

# KENTUCKY DEPARTMENT OF HIGHWAYS

## WARREN COUNTY

### BOWLING GREEN-OWENSBORO PARKWAY

### KY. 884 OVER B.O.P.

FOR: ADAM K. GRAFE & ASSOC.  
CONSULTING ENGRS.

PLANS PREPARED BY:  
KROBOTH ENGRS., INC.

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#### REFERENCE & ESTIMATE OF QUANTITIES

Location	Item	Sheet No.	Concrete Class 'A' (Cu. Yds.)	Concrete Class 'AA' (Cu. Yds.)	Steel Reinforcement (Lbs.)	Structural Steel (Lump Sum)	High Strength Handrail (Lin. Ft.)	Protective Coating		End Bent Backfill (Cu. Yds.)	Structure Excavation Common (Cu. Yds.)	Piling 12 BP 53		Slope Prot. 12' Deep Crush Agg. (Sq. Yds.)
								Styrene-Butadiene (Gal.)	Linseed Oil (Sq. Yds.)			Furnish (Lin. Ft.)	Drive (Lin. Ft.)	
Title & Quantities		1												
Notes		2												
Layout		3												
Pile Record		4												
End Bent 1		5,6	31.8	12.8	3,781			1	5	30	90	452	452	175
Pier 1		7	23.6		6,217			2			40	229	229	
Pier 2		7	22.4		5,977			2			10	266	266	
Pier 3		7	24.1		6,343			2			40	232	232	
End Bent 2		5,6	31.8	12.6	3,781			1	5	30	90	432	432	175
Spans 1,2,3 & 4		8,9,10		373.8	120,884			10	640					
High Strength Handrail		3				482								
Construction Elevations		11												
Soundings		12												
Sub-total Substructure			133.7	25.4	26,099			8	10	60	270	1611	1611	350
Sub-total Superstructure				373.8	120,884	①	482	10	640					
Total			133.7	399.2	146,983	①	482	18	650	60	270	1611	1611	350

① Approximate Weight of Structural Steel = 14,200 Lbs

#### BILL OF INCIDENTAL MATERIAL

Item	No.	Description	Location
Four Bolt Insert Assembly	4	See Note Sh. 3 & 6	End Bent Wings
Joint Sealing Compound	2	3 1/2" x 1" x 29' 0"	Expansion Dams at End Bents
Prem. Cork Expan. Jt. Material	4	6" x 1/8" x 1'-7"	Sides of Keys at End Bents
	2	18" x 1/8" x 4'-3"	Top of Keys at End Bents

#### SPECIAL PROVISIONS

- No. 8A for Linseed Oil Protective Coating
- No. 12 for Joint Sealing Compound
- No. 30B for Membrane Curing of Concrete Structures
- No. 35B for Class 'AA' Concrete
- No. 77B for Styrene-Butadiene Protective Coating
- No. 79 for Concrete Bridge Deck Finishing Machine
- No. 80A for Blast Cleaning and Painting Structural Steel

#### REFERENCES

(Standard Drawing listed below are the Current Edition and are to be used with these plans.)

AE1-D G354C P212A-A SS 2B  
ED3C H116C 3F2B 17.40a

Ky 884 over BOP

Sheet 1 of 12

<b>COMMONWEALTH OF KENTUCKY</b>			
DEPARTMENT OF HIGHWAYS			
FRANKFORT			
COUNTY OF			
<b>WARREN</b>			
BOWLING GREEN - OWENSBORO PKWY.			
ROAD		B.O.P. 1-1	
STATION 961+49.80		P.E. PROJECT NO. SP 114-113-1L	
CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO.	
		18261	

LETTING DATE

## GENERAL NOTES

**SPECIFICATIONS**

THE KENTUCKY DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, CURRENT EDITION WITH REVISIONS, SHALL APPLY TO THIS PROJECT.

**DESIGN LOAD:**

THIS BRIDGE IS DESIGNED FOR H20-44 LIVE LOAD AS SPECIFIED IN 1969 AASHTO SPECIFICATIONS. THIS BRIDGE IS DESIGNED FOR A WIND LOAD BASED ON A WIND VELOCITY OF 84 m.p.h.

**DESIGN STRESSES:**

FOR REINFORCED CONCRETE USE THE FOLLOWING:

CLASS A	CLASS AA
$f_s$ - 20,000 PSI	$f_s$ - 20,000 PSI
$f_c$ - 1,200 PSI	$f_c$ - 1,600 PSI FOR OTHER THAN SLABS
$f_c$ - 3,000 PSI	$f_c$ - 1,200 PSI FOR DECK SLABS
$u$ (for embed.) - 200 PSI	$f_c$ - 4,000 PSI
$u$ (for $\epsilon$ ) - 300 PSI	$u$ (for embed.) - 200 PSI
$n$ - 10	$u$ (for $\epsilon$ ) - 300 PSI
	$n$ - 8

**FOUNDATION PRESSURE**

PILES IN PIER FOOTINGS ARE DESIGNED FOR A MAXIMUM AXIAL LOAD OF 52.3 TONS PER PILE. END BENT PILES ARE DESIGNED FOR A MAXIMUM AXIAL LOAD OF 27.9 TONS PER PILE AND A MAXIMUM HORIZONTAL SHEAR OF 0.0 TON PER PILE. THESE MAXIMUMS ARE FOR GROUP 1 LOADS WITH INCREASES ALLOWED FOR OTHER LOADING GROUPS.

**CONCRETE**

CLASS "AA" CONCRETE IS TO BE USED THROUGHOUT THE SUPERSTRUCTURE AND IS TO BE USED IN PORTIONS OF THE SUBSTRUCTURE ABOVE BEARING SEATS. CLASS "A" CONCRETE IS TO BE USED IN THE SUBSTRUCTURE BELOW THE BEARING SEATS.

**REINFORCEMENT**

DIMENSIONS SHOWN FROM THE FACE OF CONCRETE TO BARS ARE CLEAR DISTANCES UNLESS OTHERWISE SHOWN. SPACING OF BARS IS FROM CENTER TO CENTER OF BARS.

**BEVELED EDGES**

ALL EXPOSED EDGES SHALL BE BEVELED 7/8" UNLESS OTHERWISE SHOWN.

**BILL OF INCIDENTAL MATERIAL**

THE QUANTITIES SHOWN IN THE BILL OF INCIDENTAL MATERIAL ARE APPROXIMATE ONLY AND THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ENOUGH MATERIAL TO COMPLETE THE WORK IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE COST OF THESE ITEMS IS TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS "AA" CONCRETE.

**PAYMENT FOR STRUCTURAL STEEL**

THE LUMP SUM BID FOR STRUCTURAL STEEL SHALL BE FULL PAYMENT FOR ALL STRUCTURAL STEEL, BOLTS, WASHERS, STEEL PINS, LEAD PLATES, MOLTEN LEAD, WELDING AND WELDING MATERIALS, PAINT AND ALL LABOR AND MATERIALS NECESSARY TO ERECT THE STEEL IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE APPROXIMATE WEIGHT OF STRUCTURAL STEEL SHOWN IN THE ESTIMATE OF QUANTITIES DOES NOT INCLUDE OVERRUN OR WELD MATERIAL.

**PILING**

THE CONTRACTOR SHALL USE A STANDARD 12" STRUCTURAL STEEL BEARING PILE @ 53 LBS. SEE STANDARD DRAWING P212A, CURRENT EDITION. PILING SHALL BE DRIVEN TO REFUSAL OR TO SOLID ROCK. TEST PILES SHALL BE DRIVEN WHERE DESIGNATED ON THE PLANS TO DETERMINE THE LENGTH OF PILE REQUIRED. THE TEST PILES SHALL BE ACCURATELY LOCATED SO THAT THEY MAY BE USED IN THE FINISHED STRUCTURE.

**PAINT**

ALL STRUCTURAL STEEL SHALL BE CLEANED AND PAINTED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR BLAST CLEANING AND PAINTING STRUCTURAL STEEL, CURRENT EDITION.

**HIGH STRENGTH HANDRAIL**

THE CONTRACTOR SHALL USE A HIGH STRENGTH ALUMINUM HANDRAIL ACCORDING TO STANDARD DRAWING H116, CURRENT EDITION.

**CONSTRUCTION IDENTIFICATION**

THE NAMES OF THE PRIME CONTRACTOR AND THE SUB-CONTRACTOR SHALL BE IMPRINTED IN THE CONCRETE WITH ONE INCH LETTERS AT A LOCATION DESIGNATED BY THE ENGINEER. THE CONTRACTOR SHALL FURNISH ALL PLANS, EQUIPMENT AND LABOR NECESSARY TO DO THE WORK FOR WHICH NO DIRECT PAYMENT WILL BE MADE.

**MATERIALS**

AWS & ASTM SPECIFICATIONS, CURRENT EDITION, AS DESIGNATED BELOW SHALL GOVERN THE MATERIALS FURNISHED.

ASTM A 36-69 STRUCTURAL STEEL FOR ARMORED EDGES, EXPANSION DAMS, SHOES AND ROCKERS.  
ASTM A108-69 PINTLES (GRADES 1016 TO 1030 INCLUSIVE)  
AWS A5.1-69 MILD STEEL ELECTRODES FOR MANUAL SHIELDED METAL ARCH WELDING.  
ASTM B 29-55 LEAD PLATES AND MOLTEN LEAD

**POURING SEQUENCE**

(1966)  
POUR THE GIRDER STEM IN ONE CONTINUOUS OPERATION IN HORIZONTAL LAYERS FOR EACH GIRDER. POUR ENDWALLS AND DIAPHRAGMS WITH GIRDER STEM BY PROVIDING VERTICAL CONSTRUCTION JOINTS MIDWAY BETWEEN GIRDERS. POUR SLAB IN ONE CONTINUOUS POUR. THE POURING SEQUENCE OF THE SLAB MAY BE CHANGED WITH THE WRITTEN APPROVAL OF THE ENGINEER.

**ANCHOR BOLT HOLES**

HOLES OF DEPTH AND DIMENSIONS SHOWN SHALL BE DRILLED FOR ANCHOR BOLTS OR DOWELS BY THE SUPERSTRUCTURE CONTRACTOR WHO SHALL BE RESPONSIBLE FOR KEEPING HOLES DRY IN FREEZING WEATHER. AFTER BASE PLATES ARE PROPERLY SET AND ANCHOR BOLTS ARE PLACED IN DRILLED HOLES, MOLTEN LEAD SHALL BE POURED IN HOLES AND PACKED UNTIL HOLES ARE COMPLETELY FILLED FLUSH TO TOP OF BASE PLATES. THE COST OF DRILLING ANCHOR BOLT HOLES, FURNISHING LEAD, AND FILLING HOLES WITH MOLTEN LEAD SHALL BE INCIDENTAL TO AND INCLUDED IN THE LUMP SUM BID FOR STRUCTURAL STEEL.

**MEMBRANE CURING COMPOUND:**

WHITE PIGMENTED CURING COMPOUND SHALL BE APPLIED TO THE BRIDGE DECK IN ACCORDANCE WITH THE SPECIAL PROVISION, EXCEPT THAT THE MEMBRANE COMPOUND USED SHALL HAVE A RESINOUS BASE.

**LINSEED OIL PROTECTIVE COATING**

LINSEED OIL PROTECTIVE COATING SHALL BE APPLIED IN ACCORDANCE WITH THE SPECIAL PROVISION, EXCEPT THAT IT SHALL ONLY BE APPLIED TO THE BRIDGE DECK BETWEEN THE GUTTER LINES AND SHALL NOT BE APPLIED UNTIL AFTER THE STYRENE-BUTADIENE PROTECTIVE COATING HAS BEEN APPLIED TO THE CURBS AND PLINTHS.

**STYRENE-BUTADIENE PROTECTIVE COATING**

STYRENE-BUTADIENE PROTECTIVE COATING SHALL BE APPLIED TO THE TOP SURFACES AND INSIDE FACES OF CURBS, THE TOP AND INSIDE VERTICAL SURFACES OF PLINTHS, THE TOP AND INSIDE EXPOSED SURFACES OF END BENT SIDE WALLS, THE TOP, SIDES AND ENDS OF PIER CAPS, AND THE SEAT OF END BENTS.

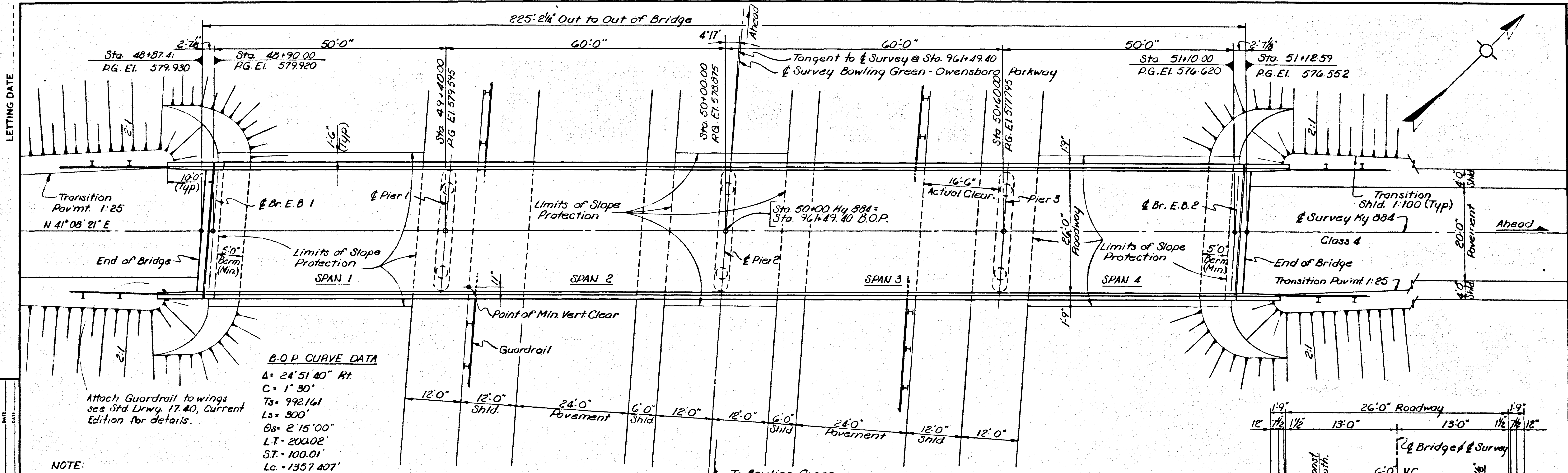
DESIGNED BY: W.G.  
CHECKED BY: W.G.  
DATE: 7/68  
REVISIONS:  
DATE: 7/68  
DATE: 7/68

NOTES

My 334 over B.O.P. Sheet 2

**COMMONWEALTH OF KENTUCKY**  
DEPARTMENT OF HIGHWAYS  
FRANKFORT  
COUNTY OF  
**WARREN**  
BOWLING GREEN-OWENSBORO PKWY.  
ROAD  
P. E. PROJECT NO.

STATION 961+49.40	CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO. 18261
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**B.O.P. CURVE DATA**

$\Delta = 24^\circ 51' 40''$  Rt.

$C = 1' 30''$

$T_s = 992.161$

$L_s = 300'$

$\theta_s = 2^\circ 15' 00''$

$L.T. = 200.02'$

$S.T. = 100.01'$

$L_c = 1357.407'$

$R_c = 3819.719'$

$E_s = 98.696'$

$S_e = .058\%$

$R_o = 300'$

**NOTE:**  
For detail of Earth Core see Std. Drwg. S.F. 2, Current Ed.

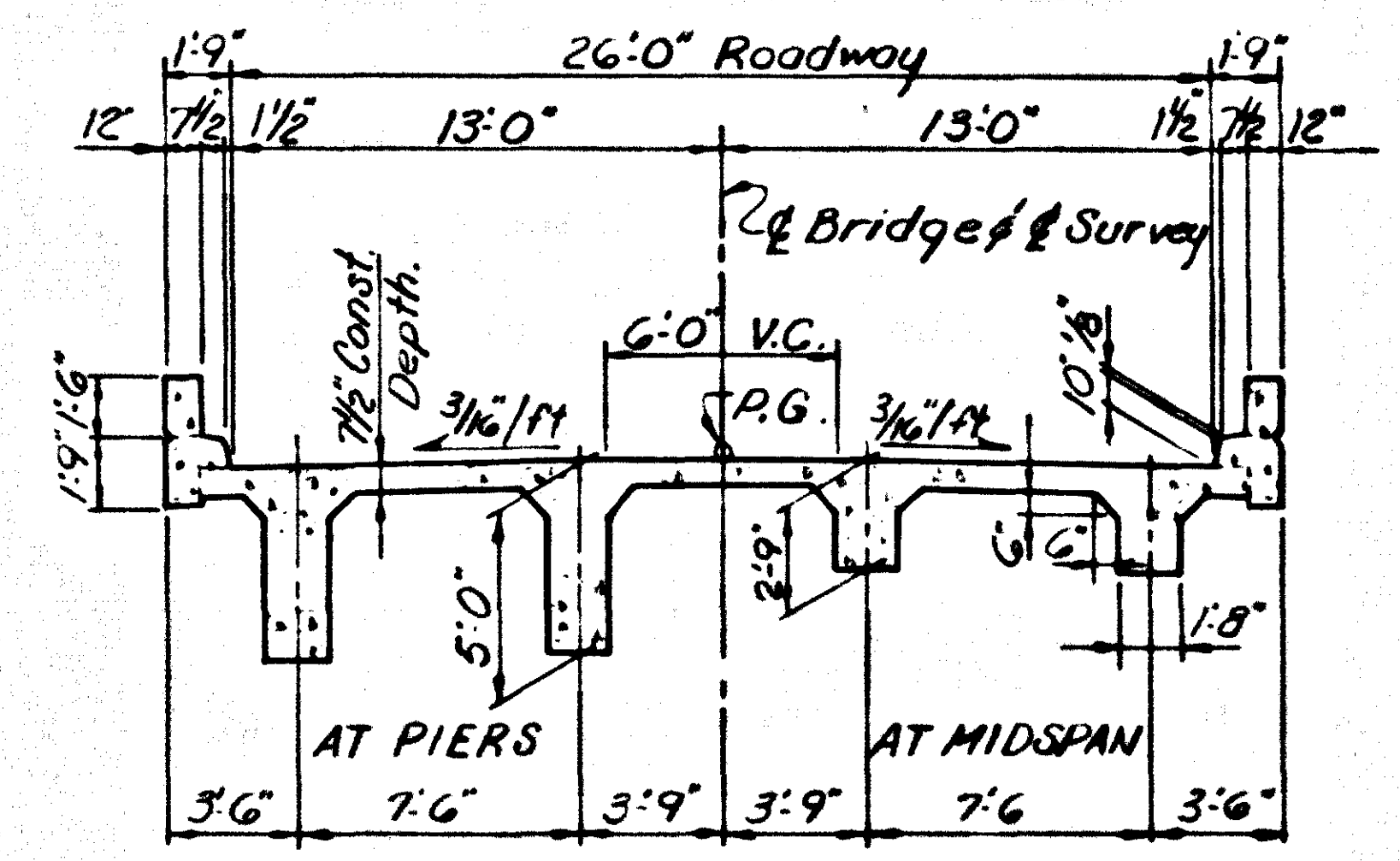
Attach Guardrail to wings see Std. Drwg. 17.40, Current Edition for details.

**PLAN**

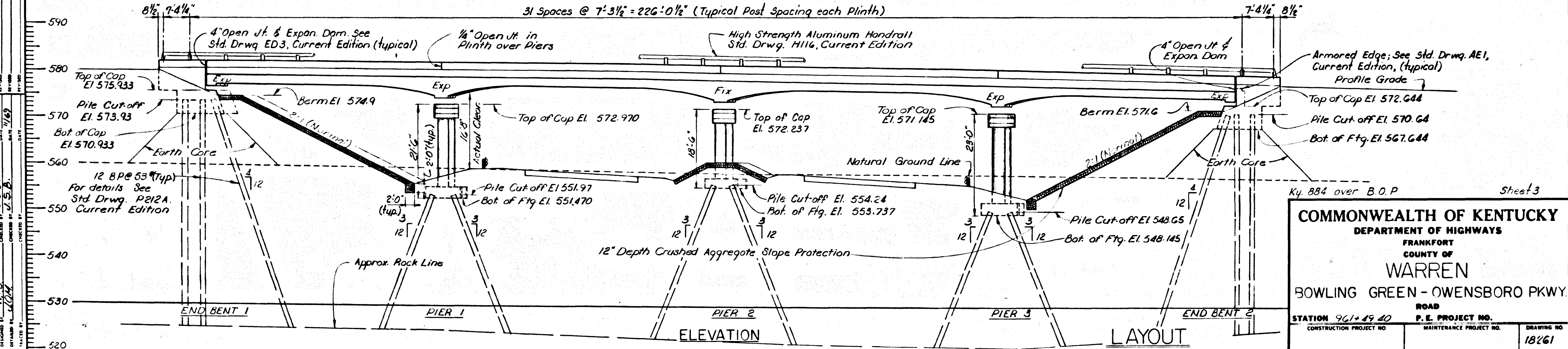
50'-60'-60'-50' Continuous R.C.D.G. H20-44 Loading

26' Roadway 9" Curbs 4'11" Skew Pt. 2:1 Slopes

37'6" Shoulders @ Bridge



TYPICAL SECTION THRU DECK



Ky. 884 over B.O.P. Sheet 3

**COMMONWEALTH OF KENTUCKY**  
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FRANKFORT  
COUNTY OF  
**WARREN**  
BOWLING GREEN - OWENSBORO PKWY.  
ROAD

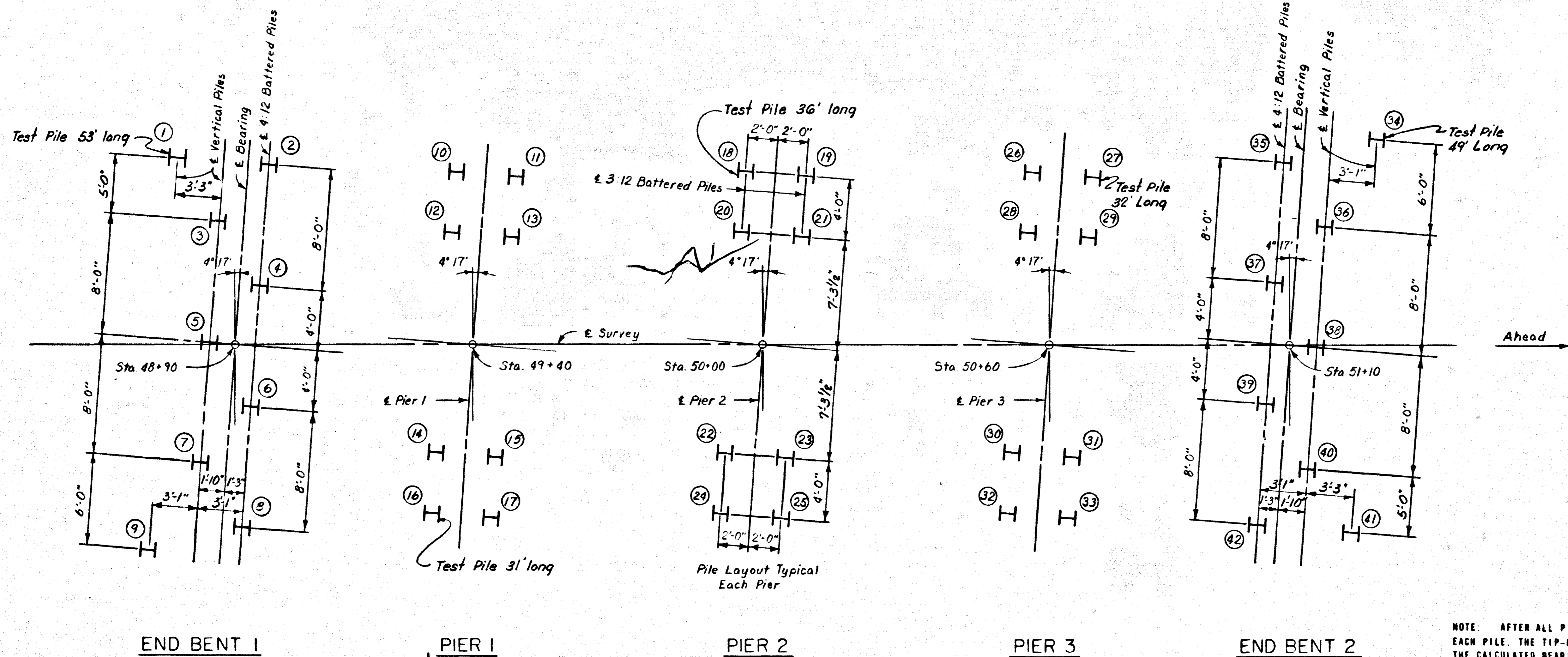
STATION 961+49.40 P.E. PROJECT NO.  
CONSTRUCTION PROJECT NO. MAINTENANCE PROJECT NO. DRAWING NO.

18261

DATE 11/67  
REVISION  
DATE 11/69  
REVISION  
DATE  
DESIGNED BY W.T.B.  
CHECKED BY J.S.B.  
DRAWN BY J.C.B.  
TRACED BY

LETTING DATE

DESIGNED BY	DATE	CHECKED BY	DATE
AF	11/67	JSB	11/67
DRAWN BY	DATE	CHECKED BY	DATE
W.W.C.		JSB	
PLACED BY	DATE		



Pile No.	Cutoff Elev.	Tip of Pile Elev.	Pile Lgth (Lin Ft.)	Calc. Brg. Capy (Tons)
<b>END BENT 1</b>				
1	573.93			
2	"			
3	"			
4	"			
5	"			
6	"			
7	"			
8	"			
9	"			
<b>PIER 1</b>				
10	551.97			
11	"			
12	"			
13	"			
14	"			
15	"			
16	"			
17	"			
<b>PIER 2</b>				
18	554.24			
19	"			
20	"			
21	"			
22	"			
23	"			
24	"			
25	"			
<b>PIER 3</b>				
26	548.65			
27	"			
28	"			
29	"			
30	"			
31	"			
32	"			
33	"			
<b>END BENT 2</b>				
34	570.64			
35	"			
36	"			
37	"			
38	"			
39	"			
40	"			
41	"			
42	"			

NOTE: AFTER ALL PILES HAVE BEEN DRIVEN, THE RESIDENT ENGINEER SHALL RECORD FOR EACH PILE, THE TIP-OF-PILE ELEVATION AS DRIVEN, THE LENGTH OF PILE IN PLACE AND THE CALCULATED BEARING CAPACITY AND SHALL RETURN ONE BLUE PRINT COPY OF THIS SHEET WITH THIS DATA TO THE DIRECTOR OF THE DIVISION OF BRIDGES SO THAT THE DATA MAY BE RECORDED ON THE ORIGINAL PLANS. LENGTHS OF PILES IN PLACE SHOWN HEREON ARE THE ACTUAL LENGTHS OF PILES IN THE FINISHED STRUCTURE BELOW CUTOFF ELEVATION AND ARE NOT NECESSARILY PAY ITEMS. THIS PILE RECORD DOES NOT REPLACE OTHER RECORDS OF PILES REQUIRED TO BE KEPT AND SUBMITTED BY THE RESIDENT ENGINEER.

**PILE LAYOUT**

All piles to be 12 B.P. 53, See Std. Drawg. P212A, Current Edition

**PILE RECORD**

Ky 354 over B.O.P. Sheet 4

**COMMONWEALTH OF KENTUCKY**  
 DEPARTMENT OF HIGHWAYS  
 FRANKFORT  
 COUNTY OF  
**WARREN**

BOWLING GREEN - OWENSBORO PKWY.

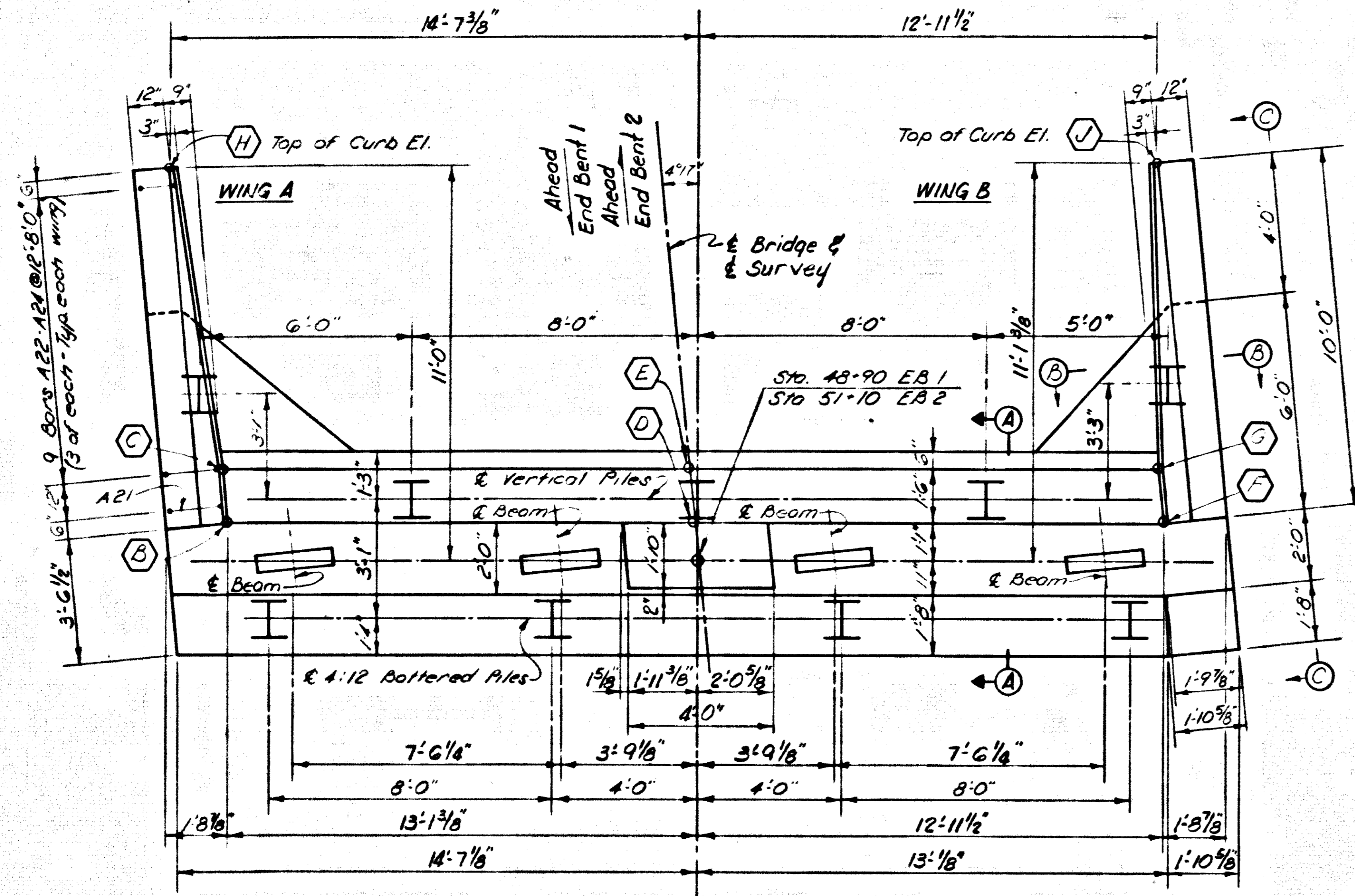
ROAD

STATION 961+49.40 P. E. PROJECT NO.

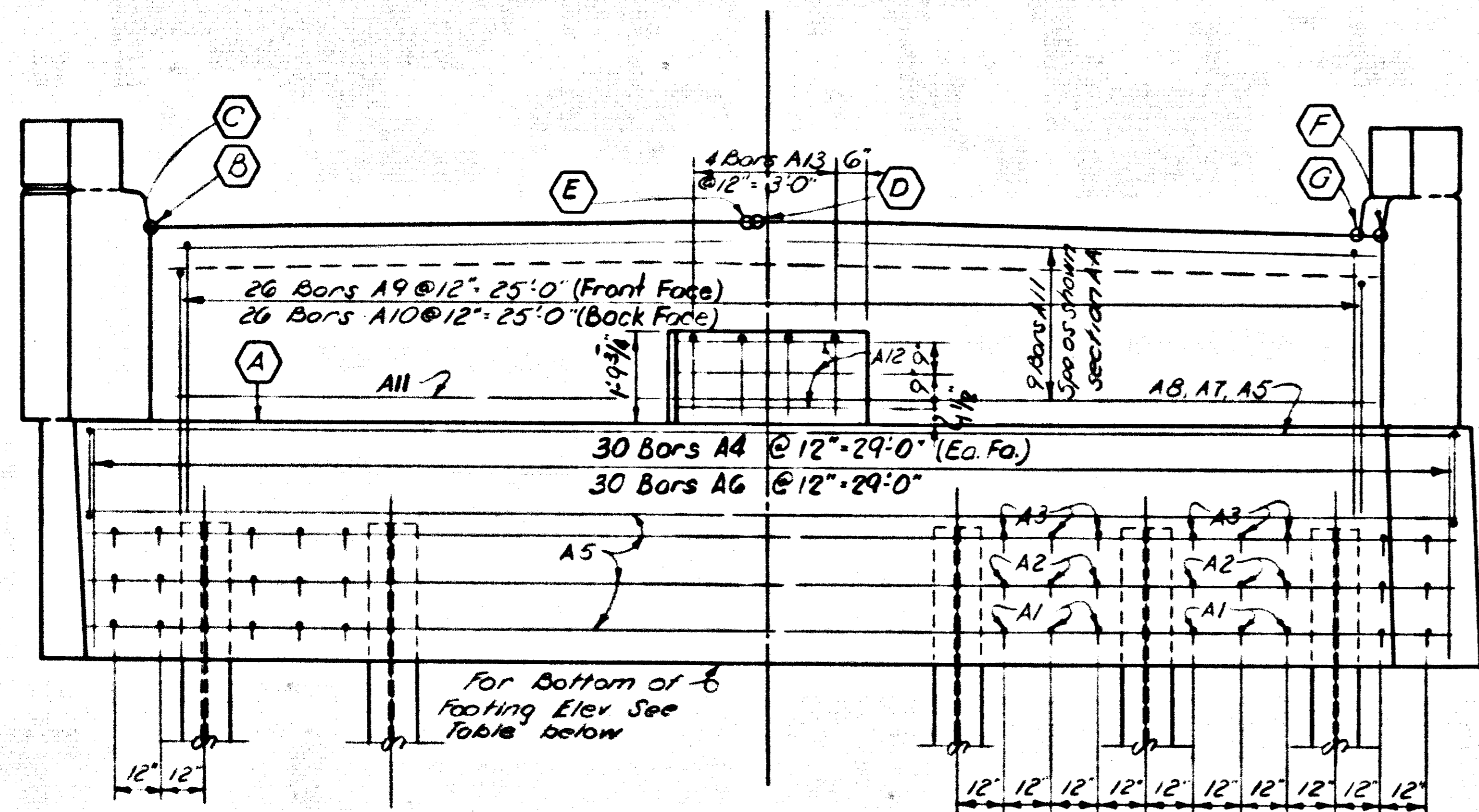
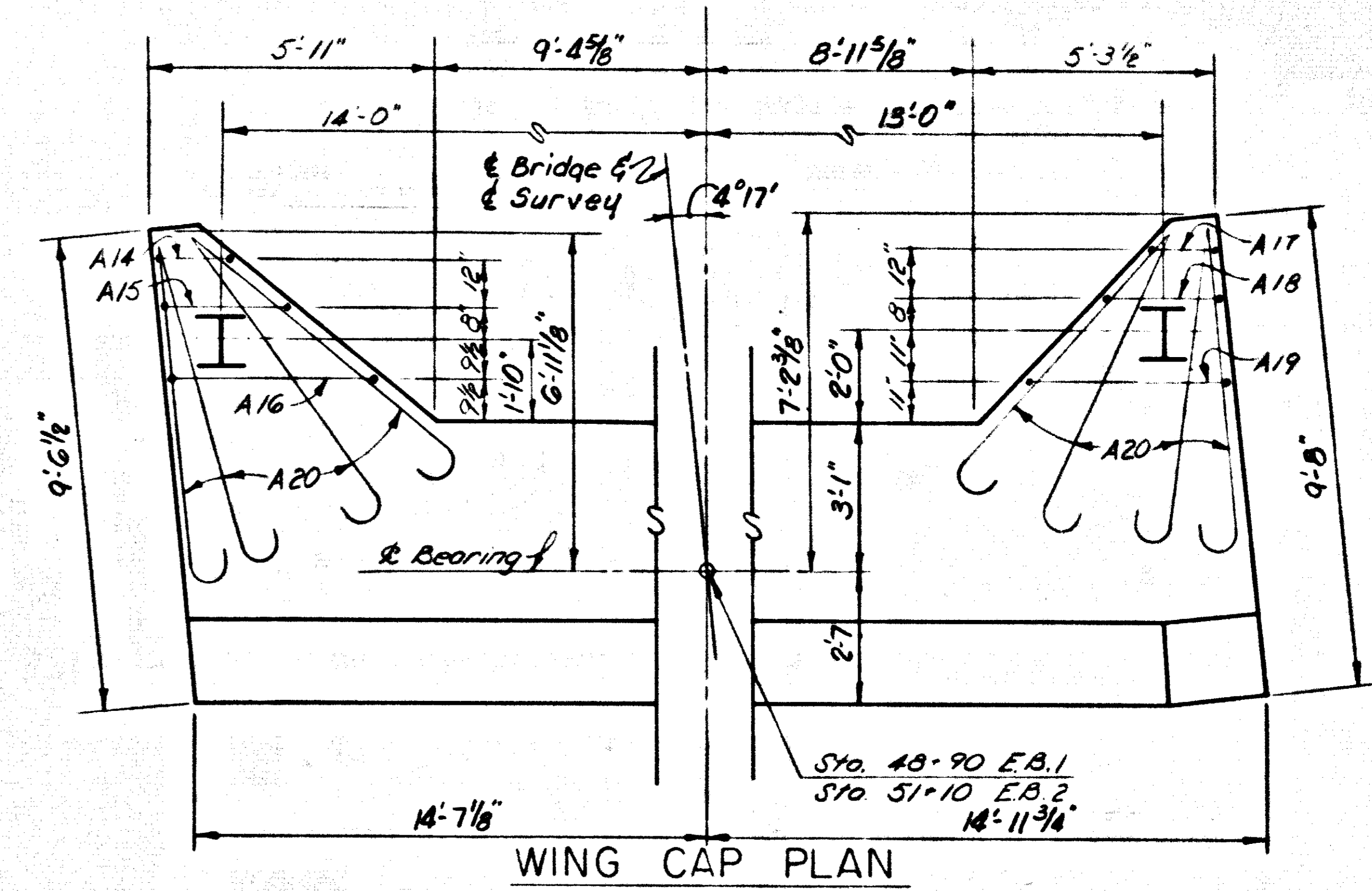
CONSTRUCTION PROJECT NO. MAINTENANCE PROJECT NO. DRAWING NO.

18261

LETTING DATE



PLAN OF CAP

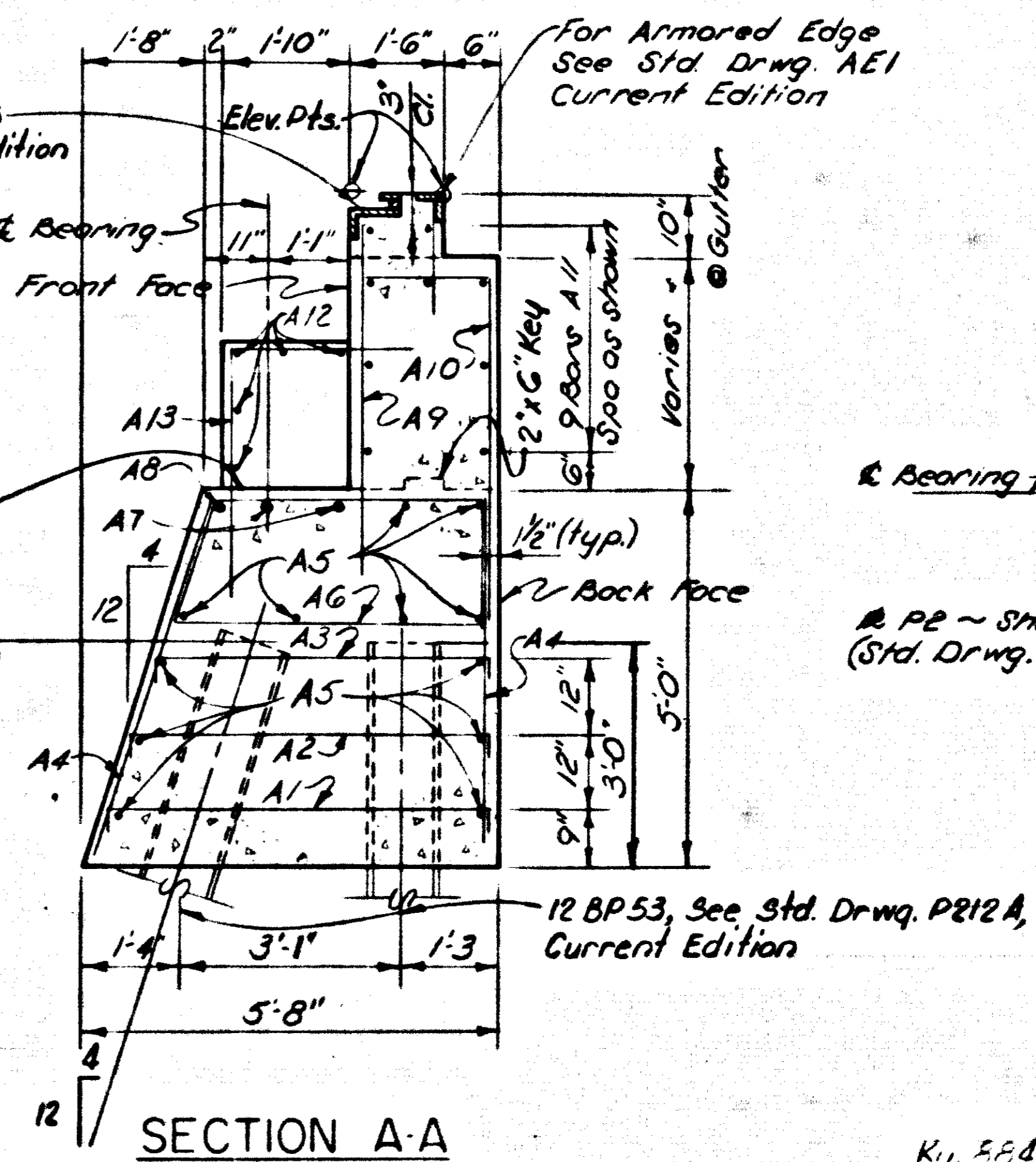


ELEVATION

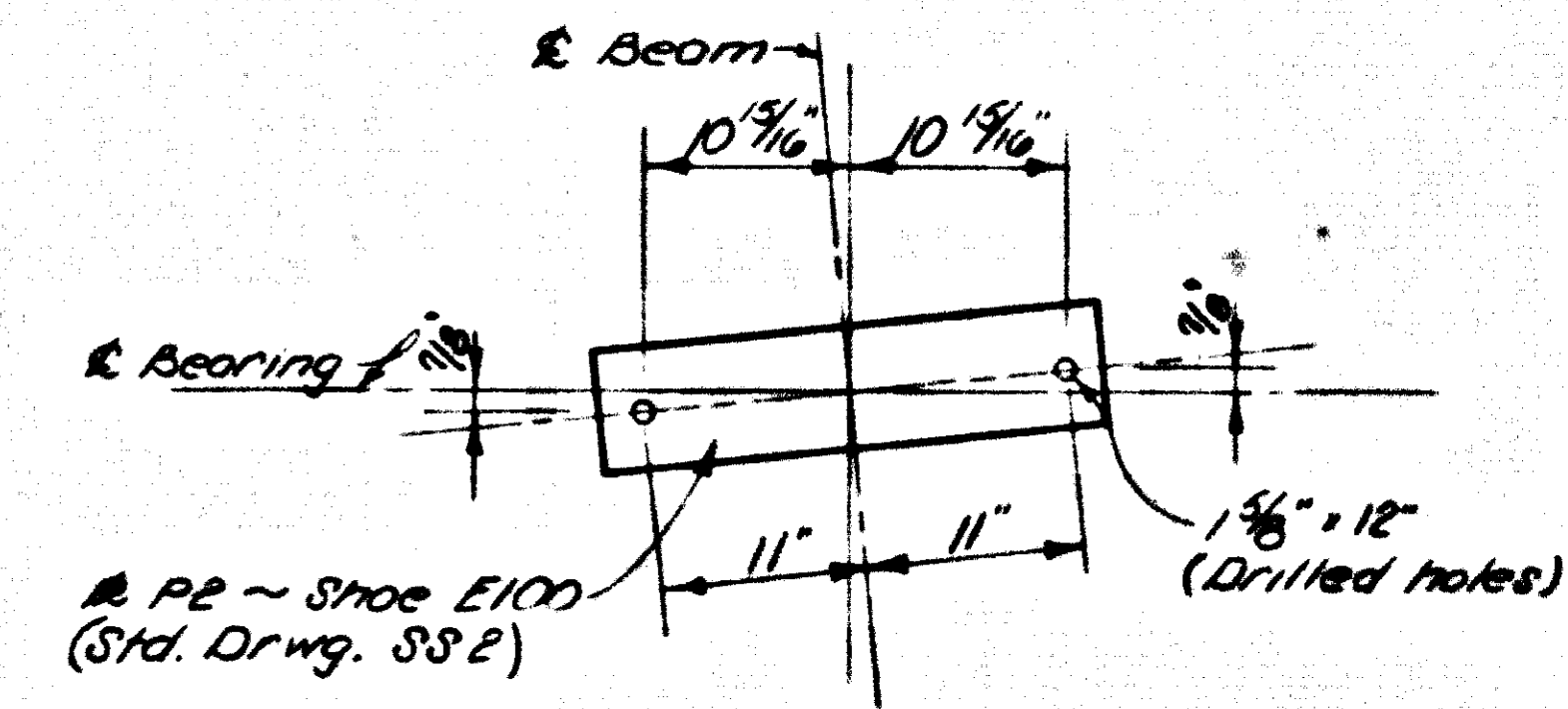
Expansion Dam Assembly B  
See Std. Drwg. ED3, Current Edition

NOTE:  
Top of Cap Bars to be accurately located in accordance with the plans so that they will not interfere with drilling Anchor Bolt holes.  
No Construction Joint Allowed Between Top of cap & Key

NOTE:  
Field Bend Bars A5 in front face of Cap



SECTION A-A



ANCHOR BOLT LAYOUT

TABLE OF ELEVATIONS

End Bent	A	B	C	D	E	F	G	H	J	Bot at Pile	Pile Cut Off
EB 1	575.933	579.725	579.731	579.901	579.907	579.717	579.723	580.602	580.596	570.933	573.93
EB 2	572.644	576.363	576.324	576.568	576.529	576.372	576.324	576.940	576.993	567.644	570.64

END BENT 1&2

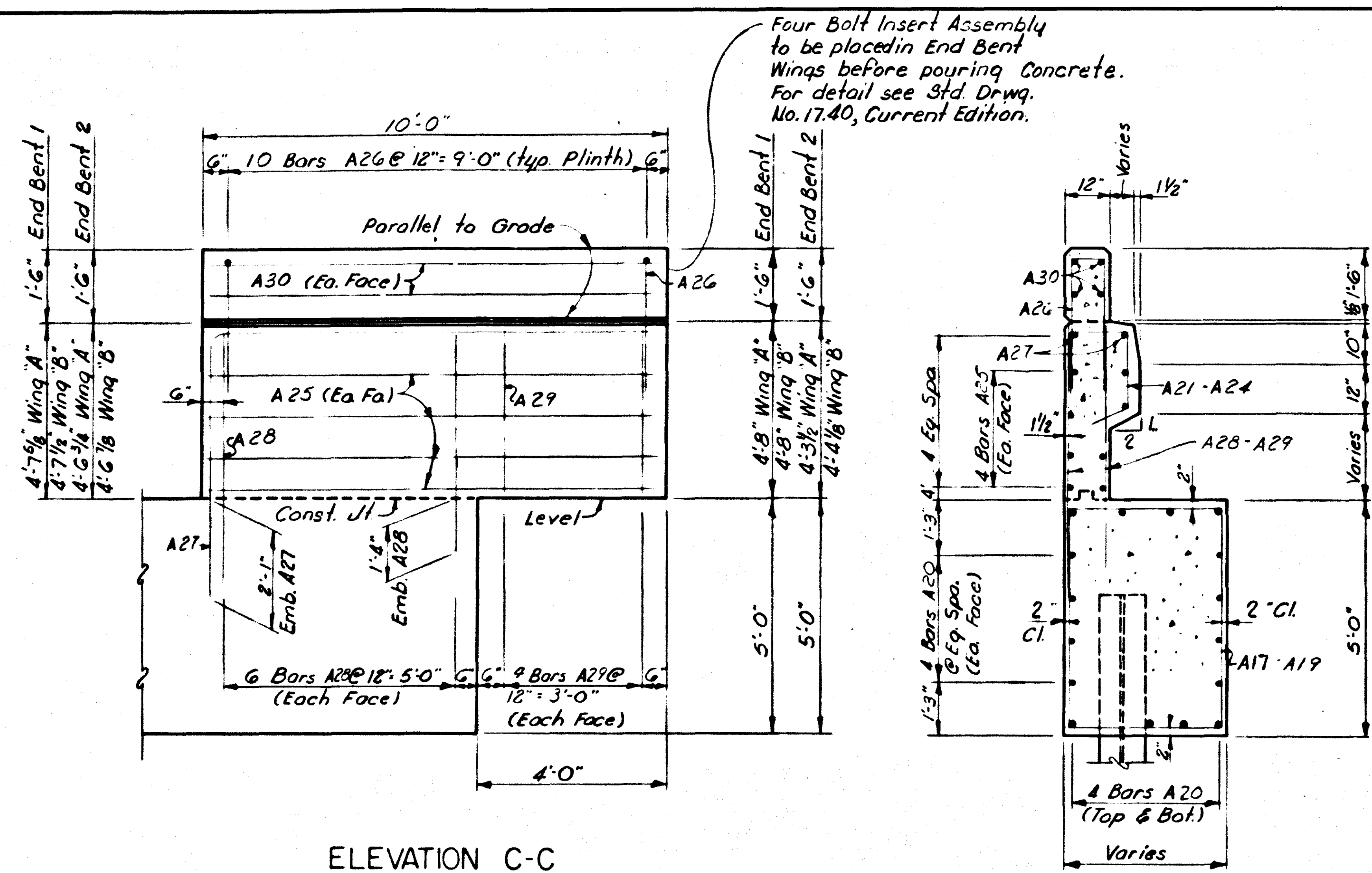
Ry. E&D over B.C.P.

Sheet 5

COMMONWEALTH OF KENTUCKY  
DEPARTMENT OF HIGHWAYS  
FRANKFORT  
COUNTY OF  
WARREN  
BOWLING GREEN-OWENSBORO PKWY.  
ROAD  
STATION 961+49.40 P. E. PROJECT NO.  
CONSTRUCTION PROJECT NO. MAINTENANCE PROJECT NO. DRAWING NO.  
18261

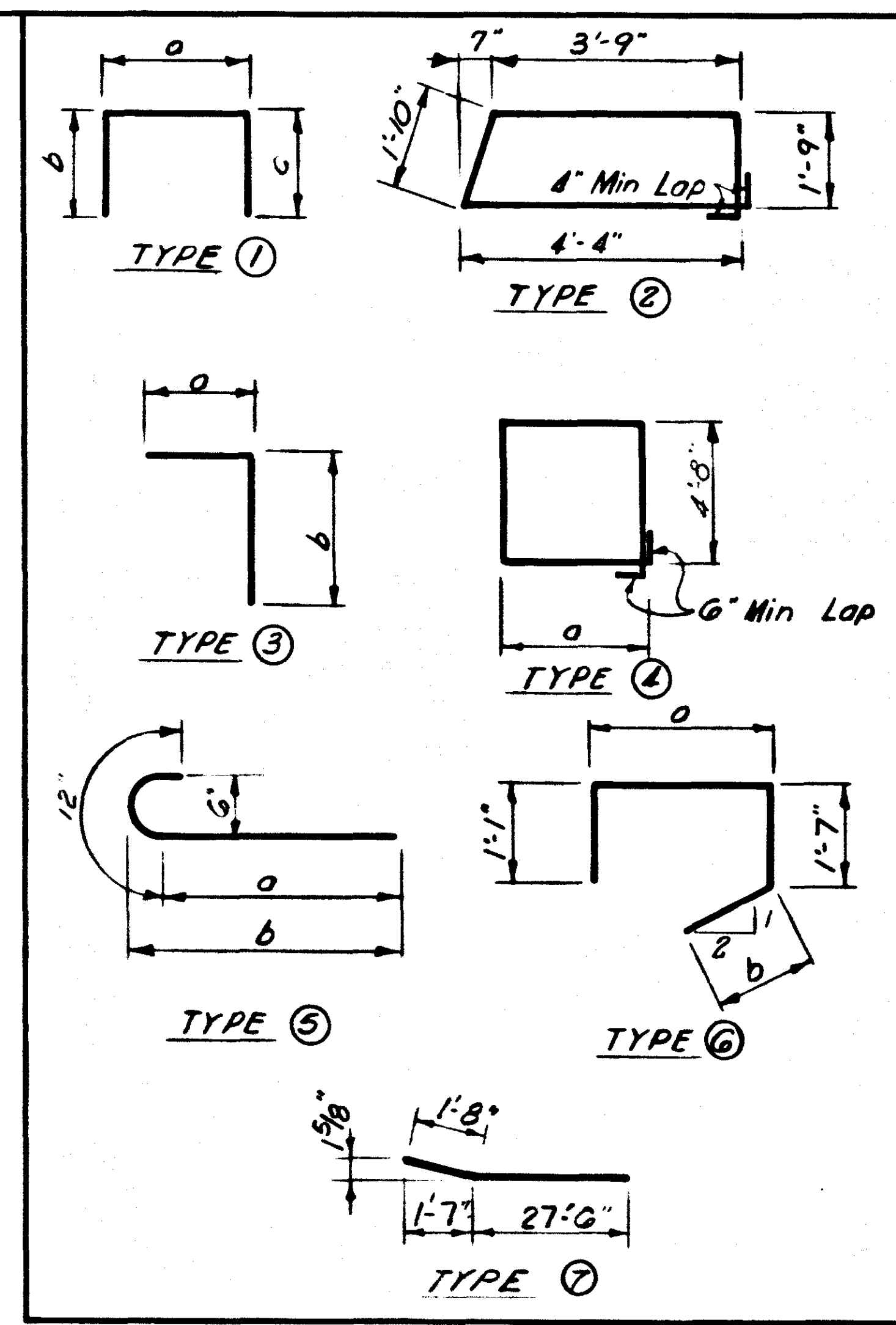
DESIGNED BY: AF  
 CHECKED BY: JSB  
 DATE: 11/67  
 DRAWN BY: JMP  
 DATE: 11/67  
 REVISIONS:  
 NO. DATE BY

LETTING DATE



ELEVATION C-C

SECTION B-B



BILL OF REINFORCEMENT												
MARK	TYPE	NUMBER		SIZE	LENGTH Ft. In.	LOCATION	a		b		c	
		E.B.1	E.B.2				Ft.	In.	Ft.	In.	Ft.	In.
A1	○	22	22	#5	5 4	Cap	5	2	0	4	0	4
A2	○	22	22	#5	5 5	"	4	10	0	4	0	4
A3	○	22	22	#5	5 1	"	4	6	0	4	0	4
A4	○	60	60	#5	4 5	"						
A5	○	12	12	#5	29 3	"						
A6	○	30	30	#5	12 1	"						
A7	○	2	2	#8	29 3	"						
A8	○	1	1	#8	29 2	"						
A9	○	26	26	#6	3 5	Parapet	1	3	5	3	2	0
A10	○	26	26	#6	3 1	"	1	9	4	5		
A11	○	9	9	#5	29 3	"						
A12	○	5	5	#4	3 9	Key						
A13	○	4	4	#5	5 10	"	3	0	2	10		
A14	○	1	1	#5	13 1	Wing Cap	1	6				
A15	○	1	1	#5	15 1	"	2	6				
A16	○	1	1	#5	8 7	"	4	3				
A17	○	1	1	#5	12 7	"	1	3				
A18	○	1	1	#5	14 7	"	2	3				
A19	○	1	1	#5	18 1	"	4	0				
A20	○	32	32	#6	7 9	"	6	9	7	0		
A21	○	2	2	#5	5 4	Wings	1	4 1/2	1	4 1/2		
A22	○	6	6	#5	5 2	"	1	3	1	4		
A23	○	6	6	#5	4 10	"	1	1	1	2		
A24	○	6	6	#5	4 6	"	1	11	1	0		
A25	○	16	16	#5	9 7	"						
A26	○	20	20	#5	5 10	"	0	9	2	7	2	7
A27	○	4	4	#8	16 1	"	9	8	6	6		
A28	○	24	24	#5	5 10	"						
A29	○	16	16	#4	4 3	"						
A30	○	8	8	#4	9 9	Plinth						

ESTIMATE OF QUANTITIES			
Item	Location	E.B.1	E.B.2
Concrete, Class "A" (Cu. Yds)		31.8	31.8
Concrete, Class "AA" (Cu. Yds)		12.8	12.6
Steel Reinforcement (Lbs)		3781	3781

Ky 984 over B.O.P. Sheet 6

**COMMONWEALTH OF KENTUCKY**  
 DEPARTMENT OF HIGHWAYS  
 FRANKFORT  
 COUNTY OF  
**WARREN**  
 BOWLING GREEN-OWENSBORO PKWY.  
 ROAD

STATION 961+49.40 P. E. PROJECT NO.

CONSTRUCTION PROJECT NO. MAINTENANCE PROJECT NO. DRAWING NO.

18261

END BENTS 1&2











