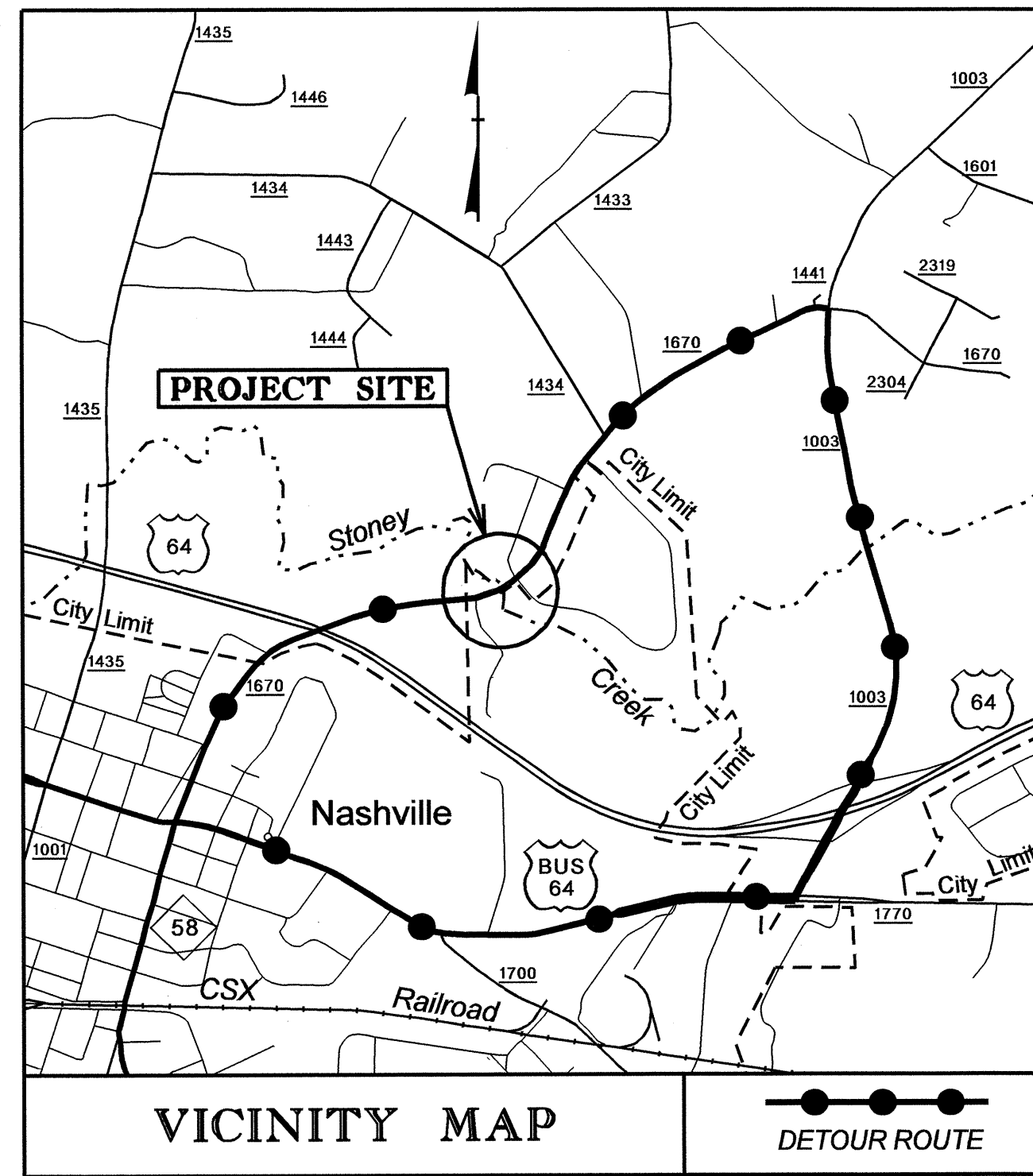


**TIP PROJECT: B-4588**

**CONTRACT: C202749**



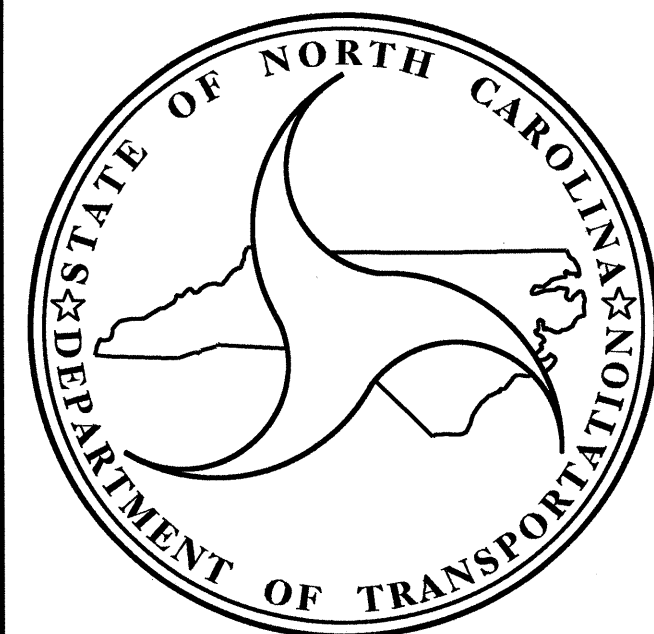
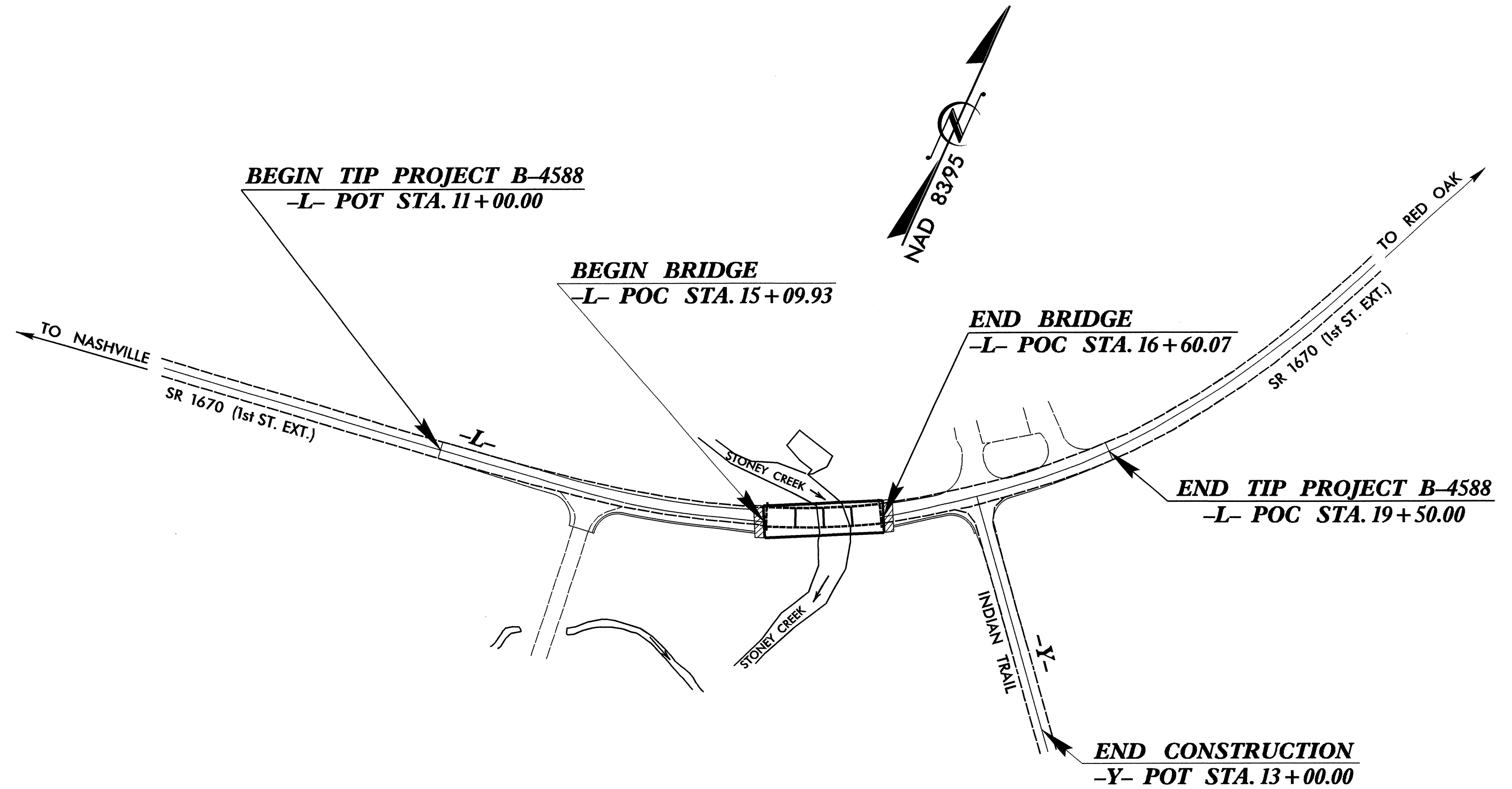
**STRUCTURE**

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

**LOCATION: BRIDGE NO.1 OVER STONEY CREEK ON SR 1670**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE**

| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | <b>B-4588</b>               |             |              |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION |              |
| 33788.1.1       | BRZ-1670(1)                 | P.E.        |              |
| 33788.2.1       | BRZ-1670(1)                 | RW, UTIL    |              |
| 33788.3.1       | BRZ-1670(1)                 | CONST.      |              |
|                 |                             |             |              |
|                 |                             |             |              |
|                 |                             |             |              |



**DESIGN DATA**

|                       |        |
|-----------------------|--------|
| ADT 2012 =            | 4400   |
| ADT 2032 =            | 6845   |
| DHV =                 | 10 %   |
| D =                   | 60 %   |
| T =                   | 3 % *  |
| V =                   | 50 MPH |
| FUNC CLASS =          | LOCAL  |
| * (TTST 1% + DUAL 2%) |        |
| SUBREGIONAL TIER      |        |

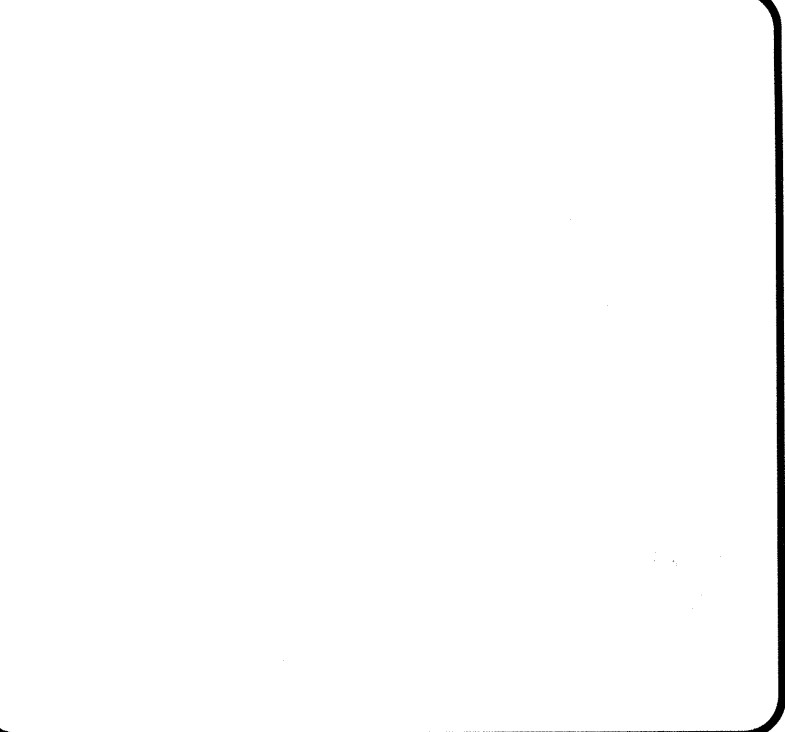
**PROJECT LENGTH**

|                                      |             |
|--------------------------------------|-------------|
| LENGTH ROADWAY TIP PROJ. B-4588 =    | 0.133 MILES |
| LENGTH STRUCTURES TIP PROJ. B-4588 = | 0.028 MILES |
| TOTAL LENGTH OF TIP PROJ. B-4588 =   | 0.161 MILES |
| 2012 STANDARD SPECIFICATIONS         |             |
| <b>LETTING DATE:</b>                 |             |
| JANUARY 17, 2012                     |             |

Prepared in the Office of:  
**DEPARTMENT OF TRANSPORTATION**  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

**B. S. COX, P.E.**  
PROJECT ENGINEER

**K. W. ALFORD, P.E.**  
PROJECT DESIGN ENGINEER



DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

15+00

16+00

17+00

(+)-0.9231% (-)-0.3000%

P.I. = 13+90.00 -L-  
EL. = 139.01'  
V.C. = 200.00'

GRADE DATA -L-

FILL FACE @ END BENT No. 1  
STA. 15+09.93 -L-  
GRADE PT. EL. = 138.650

BEGIN FRONT SLOPE  
STA. 15+04.40 -L-  
GRADE PT. EL. 138.667

SPAN "A"

SPAN "B"

FILL FACE @ END BENT No. 2  
STA. 16+60.07 -L-  
GRADE PT. EL. = 138.200

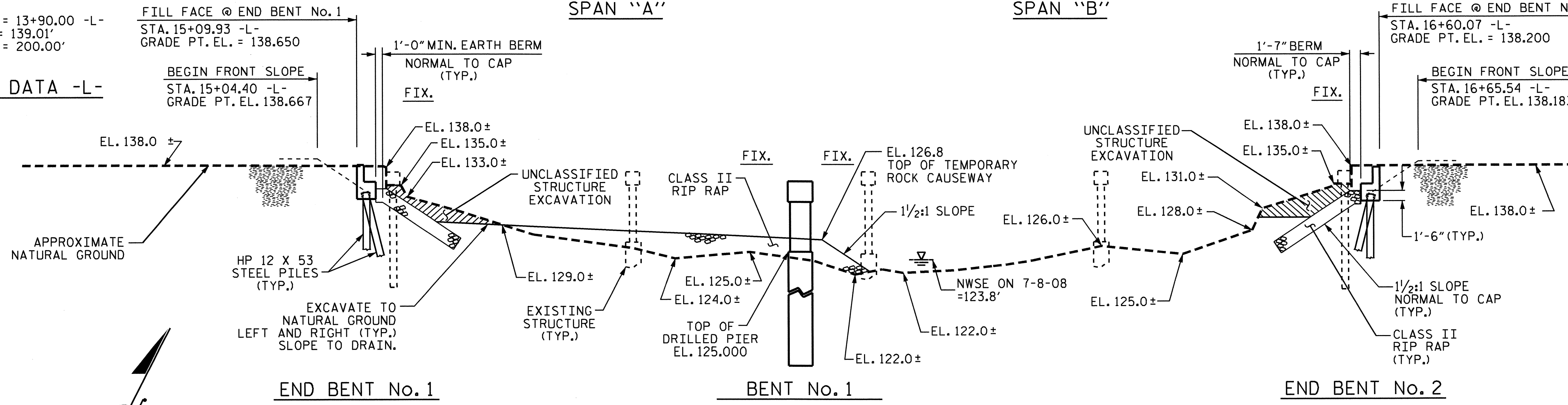
BEGIN FRONT SLOPE  
STA. 16+65.54 -L-  
GRADE PT. EL. 138.183

(-)-0.3000% (-)-1.0571%

P.I. = 18+20.00 -L-  
EL. = 137.72'  
V.C. = 200.00'

GRADE DATA -L-

150  
140  
130  
120



**HYDROGRAPHIC DATA**

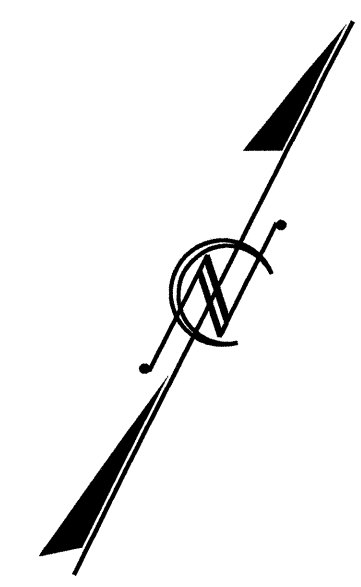
|                             |              |
|-----------------------------|--------------|
| DESIGN DISCHARGE            | 6500 CFS     |
| FREQUENCY OF DESIGN FLOOD   | 25 yr        |
| DESIGN HIGH WATER ELEVATION | 136.0        |
| DRAINAGE AREA               | 57.2 sq. mi. |
| BASE DISCHARGE (Q100)       | 9300 CFS     |
| BASE HIGH WATER ELEVATION   | 136.8        |

**OVERTOPPING FLOOD DATA**

|   |             |
|---|-------------|
| OVERTOPPING DISCHARGE                       | < 4,900 CFS |
| FREQUENCY OF OVERTOPPING FLOOD              | < 10 YRS.   |
| OVERTOPPING FLOOD ELEVATION @ SAG LINE BACK | = 133.0     |

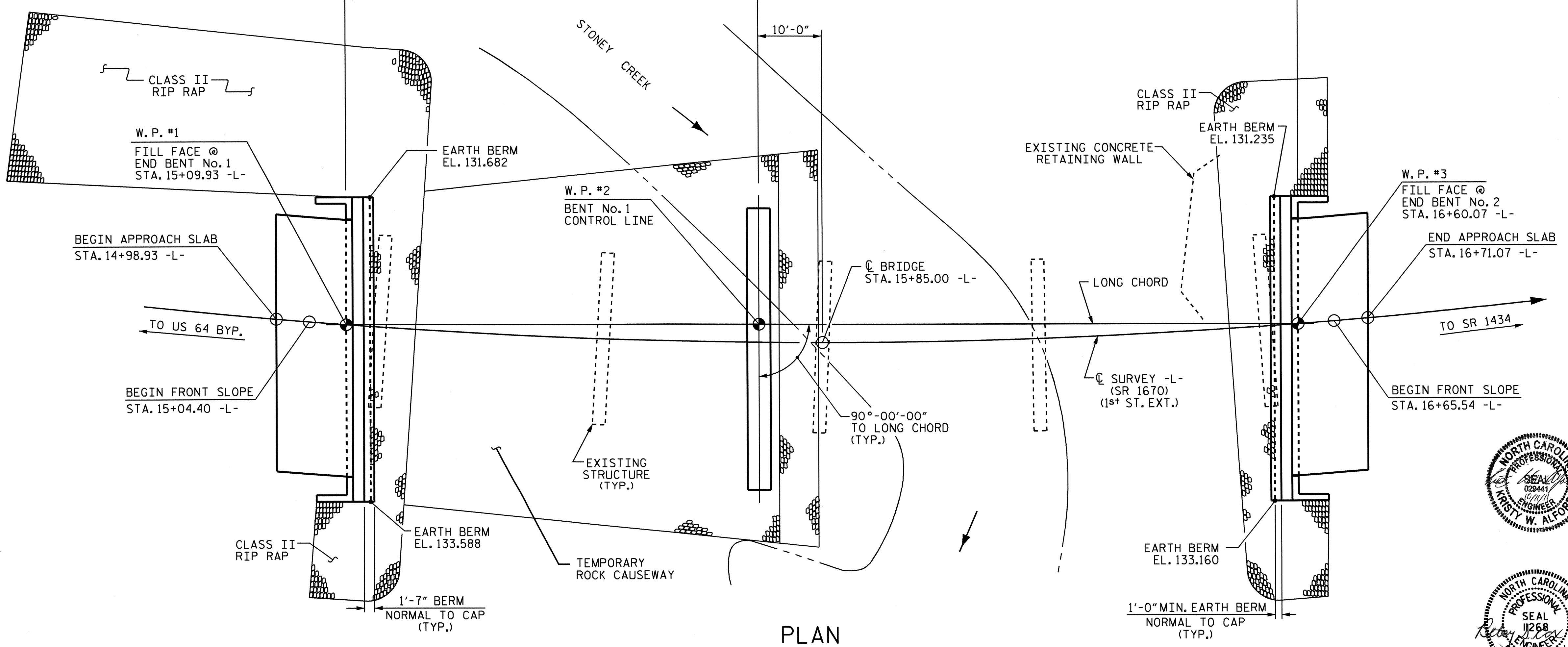
**SECTION ALONG C SURVEY -L-**

(SECTIONS AT END BENTS AND BENT ARE AT RIGHT ANGLES)



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

150'-0" TOTAL LENGTH OF BRIDGE  
(FILL FACE @ END BENT No. 1 TO FILL FACE @ END BENT No. 2 ALONG LONG CHORD)  
65'-0"      85'-0"



**PLAN**

PILES AND DRILLED PIERS NOT SHOWN FOR CLARITY

DRAWN BY : A. V. ROYAL DATE : 12/09  
CHECKED BY : T. BANKOVICH DATE : 7/10

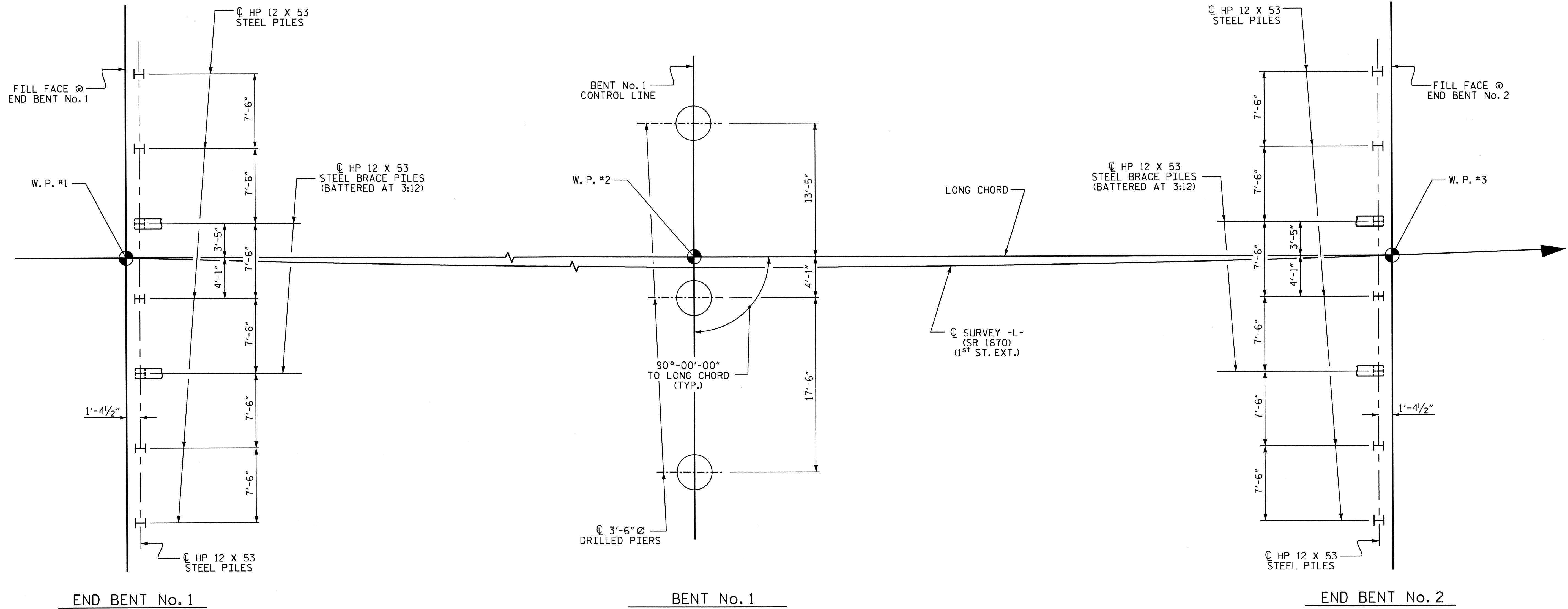
11-OCT-2011 11:05  
L:\Structures\Gen.draw\B4588.SD.GD.dgn  
Kalford



PROJECT NO. B-4588  
NASH COUNTY  
STATION: 15+85.00 -L-

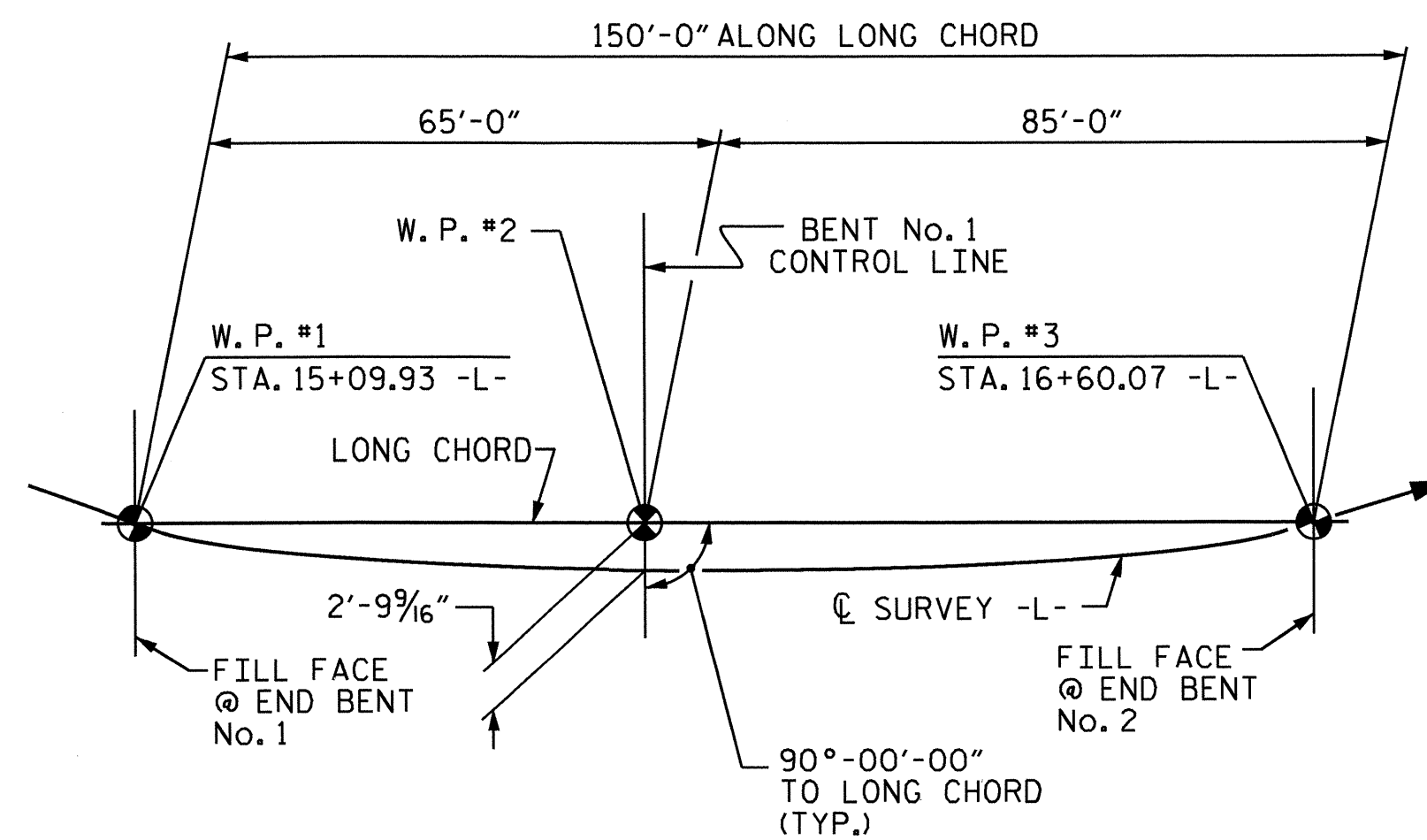
SHEET 1 OF 3 REPLACES BRIDGE No. 1  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**GENERAL DRAWING**  
BRIDGE ON SR 1670  
(1st ST. EXT.)  
OVER STONEY CREEK BETWEEN  
US 64 BYP. AND SR 1434

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



**FOUNDATION LAYOUT**

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE TO THE CENTERLINE AT BOTTOM OF CAP.



**LONG CHORD LAYOUT**

NOTE: THE EFFECTS OF THE HORIZONTAL CURVE SHALL BE NEGLECTED IN THE CONSTRUCTION OF THIS BRIDGE. BRIDGE TO BE BUILT ALONG THE LONG CHORD BETWEEN THE WORK POINTS AT THE FILL FACES.

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE ON SR 1670  
 (1<sup>ST</sup> ST. EXT.)  
 OVER STONEY CREEK BETWEEN  
 US 64 BYP. AND SR 1434

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

DRAWN BY : A. V. ROYAL DATE : 12/09  
 CHECKED BY : T. BANKOVICH DATE : 7/10



LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE BOX BEAMS

| LEVEL                    | VEHICLE     | WEIGHT (W)<br>(TONS) | CONTROLLING<br>LOAD RATING<br># | MINIMUM<br>RATING FACTORS<br>(RF) | TONS = W X RF | STRENGTH I LIMIT STATE |                              |               |      |               |   |                              |               |      |               | SERVICE III LIMIT STATE                   |                     |                              |               |      |               |   |        |
|--------------------------|-------------|----------------------|---------------------------------|-----------------------------------|---------------|------------------------|------------------------------|---------------|------|---------------|---|------------------------------|---------------|------|---------------|---|---------------------|------------------------------|---------------|------|---------------|---|--------|
|                          |             |                      |                                 |                                   |               | LIVELOAD<br>FACTORS    | MOMENT                       |               |      |               |   | SHEAR                        |               |      |               |   | LIVELOAD<br>FACTORS | MOMENT                       |               |      |               |   |        |
|                          |             |                      |                                 |                                   |               |                        | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN | BEAM LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (ft) | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN | BEAM LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (ft) |                     | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN | BEAM LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (ft) |        |
| DESIGN<br>LOAD<br>RATING | HL-93 (INV) | N/A                  | 1                               | 1.042                             | --            | 1.75                   | 0.276                        | 1.39          | A    | EL            | 31.156                                    | 0.516                        | 1.20          | A    | EL            | 6.231                                     | 0.80                | 0.276                        | 1.04          | A    | EL            | 31.156                                    |        |
|                          | HL-93 (OPR) | N/A                  | --                              | 1.560                             | --            | 1.35                   | 0.276                        | 1.80          | A    | EL            | 31.156                                    | 0.516                        | 1.56          | A    | EL            | 6.231                                     | N/A                 | --                           | --            | --   | --            | --  |        |
|                          | HS-20 (INV) | 36.000               | 2                               | 1.332                             | 47.942        | 1.75                   | 0.276                        | 1.77          | A    | EL            | 31.156                                    | 0.516                        | 1.47          | A    | EL            | 6.231                                     | 0.80                | 0.276                        | 1.33          | A    | EL            | 31.156                                    |        |
|                          | HS-20 (OPR) | 36.000               | --                              | 1.907                             | 68.663        | 1.35                   | 0.276                        | 2.30          | A    | EL            | 31.156                                    | 0.516                        | 1.91          | A    | EL            | 6.231                                     | N/A                 | --                           | --            | --   | --            | --  |        |
| LEGAL<br>LOAD<br>RATING  | SV          | SNSH                 | 13,500                          | --                                | 2.907         | 39,239                 | 1.4                          | 0.276         | 4.83 | A             | EL  | 31.156                       | 0.516         | 4.29 | A             | EL  | 6.231               | 0.80                         | 0.276         | 2.91 | A             | EL  | 31.156 |
|                          |             | SNGARBS2             | 20,000                          | --                                | 2.208         | 44,159                 | 1.4                          | 0.276         | 3.67 | A             | EL  | 31.156                       | 0.516         | 3.08 | A             | EL  | 6.231               | 0.80                         | 0.276         | 2.21 | A             | EL  | 31.156 |
|                          |             | SNAGRIS2             | 22,000                          | --                                | 2.109         | 46,398                 | 1.4                          | 0.276         | 3.51 | A             | EL  | 31.156                       | 0.516         | 2.87 | A             | EL  | 6.231               | 0.80                         | 0.276         | 2.11 | A             | EL  | 31.156 |
|                          |             | SNCOTTS3             | 27,250                          | --                                | 1.448         | 39,447                 | 1.4                          | 0.276         | 2.41 | A             | EL  | 31.156                       | 0.516         | 2.14 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.45 | A             | EL  | 31.156 |
|                          |             | SNAGGRS4             | 34,925                          | --                                | 1.226         | 42,807                 | 1.4                          | 0.276         | 2.04 | A             | EL  | 31.156                       | 0.516         | 1.80 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.23 | A             | EL  | 31.156 |
|                          |             | SNS5A                | 35,550                          | --                                | 1.198         | 42,572                 | 1.4                          | 0.276         | 1.99 | A             | EL  | 31.156                       | 0.516         | 1.83 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.20 | A             | EL  | 31.156 |
|                          |             | SNS6A                | 39,950                          | --                                | 1.106         | 44,165                 | 1.4                          | 0.276         | 1.84 | A             | EL  | 31.156                       | 0.516         | 1.68 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.11 | A             | EL  | 31.156 |
|                          | TTST        | SNS7B                | 42,000                          | --                                | 1.053         | 44,228                 | 1.4                          | 0.276         | 1.75 | A             | EL  | 31.156                       | 0.516         | 1.66 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.05 | A             | EL  | 31.156 |
|                          |             | TNAGRIT3             | 33,000                          | --                                | 1.350         | 44,554                 | 1.4                          | 0.276         | 2.25 | A             | EL  | 31.156                       | 0.516         | 1.99 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.35 | A             | EL  | 31.156 |
|                          |             | TNT4A                | 33,075                          | --                                | 1.358         | 44,914                 | 1.4                          | 0.276         | 2.26 | A             | EL  | 31.156                       | 0.516         | 1.93 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.36 | A             | EL  | 31.156 |
|                          |             | TNT6A                | 41,600                          | --                                | 1.117         | 46,463                 | 1.4                          | 0.276         | 1.86 | A             | EL  | 31.156                       | 0.516         | 1.79 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.12 | A             | EL  | 31.156 |
|                          |             | TNT7A                | 42,000                          | --                                | 1.126         | 47,294                 | 1.4                          | 0.276         | 1.87 | A             | EL  | 31.156                       | 0.516         | 1.73 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.13 | A             | EL  | 31.156 |
|                          |             | TNT7B                | 42,000                          | --                                | 1.174         | 49,299                 | 1.4                          | 0.276         | 1.95 | A             | EL  | 31.156                       | 0.516         | 1.61 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.17 | A             | EL  | 31.156 |
|                          |             | TNAGRIT4             | 43,000                          | --                                | 1.110         | 47,731                 | 1.4                          | 0.276         | 1.85 | A             | EL  | 31.156                       | 0.516         | 1.56 | A             | EL  | 6.231               | 0.80                         | 0.276         | 1.11 | A             | EL  | 31.156 |
| TNAGT5A                  | 45,000      | --                   | 1.044                           | 46,960                            | 1.4           | 0.276                  | 1.74                         | A             | EL   | 31.156        | 0.516                                     | 1.56                         | A             | EL   | 6.231         | 0.80                                      | 0.276               | 1.04                         | A             | EL   | 31.156        |   |        |
| TNAGT5B                  | 45,000      | 3                    | 1.028                           | 46,271                            | 1.4           | 0.276                  | 1.71                         | A             | EL   | 31.156        | 0.516                                     | 1.48                         | A             | EL   | 6.231         | 0.80                                      | 0.276               | 1.03                         | A             | EL   | 31.156        |   |        |

LOAD FACTORS:

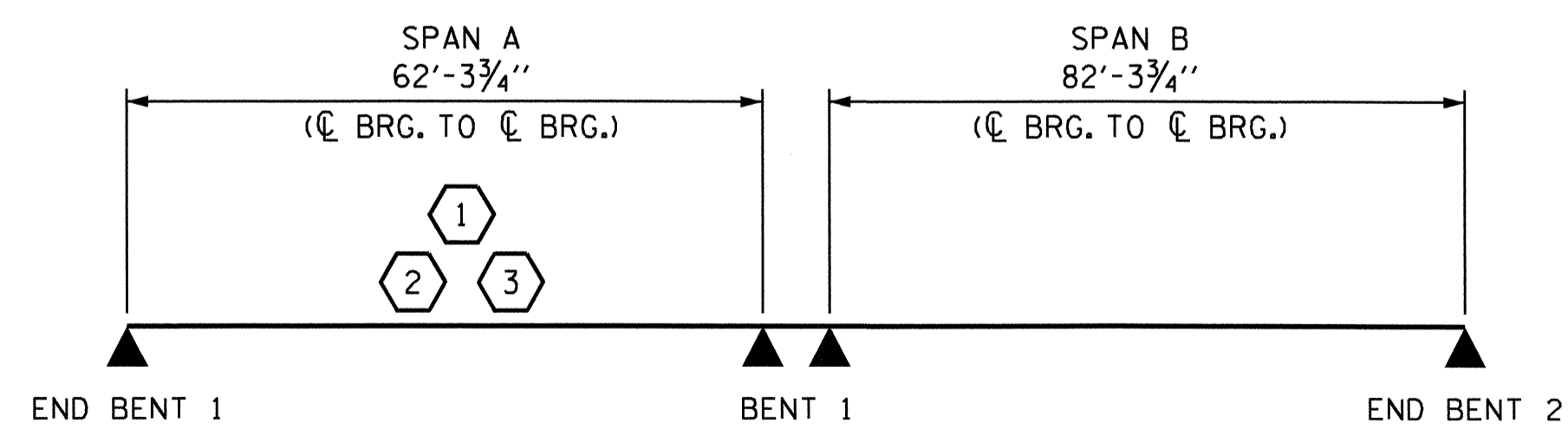
|                                     |             |               |               |
|-------------------------------------|-------------|---------------|---------------|
| DESIGN<br>LOAD<br>RATING<br>FACTORS | LIMIT STATE | $\gamma_{DC}$ | $\gamma_{DW}$ |
|                                     | STRENGTH I  | 1.25          | 1.50          |
|                                     | SERVICE III | 1.00          | 1.00          |

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

|                               |                            |
|-------------------------------|----------------------------|
| #                             | CONTROLLING LOAD RATING    |
| 1                             | DESIGN LOAD RATING (HL-93) |
| 2                             | DESIGN LOAD RATING (HS-20) |
| 3                             | LEGAL LOAD RATING **       |
| ** SEE CHART FOR VEHICLE TYPE |                            |
| BOX BEAM LOCATION             |                            |
| I - INTERIOR BOX BEAM         |                            |
| EL - EXTERIOR LEFT BOX BEAM   |                            |
| ER - EXTERIOR RIGHT BOX BEAM  |                            |



LRFR SUMMARY

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE BOX BEAMS  
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : T. M. GARRISON    DATE : 1/11  
 CHECKED BY : T. N. CARROLL    DATE : 2/11  
 DRAWN BY : MAA    1/08    REV. 11/12/08R    MAA/GM  
 CHECKED BY : GM/DI 2/08

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

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" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS. THE JOINT OPENING BETWEEN THE BACKWALL AND BOX BEAM UNITS AND BETWEEN BOX BEAM UNITS SHALL BE FILLED WITH GROUT.

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 4,000 PSI FOR SPAN A & 5,200 PSI FOR SPAN B.

ALL REINFORCING STEEL IN CONCRETE PARAPET AND SIDEWALK 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.

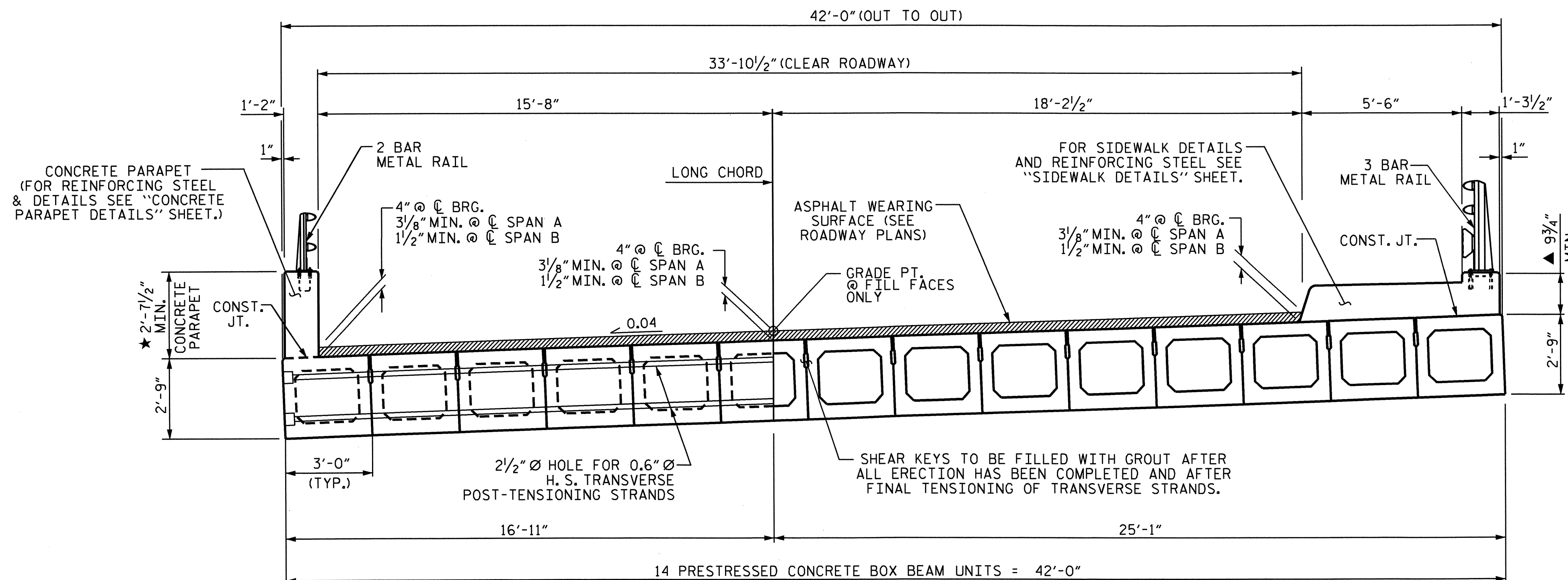
VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN CONCRETE PARAPET EXPANSION JOINTS. ONLY ONE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

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

★ THE MINIMUM HEIGHT OF THE CONCRETE PARAPET IS SHOWN. THE HEIGHT OF THE CONCRETE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE FINISH GRADE PROFILE OF THE GUTTERLINE.

▲ FOR GROUT FOR STRUCTURE, SEE SPECIAL PROVISIONS.

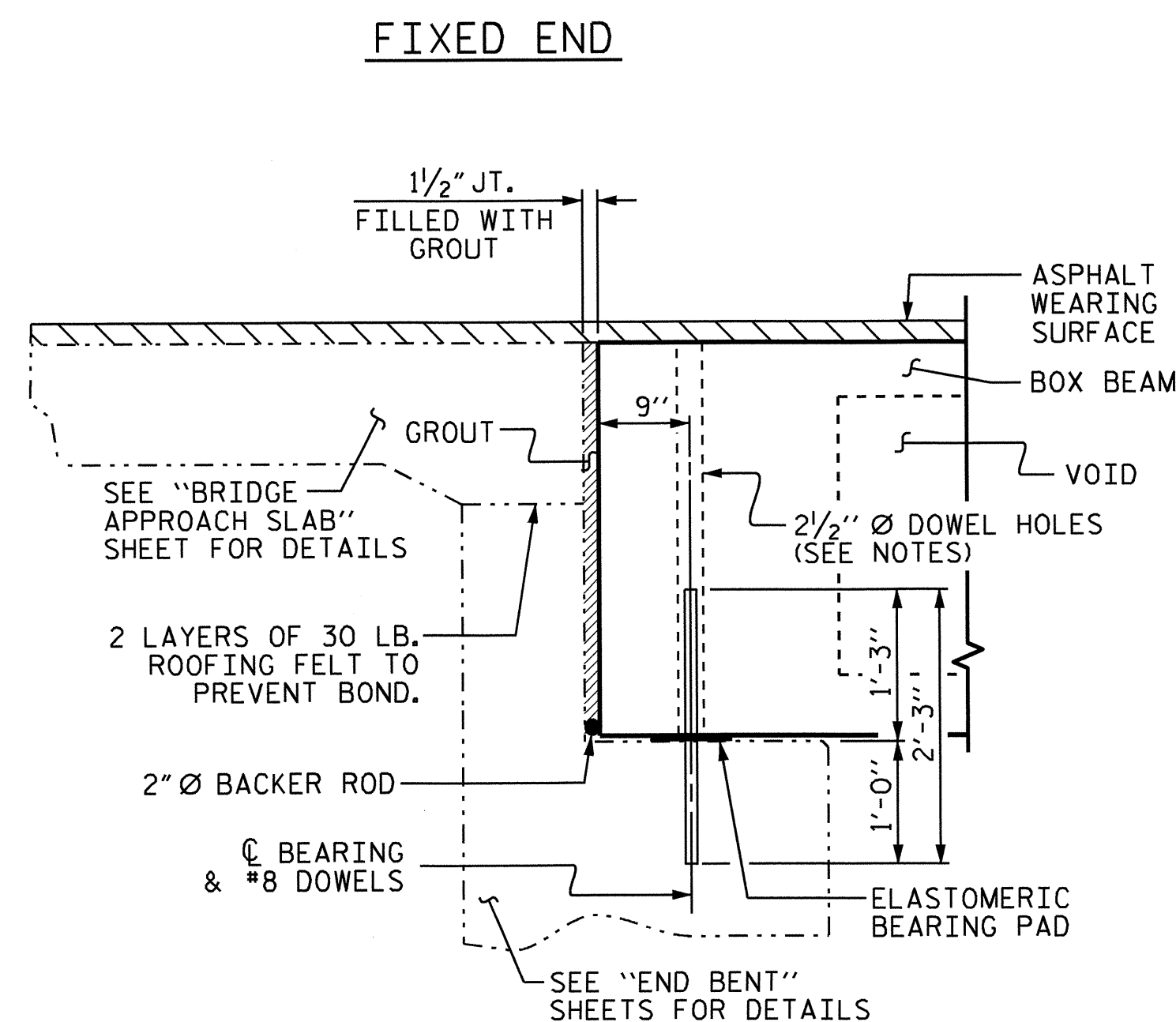
▲ THE MINIMUM HEIGHT OF THE CONCRETE SIDEWALK IS SHOWN. THE HEIGHT OF THE CONCRETE SIDEWALK VARIES WHILE THE TOP OF THE SIDEWALK FOLLOWS THE FINISH GRADE PROFILE OF THE GUTTERLINE.



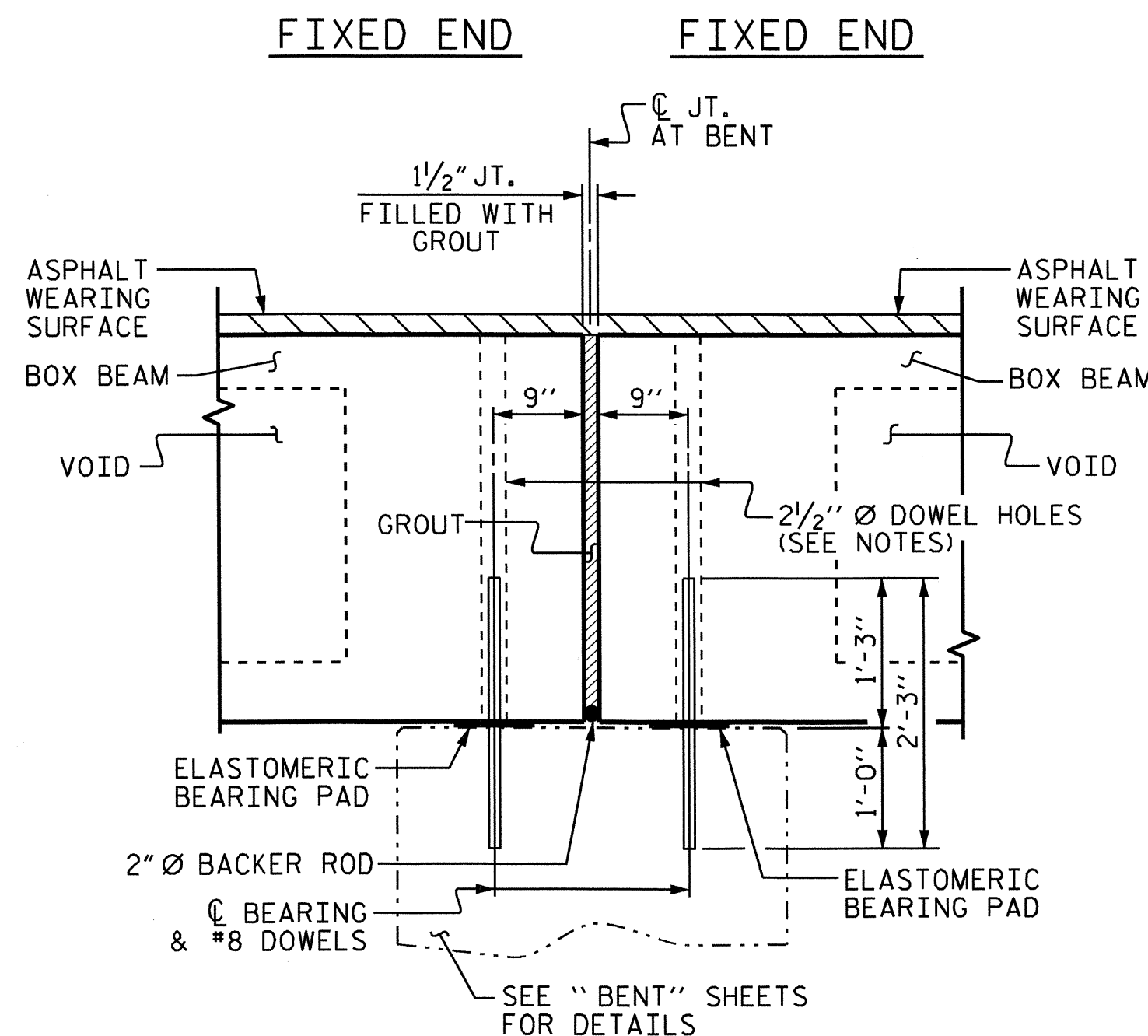
HALF-SECTION AT INTERMEDIATE DIAPHRAGM

HALF-SECTION AT VOIDS

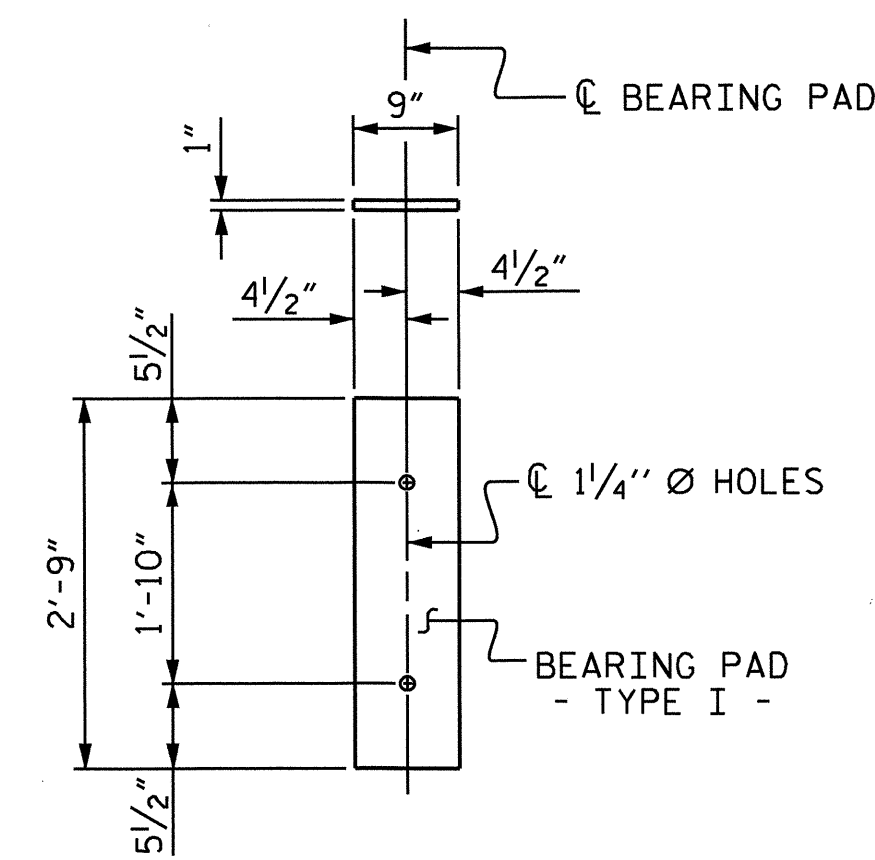
TYPICAL SECTION



SECTION AT END BENT



SECTION AT BENT



FIXED END  
(TYPE I - 56 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 1 OF 8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT

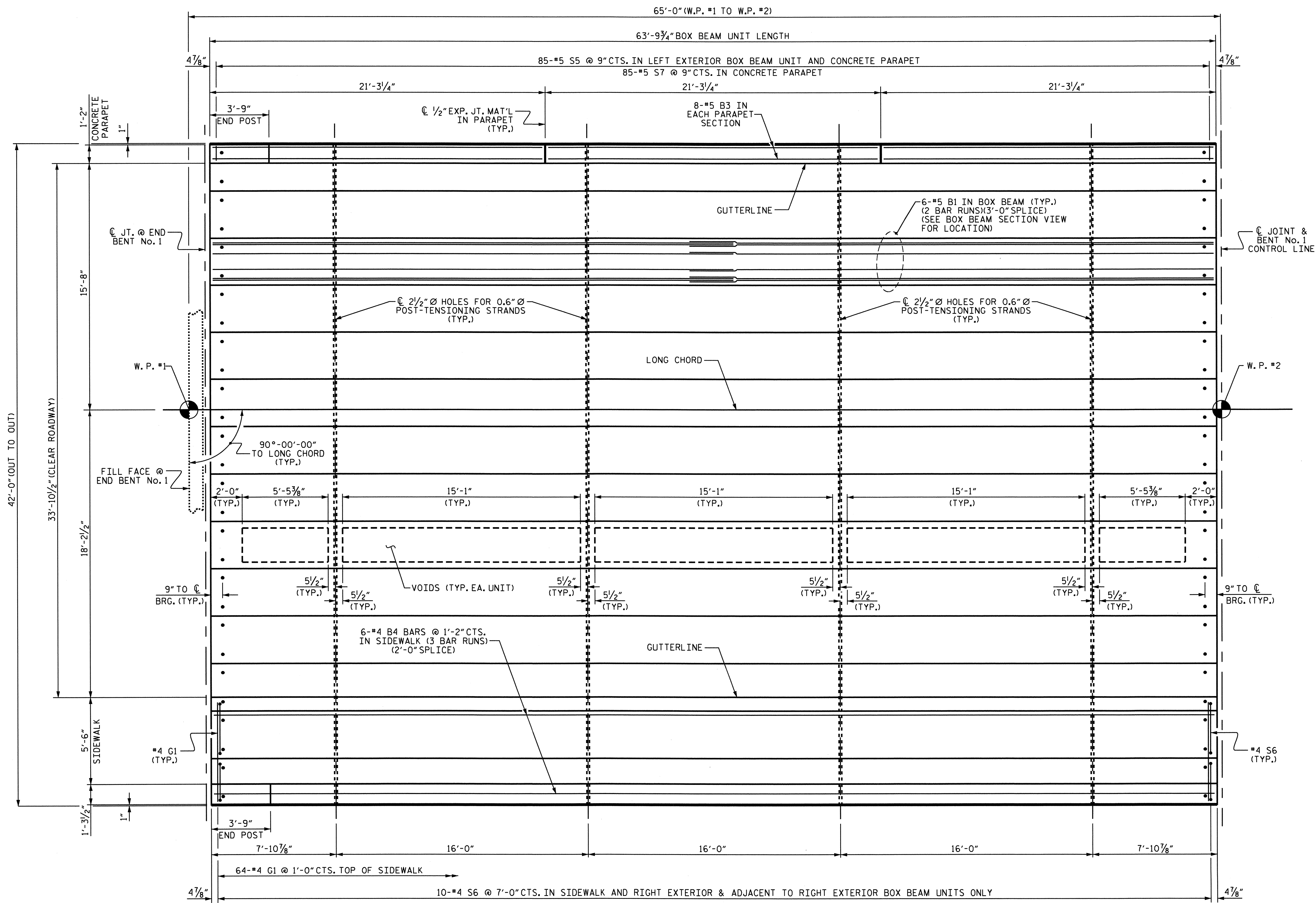


DRAWN BY : A. V. ROYAL DATE : 4/09  
 CHECKED BY : D. G. ELY DATE : 7/09

27-OCT-2011 09:13  
 L:\Structures\Super.Draw\B4588.sd.BX.dgn  
 kalford

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-5          |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |

STD. NO. PCBB1



FIX.

FIX.

### PLAN OF SPAN "A"

FOR DETAILS AND REINFORCING STEEL IN CONCRETE PARAPET, SEE "CONCRETE PARAPET DETAILS" SHEET.  
 FOR DETAILS AND REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 2 OF 8

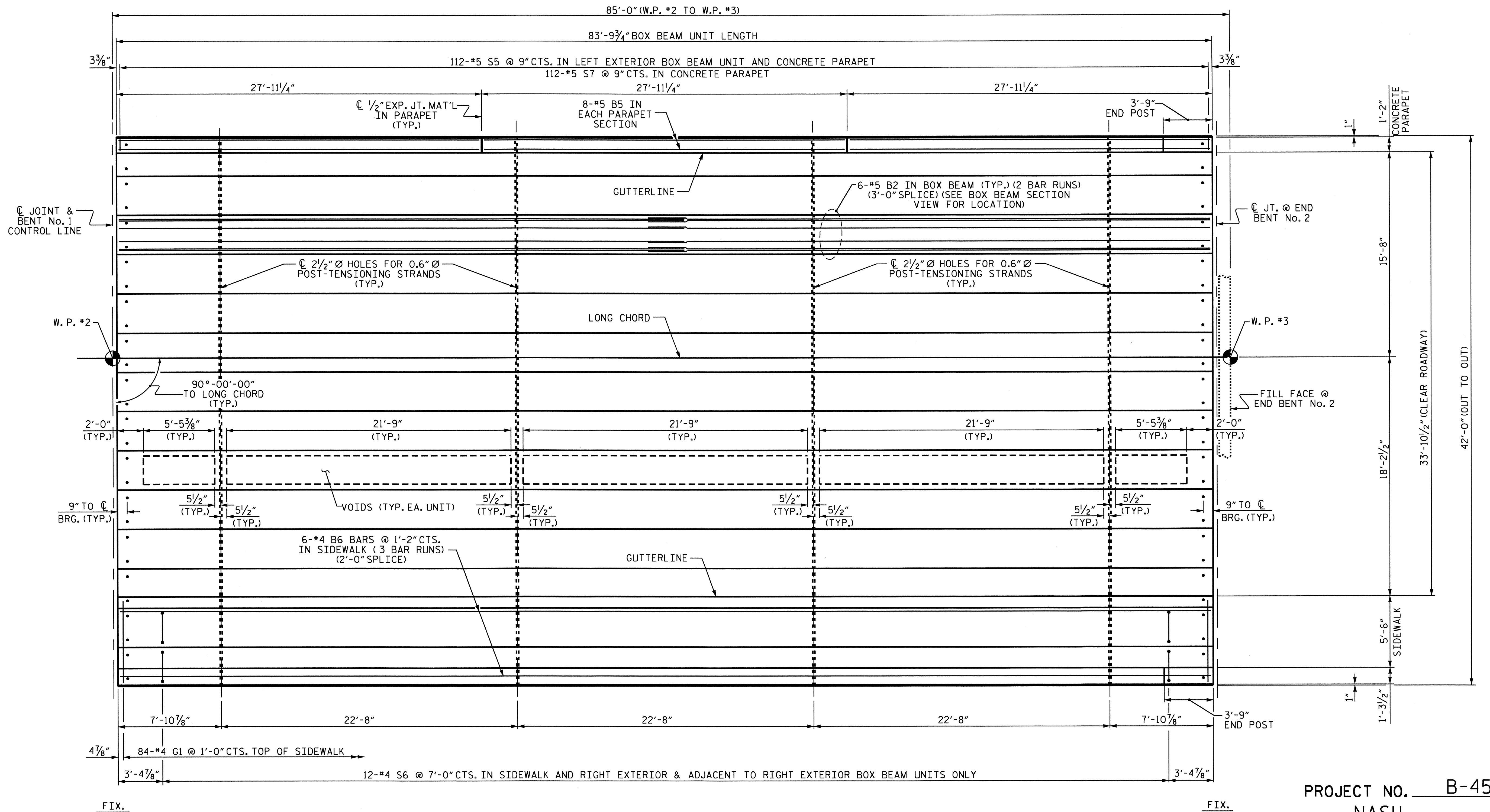
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE

## PLAN OF SPAN "A"



DRAWN BY: A. V. ROYAL DATE: 4/09  
 CHECKED BY: D. G. ELY DATE: 7/09

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-6          |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |



PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 3 OF 8

PLAN OF SPAN "B"

FOR DETAILS AND REINFORCING STEEL IN CONCRETE PARAPET, SEE "CONCRETE PARAPET DETAILS" SHEET.  
 FOR DETAILS AND REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.

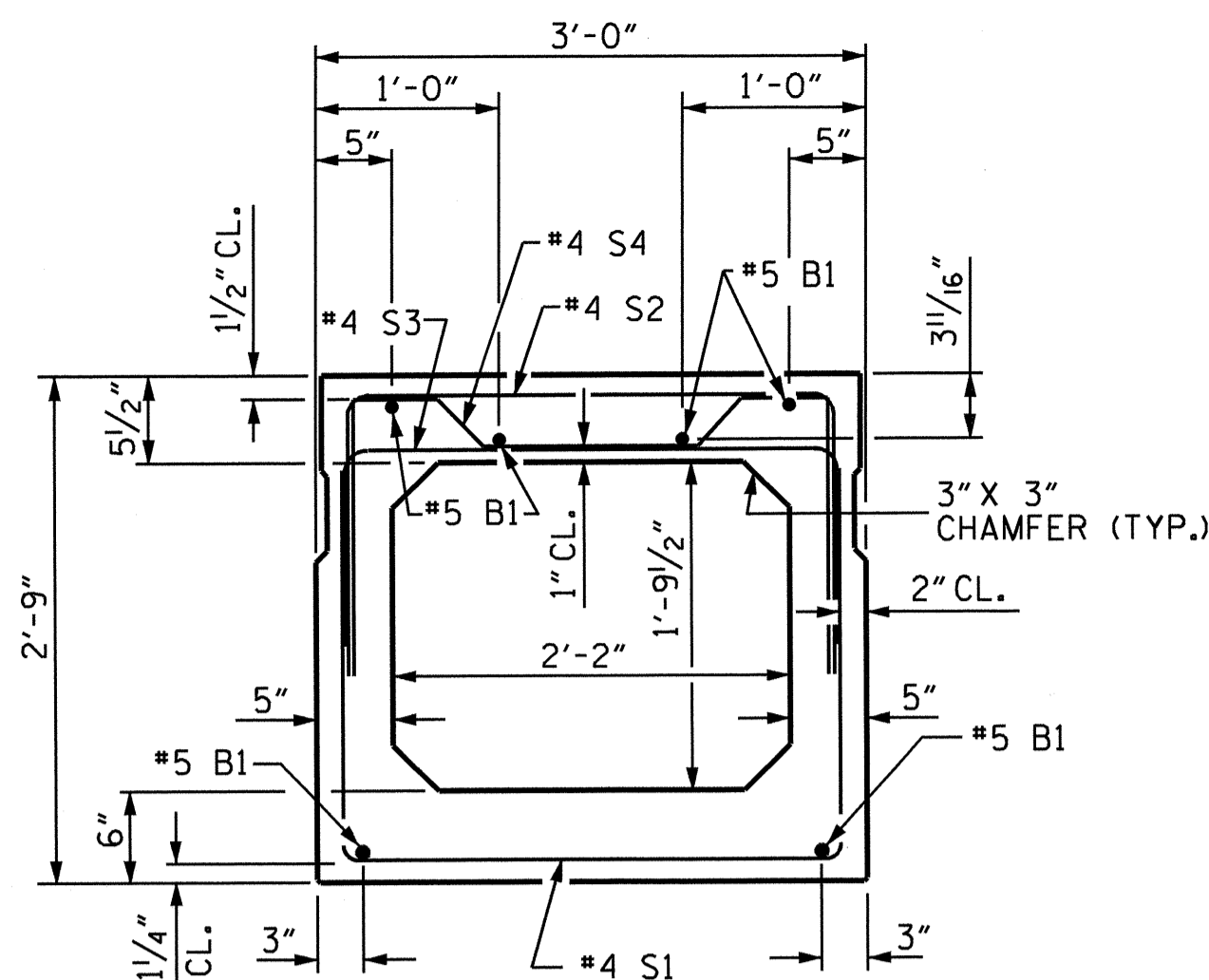
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN "B"



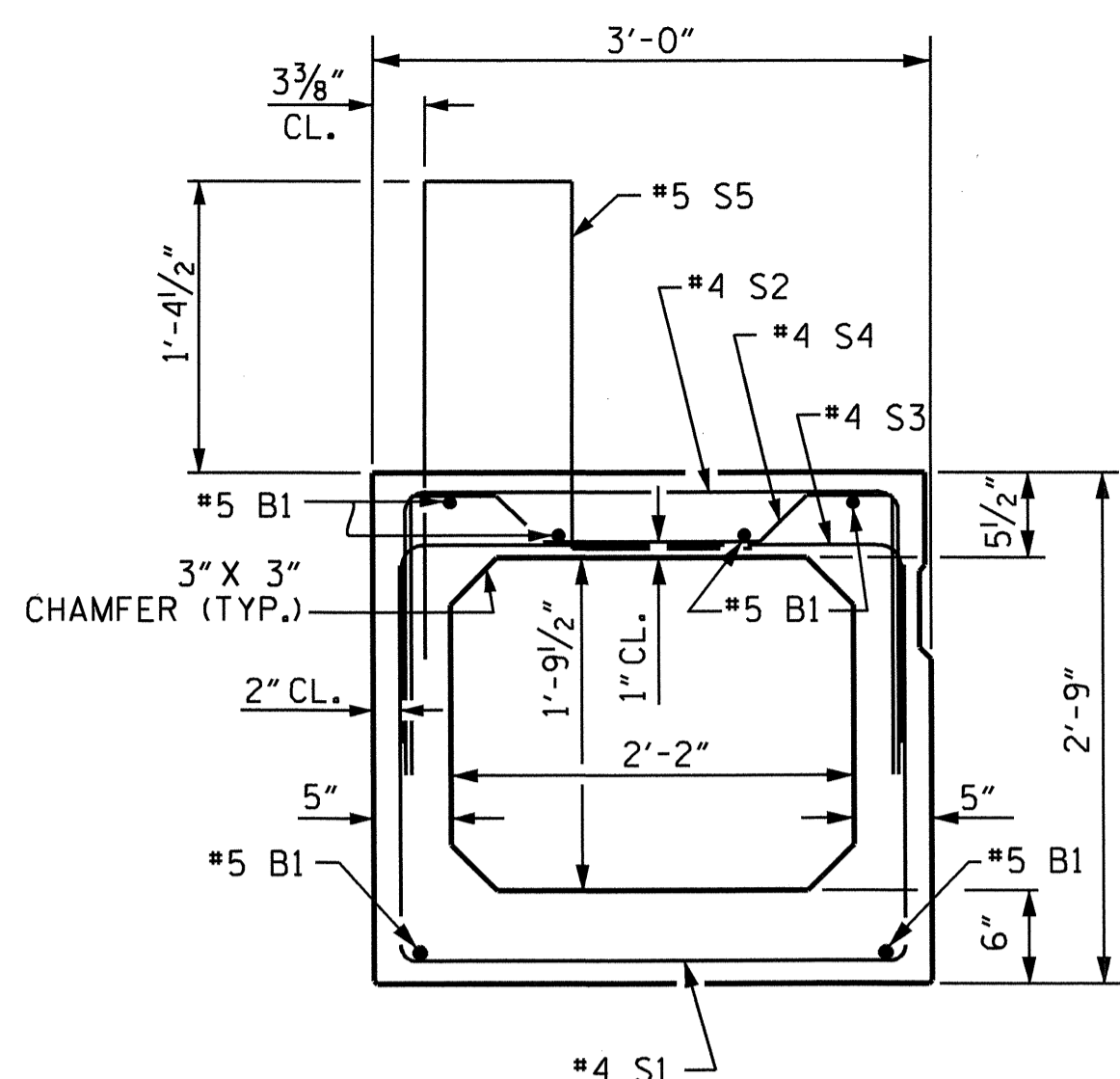
DRAWN BY : A. V. ROYAL DATE : 4/09  
 CHECKED BY : D. G. ELY DATE : 7/09

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-7          |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
| 2         |     |       | 4   |     |       | 31           |  |

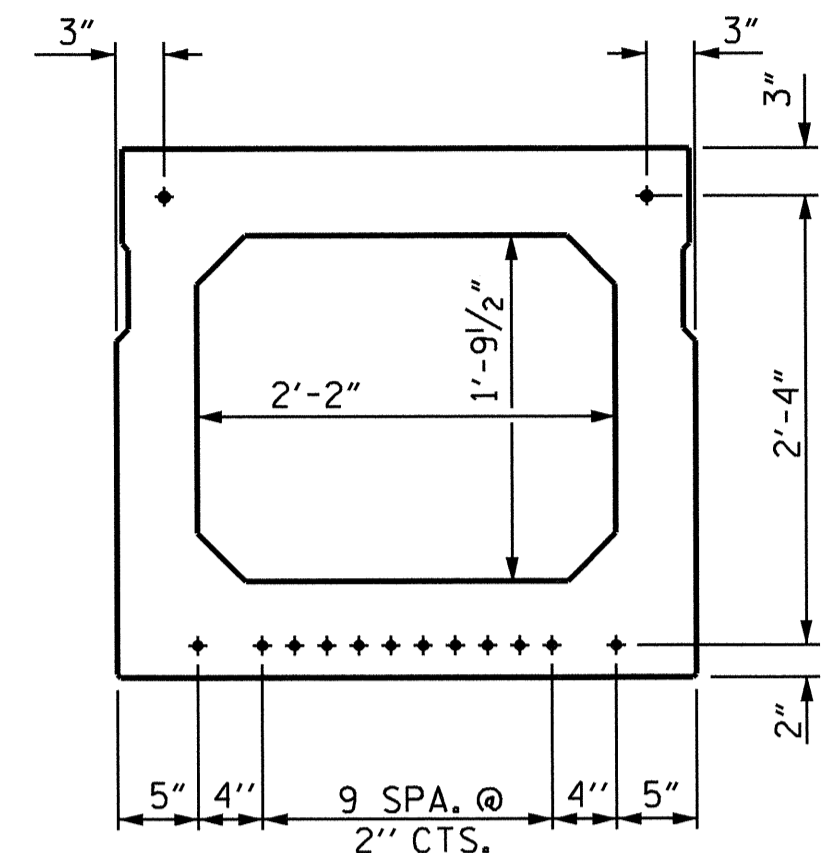




★ INTERIOR BOX BEAM SECTION  
(STRAND LAYOUT NOT SHOWN)

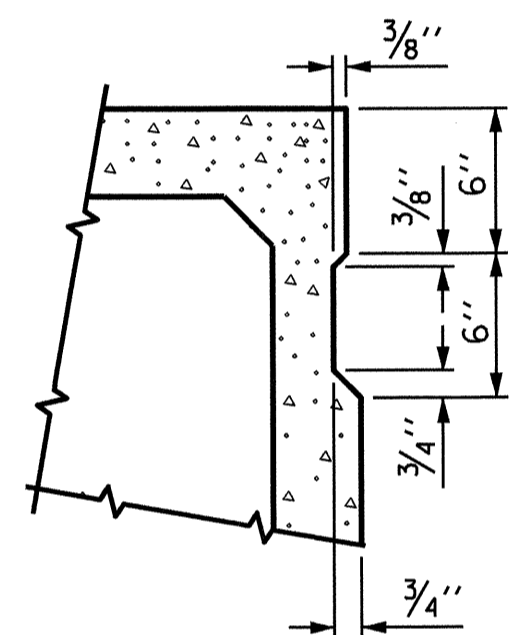


★ LEFT EXTERIOR BOX BEAM SECTION  
(STRAND LAYOUT NOT SHOWN)



TYPICAL STRAND LOCATION  
(14 STRANDS REQUIRED)

★ FOR RIGHT EXTERIOR AND ADJACENT TO RIGHT EXTERIOR BOX BEAM SECTIONS, SEE "SIDEWALK DETAILS" SHEET.



SHEAR KEY DETAIL

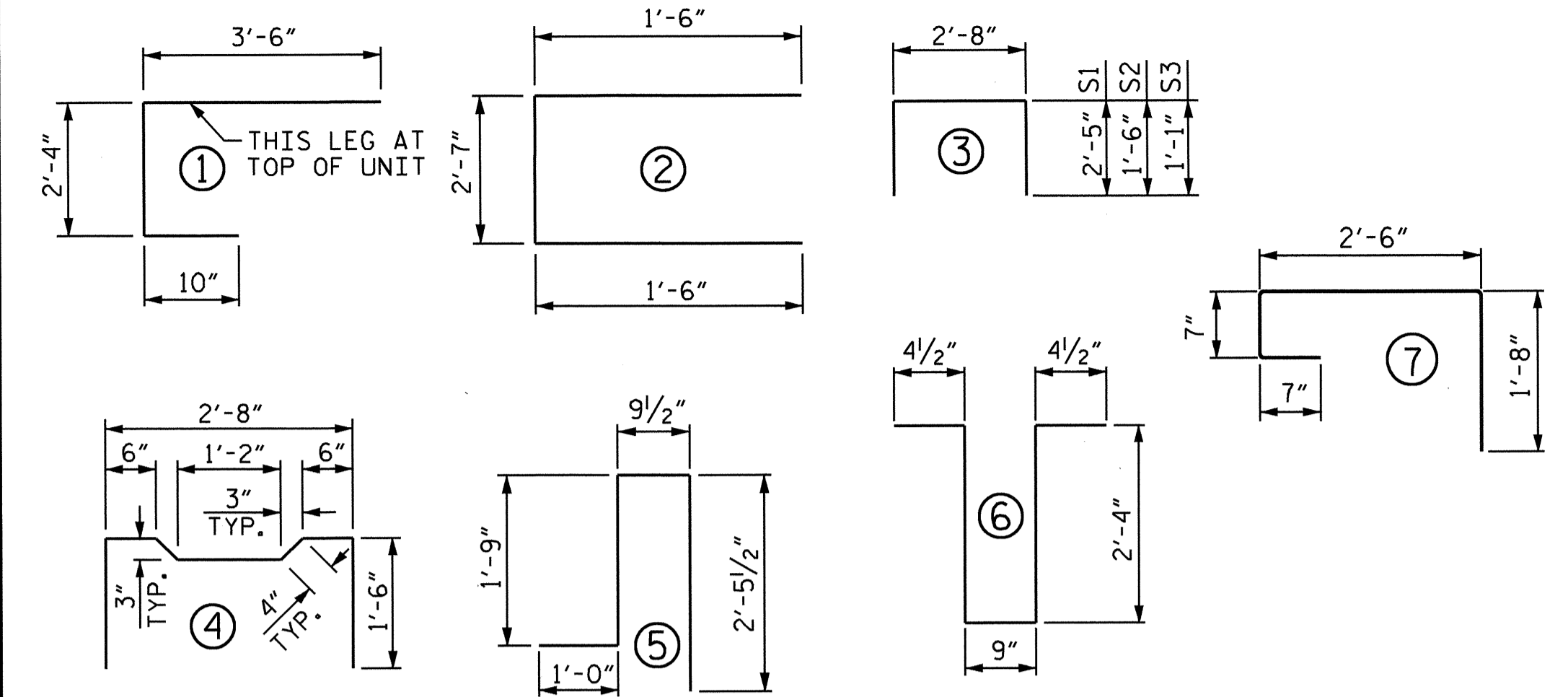
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

DEBONDING LEGEND

● FULLY BONDED STRANDS

0.6" Ø LOW RELAXATION STRAND LAYOUT

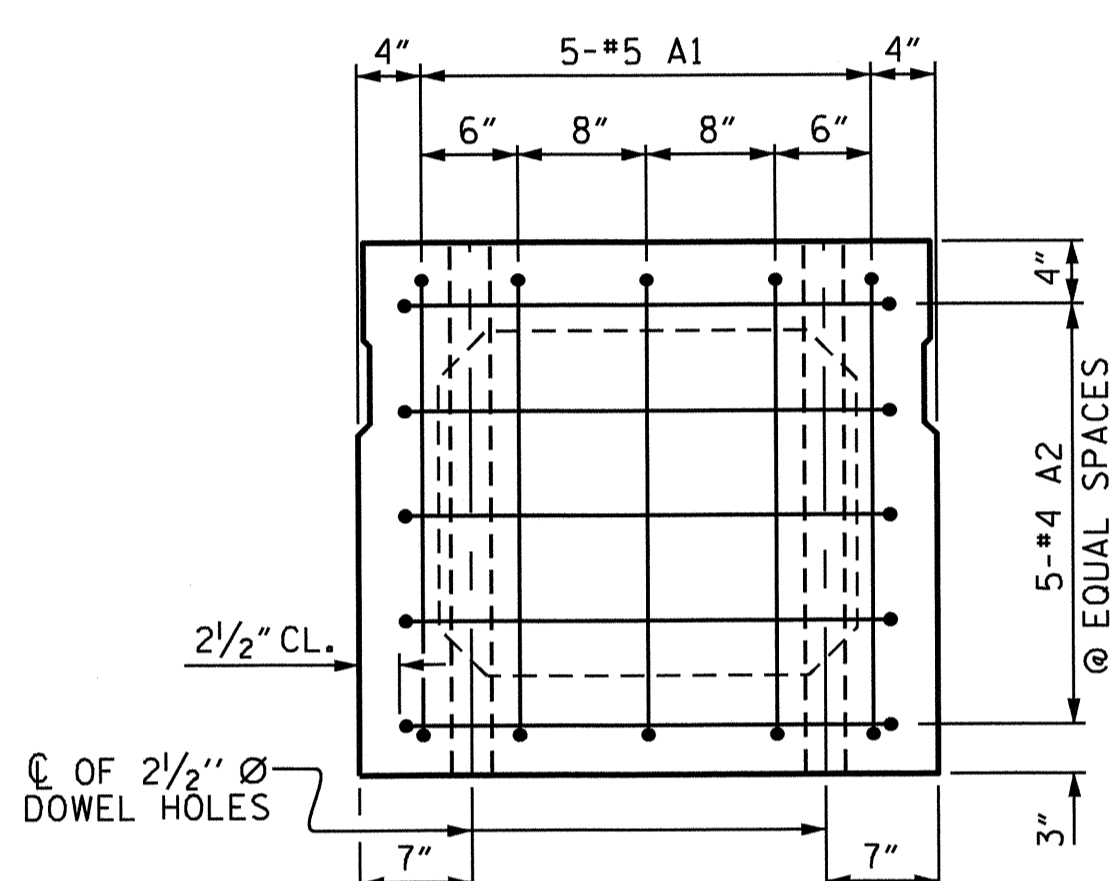
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

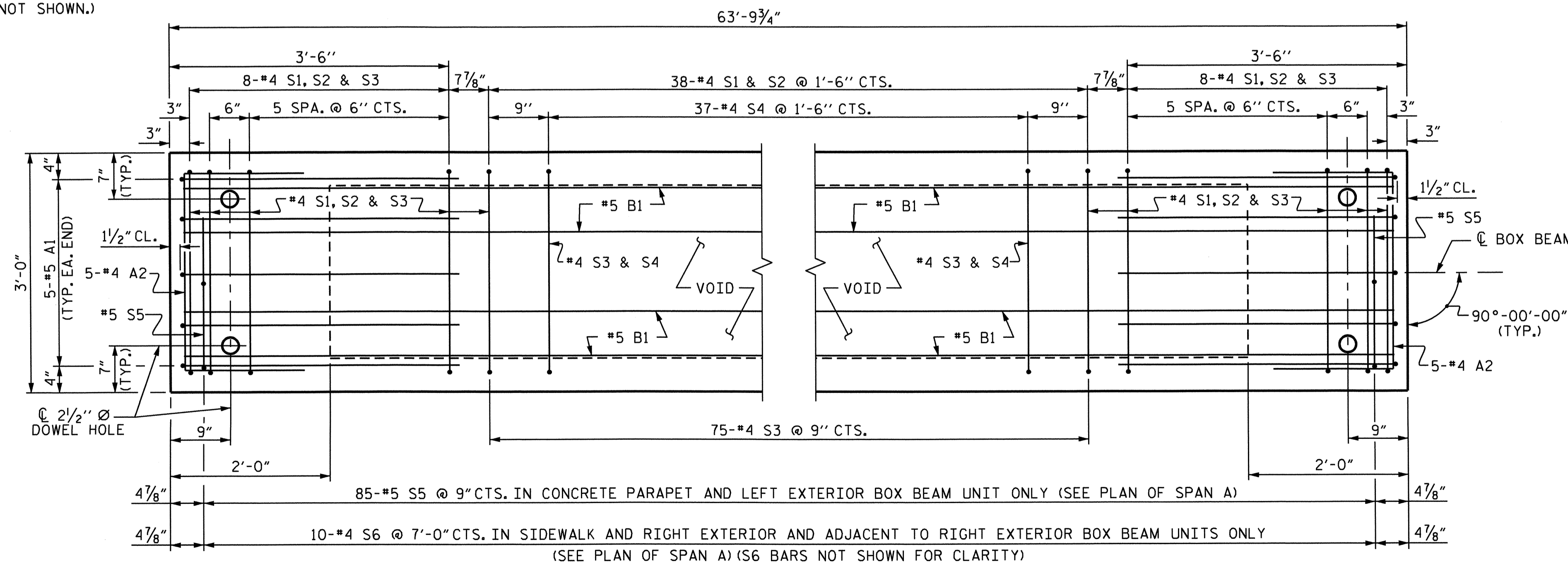
BILL OF MATERIAL FOR ONE BOX BEAM SECTION FOR SPAN "A"

| BAR NUMBER                 | SIZE | TYPE | LEFT EXTERIOR UNIT |        | INTERIOR UNIT |        | ★ ADJACENT TO RIGHT EXTERIOR UNIT |        | ★ RIGHT EXTERIOR UNIT |        |
|----------------------------|------|------|--------------------|--------|---------------|--------|-----------------------------------|--------|-----------------------|--------|
|                            |      |      | LENGTH             | WEIGHT | LENGTH        | WEIGHT | LENGTH                            | WEIGHT | LENGTH                | WEIGHT |
| A1                         | 10   | #5   | 6'-8"              | 70     | 6'-8"         | 70     | 6'-8"                             | 70     | 6'-8"                 | 70     |
| A2                         | 34   | #4   | 5'-7"              | 127    | 5'-7"         | 127    | 5'-7"                             | 127    | 5'-7"                 | 127    |
| B1                         | 12   | #5   | STR                | 33'-3" | 416           | 33'-3" | 416                               | 33'-3" | 416                   | 33'-3" |
| K1                         | 12   | #4   | 6                  | 6'-2"  | 49            | 6'-2"  | 49                                | 6'-2"  | 49                    | 6'-2"  |
| K2                         | 8    | #4   | STR                | 2'-7"  | 14            | 2'-7"  | 14                                | 2'-7"  | 14                    | 2'-7"  |
| S1                         | 54   | #4   | 3                  | 7'-6"  | 271           | 7'-6"  | 271                               | 7'-6"  | 271                   | 7'-6"  |
| S2                         | 54   | #4   | 3                  | 5'-8"  | 204           | 5'-8"  | 204                               | 5'-8"  | 204                   | 5'-8"  |
| S3                         | 91   | #4   | 3                  | 4'-10" | 294           | 4'-10" | 294                               | 4'-10" | 294                   | 4'-10" |
| S4                         | 37   | #4   | 4                  | 5'-10" | 144           | 5'-10" | 144                               | 5'-10" | 144                   | 5'-10" |
| *S5                        | 85   | #5   | 5                  | 6'-0"  | 532           | --     | --                                | --     | --                    | --     |
| *S6                        | 10   | #4   | 7                  | --     | --            | --     | --                                | 5'-4"  | 36                    | 5'-4"  |
| REINFORCING STEEL          |      |      | 1589 LBS.          |        | 1589 LBS.     |        | 1589 LBS.                         |        | 1589 LBS.             |        |
| *EPOXY COATED REINF. STEEL |      |      | 532 LBS.           |        | --            |        | 36 LBS.                           |        | 36 LBS.               |        |
| 5,000 P.S.I. CONCRETE      |      |      | 11.5 CU. YDS.      |        | 11.5 CU. YDS. |        | 11.5 CU. YDS.                     |        | 11.5 CU. YDS.         |        |
| 0.6" Ø L.R. STRANDS        |      |      | No. 14             |        | No. 14        |        | No. 14                            |        | No. 14                |        |



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.)



PLAN OF BOX BEAM FOR SPAN "A"

LEFT EXTERIOR UNIT SHOWN. RIGHT EXTERIOR UNIT AND ADJACENT TO RIGHT EXTERIOR UNIT SIMILAR EXCEPT INCLUDE #4 S6 BARS AND OMIT #5 S5 BARS. OTHER INTERIOR UNITS SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

| GRADE 270 STRANDS                     |        |
|---------------------------------------|--------|
| AREA ( SQUARE INCHES )                | 0.217  |
| ULTIMATE STRENGTH ( LBS. PER STRAND ) | 58,600 |
| APPLIED PRESTRESS ( LBS. PER STRAND ) | 43,950 |

PROJECT NO. B-4588  
NASH COUNTY  
STATION: 15+85.00 -L-

SHEET 4 OF 8



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-9"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPAN "A"

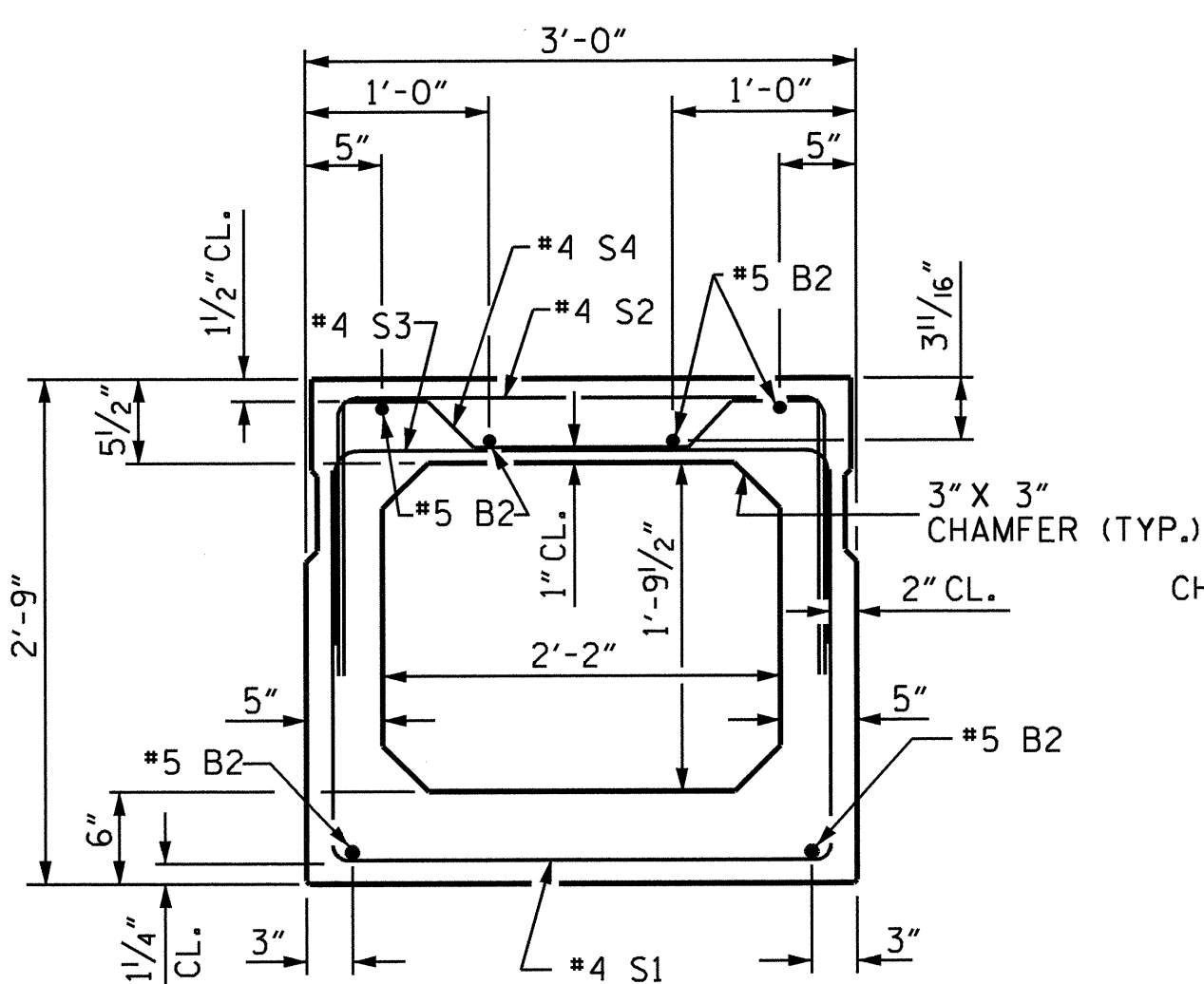
| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-8             |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 31 |
| 2         |     |       | 4   |     |       |                 |

ASSEMBLED BY : A. V. ROYAL DATE : 4/09  
CHECKED BY : D. G. ELY DATE : 7/09  
DRAWN BY : TLA 5/05  
CHECKED BY : GM 6/05

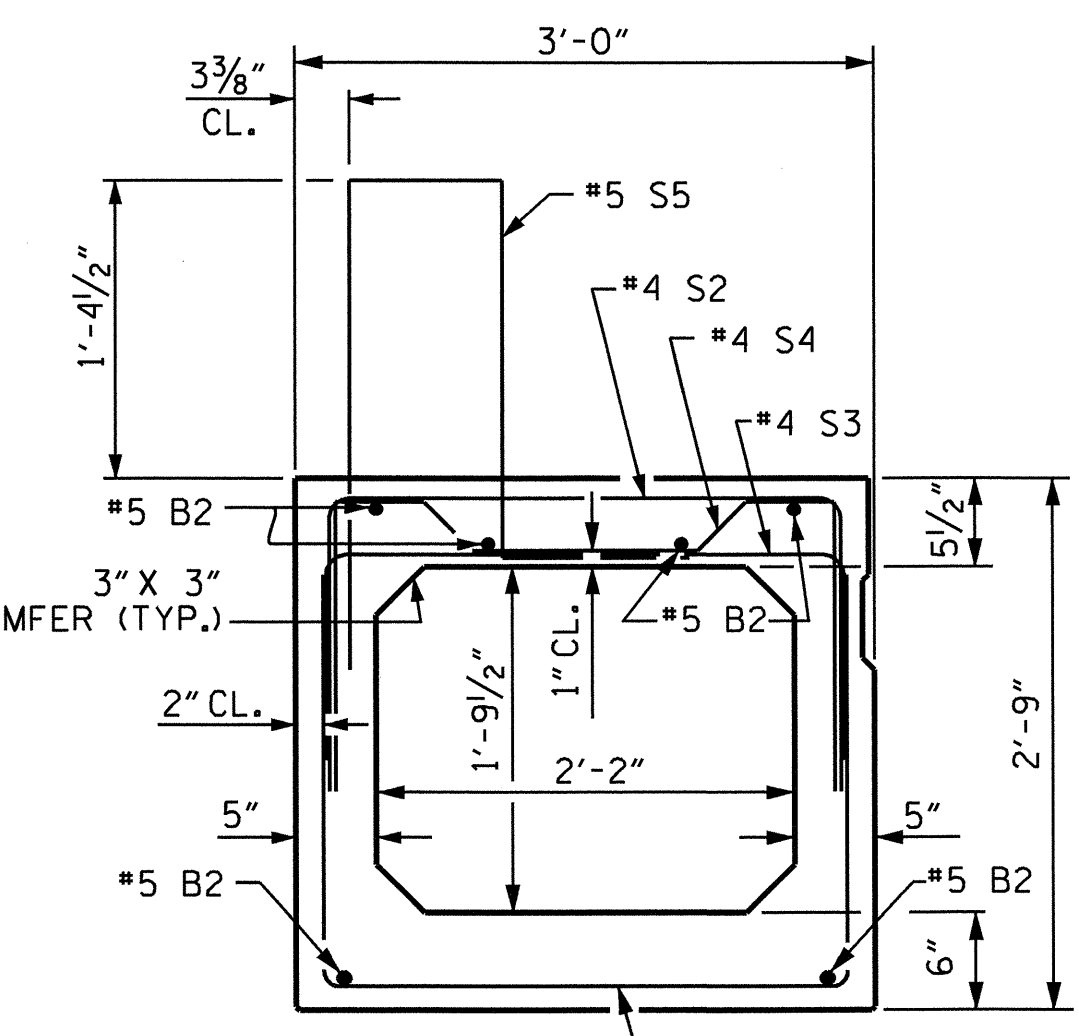
ADDED 7/11/05  
REV. 5/1/06 TLA/GM

11-OCT-2011 10:52  
L:\Structures\Super\_Draw\B4588.sd.BX.dgn  
kalford

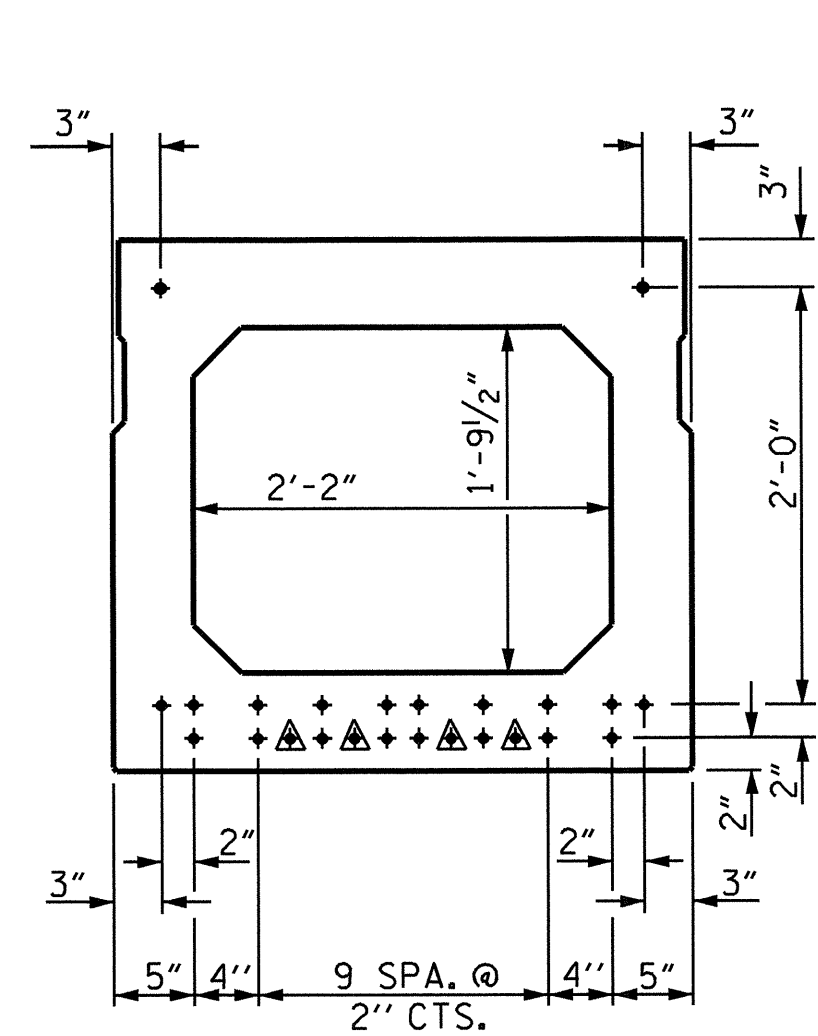
STD. NO. PCBB4



★ INTERIOR BOX BEAM SECTION  
(STRAND LAYOUT NOT SHOWN)



★ LEFT EXTERIOR BOX BEAM SECTION  
(STRAND LAYOUT NOT SHOWN)



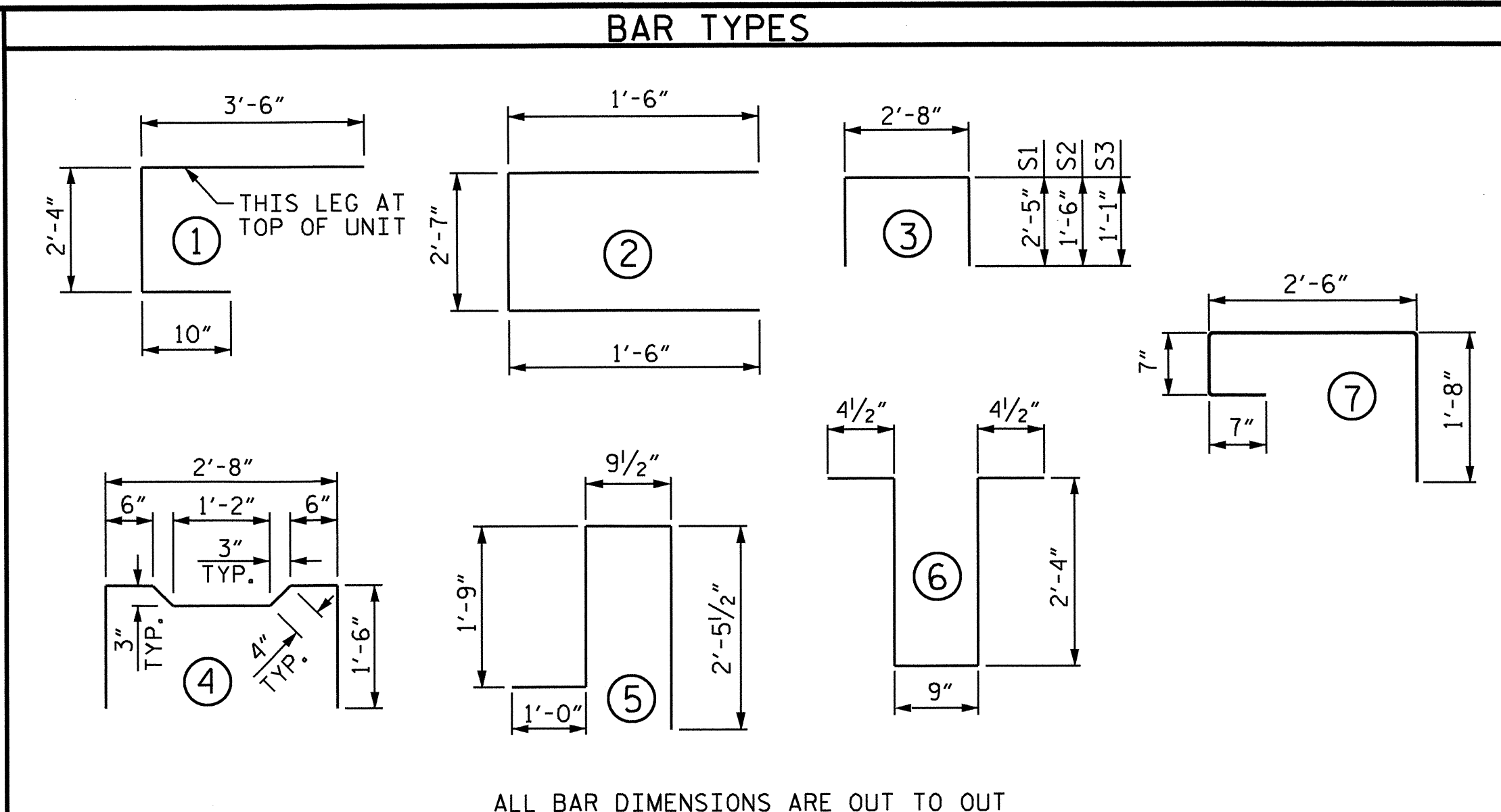
TYPICAL STRAND LOCATION  
(24 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

DEBONDING LEGEND

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

0.6" Ø LOW RELAXATION STRAND LAYOUT

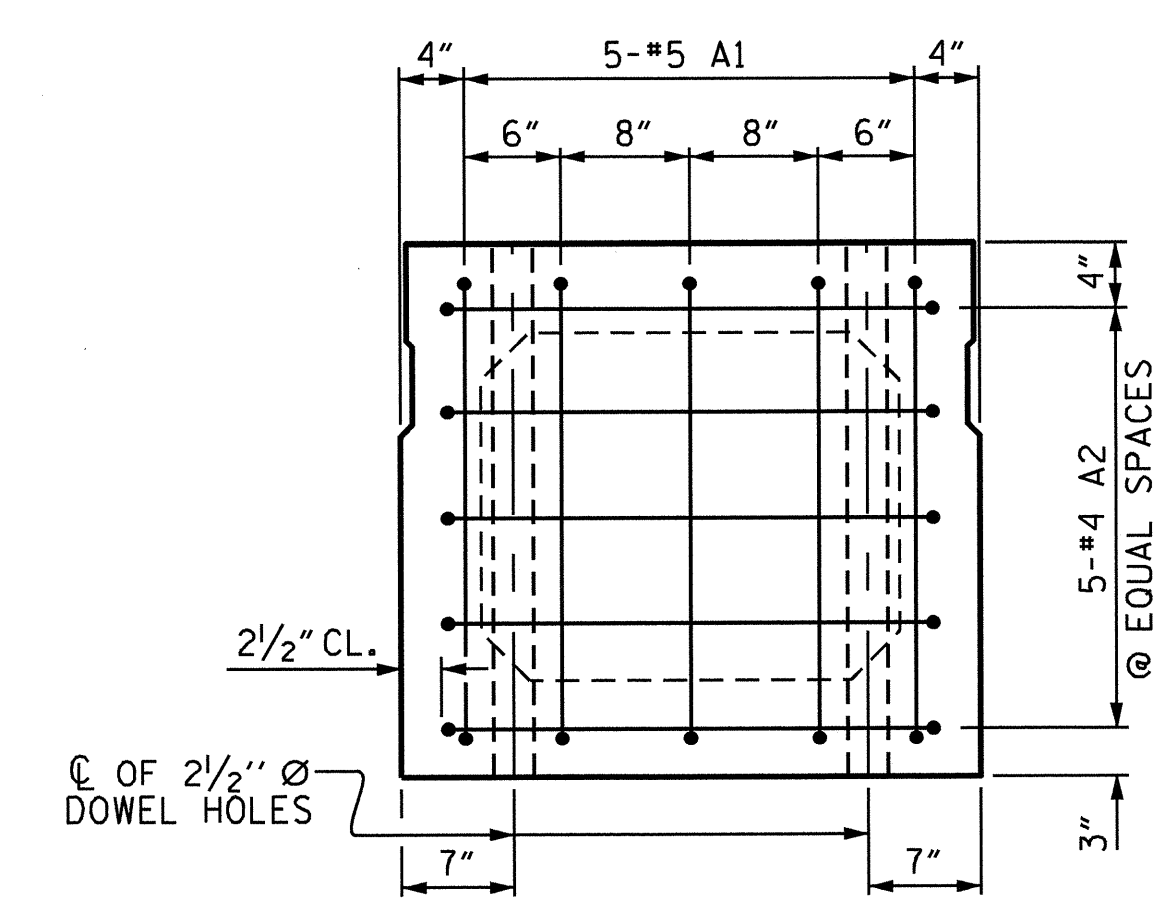
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.



ALL BAR DIMENSIONS ARE OUT TO OUT

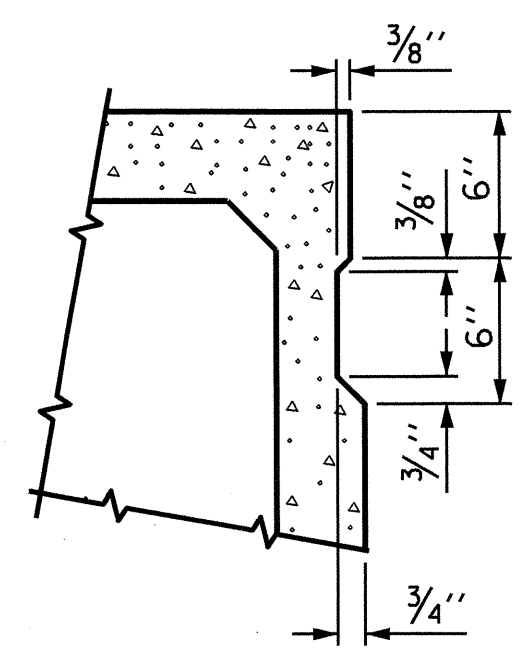
BILL OF MATERIAL FOR ONE BOX BEAM SECTION FOR SPAN "B"

| BAR NUMBER                 | SIZE | TYPE | LEFT EXTERIOR UNIT |        | INTERIOR UNIT |        | ★ ADJACENT TO RIGHT EXTERIOR UNIT |        | ★ RIGHT EXTERIOR UNIT |        |
|----------------------------|------|------|--------------------|--------|---------------|--------|-----------------------------------|--------|-----------------------|--------|
|                            |      |      | LENGTH             | WEIGHT | LENGTH        | WEIGHT | LENGTH                            | WEIGHT | LENGTH                | WEIGHT |
| A1                         | 10   | #5   | 6'-8"              | 70     | 6'-8"         | 70     | 6'-8"                             | 70     | 6'-8"                 | 70     |
| A2                         | 34   | #4   | 5'-7"              | 127    | 5'-7"         | 127    | 5'-7"                             | 127    | 5'-7"                 | 127    |
| B2                         | 12   | #5   | STR                | 43'-3" | 541           | 43'-3" | 541                               | 43'-3" | 541                   | 43'-3" |
| K1                         | 12   | #4   | 6                  | 6'-2"  | 49            | 6'-2"  | 49                                | 6'-2"  | 49                    | 6'-2"  |
| K2                         | 8    | #4   | STR                | 2'-7"  | 14            | 2'-7"  | 14                                | 2'-7"  | 14                    | 2'-7"  |
| S1                         | 69   | #4   | 3                  | 7'-6"  | 346           | 7'-6"  | 346                               | 7'-6"  | 346                   | 7'-6"  |
| S2                         | 69   | #4   | 3                  | 5'-8"  | 261           | 5'-8"  | 261                               | 5'-8"  | 261                   | 5'-8"  |
| S3                         | 119  | #4   | 3                  | 4'-10" | 384           | 4'-10" | 384                               | 4'-10" | 384                   | 4'-10" |
| S4                         | 50   | #4   | 4                  | 5'-10" | 195           | 5'-10" | 195                               | 5'-10" | 195                   | 5'-10" |
| *S5                        | 112  | #5   | 5                  | 6'-0"  | 701           | --     | --                                | --     | --                    | --     |
| *S6                        | 12   | #4   | 7                  | --     | --            | --     | --                                | 5'-4"  | 43                    | 5'-4"  |
| REINFORCING STEEL          |      |      | 1987 LBS.          |        | 1987 LBS.     |        | 1987 LBS.                         |        | 1987 LBS.             |        |
| *EPOXY COATED REINF. STEEL |      |      | 701 LBS.           |        | --            |        | 43 LBS.                           |        | 43 LBS.               |        |
| 7,000 P.S.I. CONCRETE      |      |      | 14.8 CU. YDS.      |        | 14.8 CU. YDS. |        | 14.8 CU. YDS.                     |        | 14.8 CU. YDS.         |        |
| 0.6" Ø L.R. STRANDS        |      |      | No. 24             |        | No. 24        |        | No. 24                            |        | No. 24                |        |

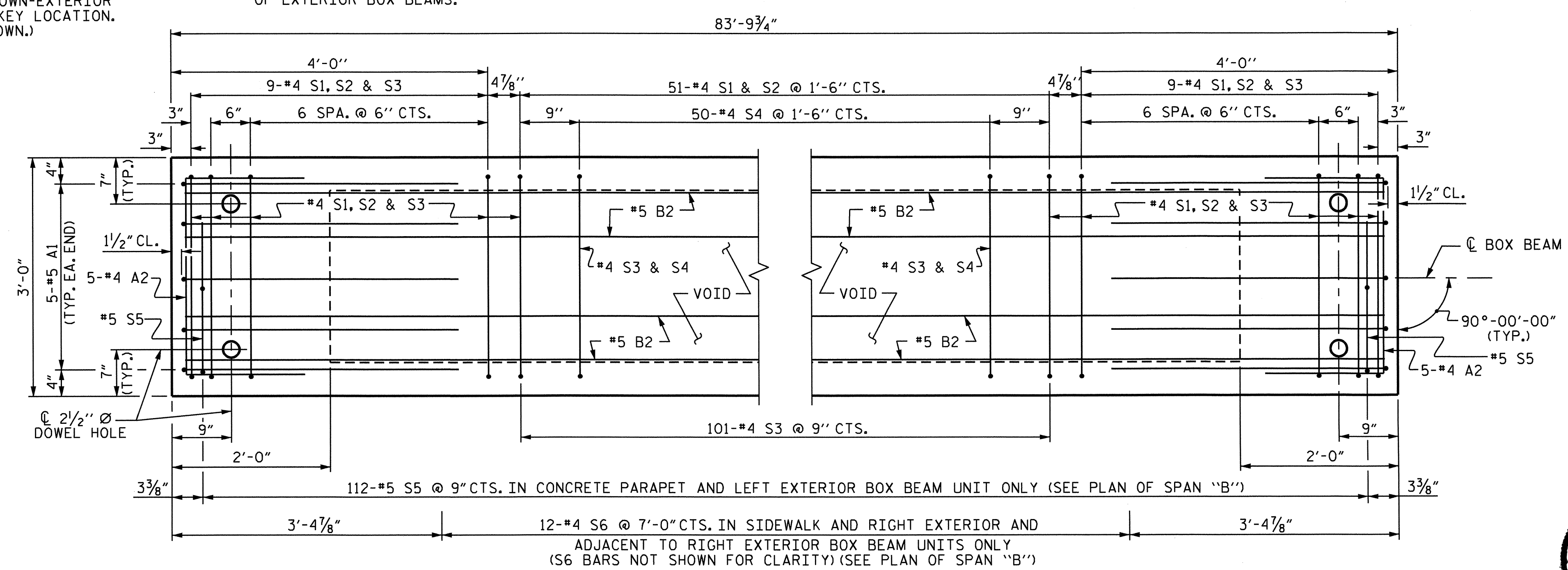


END ELEVATION  
SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)

★ FOR RIGHT EXTERIOR AND ADJACENT TO RIGHT EXTERIOR BOX BEAM SECTIONS, SEE "SIDEWALK DETAILS" SHEET.



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



PLAN OF BOX BEAM FOR SPAN "B"

LEFT EXTERIOR UNIT SHOWN. RIGHT EXTERIOR UNIT AND ADJACENT TO RIGHT EXTERIOR UNIT SIMILAR EXCEPT INCLUDE #4 S6 BARS AND OMIT #5 S5 BARS. OTHER INTERIOR UNITS SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

| 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      |

PROJECT NO. B-4588  
NASH COUNTY  
STATION: 15+85.00 -L-

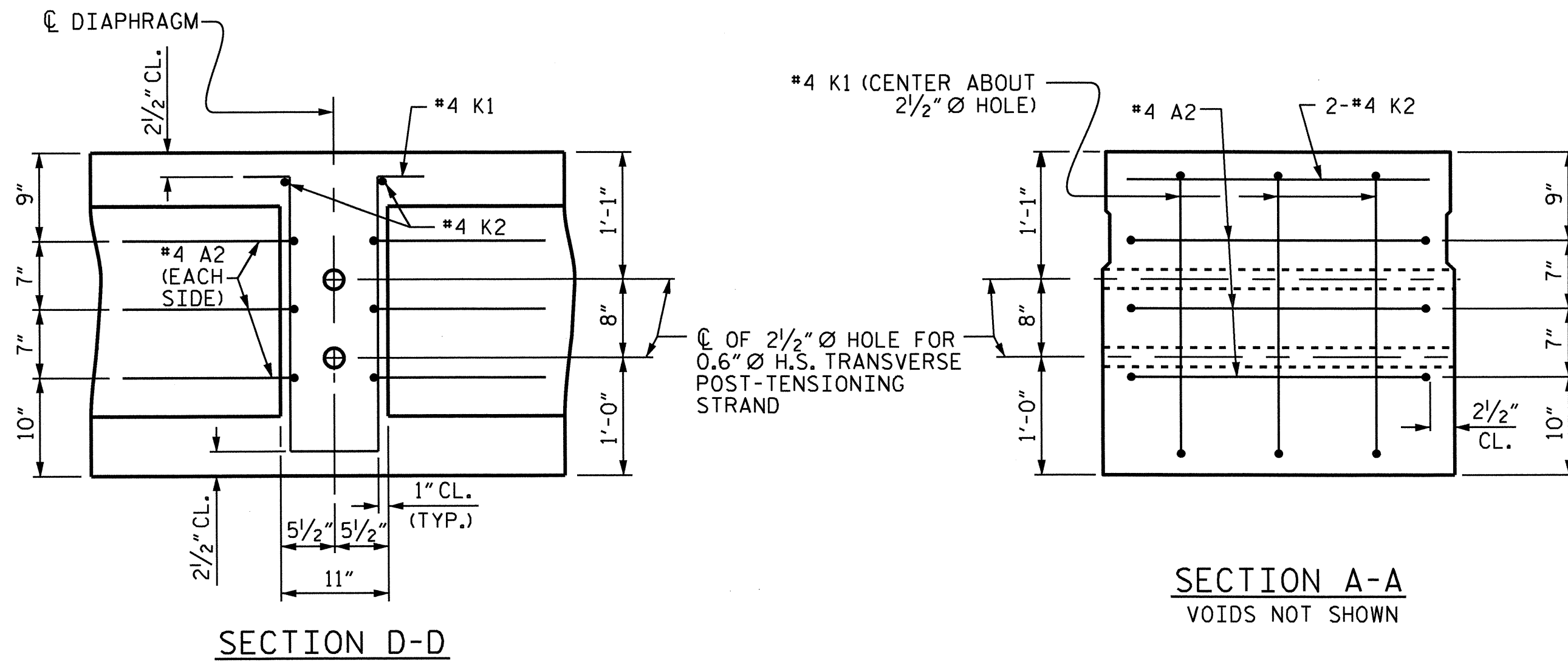
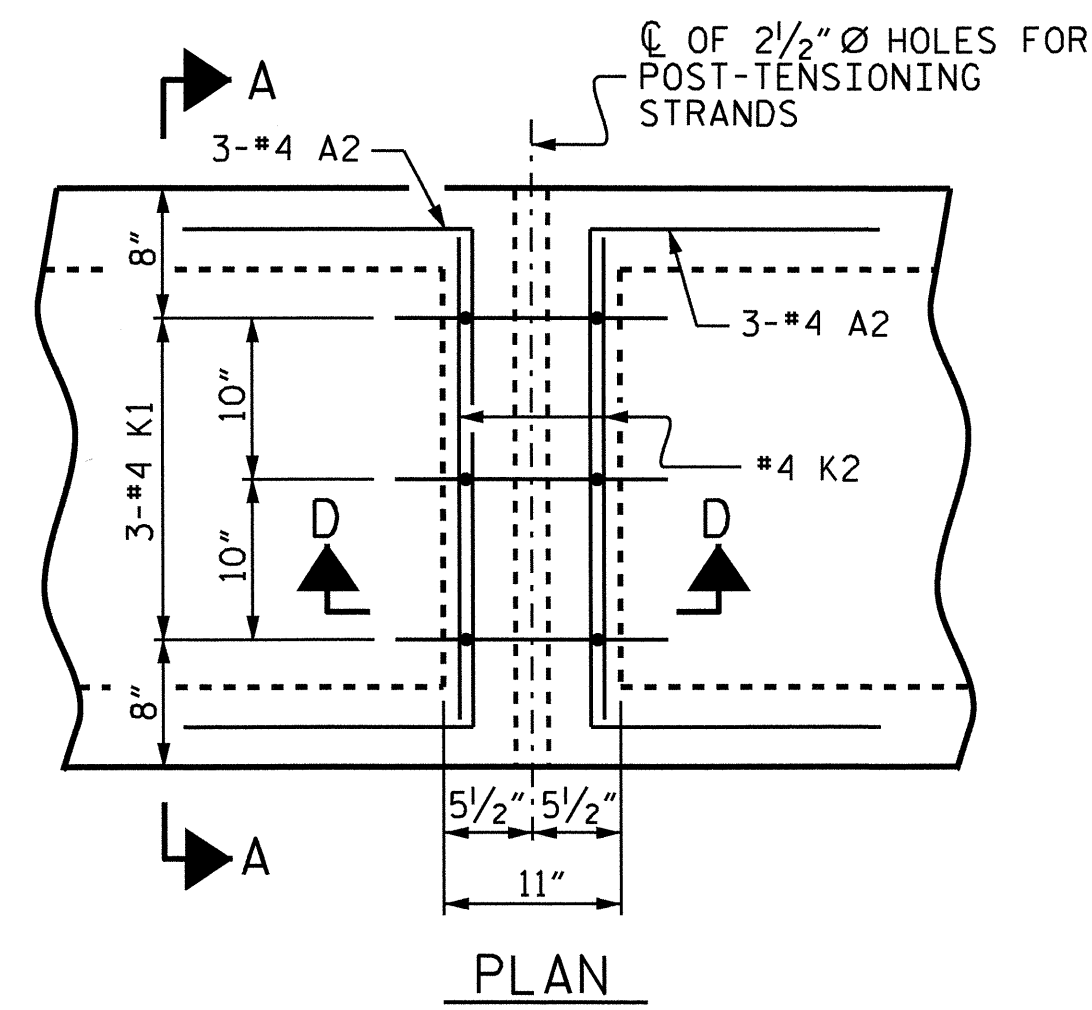
SHEET 5 OF 8



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-9"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPAN "B"

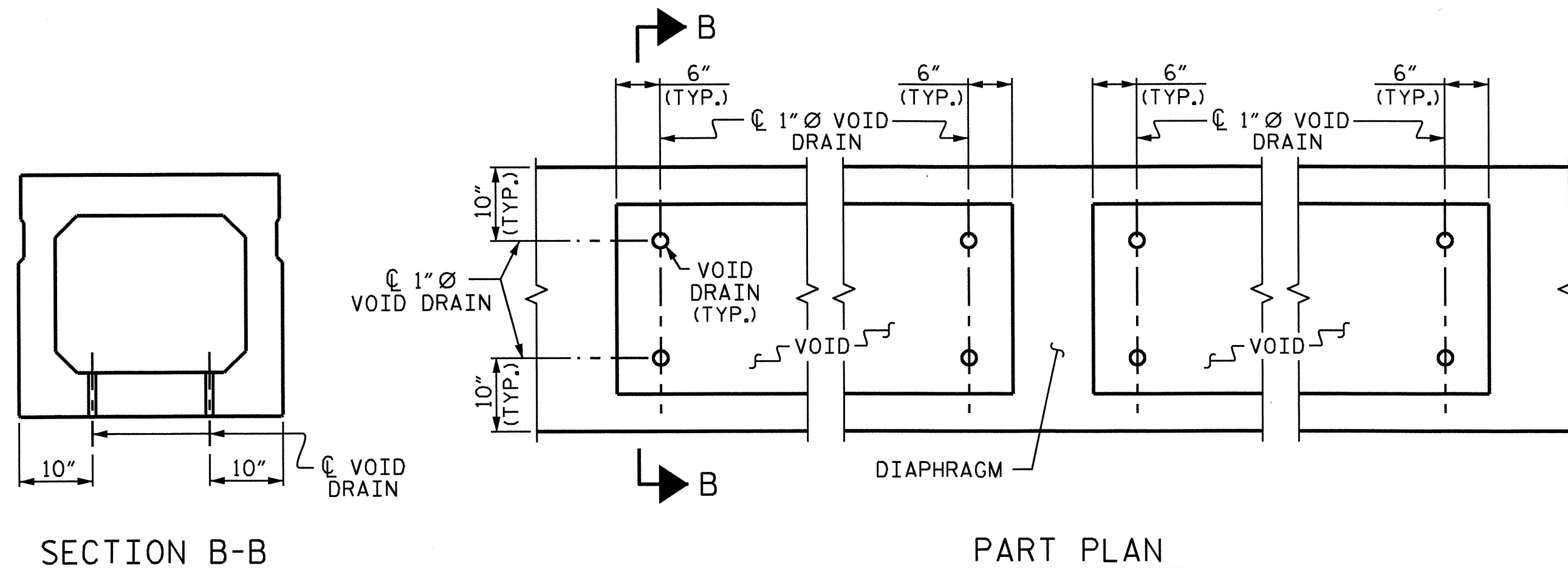
|                            |                    |
|----------------------------|--------------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 4/09        |
| CHECKED BY : D. G. ELY     | DATE : 7/09        |
| DRAWN BY : TLA 5/05        | ADDED 7/11/05      |
| CHECKED BY : GM 6/05       | REV. 5/1/06 TLA/GM |

| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-9   |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>31 |
| 2         |     |       | 4   |     |       |                    |

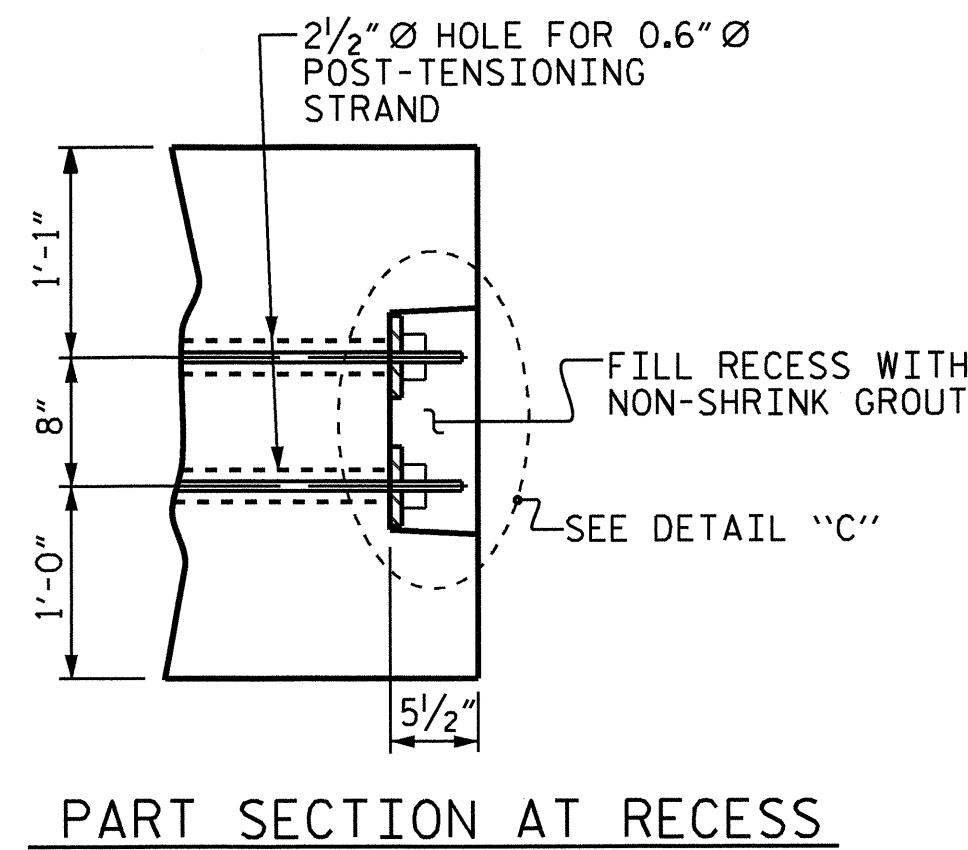
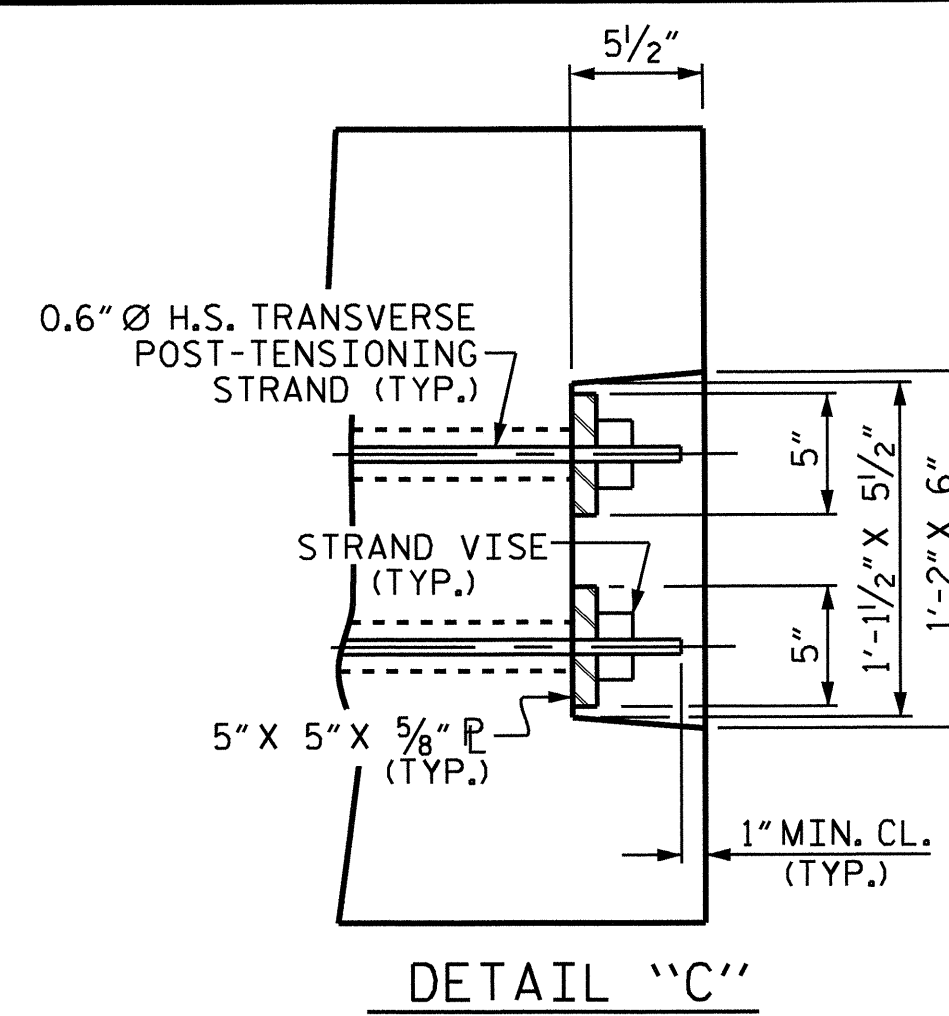


**DOUBLE DIAPHRAGM DETAILS**

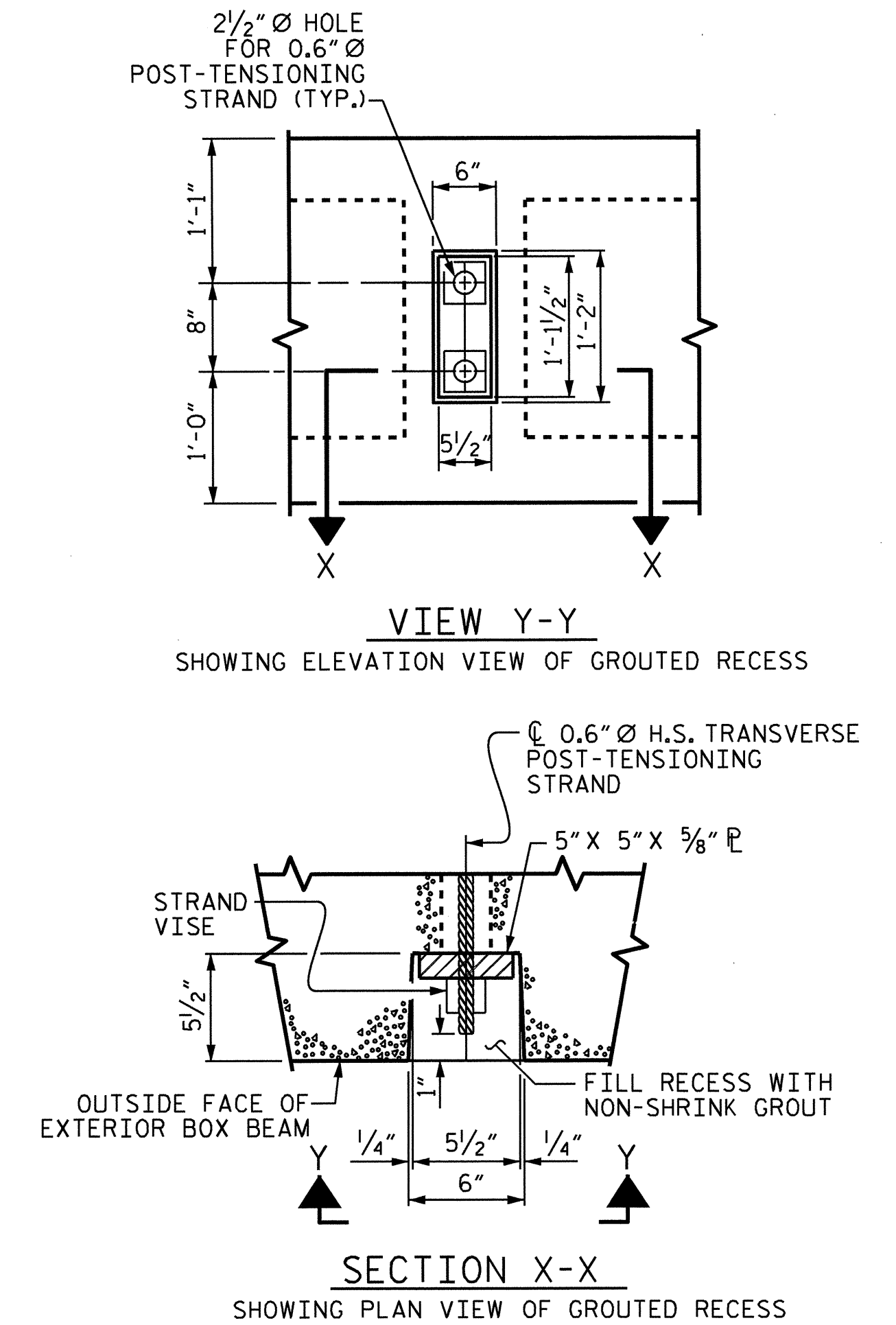
\*4 "S" BARS NOT SHOWN. \*4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.



**VOID DRAIN DETAILS**  
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)



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



| DEAD LOAD DEFLECTION AND CAMBER             |                    |           |
|---|--------------------|-----------|
|   | 3'-0" x 2'-9"      |           |
|   | 0.6" Ø L.R. STRAND |           |
|   | SPAN "A"           | SPAN "B"  |
| CAMBER (BEAM ALONE IN PLACE)                | 1 1/8" ↑           | 3 3/16" ↑ |
| DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ** | 1/4" ↓             | 1 1/16" ↓ |
| FINAL CAMBER                                | 7/8" ↑             | 2 1/2" ↑  |

\*\* INCLUDES FUTURE WEARING SURFACE

| BOX BEAM UNITS REQUIRED       |        |            |              |
|-------------------------------|--------|------------|--------------|
|                               | NUMBER | LENGTH     | TOTAL LENGTH |
| SPAN A                        |        |            |              |
| L.T. EXTERIOR B.B.            | 1      | 63'-9 3/4" | 63'-9 3/4"   |
| INTERIOR B.B.                 | 11     | 63'-9 3/4" | 701'-11 1/4" |
| ADJACENT TO RT. EXTERIOR B.B. | 1      | 63'-9 3/4" | 63'-9 3/4"   |
| RT. EXTERIOR B.B.             | 1      | 63'-9 3/4" | 63'-9 3/4"   |
| SPAN B                        |        |            |              |
| L.T. EXTERIOR B.B.            | 1      | 83'-9 3/4" | 83'-9 3/4"   |
| INTERIOR B.B.                 | 11     | 83'-9 3/4" | 921'-11 1/4" |
| ADJACENT TO RT. EXTERIOR B.B. | 1      | 83'-9 3/4" | 83'-9 3/4"   |
| RT. EXTERIOR B.B.             | 1      | 83'-9 3/4" | 83'-9 3/4"   |
| TOTAL                         | 28     |            | 2066'-9"     |

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 6 OF 8



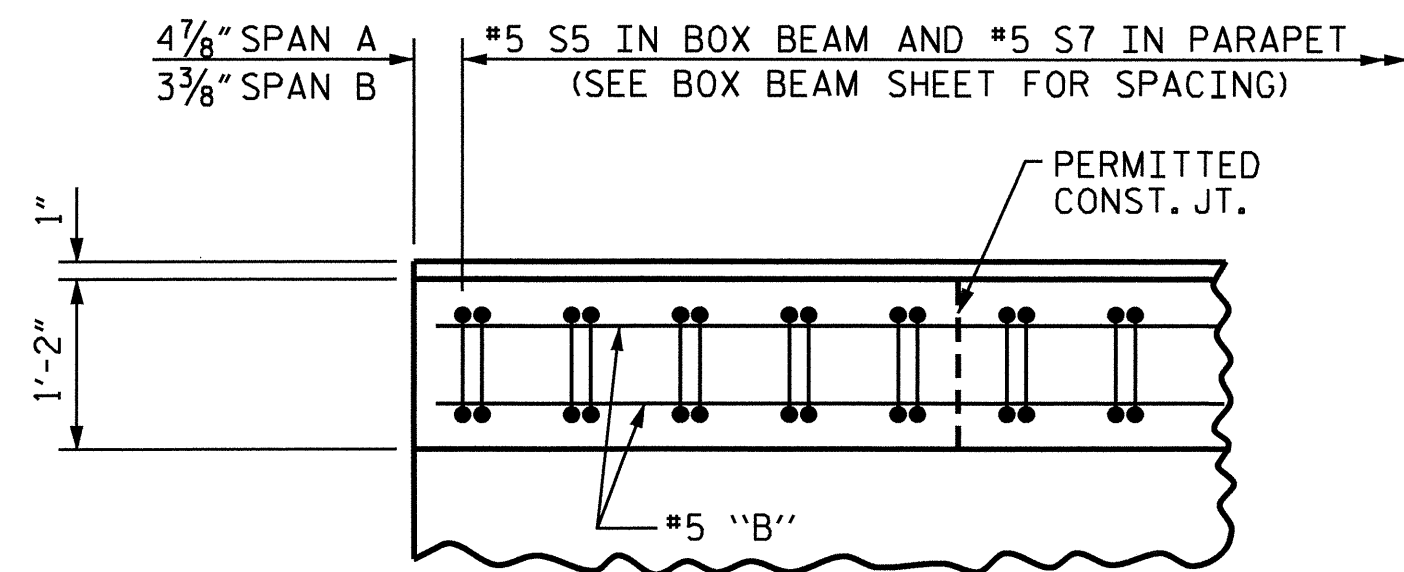
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT

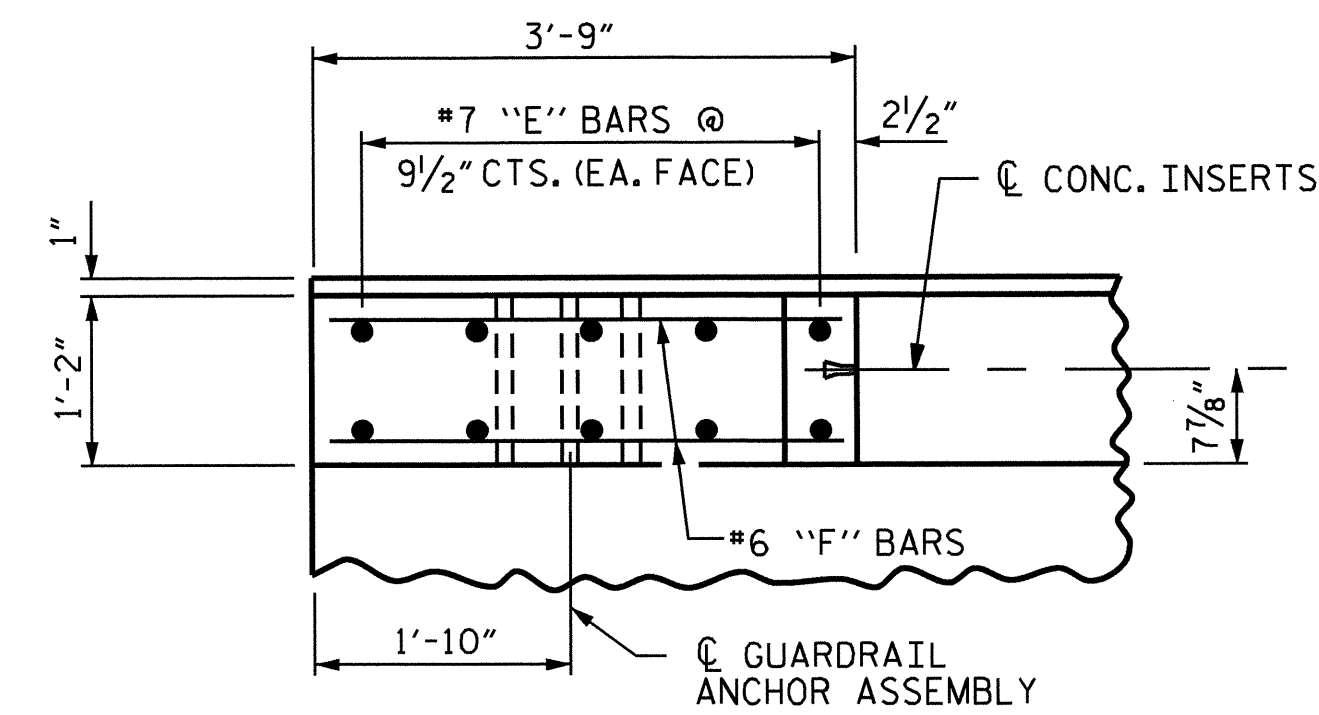
| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-10  |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>31 |
| 2         |     |       | 4   |     |       |                    |

ASSEMBLED BY : A. V. ROYAL DATE : 4/09  
 CHECKED BY : D. G. ELY DATE : 7/09  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05

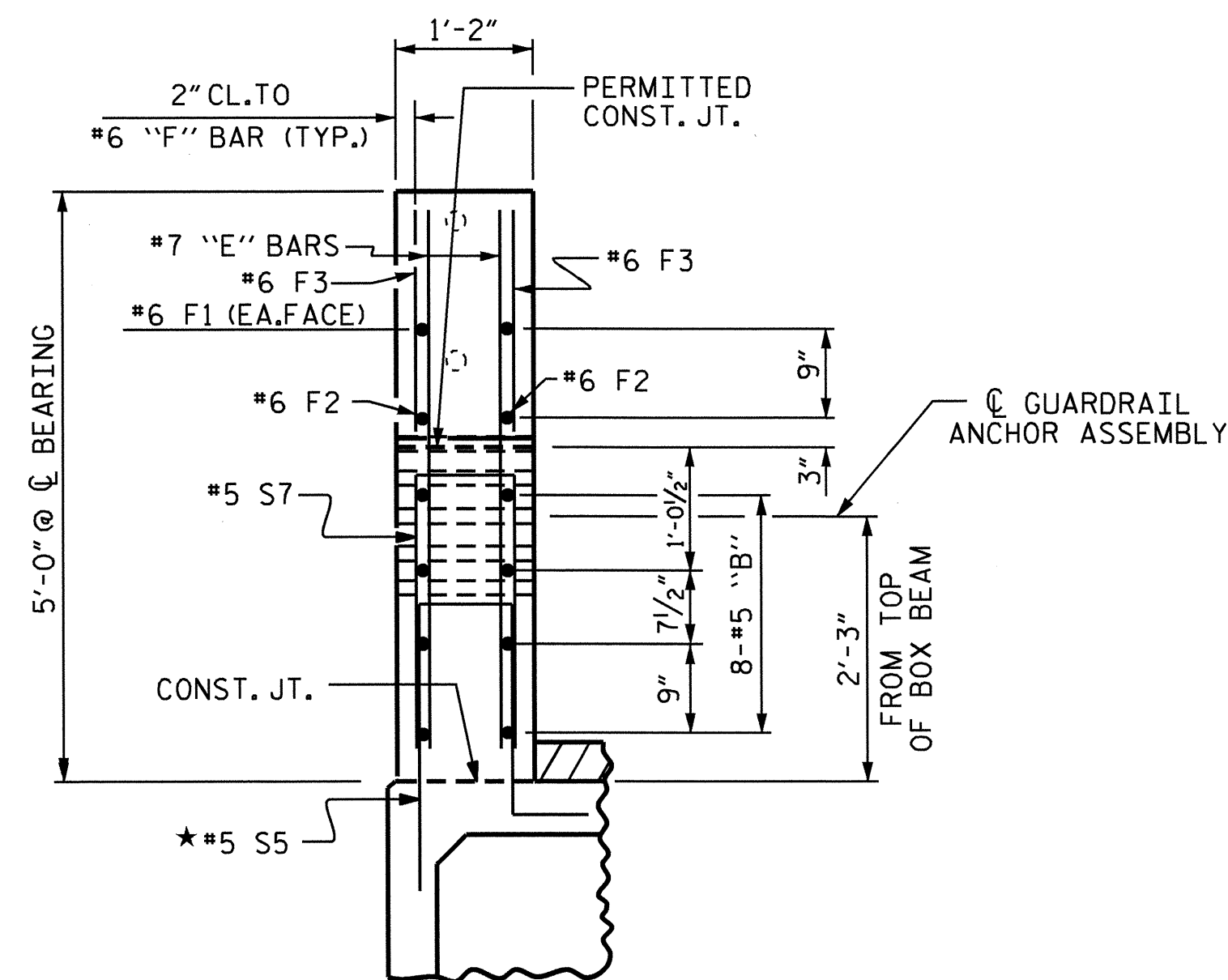
ADDED 7/11/05  
 REV. 5/1/06  
 TLA/GM



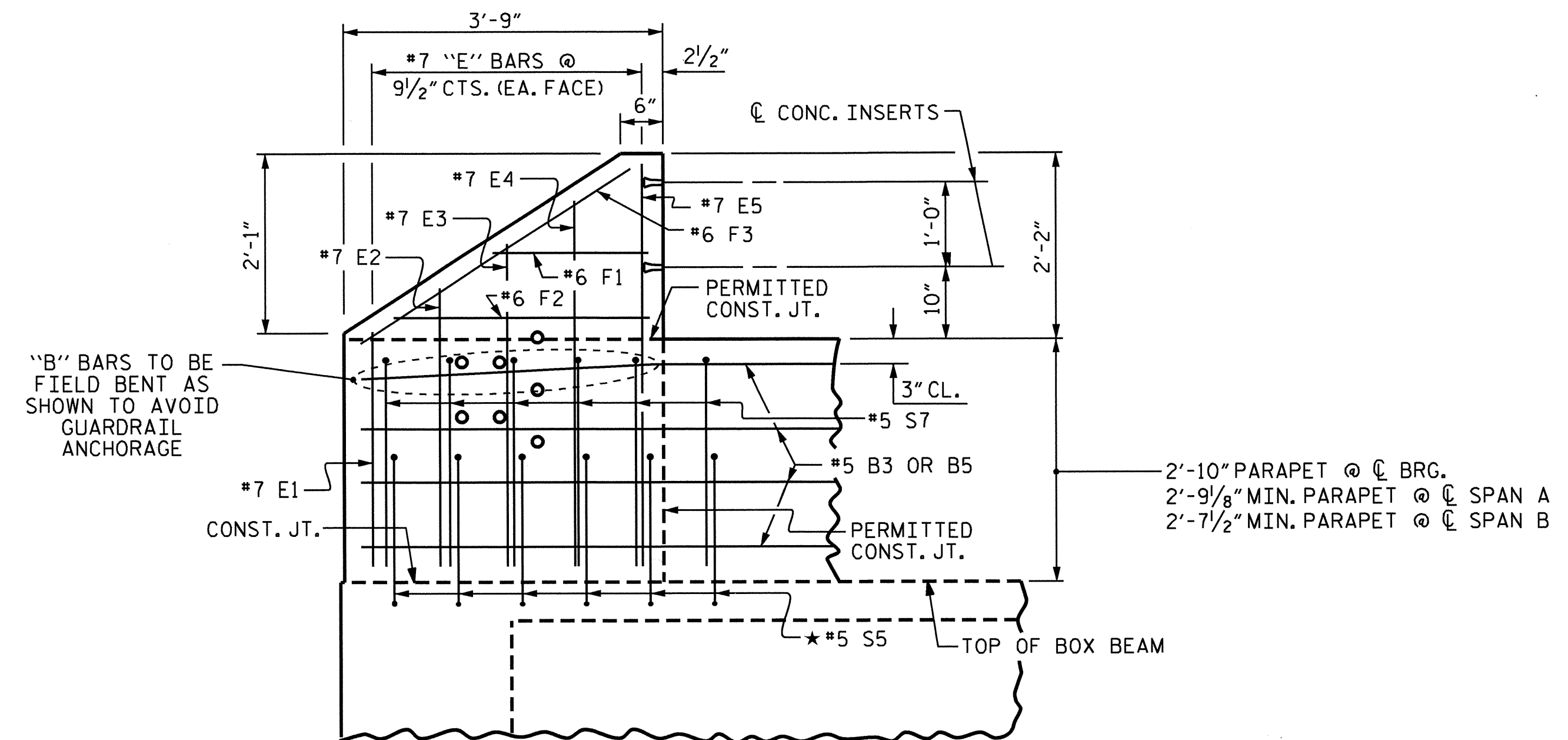
PLAN OF PARAPET



PLAN OF END POST



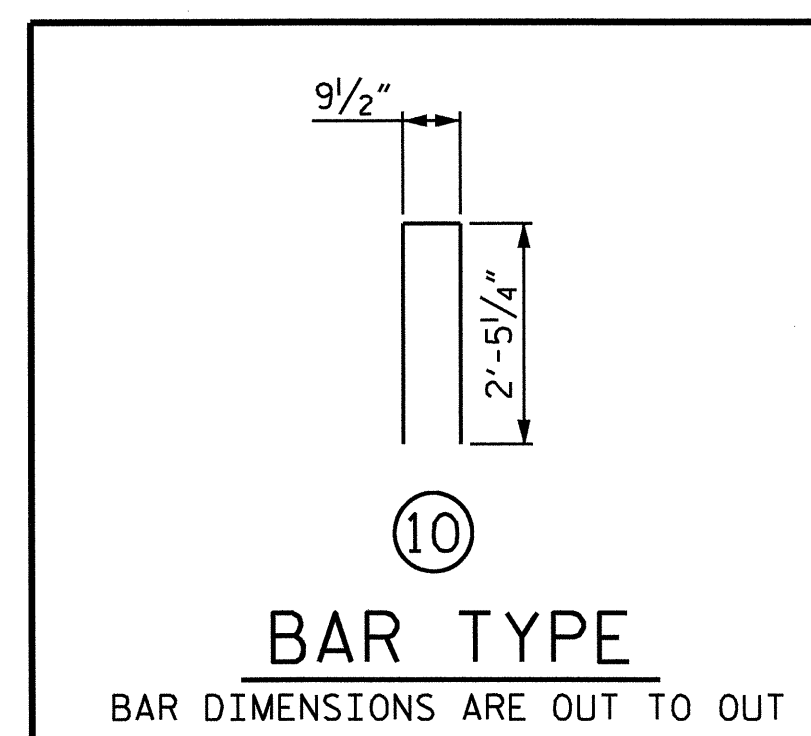
END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

\* S5 BARS INCLUDED IN BILL OF MATERIAL FOR BOX BEAM



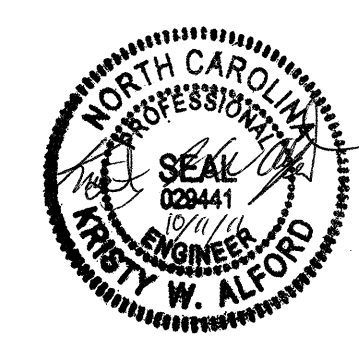
10  
BAR TYPE  
BAR DIMENSIONS ARE OUT TO OUT

| BILL OF MATERIAL FOR PARAPET & END POSTS |               |        |           |      |      |          |         |
|--|---------------|--------|-----------|------|------|----------|---------|
| BAR                                      | BARS PER SPAN |        | TOTAL NO. | SIZE | TYPE | LENGTH   | WEIGHT  |
|  | SPAN A        | SPAN B |           |      |      |          |         |
| *B3                                      | 24            |        | 24        | # 5  | STR  | 20'-11"  | 524     |
| *B5                                      |               | 24     | 24        | # 5  | STR  | 27'-7"   | 690     |
| *E1                                      | 2             | 2      | 4         | #7   | STR  | 2'-7"    | 21      |
| *E2                                      | 2             | 2      | 4         | #7   | STR  | 3'-0"    | 25      |
| *E3                                      | 2             | 2      | 4         | #7   | STR  | 3'-6"    | 29      |
| *E4                                      | 2             | 2      | 4         | #7   | STR  | 4'-0"    | 33      |
| *E5                                      | 2             | 2      | 4         | #7   | STR  | 4'-5"    | 36      |
| *F1                                      | 2             | 2      | 4         | #6   | STR  | 1'-10"   | 11      |
| *F2                                      | 2             | 2      | 4         | #6   | STR  | 3'-0"    | 18      |
| *F3                                      | 2             | 2      | 4         | #6   | STR  | 3'-4"    | 20      |
| *S7                                      | 85            | 112    | 197       | #5   | 10   | 5'-8"    | 1164    |
| * EPOXY COATED REINFORCING STEEL         |               |        |           |      |      | LBS.     | 2571    |
| CLASS AA CONCRETE                        |               |        |           |      |      | CU. YDS. | 18.0    |
| TOTAL LIN. FT. OF CONCRETE PARAPET       |               |        |           |      |      |          | 147'-9" |

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

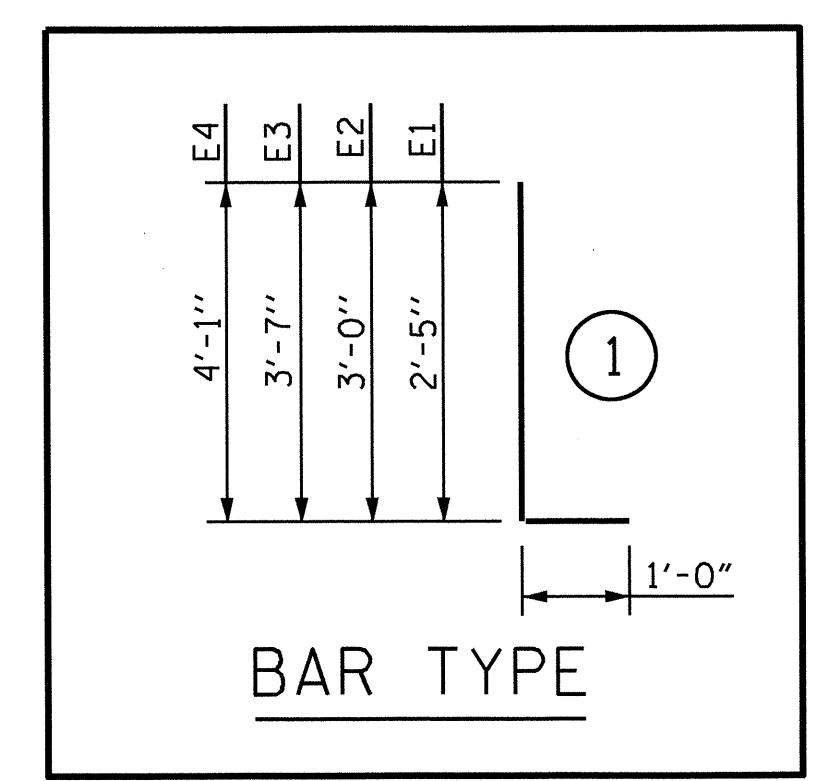
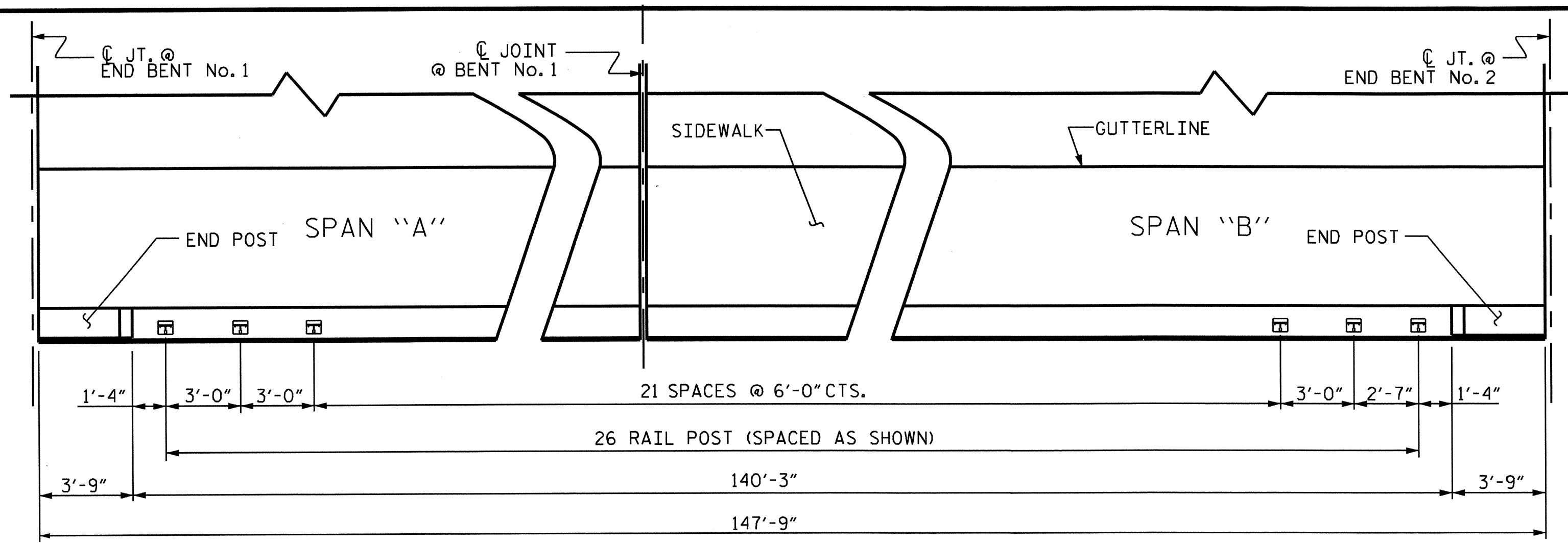
SHEET 7 OF 8

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 CONCRETE PARAPET  
 DETAILS

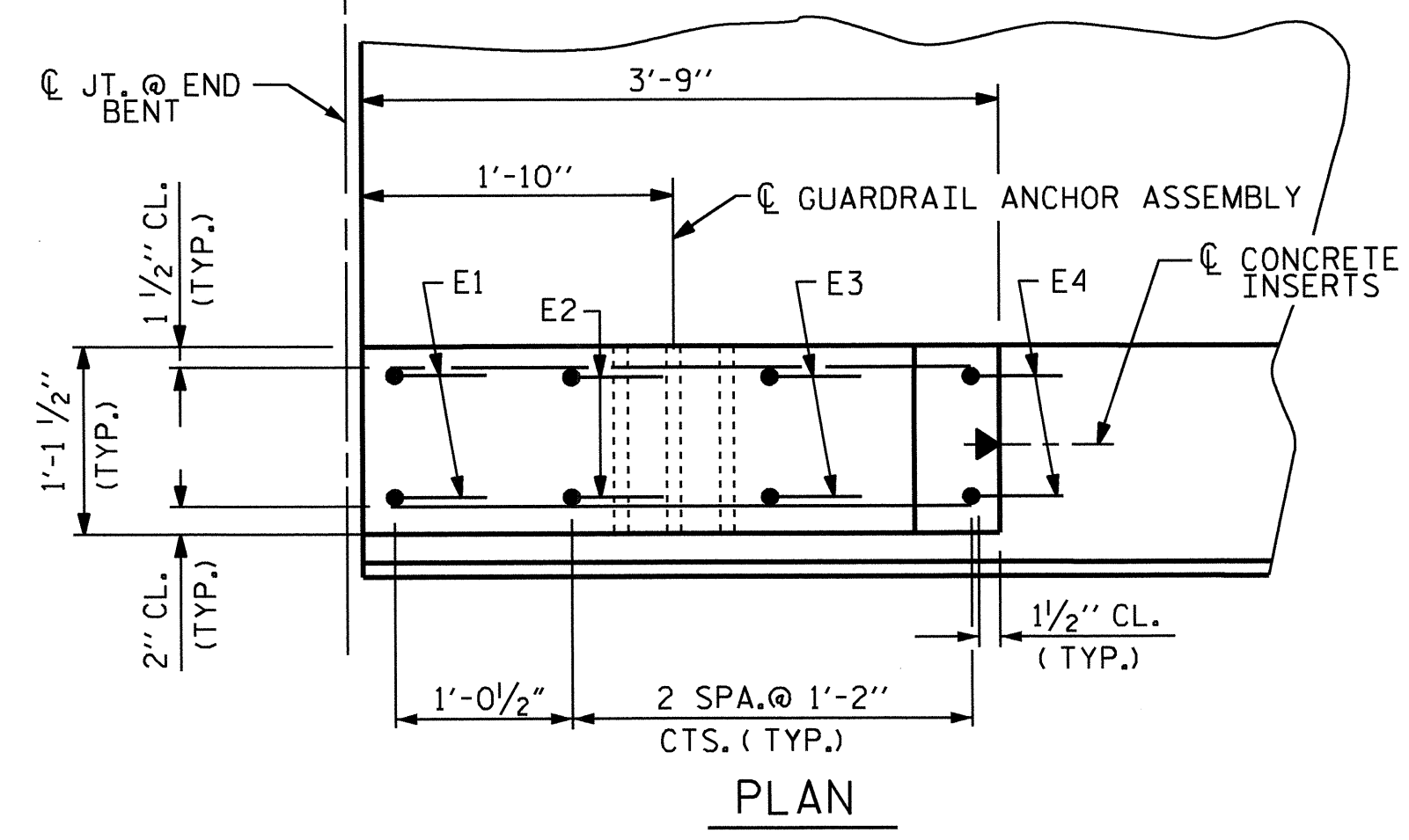
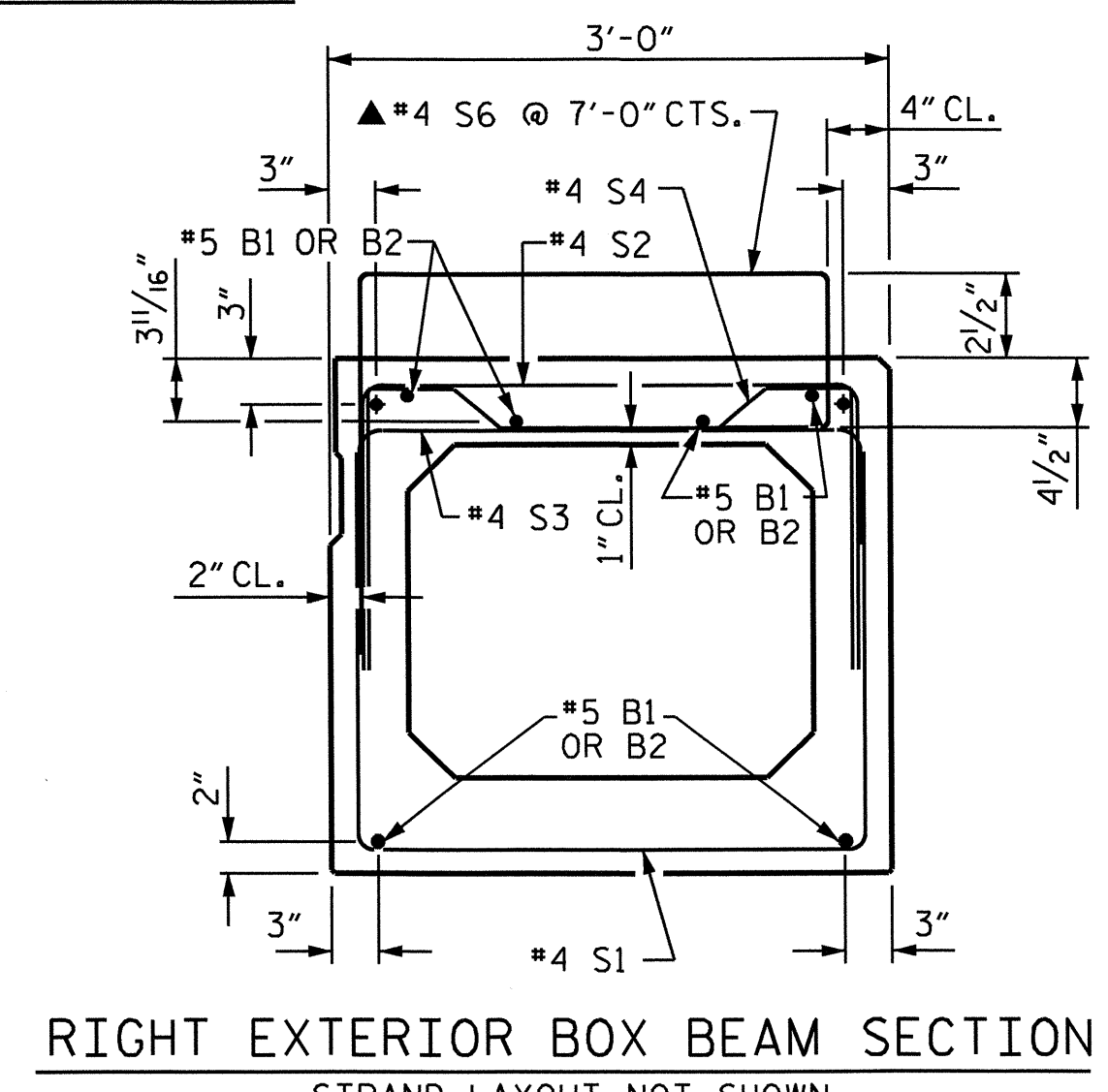
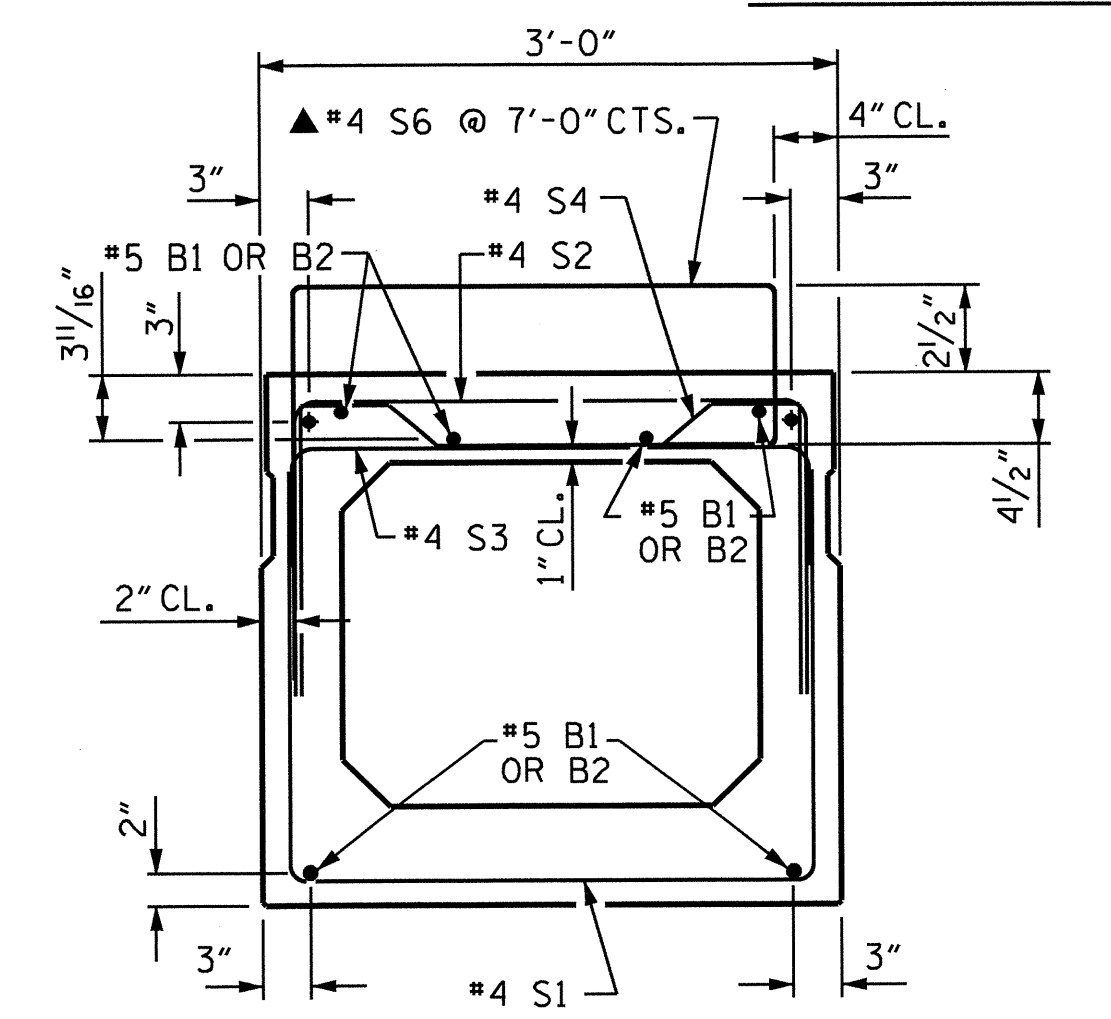
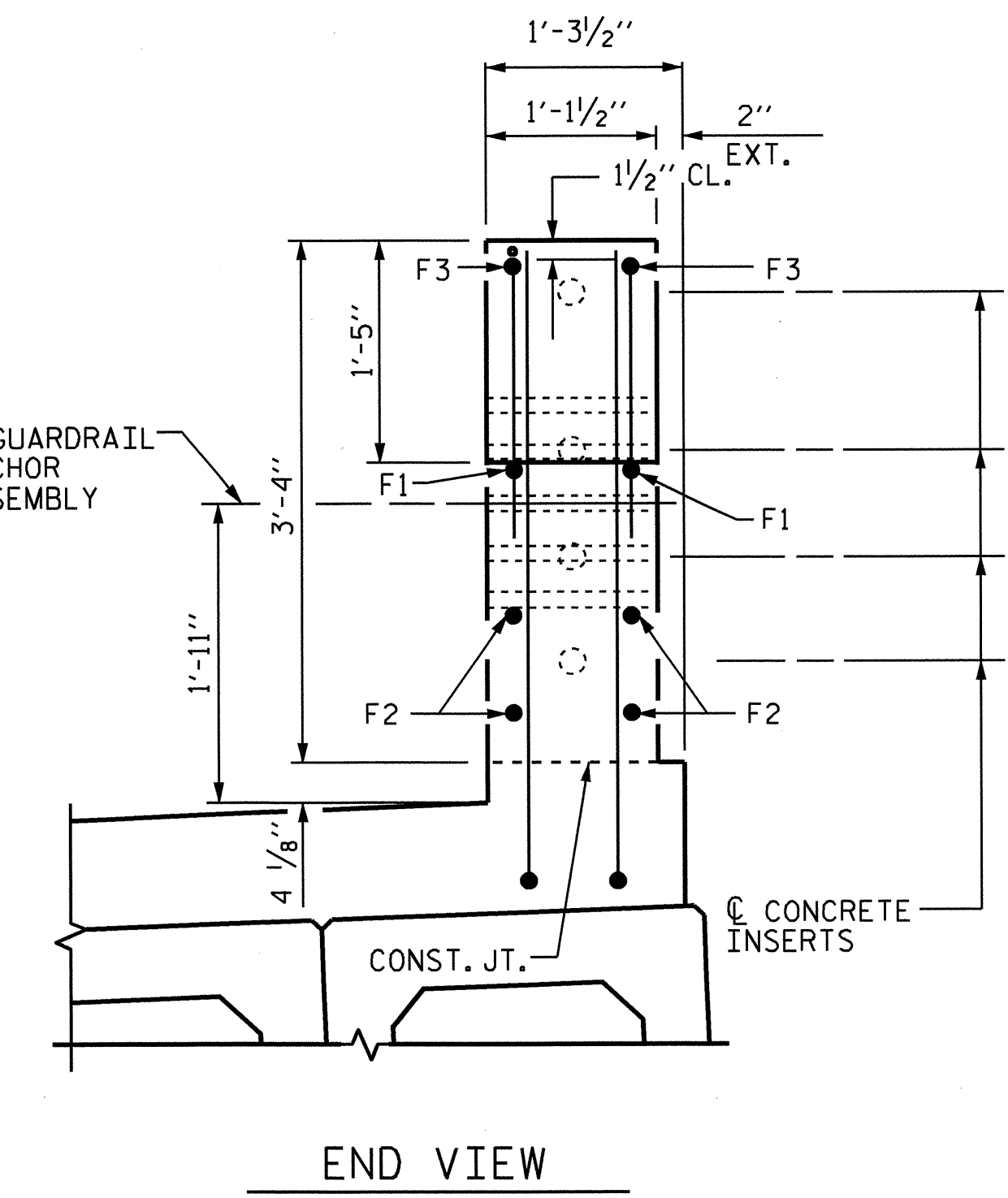
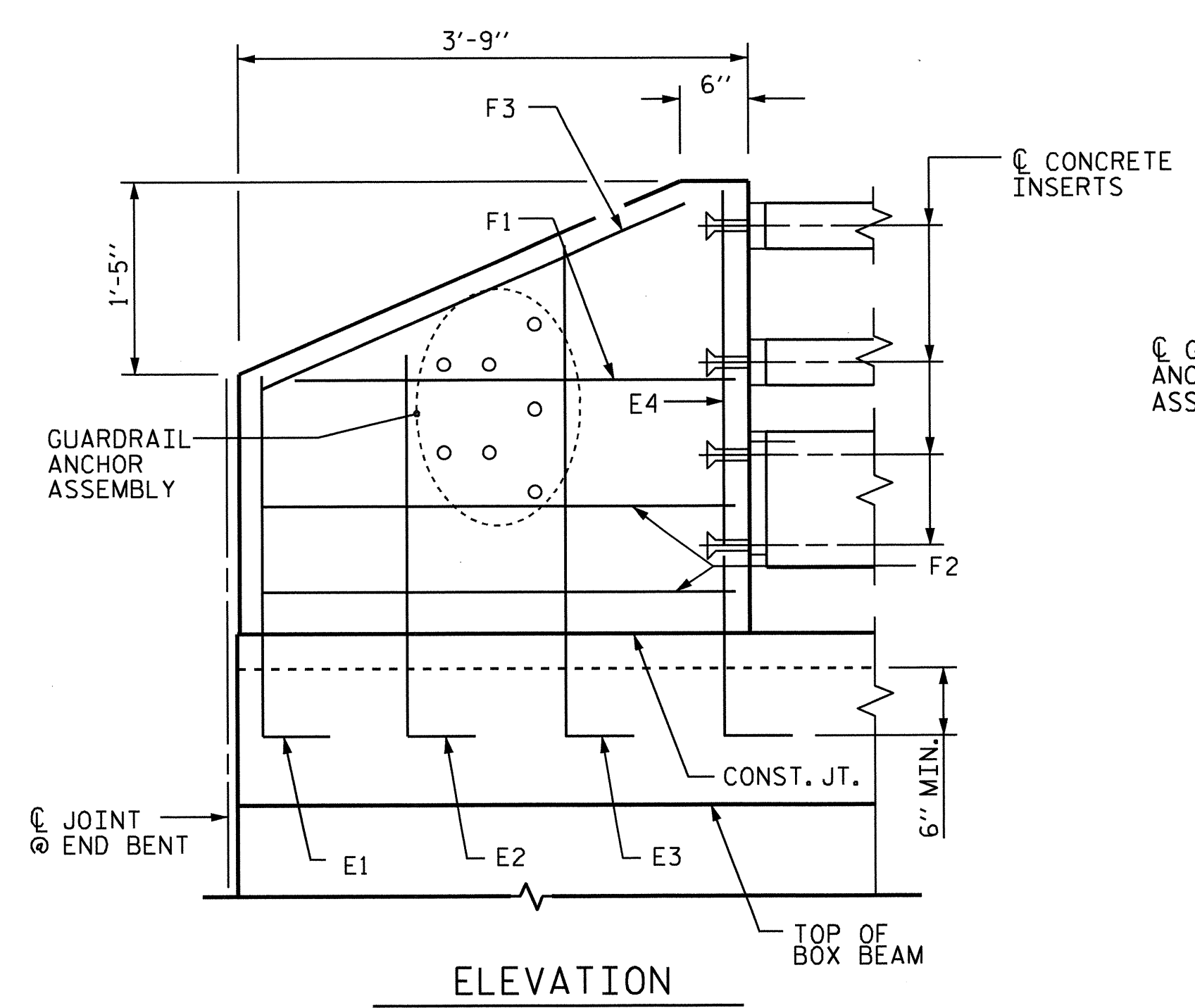
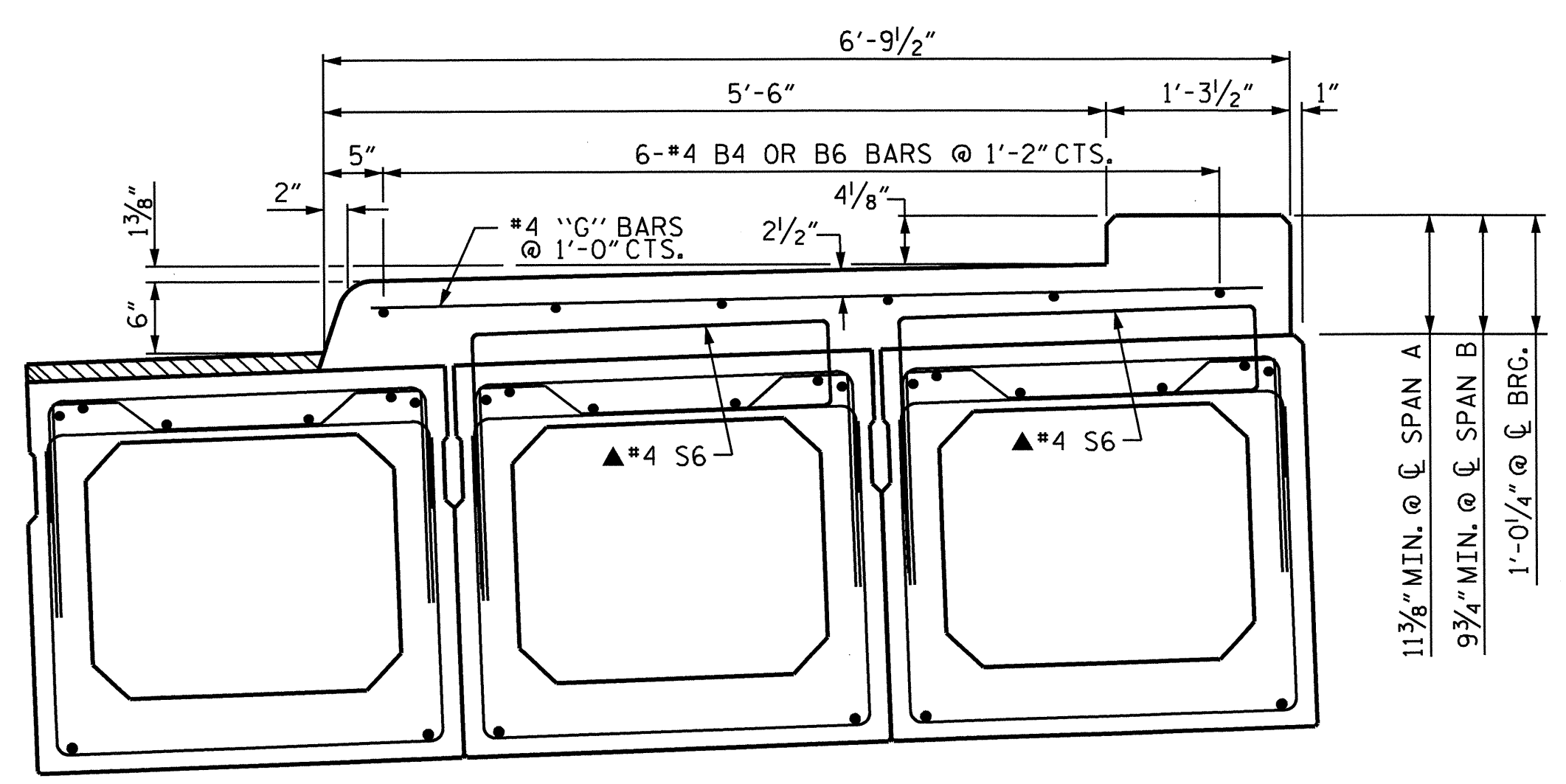


| REVISIONS |     |       |     |     |       | SHEET NO.<br>S-11  |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS<br>31 |
| 2         |     |       | 4   |     |       |                    |

DRAWN BY : A. V. ROYAL DATE : 4/09  
 CHECKED BY : D. G. ELY DATE : 7/09



| BILL OF MATERIAL FOR SIDEWALK AND END POSTS |               |           |      |      |        |        |               |
|---|---------------|-----------|------|------|--------|--------|---------------|
| BAR   | BARS PER SPAN | TOTAL NO. | SIZE | TYPE | LENGTH | WEIGHT |               |
| SPAN A                                      |               | SPAN B    |      |      |        |        |               |
| *B4   | 18            | --        | 18   | #4   | STR    | 22'-6" | 271           |
| *B6   | --            | 18        | 18   | #4   | STR    | 29'-2" | 351           |
| *E1   | 2             | 2         | 4    | #7   | 1      | 3'-5"  | 28            |
| *E2   | 2             | 2         | 4    | #7   | 1      | 4'-0"  | 33            |
| *E3   | 2             | 2         | 4    | #7   | 1      | 4'-7"  | 37            |
| *E4   | 2             | 2         | 4    | #7   | 1      | 5'-1"  | 42            |
| *F1   | 2             | 2         | 4    | #6   | STR    | 3'-2"  | 19            |
| *F2   | 4             | 4         | 8    | #6   | STR    | 3'-5"  | 41            |
| *F3   | 2             | 2         | 4    | #6   | STR    | 3'-8"  | 22            |
| *G1   | 64            | 84        | 148  | #4   | STR    | 6'-3"  | 618           |
| * EPOXY COATED REINFORCING STEEL            |               |           |      |      |        | LBS.   | 1462          |
| CLASS AA CONCRETE                           |               |           |      |      |        |        |               |
| SIDEWALK                                    |               |           |      |      |        |        | 27.8 CU. YDS. |
| END POSTS                                   |               |           |      |      |        |        | 0.9 CU. YDS.  |
| CLASS AA CONCRETE TOTAL                     |               |           |      |      |        |        | 28.7 CU. YDS. |

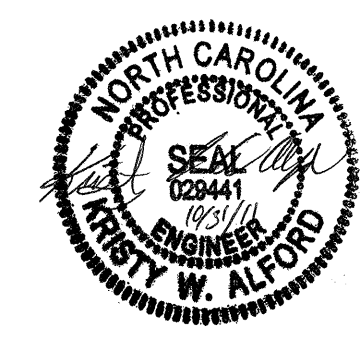


STRAND LAYOUT NOT SHOWN (INTERIOR BOX BEAM SECTION ADJACENT TO RIGHT EXTERIOR BOX BEAM SECTION)

STRAND LAYOUT NOT SHOWN (EXTERIOR BOX BEAM SECTION)

NOTES:  
 GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.  
 PLACE 1/2" EXPANSION JOINT MATERIAL IN SIDEWALK IN JOINTS LOCATED AT END BENTS No. 1 & 2 AND BENT No. 1.  
 ▲ #4 S6 BARS INCLUDED IN BILL OF MATERIAL FOR BOX BEAM.

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-  
 SHEET 8 OF 8



| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-12            |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 31 |
| 2         |     |       | 4   |     |       |                 |

DRAWN BY: A. V. ROYAL DATE: 01/11  
 CHECKED BY: D. G. ELY DATE: 01/11

SIDEWALK ON BOX BEAM

END POST FOR THREE BAR RAIL

**NOTES**

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

**ALUMINUM RAILS**

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

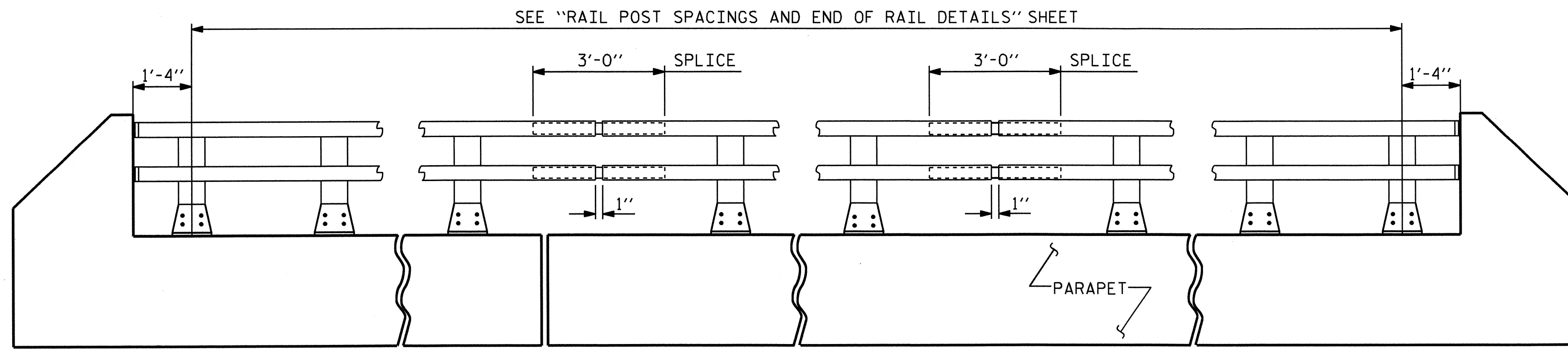
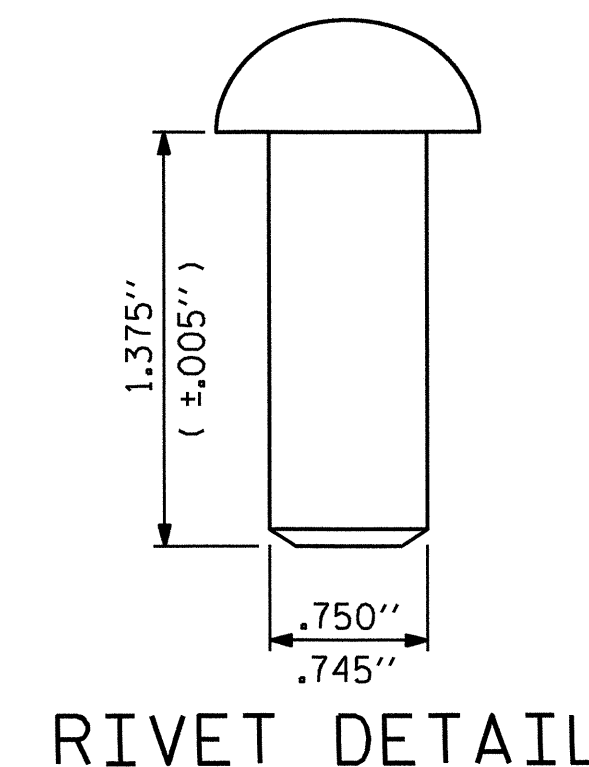
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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.

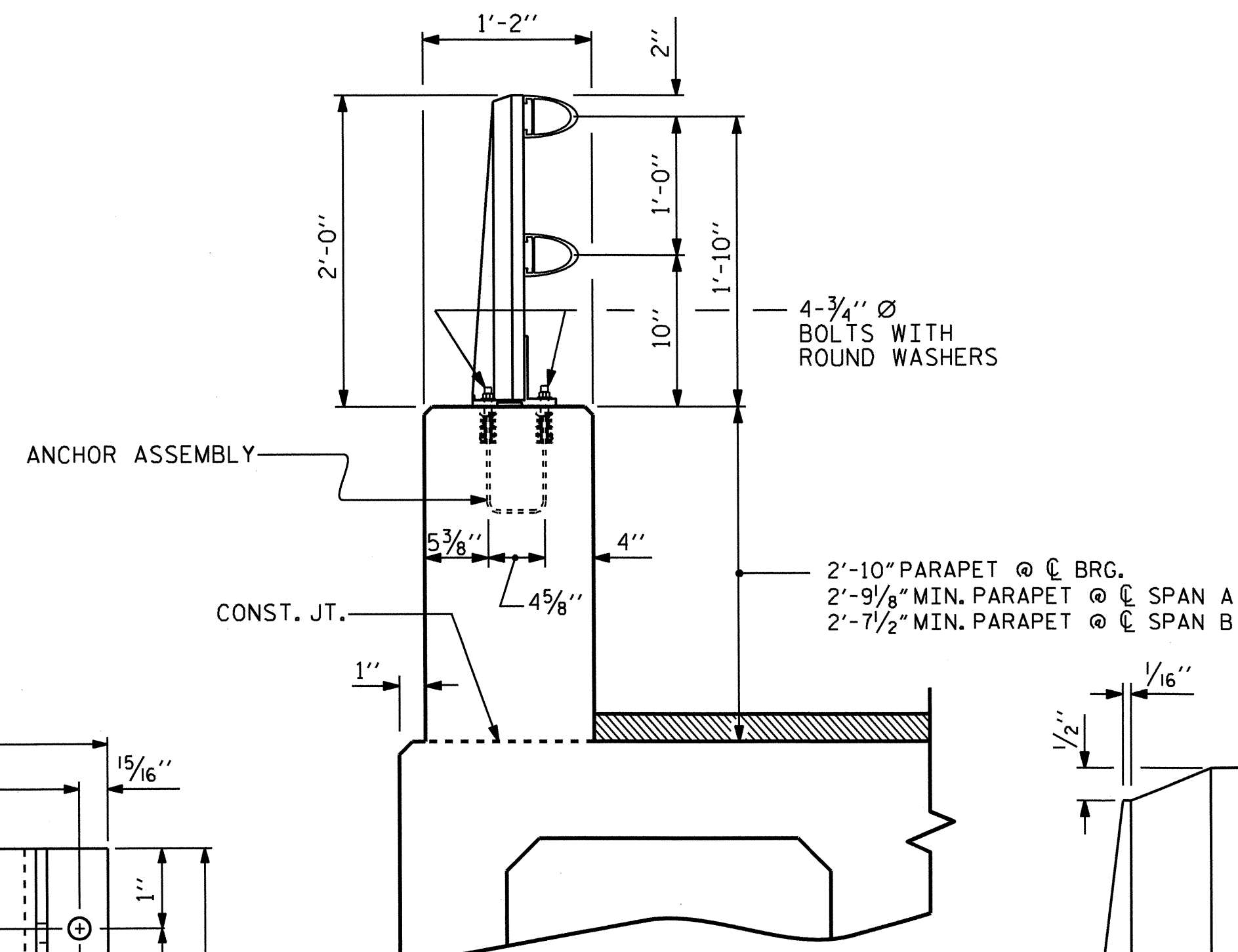
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR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

PAY LENGTH = 140'-3" LIN. FT.

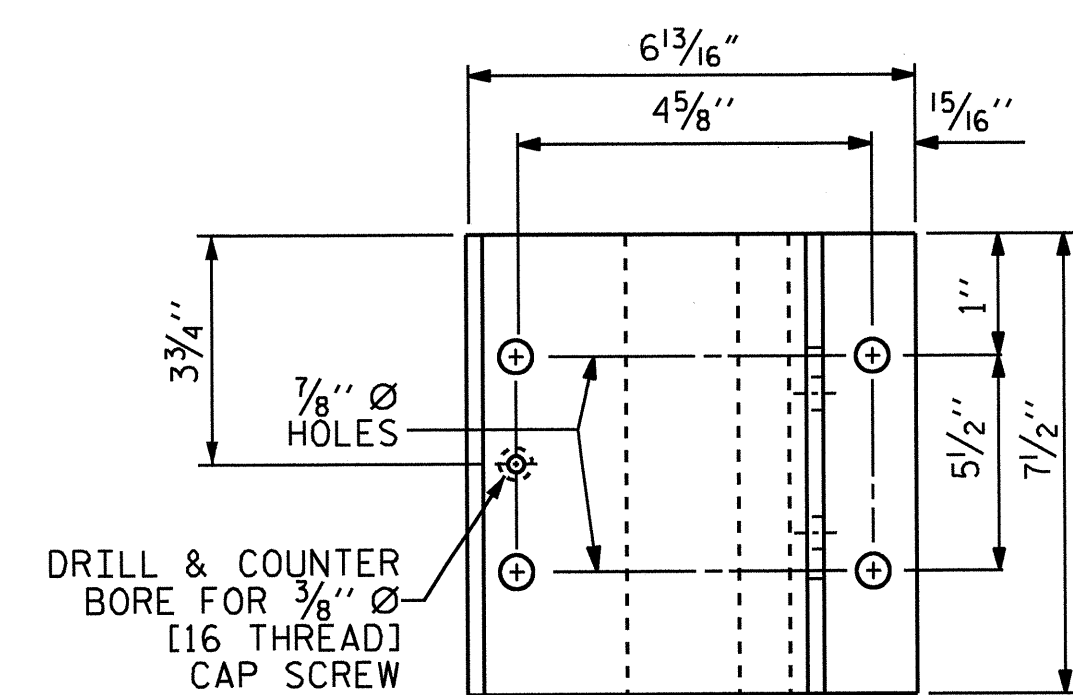


**ELEVATION**

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



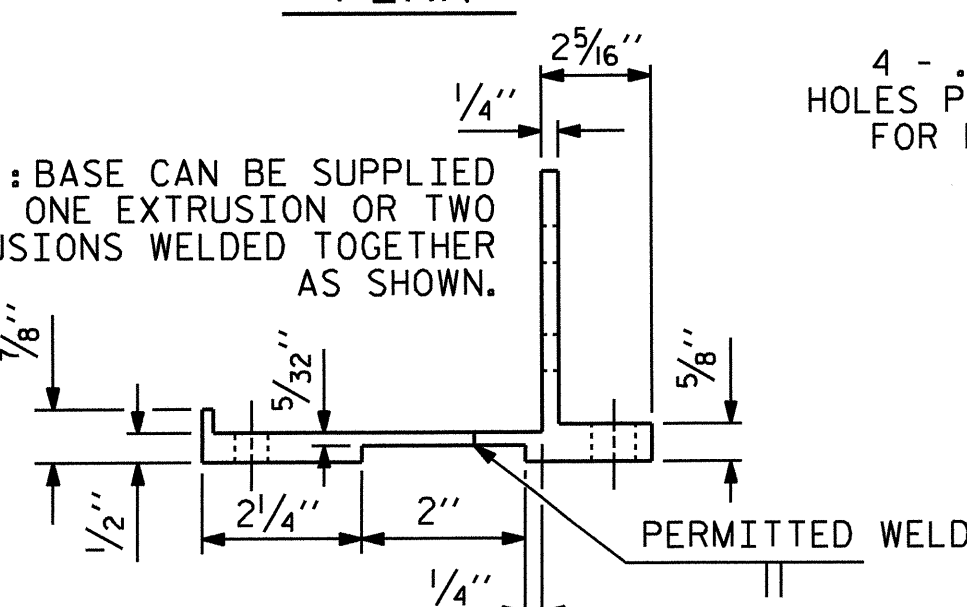
**SECTION THRU PARAPET AND RAIL**



**PLAN**

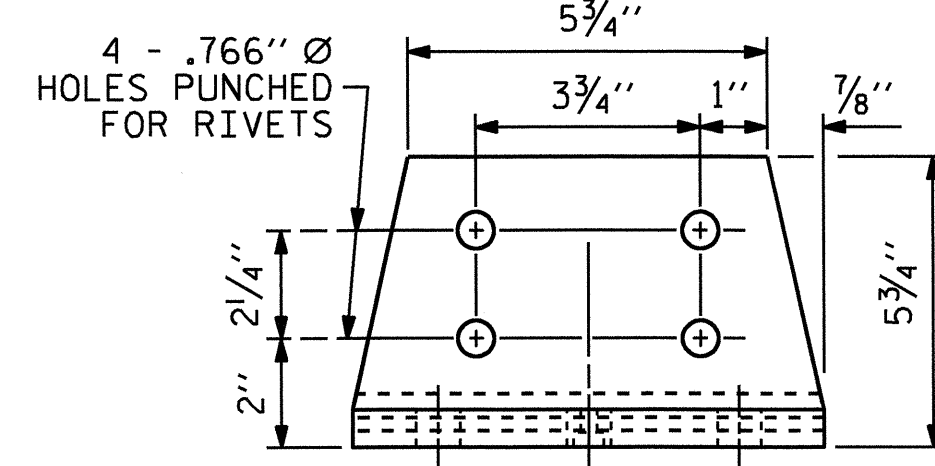
DRILL & COUNTER BORE FOR 3/8" Ø [16 THREAD] CAP SCREW

NOTE: BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.

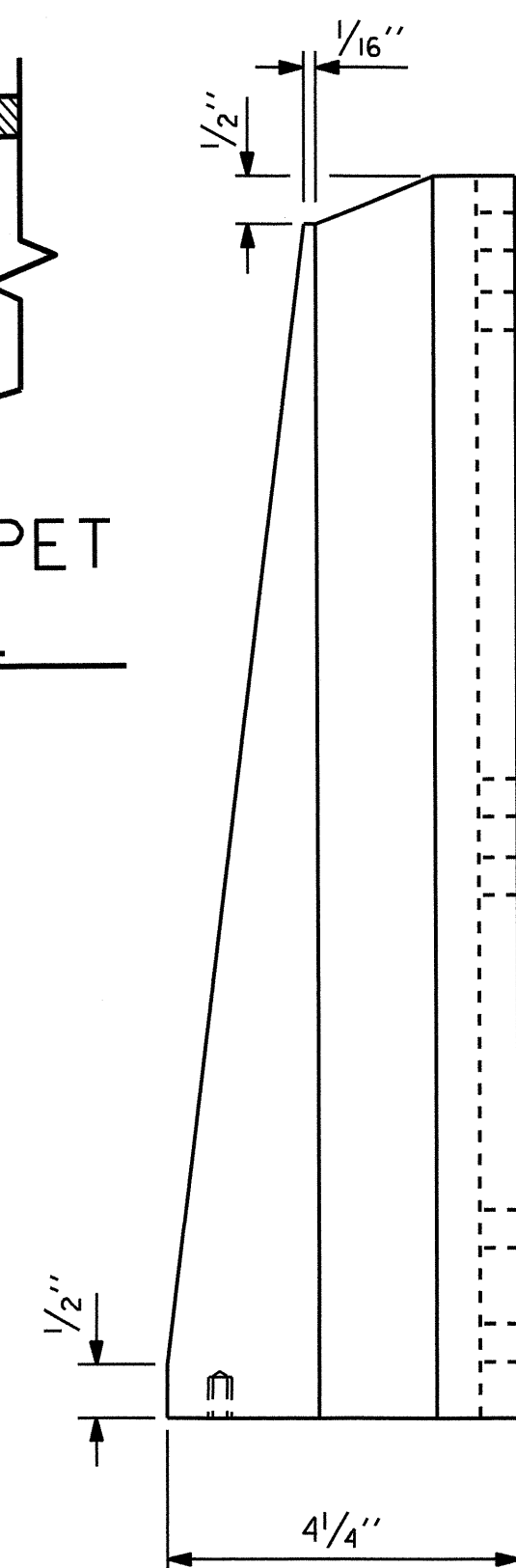


**SIDE ELEVATION**

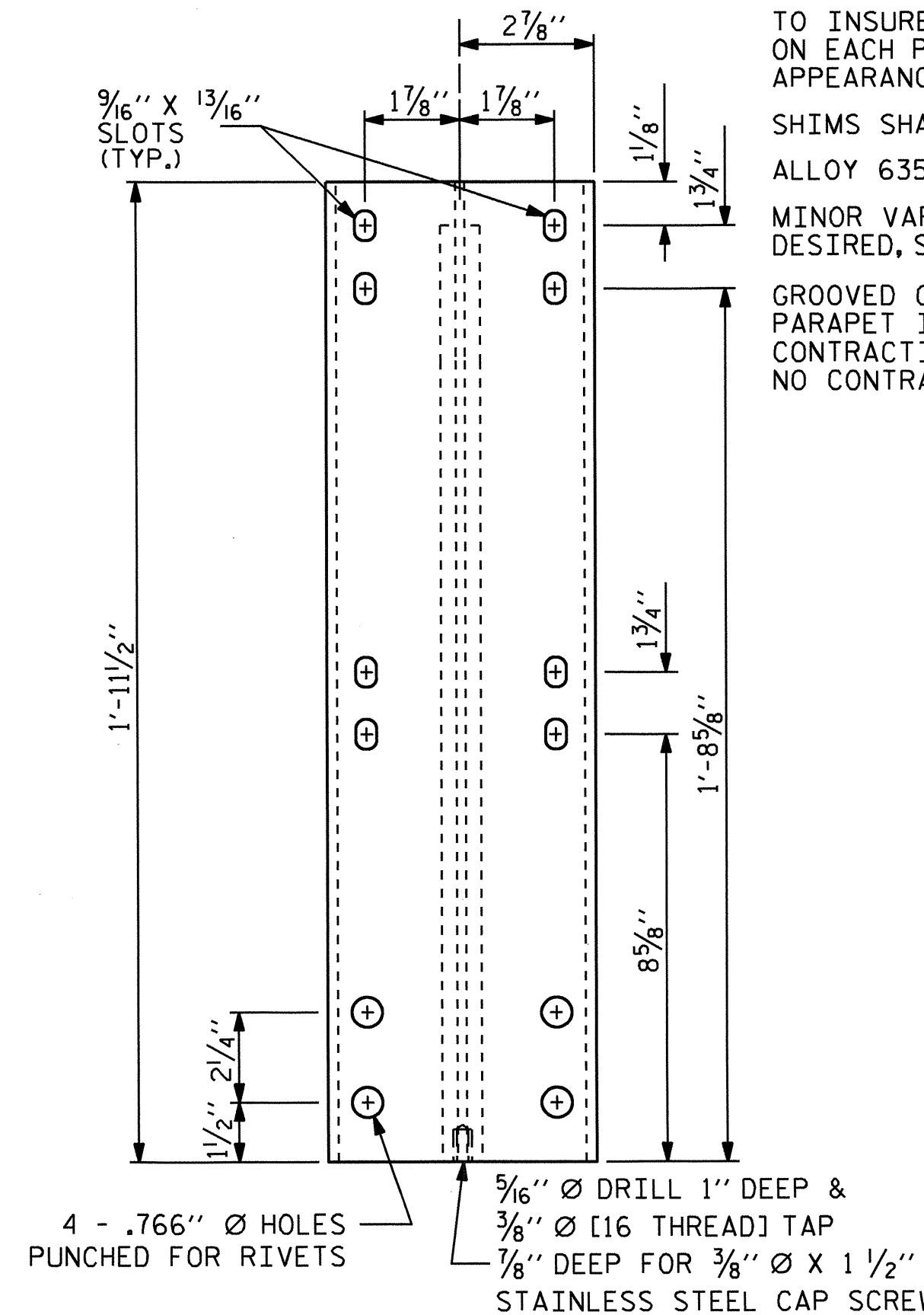
**POST BASE DETAILS**



**FRONT ELEVATION**



**SIDE ELEVATION**



**FRONT ELEVATION**

**DETAILS OF POST**

|                           |                      |
|---------------------------|----------------------|
| ASSEMBLED BY: A. V. ROYAL | DATE: 05/09          |
| CHECKED BY: D. G. ELY     | DATE: 07/09          |
| DRAWN BY: EEM 6/94        | LES/RDR              |
| CHECKED BY: RGW 6/94      | REV. 5/7/03R RWW/JTE |
|                           | REV. 5/1/06 TLA/GM   |

PROJECT NO. B-4588  
NASH COUNTY  
STATION: 15+85.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
2 BAR METAL RAIL

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-13         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |

NOTES

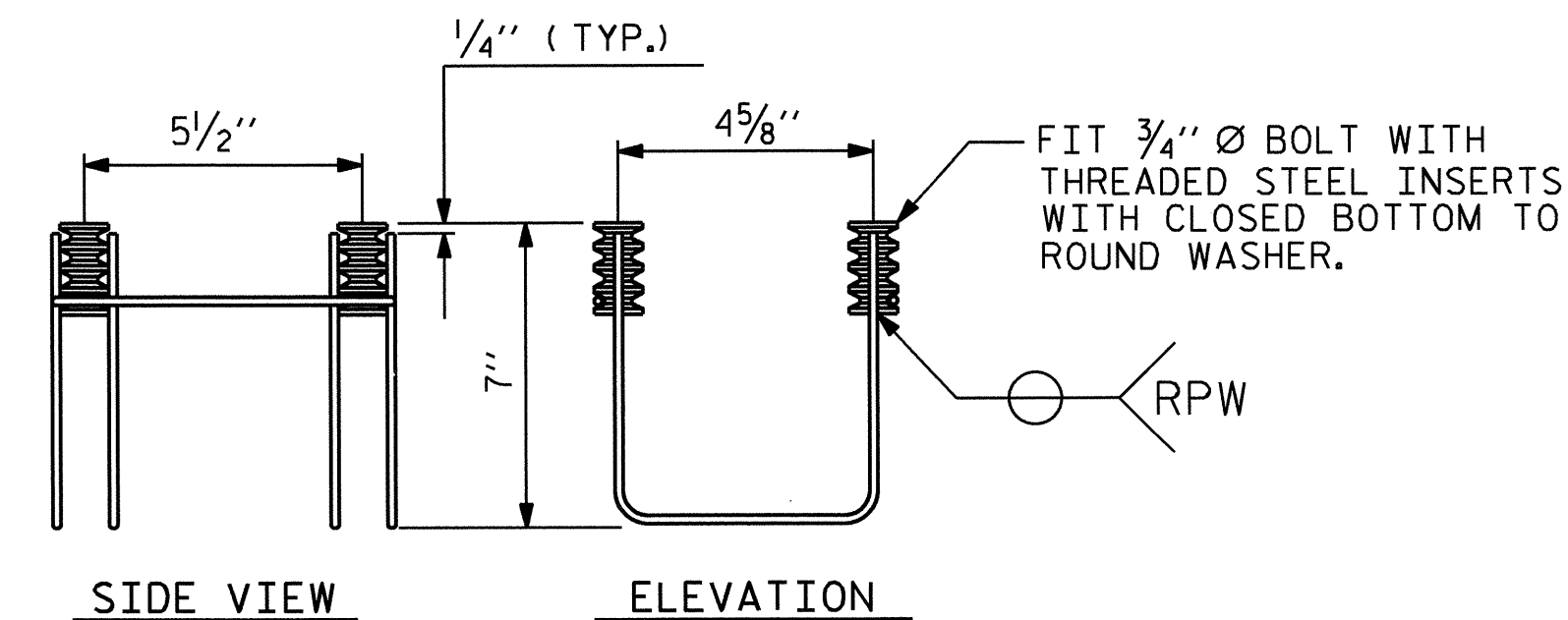
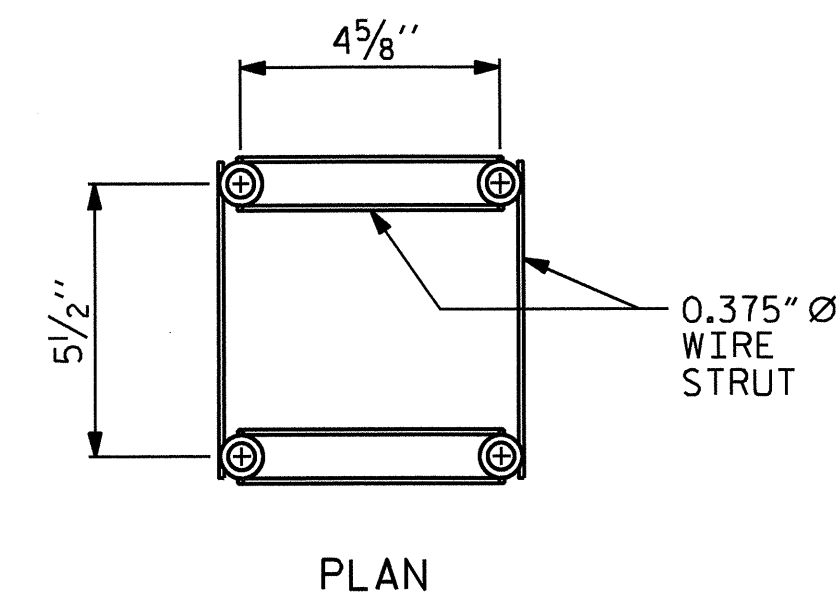
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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 7/16" 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 IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS.

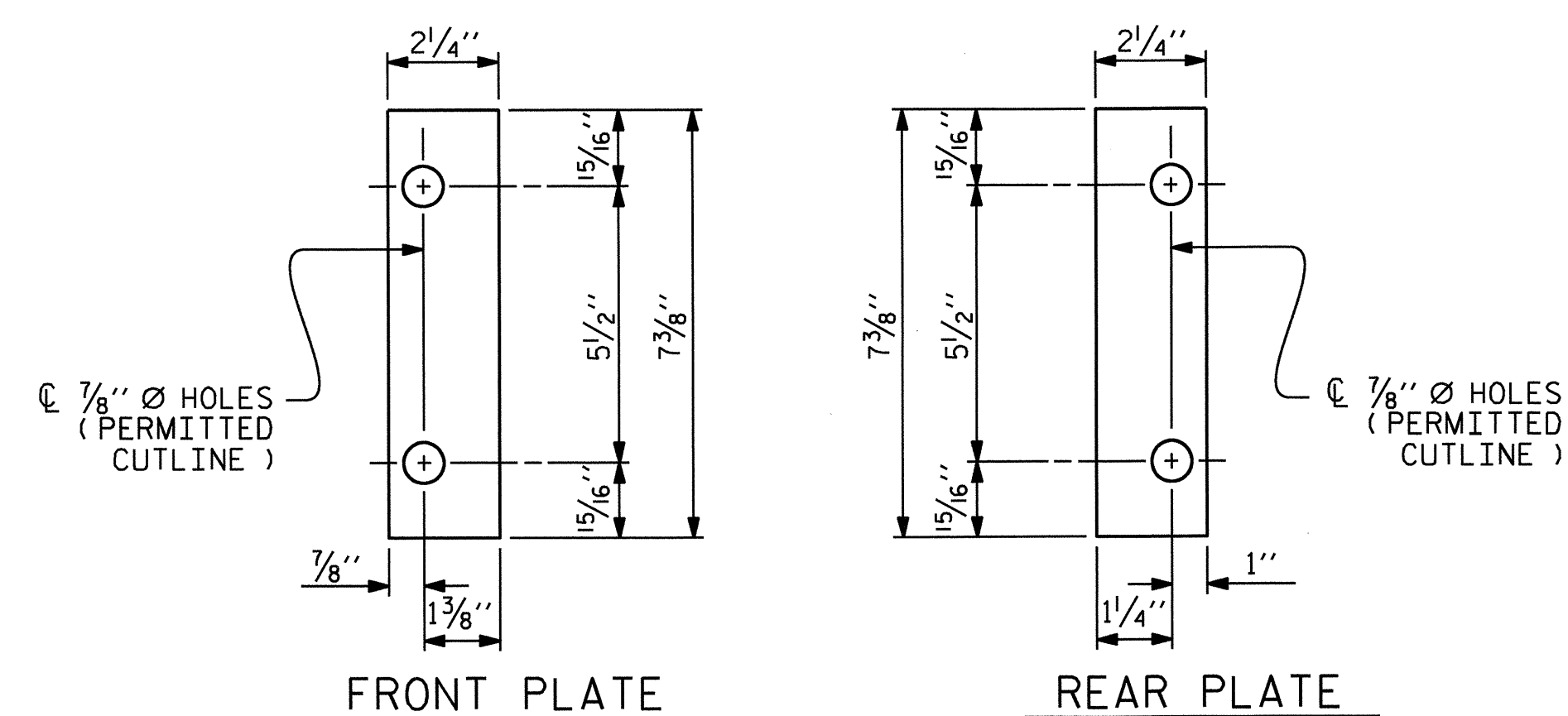
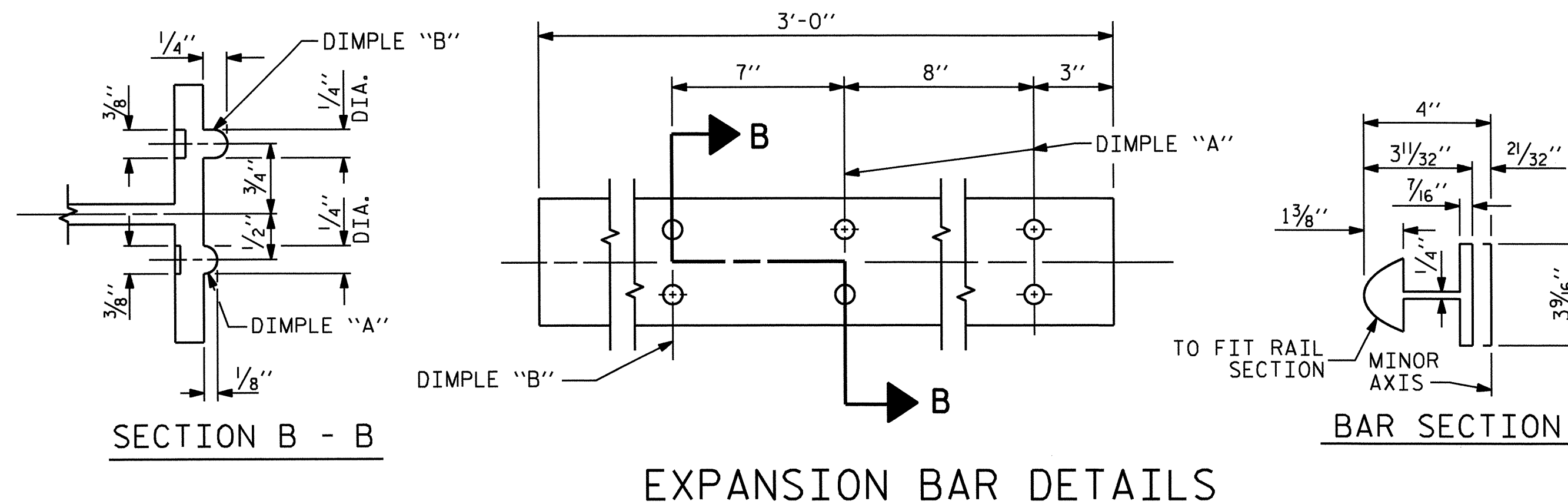
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



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

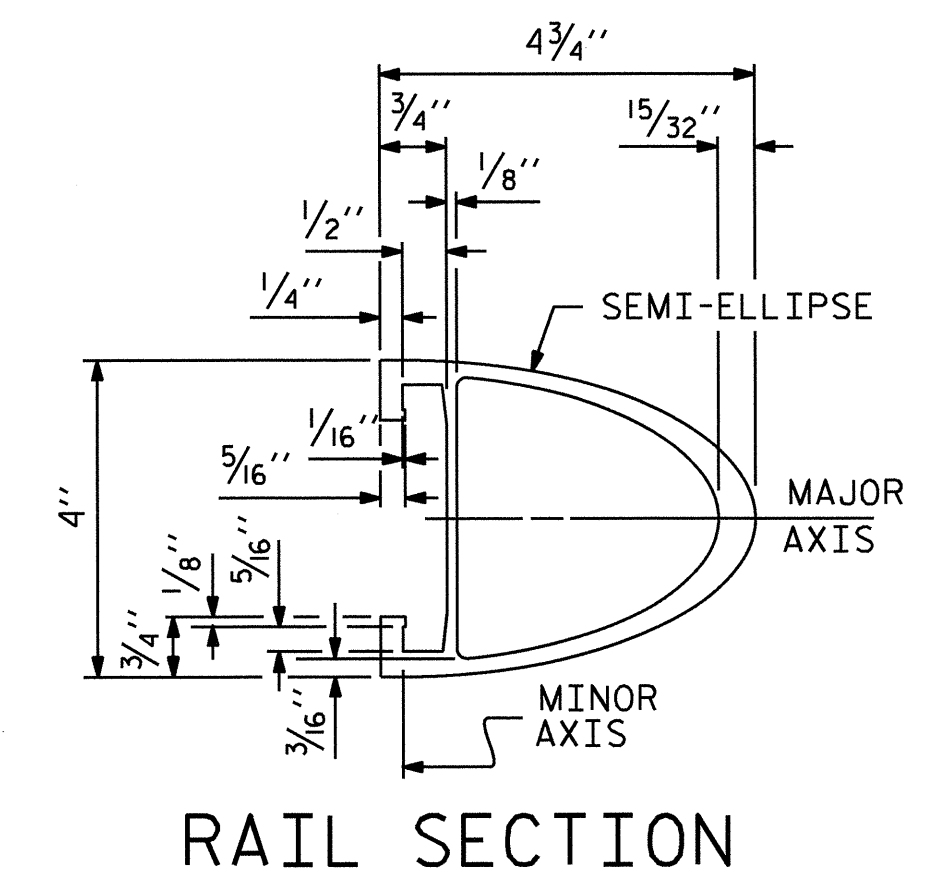
4-BOLT METAL RAIL ANCHOR ASSEMBLY

(26 ASSEMBLIES REQUIRED)

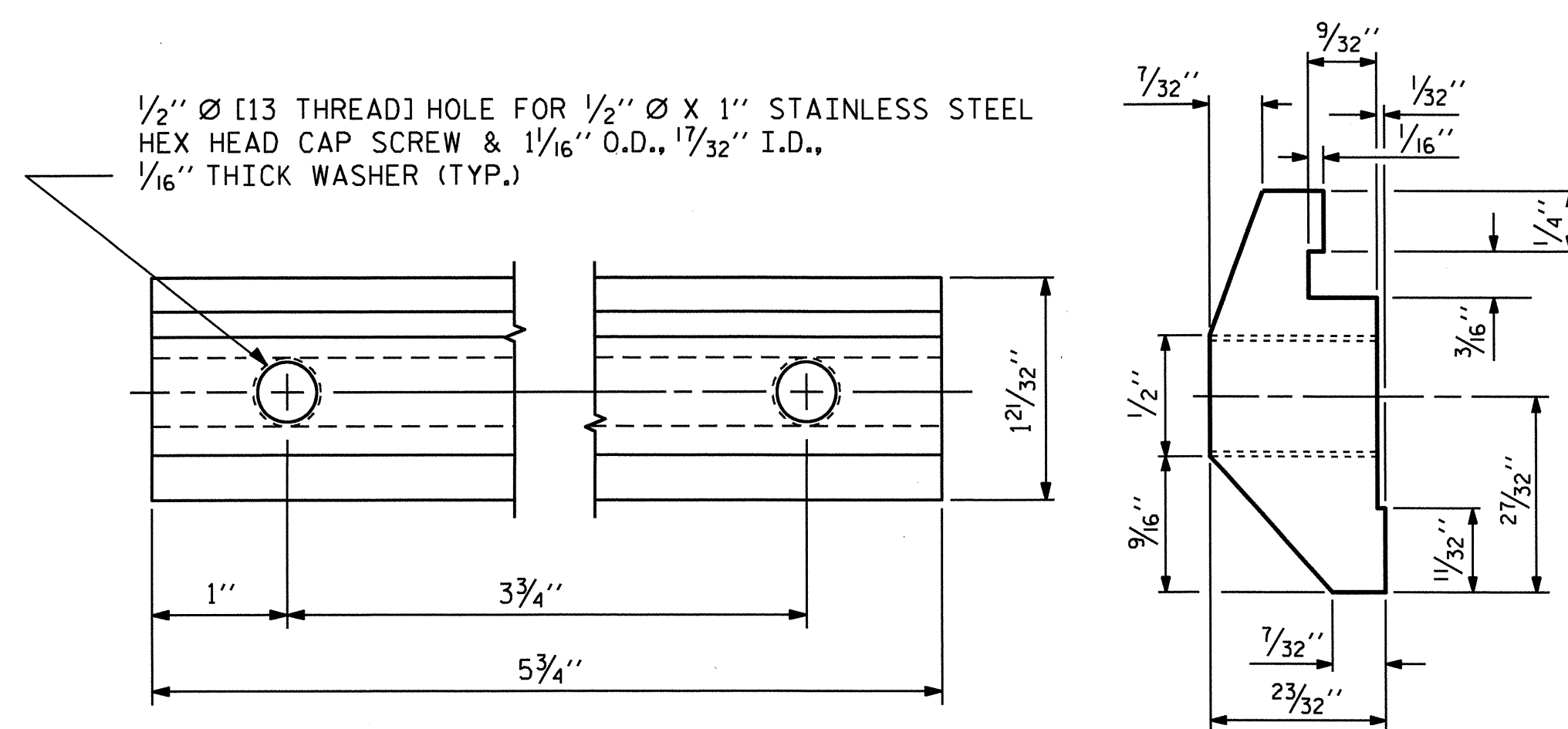


SHIM DETAILS

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

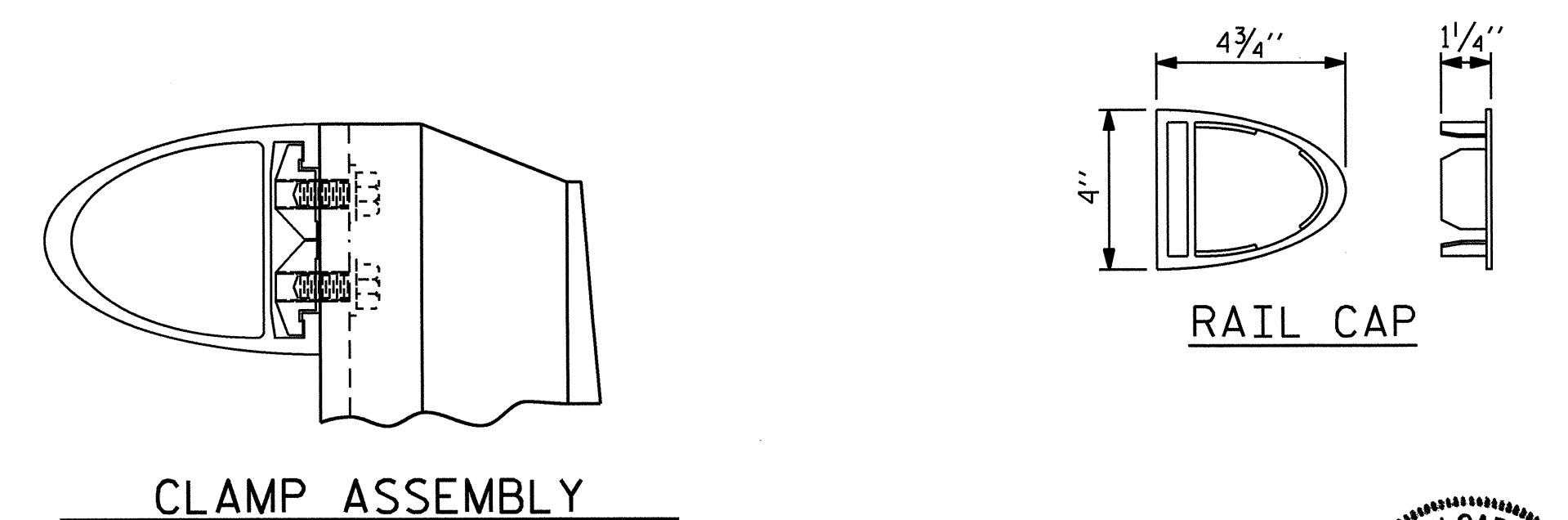


RAIL SECTION



CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY

RAIL CAP

|                            |                      |
|----------------------------|----------------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 05/09         |
| CHECKED BY : D. G. ELY     | DATE : 07/09         |
| 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  |

27-OCT-2011 09:17  
L:\S\Structures\Super.Draw\B4588.sd.BX.dgn  
kalford

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-  
 SHEET 2 OF 2

|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| STANDARD   |     |       |     |     |                    |
| 2 BAR METAL RAIL   |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
|  |     |       |     |     | SHEET NO.<br>S-14  |
|  |     |       |     |     | TOTAL SHEETS<br>31 |



STD. NO. BMR4

**NOTES**

**STRUCTURAL CONCRETE INSERT**

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

**NOTES**

**METAL RAIL TO END POST CONNECTION**

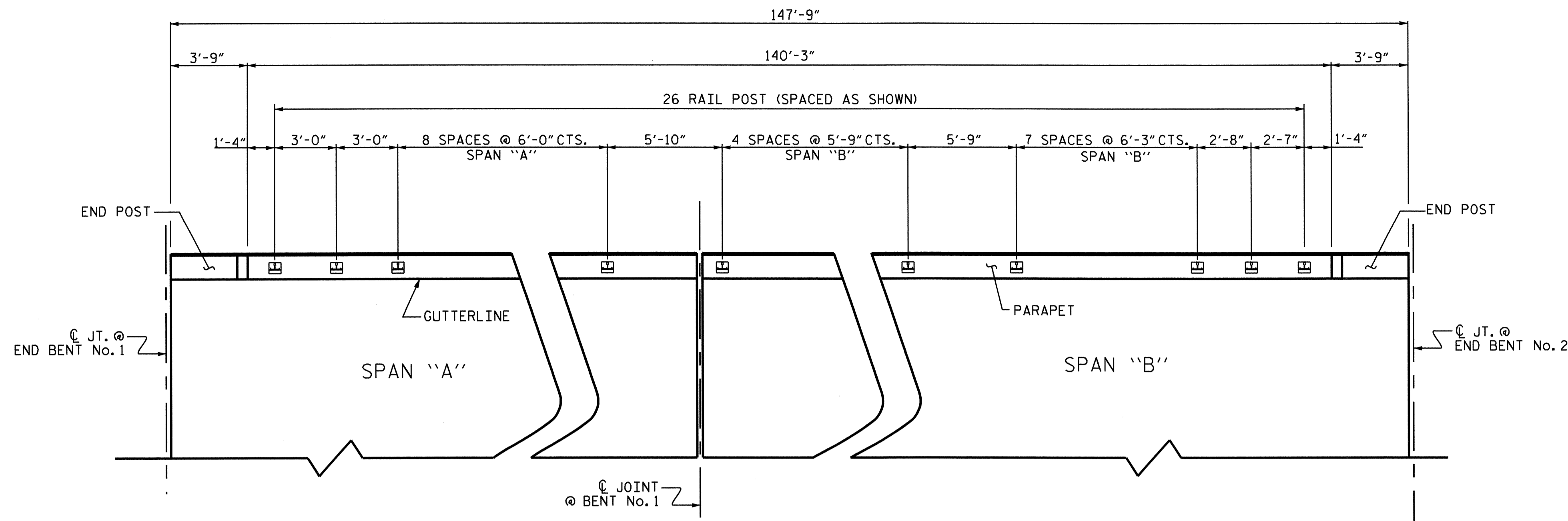
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
  - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - E. 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 2 BAR METAL RAIL.

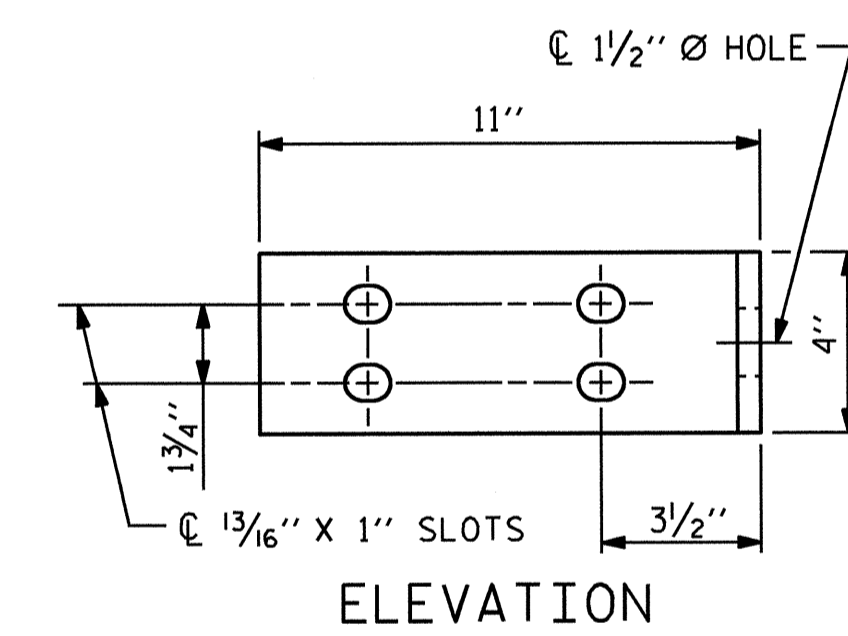
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

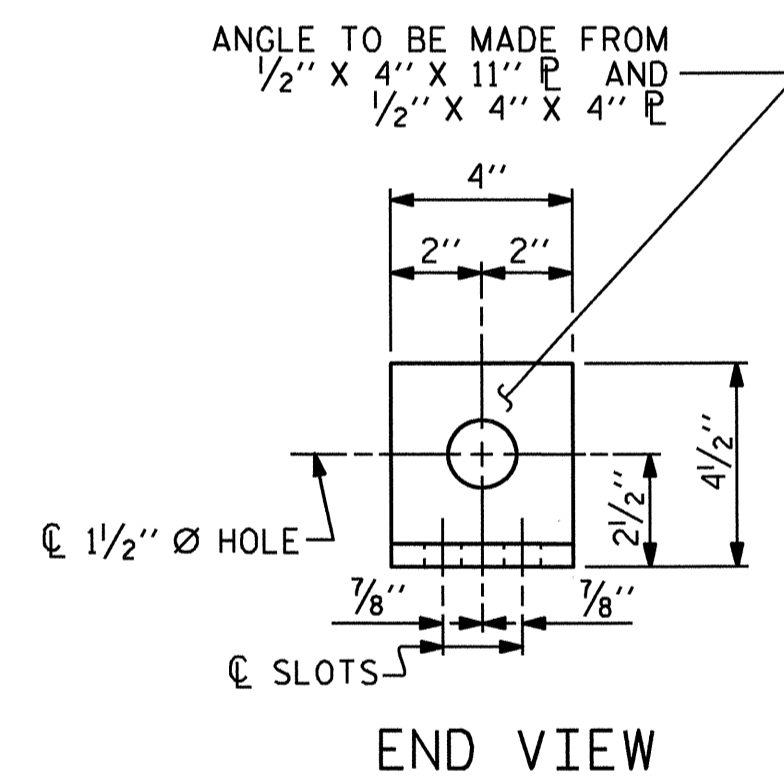
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



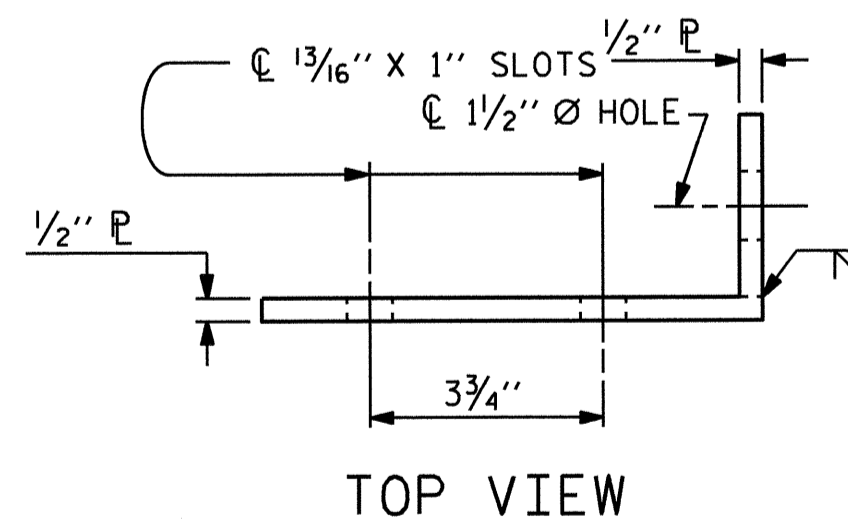
**PLAN OF RAIL POST SPACINGS**



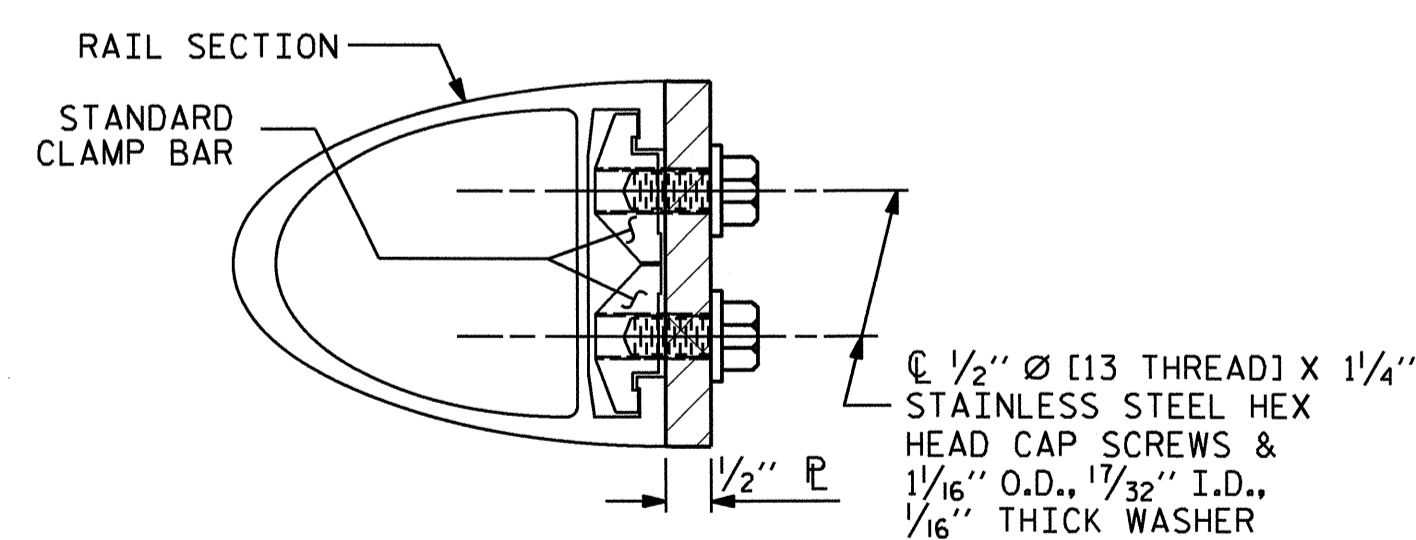
**ELEVATION**



**END VIEW**

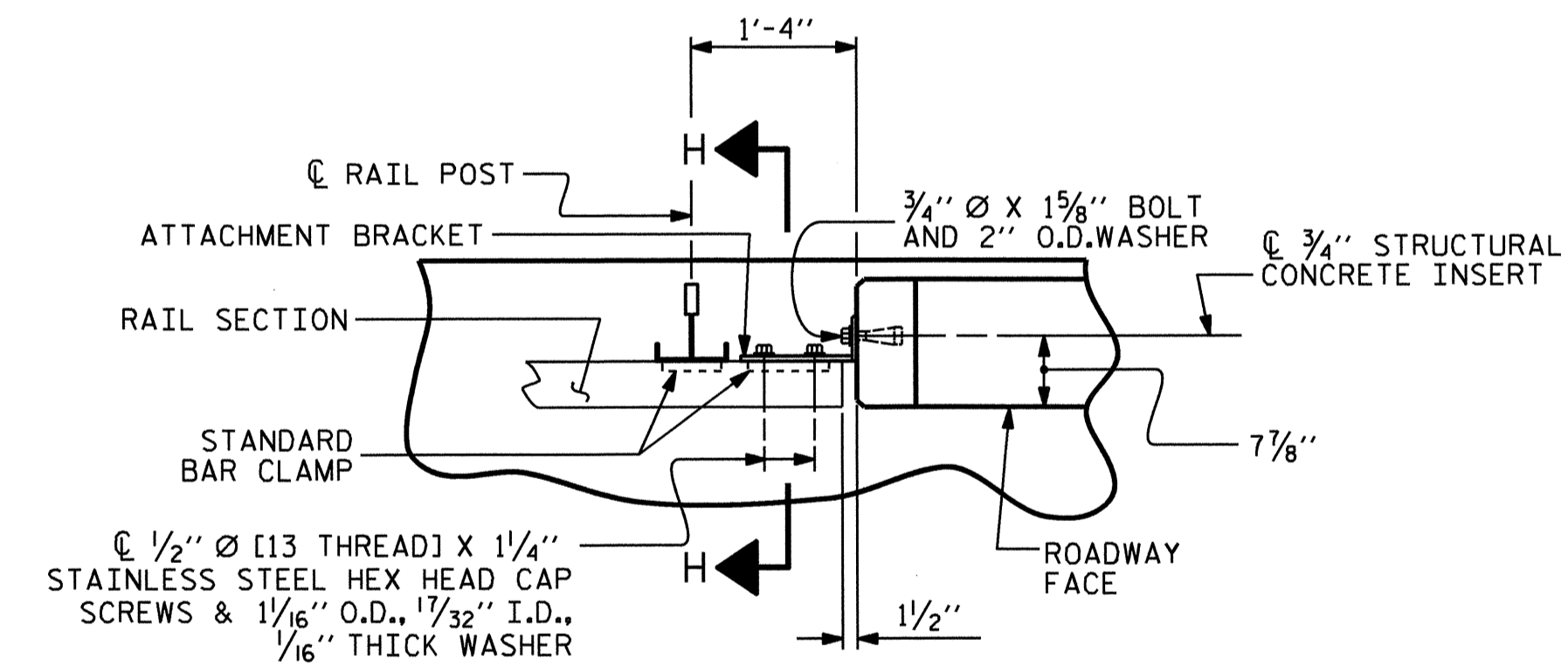


**TOP VIEW**

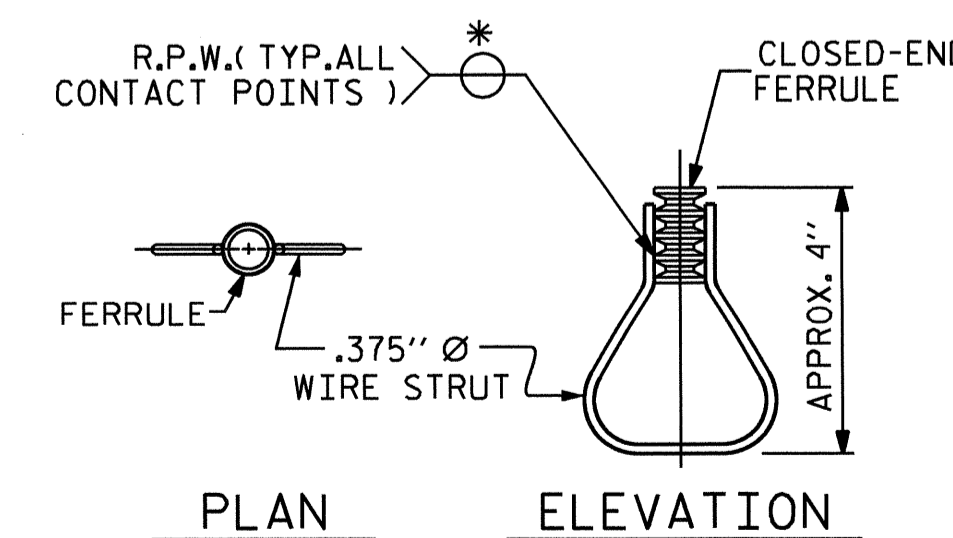


**SECTION H-H**

**DETAILS FOR ATTACHING METAL RAIL TO END POST**



**PLAN - RAIL AND END POST**



**PLAN ELEVATION STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

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



|                            |                       |
|----------------------------|-----------------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 05/09          |
| CHECKED BY : D. G. ELY     | DATE : 07/09          |
| 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    |

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-15         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |



**NOTES**

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

**ALUMINUM RAILS**

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

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 140'-3" LIN. FT.



PROJECT NO. B-4588

NASH COUNTY

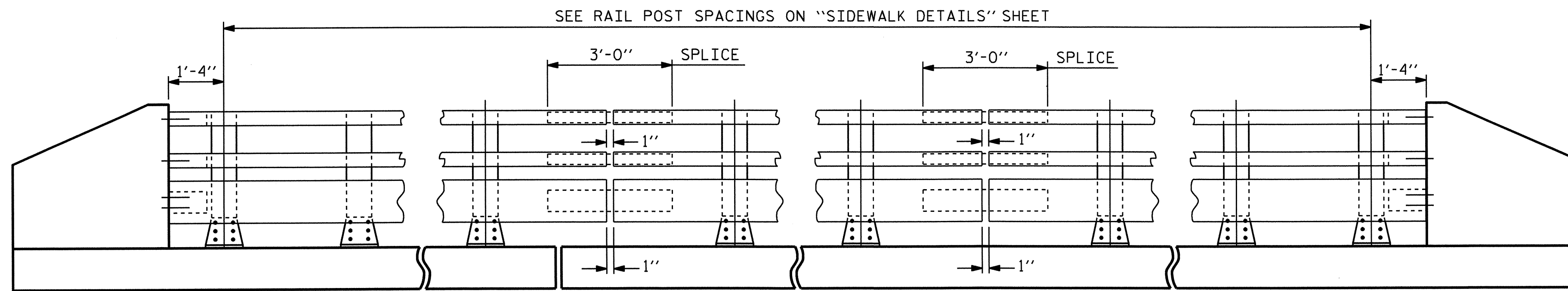
STATION: 15+85.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

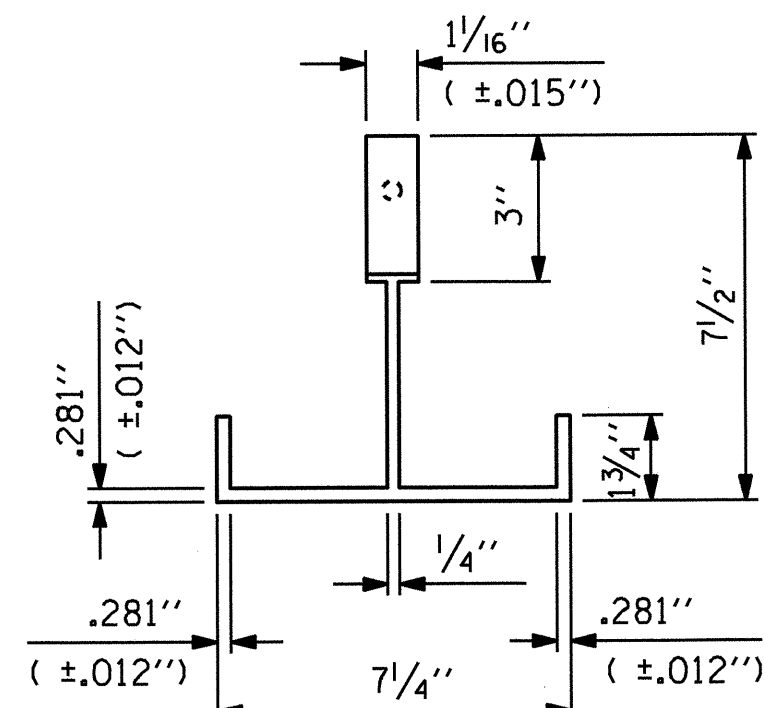
STANDARD  
3 BAR METAL RAIL

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-16            |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 31 |
| 2         |     |       | 4   |     |       |                 |

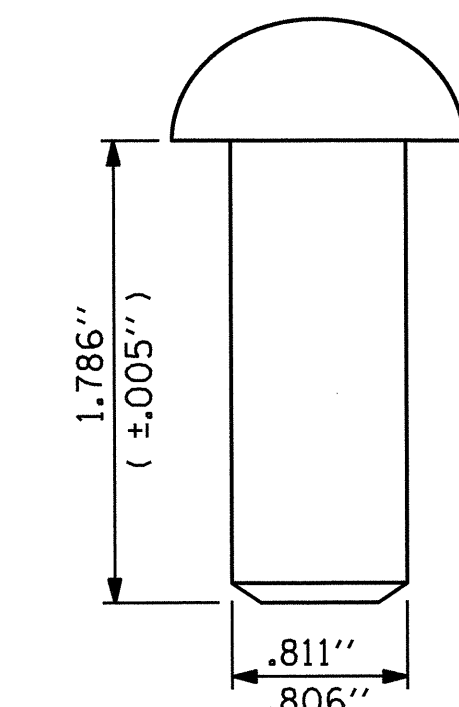


**ELEVATION**

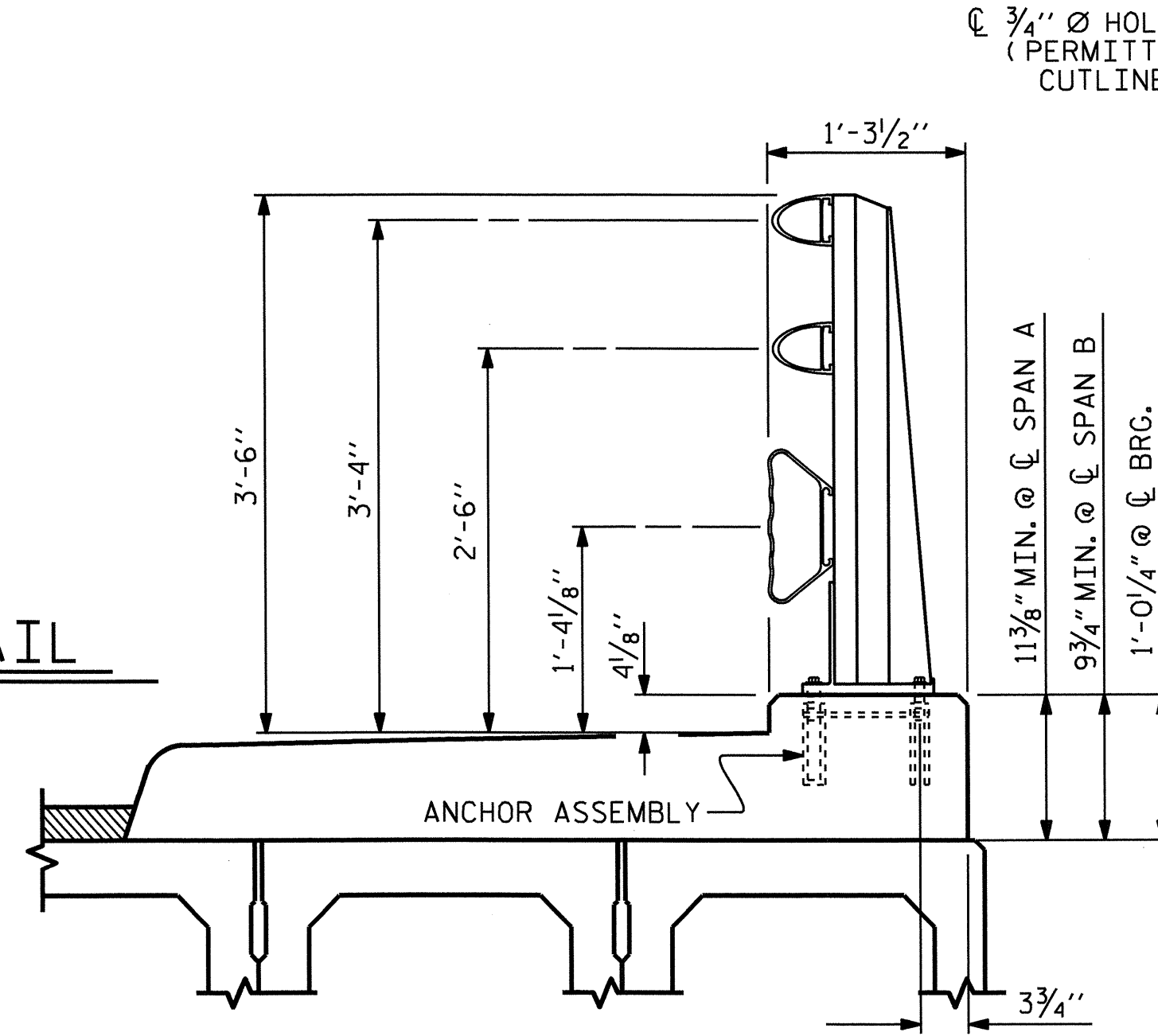
NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.



**PLAN**

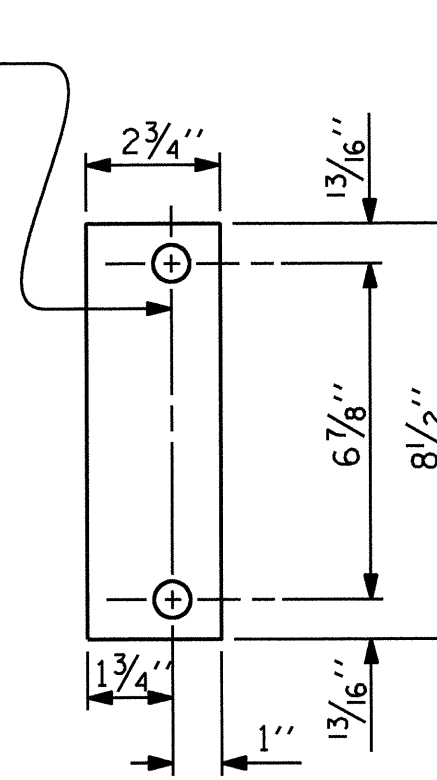


**RIVET DETAIL**

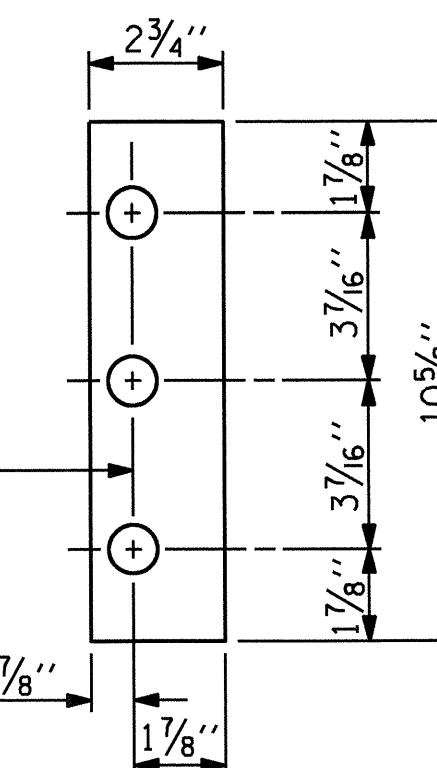


**SECTION THRU RAIL**

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

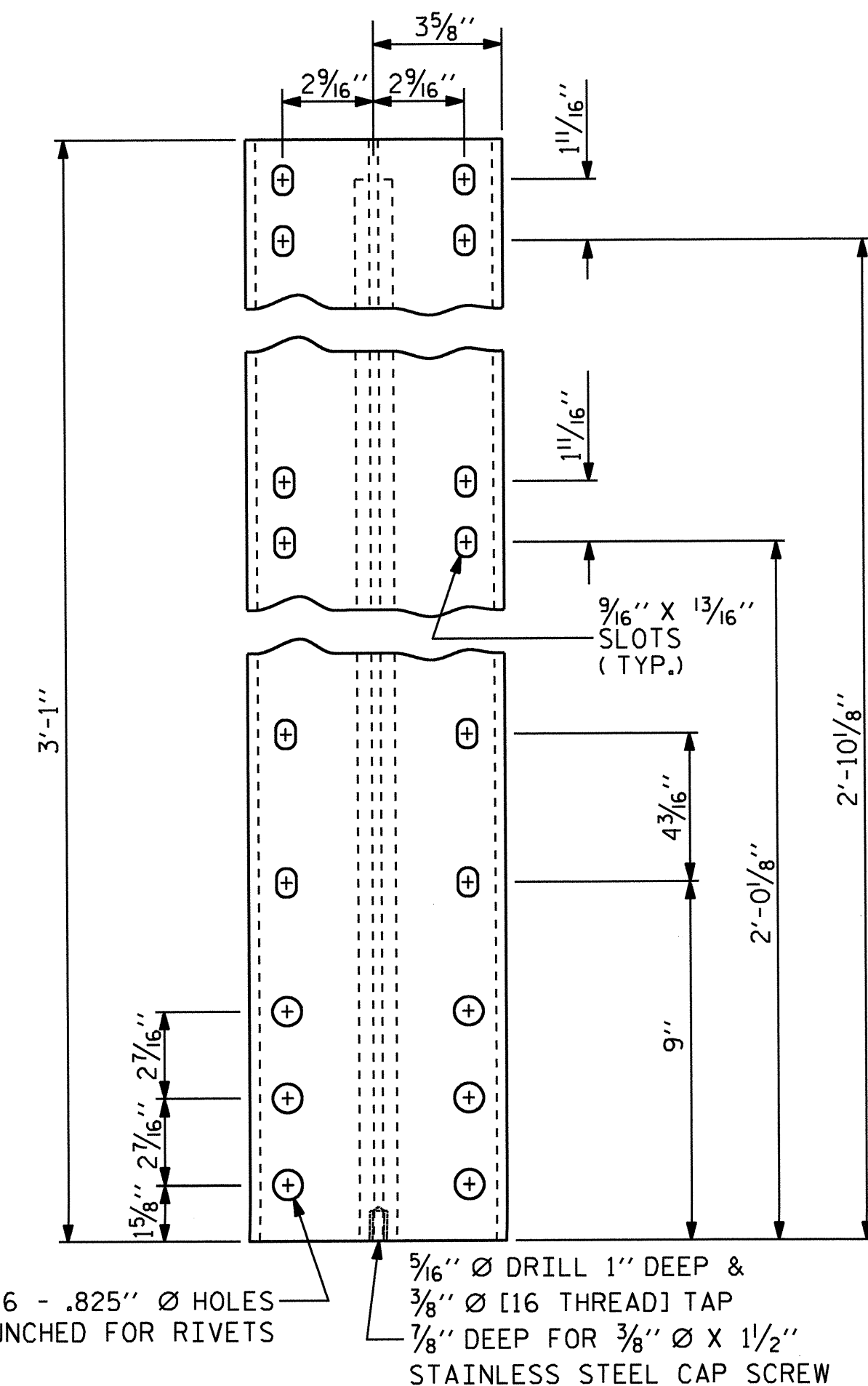


**REAR PLATE**

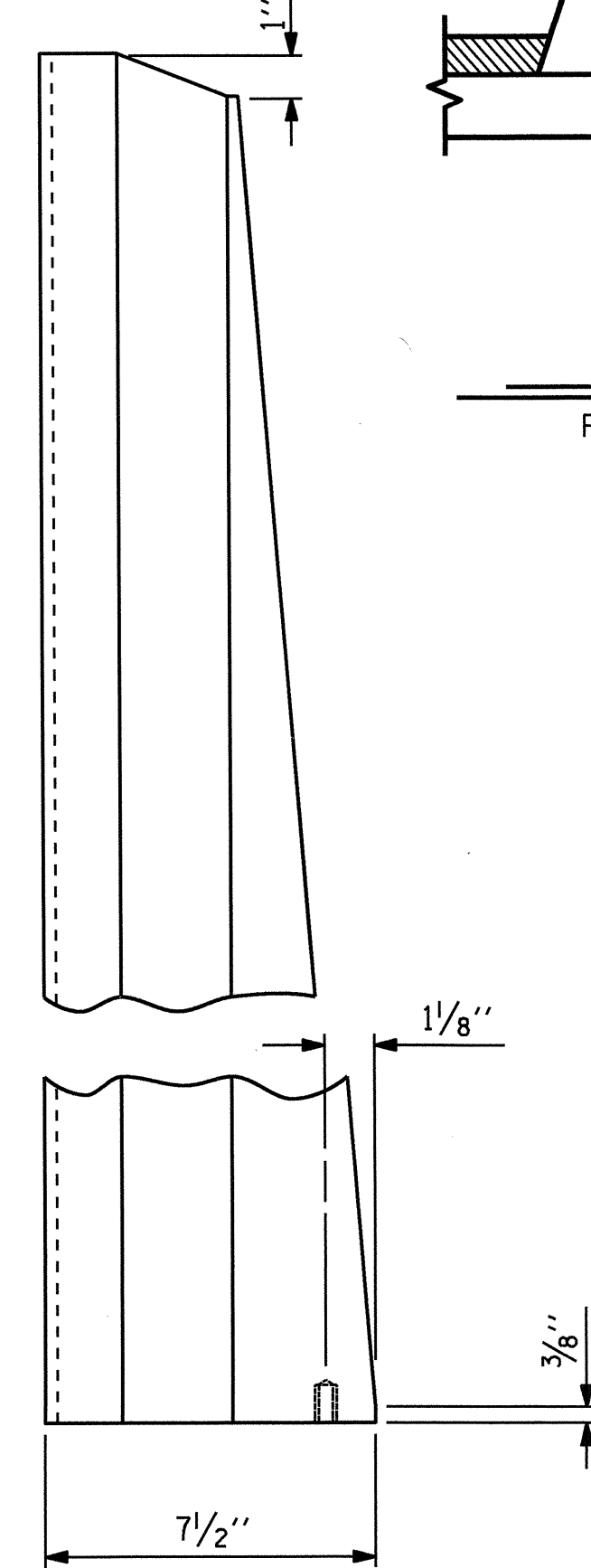


**FRONT PLATE SHIM DETAILS**

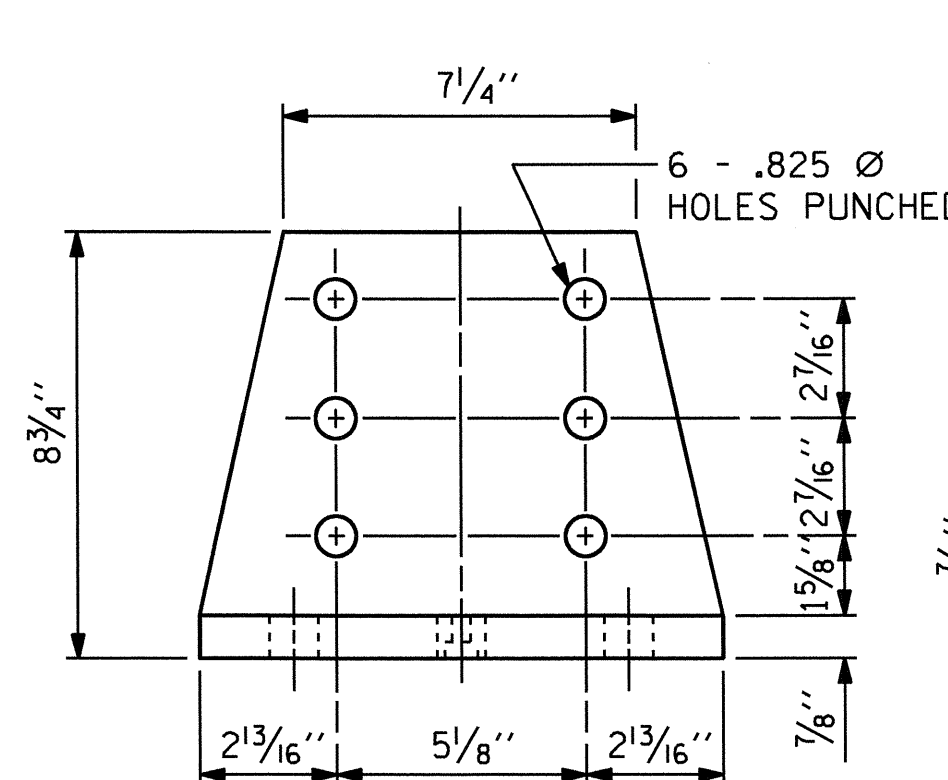
NOTE: SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



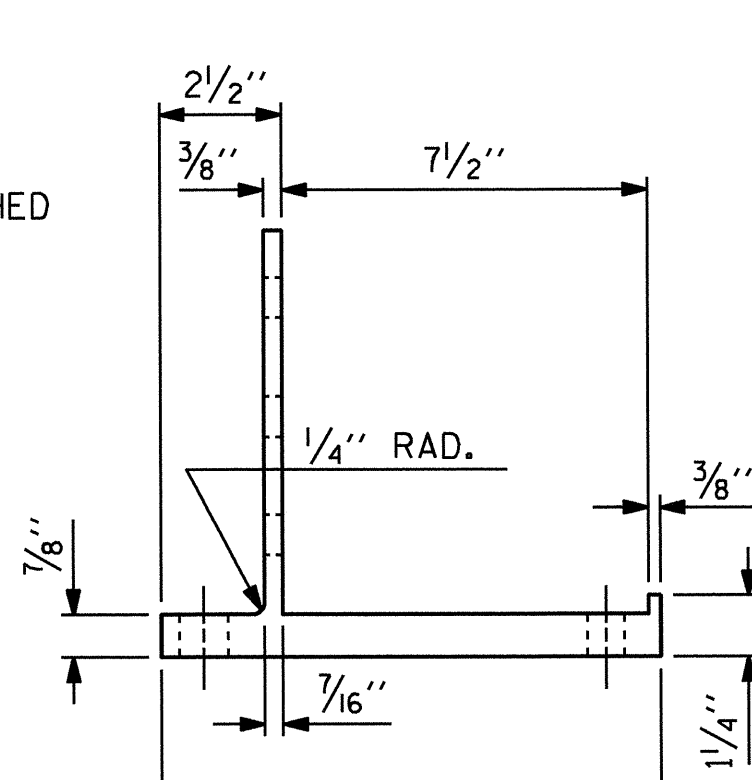
**FRONT ELEVATION**



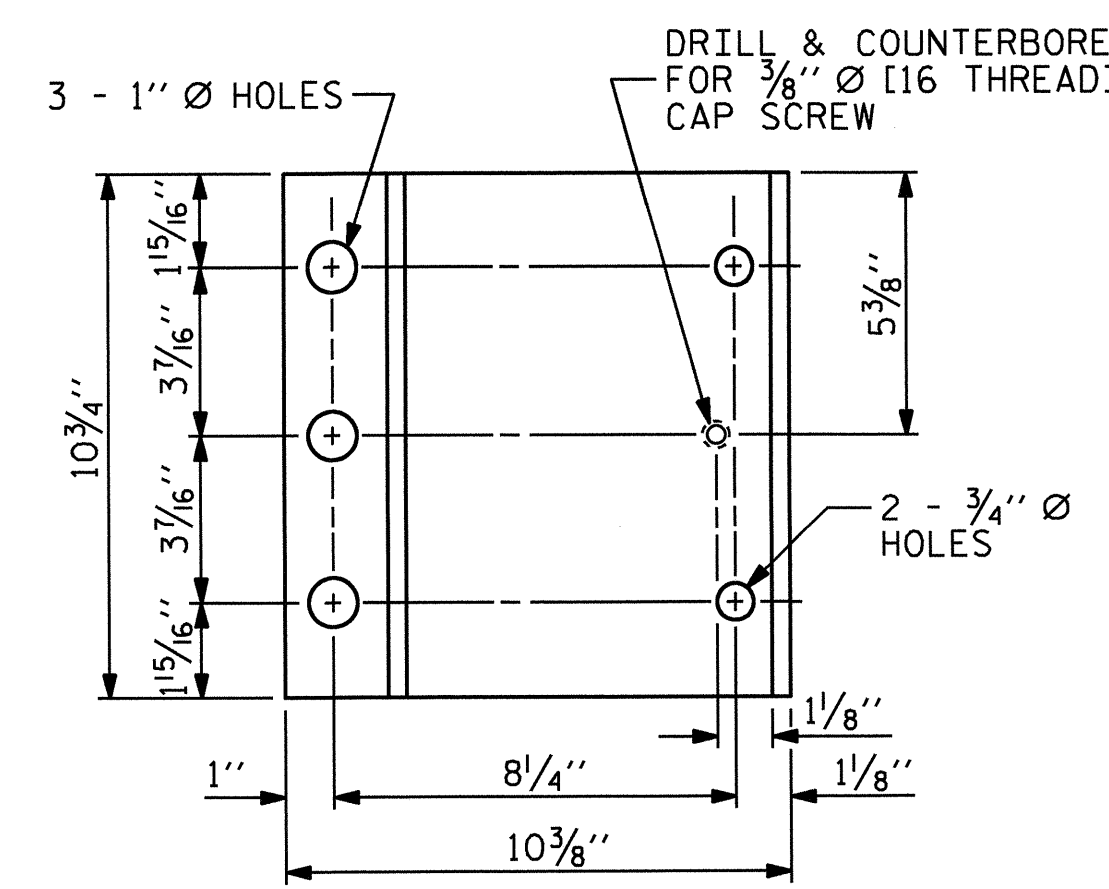
**SIDE ELEVATION**



**FRONT ELEVATION**



**SIDE ELEVATION**



**PLAN**

**POST BASE DETAILS**

|                            |                       |
|----------------------------|-----------------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 05/09          |
| CHECKED BY : D. G. ELY     | DATE : 07/09          |
| DRAWN BY : JMB 1/88        | REV. 10/17/00 RWW/LES |
| CHECKED BY : GGH 1/88      | REV. 5/7/03 RWW/JTE   |
|                            | REV. 5/1/06 TLA/GM    |



NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
- C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
- D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

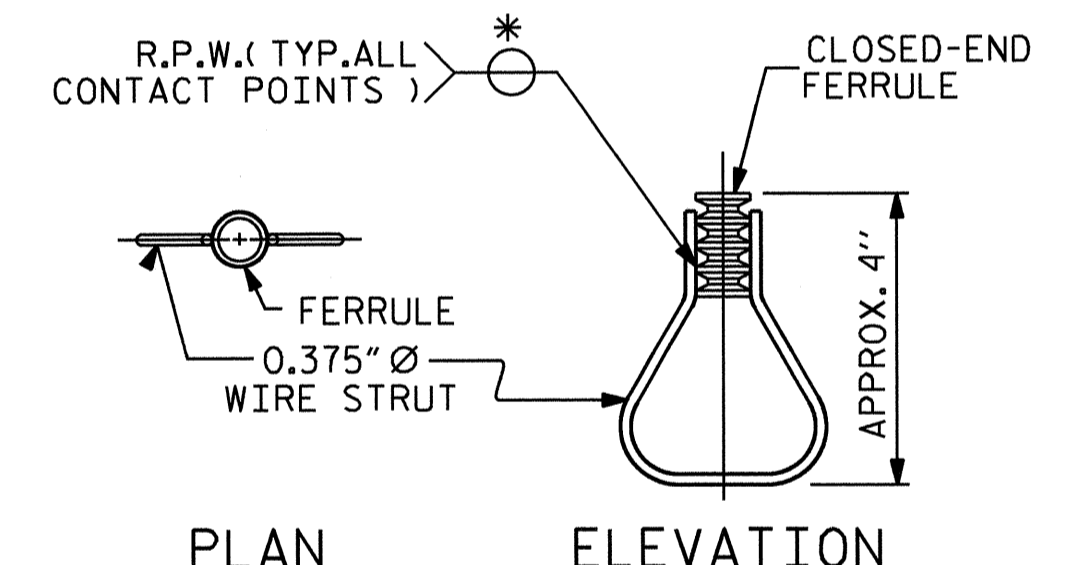
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

STRUCTURAL CONCRETE INSERT

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

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



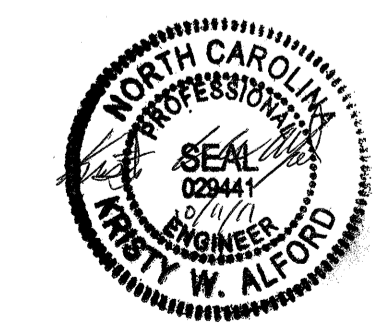
STRUCTURAL CONCRETE INSERT

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

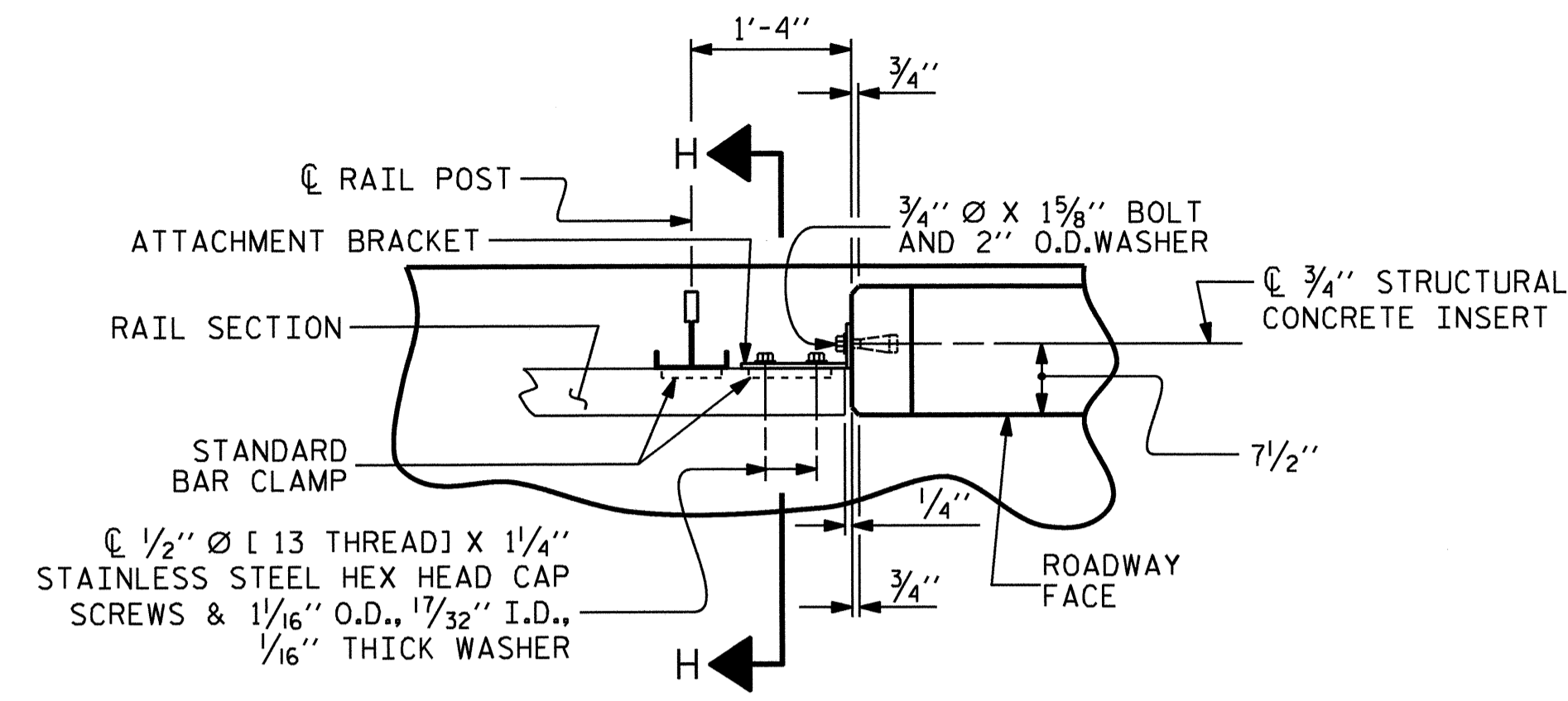
PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 3 OF 3

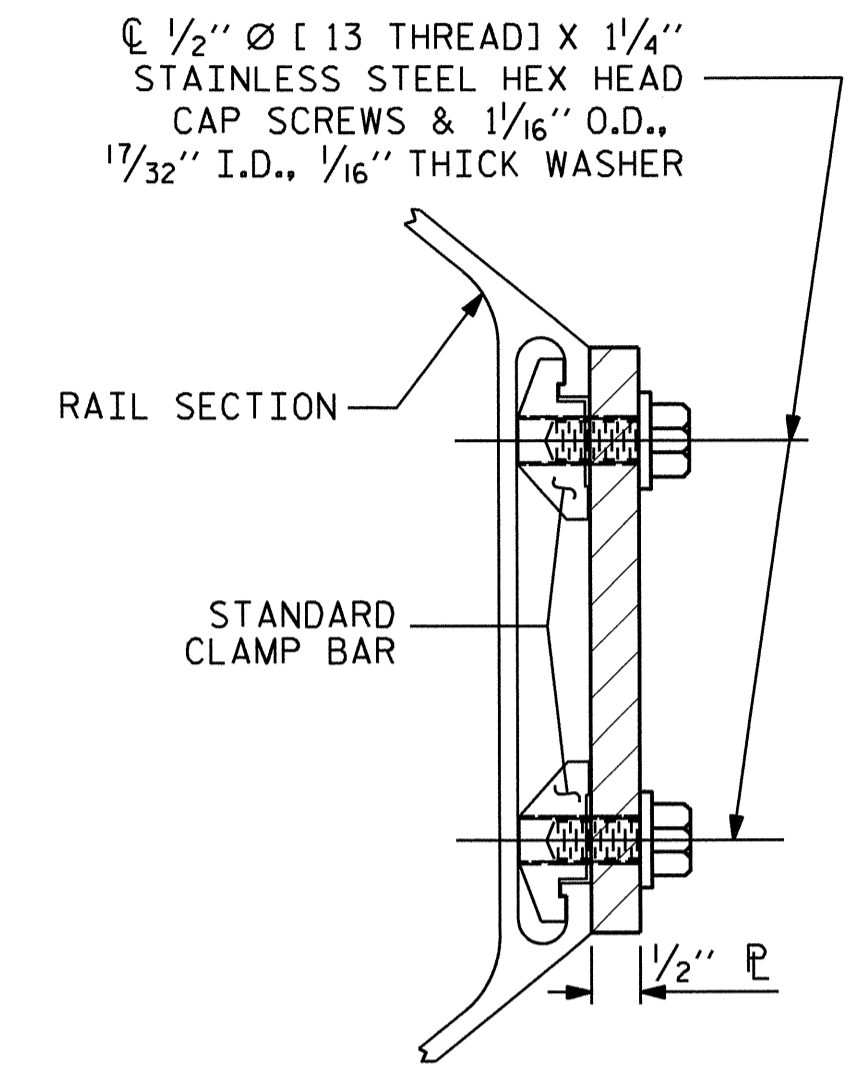
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       | SHEET NO.<br>S-18  |
|--|-----|-------|-----|-----|-------|--------------------|
| STANDARD   |     |       |     |     |       | TOTAL SHEETS<br>31 |
| 3 BAR METAL RAIL   |     |       |     |     |       |                    |
| REVISIONS  |     |       |     |     |       | NO.                |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1  |     |       | 3   |     |       |                    |
| 2  |     |       | 4   |     |       |                    |



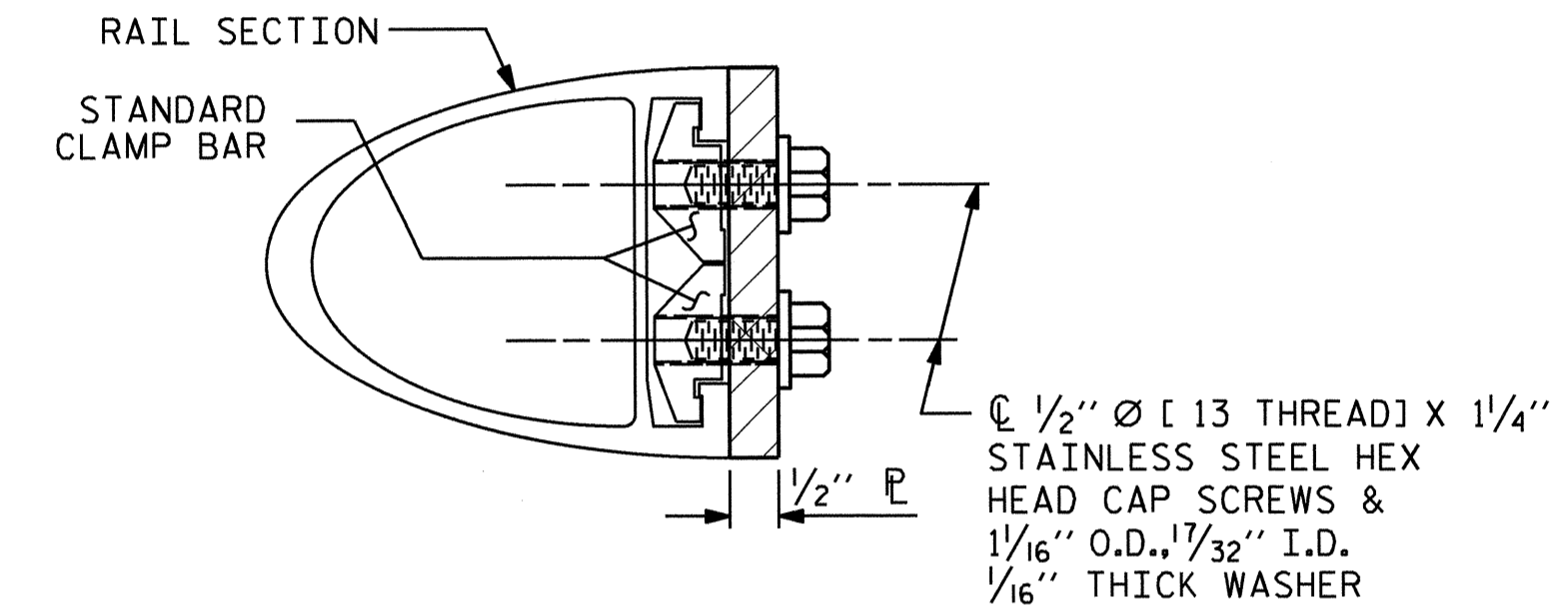
STD. NO. BMR7



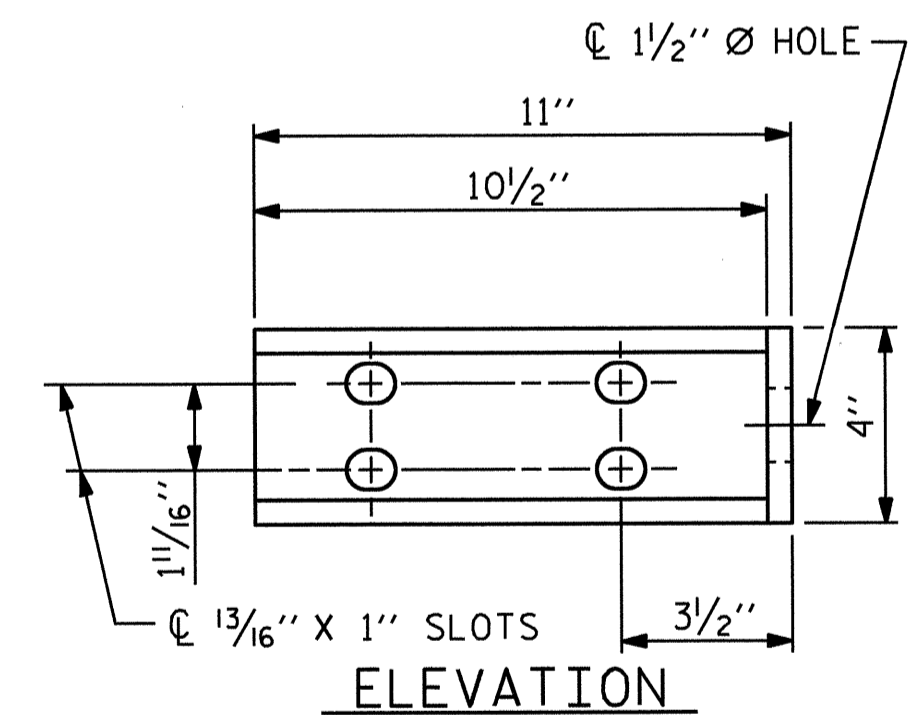
PLAN OF RAIL AND END POST  
 (STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



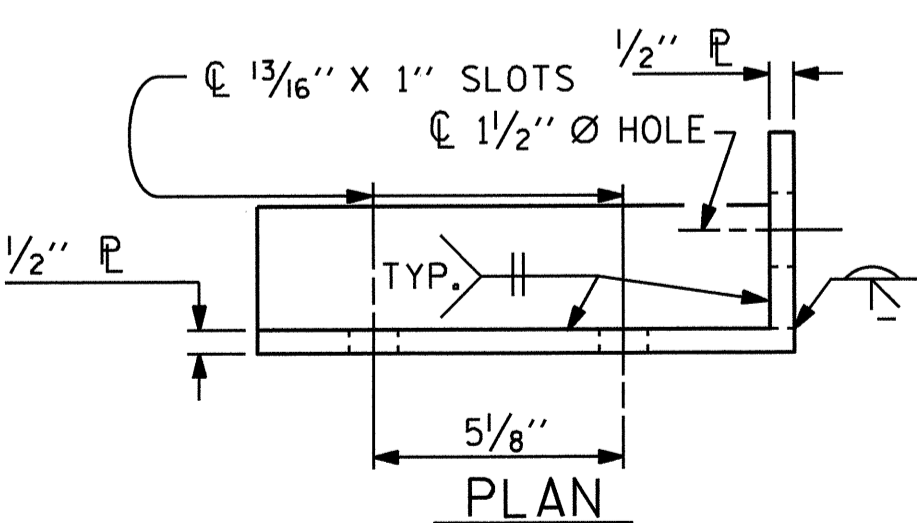
SECTION H-H  
 (FOR BOTTOM RAIL)



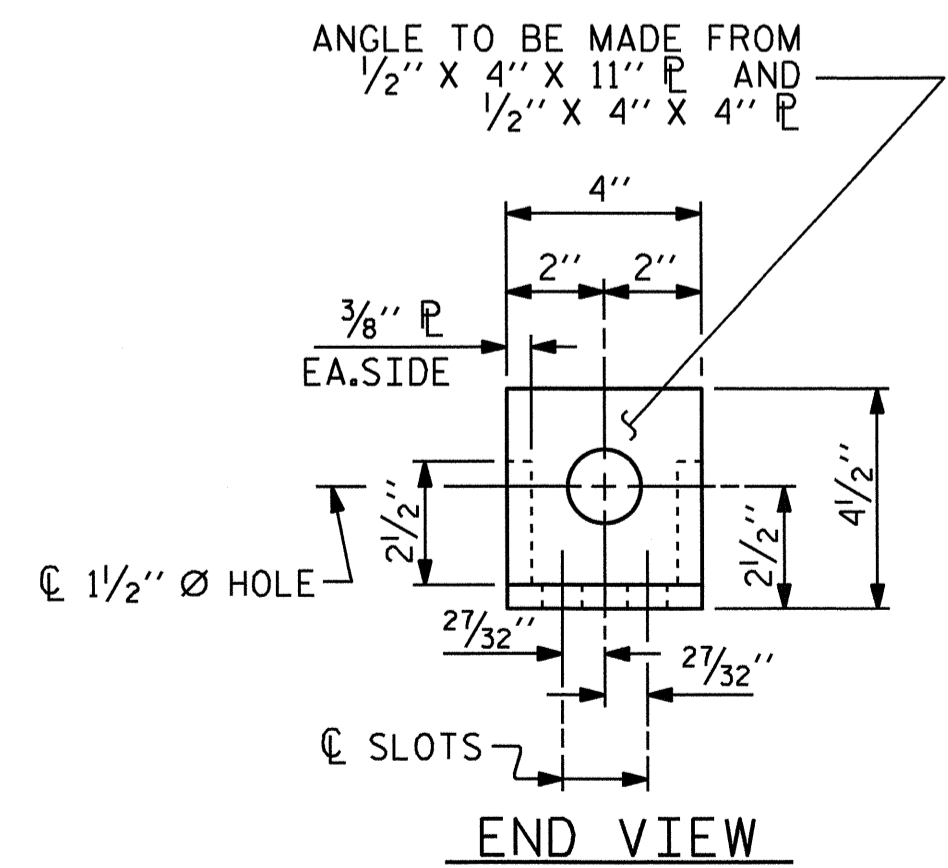
SECTION H-H  
 (FOR TOP & MIDDLE RAIL)



ELEVATION

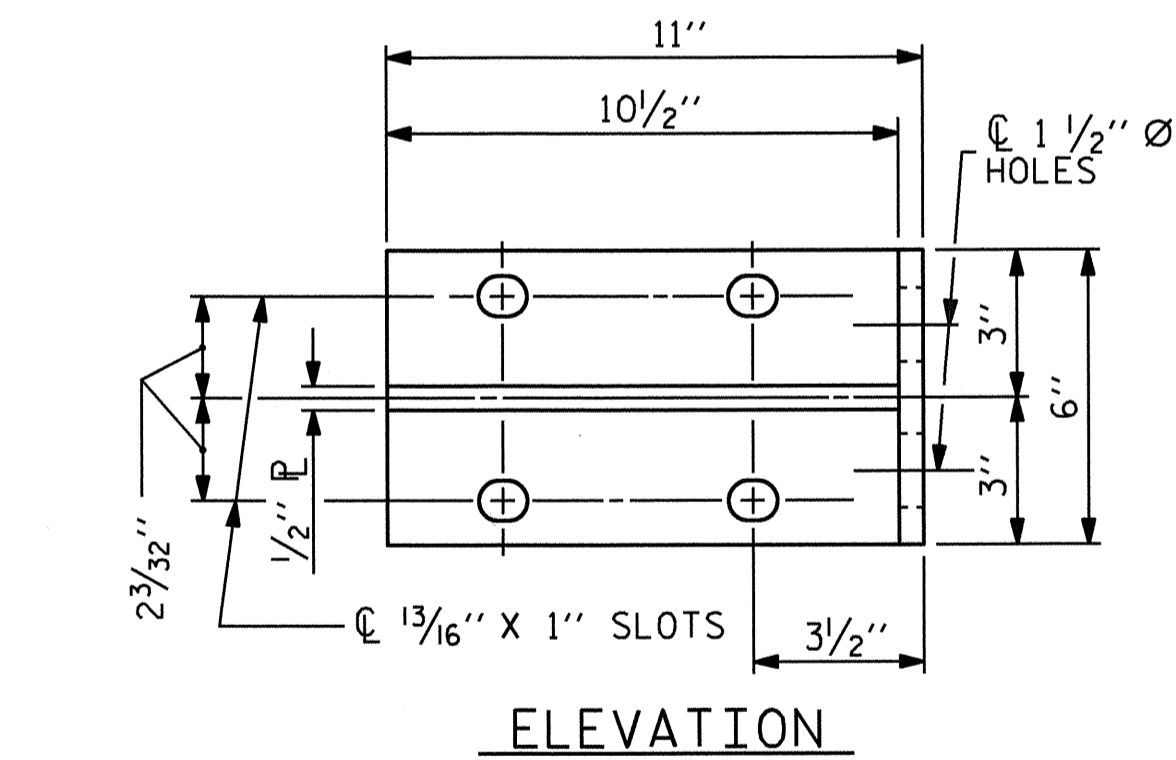


PLAN

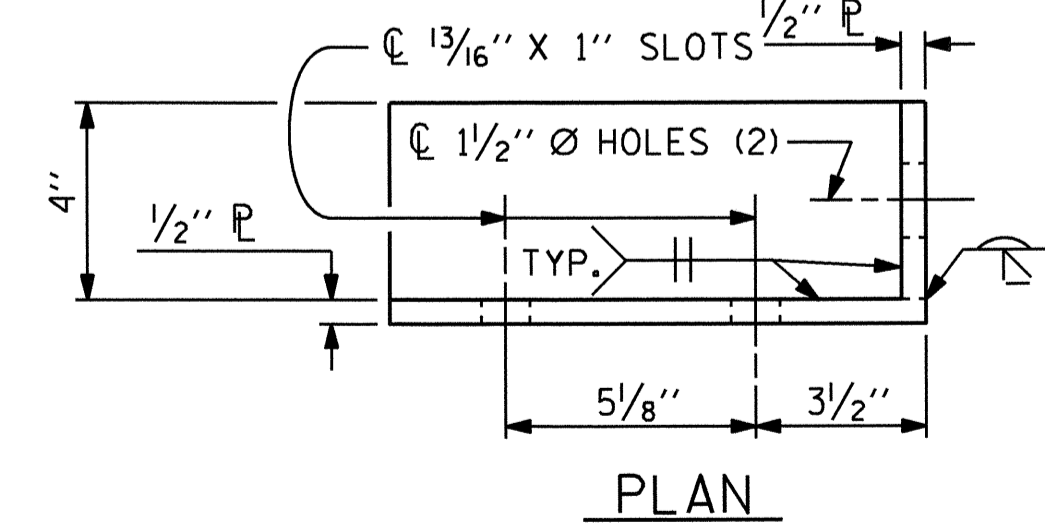


END VIEW

DETAILS FOR ATTACHMENT BRACKET  
 (TOP & MIDDLE RAIL ONLY)

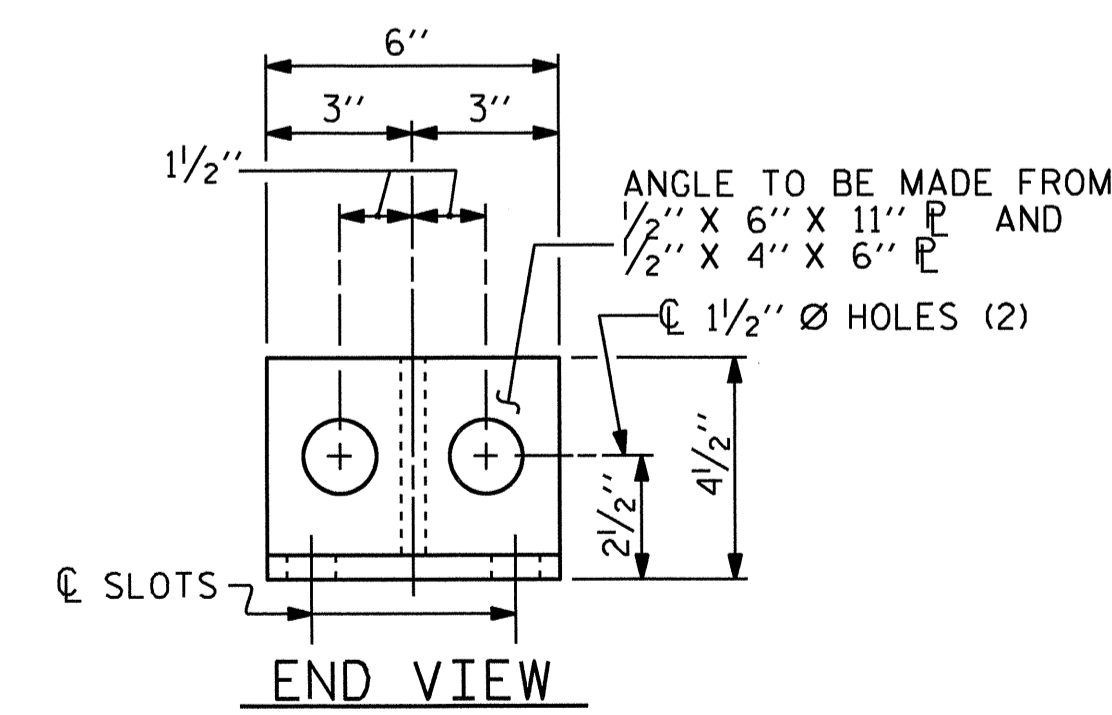


ELEVATION



PLAN

DETAILS FOR ATTACHMENT BRACKET  
 (BOTTOM RAIL ONLY)



END VIEW

|                            |                      |
|----------------------------|----------------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 05/09         |
| CHECKED BY : D. G. ELY     | DATE : 07/09         |
| DRAWN BY : JMB 1/88        | REV. 7/10/01 RWW/LES |
| CHECKED BY : GGH 1/88      | 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.

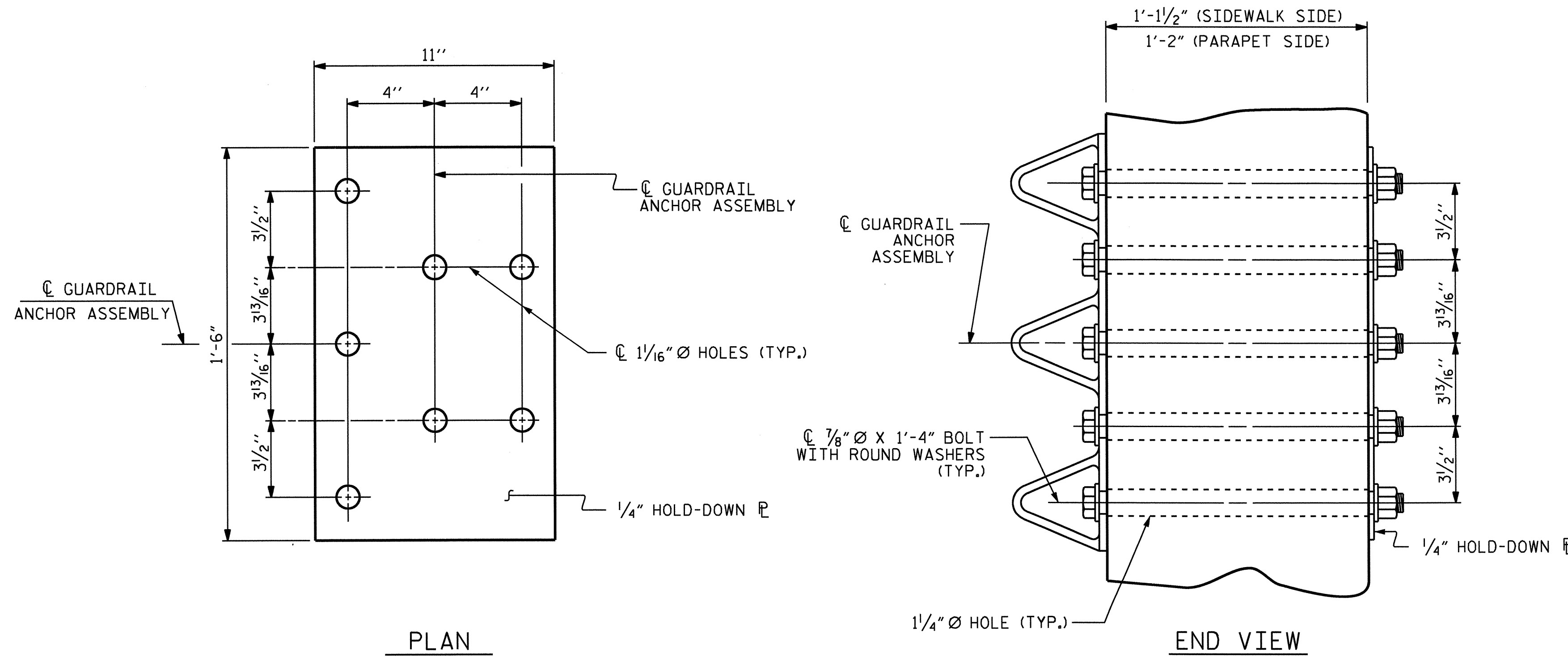
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

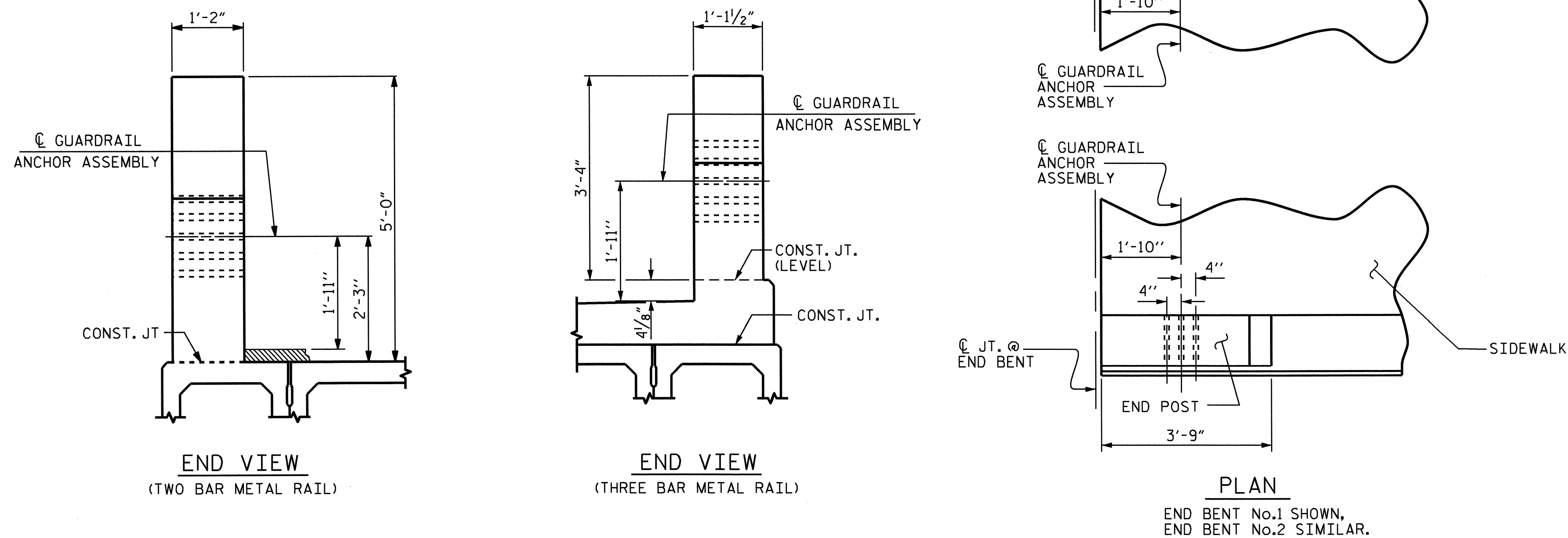
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

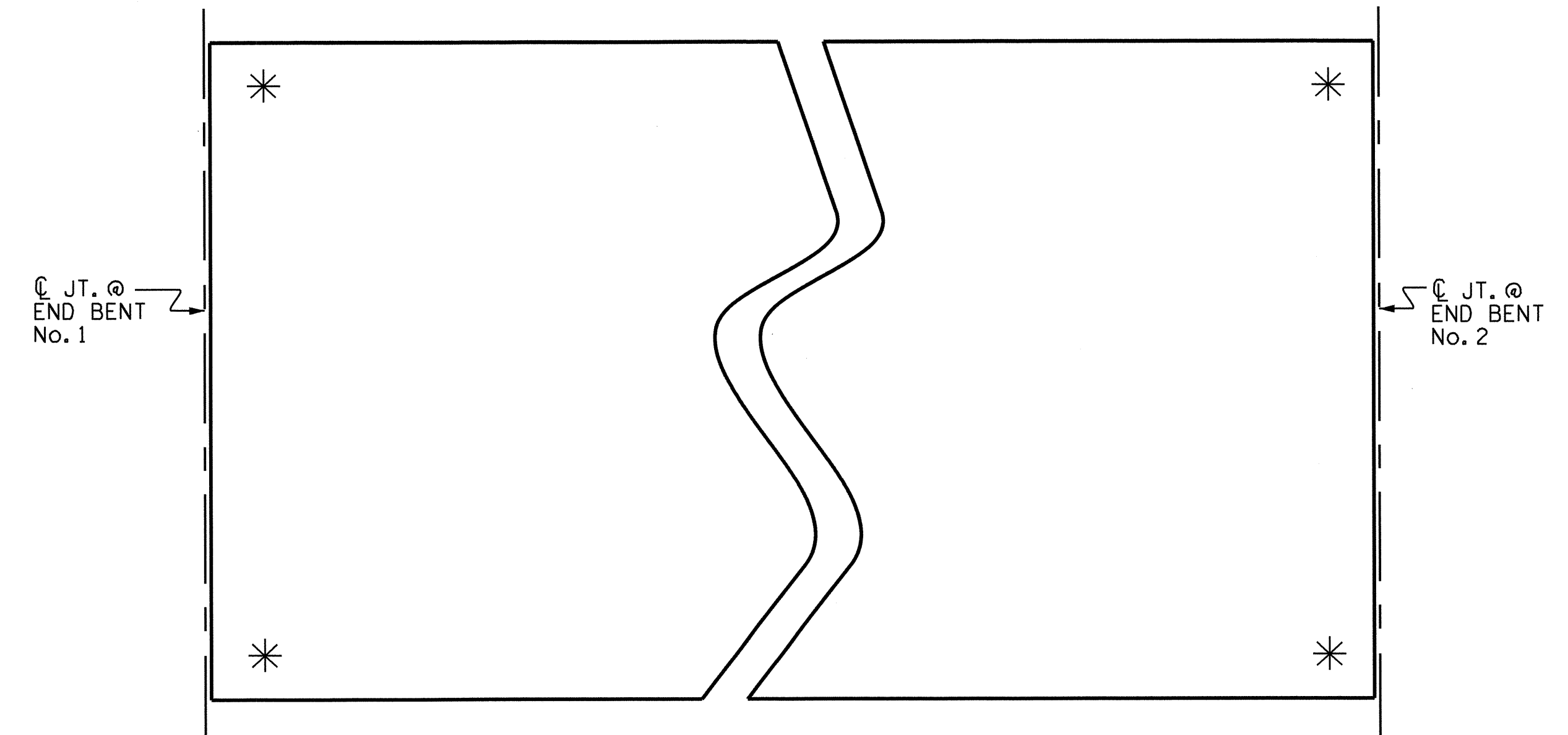
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

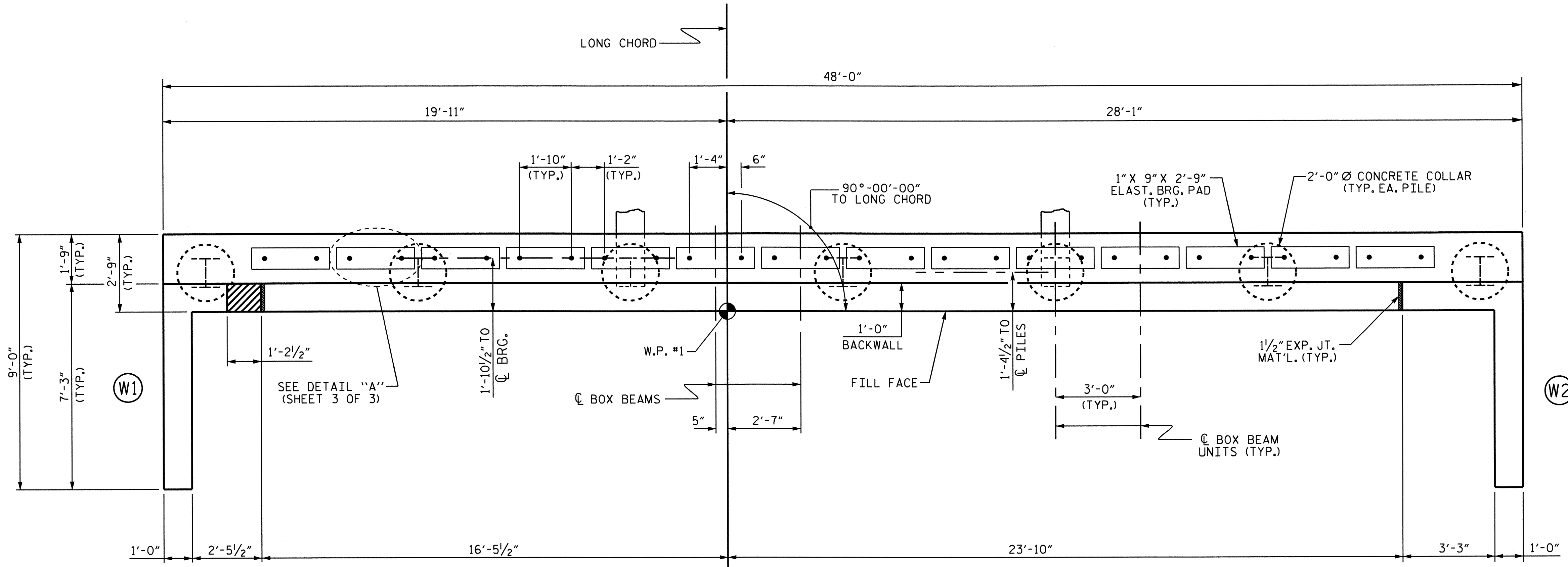


| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       | SHEET NO.<br>S-19  |
|--|-----|-------|-----|-----|-------|--------------------|
| STANDARD<br>GUARDRAIL ANCHORAGE<br>DETAILS<br>FOR METAL RAILS      |     |       |     |     |       | TOTAL SHEETS<br>31 |
| REVISIONS  |     |       |     |     |       |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |                    |
| 1  |     |       | 3   |     |       |                    |
| 2  |     |       | 4   |     |       |                    |

ASSEMBLED BY : A. V. ROYAL DATE : 05/09  
 CHECKED BY : D. G. ELY DATE : 07/09  
 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

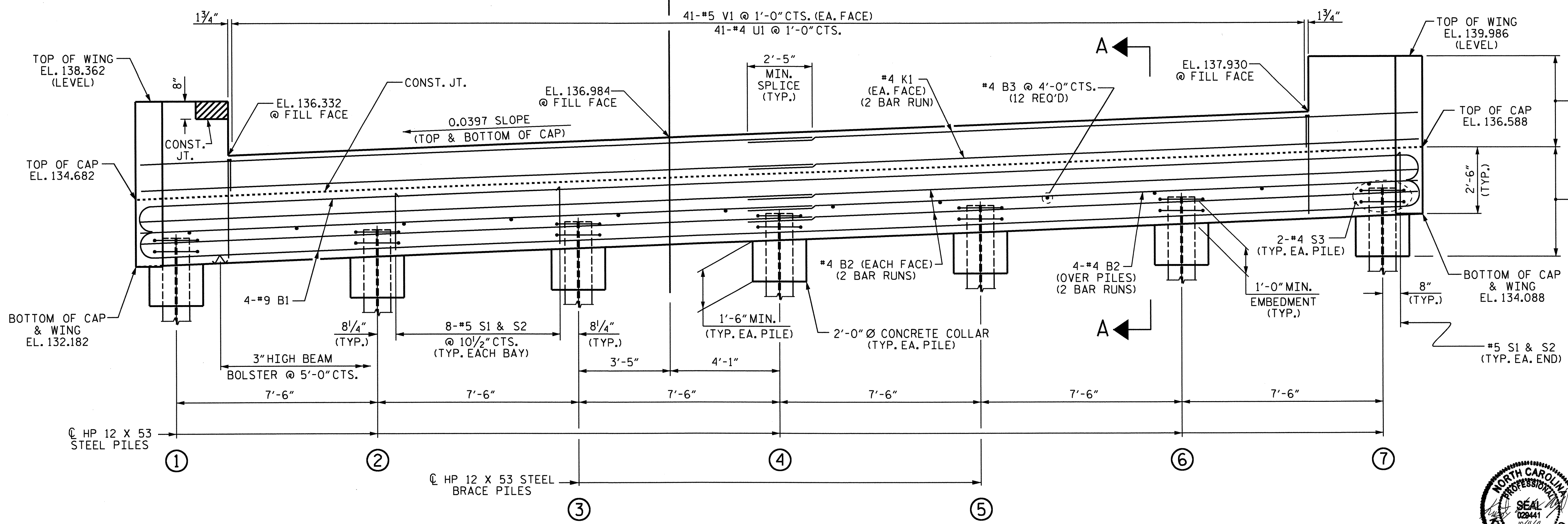
**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.  
 FOR SECTION A-A, SEE SHEET 3 OF 3.



**PLAN**

| TOP OF PILE ELEVATIONS |         |
|------------------------|---------|
| ①                      | 133.261 |
| ②                      | 133.559 |
| ③                      | 133.857 |
| ④                      | 134.155 |
| ⑤                      | 134.452 |
| ⑥                      | 134.750 |
| ⑦                      | 135.048 |



**ELEVATION**

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

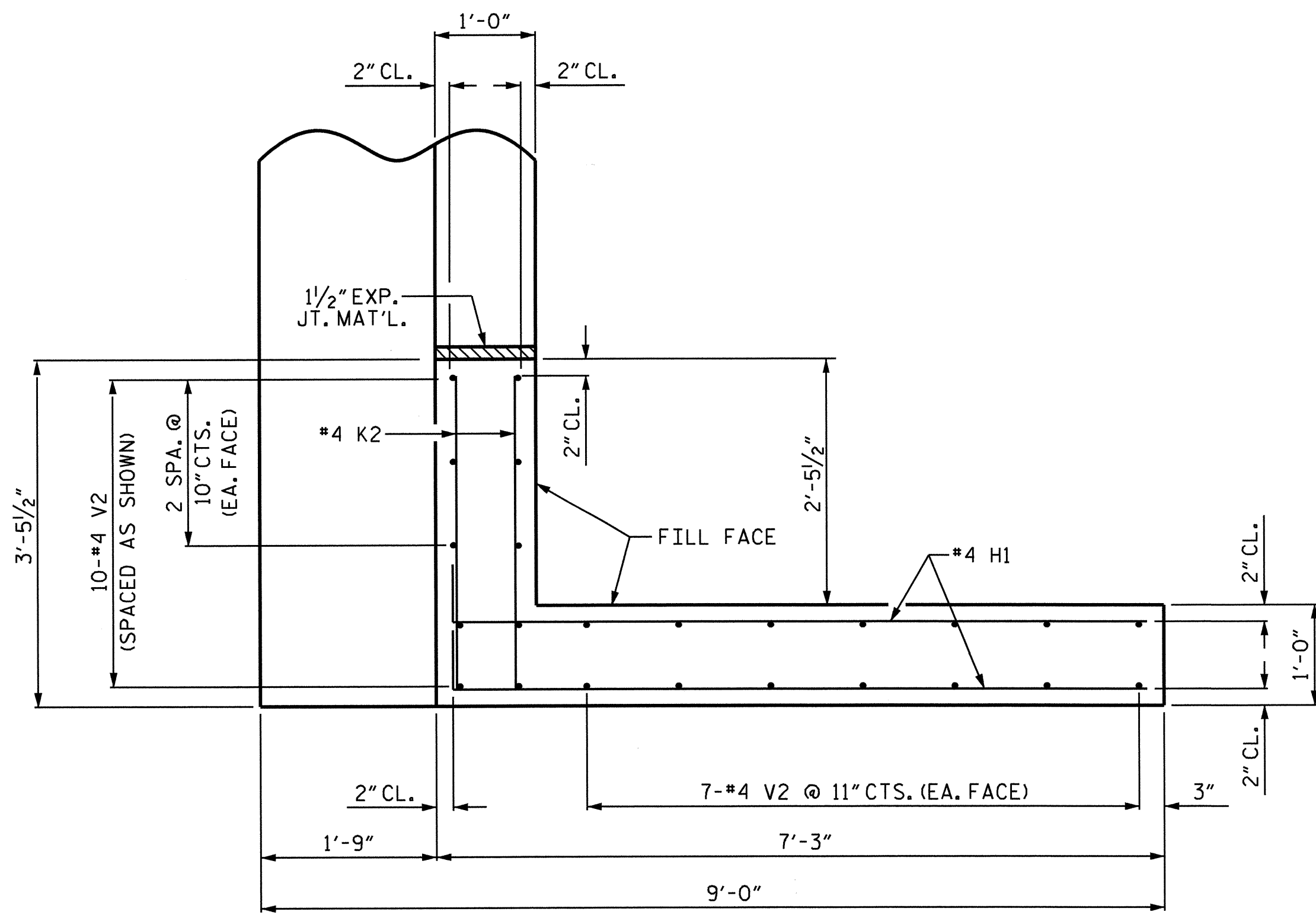
**SUBSTRUCTURE**  
**END BENT No. 1**

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-20            |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 31 |
| 2         |     |       | 4   |     |       |                 |

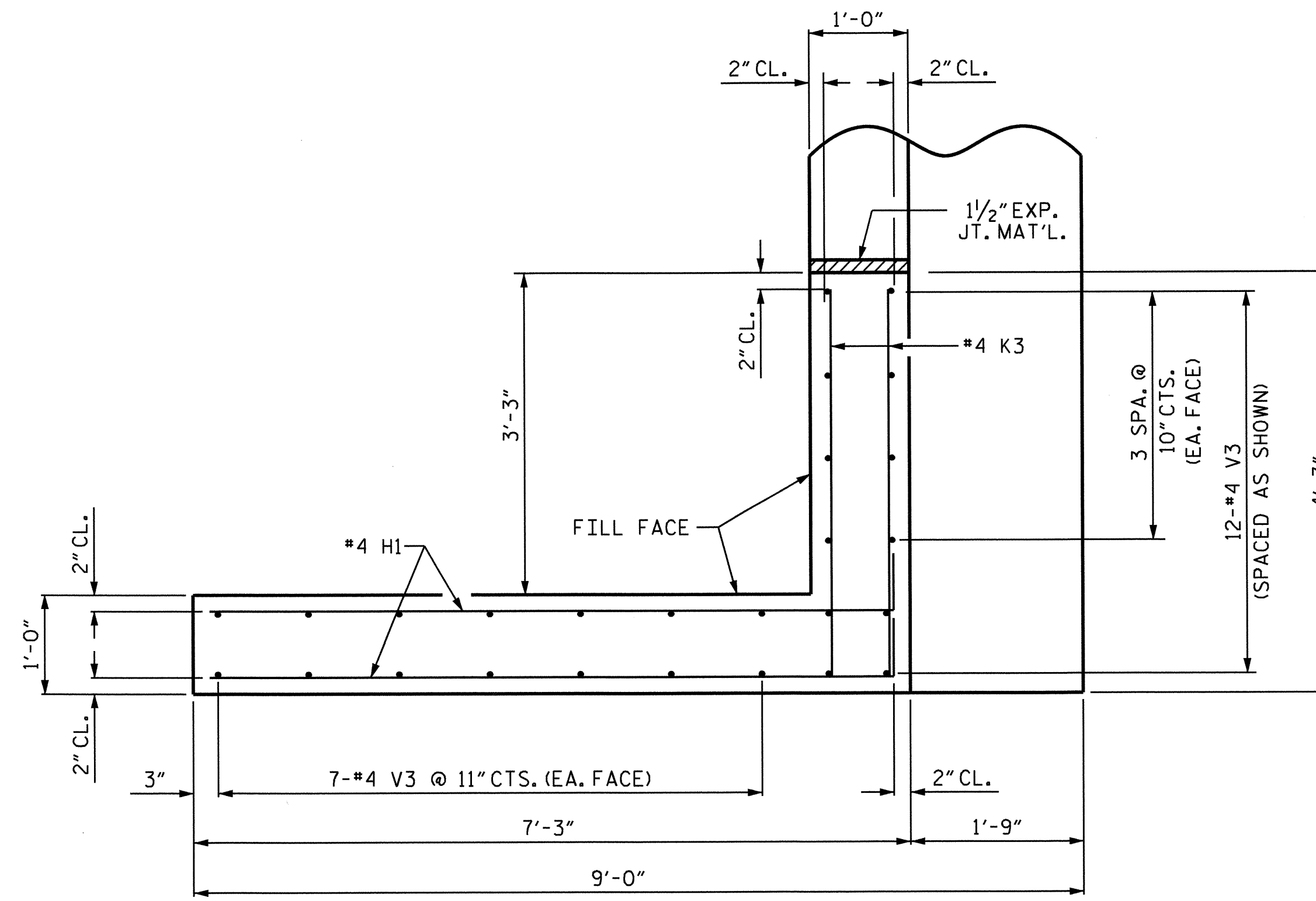


DRAWN BY: A. V. ROYAL DATE: 8/09  
 CHECKED BY: M. K. TOM DATE: 9/09

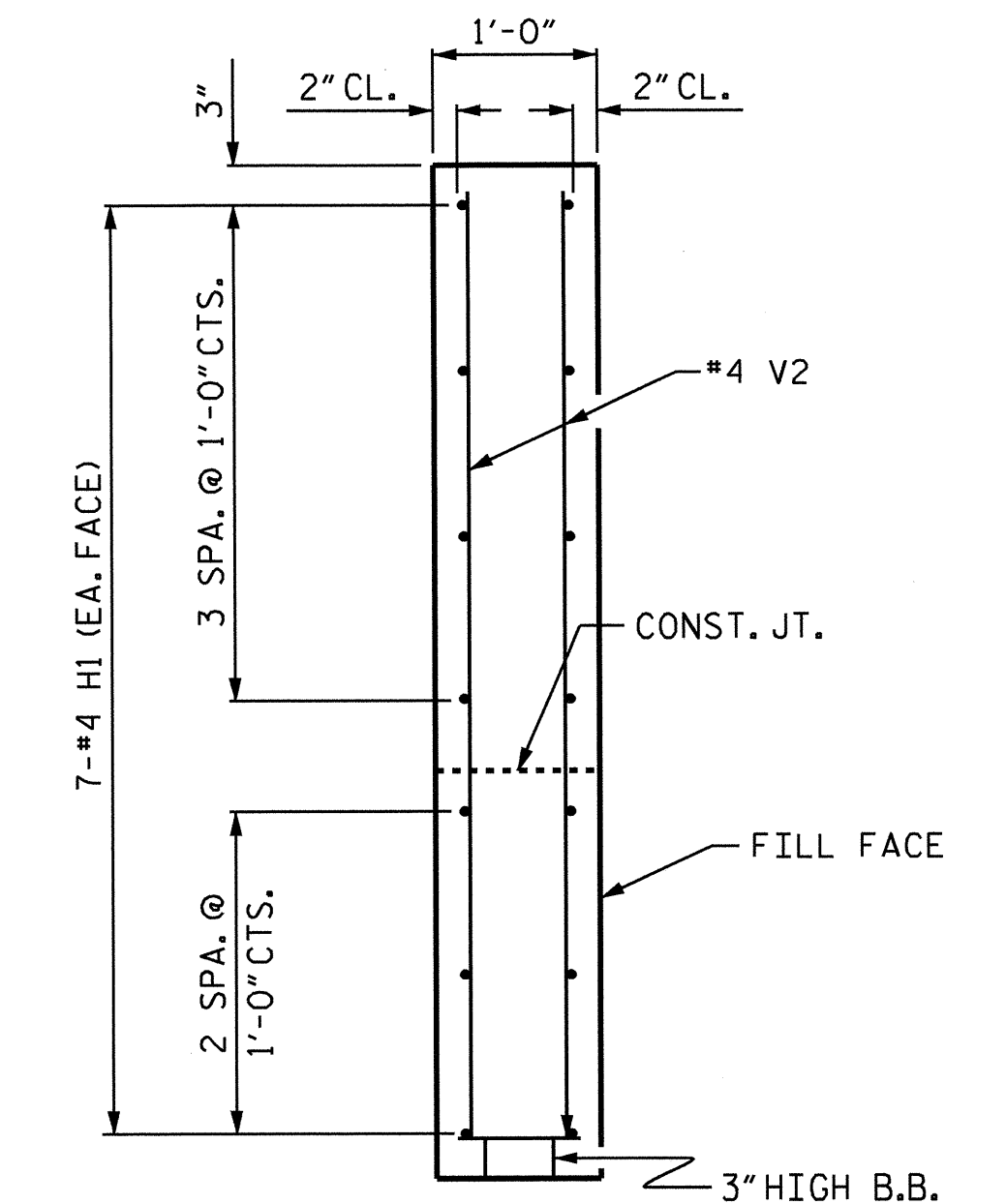
11-OCT-2011 10:50  
 L:\Structures\Sub.Draw\B4588.EB\*1.sd...dgn  
 kalford



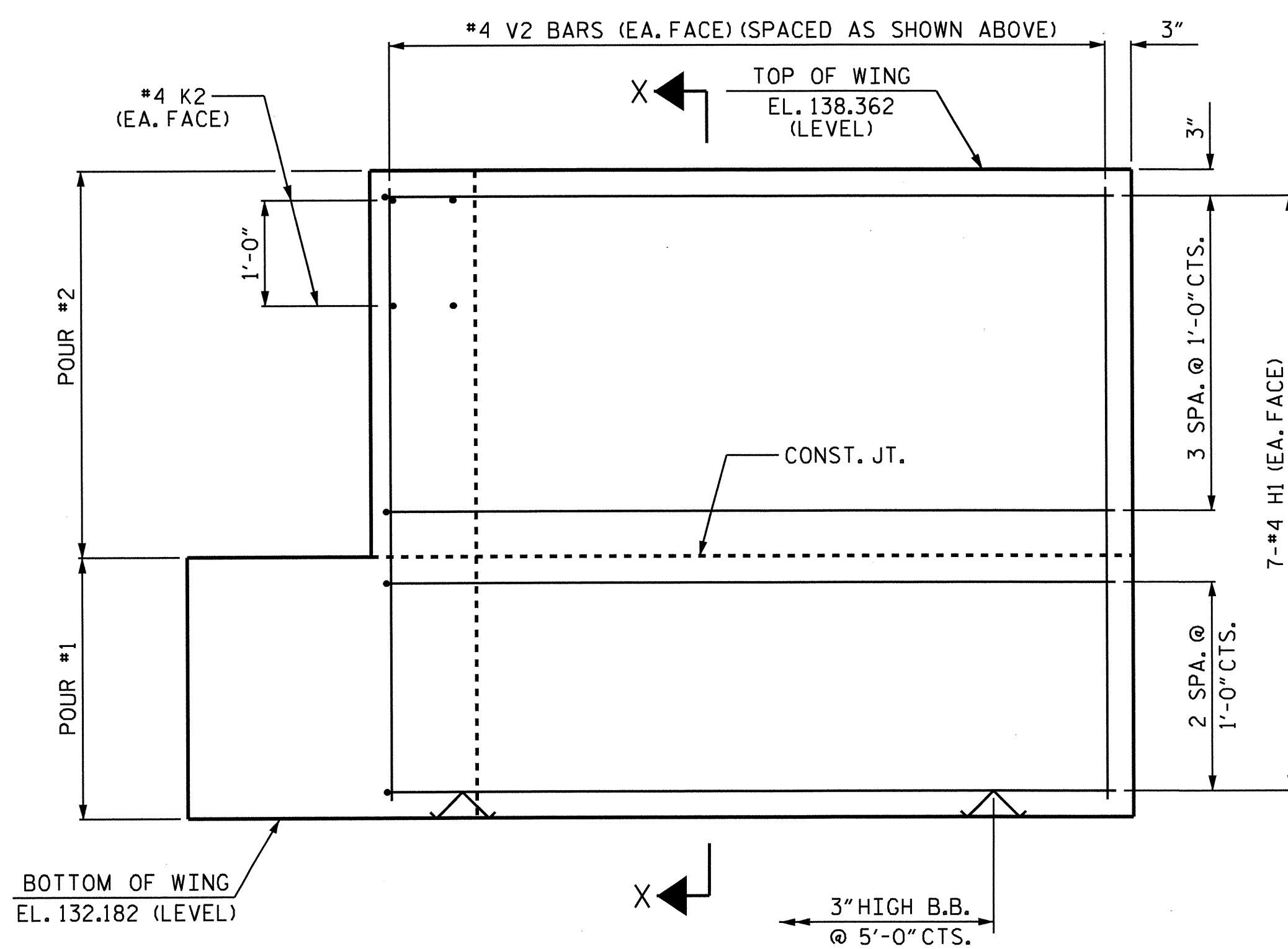
PLAN OF WING (W1)



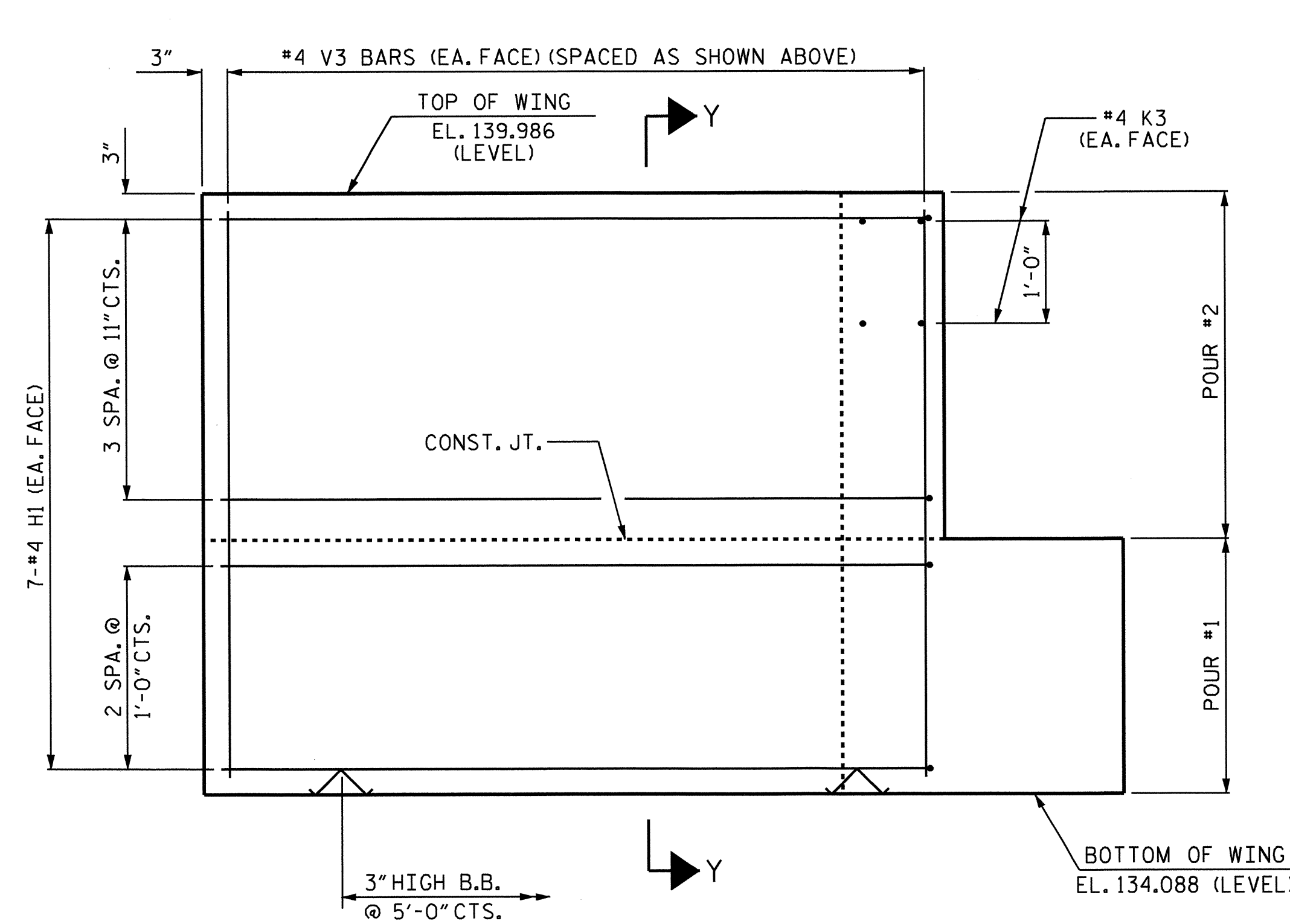
(W2) PLAN OF WING



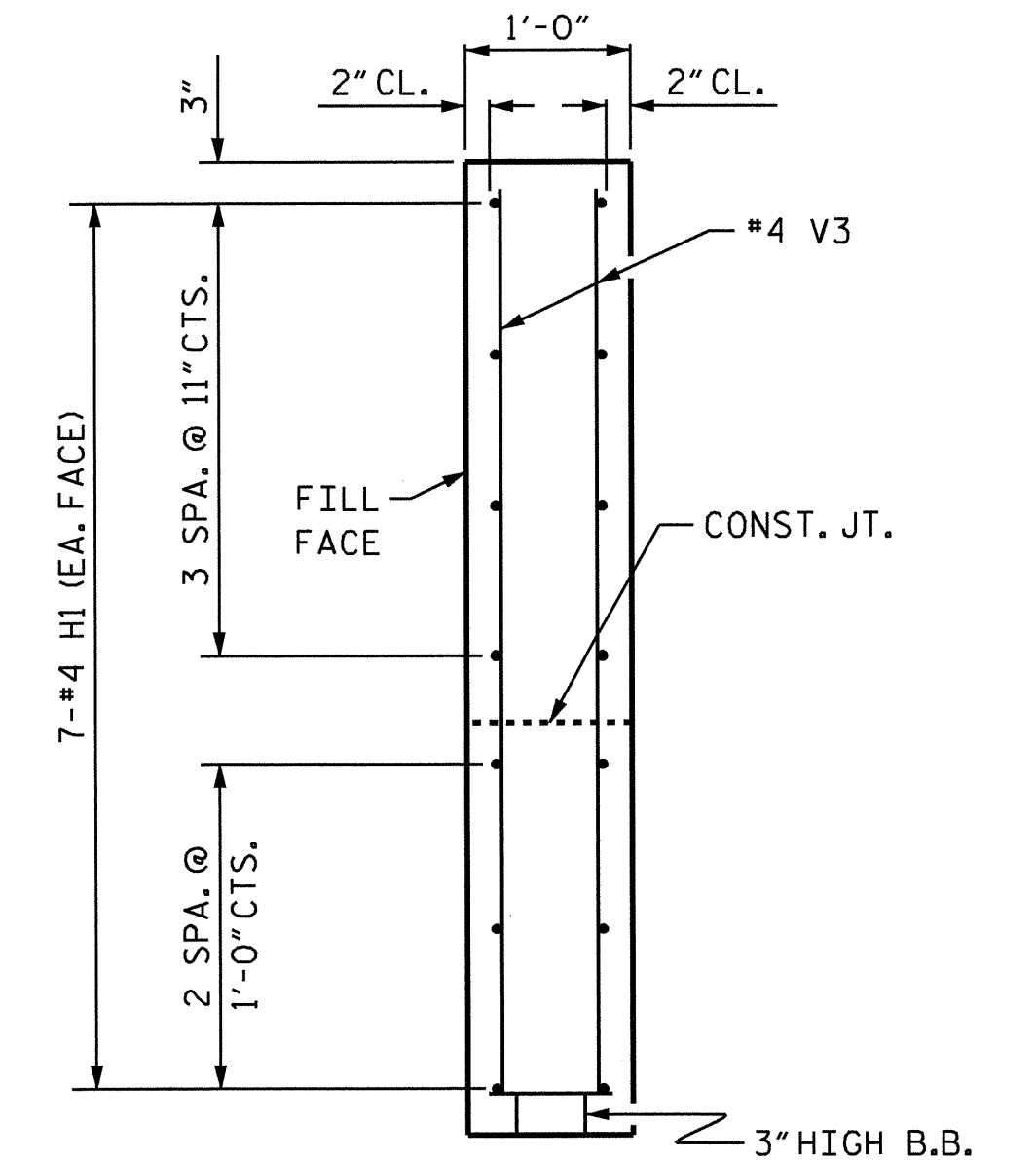
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

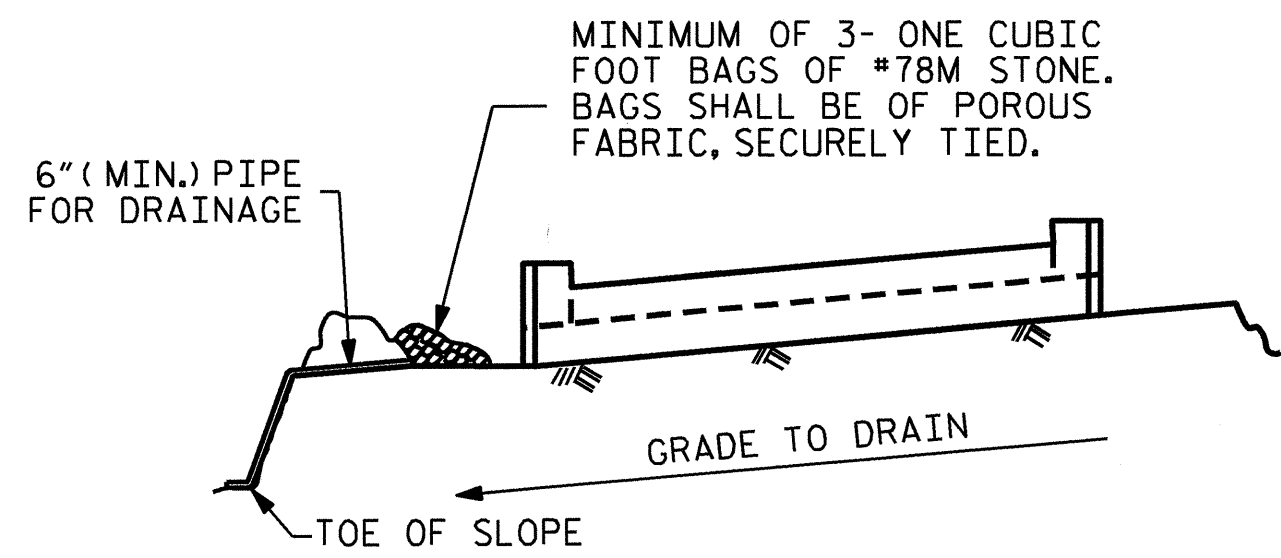
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1



DRAWN BY: A. V. ROYAL DATE: 8/09  
 CHECKED BY: M. K. TOM DATE: 9/09

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-21         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |

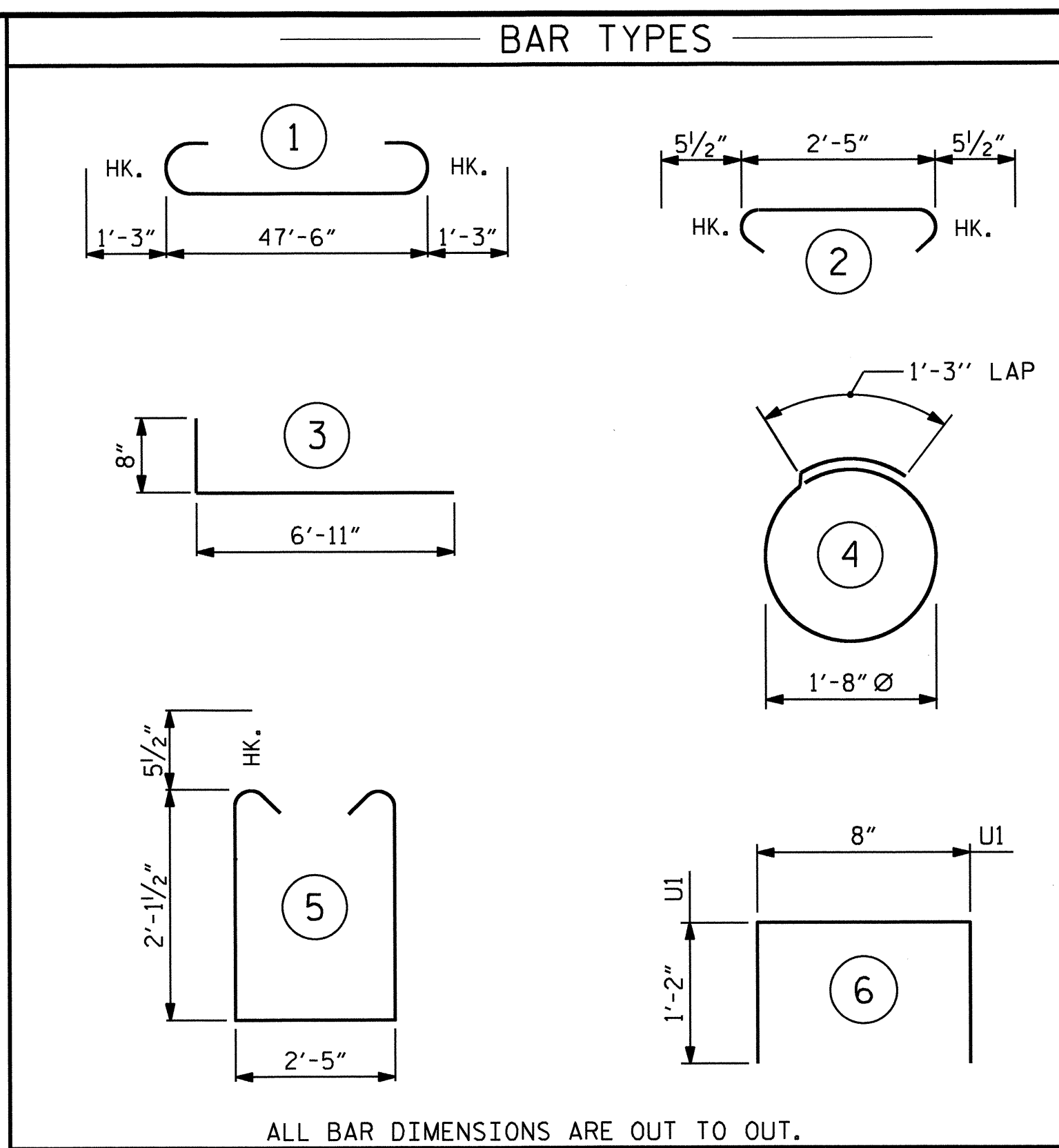
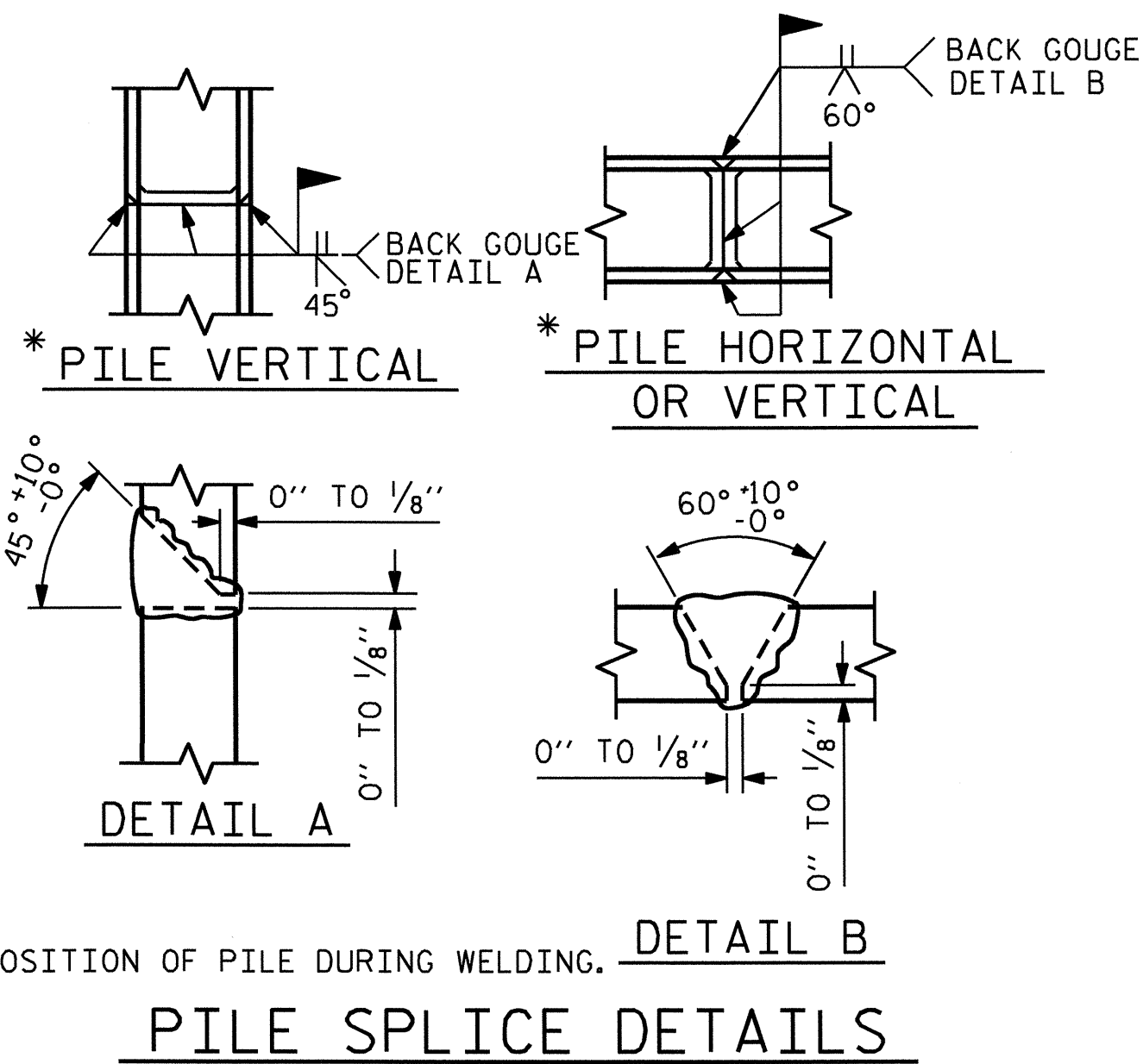


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

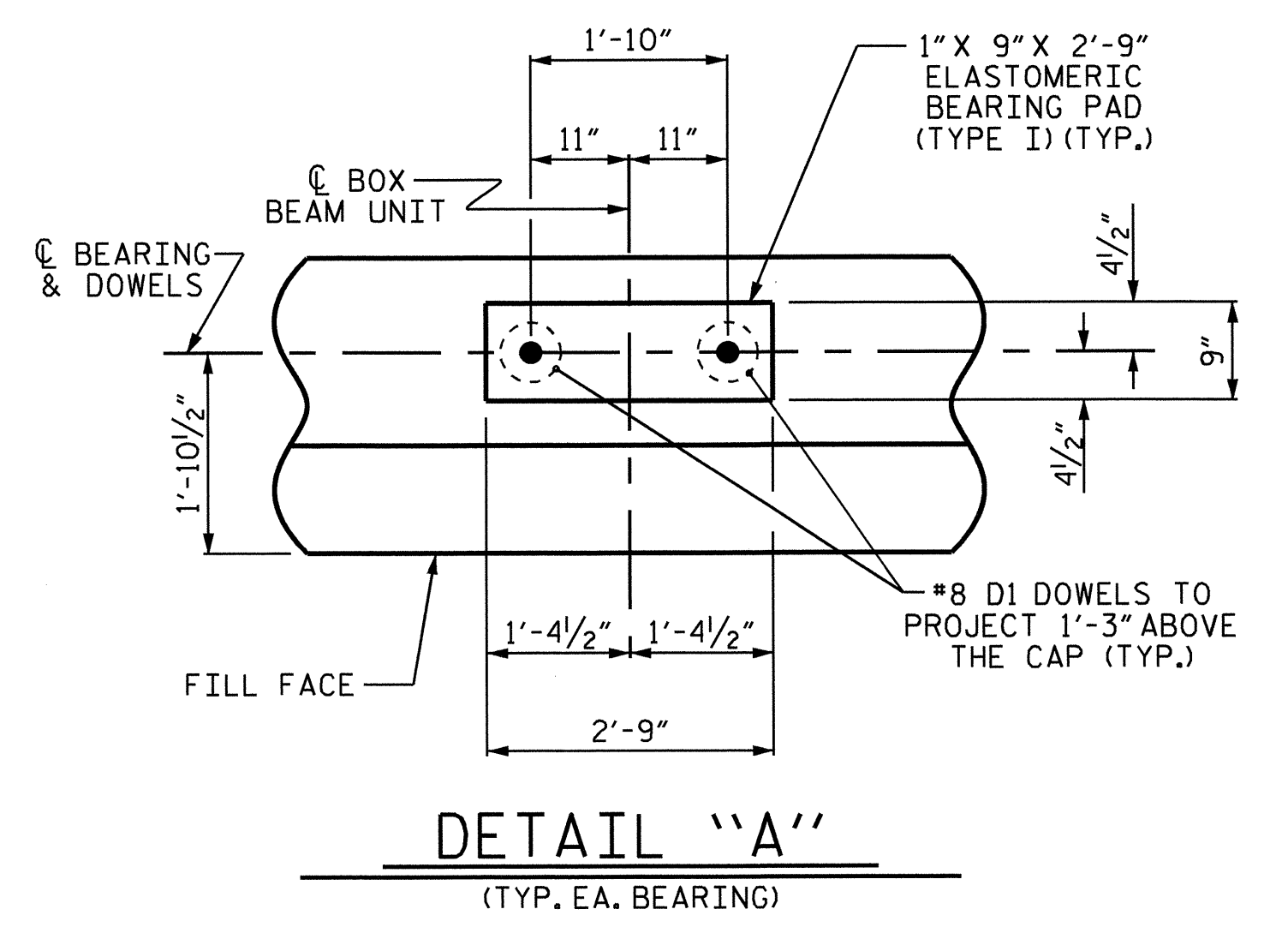
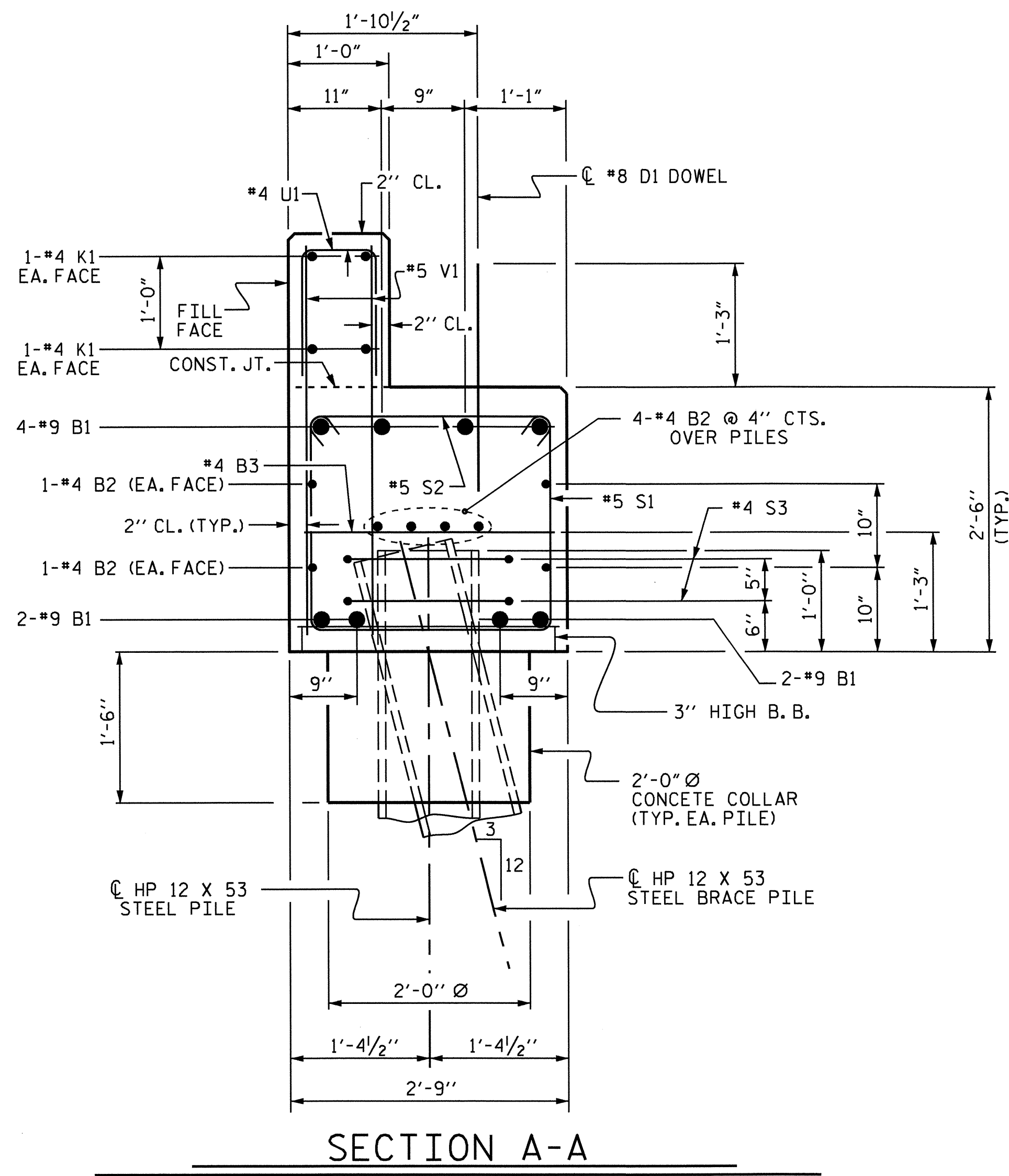
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



ALL BAR DIMENSIONS ARE OUT TO OUT.

| BILL OF MATERIAL                   |     |      |      |              |        |
|------------------------------------|-----|------|------|--------------|--------|
| END BENT No. 1                     |     |      |      |              |        |
| BAR                                | NO. | SIZE | TYPE | LENGTH       | WEIGHT |
| B1                                 | 8   | #9   |      | 50'-0"       | 1360   |
| B2                                 | 16  | #4   | STR  | 25'-1"       | 268    |
| B3                                 | 12  | #4   | STR  | 2'-5"        | 19     |
| D1                                 | 28  | #8   | STR  | 2'-3"        | 168    |
| H1                                 | 28  | #4   | 3    | 7'-7"        | 142    |
| K1                                 | 8   | #4   | STR  | 25'-1"       | 134    |
| K2                                 | 4   | #4   | STR  | 3'-1"        | 8      |
| K3                                 | 4   | #4   | STR  | 3'-11"       | 10     |
| S1                                 | 50  | #5   | 5    | 7'-7"        | 395    |
| S2                                 | 50  | #5   | 2    | 3'-4"        | 174    |
| S3                                 | 14  | #4   | 4    | 6'-6"        | 61     |
| U1                                 | 41  | #4   | 6    | 3'-0"        | 82     |
| V1                                 | 82  | #5   | STR  | 3'-8"        | 314    |
| V2                                 | 24  | #4   | STR  | 5'-10"       | 94     |
| V3                                 | 26  | #4   | STR  | 5'-6"        | 96     |
| REINFORCING STEEL                  |     |      |      | 3325 LBS.    |        |
| CLASS A CONCRETE BREAKDOWN         |     |      |      |              |        |
| POUR #1 CAP, LOWER WINGS & COLLARS |     |      |      | 14.6 C.Y.    |        |
| POUR #2 UPPER WINGS & BACKWALL     |     |      |      | 4.9 C.Y.     |        |
| TOTAL CLASS A CONCRETE             |     |      |      | 19.5 C.Y.    |        |
| HP 12 X 53 STEEL PILES             |     |      |      | 175 LIN. FT. |        |
| No. = 7                            |     |      |      |              |        |



PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

END BENT No. 1

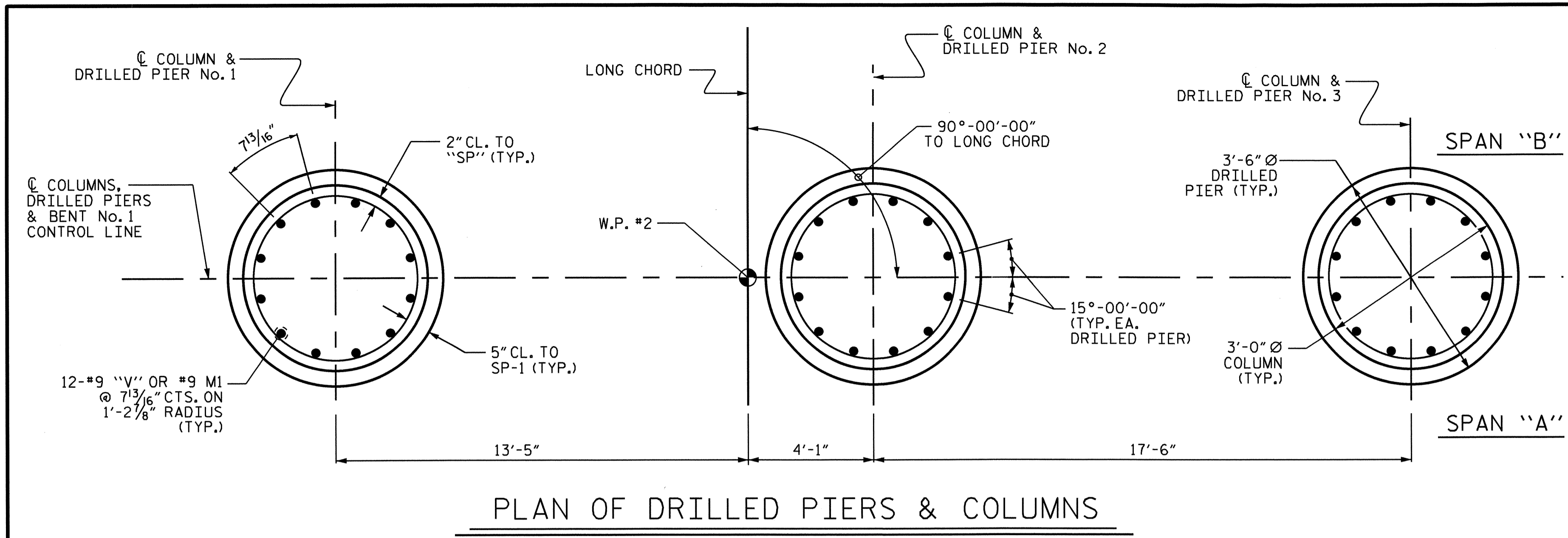


DRAWN BY: A. V. ROYAL DATE: 8/09  
 CHECKED BY: M. K. TOM DATE: 9/09

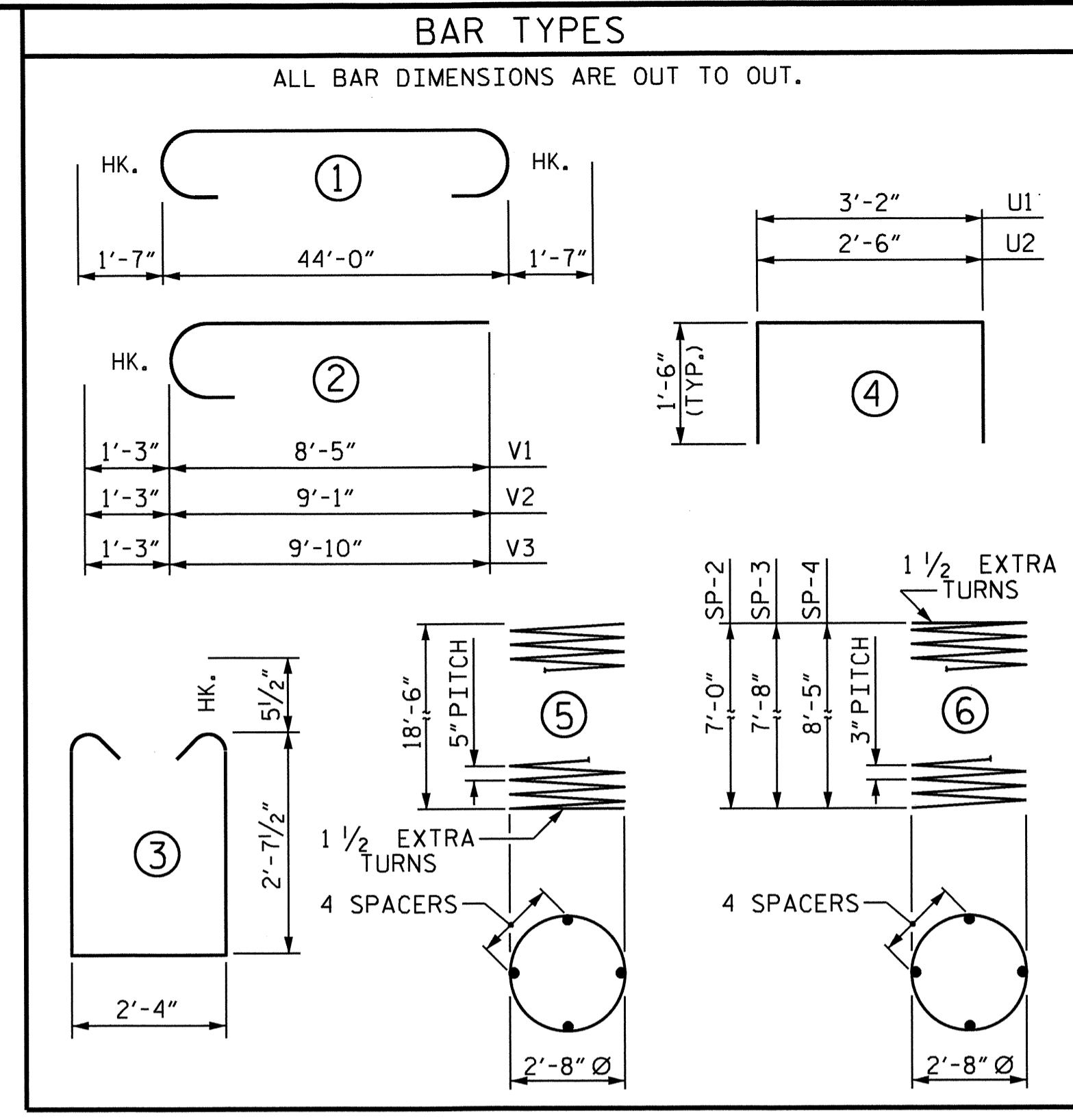
| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-22         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |







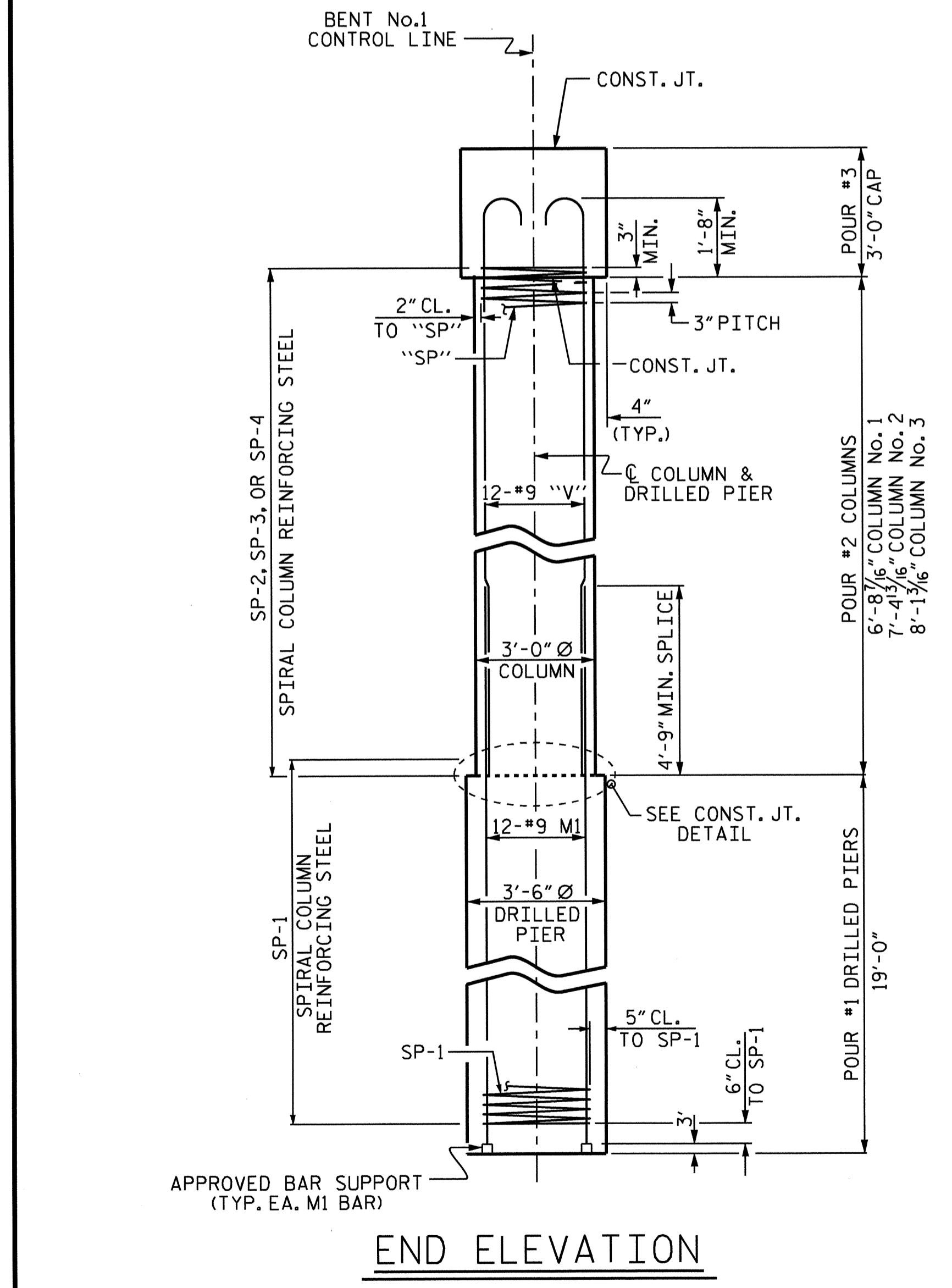
PLAN OF DRILLED PIERS & COLUMNS



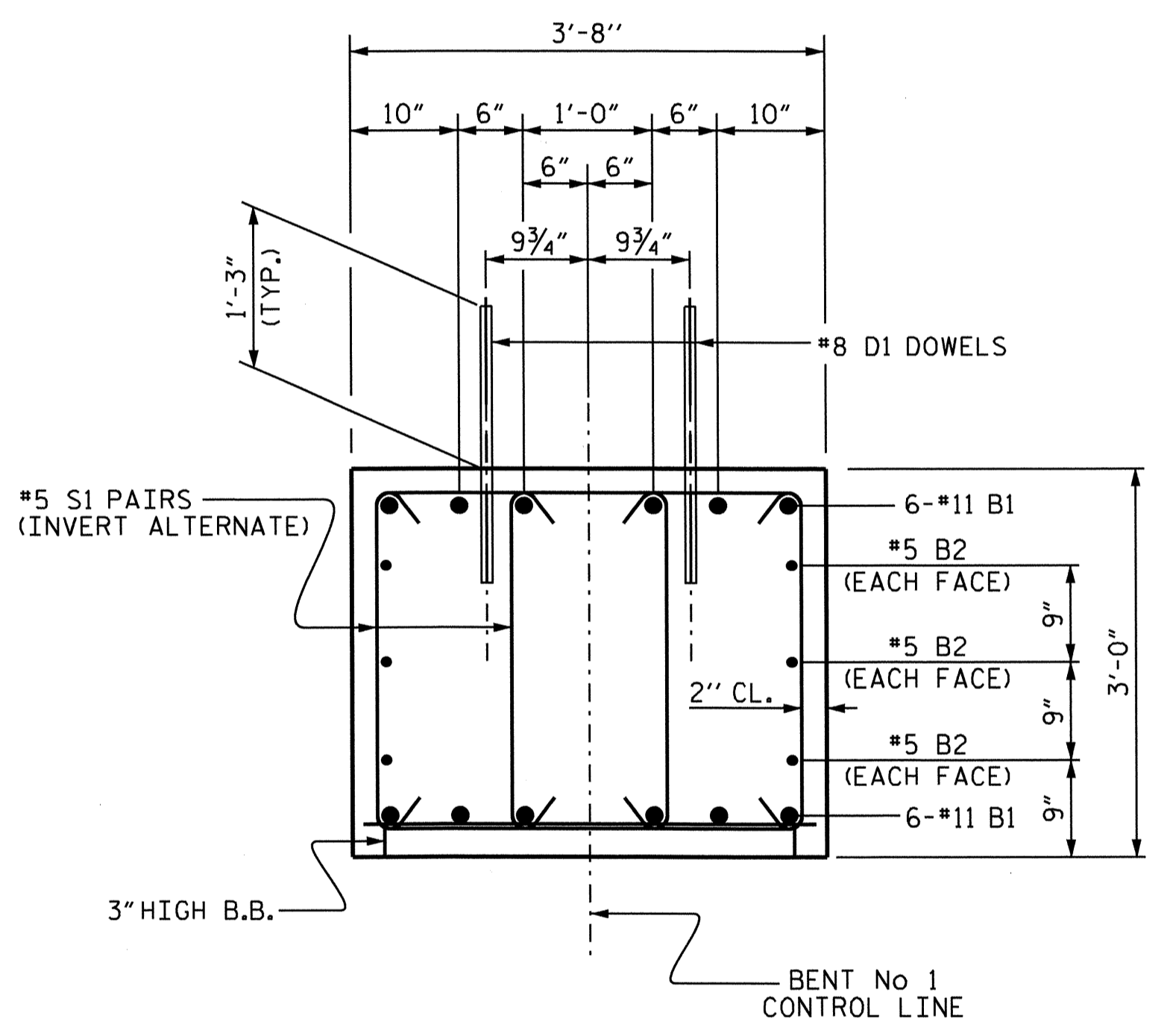
VIEW X-X

(TYPICAL EACH END)

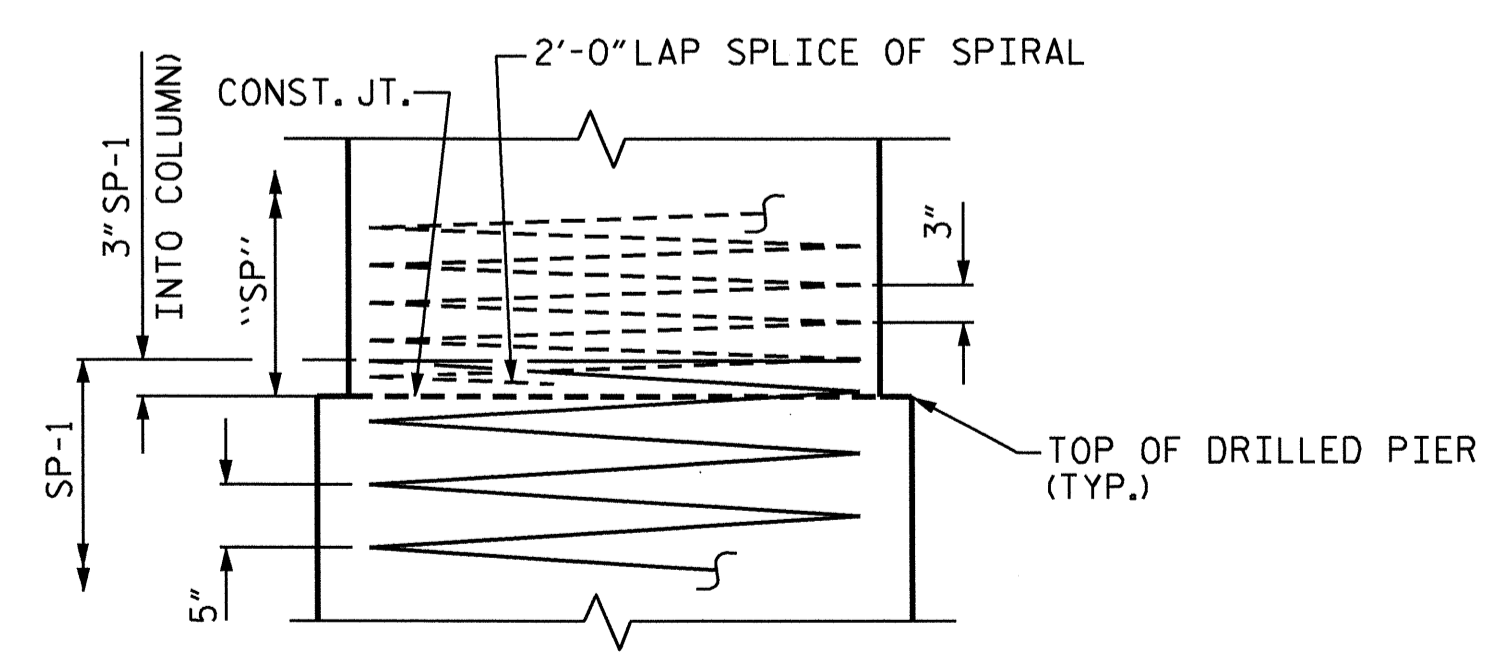
| BILL OF MATERIAL           |      |      |        |         |      |
|----------------------------|------|------|--------|---------|------|
| BENT No. 1                 |      |      |        |         |      |
| BAR NO.                    | SIZE | TYPE | LENGTH | WEIGHT  |      |
| B1                         | #11  | 1    | 47'-2" | 3007    |      |
| B2                         | #5   | STR  | 44'-2" | 276     |      |
| D1                         | #8   | STR  | 2'-3"  | 336     |      |
| M1                         | #9   | STR  | 26'-6" | 3244    |      |
| S1                         | #5   | 3    | 8'-6"  | 851     |      |
| U1                         | #4   | 4    | 6'-2"  | 25      |      |
| U2                         | #4   | 4    | 5'-6"  | 22      |      |
| V1                         | #9   | 2    | 9'-8"  | 394     |      |
| V2                         | #9   | 2    | 10'-4" | 422     |      |
| V3                         | #9   | 2    | 11'-1" | 452     |      |
| REINFORCING STEEL          |      |      |        | 9029    | LBS  |
| SPIRAL REINFORCING STEEL   |      |      |        |         |      |
| SP-1                       | 3    | *    | 5      | 378'-4" | 1184 |
| SP-2                       | 1    | **   | 6      | 247'-6" | 165  |
| SP-3                       | 1    | **   | 6      | 272'-4" | 182  |
| SP-4                       | 1    | **   | 6      | 297'-1" | 198  |
| SPIRAL REINFORCING STEEL   |      |      |        | 1729    | LBS. |
| CLASS A CONCRETE BREAKDOWN |      |      |        |         |      |
| POUR #2 (COLUMNS)          |      |      |        | 5.8     | C.Y. |
| POUR #3 (CAP)              |      |      |        | 18.1    | C.Y. |
| TOTAL CLASS A CONCRETE     |      |      |        | 23.9    | C.Y. |



END ELEVATION



SECTION A-A



CONSTRUCTION JOINT DETAIL

| DRILLED PIERS                                 |                 |
|---|-----------------|
| DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS) | = 20.3 C.Y.     |
| 3'-6" Ø DRILLED PIERS IN SOIL, LIN. FT.       | = 41.0          |
| 3'-6" Ø DRILLED PIERS NOT IN SOIL, LIN. FT.   | = 16.0          |
| PERMANENT STEEL CASING                        | = 24.0 LIN. FT. |
| STD INSPECTION                                | EACH 1          |
| CSL TESTING                                   | EACH 1          |
| CSL TUBES                                     | = 258 LIN. FT.  |

\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

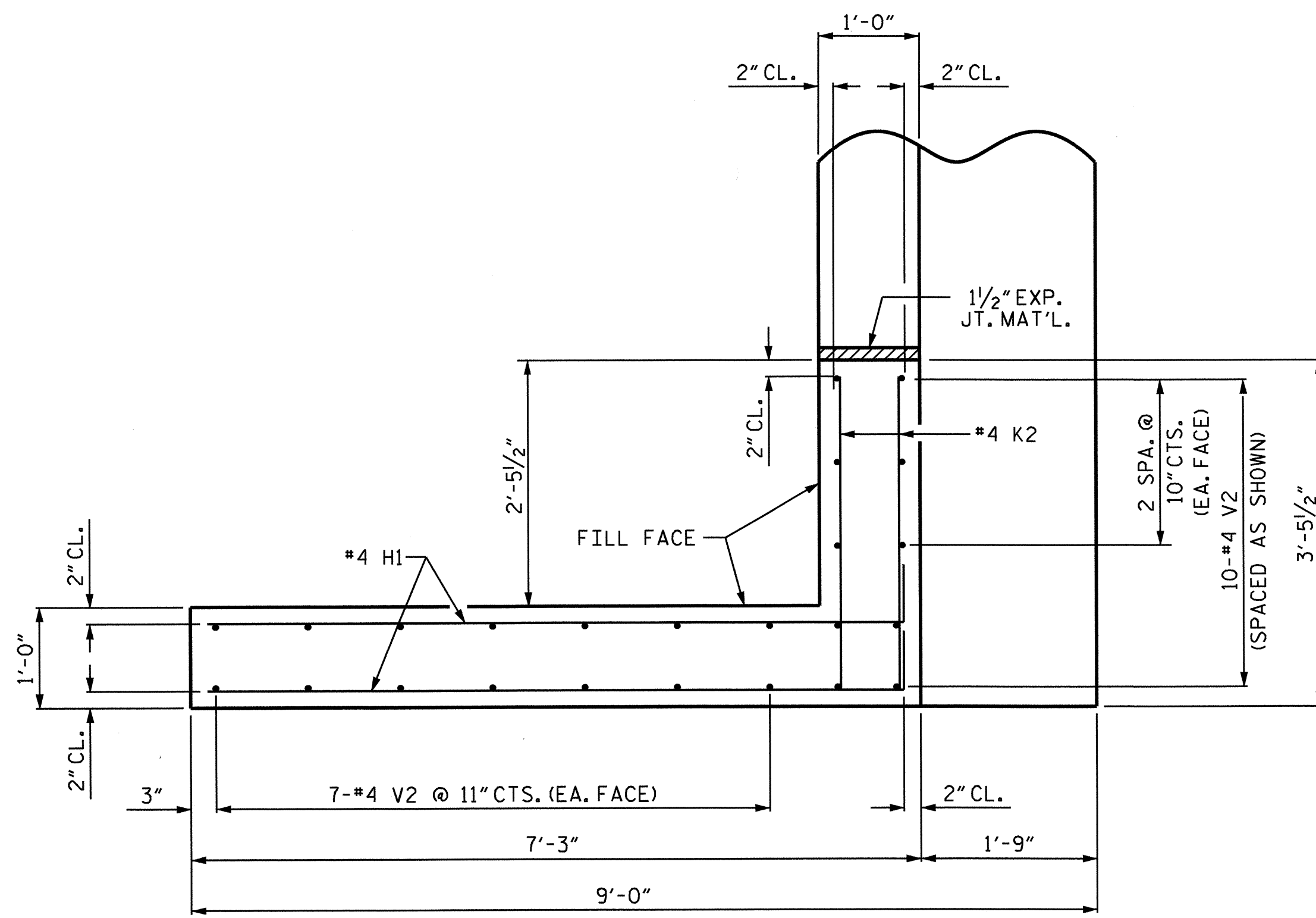
SUBSTRUCTURE  
 BENT No.1



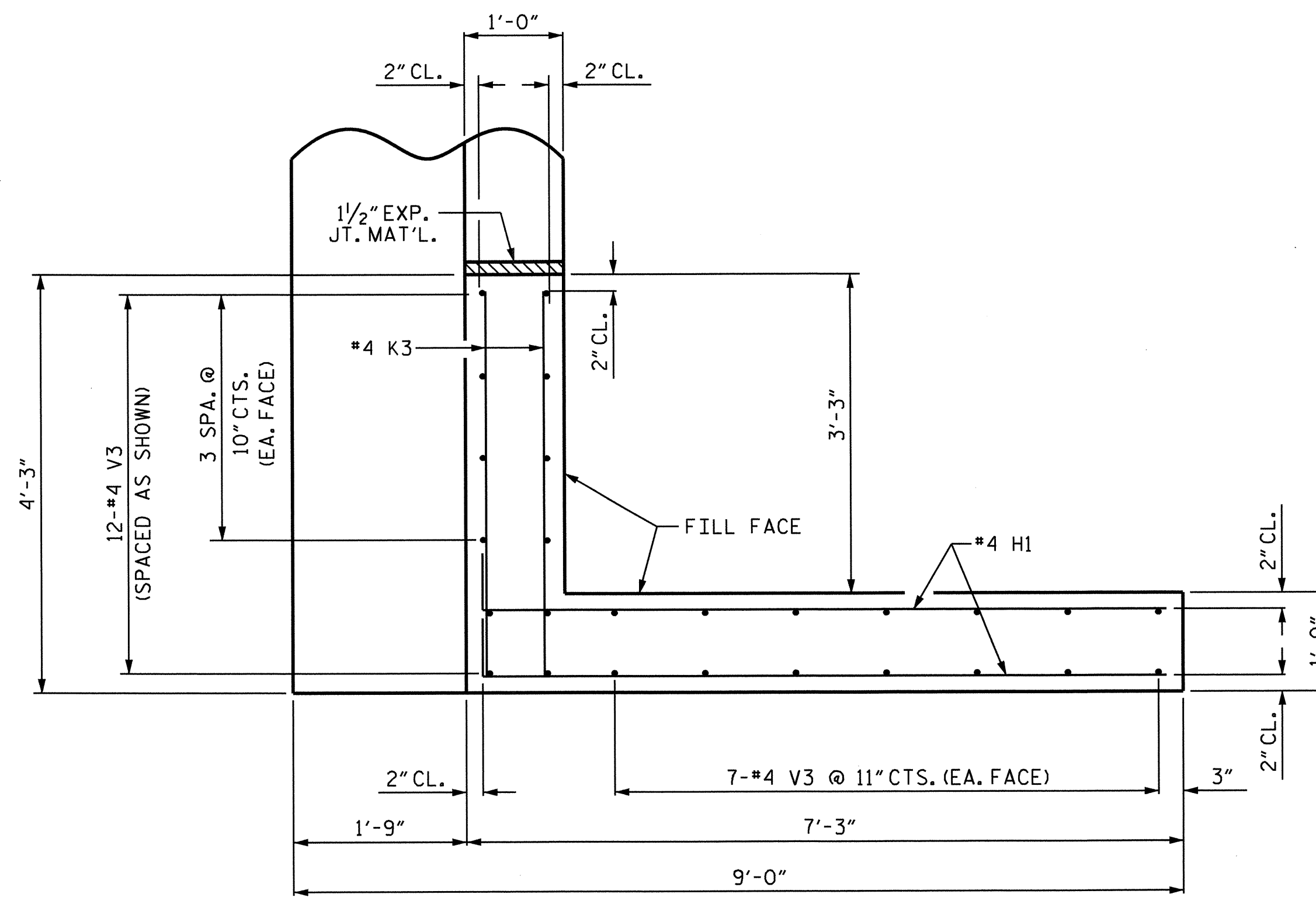
DRAWN BY: A. V. ROYAL DATE: 3/10  
 CHECKED BY: M. K. TOM DATE: 3/10

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-24         |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
| 2         |     |       | 4   |     |       | 31           |  |

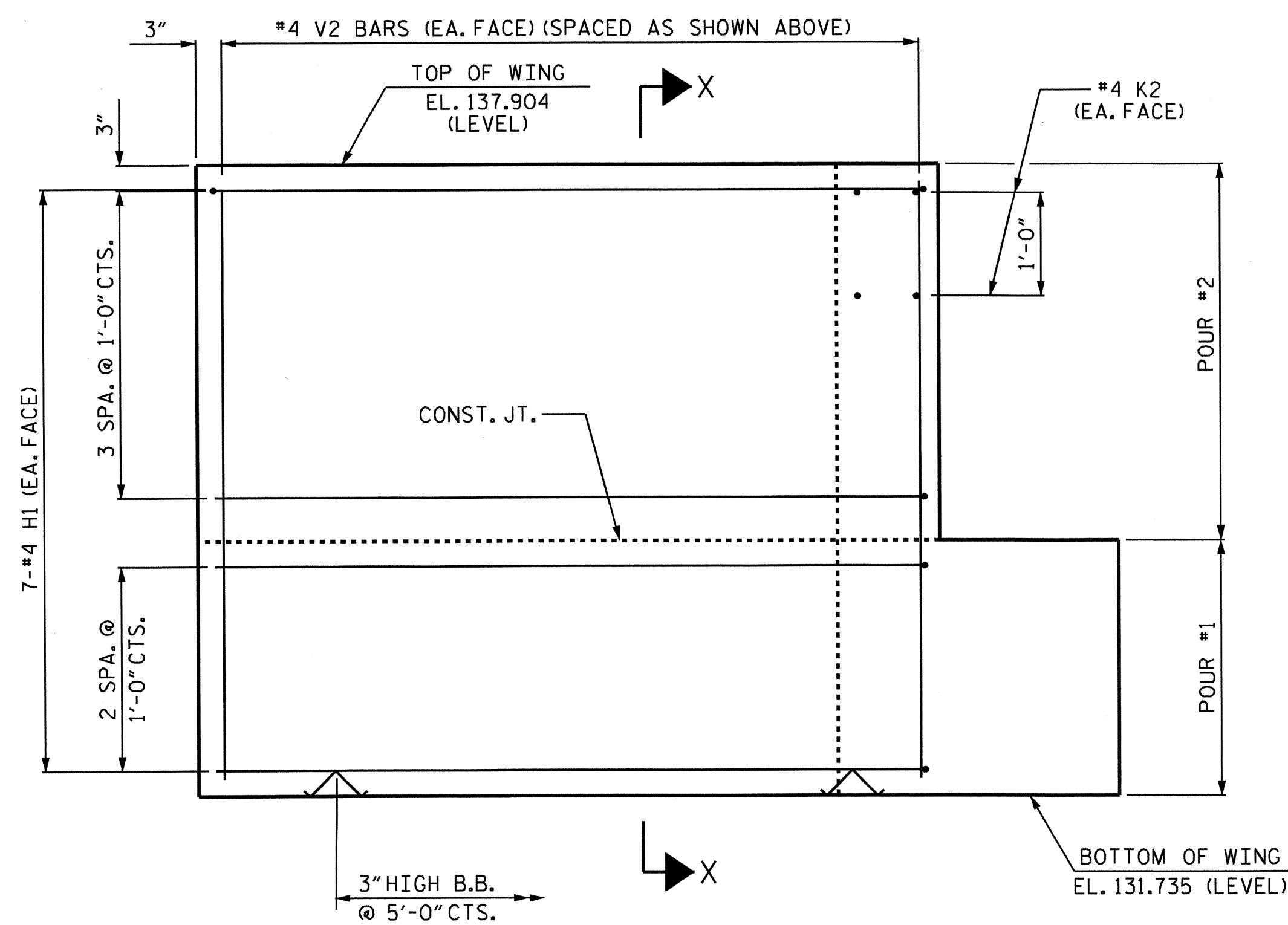




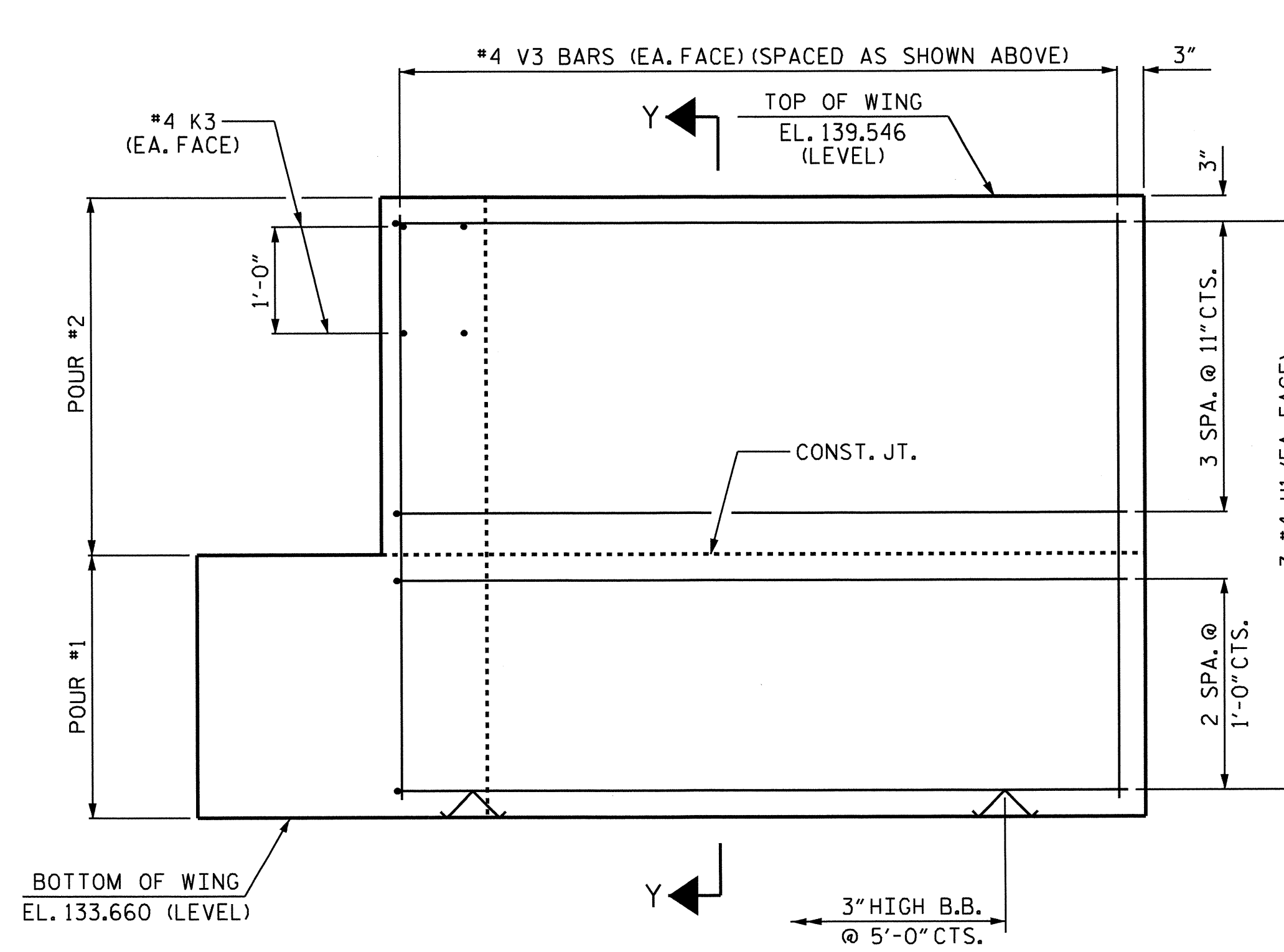
PLAN OF WING (W1)



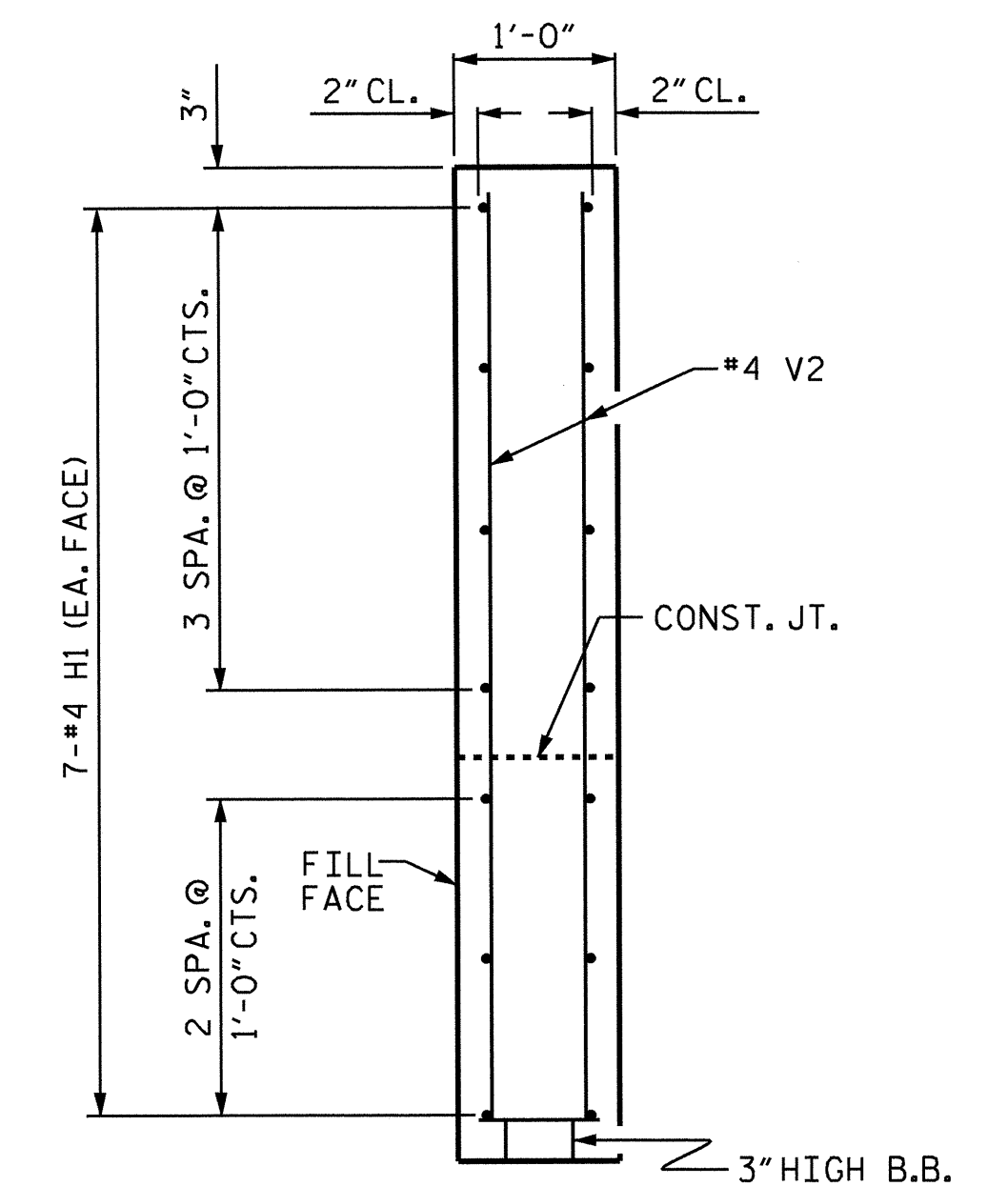
(W2) PLAN OF WING



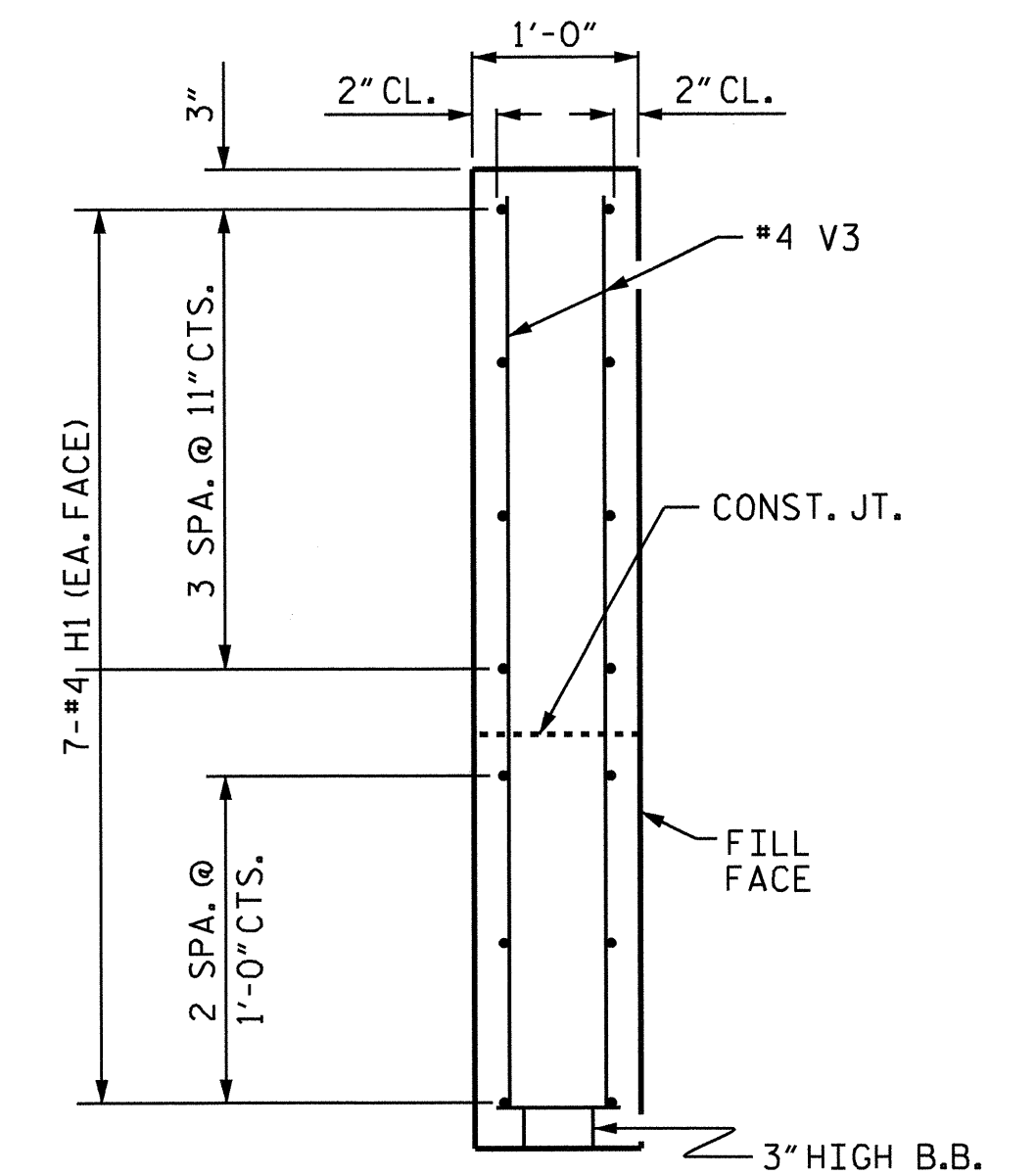
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

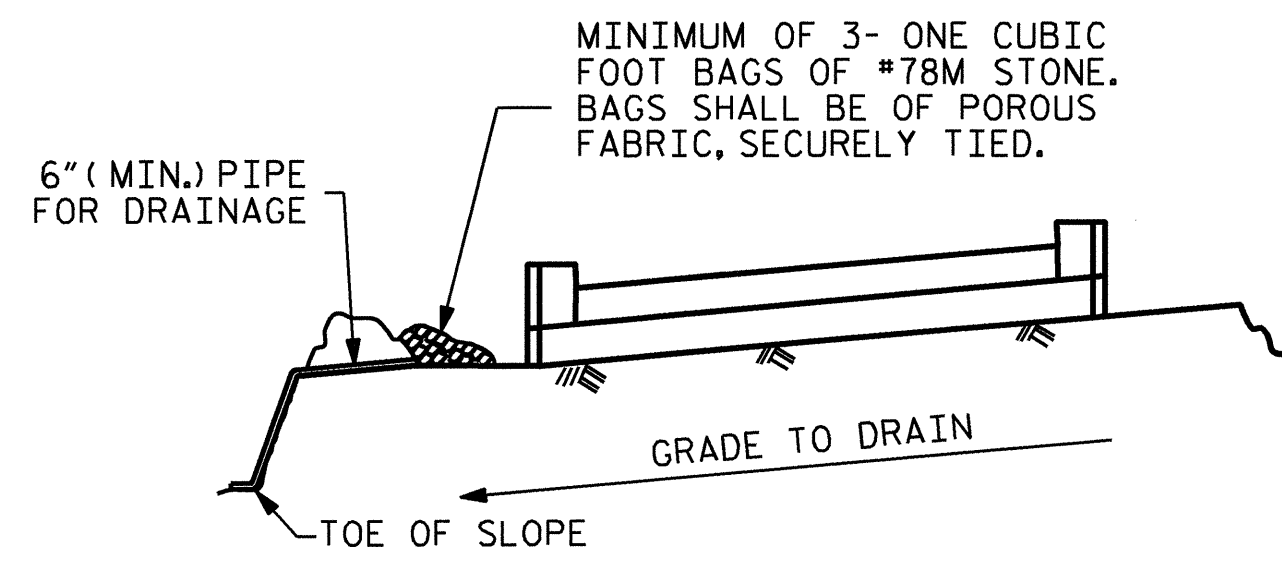
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2



DRAWN BY: A. V. ROYAL DATE: 8/09  
 CHECKED BY: M. K. TOM DATE: 9/09

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-26         |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
| 2         |     |       | 4   |     |       | 31           |  |

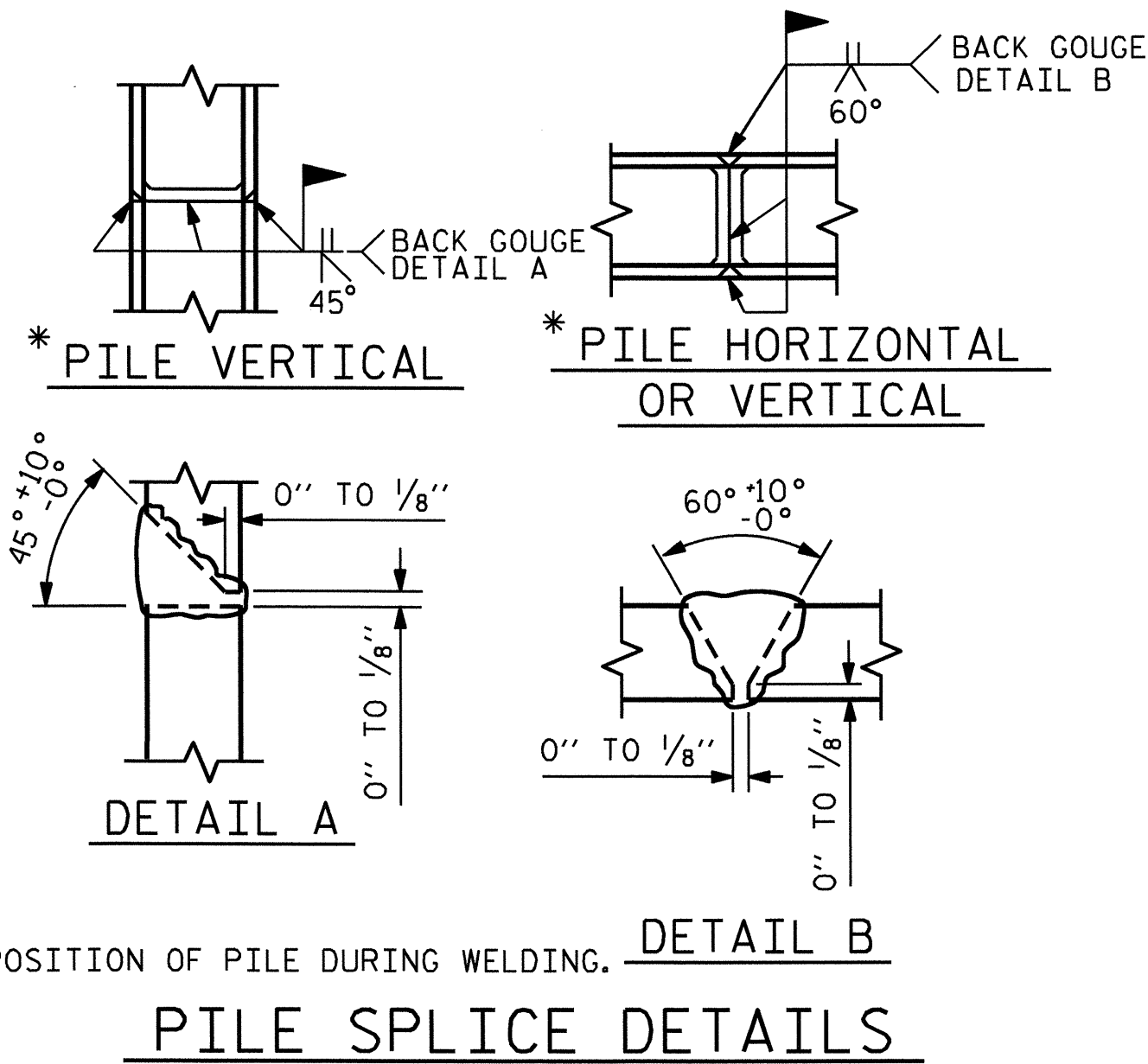
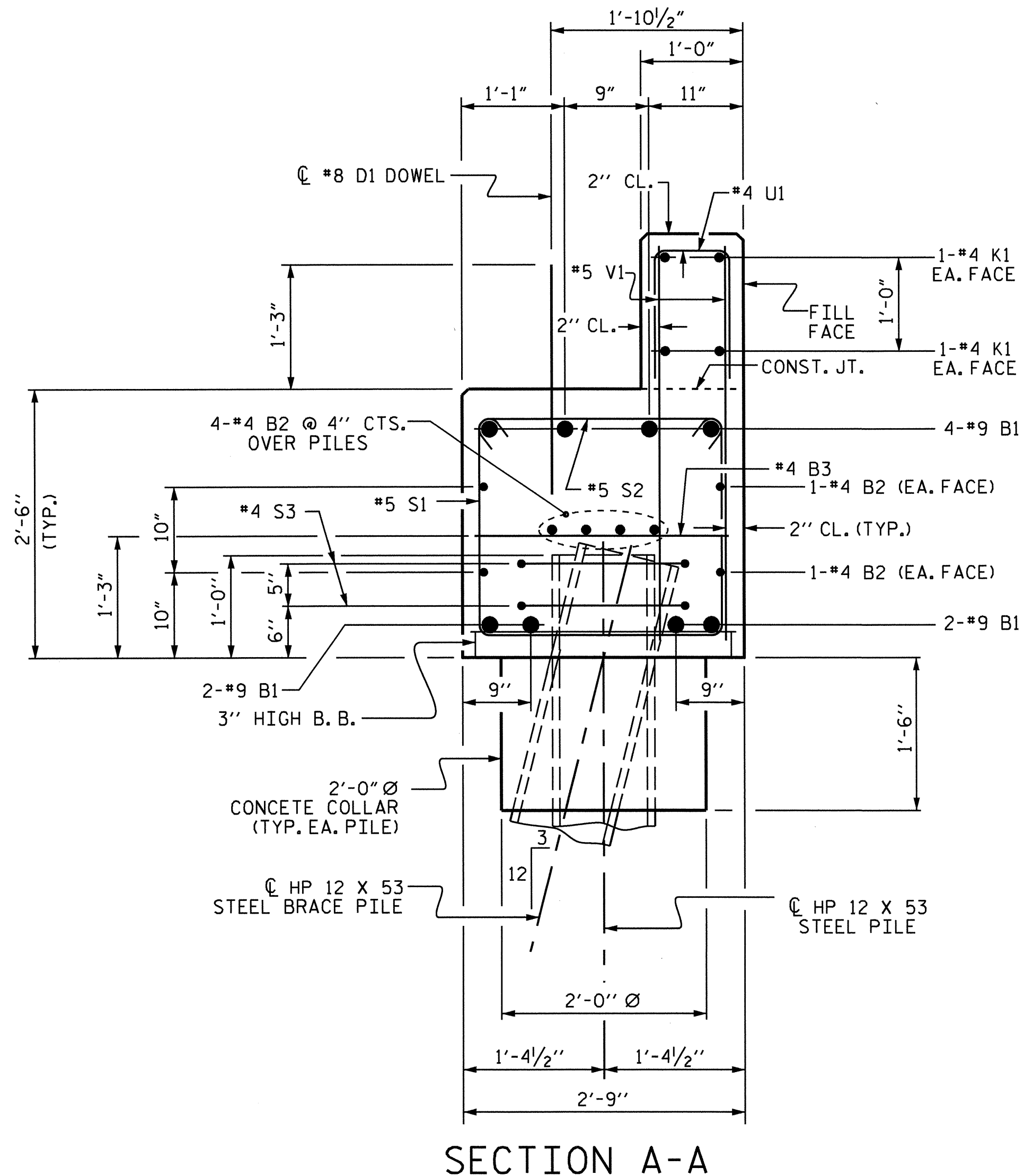


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

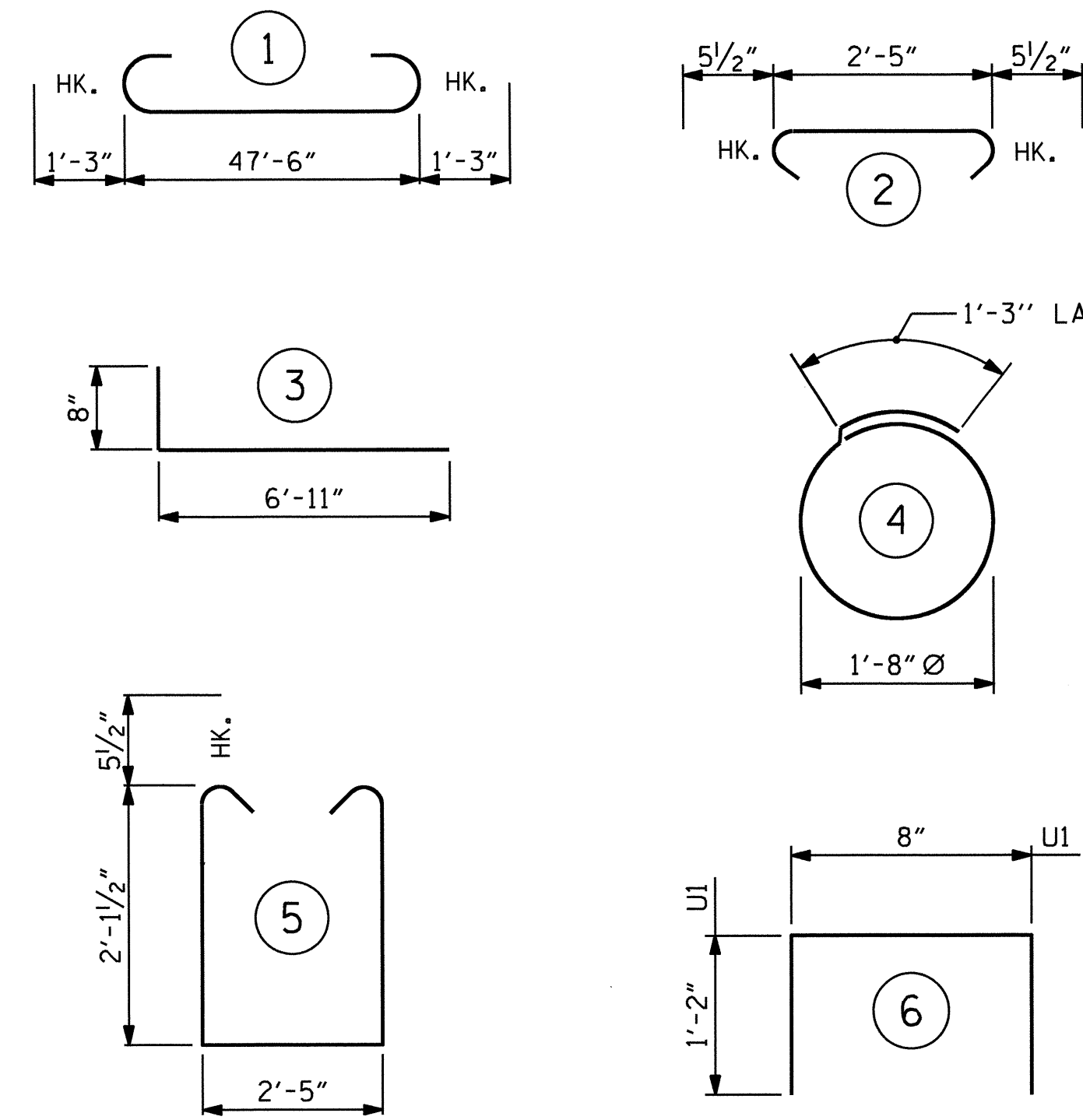
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



\* POSITION OF PILE DURING WELDING.

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT No. 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| B1  | 8   | #9   | 1    | 50'-0" | 1360   |
| B2  | 16  | #4   | STR  | 25'-1" | 268    |
| B3  | 12  | #4   | STR  | 2'-5"  | 19     |
| D1  | 28  | #8   | STR  | 2'-3"  | 168    |
| H1  | 28  | #4   | 3    | 7'-7"  | 142    |
| K1  | 8   | #4   | STR  | 25'-1" | 134    |
| K2  | 4   | #4   | STR  | 3'-1"  | 8      |
| K3  | 4   | #4   | STR  | 3'-11" | 10     |
| S1  | 50  | #5   | 5    | 7'-7"  | 395    |
| S2  | 50  | #5   | 2    | 3'-4"  | 174    |
| S3  | 14  | #4   | 4    | 6'-6"  | 61     |
| U1  | 41  | #4   | 6    | 3'-0"  | 82     |
| V1  | 82  | #5   | STR  | 3'-8"  | 314    |
| V2  | 24  | #4   | STR  | 5'-10" | 94     |
| V3  | 26  | #4   | STR  | 5'-6"  | 96     |

REINFORCING STEEL 3325 LBS.

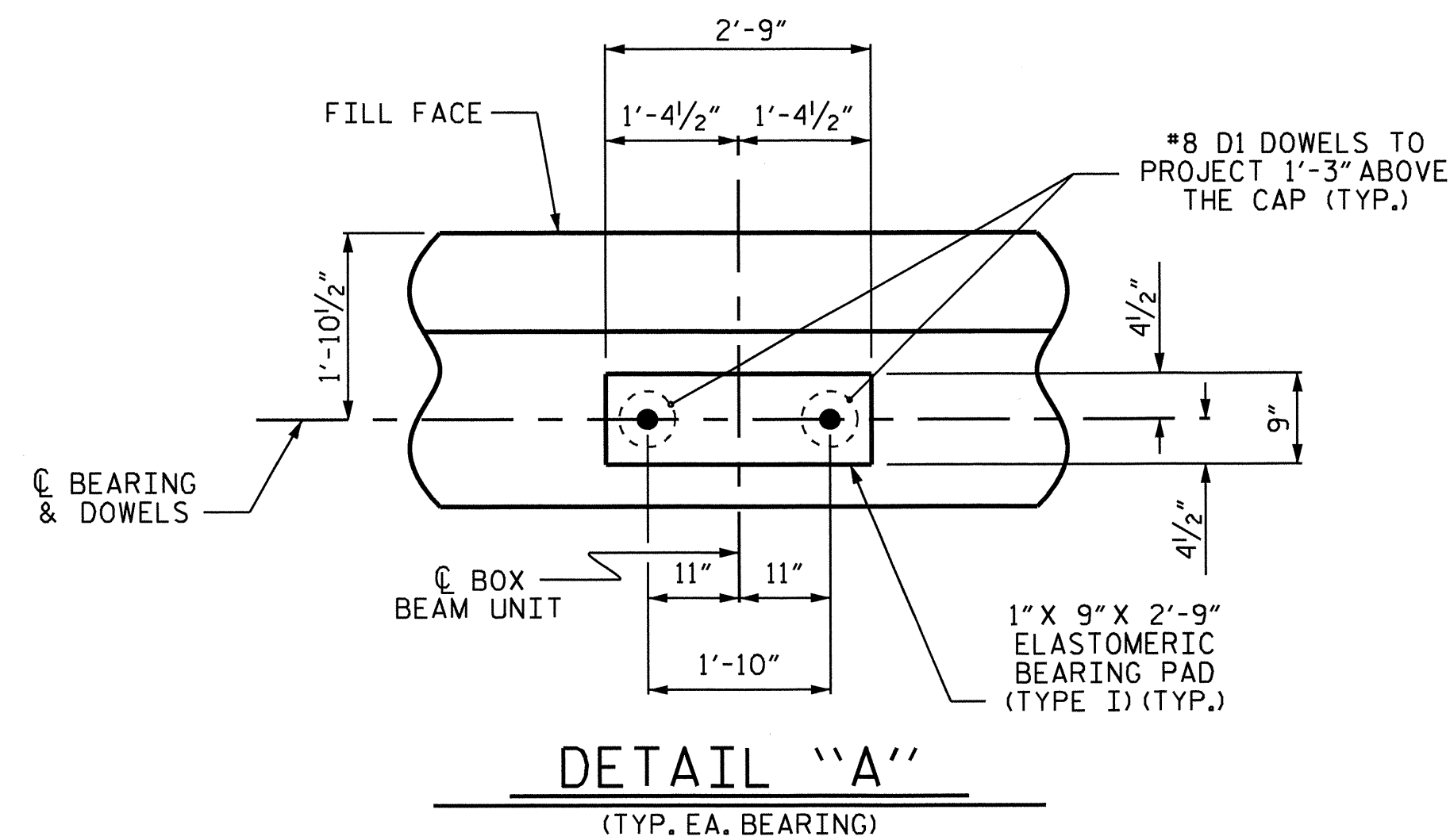
CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER WINGS & COLLARS 14.6 C.Y.  
POUR #2 UPPER WINGS & BACKWALL 4.9 C.Y.

TOTAL CLASS A CONCRETE 19.5 C.Y.

HP 12 X 53 STEEL PILES

No. = 7 105 LIN. FT.



PROJECT NO. B-4588  
NASH COUNTY  
STATION: 15+85.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE

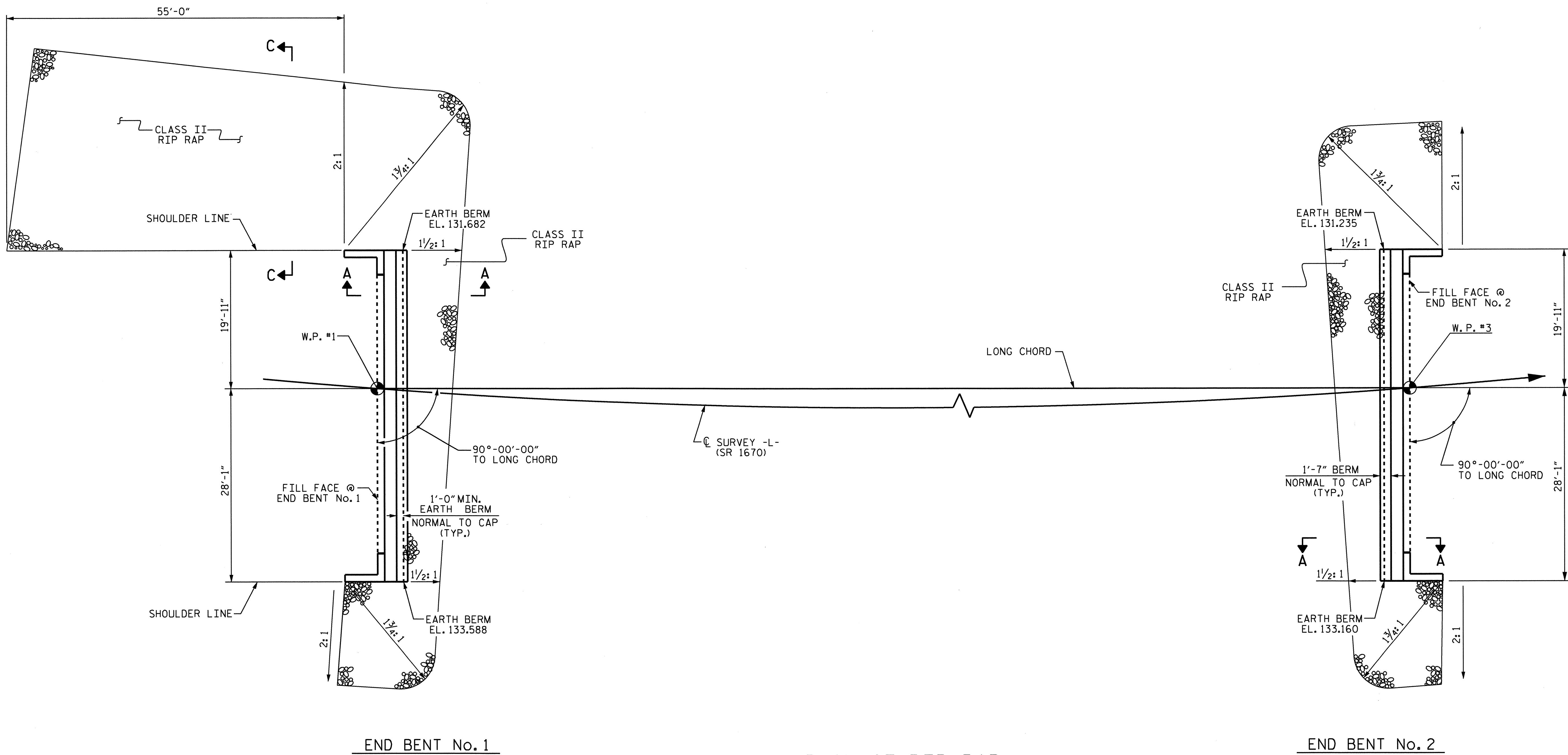
END BENT No. 2



DRAWN BY: A. V. ROYAL DATE: 8/09  
CHECKED BY: M. K. TOM DATE: 9/09

11-OCT-2011 10:48  
L:\Structures\Sub\_Draw\B4588\_EB\*2.sd...dgn  
kalford

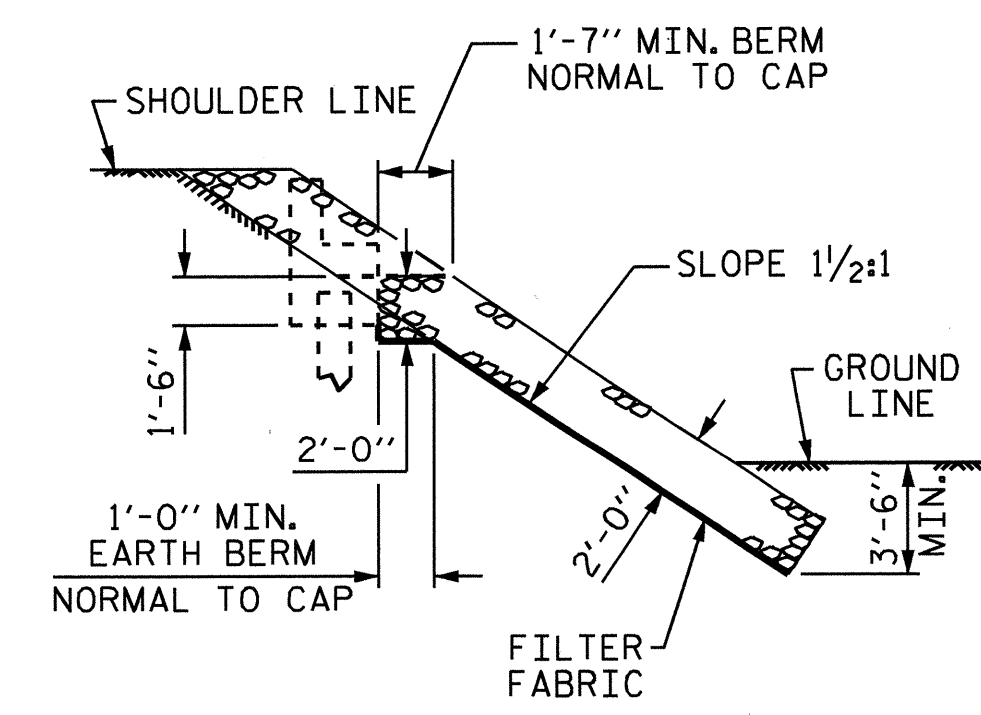
| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S-27         |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 31           |



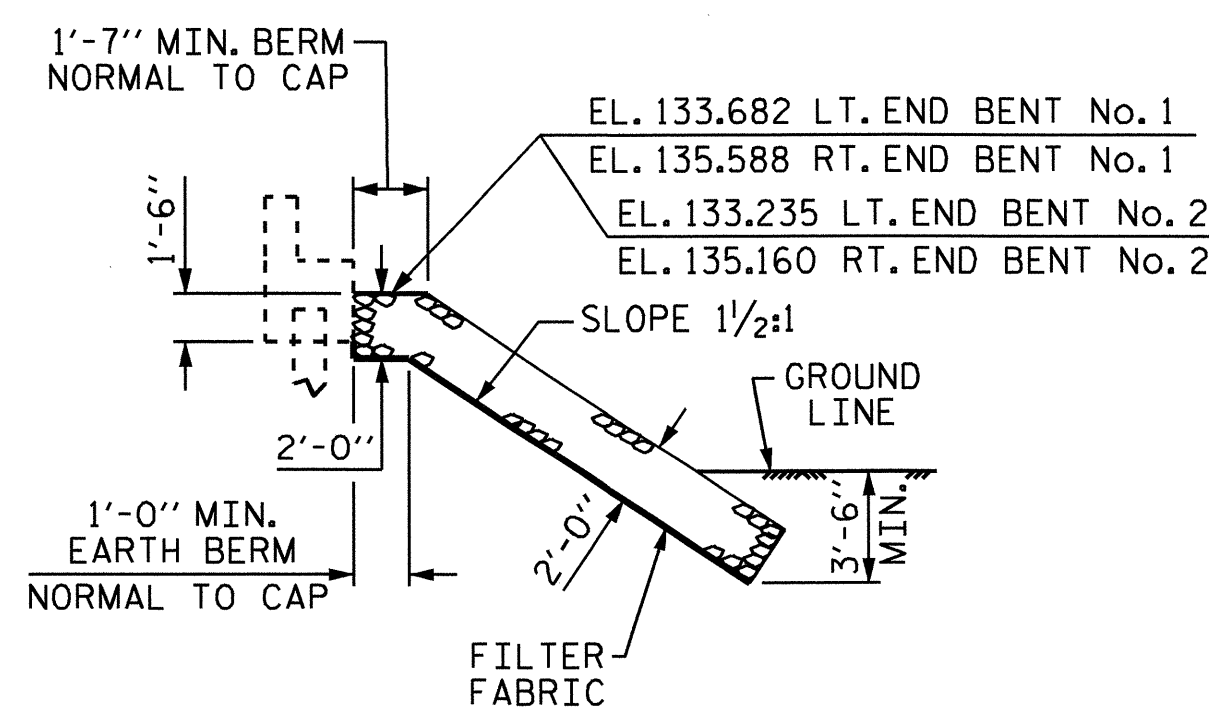
END BENT No. 1

END BENT No. 2

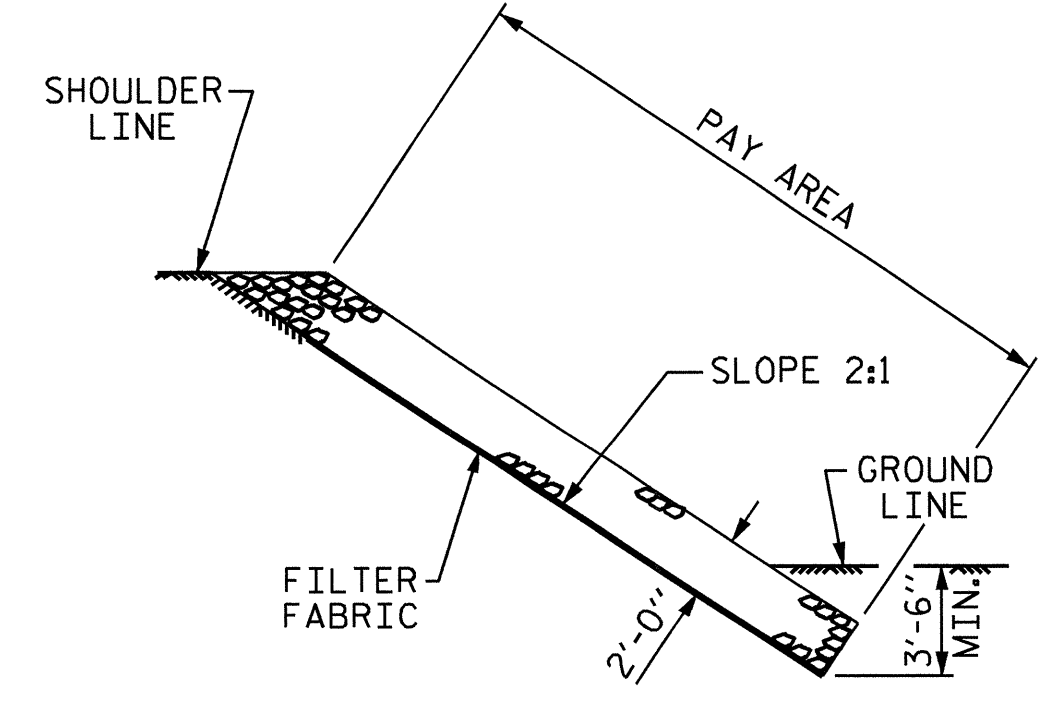
PLAN OF RIP RAP



SECTION A-A



SECTION C-C  
BERM RIP RAPPED



SECTION C-C

| ESTIMATED QUANTITIES          |                     |                               |
|-------------------------------|---------------------|-------------------------------|
| BRIDGE @<br>STA. 15+85.00 -L- | RIp RAP<br>CLASS II | FILTER FABRIC<br>FOR DRAINAGE |
|                               | TONS                | SQUARE YARDS                  |
| END BENT No. 1                | 290                 | 325                           |
| END BENT No. 2                | 120                 | 135                           |

PROJECT NO. B-4588  
NASH COUNTY  
 STATION: 15+85.00 -L-

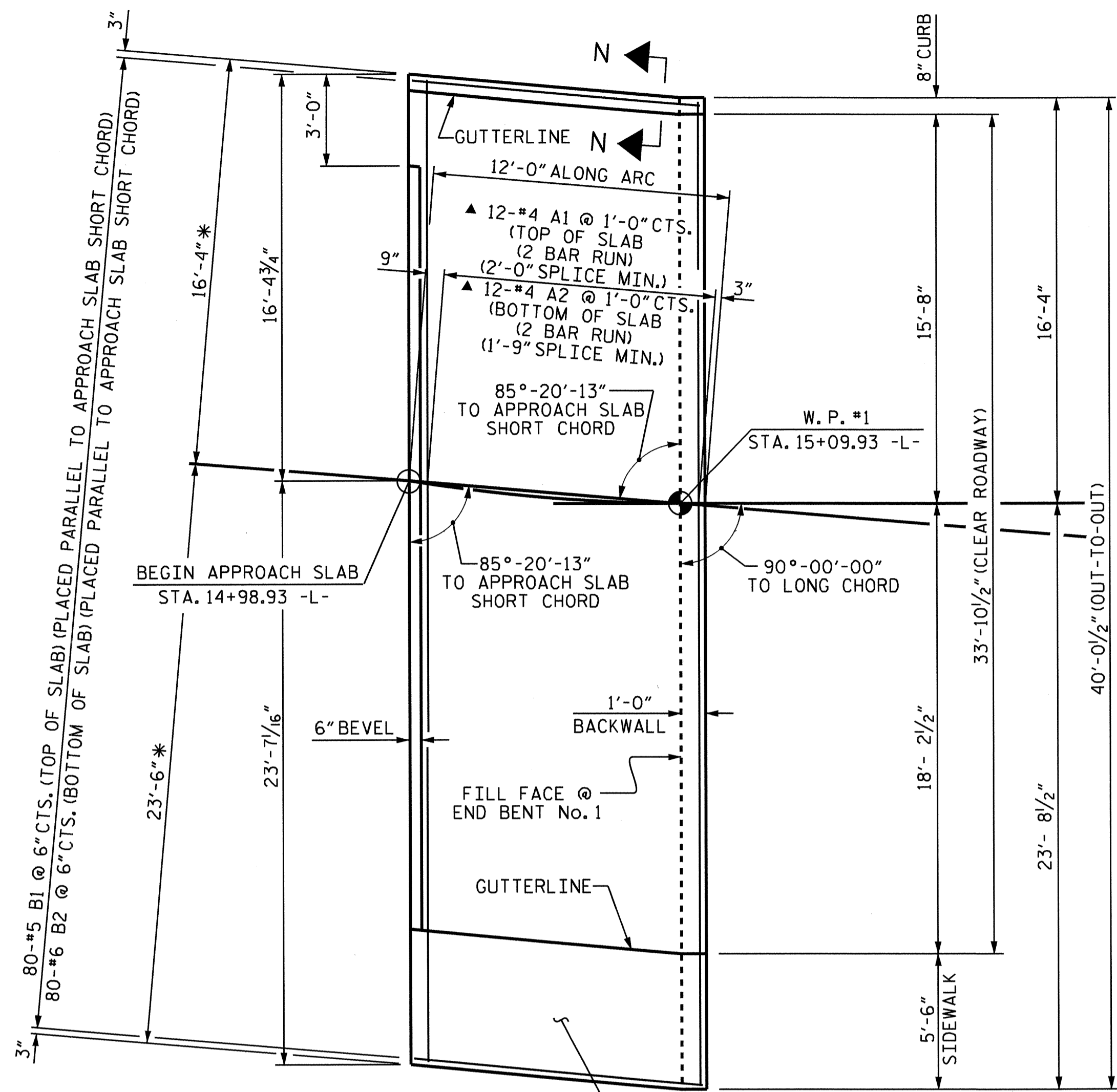


| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       |
|--|-----|-------|-----|-----|-------|
| = RIP RAP DETAILS =  |     |       |     |     |       |
| REVISIONS  |     |       |     |     |       |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |
| 1  |     |       | 3   |     |       |
| 2  |     |       | 4   |     |       |

DRAWN BY : A. V. ROYAL DATE : 11/09  
 CHECKED BY : T. N. CARROLL DATE : 02/10

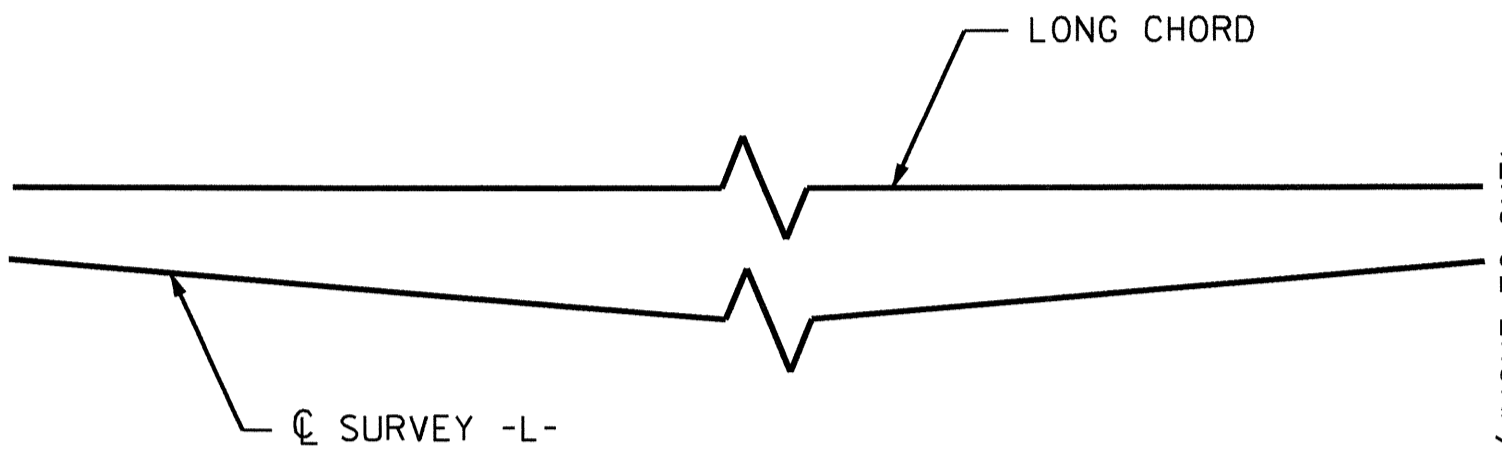
11-OCT-2011 10:47  
 L:\Structures\Misc.draw\B4588.SD.RR.dgn  
 kaiford

SHEET NO.  
S-28  
TOTAL SHEETS  
31



FOR REINFORCING STEEL IN SIDEWALK SEE "SIDEWALK DETAILS", SHEET 2 OF 3

PLAN @ END BENT No. 1



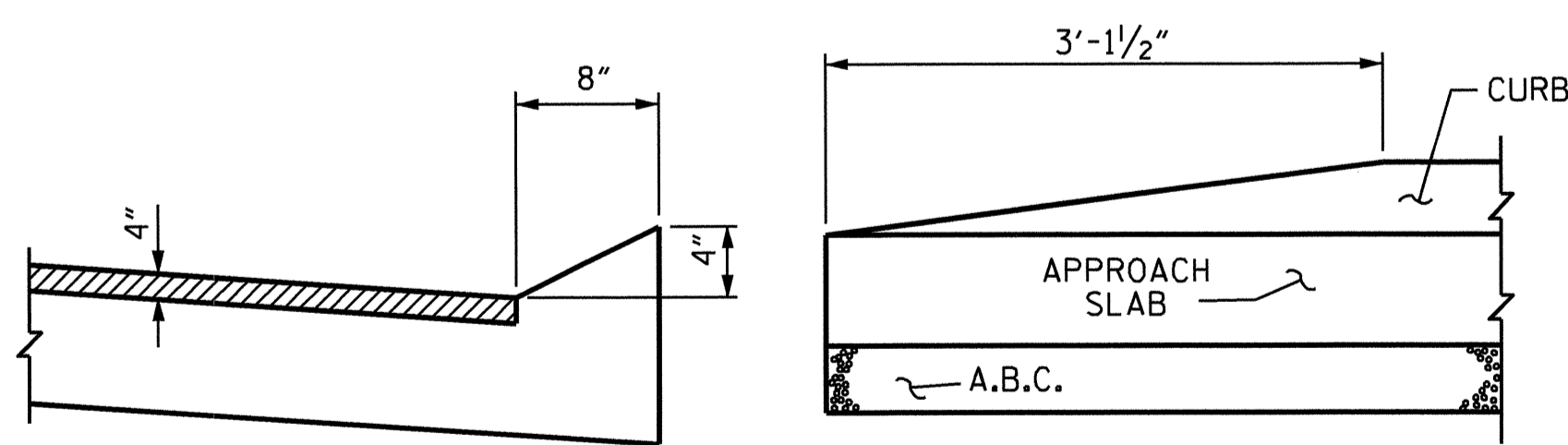
FOR REINFORCING STEEL IN SIDEWALK SEE "SIDEWALK DETAILS", SHEET 2 OF 3

PLAN @ END BENT No. 2

PLAN OF APPROACH SLABS

NOTES:

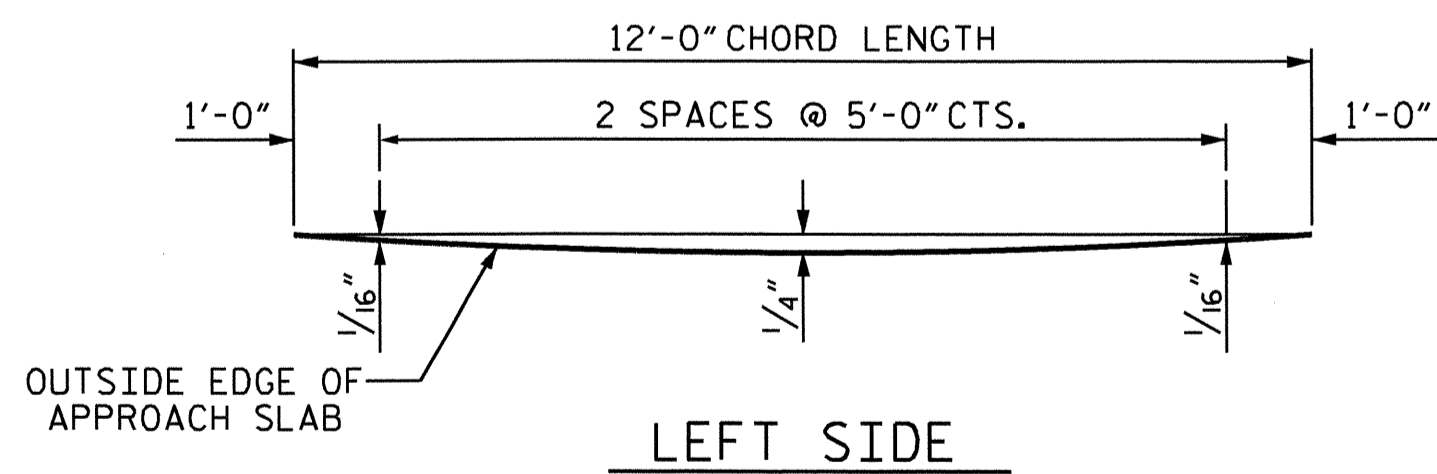
- \* MEASURED RADIALLY
- ▲ "A" BARS ARE PLACED ALONG APPROACH SLAB CHORD AND PLACED PARALLEL TO FILL FACE.



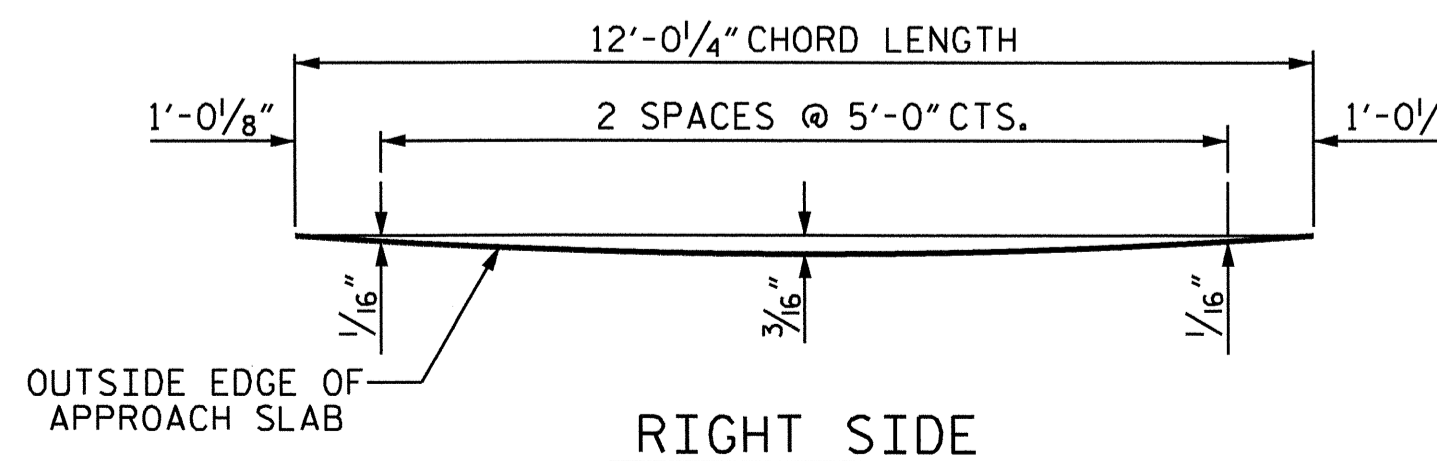
SECTION N-N

END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

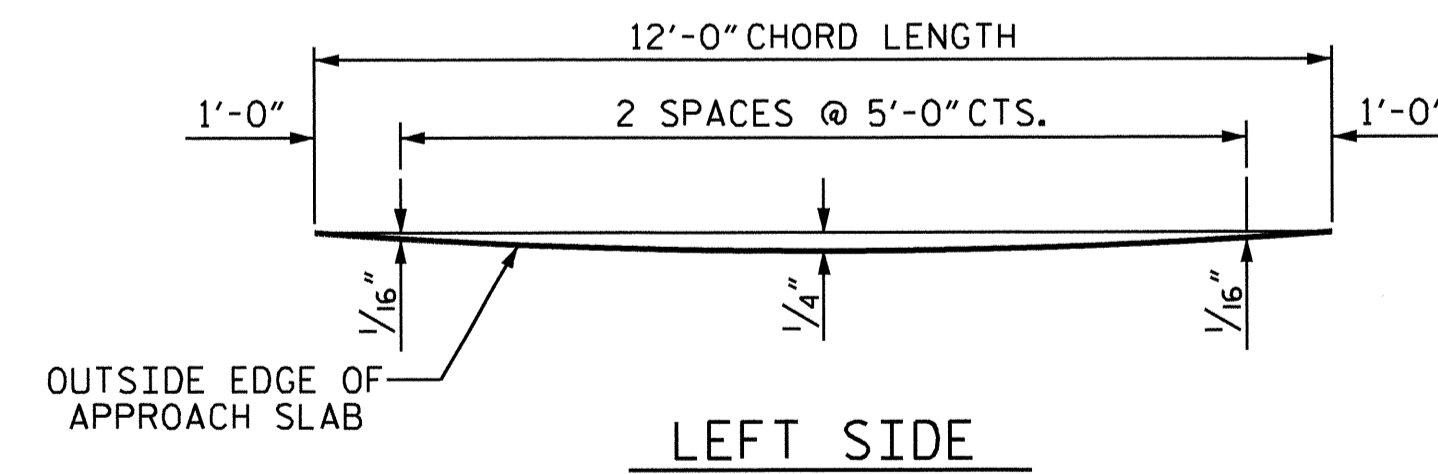


LEFT SIDE

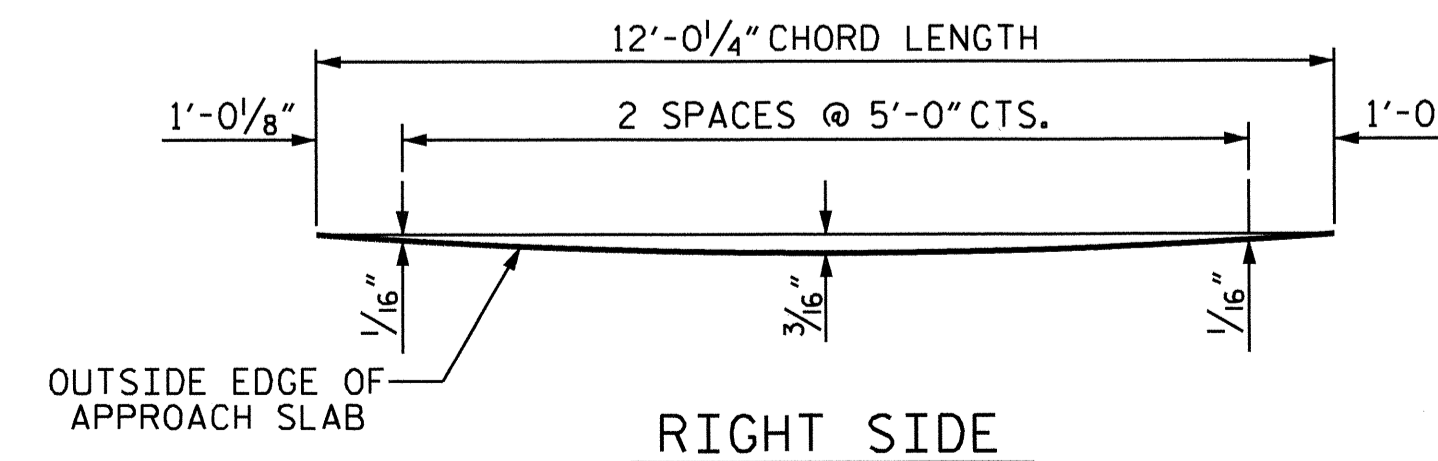


RIGHT SIDE

ARC OFFSETS @ END BENT No. 1



LEFT SIDE



RIGHT SIDE

ARC OFFSETS @ END BENT No. 2

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB  
 FOR PRESTRESSED  
 CONCRETE BOX BEAM  
 (SUB-REGIONAL TIER)

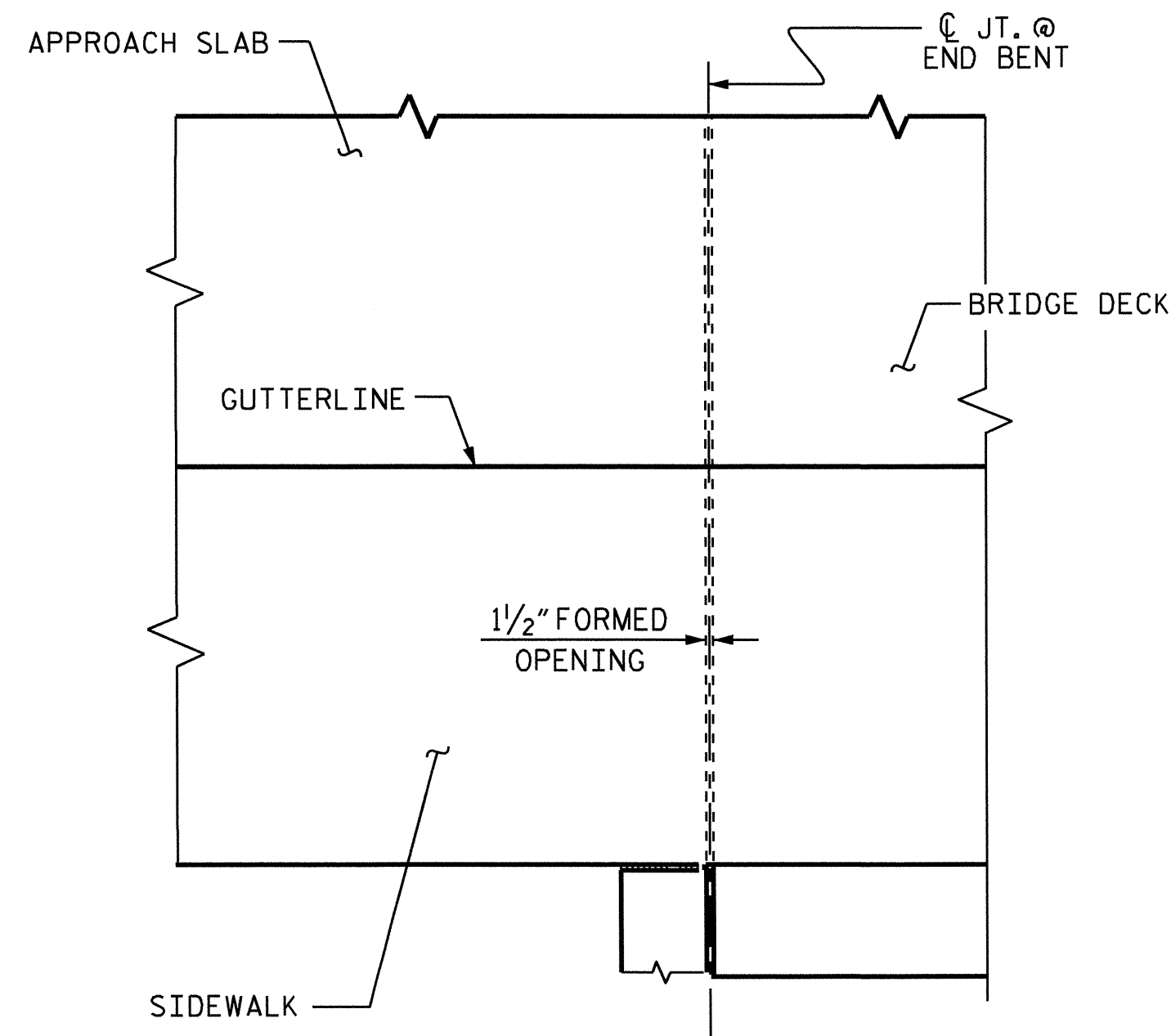


REVISIONS

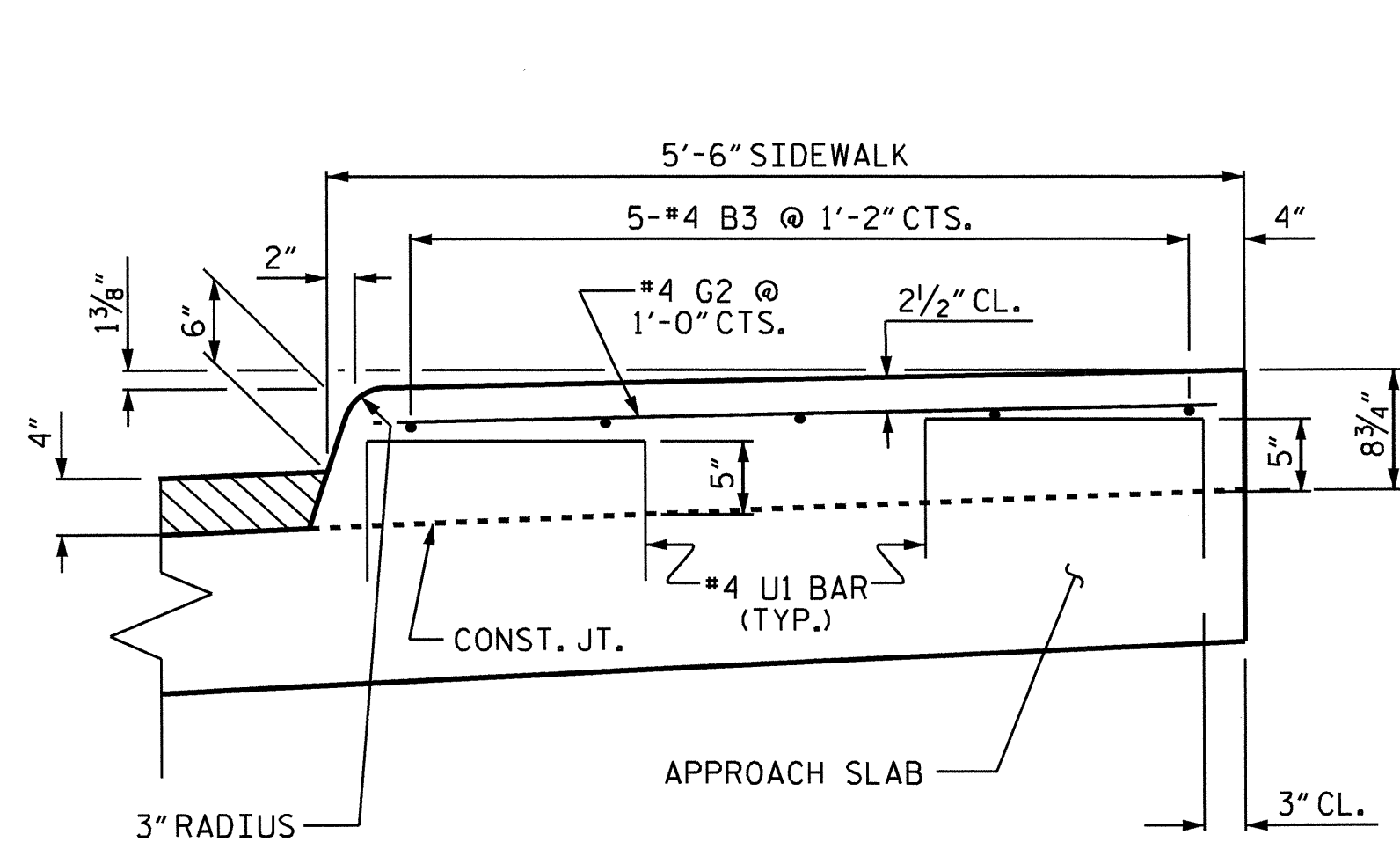
| NO. | BY: | DATE: | NO. | BY: | DATE: |
|-----|-----|-------|-----|-----|-------|
| 1   |     |       | 3   |     |       |
| 2   |     |       | 4   |     |       |

|              |      |
|--------------|------|
| SHEET NO.    | S-29 |
| TOTAL SHEETS | 31   |

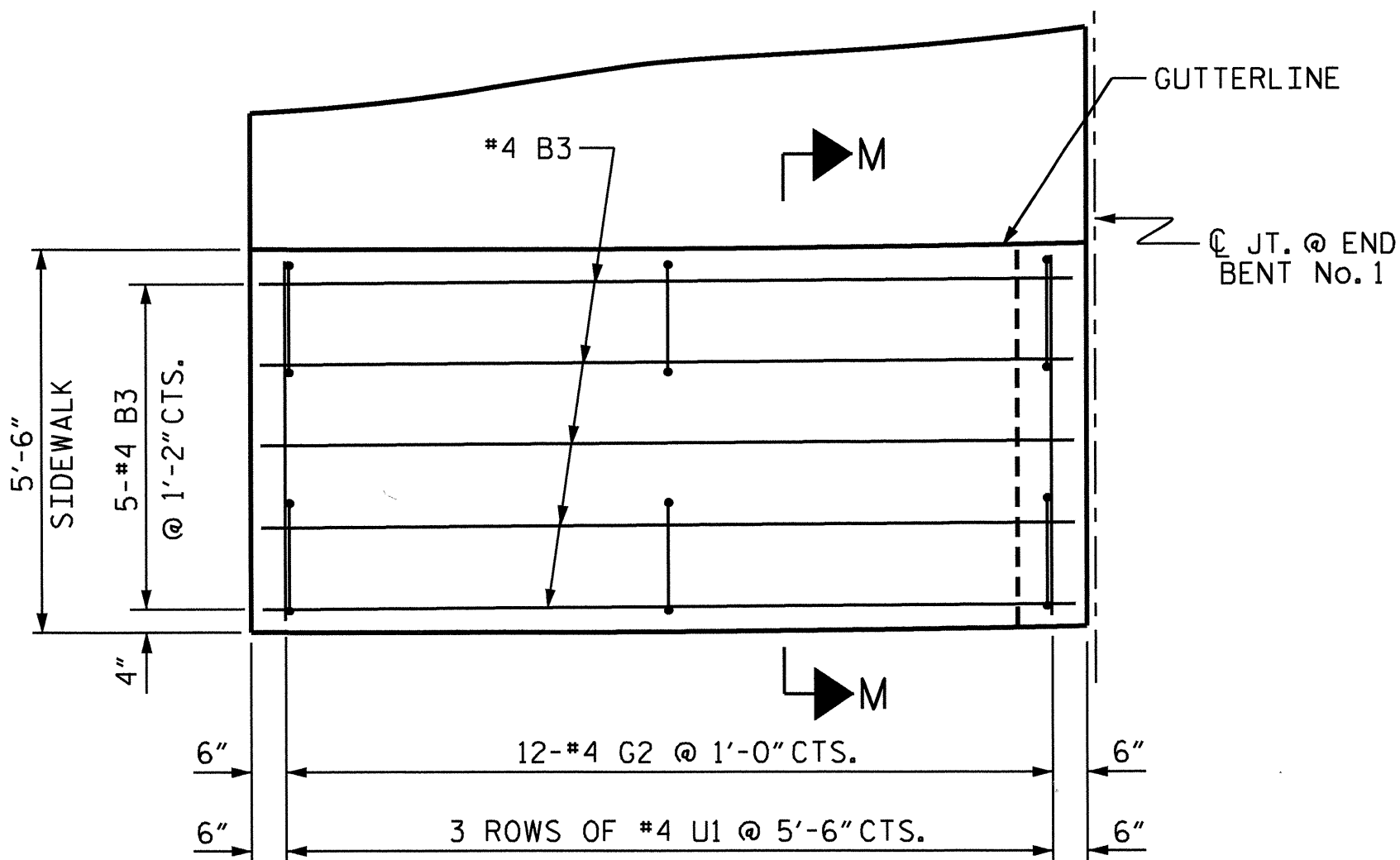
DRAWN BY: A. V. ROYAL DATE: 11/09  
 CHECKED BY: T. N. CARROLL DATE: 02/10



PLAN VIEW OF SIDEWALK @ END BENT  
 PLAN VIEW @ END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR



SECTION M-M



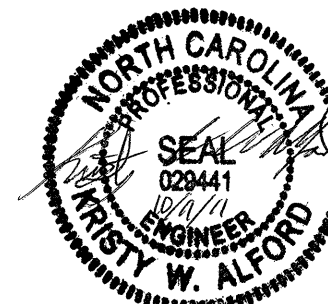
PLAN

DETAILS OF SIDEWALK ON APPROACH SLAB

END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR

PROJECT NO. B-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH  
 SLAB DETAILS

|                            |              |
|----------------------------|--------------|
| ASSEMBLED BY : A. V. ROYAL | DATE : 11/09 |
| CHECKED BY : T. N. CARROLL | DATE : 02/10 |
| DRAWN BY : FCJ             | 11/88        |
| CHECKED BY : ARB           | 11/88        |
| REV. 10/17/00              | RWW/LES      |
| REV. 5/7/03                | RWW/JTE      |
| REV. 5/1/06R               | MAA/KMM      |

11-OCT-2011 10:47  
 Li:\Structures\Misc.draw\B4588\_SD\_AS.dgn  
 kaiford

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 31           |
| 2         |     |       | 4   |     |       |              |

STD. NO. BAS10

NOTES

FOR BRIDGE APPROACH FILL INCLUDING FABRIC, 4"Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

FABRIC SHALL BE TYPE 1 ENGINEERING FABRIC IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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.

APPROACH SLAB GROOVING IS NOT REQUIRED.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

THE CONTRACTOR HAS THE OPTION TO OMIT GROUT BETWEEN THE APPROACH SLAB AND THE BOX BEAM UNITS AND POUR THE APPROACH SLAB DIRECTLY AGAINST THE BOX BEAM UNITS. SEE "OPTIONAL JOINT DETAIL".

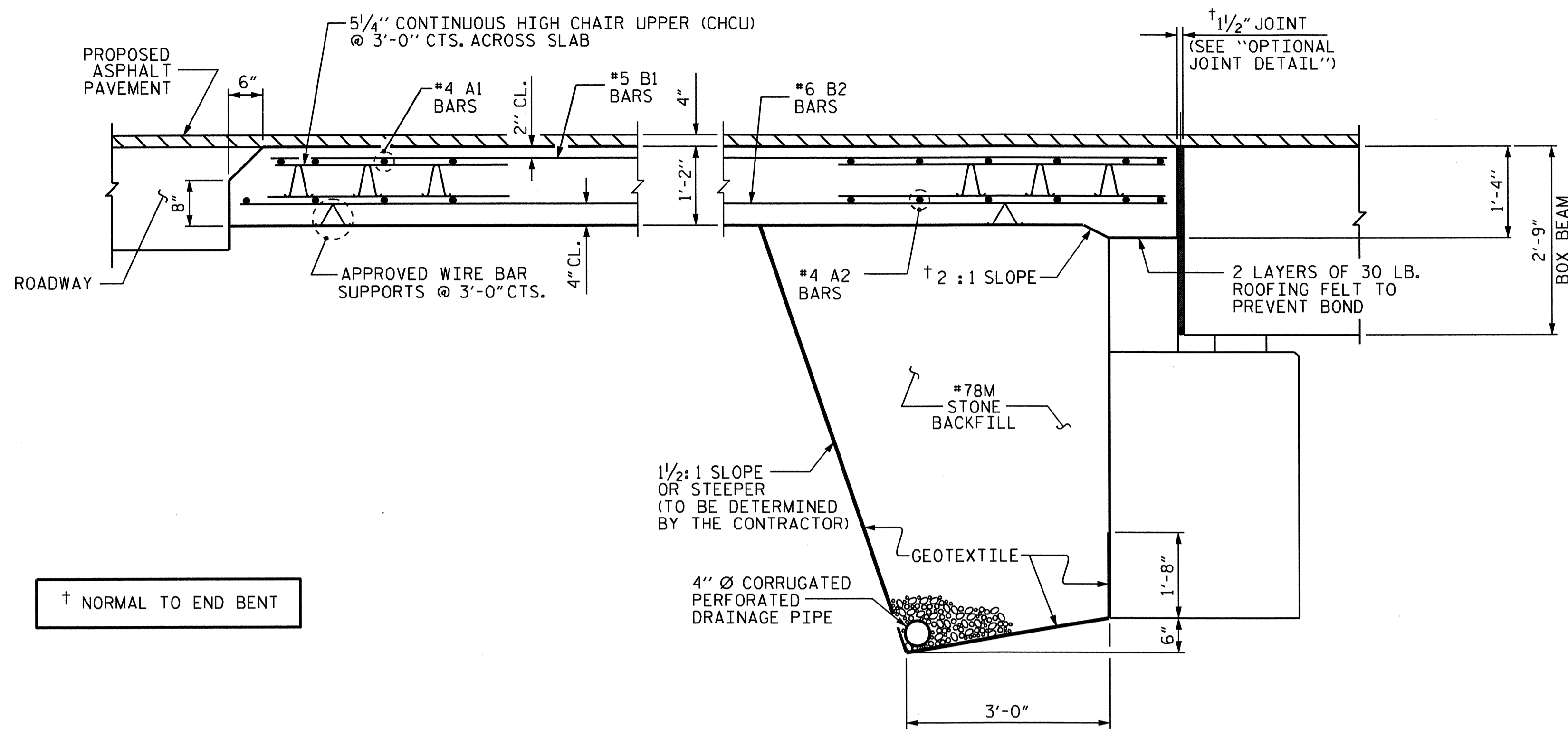
BILL OF MATERIAL

APPROACH SLAB AT EB No. 1

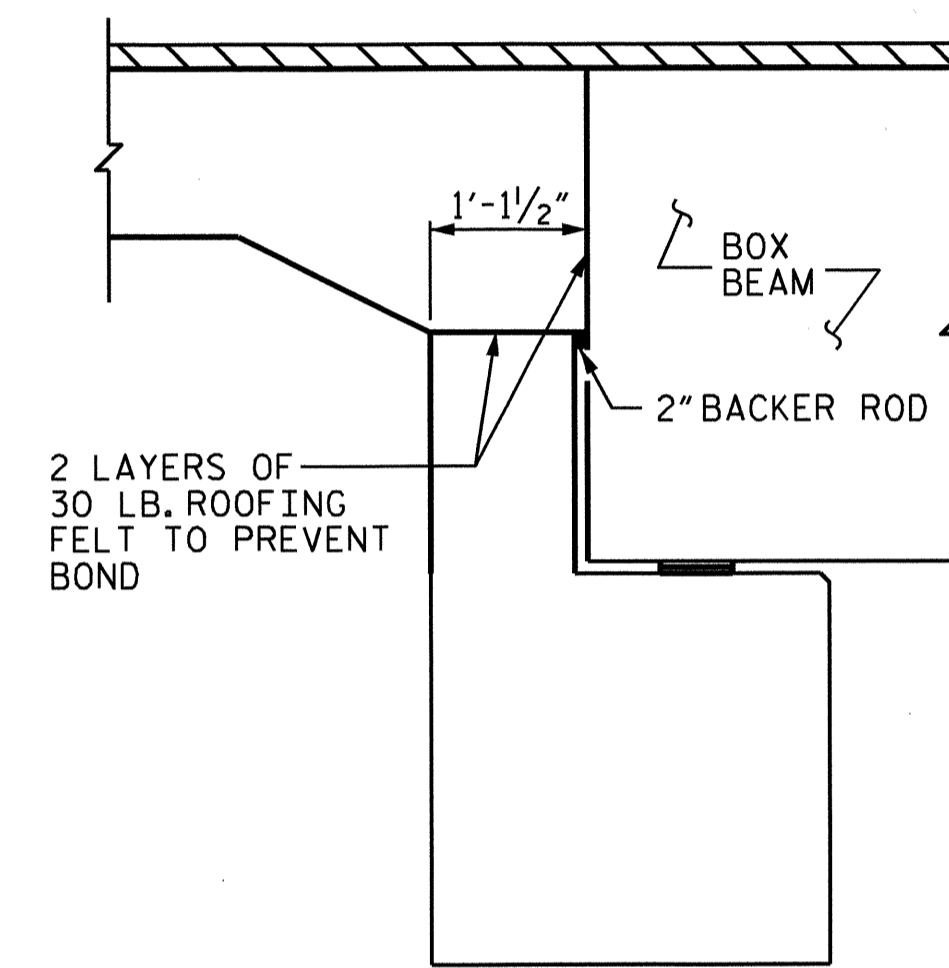
| BAR NO.                         | SIZE | TYPE | LENGTH      | WEIGHT     |
|---------------------------------|------|------|-------------|------------|
| *A1                             | 24   | #4   | STR 20'-11" | 335        |
| A2                              | 24   | #4   | STR 20'-9"  | 333        |
| *B1                             | 80   | #5   | STR 11'-1"  | 925        |
| B2                              | 80   | #6   | STR 11'-7"  | 1392       |
| *B3                             | 5    | #4   | STR 11'-8"  | 39         |
| *G2                             | 12   | #4   | STR 5'-0"   | 40         |
| *U1                             | 6    | #4   | 1 3'-4"     | 13         |
| REINFORCING STEEL               |      |      |             | 1725 LBS.  |
| *EPOXY COATED REINFORCING STEEL |      |      |             | 1352 LBS.  |
| CLASS AA CONCRETE               |      |      |             |            |
| POUR #1 (SLAB & CURB)           |      |      |             | 21.0 C. Y. |
| POUR #2 (SIDEWALK)              |      |      |             | 1.9 C. Y.  |
| TOTAL                           |      |      |             | 22.9 C. Y. |

APPROACH SLAB AT EB No. 2

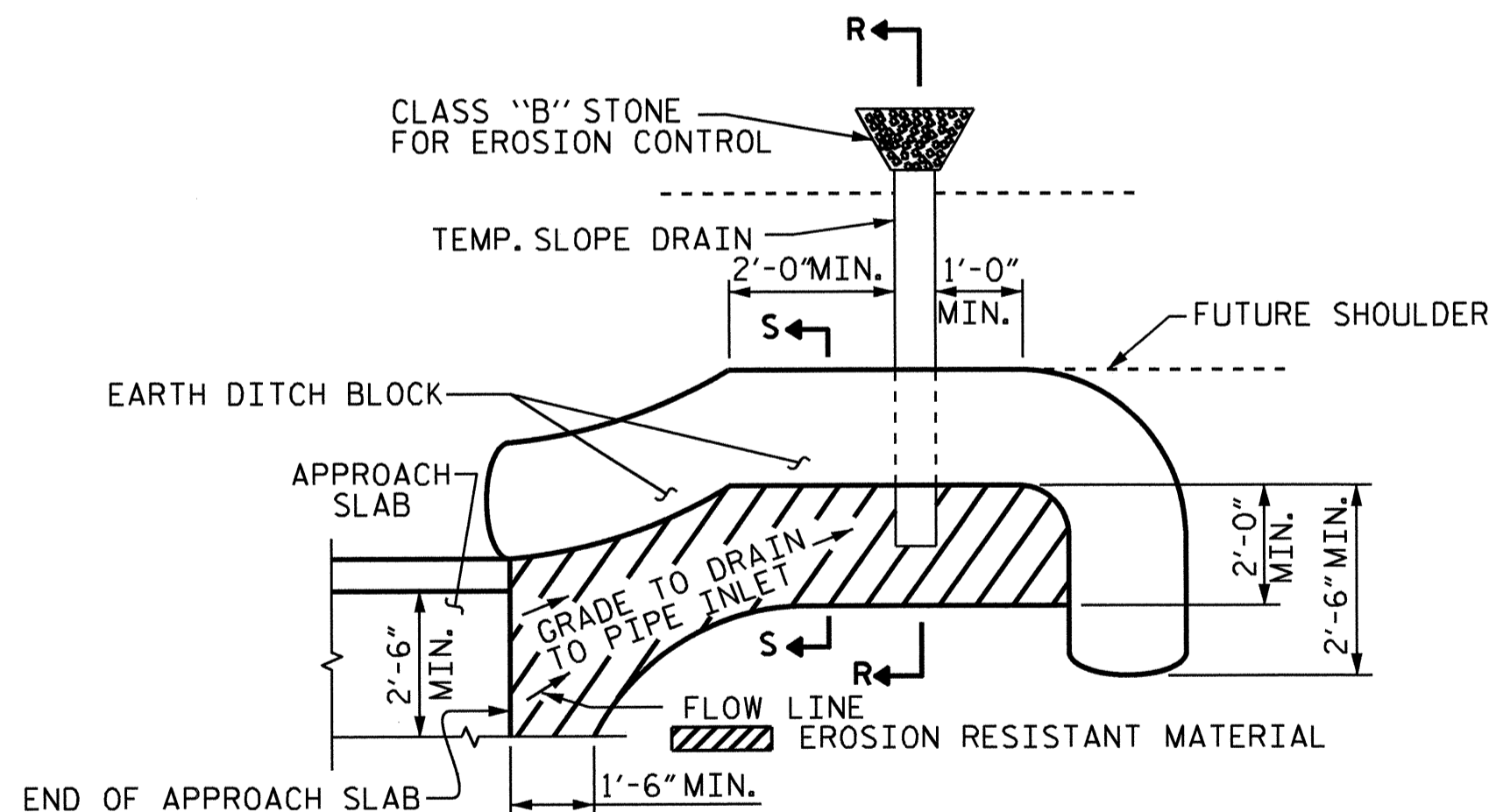
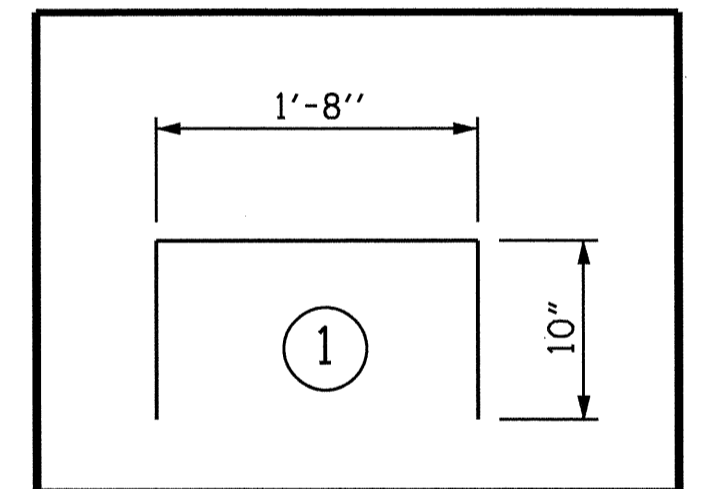
| BAR NO.                         | SIZE | TYPE | LENGTH      | WEIGHT     |
|---------------------------------|------|------|-------------|------------|
| *A1                             | 24   | #4   | STR 20'-11" | 335        |
| A2                              | 24   | #4   | STR 20'-9"  | 333        |
| *B1                             | 80   | #5   | STR 11'-1"  | 925        |
| B2                              | 80   | #6   | STR 11'-7"  | 1392       |
| *B3                             | 5    | #4   | STR 11'-8"  | 39         |
| *G2                             | 12   | #4   | STR 5'-0"   | 40         |
| *U1                             | 6    | #4   | 1 3'-4"     | 13         |
| REINFORCING STEEL               |      |      |             | 1725 LBS.  |
| *EPOXY COATED REINFORCING STEEL |      |      |             | 1352 LBS.  |
| CLASS AA CONCRETE               |      |      |             |            |
| POUR #1 (SLAB & CURB)           |      |      |             | 21.0 C. Y. |
| POUR #2 (SIDEWALK)              |      |      |             | 1.9 C. Y.  |
| TOTAL                           |      |      |             | 22.9 C. Y. |



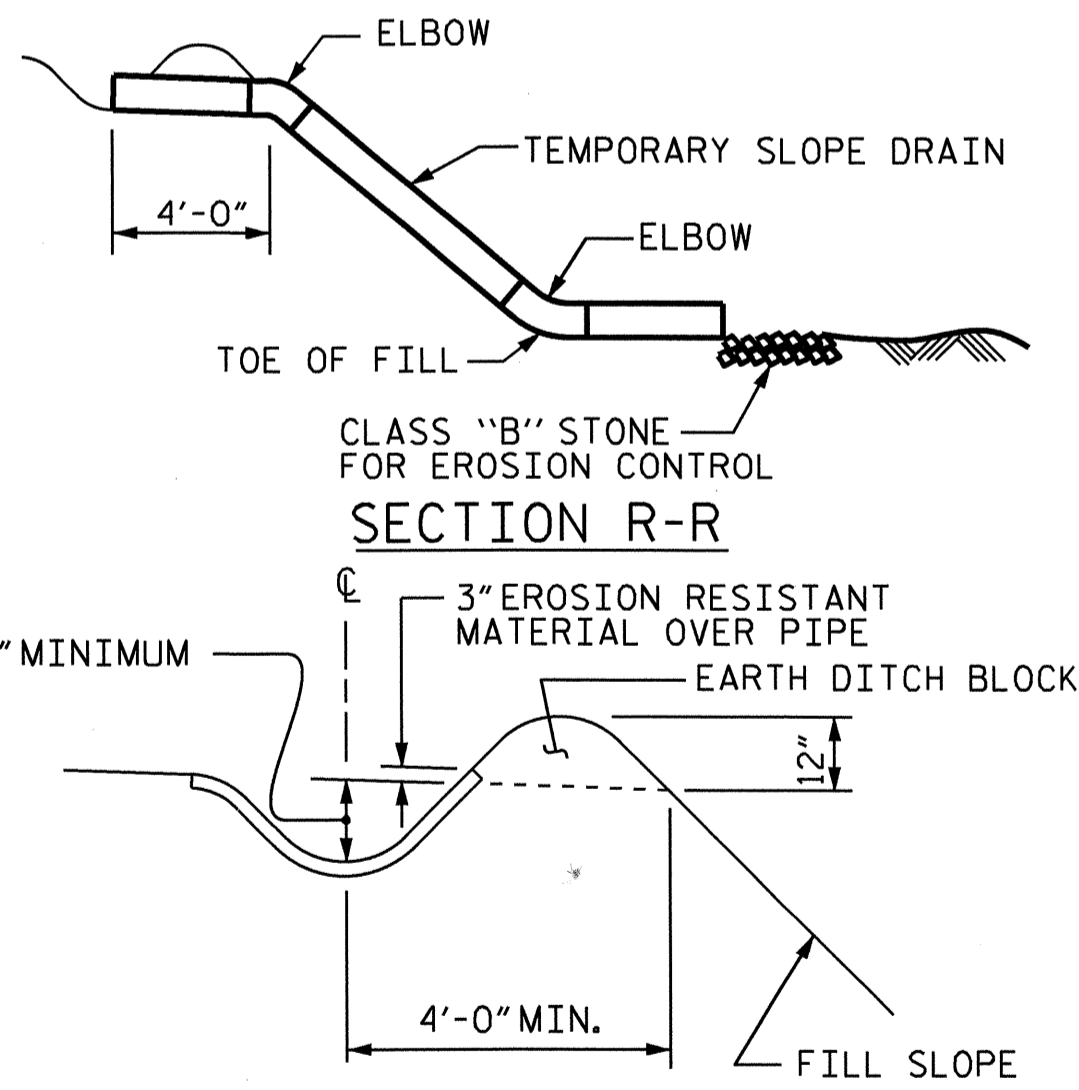
SECTION THRU SLAB



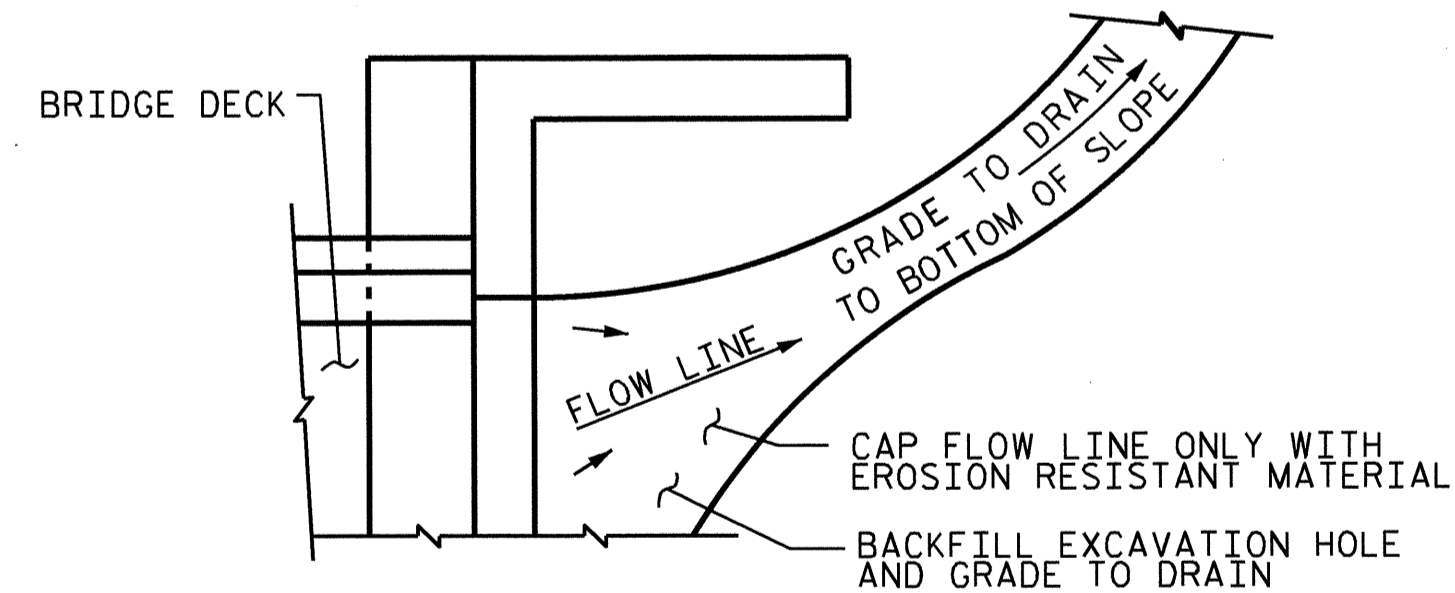
OPTIONAL JOINT DETAIL



PLAN VIEW



SECTION R-R



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-4588  
 NASH COUNTY  
 STATION: 15+85.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 (SUB-REGIONAL TIER)

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

|                           |             |
|---------------------------|-------------|
| ASSEMBLED BY: A. V. ROYAL | DATE: 11/09 |
| CHECKED BY: T. N. CARROLL | DATE: 02/10 |
| DRAWN BY: KMM             | 3-08        |
| CHECKED BY: GM            | 3-08        |



## 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      |       |                         |
| OF TIMBER                               | ----- | 375 LBS. PER SQ. IN.    |
| EQUIVALENT FLUID PRESSURE OF EARTH      | ----- | 30 LBS. PER CU. FT.     |
|   |       | (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 2006 "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; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

### 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. 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.

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

STD. NO. SN