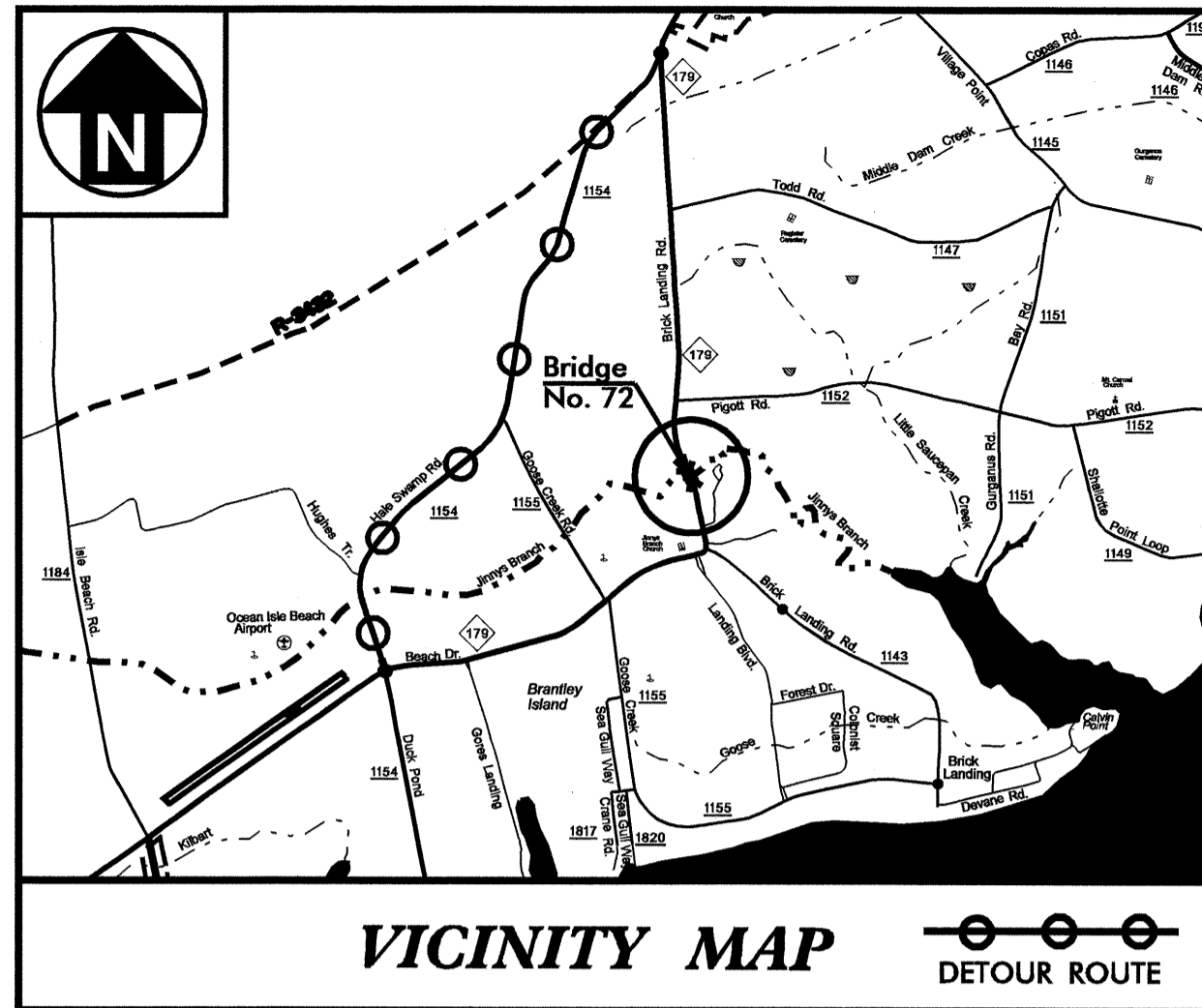


CONTRACT: C201848 TIP PROJECT: B-4031

16-MAY-2008 11:23  
 emurray

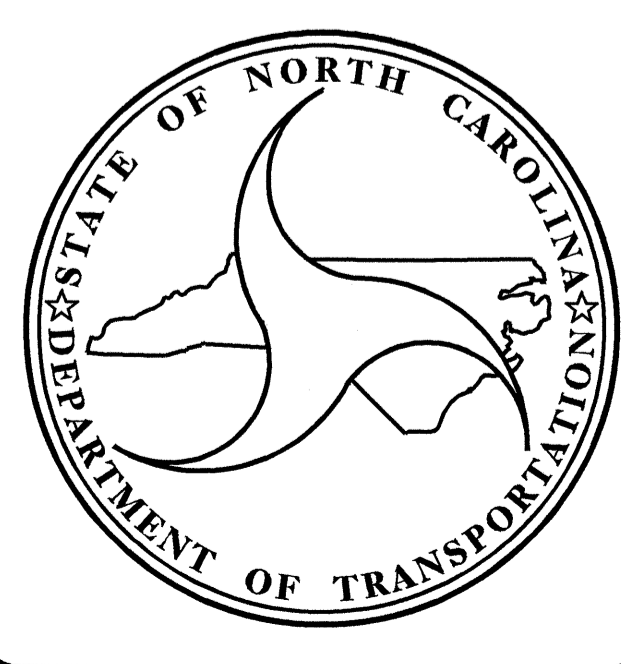
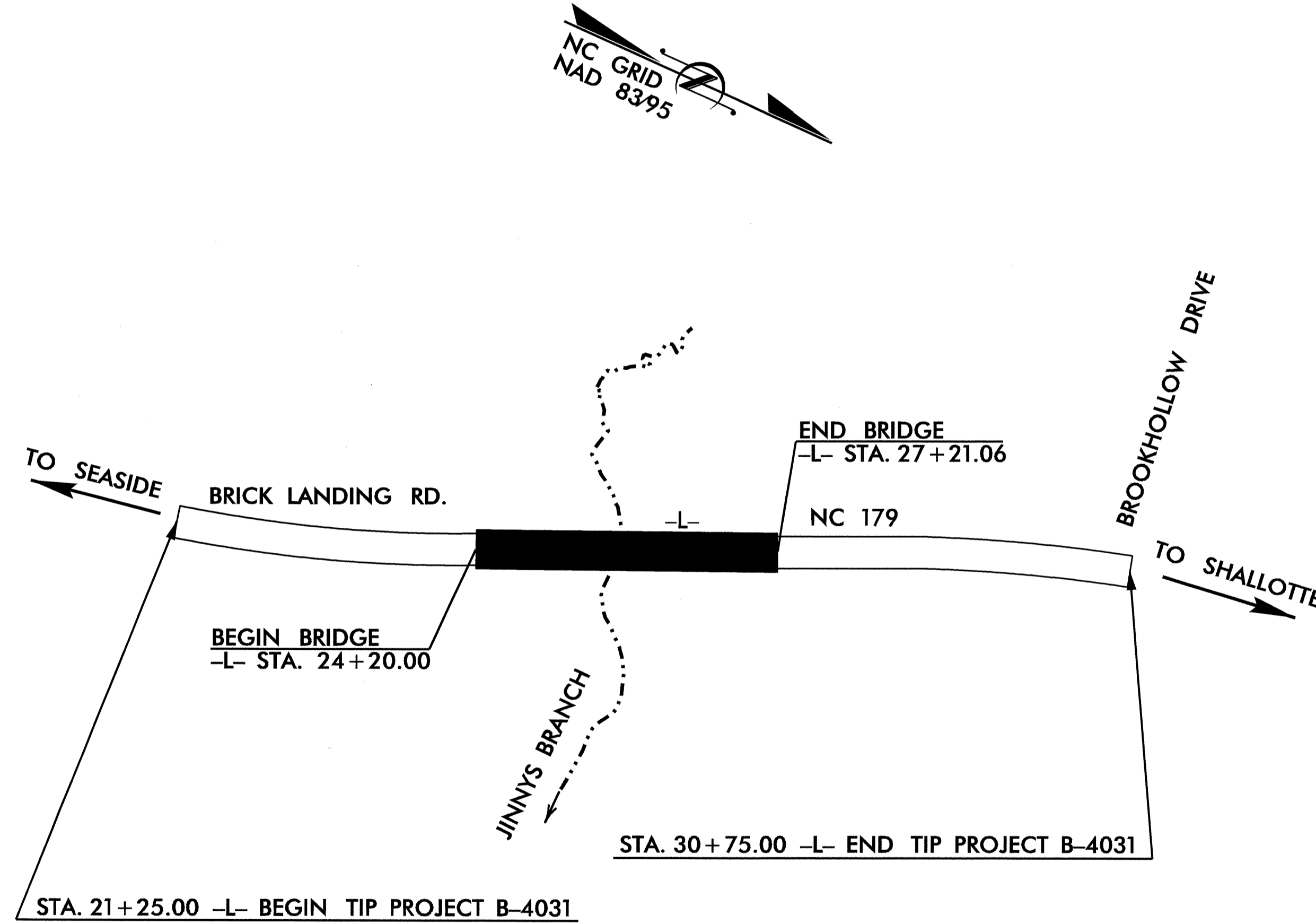


STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**BRUNSWICK COUNTY**

**LOCATION: BRIDGE NO. 72 OVER JINNYS BRANCH ON NC 179**  
**TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE**

| STATE     | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------|-----------------------------|-------------|--------------|
| N.C.      | B-4031                      |             |              |
| WAELEMENT | F.A. PROJ. NO.              | DESCRIPTION |              |
| 33398.1.1 | BRSTP-0179(2)               | P.E.        |              |
| 33398.2.1 | BRSTP-0179(2)               | R/W & UTL.  |              |
| 33398.3.1 | BRSTP-0179(2)               | CONST.      |              |
|           |                             |             |              |
|           |                             |             |              |
|           |                             |             |              |

**STRUCTURE**



**DESIGN DATA**

|                       |                         |
|-----------------------|-------------------------|
| ADT 2007 =            | 9,100                   |
| ADT 2027 =            | 16,800                  |
| DHV =                 | 15%                     |
| D =                   | 55%                     |
| * T =                 | 4%                      |
| ** V =                | 60 mph                  |
| * Duals               | 3% TTST 1%              |
| ** Design Exception - | Sag vertical Curve K    |
|                       | Horizontal Curve Radius |

**PROJECT LENGTH**

|                                       |              |
|---------------------------------------|--------------|
| LENGTH ROADWAY TIP PROJECT B-4031     | = 0.123 MILE |
| LENGTH STRUCTURE TIP PROJECT B-4031   | = 0.057 MILE |
| TOTAL LENGTH STATE TIP PROJECT B-4031 | = 0.180 MILE |

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**

|                                       |  |
|---------------------------------------|--|
| <b>LETTING DATE:</b><br>July 15, 2008 | <b>OMAR R. AZIZI, PE</b><br><small>PROJECT ENGINEER</small>            |
|                                       | <b>EMILY E. MURRAY, P.E.</b><br><small>PROJECT DESIGN ENGINEER</small> |

**STRUCTURE DESIGN UNIT**  
 1000 BIRCH RIDGE DR.  
 RALEIGH, N.C. 27610

**DIVISION OF HIGHWAYS**  
 STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER  
**FEDERAL HIGHWAY ADMINISTRATION**

APPROVED  
 DIVISION ADMINISTRATOR

DATE

-1.8353%    -0.5048%

P.I. STA. = 23+43.00 -L-  
ELEV. = 13.77  
VC = 154'

**GRADE DATA**

FILL FACE @ END BENT #1  
STA. 24+20.00 -L-  
GRADE POINT EL. 13.381

BEGIN FRONT SLOPE  
STA. 24+09.41 -L-  
GRADE POINT EL. 13.440

EXISTING NATURAL GROUND

12" CONC. PILES

2:1 SLOPE (NORMAL TO CAP) (TYP.)

EXISTING SUBSTRUCTURE (TYP.)

END BENT #1

**SPAN A**

APPROX. LOW TIDE EL. -1.2 (4/28/05)

APPROX. HIGH TIDE EL. 0.0 (4/28/05)

EL. 10.4±

EL. 6.0±

EL. 3.1±

EL. -1.6±

**SPAN B**

FIX. EXP.

HIGH WATER EL. 7.5± (1999)

EL. 7.3±

EL. 3.0±

EL. 1.5±

EL. -2.2±

EL. -3.6±

BENT #1

**SPAN C**

FIX. FIX.

EL. 10.3±

EL. 3.0±

EL. 1.5±

EL. -2.2±

EL. -3.6±

BENT #2

**SPAN D**

FIX. FIX.

EL. 11.2±

EL. 3.0±

EL. 3.0±

END BENT #2

-0.5048%    +3.5275%

P.I. STA. = 28+52.00 -L-  
ELEV. = 11.20  
VC = 251'

**GRADE DATA**

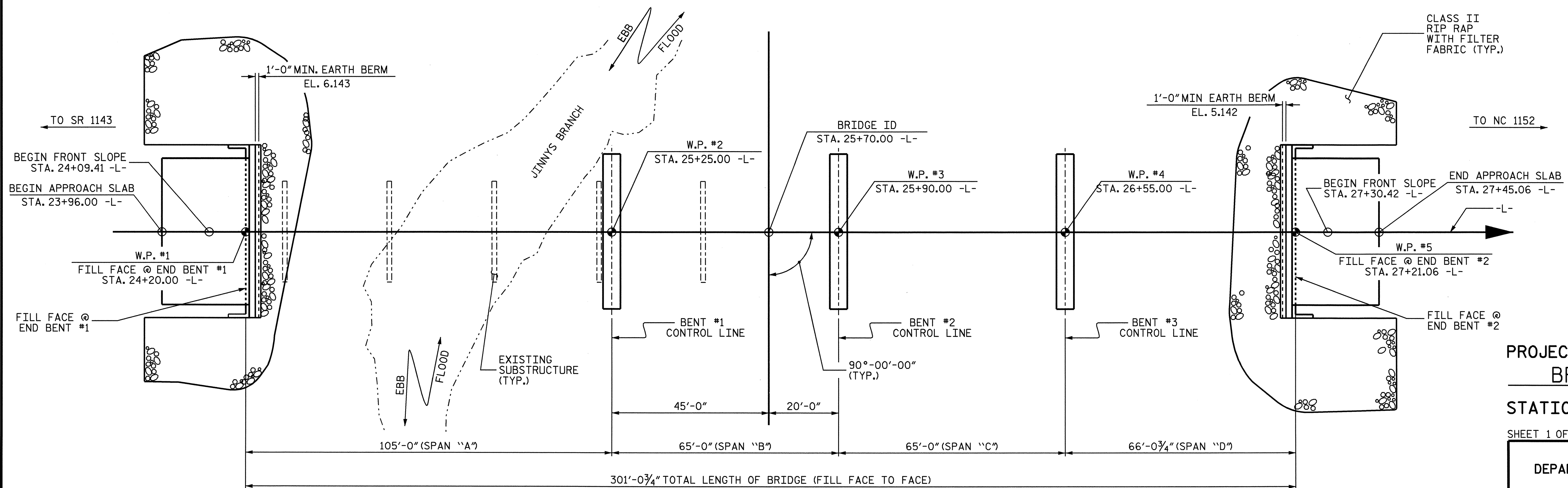
FILL FACE @ END BENT #2  
STA. 27+21.06 -L-  
GRADE POINT EL. 11.862

BEGIN FRONT SLOPE  
STA. 27+30.42 -L-  
GRADE POINT EL. 11.815

EXISTING NATURAL GROUND

UNCLASSIFIED STRUCTURE EXCAVATION

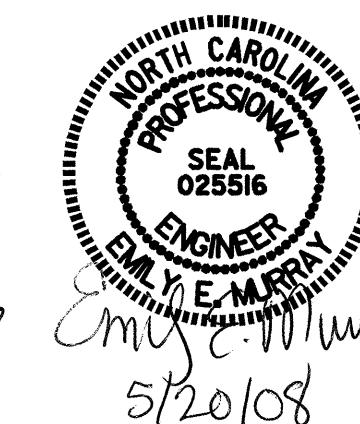
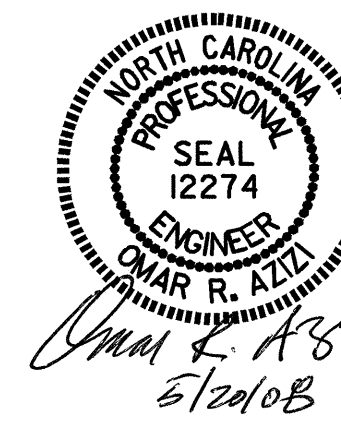
**SECTION ALONG C -L-**



**PLAN**

DRAWN BY: ZJR/C.R. MCDUFFEE DATE: 3/18/08  
CHECKED BY: M. PISO DATE: 3/18/08

19-MAY-2008 10:15  
g:\tipprojects\b4031\structures\b4031\final\plane\b4031\_sd.gd.dgn  
faverette



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
STATION: 25+70.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 72

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**

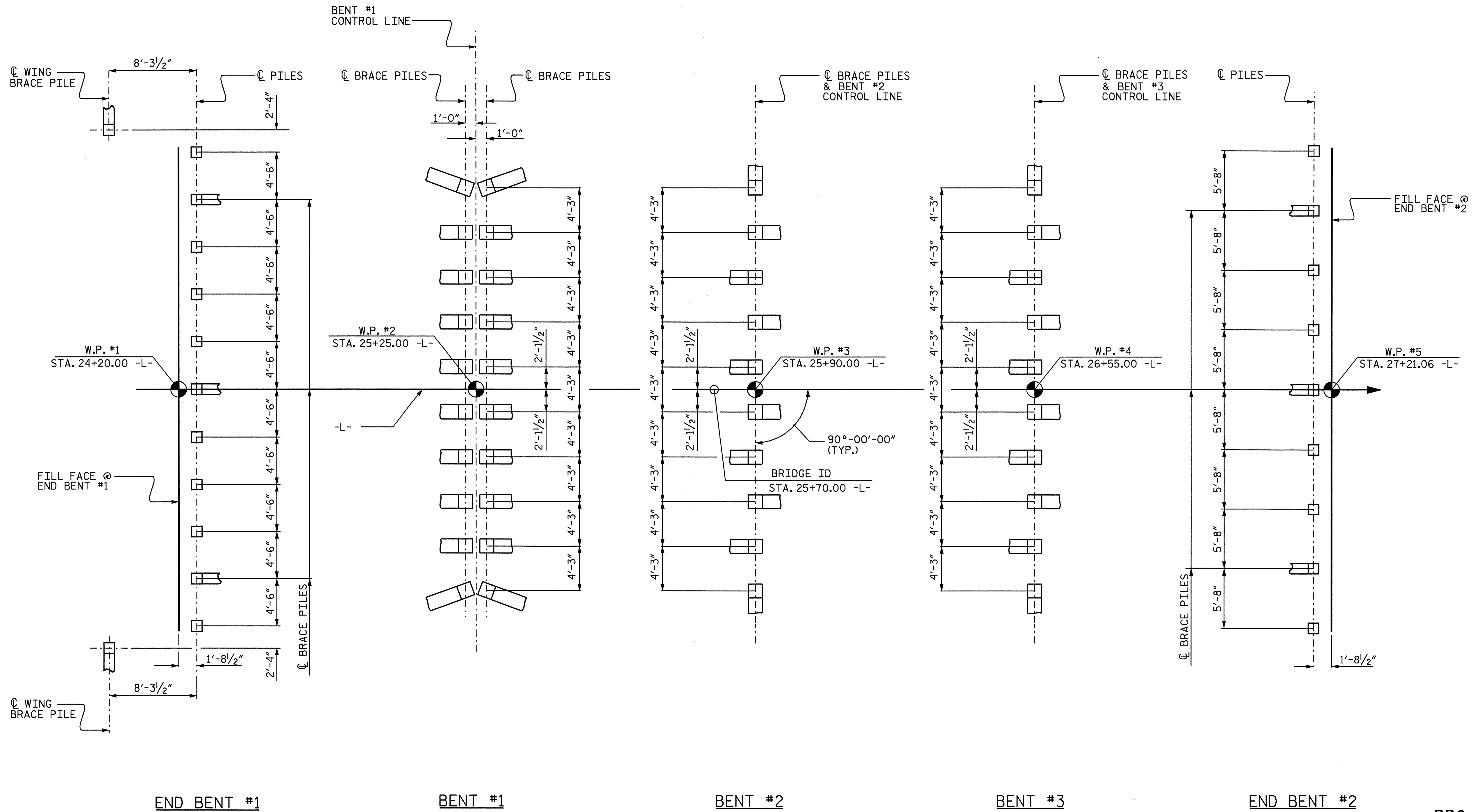
FOR BRIDGE ON NC 179  
OVER JINNY'S BRANCH  
BETWEEN SR 1143 AND SR 1152

REVISIONS

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

SHEET NO.  
S-1  
TOTAL SHEETS  
33

NC006



**FOUNDATION LAYOUT**

END BENT PILES ARE 12" PRESTRESSED CONCRETE.  
 BRACE PILES AT END BENTS ARE TO BE BATTERED @ 3:12.  
 BENT PILES ARE 16" PRESTRESSED CONCRETE WITH STEEL PILE TIPS.  
 BRACE PILES AT BENTS ARE TO BE BATTERED @ 1 1/2:12.  
 DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

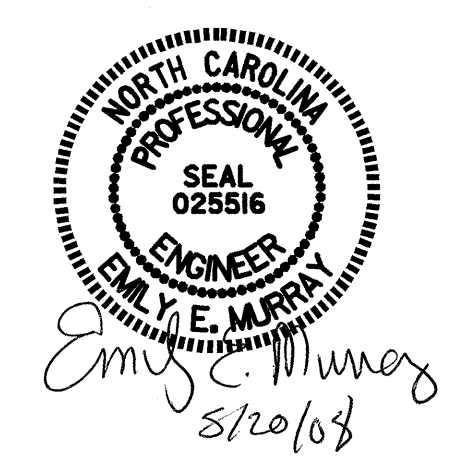
PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**

FOR BRIDGE ON NC 179  
 OVER JINNY'S BRANCH  
 BETWEEN SR 1143 AND SR 1152



DRAWN BY: C.R. MCDUFFEE DATE: 3/18/08  
 CHECKED BY: T.L. AVERETTE DATE: 3/28/08

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

**TOTAL BILL OF MATERIAL**

|                | REMOVAL OF EXISTING STRUCTURE | PDA TESTING | PDA ASSISTANCE | UNCLASSIFIED STRUCTURE EXCAVATION | CONCRETE WEARING SURFACE | GROOVING BRIDGE FLOORS | CLASS AA CONCRETE | BRIDGE APPROACH SLABS | EPOXY COATED REINFORCING STEEL | 12" PRESTRESSED CONCRETE PILES | 16" PRESTRESSED CONCRETE PILES | PILE REDRIVES | 2 BAR METAL RAIL | 1'-2" X 3'-0" CONCRETE PARAPET | RIP RAP CLASS II (2'-0" THICK) | FILTER FABRIC FOR DRAINAGE | ELASTOMERIC BEARINGS | EVAZOTE JOINT SEALS | 3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS | 3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS |         |          |         |          |
|----------------|-------------------------------|-------------|----------------|-----------------------------------|--------------------------|------------------------|-------------------|-----------------------|--------------------------------|--------------------------------|--------------------------------|---------------|------------------|--------------------------------|--------------------------------|----------------------------|----------------------|---------------------|--|--|---------|----------|---------|----------|
|                | LUMP SUM                      | EACH        | EACH           | CU. YDS.                          | SQ. FEET                 | SQ. FEET               | CU. YDS.          | LUMP SUM              | LBS.                           | NO.                            | LIN. FT.                       | NO.           | LIN. FT.         | EACH                           | LIN. FT.                       | LIN. FT.                   | TONS                 | SQ. YDS.            | LUMP SUM                                     | LUMP SUM                                     | NO.     | LIN. FT. | NO.     | LIN. FT. |
| SUPERSTRUCTURE |                               |             |                |                                   | 11803                    | 12554                  |                   | LUMP SUM              |                                |                                |                                |               | 582.50           | 597.50                         |                                |                            |                      | LUMP SUM            | LUMP SUM                                     | 42   | 2723.00 | 14       | 1452.50 |          |
| END BENT NO.1  |                               |             |                | 100                               |                          |                        | 24.4              |                       | 3590                           | 13                             | 260                            |               |                  |                                |                                |                            | 230                  | 256                 |  |  |         |          |         |          |
| BENT NO.1      |                               |             |                |                                   |                          |                        | 27.0              |                       | 4354                           |                                |                                |               | 20               | 400                            |                                |                            |                      |                     |  |  |         |          |         |          |
| BENT NO.2      |                               |             |                |                                   |                          |                        | 16.2              |                       | 2826                           |                                |                                |               | 10               | 200                            |                                |                            |                      |                     |  |  |         |          |         |          |
| BENT NO.3      |                               |             |                |                                   |                          |                        | 16.2              |                       | 2826                           |                                |                                |               | 10               | 200                            |                                |                            |                      |                     |  |  |         |          |         |          |
| END BENT NO.2  |                               |             |                | 2500                              |                          |                        | 22.0              |                       | 3386                           | 9                              | 180                            |               |                  |                                |                                |                            | 194                  | 215                 |  |  |         |          |         |          |
| TOTAL          | LUMP SUM                      | 2           | 2              | 2600                              | 11803                    | 12554                  | 105.8             | LUMP SUM              | 16982                          | 22                             | 440                            | 40            | 800              | 20                             | 582.50                         | 597.50                     | 424                  | 471                 | LUMP SUM                                     | LUMP SUM                                     | 42      | 2723.00  | 14      | 1452.50  |

**NOTES**

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE BOX BEAM UNITS FOR SPANS B,C, AND D HAVE BEEN DESIGNED FOR HS25.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

ALL BAR SUPPORTS USED IN THE PARAPET AND BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE PILES SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS: 1 @ 30'-6", 2 @ 30'-0", 1 @ 30'-6", WITH A CLEAR ROADWAY WIDTH OF 29'-7". A PRESTRESSED CONCRETE CHANNEL DECK WITH P.P.C. CAPS AND TIMBER PILES WITH SPILL THRU ABUTMENTS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT. SEE SPECIAL PROVISION FOR SALVAGE INSTRUCTIONS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.

DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED BEARING CAPACITY OF 150 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT NO.1 AND END BENT NO.2 IS 75 TONS PER PILE.

DRIVE PILES AT BENT NO.1 THROUGH BENT NO.3 TO A REQUIRED BEARING CAPACITY OF 160 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO PLUS ANY ADDITIONAL CAPACITY TO ACCOUNT FOR DOWN DRAG OR NEGATIVE SKIN FRICTION AND SCOUR.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT BENT NO.1 THROUGH BENT NO.3 IS 75 TONS PER PILE.

STEEL PILE TIPS ARE REQUIRED FOR PRESTRESSED CONCRETE PILES AT BENT NO.1, BENT NO.2, AND BENT NO.3. SEE SECTION 450 OF THE THE STANDARD SPECIFICATIONS.

SCOUR CRITICAL ELEVATION FOR BENT NO.1 THROUGH BENT NO.3 IS ELEVATION -8 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING PILE DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED AT BENT NO.1 OR BENT NO.3. THE ENGINEER WILL DETERMINE THE NEED FOR ADDITIONAL PDA TESTING. SEE PILE DRIVING ANALYZER SPECIAL PROVISION.

DRIVE PILES AT BENT NO.1 THROUGH NO.3 TO A PRESTRESSED CONCRETE PILE TIP ELEVATION NO HIGHER THAN -12 FT.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

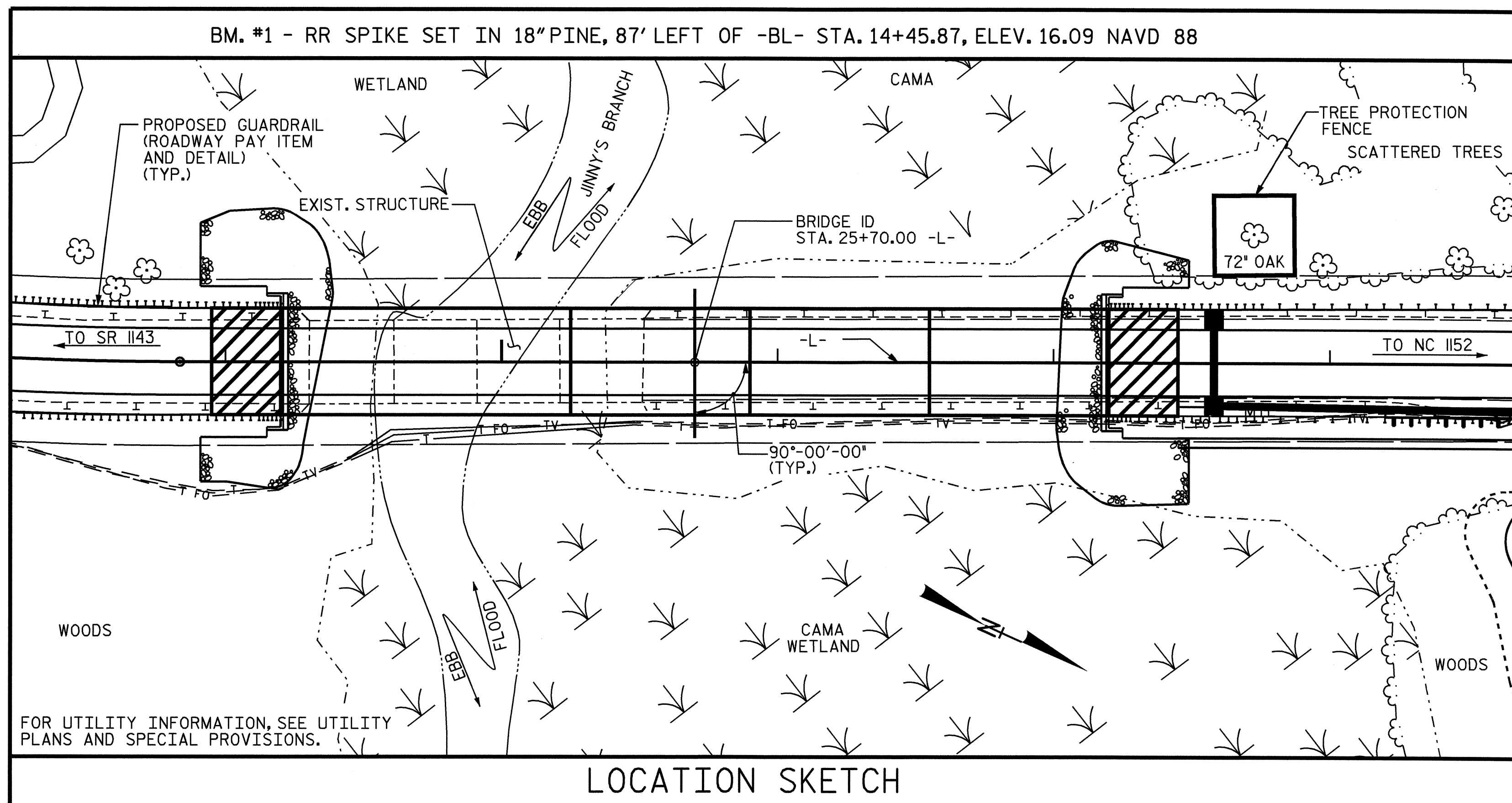
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 3 SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC YARD FOR UNCLASSIFIED STRUCTURE EXCAVATION.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, 'EVALUATING SCOUR AT BRIDGES', MAY, 2001.



**LOCATION SKETCH**

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

**HYDRAULIC DATA**

|                             |   |             |
|-----------------------------|---|-------------|
| DESIGN DISCHARGE            | = | 1100 C.F.S. |
| FREQUENCY OF DESIGN FLOOD   | = | 50 YR.      |
| DESIGN HIGH WATER ELEVATION | = | 4.80'       |
| DRAINAGE AREA               | = | 6.5 SQ.MI.  |
| BASIC DISCHARGE (Q100)      | = | 1350 C.F.S. |
| BASIC HIGH WATER ELEVATION  | = | 5.10'       |

**OVERTOPPING FLOOD DATA**

|                                |   |              |
|--------------------------------|---|--------------|
| OVERTOPPING DISCHARGE          | = | 17000 C.F.S. |
| FREQUENCY OF OVERTOPPING FLOOD | = | 500 YR. +    |
| OVERTOPPING FLOOD ELEVATION    | = | 11.75'       |

**PROJECT NO. B-4031**  
**BRUNSWICK COUNTY**  
**STATION: 25+70.00 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

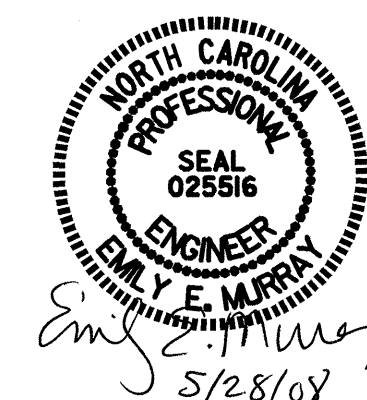
**GENERAL DRAWING**

FOR BRIDGE ON NC 179  
 OVER JINNY'S BRANCH  
 BETWEEN SR 1143 AND SR 1152

REVISIONS

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

SHEET NO.  
S-3  
TOTAL SHEETS  
33



DRAWN BY: C.R.MCDUFFEE DATE: 3/18/08  
 CHECKED BY: J.L.AVERETTE DATE: 3/28/08

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 CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO 1/2" ABOVE THE TOP OF DOWELS AND THEN FILLED WITH GROUT.

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5900 PSI FOR SPAN A AND 4100 PSI FOR SPANS B, C, AND D.

ALL REINFORCING STEEL IN PARAPETS, END POSTS AND CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3/16" AT BENT #1.

PRESTRESSED CONCRETE BOX BEAM UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

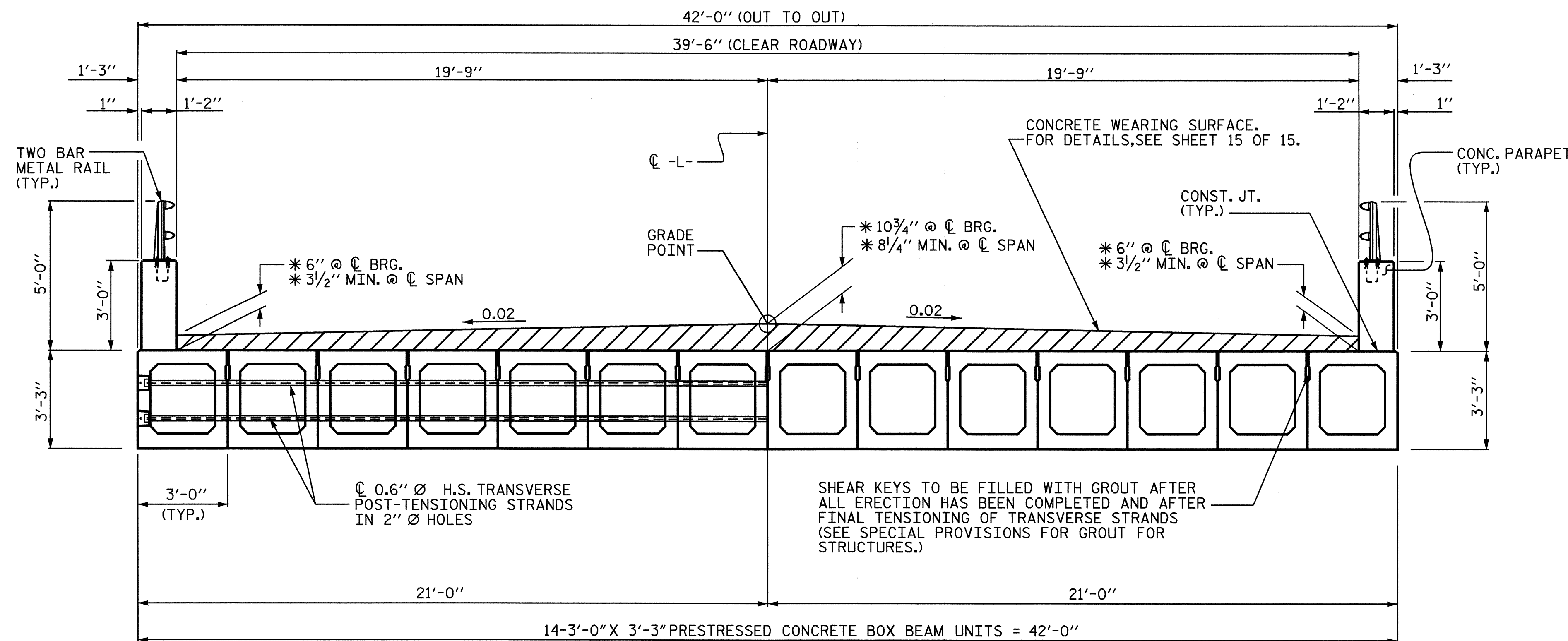
PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE PARAPET. THE COST OF THE REINFORCING STEEL CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

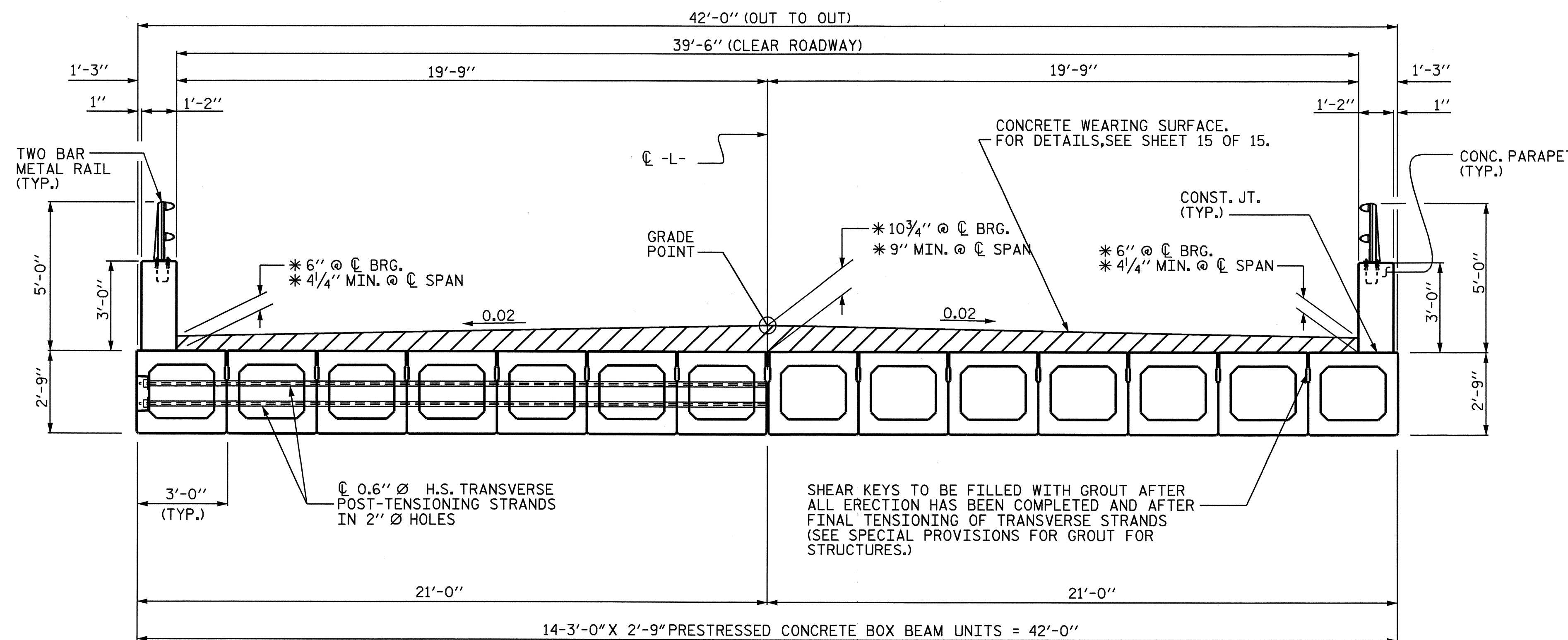
FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



TYPICAL SECTION SPAN "A"

\*BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS



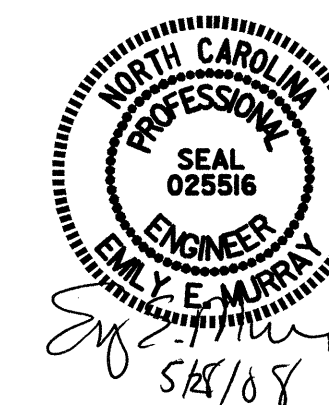
TYPICAL SECTION SPANS "B", "C", & "D"

\*BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 1 OF 15

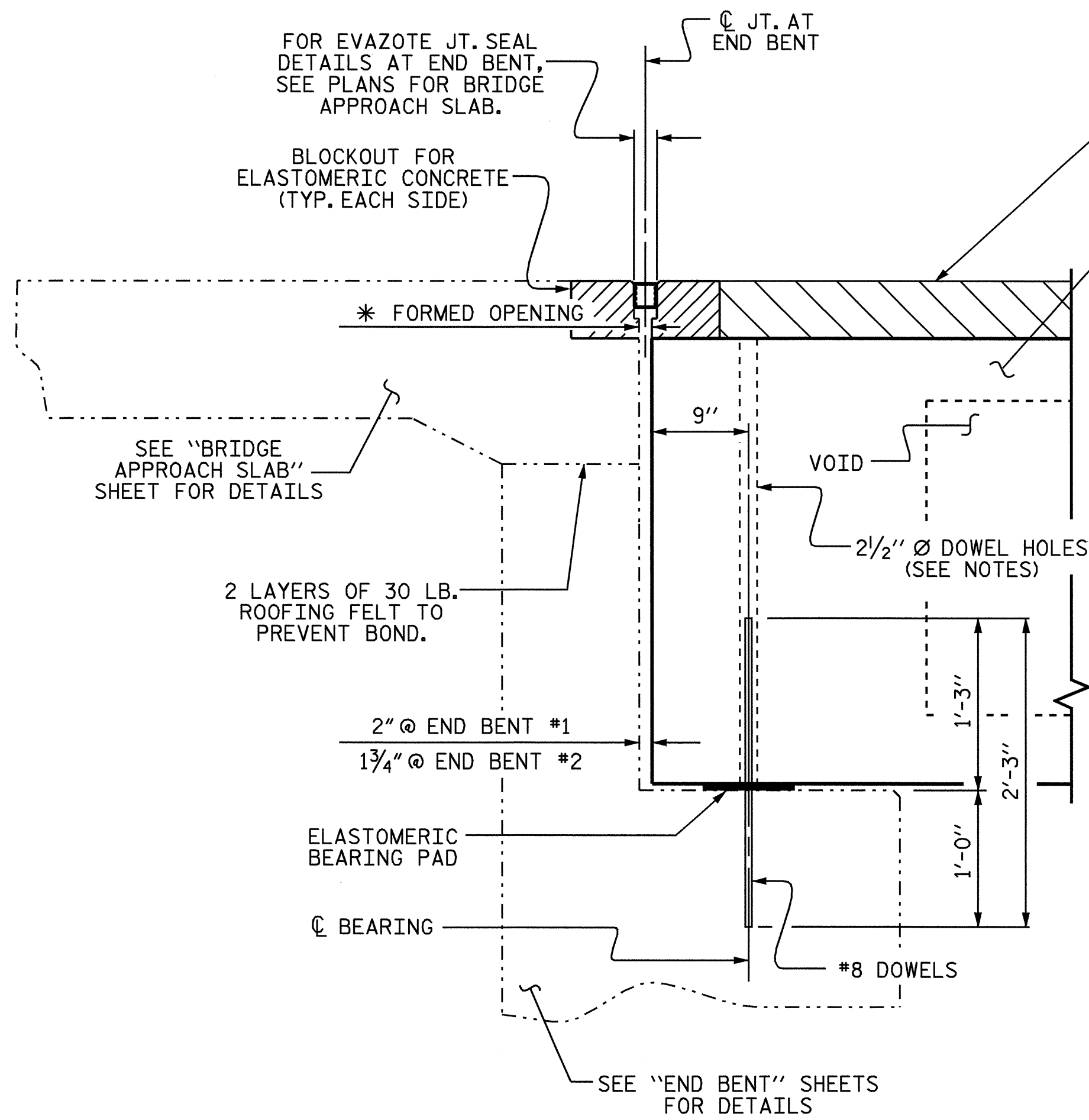
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTIONS



|                       |                    |
|-----------------------|--------------------|
| ASSEMBLED BY : MDPISO | DATE : 06/2006     |
| CHECKED BY : PADKINS  | DATE : 10/2006     |
| DRAWN BY : TLA 5/05   | ADDED 7/11/05R     |
| CHECKED BY : GM 6/05  | REV. 5/1/06 TLA/GM |

| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-4 |
|-----------|-----|-------|-----|-----|-------|------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS     |
| 2         |     |       | 4   |     |       | 33               |

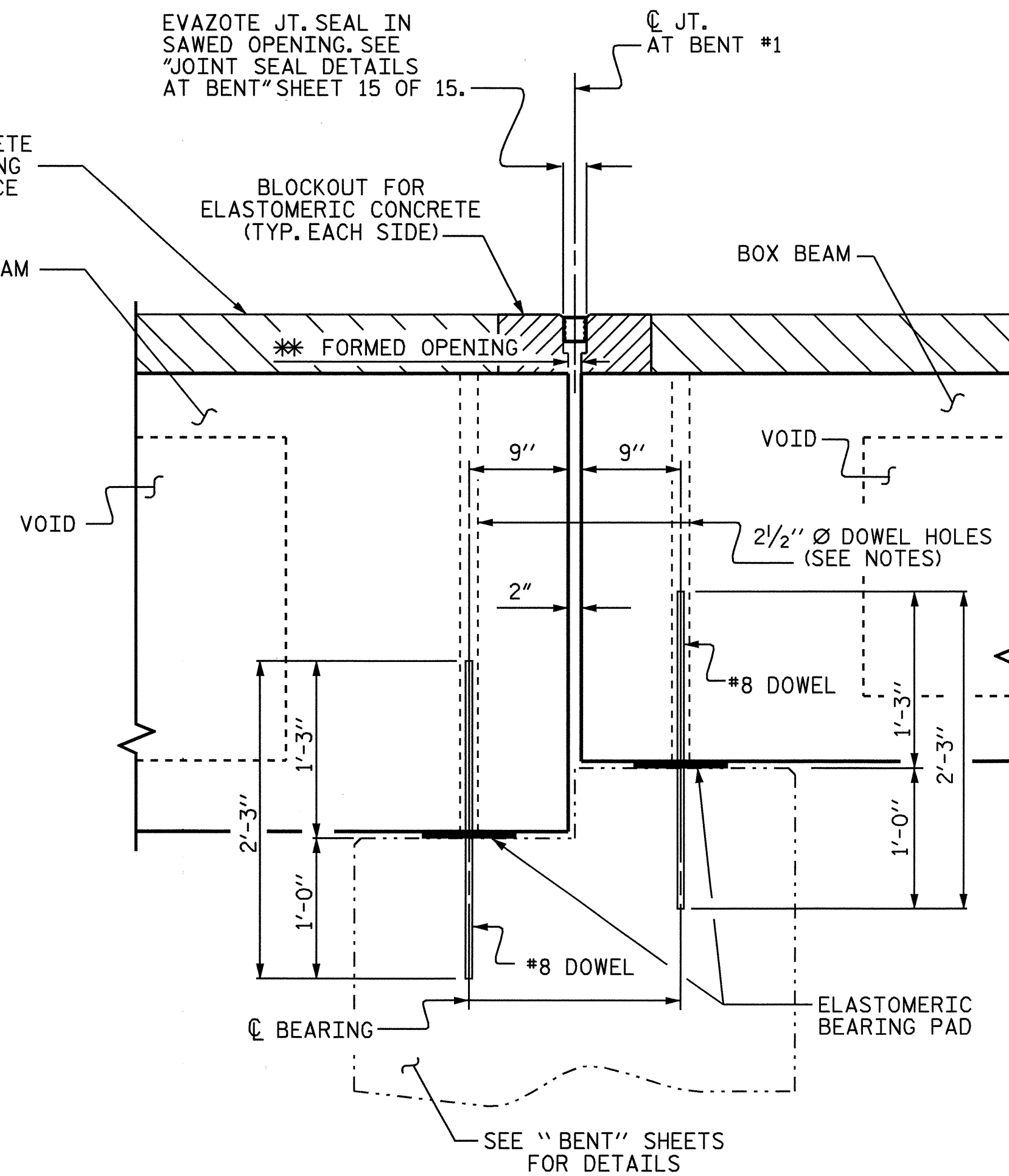
EXPANSION END



SECTION AT END BENT

(END BENT #1 SHOWN, END BENT #2 SIMILAR EXCEPT FOR BOX BEAM HEIGHT.)  
 \* FORMED OPENING TO MATCH ACTUAL OPENING BETWEEN THE TOP OF THE BOX BEAM UNIT AND THE BACKWALL WITH A MINIMUM FORMED OPENING OF 1/2".

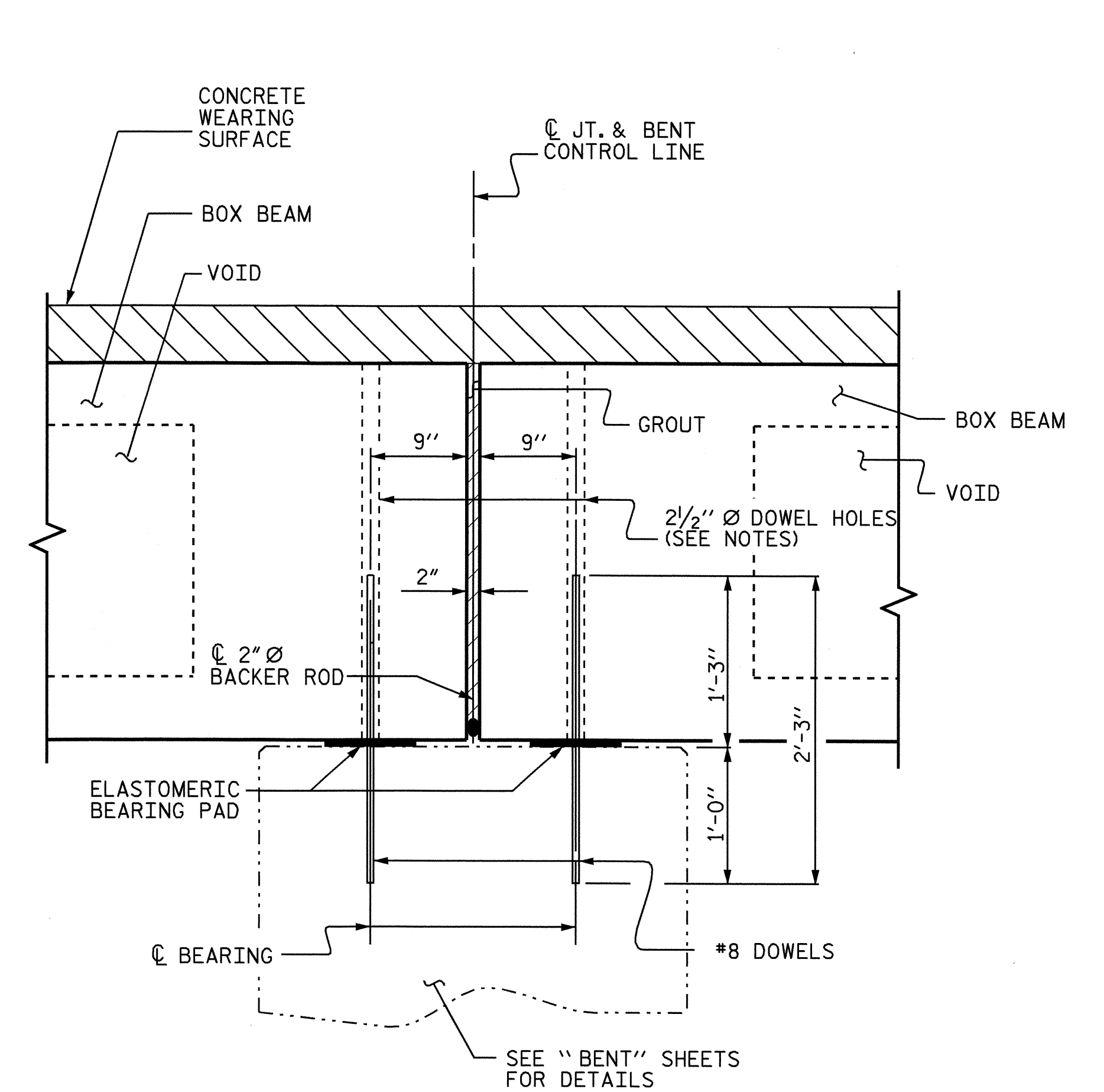
FIXED END



SECTION AT BENT #1

\*\* FORMED OPENING TO MATCH ACTUAL OPENING BETWEEN THE TOP OF THE BOX BEAM UNITS WITH A MINIMUM FORMED OPENING OF 1/2".

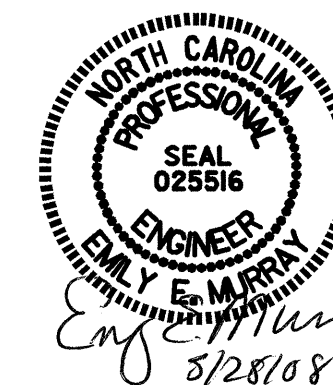
EXPANSION END



SECTION AT BENT #2 & #3

|                       |                     |
|-----------------------|---------------------|
| ASSEMBLED BY : MDPISO | DATE : 06/2006      |
| CHECKED BY : PADKINS  | DATE : 10/2006      |
| DRAWN BY : TLA 5/05   | ADDED 7/11/05R      |
| CHECKED BY : GM 6/05  | REV. 5/11/06 TLA/GM |

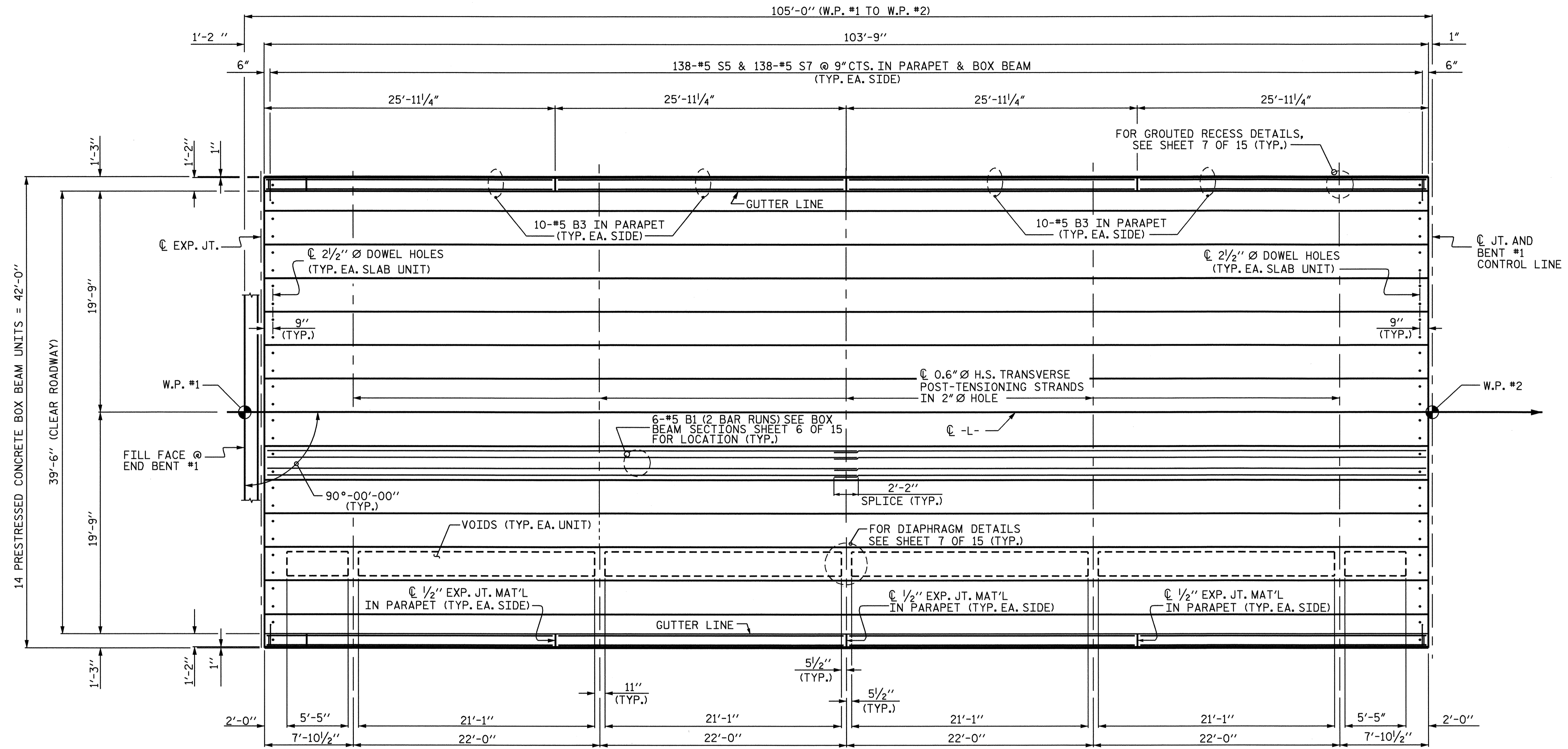
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 emurray



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 15

|  |     |       |     |     |                 |
|--|-----|-------|-----|-----|-----------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                 |
| SUPERSTRUCTURE   |     |       |     |     |                 |
| TYPICAL SECTION<br>DETAILS   |     |       |     |     |                 |
| REVISIONS  |     |       |     |     |                 |
| NO.  | BY: | DATE: | NO. | BY: | DATE:           |
| 1  |     |       | 3   |     |                 |
| 2  |     |       | 4   |     |                 |
| SHEET NO. S-5  |     |       |     |     | TOTAL SHEETS 33 |



**PLAN OF BOX BEAM UNIT - SPAN "A"**  
 (SEE SHEETS 6 AND 7 FOR REINFORCING STEEL IN CONCRETE BOX BEAM UNITS FOR SPAN A)

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

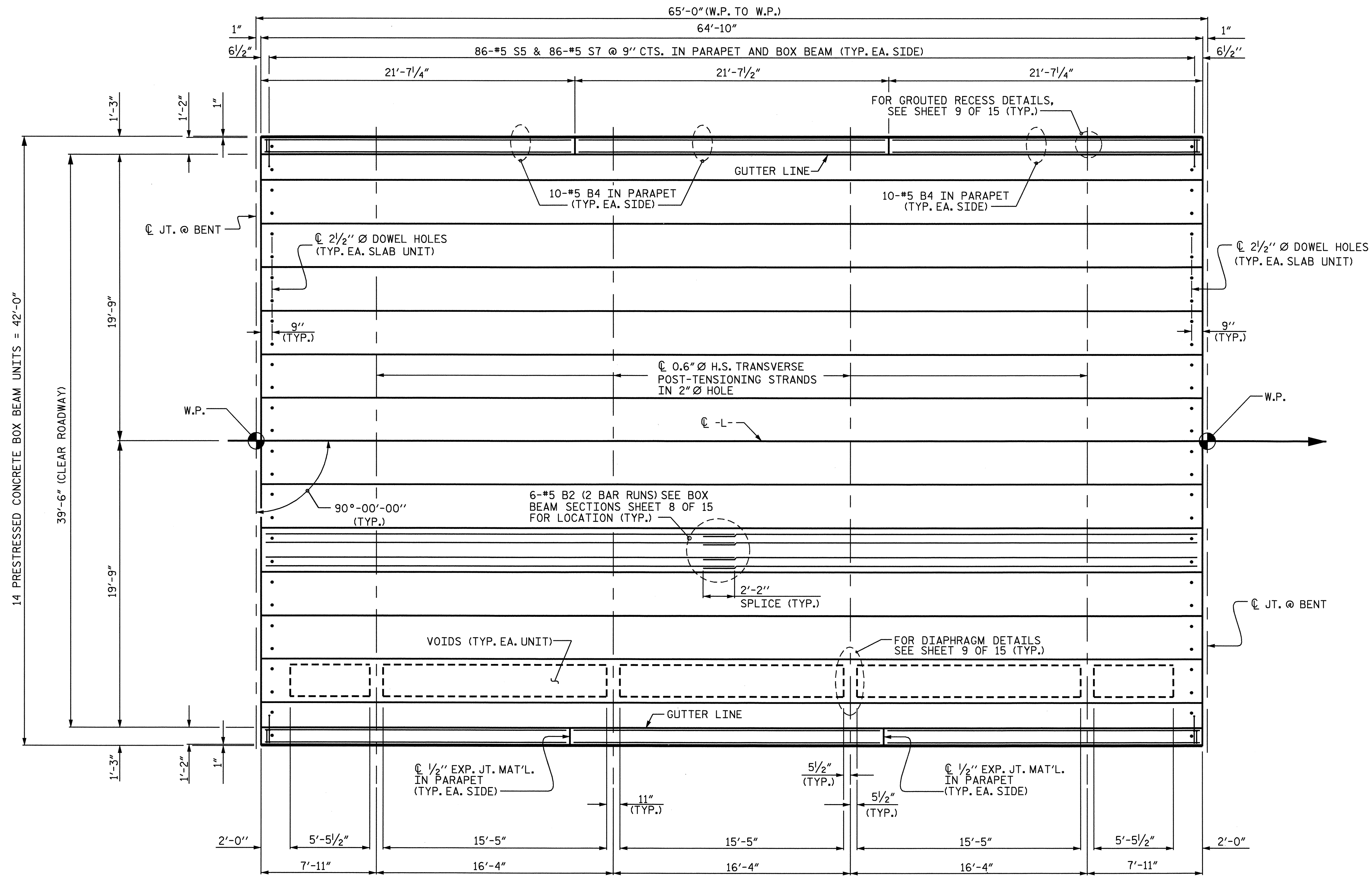
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN A  
 3'-0" X 3'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM



DRAWN BY: MDPISO DATE: 06/2006  
 CHECKED BY: P.ADKINS DATE: 09/2006

19-MAY-2008 10:37  
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 taverette

| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-6   |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
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| 2         |     |       | 4   |     |       |                    |



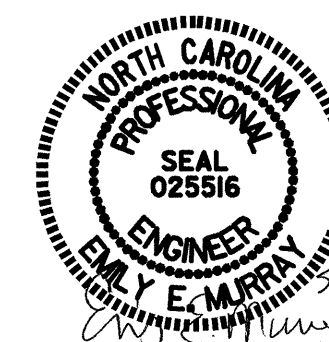
PLAN OF BOX BEAM UNIT - SPANS "B" & "C"

(SEE SHEETS 8 AND 9 FOR REINFORCING STEEL IN CONCRETE BOX BEAM UNITS FOR SPANS B AND C)

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 4 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS B & C  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM

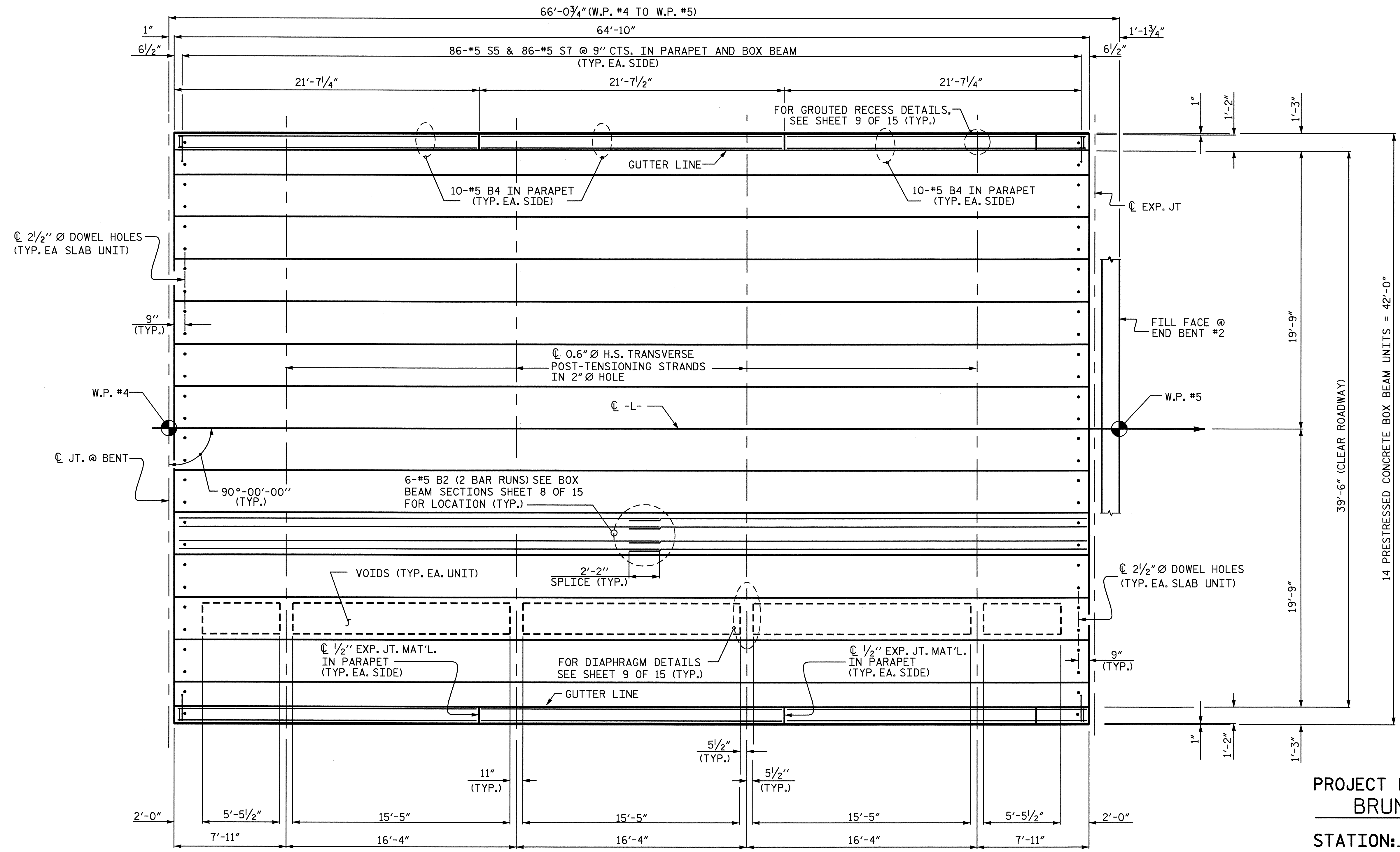


DRAWN BY : MDPISO DATE : 06/2006  
 CHECKED BY : PADKINS DATE : 10/2006

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 faverette

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-7          |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



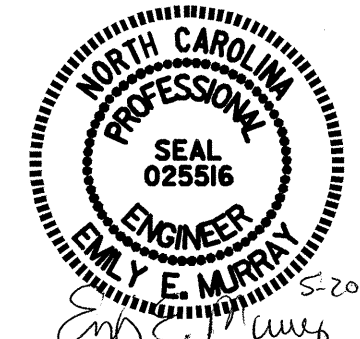


PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 5 OF 15

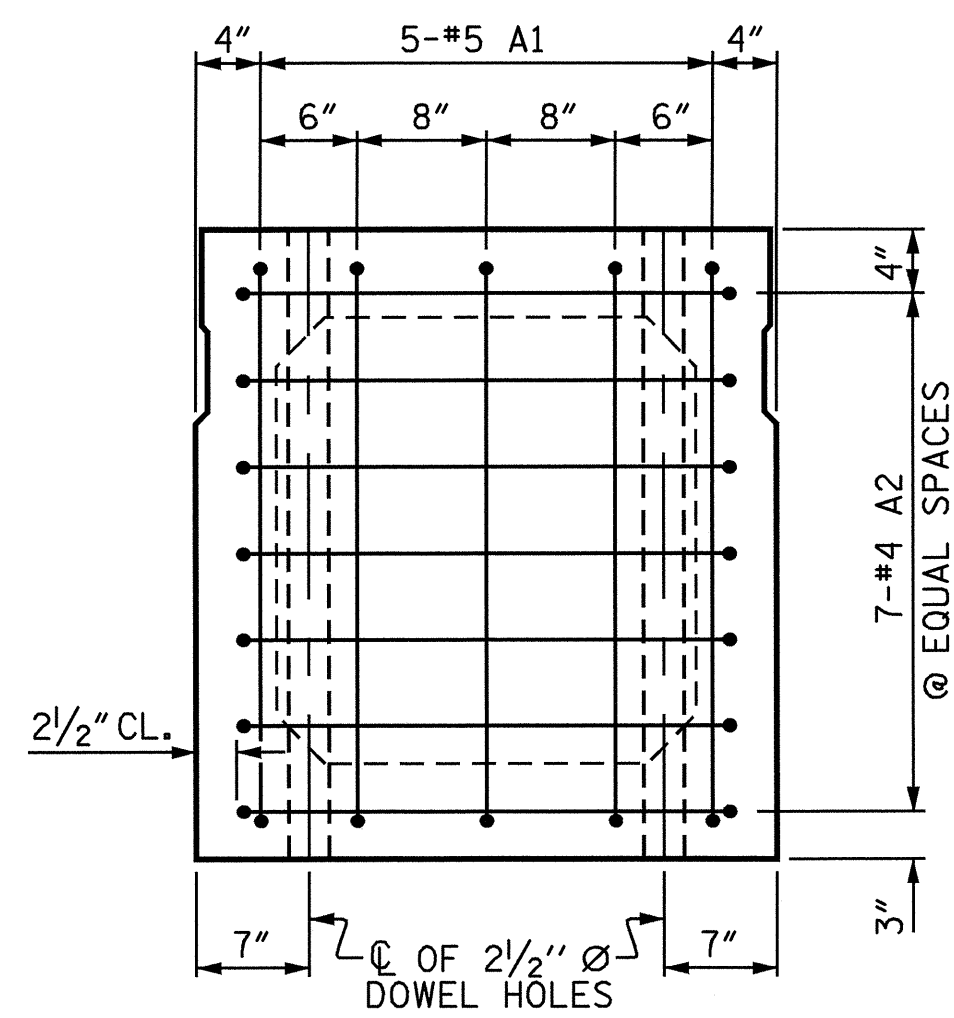
**PLAN OF BOX BEAM UNIT - SPAN "D"**  
 (SEE SHEETS 8 AND 9 FOR REINFORCING STEEL IN CONCRETE BOX BEAM UNITS FOR SPAN D)

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN D  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM



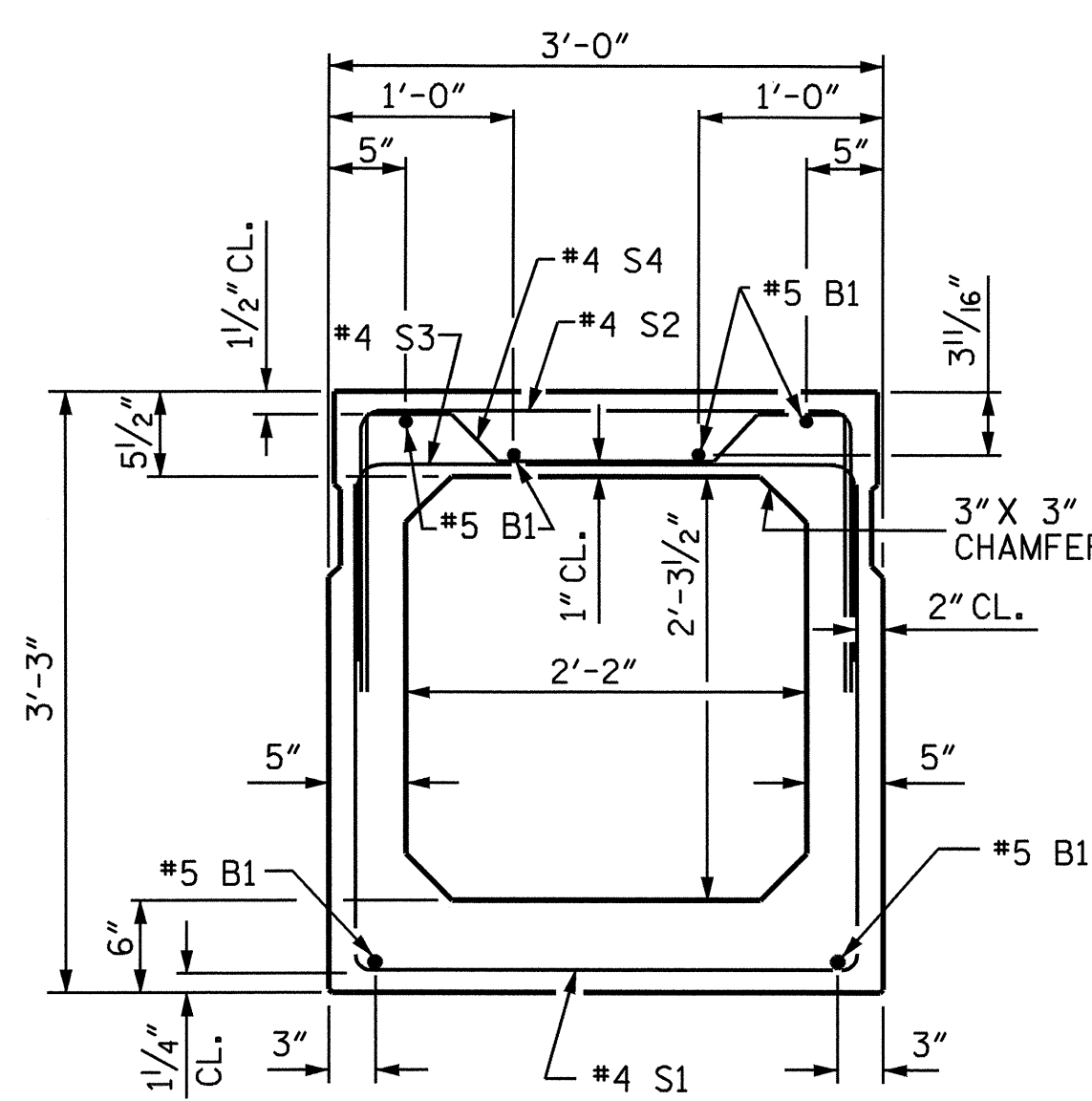
| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-8   |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>33 |
| 2         |     |       | 4   |     |       |                    |

DRAWN BY: MDPISO DATE: 06/2006  
 CHECKED BY: PADKINS DATE: 10/2006



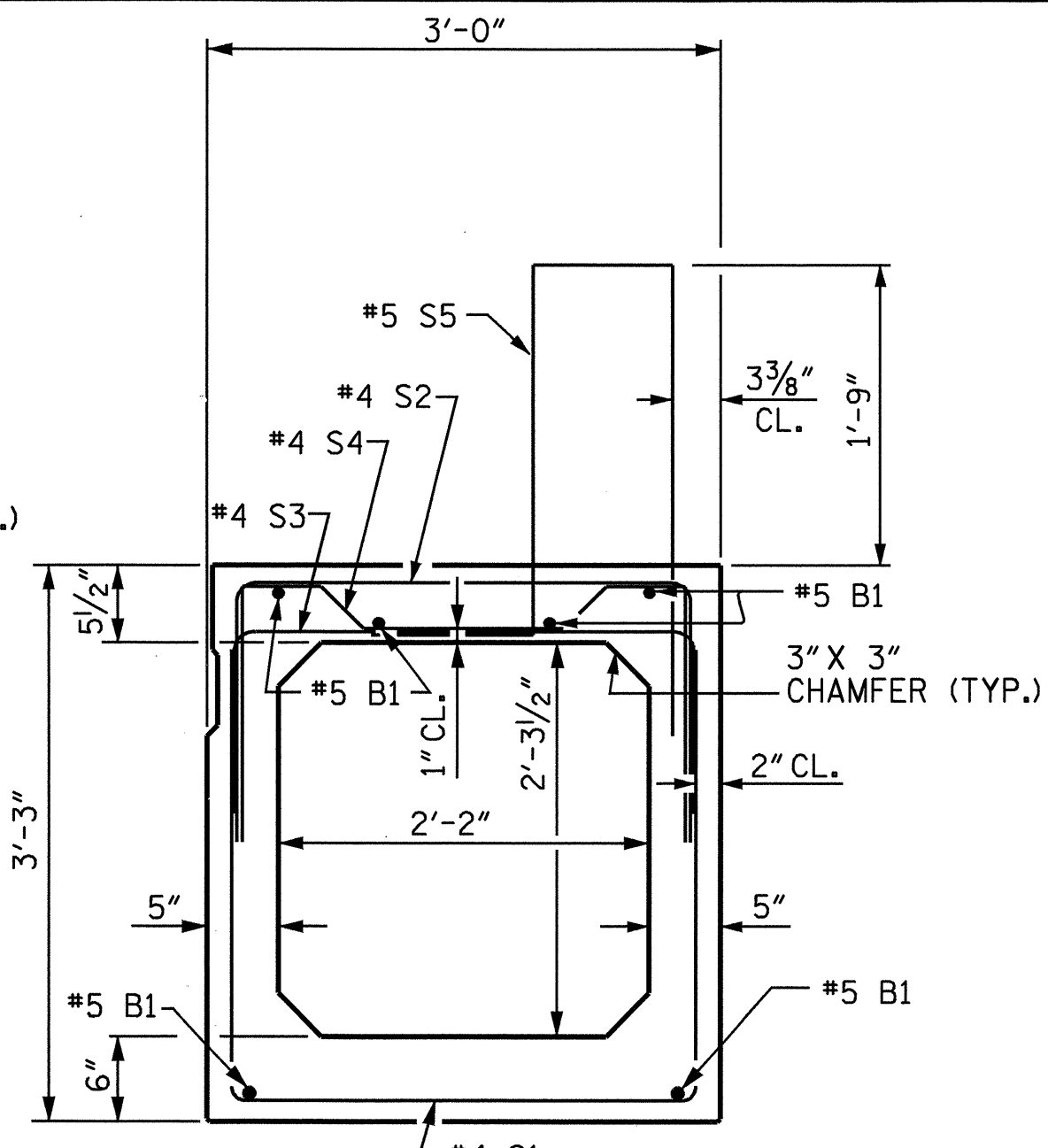
**END ELEVATION**

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.  
 (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



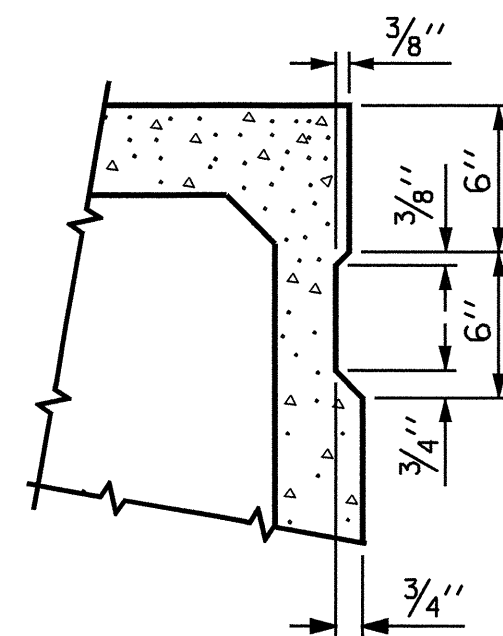
**INTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**

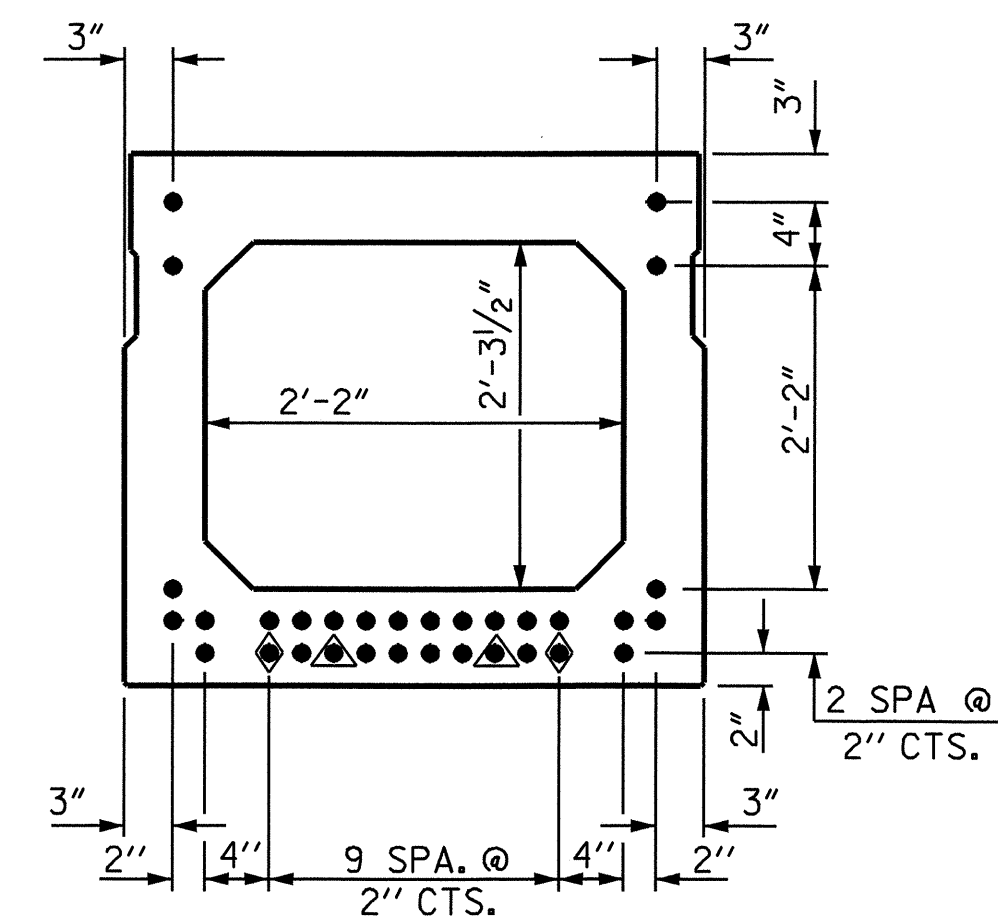
(STRAND LAYOUT NOT SHOWN)



**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**

(32 STRANDS REQUIRED)  
 (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◆ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

**GRADE 270 STRANDS**

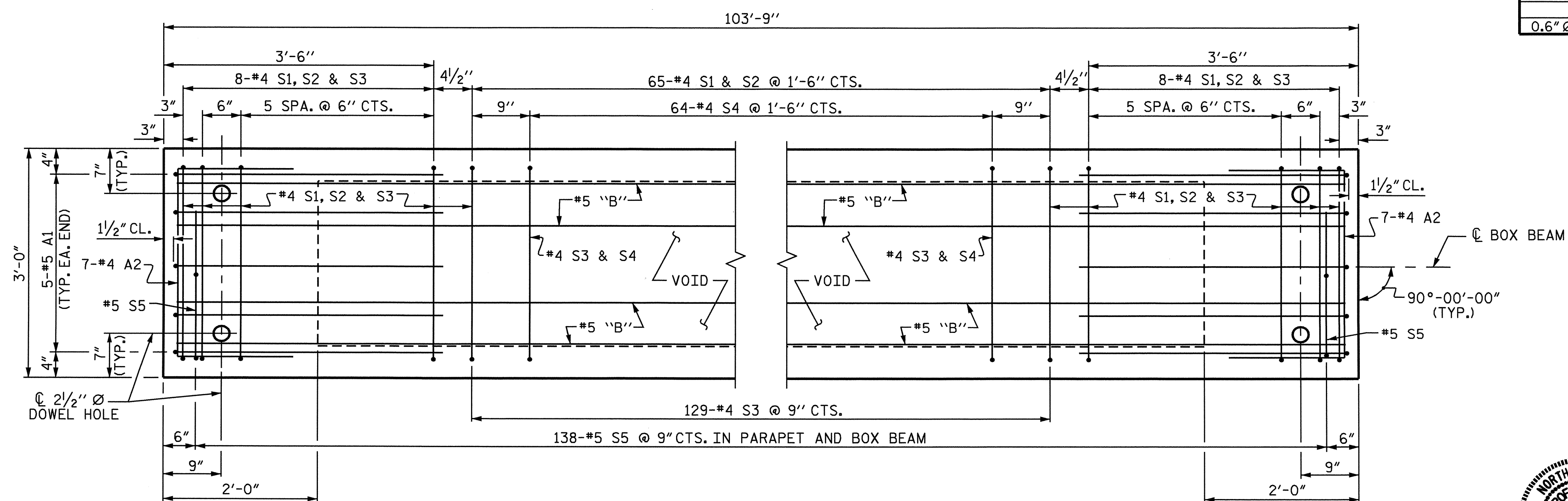
|                                       | 0.6" Ø L.R. |
|---------------------------------------|-------------|
| AREA ( SQUARE INCHES )                | 0.217       |
| ULTIMATE STRENGTH ( LBS. PER STRAND ) | 58,600      |
| APPLIED PRESTRESS ( LBS. PER STRAND ) | 43,950      |

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

| BAR NUMBER                 | SIZE | TYPE | EXTERIOR UNIT |        | INTERIOR UNIT |        |
|----------------------------|------|------|---------------|--------|---------------|--------|
|                            |      |      | LENGTH        | WEIGHT | LENGTH        | WEIGHT |
| A1                         | #5   | 1    | 7'-2"         | 75     | 7'-2"         | 75     |
| A2                         | #4   | 2    | 5'-7"         | 164    | 5'-7"         | 164    |
| B1                         | #5   | STR  | 52'-10"       | 661    | 52'-10"       | 661    |
| K1                         | #4   | 6    | 7'-2"         | 72     | 7'-2"         | 72     |
| K2                         | #4   | STR  | 2'-7"         | 17     | 2'-7"         | 17     |
| S1                         | #4   | 3    | 8'-6"         | 460    | 8'-6"         | 460    |
| S2                         | #4   | 3    | 5'-8"         | 307    | 5'-8"         | 307    |
| S3                         | #4   | 3    | 4'-10"        | 468    | 4'-10"        | 468    |
| S4                         | #4   | 4    | 5'-10"        | 249    | 5'-10"        | 249    |
| *S5                        | #5   | 5    | 6'-9"         | 972    | --            | --     |
| REINFORCING STEEL          |      |      | 2473 LBS.     |        | 2473 LBS.     |        |
| *EPOXY COATED REINF. STEEL |      |      | 972 LBS.      |        |               |        |
| 7500 P.S.I. CONCRETE       |      |      | 20.2 CU. YDS. |        | 20.2 CU. YDS. |        |
| 0.6" Ø L.R. STRANDS        |      |      | No. 32        |        | No. 32        |        |

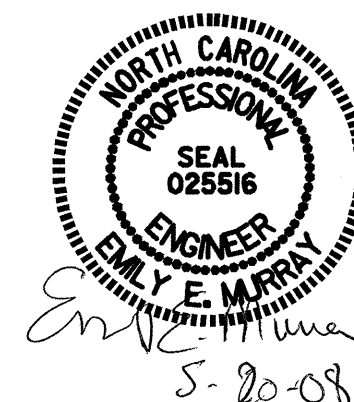


**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.  
 FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS.  
 FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

|                         |                     |
|-------------------------|---------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 09/2006      |
| CHECKED BY : P.ADKINS   | DATE : 09/2006      |
| DRAWN BY : TLA 5/05     | ADDED 7/11/05       |
| CHECKED BY : GM 6/05    | REV. 5/11/06 TLA/GM |

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PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

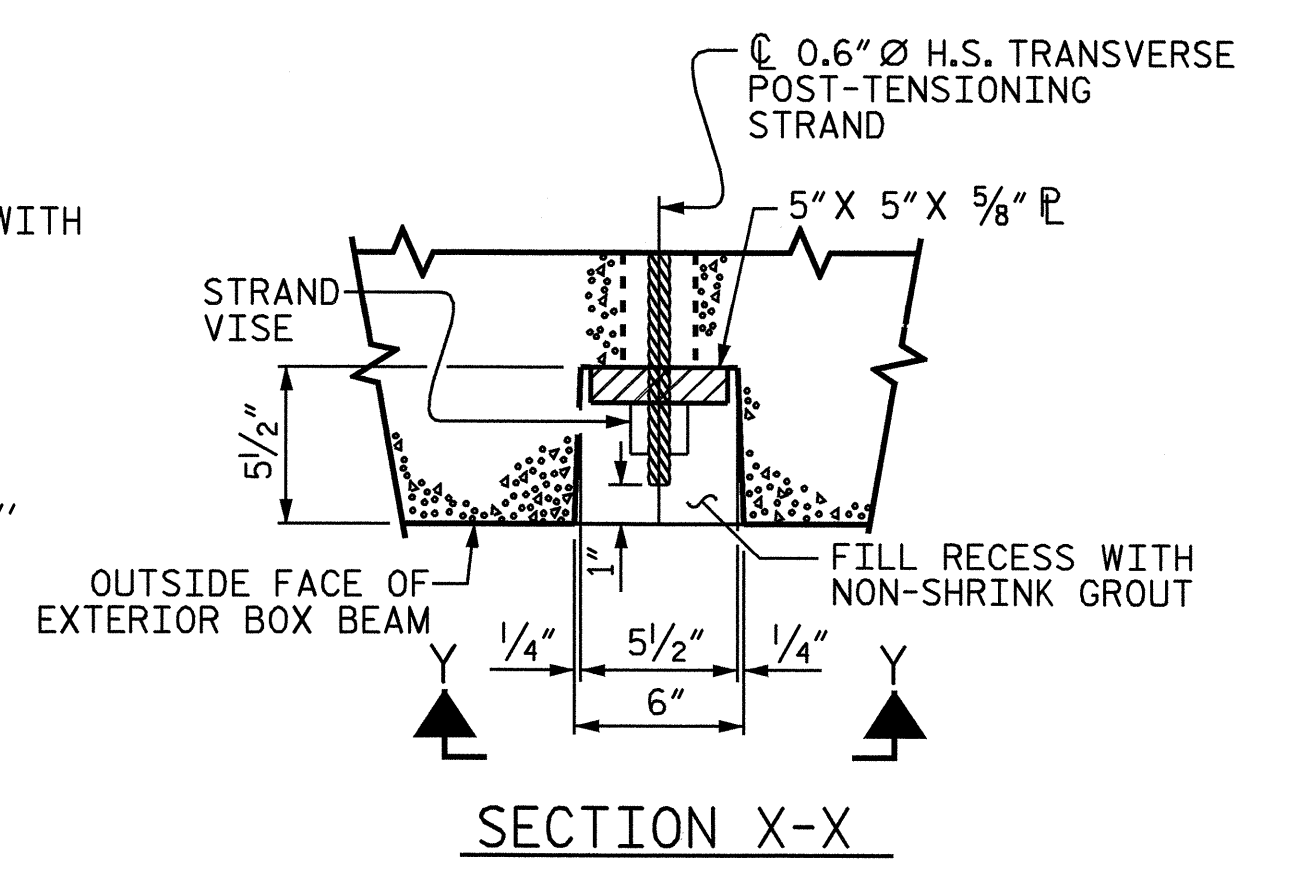
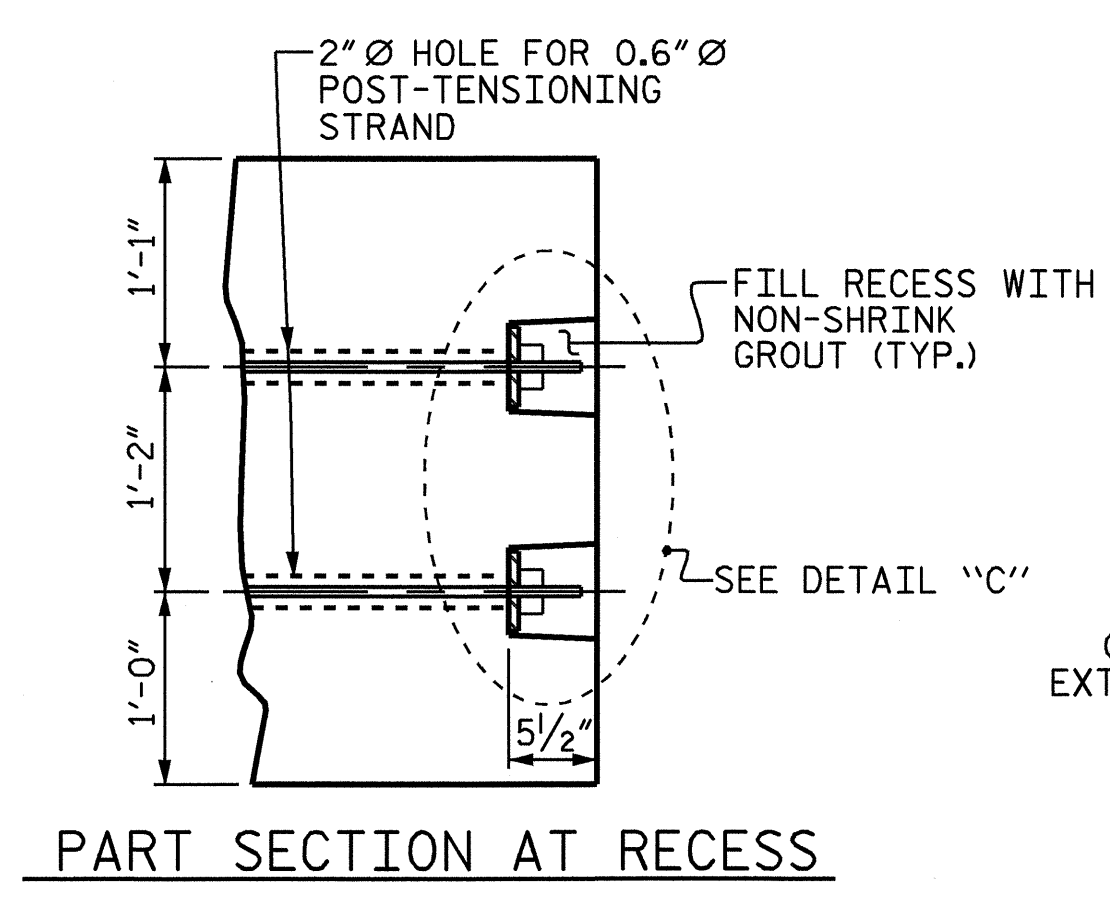
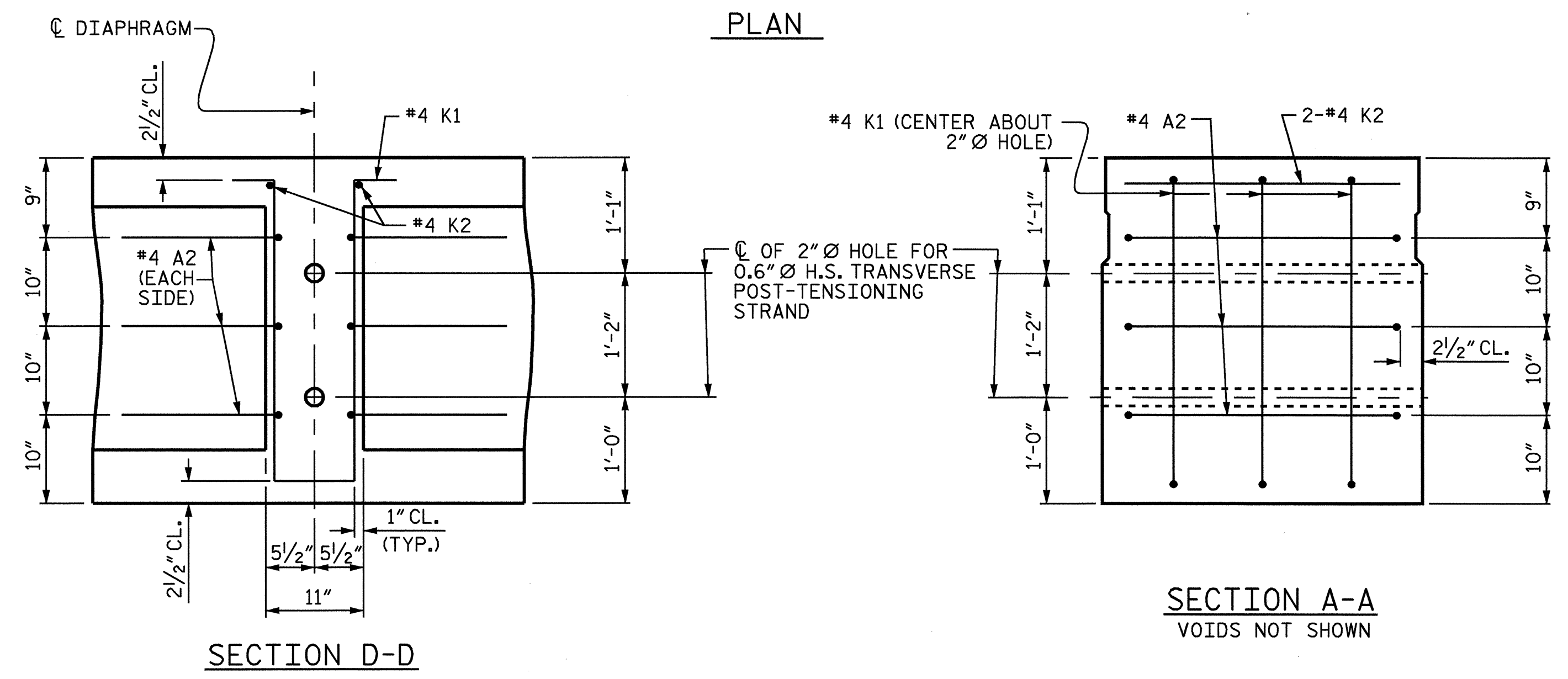
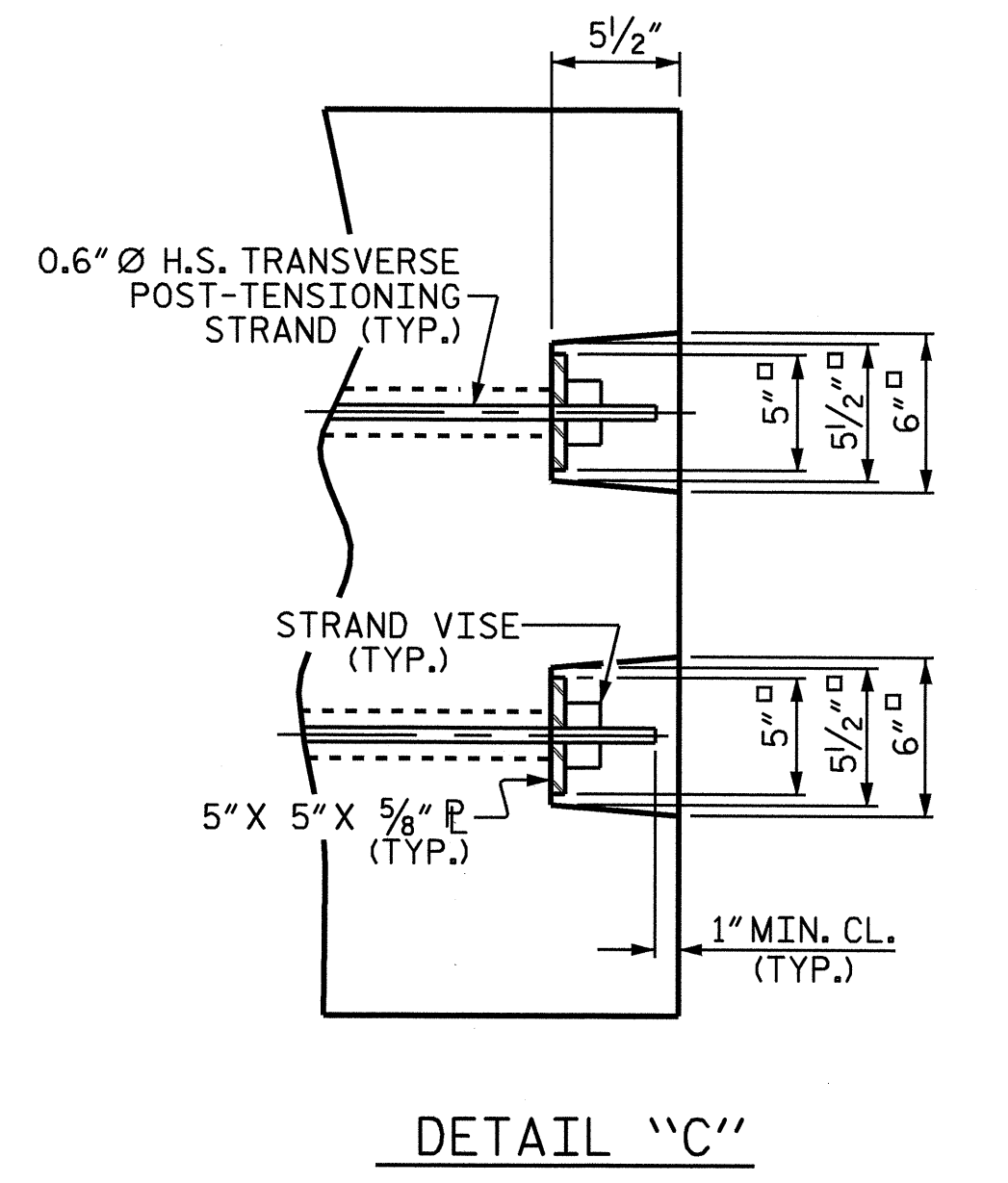
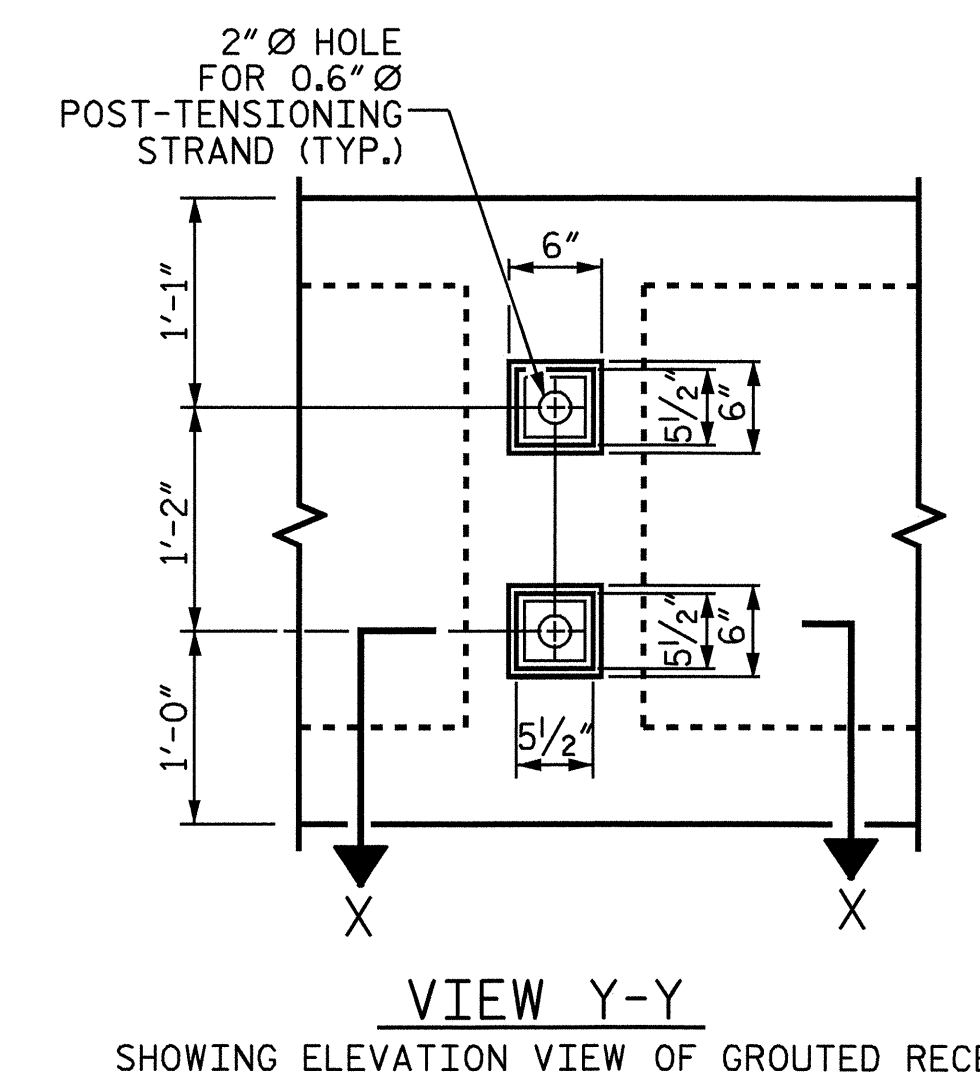
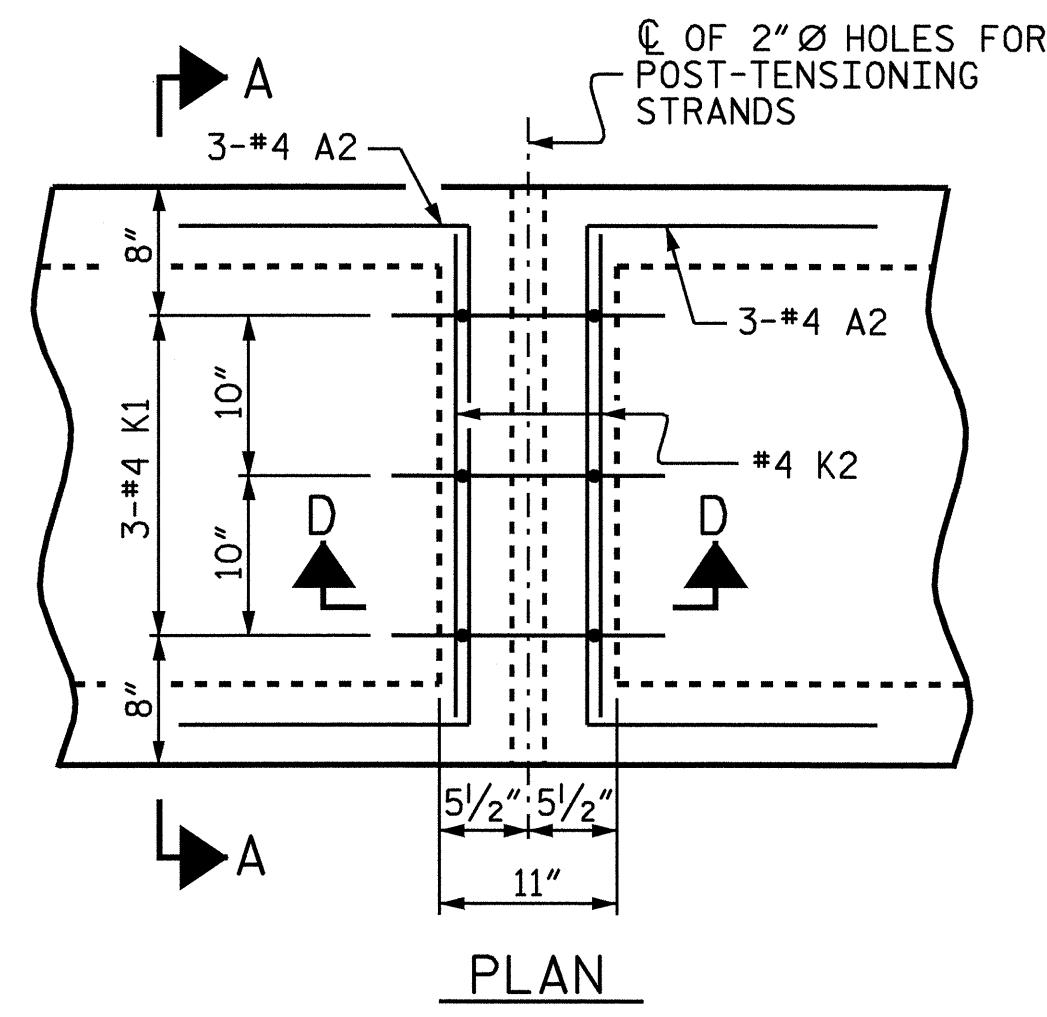
SHEET 6 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 3'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 SPAN "A"

| REVISIONS |     |       |     | SHEET NO. |       |
|-----------|-----|-------|-----|-----------|-------|
| NO.       | BY: | DATE: | NO. | BY:       | DATE: |
| 1         |     |       | 3   |           |       |
| 2         |     |       | 4   |           |       |

TOTAL SHEETS 33

STD. NO. PCBB6



SECTION D-D

SECTION A-A  
VOIDS NOT SHOWN

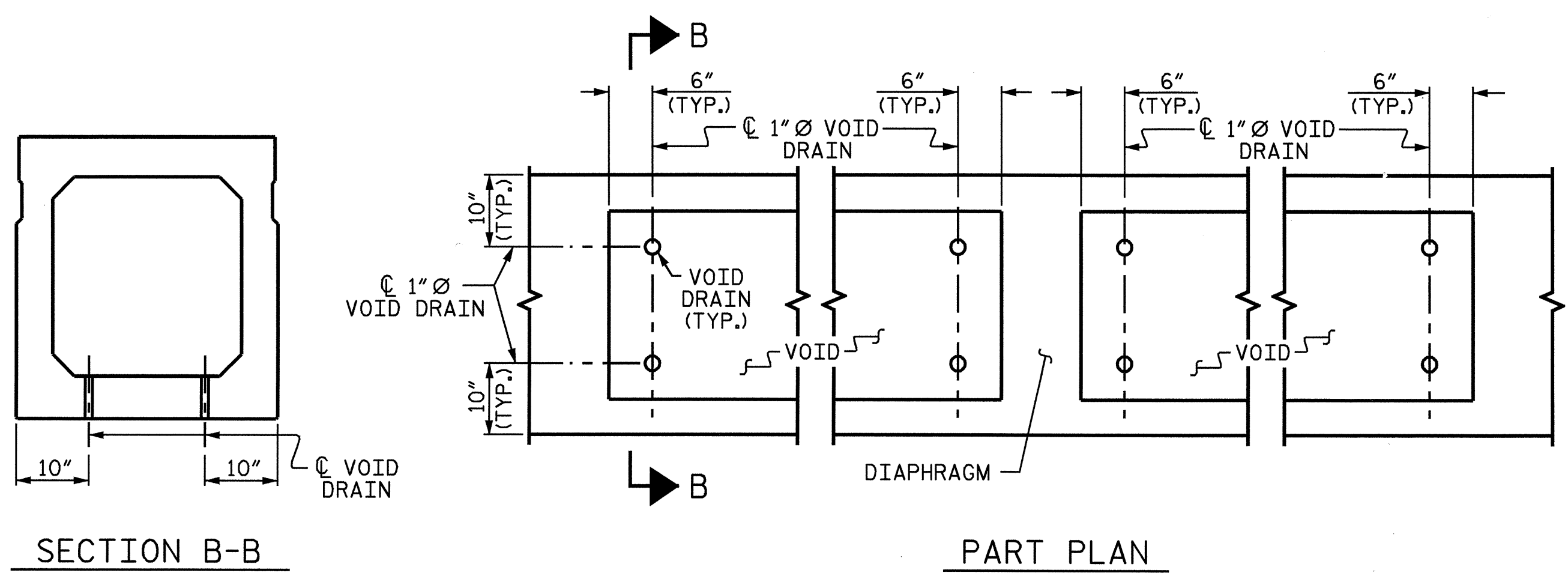
PART SECTION AT RECESS

SECTION X-X

DOUBLE DIAPHRAGM DETAILS - SPAN A

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2" Ø HOLE.

GROUTED RECESS DETAIL AT  
END OF POST-TENSIONED STRANDS  
OF EXTERIOR BOX BEAM - SPAN A



SECTION B-B

PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

| DEAD LOAD DEFLECTION AND CAMBER            |                    |
|--|--------------------|
|  | 3'-0" x 3'-3"      |
|  | 0.6" Ø L.R. STRAND |
|  | SPAN "A"           |
| CAMBER ( BEAM ALONE IN PLACE )             | 4/16" ↑            |
| DEFLECTION DUE TO CONCRETE WEARING SURFACE | 1 5/8" ↓           |
| FINAL CAMBER                               | 2 3/8" ↑           |

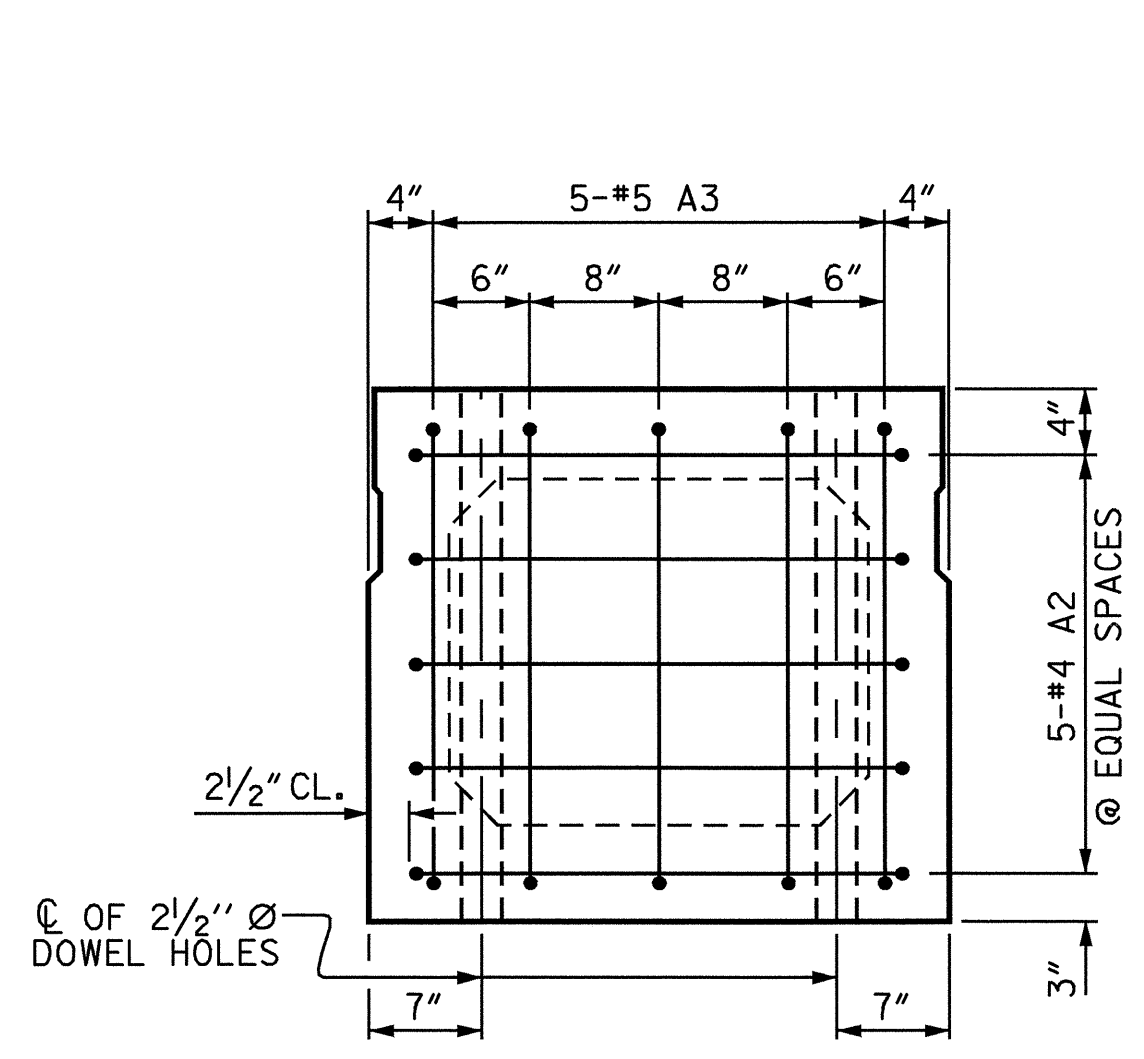
PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-  
 SHEET 7 OF 15



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 3'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 SPAN "A"

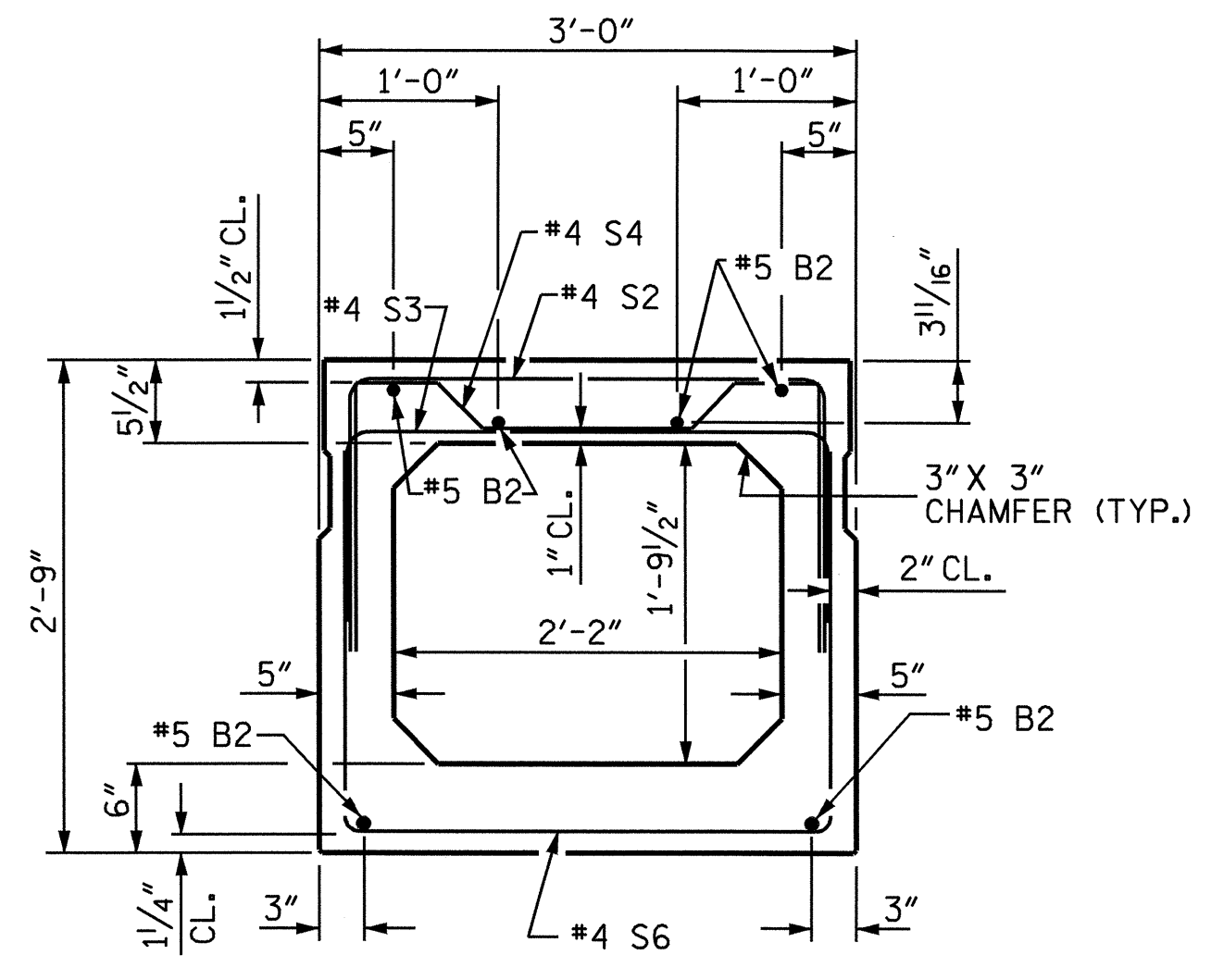
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|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-10            |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 33 |
| 2         |     |       | 4   |     |       |                 |

|                |          |         |         |
|----------------|----------|---------|---------|
| ASSEMBLED BY : | M.D.PISO | DATE :  | 09/2006 |
| CHECKED BY :   | P.ADKINS | DATE :  | 09/2006 |
| DRAWN BY :     | TLA 5/05 | ADDED : | 7/11/05 |
| CHECKED BY :   | GM 6/05  | REV. :  | 5/1/06  |

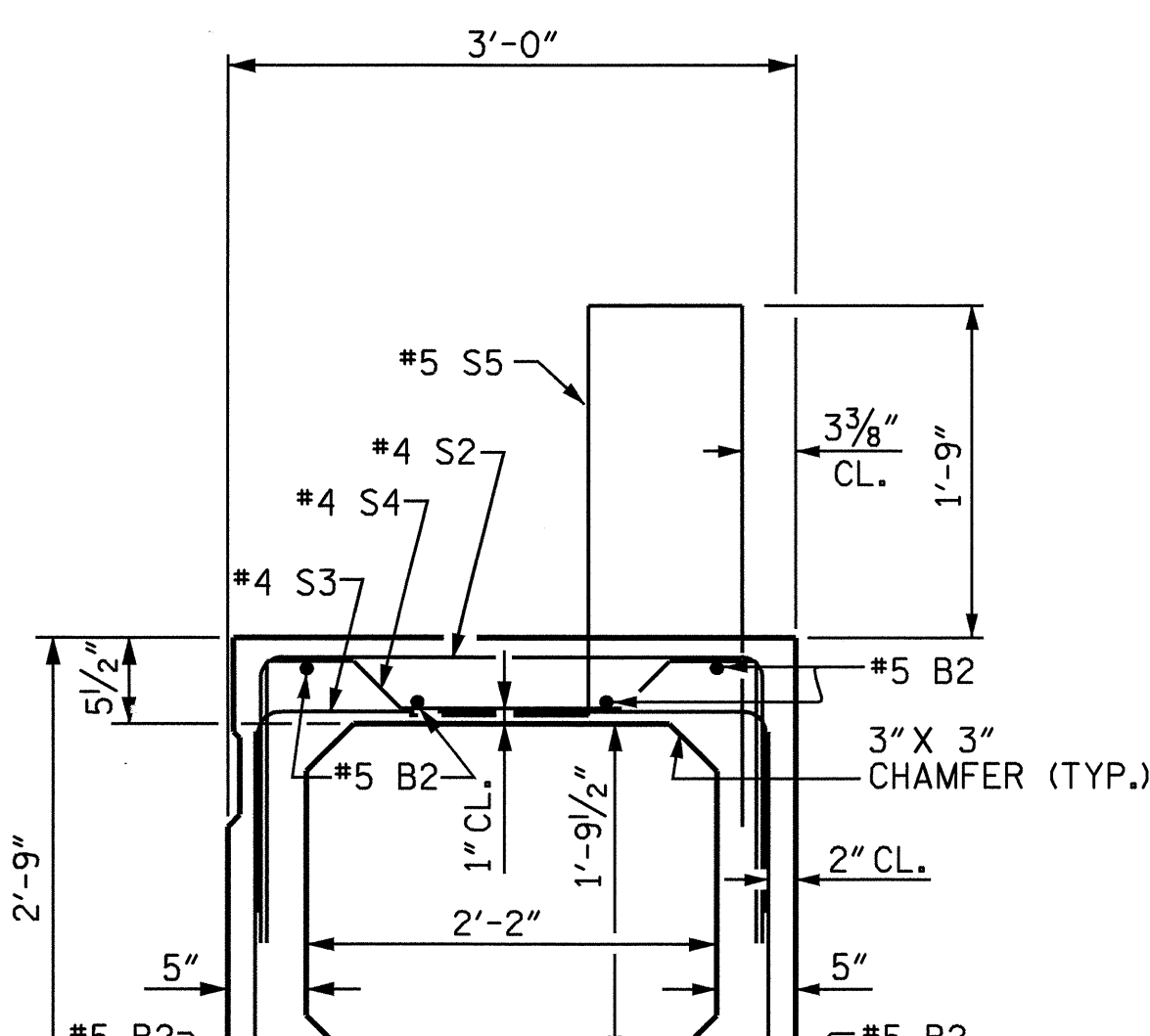


**END ELEVATION**

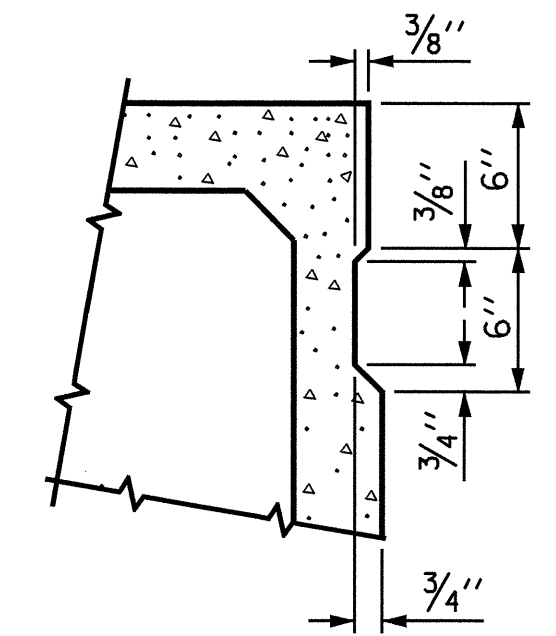
SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



**INTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)



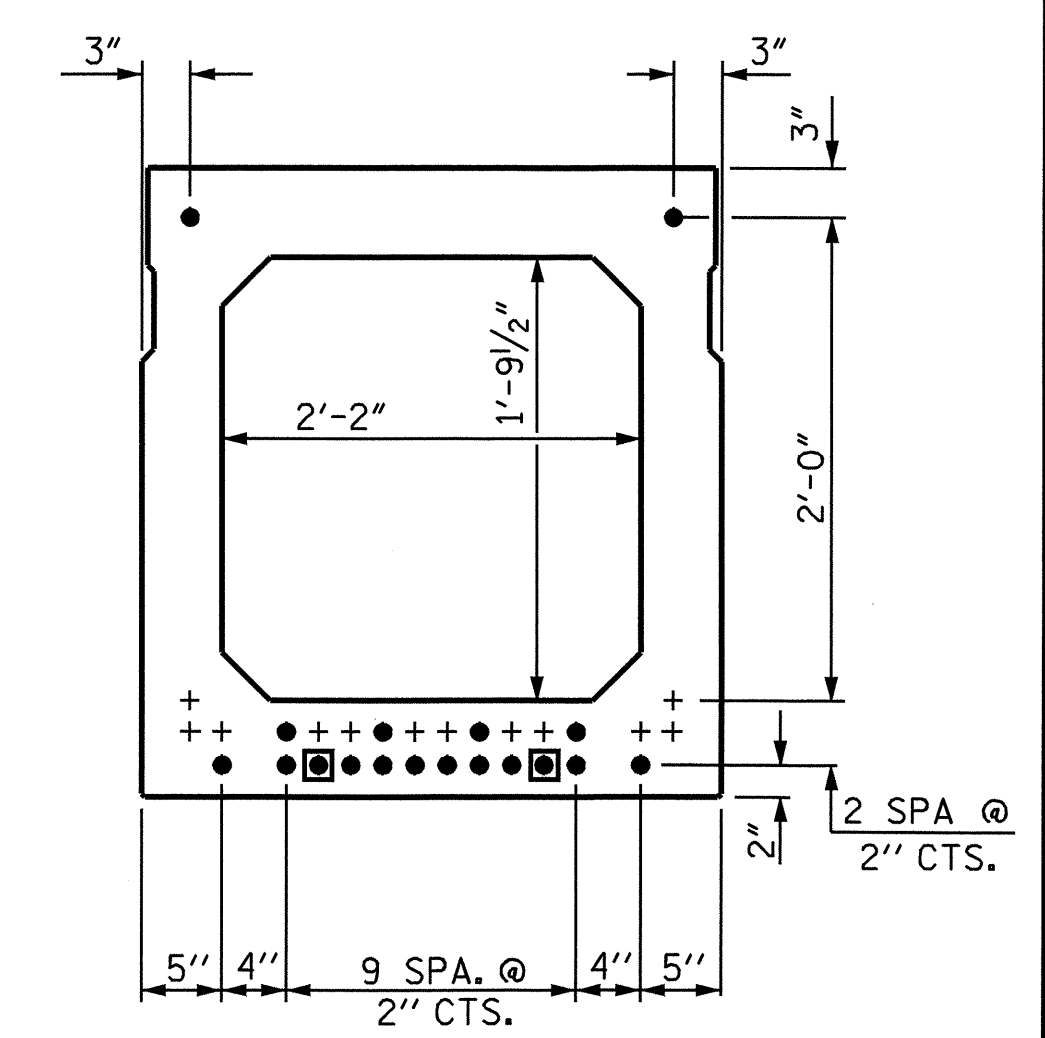
**EXTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)



**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**  
(18 STRANDS REQUIRED)

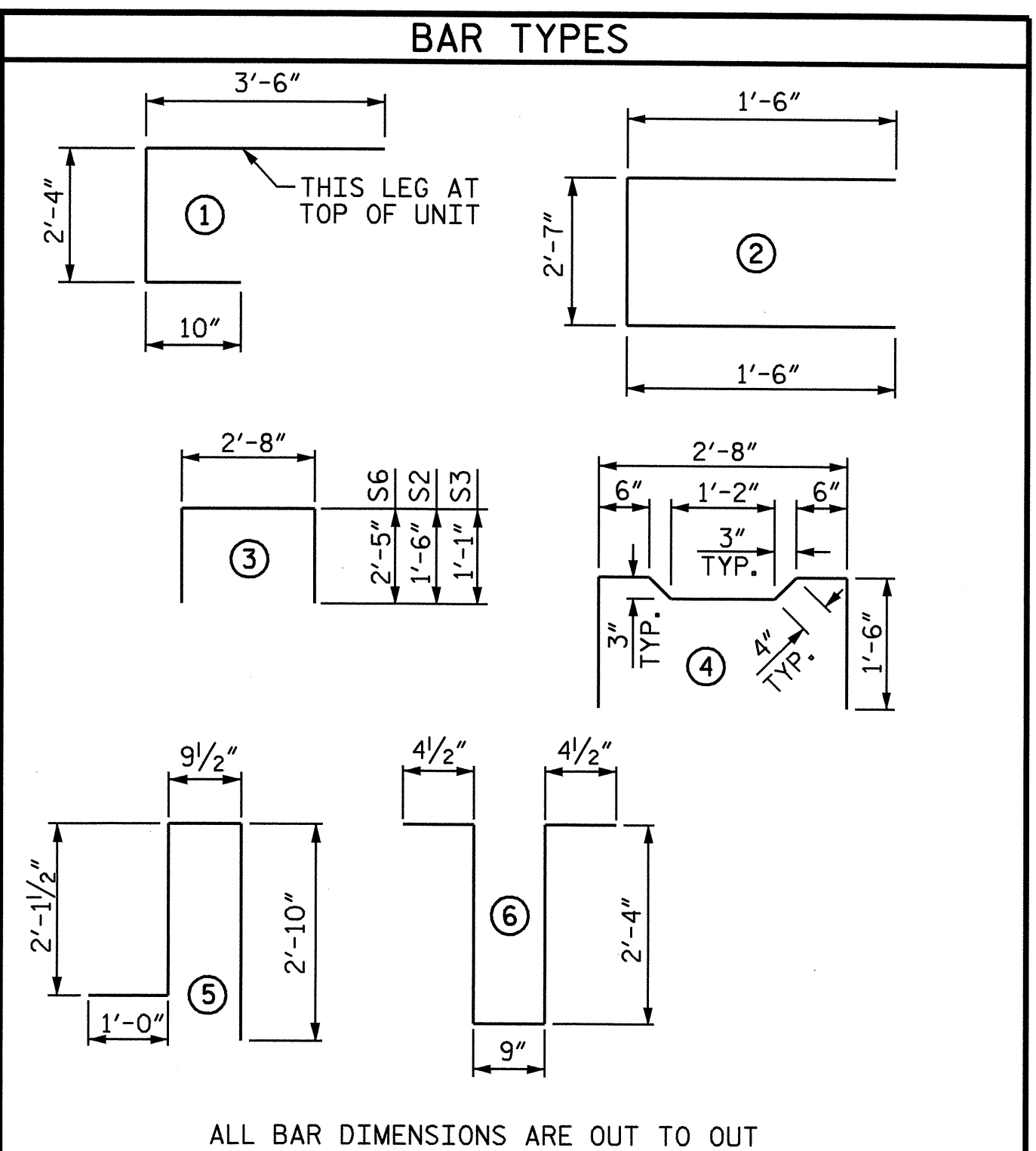
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
  - ◼ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

**GRADE 270 STRANDS**

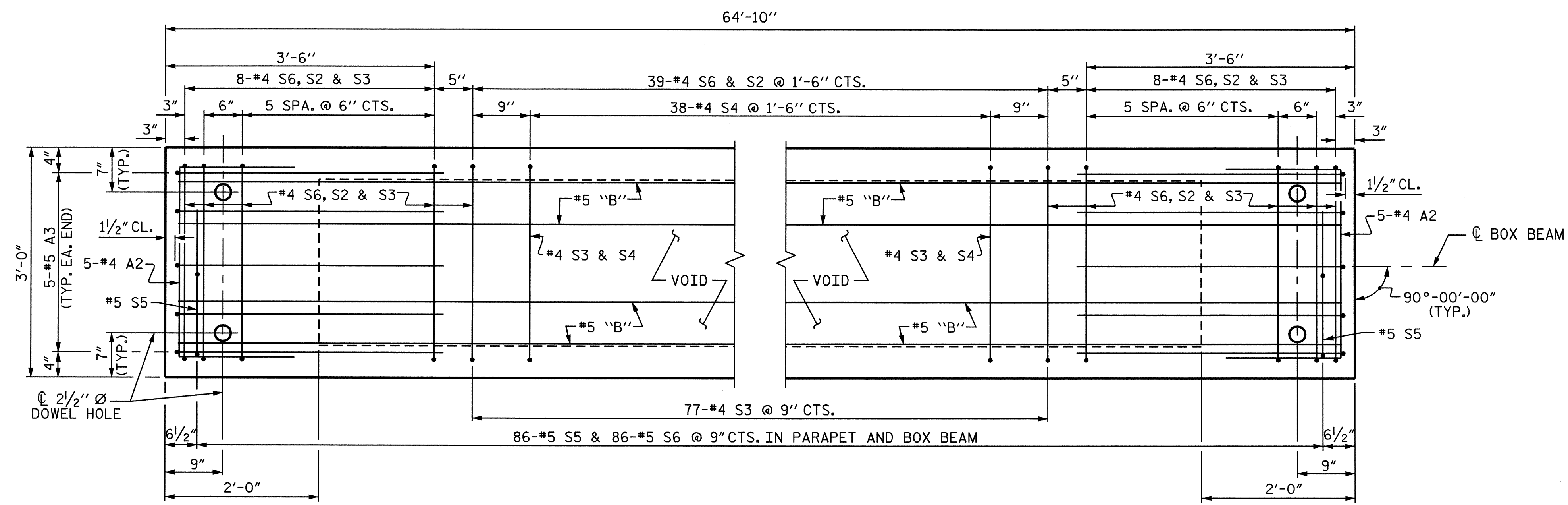
|                                       |             |
|---------------------------------------|-------------|
| AREA ( SQUARE INCHES )                | 0.6" Ø L.R. |
| ULTIMATE STRENGTH ( LBS. PER STRAND ) | 58,600      |
| APPLIED PRESTRESS ( LBS. PER STRAND ) | 43,950      |



ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

| BAR                        | NUMBER | SIZE | TYPE | EXTERIOR UNIT |               | INTERIOR UNIT |               |
|----------------------------|--------|------|------|---------------|---------------|---------------|---------------|
|                            |        |      |      | LENGTH        | WEIGHT        | LENGTH        | WEIGHT        |
| A2                         | 34     | #4   | 2    | 5'-7"         | 127           | 5'-7"         | 127           |
| A3                         | 10     | #5   | 1    | 6'-8"         | 70            | 6'-8"         | 70            |
| B2                         | 12     | #5   | STR  | 33'-5"        | 418           | 33'-5"        | 418           |
| K2                         | 8      | #4   | STR  | 2'-7"         | 14            | 2'-7"         | 14            |
| K3                         | 12     | #4   | 6    | 6'-2"         | 49            | 6'-2"         | 49            |
| S2                         | 55     | #4   | 3    | 5'-8"         | 208           | 5'-8"         | 208           |
| S3                         | 93     | #4   | 3    | 4'-10"        | 300           | 4'-10"        | 300           |
| S4                         | 38     | #4   | 4    | 5'-10"        | 148           | 5'-10"        | 148           |
| S6                         | 55     | #4   | 3    | 7'-6"         | 276           | 7'-6"         | 276           |
| *S5                        | 86     | #5   | 5    | 6'-9"         | 605           | --            | --            |
| REINFORCING STEEL          |        |      |      |               | 1610 LBS.     |               | 1610 LBS.     |
| *EPOXY COATED REINF. STEEL |        |      |      |               | 605 LBS.      |               |               |
| 5500 P.S.I. CONCRETE       |        |      |      |               | 11.7 CU. YDS. |               | 11.7 CU. YDS. |
| 0.6" Ø L.R. STRANDS        |        |      |      | No. 18        |               | No. 18        |               |



**PLAN OF BOX BEAM**

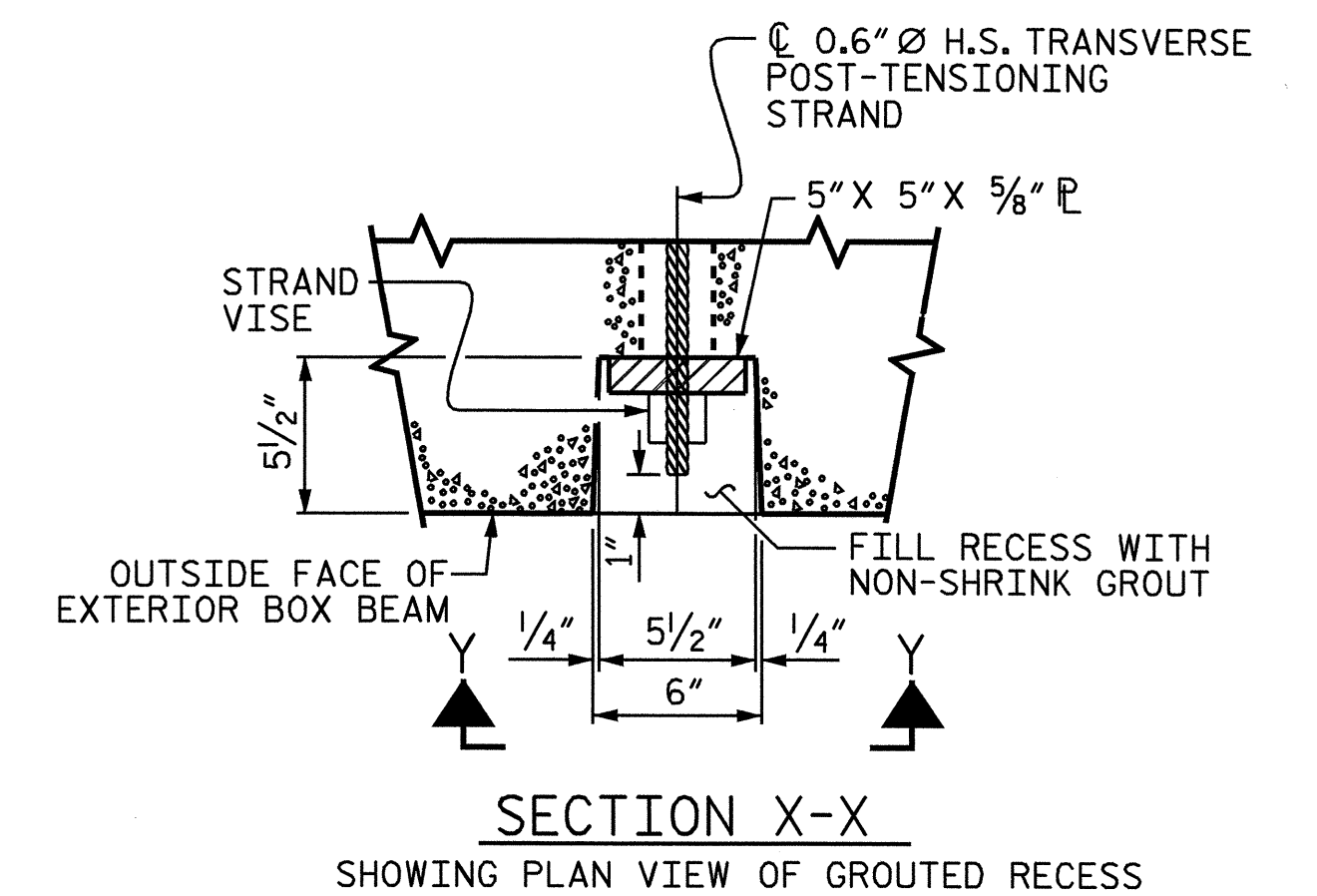
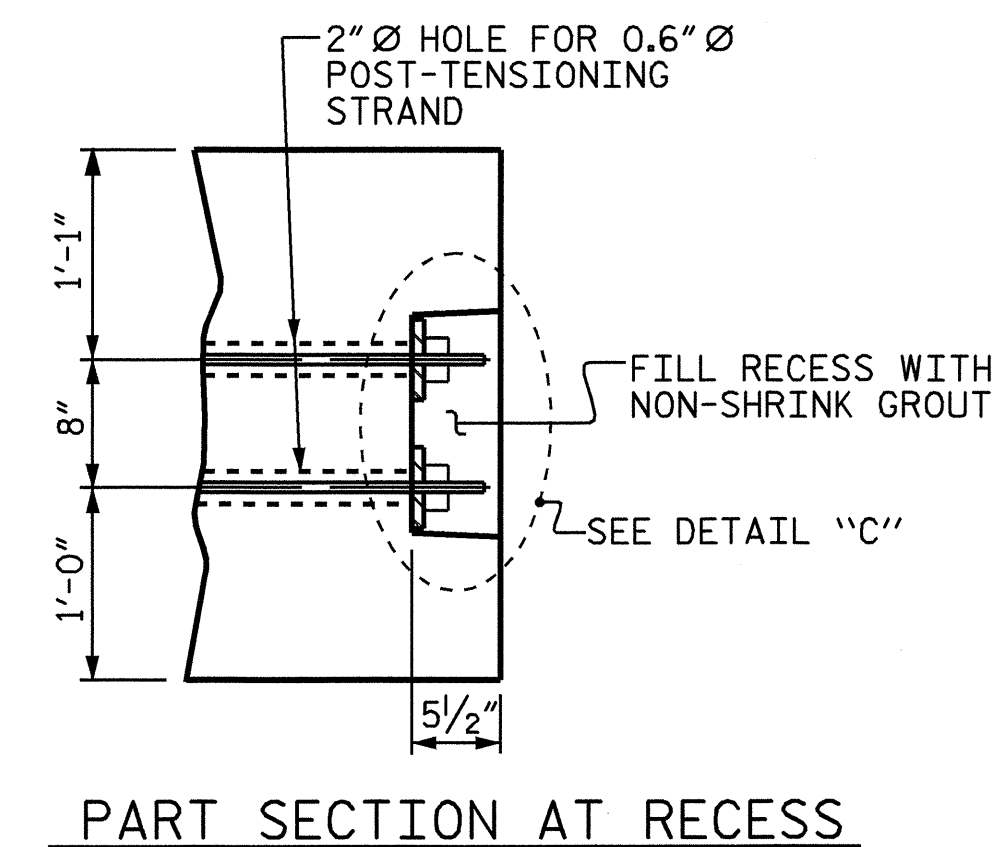
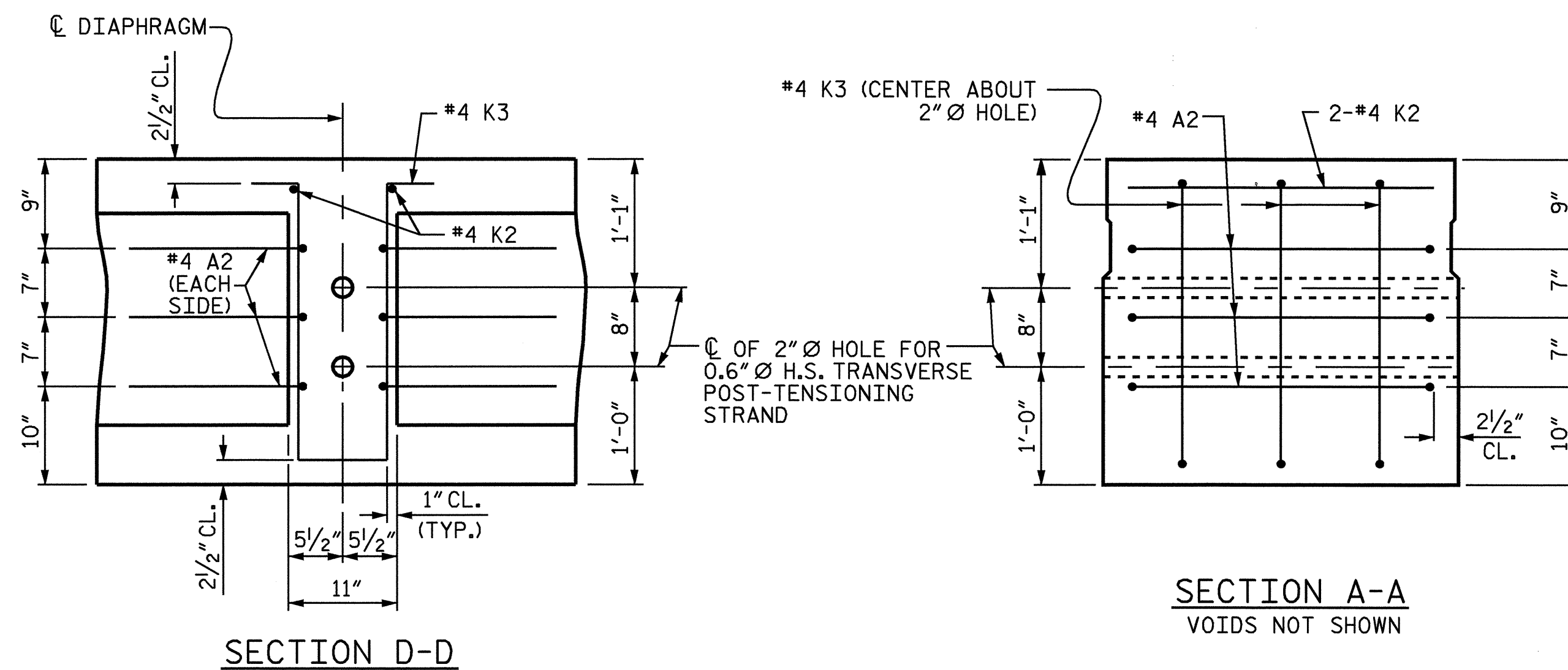
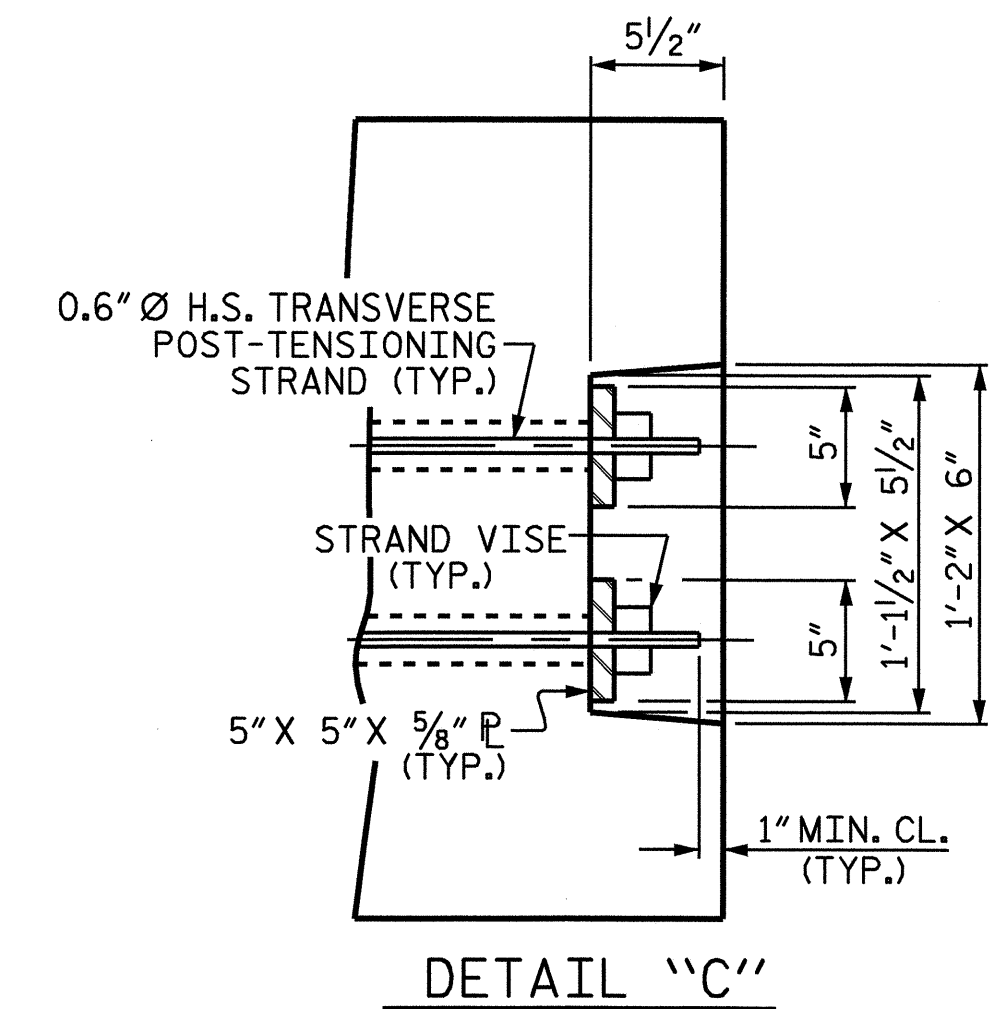
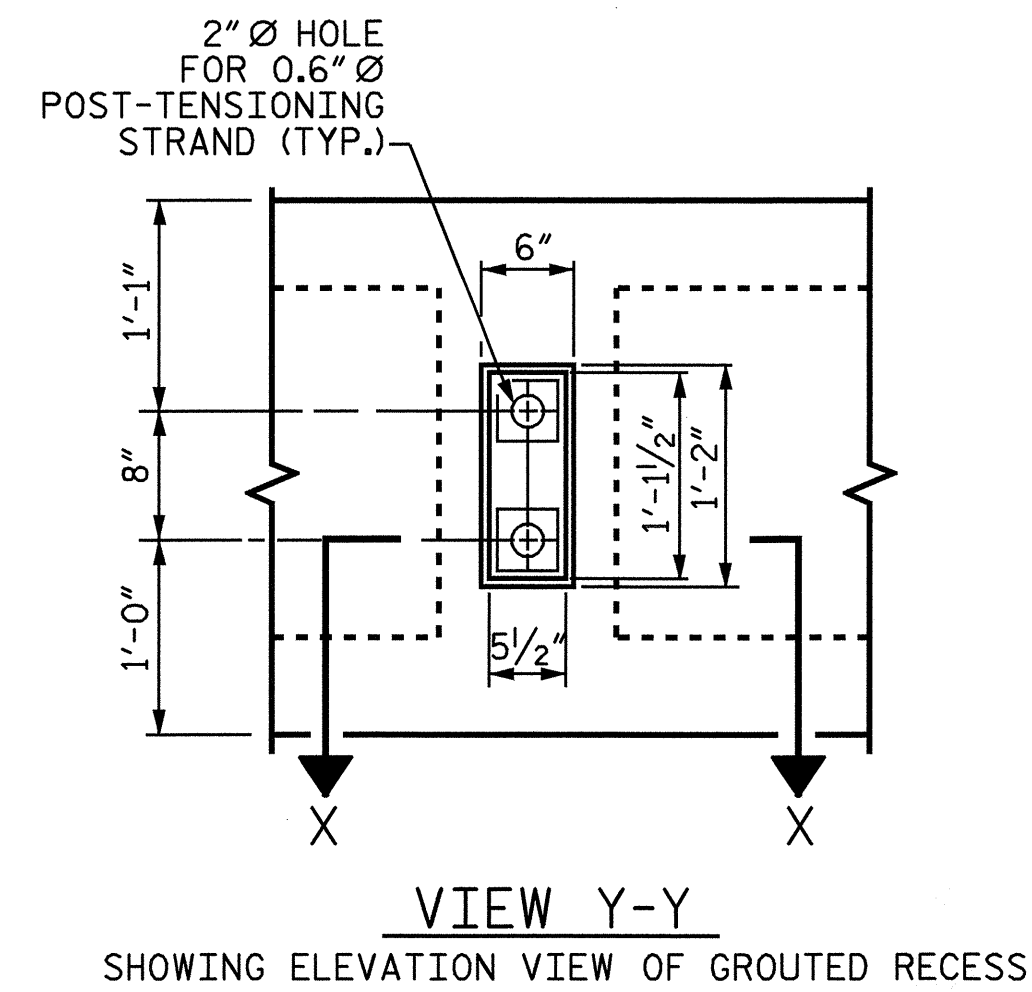
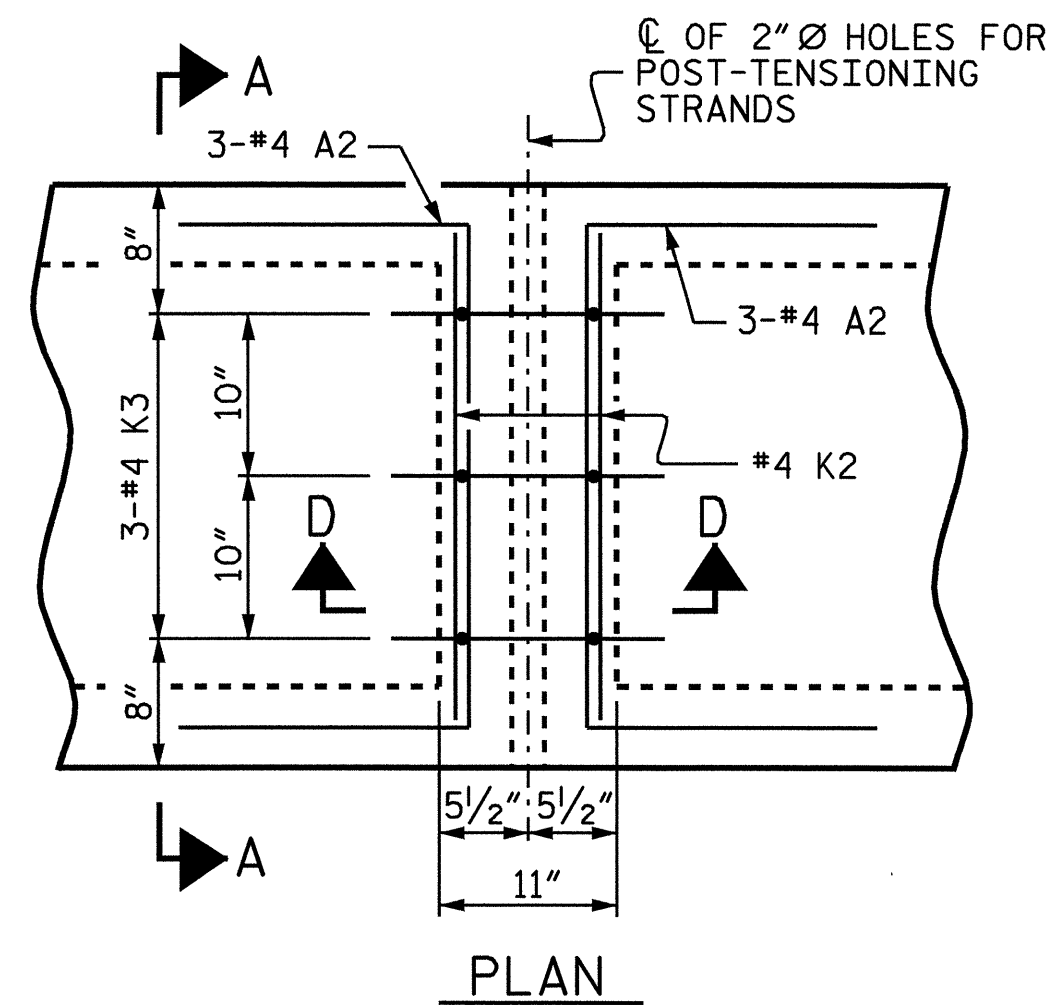
EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

|                         |                    |
|-------------------------|--------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 09/2006     |
| CHECKED BY : P.ADKINS   | DATE : 09/2006     |
| DRAWN BY : TLA 5/05     | ADDED 7/11/05      |
| CHECKED BY : GM 6/05    | REV. 5/1/06 TLA/GM |



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-  
 SHEET 8 OF 15

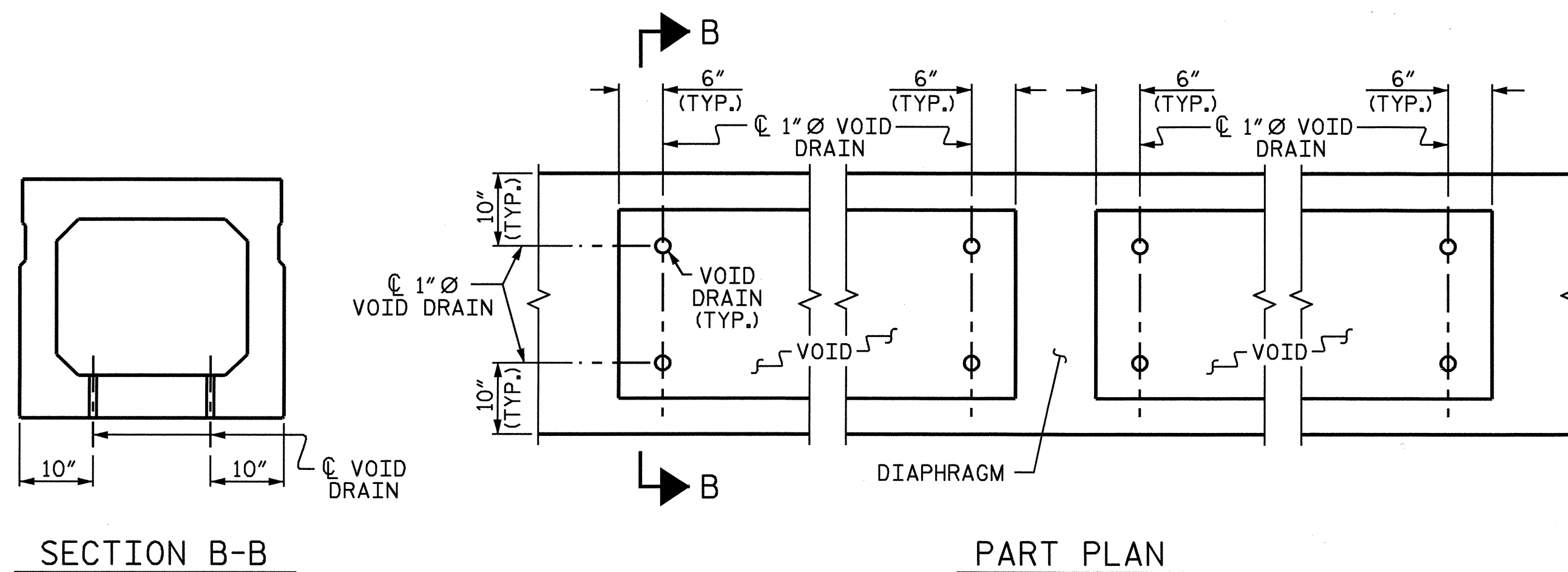
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH                         |     |       |     |     |                 |
|--|-----|-------|-----|-----|-----------------|
| STANDARD<br>3'-0" X 2'-9"<br>PRESTRESSED CONCRETE<br>BOX BEAM UNIT<br>SPANS "B", "C" & "D" |     |       |     |     |                 |
| REVISIONS  |     |       |     |     | SHEET NO.       |
| NO.  | BY: | DATE: | NO. | BY: | DATE:           |
| 1  |     |       | 3   |     |                 |
| 2  |     |       | 4   |     |                 |
|  |     |       |     |     | S-11            |
|  |     |       |     |     | TOTAL SHEETS 33 |



**DOUBLE DIAPHRAGM DETAILS - SPANS B THRU D**

\*4 "S" BARS NOT SHOWN. \*4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2" Ø HOLE.

**GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM - SPANS B THRU D**



**VOID DRAIN DETAILS**

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

| DEAD LOAD DEFLECTION AND CAMBER            |                        |
|--|------------------------|
|  | 3'-0" x 2'-9"          |
|  | 0.6" Ø L.R. STRAND     |
|  | SPAN "B", "C", AND "D" |
| CAMBER (BEAM ALONE IN PLACE)               | ↑ 2/4"                 |
| DEFLECTION DUE TO CONCRETE WEARING SURFACE | ↓ 7/16"                |
| FINAL CAMBER                               | ↑ 1 13/16"             |

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 9 OF 15



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 SPANS "B", "C" & "D"

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-12            |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 33 |
| 2         |     |       | 4   |     |       |                 |

ASSEMBLED BY : MDPISO DATE : 10/2006  
 CHECKED BY : PADKINS DATE : 10/2006  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05

**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 DESIGNED.

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 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.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS 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 REMAINS 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.

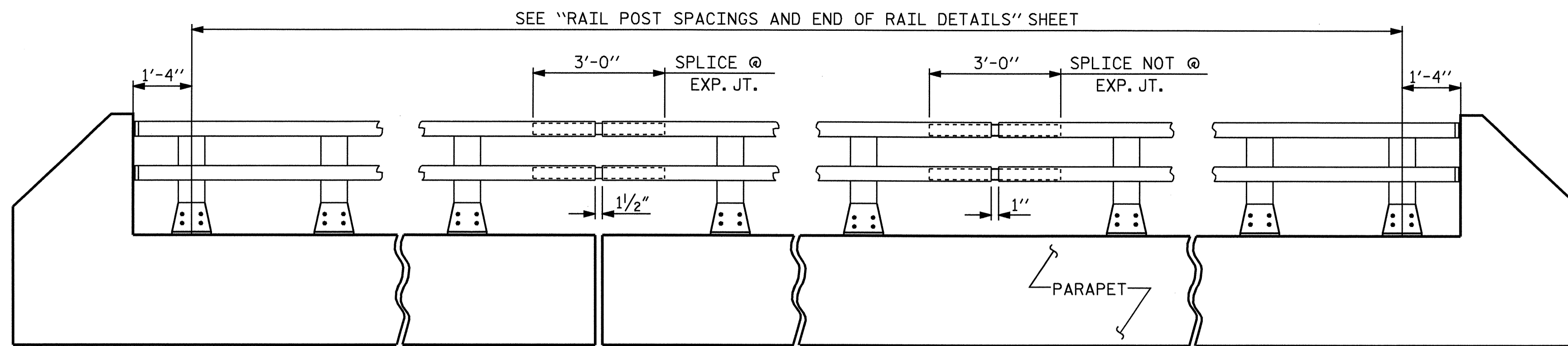
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR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

PAY LENGTH = 582.50 LIN. FT.

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

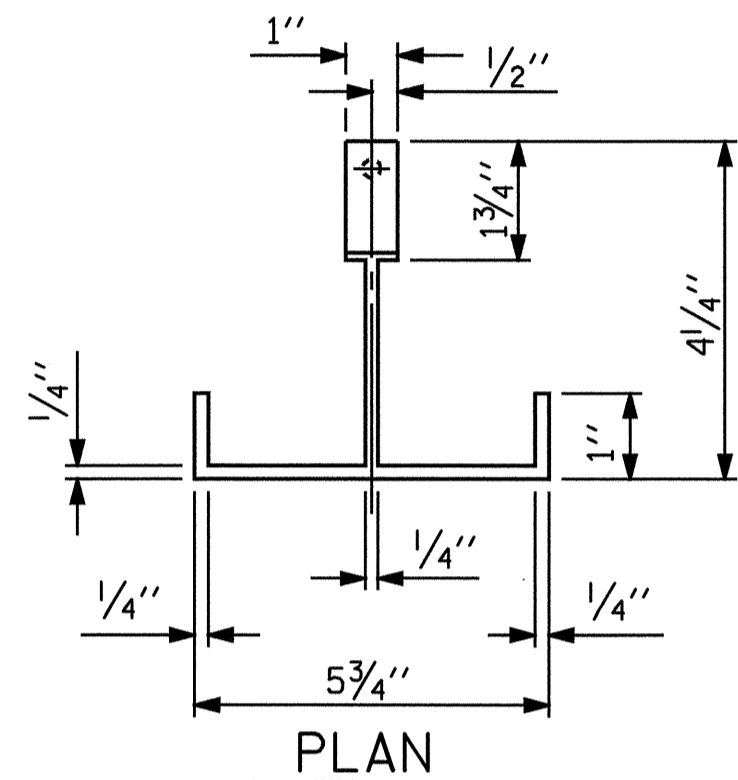
SHEET 10 OF 15

|  |     |       |     |     |       |                    |
|--|-----|-------|-----|-----|-------|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       | SHEET NO.<br>S-13  |
| STANDARD   |     |       |     |     |       | TOTAL SHEETS<br>33 |
| 2 BAR METAL RAIL   |     |       |     |     |       |                    |
| REVISIONS  |     |       |     |     |       |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1  |     |       | 3   |     |       |                    |
| 2  |     |       | 4   |     |       |                    |

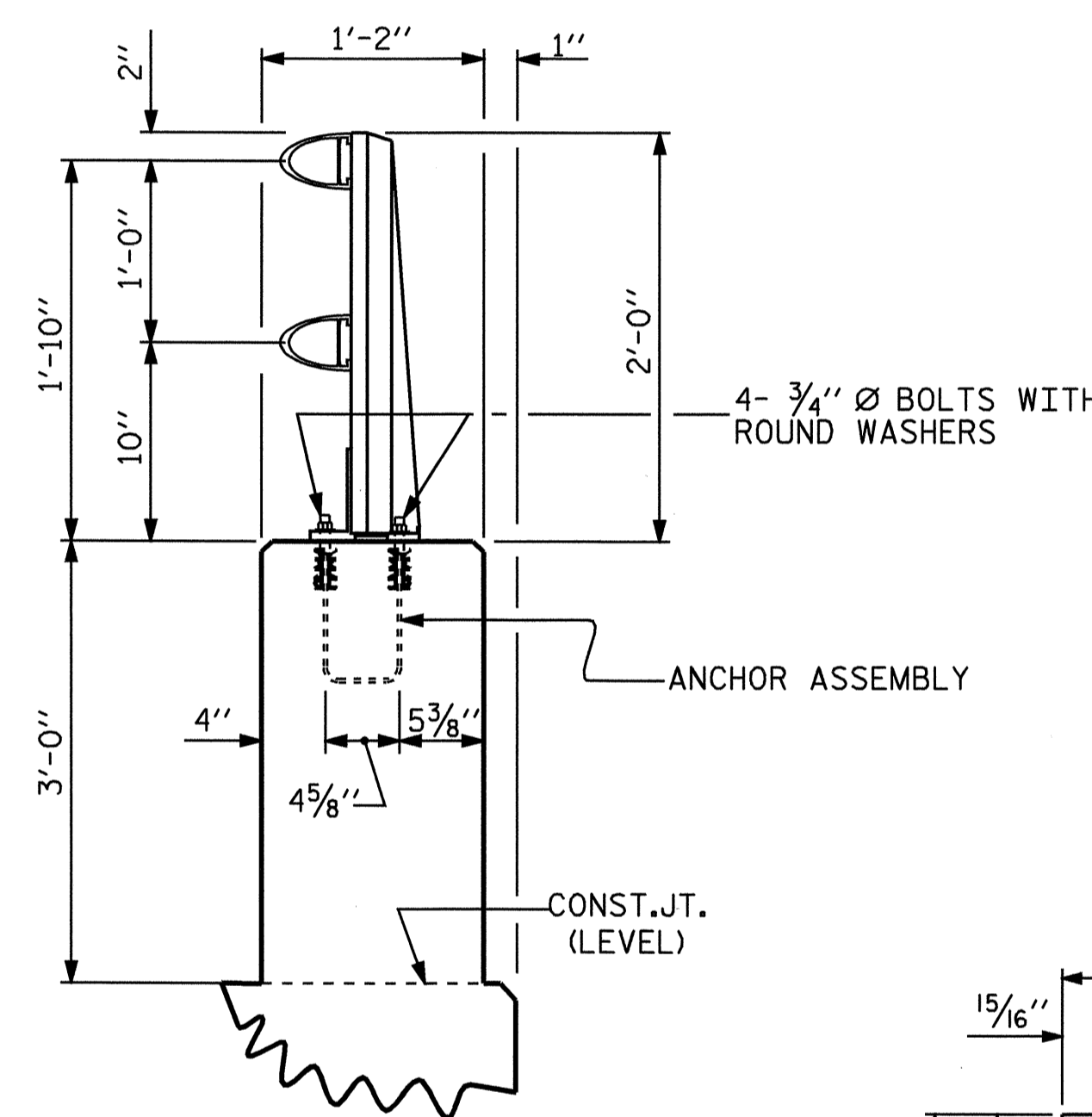


**ELEVATION**

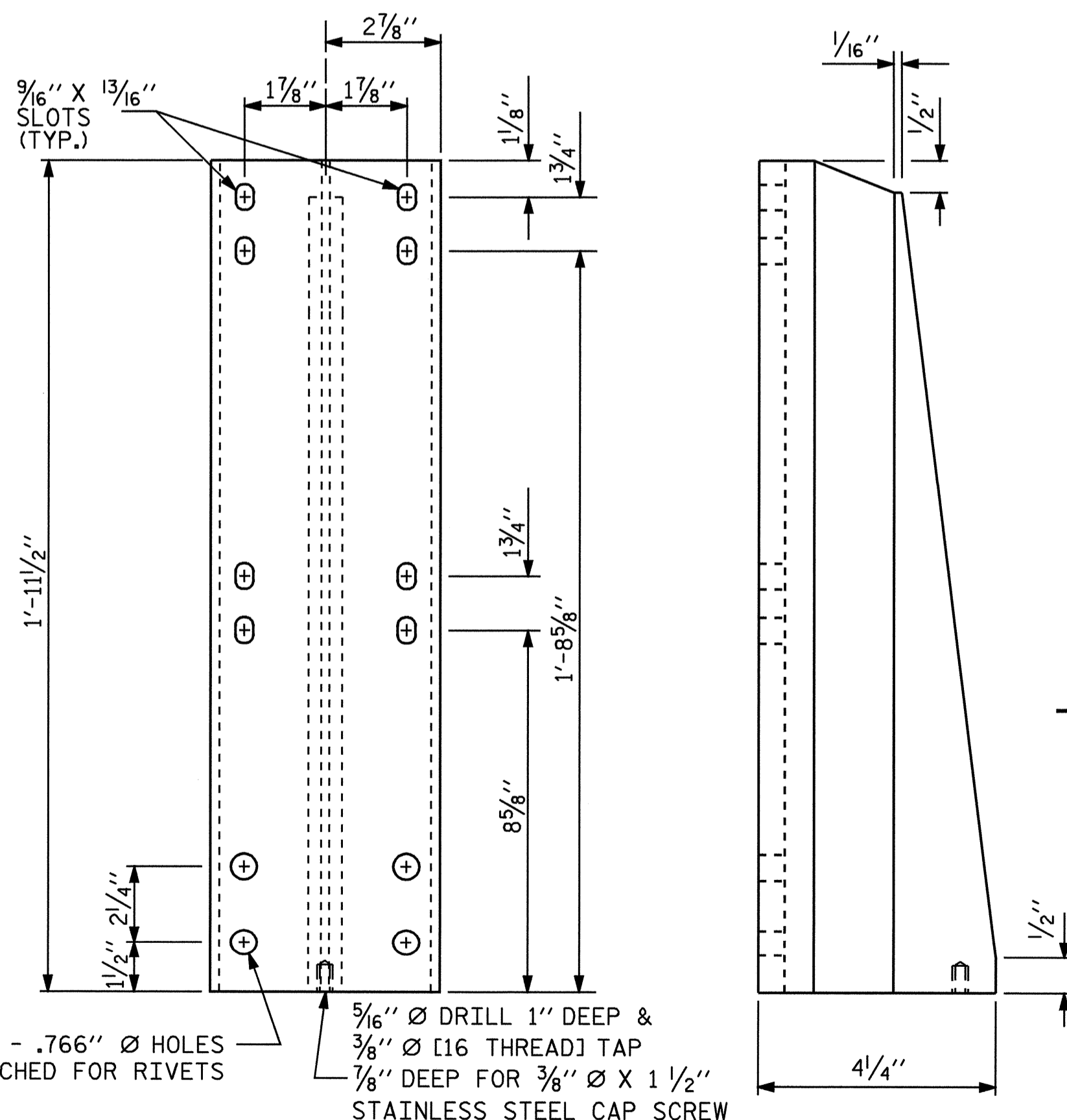
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



**PLAN**



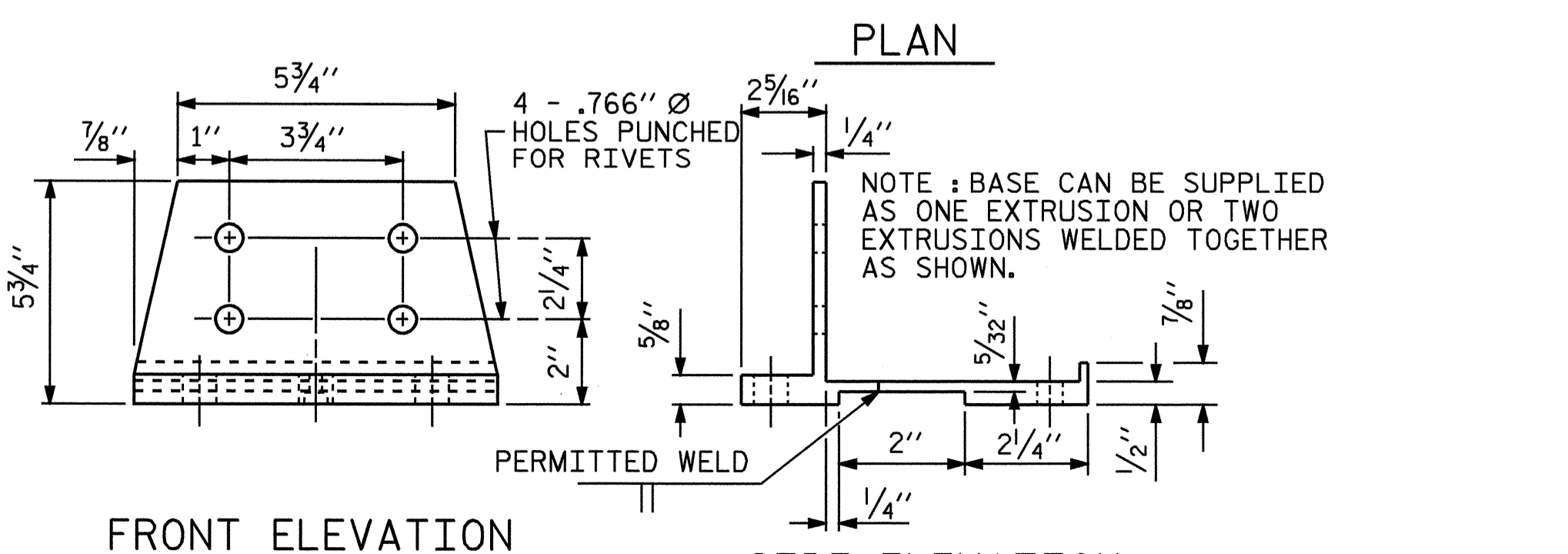
**SECTION THRU PARAPET AND RAIL**



**FRONT ELEVATION**

**SIDE ELEVATION**

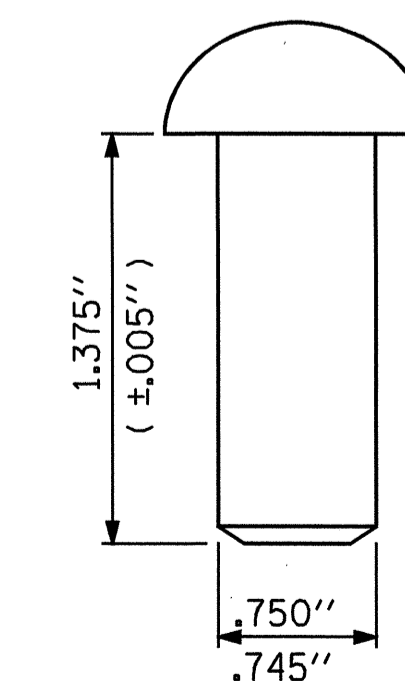
**DETAILS OF POST**



**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



**RIVET DETAIL**

|                         |                       |
|-------------------------|-----------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 09/2006        |
| CHECKED BY : P.ADKINS   | DATE : 09/2006        |
| DRAWN BY : EEM 6/94     | REV. 10/17/00 LES/RDR |
| CHECKED BY : RGW 6/94   | REV. 5/7/03R RWW/JTE  |
|                         | REV. 5/1/06 TLA/GM    |

NOTES

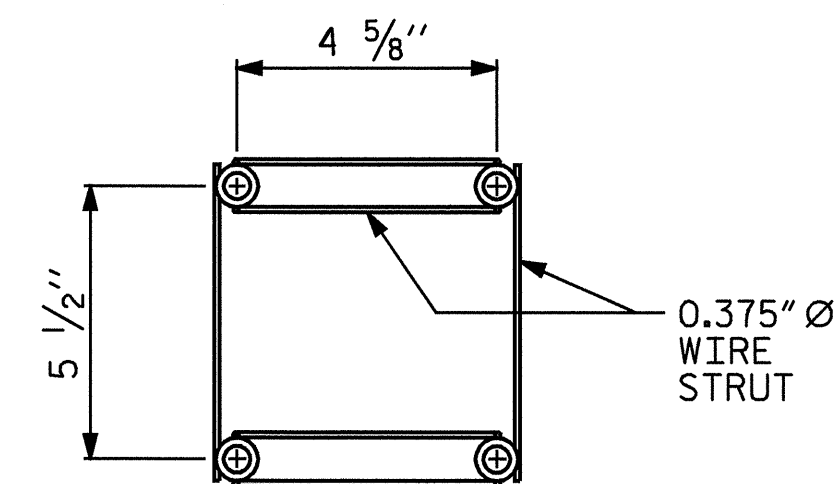
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

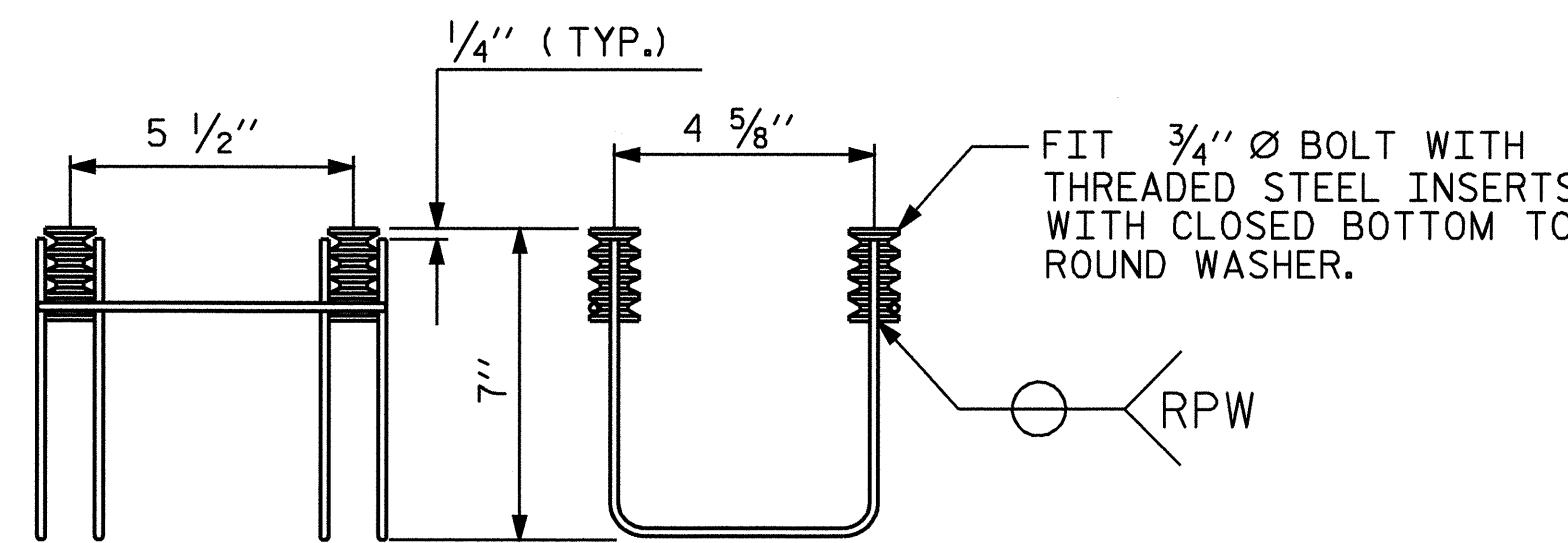
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS 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.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR 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.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS AND OR DOWELS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø ANCHOR BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



PLAN



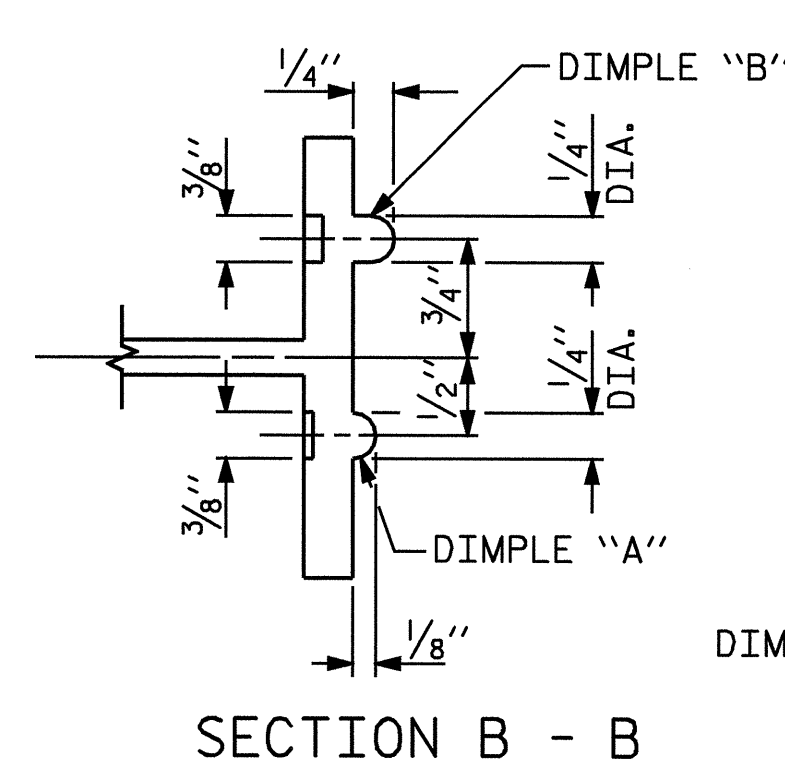
SIDE VIEW

ELEVATION

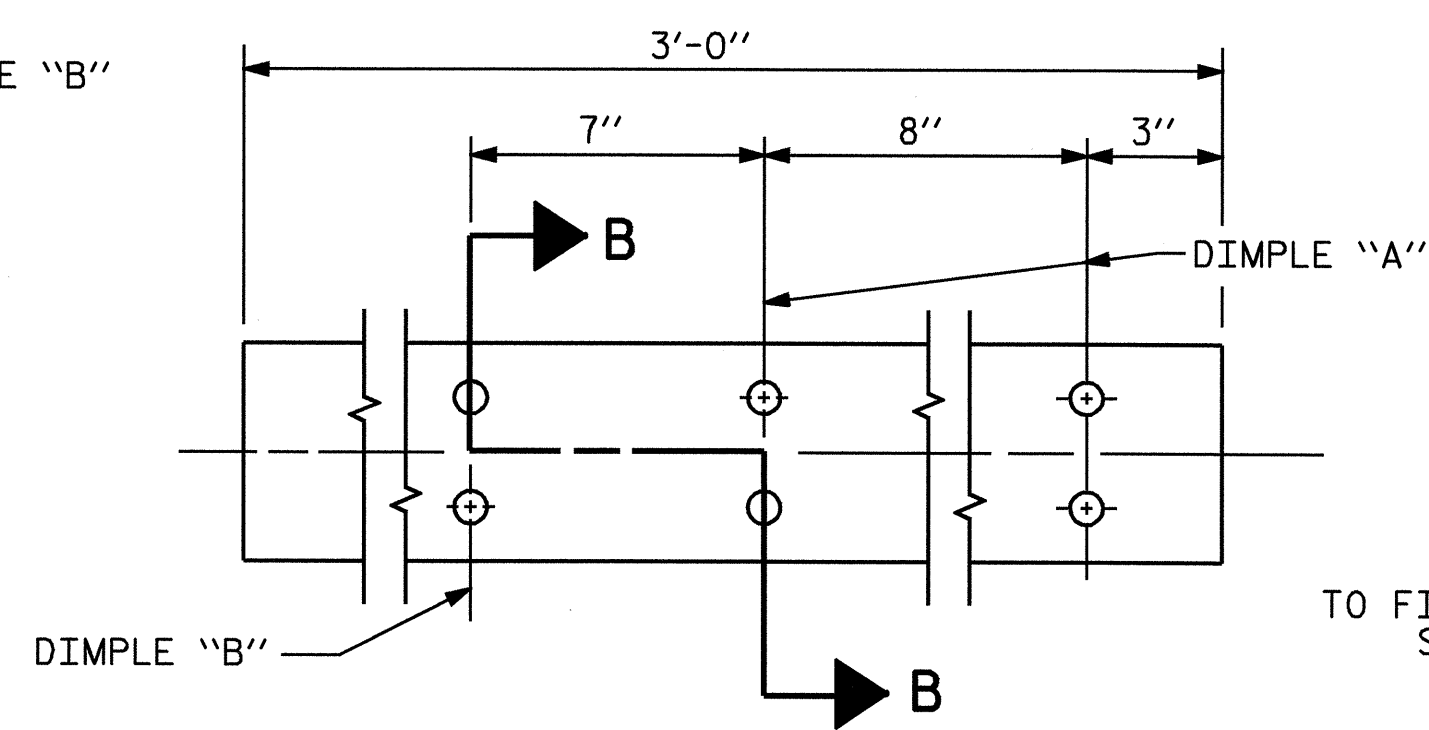
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

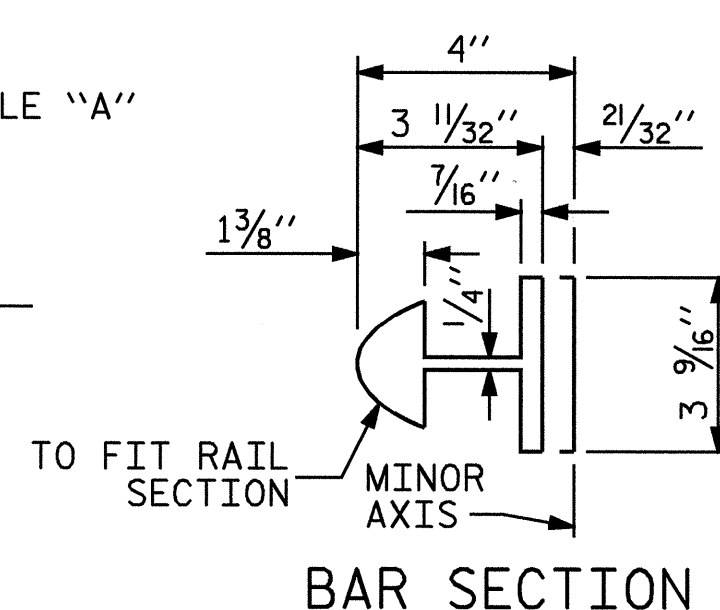
( 96 ASSEMBLIES REQUIRED )



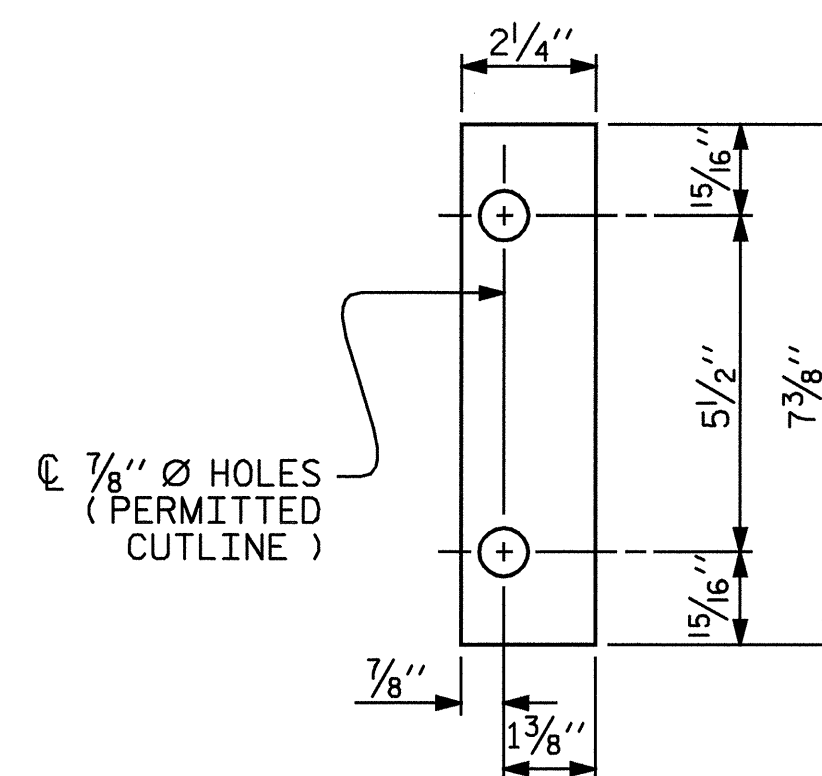
SECTION B - B



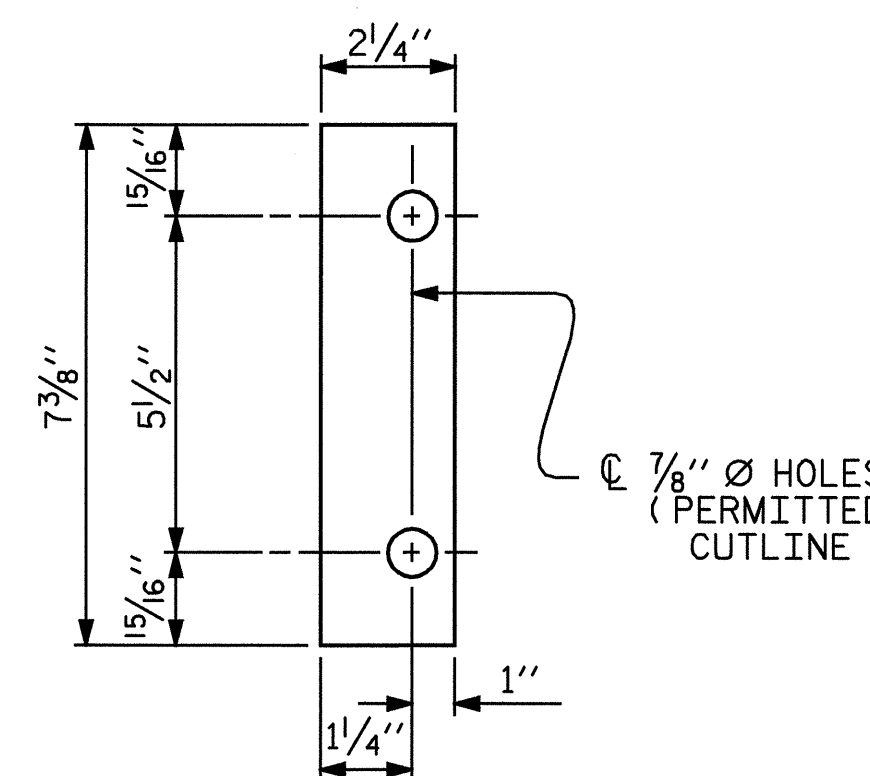
EXPANSION BAR DETAILS



BAR SECTION



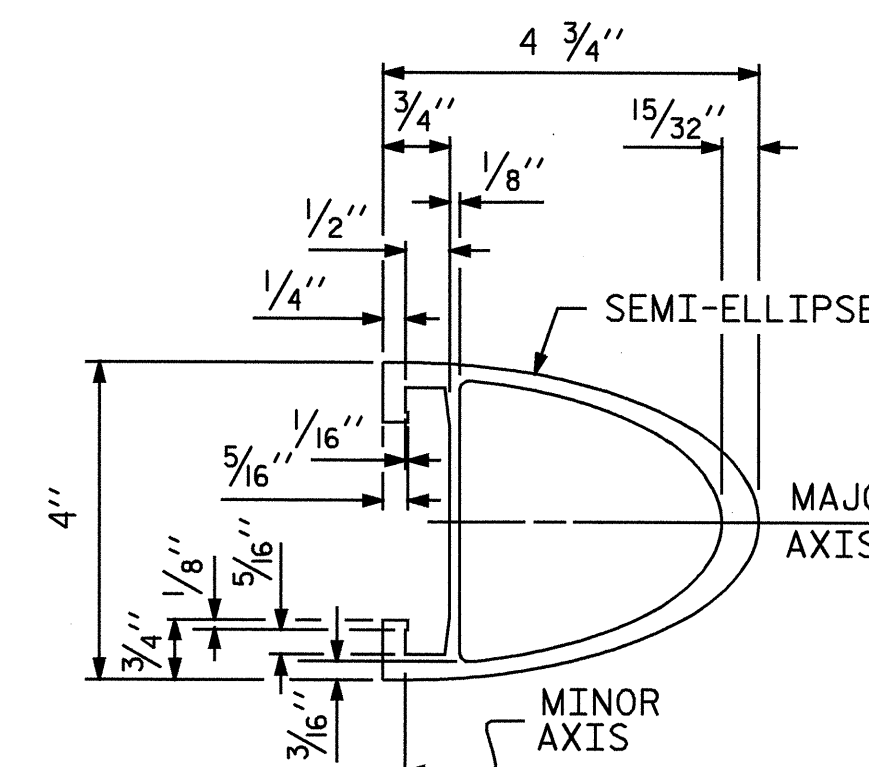
FRONT PLATE



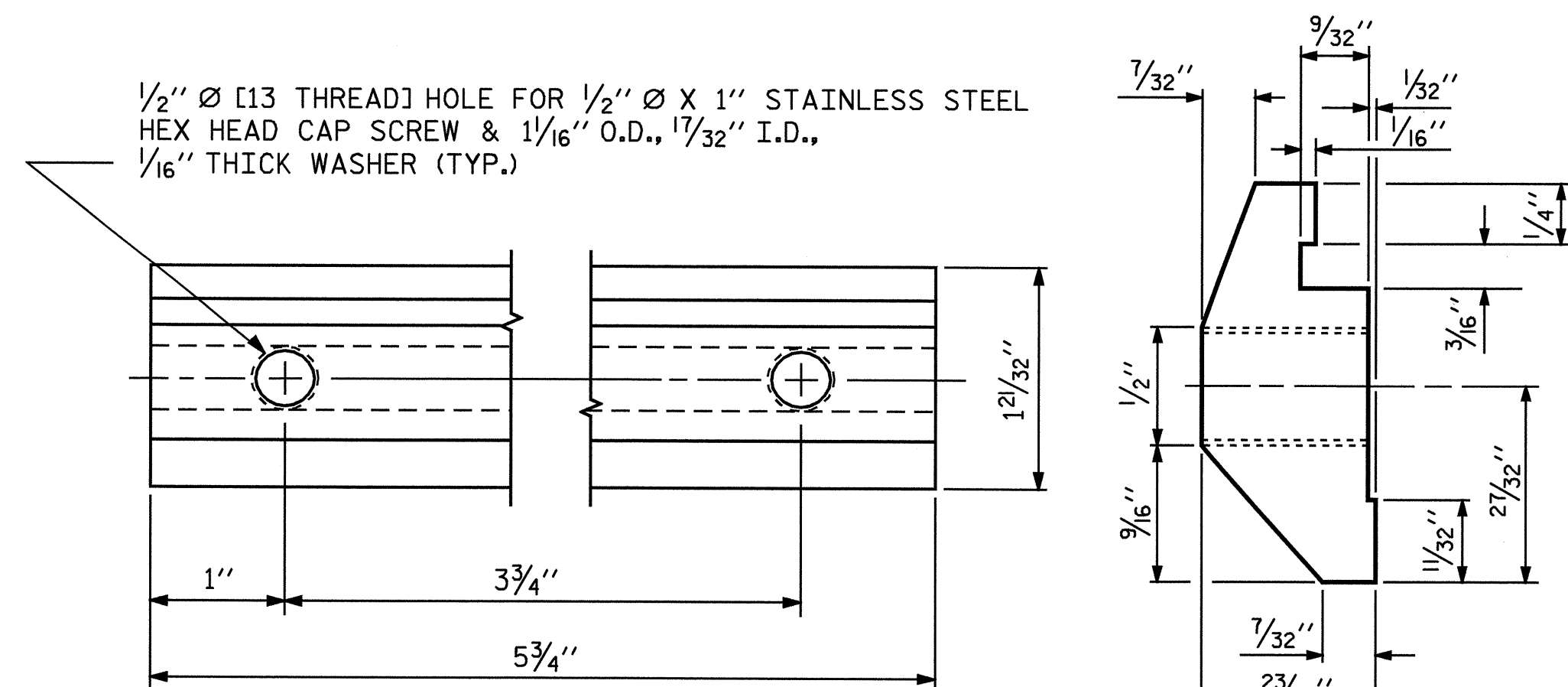
REAR PLATE

SHIM DETAILS

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

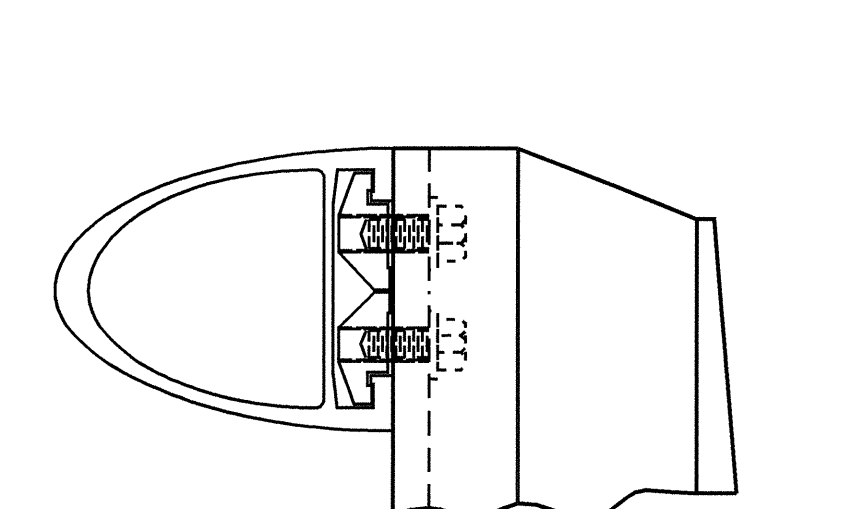


RAIL SECTION

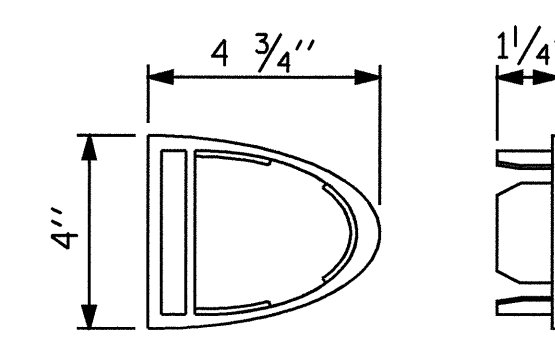


CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 11 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

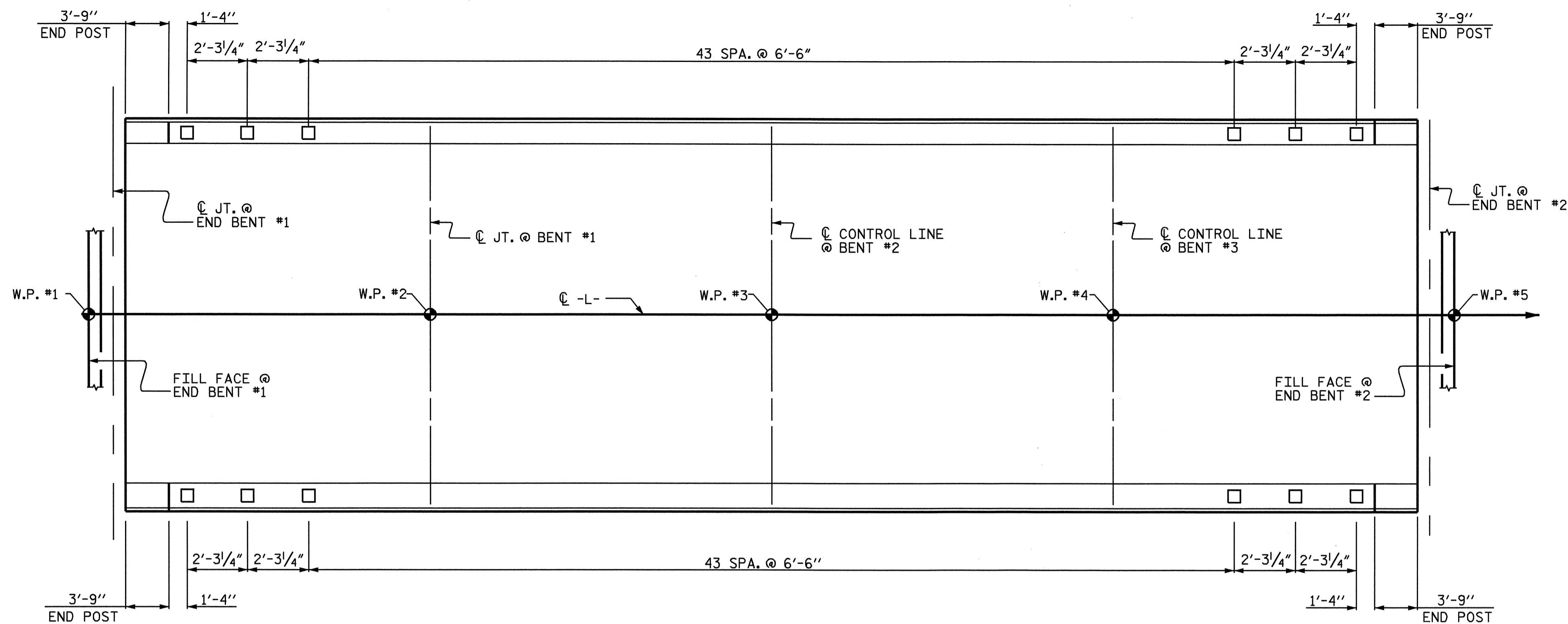
STANDARD

2 BAR METAL RAIL



|                         |                      |
|-------------------------|----------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 09/2006       |
| CHECKED BY : P.ADKINS   | DATE : 09/2006       |
| DRAWN BY : EEM 6/94     | REV. 2/6/97 EEM/RGW  |
| CHECKED BY : RGW 6/94   | REV. 8/16/99 MAB/LES |
|                         | REV. 5/1/06R KMM/GM  |

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-14         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



**PLAN OF RAIL POST SPACINGS**

(96 POST AND ANCHOR ASSEMBLIES REQUIRED)

- NOTES**  
STRUCTURAL CONCRETE INSERT
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 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".
  - 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.)
  - 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.

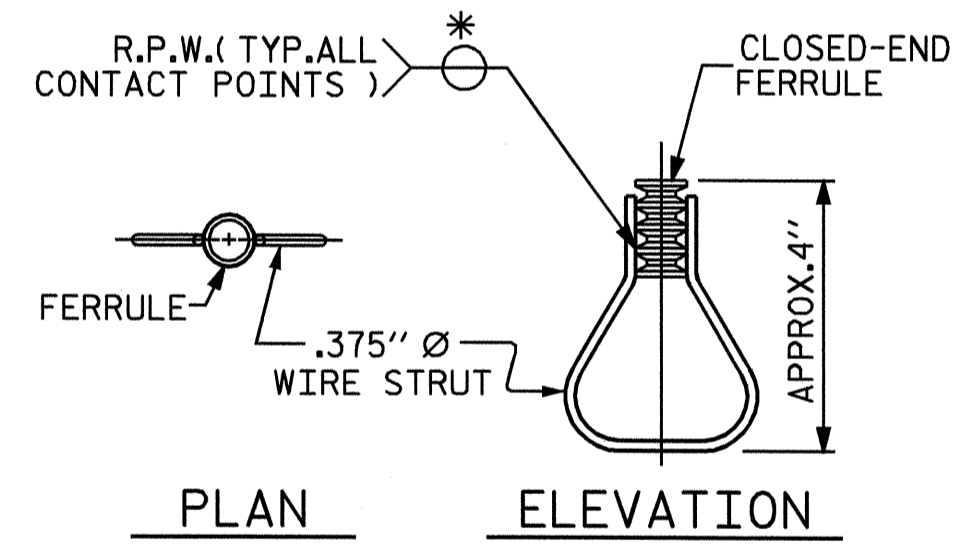
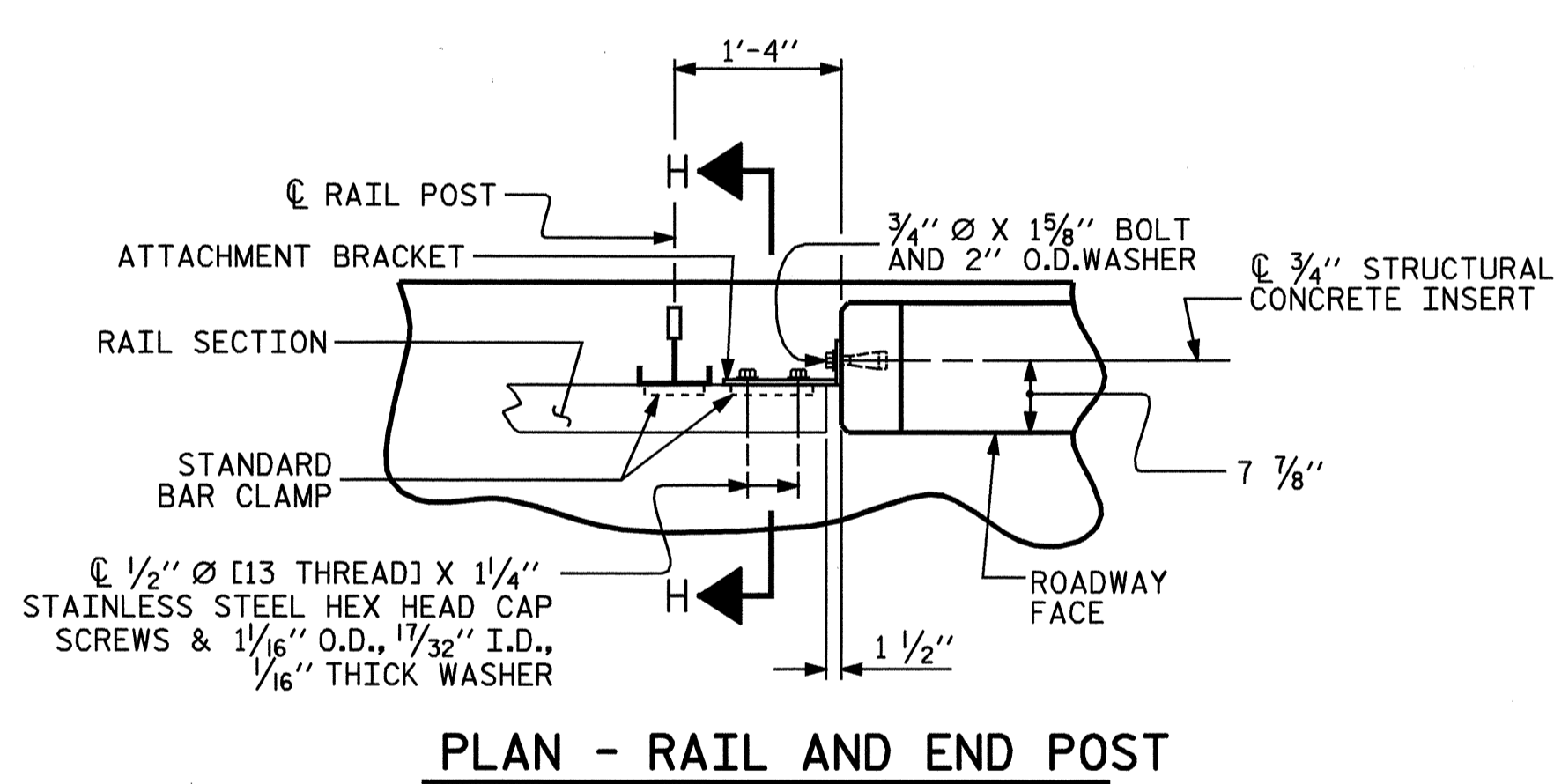
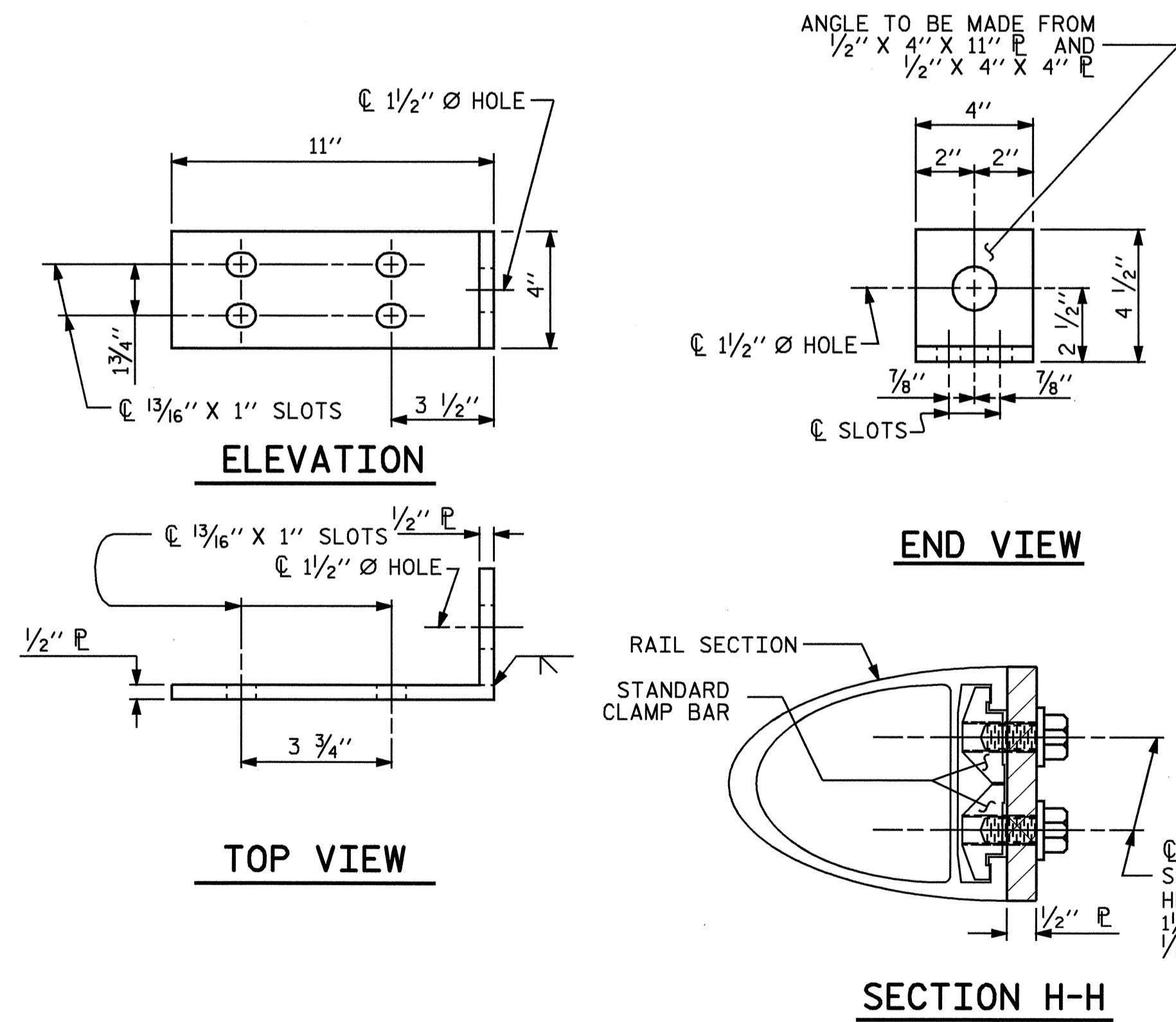
- NOTES**  
METAL RAIL TO END POST CONNECTION
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY 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.
  - 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.
  - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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 1 OR 2 BAR METAL RAILS.

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.



**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
STATION: 25+70.00 -L-

SHEET 12 OF 15

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR ONE OR TWO BAR METAL RAILS



| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-15  |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>33 |
| 2         |     |       | 4   |     |       |                    |

|                         |                       |
|-------------------------|-----------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 09/2006        |
| CHECKED BY : P.ADKINS   | DATE : 09/2006        |
| DRAWN BY : FCJ 1/88     | REV. 10/17/00 LES/RDR |
| CHECKED BY : CRK 3/89   | REV. 5/7/03 RWW/JTE   |
|                         | REV. 5/1/06 TLA/GM    |



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.

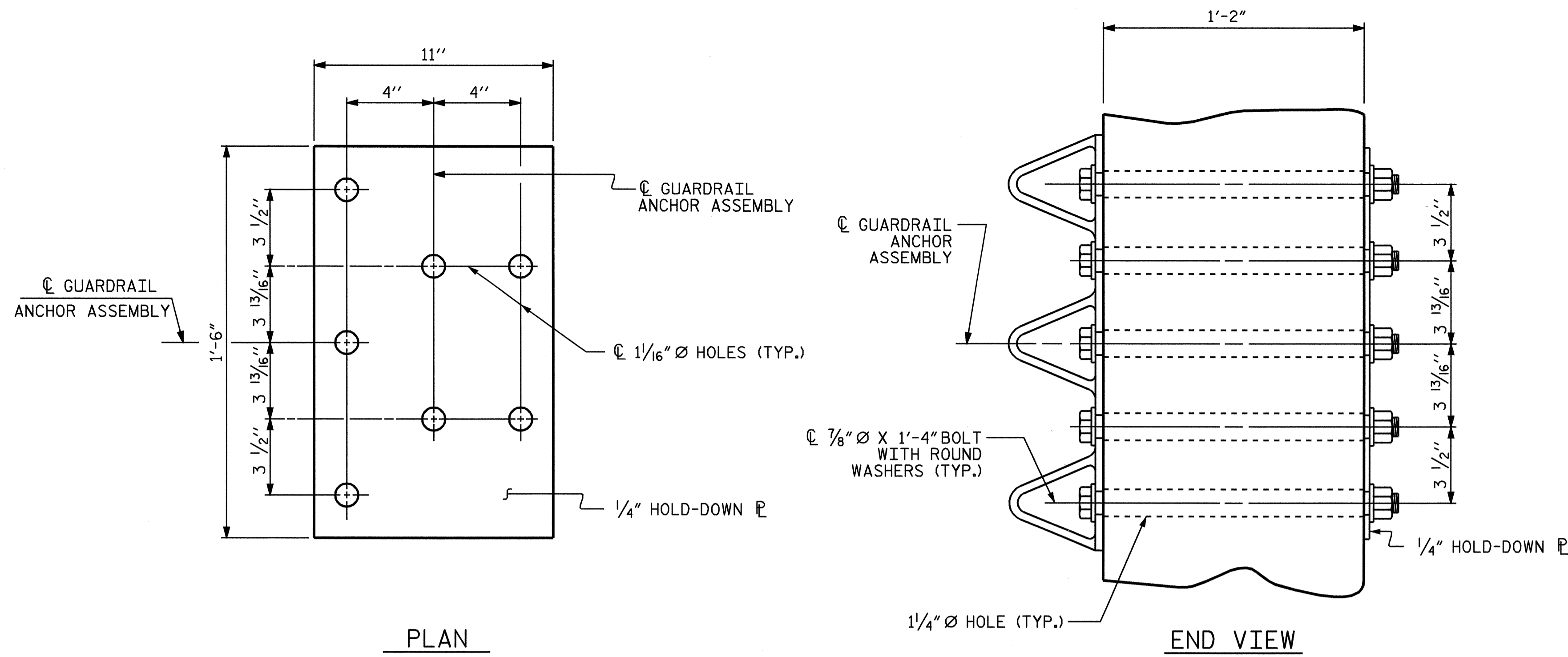
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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

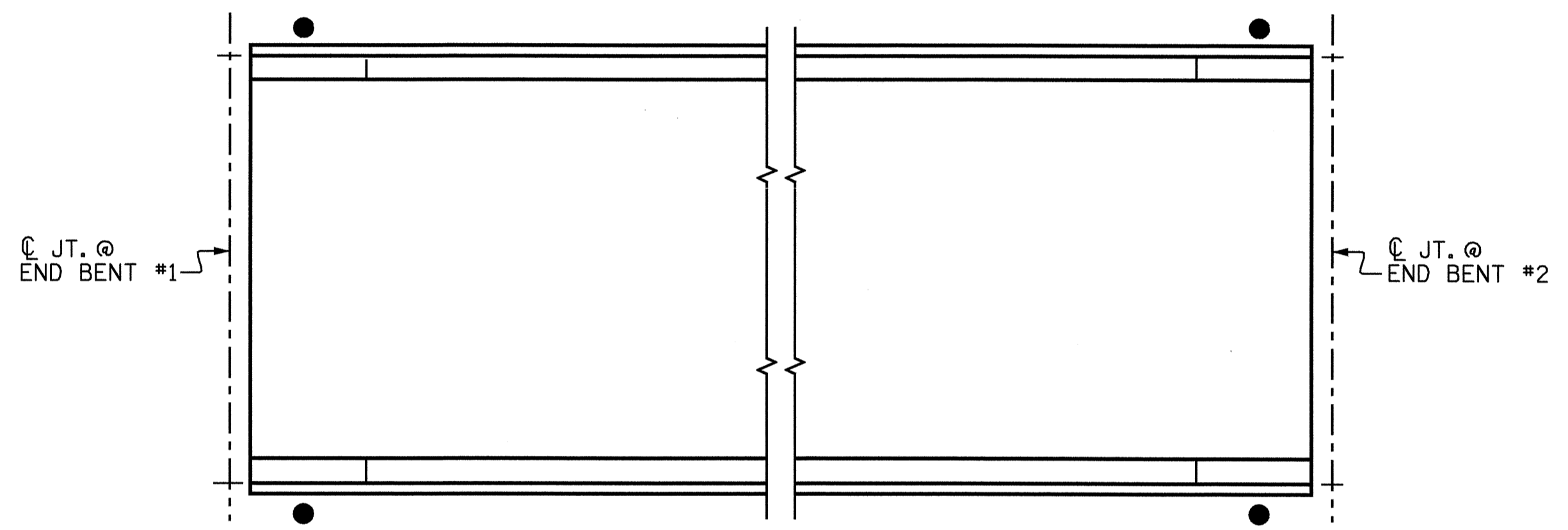
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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.

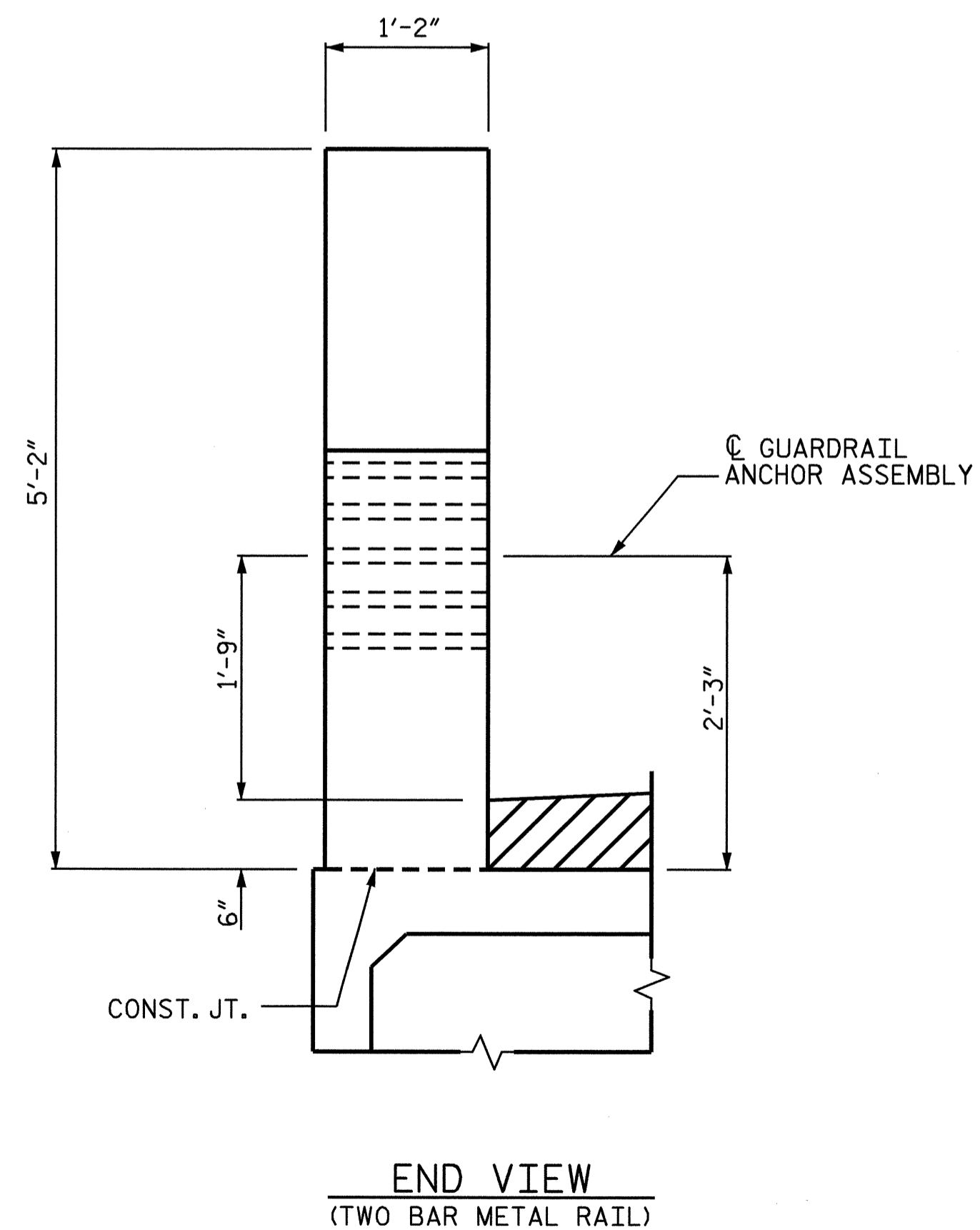


GUARDRAIL ANCHOR ASSEMBLY DETAILS

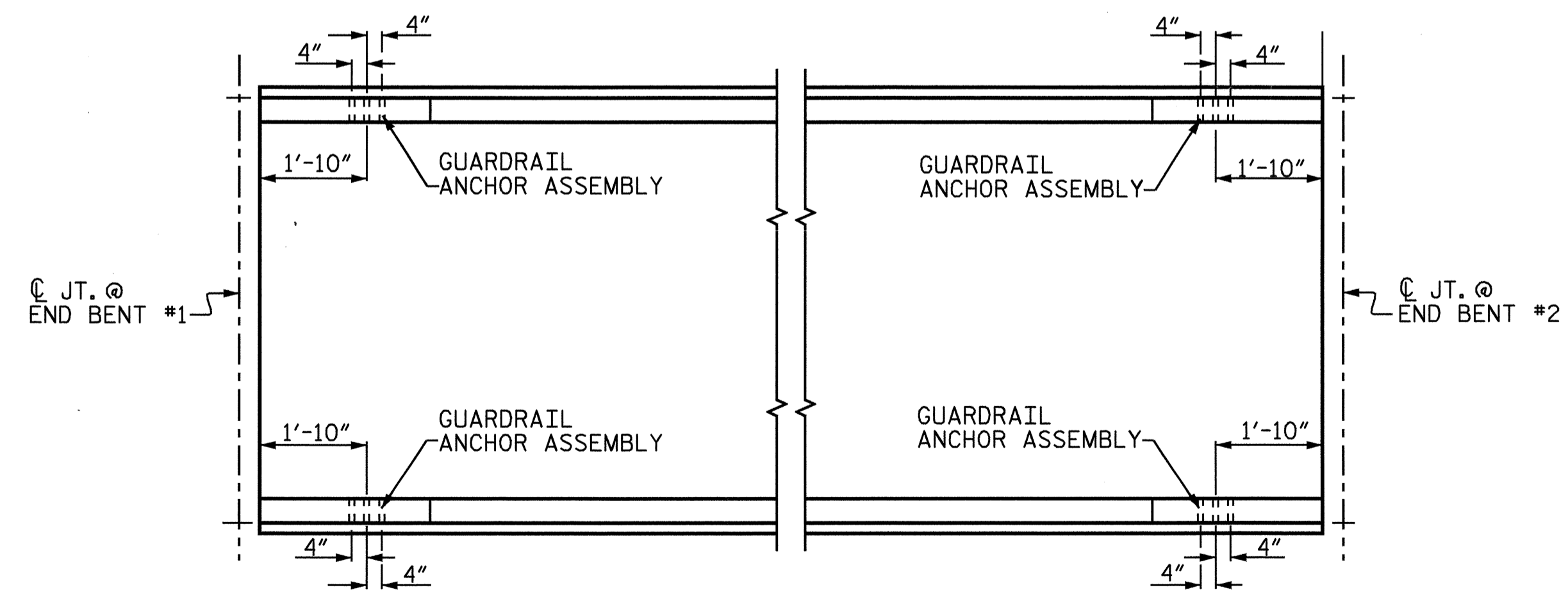


SKETCH SHOWING POINTS OF ATTACHMENT

● LOCATION OF GUARDRAIL ATTACHMENT



END VIEW  
(TWO BAR METAL RAIL)



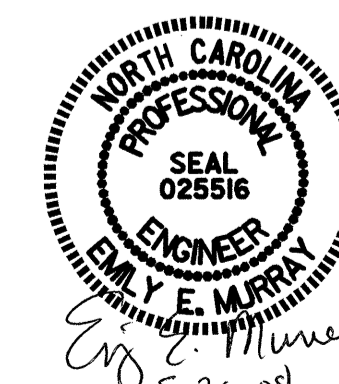
PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 13 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS



|                         |                       |
|-------------------------|-----------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 10/2006        |
| CHECKED BY : P.ADKINS   | DATE :                |
| DRAWN BY : EEM 6/94     | REV. 10/17/00 RWW/LES |
| CHECKED BY : RGW 6/94   | REV. 5/1/03 RWW/JTE   |
|                         | REV. 5/1/06 TLA/GM    |

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-16         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |

**BILL OF MATERIAL FOR CONCRETE PARAPET AND END POSTS**

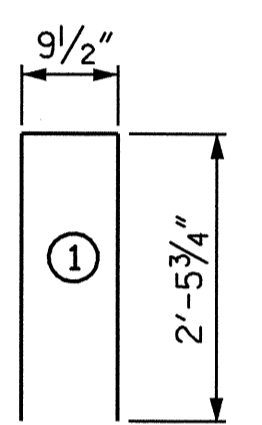
| BAR  | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|------|-----|------|------|--------|--------|
| * B3 | 80  | #5   | STR  | 25'-6" | 2128   |
| * B4 | 180 | #5   | STR  | 21'-2" | 3974   |
| * E1 | 8   | #7   | STR  | 2'-11" | 48     |
| * E2 | 8   | #7   | STR  | 3'-5"  | 56     |
| * E3 | 8   | #7   | STR  | 3'-11" | 64     |
| * E4 | 8   | #7   | STR  | 4'-5"  | 72     |
| * E5 | 8   | #7   | STR  | 4'-10" | 79     |
| * F1 | 8   | #6   | STR  | 1'-10" | 22     |
| * F2 | 8   | #6   | STR  | 3'-0"  | 36     |
| * F3 | 8   | #6   | STR  | 3'-8"  | 44     |
| * S7 | 792 | #5   | 1    | 5'-9"  | 4750   |

\* EPOXY COATED REINFORCING STEEL (LBS.) 11273 LBS.

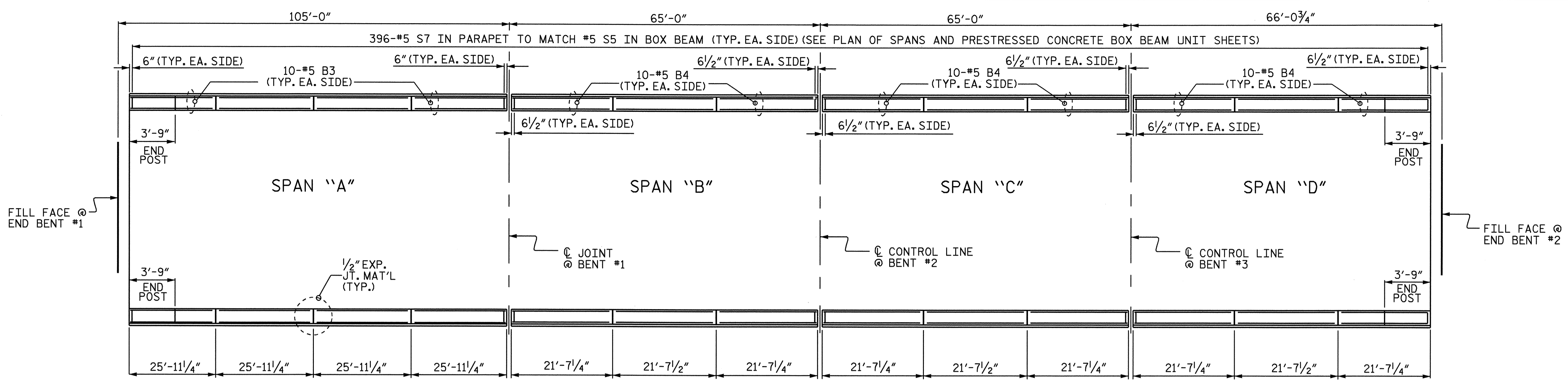
CLASS AA CONCRETE C.Y. 78.3 CU.YDS.

TOTAL LENGTH OF 1'-2" x 3'-0" CONCRETE PARAPET 597.50 LIN. FT.

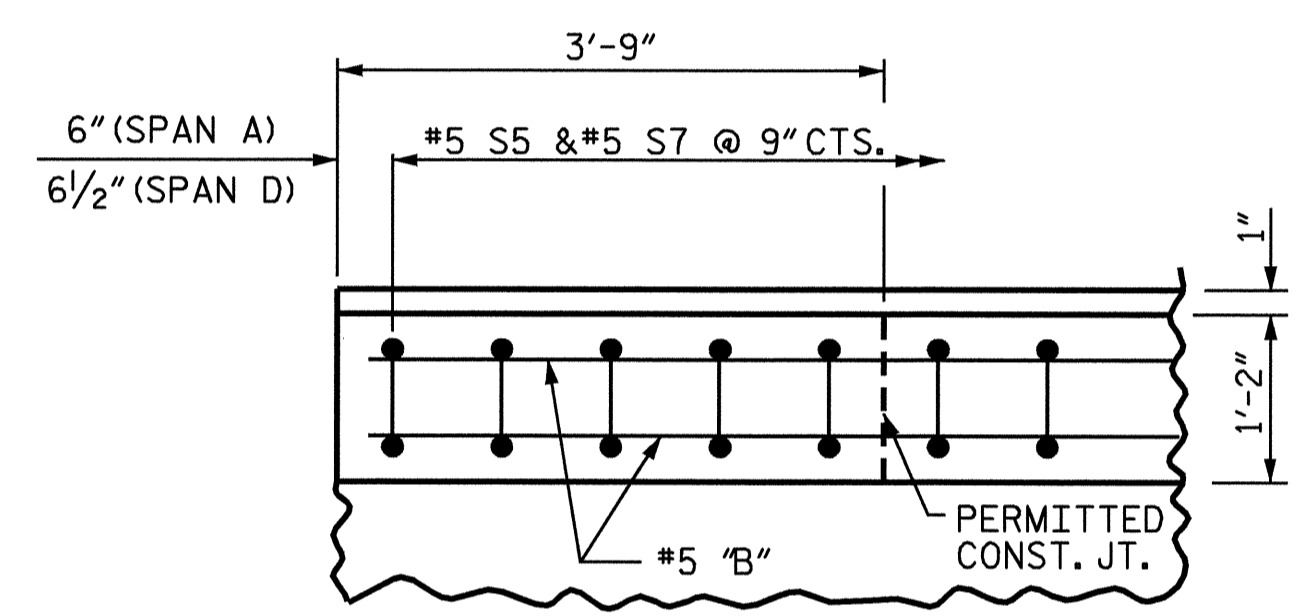
**BAR TYPES**



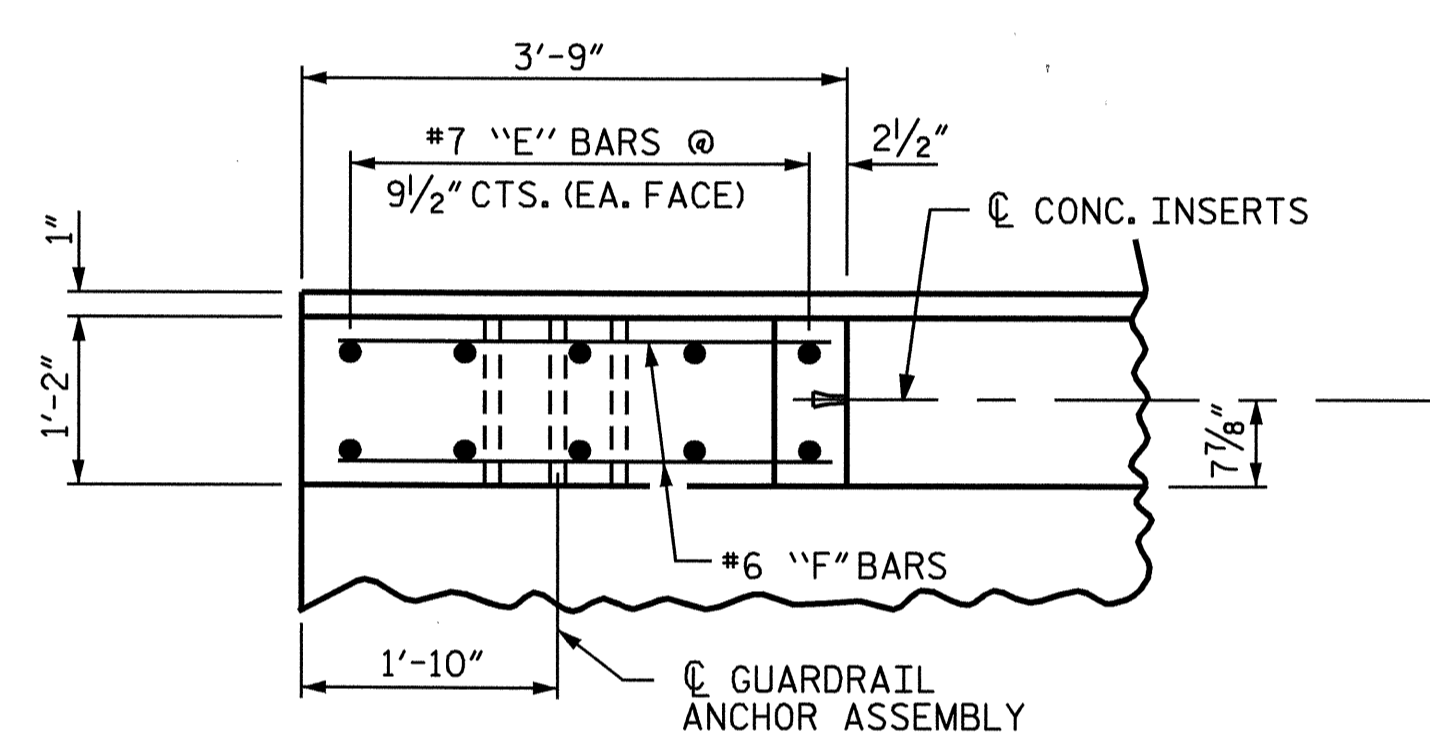
ALL BAR DIMENSIONS ARE OUT TO OUT



**PLAN OF PARAPET**

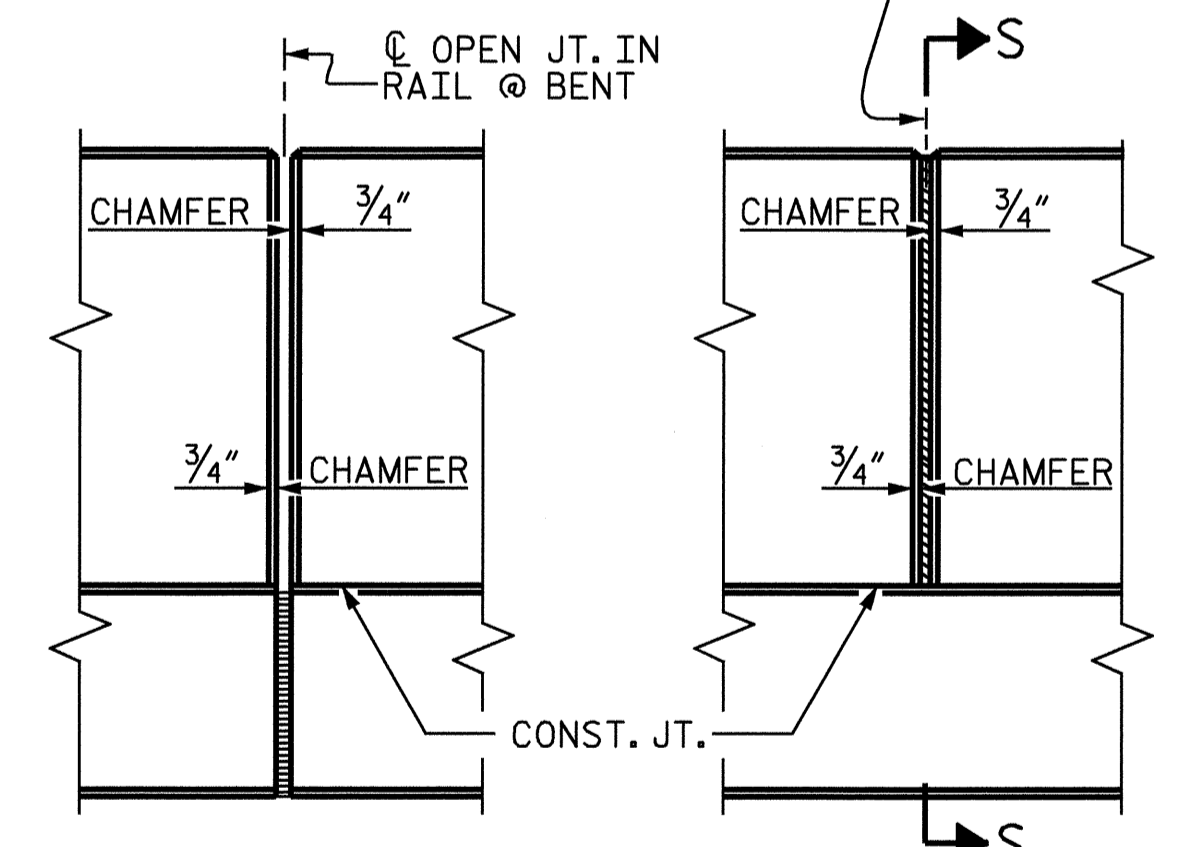


**PLAN OF PARAPET**

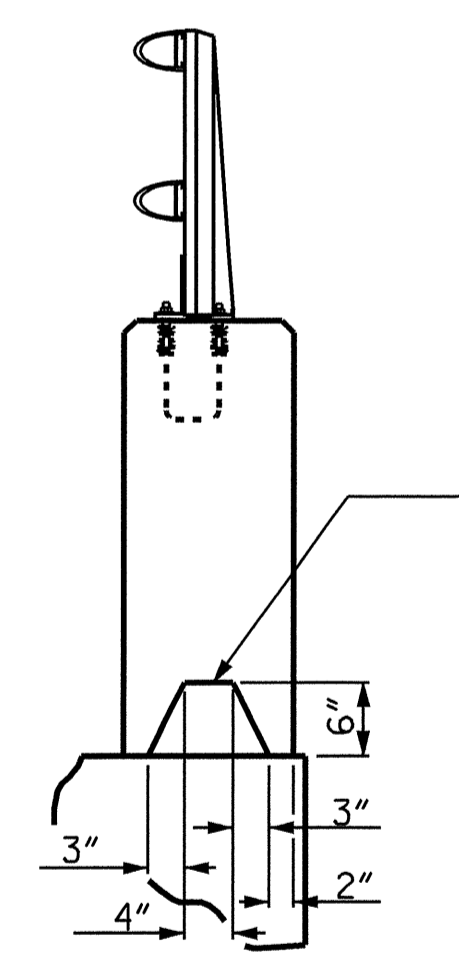


**PLAN OF END POST**

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED)

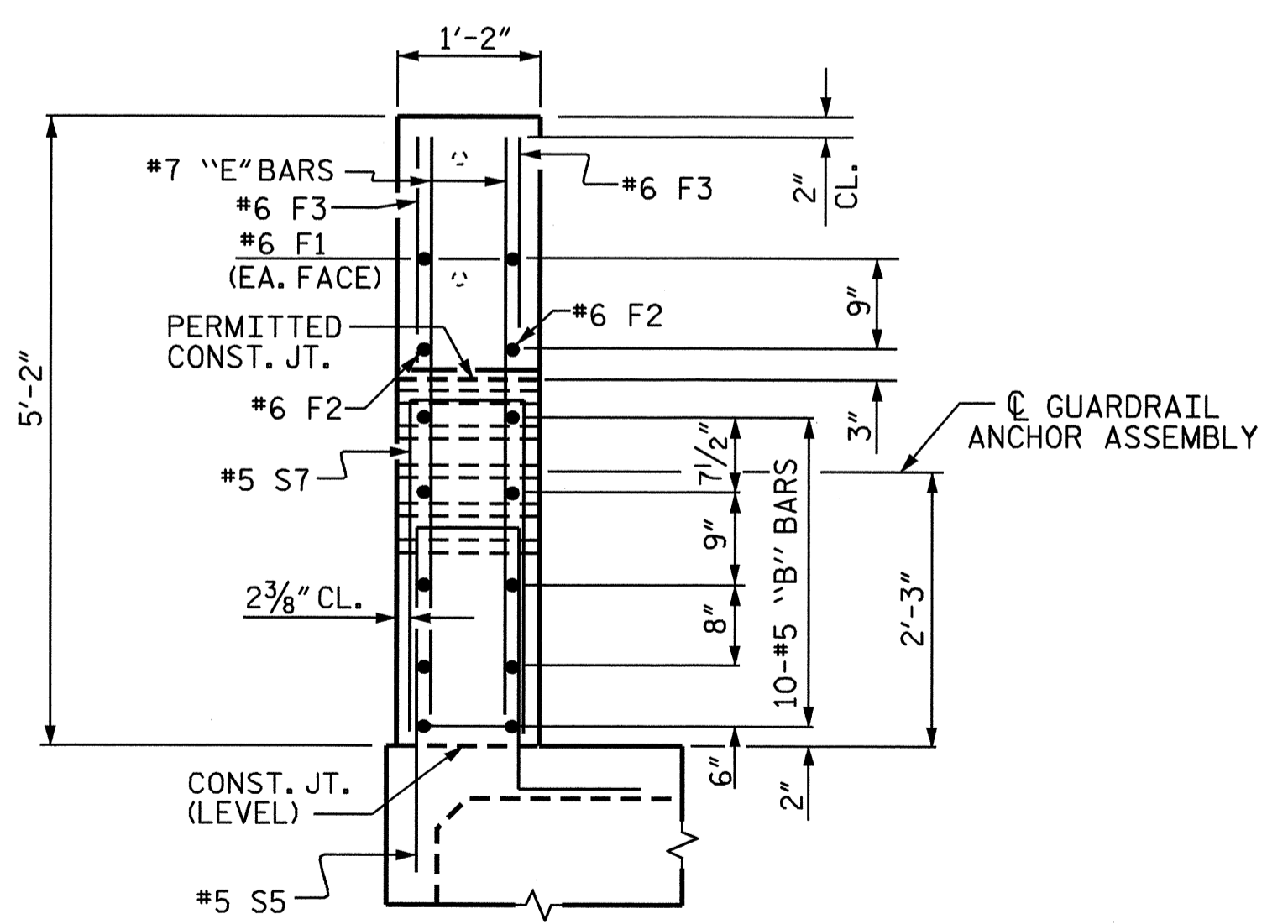


**ELEVATION AT EXPANSION JOINTS**

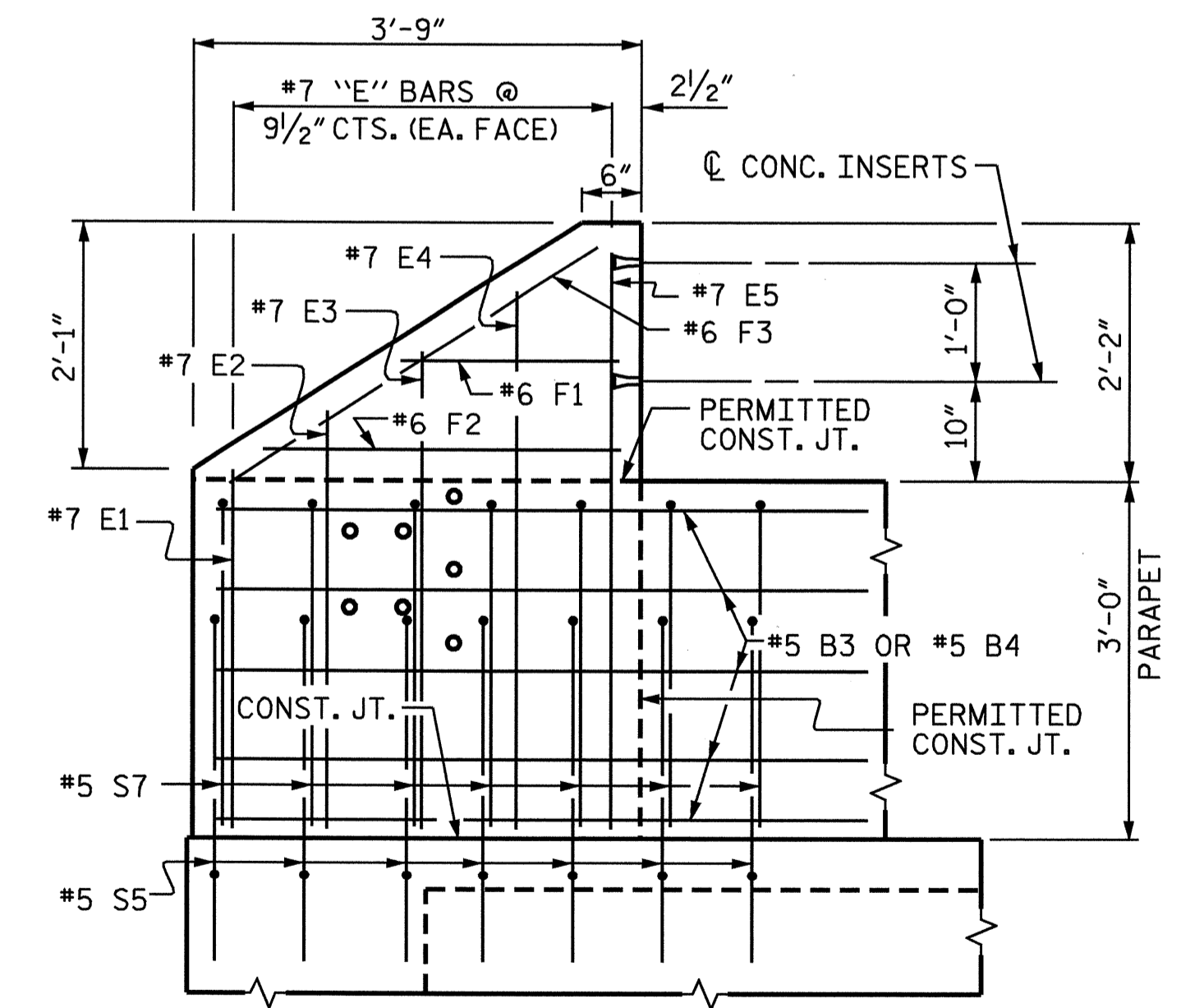


**SECTION S-S**

DAM IN OPEN JOINT (TO BE USED ONLY WHEN SLIP FORM IS USED.)



**END VIEW**



**ELEVATION**

**PARAPET DETAILS**

**PARAPET AND END POST FOR TWO BAR RAIL**

DRAWN BY: MDPISO DATE: 06/2006  
 CHECKED BY: PADKINS DATE: 10/2006

19-MAY-2008 10:58  
 g:\tpprojects-b\4031\structures\4031\final plans\4031.sd.op.dgn  
 taverette

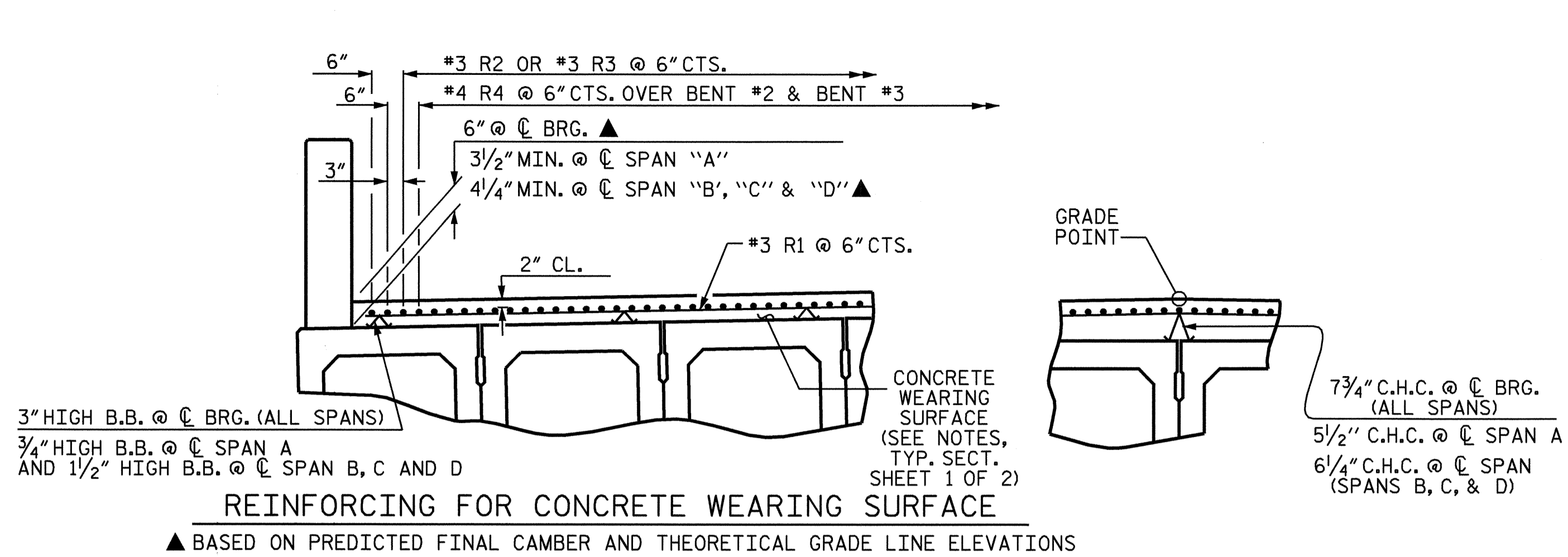
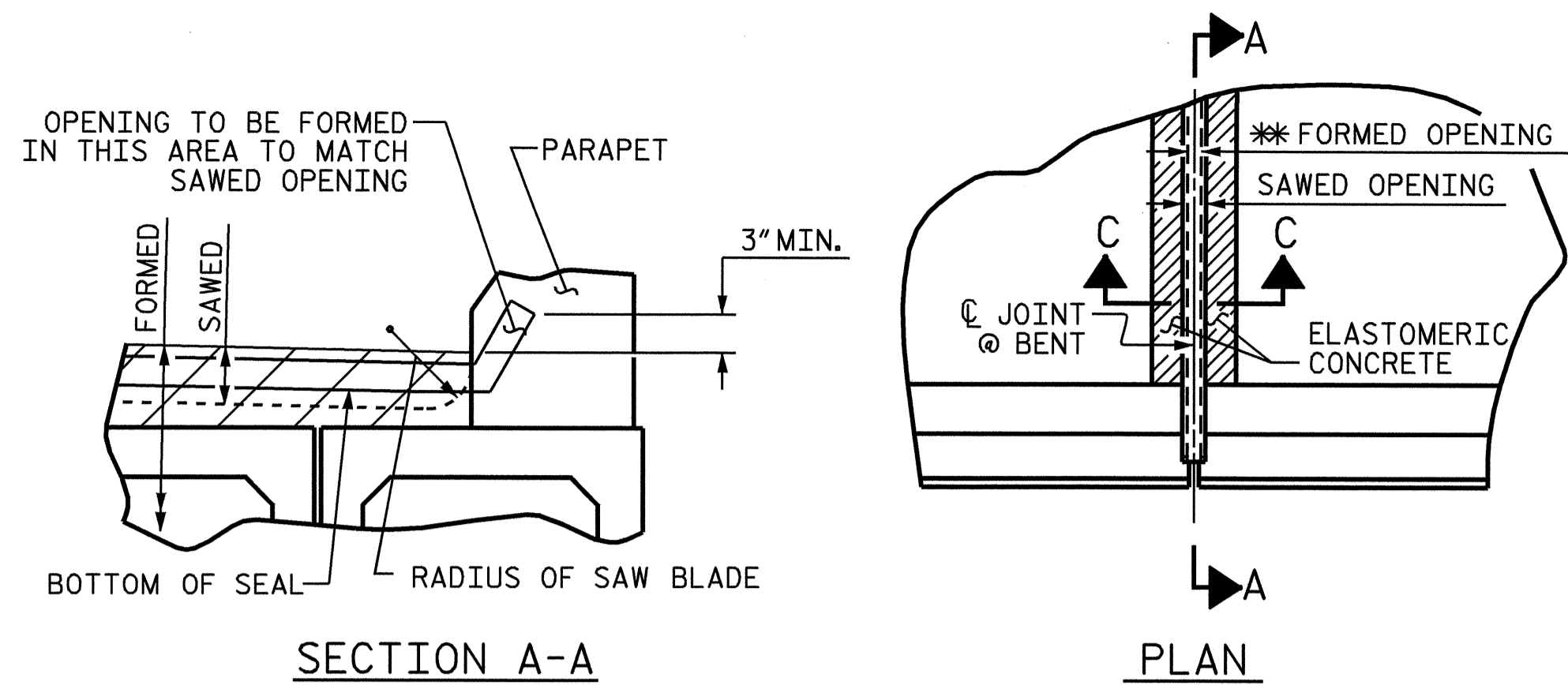


PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 14 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 CONCRETE PARAPET  
 AND END POST  
 DETAILS

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-17         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



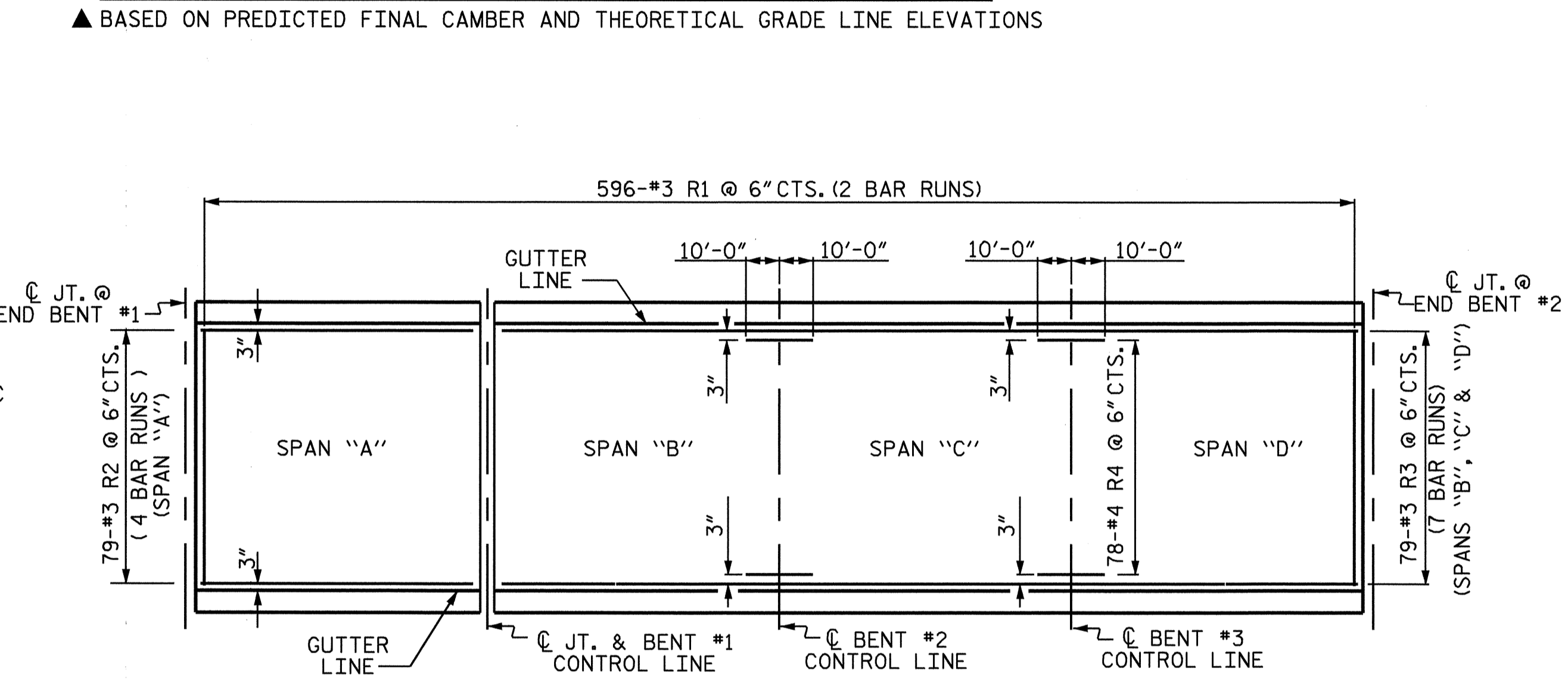
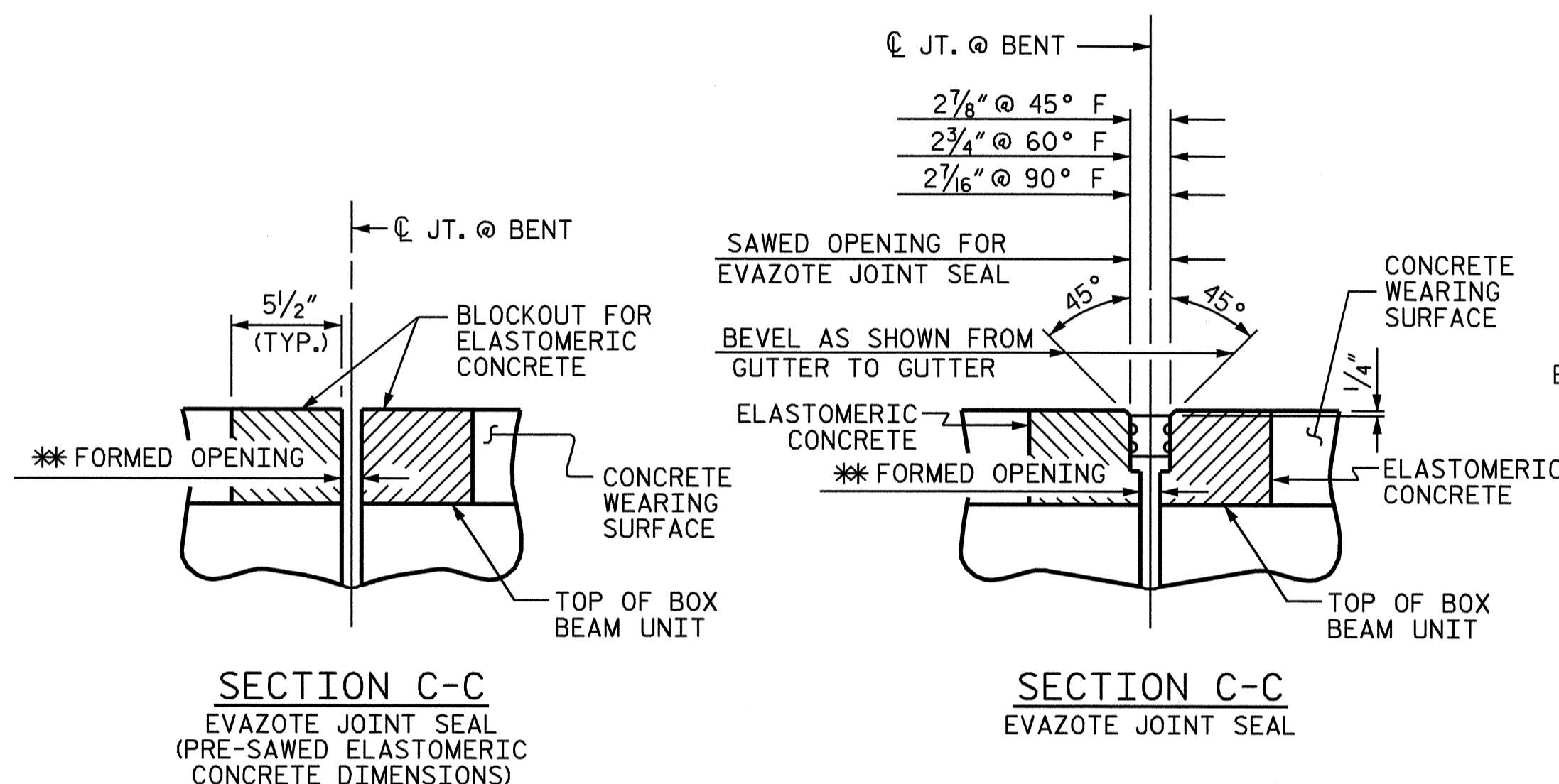
| BILL OF MATERIAL FOR CONCRETE WEARING SURFACE |      |      |      |                                  |                |
|---|------|------|------|----------------------------------|----------------|
| BAR   | NO.  | SIZE | TYPE | LENGTH                           | WEIGHT         |
| *R1   | 1192 | #3   | STR  | 20'-3"                           | 9076           |
| *R2   | 316  | #3   | STR  | 26'-10"                          | 3188           |
| *R3   | 553  | #3   | STR  | 28'-9"                           | 5978           |
| *R4   | 156  | #4   | STR  | 20'-0"                           | 2084           |
|   |      |      |      | * EPOXY COATED REINFORCING STEEL | 20,326 LBS.    |
|   |      |      |      | CONCRETE WEARING SURFACE         | 11,803 SQ. FT. |

| GROOVING BRIDGE FLOORS |                |
|------------------------|----------------|
| APPROACH SLABS         | 1,743 SQ. FT.  |
| BRIDGE DECK            | 10,811 SQ. FT. |
| TOTAL                  | 12,554 SQ. FT. |

| ELASTOMERIC CONCRETE |                                   |
|----------------------|-----------------------------------|
| BENT NO.             | ELASTOMERIC CONCRETE ++ (CU. FT.) |
| 1                    | 25.3 CU. FT.                      |
| TOTAL                | 25.3 CU. FT.                      |

++ BASED ON THE MINIMUM BLOCKOUT SHOWN.

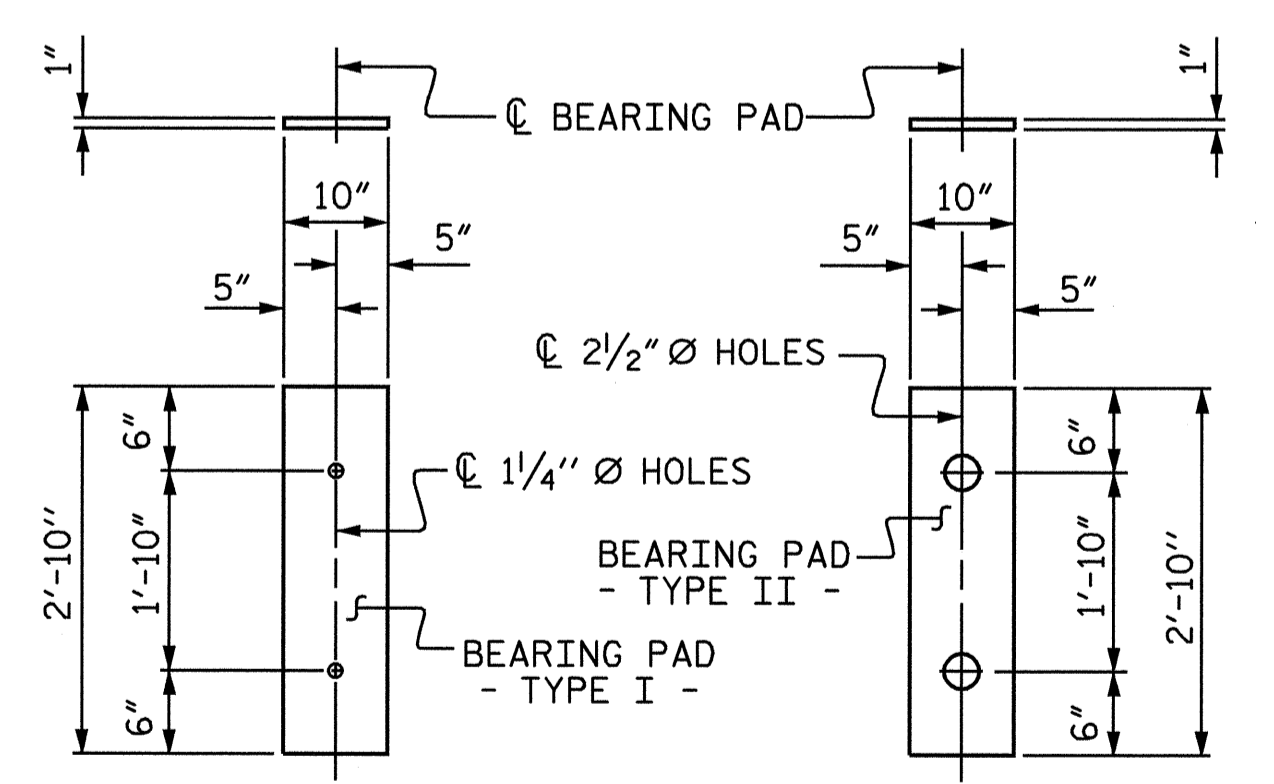
| SPLICE LENGTH CHART |              |
|---------------------|--------------|
| BAR SIZE            | EPOXY COATED |
| #3                  | 1'-3"        |
| #4                  | 1'-8"        |



**JOINT SEAL DETAILS AT BENT #1**

\* FORMED OPENING TO MATCH ACTUAL OPENING BETWEEN THE TOP OF THE BOX BEAM UNITS WITH A MINIMUM FORMED OPENING OF 1/2".

**PLAN SHOWING CONCRETE WEARING SURFACE REINFORCING STEEL**



**ELASTOMERIC BEARING DETAILS**

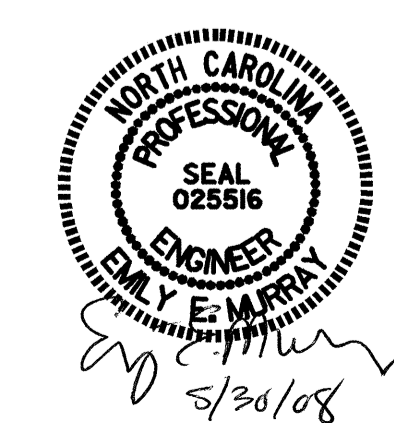
NOTE: ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

| PRECAST CONCRETE BOX BEAM UNITS REQUIRED |            |        |        |         |                       |                                   |
|--|------------|--------|--------|---------|-----------------------|-----------------------------------|
| BOX                                      | SPAN       | NUMBER | NUMBER | LENGTH  | TOTAL LENGTH SPAN 'A' | TOTAL LENGTH SPANS 'B', 'C' & 'D' |
| 3'-0" X 3'-3"                            | SPAN A INT | 12     |        | 103'-9" | 1245'-0"              |                                   |
|  | EXT        | 2      |        | 103'-9" | 207'-6"               |                                   |
| 3'-0" X 2'-9"                            | SPAN B INT |        | 12     | 64'-10" |                       | 778'-0"                           |
|  | EXT        |        | 2      | 64'-10" |                       | 129'-8"                           |
| 3'-0" X 2'-9"                            | SPAN C INT |        | 12     | 64'-10" |                       | 778'-0"                           |
|  | EXT        |        | 2      | 64'-10" |                       | 129'-8"                           |
| 3'-0" X 2'-9"                            | SPAN D INT |        | 12     | 64'-10" |                       | 778'-0"                           |
|  | EXT        |        | 2      | 64'-10" |                       | 129'-8"                           |
| TOTAL                                    |            | 14     | 42     |         | 1452'-6"              | 2723'-0"                          |

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 15 OF 15

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 DETAILS



| REVISIONS |     |       |     |     | SHEET NO. |
|-----------|-----|-------|-----|-----|-----------|
| NO.       | BY: | DATE: | NO. | BY: | DATE:     |
| 1         |     |       | 3   |     |           |
| 2         |     |       | 4   |     |           |

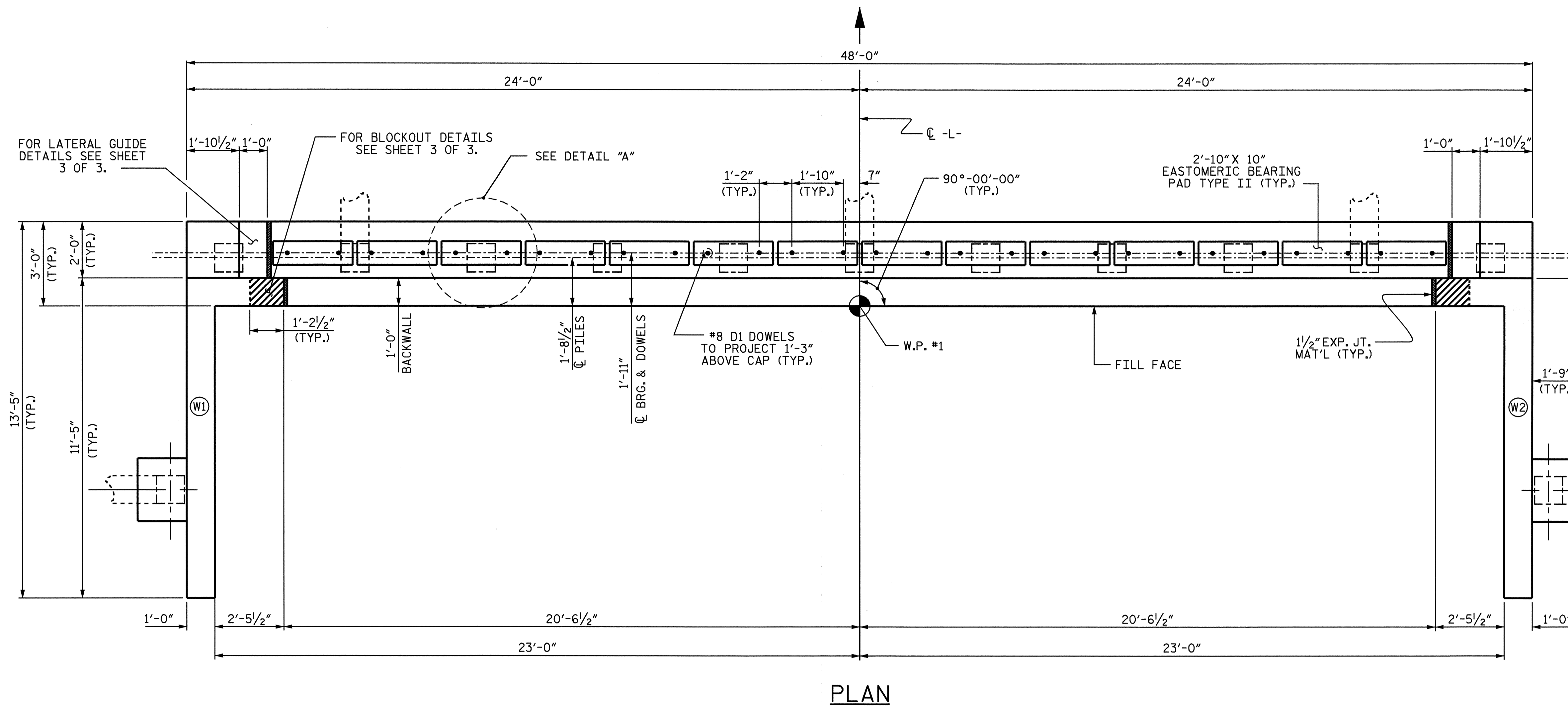
|                         |                    |
|-------------------------|--------------------|
| ASSEMBLED BY : M.D.PISO | DATE : 10/2006     |
| CHECKED BY : PADKINS    | DATE : 10/2006     |
| DRAWN BY : TLA 5/05     | ADDED 7/11/05R     |
| CHECKED BY : GM 6/05    | REV. 5/1/06 TLA/GM |

**NOTES**

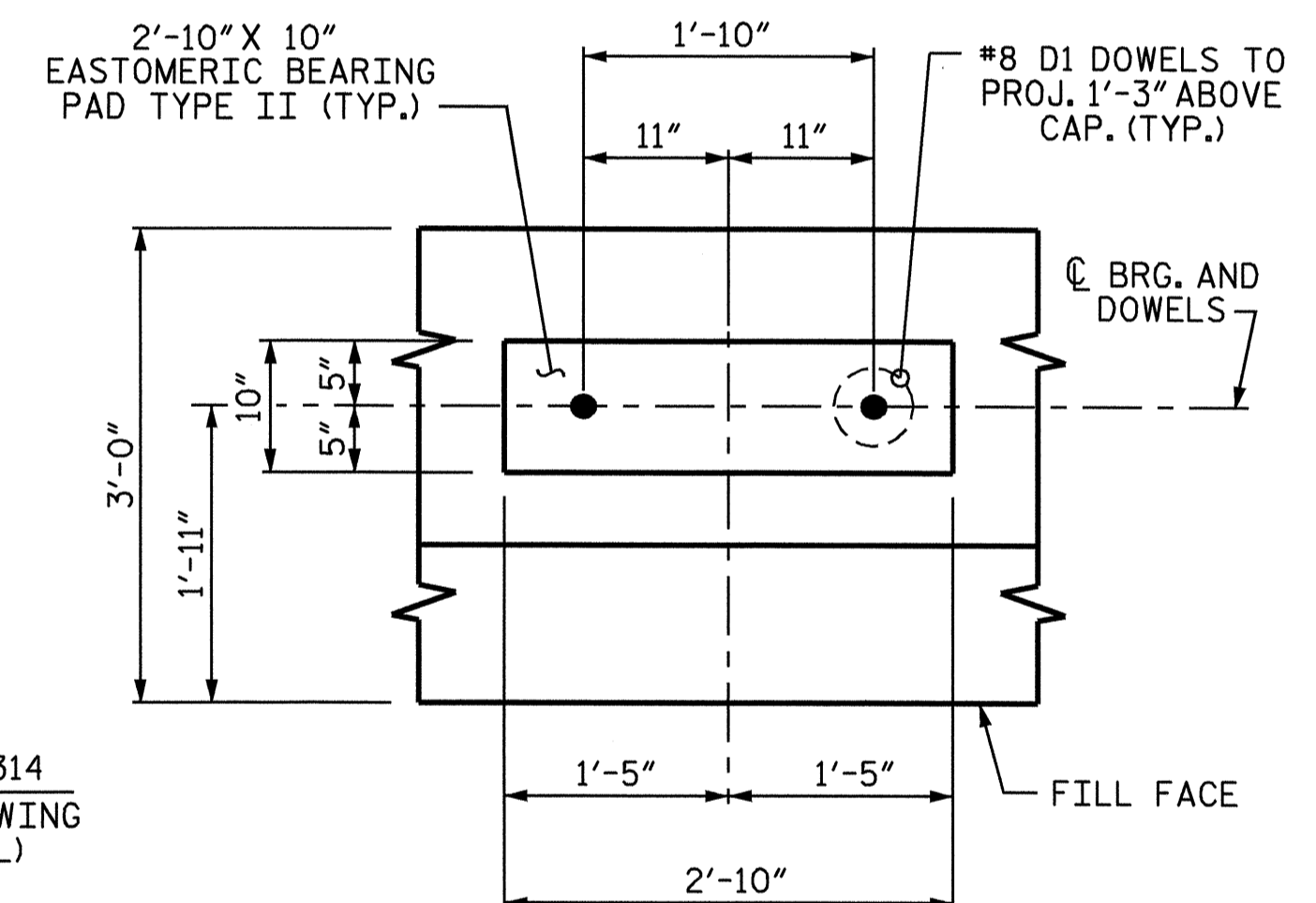
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.

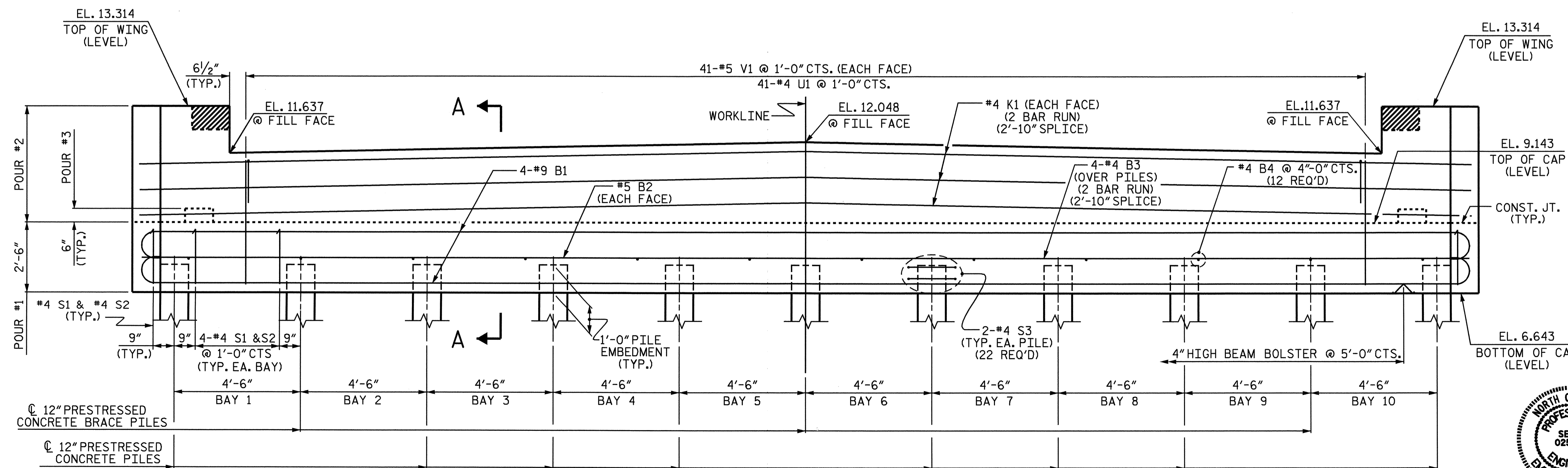
THE LATERAL GUIDE @ EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.



**PLAN**



**DETAIL "A"**



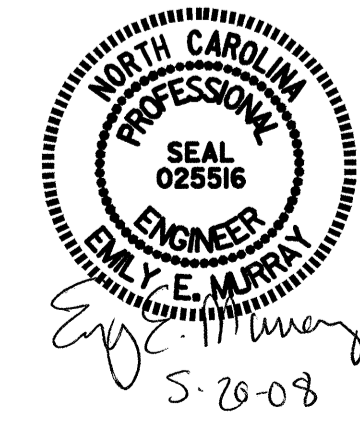
**ELEVATION**

(WING BRACE PILES NOT SHOWN FOR CLARITY)

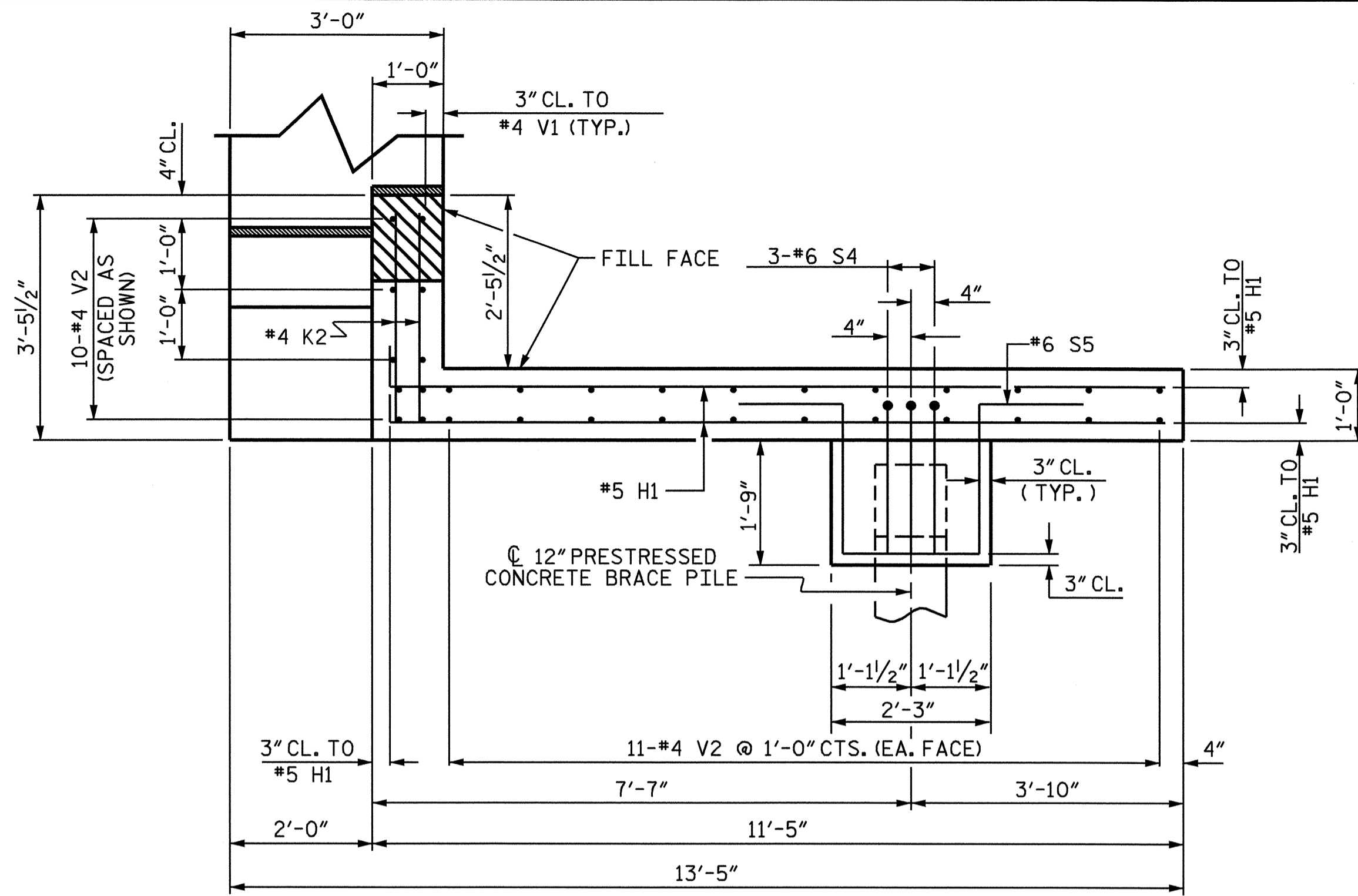
PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 1 OF 3

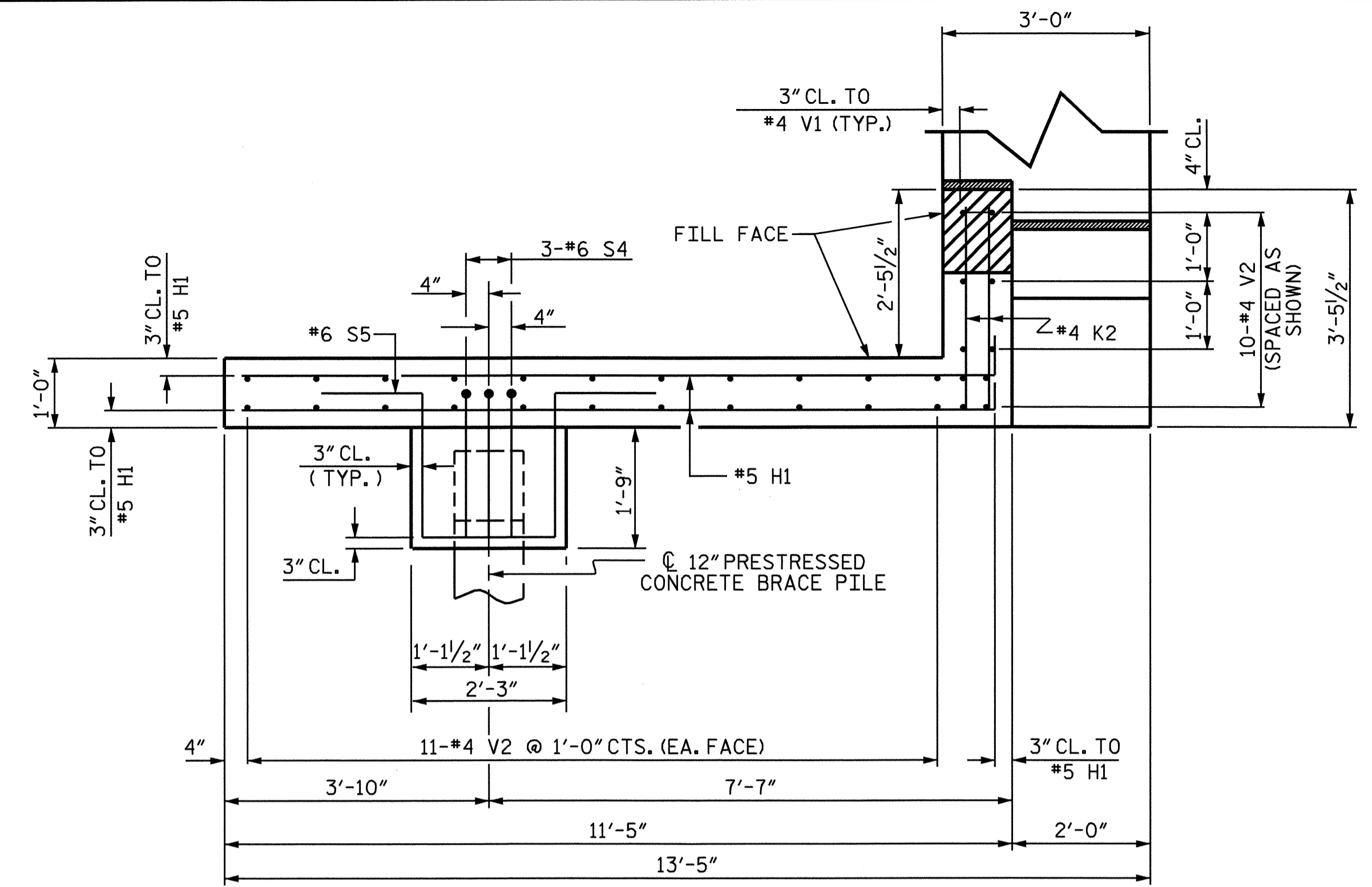
|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUBSTRUCTURE<br>END BENT #1  |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
|  |     |       |     |     | SHEET NO.<br>S-19  |
|  |     |       |     |     | TOTAL SHEETS<br>33 |



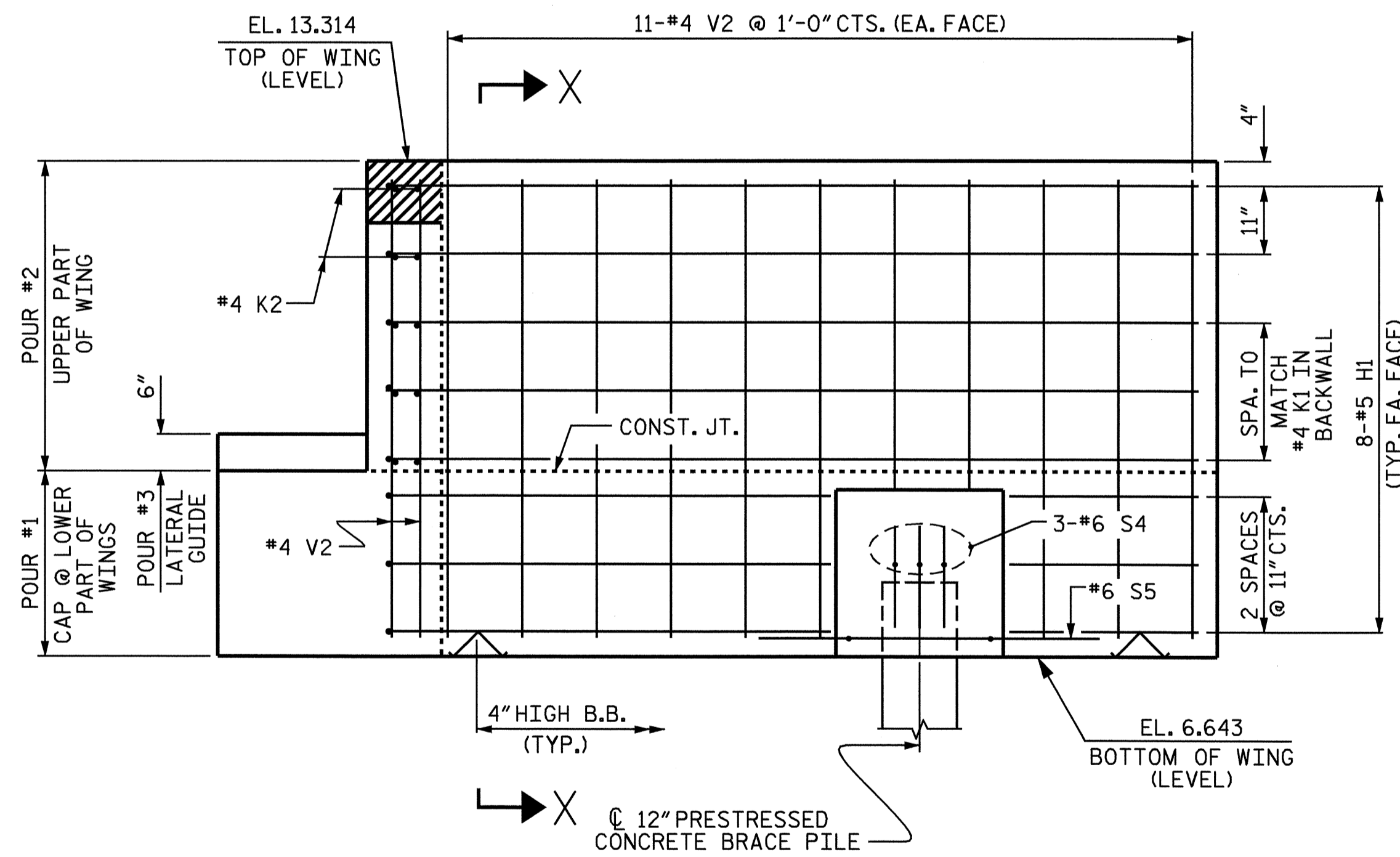
DRAWN BY: M. GUDLAUGSSON DATE: 9/27/07  
 CHECKED BY: J.B. WILSON DATE: 1/11/08



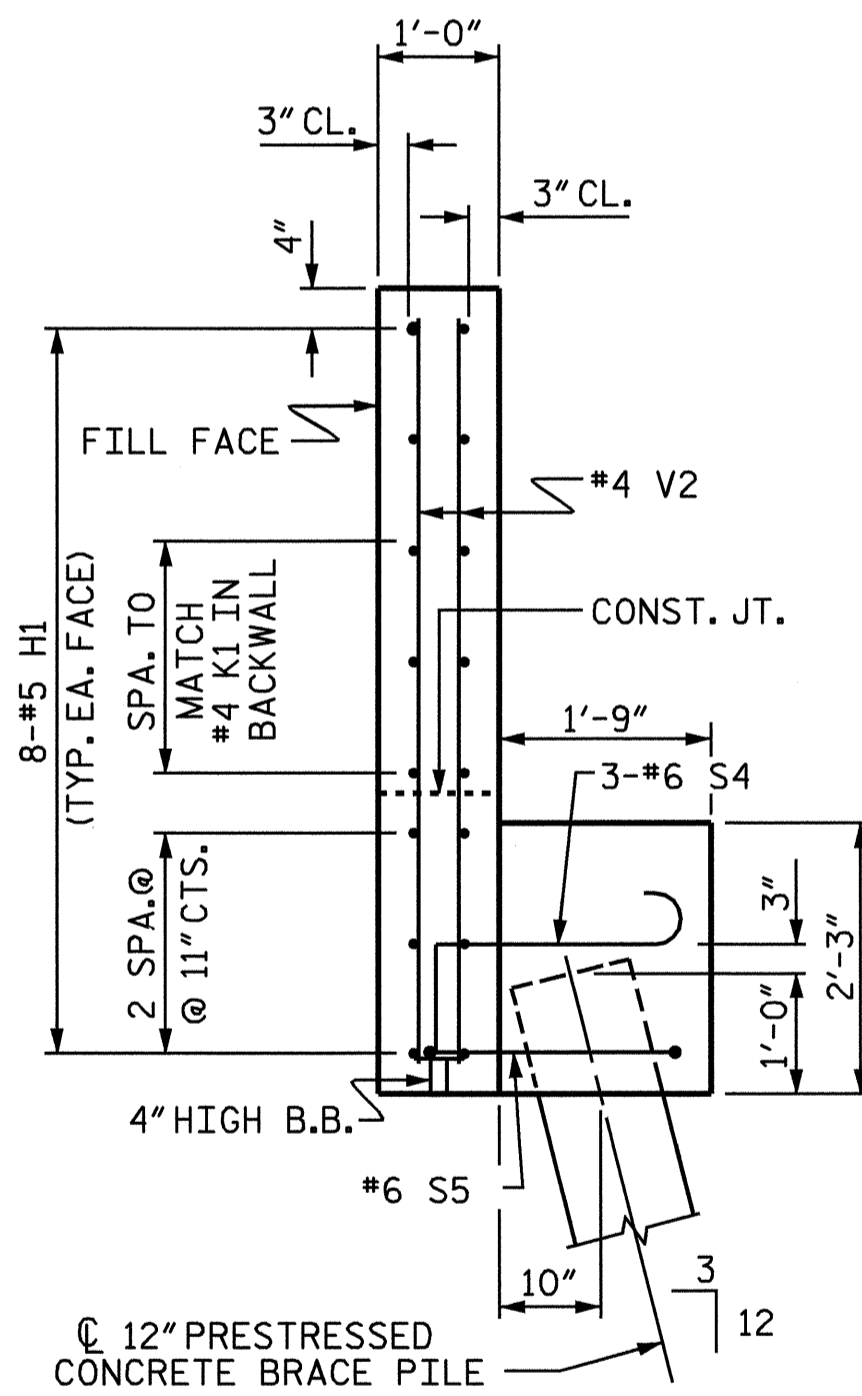
PLAN OF WING W1



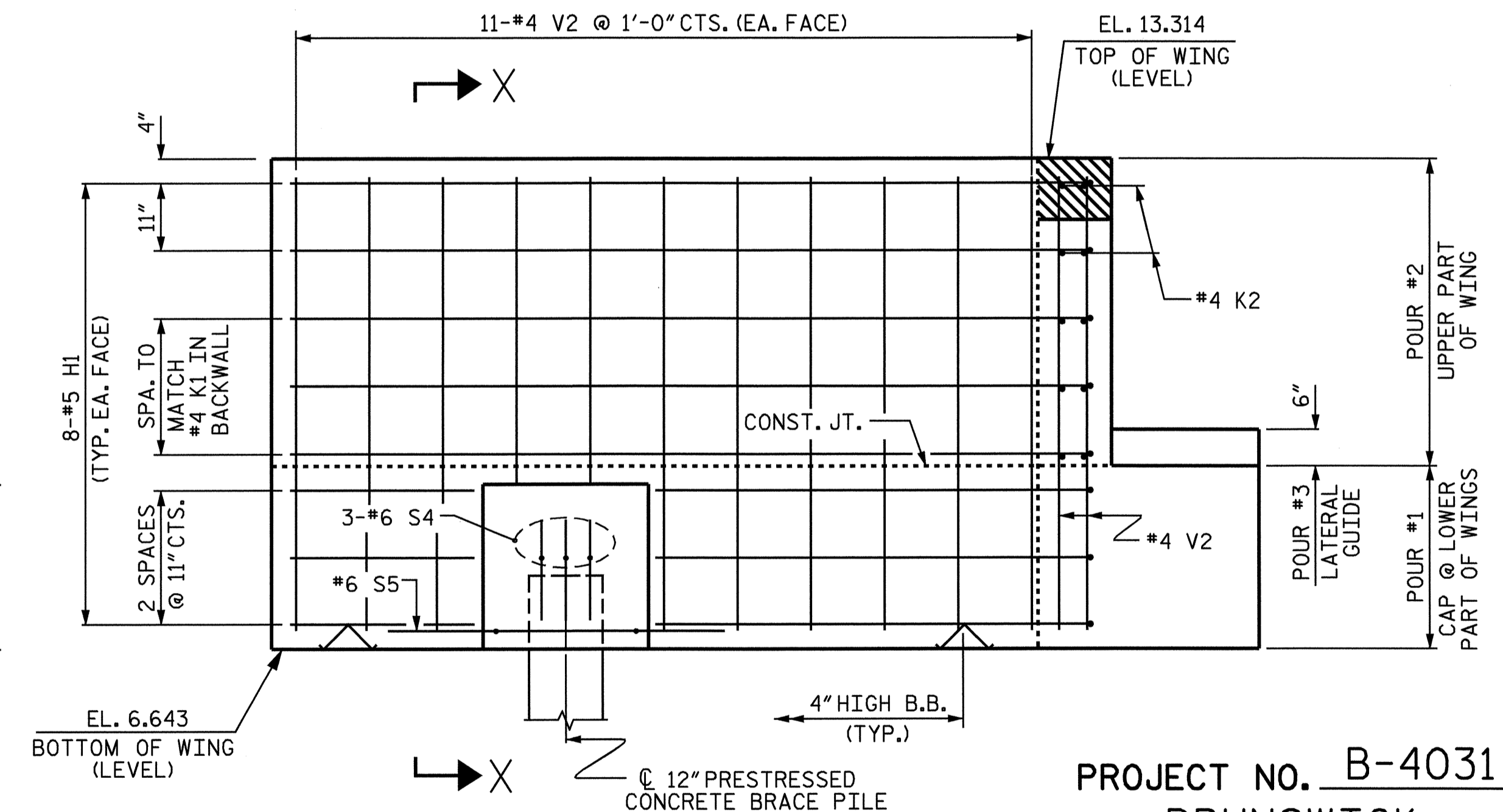
PLAN OF WING W2



ELEVATION OF WING W1



SECTION X-X



ELEVATION OF WING W2

PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

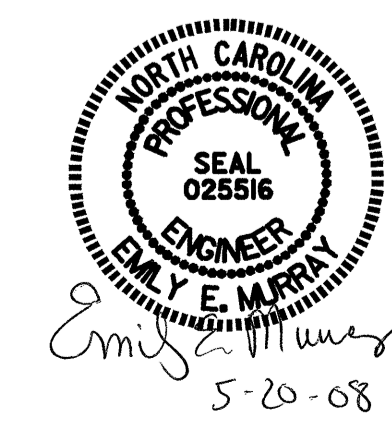
SHEET 2 OF 3

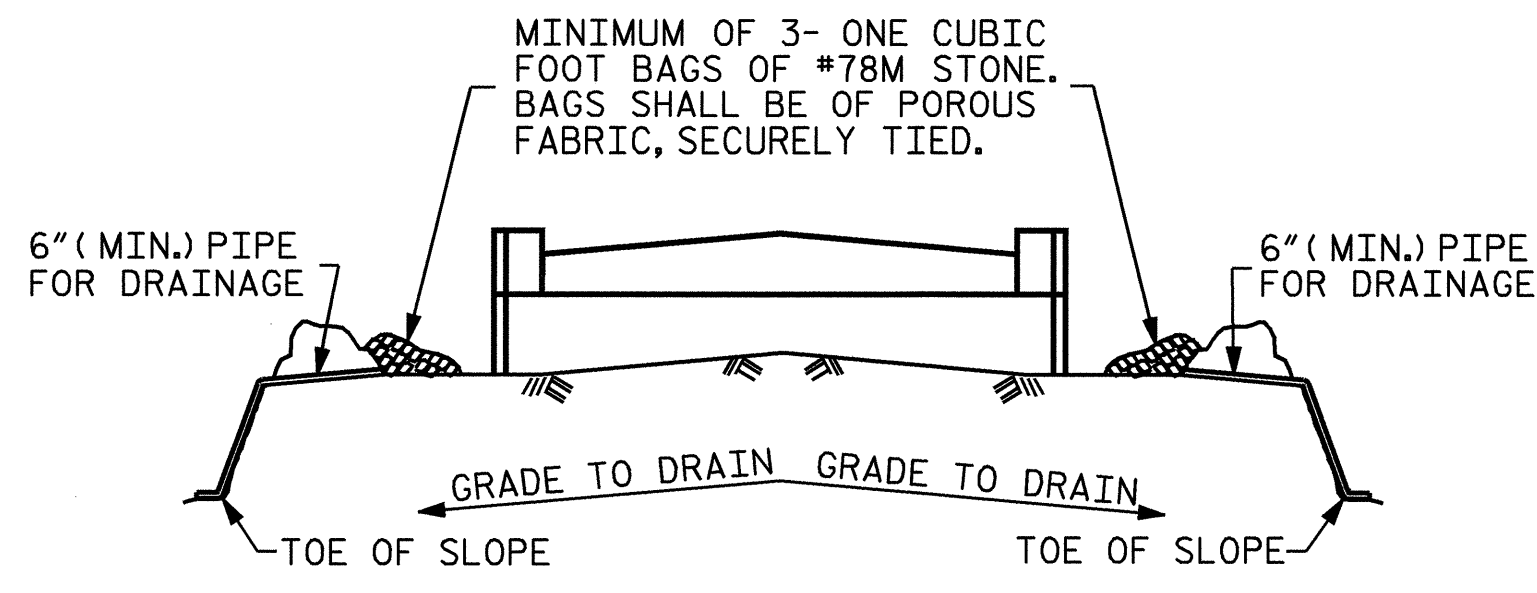
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #1

| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-20  |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>33 |
| 2         |     |       | 4   |     |       |                    |

DRAWN BY: M.GUDLAUGSSON DATE: 9/27/07  
 CHECKED BY: J.B. WILSON DATE: 1/11/08



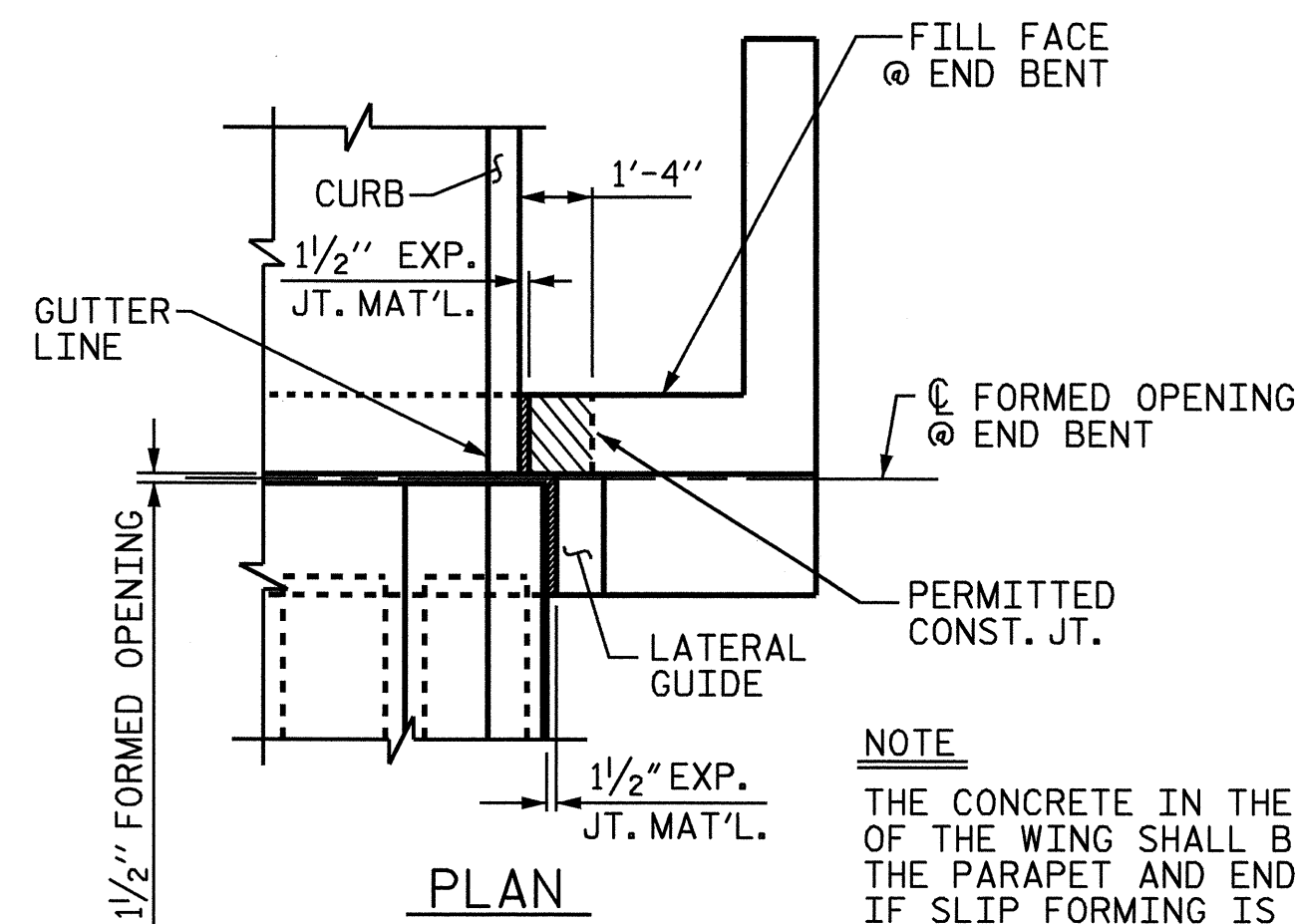


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

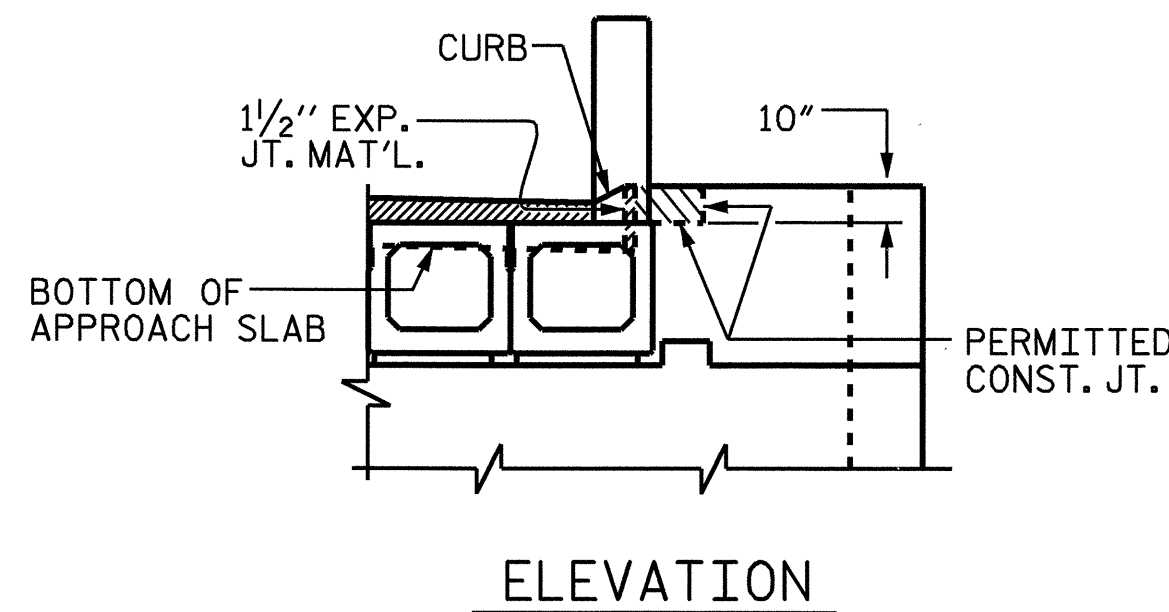
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



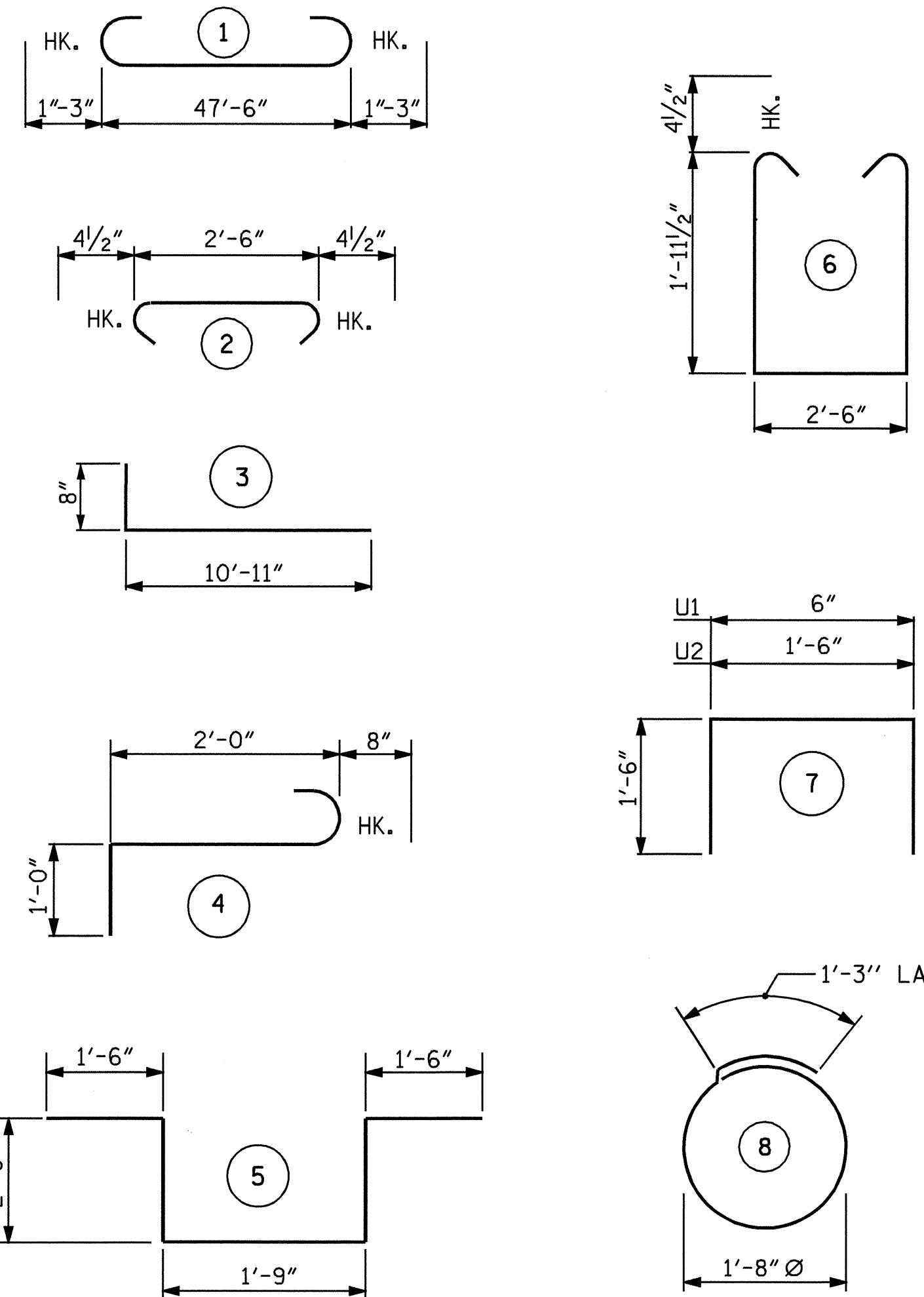
**NOTE**

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.



### BLOCKOUT IN WING WALL FOR BOX BEAM

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT #1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| *B1 | 8   | #9   | 1    | 50'-0" | 1360   |
| *B2 | 2   | #5   | STR  | 47'-6" | 99     |
| *B3 | 8   | #4   | STR  | 25'-2" | 134    |
| *B4 | 12  | #4   | STR  | 2'-6"  | 20     |
| *D1 | 28  | #8   | STR  | 2'-3"  | 168    |
| *H1 | 32  | #5   | 3    | 11'-7" | 387    |
| *K1 | 12  | #4   | STR  | 25'-2" | 202    |
| *K2 | 8   | #4   | STR  | 2'-11" | 16     |
| *S1 | 42  | #4   | 2    | 3'-3"  | 91     |
| *S2 | 42  | #4   | 6    | 7'-2"  | 201    |
| *S3 | 22  | #4   | 8    | 6'-6"  | 96     |
| *S4 | 6   | #6   | 4    | 3'-8"  | 33     |
| *S5 | 2   | #6   | 5    | 8'-9"  | 26     |
| *U1 | 41  | #4   | 7    | 3'-6"  | 96     |
| *U2 | 4   | #4   | 7    | 4'-6"  | 12     |
| *V1 | 82  | #5   | STR  | 4'-6"  | 385    |
| *V2 | 64  | #4   | STR  | 6'-2"  | 264    |

\* EPOXY COATED REINF. STEEL = 3590 LBS.  
CLASS "AA" CONCRETE BREAKDOWN

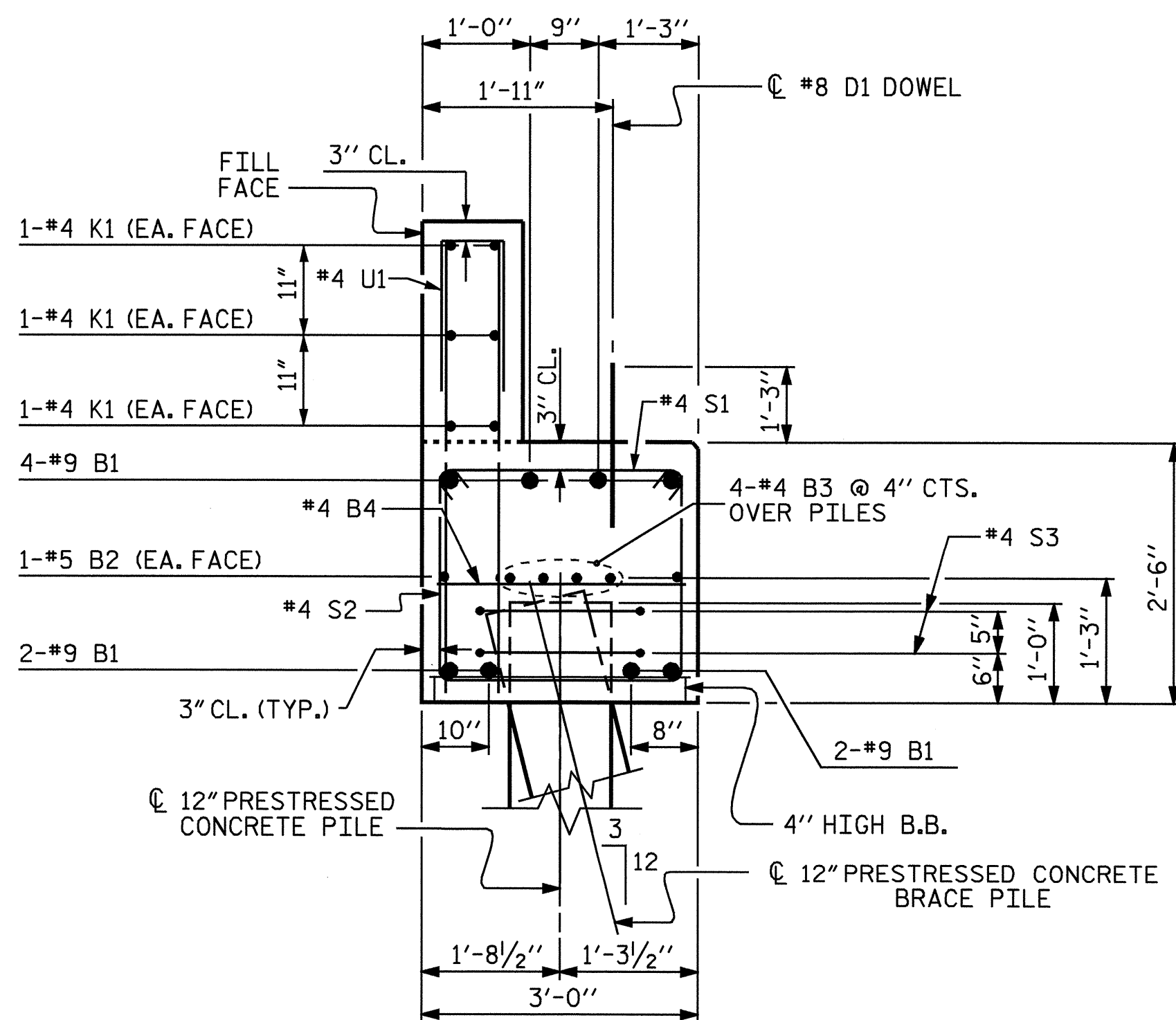
POUR #1 CAP AND LOWER WINGS  
CU. YDS. 15.9

POUR #2 BACKWALL AND UPPER WINGS  
CU. YDS. 8.4

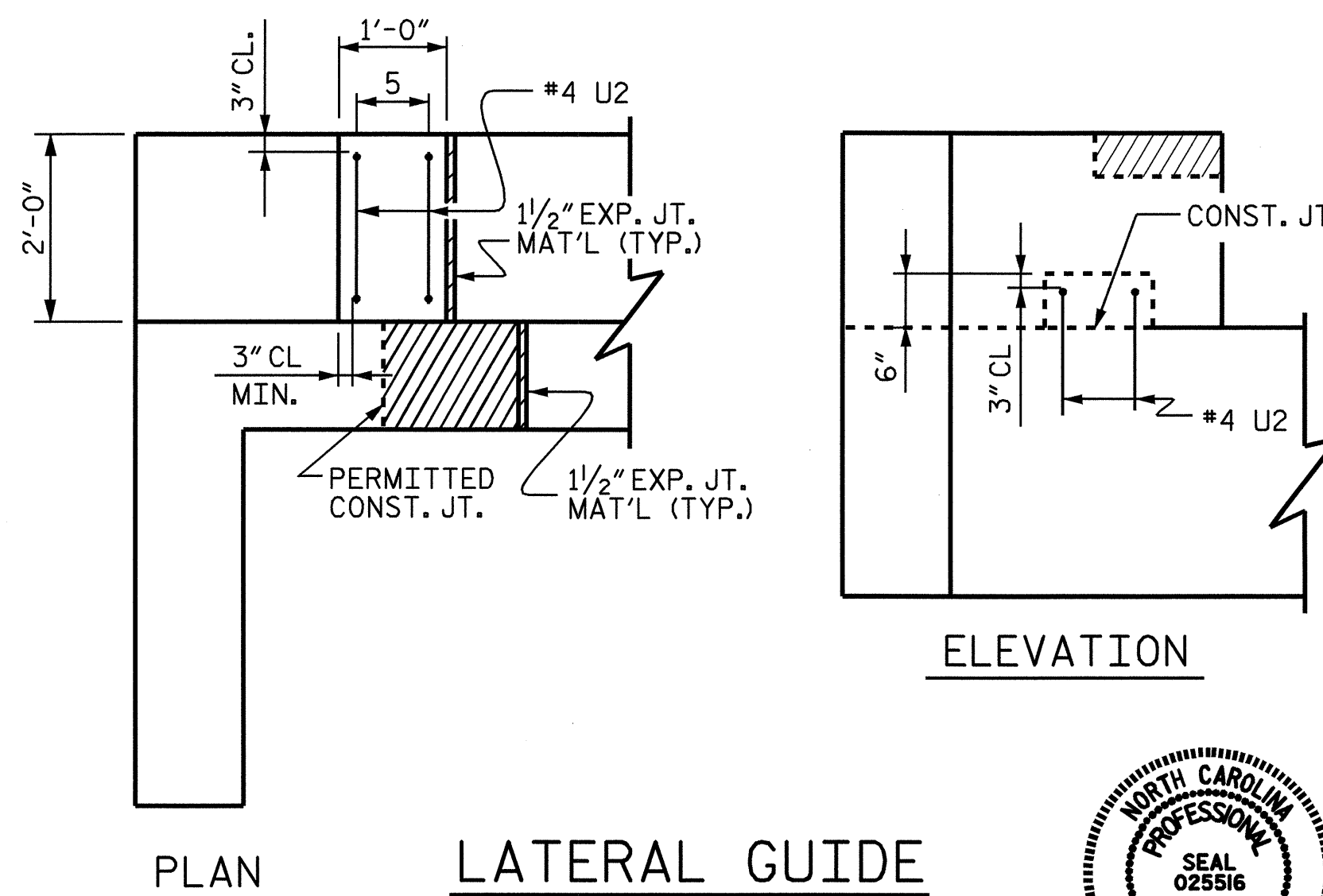
POUR #3 LATERAL GUIDE  
CU. YDS. 0.1

TOTAL CLASS "AA" CONCRETE  
CU. YDS. 24.4

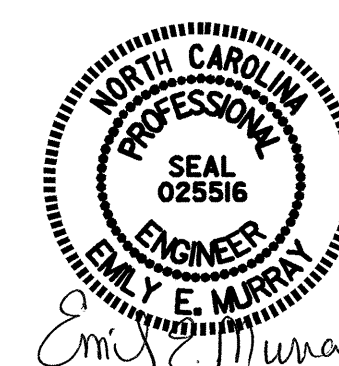
12" PRESTRESSED CONCRETE PILE  
NO. 13 LIN. FT. 260



### SECTION A-A



### ELEVATION



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
STATION: 25+70.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT #1

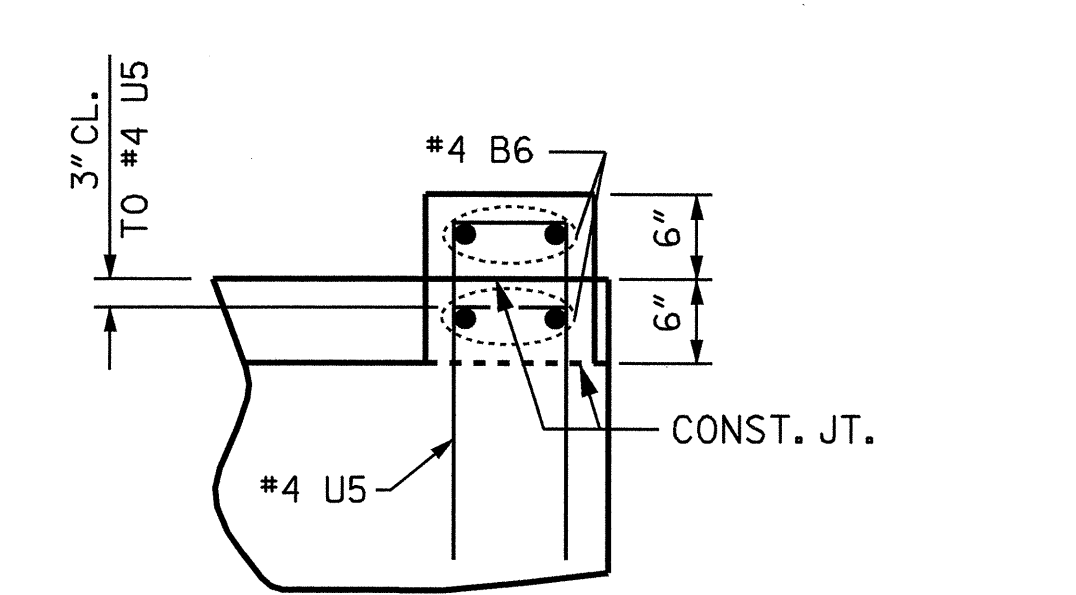
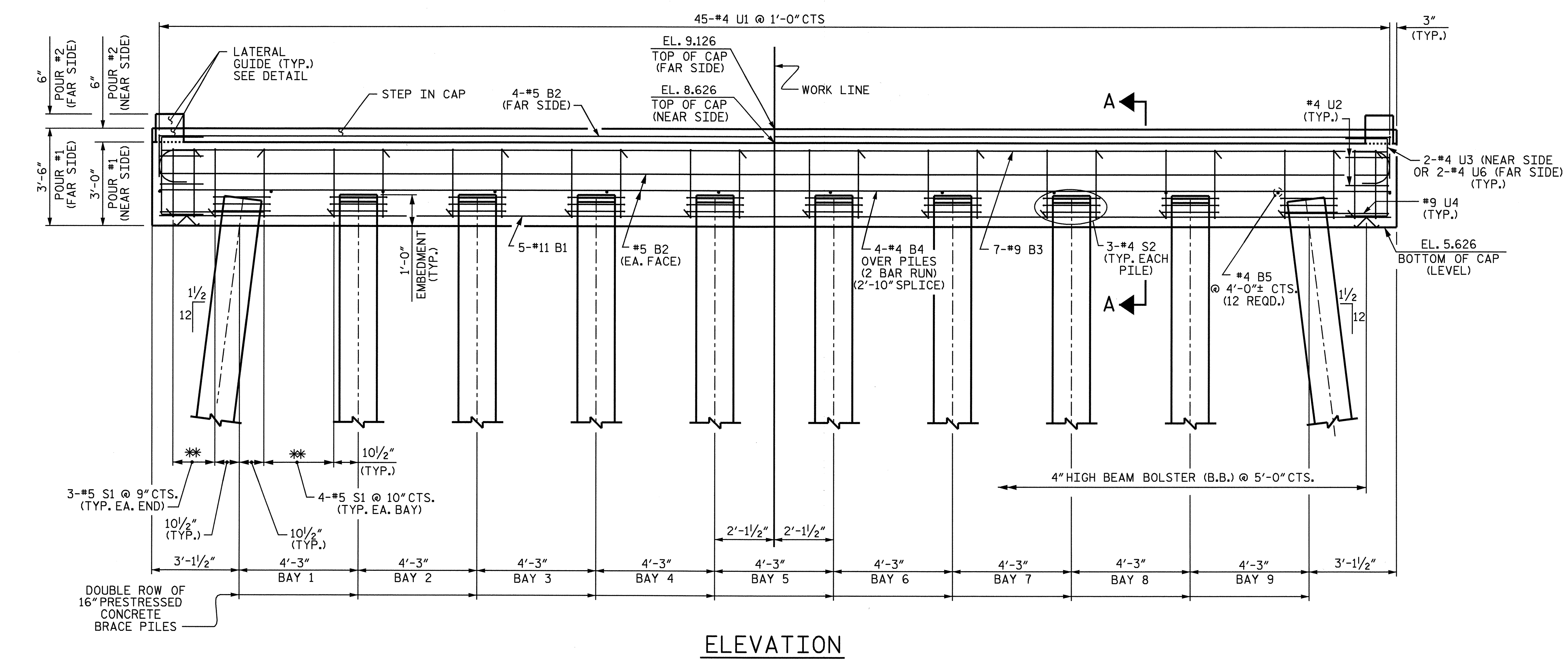
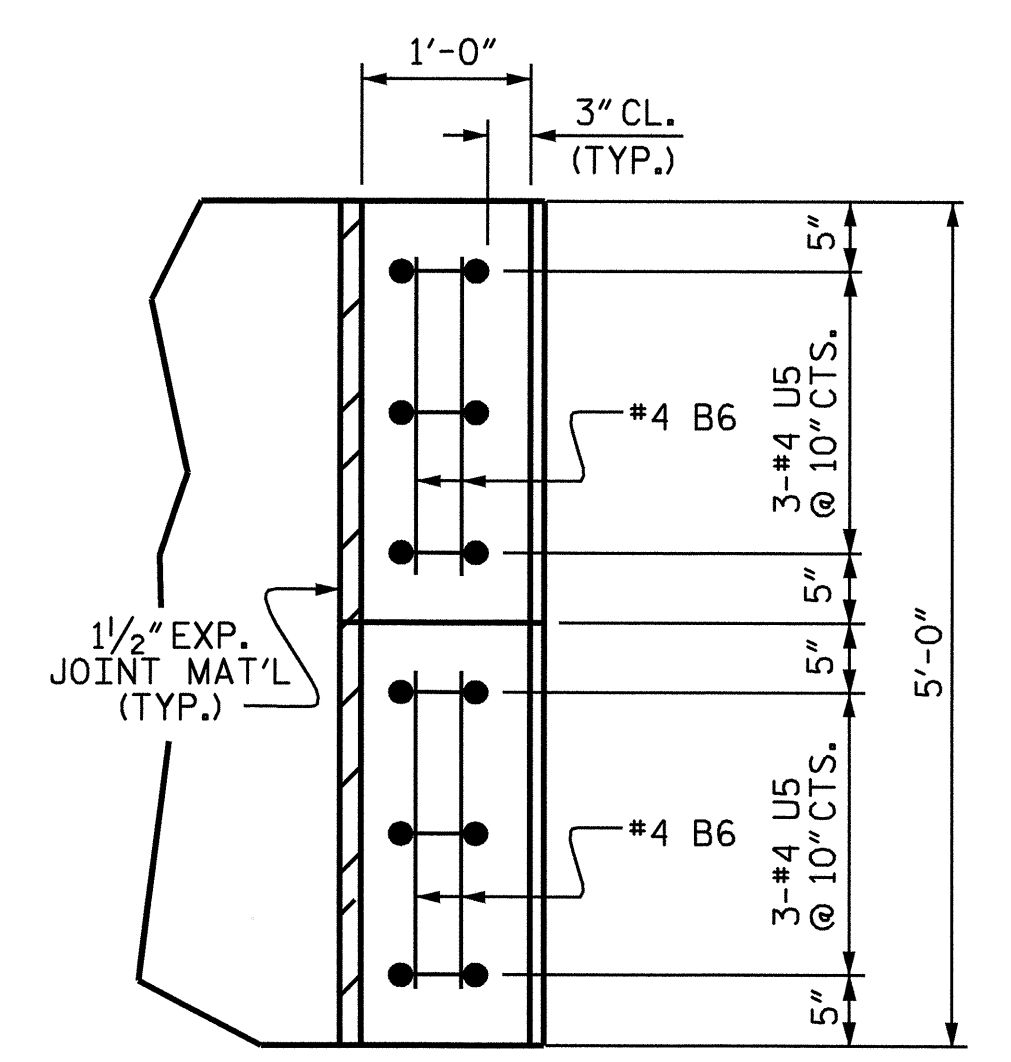
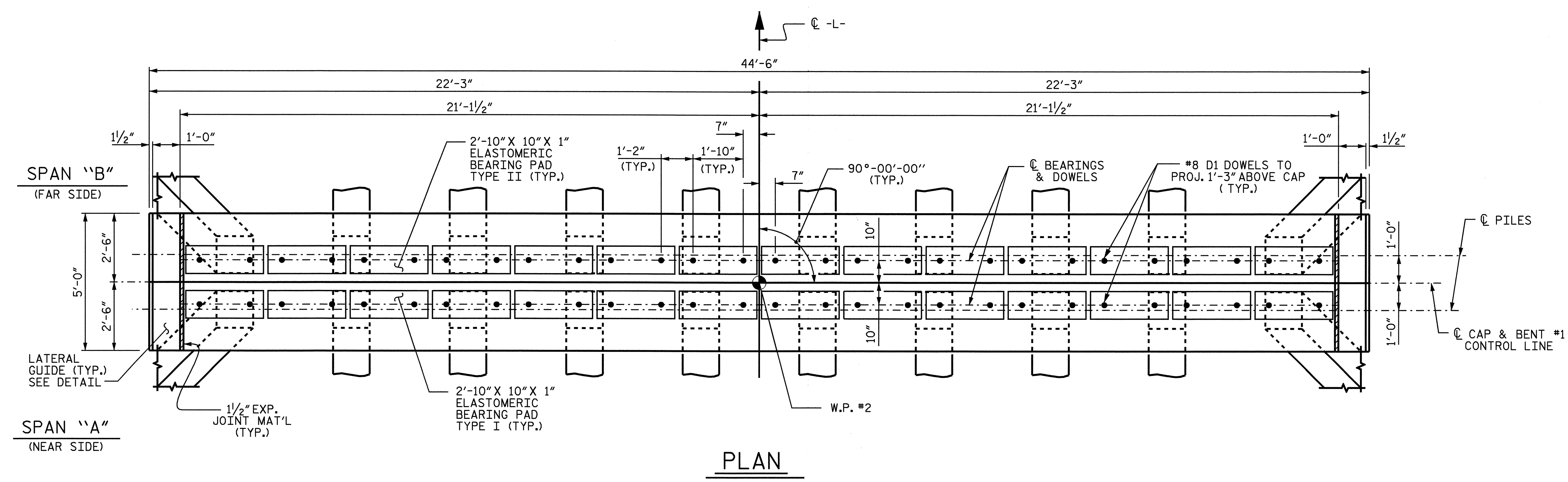
#### REVISIONS

| NO. | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.       |
|-----|-----|-------|-----|-----|-------|-----------------|
| 1   |     |       | 3   |     |       | S-21            |
| 2   |     |       | 4   |     |       | TOTAL SHEETS 33 |

DRAWN BY: M. GUDLAUGSSON DATE: 9/27/07  
CHECKED BY: J.B. WILSON DATE: 1/11/08

**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 ALL REINFORCING STEEL IS EPOXY COATED.  
 THE LATERAL GUIDE AT EACH END OF CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM SLAB UNITS ARE IN PLACE.  
 \*\* INVERT ALTERNATE STIRRUPS.



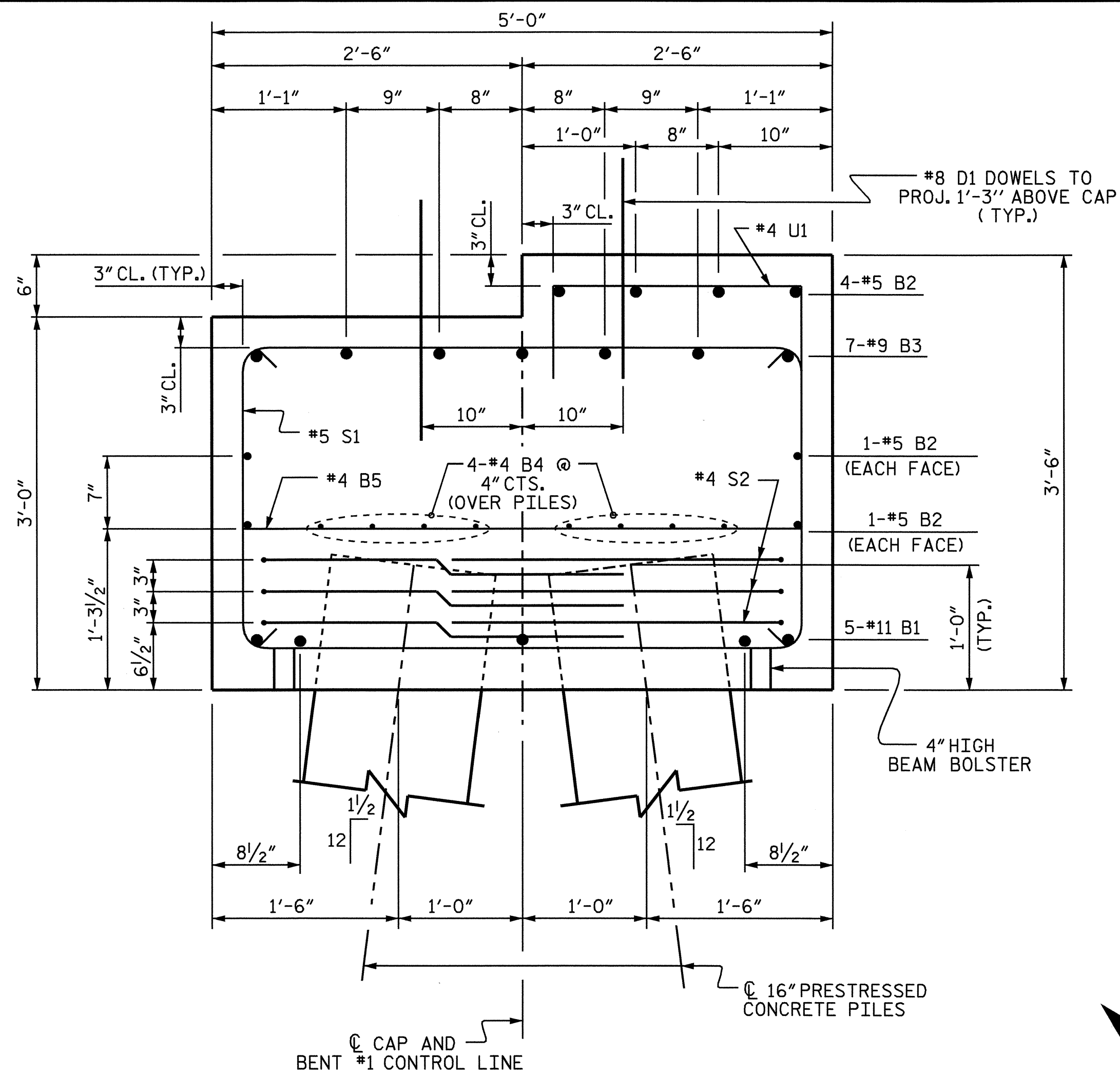
**LATERAL GUIDE DETAILS**  
 (TYP. EA. LATERAL GUIDE)

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-  
 SHEET 1 OF 2

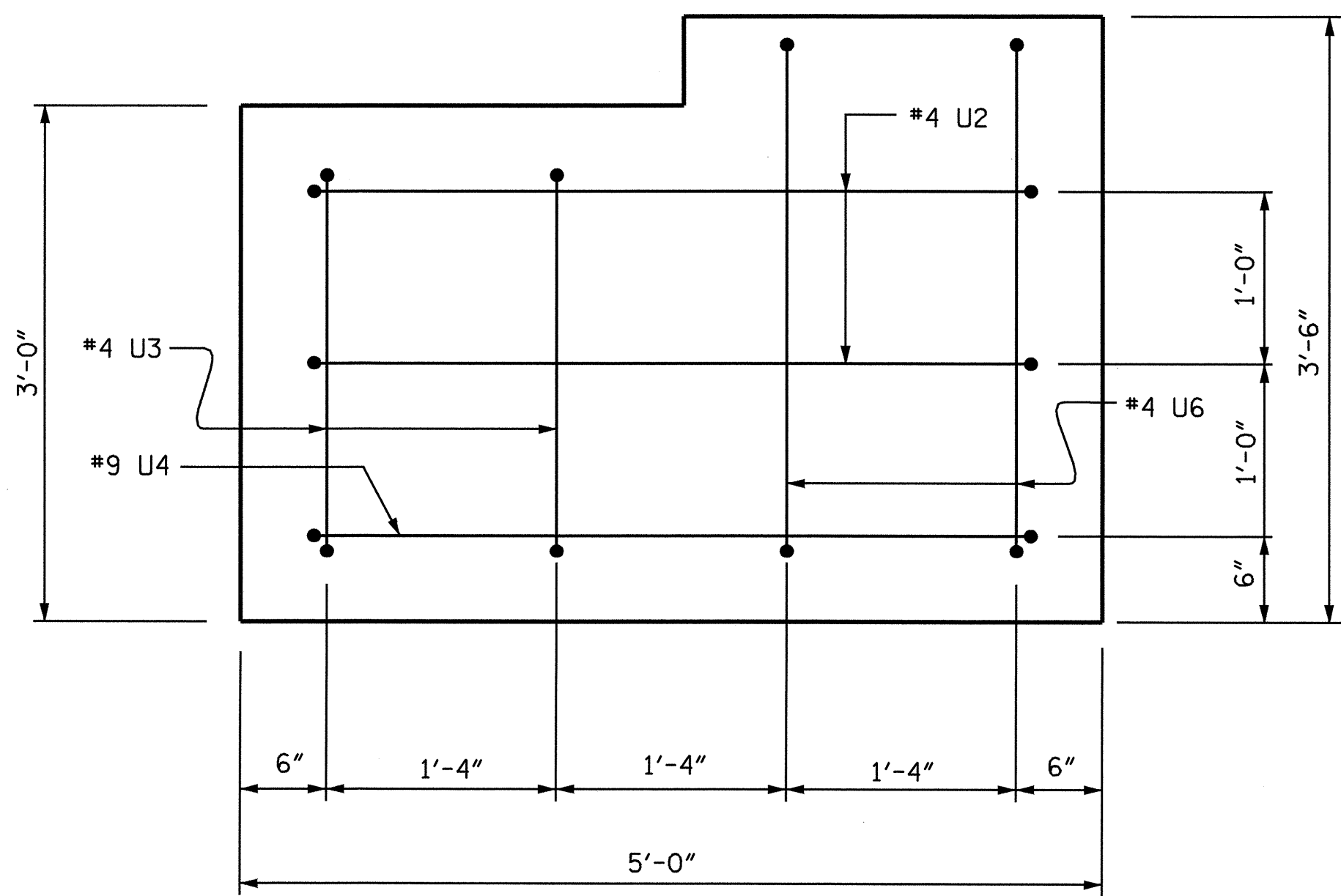
|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUBSTRUCTURE<br>BENT #1  |     |       |     |     |                    |
| REVISIONS  |     |       |     |     | SHEET NO.          |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
|  |     |       |     |     | TOTAL SHEETS<br>33 |



DRAWN BY: B.N.BARODAWALA DATE: 12-13-06  
 CHECKED BY: J.B.WILSON DATE: 1-8-07



SECTION A-A

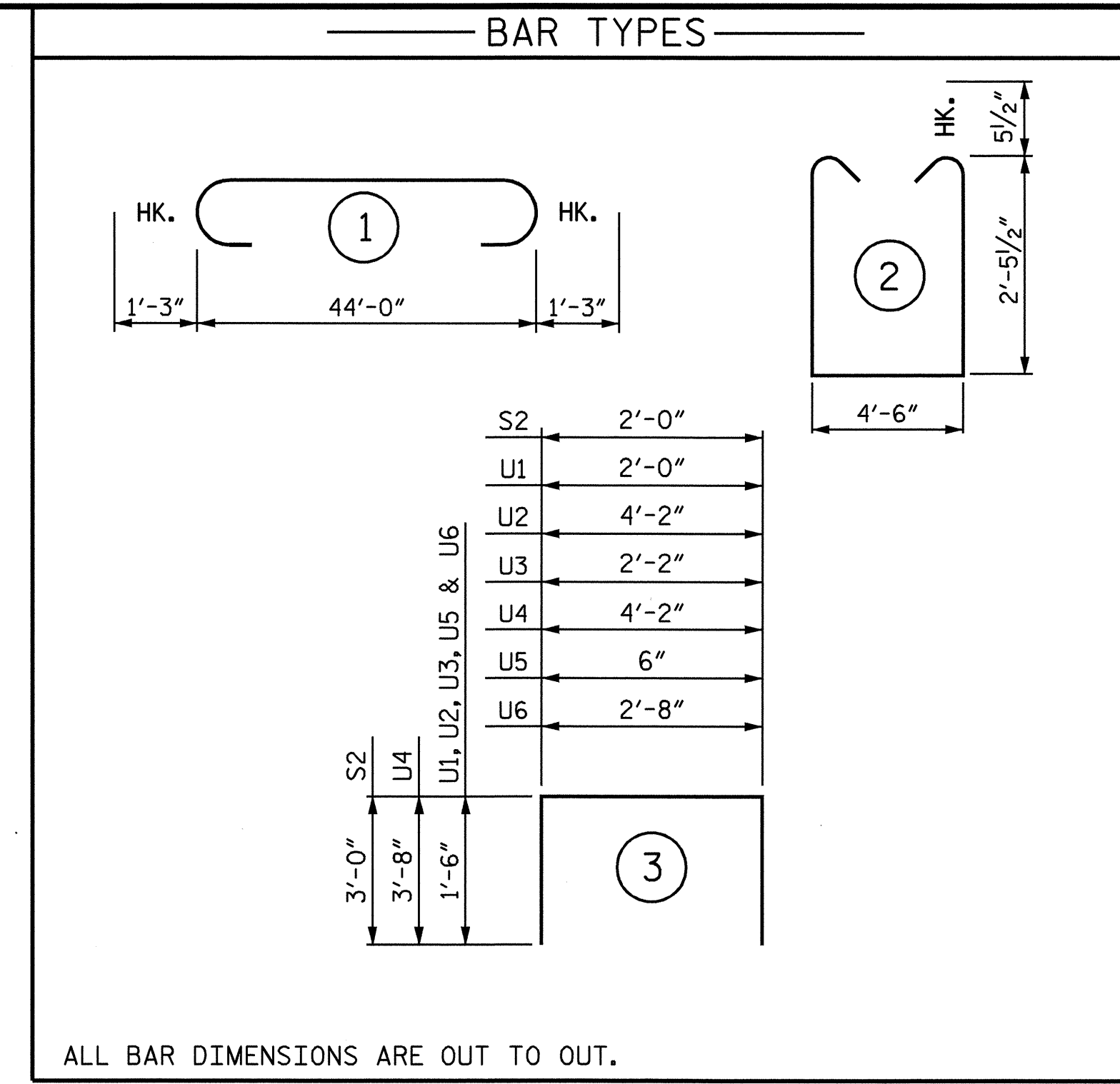


END OF CAP VIEW

(RIGHT END SHOWN, LEFT END SIMILAR)

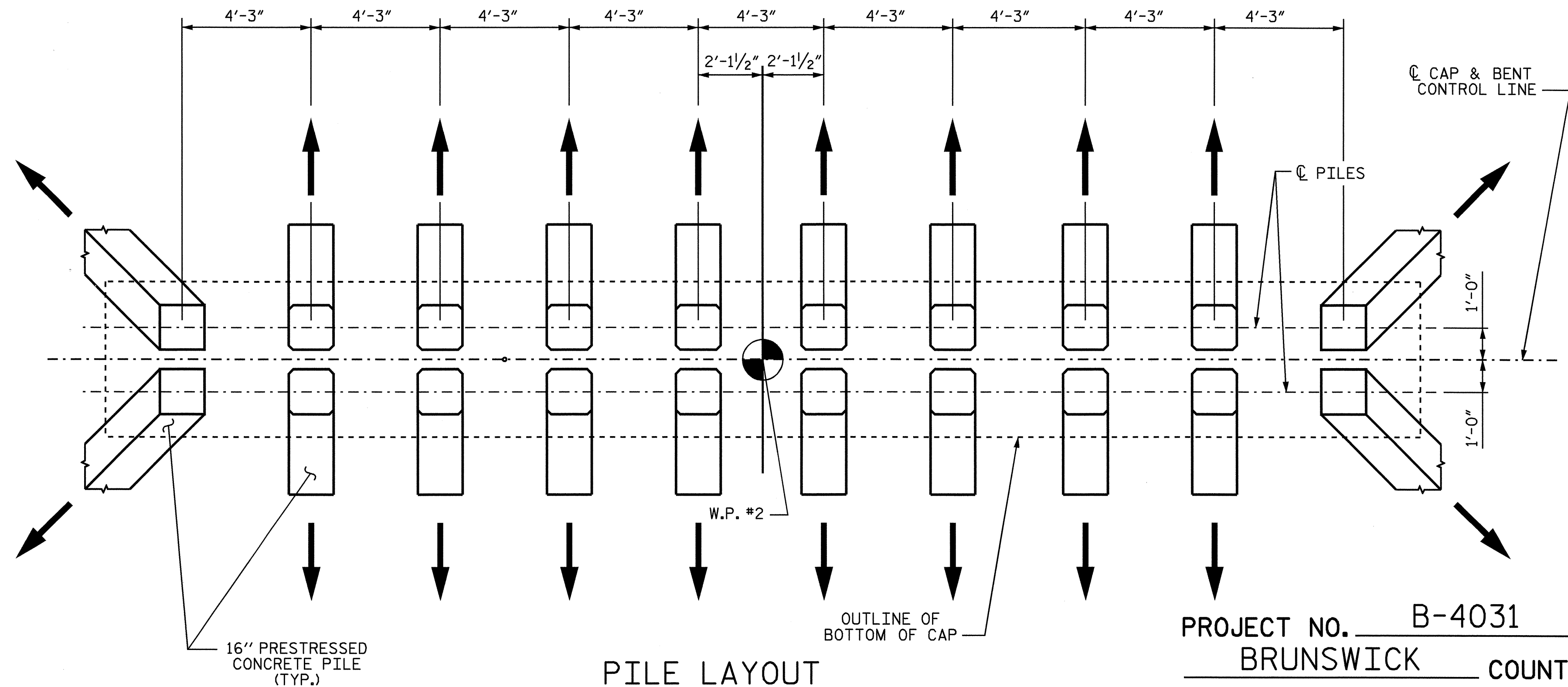
DRAWN BY: B.N.BARODAWALA DATE: 12-13-06  
 CHECKED BY: J.B.WILSON DATE: 1-8-07

19-MAY-2008 11:04  
 g:\t\projects-b\4031\structures\4031\final plans\4031.sd.b\*.dgn  
 taverette



ALL BAR DIMENSIONS ARE OUT TO OUT.

| BILL OF MATERIAL                |     |      |      |          |        |
|---------------------------------|-----|------|------|----------|--------|
| BENT #1                         |     |      |      |          |        |
| BAR                             | NO. | SIZE | TYPE | LENGTH   | WEIGHT |
| *B1                             | 5   | #11  | STR  | 44'-0"   | 1169   |
| *B2                             | 8   | #5   | STR  | 44'-0"   | 367    |
| *B3                             | 7   | #9   | 1    | 46'-6"   | 1107   |
| *B4                             | 16  | #4   | STR  | 23'-5"   | 250    |
| *B5                             | 12  | #4   | STR  | 4'-6"    | 36     |
| *B6                             | 8   | #4   | STR  | 2'-0"    | 11     |
| *D1                             | 56  | #8   | STR  | 2'-3"    | 336    |
| *S1                             | 42  | #5   | 2    | 10'-4"   | 453    |
| *S2                             | 60  | #4   | 3    | 8'-0"    | 321    |
| *U1                             | 45  | #4   | 3    | 5'-0"    | 150    |
| *U2                             | 4   | #4   | 3    | 7'-2"    | 19     |
| *U3                             | 4   | #4   | 3    | 5'-2"    | 14     |
| *U4                             | 2   | #9   | 3    | 11'-6"   | 78     |
| *U5                             | 12  | #4   | 3    | 3'-6"    | 28     |
| *U6                             | 4   | #4   | 3    | 5'-8"    | 15     |
| *EPOXY COATED REINFORCING STEEL |     |      |      | LBS.     | 4354   |
| CLASS "AA" CONCRETE BREAKDOWN   |     |      |      |          |        |
| POUR #1 (CAP)                   |     |      |      | C.Y.     | 26.8   |
| POUR #2 (LATERAL GUIDE)         |     |      |      | C.Y.     | 0.2    |
| TOTAL CLASS "AA" CONCRETE       |     |      |      | C.Y.     | 27.0   |
| 16" PRESTRESSED CONCRETE PILES  |     |      |      |          |        |
| NO. 20                          |     |      |      | LIN. FT. | 400    |
| STEEL PILE TIPS                 |     |      |      | EACH     | 20     |



PILE LAYOUT

NOTE: DIMENSIONS SHOWN ARE TO PILE CENTERLINES AT BOTTOM OF CAP

→ : DENOTES DIRECTION OF 1/2:12 PILE BATTER

PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT #1



| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-23         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



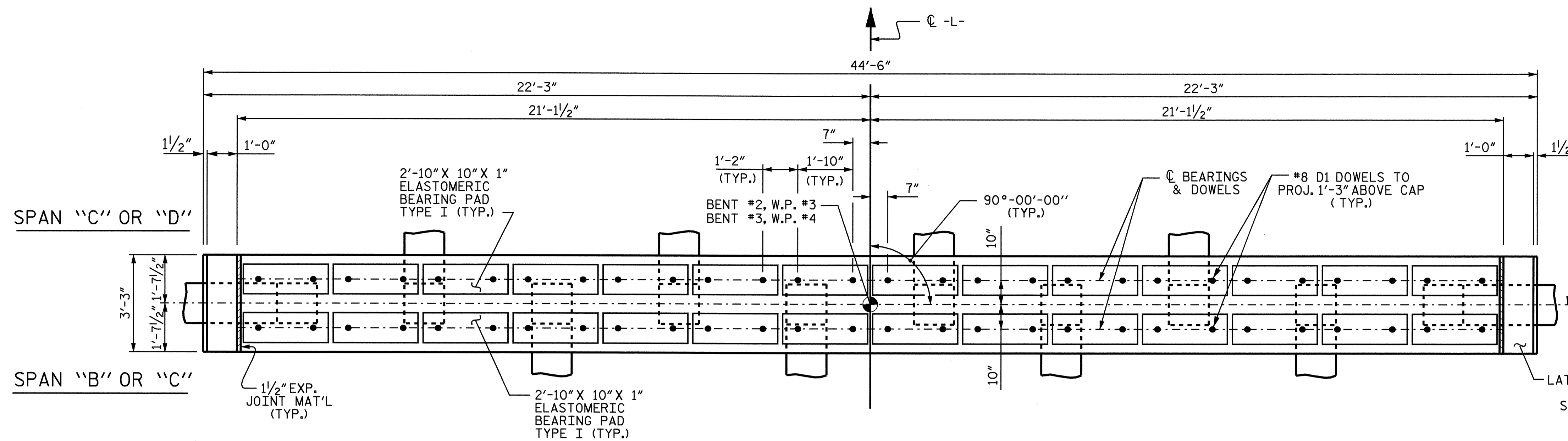
**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

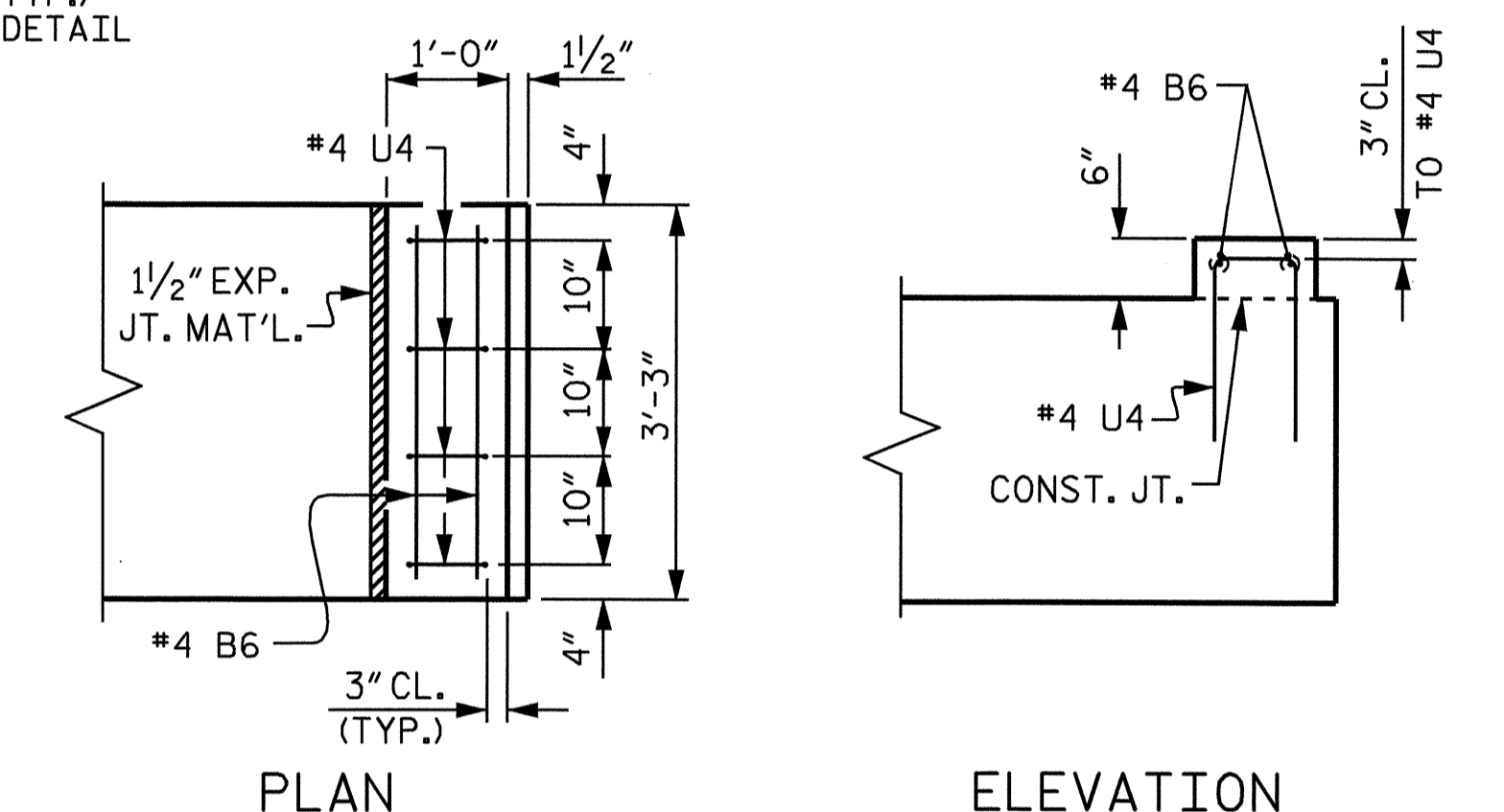
ALL REINFORCING STEEL IS EPOXY COATED.

THE LATERAL GUIDE AT EACH END OF CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM SLAB UNITS ARE IN PLACE.

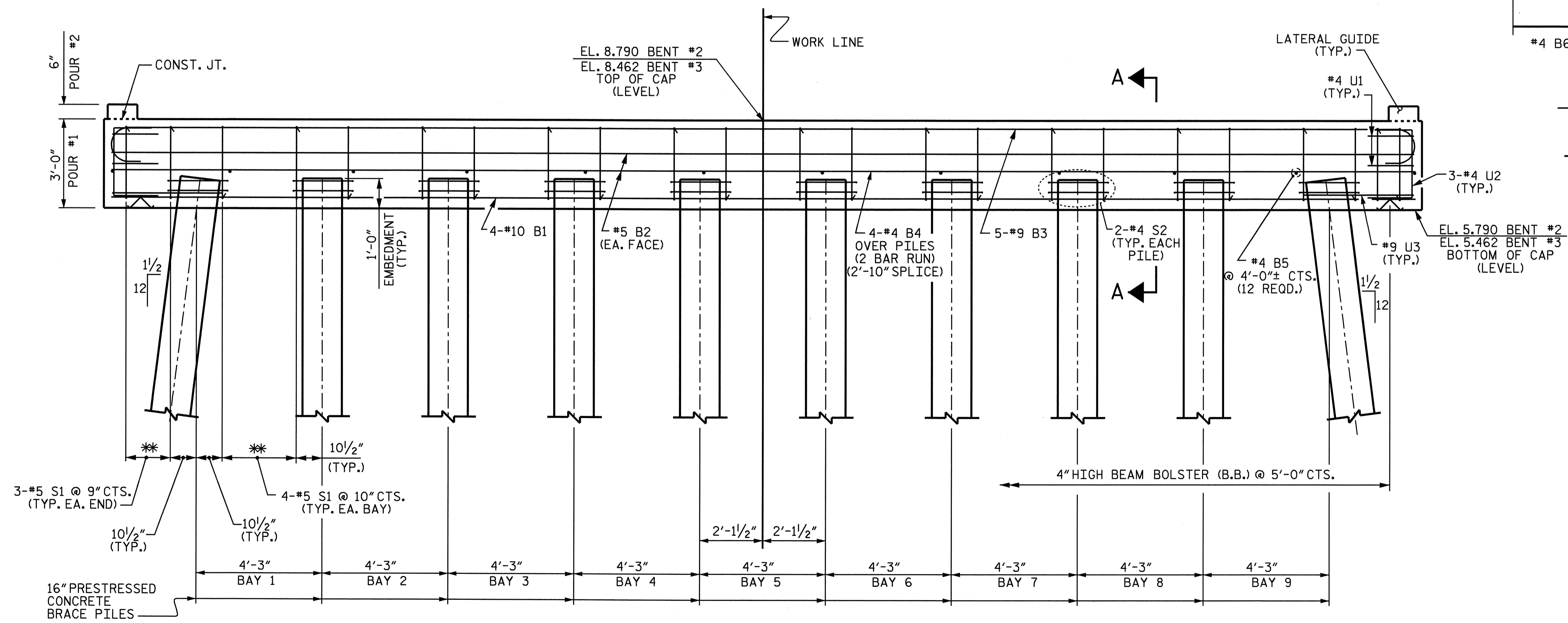
\*\* INVERT ALTERNATE STIRRUPS.



**PLAN**



**LATERAL GUIDE DETAILS**  
(TYP. EA. LATERAL GUIDE)

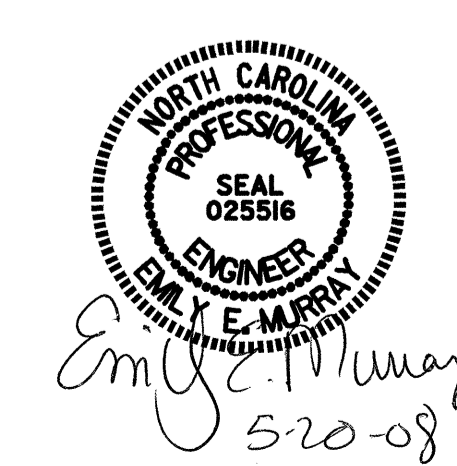


**ELEVATION**

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

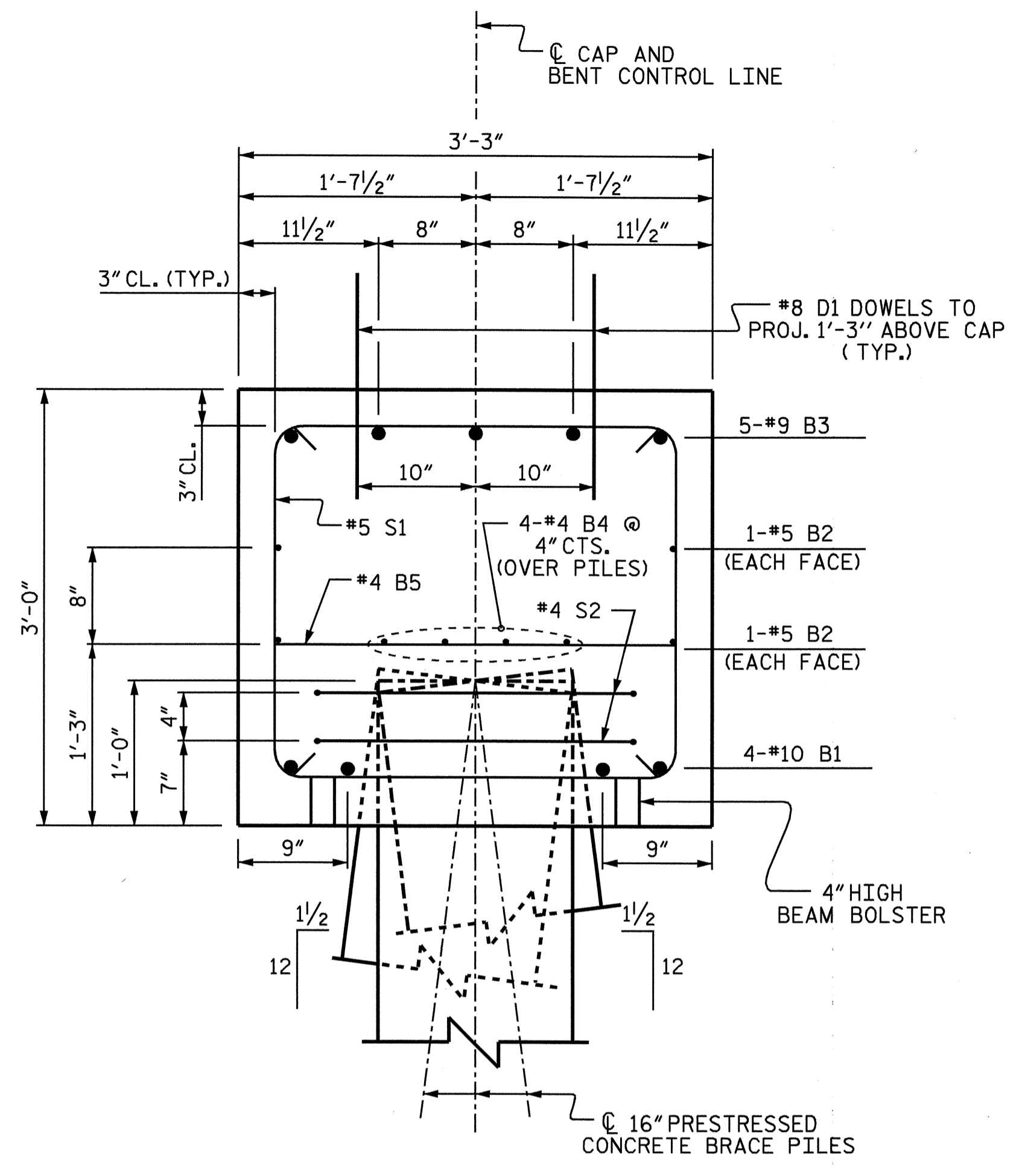
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT #2 & #3

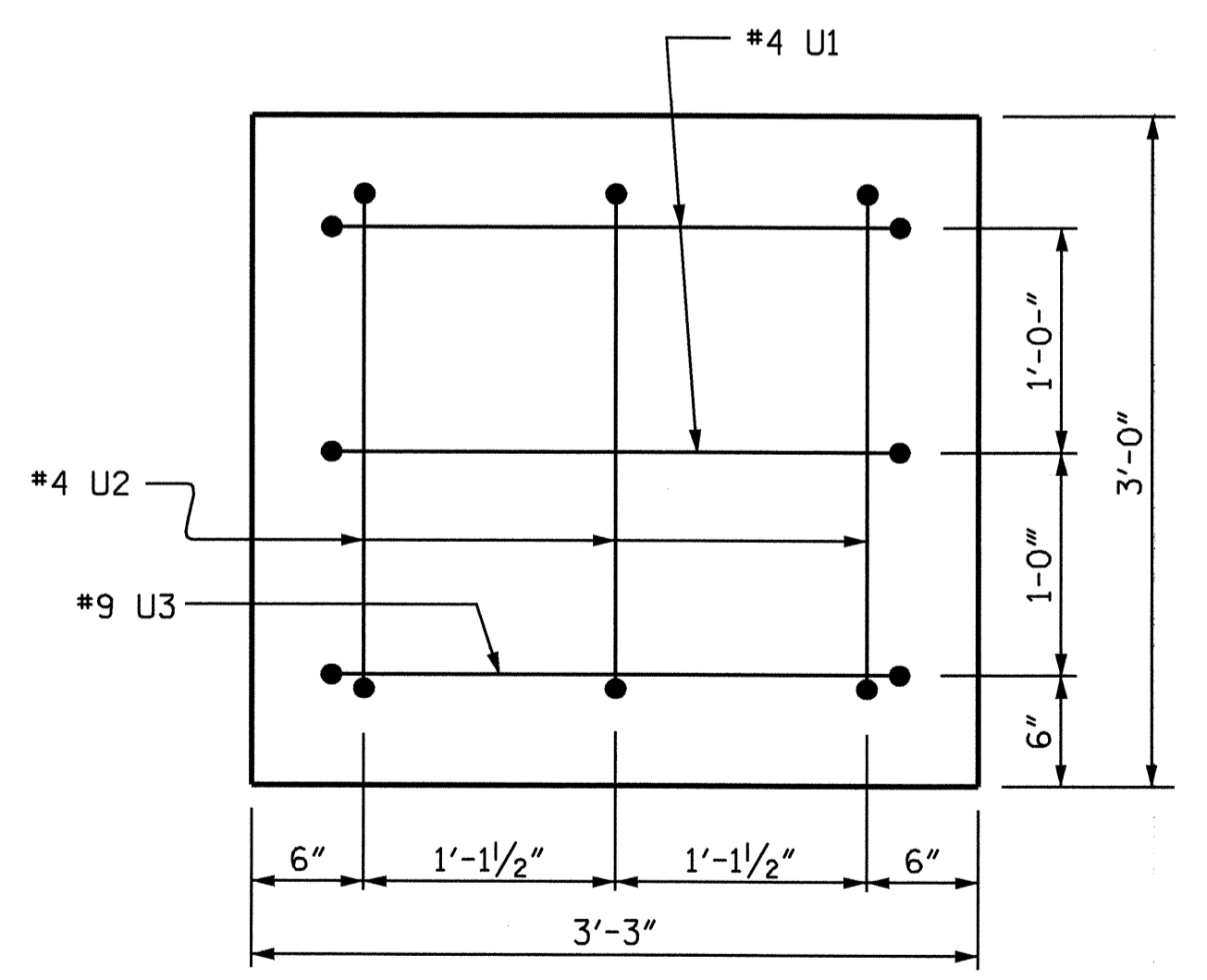


DRAWN BY: B.N. BARODAWALA DATE: 12-13-06  
 CHECKED BY: J.B. WILSON DATE: 1-8-07

| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-24  |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>33 |
| 2         |     |       | 4   |     |       |                    |



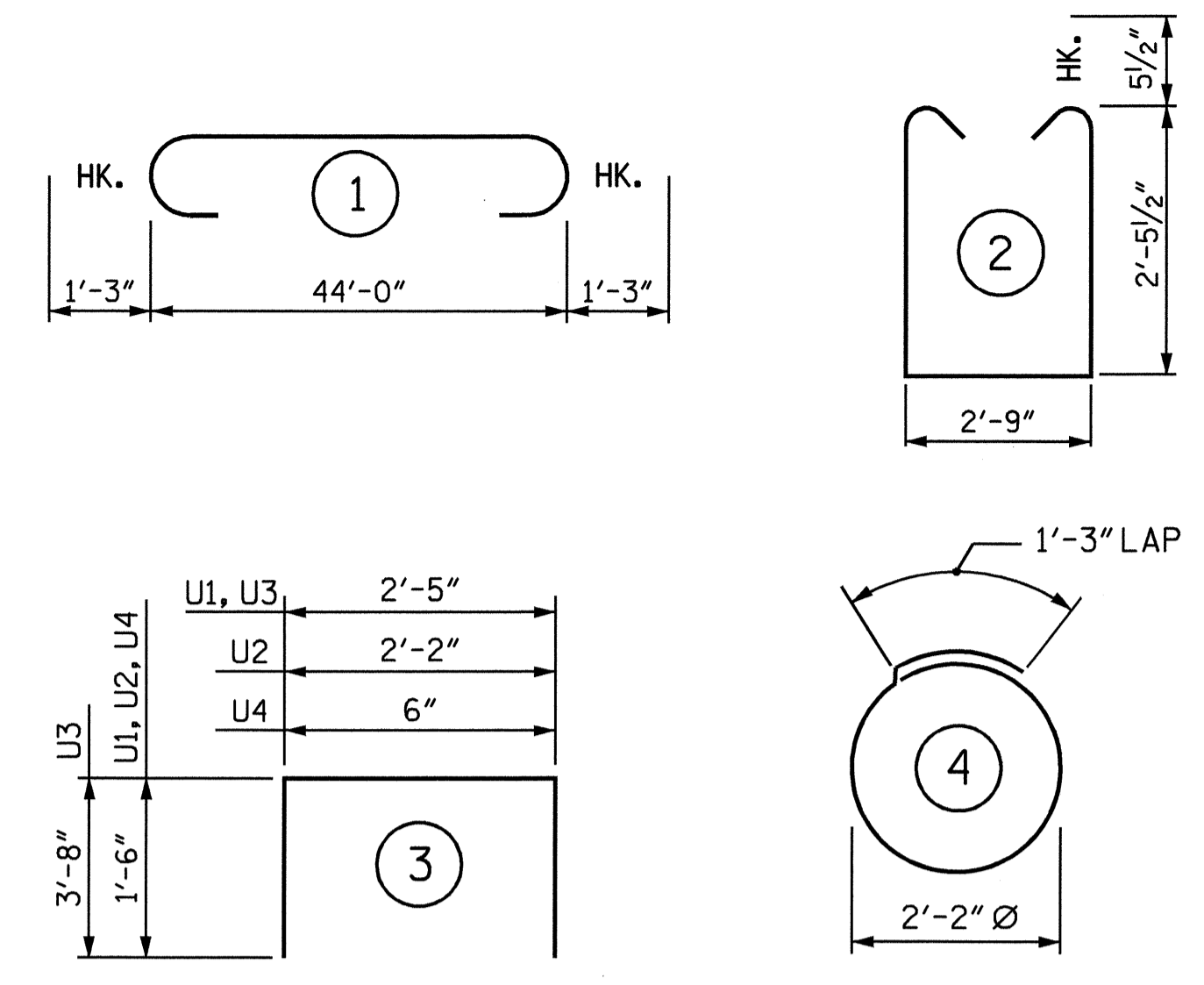
SECTION A-A



END OF CAP VIEW  
(TYP. EA. END)

| BILL OF MATERIAL                      |     |      |      |              |           |
|---------------------------------------|-----|------|------|--------------|-----------|
| FOR ONE BENT (2 REQUIRED)             |     |      |      |              |           |
| BAR                                   | NO. | SIZE | TYPE | LENGTH       | WEIGHT    |
| *B1                                   | 4   | #10  | STR  | 44'-0"       | 757       |
| *B2                                   | 4   | #5   | STR  | 44'-0"       | 184       |
| *B3                                   | 5   | #9   | 1    | 46'-6"       | 791       |
| *B4                                   | 8   | #4   | STR  | 23'-5"       | 125       |
| *B5                                   | 12  | #4   | STR  | 2'-9"        | 22        |
| *B6                                   | 4   | #4   | STR  | 2'-9"        | 7         |
| *D1                                   | 56  | #8   | STR  | 2'-3"        | 336       |
| *S1                                   | 42  | #5   | 2    | 8'-7"        | 376       |
| *S2                                   | 20  | #4   | 4    | 8'-1"        | 108       |
| *U1                                   | 4   | #4   | 3    | 5'-5"        | 14        |
| *U2                                   | 6   | #4   | 3    | 5'-2"        | 21        |
| *U3                                   | 2   | #9   | 3    | 9'-9"        | 66        |
| *U4                                   | 8   | #4   | 3    | 3'-6"        | 19        |
| * EPOXY COATED REINFORCING STEEL LBS. |     |      |      |              | 2826      |
| CLASS "AA" CONCRETE BREAKDOWN         |     |      |      |              |           |
| POUR #1 (CAP)                         |     |      |      |              | C.Y. 16.1 |
| POUR #2 (LATERAL GUIDE)               |     |      |      |              | C.Y. 0.1  |
| TOTAL CLASS "AA" CONCRETE             |     |      |      |              | C.Y. 16.2 |
| 16" PRESTRESSED CONCRETE PILES        |     |      |      |              |           |
| NO. 10                                |     |      |      | LIN. FT. 200 |           |
| STEEL PILE TIPS                       |     |      |      |              | EACH 10   |

ALL BAR DIMENSIONS ARE OUT TO OUT.



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 2

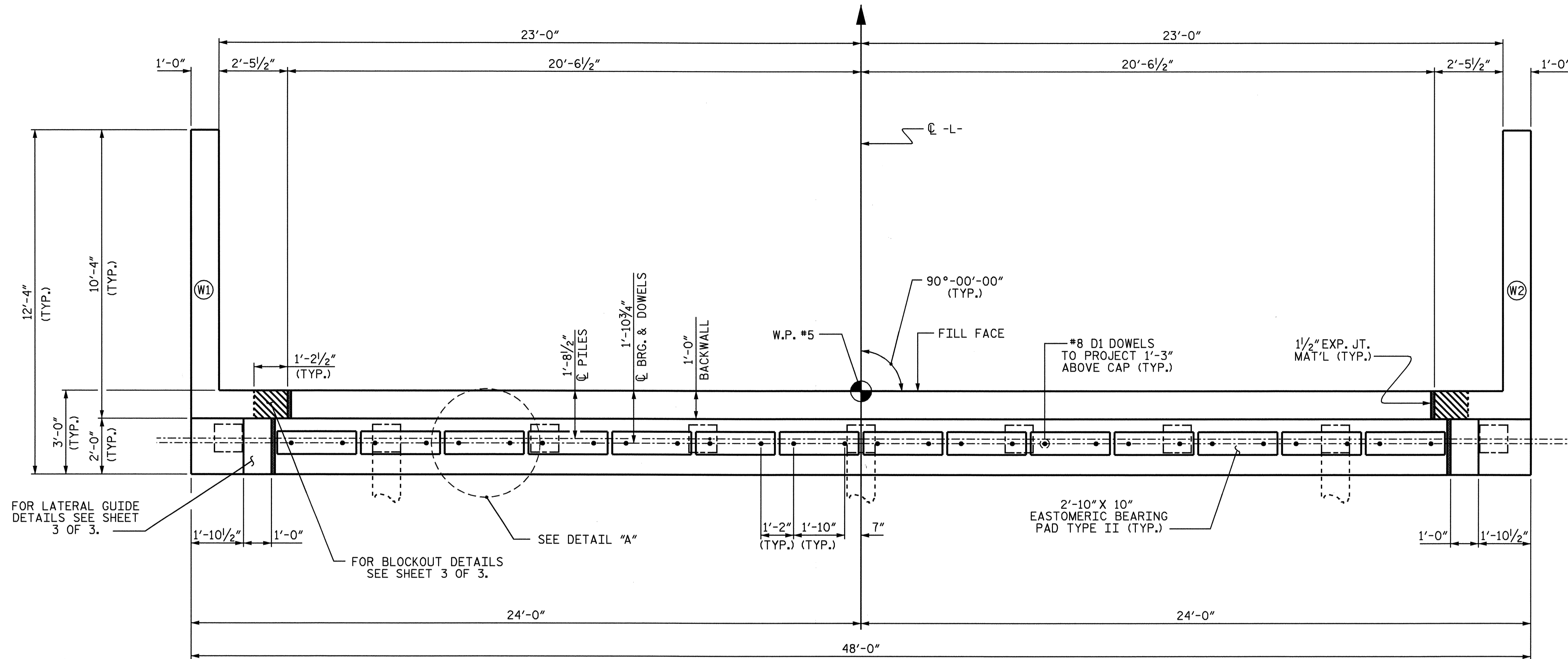
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT #2 & #3



DRAWN BY: B.N. BARODAWALA DATE: 12-13-06  
 CHECKED BY: J. B. WILSON DATE: 1-8-07

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-25         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



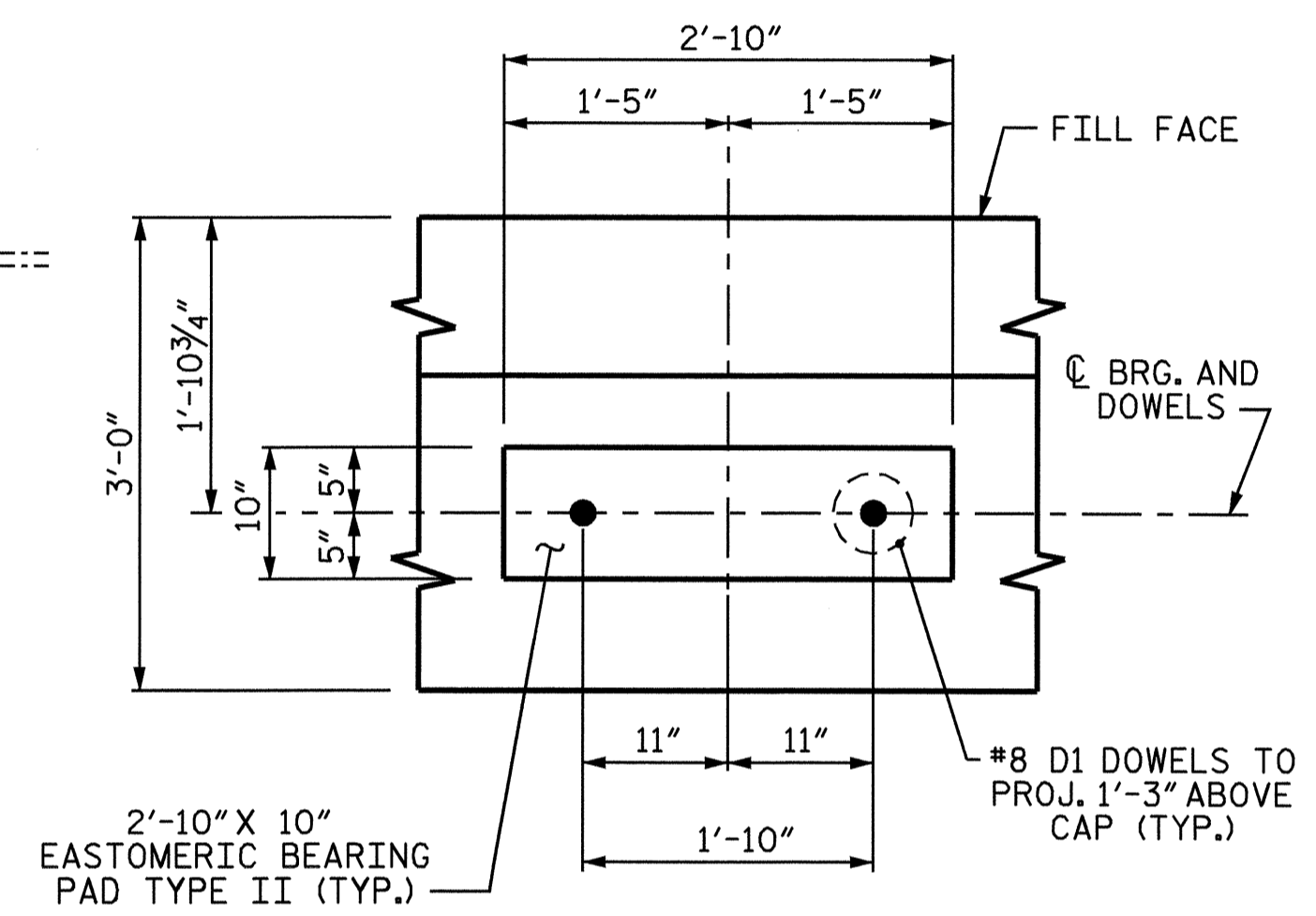
PLAN

**NOTES**

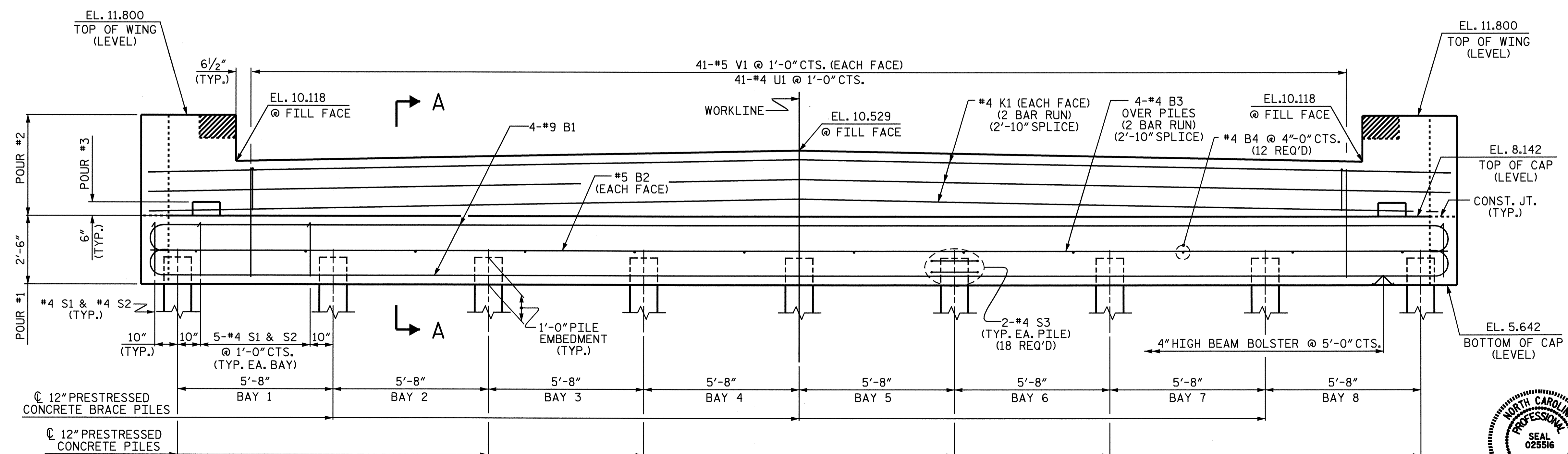
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.

THE LATERAL GUIDE @ EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.



DETAIL "A"



ELEVATION

PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 1 OF 3

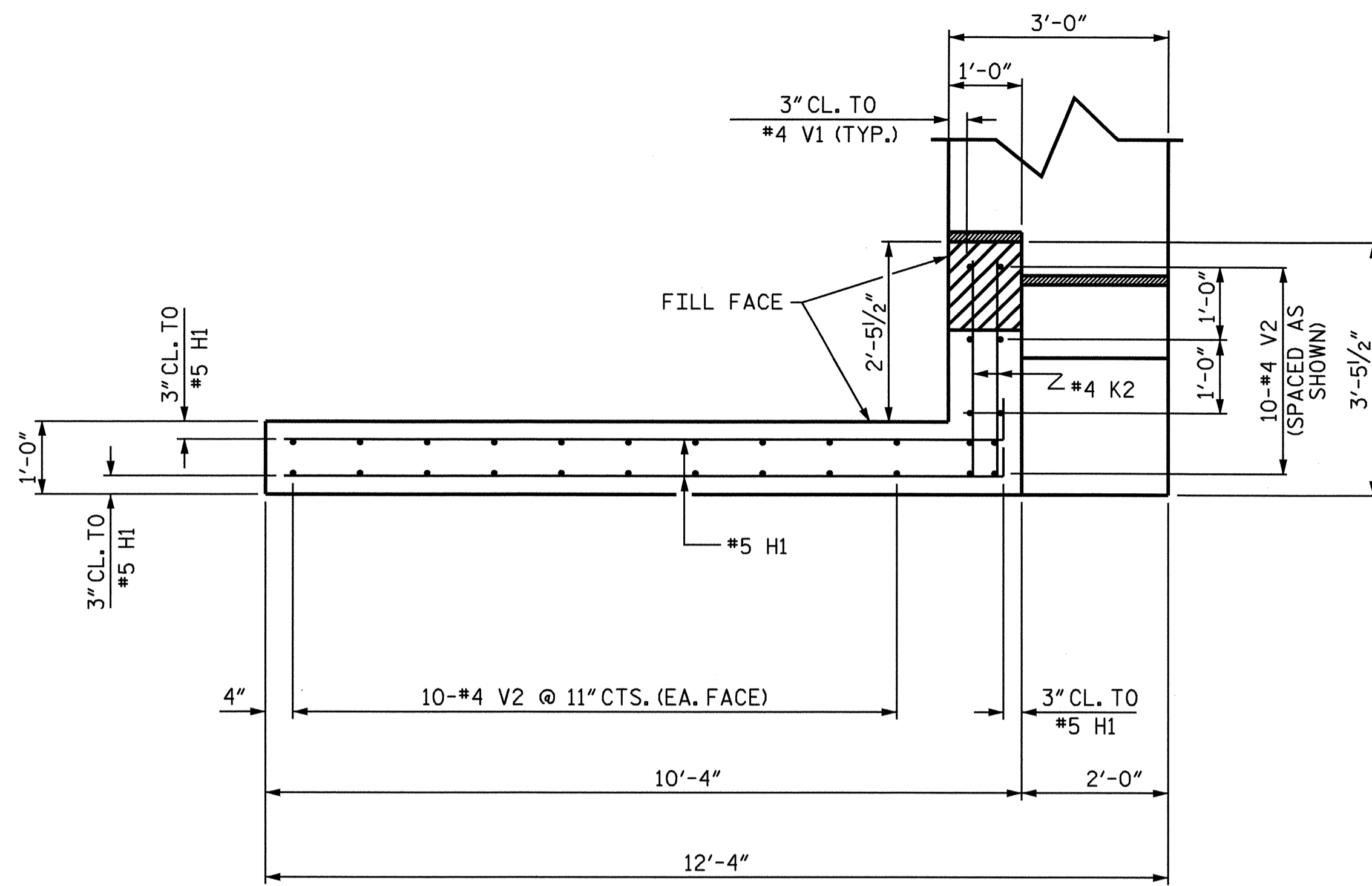
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #2

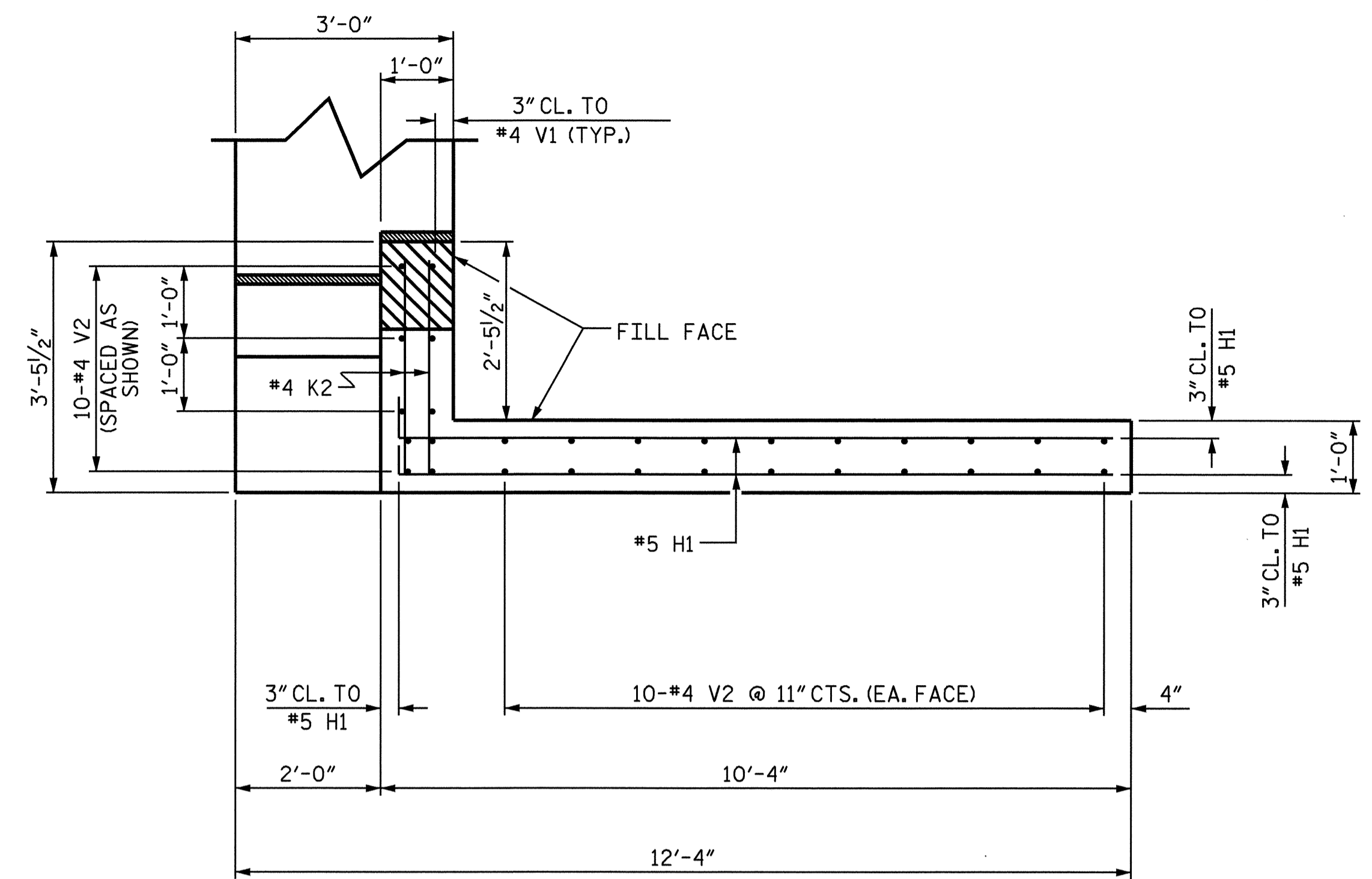
| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-26         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



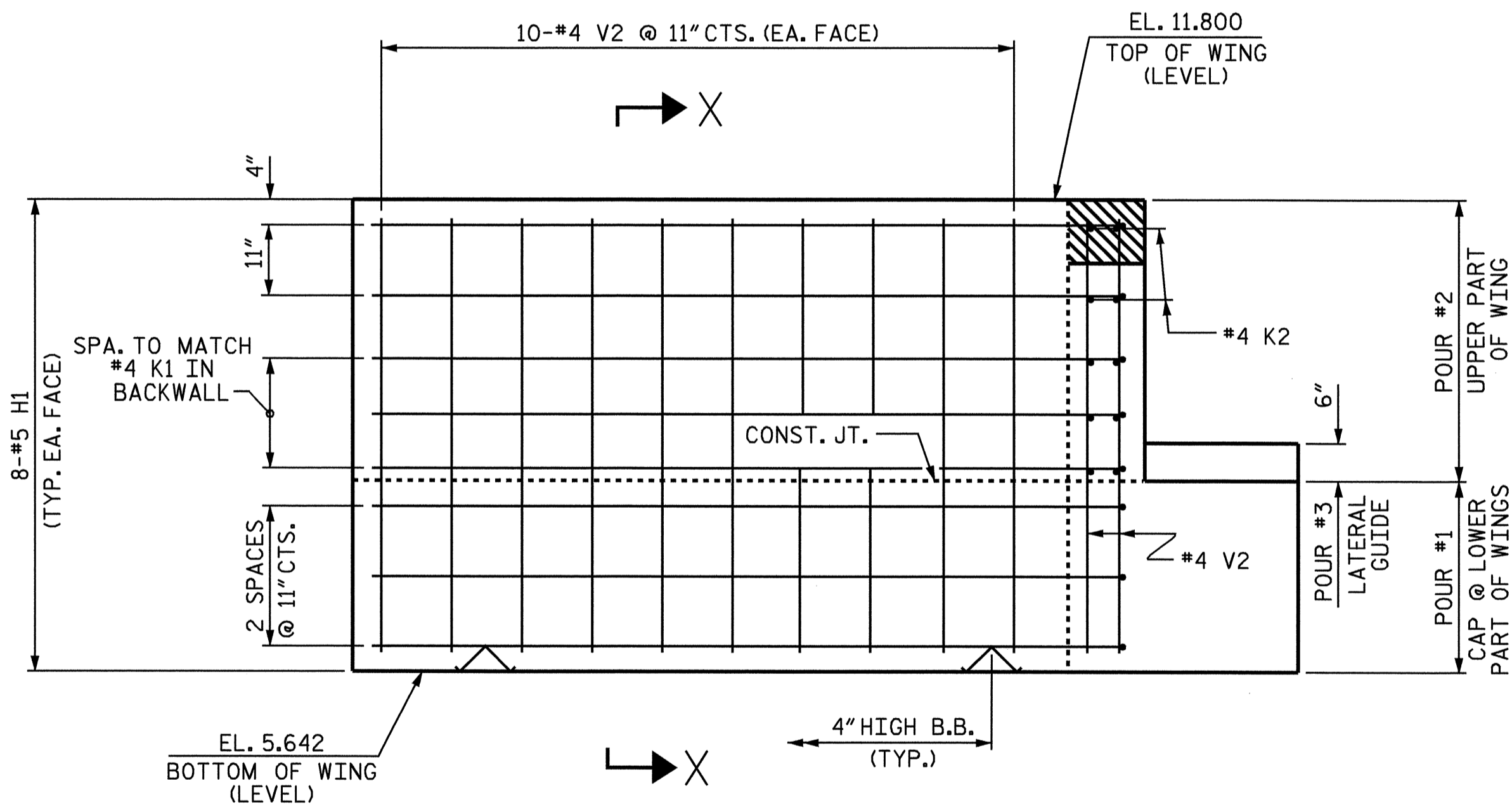
DRAWN BY: M. GUDLAUGSSON DATE: 9/28/07  
 CHECKED BY: J.B. WILSON DATE: 1/11/08



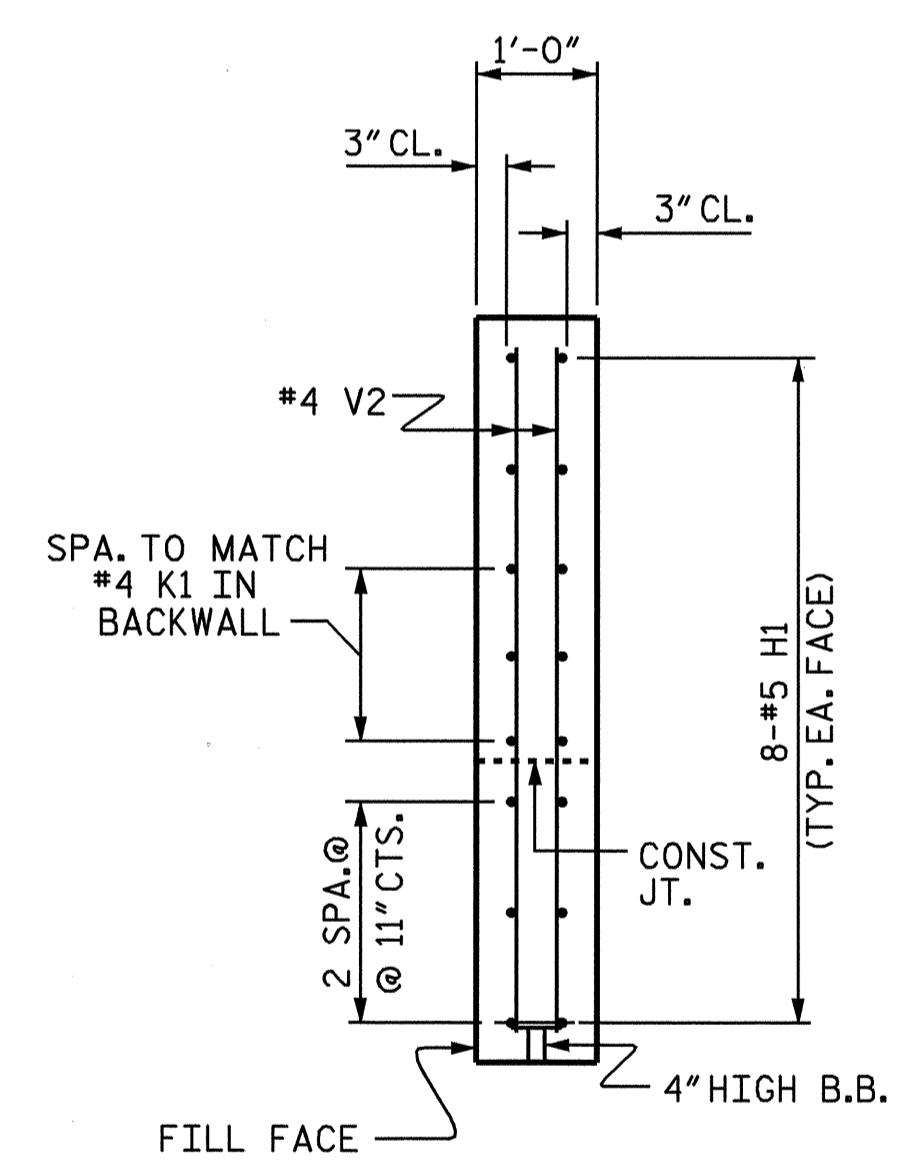
PLAN OF WING W1



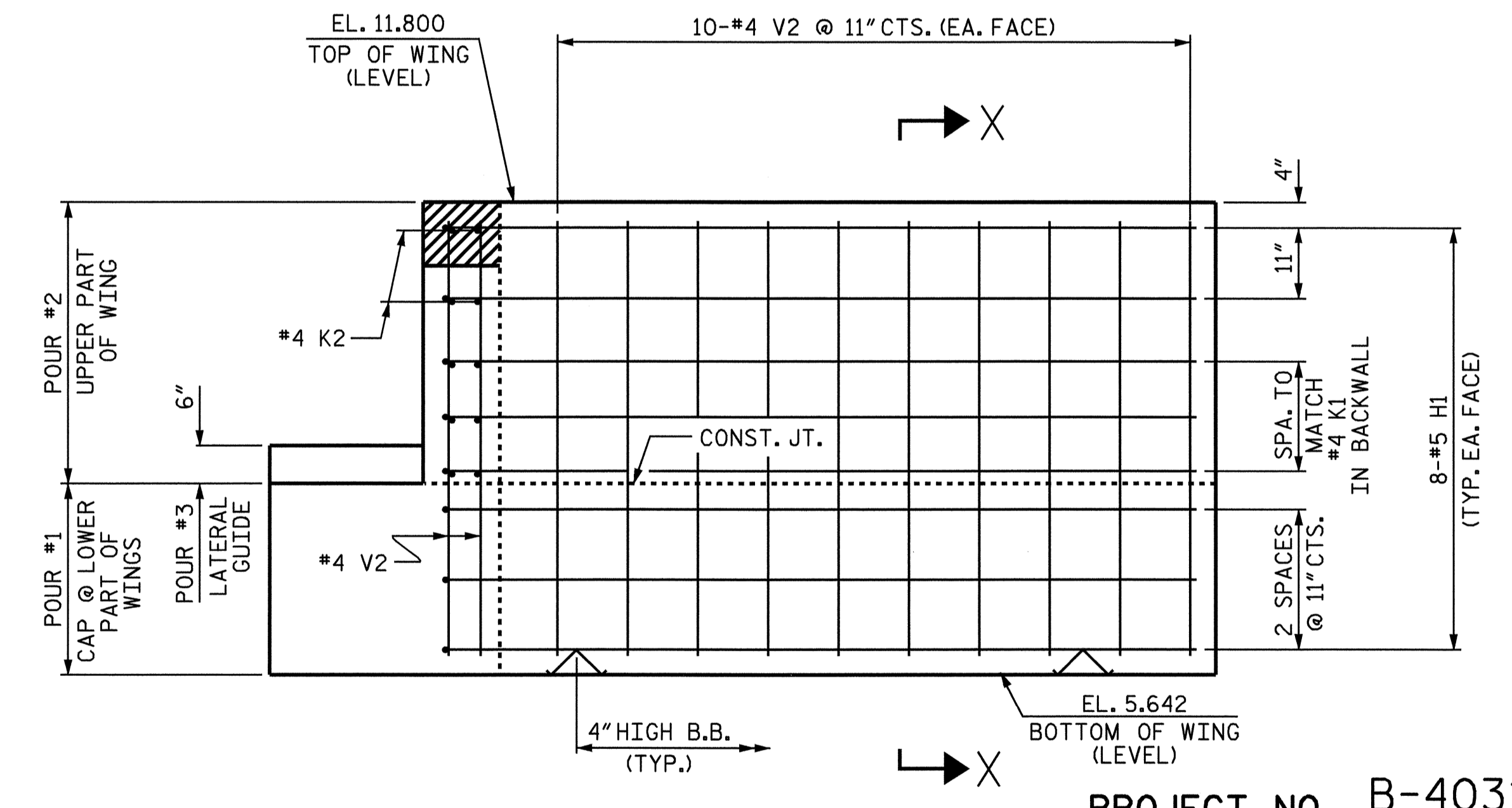
PLAN OF WING W2



ELEVATION OF WING W1



SECTION X-X



ELEVATION OF WING W2

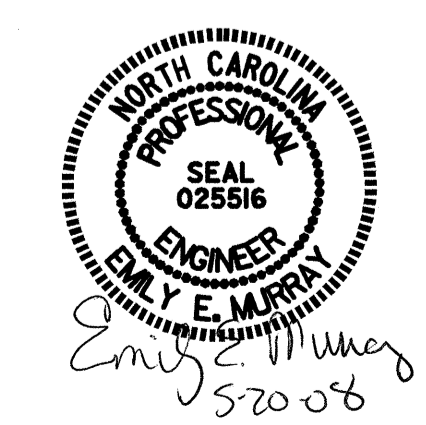
PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 3

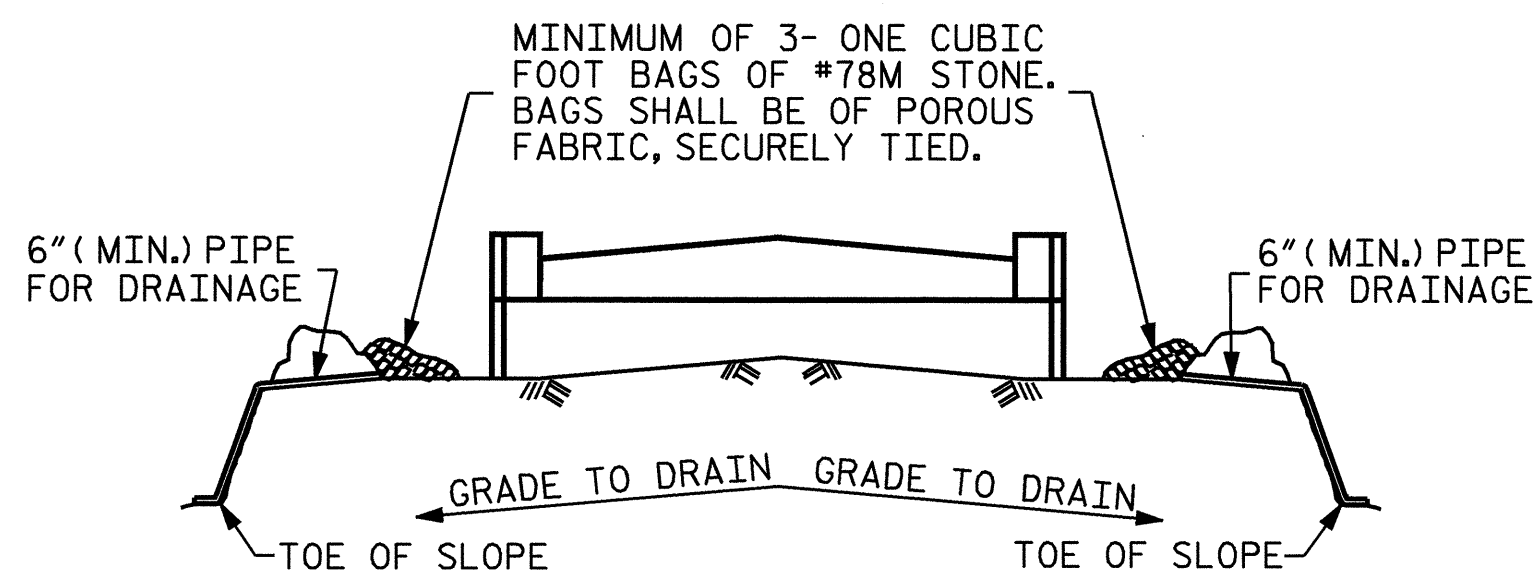
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #2

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-27         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



DRAWN BY: M. GUDLAUGSSON DATE: 9/28/07  
 CHECKED BY: J.B. WILSON DATE: 1/11/08

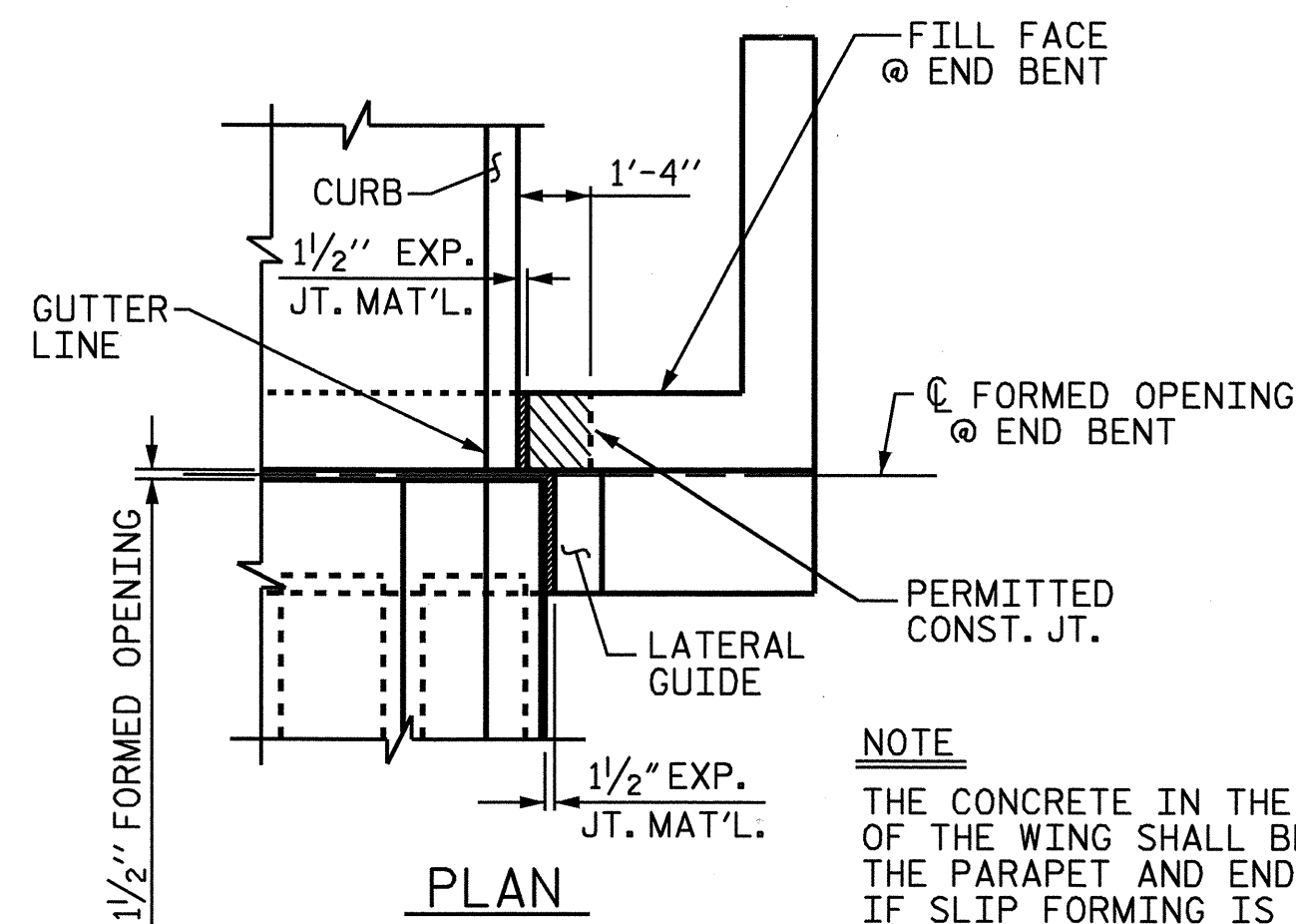


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

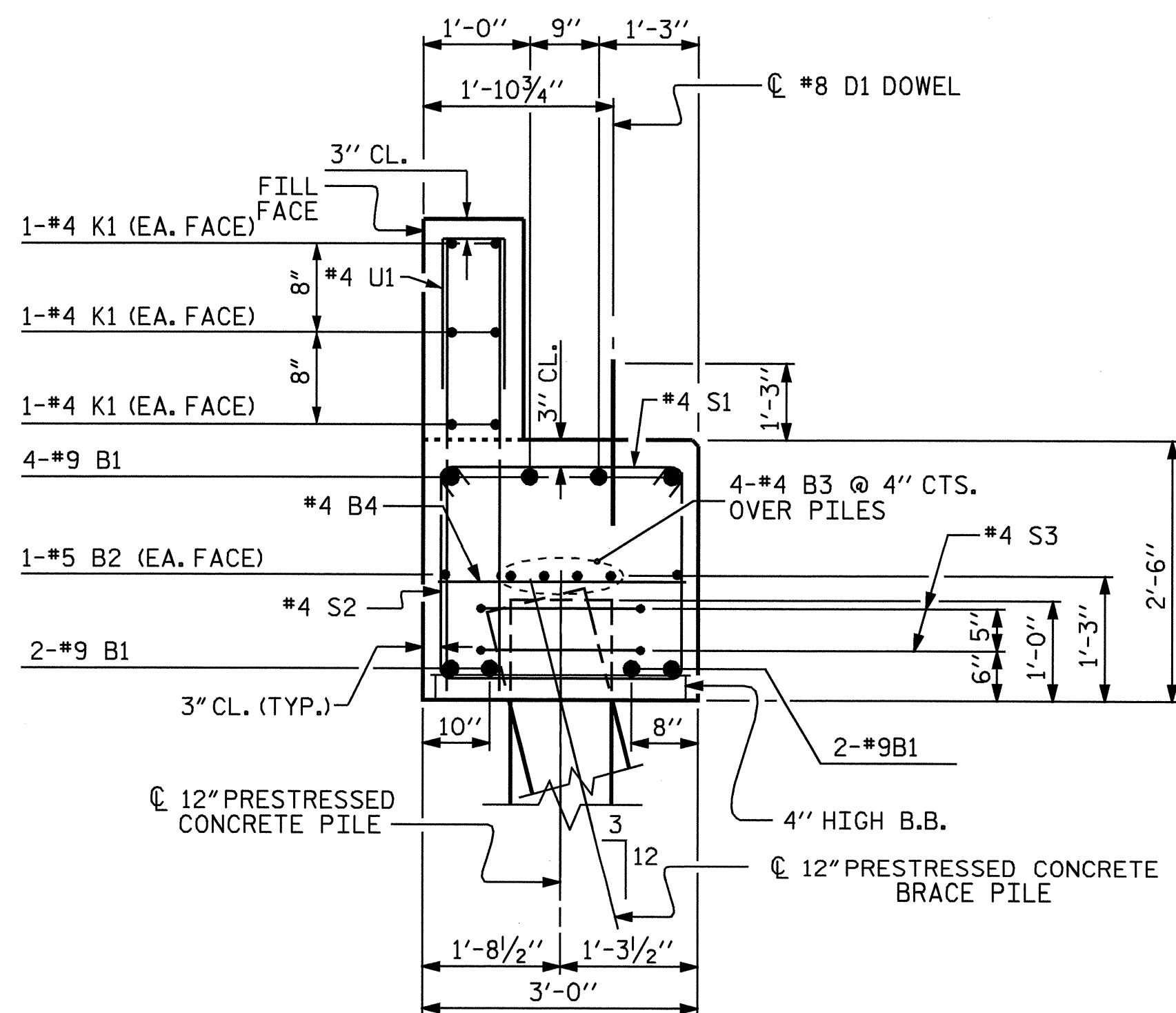
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

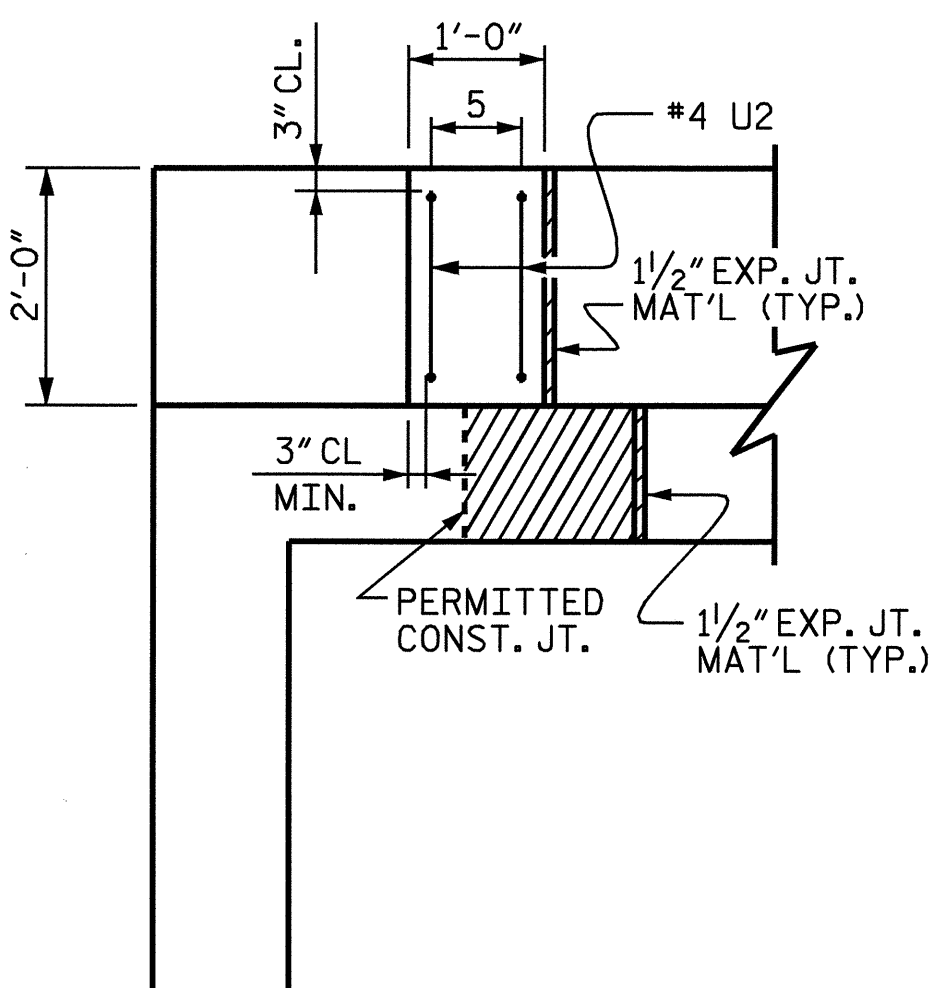
### TEMPORARY DRAINAGE AT END BENT



### BLOCKOUT IN WING WALL FOR BOX BEAM



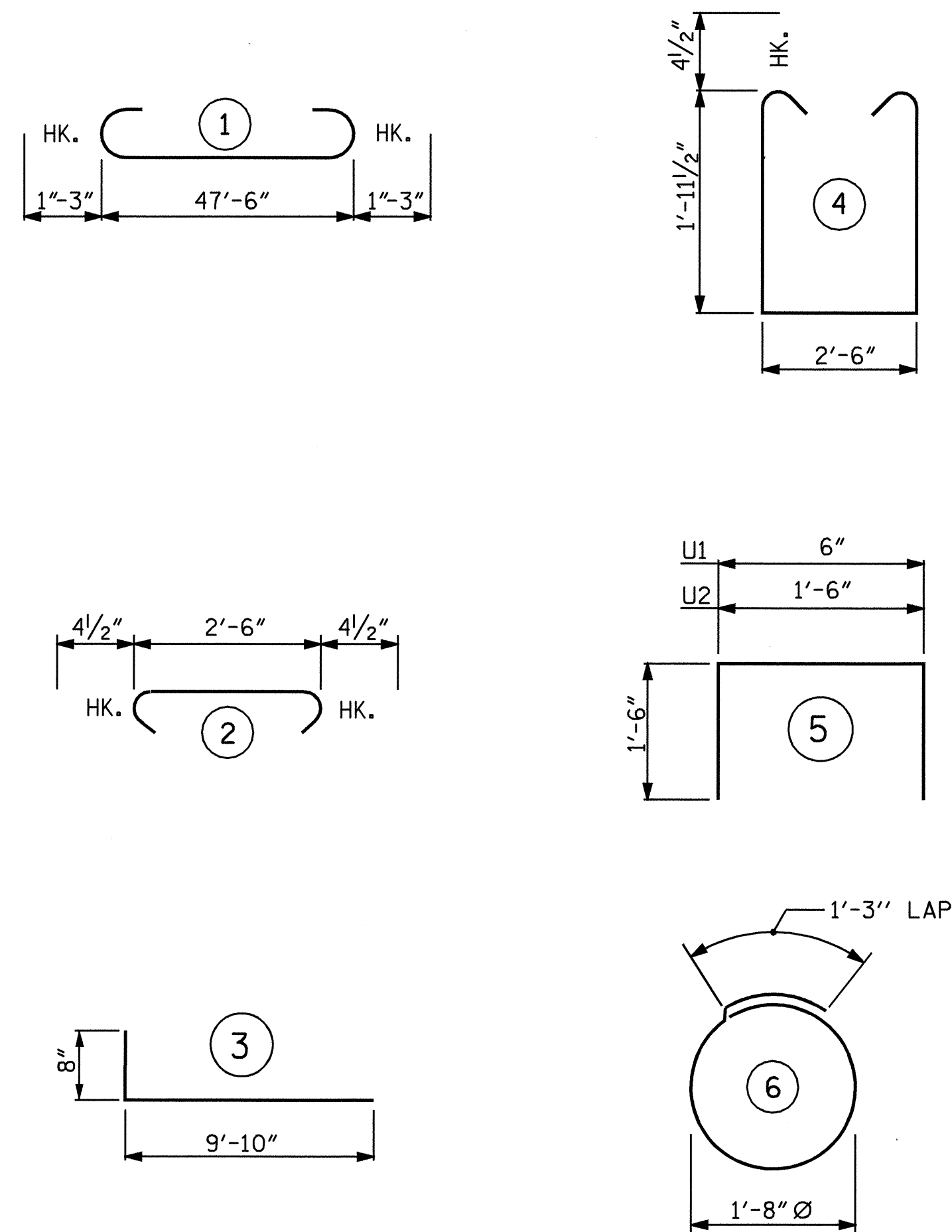
### SECTION A-A



### LATERAL GUIDE

(EACH END SIMILAR)

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT #2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| *B1 | 8   | #9   | 1    | 50'-0" | 1360   |
| *B2 | 2   | #5   | STR  | 47'-6" | 99     |
| *B3 | 8   | #4   | STR  | 25'-2" | 134    |
| *B4 | 12  | #4   | STR  | 2'-6"  | 20     |
| *D1 | 28  | #8   | STR  | 2'-3"  | 168    |
| *H1 | 32  | #5   | 3    | 10'-6" | 350    |
| *K1 | 12  | #4   | STR  | 25'-2" | 202    |
| *K2 | 8   | #4   | STR  | 2'-11" | 16     |
| *S1 | 42  | #4   | 2    | 3'-3"  | 91     |
| *S2 | 42  | #4   | 4    | 7'-2"  | 201    |
| *S3 | 18  | #4   | 6    | 6'-6"  | 78     |
| *U1 | 41  | #4   | 5    | 3'-6"  | 96     |
| *U2 | 4   | #4   | 5    | 4'-6"  | 12     |
| *V1 | 82  | #5   | STR  | 3'-11" | 335    |
| *V2 | 60  | #4   | STR  | 5'-7"  | 224    |

\* EPOXY COATED REIN. STEEL = 3386 LBS.  
CLASS "AA" CONCRETE BREAKDOWN

POUR #1 CAP AND LOWER WINGS

CU. YDS. 15.1

POUR #2 BACKWALL AND UPPER WINGS

CU. YDS. 6.8

POUR #3 LATERAL GUIDE

CU. YDS. 0.1

TOTAL CLASS "AA" CONCRETE

CU. YDS. 22.0

12" PRESTRESSED CONCRETE PILE

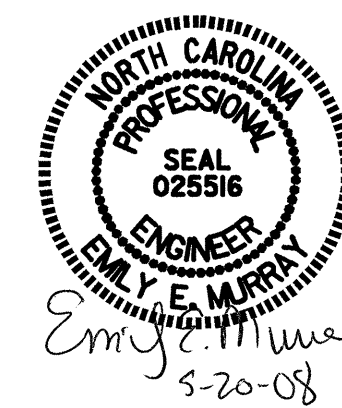
NO. 9 LIN. FT. 180

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
STATION: 25+70.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

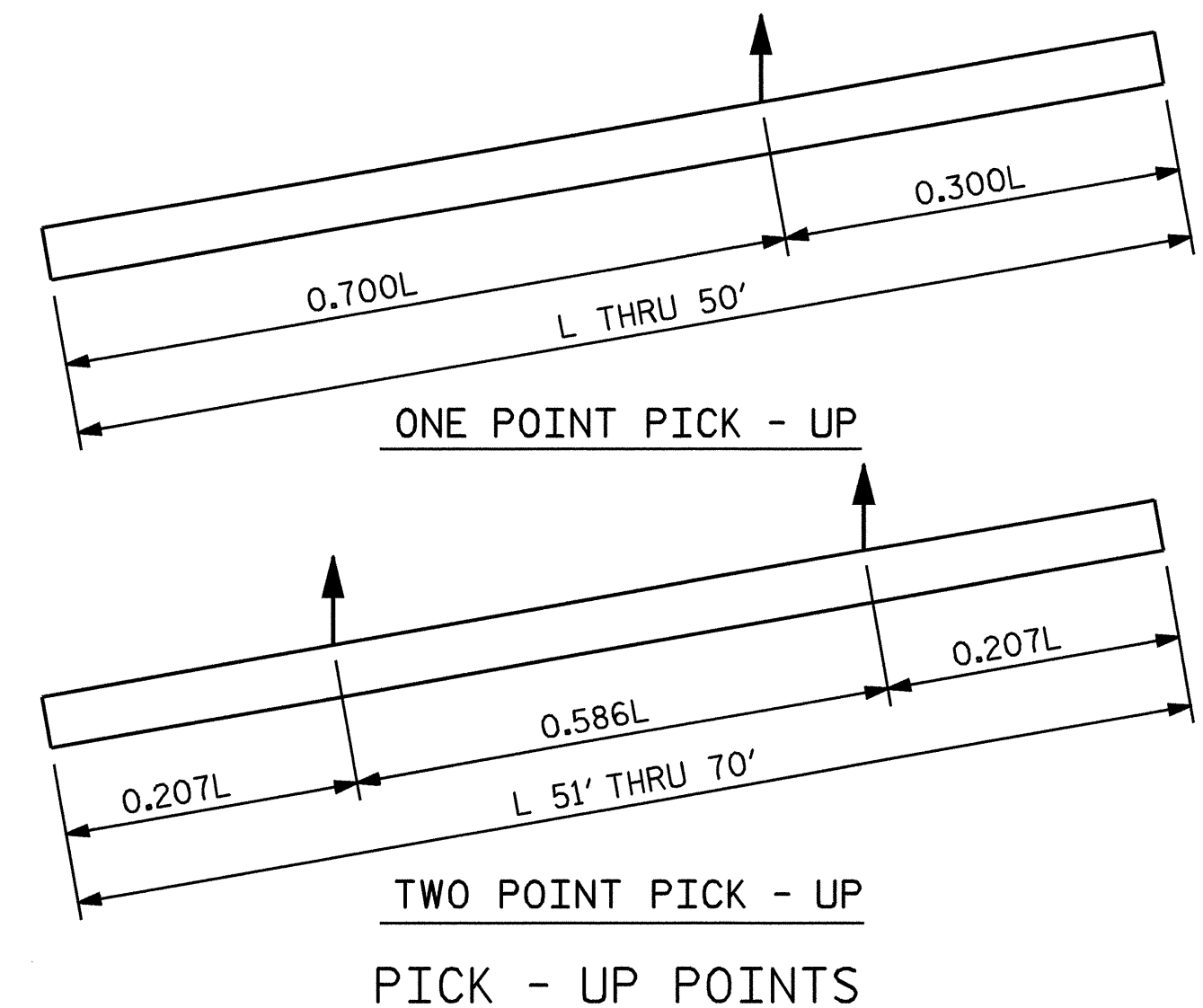
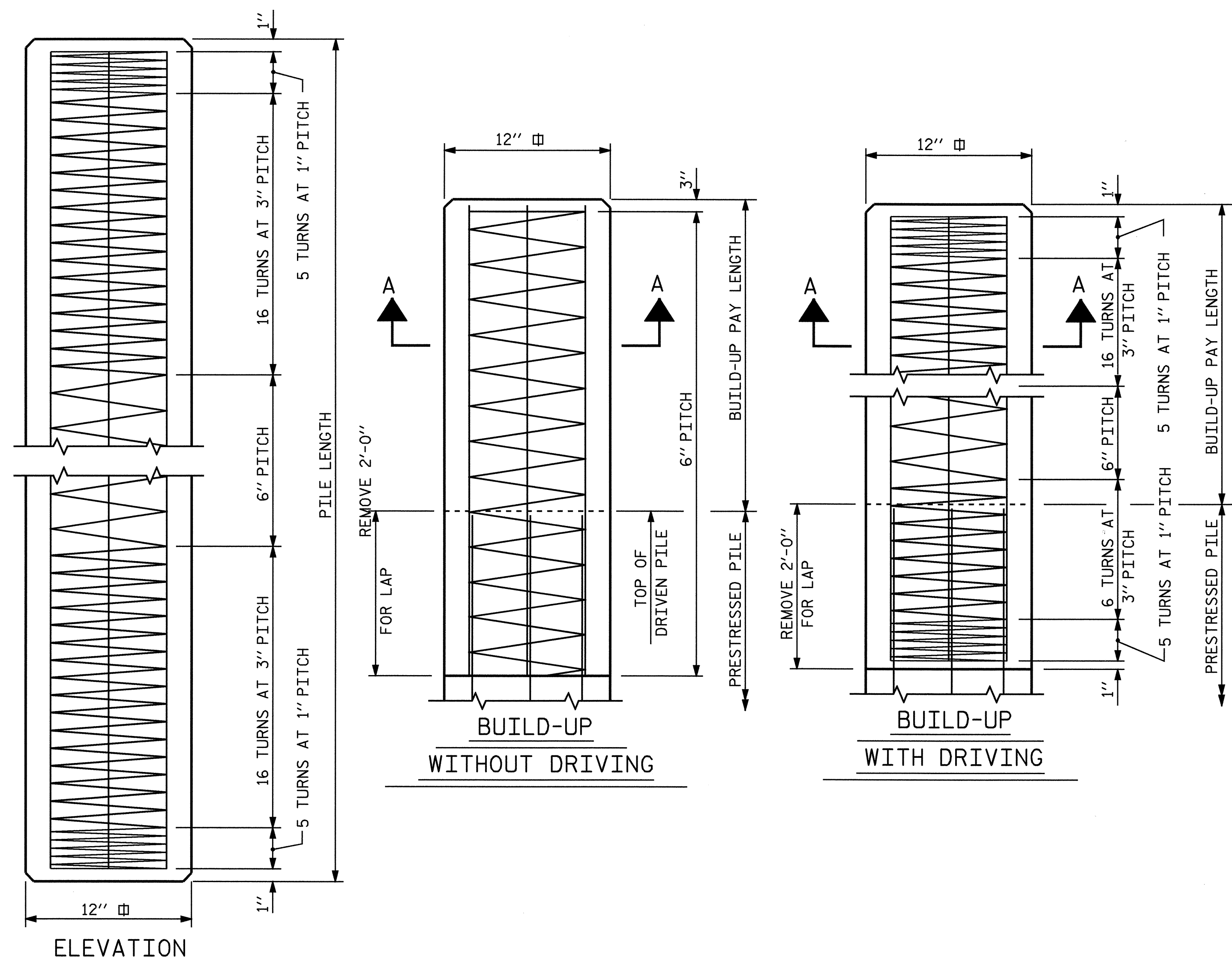
SUBSTRUCTURE  
END BENT #2



DRAWN BY: M. GUDLAUGSSON DATE: 9/28/07  
CHECKED BY: J.B. WILSON DATE: 1/11/08

19-MAY-2008 11:13  
g:\1100\projects-b\b4031\structures\b4031\final plans\b4031.ed.E\*.dgn  
faveretta

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-28         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 33           |



**QUANTITIES FOR ONE 12" PRESTRESSED PILE**

| LENGTH | CONCRETE CU. YDS. | PILE WT. TONS | ONE PICK-UP POINT |        | TWO PICK-UP POINT |        |
|--------|-------------------|---------------|-------------------|--------|-------------------|--------|
|        |                   |               | 0.300L            | 0.700L | 0.207L            | 0.586L |
| 25'-0" | 0.91              | 1.85          | 7'-6"             | 17'-6" |                   |        |
| 30'-0" | 1.10              | 2.22          | 9'-0"             | 21'-0" |                   |        |
| 35'-0" | 1.28              | 2.59          | 10'-6"            | 24'-6" |                   |        |
| 40'-0" | 1.46              | 2.96          | 12'-0"            | 28'-0" |                   |        |
| 45'-0" | 1.64              | 3.33          | 13'-6"            | 31'-6" |                   |        |
| 50'-0" | 1.83              | 3.70          | 15'-0"            | 35'-0" |                   |        |
| 55'-0" | 2.01              | 4.07          |                   |        | 11'-4 1/2"        | 32'-3" |
| 60'-0" | 2.19              | 4.44          |                   |        | 12'-5"            | 35'-2" |
| 65'-0" | 2.37              | 4.81          |                   |        | 13'-5 1/2"        | 38'-1" |
| 70'-0" | 2.56              | 5.18          |                   |        | 14'-6"            | 41'-0" |

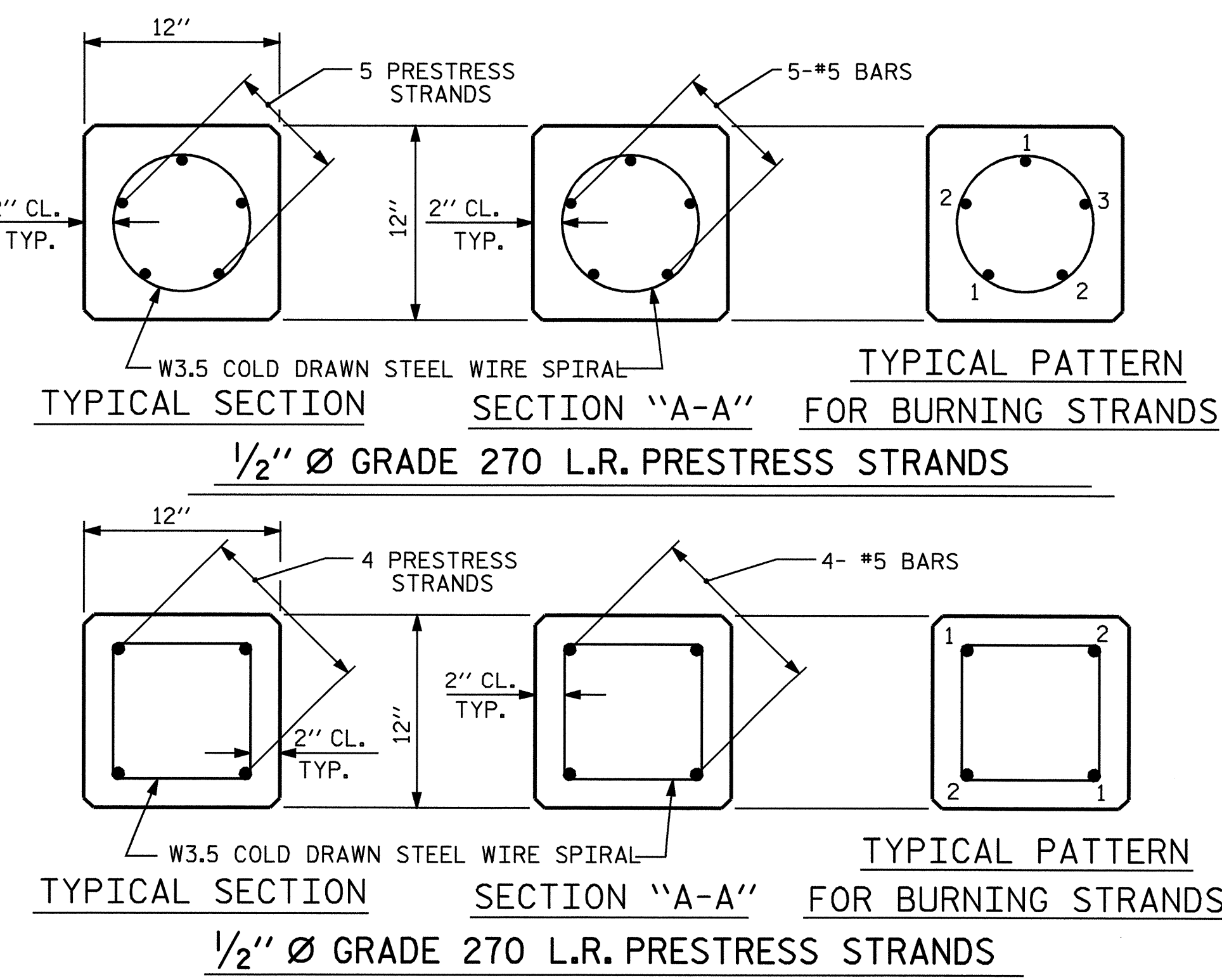
**NOTES**

CONCRETE DESIGN DATA :  $f'_c = 5,000$  PSI ;  $f_c = 2,000$  PSI  
 IMPACT IN HANDLING = 50%  
 THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE PILE SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 3,500 PSI.  
 IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.  
 PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.  
 WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.  
 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 STANDARD SPECIFICATIONS.

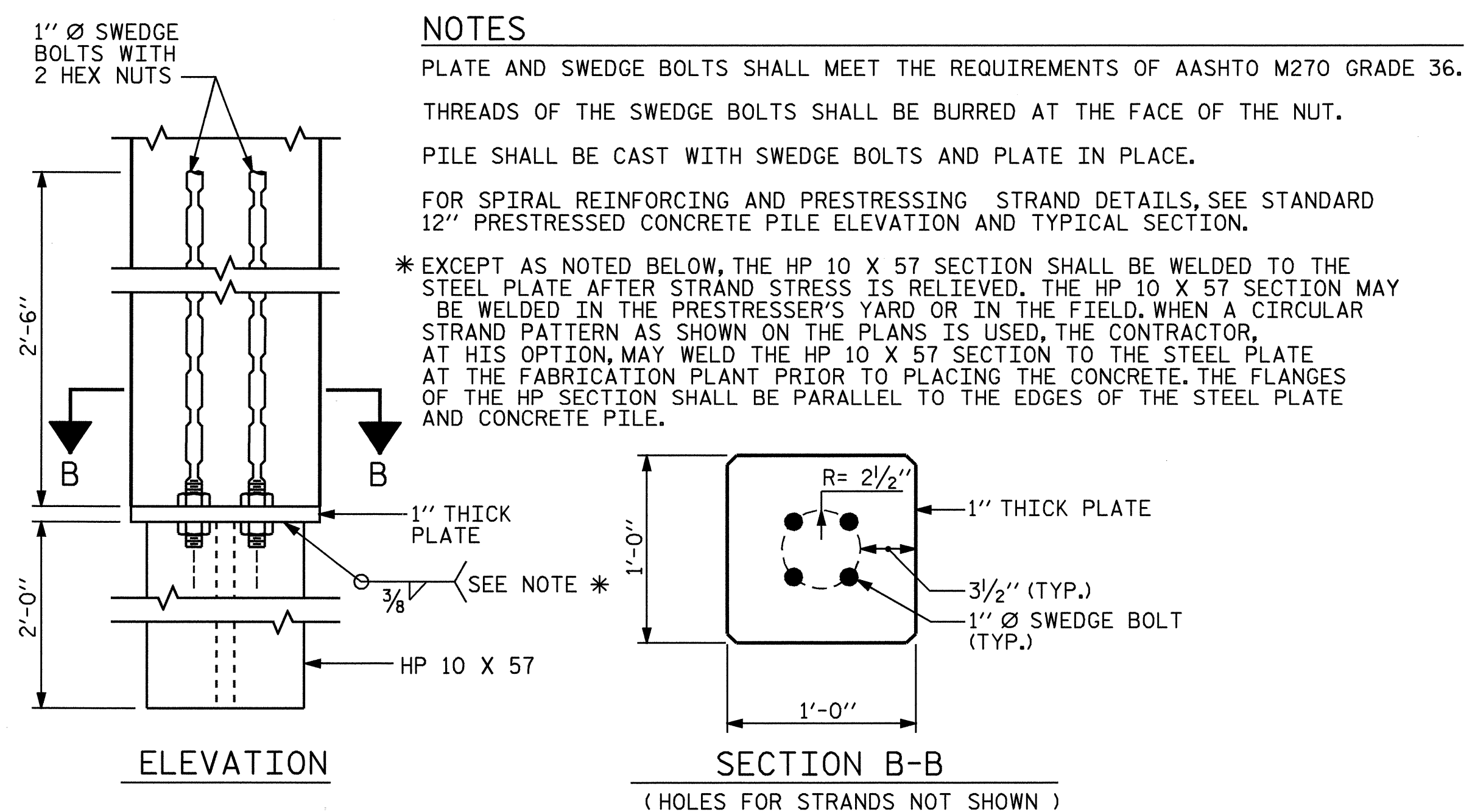
THE CONTRACTOR MAY USE EITHER OF THE FOLLOWING STRAND CONFIGURATIONS:

| SIZE | GRADE    | NUMBER OF STRANDS | AREA  | ULTIMATE STRENGTH  | APPLIED PRESTRESS FORCE |
|------|----------|-------------------|-------|--------------------|-------------------------|
| 1/2" | 270 L.R. | 4                 | 0.153 | 41,300* PER STRAND | 30,980* PER STRAND      |
| 1/2" | 270 L.R. | 5                 | 0.153 | 41,300* PER STRAND | 30,980* PER STRAND      |

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.  
 IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN PAIRS, EXCEPT WHERE 5 STRANDS ARE USED THE LAST STRAND MAY BE BURNED SINGLY, ACCORDING TO BURNING PATTERNS SHOWN. NOT MORE THAN 4 STRANDS MAY BE BURNED AT ANY ONE SECTION BEFORE THE SAME STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.  
 BUILD-UPS SHALL BE 'CLASS A' CONCRETE WITH 20% ADDITIONAL CEMENT. NO DRIVING OF THE BUILT-UP PILE WILL BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.  
 ALL CORNERS TO BE CHAMFERED 3/4".  
 THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.  
 PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.  
 FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.



**STEEL PILE TIP DETAILS**



PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 12" PRESTRESSED  
 CONCRETE PILE

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                 |
| 1         |     |       | 3   |     |       | S-29            |
| 2         |     |       | 4   |     |       | TOTAL SHEETS 33 |



ASSEMBLED BY : M.GUDLAUGSSON DATE : 9/27/07  
 CHECKED BY : J.B.WILSON DATE : 01/11/08  
 DRAWN BY : FCJ 7/88 REV. 7/17/98 RWW/LES  
 CHECKED BY : CRK 3/89 REV. 8/16/99R RWW/LES  
 REV. 5/1/06 TLA/GM

**NOTES**

CONCRETE DESIGN DATA :  $f'c = 5,000$  PSI ;  $f_c = 2,000$  PSI

IMPACT IN HANDLING = 50%

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE PILE SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 3,500 PSI.

IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST - IN - PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

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 STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL USE THE FOLLOWING STRAND TYPE:

| SIZE | GRADE    | NUMBER OF STRANDS | AREA SQ. IN. | ULTIMATE STRENGTH LBS. | APPLIED PRESTRESS FORCE LBS. |
|------|----------|-------------------|--------------|------------------------|------------------------------|
| 1/2" | 270 L.R. | 8                 | 0.153        | 41,300 PER STRAND      | 30,980 PER STRAND            |

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS BURN IN OPPOSITE PAIRS AND SYMMETRICAL ABOUT BOTH VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT THE BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

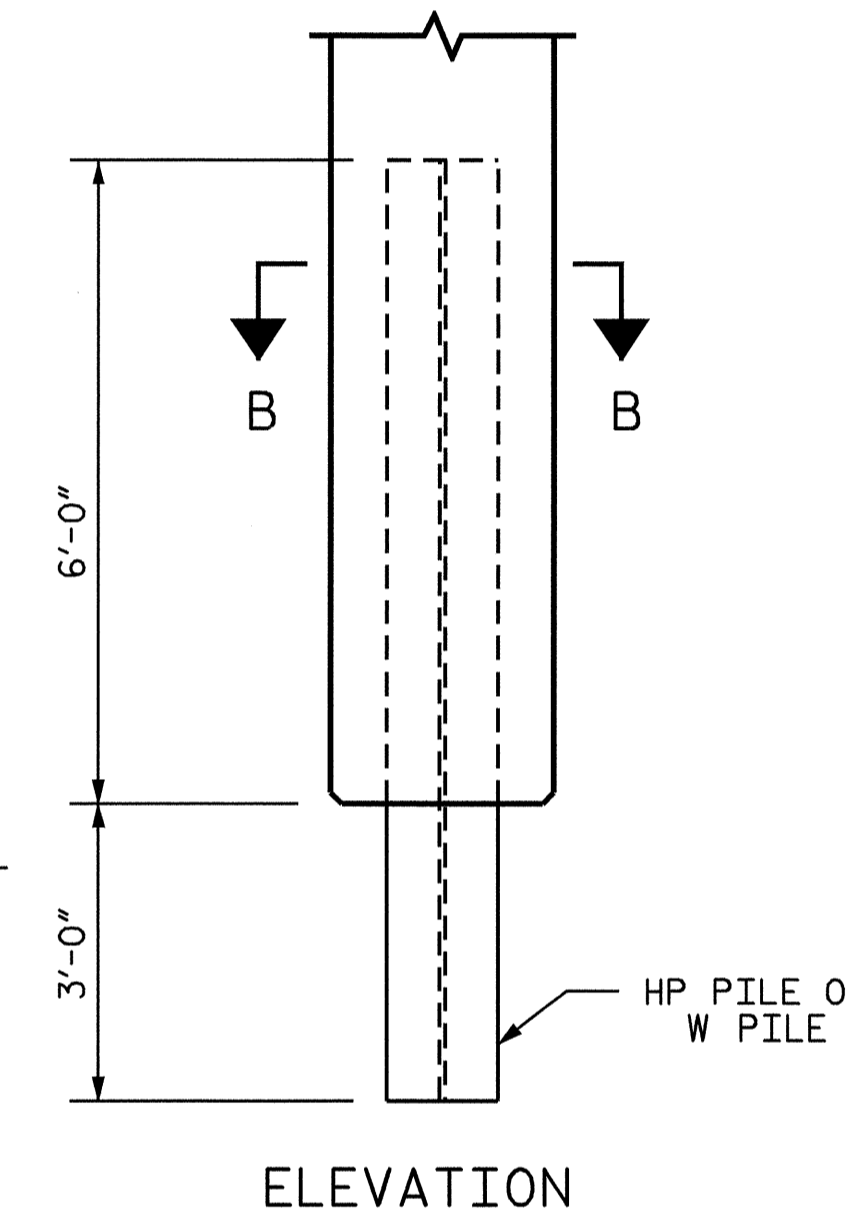
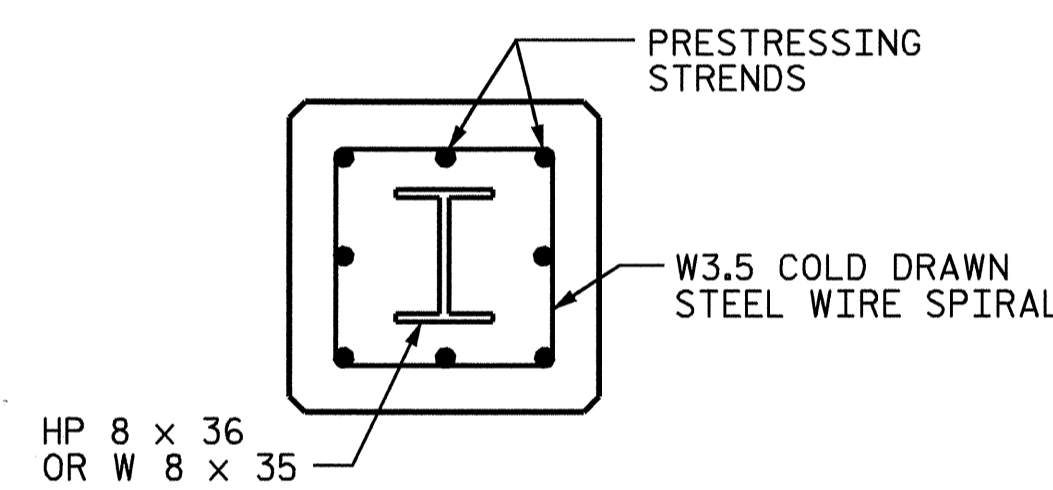
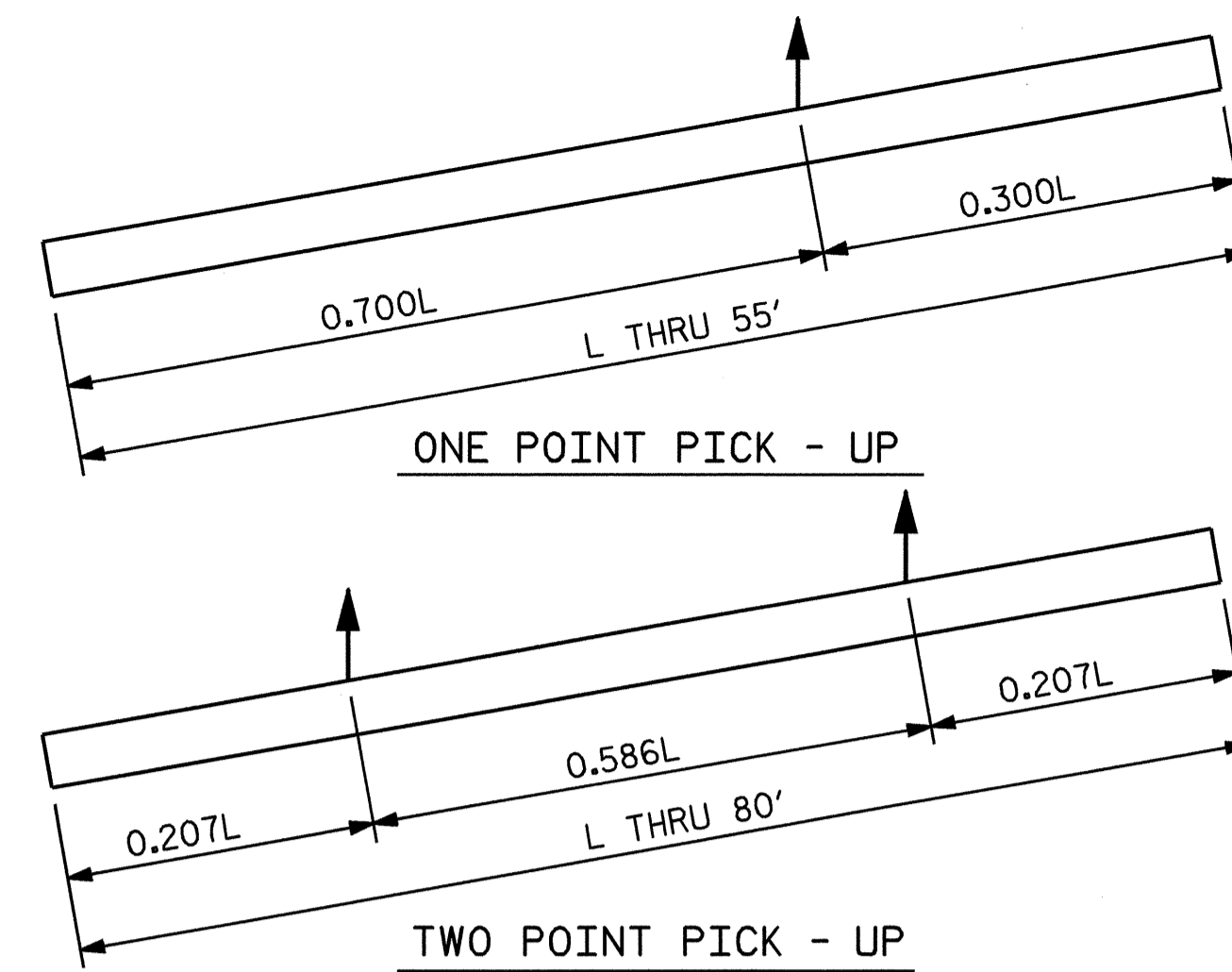
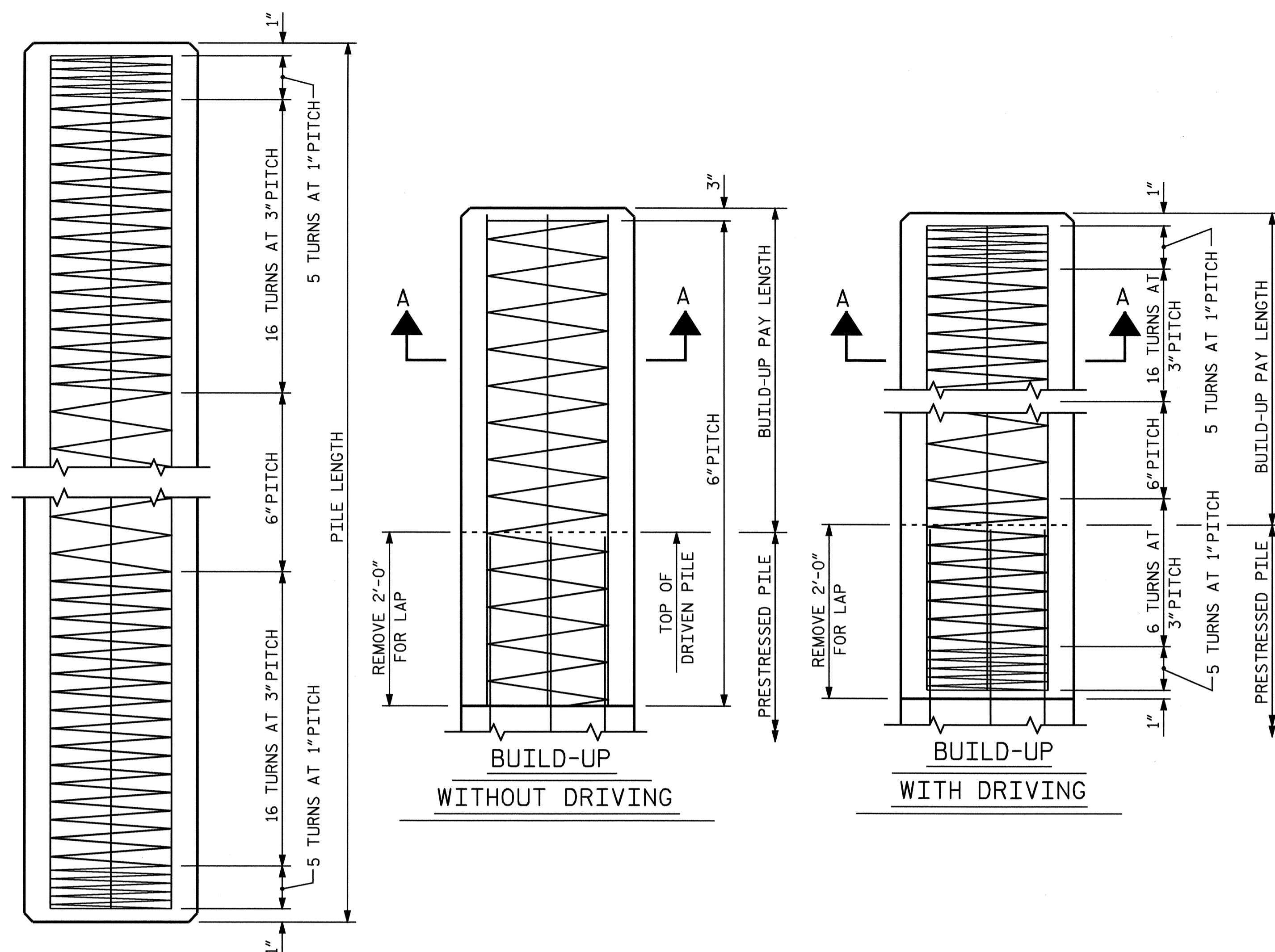
BUILD-UPS SHALL BE 'CLASS A' CONCRETE WITH 20% ADDITIONAL CEMENT. NO DRIVING OF THE BUILT-UP PILE WILL BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

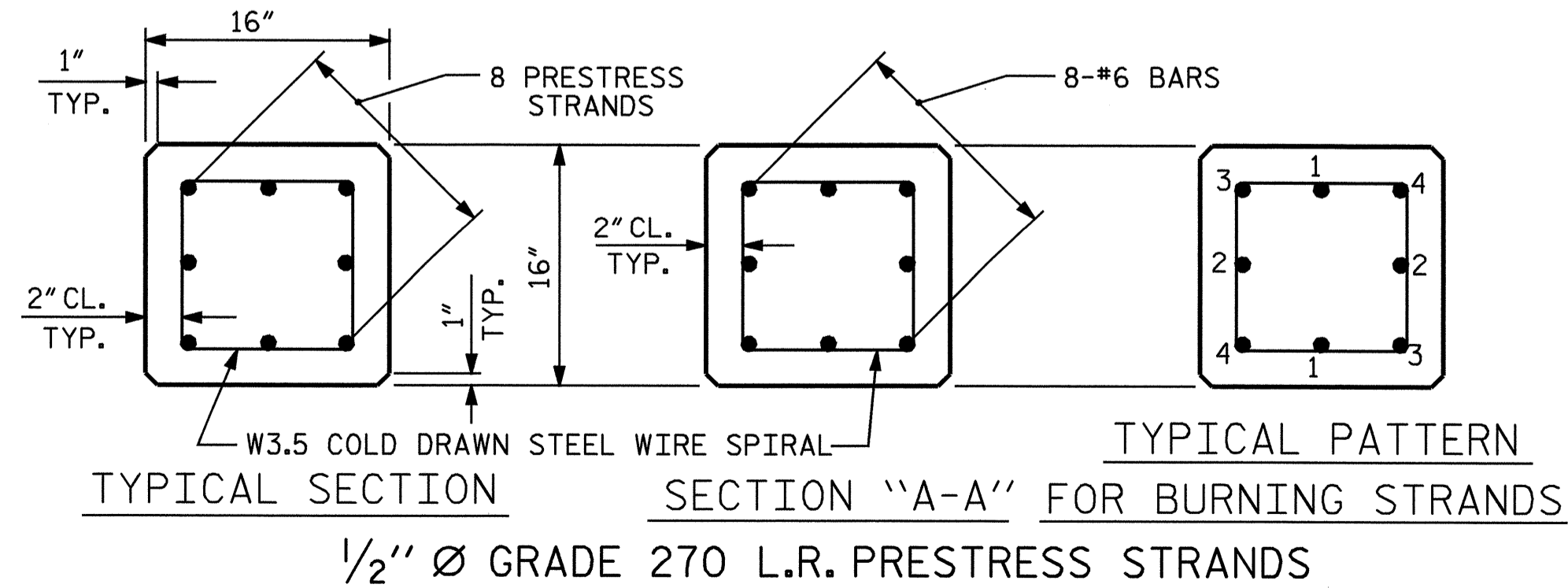
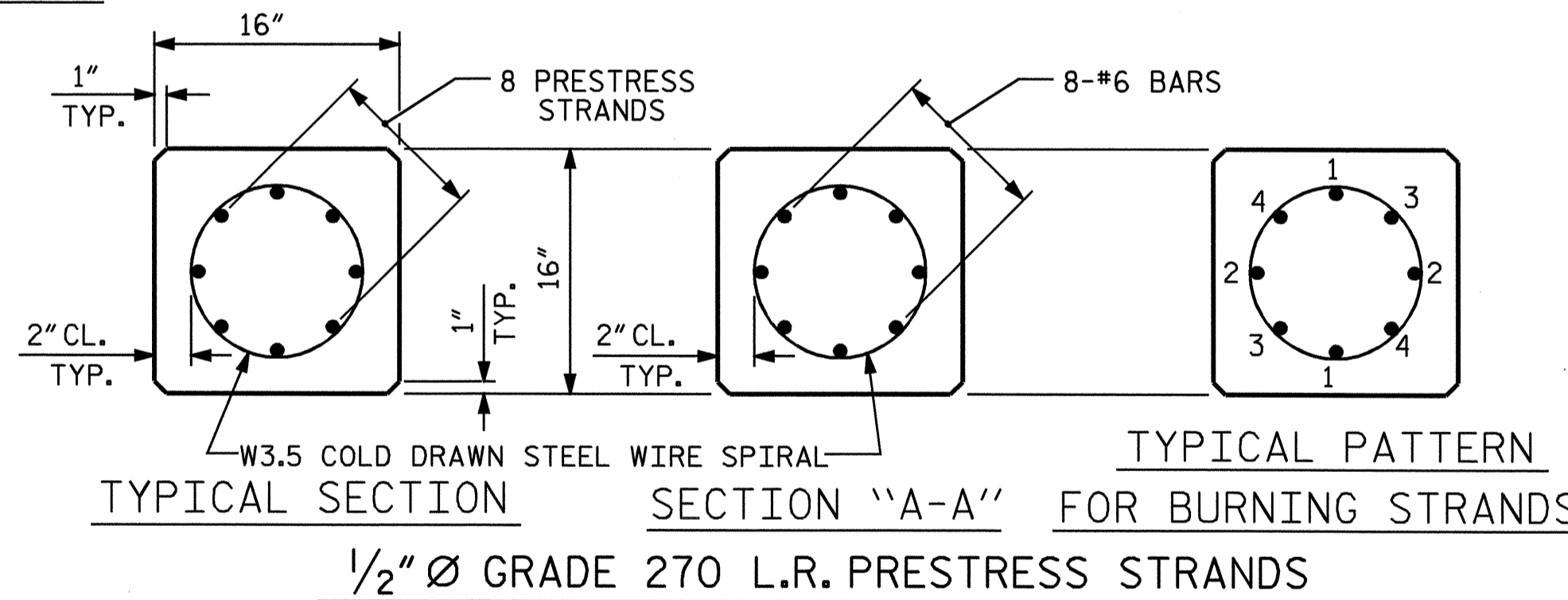
FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

THE CONCRETE IN THE PILES OF BENTS SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.



**PILE TIP DETAILS**

**ELEVATION**



SECTION B-B FOR 16" SQUARE PRESTRESSED CONCRETE PILE

| LENGTH | CONCRETE CU. YDS. | PILE WT. TONS | ONE POINT PICK-UP |        | TWO POINT PICK-UP |         |
|--------|-------------------|---------------|-------------------|--------|-------------------|---------|
|        |                   |               | 0.300L            | 0.700L | 0.207L            | 0.586L  |
| 25'-0" | 1.63              | 3.31          | 7'-6"             | 17'-6" | 5'-2"             | 14'-8"  |
| 30'-0" | 1.96              | 3.97          | 9'-0"             | 21'-0" | 6'-2 1/2"         | 17'-7"  |
| 35'-0" | 2.29              | 4.63          | 10'-6"            | 24'-6" | 7'-3"             | 20'-6"  |
| 40'-0" | 2.61              | 5.29          | 12'-0"            | 28'-0" | 8'-3 1/2"         | 23'-5"  |
| 45'-0" | 2.94              | 5.95          | 13'-6"            | 31'-6" | 9'-4"             | 26'-4"  |
| 50'-0" | 3.27              | 6.61          | 15'-0"            | 35'-0" | 10'-4"            | 29'-4"  |
| 55'-0" | 3.59              | 7.28          | 16'-6"            | 38'-6" | 11'-4 1/2"        | 32'-3"  |
| 60'-0" | 3.92              | 7.94          |                   |        | 12'-5"            | 35'-2"  |
| 65'-0" | 4.25              | 8.60          |                   |        | 13'-5 1/2"        | 38'-1"  |
| 70'-0" | 4.57              | 9.26          |                   |        | 14'-6"            | 41'-0"  |
| 75'-0" | 4.90              | 9.92          |                   |        | 15'-6 1/2"        | 43'-11" |
| 80'-0" | 5.23              | 10.58         |                   |        | 16'-7"            | 46'-10" |

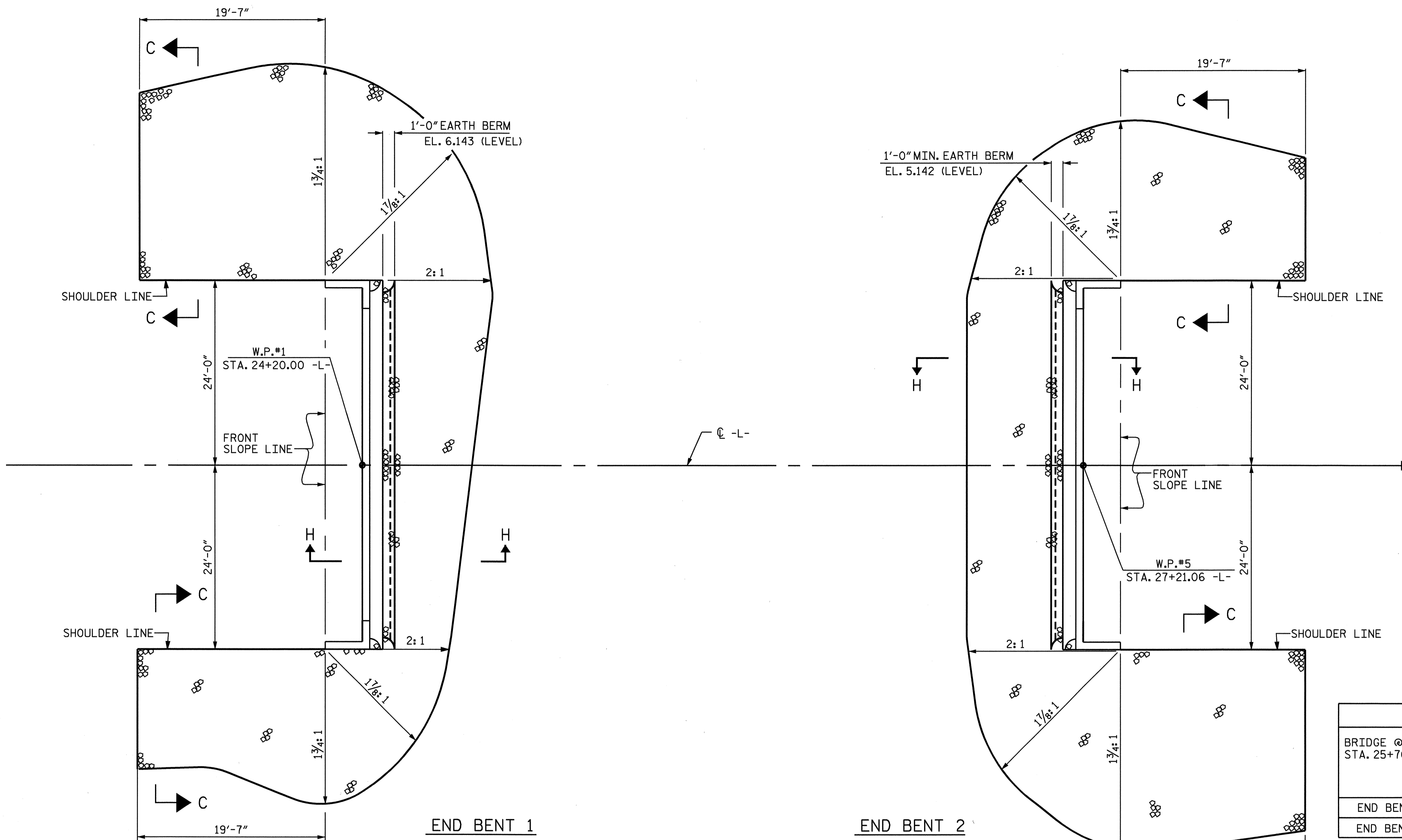
PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 16" PRESTRESSED CONCRETE PILE

| REVISIONS |    |      |     |    |      | SHEET NO.<br>S-30  |
|-----------|----|------|-----|----|------|--------------------|
| NO.       | BY | DATE | NO. | BY | DATE |                    |
| 1         |    |      | 3   |    |      | TOTAL SHEETS<br>33 |
| 2         |    |      | 4   |    |      |                    |

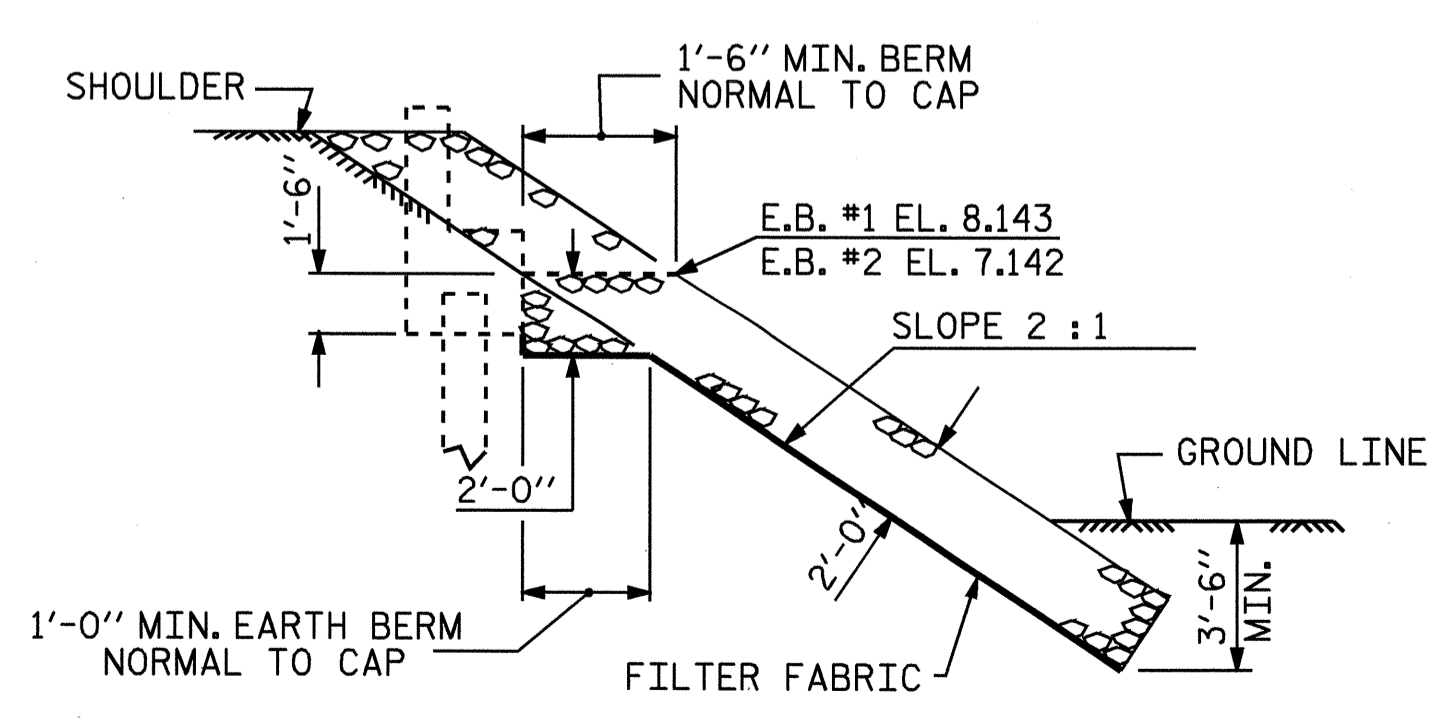


ASSEMBLED BY : B.N.BARODAWALA DATE : 12-13-06  
 CHECKED BY : J. B. WILSON DATE : 1-8-07  
 DRAWN BY : RH 9/98  
 CHECKED BY : LES 10/98  
 ADDED 12/2/98  
 REV. 8/16/99RR RWW/LES  
 REV. 5/1/06 TLA/GM

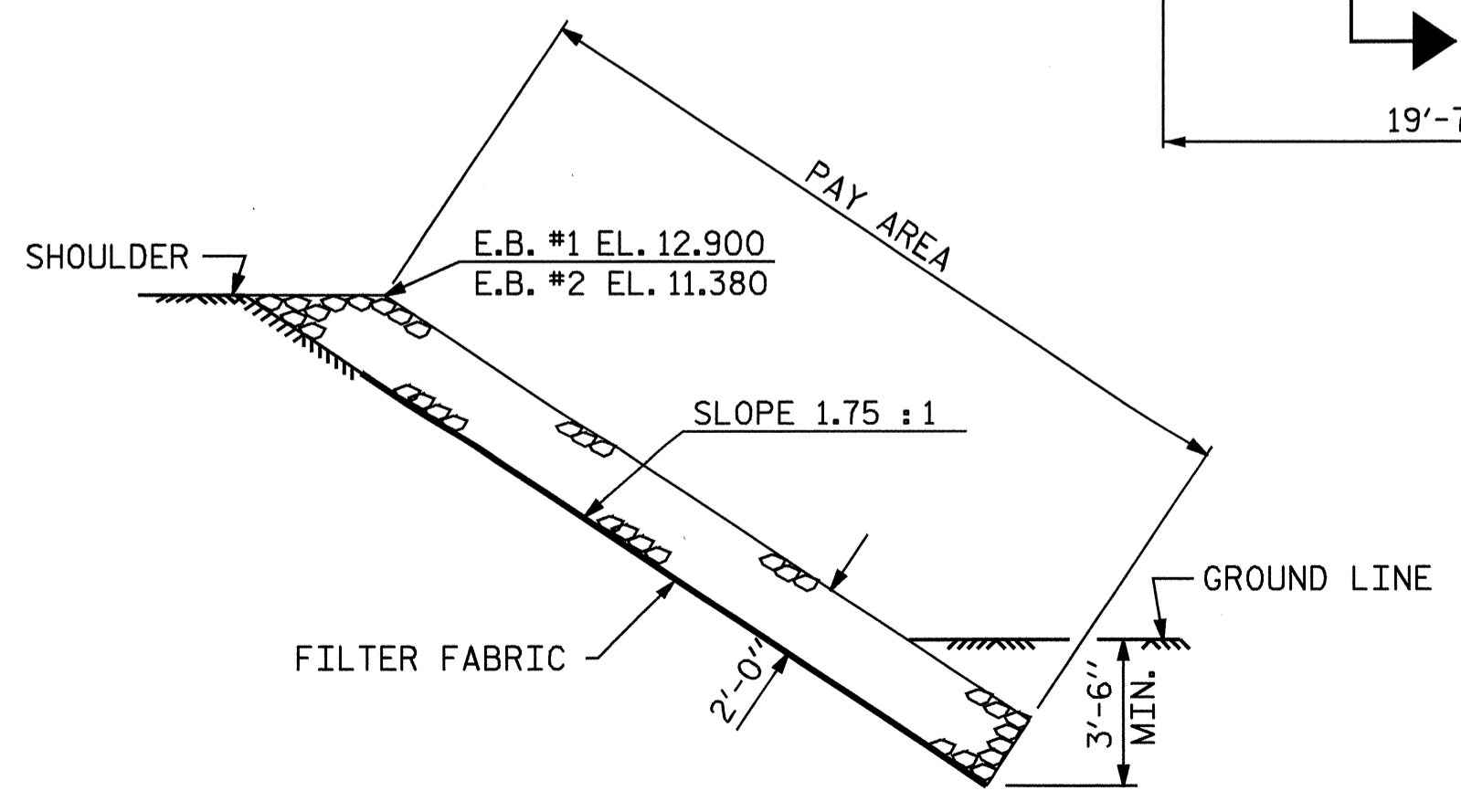


PLAN

| ESTIMATED QUANTITIES          |                     |                               |
|-------------------------------|---------------------|-------------------------------|
| BRIDGE @<br>STA. 25+70.00 -L- | RIP RAP<br>CLASS II | FILTER FABRIC<br>FOR DRAINAGE |
|                               | TONS                | SQUARE YARDS                  |
| END BENT 1                    | 230                 | 256                           |
| END BENT 2                    | 194                 | 215                           |



SECTION H-H

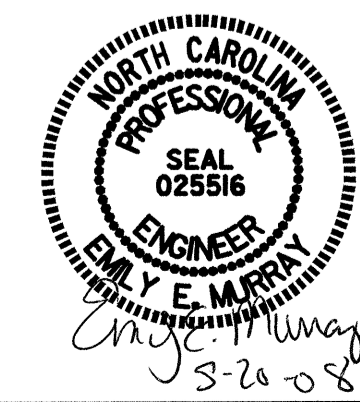


SECTION C-C

PROJECT NO. B-4031  
BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**RIP RAP DETAILS**



| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-31 |
|-----------|-----|-------|-----|-----|-------|-------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                   |
| 1         |     |       | 3   |     |       | TOTAL SHEETS      |
| 2         |     |       | 4   |     |       | 33                |

DRAWN BY: J.B. WILSON DATE: 3/16/07  
 CHECKED BY: I.L. AVERETTE DATE: 3/28/08



**NOTES**

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

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

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.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL EXTEND 1'-0" BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE PARAPET AND END POST.

APPROACH SLABS SHALL BE POURED AFTER CONCRETE OVERLAY IS POURED.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3/16".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

**BILL OF MATERIAL**

**APPROACH SLAB AT EB #1**

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| *A1 | 50  | #4   | STR  | 21'-3" | 710    |
| A2  | 52  | #4   | STR  | 21'-2" | 735    |
| *B1 | 82  | #5   | STR  | 23'-8" | 2024   |
| B2  | 82  | #6   | STR  | 24'-8" | 3038   |

|                                 |      |      |
|---------------------------------|------|------|
| REINFORCING STEEL               | LBS. | 3773 |
| *EPOXY COATED REINFORCING STEEL | LBS. | 2734 |

|                   |      |      |
|-------------------|------|------|
| CLASS AA CONCRETE | C.Y. | 38.5 |
|-------------------|------|------|

**APPROACH SLAB AT EB #2**

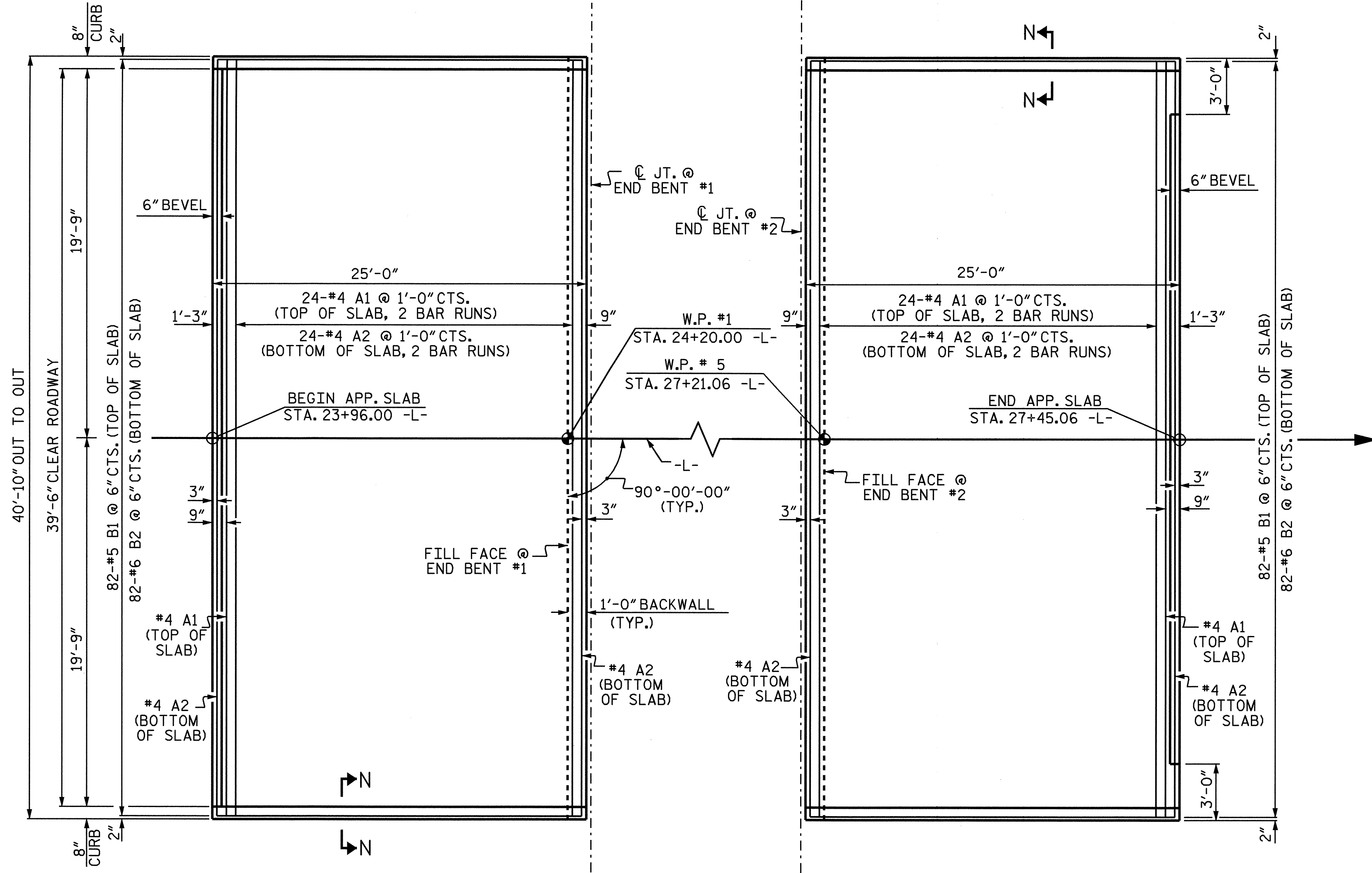
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| *A1 | 50  | #4   | STR  | 21'-3" | 710    |
| A2  | 52  | #4   | STR  | 21'-2" | 735    |
| *B1 | 82  | #5   | STR  | 23'-8" | 2024   |
| B2  | 82  | #6   | STR  | 24'-8" | 3038   |

|                                 |      |      |
|---------------------------------|------|------|
| REINFORCING STEEL               | LBS. | 3773 |
| *EPOXY COATED REINFORCING STEEL | LBS. | 2734 |

|                   |      |      |
|-------------------|------|------|
| CLASS AA CONCRETE | C.Y. | 38.5 |
|-------------------|------|------|

**SPLICE CHART**

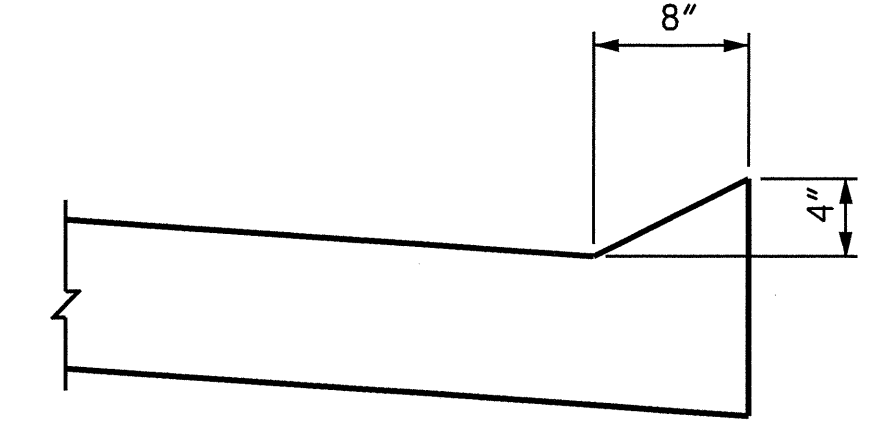
| BAR   | SPLICE LENGTH |
|-------|---------------|
| #4 A1 | 2'-0"         |
| #4 A2 | 1'-9"         |



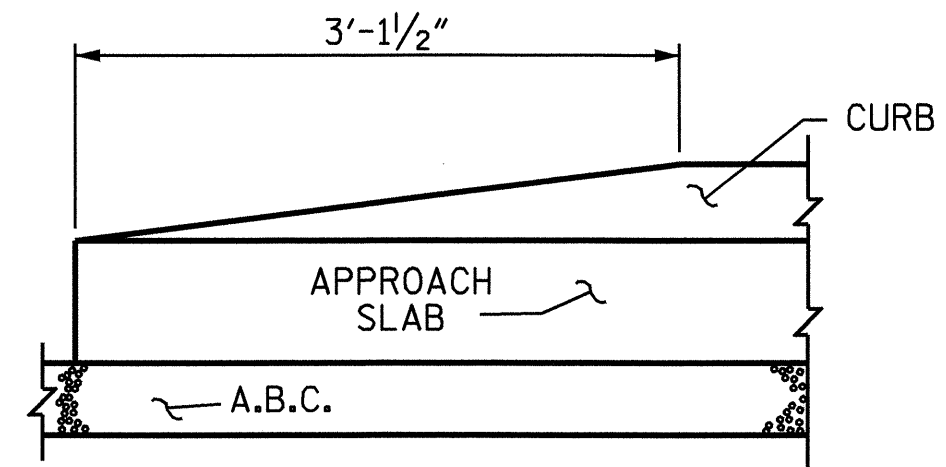
PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

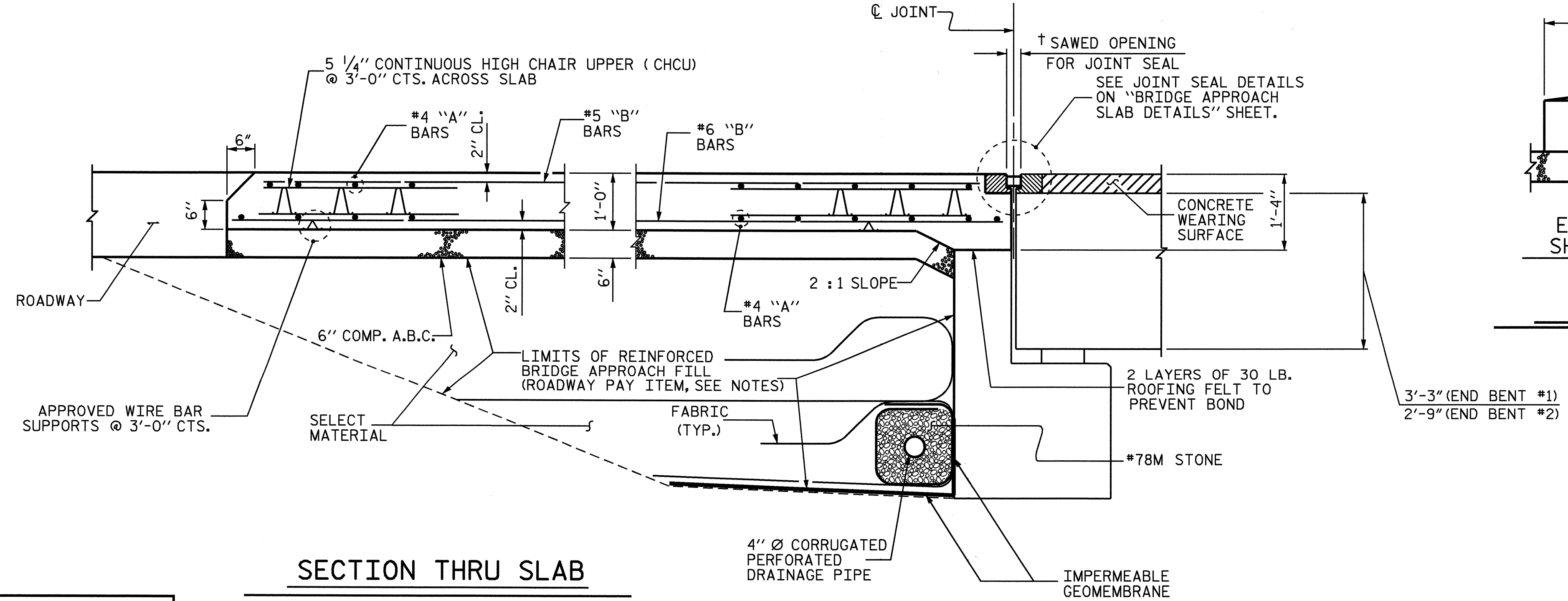


SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

**CURB DETAILS**



SECTION THRU SLAB

PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 1 OF 2

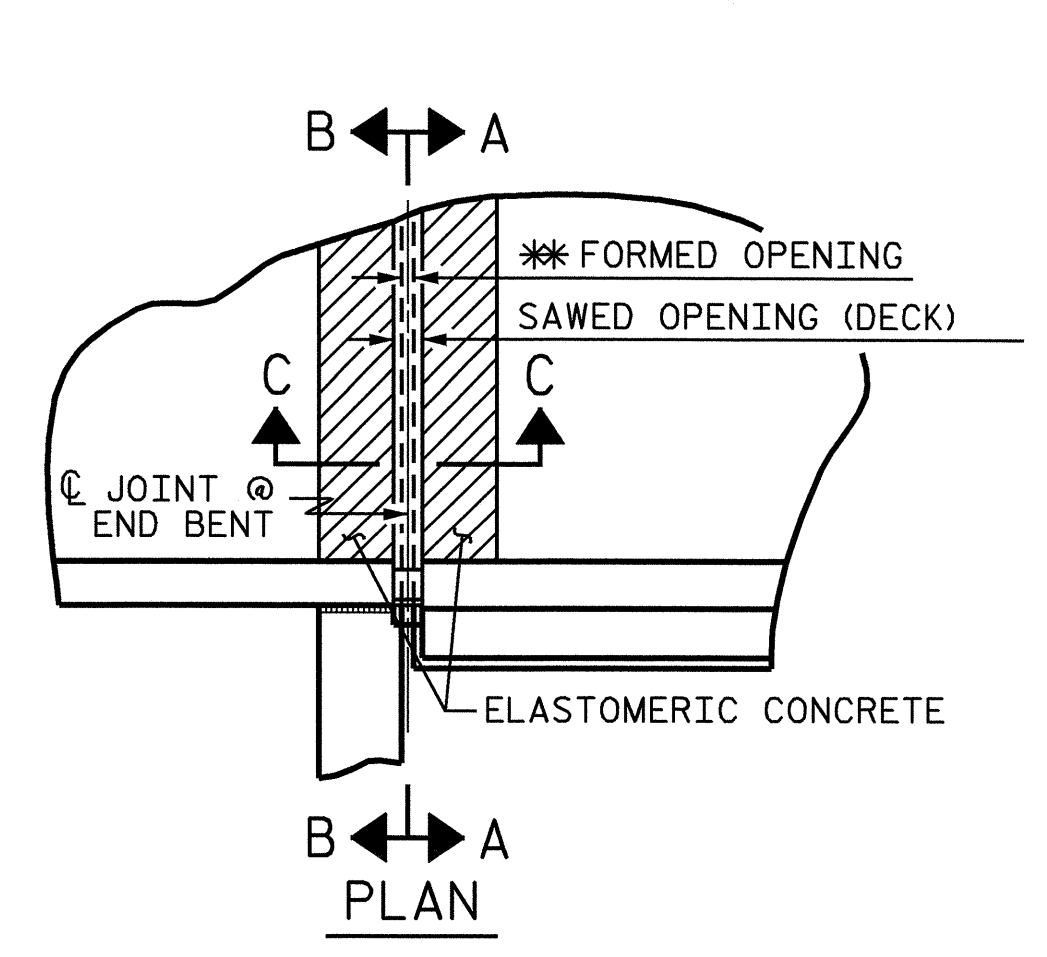
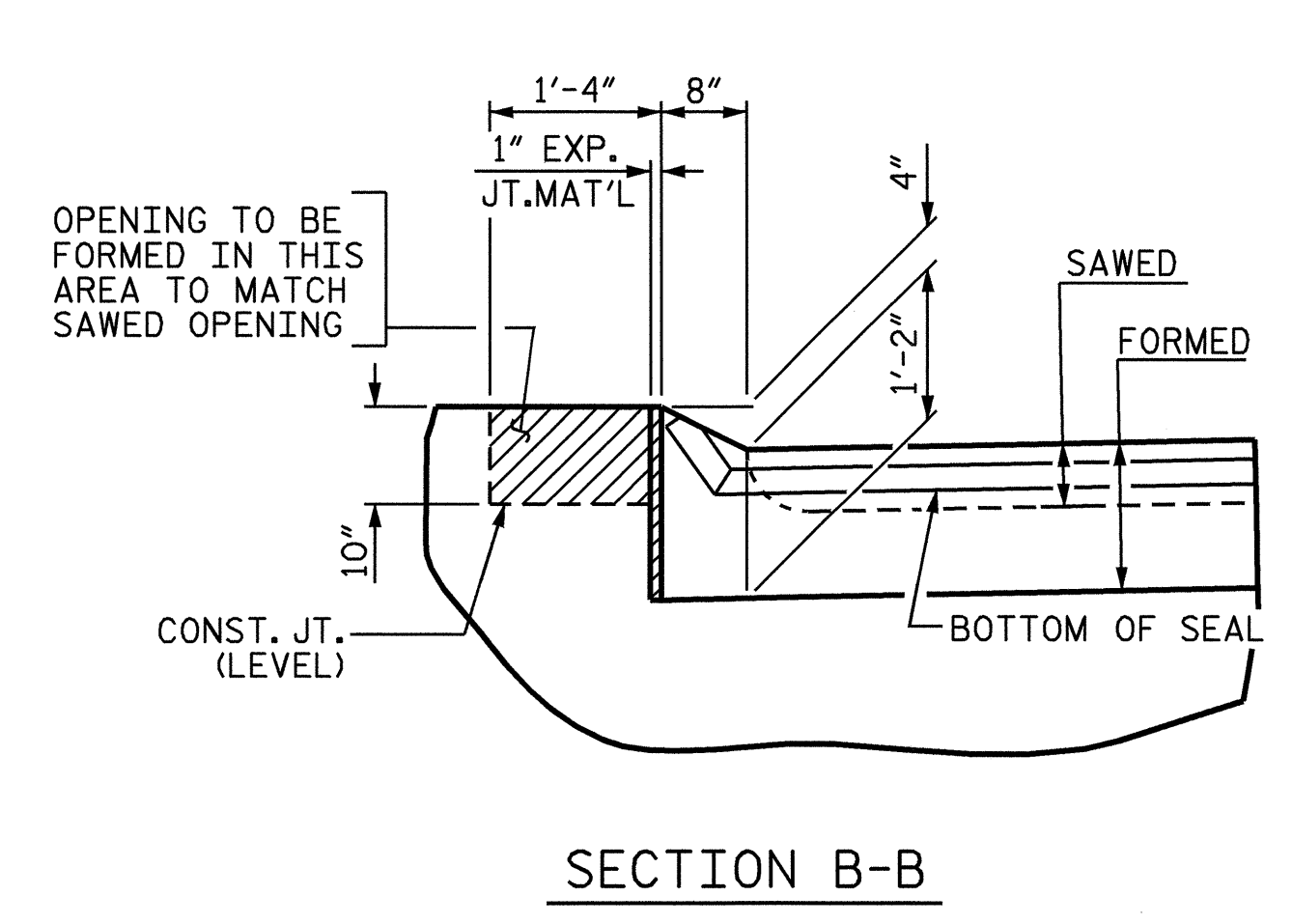
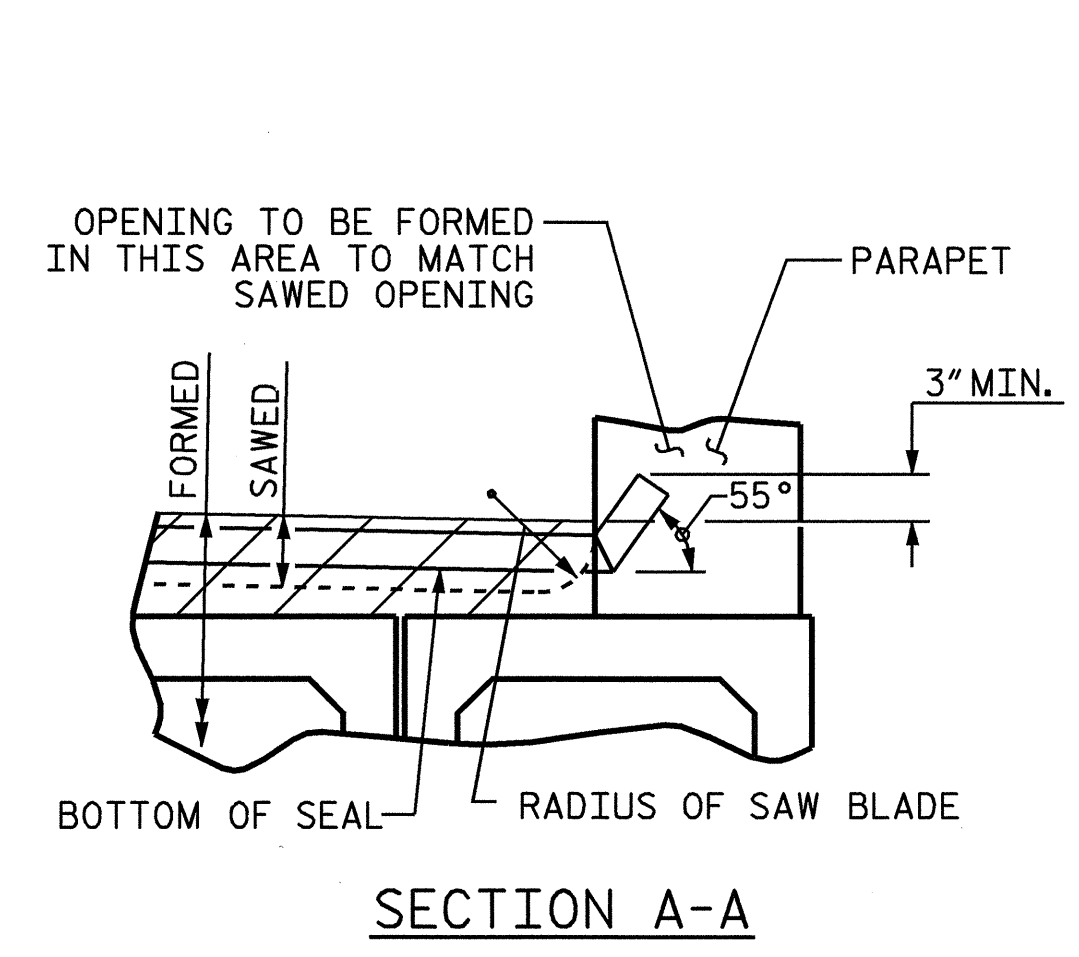
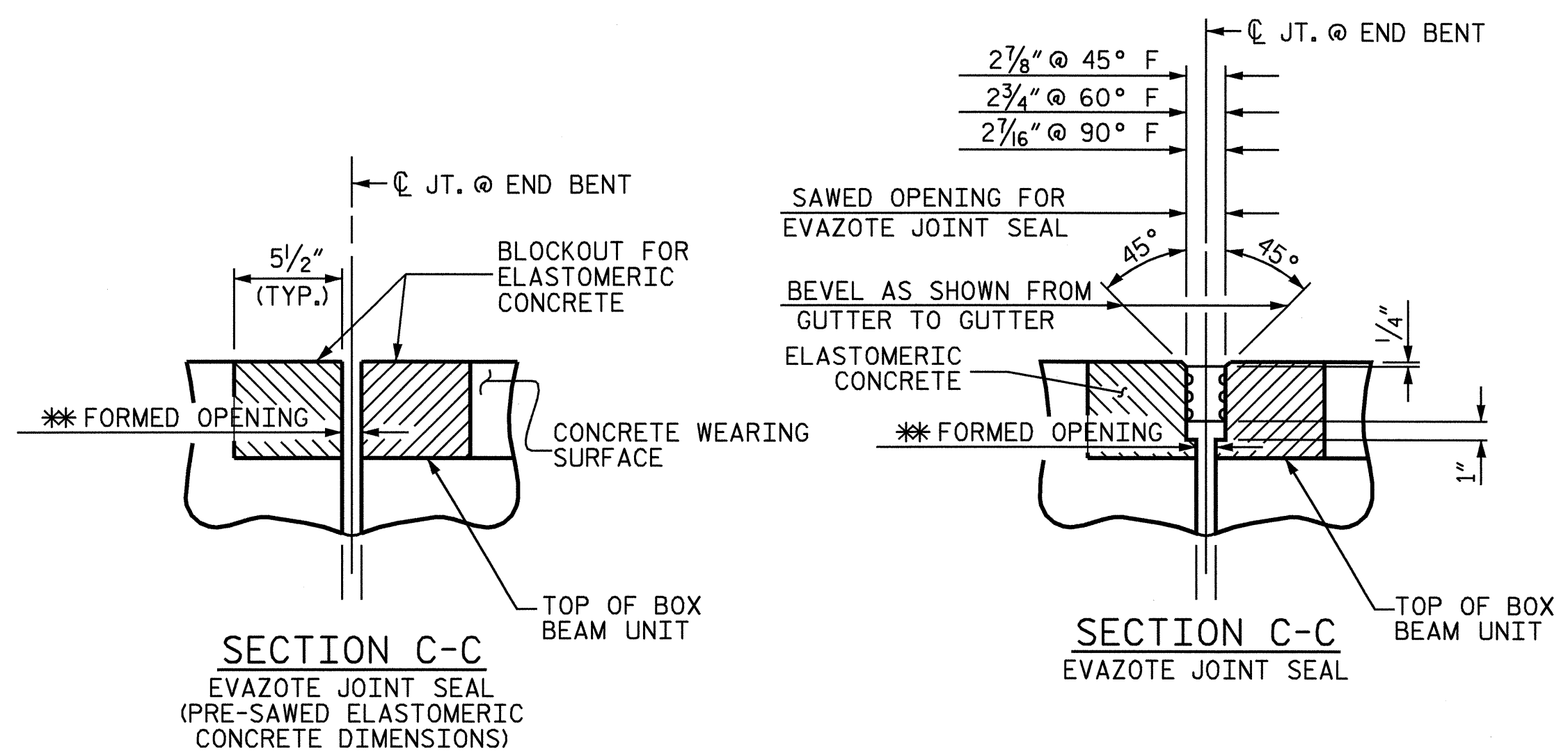
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM**



| REVISIONS |     |       |     |     |       | SHEET NO.       |  |
|-----------|-----|-------|-----|-----|-------|-----------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-32            |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 33 |  |
| 2         |     |       | 4   |     |       |                 |  |

|                              |                      |
|------------------------------|----------------------|
| ASSEMBLED BY : C.R. MCDUFFEE | DATE : 3/27/08       |
| CHECKED BY : T.L. AVERETTE   | DATE : 4/28/08       |
| DRAWN BY : LES 8/01          | REV. 5/7/03R RWW/JTE |
| CHECKED BY : RDR 8/01        | REV. 5/1/06R KMM/GM  |

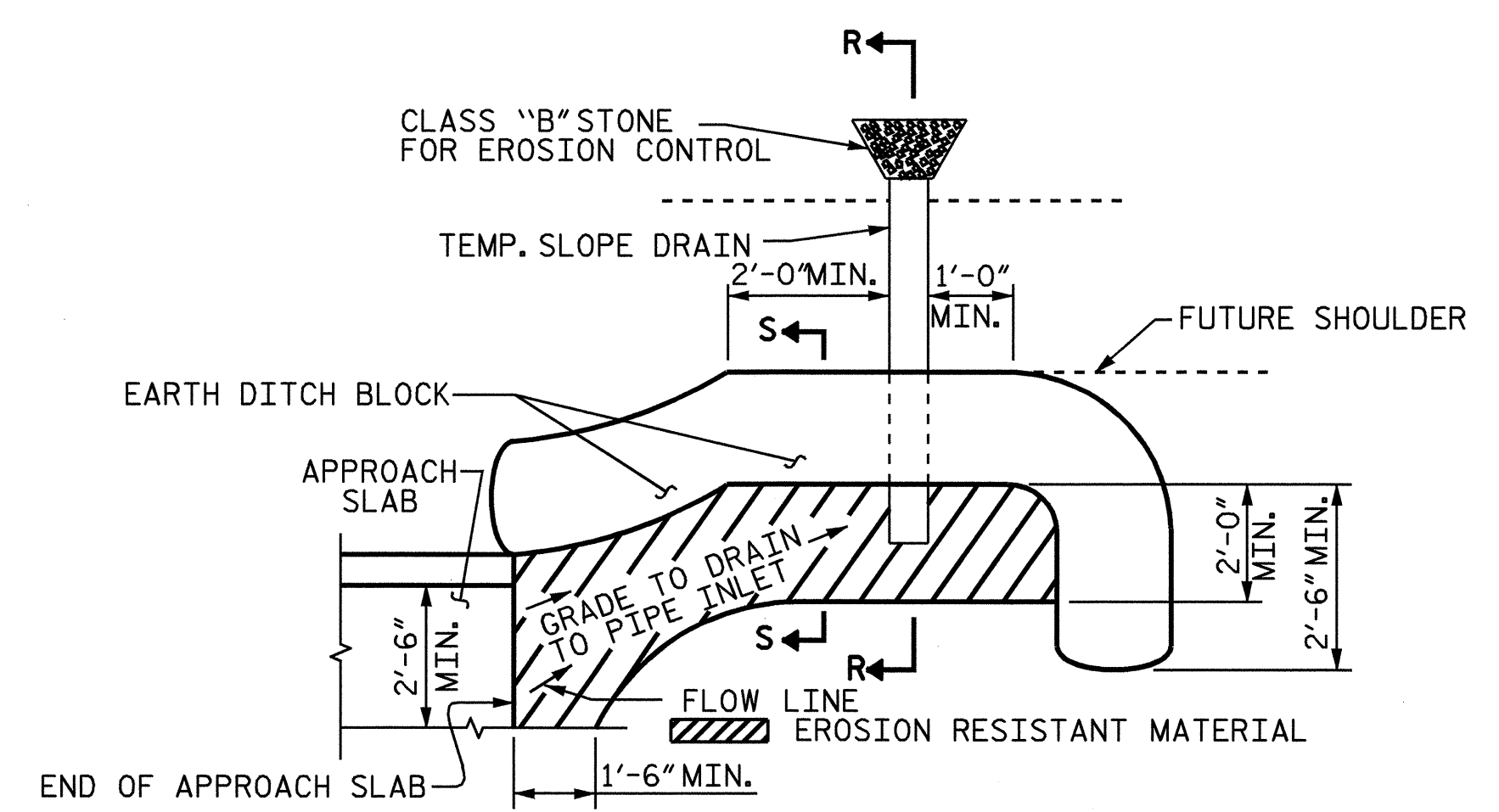


**JOINT SEAL DETAILS @ END BENT**

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP AS SHOWN.  
 \* FORMED OPENING TO MATCH ACTUAL OPENING BETWEEN THE TOP OF THE BOX BEAM UNIT AND THE BACKWALL WITH A MINIMUM FORMED OPENING OF 1 1/2".

| ELASTOMERIC CONCRETE |                                  |
|----------------------|----------------------------------|
| END BENT NO.         | ELASTOMERIC CONCRETE * (CU. FT.) |
| 1                    | 25.3                             |
| 2                    | 25.3                             |
| TOTAL                | 50.6                             |

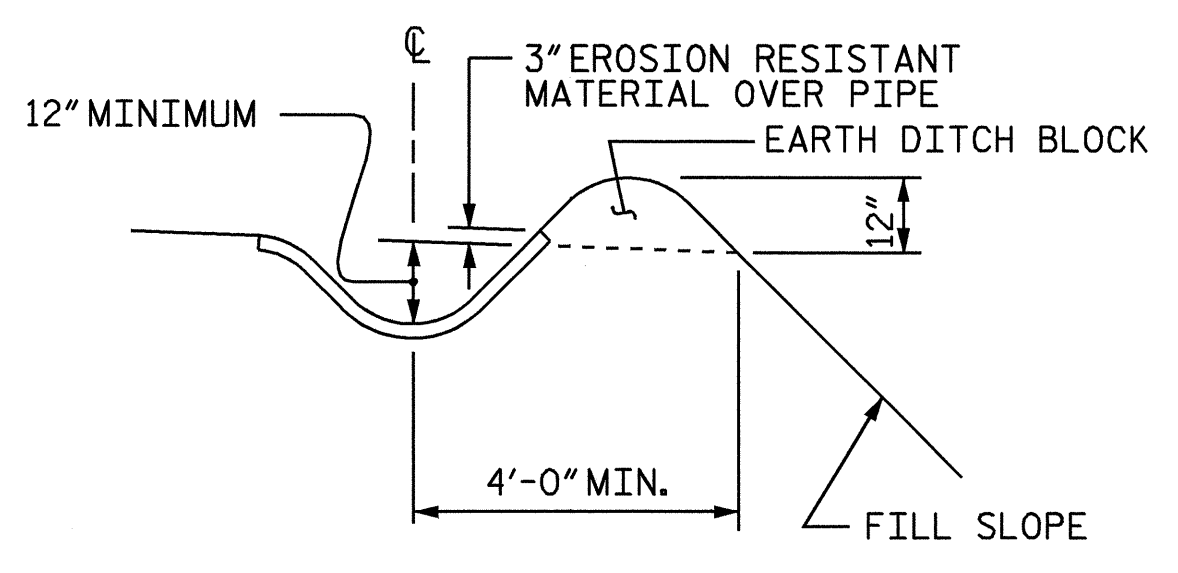
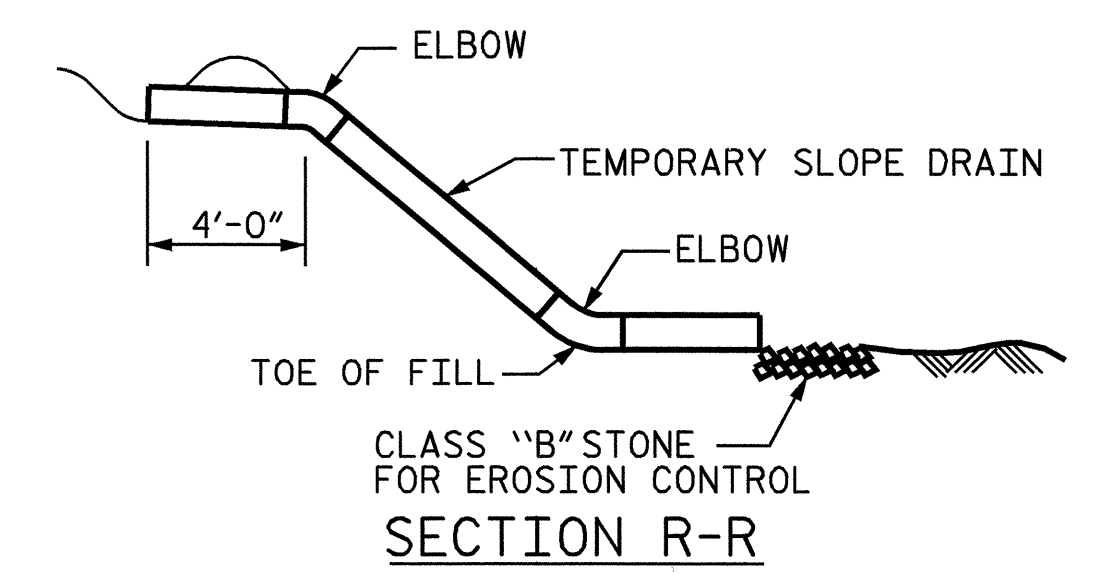
\* BASED ON THE MINIMUM BLOCKOUT SHOWN.



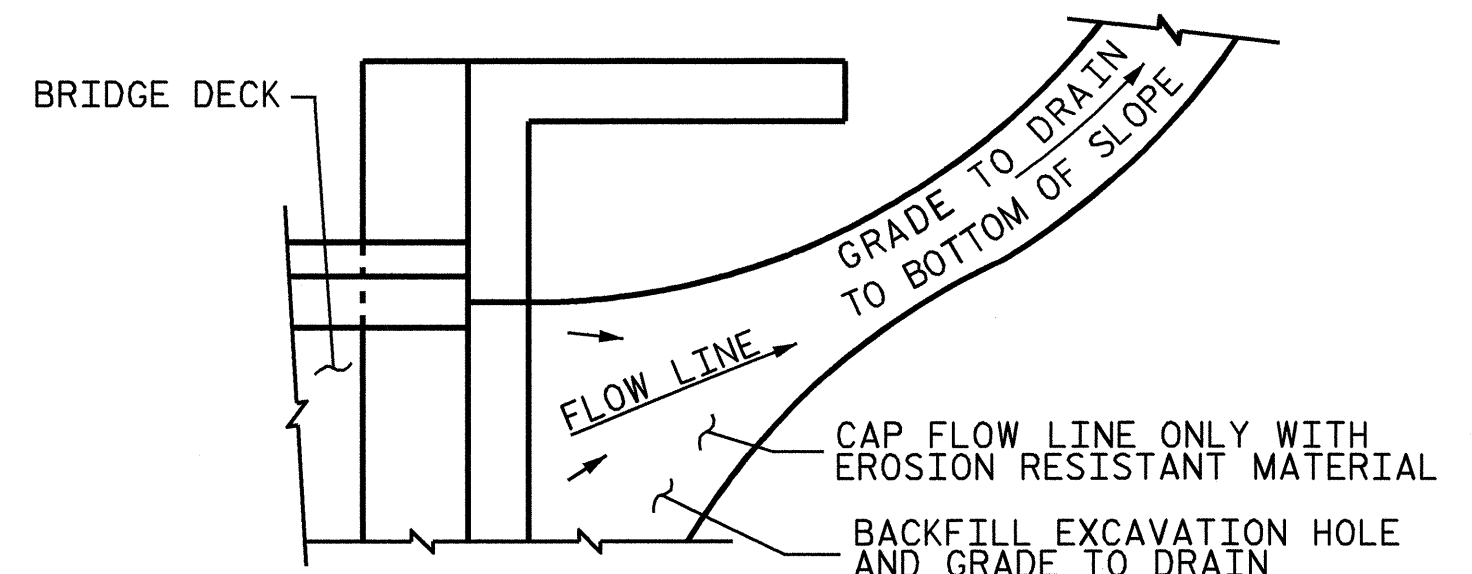
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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.

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



**SECTION S-S**



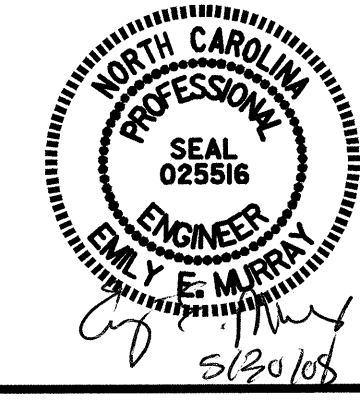
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

**TEMPORARY DRAINAGE DETAIL**

PROJECT NO. B-4031  
 BRUNSWICK COUNTY  
 STATION: 25+70.00 -L-

SHEET 2 OF 2

| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       | STANDARD        |  | BRIDGE APPROACH<br>SLAB DETAILS |  |
|--|-----|-------|-----|-----|-------|-----------------|--|---------------------------------|--|
| REVISIONS  |     |       |     |     |       |                 |  |                                 |  |
| NO.  | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.       |  |                                 |  |
| 1  |     |       | 3   |     |       | S-33            |  |                                 |  |
| 2  |     |       | 4   |     |       | TOTAL SHEETS 33 |  |                                 |  |



|                              |                       |
|------------------------------|-----------------------|
| ASSEMBLED BY : C.R. MCDUFFEE | DATE : 2/13/06        |
| CHECKED BY : T. L. AVERETTE  | DATE : 2/13/06        |
| DRAWN BY : FCJ 11/88         | REV. 10/17/00 RWW/LES |
| CHECKED BY : ARB 11/88       | REV. 5/1/03 RWW/JTE   |
|                              | REV. 5/1/06R MAA/KMM  |

## STANDARD NOTES

### DESIGN DATA:

|   |       |                                  |
|---|-------|----------------------------------|
| SPECIFICATIONS                                  | ----- | A.A.S.H.T.O. (CURRENT)           |
| LIVE LOAD                                       | ----- | SEE PLANS                        |
| IMPACT ALLOWANCE                                | ----- | SEE A.A.S.H.T.O.                 |
| STRESS IN EXTREME FIBER OF                      |       |                                  |
| STRUCTURAL STEEL - AASHTO M270 GRADE 36         | -     | 20,000 LBS. PER SQ. IN.          |
| - AASHTO M270 GRADE 50W                         | -     | 27,000 LBS. PER SQ. IN.          |
| - AASHTO M270 GRADE 50                          | -     | 27,000 LBS. PER SQ. IN.          |
| REINFORCING STEEL IN TENSION                    |       |                                  |
| GRADE 60  | --    | 24,000 LBS. PER SQ. IN.          |
| CONCRETE IN COMPRESSION                         | ----- | 1,200 LBS. PER SQ. IN.           |
| CONCRETE IN SHEAR                               | ----- | SEE A.A.S.H.T.O.                 |
| STRUCTURAL TIMBER - TREATED OR                  |       |                                  |
| UNTREATED - EXTREME FIBER STRESS                | ----- | 1,800 LBS. PER SQ. IN.           |
| COMPRESSION PERPENDICULAR TO GRAIN<br>OF TIMBER | ----- | 375 LBS. PER SQ. IN.             |
| EQUIVALENT FLUID PRESSURE OF EARTH              | ----- | 30 LBS. PER CU. FT.<br>(MINIMUM) |

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2002 STANDARD SPECIFICATIONS "FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

### CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP; AND CLASS S SHALL BE USED FOR UNDERWATER FOOTING SEALS.

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED WITH THE EXCEPTION OF #2 BARS WHICH MAY BE FABRICATED FROM COLD DRAWN STEEL WIRE. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991. THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

# ENGLISH

JANUARY, 1990

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