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CONTRACT NO: C203661 TIP PROJECT: U-4910A / U-4910B

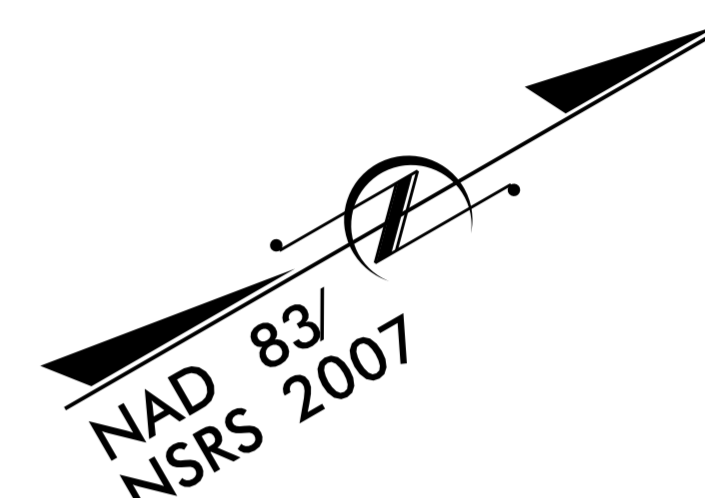
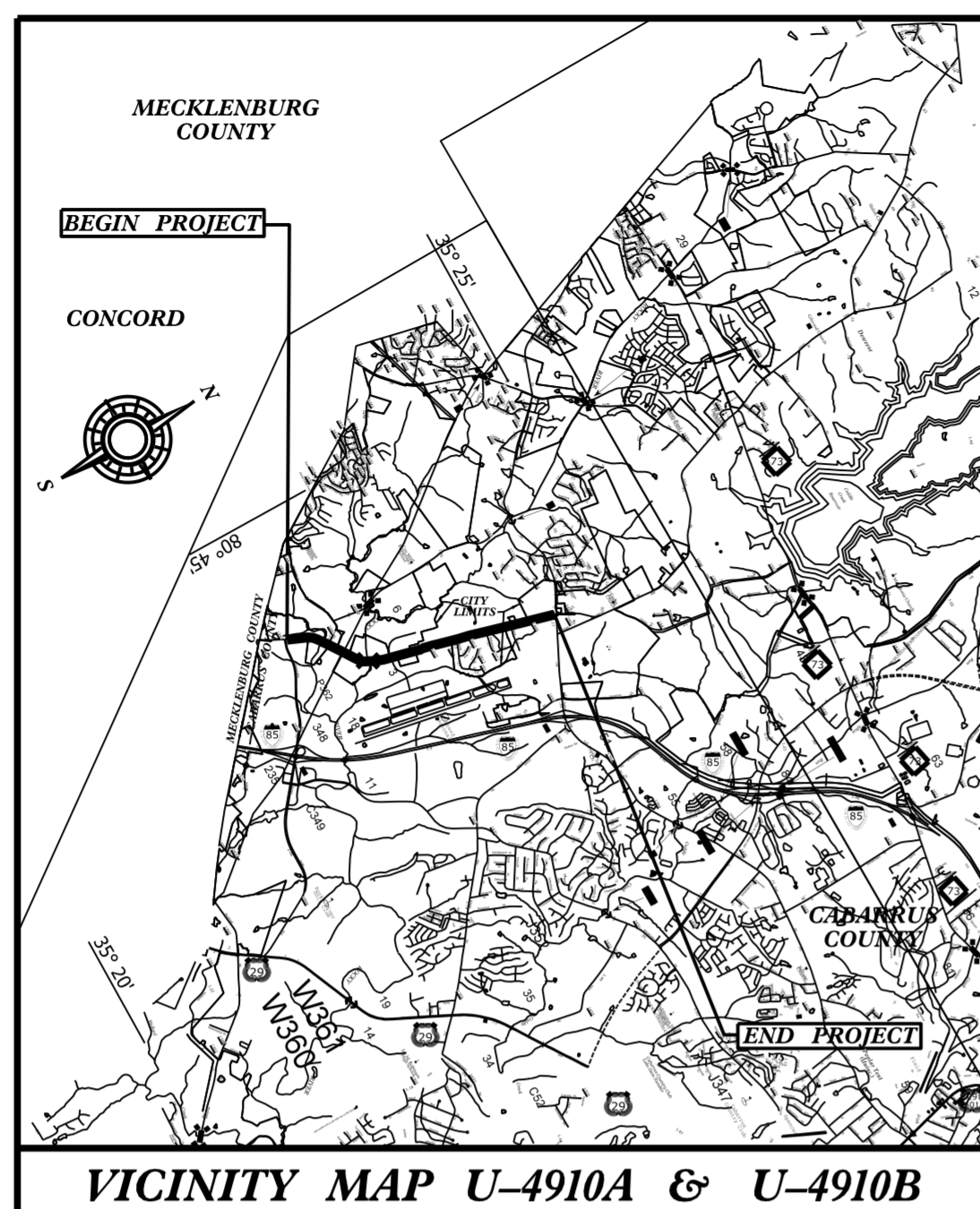
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CABARRUS COUNTY**

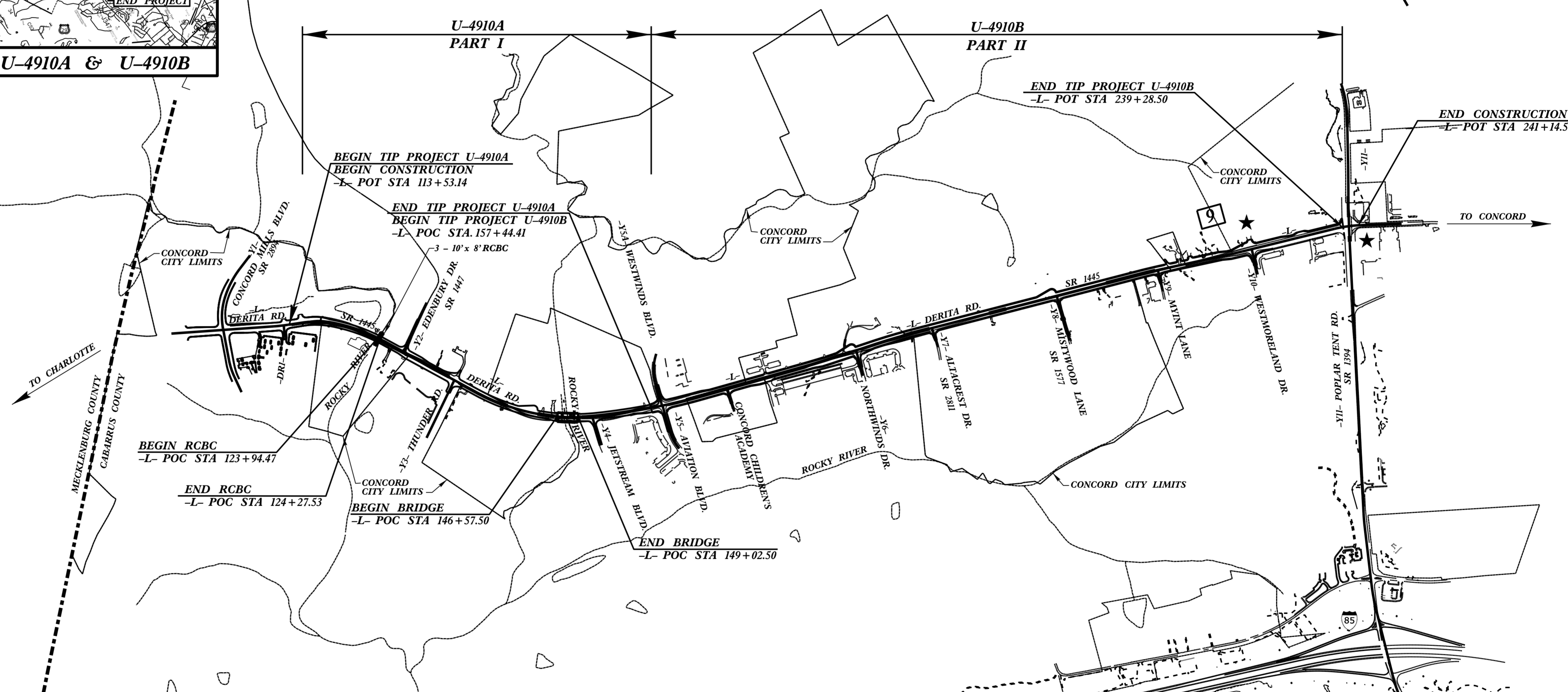
LOCATION: SR 1445 (DERITA ROAD) FROM NORTH OF SR 2894 (CONCORD MILLS BOULEVARD) TO SR 1394 (POPLAR TENT ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES & SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4910A / U-4910B		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40373.1.1		U-4910A (PE)	
40373.1.F3	HPP-1445(7)	U-4910B (PE)	
40373.2.D1		U-4910A (R/W & UTIL)	
40373.2.F2	HPP-1445(7)	U-4910B (R/W & UTIL)	
40373.3.3	STPDA-1445(008)	U-4910A CONST U-4910B CONST	



**STRUCTURES**



**DESIGN DATA**

ADT 2011 =	11,000
ADT 2035 =	28,300
K =	12 %
D =	65 %
T =	4 % *
V =	50 MPH
* TTST =	1% DUAL 3%

FUNC CLASS - ARTERIAL  
SUBREGIONAL DESIGN

**PROJECT LENGTH**

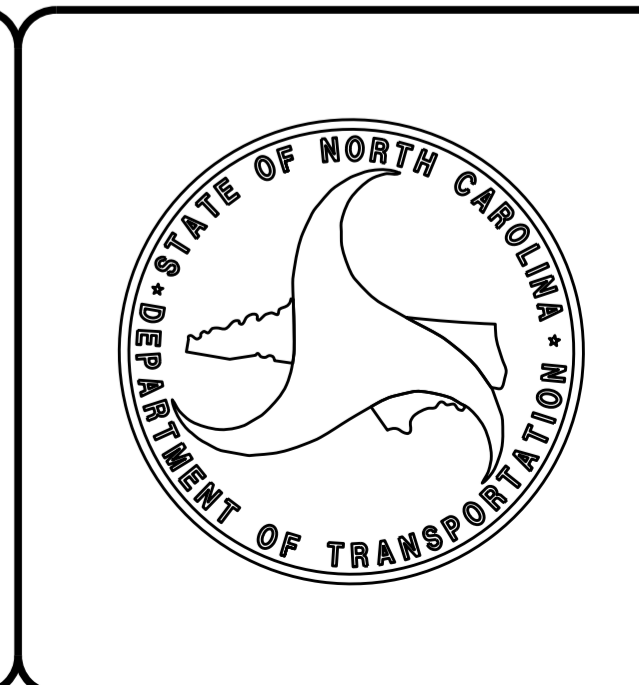
LENGTH ROADWAY TIP PROJECT U-4910A /U-4910B	= 2.329 MILES
LENGTH STRUCTURE TIP PROJECT U-4910A /U-4910B	= 0.053 MILES
TOTAL LENGTH TIP PROJECT U-4910A /U-4910B	= 2.382 MILES

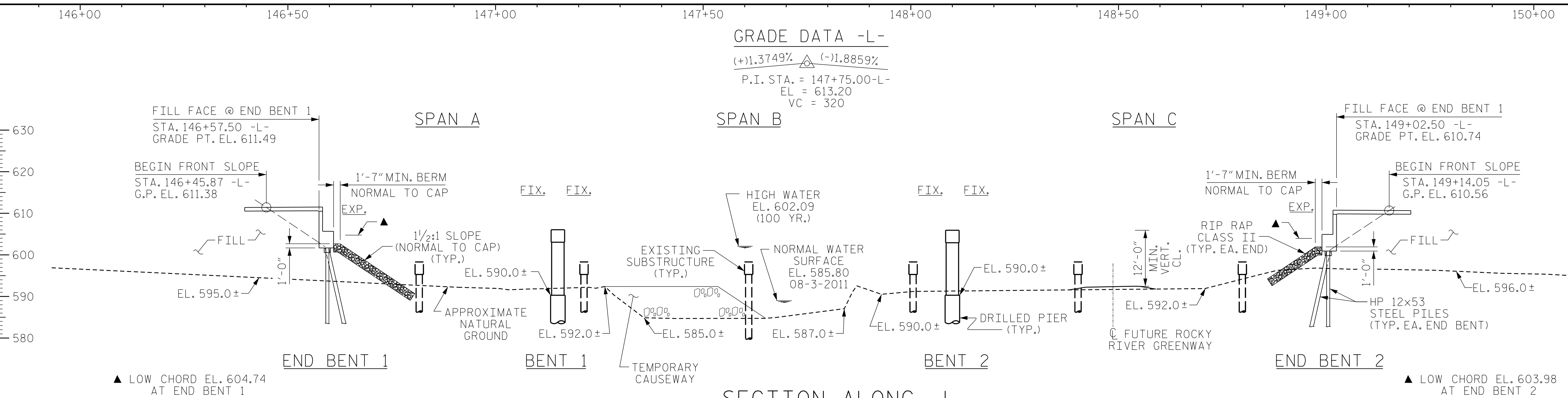
Prepared in the Office of:

**AECOM**  
NC FIRM LICENSE No: F-0342  
701 Corporate Center Drive, Suite 475  
Raleigh, NC 27607  
(919) 854-6200 - (919) 854-6259(FAX)

2012 STANDARD SPECIFICATIONS

LETTING DATE:  
FEBRUARY 21, 2017





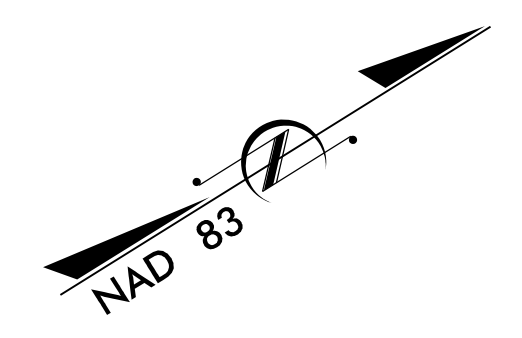
**HYDRAULIC DATA**

DESIGN DISCHARGE = 9765 CFS.  
 FREQUENCY OF DESIGN FLOOD = 50 YR.  
 DESIGN HIGH WATER ELEVATION = 601.3  
 DRAINAGE AREA = 76.8 SQ. MI.  
 BASE DISCHARGE (Q100) = 11722 CFS.  
 BASE HIGH WATER ELEVATION = 602.09

**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE = > 16923 CFS.  
 FREQUENCY OF OVERTOPPING FLOOD = 500 YR. +  
 OVERTOPPING FLOOD ELEVATION = 608.17

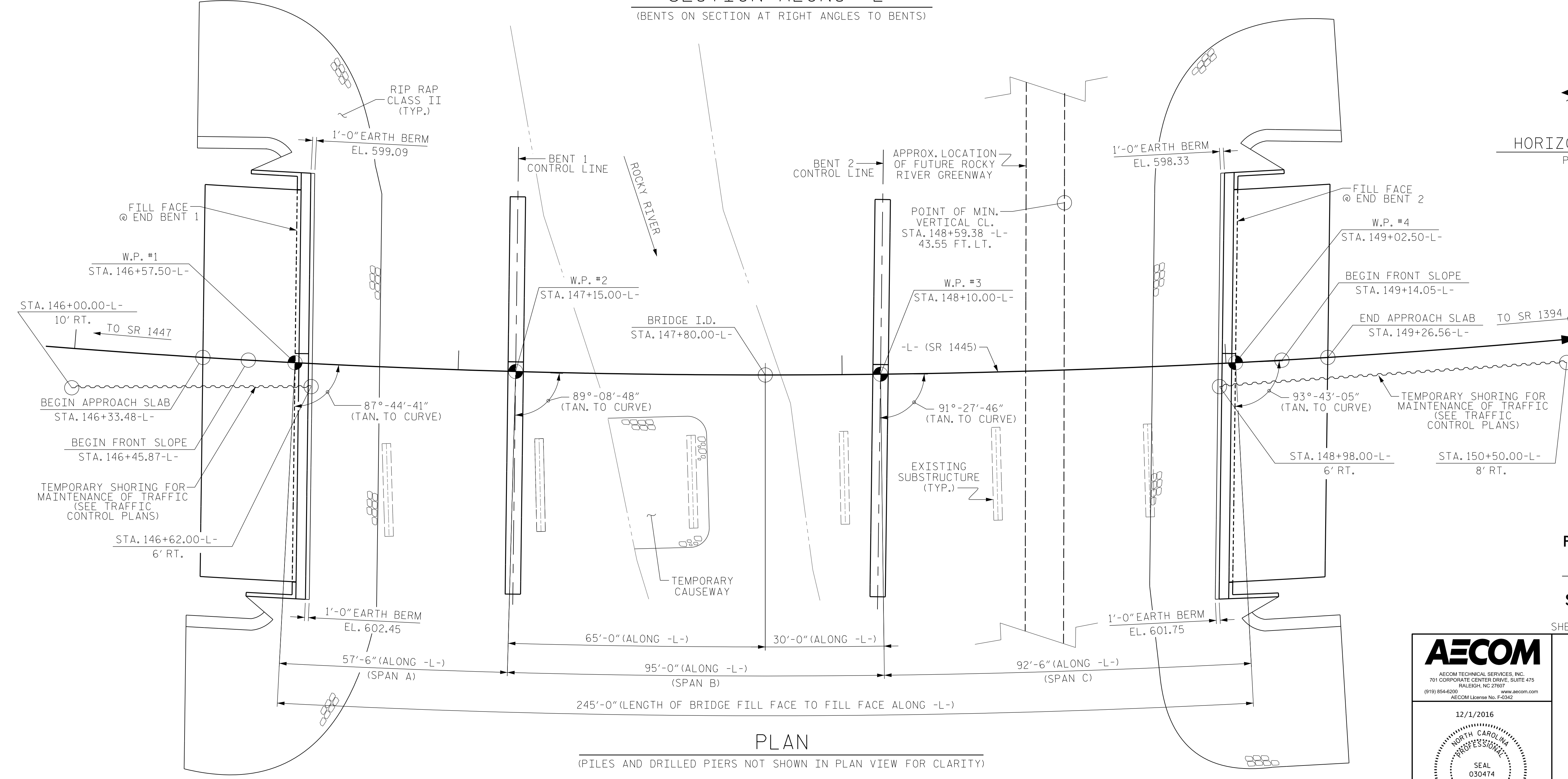
SECTION ALONG -L- (BENTS ON SECTION AT RIGHT ANGLES TO BENTS)



**HORIZONTAL CURVE DATA -L-**

PI STA. = 144+20.22 -L-  
 $\Delta = 34^\circ - 36' - 26.3''$  LT.  
 $D = 2^\circ - 26' - 17.2''$   
 $L = 1,419.43'$   
 $T = 732.11'$   
 $R = 2,350.00'$

HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 1 OF 4 REPLACES BRIDGE NO. 3

**AECOM**  
 AECOM TECHNICAL SERVICES, INC.  
 701 CORPORATE CENTER DRIVE, SUITE 475  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. F-0342

12/1/2016

SEAL 030474  
 JOHN C. MORRISON  
 PROFESSIONAL ENGINEER  
 STATE OF NORTH CAROLINA  
 A3FD142C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 BRIDGE OVER ROCKY RIVER  
 ON DERITA RD. (SR 1445)  
 BETWEEN SR 1447 & SR 1394

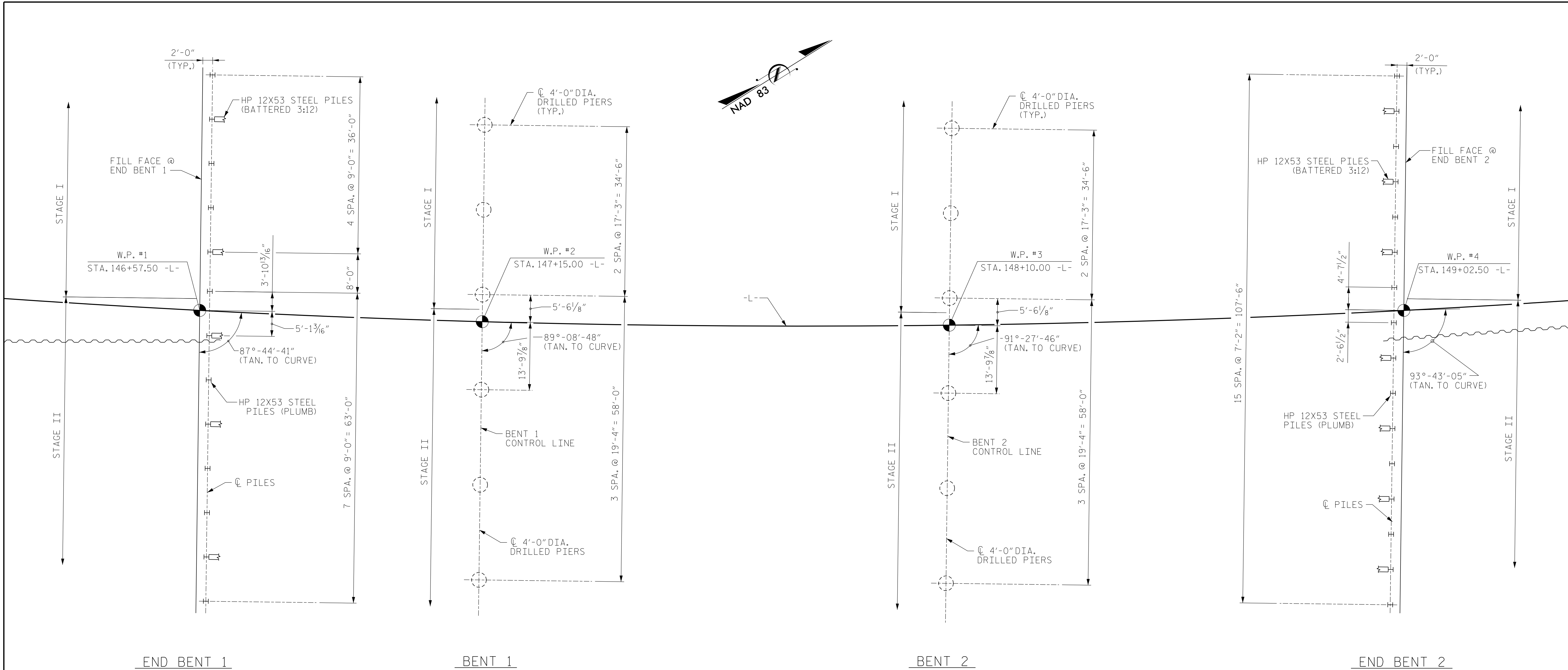
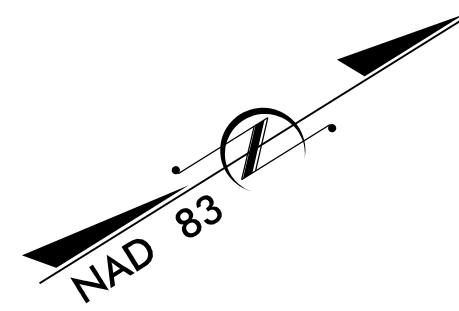
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			55

DRAWN BY : K.H. COMPTON DATE : 2/2016  
 CHECKED BY : J.C. MORRISON DATE : 2/2016  
 DESIGNED BY : K.H. COMPTON DATE : 2/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DATE: 12/1/2016 TIME: 12:55:57 PM  
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### FOUNDATION LAYOUT PLAN

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE)

#### NOTES:

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 515 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 605 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 40 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENTS 1 AND 2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 570 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASINGS.

INSTALL DRILLED PIERS AND BENT 1 TO A TIP ELEVATION NO HIGHER THAN 544 FT (LEFT), 550 FT (CENTER) AND 549 FT (RIGHT) AND WITH THE REQUIRED TIP RESISTANCE.

INSTALL DRILLED PIERS AND BENT 2 TO A TIP ELEVATION NO HIGHER THAN 552 FT (LEFT), 546 FT (CENTER) AND 549 FT (RIGHT) AND WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS 573 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS 575 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

TESTING THE PRODUCTION PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED AT END BENT 2. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A TWO (2) MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

SPT MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, THE REQUIRED SPT N60 VALUE WILL BE 100 BLOWS OR MORE IN THE FIRST FOUR (4) INCHES OF THE DRIVE. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, THE REQUIRED SPT N60 VALUE WILL BE 60 BLOWS OR MORE IN THE FIRST ONE (1) INCH OF THE DRIVE. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-4910A

CABARRUS COUNTY

STATION: 147+80.00 -L-

SHEET 2 OF 4

DRAWN BY : K.H. COMPTON DATE : 7/2016  
 CHECKED BY : J.C. MORRISON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 7/2016

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**AECOM**  
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11/30/2016

SEAL  
 030474  
 JOHN C. MORRISON  
 ENGINEER

STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
 RALEIGH

**GENERAL DRAWING**

BRIDGE OVER ROCKY RIVER  
 ON DERITA RD. (SR 1445)  
 BETWEEN SR 1447 & SR 1394

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-02
2			4			TOTAL SHEETS 55

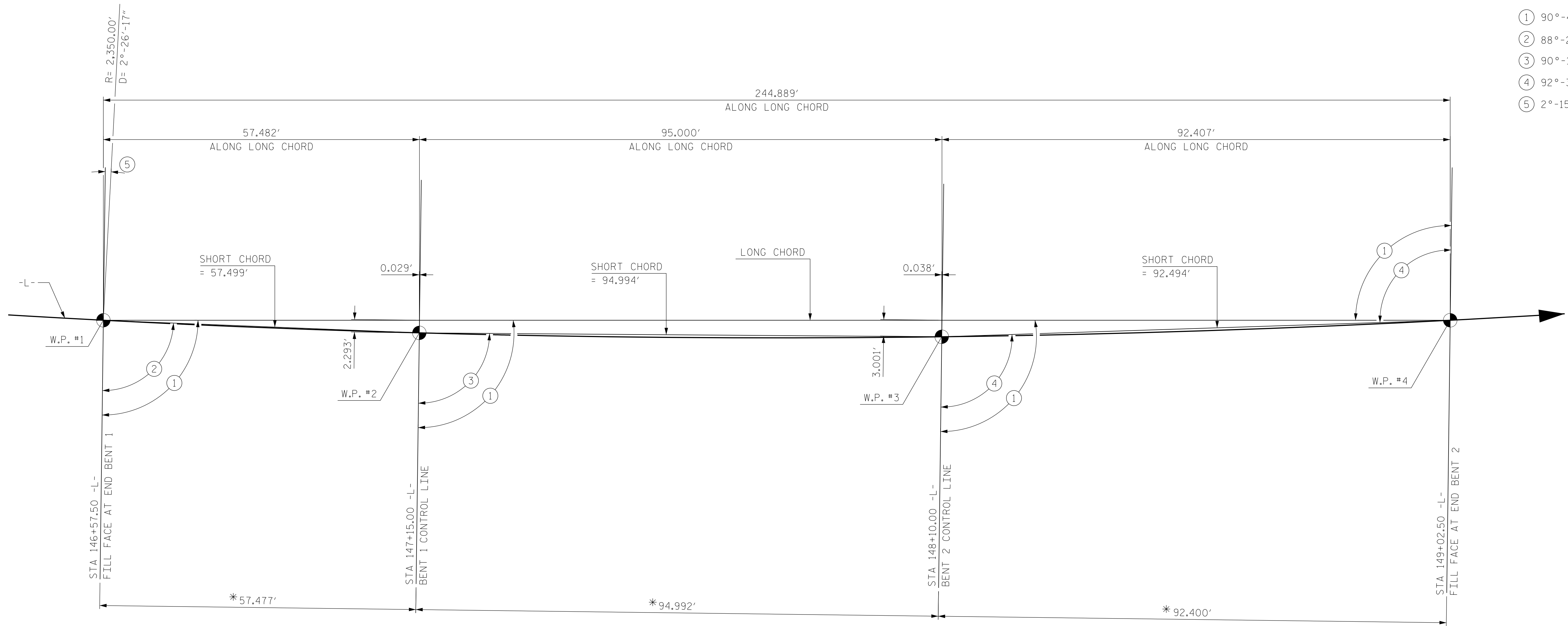
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ANGLES

- ① 90°-43'-53"
- ② 88°-26'-45"
- ③ 90°-18'-17"
- ④ 92°-35'-26"
- ⑤ 2°-15'-19"



LONG CHORD LAYOUT

ALL BENTS ARE PARALLEL

HORIZONTAL CURVE DATA -L-

PI STA.=144+20.22 -L-  
 Δ=34°-36'-26.3" LT.  
 D=2°-26'-17.2"  
 L=1,419.43'  
 T=732.11'  
 R=2,350.00'  
 DS=50 MPH  
 S.E.=03

\* DIMENSION MEASURED NORMAL TO BENT CONTROL LINE

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-

SHEET 3 OF 4

DRAWN BY : K.H. COMPTON DATE : 2/2016  
 CHECKED BY : J.C. MORRISON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 2/2016

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11/30/2016

NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 030474  
 ENGINEER  
 JOHN C. MORRISON  
 A2FDE142C82F44B

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 BRIDGE OVER ROCKY RIVER  
 ON DERITA RD. (SR 1445)  
 BETWEEN SR 1447 & SR 1394

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
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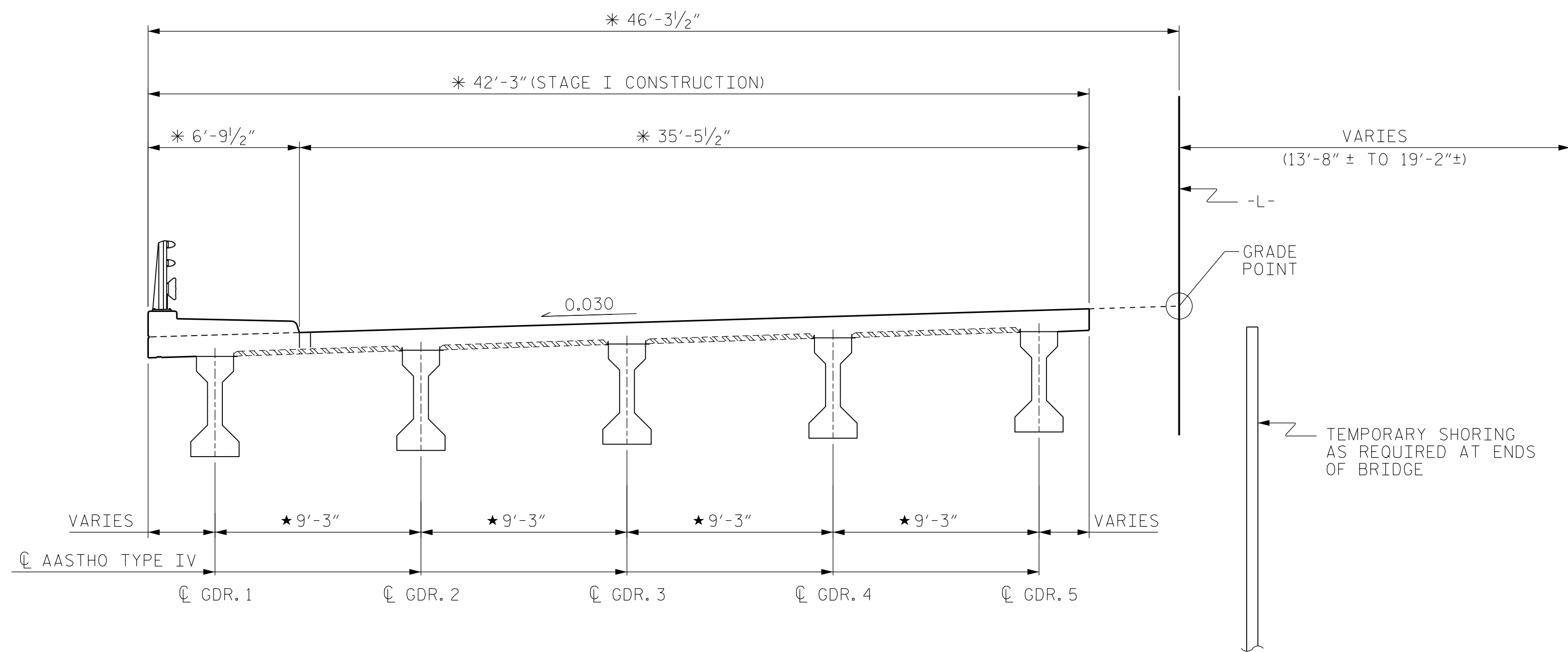
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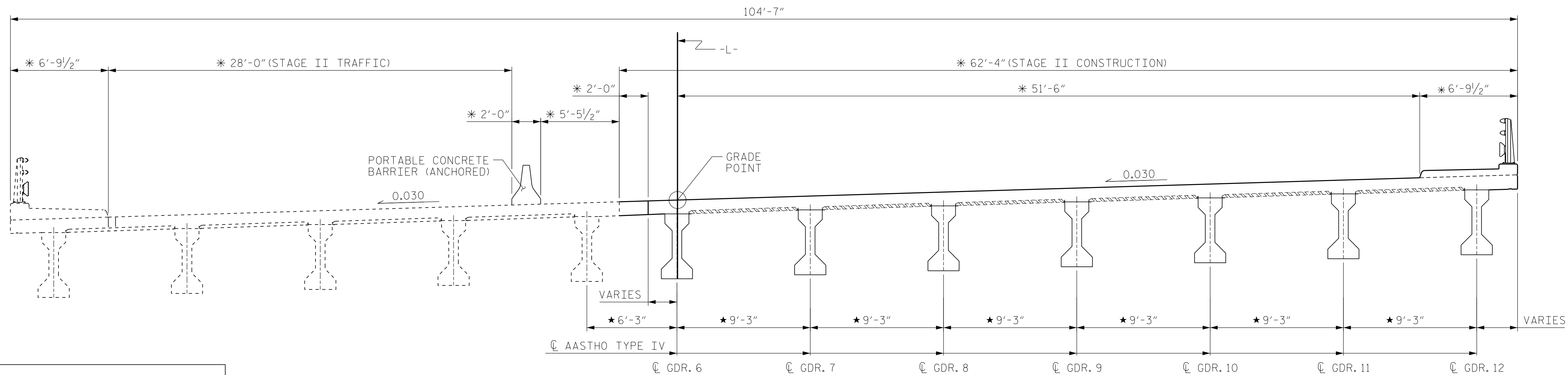




**NOTES:**  
 FOR MAINTENANCE OF TRAFFIC,  
 LOCATION OF TEMPORARY SHORING  
 AND LOCATION AND PAY LIMIT OF  
 THE PORTABLE CONCRETE BARRIER,  
 SEE TRAFFIC CONTROL PLANS.

**STAGE I CONSTRUCTION**

(CONSTRUCT LEFT SIDE OF PROPOSED BRIDGE,  
 MAINTAIN TRAFFIC ON EXISTING STRUCTURE)



- \* MEASURED NORMAL TO C GIRDER
- \* RADIAL DIMENSIONS

**STAGE II CONSTRUCTION**

(MOVE TRAFFIC ONTO STAGE I, REMOVE  
 EXISTING STRUCTURE)

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-

SHEET 1 OF 2

DRAWN BY : K.H. COMPTON DATE : 7/2016  
 CHECKED BY : J.C. MORRISON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 7/2016

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 AECOM License No. F-0342

11/30/2016

NORTH CAROLINA  
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 SEAL  
 030474  
 ENGINEER  
 J.C. MORRISON  
 John C. Morrison  
 A2FDE142C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

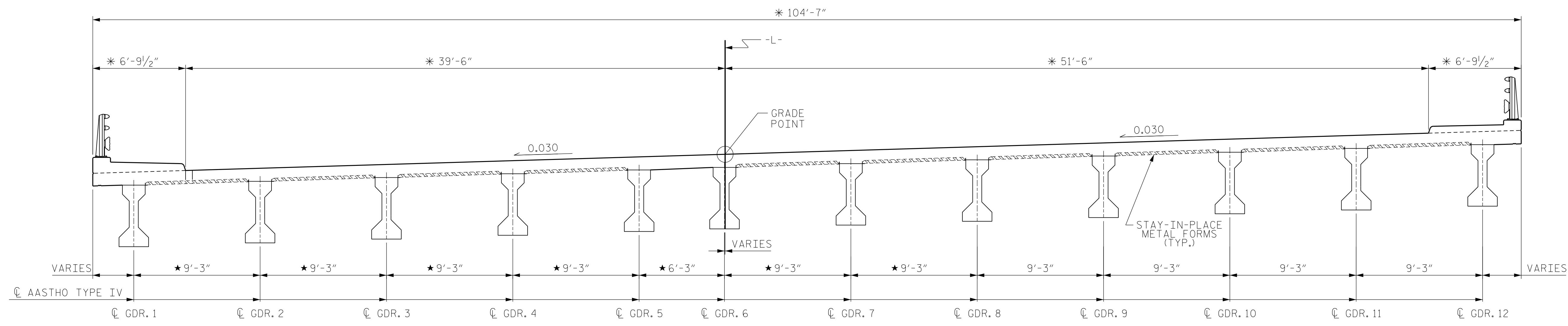
SUPERSTRUCTURE  
 CONSTRUCTION  
 SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			55
2			4			

DATE: 11/30/2016 TIME: 10:05:54 AM

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★ MEASURED NORMAL TO  $\text{C}$  GIRDER  
 \* RADIAL DIMENSIONS

FINAL STAGE

DATE: 11/30/2016  
 TIME: 10:55:55 AM

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PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 2 OF 2

DRAWN BY : K.H. COMPTON DATE : 7/2016  
 CHECKED BY : J.C. MORRISON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 7/2016

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 AECOM License No. F-0342

11/30/2016

NORTH CAROLINA  
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 A2FDE142C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 CONSTRUCTION  
 SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-07
1			3			TOTAL SHEETS
2			4			55

DOCUMENT NOT CONSIDERED  
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 SIGNATURES COMPLETED

**NOTES:**

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE STAY-IN-PLACE METAL FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS, WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

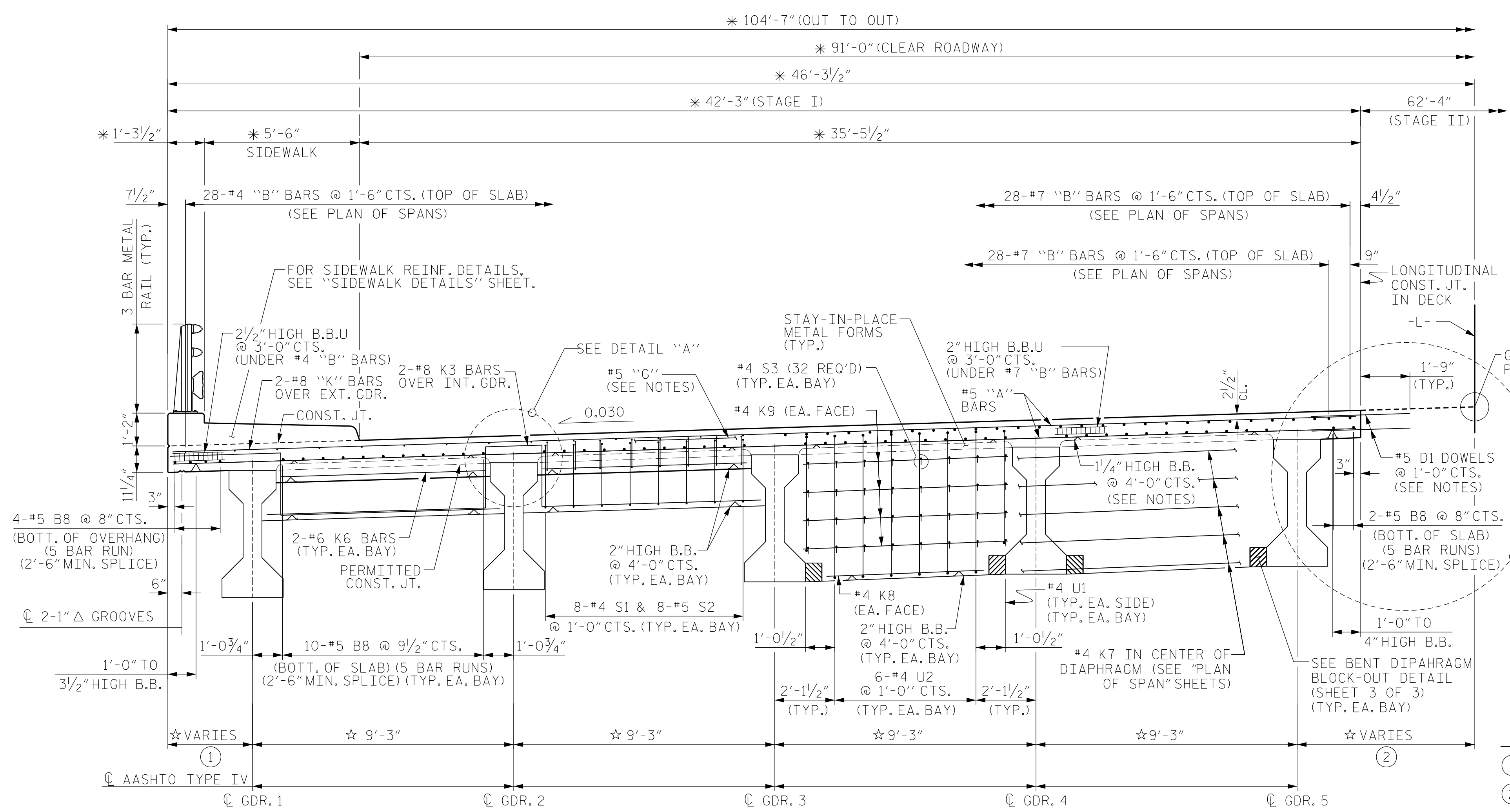
FOR SECTION AT INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

#5 D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

FOR EACH STAGE, PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

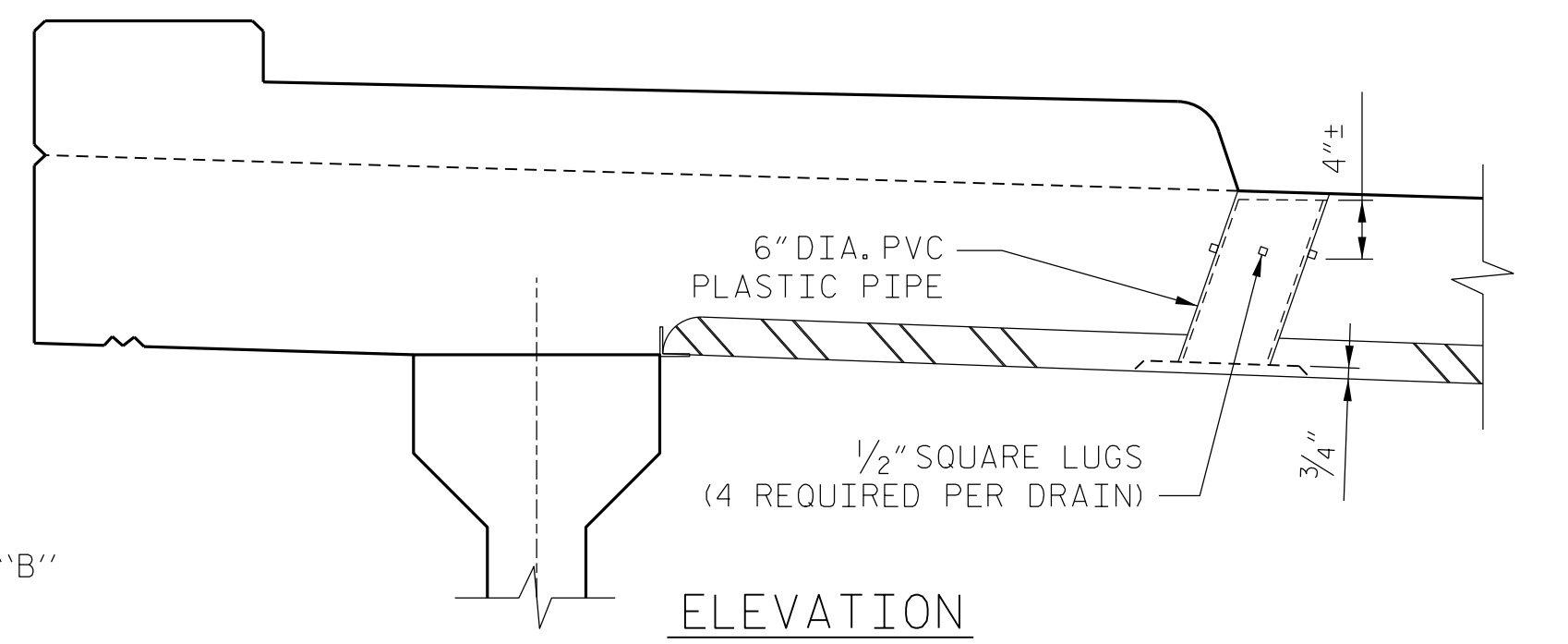
#5 "G" BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS. THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO CASTING OF SIDEWALK.

SEE CONSTRUCTION SEQUENCE SHEETS FOR LOCATION OF TEMPORARY PORTABLE CONCRETE BARRIER (ANCHORED).

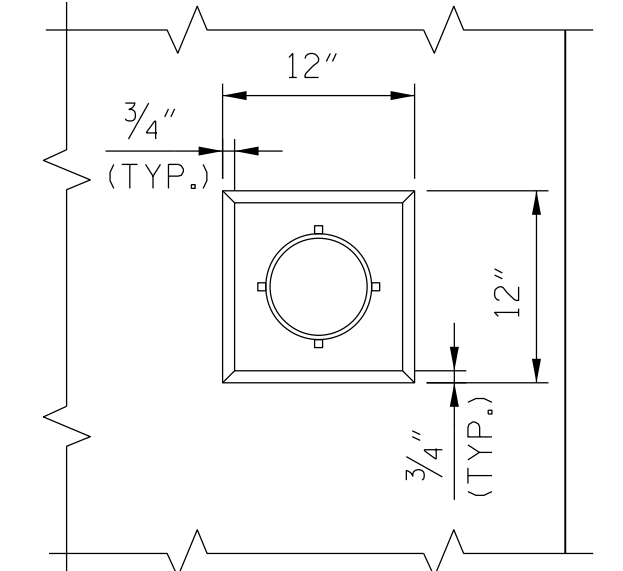


**TYPICAL HALF SECTION**  
(SHOWING END BENT DIAPHRAGMS)

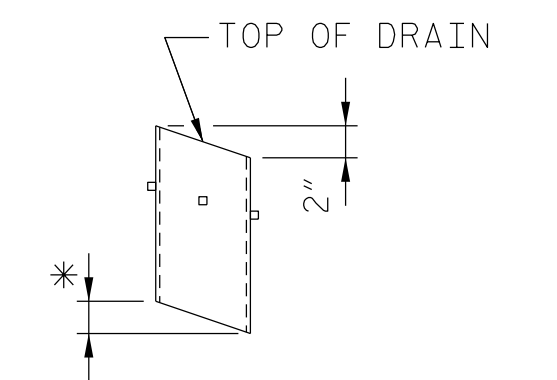
**TYPICAL HALF SECTION**  
(SHOWING BENT DIAPHRAGMS)



**ELEVATION**



**PLAN OF RECESS**



**PIPE DETAIL**

**DRAIN NOTES:**  
TOP OF FLOOR DRAIN TO BE SET 3/8\"/>

4- 1/2\"/>

THE 6\"/>

**DRAIN DETAILS**

**PROJECT NO.** U-4910A  
**CABARRUS COUNTY**  
**STATION:** 147+80.00 -L-  
SHEET 1 OF 3

**AECOM**  
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(919) 854-6200 www.aecom.com  
AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
030474  
JOHN B. MORRISON  
REGISTERED PROFESSIONAL ENGINEER  
A2F0E142C2F44B

STATE OF NORTH CAROLINA <b>DEPARTMENT OF TRANSPORTATION</b> RALEIGH					
<b>SUPERSTRUCTURE TYPICAL SECTION AND DETAILS</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. <b>S-08</b>
					TOTAL SHEETS <b>55</b>

DRAWN BY : N.K. BROWN DATE : 7/2016  
CHECKED BY : K.H. COMPTON DATE : 7/2016  
DESIGNED BY : N.K. BROWN DATE : 2/2016

SHOWING BENT DIAPHRAGM AT CLOSURE POUR (STAGE II CONSTRUCTION)

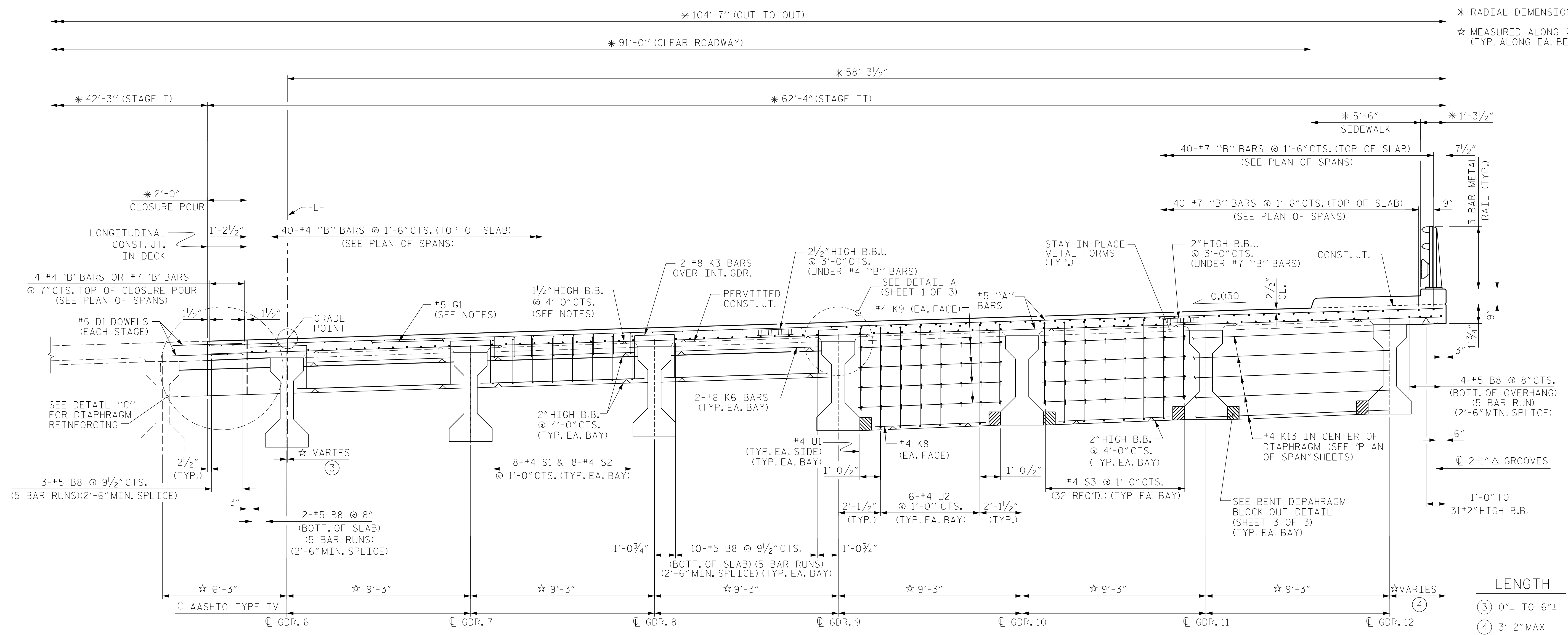
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NOTES:  
FOR NOTES SEE SHEET 1 OF 3  
\* RADIAL DIMENSIONS  
☆ MEASURED ALONG C BEARING (TYP. ALONG EA. BENT)

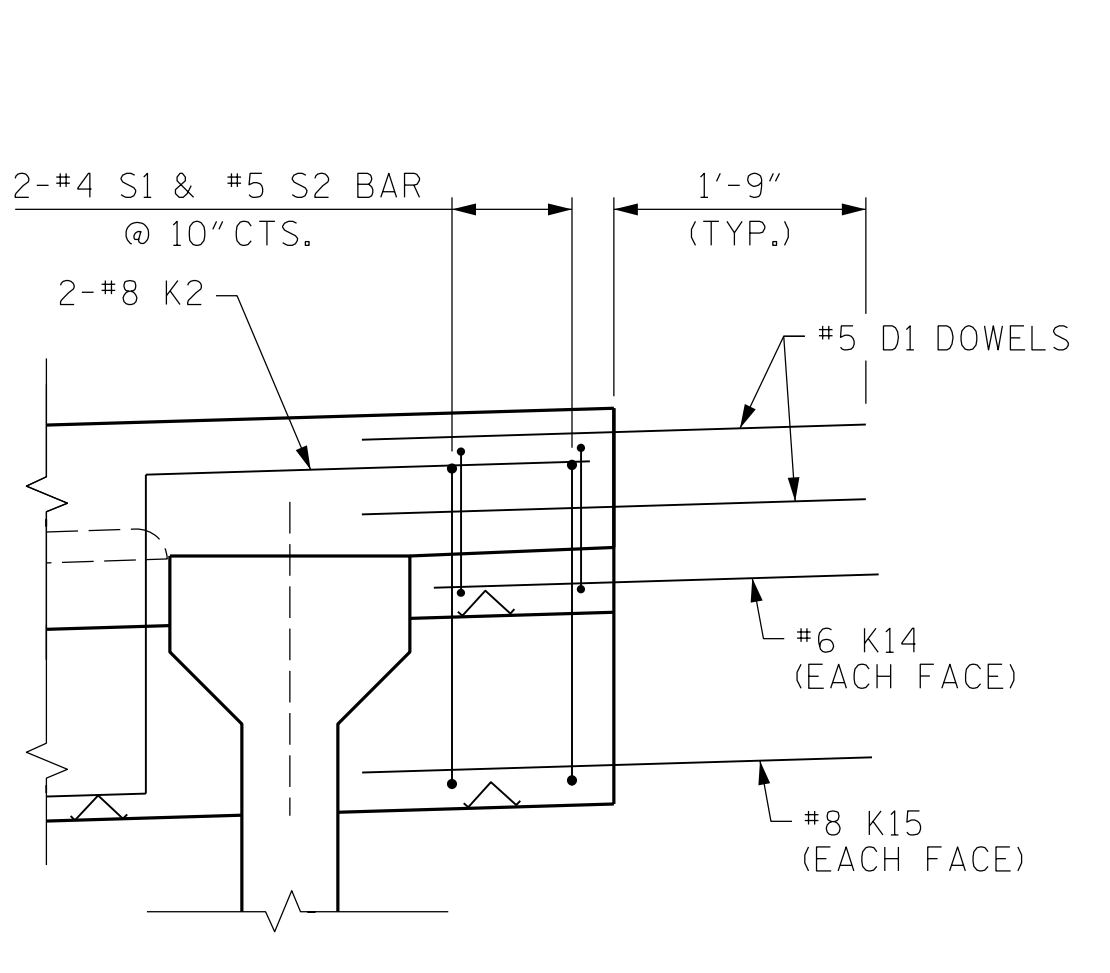


TYPICAL HALF SECTION (SHOWING END BENT DIAPHRAGMS)

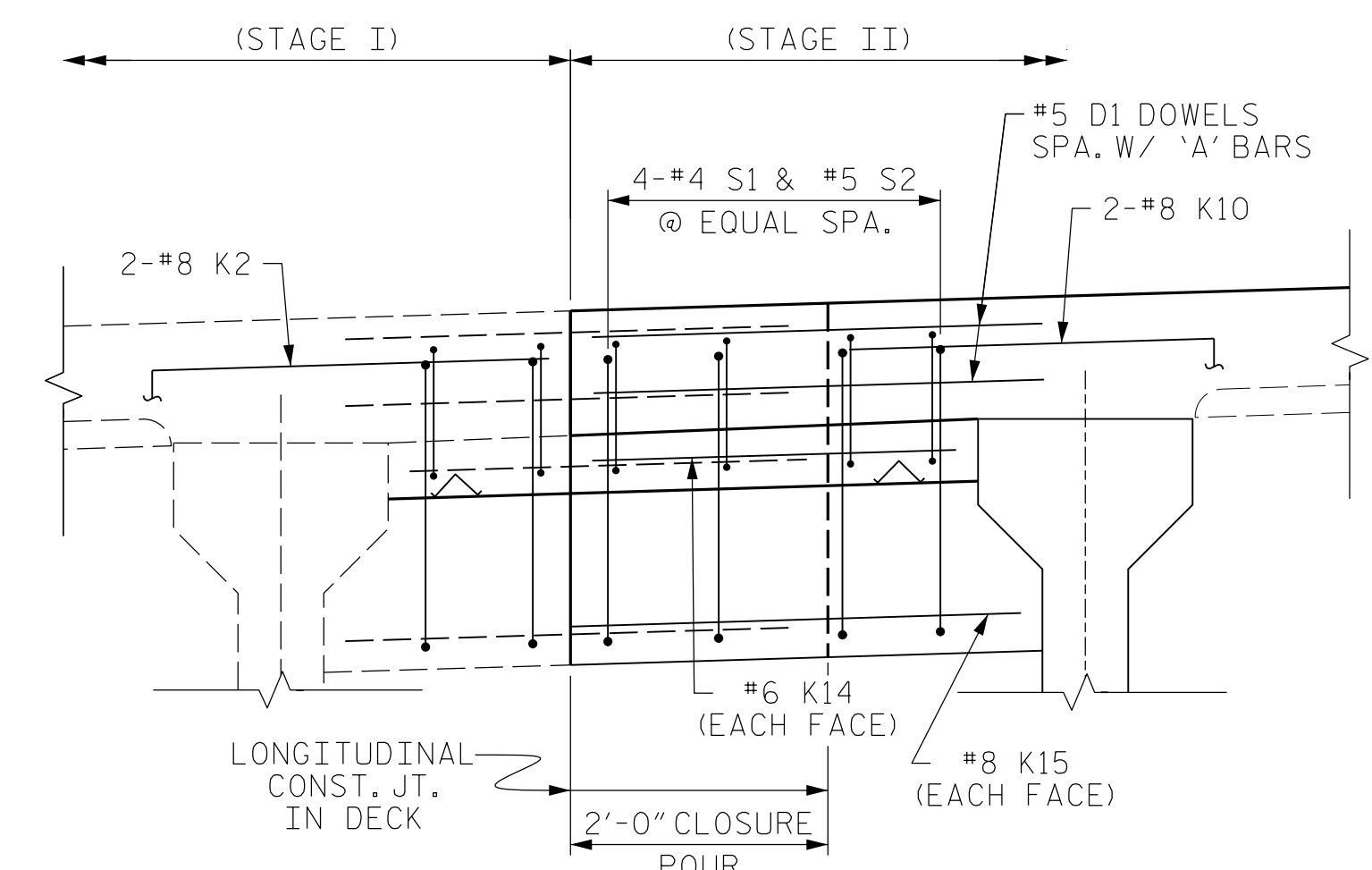
TYPICAL SECTION

TYPICAL HALF SECTION (SHOWING BENT DIAPHRAGMS)

LENGTH  
③ 0" ± TO 6" ±  
④ 3'-2" MAX



STAGE I CONSTRUCTION



STAGE II CONSTRUCTION

DETAIL "C"

SHOWING END BENT DIAPHRAGM AT CLOSURE POUR (LONGITUDINAL DECK REINFORCING NOT SHOWN FOR CLARITY)

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 2 OF 3

**AECOM**  
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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
030474  
JOHN C. MORRISON  
ENGINEER  
A2FD0E142C82F44B

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
TYPICAL SECTION  
AND DETAILS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

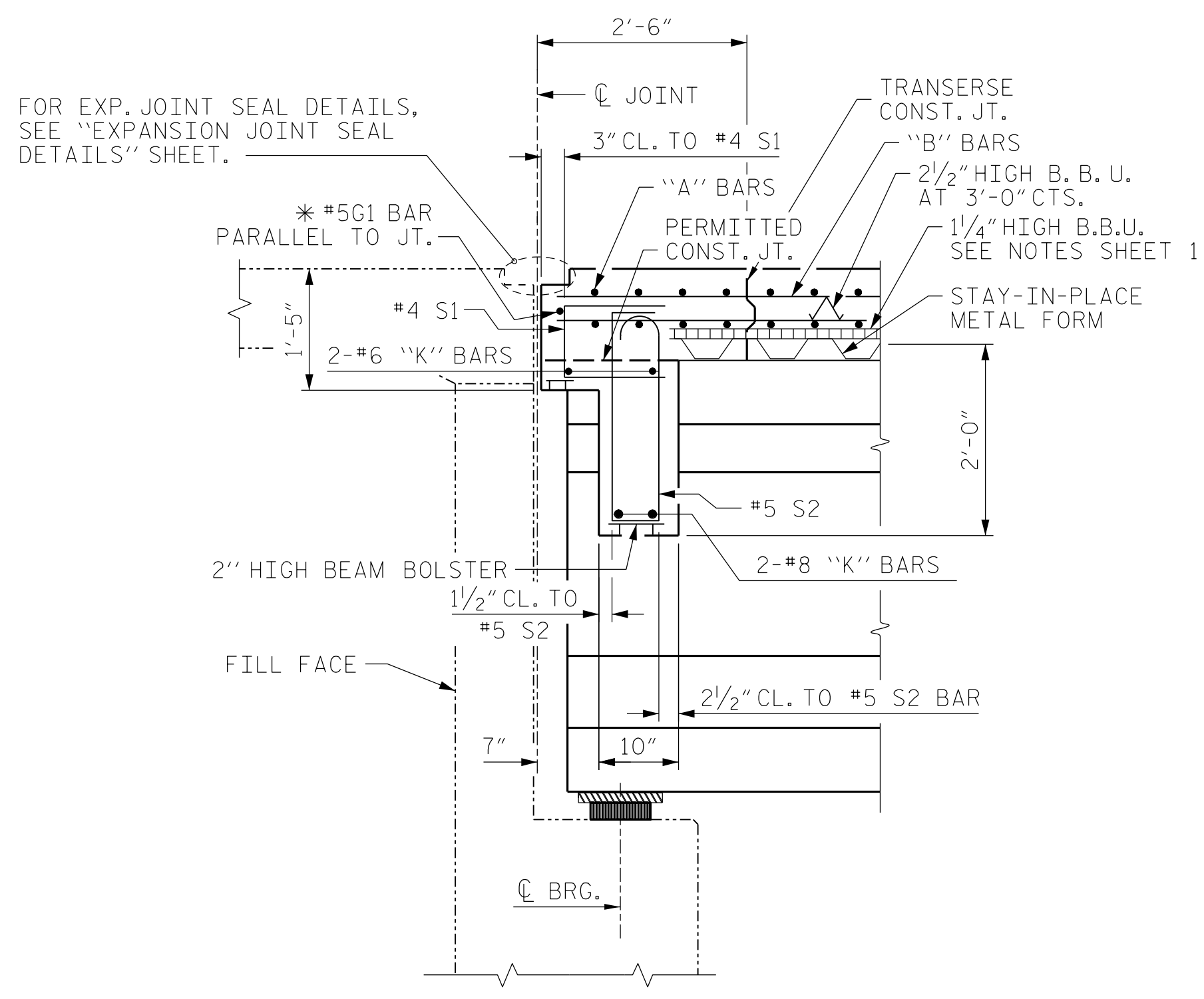
SHEET NO. S-09  
TOTAL SHEETS 55

DRAWN BY : N.K. BROWN DATE : 7/2016  
CHECKED BY : K.H. COMPTON DATE : 7/2016  
DESIGNED BY : N.K. BROWN DATE : 2/2016

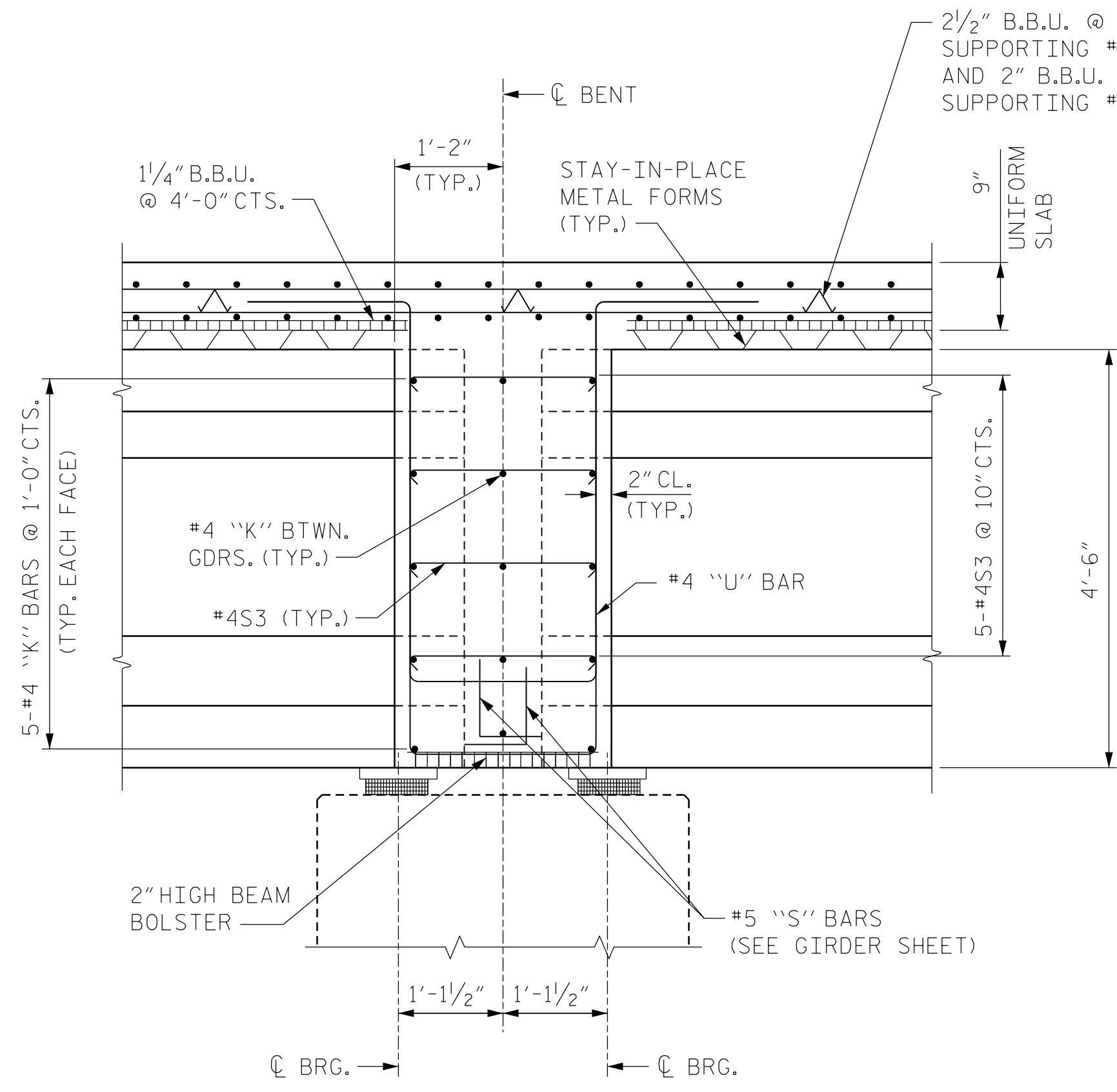
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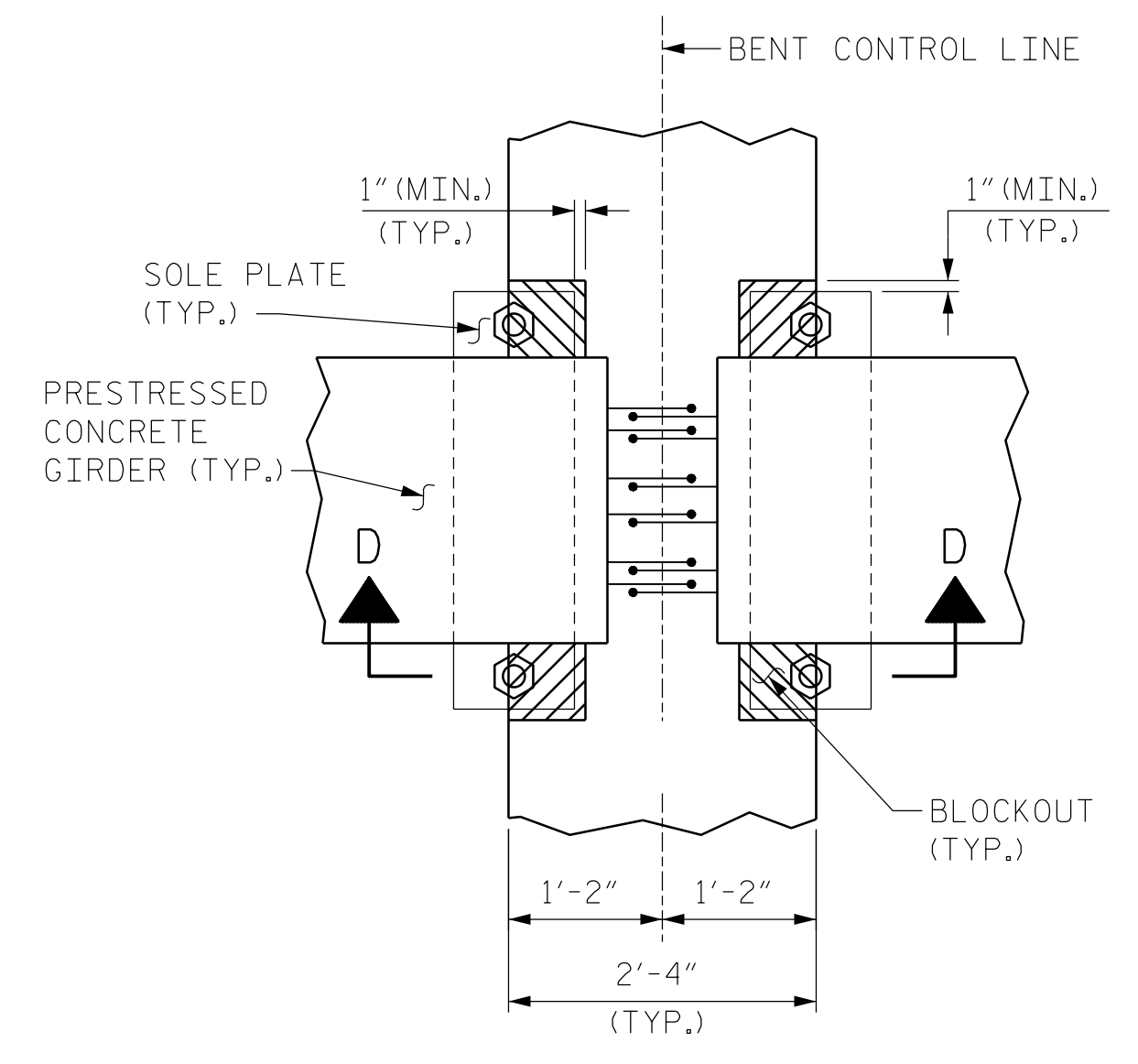
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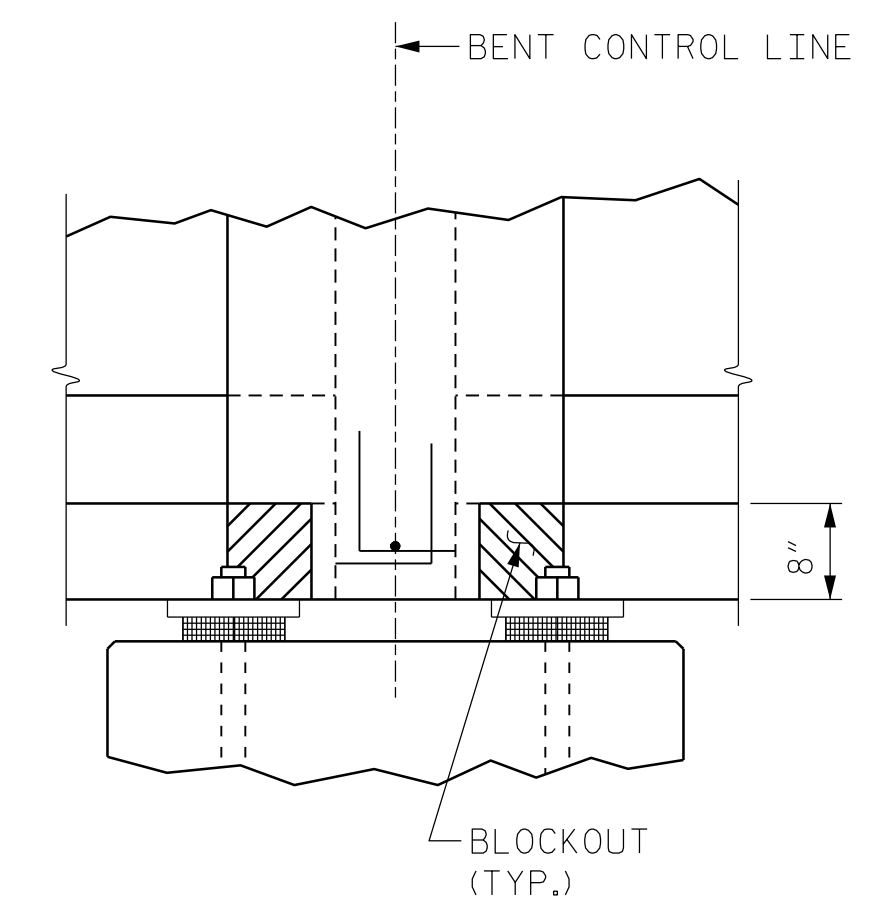
**SECTION THRU END BENT DIAPHRAGM**  
 \* #5G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



**SECTION THRU BENT DIAPHRAGMS**

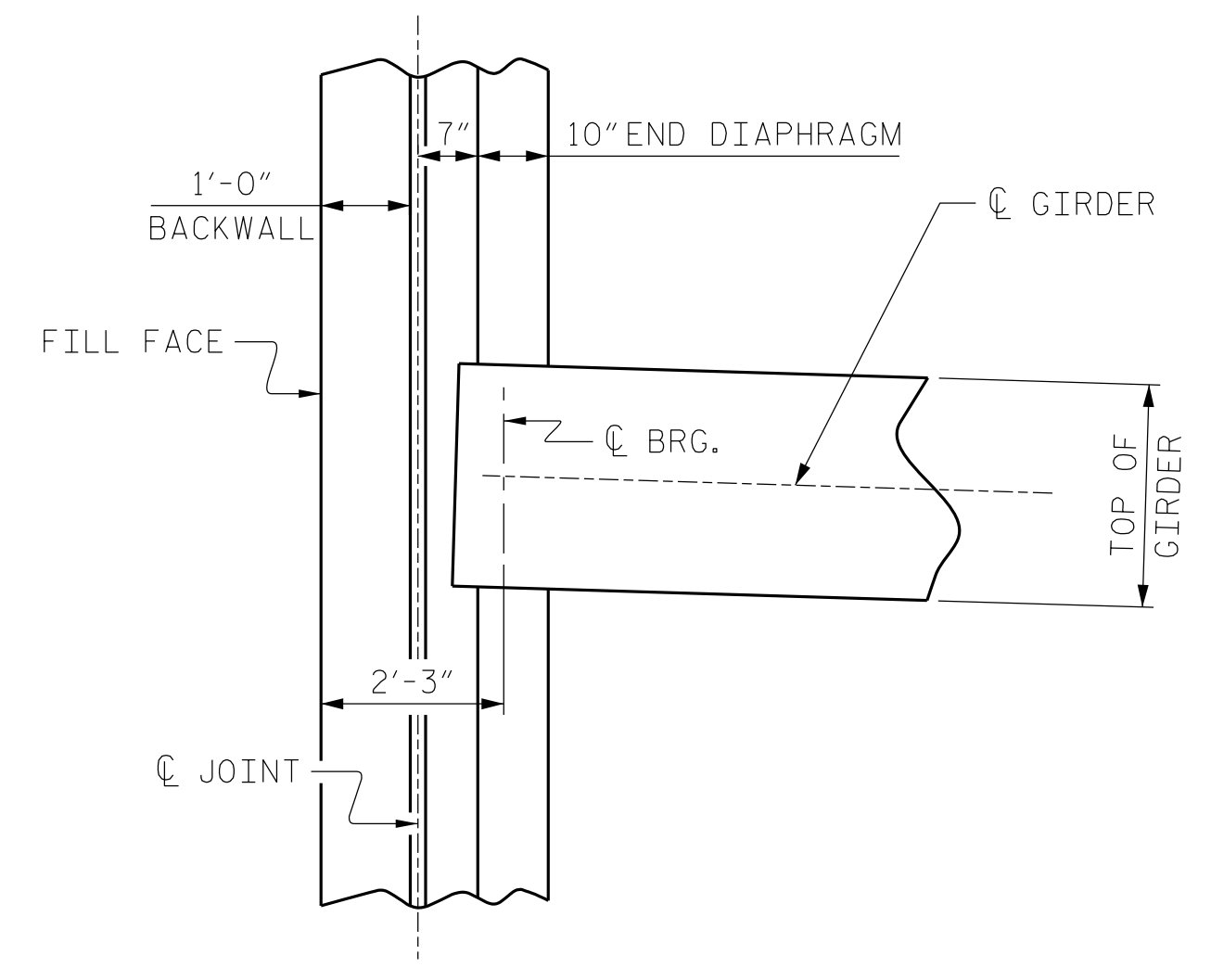


**PLAN VIEW**

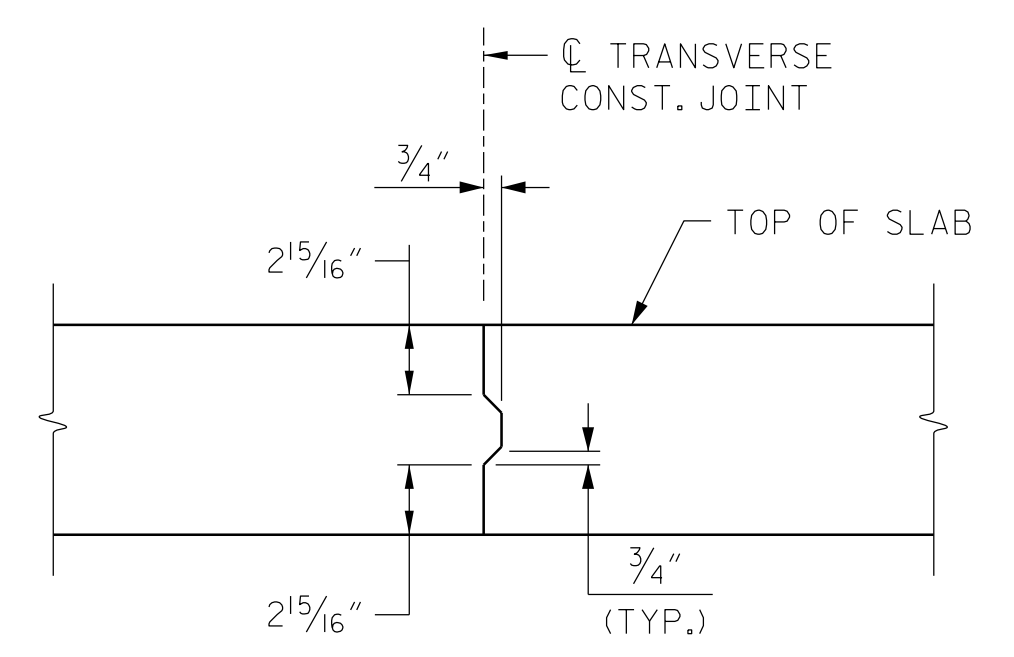


**SECTION "D-D"**

**BLOCKOUT DETAIL**  
 (BENT DIAPHRAGM FOR CONTINUOUS DECK SLAB AT INTERIOR BENTS)



**END BENT DIAPHRAGM**



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

NOTES: REINFORCING STEEL IN SLAB NOT SHOWN.  
 LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-

SHEET 3 OF 3

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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL 030474

JOHN C. MORRISON  
 ENGINEER  
 JOHN C. MORRISON  
 A2FD0E142C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION  
 AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
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2			4			

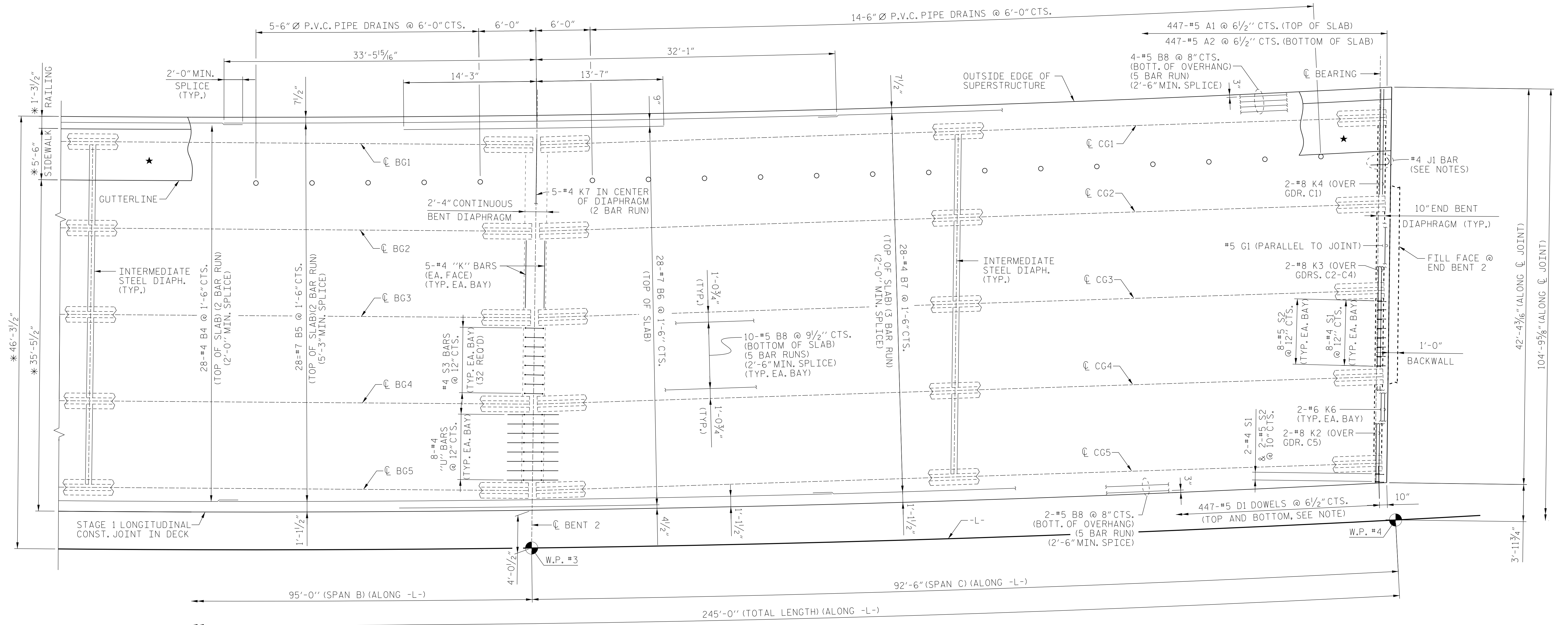
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CHECKED BY :	K.H. COMPTON	DATE :	7/2016
DESIGNED BY :	N.K. BROWN	DATE :	2/2016







**PARTIAL PLAN OF SPAN B AND PLAN OF SPAN C**  
(STAGE I)  
\* RADIAL DIMENSION

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 2 OF 4

- NOTES**
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL AND LOCATION, SEE "POURING SEQUENCE" SHEET.
  - FOR 3 BAR METAL RAIL REINFORCING, SEE "3 BAR METAL RAIL" SHEET.
  - \* FOR SIDEWALK REINFORCING, SEE "SIDEWALK DETAILS" SHEET.
  - #5 "A" BARS ARE TO BE PLACED PERPENDICULAR TO AND ALONG THE LONG CHORD
  - #5 D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.
  - FOR PLACEMENT OF #4 J1 BAR, SEE "EXPANSION JOINT SEAL DETAILS" SHEETS.

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 030474  
 ENGINEER  
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**DEPARTMENT OF TRANSPORTATION**  
RALEIGH

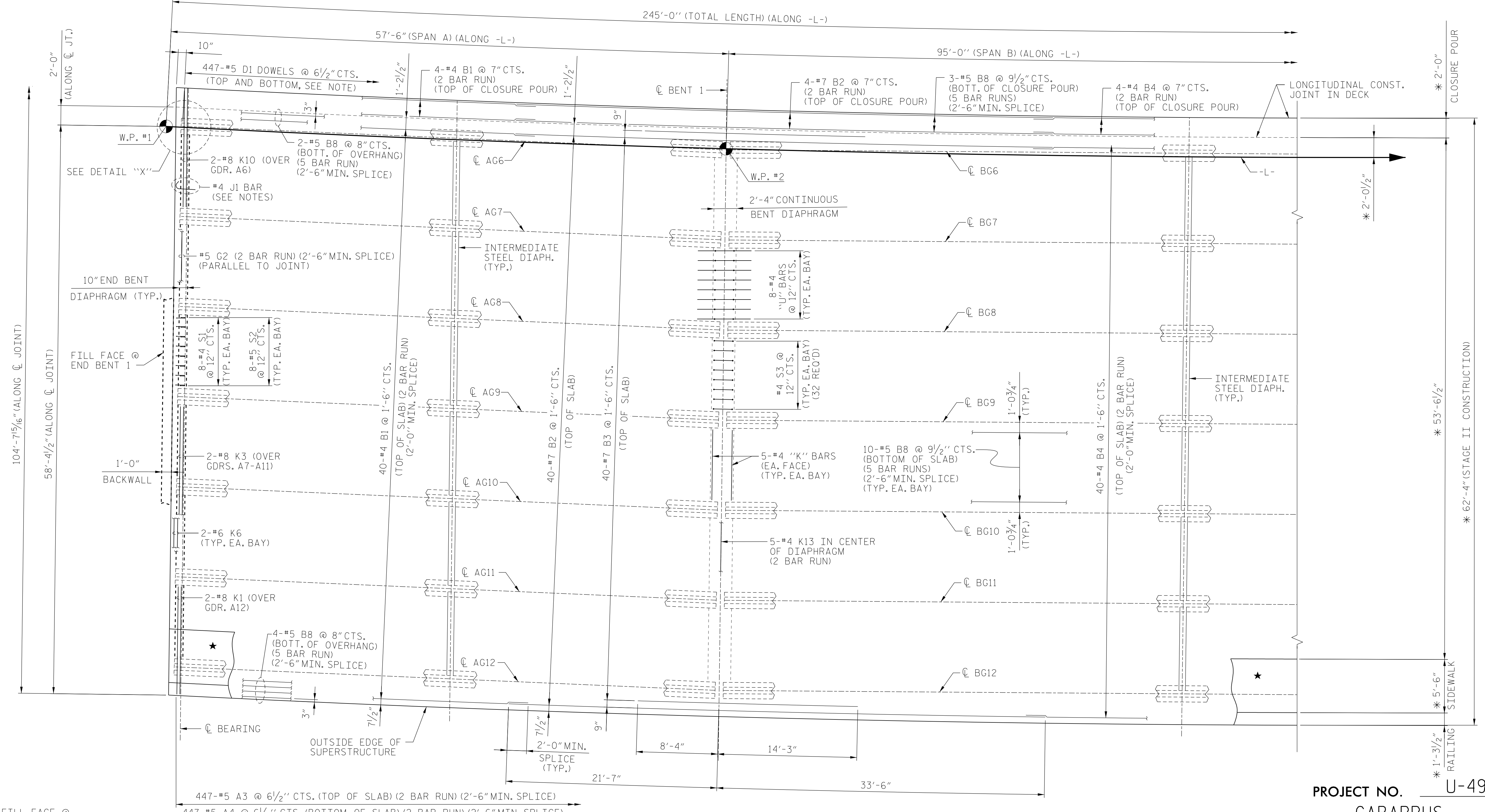
**SUPERSTRUCTURE**  
**PLAN OF SPANS**  
**STAGE I**

REVISIONS						SHEET NO.
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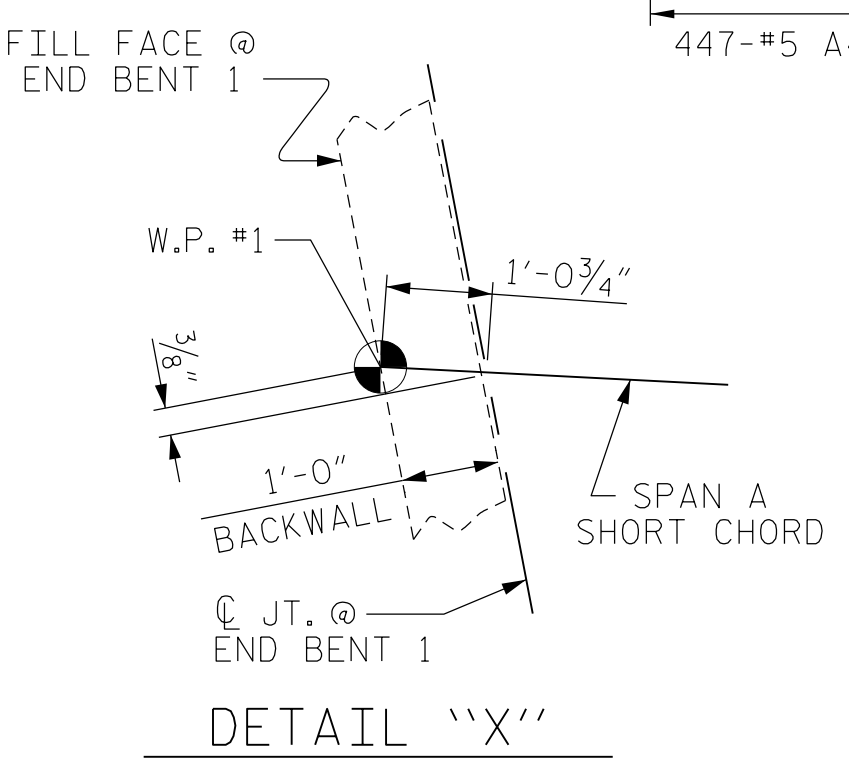
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PLAN OF SPAN A AND PARTIAL PLAN OF SPAN B  
(STAGE II)  
\* RADIAL DIMENSION

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 3 OF 4



- NOTES**
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL AND LOCATION, SEE "POURING SEQUENCE" SHEET.
  - FOR 3 BAR METAL RAIL REINFORCING, SEE "3 BAR METAL RAIL" SHEET.
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ENGINEER

STATE OF NORTH CAROLINA  
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SUPERSTRUCTURE  
PLAN OF SPANS  
STAGE II

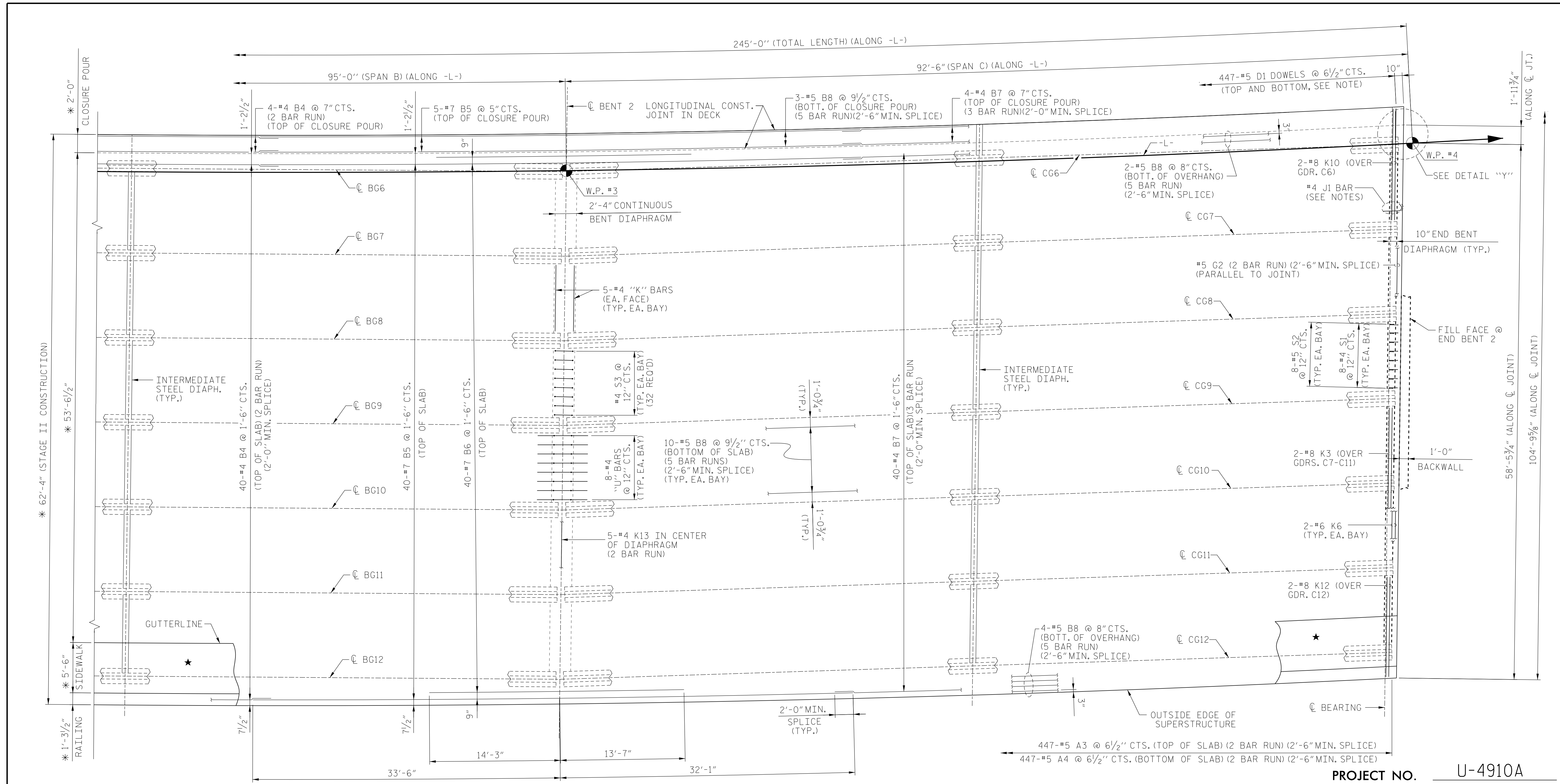
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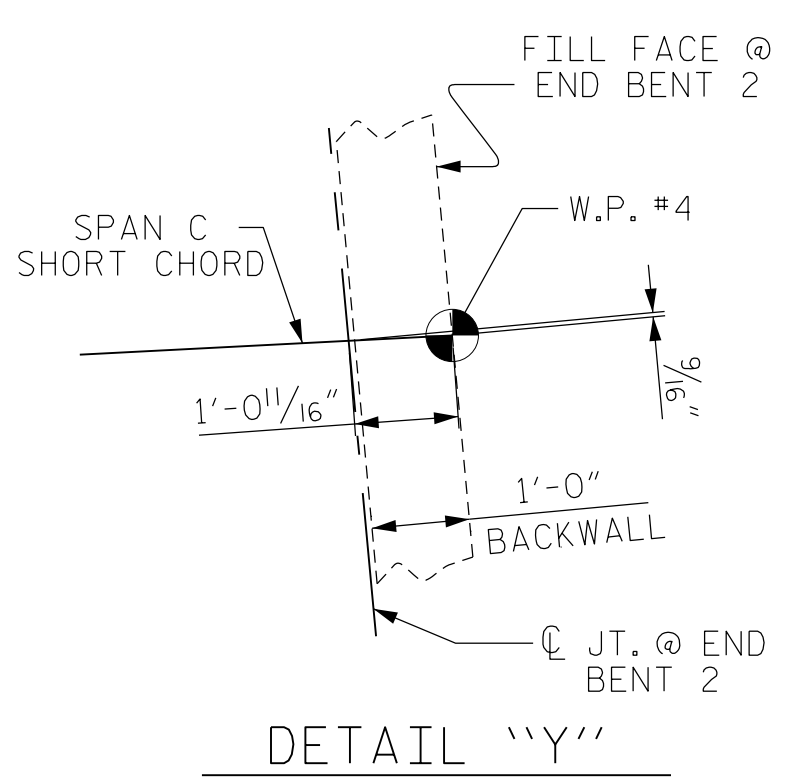
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**PARTIAL PLAN OF SPAN B AND PLAN OF SPAN C**  
(STAGE II)  
\* RADIAL DIMENSION

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 4 OF 4



- NOTES**
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL AND LOCATION, SEE "POURING SEQUENCE" SHEET.
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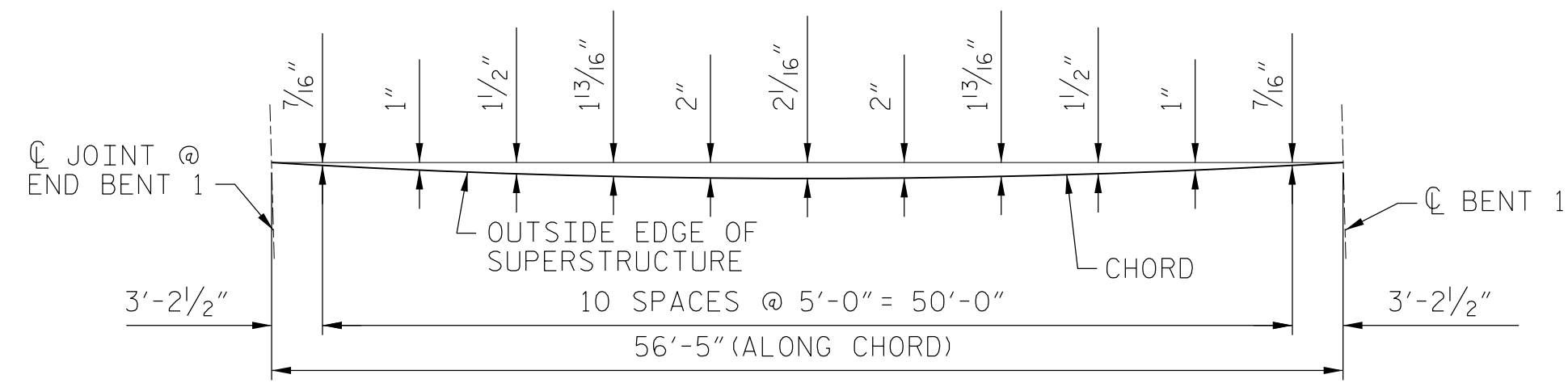
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 030474  
 JOHN C. MORRISON  
 ENGINEER

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

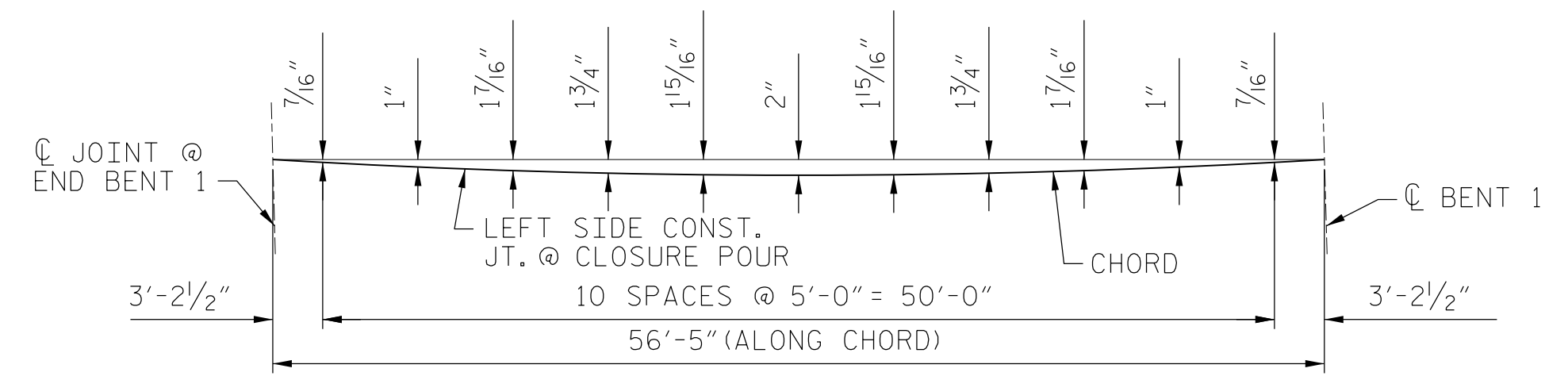
**SUPERSTRUCTURE  
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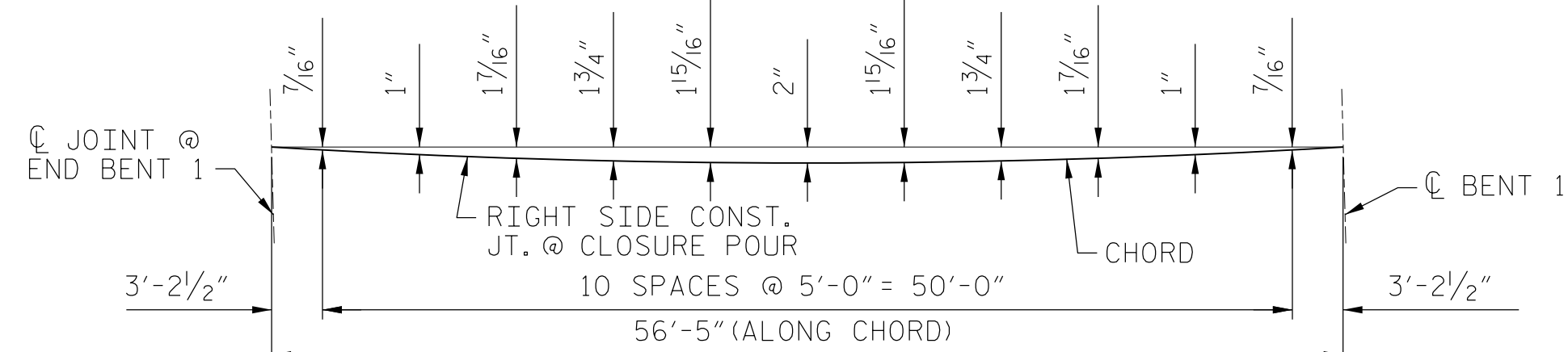




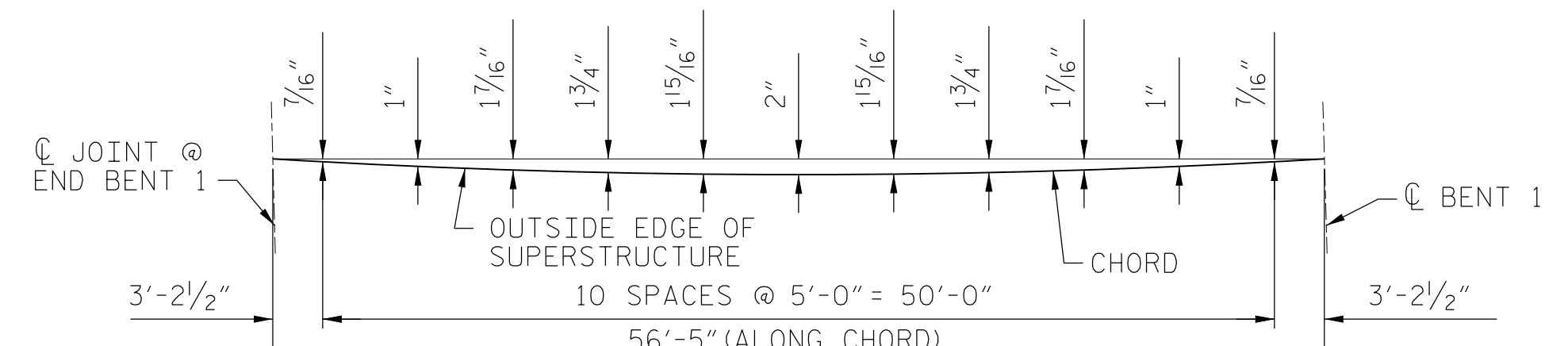
ARC OFFSETS - SPAN "A" (LEFT SIDE)



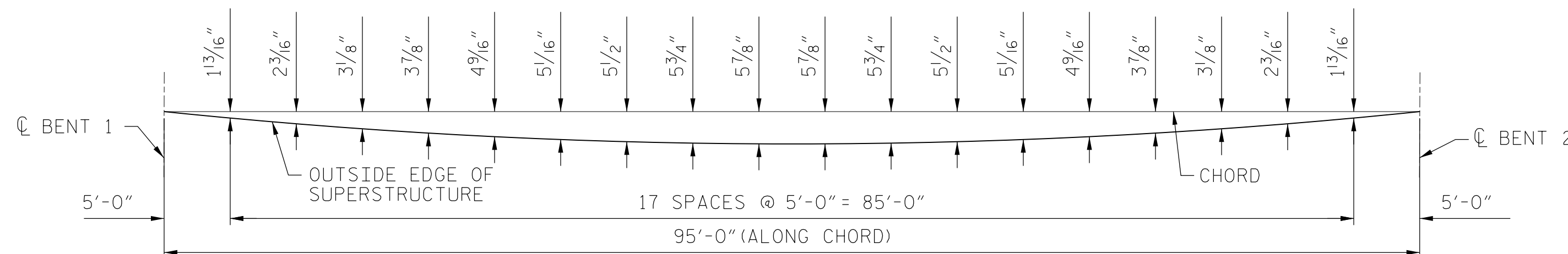
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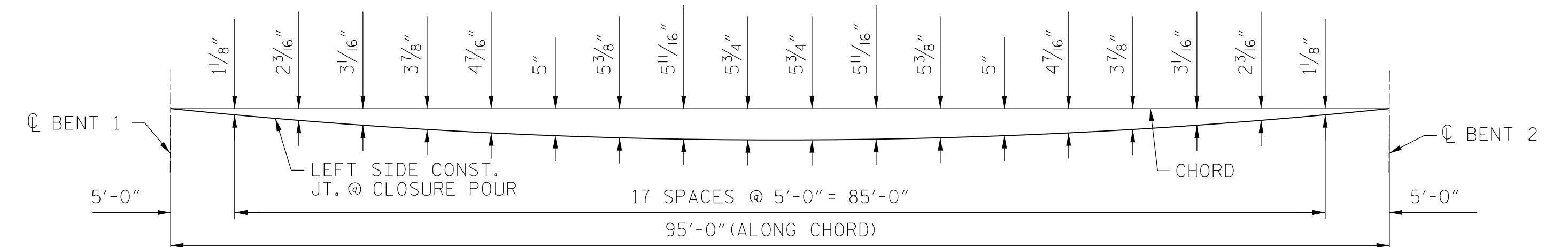
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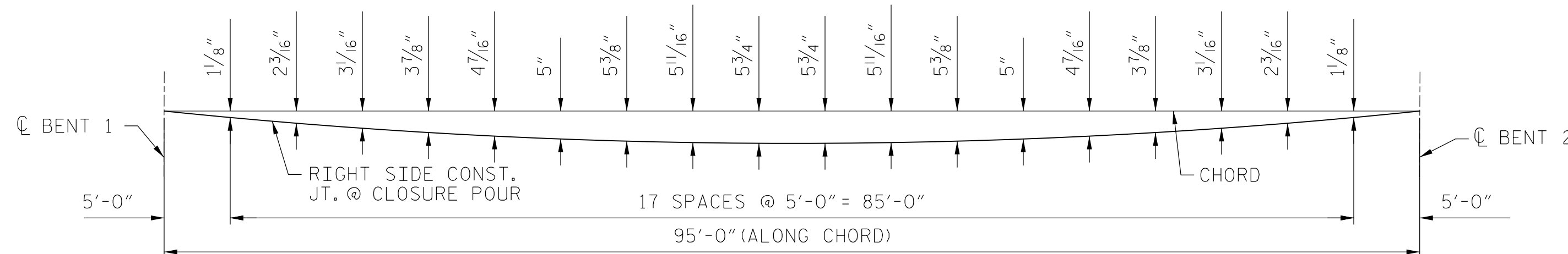
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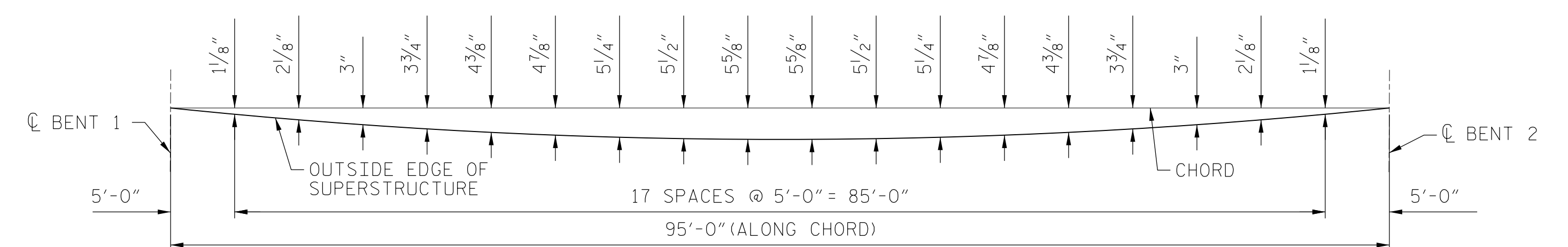
ARC OFFSETS - SPAN "B" (LEFT SIDE)



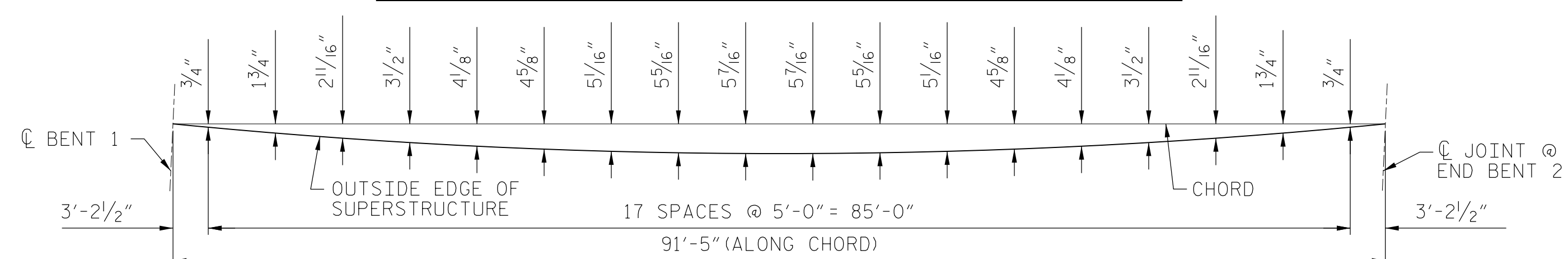
ARC OFFSETS - SPAN "B" (STAGE I CONST. JT.)



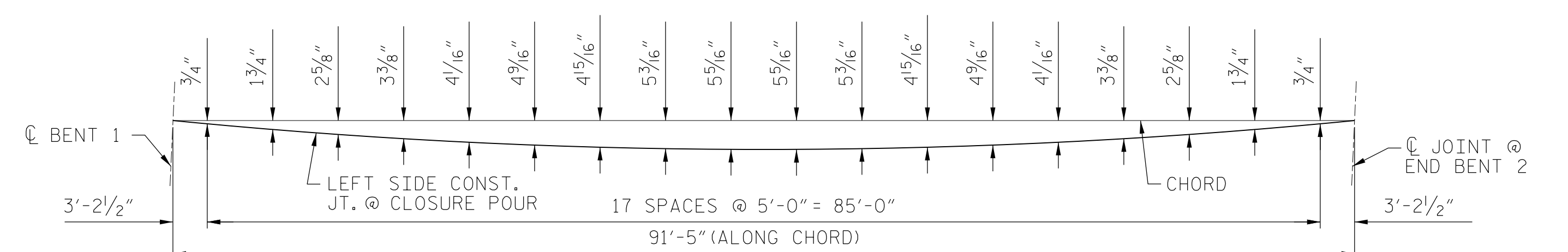
ARC OFFSETS - SPAN "B" (STAGE II CONST. JT.)



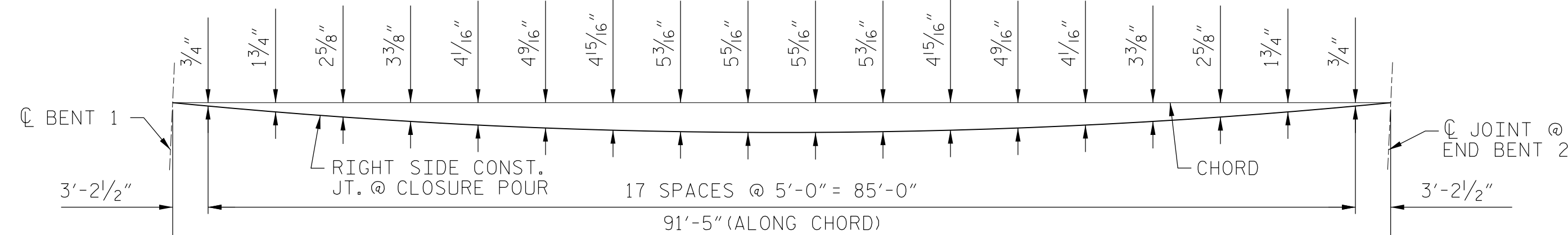
ARC OFFSETS - SPAN "B" (RIGHT SIDE)



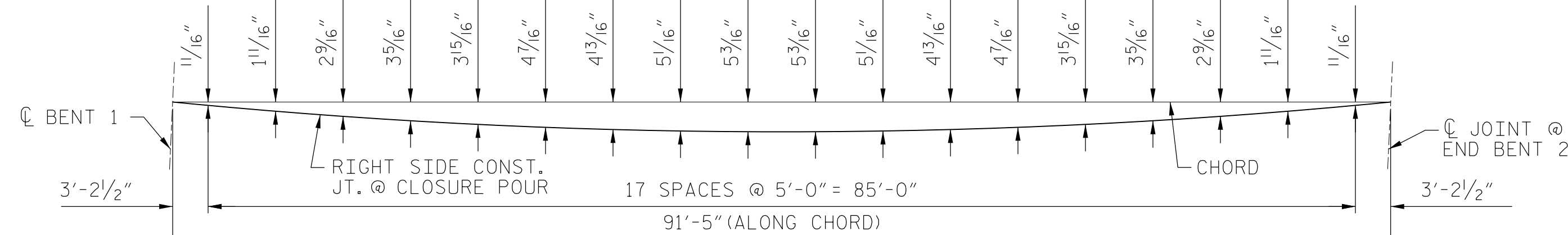
ARC OFFSETS - SPAN "C" (LEFT SIDE)



ARC OFFSETS - SPAN "C" (STAGE I CONST. JT.)



ARC OFFSETS - SPAN "C" (STAGE II CONST. JT.)

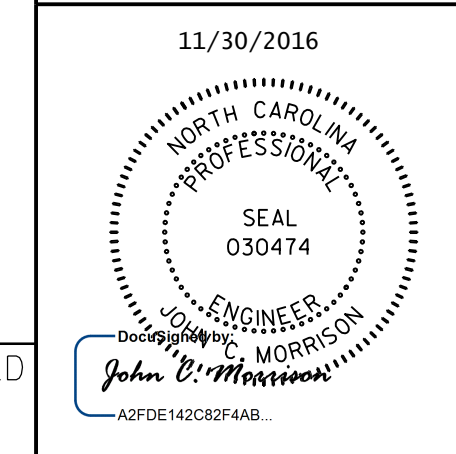


ARC OFFSETS - SPAN "C" (RIGHT SIDE)

PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-



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SUPERSTRUCTURE  
 ARC OFFSETS

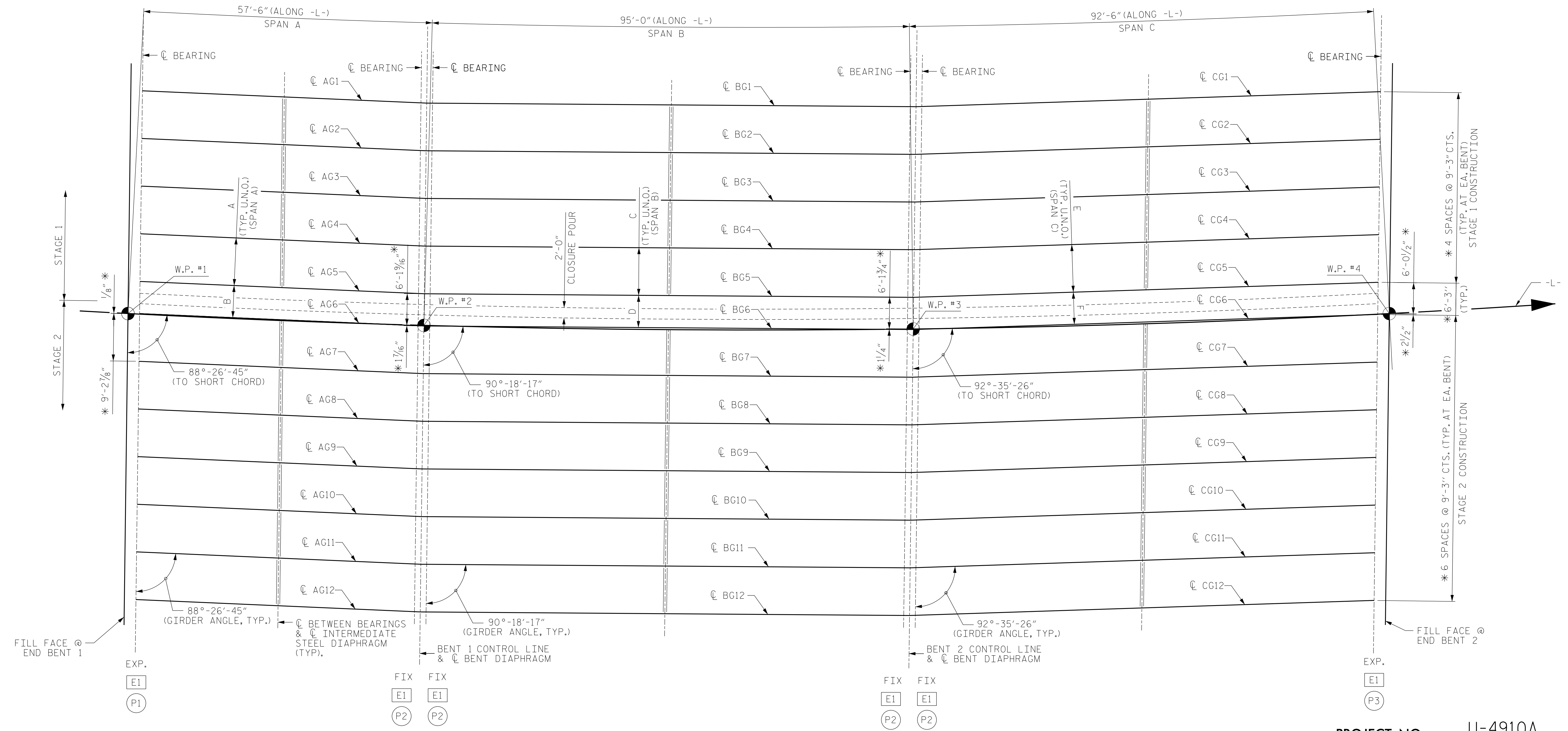
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DATE: 11/30/2016 TIME: 10:07:57 AM  
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**NOTES:**  
 ELASTOMERIC BEARINGS INDICATED THUS: (EN) (N= NUMBER).  
 SOLE PLATES INDICATED THUS: (PN) (N= NUMBER).



MARK	DIMENSION
A	9'-2 15/16"
B	6'-2 15/16"
C	9'-3"
D	6'-3"
E	9'-2 7/8"
F	6'-2 7/8"

NOTE: GIRDERS ARE PARALLEL TO SHORT CHORD.

### FRAMING PLAN

\* MEASUREMENT TAKEN FROM W.P. TO ADJACENT GIRDER ALONG CL BRG.

PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-

DATE: 11/30/2016  
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 SEAL 030474  
 JOHN C. MORRISON  
 ENGINEER  
 A2FD0E143C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 FRAMING PLAN

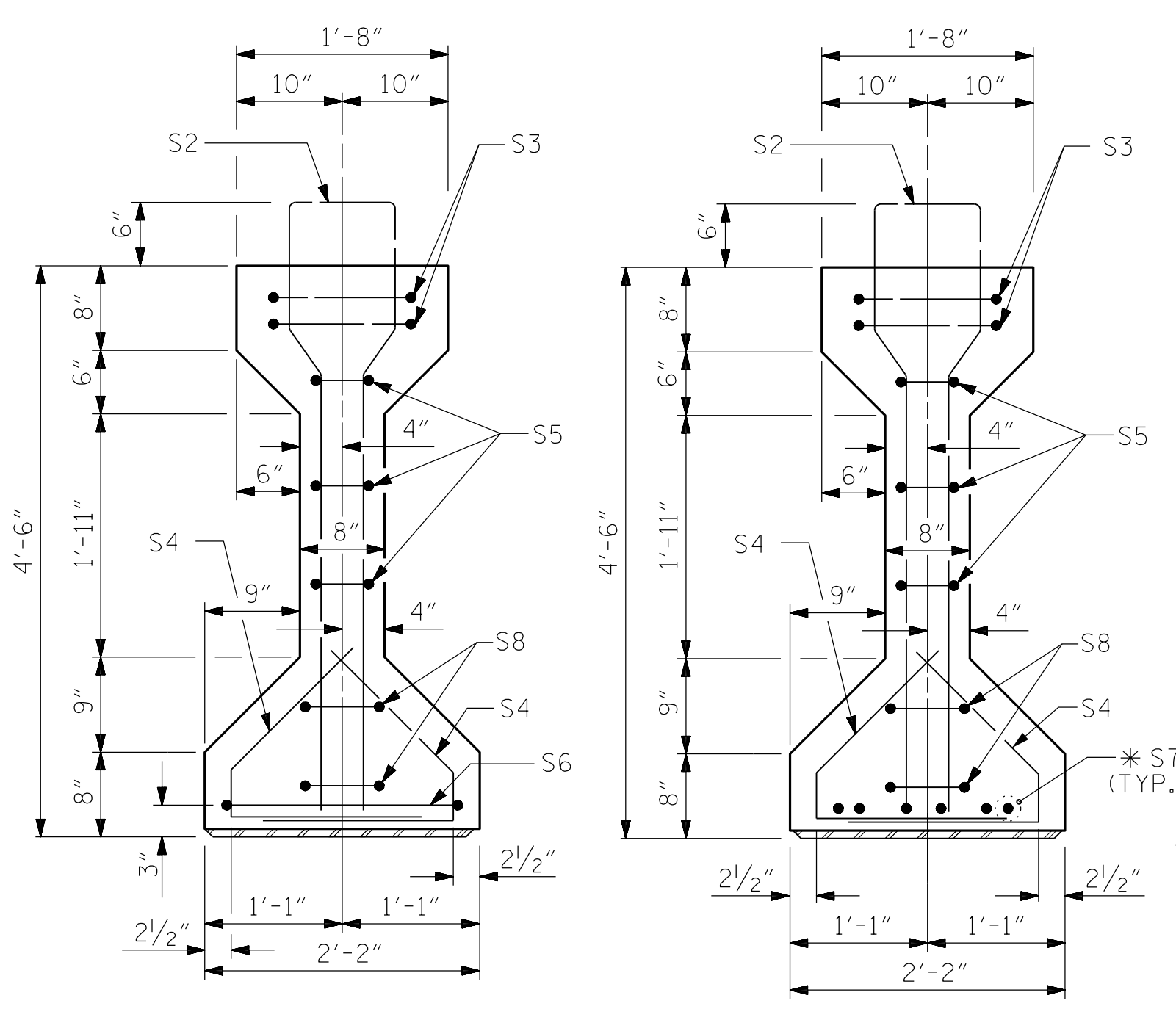
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S-16



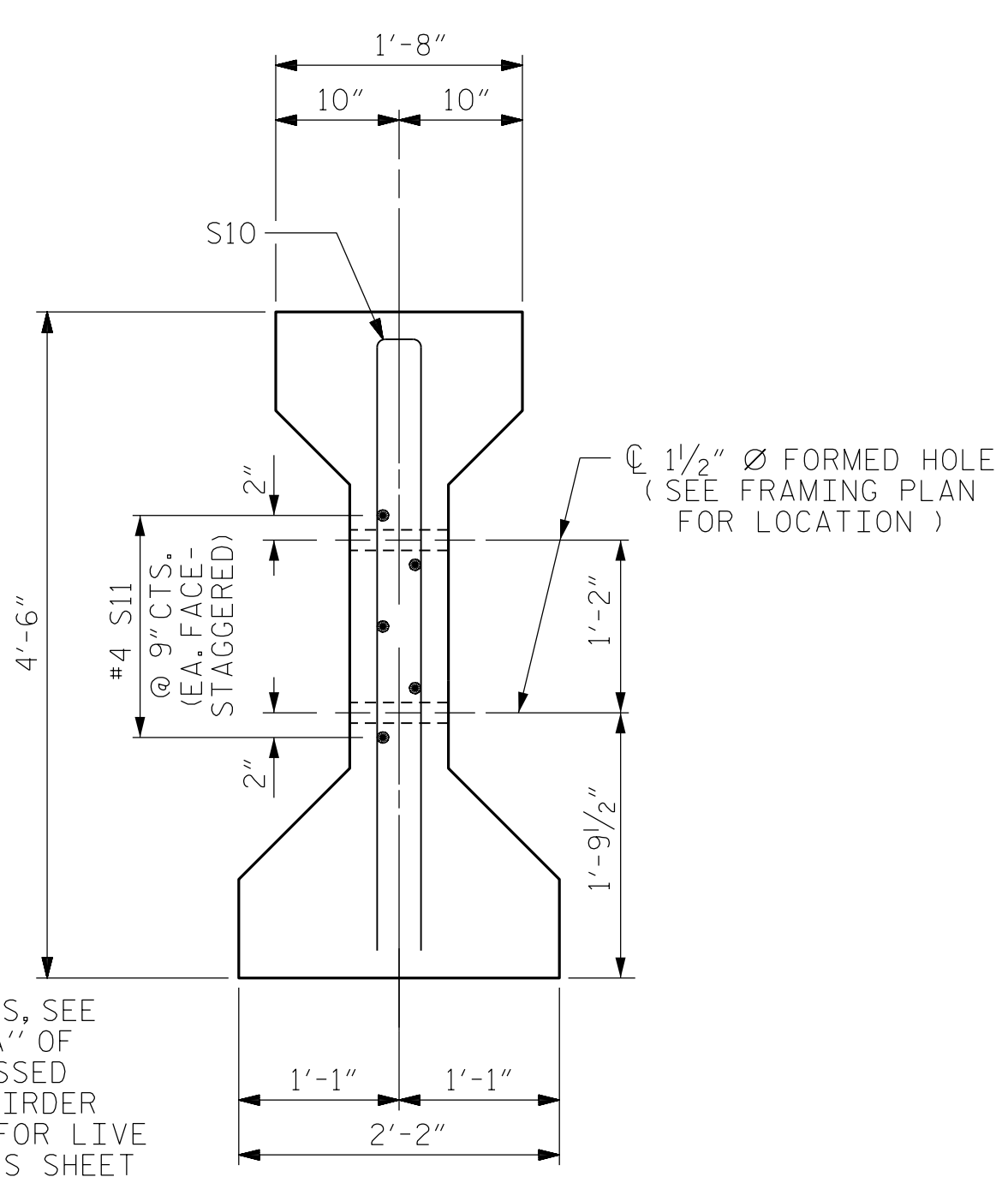
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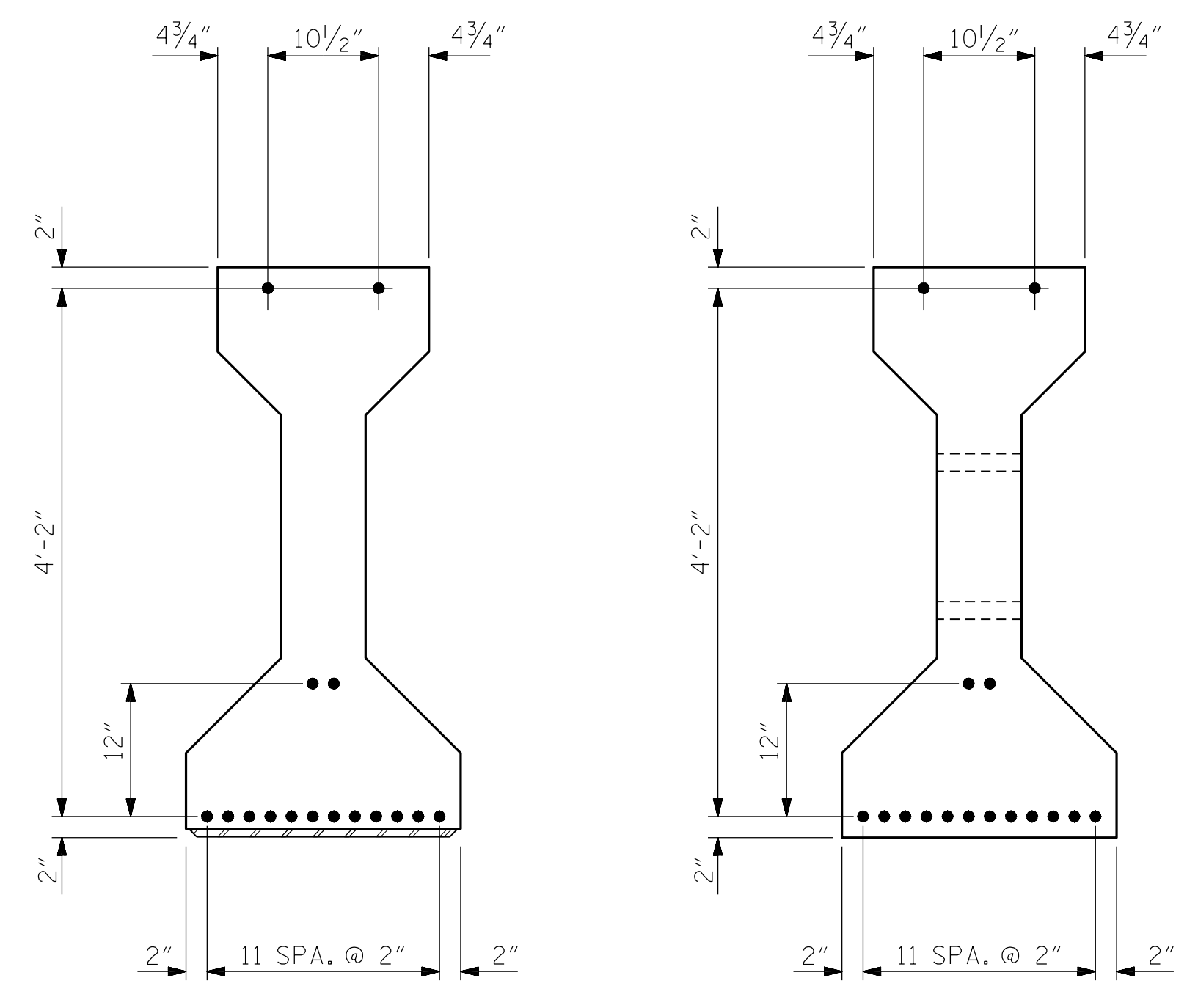
SECTION A-A

SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET

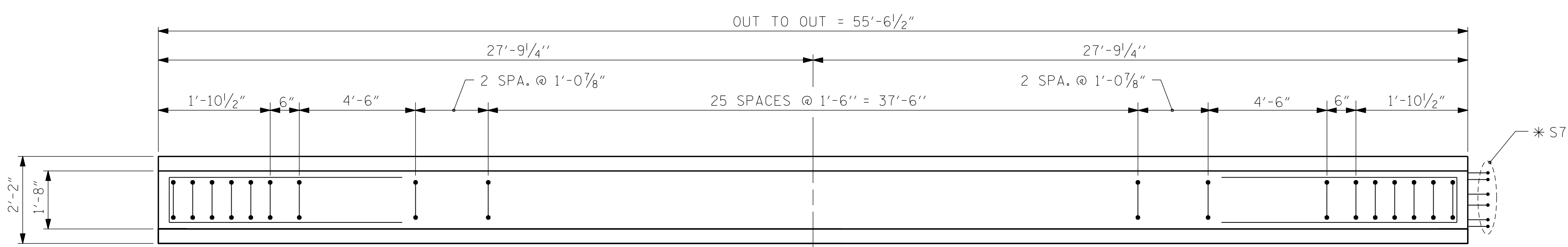


AT END OF GIRDER

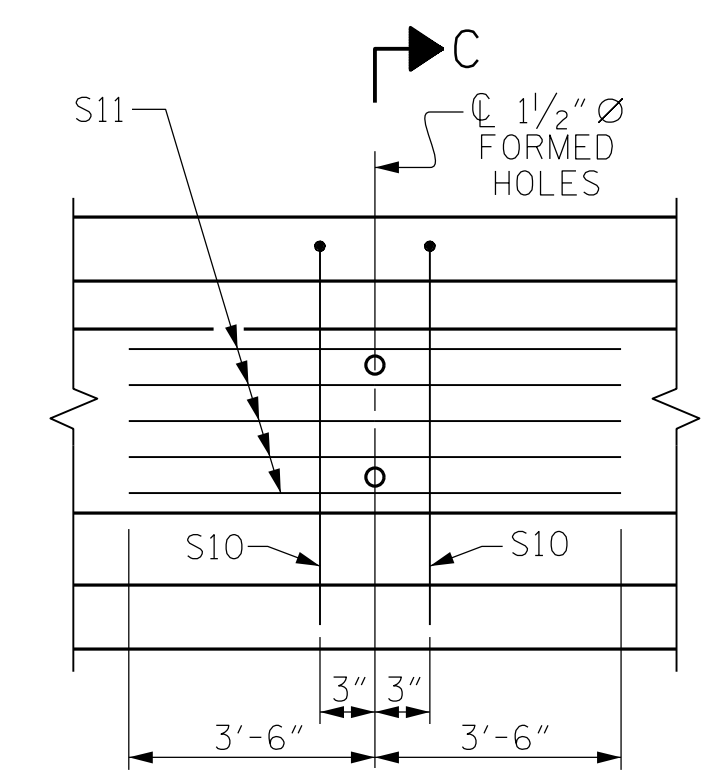
AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(16 STRANDS)  
• FULLY BONDED STRANDS

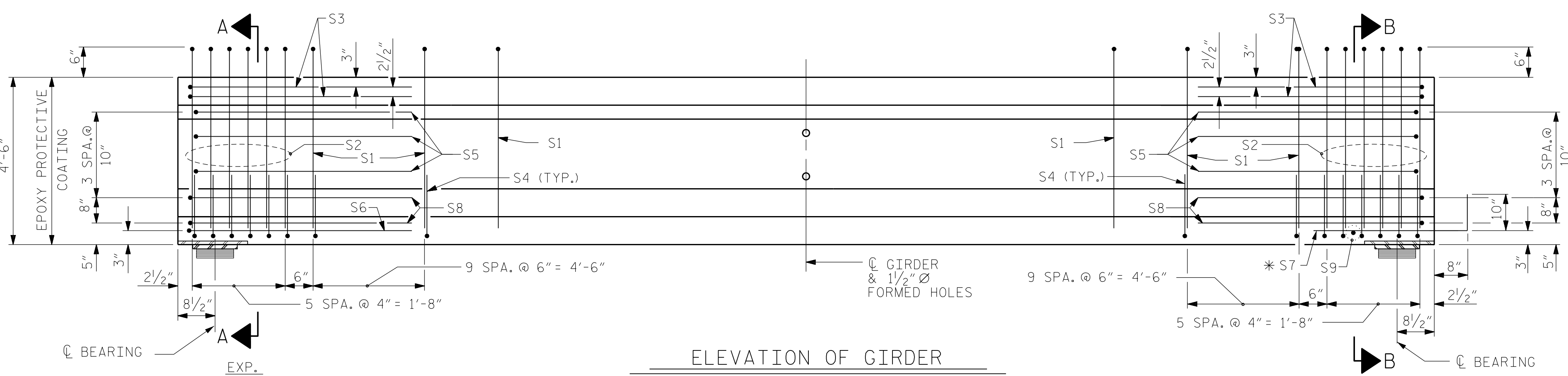


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL FOR GIRDER Nos. 1-12



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

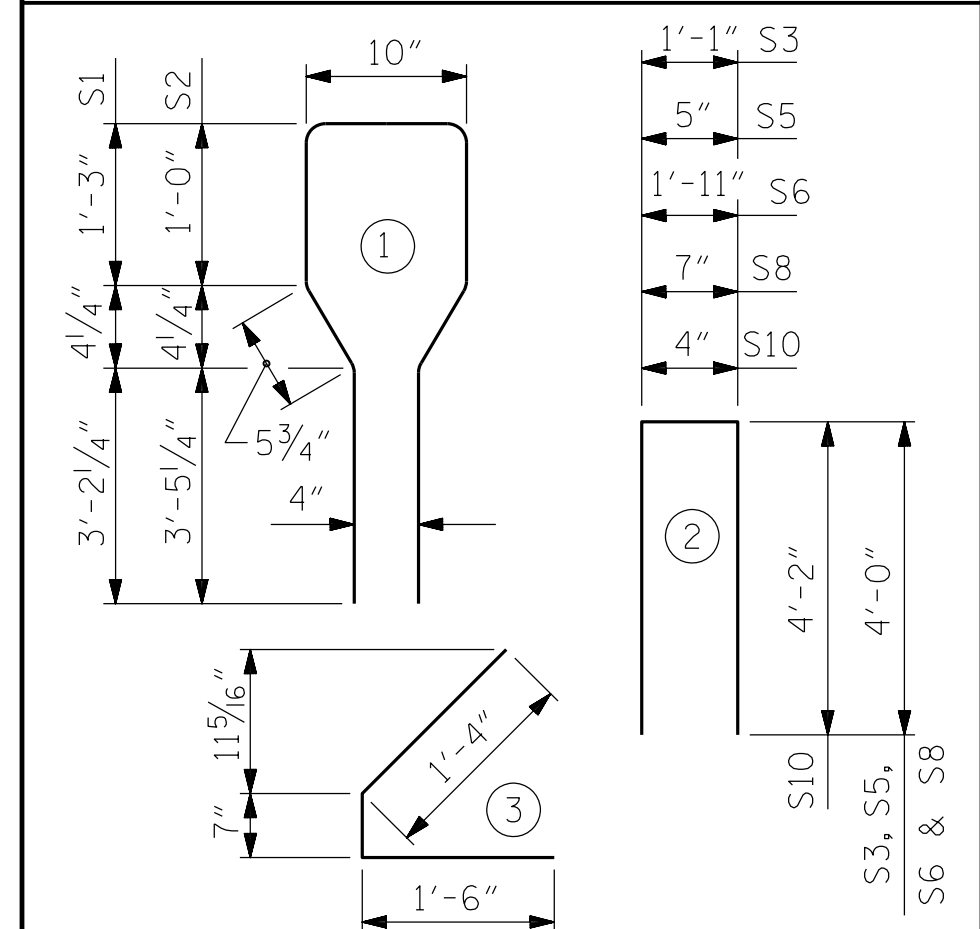
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	10'-8"	342
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
*S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
EXT. & INT. GDERS	REINFORCING STEEL	7000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	833	11.3	16

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
12	55'-6 1/2"	666'-6"

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 1 OF 5

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11/30/2016

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SEAL  
030474

JOHN C. MORRISON  
ENGINEER  
42FDE142R2F4AB

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN A

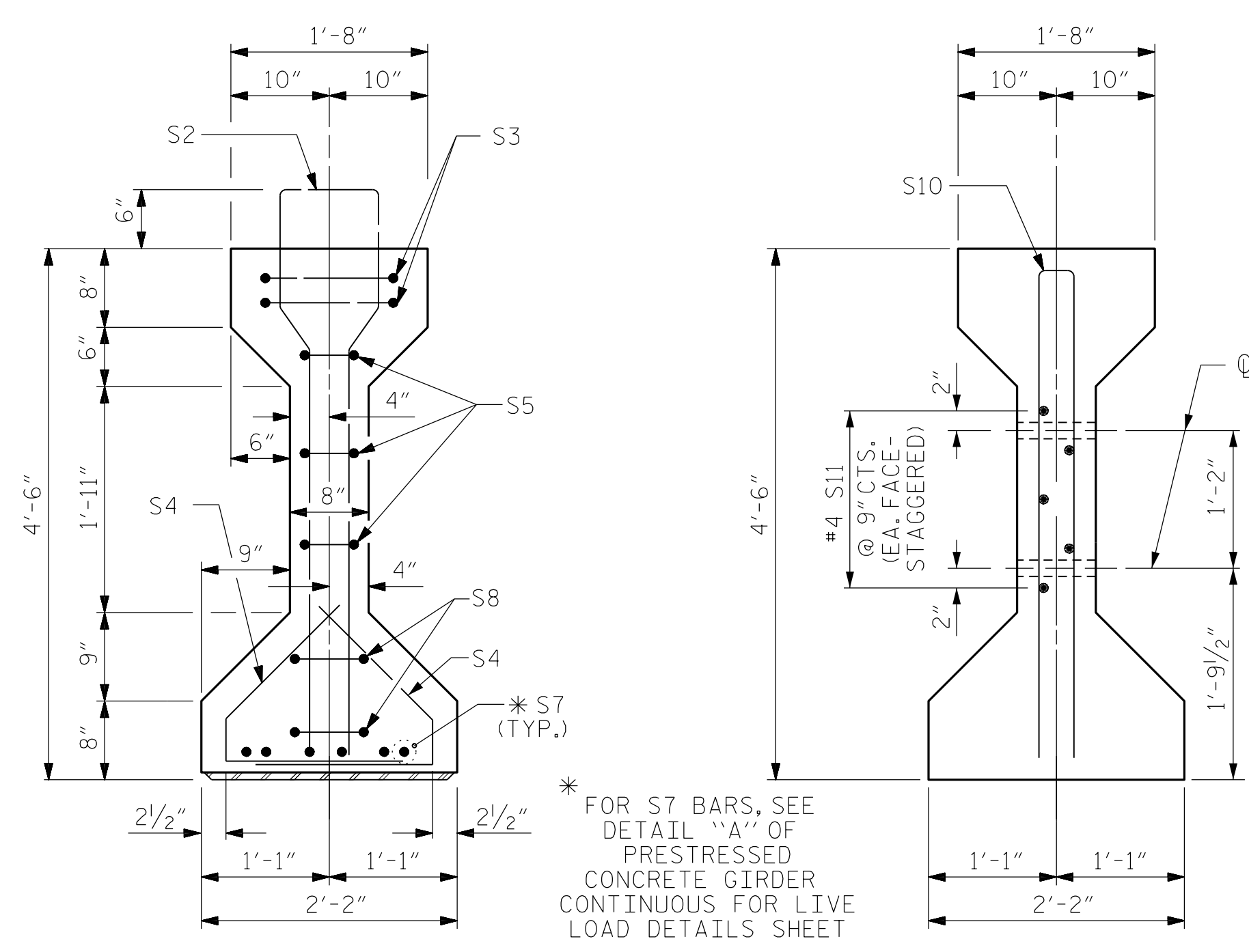
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ASSEMBLED BY : N.K. BROWN	DATE : 3/2016
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DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

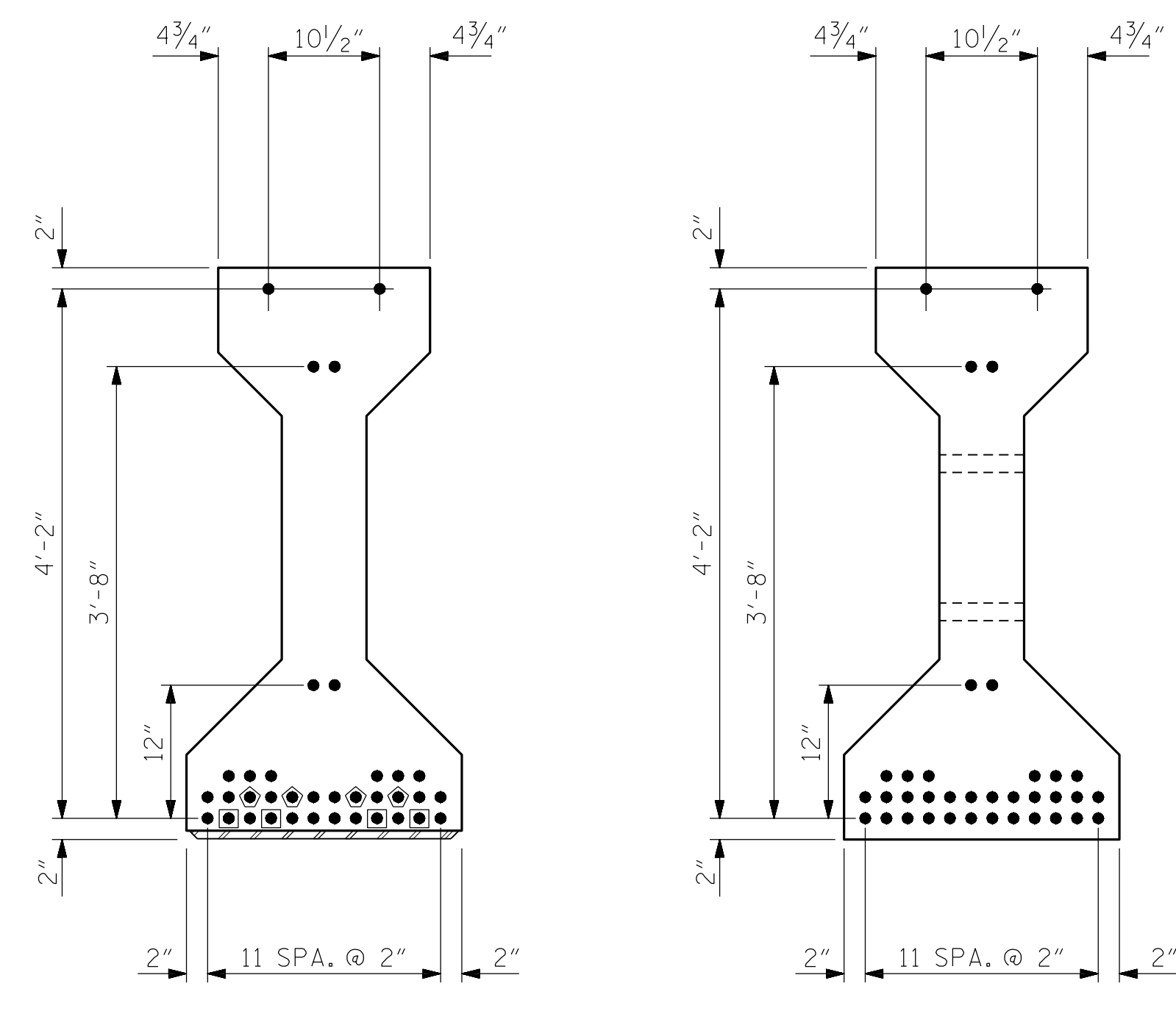
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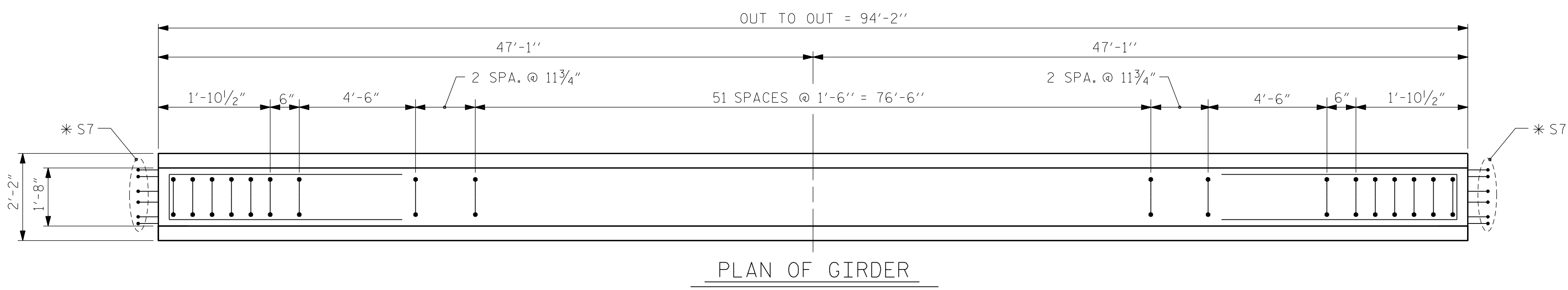


\* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

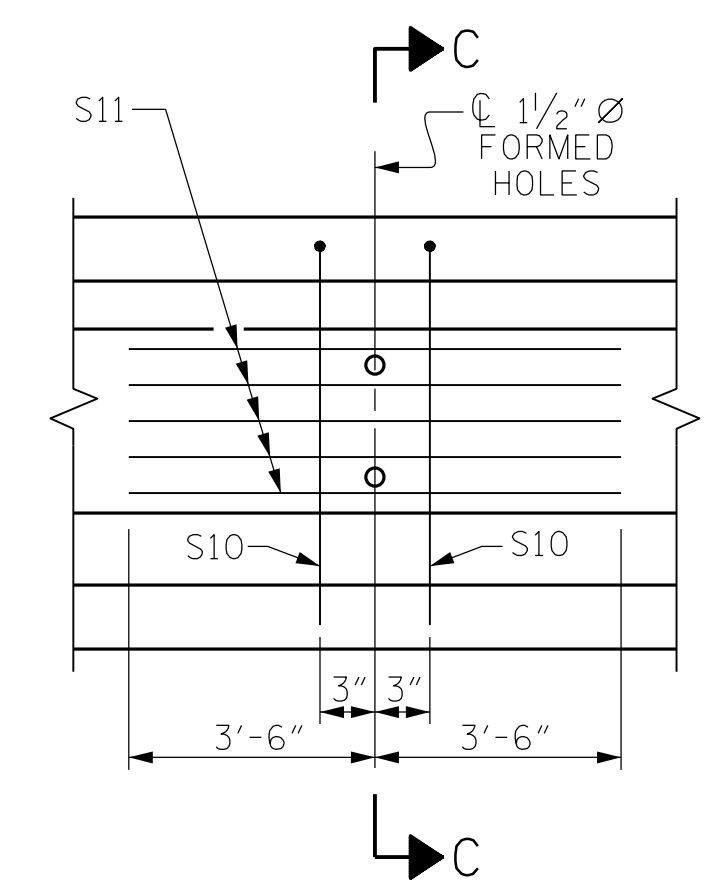


0.6" Ø LOW RELAXATION STRAND LAYOUT

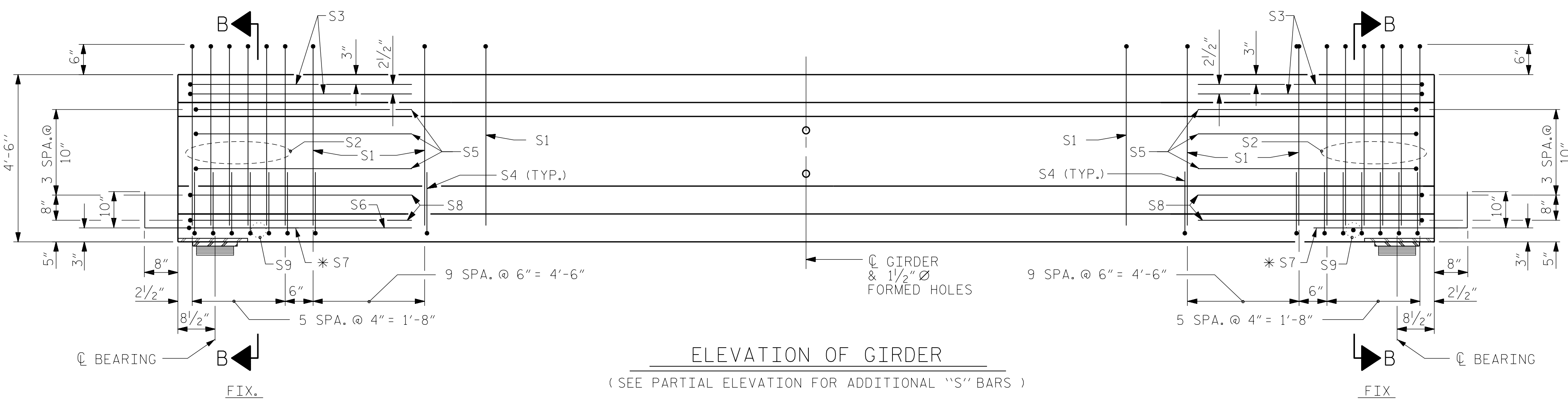
- (36 STRANDS)
- FULLY BONDED STRANDS
  - STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER
  - STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER



PLAN OF GIRDER



PARTIAL ELEVATION



ELEVATION OF GIRDER

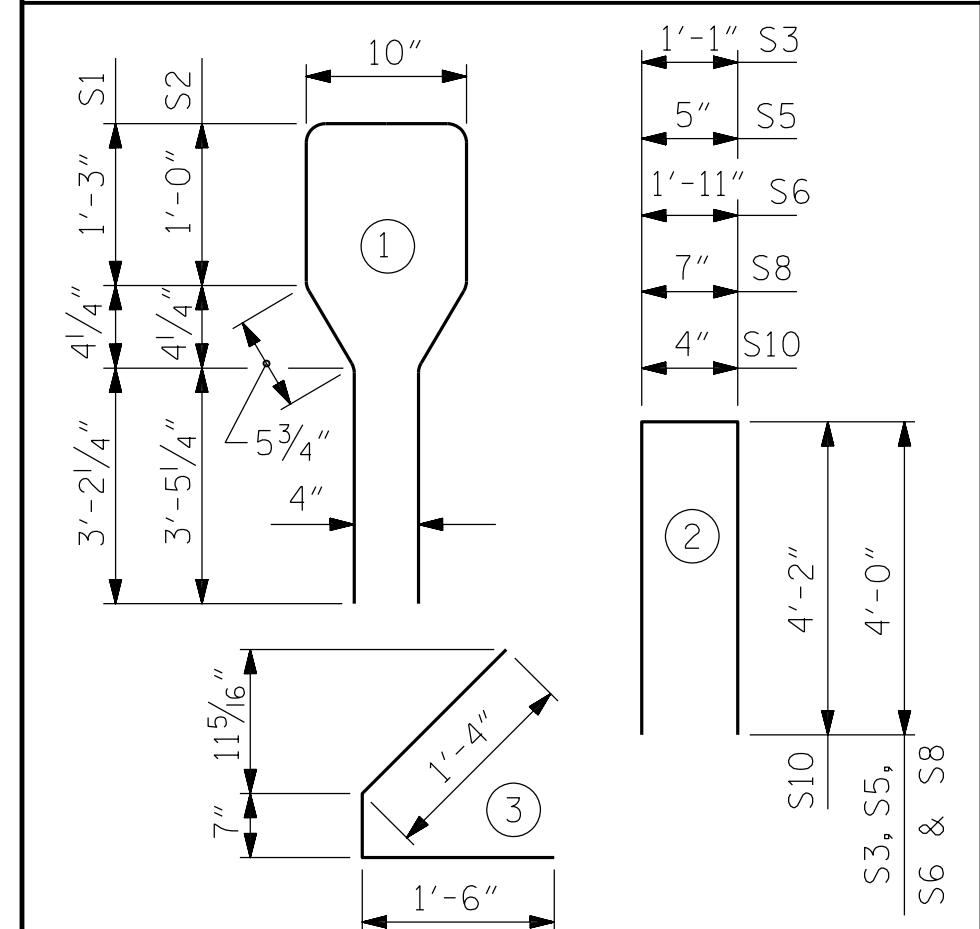
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	74	#4	1	10'-8"	527
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
* S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	7000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXT. & INT. GDERS	1041	229.3	36

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
12	94'-2"	1130'-0"

PROJECT NO. U-4910A  
 COUNTY CABARRUS  
 STATION: 147+80.00 -L-  
 SHEET 2 OF 5

**AECOM**  
 AECOM TECHNICAL SERVICES, INC.  
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 RALEIGH, NC 27607  
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 AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
 JOHN C. MORRISON  
 42PDE142R2F4AB

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 AASHTO TYPE IV  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 SPAN B

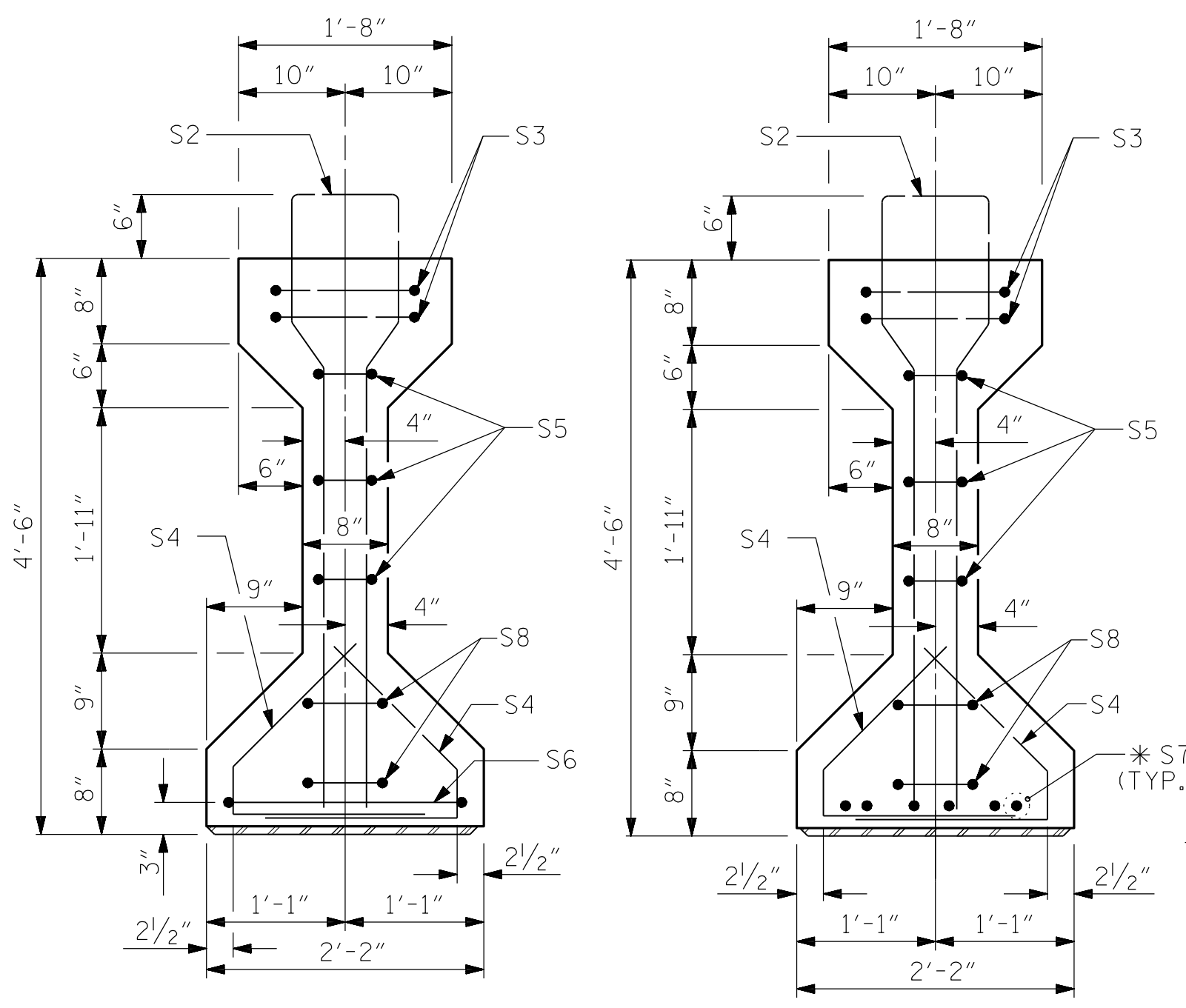
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. **S-18**  
 TOTAL SHEETS **55**

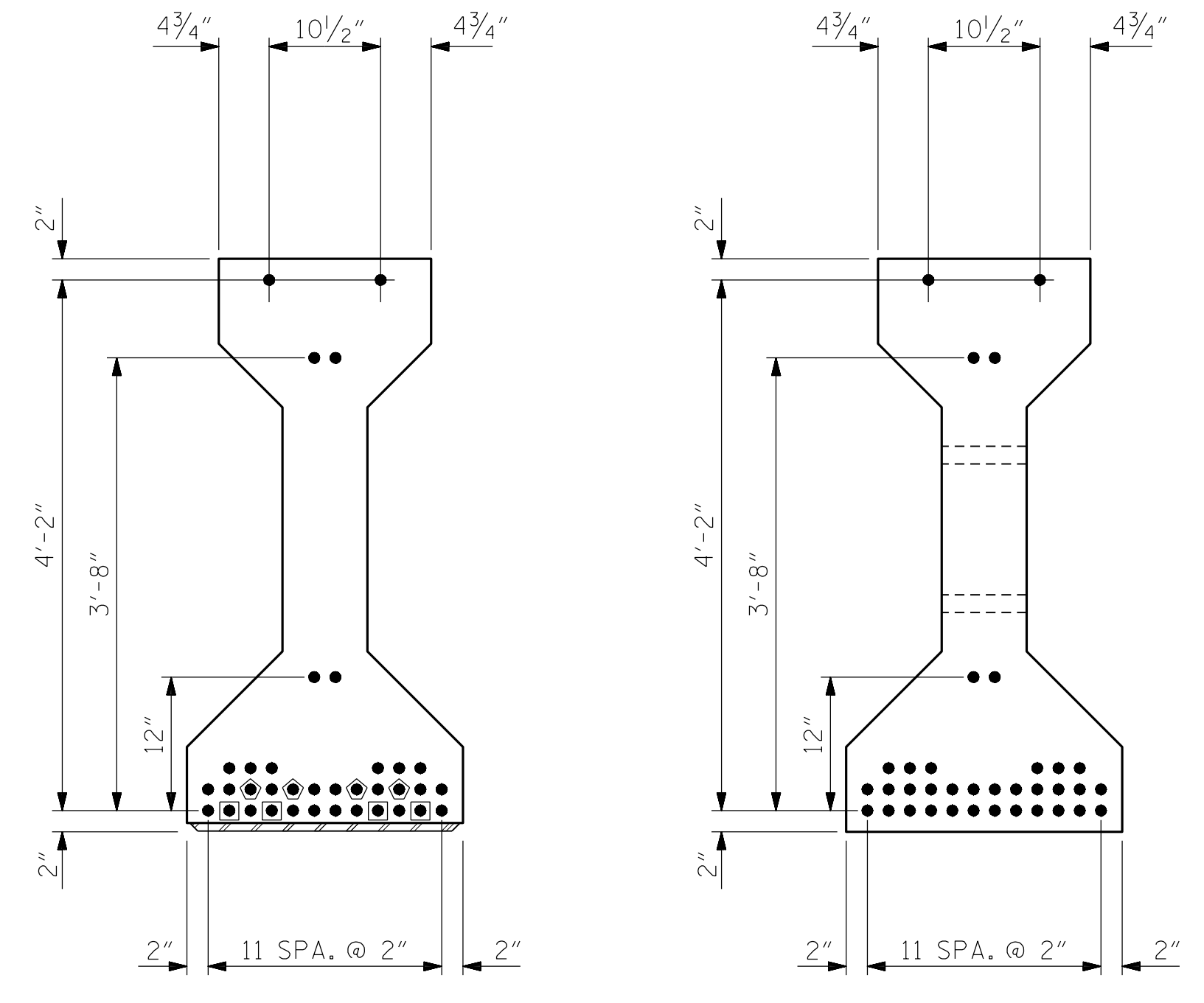
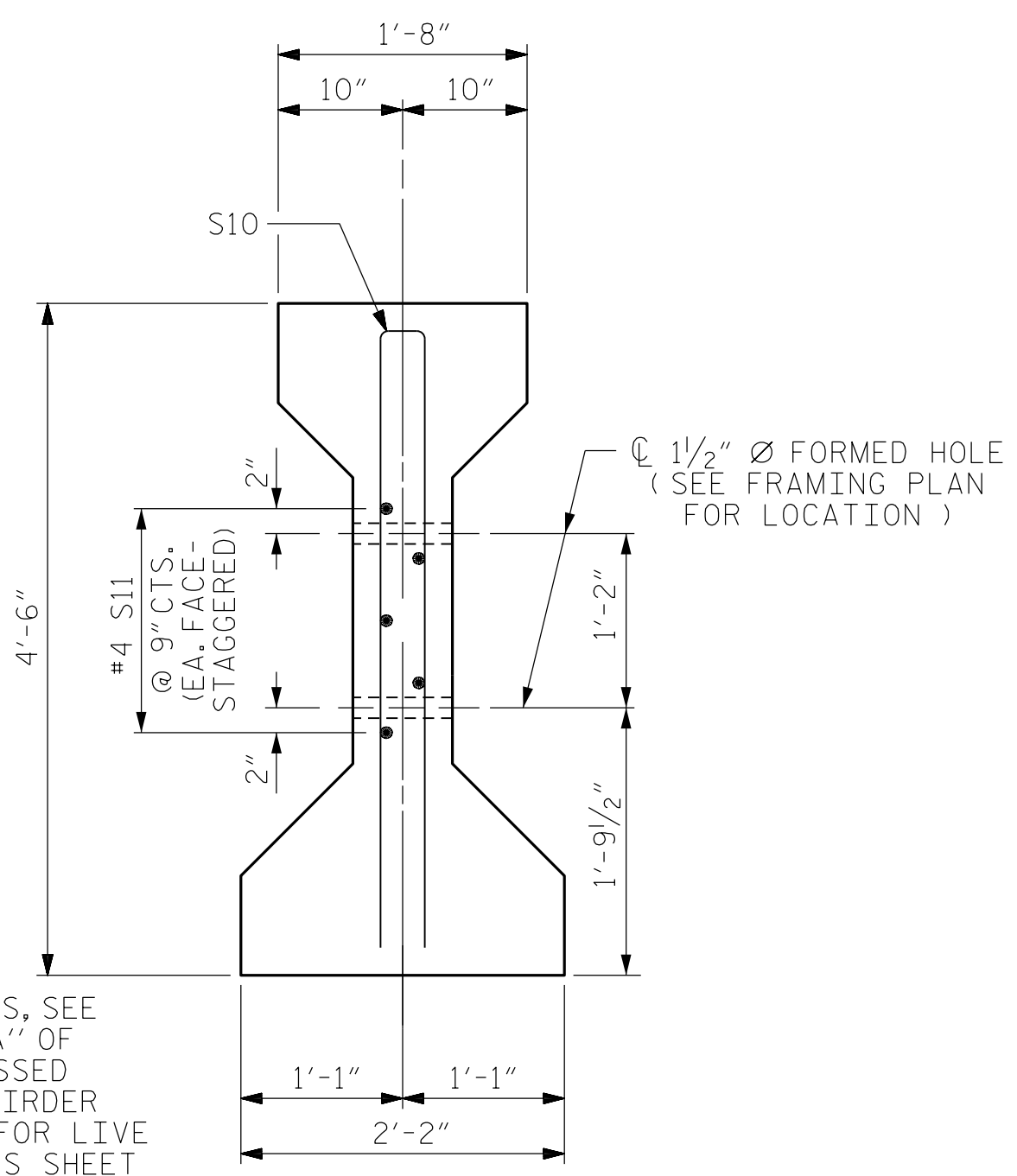
ASSEMBLED BY : N.K. BROWN	DATE : 3/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

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\* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



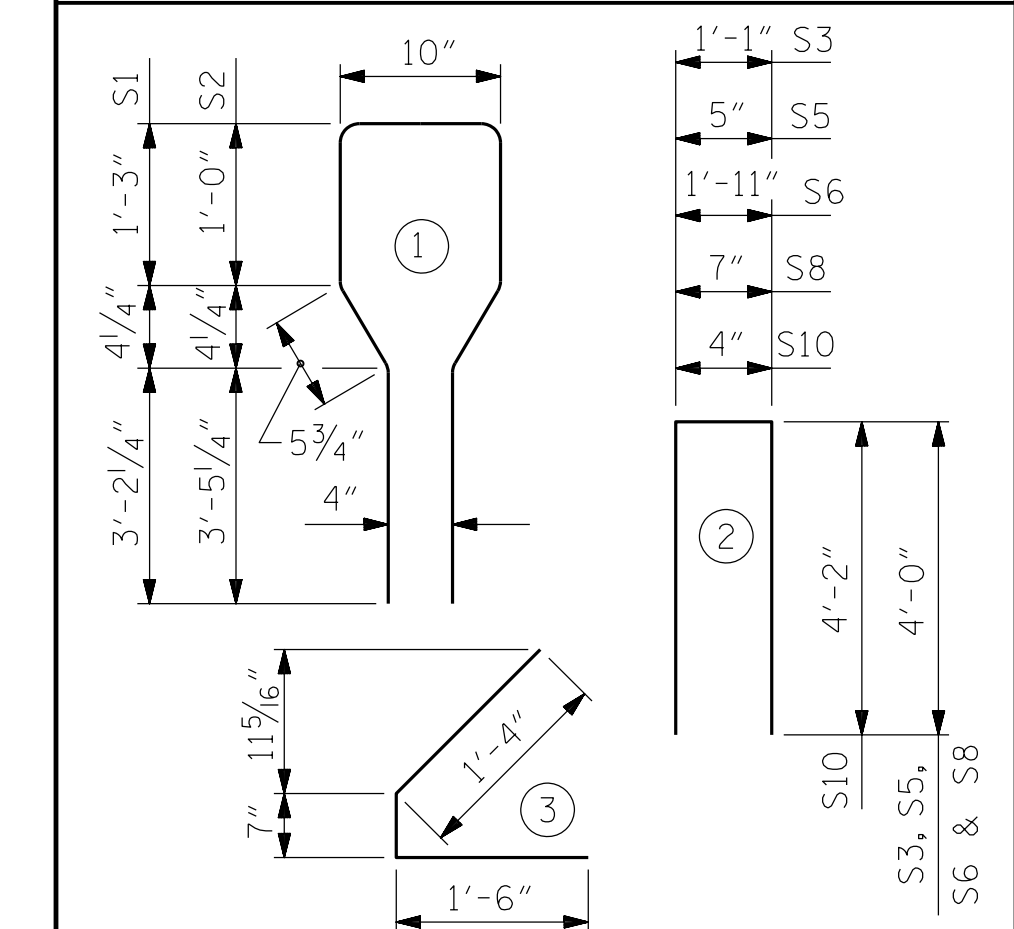
- (36 STRANDS)
- FULLY BONDED STRANDS
  - STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER
  - STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	72	#4	1	10'-8"	513
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
*S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

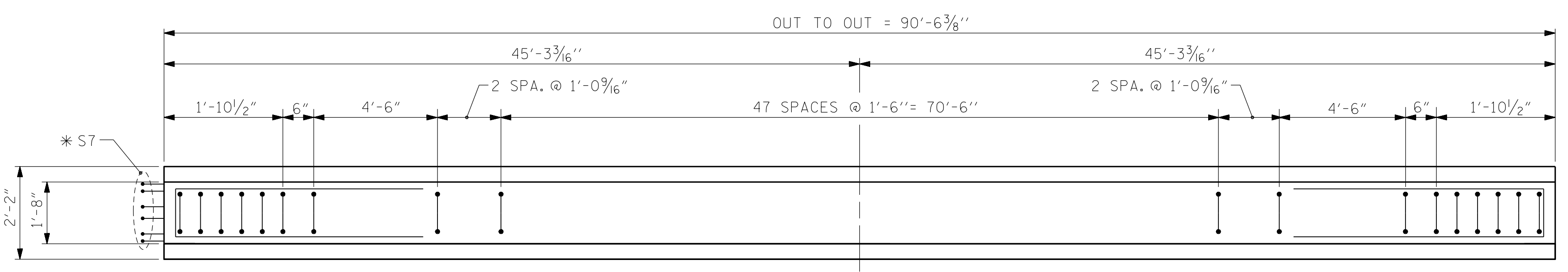
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

**BAR TYPES**  
ALL BAR DIMENSIONS ARE OUT-TO-OUT

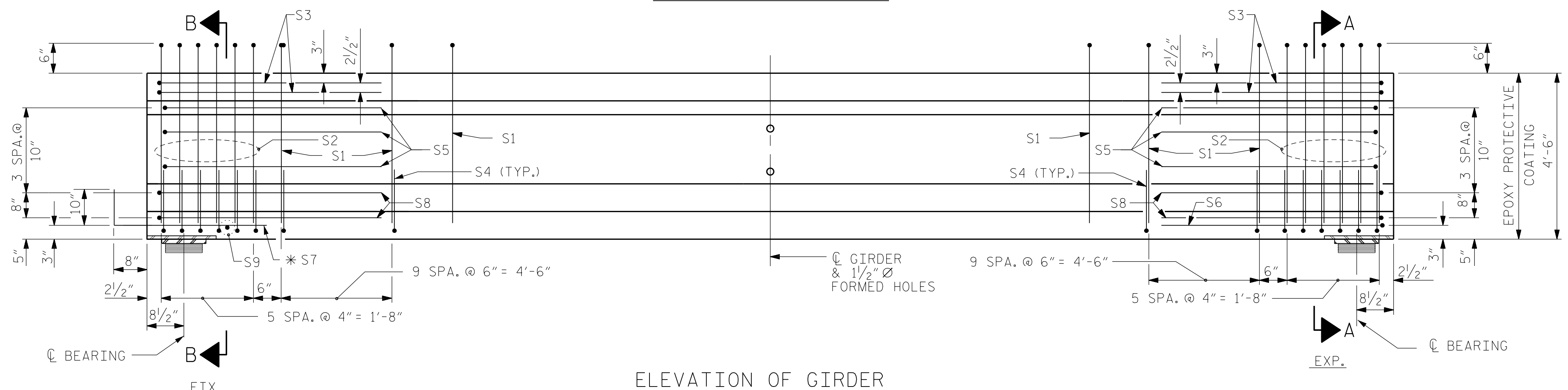


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	7000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
EXT. & INT. GDERS	1004	220.3	36

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
12	90'-6 3/8"	1086'-4 1/2"

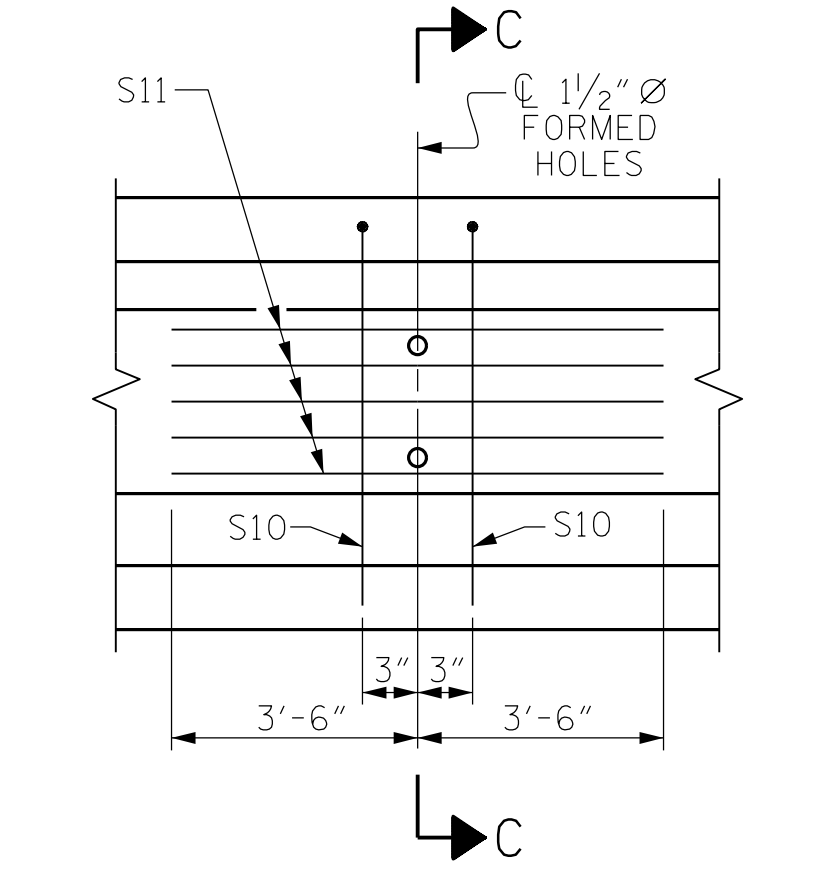


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-12

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 3 OF 5

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11/30/2016

NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 030474  
JOHN C. MORRISON  
42FDE142R2F4AB

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN C

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS	
2			4			55	

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ASSEMBLED BY : N.K. BROWN	DATE : 3/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

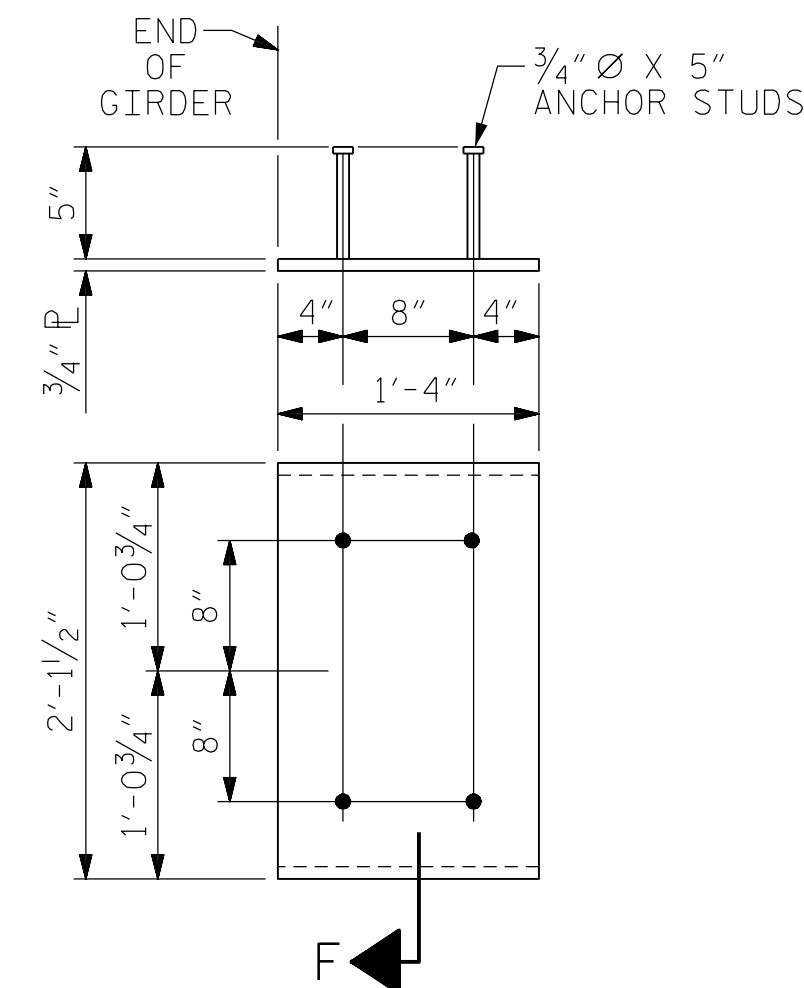
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5500 PSI FOR ALL SPANS.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

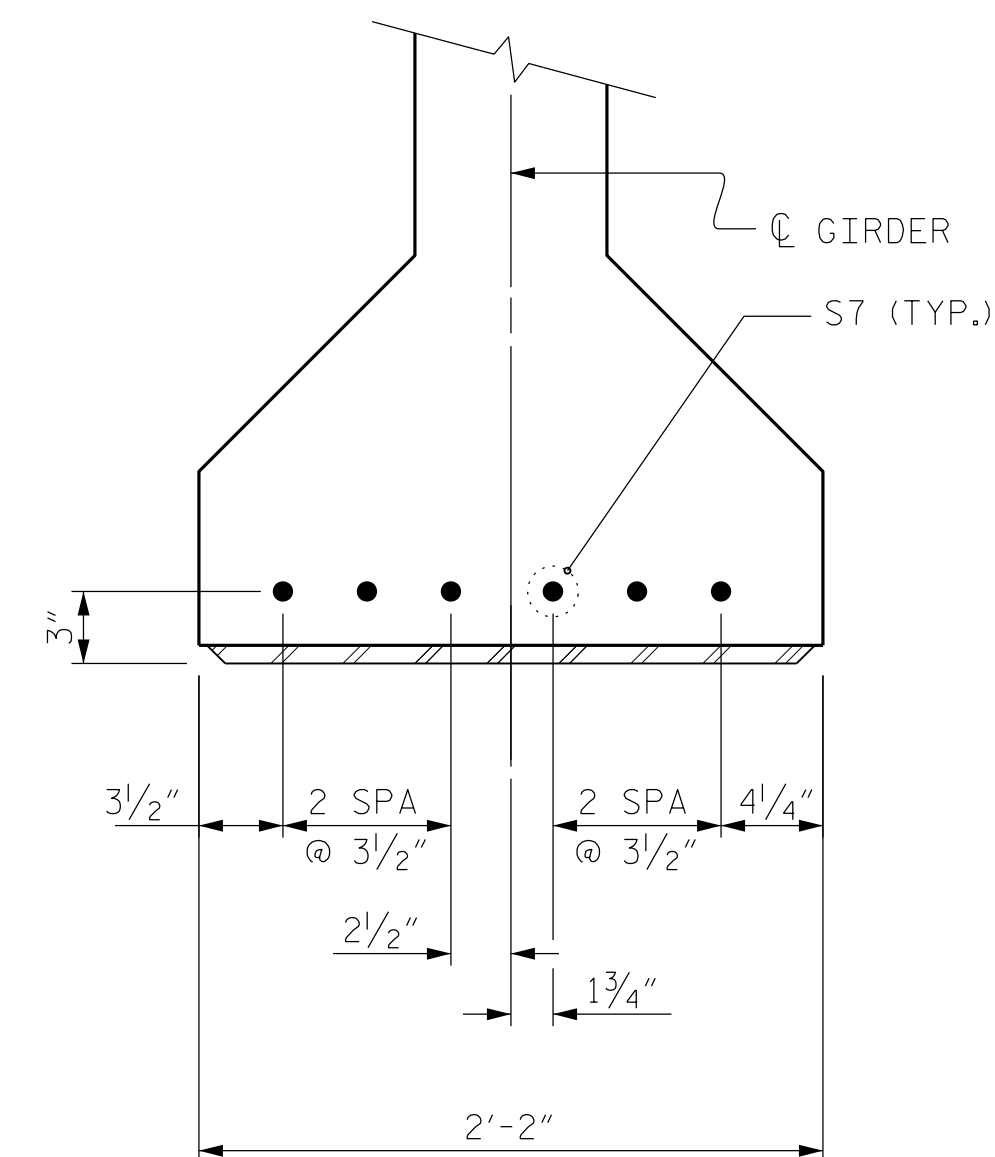
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

FOR EMBEDDED CLIPS FOR PRECAST CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.



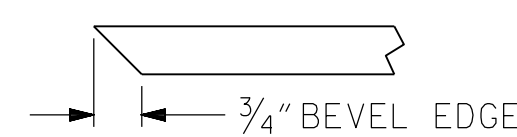
EMBEDDED PLATE "B-1" DETAILS  
FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

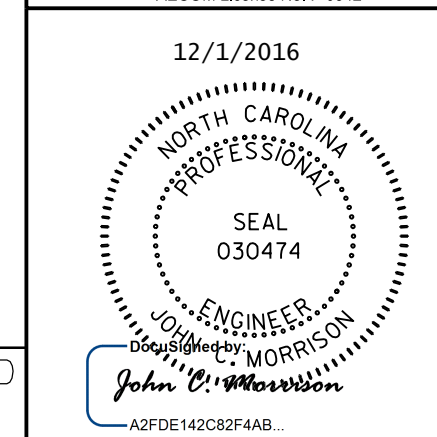


SECTION "F"

(SEE NOTES)

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

SHEET 4 OF 5



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			55	
2			4				

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SIGNATURES COMPLETED

ASSEMBLED BY : N.K. BROWN	DATE : 3/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

DATE: 12/1/2016  
TIME: 14:42:57 PM

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**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

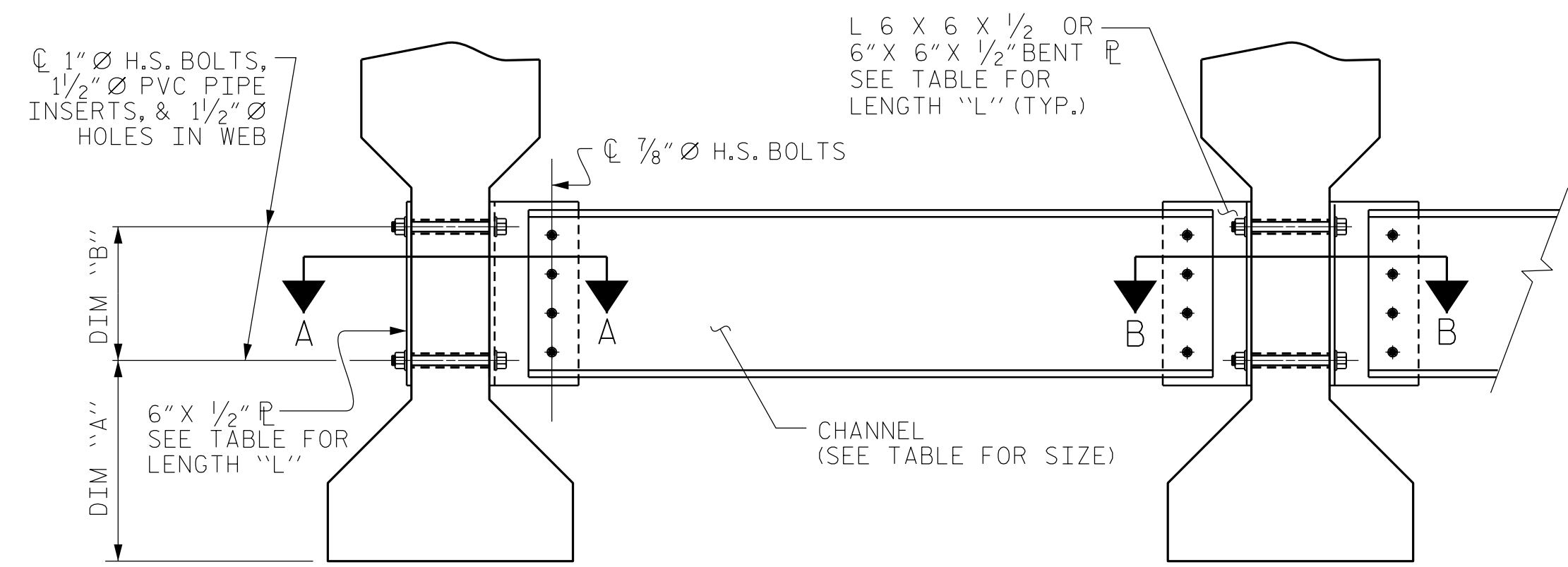
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

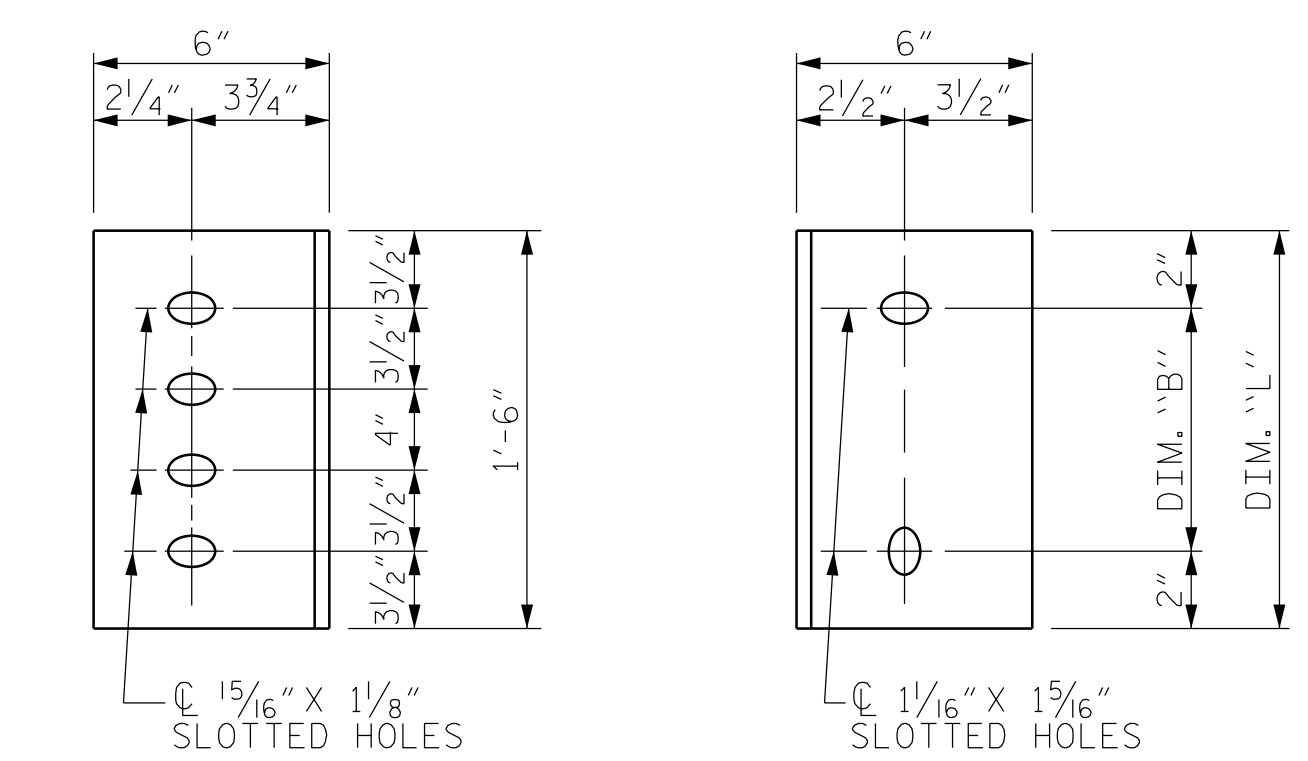
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

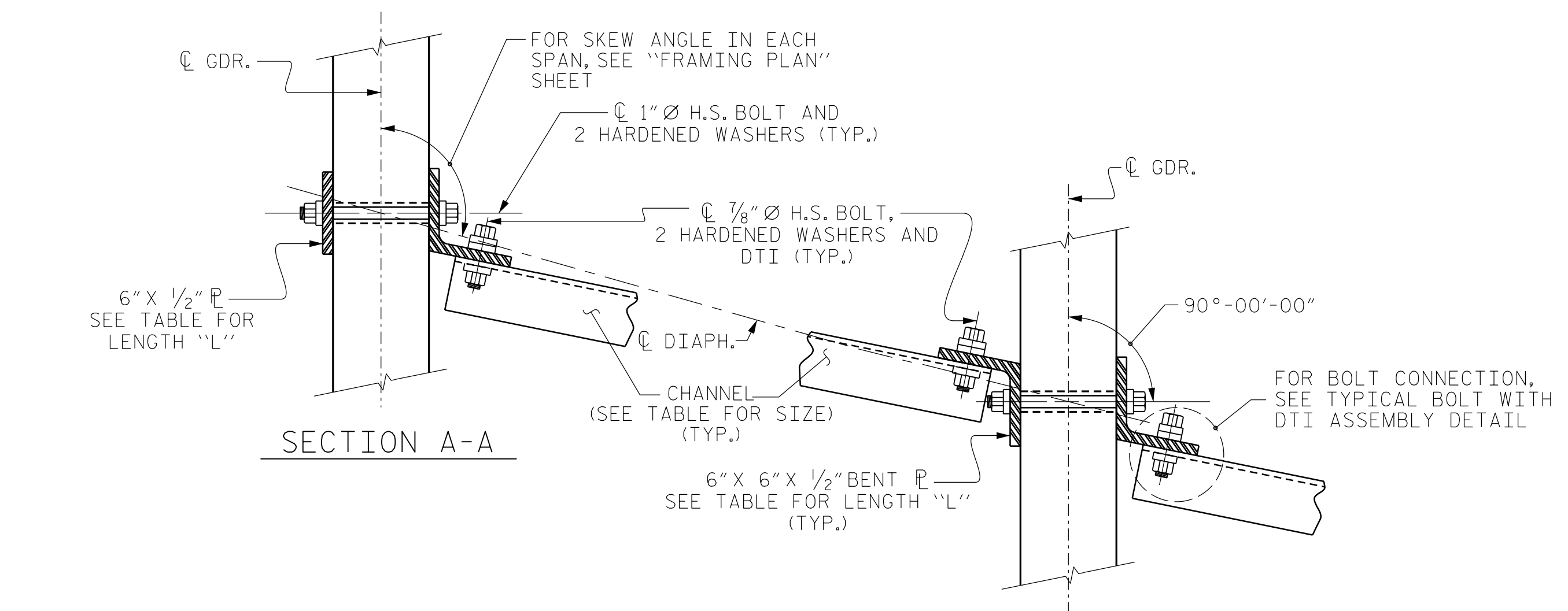
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



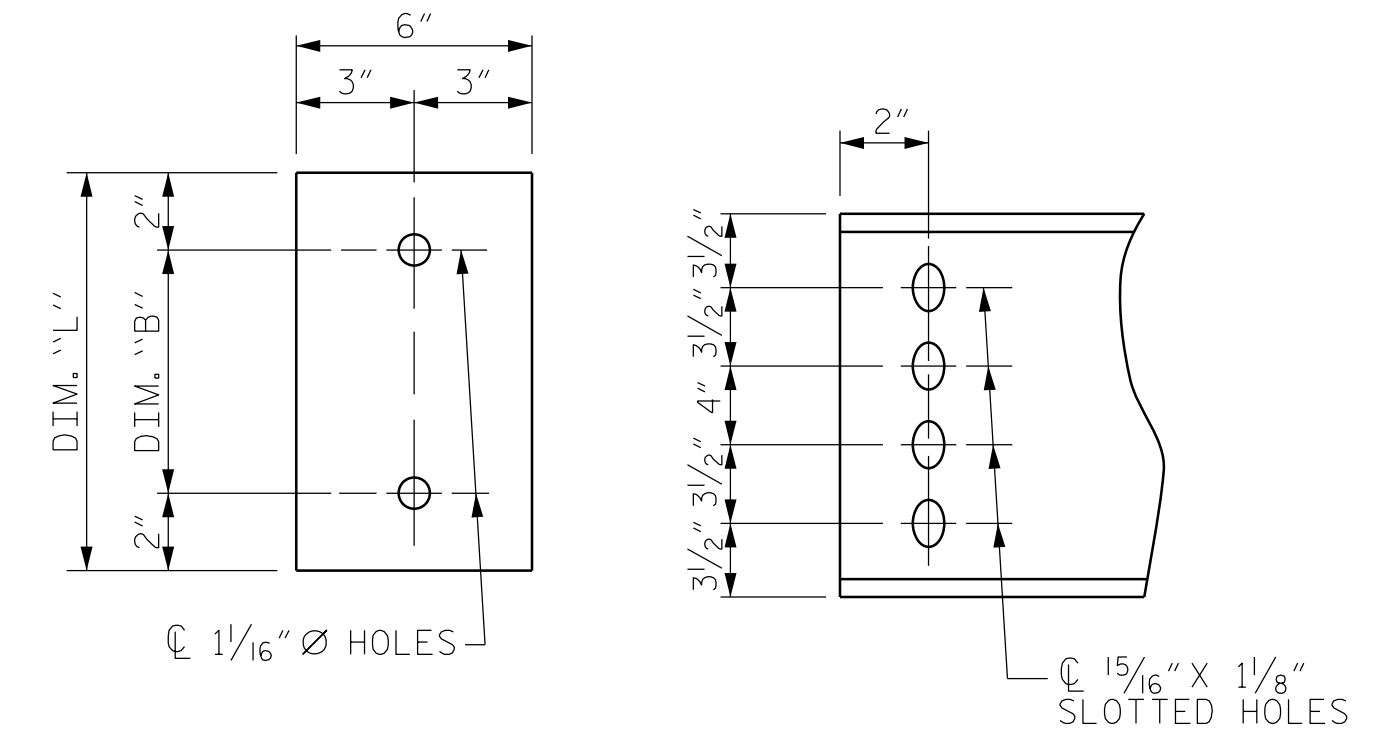
**EXTERIOR GIRDER**      **INTERIOR GIRDER**  
**PART SECTION AT INTERMEDIATE DIAPHRAGM**  
 (TYPE IV GIRDER SHOWN)



**DIAPHRAGM FACE**      **WEB FACE**  
 (TYPE IV GDR.)  
**CONNECTOR PLATE DETAILS**



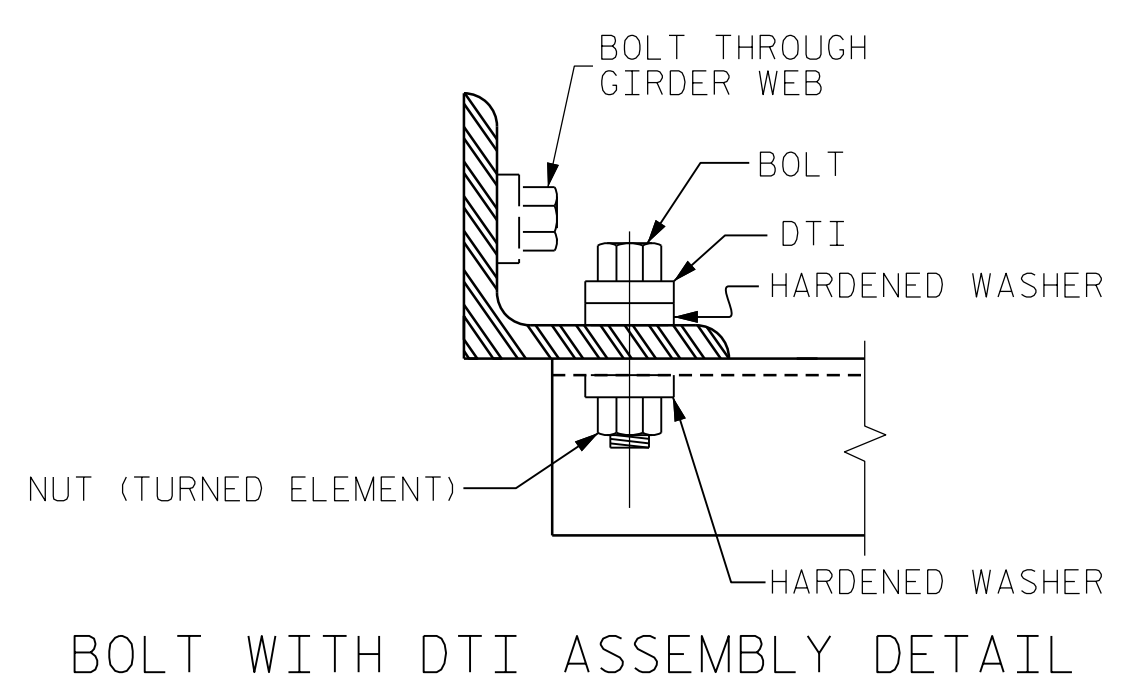
**SECTION A-A**      **SECTION B-B**  
**CONNECTION DETAILS**  
 (90° < SKEW < 110° SHOWN  
 70° < SKEW < 90° SIM.)



**PLATE DETAILS**      **CHANNEL END**  
 (TYPE IV GDR.)

**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"



**BOLT WITH DTI ASSEMBLY DETAIL**

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 5 OF 5

**AECOM**  
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11/30/2016

NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 030474

JOHN C. MORRISON  
 ENGINEER  
 JOHN C. MORRISON  
 A2FDE142R2F4AB

STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
 RALEIGH

STANDARD  
 INTERMEDIATE STEEL  
 DIAPHRAGMS FOR TYPE II,  
 III, & IV PRESTRESSED  
 CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			55

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ASSEMBLED BY : N.K. BROWN	DATE : 3/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : TLA 6/05	ADDED 10/21/05
CHECKED BY : VC 6/05	REV. 5/1/06RRR KMM/GM
	REV. 10/1/11 MAA/GM

DATE: 11/30/2016  
 TIME: 10:38:55 AM

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NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

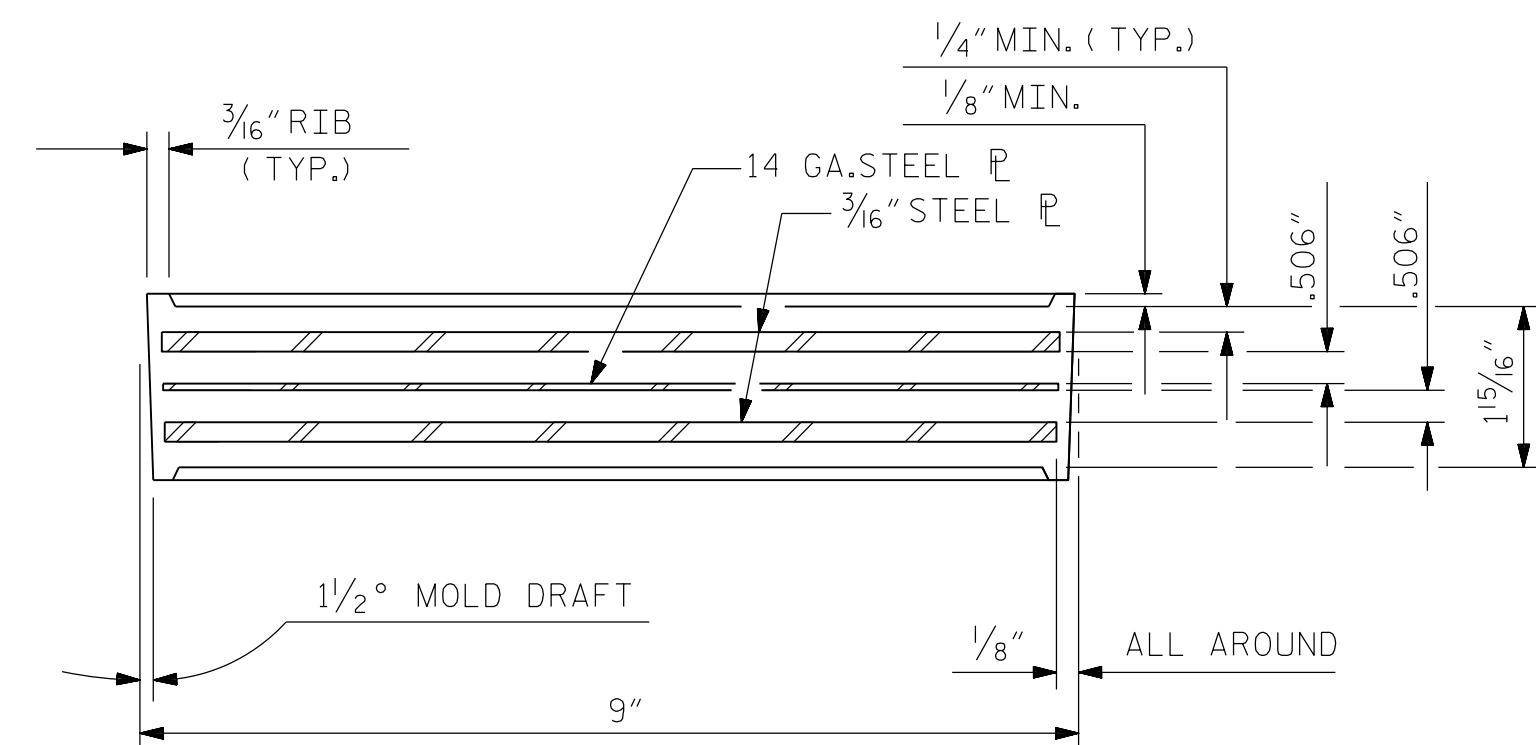
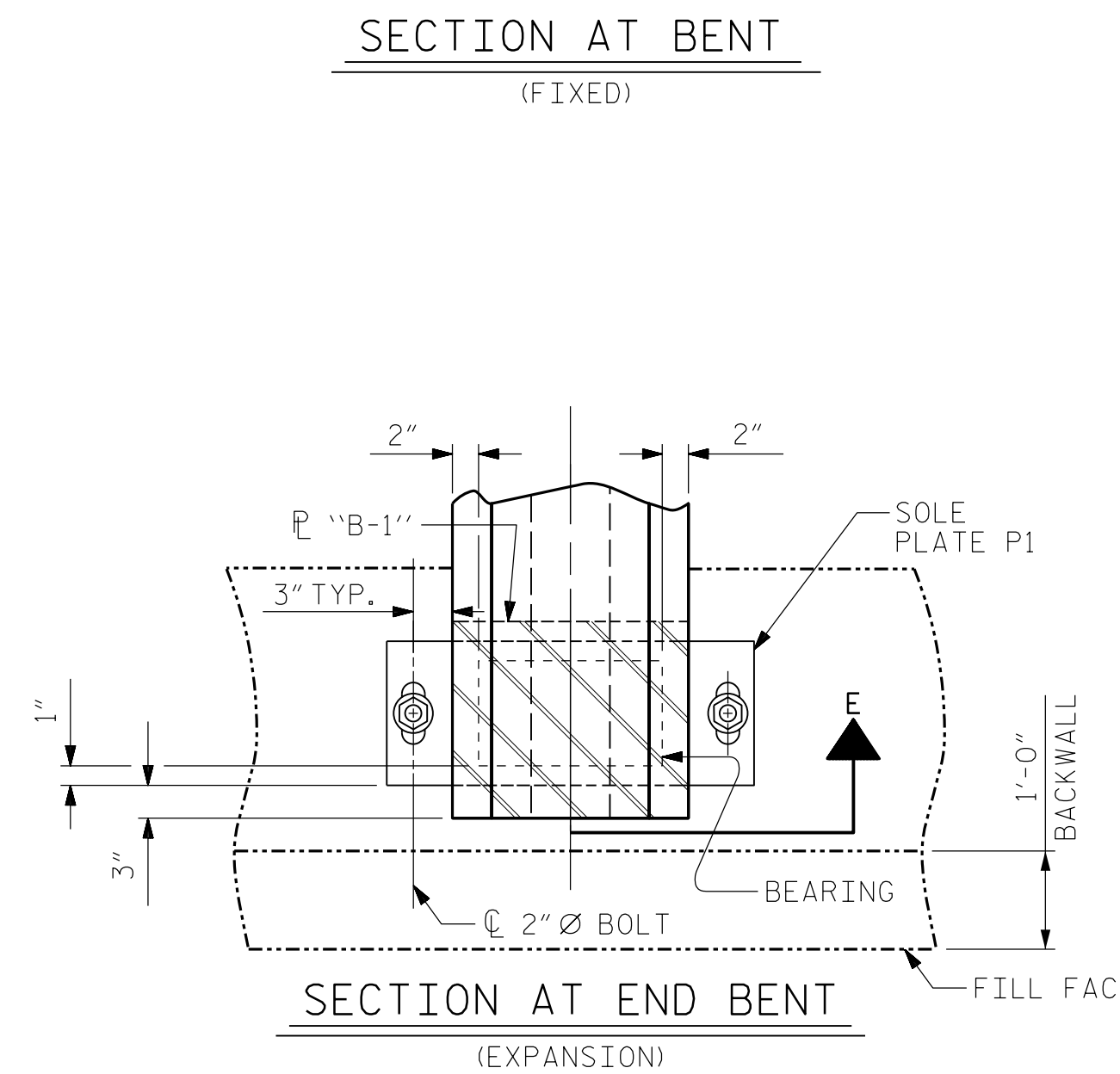
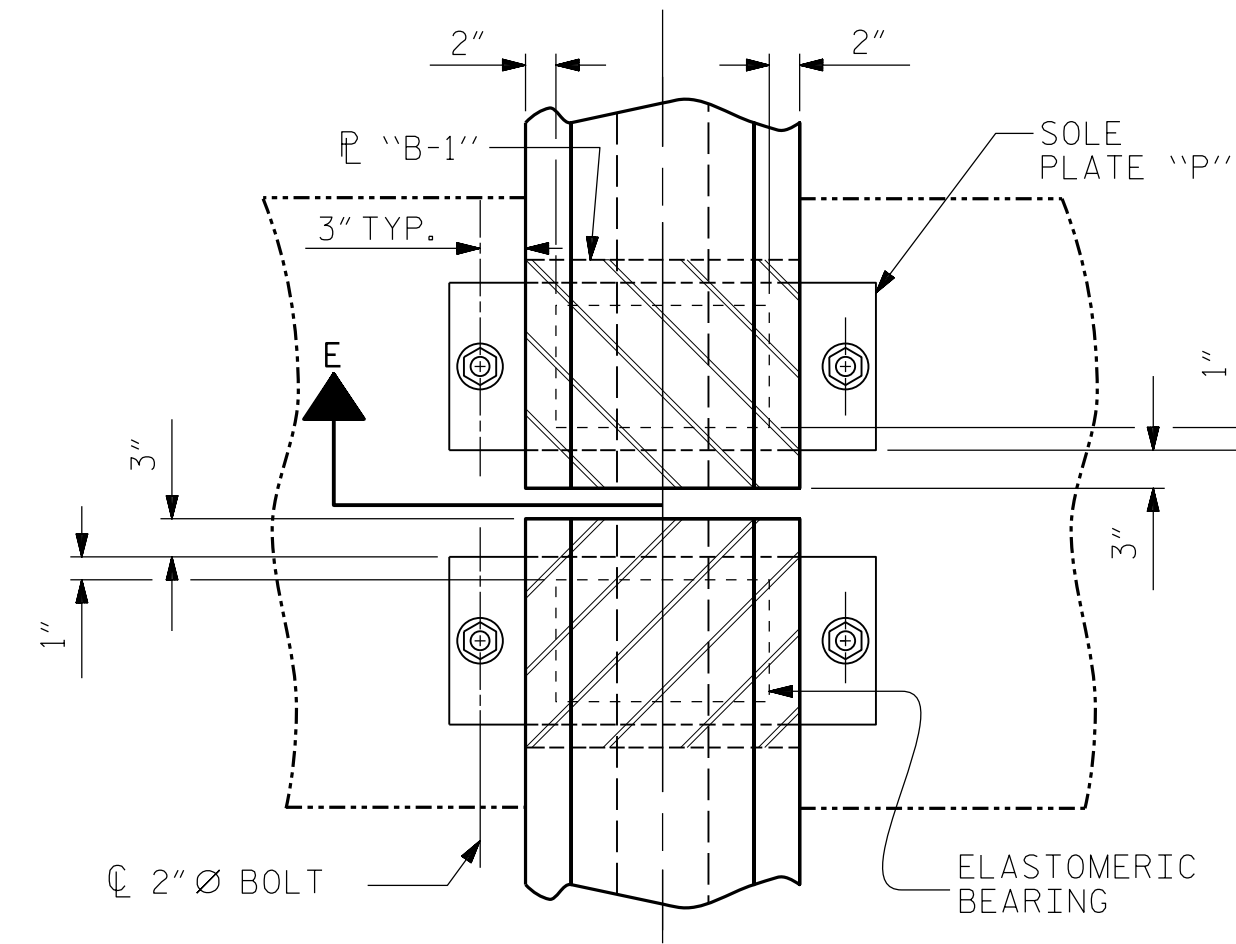
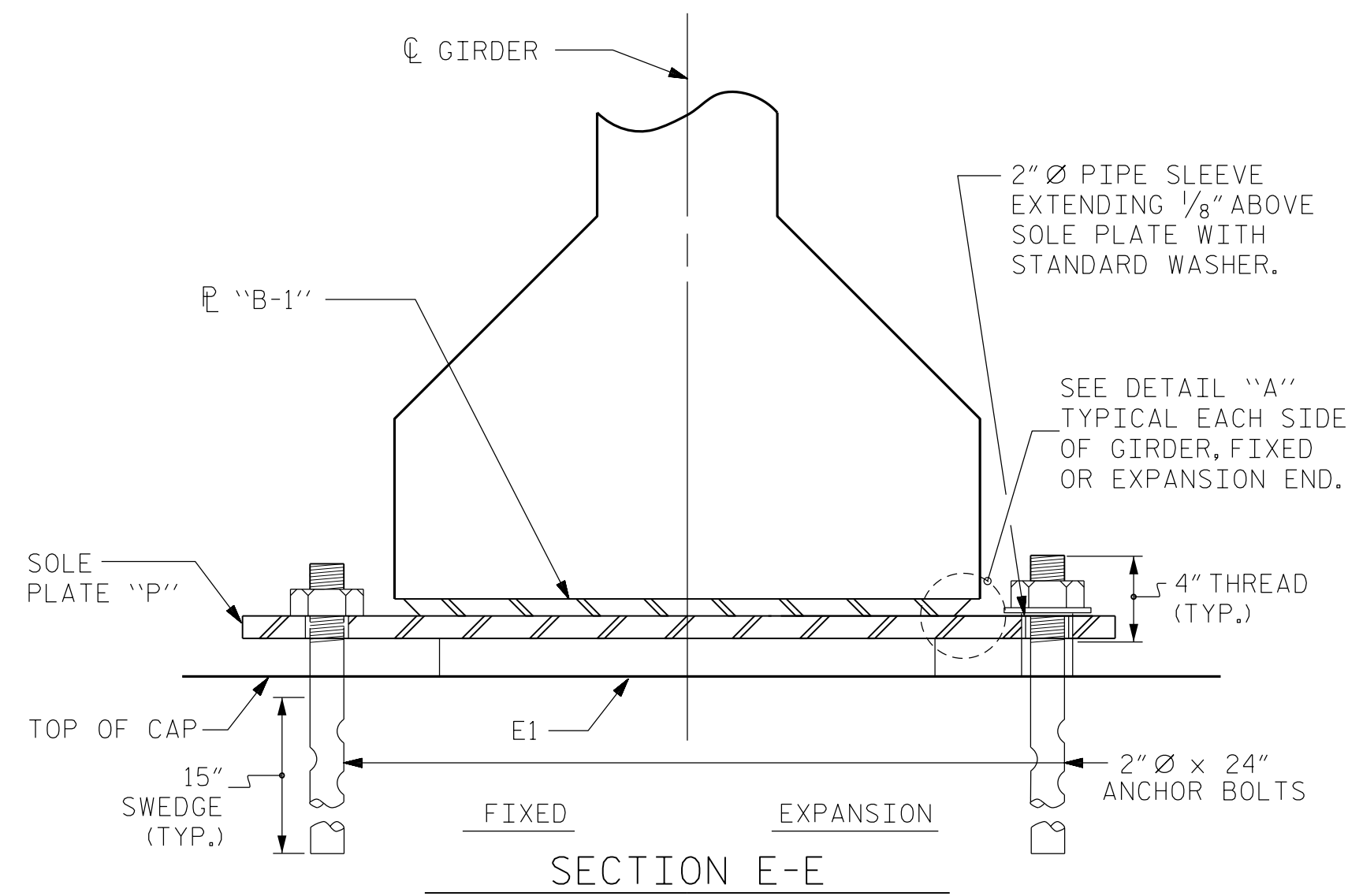
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

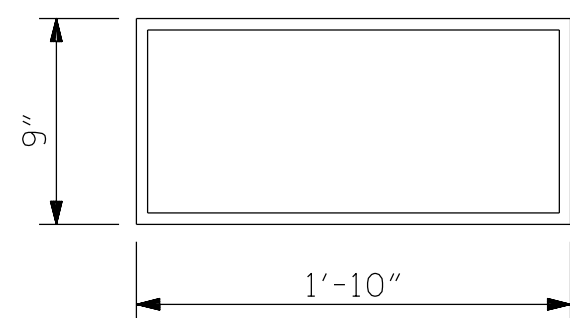
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

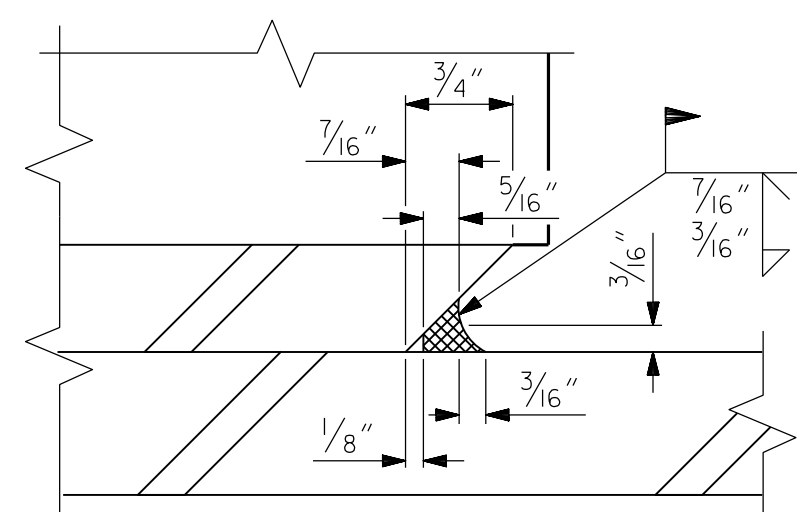


TYPICAL SECTION OF ELASTOMERIC BEARINGS

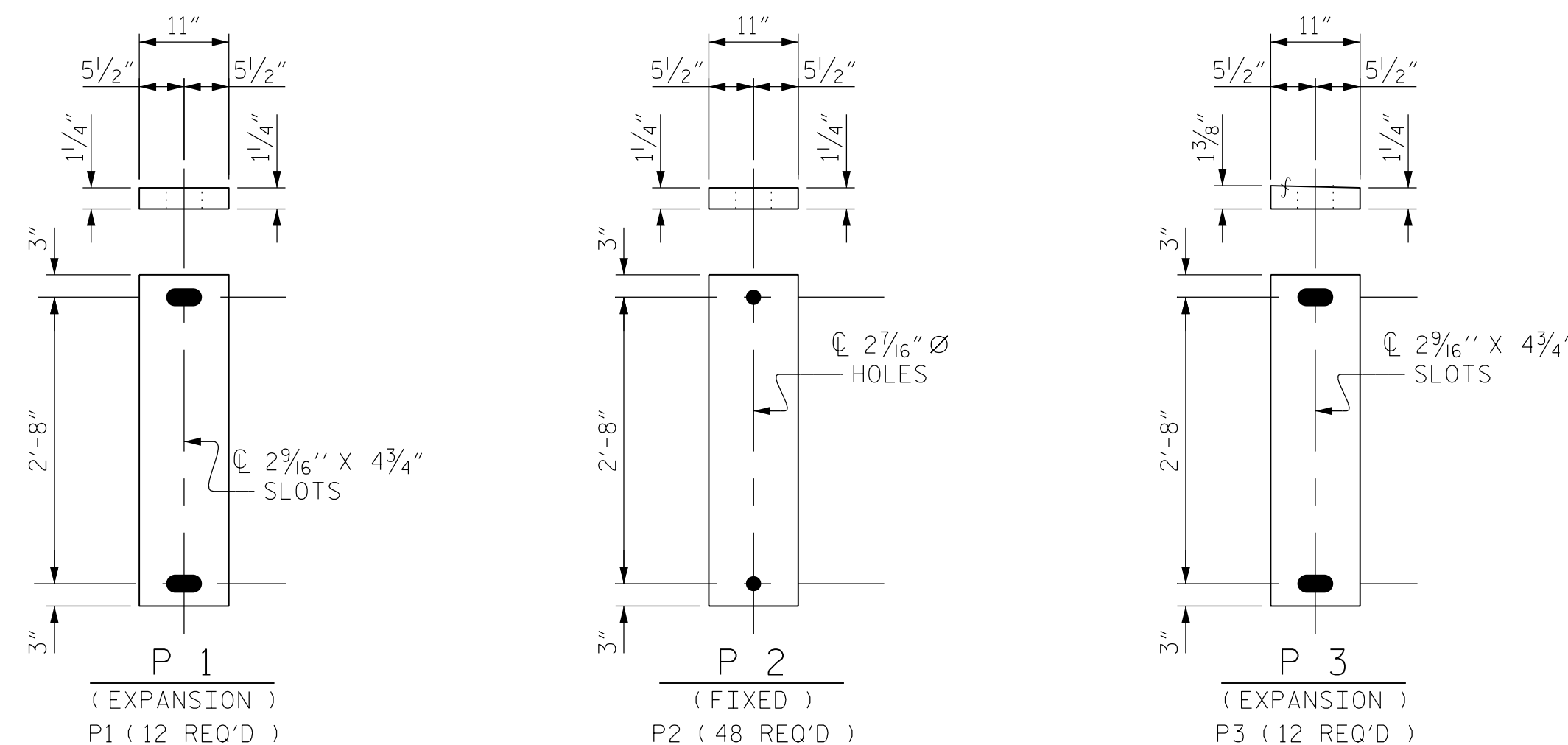


E1 (72 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



DETAIL "A"



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-

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11/30/2016

NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
 JOHN D. MORRISON  
 42FDE142R2F4AB

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 ELASTOMERIC BEARING  
 DETAILS  
 PRESTRESSED CONCRETE GIRDER  
 SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			55

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ASSEMBLED BY : K.H. COMPTON	DATE : 7/2016
CHECKED BY : G.L. HAMILTON	DATE : 7/2016
DRAWN BY : WJH 8/89	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 8/89	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG

DATE: 11/30/2016 TIME: 10:05:05 AM  
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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" DIA. LOW-RELAXATION	SPAN A																						
	GIRDER 1											GIRDERS 2, 3, 4, 7, 8, 9, 10, 11											
	TENTH POINTS	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.012	0.023	0.032	0.038	0.040	0.038	0.032	0.023	0.012	0.000	0.000	0.012	0.023	0.032	0.038	0.040	0.038	0.032	0.023	0.012	0.000	
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.008	0.011	0.014	0.014	0.014	0.012	0.008	0.004	0.000	0.000	0.005	0.010	0.014	0.016	0.017	0.016	0.014	0.010	0.010	0.005	0.000
FINAL CAMBER (OR DEFLECTION) ↑	0"	1/8"	3/16"	1/4"	5/16"	5/16"	5/16"	1/4"	3/16"	1/8"	0"	0"	1/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	1/16"	0"	

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" DIA. LOW-RELAXATION	SPAN A										
	GIRDERS 5 & 6										
	TENTH POINTS	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.012	0.023	0.032	0.038	0.040	0.038	0.032	0.023	0.012	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.008	0.011	0.013	0.014	0.013	0.011	0.008	0.004	0.000
FINAL CAMBER (OR DEFLECTION) ↑	0"	1/8"	3/16"	1/4"	5/16"	5/16"	5/16"	1/4"	3/16"	1/8"	0"

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" DIA. LOW-RELAXATION	SPAN B																						
	GIRDER 1											GIRDERS 2, 3, 4, 7, 8, 9, 10, 11											
	TENTH POINTS	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.059	0.111	0.152	0.179	0.188	0.179	0.152	0.111	0.059	0.000	0.000	0.059	0.111	0.152	0.179	0.188	0.179	0.152	0.111	0.059	0.000	
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.036	0.070	0.097	0.114	0.120	0.114	0.097	0.070	0.036	0.000	0.000	0.042	0.083	0.115	0.135	0.143	0.136	0.115	0.083	0.043	0.000	
FINAL CAMBER (OR DEFLECTION) ↑	0"	1/4"	1/2"	11/16"	3/4"	13/16"	3/4"	11/16"	1/2"	1/4"	0"	0"	3/16"	5/16"	7/16"	1/2"	9/16"	1/2"	7/16"	5/16"	3/16"	0"	

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" DIA. LOW-RELAXATION	SPAN C																						
	GIRDER 1											GIRDERS 2, 3, 4, 7, 8, 9, 10, 11											
	TENTH POINTS	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.057	0.108	0.148	0.174	0.183	0.174	0.148	0.108	0.057	0.000	0.000	0.057	0.108	0.148	0.174	0.183	0.174	0.148	0.108	0.057	0.000	
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.031	0.060	0.083	0.098	0.103	0.098	0.084	0.061	0.032	0.000	0.000	0.036	0.071	0.099	0.116	0.122	0.116	0.099	0.072	0.037	0.000	
FINAL CAMBER (OR DEFLECTION) ↑	0"	5/16"	9/16"	13/16"	15/16"	15/16"	15/16"	3/4"	9/16"	5/16"	0"	0"	1/4"	7/16"	5/8"	11/16"	3/4"	11/16"	5/8"	7/16"	1/4"	0"	

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

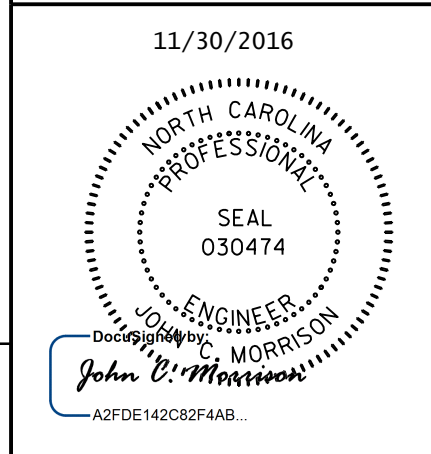
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" DIA. LOW-RELAXATION	SPAN C																						
	GIRDERS 5 & 6											GIRDER 12											
	TENTH POINTS	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.	BRG.	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.057	0.108	0.148	0.174	0.183	0.174	0.148	0.108	0.057	0.000	0.000	0.057	0.108	0.148	0.174	0.183	0.174	0.148	0.108	0.057	0.000	
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.030	0.059	0.082	0.096	0.101	0.097	0.082	0.060	0.031	0.000	0.000	0.029	0.057	0.079	0.092	0.097	0.093	0.079	0.057	0.030	0.000	
FINAL CAMBER (OR DEFLECTION) ↑	0"	5/16"	5/8"	13/16"	15/16"	1"	15/16"	13/16"	9/16"	5/16"	0"	0"	5/16"	5/8"	13/16"	1"	1"	1"	13/16"	5/8"	5/16"	0"	

DRAWN BY : K.H. COMPTON DATE : 4/2016  
 CHECKED BY : G.L. HAMILTON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 4/2016

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 DEAD LOAD DEFLECTIONS  
 SPANS A, B & C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23 TOTAL SHEETS 55
1			3			
2			4			

DATE: 11/30/2016  
TIME: 10:55:27 AM

USER: H:\aecom\99...  
DGN: 01603001\1400\_Structural\Comp\401\_045\_U4910A\_SMU\_S23\_D101.dgn

### NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

#### ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

#### GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS : AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

#### GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

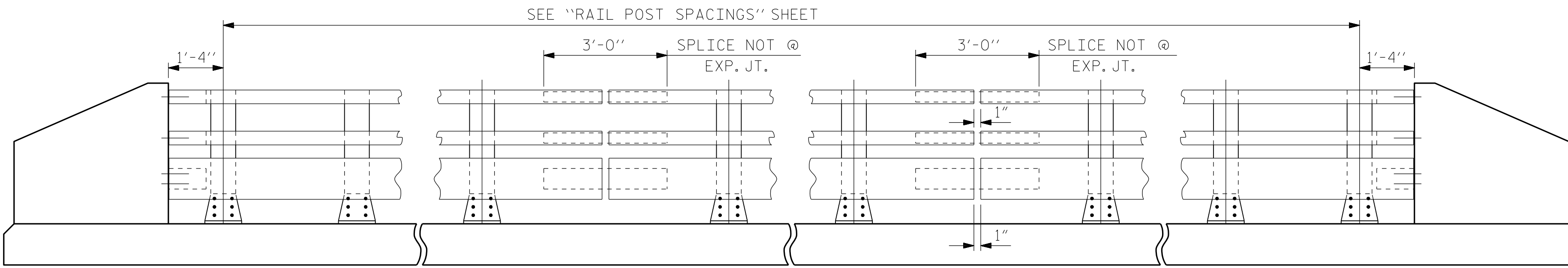
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

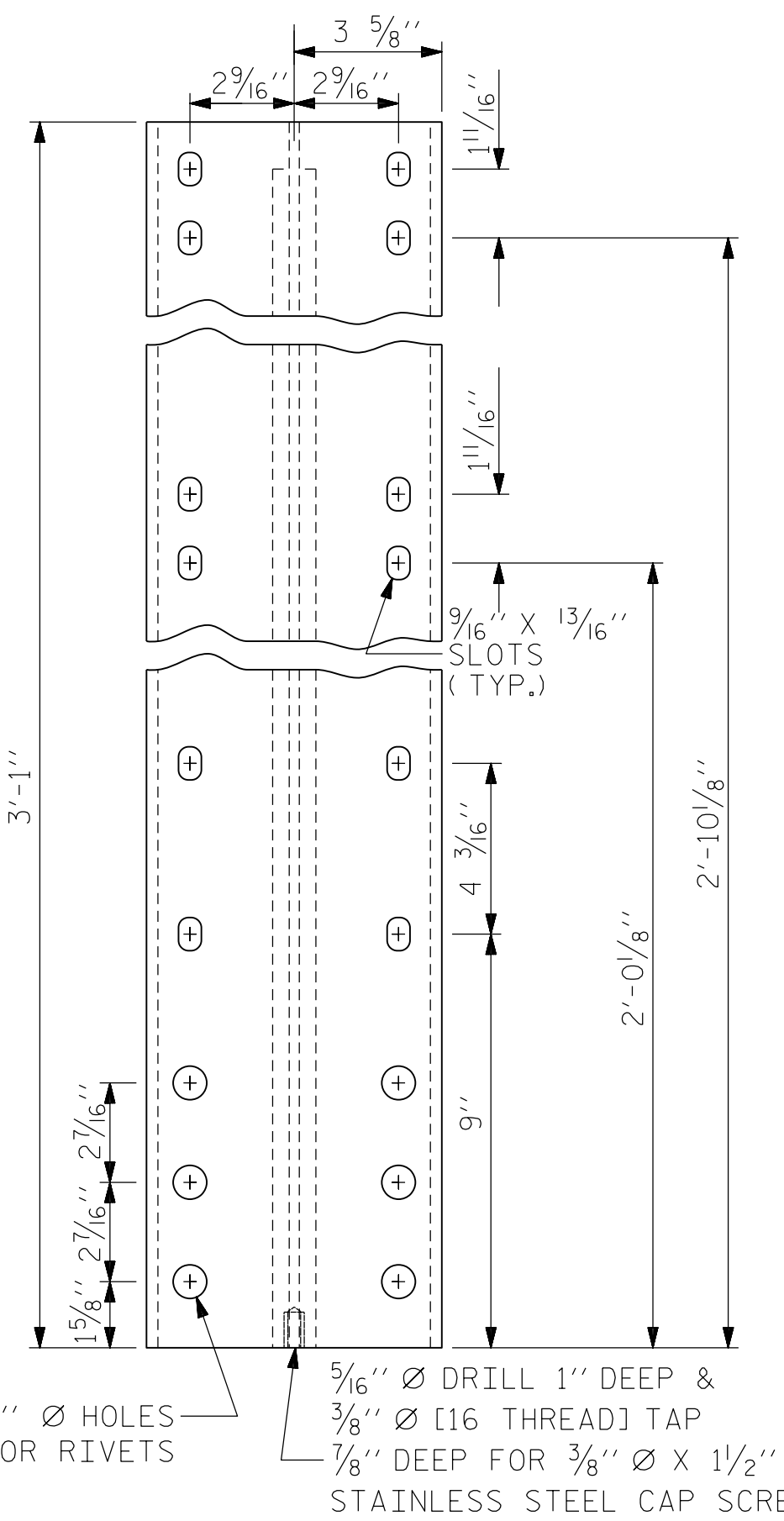
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 485.5 LIN.FT.

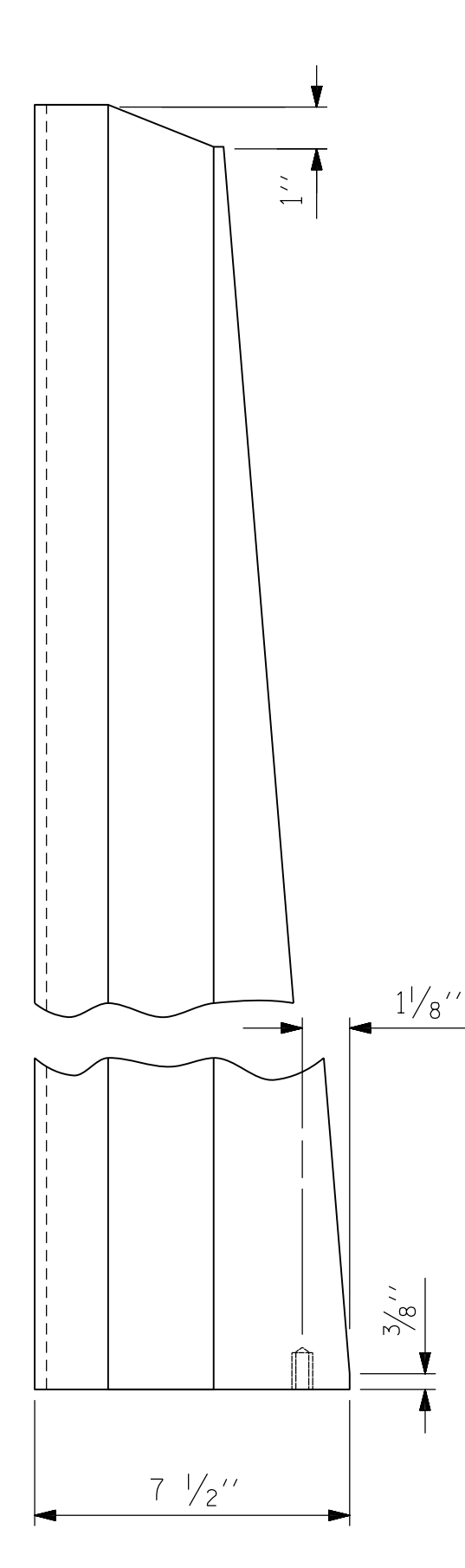


ELEVATION

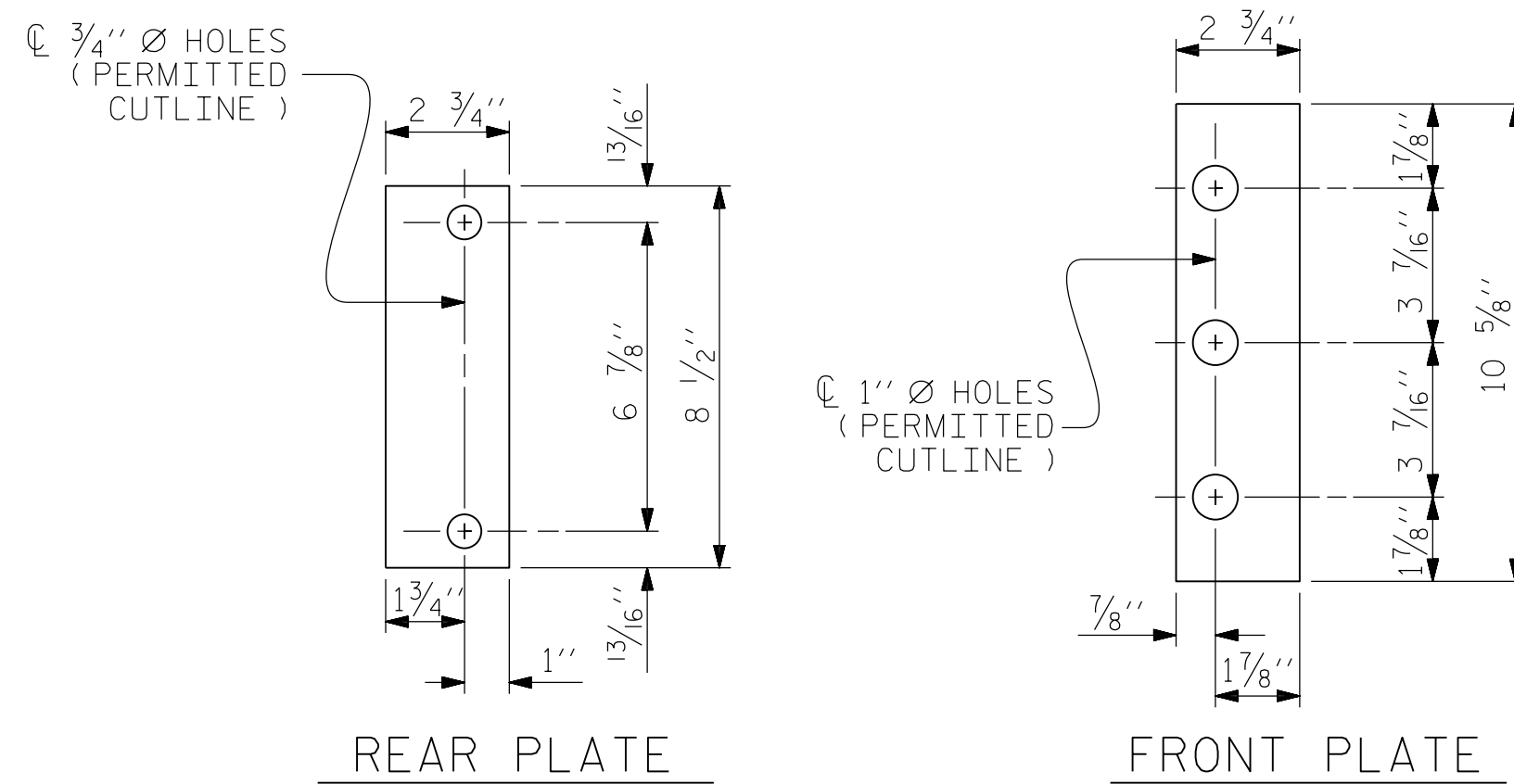
NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 3 OF 3.



FRONT ELEVATION

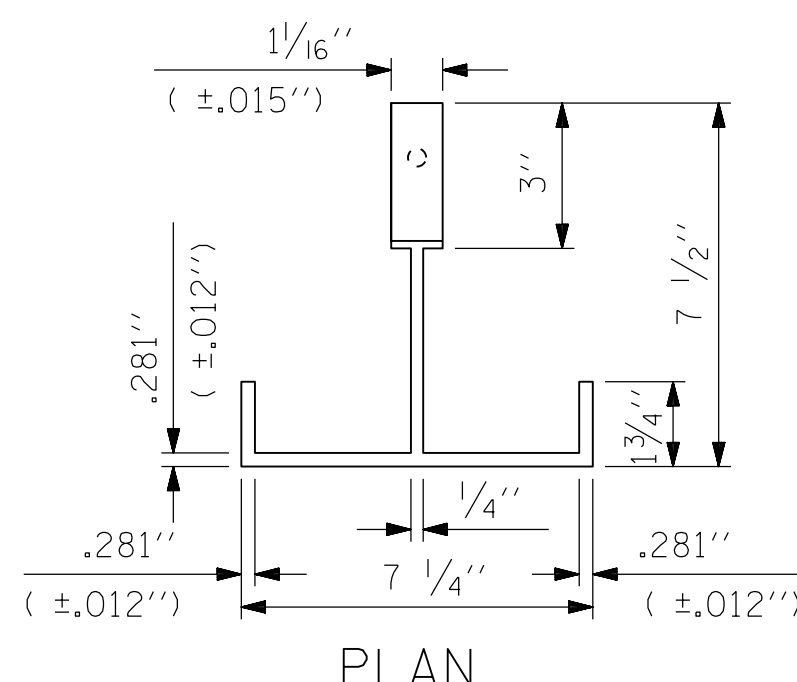


SIDE ELEVATION

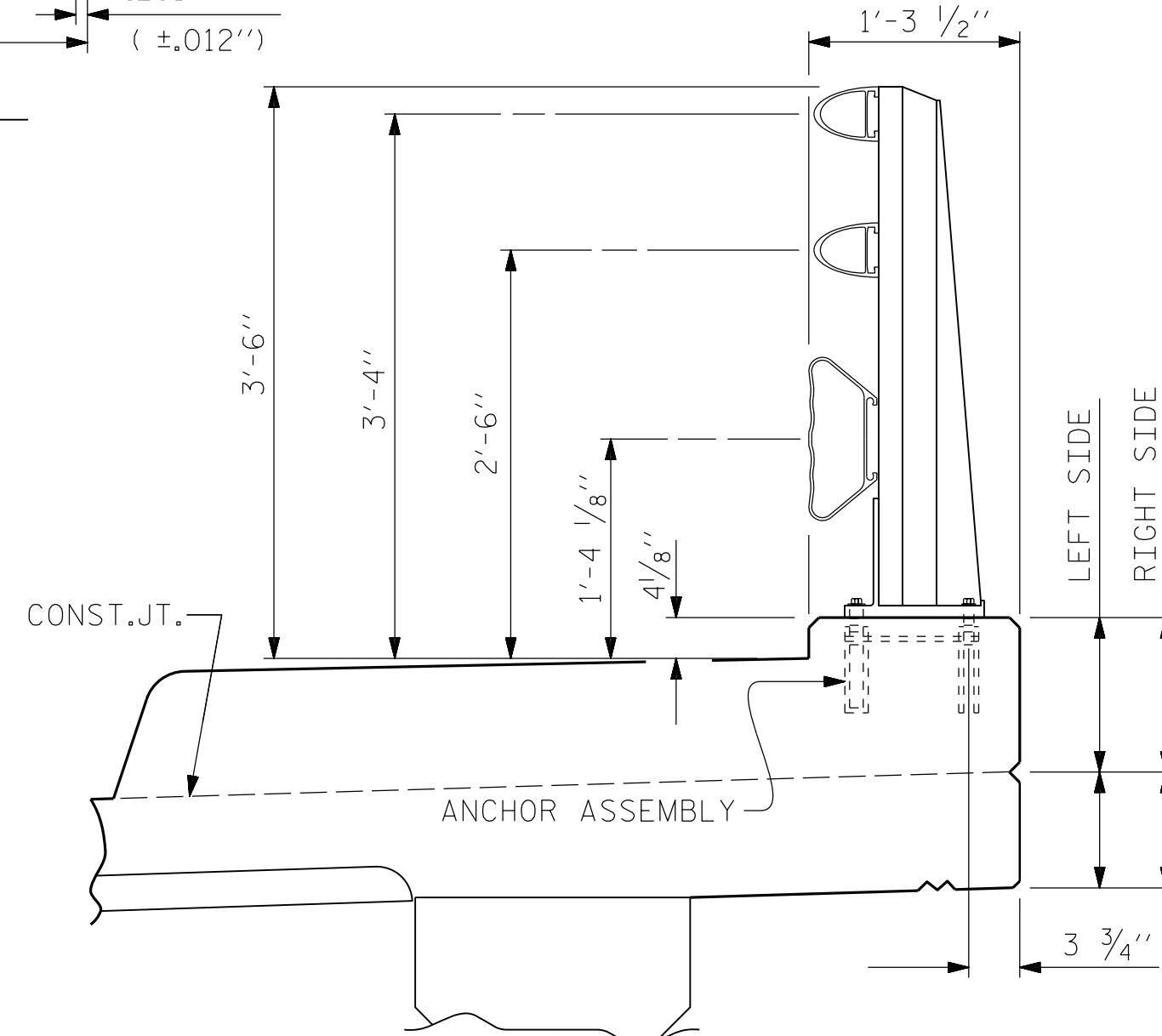


SHIM DETAILS

NOTE:  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

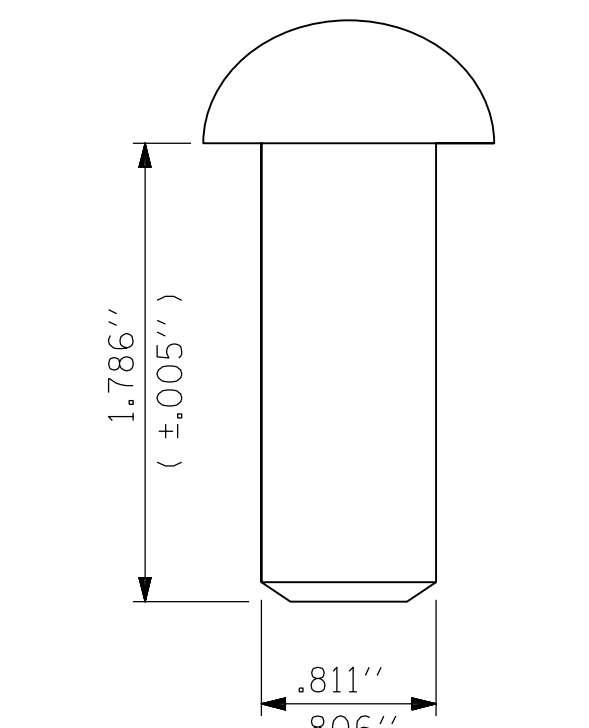


PLAN

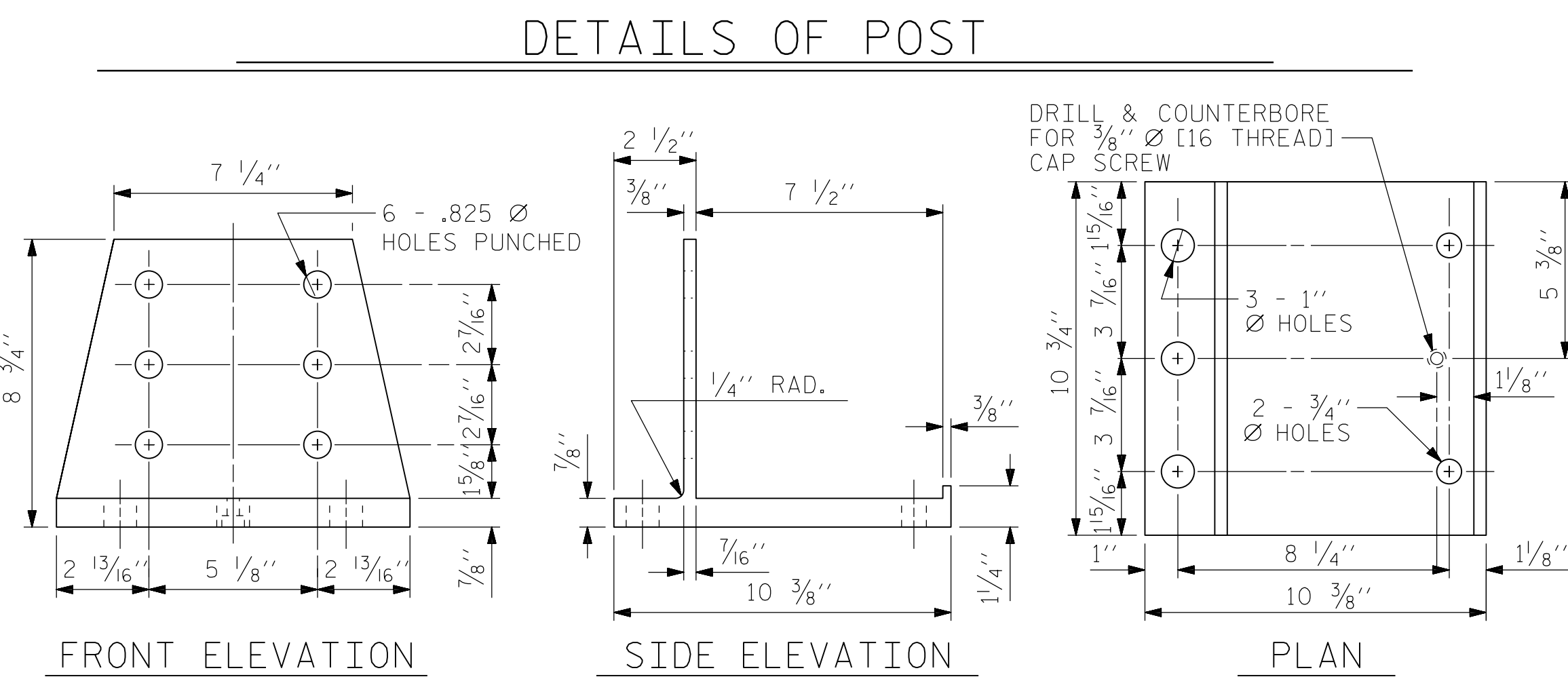


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



RIVET DETAIL



DETAILS OF POST

FRONT ELEVATION

SIDE ELEVATION

PLAN

DRILL & COUNTERBORE FOR 3/8" Ø [16 THREAD] CAP SCREW

ASSEMBLED BY : N.K. BROWN	DATE : 4/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**AECOM**  
AECOM TECHNICAL SERVICES, INC.  
701 CORPORATE CENTER DRIVE, SUITE 475  
RALEIGH, NC 27607  
(919) 854-4200 www.aecom.com  
AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
SEAL 030474  
JOHN C. MORRISON  
REGISTERED PROFESSIONAL ENGINEER  
A2FD142C82F44B

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3 BAR METAL RAIL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 55





NOTES

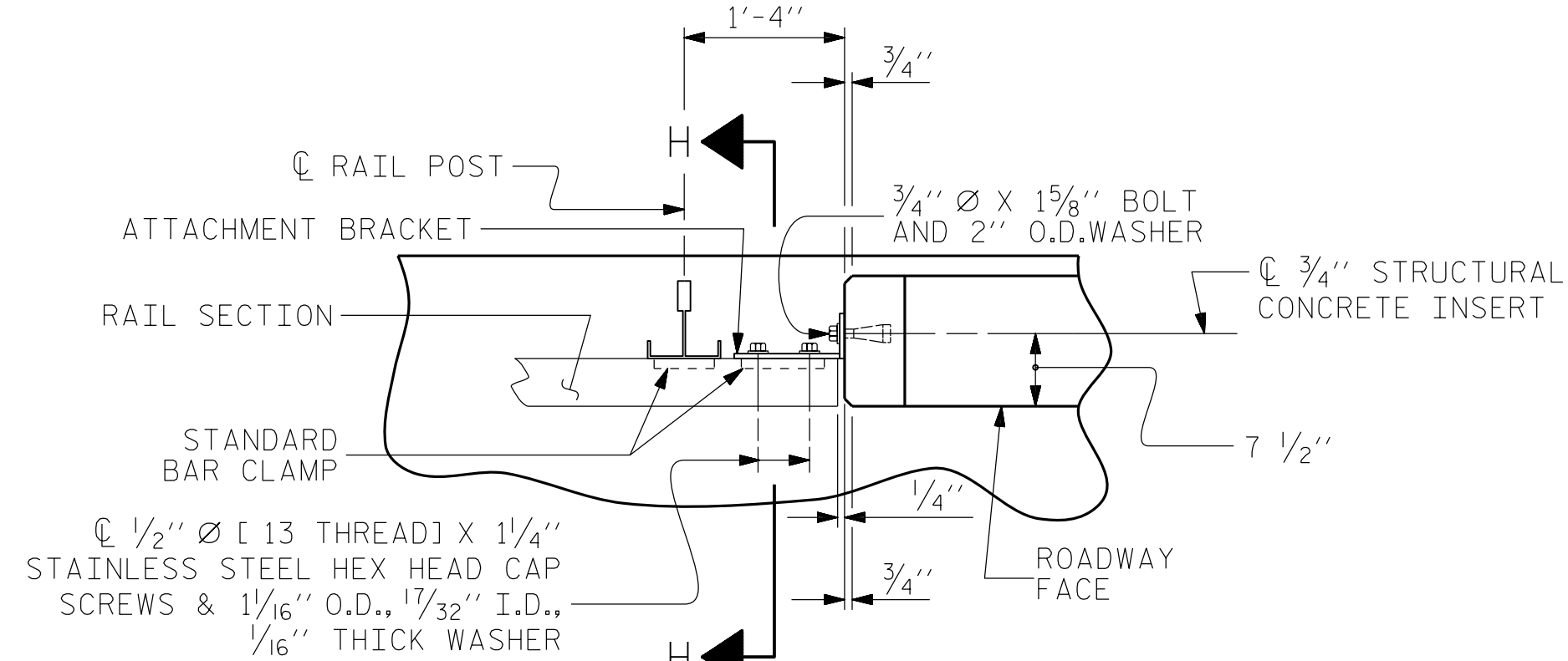
METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR6 ).
- THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.
- THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.
- THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.
- THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

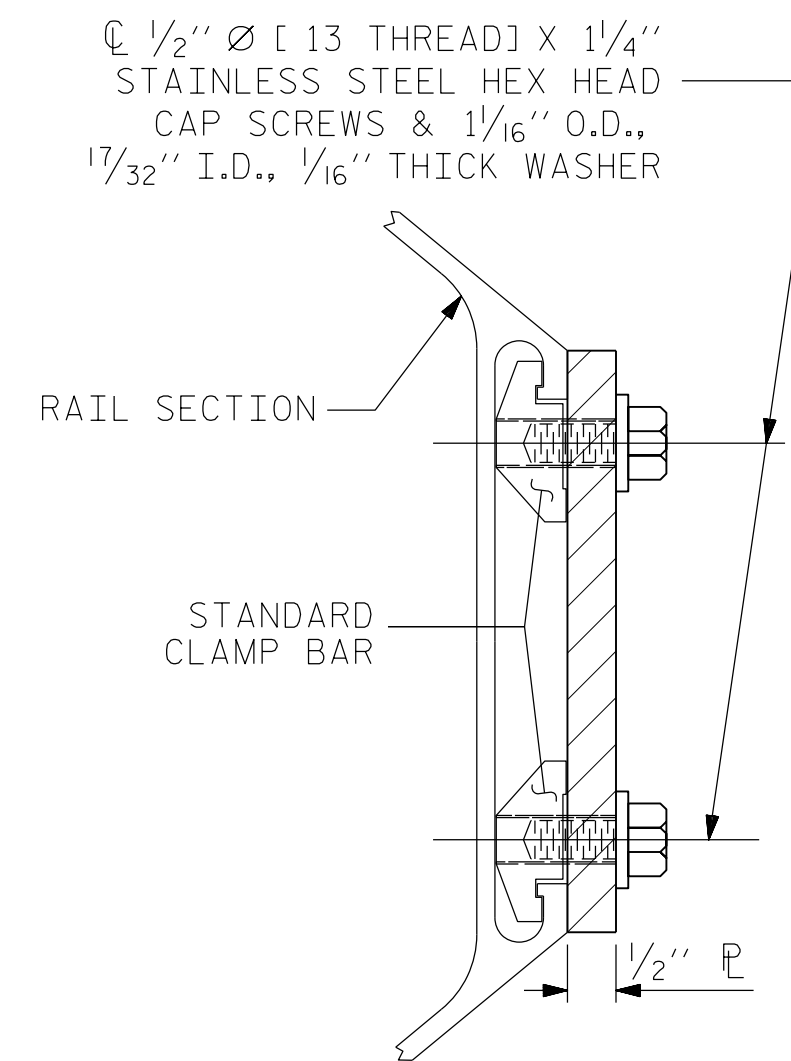
STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
  - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
  - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



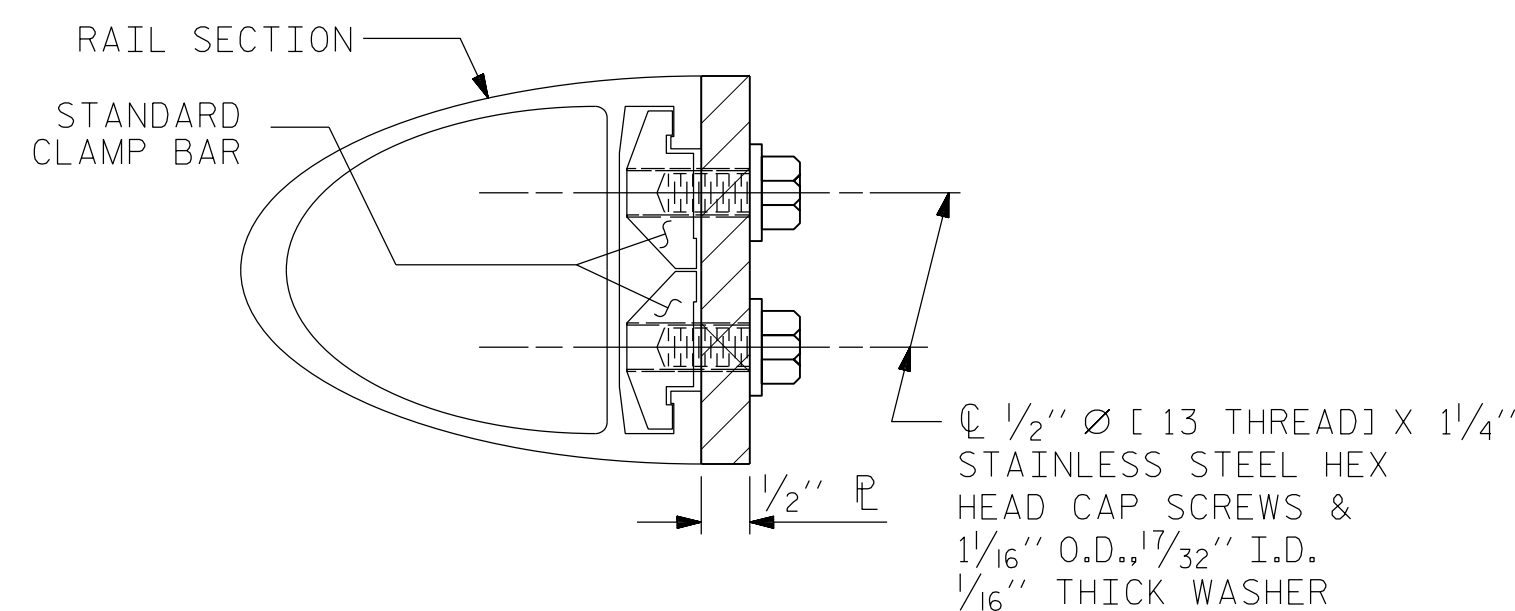
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



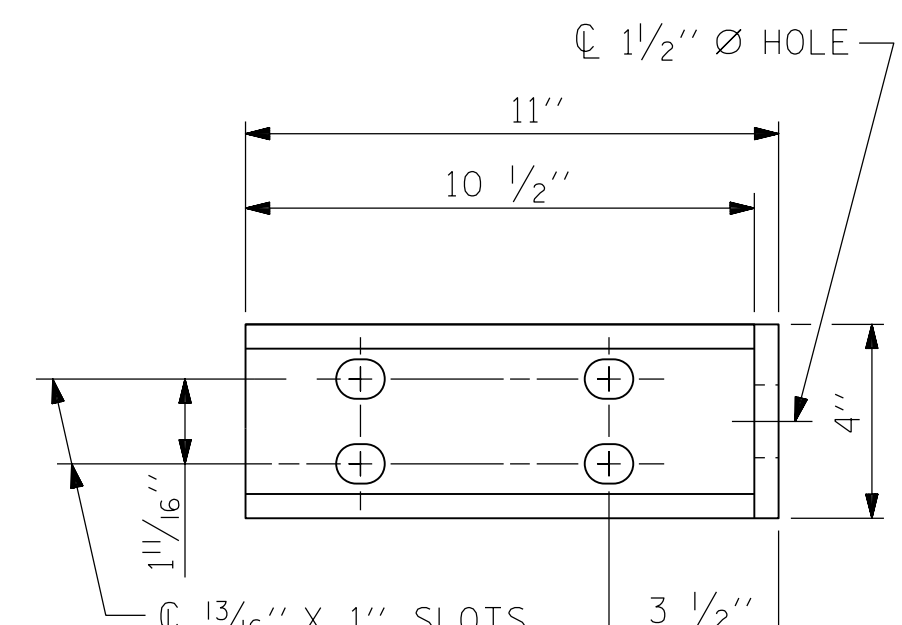
SECTION H-H

(FOR BOTTOM RAIL)

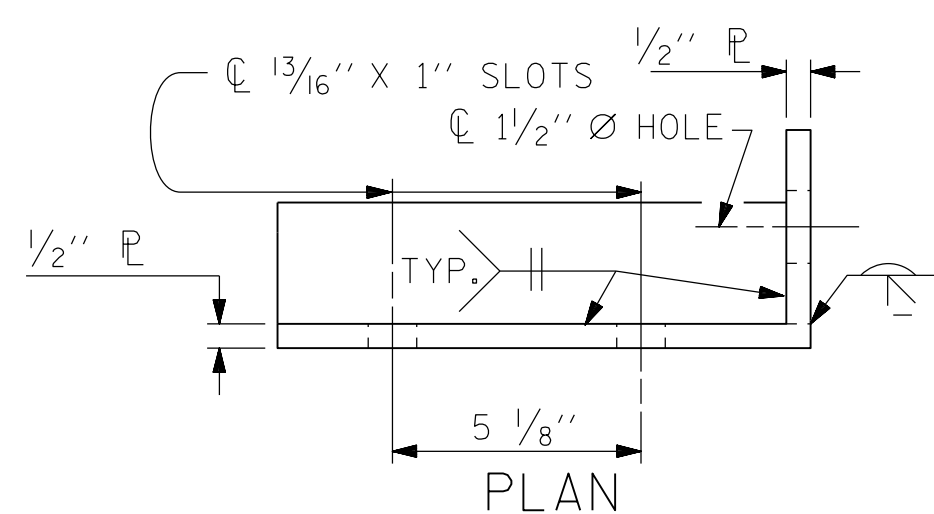


SECTION H-H

(FOR TOP & MIDDLE RAIL)

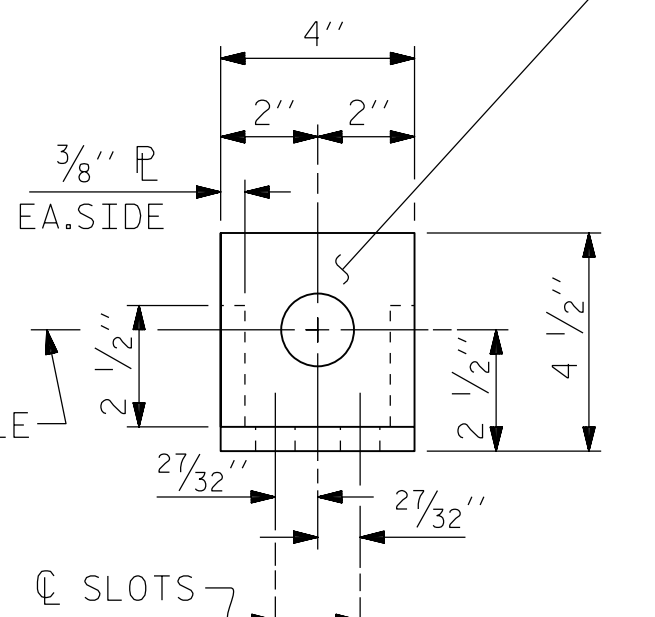


ELEVATION



PLAN

ANGLE TO BE MADE FROM  
 1/2" X 4" X 11" P AND  
 1/2" X 4" X 4" P

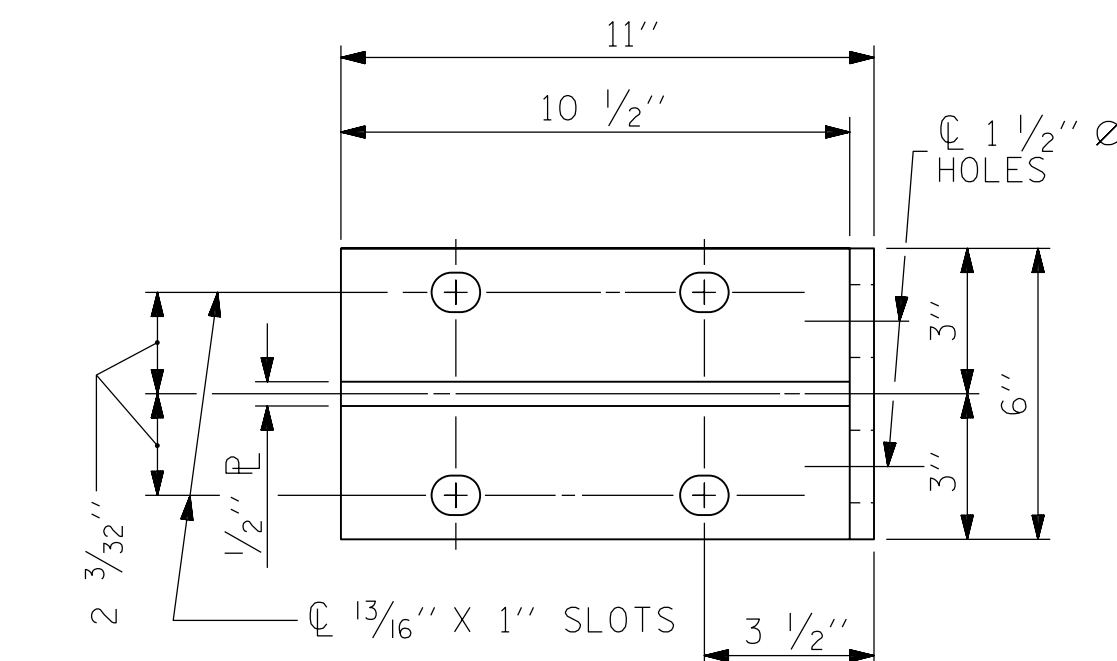


END VIEW

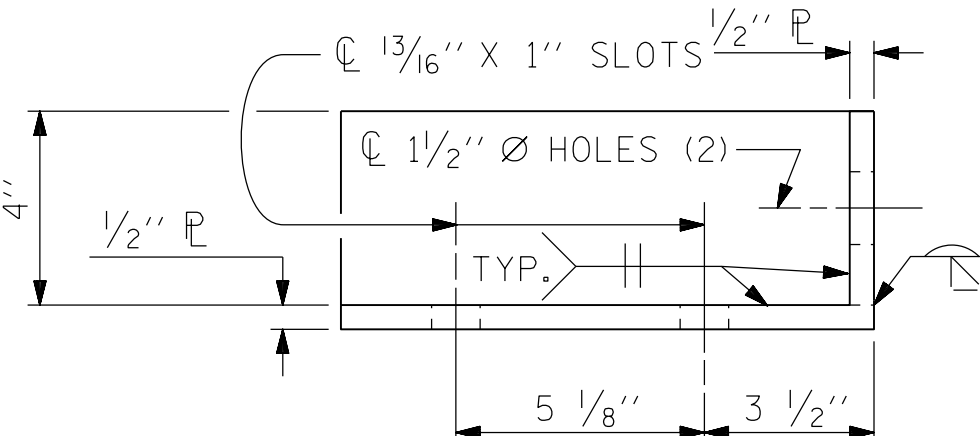
(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



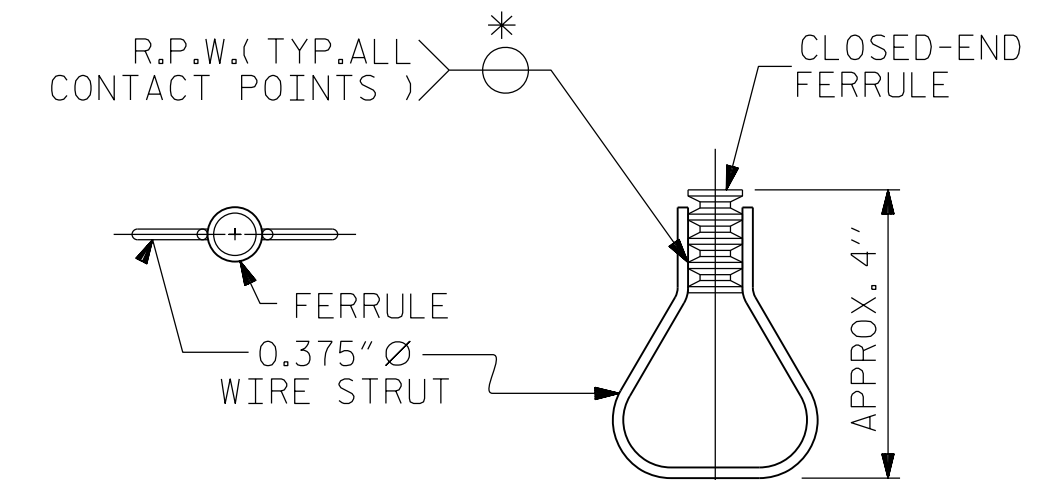
ELEVATION



PLAN

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

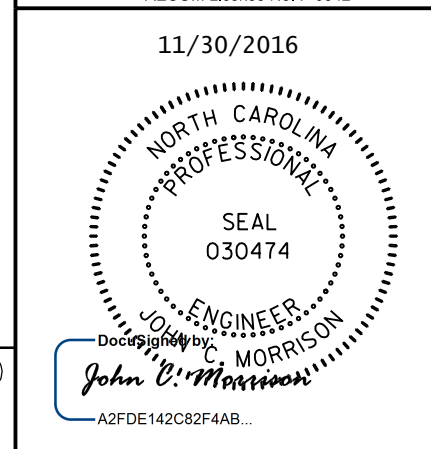
\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. U-4910A

CABARRUS COUNTY

STATION: 147+80.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD

3 BAR METAL RAIL

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

S-26

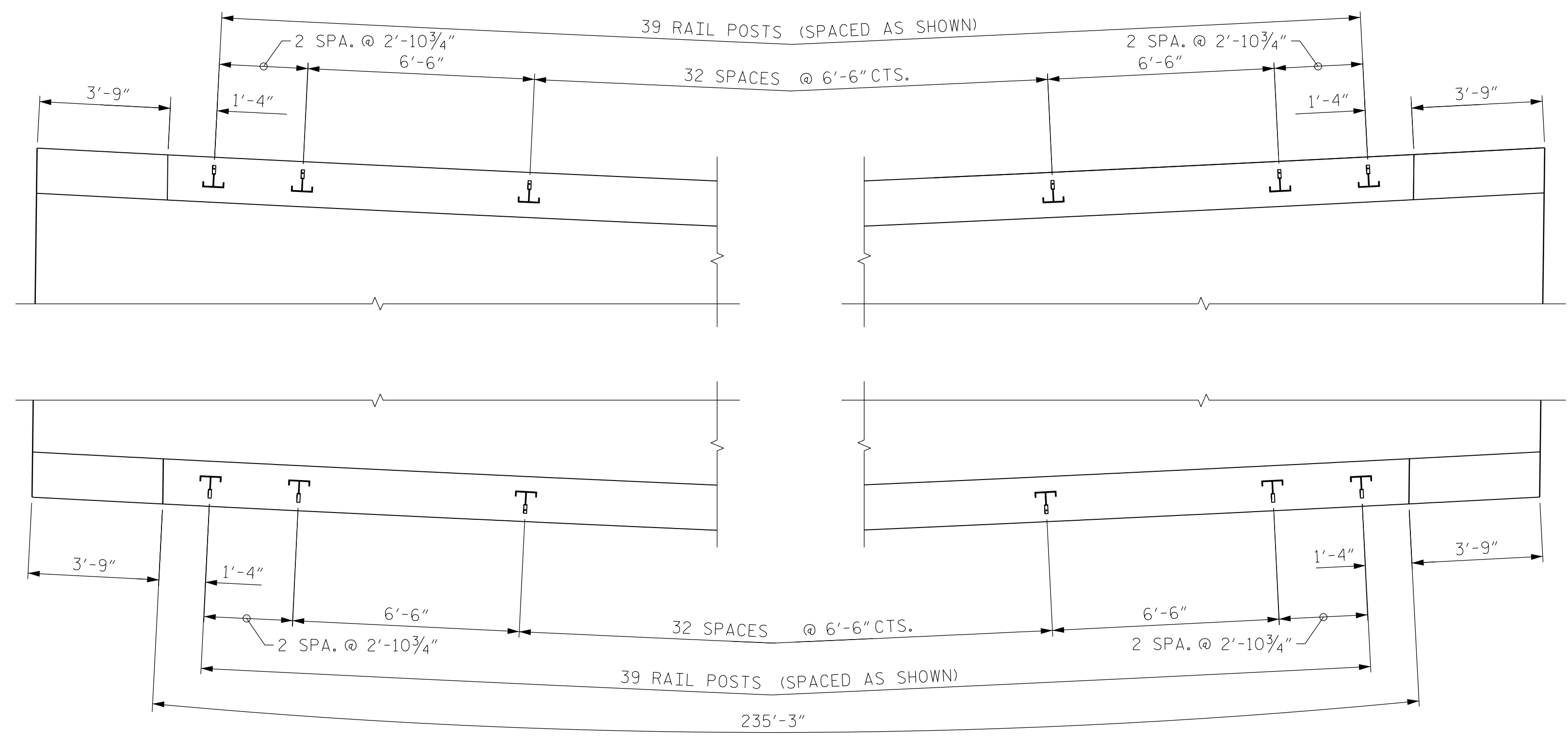
TOTAL SHEETS

55

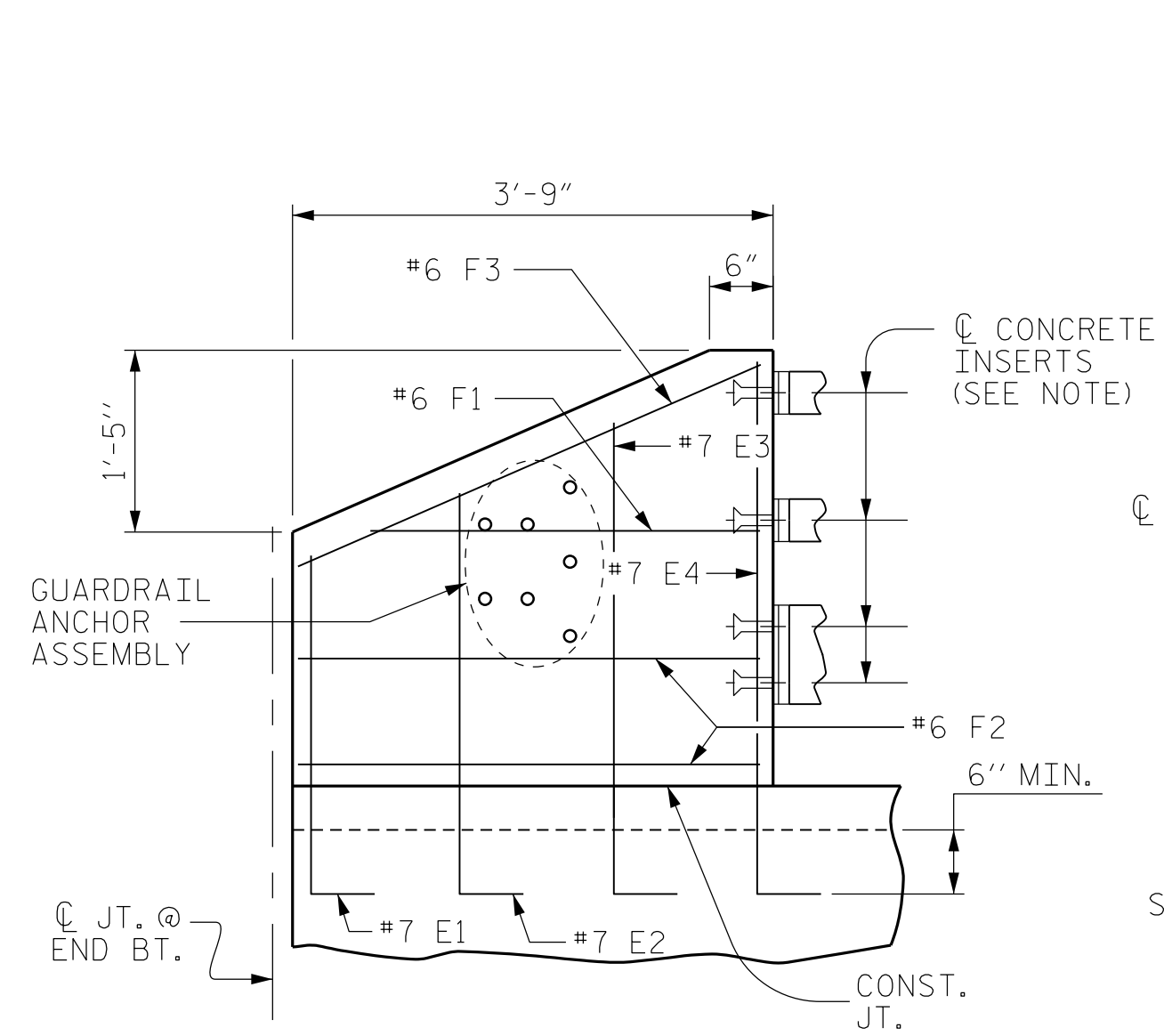
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : N.K. BROWN	DATE : 4/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

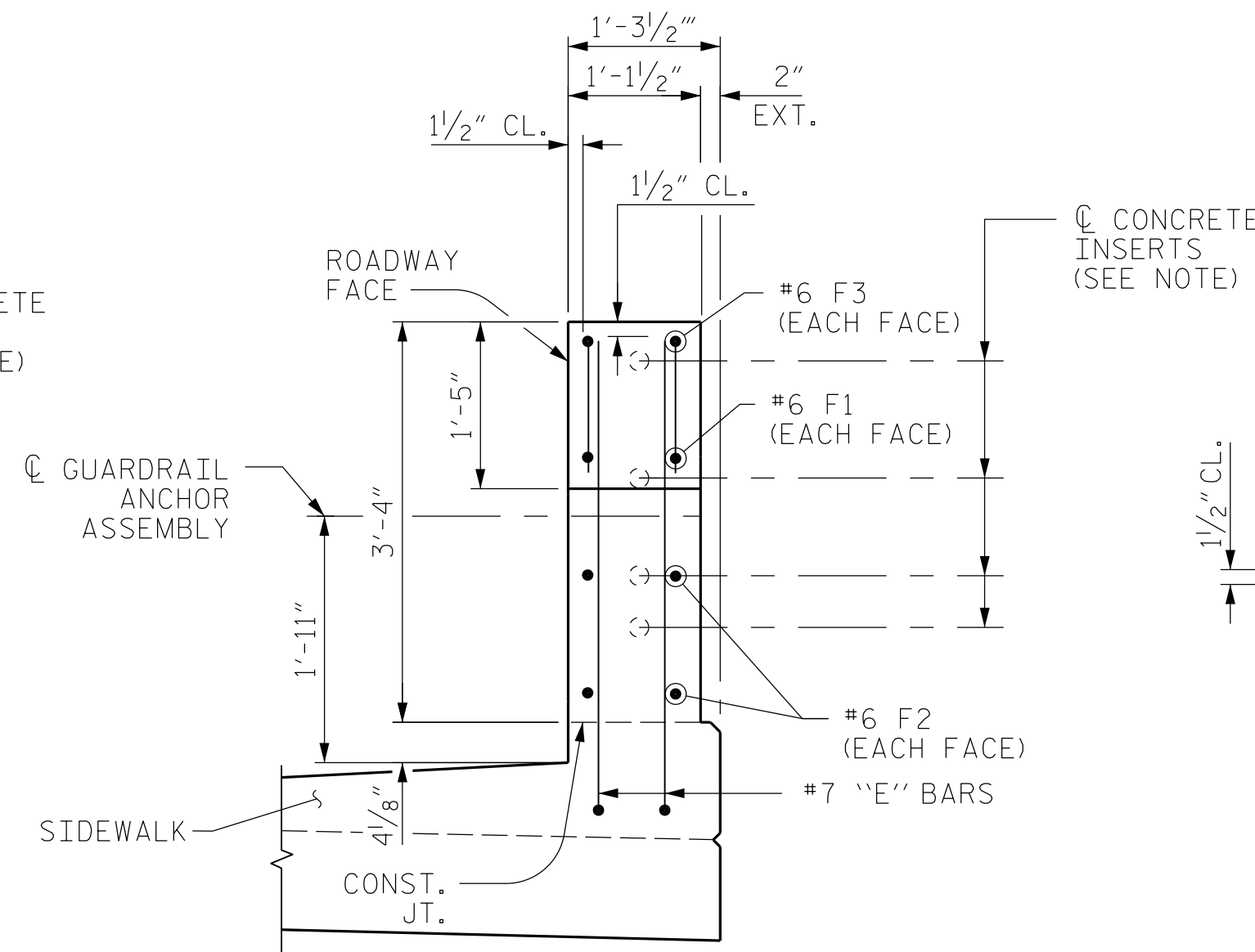




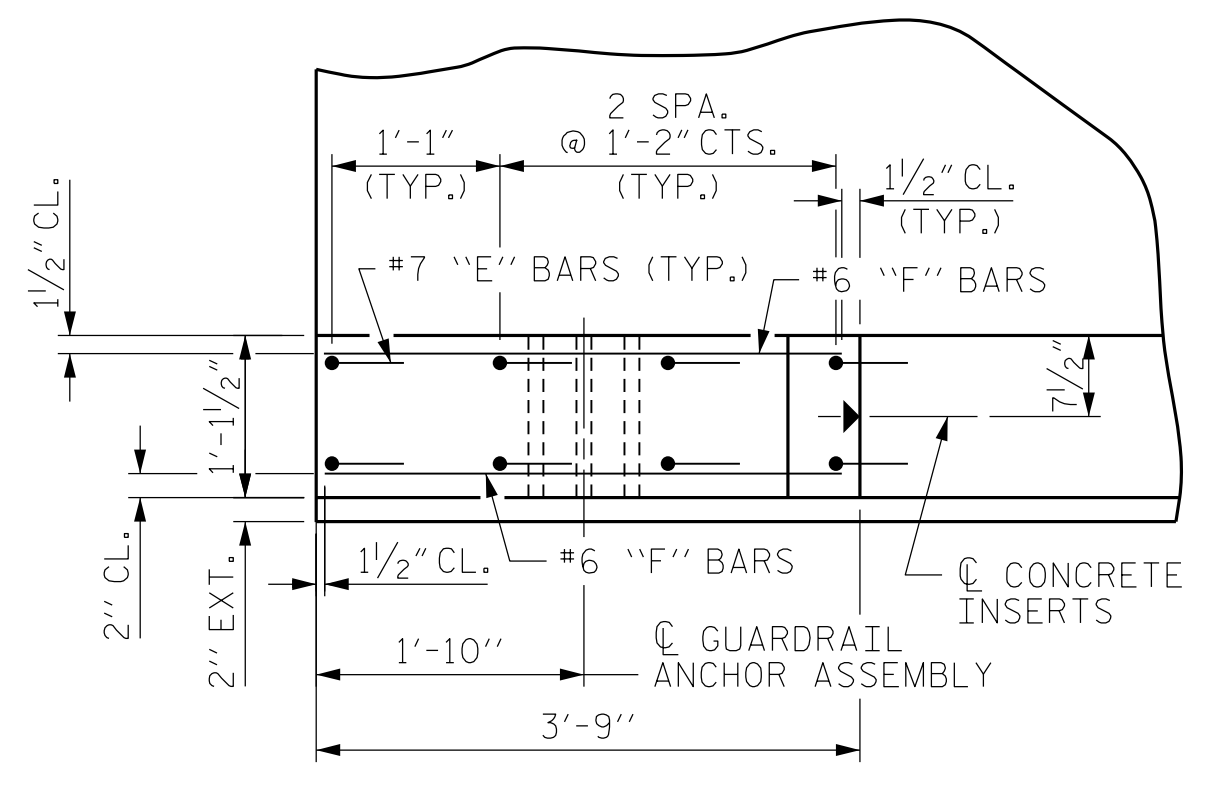
**PLAN**  
DIMENSIONS ARE MEASURED ALONG THE ARC AT THE OUTSIDE EDGE OF SUPERSTRUCTURE



**ELEVATION**

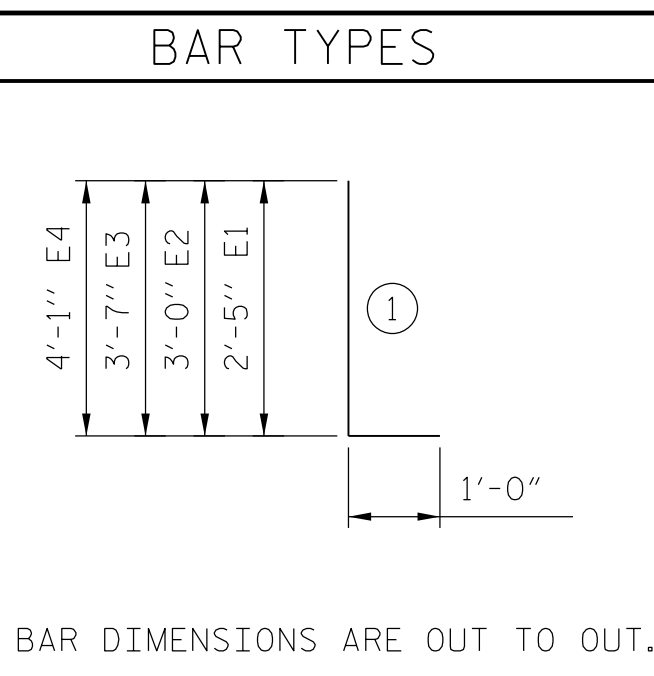


**END VIEW**



**PLAN**  
BEGIN BRIDGE SHOWN, END BRIDGE SIMILAR

**END POST DETAILS**



BILL OF MATERIAL					
BILL FOR ONE END POST					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*E1	2	#7	1	3'-5"	14
*E2	2	#7	1	4'-0"	16
*E3	2	#7	1	4'-7"	19
*E4	2	#7	1	5'-1"	21
*F1	2	#6	STR	1'-10"	6
*F2	4	#6	STR	3'-0"	18
*F3	2	#6	STR	3'-4"	10
EPOXY COATED REINFORCING STEEL				LBS.	104
CLASS AA CONCRETE				C.Y.	0.43
TOTAL EPOXY COATED REINFORCING STEEL				LBS.	416
TOTAL CLASS AA CONCRETE				C.Y.	1.7

DATE: 11/30/2016  
TIME: 10:00:15 AM

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DGN: C:\62300\17000...\_Structural\cadd\401\_053\_UA910A\_SML\_S27\_EP3BAR.dgn

DRAWN BY : N.K. BROWN    DATE : 4/2016  
CHECKED BY : J.C. MORRISON    DATE : 7/2016  
DESIGNED BY : N.K. BROWN    DATE : 4/2016

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(919) 854-6200    www.aecom.com  
AECOM License No. F-0342

11/30/2016

NORTH CAROLINA  
PROFESSIONAL  
SEAL  
030474  
ENGINEER  
John C. Morrison  
A2F0E142C82F4A8

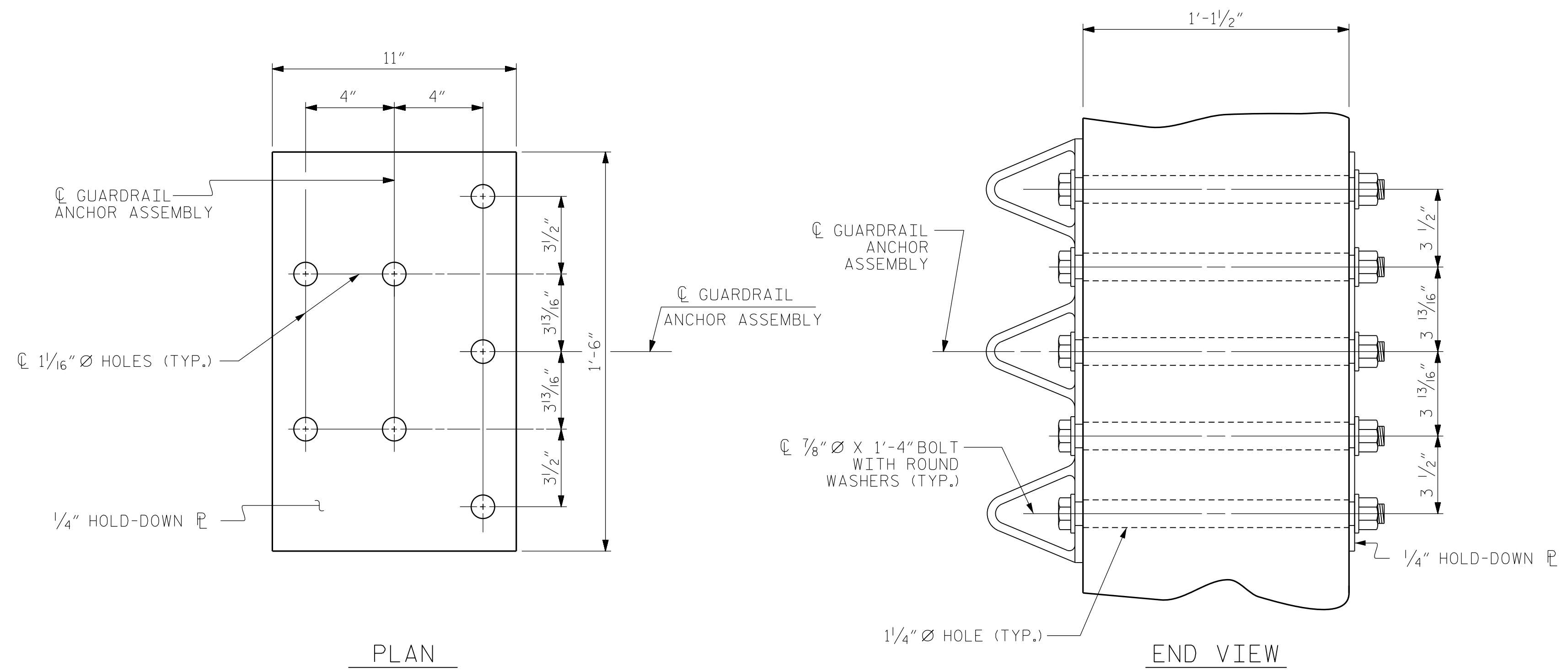
PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
RAIL POST SPACING  
& END POST DETAILS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-27  
TOTAL SHEETS 55



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

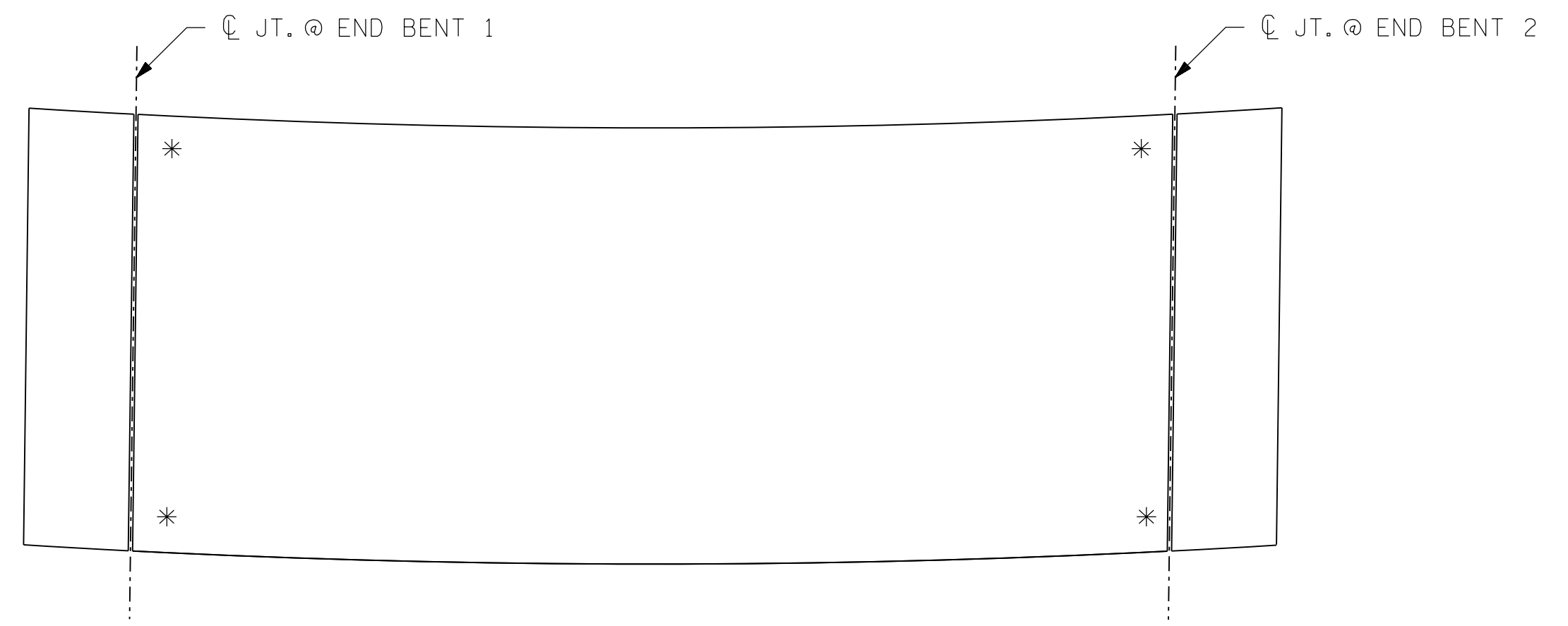
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

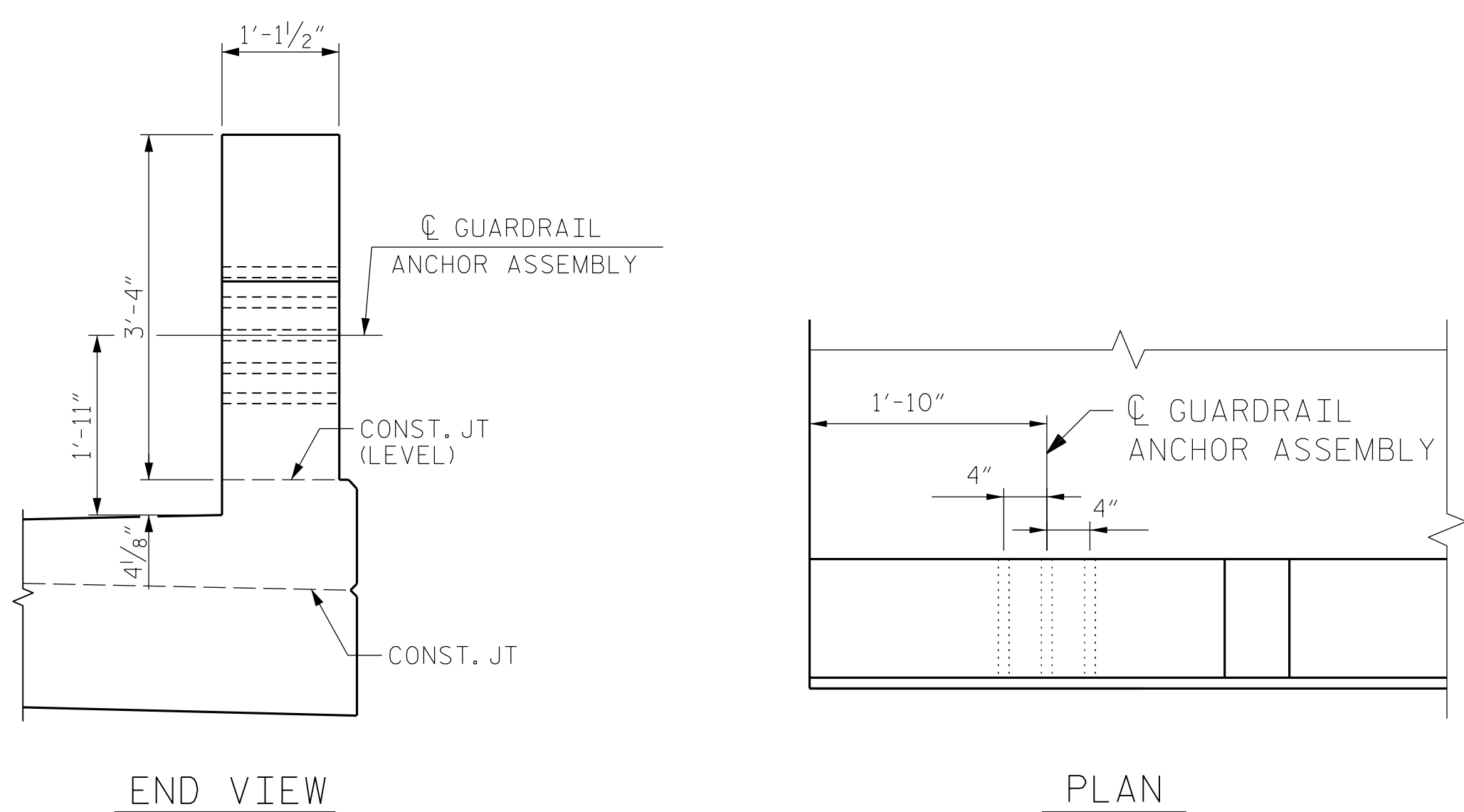
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-



LOCATION OF GUARDRAIL ANCHOR AT END POST

ASSEMBLED BY : N.K. BROWN	DATE : 4/2016
CHECKED BY : J.C. MORRISON	DATE : 7/2016
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

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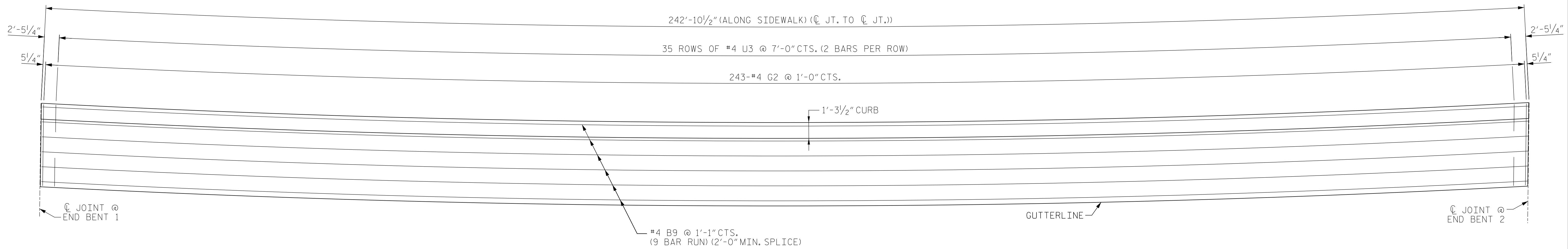
11/30/2016

**JOHN C. MORRISON**  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
DocuSign Envelope ID: A2FDE142C82F4AB

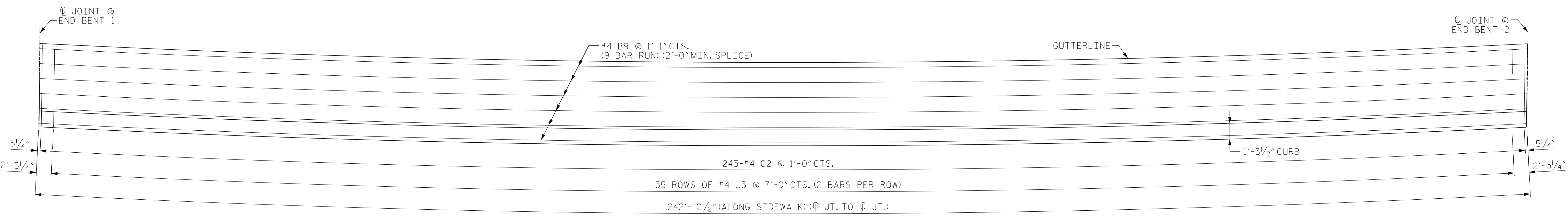
STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
STANDARD					
GUARDRAIL ANCHORAGE					
DETAILS FOR METAL					
RAILS & VERTICAL					
CONCRETE BARRIER RAIL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					55
					S-28

DATE: 11/30/2016 TIME: 10:00:08 AM  
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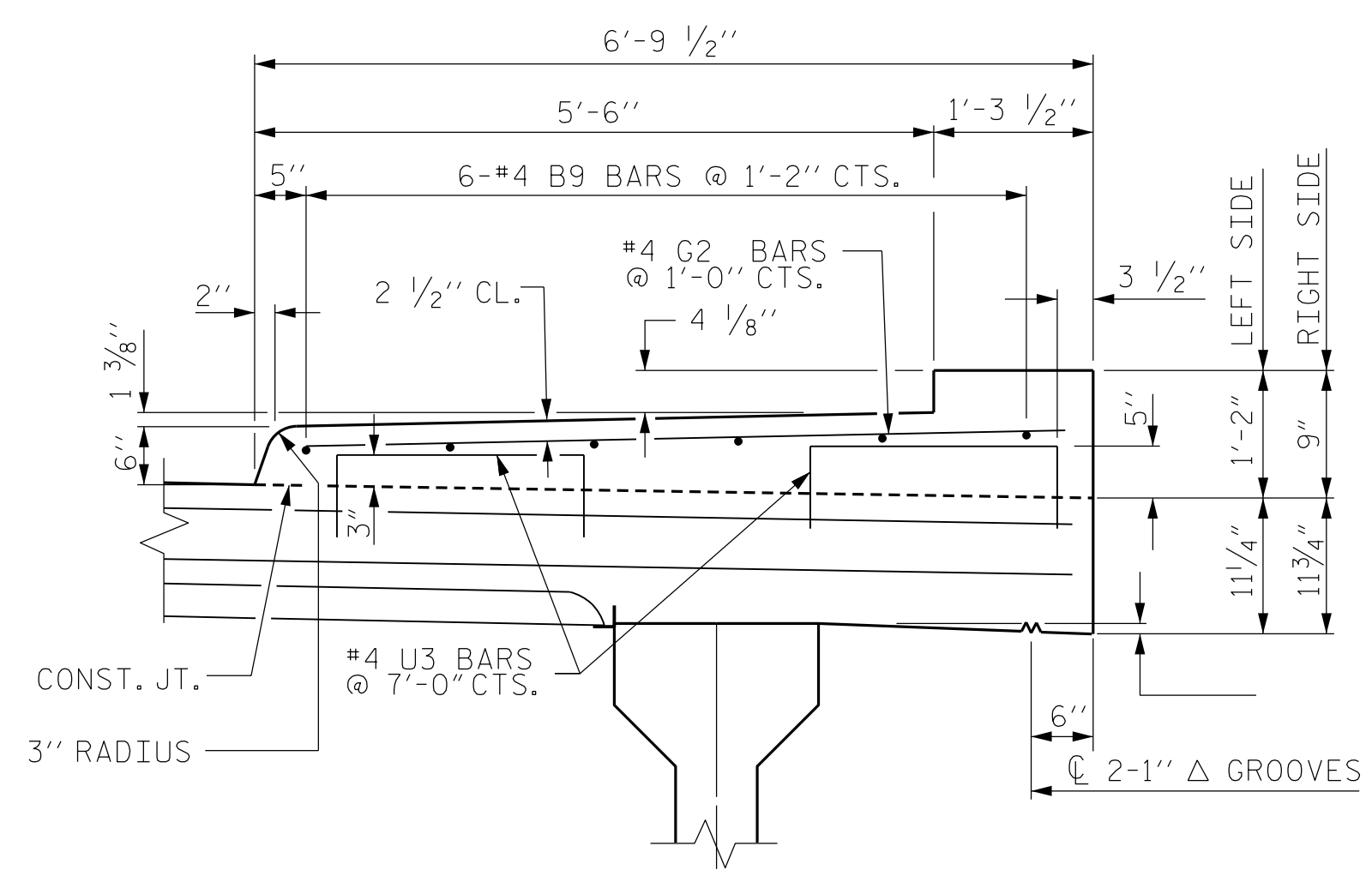


LEFT SIDEWALK



RIGHT SIDEWALK

PLAN OF SIDEWALK



SECTION THRU SIDEWALK

\*\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

NOTES

- SIDEWALK IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- GROOVED CONTRACTION JOINT, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.
- SIDEWALK REINFORCING STEEL AND CONCRETE ON BRIDGE DECK SHALL BE INCLUDED IN THE LUMP SUM PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".
- SIDEWALK REINFORCING STEEL AND CONCRETE ON APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM PAY ITEM FOR "BRIDGE APPROACH SLAB".
- FOR SIDEWALK REINFORCING STEEL AND CONCRETE QUANTITIES ON BRIDGE DECK, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.
- ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.
- FOR EXPANSION JOINT SEAL DETAILS SEE "EXPANSION JOINT SEAL DETAILS" SHEET.
- FOR SIDEWALK COVER PLATE DETAILS AT EXPANSION JOINTS SEE "EXPANSION JOINT SEAL DETAILS FOR SIDEWALK" SHEET.
- THE #4 U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE DECK HAS BEEN FINISHED.

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11/30/2016

**JOHN C. MORRISON**  
 NORTH CAROLINA PROFESSIONAL SEAL  
 030474  
 ENGINEER  
DocuSign  
 John C. Morrison  
 A2FDE142C82F4A8

STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUPERSTRUCTURE					
SIDEWALK DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-29
TOTAL SHEETS					55

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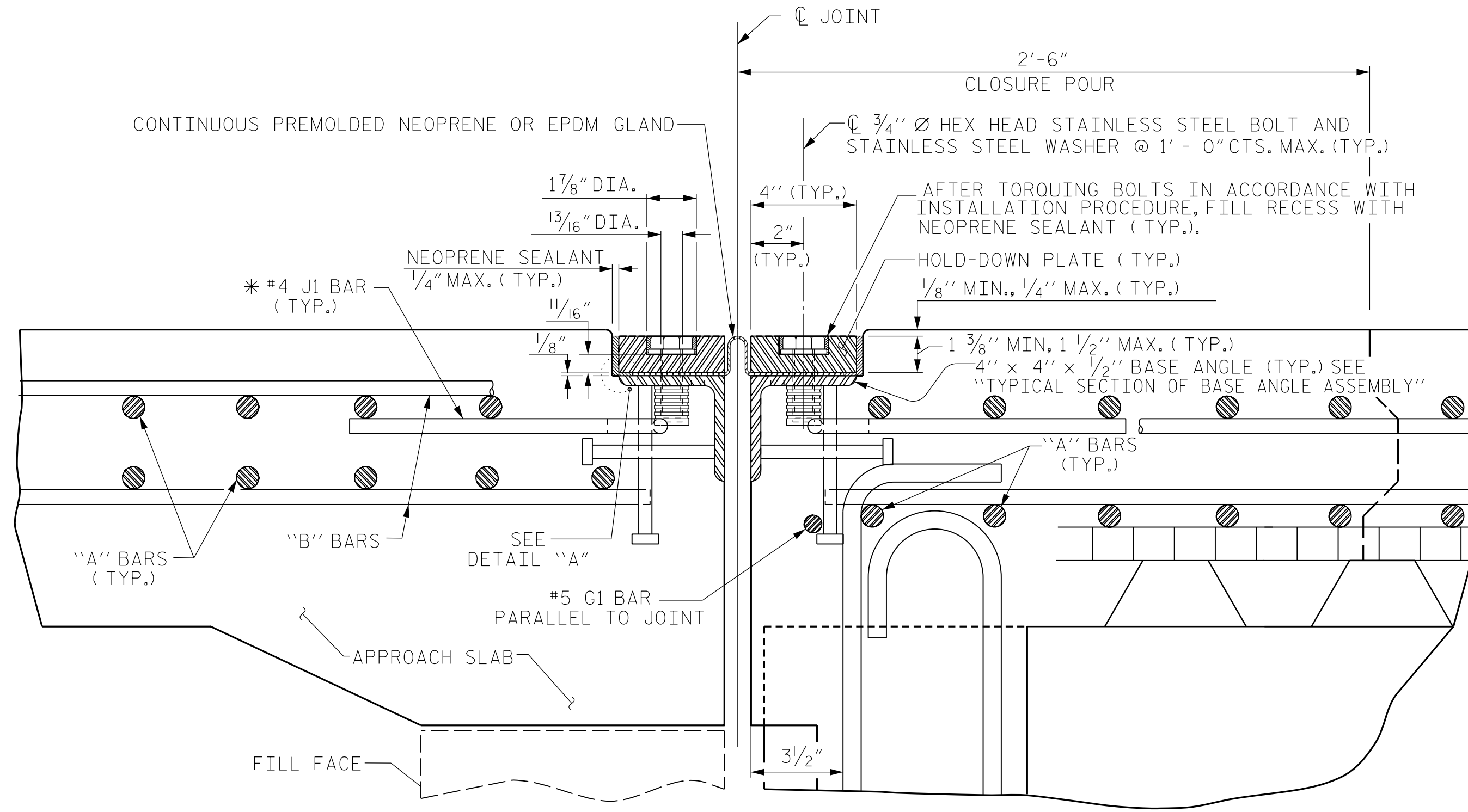
DRAWN BY :	N.K. BROWN	DATE :	5/2016
CHECKED BY :	J.C. MORRISON	DATE :	7/2016
DESIGNED BY :	N.K. BROWN	DATE :	5/2016

DATE: 11/30/2016  
 TIME: 10:00:45 AM

USER: H:\aecom\000...  
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INSTALLATION PROCEDURE

GENERAL NOTES



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

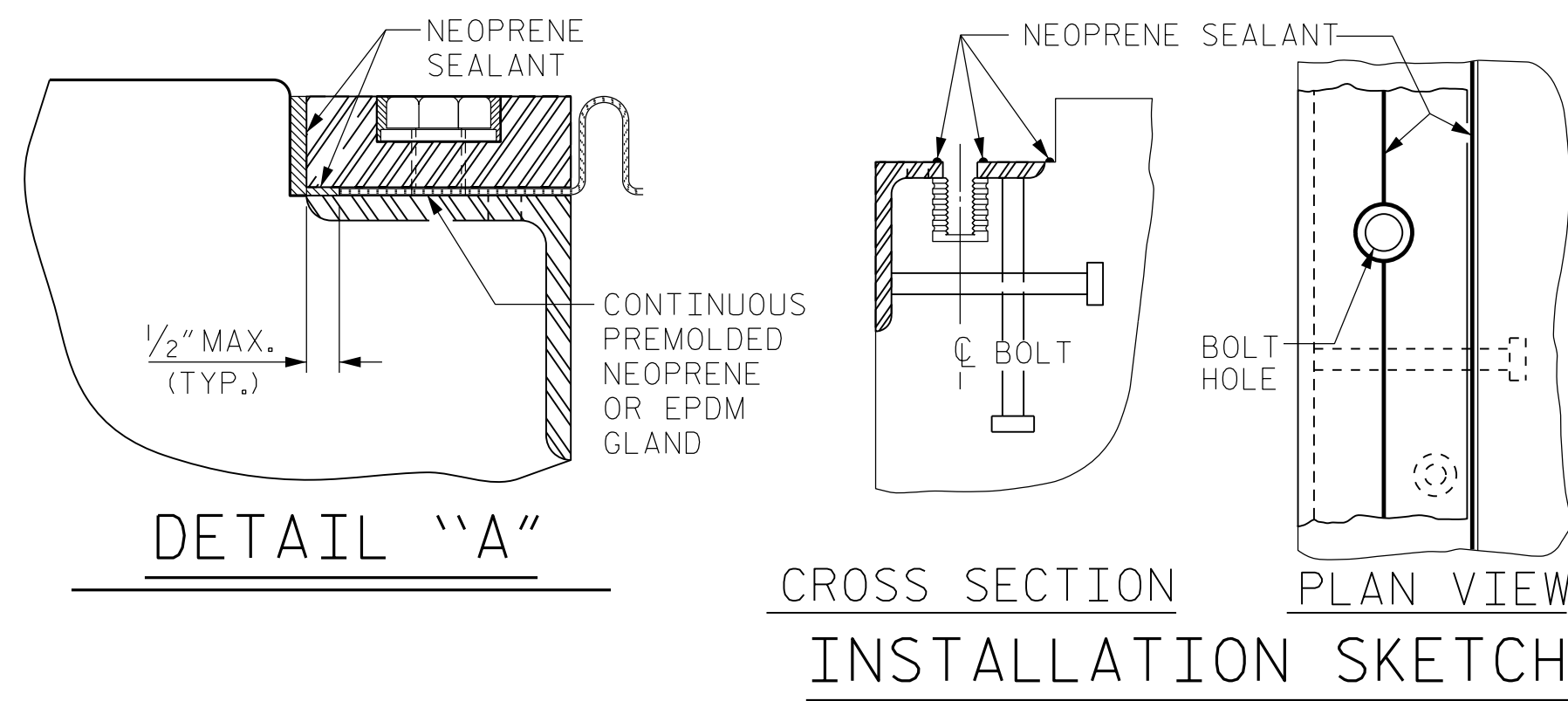
\* THE QUANTITY OF #4 JI BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF JI BARS SPECIFIED, ADDITIONAL JI BARS WILL NOT BE REQUIRED.

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 1/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

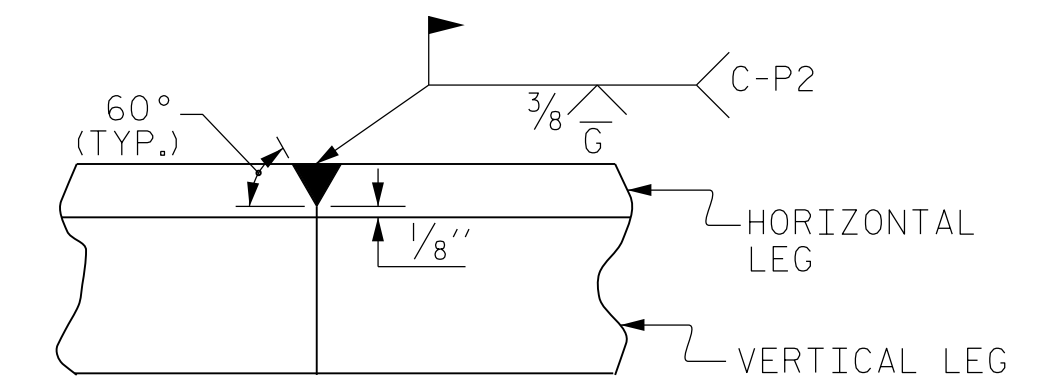
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

DATE: 11/30/2016  
TIME: 10:00:05 AM

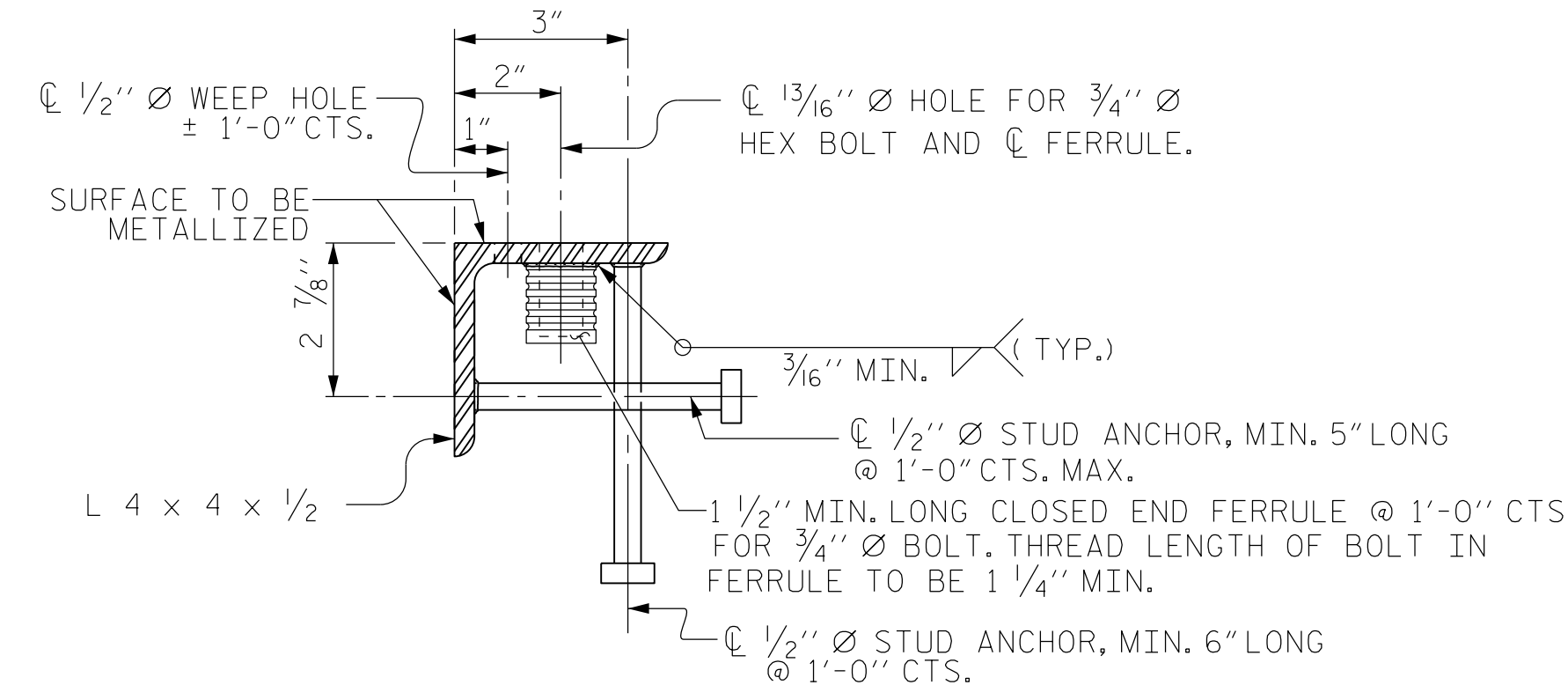
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DRAWN BY: REK 9/87  
CHECKED BY: CRK 10/87



MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	87°46'14"	3/4"	1 1/16"	1 1/16"	1 3/16"
2	93°41'32"	3/4"	1 1/16"	1 1/16"	1 3/16"



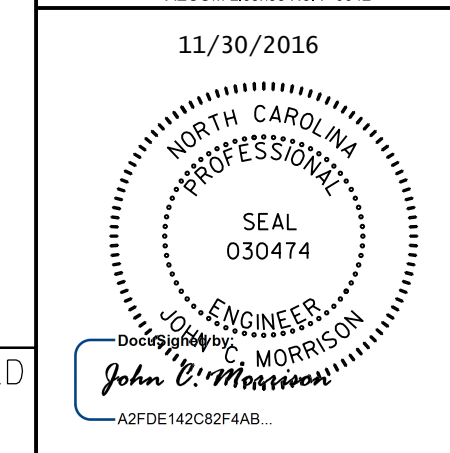
DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
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RALEIGH  
STANDARD  
EXPANSION JOINT SEAL DETAILS

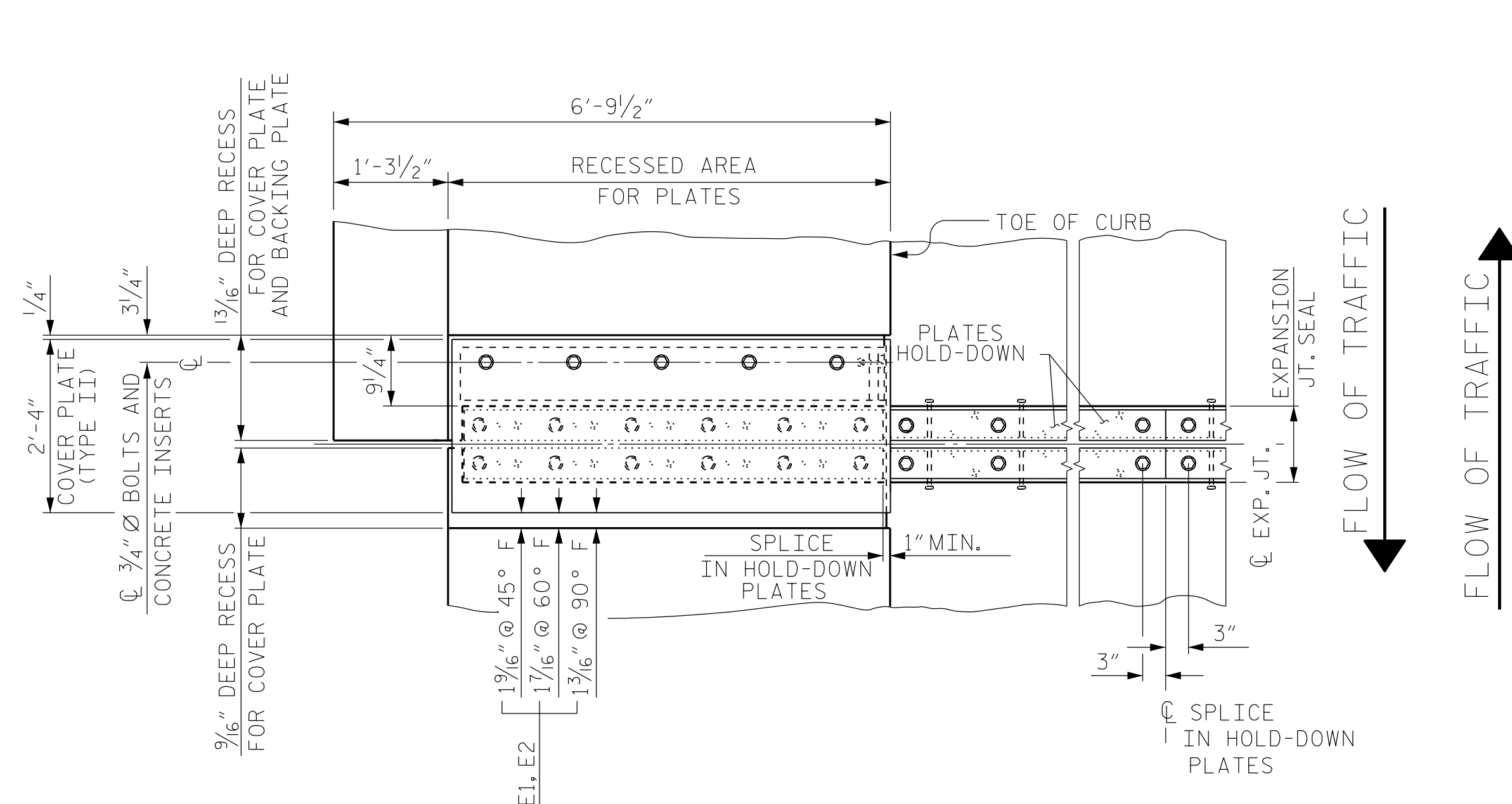
ASSEMBLED BY: K.H. COMPTON DATE: 5/2016  
CHECKED BY: G.L. HAMILTON DATE: 7/2016  
DRAWN BY: REK 9/87  
CHECKED BY: CRK 10/87

REV. 5/7/03R RWW/JTE  
REV. 5/1/06R TLA/GM  
REV. 10/1/11 MAA/GM

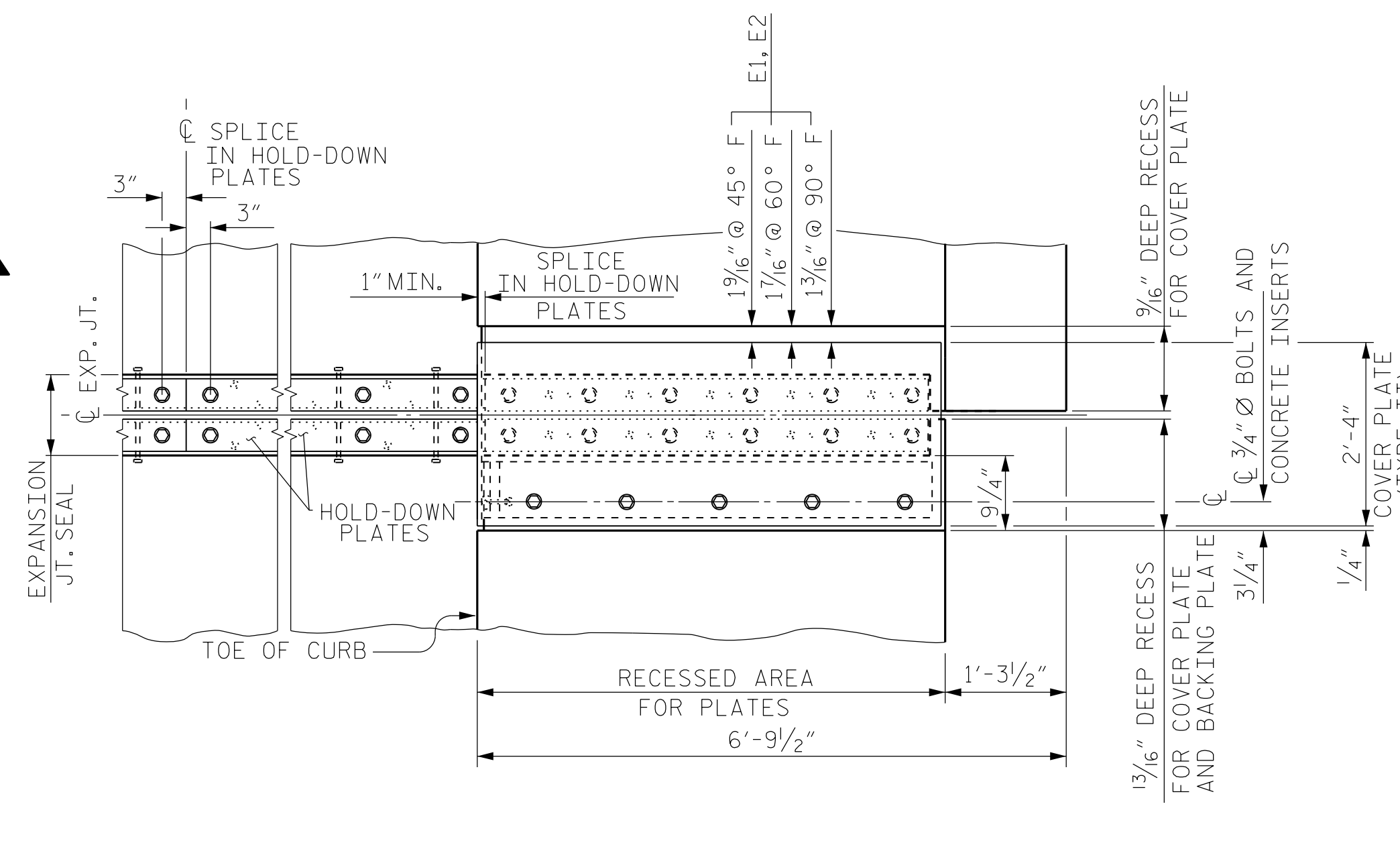
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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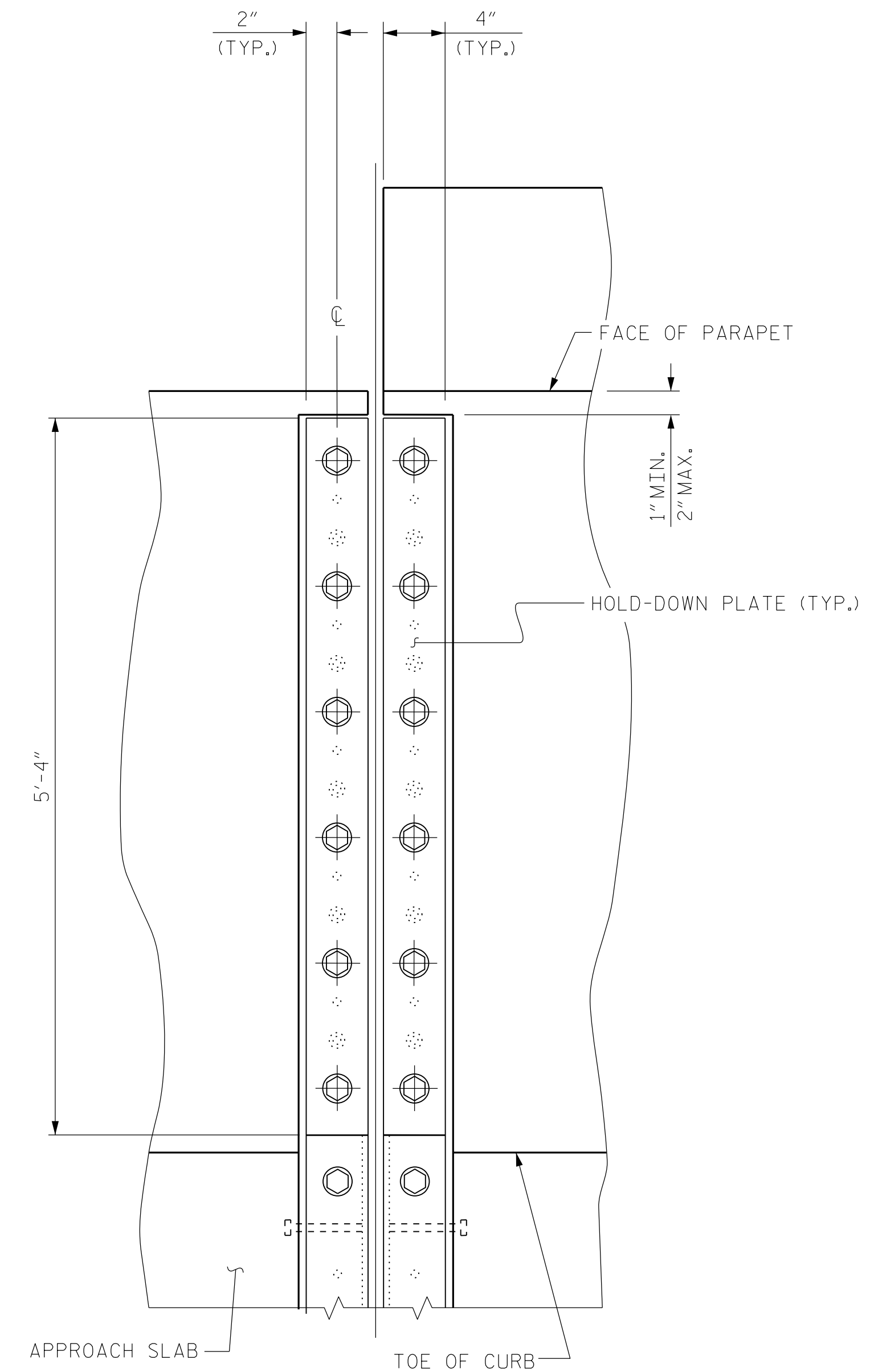




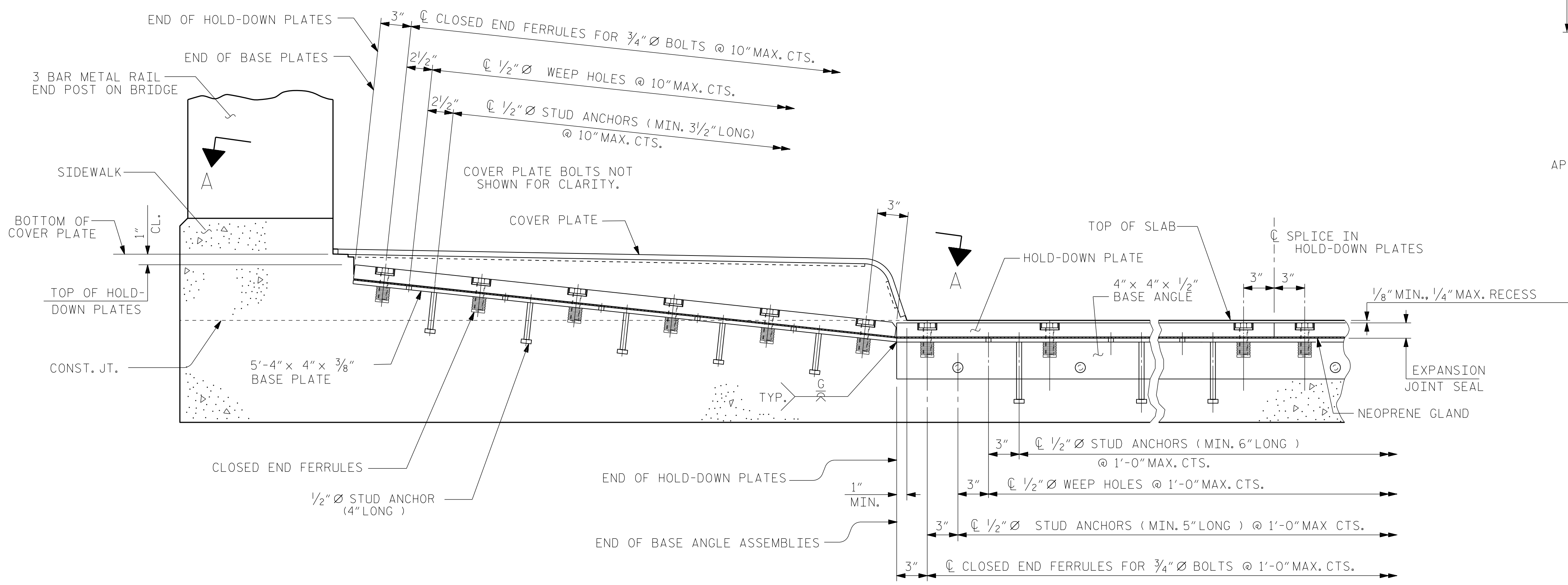
PLAN OF EXPANSION JOINT SEAL - LEFT SIDE



PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE



SECTION A - A



SECTION THRU SIDEWALK NORMAL TO JOINT

PROJECT NO. U-4910A  
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 SHEET 2 OF 3

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11/30/2016

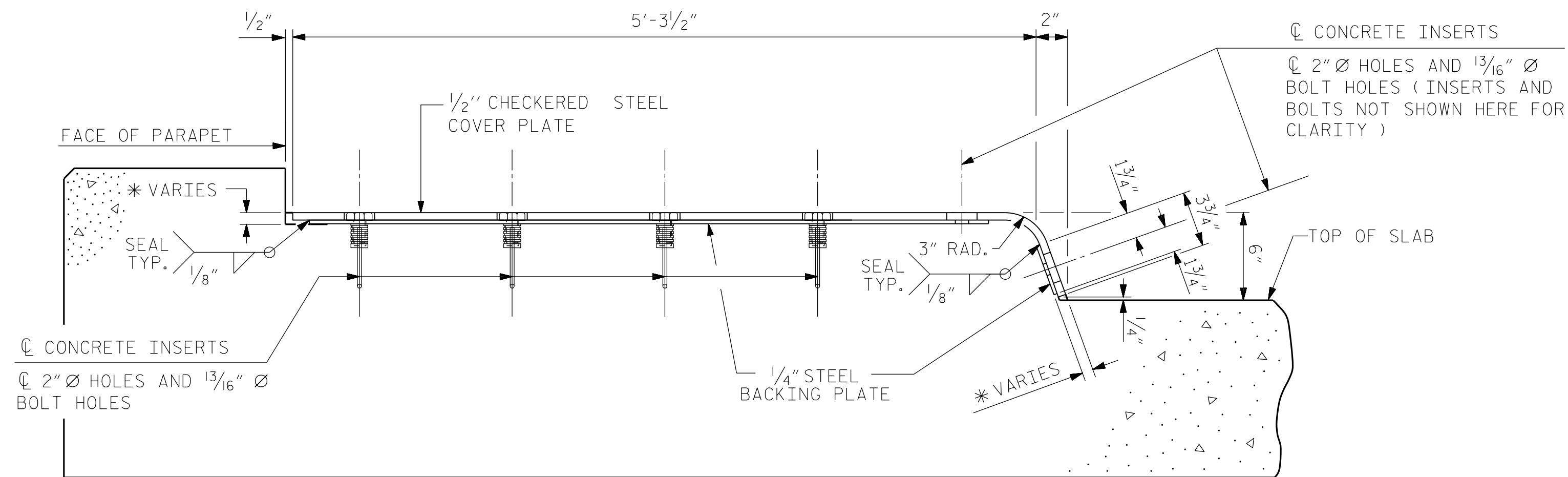
NORTH CAROLINA PROFESSIONAL SEAL 030474

JOHN C. MORRISON  
 ENGINEER  
 A2FDE142C2F44B

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS FOR SIDEWALK					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-31					TOTAL SHEETS 55

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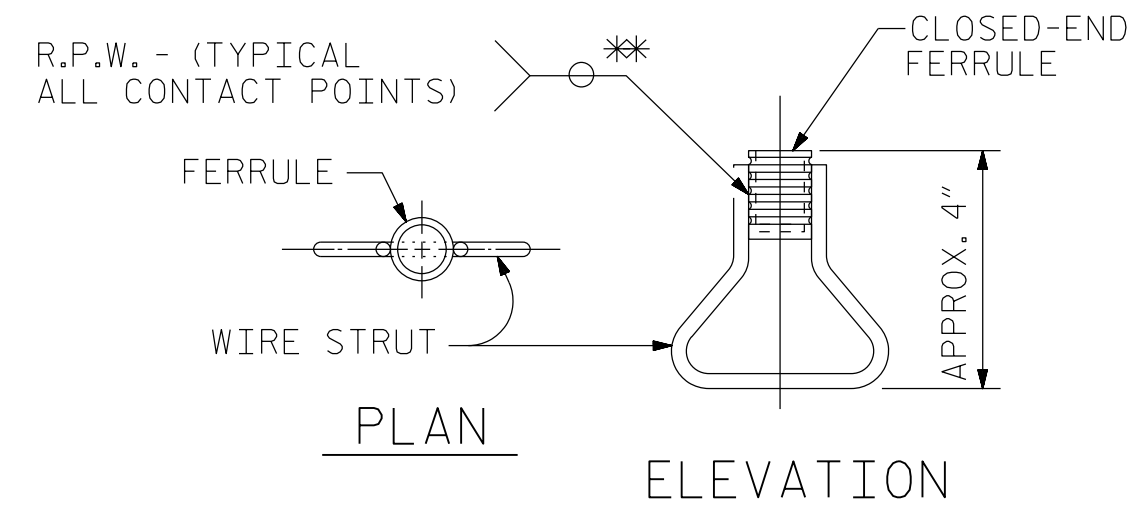
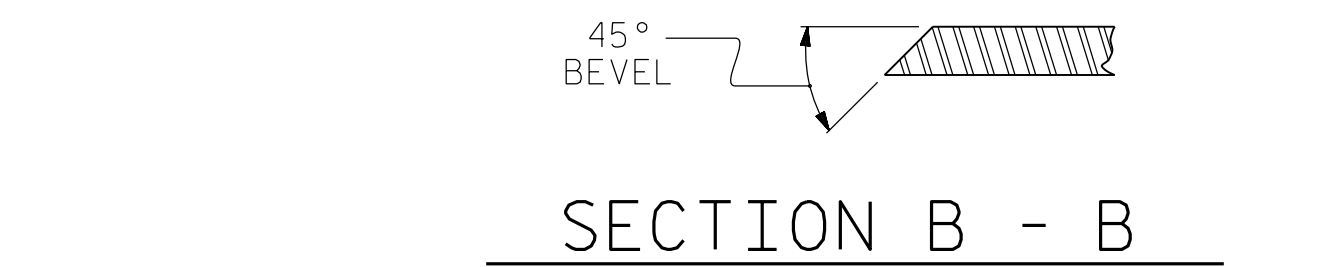
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**END VIEW**  
(NORMAL TO SIDEWALK)

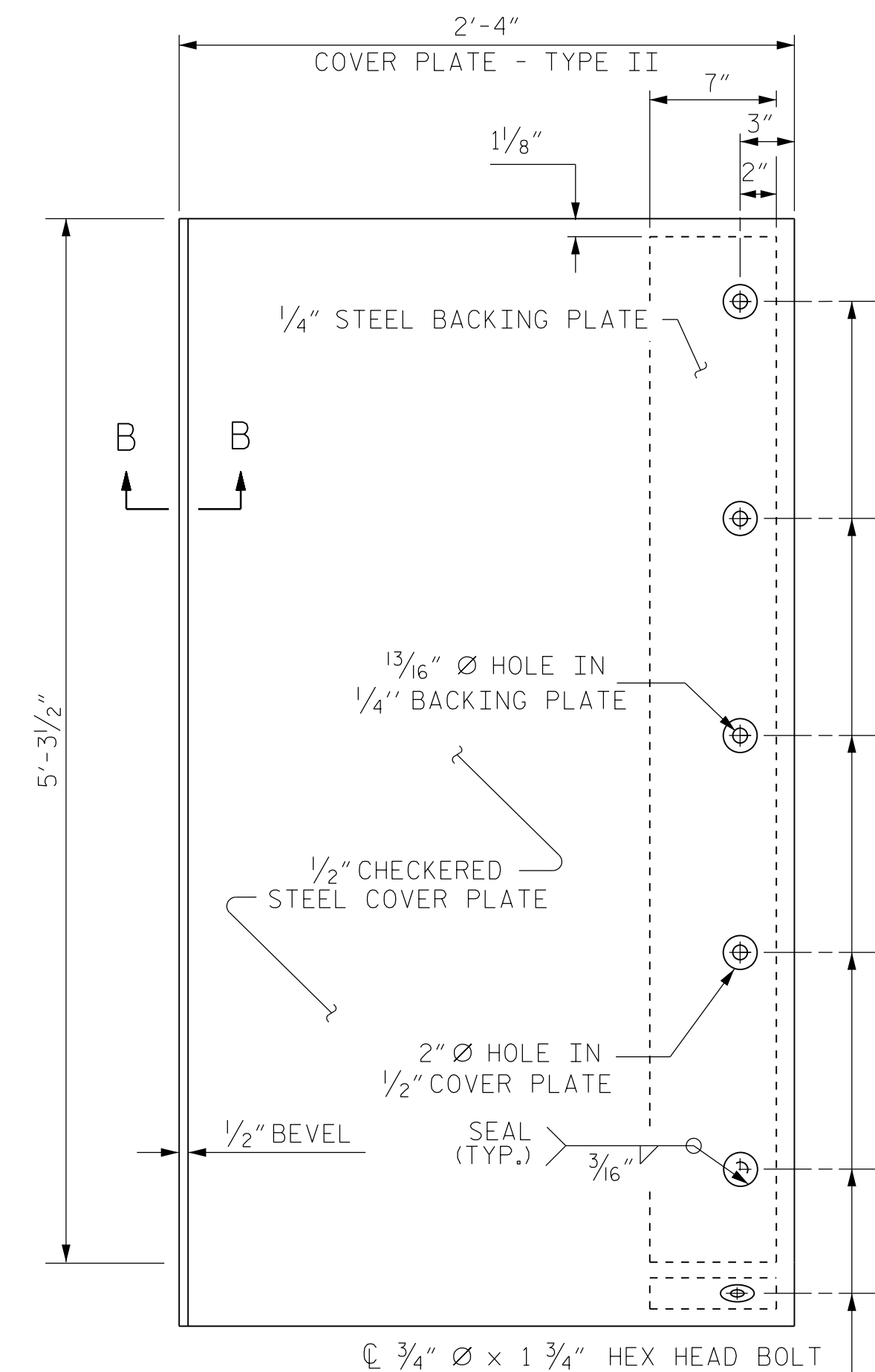
\* CONCRETE RECESS DIMENSIONS:

- 13/16" FOR THE SIDE OF THE JOINT HAVING THE 1/2" COVER PLATE WITH A 1/4" BACKING PLATE.
- 9/16" FOR THE SIDE OF THE JOINT HAVING ONLY THE 1/2" COVER PLATE.



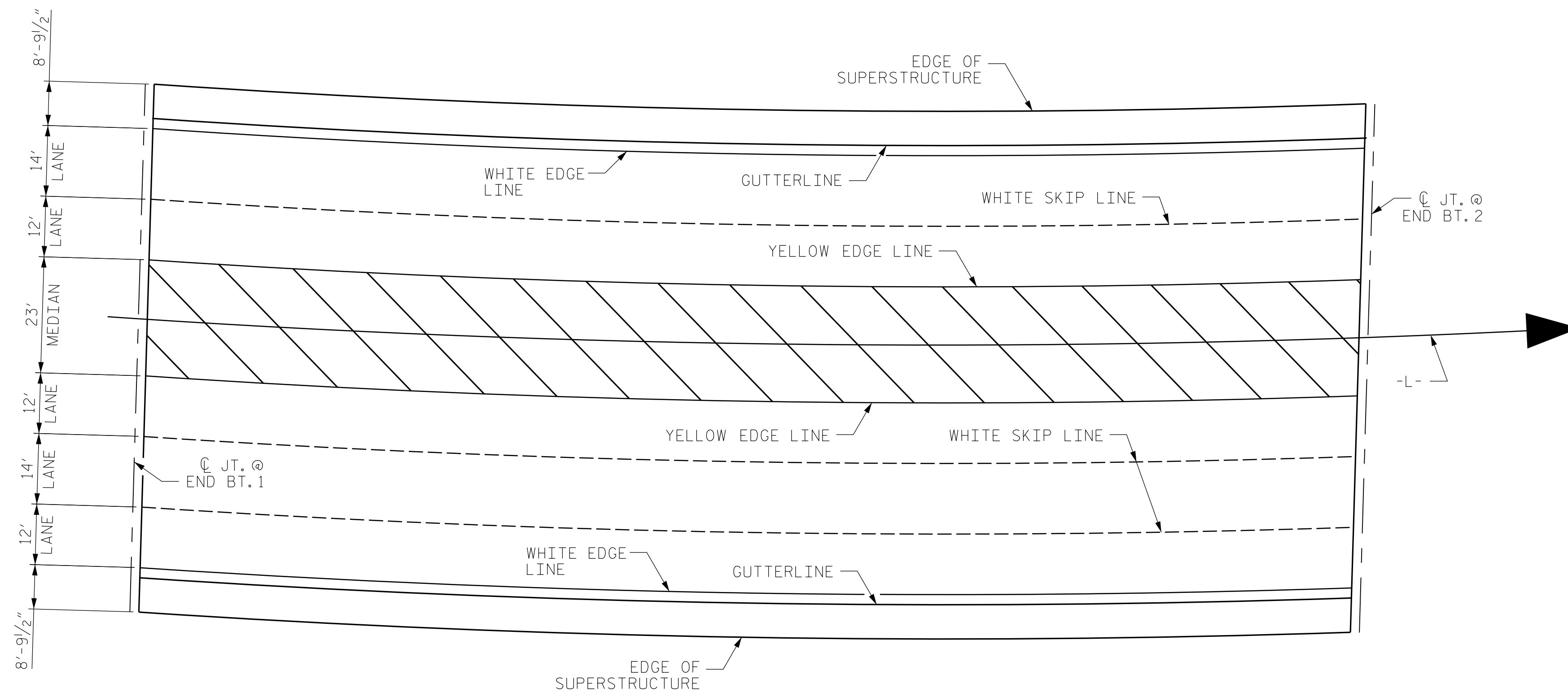
**CONCRETE INSERT**

\*\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



**TYPE II - PLAN VIEW**

**COVER PLATE DETAILS**



**PAVEMENT MARKING ALIGNMENT**

PROJECT NO. U-4910A  
CABARRUS COUNTY  
 STATION: 147+80.00 -L-

SHEET 3 OF 3

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 AECOM License No. F-0342

11/30/2016

**JOHN C. MORRISON**  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
DocuSign Envelope ID: A2FDE142C82F4A8

STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
RALEIGH

STANDARD  
**EXPANSION JOINT SEAL DETAILS FOR SIDEWALK**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			55

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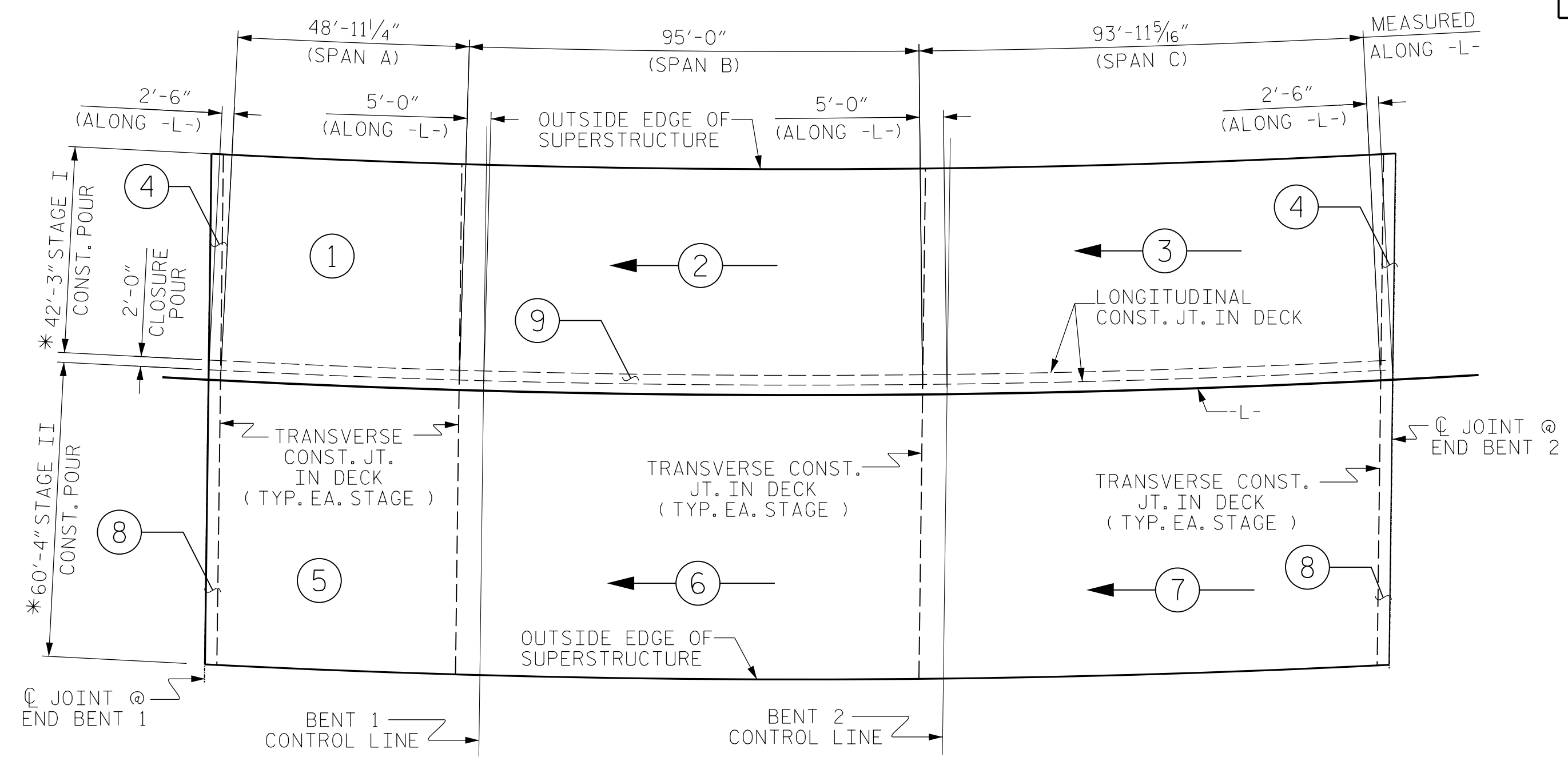
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ASSEMBLED BY : K.H. COMPTON	DATE : 5/2016
CHECKED BY : G.L. HAMILTON	DATE : 7/2016
DRAWN BY : REK 10/87	REV. 10/17/00 RWW/LES
CHECKED BY : CRK 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



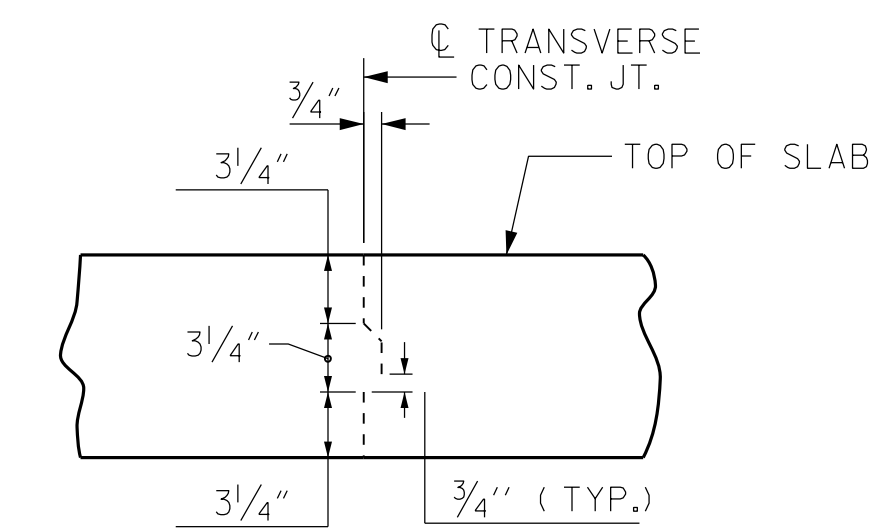
NOTE :  
FOR QUANTITY BREAKDOWN, SEE  
"BILL OF MATERIAL" SHEET

\* RADIAL DIMENSION



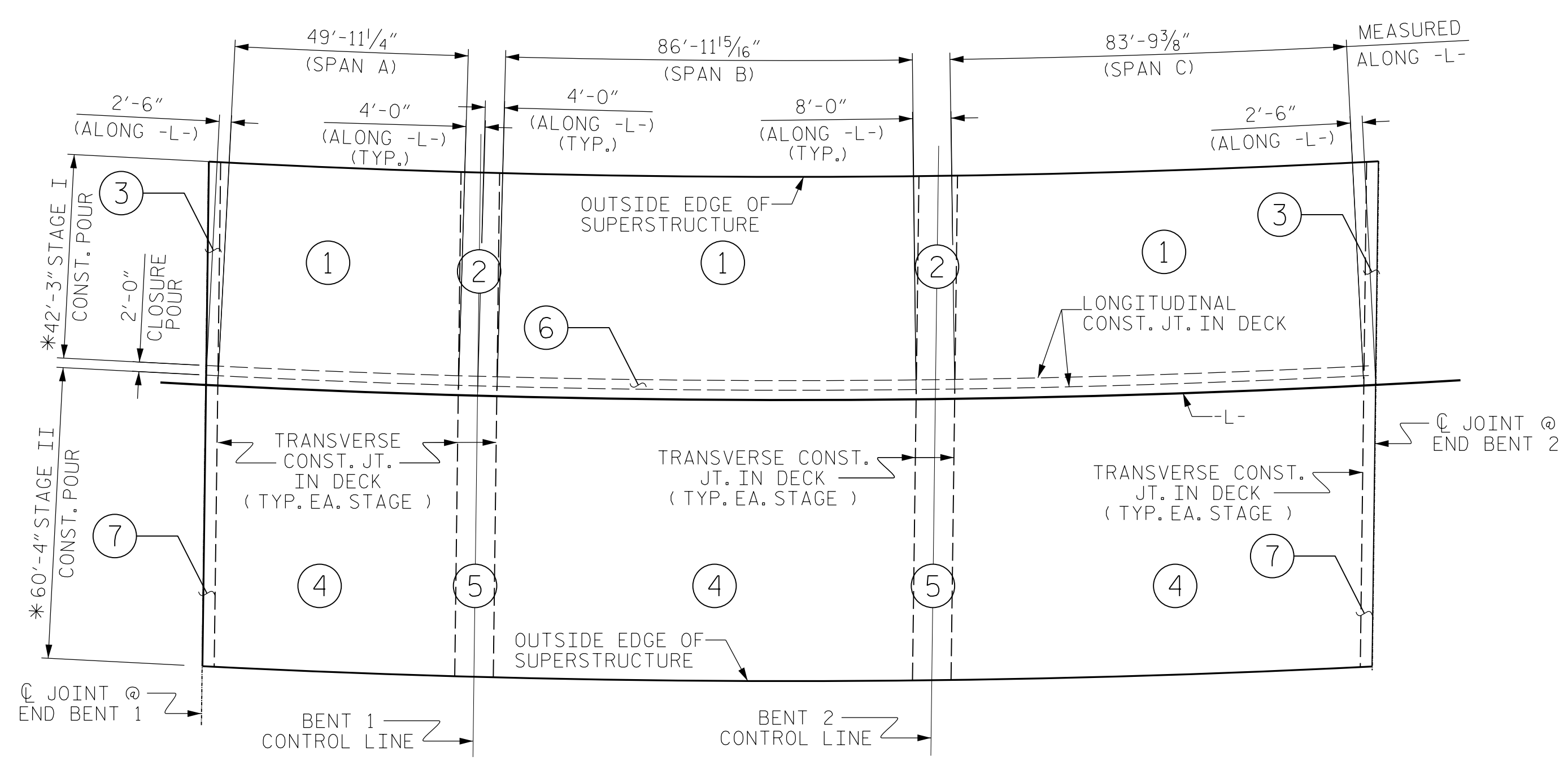
**POUR SEQUENCE**

← # → INDICATES POUR NUMBER AND DIRECTION OF POUR



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL AND LATERAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



**OPTIONAL POURING SEQUENCE**

IN EACH STAGE, POUR 2 OR 5 SHALL NOT BE STARTED UNTIL BOTH ADJACENT 1 OR 4 POURS REACH A MINIMUM OF 3000 PSI. POUR 6 IS A 2'-0\"/>

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
030474  
J.C. MORRISON  
ENGINEER

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE DECK POURING SEQUENCE**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			55

DRAWN BY : K.H. COMPTON DATE : 7/2016  
CHECKED BY : J.C. MORRISON DATE : 7/2016  
DESIGNED BY : K.H. COMPTON DATE : 7/2016

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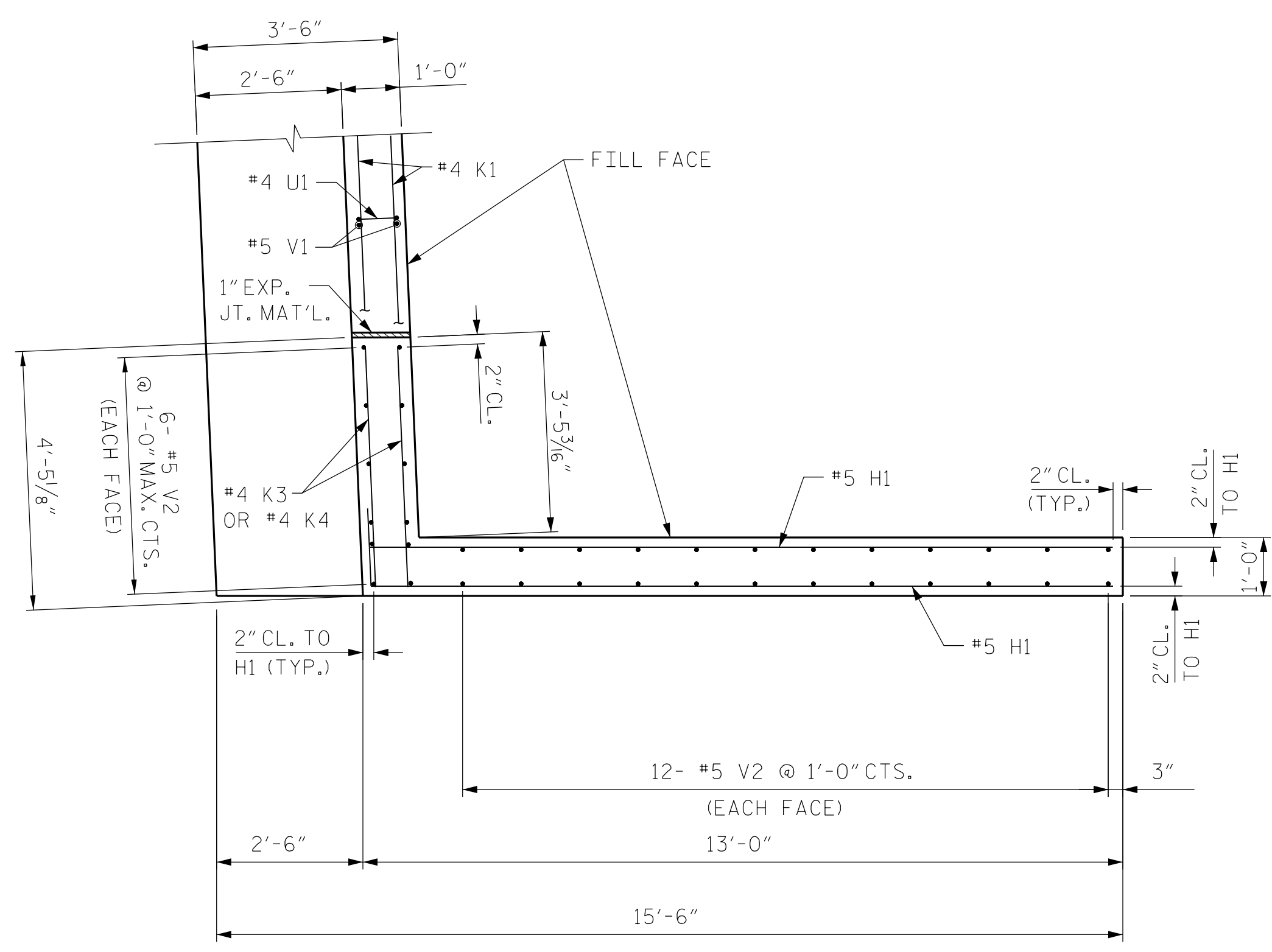




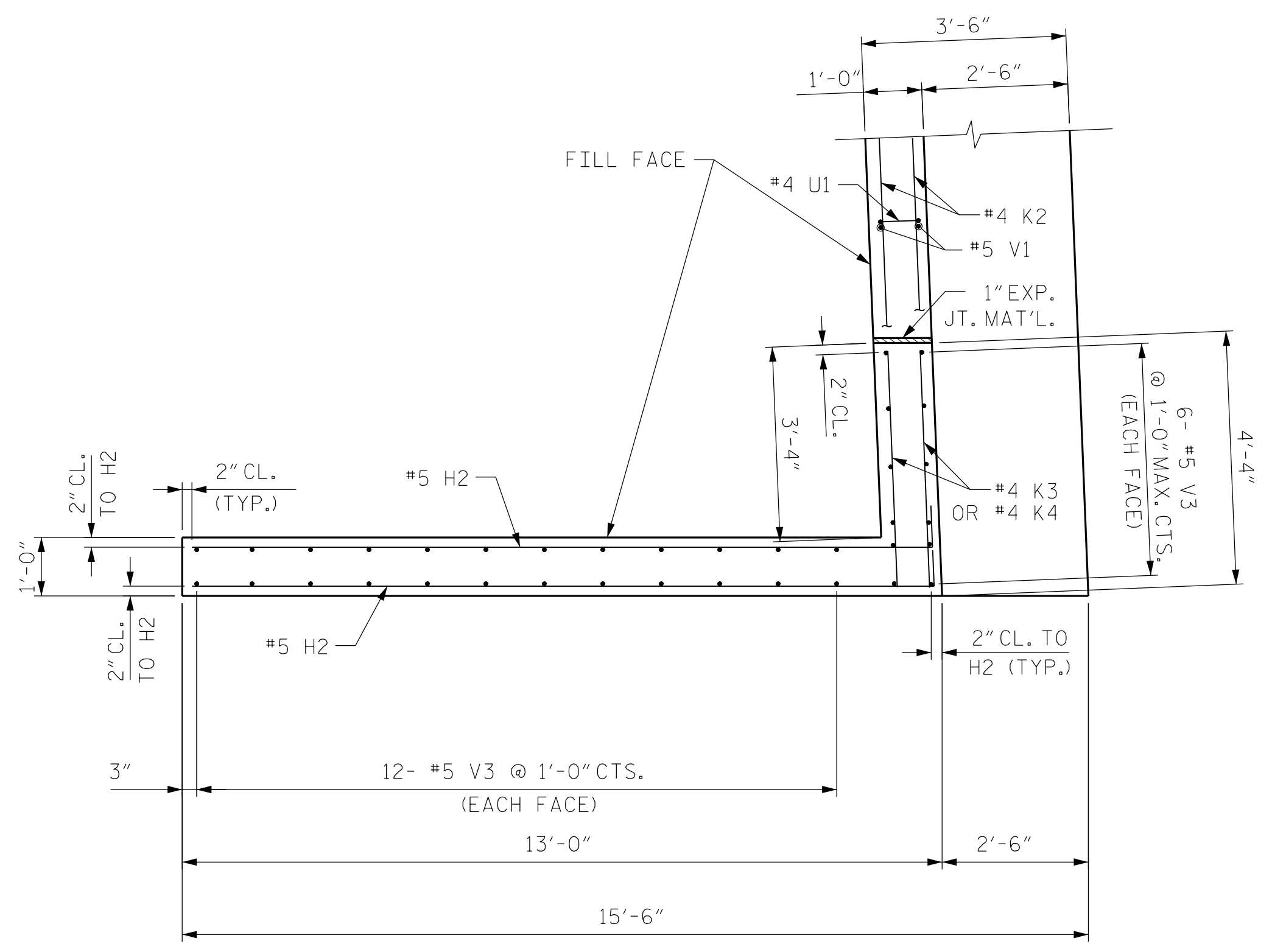






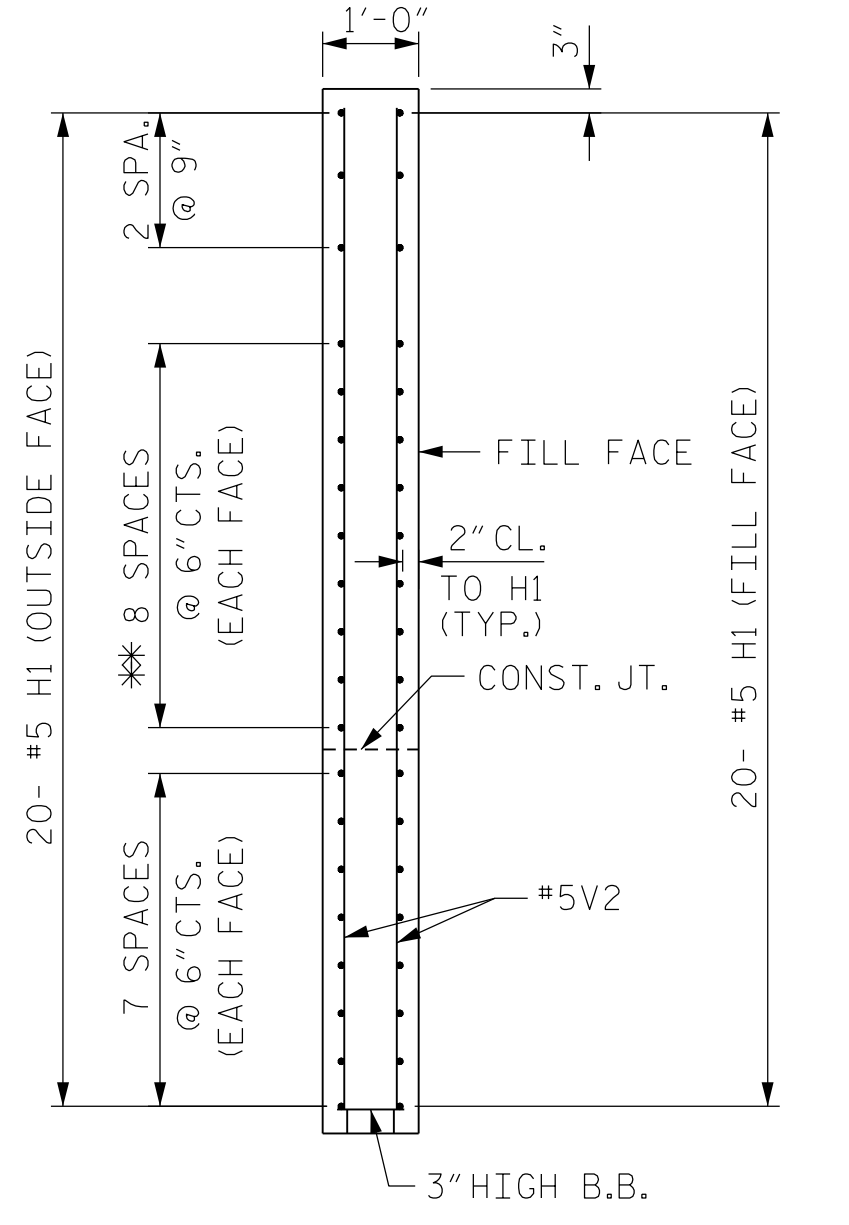


PLAN OF WING (W1)

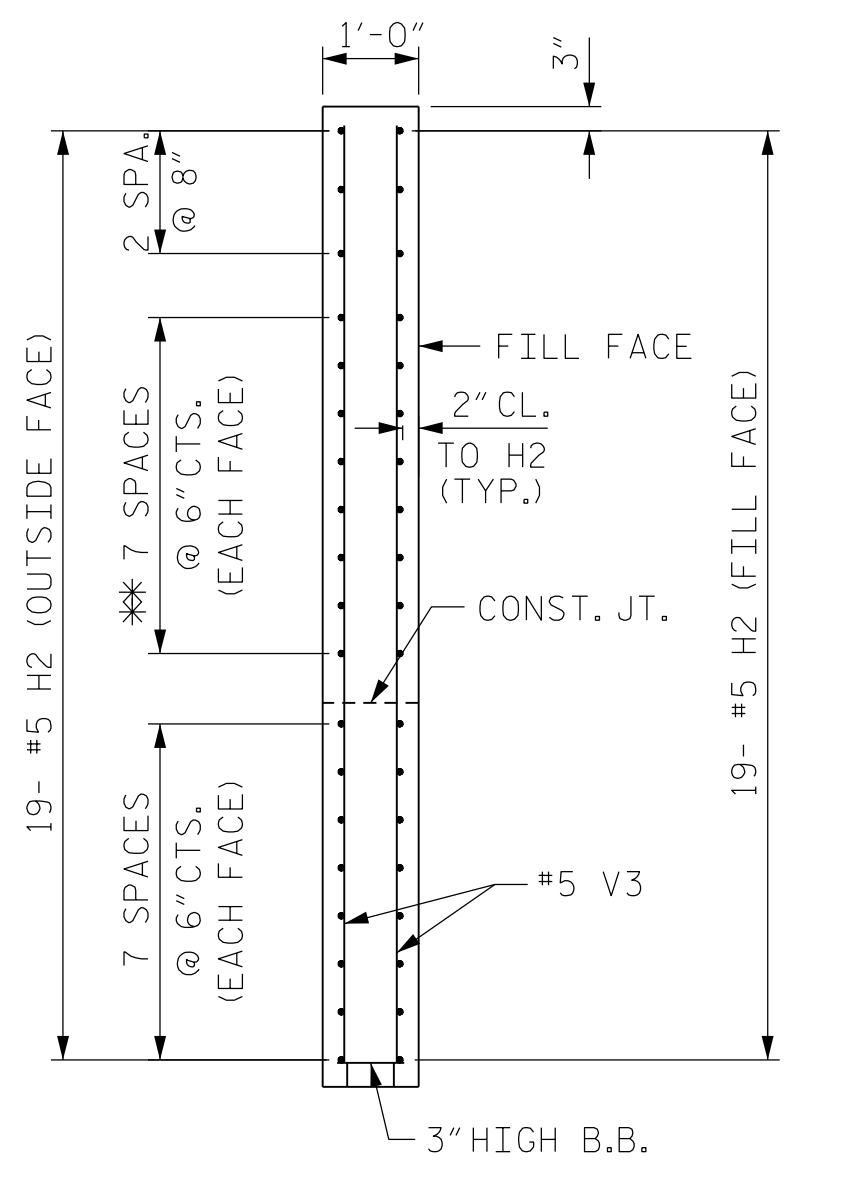


PLAN OF WING (W2)

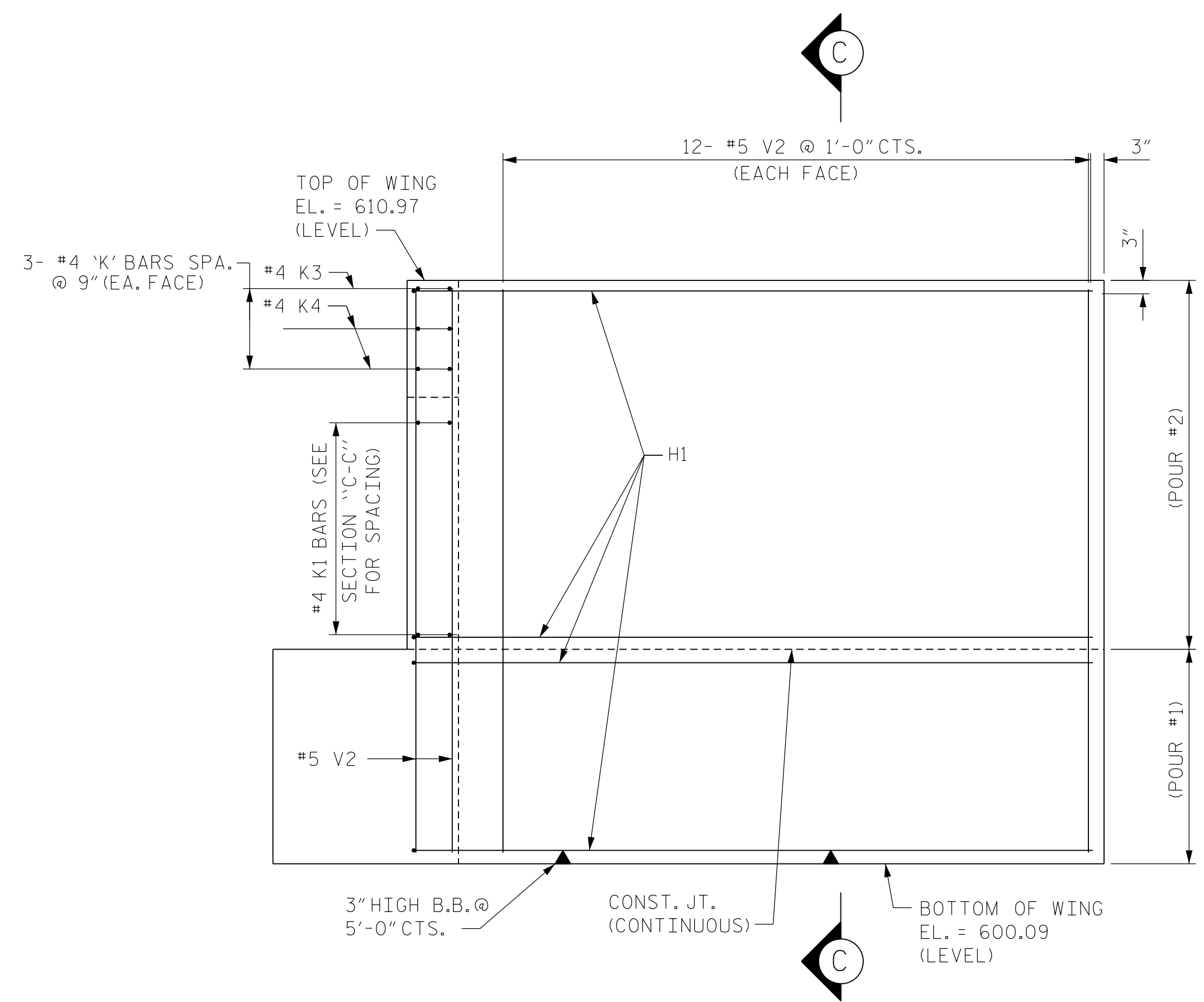
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SEE SHEET 4 OF 4 FOR NOTES.



SECTION "C-C"

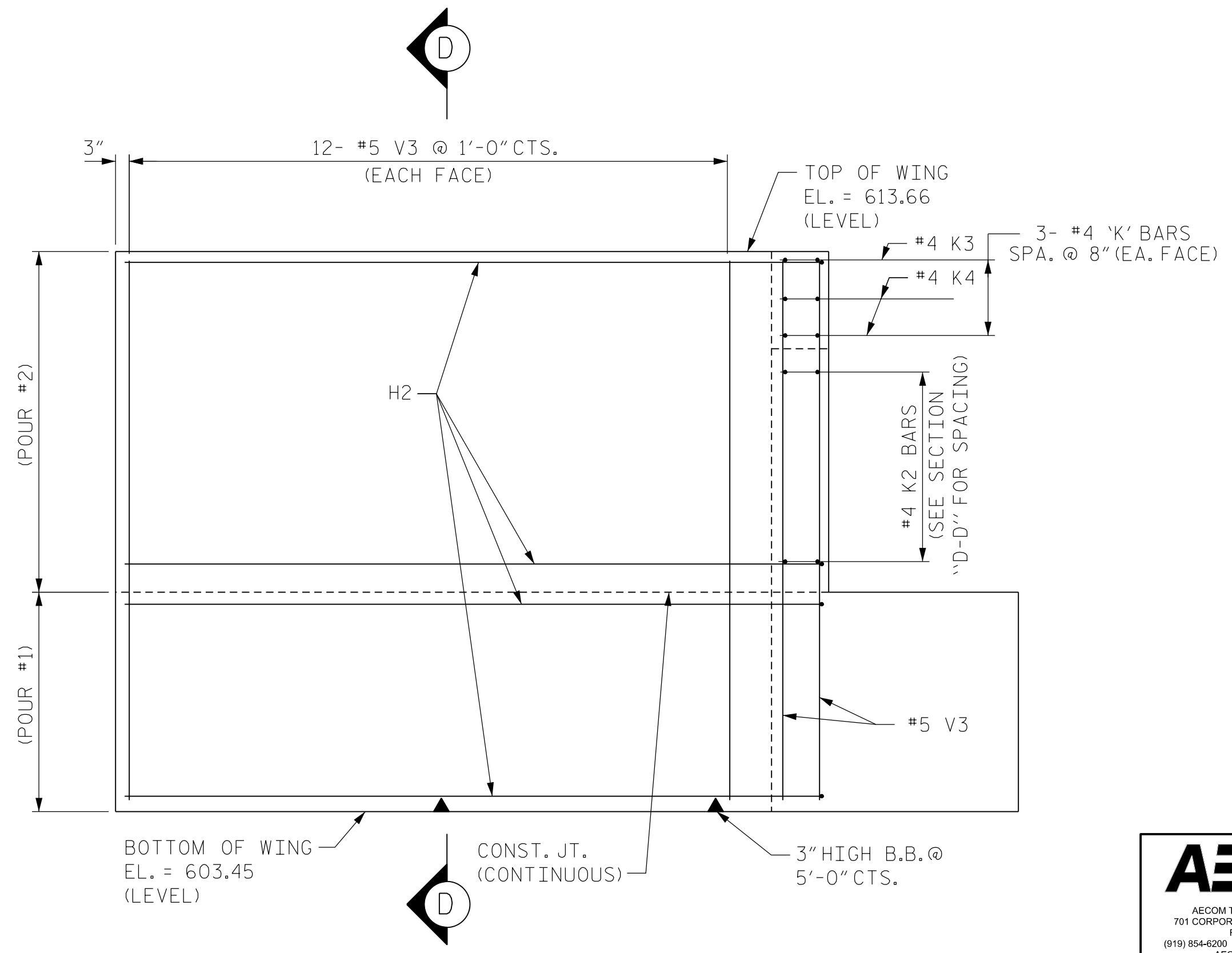


SECTION "D-D"



ELEVATION OF WING (W1)

\* PLACE #5 H1 BARS TO MATCH #4 'K' BARS IN BACKWALL



ELEVATION OF WING (W2)

PLACE #5 H2 BARS TO MATCH #4 'K' BARS IN BACKWALL

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-  
SHEET 3 OF 4

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11/30/2016

SEAL  
030474  
JOHN B. MORRISON  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF NORTH CAROLINA  
A2F0E142C82F4A8

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1  
SECTIONS AND DETAILS

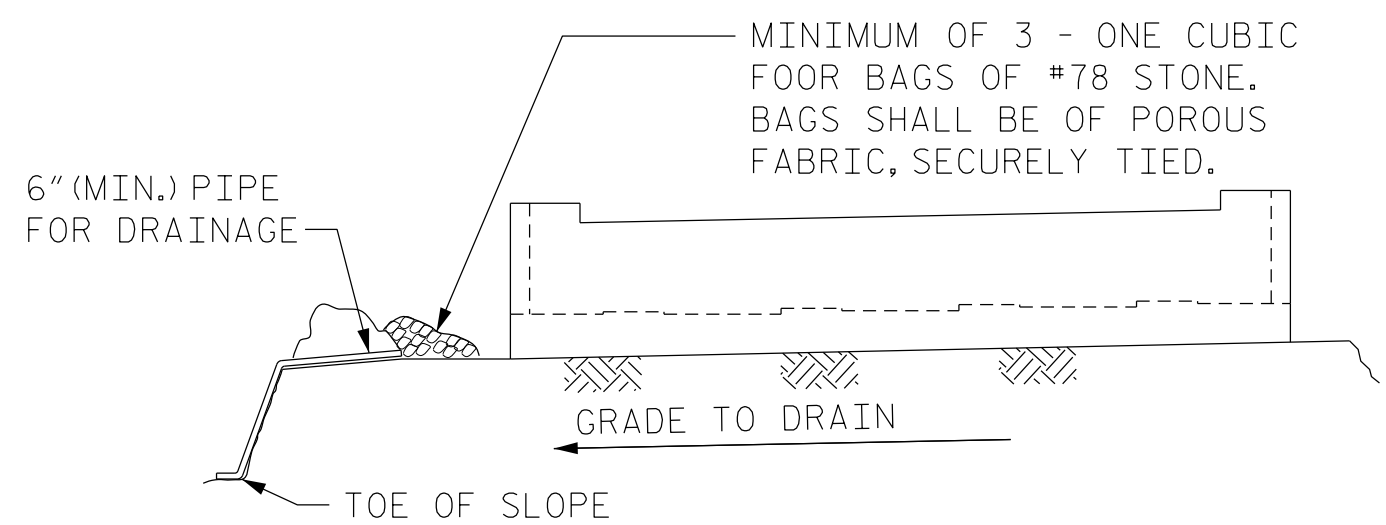
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			55

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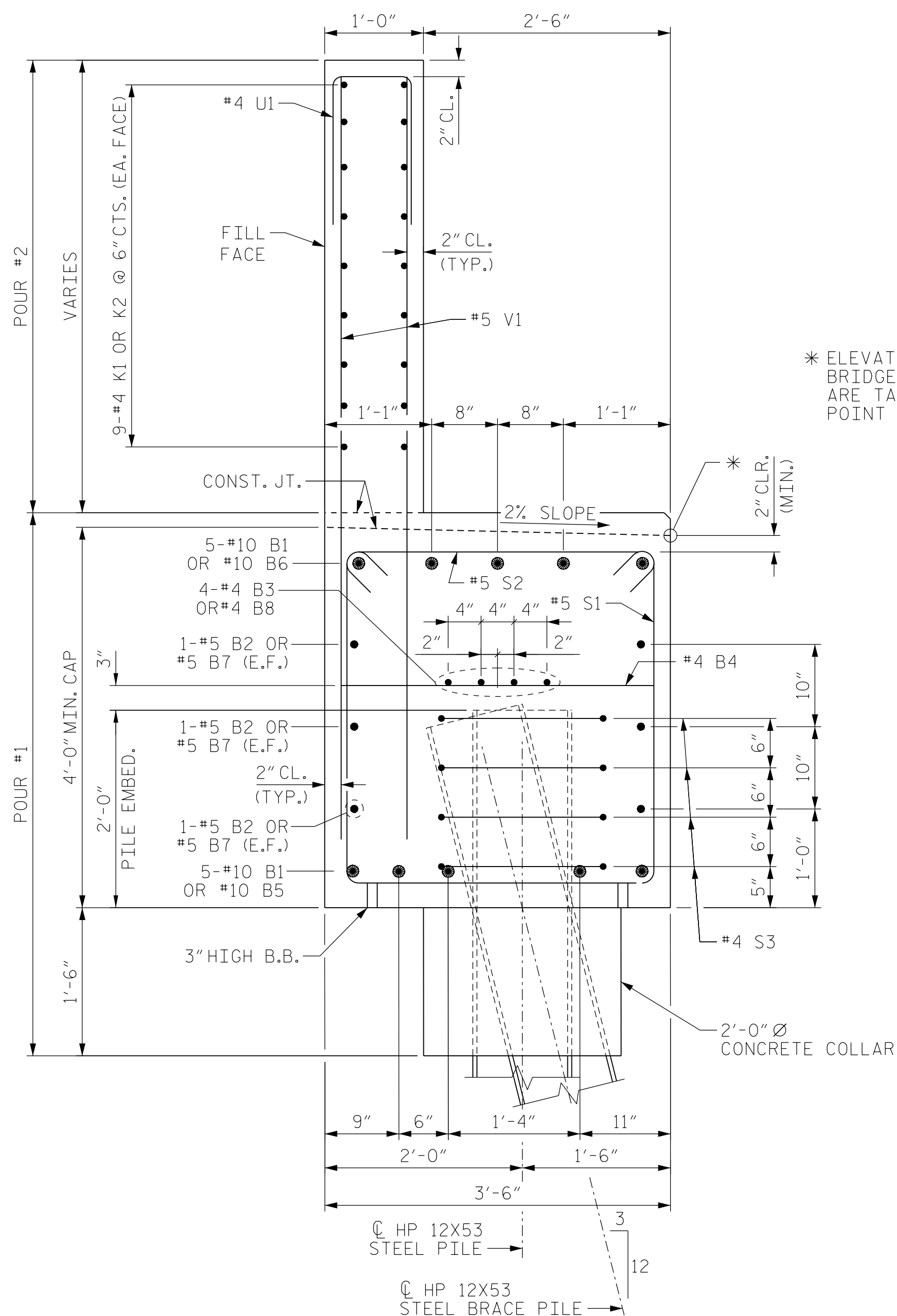


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

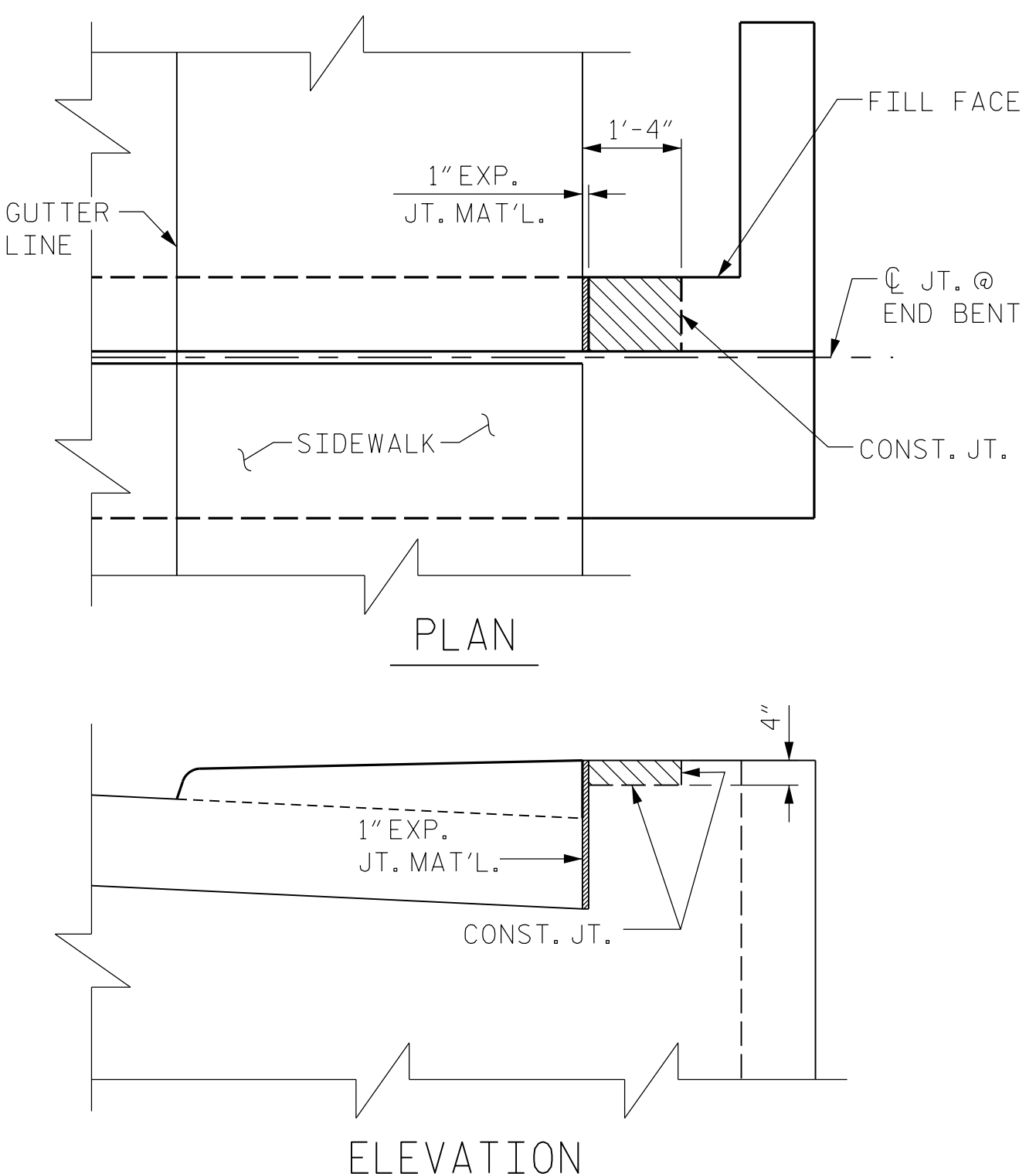
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT

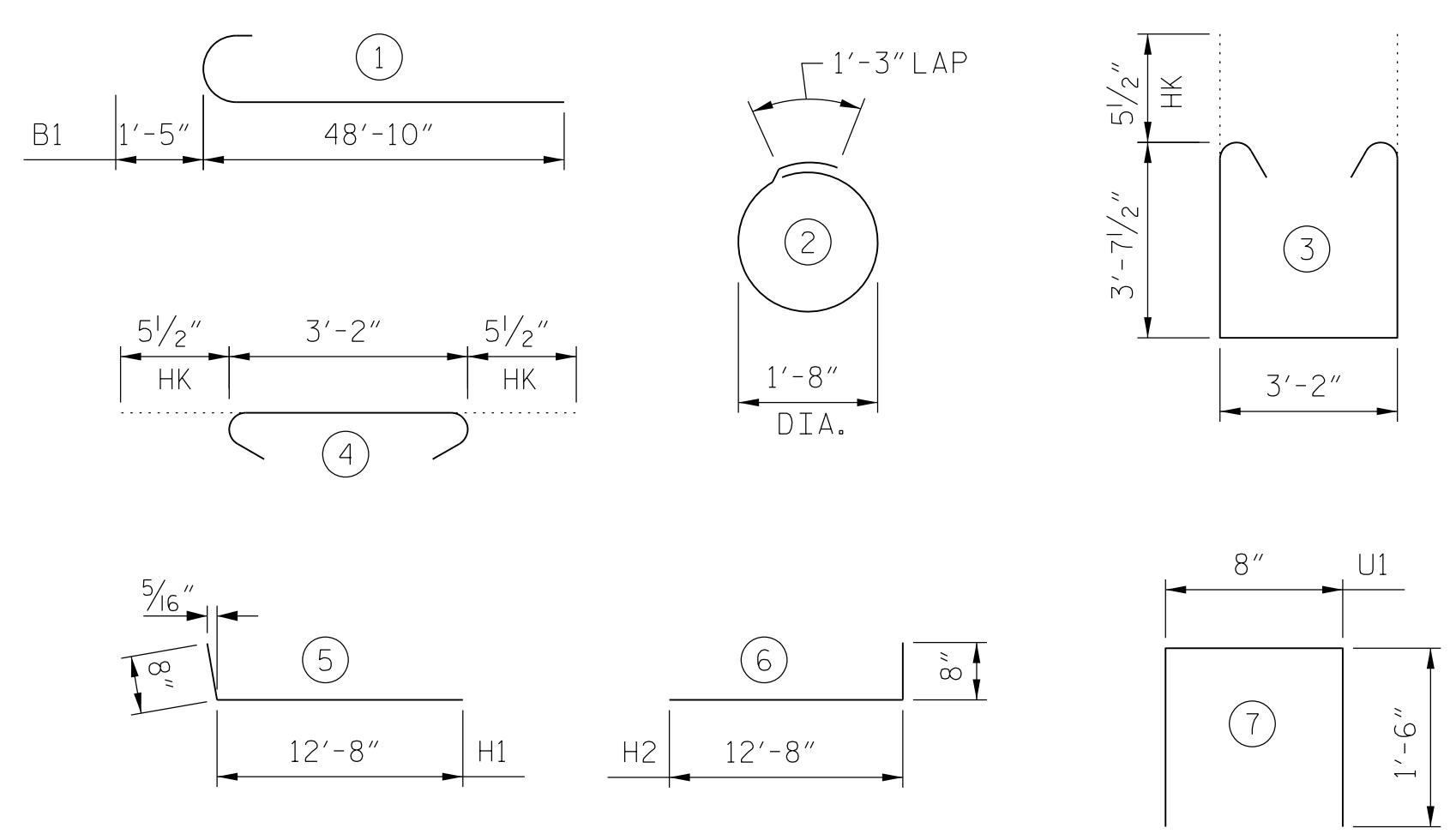


\* ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS ARE TAKEN AT THIS POINT



### BLOCKOUT IN WING DETAILS

### BAR TYPES



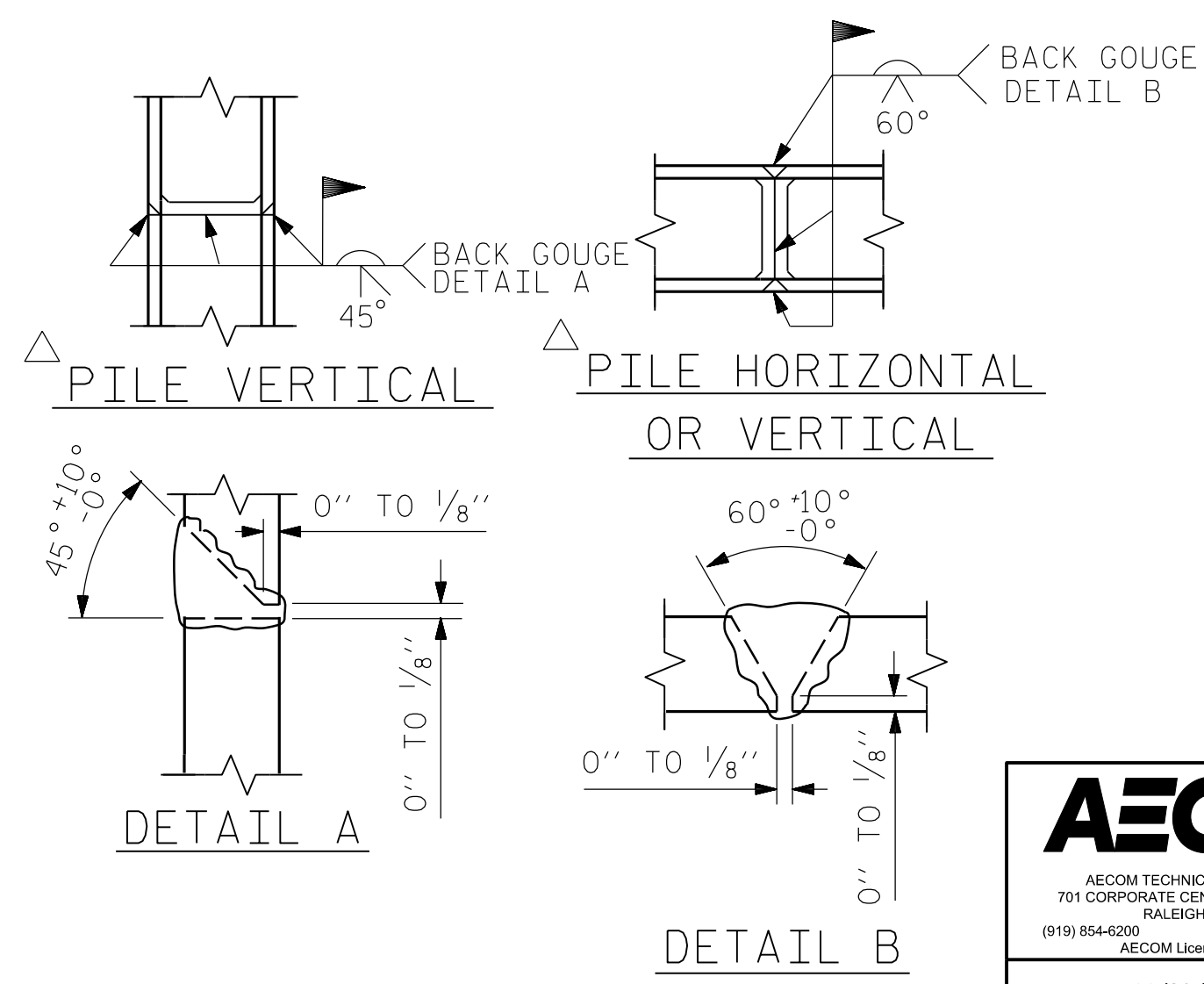
ALL BAR DIMENSIONS ARE OUT TO OUT.

### END BENT 1 - BILL OF MATERIAL

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	(1)	50'-3"	2162	B1	10	#10	(1)	50'-3"	2162
B2	6	#5	STR	49'-10"	312	B4	16	#4	STR	3'-2"	34
B3	8	#4	STR	26'-2"	140	B5	5	#10	STR	22'-11"	493
B4	12	#4	STR	3'-2"	25	B6	5	#10	STR	26'-1"	561
						B7	12	#5	STR	33'-5"	418
						B8	8	#4	STR	33'-2"	177
H1	40	#5	(5)	13'-4"	556	H2	38	#5	(6)	13'-4"	528
K1	36	#4	STR	26'-2"	629	K2	54	#4	STR	22'-11"	827
K3	2	#4	STR	2'-9"	4	K3	2	#4	STR	2'-9"	4
K4	4	#4	STR	4'-0"	11	K4	4	#4	STR	4'-0"	11
S1	56	#5	(3)	11'-4"	662	S1	79	#5	(3)	11'-4"	934
S2	56	#5	(4)	4'-1"	238	S2	79	#5	(4)	4'-1"	336
S3	24	#4	(2)	6'-6"	104	S3	28	#4	(2)	6'-6"	122
U1	43	#4	(7)	3'-8"	105	U1	60	#4	(7)	3'-8"	147
V1	86	#5	STR	8'-3"	740	V1	120	#5	STR	8'-3"	1033
V2	36	#5	STR	10'-6"	394	V3	36	#5	STR	9'-10"	369
REINFORCING STEEL						REINFORCING STEEL					
LBS. 6082						LBS. 8156					
CLASS A CONCRETE						CLASS A CONCRETE					
POUR #1 (CAP, COLLAR & LOWER WING) C.Y. 27.7						POUR #1 (CAP, COLLAR & LOWER WING) C.Y. 36.8					
POUR 2 (BACKWALL & UPPER WING) C.Y. 11.2						POUR 2 (BACKWALL & UPPER WING) C.Y. 13.7					
TOTAL C.Y. 38.9						TOTAL C.Y. 50.5					
HP 12x53 STEEL PILES NO. 6						HP 12x53 STEEL PILES NO. 7					
LIN. FT. 240						LIN. FT. 280					

### NOTES:

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- FOR OTHER NOTES, SEE "FOUNDATION LAYOUT" SHEET AND "LONG CHORD LAYOUT" SHEET.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE END POST ARE CAST IF SLIP FORMING IS USED.
- INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



### PILE SPLICE DETAILS

△ POSITION OF PILE DURING WELDING.

PROJECT NO. U-4910A  
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 SHEET 4 OF 4

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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
 030474  
 JOHN C. MORRISON  
 CIVIL ENGINEER  
 A2F0E143C82F4A8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1  
 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			55

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NOTES:

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCEMENT STEEL".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

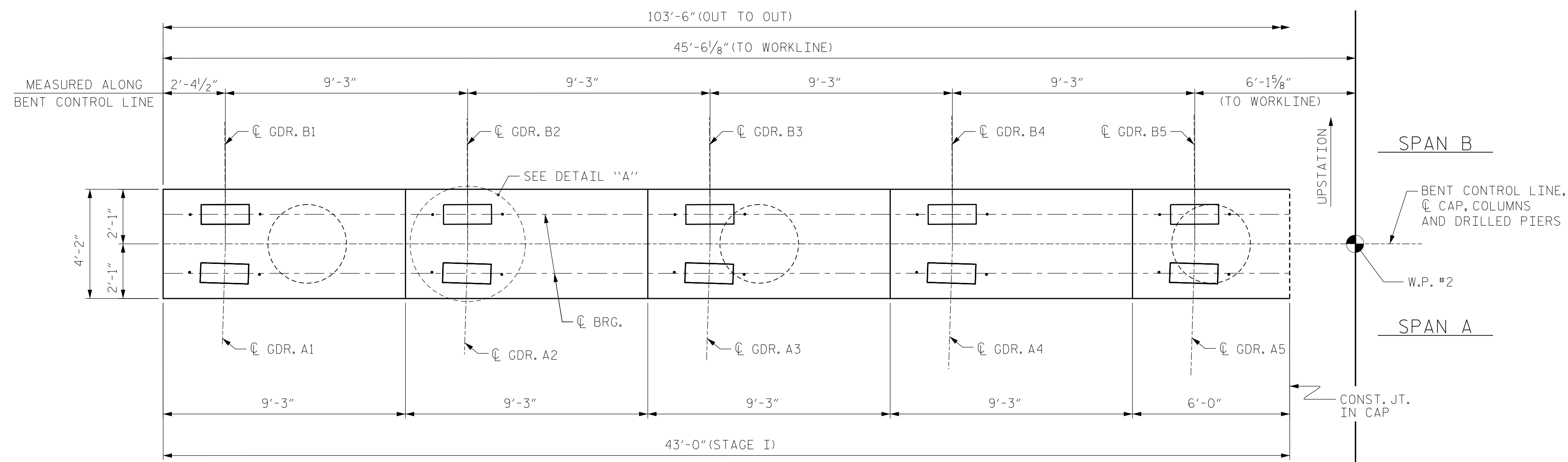
MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" BARS IN STAGE I WITH THE #9 "B" BARS IN STAGE II. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY 1 FOOT AND THE STAGE I BARS SHALL BE CUT ACCORDINGLY TO ALLOW A MINIMUM OF 1'-0" AND A MAXIMUM OF 2'-0" EXTENSION INTO STAGE II CONSTRUCTION.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LENGTHS OF THE #9 "B" BARS AT THE STAGED CONSTRUCTION JOINT MAY NEED TO BE ADJUSTED DUE TO THE TYPE OF MECHANICAL BUTT SPLICE CHOSEN BY THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY ADJUSTMENTS.

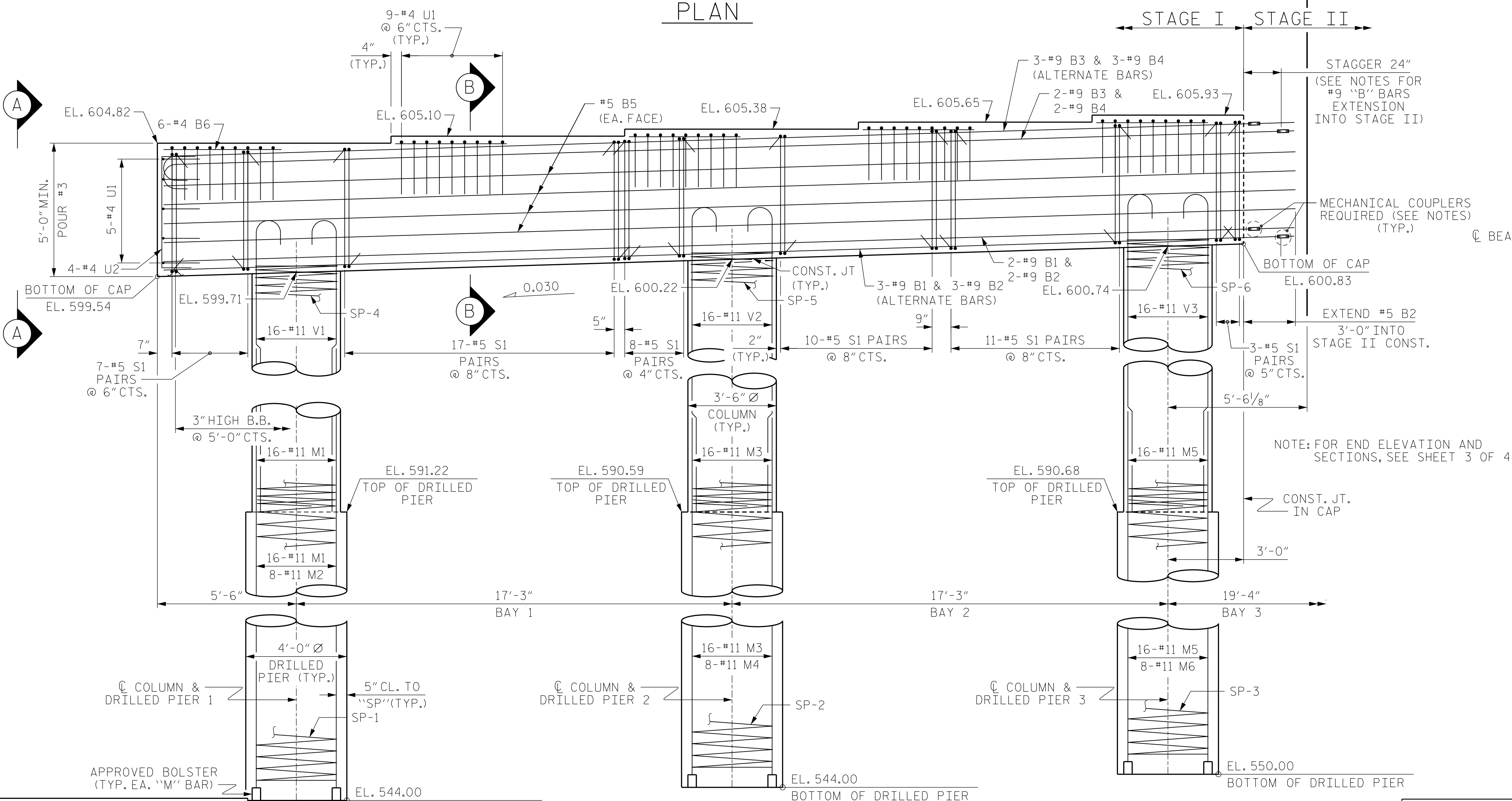
FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD SPECIFICATIONS.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.

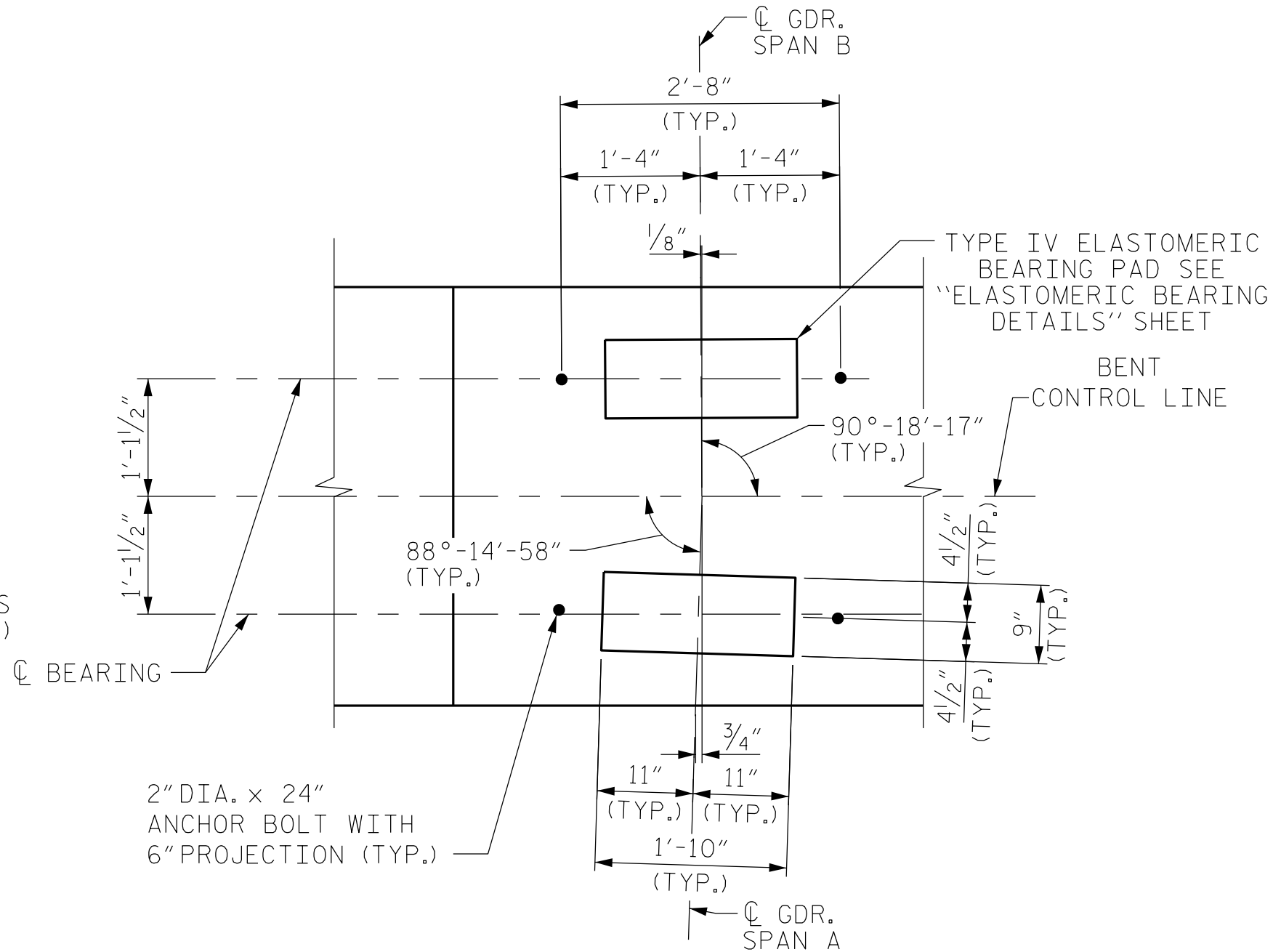
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.



PLAN



ELEVATION



DETAIL "A" (TYP. ALL GIRDERS)

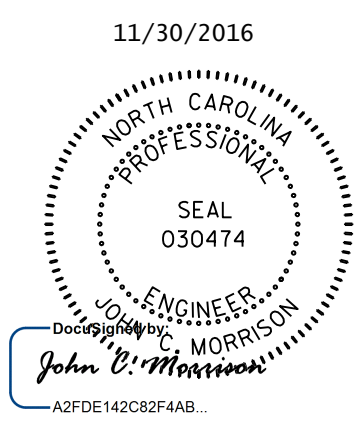
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CABARRUS COUNTY  
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SHEET 1 OF 4



STATE OF NORTH CAROLINA  
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RALEIGH

SUBSTRUCTURE  
BENT 1  
PLAN & ELEVATION



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-39
2			4			TOTAL SHEETS 55

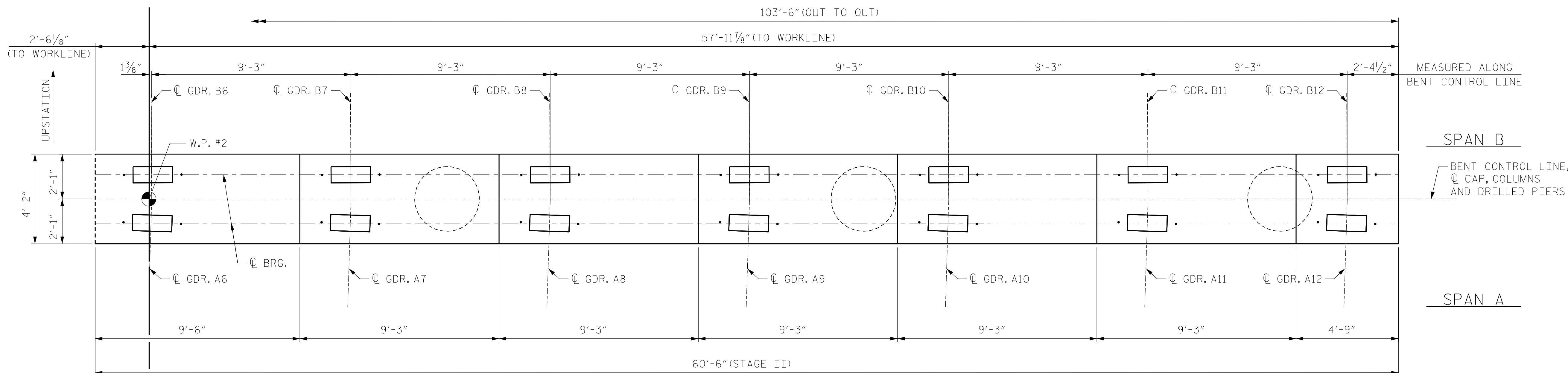
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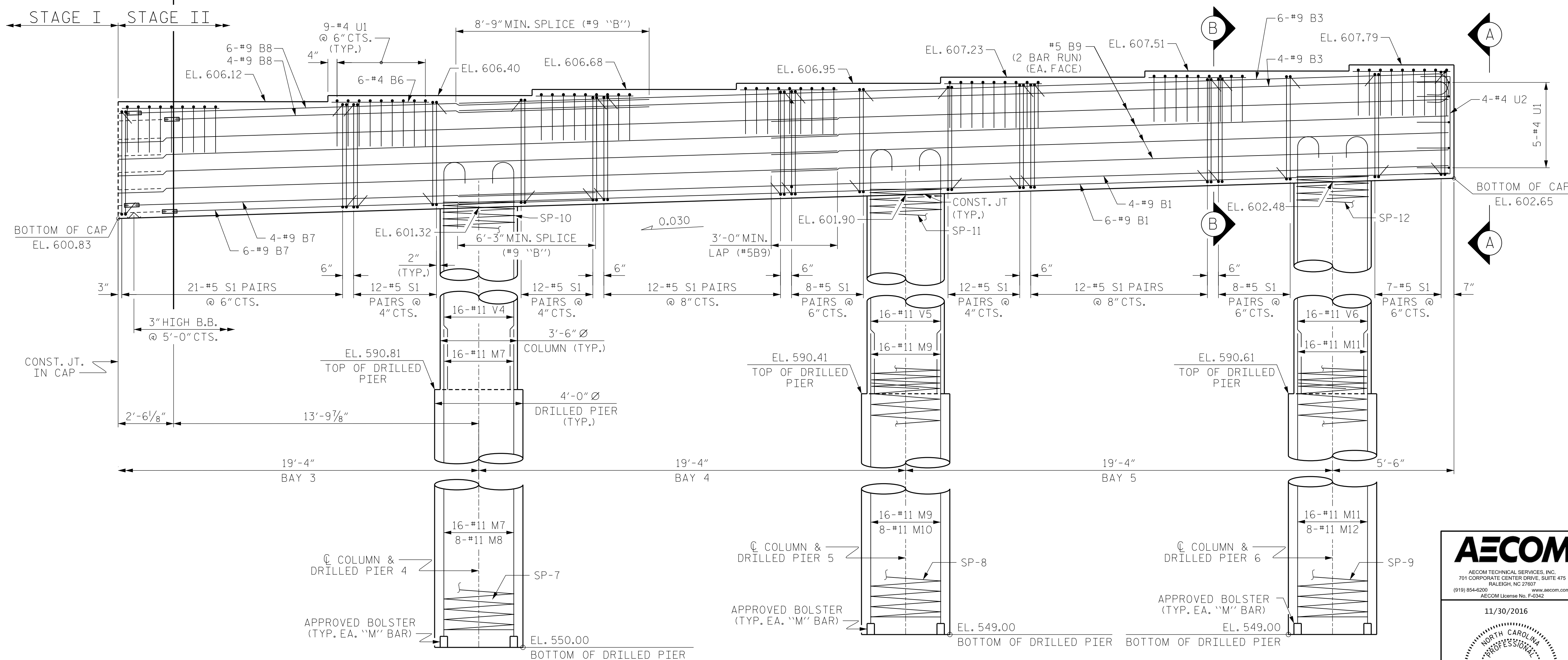
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NOTES:  
FOR NOTES, SEE SHEET 1 OF 4.



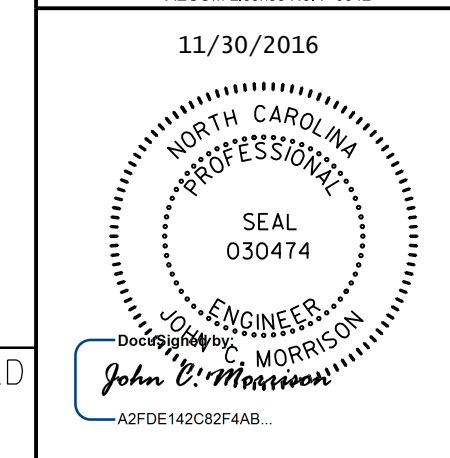
PLAN



ELEVATION

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1  
PLAN & ELEVATION

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
S-40  
TOTAL SHEETS  
55

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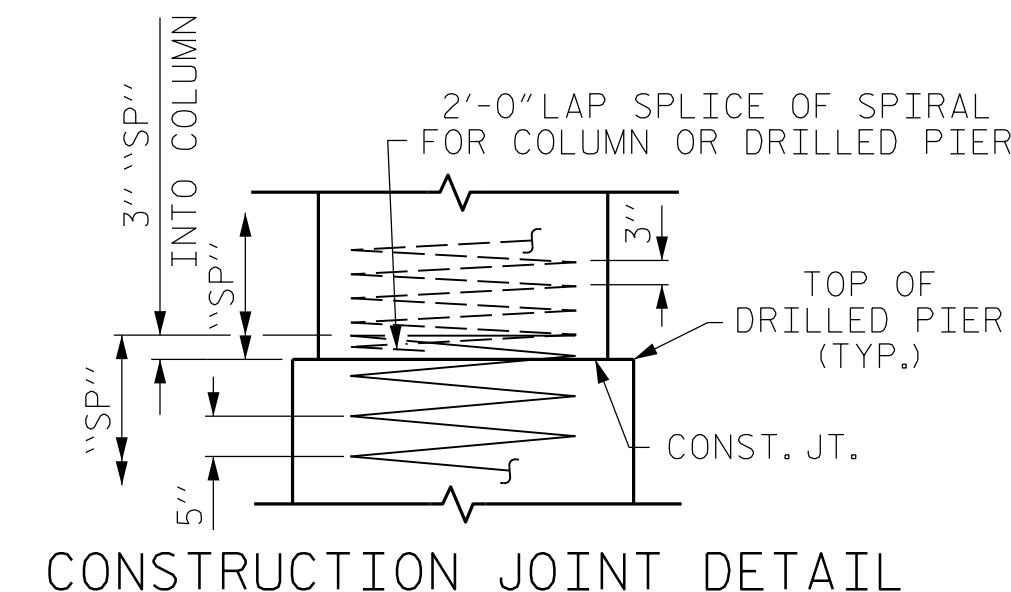
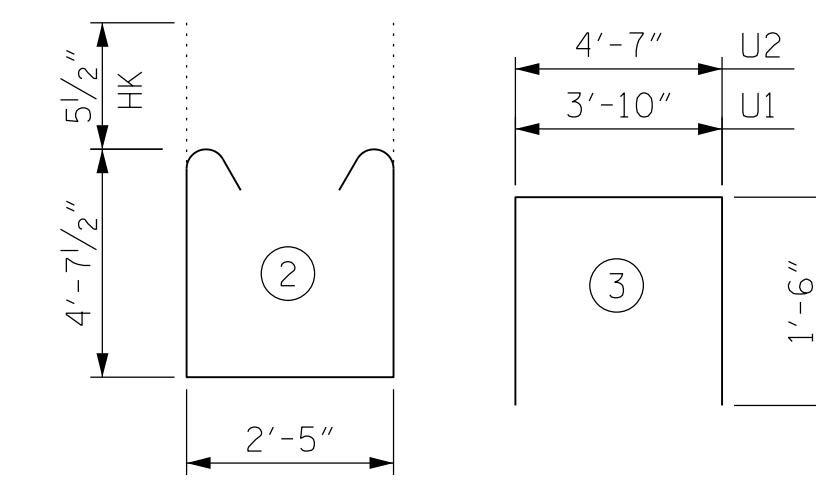
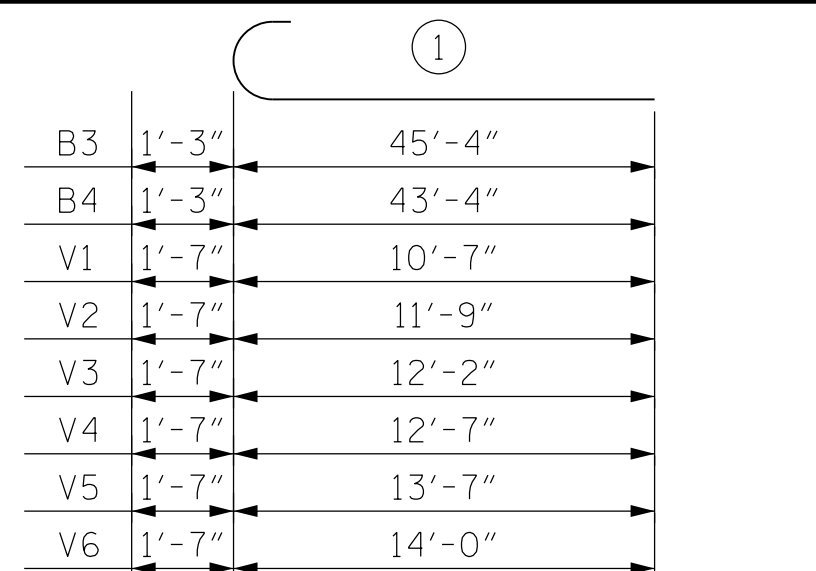
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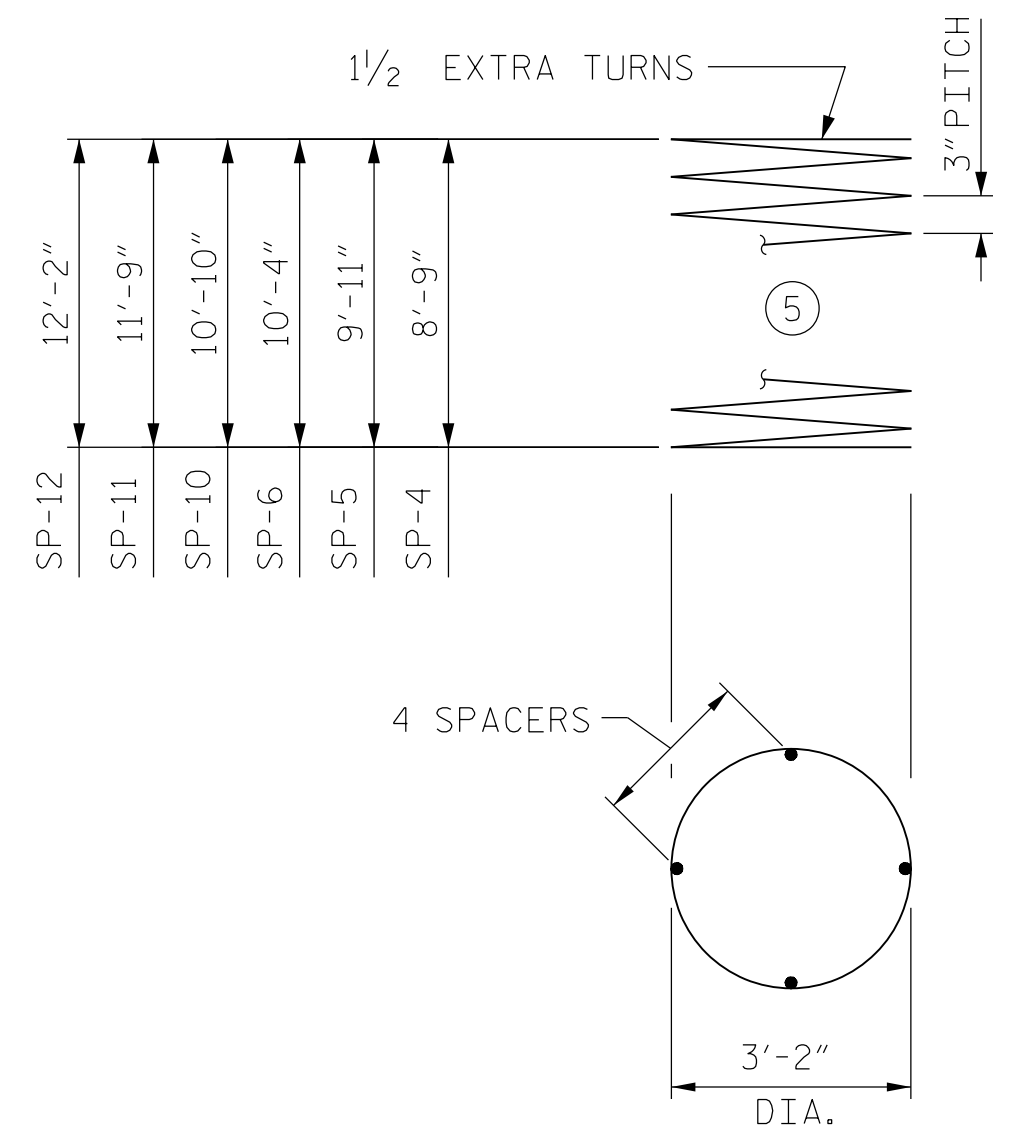
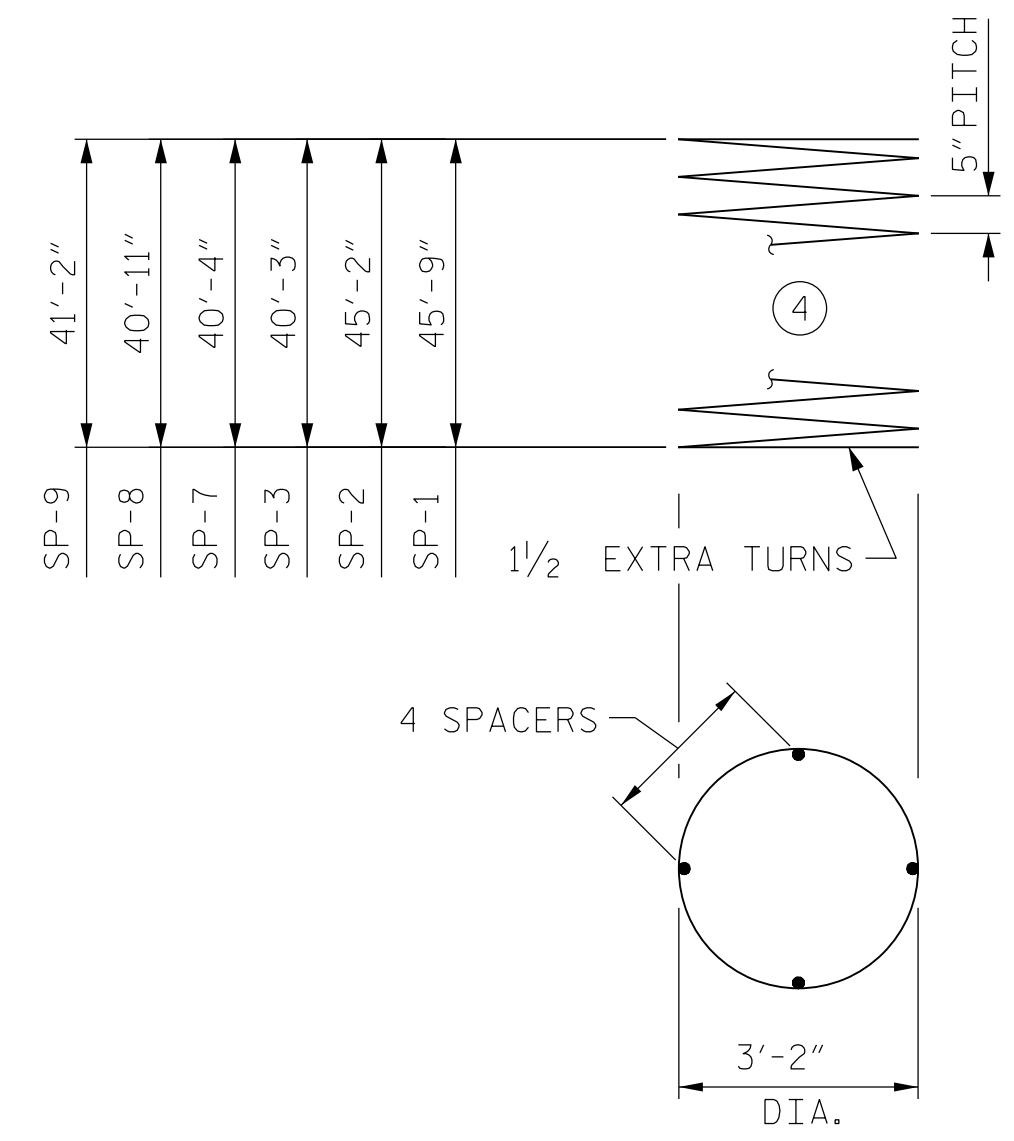


BAR TYPES



CONSTRUCTION JOINT DETAIL

COLUMN	LENGTH	DRILLED PIER	LENGTH
1	8'-5 7/8"	1	47'-2 5/8"
2	9'-7 1/2"	2	46'-7"
3	10'-0 3/4"	3	40'-8 1/4"
4	10'-6 1/8"	4	40'-9 3/4"
5	11'-5 7/8"	5	41'-5"
6	6'-10 1/2"	6	41'-7 3/8"



ALL BAR DIMENSIONS ARE OUT TO OUT.

SPLICE LENGTHS		
BAR SIZE	TOP BAR	BASIC
#5	3'-0"	2'-2"
#9	8'-9"	6'-3"

BENT 1 - BILL OF MATERIAL

STAGE I					STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	STR	45'-4"	771	B1	10	#9	STR	45'-4"	1541
B2	5	#9	STR	43'-4"	737	B3	10	#9	(1)	46'-7"	1584
B3	5	#9	(1)	46'-7"	792	B6	42	#4	STR	4'-5"	124
B4	5	#9	(1)	44'-7"	758	B7	10	#9	STR	20'-9"	706
B5	8	#5	STR	45'-10"	382	B8	10	#9	STR	23'-3"	791
B6	30	#4	STR	4'-5"	89	B9	16	#5	STR	31'-8"	528
M1	16	#11	STR	57'-2"	4860	M7	16	#11	STR	50'-9"	4314
M2	8	#11	STR	49'-7"	2107	M8	8	#11	STR	43'-2"	1835
M3	16	#11	STR	56'-7"	4810	M9	16	#11	STR	51'-4"	4364
M4	8	#11	STR	49'-0"	2083	M10	8	#11	STR	43'-9"	1860
M5	16	#11	STR	50'-8"	4307	M11	16	#11	STR	51'-7"	4385
M6	8	#11	STR	43'-1"	1831	M12	8	#11	STR	44'-0"	1870
S1	110	#5	(2)	12'-7"	1444	S1	208	#5	(2)	12'-7"	2730
U1	50	#4	(3)	6'-10"	228	U1	68	#4	(3)	6'-10"	310
U2	4	#4	(3)	7'-7"	20	U2	4	#4	(3)	7'-7"	20
V1	16	#11	(1)	12'-2"	1034	V4	16	#11	(1)	14'-3"	1211
V2	16	#11	(1)	13'-4"	1133	V5	16	#11	(1)	15'-2"	1289
V3	16	#11	(1)	13'-9"	1169	V6	16	#11	(1)	15'-7"	1325

REINFORCING STEEL					REINFORCING STEEL						
LBS. 28555					LBS. 30787						
SP-1	1	*	(4)	1116'-6"	1165	SP-7	1	*	(4)	969'-7"	1011
SP-2	1	*	(4)	1106'-9"	1154	SP-8	1	*	(4)	979'-5"	1022
SP-3	1	*	(4)	969'-7"	1011	SP-9	1	*	(4)	989'-2"	1032
SP-4	1	**	(5)	363'-5"	243	SP-10	1	**	(5)	442'-0"	295
SP-5	1	**	(5)	412'-6"	276	SP-11	1	**	(5)	481'-3"	321
SP-6	1	**	(5)	422'-4"	282	SP-12	1	**	(5)	500'-11"	335

SPIRAL REINFORCING STEEL					SPIRAL REINFORCING STEEL				
4131 LBS.					4016 LBS.				

\* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BENT 1 TOTAL QUANTITIES

CLASS A CONCRETE		CLASS A CONCRETE	
POUR 2 (COLUMNS)	10.0 C.Y.	POUR 2 (COLUMNS)	12.1 C.Y.
POUR 3 (CAP)	34.1 C.Y.	POUR 3 (CAP)	48.0 C.Y.
TOTAL CLASS A CONCRETE	44.1 C.Y.	TOTAL CLASS A CONCRETE	60.1 C.Y.

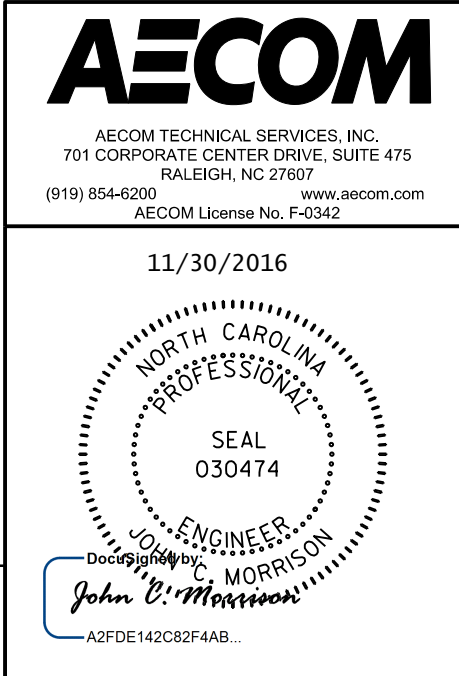
DRILLED PIERS:		DRILLED PIERS:	
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	62.6 C.Y.	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	57.6 C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL	37.0 LIN. FT.	4'-0" Ø DRILLED PIER NOT IN SOIL	37.0 LIN. FT.
4'-0" Ø DRILLED PIER IN SOIL	97.5 LIN. FT.	4'-0" Ø DRILLED PIER IN SOIL	86.8 LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	62.5 LIN. FT.	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	61.8 LIN. FT.

DATE: 11/30/2016 TIME: 10:53:58 AM

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 SHEET 4 OF 4

STATE OF NORTH CAROLINA  
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 RALEIGH

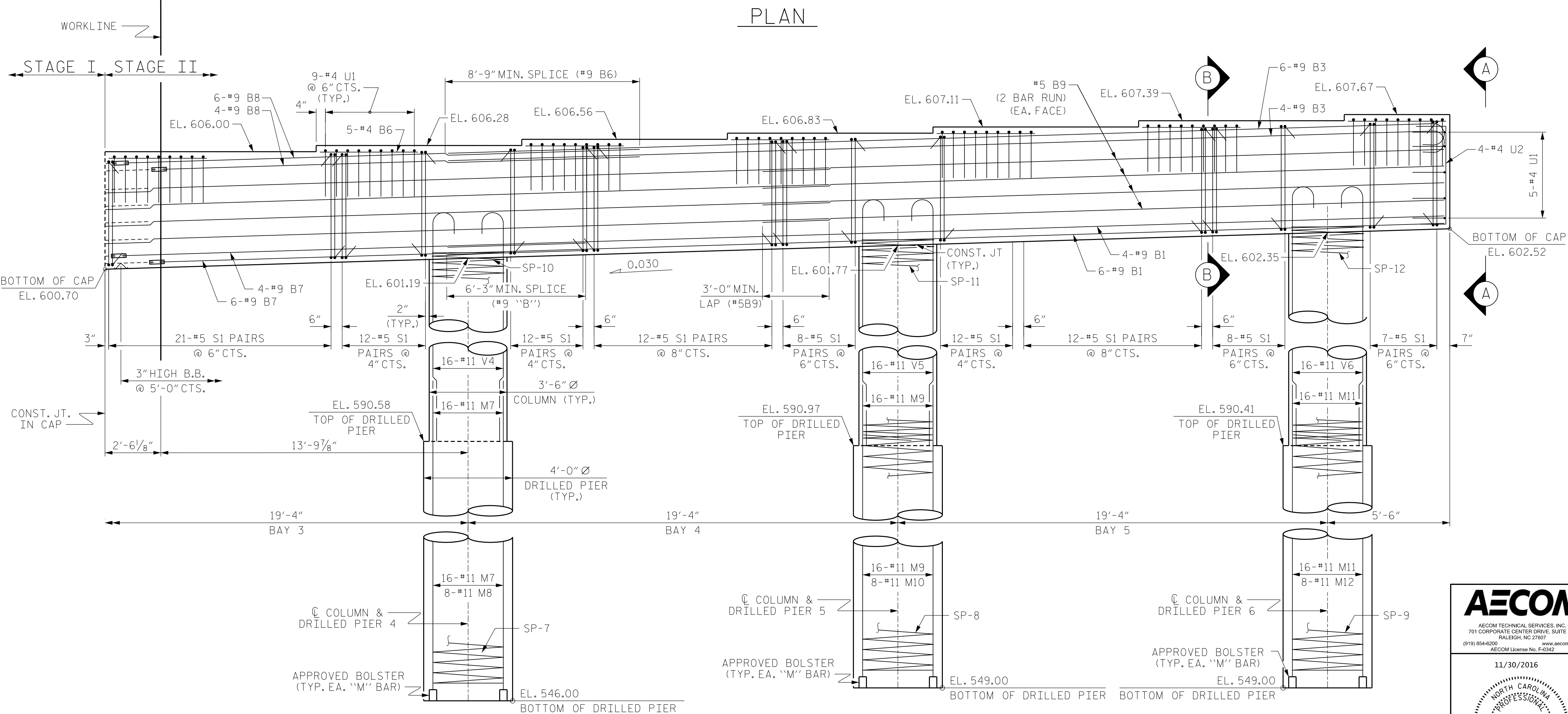
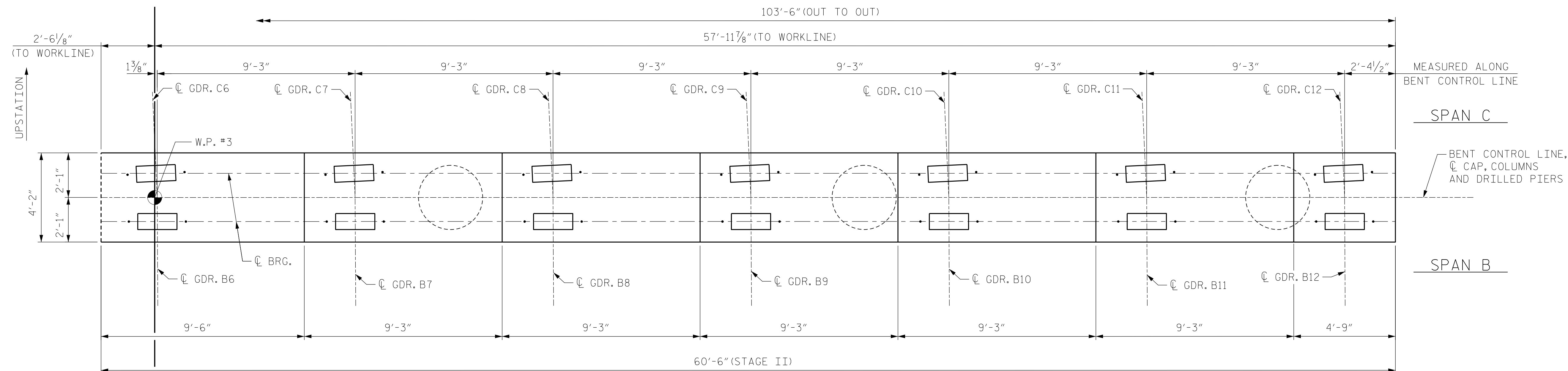
SUBSTRUCTURE  
 BENT 1  
 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			
2			4			





NOTES:  
FOR NOTES, SEE SHEET 1 OF 4.

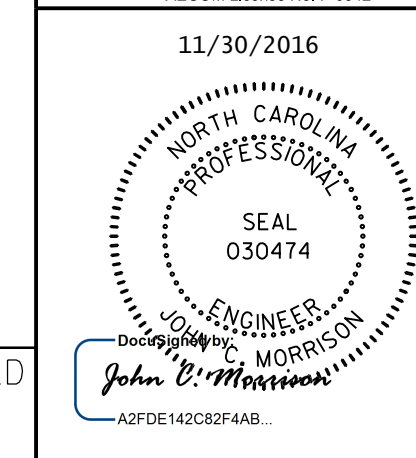


PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

SHEET 2 OF 4



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RALEIGH

SUBSTRUCTURE  
BENT 2  
PLAN & ELEVATION

REVISIONS						SHEET NO. S-44
NO.	BY:	DATE:	NO.	BY:	DATE:	
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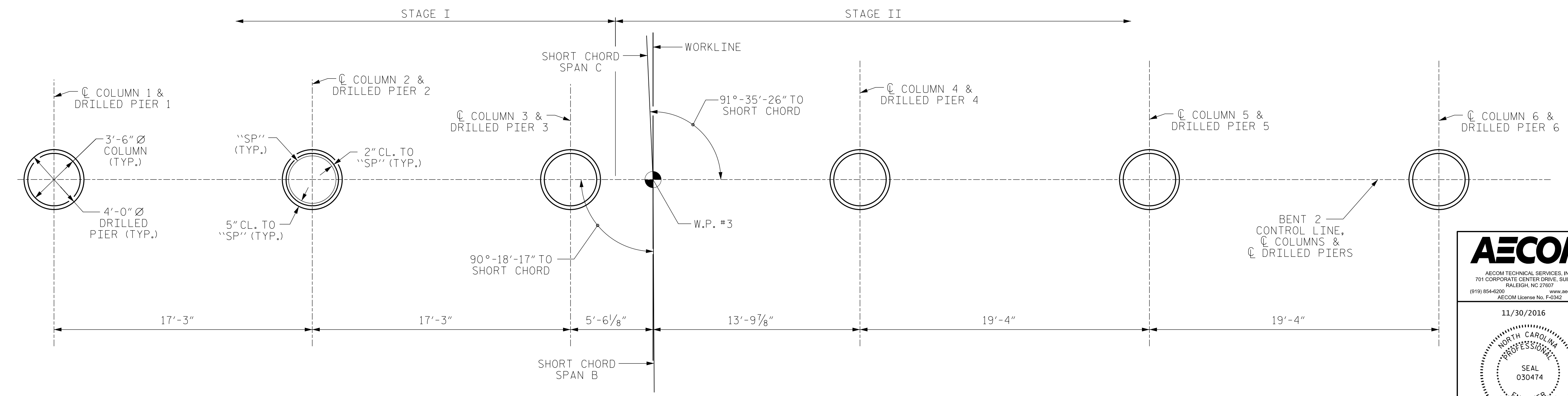
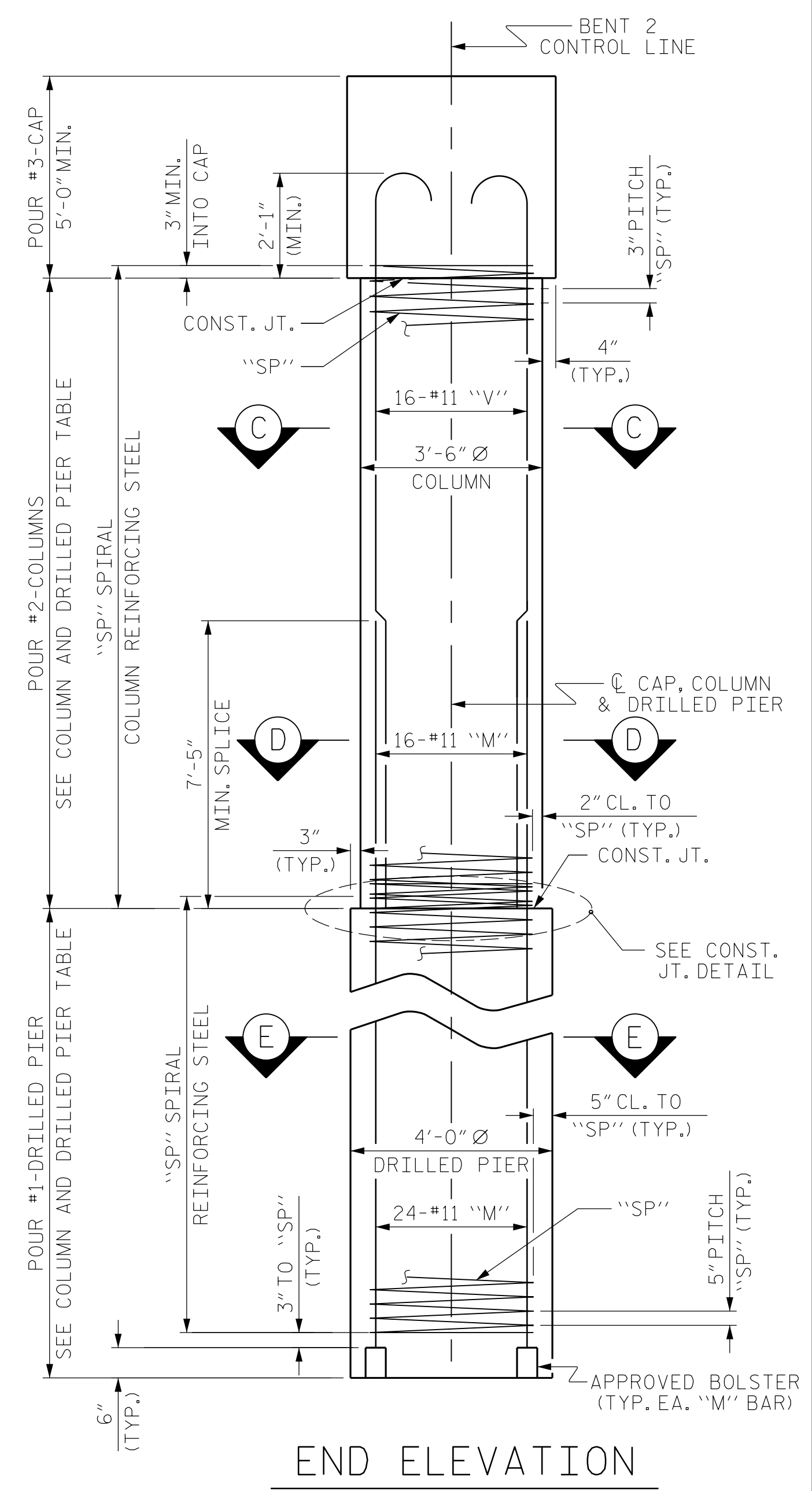
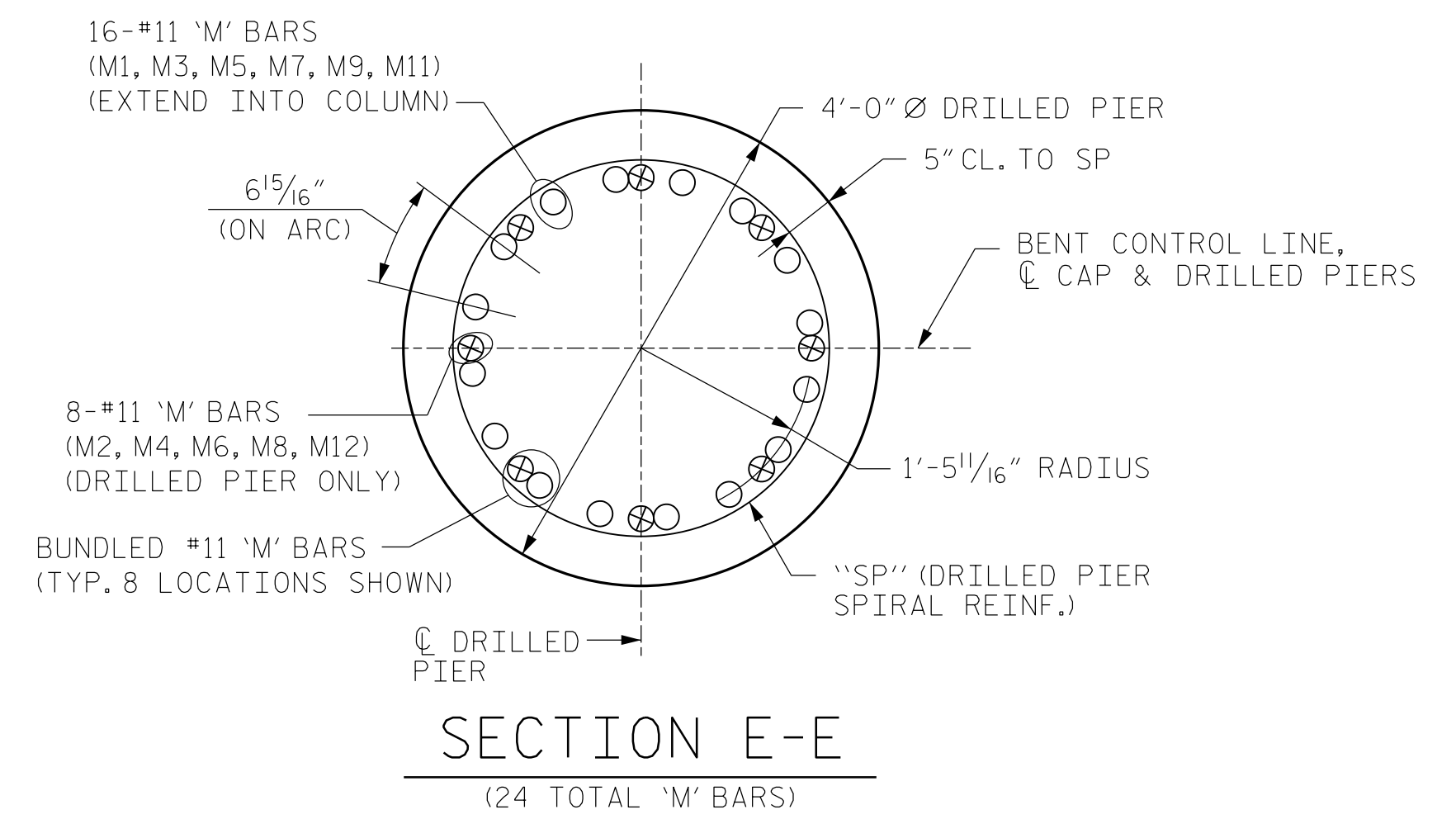
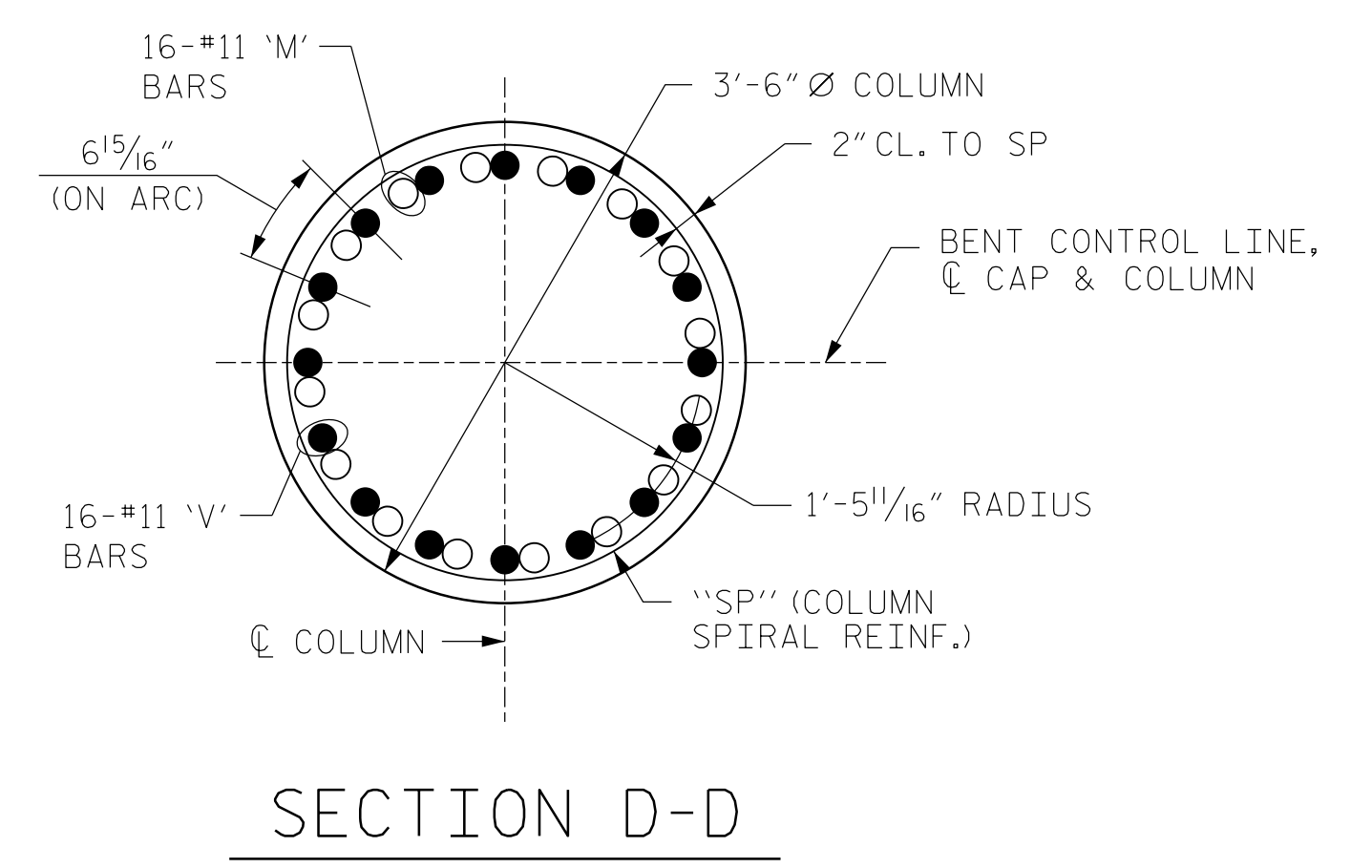
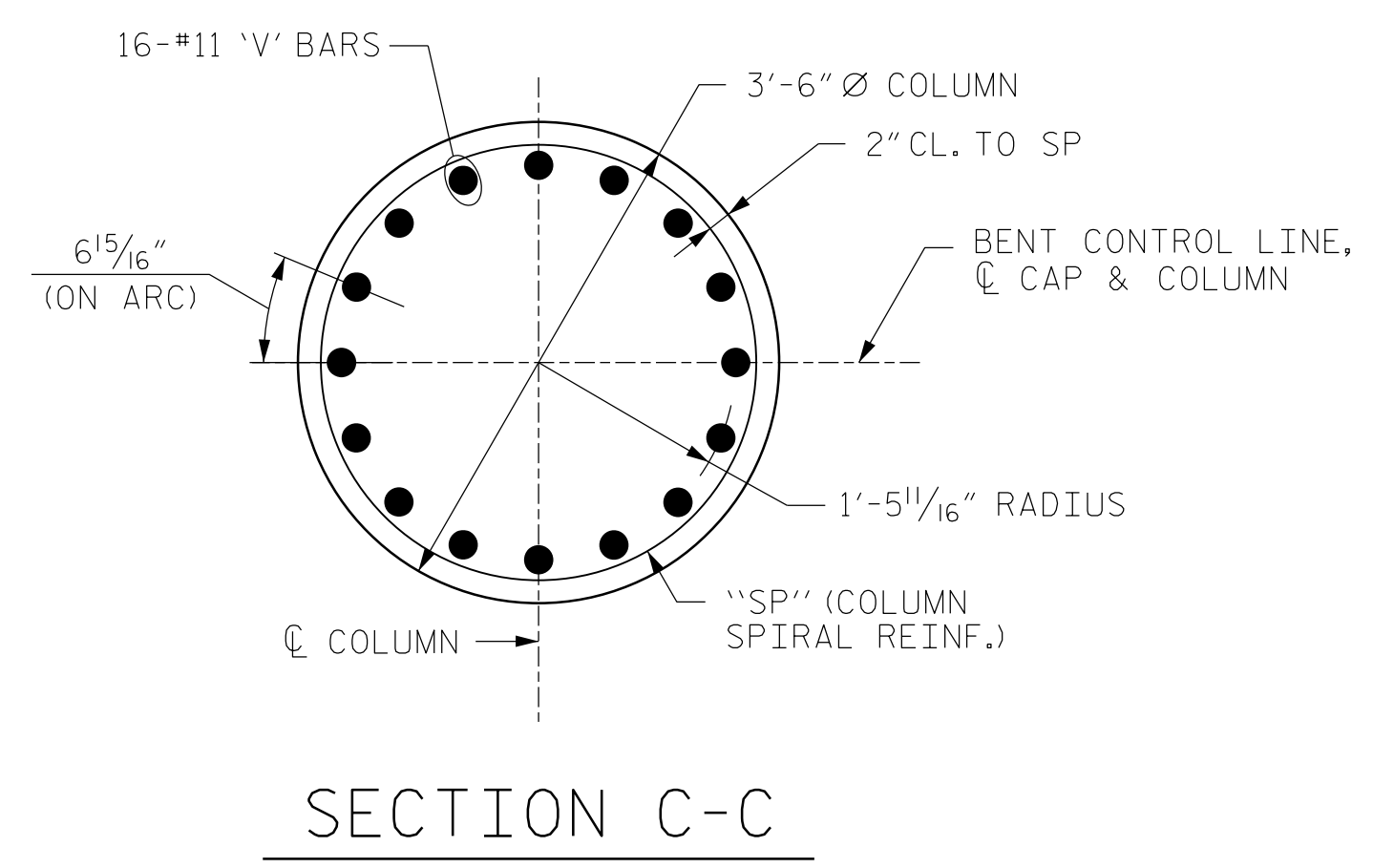
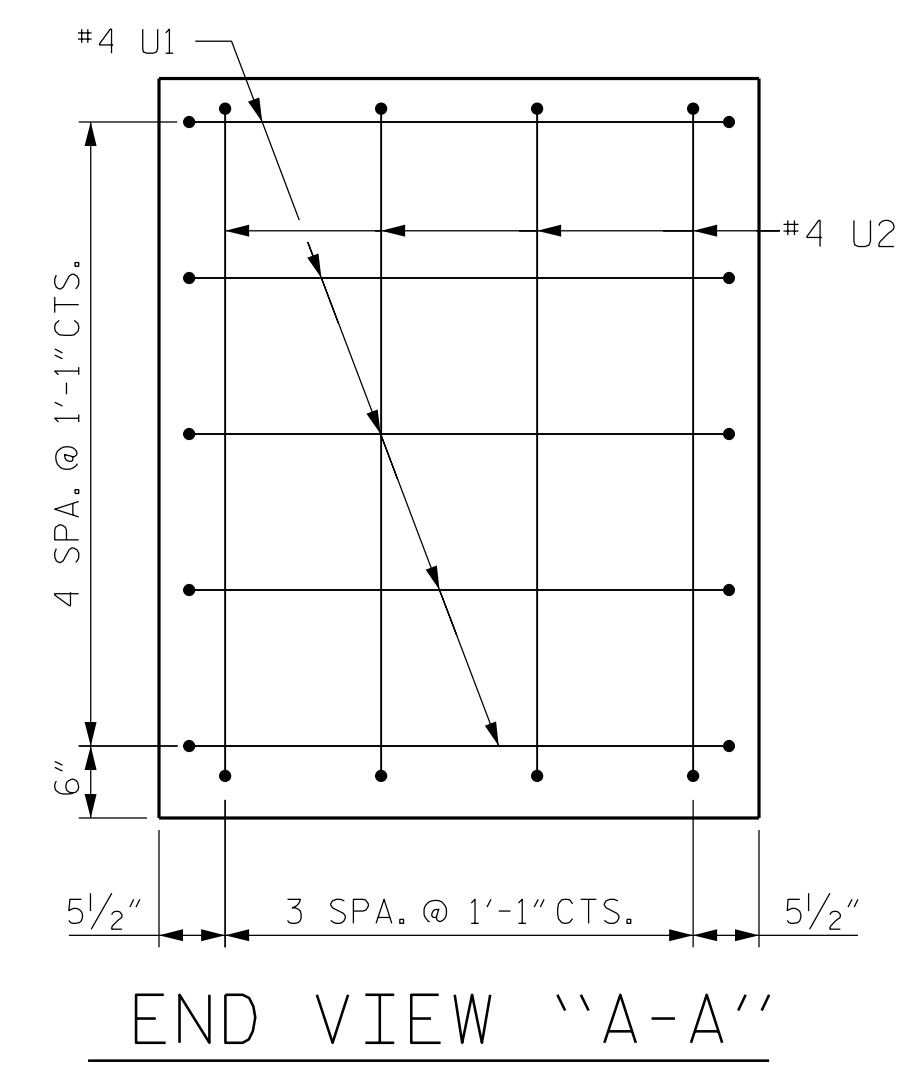
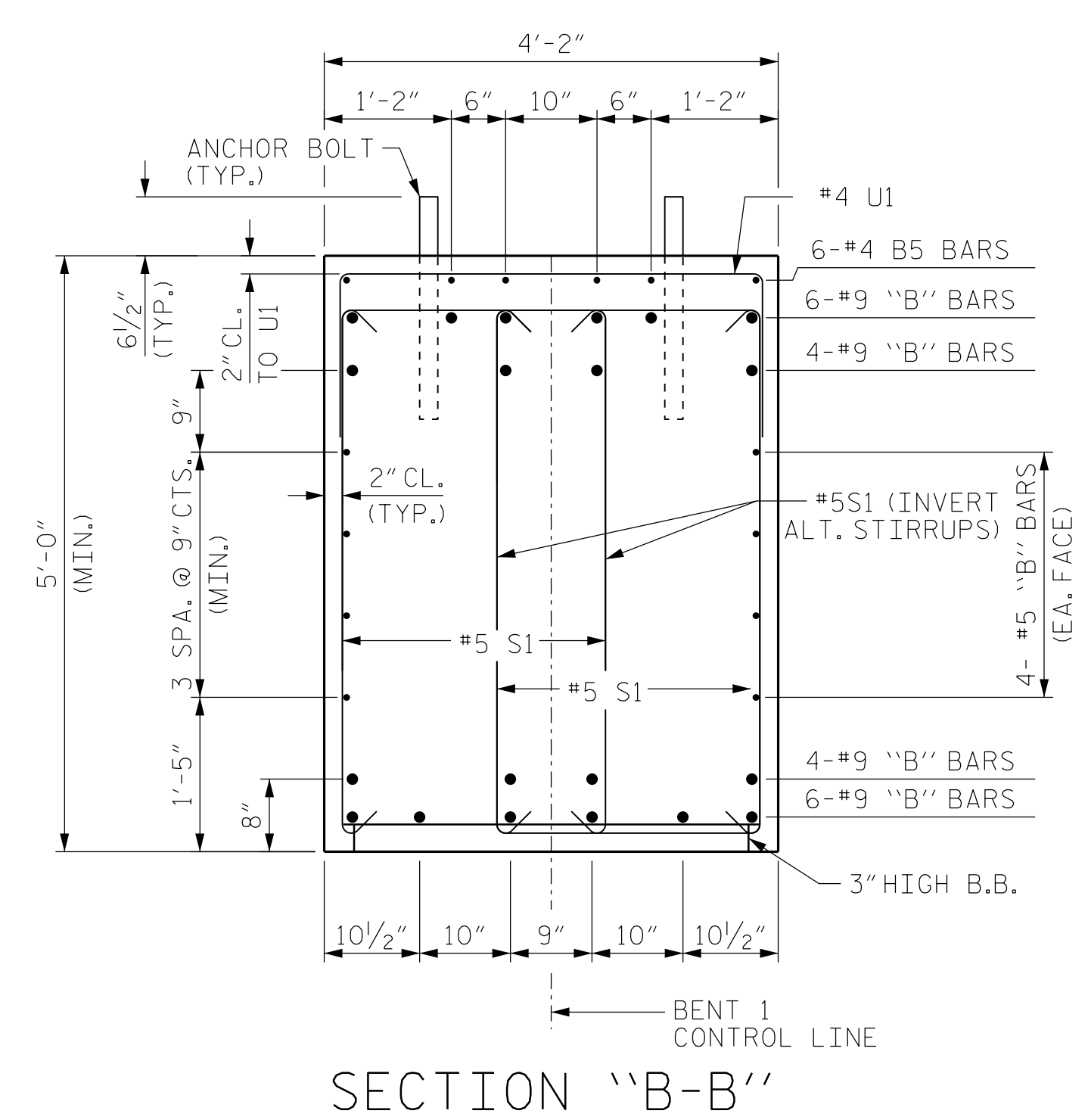
DRAWN BY: K.H. COMPTON DATE: 7/2016  
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DESIGNED BY: K.H. COMPTON DATE: 7/2016

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 CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 3 OF 4

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PLAN OF COLUMNS & DRILLED PIERS

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11/30/2016

**JOHN C. MORRISON**  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
 JOHN C. MORRISON  
 42F0E142C82F44B

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 2  
 SECTION AND DETAILS

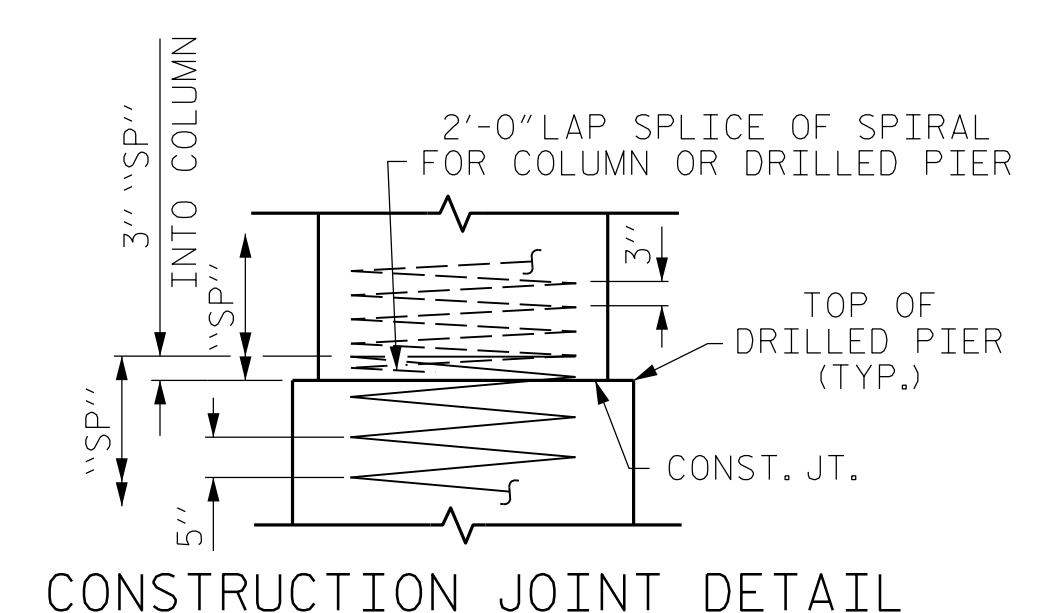
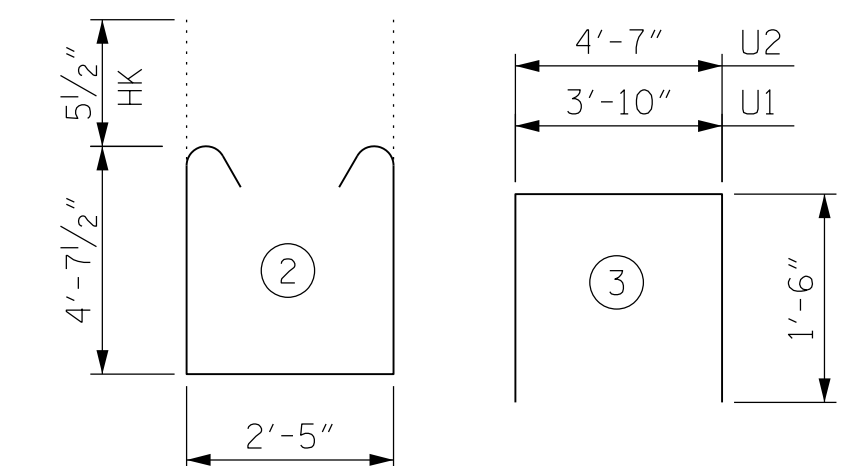
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SHEET NO. S-45  
 TOTAL SHEETS 55

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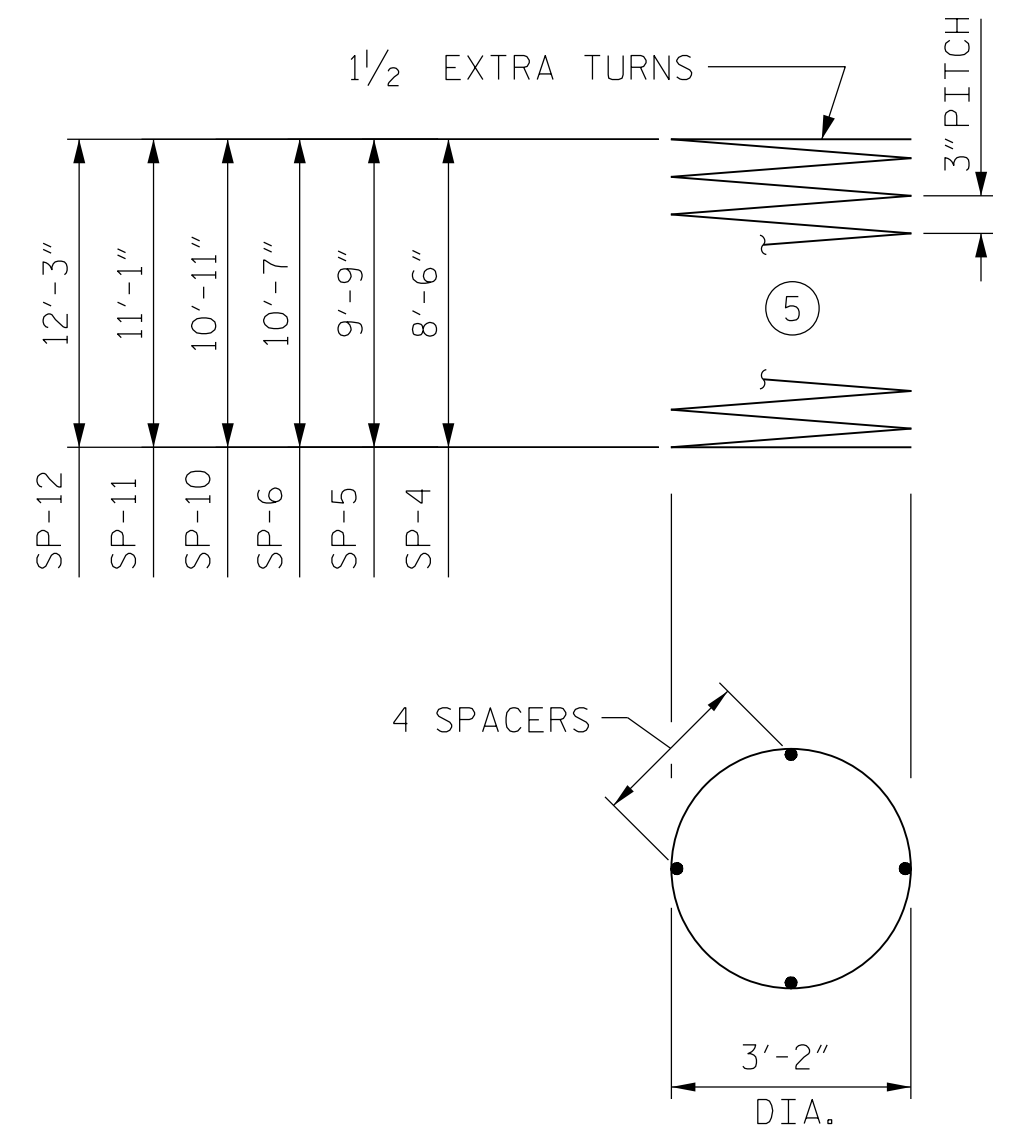
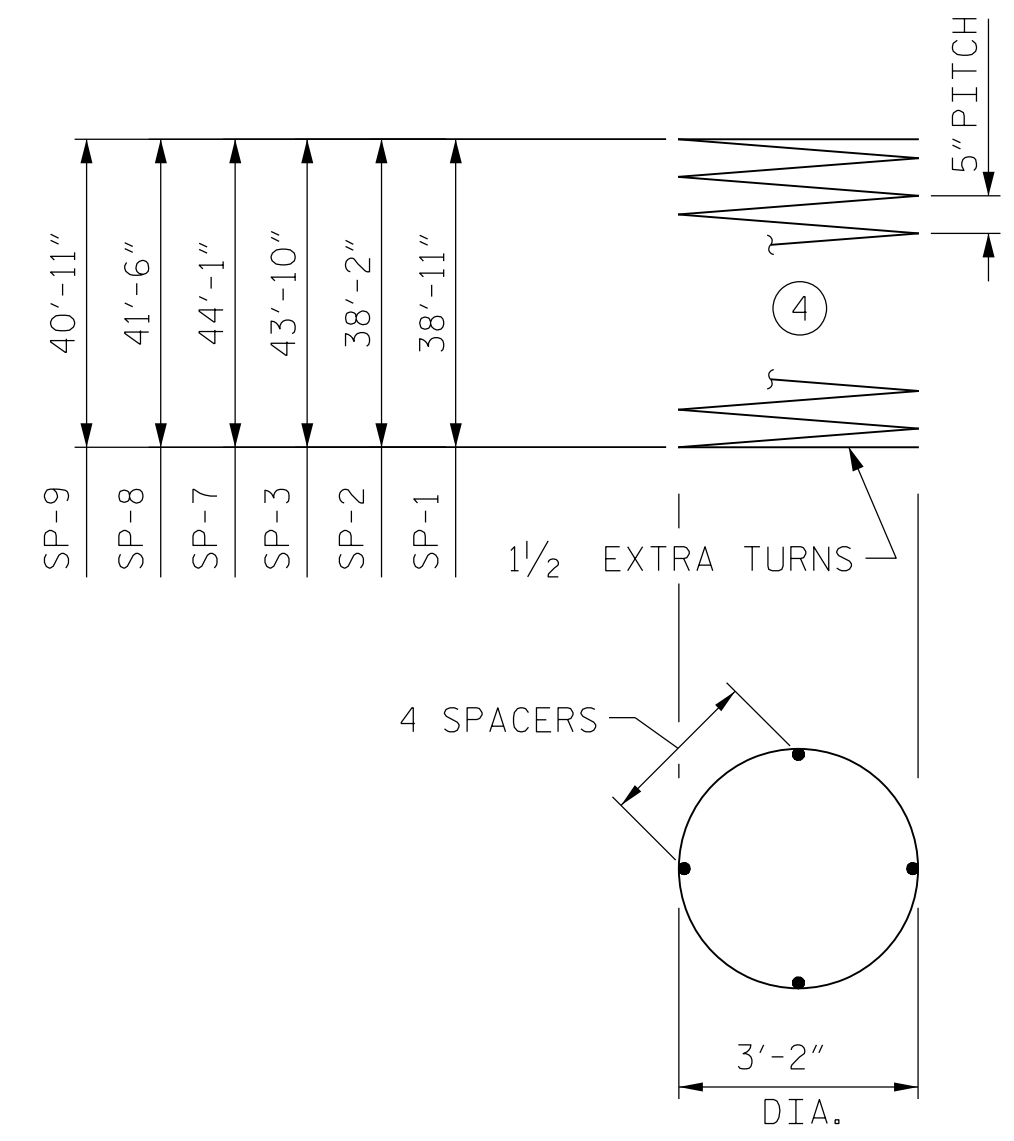
BAR TYPES

B3	1'-3"	45'-4"
B4	1'-3"	43'-4"
V1	1'-7"	10'-4"
V2	1'-7"	11'-7"
V3	1'-7"	12'-5"
V4	1'-7"	12'-9"
V5	1'-7"	12'-11"
V6	1'-7"	14'-1"



CONSTRUCTION JOINT DETAIL

COLUMN	LENGTH	DRILLED PIER	LENGTH
1	8'-2"	1	39'-5"
2	9'-5 3/8"	2	38'-7 3/4"
3	10'-3 1/2"	3	44'-3 3/4"
4	10'-7 1/4"	4	44'-7"
5	10'-9 5/8"	5	41'-11 5/8"
6	11'-11 1/4"	6	41'-5"



ALL BAR DIMENSIONS ARE OUT TO OUT.

BENT 2 - BILL OF MATERIAL

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	STR	45'-4"	771	B1	10	#9	STR	45'-4"	1541
B2	5	#9	STR	43'-4"	737	B3	10	#9	(1)	46'-7"	1584
B3	5	#9	(1)	46'-7"	792	B6	42	#4	STR	4'-5"	124
B4	5	#9	(1)	44'-7"	758	B7	10	#9	STR	20'-9"	706
B5	8	#5	STR	45'-10"	382	B8	10	#9	STR	23'-3"	791
B6	30	#4	STR	4'-5"	89	B9	16	#5	STR	31'-8"	528
M1	16	#11	STR	49'-4"	4194	M4	16	#11	STR	54'-6"	4633
M2	8	#11	STR	41'-9"	1775	M5	8	#11	STR	46'-11"	1994
M3	16	#11	STR	48'-7"	4130	M6	16	#11	STR	51'-11"	4413
M4	8	#11	STR	41'-0"	1743	M7	8	#11	STR	44'-4"	1884
M5	16	#11	STR	54'-3"	4612	M8	16	#11	STR	51'-4"	4364
M6	8	#11	STR	46'-8"	1984	M9	8	#11	STR	43'-9"	1860
S1	110	#5	(2)	12'-7"	1444	S1	208	#5	(2)	12'-7"	2730
U1	50	#4	(3)	6'-10"	228	U1	68	#4	(3)	6'-10"	310
U2	4	#4	(3)	7'-7"	20	U2	4	#4	(3)	7'-7"	20
V1	16	#11	(1)	11'-11"	1013	V4	16	#11	(1)	14'-4"	1218
V2	16	#11	(1)	13'-2"	1119	V5	16	#11	(1)	14'-6"	1233
V3	16	#11	(1)	14'-0"	1190	V6	16	#11	(1)	15'-8"	1332

REINFORCING STEEL LBS. 26981 REINFORCING STEEL LBS. 31265

SP-1	1	*	(4)	930'-5"	970	SP-7	1	*	(4)	1057'-9"	1103
SP-2	1	*	(4)	920'-8"	960	SP-8	1	*	(4)	999'-0"	1042
SP-3	1	*	(4)	1048'-0"	1093	SP-9	1	*	(4)	979'-5"	1022
SP-4	1	**	(5)	353'-7"	236	SP-10	1	**	(5)	451'-10"	302
SP-5	1	**	(5)	402'-8"	269	SP-11	1	**	(5)	451'-10"	302
SP-6	1	**	(5)	432'-2"	289	SP-12	1	**	(5)	500'-11"	335

SPIRAL REINFORCING STEEL 3817 LBS. SPIRAL REINFORCING STEEL 4106 LBS.

\* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BENT 2 TOTAL QUANTITIES

CLASS A CONCRETE	POUR 2 (COLUMNS)	POUR 3 (CAP)	TOTAL CLASS A CONCRETE
9.9 C.Y.	34.2 C.Y.	44.1 C.Y.	

DRILLED PIERS:	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	4'-0" Ø DRILLED PIER NOT IN SOIL	4'-0" Ø DRILLED PIER IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER
57.0 C.Y.	25.0 LIN. FT.	97.4 LIN. FT.	103.0 LIN. FT.	62.4 LIN. FT.

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BAR SIZE	TOP BAR	BASIC
#5	3'-0"	2'-2"
#9	8'-9"	6'-3"

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 CABARRUS COUNTY  
 STATION: 147+80.00 -L-

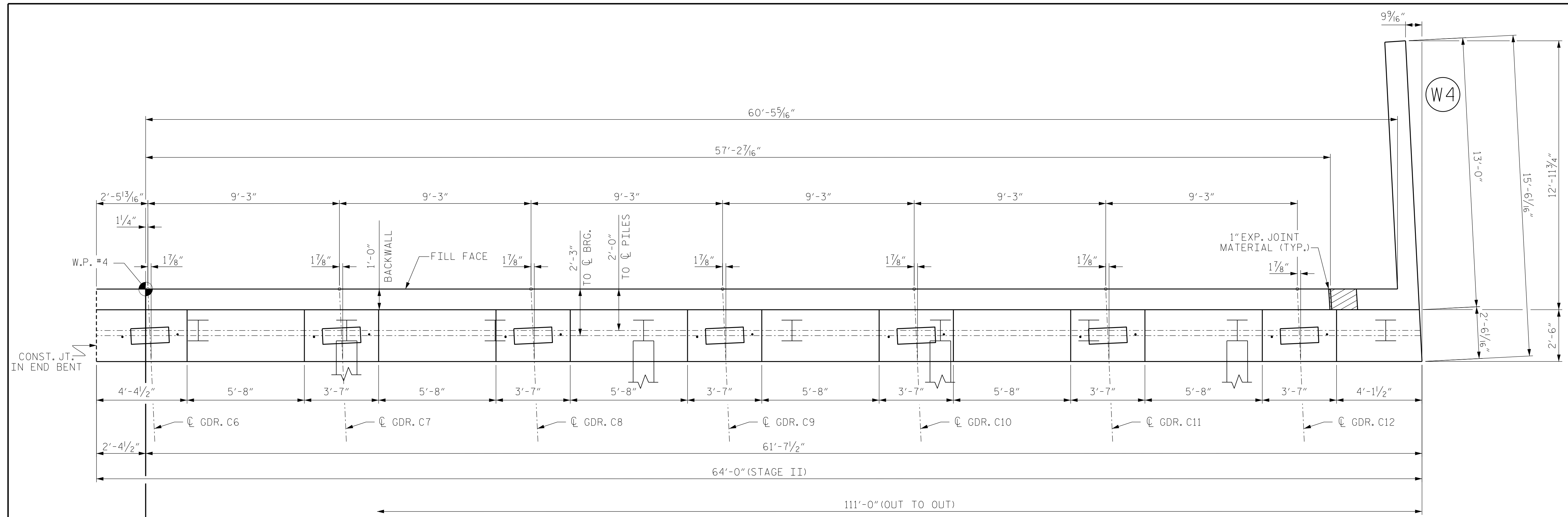
SHEET 4 OF 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			TOTAL SHEETS 55

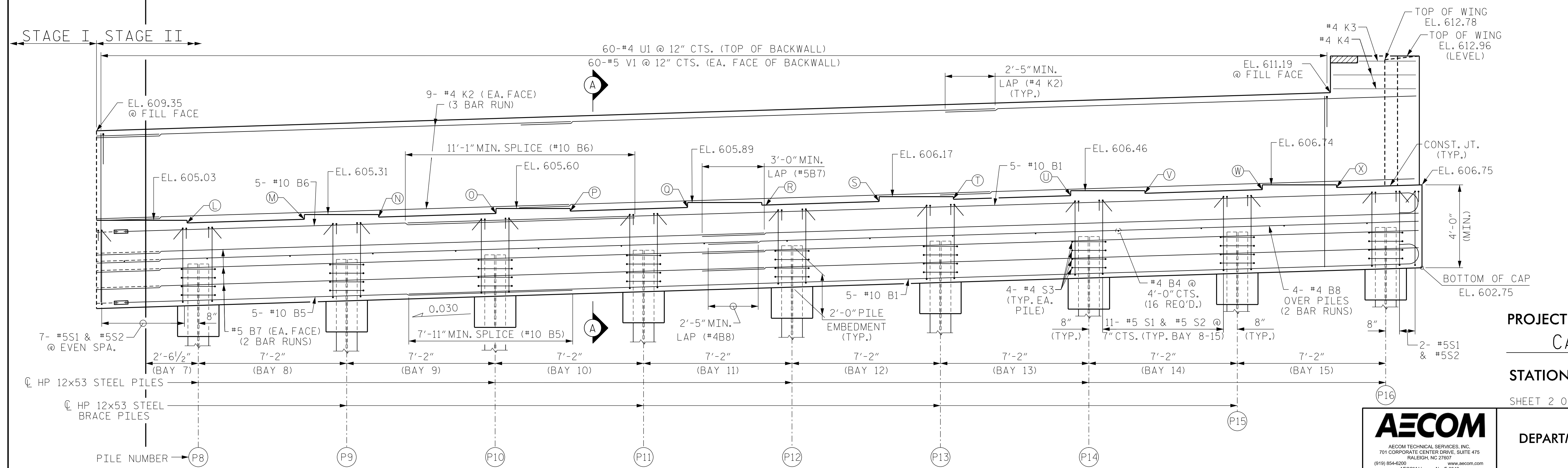




NOTES:  
FOR NOTES, SEE SHEET 1 OF 4.



PLAN



ELEVATION

\*\* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A", SHEET 4 OF 4.

ELEVATIONS **	
L	604.91
M	605.08
N	605.18
O	605.35
P	605.48
Q	605.65
R	605.77
S	605.94
T	606.04
U	606.21
V	606.34
W	606.51
X	606.62

PROJECT NO. U-4910A  
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SHEET 2 OF 4

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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL  
030474  
JOHN C. MORRISON  
ENGINEER

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 2  
STAGE II

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

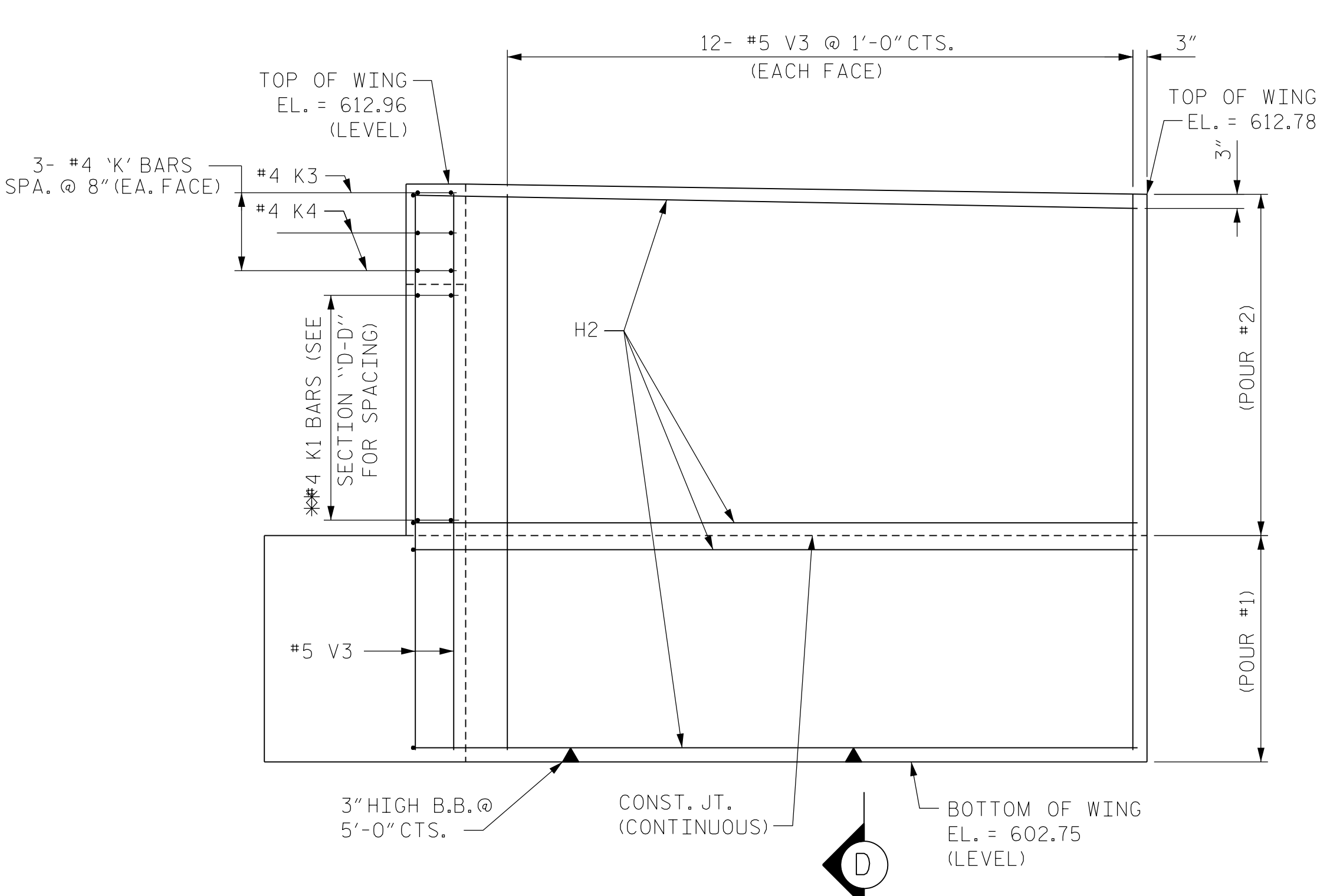
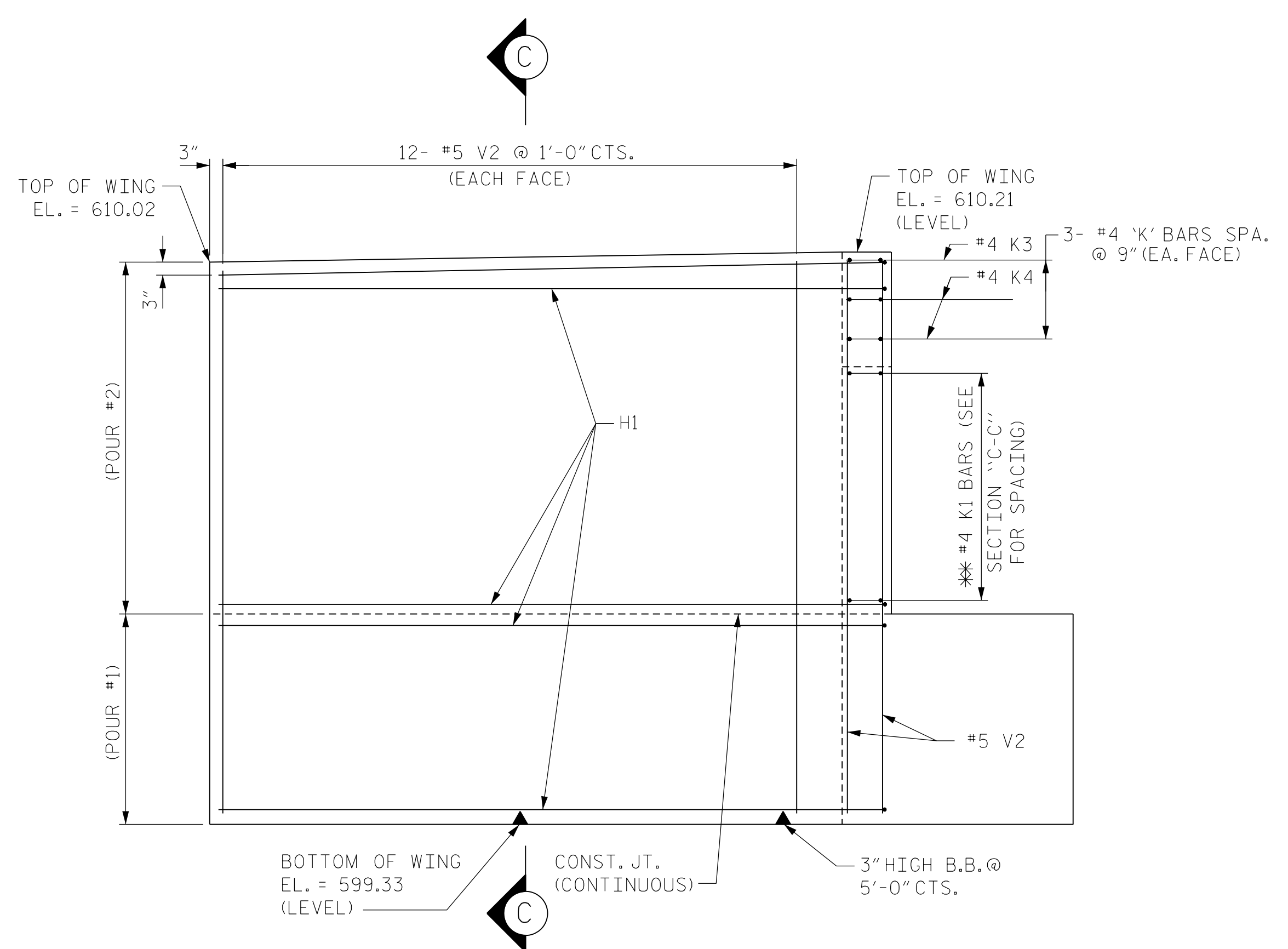
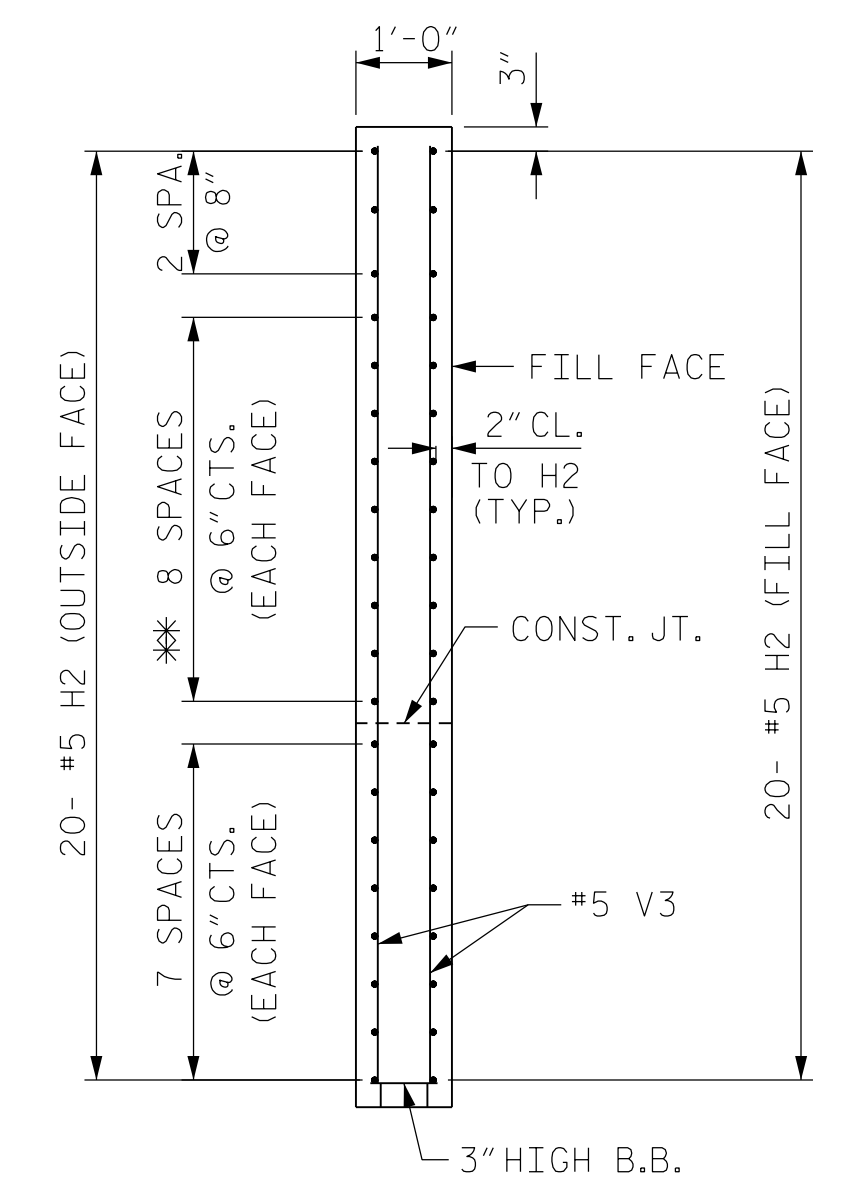
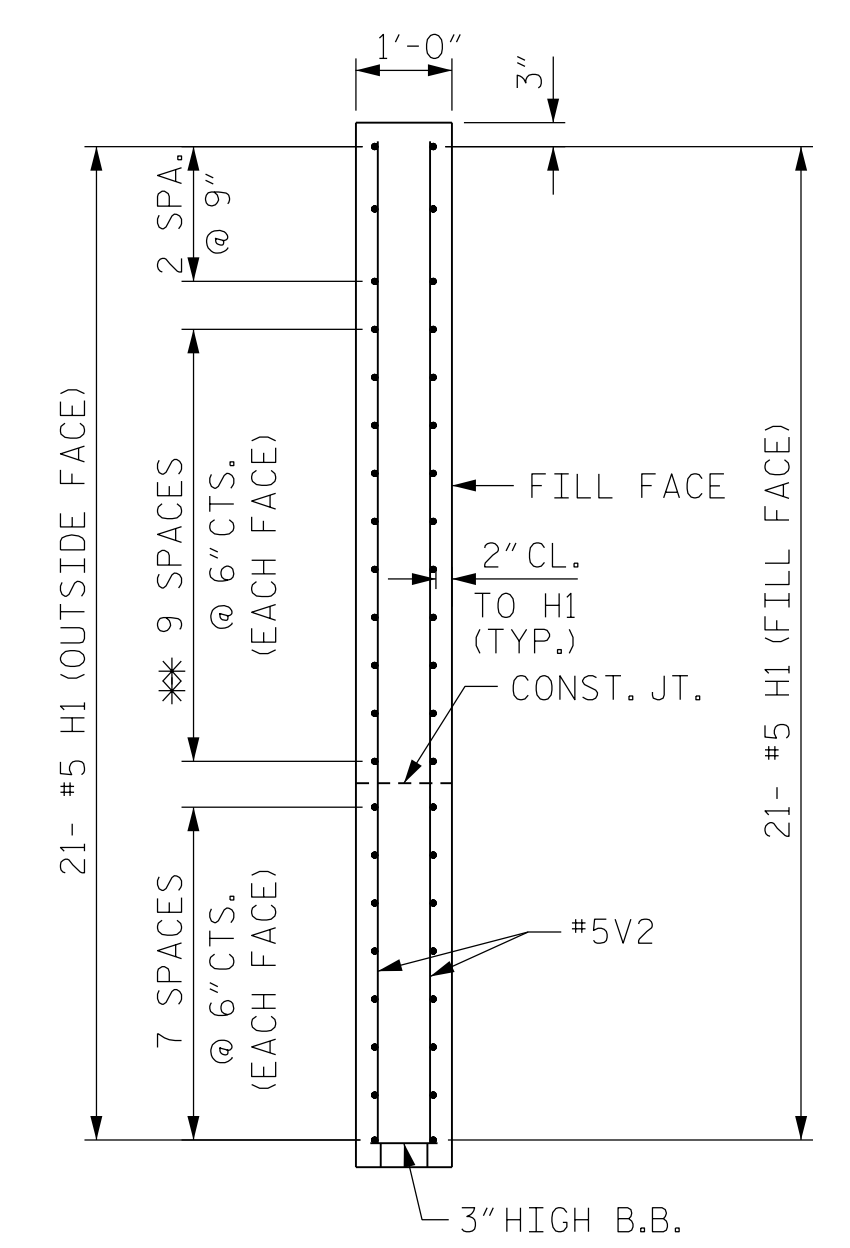
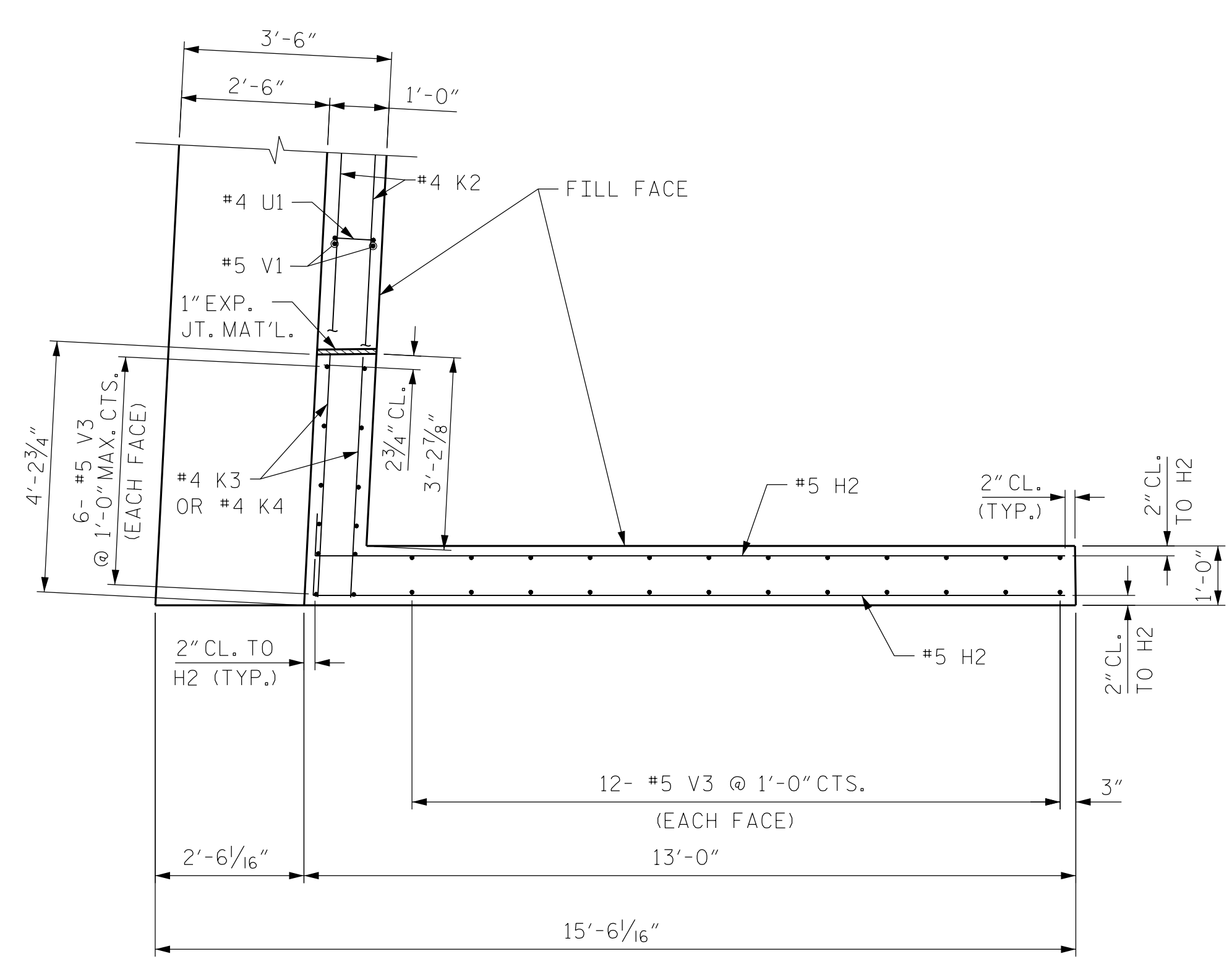
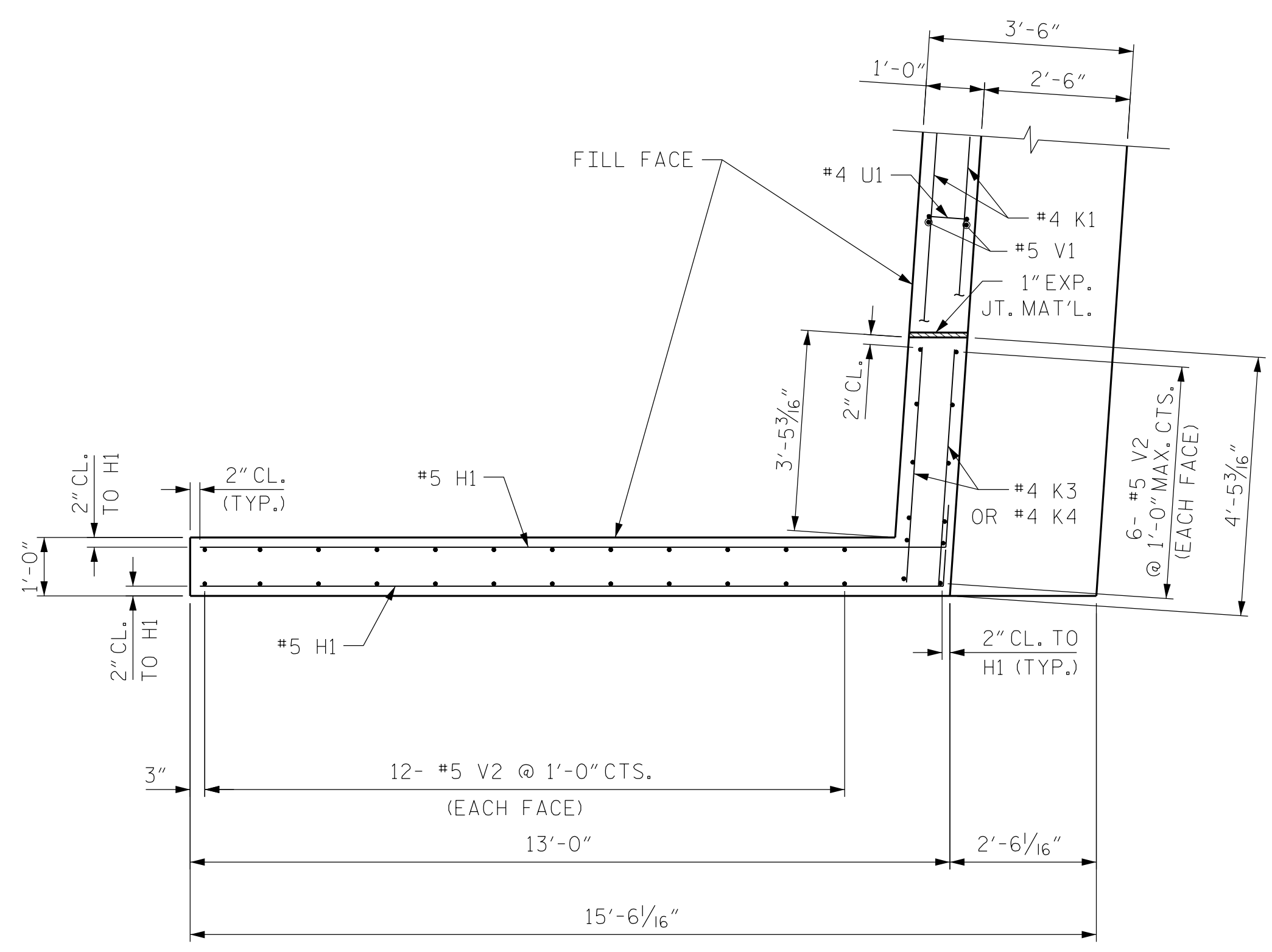
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TOTAL SHEETS 55

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ELEVATION OF WING (W3)

\* PLACE #5 'H' BARS TO MATCH #4 K1 BARS IN BACKWALL

ELEVATION OF WING (W4)

PLACE #5 'H' BARS TO MATCH #4 K1 BARS IN BACKWALL

PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 3 OF 4

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SEAL 030474

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 ENGINEER

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
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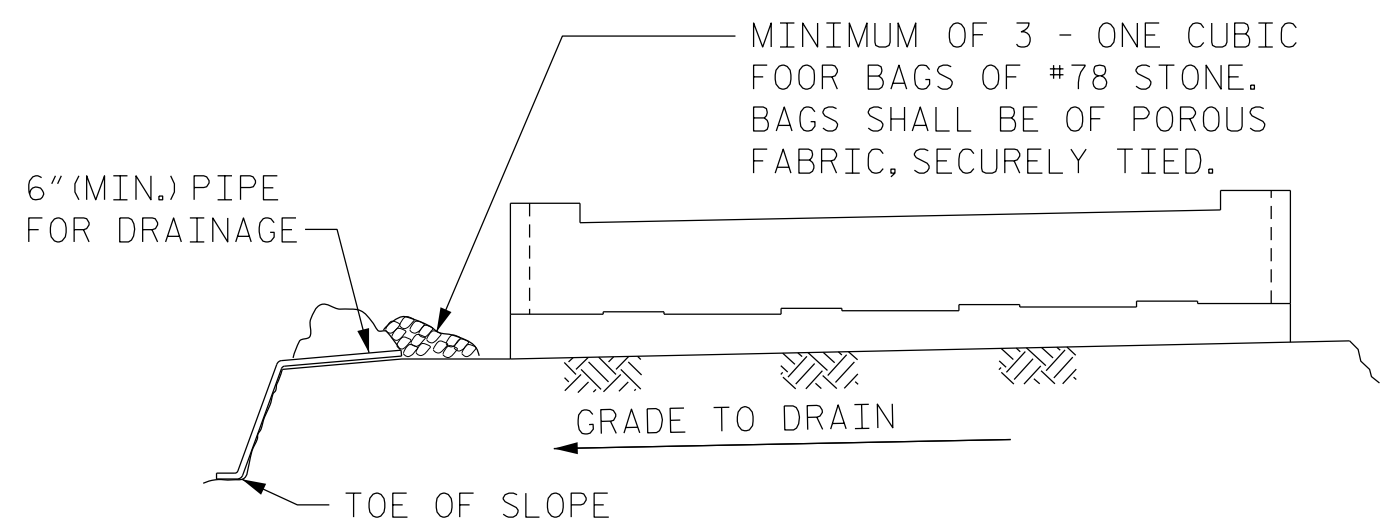
SUBSTRUCTURE  
 END BENT 2  
 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			55

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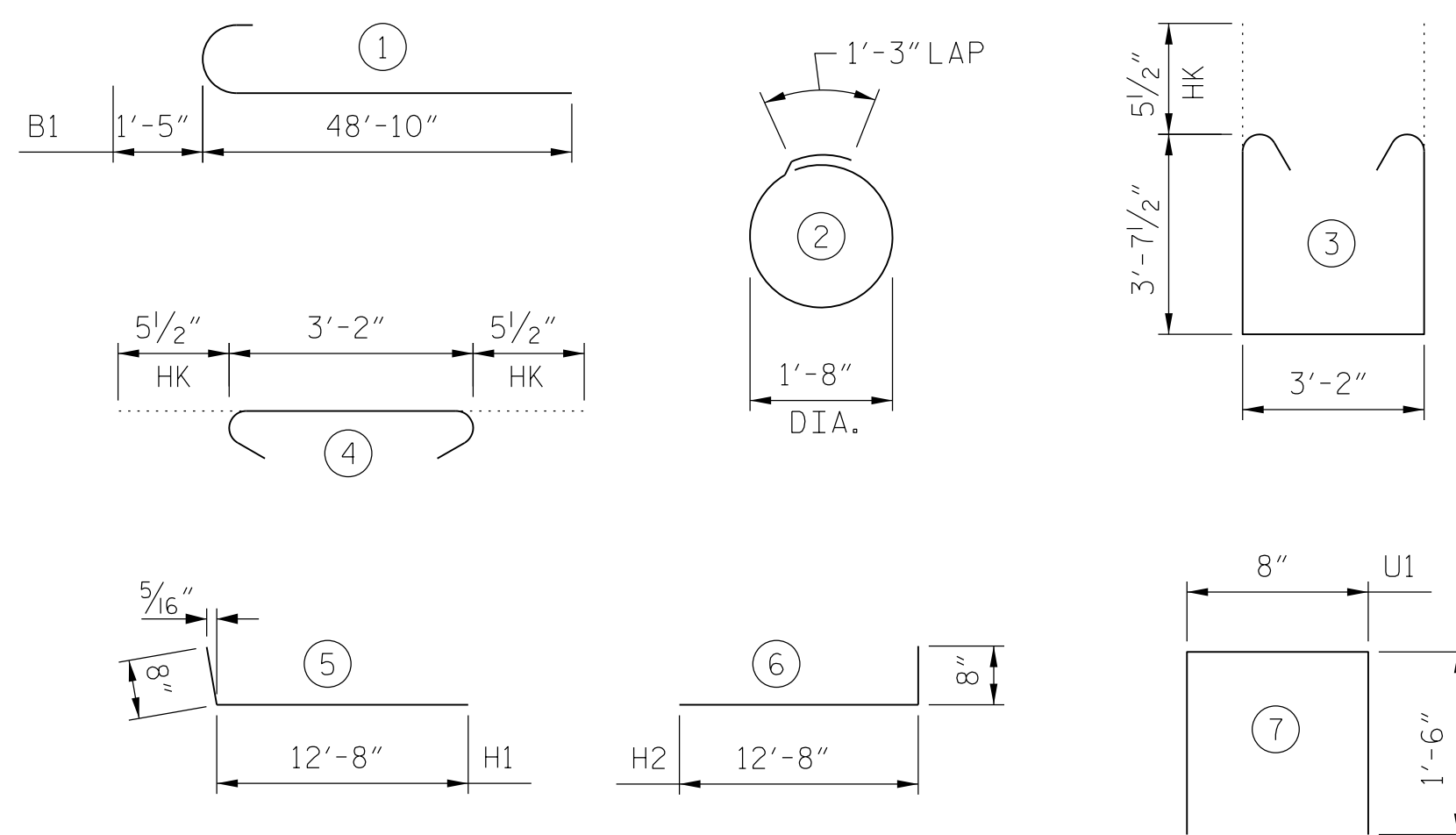
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**END BENT 2 - BILL OF MATERIAL**

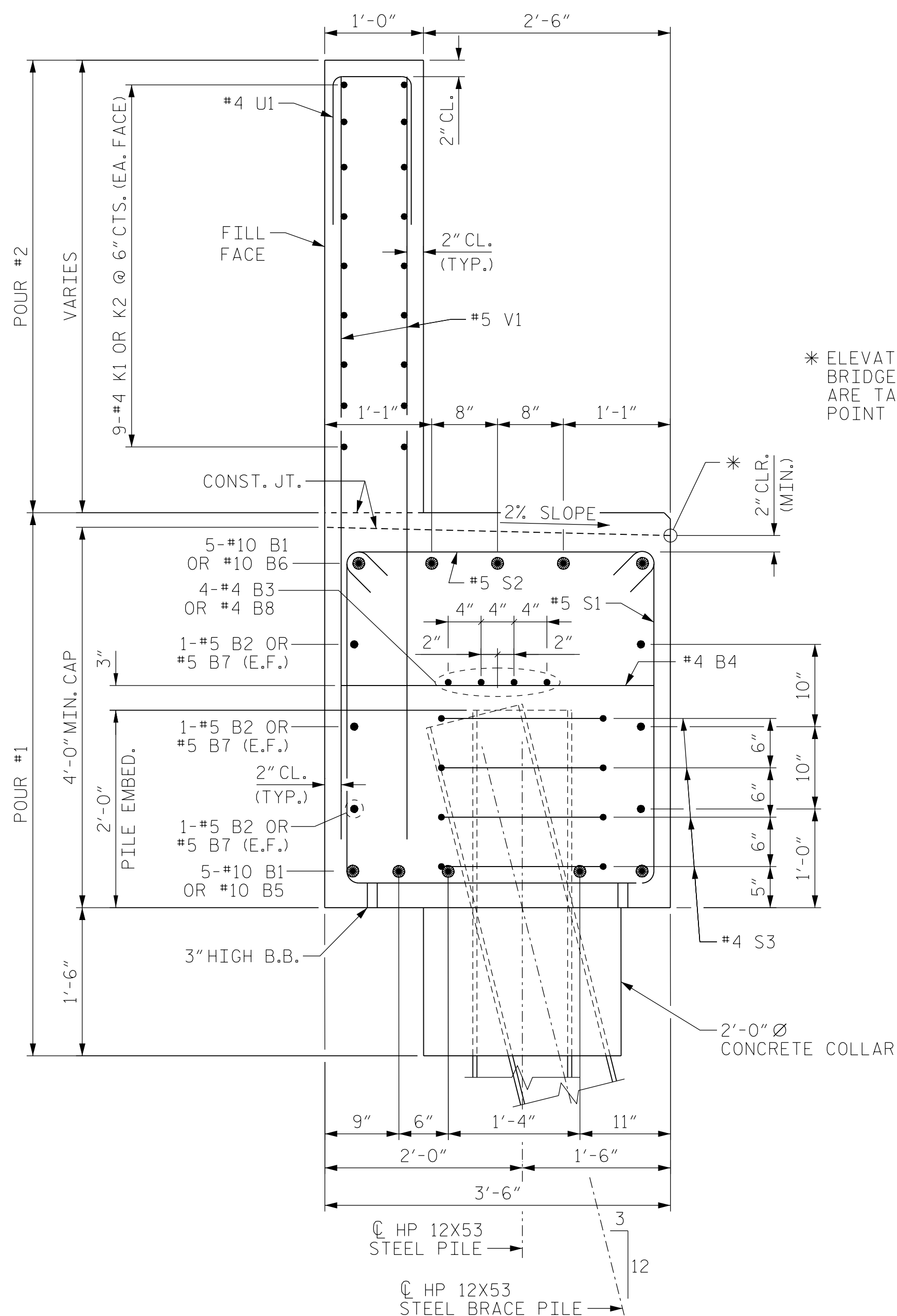
STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	(1)	50'-3"	2162	B1	10	#10	(1)	50'-3"	2162
B2	6	#5	STR	49'-10"	312	B4	16	#4	STR	3'-2"	34
B3	8	#4	STR	26'-2"	140	B5	5	#10	STR	22'-11"	493
B4	12	#4	STR	3'-2"	25	B6	5	#10	STR	26'-1"	561
						B7	12	#5	STR	33'-5"	418
						B8	8	#4	STR	33'-2"	177
H1	42	#5	(5)	13'-4"	584	H2	40	#5	(6)	13'-4"	556
K1	36	#4	STR	26'-2"	629	K2	54	#4	STR	22'-11"	827
K3	2	#4	STR	2'-7"	3	K3	2	#4	STR	2'-7"	3
K4	4	#4	STR	3'-10"	10	K4	4	#4	STR	3'-10"	10
S1	71	#5	(3)	11'-4"	839	S1	97	#5	(3)	11'-4"	1147
S2	71	#5	(4)	4'-1"	302	S2	97	#5	(4)	4'-1"	413
S3	28	#4	(2)	6'-6"	122	S3	36	#4	(2)	6'-6"	156
U1	43	#4	(7)	3'-8"	105	U1	60	#4	(7)	3'-8"	147
V1	86	#5	STR	8'-3"	740	V1	120	#5	STR	8'-11"	1116
V2	36	#5	STR	10'-4"	388	V3	36	#5	STR	9'-8"	363
REINFORCING STEEL						REINFORCING STEEL					
LBS. 6361						LBS. 8583					
CLASS A CONCRETE						CLASS A CONCRETE					
POUR #1 (CAP, COLLAR & LOWER WING) C.Y. 27.8						POUR #1 (CAP, COLLAR & LOWER WING) C.Y. 37.2					
POUR 2 (BACKWALL & UPPER WING) C.Y. 11.2						POUR 2 (BACKWALL & UPPER WING) C.Y. 13.6					
TOTAL C.Y. 39.0						TOTAL C.Y. 50.8					
HP 12x53 STEEL PILES NO. 7						HP 12x53 STEEL PILES NO. 9					
LIN. FT. 280						LIN. FT. 360					

**NOTES:**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- FOR OTHER NOTES, SEE "FOUNDATION LAYOUT" SHEET AND "LONG CHORD LAYOUT" SHEET.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE END POST ARE CAST IF SLIP FORMING IS USED.
- INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

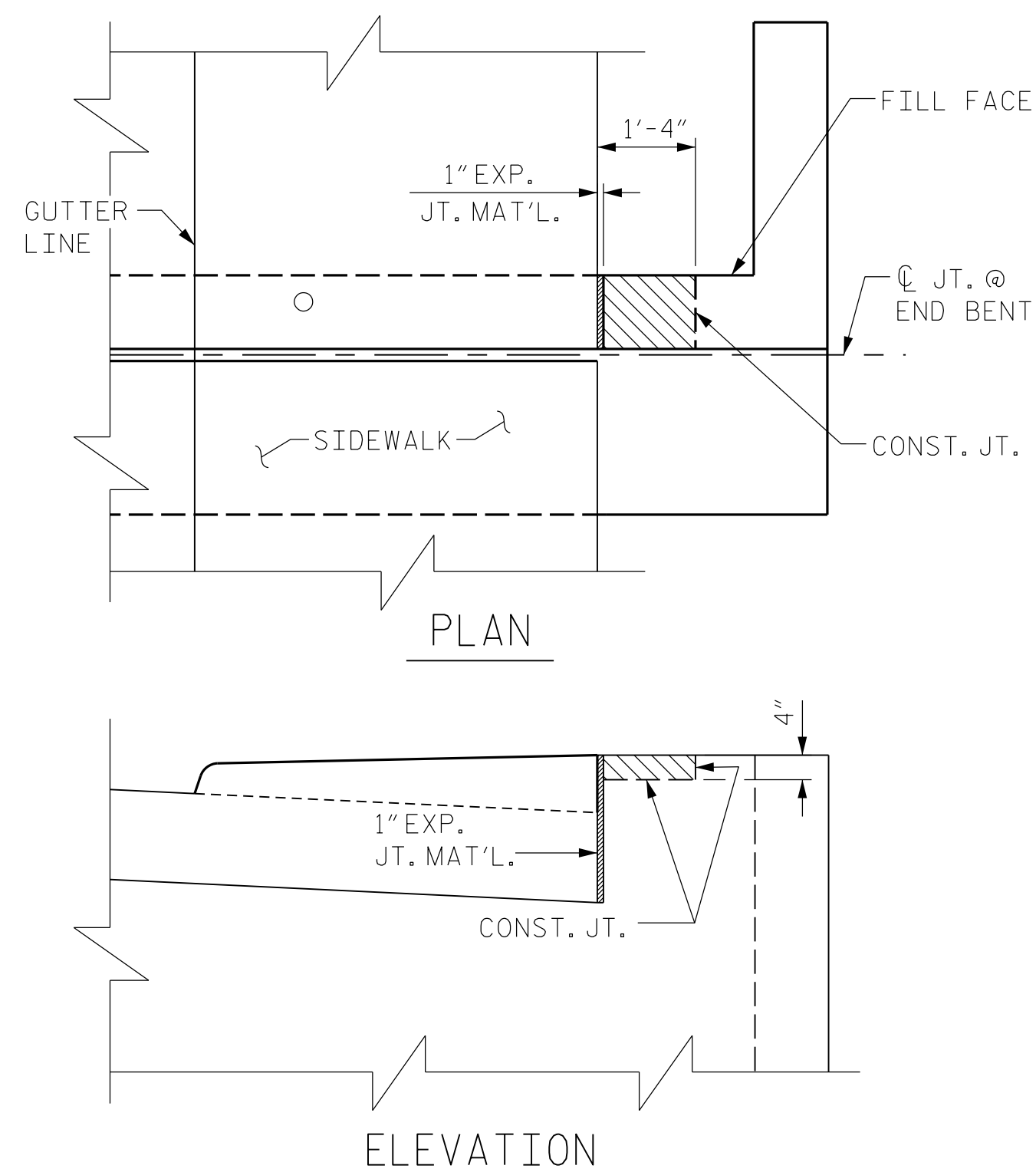
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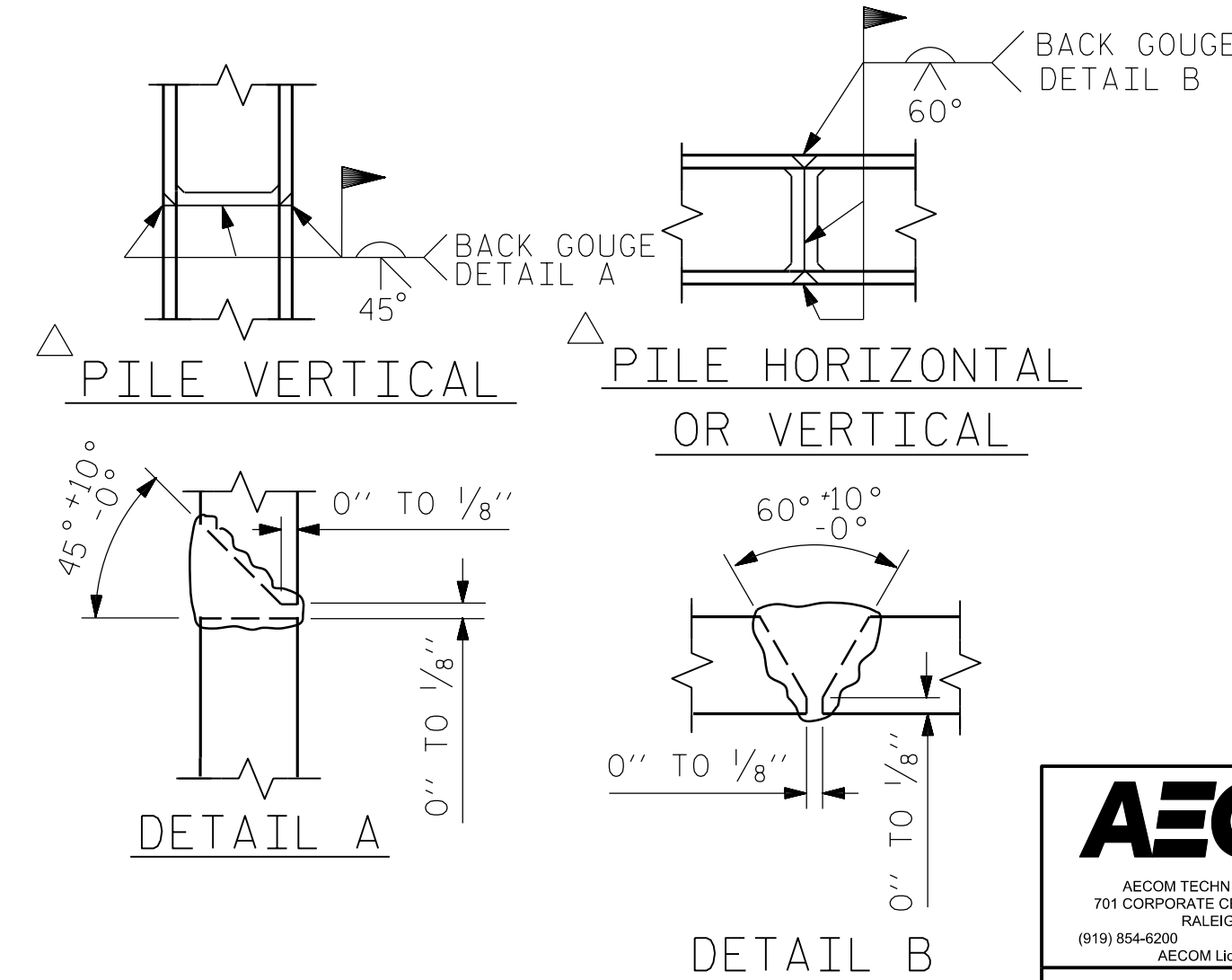


**SECTION "A-A"**

\* ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS ARE TAKEN AT THIS POINT



**BLOCKOUT IN WING DETAILS**

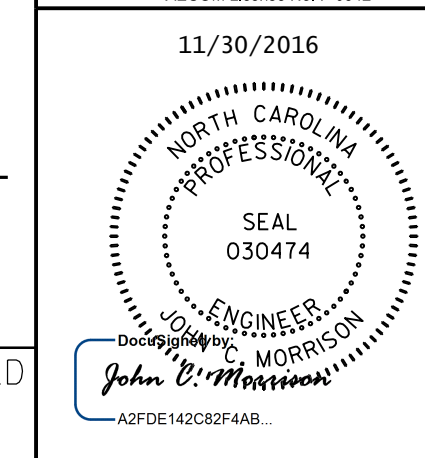


**PILE SPLICE DETAILS**

△ POSITION OF PILE DURING WELDING.

PROJECT NO. U-4910A  
CABARRUS COUNTY  
STATION: 147+80.00 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
RALEIGH

**SUBSTRUCTURE  
END BENT 2  
SECTION AND DETAILS**

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
**S-50**  
TOTAL SHEETS  
**55**

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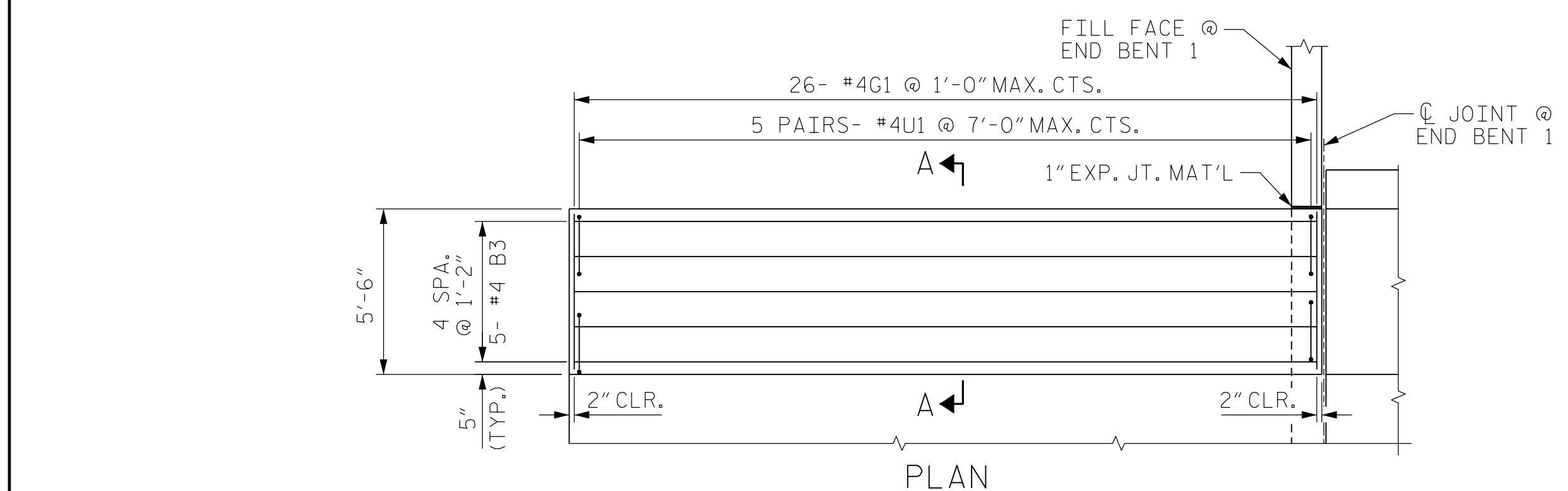
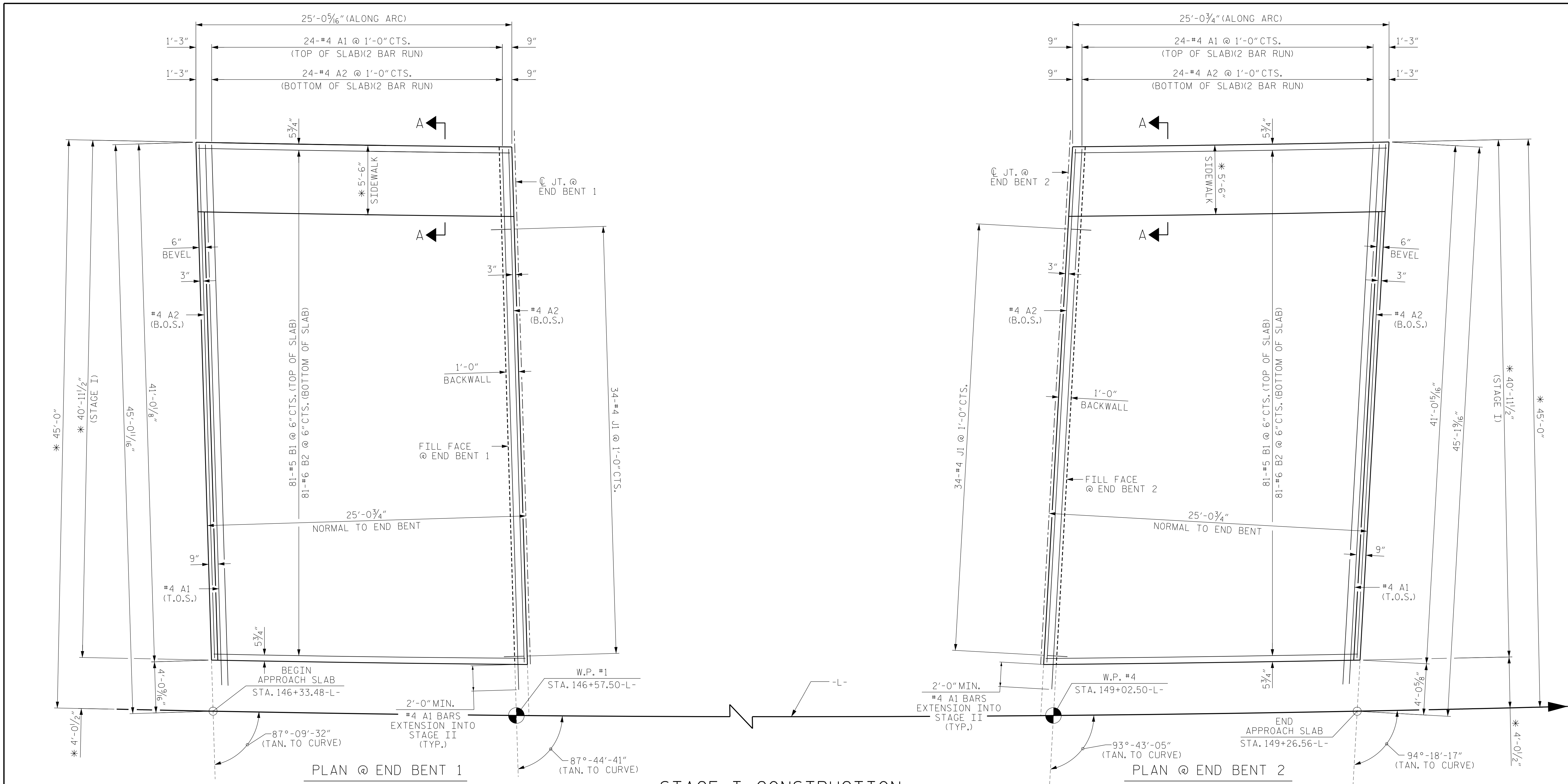
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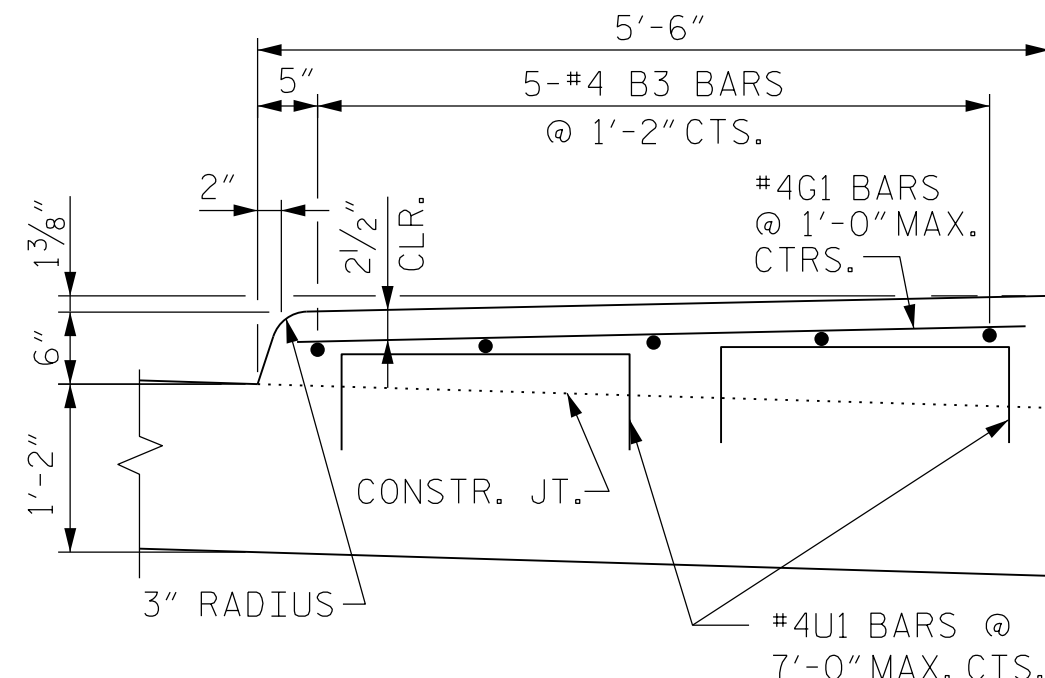
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\* RADIAL DIMENSIONS

T.O.S = TOP OF SLAB  
B.O.S = BOTTOM OF SLAB



NOTE:  
GROOVED CONTRACTION JOINT, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

DRAWN BY : K.H. COMPTON DATE : 5/2016  
 CHECKED BY : G.L. HAMILTON DATE : 7/2016  
 DESIGNED BY : K.H. COMPTON DATE : 5/2016

LEFT SIDE END BENT 1 SHOWN, OTHER CORNERS ARE SIMILAR.

**SIDWALK DETAILS**

**SECTION A-A**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-

SHEET 1 OF 4

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11/30/2016

NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 030474  
 JOHN C. MORRISON

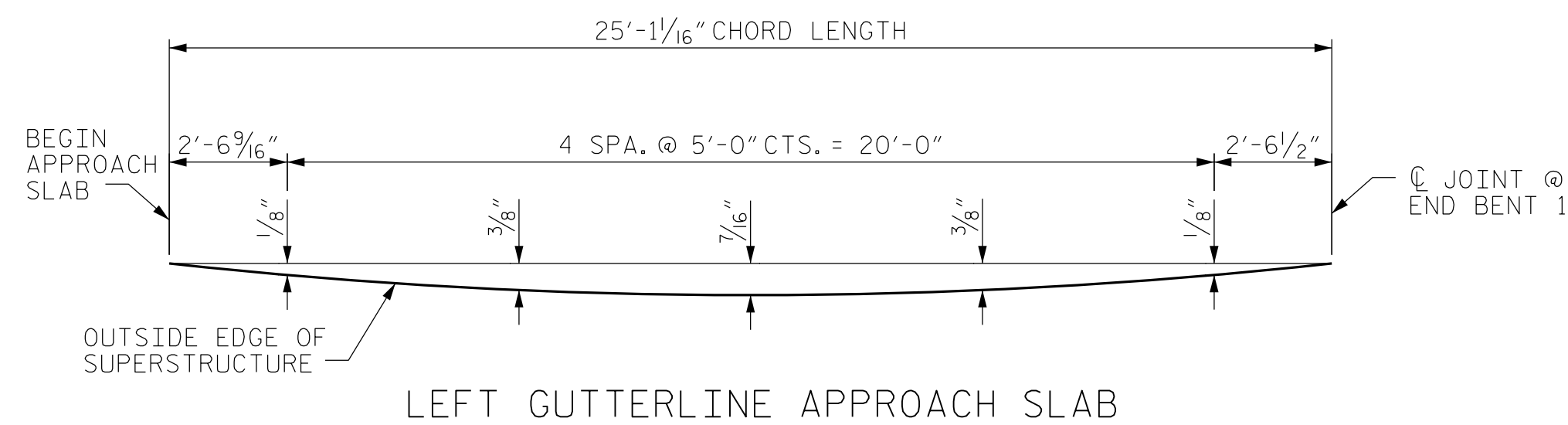
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT**  
 STAGE I

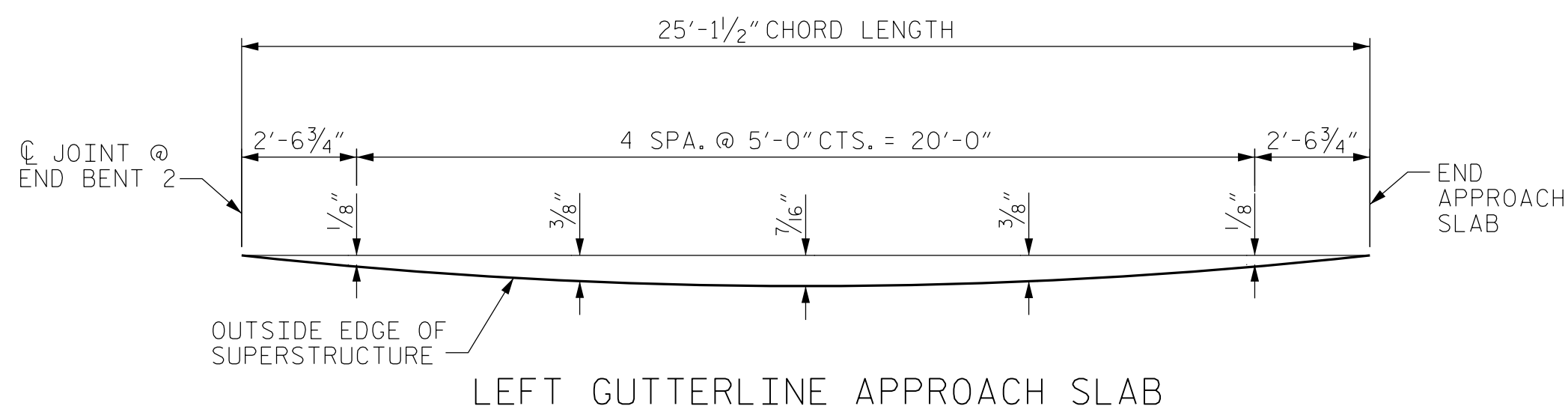
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			55



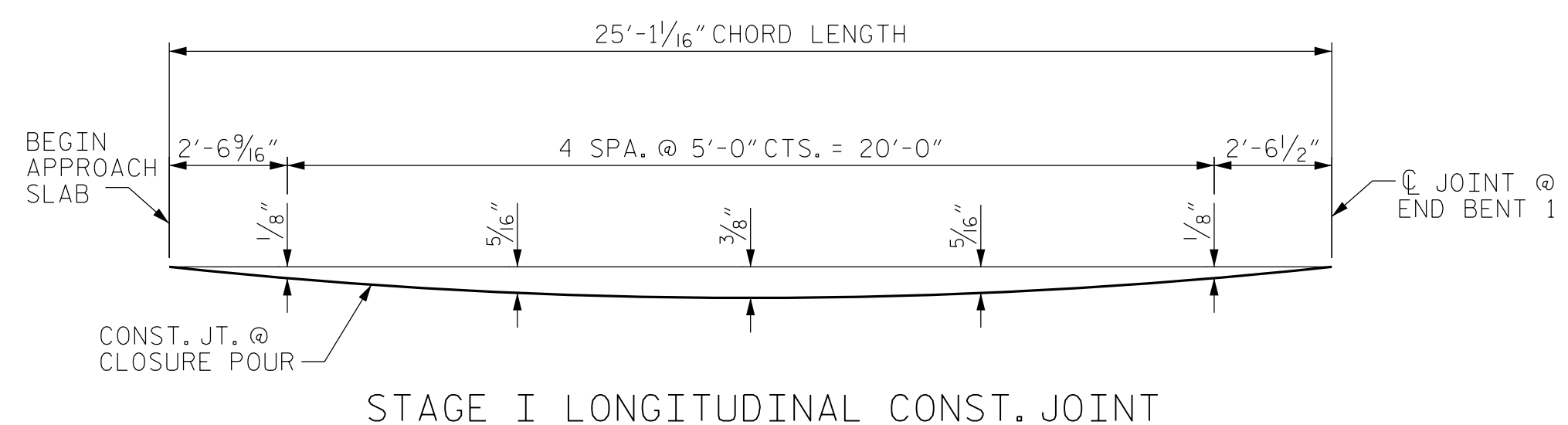




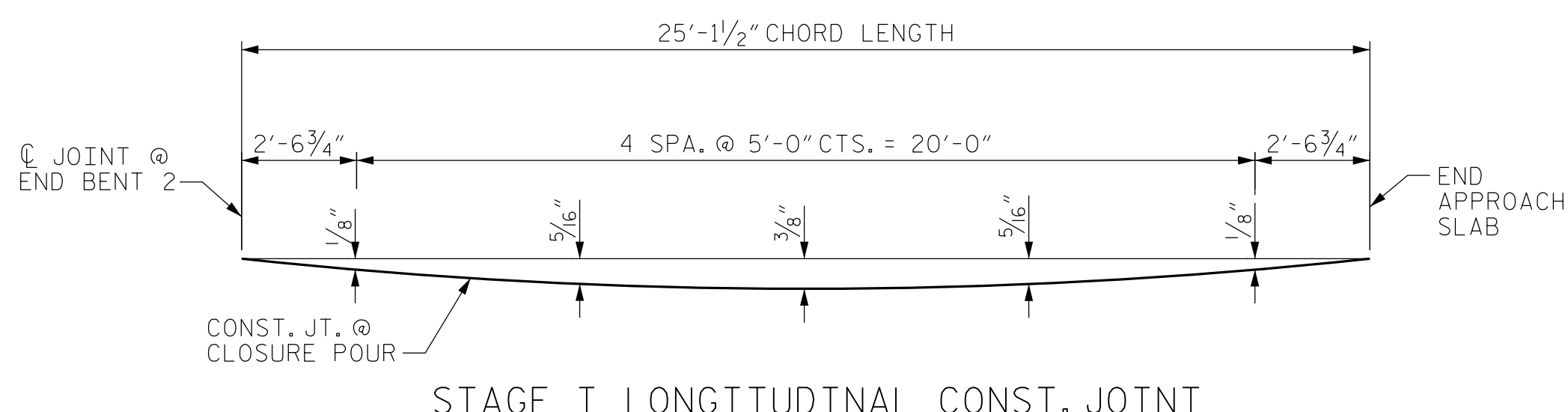
LEFT GUTTERLINE APPROACH SLAB



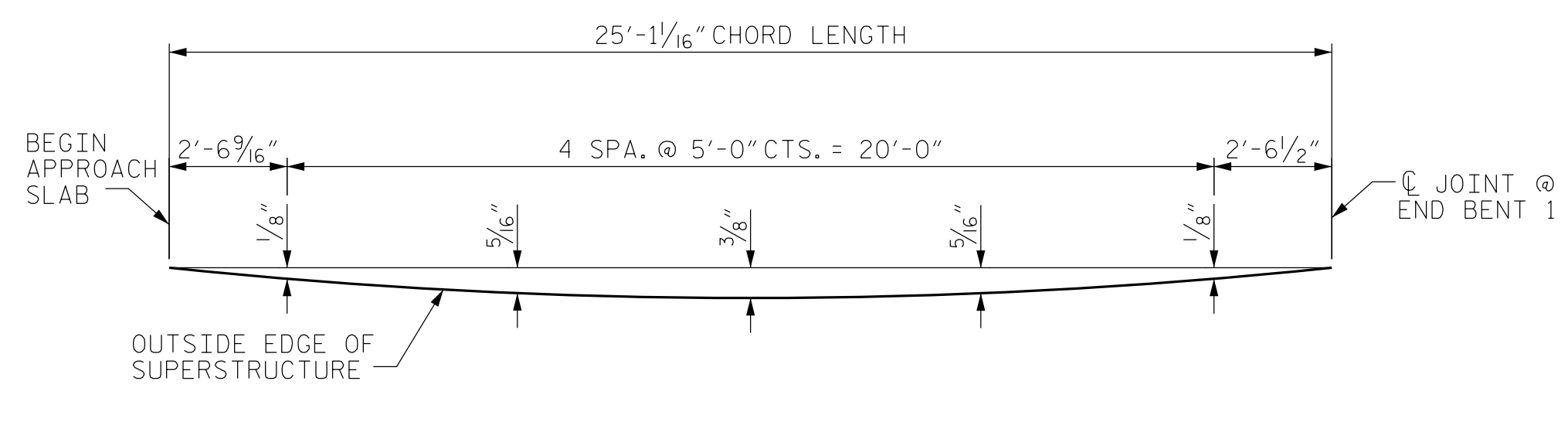
LEFT GUTTERLINE APPROACH SLAB



STAGE I LONGITUDINAL CONST. JOINT

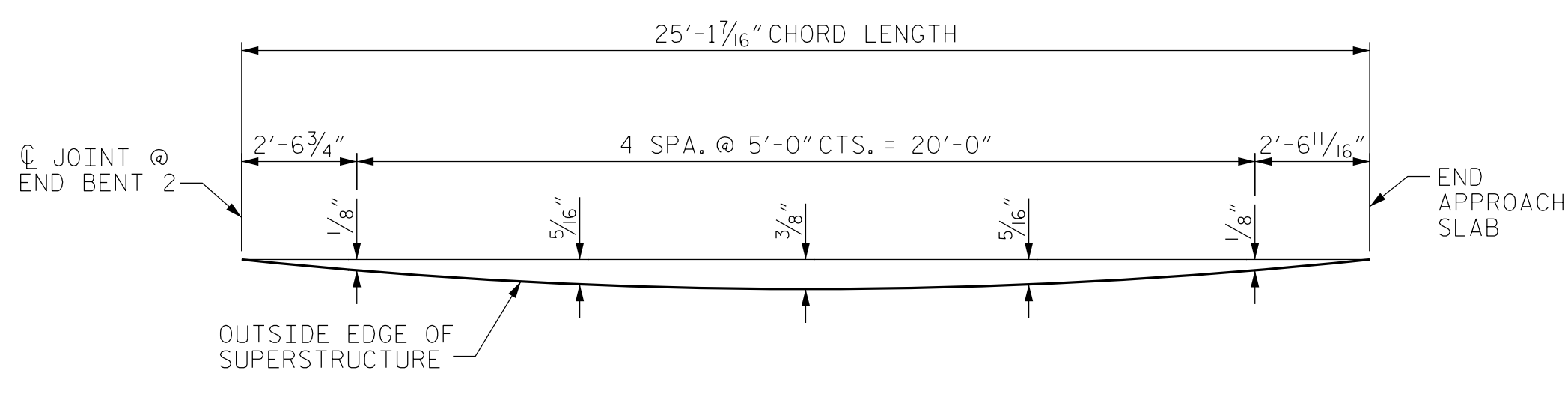


STAGE I LONGITUDINAL CONST. JOINT



RIGHT GUTTERLINE APPROACH SLAB

APPROACH SLAB  
@ END BENT 1

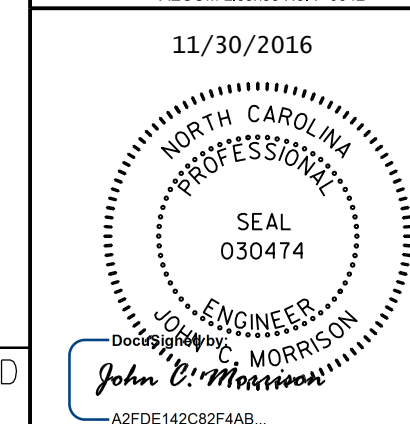


RIGHT GUTTERLINE APPROACH SLAB

APPROACH SLAB  
@ END BENT 2

PROJECT NO. U-4910A  
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SHEET 3 OF 4



STATE OF NORTH CAROLINA  
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ARC OFFSETS  
 APPROACH SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			55
2			4			

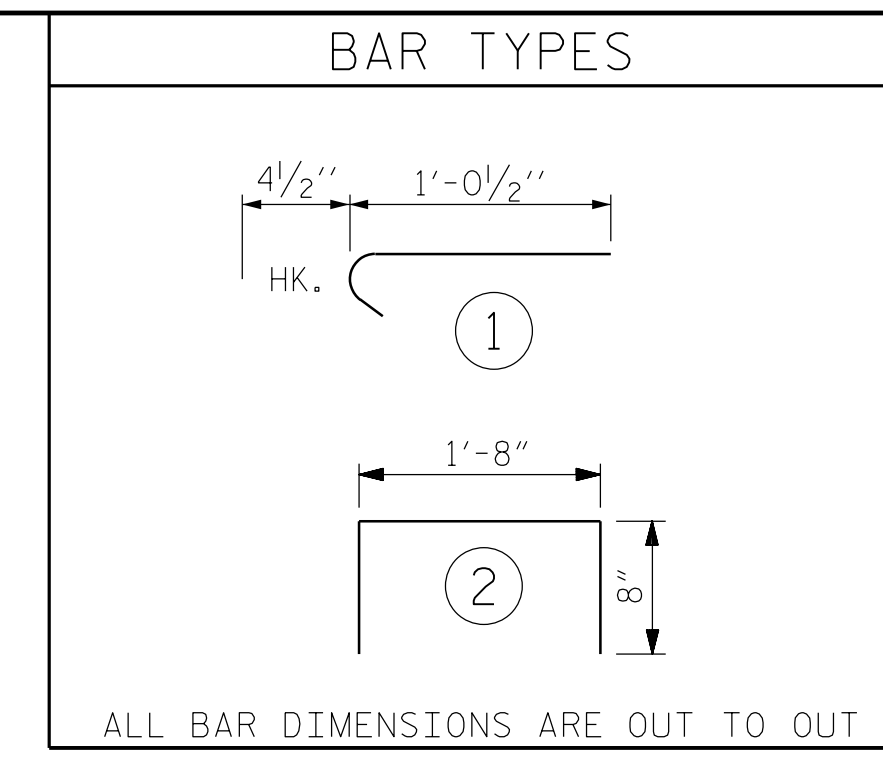
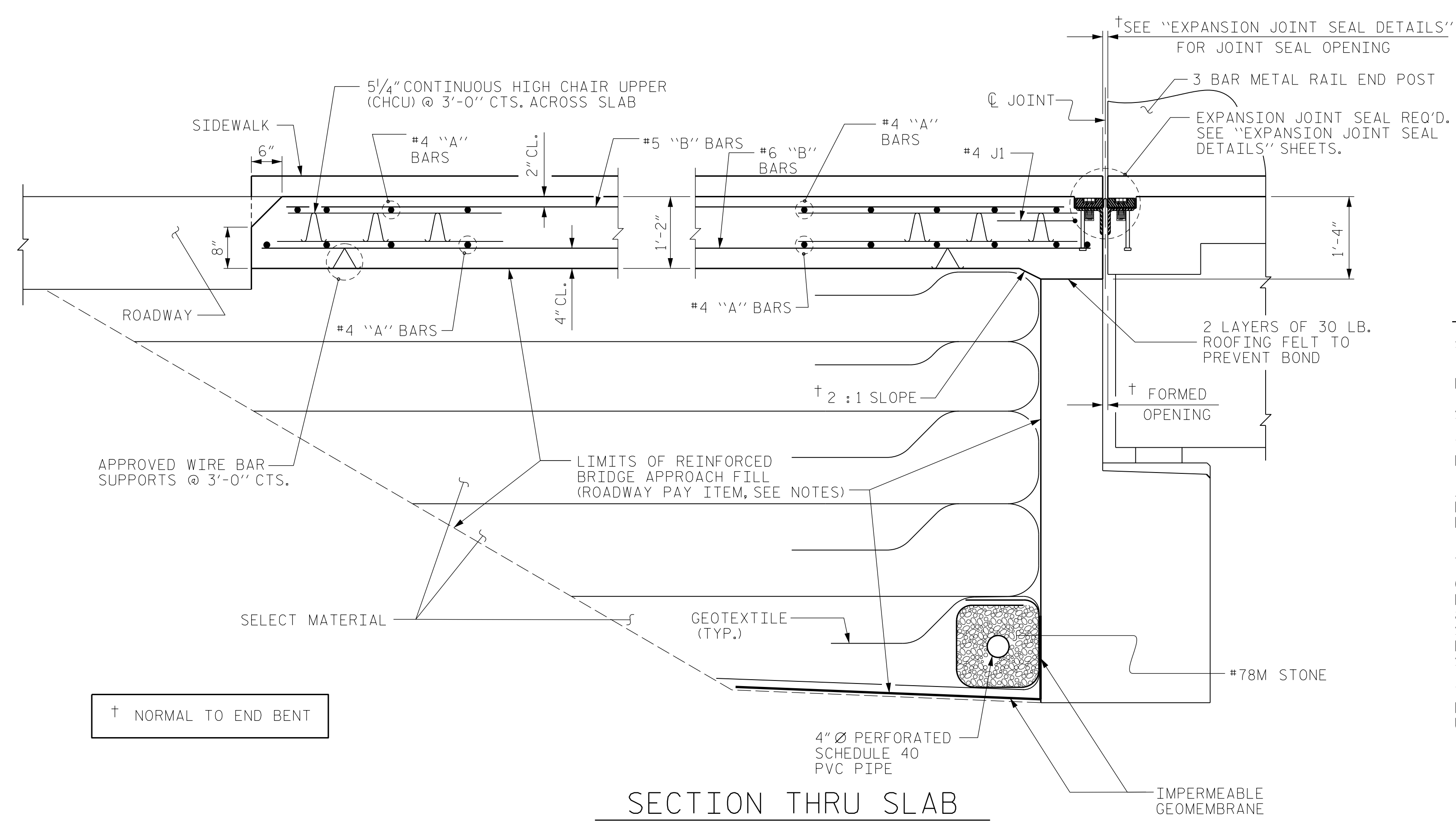
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BILL OF MATERIAL						
STAGE I						
FOR ONE APPROACH SLAB (2 REQ'D)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	50	#4	STR	23'-1"	770	
A2	52	#4	STR	21'-11"	761	
*B1	81	#5	STR	23'-10"	2014	
B2	81	#6	STR	24'-8"	3001	
*B3	10	#4	STR	24'-8"	165	
*G1	26	#4	STR	5'-1"	88	
*J1	34	#4	①	1'-5"	32	
*U1	10	#4	②	3'-0"	20	
REINFORCING STEEL				LBS.	3762	
* EPOXY COATED REINFORCING STEEL				LBS.	3089	
CLASS AA CONCRETE						
POUR #1 (SLAB)				C.Y.	44.5	
POUR #2 (SIDEWALK)				C.Y.	3.2	
TOTAL				C.Y.	47.7	

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

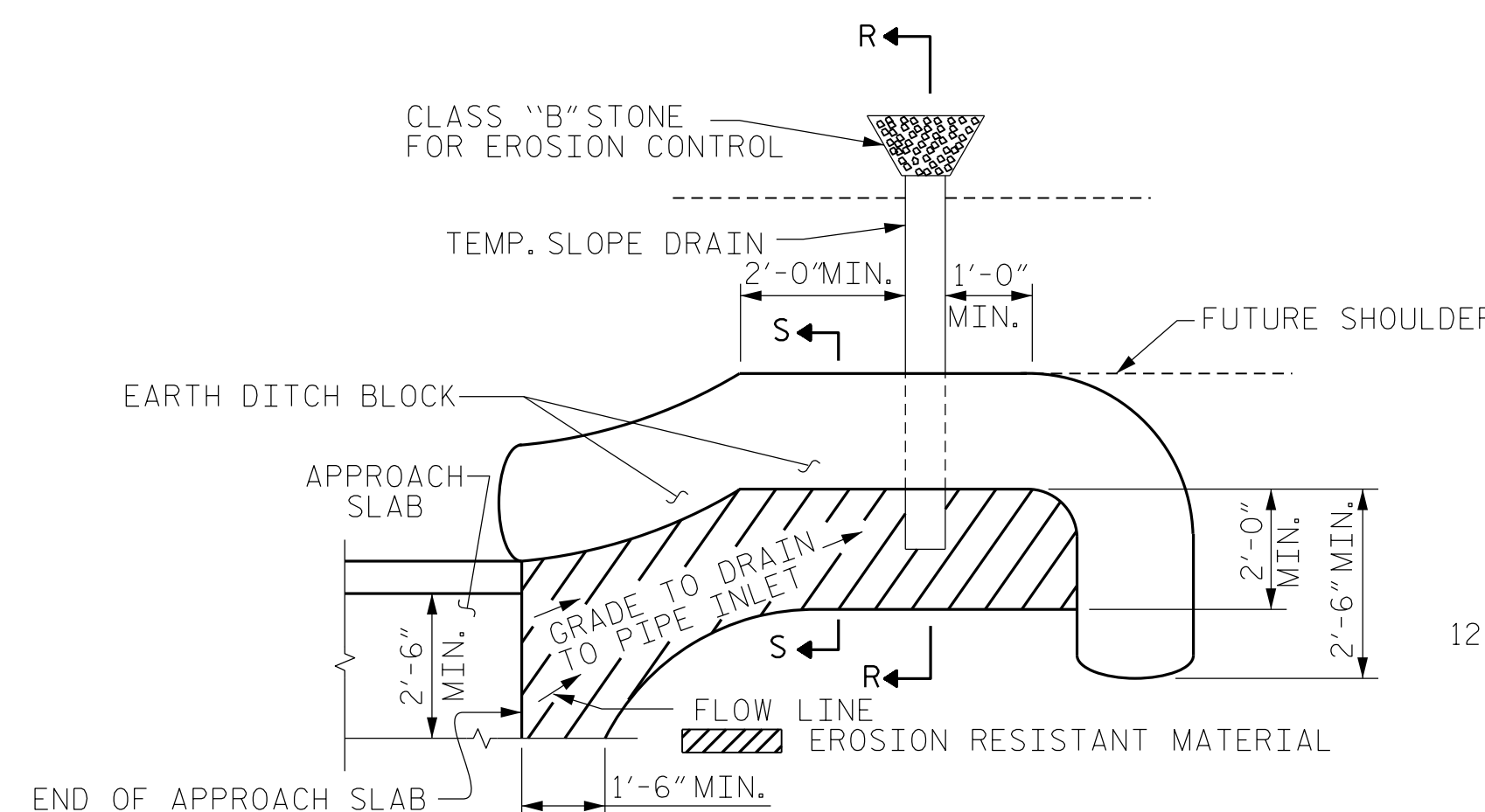
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE COST OF THE SIDEWALK, TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

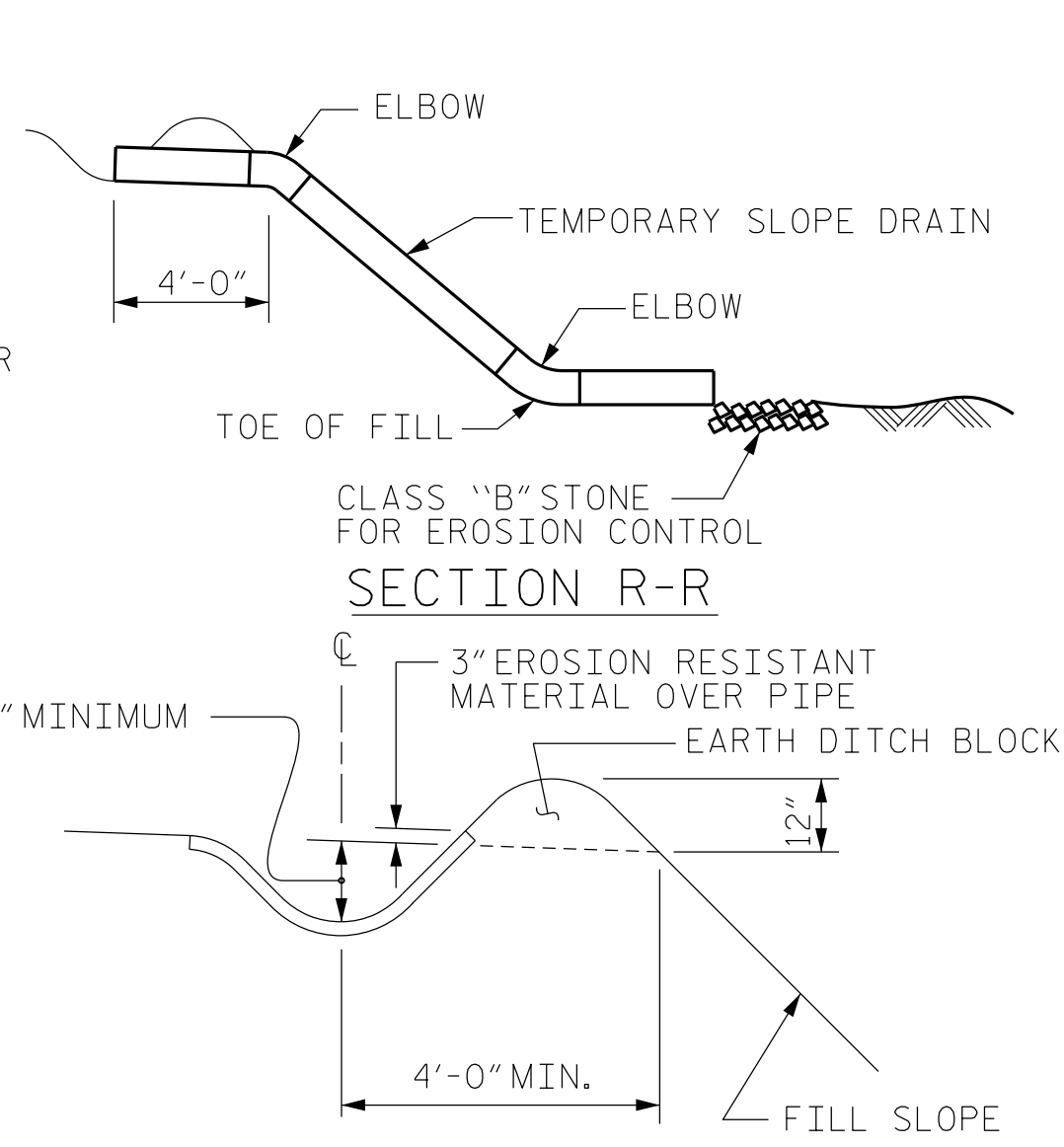
STAGE II						
FOR ONE APPROACH SLAB (2 REQ'D)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	75	#4	STR	22'-1"	1105	
A2	78	#4	STR	21'-11"	1140	
*B1	122	#5	STR	23'-10"	3033	
B2	122	#6	STR	24'-8"	4520	
*B3	10	#4	STR	24'-8"	165	
*G1	26	#4	STR	5'-1"	88	
*J1	54	#4	1	1'-5"	51	
*U1	10	#4	2	3'-0"	20	
REINFORCING STEEL				LBS.	5660	
* EPOXY COATED REINFORCING STEEL				LBS.	4462	
CLASS AA CONCRETE						
POUR #1 (SLAB)				C.Y.	66.4	
POUR #2 (SIDEWALK)				C.Y.	3.2	
TOTAL				C.Y.	69.6	

SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

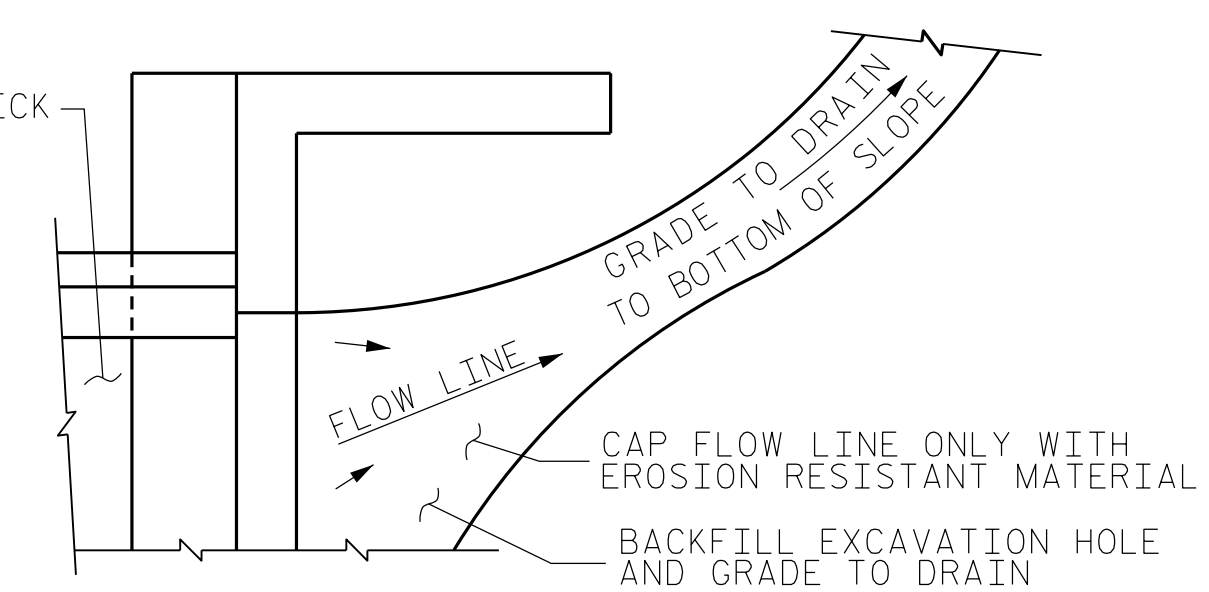
PROJECT NO. U-4910A  
 CABARRUS COUNTY  
 STATION: 147+80.00 -L-  
 SHEET 4 OF 4



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.



SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

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11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL 030474  
 JOHN C. MORRISON  
 CIVIL ENGINEER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-55
2			4			TOTAL SHEETS 55

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