

LOAD FACTORS:

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

| LEVEL              | VEHICLE                           | WEIGHT (W)<br>(TONS) | CONTROLLING LOAD RATING # | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE              |                           |               |      |                 |                                     |                           |               |      |                 | SERVICE III LIMIT STATE             |                                     |                           |               |      |                 | COMMENT NUMBER |                                     |   |
|--------------------|-----------------------------------|----------------------|---------------------------|-----------------------------|---------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|-------------------------------------|---------------------------|---------------|------|-----------------|----------------|-------------------------------------|---|
|                    |                                   |                      |                           |                             |               | MOMENT                              |                           |               |      |                 | SHEAR                               |                           |               |      |                 | MOMENT                              |                                     |                           |               |      |                 |                |                                     |   |
|                    |                                   |                      |                           |                             |               | LIVE-LOAD FACTORS ( $\gamma_{LL}$ ) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (FT) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (FT) | LIVE-LOAD FACTORS ( $\gamma_{LL}$ ) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION |                | DISTANCE FROM LEFT END OF SPAN (FT) |   |
| DESIGN LOAD RATING | HL-93 (INVENTORY)                 | N/A                  | ①                         | 1.17                        | --            | 1.75                                | 0.730                     | 1.53          | A    | I               | 60.9                                | 0.950                     | 1.19          | A    | I               | 115.6                               | 0.80                                | 0.730                     | 1.17          | A    | I               | 60.9           | 1                                   |   |
|                    | HL-93 (OPERATING)                 | N/A                  |                           | 1.70                        | --            | 1.35                                | 0.730                     | 1.98          | A    | I               | 60.9                                | 0.950                     | 1.70          | A    | I               | 115.6                               | N/A                                 | --                        | --            | --   | --              | --             | 1                                   |   |
|                    | HS-20 (INVENTORY)                 | 36.000               | ②                         | 1.72                        | 61.92         | 1.75                                | 0.730                     | 2.24          | A    | I               | 60.9                                | 0.950                     | 2.06          | A    | I               | 115.6                               | 0.80                                | 0.730                     | 1.72          | A    | I               | 60.9           | 1                                   |   |
|                    | HS-20 (OPERATING)                 | 36.000               |                           | 2.78                        | 100.08        | 1.35                                | 0.730                     | 2.91          | A    | I               | 60.9                                | 0.950                     | 2.78          | A    | I               | 110.2                               | N/A                                 | --                        | --            | --   | --              | --             | 1                                   |   |
| LEGAL LOAD RATING  | SINGLE VEHICLE (SV)               | SNSH                 | 13.500                    |                             | 4.21          | 56.84                               | 1.40                      | 0.730         | 6.86 | A               | I                                   | 60.9                      | 0.950         | 7.18 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 4.21 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNGARBS2             | 20.000                    |                             | 2.99          | 59.80                               | 1.40                      | 0.730         | 4.87 | A               | I                                   | 60.9                      | 0.950         | 4.93 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 2.99 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNAGRIS2             | 22.000                    |                             | 2.77          | 60.94                               | 1.40                      | 0.730         | 4.51 | A               | I                                   | 60.9                      | 0.950         | 4.52 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 2.77 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNCOTTS3             | 27.250                    |                             | 2.08          | 56.68                               | 1.40                      | 0.730         | 3.39 | A               | I                                   | 60.9                      | 0.950         | 3.46 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 2.08 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNAGGRS4             | 34.925                    |                             | 1.68          | 58.67                               | 1.40                      | 0.730         | 2.74 | A               | I                                   | 60.9                      | 0.950         | 2.67 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 1.68 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNS5A                | 35.550                    |                             | 1.65          | 58.66                               | 1.40                      | 0.730         | 2.69 | A               | I                                   | 60.9                      | 0.950         | 2.65 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 1.65 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNS6A                | 39.950                    |                             | 1.50          | 59.93                               | 1.40                      | 0.730         | 2.44 | A               | I                                   | 60.9                      | 0.950         | 2.38 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 1.50 | A               | I              | 60.9                                | 1 |
|                    |                                   | SNS7B                | 42.000                    |                             | 1.42          | 59.64                               | 1.40                      | 0.730         | 2.32 | A               | I                                   | 60.9                      | 0.950         | 2.27 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.42 | A               | I              | 60.9                                | 1 |
|                    | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3             | 33.000                    |                             | 1.82          | 60.06                               | 1.40                      | 0.730         | 2.97 | A               | I                                   | 60.9                      | 0.950         | 2.86 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 1.82 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNT4A                | 33.075                    |                             | 1.82          | 60.20                               | 1.40                      | 0.730         | 2.97 | A               | I                                   | 60.9                      | 0.950         | 2.82 | A               | I                                   | 110.2                               | 0.80                      | 0.730         | 1.82 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNT6A                | 41.600                    |                             | 1.47          | 61.15                               | 1.40                      | 0.730         | 2.39 | A               | I                                   | 60.9                      | 0.950         | 2.34 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.47 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNT7A                | 42.000                    |                             | 1.47          | 61.74                               | 1.40                      | 0.730         | 2.39 | A               | I                                   | 60.9                      | 0.950         | 2.30 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.47 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNT7B                | 42.000                    |                             | 1.49          | 62.58                               | 1.40                      | 0.730         | 2.43 | A               | I                                   | 60.9                      | 0.950         | 2.24 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.49 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNAGRIT4             | 43.000                    |                             | 1.44          | 61.92                               | 1.40                      | 0.730         | 2.34 | A               | I                                   | 60.9                      | 0.950         | 2.16 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.44 | A               | I              | 60.9                                | 1 |
|                    |                                   | TNAGT5A              | 45.000                    |                             | 1.36          | 61.20                               | 1.40                      | 0.730         | 2.22 | A               | I                                   | 60.9                      | 0.950         | 2.07 | A               | I                                   | 115.6                               | 0.80                      | 0.730         | 1.36 | A               | I              | 60.9                                | 1 |
| TNAGT5B            | 45.000                            | ③                    | 1.35                      | 60.75                       | 1.40          | 0.730                               | 2.21                      | A             | I    | 60.9            | 0.950                               | 2.08                      | A             | I    | 115.6           | 0.80                                | 0.730                               | 1.35                      | A             | I    | 60.9            | 1              |                                     |   |

**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.

**COMMENTS:**  
 1. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE.  
 GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.

⑥ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

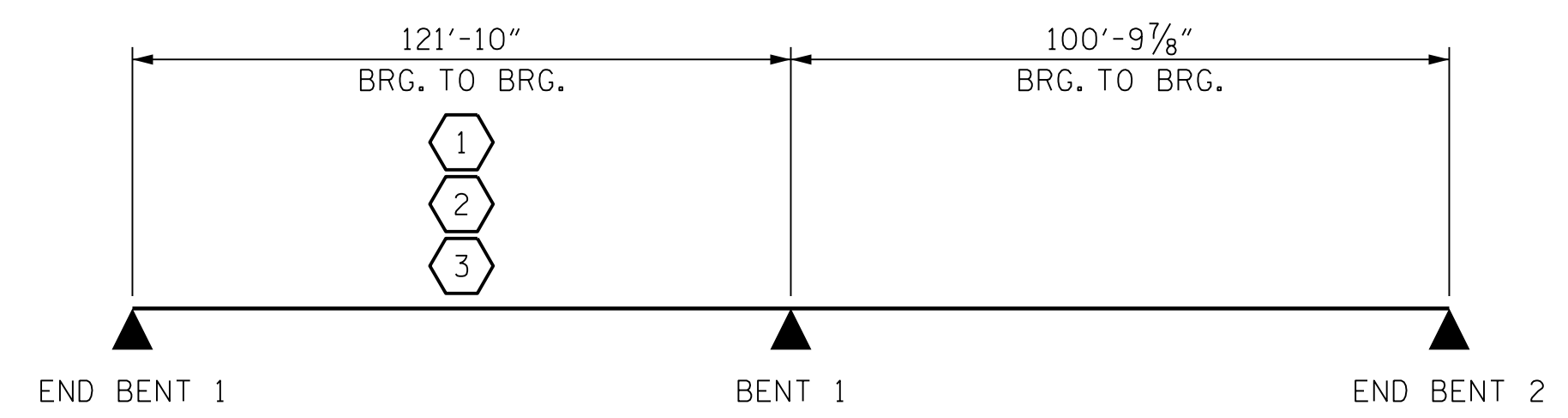
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER  
 EL - EXTERIOR LEFT GIRDER  
 ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

4/22/2020 404\_009\_R2233BB\_SMLLRFR\_800663.dgn

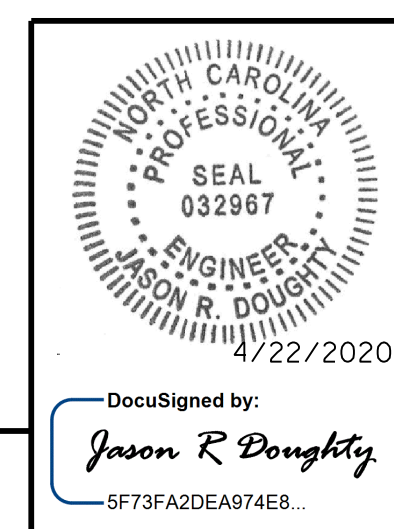
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 DRAWN BY: K. WHITE DATE: AUG 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

DRAWN BY: MAA 1/08  
 CHECKED BY: GM/DI 2/08  
 REV. 11/12/08RR MAA/GM  
 REV. 10/1/11 MAA/GM  
 REV. 12/17 MAA/THC



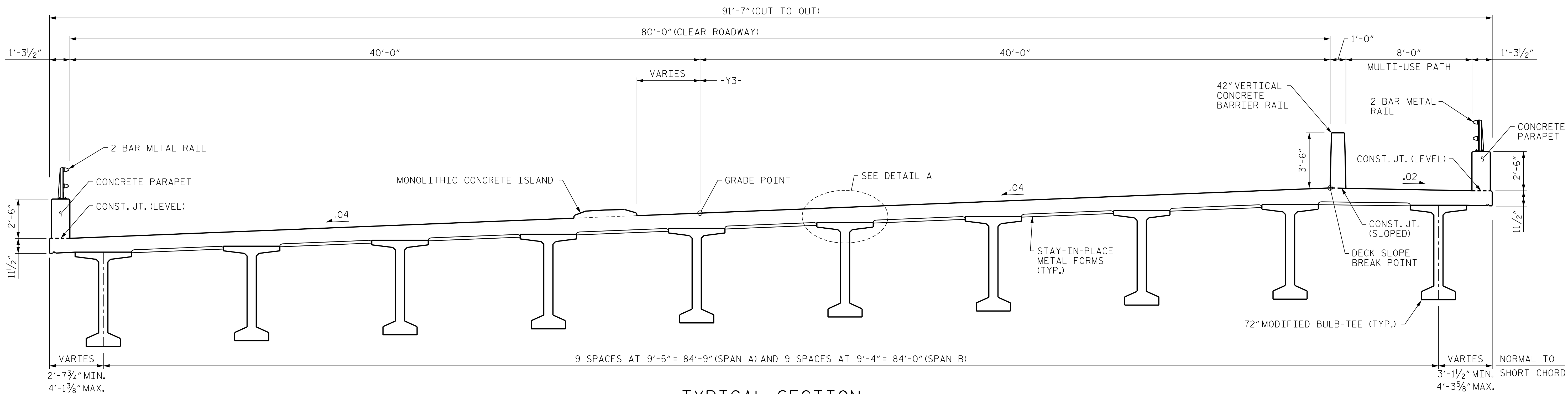
333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



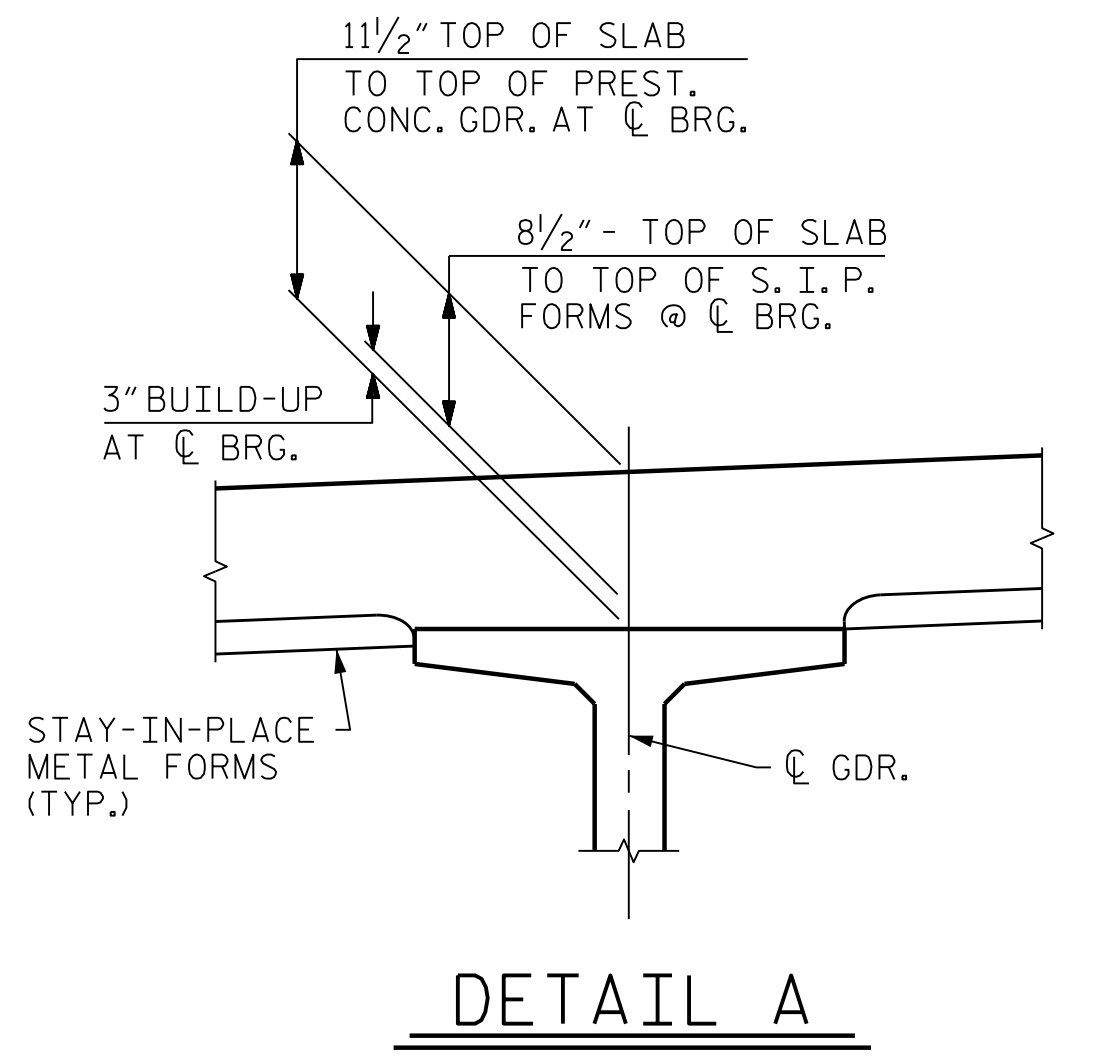
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 45           |
| 2         |     |       | 4   |     |       |              |



**TYPICAL SECTION**

DIMENSIONS ARE RADIAL UNLESS NOTED OTHERWISE.



**DETAIL A**

**NOTES:**

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

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

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

CONCRETE PARAPET RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

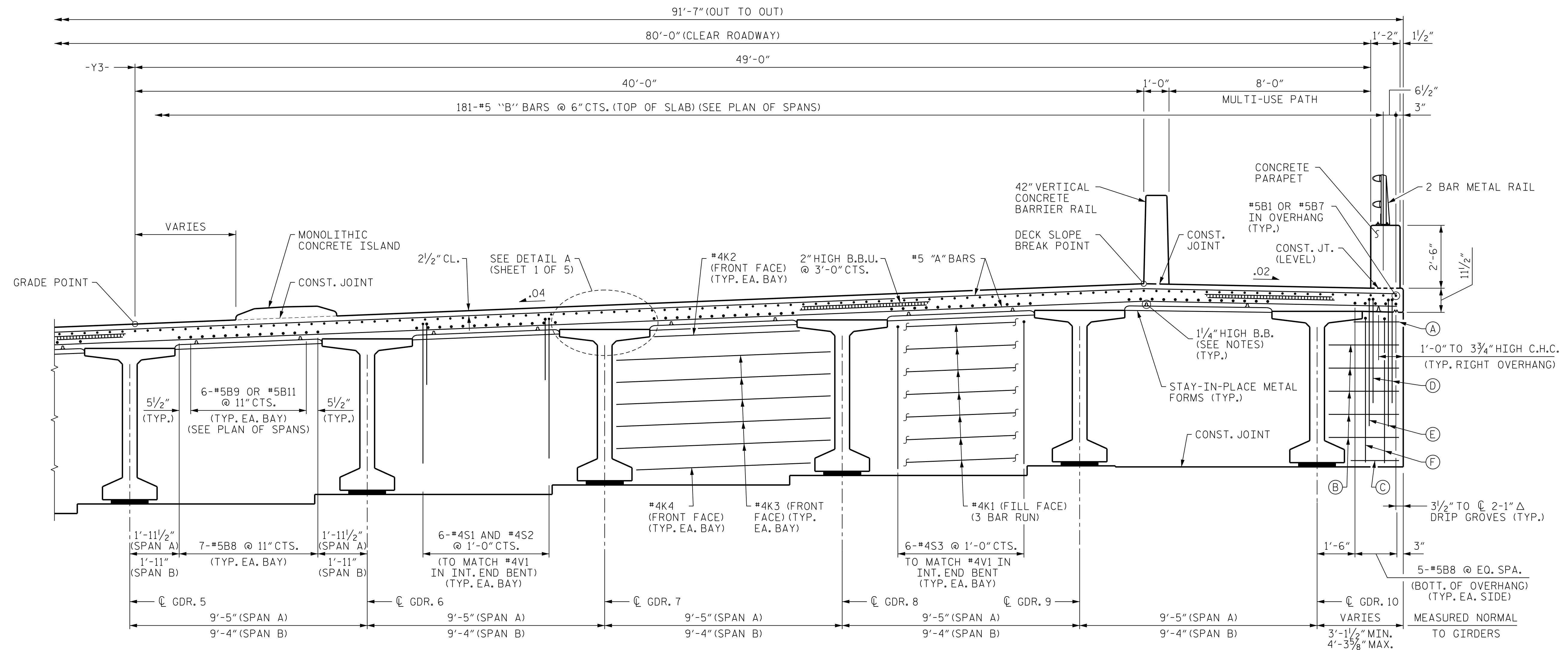
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|-----------|-----|-------|-----|-----|-------|--------------|
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| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 45           |

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 Experience great bridges.  
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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

DocuSigned by:  
*Jason R. Dougherty*  
 5F73FA2DEA974E8...

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DESIGNED BY: J. BORUTA DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: FEB 2019  
 CHECKED BY: B. LOFLIN DATE: JULY 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019



**TYPICAL HALF SECTION AT INTEGRAL END BENT**

ALL DIMENSIONS RADIAL UNLESS OTHERWISE NOTED.

- (A) #4K5 (END BENT 1, RT.), #4K8 (END BENT 1, LT.), #4K11 (END BENT 2, RT.), #4K14 (END BENT 2, LT.) (FRONT FACE)
- (B) #4K6 (END BENT 1, RT.), #4K9 (END BENT 1, LT.), #4K12 (END BENT 2, RT.), #4K15 (END BENT 2, LT.) (FRONT FACE)
- (C) #4K7 (END BENT 1, RT.), #4K10 (END BENT 1, LT.), #4K13 (END BENT 2, RT.), #4K16 (END BENT 2, LT.) (FRONT FACE)
- (D) #4S1 (TO MATCH #4V1 IN END BENT) (TYP. EA. SIDE) (SEE PLAN OF SPANS)
- (E) 2-#4S2 (RIGHT SIDE) OR 1-#4S2 (LEFT SIDE) (TO MATCH #4V1 IN END BENT) (SEE PLAN OF SPANS)
- (F) #4S3 (TO MATCH #4V1 IN END BENT) (TYP. EA. SIDE) (SEE PLAN OF SPANS)

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

PROFESSIONAL SEAL  
 032967  
 ENGINEER  
 JASON R. DOUGHTY  
 4/22/2020

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                 |
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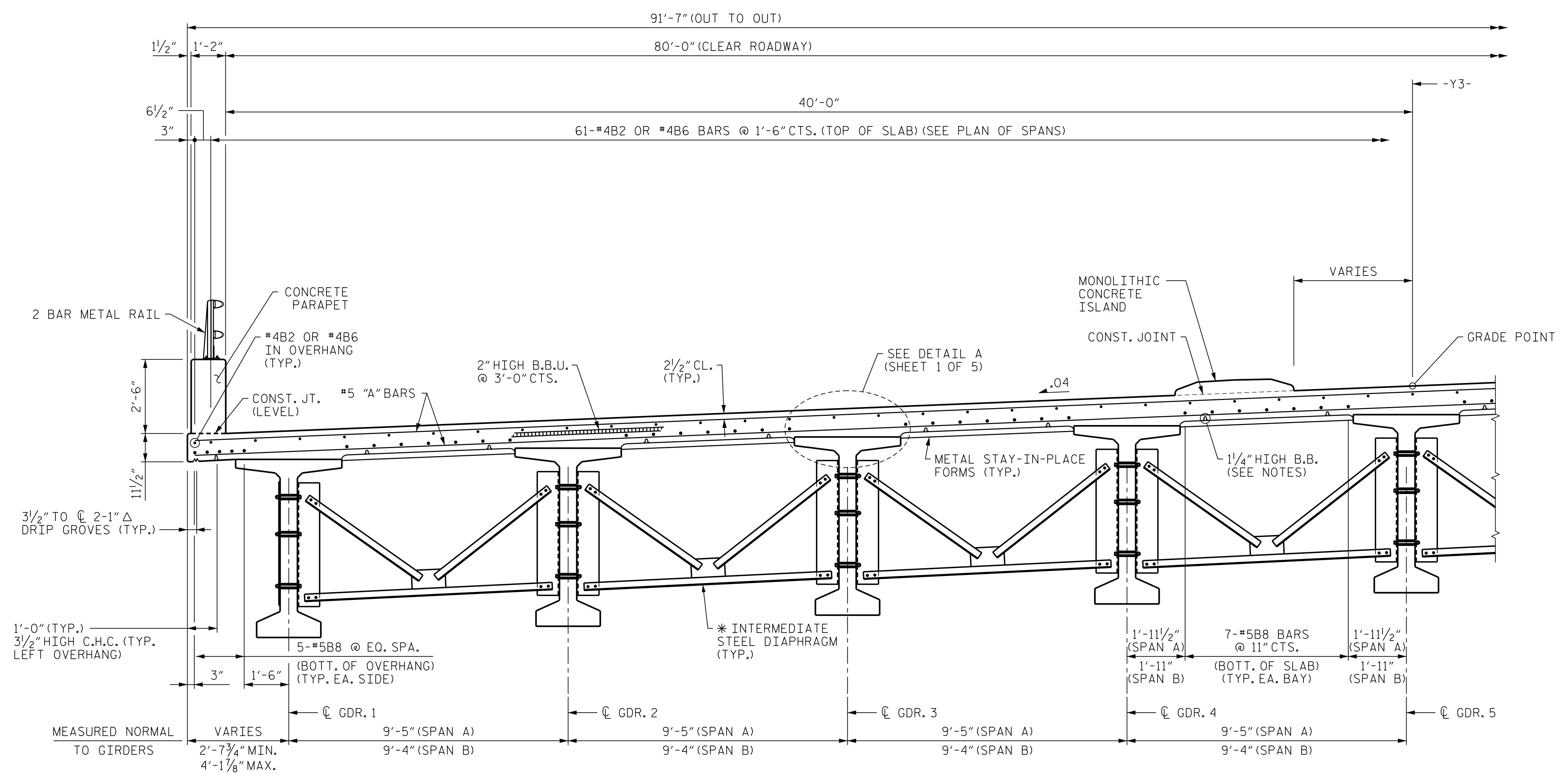
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STR. #4

DESIGNED BY: J. BORUTA DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: MAY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

4/22/2020  
 404\_013\_R2233BB\_SWL\_TS2\_800663.dgn



**TYPICAL HALF SECTION AT INTERMEDIATE STEEL DIAPHRAGMS**

\* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.  
 ALL DIMENSIONS RADIAL UNLESS OTHERWISE NOTED.

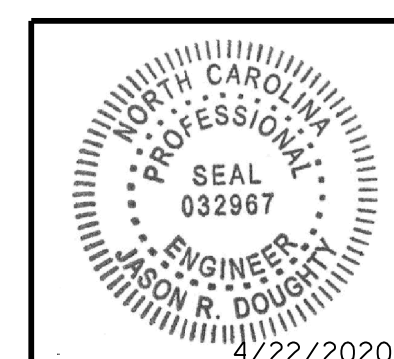
PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION



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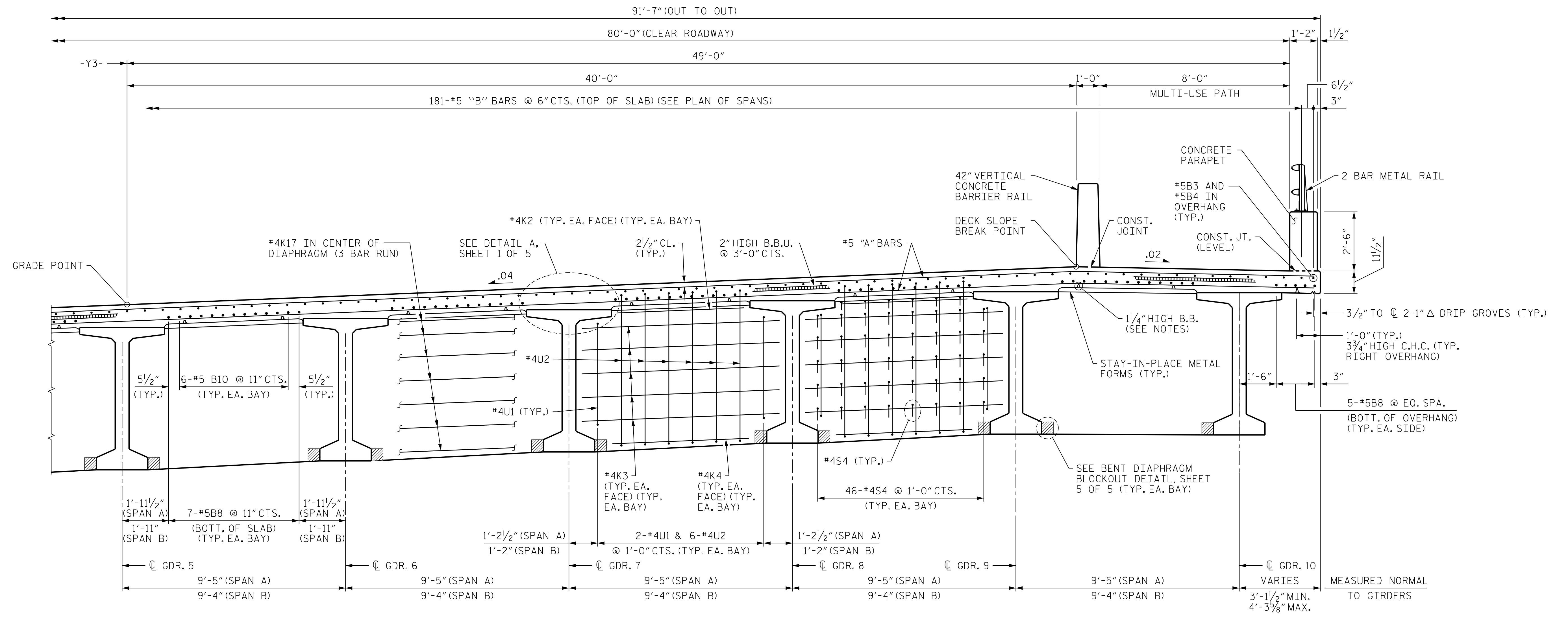
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STR. #4

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|                            |            |       |           |
|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | J. BORUTA  | DATE: | JUNE 2019 |
| DRAWN BY:                  | K. WHITE   | DATE: | MAY 2019  |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |



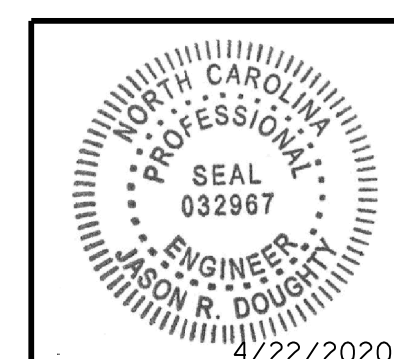
**TYPICAL HALF SECTION AT CONTINUOUS BENT DIAPHRAGM**  
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PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-  
 SHEET 4 OF 5

|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUPERSTRUCTURE<br>TYPICAL SECTION                                  |     |       |     |     |                    |
| REVISIONS  |     |       |     |     | SHEET NO.          |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
|  |     |       |     |     | TOTAL SHEETS<br>45 |



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



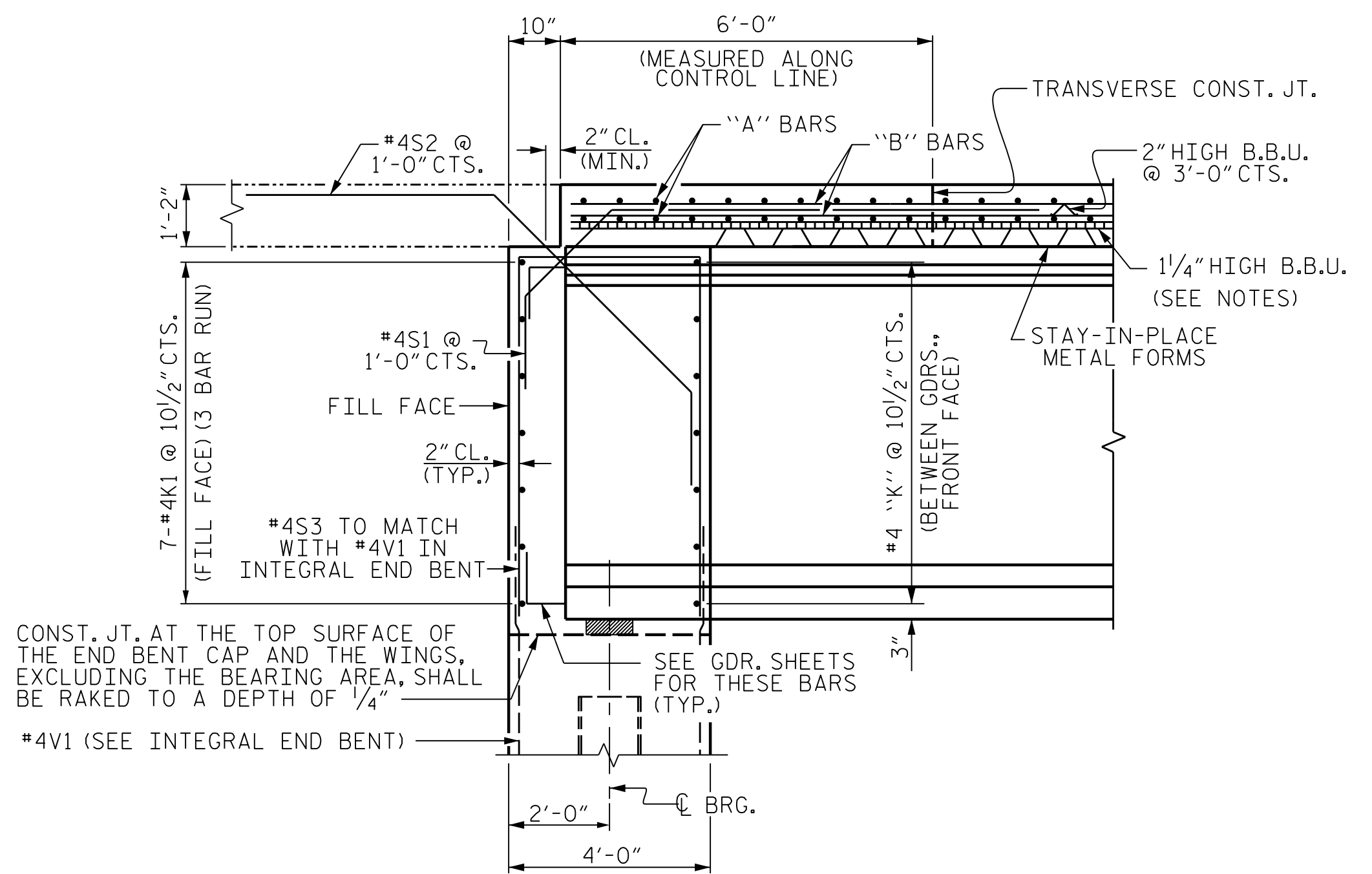
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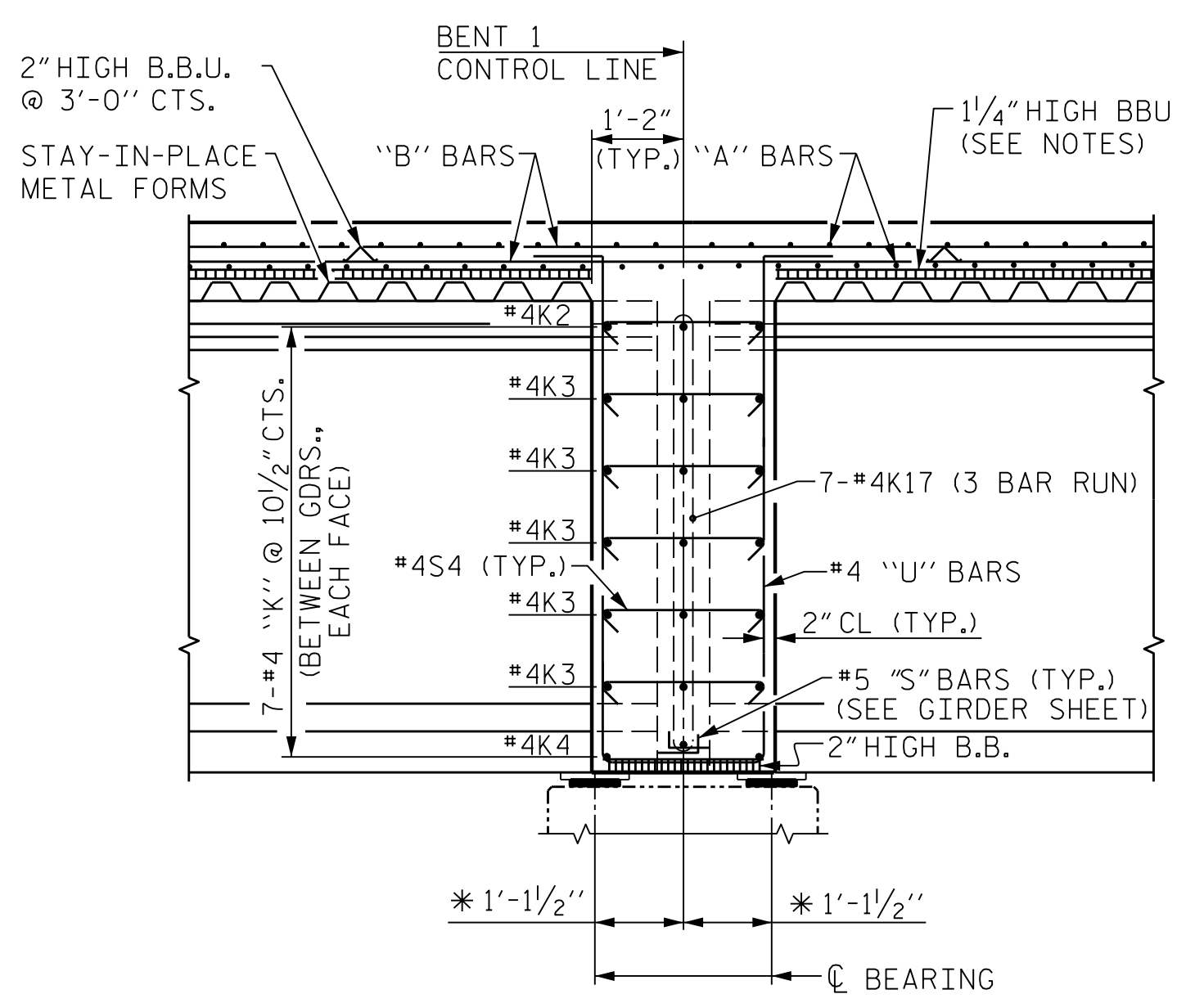
STR. #4

4/22/2020  
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| DRAWN BY:                  | K. WHITE   | DATE: | MAY 2019  |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

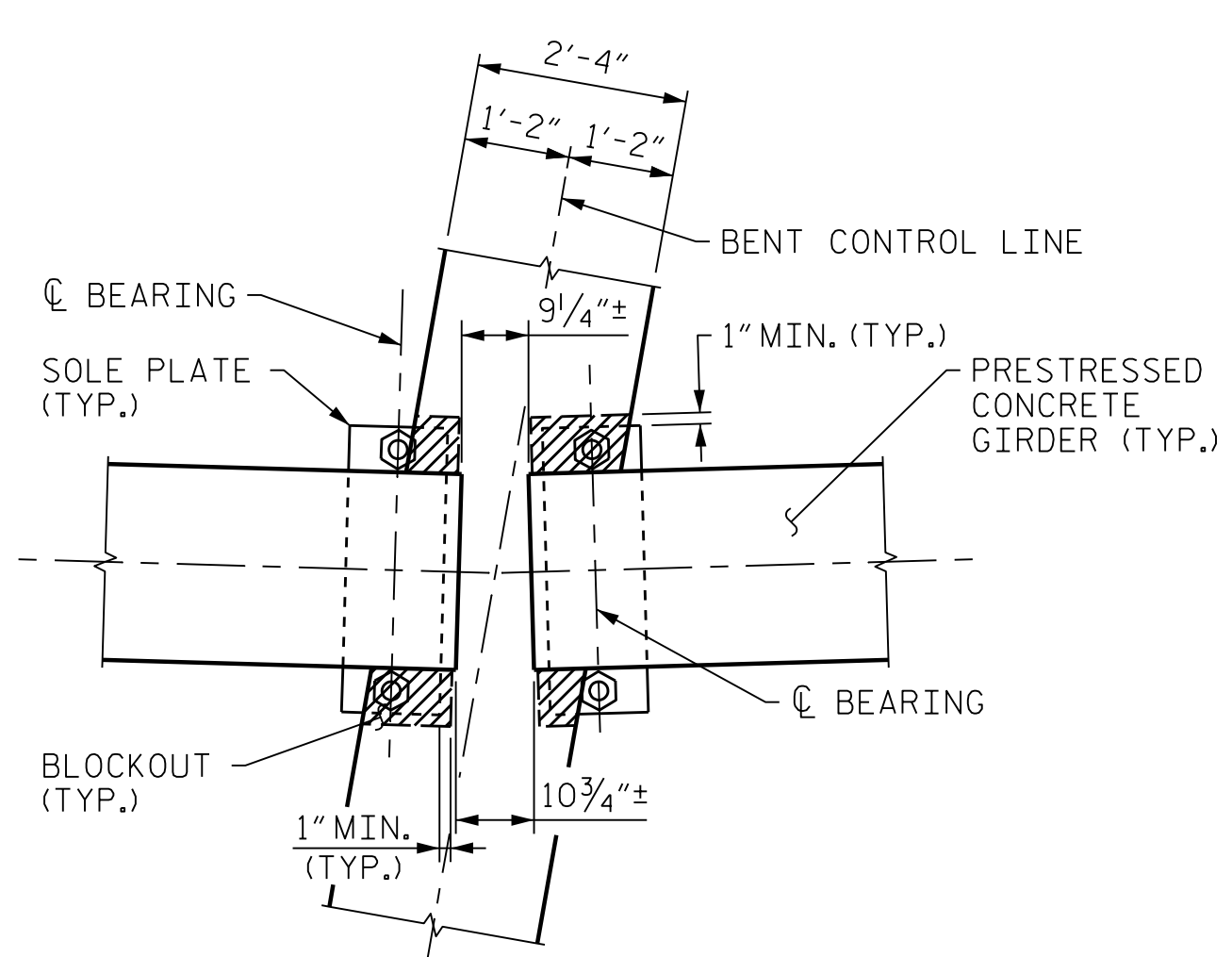


SECTION THRU INTEGRAL END BENT

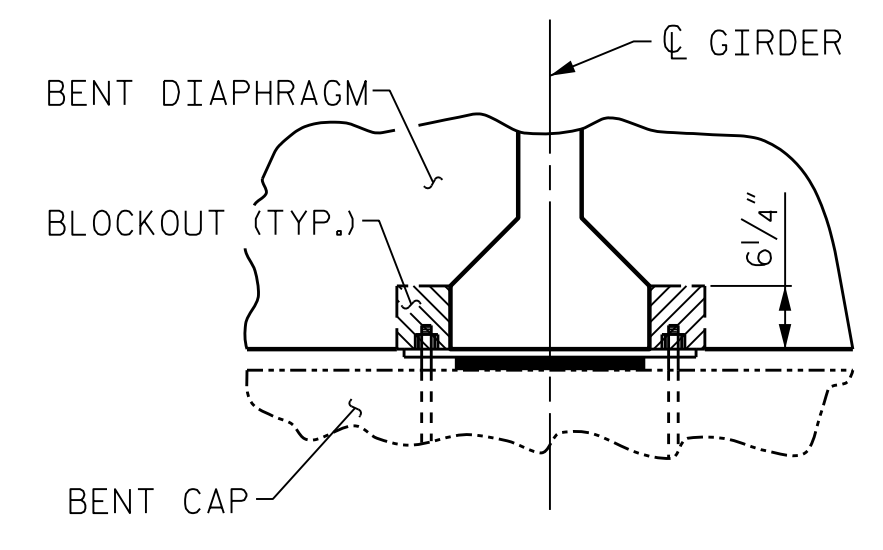


SECTION THRU BENT DIAPHRAGM

\* MEASURED ALONG CL GIRDER



PLAN



SECTION

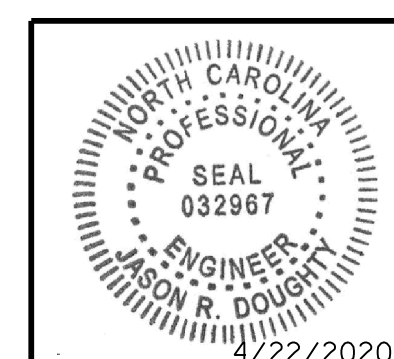
PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 DETAILS



333 FAYETTEVILLE STREET, SUITE 500  
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 NC LICENSE NO. C-2979



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 Jason R. Doughty  
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| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 45           |
| 2         |     |       | 4   |     |       |              |

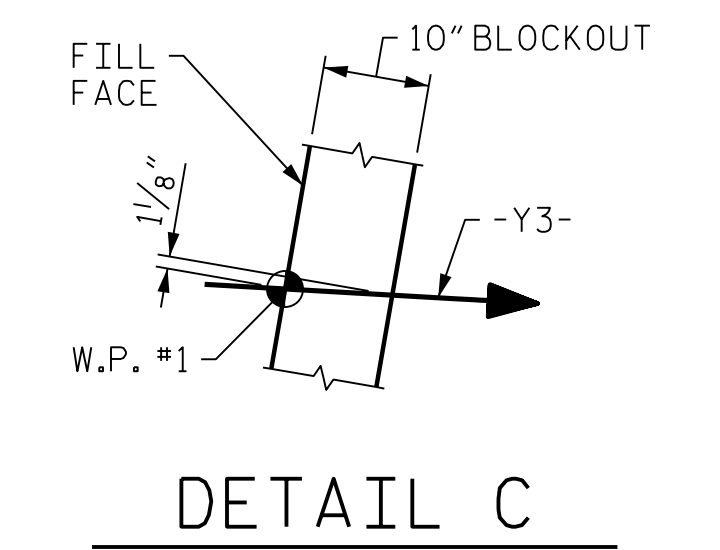
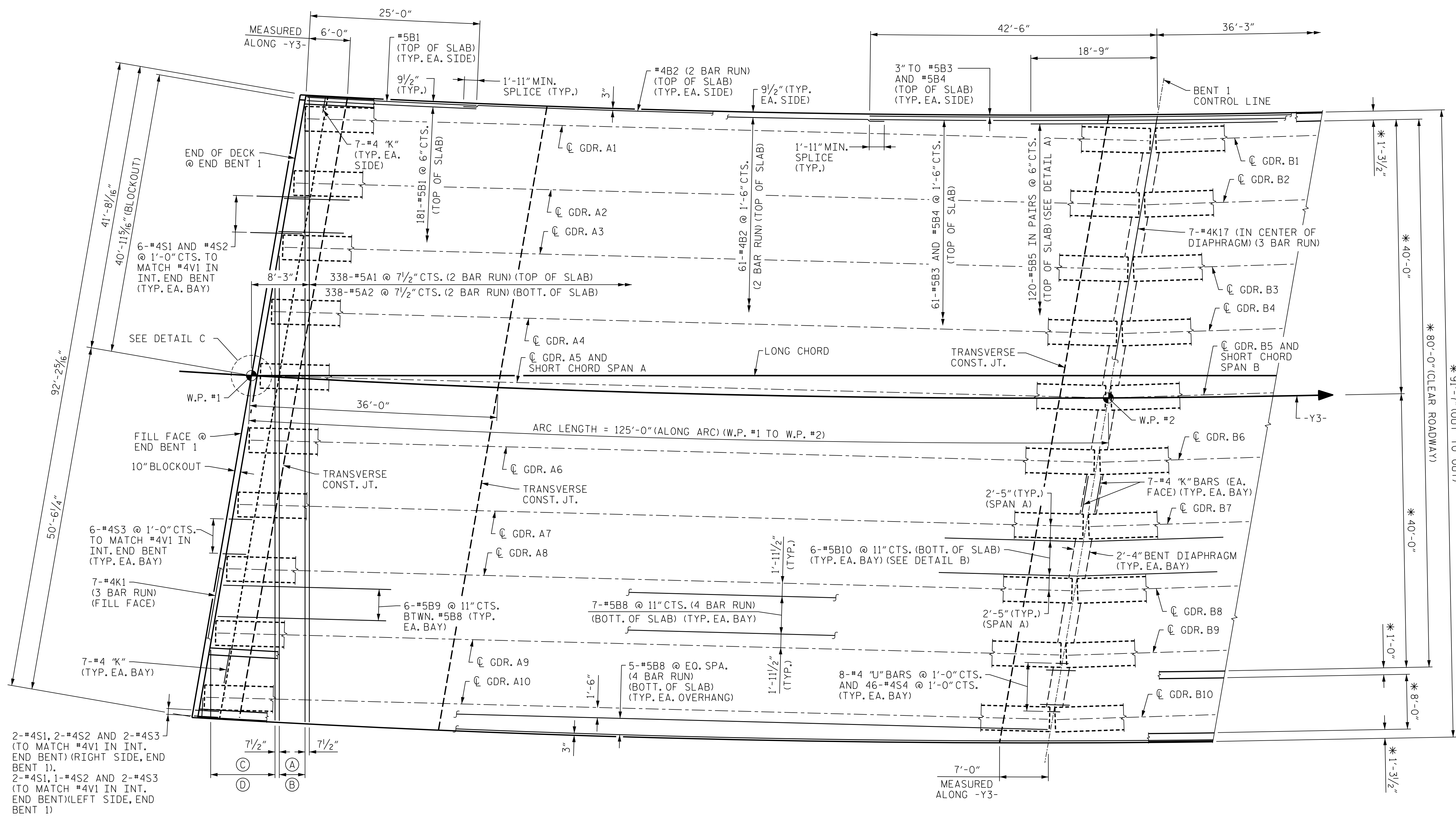
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STR. #4

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|                            |            |       |           |
|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | J. BORUTA  | DATE: | JULY 2019 |
| DRAWN BY:                  | K. WHITE   | DATE: | MAY 2019  |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

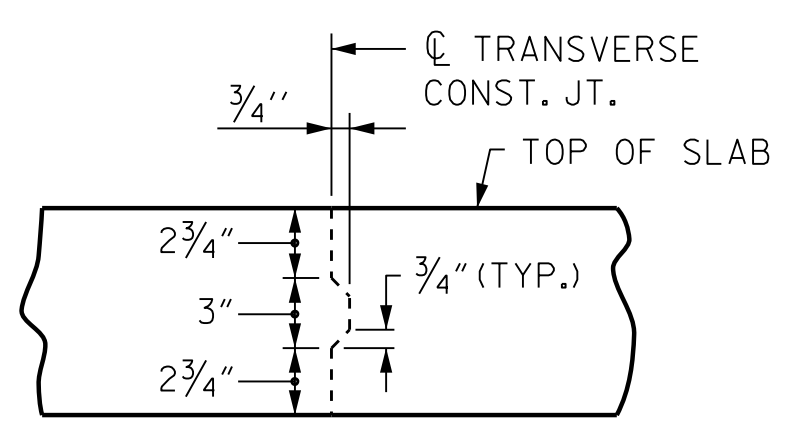
**NOTES:**  
 FOR LAP LENGTHS NOT SHOWN, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET.  
 STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.



\* RADIAL DIMENSIONS

**PLAN OF SPAN A**

"A" BARS TO BE PLACED PERPENDICULAR TO AND ALONG LONG CHORD



**TRANSVERSE CONSTRUCTION JOINT**

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

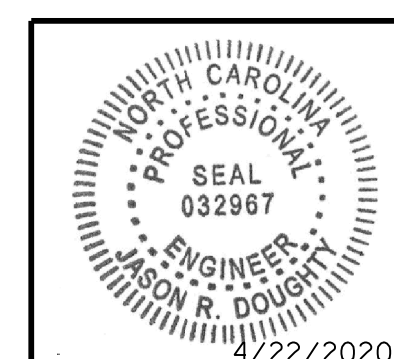
- (A) #5A101 THRU #5A103 @ 7 1/2" CTS. (3 BARS PER MARK) (TOP OF SLAB) (2 BAR RUN)
- (B) #5A201 THRU #5A203 @ 7 1/2" CTS. (3 BARS PER MARK) (BOTT. OF SLAB) (2 BAR RUN)
- (C) #5A104 THRU #5A118 @ 7 1/2" CTS. (TOP OF SLAB)
- (D) #5A204 THRU #5A218 @ 7 1/2" CTS. (BOTT. OF SLAB)

DESIGNED BY: J. BORUTA DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: MAY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



DocuSigned by:  
 Jason R Doughty  
 SF73FA2DEA974E8...

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

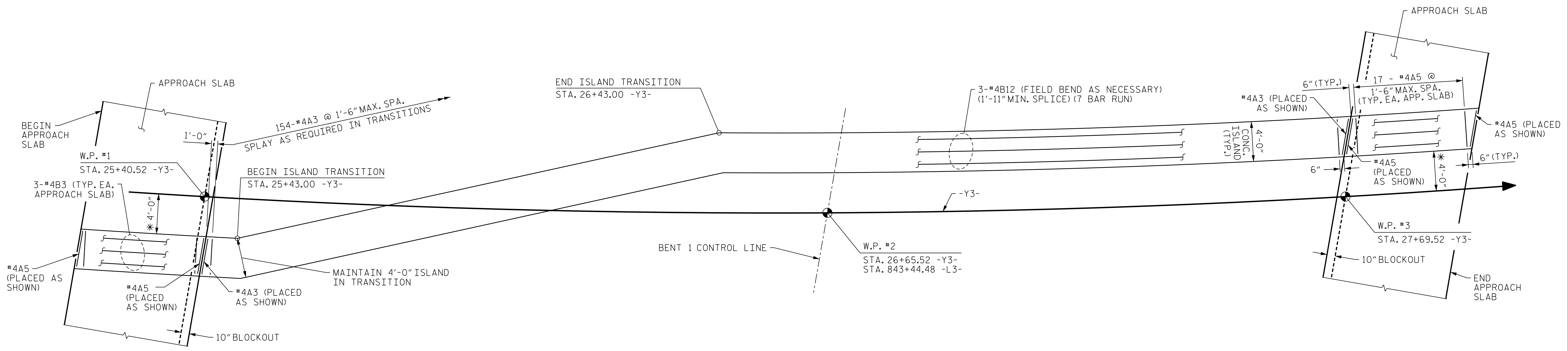
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**PLAN OF SPAN A**

| REVISIONS |     |       |     |     |       | SHEET NO.       |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S4-11           |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 45 |
| 2         |     |       | 4   |     |       |                 |







### PLAN OF MONOLITHIC CONCRETE ISLAND

\* RADIAL DIMENSIONS

#### NOTES:

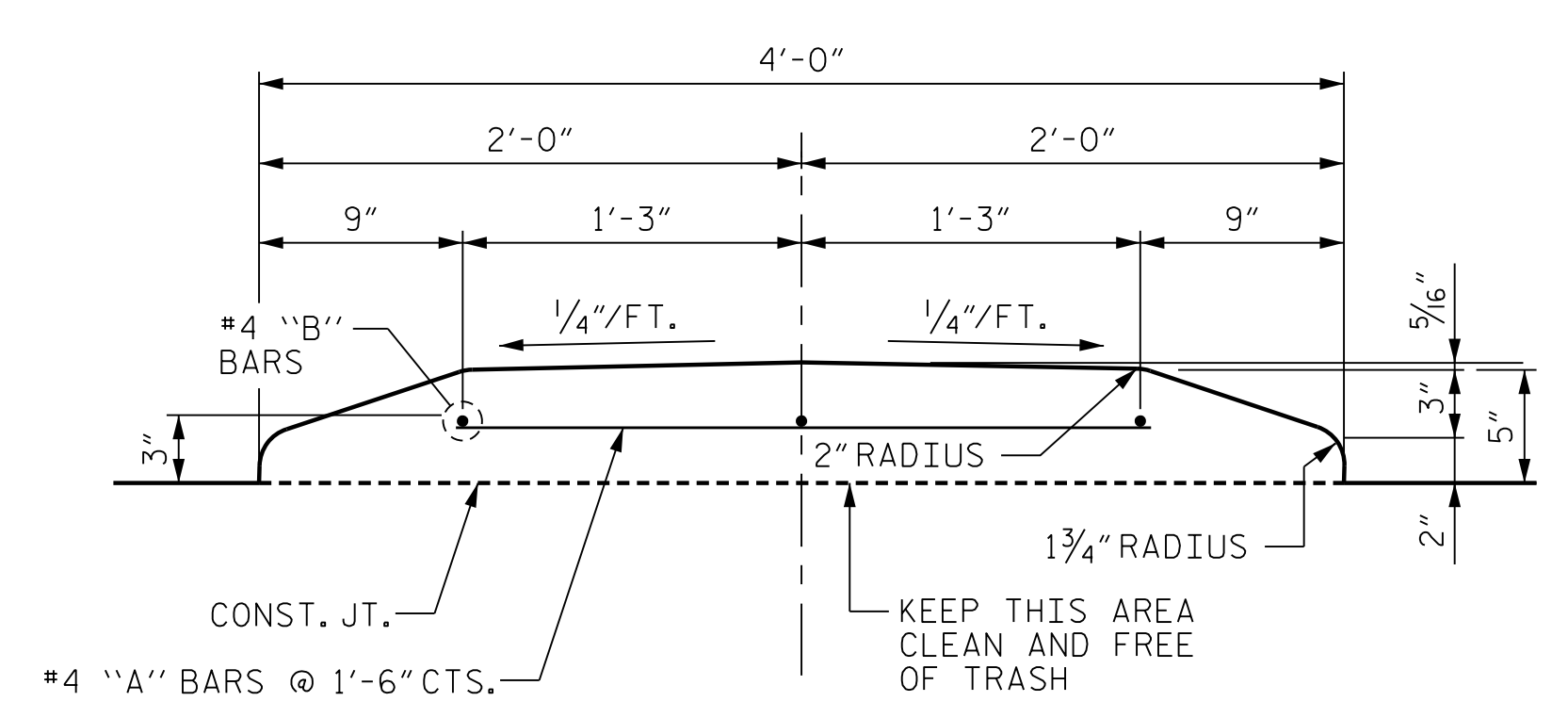
THE CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONCRETE ISLAND ON THE BRIDGE DECK IS INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL AND PAYMENT IS INCLUDED IN THE SQUARE FOOT PRICE BID FOR "REINFORCED CONCRETE DECK SLAB".

THE CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONCRETE ISLAND ON THE APPROACH SLABS IS INCLUDED IN THE APPROACH SLAB BILL OF MATERIAL AND PAYMENT IS INCLUDED IN PRICE BID FOR BRIDGE APPROACH SLABS AT STA. 26+65.52 -Y3-.

CONCRETE ISLAND IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

ALL REINFORCING STEEL IN CONCRETE ISLAND SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE ISLAND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS 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 FT. IN LENGTH.



### SECTION THRU MONOLITHIC CONCRETE ISLAND

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

4/22/2020 404\_024\_R2233BB\_SML\_MID\_800663.dgn

|                            |            |       |           |
|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | J. BORUTA  | DATE: | JULY 2019 |
| DRAWN BY:                  | K. WHITE   | DATE: | JULY 2019 |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

**MODJESKI and MASTERS**  
 Experience great bridges.  
 333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

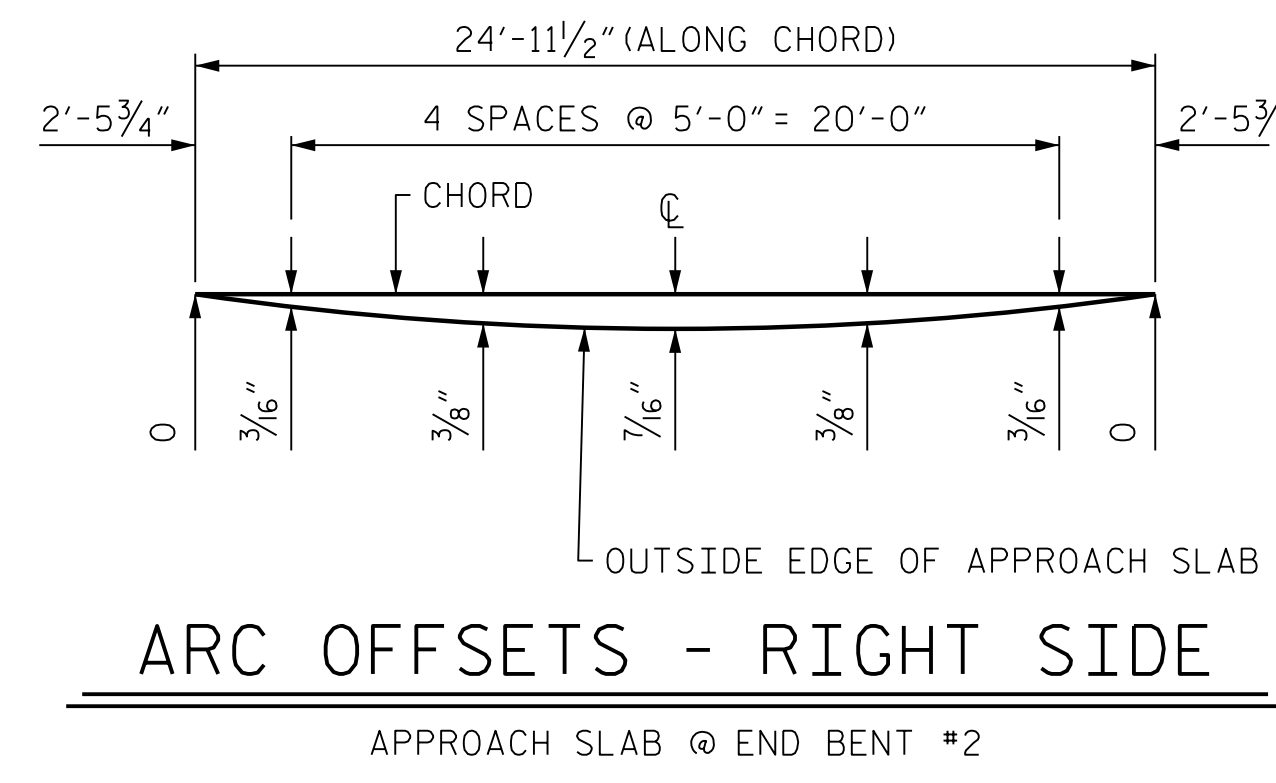
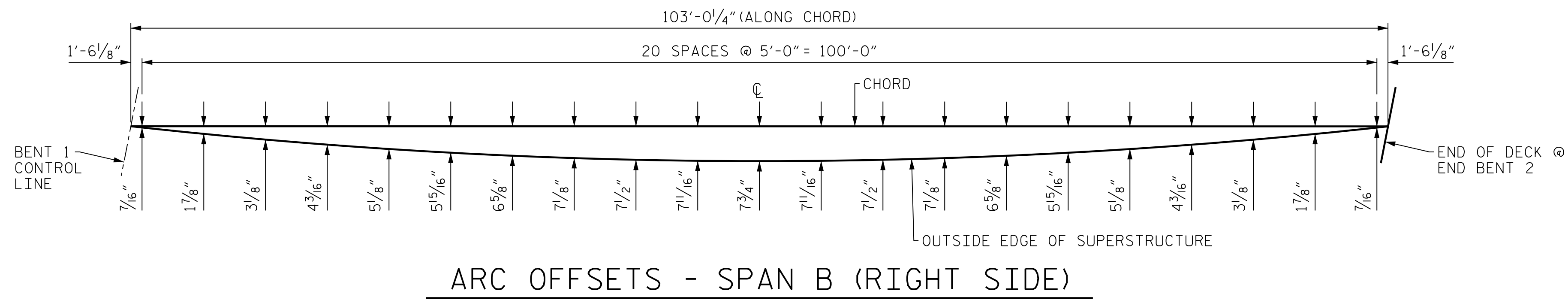
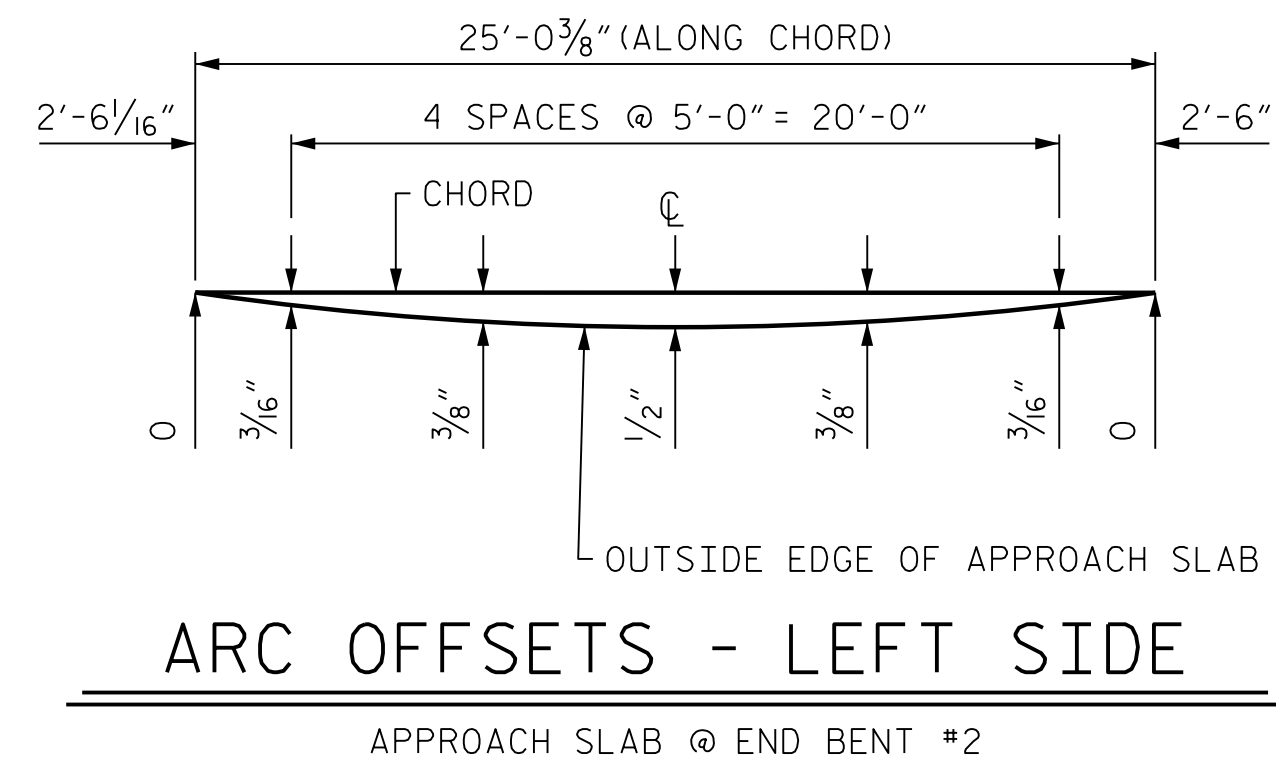
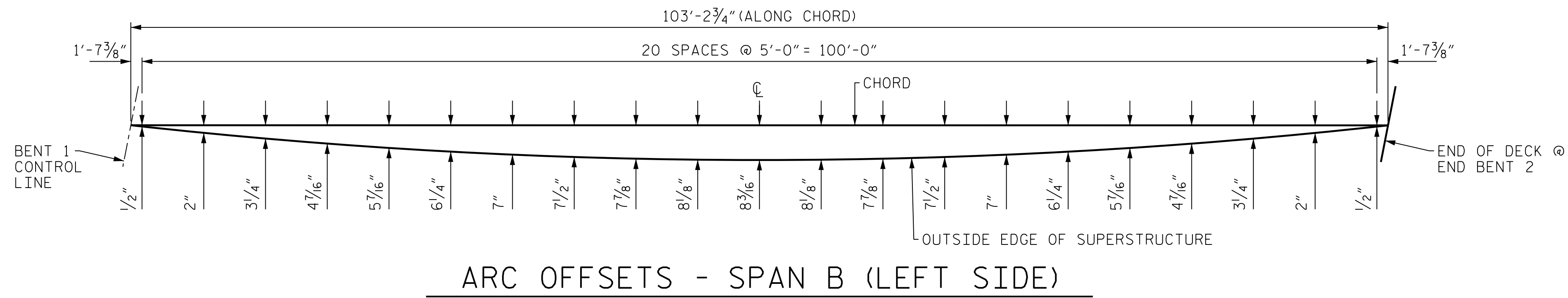
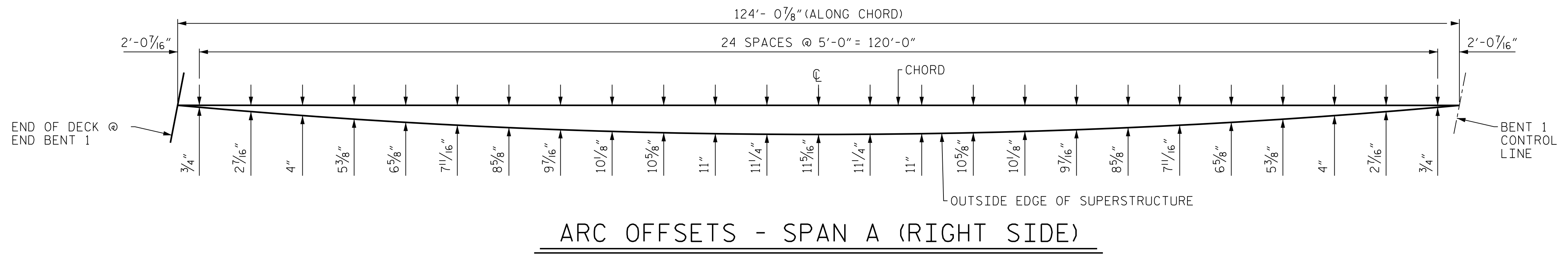
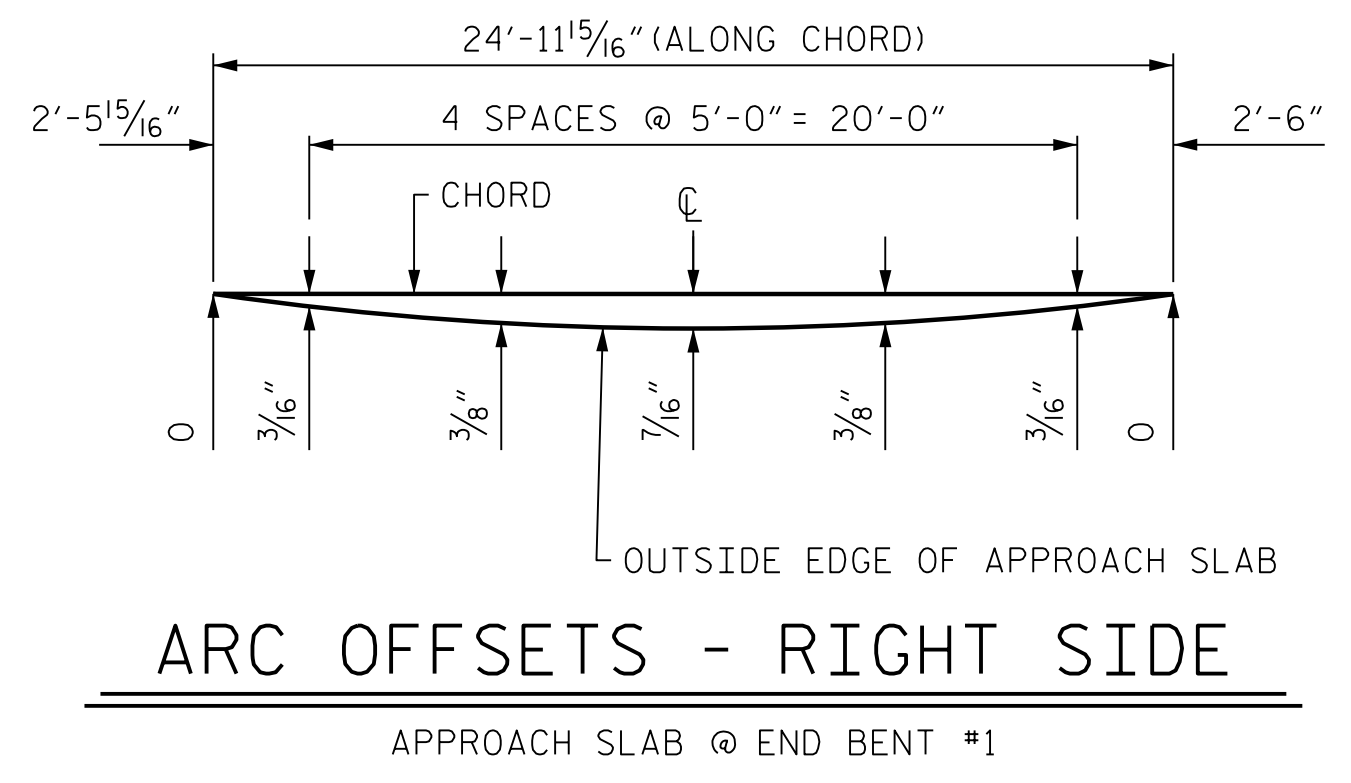
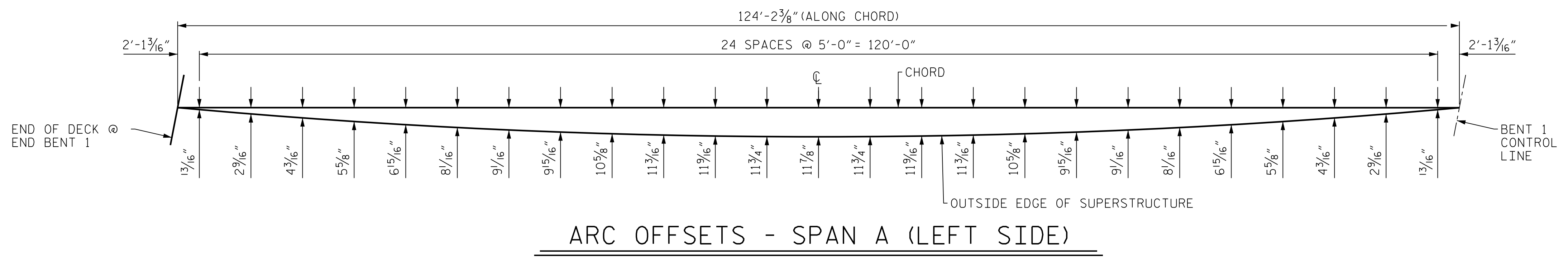
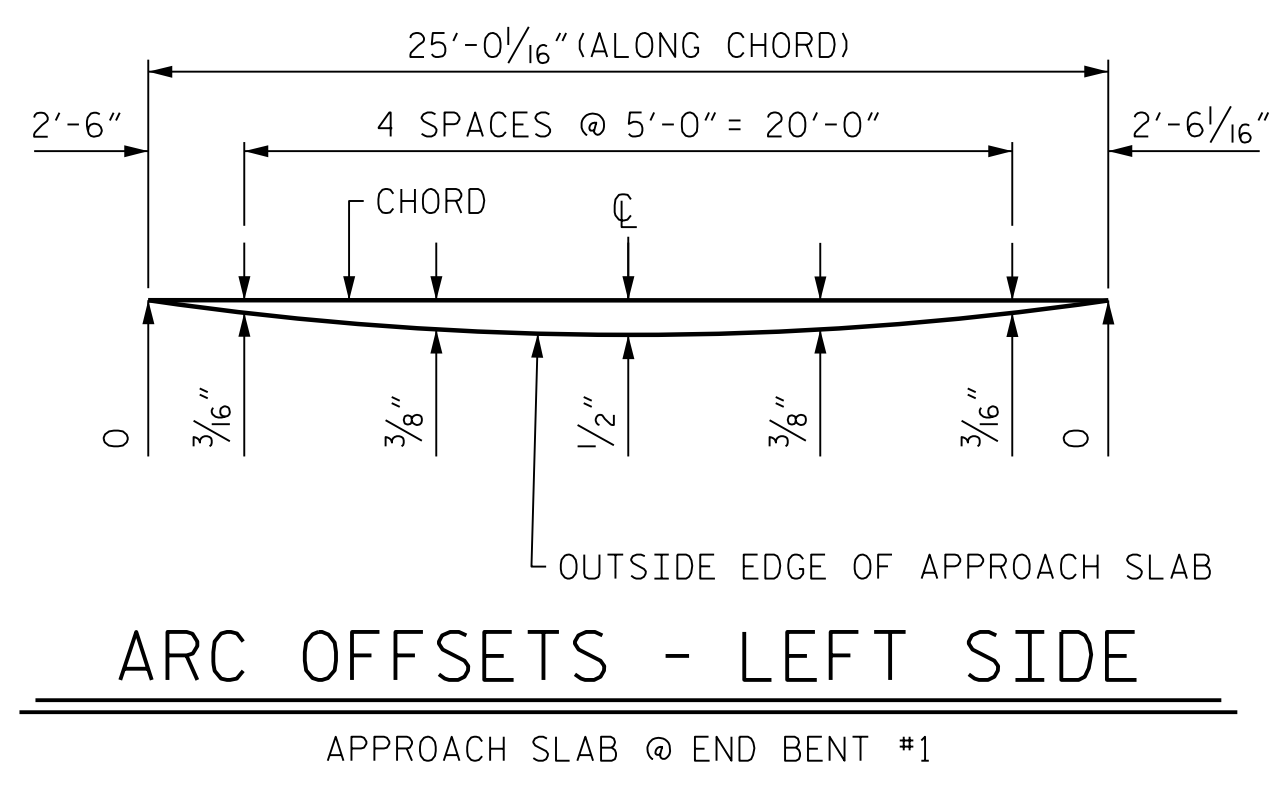
DocuSigned by:  
**Jason R. Doughty**  
 5F73FA2DEA874E8...

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**MONOLITHIC CONCRETE ISLAND**

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 45           |
| 2         |     |       | 4   |     |       |              |

STR. #4

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

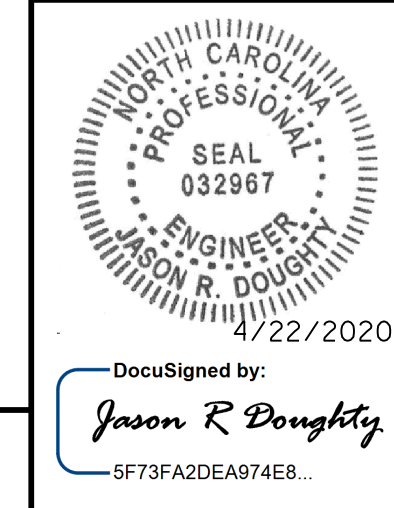


PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| <b>ARC OFFSETS</b>   |     |       |     |     |                    |
| REVISIONS  |     |       |     |     | SHEET NO.          |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
|  |     |       |     |     | TOTAL SHEETS<br>45 |



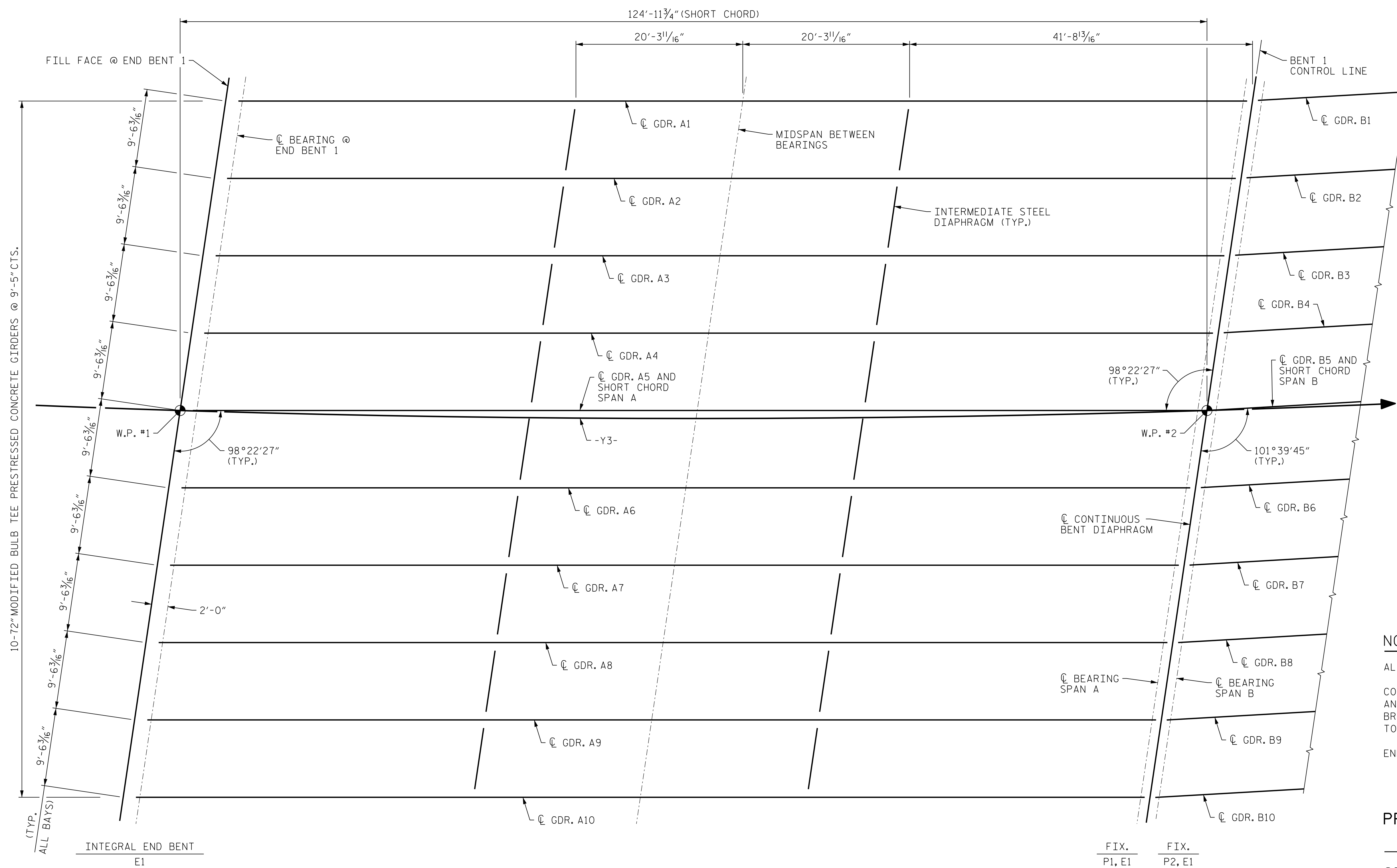
333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

DESIGNED BY: J. BORUTA DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: JULY 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

4/22/2020 404\_025\_R2233BB\_SML\_ARC\_R00663.dgn



### FRAMING PLAN - SPAN A

**NOTES:**

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

END BENTS AND BENT ARE PARALLEL.

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

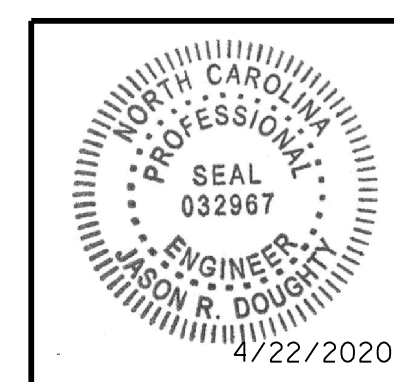
**FRAMING PLAN  
 SPAN A**

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 45           |
| 2         |     |       | 4   |     |       |              |

SHEET NO. S4-15



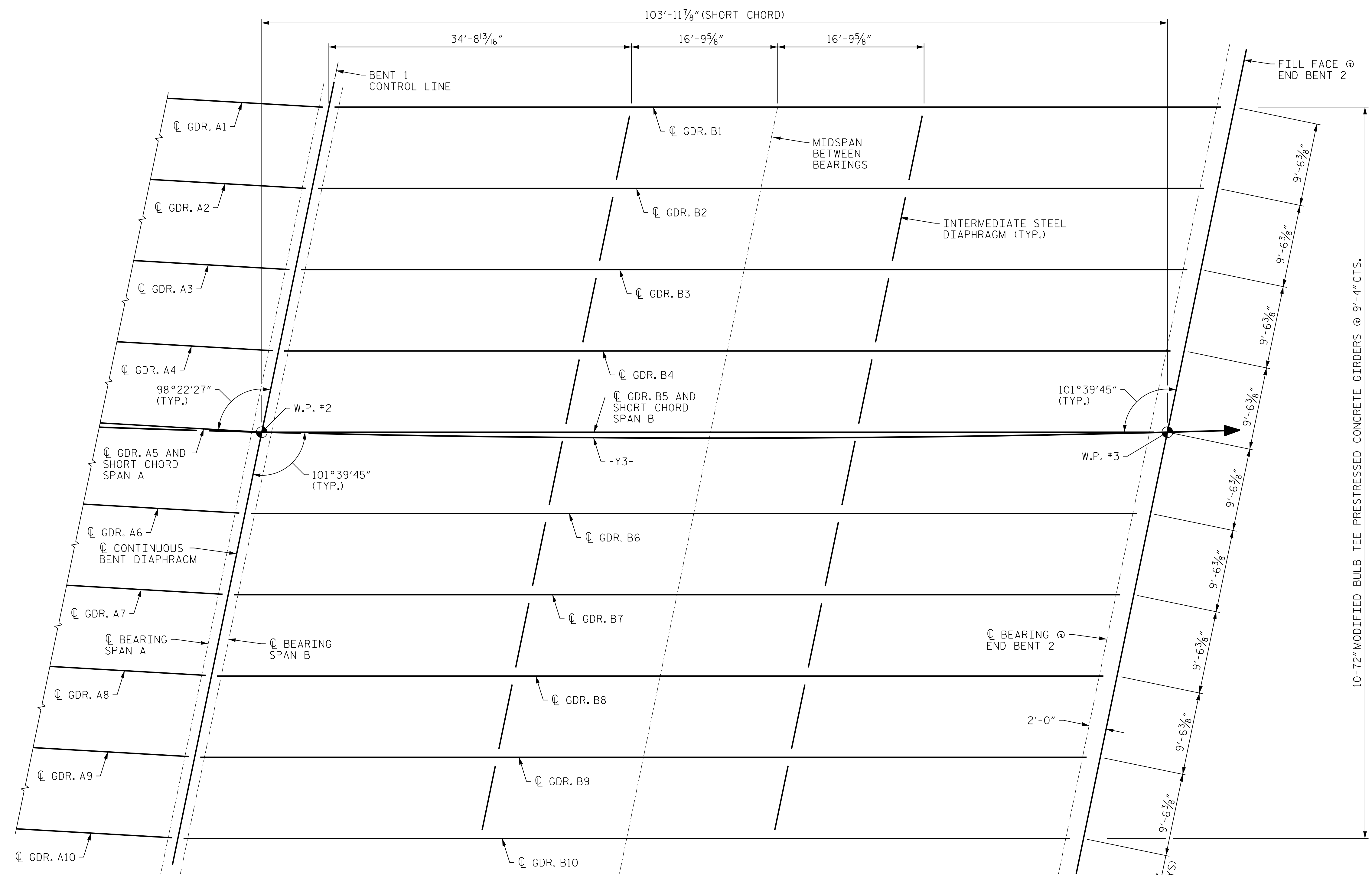
333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



DocuSigned by:  
 Jason R. Doughty  
 SF73FA2DEA974E8...

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

DESIGNED BY: J. BORUTA DATE: JUNE 2019  
 DRAWN BY: K. WHITE DATE: MAY 2019  
 CHECKED BY: B. LOFLIN DATE: JULY 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019



FIX. P1, E1      FIX. P2, E1

**FRAMING PLAN - SPAN B**

**NOTES:**  
 ALL DIMENSIONS ARE HORIZONTAL.  
 CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.  
 END BENTS AND BENT ARE PARALLEL.

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 2 OF 2

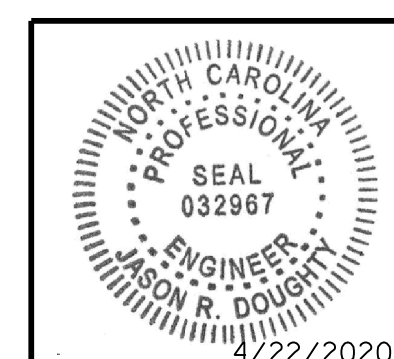
4/22/2020 404\_029\_R2233BB\_SML\_FPB\_800663.dgn

DESIGNED BY: J. BORUTA      DATE: JUNE 2019  
 DRAWN BY: K. WHITE      DATE: MAY 2019  
 CHECKED BY: B. LOFLIN      DATE: JULY 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY      DATE: NOV 2019



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

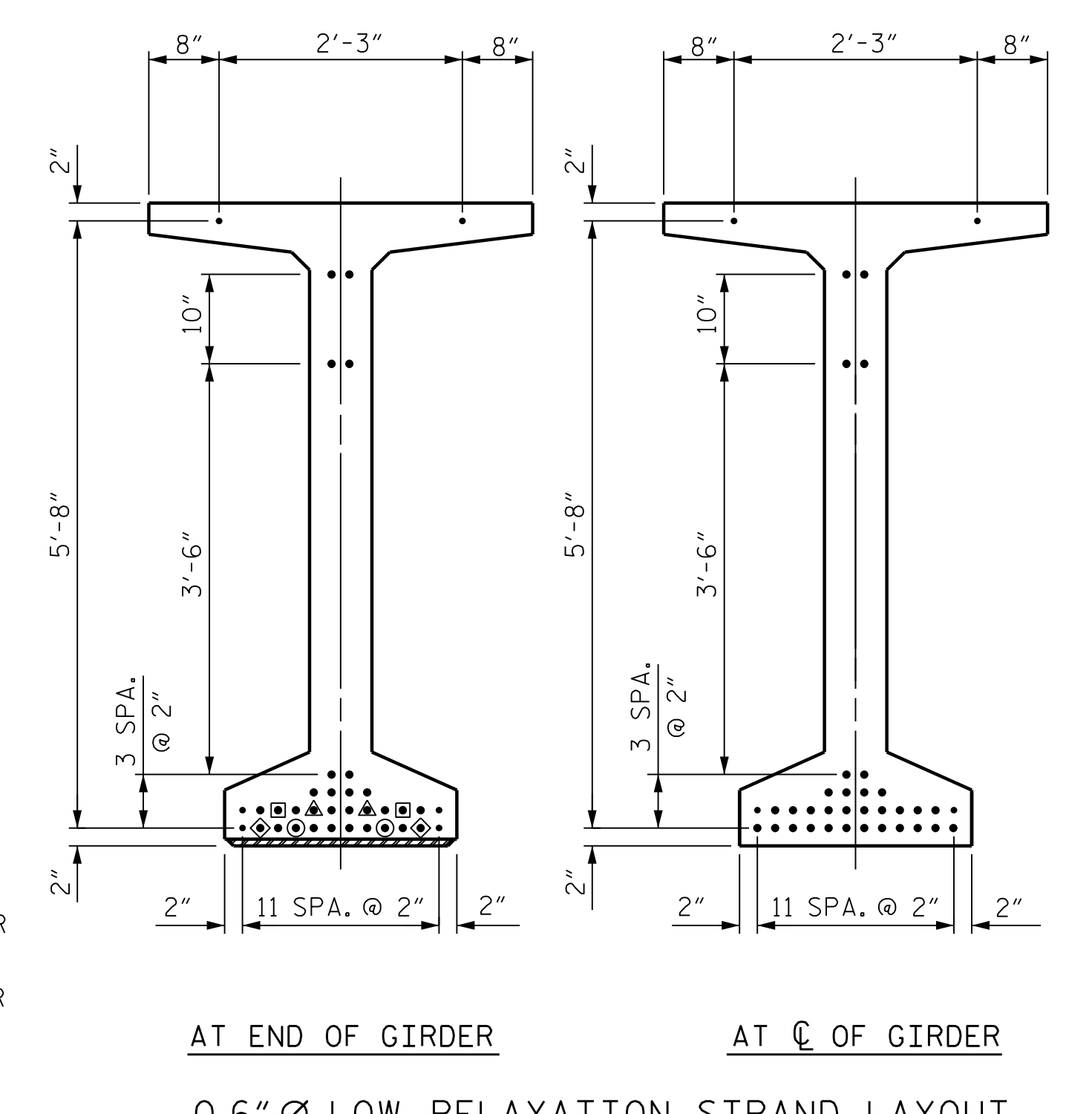
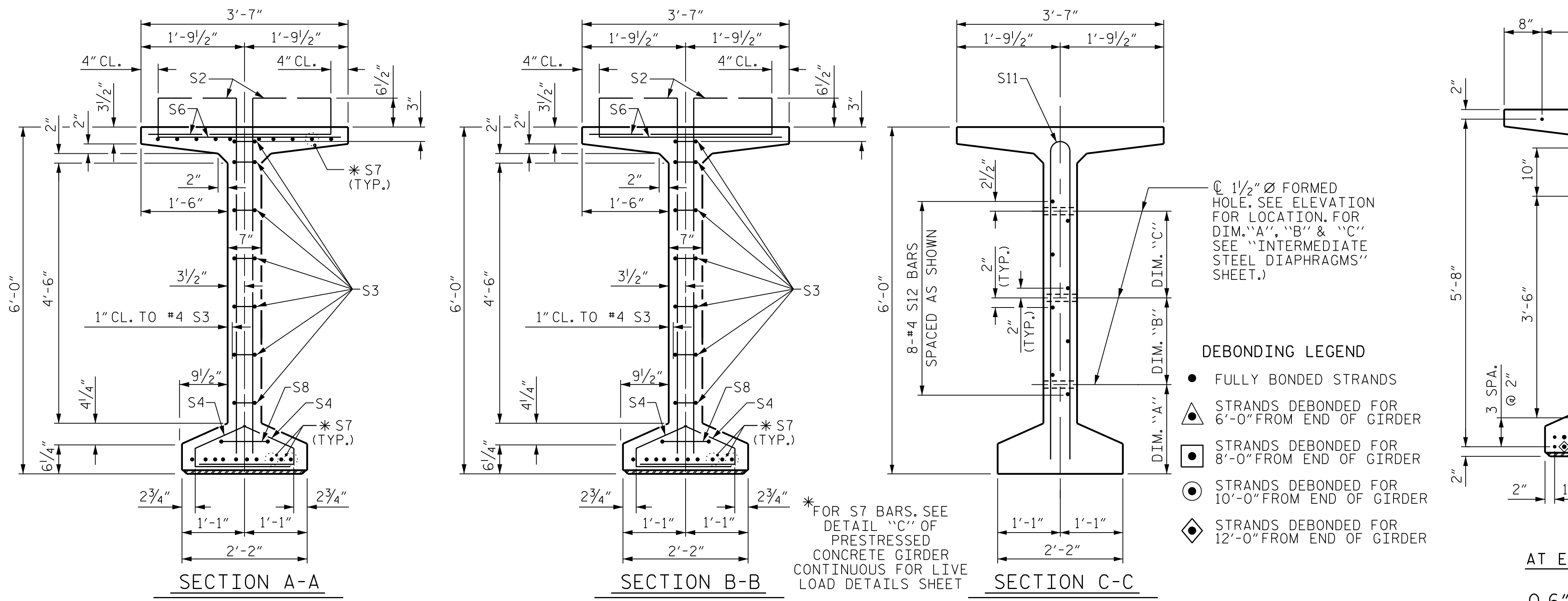


DocuSigned by:  
 Jason R. Doughty  
 5F73FA2DEA974E8...

|  |     |       |     |     |           |
|--|-----|-------|-----|-----|-----------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |           |
| FRAMING PLAN<br>SPAN B   |     |       |     |     |           |
| REVISIONS  |     |       |     |     | SHEET NO. |
| NO.  | BY: | DATE: | NO. | BY: | DATE:     |
| 1  |     |       | 3   |     |           |
| 2  |     |       | 4   |     |           |
| TOTAL SHEETS   |     |       |     |     | 45        |

STR. #4

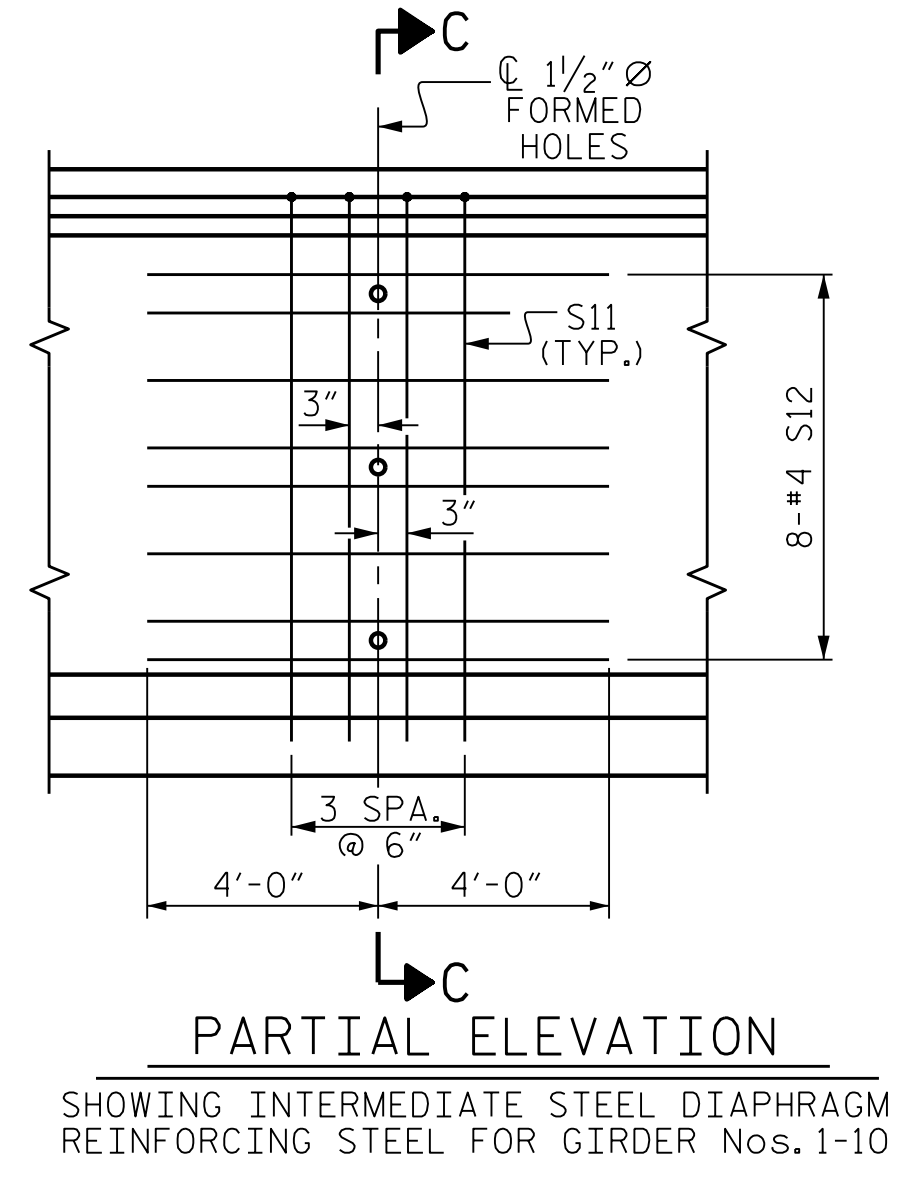
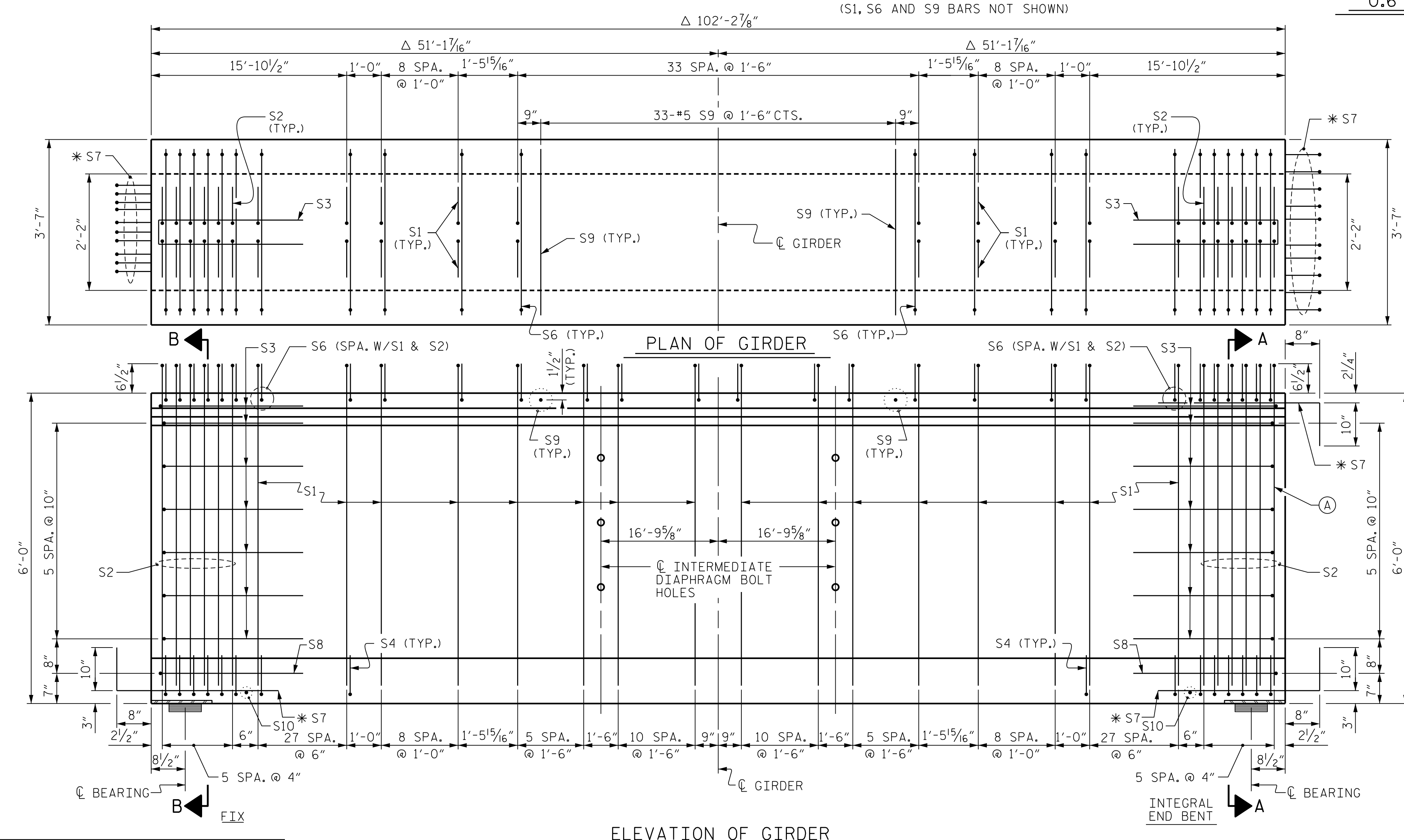
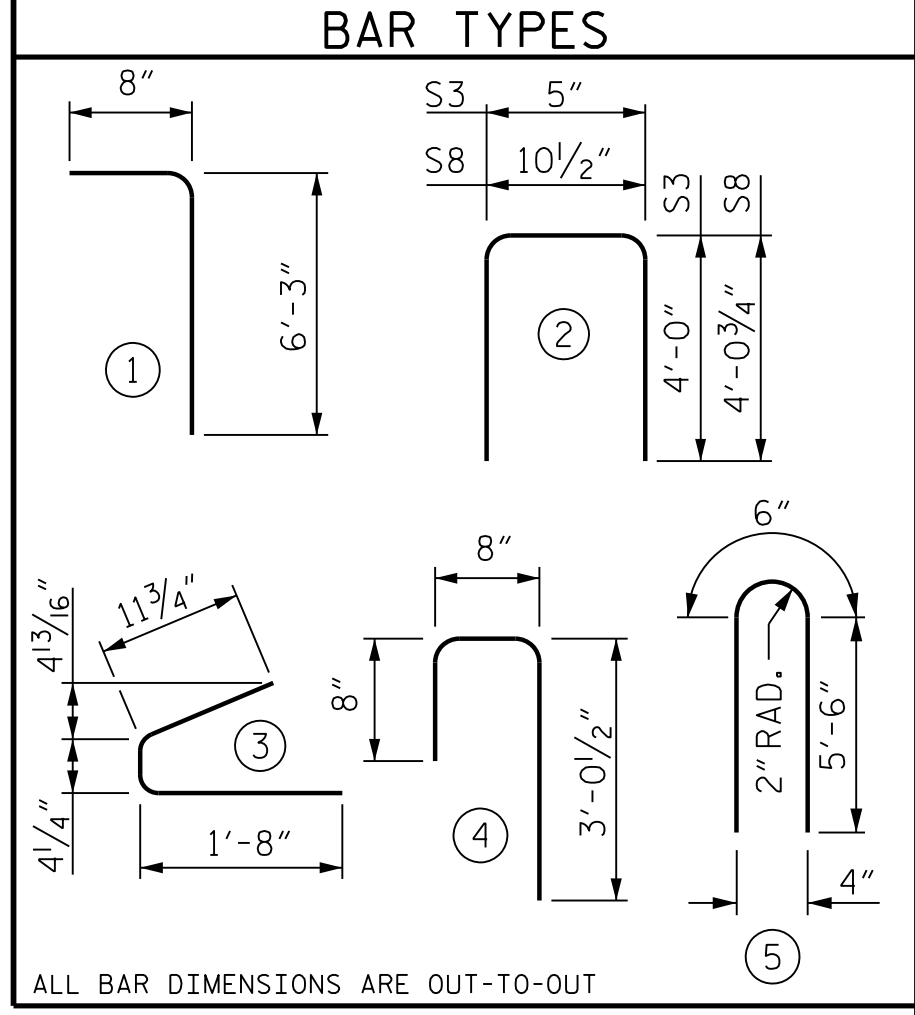




| 0.6" Ø L. R. GRADE 270 STRANDS |                                     |                                     |
|--------------------------------|-------------------------------------|-------------------------------------|
| AREA (SQUARE INCHES)           | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED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

| REINFORCING STEEL FOR ONE GDR |        |      |      |               |
|-------------------------------|--------|------|------|---------------|
| BAR                           | NUMBER | SIZE | TYPE | LENGTH/WEIGHT |
| S1                            | 216    | #4   | 1    | 6'-11" 998    |
| S2                            | 24     | #5   | 1    | 6'-11" 173    |
| S3                            | 14     | #4   | 2    | 8'-5" 79      |
| S4                            | 136    | #4   | 3    | 3'-0" 273     |
| S6                            | 240    | #5   | 4    | 4'-5" 1106    |
| * S7                          | 30     | #5   | STR  | 3'-8" 115     |
| S8                            | 2      | #5   | 2    | 9'-0" 19      |
| S9                            | 33     | #5   | STR  | 3'-3" 112     |
| S10                           | 2      | #3   | STR  | 1'-10" 1      |
| S11                           | 8      | #5   | 5    | 11'-6" 96     |
| S12                           | 16     | #4   | STR  | 8'-0" 86      |

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



Δ MEASURED AND SPACED ALONG GIRDER BOTTOM FLANGE. SEE END BEVEL (ELEVATION VIEW) DETAIL ON PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

Ⓐ END BEVEL IS REQUIRED. ROTATE END S2 BAR SUCH THAT IT IS PLACED PARALLEL TO END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER.

| QUANTITIES FOR ONE GIRDER |                   |                   |                     |
|---------------------------|-------------------|-------------------|---------------------|
| GIRDER                    | REINFORCING STEEL | 8000 PSI CONCRETE | 0.6" Ø L.R. STRANDS |
|                           | LB.               | C.Y.              | No.                 |
| GIRDER                    | 3,058             | 21.9              | 36                  |

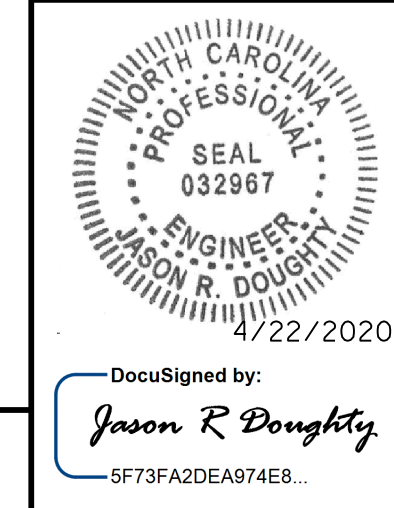
| GIRDERS REQUIRED |         |              |
|------------------|---------|--------------|
| NUMBER           | LENGTH  | TOTAL LENGTH |
| 10               | 102.24' | 1022.40'     |

PROJECT NO. R-2233BB  
 RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

DESIGNED BY: J. BORUTA DATE: MAY 2019  
 DRAWN BY: K. WHITE DATE: MAY 2019  
 CHECKED BY: B. LOFLIN DATE: JULY 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

DRAWN BY: EEM 2/6/97  
 CHECKED BY: VAP 2/6/97  
 REV. 6/13  
 REV. 1/15  
 REV. 12/17  
 MAA/GM  
 MAA/TMG  
 MAA/THC

**MODJESKI and MASTERS**  
 Experience great bridges.  
 333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 72" PRESTRESSED CONCRETE  
 MODIFIED BULB TEE  
 CONTINUOUS FOR LIVE LOAD  
 SPAN B

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

SHEET NO. S4-18  
 TOTAL SHEETS 45

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

| SPAN A                                |     |       |       |        |       |       |        |        |        |         |         |         |        |        |         |       |       |        |       |       |     |
|---------------------------------------|-----|-------|-------|--------|-------|-------|--------|--------|--------|---------|---------|---------|--------|--------|---------|-------|-------|--------|-------|-------|-----|
| GIRDER 1                              |     |       |       |        |       |       |        |        |        |         |         |         |        |        |         |       |       |        |       |       |     |
| TWENTIETH POINTS                      | 0.0 | .05   | .10   | .15    | .20   | .25   | .30    | .35    | .40    | .45     | .50     | .55     | .60    | .65    | .70     | .75   | .80   | .85    | .90   | .95   | 1.0 |
| CAMBER (GIRDER ALONE IN PLACE)        | ↑ 0 | 0.046 | 0.092 | 0.134  | 0.174 | 0.208 | 0.237  | 0.261  | 0.278  | 0.289   | 0.292   | 0.289   | 0.278  | 0.261  | 0.237   | 0.208 | 0.174 | 0.134  | 0.092 | 0.046 | 0   |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | ↓ 0 | 0.026 | 0.052 | 0.078  | 0.101 | 0.123 | 0.140  | 0.155  | 0.165  | 0.171   | 0.174   | 0.171   | 0.165  | 0.155  | 0.140   | 0.123 | 0.101 | 0.078  | 0.052 | 0.026 | 0   |
| FINAL CAMBER                          | ↑ 0 | 1/4"  | 1/2"  | 11/16" | 7/8"  | 1"    | 13/16" | 1 1/4" | 1 3/8" | 1 7/16" | 1 7/16" | 1 7/16" | 1 3/8" | 1 1/4" | 1 3/16" | 1"    | 7/8"  | 11/16" | 1/2"  | 1/4"  | 0   |

| SPAN A                                |     |       |       |       |       |       |       |         |        |         |         |         |        |         |       |       |       |       |       |       |     |
|---------------------------------------|-----|-------|-------|-------|-------|-------|-------|---------|--------|---------|---------|---------|--------|---------|-------|-------|-------|-------|-------|-------|-----|
| GIRDERS 2 - 7                         |     |       |       |       |       |       |       |         |        |         |         |         |        |         |       |       |       |       |       |       |     |
| TWENTIETH POINTS                      | 0.0 | .05   | .10   | .15   | .20   | .25   | .30   | .35     | .40    | .45     | .50     | .55     | .60    | .65     | .70   | .75   | .80   | .85   | .90   | .95   | 1.0 |
| CAMBER (GIRDER ALONE IN PLACE)        | ↑ 0 | 0.046 | 0.092 | 0.134 | 0.174 | 0.208 | 0.237 | 0.261   | 0.278  | 0.289   | 0.292   | 0.289   | 0.278  | 0.261   | 0.237 | 0.208 | 0.174 | 0.134 | 0.092 | 0.046 | 0   |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | ↓ 0 | 0.029 | 0.058 | 0.086 | 0.113 | 0.136 | 0.156 | 0.172   | 0.184  | 0.191   | 0.193   | 0.191   | 0.184  | 0.172   | 0.156 | 0.136 | 0.113 | 0.086 | 0.058 | 0.029 | 0   |
| FINAL CAMBER                          | ↑ 0 | 3/16" | 3/8"  | 9/16" | 3/4"  | 7/8"  | 1"    | 1 1/16" | 1 1/8" | 1 3/16" | 1 3/16" | 1 3/16" | 1 1/8" | 1 1/16" | 1"    | 7/8"  | 3/4"  | 9/16" | 3/8"  | 3/16" | 0   |

| SPAN A                                |     |       |       |       |       |       |        |         |       |       |       |       |       |         |         |       |       |       |       |       |     |
|---------------------------------------|-----|-------|-------|-------|-------|-------|--------|---------|-------|-------|-------|-------|-------|---------|---------|-------|-------|-------|-------|-------|-----|
| GIRDERS 8 - 10                        |     |       |       |       |       |       |        |         |       |       |       |       |       |         |         |       |       |       |       |       |     |
| TWENTIETH POINTS                      | 0.0 | .05   | .10   | .15   | .20   | .25   | .30    | .35     | .40   | .45   | .50   | .55   | .60   | .65     | .70     | .75   | .80   | .85   | .90   | .95   | 1.0 |
| CAMBER (GIRDER ALONE IN PLACE)        | ↑ 0 | 0.046 | 0.092 | 0.134 | 0.174 | 0.208 | 0.237  | 0.261   | 0.278 | 0.289 | 0.292 | 0.289 | 0.278 | 0.261   | 0.237   | 0.208 | 0.174 | 0.134 | 0.092 | 0.046 | 0   |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | ↓ 0 | 0.031 | 0.062 | 0.093 | 0.121 | 0.146 | 0.168  | 0.185   | 0.197 | 0.205 | 0.208 | 0.205 | 0.197 | 0.185   | 0.168   | 0.146 | 0.121 | 0.093 | 0.062 | 0.031 | 0   |
| FINAL CAMBER                          | ↑ 0 | 3/16" | 3/8"  | 1/2"  | 5/8"  | 3/4"  | 13/16" | 1 5/16" | 1"    | 1"    | 1"    | 1"    | 1"    | 1 5/16" | 1 3/16" | 3/4"  | 5/8"  | 1/2"  | 3/8"  | 3/16" | 0   |

| SPAN B                                |     |       |       |       |       |        |        |       |         |       |       |       |         |       |        |         |       |       |       |       |     |
|---------------------------------------|-----|-------|-------|-------|-------|--------|--------|-------|---------|-------|-------|-------|---------|-------|--------|---------|-------|-------|-------|-------|-----|
| GIRDERS 1 - 8                         |     |       |       |       |       |        |        |       |         |       |       |       |         |       |        |         |       |       |       |       |     |
| TWENTIETH POINTS                      | 0.0 | .05   | .10   | .15   | .20   | .25    | .30    | .35   | .40     | .45   | .50   | .55   | .60     | .65   | .70    | .75     | .80   | .85   | .90   | .95   | 1.0 |
| CAMBER (GIRDER ALONE IN PLACE)        | ↑ 0 | 0.027 | 0.054 | 0.079 | 0.102 | 0.122  | 0.140  | 0.153 | 0.163   | 0.170 | 0.172 | 0.170 | 0.163   | 0.153 | 0.140  | 0.122   | 0.102 | 0.079 | 0.054 | 0.027 | 0   |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | ↓ 0 | 0.013 | 0.027 | 0.040 | 0.052 | 0.063  | 0.072  | 0.080 | 0.085   | 0.088 | 0.089 | 0.088 | 0.085   | 0.080 | 0.072  | 0.063   | 0.052 | 0.040 | 0.027 | 0.013 | 0   |
| FINAL CAMBER                          | ↑ 0 | 3/16" | 5/16" | 7/16" | 5/8"  | 11/16" | 13/16" | 7/8"  | 1 5/16" | 1"    | 1"    | 1"    | 1 5/16" | 7/8"  | 13/16" | 1 1/16" | 5/8"  | 7/16" | 5/16" | 3/16" | 0   |

| SPAN B                                |     |       |       |       |       |       |       |        |         |       |       |       |         |         |       |       |       |       |       |       |     |
|---------------------------------------|-----|-------|-------|-------|-------|-------|-------|--------|---------|-------|-------|-------|---------|---------|-------|-------|-------|-------|-------|-------|-----|
| GIRDERS 9 AND 10                      |     |       |       |       |       |       |       |        |         |       |       |       |         |         |       |       |       |       |       |       |     |
| TWENTIETH POINTS                      | 0.0 | .05   | .10   | .15   | .20   | .25   | .30   | .35    | .40     | .45   | .50   | .55   | .60     | .65     | .70   | .75   | .80   | .85   | .90   | .95   | 1.0 |
| CAMBER (GIRDER ALONE IN PLACE)        | ↑ 0 | 0.027 | 0.054 | 0.079 | 0.102 | 0.122 | 0.140 | 0.153  | 0.163   | 0.170 | 0.172 | 0.170 | 0.163   | 0.153   | 0.140 | 0.122 | 0.102 | 0.079 | 0.054 | 0.027 | 0   |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | ↓ 0 | 0.015 | 0.030 | 0.044 | 0.058 | 0.069 | 0.080 | 0.088  | 0.093   | 0.097 | 0.098 | 0.097 | 0.093   | 0.088   | 0.080 | 0.069 | 0.058 | 0.044 | 0.030 | 0.015 | 0   |
| FINAL CAMBER                          | ↑ 0 | 1/8"  | 5/16" | 7/16" | 9/16" | 5/8"  | 3/4"  | 13/16" | 1 3/16" | 7/8"  | 7/8"  | 7/8"  | 1 3/16" | 1 3/16" | 3/4"  | 5/8"  | 9/16" | 7/16" | 5/16" | 1/8"  | 0   |

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

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

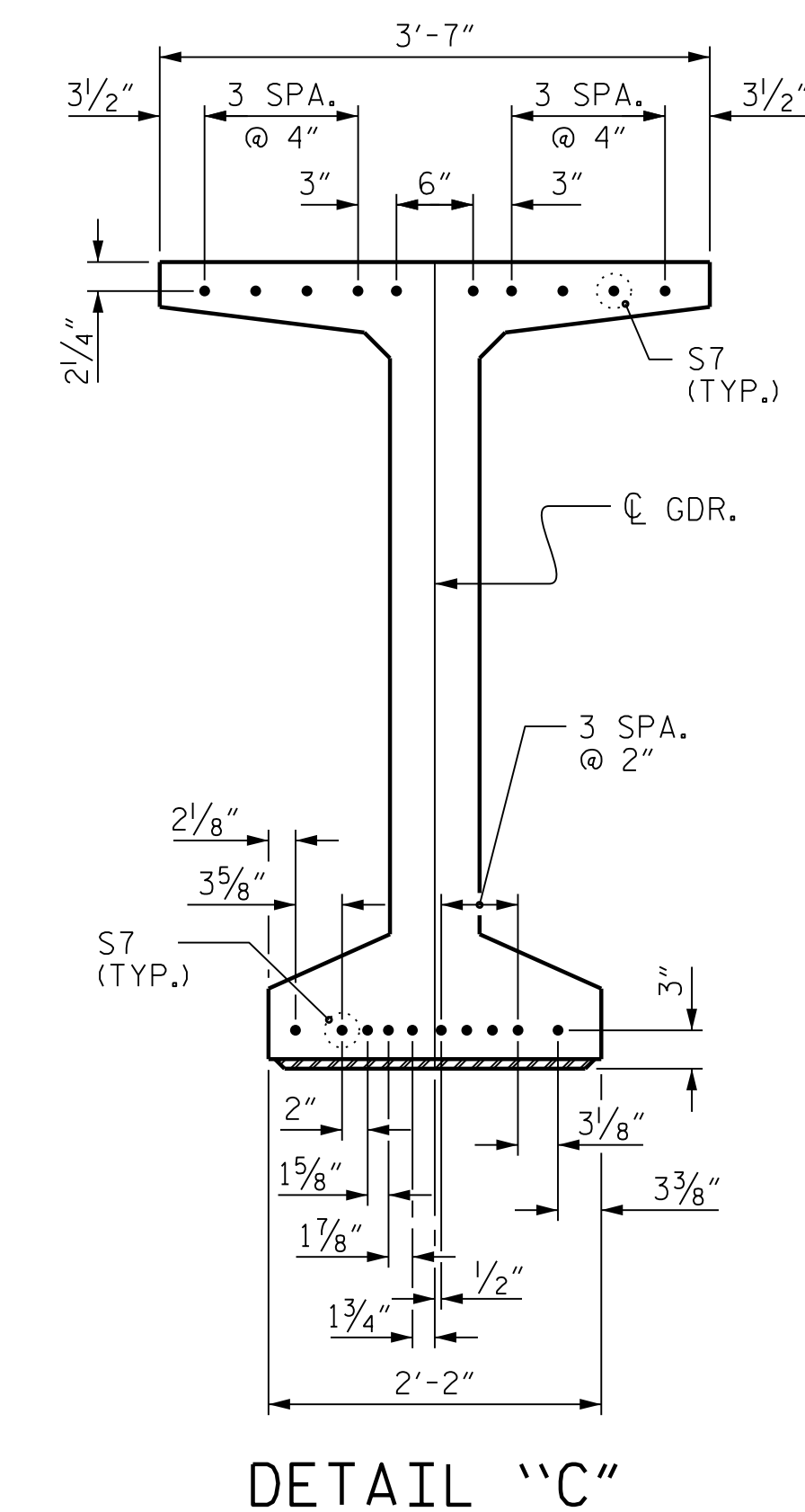
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,800 PSI.

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

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

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND BOTTOM FLANGE.



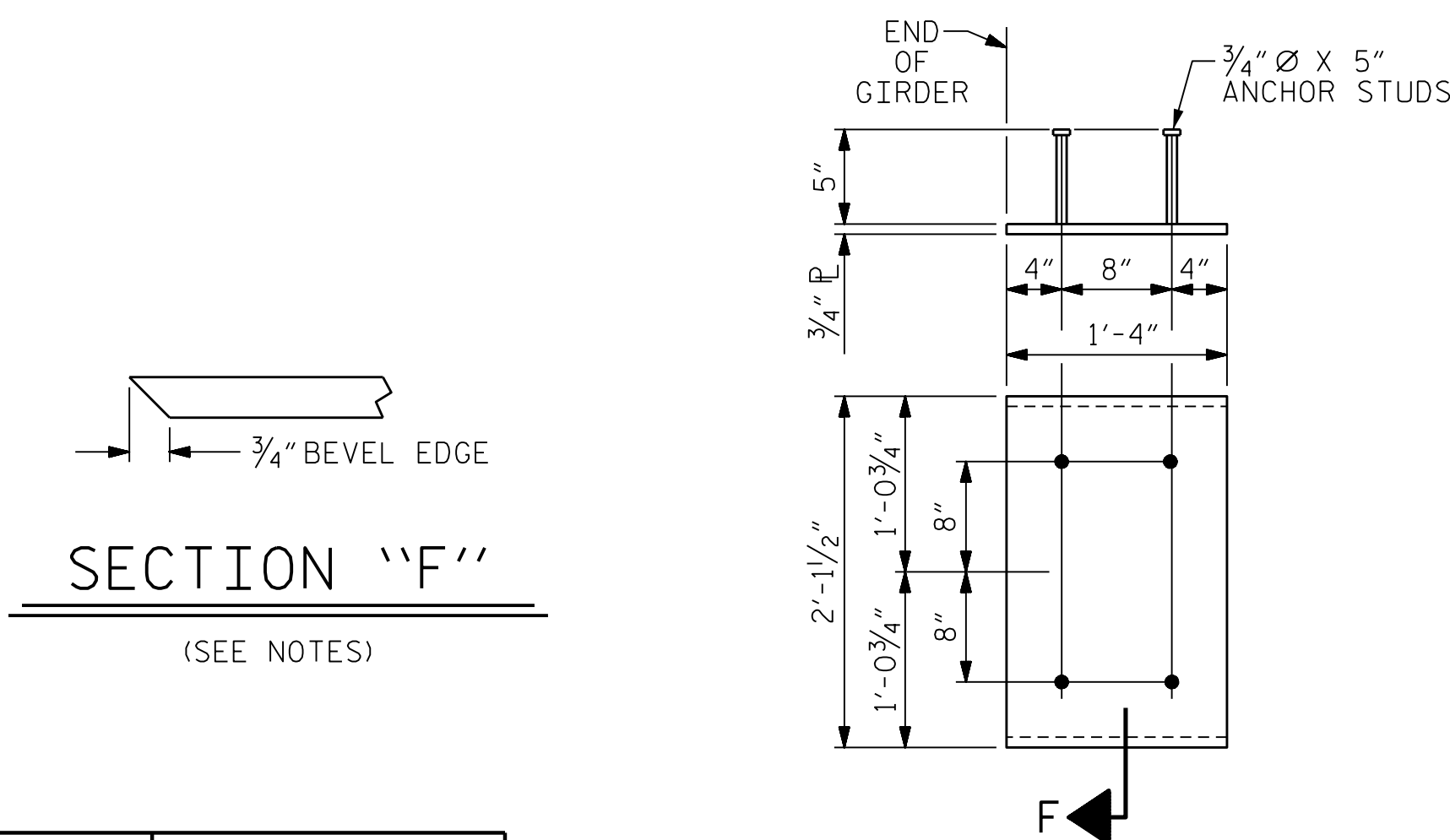
PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

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

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S4-19        |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 45           |

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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

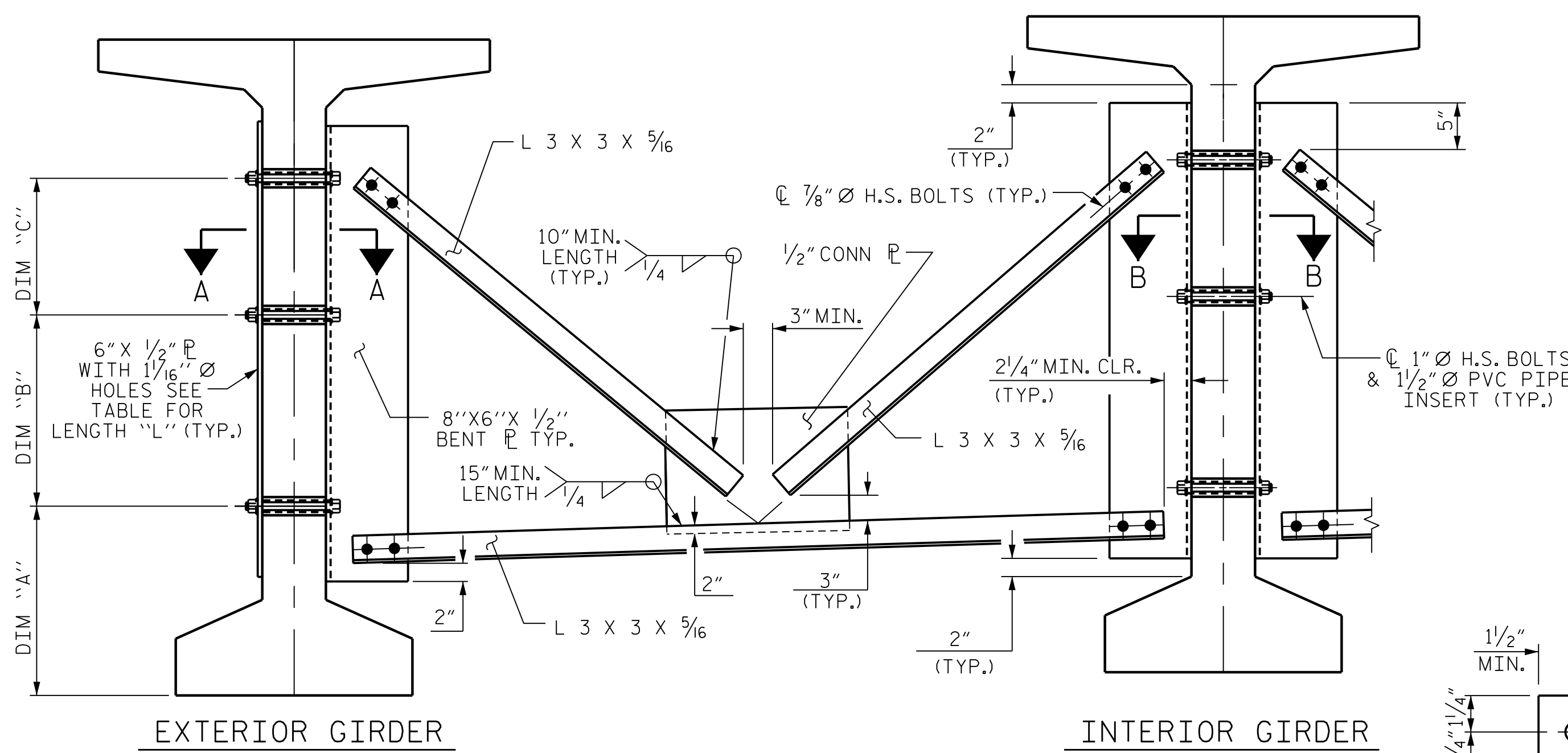
PROFESSIONAL ENGINEER  
 SEAL 032967  
 JASON R. DOUGHTY  
 4/22/2020  
 DocuSigned by:  
 Jason R. Doughty



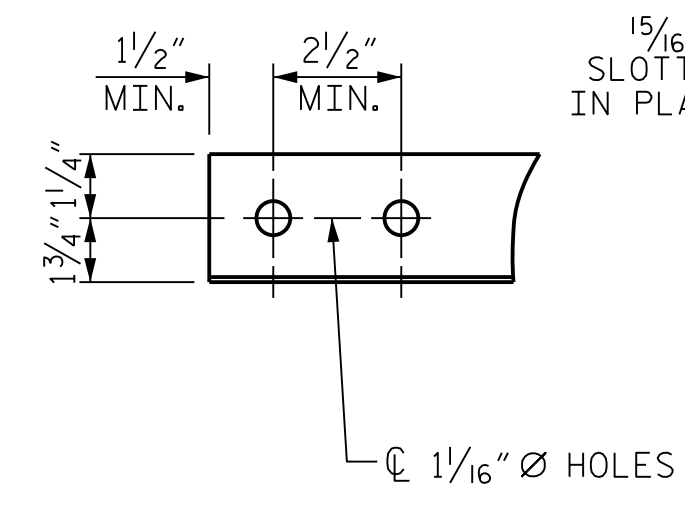
EMBEDDED PLATE "B-1" DETAILS  
 FOR 72" MODIFIED BULB TEES  
 (2 REQ'D PER GIRDER)

END BEVEL (ELEVATION VIEW)

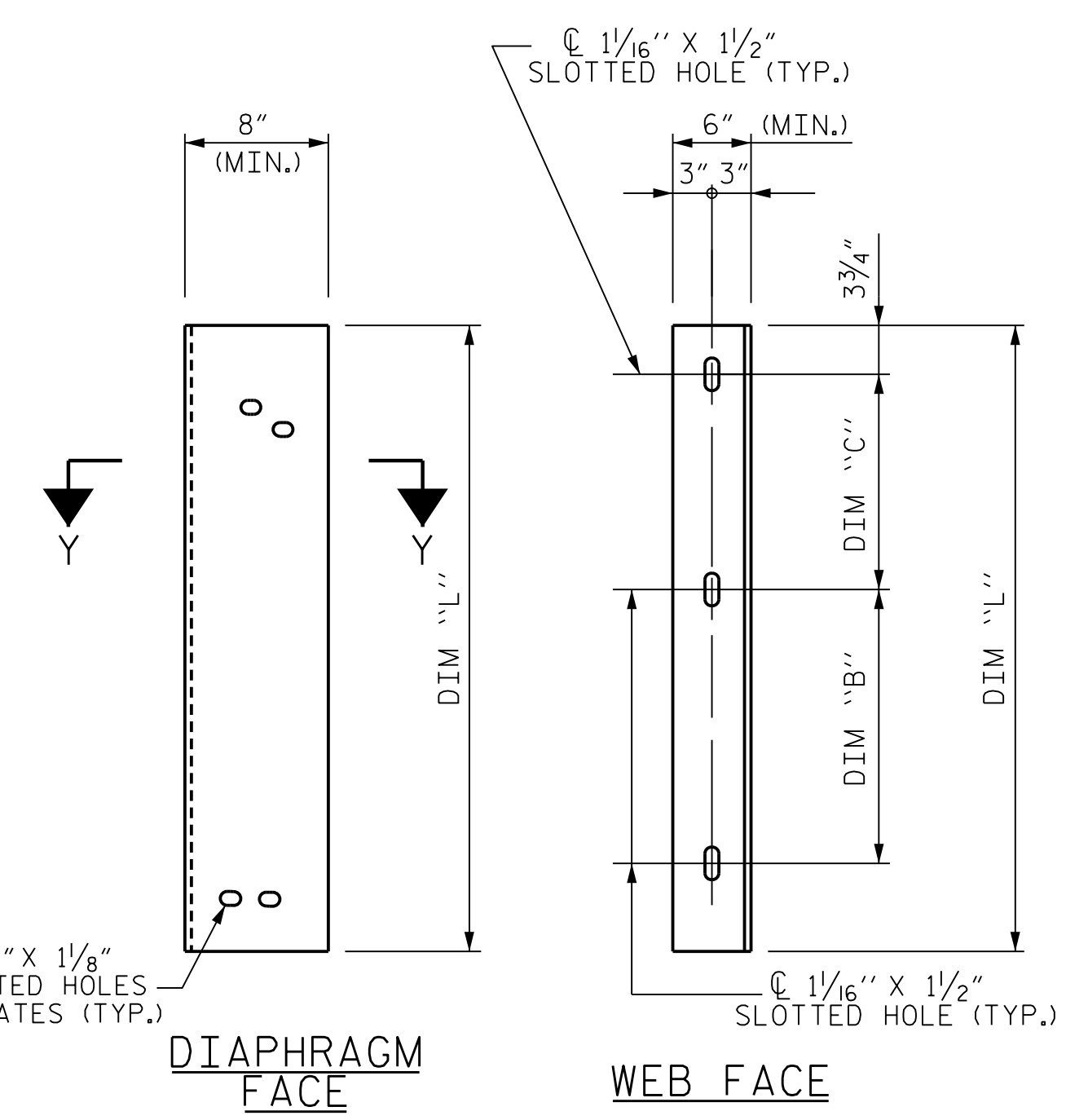
|                                       |                 |         |
|---------------------------------------|-----------------|---------|
| DRAWN BY: ELR 11/91                   | REV. 1/15       | MAA/TMG |
| CHECKED BY: GRP 11/91                 | REV. 2/15       | MAA/TMG |
|                                       | REV. 12/17      | MAA/THC |
| DESIGNED BY: J. BORUTA                | DATE: MAY 2019  |         |
| DRAWN BY: K. WHITE                    | DATE: MAY 2019  |         |
| CHECKED BY: B. LOFLIN                 | DATE: JULY 2019 |         |
| DESIGN ENGINEER OF RECORD: J. DOUGHTY | DATE: NOV 2019  |         |



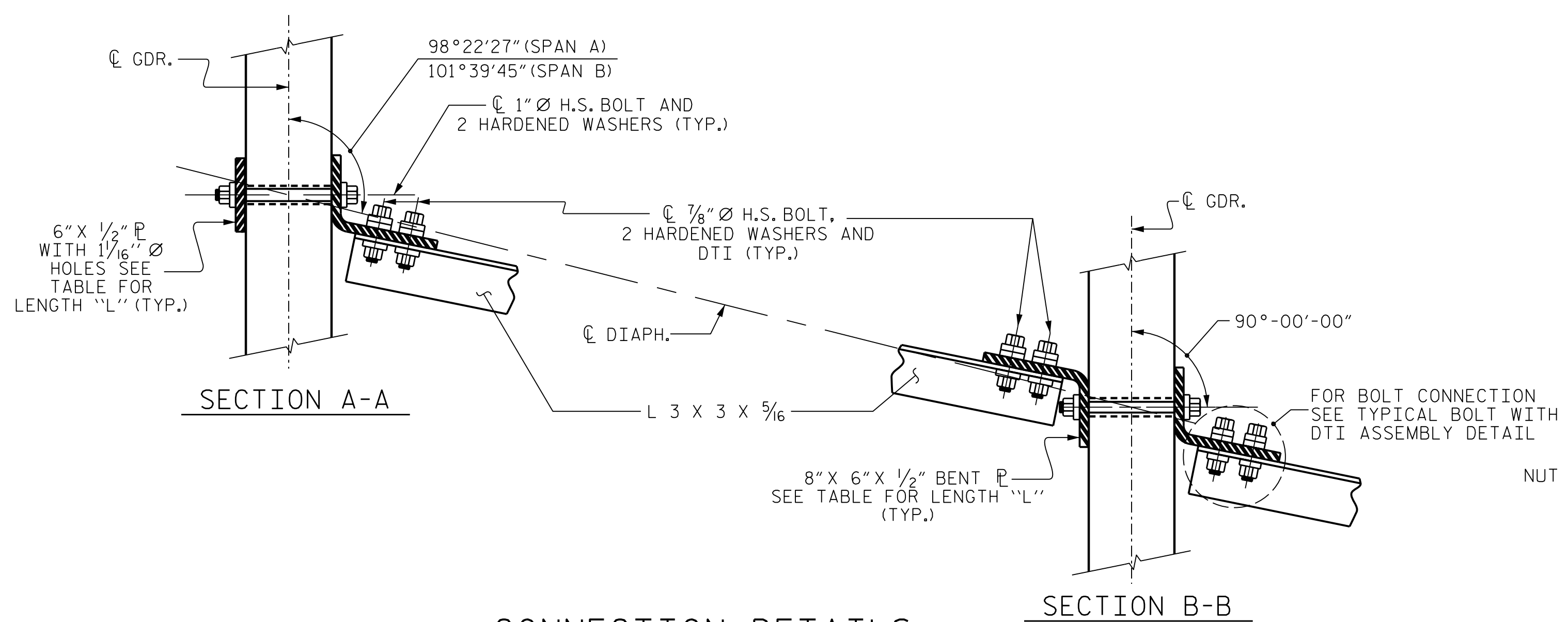
PART SECTION AT INTERMEDIATE DIAPHRAGM



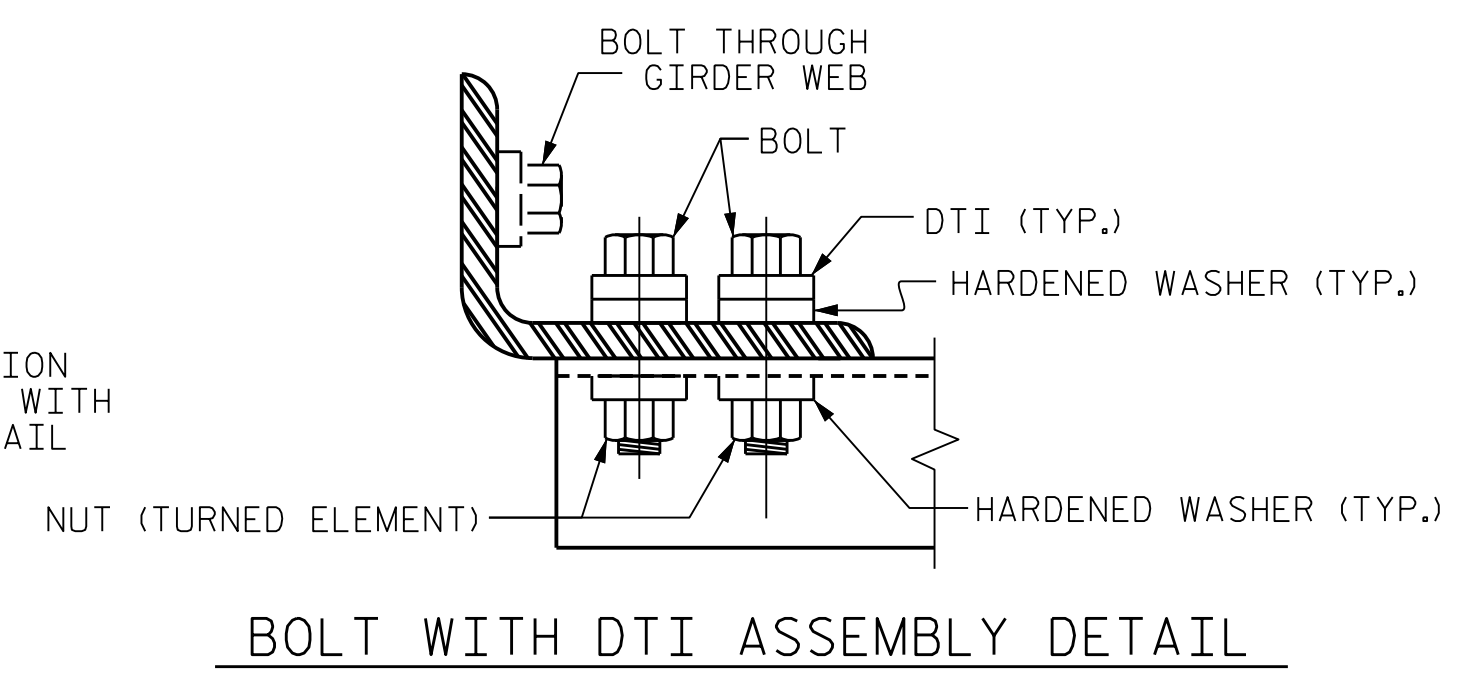
ANGLE END  
(L 3 x 3 x 5/16)



CONNECTOR PLATE DETAIL



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM F3125 GRADE A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

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

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

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

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

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

TABLE

| GIRDER TYPE  | DIM "A"   | DIM "B" | DIM "C" | DIM "L" |
|--------------|-----------|---------|---------|---------|
| 72" BULB TEE | 1'-8 3/4" | 1'-10"  | 1'-4"   | 4'-2"   |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

|  |                  |         |
|--|------------------|---------|
| DRAWN BY : RWW 11/09                   | REV. 10/11       | MAA/GM  |
| CHECKED BY : GM 11/09                  | REV. 12/17       | MAA/THC |
| DESIGNED BY : J. BORUTA                | DATE : JUNE 2019 |         |
| DRAWN BY : K. WHITE                    | DATE : MAY 2019  |         |
| CHECKED BY : B. LOFLIN                 | DATE : JULY 2019 |         |
| DESIGN ENGINEER OF RECORD : J. DOUGHTY | DATE : NOV 2019  |         |

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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

DocuSigned by:  
**Jason R. Doughty**  
 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 INTERMEDIATE STEEL  
 DIAPHRAGMS FOR  
 72" MODIFIED BULB TEE  
 PRESTRESSED CONCRETE GIRDERS

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 45           |
| 2         |     |       | 4   |     |       |              |

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**



### NOTES

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

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

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

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

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

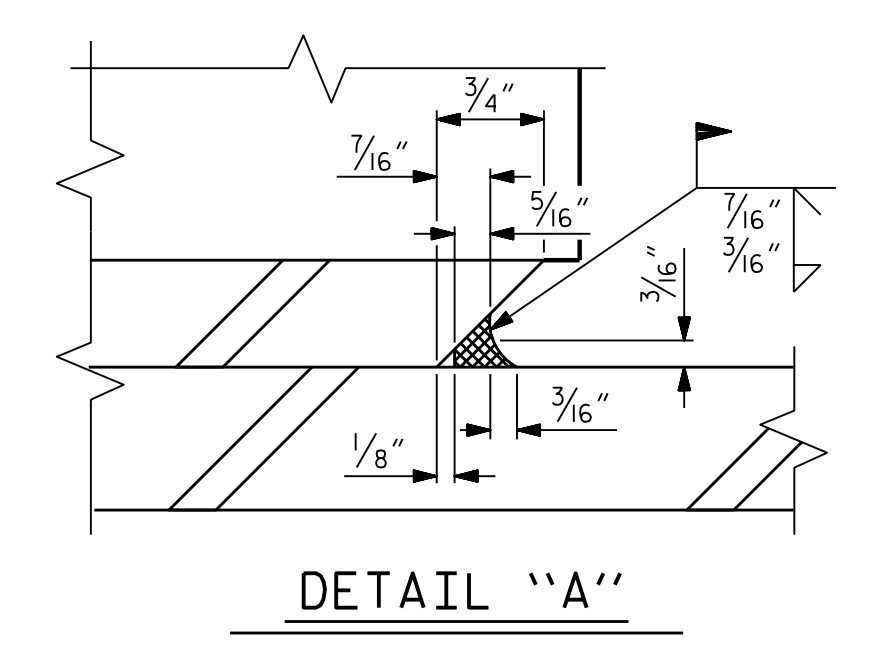
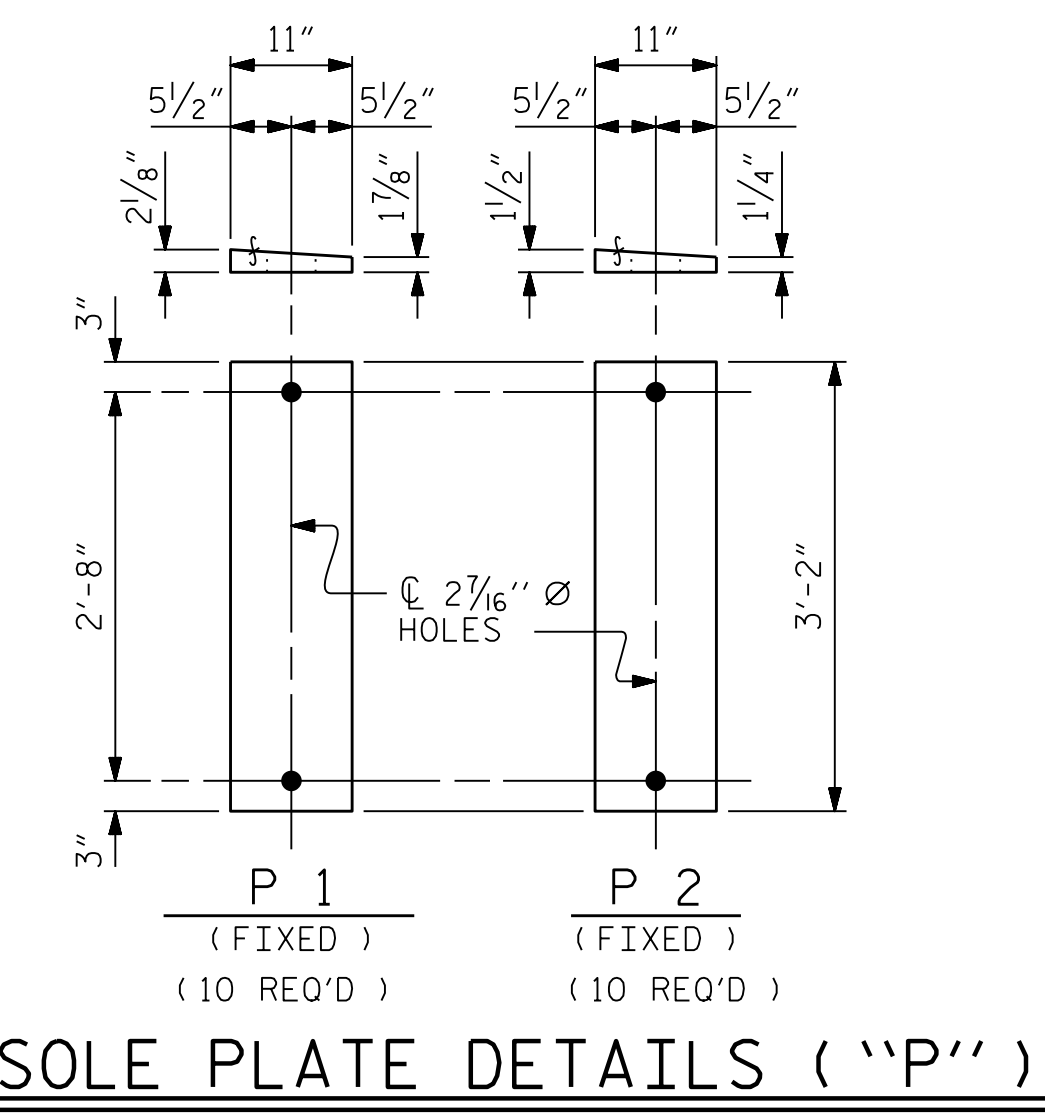
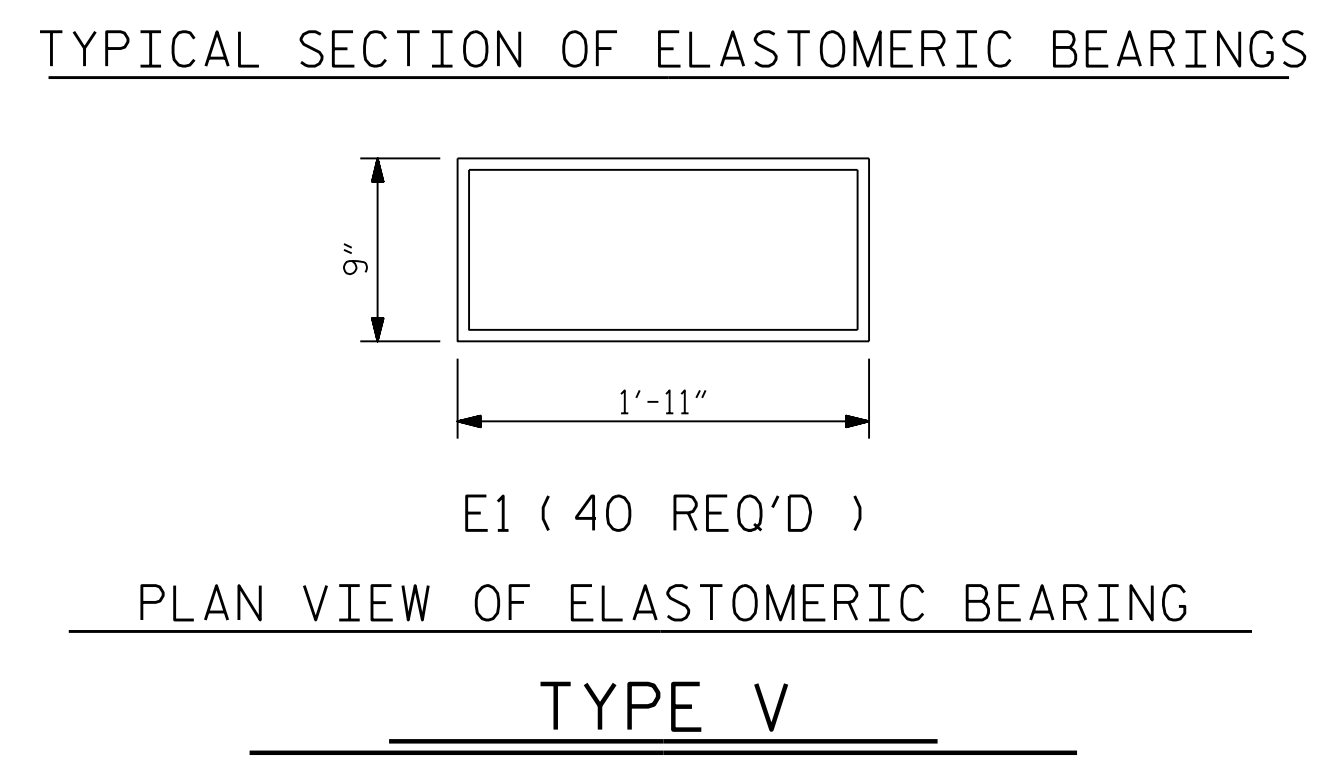
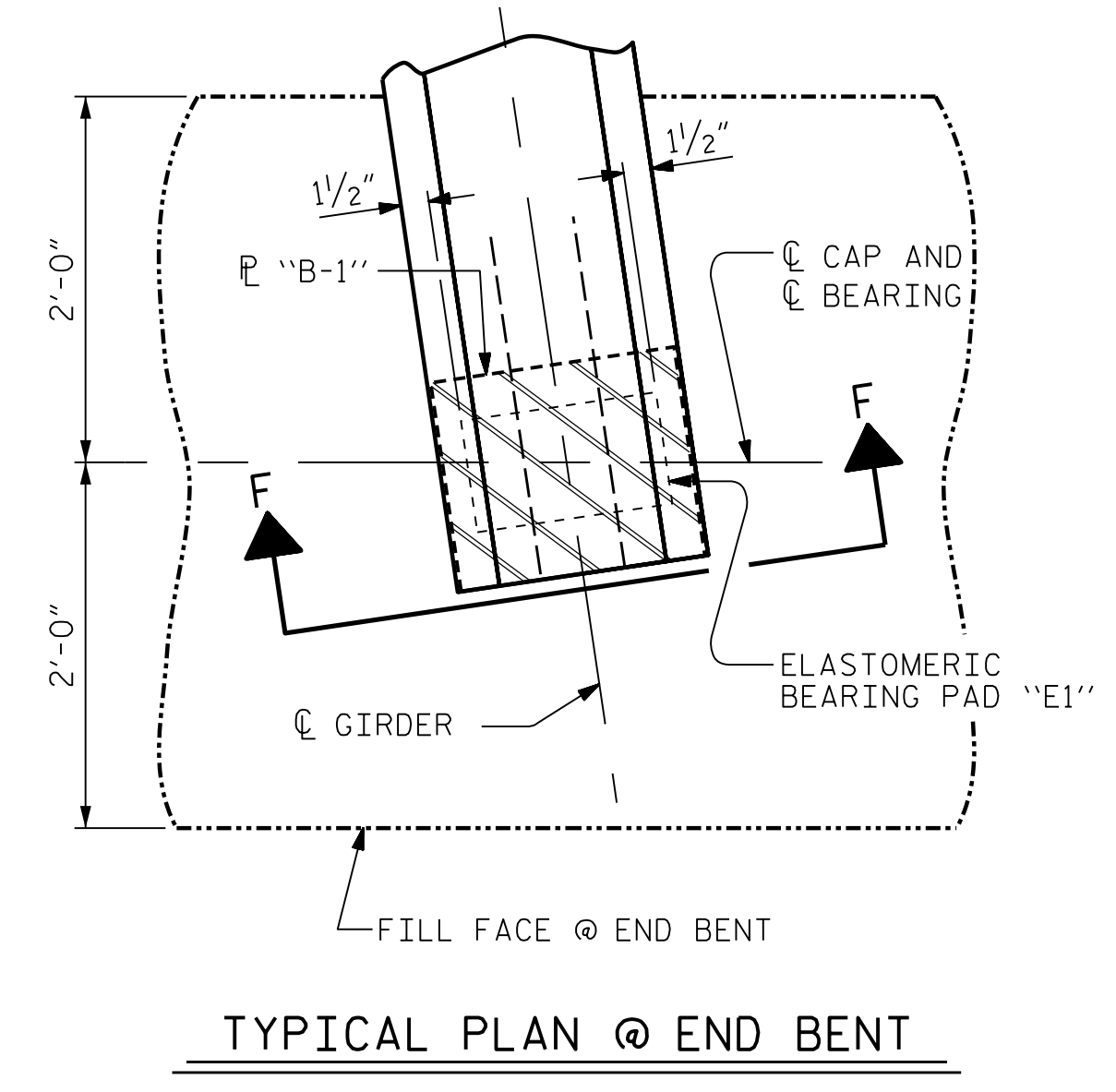
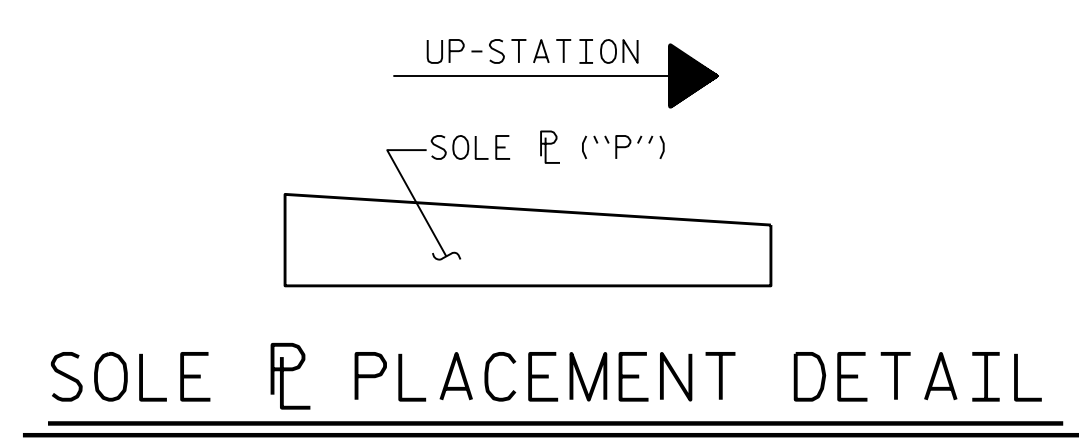
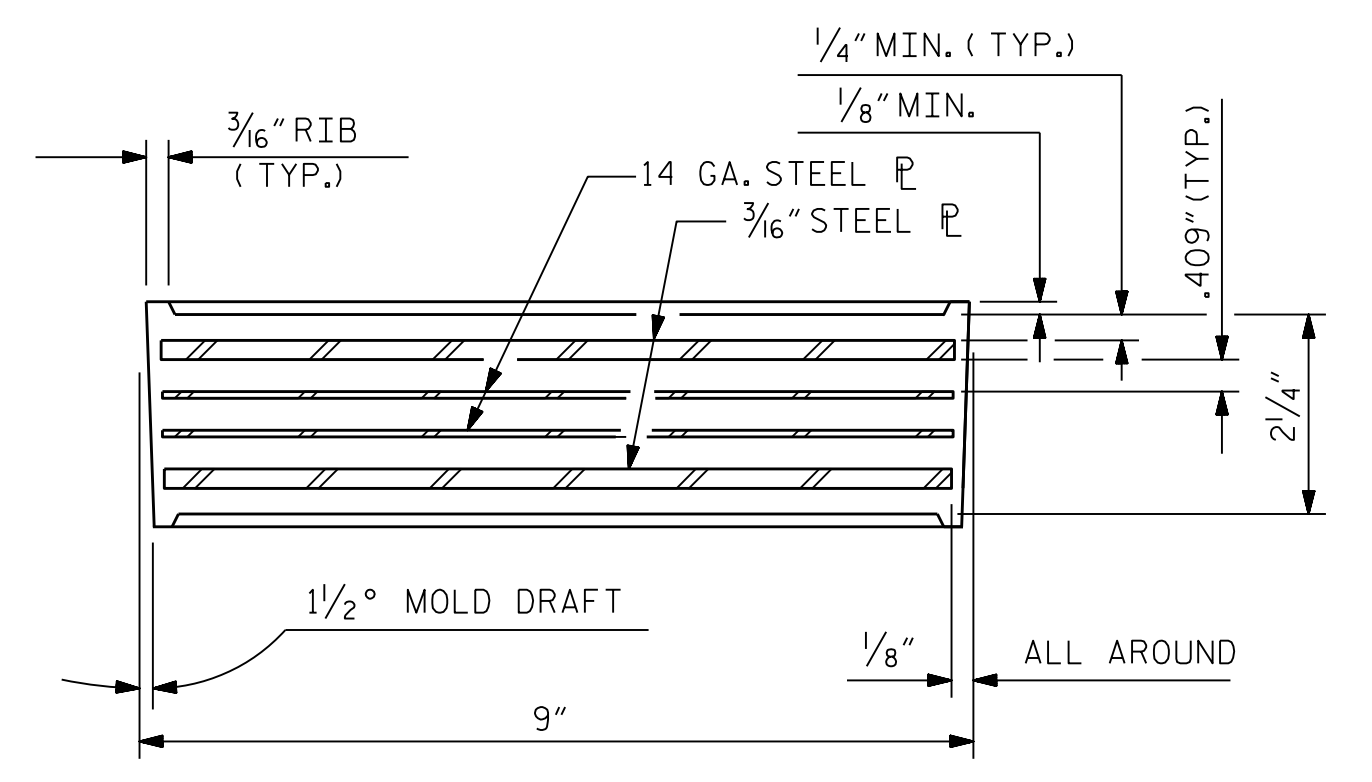
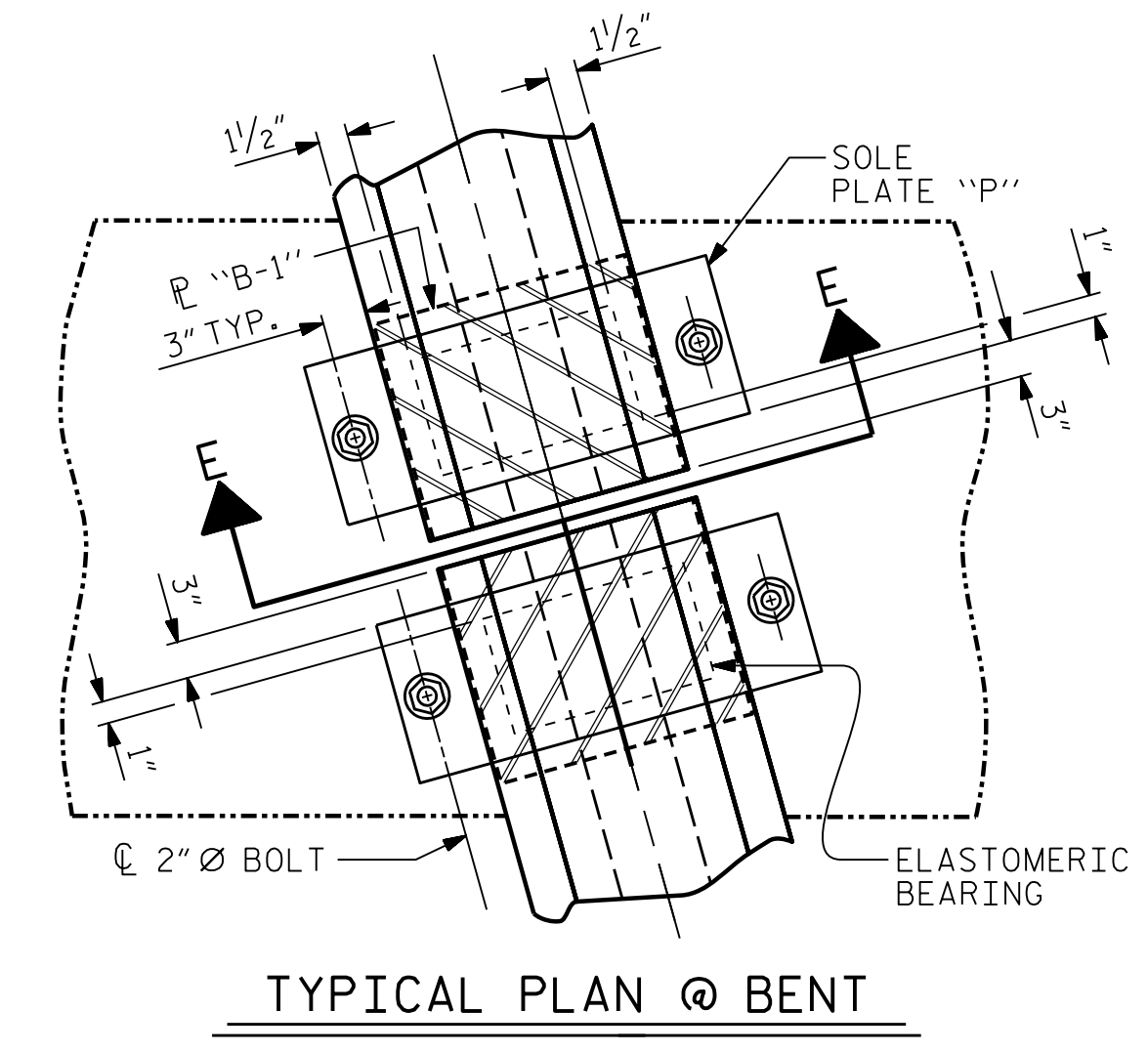
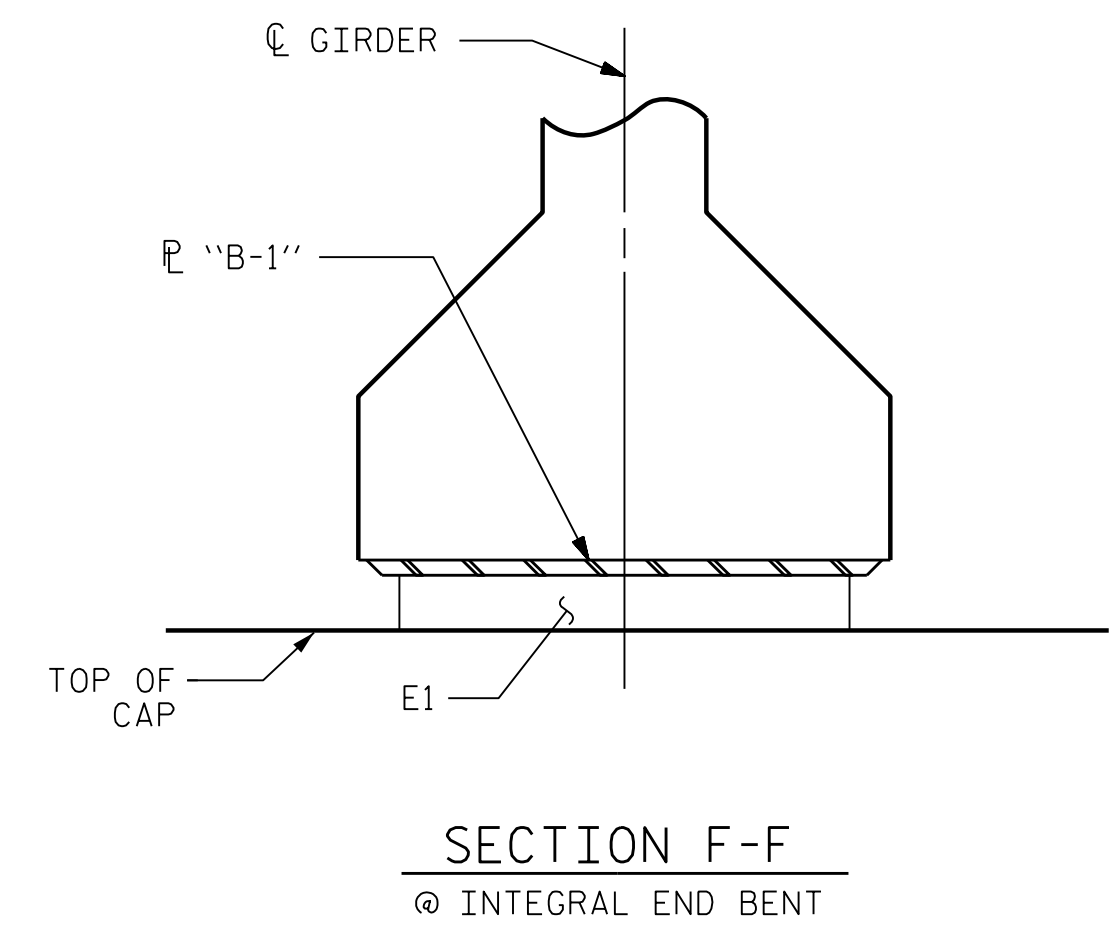
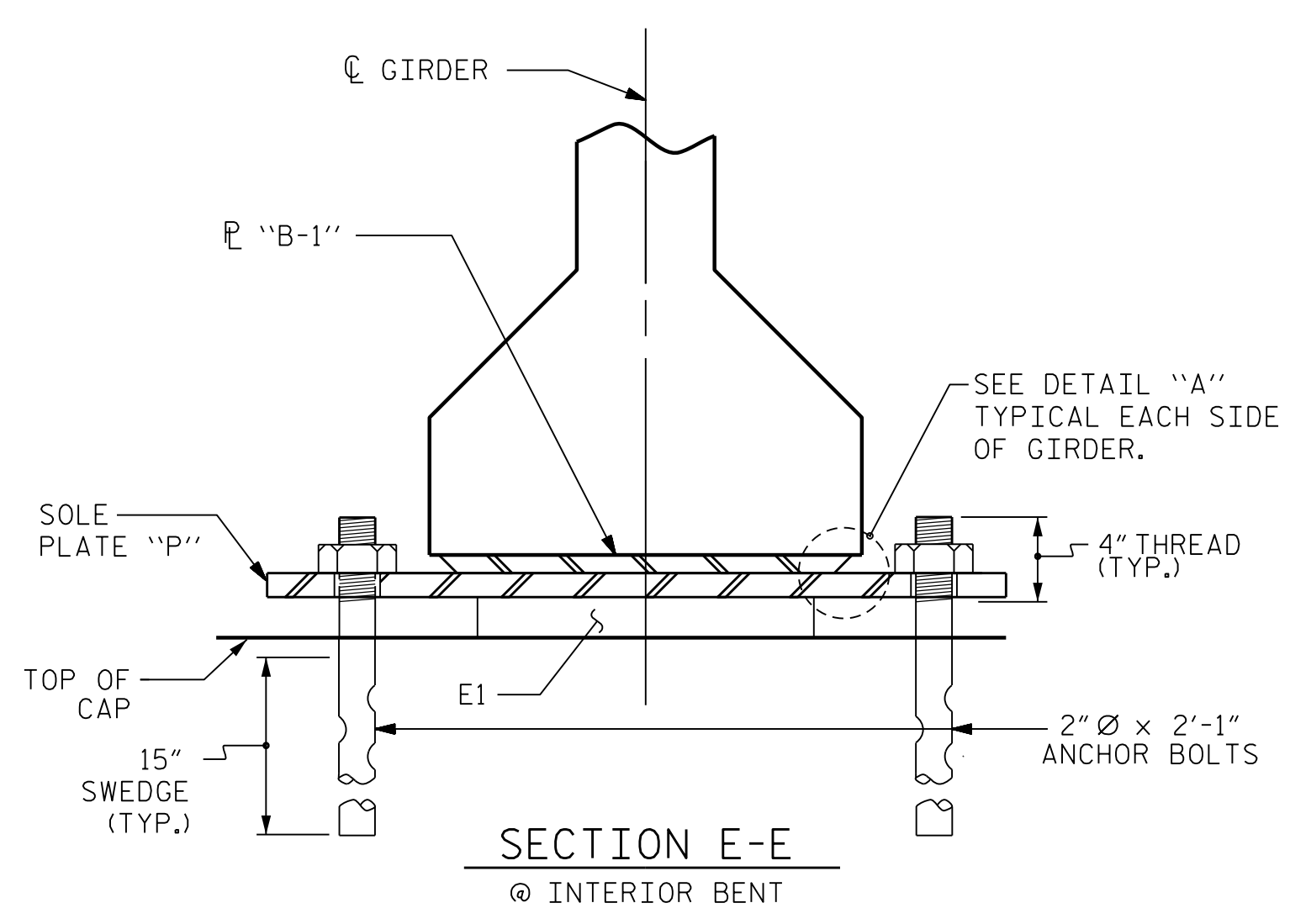
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

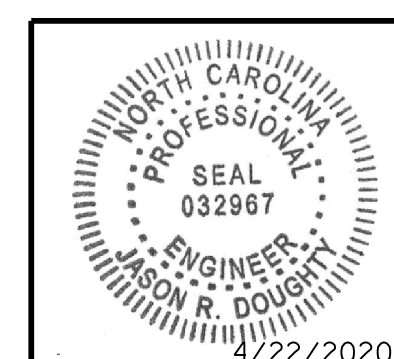
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



|                                 |       |
|---------------------------------|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS |       |
| D.L.+L.L. (NO IMPACT)           |       |
| TYPE V                          | 365 k |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

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



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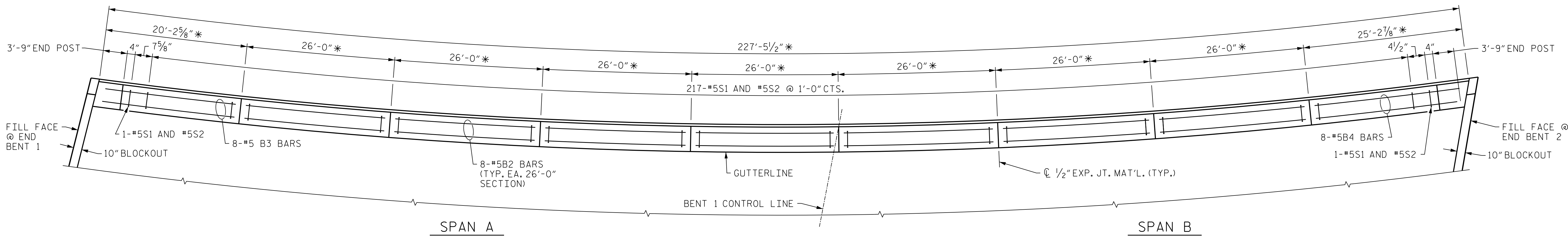
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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

TOTAL SHEETS: 45

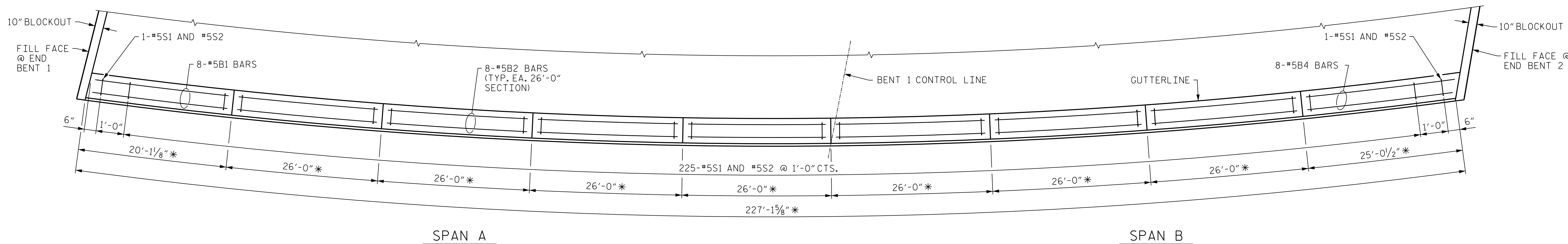
4/22/2020 404\_039\_R2233BB\_SML.BG\_800663.dgn

|                        |                 |                                       |                |            |         |
|------------------------|-----------------|---------------------------------------|----------------|------------|---------|
| DESIGNED BY: J. BORUTA | DATE: JULY 2019 | DRAWN BY: EEM                         | 2/97           | REV. 6/13  | AAC/MAA |
| DRAWN BY: K. WHITE     | DATE: JULY 2019 | CHECKED BY: VAP                       | 2/97           | REV. 1/15  | MAA/TMG |
| CHECKED BY: B. LOFLIN  | DATE: JULY 2019 | DESIGN ENGINEER OF RECORD: J. DOUGHTY | DATE: NOV 2019 | REV. 12/17 | MAA/THC |



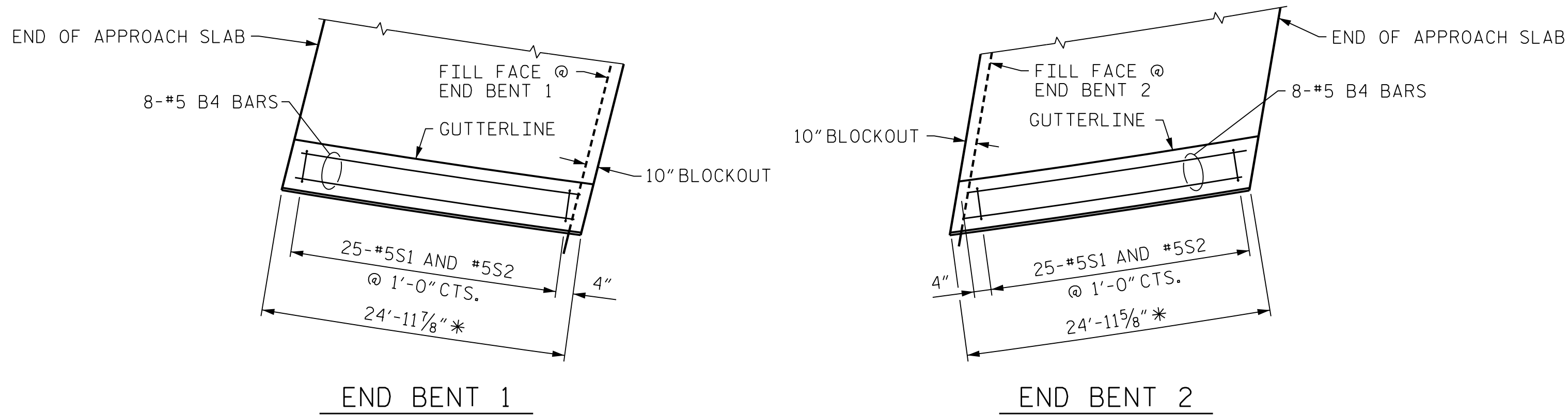
**PARAPET LAYOUT - LEFT**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET



**PARAPET LAYOUT - RIGHT**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET  
NO END POSTS ON RIGHT SIDE



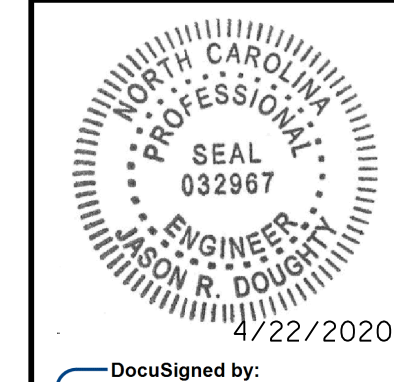
**PARAPET LAYOUT - APPROACH SLABS - RIGHT SIDE ONLY**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 2

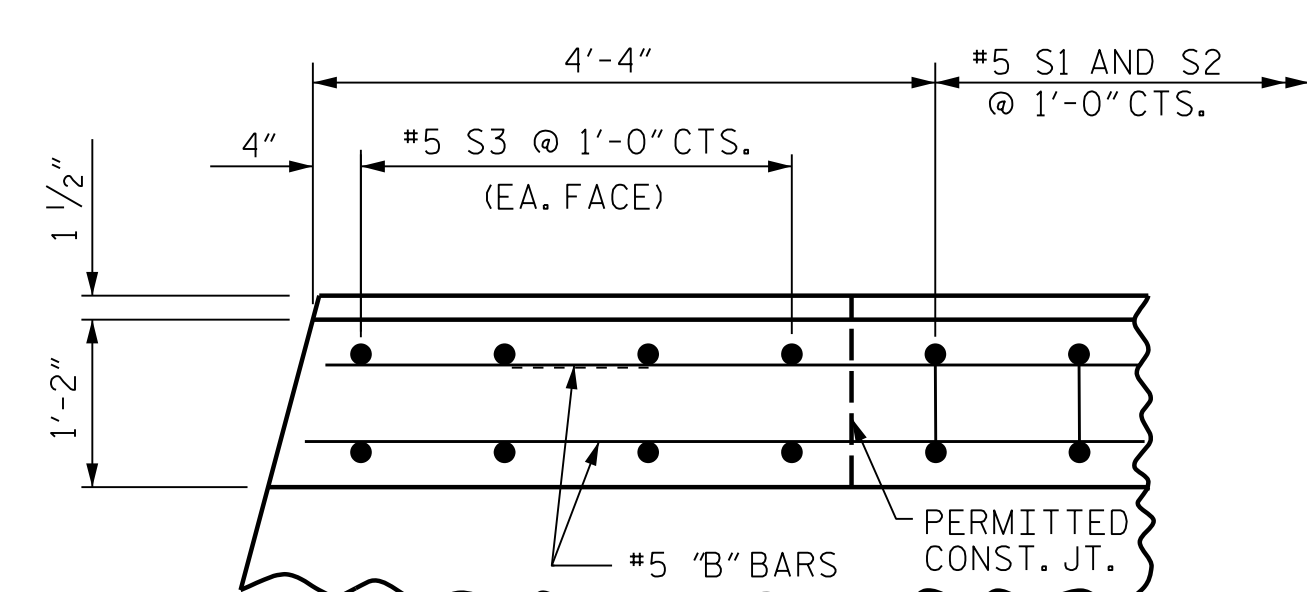
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|--|-----|-------|-----|-----|-------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       |
| <b>CONCRETE PARAPET<br/>DETAILS</b>                                |     |       |     |     |       |
| SHEET NO. <b>S4-22</b>   |     |       |     |     |       |
| TOTAL SHEETS 45  |     |       |     |     |       |
| REVISIONS  |     |       |     |     |       |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |
| 1  |     |       | 3   |     |       |
| 2  |     |       | 4   |     |       |



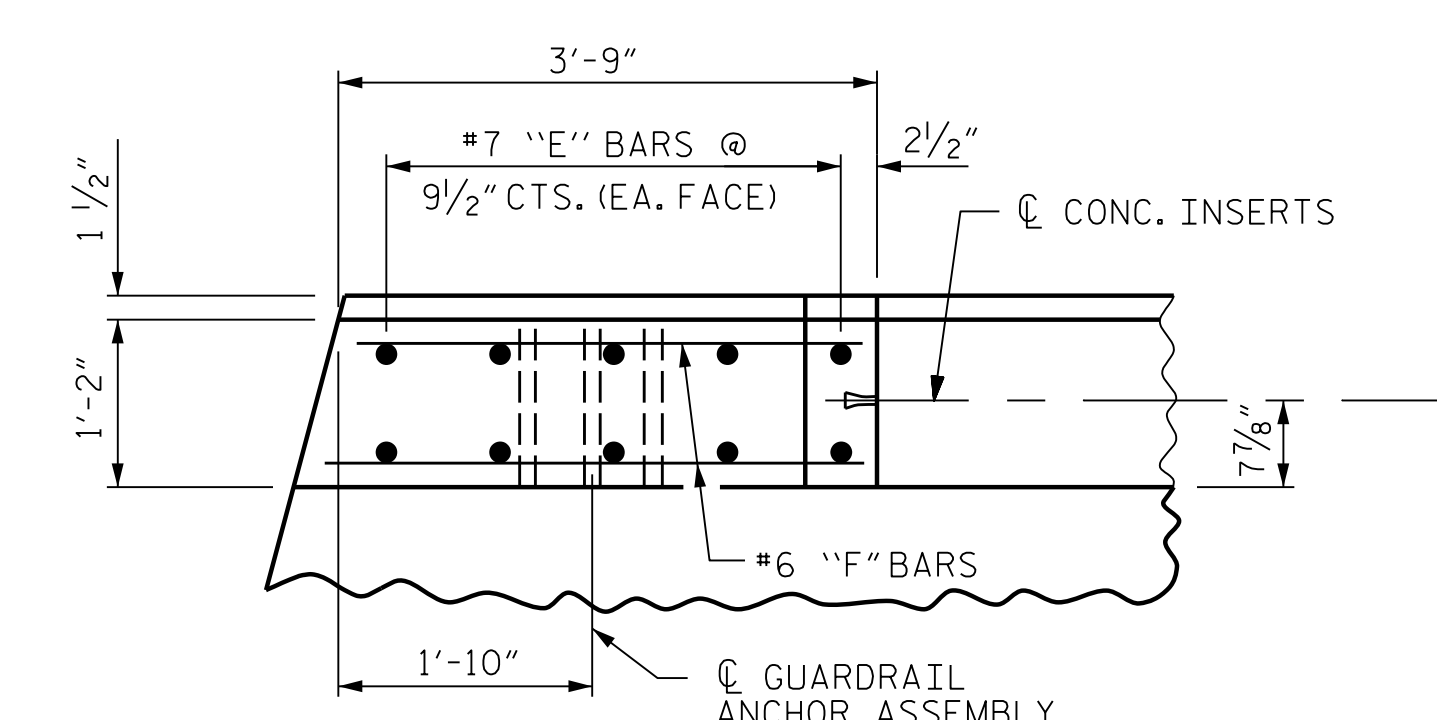
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

|  |                        |
|--|------------------------|
| DESIGNED BY: <u>C. CORMAN</u>                | DATE: <u>JULY 2019</u> |
| DRAWN BY: <u>K. WHITE</u>                    | DATE: <u>JULY 2019</u> |
| CHECKED BY: <u>B. LOFLIN</u>                 | DATE: <u>AUG 2019</u>  |
| DESIGN ENGINEER OF RECORD: <u>J. DOUGHTY</u> | DATE: <u>NOV 2019</u>  |

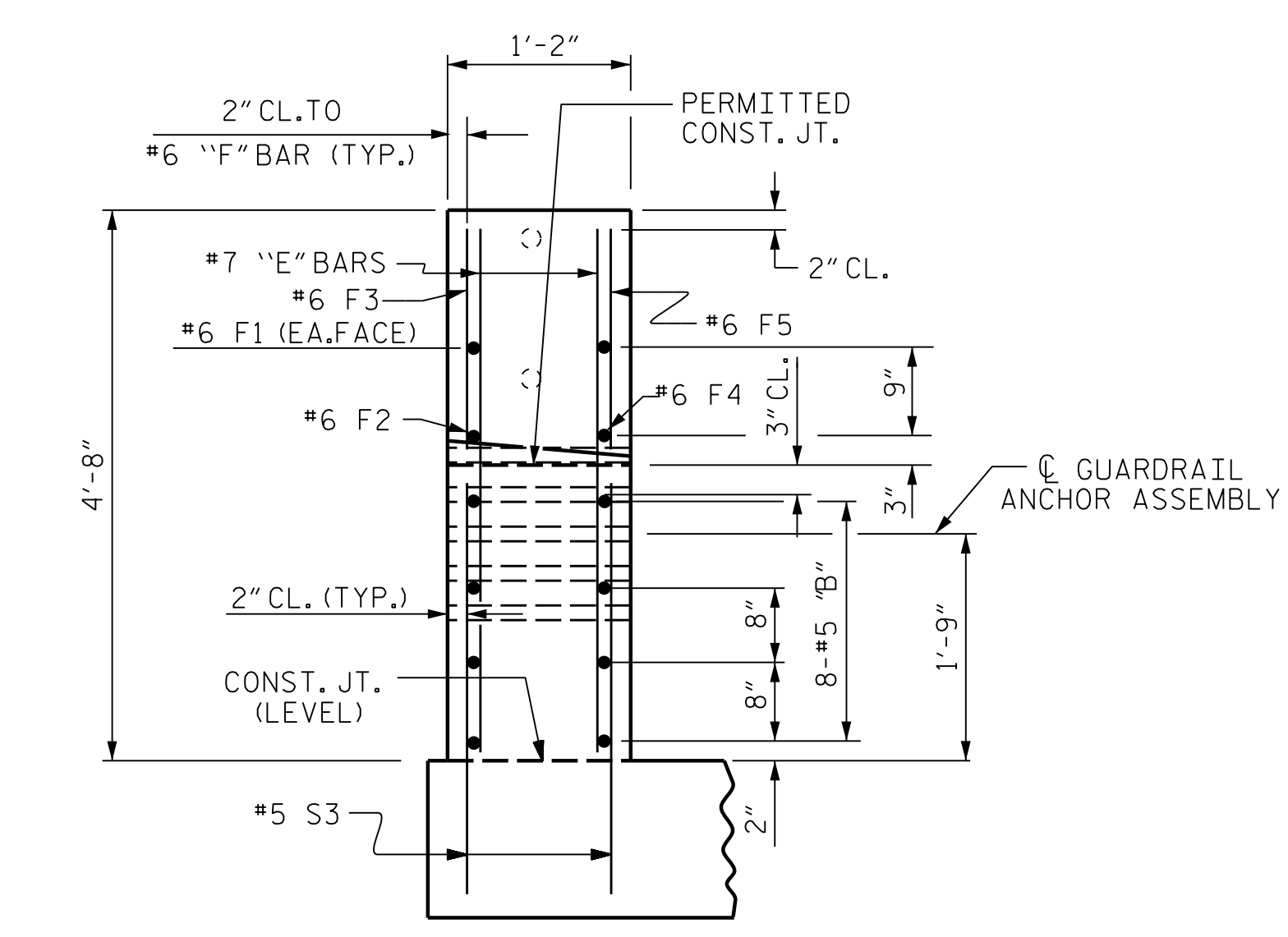
4/22/2020 404\_041\_R2233BB\_SML\_CPL\_800663.dgn



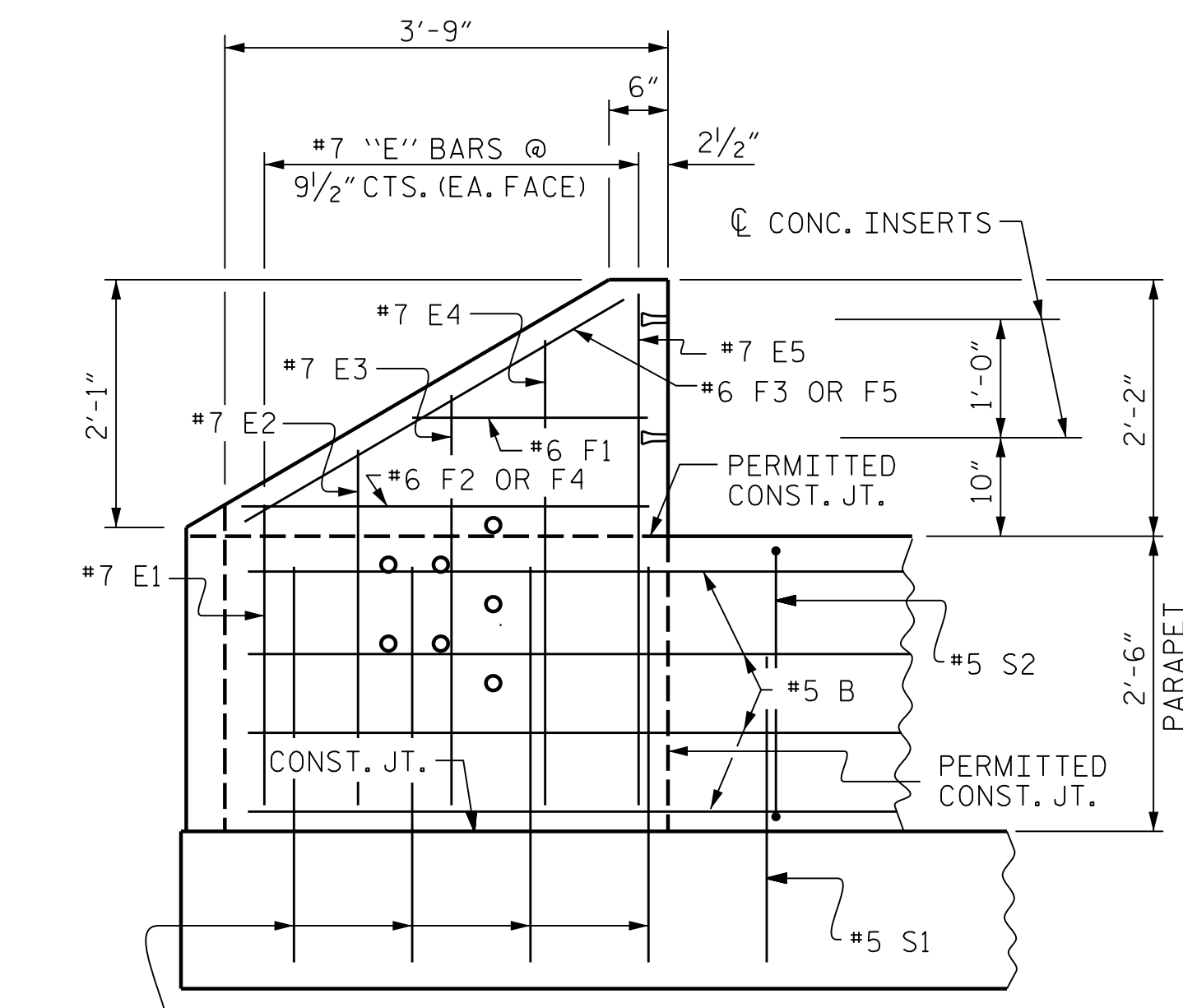
PLAN OF PARAPET



PLAN OF END POST



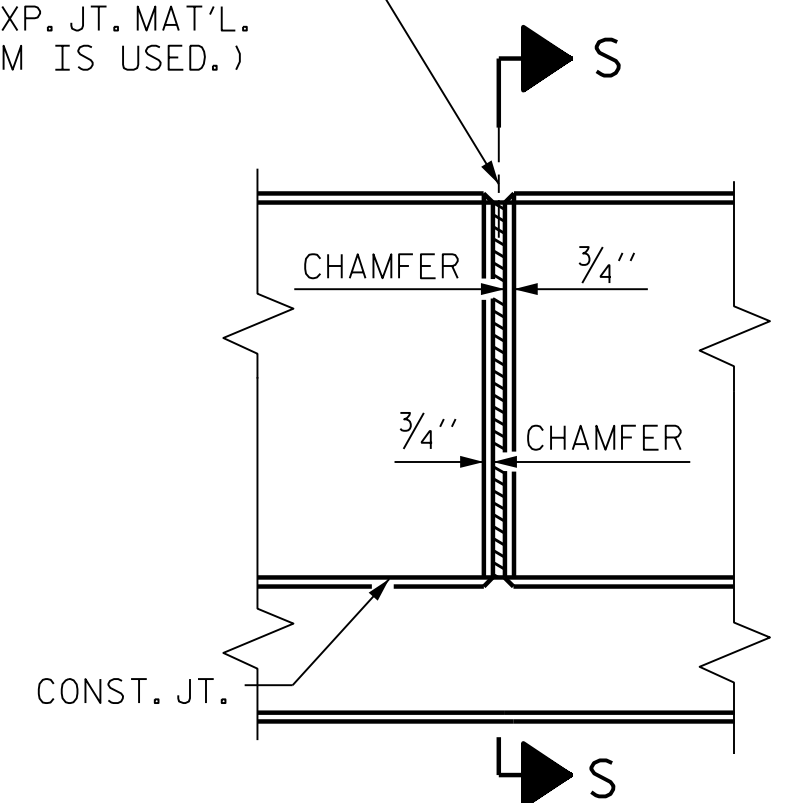
END VIEW



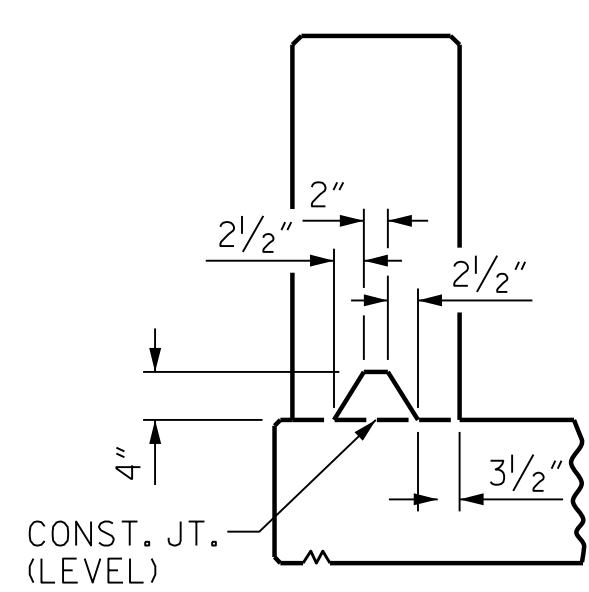
ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

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

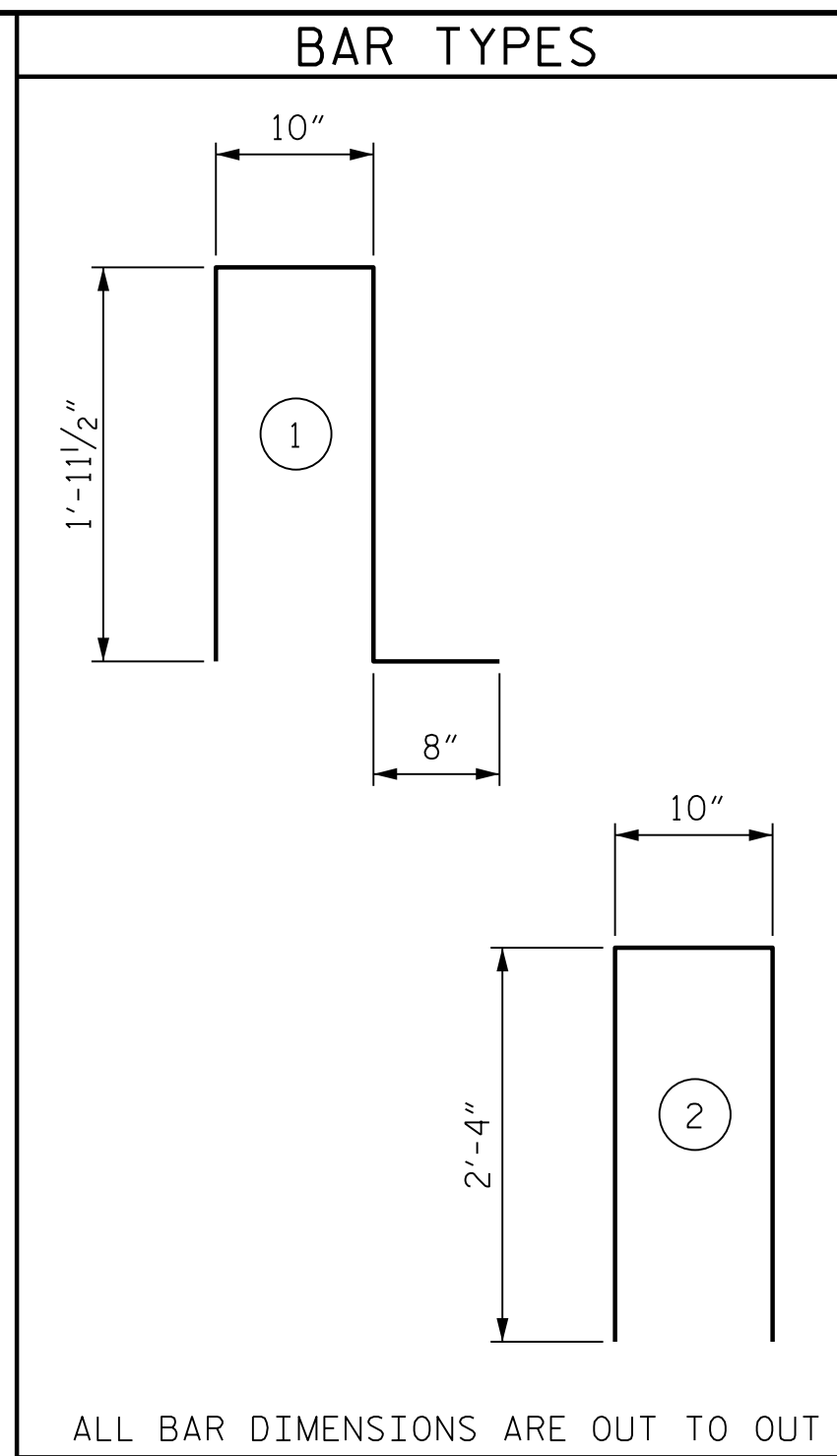


ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

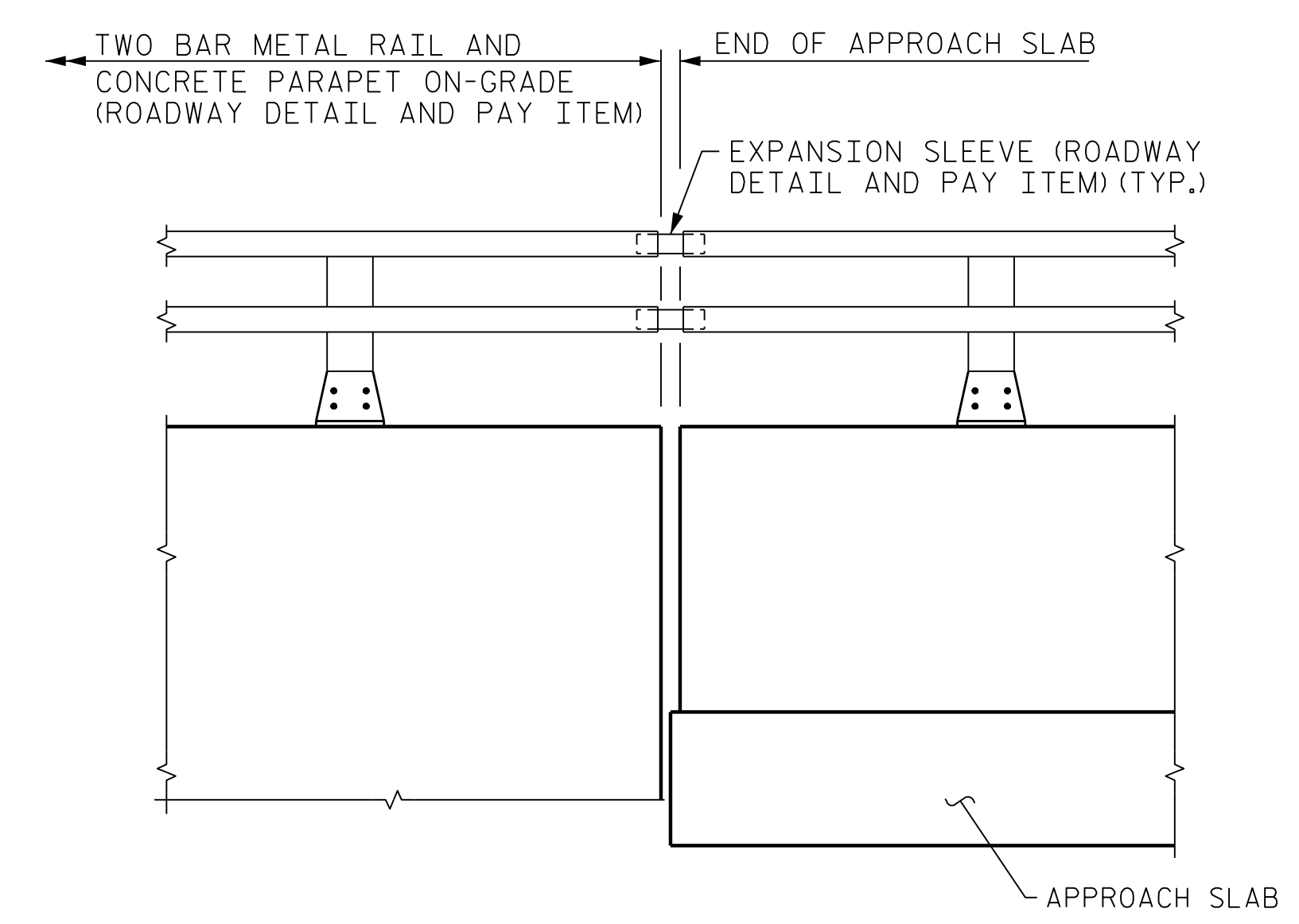


ALL BAR DIMENSIONS ARE OUT TO OUT

| BILL OF MATERIAL                 |     |      |      |                 |        |
|----------------------------------|-----|------|------|-----------------|--------|
| FOR 2 PARAPETS AND 2 END POSTS   |     |      |      |                 |        |
| BAR                              | NO. | SIZE | TYPE | LENGTH          | WEIGHT |
| *B1                              | 8   | #5   | STR  | 19'-6"          | 163    |
| *B2                              | 112 | #5   | STR  | 25'-7"          | 2989   |
| *B3                              | 8   | #5   | STR  | 19'-9"          | 165    |
| *B4                              | 32  | #5   | STR  | 24'-6"          | 818    |
| *E1                              | 4   | #7   | STR  | 2'-6"           | 20     |
| *E2                              | 4   | #7   | STR  | 3'-0"           | 25     |
| *E3                              | 4   | #7   | STR  | 3'-6"           | 29     |
| *E4                              | 4   | #7   | STR  | 4'-0"           | 33     |
| *E5                              | 4   | #7   | STR  | 4'-5"           | 36     |
| *F1                              | 4   | #6   | STR  | 2'-0"           | 12     |
| *F2                              | 2   | #6   | STR  | 3'-4"           | 10     |
| *F3                              | 2   | #6   | STR  | 3'-9"           | 11     |
| *F4                              | 2   | #6   | STR  | 3'-3"           | 10     |
| *F5                              | 2   | #6   | STR  | 3'-8"           | 11     |
| *S1                              | 446 | #5   | 1    | 5'-5"           | 2520   |
| *S2                              | 446 | #5   | 2    | 5'-6"           | 2558   |
| *S3                              | 16  | #5   | STR  | 3'-0"           | 50     |
| * EPOXY COATED REINFORCING STEEL |     |      |      | 9,460 LBS.      |        |
| CLASS AA CONCRETE                |     |      |      | 54.8 CU. YDS.   |        |
| 1'-2" X 2'-6" CONCRETE PARAPET   |     |      |      | 504.55 LIN. FT. |        |

NOTES:

- ALL REINFORCING STEEL IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.
- PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.



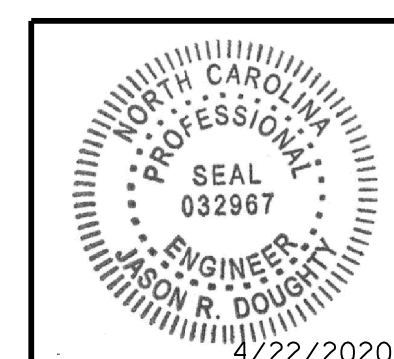
END OF RAIL AND CONCRETE PARAPET DETAIL - RIGHT SIDE

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-  
 SHEET 2 OF 2

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

SHEET NO. S4-23  
 TOTAL SHEETS 45

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 333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

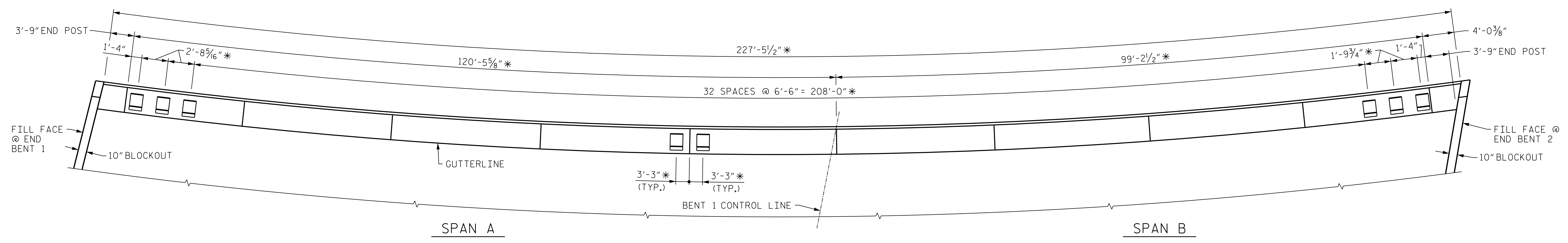


**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

DocuSigned by:  
 Jason R Doughty  
 SF73FA2DEA874E8...

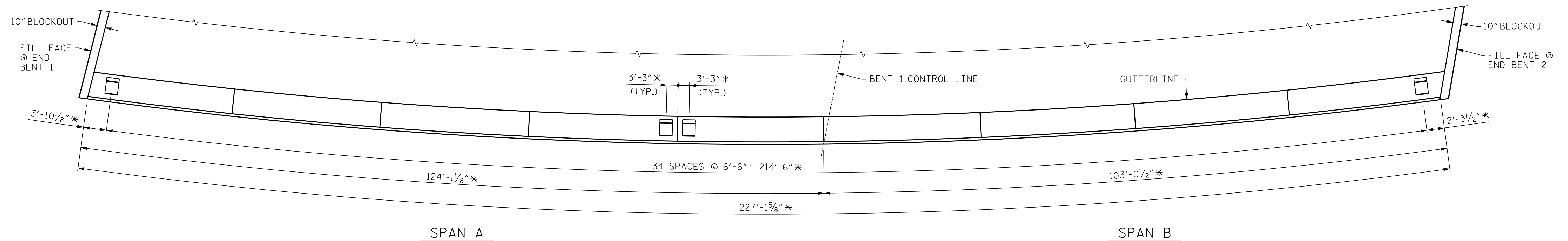
DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

4/22/2020  
 404\_043\_R2233BB\_SML\_CPL\_800663.dgn



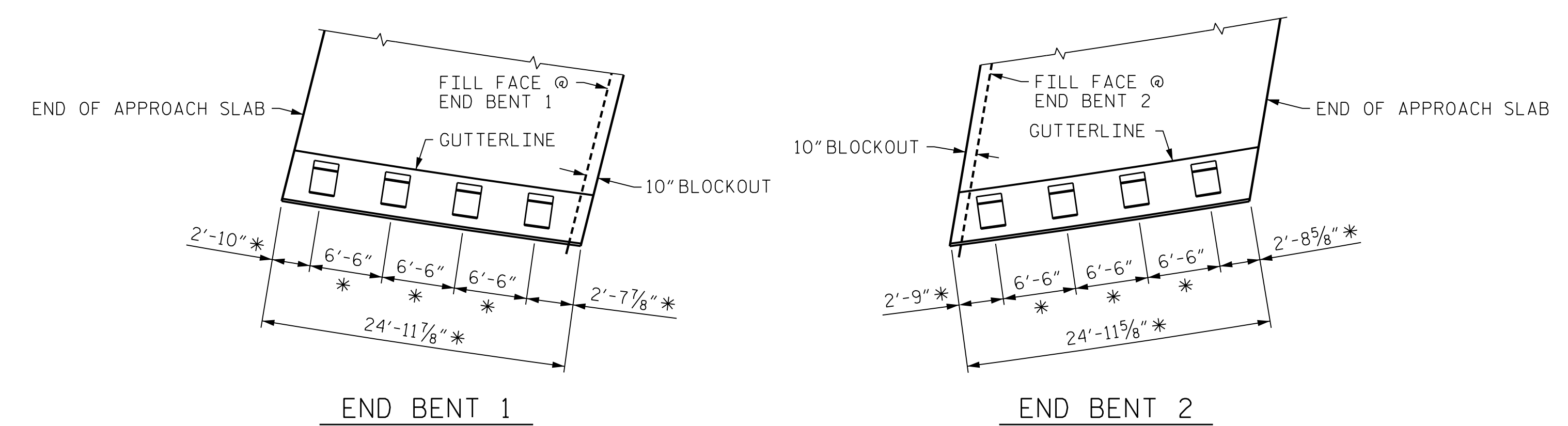
**PLAN OF RAIL POST SPACING - LEFT**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET



**PLAN OF RAIL POST SPACING - RIGHT**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET



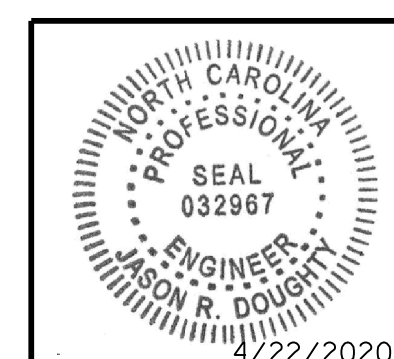
**PLAN OF RAIL POST SPACING - APPROACH SLABS - RIGHT SIDE ONLY**

\* MEASURED ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**RAIL POST SPACINGS  
 FOR TWO BAR  
 METAL RAIL**



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333 FAYETTEVILLE STREET, SUITE 500  
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| REVISIONS |     |       |     |     |       | SHEET NO.    |
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| 2         |     |       | 4   |     |       |              |

DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

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 404\_045\_R2233BB\_SML\_2WRL\_800663.dgn





**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 1/2".
  - B. 1 - 3/4" Ø X 1 1/8" 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 1/8" 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

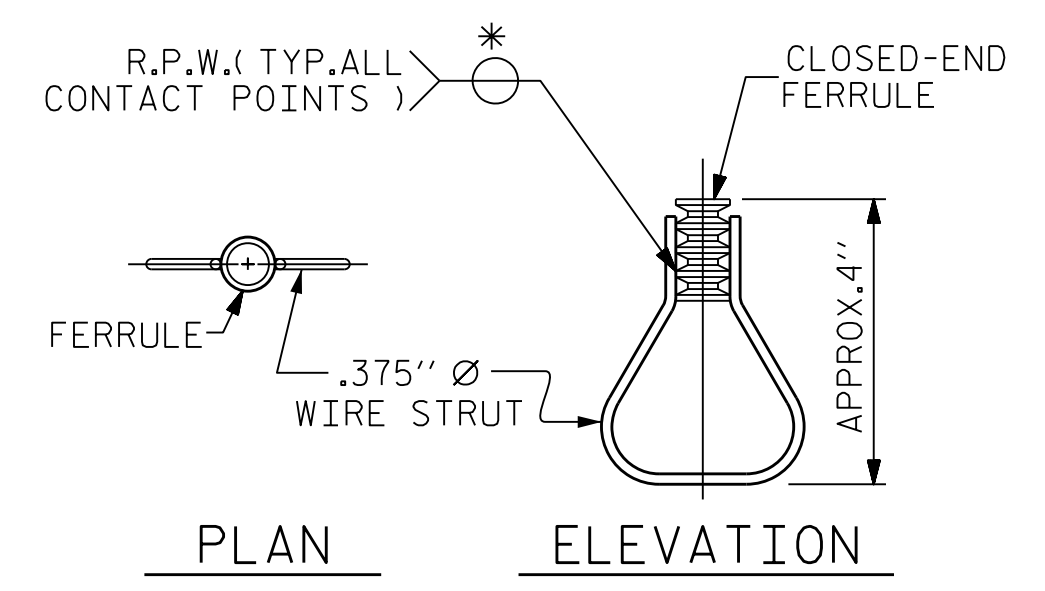
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" 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 SHEET 2 OF 3).

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 RAILS.

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

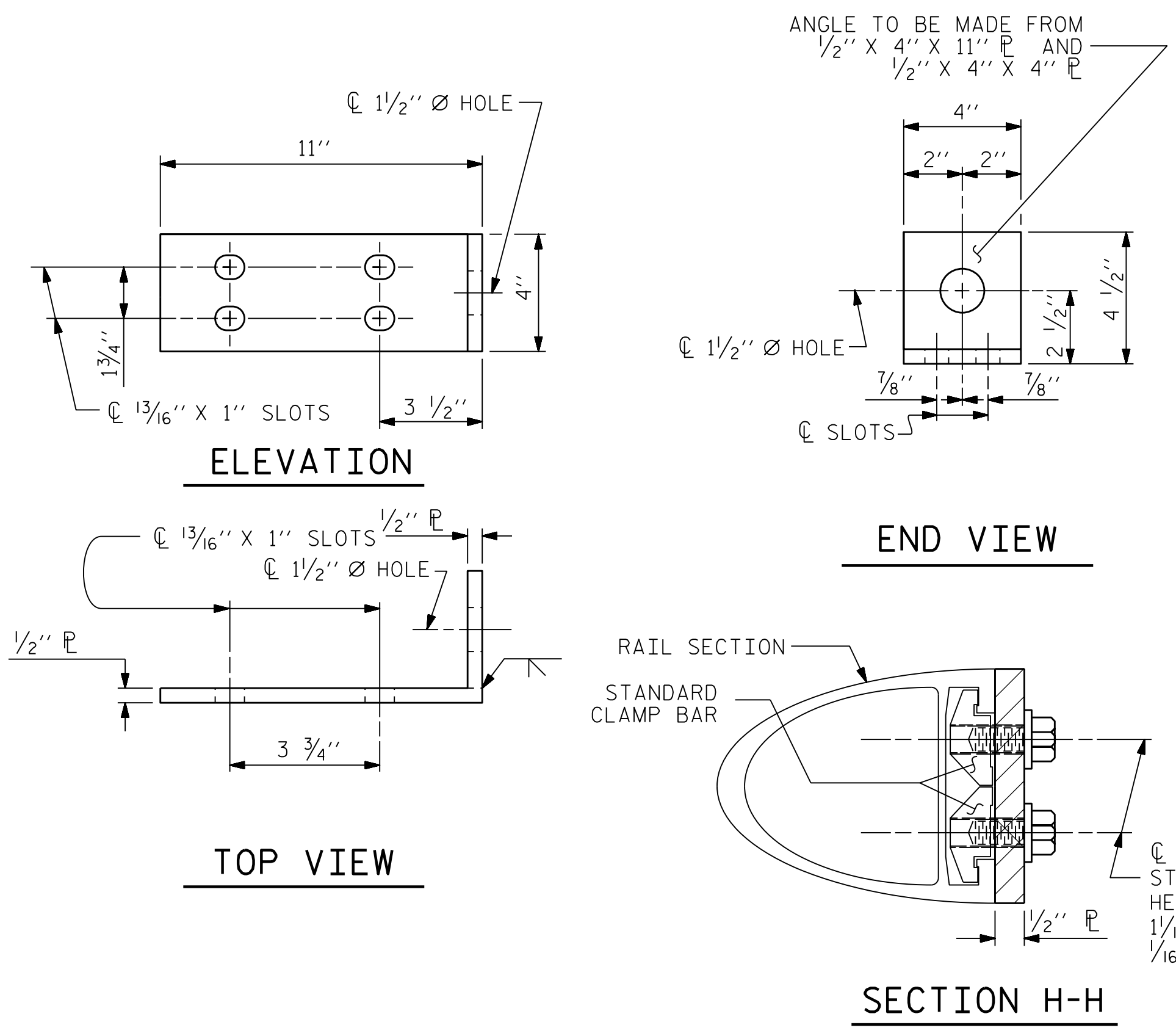
THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 1/8" 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 1/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

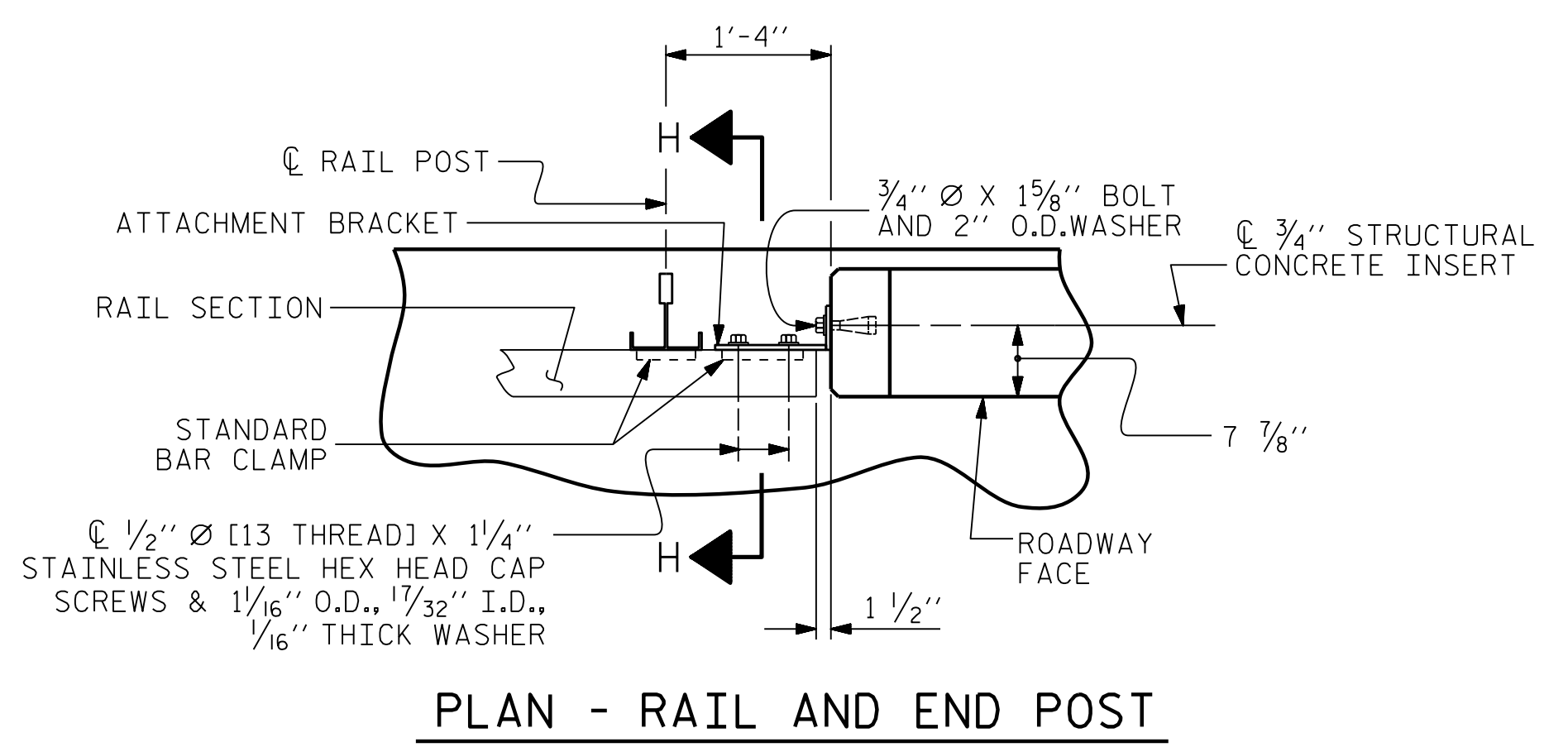


**STRUCTURAL CONCRETE INSERT**

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



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

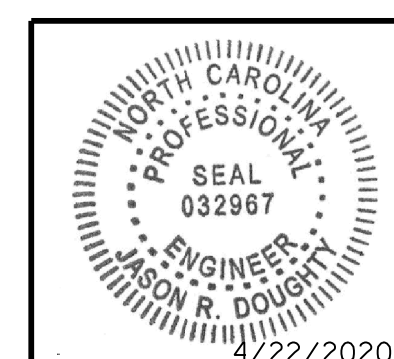


**PLAN - RAIL AND END POST**

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 3 OF 3

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



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

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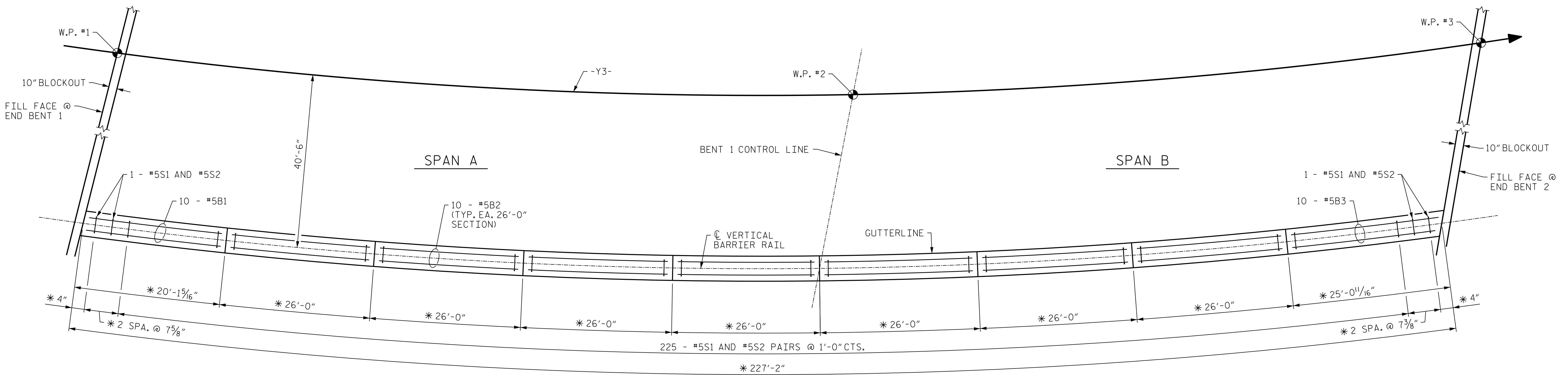
STR. #4

STD. NO. BMR2

4/22/2020 404\_050\_R2233BB\_SMLL2MR4\_800663.dgn

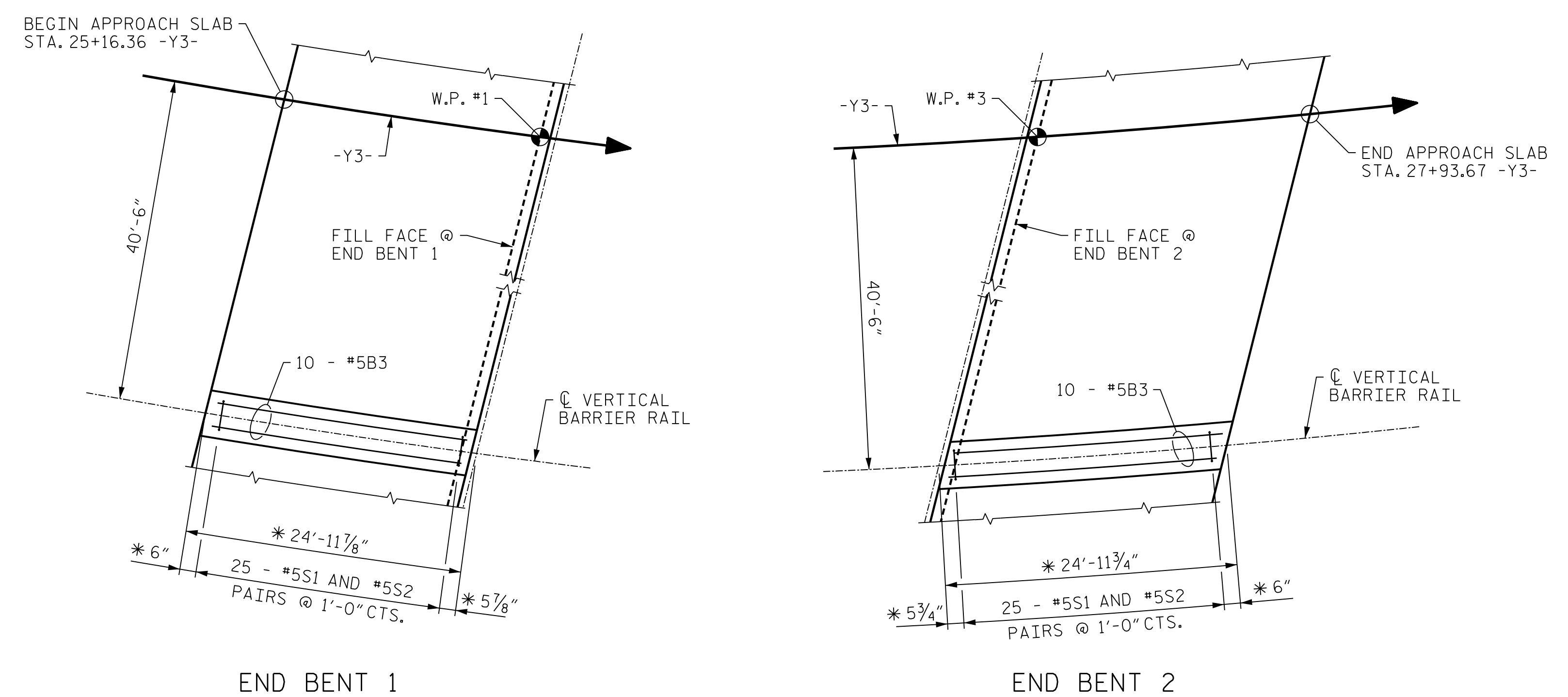
DESIGNED BY: C. CORMAN DATE: AUG 2019  
 DRAWN BY: K. WHITE DATE: AUG 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

DRAWN BY: FCJ 1/88  
 CHECKED BY: CRK 3/89  
 REV. 5/1/06 TLA/GM  
 REV. 10/1/11 MAA/GM  
 REV. 12/17 MAA/THC



**VERTICAL BARRIER RAIL PLAN**

\* MEASURED ALONG  $\bar{C}$  VERTICAL BARRIER RAIL



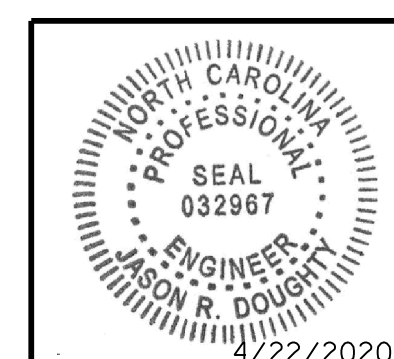
**VERTICAL BARRIER RAIL PLAN - APPROACH SLABS**

\* MEASURED ALONG  $\bar{C}$  VERTICAL BARRIER RAIL

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**VERTICAL CONCRETE BARRIER RAIL LAYOUT**



DocuSigned by:  
*Jason R Doughty*  
 SF73FA2DEA874E8...

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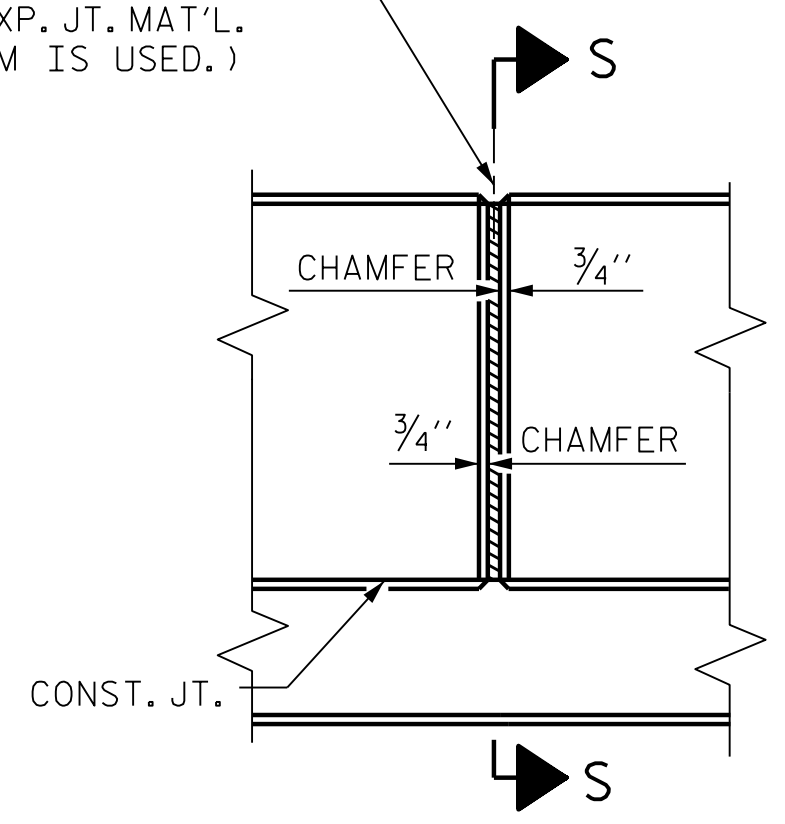
STR. #4

4/22/2020 404\_051\_R2233BB\_SML\_BR1\_800663.dgn

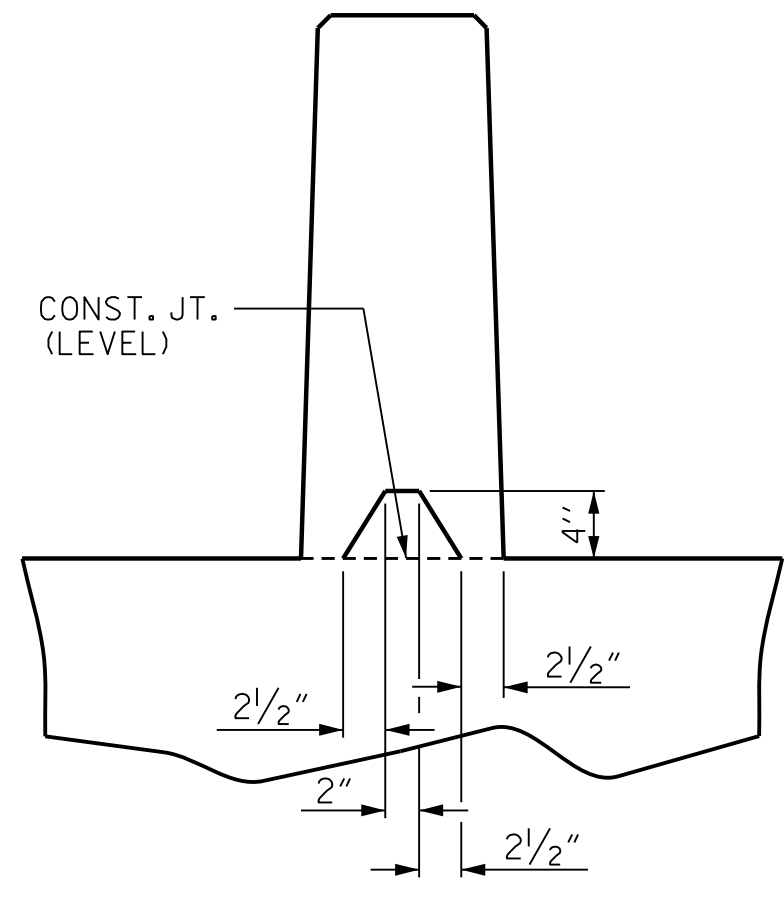
DESIGNED BY: C. CORMAN DATE: MAY 2019  
 DRAWN BY: K. WHITE DATE: MAY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019



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



ELEVATION AT EXPANSION JOINTS



SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

**BARRIER RAIL DETAILS**

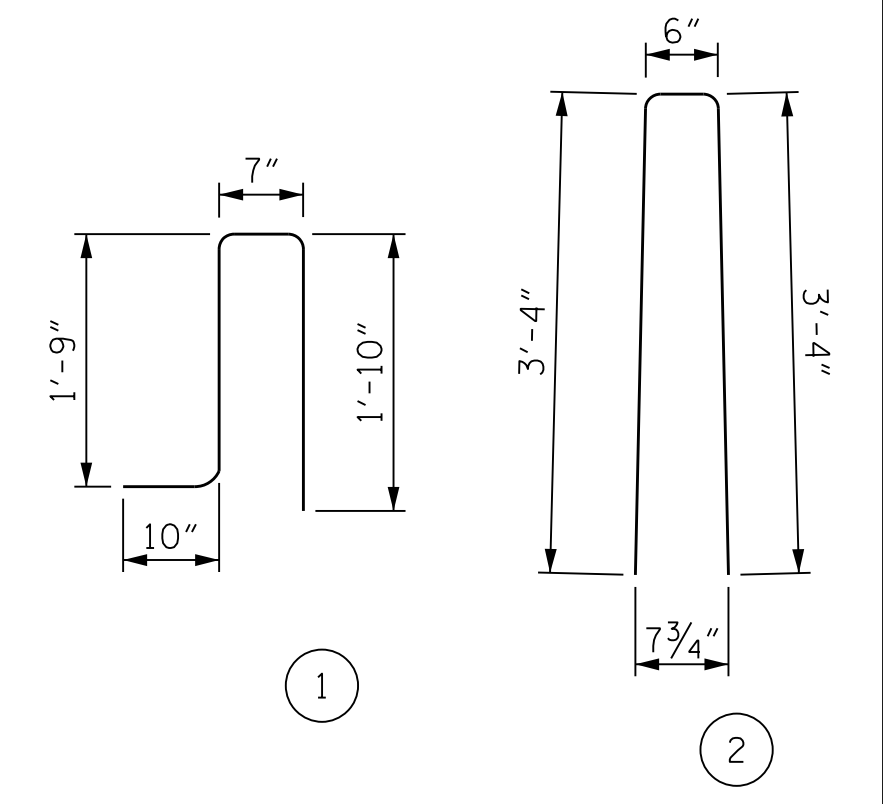
**NOTES**

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

**BAR TYPES**

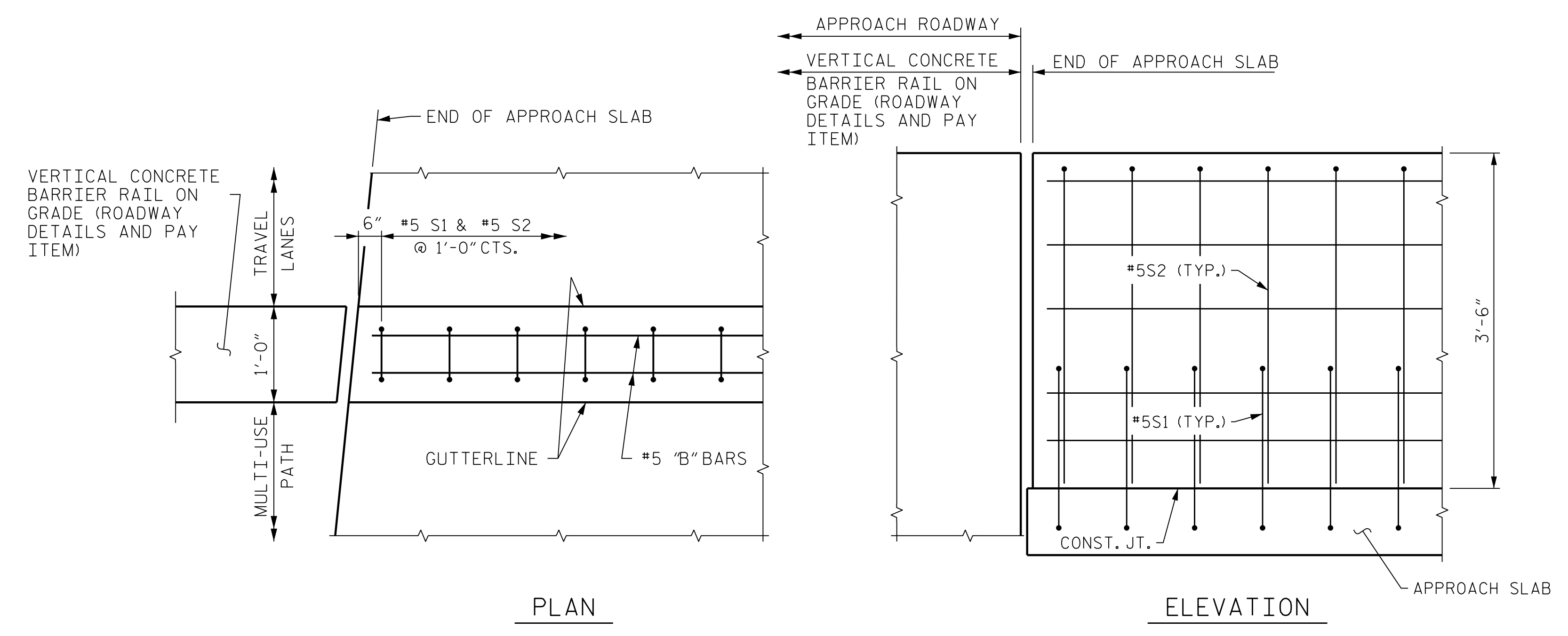


ALL BAR DIMENSIONS ARE OUT TO OUT

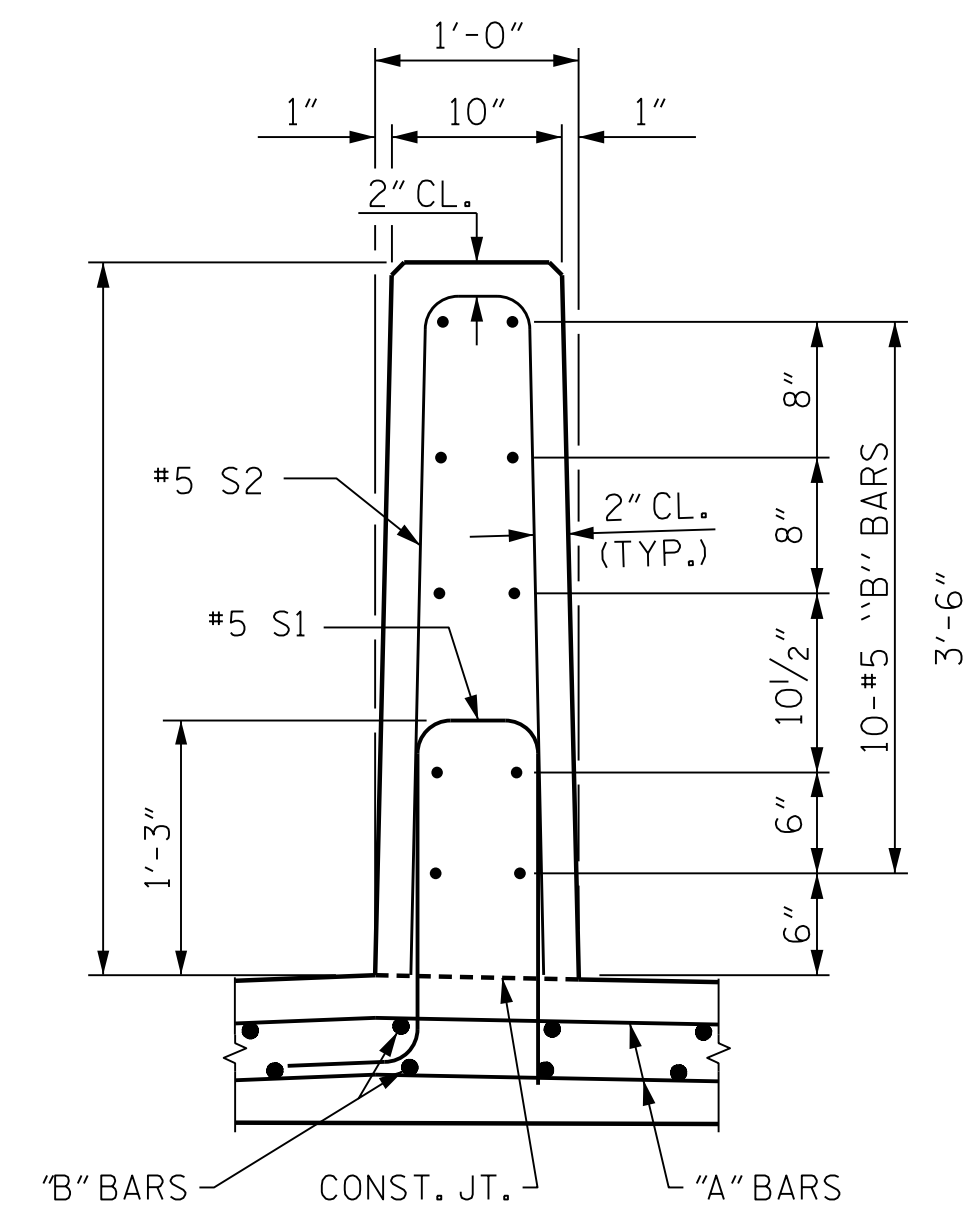
**BILL OF MATERIAL**

FOR VERTICAL CONCRETE BARRIER RAIL ONLY

| BAR                              | NO. | SIZE | TYPE | LENGTH | WEIGHT          |
|----------------------------------|-----|------|------|--------|-----------------|
| *B1                              | 10  | #5   | STR  | 19'-7" | 204             |
| *B2                              | 70  | #5   | STR  | 25'-7" | 1868            |
| *B3                              | 30  | #5   | STR  | 24'-7" | 769             |
| *S1                              | 279 | #5   | 1    | 5'-0"  | 1455            |
| *S2                              | 279 | #5   | 2    | 7'-2"  | 2085            |
| * EPOXY COATED REINFORCING STEEL |     |      |      |        | 6,381 LBS.      |
| CLASS AA CONCRETE                |     |      |      |        | 32.94 CU. YDS.  |
| VERTICAL CONCRETE BARRIER RAIL   |     |      |      |        | 277.14 LIN. FT. |



PLAN  
ELEVATION  
**END OF RAIL DETAILS**



**SECTION THRU RAIL**

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
STATION: 26+65.52 -Y3-

4/22/2020 404\_053\_R2233BB\_SML\_BR2\_800663.dgn

|                        |                 |                    |                 |                       |                |                                       |                |
|------------------------|-----------------|--------------------|-----------------|-----------------------|----------------|---------------------------------------|----------------|
| DESIGNED BY: C. CORMAN | DATE: JULY 2019 | DRAWN BY: K. WHITE | DATE: JULY 2019 | CHECKED BY: B. LOFLIN | DATE: AUG 2019 | DESIGN ENGINEER OF RECORD: J. DOUGHTY | DATE: NOV 2019 |
| DRAWN BY: MAA          | 5/10            | REV. 6/13          | MAA/GM          | CHECKED BY: GM        | 5/10           | REV. 12/17                            | MAA/THC        |
|                        |                 | REV. 5/18          | MAA/THC         |                       |                |                                       |                |

**MODJESKI and MASTERS**  
Experience great bridges.  
333 FAYETTEVILLE STREET, SUITE 500  
RALEIGH, NC 27601  
NC LICENSE NO. C-2979

DocuSigned by:  
*Jason R. Dougherty*  
SEAL 032967  
ENGINEER  
JASON R. DOUGHTY  
4/22/2020

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
VERTICAL CONCRETE BARRIER RAIL

| REVISIONS |     |       |     |     |       | SHEET NO.    |
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| 2         |     |       | 4   |     |       |              |

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**NOTES**

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

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

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

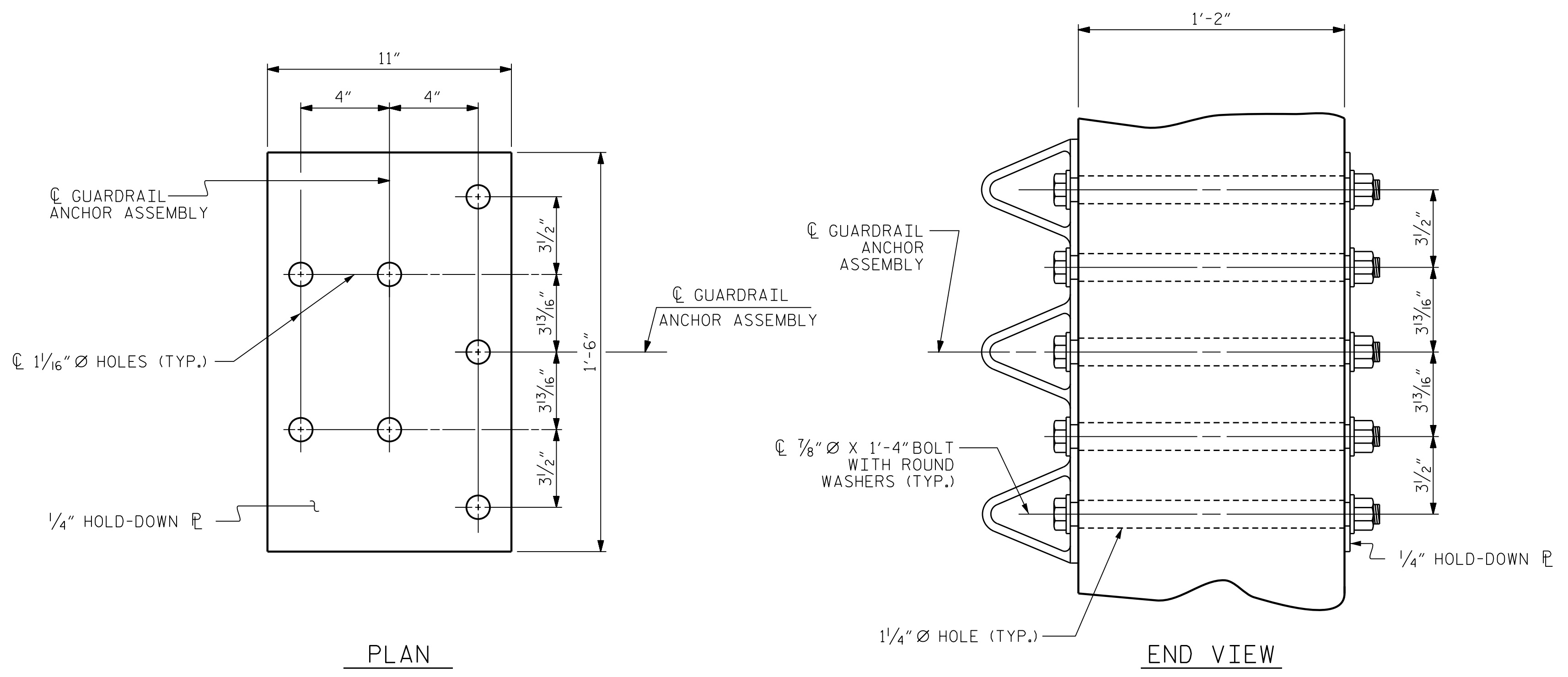
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

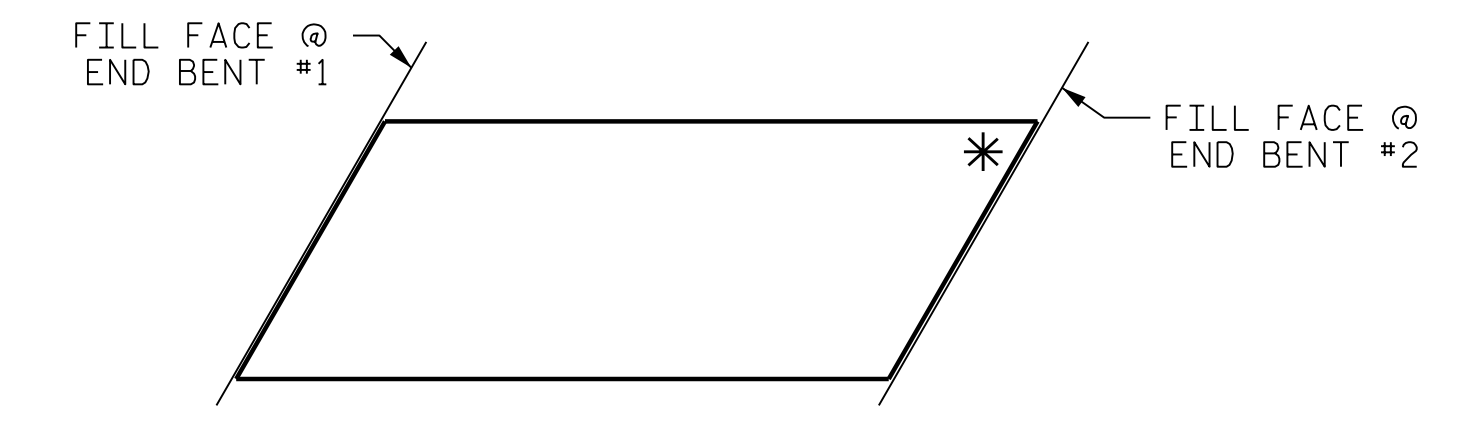
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

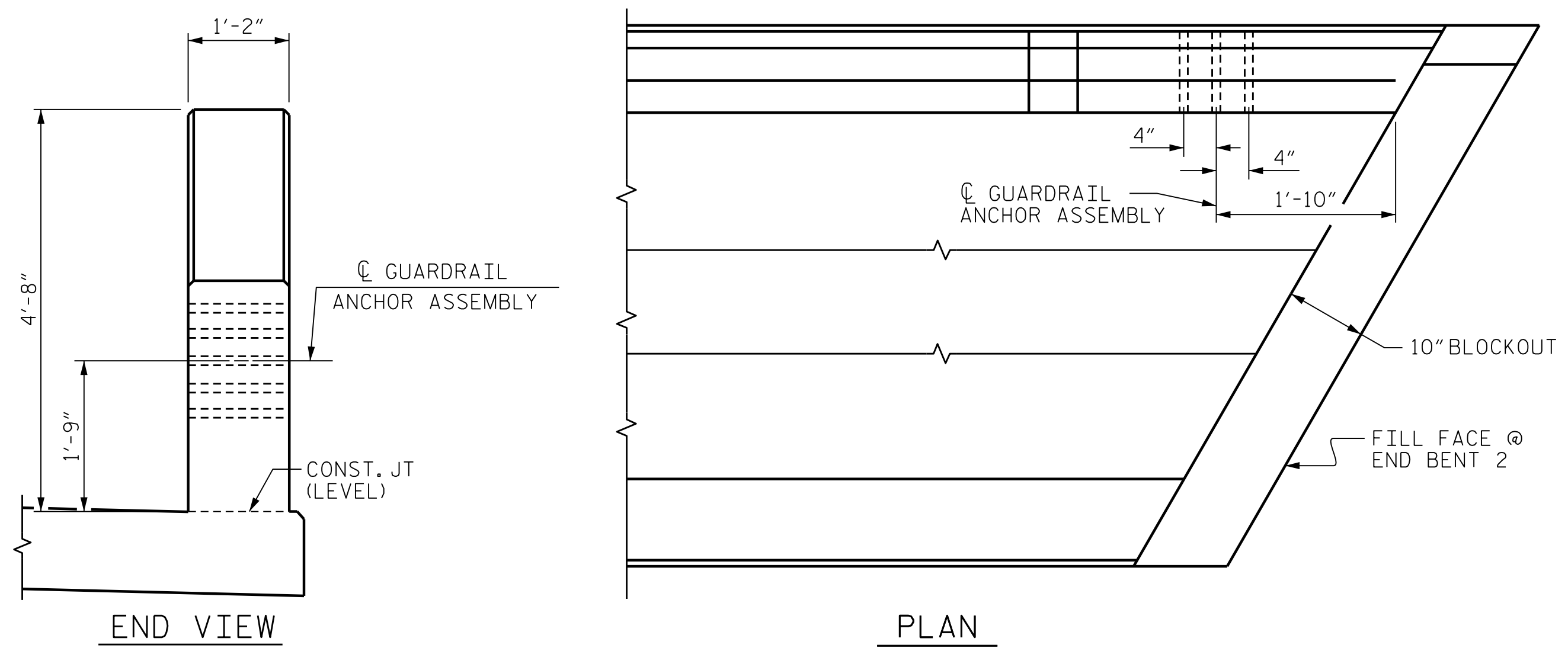


**GUARDRAIL ANCHOR ASSEMBLY DETAILS**



**SKETCH SHOWING POINTS OF ATTACHMENT**

\* LOCATION OF GUARDRAIL ATTACHMENT



**LOCATION OF GUARDRAIL ANCHOR AT END POST**

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL**

**MODJESKI and MASTERS**  
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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

DocuSigned by:  
**Jason R. Doughty**  
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 4/22/2020

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

TOTAL SHEETS: 45

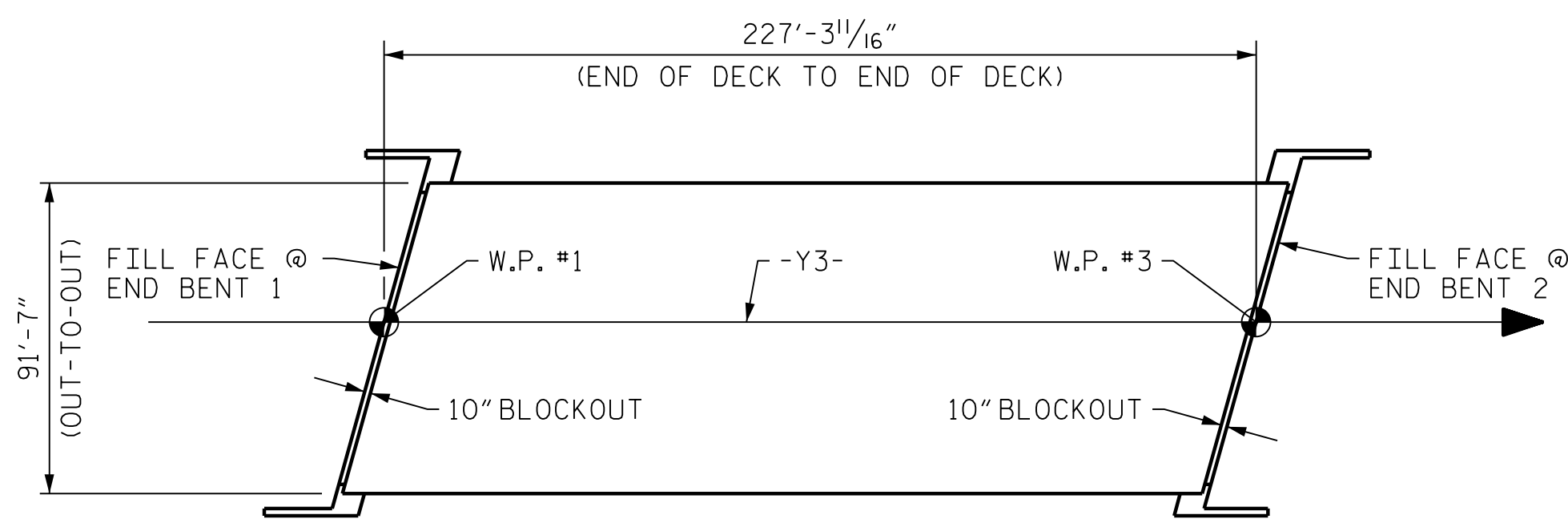
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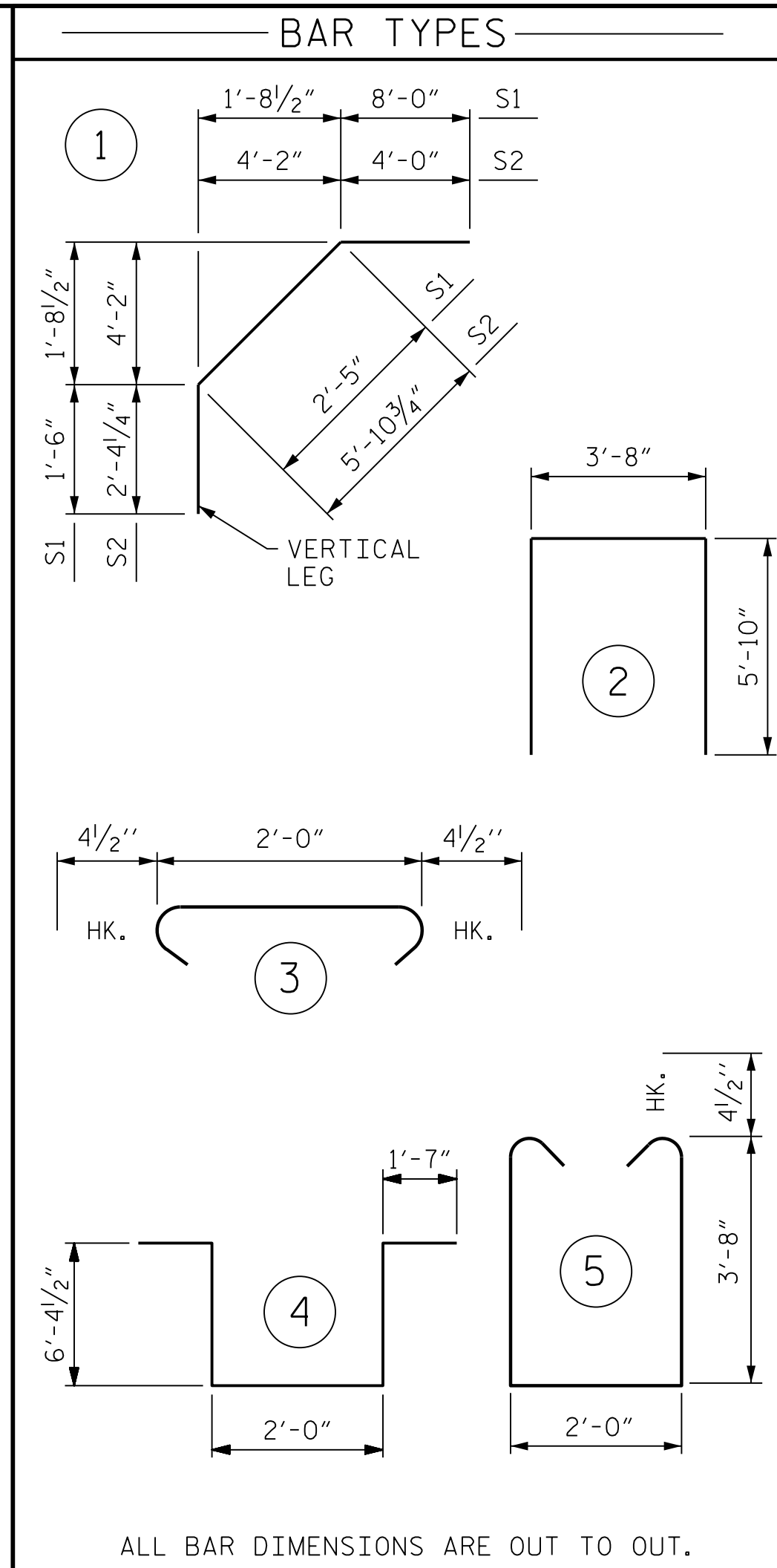
|                               |                        |                           |                        |                              |                       |  |                       |
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| DESIGNED BY: <u>C. CORMAN</u> | DATE: <u>JULY 2019</u> | DRAWN BY: <u>K. WHITE</u> | DATE: <u>JULY 2019</u> | CHECKED BY: <u>B. LOFLIN</u> | DATE: <u>AUG 2019</u> | DESIGN ENGINEER OF RECORD: <u>J. DOUGHTY</u> | DATE: <u>NOV 2019</u> |
| DRAWN BY: <u>MAA</u>          | 5/10                   | REV. <u>1/15</u>          | <u>MAA/TMG</u>         | CHECKED BY: <u>GM</u>        | 5/10                  | REV. <u>12/17</u>                            | <u>MAA/THC</u>        |
|                               |                        | REV. <u>5/18</u>          | <u>MAA/THC</u>         |                              |                       |  |                       |

**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

| BAR SIZE | SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL |          | APPROACH SLABS |          | PARAPET AND BARRIER RAIL |
|----------|---|----------|----------------|----------|--------------------------|
|          | EPOXY COATED  | UNCOATED | EPOXY COATED   | UNCOATED |                          |
| #4       | 1'-11"  | 1'-7"    | 1'-11"         | 1'-7"    | 2'-6"                    |
| #5       | 2'-5"   | 2'-0"    | 2'-5"          | 2'-0"    | 3'-1"                    |
| #6       | 2'-10"  | 2'-5"    | 3'-7"          | 2'-5"    | 3'-8"                    |
| #7       | 4'-2"   | 2'-9"    |                |          |                          |
| #8       | 4'-9"   | 3'-2"    |                |          |                          |



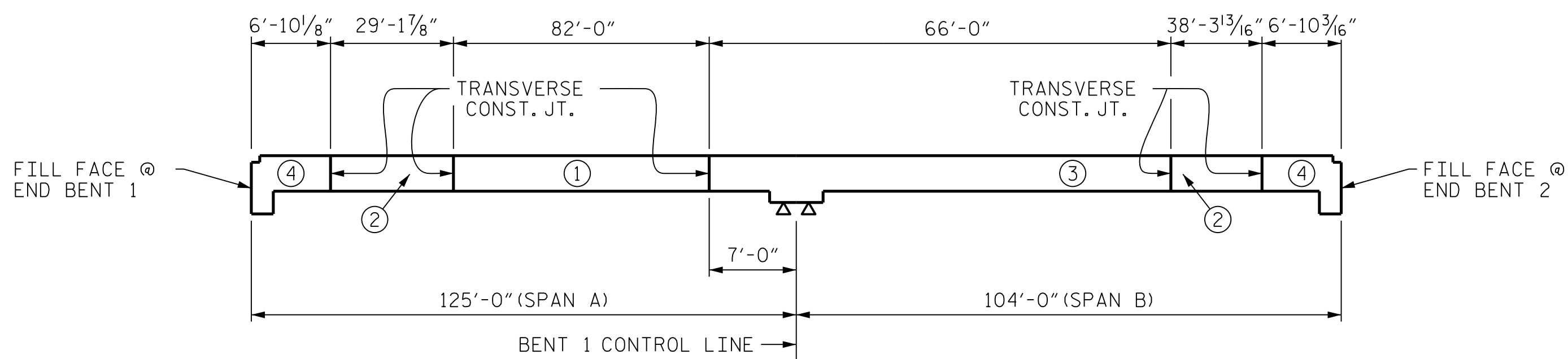
**LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 20,818)**



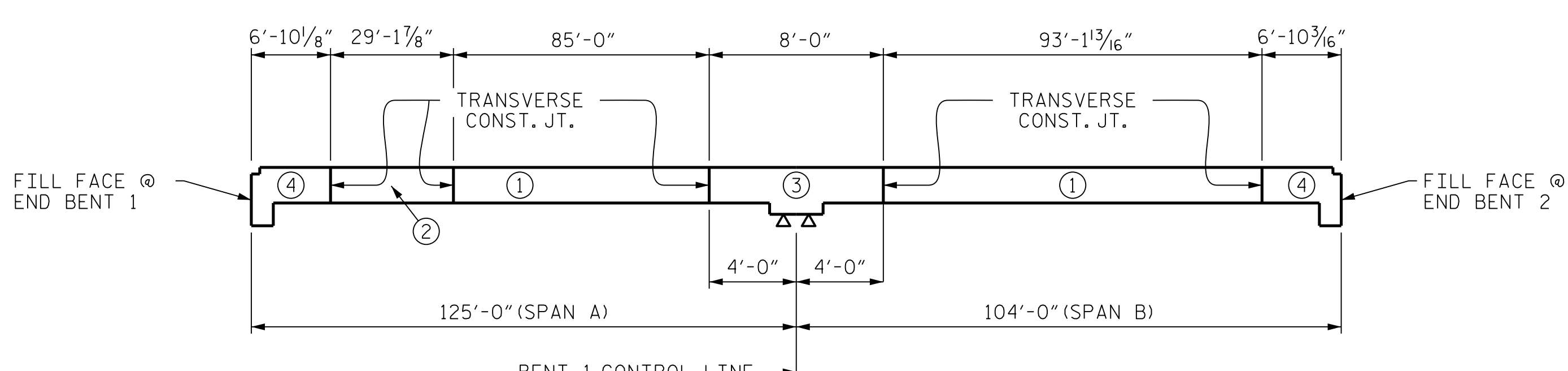
ALL BAR DIMENSIONS ARE OUT TO OUT.

| BILL OF MATERIAL |        |      |      |         |        | BILL OF MATERIAL |        |      |      |         |        | BILL OF MATERIAL |        |      |      |         |        |
|------------------|--------|------|------|---------|--------|------------------|--------|------|------|---------|--------|------------------|--------|------|------|---------|--------|
| BAR              | NUMBER | SIZE | TYPE | LENGTH  | WEIGHT | BAR              | NUMBER | SIZE | TYPE | LENGTH  | WEIGHT | BAR              | NUMBER | SIZE | TYPE | LENGTH  | WEIGHT |
| * A1             | 676    | 5    | STR  | 46'-10" | 33021  | A2               | 676    | 5    | STR  | 46'-8"  | 32903  | * B1             | 183    | 5    | STR  | 24'-10" | 4740   |
| * A101           | 6      | 5    | STR  | 45'-5"  | 284    | A201             | 6      | 5    | STR  | 45'-2"  | 283    | * B2             | 126    | 4    | STR  | 31'-3"  | 2630   |
| * A102           | 6      | 5    | STR  | 39'-11" | 250    | A202             | 6      | 5    | STR  | 39'-9"  | 249    | * B3             | 63     | 5    | STR  | 50'-0"  | 3285   |
| * A103           | 6      | 5    | STR  | 34'-5"  | 215    | A203             | 6      | 5    | STR  | 34'-4"  | 215    | * B4             | 63     | 5    | STR  | 31'-2"  | 2048   |
| * A104           | 1      | 5    | STR  | 55'-8"  | 58     | A204             | 1      | 5    | STR  | 55'-8"  | 58     | * B5             | 120    | 5    | STR  | 36'-6"  | 4568   |
| * A105           | 1      | 5    | STR  | 52'-0"  | 54     | A205             | 1      | 5    | STR  | 52'-0"  | 54     | * B6             | 126    | 4    | STR  | 25'-10" | 2174   |
| * A106           | 1      | 5    | STR  | 48'-5"  | 50     | A206             | 1      | 5    | STR  | 48'-5"  | 50     | * B7             | 183    | 5    | STR  | 20'-10" | 3976   |
| * A107           | 1      | 5    | STR  | 44'-9"  | 47     | A207             | 1      | 5    | STR  | 44'-9"  | 47     | * B8             | 292    | 5    | STR  | 58'-4"  | 17766  |
| * A108           | 1      | 5    | STR  | 41'-2"  | 43     | A208             | 1      | 5    | STR  | 41'-2"  | 43     | B9               | 54     | 5    | STR  | 24'-10" | 1399   |
| * A109           | 1      | 5    | STR  | 37'-6"  | 39     | A209             | 1      | 5    | STR  | 37'-6"  | 39     | B10              | 54     | 5    | STR  | 36'-6"  | 2056   |
| * A110           | 1      | 5    | STR  | 33'-11" | 35     | A210             | 1      | 5    | STR  | 33'-11" | 35     | B11              | 54     | 5    | STR  | 20'-10" | 1173   |
| * A111           | 1      | 5    | STR  | 30'-3"  | 32     | A211             | 1      | 5    | STR  | 30'-3"  | 32     |                  |        |      |      |         |        |
| * A112           | 1      | 5    | STR  | 26'-8"  | 28     | A212             | 1      | 5    | STR  | 26'-8"  | 28     | K1               | 42     | 4    | STR  | 32'-3"  | 905    |
| * A113           | 1      | 5    | STR  | 23'-0"  | 24     | A213             | 1      | 5    | STR  | 23'-0"  | 24     | K2               | 36     | 4    | STR  | 5'-6"   | 132    |
| * A114           | 1      | 5    | STR  | 19'-4"  | 20     | A214             | 1      | 5    | STR  | 19'-4"  | 20     | K3               | 180    | 4    | STR  | 8'-7"   | 1032   |
| * A115           | 1      | 5    | STR  | 15'-9"  | 16     | A215             | 1      | 5    | STR  | 15'-9"  | 16     | K4               | 36     | 4    | STR  | 8'-11"  | 166    |
| * A116           | 1      | 5    | STR  | 12'-1"  | 13     | A216             | 1      | 5    | STR  | 12'-1"  | 13     | K5               | 1      | 4    | STR  | 1'-1"   | 1      |
| * A117           | 1      | 5    | STR  | 8'-6"   | 9      | A217             | 1      | 5    | STR  | 8'-6"   | 9      | K6               | 5      | 4    | STR  | 2'-5"   | 8      |
| * A118           | 1      | 5    | STR  | 4'-10"  | 5      | A218             | 1      | 5    | STR  | 4'-10"  | 5      | K7               | 1      | 4    | STR  | 1'-8"   | 1      |
|                  |        |      |      |         |        |                  |        |      |      |         |        | K8               | 1      | 4    | STR  | 1'-5"   | 1      |
| * A120           | 6      | 5    | STR  | 45'-5"  | 284    | A220             | 6      | 5    | STR  | 45'-3"  | 283    | K9               | 5      | 4    | STR  | 2'-9"   | 9      |
| * A121           | 6      | 5    | STR  | 40'-1"  | 251    | A221             | 6      | 5    | STR  | 39'-11" | 250    | K10              | 1      | 4    | STR  | 2'-0"   | 1      |
| * A122           | 6      | 5    | STR  | 34'-9"  | 217    | A222             | 6      | 5    | STR  | 34'-7"  | 216    | K11              | 1      | 4    | STR  | 1'-11"  | 1      |
| * A123           | 1      | 5    | STR  | 56'-5"  | 59     | A223             | 1      | 5    | STR  | 56'-5"  | 59     | K12              | 5      | 4    | STR  | 3'-4"   | 11     |
| * A124           | 1      | 5    | STR  | 52'-10" | 55     | A224             | 1      | 5    | STR  | 52'-10" | 55     | K13              | 1      | 4    | STR  | 2'-6"   | 2      |
| * A125           | 1      | 5    | STR  | 49'-3"  | 51     | A225             | 1      | 5    | STR  | 49'-3"  | 51     | K14              | 1      | 4    | STR  | 2'-2"   | 1      |
| * A126           | 1      | 5    | STR  | 45'-8"  | 48     | A226             | 1      | 5    | STR  | 45'-8"  | 48     | K15              | 5      | 4    | STR  | 3'-7"   | 12     |
| * A127           | 1      | 5    | STR  | 42'-2"  | 44     | A227             | 1      | 5    | STR  | 42'-2"  | 44     | K16              | 1      | 4    | STR  | 2'-9"   | 2      |
| * A128           | 1      | 5    | STR  | 38'-7"  | 40     | A228             | 1      | 5    | STR  | 38'-7"  | 40     | K17              | 21     | 4    | STR  | 30'-7"  | 429    |
| * A129           | 1      | 5    | STR  | 35'-0"  | 37     | A229             | 1      | 5    | STR  | 35'-0"  | 37     |                  |        |      |      |         |        |
| * A130           | 1      | 5    | STR  | 31'-6"  | 33     | A230             | 1      | 5    | STR  | 31'-6"  | 33     | * S1             | 116    | 4    | 1    | 11'-11" | 923    |
| * A131           | 1      | 5    | STR  | 27'-11" | 29     | A231             | 1      | 5    | STR  | 27'-11" | 29     | * S2             | 114    | 4    | 1    | 12'-3"  | 933    |
| * A132           | 1      | 5    | STR  | 24'-4"  | 25     | A232             | 1      | 5    | STR  | 24'-4"  | 25     | S3               | 116    | 4    | 2    | 15'-4"  | 1188   |
| * A133           | 1      | 5    | STR  | 20'-10" | 22     | A233             | 1      | 5    | STR  | 20'-10" | 22     | S4               | 414    | 4    | 3    | 2'-9"   | 761    |
| * A134           | 1      | 5    | STR  | 17'-3"  | 18     | A234             | 1      | 5    | STR  | 17'-3"  | 18     |                  |        |      |      |         |        |
| * A135           | 1      | 5    | STR  | 13'-8"  | 14     | A235             | 1      | 5    | STR  | 13'-8"  | 14     | U1               | 18     | 4    | 5    | 10'-1"  | 121    |
| * A136           | 1      | 5    | STR  | 10'-2"  | 11     | A236             | 1      | 5    | STR  | 10'-2"  | 11     | U2               | 54     | 4    | 4    | 17'-11" | 646    |
| * A137           | 1      | 5    | STR  | 6'-7"   | 7      | A237             | 1      | 5    | STR  | 6'-7"   | 7      |                  |        |      |      |         |        |
| * A138           | 1      | 5    | STR  | 3'-0"   | 3      | A238             | 1      | 5    | STR  | 3'-0"   | 3      |                  |        |      |      |         |        |

REINFORCING STEEL = 63,193 LBS.  
\* EPOXY COATED REINFORCING STEEL = 60,770 LBS.



**POUR SEQUENCE**



**OPTIONAL POUR SEQUENCE**

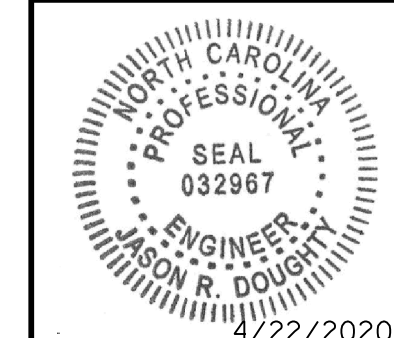
| SUPERSTRUCTURE BILL OF MATERIAL |                              |                          |                                       |
|---------------------------------|------------------------------|--------------------------|---------------------------------------|
|                                 | CLASS AA CONCRETE (CU. YDS.) | REINFORCING STEEL (LBS.) | EPOXY COATED REINFORCING STEEL (LBS.) |
| POUR #1                         | 240.4                        | 63,192                   | 60,768                                |
| POUR #2                         | 202.2                        |                          |                                       |
| POUR #3                         | 236.5                        |                          |                                       |
| POUR #4                         | 96.9                         |                          |                                       |
| TOTALS **                       | 776.0                        | 63,192                   | 60,768                                |

\*\* QUANTITIES FOR RAILS ARE NOT INCLUDED.

| GROOVING BRIDGE FLOORS |  |                |
|------------------------|--|----------------|
| APPROACH SLABS         |  | 3,964 SQ. FT.  |
| BRIDGE DECK            |  | 18,614 SQ. FT. |
| TOTAL                  |  | 22,578 SQ. FT. |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
STATION: 26+65.52 -Y3-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
SUPERSTRUCTURE  
BILL OF MATERIAL

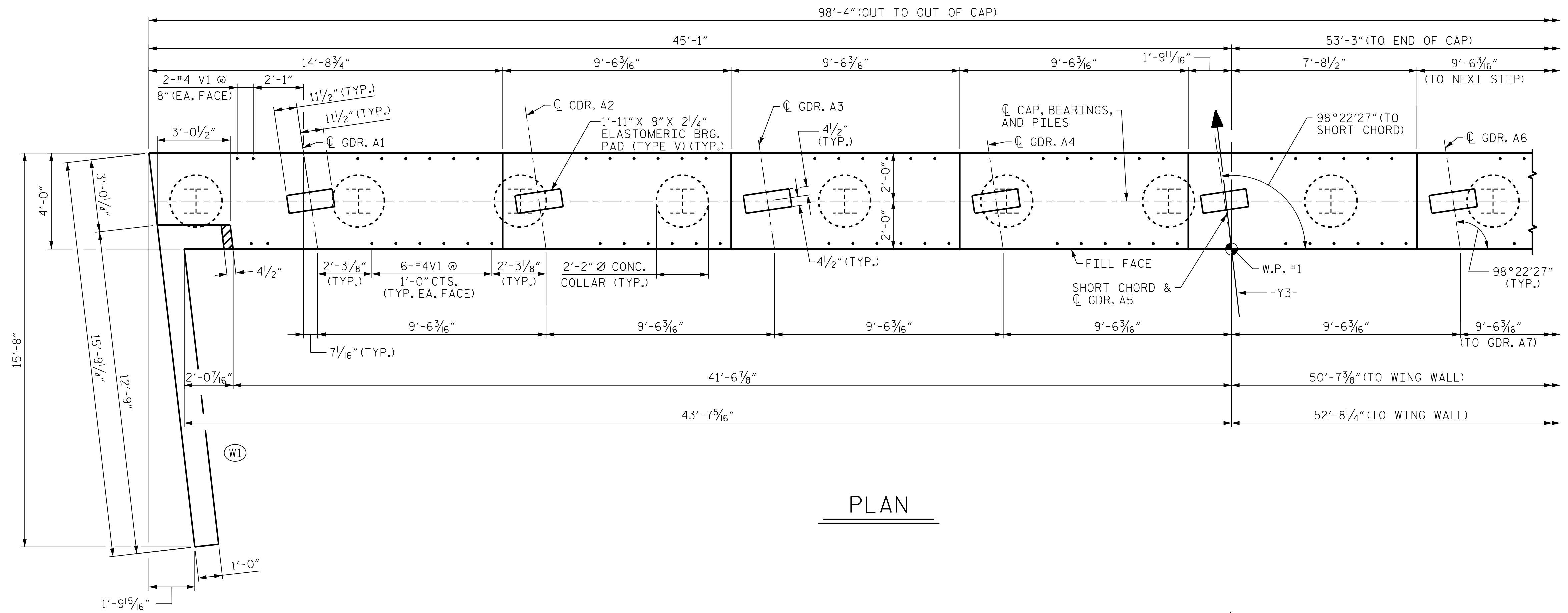


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RALEIGH, NC 27601  
NC LICENSE NO. C-2979

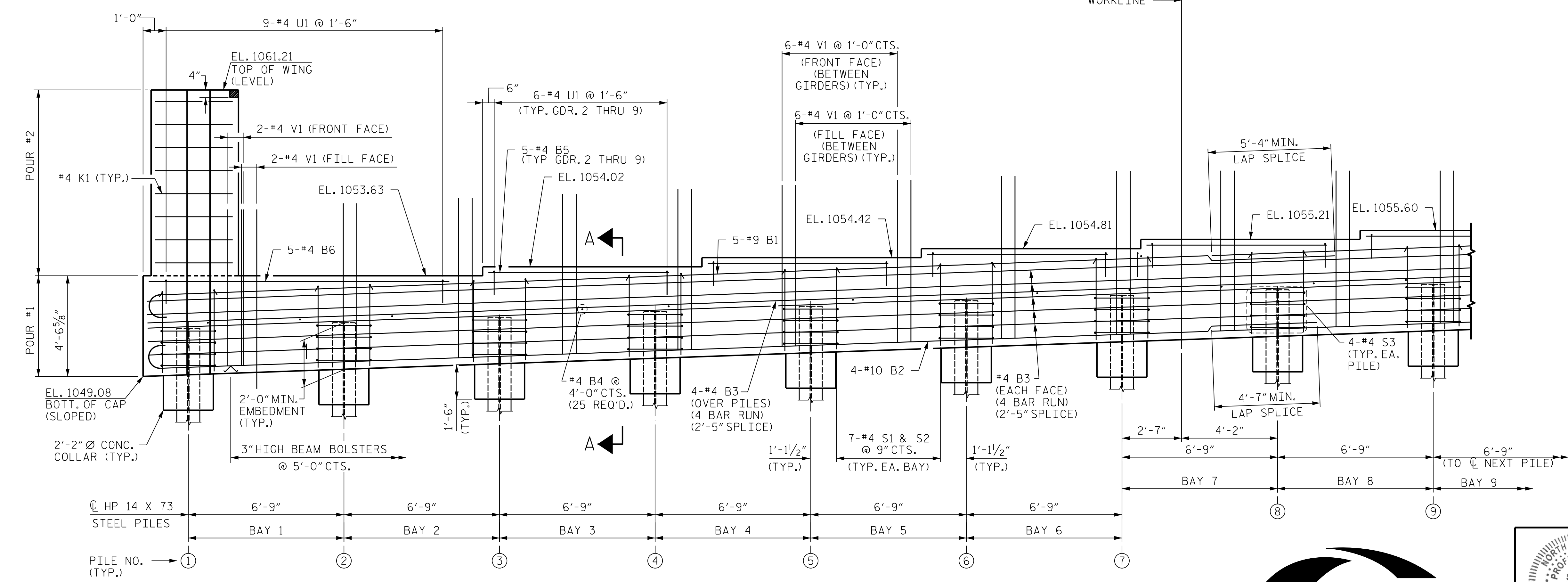
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|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |                 |
| 1         |     |       | 3   |     |       | S4-31           |
| 2         |     |       | 4   |     |       | TOTAL SHEETS 45 |

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|                       |                 |                 |      |              |         |
|-----------------------|-----------------|-----------------|------|--------------|---------|
| DESIGNED BY: A. DUTTA | DATE: SEPT 2019 | DRAWN BY: JMB   | 5/87 | REV. 10/1/11 | MAA/GM  |
| DRAWN BY: K. WHITE    | DATE: MAY 2019  | CHECKED BY: SJD | 9/87 | REV. 12/17   | MAA/THC |
| CHECKED BY: B. LOFLIN | DATE: NOV 2019  | DESIGN ENGINEER |      | REV. 06/19   | BNB/THC |
| DESIGN ENGINEER       |                 | DATE: NOV 2019  |      |              |         |



**PLAN**



**ELEVATION**

FOR SECTION A-A, SEE SHEET 4 OF 4.

**NOTES:**  
 THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT TO THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

| TOP OF PILE ELEVATIONS |           |
|------------------------|-----------|
| PILE NO.               | ELEVATION |
| 1                      | 1051.15   |
| 2                      | 1051.41   |
| 3                      | 1051.66   |
| 4                      | 1051.91   |
| 5                      | 1052.16   |
| 6                      | 1052.41   |
| 7                      | 1052.66   |
| 8                      | 1052.91   |
| 9                      | 1053.16   |
| 10                     | 1053.42   |
| 11                     | 1053.67   |
| 12                     | 1053.92   |
| 13                     | 1054.17   |
| 14                     | 1054.42   |
| 15                     | 1054.67   |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

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

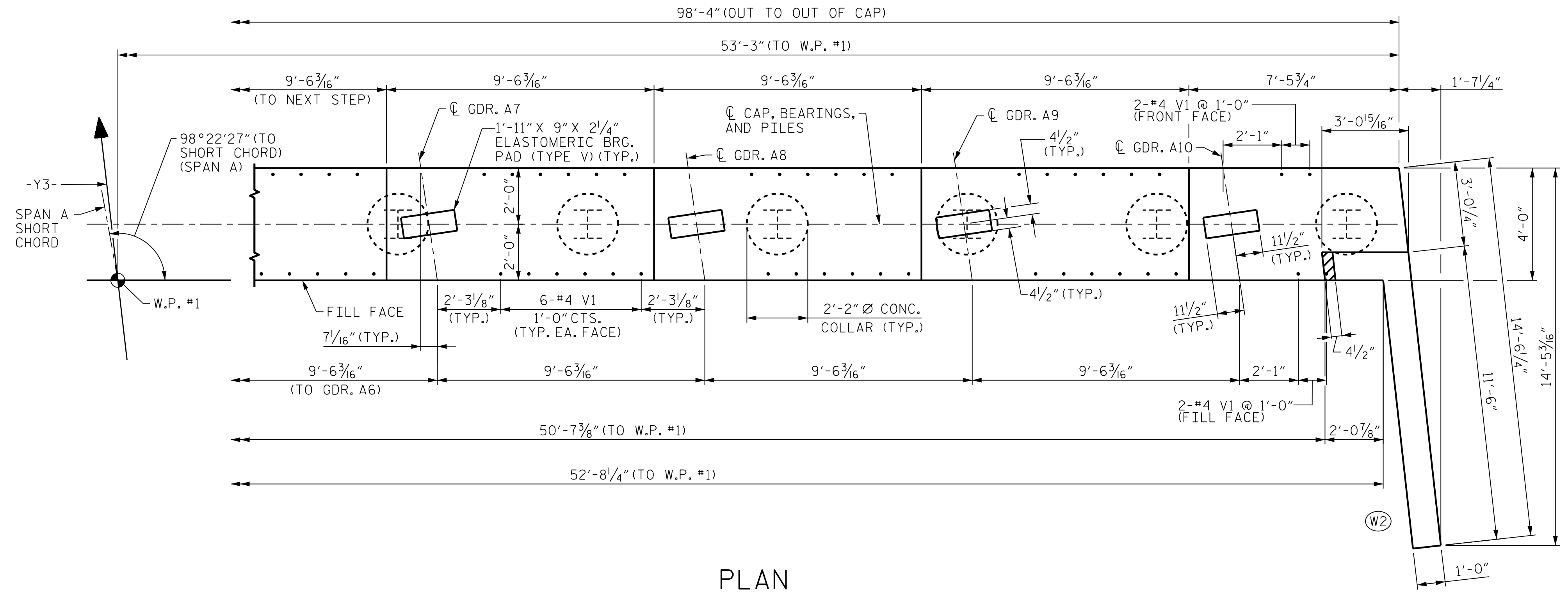
SHEET NO. S4-32  
 TOTAL SHEETS 45

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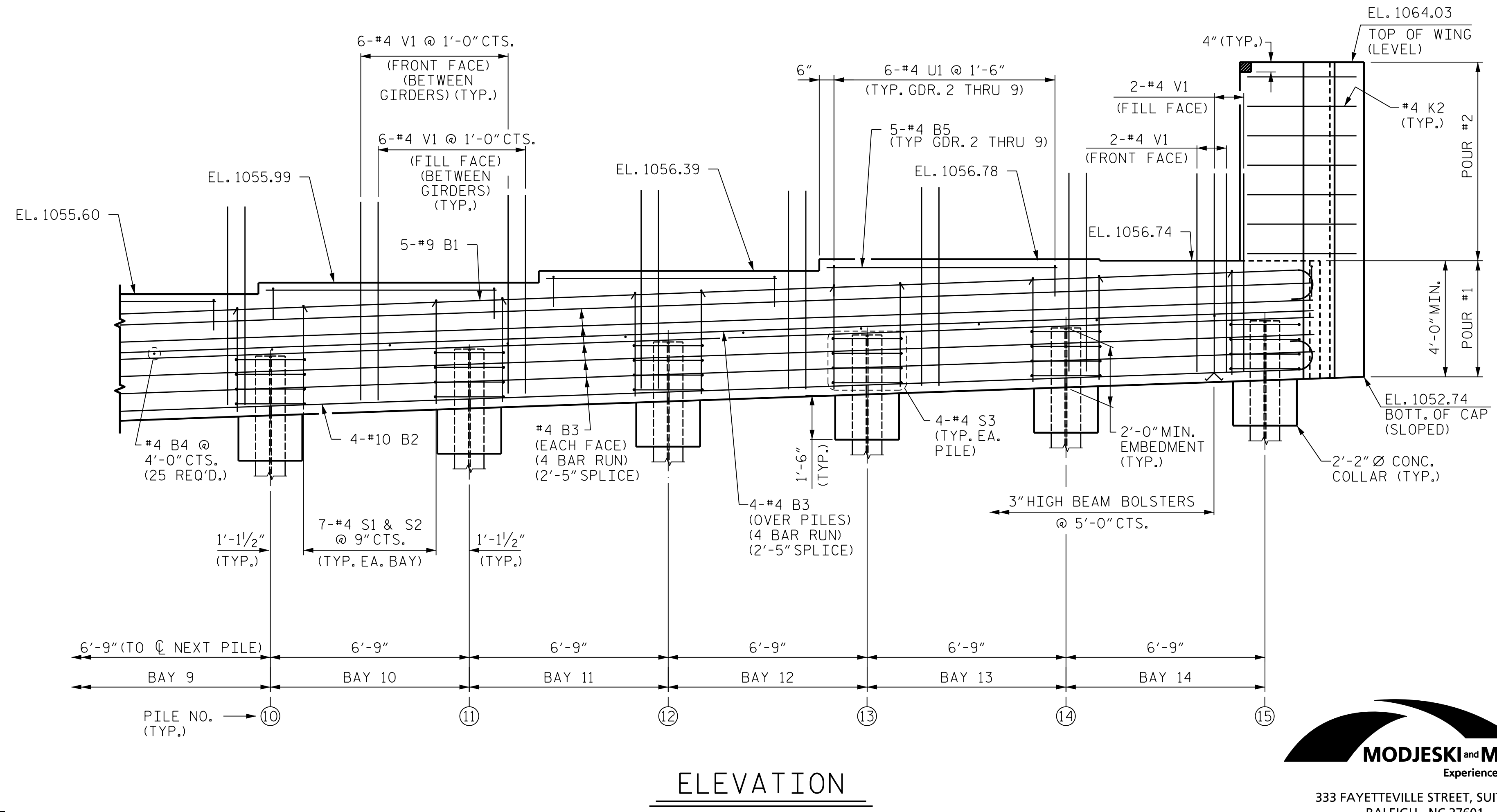
DocuSigned by:  
**Jason R. Doughty**  
 5F73FA2DEA974E8...

DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: A. HARLESS DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**



PLAN



ELEVATION

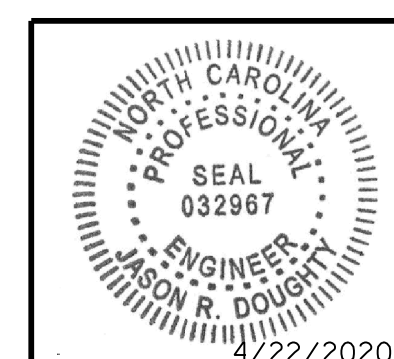
PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-  
 SHEET 2 OF 4

|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUBSTRUCTURE<br>END BENT 1   |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
| SHEET NO.<br>S4-33   |     |       |     |     | TOTAL SHEETS<br>45 |



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 NC LICENSE NO. C-2979

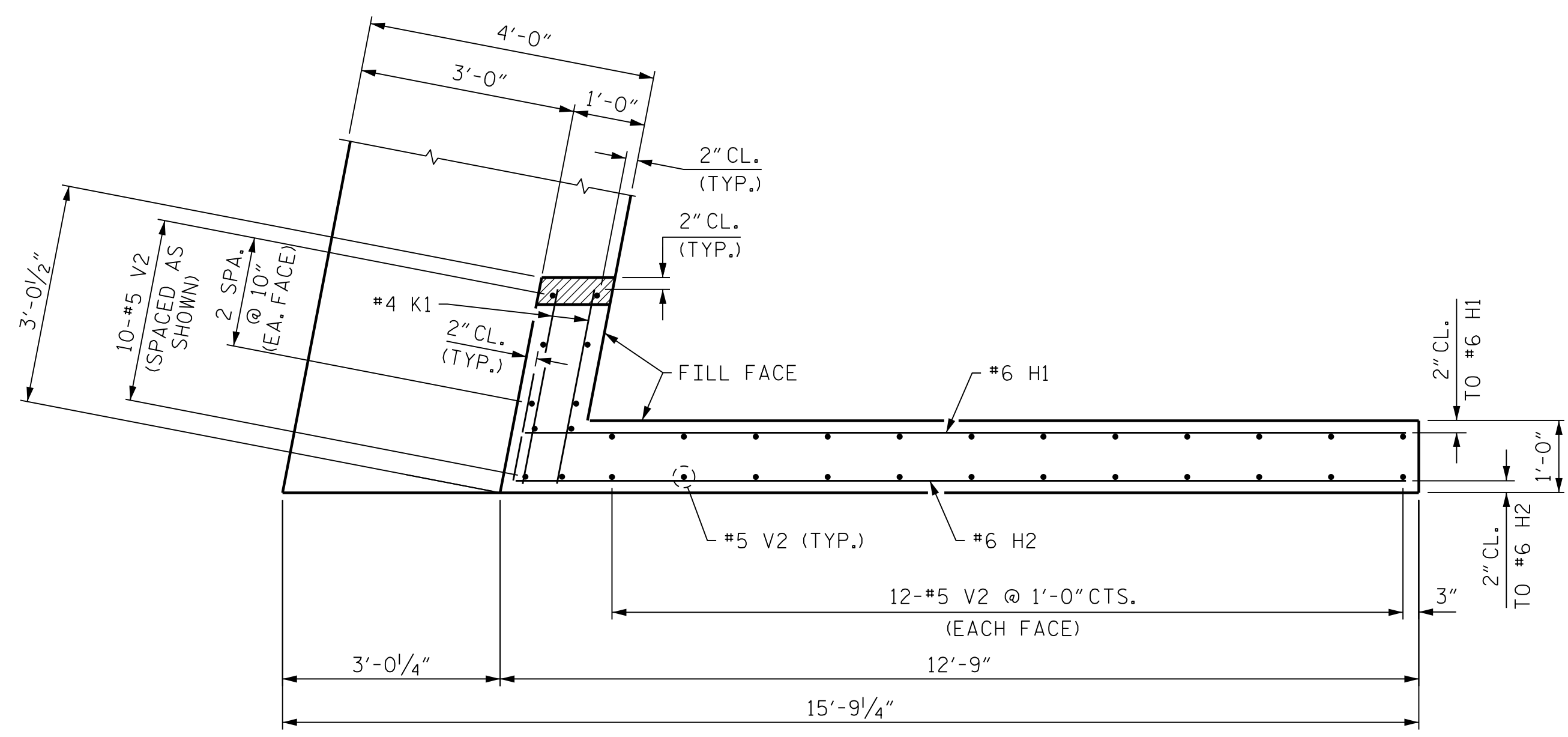
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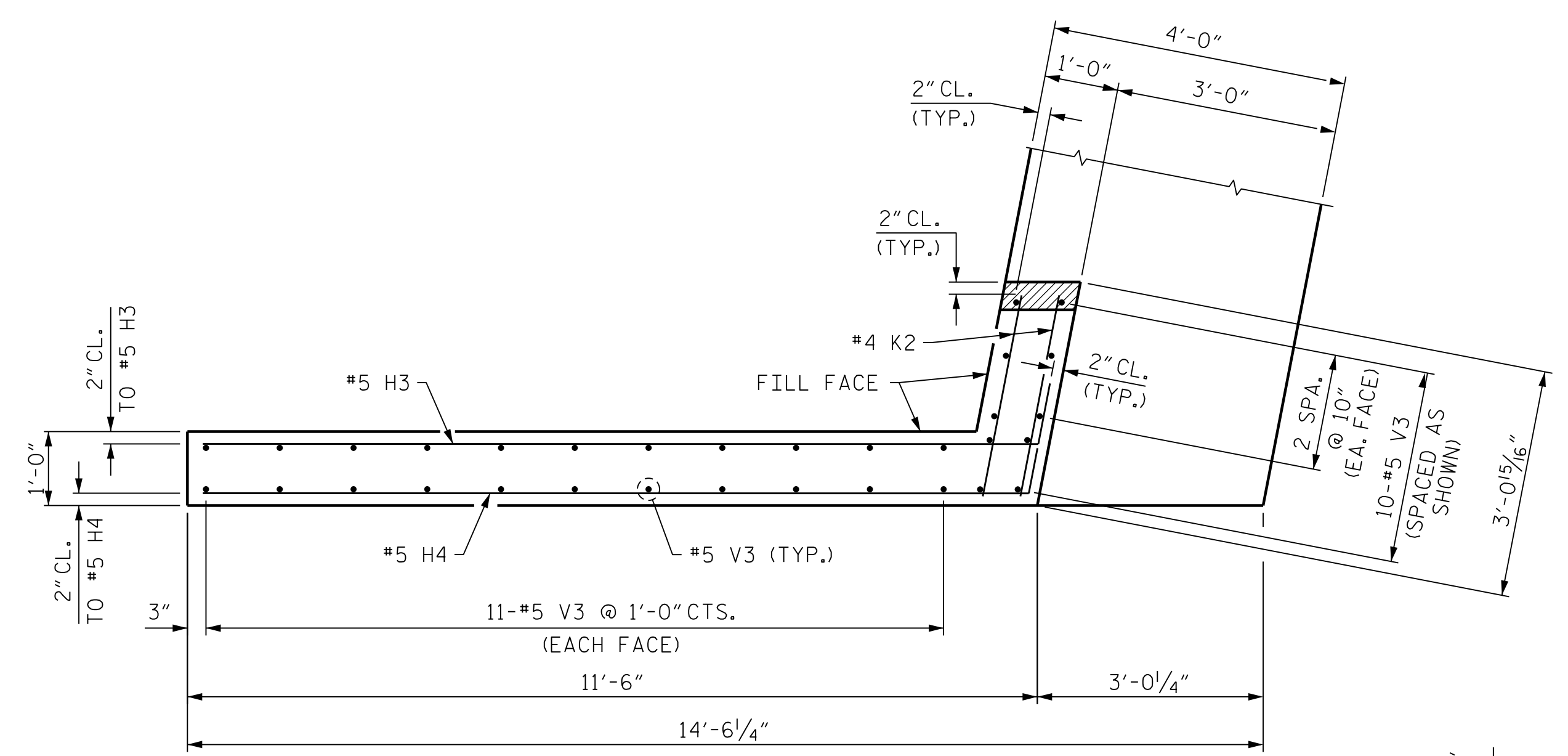
DocuSigned by:  
 Jason R. Doughty  
 SF73FA2DEA874E8...

DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: A. HARLESS DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

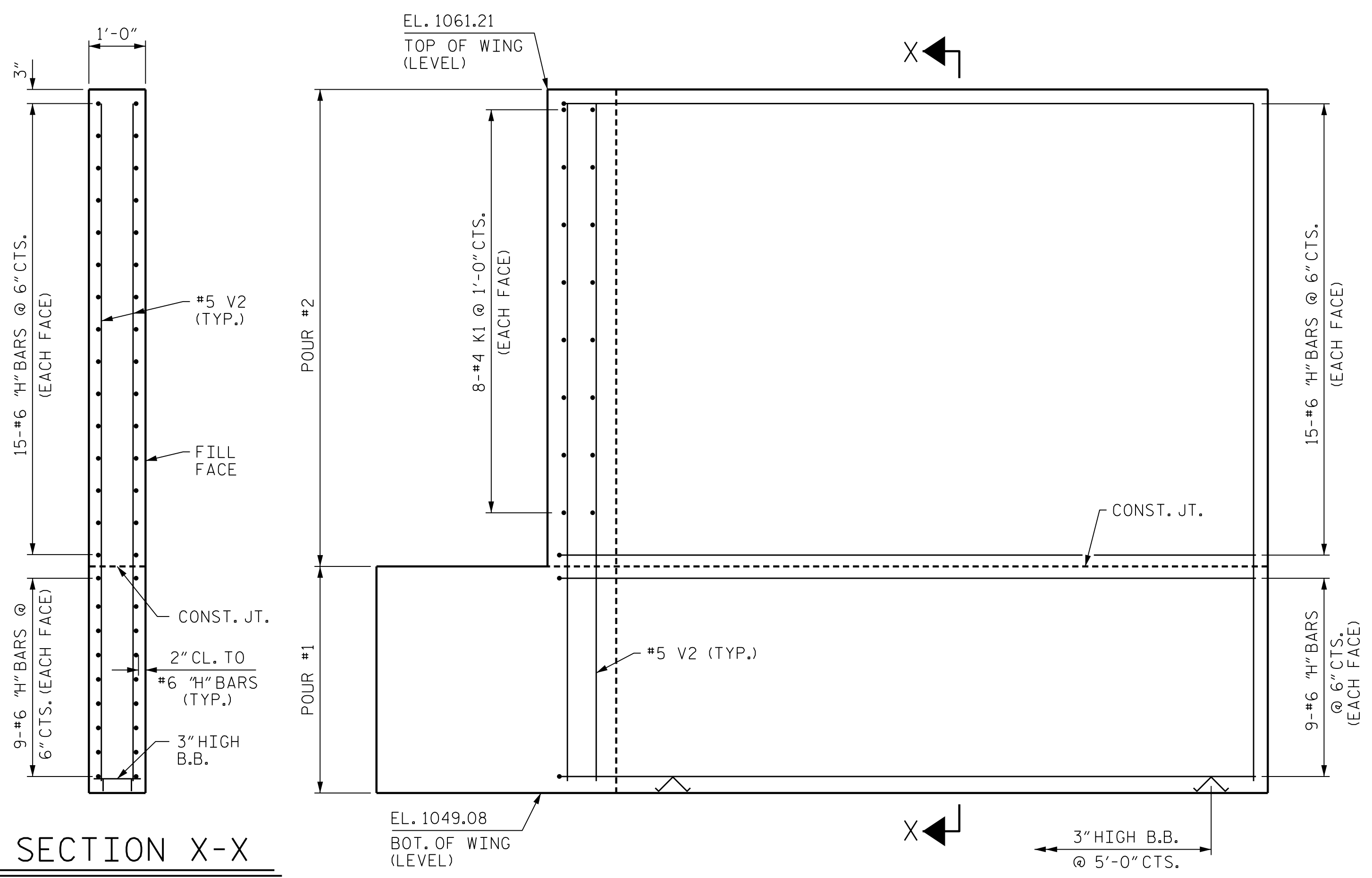
4/22/2020  
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PLAN OF WING W1

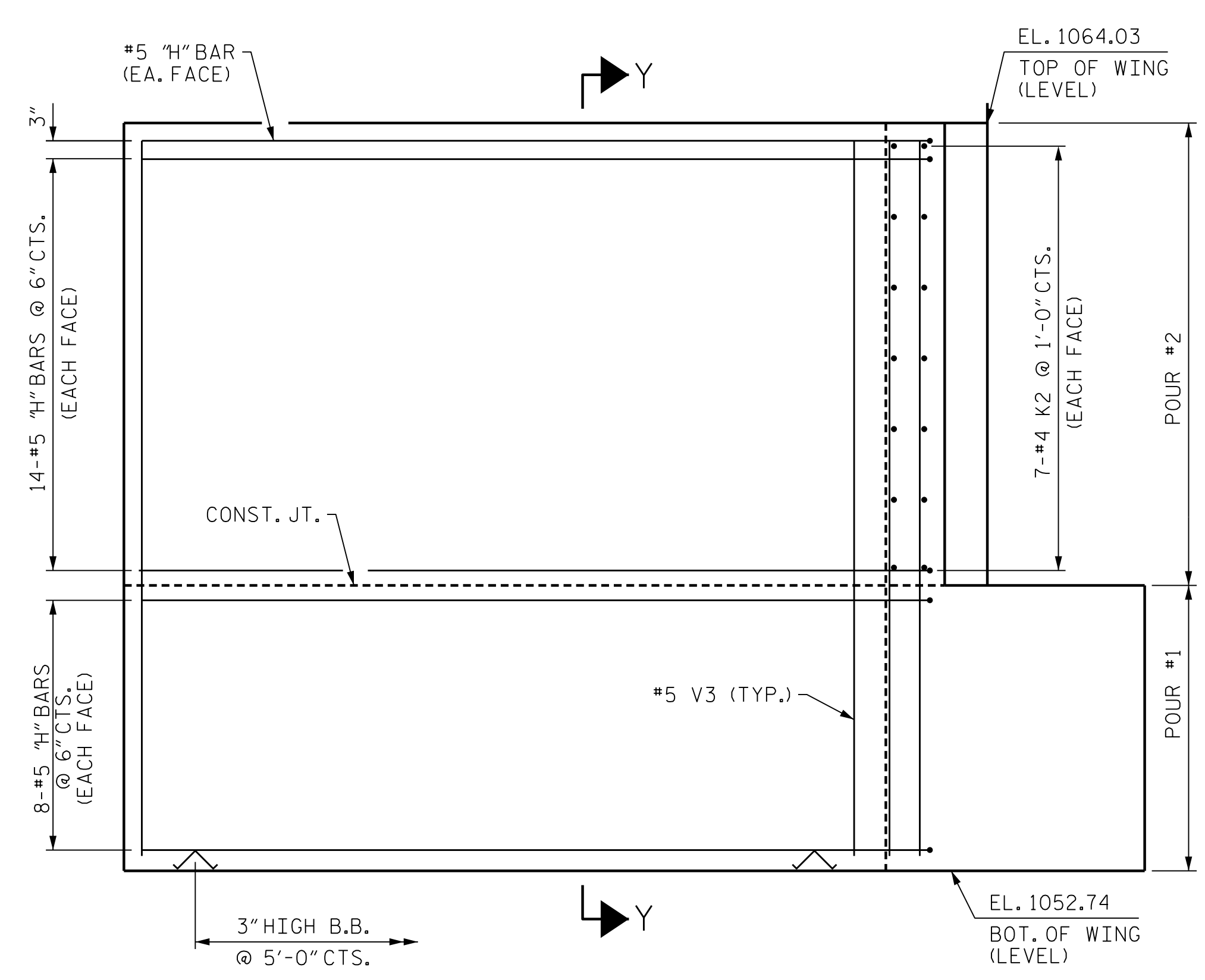


PLAN OF WING W2

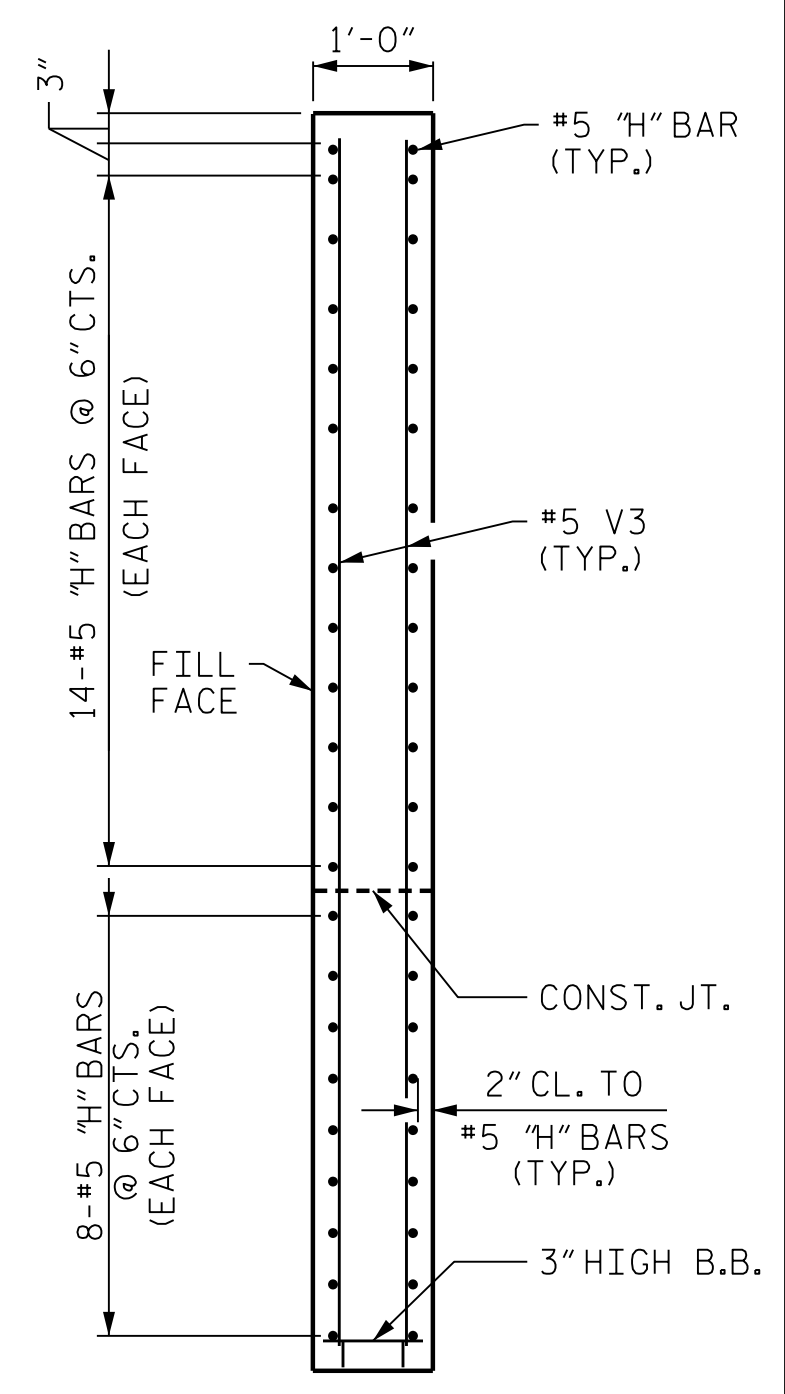


SECTION X-X

ELEVATION OF WING W1



ELEVATION OF WING W2

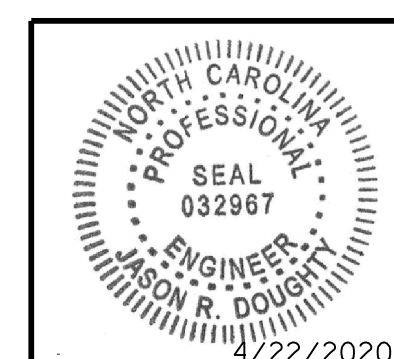


SECTION Y-Y

PROJECT NO. R-2233BB  
 RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 3 OF 4

|  |     |       |     |     |                 |
|--|-----|-------|-----|-----|-----------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                 |
| SUBSTRUCTURE<br>END BENT 1   |     |       |     |     |                 |
| REVISIONS  |     |       |     |     |                 |
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| 1  |     |       | 3   |     |                 |
| 2  |     |       | 4   |     |                 |
| SHEET NO. S4-34  |     |       |     |     | TOTAL SHEETS 45 |



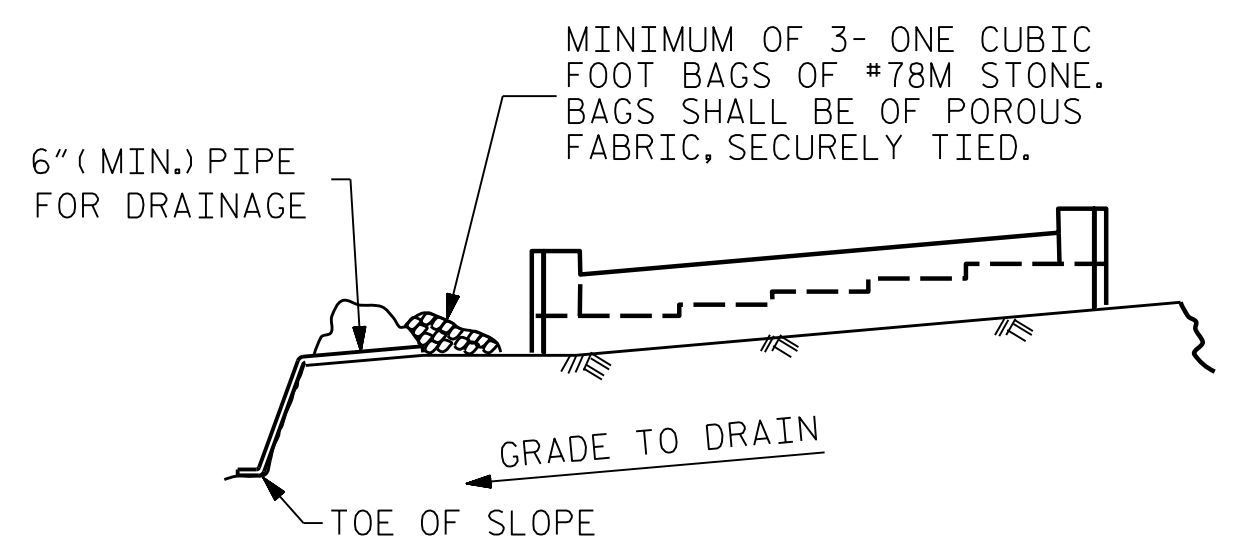
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STR. #4

4/22/2020  
 404\_063\_R2233BB\_SMLLE13\_800663.dgn

|                            |            |       |           |
|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | C. CORMAN  | DATE: | JULY 2019 |
| DRAWN BY:                  | A. HARLESS | DATE: | JULY 2019 |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

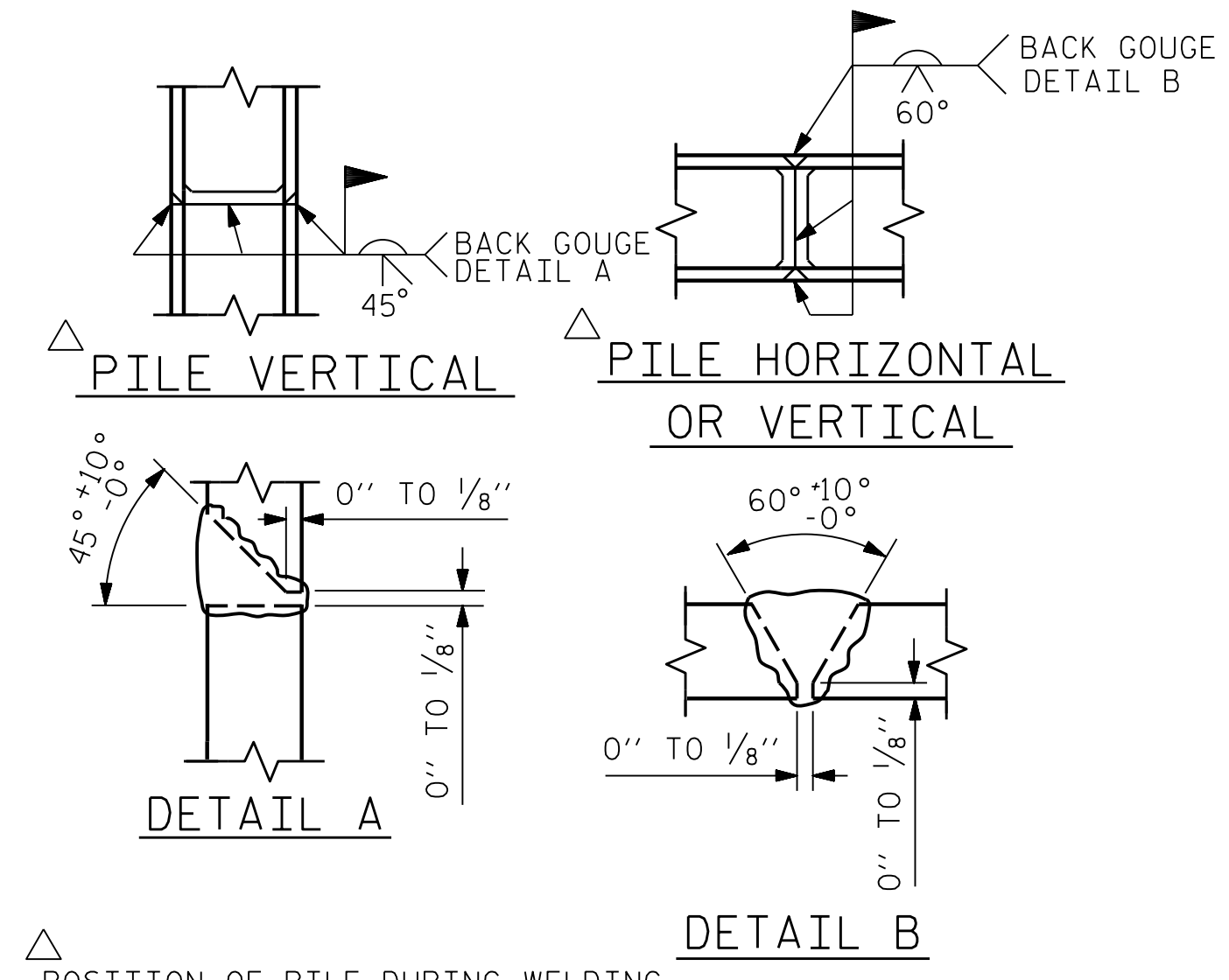


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

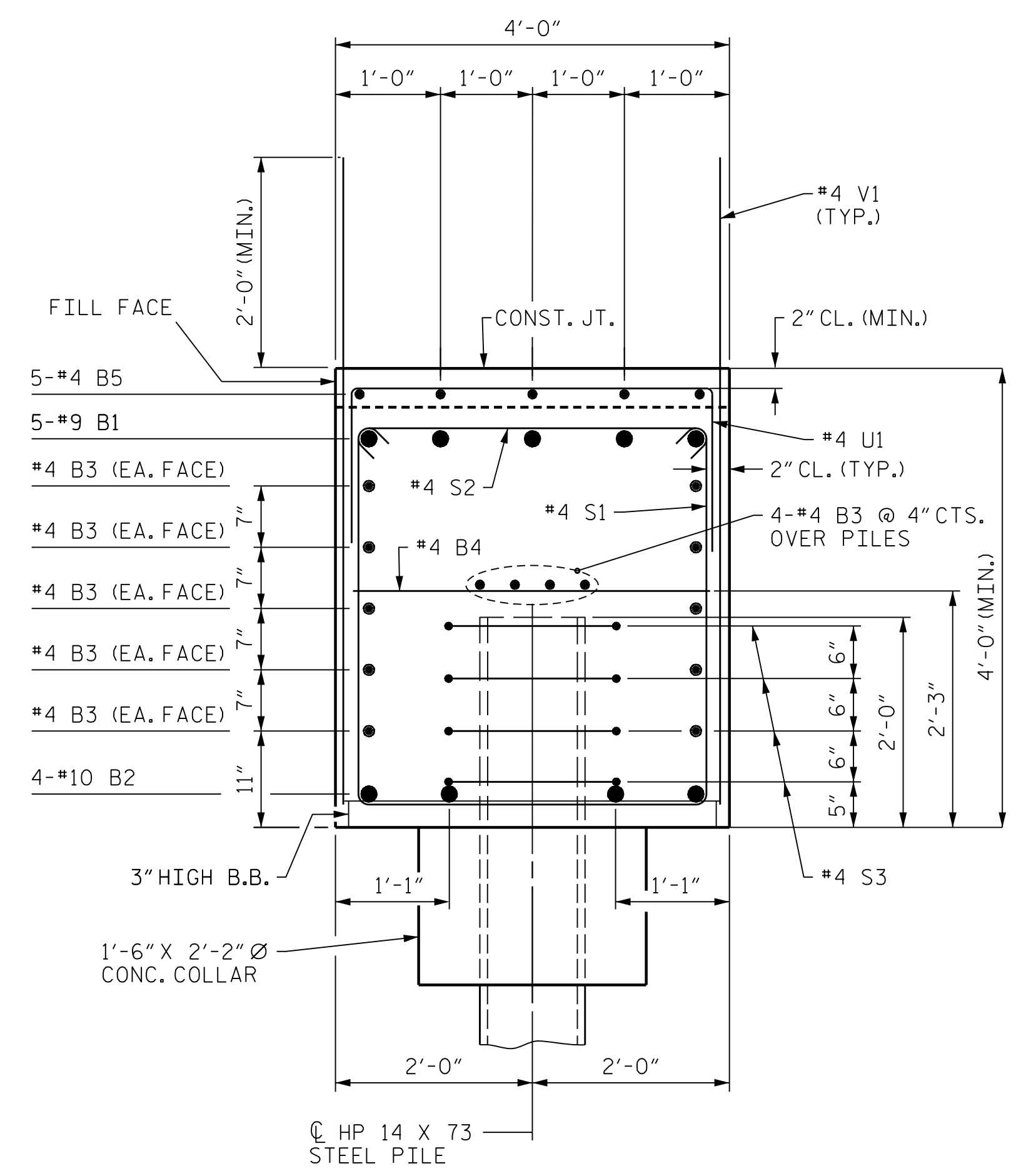
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

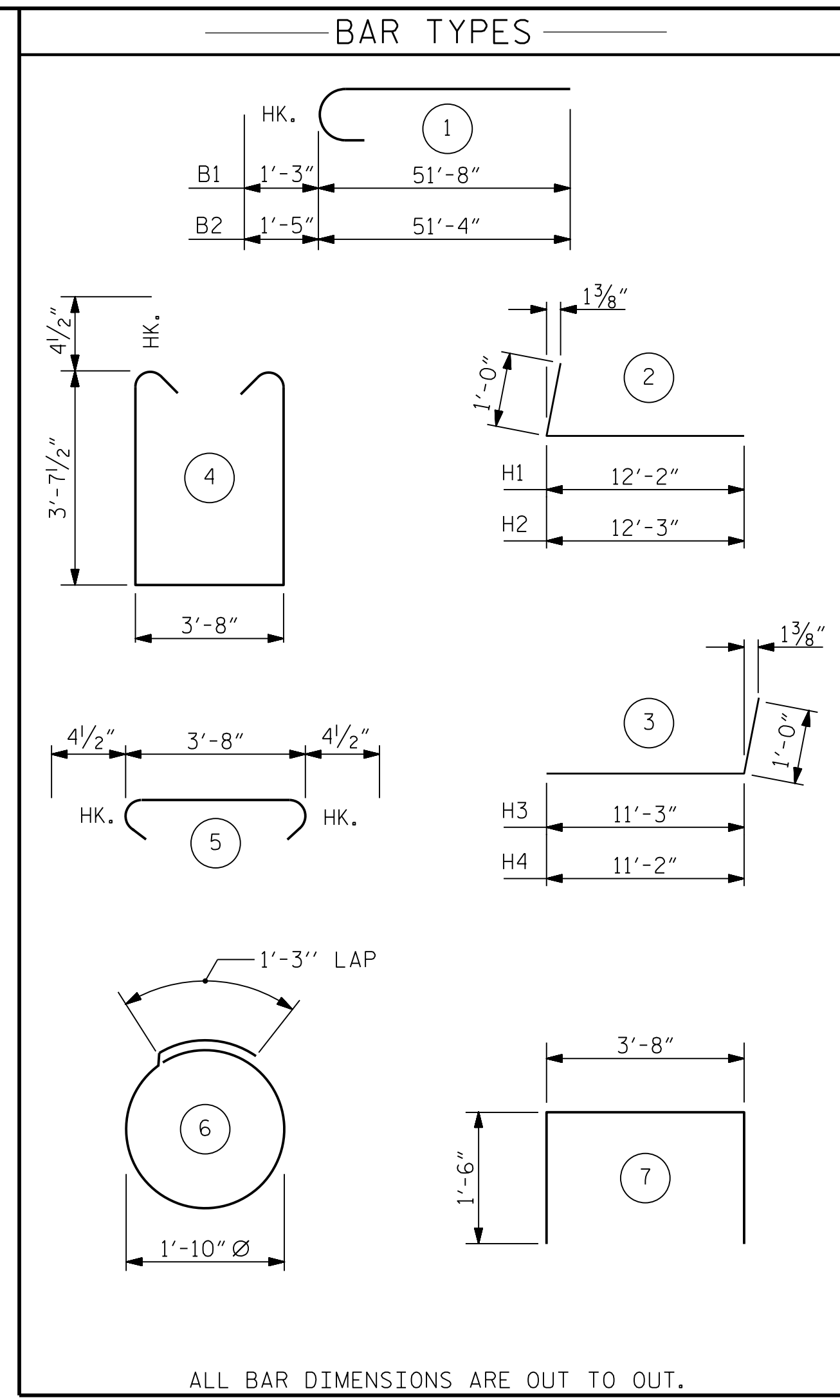
**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**



**SECTION A-A**



| BILL OF MATERIAL                                      |     |      |      |          |        |
|---|-----|------|------|----------|--------|
| BAR   | NO. | SIZE | TYPE | LENGTH   | WEIGHT |
| B1  | 10  | #9   | 1    | 52'-11"  | 1799   |
| B2  | 8   | #10  | 1    | 52'-9"   | 1816   |
| B3  | 56  | #4   | STR  | 26'-4"   | 985    |
| B4  | 25  | #4   | STR  | 3'-8"    | 61     |
| B5  | 40  | #4   | STR  | 8'-0"    | 214    |
| B6  | 5   | #4   | STR  | 13'-3"   | 44     |
| H1  | 24  | #6   | 2    | 13'-2"   | 475    |
| H2  | 24  | #6   | 2    | 13'-3"   | 478    |
| H3  | 23  | #5   | 3    | 12'-3"   | 294    |
| H4  | 23  | #5   | 3    | 12'-2"   | 292    |
| K1  | 16  | #4   | STR  | 2'-8"    | 29     |
| K2  | 16  | #4   | STR  | 2'-8"    | 29     |
| S1  | 98  | #4   | 4    | 11'-8"   | 764    |
| S2  | 98  | #4   | 5    | 4'-5"    | 289    |
| S3  | 60  | #4   | 6    | 7'-0"    | 281    |
| U1  | 57  | #4   | 7    | 6'-8"    | 254    |
| V1  | 116 | #4   | STR  | 6'-10"   | 530    |
| V2  | 34  | #5   | STR  | 11'-8"   | 414    |
| V3  | 32  | #5   | STR  | 10'-10"  | 362    |
| REINFORCING STEEL                                     |     |      |      | LBS.     | 9,410  |
| CLASS A CONCRETE                                      |     |      |      |          |        |
| POUR #1 CAP, LOWER WINGS & CONC. COLLARS              |     |      |      | C.Y.     | 70.6   |
| POUR #2 UPPER PART OF WINGS                           |     |      |      | C.Y.     | 7.8    |
| TOTAL CLASS A CONCRETE                                |     |      |      | C.Y.     | 78.4   |
| HP 14x73 STEEL PILES NO. 15                           |     |      |      | LIN. FT. | 375    |
| PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES |     |      |      | NO.      | 15     |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1

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

SHEET NO. S4-35  
 TOTAL SHEETS 45

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SEAL  
 032967  
 ENGINEER  
 JASON R. DOUGHTY  
 4/22/2020

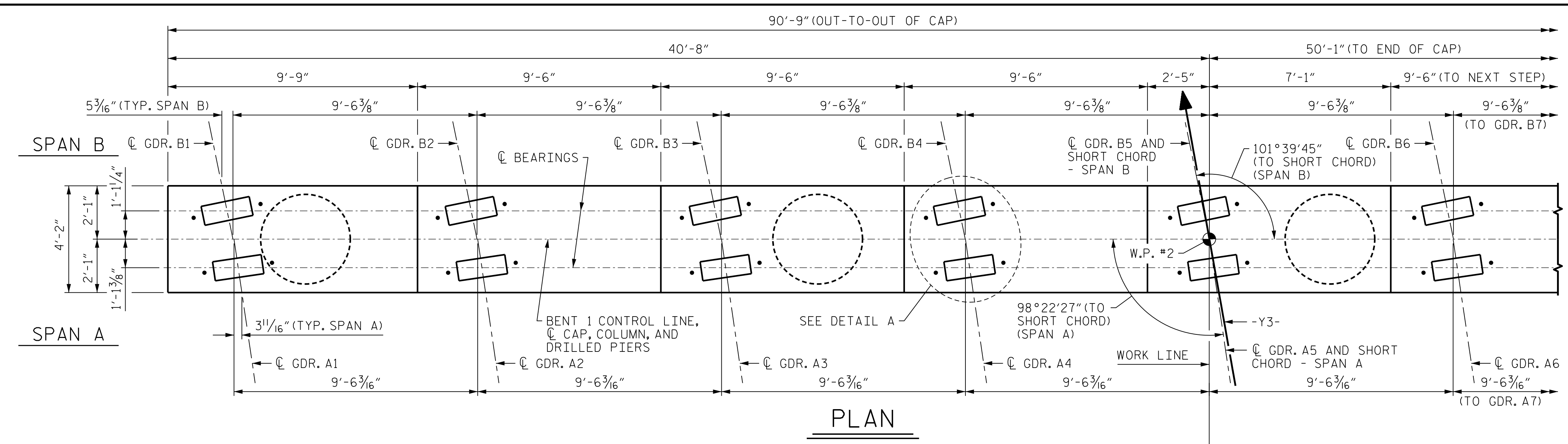
DocuSigned by:  
 Jason R Doughty  
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**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

STR, #4

4/22/2020  
 404\_065\_R2233BB\_SMLL14\_800663.dgn

DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: A. HARLESS DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019



**NOTES:**

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

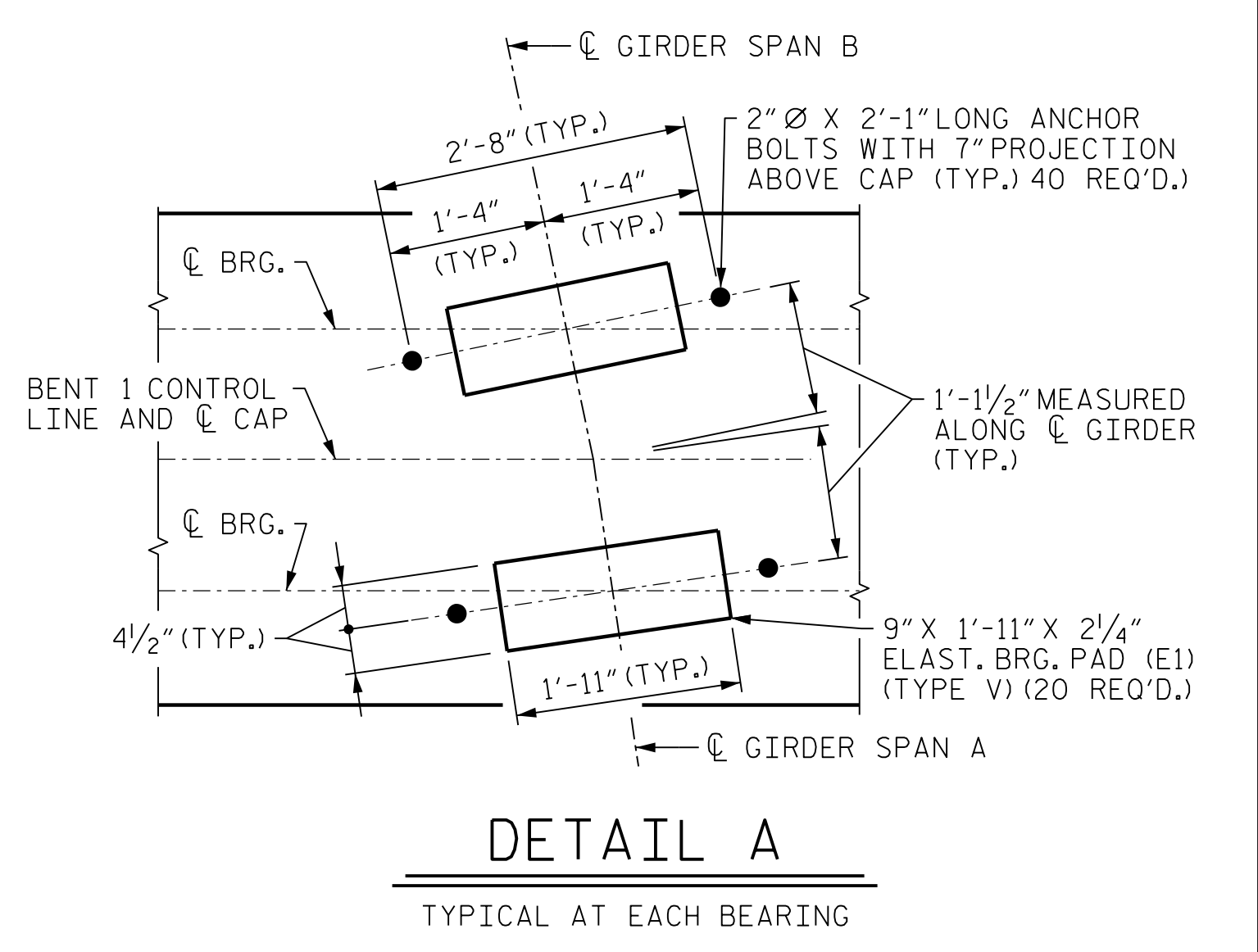
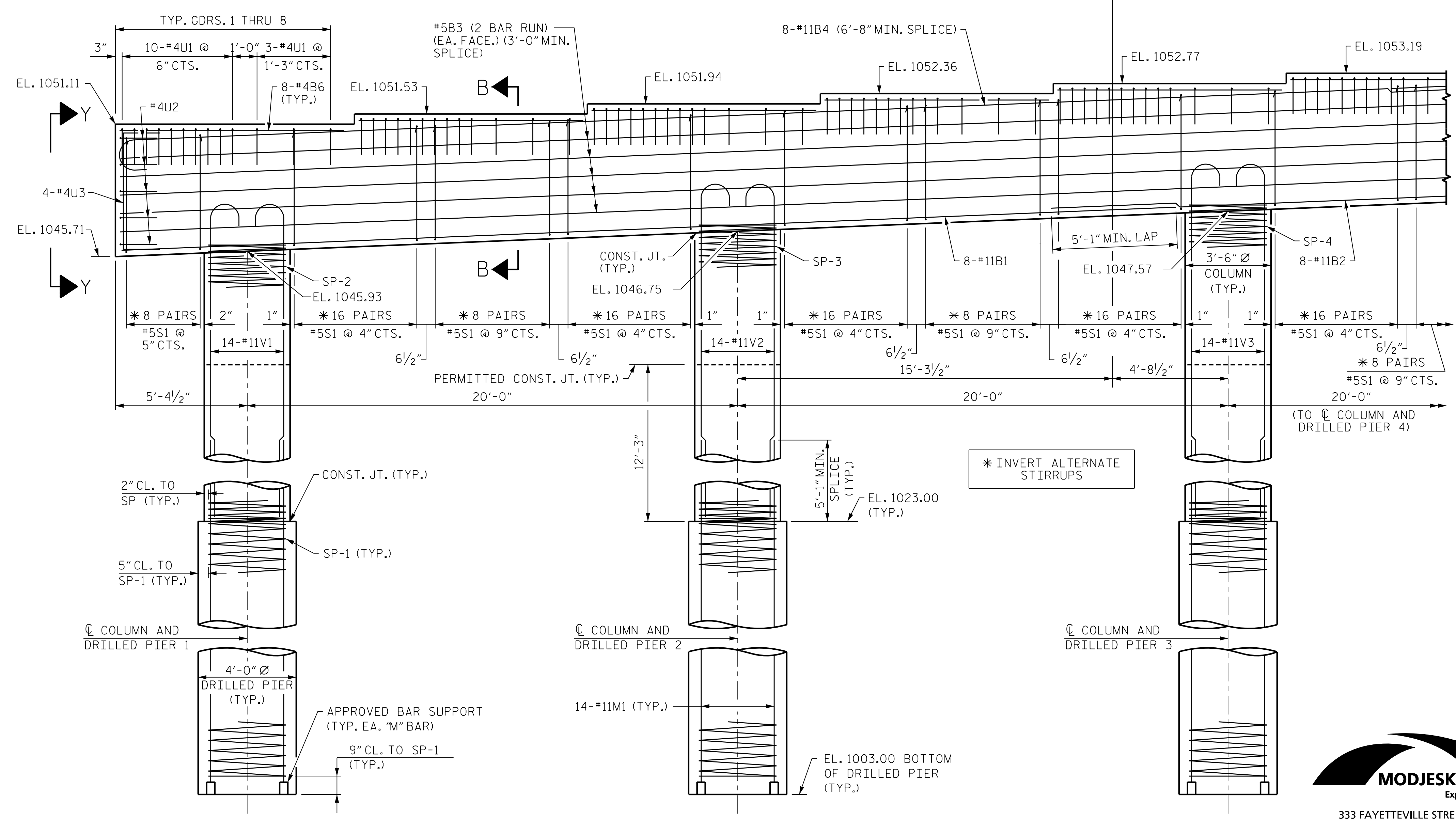
HOOBS IN "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

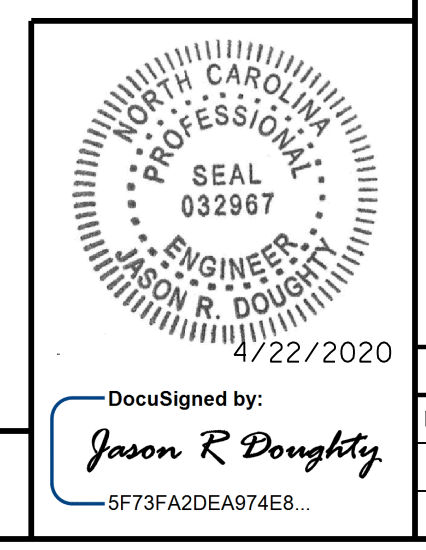
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE PROPOSED GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL PROPOSED GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE PROPOSED GROUND LINE.



PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 3

|  |     |       |     |     |                        |
|--|-----|-------|-----|-----|------------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                        |
| SUBSTRUCTURE<br>BENT 1   |     |       |     |     |                        |
| REVISIONS  |     |       |     |     |                        |
| NO.  | BY: | DATE: | NO. | BY: | DATE:                  |
| 1  |     |       | 3   |     |                        |
| 2  |     |       | 4   |     |                        |
| SHEET NO. <u>S4-36</u>   |     |       |     |     | TOTAL SHEETS <u>45</u> |

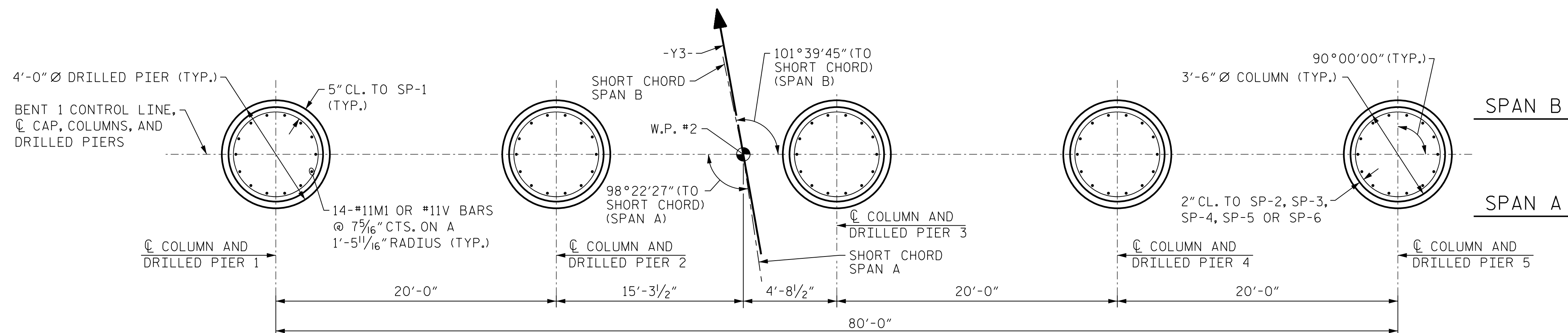


DESIGNED BY: J. BORUTA DATE: JULY 2019  
 DRAWN BY: K. WHITE DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

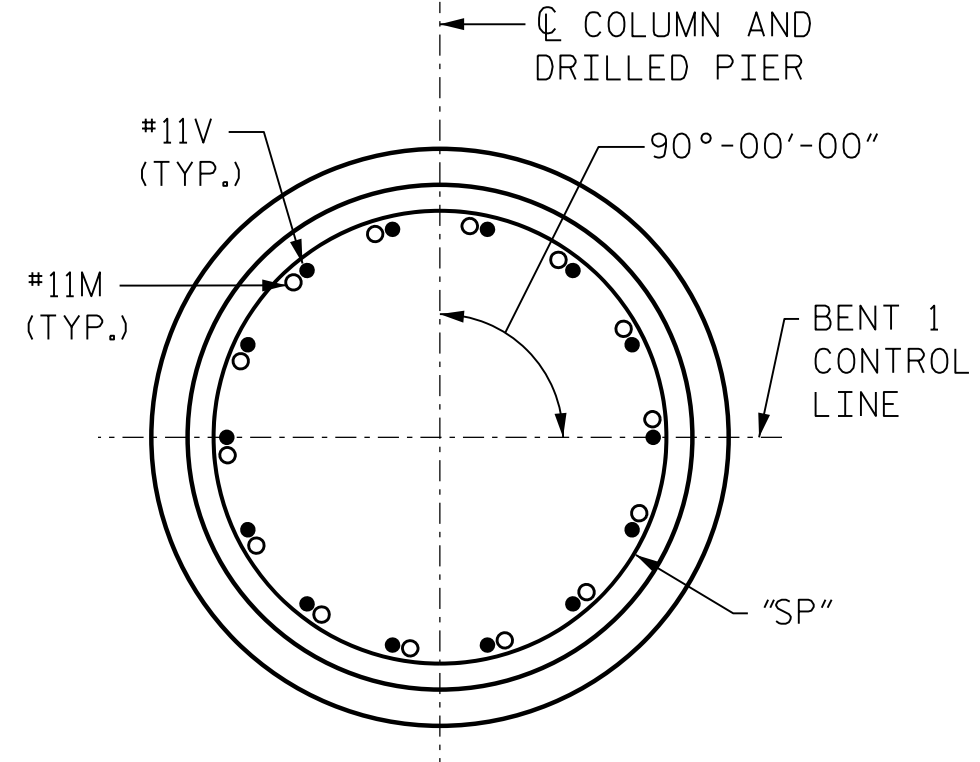
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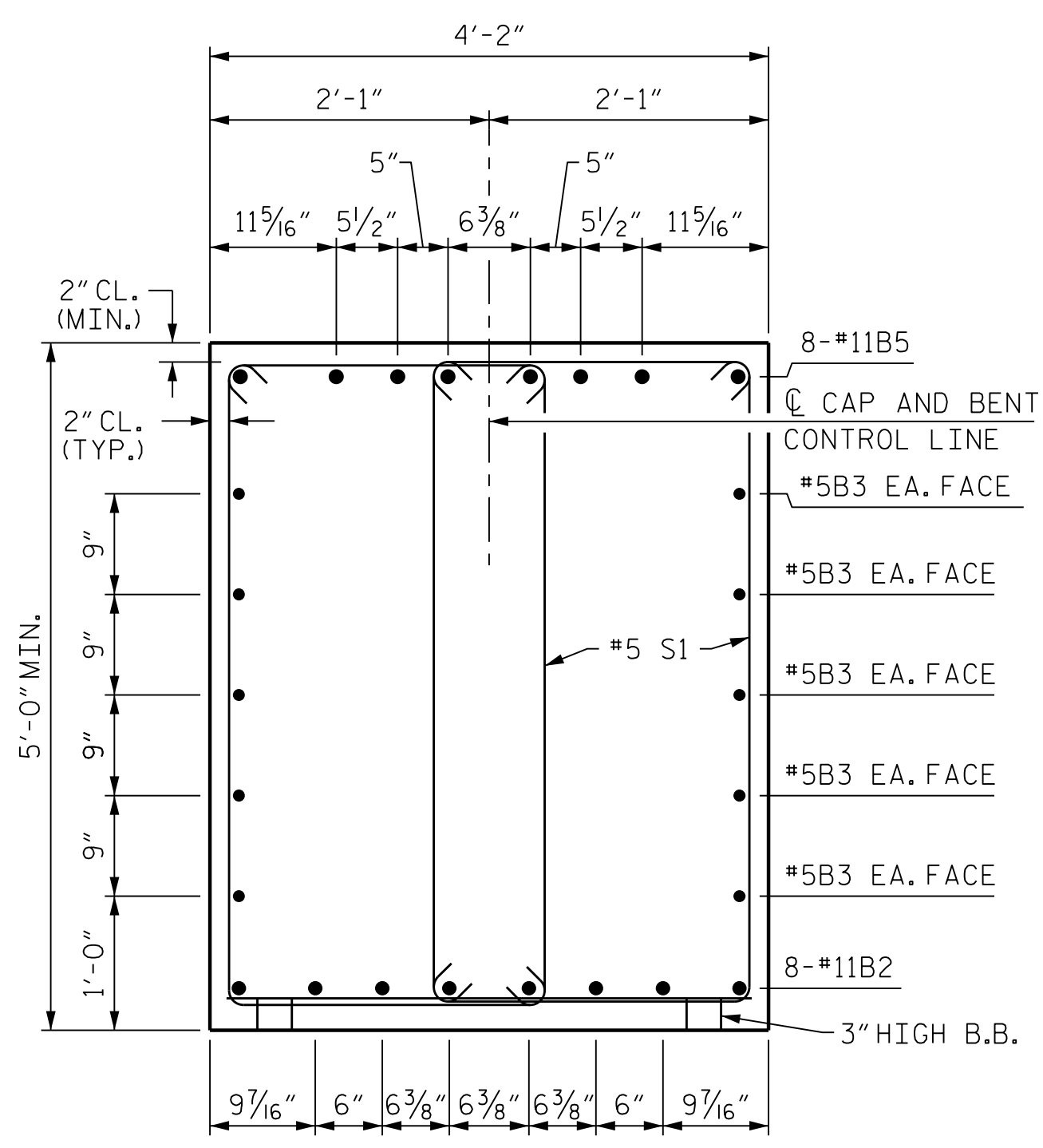




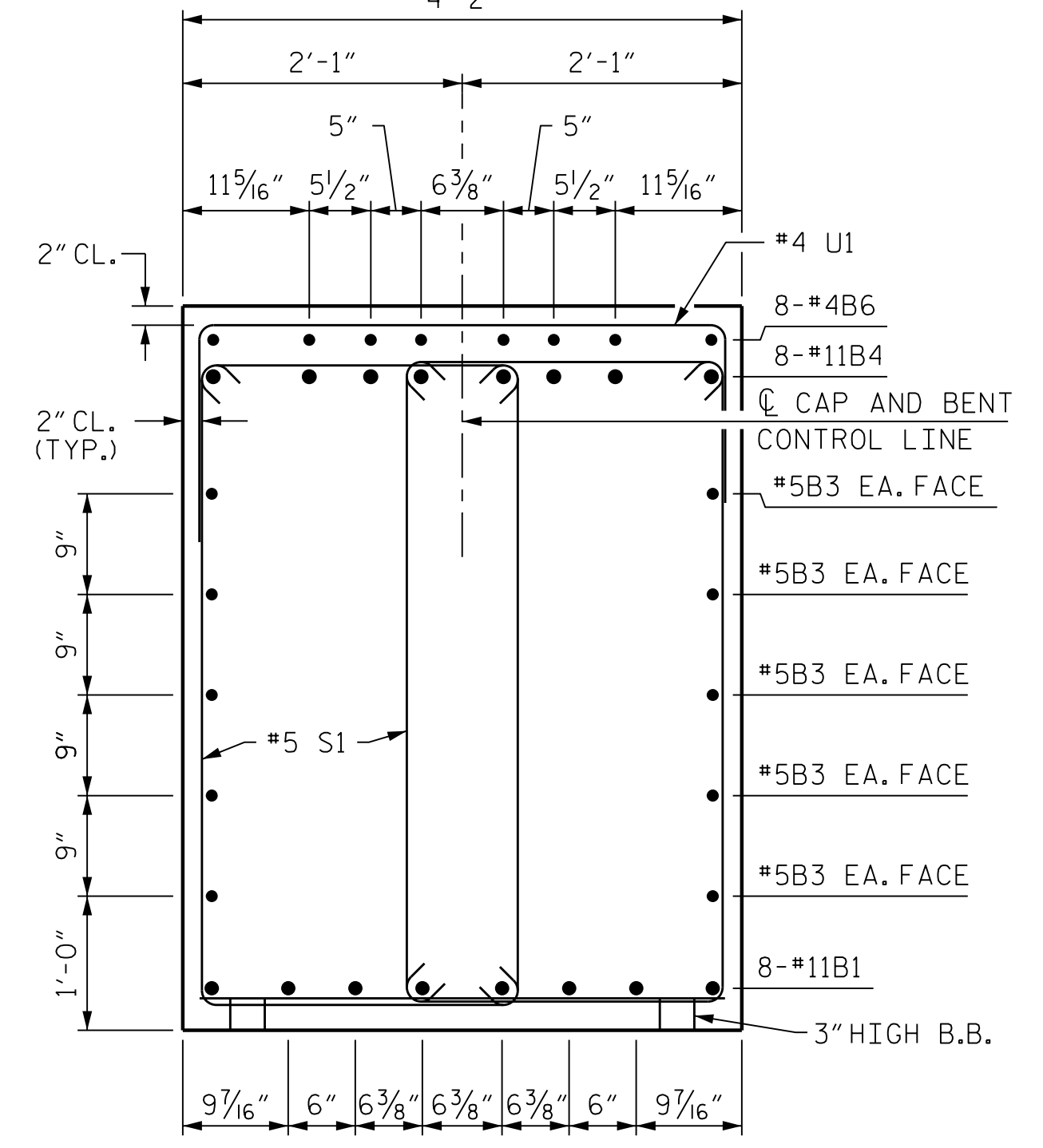
PLAN OF COLUMNS AND DRILLED PIERS



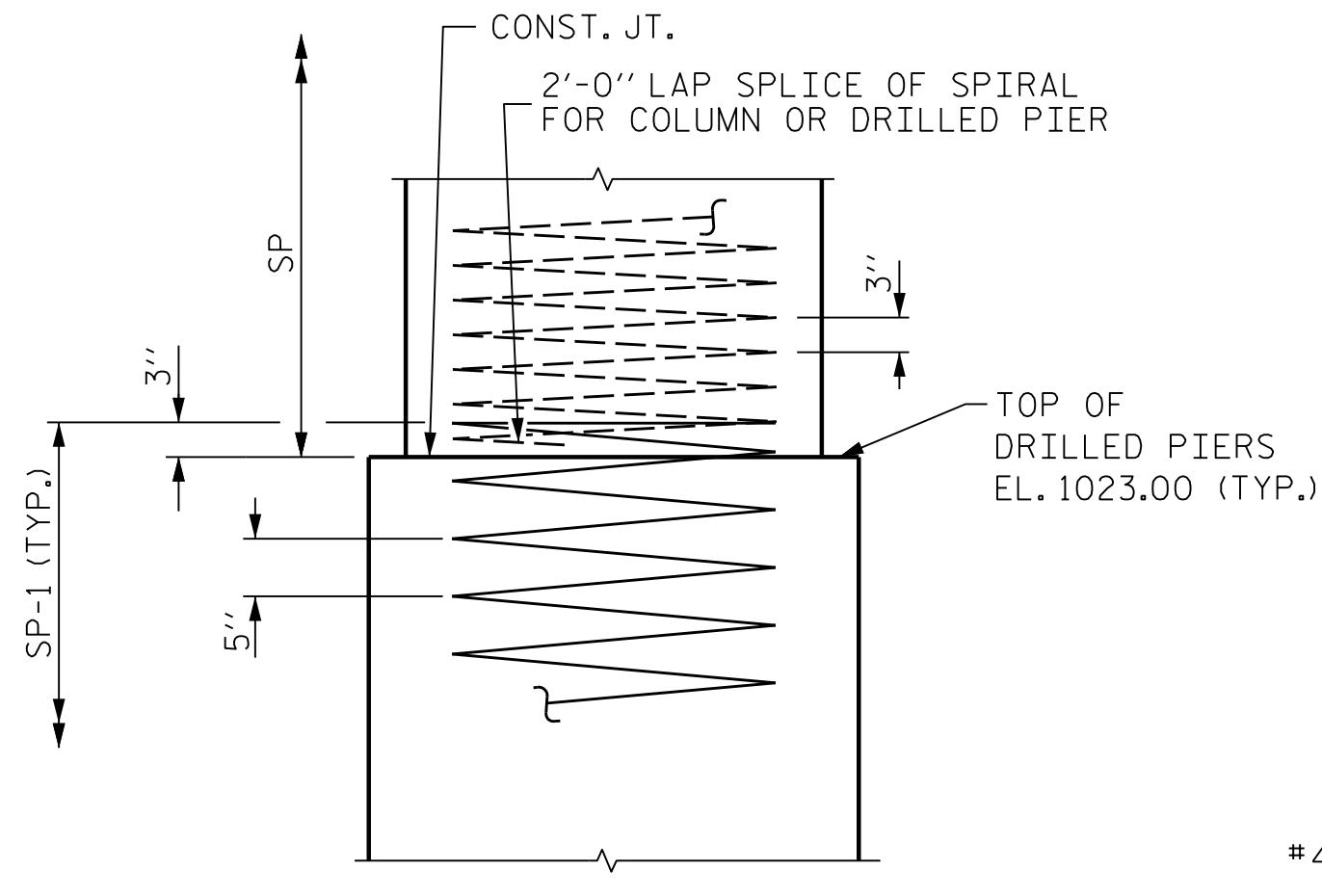
COLUMN AND DRILLED PIER DETAIL



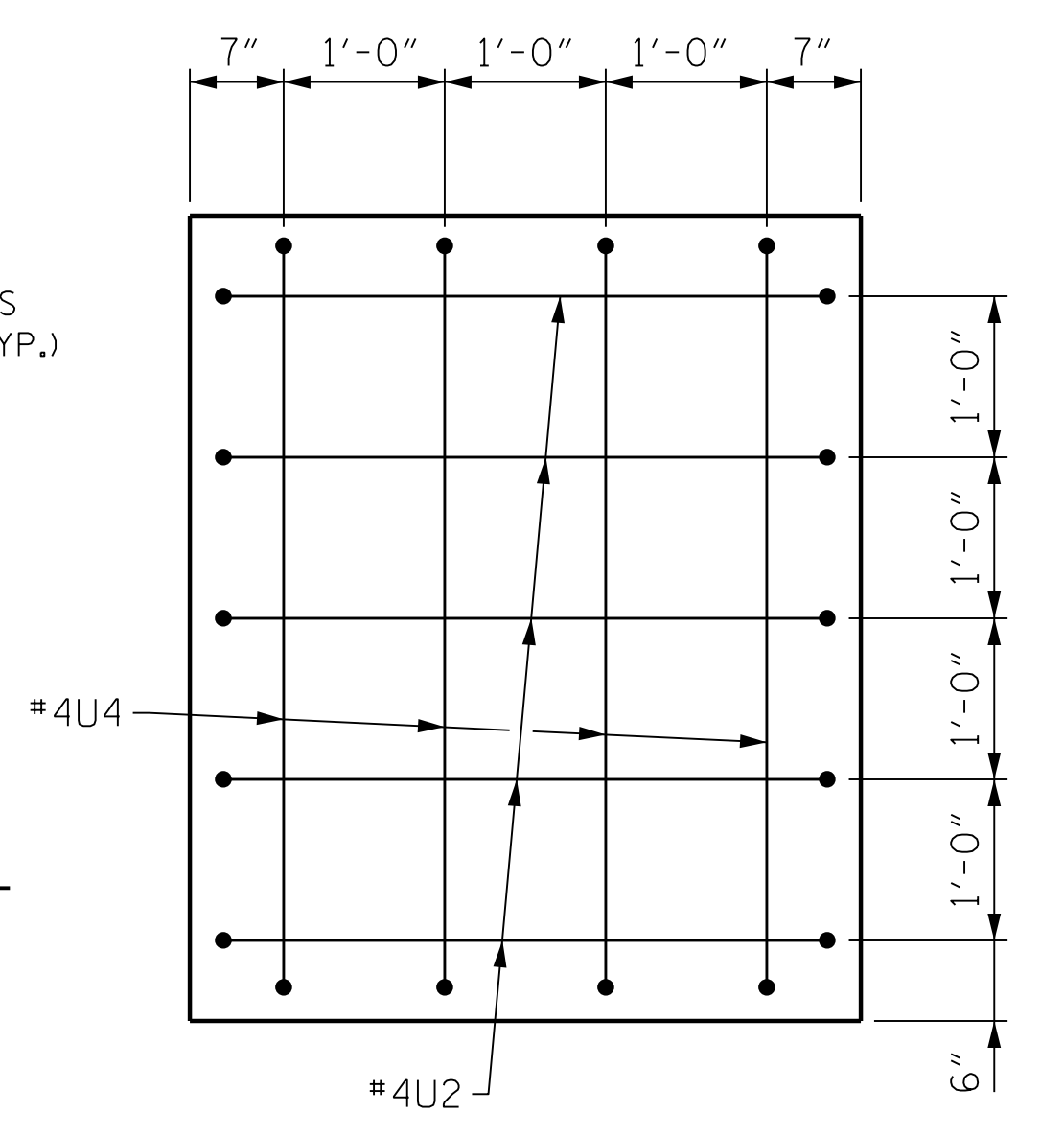
SECTION A-A



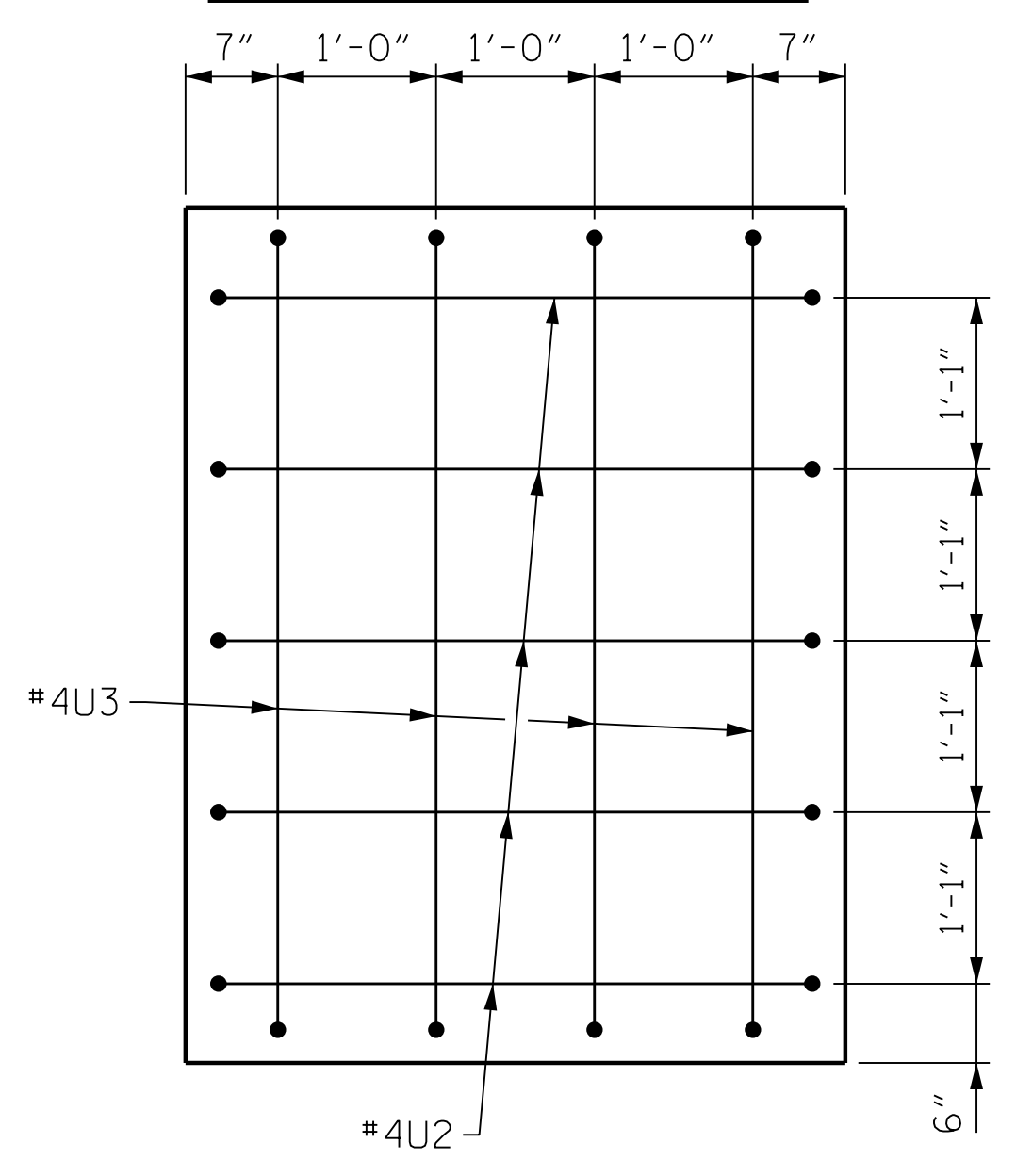
SECTION B-B



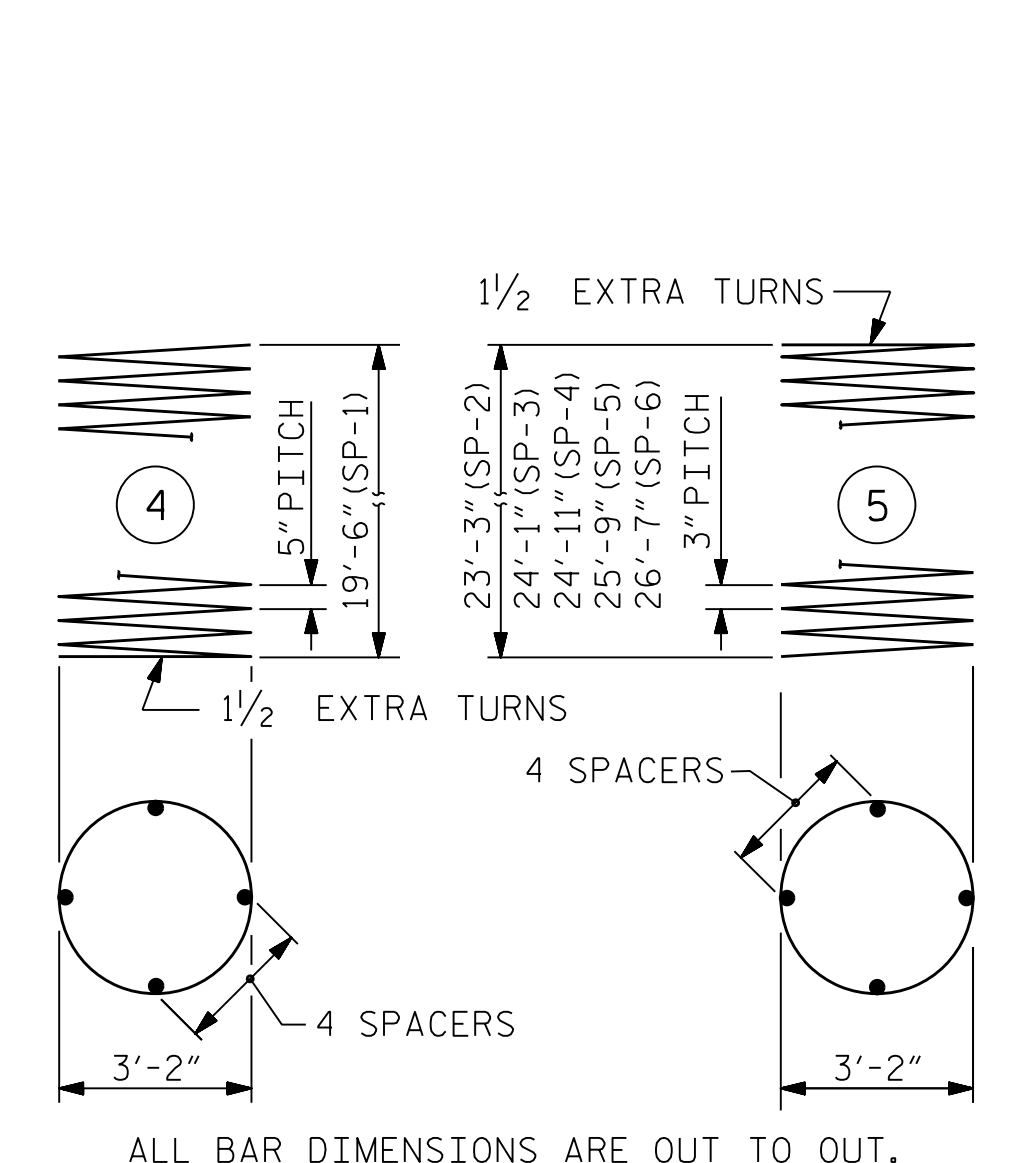
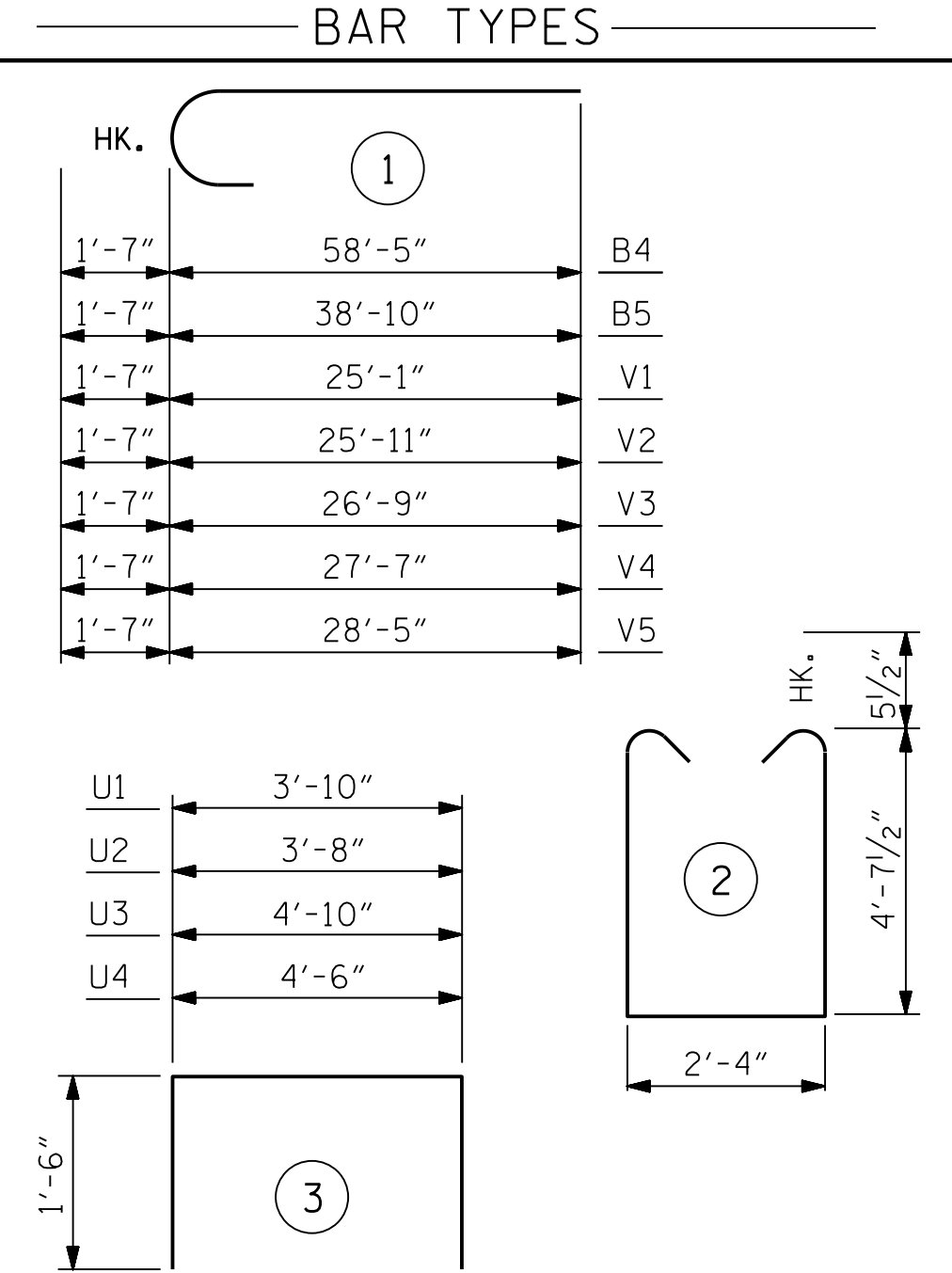
CONSTRUCTION JOINT DETAIL



VIEW X-X



VIEW Y-Y



ALL BAR DIMENSIONS ARE OUT TO OUT.  
 \* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE SP-2, SP-3, SP-4, SP-5 AND SP-6 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

| BILL OF MATERIAL |        |      |      |        |        |
|------------------|--------|------|------|--------|--------|
| BAR              | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
| B1               | 8      | #11  | STR  | 43'-4" | 1842   |
| B2               | 8      | #11  | STR  | 52'-4" | 2224   |
| B3               | 20     | #5   | STR  | 46'-9" | 975    |
| B4               | 8      | #11  | 1    | 60'-0" | 2550   |
| B5               | 8      | #11  | 1    | 40'-5" | 1718   |
| B6               | 64     | #4   | STR  | 9'-2"  | 392    |
| B7               | 8      | #4   | STR  | 11'-3" | 60     |
| M1               | 70     | #11  | STR  | 27'-9" | 10321  |
| S1               | 352    | #5   | 2    | 12'-6" | 4589   |
| U1               | 127    | #4   | 3    | 6'-10" | 580    |
| U2               | 10     | #4   | 3    | 6'-8"  | 45     |
| U3               | 4      | #4   | 3    | 7'-10" | 21     |
| U4               | 4      | #4   | 3    | 7'-6"  | 20     |
| V1               | 14     | #11  | 1    | 26'-8" | 1984   |
| V2               | 14     | #11  | 1    | 27'-6" | 2046   |
| V3               | 14     | #11  | 1    | 28'-4" | 2107   |
| V4               | 14     | #11  | 1    | 29'-2" | 2169   |
| V5               | 14     | #11  | 1    | 30'-0" | 2231   |

| REINFORCING STEEL               |        |      |      |          |        |
|---------------------------------|--------|------|------|----------|--------|
| SPAN                            | NUMBER | SIZE | TYPE | LENGTH   | WEIGHT |
| SP-1                            | 5      | *    | 4    | 479'-11" | 2503   |
| SP-2                            | 1      | **   | 5    | 933'-0"  | 623    |
| SP-3                            | 1      | **   | 5    | 972'-3"  | 649    |
| SP-4                            | 1      | **   | 5    | 1001'-8" | 669    |
| SP-5                            | 1      | **   | 5    | 1031'-2" | 689    |
| SP-6                            | 1      | **   | 5    | 1070'-5" | 715    |
| SPIRAL COLUMN REINFORCING STEEL |        |      |      |          | 5,848  |

| CLASS "A" CONCRETE BREAKDOWN |             |               |  |  |  |
|------------------------------|-------------|---------------|--|--|--|
| POUR                         | DESCRIPTION | WEIGHT (C.Y.) |  |  |  |
| POUR #2                      | COLUMNS     | 43.8 C.Y.     |  |  |  |
| POUR #3                      | CAP         | 74.1 C.Y.     |  |  |  |
| CLASS "A" CONCRETE           |             | 117.9 C.Y.    |  |  |  |

| DRILLED PIER QUANTITIES           |            |
|-----------------------------------|------------|
| POUR #1 - DRILLED PIER CONCRETE   | 46.5 C.Y.  |
| 4'-0" Ø DRILLED PIERS IN SOIL     | 50.0 L.F.  |
| 4'-0" Ø DRILLED PIERS NOT IN SOIL | 50.0 L.F.  |
| CSL TUBES                         | 430.0 L.F. |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1

**MODJESKI and MASTERS**  
 Experience great bridges.  
 333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

PROFESSIONAL ENGINEER  
 SEAL  
 032967  
 JASON R. DOUGHTY  
 4/22/2020

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

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SHEET NO. S4-38  
 TOTAL SHEETS 45

STR. #4

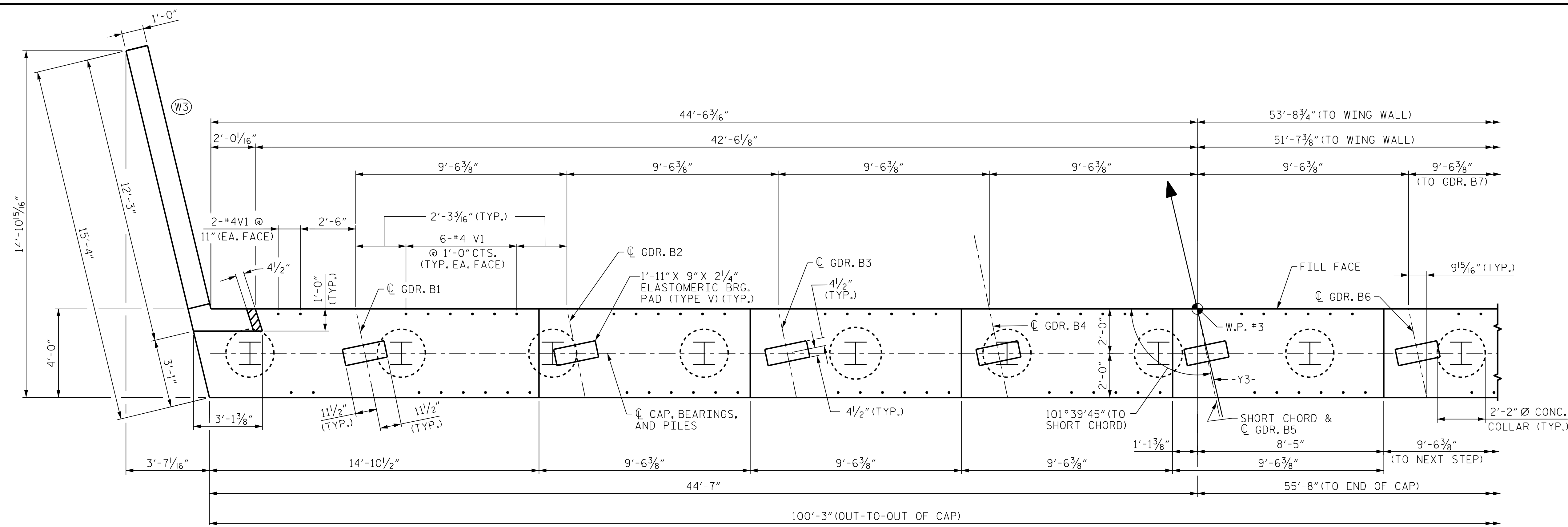
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|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | J. BORUTA  | DATE: | JULY 2019 |
| DRAWN BY:                  | K. WHITE   | DATE: | JULY 2019 |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

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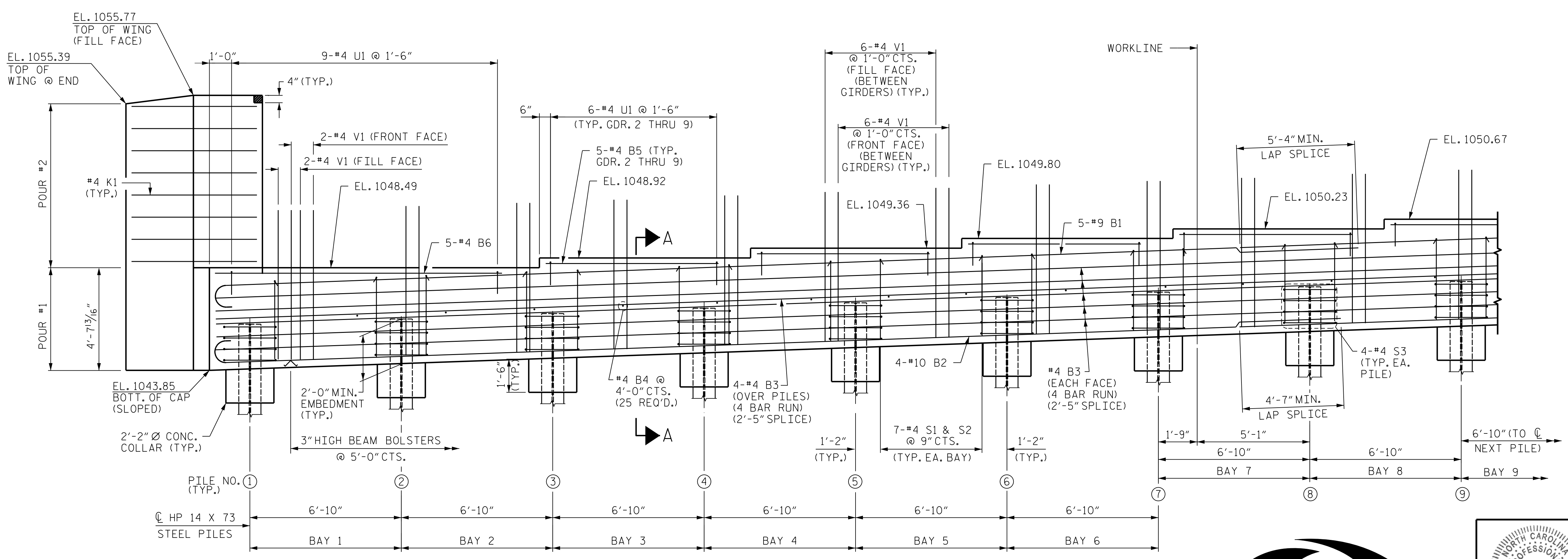
**NOTES:**

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT TO THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

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



**PLAN**



**ELEVATION**

FOR SECTION A-A, SEE SHEET 4 OF 4.

**TOP OF PILE ELEVATIONS**

| PILE NO. | ELEVATION |
|----------|-----------|
| 1        | 1045.93   |
| 2        | 1046.21   |
| 3        | 1046.49   |
| 4        | 1046.78   |
| 5        | 1047.06   |
| 6        | 1047.35   |
| 7        | 1047.63   |
| 8        | 1047.92   |
| 9        | 1048.20   |
| 10       | 1048.48   |
| 11       | 1048.77   |
| 12       | 1049.05   |
| 13       | 1049.34   |
| 14       | 1049.62   |
| 15       | 1049.91   |

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 2**

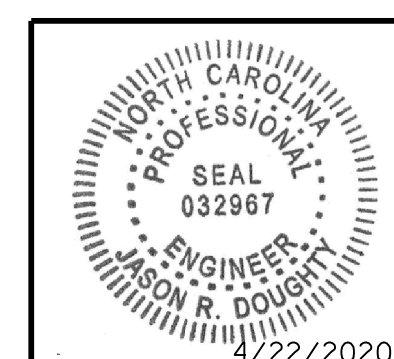
REVISIONS

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

SHEET NO. **S4-39**  
 TOTAL SHEETS 45



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



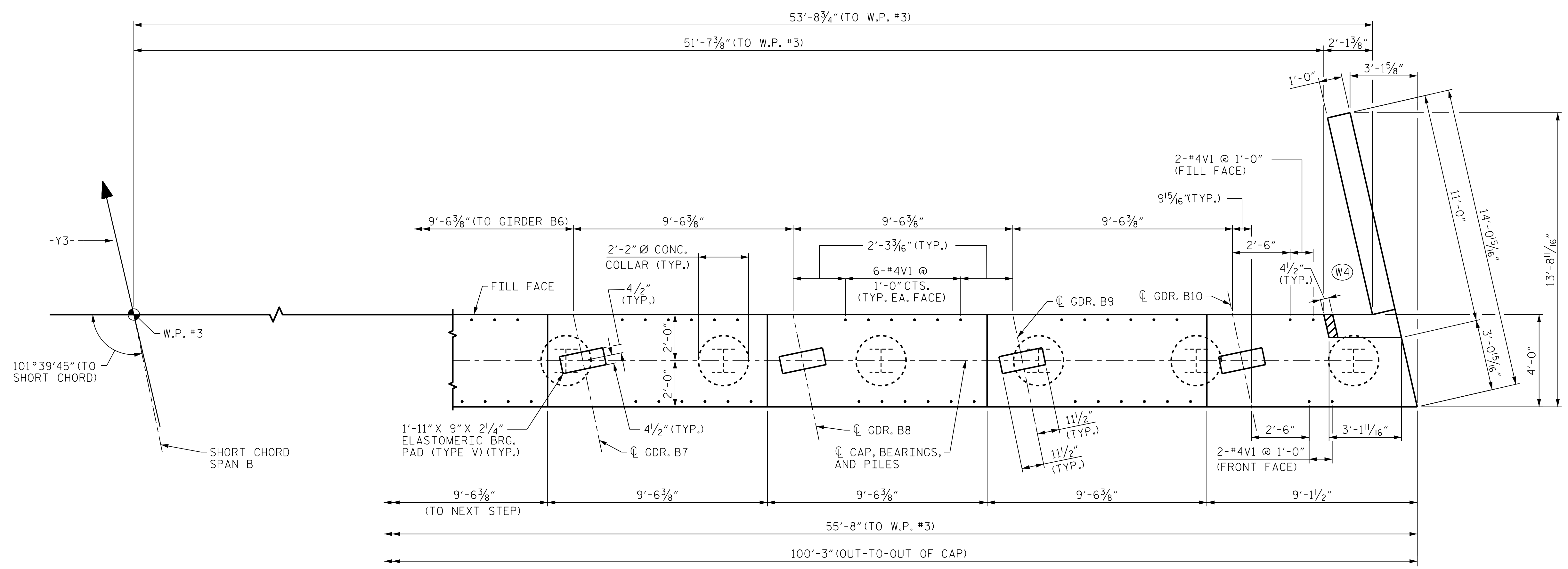
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**Jason R. Doughty**  
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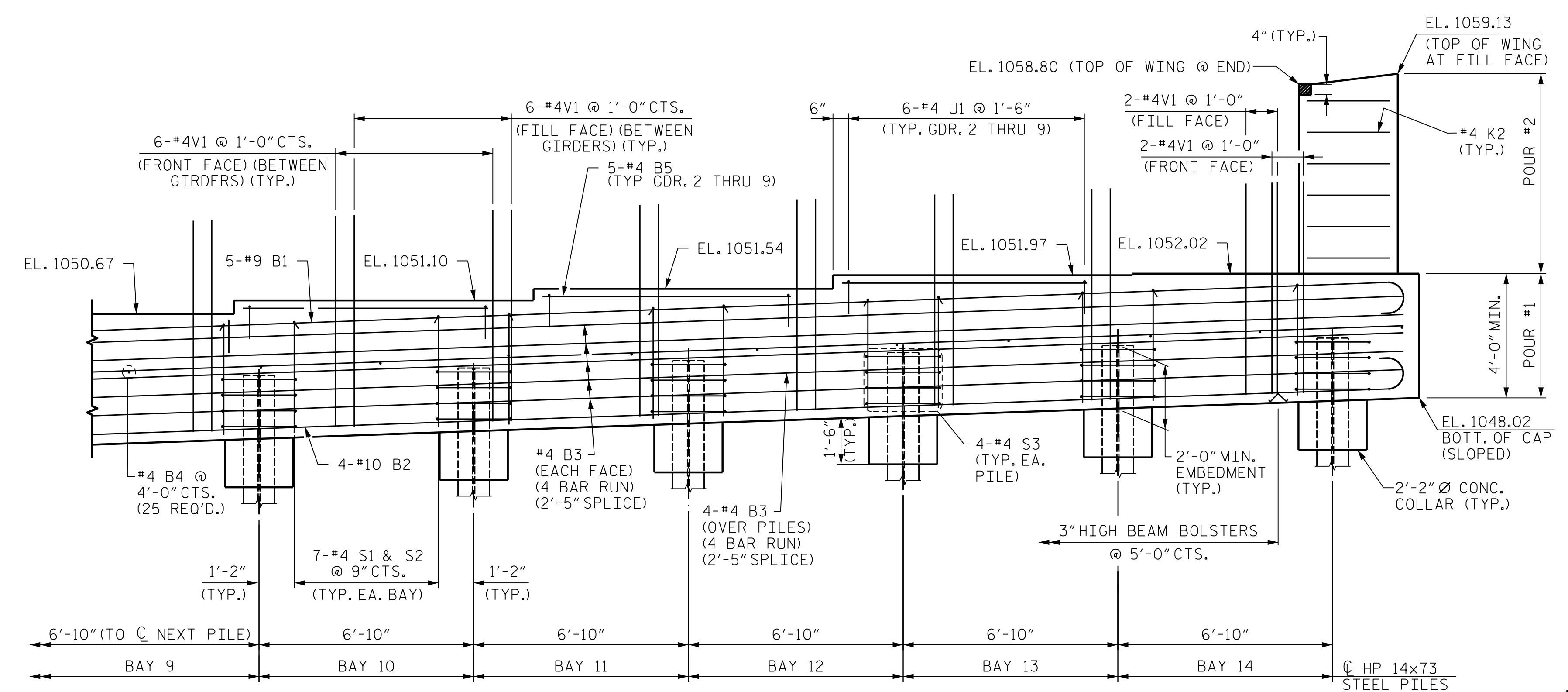
DESIGNED BY: C. CORMAN DATE: JULY 2019  
 DRAWN BY: A. HARLESS DATE: JULY 2019  
 CHECKED BY: B. LOFLIN DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

4/22/2020  
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STR. #4



PLAN

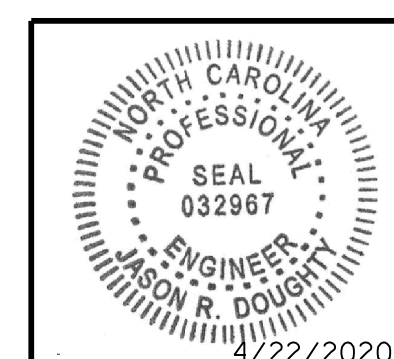


ELEVATION

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2



333 FAYETTEVILLE STREET, SUITE 500  
 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

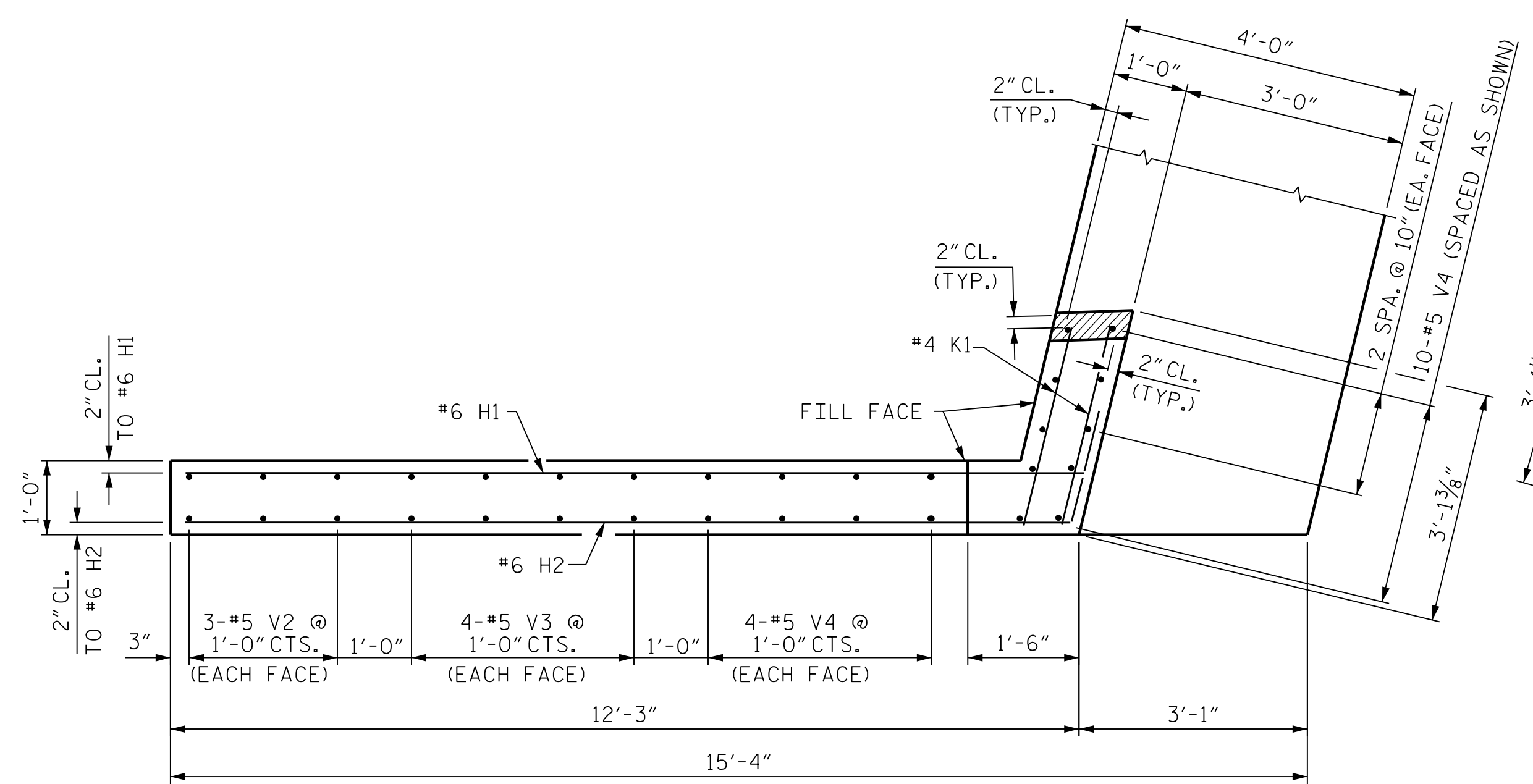
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| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
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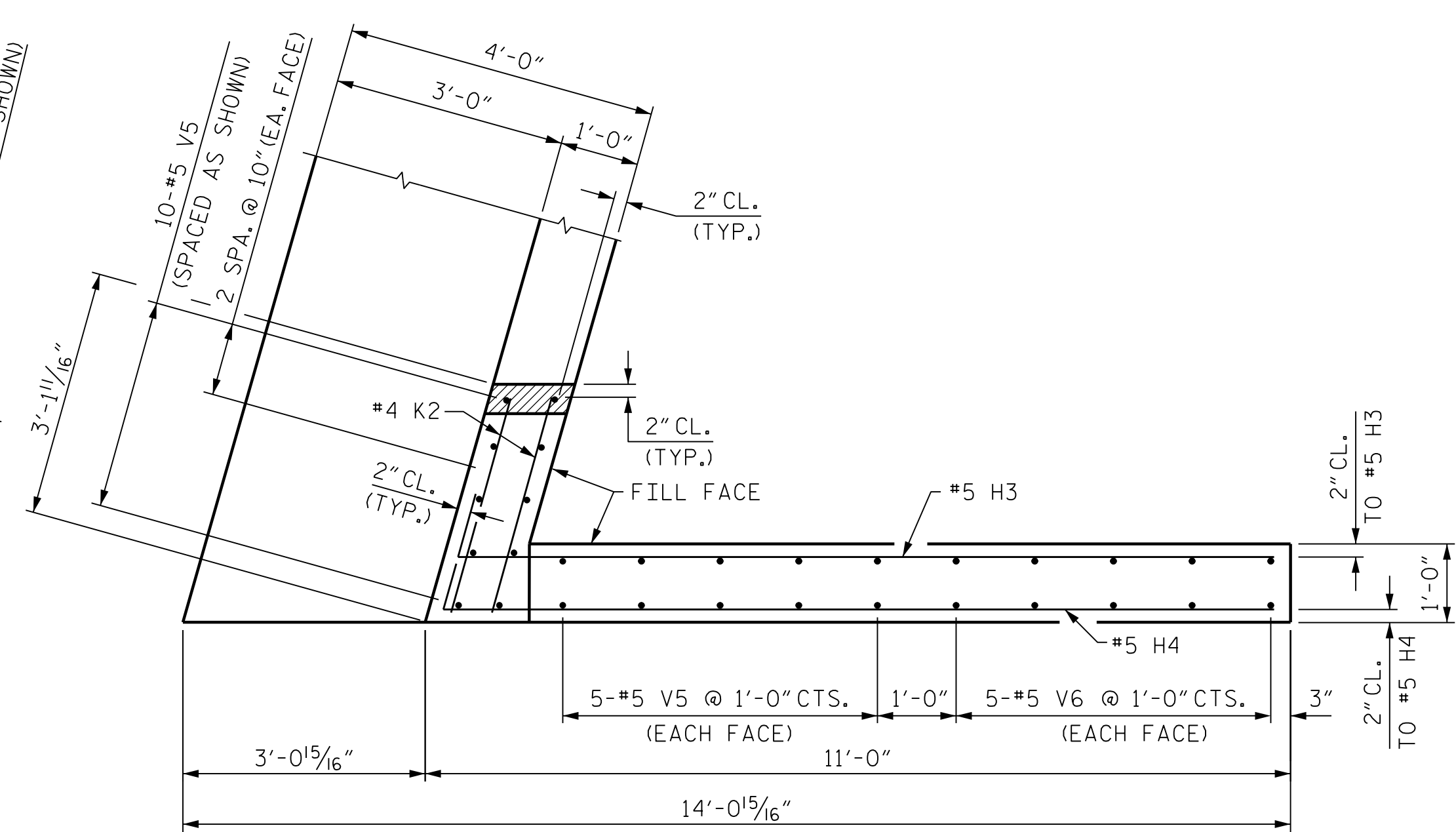
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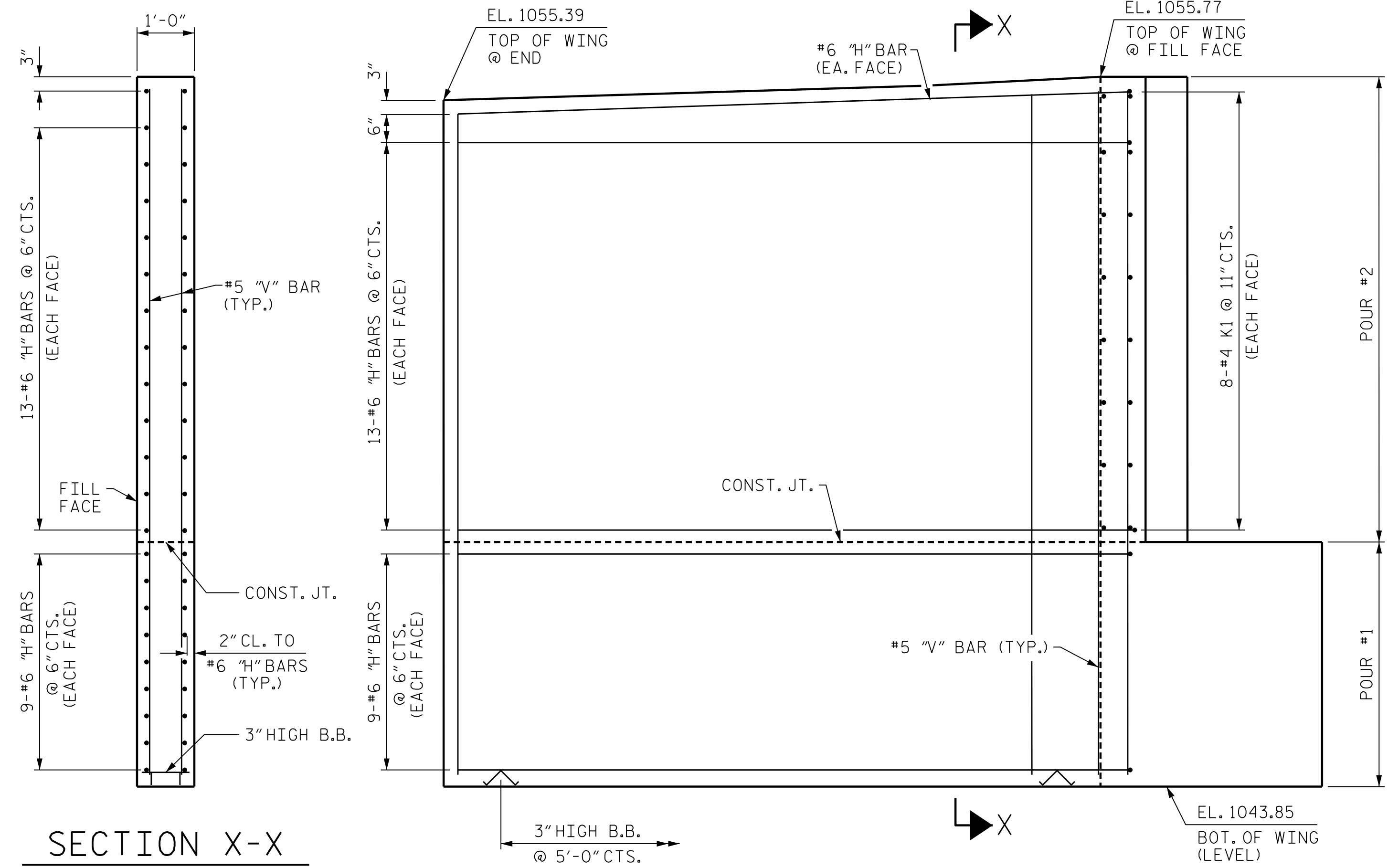
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| DESIGNED BY:               | C. CORMAN  | DATE: | JULY 2019 |
| DRAWN BY:                  | A. HARLESS | DATE: | JULY 2019 |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |



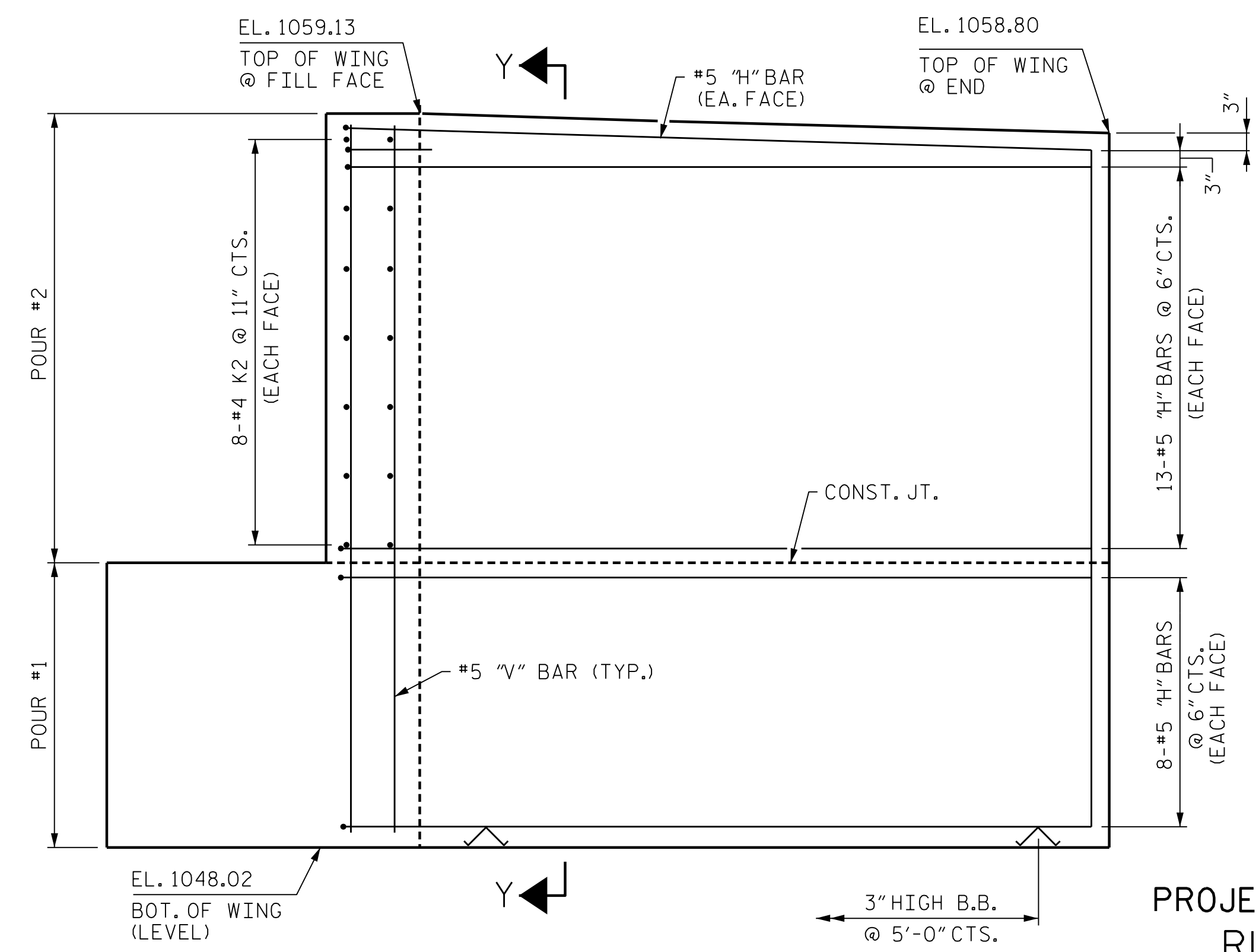
PLAN OF WING W3



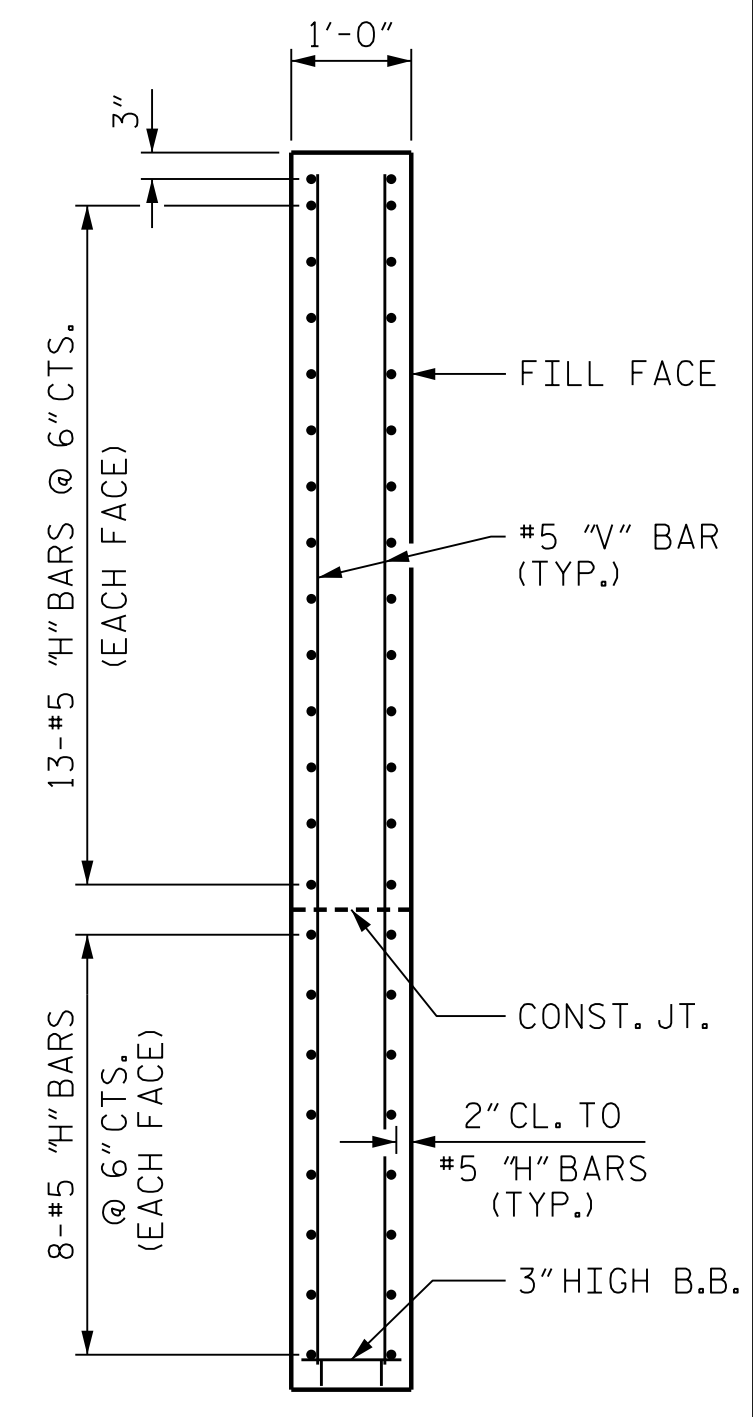
PLAN OF WING W4



ELEVATION OF WING W3



ELEVATION OF WING W4



SECTION Y-Y

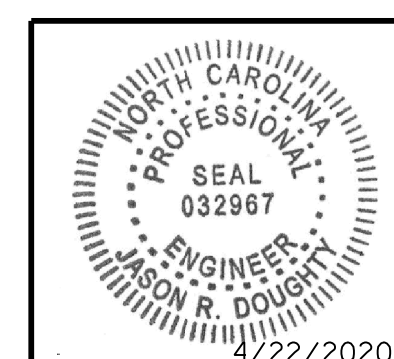
PROJECT NO. R-2233BB  
 RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 3 OF 4

|                         |     |                              |     |         |                 |
|-------------------------|-----|------------------------------|-----|---------|-----------------|
| STATE OF NORTH CAROLINA |     | DEPARTMENT OF TRANSPORTATION |     | RALEIGH |                 |
| SUBSTRUCTURE            |     | END BENT 2                   |     |         |                 |
| REVISIONS               |     |                              |     |         |                 |
| NO.                     | BY: | DATE:                        | NO. | BY:     | DATE:           |
| 1                       |     |                              | 3   |         |                 |
| 2                       |     |                              | 4   |         |                 |
| SHEET NO. S4-41         |     |                              |     |         | TOTAL SHEETS 45 |



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 NC LICENSE NO. C-2979



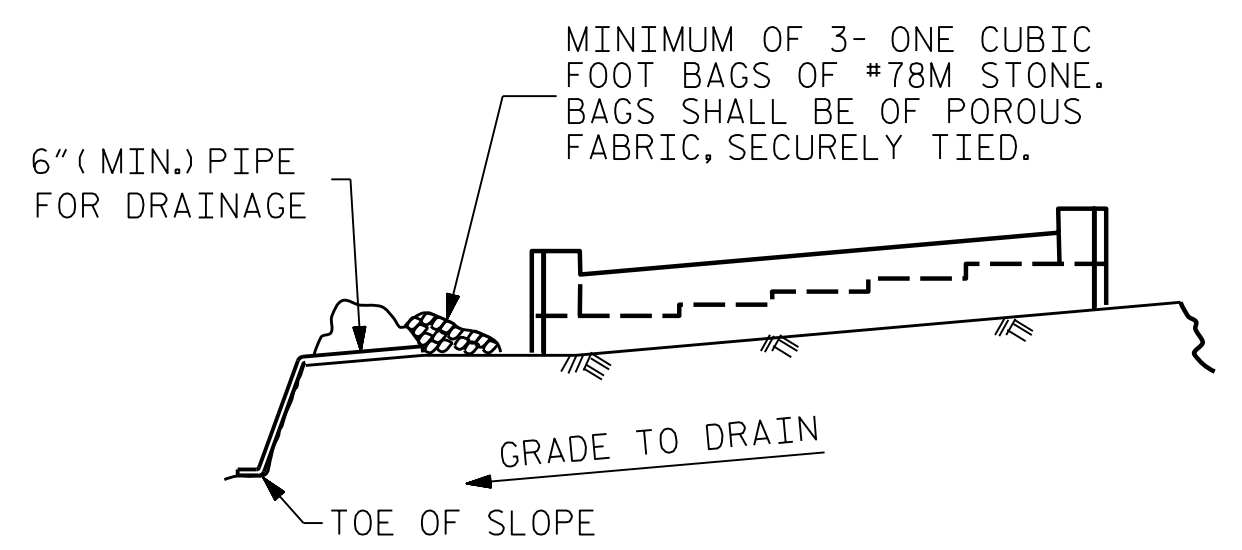
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|---------------------------------------|-----------------|
| DESIGNED BY: C. CORMAN                | DATE: JULY 2019 |
| DRAWN BY: A. HARLESS                  | DATE: JULY 2019 |
| CHECKED BY: B. LOFLIN                 | DATE: AUG 2019  |
| DESIGN ENGINEER OF RECORD: J. DOUGHTY | DATE: NOV 2019  |

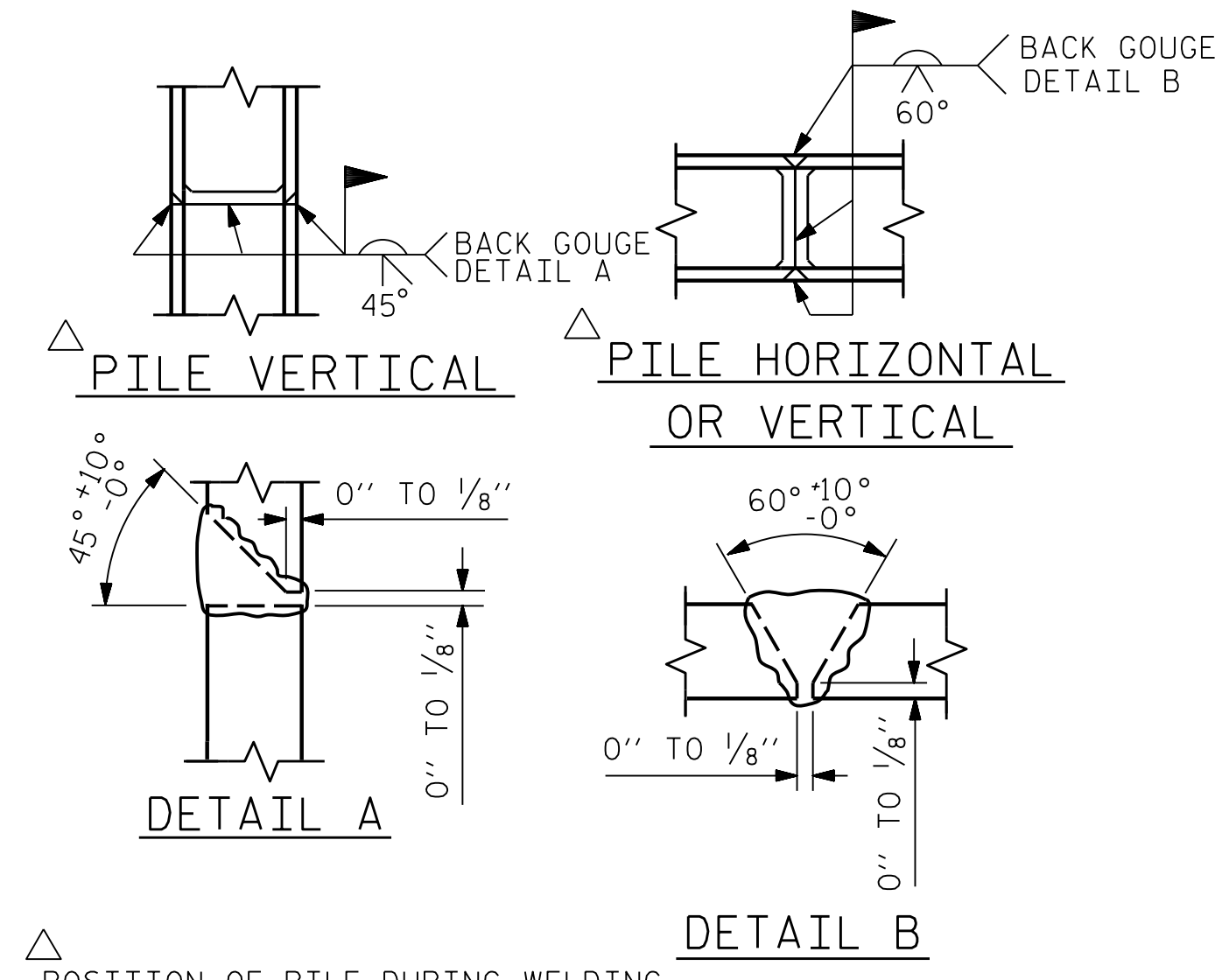


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

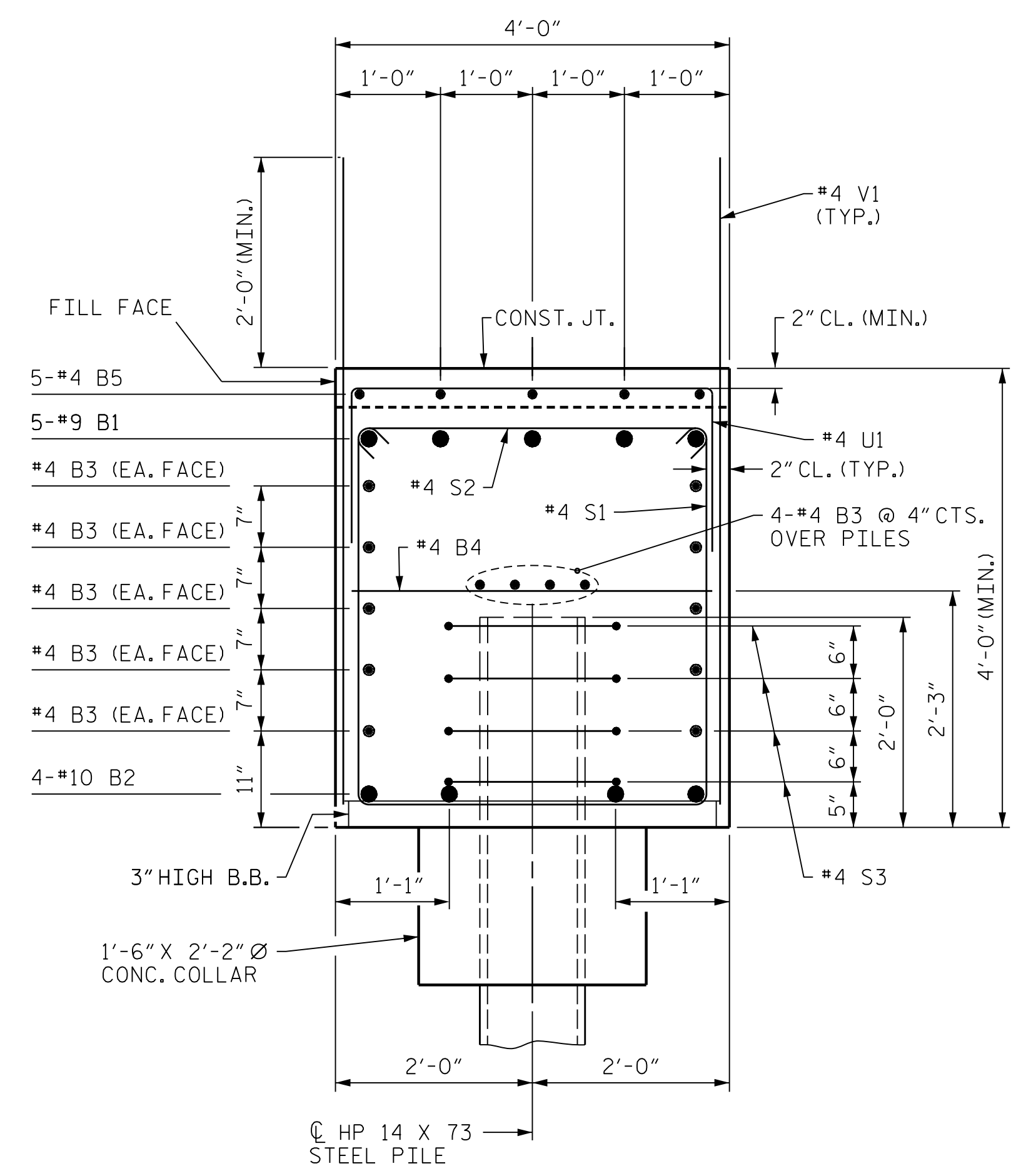
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



### PILE SPLICE DETAILS



### SECTION A-A

| BAR TYPES   |     |      |      | BILL OF MATERIAL |          |      |  |
|---|-----|------|------|------------------|----------|------|--|
| BAR   | NO. | SIZE | TYPE | LENGTH           | WEIGHT   |      |  |
| B1  | 10  | #9   | 1    | 53'-6"           | 1819     |      |  |
| B2  | 8   | #10  | 1    | 54'-1"           | 1862     |      |  |
| B3  | 56  | #4   | STR  | 26'-10"          | 1004     |      |  |
| B4  | 25  | #4   | STR  | 3'-8"            | 61       |      |  |
| B5  | 40  | #4   | STR  | 8'-0"            | 214      |      |  |
| B6  | 5   | #4   | STR  | 13'-5"           | 45       |      |  |
| H1  | 23  | #6   | 3    | 13'-1"           | 452      |      |  |
| H2  | 23  | #6   | 3    | 12'-11"          | 446      |      |  |
| H3  | 22  | #5   | 2    | 11'-5"           | 262      |      |  |
| H4  | 22  | #5   | 2    | 11'-6"           | 264      |      |  |
| K1  | 16  | #4   | STR  | 2'-8"            | 29       |      |  |
| K2  | 16  | #4   | STR  | 2'-9"            | 29       |      |  |
| S1  | 98  | #4   | 4    | 11'-8"           | 764      |      |  |
| S2  | 98  | #4   | 5    | 4'-5"            | 289      |      |  |
| S3  | 60  | #4   | 6    | 7'-0"            | 281      |      |  |
| U1  | 57  | #4   | 7    | 6'-8"            | 254      |      |  |
| V1  | 116 | #4   | STR  | 6'-10"           | 530      |      |  |
| V2  | 6   | #5   | STR  | 11'-2"           | 70       |      |  |
| V3  | 8   | #5   | STR  | 11'-3"           | 94       |      |  |
| V4  | 18  | #5   | STR  | 11'-5"           | 214      |      |  |
| V5  | 20  | #5   | STR  | 10'-7"           | 221      |      |  |
| V6  | 10  | #5   | STR  | 10'-5"           | 109      |      |  |
| REINFORCING STEEL                                     |     |      |      |                  | LBS.     | 9313 |  |
| CLASS A CONCRETE                                      |     |      |      |                  |          |      |  |
| POUR #1 CAP, LOWER WINGS & CONC. COLLARS              |     |      |      |                  | C.Y.     | 71.2 |  |
| POUR #2 UPPER PART OF WINGS                           |     |      |      |                  | C.Y.     | 7.1  |  |
| TOTAL CLASS A CONCRETE                                |     |      |      |                  | C.Y.     | 78.3 |  |
| HP 14x73 STEEL PILES NO. 15                           |     |      |      |                  | LIN. FT. | 565  |  |
| PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES |     |      |      |                  | NO.      | 15   |  |

ALL BAR DIMENSIONS ARE OUT TO OUT.

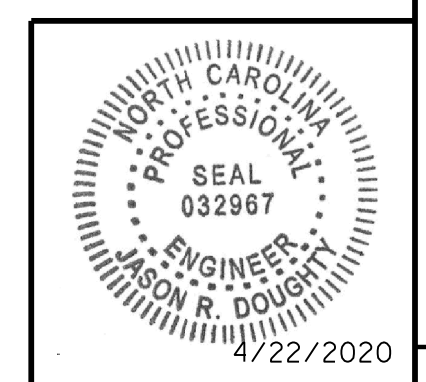
PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 4 OF 4

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

SHEET NO. S4-42  
 TOTAL SHEETS 45

**MODJESKI and MASTERS**  
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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979



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 UNLESS ALL SIGNATURES COMPLETED**

DocuSigned by:  
 Jason R. Dougherty  
 SF73FA2DEA874E8...

STR. #4

4/22/2020  
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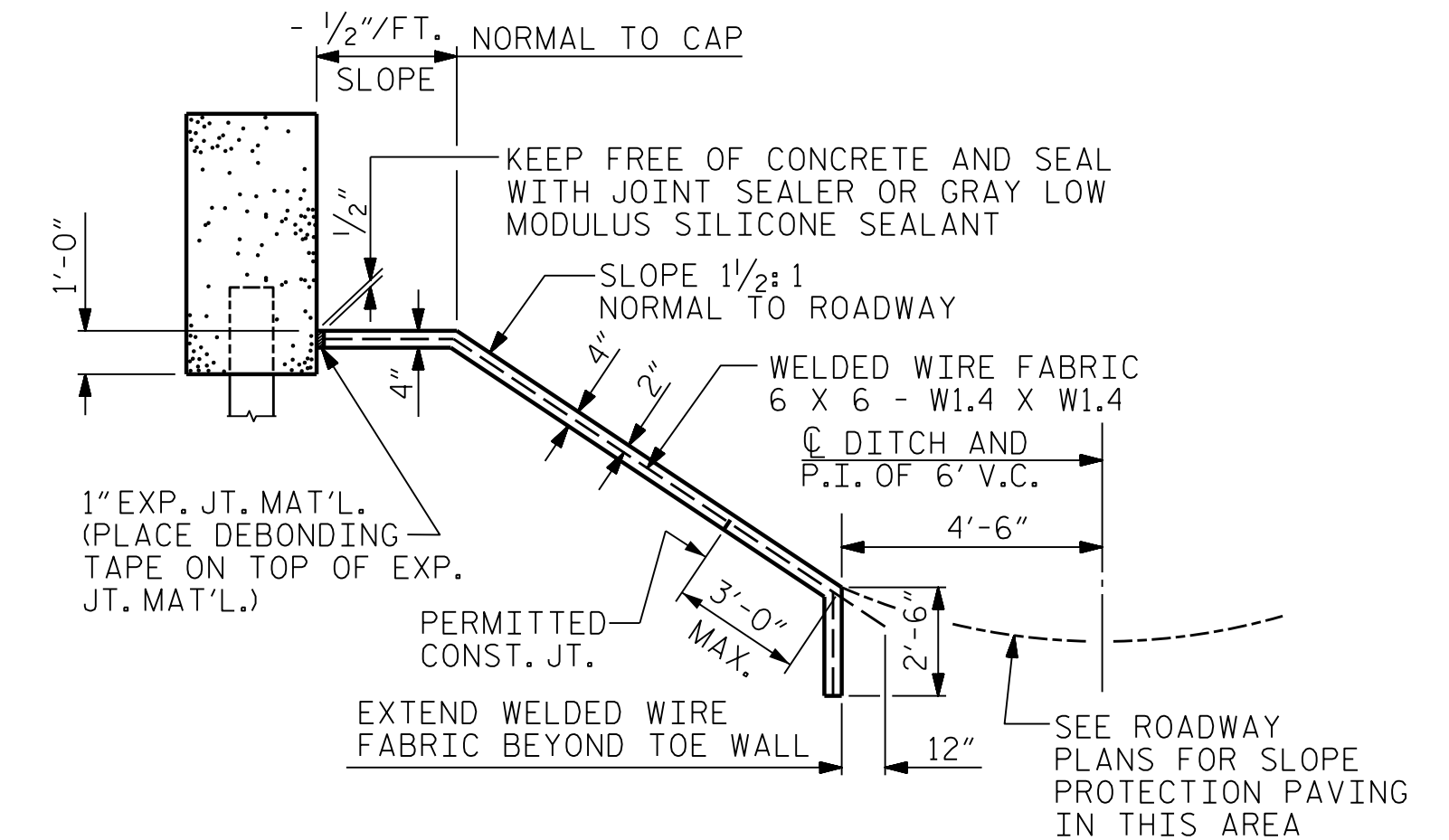
|                            |            |       |           |
|----------------------------|------------|-------|-----------|
| DESIGNED BY:               | C. CORMAN  | DATE: | JULY 2019 |
| DRAWN BY:                  | A. HARLESS | DATE: | JULY 2019 |
| CHECKED BY:                | B. LOFLIN  | DATE: | AUG 2019  |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE: | NOV 2019  |

**GENERAL NOTES**

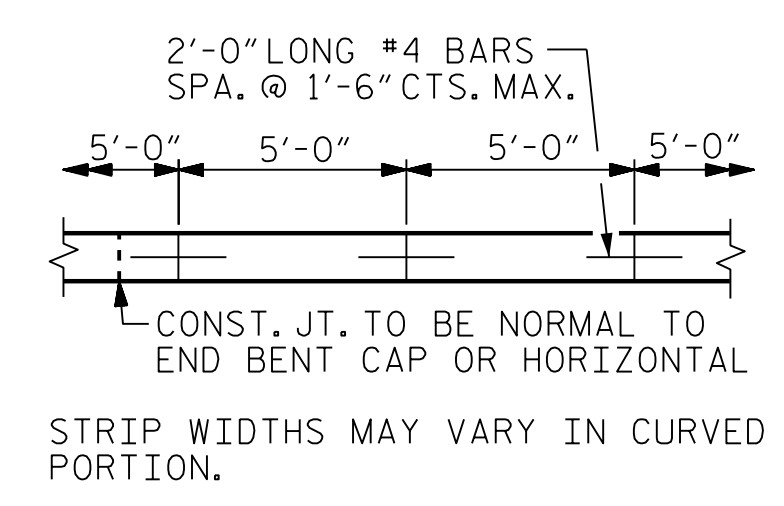
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

| BRIDGE @<br>STA. 26+65.52 -Y3- | 4 INCH<br>SLOPE PROTECTION | *<br>WELDED WIRE FABRIC<br>60 INCHES WIDE |
|--------------------------------|----------------------------|---|
|                                | SQUARE YARDS               | APPROX. L.F.                              |
| END BENT 1                     | 954                        | 1720                                      |
| END BENT 2                     | 479                        | 865                                       |

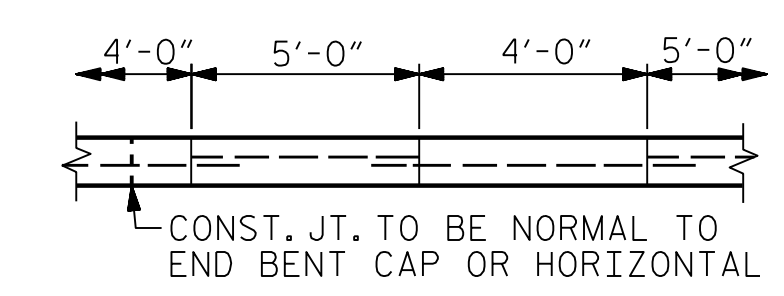
\* QUANTITY SHOWN IS BASED ON 5' POURS.



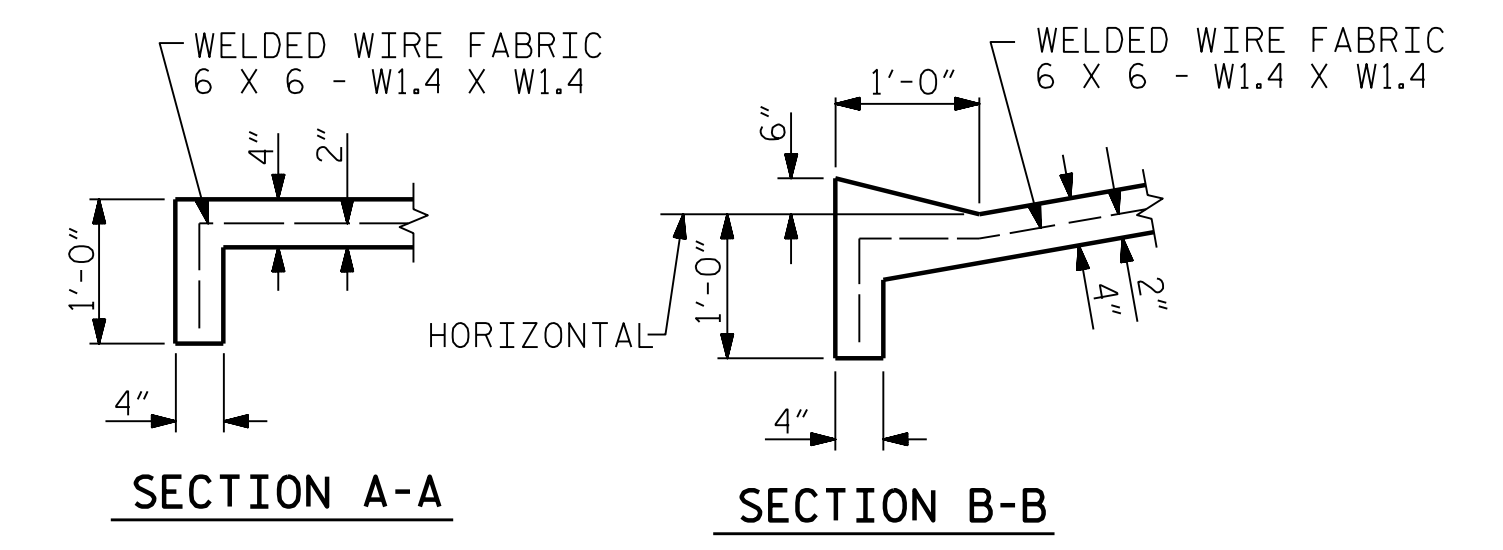
**SECTION ALONG C SURVEY WHEN FILL CATCHES IN DITCH**



**POURING DETAIL**



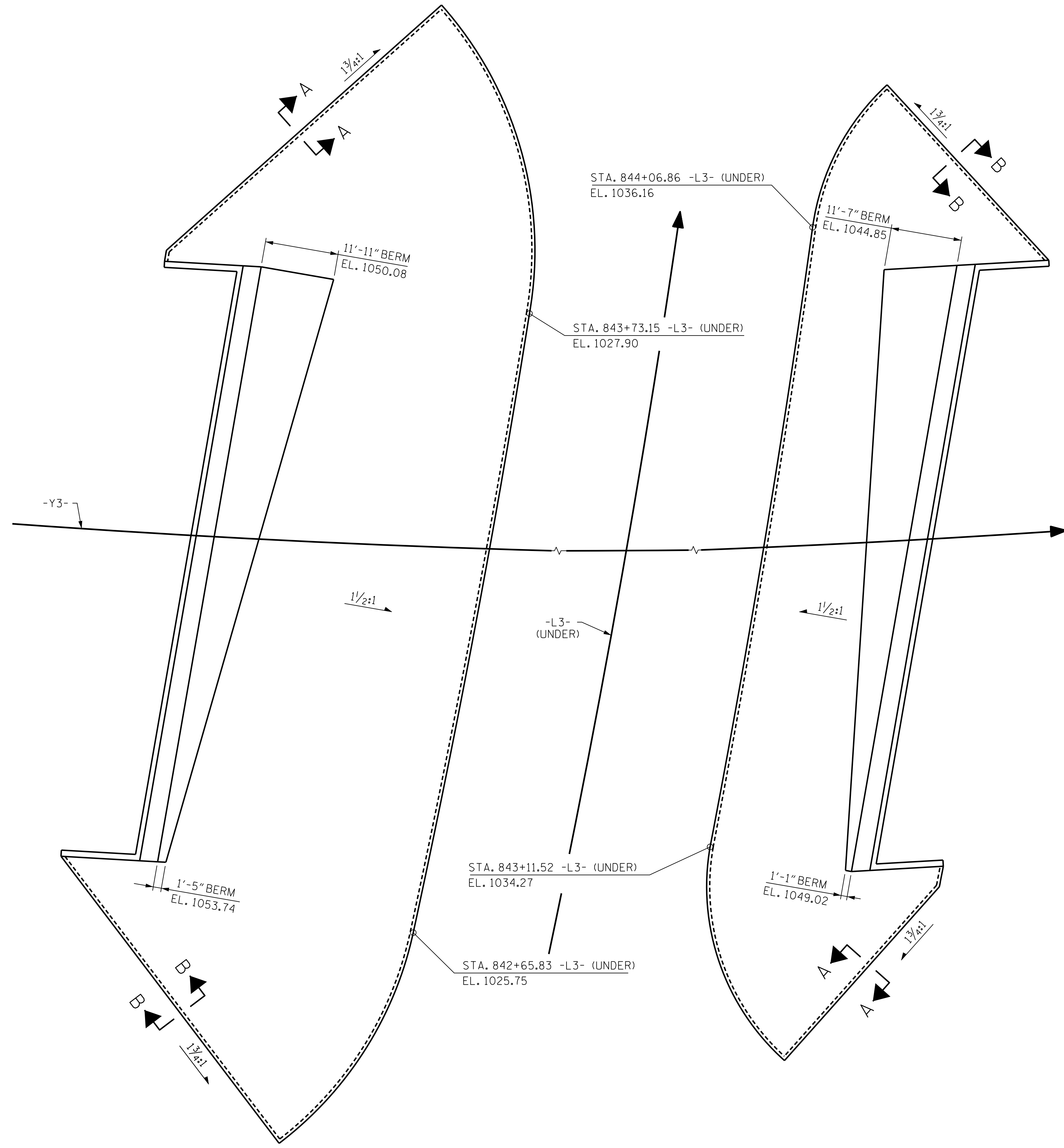
**OPTIONAL POURING DETAIL**



**SECTION A-A**

**SECTION B-B**

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-



**PLAN**

|  |                 |         |
|--|-----------------|---------|
| DRAWN BY : ELR 5/92                    | REV. 12/21/11   | MAA/GM  |
| CHECKED BY : GRP 6/92                  | REV. 1/16       | MAA/TMG |
|  | REV. 12/17      | MAA/THC |
| DESIGNED BY : B. LOFLIN                | DATE : AUG 2019 |         |
| DRAWN BY : K. WHITE                    | DATE : MAY 2019 |         |
| CHECKED BY : J. BORUTA                 | DATE : AUG 2019 |         |
| DESIGN ENGINEER OF RECORD : J. DOUGHTY | DATE : NOV 2019 |         |

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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

DocuSigned by:  
 Jason R Doughty  
 SF73FA2DEA974E8...

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION**

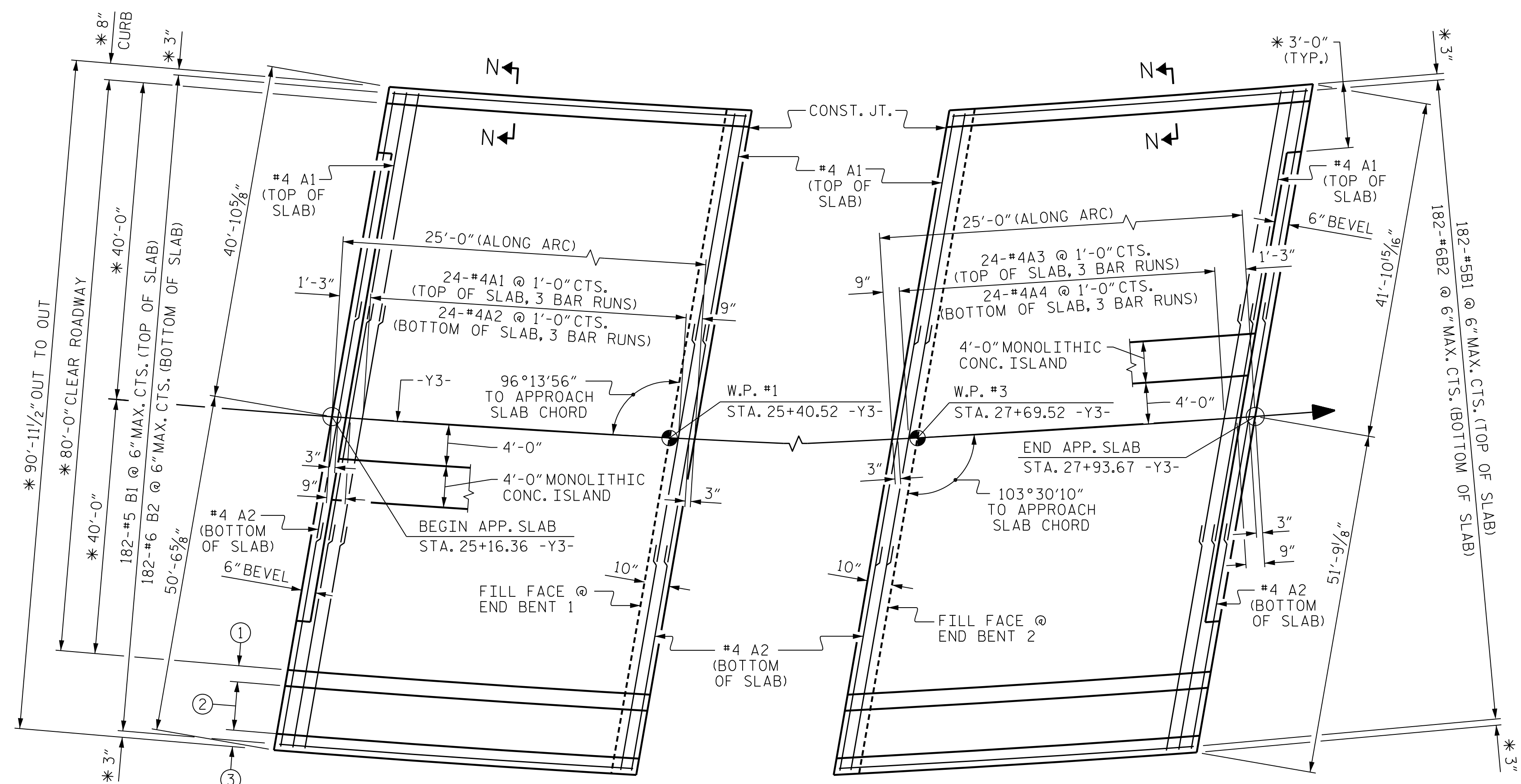
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|-----------|-----|-------|-----|-----|-------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |
| 1         |     |       | 3   |     |       |
| 2         |     |       | 4   |     |       |

SHEET NO. S4-43  
 TOTAL SHEETS 45

STR. #4      STD. NO. SP2

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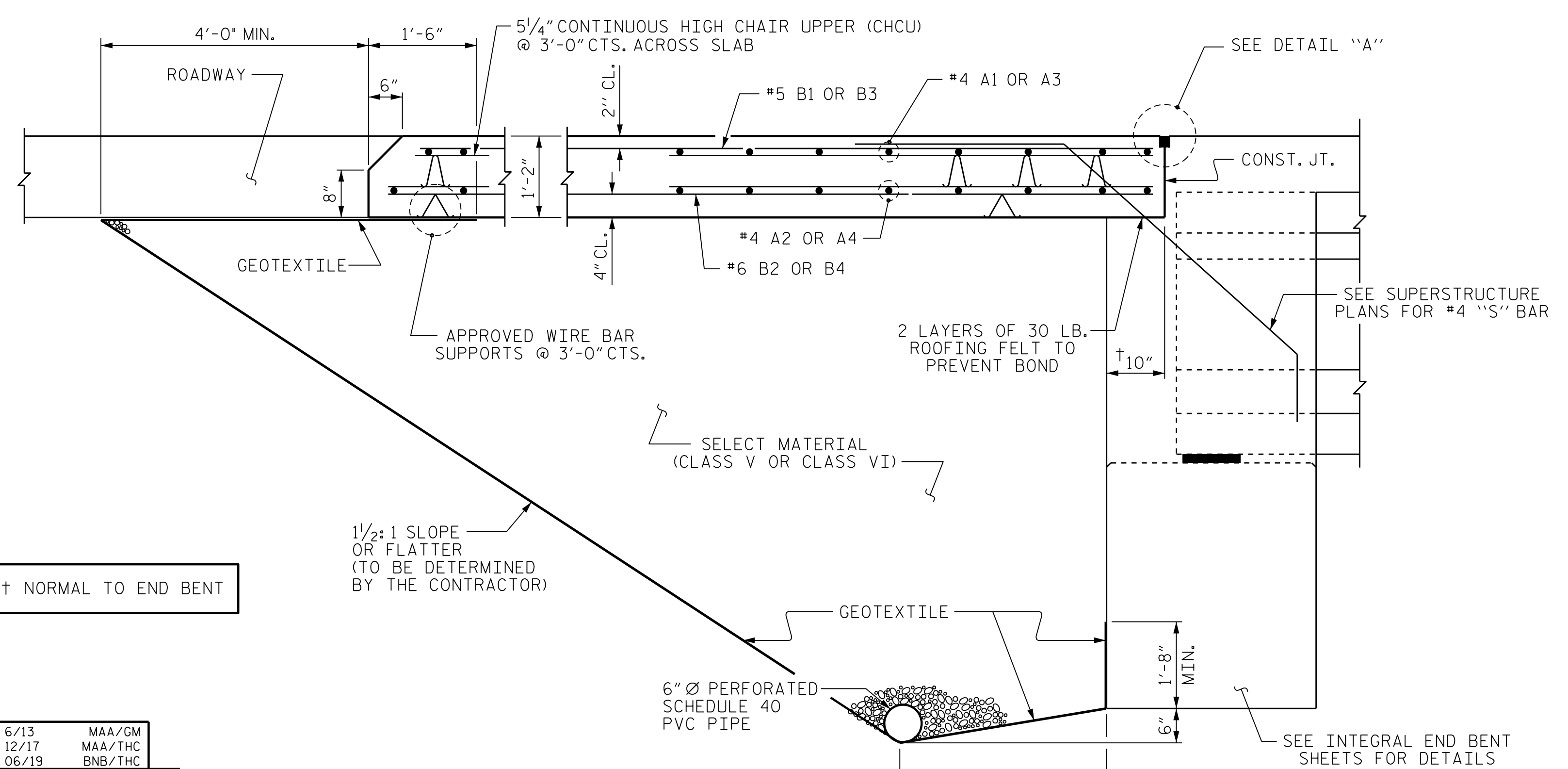


- ① \*1'-0" VERTICAL CONCRETE BARRIER RAIL
- ② \*8'-0" MULTI-USE PATH
- ③ \*1'-3/2" 2 BAR METAL RAIL AND CONCRETE PARAPET

PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.  
 \* RADIAL DIMENSIONS.  
 "A" BARS ARE SPACED ALONG APPROACH SLAB CHORD AND PLACED PARALLEL TO FILL FACE.



SECTION THRU SLAB  
 (TYPE I - STANDARD APPROACH FILL)

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6" 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.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

FOR ARC OFFSETS, SEE "ARC OFFSETS" SHEET.

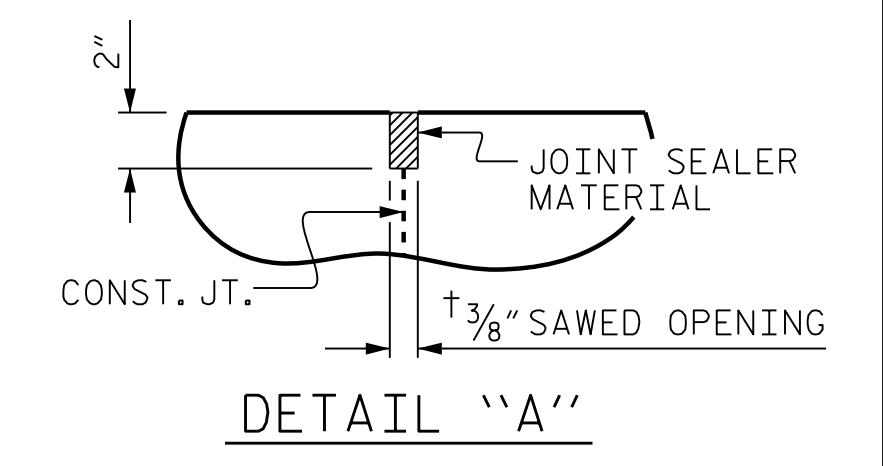
FOR RAIL POST SPACING, SEE "RAIL POST SPACINGS FOR TWO BAR METAL RAIL" SHEET.

FOR VERTICAL CONCRETE BARRIER RAIL, SEE "VERTICAL CONCRETE BARRIER RAIL LAYOUT" SHEET.

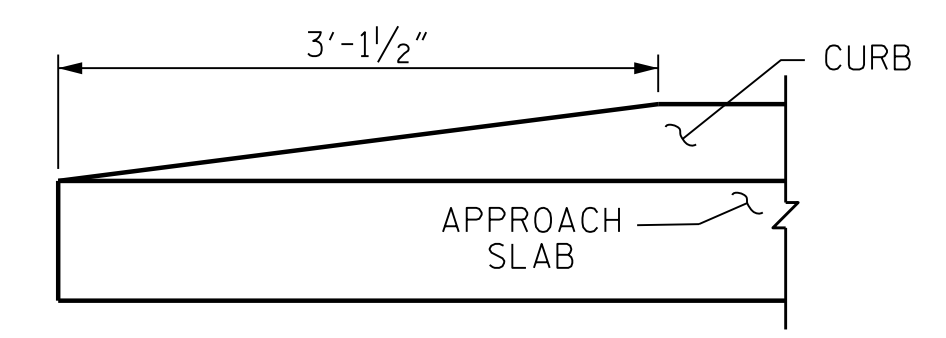
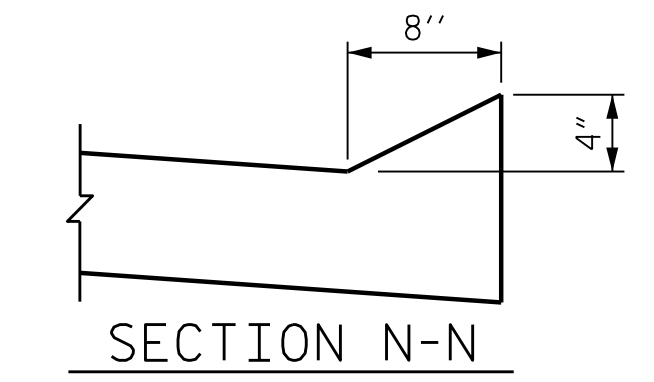
FOR MONOLITHIC CONCRETE ISLAND, SEE "MONOLITHIC CONCRETE ISLAND" SHEET.

MONOLITHIC CONCRETE ISLAND ON APPROACH SLABS INCLUDED IN BILL OF MATERIAL.

| BILL OF MATERIAL |     |      |      |                                 |        |        |
|------------------|-----|------|------|---------------------------------|--------|--------|
| BAR              | NO. | SIZE | TYPE | LENGTH                          | WEIGHT |        |
| *A1              | 78  | 4    | STR  | 31'-9"                          | 1654   |        |
| A2               | 78  | 4    | STR  | 31'-6"                          | 1641   |        |
| *A3              | 78  | 4    | STR  | 32'-5"                          | 1689   |        |
| A4               | 78  | 4    | STR  | 32'-4"                          | 1685   |        |
| *A5              | 38  | 4    | STR  | 2'-6"                           | 63     |        |
| *B1              | 364 | 5    | STR  | 24'-2"                          | 9175   |        |
| B2               | 364 | 6    | STR  | 24'-8"                          | 13486  |        |
| *B3              | 6   | 4    | STR  | 24'-8"                          | 99     |        |
|                  |     |      |      | REINFORCING STEEL               | LBS.   | 16,812 |
|                  |     |      |      | *EPOXY COATED REINFORCING STEEL | LBS.   | 12,680 |
|                  |     |      |      | CLASS AA CONCRETE               | C. Y.  | 195.9  |



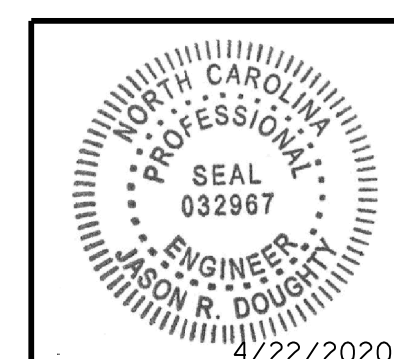
| SPlice LENGTHS |              |          |
|----------------|--------------|----------|
| BAR SIZE       | EPOXY COATED | UNCOATED |
| #4             | 1'-11"       | 1'-7"    |
| #5             | 2'-5"        | 2'-0"    |
| #6             | 3'-7"        | 2'-5"    |



PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**BRIDGE APPROACH  
 SLAB FOR INTEGRAL  
 ABUTMENT**



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 NC LICENSE NO. C-2979

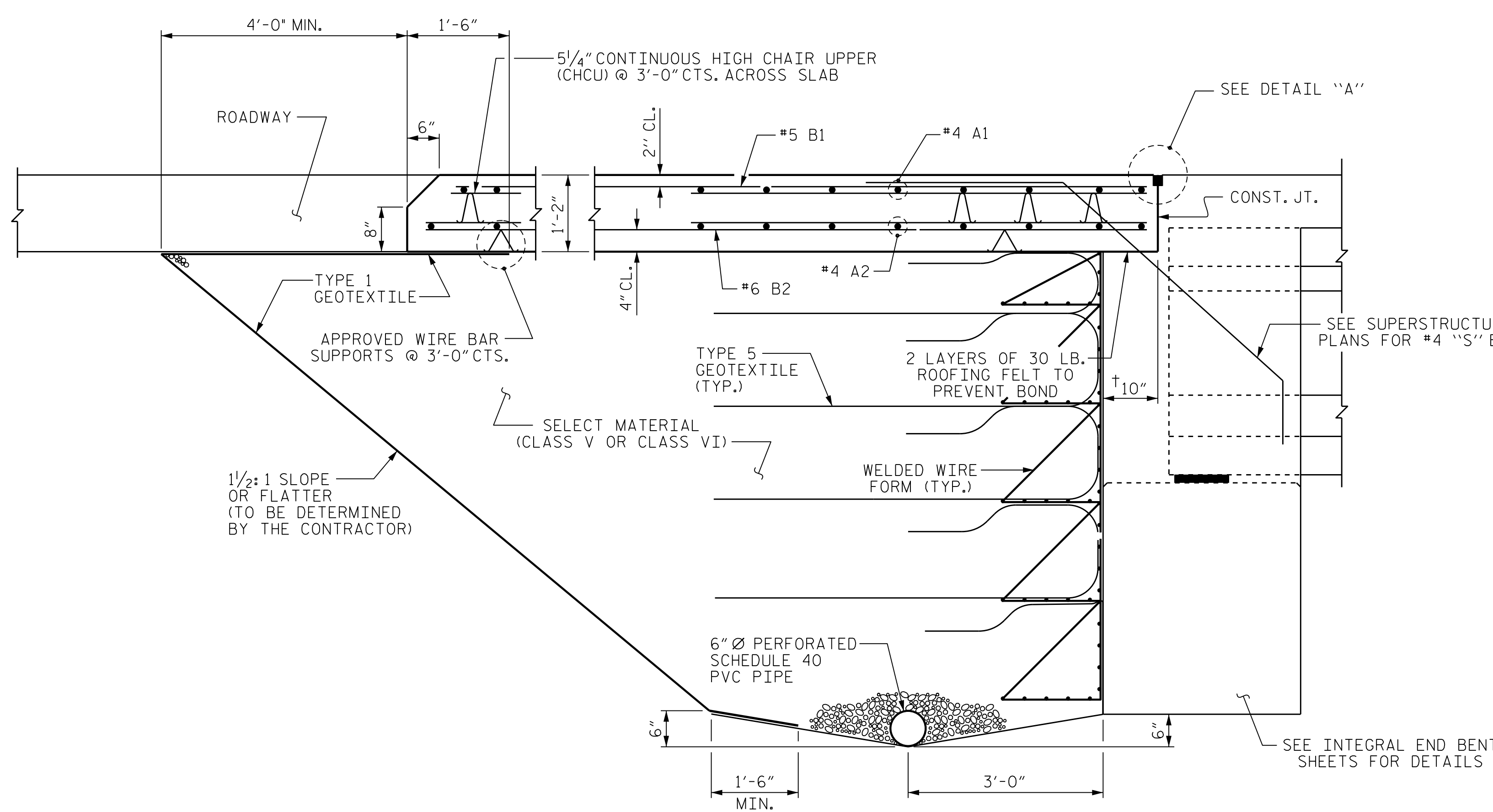
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|-----------|-----|-------|-----|-----|-------|-----------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S4-44           |
| 1         |     |       | 3   |     |       | TOTAL SHEETS 45 |
| 2         |     |       | 4   |     |       |                 |

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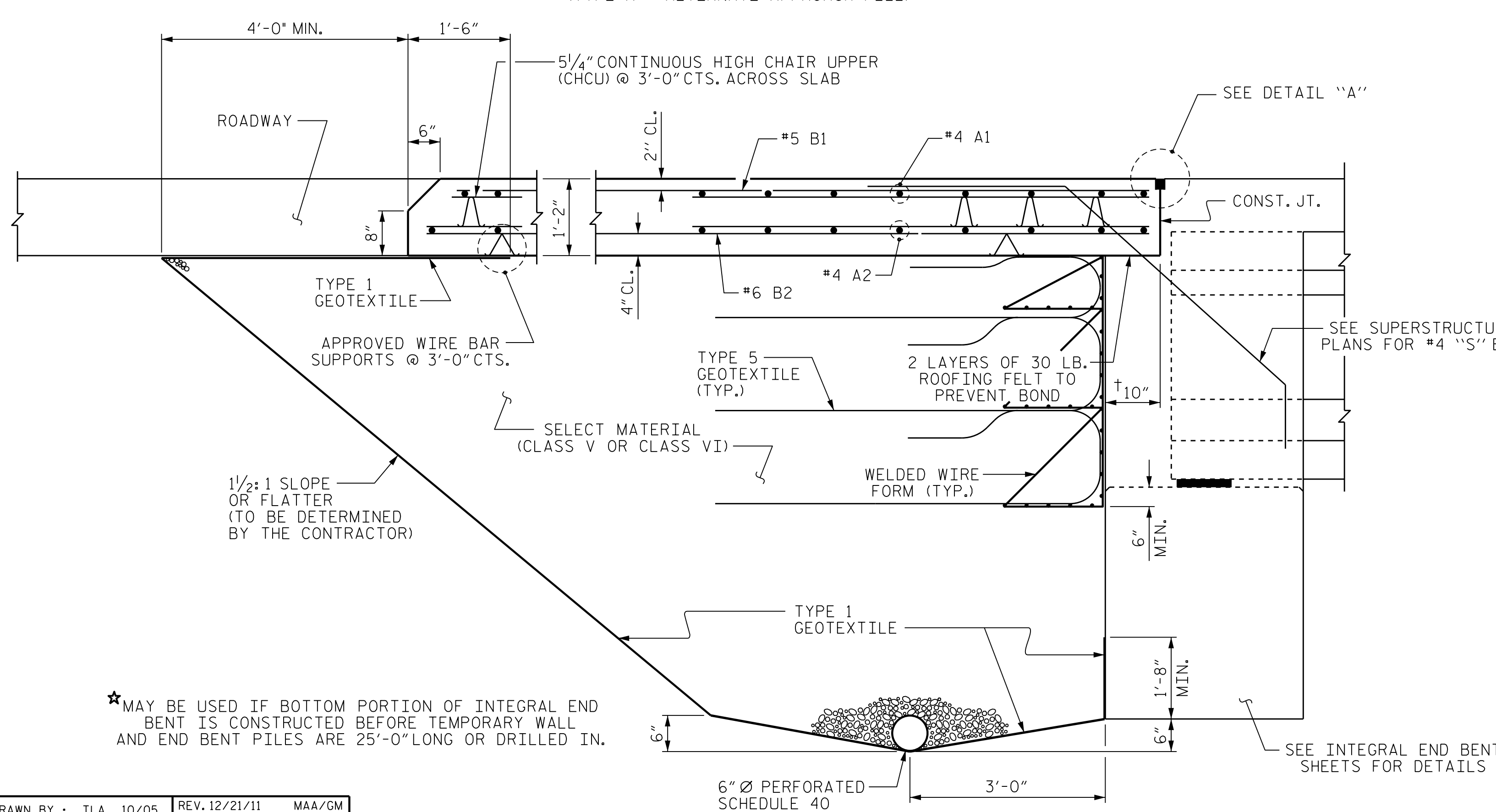
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| CHECKED BY: GM                        | 5/06           | REV. 12/17 | MAA/THC |
|                                       |                | REV. 06/19 | BNB/THC |
| DESIGNED BY: A. DUTTA                 | DATE: AUG 2019 |            |         |
| DRAWN BY: K. WHITE                    | DATE: AUG 2019 |            |         |
| CHECKED BY: J. BORUTA                 | DATE: AUG 2019 |            |         |
| DESIGN ENGINEER OF RECORD: J. DOUGHTY | DATE: NOV 2019 |            |         |

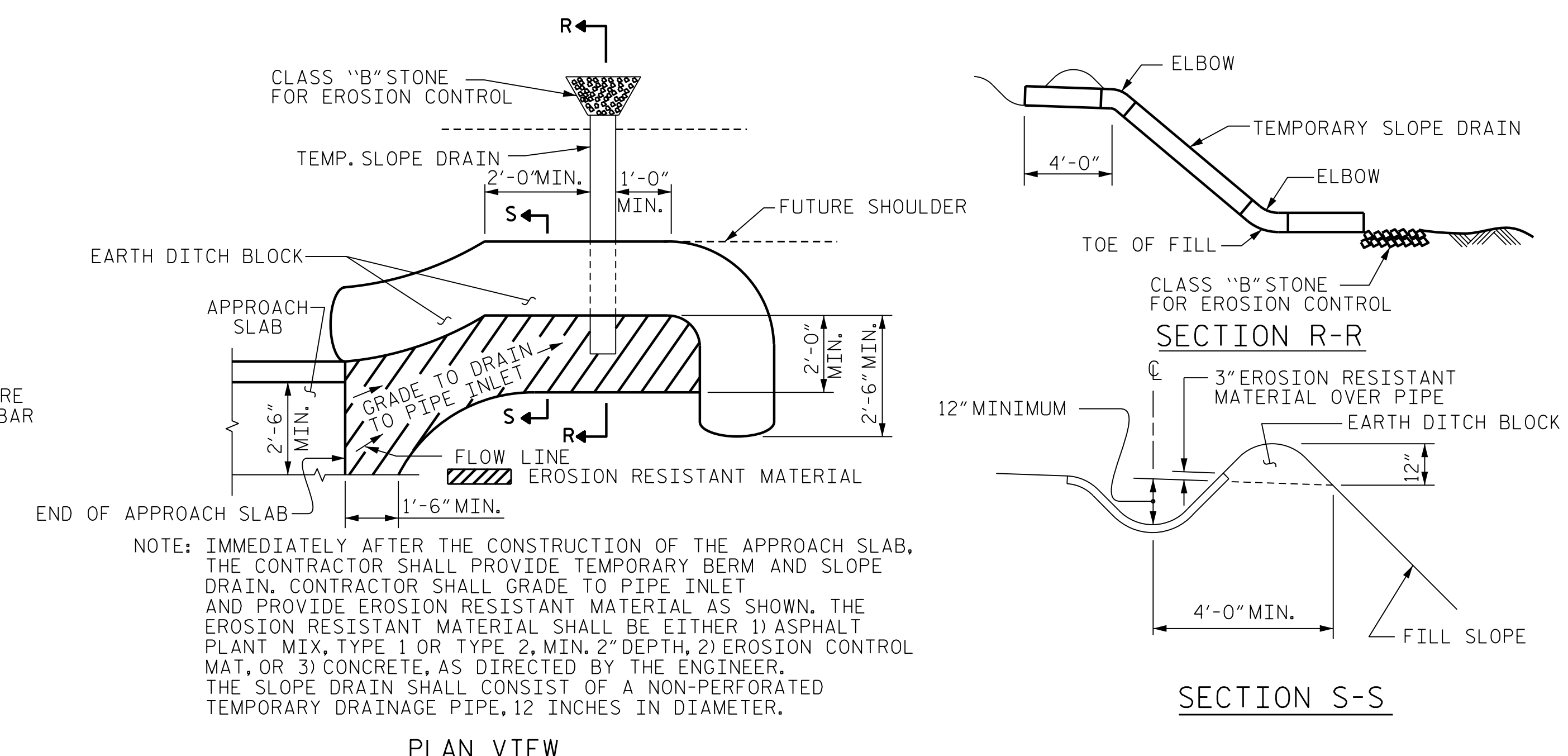




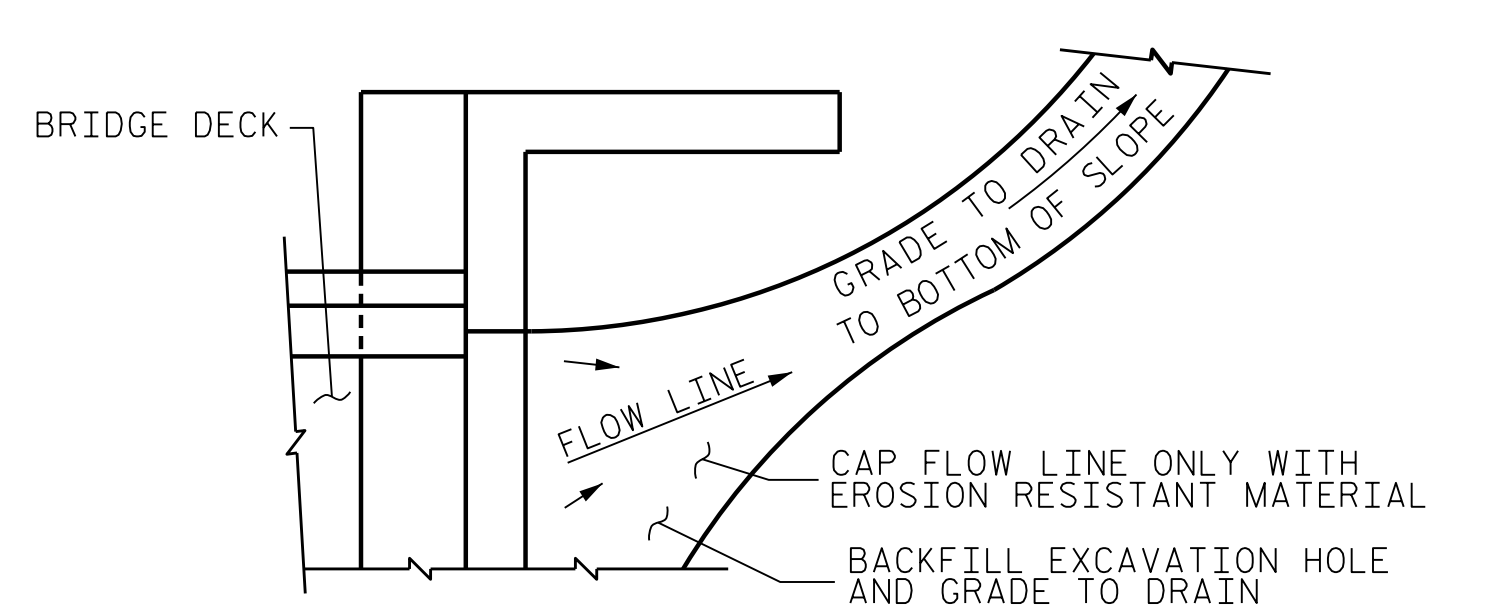
**SECTION THRU SLAB**  
(TYPE A - ALTERNATE APPROACH FILL)



**SECTION THRU SLAB**  
(TYPE A - ALTERNATE APPROACH FILL)



**TEMPORARY BERM AND SLOPE DRAIN DETAILS**  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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**

**NOTES**

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" 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.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-2233BB  
RUTHERFORD COUNTY  
 STATION: 26+65.52 -Y3-  
 SHEET 2 OF 2

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

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

SHEET NO. S4-45  
 TOTAL SHEETS 45  
 STR. #4 STD. NO. BASS

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 RALEIGH, NC 27601  
 NC LICENSE NO. C-2979

DocuSigned by:  
**Jason R. Dougherty**  
 5F73FA2DEA874E8...

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4/22/2020  
 404\_095\_R2233BB\_SMLL\_AS2\_800663.DGN

DRAWN BY: TLA 10/05  
 CHECKED BY: GM 5/06

DESIGNED BY: A. DUTTA DATE: AUG 2019  
 DRAWN BY: K. WHITE DATE: AUG 2019  
 CHECKED BY: J. BORUTA DATE: AUG 2019  
 DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: NOV 2019

\*MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

## 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<br>STRUCTURAL STEEL - AASHTO M270 GRADE 36 | --    | 20,000 LBS. PER SQ. IN.          |
|   | --    | 27,000 LBS. PER SQ. IN.          |
|   | --    | 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<br>EXTREME FIBER STRESS      | ---   | 1,800 LBS. PER SQ. IN.           |
| COMPRESSION PERPENDICULAR TO GRAIN<br>OF TIMBER                       | ----- | 375 LBS. PER SQ. IN.             |
| EQUIVALENT FLUID PRESSURE OF EARTH                                    | ----- | 30 LBS. PER CU. FT.<br>(MINIMUM) |

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "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  $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO  $\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A  $\frac{1}{4}$ " 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  $\frac{1}{4}$ " 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  $\frac{1}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{1}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{1}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{1}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  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  $\frac{3}{16}$ " 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  $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

# ENGLISH

JANUARY, 1990

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