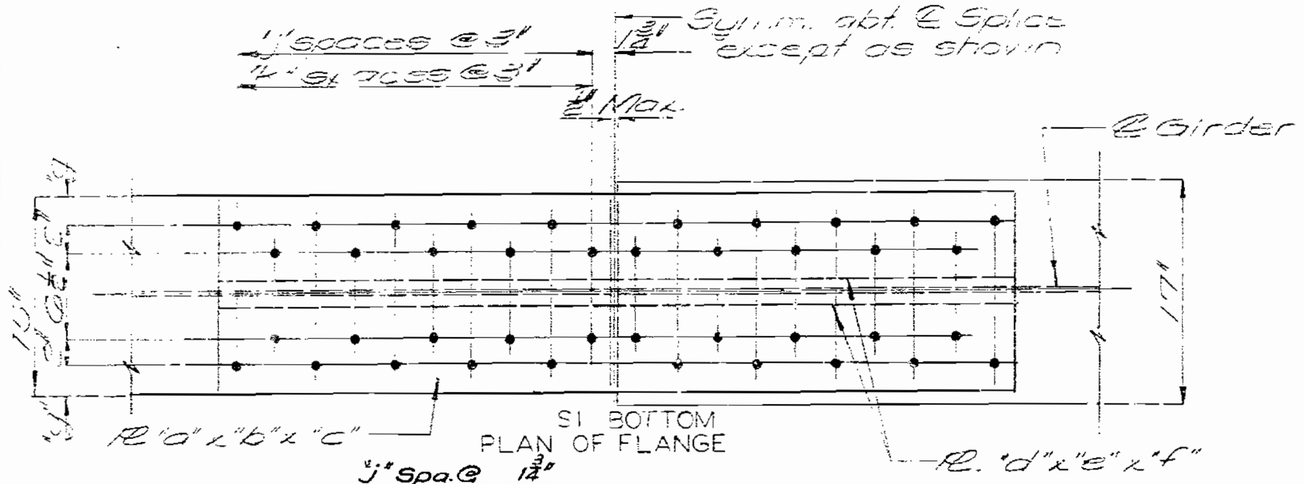
JACKSON COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

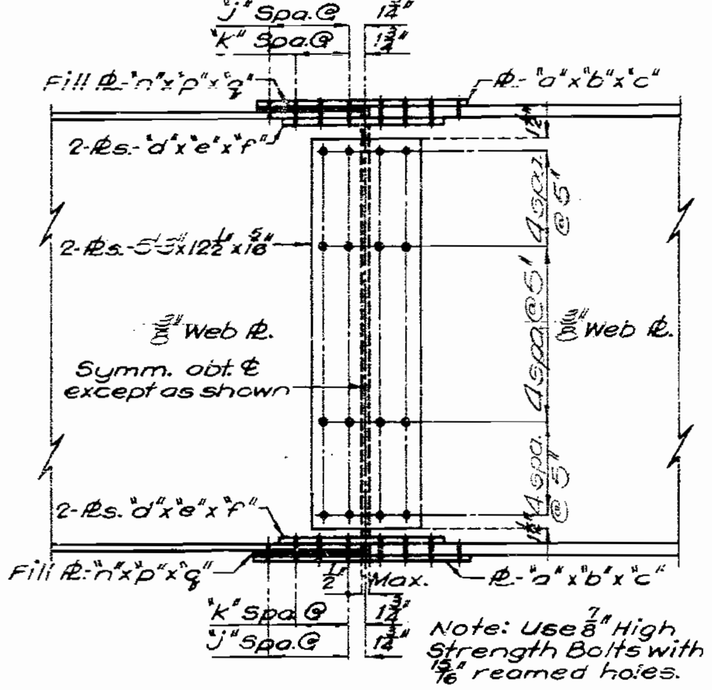
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.		19	62	



SI TOP



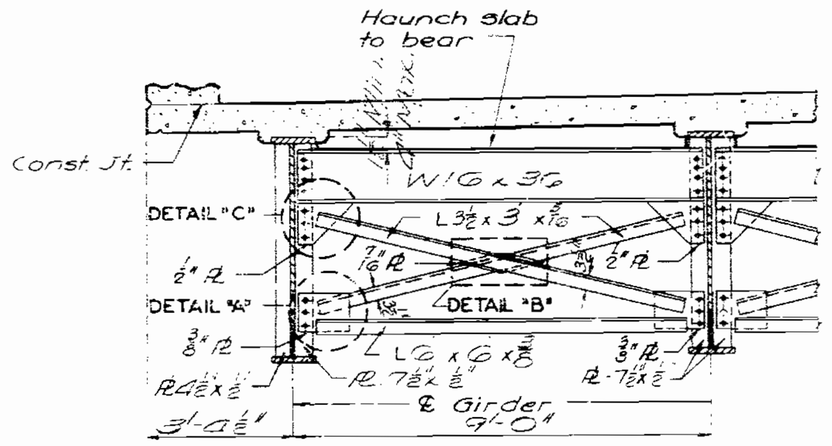
SI BOTTOM
PLAN OF FLANGE



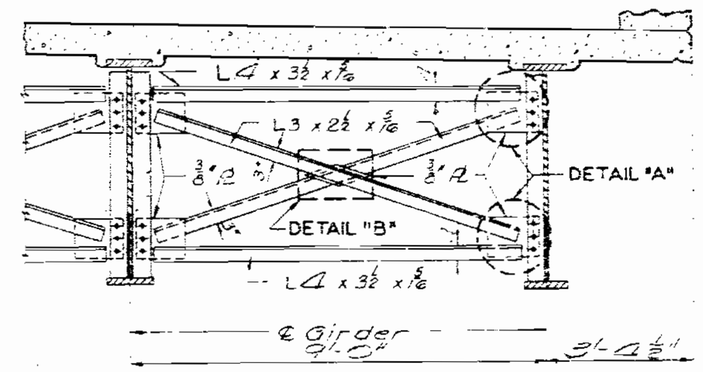
Note: Use 7/8" High Strength Bolts with 15/16" reamed holes.

DETAILS OF FIELD SPLICE

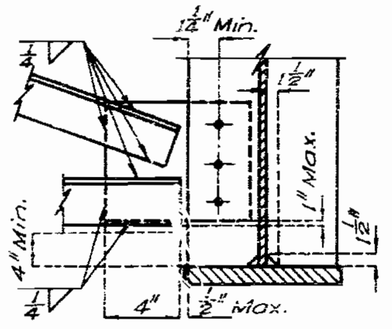
SPLICE LOCATION	TABLE OF DIMENSIONS - FIELD SPLICE											
	"a"	"b"	"c"	"d"	"e"	"f"	"g"	"j"	"k"	"m"	"n"	"p"	"q"
SI TOP	10"	3/8"	2'-0 1/2"	4"	1/2"	2'-0 1/2"	2"	3	3	10"	1/2"	12"
SI BOTTOM	15"	7/8"	5'-0 1/2"	6 1/2"	2 1/2"	5'-0 1/2"	2 1/2"	9	9	-	-	-



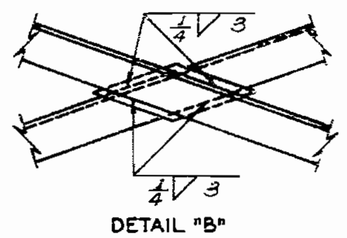
TYP. PART SECTION SHOWING END DIAPHRAGMS



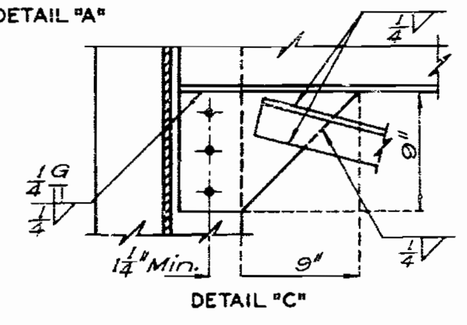
TYP. PART SECTION SHOWING INT. DIAPHRAGMS AND CROSS FRAMES



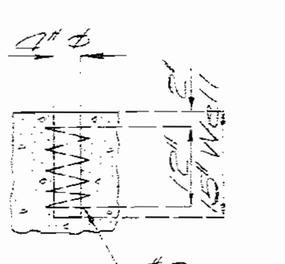
DETAIL "A"



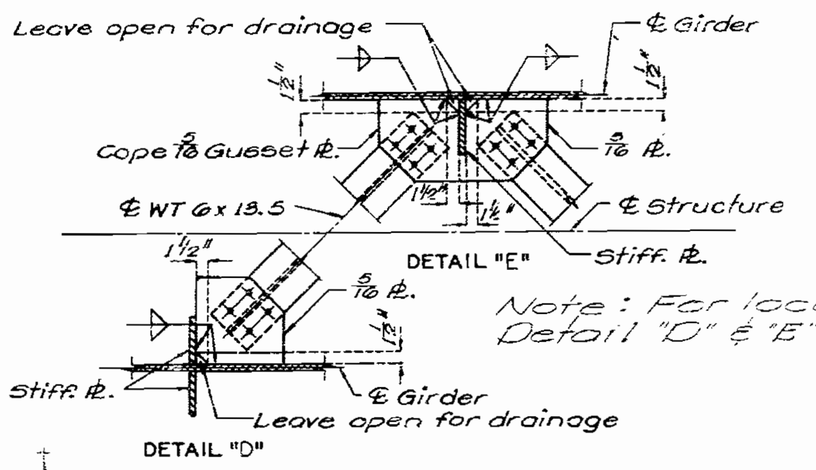
DETAIL "B"



DETAIL "C"

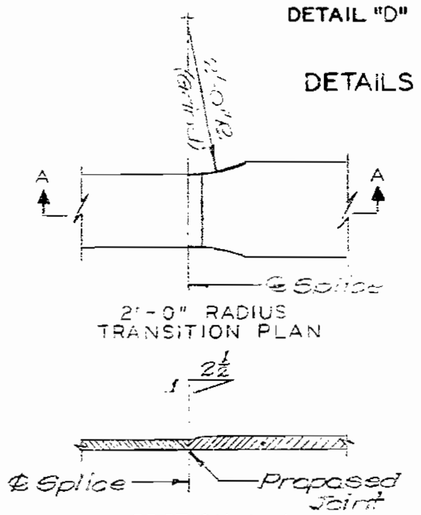


DETAIL OF ANCHOR BOLT WELLS

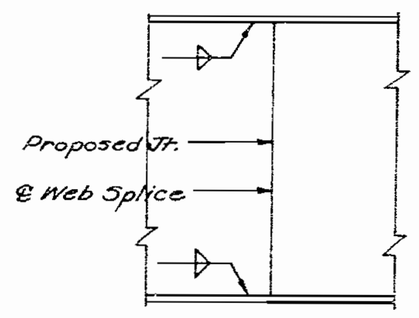


Note: For location of Detail "D" & "E" see Sht. #9.

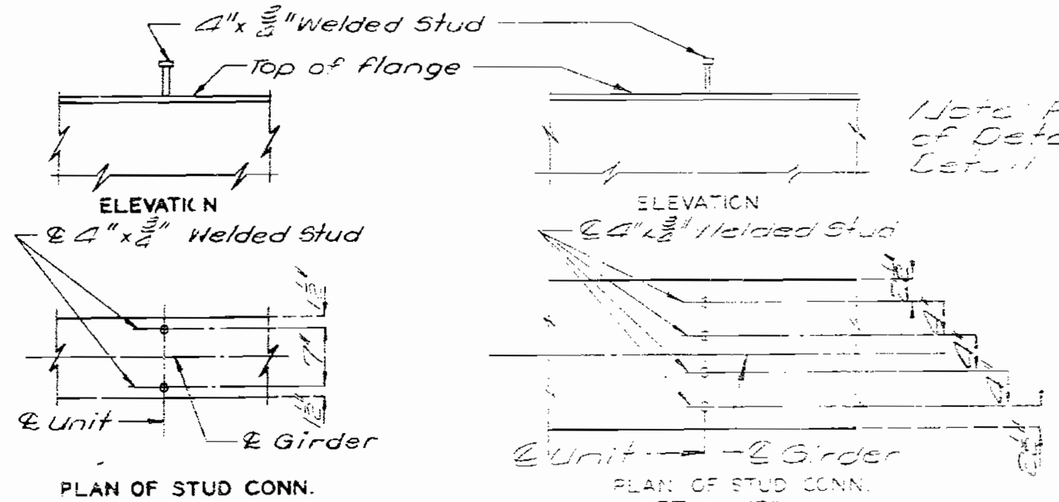
DETAILS OF LATERAL BRACING



WELDED SHOP FLANGE SPLICE



SHOP WEB SPLICE



Note: For location of Detail "A" & Detail "B" see Sht. #9.

DETAILS OF SHEAR CONNECTORS

Note: Weight of 100 lbs. of shear connectors is included in Weight of Fabricated Structural Carbon Steel.

DETAILED JUNE 1978
CHECKED Aug. 1978

Note: This drawing is not to scale. Follow dimensions.

Sheet No. of 62

JACKSON COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO		19		

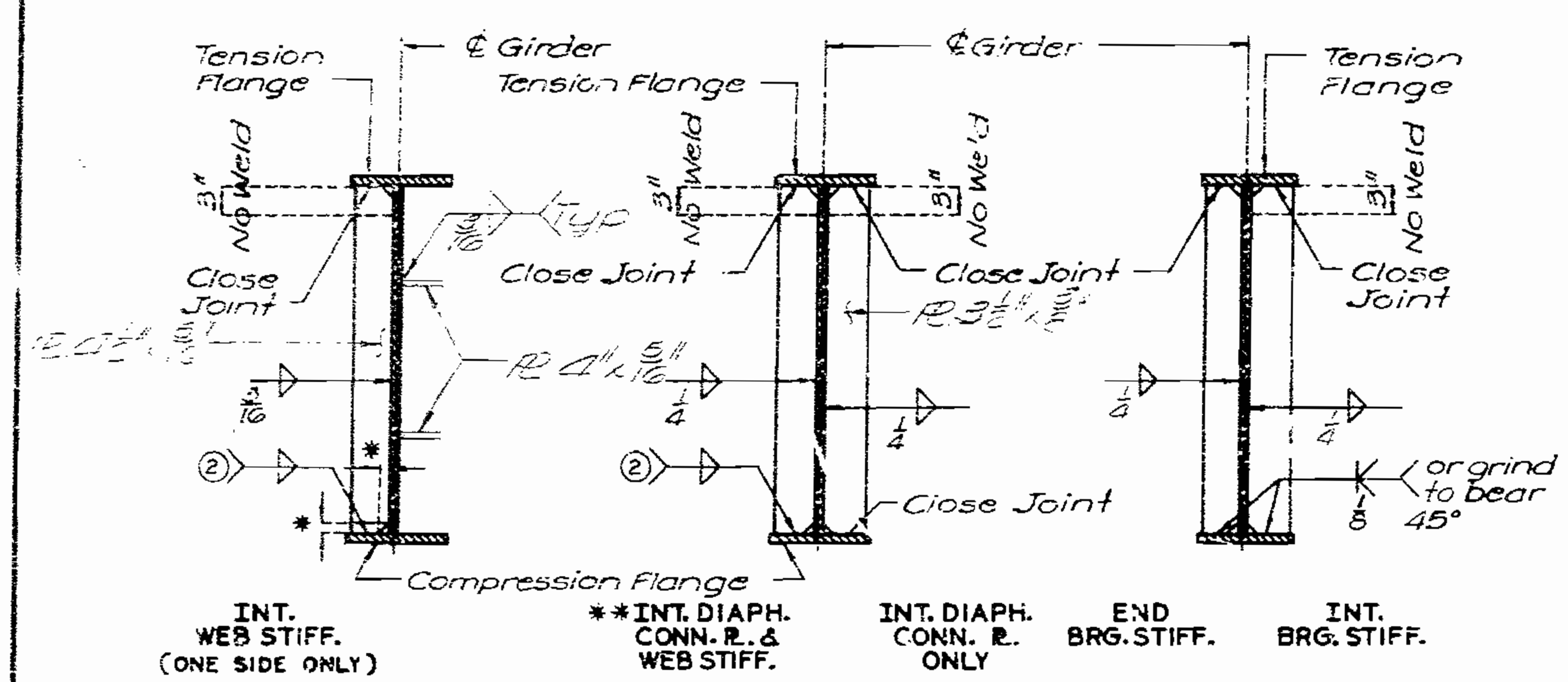
NOTE. TYPE "D" BEARINGS

ANCHOR BOLTS FOR TYPE "D" BEARINGS SHALL BE 1-1/4"Ø SWEDGED BOLTS AND SHALL EXTEND 12" INTO CONCRETE, WITH HEXAGON NUTS AND PLAIN WASHERS FOR FIXED BEARINGS, NO NUTS FOR EXPANSION BEARINGS.

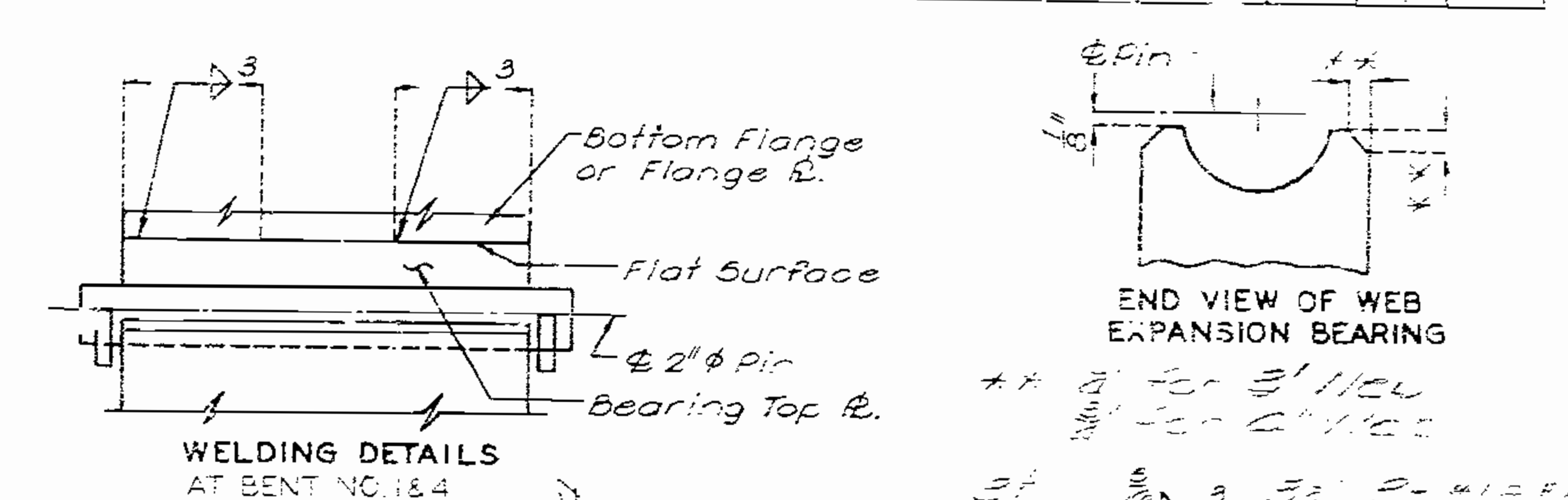
"ESTIMATED WEIGHT" DOES NOT INCLUDE WEIGHT OF ANCHOR BOLTS.

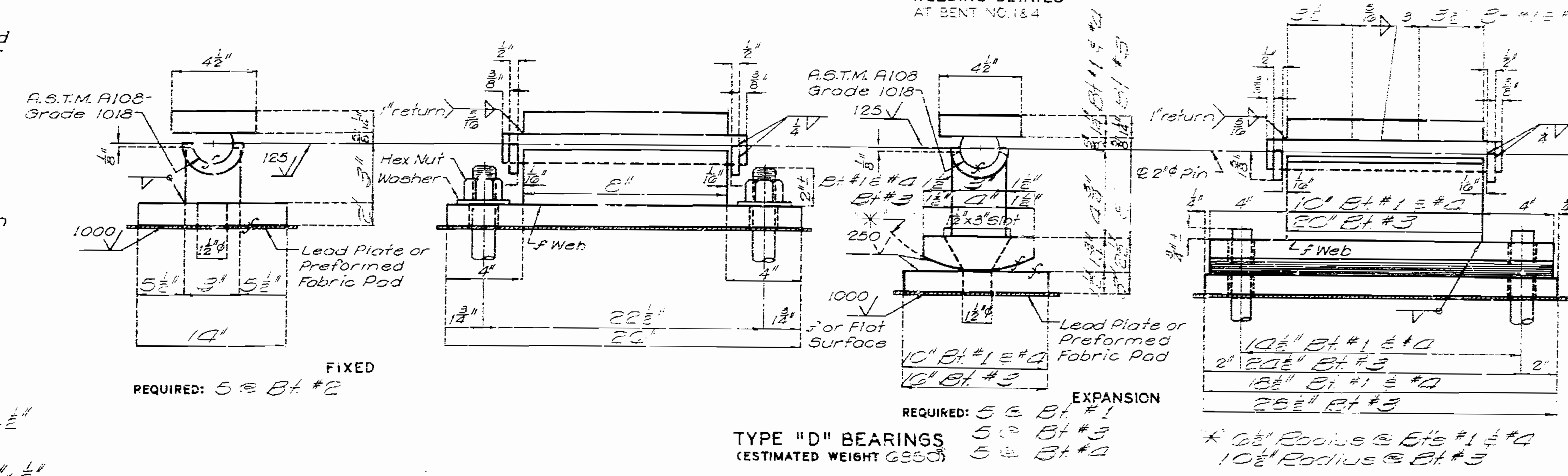
"⌀" INDICATES MACHINE FINISH SURFACE.

SHOP DRAWINGS ARE NOT REQUIRED FOR LEAD PLATES AND OR PREFORMED FABRIC PADS.

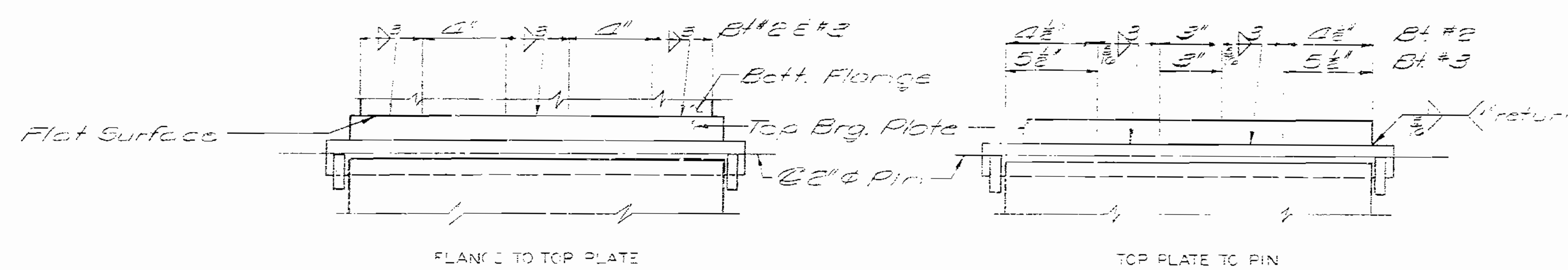


② Weld to compression flange as located on Elevation of Girder.
* 1½" Typical for all Int. Web Stiff., Int. Diaph. Conn. ℞ and Brg. Stiff.
** Weld may be omitted on interior girders, and Close Joint used when Intermediate Diaphragm Connection Plate is required on both sides.

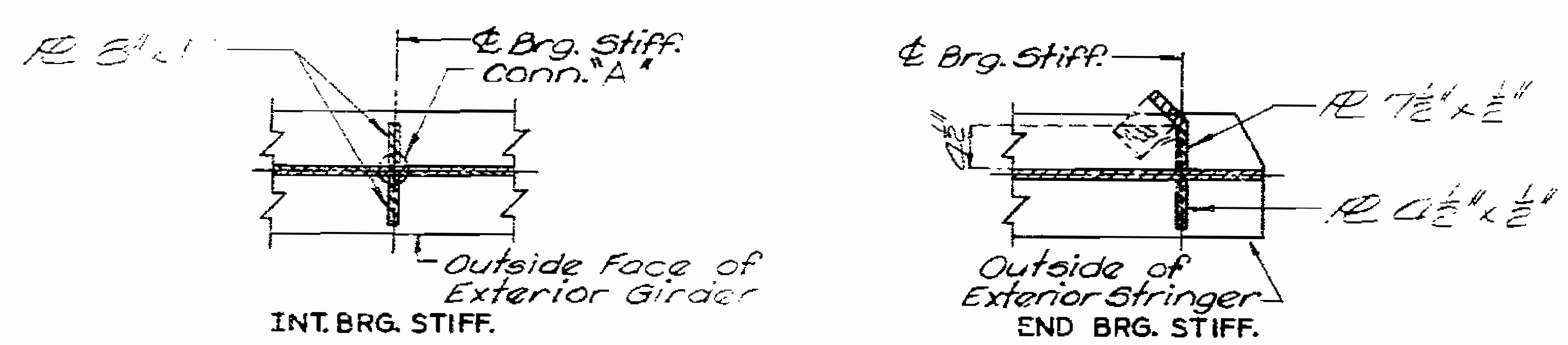




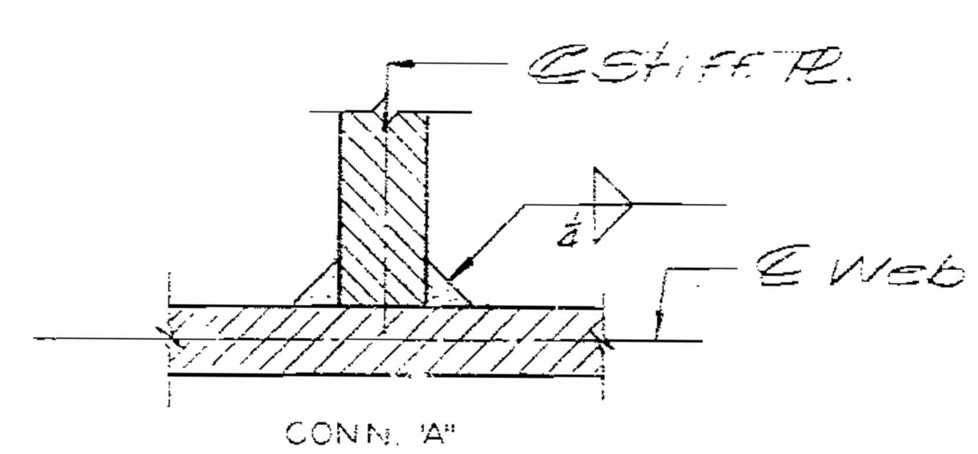
TYPE "D" BEARINGS
(ESTIMATED WEIGHT 6350)



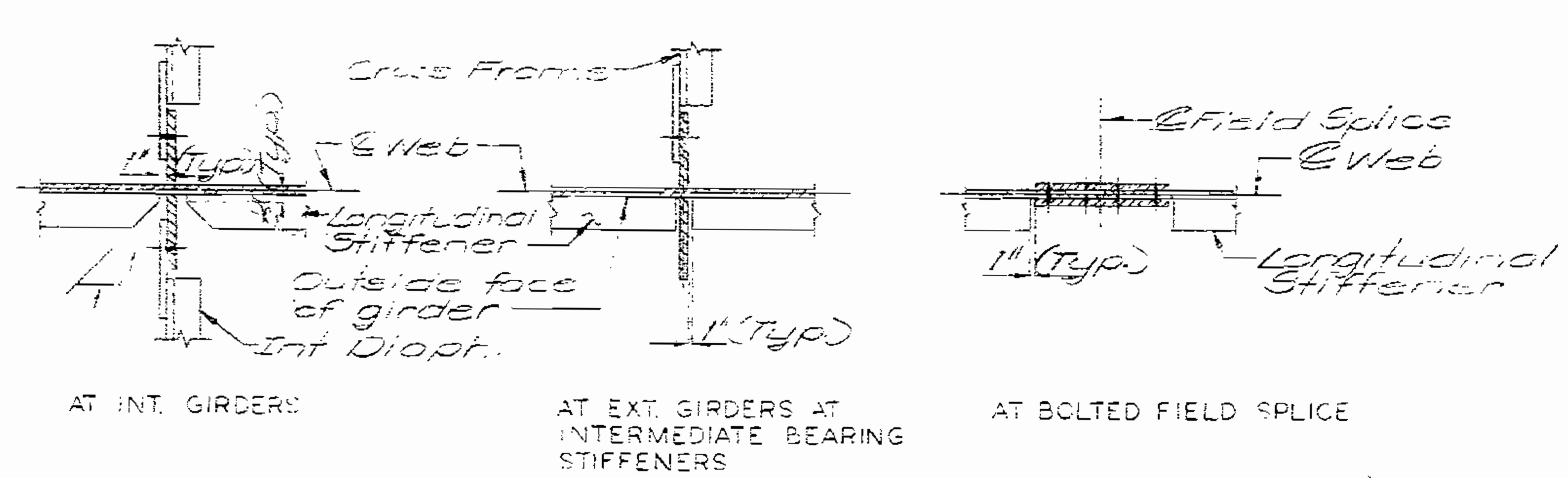
WELDING DETAILS FOR BRGS. AT BT NO. 2&3



TYPICAL LOCATION DETAILS



WELDING DETAILS



DETAILS OF LONGITUDINAL STIFFENERS

529

STD. D.B.	REVISED
FEB. 1965	OCT. 1977

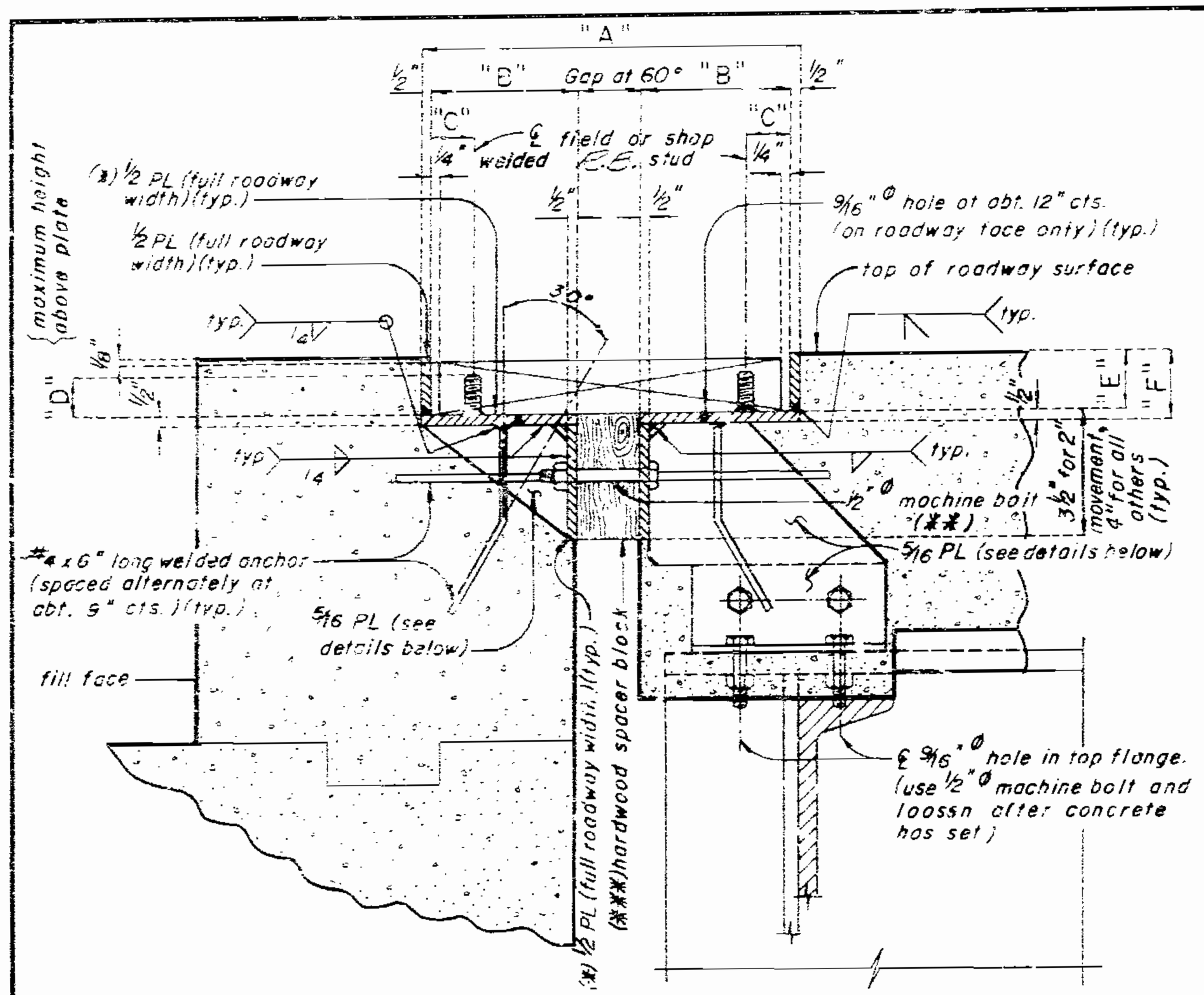
DETAILED JUNE 1978
CHECKED

Note: This drawing is not to scale. Follow dimensions.

Sheet No. of

JACKSON COUNTY

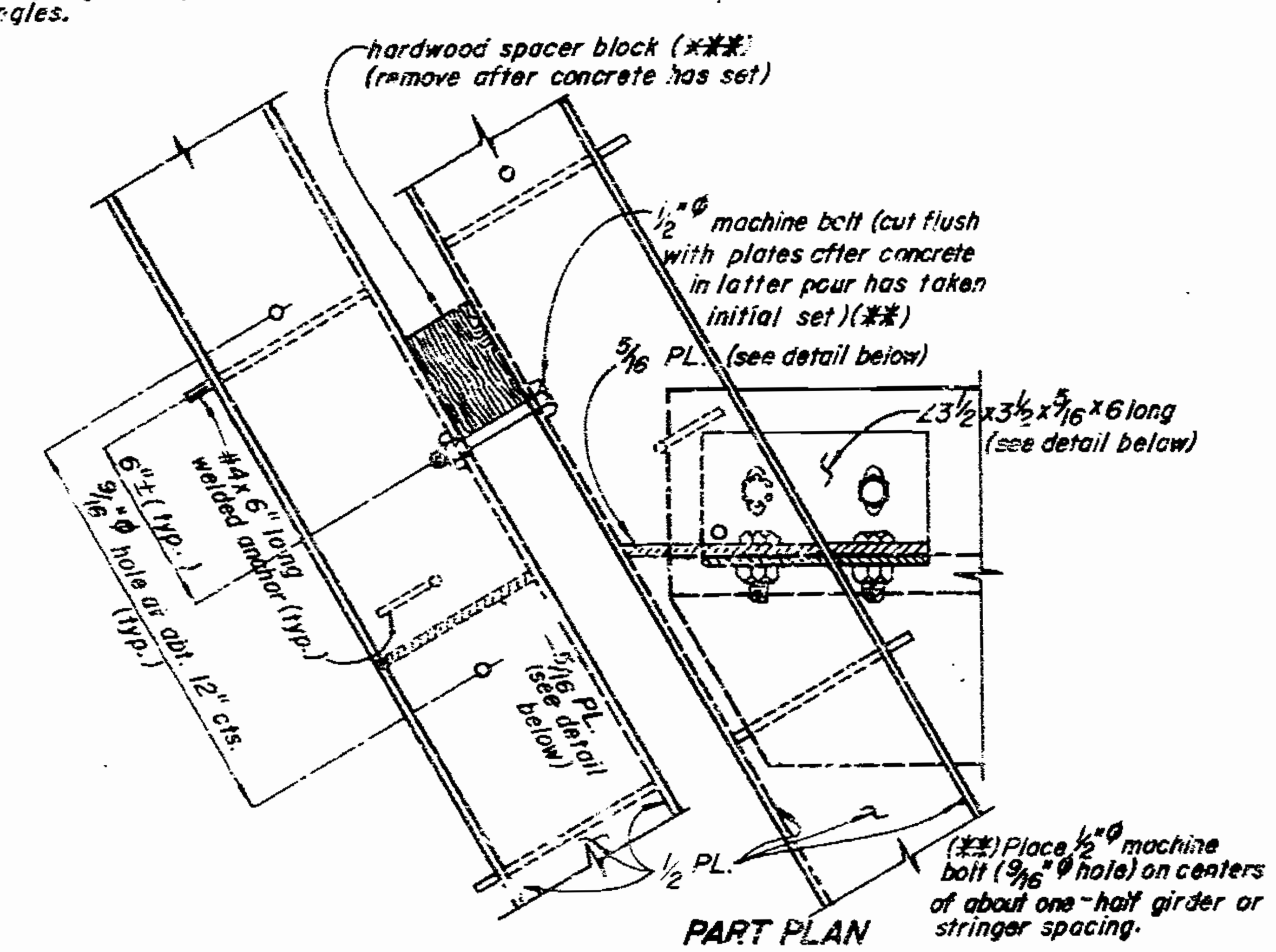
MISSOURI STATE HIGHWAY DEPARTMENT



PART SECTION THRU ARMOURED JOINT

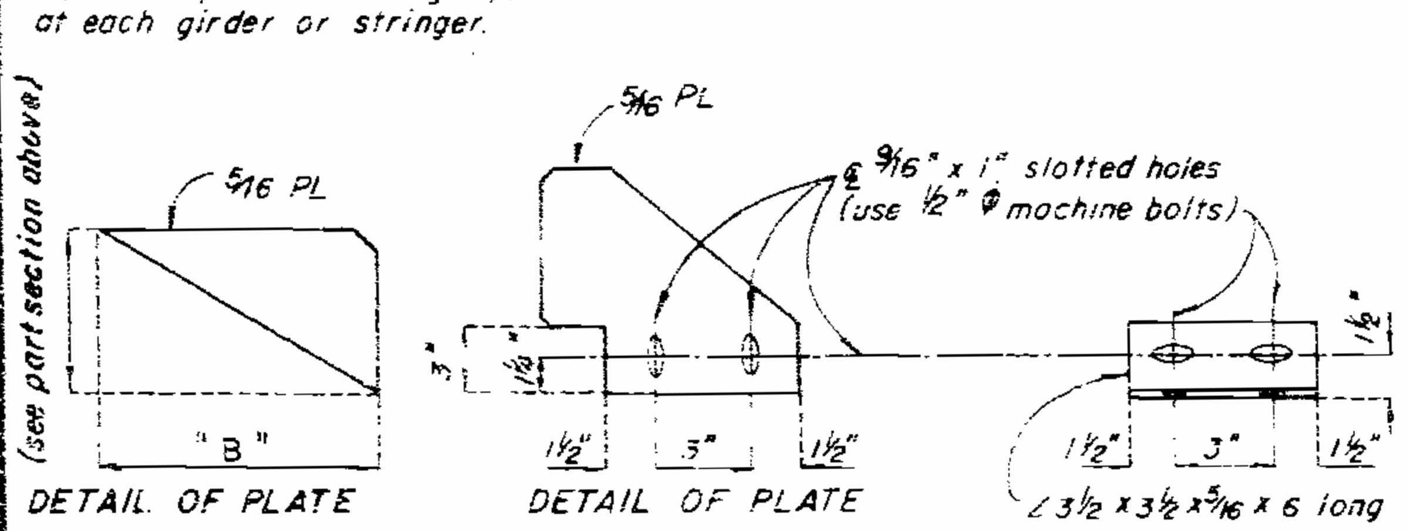
(*) these plates may be one piece by using legs of equal or unequal angles.

(***) spacer may be a combination of a hardwood block and metal shims (2"x3").



PART PLAN

Note: 5/16 plates and angle placed at each girder or stringer.



DETAIL OF PLATE DETAIL OF PLATE DETAIL OF ANGLE

TABLE OF DIMENSIONS										
LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP. GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	ANCHOR STUDS "G"
END BENT NO. 4	TRANSFLEX 400A	3⅞"	24⅝"	9⅞"	2 1/16"	1½"	2 5/16"	2 13/16"	¾"	85
	WABO-FLEX SR 4A	2⅞"	20⅜"	10¼"	1 15/16"	1½"	2 5/16"	2 13/16"	¾"	85

NOTE: All dimensions are at right angles. Expansion gap and dimension "A" shall be increased ⅛" for each 10° fall in temperature and decreased ⅛" for each 10° rise in temperature.

GENERAL NOTES:

FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		19	62	

THE EXPANSION JOINT SEAL SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS SHOWN ON THE SHOP DRAWINGS AND IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

THE NUTS ON THE ANCHOR STUDS SHALL BE TIGHTENED TO THE FOOT POUNDS "G" SPECIFIED IN THE TABLE OF DIMENSIONS. RETIGHTEN TO "G" FOOT POUNDS A MINIMUM OF 30 MINUTES AFTER INITIAL TIGHTENING.

MATERIAL FOR THE ARMOURED JOINT SHALL BE A36 STRUCTURAL GRADE STEEL. NO. 4 BARS FOR ANCHORS SHALL BE STRUCTURAL GRADE STEEL. APPROVED STUD WELDED ANCHORS OR DEFORMED BAR ANCHORS (ASTM A496) MAY BE USED IN LIEU OF NO. 4 BARS SHOWN.

SEE SPECIAL PROVISIONS FOR PAINTING.

ANCHOR BOLTS IN THE BARRIER CURB SHALL BE CAST-IN-PLACE, GROUTED OR CONE-EXPANSION TYPE. HOLES IN THE BARRIER CURB FOR ANCHORS SHALL NOT BE DRILLED UNTIL THE CONCRETE IS AT LEAST 7 DAYS OLD.

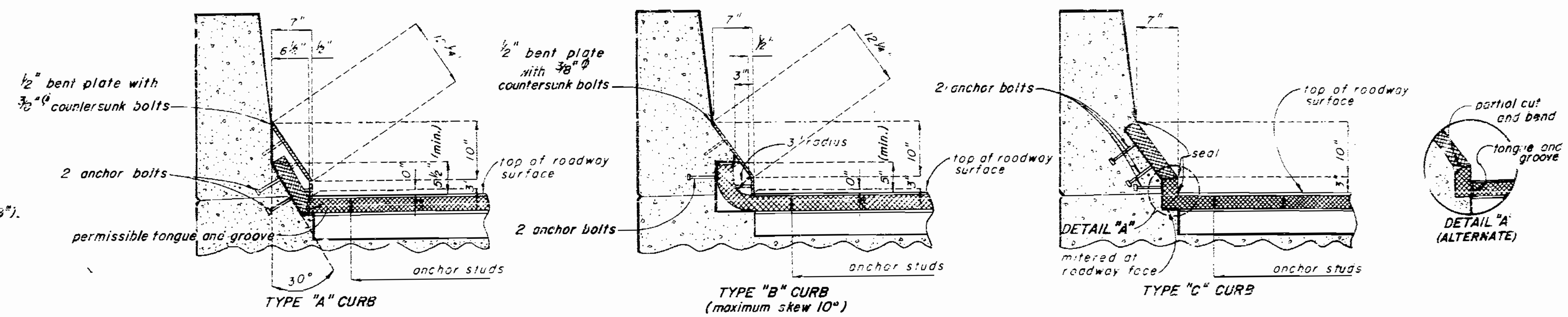
PLAN DIMENSIONS ARE BASED ON INSTALLATION AT 60°F. THE EXPANSION GAP AND OTHER DIMENSIONS SHALL BE ADJUSTED DURING INSTALLATION FOR COMPLIANCE WITH ANY TEMPERATURE CHANGE.

PLATES SHALL BE FIELD ADJUSTED BY ADDING OR REMOVING METAL SHIMS (2 x 3), AS REQUIRED FOR TEMPERATURE CORRECTION. THE EXPANSION GAP SHALL BE ADJUSTED FOR ANY TEMPERATURE CORRECTION PRIOR TO POURING TOP OF END BENT BACKWALL.

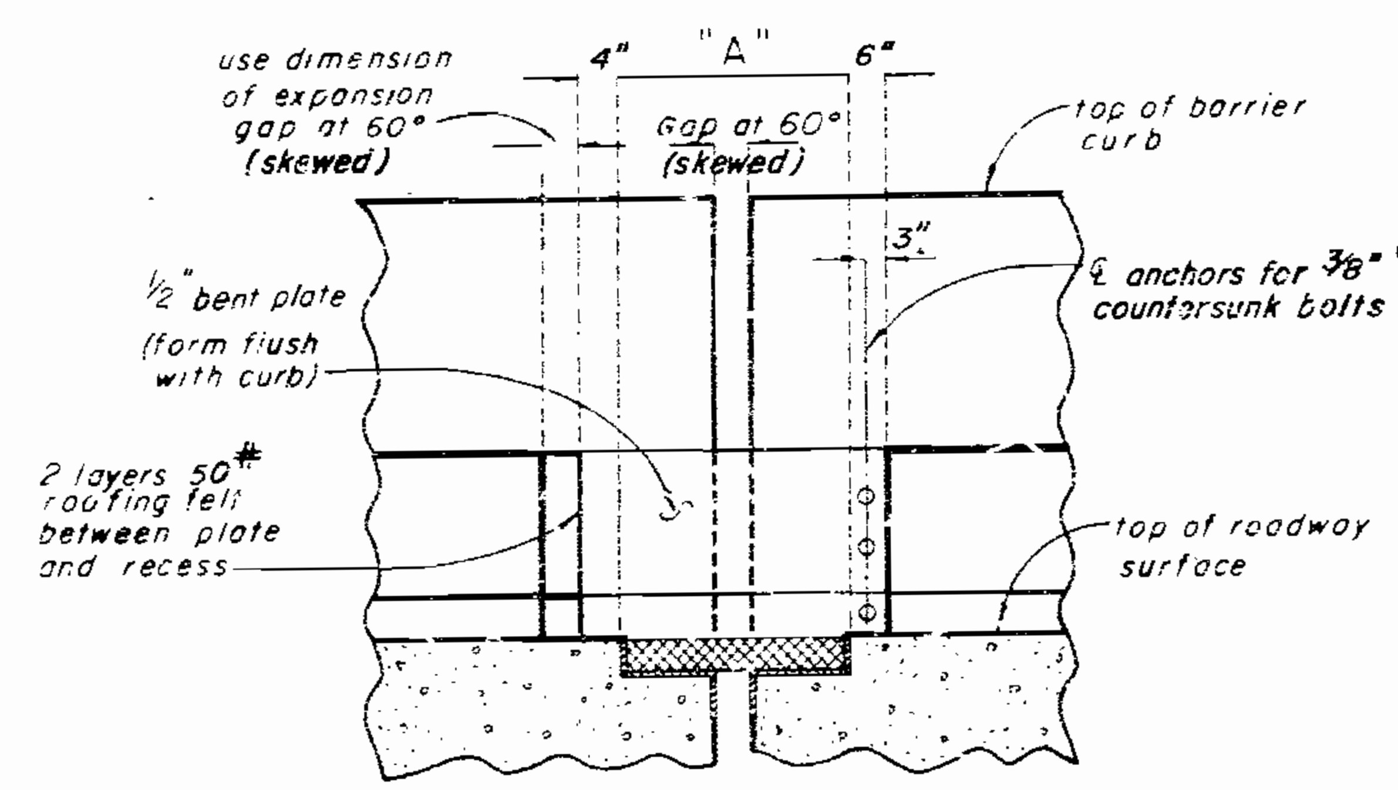
CONTACT SURFACE OF STEEL TO ALUMINUM SHALL BE INSULATED WITH THE MATERIAL SPECIFIED ON THE SHOP DRAWINGS.

FURNISHING AND INSTALLING THE ELASTOMERIC EXPANSION JOINT SEAL WILL BE PAID FOR AT THE CONTRACT BID PRICE PER LINEAR FOOT.

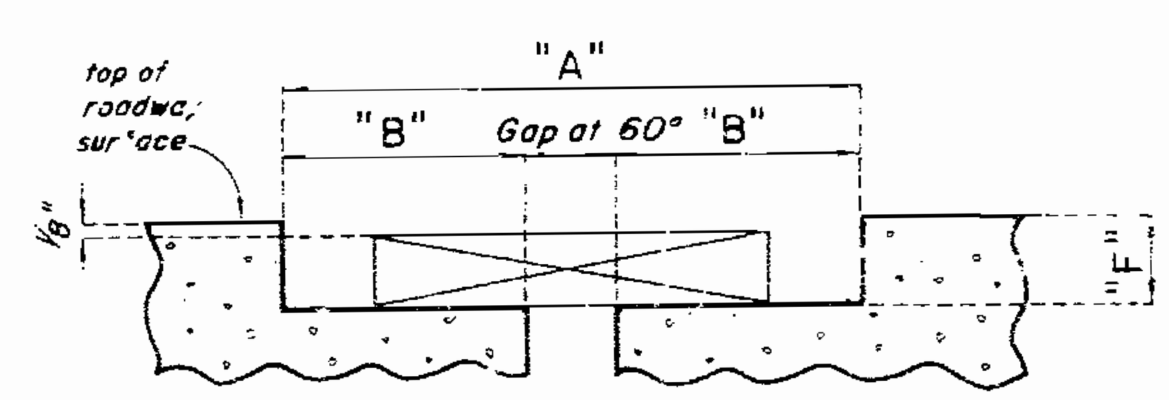
FURNISHING, PAINTING AND INSTALLING THE STRUCTURAL STEEL ARMOURED JOINT WILL BE INCLUDED IN THE CONTRACT PRICE BID FOR OTHER ITEMS.



ALTERNATE CURB TREATMENTS



PART ELEVATION OF BARRIER CURB



BLOCKOUT FOR MODULAR UNITS

NOTE: WHEN MODULAR UNITS ARE SPECIFIED AS AN ALTERNATE STEEL CURB PLATE TREATMENTS ARE REQUIRED.

DETAILS OF ELASTOMERIC EXPANSION JOINT SEAL AT BENT NO. 4

Sheet No. of

JACKSON COUNTY

DETAILED JUNE 1978
CHECKED AUG 1978

Note: This drawing is not to scale. Follow dimensions.

SPS-END-BT.	REVISED
FEB. 1978	APRIL 1978

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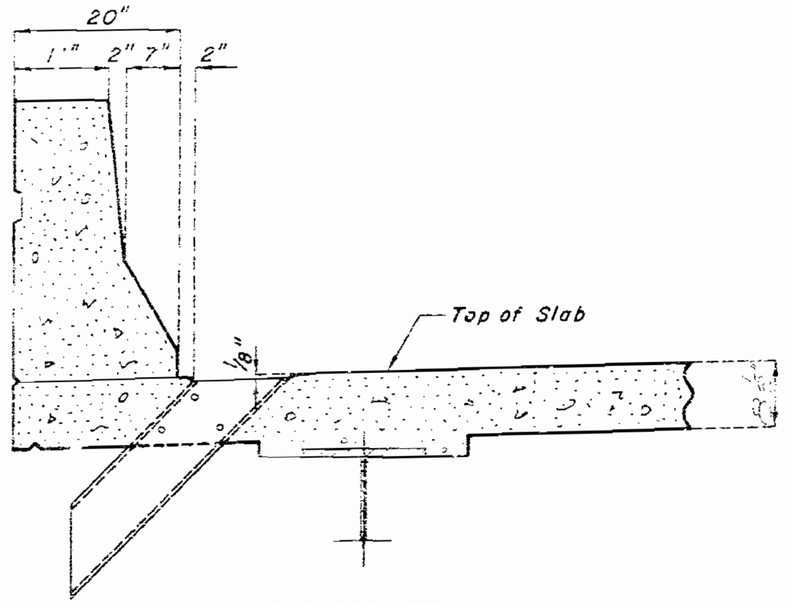
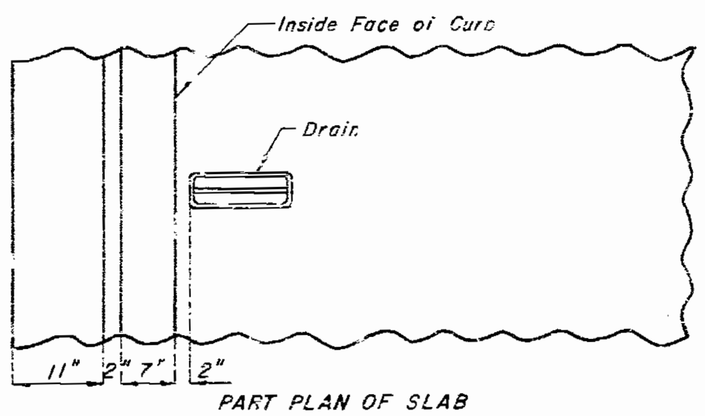
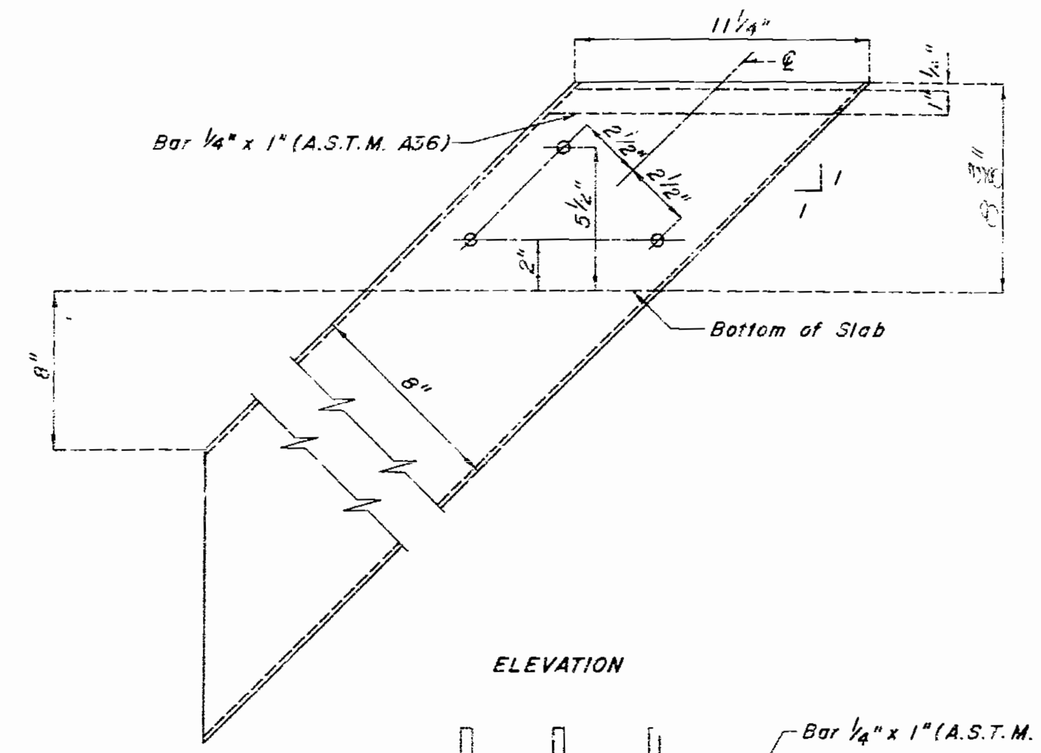
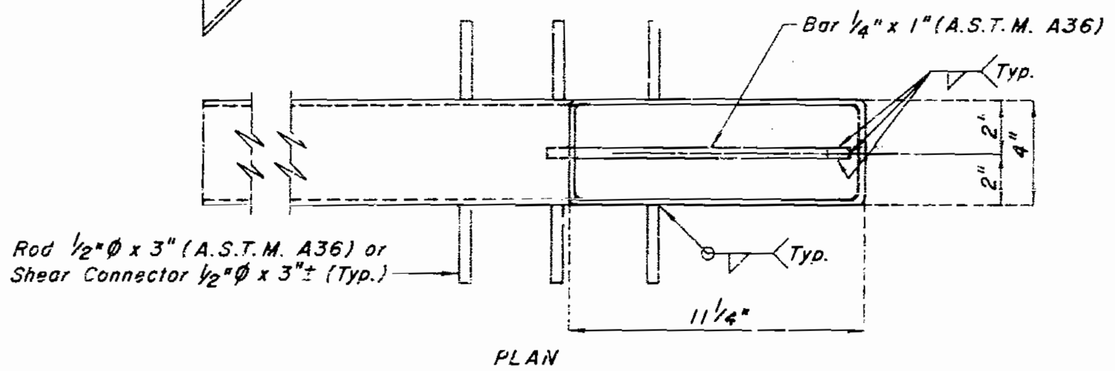
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	53	









SLAB DRAIN DETAILS

GENERAL NOTES:

SLAB DRAINS MAY BE FABRICATED OF EITHER [illegible] ROLLED SHEETS OF A.S.T.M. A36 STEEL OR FROM [illegible] STRUCTURAL STEEL TUBING A.S.T.M. A500 OR A501.

OUTSIDE DIMENSIONS OF DRAINS ARE [illegible].

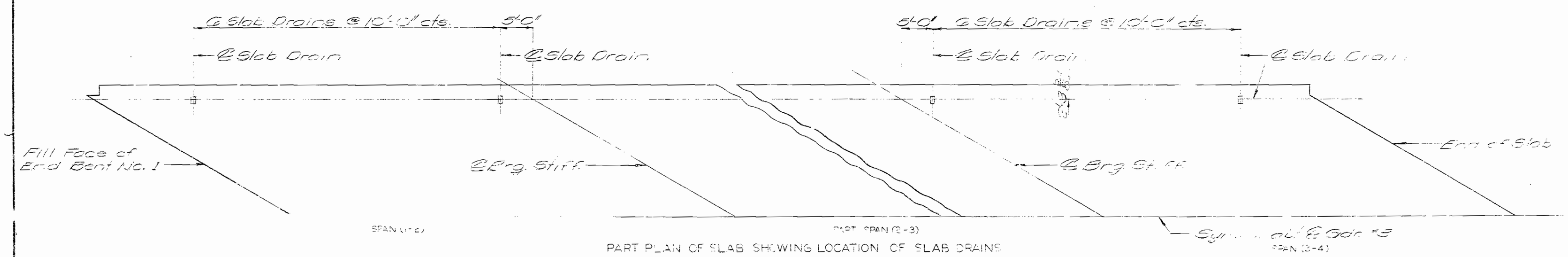
THE DRAINS SHALL BE CAST IN THE CONCRETE WITH THE TOP OF THE DRAINS BEING FLUSH WITH THE FINISHED CONCRETE LINE.

[illegible] OF THE SLAB BY DIMENSIONS SHOWN IN THE PART ELEVATION.

SHIFT REINFORCING STEEL IN FIELD WHERE NECESSARY TO CLEAR DRAINS.

THE DRAINS SHALL BE GALVANIZED IN ACCORDANCE WITH A.S.T.M. A123.

SHOP DRAWINGS WILL NOT BE REQUIRED FOR THE SLAB DRAINS.



PART PLAN OF SLAB SHOWING LOCATION OF SLAB DRAINS

531

STD. S.D.-N.H.S. | REVISED FEB. 1975 | MAR. 1978

DETAILED JUNE 1975
CHECKED AUG. 1975

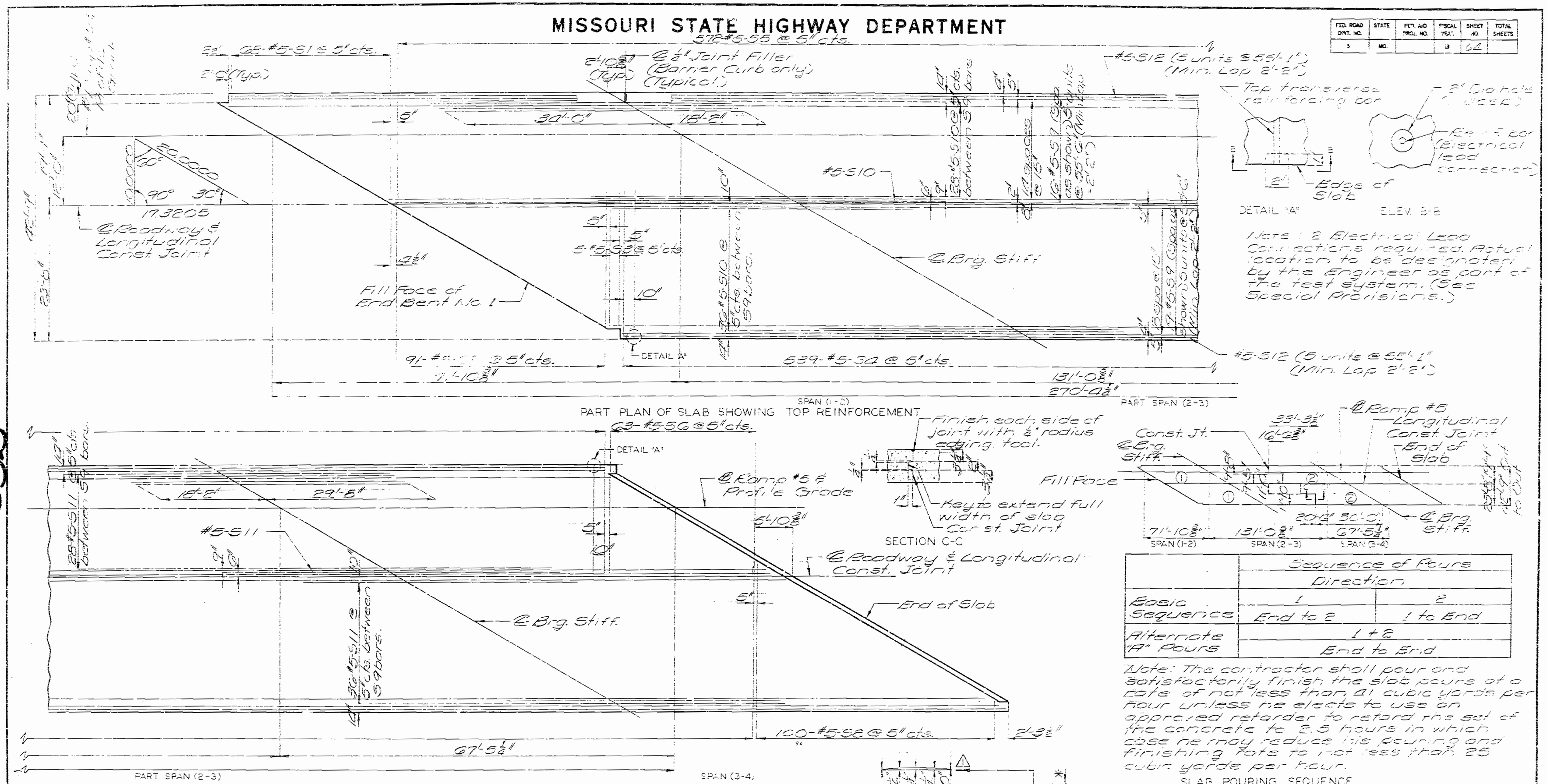
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 4 of 12.

JACKSON COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

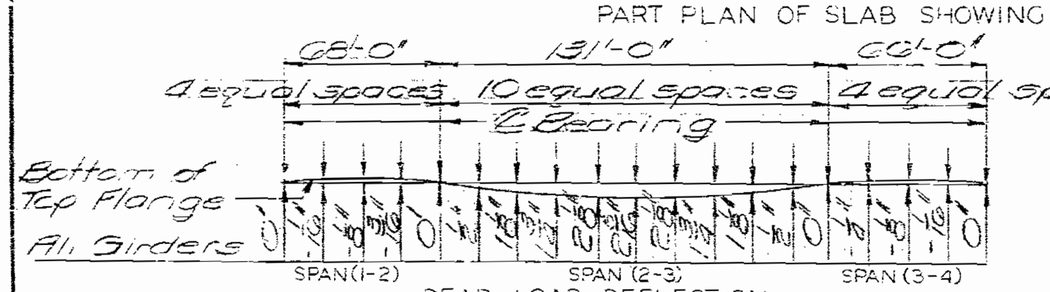
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	22	



	Sequence of Pours	
	Direction	
Basic Sequence	1	2
	End to E	1 to End
Alternate "A" Pours	1 + 2	
	End to End	

SLAB POURING SEQUENCE

Note: The contractor shall pour and satisfactorily finish the slab pours at a rate of not less than 81 cubic yards per hour unless he elects to use an approved retarder to retard the set of the concrete to 2.5 hours in which case he may reduce the pouring and finishing rate to not less than 25 cubic yards per hour.



DEAD LOAD DEFLECTION

Note: 17 % of dead load deflection is due to weight of structural steel.

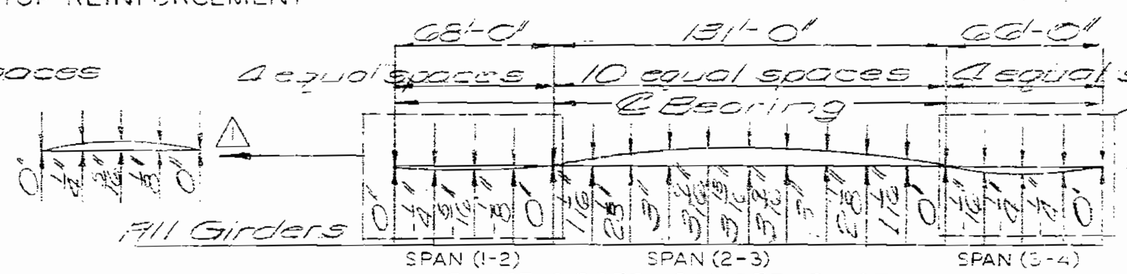
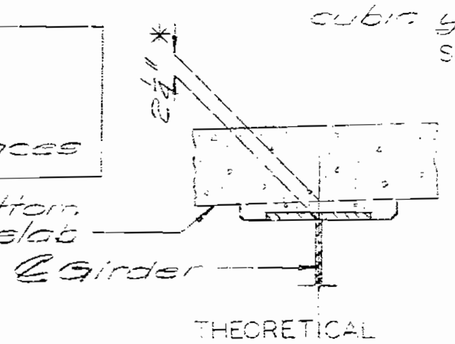


PLATE GIRDER CAMBER DIAGRAM

Note: Camber includes allowance for vertical curve and for dead load deflection due to concrete slab, cure and structural steel.



THEORETICAL SLAB HAUNCH

* Camber may vary if girder camber after erection differs from plan camber by more than the % of D.L. deflection due to weight of structural steel. No payment will be made for additional forming or concrete required for variations in camber.

DETAILED JUNE 19[illegible]
CHECKED [illegible] 19[illegible]

Note: This drawing is not to scale. Follow dimensions.

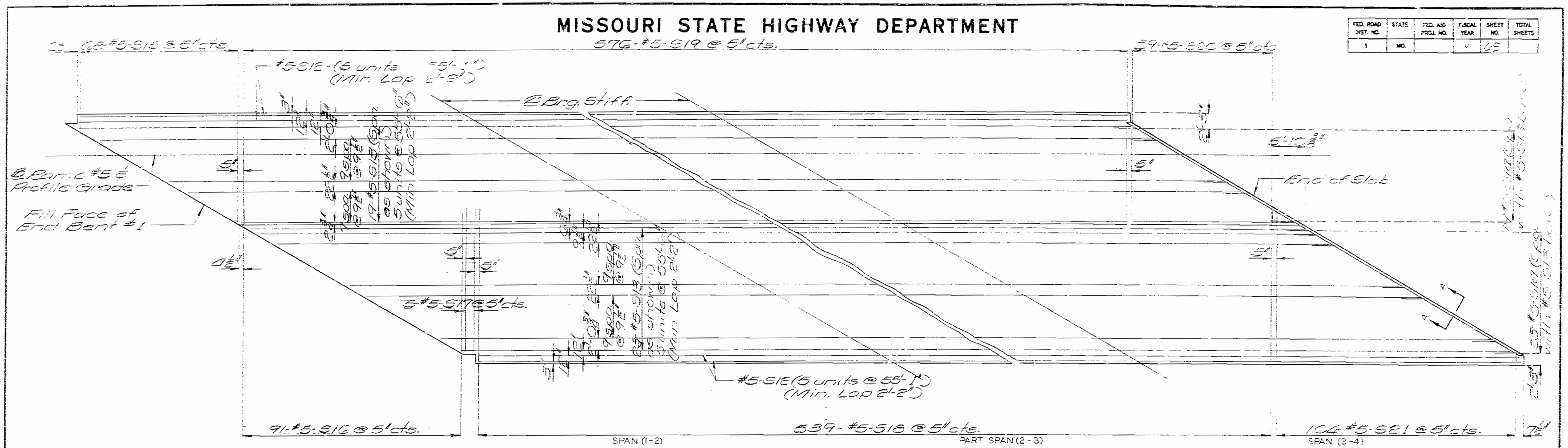
Sheet No. 3 of 10 Sheets

JACKSON COUNTY

A-21-22

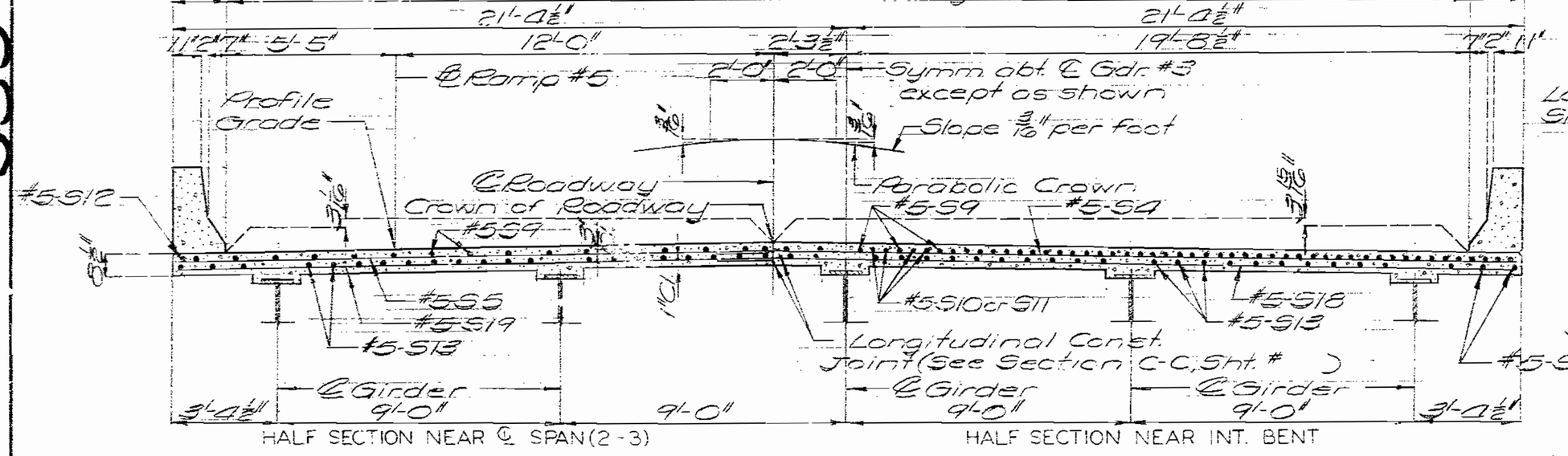
MISSOURI STATE HIGHWAY DEPARTMENT

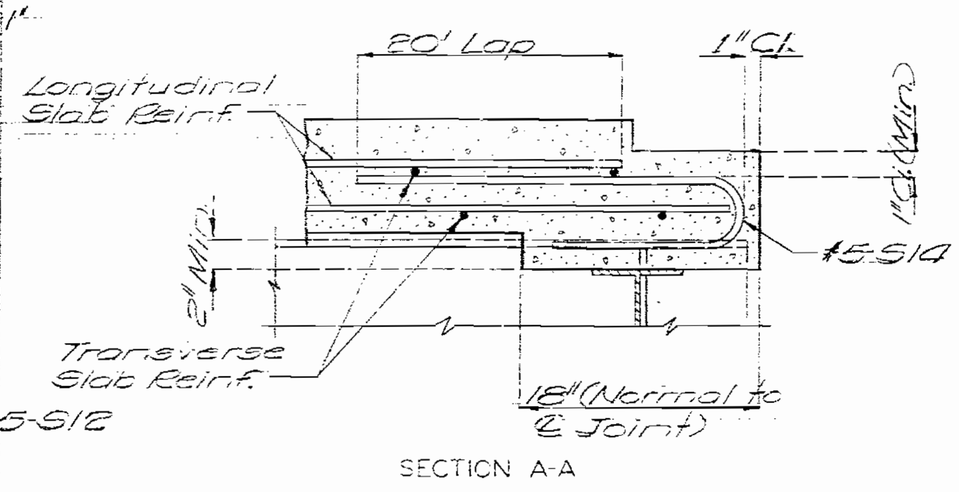
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	F.SCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		V	45	



PART PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT

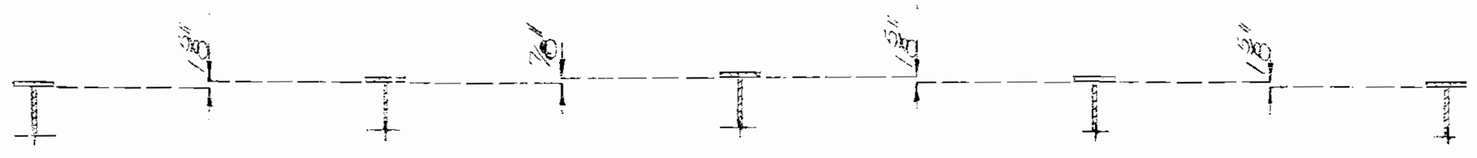
Note: For dimensions and reinforcement not shown see Sht. No. 15.





SECTION A-A

Note: For details & reinforcement of safety barrier bridge curb not shown see Sht. #17.



GIRDER VARIATION SKETCH

533

DETAILED JUNE 1978
CHECKED AUG 1978

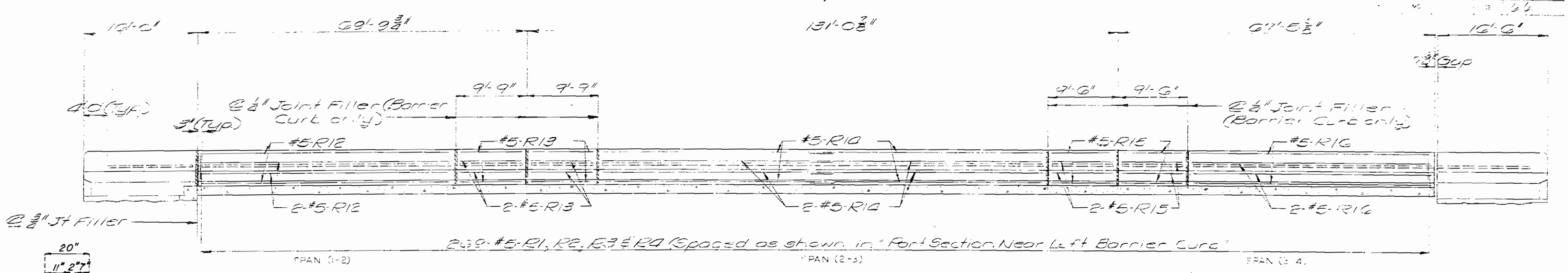
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 45.

JACKSON COUNTY

A-2 6

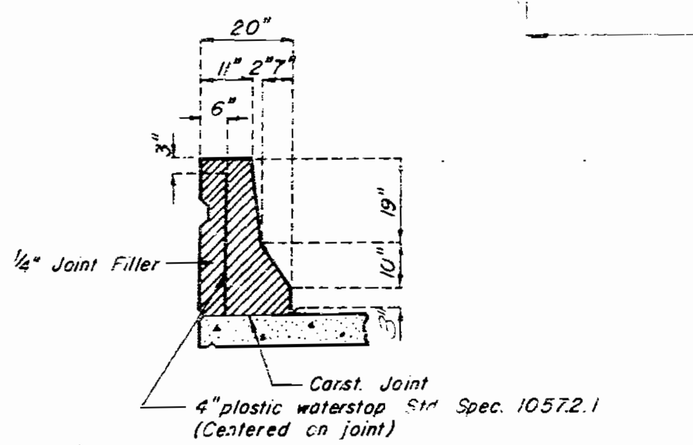
MISSOURI STATE HIGHWAY DEPARTMENT



SECTION NEAR LEFT BARRIER CURB

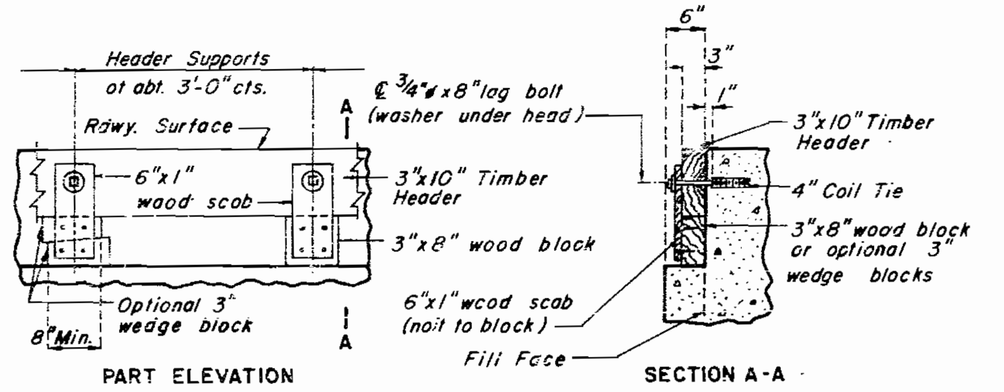
Note: Longitudinal dimensions are along top of barrier curb parallel to grade.

Note: Top of Barrier Curb to be built parallel to grade with Barrier Curb joints (except at End Bents) normal to grade.
All exposed edges of Barrier Curb shall have 12" radius or 3/4" Bevel unless otherwise noted.



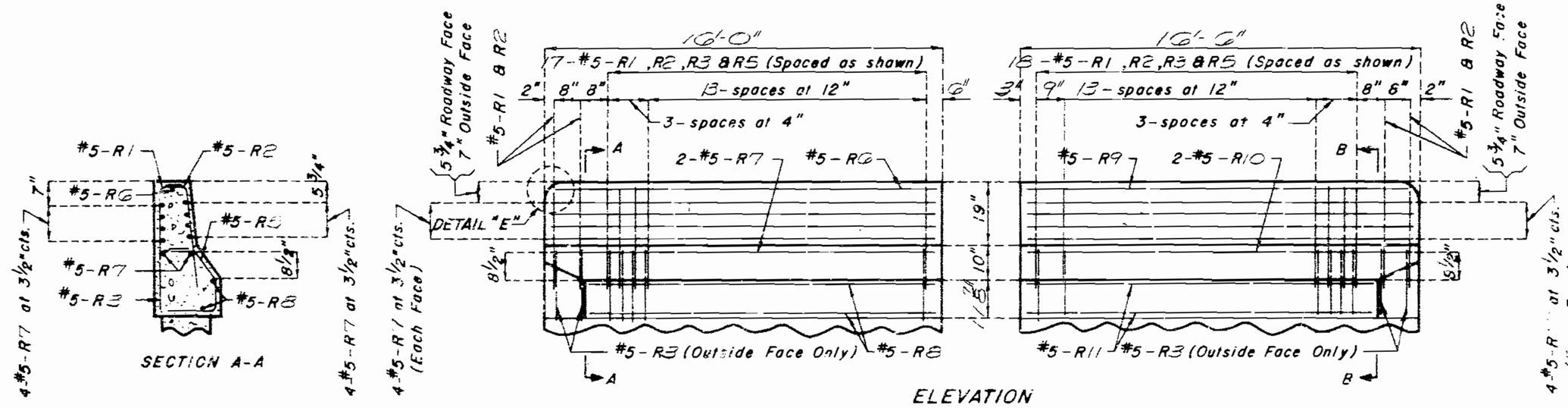
Note: Plastic waterstop shall be placed in all safety barrier curb filled joints.
Cost of plastic waterstop complete in place to be included in unit price bid for concrete.

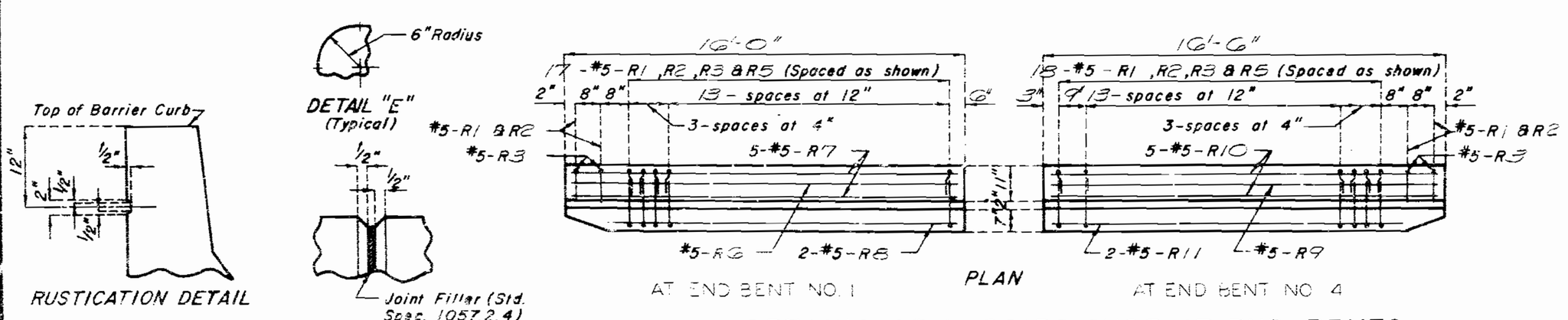
DETAILS OF PLASTIC WATERSTOP



Note: Cost of timber headers complete in place to be included in price bid for concrete.

DETAILS OF TIMBER HEADER AT END BENTS





DETAILS OF BARRIER CURB AT END BENTS

Note: This drawing is not to scale. Follow dimensions.

PART SECTION NEAR LEFT BARRIER CURB

Sheet No. 7 of 22

JACKSON COUNTY

A-21120

STD. 1.7.3	REVISED	MAR. 1978
	NOV. 1974	

DETAILED JUNE 1978
CHECKED AUG 1978

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MISSOURI STATE HIGHWAY DEPARTMENT

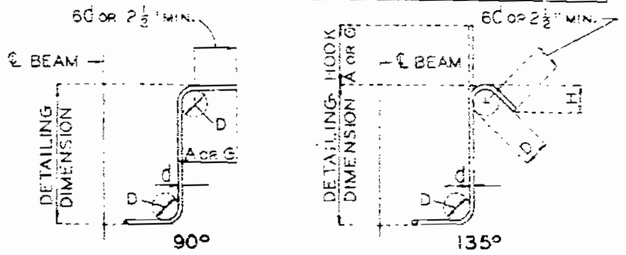
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	67	

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	MARK NO. SIZE / MARK	LOCATION	GRADE 60 (H)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT.IN.	FT.IN.	LBS.
		END BENT NO 1																
6	6F1	BACKWALL	H	15	S	X			13.750	3 7.250	13.750	13.250	3.750	13.250	3.750	5 11	5 8	51
5	6F2	BACKWALL	H	15	S	X			13.750	12 8.500	13.750	3.750	13.250	3.750	13.250	15 0	15 0	113
4	7H1	BEAM	H	11		X				4 10.500	2 7.500	8 9.000				16 3	15 11	130
4	8F2	BEAM	H	17		X	V	1	23 3.500							24 2	24 2	
		INCR = 24.625 IN							32 0.000							32 10	32 10	304
3	8H3	BEAM	H	17		X	V	1	44 11.000							45 9	45 9	
		INCR = 36.000 IN							50 11.000							51 9	51 9	390
1	8H4	BEAM	H	17		X			50 0.000							50 10	50 10	136
4	8H5	BEAM	H	20		X			22 6.000							22 6	22 6	240
4	8H6	BEAM	H	20		X			8 6.000							8 6	8 6	91
4	8H7	BEAM	H	20		X			16 10.000							16 10	16 10	180
3	8H8	BEAM	H	17		X	V	1	40 11.000							41 9	41 9	
		INCR = 31.500 IN							35 8.000							36 6	36 6	313
1	8H9	BEAM	H	17		X			30 4.000							31 2	31 2	83
4	8H10	BEAM	H	17		X	V	1	27 9.000							28 7	28 7	
		INCR = 36.000 IN							18 9.000							19 7	19 7	257
4	7H11	BEAM	H	19		X			12 6.000	3 6.000						16 0	15 10	129
2	6H12	BEAM	H	20		X			40 11.000							40 11	40 11	123
2	6H13	BEAM	H	20		X			33 0.000							33 0	33 0	99
1	6H14	BEAM	H	20		X			51 5.000							51 5	51 5	77
1	6H15	BEAM	H	20		X			44 2.000							44 2	44 2	66
2	6H16	BEAM	H	20		X			24 8.000							24 6	24 8	74
2	3H17	BACKWALL	H	20		X			33 11.000							33 11	33 11	102
6	4H18	BACKWALL	H	20		X			33 11.000							33 11	33 11	136
2	6H19	BACKWALL	H	20		X			51 0.000							51 0	51 0	153
12	4H20	BACKWALL	H	20		X			26 4.000							26 4	26 4	211
8	6N21	WING	H	20		X			15 9.000							15 9	15 9	189
12	3H22	WING	H	20		X	V	2	15 5.625							15 6	15 6	
		INCR = 20.625 IN							6 11.375							6 11	6 11	202
12	6H48	WING	H	20		X	V	2	15 4.000							15 4	15 4	
		INCR = 20.750 IN							6 7.500							6 8	6 8	198
2	6T1	WING	H	25	S	X			2 3.000	10 10.750	2 0.000			4 5.125	9 11.500	15 2	15 1	45
2	6T2	WING	H	19	S	X			7 11.000	8 9.000						16 8	16 6	50
2	6T3	WING	H	25	S	X			2 3.000	10 8.000	2 0.000			4 2.500	9 9.625	14 11	14 10	45
2	6T4	WING	H	19	S	X			7 7.000	4 8.000						12 3	12 1	36
2	6U1	BEAM	H	10	S	X				21.000	4 2.125					7 8	7 4	22
5	4U2	BEAM	H	13	S	X	V	1	2 4.500	2 9.000	2 4.500	2 9.000				11 0	10 9	
		INCR = 13.750 IN							4 9.000	2 9.000	4 8.000	2 9.000				15 7	15 4	44
18	4U3	BEAM	H	13	S	X			5 3.000	2 9.000	5 3.000	2 9.000				16 9	16 6	198
16	4U4	BEAM	H	13	S	X			5 3.000	3 3.500	5 3.000	3 3.500				17 10	17 7	188
17	4U5	BEAM	H	13	S	X			5 3.000	3 8.875	5 3.000	3 8.875				18 9	18 6	210
17	4U6	BEAM	H	13	S	X			5 3.000	3 11.625	5 3.000	3 11.625				19 2	18 11	215
4	4U7	BEAM	H	13	S	X	V	1	3 3.000	4 2.125	3 3.000	4 2.125				15 7	15 4	
		INCR = 14.000 IN							5 0.000	4 2.125	5 0.000	4 2.125				19 1	18 10	46
3	4U8	BEAM	H	13	S	X	V	1	12.250	4 2.125	12.250	4 2.125				11 2	10 11	
		INCR = 14.000 IN							2 2.125	4 2.125	2 2.125	4 2.125				13 6	13 3	24
14	4U9	BEAM	H	10	S	X				6.000	5 3.000					6 3	6 1	57
6	4U10	MUDWALL	H	10	S	X				8 3.000	6.000					17 0	16 10	67
6	4U11	MUDWALL	H	10	S	X				4 3.000	6.000					9 0	8 10	35
4	6U24	BEAM	H	13	S	X				21.000	2 9.000					6 3	5 11	36
2	6V1	BEAM	H	20		X			2 9.000							2 9	2 9	8
1	6V2	BEAM	H	20		X			4 2.000							4 2	4 2	6

COMPLETE BILL OF REINFORCING STEEL

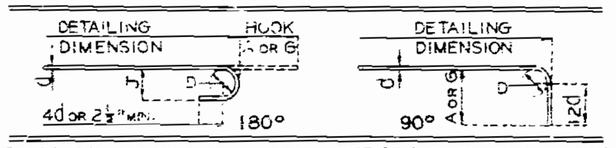
NO. REQD.	MARK NO. SIZE / MARK	LOCATION	GRADE 60 (H)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT.IN.	FT.IN.	LBS.
154	5V3	BACKWALL	H	20		X			7 6.000							7 5	7 5	1205
10	6V4	WING	H	20		X	V	1	2 8.375							2 8	2 8	
		INCR = 5.375 IN							6 8.37.							6 8	6 8	70
10	6V5	WING	H	17		X	V	1	2 6.375							3 2	3 2	
		INCR = 5.375 IN							6 6.375							7 2	7 2	78
6	6V6	WING	H	20		X			9 1.000							9 1	9 1	82
6	6V7	WING	H	17		X			8 11.000							9 7	9 7	86
8	4V8	MUDWALL	H	20		X			7 6.000							7 6	7 6	40
10	6V9	WING	H	20		X	V	1	2 8.250							2 8	2 8	
		INCR = 5.250 IN							6 6.625							6 7	6 7	69
10	6V10	WING	H	17		X	V	1	2 6.250							3 2	3 2	
		INCR = 5.125 IN							6 6.250							7 0	7 0	76
6	6V11	WING	H	20		X			8 11.000							8 11	8 11	30
6	6V12	WING	H	17		X			8 9.300							9 5	9 5	85
2	4V13	MUDWALL	H	20		X			7 3.000							7 3	7 3	10
10	2W.	A B WELL	H	22		X			12.000	9.125						19 9	19 9	33
		INT BENT NO 2																
16	6F4	FOOTING	H	10	S	X				2 11.000	13.000					6 11	6 7	158
16	6F5	FOOTING	H	10	S	X				3 2.000	13.000					7 5	7 1	170
4	6H23	BEAM	H	20		X			43 10.000							43 10	43 10	263
9	11H24	BEAM	H	17		X			20 7.000							21 9	21 9	1040
10	11H25	BEAM	H	20		X			30 8.000							30 8	30 8	1629
9	11H26	BEAM	H	20		X			21 3.000							21 3	21 3	1016
9	11H27	BEAM	H	20		X			45 1.000							45 1	45 1	2156
4	11H28	BEAM	H	17		X			9 4.000							10 6	10 6	223
10	11H29	BEAM	H	20		X			47 1.000							47 1	47 1	2502
4	6H30	BEAM	H	20		X			30 8.000							30 8	30 8	184
5	11H49	BEAM	H	17		X			10 7.000							11 9	11 9	312
68	4P1	COLUMN	H	16		X			2 9.000							9 6	9 6	432
10	5U12	BEAM	H	13	S	X			2 4.000	3 3.000	2 4.000	3 3.000				12 1	11 9	123
7	5U13	BEAM	H	13	S	X			3 6.000	3 3.000	3 6.000	3 3.000				14 5	14 1	103
27	5U14	BEAM	H	13	S	X			3 8.000	3 8.625	3 6.000	3 8.625				15 4	15 1	425
45	5U15	BEAM	H	13	S	X			3 6.000	4 1.250	3 6.000	4 1.250				16 2	15 10	743
7	5U16	BEAM	H	13	S	X			3 6.000	4 5.000	3 6.000	4 5.000				16 9	16 5	120
10	5U17	BEAM	H	13	S	X			2 4.000	4 5.000	2 4.000	4 5.000				14 5	14 1	147
8	7U18	BEAM	H	7		X			4 4.000	3 4.750						10 4	10 4	168
2	4U19	BEAM	H	10	S	X				6.000	3 6.000					4 6	4 4	6
1	5U33	BEAM	H	13	S	X			3 5.000	3 3.000	3 5.000	3 3.000				14 3	13 11	15
1	5U34	BEAM	H	13	S	X			3 5.000	4 3.000	3 5.000	4 3.000				16 3	15 11	17
32	10.14	COLUMN	H	26		X			19 6.000							19 6	19 6	2685
33	15	FOOTING	H	20		X			6 9.000							6 9	6 9	929
10	2W1	A B WELL	H	22		X			12.000	9.125						19 9	19 9	33
		INT BENT NO 3																
16	6F4	FOOTING	H	10	S	X				2 11.000	13.000					6 11	6 7	158
16	6F5	FOOTING	H	10	S	X				3 2.000	13.000					7 5	7 1	170
4	6H23	BEAM	H	20		X			43 10.000							43 10	43 10	263
9	11H24	BEAM	H	17		X			20 7.000							21 9	21 9	1040
10	11H2.	BEAM	H	20		X			30 8.000							30 8	30 8	1629
5	11H26	BEAM	H	20		X			21 3.000							21 3	21 3	1016
9	11H27	BEAM	H	20		X			45 1.000							45 1	45 1	2156
4	11H28	BEAM	H	17		X			9 4.000							10 6	10 6	223



STIRRUP HOOK DIMENSIONS
GRADES 40-50-60 KSI

BAR SIZE	U (MIN)	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#3	1-1/2"	4"	4"	2-1/2"
#4	2"	4-1/2"	4-1/2"	3"
#5	2-1/2"	6"	5-1/2"	3-3/4"
#6	4-1/2"	8"	7"	4-1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



SIZE OF 180° HOOKS (GRADE 40 KSI)

D = 5d FOR #3 THRU # 11
D = 10d FOR #14 AND # 18

SIZE OF 90° HOOKS (ALL GRADES) AND 180° HOOKS (GRADE 60 KSI)

D = 6d FOR #3 THRU #8
D = 8d FOR #9, #10 AND #11
D = 10d FOR #14 AND #18

END HOOK DIMENSIONS

BAR SIZE	180° HOOKS: GRADE 40 A OR G	180° HOOKS: GRADE 40 J	180° HOOKS: GRADE 60 A OR G	180° HOOKS: GRADE 60 J	90° HOOKS: ALL GRADES A OR G
#3	5"	2-3/4"	5"	3"	6"
#4	6"	3-1/2"	6"	4"	8"
#5	7"	4-1/2"	7"	5"	10"
#6	8"	5-1/4"	8"	6"	12"
#7	9"	6-1/4"	10"	7"	14"
#8	10"	7"	11"	8"	16"
#9	12"	8"	15"	11-1/4"	19"
#10	13"	9"	17"	12-3/4"	22"
#11	14"	10"	19"	14-1/4"	21-0"
#14	21-2"	20-1/2"	31-2"	20-1/2"	21-7"
#18	21-11"	21-3"	21-11"	21-3"	31-5"

NOTES:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STD. HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

H - HIGH STRENGTH (ASTM A-615 GRADE 60).

S - STIRRUP.

X - BARS INCLUDED IN SUBSTRUCTURE QUANTITIES.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO. EA. - NUMBER OF BARS OF EACH LENGTH.

NOMINAL LENGTHS - ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS - ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

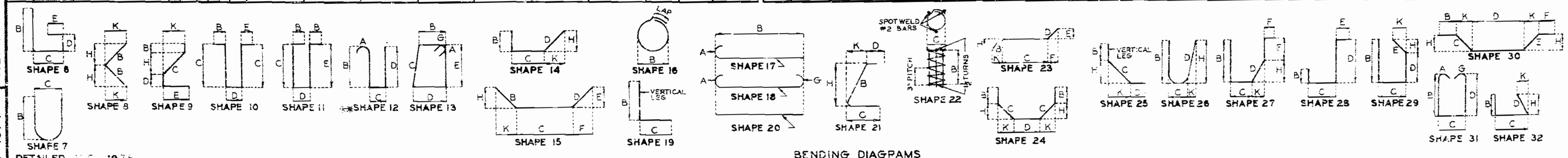
** ALL HOOKS AND BENDS FOR SHAPE NO. 12 - GRADE 40 (ONLY) ARE BASED ON D = 5d.

REVISED JULY 1978

STD. 90.8 MAY 1974

DETAILED AUG 1975

CHECKED AUG 1975



BENDING DIAGRAMS

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 8 of 10

JACKSON COUNTY

FOR INFORMATION ONLY

A21201, Sht. 26

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO		19	6E	

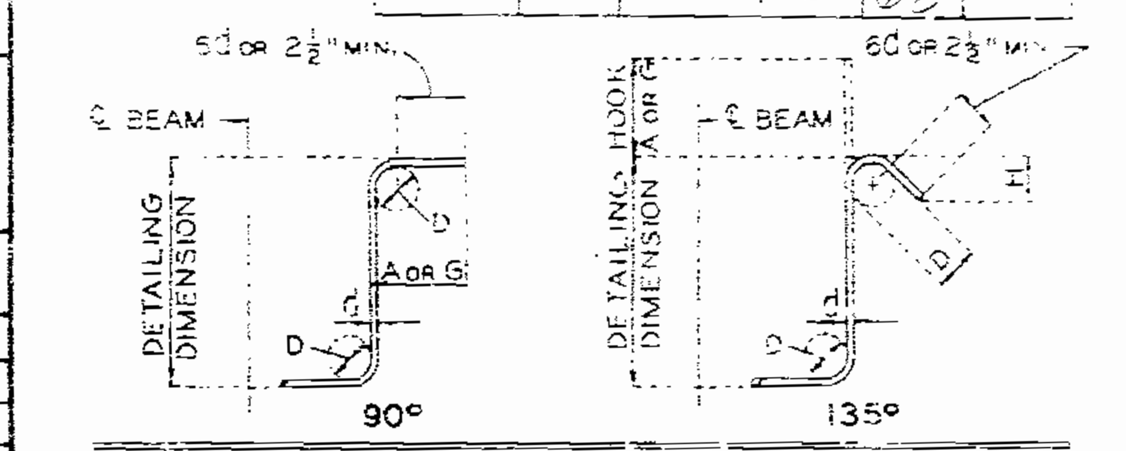
536

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE MARK	LOCATION	GRADE 60 (H)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
10	11H29	BEAM	H	20		X			47 1.000							47 1	47 1	2502
4	6H30	BEAM	H	20		X			30 8.000							30 8	30 8	184
60	4P1	COLUMN	H	16		X			2 9.000							9 6	9 6	381
8	7U18	BEAM	H	7		X			4 3.000	3 4.750						10 4	10 4	769
2	4U19	BEAM	H	10	S	X				6.000	3 6.000					4 6	4 4	6
10	5U12	BEAM	H	13	S	X			2 4.000	3 3.000	2 4.000	3 3.000				12 1	11 9	123
7	5U13	BEAM	H	13	S	X			3 6.000	3 3.000	3 6.000	3 3.000				14 5	14 1	103
27	5U20	BEAM	H	13	S	X			3 6.000	3 7.250	3 6.000	3 7.250				15 2	14 10	418
45	5U21	BEAM	H	13	S	X			3 6.000	3 10.500	3 6.000	3 10.500				15 8	15 4	720
10	5U23	BEAM	H	13	S	X			2 4.000	3 11.375	2 4.000	3 11.375				13 6	13 2	137
7	5U22	BEAM	H	13	S	X			3 6.000	3 11.375	3 6.000	3 11.375				15 10	15 6	113
1	5U33	BEAM	H	13	S	X			3 5.000	3 3.000	3 5.000	3 3.000				14 3	13 11	15
1	5U35	BEAM	H	13	S	X			3 5.000	3 11.375	3 5.000	3 11.375				15 8	15 4	17
32	10V15	FOOTING	H	20		X			6 9.000							6 9	6 9	929
32	10V16	COLUMN	H	20		X			17 0.000							17 0	17 0	2341
10	2W1	A B WALL	H	22		X			12.000	9.125						19 9	19 9	33
		END BENT NO. 4																
6	6F5	WING	H	15	S	X			13.750	3 10.750	13.750	13.250	3.750	13.250	3.750	6 2	6 0	54
6	6F6	WING	H	15	S	X			13.750	13 8.500	13.750	3.750	13.250	3.750	13.250	26 0	16 0	144
4	7H1	BEAM	H	11		X				4 10.500	2 7.500	8 9.000				16 3	15 11	130
4	7H11	BEAM	H	19		X			12 6.000	3 6.000						16 0	15 10	129
4	8H31	BEAM	H	17		X	V	1	28 6.000							29 4	29 4	
		INCR = 31.625 IN							20 7.000							21 5	21 5	271
4	8H32	BEAM	H	20		X			27 9.000							27 9	27 9	296
4	8H33	BEAM	H	17		X	V	1	41 4.000							42 2	42 2	
		INCR = 28.625 IN							34 2.000							35 0	35 0	412
3	8H34	BEAM	H	17		X	V	1	51 8.000							52 6	52 6	
		INCR = 32.000 IN							46 4.000							47 2	47 2	399
3	8H35	BEAM	H	17		X	V	1	34 2.000							35 0	35 0	
		INCR = 38.500 IN							40 7.000							41 5	41 5	306
1	8H36	BEAM	H	17		X			41 0.000							41 10	41 10	112
1	8H37	BEAM	H	17		X			39 6.000							40 4	40 4	106
2	6H38	BACKWALL	H	20		X			43 7.000							43 7	43 7	131
16	4H39	BACKWALL	H	20		X			22 4.000							22 4	22 4	239
2	6H40	BACKWALL	H	20		X			40 4.000							40 4	40 4	121
8	4H41	BACKWALL	H	20		X			40 0.000							40 0	40 0	214
1	6H42	BEAM	H	20		X			43 0.000							43 0	43 0	65
1	6H43	BEAM	H	20		X			51 0.000							51 0	51 0	77
1	6H44	BEAM	H	20		X			34 2.000							34 2	34 2	51
1	6H45	BEAM	H	20		X			41 4.000							41 4	41 4	62
8	6H46	WING	H	20		X			16 3.000							16 3	16 3	195
28	6H47	WING	H	20		X	V	4	6 3.500							6 4	6 4	
		INCR = 19.125 IN							15 11.000							15 11	15 11	468
4	6T5	WING	H	25	S	X			2 3.000	11 6.125	23.000			4 10.750	10 5.000	15 8	15 7	94
2	6T6	WING	H	19	S	X			7 7.000	8 9.000						16 4	16 2	49
2	6T7	WING	H	19	S	X			7 7.000	4 10.000						12 5	12 3	37
12	4U9	BEAM	H	10	S	X				6.000	5 3.000					6 3	6 1	49
2	6U24	BEAM	H	10	S	X				21.000	2 9.000					6 3	5 11	18
4	6U25	BEAM	H	10	S	X				21.000	3 2.000					6 8	6 4	38
3	4U26	BEAM	H	13	S	X	V	1	13.000	2 9.000	13.000	2 9.000				8 5	8 2	
		INCR = 14.000 IN							2 3.000	2 9.000	2 3.000	2 9.000				10 9	10 6	19
4	4U27	BEAM	H	13	S	X	V	1	3 3.000	2 9.000	3 3.000	2 9.000				12 9	12 6	
		INCR = 14.000 IN							5 0.000	2 9.000	5 0.000	2 9.000				16 3	16 0	38

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE MARK	LOCATION	GRADE 60 (H)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
15	4U28	BEAM	H	13	S	X			5 3.000	2 9.000	5 3.000	2 9.000				16 9	16 6	165
53	4U29	BEAM	H	13	S	X			5 3.000	3 0.500	5 3.000	3 0.500				17 4	17 1	605
5	4U30	BEAM	H	13	S	X	V	1	2 5.250	3 0.500	2 5.250	3 0.500				11 9	11 6	
		INCR = 13.750 IN							4 9.000	3 0.500	4 9.000	3 0.500				16 4	16 1	46
5	4U31	MUDWALL	H	10	S	X				8 3.000	6.000					17 0	16 10	56
5	4U32	MUDWALL	H	10	S	X				4 3.000	6.000					9 0	8 10	30
1	6V1	BEAM	H	20		X			2 9.000							2 9	2 9	4
2	6V10	BEAM	H	20		X			3 2.500							3 3	3 3	10
79	5V11	BACKWALL	H	20		X			8 4.000							8 4	8 4	687
105	6V12	BACKWALL	H	20		X			8 4.000							8 4	8 4	1314
22	6V13	WING	H	20		X	V	2	2 8.750							2 9	2 9	
		INCR = 5.625 IN							7 5.000							7 5	7 5	168
22	6V16	WING	H	17		X	V	2	2 6.750							3 3	3 3	
		INCR = 5.625 IN							7 3.000							7 11	7 11	184
12	6V17	WING	H	20		X			8 10.000							8 10	8 10	159
12	6V18	WING	H	17		X			8 8.000							9 4	9 4	168
10	4V19	WING	H	20		X			7 2.000							7 2	7 2	48
10	2W1	A.B.WELL	H	22		X			12.000	9.125						19 9	19 9	33
		SUPERSTRUCTURE																
68	5S1	SLAB *	H	20			V	1	2 8.000							2 8	2 8	
		INCR = 2.875 IN							18 9.500							18 10	18 10	762
91	5S2	SLAB *	H	20			V	1	2 4.375							2 4	2 4	
		INCR = 2.875 IN							24 0.125							24 0	24 0	1250
5	5S3	SLAB *	H	20					24 2.000							24 2	24 2	126
539	5S4	SLAB *	H	20					25 10.000							25 10	25 10	14523
574	5S5	SLAB *	H	20					18 10.000							18 10	18 10	11276
63	5S6	SLAB *	H	20			V	1	2 1.875							2 2	2 2	
		INCR = 2.875 IN							17 0.875							17 1	17 1	632
100	5S8	SLAB *	H	20			V	1	21.250							21	21	
		INCR = 2.875 IN							25 7.125							25 7	25 7	1425
175	5S9	SLAB *	H	20					55 6.000							55 6	55 6	10130
65	5S10	SLAB *	H	20					52 2.000							52 2	52 2	3537
65	5S11	SLAB *	H	20					47 10.000							47 10	47 10	3243
30	5S12	SLAB	H	20					55 1.000							55 1	55 1	1724
210	5S13	SLAB	H	20					55 6.000							55 6	55 6	12156
42	5S14	SLAB *	H	26					12.000	7.000	3 3.000			3 3.000		4 6	4 6	197
68	5S15	SLAB	H	20			V	1	2 8.000							2 8	2 8	
		INCR = 2.875 IN							18 9.500							18 10	18 10	762
91	5S16	SLAB	H	20			V	1	2 4.375							2 4	2 4	
		INCR = 2.875 IN							24 0.125							24 0	24 0	1250
5	5S17	SLAB	H	20					24 2.000							24 2	24 2	126
539	5S18	SLAB	H	20					25 10.000							25 10	25 10	14523
576	5S19	SLAB	H	20					18 10.000							18 10	18 10	11314
59	5S20	SLAB	H	20			V	1	3 1.000							3 1	3 1	
		INCR = 2.875 IN							17 1.000							17 1	17 1	620
104	5S21	SLAB	H	20			V	1	20.000							20	20	
		INCR = 2.875 IN							26 6.000							26 6	26 6	1528
616	5R1	BARRIER CURB	H	19	S				2 6.000	6.000						3 0	2 11	1874
616	5R2	BARRIER CURB	H	15	S				2 6.125	6.000				2 6.000	3.000	3 0	2 11	1874
616	5R3	BARRIER CURB	H	19	S				17.000	9.000						2 2	2 1	1338
538	5R4	BARRIER CURB	H	27	S					9.000	11.125	7.000	12.000	9.125	6.375	3 3	3 1	1730

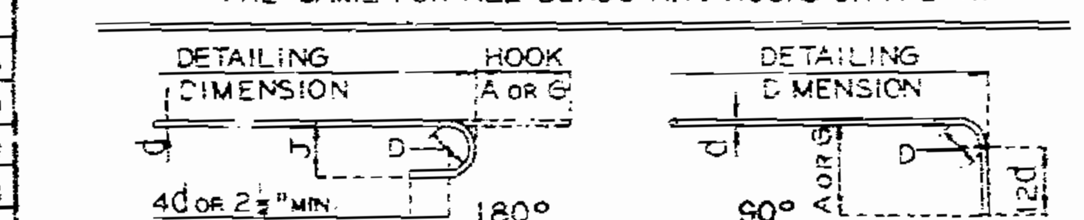


STIRRUP HOOK DIMENSIONS

GRADES 40-50-60 KSI

BAR SIZE	D (IN.)	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#3	1-1/2"	4"	4"	2-1/2"
#4	2"	4-1/2"	4-1/2"	3"
#5	2-1/2"	6"	5-1/2"	3-3/4"
#6	4-1/2"	8"	7"	4-1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



SIZE OF 180° HOOKS (GRADE 40 KSI)

D = 5d FOR #3 THRU #11
D = 10d FOR #14 AND #18

SIZE OF 90° HOOKS (ALL GRADES) AND 180° HOOKS (GRADE 60 KSI)

D = 6d FOR #3 THRU #8
D = 8d FOR #9, #10 AND #11
D = 10d FOR #14 AND #18

END HOOK DIMENSIONS

BAR SIZE	180° HOOKS GRADE 40: A OR G	180° HOOKS GRADE 40: J	180° HOOKS GRADE 60: A OR G	180° HOOKS GRADE 60: J	90° HOOKS ALL GRADES: A OR G
#3	5"	2-3/4"	5"	3"	6"
#4	6"	3-1/2"	6"	4"	8"
#5	7"	4-1/2"	7"	5"	10"
#6	8"	5-1/4"	8"	6"	12"
#7	9"	6-1/4"	10"	7"	14"
#8	10"	7"	11"	8"	16"
#9	12"	8"	15"	11-1/4"	19"
#10	13"	9"	17"	12-3/4"	22"
#11	14"	10"	19"	14-1/4"	2'-0"
#14	2'-2"	20- 2"	2'-2"	20-1/2"	2'-7"
#18	2'-11"	2'-3"	2'-11"	2'-3"	3'-5"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STD. HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

H - HIGH STRENGTH (ASTM A-615 GRADE 60).

S - STIRRUP.

X - BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN [illegible] LINE AND THE [illegible] LINE.

NO. EA. - NUMBER OF BARS OF EACH LENGTH.

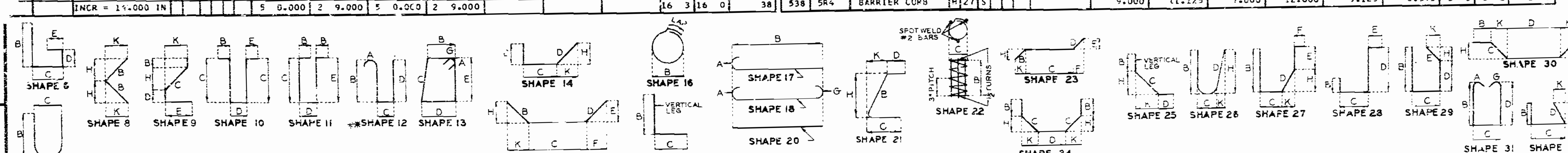
NOMINAL LENGTHS - ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS - ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

⋆✱ ALL HOOKS AND BENDS FOR SHAPE NO. 12 - GRADE 40 (ONLY) ARE BASED ON D = 5d.

Note: The additional #5-S5 are provided for [illegible] purposes.

* Indicates Bars to be epoxy coated



BENDING DIAGRAMS

Note: This drawing is not to scale. Follow dimensions.

STD. 90.8	MAY 1974
REVISED	JULY 1978

DETAILED AUG 1978

CHECKED AUG 1978

Sheet No. _ of _

JACKSON COUNTY

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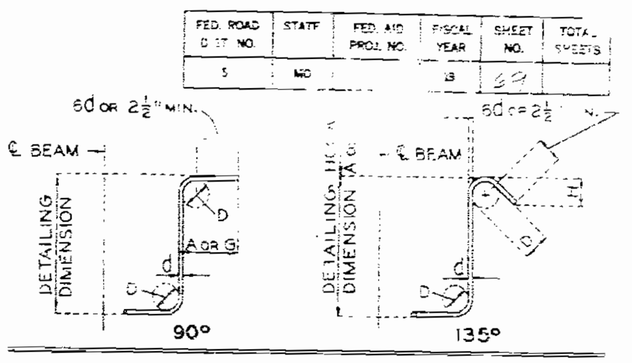
MISSOURI STATE HIGHWAY DEPARTMENT

COMPLETE BILL OF REINFORCING STEEL

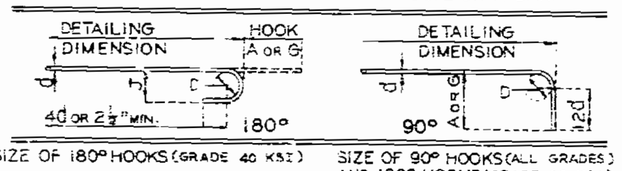
NO. REQ'D.	MARK NO. SIZE MARK	LOCATION	GRADE 60(H)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	LBS.
70	5R5	BARRIER CURB	H	27	S				12.000	7.000	11.125	9.000		6.375	9.325	3 3	3 1	225
2	5R6	BARRIER CURB	H	20					15 3.000							15 3	15 3	32
20	5R7	BARRIER CURB	H	20					15 9.000							15 9	15 9	329
4	5R8	BARRIER CURB	H	20					14 9.000							14 9	14 9	62
2	5R9	BARRIER CURB	H	20					15 9.000							15 9	15 9	33
20	5R10	BARRIER CURB	H	20					16 3.000							16 3	16 3	339
4	5R11	BARRIER CURB	H	20					15 3.000							15 3	15 3	64
12	5R12	BARRIER CURB	H	20					59 10.000							59 10	59 10	749
24	5R13	BARRIER CURB	H	20					9 6.000							9 6	9 6	238
24	5R14	BARRIER CURB	H	20					56 7.000							56 7	56 7	1416
24	5R15	BARRIER CURB	H	20					9 3.000							9 3	9 3	232
12	5R16	BARRIER CURB	H	20					57 9.000							57 9	57 9	723
		* INDICATES BARS TO BE EPOXY COATED																
		END OF BAR LIST																



STIRRUP HOOK DIMENSIONS
GRADES 40-50-60 KSI

BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#3	1-1/2"	4"	4"	2-1/2"
#4	2"	4-1/2"	4-1/2"	3"
#5	2-1/2"	6"	5-1/2"	3-3/4"
#6	4-1/2"	8"	7"	4-1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



SIZE OF 180° HOOKS (GRADE 40 KSI)
D = 5d FOR #3 THRU #11
D = 10d FOR #14 AND #18

SIZE OF 90° HOOKS (ALL GRADES) AND 180° HOOKS (GRADE 60 KSI)
D = 6d FOR #3 THRU #8
D = 8d FOR #9, #10 AND #11
D = 10d FOR #14 AND #18

END HOOK DIMENSIONS

BAR SIZE	180° HOOKS GRADE 40 A OR G	180° HOOKS GRADE 40 J	180° HOOKS GRADE 60 A OR G	180° HOOKS GRADE 60 J	90° HOOKS ALL GRADES A OR G
#3	5"	2-3/4"	5"	3"	6"
#4	6"	3-1/2"	6"	4"	8"
#5	7"	4-1/2"	7"	5"	10"
#6	8"	5-1/4"	8"	6"	12"
#7	9"	6-1/4"	10"	7"	14"
#8	10"	7"	11"	8"	16"
#9	12"	8"	15"	11-1/4"	19"
#10	13"	9"	17"	12-3/4"	22"
#11	14"	10"	19"	14-1/4"	2'-0"
#14	2'-2"	20-1/2"	2'-2"	20-1/2"	2'-7"
#18	2'-11"	2'-3"	2'-11"	2'-3"	3'-5"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STD. HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

H - HIGH STRENGTH (ASTM A-615 GRADE 60).

S - STIRRUP.

X - BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

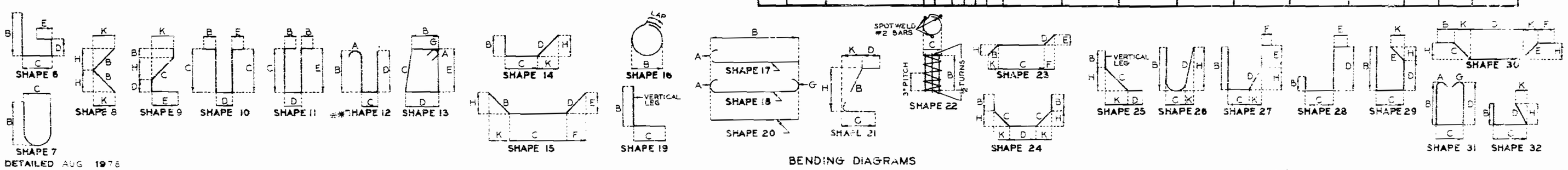
V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO. EA. - NUMBER OF BARS OF EACH LENGTH.

NOMINAL LENGTHS - ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH).

ACTUAL LENGTHS - ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

** ALL HOOKS AND BENDS FOR SHAPE NO. 12 - GRADE 40 (ONLY) ARE BASED ON D = 5d.



BENDING DIAGRAMS

STD. 90.8.5 | REVISED JULY 1978
MAY 1974

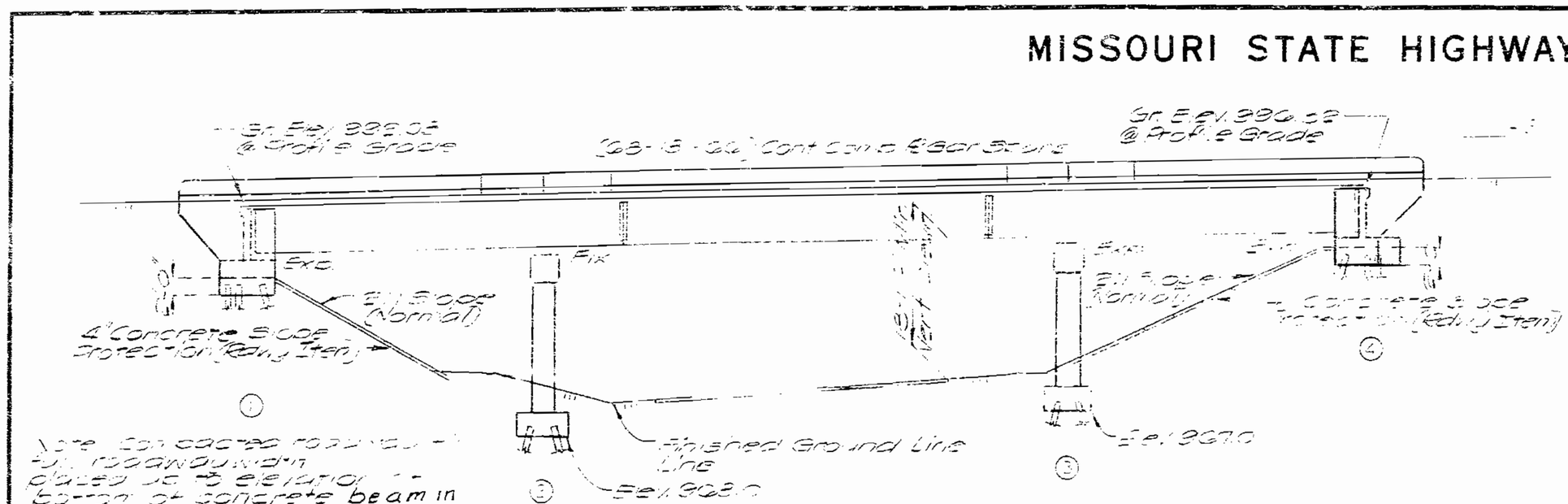
DETAILED AUG 1978
CHECKED AUG 1978

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 10 of 10

JACKSON COUNTY

A-21201



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	[illegible]	

FINAL PLANS

MISSOURI STATE HIGHWAY DEPARTMENT

Note: Contractor required to adjust ... roadway ... placed to elevation of bottom of concrete beam in ... and not less than ... in back of End Bents 1 & 4 before piles were driven at End Bents No. 1 & 4

GENERAL NOTES:

Design Specifications: AASHO 1973

Design Loading: H 20-S16 ... 20,000# ...
35 psf for future wearing surface
Earth 30# Equivalent Fluid Pressure 30#
Fatigue Stress - Case I ...

Design Unit Stresses:
Class B Concrete (Substructure) f'c = 3000 psi
Class B1 Concrete (Superstructure) f'c = 4000 psi
Reinforcing Steel ...

Structural Carbon Steel fs = 20,000 psi
Steel Pile fs = 9000 psi

Structural Steel:
Field connections High Strength bolts ... holes ... except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel ... unless otherwise shown.
Reinforcing steel in top of substructure beams or caps ... spaced to clear anchor bolts ...

Note ⊗ - Indicates location of boring. For boring data see Sheet No. 2.

PILE DATA				
BENT NO.	[illegible]	2	3	[illegible]
Pile Type and Size	HP10x42	HP10x42	HP10x42	HP10x42
Number	13	16	16	13
Approximate Length Ft.	30	12	15	35
Design Bearing Tons	52	53	53	52
Hammer Energy Req'd Ft. Lbs.	12800	12800	12800	12800

Minimum energy requirement of hammer based on plan length and design bearing value of piles.
All pile ... driven to practical refusal.
Piling at Int. Bent No. 2 ... pre-bored to Elev. 953.0 (See Special Provisions).

Note: This drawing is not to scale. Follow dimensions.

B.M. Elev. 994.05 P.K. nail in top of barrier curb @ Lt. wing Bt. 1
Elev. 999.75 P.K. nail in top of barrier curb @ Rt. wing Bt. 4

BRIDGE: NBL I-470 UNDER RAMP 5

STATE ROAD FROM RTE 50 TO VELIA ROAD

... I-470; ROUTE ... INTERCHANGE

PROJECT NO. ID-I06-470-1(36)R **STA.** 9+24.56

JOB NO. 4-I470-4 **RTE** I-470

COUNTY

DATE ... 1973

STD. ...
STD. 706.35

DESIGNED Apr. 1972
DETAILED June 1973
CHECKED Aug. 1973

Sheet No. ... of ...

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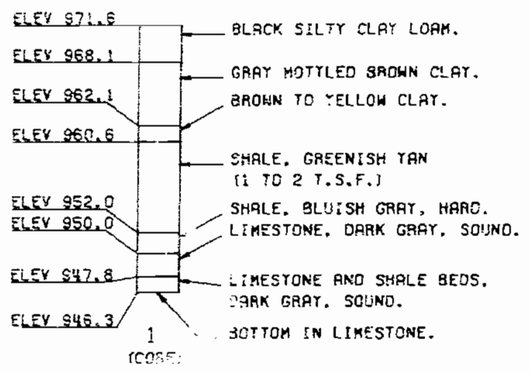
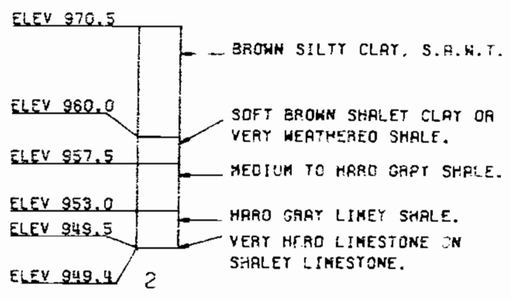
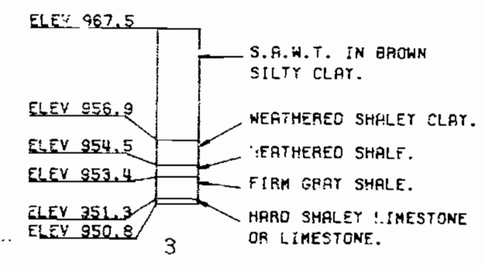
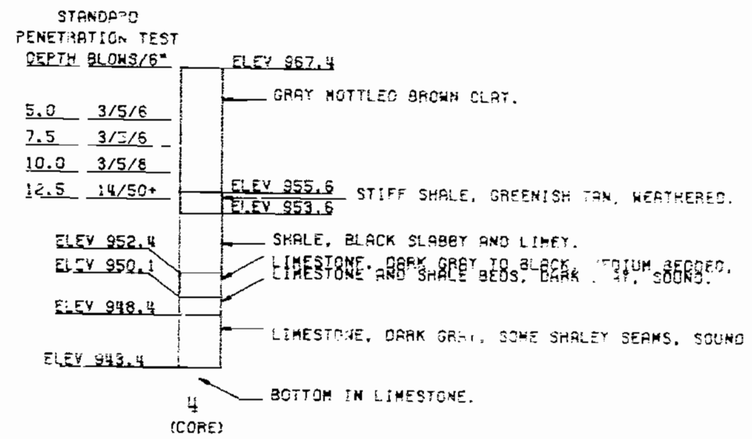
MISSOURI STATE HIGHWAY DEPARTMENT

FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	57	



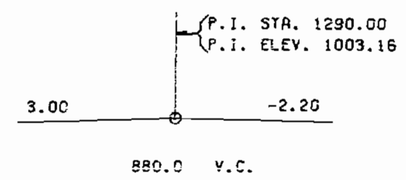




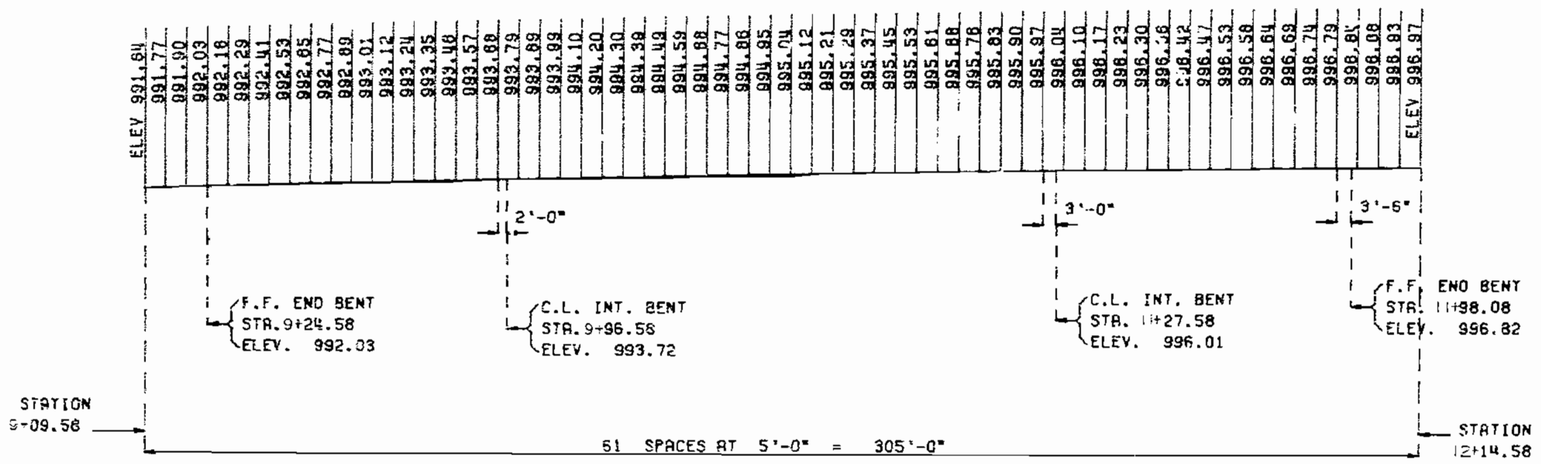


BORING DATA

Note: For location of Borings see Sheet No 1.



539



PROFILE GRADE ELEVATIONS

ESTIMATED QUANTITIES				
ITEM		SUBSTR	SUPER	TOTAL
Class I Excavation	Cu. Yd.	640		640
Structural Steel Pile (10")	Lin. Ft.	1281		1281
Class "B" Concrete	Cu. Yd.	343.6		343.6
Class B-1 Concrete	Cu. Yd.		389.9	389.9
Elastomeric Exp. Jt. Seal (4.0 in.)	Lin. Ft.		79	79
Reinforcing Steel (Grade 60)	Lbs.	46050	55260	101310
Reinforcing Steel (Epoxy)	Lbs.		47080	47080
Fabricated Structural Carbon Steel	Lbs.		308270	308270
Painting (System B) Green	Tons		153.6	153.6
Slab Drains	Each		24	24
Pre-Bore for Piling	Lin. Ft.	160		160

Note: All concrete and reinforcement in safety corner curbs is included with superstructure quantities.

DETAILED JULY 1978
CHECKED Aug. 1978

Note: This drawing is not to scale. follow dimensions.

Sheet No. 24 of 30 Sheets. JACKSON COUNTY A-2120