

Fed. Proj. No.

DESIGN DATA
 1969 A.A.S.H.O. DESIGN SPECIFICATIONS
 DESIGN LOADING HS20
 MAXIMUM ALLOWABLE DESIGN STRESSES
 $f_c = 1,600$ p.s.i. $n = 8$
 $f_s = 24,000$ p.s.i. REINFORCEMENT
 $f_s = 20,000$ p.s.i. (STRUCT. STEEL M.H.D.3306)

DECK AREA: 19,703 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
1	GENERAL PLAN AND ELEVATION
2	BRIDGE LAYOUT
3	EAST ABUTMENT
4	EAST ABUTMENT REINFORCING
5	WEST ABUTMENT
6	WEST ABUTMENT REINFORCING
7	ABUTMENT DETAILS
8	PIER 1
9	PIER 2
10	PIER DETAILS
11	SUPERSTRUCTURE FRAMING PLAN
12	DECK PLAN
13	54" PRESTRESSED CONCRETE GIRDER TYPE 54-1
14	54" PRESTRESSED CONCRETE GIRDER TYPE 54-2
15	54" PRESTRESSED CONCRETE GIRDER TYPE 54-3
16	CONCRETE RAILING (TYPE G)
17	CLASS B SLOPE PAVING UNDER BRIDGES
18-20	DETAILS
21	BRIDGE SURVEY
22	BRIDGE SURVEY PLAN AND PROFILE

CONSTRUCTION NOTES

THE "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION" DATED JANUARY 1972 SHALL GOVERN.

REINFORCEMENT BARS OTHER THAN SPIRAL ROD STOCK SHALL BE DEFORMED BILLET STEEL BARS CONFORMING TO ASTM A 615 GRADE 60 CONCRETE JOINT SEALER OTHER THAN FORMED TYPE SHALL COMPLY WITH MHD 5725.

BRIDGE SEAT REINFORCEMENT SHALL BE FULLY PLACED TO AVOID INTERFERENCE WITH DRILLING HOLES FOR ANCHOR BOLTS. THE SUPERSTRUCTURE GIRDERS SHALL BE ERECTED IN FINAL POSITION PRIOR TO DRILLING HOLES FOR AND PLACING ANCHOR BOLTS.

THE FIRST DIGIT OR THE FIRST TWO DIGITS OF EACH BAR MARK INDICATE THE BAR SIZE. RESTORE SIDE DITCHES AFTER PLACEMENT OF SLOPE PAVING TO PROVIDE DRAINAGE AS DIRECTED BY THE ENGINEER. RESTORATION COSTS SHALL BE INCLUDED IN UNIT PRICE FOR STRUCTURE EXCAVATION.

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

SIGNED *Richard J. Johnson*
 DATE 10-29-73 REG NO. 8476

TRUNK HIGHWAY NO. STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS

Bridge No. 02521

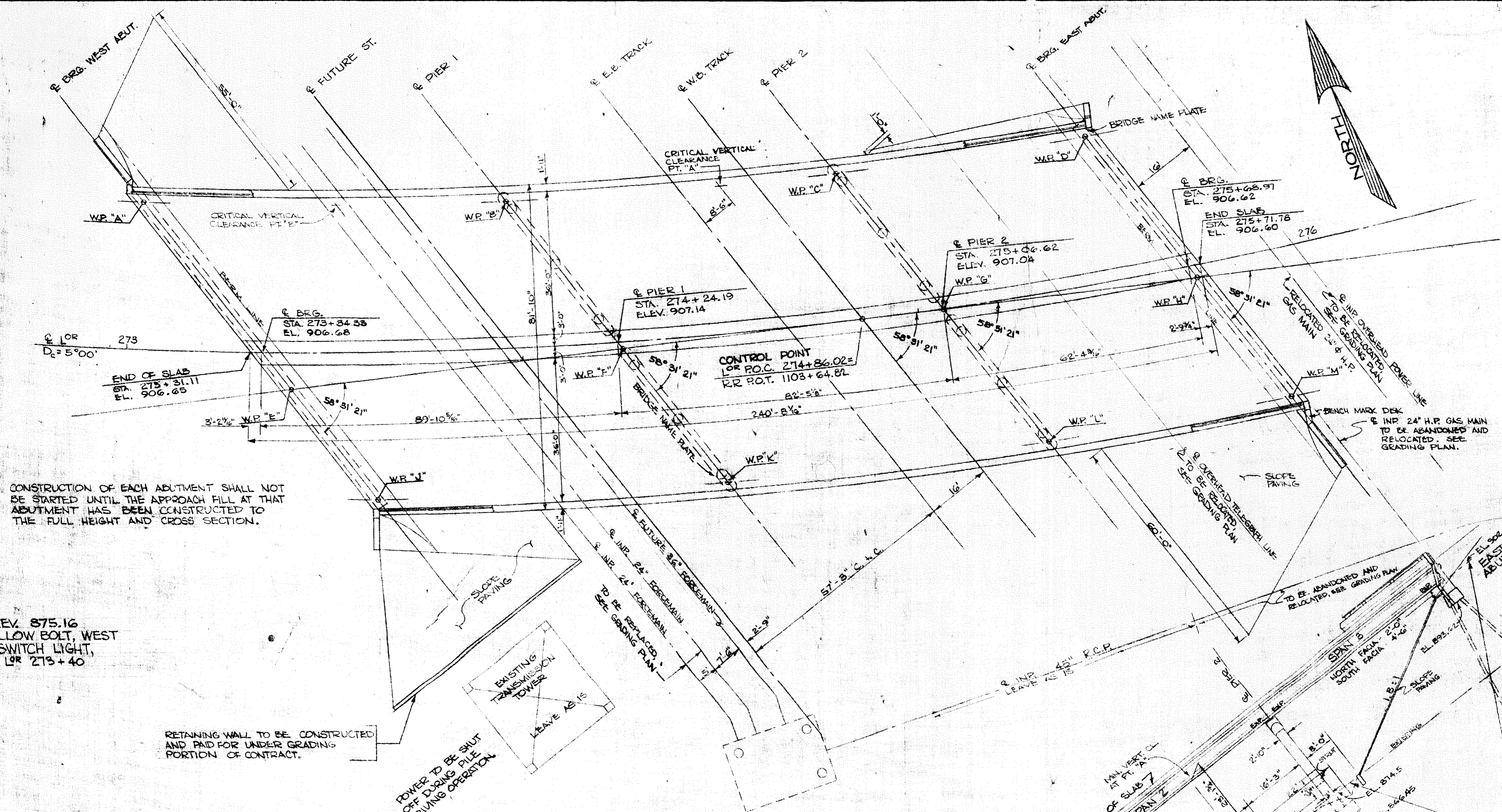
COON RAPIDS BOULEVARD BY-PASS OVER BURLINGTON NORTHERN R.R. IN COON RAPIDS 90°-82'-62" PRESTRESSED CONC. GIRDER SPANS 72' ROADWAY 31°28'39" SKEW 1'-6" MEDIAN

GENERAL PLAN AND ELEVATION

SEC. 26 T. 31 N. R. 24 W. CITY OF COON RAPIDS ANOKA COUNTY

APPROVED: *R. J. Johnson*
 BRIDGE DESIGN & PLANNING ENGINEER

DES. *B. Jahn* DR. *SMALL*
 CHK. *W.S.* CHK. *B.W.* 02521



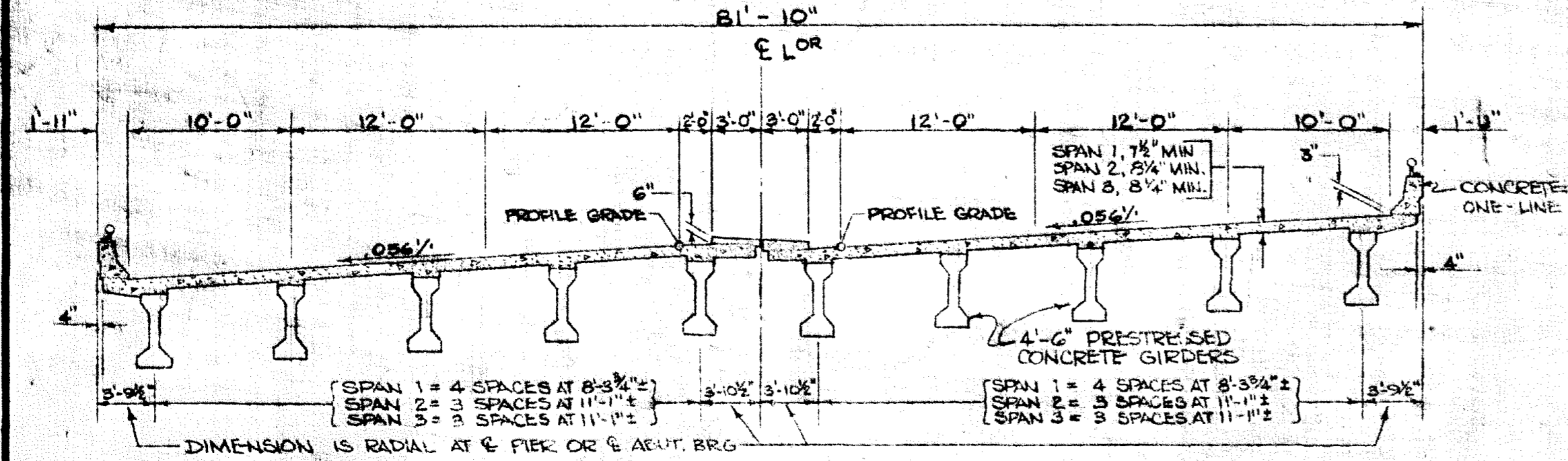
CONSTRUCTION OF EACH ABUTMENT SHALL NOT BE STARTED UNTIL THE APPROACH FILL AT THAT ABUTMENT HAS BEEN CONSTRUCTED TO THE FULL HEIGHT AND CROSS SECTION.

B.M. ELEV. 875.16
 TOP YELLOW BOLT, WEST
 EDGE, SWITCH LIGHT,
 180' LT. LOR 273+40

RETAINING WALL TO BE CONSTRUCTED AND PAID FOR UNDER GRADING PORTION OF CONTRACT.

POWER TO BE SHUT
 OFF DURING PILE
 DRIVING OPERATION

GENERAL PLAN
 SCALE: 1"=15'

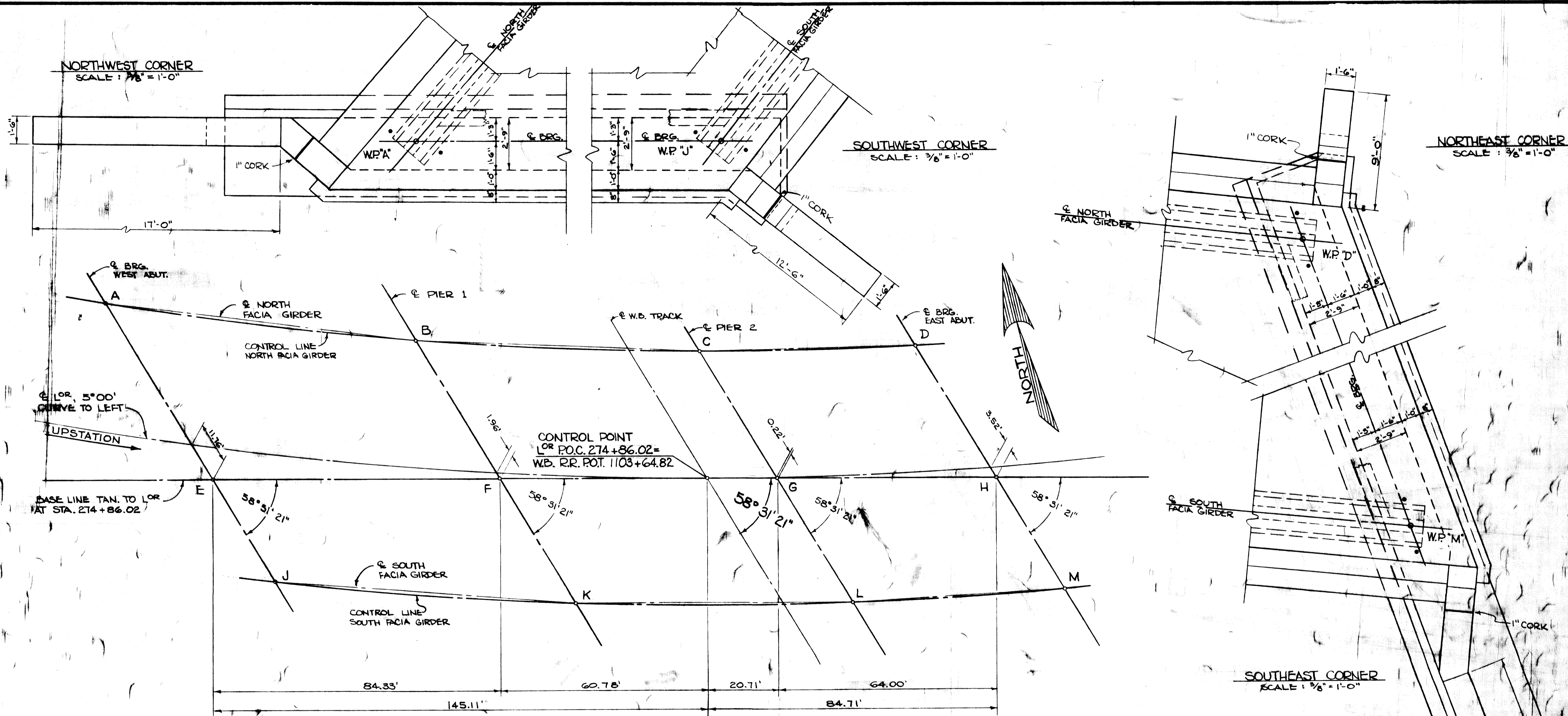


TYPICAL SECTION
 SCALE: 1"=8'
 LOOKING EAST

NOTE: GIRDERS ARE EQUALLY SPACED ALONG PIER OR ABUT. BRG.

SCHEDULE OF QUANTITIES FOR ENTIRE BRIDGE

ITEM NO.	2401.501	2401.501 *	2401.501	2401.501	2401.521	2401.541	2401.543	401.601	2402.521	2402.583	2402.593	2402.593	2402.594	2402.594	2402.594	2402.594	2405.501	2405.501	2405.501	2452.510	2452.511
ITEM	CONCRETE, MIX NO. 1A43	CONCRETE, MIX NO. 3Y43	CONCRETE, MIX NO. 3Y46A (SPECIAL)	CONCRETE, MIX NO. 3Y43A	STRUCTURE EXCAVATION, CLASS E	REINFORCE - MENT BARS	SPIRAL REINFORCE -	SLOPE PAVING	STRUCTURAL STEEL, MHD3306	ORNAMENTAL METAL RAILING	FIXED BEARING ASSEMBLIES, TYPE 1	FIXED BEARING ASSEMBLIES, TYPE 2	EXP. BEARING ASSEMBLIES, TYPE 1	EXP. BEARING ASSEMBLIES, TYPE 3	EXP. BEARING ASSEMBLIES, TYPE 4	EXP. BEARING ASSEMBLIES, TYPE 5	PRESTRESSED CONCRETE GIRDERS, TYPE 54-92	PRESTRESSED CONCRETE GIRDERS, TYPE 54-83	PRESTRESSED CONCRETE GIRDERS, TYPE 54-64	STEEL H-PILING DRIVEN	STEEL H-PILING DELIVERED
UNIT	CU. YD.	CU. YD.	CU. YD.	CU. YD.	CU. YD.	POUND	POUND	SQ. YD.	POUND	LIN. FT.	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	LIN. FT.	LIN. FT.
QUANTITY	221 (P)	415 (P)	80 (P)	635 (P)	975 (P)	249400 (P)	2150 (P)	1530 (P)	1280	475	6	2	26	8	8	2	10	8	8	9760	9840

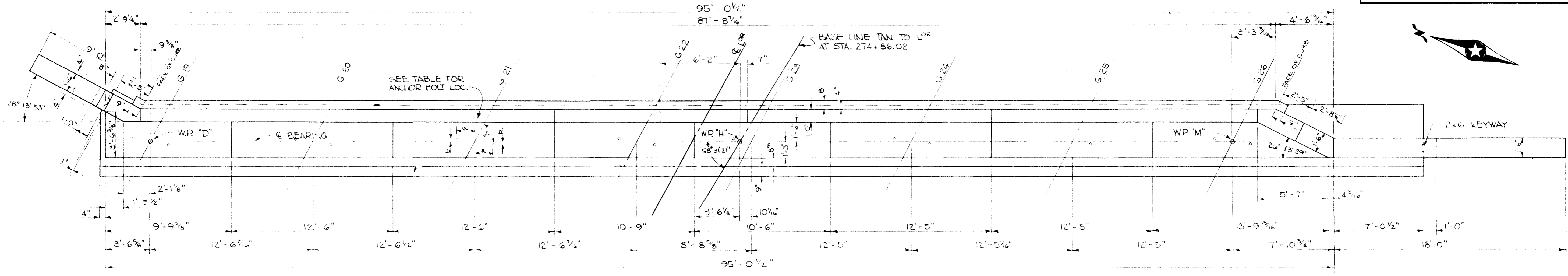
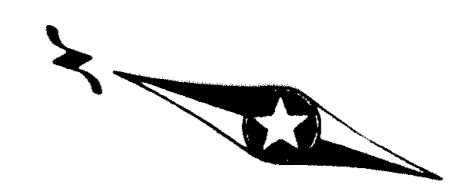


LAYOUT SHOWING WORKING POINTS

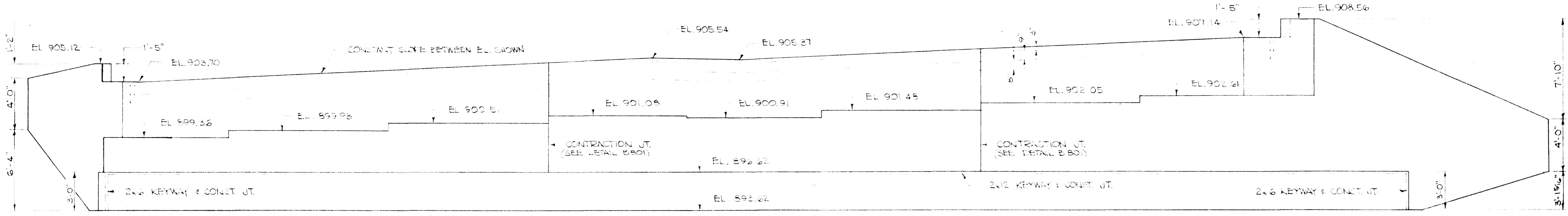
SCALE: 1" = 15'

POINT	STATION	DIMENSIONS BETWEEN WORKING POINTS																ELEVATIONS			POINT					
		A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U		V	W	TOP OF SLAB	TOP OF SLAB TO RR. SEAT	BRIDGE SEAT
A	273+02.84																						904.57	5.62	898.95	A
B	273+97.54	91.60																					905.27	5.62	899.65	B
C	274+83.93		83.58																				905.32	5.62	899.70	C
D	275+49.05			63.00																			904.99	5.63	899.36	D
E	275+41.69	60.11	72.00																							E
F	274+25.30	126.56	47.41	69.50	84.33																					F
G	275+06.73		113.68	43.54	55.91	81.49																				G
H	275+70.58			94.35	45.50		64.00																			H
J	275+63.23		81.79	141.61	35.57	72.41																	908.69	5.62	903.07	J
K	274+48.79	163.59		82.14	124.69	112.74	82.79	69.50															908.97	5.63	903.34	K
L	275+27.65	236.50	149.69		77.21		109.92	42.61	55.35														908.73	5.63	903.10	L
M	275+87.48		203.64	127.34				89.96	38.09														908.24	5.63	902.61	M
N																										N
P																										P
Q																										Q
R																										R
S																										S
T																										T
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V																										V
W																										W

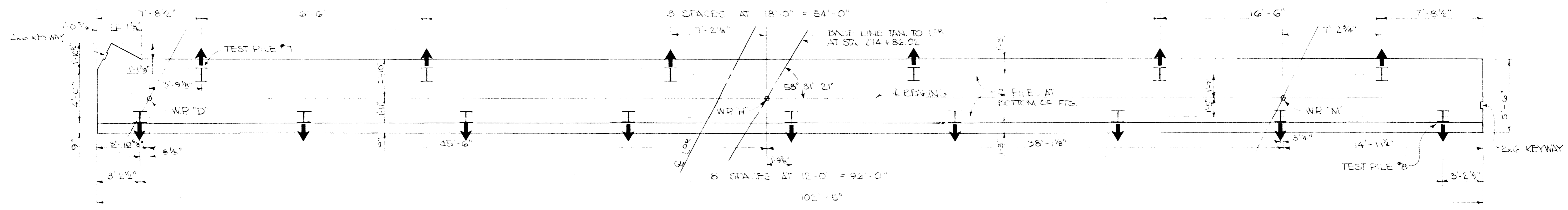
AS BUILT
 10-16-73
 B. J. L.



PLAN
SCALE: 1/4" = 1'-0"



ELEVATION
SCALE: 3/4" = 1'-0"



FOOTING PLAN
SCALE: 1/4" = 1'-0"

ANCHOR BOLT LOCATIONS			
GIRDER	α	a	b
G 19	60° 02' 46"	1'-4 1/2"	3 3/16"
G 20	60° 21' 48"	1'-4 1/2"	3 3/16"
G 21	60° 40' 57"	1'-4 1/2"	3 3/4"
G 22	61° 00' 14"	1'-4 1/2"	3 3/16"
G 23	61° 13' 04"	1'-4 1/2"	3 1/8"
G 24	61° 30' 36"	1'-4 1/2"	3"
G 25	61° 48' 15"	1'-4 1/2"	2 3/16"
G 26	62° 05' 59"	1'-4 1/2"	2 1/8"

COMPUTED PILE LOADS - TONS/PILE	
D.L. + EARTH PRESSURE	61.4
LIVE LOAD	8.1
TOTAL	69.5

PILE NOTES

- 2 STEEL TEST PILES 145 FT. LONG
- 13 STEEL PILES EST. LENGTH 140 FT.
- 15 STEEL PILES REQ'D FOR EAST ABUTMENT

ALL PILES TO BE 12BP53.
ESTIMATED PENETRATION 1 FT. LESS THAN LENGTH GIVEN.
PILES MARKED THUS H → TO BE BATTERED 3" PER FT. IN DIRECTION SHOWN.
PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
FOR SPLICES AND TIP REINFORCEMENT SEE DETAIL B 202.

AS BUILT
10-14-73
B. Jahn

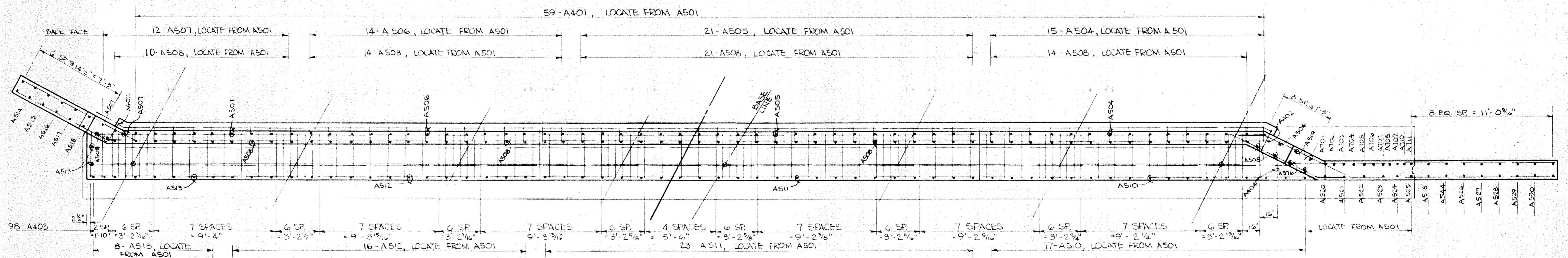
STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS

BRIDGE NO. 02521

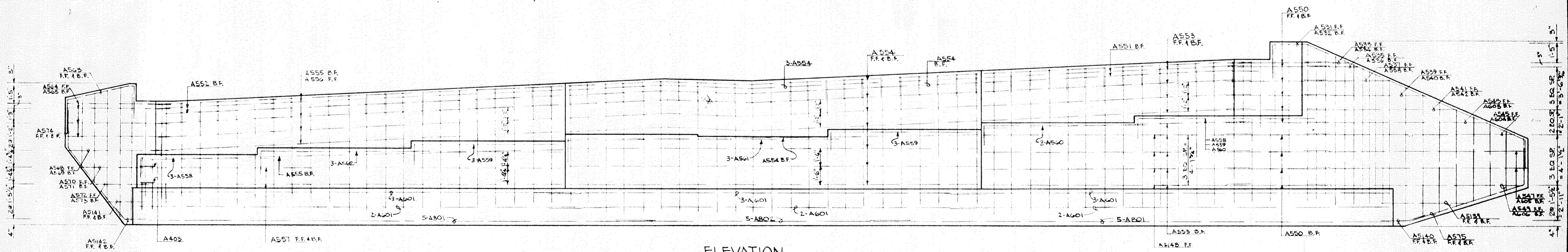
EAST ABUTMENT

APPROVED: 12-21-71

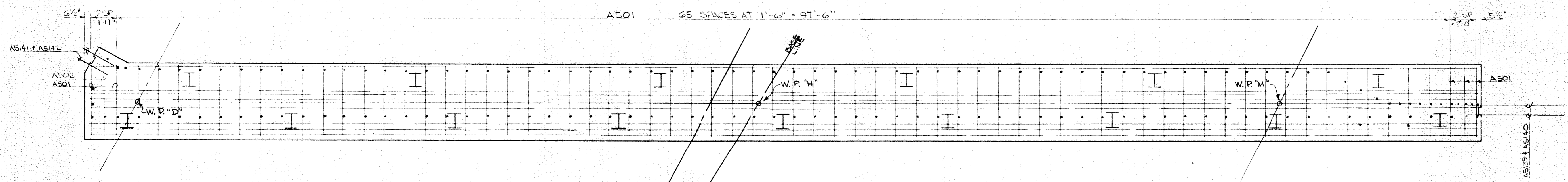
DES. B.J.	DR. M.S.	02521
CHK. D.S.	CHK. B.J.	



PLAN
SCALE: 1/4" = 1'-0"



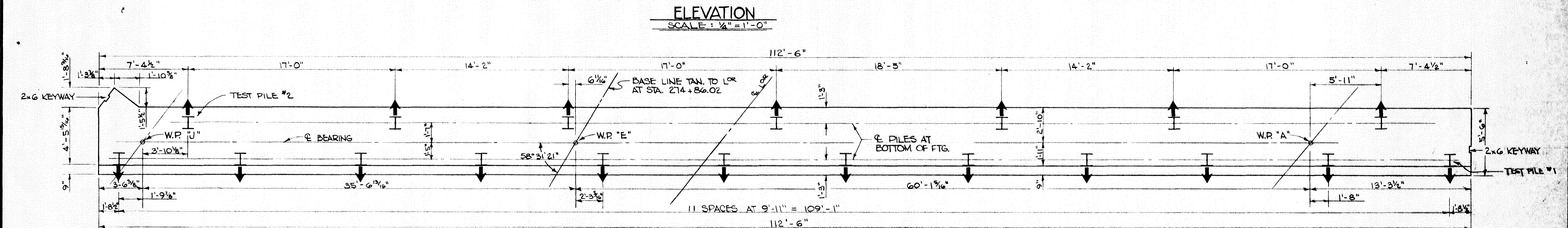
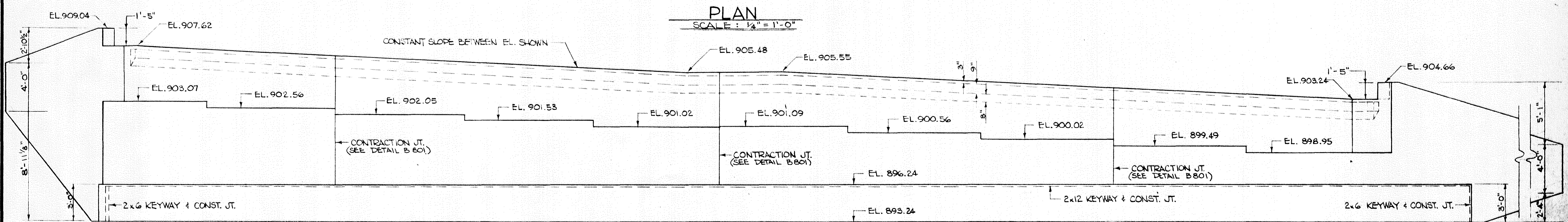
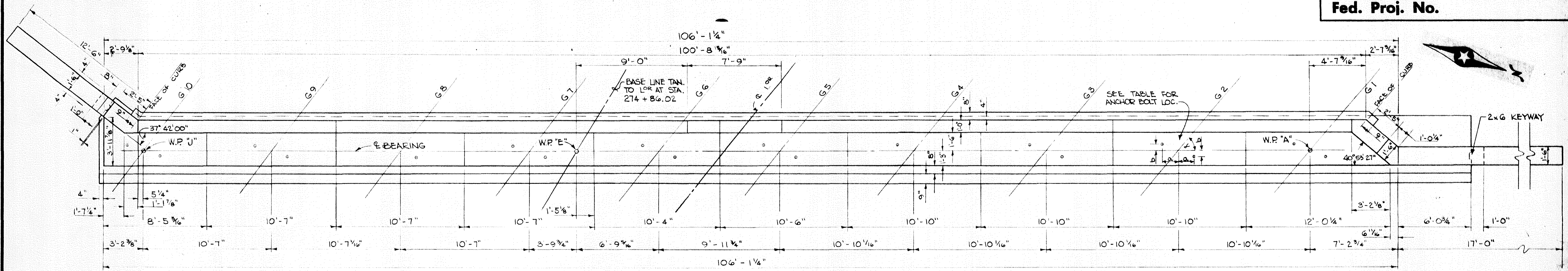
ELEVATION
SCALE: 1/4" = 1'-0"



FOOTING PLAN
SCALE: 1/4" = 1'-0"

AS BUILT
10-16-73
B. Jah

STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS		
BRIDGE NO. <u>02521</u>		
EAST ABUTMENT REINFORCING		
APPROVED: <u>12-21-71</u>		
DES. BJ	DR. MS	02521
CHK. DG	CHK. BJ	



ANCHOR BOLT LOCATIONS			
GIRDER	c	a	b
G 1	51° 43' 51"	1'-3 3/8"	5 1/16"
G 2	52° 03' 13"	1'-3 3/8"	5 1/16"
G 3	52° 22' 45"	1'-3 3/8"	5 1/16"
G 4	52° 42' 27"	1'-3 3/8"	5 1/16"
G 5	53° 02' 19"	1'-3 3/8"	5 1/16"
G 6	53° 19' 46"	1'-3 3/8"	5 1/16"
G 7	53° 37' 27"	1'-4"	5 1/16"
G 8	53° 55' 16"	1'-4"	5 1/16"
G 9	54° 13' 13"	1'-4 1/8"	5 1/16"
G 10	54° 31' 19"	1'-4 1/8"	5"

COMPUTED PILE LOADS - TONS/PILE	
D.L. + EARTH PRESSURE	62.1
LIVE LOAD	6.4
TOTAL	68.5

PILE NOTES

2 STEEL TEST PILES 145 FT. LONG
 17 STEEL PILES EST. LENGTH 140 FT.
 19 STEEL PILES REQ'D FOR WEST ABUTMENT

ALL PILES TO BE 12BP53.
 ESTIMATED PENETRATION 1 FT. LESS THAN LENGTH GIVEN.
 PILES MARKED THUS \rightarrow TO BE BATTERED 3' PER FT.
 IN DIRECTION SHOWN.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR SPLICES AND TIP REINFORCEMENT SEE DETAIL B 202.

AS BUILT
 10-16-73
 B. J. J.

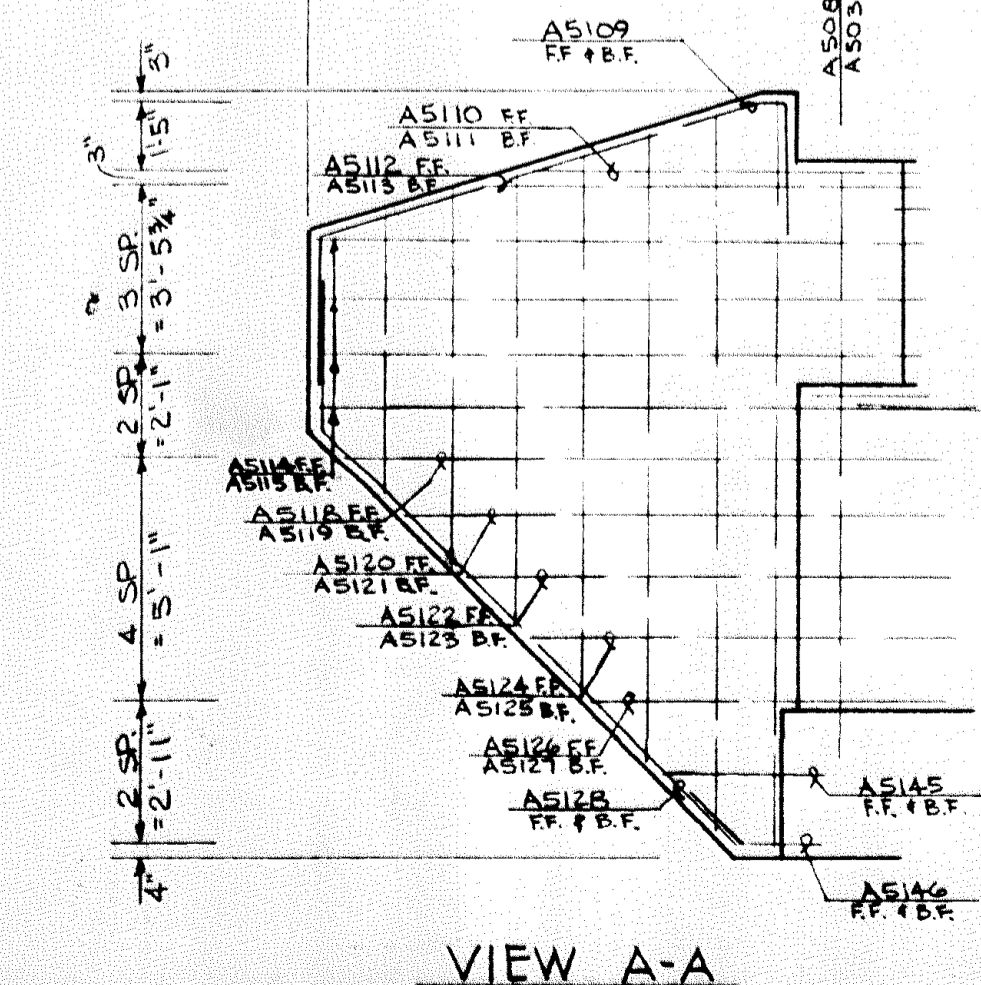
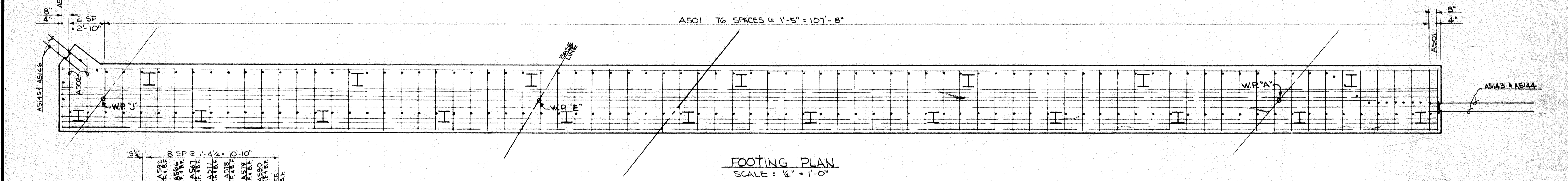
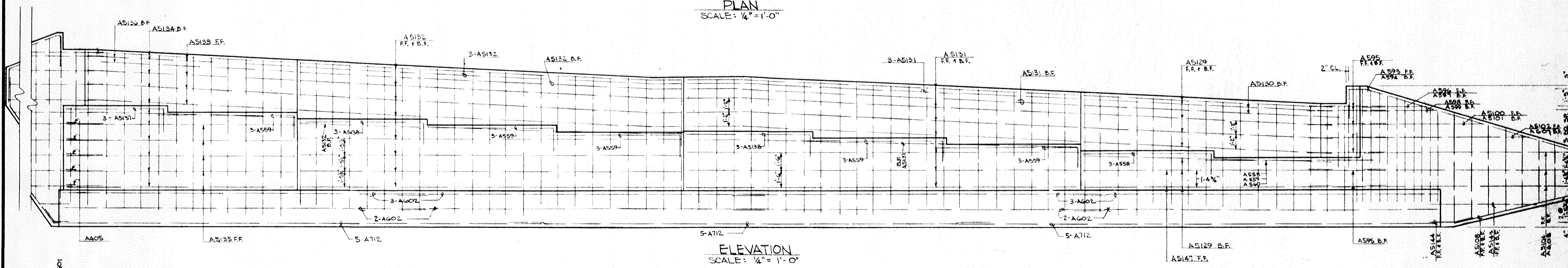
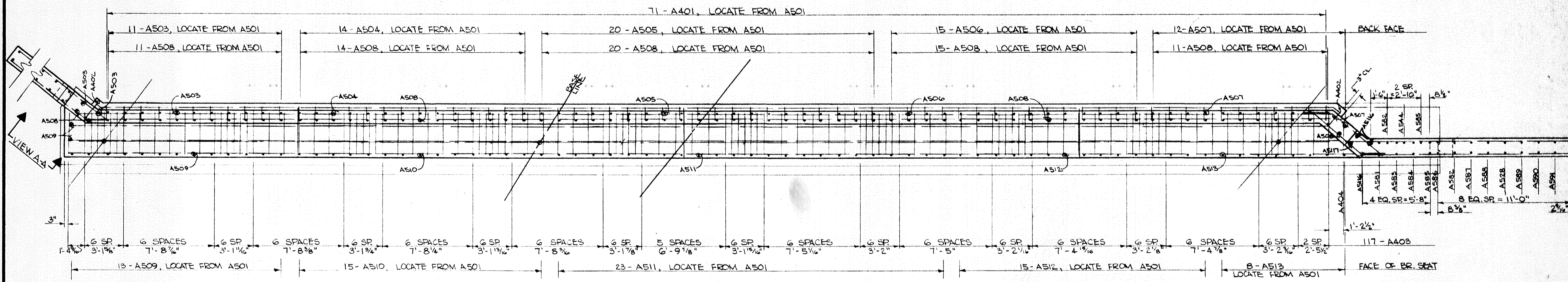
STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

BRIDGE NO. 02521

WEST ABUTMENT

APPROVED: 12-31-71

DES. BJ	DR. MD	02521
CHK. DG	CHK. BJ	

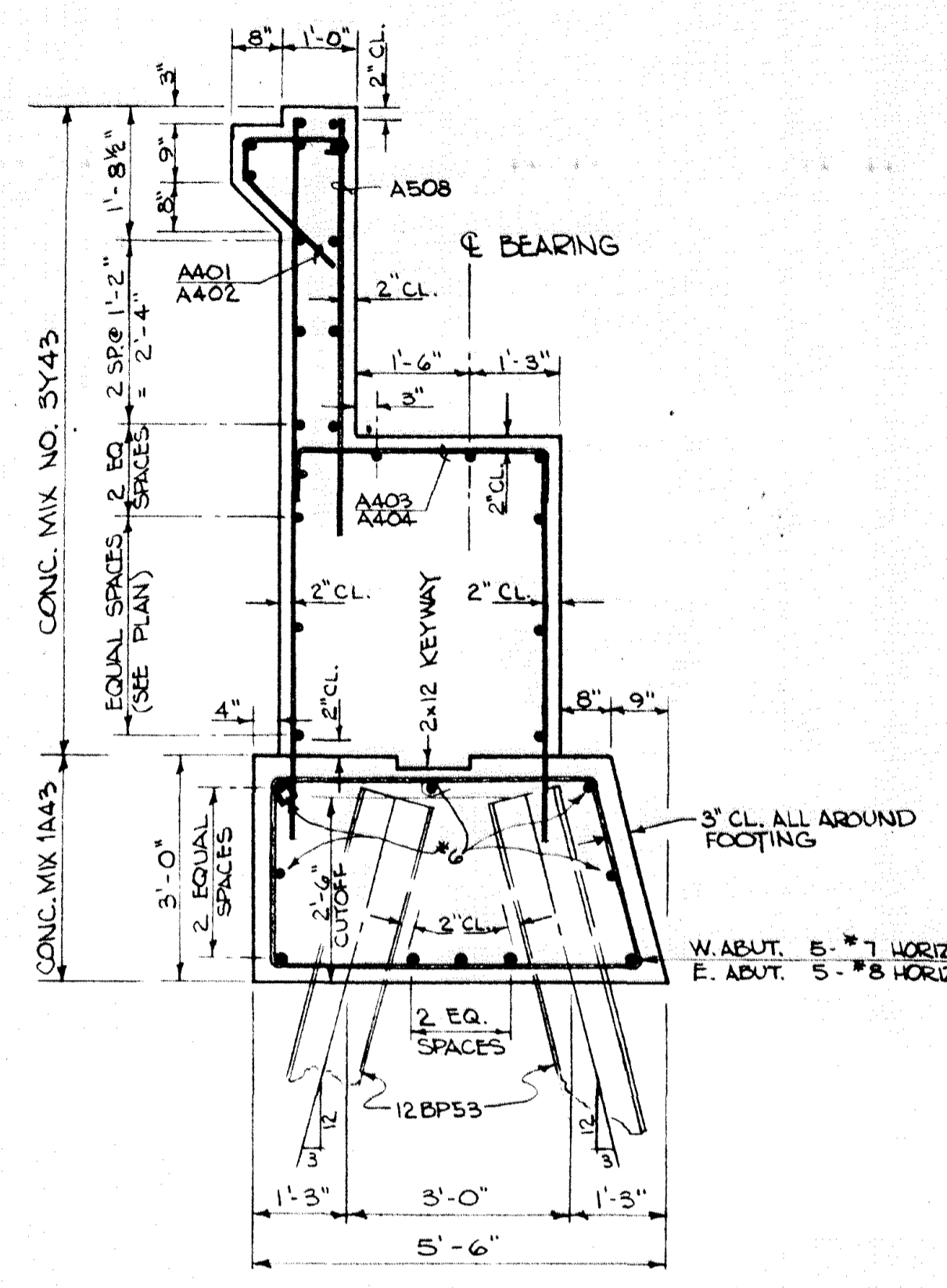


AS BUILT
10-16-73
B. Jahn

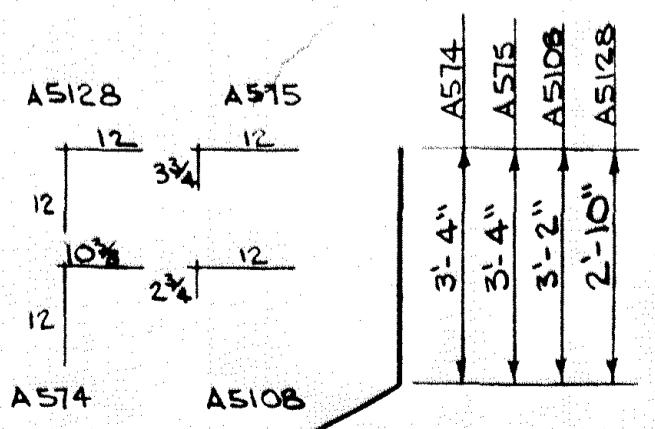
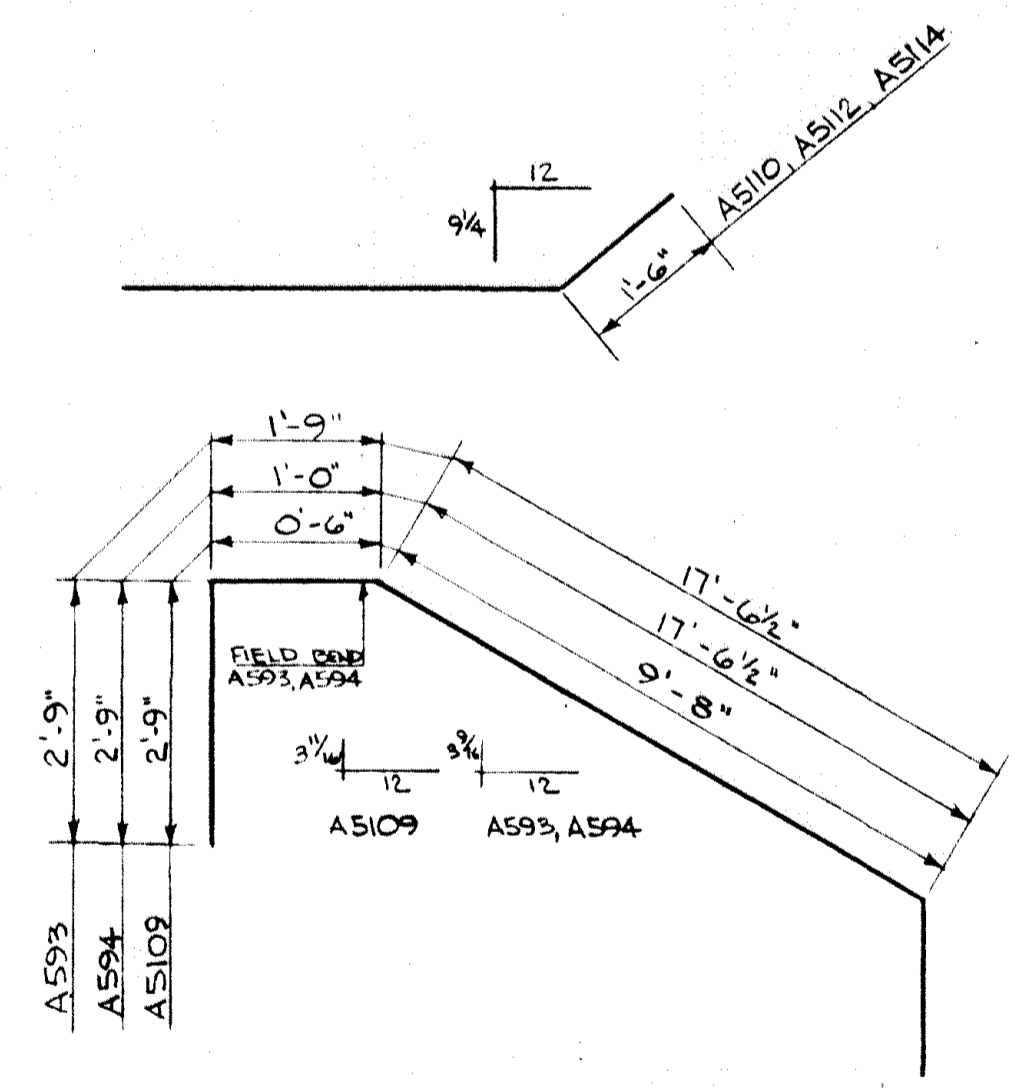
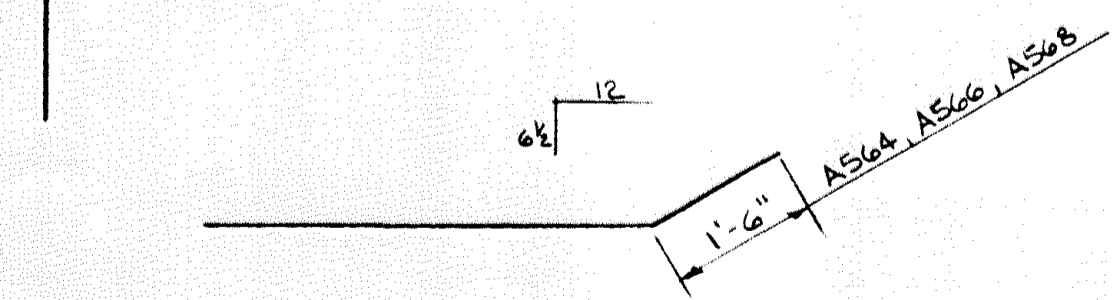
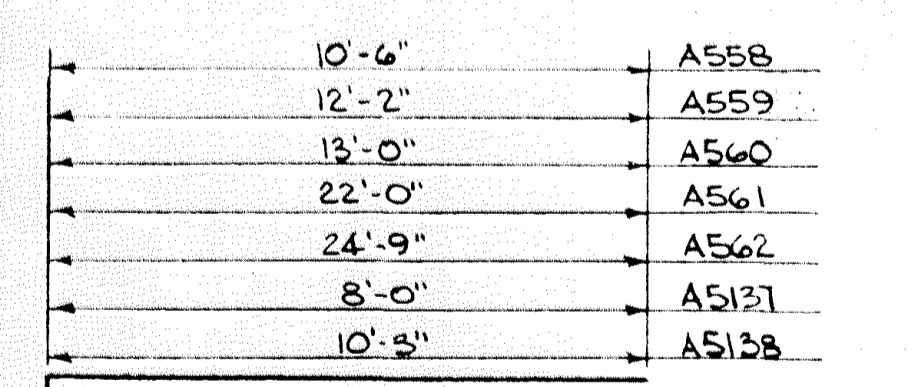
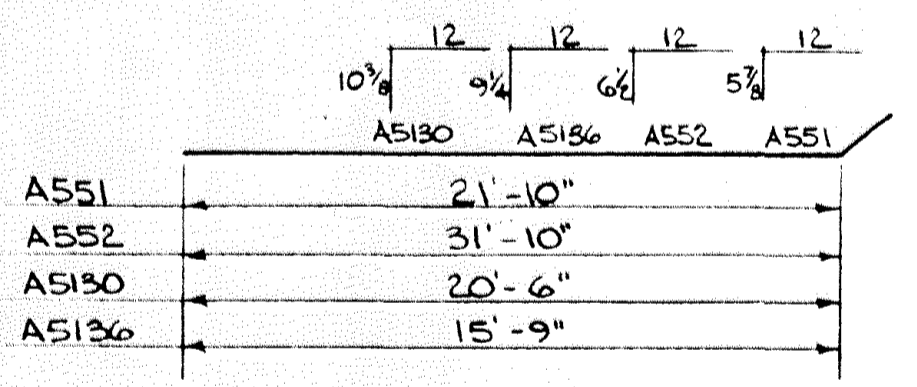
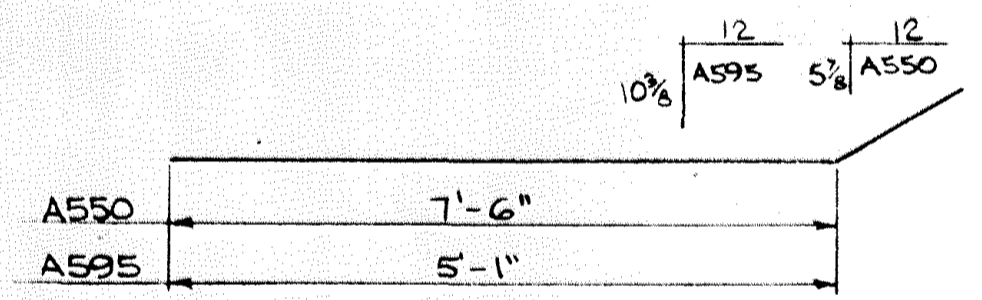
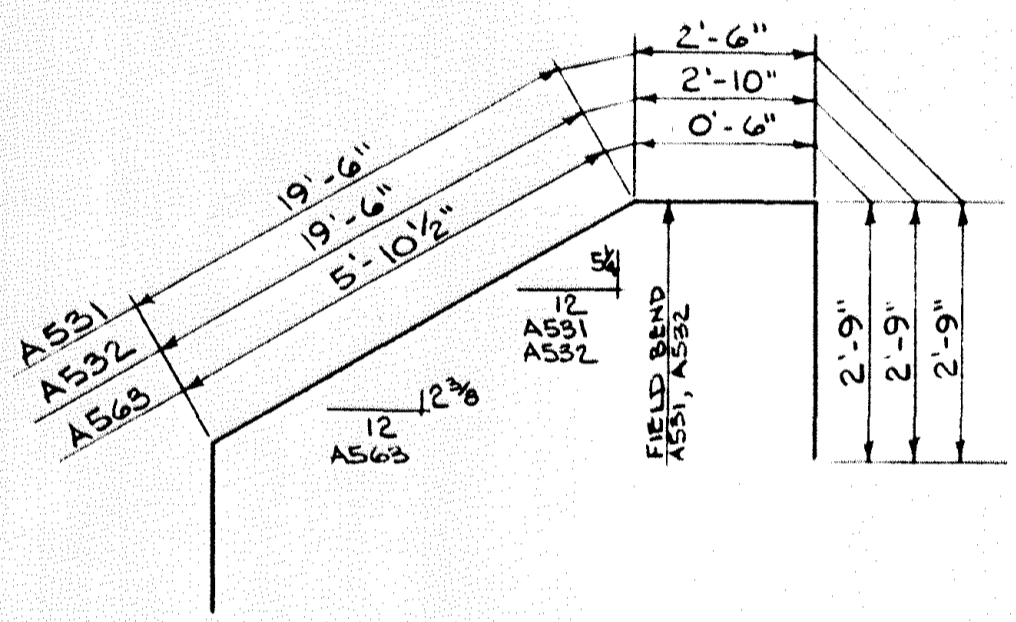
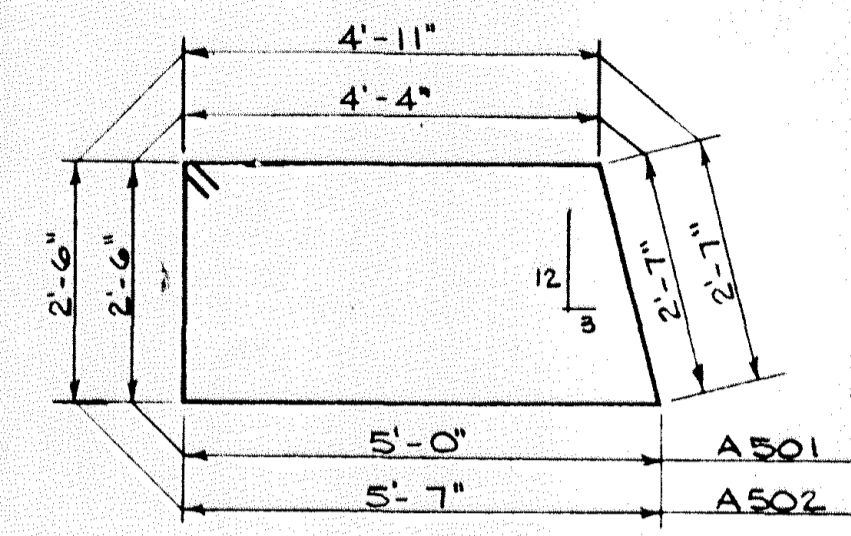
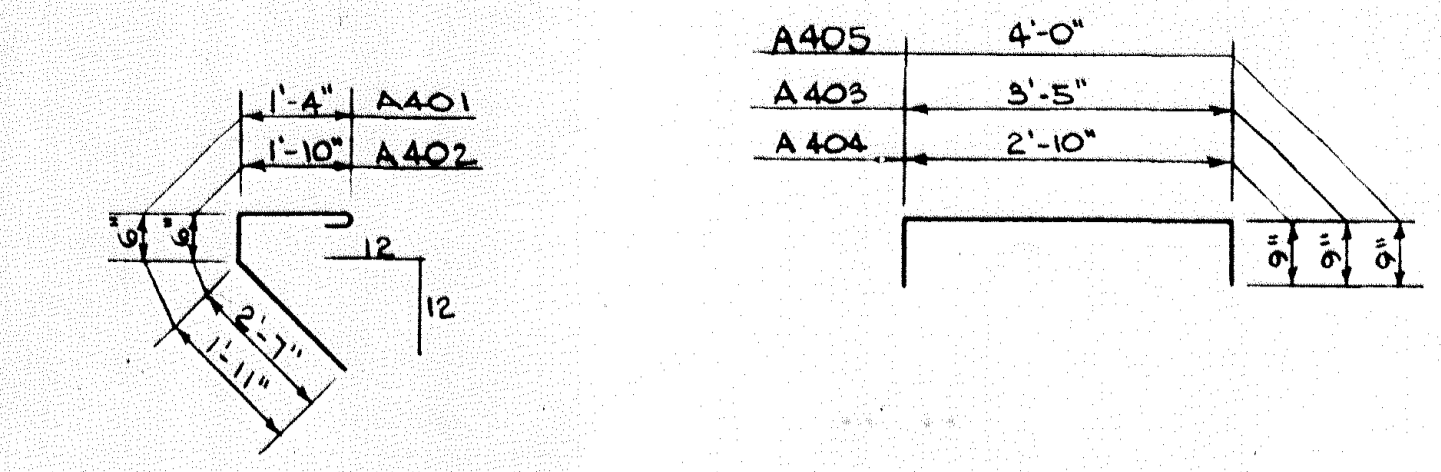
STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS		
BRIDGE NO. 02521		
WEST ABUTMENT REINFORCING		
APPROVED: 12-21-71		
DES. BJ	DR. MS	02521
CHK. DG	CHK. BJ	

BILL OF REINFORCEMENT FOR 2 ABUTMENTS

BAR	EAST NO.	WEST NO.	LENGTH	SHAPE	LOCATION	BAR	EAST NO.	WEST NO.	LENGTH	SHAPE	LOCATION	BAR	EAST NO.	WEST NO.	LENGTH	SHAPE	LOCATION
A401	59	71	4'-3"	U	PAV. BRACKET	A557	4		34'-7"	U	BR. SEAT HORIZ.	A5119		1	12'-9"	U	W. W. HORIZ.
A402	2	2	5'-5"	U	"	A558	4	4	12'-0"	U	"	A5120		1	10'-9"	U	"
A403	100	117	4'-11"	U	BR. SEAT TIE	A559	7	16	13'-8"	U	"	A5121		1	11'-6"	U	"
A404	1	1	4'-4"	U	"	A560	4	1	14'-6"	U	"	A5122		1	9'-4"	U	"
A405		5	5'-6"	U	"	A561	3		23'-6"	U	"	A5123		1	10'-3"	U	"
					END TEMP.	A562	3		26'-3"	U	"	A5124		1	8'-1"	U	"
A501	69	79	15'-4"	U	FOOTING TIE	A563	2		10'-7"	U	W. W. HORIZ.	A5125		1	9'-0"	U	"
A502	1	2	16'-6"	U	"	A564	4		9'-5"	U	"	A5126		1	6'-10"	U	"
A503		13	12'-6"	U	PARAPET VERT.	A565	4		10'-1"	U	"	A5127		1	7'-8"	U	"
A504	16	14	11'-6"	U	"	A566		2	7'-5"	U	W. W. VERT.	A5128		2	15'-8"	U	"
A505	21	20	10'-6"	U	"	A567		2	9'-3"	U	"	A5129		13	20'-4"	U	PRPT. & SEAT HORIZ.
A506	14	15	9'-6"	U	"	A568	1		9'-0"	U	W. W. HORIZ.	A5130		2	21'-2"	U	PAV. BRACKET HORIZ.
A507	12	13	8'-6"	U	"	A569	1		9'-8"	U	"	A5131		19	32'-0"	U	PRPT. SEAT & BRKT.
A508	63	74	5'-7"	U	PARAPET VERT.	A570	1		6'-6"	U	"	A5132		21	31'-4"	U	"
A509		15	7'-10"	U	BR. SEAT VERT.	A571	1		8'-6"	U	"	A5133		5	17'-2"	U	PARAPET HORIZ.
A510	17	15	6'-10"	U	"	A572	1		5'-4"	U	"	A5134		11	13'-0"	U	"
A511	23	23	5'-10"	U	"	A573	1		7'-4"	U	"	A5135		5	18'-9"	U	BR. SEAT HORIZ.
A512	16	15	4'-10"	U	"	A574	2		11'-11"	U	"	A5136		2	16'-5"	U	PAV. BRACKET HORIZ.
A513	10	8	3'-10"	U	"	A575	2		13'-4"	U	"	A5137		3	10'-3"	U	BR. SEAT HORIZ.
A514	2		5'-5"	U	W. W. VERT.	A576	2		6'-9"	U	W. W. VERT.	A5138		6	12'-6"	U	"
A515	2		7'-11"	U	"	A577	2	2	11'-11"	U	"	A5139		2	7'-0"	U	FOOTING DONEL
A516	2		8'-1"	U	"	A578	2	2	12'-8"	U	"	A5140		2	4'-2"	U	"
A517	2		10'-4"	U	"	A579	2	2	14'-6"	U	"	A5141		2	3'-3"	U	"
A518	4		11'-1"	U	"	A580	2	2	15'-4"	U	"	A5142		2	3'-11"	U	"
A519	2		12'-9"	U	"	A581	2	2	9'-0"	U	"	A5143		2	7'-4"	U	"
A520	1		12'-8"	U	"	A582	3	3	8'-9"	U	"	A5144		2	4'-3"	U	"
A521	1		12'-0"	U	"	A583	2	2	8'-7"	U	"	A5145		2	3'-7"	U	"
A522	1		11'-4"	U	"	A584	2	2	8'-2"	U	"	A5146		2	3'-11"	U	"
A523	1		10'-9"	U	"	A585	3	3	8'-0"	U	"	A5147		2	25'-4"	U	BR. SEAT HORIZ.
A524	1		10'-3"	U	"	A586	2	2	7'-9"	U	"	A5148		4	27'-6"	U	"
A525	2		9'-11"	U	"	A587	2	2	8'-1"	U	"						
A526	2		8'-11"	U	"	A588	2	2	7'-2"	U	"						
A527	2		7'-11"	U	"	A589	2	2	6'-0"	U	"						
A528	2		6'-10"	U	"	A590	2	2	5'-2"	U	"						
A529	2		5'-10"	U	"	A591	2	2	4'-5"	U	"						
A530	2		4'-10"	U	"	A592	2	2	5'-8"	U	"						
A531	1		26'-8"	U	W. W. HORIZ.	A593	1		24'-1"	U	W. W. HORIZ.	A601		15	35'-0"	U	FOOTING HORIZ.
A532	1		27'-0"	U	"	A594	1		23'-4"	U	"	A602		20	29'-9"	U	"
A533	1		3'-5"	U	"	A595	12		6'-7"	U	"	A603		1	17'-0"	U	W. W. HORIZ.
A534	1		5'-9"	U	"	A596	1		5'-6"	U	"	A604		1	19'-6"	U	"
A535	1		4'-0"	U	"	A597	1		6'-10"	U	"	A605		2	20'-6"	U	"
A536	1		6'-4"	U	"	A598	1		6'-3"	U	"	A606		1	20'-4"	U	"
A537	1		6'-9"	U	"	A599	1		7'-7"	U	"	A607		1	15'-6"	U	"
A538	1		9'-11"	U	"	A5100	1		10'-5"	U	"	A608		3	18'-7"	U	"
A539	1		9'-6"	U	"	A5101	1		11'-9"	U	"						
A540	1		11'-10"	U	"	A5102	1		14'-2"	U	"						
A541	1		12'-3"	U	"	A5103	2		6'-9"	U	W. W. VERT.	A701		1	12'-11"	U	W. W. VERT.
A542	1		14'-7"	U	"	A5104	3		17'-3"	U	W. W. HORIZ.	A702		1	12'-7"	U	"
A543	1		14'-8"	U	"							A703		1	12'-3"	U	"
A544	1		8'-4"	U	"	A5106	1		16'-5"	U	"	A704		1	11'-11"	U	"
A545	1		17'-2"	U	"	A5107	1		17'-9"	U	"	A705		1	11'-7"	U	"
A546	1		9'-10"	U	"	A5108	2		12'-9"	U	"	A706		1	11'-4"	U	"
A547	3		18'-2"	U	"	A5109	2		15'-5"	U	"	A707		1	11'-0"	U	"
					HORIZ.	A5110	1		9'-3"	U	"	A708		1	10'-9"	U	"
A549	1		18'-0"	U	"	A5111	1		8'-8"	U	"	A709		1	10'-6"	U	"
A550	16		9'-0"	U	"	A5112	1		10'-2"	U	"	A710		1	10'-4"	U	"
A551	2		22'-6"	U	PAV. BRACKET HORIZ.	A5113	1		9'-7"	U	"	A711		1	10'-1"	U	"
A552	2		32'-4"	U	"	A5114	3		14'-0"	U	"	A712		15	39'-2"	U	FOOTING HORIZ.
A553	15		21'-10"	U	PRPT. & SEAT HORIZ.	A5115	3		13'-5"	U	"						
A554	19		33'-6"	U	PRPT. SEAT & BRKT.	A5116	3		9'-10"	U	W. W. VERT.	A801		10	42'-0"	U	FOOTING HORIZ.
A555	6		34'-4"	U	PARAPET HORIZ.	A5117	1		7'-6"	U	"	A802		5	24'-0"	U	"
A556	5		33'-4"	U	"	A5118	1		11'-10"	U	W. W. HORIZ.						



TYPICAL SECTION
SCALE: 1/2" = 1'-0"
BOTH ABUTMENTS



- ① DOES NOT INCLUDE TEST PILES.
- ② OWNER WILL FURNISH DISK. PAYMENT FOR PLACING TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS. SEE STD PLATE NO. 9301 FOR PLACING.

SUMMARY OF QUANTITIES FOR 2 ABUTMENTS	
STRUCTURE EXCAVATION, CLASS E	620 CU.YD.
CONCRETE, MIX NO. 3Y43	190 CU.YD.
CONCRETE, MIX NO. 1A43	121 CU.YD.
REINFORCEMENT BARS	18210 POUND
4 STEEL H-TEST PILES IN PLACE, 145 FT. LONG	
STEEL H-PILING DELIVERED	4200 LIN. FT.
BENCH MARK DISK	ONE DISK

AS BUILT
10-16-73
B. Jahn

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DEPARTMENT OF HIGHWAYS

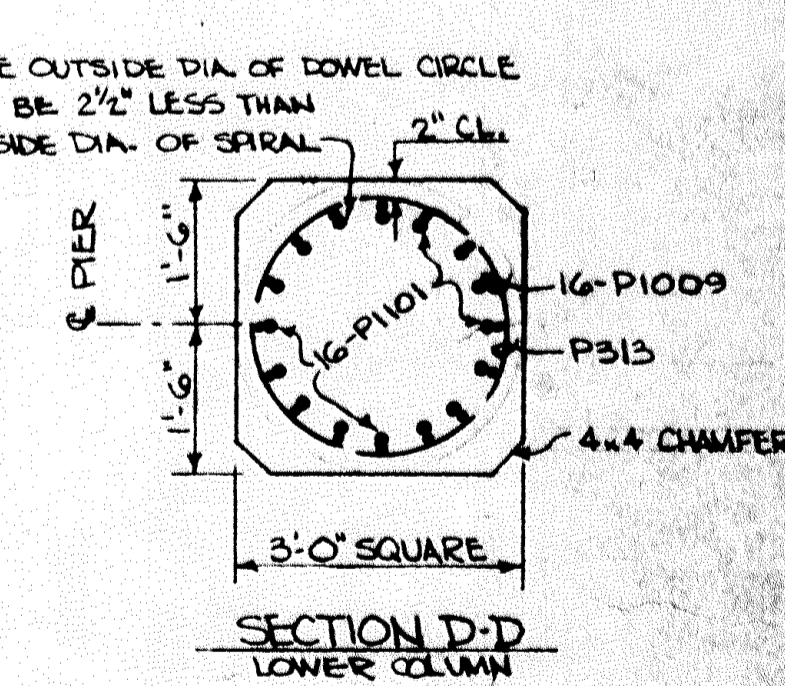
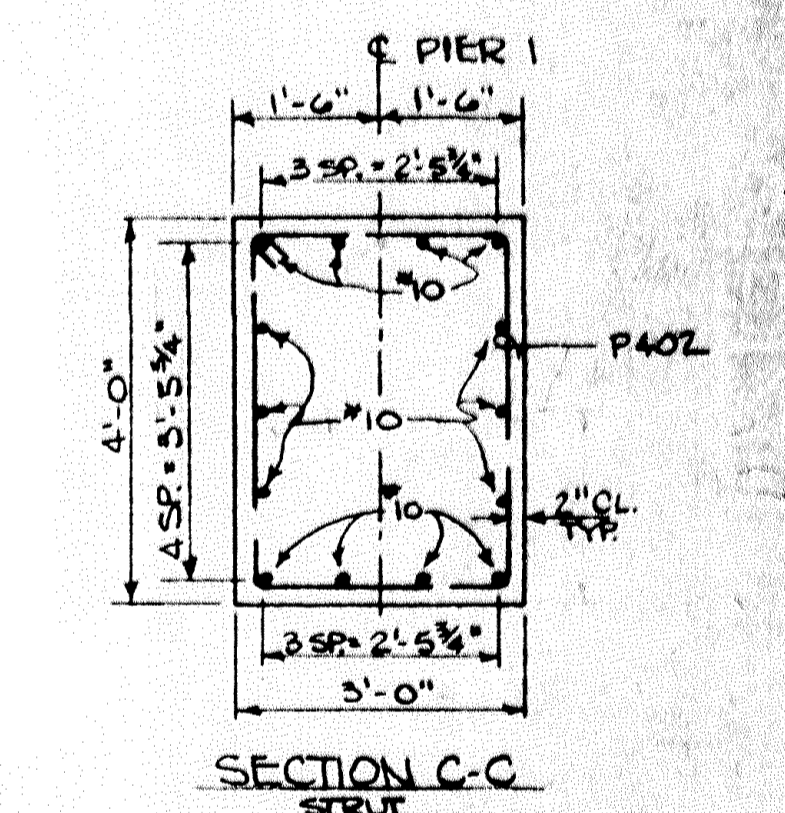
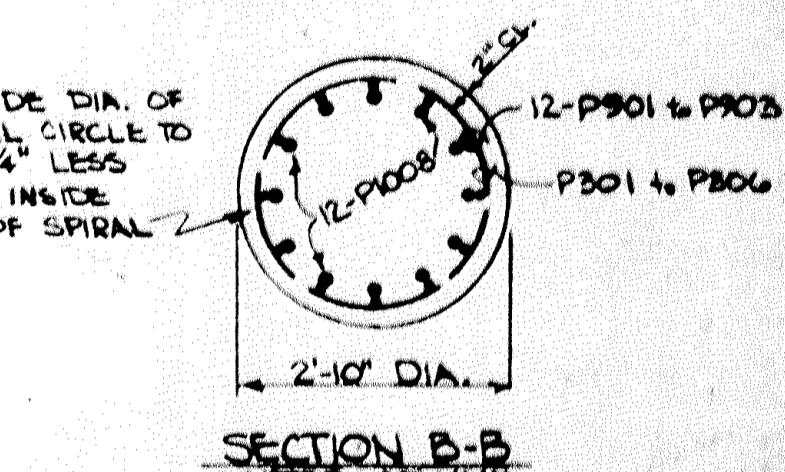
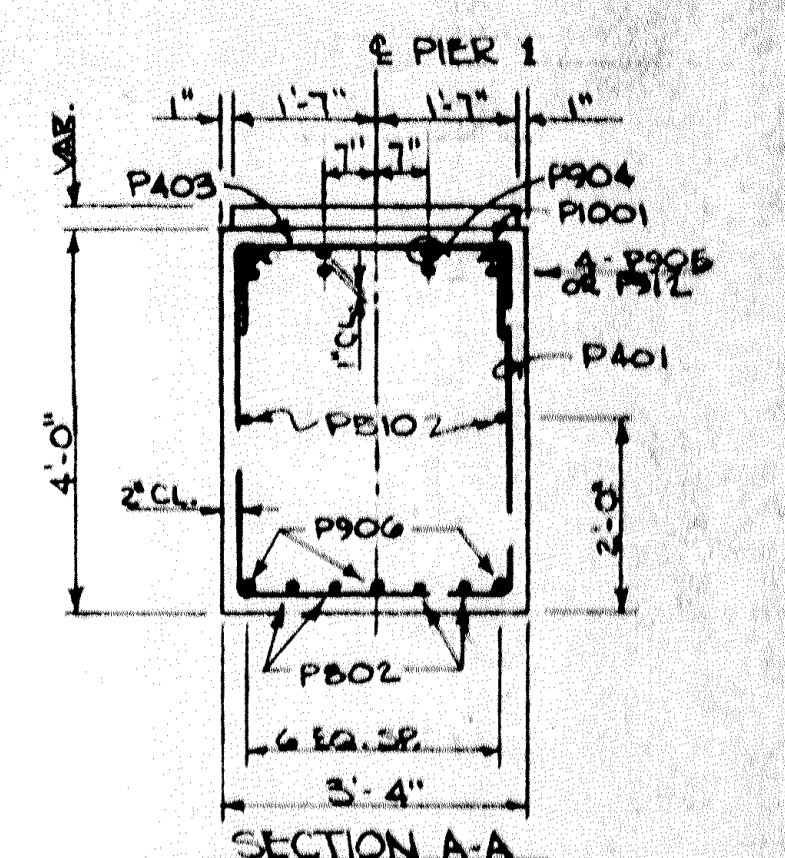
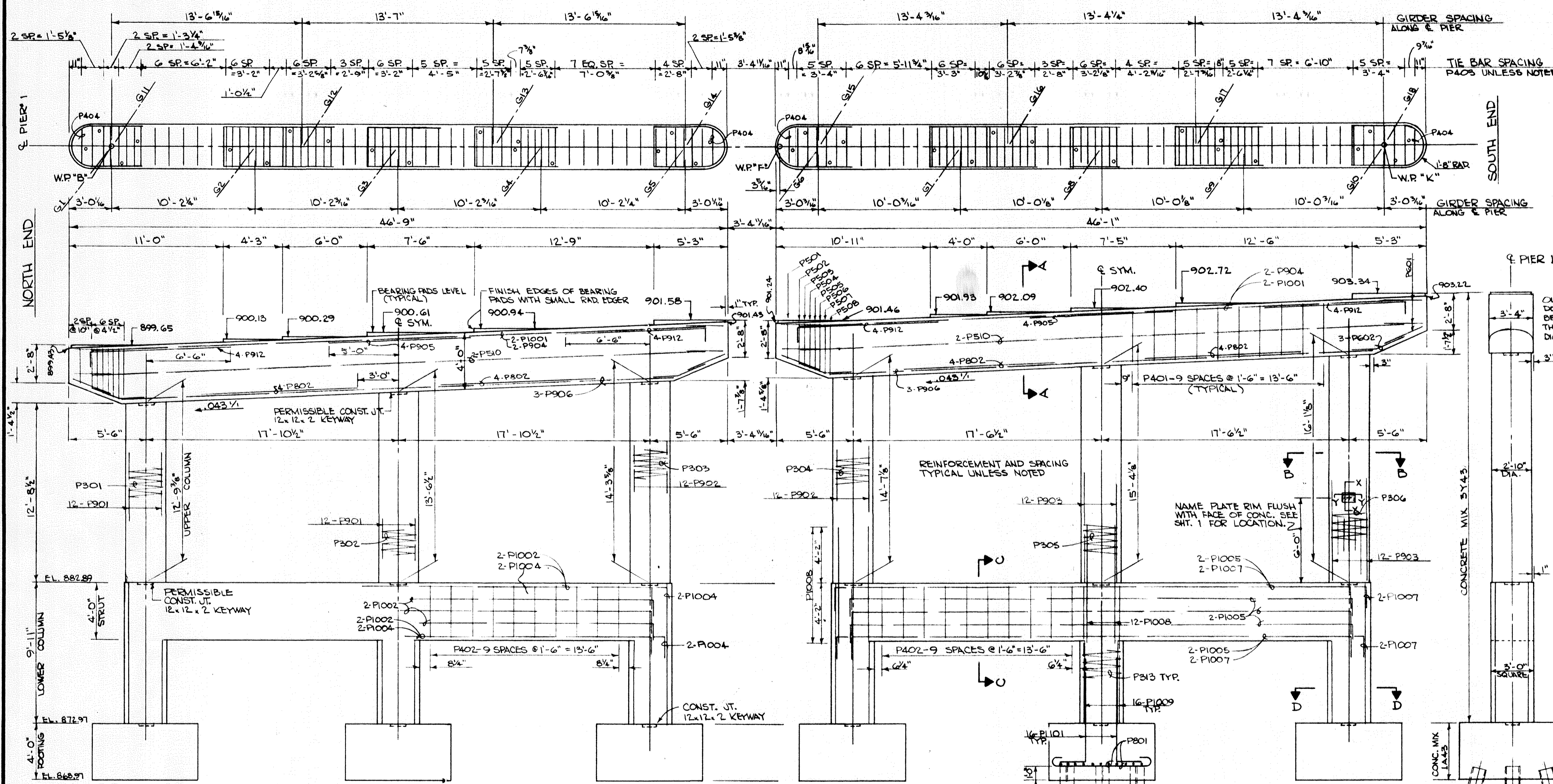
BRIDGE NO. 02521

ABUTMENT DETAILS

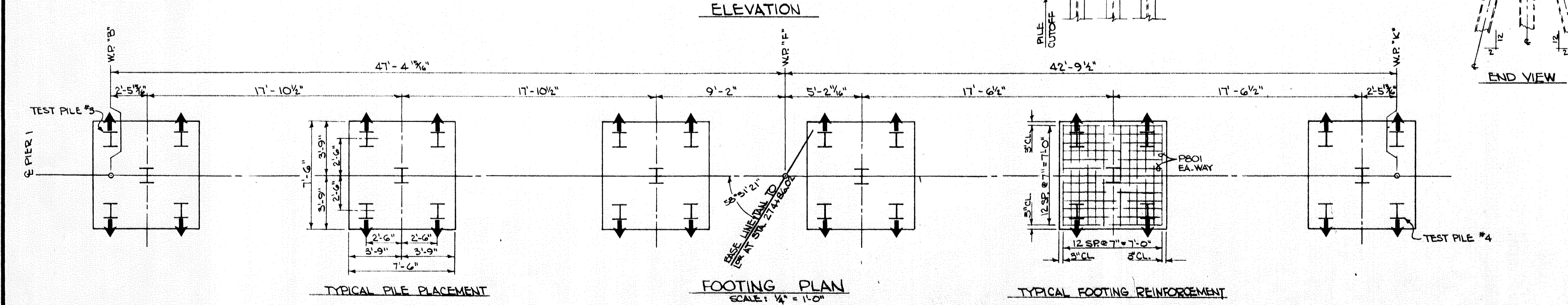
APPROVED: 12-21-71

DES. BJ	DR. MS	02521
CHK. DG	CHK. BJ	

PLAN



THE OUTSIDE DIA. OF DOWEL CIRCLE TO BE 2 1/2" LESS THAN INSIDE DIA. OF SPIRAL



END VIEW

CONCRETE MIX 3Y4.3

3'-0" SQUARE

CONC. MIX 3Y4.3

12

12

12

12

12

12

12

12

12

12

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10-16-73
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DEPARTMENT OF HIGHWAYS

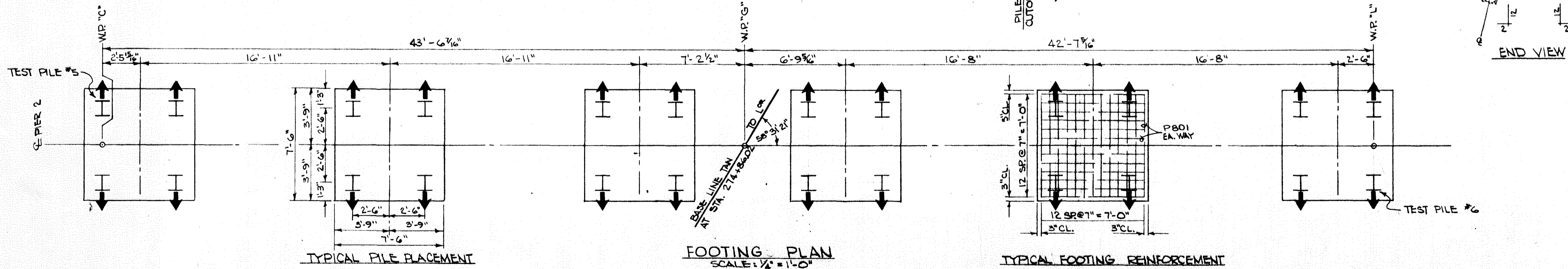
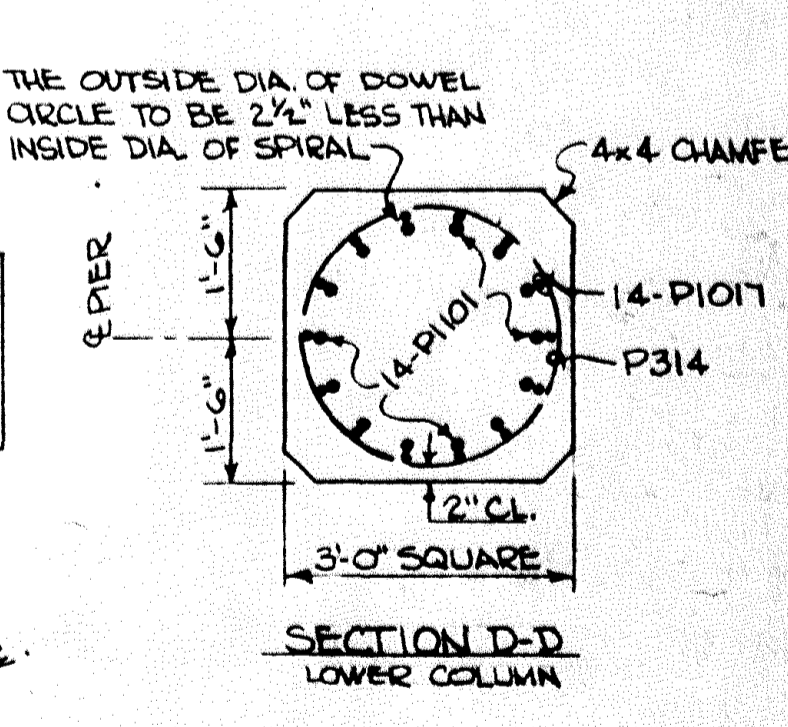
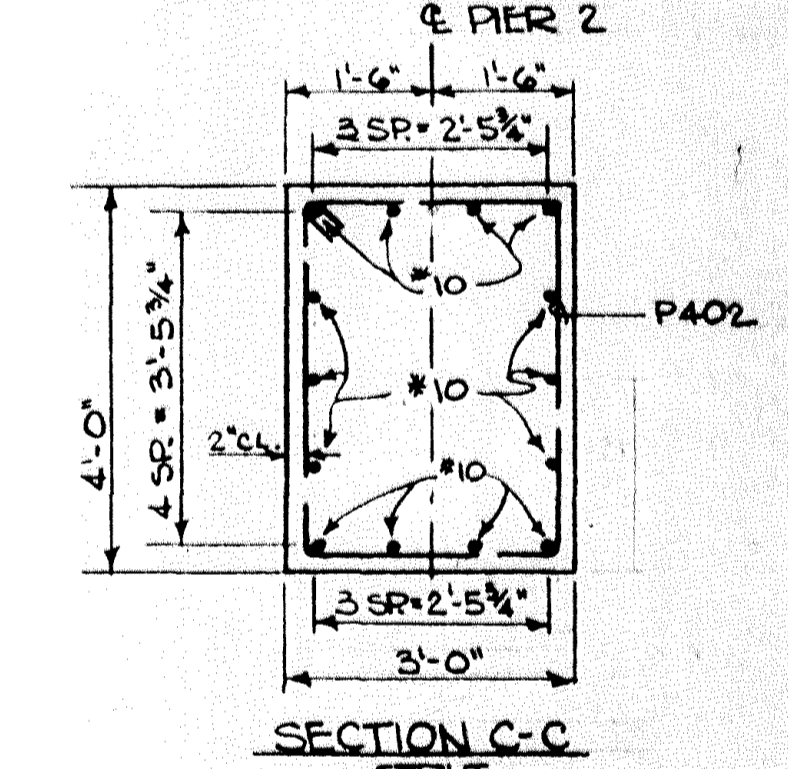
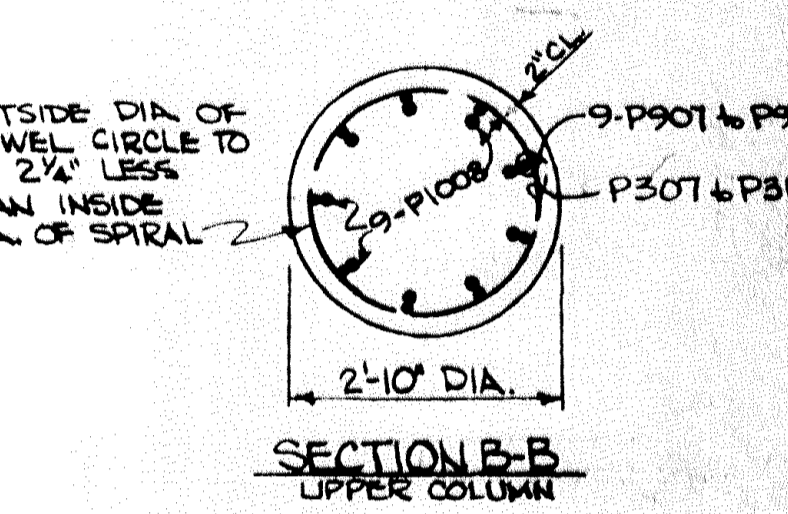
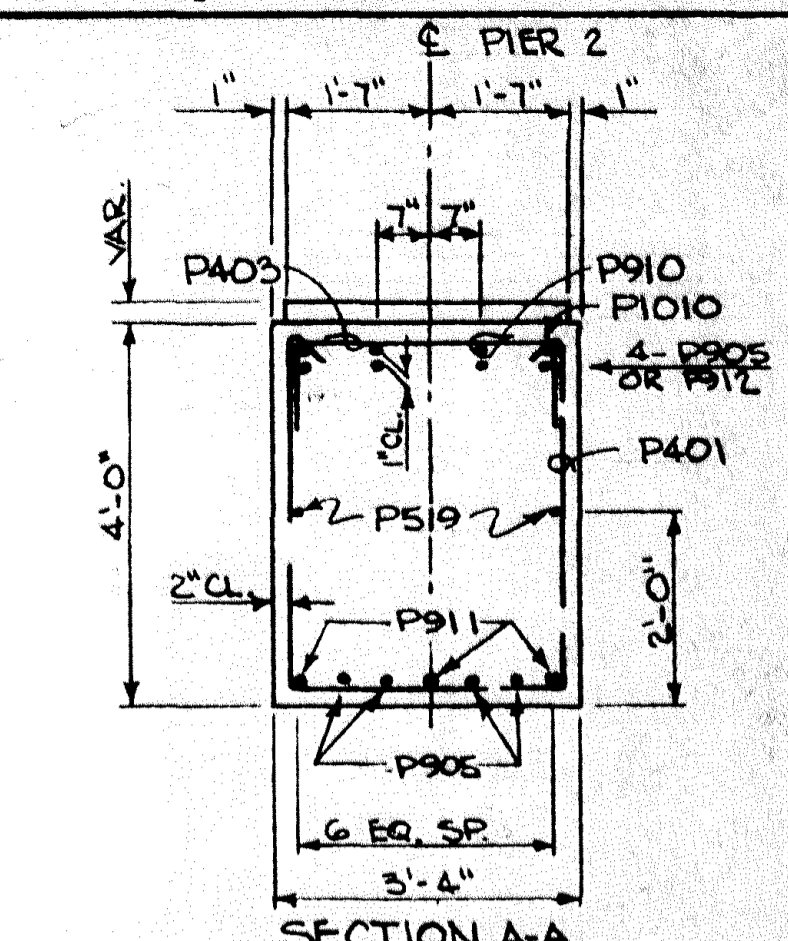
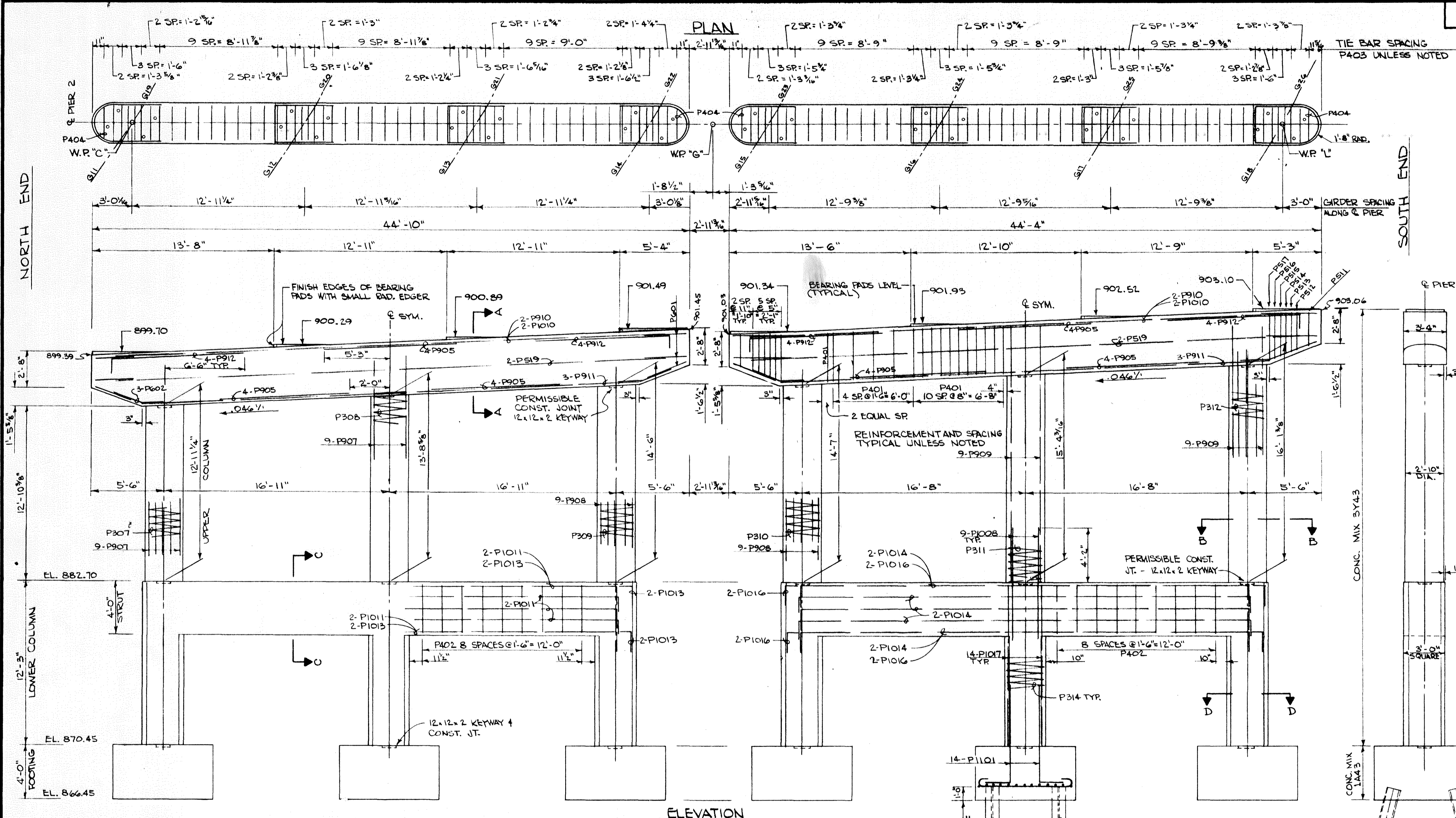
BRIDGE NO. 02521

PIER 1

APPROVED 12-21-71

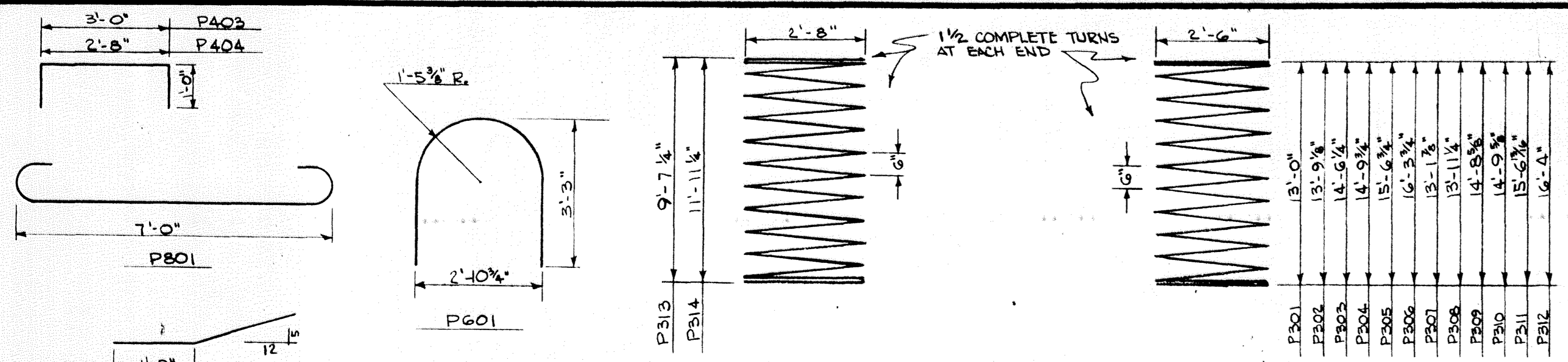
DES. BJ DR. MG

CHK. DG CHK. BJ 02521

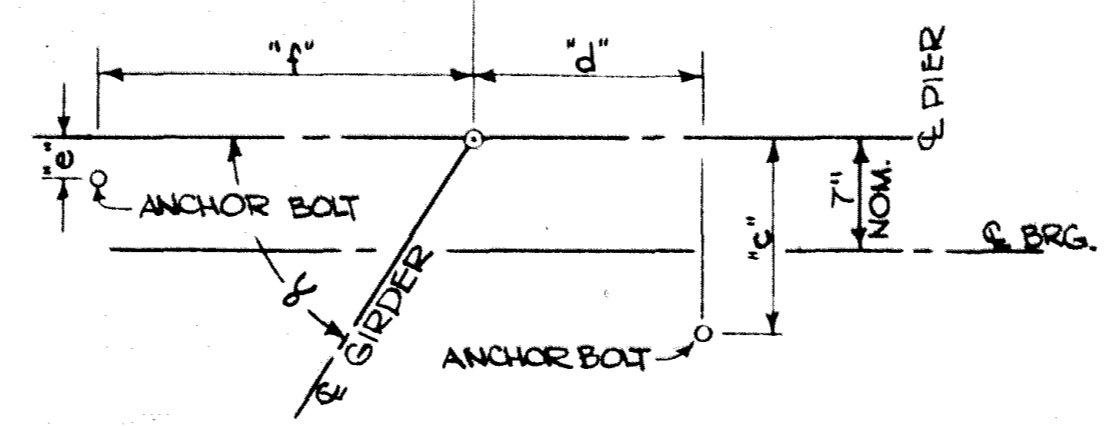
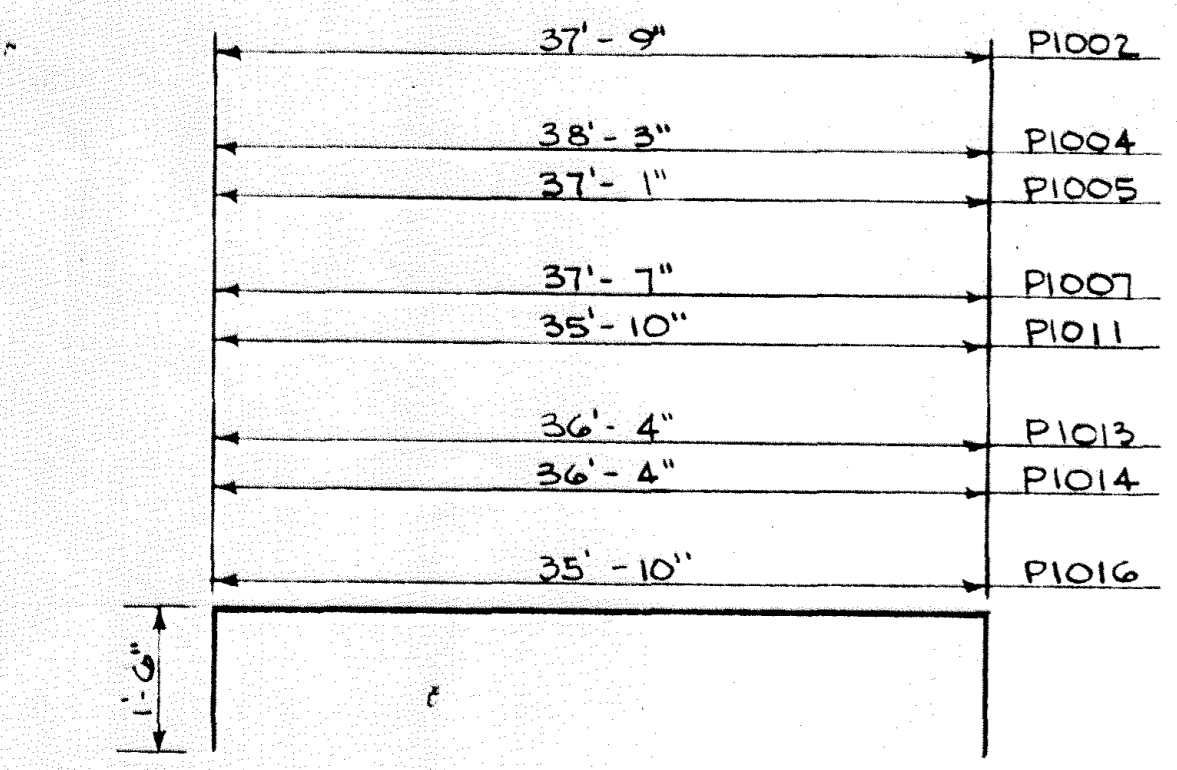
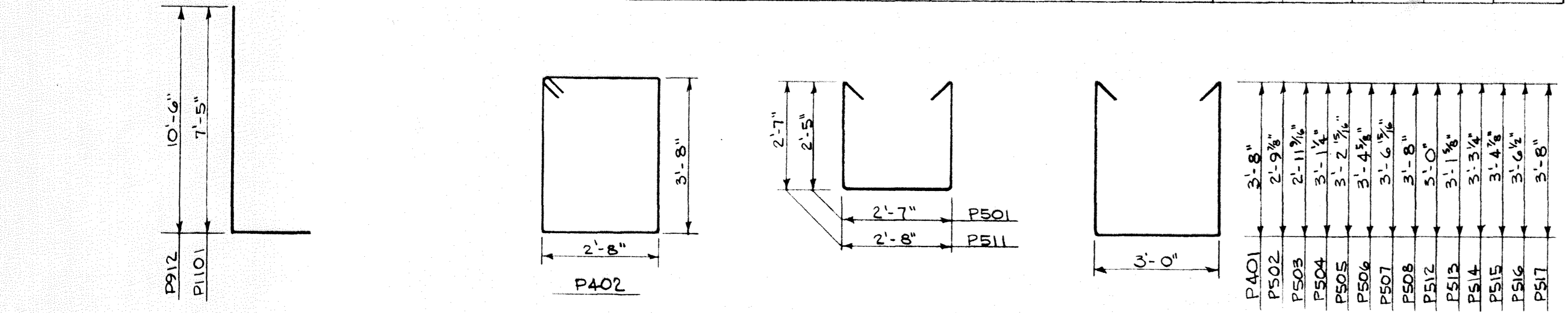


AS BUILT
10-16-73
B. Jahn

STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS	
BRIDGE NO. 02521	
PIER 2	
APPROVED 12-21-71	
DES. BJ	DR. MS
CHK. DG	CHK. BJ
02521	

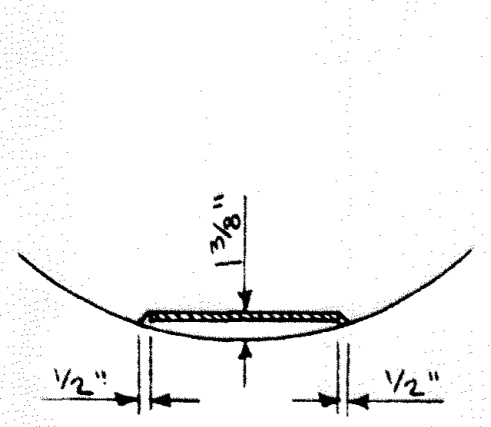


BAR	P301	P302	P303	P304	P305	P306	P307	P308	P309	P310	P311	P312	P313	P314
OUTSIDE DIA.	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-8"	2'-8"
LENGTH	13'-0"	13'-9 1/2"	14'-6 1/4"	14'-9 3/4"	15'-6 3/4"	16'-3 3/4"	13'-1 1/8"	13'-11 1/2"	14'-8 5/8"	14'-9 9/8"	15'-6 3/8"	16'-4"	9'-7 1/4"	11'-11 1/4"
PITCH	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
SPIRAL ROD SIZE	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
EST. WT. (EACH)	89*	93*	98*	99*	104*	108*	90*	95*	99*	100*	104*	109*	73*	88*

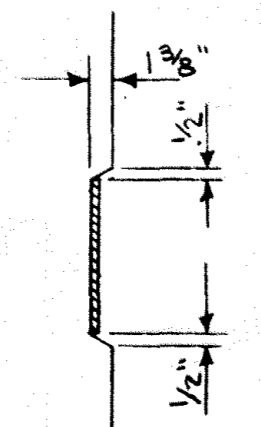


α	GIRDER NO.	SPAN NO.	"c"	"d"	"e"	"f"
51° 43' 51"	G1	1	1'-0 1/2"	10 5/8"	1 3/16"	1'-9 3/8"
52° 03' 13"	G2	1	1'-0 1/8"	10 3/8"	1 3/8"	1'-9 3/8"
52° 22' 45"	G3	1	1'-0 3/8"	10 1/2"	1 3/8"	1'-9 1/2"
52° 42' 27"	G4	1	1'-0 1/2"	10 1/4"	2 1/4"	1'-8 3/4"
53° 02' 19"	G5	1	1'-0 1/4"	10 1/4"	1 3/8"	1'-9 3/8"
53° 19' 46"	G6	1	1'-0 3/8"	10 3/4"	1 3/8"	1'-9 3/8"
53° 31' 27"	G7	1	1'-0 1/4"	10 3/4"	1 3/8"	1'-9 3/8"
53° 55' 16"	G8	1	1'-0 3/8"	10 1/4"	1 3/8"	1'-9 3/8"
54° 13' 13"	G9	1	1'-0 1/8"	11"	2 3/8"	1'-8 1/2"
54° 31' 19"	G10	1	1'-0"	11 1/8"	2"	1'-9 1/8"
56° 15' 30"	G11	2	11 1/2"	11 3/8"	2 3/8"	1'-8 3/8"
56° 37' 30"	G12	2	11 1/8"	11 3/8"	2 3/8"	1'-8 3/8"
56° 59' 41"	G13	2	11 3/8"	11 3/8"	3 3/8"	1'-7 3/4"
57° 22' 03"	G14	2	11 3/8"	11 3/8"	2 3/8"	1'-8 1/8"
57° 36' 54"	G15	2	11 1/8"	11 3/8"	2 3/8"	1'-8 3/4"
57° 57' 06"	G16	2	11 1/8"	11 3/8"	2 3/8"	1'-8 3/4"
58° 17' 27"	G17	2	10 3/8"	11 3/8"	3 3/8"	1'-7 5/8"
58° 37' 57"	G18	2	10 3/8"	11 3/8"	3 3/8"	1'-8 3/8"
60° 02' 46"	G19	3	10 3/8"	11 3/8"	3 3/8"	1'-8 1/2"
60° 21' 48"	G20	3	10 3/8"	11 3/8"	3 3/8"	1'-8 1/2"
60° 40' 57"	G21	3	10 3/8"	11 3/8"	3 3/8"	1'-8 1/2"
61° 00' 14"	G22	3	10 3/8"	11 3/8"	3 3/8"	1'-8 1/2"
61° 13' 04"	G23	3	10 3/8"	11 3/8"	3 3/8"	1'-8 1/2"
61° 30' 36"	G24	3	10"	11 3/8"	4"	1'-8 3/8"
61° 48' 15"	G25	3	9 3/8"	11 3/8"	4 1/8"	1'-8 3/8"
62° 05' 59"	G26	3	9 3/8"	11 3/8"	4 3/8"	1'-8 3/8"

NAME PLATE PLACEMENT



SECTION Y-Y



SECTION X-X

BAR	PIER 1 NO.	PIER 2 NO.	LENGTH	SHAPE	LOCATION
P301	1	-	-	SPIRAL	LEFT, UPPER COLUMN
P302	-	1	-	-	" " "
P303	-	1	-	-	" " "
P304	-	1	-	-	RIGHT, " "
P305	-	1	-	-	" " "
P306	-	1	-	-	" " "
P307	-	1	-	-	LEFT, " "
P308	-	1	-	-	" " "
P309	-	1	-	-	" " "
P310	-	1	-	-	RIGHT, " "
P311	-	1	-	-	" " "
P312	-	1	-	-	" " "
P313	6	-	-	-	LOWER COLUMN
P314	-	6	-	-	" " "
P401	40	64	11'-1"	M	PIER CAP STIRRUP
P402	40	36	13'-8"	M	STRUT STIRRUP
P403	123	108	5'-0"	M	PIER CAP TIE
P404	4	4	4'-8"	M	" " "
P501	4	-	8'-5"	M	PIER CAP STIRRUP
P502	4	-	9'-7"	M	" " "
P503	4	-	9'-10"	M	" " "
P504	4	-	10'-2"	M	" " "
P505	4	-	10'-5"	M	" " "
P506	4	-	10'-8"	M	" " "
P507	4	-	11'-1"	M	" " "
P508	4	-	11'-3"	M	" " "
P510	4	-	42'-11"	-	PIER CAP LONG.
P511	-	4	8'-10"	M	PIER CAP STIRRUP
P512	-	4	9'-11"	M	" " "
P513	-	4	10'-2"	M	" " "
P514	-	4	10'-6"	M	" " "
P515	-	4	10'-9"	M	" " "
P516	-	4	11'-0"	M	" " "
P517	-	4	11'-3"	M	" " "
P519	-	4	41'-2"	-	PIER CAP LONG.

BAR	PIER 1 NO.	PIER 2 NO.	LENGTH	SHAPE	LOCATION
P601	12	12	8'-2"	M	PIER CAP ENDS
P602	12	12	4'-1"	M	" " "
P801	156	156	9'-2"	M	FOOTING HORIZ.
P802	16	-	11'-0"	-	PIER CAP LONG.
P901	24	-	16'-3"	-	UPPER COLUMN VERT.
P902	24	-	17'-9"	-	" " "
P903	24	-	18'-10"	-	" " "
P904	4	-	45'-5"	-	PIER CAP LONG.
P905	8	24	10'-6"	-	" " "
P906	6	-	38'-5"	-	" " "
P907	-	18	16'-5"	-	UPPER COLUMN VERT.
P908	-	18	18'-0"	-	" " "
P909	-	18	18'-10"	-	" " "
P910	-	4	43'-8"	-	PIER CAP LONG.
P911	-	6	36'-8"	-	" " "
P912	16	16	11'-10"	-	" " "
P1001	4	-	42'-11"	-	PIER CAP LONG.
P1002	10	-	40'-9"	-	STRUT LONG. - LT.
P1004	4	-	41'-3"	-	" " "
P1005	10	-	40'-1"	-	" " - RT.
P1007	4	-	40'-7"	-	" " "
P1008	72	54	8'-4"	-	DOWEL - LOW. COL. TO UPPER
P1009	96	-	9'-9"	-	LOWER COLUMN VERT.
P1010	-	4	41'-2"	-	PIER CAP LONG.
P1011	-	10	38'-10"	-	STRUT LONG. - LT.
P1013	-	4	39'-4"	-	" " "
P1014	-	10	39'-4"	-	" " - RT.
P1016	-	4	38'-10"	-	" " "
P1017	-	84	12'-1"	-	LOWER COLUMN VERT.
P1101	96	84	9'-2"	L	DOWEL - FTG. TO LWR. COL.

PILE NOTES

2 STEEL TEST PILES 120 FT. LONG.
 28 STEEL PILES EST. LENGTH 115 FT.
 30 STEEL PILES REQ'D FOR PIER 1

2 STEEL TEST PILES 115 FT. LONG.
 22 STEEL PILES EST. LENGTH 110 FT.
 24 STEEL PILES REQ'D FOR PIER 2

ALL PILES TO BE 12BPS3.
 ESTIMATED PENETRATION 1 FT. LESS THAN LENGTH GIVEN.
 PILES MARKED THUS H → TO BE BATTERED 2" PER FT.
 IN DIRECTION SHOWN.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR SPLICES AND TIP REINFORCEMENT SEE DETAIL B202.

	PIER 1	PIER 2
DEAD LOAD	45.3	46.4
LIVE LOAD	10.8	11.3
OVERTURNING	30.0	28.3
TOTAL	86.1	86.0

86.1 = 68.9 REDUCTION PER A.A.S.H.O. 1.2.22 (PIER 1)
 1.25

86.0 = 68.8 REDUCTION PER A.A.S.H.O. 1.2.22 (PIER 2)
 1.25

① CONCRETE, MIX NO. 1A43	100 CU. YD.
② CONCRETE, MIX NO. 3Y43	225 CU. YD.
STRUCTURE EXCAVATION, CLASS E	365 CU. YD.
REINFORCEMENT BARS	57 270 POUND
2 STEEL H-TEST PILES IN PLACE, 120 FT. LONG	
2 STEEL H-TEST PILES IN PLACE, 115 FT. LONG	
③ STEEL H-PILING DELIVERED	5640 LIN. FT.
④ BRIDGE NAME PLATE	
SPIRAL REINFORCEMENT	2150 POUND

- ① CONCRETE FOR FOOTINGS
- ② CONCRETE FOR COLUMNS, PIER CAPS & STRUTS.
- ③ DOES NOT INCLUDE TEST PILES.
- ④ TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS.
- ⑤ CITY OF COON RAPIDS MINNESOTA BRIDGE 02521 1972

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

BRIDGE NO. 02521

PIER DETAILS

APPROVED 12-21-71

AS BUILT
 10-16-73
 B. John

DES. BJ	DR. MS	02521
CHK. DG	CHK. BJ	

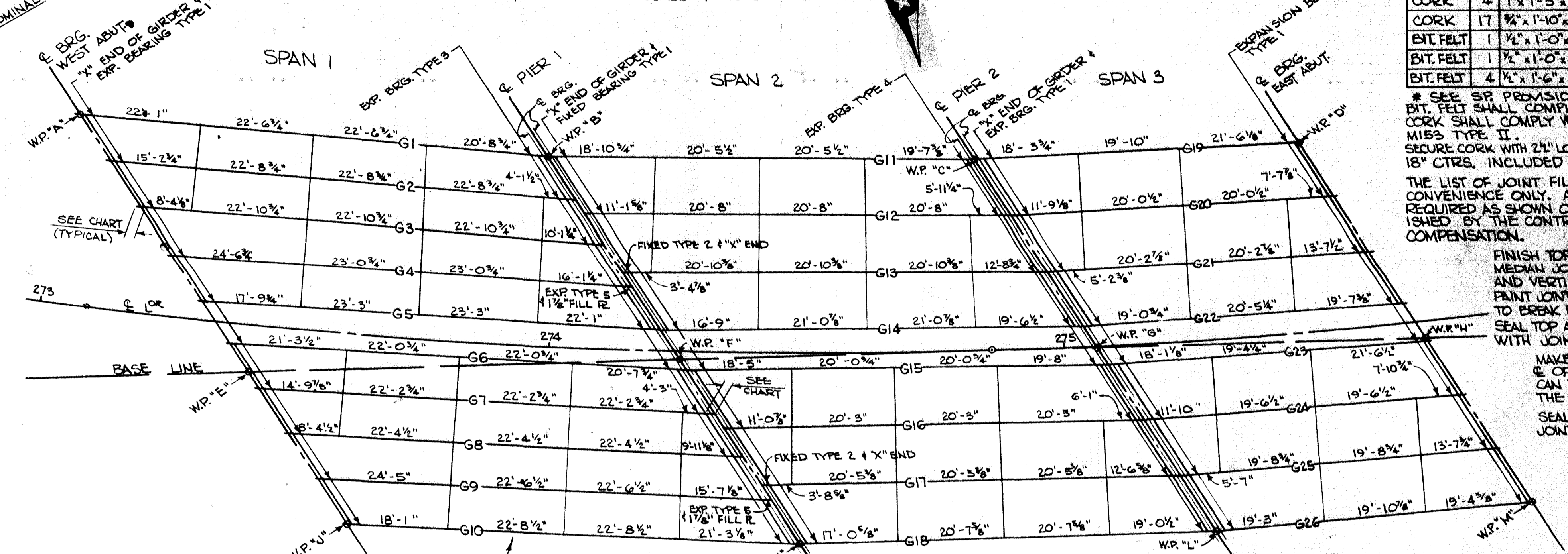
*** PREFORMED JOINT FILLER LIST**

TYPE	NO.	SIZE	LOCATION
POLY-ETHYLENE	1	1" x 5" x 240'-8"	¢ MEDIAN
CORK	4	1" x 1'-5" x 1'-6"	BETWEEN WING WALL & SLAB
CORK	17	¾" x 1'-10" x 2'-¾"	RAILBASE DEF. JTS.
BIT. FELT	1	½" x 1'-0" x 91'-5"	TOP OF WEST PARAPET
BIT. FELT	1	½" x 1'-0" x 89'-1"	TOP OF EAST PARAPET
BIT. FELT	4	½" x 1'-6" x 2'-5"	TOP OF PARAPETS @ CORNERS

SEE SP. PROVISIONS
 BIT. FELT SHALL COMPLY WITH M.H.D. 5102 AND A.M.S. 5103
 CORK SHALL COMPLY WITH M.H.D. 5102 AND A.M.S. 5103
 MISS TYPE II.
 SECURE CORK WITH 24" LONG #16 COPPER NAILS ABOUT
 18" CTRS. INCLUDED IN PRICE BID FOR OTHER ITEMS.
 THE LIST OF JOINT FILLER IS FOR THE CONTRACTOR'S
 CONVENIENCE ONLY. ANY ADDITIONAL JOINT FILLER
 REQUIRED AS SHOWN ON THE PLANS SHALL BE FURNISHED
 BY THE CONTRACTOR WITH NO ADDITIONAL
 COMPENSATION.

FINISH TOP OF ALL CURBS, SIDEWALK AND
 MEDIAN JOINTS WITH SMALL RADIUS EDGES
 AND VERTICAL EDGES WITH ½" V STRIPES.
 PAINT JOINT WITH ASPHALT OR APPROVED EQUAL
 TO BREAK BOND. NO REIN. THRU JOINTS.
 SEAL TOP AND FRONT FACE OF JOINT
 WITH JOINT SEALER.
 MAKE SAW CUT IN ROADWAY SLAB OVER
 ¢ OF PIERS AS SOON AS THE CUTTING
 CAN BE DONE WITHOUT TRAVELING
 THE CONCRETE.
 SEAL ALL SAW CUTS WITH CONCRETE
 JOINT SEALER.

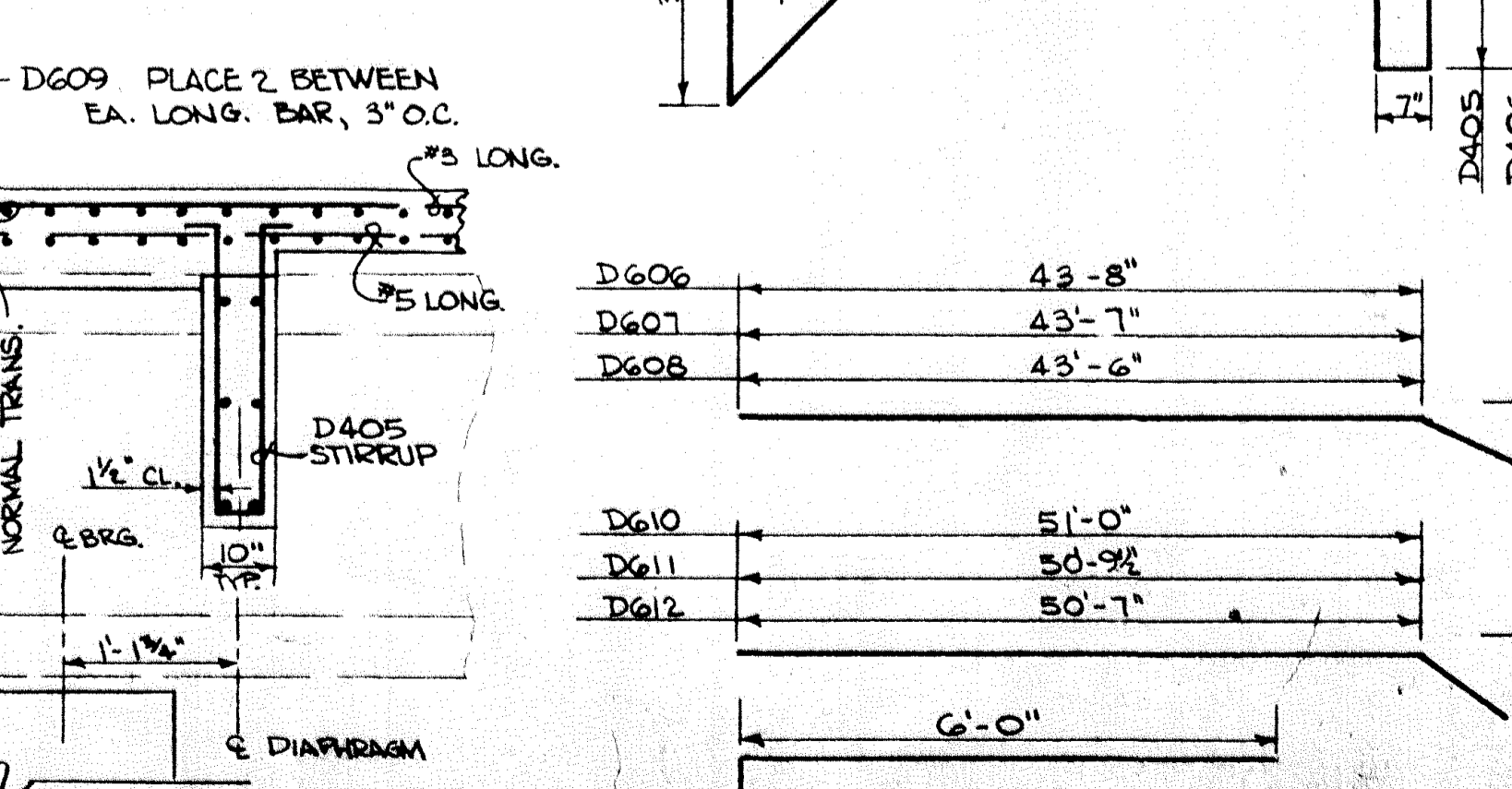
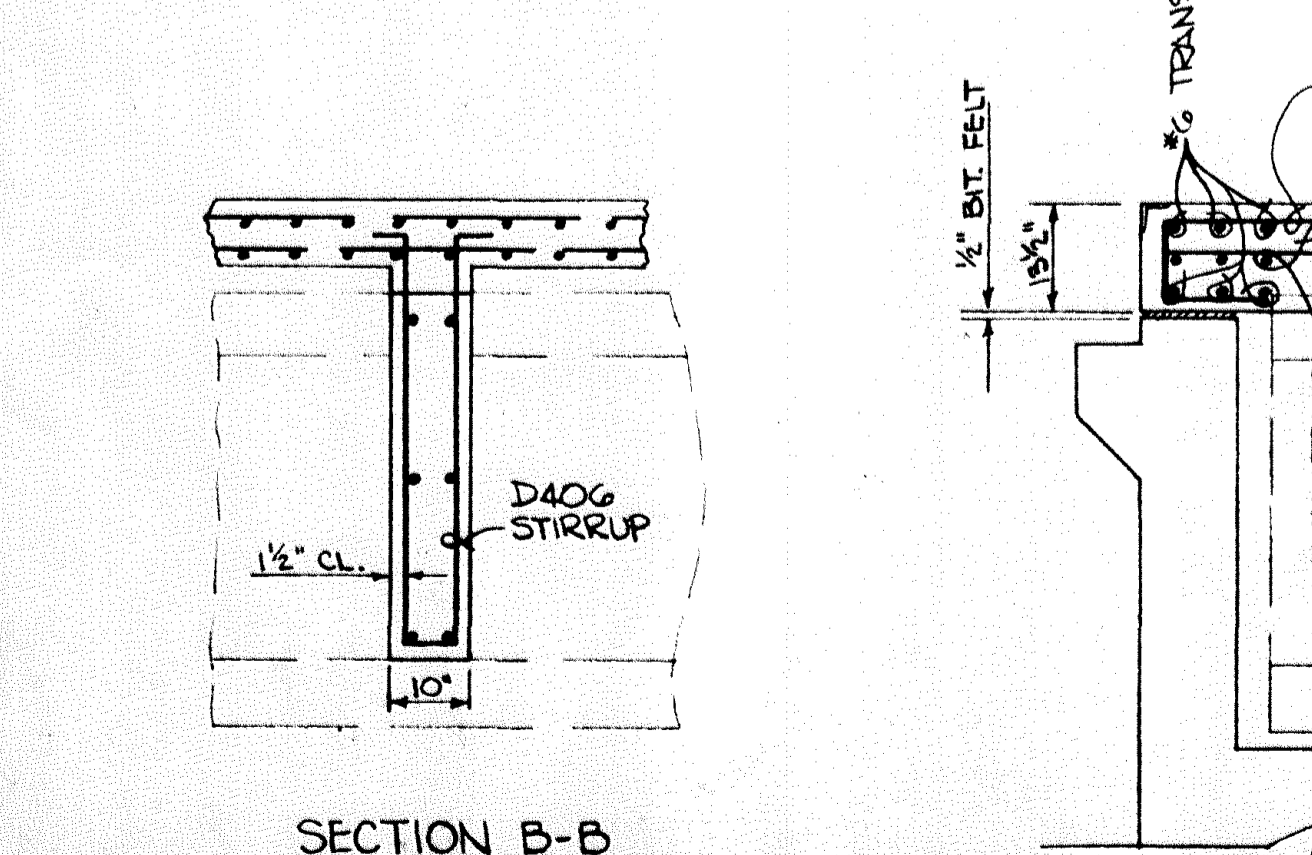
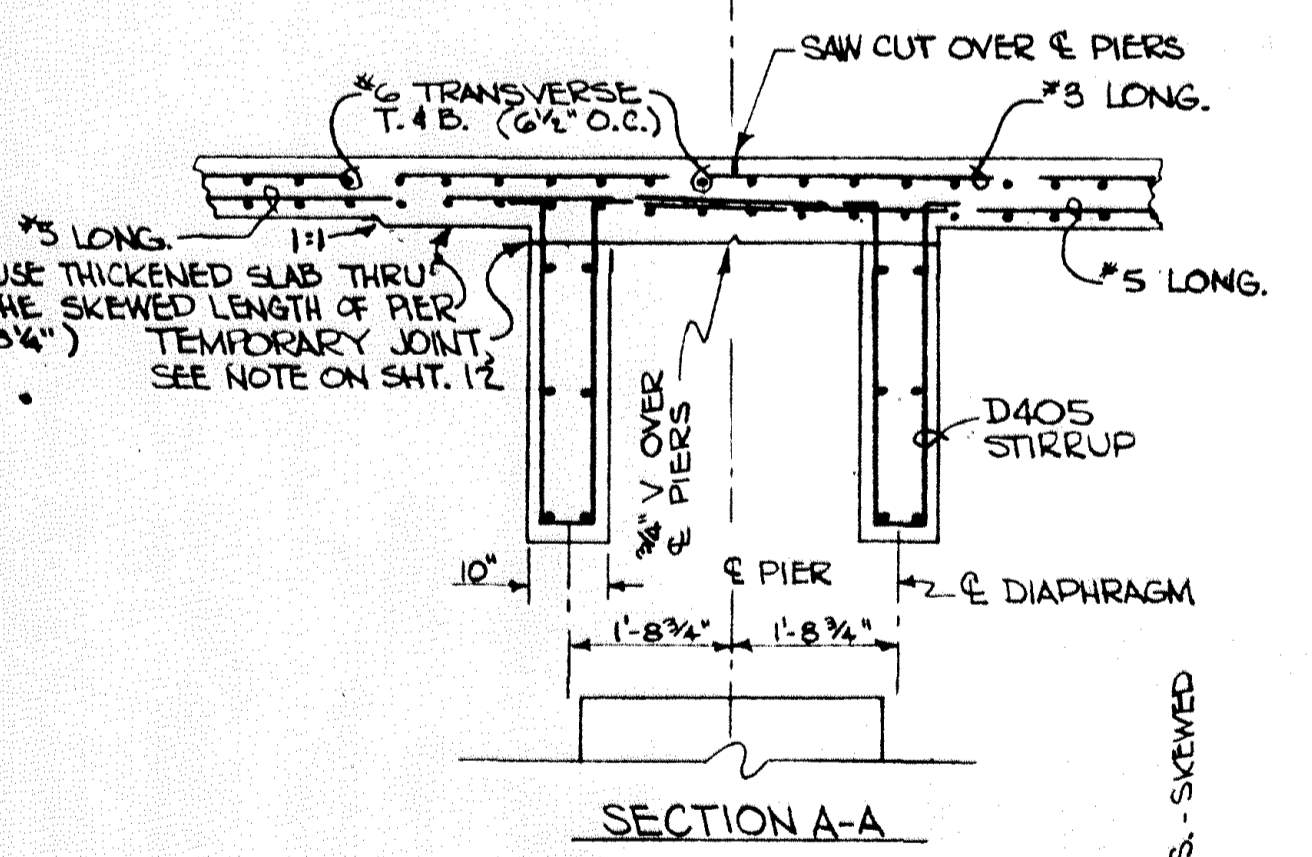
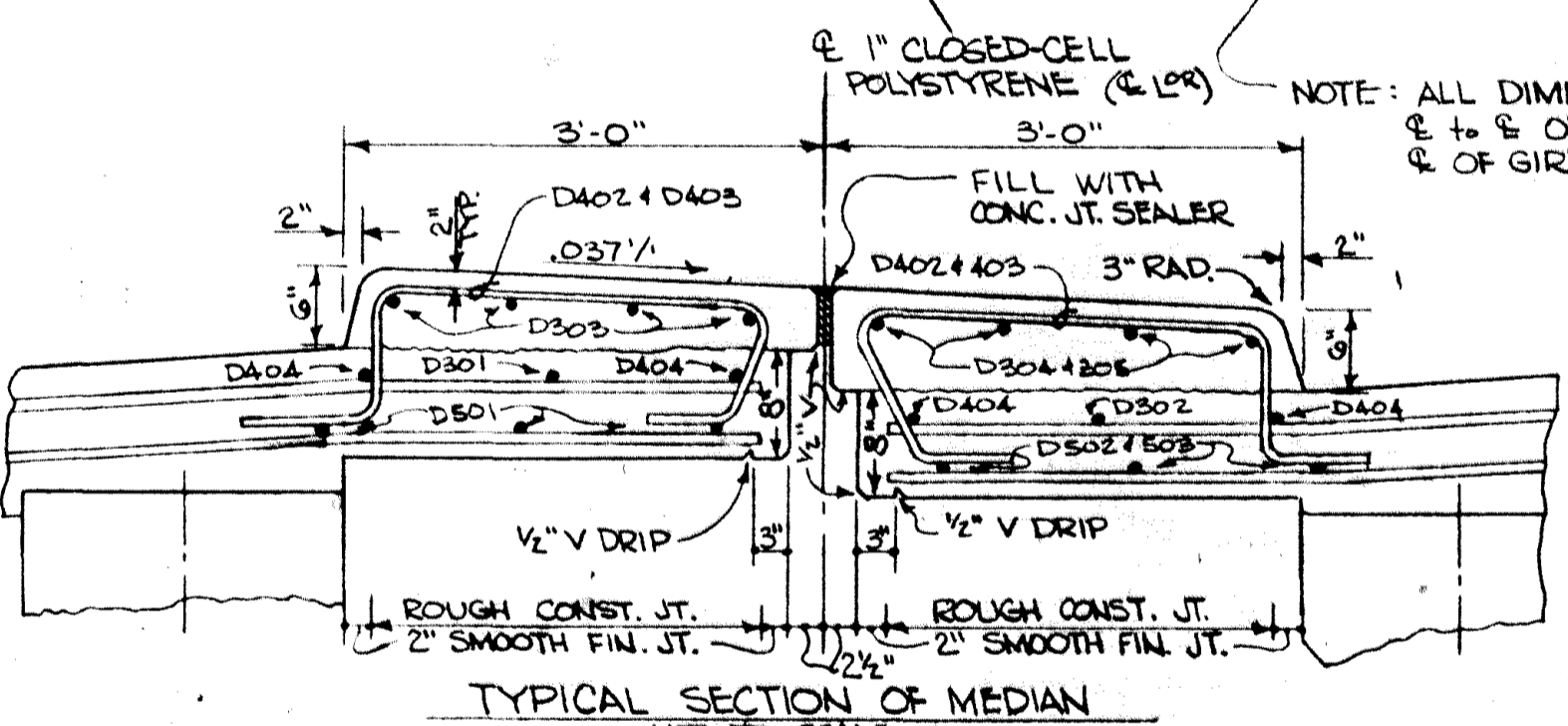
FRAMING PLAN
 SCALE: 1" = 15'-0"



SPACING DIAGRAM
 NOT TO SCALE

FRAMING PLAN DIMENSIONS

GIRDER NO.	SPAN NO.	GIRDER LENGTH	"C"	"D"	¢ TO ¢ OF BEARINGS	"X"	"Y"
1	1	92'-1 1/4"	2'-1"	8 3/8"	90'-10 1/2"	1'-7"	1'-7 3/8"
2	1	91'-8 1/2"	2'-1"	8 3/8"	90'-5 1/2"	1'-6"	1'-6 1/4"
3	1	91'-3 3/4"	2'-1"	8 3/8"	90'-0 3/4"	1'-4"	1'-5 1/8"
4	1	90'-11"	2'-0 1/2"	8 3/8"	89'-8"	1'-3"	1'-4 1/4"
5	1	90'-6 1/4"	2'-0 1/2"	8 3/8"	89'-3 3/4"	1'-2"	1'-3 3/8"
6	1	90'-2 1/4"	2'-0 1/2"	8 3/8"	88'-11 1/4"	1'-1"	1'-2 1/8"
7	1	89'-10 1/8"	2'-0 1/2"	8 3/8"	88'-7 1/8"	1'-0"	1'-1 1/4"
8	1	89'-6 1/8"	2'-0 1/2"	8 3/8"	88'-3 1/8"	0'-11"	1'-0 1/4"
9	1	89'-2 1/8"	2'-0 1/2"	8 3/8"	87'-11 1/8"	0'-10"	0'-11 1/4"
10	1	88'-10 1/8"	2'-0 1/2"	8 3/8"	87'-7 1/8"	0'-9"	0'-10 1/4"
11	2	83'-5 1/8"	2'-0"	8 3/8"	82'-2 1/8"	1'-1"	1'-1 1/4"
12	2	83'-0 1/8"	2'-0"	8 3/8"	81'-9 1/8"	1'-0"	1'-0 1/4"
13	2	82'-8 1/4"	2'-0"	8 3/8"	81'-5 1/4"	0'-11"	0'-11 1/4"
14	2	82'-4 1/4"	1'-11 1/2"	8 3/8"	81'-1 1/4"	0'-10"	0'-10 1/4"
15	2	82'-2"	1'-11 1/2"	8 3/8"	80'-11"	0'-9"	0'-10"
16	2	81'-10 1/4"	1'-11 1/2"	8 3/8"	80'-7 1/4"	0'-8"	0'-9 1/4"
17	2	81'-6 1/4"	1'-11 1/2"	8 3/8"	80'-3 1/4"	0'-7"	0'-8 1/4"
18	2	81'-3 1/4"	1'-11 1/2"	8 3/8"	80'-0 1/4"	0'-6"	0'-7 1/4"
19	3	63'-6 1/8"	1'-11 1/2"	8 3/8"	62'-3 1/8"	1'-1"	1'-2 1/4"
20	3	63'-4 1/2"	1'-11 1/2"	8 3/8"	62'-1 1/2"	1'-1"	1'-1 1/4"
21	3	63'-2 1/8"	1'-11 1/2"	8 3/8"	61'-11 1/8"	1'-0"	1'-1 1/4"
22	3	62'-11 1/8"	1'-11 1/2"	8 3/8"	61'-8 1/8"	0'-11"	1'-0 1/4"
23	3	62'-10 1/8"	1'-11 1/2"	7 3/8"	61'-7 1/8"	0'-11"	1'-0 3/4"
24	3	62'-8 1/4"	1'-11 1/2"	7 3/8"	61'-5 1/4"	0'-11"	0'-11 1/4"
25	3	62'-6 1/4"	1'-11"	8"	61'-3 1/4"	0'-10"	0'-11 1/8"
26	3	62'-4 1/4"	1'-11"	8"	61'-1 1/4"	0'-10"	0'-10 1/8"



BILL OF REINFORCEMENT FOR SUPERSTRUCTURE

BAR NO.	LENGTH	SHAPE	LOCATION
D301	450	28'-2"	LONG. SLAB, TOP, LEFT
D302	450	27'-9"	" " " RT.
D303	24	31'-8"	" " MEDIAN, SPAN 1
D304	24	28'-2"	" " " SPAN 2
D305	24	22'-10"	" " " SPAN 3
D401	376	15'-0"	LONG. SLAB, STG'D @ PIERS
D402	316	5'-5"	TRANS. MEDIAN
D403	12	5'-10"	" " SKEWED
D404	24	41'-4"	LONG. SLAB BELOW MEDIAN
D405	224	7'-9"	DIAPH. STIRRUPS
D406	368	9'-9"	" " " " "
D407	64	10'-4"	" " SPAN 1
D408	32	9'-2"	" " " LONG.
D409	104	6'-3"	" " " " "
D410	96	11'-9"	" " SPANS 2 & 3
D411	48	11'-7"	" " " " LONG.
D412	136	9'-1"	" " " " " "
D413	12	42'-0"	LONG. SLAB BELOW NO. RAIL
D414	12	40'-9"	" " " " " SO.
D501	184	49'-5"	LONG. SLAB, BOT. SPAN 1
D502	204	43'-10"	" " " " SPAN 2
D503	204	34'-10"	" " " " SPAN 3
D504	560	40'-0"	TRANS. " T. & B. SPAN 1
D505	68	42'-7"	" " " " N.W.
D506	62	40'-2"	" " " " S.W.
D507	6	40'-5"	" " " " (AT POST)
D601	1132	40'-0"	TRANS. SLAB, T. & B. SPANS 2 & 3
D602	36	39'-9"	" " " " N.E.
D603	34	43'-7"	" " " " S.E.
D604	6	40'-5"	" " " " (AT POST)
D605	6	45'-4"	" " " " SKEWED
D606	2	45'-8"	" " " " " "
D607	2	45'-7"	" " " " " "
D608	2	45'-6"	" " " " " "
D609	376	7'-11"	END OF EACH SLAB
D610	2	52'-8"	TRANS. SLAB T. & B., SKEWED
D611	2	52'-7"	" " " " " "
D612	2	52'-6"	" " " " " "
D613	6	51'-0"	" " " " " "
D614	132	4'-6"	THRU GIRDERS
D615	52	6'-5"	DIAPH., SPAN 1 LONG.
D701	68	9'-1"	" " SPANS 2 & 3
D702	16	9'-2"	" " SPAN 1
D703	16	9'-9"	" " SPAN 1

BAR NO.	LENGTH	SHAPE	LOCATION
D801	12	11'-7"	DIAPH., SPAN 3 LONG.
D802	24	11'-11"	" " SPANS 2 & 3
D803	12	12'-6"	" " SPAN 2

- ① SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE**
- ② CONCRETE MIX NO. 3Y43A 633 CU. YD.
 - ③ CONCRETE MIX NO. 3Y46A (SPECIAL) 80 CU. YD.
 - REINFORCEMENT BARS 174,500 POUND
 - PRESTRESSED CONCRETE GIRDERS, TYPE 54-92 TO EACH
 - PRESTRESSED CONCRETE GIRDERS, TYPE 54-83 8 EACH
 - PRESTRESSED CONCRETE GIRDERS, TYPE 54-64 8 EACH
 - STRUCTURAL STEEL, 3306 12,800 POUND
 - ④ PREFORMED JOINT FILLER (SEE LIST)
 - ⑤ BRIDGE NAME PLATE (DETAIL NO. B103)
 - ORNAMENTAL METAL RAILING 1,475 LIN. FT.
 - FIXED BEARING ASSEMBLIES, TYPE 1 6 EACH
 - FIXED BEARING ASSEMBLIES, TYPE 2 2 EACH
 - EXP. BEARING ASSEMBLIES, TYPE 1 26 EACH
 - EXP. BEARING ASSEMBLIES, TYPE 3 8 EACH
 - EXP. BEARING ASSEMBLIES, TYPE 4 8 EACH
 - EXP. BEARING ASSEMBLIES, TYPE 5 2 EACH

- ① INCLUDES RAILING QUANTITIES
- ② CONCRETE FOR SLAB & DIAPHRAGMS
- ③ CONCRETE FOR RAILBASE & MEDIAN
- ④ TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS
- ⑤ CITY OF COON RAPIDS MINNESOTA BRIDGE 02521 1972

FILL PLATES ARE TO BE INCLUDED IN PRICE BID FOR BEARING ASSEMBLIES (SAME SHAPE AS MASONRY R. & LUGS)
 THE VOLUME OF DECK CONCRETE FOR PAYMENT SHALL BE COMPUTED USING AN AVERAGE STOOL HEIGHT OF 2 1/4"

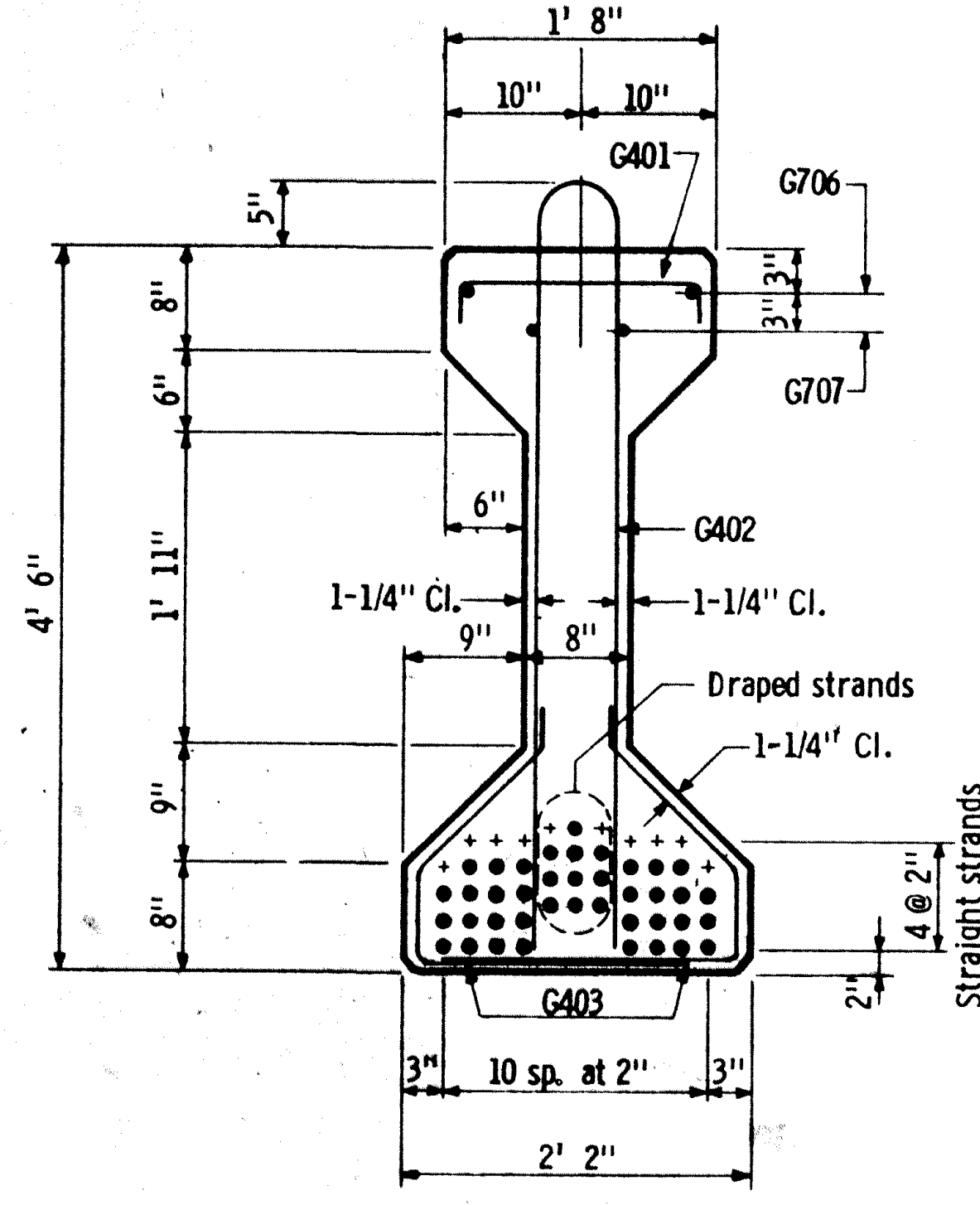
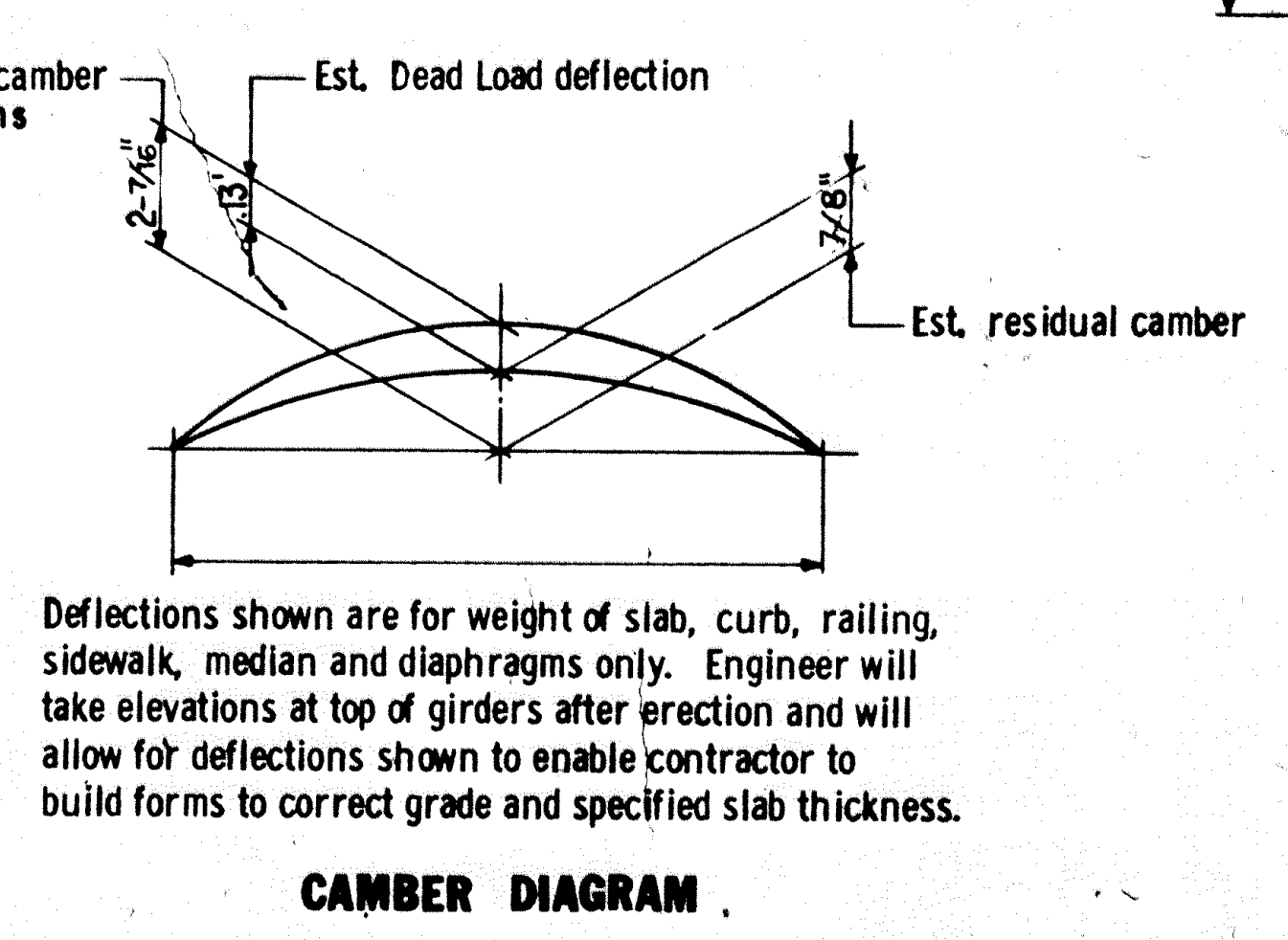
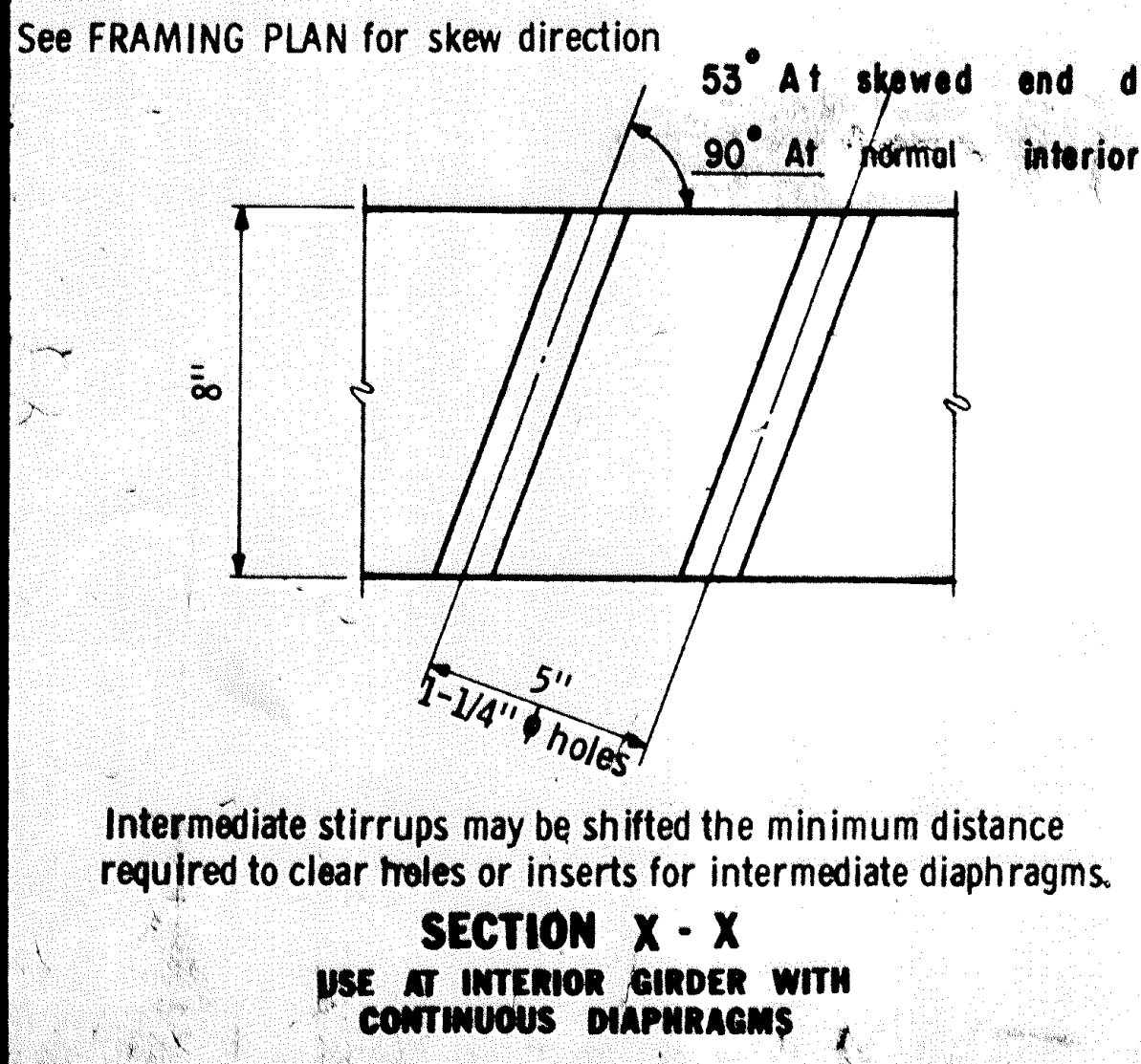
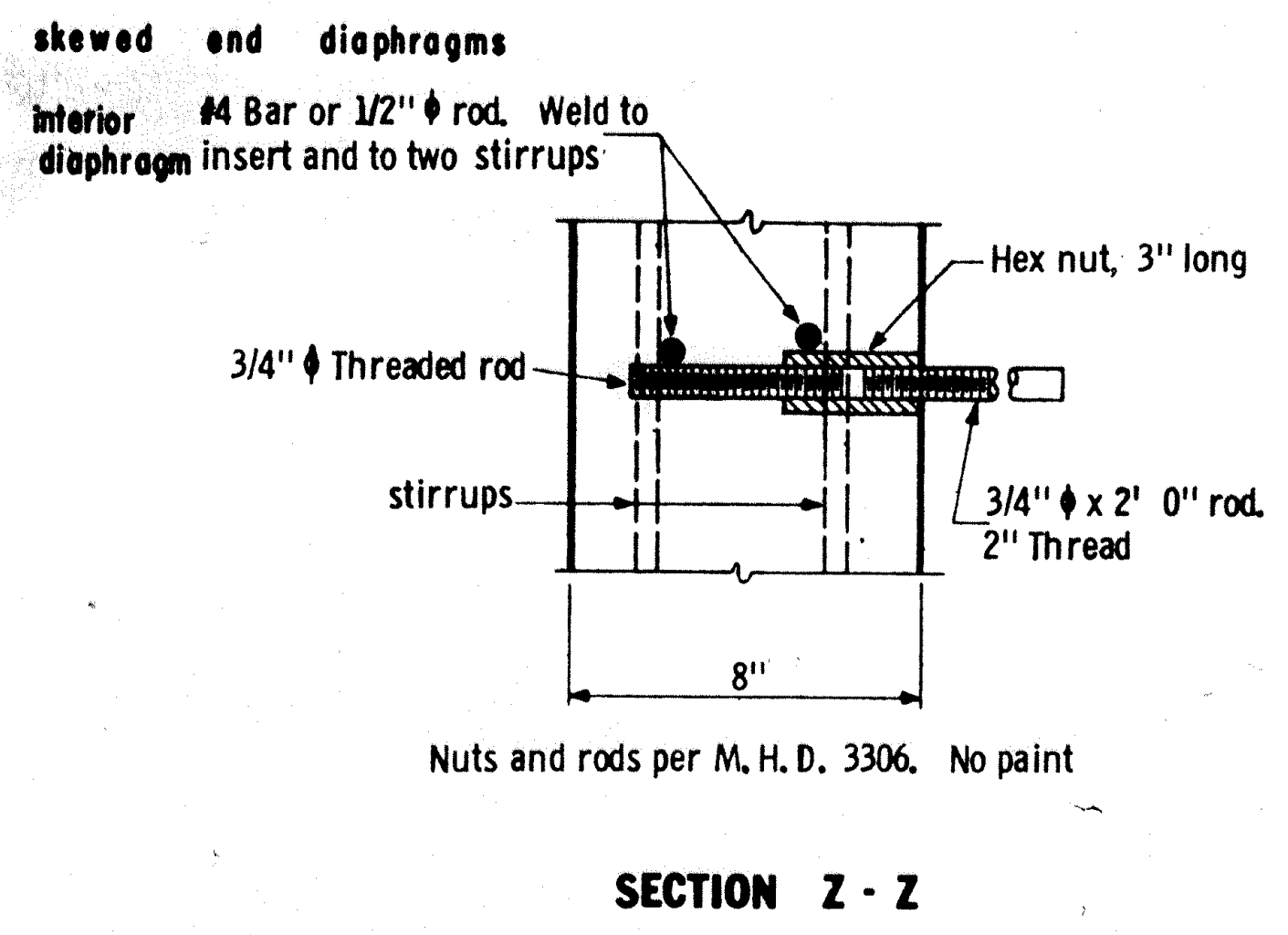
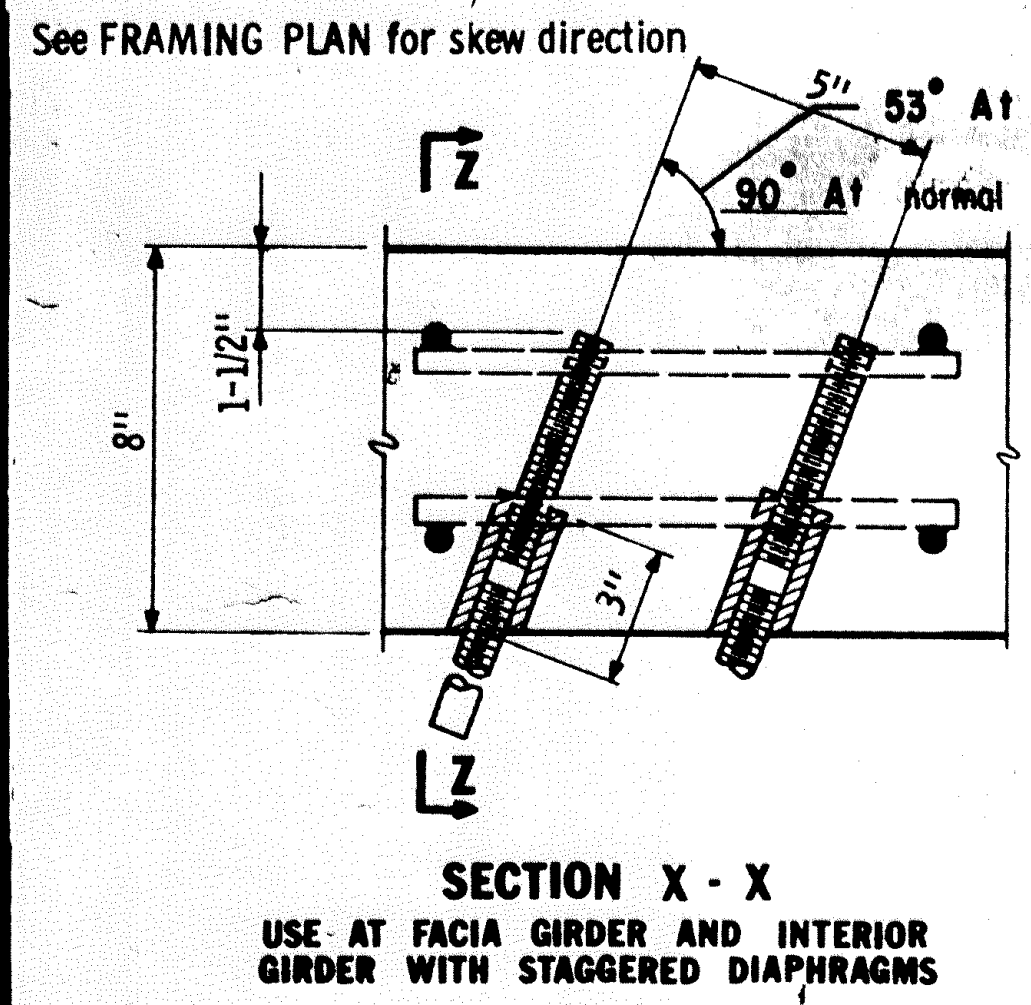
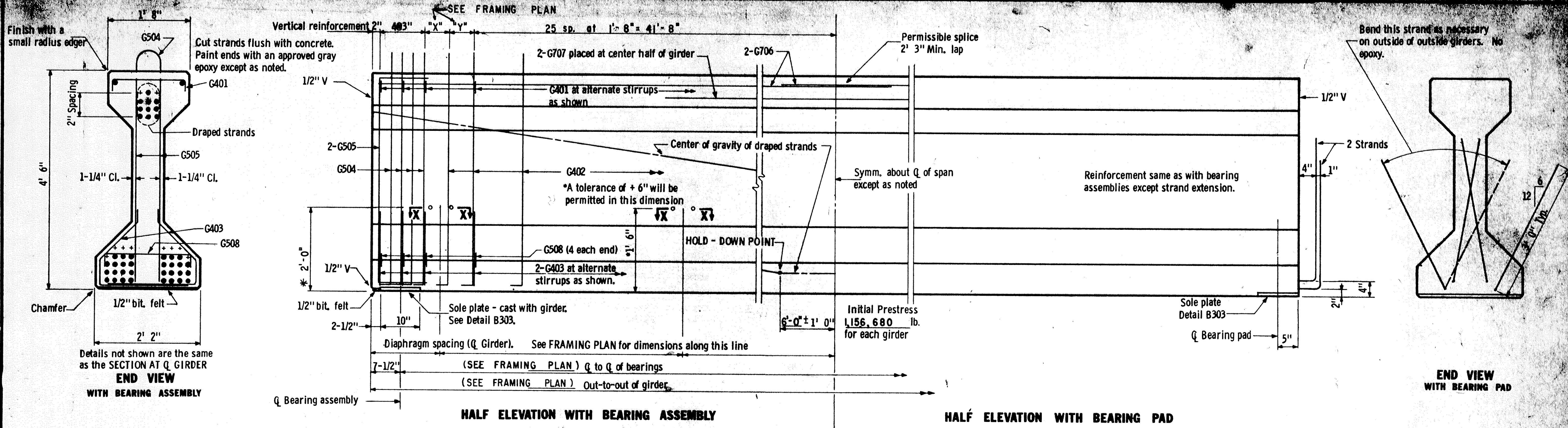
STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

BRIDGE NO. 02521

SUPERSTRUCTURE FRAMING PLAN

APPROVED: 12-21-71

DES. B.J. DR. M.S. 02521
 CHK. M.S. CHK. B.J.

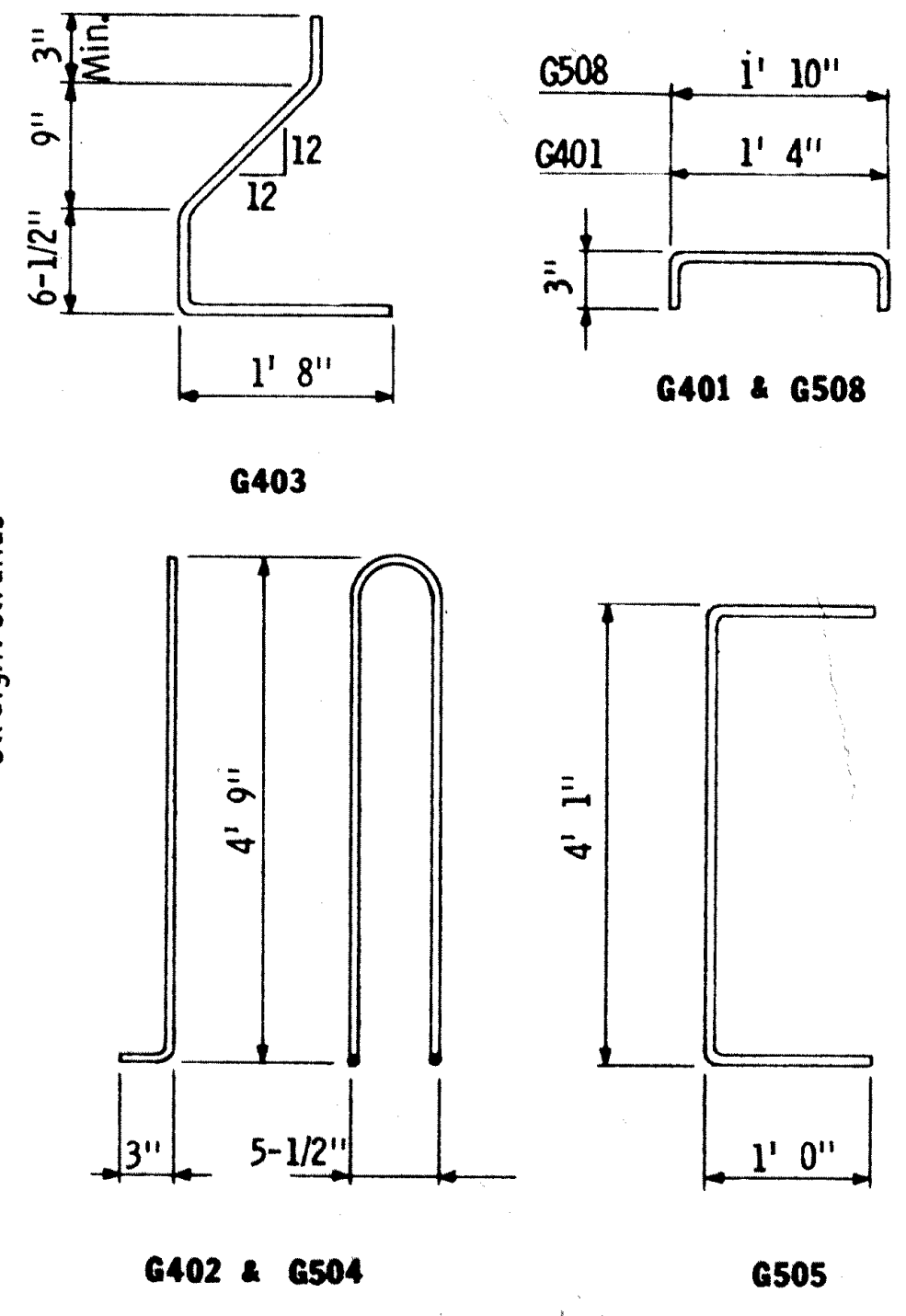


Y DISTANCES (IN INCHES)			
	NO.	Q SPAN	END
Straight strands	30	4.80	
Draped strands	10	5.00	42.76
Total strands	40	4.85	

Y = distance of Center of Gravity of strands from bottom of girder. All strands spaced 2" c-c, horizontally and vertically.

All strands 1/2" ϕ 270 kip, ultimate strength.

A tolerance of ± 2 " will be permitted in this dimension.



First digit of bar mark indicates bar size. All bar dimensions are out-to-out.

GIRDERS G1 Thru G10

TITLE: 54" PRESTRESSED CONCRETE GIRDER (PRETENSIONED) TYPE 54-82

GENERAL NOTES:

Tops of girders shall be rough floated and broomed transversely for bond. Provide handling hooks or devices as required by Contractor. Hooks or devices provided will be subject to approval of Engineer and shall be installed within 4' 0" of the end of girder.

A modified strand pattern which does not change center of gravity of strands may be submitted to the Engineer for approval.

A post-tensioned girder may be used as an alternate for the pretensioned design shown. M. H. D. will have plans available for the post-tensioned alternate.

Each girder shall be marked, showing bridge number, casting date, and individual identification letters and numbers. Markings shall be made on the face of the girder, near the end, so located that they will be exposed after the end diaphragms have been cast. Facia girders shall be marked on an inside face. All markings shall be stencilled and be clearly legible. For location of girders, see framing plan.

All material and work shown or noted on this sheet shall be included in unit price bid for prestressed concrete girders. See M. H. D. 2405.

See framing plan for girder ends marked 'X'.

Approximate weight of girder 38 tons.

MINIMUM CONCRETE STRENGTH - P.S.I.			
	①	③	f'c
Computed Min. Concrete Strength	4000	5180	
Required Min. Concrete Strength	4500	5180	

- ① Minimum concrete strength at time of prestress transfer.
- ② Minimum concrete strength when curing can be discontinued and girder transported and installed.
- ③ Required minimum concrete strength shall be used. Computed minimum concrete strength is for information only.

DES: BJ DR: MHD APPROVED: 12-21-71

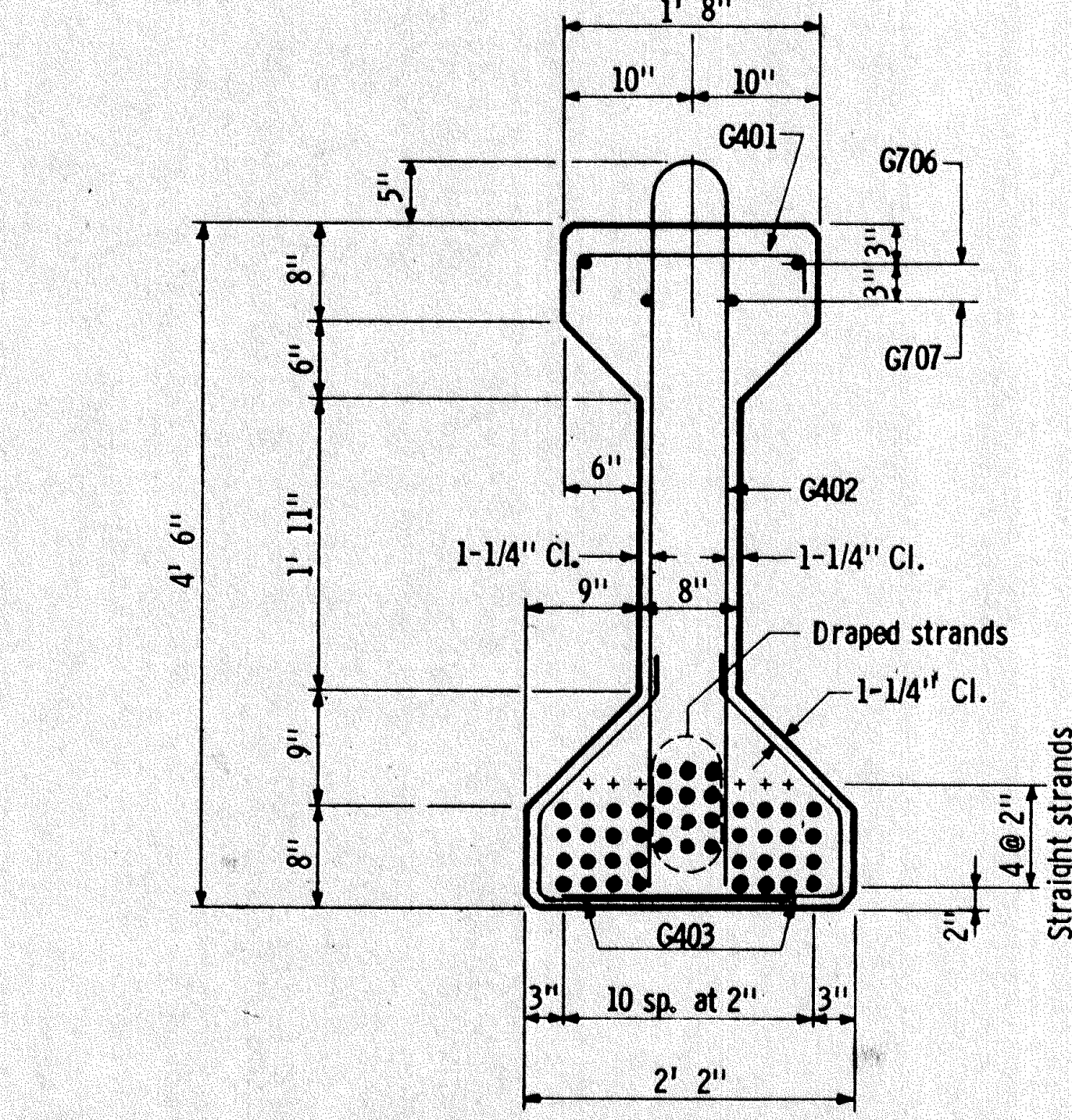
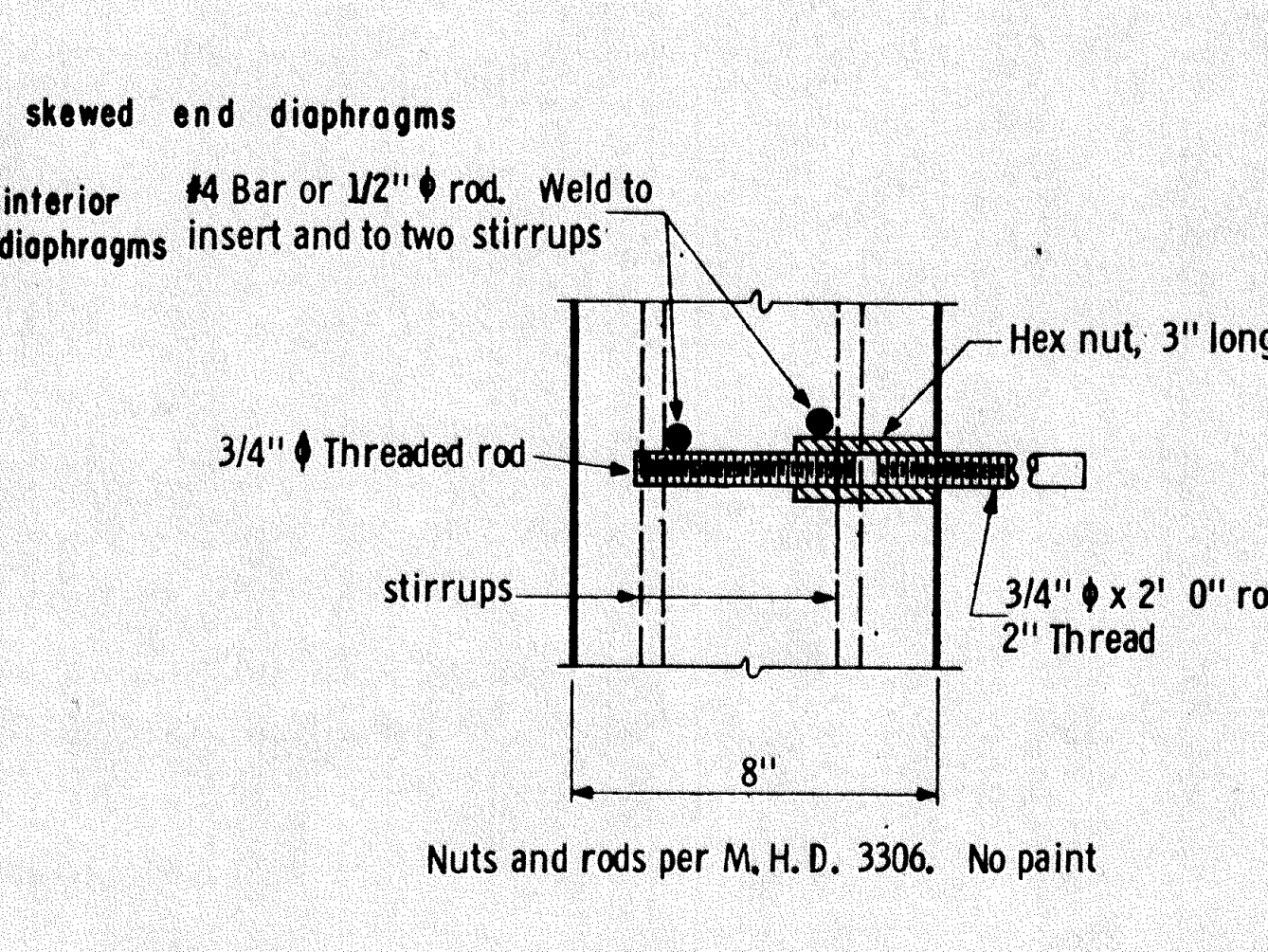
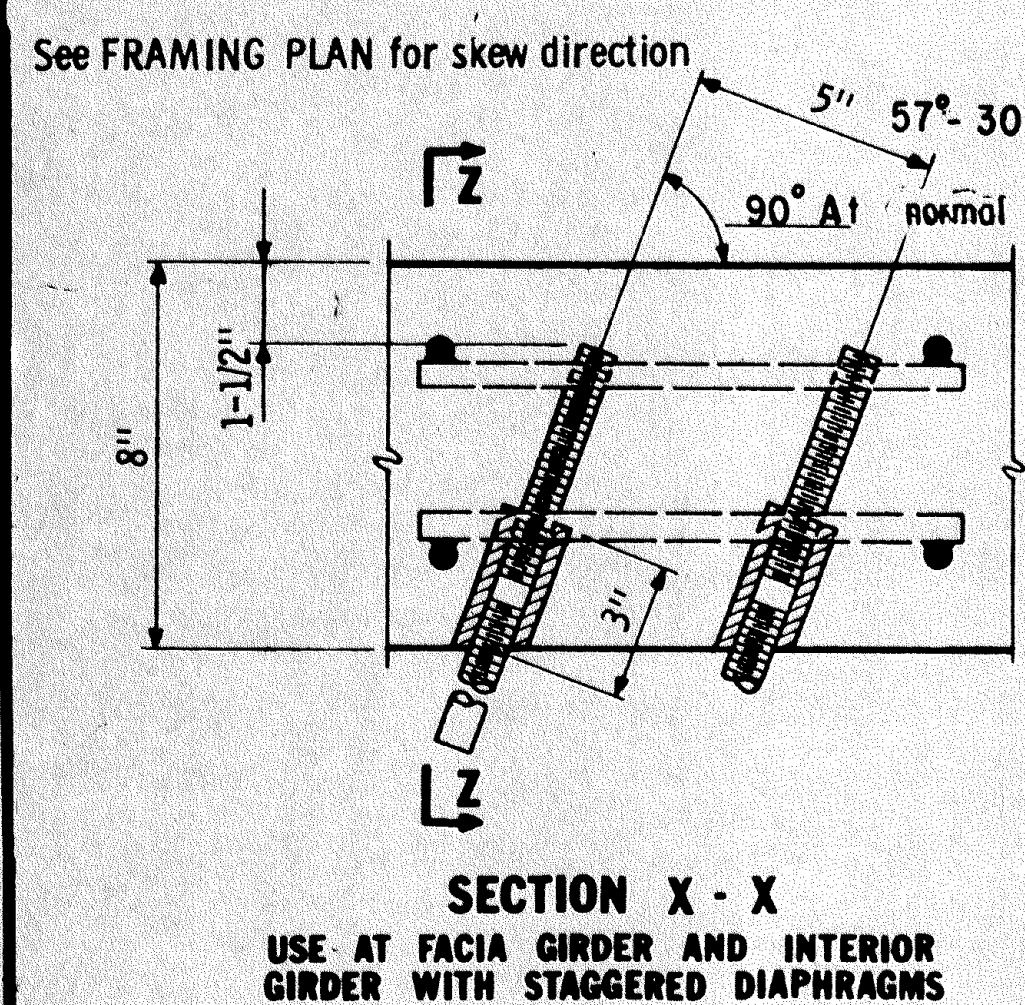
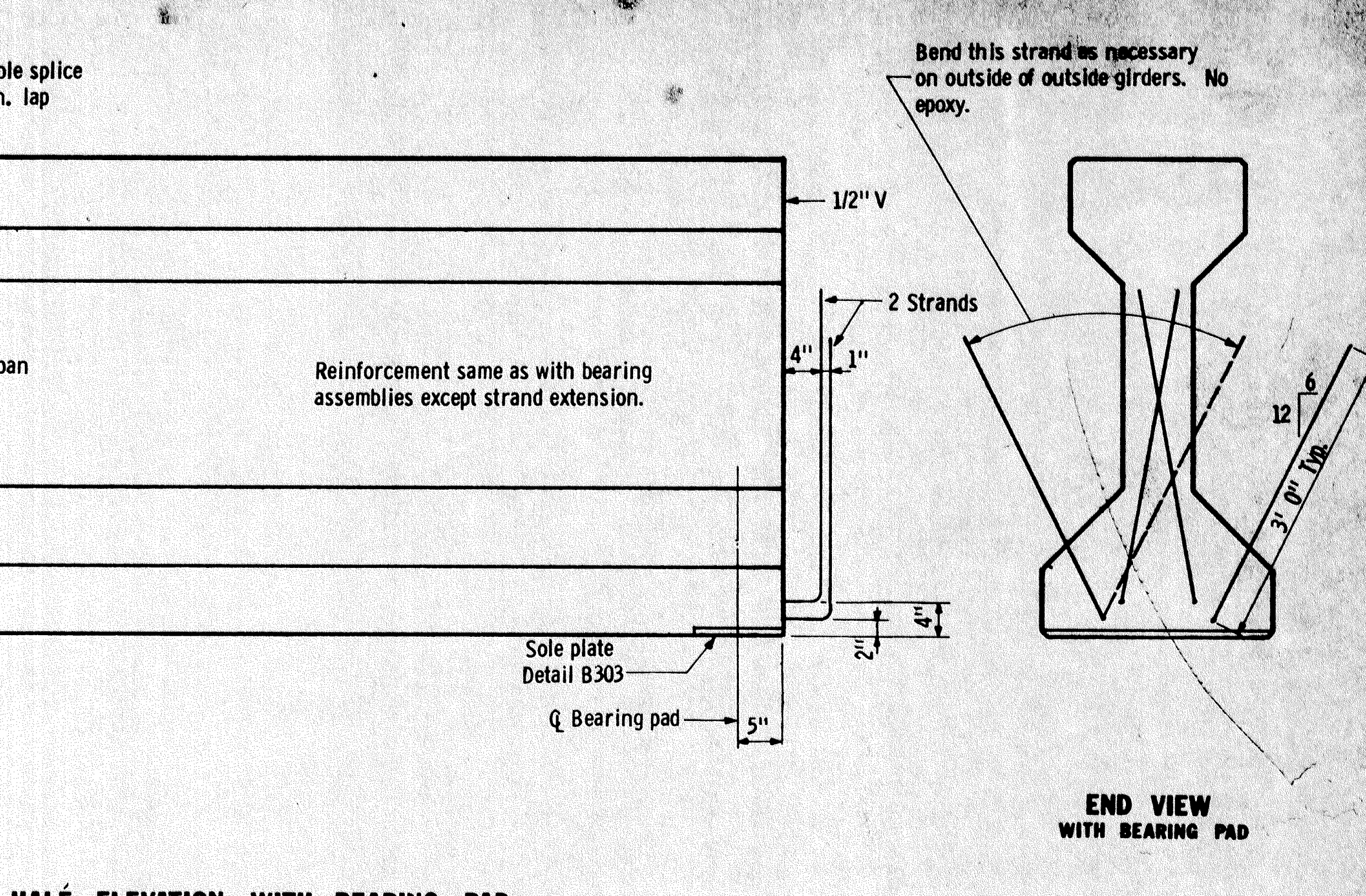
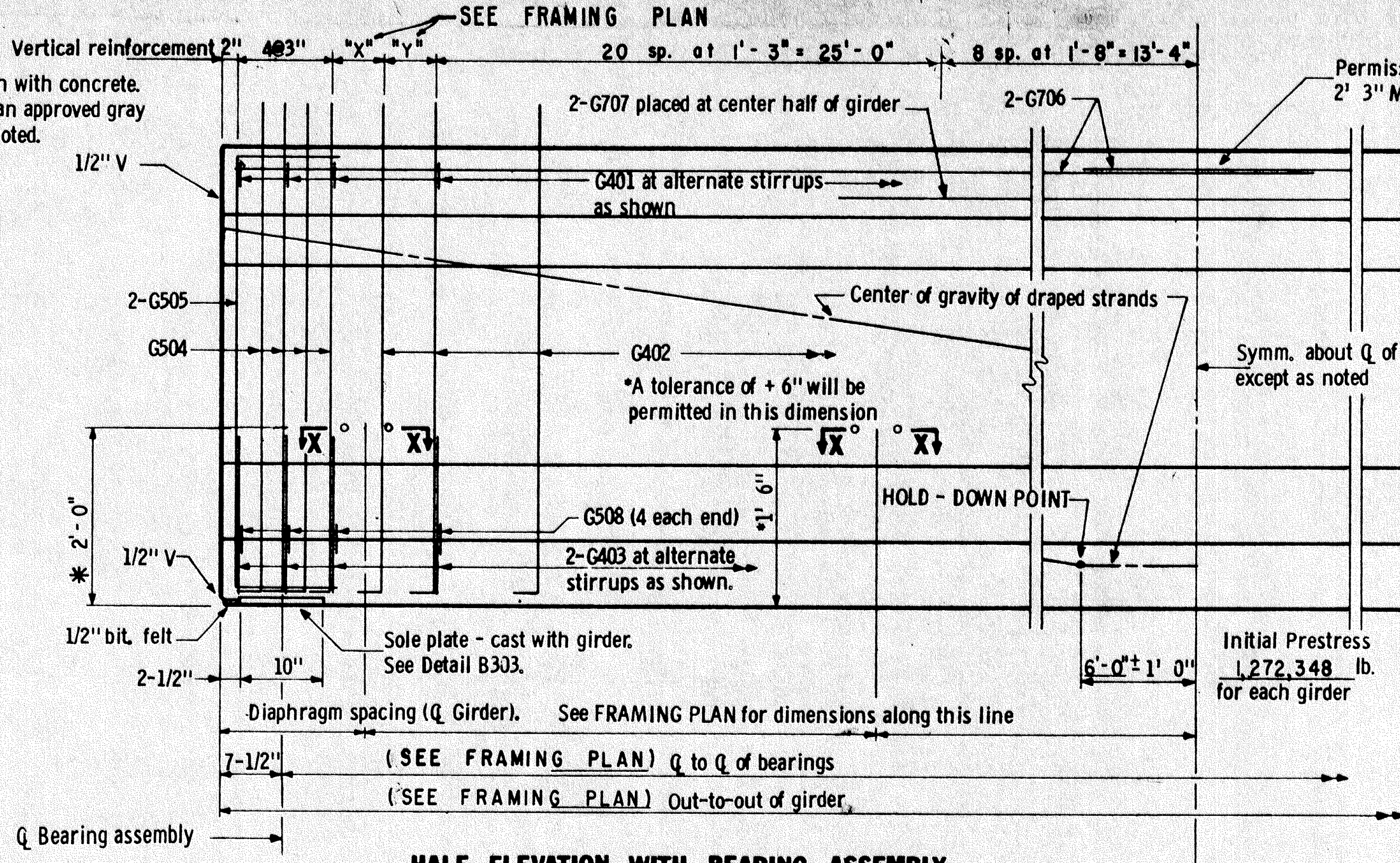
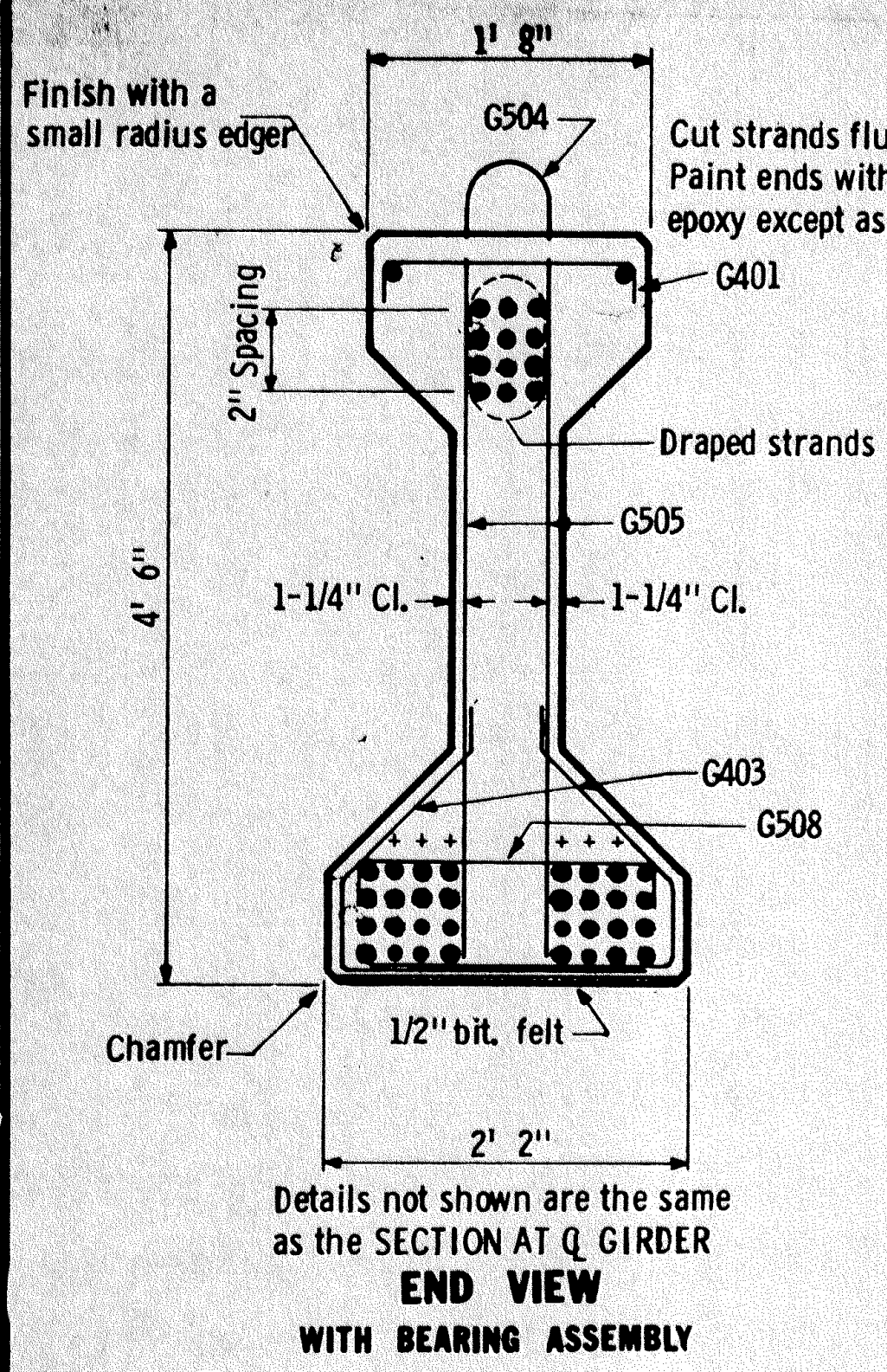
CHK: DG CM: BJ

AS BUILT 10-16-75 B. Jak

Fig. 5-397.505 SEPT. 1, 1969

Bridge No. 02521

Sheet No. 13 of 22 Sheets



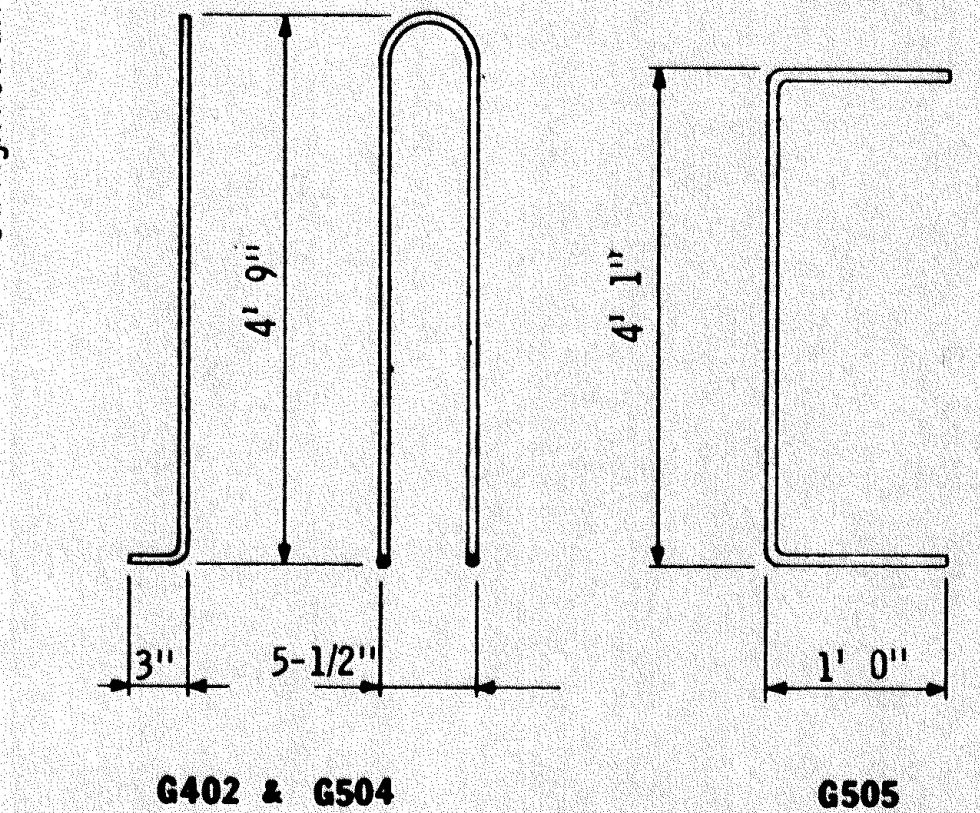
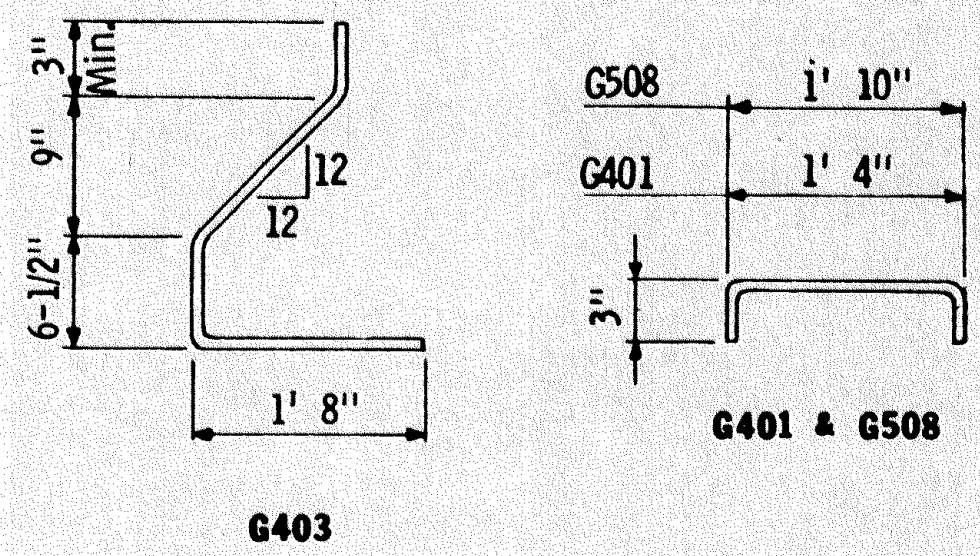
Y DISTANCES (IN INCHES)

	NO.	Q SPAN	END
Straight strands	32	5.00	
Draped strands	12	8.67	39.61
Total strands	44	6.00	

v = distance of Center of Gravity of strands from bottom of girder. All strands spaced 2" c-c, horizontally and vertically.

All strands 1/2" φ 270 kip ultimate strength.

*A tolerance of ± 2" will be permitted in this dimension.



First digit of bar mark indicates bar size. All bar dimensions are out-to-out.

GIRDERS G11 Thru G18

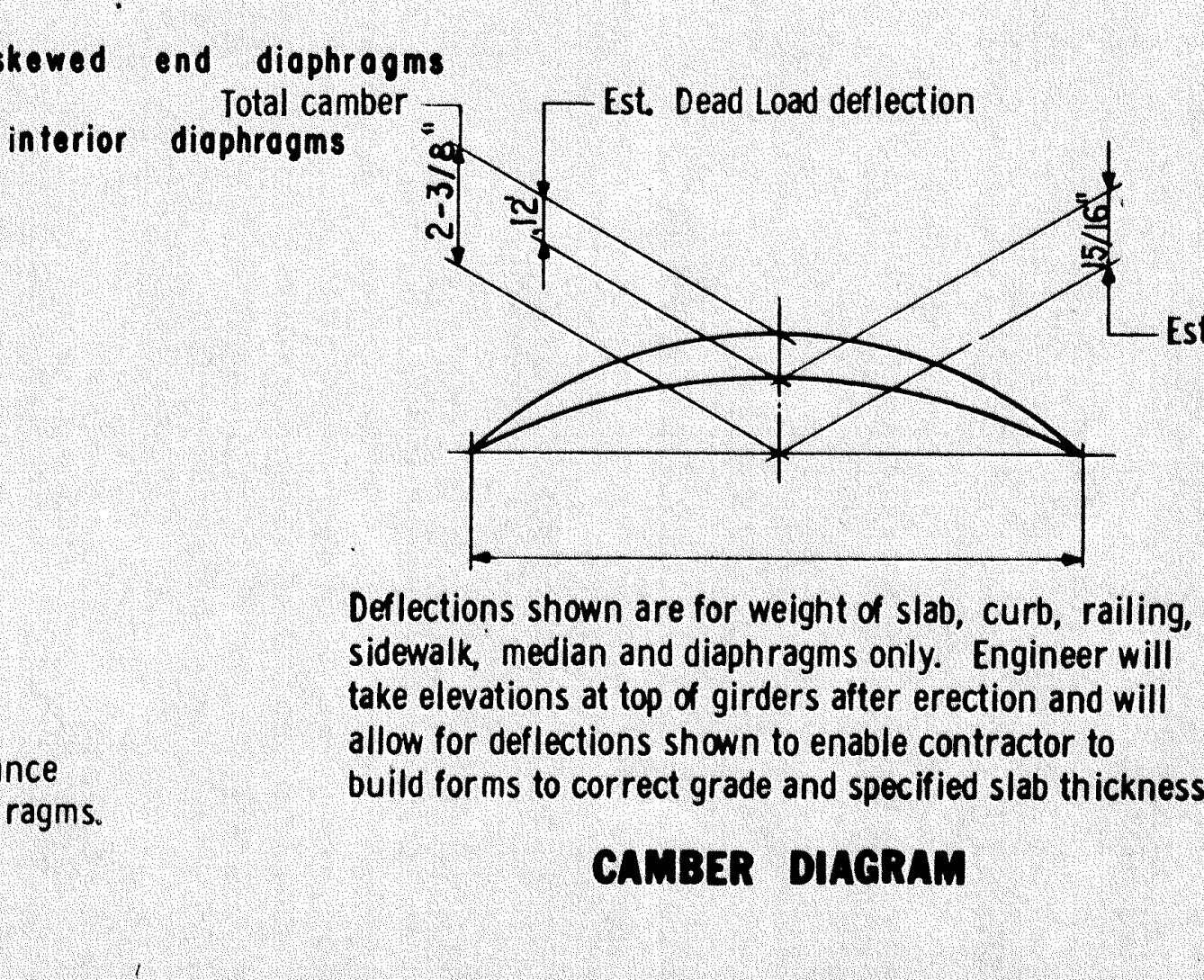
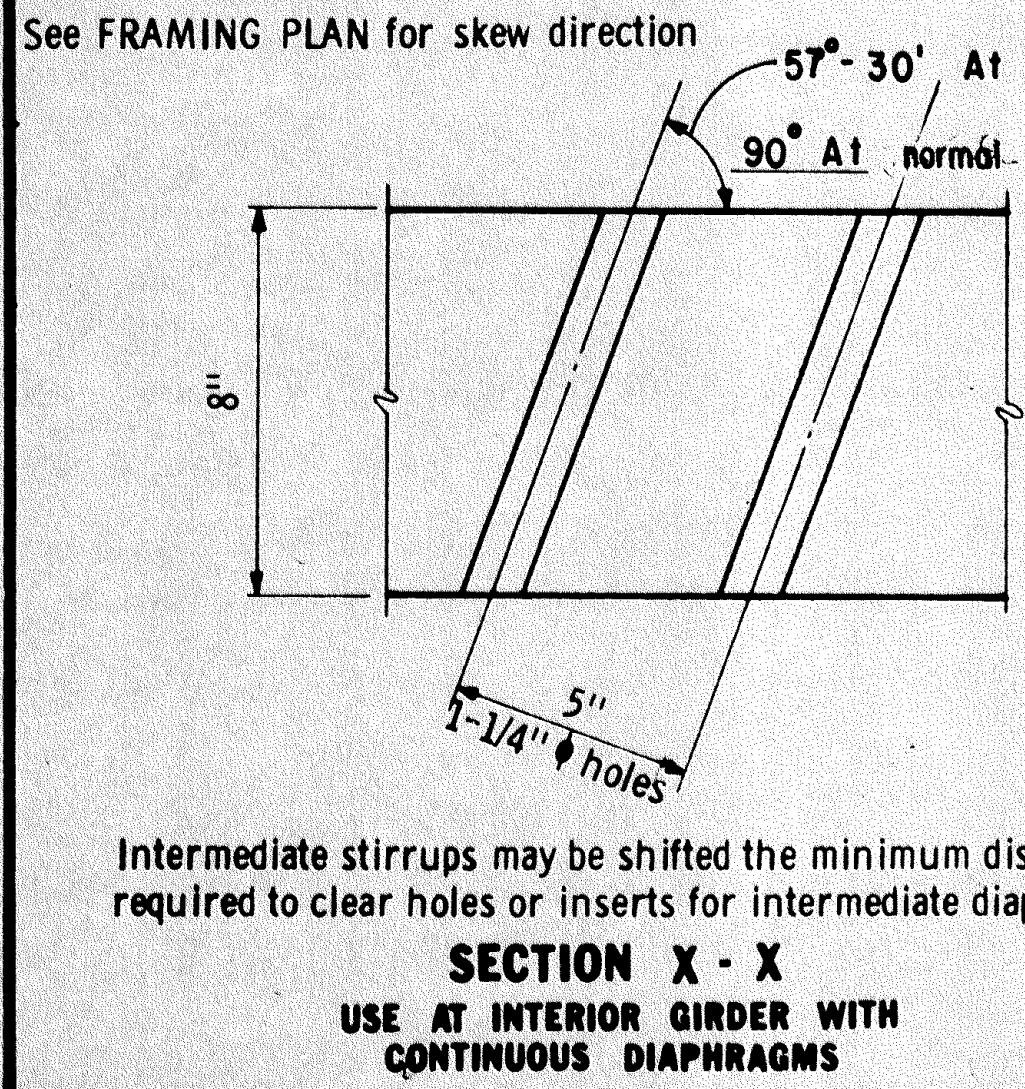
TITLE: **54" PRESTRESSED CONCRETE GIRDER (PRETENSIONED) TYPE 54-83**

- GENERAL NOTES:**
- Tops of girders shall be rough floated and broomed transversely for bond.
 - Provide handling hooks or devices as required by Contractor. Hooks or devices provided will be subject to approval of Engineer and shall be installed within 4' 0" of the end of girder.
 - A modified strand pattern which does not change center of gravity of strands may be submitted to the Engineer for approval.
 - A post-tensioned girder may be used as an alternate for the pretensioned design shown. M. H. D. will have plans available for the post-tensioned alternate.
 - Each girder shall be marked, showing bridge number, casting date, and individual identification letters and numbers. Markings shall be made on the face of the girder, near the end, so located that they will be exposed after the end diaphragms have been cast. Facia girders shall be marked on an inside face. All markings shall be stencilled and be clearly legible. For location of girders, see framing plan.
 - All material and work shown or noted on this sheet shall be included in unit price bid for prestressed concrete girders. See M. H. D. 2405.
 - See framing plan for girder ends marked "X".
 - Approximate weight of girder 34 tons.

MINIMUM CONCRETE STRENGTH - P.S.I.

	① ③ f'ci	② ③ f'c
Computed Min. Concrete Strength	4453	6000
Required Min. Concrete Strength	4500	6000

- ① Minimum concrete strength at time of prestress transfer.
- ② Minimum concrete strength when curing can be discontinued and girder transported and installed.
- ③ Required minimum concrete strength shall be used. Computed minimum concrete strength is for information only.



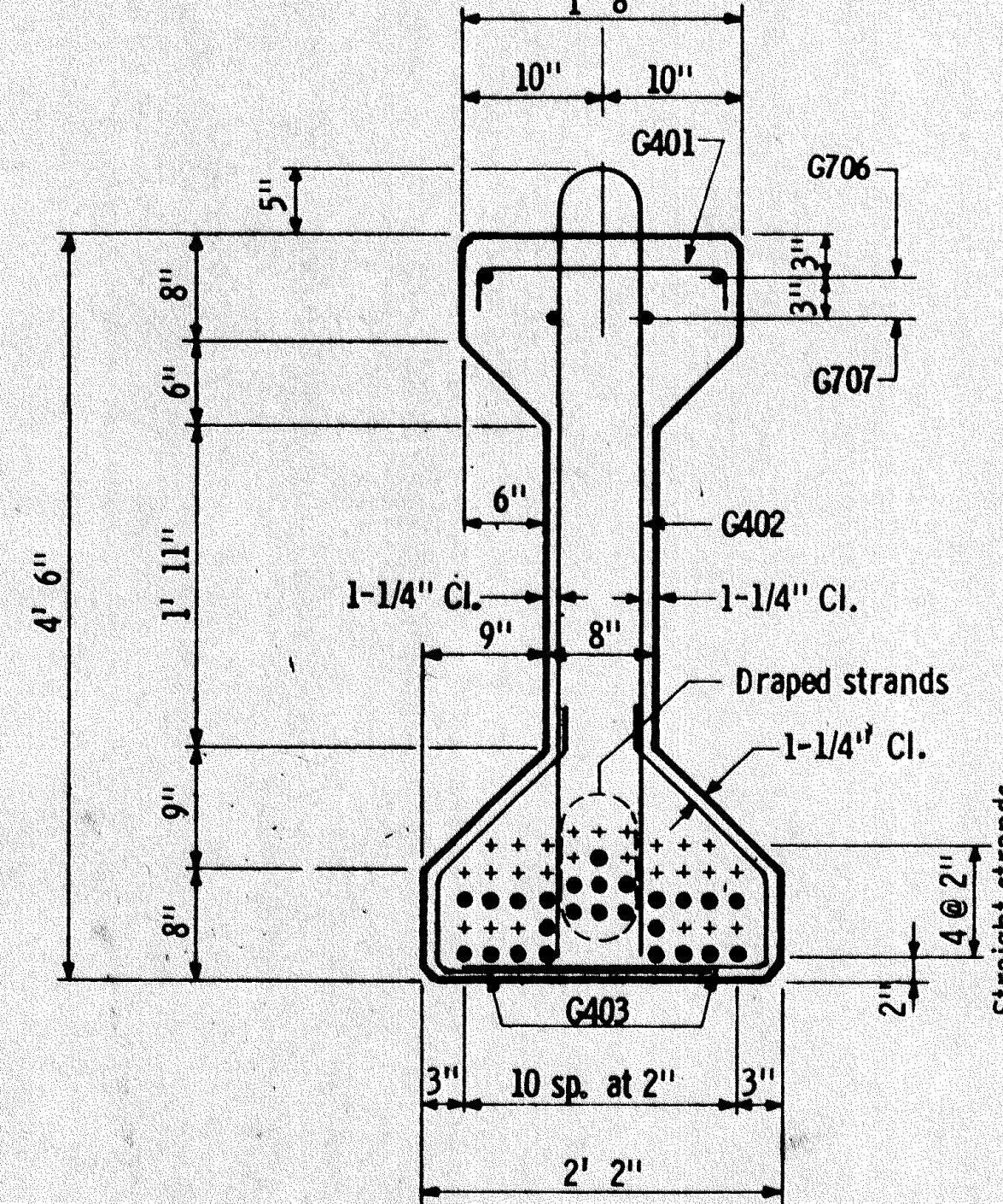
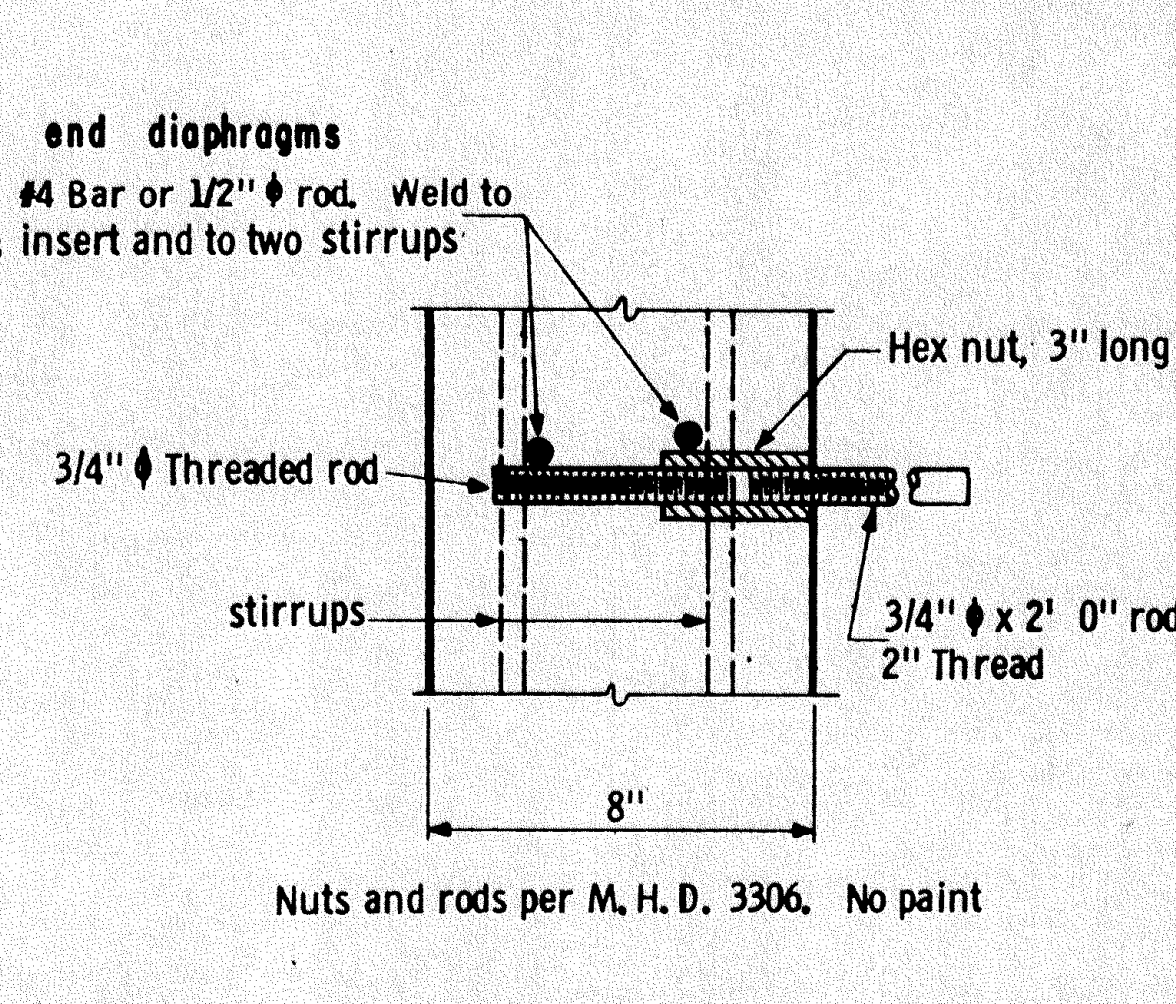
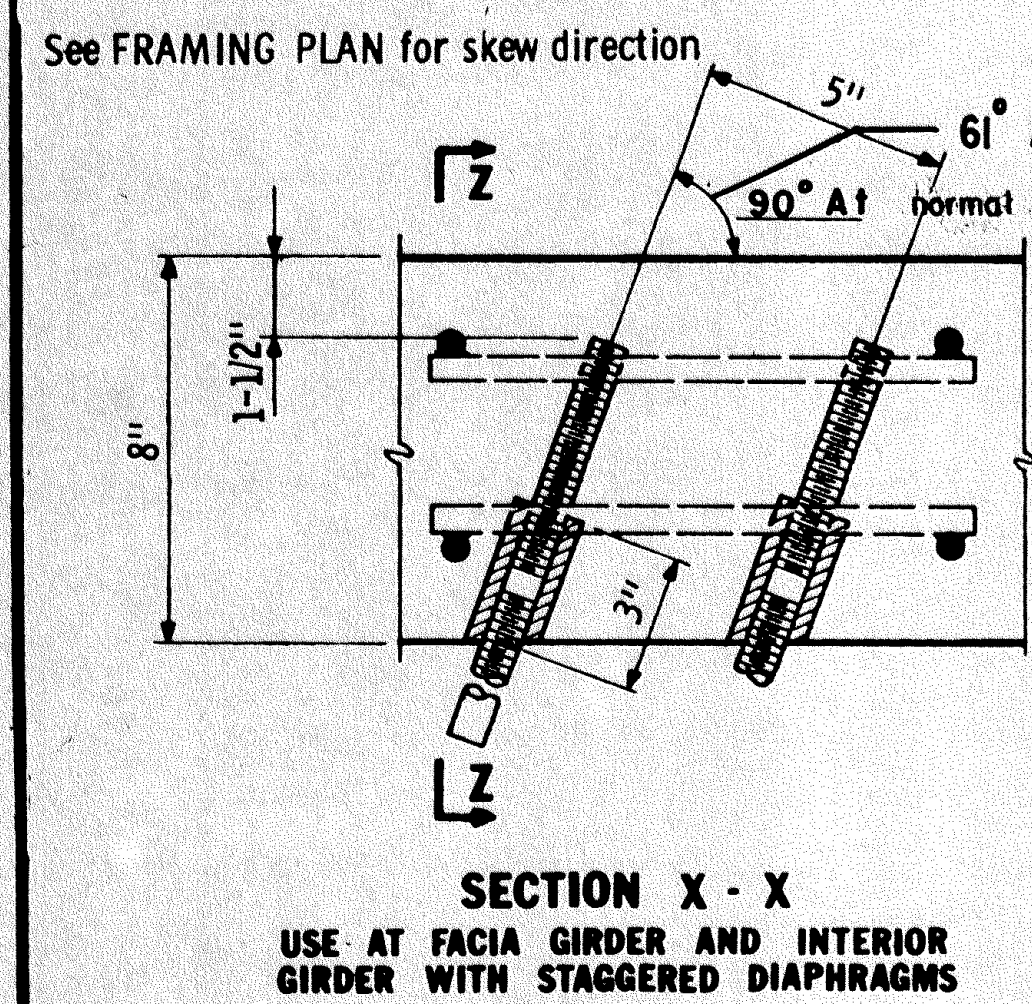
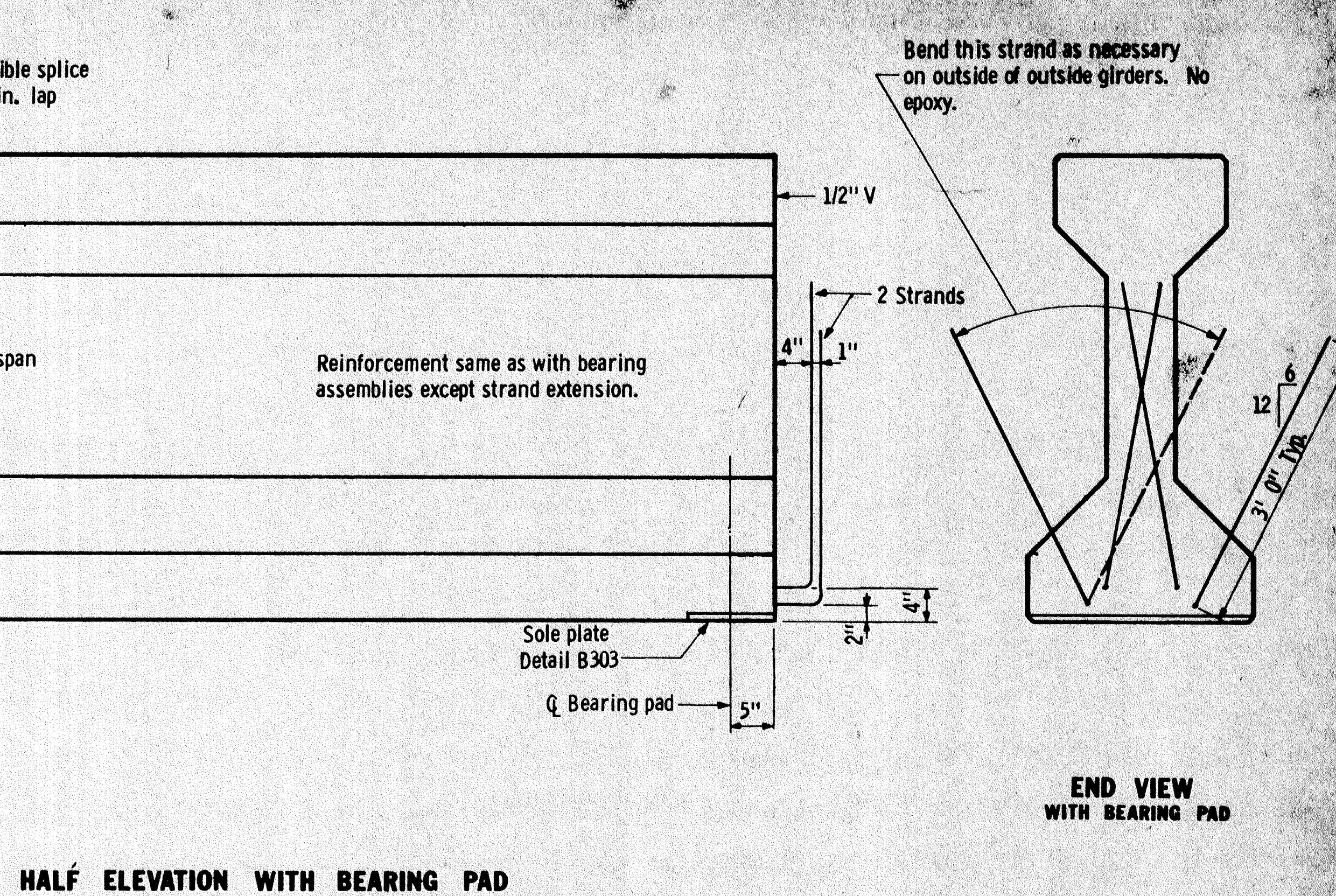
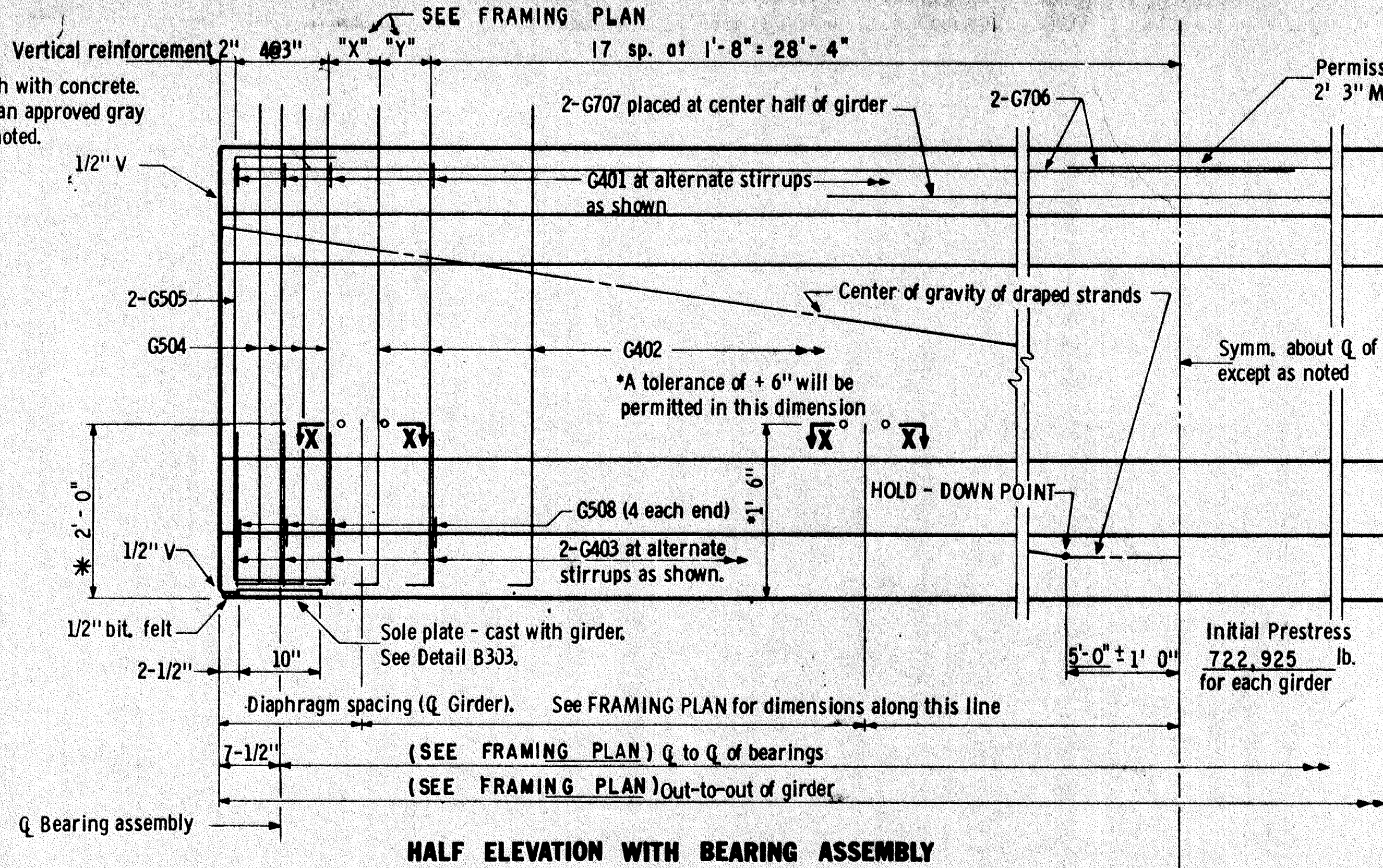
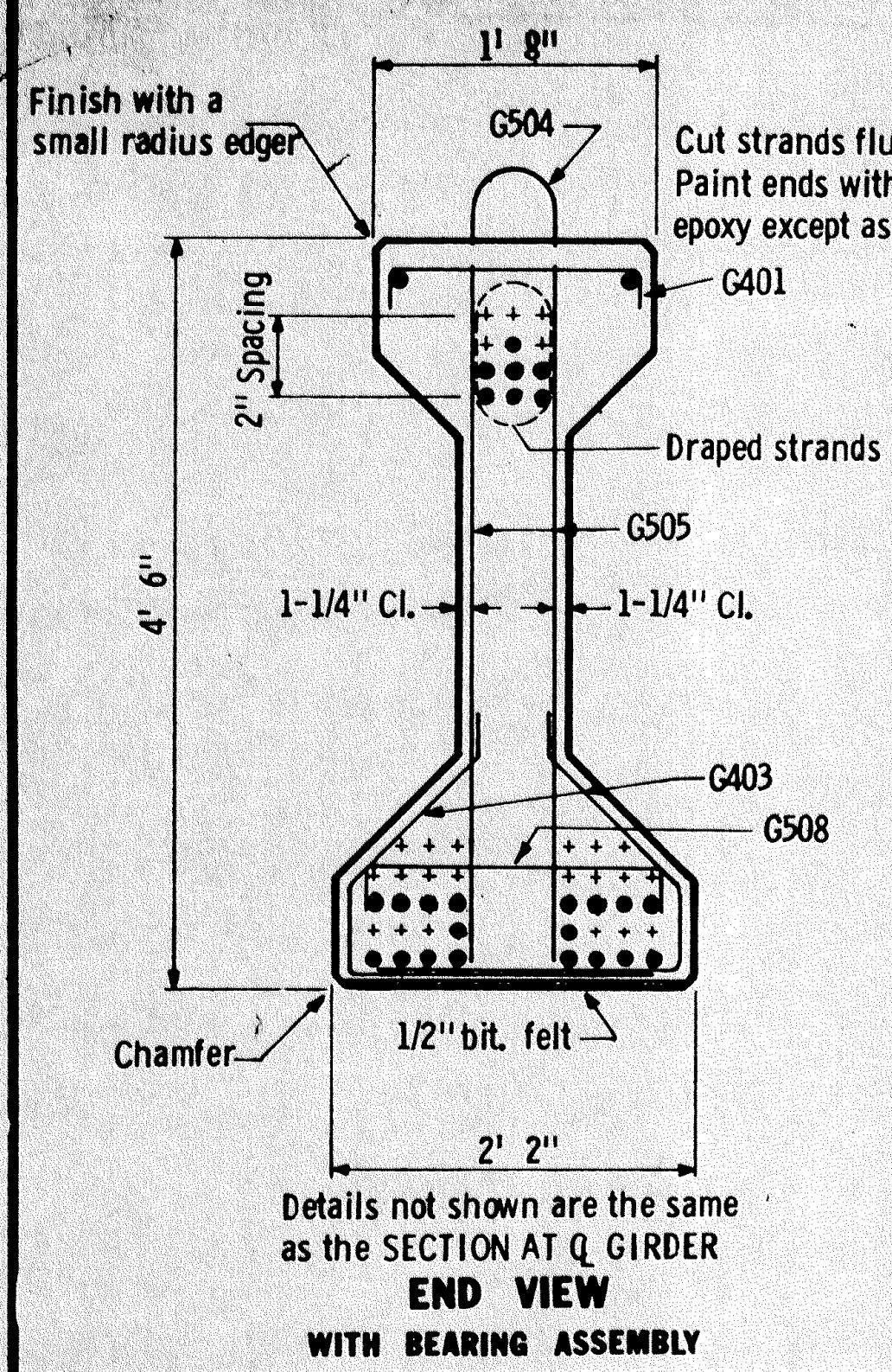
AS BUILT
10-16-73
B. J. S. J.

Fig. 5-397.505
SEPT. 1, 1969

DES: BJ DR: MHD APPROVED: 12-21-71
CHK: DG CHK: SJ

Bridge No. 02521

Sheet No. 14 of 22 Sheets



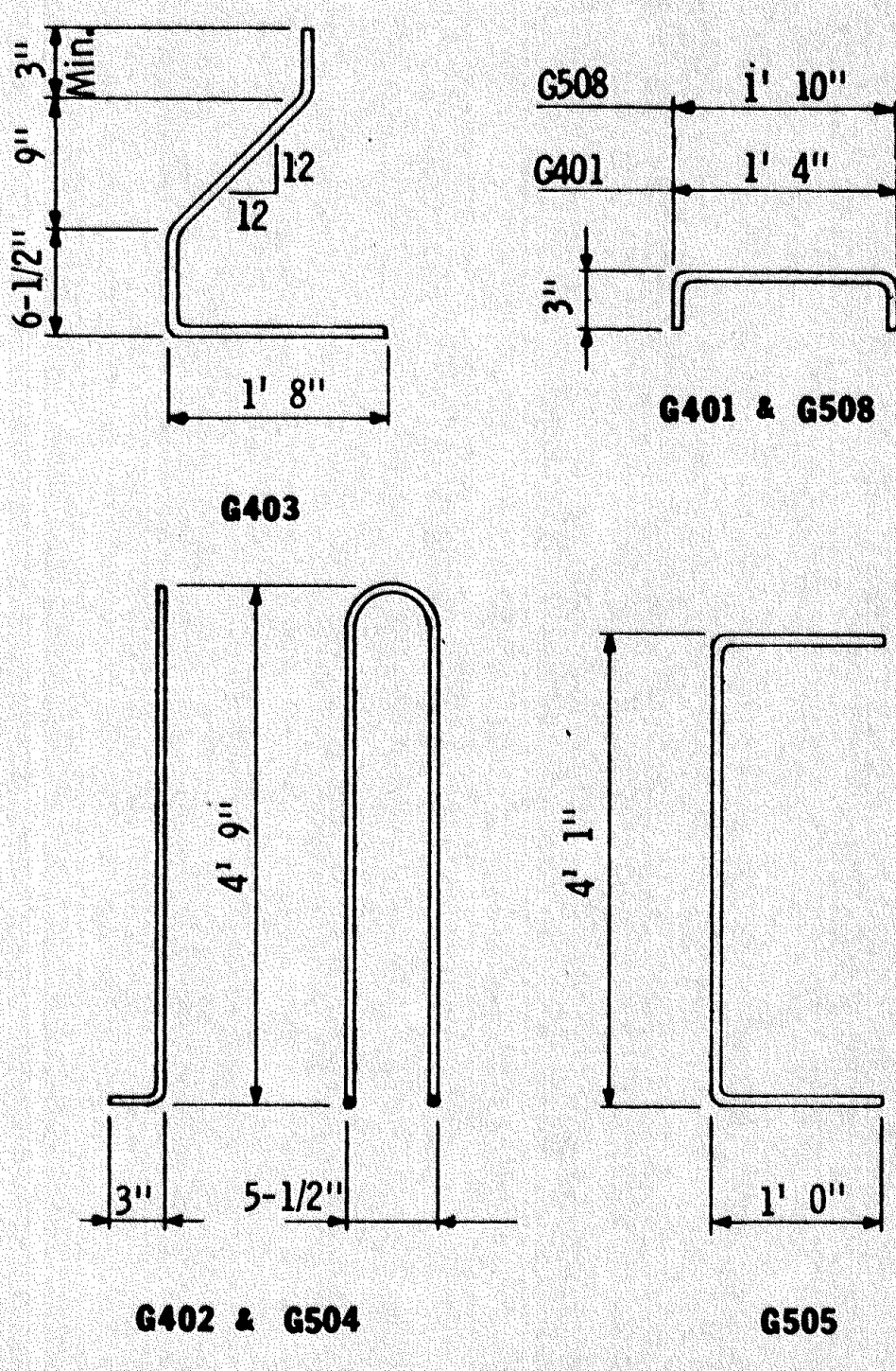
SECTION AT Q GIRDER

Y DISTANCES (IN INCHES)			
	NO.	Q SPAN	END
Straight strands	18	4.00	
Draped strands	7	5.22	40.72
Total strands	25	4.34	

Y = distance of Center of Gravity of strands from bottom of girder. All strands spaced 2" c-c, horizontally and vertically.

All strands 1/2" # 270 kip, ultimate strength.

*A tolerance of ± 2" will be permitted in this dimension.



GENERAL NOTES:

Tops of girders shall be rough floated and broomed transversely for bond. Provide handling hooks or devices as required by Contractor. Hooks or devices provided will be subject to approval of Engineer and shall be installed within 4' 0" of the end of girder.

A modified strand pattern which does not change center of gravity of strands may be submitted to the Engineer for approval.

A post-tensioned girder may be used as an alternate for the pretensioned design shown. M. H. D. will have plans available for the post-tensioned alternate.

Each girder shall be marked, showing bridge number, casting date, and individual identification letters and numbers. Markings shall be made on the face of the girder, near the end, so located that they will be exposed after the end diaphragms have been cast. Facia girders shall be marked on an inside face. All markings shall be stenciled and be clearly legible. For location of girders, see framing plan.

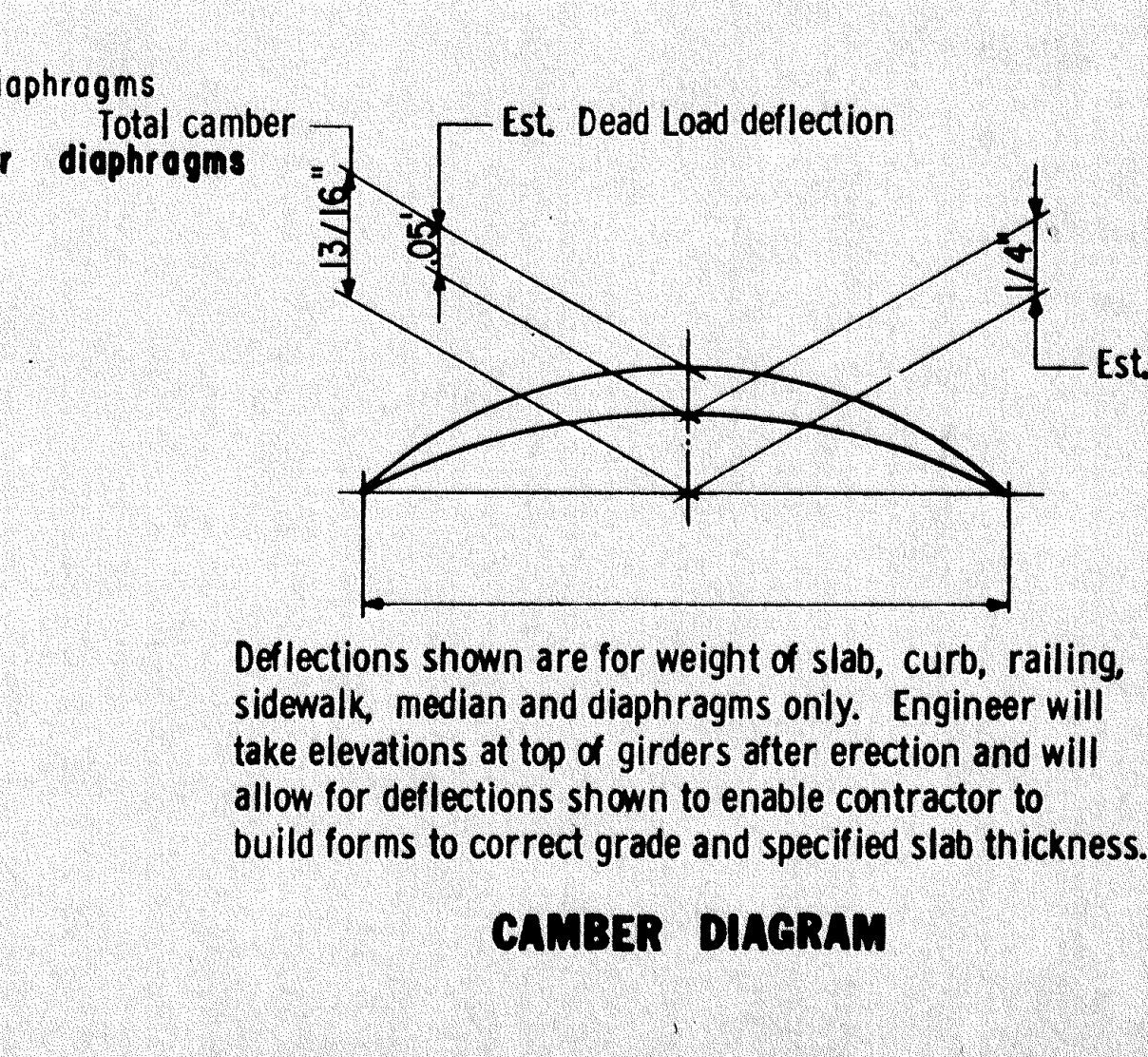
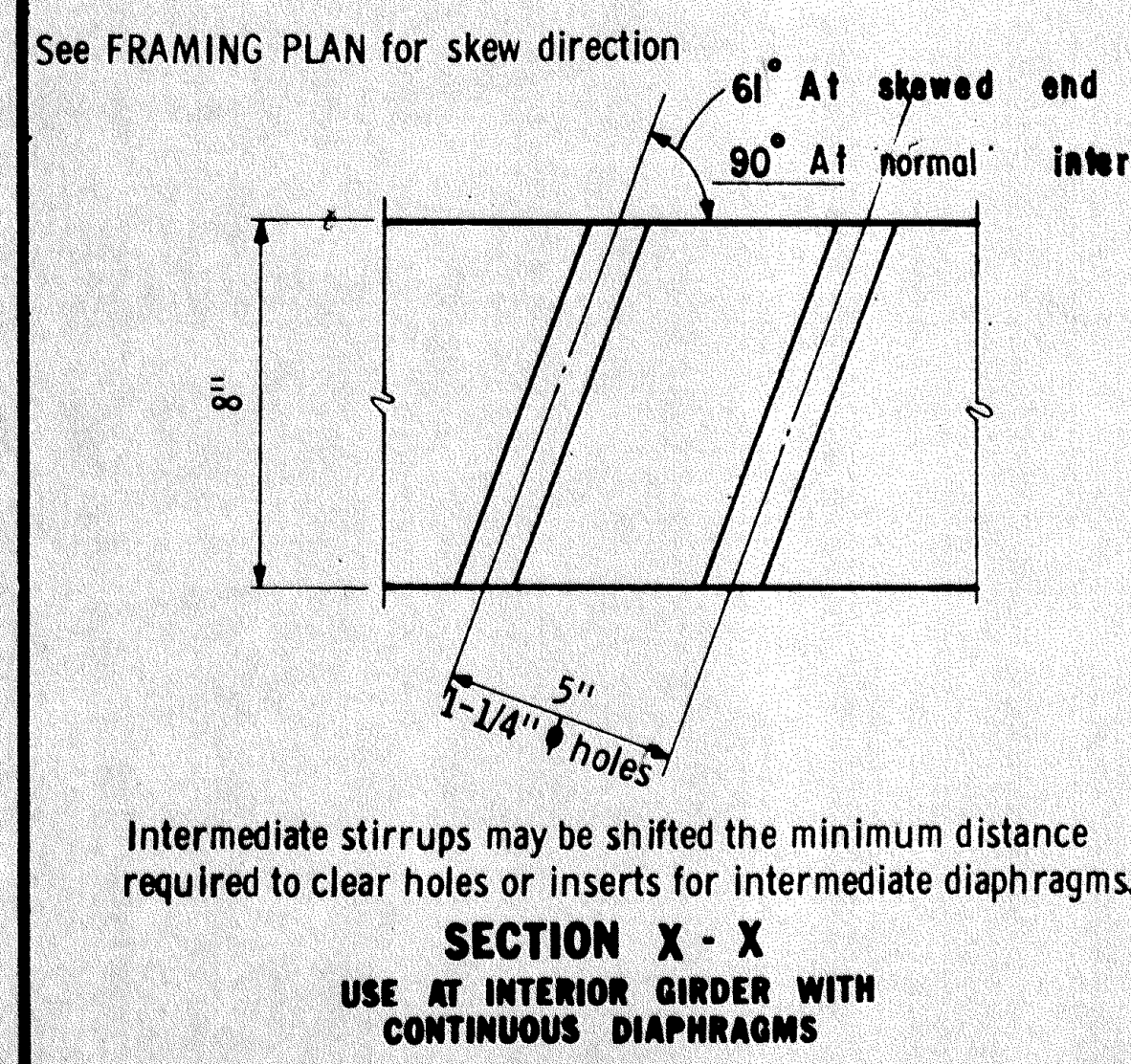
All material and work shown or noted on this sheet shall be included in unit price bid for prestressed concrete girders. See M. H. D. 2405.

See framing plan for girder ends marked "X".

Approximate weight of girder 26 tons.

MINIMUM CONCRETE STRENGTH - P.S.I.						
	①	③	f'ci	②	③	f'c
Computed Min. Concrete Strength			2900			3130
Required Min. Concrete Strength			4500			5000

- Minimum concrete strength at time of prestress transfer.
- Minimum concrete strength when curing can be discontinued and girder transported and installed.
- Required minimum concrete strength shall be used. Computed minimum concrete strength is for information only.



Deflections shown are for weight of slab, curb, railing, sidewalk, median and diaphragms only. Engineer will take elevations at top of girders after erection and will allow for deflections shown to enable contractor to build forms to correct grade and specified slab thickness.

GIRDERS G19 Thru G26

TITLE: **54" PRESTRESSED CONCRETE GIRDER (PRETENSIONED) TYPE 54 - 64**

DES: BJ DR: MHD APPROVED: 12-21-71

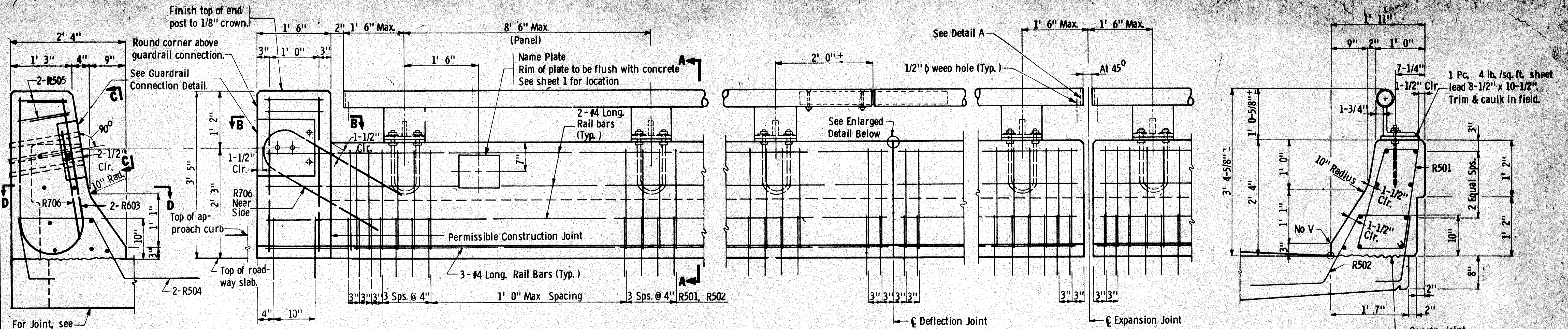
CHK: DG CHK: BJ

AS BUILT 10-10-73 B. Jahn

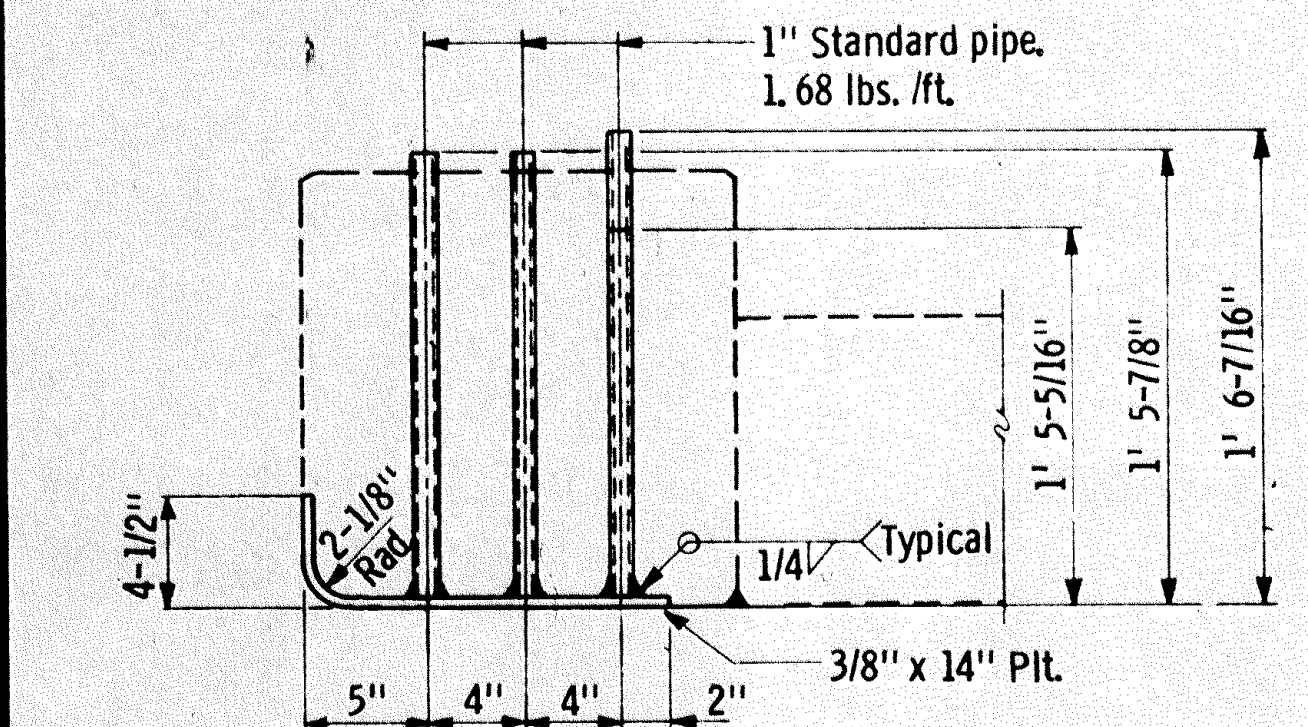
Fig. 5-397.505 SEPT. 1, 1969

Bridge No. 02521

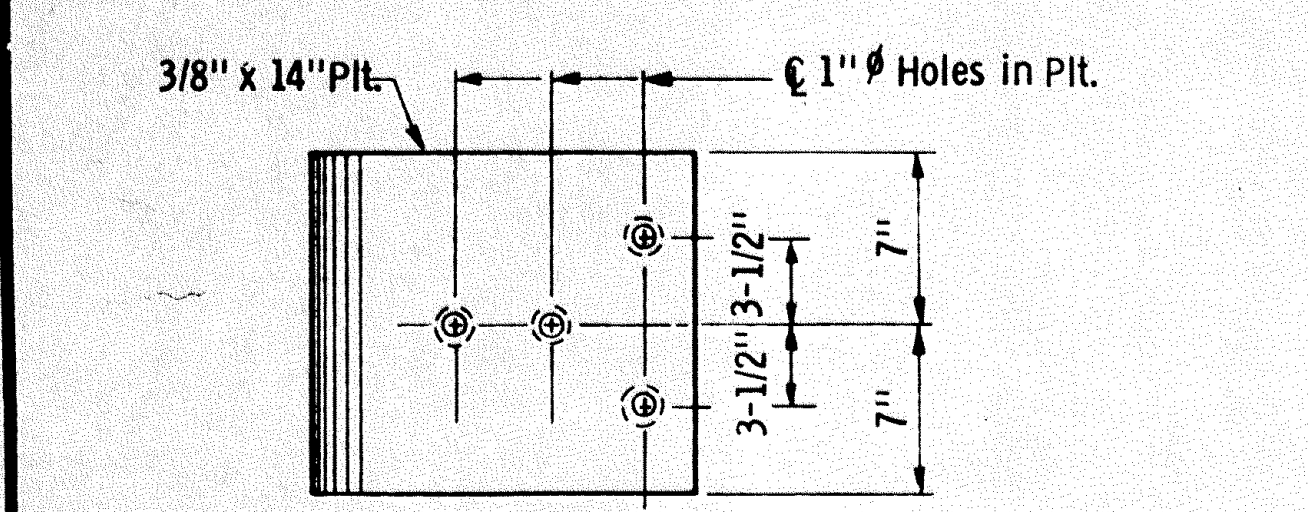
Sheet No. 15 of 22 Sheets



END VIEW

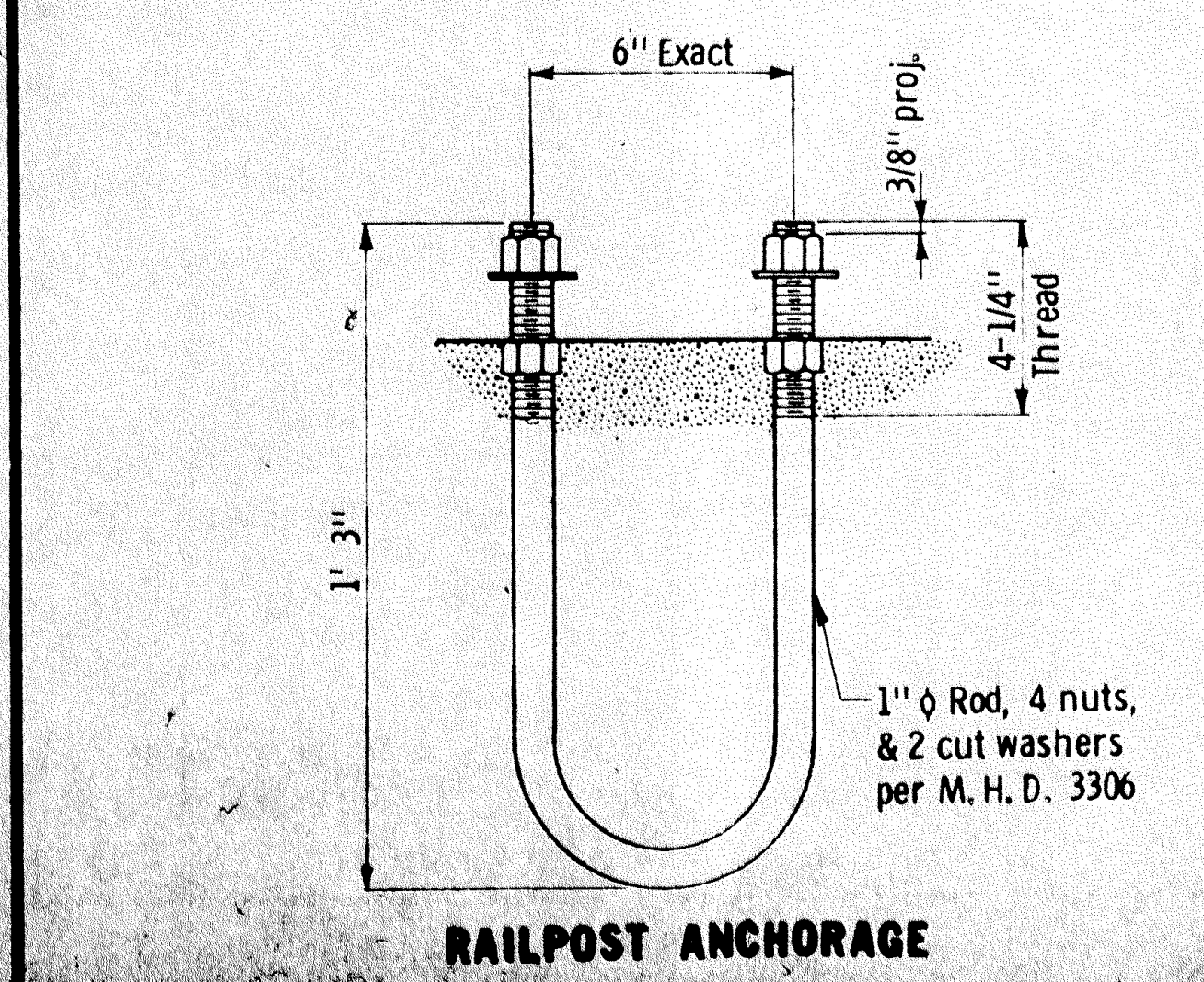


SECTION B-B

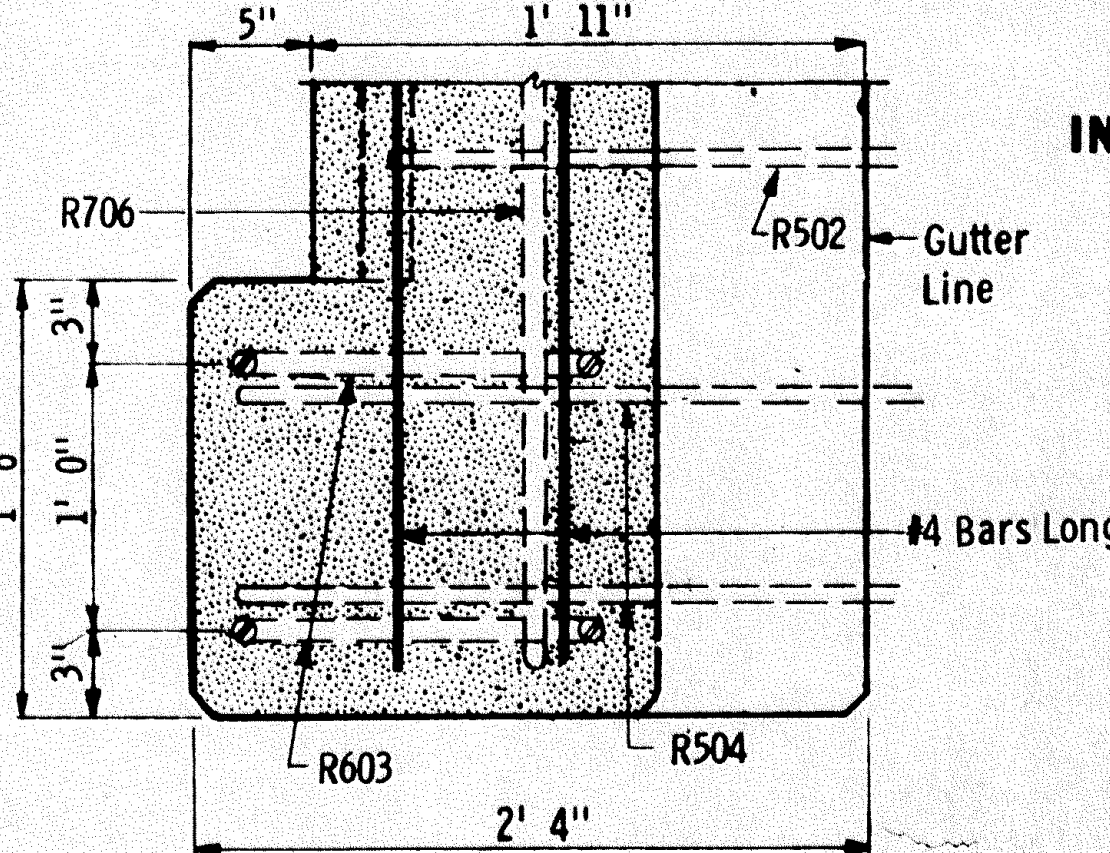


VIEW C-C

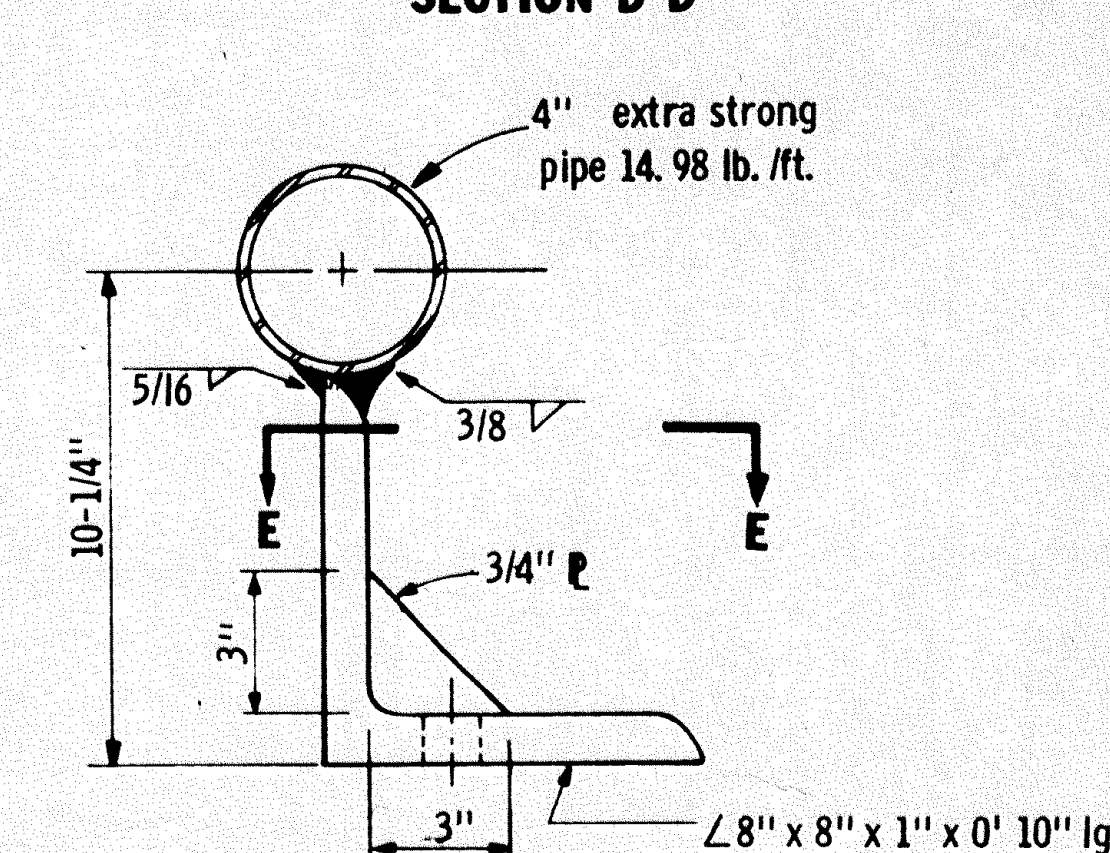
GUARDRAIL CONNECTION DETAIL
GALVANIZE AFTER FABRICATION PER M.H.D. 3394
Est. Wt. 37 Lbs.



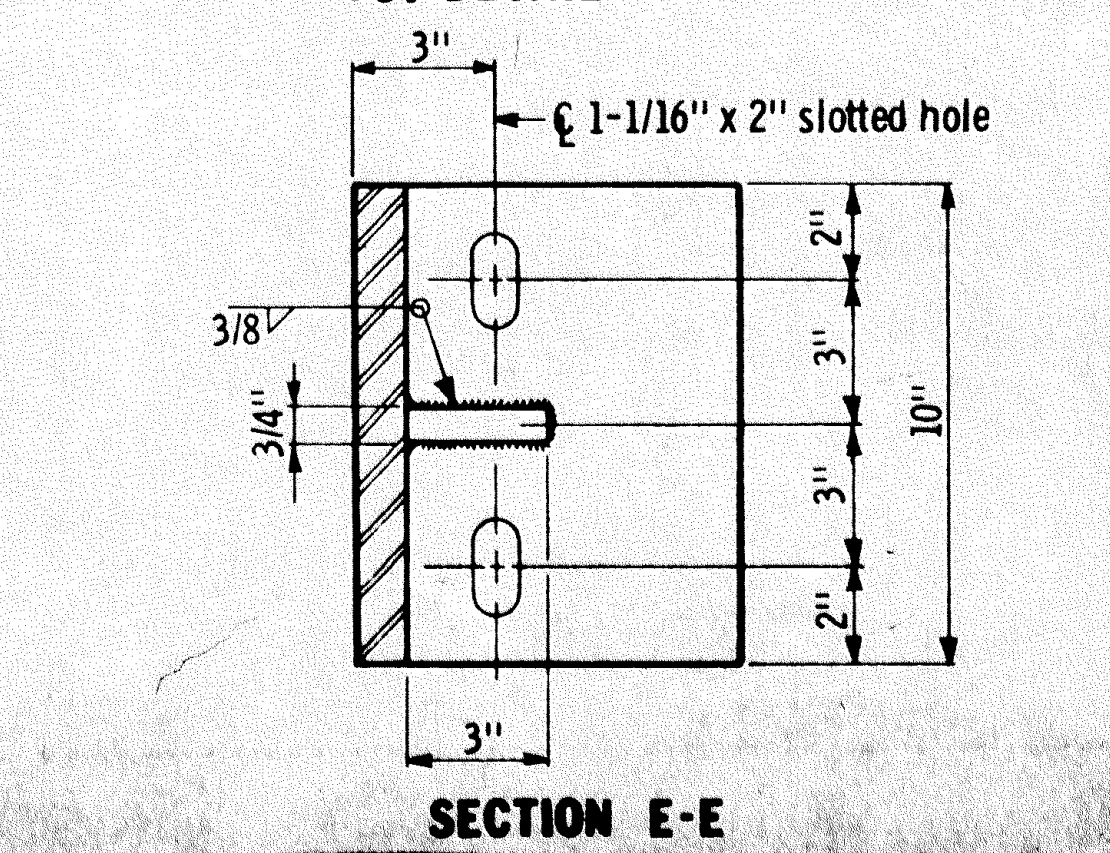
RAILPOST ANCHORAGE



SECTION D-D

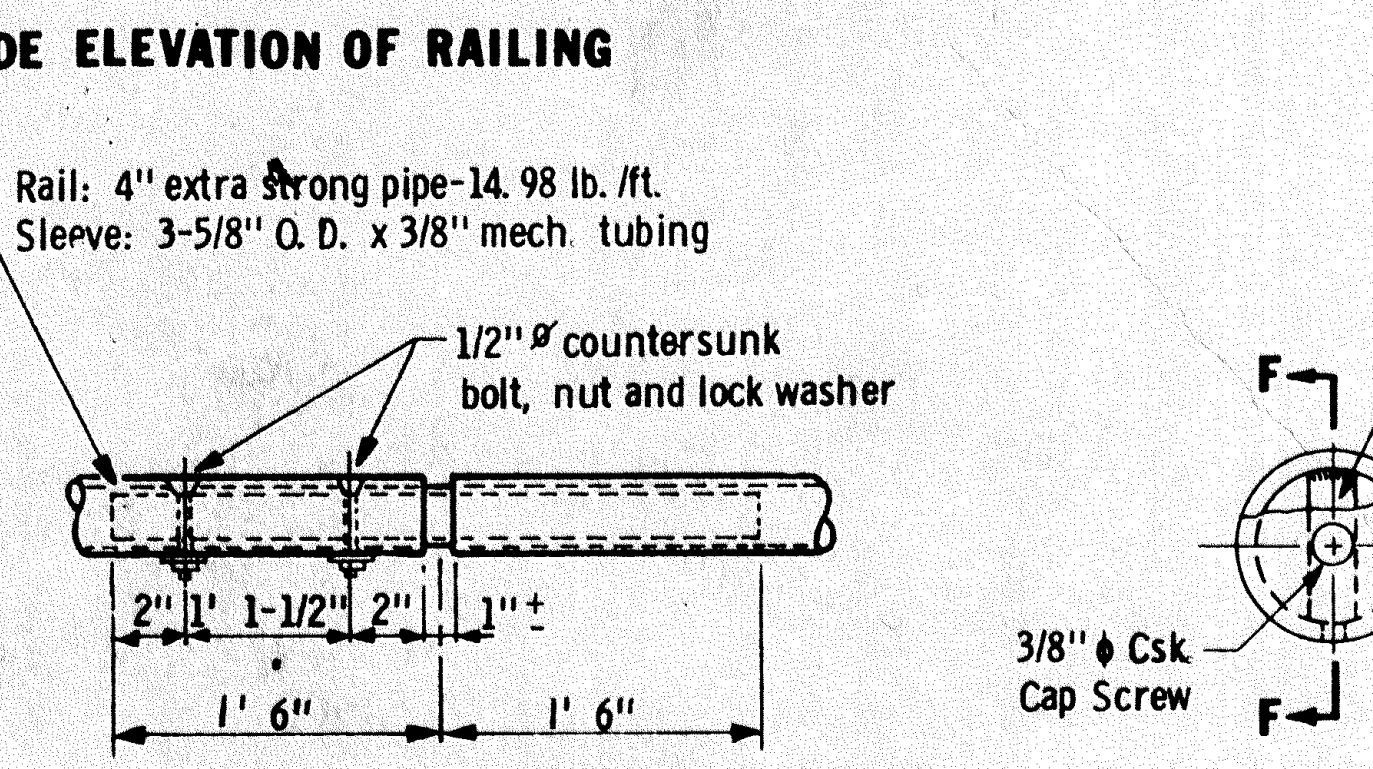


POST DETAIL

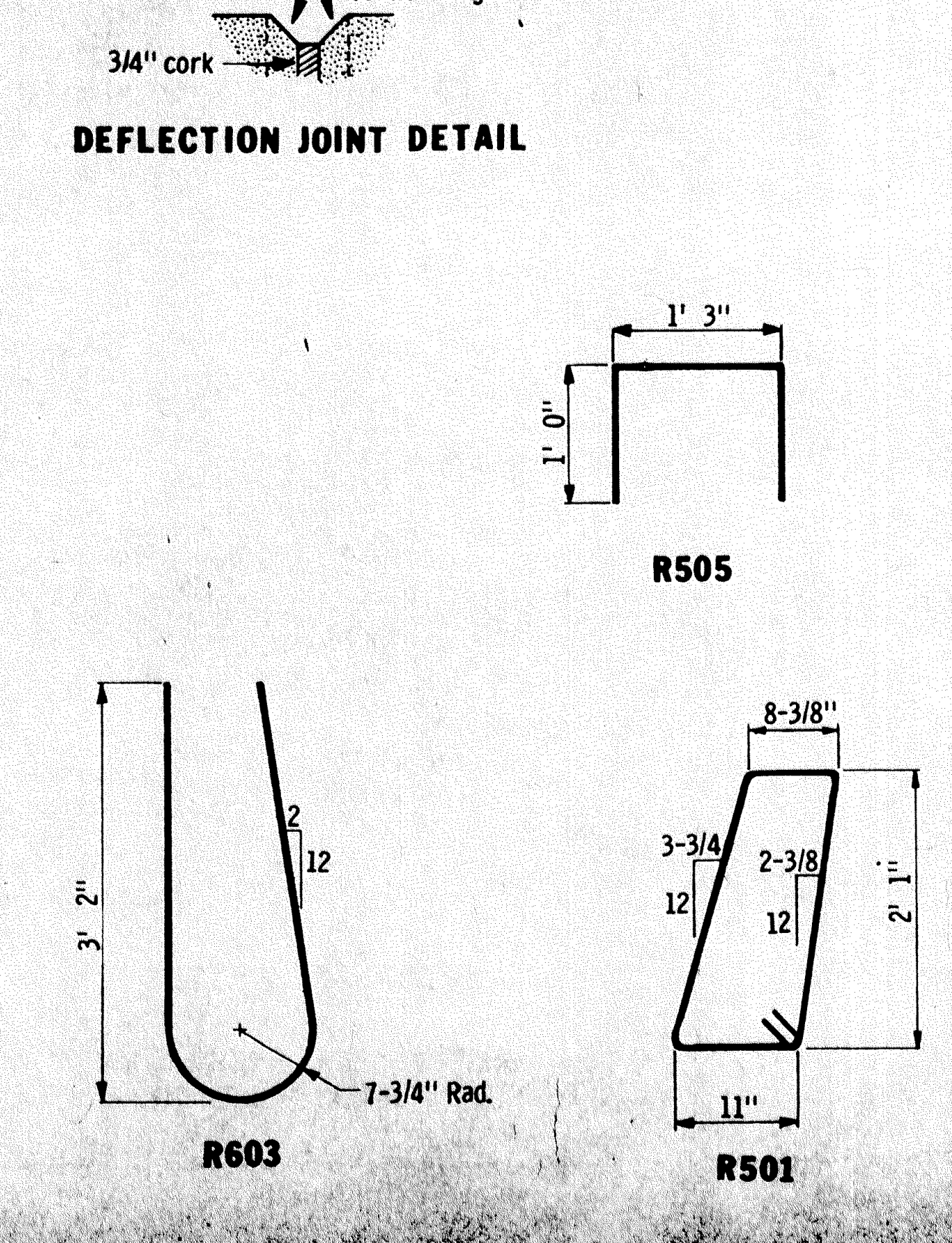


SECTION E-E

DEFLECTION JOINT

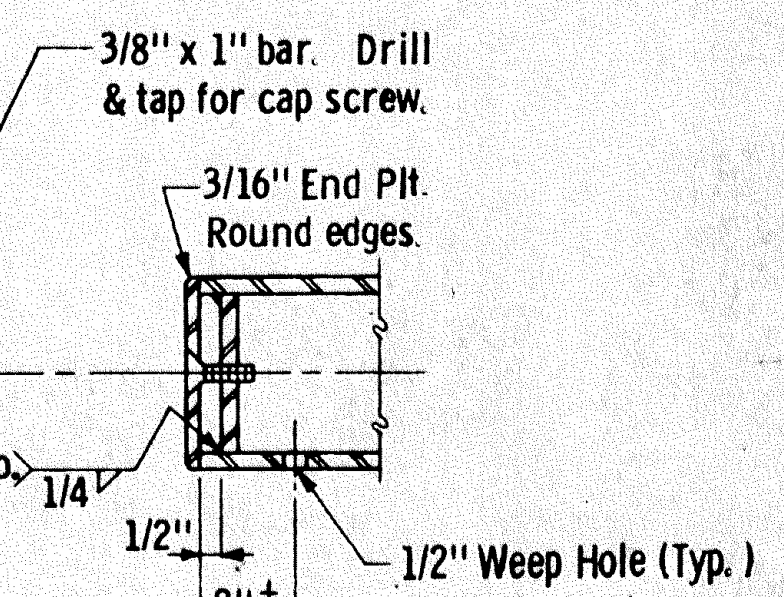


DEFLECTION JOINT DETAIL



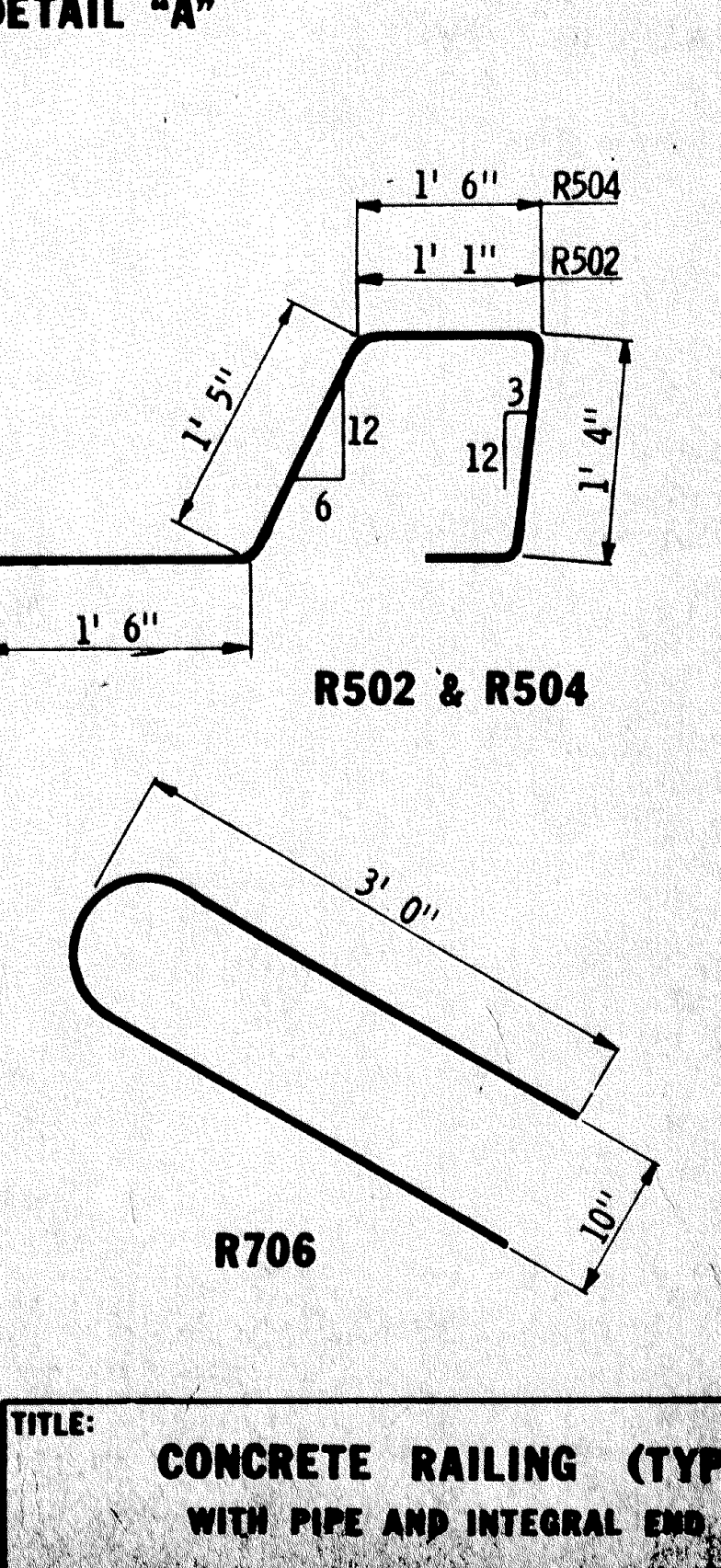
EXPANSION JOINT

Expansion device not shown. Expansion joint required only if expansion device is used. See superstructure sheets.

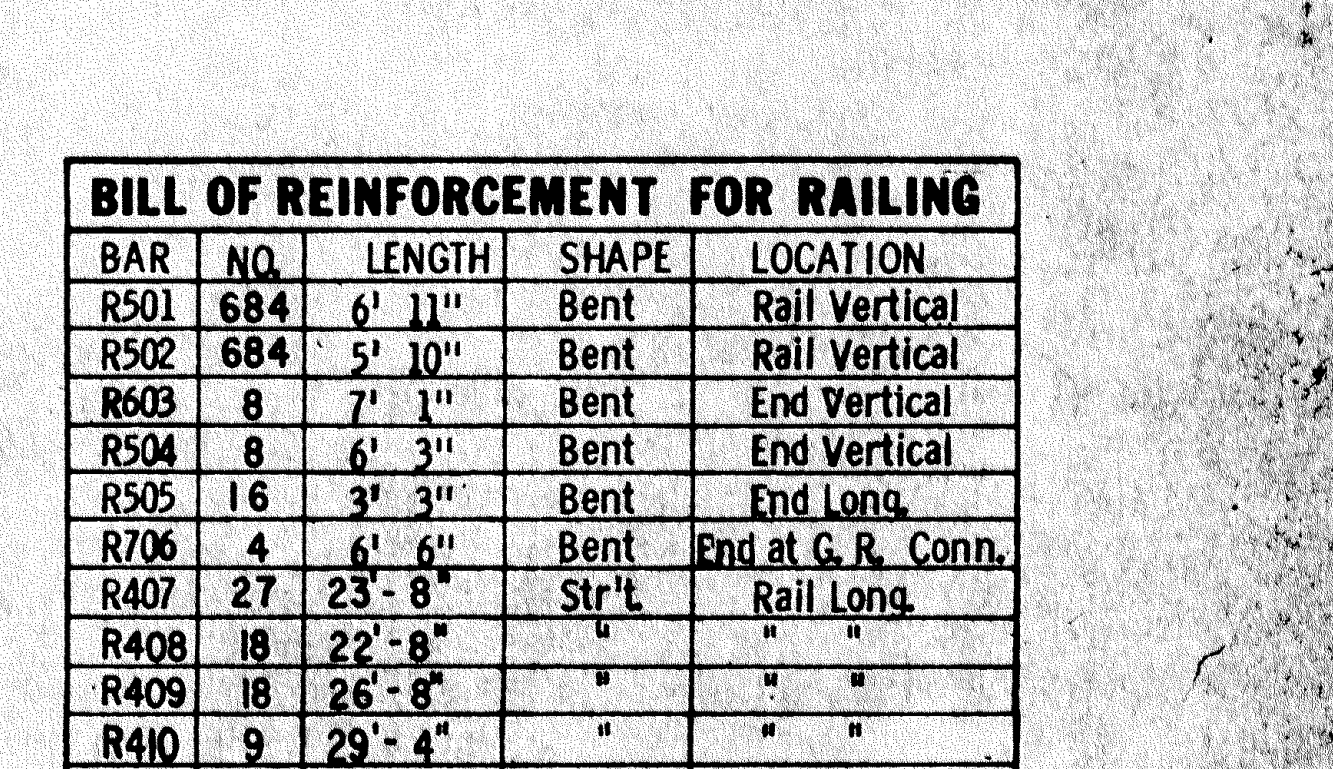


SECTION F-F

DETAIL "A"



SECTION A-A



SECTION A-A

BILL OF REINFORCEMENT FOR RAILING

BAR	NO.	LENGTH	SHAPE	LOCATION
R501	684	6' 11"	Bent	Rail Vertical
R502	684	5' 10"	Bent	Rail Vertical
R603	8	7' 1"	Bent	End Vertical
R504	8	6' 3"	Bent	End Vertical
R505	16	3' 3"	Bent	End Long.
R706	4	6' 6"	Bent	End at G. R. Conn.
R407	27	23'-8"	Str't	Rail Long.
R408	18	22'-8"	"	"
R409	18	26'-8"	"	"
R410	9	29'-4"	"	"
R411	27	21'-8"	"	"
R412	9	20'-7"	"	"
R413	18	29'-8"	"	"
R414	9	31'-1"	"	"
R415	18	28'-8"	"	"
R416	9	23'-1"	"	"
R417	9	20'-2"	"	"

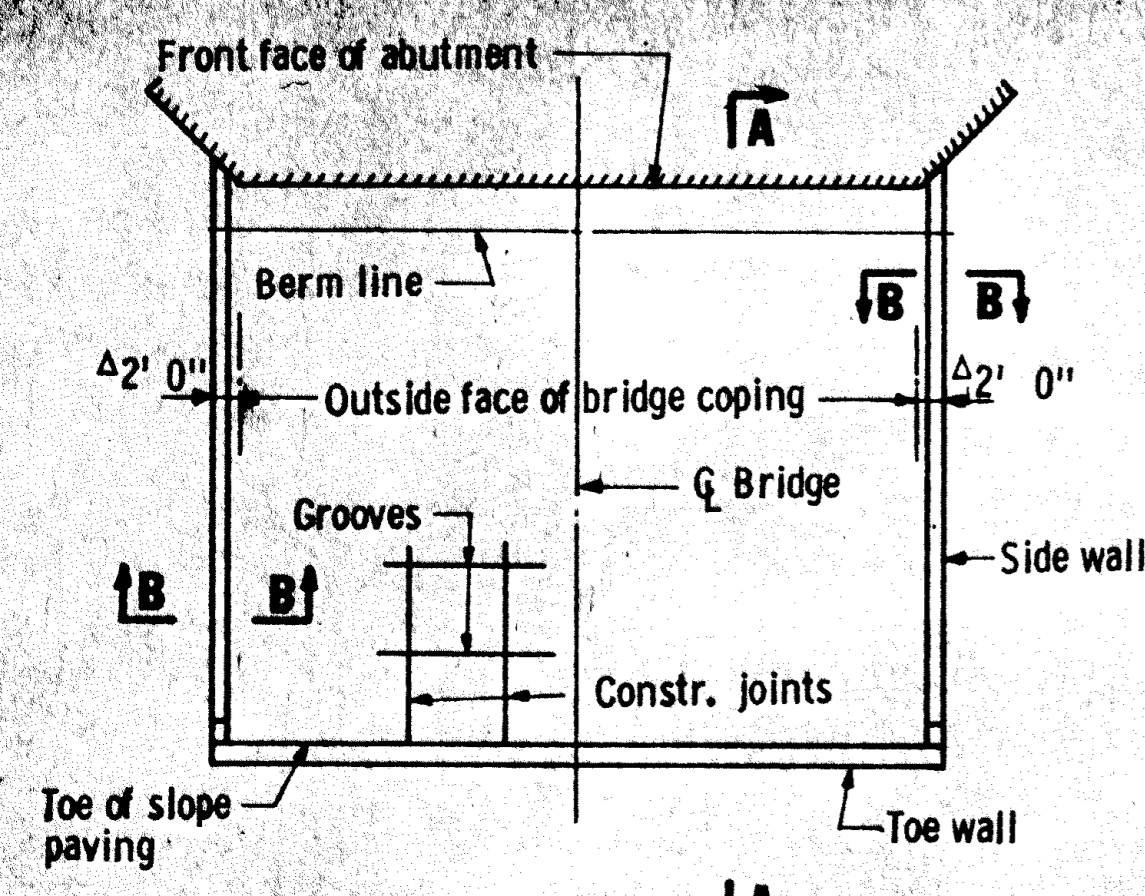
GENERAL NOTES

- Railbase to be Concrete Mix No. 3Y46A (SPECIAL)
- Pipe shall comply with M. H. D. 3362. The 4" pipe shall have a minimum yield point of 35000 P. S. I.
- Structural steel shall comply with M. H. D. 3306.
- Finish all edges of railbase and end post with 1/2" vee, except where otherwise noted.
- Anchorage shall be accurately placed to provide correct alignment of railing. Set normal to grade.
- Galvanize pipe and structural steel per M. H. D. 3394 after fabrication. Galvanize bolts and anchorages per M. H. D. 3392
- See superstructure sheet for joint spacing.
- Maximum spacing of concrete deflection joints shall be 30' 0". Railpipe deflection joints shall be placed in same panel as concrete deflection joints.
- Price bid for ornamental metal railing includes the post anchorages and all material above railbase. Guardrail connection to be included in weight of structural steel M. H. D. 3306.
- Length of ornamental metal railing for payment is measured end to end of pipe. Railing quantities are included in summary of quantities for superstructure.

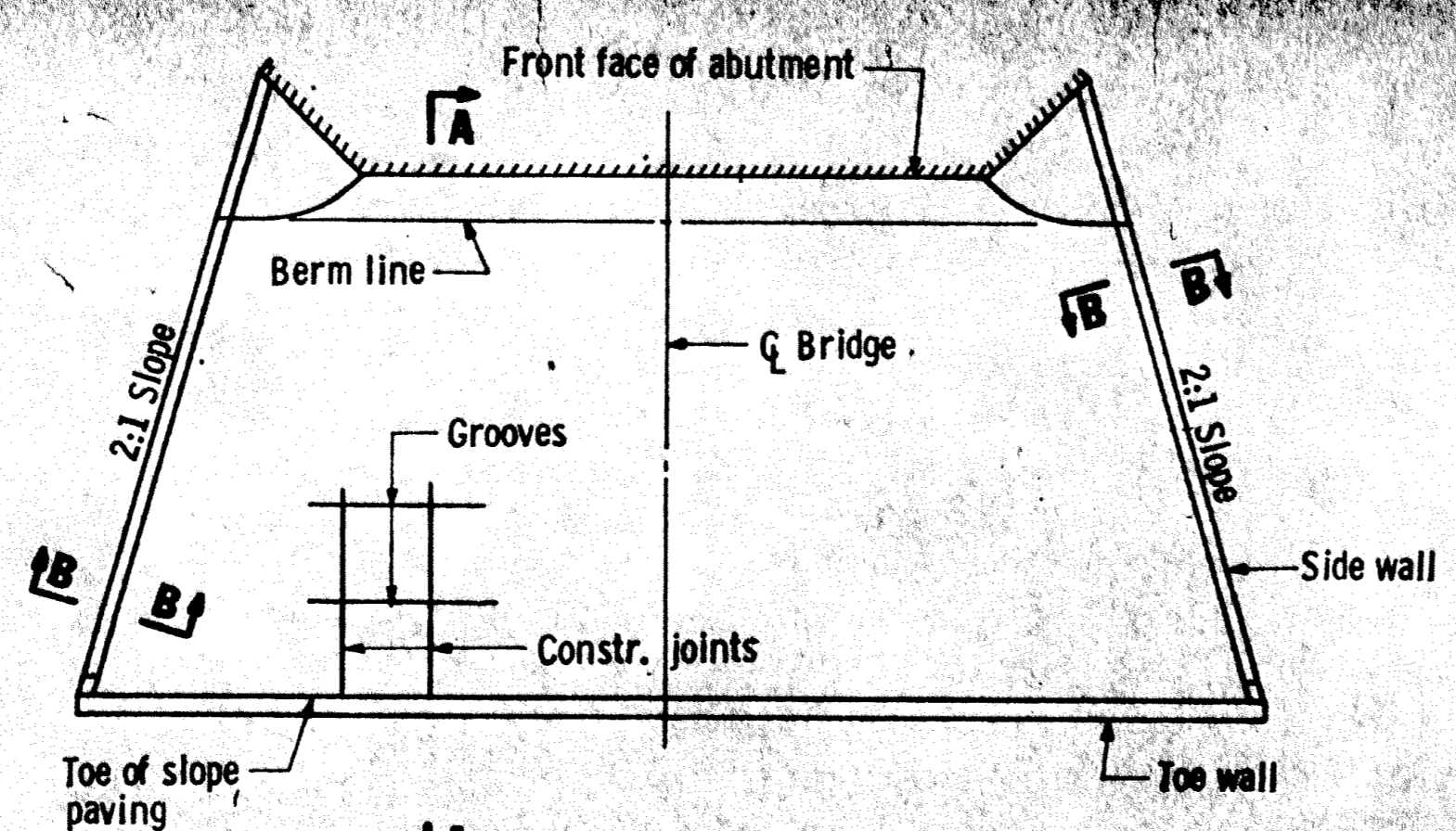
AS BUILT
10-16-73
B. J. J.

Fig. 5-397.109
June 2, 1971

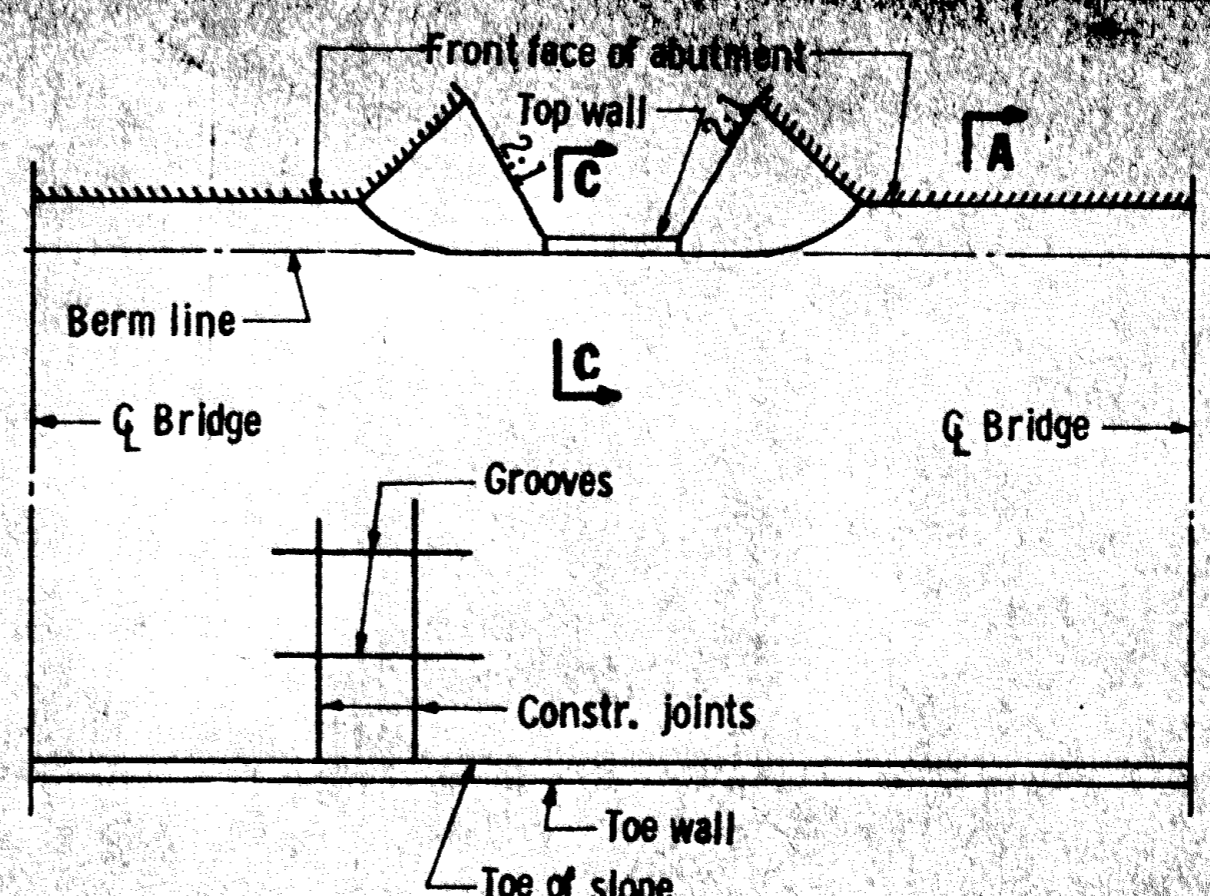
TITLE: CONCRETE RAILING (TYPE G) WITH PIPE AND INTEGRAL END POST	DES: MHD CEN: MS	DR: MHD CEN: BJ	APPROVED: 12-21-91	Bridge No. 02521
Sheet No. 4 of 22 Sheets				



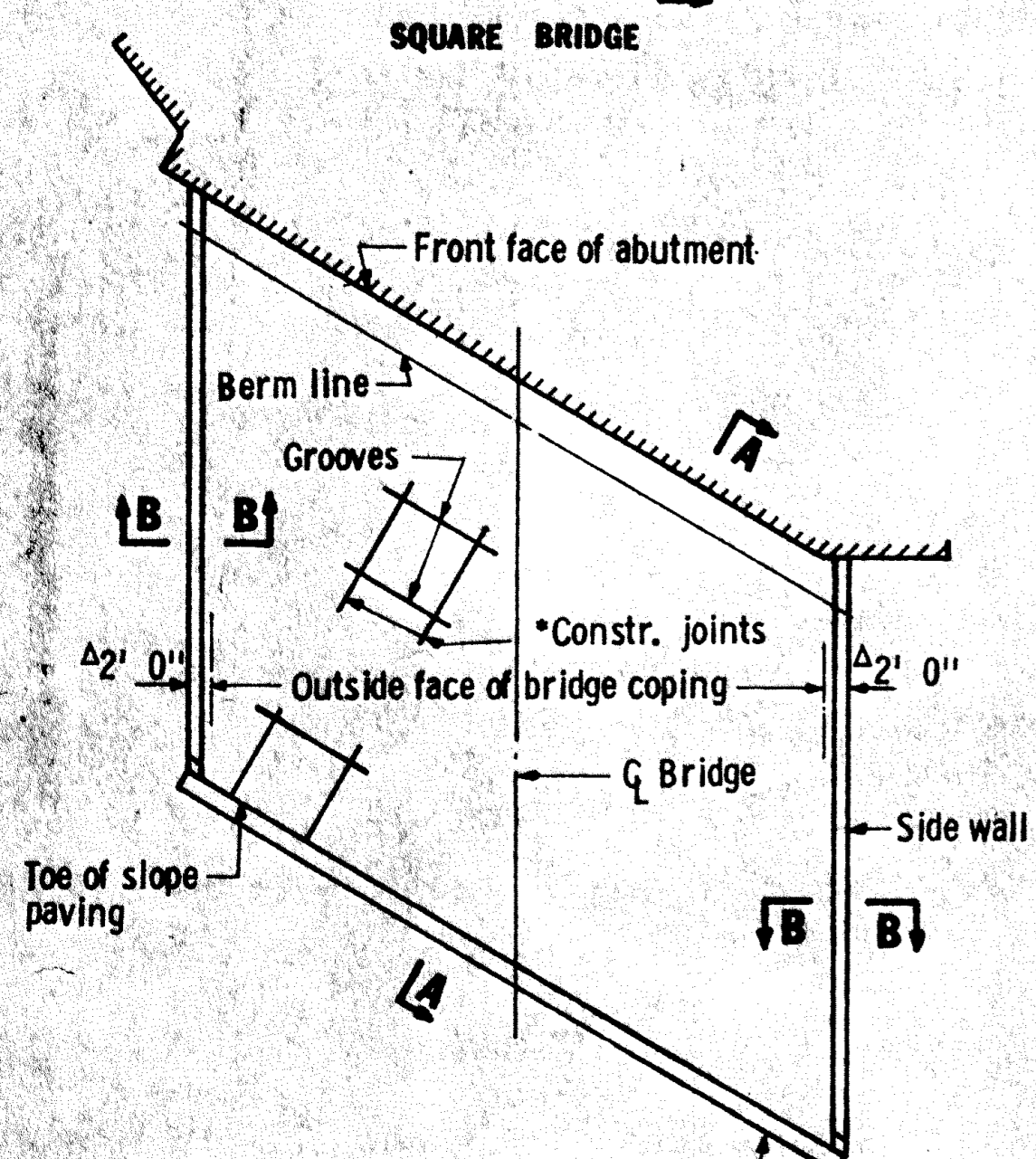
SQUARE BRIDGE



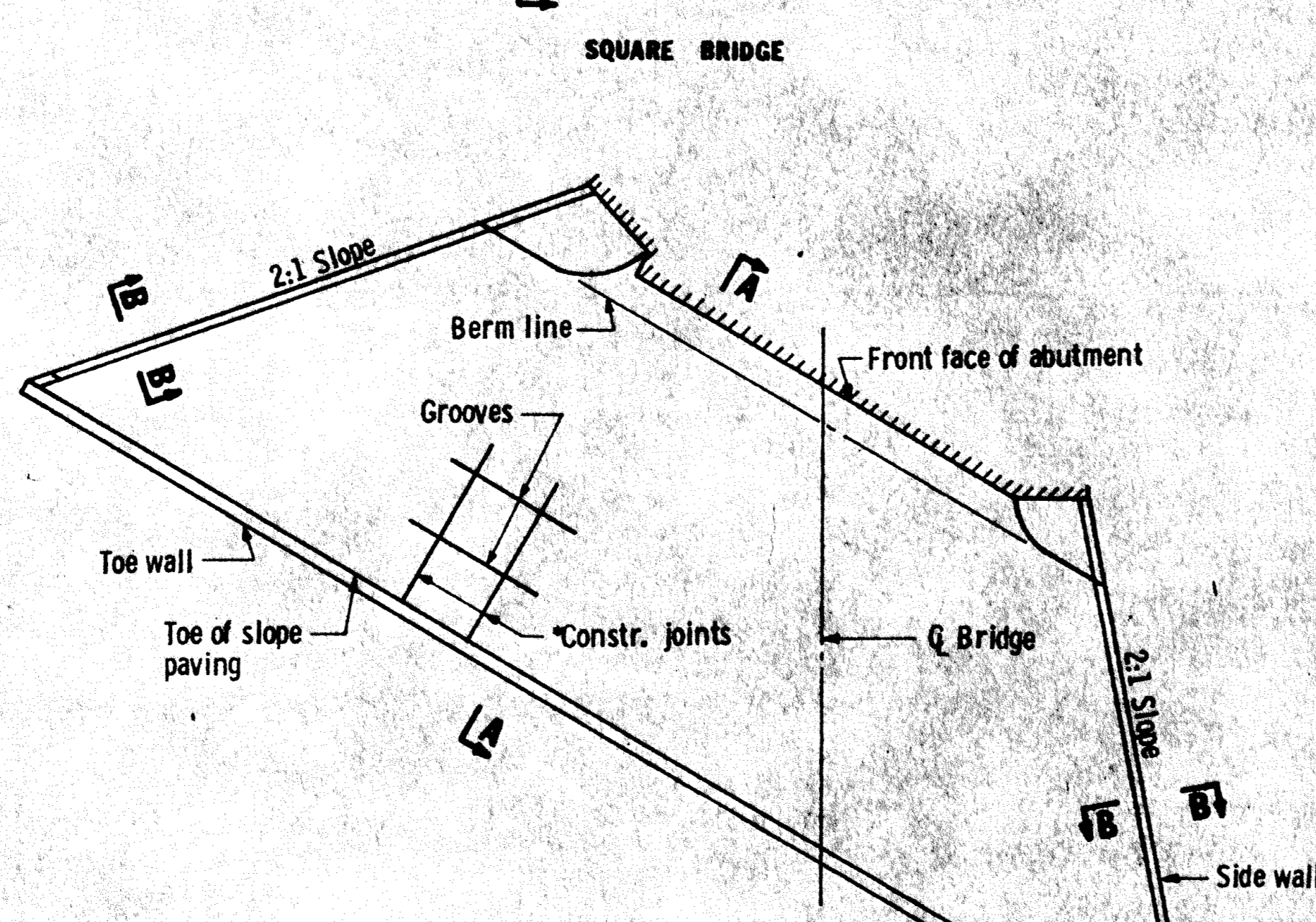
SQUARE BRIDGE



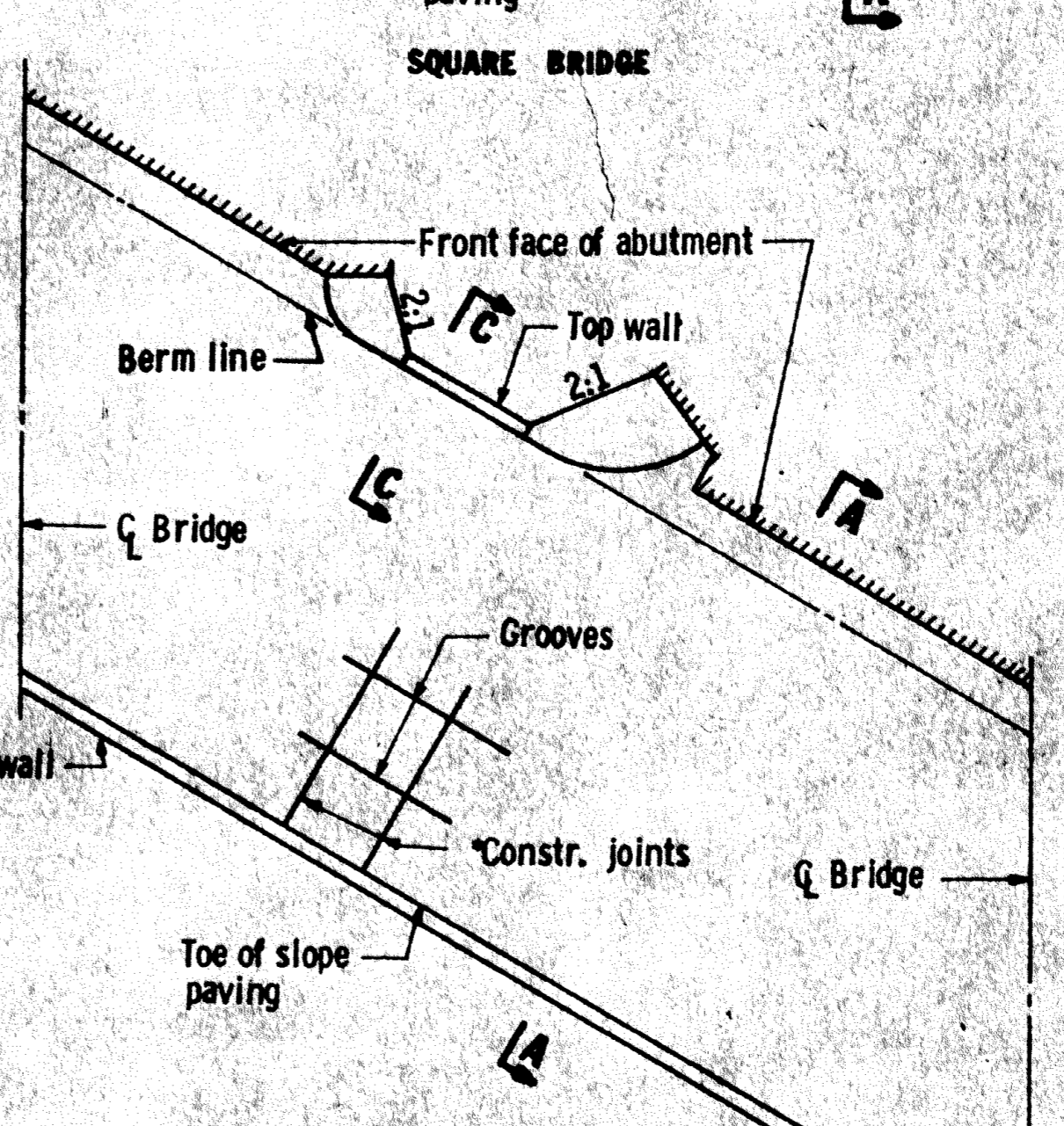
SQUARE BRIDGE



SKewed BRIDGE



SKewed BRIDGE



SKewed BRIDGE

$\Delta 2' 0''$ for tangent bridge superstructures. Varies $2' 0''$ minimum for curved bridge superstructures.
*Vertical construction joints may be constructed parallel to Q of bridge for skews to 10° only.

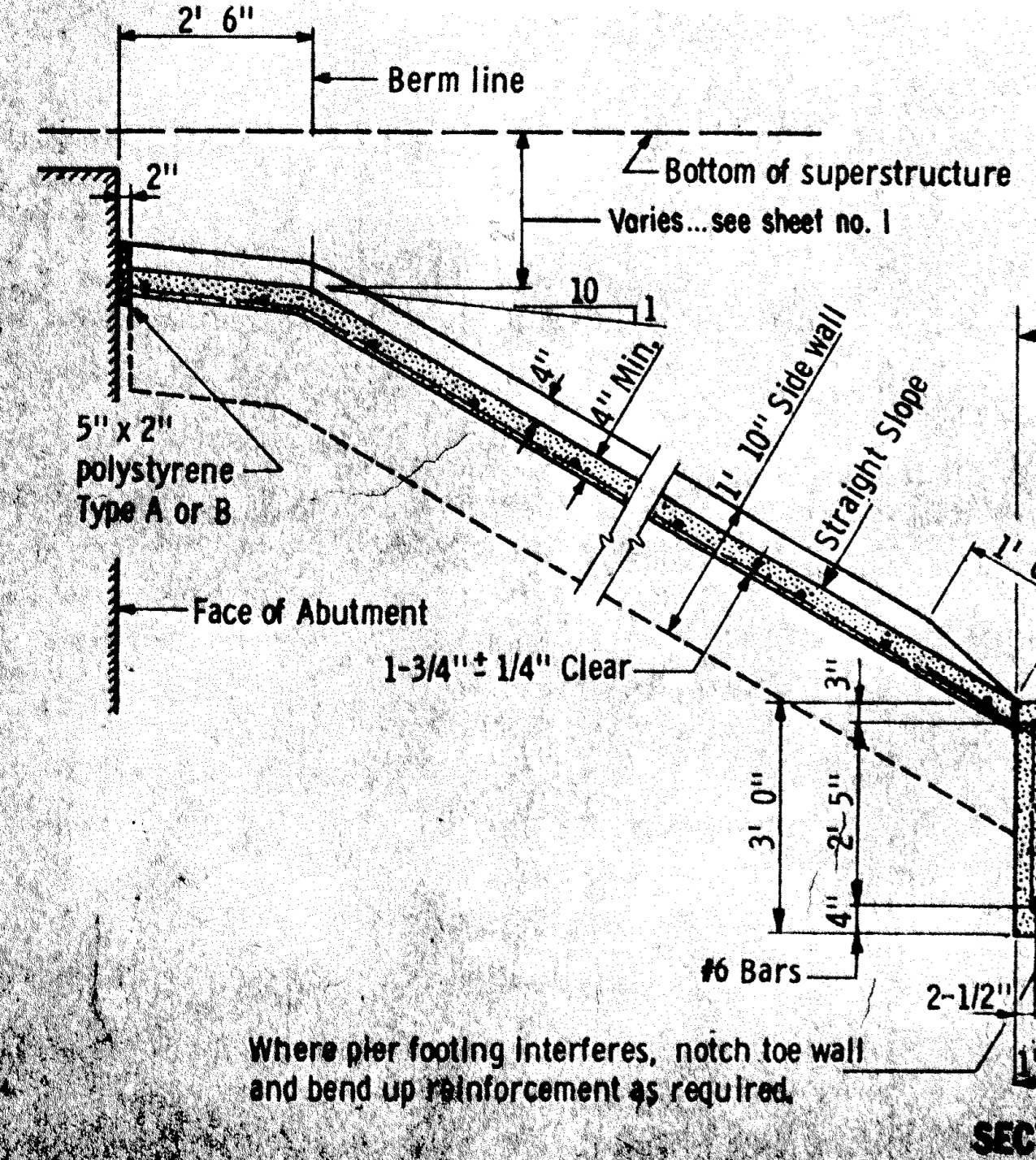
*Vertical construction joints may be constructed parallel to Q of bridge for skews to 10° only.

*Vertical construction joints may be constructed parallel to Q of bridge for skews to 10° only.

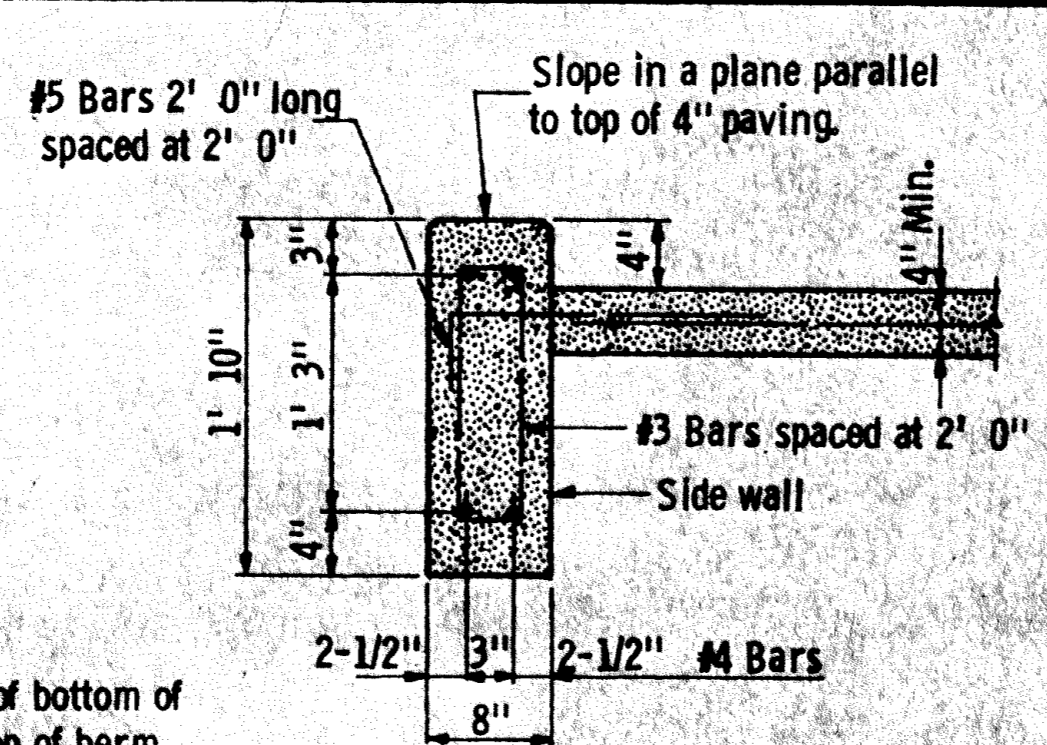
LAYOUTS FOR SLOPES 2:1 OR FLATTER

LAYOUTS FOR SLOPES STEEPER THAN 2:1

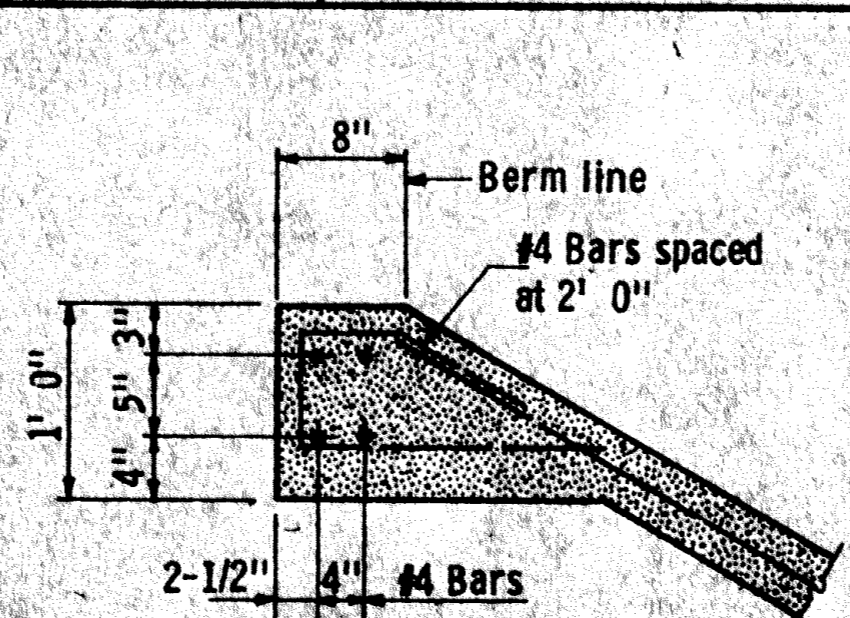
LAYOUTS FOR SLOPES STEEPER THAN 2:1 BETWEEN BRIDGES



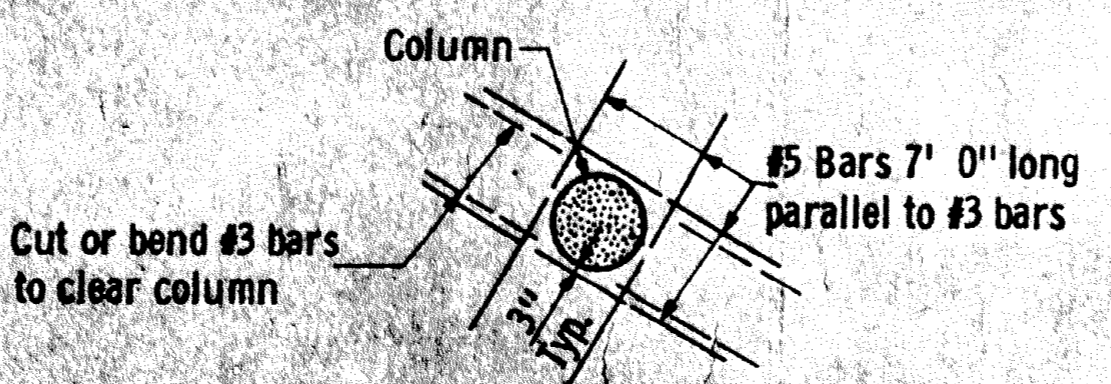
SECTION A - A



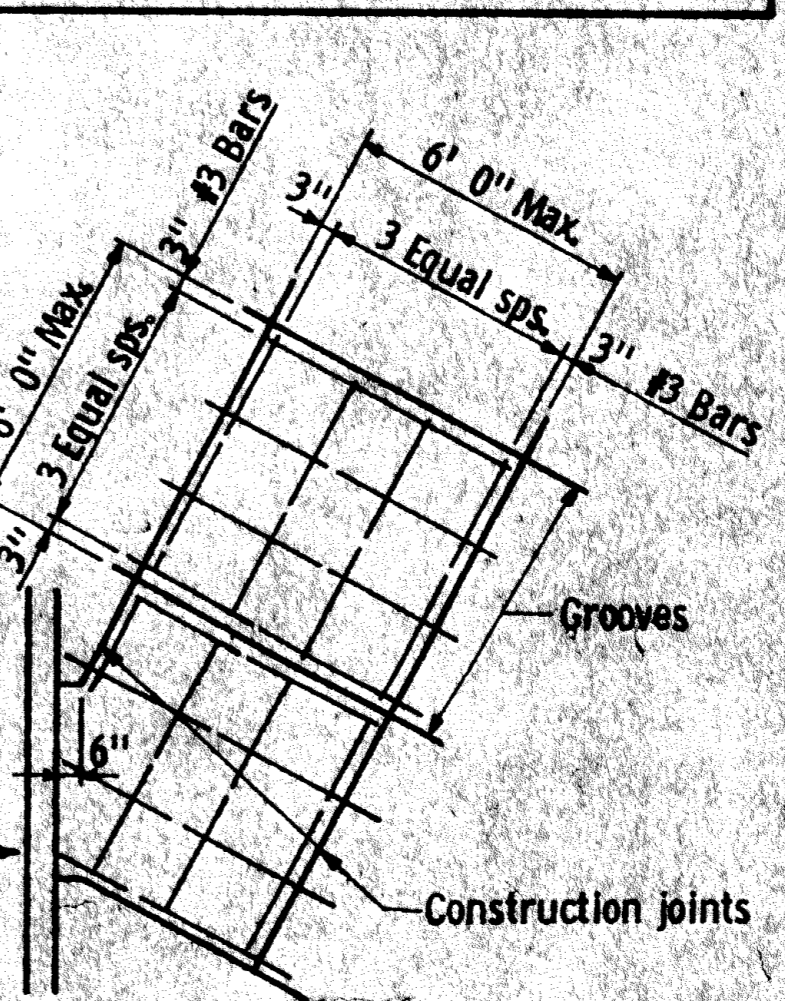
SECTION B - B (SIDE WALL)
Normal to slope



SECTION C - C (TOP WALL)



DETAIL WHERE PIER COLUMN EXTENDS THRU SLOPE PAVING



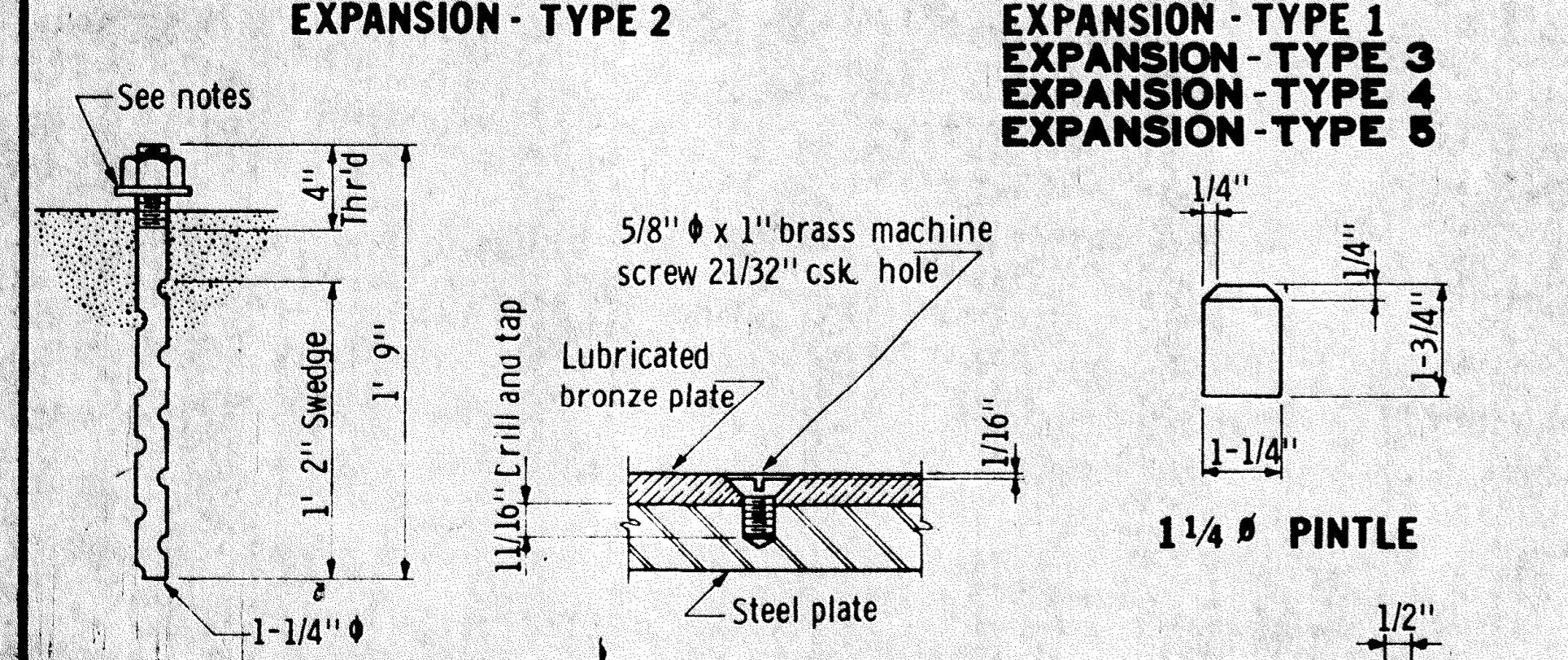
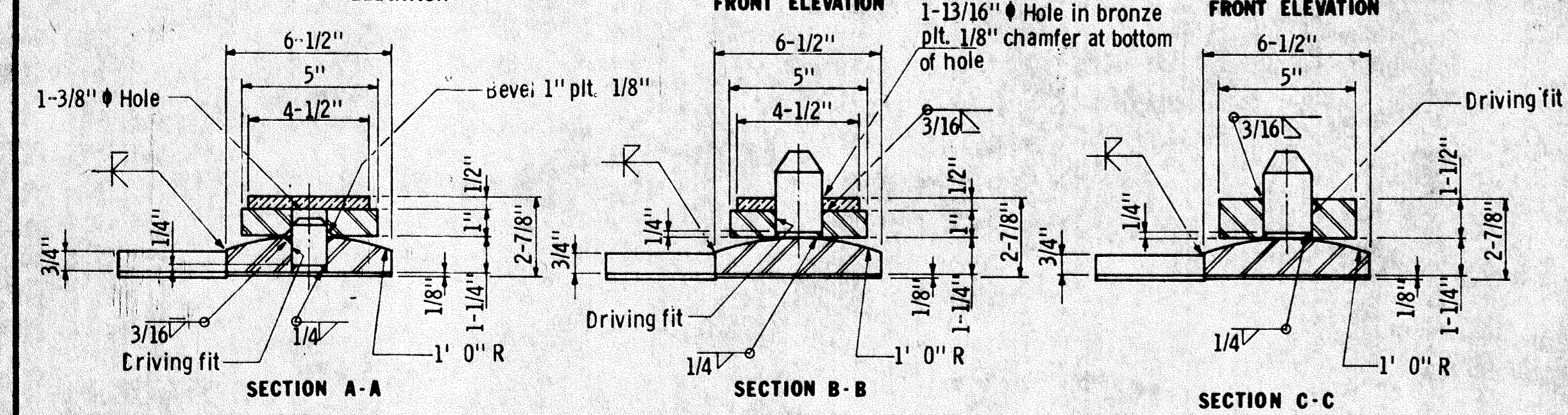
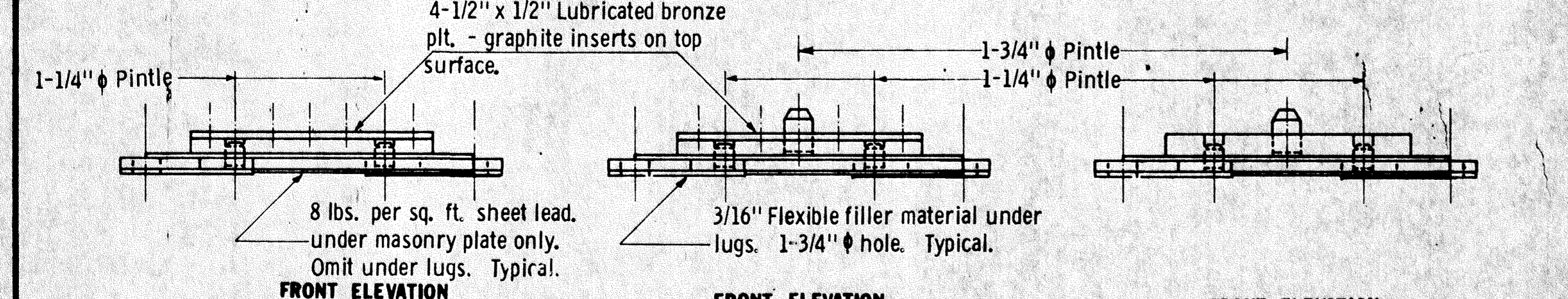
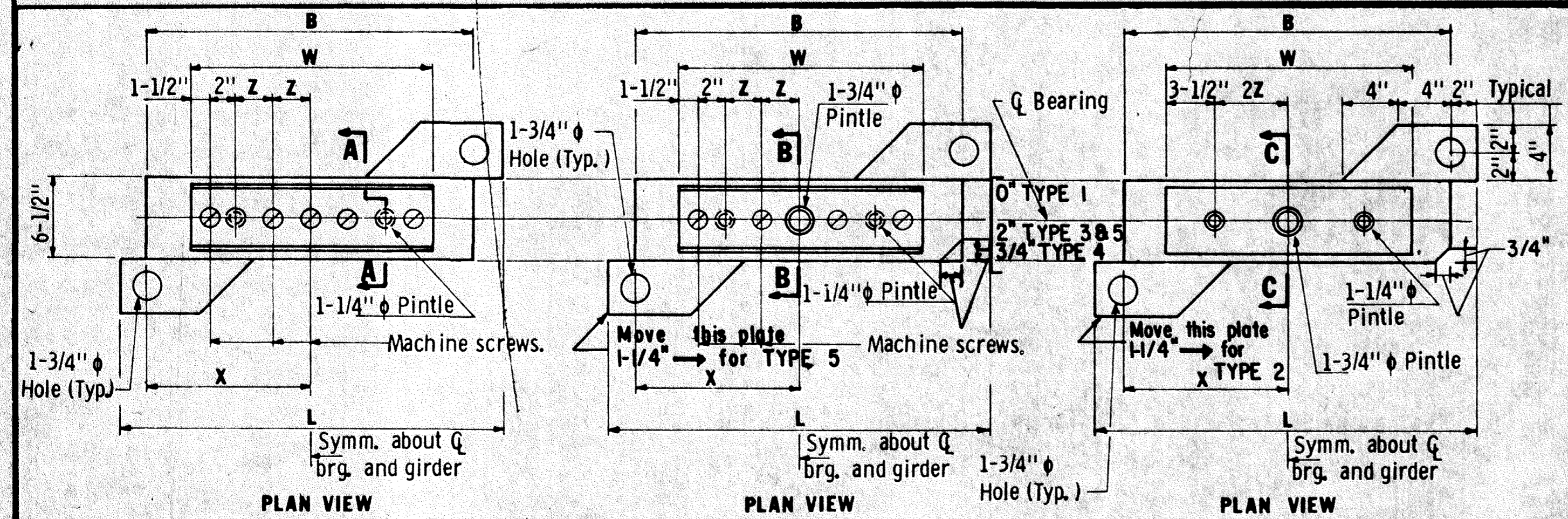
PAVING DETAIL

- CONSTRUCTION NOTES**
- The slope paving shall be cast in place concrete in accordance with the applicable sections of MHD 2401, and the following:
 - The concrete shall be M334.
 - The concrete slump may be adjusted, subject to approval of the Engineer, as may be necessary to obtain the desired results.
 - Metal reinforcement shall conform to ASTM A615 grade 60, Lap 36 diameter at splices.
 - The slopes shall conform to the section shown on the General Plan and Elevation sheet in these Plans, except as otherwise provided for below. In the event the Engineer determines that a deficiency in material exists on the approach embankments constructed by others, he may order that the dimensions shown for the berm (see upper part of Section A-A) be revised to the extent necessary to construct the slope without hauling additional material. Such revision should, however, be limited to a decrease of not more than three inches, as applied to the height and/or width of the berm. In the event additional fill is required in order to conform to the slope lines stated by the Engineer, on approach embankments completed by others, the cost of furnishing, hauling, placing and compacting additional material ordered by the Engineer will be paid for as Extra Work.
 - In the event the Engineer determines that an excess of material is present on approach embankments completed by others, he may order that the width of the berm be increased to the extent necessary to utilize such material, but not by more than 1' - 6".
 - Excess material, beyond that which is required to dress the slope to the lines and to the grades stated by the Engineer, shall be used as directed by the Engineer for purposes such as widening the shoulders adjacent to the sidewalks, flaring out these shoulders, and shaping up adjacent slope faces. The disposal of excess material, except material deposited by the Contractor during excavation for substructure units or related work, which can not be incorporated into the slopes as hereinbefore defined, and which the Engineer directs to be hauled from the site, will be paid for as Extra Work.
 - Any revision in berm grades and dimensions should be applied uniformly for the full length of the berm. Connection will be required.
 - Toe and side walls shall be in place before casting remainder of slope paving.
 - Slope paving shall, in general, be poured in equal alternate vertical strips with a maximum width of 6 ft. The strips shall be cut into sections by grooves spaced at equal distances not exceeding 6 ft, and shall be at right angles to the strips. Other patterns for strips and grooves will be considered if requested by the contractor. Subgrade shall be moist when concrete is placed.
 - The forms shall be set to accurate grade and alignment, and shall be rigidly supported. Deviations of greater than 1/4" from a ten-foot straight edge shall be corrected.
 - Care shall be taken in placement of concrete so as not to disturb the slope which it is placed, or to contaminate the concrete.
 - Sufficient hand spading and/or tamping shall be done to secure a dense surface relatively free of voids and honeycomb.
 - The top surface shall be struck off immediately after placing the concrete. When the concrete has set sufficiently to hold its shape, it shall be struck off again, after which it shall be given a final finish by hand floating with a cork or wooden float. The finished appearance shall be reasonably smooth and uniform. The finished concrete shall not vary more than 3/8" from a ten-foot straight edge.
 - All edges shall be finished with an edger or 1/2" V strip. Grooves shall be cut using a sidewalk grooving tool. The trails left by the flanges of these tools shall be removed by floating.
 - The concrete shall be cured for at least 72 hours after casting by any of the methods outlined in MHD 2401, 36, including membrane curing compounds.
 - Reinforcement shall be supported on concrete bricks or mortar blocks, or other support satisfactory to the Engineer.
 - For correct position of abutment wings and piers, see bridge plans.
 - Where piers extend thru slope paving, provide 1/2" x 5" bit felt and sealant.
 - Slope paving will be measured by area of the top surface bounded by the outside edges of the toe wall and sidewalks and the front face of the side wall.
 - Payment for furnishing and grading the slope paving will be made under No. 401.601 at the Contract price per square yard, which price shall include compensation in full for all costs of furnishing all materials, equipment, tools, and labor necessary for the satisfactory completion of work, except as otherwise provided for in item 3.

CLASS B SLOPE PAVING UNDER BRIDGES

Sheet No. _____

Fig. 8-397.301
Jan. 11, 1971



ANCHOR ROD DETAIL MACHINE SCREW DETAIL

GIRDER TYPE	L	B	W	X	Z	LOAD (KIPS)	TOTAL MAX. DESIGN MOVEMENT
28"	2' 0"	1' 8"	1' 4"	10"	2-1/4"	125	2-1/2"
36"	2' 2"	1' 10"	1' 6"	11"	2-3/4"	140	2-1/2"
40" & 45"	2' 6"	2' 2"	1' 10"	1' 1"	3-3/4"	165	2-1/2"
54" & 60"	3' 0"	2' 8"	2' 2"	1' 4"	4-3/4"	205	2-1/2"

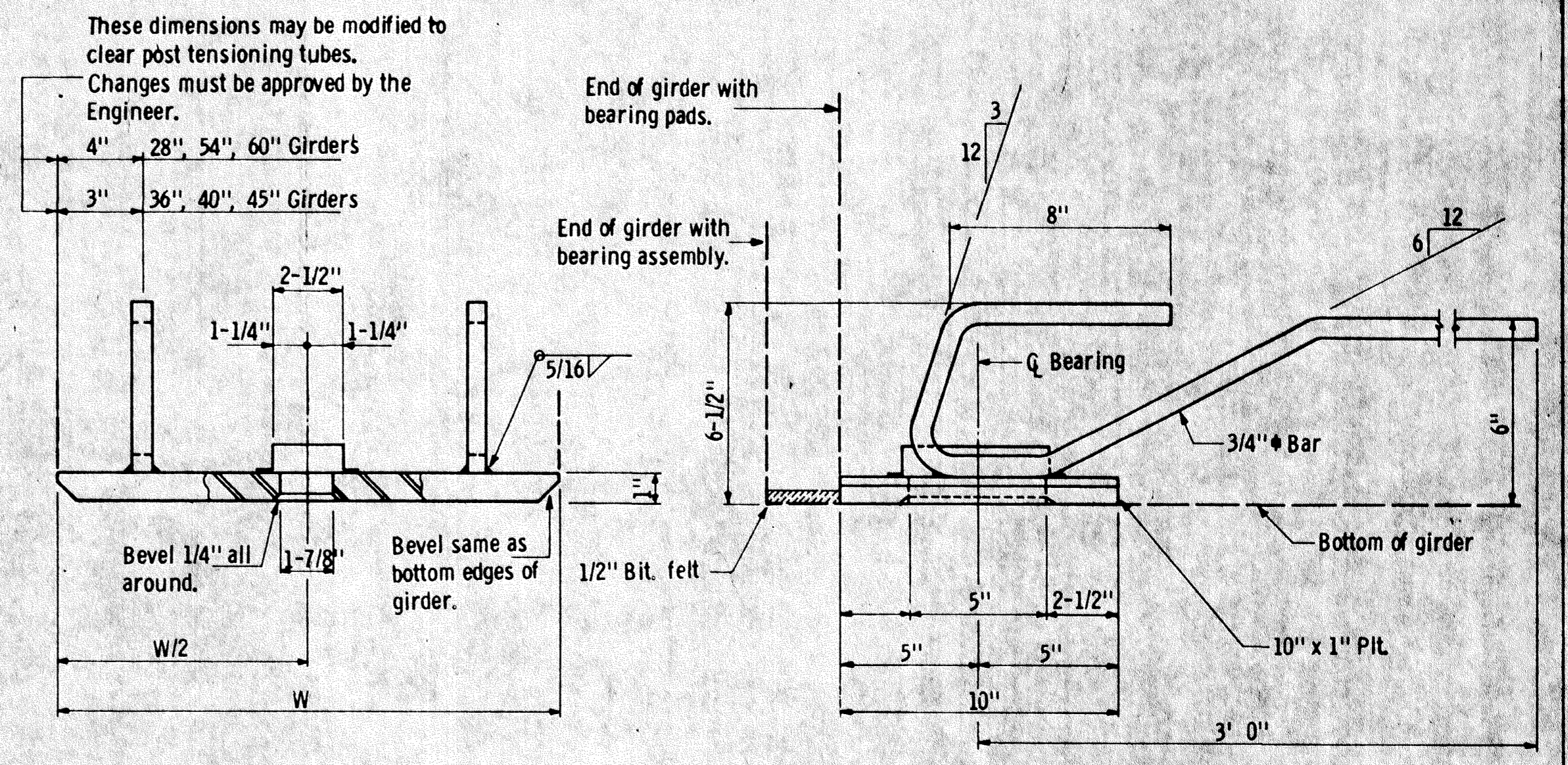
NOTES:
 Lubricated bronze plates shall comply with M. H. D. 3329.
 All plates except lubricated bronze shall comply with M. H. D. 3306.
 Pintles shall comply with M. H. D. 3314, Type II.
 Steel plates and pintles shall be galvanized per M. H. D. 3394. No paint.
 Anchor rods shall be galvanized per M. H. D. 3392. No paint, with one cut washer and nut. Anchor rods shall project 3/8" above nuts.
 Position of anchor rod lugs shown is for left skews; for right skews, lugs are to be reversed.
 Finish center 3" of top of base plate to 250 Micro. A 1/16" tolerance in thickness will be permitted.
 Scale weights shall be furnished in accordance with the requirements of M. H. D. 2471.3M1 and shall be listed on the shipping statements for the individual items.
 Payment for bearing assembly shall include all material on this detail.

APPROVED April 23, 1971

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

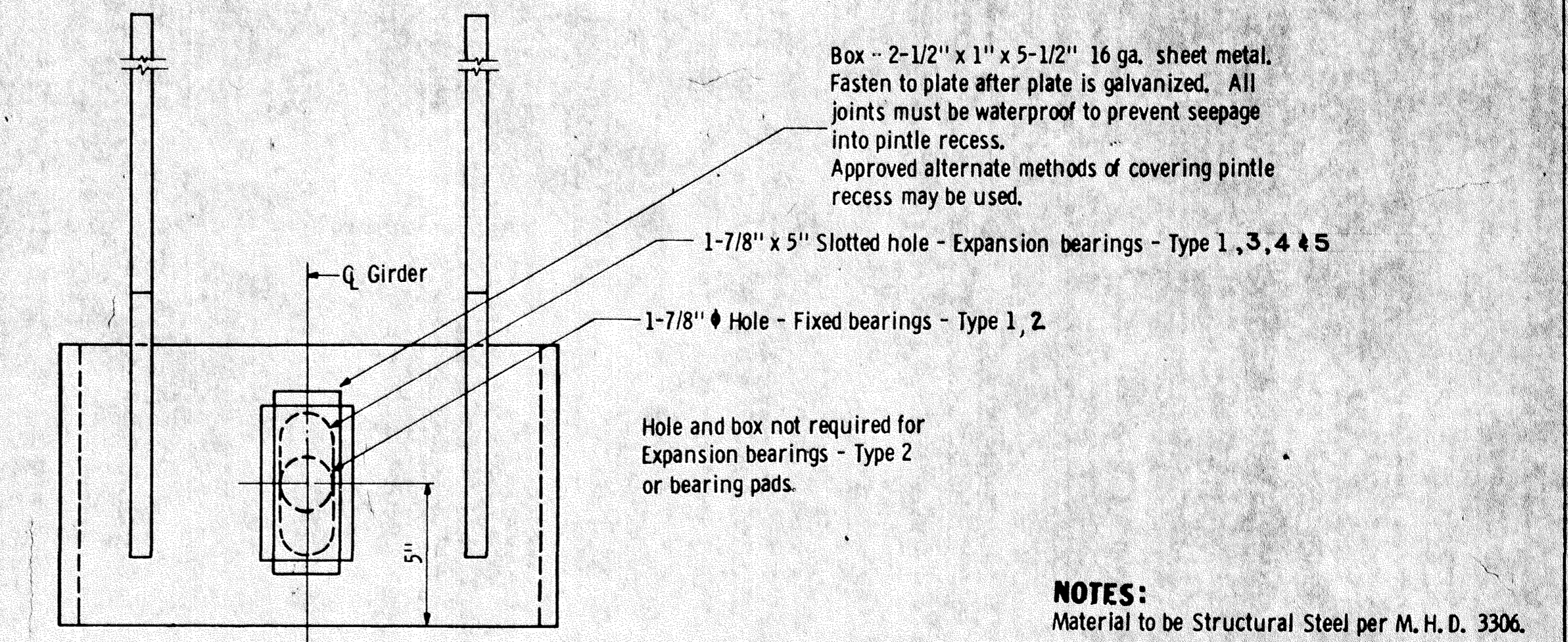
**BEARING ASSEMBLIES
 PRESTRESSED CONCRETE GIRDERS (MODIFIED)**

DETAIL NO. **B301**



FRONT VIEW
 (Area at hole shown as a section). Dimension "W" to be the width at the bottom flange of the girder.

SIDE VIEW
 Showing placement in girder.



NOTES:
 Box - 2-1/2" x 1" x 5-1/2" 16 ga. sheet metal. Fasten to plate after plate is galvanized. All joints must be waterproof to prevent seepage into pindle recess. Approved alternate methods of covering pindle recess may be used.

Material to be Structural Steel per M. H. D. 3306.
 Sole plate to be hot dipped galvanized as per M. H. D. 3394 after fabrication.
 Payment for sole plates to be included in price bid for Prestressed Concrete Girders.

APPROVED Feb. 9, 1970

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

**SOLE PLATE
 PRESTRESSED CONCRETE GIRDERS**

REVISION
 DETAIL NO. **B303**

State Proj. No. _____

Sheet No. 18 of 22 Sheets

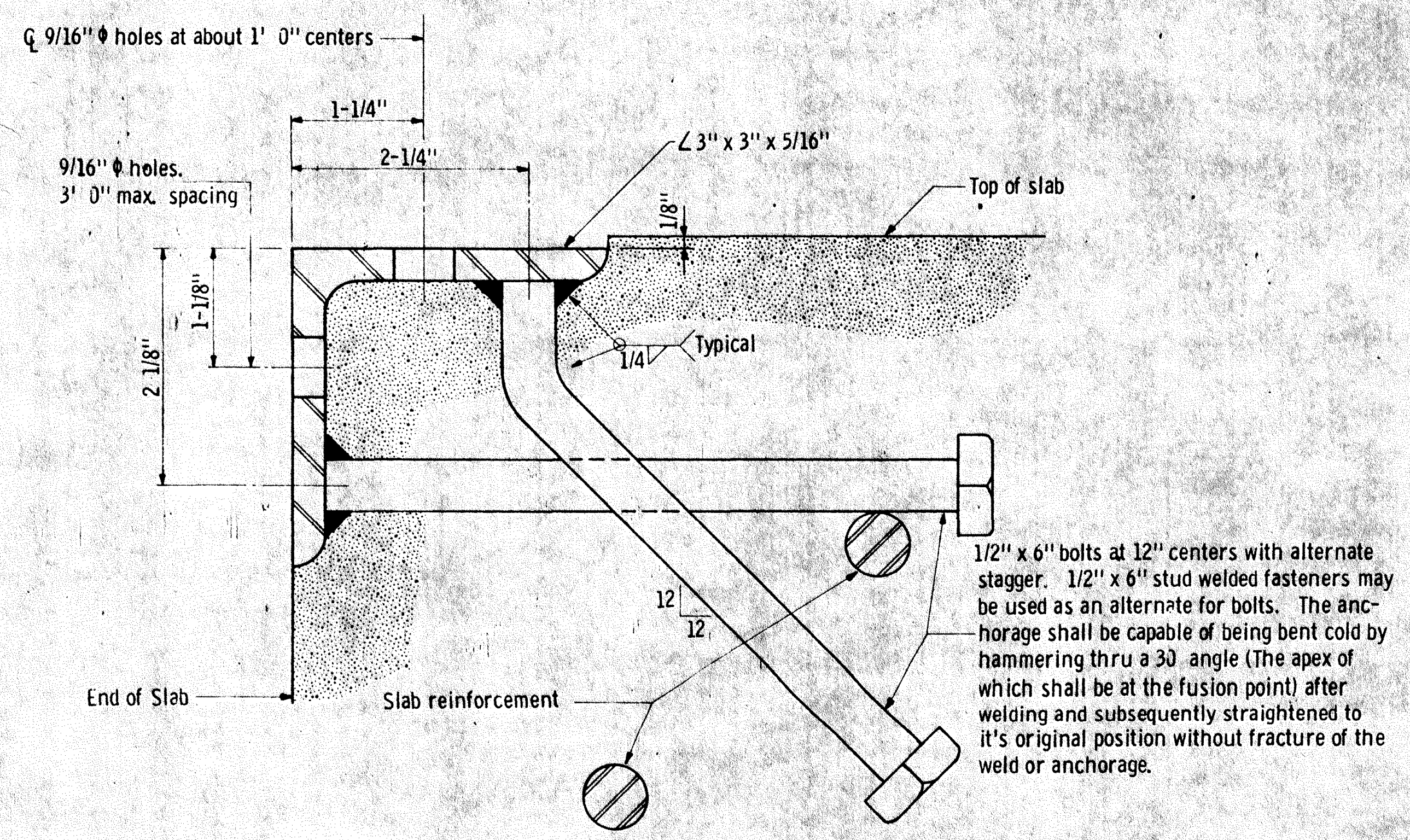
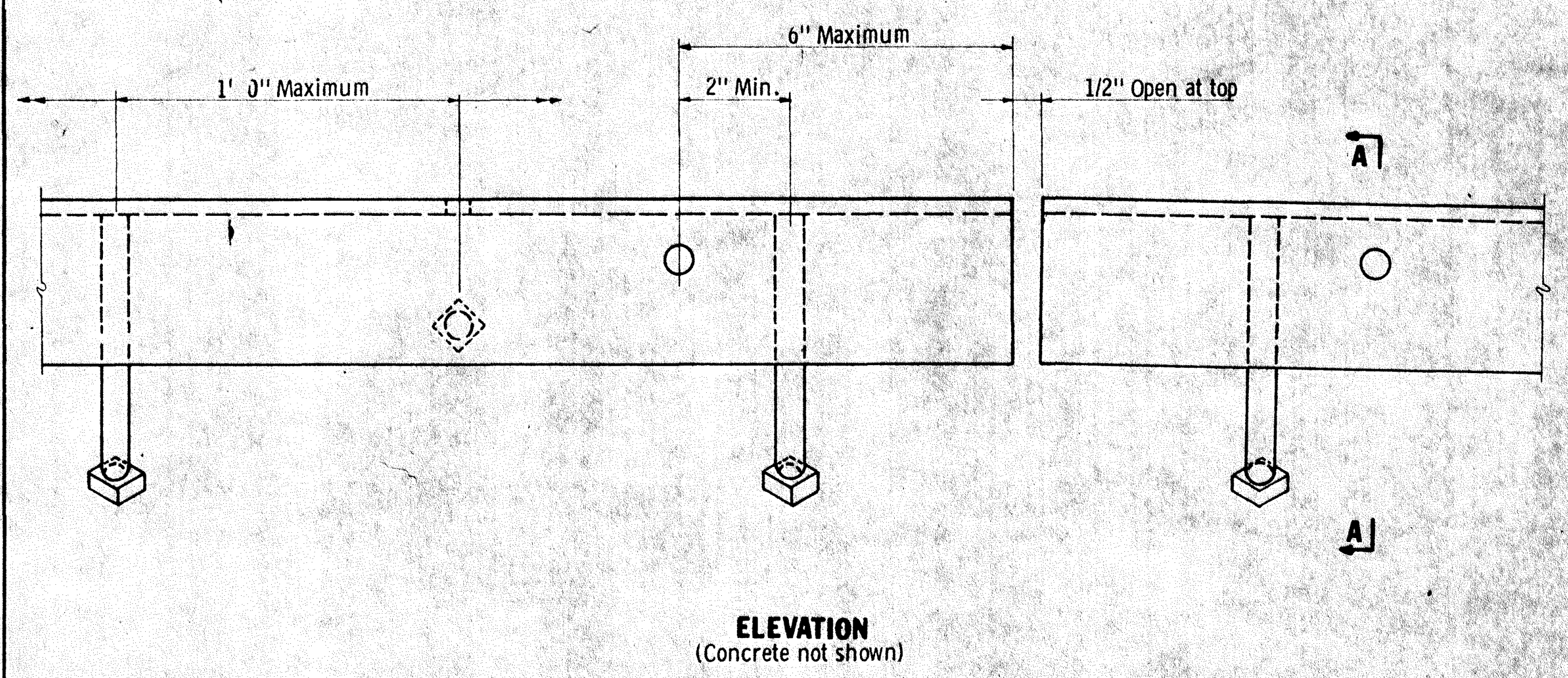
AS BUILT
 10-10-73
 B. John

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS

**BRIDGE NO.
 02521
 DETAILS**

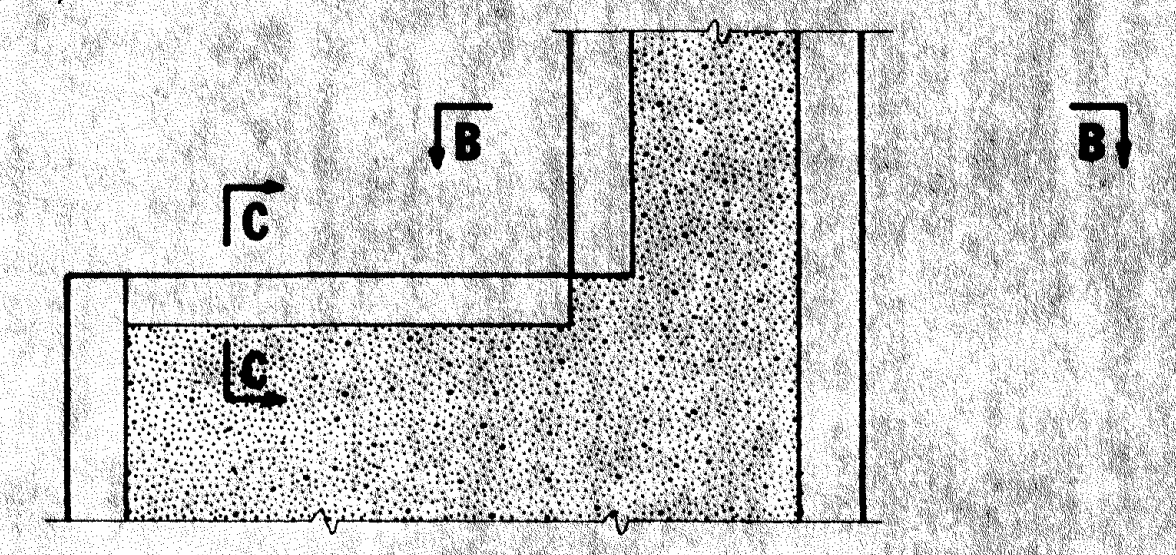
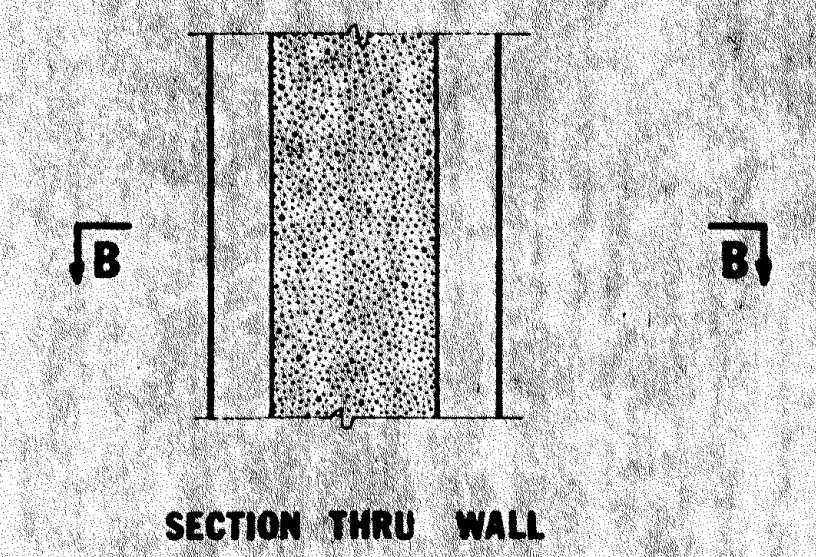
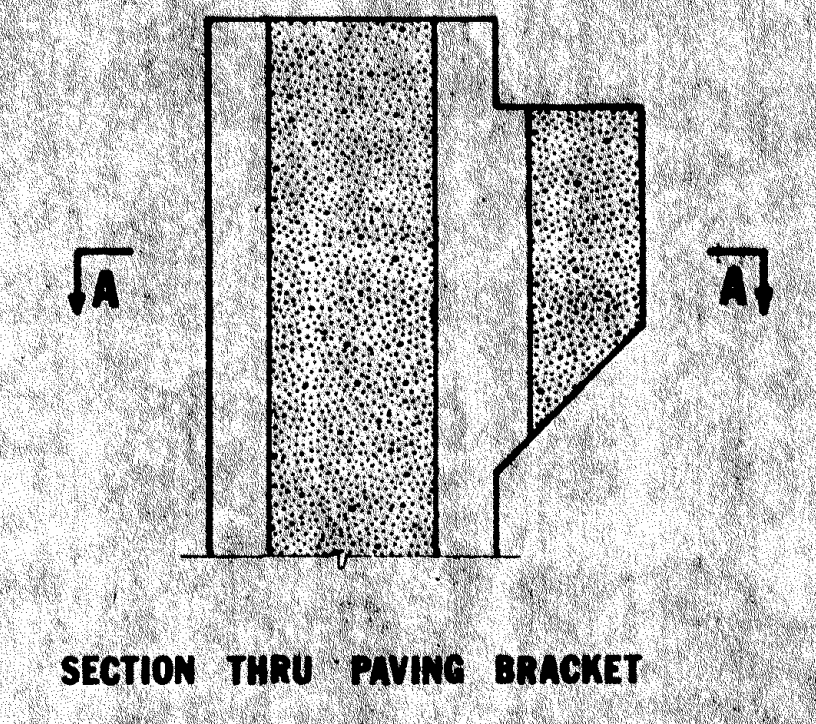
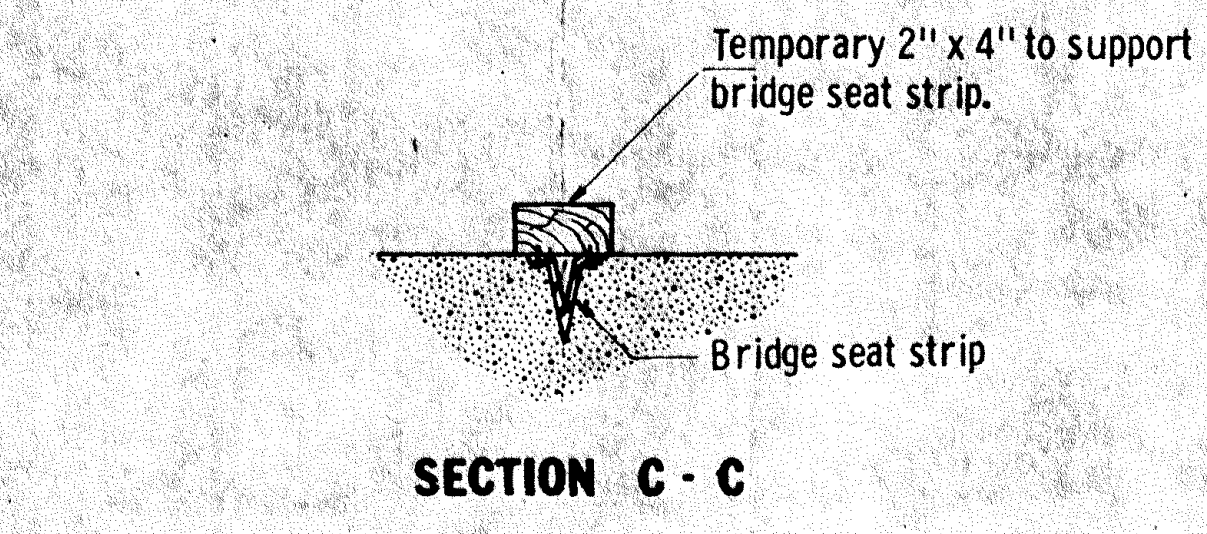
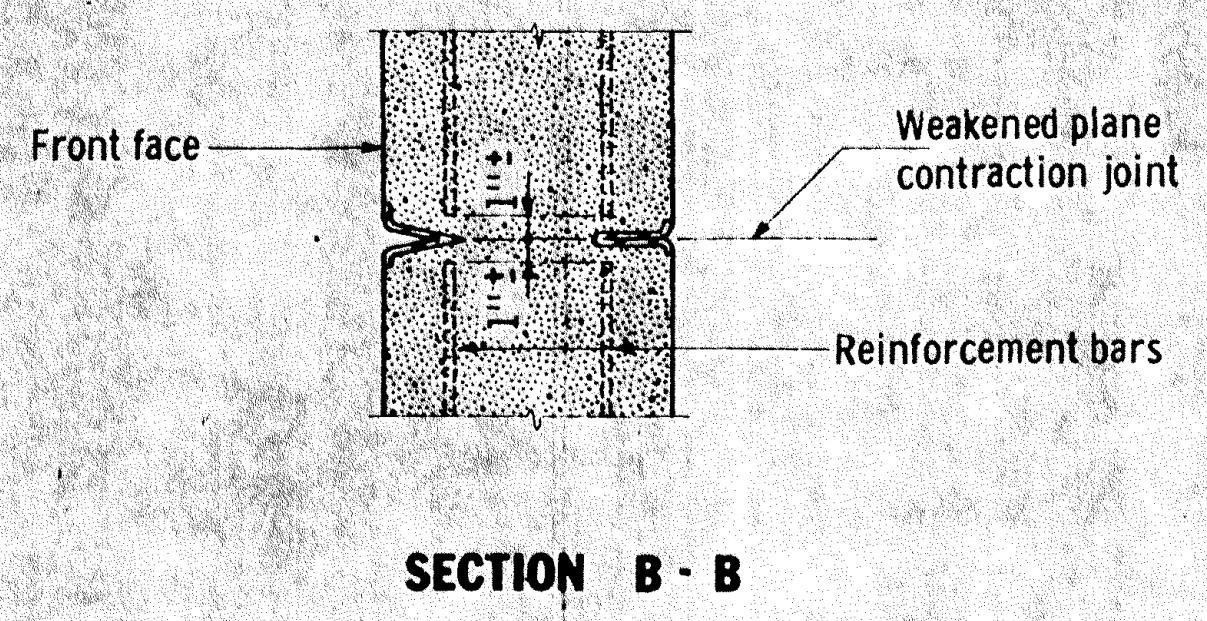
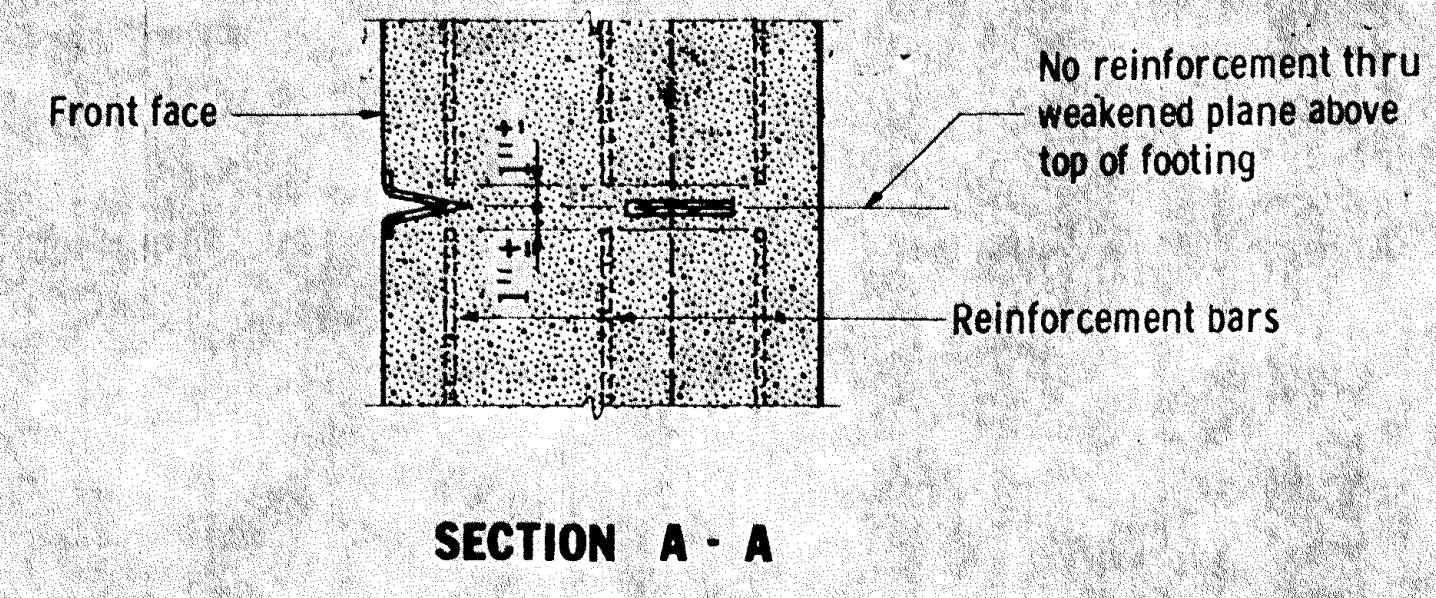
APPROVED 12-21-71

02521

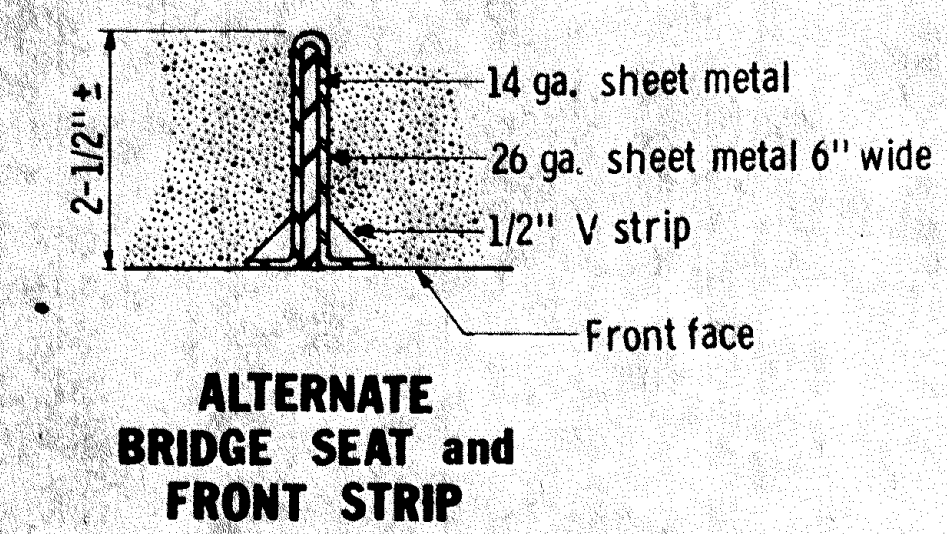
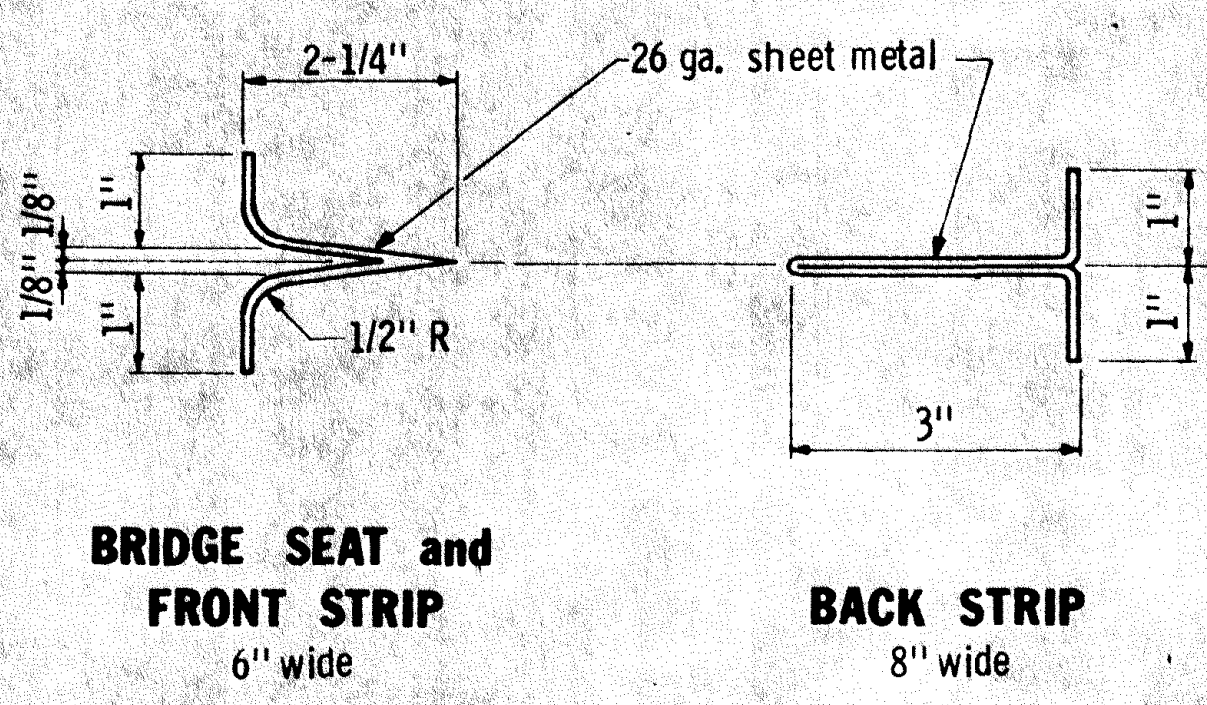


SECTION A - A

NOTES:
 Angles shall extend full width of roadway between curbs with a 1/2" open joint at each break in crown profile. Maximum length 22 feet.
 Material: Structural steel per M. H. D. 3306. Galvanize after fabrication per M. H. D. 3394
 Set angle to proper grade and crown.



PART SECTION THRU ABUTMENT AT JOINT



NOTES:
 The methods and materials indicated hereon shall be considered as suggested only. Variations will be permitted, subject to approval by the Engineer, but must provide dummy joints of a depth not less than the depth shown, and a width at the front face of the abutment of not greater than 5/16". The separation of the horizontal reinforcement bars shall be not less than 1-1/2" nor more than 3" centered as shown, regardless of the procedure used for forming the dummy joint.
 Front and bridge seat strips shall be removed with forms, except if a suitable plastic or other durable material satisfactory to the Engineer, is used, the material may be left in place. Back strip to remain in place.
 Strips to be removed shall be oiled or greased as necessary to permit removal without spalling the concrete.
 Metal strips to be galvanized sheet metal. Fasten to forms with 7/8" roofing nails about 6" centers.
 All metal in front face to be oiled for easy removal.
 Cost of forming joint to be included in price bid for other items.

APPROVED July 1, 1969
 Design Standards Engineer
 ENGINEERING STANDARDS DIVISION

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS
PROTECTION ANGLE FOR END OF SLAB

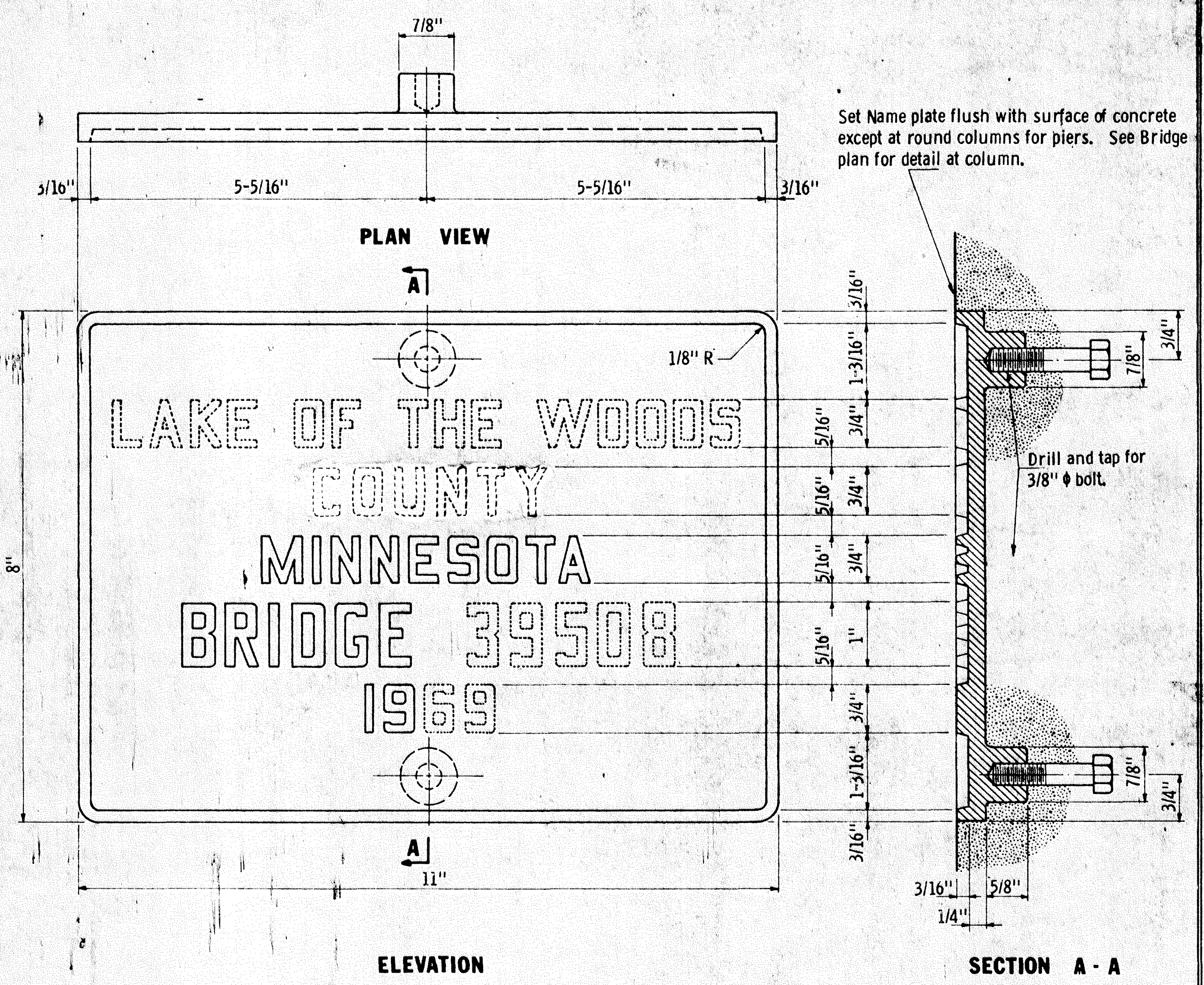
REVISION
 DETAIL NO.
B551

APPROVED July 1, 1969
 Design Standards Engineer
 ENGINEERING STANDARDS DIVISION

STATE OF MINNESOTA
 DEPARTMENT OF HIGHWAYS
CONTRACTION JOINT

REVISION
 DETAIL NO.
B801

BRIDGE NO. 02521
 DETAILS
 APPROVED 12-21-71
 02521



NOTES:

Numbers and letters shall conform to those shown.

Draft on letters shall not be more than 3" in 12" Horizontal spacing of letters shall produce a balanced layout in proportion to spacing shown. Top surface of letters and frames shall be burnished.

Background of plate shall have a deep brown oxidized finish.

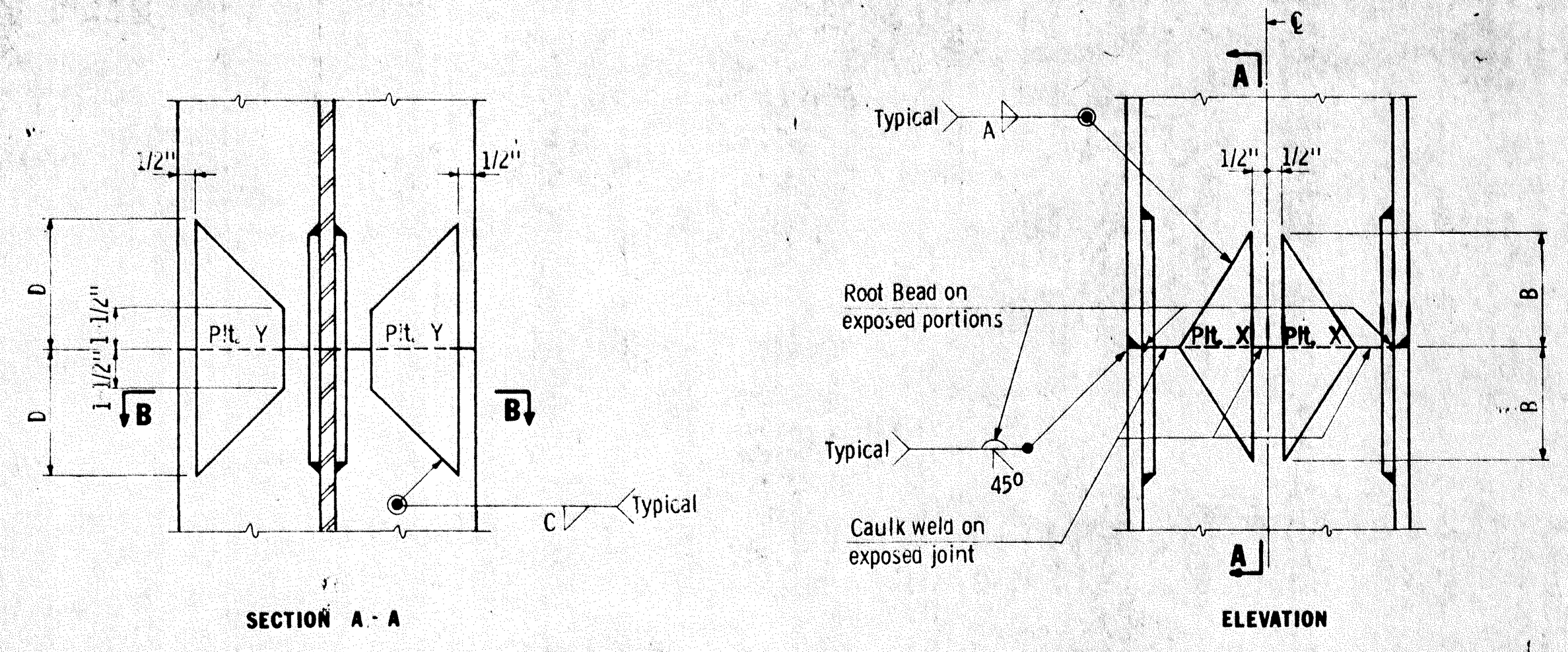
Furnish 2 steel bolts 3/8" φ x 3" long with each plate.

Plates ordered in pairs shall be cast from the same heat.

Numbers and letters shown dotted are to be obtained from Bridge plans.

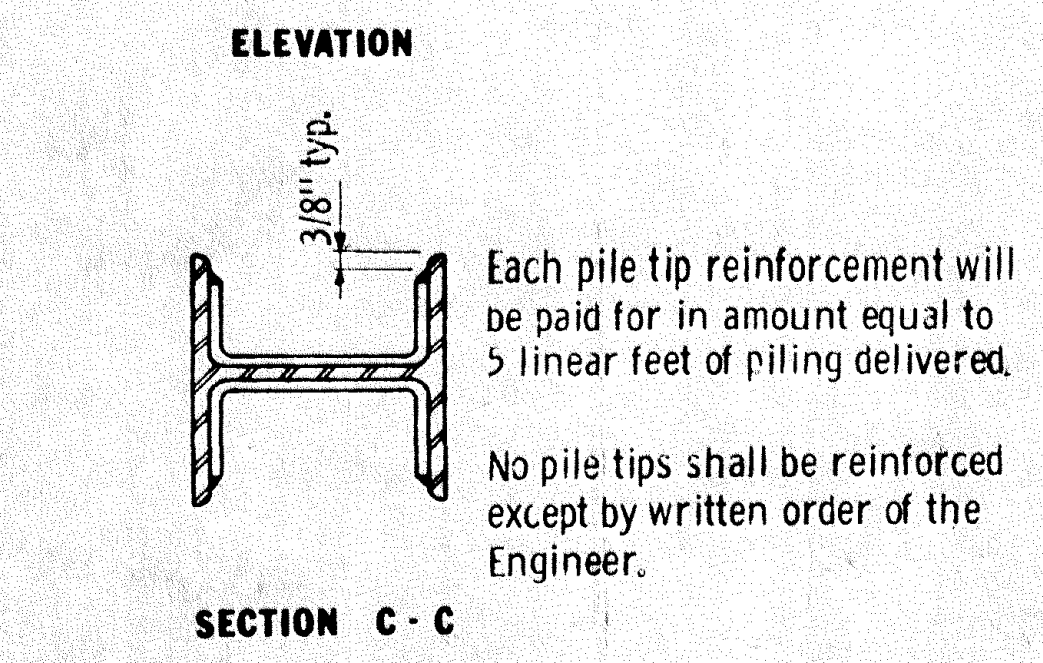
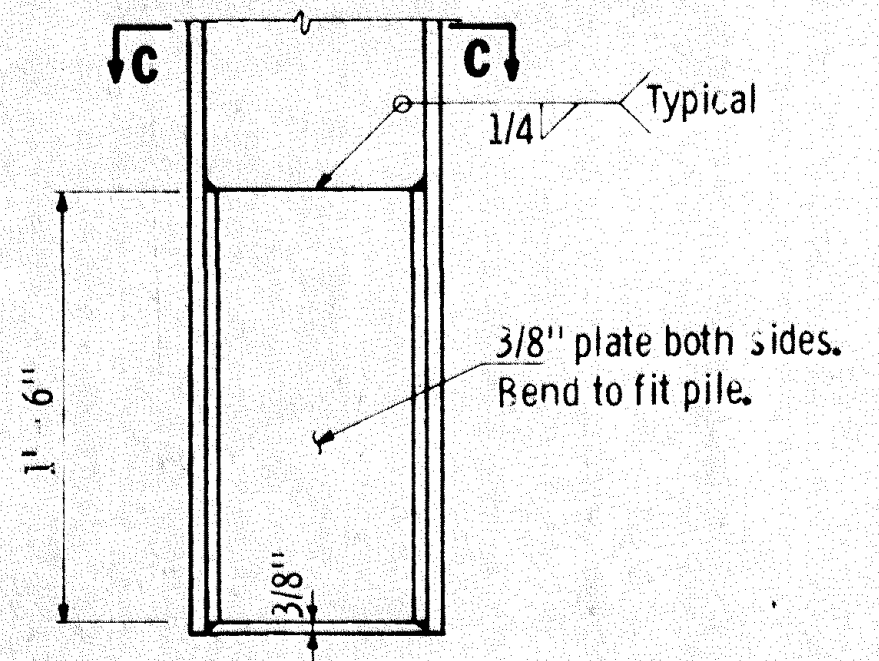
All dimensions for 3/4" high letters and numbers shall be in direct proportion to those shown for the 1" high letters and numbers.

Specification reference:
2471.3H, 3327 (Bronze castings)

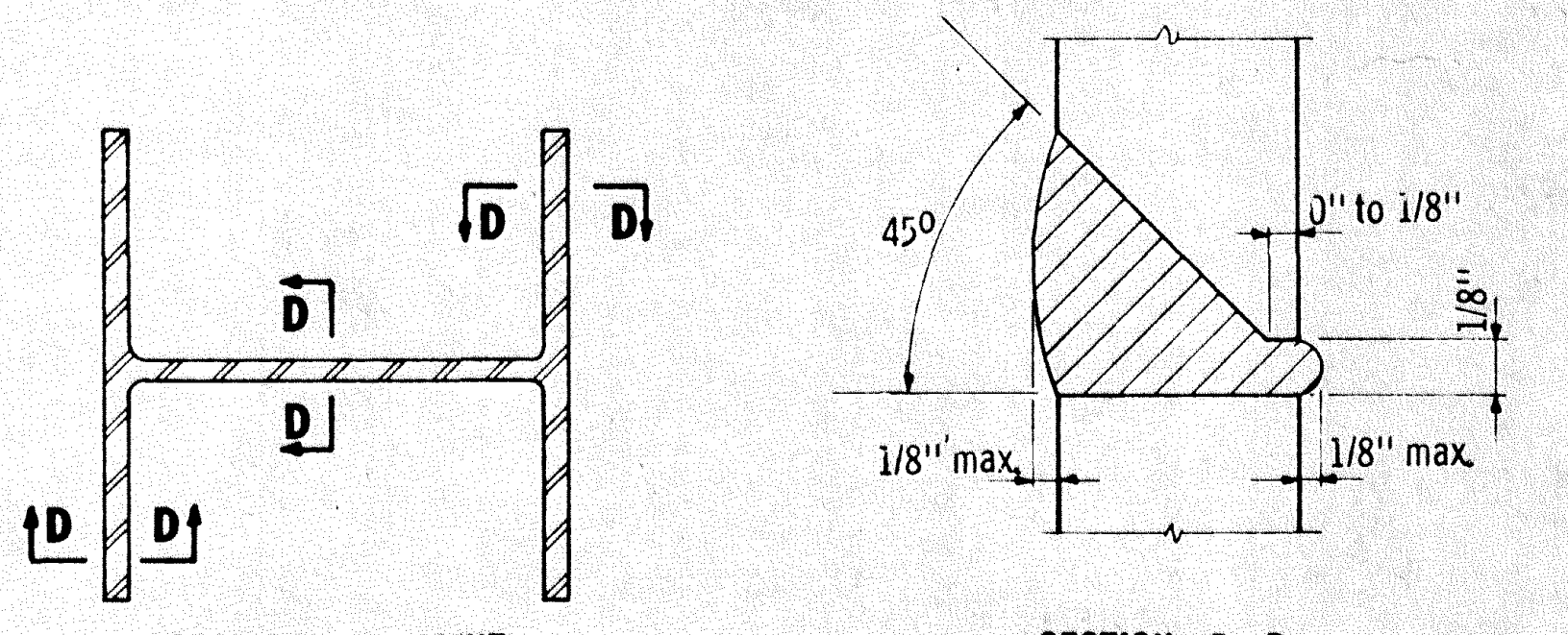


PILE SECTION	PLATE X		PLATE Y			
	Size	A	B	Size	C	D
10 BP 42	2 1/2 x 3/8	1/4	4	3 x 3/8	5/16	4
10 BP 57	2 1/2 x 1/2	5/16	4	3 x 1/2	5/16	5
12 BP 53	3-1/2 x 3/8	1/4	5	4 x 3/8	5/16	5
12 BP 74	3-1/2 x 1/2	5/16	6	4 x 1/2	5/16	6
14 BP 73	4-1/2 x 3/8	1/4	7	5 x 3/8	5/16	6
14 BP 89	4-1/2 x 7/16	5/16	7	5 x 1/2	5/16	7
14 BP 102	4-1/2 x 1/2	5/16	7	5 x 9/16	3/8	7
14 BP 117	4-1/2 x 9/16	3/8	7	5 x 5/8	3/8	8

PILE SPLICE



DETAIL OF PILE TIP REINFORCEMENT



NOTES:

Pile ends at splice to be square.

Welding electrodes per M. H. D. 3339.

With DC reverse polarity (electrode positive) only use A. S. T. M. classification E6010.

With DC reverse polarity or AC use A. S. T. M. classification E6011.

Where moisture control is properly enforced A. S. T. M. classification E6016 or E7016 may be used.

Recommended moisture content per cent of coating:

E6010 3.0 to 5.0 % D. C. R. only

E6011 2.0 to 4.0 % AC or D. C. R.

E6016 Less than 0.4 % AC or D. C. R.

E7016 Less than 0.4 % AC or D. C. R.

All welding per M. H. D. 2471.3J.

Steel plates per M. H. D. 3306.

AS BUILT
10-16-73
B. Jack

APPROVED July 1, 1969
Design Standards Engineer
ENGINEERING STANDARDS
DIVISION

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
**BRIDGE NAME PLATE
COUNTY BRIDGES
(STATE AID)**

REVISION
DETAIL NO.
B103

APPROVED July 1, 1969
Design Standards Engineer
ENGINEERING STANDARDS
DIVISION

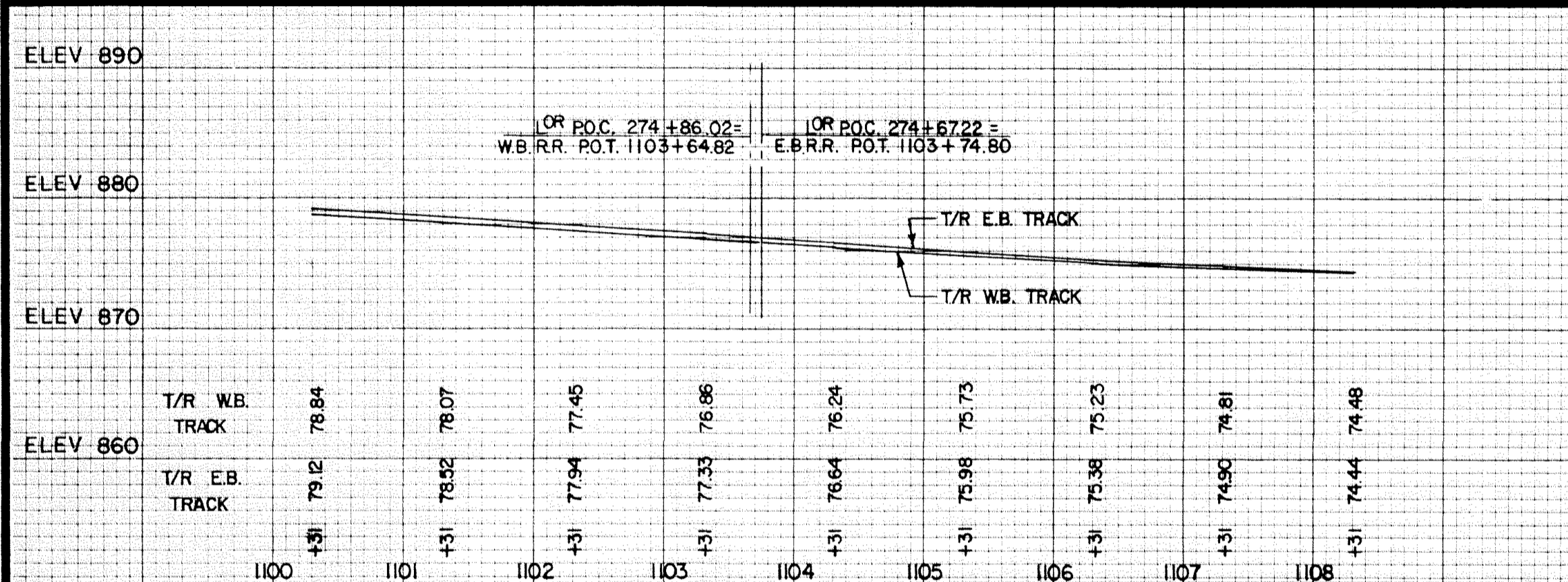
STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
**PILE SPLICE and TIP REINFORCEMENT
STEEL H BEARING PILES 10" TO 14"**

REVISION
DETAIL NO.
B202

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
**BRIDGE NO.
02521
DETAILS**
APPROVED 12-31-71
02521

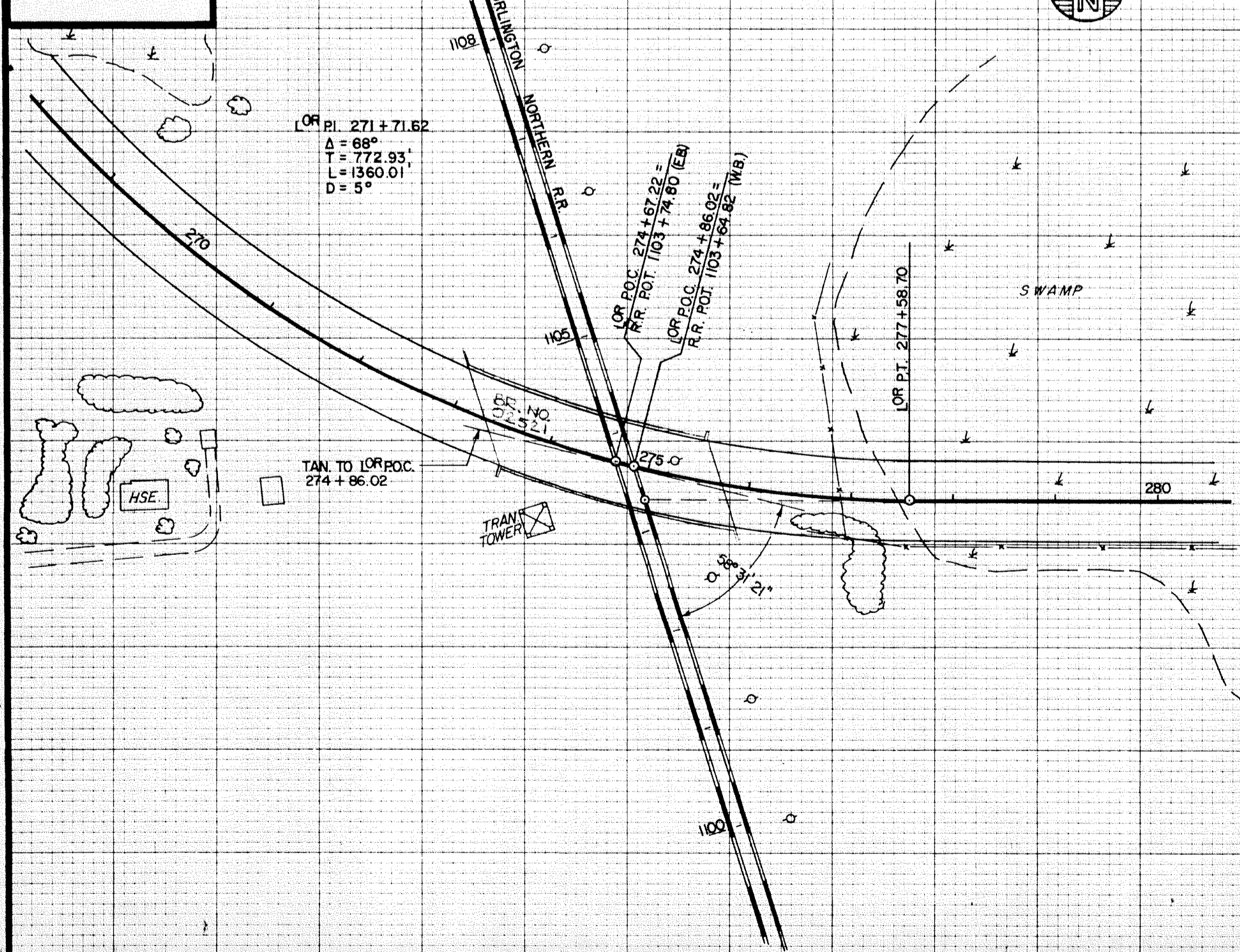
CONTRACTED PROFILE

SCALE: HOR. 1" = 100' VER. 1" = 10'



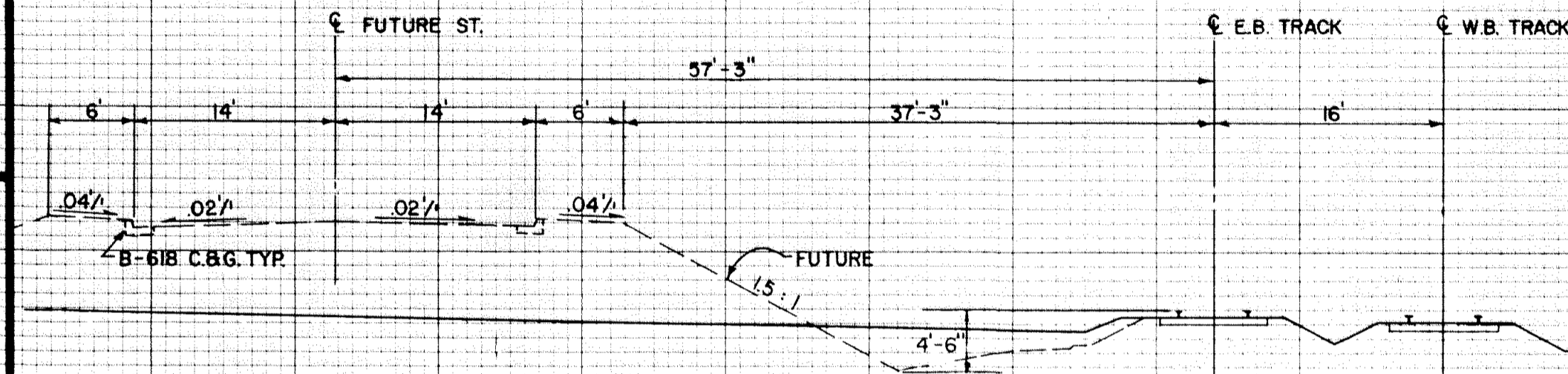
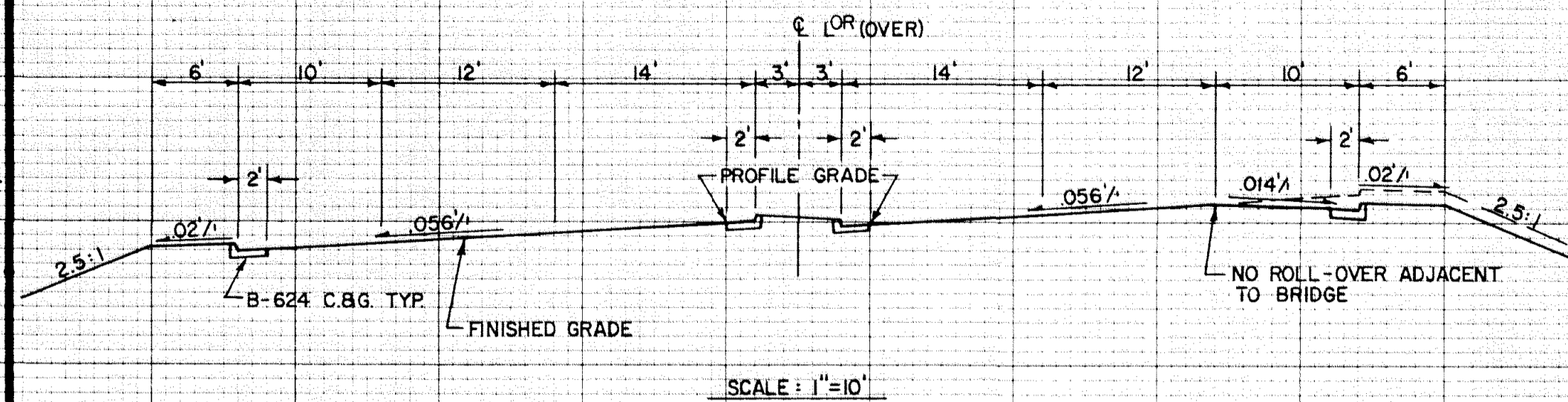
PLAT

SCALE: 1" = 100'

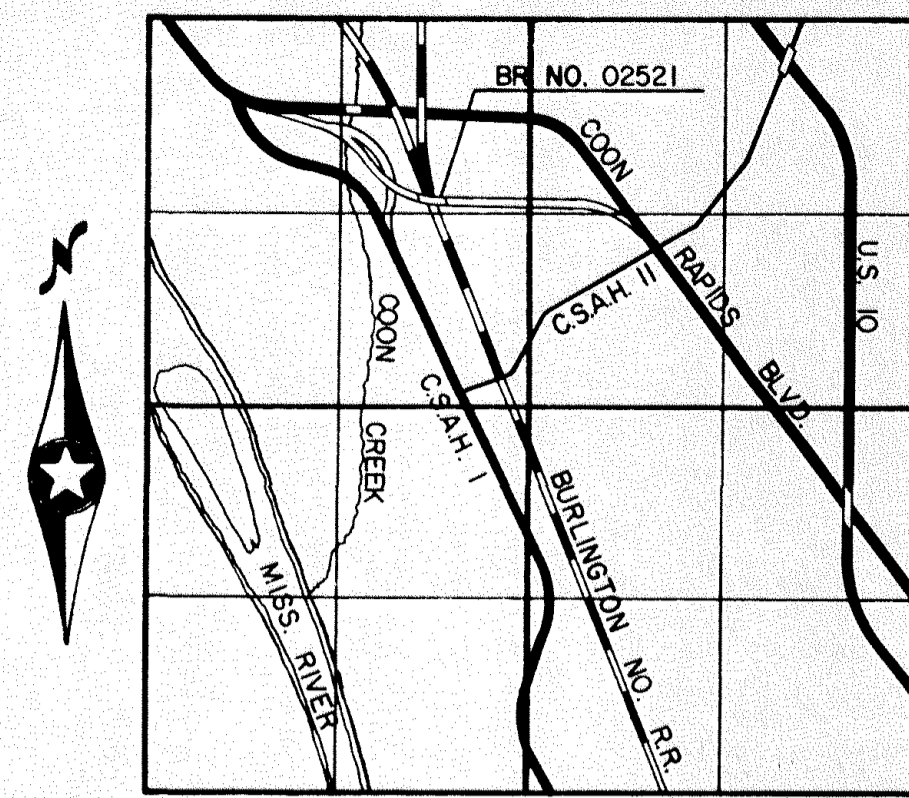


TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN



Fed. Proj. No.



R 24 W
INDEX MAP
(FOUR SECTIONS)

FOLLOW SEPARATE "INSTRUCTIONS FOR PREPARATION OF BRIDGE SURVEYS" WHEN MAKING BRIDGE SURVEYS.

DATA

- Preliminary recommendations of Engineer in charge of Bridge Survey:
 - a. Net span length and type of bridge 90'-82'-62" PRESTRESSED CONCRETE GIRDER SPANS
 - b. Width of roadway on bridge TWO-36' ROADWAYS AND ONE-6' MEDIAN
 - c. Number and width of sidewalks, if any NONE
 - d. Locate center of bridge at station 274+86.02
 - e. If a skew bridge is recommended, the angle of skew should be 31° 28' 39"
 - f. Is piling required? YES
- Special features: Waterfalls, dams, exceptional floods, ice, driftwood, sliding banks, logging, etc.
- Changes: In height or length from that of old bridge, and reasons why
- Other bridges in vicinity:
 - a. Over same stream (particularly structures which carry high water without overflow of roadway); give location, length, height above water, net cross-sectional area at high water stage and estimated age
 - b. Over or under same highway or railroad; give location, length, horizontal and vertical clearances and estimated age
 - c. Reasons why these bridges are, or are not, fair indications of what length the proposed bridge should be
- If structure is over a drainage ditch, is ditch gradient liable to be altered?
- Navigation clearances required, if any
- Information and evidence in regard to high water stages was obtained as follows:
- Must contractor provide for traffic during construction of proposed bridge? NO
If so, by what means?

HYDRAULIC ENGINEERS RECOMMENDATION

.....
.....
.....

HIGH AND LOW WATER ELEVATIONS

Date obtained from
reflects highest water elevation in the area of this construction to be and the lowest water elevation to be The above figures are for informational purposes only. The state neither warrants nor represents that these figures for high water and low water are in any way indicative of the high water or low water to be expected or encountered during this construction.

SHIPPING POINT

Proposed Bridge is in the city of
* Coon Rapids which is the nearest
Railroad shipping point:
*(Give name of town, station or siding)

Date Project or County Engineer
Date District Engineer

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS

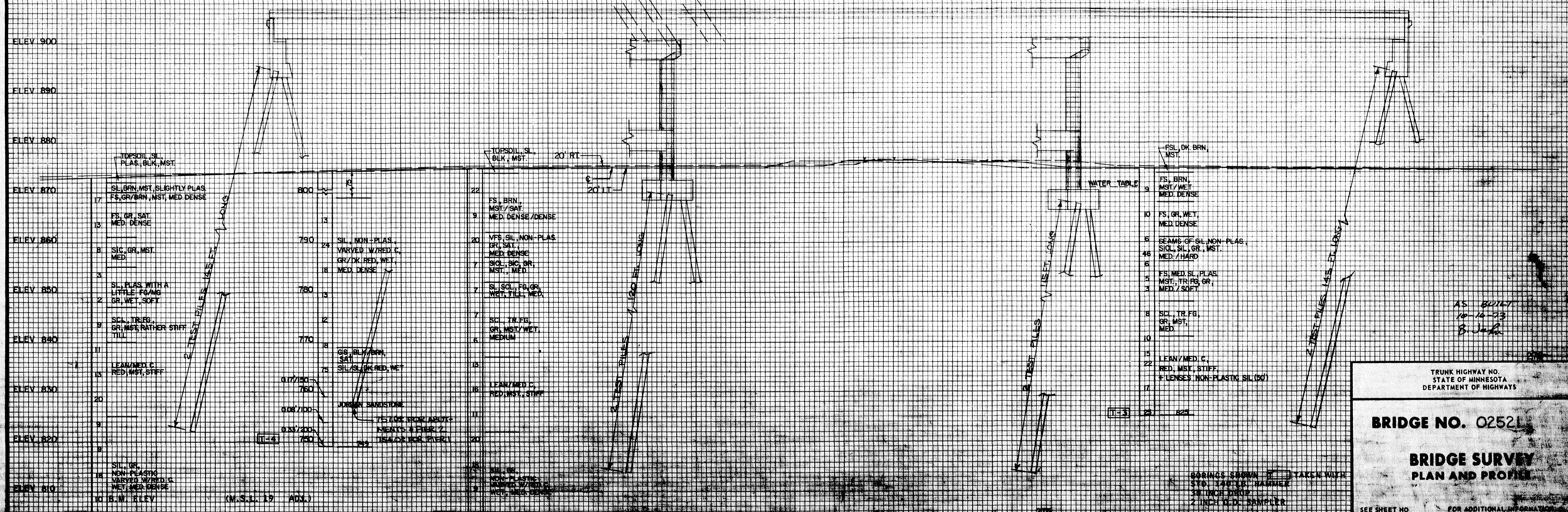
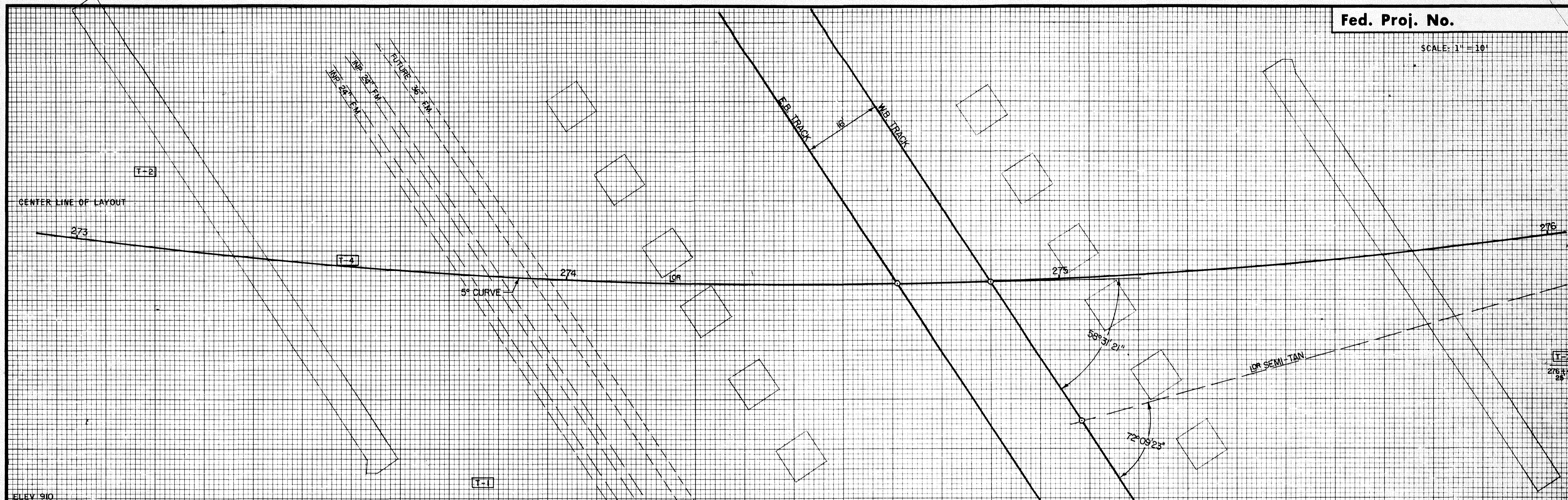
BRIDGE SURVEY

FOR
PROPOSED BRIDGE LOCATED 0.5 MILES WEST OF
JCT. OF FOLEY BLVD. (C.S.A.H. II) & COON RAPIDS BLVD.
IN COON RAPIDS, ON COON RAPIDS BLVD. BY-PASS
(TOWN OR CITY) (T.M., C.S.A.H. OR C.A.R. NUMBER)
SEC. 26 TWP. 31.N R. 24.W
CITY OF COON RAPIDS COUNTY ANOKA
SURVEY MADE DURING MONTH OF DECEMBER 19 70
SURVEY MADE BY J. MALONEY
BRIDGE NO. 02521

B.M. ELEV 875.16 (M.S.L. 19 ADJ.)
TOP YELLOW BOLT, WEST
EDGE, SWITCH LIGHT,
180' LT. LOR 273+40

AS BUILT
12-16-73
B. Jahn

SEE SHEET OF SHEETS FOR PLAN AND PROFILE



AS BUILT
10-10-53
B. J. J.

TRUNK HIGHWAY NO.
STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS

BRIDGE NO. 02521

**BRIDGE SURVEY
PLAN AND PROFILE**

SEE SHEET NO. FOR ADDITIONAL INFORMATION

Bridge Survey Sheet (Sheet 2 of 2)