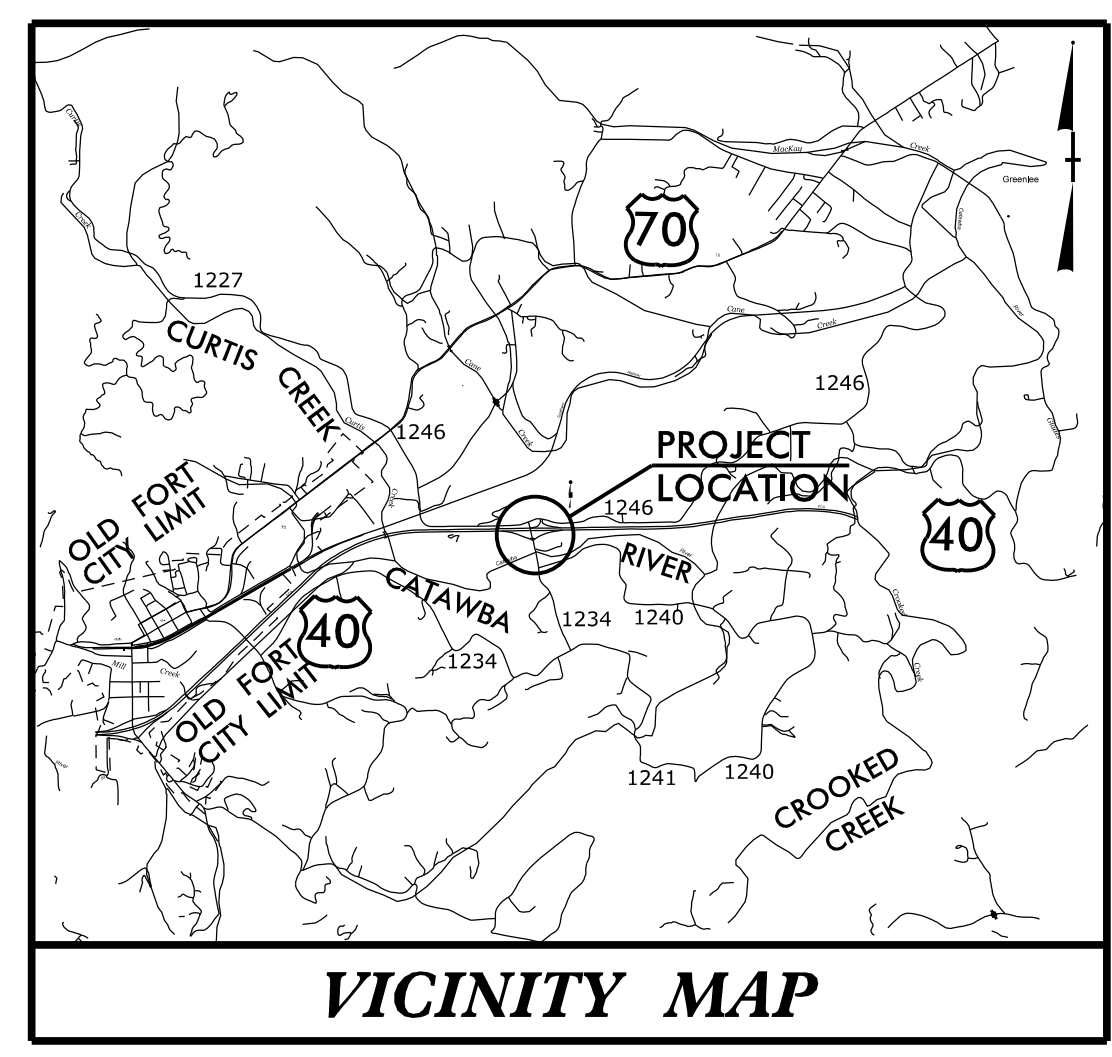


CONTRACT: C204672 TIP PROJECT: BR-0033



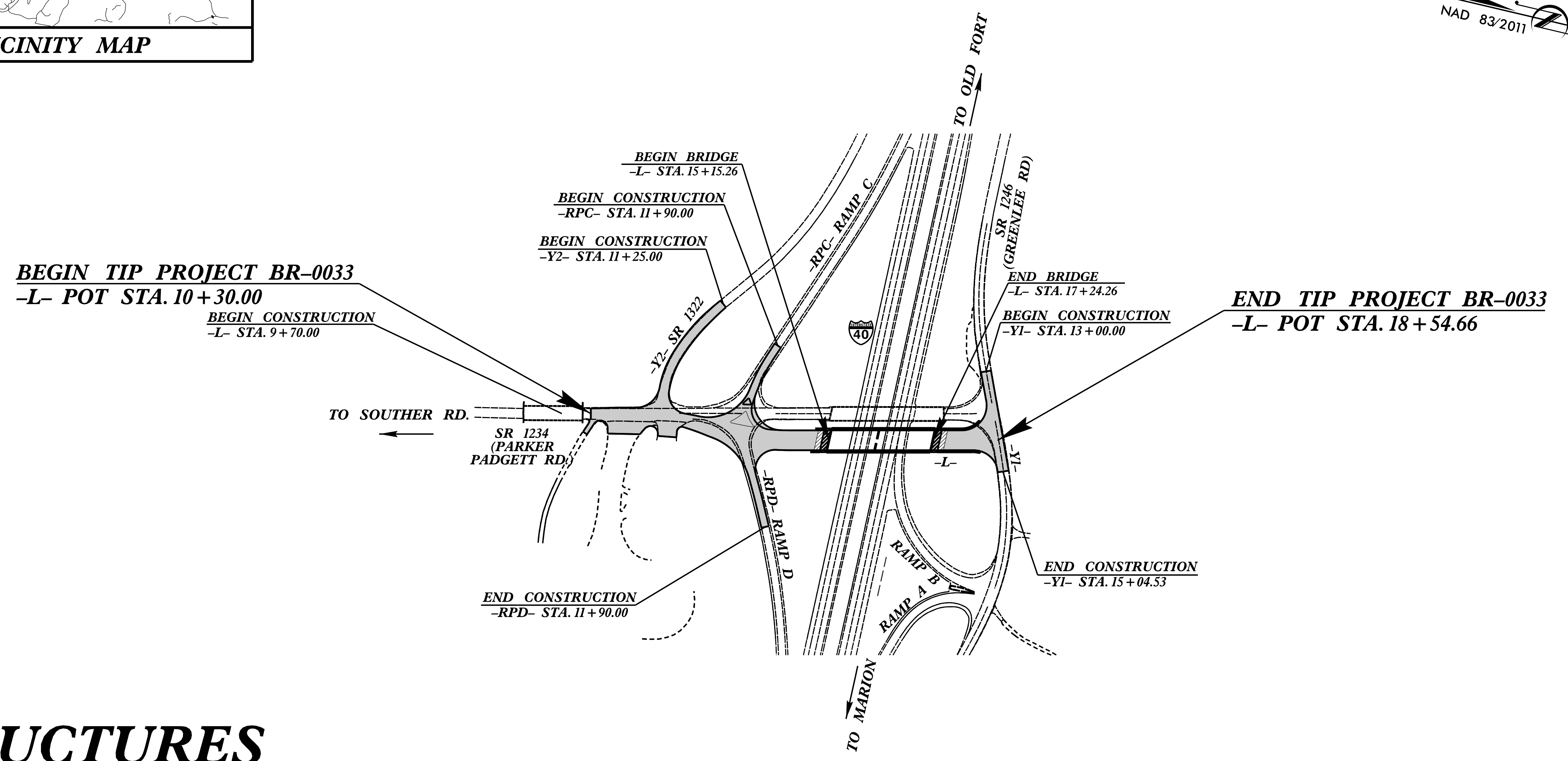
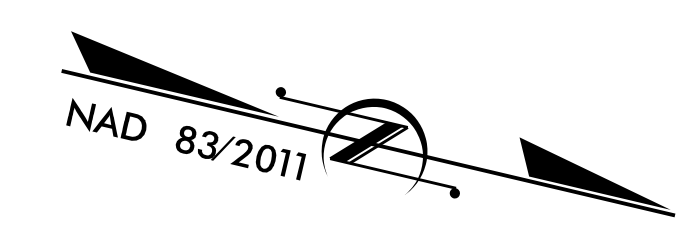
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MCDOWELL COUNTY

**LOCATION: BRIDGE NO. 84 ON SR 1234 (PARKER PADGETT ROAD)
OVER I-40 BETWEEN SR 1322 AND SR 1246**

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|----------------|--------------|
| N.C. | BR-0033 | 1A | 32 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 67033.1.1 | NA | P.E. | |
| 67033.2.1 | NA | RW & UTILITIES | |
| 67033.3.1 | NA | CONST. | |
| | | | |
| | | | |
| | | | |



STRUCTURES

DESIGN DATA

ADT 2018 = 2410
ADT 2041 = 3140
K = 13 %
D = 70 %
T = 6 % *
V = 60 MPH
* TTST 3%+DUAL 3%
FUNC CLASS =
LOCAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0033 = 0.116 MI
LENGTH STRUCTURE TIP PROJECT BR-0033 = 0.040 MI
TOTAL LENGTH TIP PROJECT BR-0033 = 0.156 MI

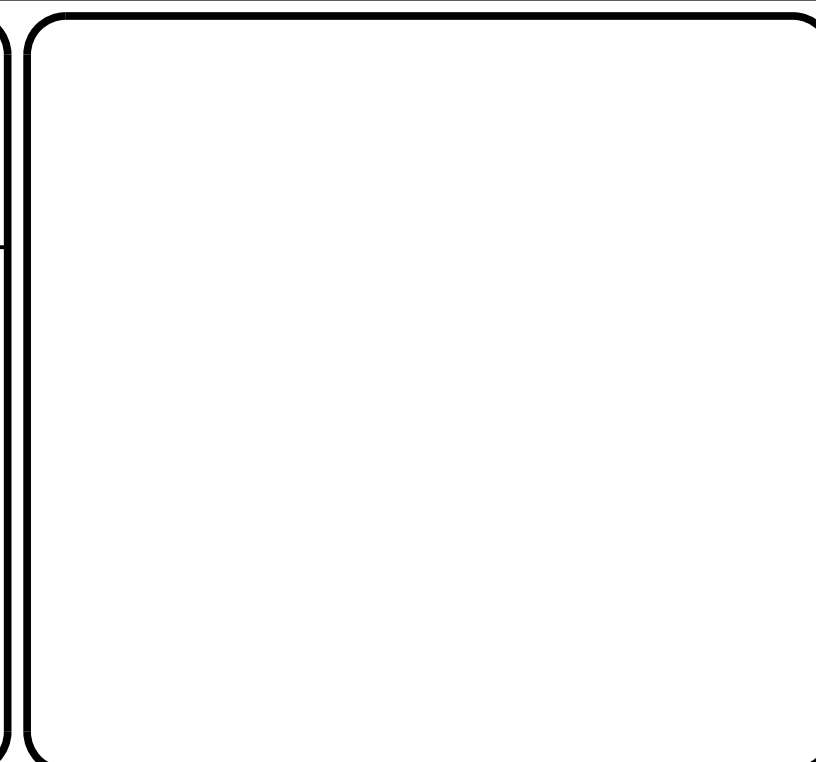
Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

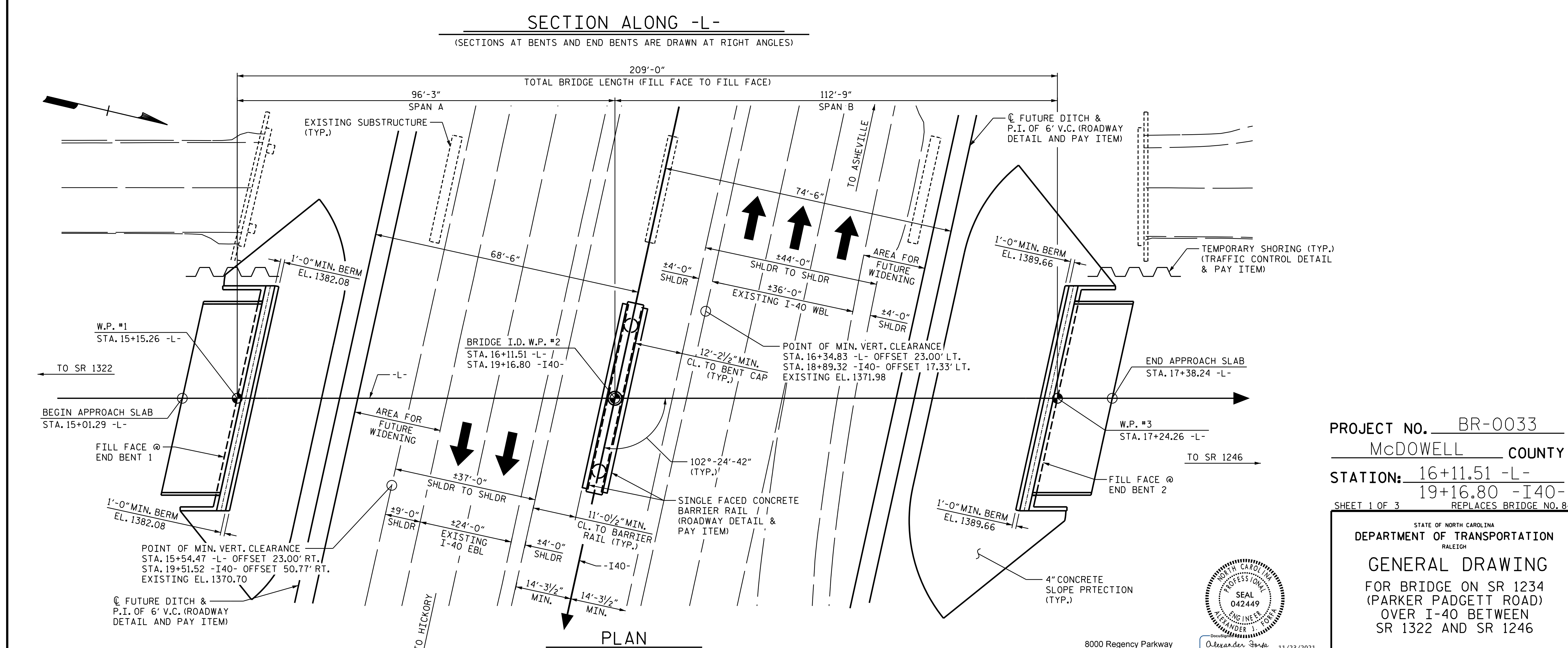
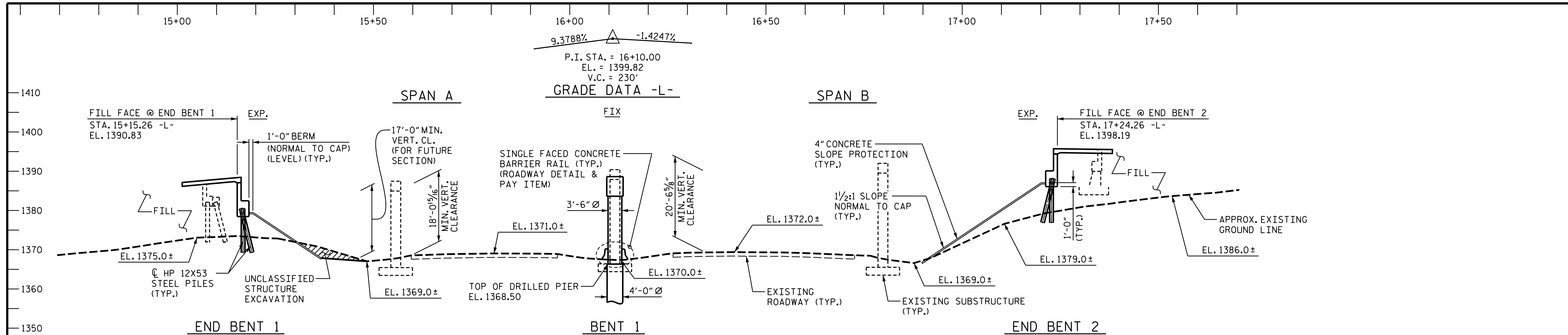
2018 STANDARD SPECIFICATIONS

LETTING DATE :
FEBRUARY 15, 2022

GREG A. STEWART, PE
PROJECT ENGINEER

ALEXANDER FORFA, PE
PROJECT DESIGN ENGINEER

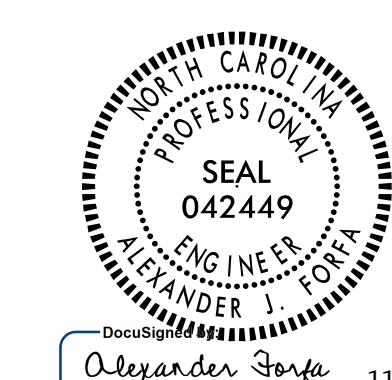




DRAWN BY : T. STUMP DATE : 06/2021
 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



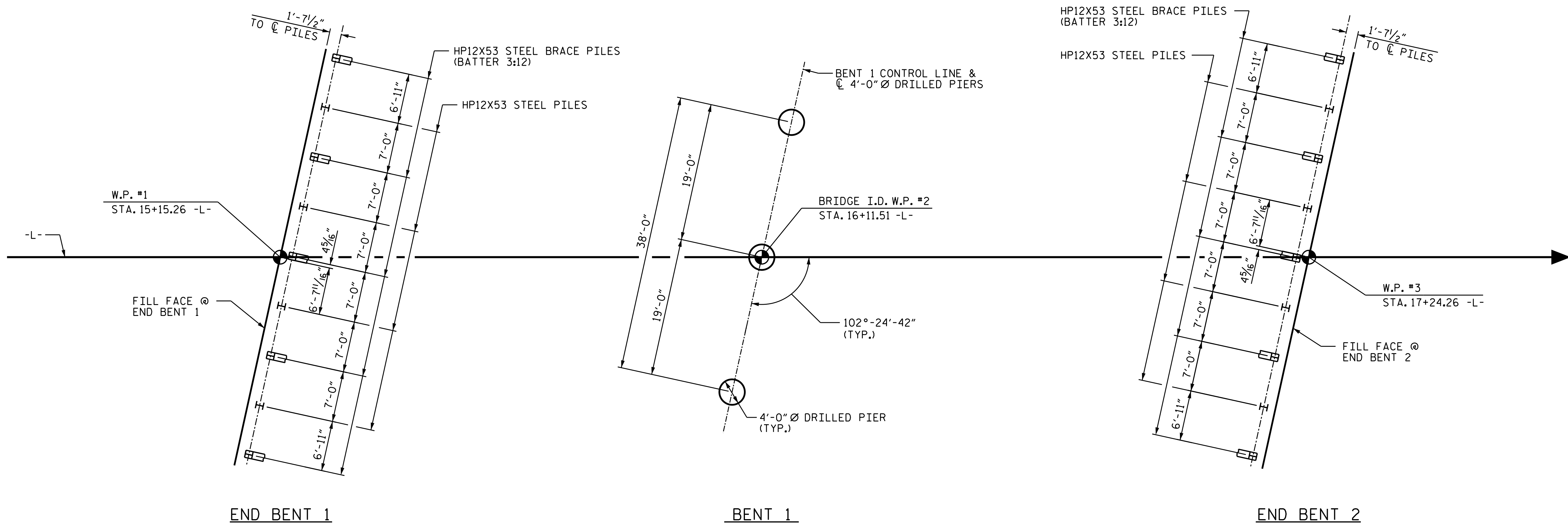
8000 Regency Parkway
 Suite 175
 Cary, NC 27518
 984-275-2490
 benesch.com
 NC License No. F-1320



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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L- / 19+16.80 -I40-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 84

| | | | | | |
|---|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| GENERAL DRAWING FOR BRIDGE ON SR 1234 (PARKER PADGETT ROAD) OVER I-40 BETWEEN SR 1322 AND SR 1246 | | | | | |
| REVISIONS | | | | | |
| NO. | BY: | DATE: | NO. | BY: | DATE: |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| | | | | | SHEET NO. S-1 |
| | | | | | TOTAL SHEETS 32 |



FOUNDATION LAYOUT

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO ϕ BENTS AND FILL FACES.
 FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT DETAILS.
 ALL PILE DIMENSIONS ARE TO ϕ OF PILES.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
 PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 93 TONS PER PILE.
 DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE.
 FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
 DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 740 TONS/PIER.
 CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 200 TSF.
 INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 1340 FT (LT), 1336 FT (CT), AND 1336 FT (RT), SATISFY THE REQUIRED TIP RESISTANCE, AND HAVE A PENETRATION OF AT LEAST 9 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.1. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 117 TONS PER PILE.

DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 198 TONS PER PILE.

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOUNDATION LAYOUT



Alexander Forfa 11/23/2021

DRAWN BY : N. ROHRBAUGH DATE : 05/2021
 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

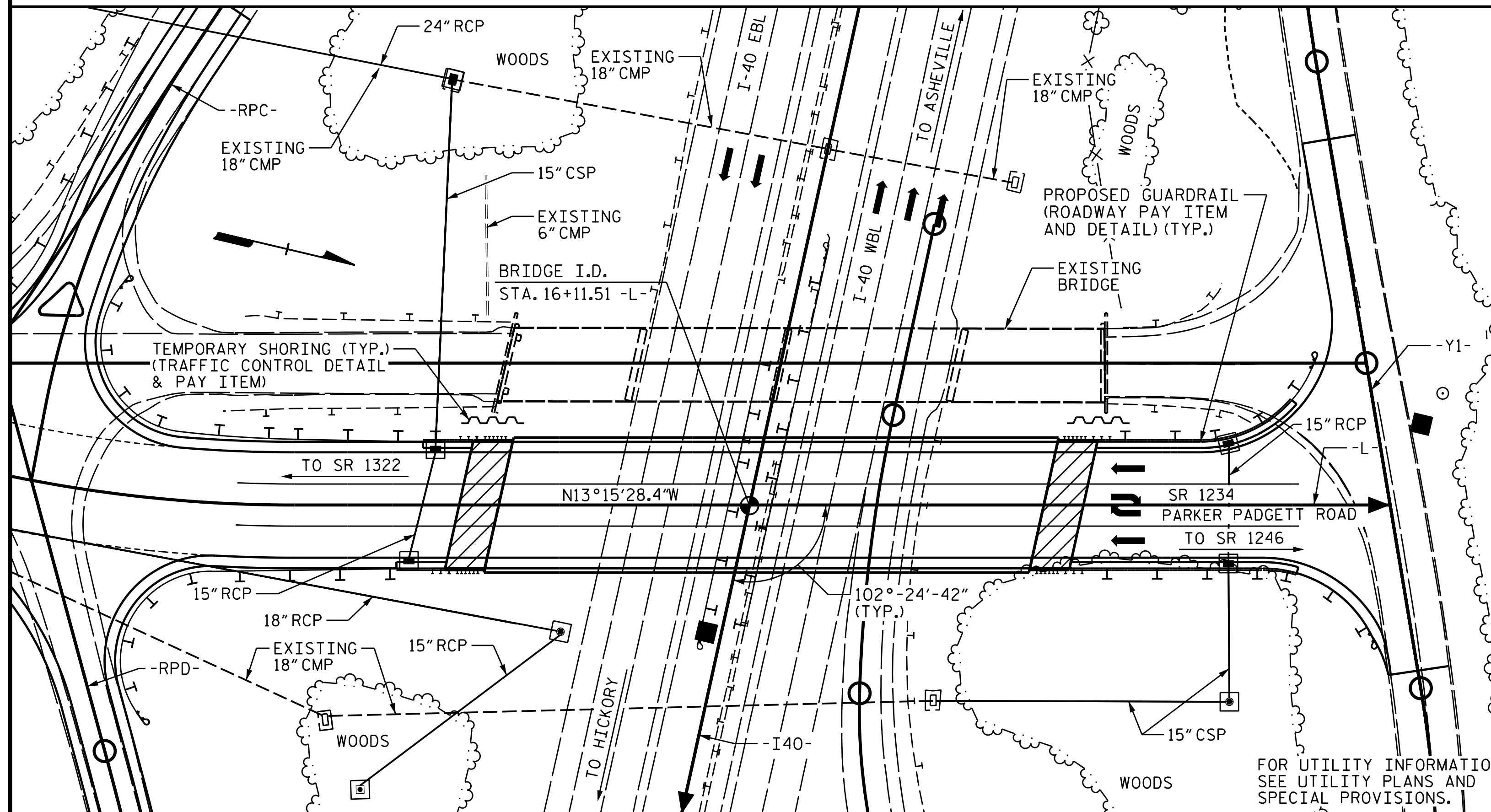


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 Suite 175
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 984-275-2490
 benesch.com
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DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

BM #2: R.R. SPIKE IN BASE OF 24" OAK, 33.53' LEFT OF STA. 15+61.27 -Y1-, ELEV. 1395.50



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+11.51 -L-".

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF APPROXIMATELY 30 FT LEFT OF CENTERLINE ROADWAY AND 40 FT RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS (1 @ 50'-6"±, 1 @ 55'-0"±, 1 @ 67'-0"±, 1 @ 56'-9"±) WITH A CLEAR ROADWAY OF APPROXIMATELY 25'-0" AND REINFORCED CONCRETE FLOOR SUPPORTED BY STEEL GIRDERS ON REINFORCED CONCRETE END BENTS AND INTERIOR BENTS LOCATED APPROXIMATELY 14'-0" FROM THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

| | REMOVAL OF EXISTING STRUCTURE AT STA. 16+11.51 -L- | ASBESTOS ASSESSMENT | 4'-0" Ø DRILLED PIERS IN SOIL | 4'-0" Ø DRILLED PIERS NOT IN SOIL | SID INSPECTION | CSL TESTING | UNCLASSIFIED STRUCTURE EXCAVATION AT 16+11.51 -L- | REINFORCED CONCRETE DECK SLAB |
|----------------|--|---------------------|-------------------------------|-----------------------------------|----------------|-------------|---|-------------------------------|
| | LUMP SUM | LUMP SUM | LIN. FT. | LIN. FT. | EACH | EACH | LUMP SUM | SQ.FT. |
| SUPERSTRUCTURE | | | | | | | | 10,598 |
| END BENT NO.1 | | | | | | | LUMP SUM | |
| BENT NO.1 | | | 67.5 | 26.0 | 1 | 1 | | |
| END BENT NO.2 | | | | | | | | |
| TOTAL | LUMP SUM | LUMP SUM | 67.5 | 26.0 | 1 | 1 | LUMP SUM | 10,598 |

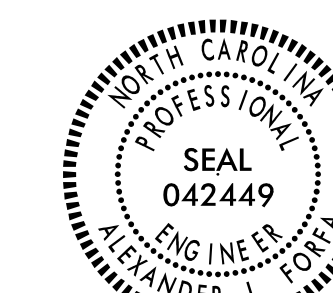
TOTAL BILL OF MATERIAL

| | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL | APPROX. 307,000 LBS. STRUCTURAL STEEL | PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES | HP12X53 STEEL PILES | CONCRETE BARRIER RAIL | 4" SLOPE PROTECTION | DISC BEARINGS | ELASTOMERIC BEARINGS | FOAM JOINT SEALS | |
|----------------|------------------------|------------------|-----------------------|-------------------|---------------------------------|---------------------------------------|--|---------------------|-----------------------|---------------------|---------------|----------------------|------------------|----------|
| | SQ.FT. | CU.YDS. | LUMP SUM | LBS. | LBS. | LUMP SUM | EACH | NO. | LIN.FT. | LIN.FT. | SQ. YDS. | LUMP SUM | LUMP SUM | LUMP SUM |
| SUPERSTRUCTURE | 10,580 | | LUMP SUM | | | LUMP SUM | | | 413.6 | | | LUMP SUM | LUMP SUM | LUMP SUM |
| END BENT NO.1 | | 48.5 | | 7,566 | | | 9 | 9 | 383 | 260 | | | | |
| BENT NO.1 | | 59.3 | | 15,873 | 2,302 | | | | | | | | | |
| END BENT NO.2 | | 46.0 | | 7,291 | | | 9 | 9 | 248 | 410 | | | | |
| TOTAL | 10,580 | 153.8 | LUMP SUM | 30,730 | 2,302 | LUMP SUM | 18 | 18 | 631 | 413.6 | 670 | LUMP SUM | LUMP SUM | LUMP SUM |

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LOCATION SKETCH



Alexander J. Forfe 11/23/2021
 A231624370F3485

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 Suite 175
 Cary, NC 27518
 984-275-2490
 benesch.com
 NC License No. F-1320



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : T. STUMP DATE : 01/2021
 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

REVISIONS

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

SHEET NO. S-3
TOTAL SHEETS 32

LOAD FACTORS:

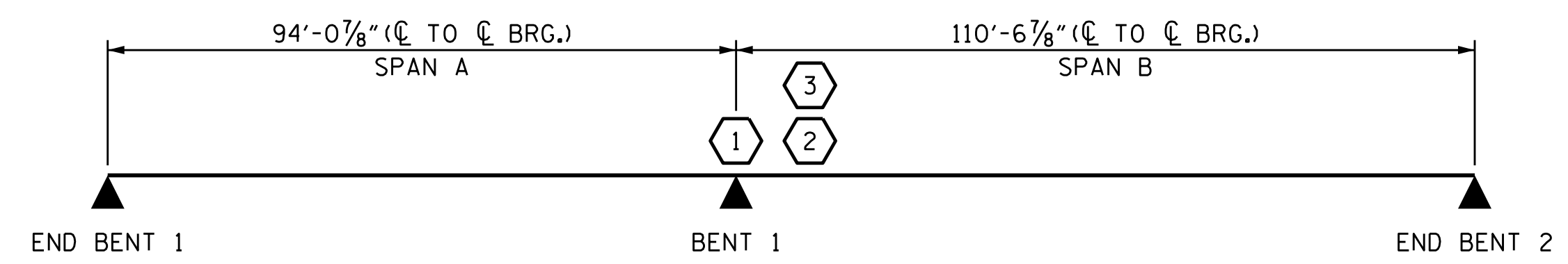
| | | | |
|----------------------------|-------------|---------------|---------------|
| DESIGN LOAD RATING FACTORS | LIMIT STATE | γ_{DC} | γ_{DW} |
| | STRENGTH I | 1.25 | 1.50 |
| | SERVICE II | 1.00 | 1.00 |

| LEVEL | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING LOAD RATING # | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE | | | | | | | | | | SERVICE II LIMIT STATE | | | | | COMMENT NUMBER | | | |
|--------------------|-----------------------------------|----------------------|---------------------------|-----------------------------|---------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|-------------------------------------|---------------------------|---------------|------|----------------|-----------------|-------------------------------------|--|
| | | | | | | LIVE-LOAD FACTORS (γ_{LL}) | MOMENT | | | | | SHEAR | | | | | LIVE-LOAD FACTORS (γ_{LL}) | MOMENT | | | | | | |
| | | | | | | | 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) | | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (FT) | |
| DESIGN LOAD RATING | HL-93 (INVENTORY) | N/A | ① | 1.04 | -- | 1.75 | 0.727 | 1.04 | B | I | 0.00 | 1.023 | 1.07 | B | I | 11.06 | 1.30 | 0.857 | 1.49 | B | E | 66.33 | | |
| | HL-93 (OPERATING) | N/A | | 1.35 | -- | 1.35 | 0.727 | 1.35 | B | I | 0.00 | 1.023 | 1.39 | B | I | 11.06 | 1.00 | 0.857 | 1.93 | B | E | 66.33 | | |
| | HS-20 (INVENTORY) | 36.00 | ② | 1.57 | 56.684 | 1.75 | 0.857 | 2.04 | B | E | 66.33 | 1.023 | 1.57 | B | I | 11.06 | 1.30 | 0.857 | 2.08 | B | E | 66.33 | | |
| | HS-20 (OPERATING) | 36.00 | | 2.04 | 73.479 | 1.35 | 0.857 | 2.64 | B | E | 66.33 | 1.023 | 2.04 | B | I | 11.06 | 1.00 | 0.857 | 2.70 | B | E | 66.33 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13.500 | | 3.68 | 49.692 | 1.40 | 0.857 | 6.02 | B | E | 66.33 | 1.023 | 3.68 | A | I | 81.07 | 1.30 | 0.857 | 4.91 | B | E | 66.33 | |
| | | SNGARBS2 | 20.000 | | 3.44 | 68.808 | 1.40 | 0.857 | 4.45 | B | E | 66.33 | 1.023 | 3.44 | B | I | 11.06 | 1.30 | 0.857 | 3.62 | B | E | 66.33 | |
| | | SNAGRIS2 | 22.000 | | 3.10 | 68.241 | 1.40 | 0.857 | 4.07 | B | E | 66.33 | 1.023 | 3.10 | B | I | 11.06 | 1.30 | 0.857 | 3.32 | B | E | 66.33 | |
| | | SNCOTTS3 | 27.250 | | 2.45 | 66.763 | 1.40 | 0.857 | 3.00 | B | E | 66.33 | 1.023 | 2.46 | B | I | 11.06 | 1.30 | 0.857 | 2.45 | B | E | 66.33 | |
| | | SNAGGRS4 | 34.925 | | 1.99 | 69.560 | 1.40 | 0.857 | 2.49 | B | E | 66.33 | 1.023 | 1.99 | B | I | 11.06 | 1.30 | 0.857 | 2.03 | B | E | 66.33 | |
| | | SNS5A | 35.550 | | 1.95 | 69.305 | 1.40 | 0.857 | 2.43 | B | E | 66.33 | 1.023 | 1.95 | B | I | 11.06 | 1.30 | 0.857 | 1.98 | B | E | 66.33 | |
| | | SNS6A | 39.950 | | 1.75 | 70.010 | 1.40 | 0.857 | 2.23 | B | E | 66.33 | 1.023 | 1.75 | B | I | 11.06 | 1.30 | 0.857 | 1.81 | B | E | 66.33 | |
| | | SNS7B | 42.000 | | 1.70 | 71.446 | 1.40 | 0.857 | 2.10 | B | E | 66.33 | 1.023 | 1.70 | B | I | 11.06 | 1.30 | 0.857 | 1.71 | B | E | 66.33 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | | 2.13 | 70.203 | 1.40 | 0.857 | 2.69 | B | E | 66.33 | 1.023 | 2.13 | B | I | 11.06 | 1.30 | 0.857 | 2.19 | B | E | 66.33 | |
| | | TNT4A | 33.075 | | 2.13 | 70.416 | 1.40 | 0.857 | 2.71 | B | E | 66.33 | 1.023 | 2.13 | B | I | 11.06 | 1.30 | 0.857 | 2.21 | B | E | 66.33 | |
| | | TNT6A | 41.600 | | 1.75 | 72.871 | 1.40 | 0.857 | 2.19 | B | E | 66.33 | 1.023 | 1.75 | B | I | 11.06 | 1.30 | 0.857 | 1.78 | B | E | 66.33 | |
| | | TNT7A | 42.000 | | 1.75 | 73.320 | 1.40 | 0.857 | 2.21 | B | E | 66.33 | 1.023 | 1.75 | B | I | 11.06 | 1.30 | 0.857 | 1.80 | B | E | 66.33 | |
| | | TNT7B | 42.000 | | 1.70 | 71.540 | 1.40 | 0.857 | 2.23 | B | E | 66.33 | 1.023 | 1.70 | B | I | 11.06 | 1.30 | 0.857 | 1.82 | B | E | 66.33 | |
| | | TNAGRIT4 | 43.000 | | 1.67 | 71.655 | 1.40 | 0.857 | 2.14 | B | E | 66.33 | 1.023 | 1.67 | B | I | 11.06 | 1.30 | 0.857 | 1.74 | B | E | 66.33 | |
| TNAGT5A | 45.000 | | 1.60 | 71.988 | 1.40 | 0.857 | 2.03 | B | E | 66.33 | 1.023 | 1.60 | B | I | 11.06 | 1.30 | 0.857 | 1.66 | B | E | 66.33 | | | |
| TNAGT5B | 45.000 | | ③ | 1.56 | 70.064 | 1.40 | 0.857 | 2.02 | B | E | 66.33 | 1.023 | 1.56 | B | I | 11.06 | 1.30 | 0.857 | 1.64 | B | E | 66.33 | | |
| FATIGUE | HL-93 (INVENTORY) | $\gamma_{LL}=0.75$ | | | | | | | | | | | | | | | | | | | | | | |

NOTES:
 MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.
 ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:
 1.
 2.
 3.
 4.

| | |
|--|-------------------------------|
| # | 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 | |



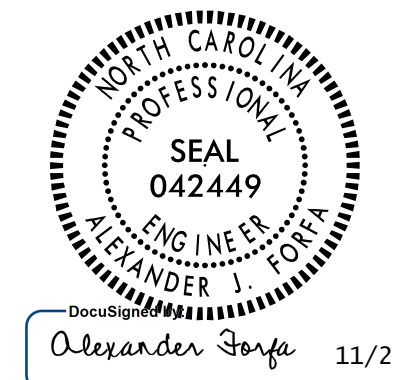
LRFR SUMMARY

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

ASSEMBLED BY : N. ROHRBAUGH DATE : 07/21
 CHECKED BY : A. FORFA DATE : 07/21
 DRAWN BY : MAA 1/08 REV. 11/2/08RR MAA/GM
 CHECKED BY : GM/DI 2/08 REV. 10/1/11 MAA/GM



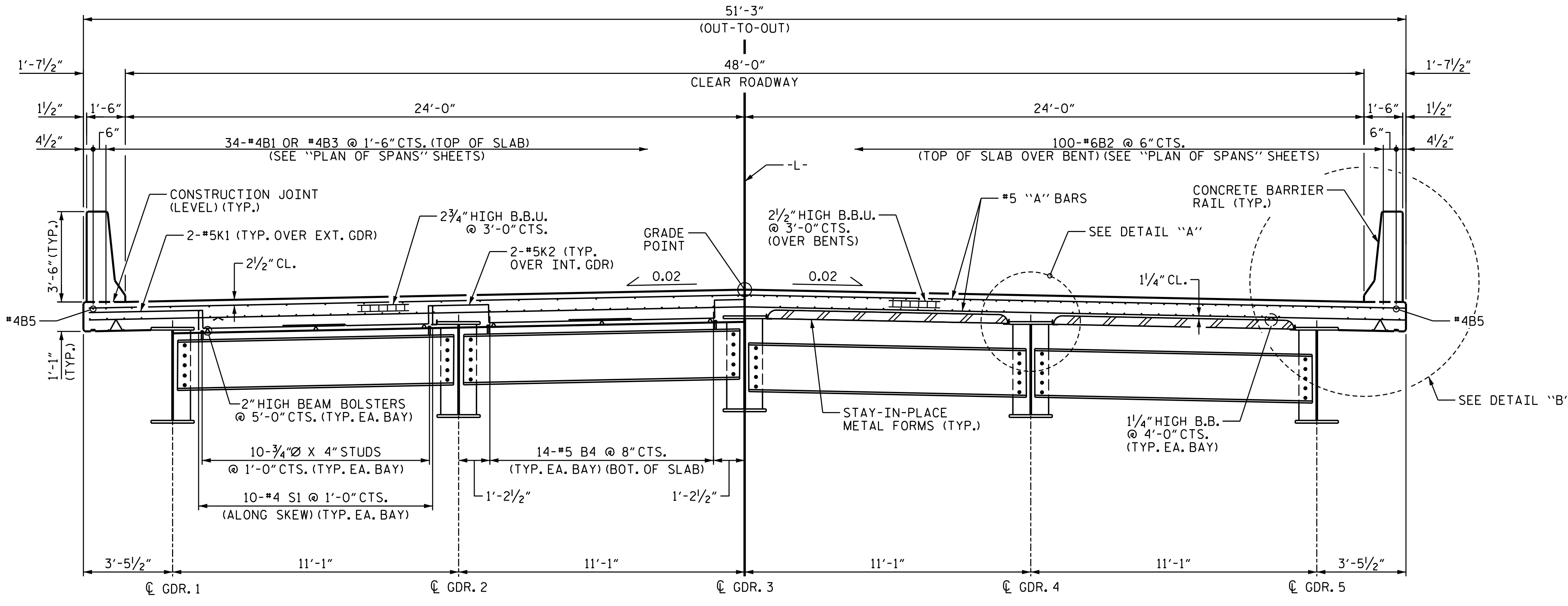
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 STEEL GIRDERS
 (NON-INTERSTATE TRAFFIC)

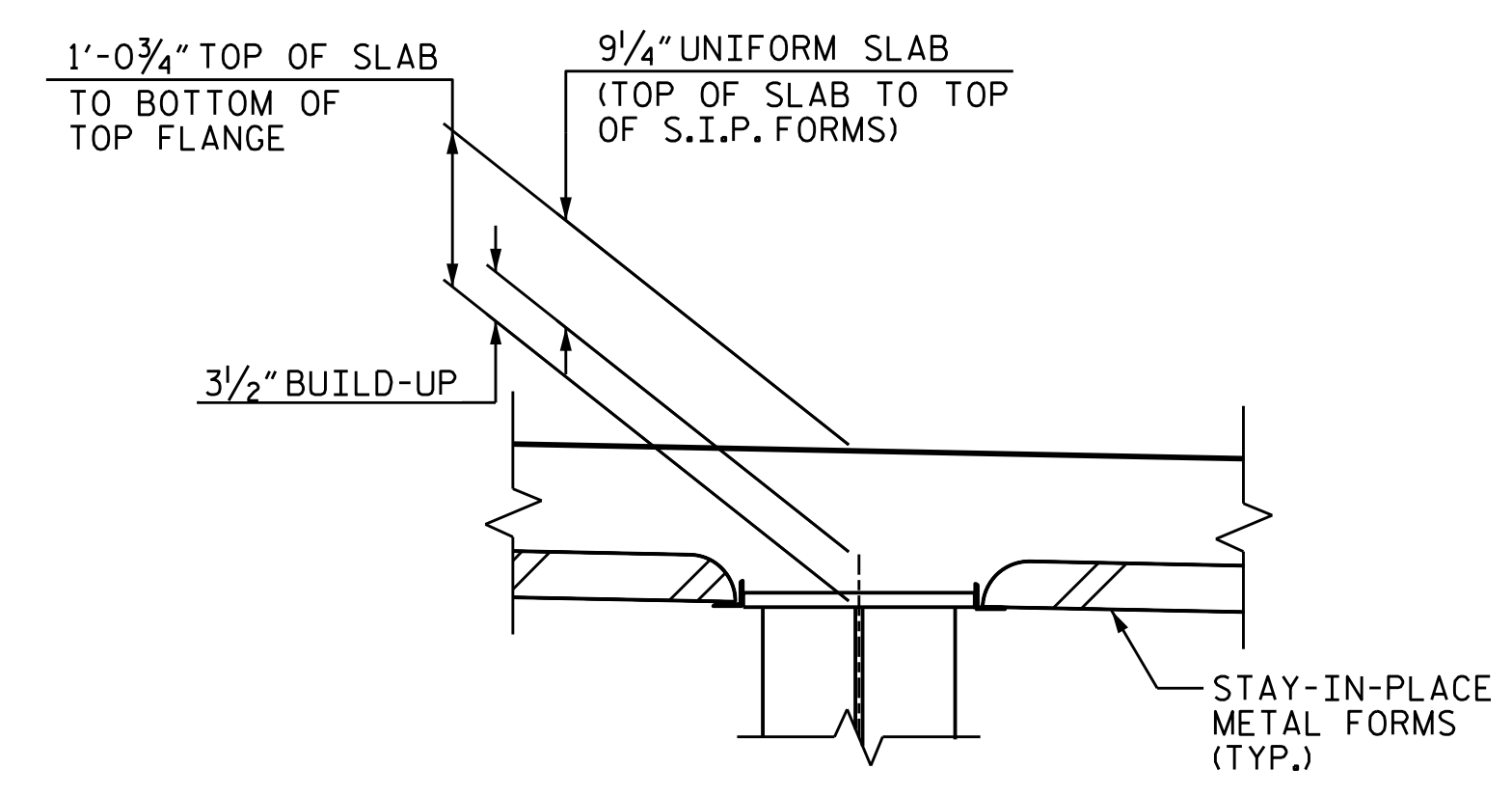
| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-4 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



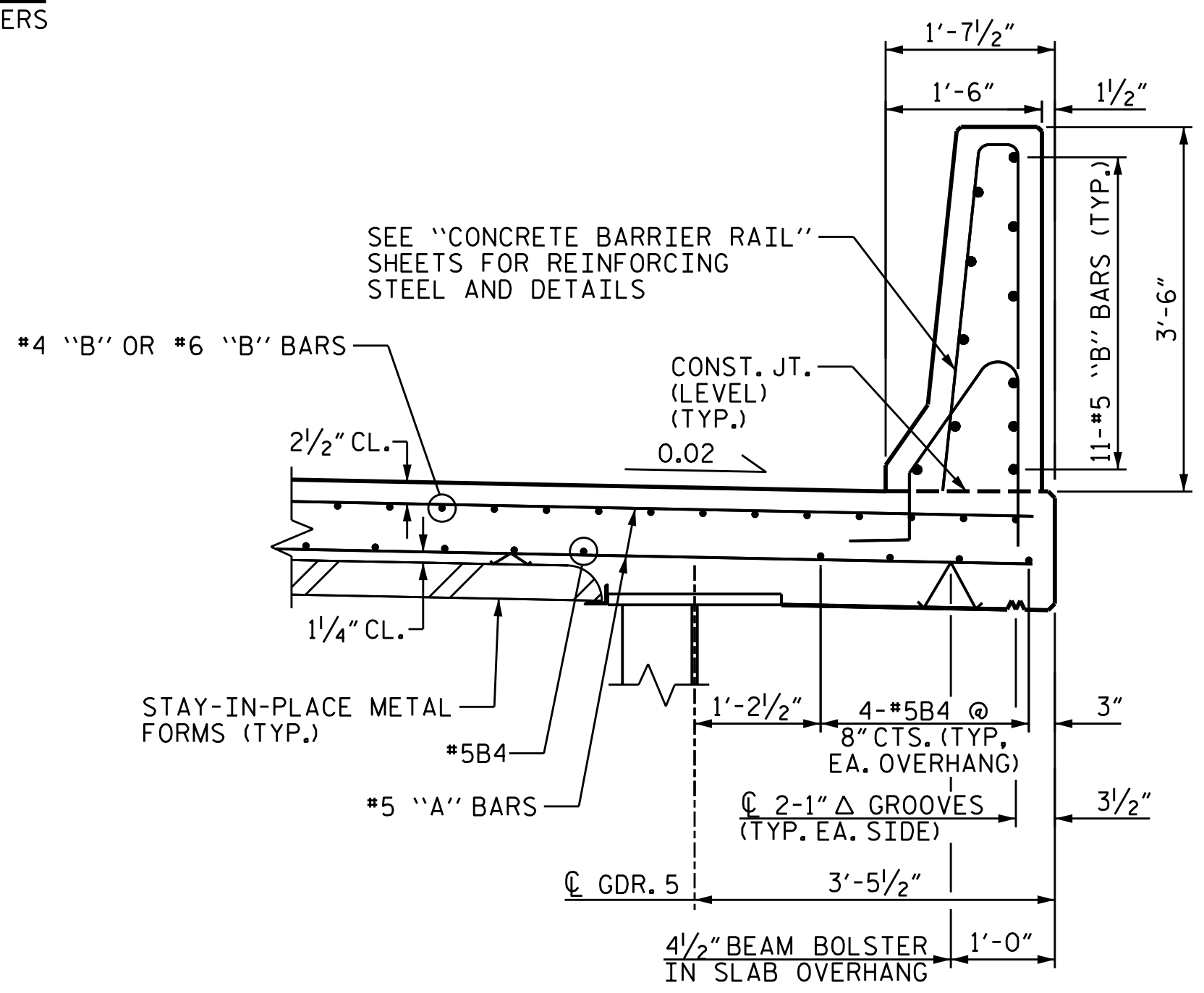
HALF SECTION
AT END BENT DIAPHRAGMS

HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION
2 SPAN CONTINUOUS, COMPOSITE STEEL PLATE GIRDERS



DETAIL "A"



DETAIL "B"

(RT. OVERHANG SHOWN, LT. OVERHANG SIMILAR)

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.
- METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.
- 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.
- BARRIER 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.
- STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.
- THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

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McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION



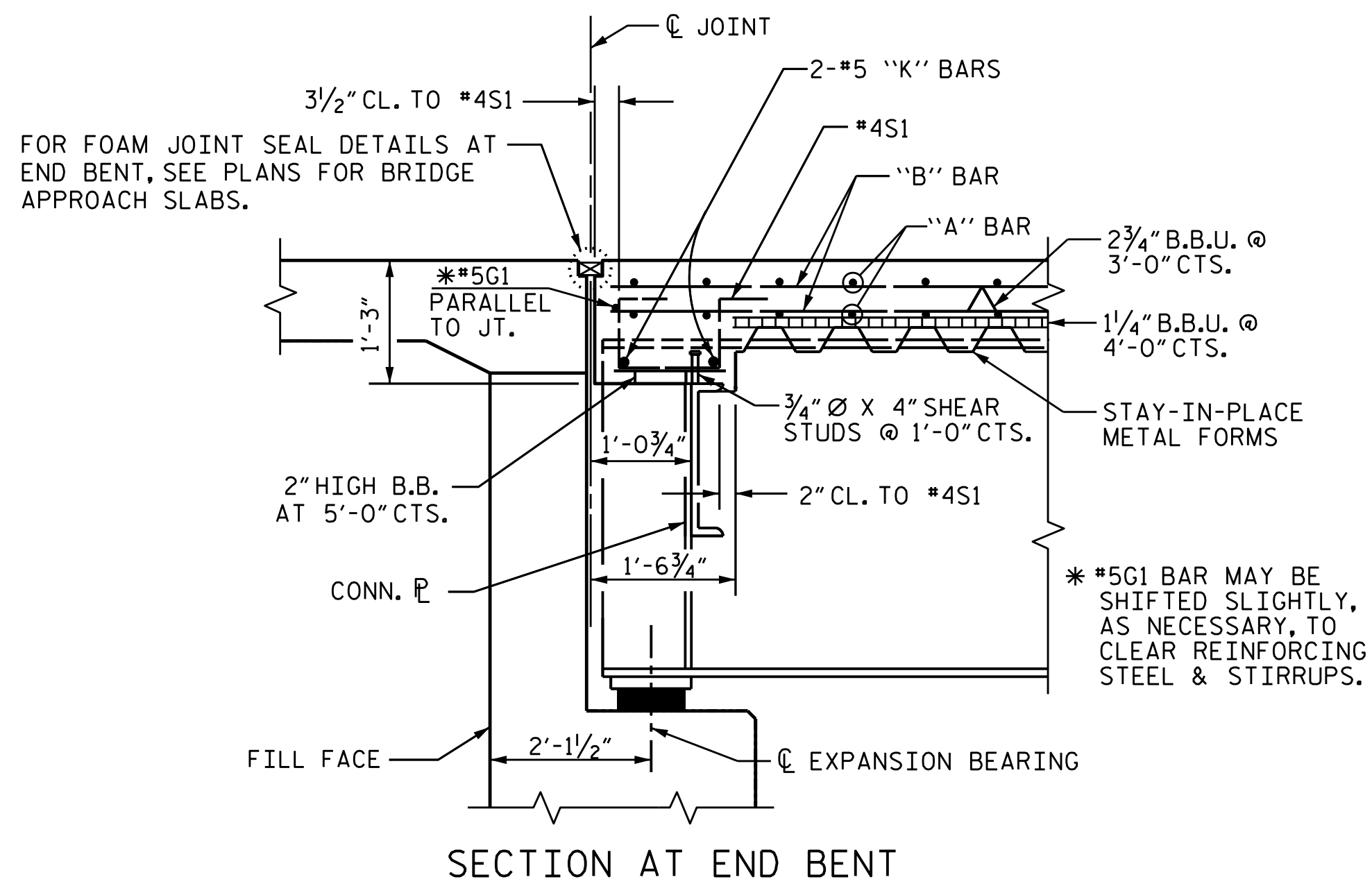
DOCUMENT NOT CONSIDERED
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DRAWN BY : T. STUMP DATE : 01/2021
CHECKED BY : A. FORFA DATE : 06/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

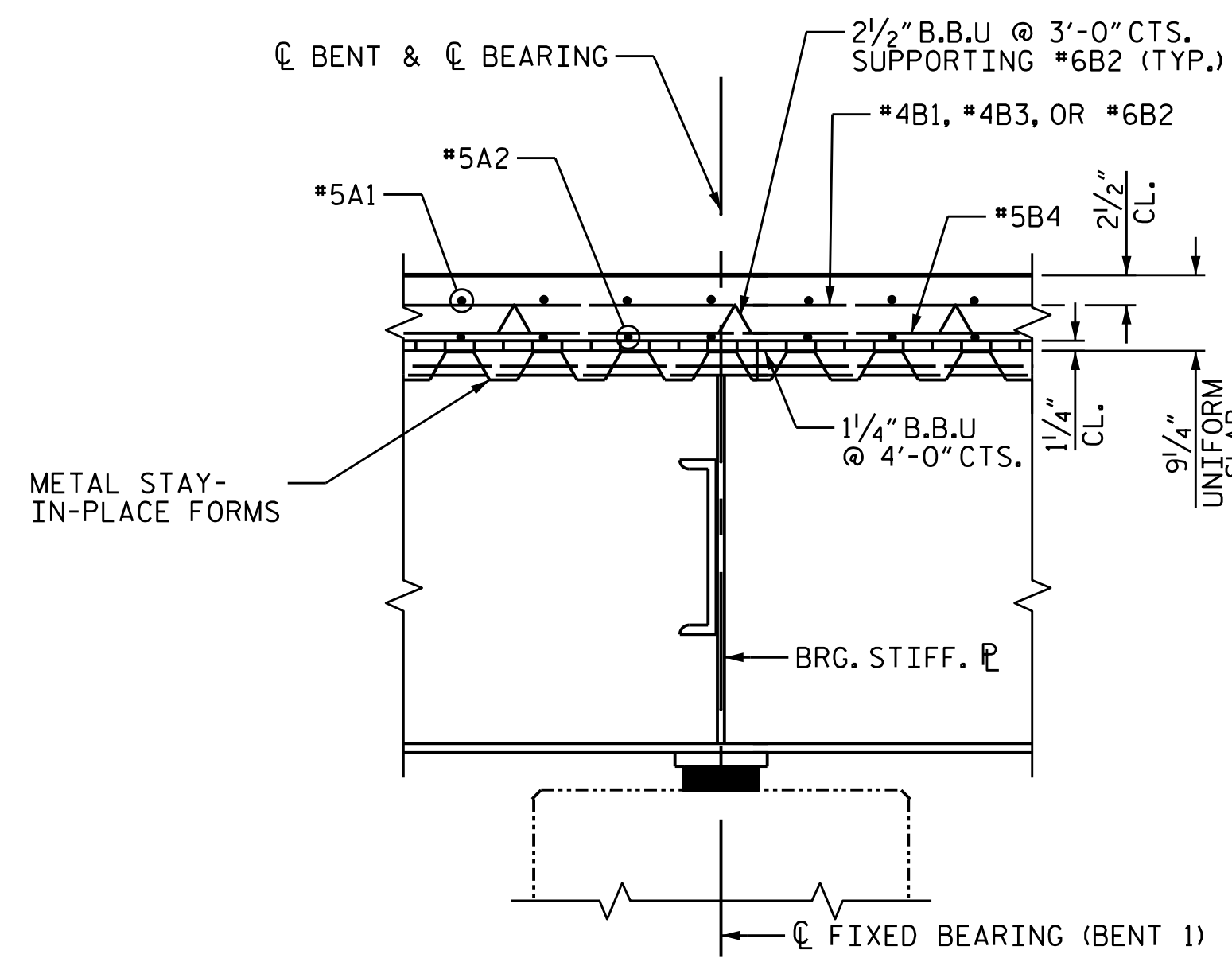


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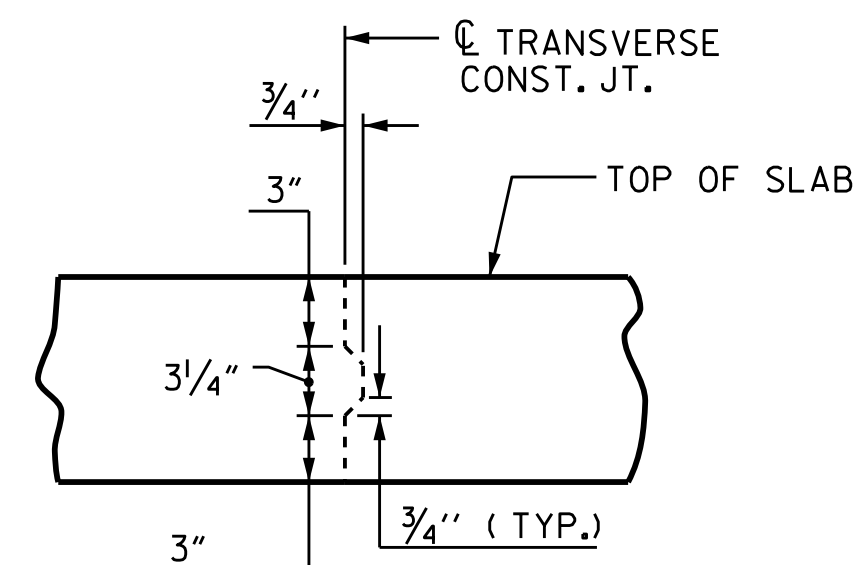
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| NO. | BY: | DATE: | NO. | BY: | DATE: | S-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



SECTION AT END BENT



SECTION AT BENT



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION



Alexander Forfa 11/23/2021

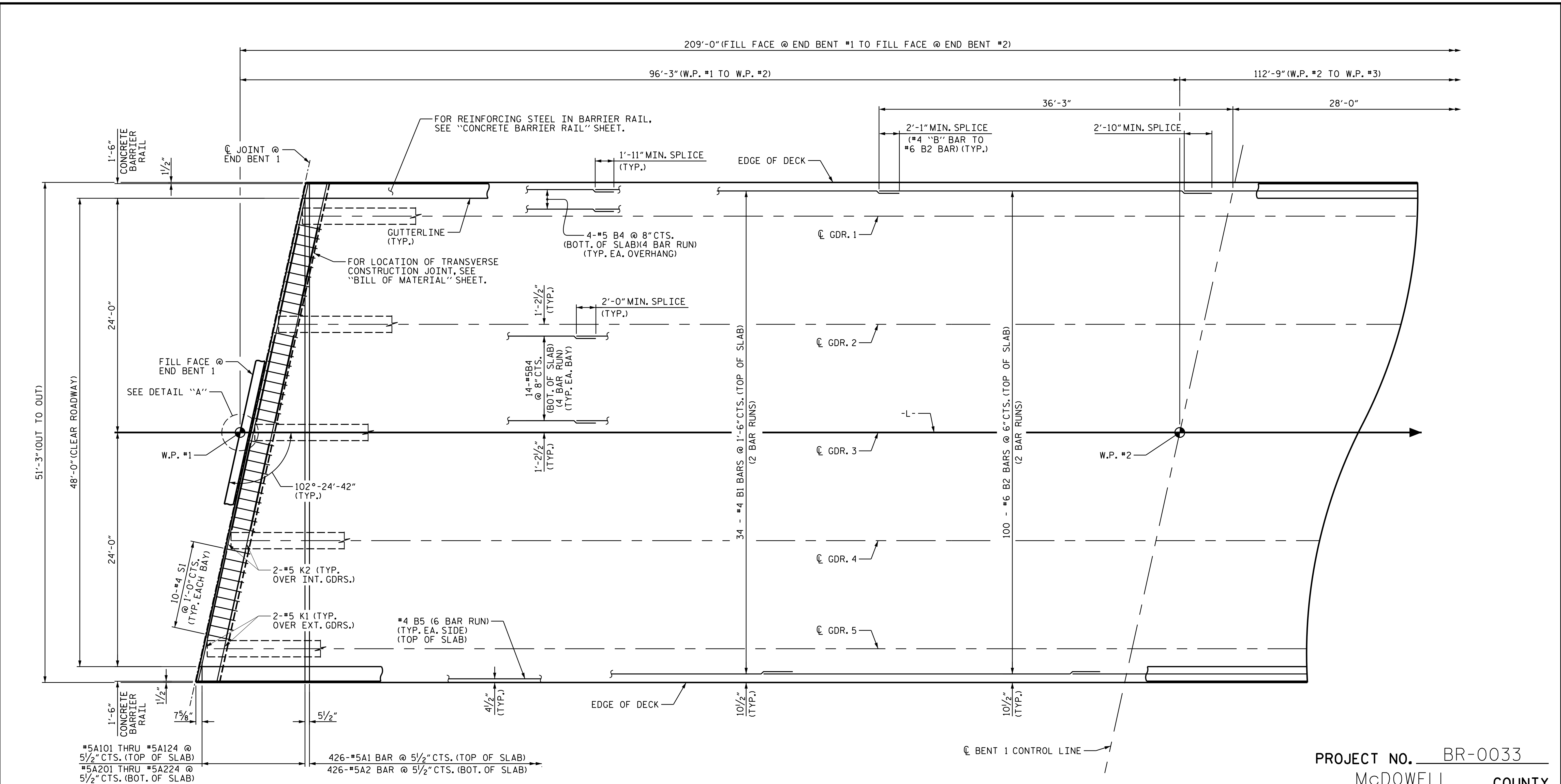
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 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



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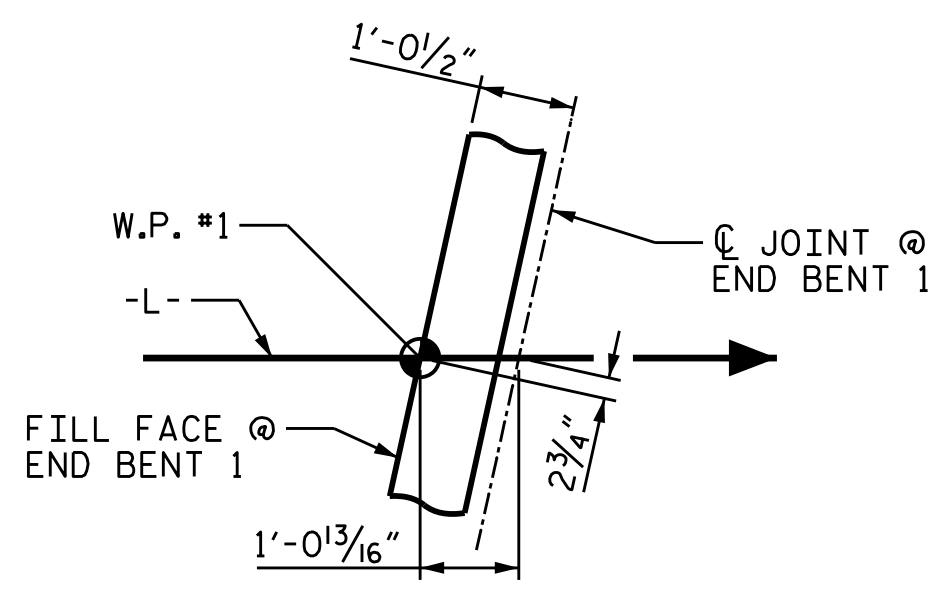
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| NO. | BY: | DATE: | NO. | BY: | DATE: | S-6 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



SPAN A

PLAN OF SPANS



DETAIL "A"

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS
 SPAN A



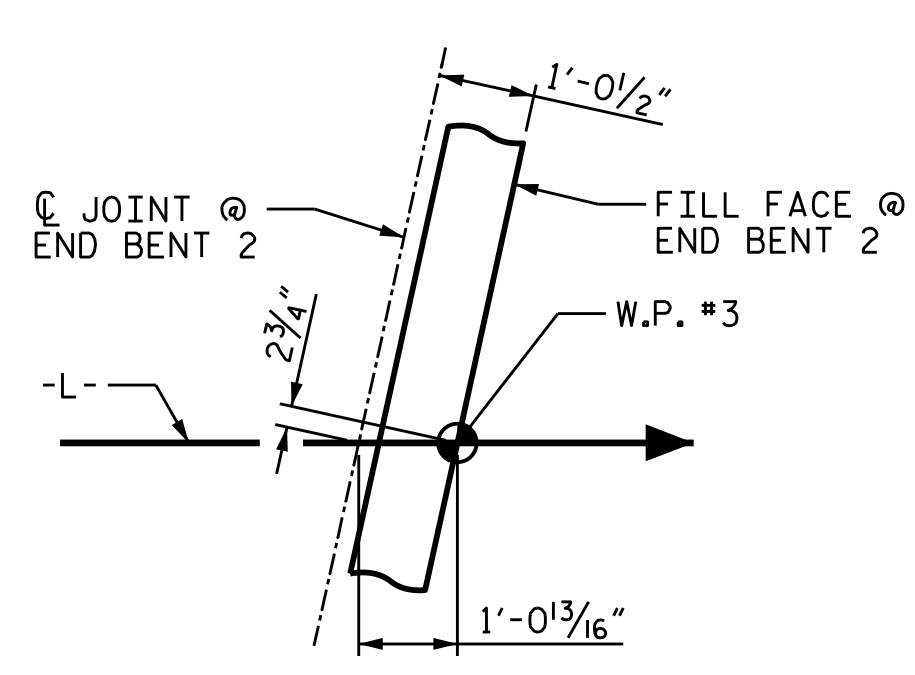
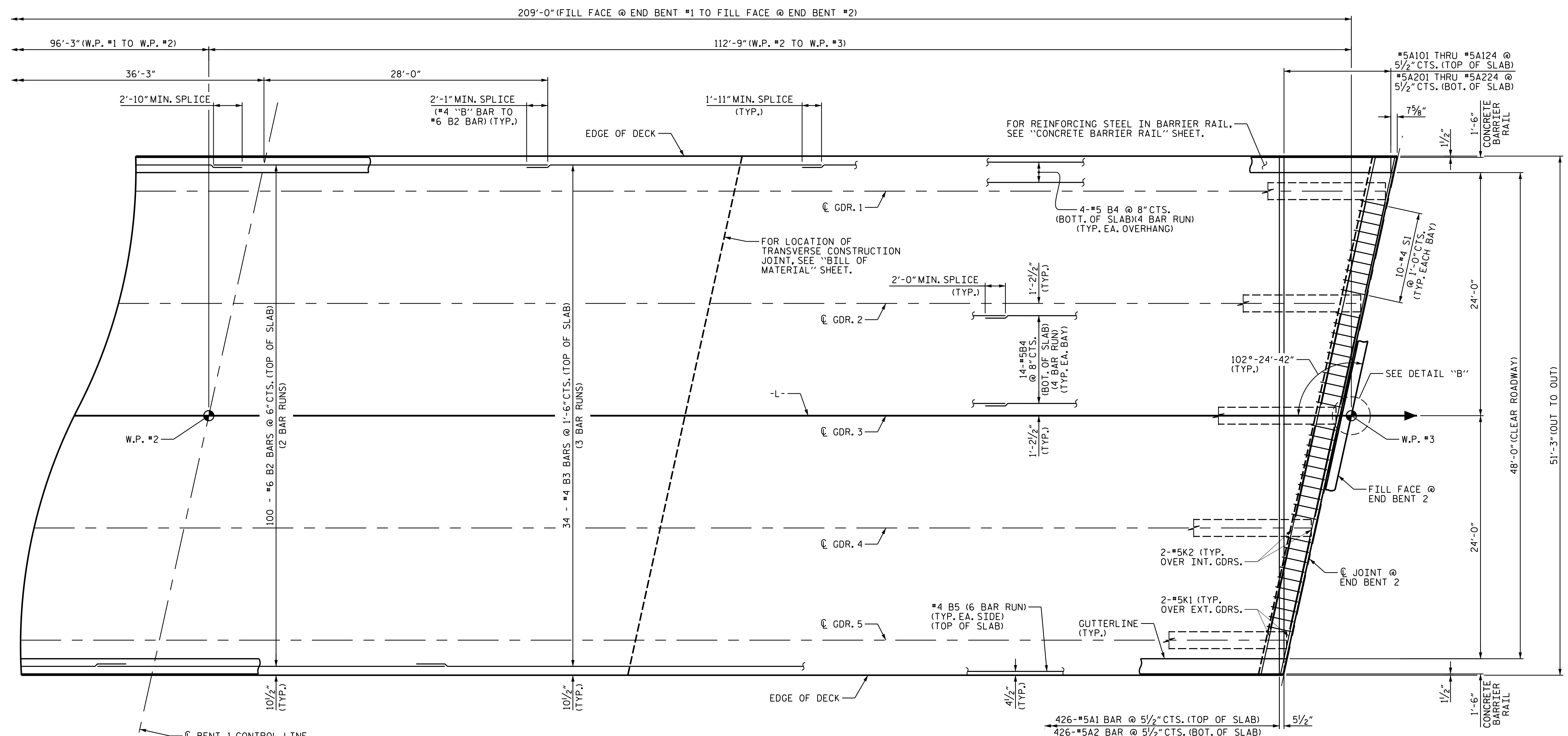
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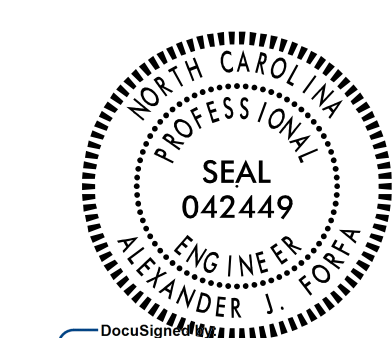
SPAN B

PLAN OF SPANS

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 2 OF 2

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



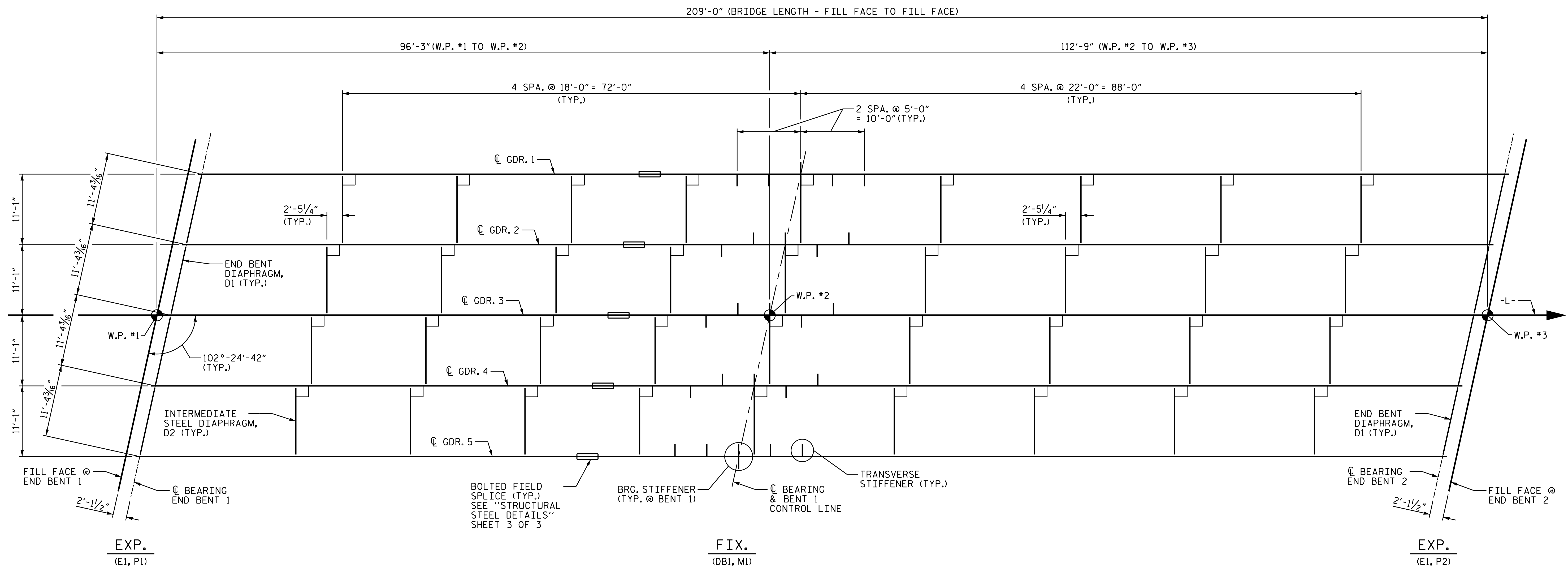
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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



SPAN A

SPAN B

FRAMING PLAN

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 McDOWELL COUNTY
 STATION: 16+11.51 -L-

DRAWN BY : N. ROHRBAUGH DATE : 05/2021
 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



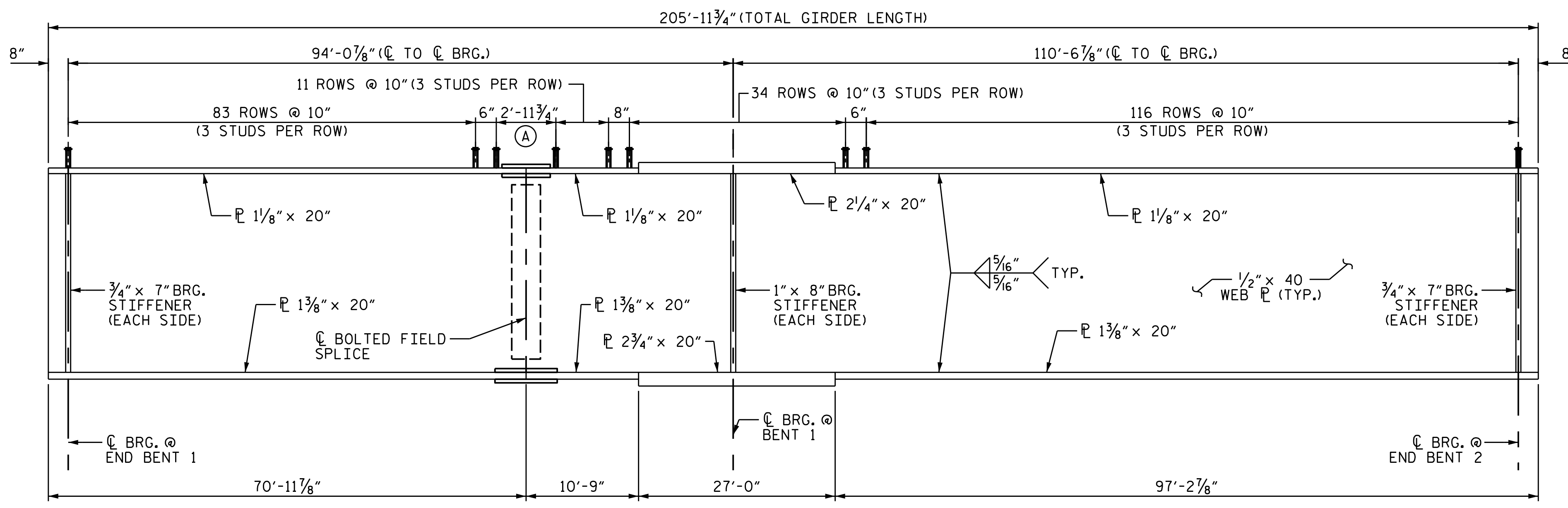
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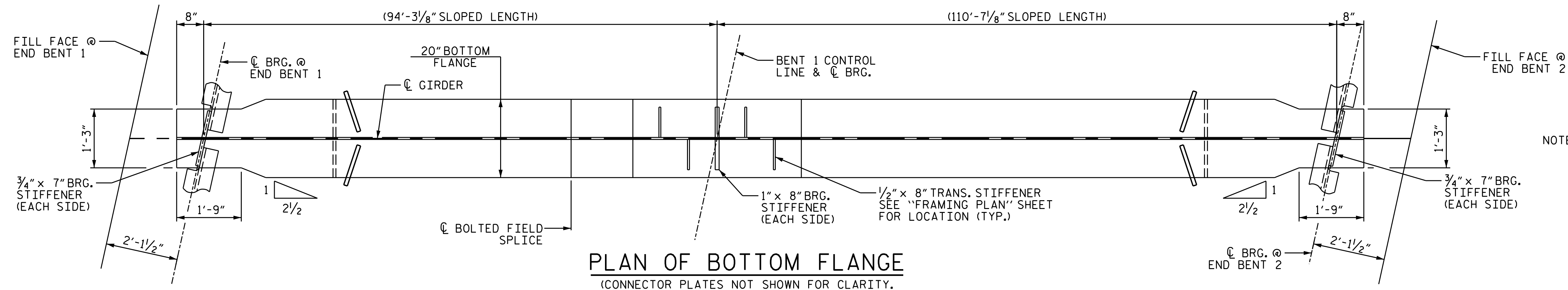
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN

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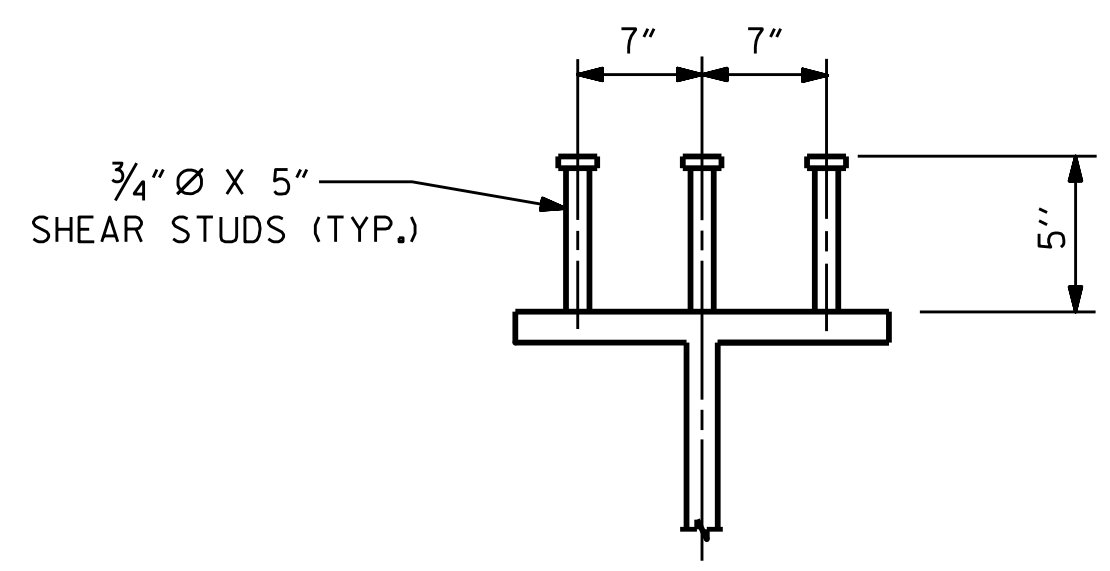
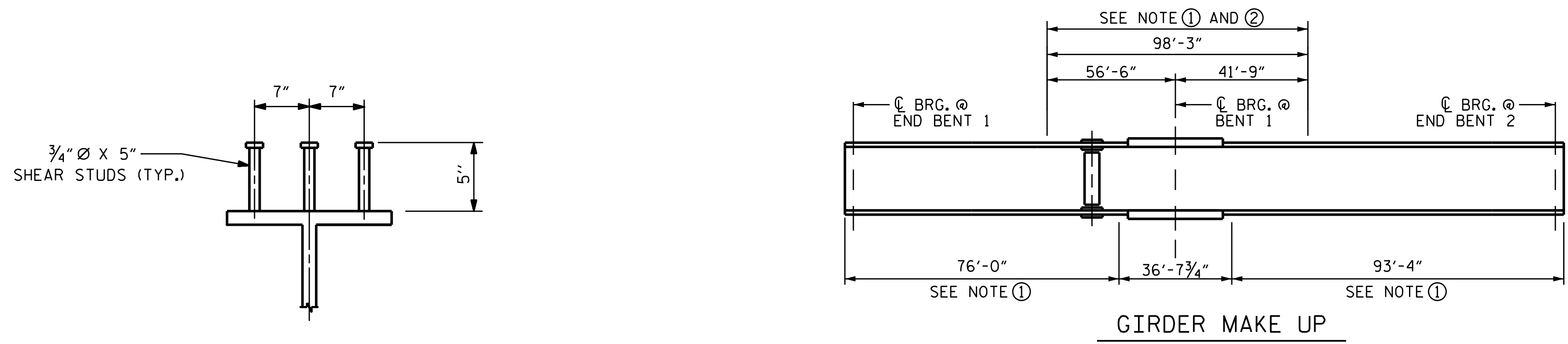
(A) FOR SHEAR STUDS IN THIS AREA SEE "STRUCTURAL STEEL DETAILS" SHEET 4 OF 4 (3 STUDS PER ROW)

PLATE GIRDER ELEVATION
(CONNECTOR PLATES AND TRANSVERSE STIFFENERS NOT SHOWN FOR CLARITY. FOR PLACEMENT SEE "FRAMING PLAN" SHEET.)



NOTE: TRANSVERSE STIFFENERS ARE TO BE PLACED ON ALTERNATING SIDES OF INTERIOR GIRDERS, AND ARE TO BE PLACED ONLY ON INSIDE OF EXTERIOR GIRDERS. SEE "FRAMING PLAN" SHEET FOR LOCATION.

PLAN OF BOTTOM FLANGE
(CONNECTOR PLATES NOT SHOWN FOR CLARITY. FOR PLACEMENT SEE "FRAMING PLAN" SHEET.)



SHEAR STUD DETAILS
(TYP. EA. GIRDER EXCEPT @ TOP FLANGE SPLICE PLATES)

NOTE ①: CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

NOTE ②: NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

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SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS



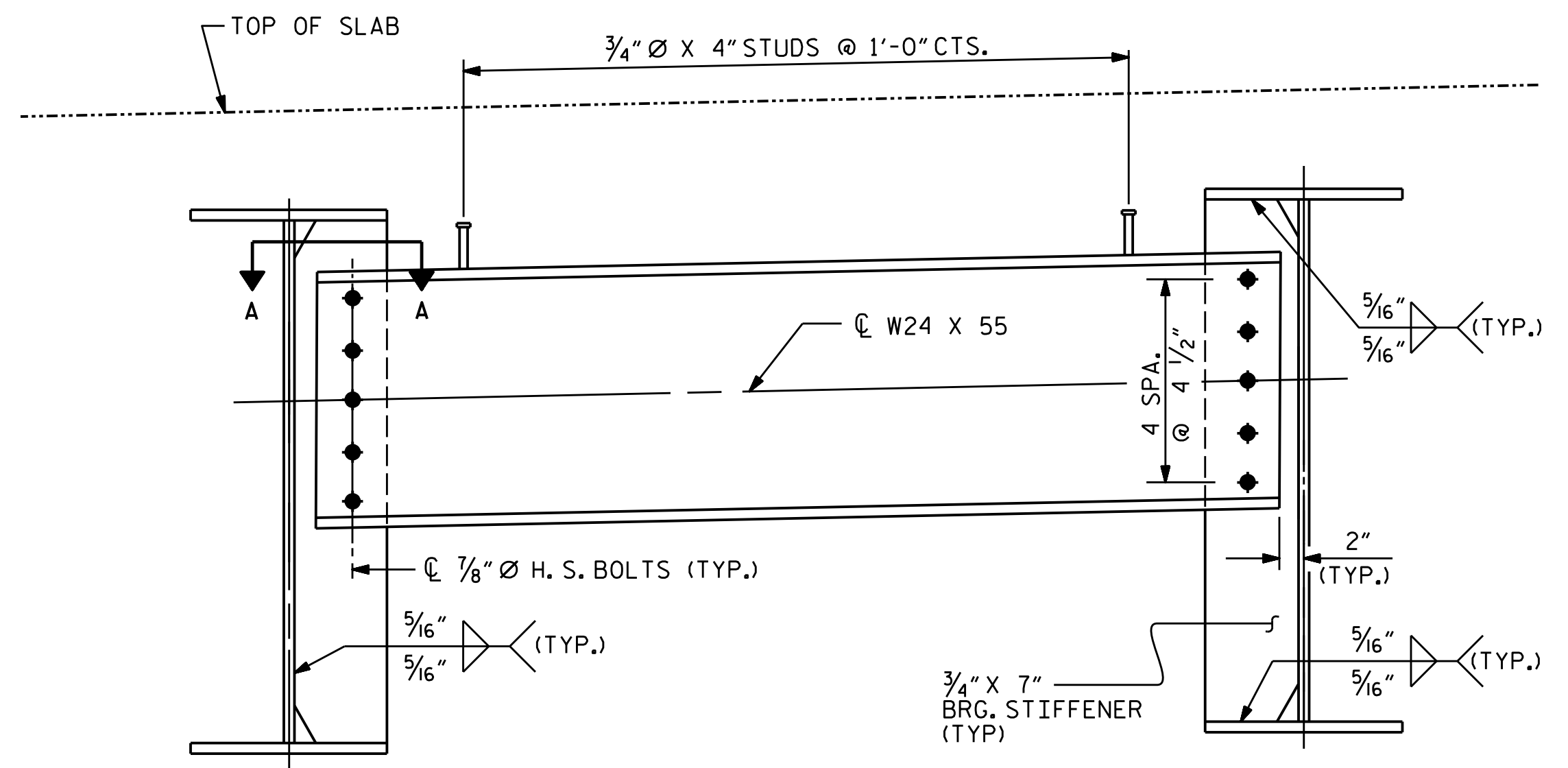
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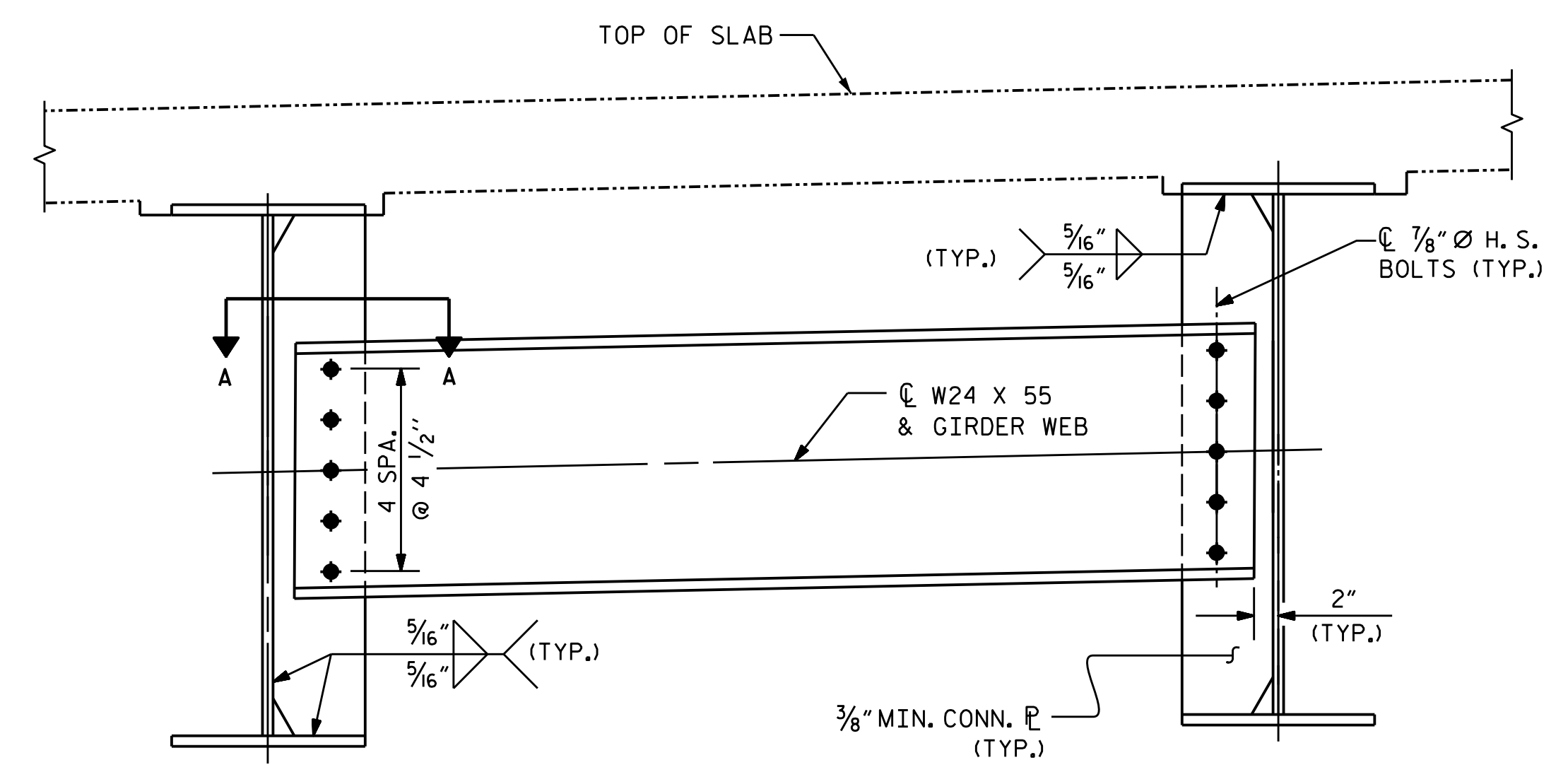
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CHECKED BY: A. FORFA DATE: 06/2021
DESIGN ENGINEER OF RECORD: A. FORFA DATE: 09/2021



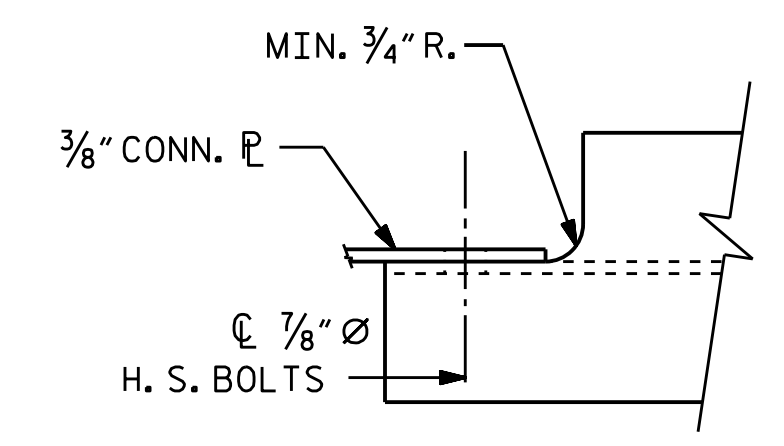
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TYPICAL END BENT DIAPHRAGM (D1)
SEE FRAMING PLAN FOR LOCATION OF BRG. STIFFENERS/CONN. P'S



TYPICAL INTERMEDIATE & BENT DIAPHRAGM (D2)
SEE FRAMING PLAN FOR LOCATION OF BRG. STIFFENERS/CONN. P'S



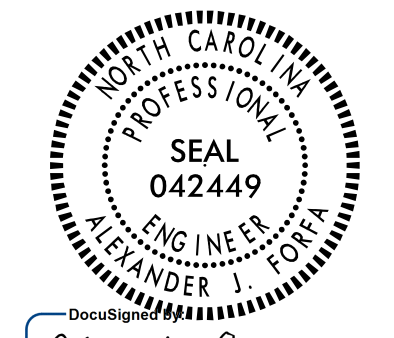
SECTION A-A

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS



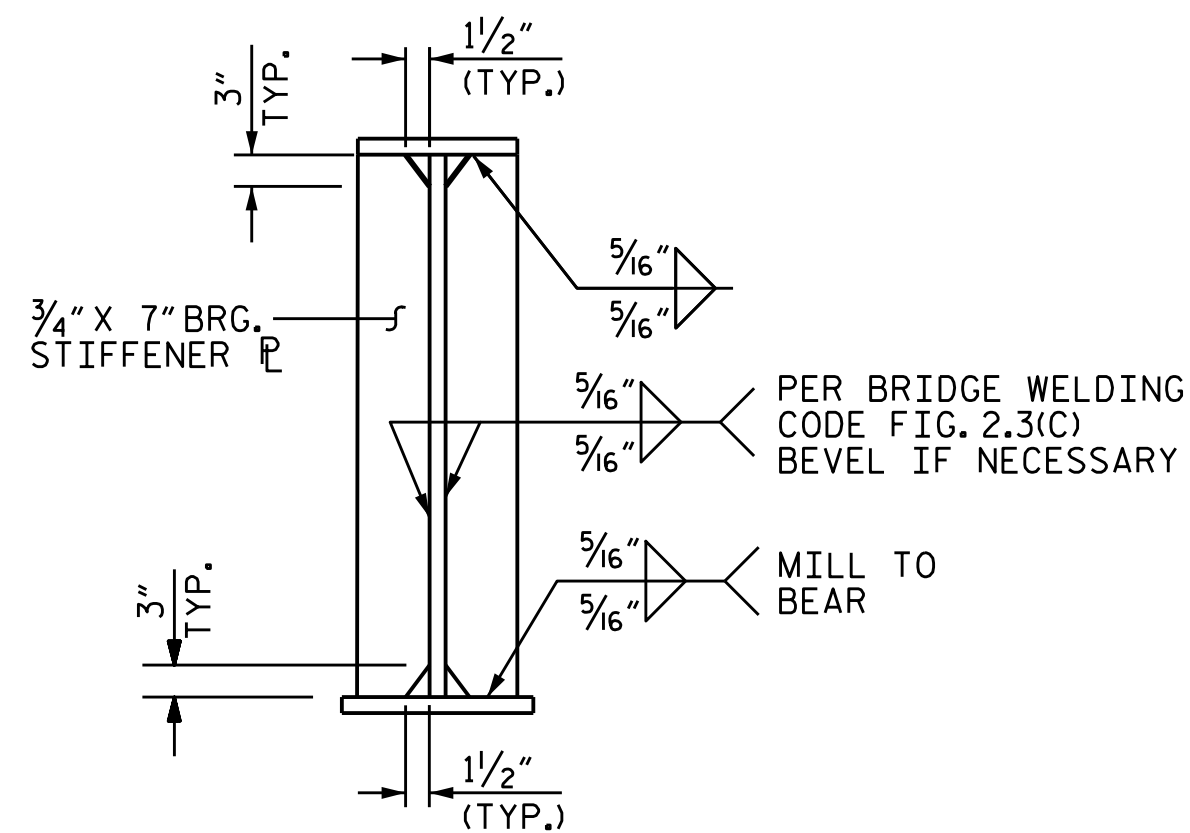
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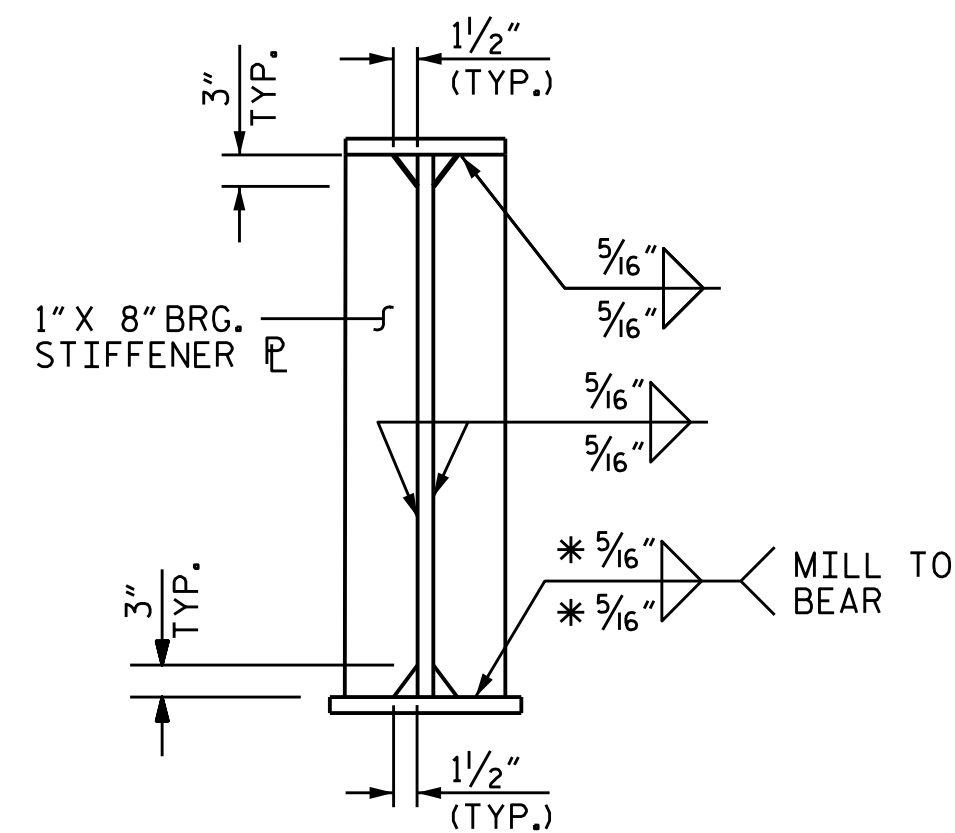
DRAWN BY : N. ROHRBAUGH DATE : 05/2021
CHECKED BY : A. FORFA DATE : 06/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



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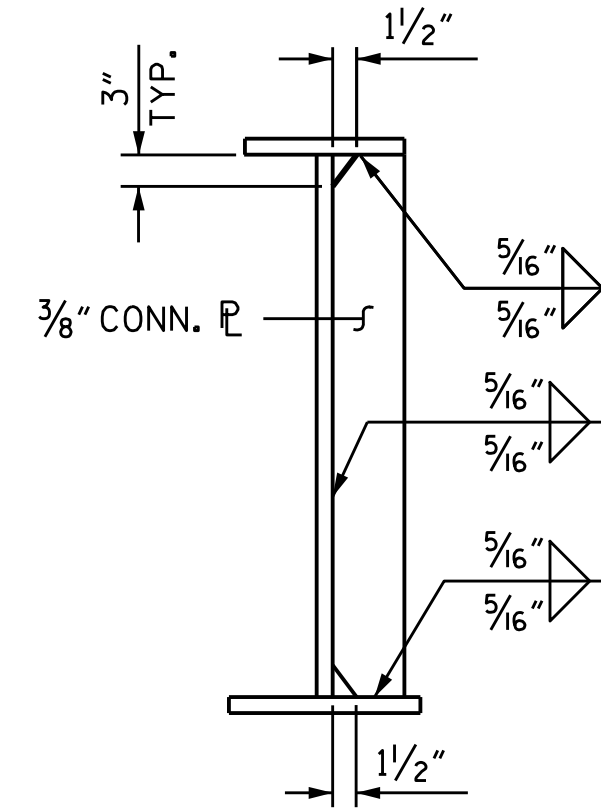


BEARING STIFFENER @ END BENTS

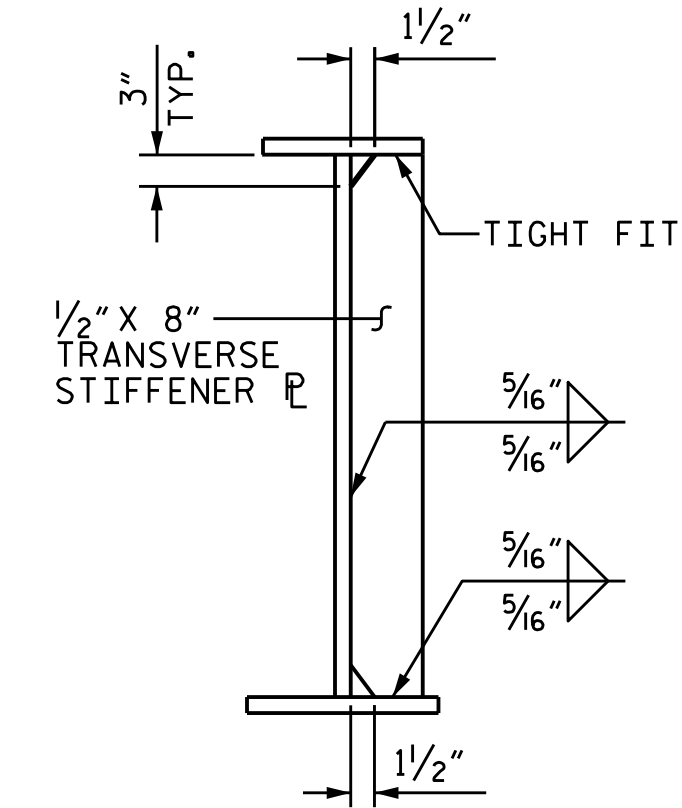


BEARING STIFFENER @ BENTS

* WELD ONLY WHEN USED AS CONNECTOR



CONNECTOR PLATE



TRANSVERSE STIFFENER

NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDERS AND SHALL BE PLUMB.

PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

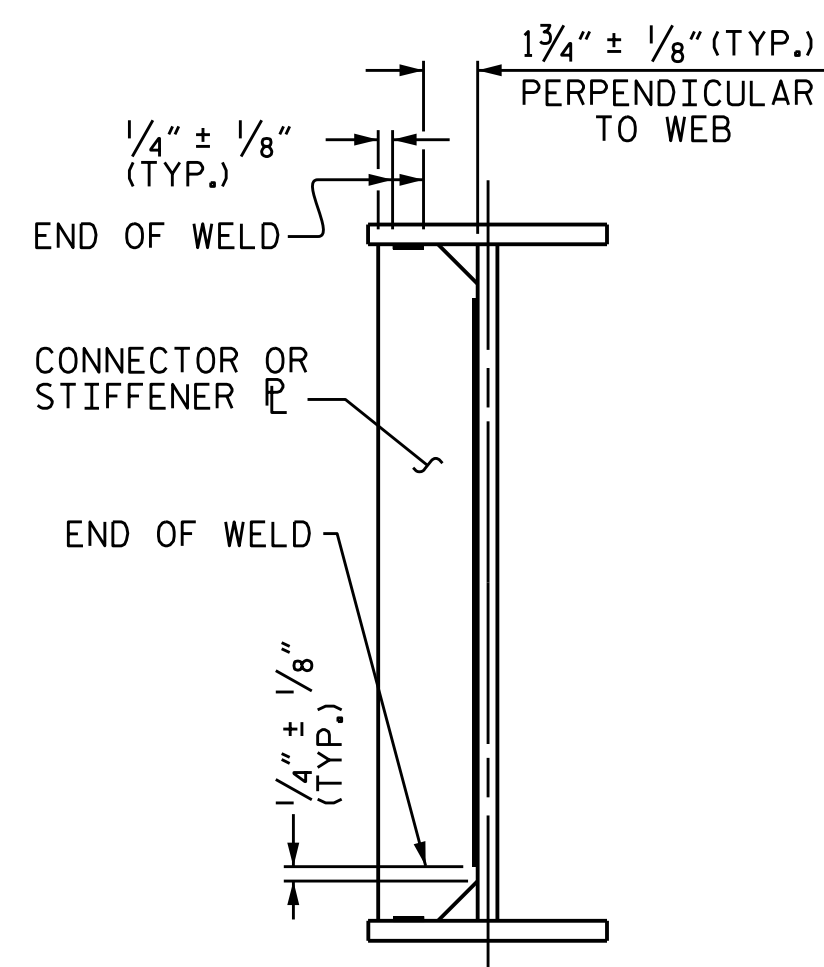
ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

END OF BEAMS AND GIRDERS SHALL BE PLUMB.

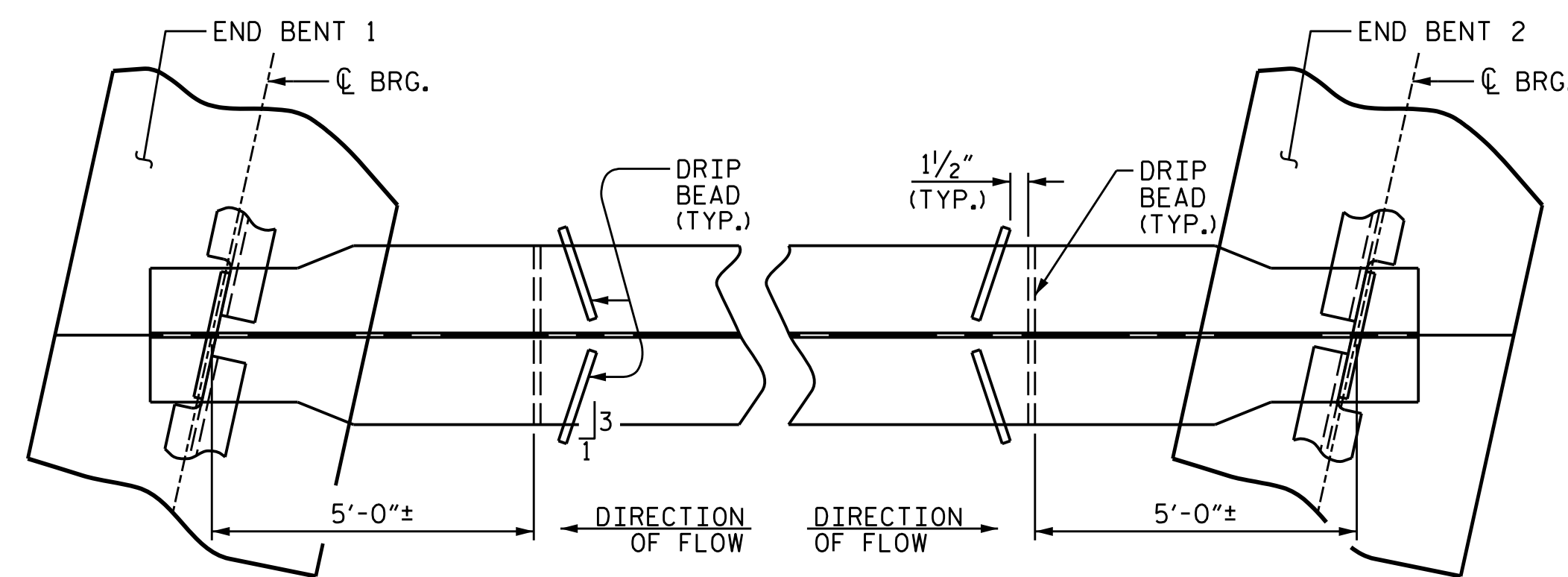
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

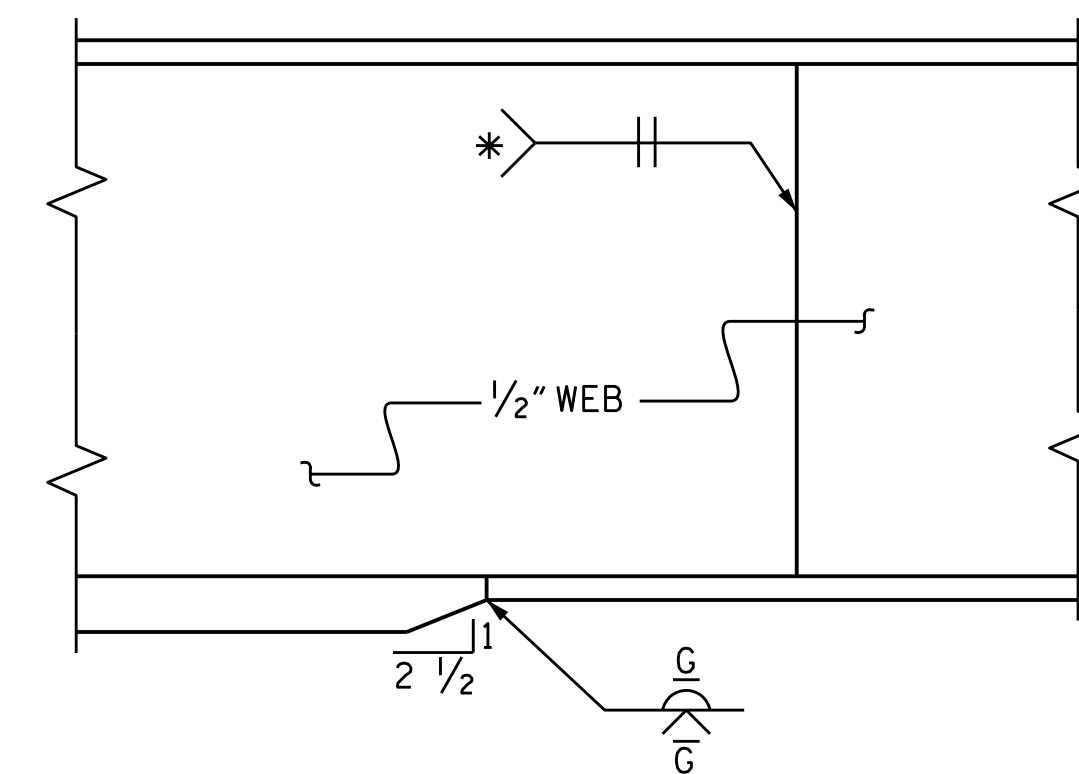


TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS



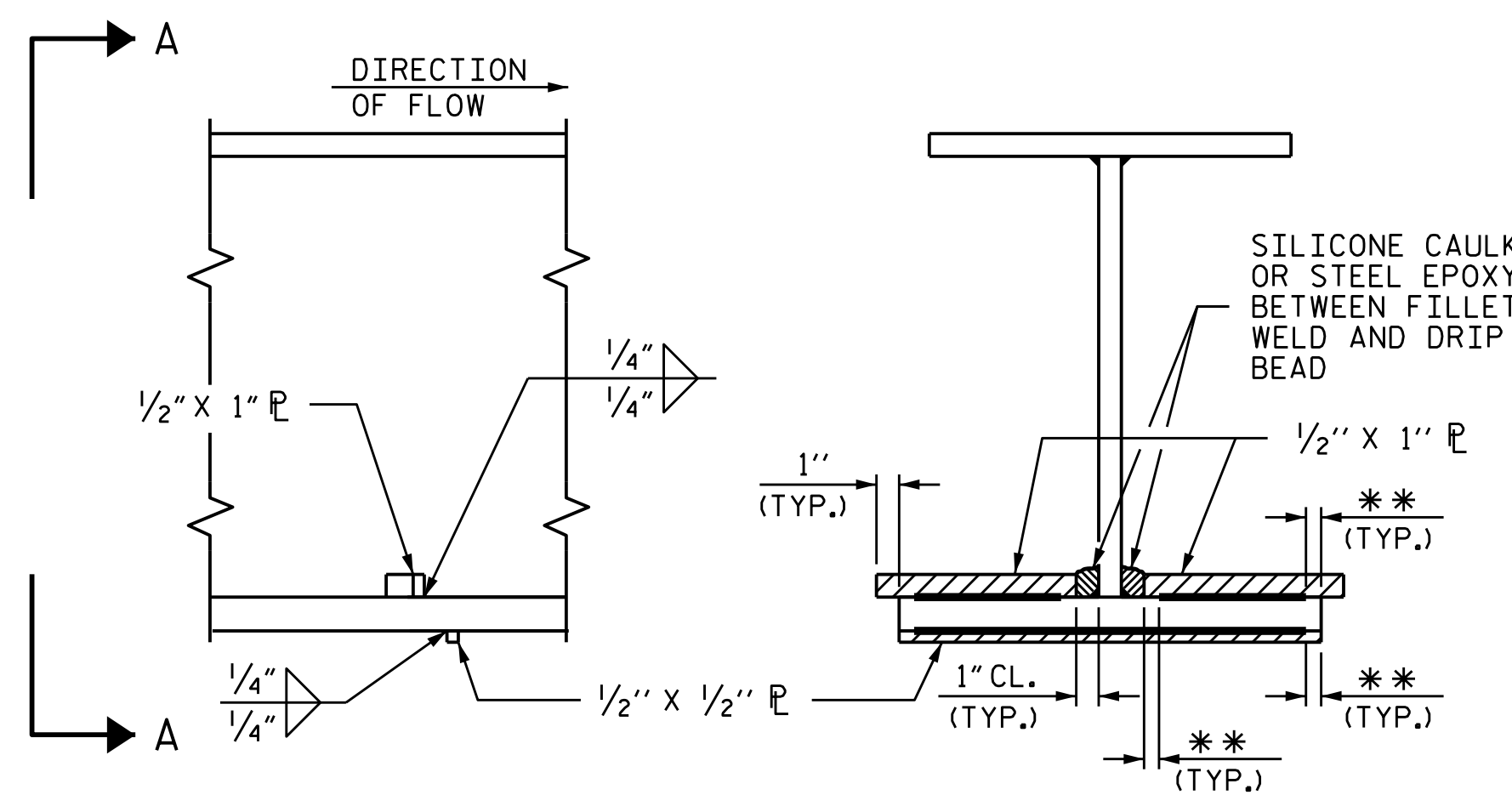
PART PLAN - BOTTOM FLANGE



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR BEAMS /GIRDERS



SECTION

VIEW A-A

** SEE "WELD TERMINATION DETAILS"

DRIP BEAD DETAILS

DRAWN BY : M. SPENCER DATE : 07/2021
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 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



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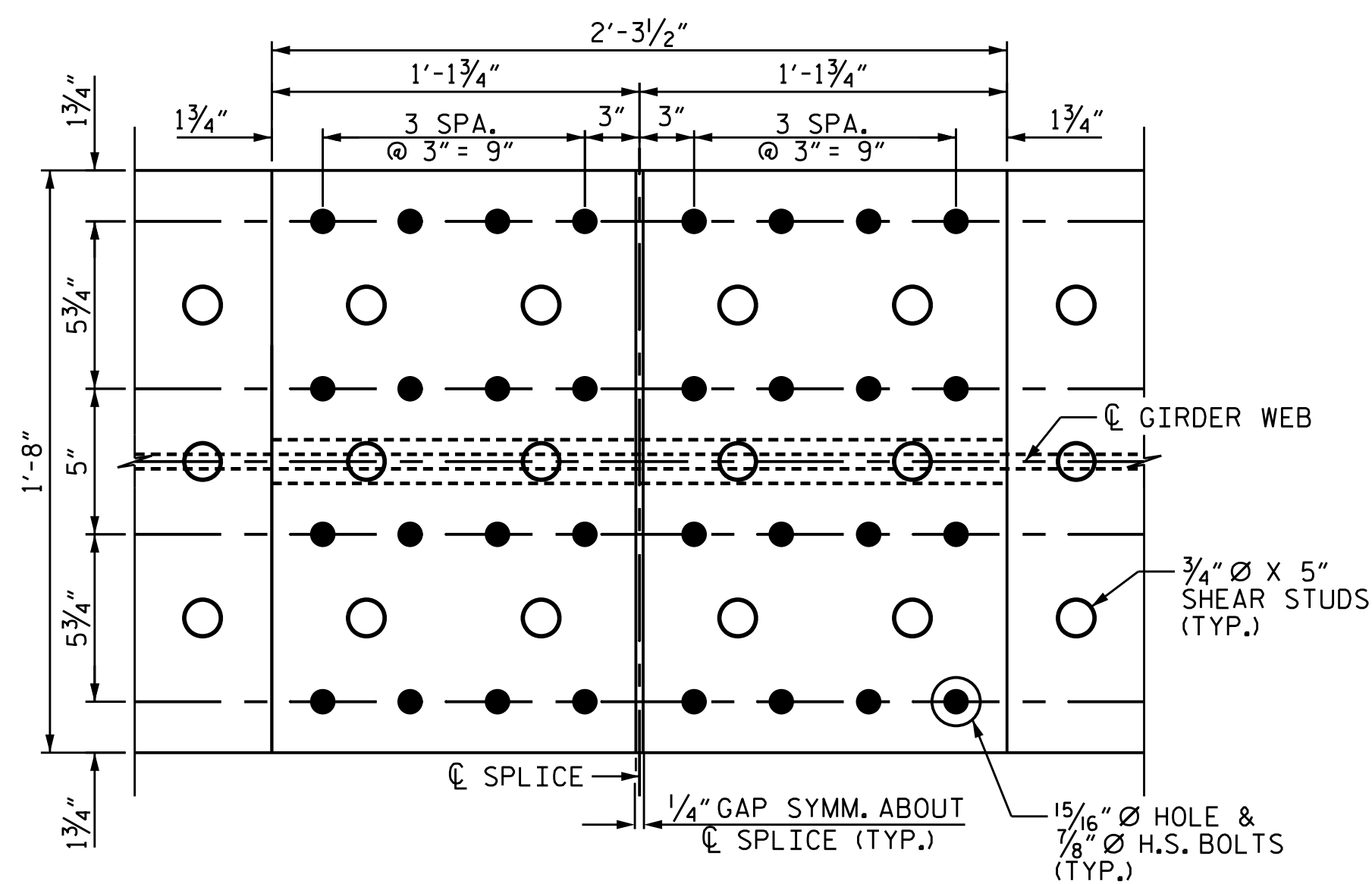


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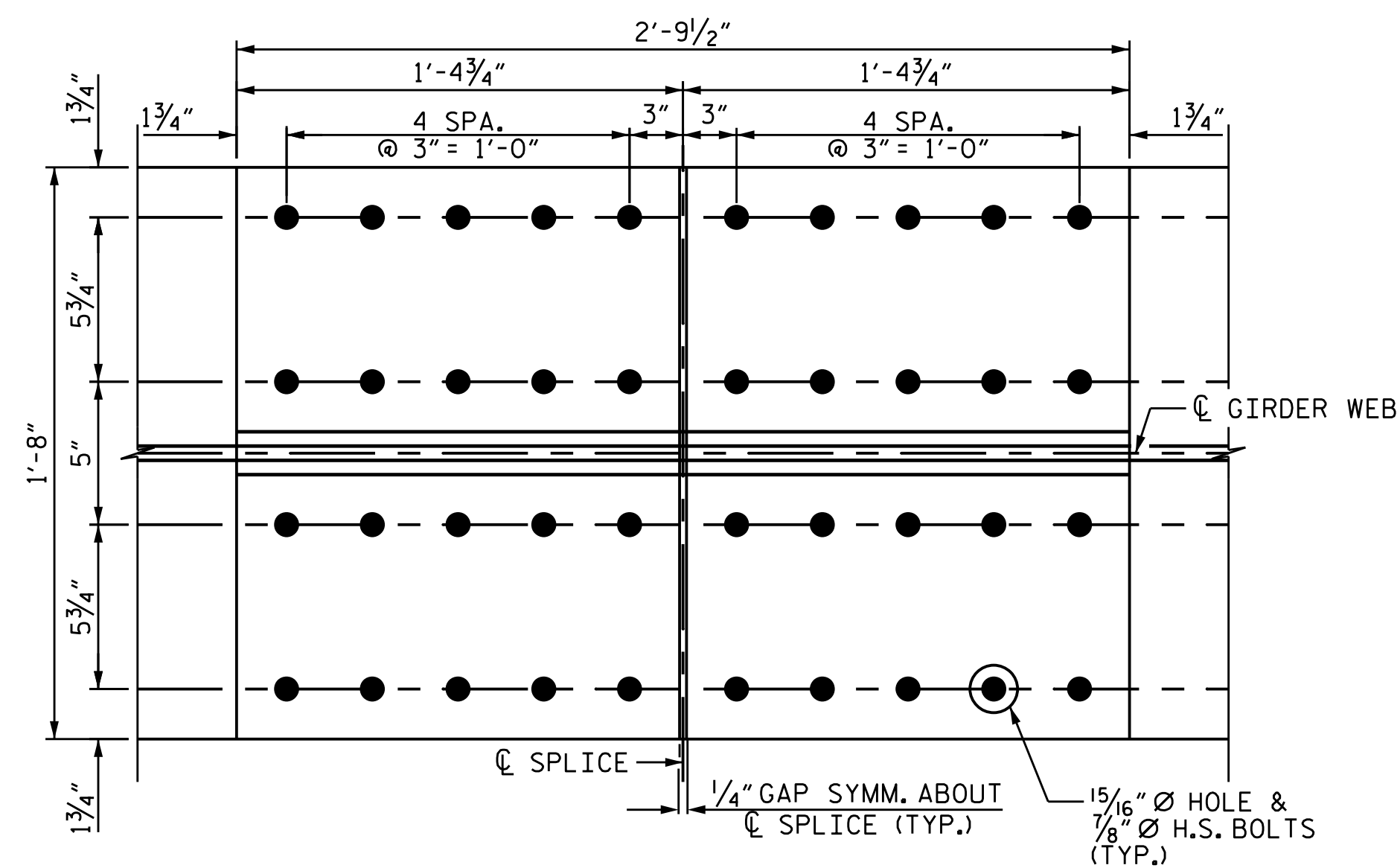
PROJECT NO. BR-0033
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 STATION: 16+11.51 -L-

SHEET 3 OF 4

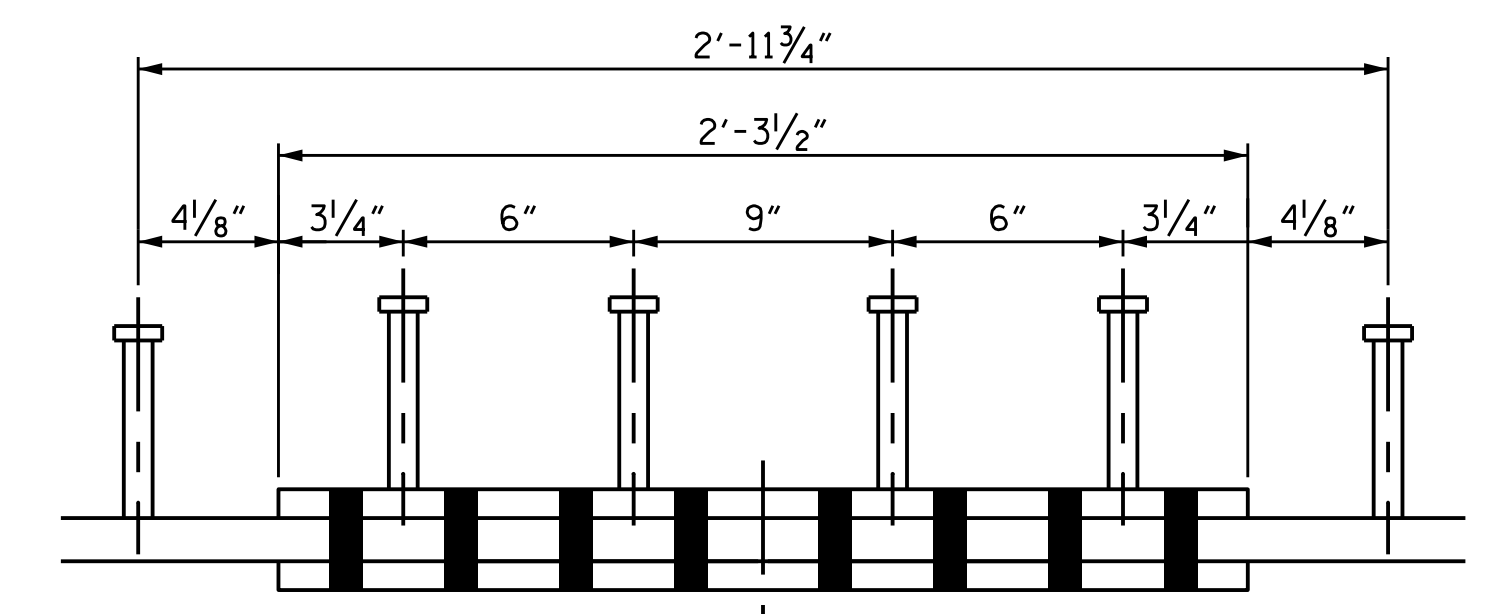
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| SUPERSTRUCTURE | | | | | |
| STRUCTURAL STEEL DETAILS | | | | | |
| REVISIONS | | | | | |
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| 2 | | | 4 | | |
| SHEET NO. S-12 | | | | | TOTAL SHEETS 32 |



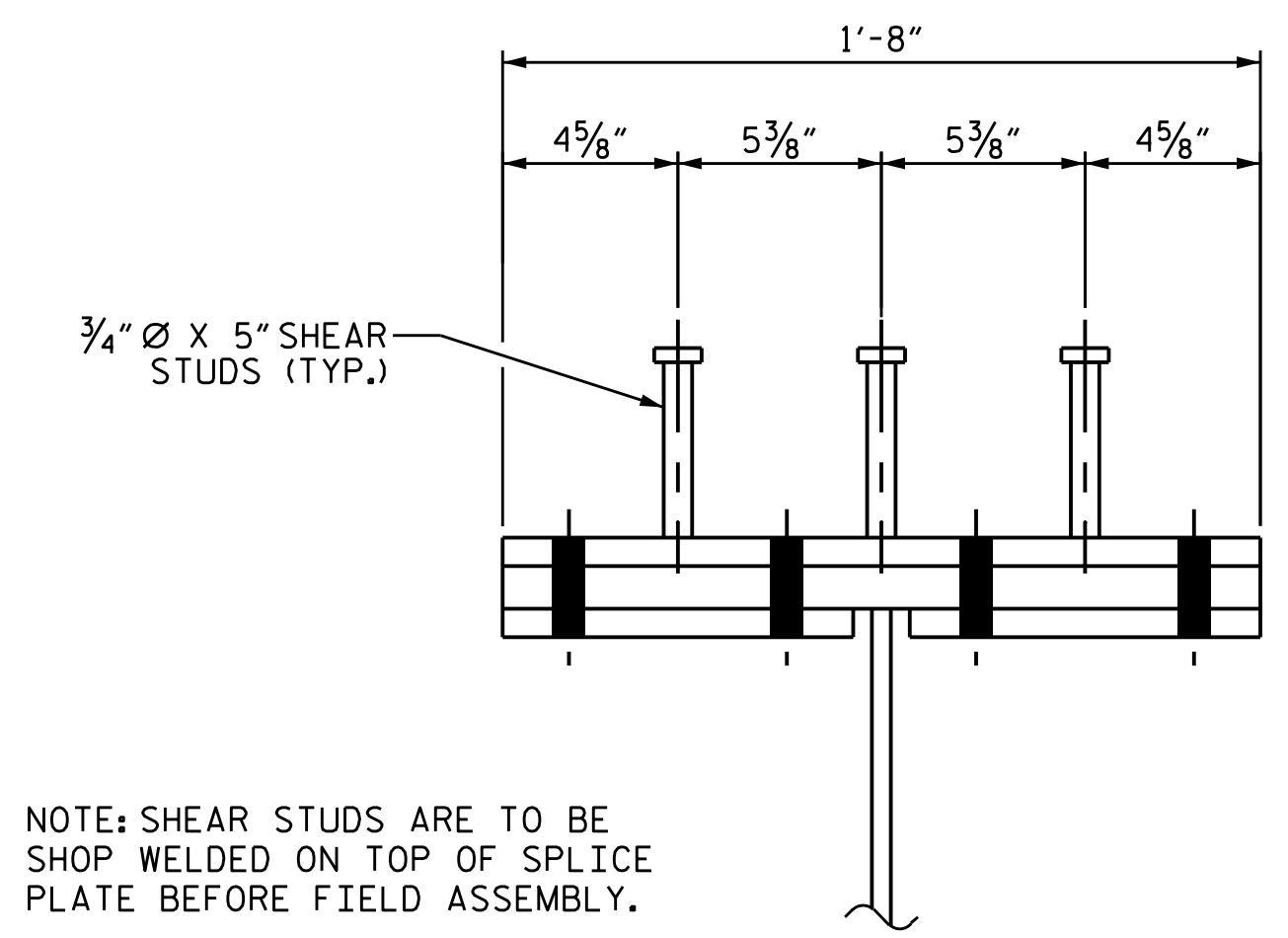
PLAN (TOP OF TOP FLANGE)
NOTE: SEE DETAIL FOR DIMENSIONS TO SHEAR STUDS.



PLAN (TOP OF BOTTOM FLANGE)



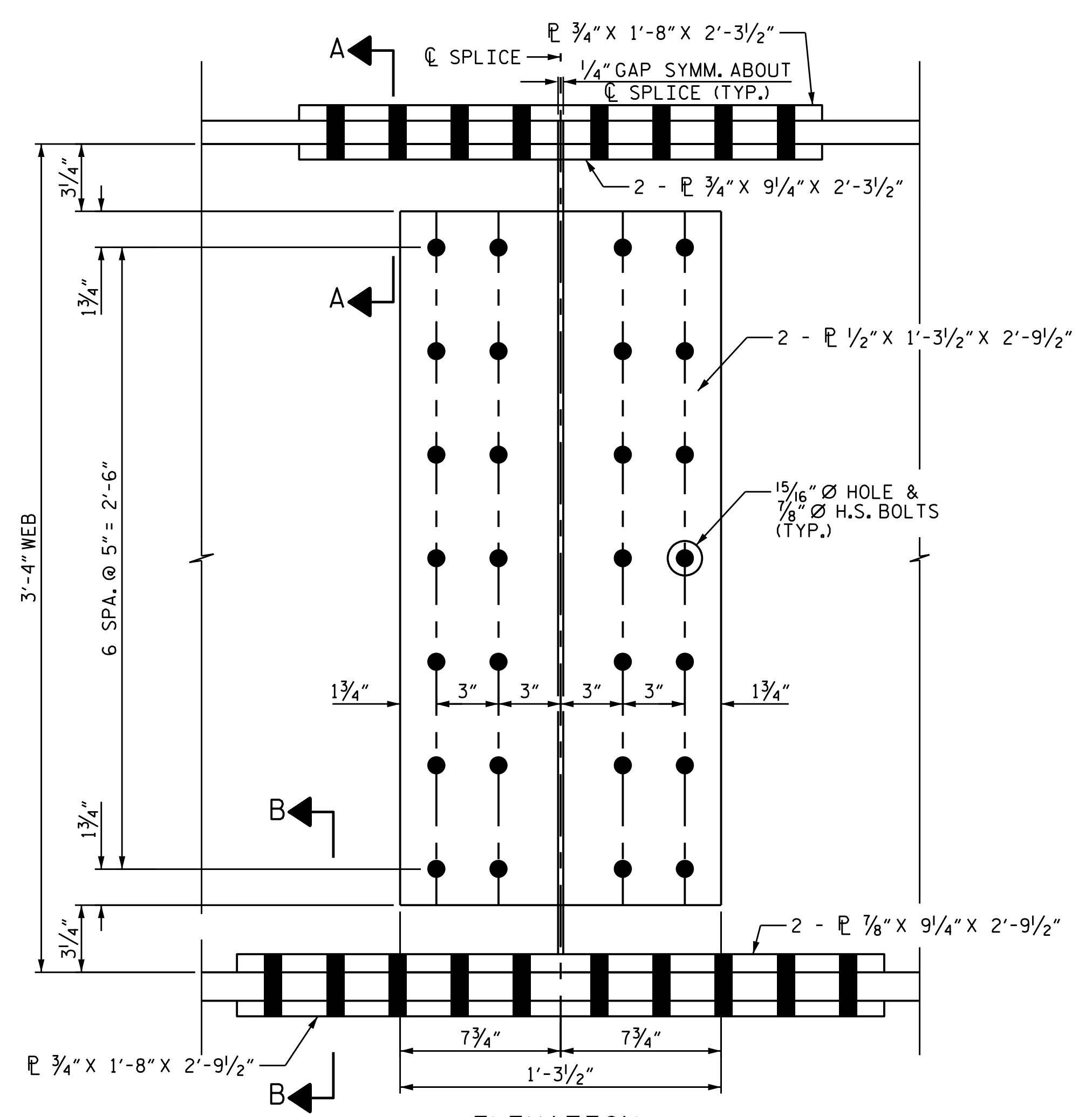
ELEVATION



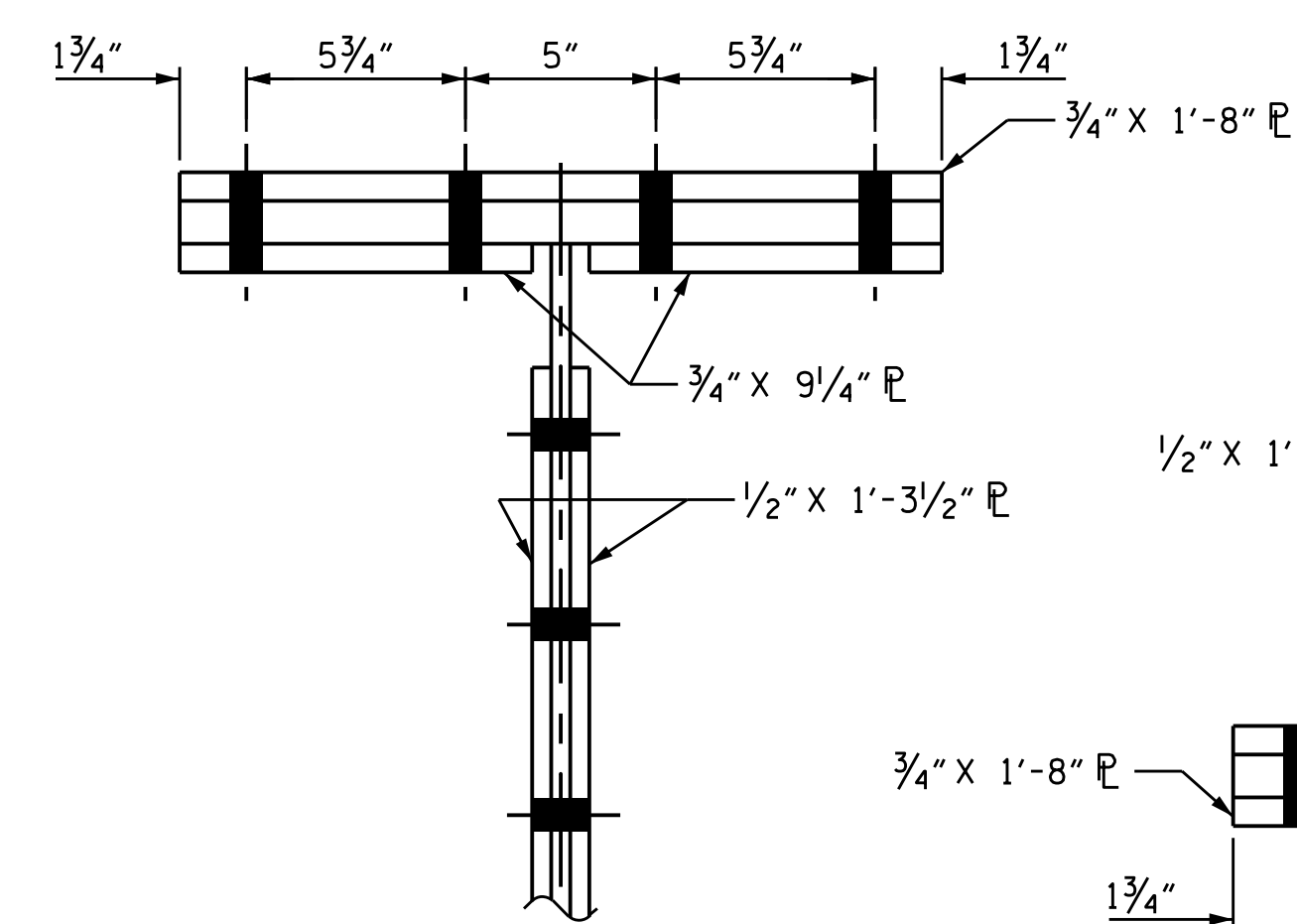
NOTE: SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF SPLICE PLATE BEFORE FIELD ASSEMBLY.

SECTION

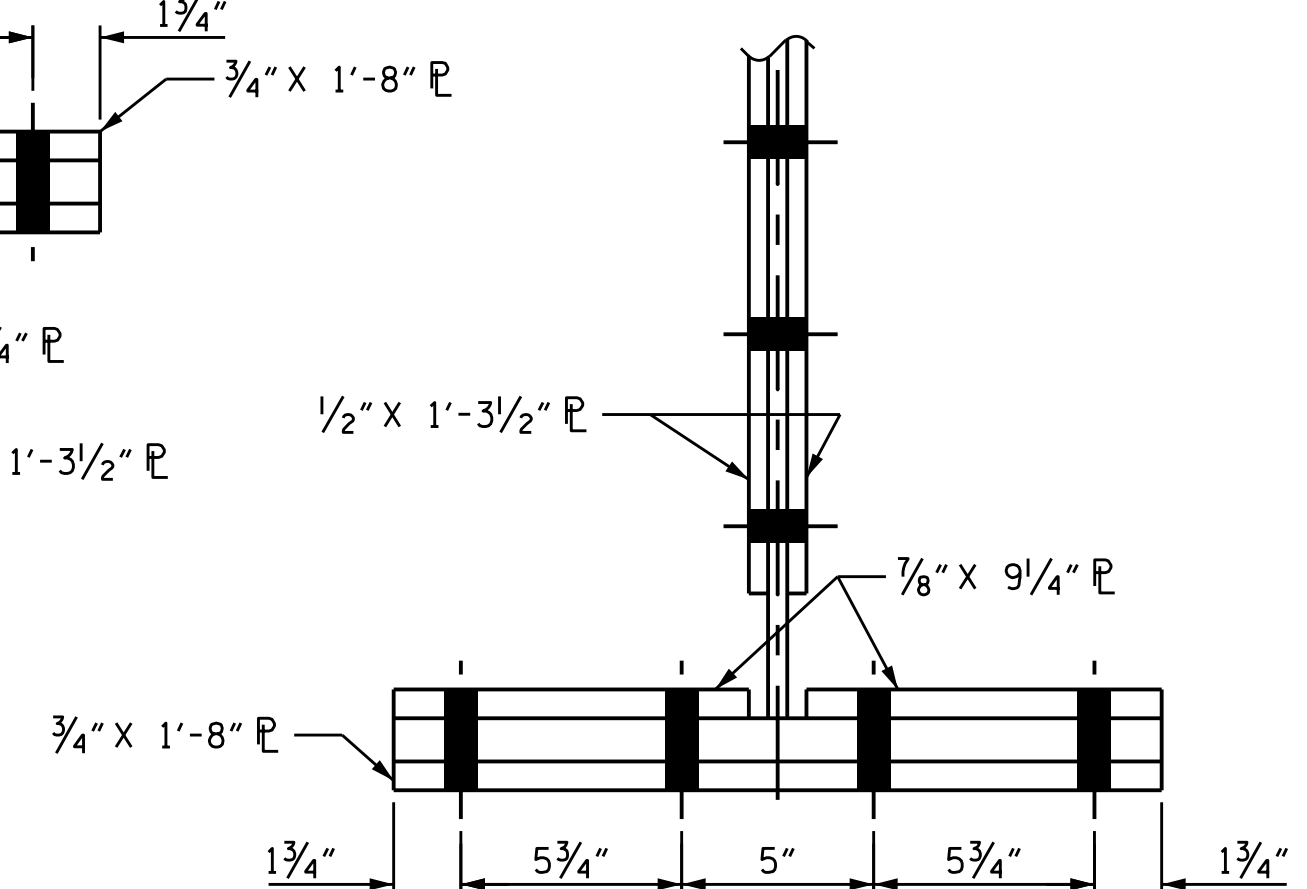
SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION
NOTE: SHEAR STUDS NOT SHOWN FOR CLARITY.



SECTION A-A



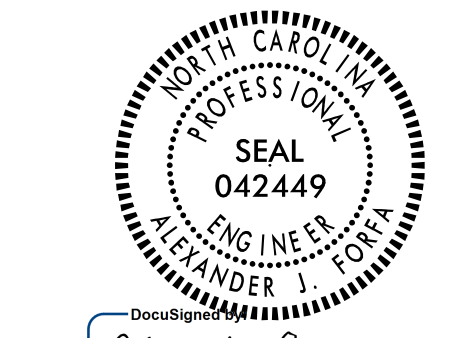
SECTION B-B

BOLTED FIELD SPLICE

DRAWN BY : M. SPENCER DATE : 06/2021
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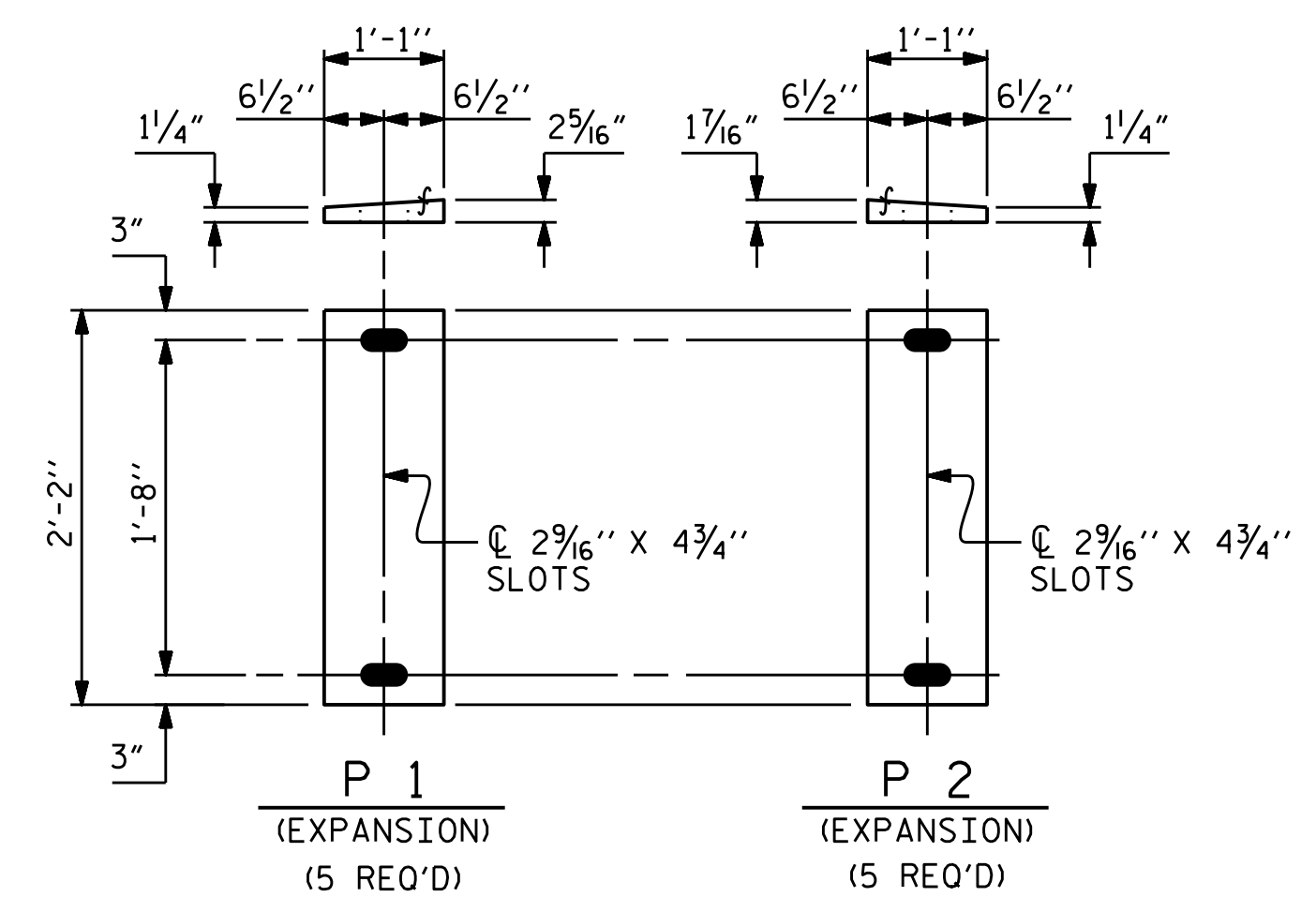
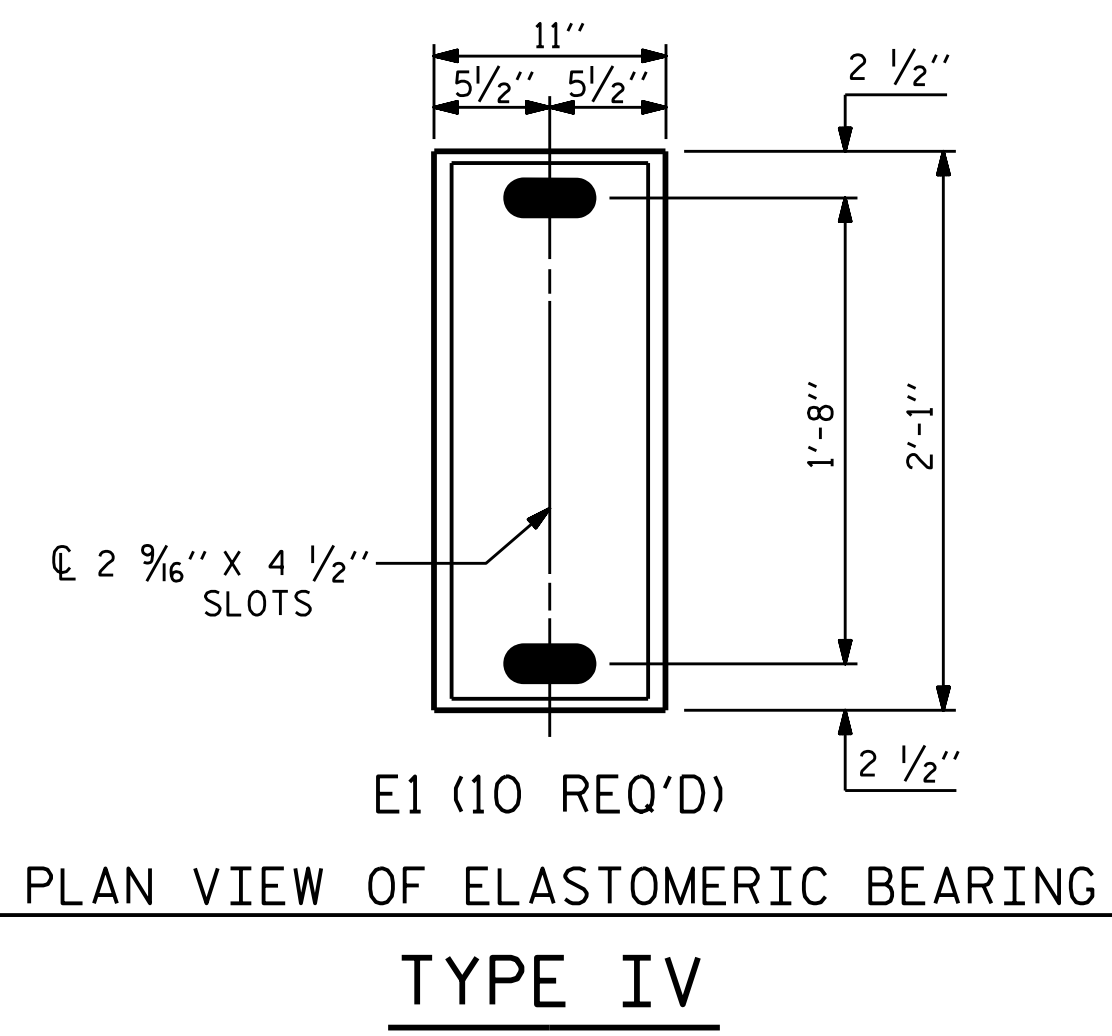
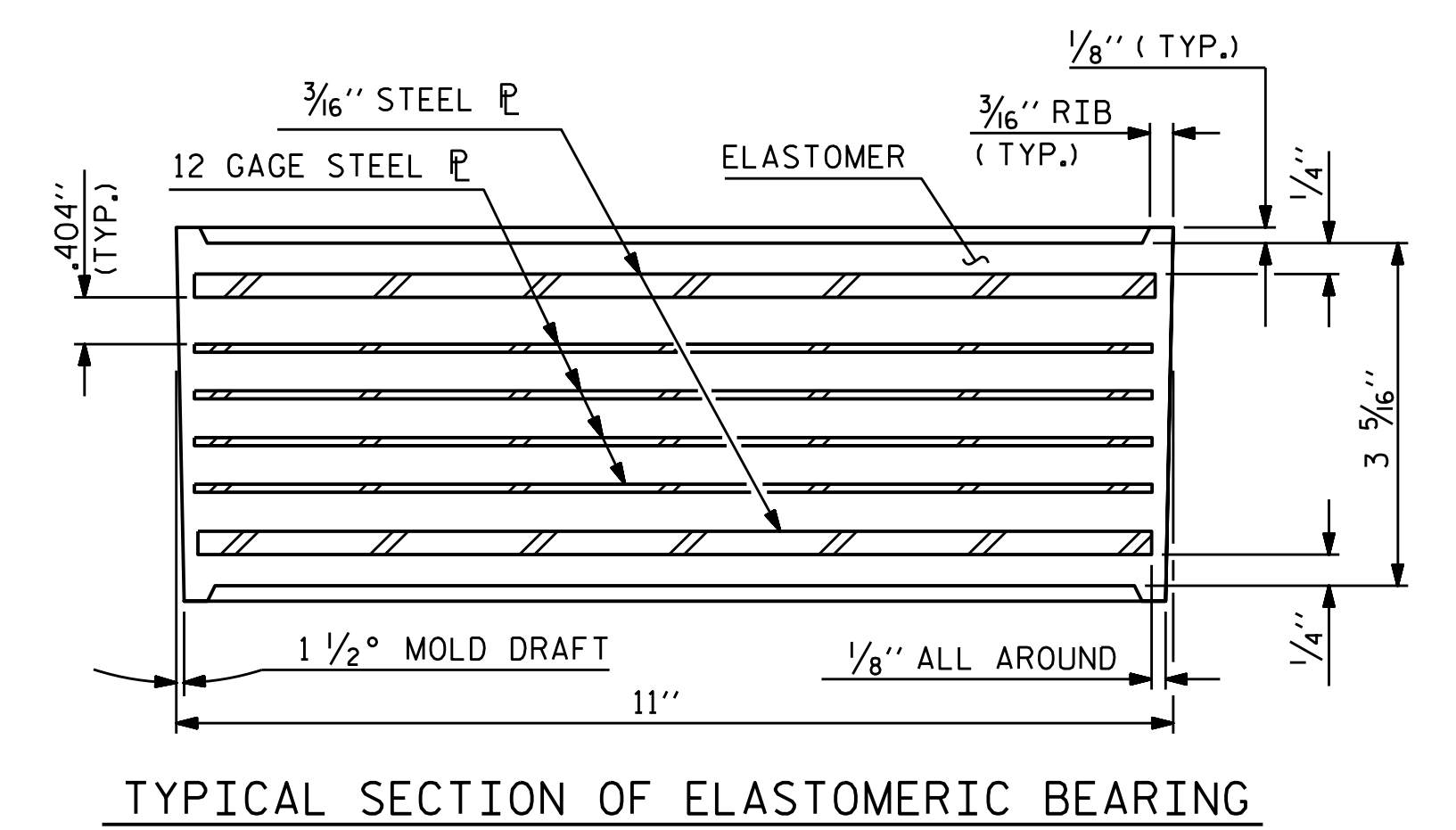
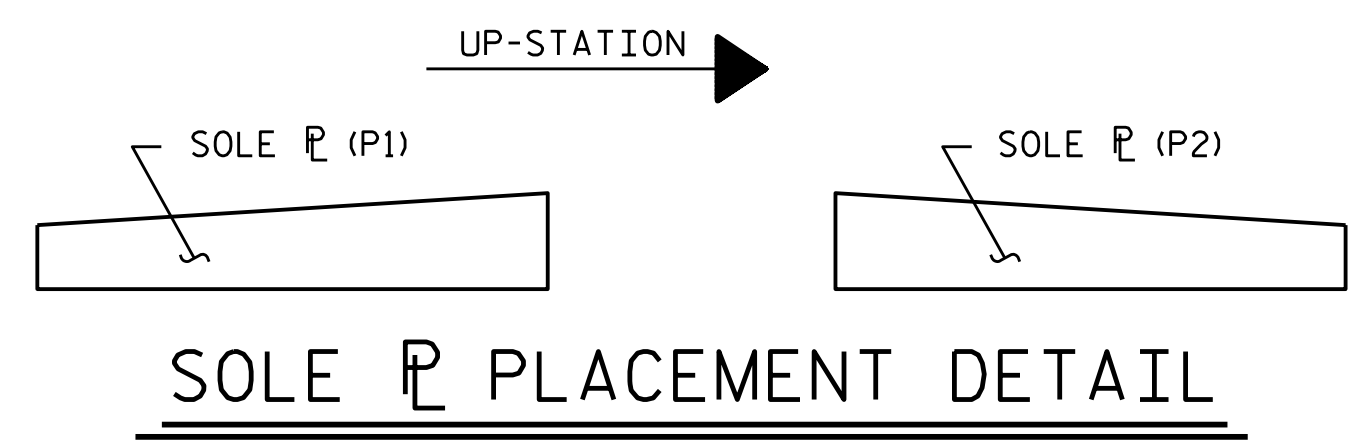
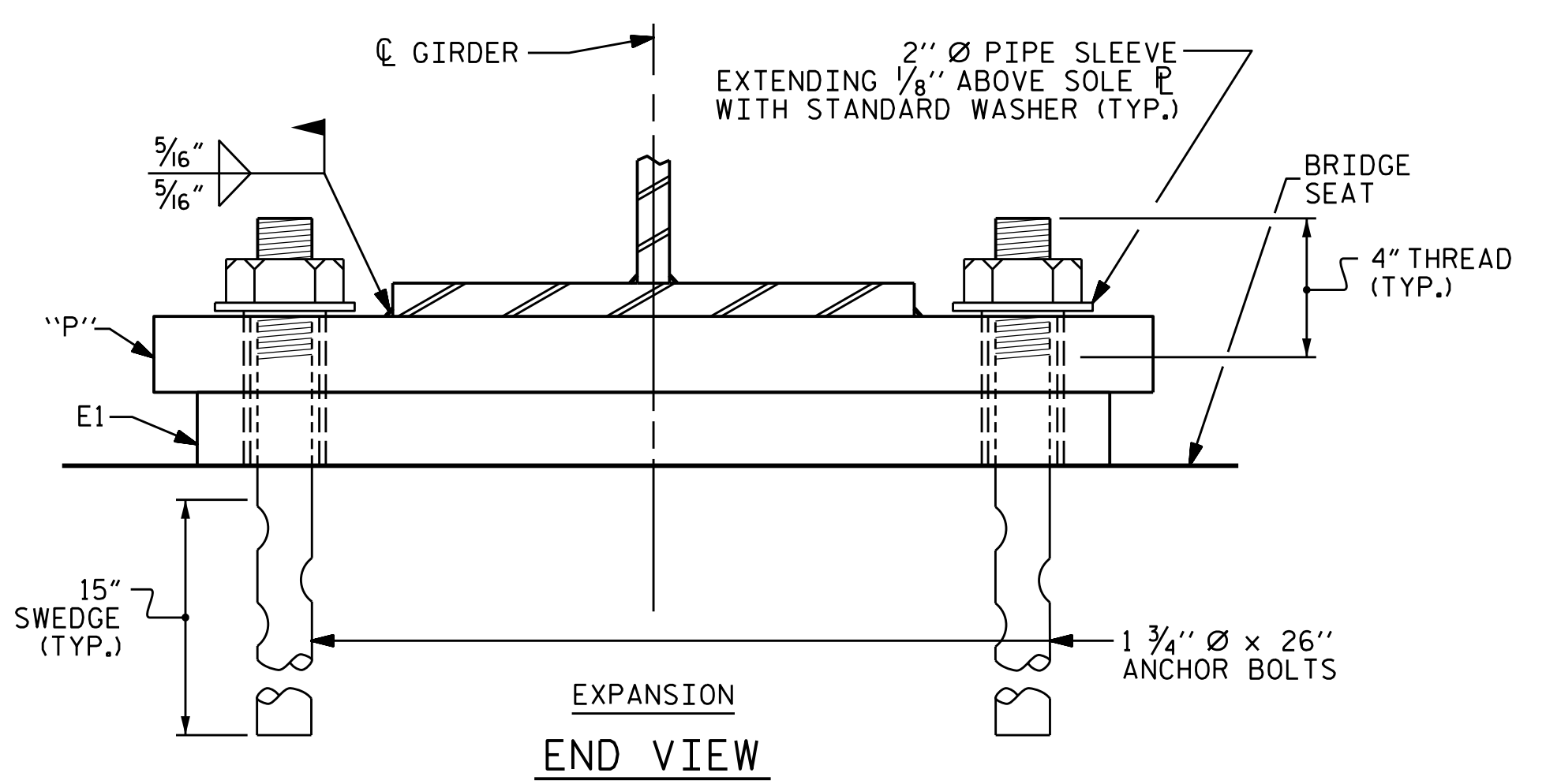


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SHEET 4 OF 4

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| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| SUPERSTRUCTURE STRUCTURAL STEEL DETAILS | | | | | |
| REVISIONS | | | | | |
| NO. | BY: | DATE: | NO. | BY: | DATE: |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| SHEET NO. S-13 | | | | | TOTAL SHEETS 32 |



NOTES

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

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

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

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.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

| | |
|--|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS | |
| D.L.+L.L. (NO IMPACT) | |
| TYPE IV | 310 k |

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

| | |
|-----------------------------|----------------------|
| ASSEMBLED BY : N. ROHRBAUGH | DATE : 06/21 |
| CHECKED BY : A. FORFA | DATE : 06/21 |
| DRAWN BY : EEM 10/95 | REV. 10/17/11 MAA/GM |
| CHECKED BY : PEK 10/95 | REV. 6/13 AAC/MAA |
| | REV. 12/17 |



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD ELASTOMERIC BEARING DETAILS
 (STEEL SUPERSTRUCTURE)

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-14 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W OR GRADE 50.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED PLUS AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR URETHANE DISC.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.

THE CLOSURE PLATE, GROUT PIPE, AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

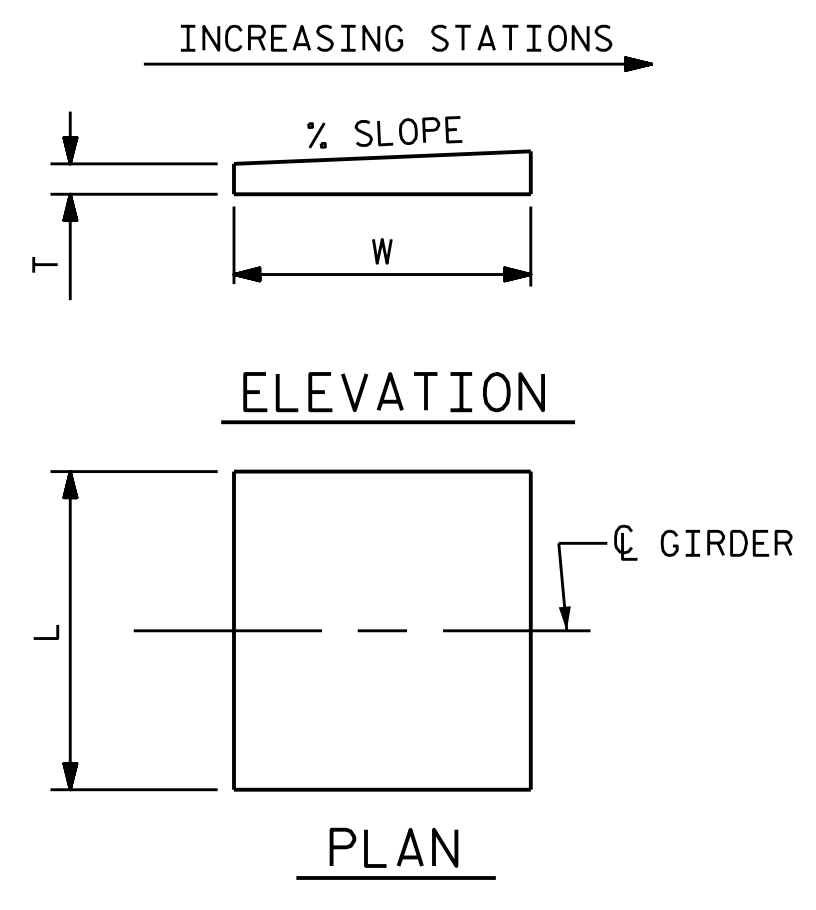
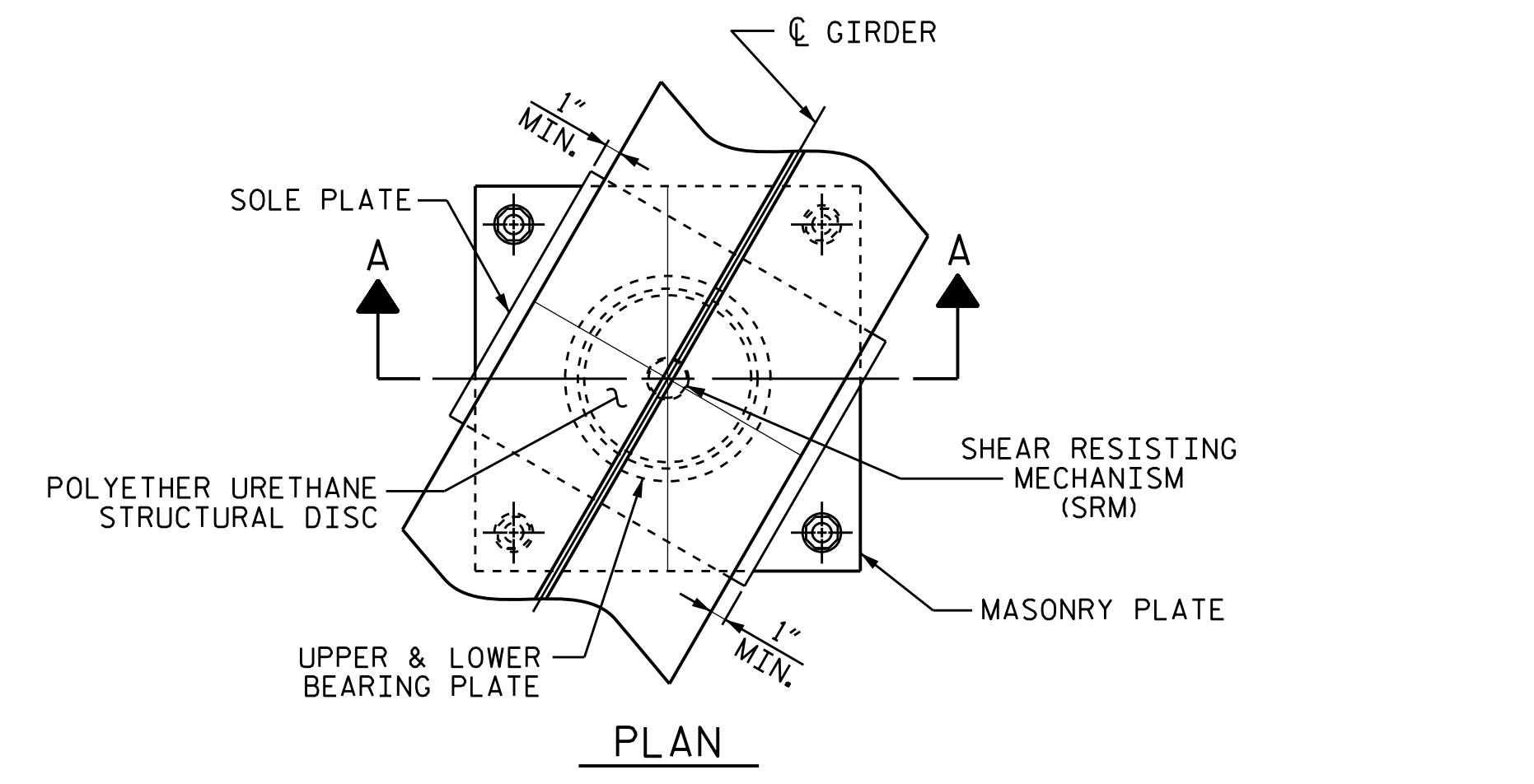
SOLE PLATES SHOULD BE WELDED TO GIRDER FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR ATTACHMENT OF THE STAINLESS STEEL SHEETS TO THE STEEL SOLE PLATE AND GUIDE BARS, AS WELL AS THE TOP AND SIDE PTFE SHEETS TO THE STEEL UPPER BEARING PLATE, SEE SPECIAL PROVISIONS.

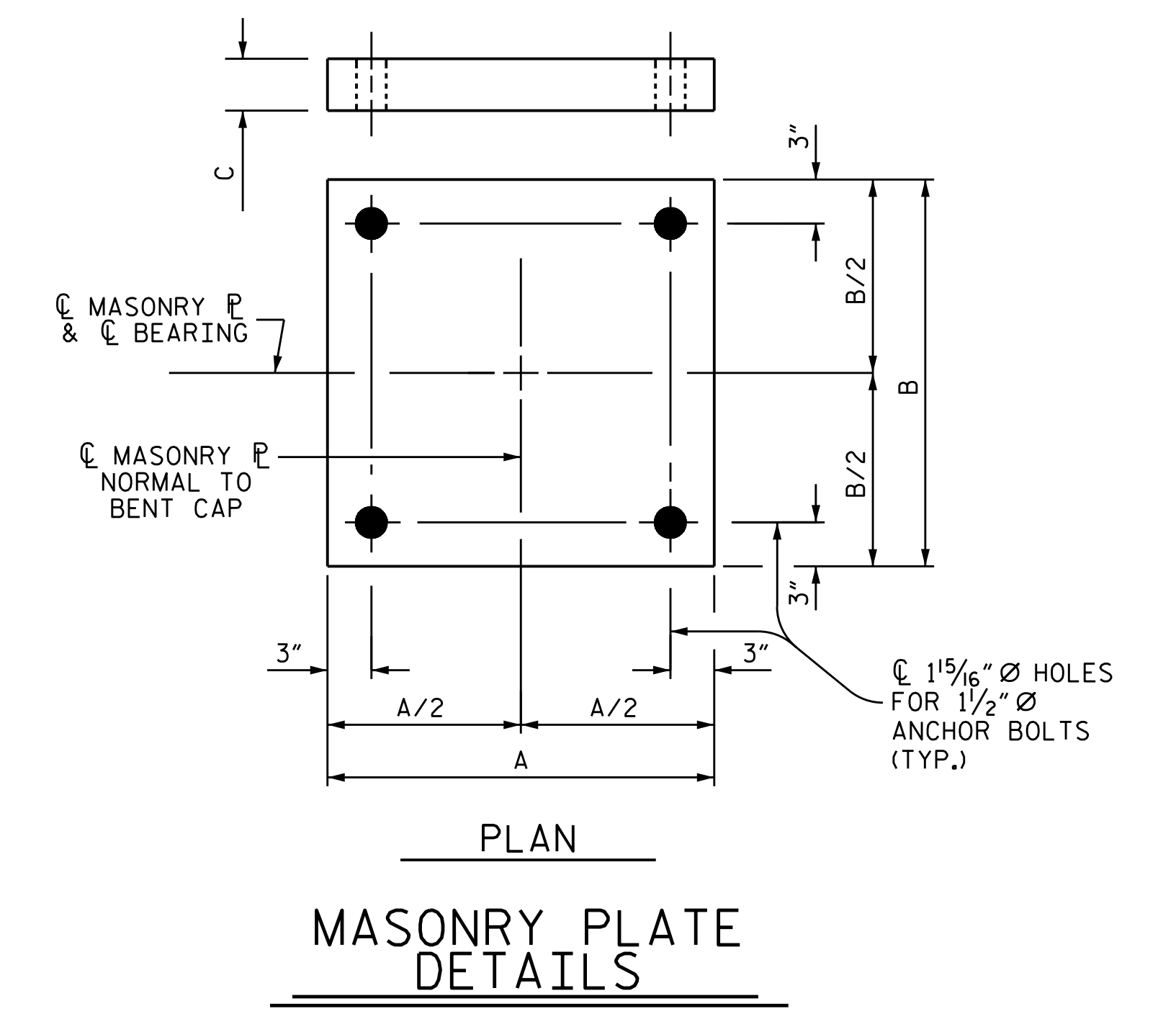
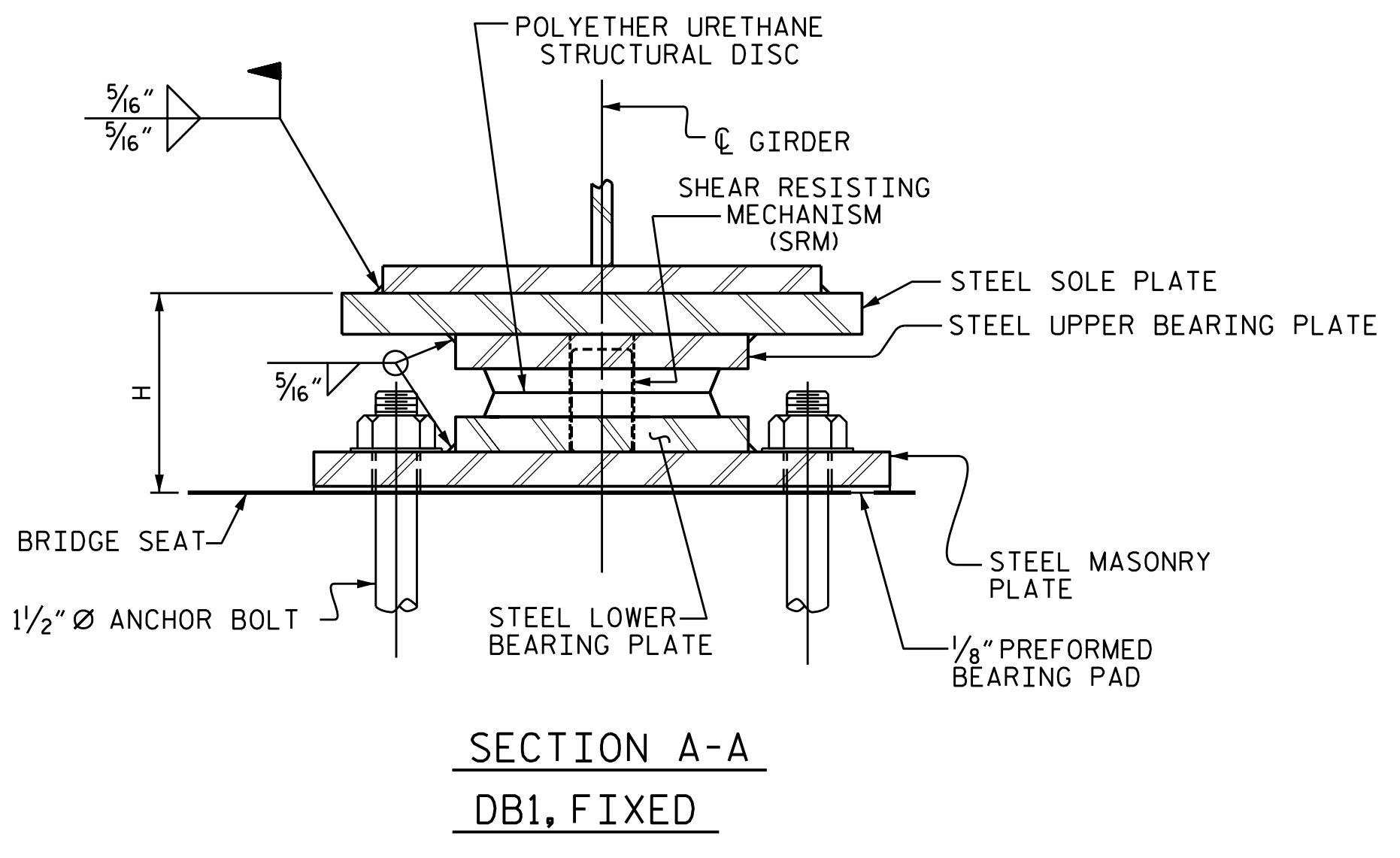
FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIAN.



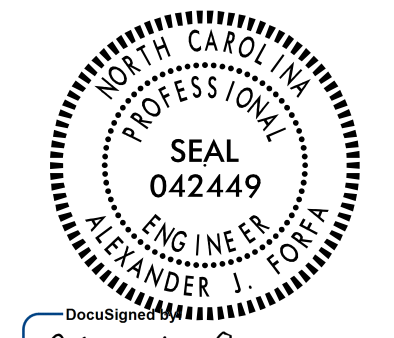
NOTE:
DIMENSIONS "W" AND "T" SHALL BE DETERMINED BY THE BEARING MANUFACTURER.

SOLE PLATE DETAILS



| DESIGNATIONS | | LOCATION | NUMBER OF BEARINGS | DIMENSIONS | | | | LOADS AND MOVEMENT | | | | | | |
|--------------|---------------|----------|--------------------|------------|---------------|---------|---------|--------------------|---------|---------------------------------|------|-------|---------------------------------|------------------------|
| BEARINGS | MASONRY PLATE | | | BEARING | MASONRY PLATE | | | SOLE PLATE | | UNFACTORED VERTICAL LOAD (KIPS) | | | FACTORED HORIZONTAL LOAD (KIPS) | ONE-WAY MOVEMENT (IN.) |
| | | | | H (IN.) | A (IN.) | B (IN.) | C (IN.) | TOP SLOPE (%) | L (IN.) | DC | DW | LIVE | | |
| DB1 (FIXED) | M1 | BENT 1 | 5 | 6 3/4" | 24 1/2" | 24 1/2" | 1" | 3.906 | 22" | 280.2 | 37.8 | 230.9 | 108.4 | 0 |

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 DISC BEARING
 DETAILS

ASSEMBLED BY : M. SPENCER DATE : 06/21
 CHECKED BY : A. FORFA DATE : 06/21
 DRAWN BY : TMG 08/13 REV. 12/17 MAA/THC
 CHECKED BY : EKP 10/13



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| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-15 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

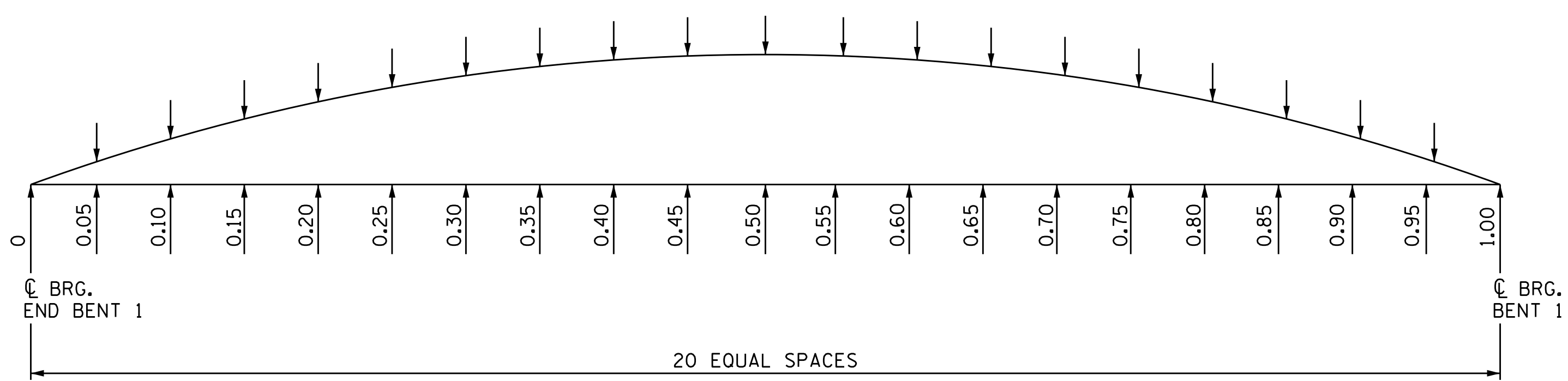
NOTE
UPWARD DEFLECTIONS ARE INDICATED WITH A "-" SIGN.

| DEAD LOAD DEFLECTION TABLE FOR GIRDERS | | | | | | | | | | | | | | | | | | | | | |
|--|-------|---------|---------|--------|--------|--------|--------|---------|--------|-------|-------|----------|---------|-------|---------|--------|----------|--------|--------|--------|-------|
| SPAN A | | | | | | | | | | | | | | | | | | | | | |
| GIRDERS 1 & 5 | | | | | | | | | | | | | | | | | | | | | |
| TWENTIETH POINTS | 0 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.003 | 0.005 | 0.007 | 0.009 | 0.011 | 0.011 | 0.012 | 0.012 | 0.011 | 0.010 | 0.008 | 0.006 | 0.004 | 0.002 | 0.000 | -0.001 | -0.002 | -0.002 | -0.002 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.015 | 0.028 | 0.038 | 0.047 | 0.052 | 0.056 | 0.058 | 0.057 | 0.053 | 0.048 | 0.039 | 0.030 | 0.022 | 0.013 | 0.003 | -0.004 | -0.007 | -0.007 | -0.005 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF BARRIER RAIL | 0.000 | 0.001 | 0.003 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.003 | 0.002 | 0.001 | 0.000 | -0.001 | -0.001 | -0.001 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.019 | 0.036 | 0.049 | 0.061 | 0.069 | 0.073 | 0.076 | 0.075 | 0.070 | 0.063 | 0.052 | 0.040 | 0.029 | 0.017 | 0.004 | -0.005 | -0.010 | -0.010 | -0.008 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.099 | 0.187 | 0.265 | 0.333 | 0.390 | 0.436 | 0.473 | 0.499 | 0.514 | 0.520 | 0.514 | 0.499 | 0.473 | 0.436 | 0.390 | 0.333 | 0.265 | 0.187 | 0.099 | 0.000 |
| REQUIRED CAMBER | 0" | 1 1/16" | 2 1/16" | 3 3/4" | 4 3/4" | 5 1/2" | 6 1/8" | 6 9/16" | 6 7/8" | 7" | 7" | 6 13/16" | 6 7/16" | 6" | 5 7/16" | 4 3/4" | 3 15/16" | 3 1/8" | 2 1/8" | 1 1/8" | 0" |

| GIRDERS 2 & 4 | | | | | | | | | | | | | | | | | | | | | |
|--|-------|---------|---------|--------|----------|--------|--------|----------|-------|--------|--------|--------|---------|--------|---------|--------|----------|--------|--------|--------|-------|
| TWENTIETH POINTS | 0 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.003 | 0.005 | 0.008 | 0.010 | 0.011 | 0.012 | 0.012 | 0.012 | 0.011 | 0.010 | 0.008 | 0.006 | 0.004 | 0.002 | 0.000 | -0.001 | -0.002 | -0.002 | -0.002 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.017 | 0.032 | 0.045 | 0.055 | 0.063 | 0.068 | 0.070 | 0.069 | 0.065 | 0.058 | 0.048 | 0.037 | 0.026 | 0.015 | 0.004 | -0.004 | -0.008 | -0.009 | -0.006 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF BARRIER RAIL | 0.000 | 0.001 | 0.002 | 0.003 | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | -0.001 | 0.000 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.021 | 0.039 | 0.056 | 0.068 | 0.078 | 0.084 | 0.086 | 0.085 | 0.080 | 0.072 | 0.059 | 0.046 | 0.032 | 0.018 | 0.004 | -0.005 | -0.010 | -0.012 | -0.008 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.099 | 0.187 | 0.265 | 0.333 | 0.390 | 0.436 | 0.473 | 0.499 | 0.514 | 0.520 | 0.514 | 0.499 | 0.473 | 0.436 | 0.390 | 0.333 | 0.265 | 0.187 | 0.099 | 0.000 |
| REQUIRED CAMBER | 0" | 1 7/16" | 2 1/16" | 3 7/8" | 4 13/16" | 5 5/8" | 6 1/4" | 6 11/16" | 7" | 7 1/8" | 7 1/8" | 6 7/8" | 6 3/16" | 6 1/8" | 5 7/16" | 4 3/4" | 3 15/16" | 3 1/8" | 2 1/8" | 1 1/8" | 0" |

| GIRDER 3 | | | | | | | | | | | | | | | | | | | | | |
|--|-------|---------|--------|----------|----------|--------|--------|----------|--------|--------|---------|----------|--------|--------|--------|--------|----------|---------|--------|--------|-------|
| TWENTIETH POINTS | 0 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.003 | 0.005 | 0.008 | 0.010 | 0.011 | 0.012 | 0.012 | 0.012 | 0.011 | 0.010 | 0.008 | 0.006 | 0.004 | 0.002 | 0.000 | -0.001 | -0.002 | -0.002 | -0.002 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.019 | 0.036 | 0.050 | 0.062 | 0.071 | 0.077 | 0.079 | 0.077 | 0.072 | 0.065 | 0.054 | 0.042 | 0.029 | 0.017 | 0.005 | -0.004 | -0.009 | -0.010 | -0.007 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF BARRIER RAIL | 0.000 | 0.001 | 0.003 | 0.004 | 0.005 | 0.005 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.004 | 0.003 | 0.002 | 0.001 | 0.000 | -0.001 | -0.001 | -0.001 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.023 | 0.044 | 0.062 | 0.077 | 0.087 | 0.095 | 0.097 | 0.095 | 0.089 | 0.080 | 0.066 | 0.052 | 0.036 | 0.021 | 0.006 | -0.005 | -0.012 | -0.013 | -0.010 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.099 | 0.187 | 0.265 | 0.333 | 0.390 | 0.436 | 0.473 | 0.499 | 0.514 | 0.520 | 0.514 | 0.499 | 0.473 | 0.436 | 0.390 | 0.333 | 0.265 | 0.187 | 0.099 | 0.000 |
| REQUIRED CAMBER | 0" | 1 7/16" | 2 3/4" | 3 15/16" | 4 15/16" | 5 3/4" | 6 3/8" | 6 13/16" | 7 1/8" | 7 1/4" | 7 3/16" | 6 15/16" | 6 5/8" | 6 1/8" | 5 1/2" | 4 3/4" | 3 15/16" | 3 1/16" | 2 1/8" | 1 1/8" | 0" |

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



SPAN A
SCHEMATIC CAMBER ORDINATES

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DEAD LOAD DEFLECTION TABLES

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



Alexander Forfa 11/23/2021

DRAWN BY : M. SPENCER DATE : 06/2021
CHECKED BY : A. FORFA DATE : 06/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



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Cary, NC 27518
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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B GIRDERS 1 & 5

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|--------|----------|---------|---------|--------|--------|-------|--------|--------|---------|----------|--------|--------|----------|---------|---------|---------|---------|---------|---------|-----------|----------|---------|-----------|----------|----------|---------|----------|----------|--------|---------|--------|--------|---------|--------|---------|---------|---------|---------|-------|
| FOURTIETH POINTS | 0 | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | 1.000 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.002 | 0.003 | 0.005 | 0.007 | 0.009 | 0.011 | 0.014 | 0.016 | 0.020 | 0.022 | 0.025 | 0.027 | 0.030 | 0.033 | 0.035 | 0.037 | 0.039 | 0.041 | 0.042 | 0.043 | 0.044 | 0.044 | 0.044 | 0.044 | 0.044 | 0.043 | 0.042 | 0.040 | 0.038 | 0.036 | 0.033 | 0.030 | 0.028 | 0.024 | 0.020 | 0.016 | 0.013 | 0.008 | 0.004 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.006 | 0.012 | 0.021 | 0.030 | 0.040 | 0.055 | 0.067 | 0.079 | 0.092 | 0.103 | 0.115 | 0.127 | 0.141 | 0.158 | 0.171 | 0.181 | 0.191 | 0.197 | 0.203 | 0.209 | 0.213 | 0.218 | 0.220 | 0.220 | 0.218 | 0.213 | 0.207 | 0.199 | 0.190 | 0.179 | 0.166 | 0.152 | 0.137 | 0.122 | 0.105 | 0.087 | 0.067 | 0.046 | 0.024 | 0.000 |
| DEFLECTION DUE TO WT. OF BARRIER RAIL | 0.000 | 0.001 | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.007 | 0.008 | 0.009 | 0.011 | 0.012 | 0.013 | 0.015 | 0.016 | 0.017 | 0.018 | 0.019 | 0.020 | 0.021 | 0.021 | 0.021 | 0.022 | 0.022 | 0.022 | 0.021 | 0.021 | 0.020 | 0.019 | 0.019 | 0.017 | 0.016 | 0.015 | 0.014 | 0.012 | 0.010 | 0.008 | 0.006 | 0.004 | 0.003 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.008 | 0.016 | 0.027 | 0.040 | 0.053 | 0.071 | 0.087 | 0.103 | 0.120 | 0.136 | 0.151 | 0.167 | 0.185 | 0.207 | 0.222 | 0.236 | 0.248 | 0.258 | 0.266 | 0.273 | 0.278 | 0.284 | 0.286 | 0.286 | 0.282 | 0.277 | 0.268 | 0.258 | 0.247 | 0.232 | 0.215 | 0.197 | 0.178 | 0.158 | 0.134 | 0.111 | 0.086 | 0.058 | 0.030 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.070 | 0.136 | 0.199 | 0.258 | 0.314 | 0.366 | 0.415 | 0.459 | 0.501 | 0.538 | 0.573 | 0.603 | 0.630 | 0.653 | 0.673 | 0.689 | 0.702 | 0.711 | 0.716 | 0.718 | 0.716 | 0.711 | 0.702 | 0.689 | 0.673 | 0.653 | 0.630 | 0.603 | 0.573 | 0.538 | 0.501 | 0.459 | 0.415 | 0.366 | 0.314 | 0.258 | 0.199 | 0.136 | 0.070 | 0.000 |
| REQUIRED CAMBER | 0" | 15/16" | 1 13/16" | 2 1/16" | 3 3/16" | 4 3/8" | 5 1/4" | 6" | 6 3/4" | 7 1/8" | 8 1/16" | 8 11/16" | 9 1/4" | 9 3/4" | 10 5/16" | 10 3/4" | 11 1/8" | 11 3/8" | 11 5/8" | 11 3/4" | 11 7/8" | 11 15/16" | 11 5/16" | 11 7/8" | 11 11/16" | 11 7/16" | 11 3/16" | 10 3/4" | 10 5/16" | 9 13/16" | 9 1/4" | 8 9/16" | 7 7/8" | 7 1/8" | 6 5/16" | 5 3/8" | 4 7/16" | 3 7/16" | 2 5/16" | 1 3/16" | 0" |

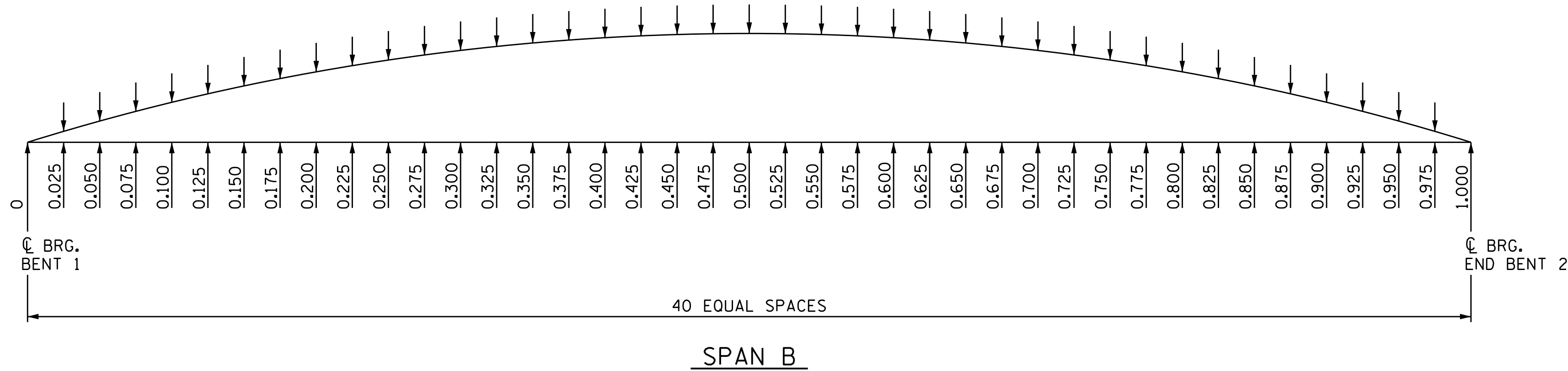
GIRDERS 2 & 4

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|--------|--------|--------|--------|--------|---------|--------|--------|--------|---------|----------|--------|----------|----------|----------|----------|---------|-------|----------|----------|----------|----------|---------|----------|---------|----------|---------|-----------|----------|---------|--------|--------|--------|--------|---------|---------|--------|--------|--------|-------|
| FOURTIETH POINTS | 0 | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | 1.000 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.002 | 0.003 | 0.005 | 0.007 | 0.010 | 0.012 | 0.015 | 0.017 | 0.020 | 0.023 | 0.026 | 0.029 | 0.032 | 0.034 | 0.037 | 0.039 | 0.041 | 0.043 | 0.044 | 0.045 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.045 | 0.044 | 0.042 | 0.040 | 0.037 | 0.035 | 0.032 | 0.029 | 0.025 | 0.021 | 0.017 | 0.013 | 0.009 | 0.005 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.007 | 0.015 | 0.024 | 0.035 | 0.047 | 0.063 | 0.077 | 0.091 | 0.106 | 0.122 | 0.137 | 0.152 | 0.166 | 0.184 | 0.199 | 0.211 | 0.222 | 0.232 | 0.241 | 0.247 | 0.252 | 0.256 | 0.257 | 0.257 | 0.254 | 0.249 | 0.242 | 0.233 | 0.222 | 0.209 | 0.194 | 0.177 | 0.160 | 0.141 | 0.121 | 0.099 | 0.076 | 0.052 | 0.027 | 0.000 |
| DEFLECTION DUE TO WT. OF BARRIER RAIL | 0.000 | 0.001 | 0.001 | 0.002 | 0.002 | 0.003 | 0.004 | 0.005 | 0.006 | 0.007 | 0.008 | 0.009 | 0.009 | 0.010 | 0.011 | 0.012 | 0.013 | 0.013 | 0.014 | 0.015 | 0.015 | 0.015 | 0.015 | 0.015 | 0.015 | 0.015 | 0.015 | 0.014 | 0.014 | 0.013 | 0.012 | 0.012 | 0.010 | 0.010 | 0.008 | 0.007 | 0.006 | 0.005 | 0.003 | 0.002 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.009 | 0.019 | 0.031 | 0.044 | 0.059 | 0.079 | 0.097 | 0.114 | 0.133 | 0.153 | 0.172 | 0.190 | 0.208 | 0.229 | 0.247 | 0.263 | 0.276 | 0.289 | 0.299 | 0.307 | 0.313 | 0.317 | 0.318 | 0.318 | 0.315 | 0.309 | 0.299 | 0.289 | 0.275 | 0.258 | 0.240 | 0.219 | 0.198 | 0.174 | 0.149 | 0.122 | 0.094 | 0.064 | 0.033 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.070 | 0.136 | 0.199 | 0.258 | 0.314 | 0.366 | 0.415 | 0.459 | 0.501 | 0.538 | 0.573 | 0.603 | 0.630 | 0.653 | 0.673 | 0.689 | 0.702 | 0.711 | 0.716 | 0.718 | 0.716 | 0.711 | 0.702 | 0.689 | 0.673 | 0.653 | 0.630 | 0.603 | 0.573 | 0.538 | 0.501 | 0.459 | 0.415 | 0.366 | 0.314 | 0.258 | 0.199 | 0.136 | 0.070 | 0.000 |
| REQUIRED CAMBER | 0" | 15/16" | 1 1/8" | 2 3/4" | 3 5/8" | 4 1/2" | 5 1/16" | 6 1/8" | 6 7/8" | 7 5/8" | 8 5/16" | 8 15/16" | 9 1/2" | 10 1/16" | 10 9/16" | 11 1/16" | 11 1/16" | 11 3/4" | 12" | 12 3/16" | 12 5/16" | 12 5/16" | 12 5/16" | 12 1/4" | 12 1/16" | 11 7/8" | 11 3/16" | 11 1/8" | 10 11/16" | 10 3/16" | 9 9/16" | 8 7/8" | 8 1/8" | 7 3/8" | 6 1/2" | 5 5/16" | 4 9/16" | 3 1/2" | 2 3/8" | 1 1/4" | 0" |

GIRDER 3

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|--------|--------|----------|---------|---------|---------|--------|-------|--------|--------|--------|--------|----------|---------|----------|---------|----------|---------|----------|-----------|---------|-----------|---------|---------|---------|-----------|---------|----------|---------|--------|---------|--------|---------|----------|--------|----------|--------|--------|--------|-------|
| FOURTIETH POINTS | 0 | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | 1.000 |
| DEFLECTION DUE TO WEIGHT OF GIRDER | 0.000 | 0.002 | 0.003 | 0.005 | 0.007 | 0.010 | 0.012 | 0.015 | 0.017 | 0.020 | 0.023 | 0.026 | 0.029 | 0.032 | 0.034 | 0.037 | 0.039 | 0.041 | 0.043 | 0.044 | 0.045 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.045 | 0.044 | 0.042 | 0.040 | 0.037 | 0.035 | 0.032 | 0.029 | 0.025 | 0.021 | 0.017 | 0.013 | 0.009 | 0.005 | 0.000 |
| DEFLECTION DUE TO WEIGHT OF SLAB * | 0.000 | 0.008 | 0.016 | 0.027 | 0.038 | 0.052 | 0.069 | 0.085 | 0.101 | 0.117 | 0.134 | 0.151 | 0.167 | 0.184 | 0.203 | 0.219 | 0.233 | 0.245 | 0.256 | 0.266 | 0.272 | 0.278 | 0.282 | 0.284 | 0.283 | 0.280 | 0.274 | 0.267 | 0.257 | 0.245 | 0.231 | 0.214 | 0.195 | 0.176 | 0.155 | 0.133 | 0.109 | 0.084 | 0.057 | 0.030 | 0.000 |
| DEFLECTION DUE TO WT. OF BARRIER RAIL | 0.000 | 0.001 | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.007 | 0.008 | 0.009 | 0.011 | 0.012 | 0.013 | 0.015 | 0.016 | 0.017 | 0.018 | 0.019 | 0.019 | 0.020 | 0.021 | 0.021 | 0.021 | 0.021 | 0.021 | 0.021 | 0.020 | 0.020 | 0.019 | 0.018 | 0.017 | 0.016 | 0.014 | 0.013 | 0.011 | 0.010 | 0.008 | 0.006 | 0.004 | 0.002 | 0.000 |
| TOTAL DEAD LOAD DEFLECTION | 0.000 | 0.010 | 0.020 | 0.034 | 0.048 | 0.065 | 0.086 | 0.106 | 0.126 | 0.146 | 0.168 | 0.189 | 0.209 | 0.230 | 0.253 | 0.272 | 0.290 | 0.304 | 0.318 | 0.330 | 0.338 | 0.345 | 0.349 | 0.351 | 0.350 | 0.347 | 0.339 | 0.330 | 0.318 | 0.302 | 0.285 | 0.264 | 0.241 | 0.218 | 0.191 | 0.163 | 0.134 | 0.103 | 0.070 | 0.036 | 0.000 |
| VERTICAL CURVE ORDINATE | 0.000 | 0.070 | 0.136 | 0.199 | 0.258 | 0.314 | 0.366 | 0.415 | 0.459 | 0.501 | 0.538 | 0.573 | 0.603 | 0.630 | 0.653 | 0.673 | 0.689 | 0.702 | 0.711 | 0.716 | 0.718 | 0.716 | 0.711 | 0.702 | 0.689 | 0.673 | 0.653 | 0.630 | 0.603 | 0.573 | 0.538 | 0.501 | 0.459 | 0.415 | 0.366 | 0.314 | 0.258 | 0.199 | 0.136 | 0.070 | 0.000 |
| REQUIRED CAMBER | 0" | 15/16" | 1 1/8" | 2 13/16" | 3 1/16" | 4 3/16" | 5 1/16" | 6 1/4" | 7" | 7 3/4" | 8 1/2" | 9 1/8" | 9 3/4" | 10 5/16" | 10 7/8" | 11 5/16" | 11 3/4" | 12 1/16" | 12 3/8" | 12 3/16" | 12 11/16" | 12 3/4" | 12 11/16" | 12 5/8" | 12 1/2" | 12 1/4" | 11 15/16" | 11 1/2" | 11 1/16" | 10 1/2" | 9 7/8" | 9 3/16" | 8 3/8" | 7 9/16" | 6 11/16" | 5 3/4" | 4 11/16" | 3 5/8" | 2 1/2" | 1 1/4" | 0" |

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



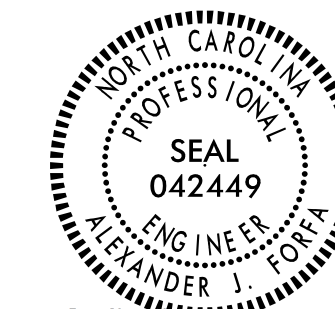
SCHEMATIC CAMBER ORDINATES

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DEAD LOAD DEFLECTION TABLES



Alexander Forfa 11/23/2021

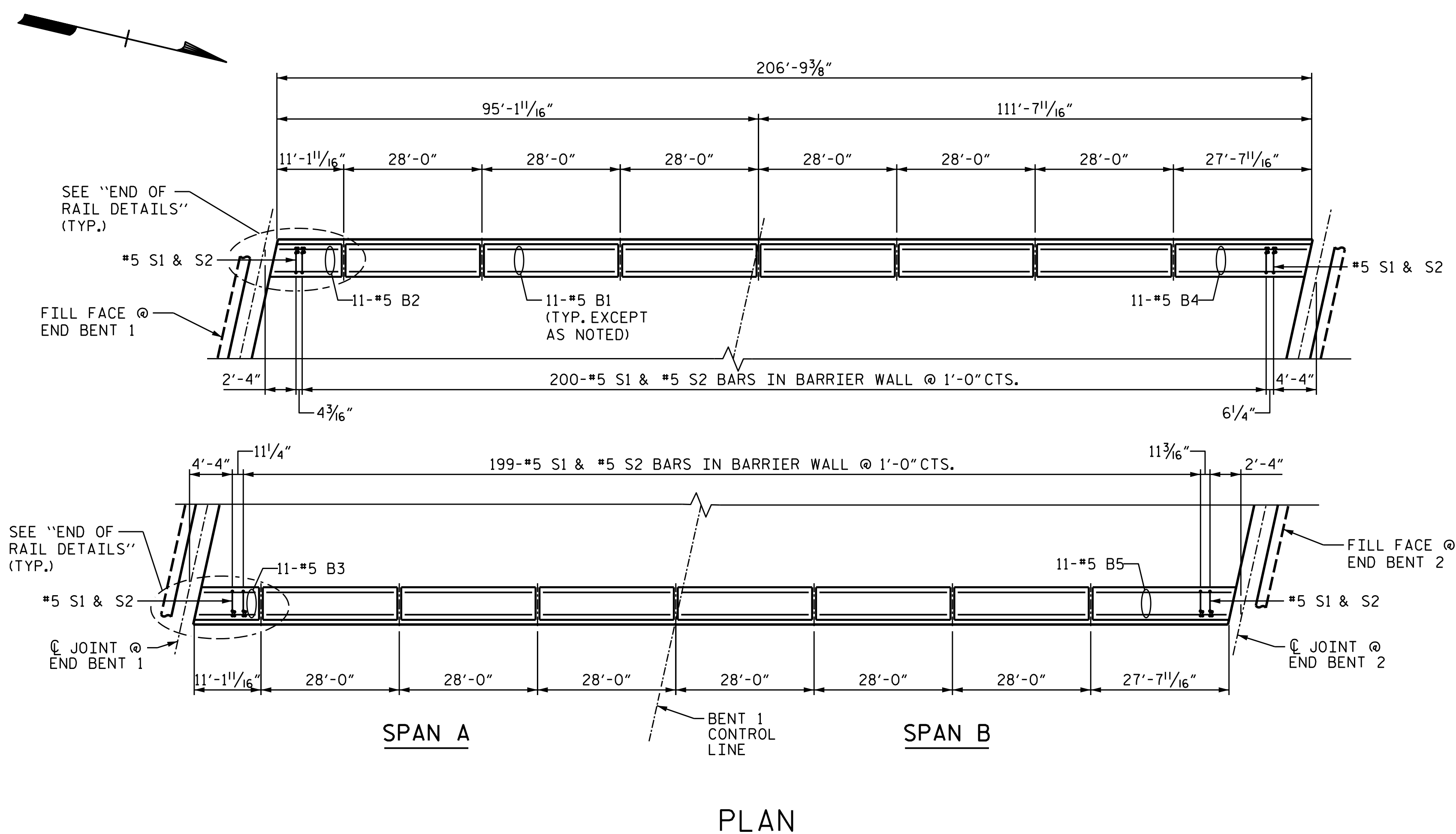
DRAWN BY: M. SPENCER DATE: 06/2021
CHECKED BY: A. FORFA DATE: 06/2021
DESIGN ENGINEER OF RECORD: A. FORFA DATE: 09/2021



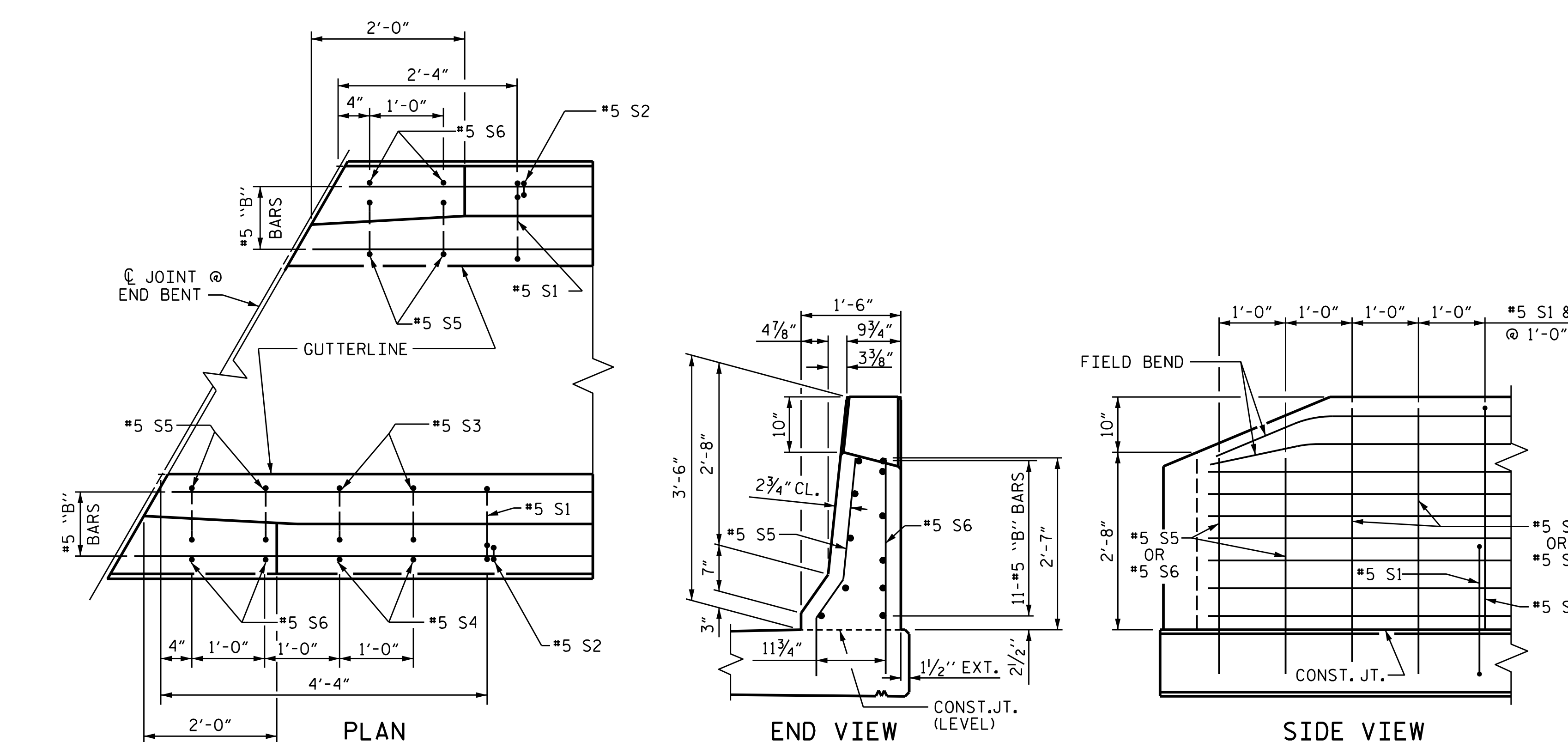
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Cary, NC 27518
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DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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



NOTE: ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF CONCRETE PARAPET



END OF RAIL DETAILS
FOR ADHESIVE ANCHORING AT SAWED JOINTS

| | |
|----------------------------|--------------------|
| ASSEMBLED BY : N. ROHBAUGH | DATE : 05/21 |
| CHECKED BY : A. FORFA | DATE : 07/21 |
| DRAWN BY : ARB 5/87 | REV. 7/12 MAA/GM |
| CHECKED BY : SJD 9/87 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

NOTES

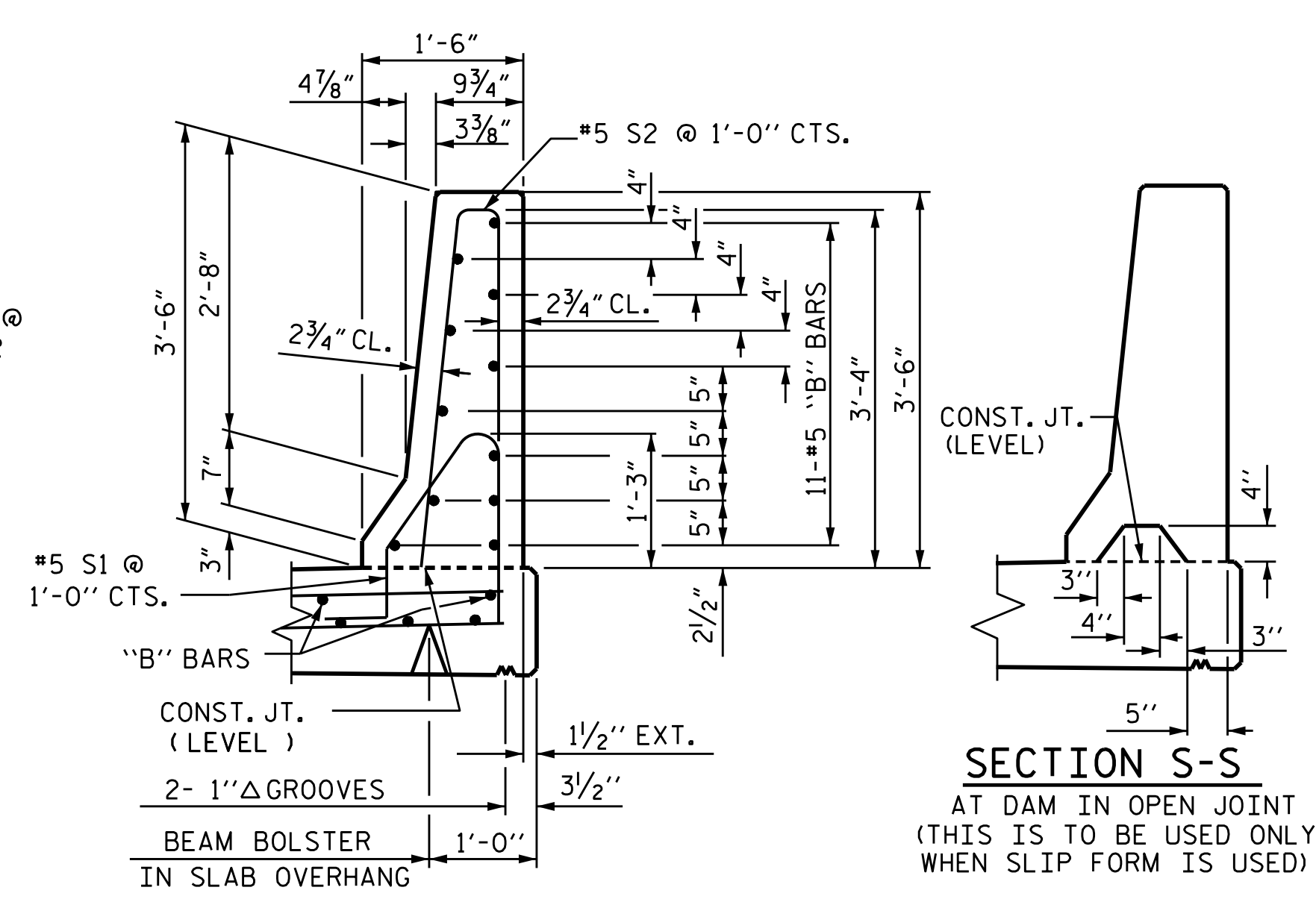
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

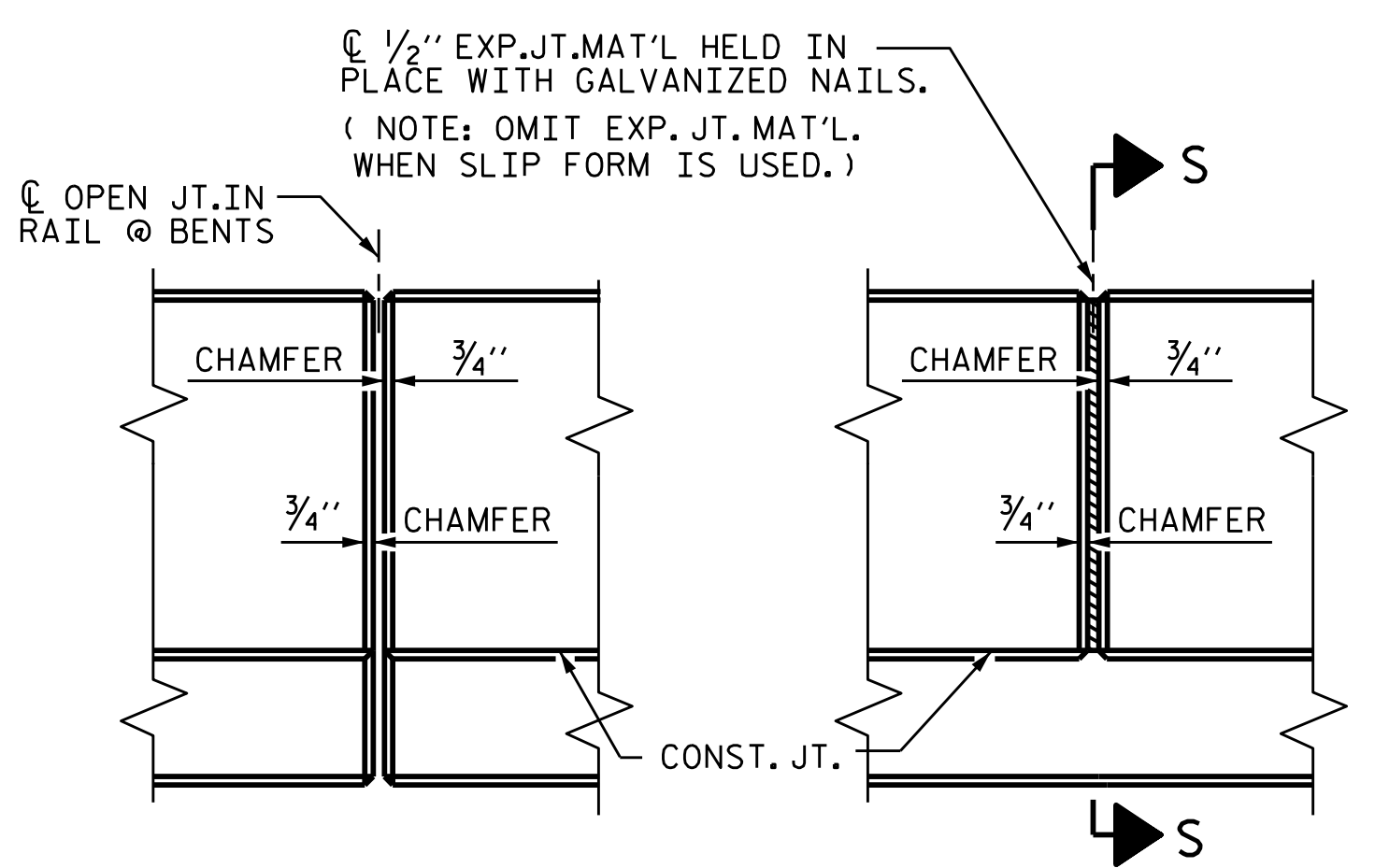
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

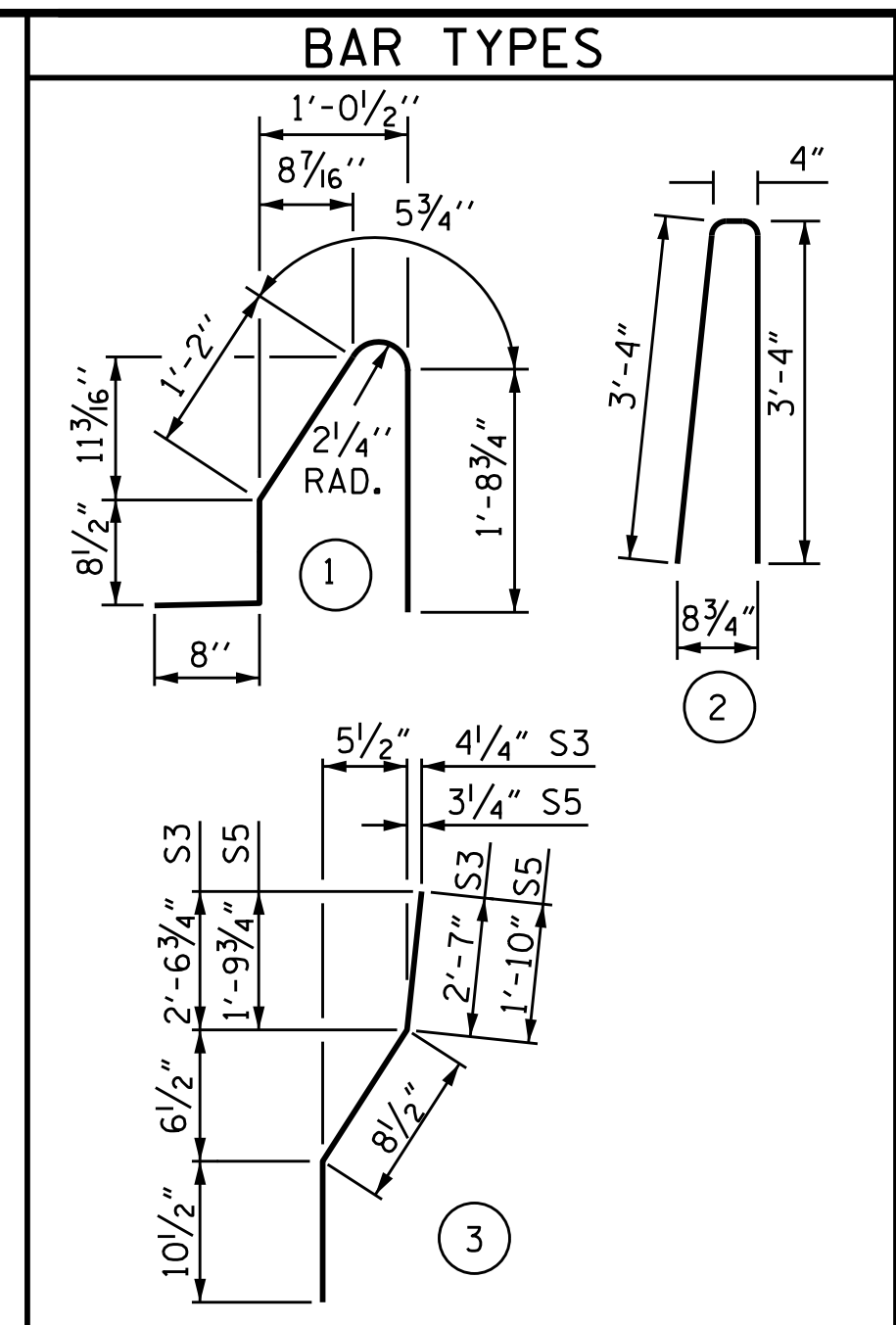
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS 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.



SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS



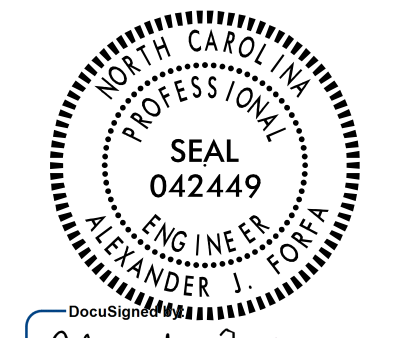
ALL BAR DIMENSIONS ARE OUT TO OUT

| BILL OF MATERIAL | | | | | |
|--------------------------------|------|---------|---------|--------|--|
| FOR CONCRETE BARRIER RAIL ONLY | | | | | |
| BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | |
| * B1 | 132 | #5 STR. | 27'-6" | 3786 | |
| * B2 | 11 | #5 STR. | 10'-10" | 124 | |
| * B3 | 11 | #5 STR. | 10'-6" | 120 | |
| * B4 | 11 | #5 STR. | 27'-0" | 310 | |
| * B5 | 11 | #5 STR. | 27'-4" | 314 | |
| * S1 | 403 | #5 | 1 4'-9" | 1997 | |
| * S2 | 403 | #5 | 2 7'-0" | 2942 | |
| * S3 | 4 | #5 | 3 4'-2" | 17 | |
| * S4 | 4 | #5 STR. | 4'-0" | 17 | |
| * S5 | 8 | #5 | 3 3'-5" | 29 | |
| * S6 | 8 | #5 STR. | 3'-3" | 27 | |

* EPOXY COATED REINFORCING STEEL 9,683 LBS.
CLASS AA CONCRETE 56.3 CU. YDS.
CONCRETE BARRIER RAIL 413.6 LIN. FT.

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

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



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Suite 175
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SIGNATURES COMPLETED

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

SHEET NO.
S-18
TOTAL SHEETS
32

NOTES

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

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 1/8" 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.)

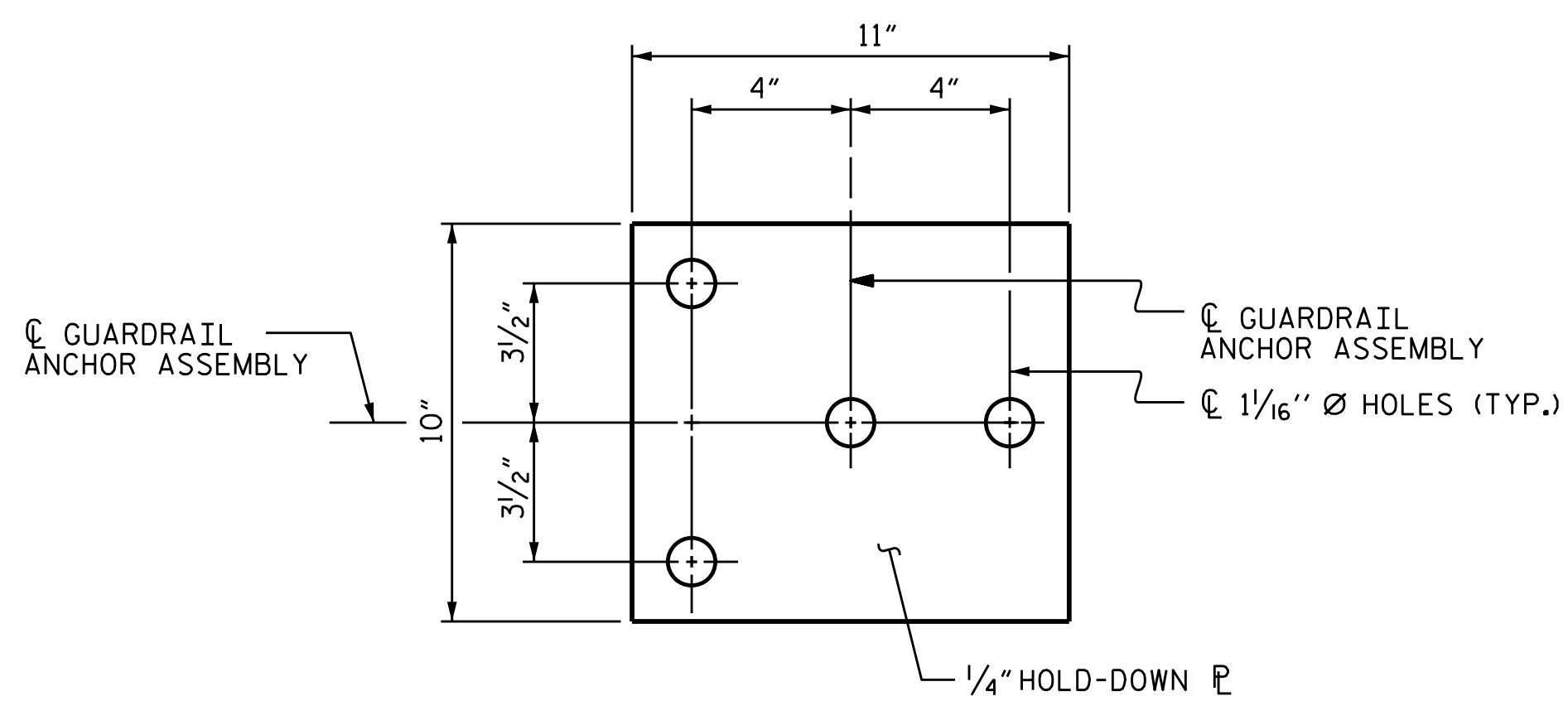
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

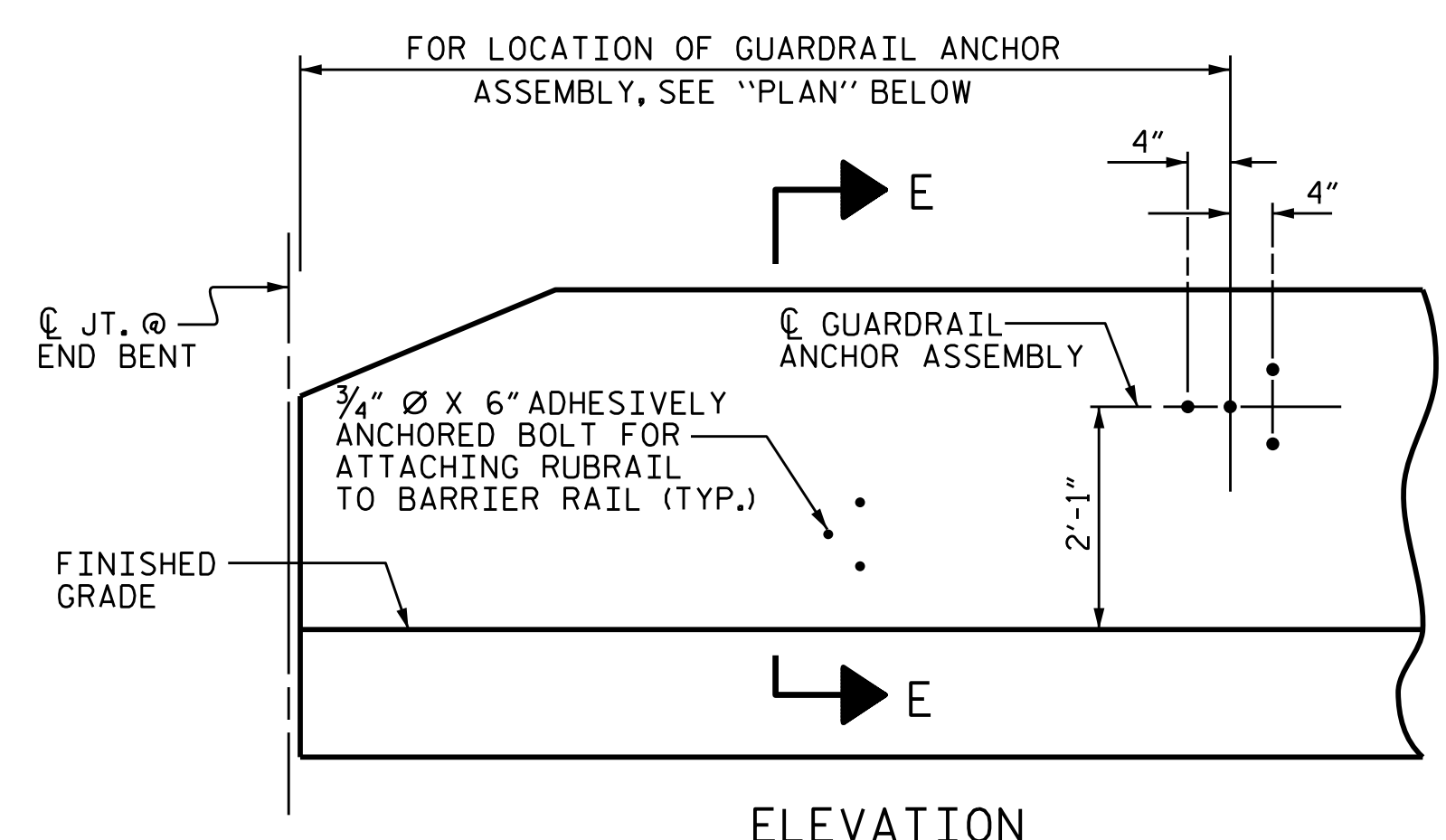
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

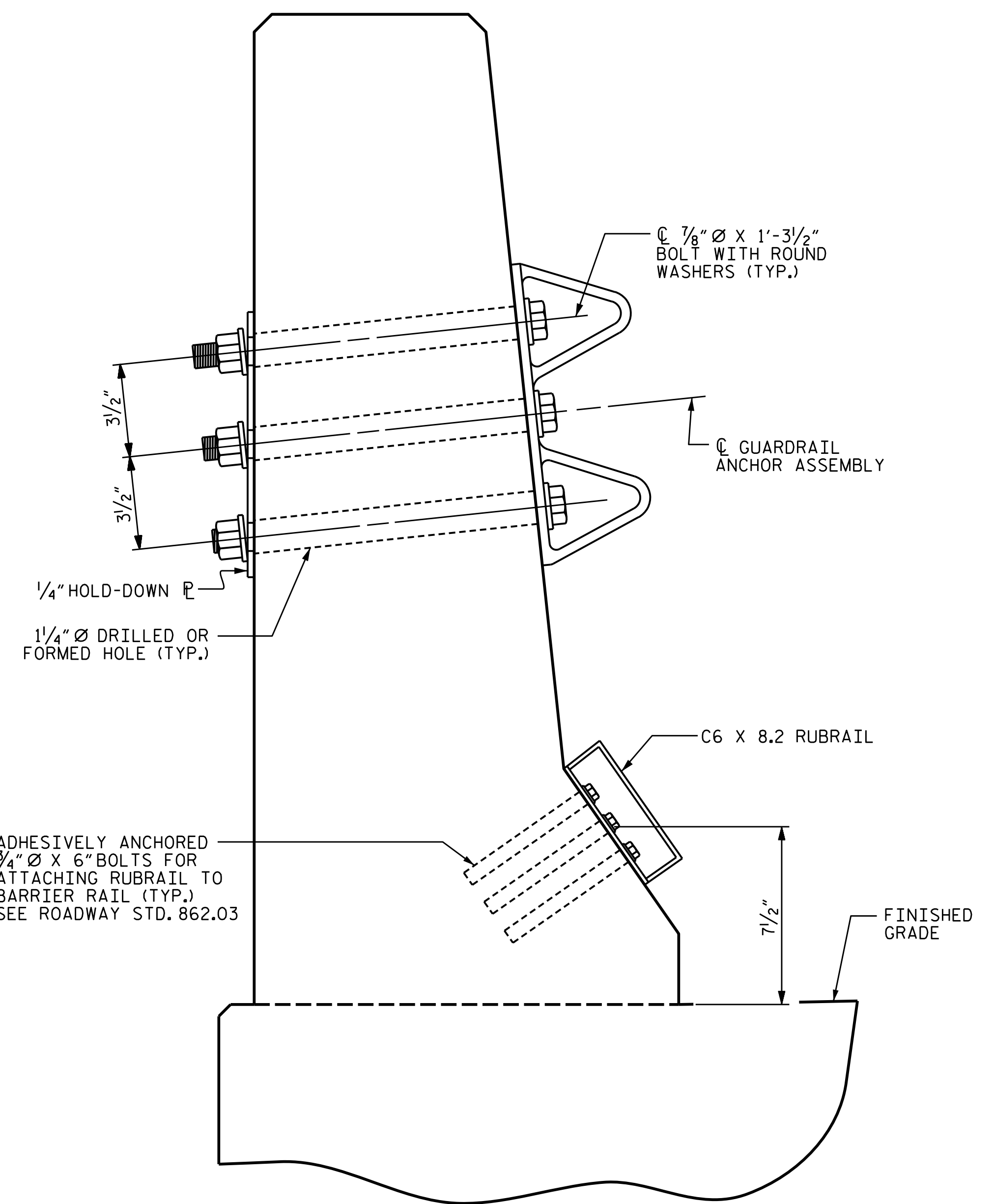
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



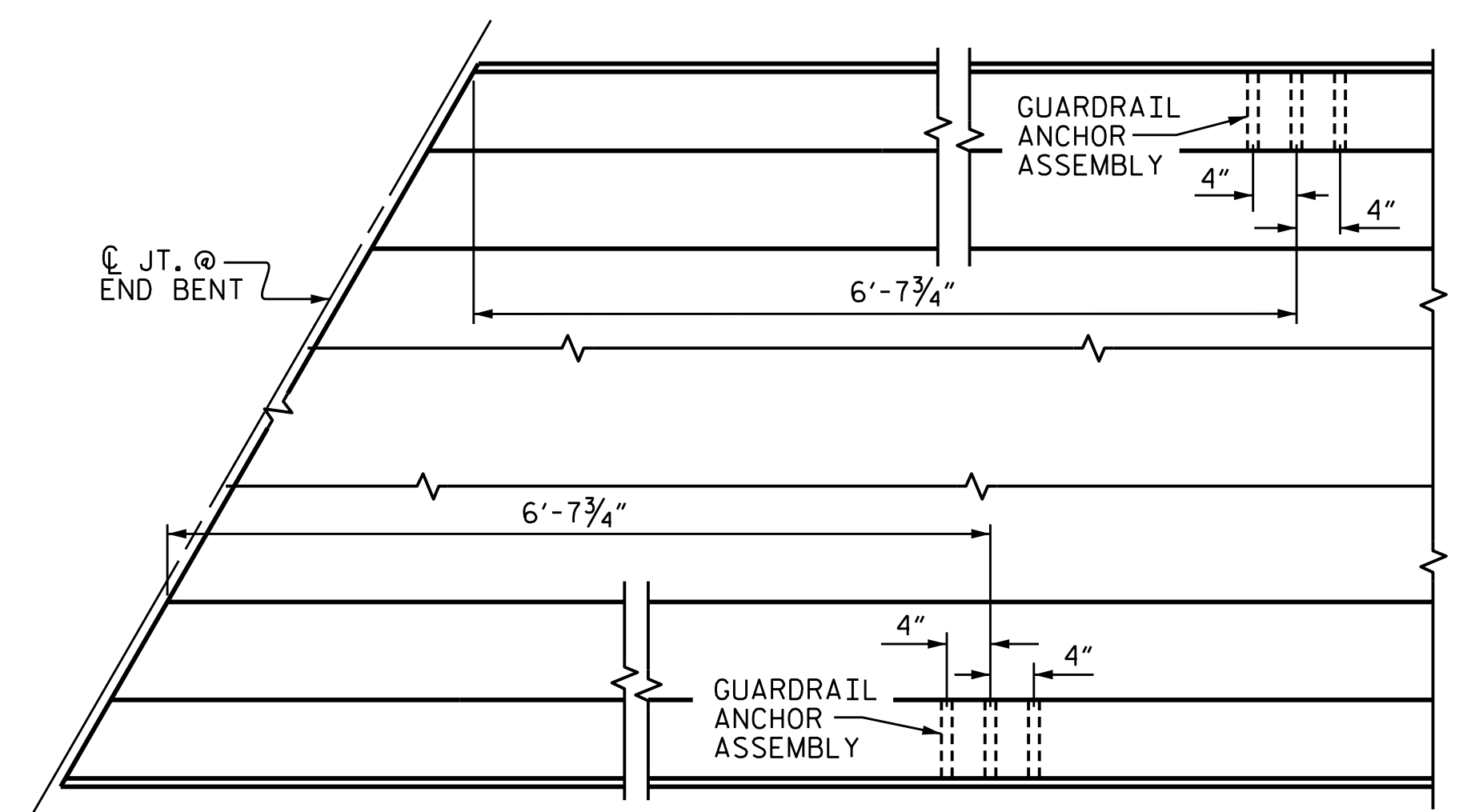
PLAN



ELEVATION



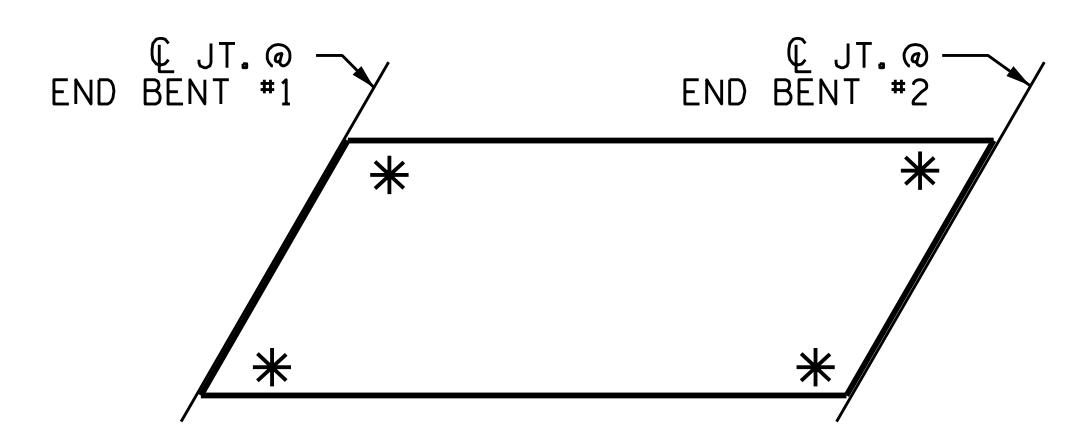
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

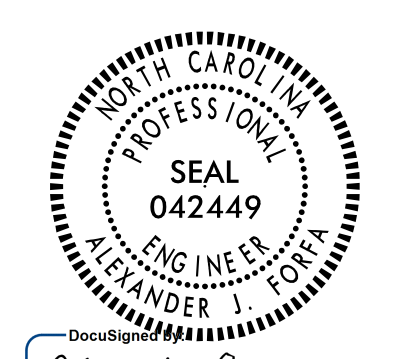
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

| | |
|-----------------------------|--------------------|
| ASSEMBLED BY : N. ROHRBAUGH | DATE : 05/21 |
| CHECKED BY : A. FORFA | DATE : 07/21 |
| DRAWN BY : TLA 5/06 | REV. 7/12 MAA/GM |
| CHECKED BY : GM 5/06 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |



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

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-19 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

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

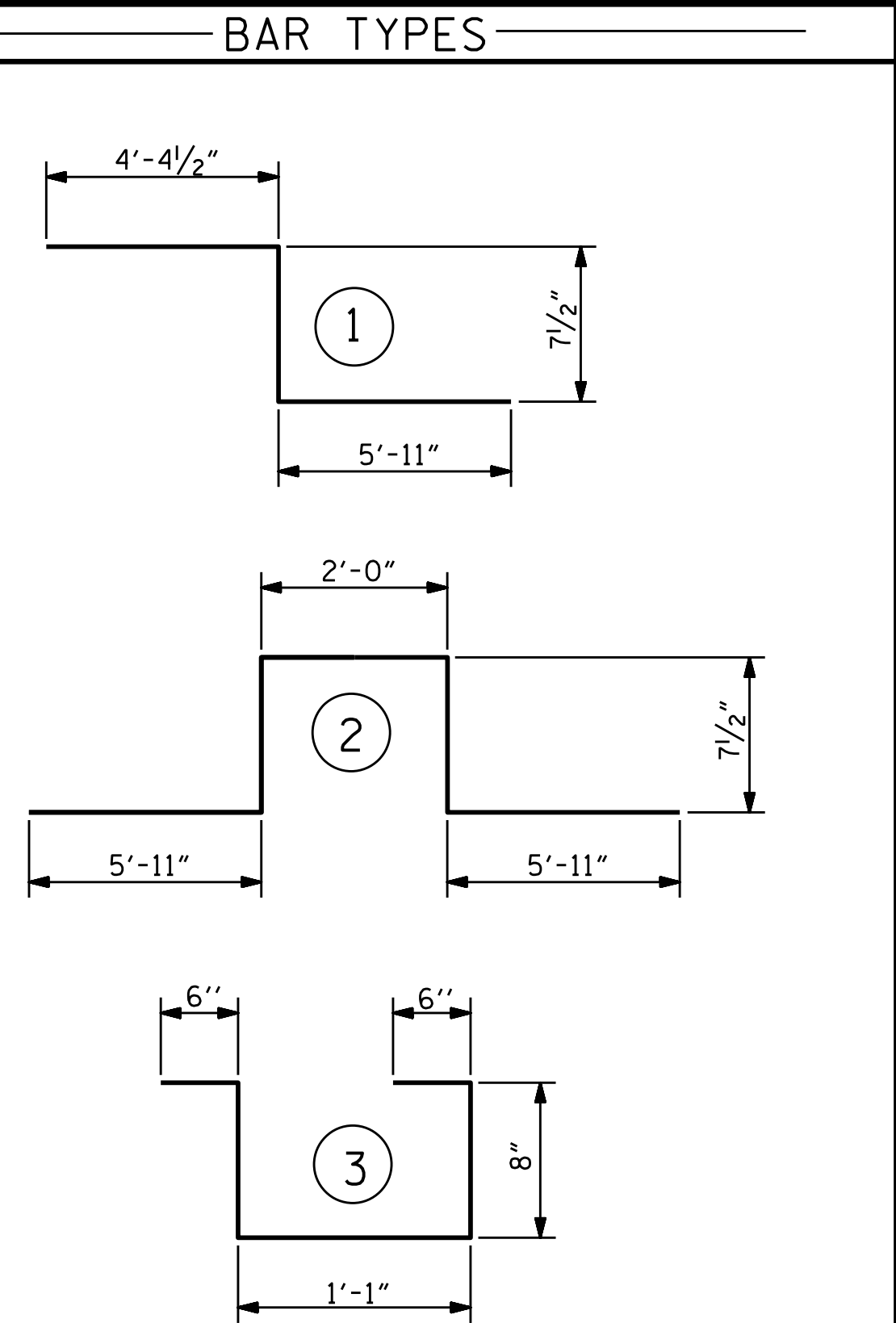
| BAR SIZE | SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS | | APPROACH SLABS | | PARAPETS AND BARRIER RAILS |
|----------|---|----------|----------------|----------|----------------------------|
| | EPOXY COATED | UNCOATED | EPOXY COATED | UNCOATED | |
| #4 | 1'-11" | 1'-7" | 1'-11" | 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" | | | |

BILL OF MATERIAL

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|--------|-----|------|------|---------|--------|
| * A1 | 426 | #5 | STR | 50'-11" | 22623 |
| A2 | 426 | #5 | STR | 50'-11" | 22623 |
| * A101 | 2 | #5 | STR | 1'-10" | 4 |
| * A102 | 2 | #5 | STR | 3'-11" | 8 |
| * A103 | 2 | #5 | STR | 6'-0" | 13 |
| * A104 | 2 | #5 | STR | 8'-1" | 17 |
| * A105 | 2 | #5 | STR | 10'-2" | 21 |
| * A106 | 2 | #5 | STR | 12'-3" | 26 |
| * A107 | 2 | #5 | STR | 14'-4" | 30 |
| * A108 | 2 | #5 | STR | 16'-5" | 34 |
| * A109 | 2 | #5 | STR | 18'-6" | 39 |
| * A110 | 2 | #5 | STR | 20'-7" | 43 |
| * A111 | 2 | #5 | STR | 22'-8" | 47 |
| * A112 | 2 | #5 | STR | 24'-9" | 52 |
| * A113 | 2 | #5 | STR | 26'-10" | 56 |
| * A114 | 2 | #5 | STR | 28'-11" | 60 |
| * A115 | 2 | #5 | STR | 31'-0" | 65 |
| * A116 | 2 | #5 | STR | 33'-1" | 69 |
| * A117 | 2 | #5 | STR | 35'-2" | 73 |
| * A118 | 2 | #5 | STR | 37'-3" | 78 |
| * A119 | 2 | #5 | STR | 39'-4" | 82 |
| * A120 | 2 | #5 | STR | 41'-5" | 86 |
| * A121 | 2 | #5 | STR | 43'-6" | 91 |
| * A122 | 2 | #5 | STR | 45'-7" | 95 |
| * A123 | 2 | #5 | STR | 47'-8" | 99 |
| * A124 | 2 | #5 | STR | 49'-9" | 104 |

| | | | | | |
|------|---|----|-----|---------|-----|
| A201 | 2 | #5 | STR | 1'-10" | 4 |
| A202 | 2 | #5 | STR | 3'-11" | 8 |
| A203 | 2 | #5 | STR | 6'-0" | 13 |
| A204 | 2 | #5 | STR | 8'-1" | 17 |
| A205 | 2 | #5 | STR | 10'-2" | 21 |
| A206 | 2 | #5 | STR | 12'-3" | 26 |
| A207 | 2 | #5 | STR | 14'-4" | 30 |
| A208 | 2 | #5 | STR | 16'-5" | 34 |
| A209 | 2 | #5 | STR | 18'-6" | 39 |
| A210 | 2 | #5 | STR | 20'-7" | 43 |
| A211 | 2 | #5 | STR | 22'-8" | 47 |
| A212 | 2 | #5 | STR | 24'-9" | 52 |
| A213 | 2 | #5 | STR | 26'-10" | 56 |
| A214 | 2 | #5 | STR | 28'-11" | 60 |
| A215 | 2 | #5 | STR | 31'-0" | 65 |
| A216 | 2 | #5 | STR | 33'-1" | 69 |
| A217 | 2 | #5 | STR | 35'-2" | 73 |
| A218 | 2 | #5 | STR | 37'-3" | 78 |
| A219 | 2 | #5 | STR | 39'-4" | 82 |
| A220 | 2 | #5 | STR | 41'-5" | 86 |
| A221 | 2 | #5 | STR | 43'-6" | 91 |
| A222 | 2 | #5 | STR | 45'-7" | 95 |
| A223 | 2 | #5 | STR | 47'-8" | 99 |
| A224 | 2 | #5 | STR | 49'-9" | 104 |

| | | | | | |
|-----------------------------|-----|----|-----|---------|-------------|
| * B1 | 68 | #4 | STR | 31'-5" | 1427 |
| * B2 | 200 | #6 | STR | 33'-7" | 10088 |
| * B3 | 102 | #4 | STR | 29'-10" | 2033 |
| B4 | 256 | #5 | STR | 53'-2" | 14196 |
| * B5 | 12 | #4 | STR | 36'-1" | 289 |
| * G1 | 2 | #5 | STR | 52'-1" | 109 |
| * K1 | 8 | #5 | 1 | 10'-11" | 91 |
| * K2 | 12 | #5 | 2 | 15'-1" | 189 |
| * S1 | 80 | #4 | 3 | 2'-9" | 147 |
| REINFORCING STEEL | | | | | 38,111 LBS. |
| * EPOXY COATED REINF. STEEL | | | | | 38,288 LBS. |



ALL BAR DIMENSIONS ARE OUT TO OUT

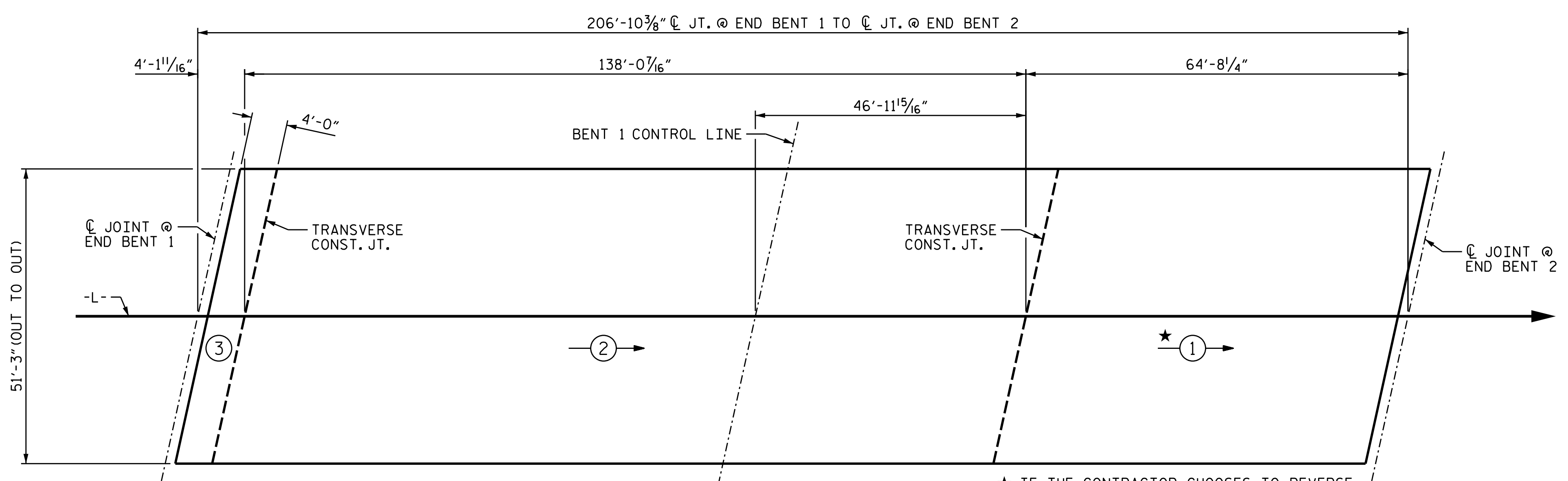
SUPERSTRUCTURE BILL OF MATERIAL

| | CLASS AA CONCRETE (CU.YDS.) | REINFORCING STEEL (LBS.) | EPOXY COATED REINFORCING STEEL (LBS.) |
|-----------------|---------------------------------|------------------------------|---|
| POUR 1 | 103.1 | | |
| POUR 2 | 217.1 | | |
| POUR 3 | 7.5 | | |
| TOTALS** | 327.7 | 38,111 | 38,238 |

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

| | |
|----------------|----------------------|
| APPROACH SLABS | 1,290 SQ.FT. |
| BRIDGE DECK | 9,290 SQ.FT. |
| TOTAL | 10,580 SQ.FT. |



* IF THE CONTRACTOR CHOOSES TO REVERSE THE DIRECTION OF POUR 1, A TRANSVERSE CONSTRUCTION JOINT WILL BE REQUIRED 4'-0" FROM THE JOINT.

DIRECTION AND NUMBER OF POUR

LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,598)

| | | | |
|----------------|------------|--------------|---------|
| ASSEMBLED BY : | M. SPENCER | DATE : | 06/21 |
| CHECKED BY : | A. FORFA | DATE : | 06/21 |
| DRAWN BY : | JMB 5/87 | REV. 10/1/11 | MAA/GM |
| CHECKED BY : | SJD 9/87 | REV. 12/17 | MAA/THC |
| | | REV. 06/19 | BNB/THC |



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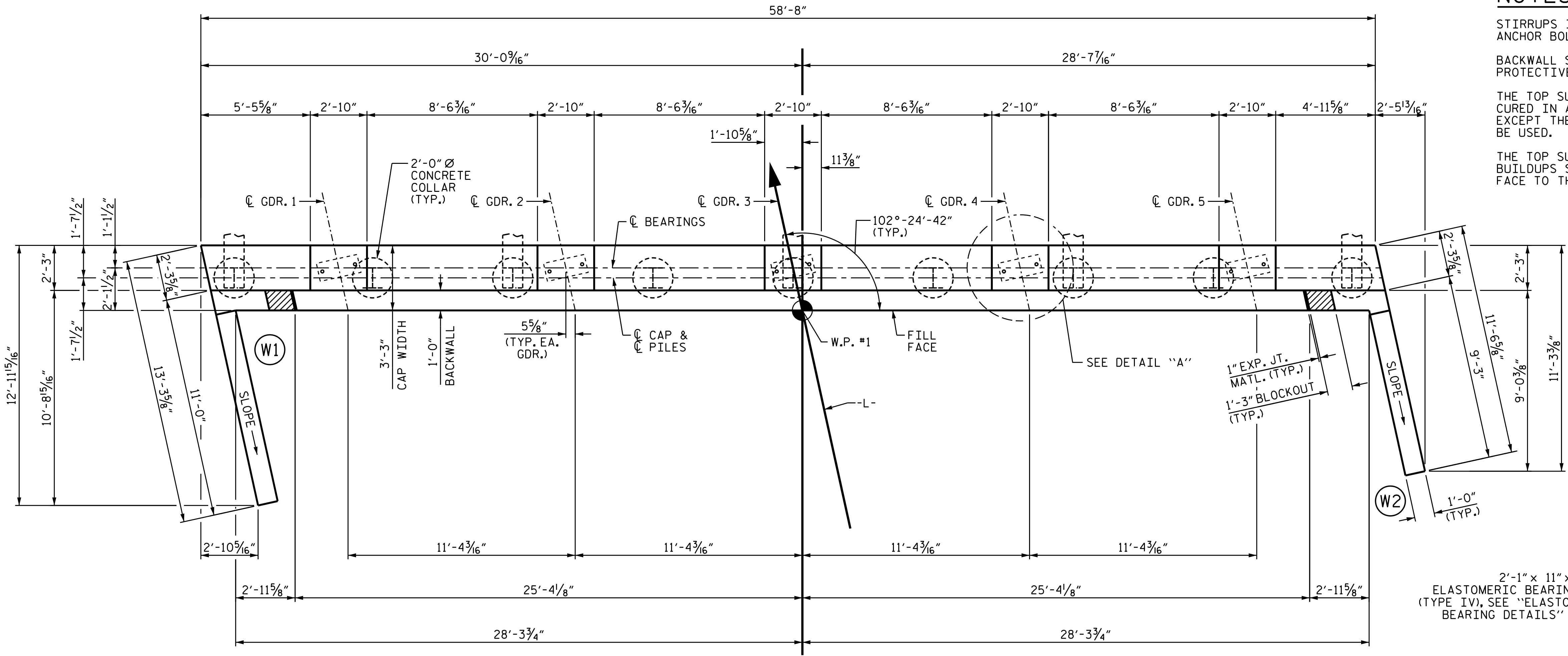


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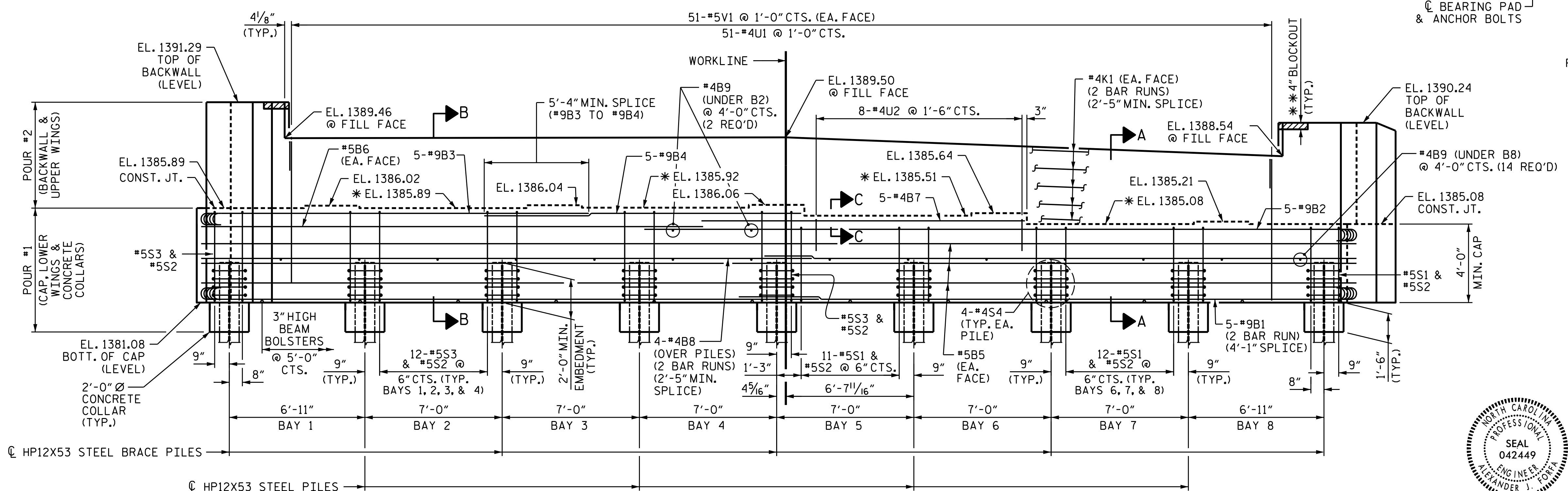
PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

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

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-20 |
| 1 | | | 3 | | | TOTAL SHEETS |
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PLAN



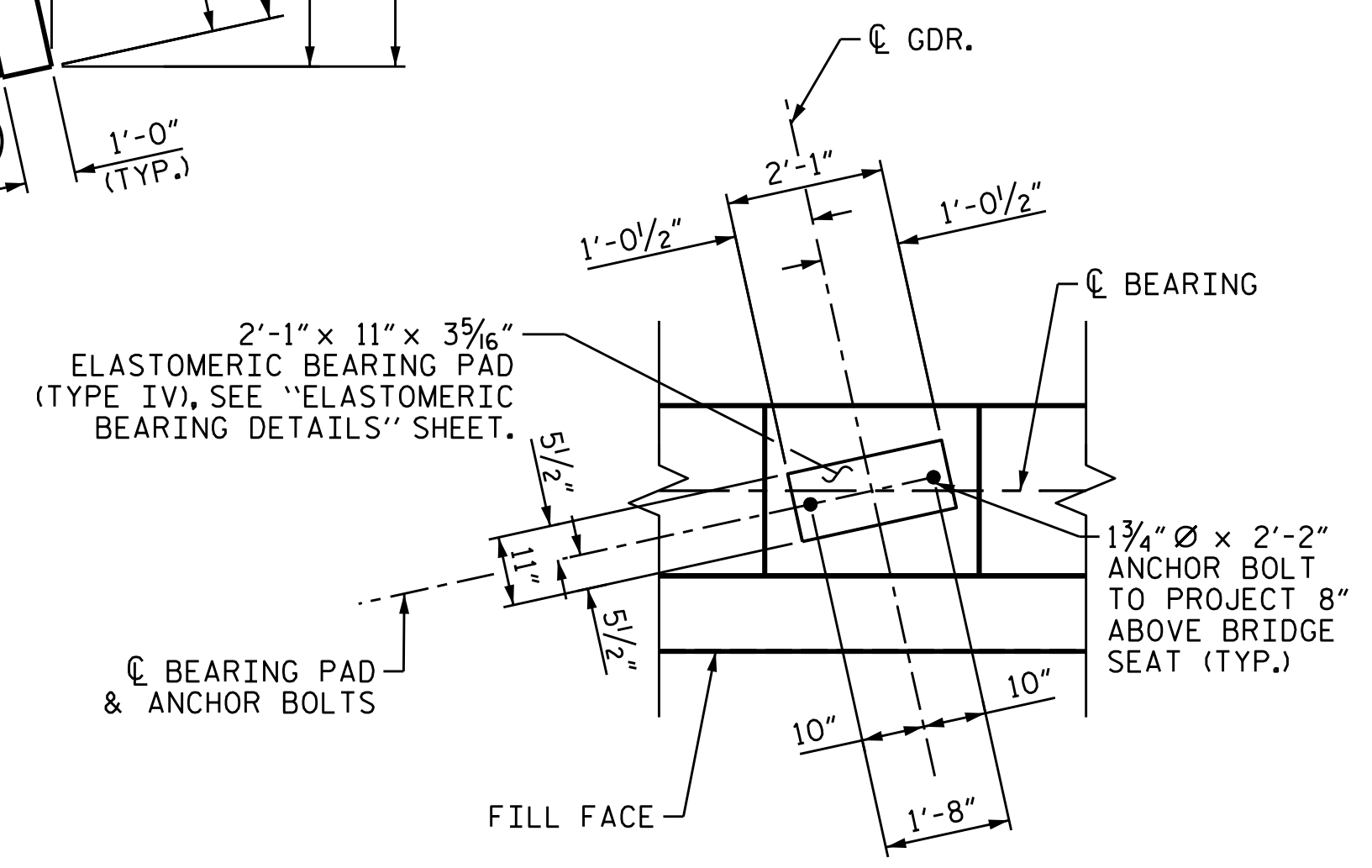
ELEVATION

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT A RATE OF 2%.

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTIONS A-A & B-B ON SHEET 3 OF 3.

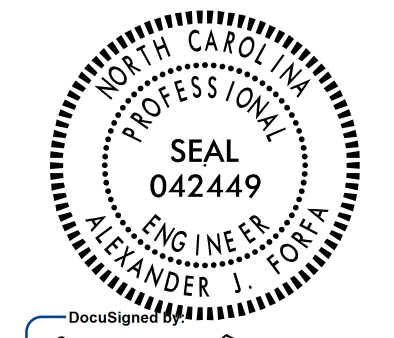
** THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



DETAIL "A"
(TYP. EA. GIRDER)

PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 1 OF 3



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

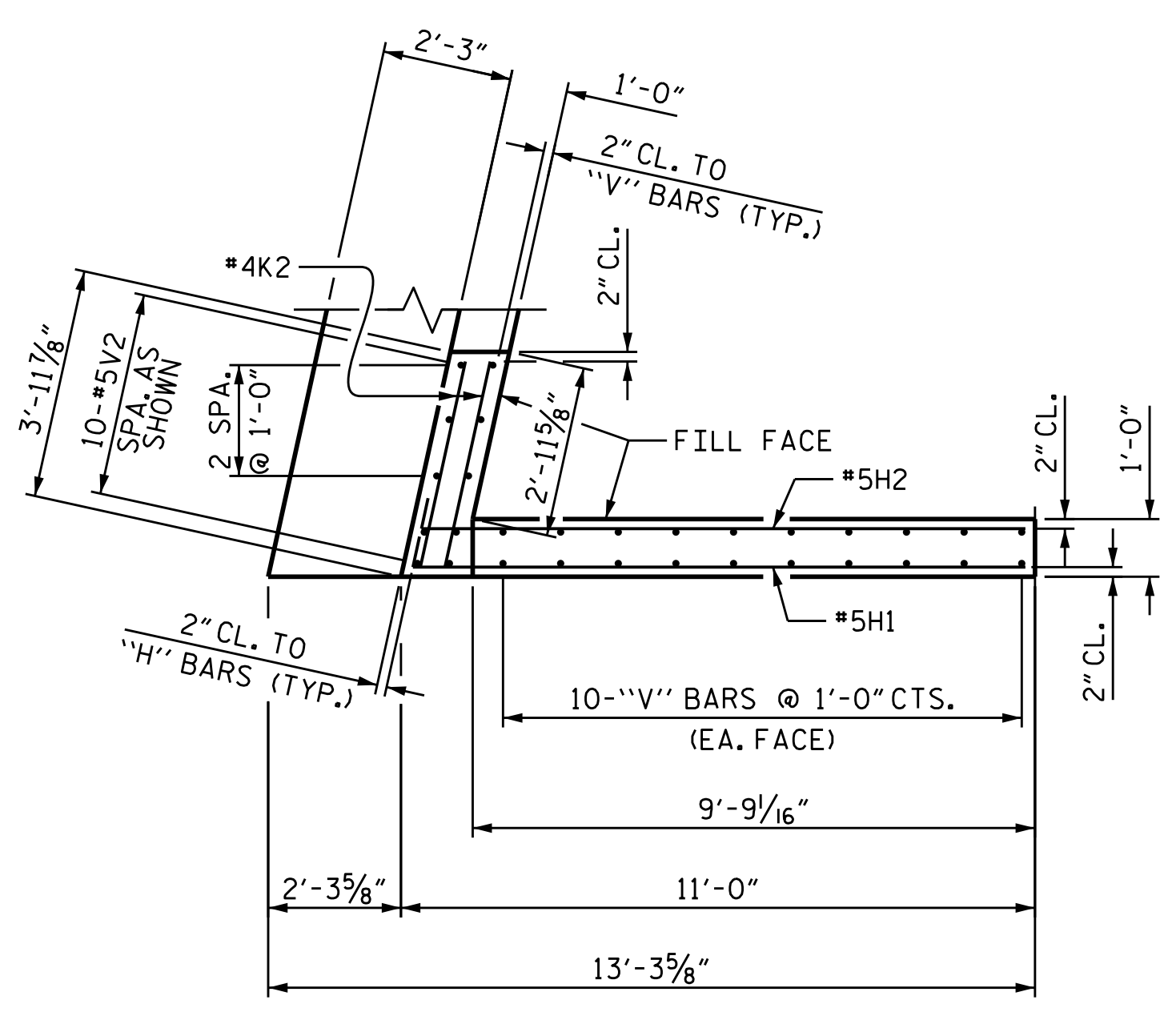
DRAWN BY : N. ROHRBAUGH DATE : 06/2021
CHECKED BY : A. FORFA DATE : 07/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

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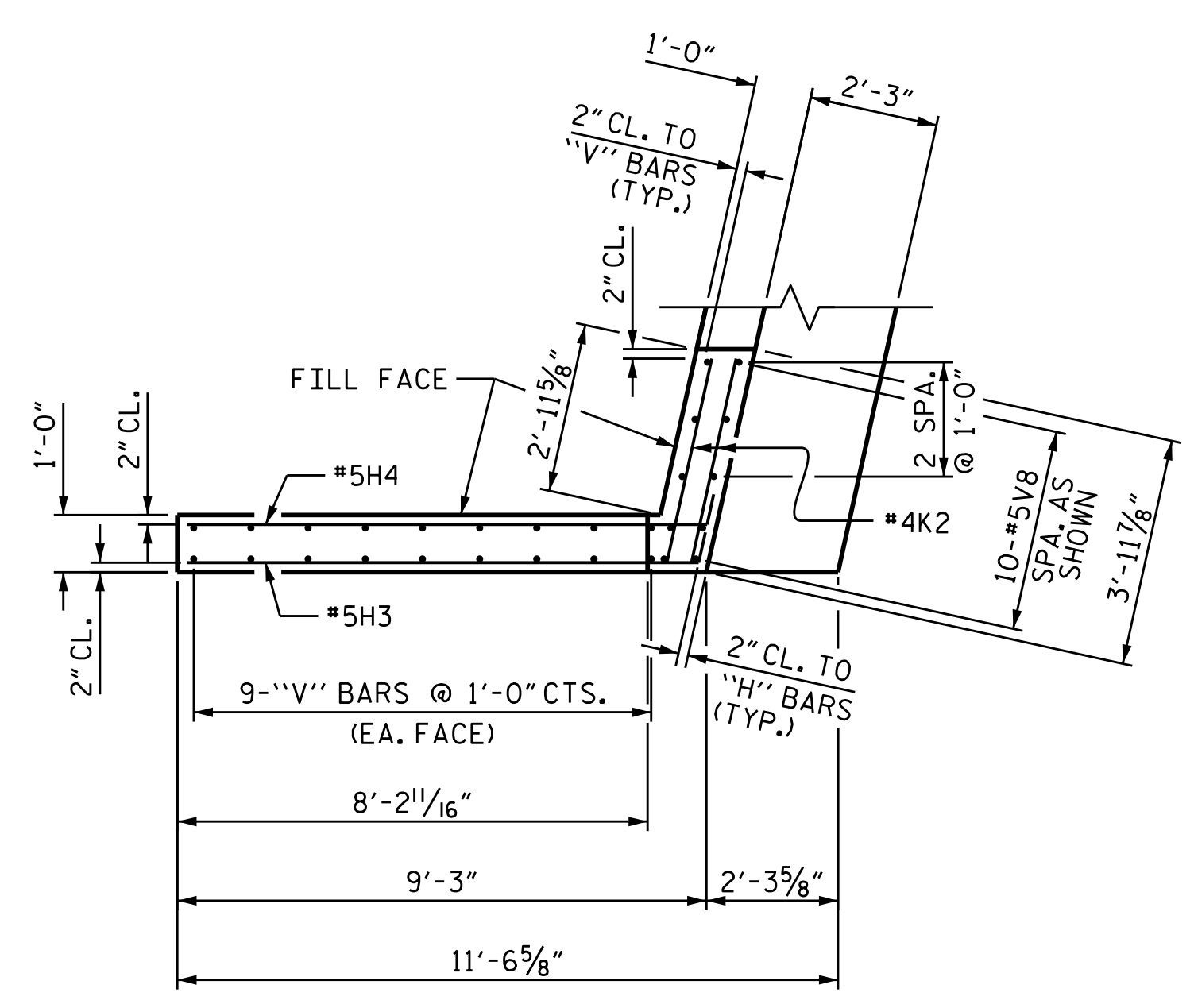


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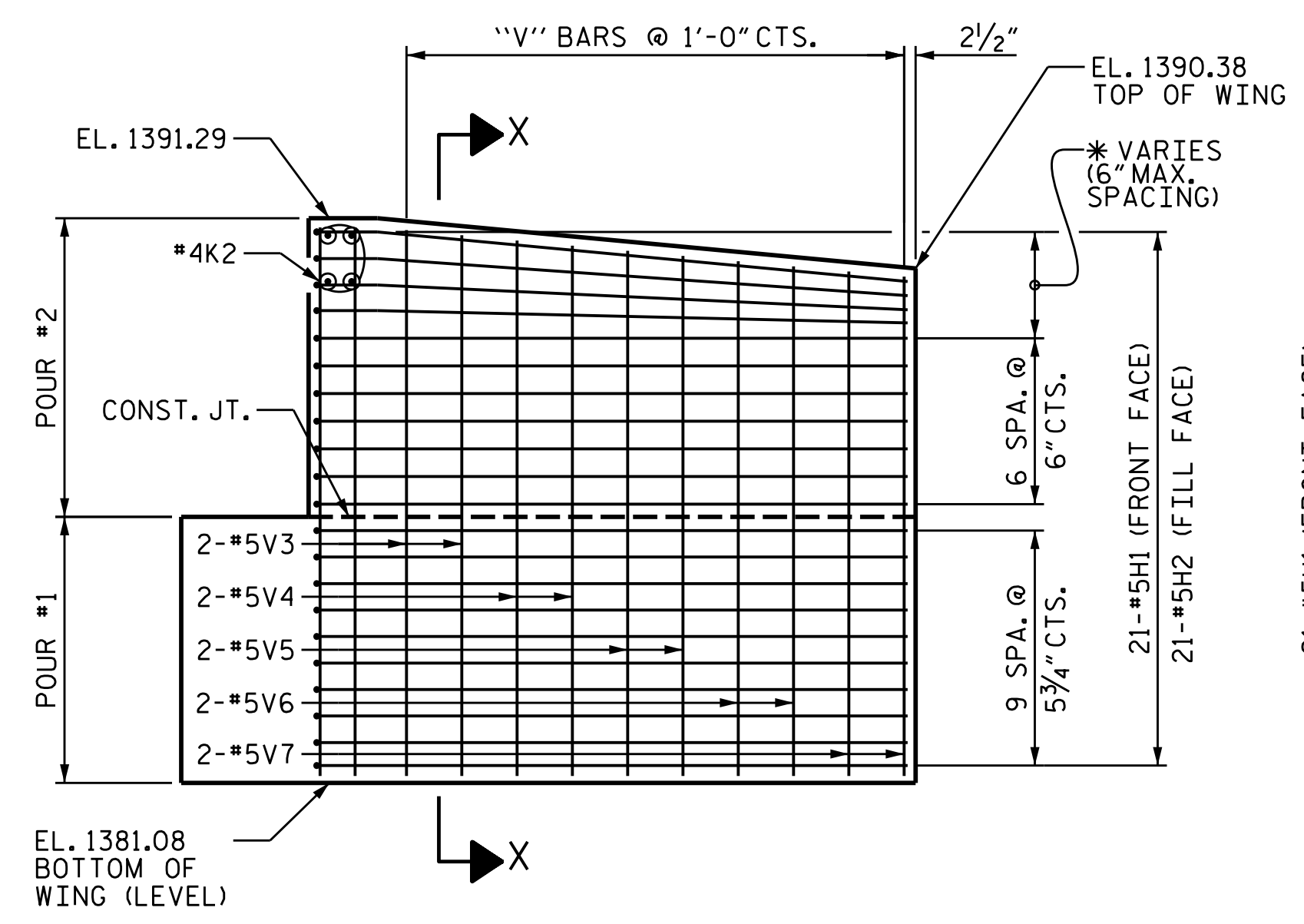
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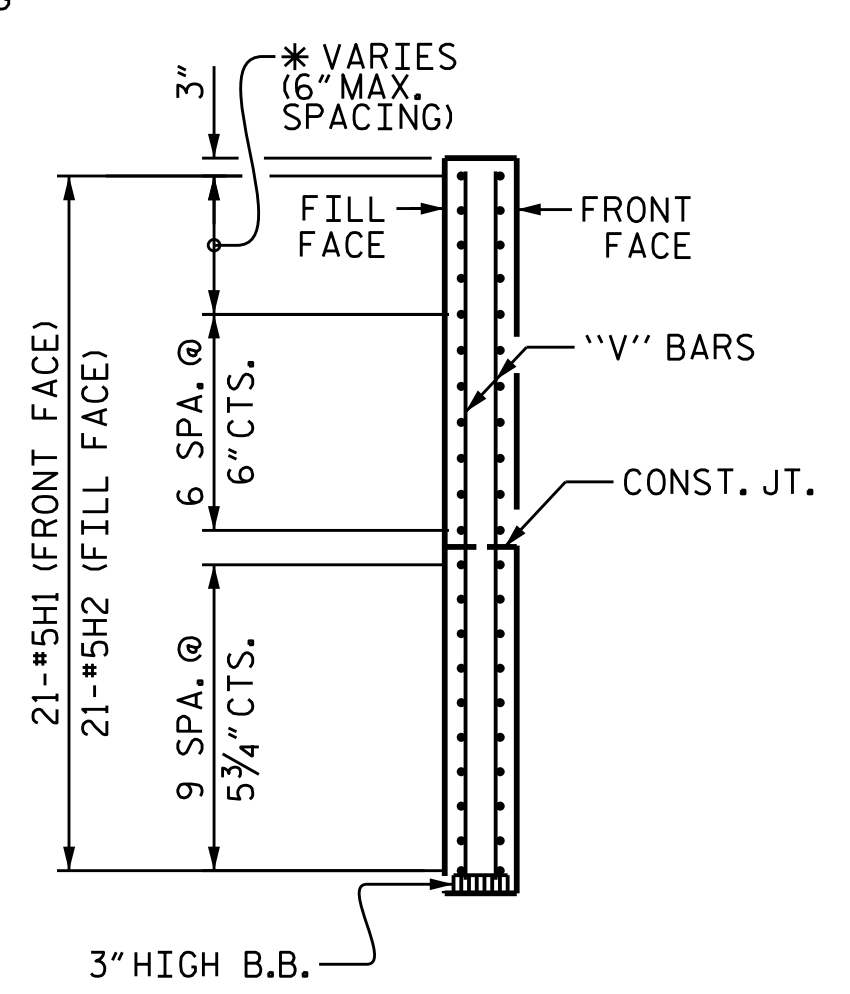
PLAN OF WING W1



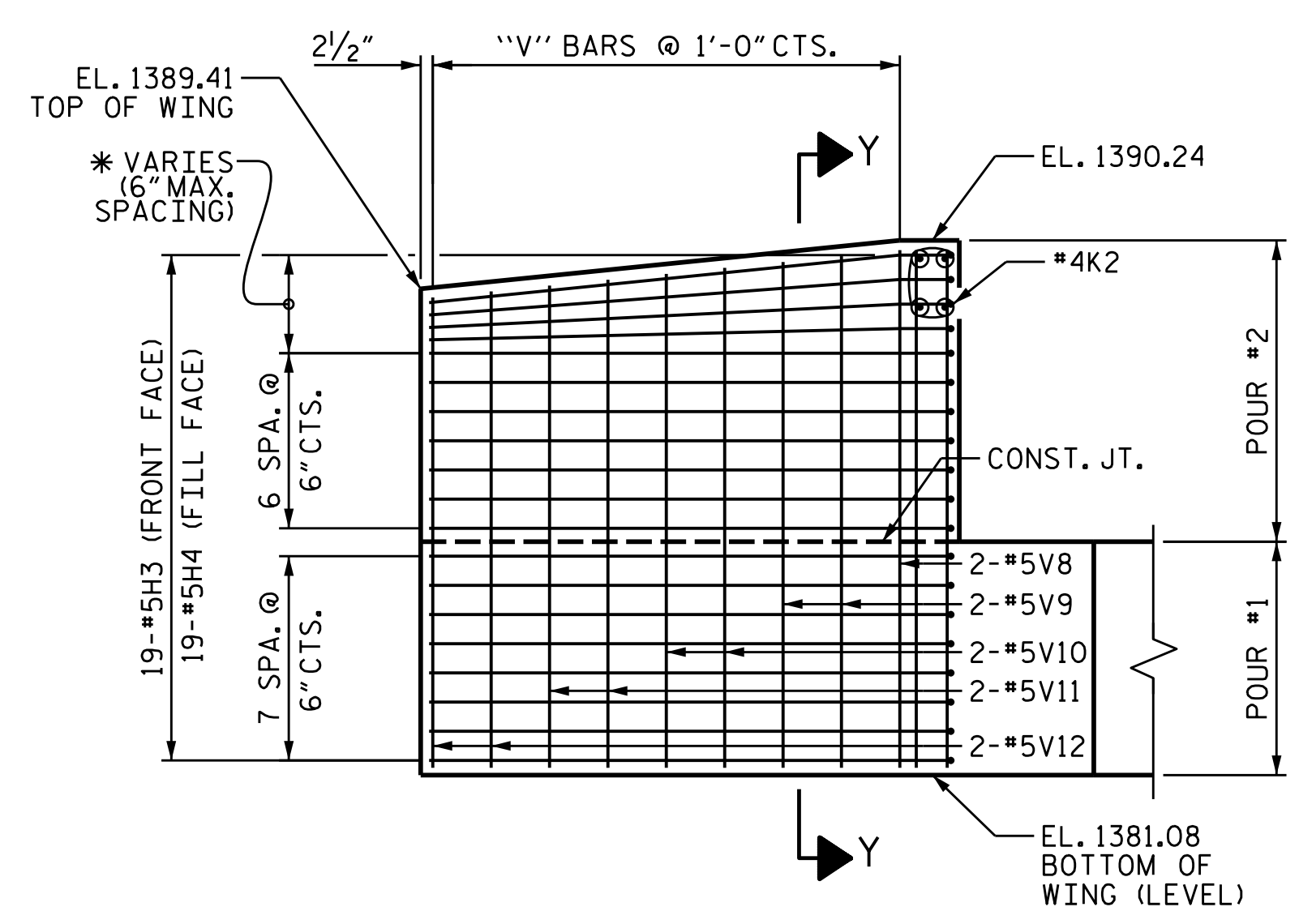
PLAN OF WING W2



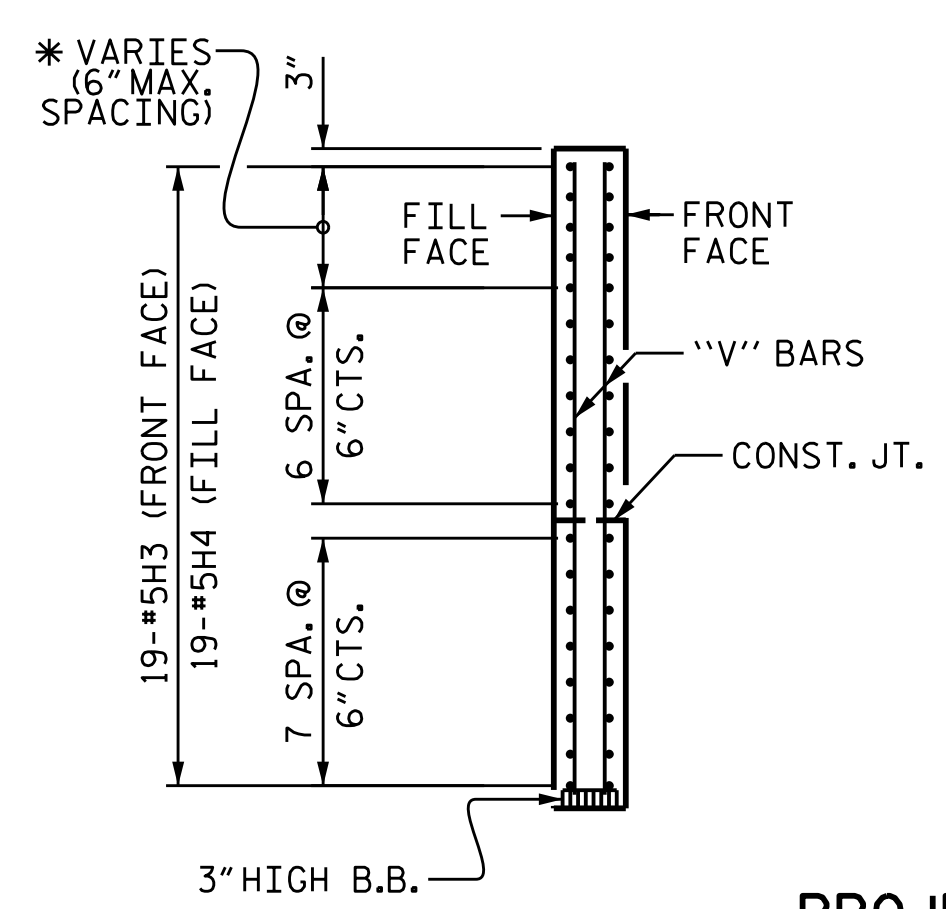
ELEVATION OF WING W1



SECTION X-X



ELEVATION OF WING W2



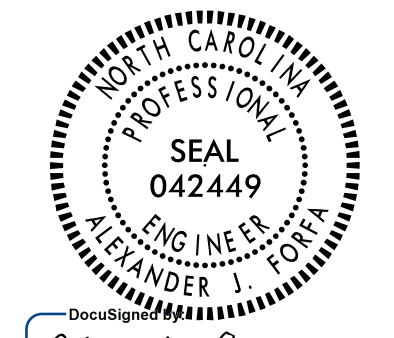
SECTION Y-Y

* "H" BARS CAN BE FIELD BENT AS NECESSARY.

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SHEET 2 OF 3

STATE OF NORTH CAROLINA
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 RALEIGH
 SUBSTRUCTURE
 END BENT 1



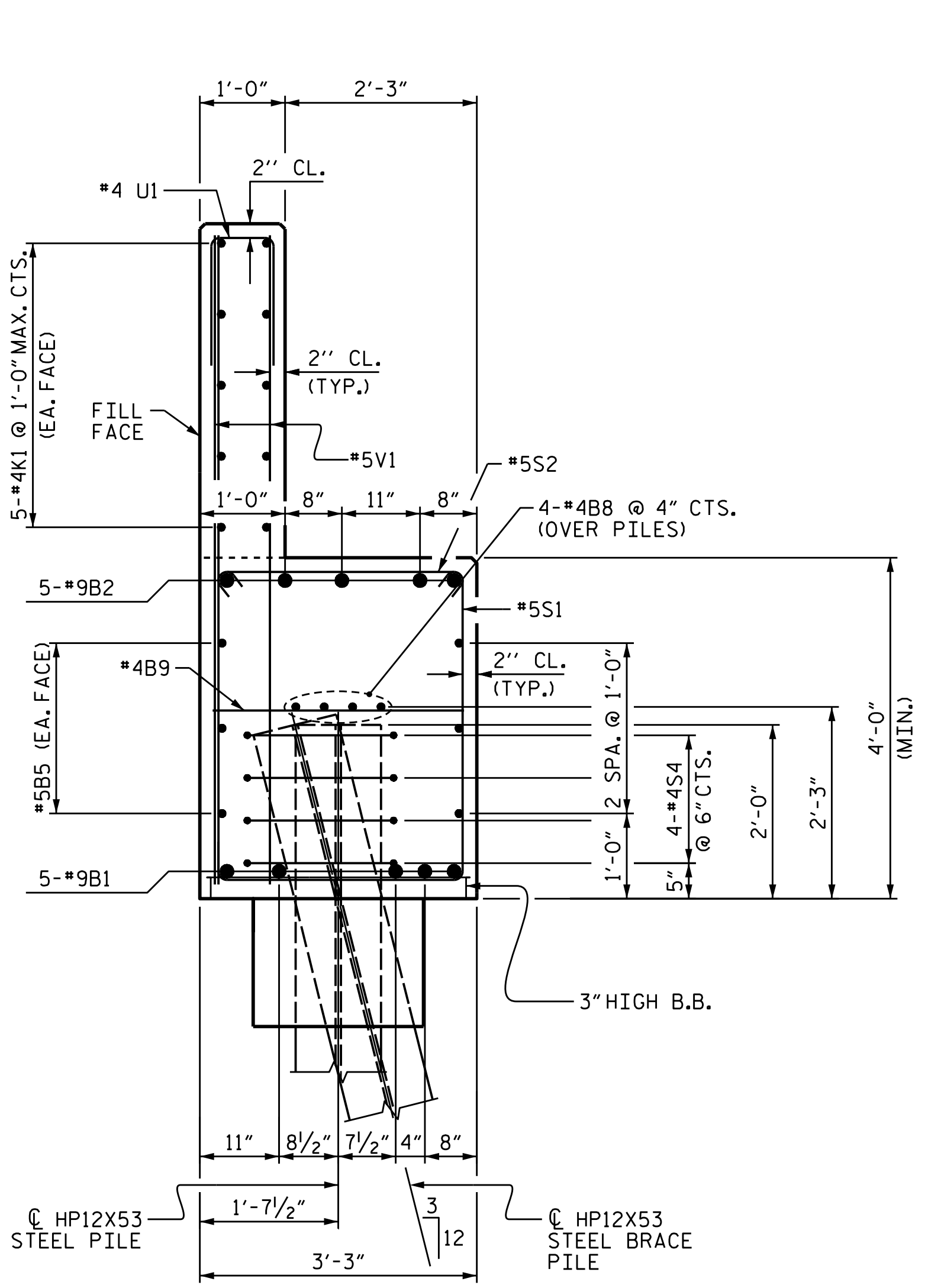
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| DESIGN ENGINEER OF RECORD : | A. FORFA | DATE : | 09/2021 |

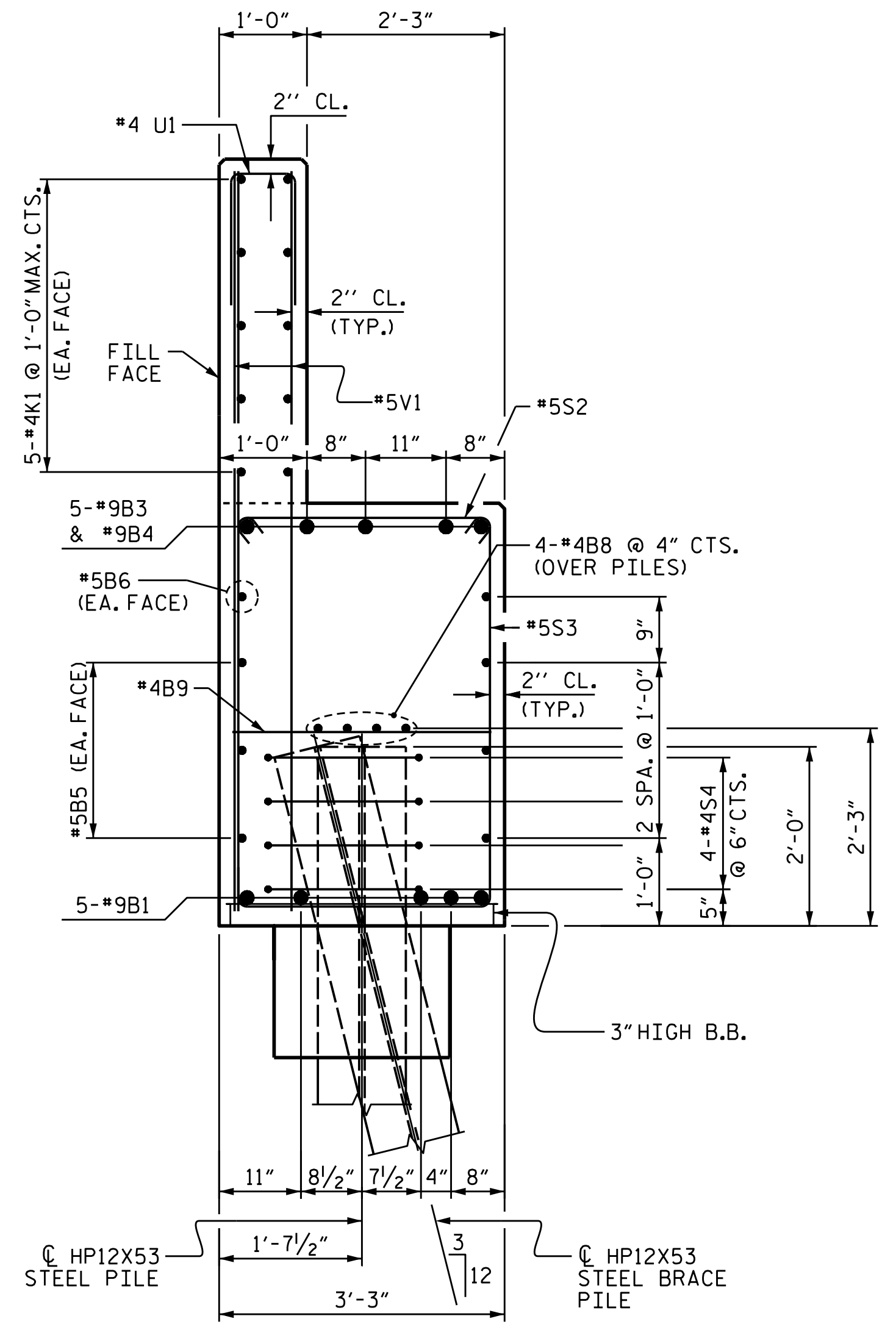


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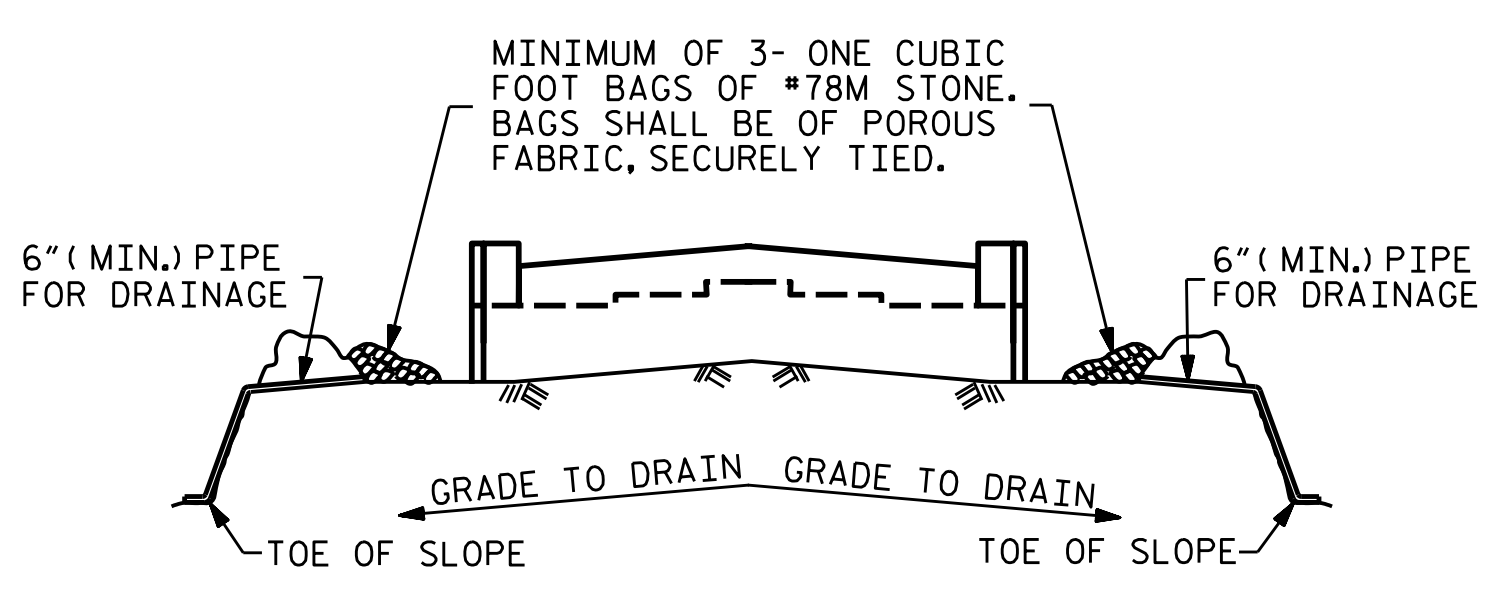
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SECTION A-A



SECTION B-B

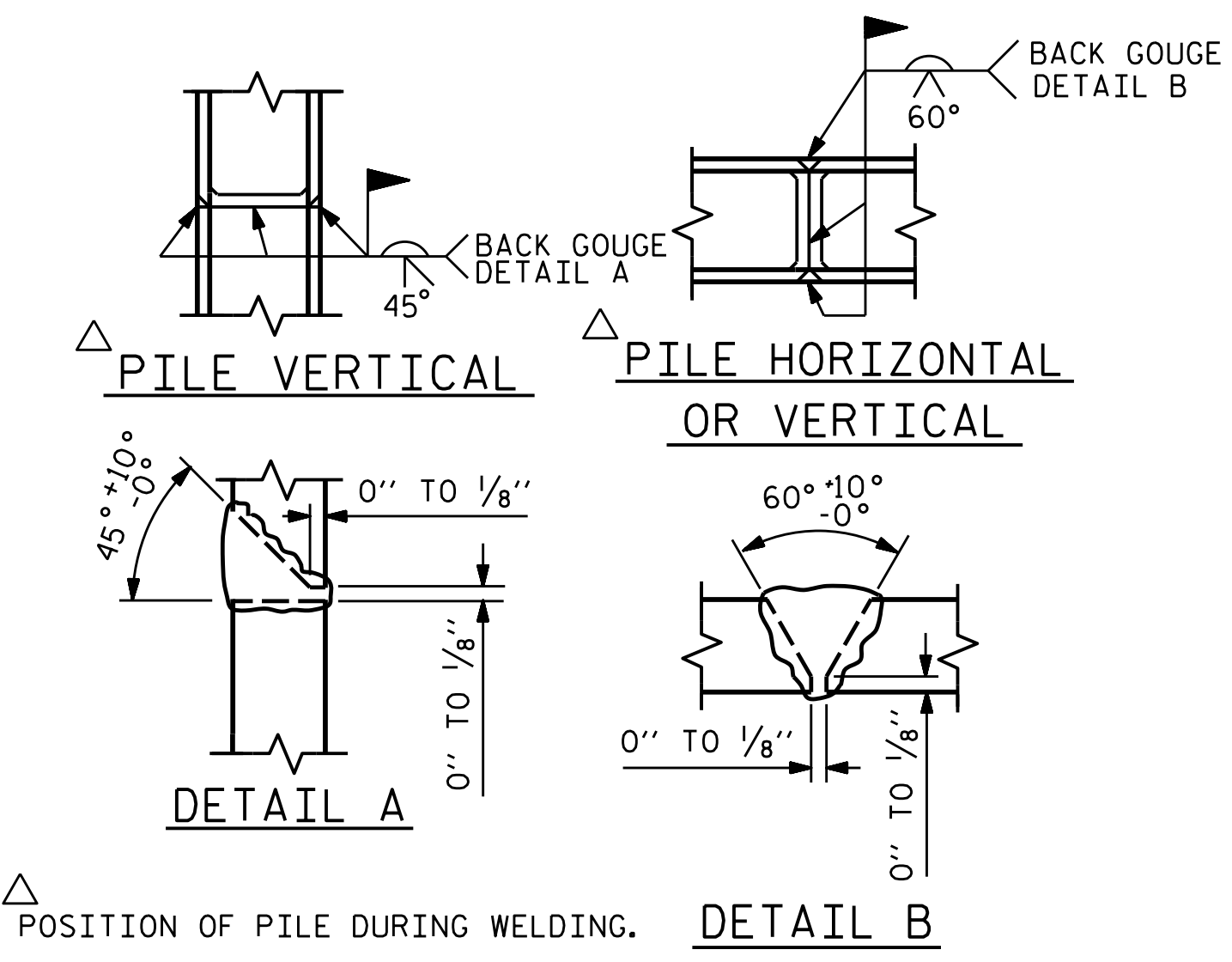


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

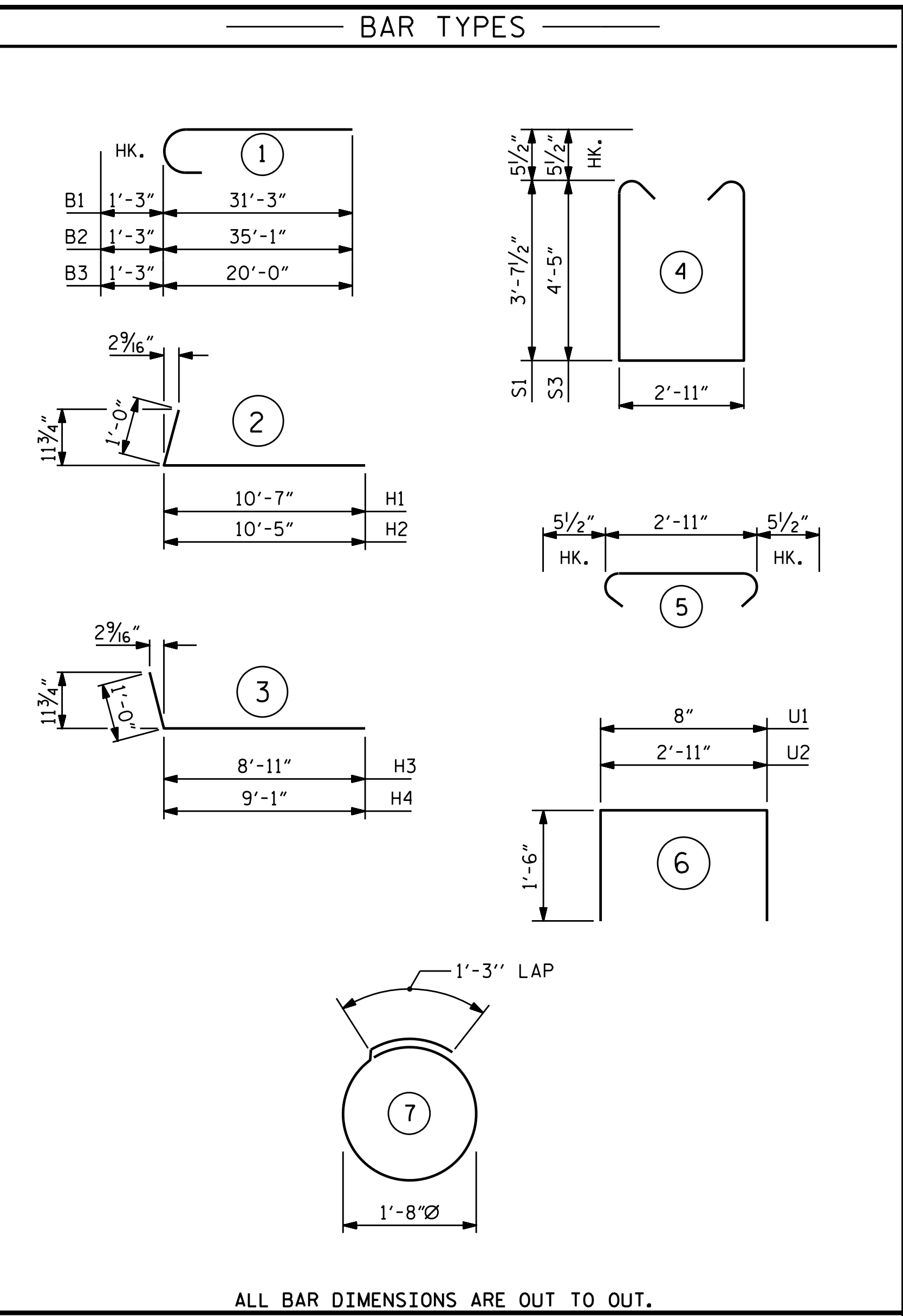
TEMPORARY DRAINAGE AT END BENT



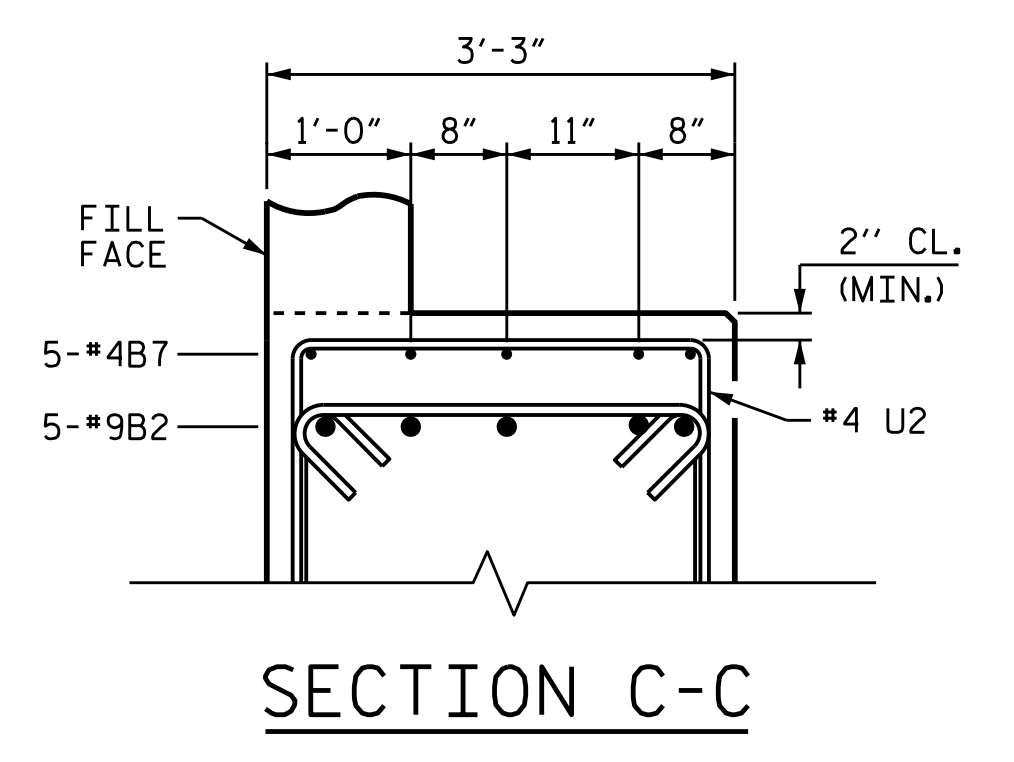
POSITION OF PILE DURING WELDING. DETAIL B

PILE SPLICE DETAILS

| BILL OF MATERIAL | | | | | |
|--|-----|------|------|--------|------------|
| END BENT #1 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 10 | #9 | 1 | 32'-6" | 1105 |
| B2 | 5 | #9 | 1 | 36'-4" | 618 |
| B3 | 5 | #9 | 1 | 21'-3" | 361 |
| B4 | 5 | #9 | STR. | 16'-2" | 275 |
| B5 | 6 | #5 | STR. | 58'-4" | 365 |
| B6 | 2 | #5 | STR. | 26'-3" | 55 |
| B7 | 5 | #4 | STR. | 11'-2" | 37 |
| B8 | 8 | #4 | STR. | 30'-5" | 163 |
| B9 | 16 | #4 | STR. | 2'-11" | 31 |
| | | | | | |
| H1 | 21 | #5 | 2 | 11'-7" | 254 |
| H2 | 21 | #5 | 2 | 11'-5" | 250 |
| H3 | 19 | #5 | 3 | 9'-11" | 197 |
| H4 | 19 | #5 | 3 | 10'-1" | 200 |
| | | | | | |
| K1 | 20 | #4 | STR. | 30'-5" | 406 |
| K2 | 8 | #4 | STR. | 3'-7" | 19 |
| | | | | | |
| S1 | 48 | #5 | 4 | 11'-1" | 555 |
| S2 | 98 | #5 | 5 | 3'-10" | 392 |
| S3 | 50 | #5 | 4 | 12'-8" | 661 |
| S4 | 36 | #4 | 7 | 6'-6" | 156 |
| | | | | | |
| U1 | 51 | #4 | 6 | 3'-8" | 125 |
| U2 | 8 | #4 | 6 | 5'-11" | 32 |
| | | | | | |
| V1 | 102 | #5 | STR. | 7'-2" | 762 |
| V2 | 10 | #5 | STR. | 9'-10" | 103 |
| V3 | 4 | #5 | STR. | 9'-8" | 40 |
| V4 | 4 | #5 | STR. | 9'-6" | 40 |
| V5 | 4 | #5 | STR. | 9'-4" | 39 |
| V6 | 4 | #5 | STR. | 9'-2" | 38 |
| V7 | 4 | #5 | STR. | 9'-0" | 38 |
| V8 | 12 | #5 | STR. | 8'-10" | 111 |
| V9 | 4 | #5 | STR. | 8'-7" | 36 |
| V10 | 4 | #5 | STR. | 8'-5" | 35 |
| V11 | 4 | #5 | STR. | 8'-2" | 34 |
| V12 | 4 | #5 | STR. | 8'-0" | 33 |
| | | | | | |
| REINFORCING STEEL | | | | | 7,566 LBS. |
| | | | | | |
| CLASS "A" CONCRETE | | | | | |
| POUR #1 (CAP, LOWER PART OF WINGS & COLLARS) | | | | | 36.6 C.Y. |
| POUR #2 (BACKWALL & UPPER PART OF WINGS) | | | | | 11.9 C.Y. |
| TOTAL CLASS "A" CONCRETE | | | | | 48.5 C.Y. |
| | | | | | |
| PILE DRIVING EQUIPMENT SETUP FOR 12X53 STEEL PILES | | | | | EA. 9 |
| | | | | | |
| HP12X53 STEEL PILES | | | | | 9 |
| NO. | | | | | 9 |
| LIN. FT. | | | | | 383 |



ALL BAR DIMENSIONS ARE OUT TO OUT.

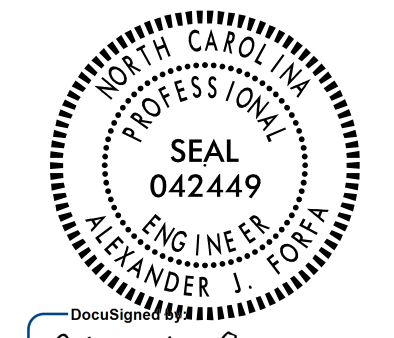


SECTION C-C

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 3 OF 3

| | | | | | |
|--|-----|-------|-----|-----|-----------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| SUBSTRUCTURE END BENT 1 | | | | | |
| REVISIONS | | | | | |
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| SHEET NO. S-23 | | | | | TOTAL SHEETS 32 |



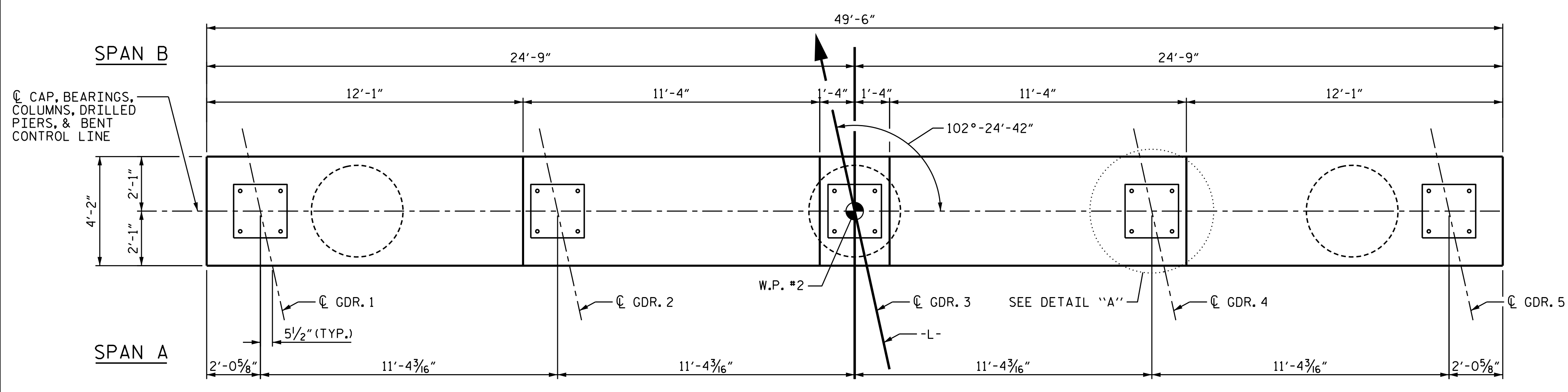
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| CHECKED BY : | A. FORFA | DATE : | 07/2021 |
| DESIGN ENGINEER OF RECORD : | A. FORFA | DATE : | 09/2021 |



PLAN

NOTES

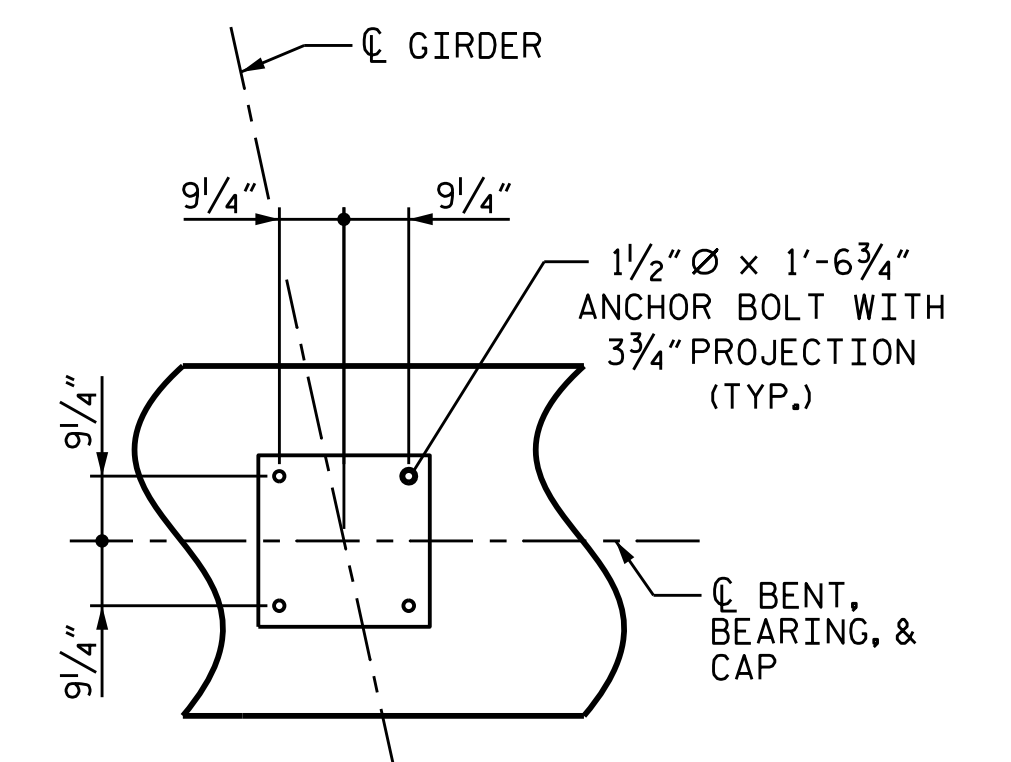
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

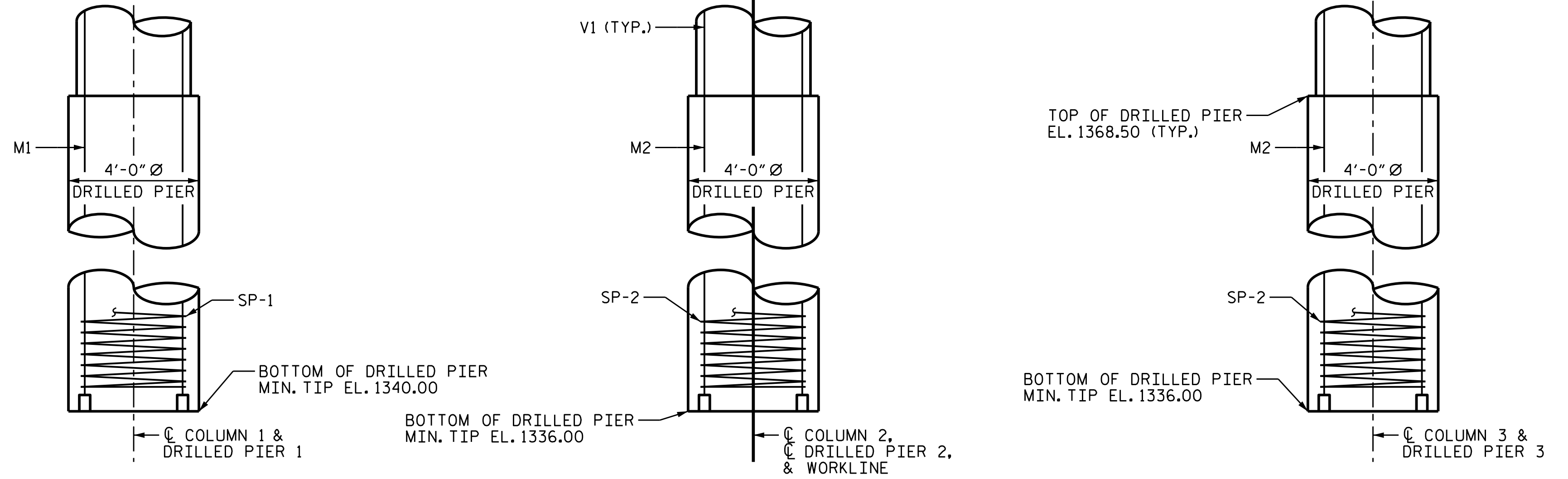
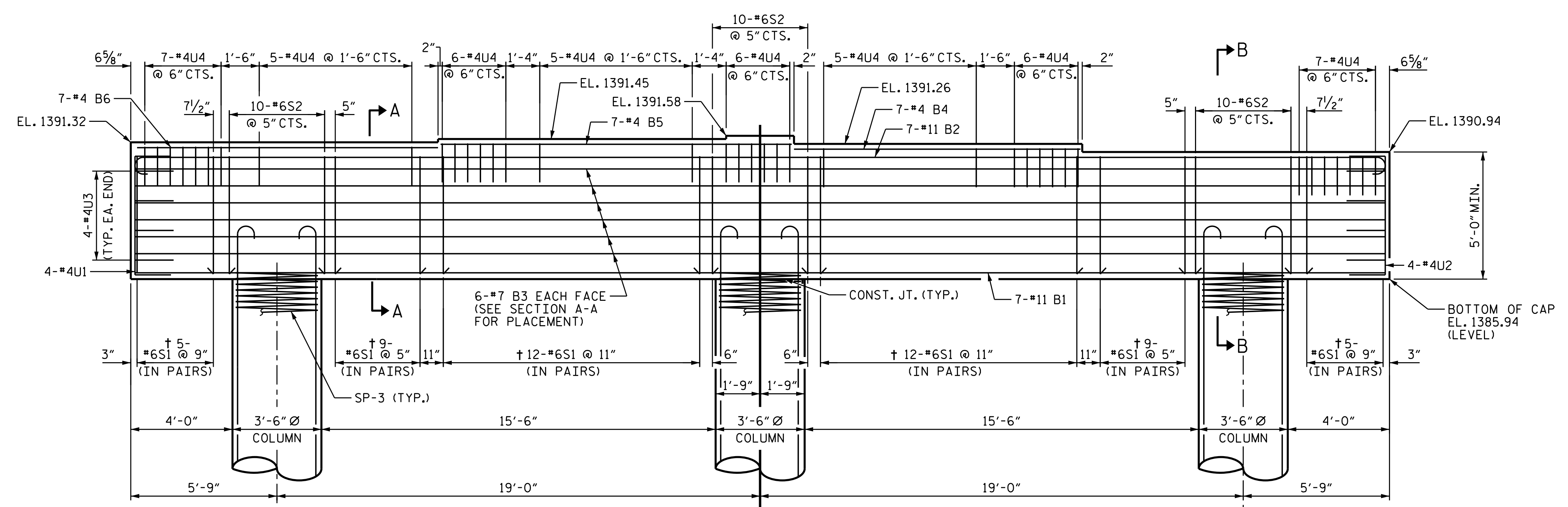
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

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

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



DETAIL "A"
(TYPICAL AT EACH BEARING)



ELEVATION

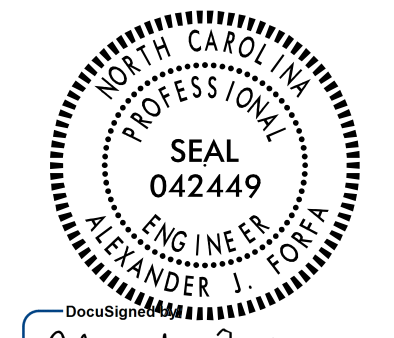
† INVERT ALTERNATE PAIRS OF STIRRUPS

PROJECT NO. BR-0033
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SHEET 1 OF 2

STATE OF NORTH CAROLINA
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 RALEIGH

SUBSTRUCTURE
 BENT 1



Alexander Forfa 11/23/2021

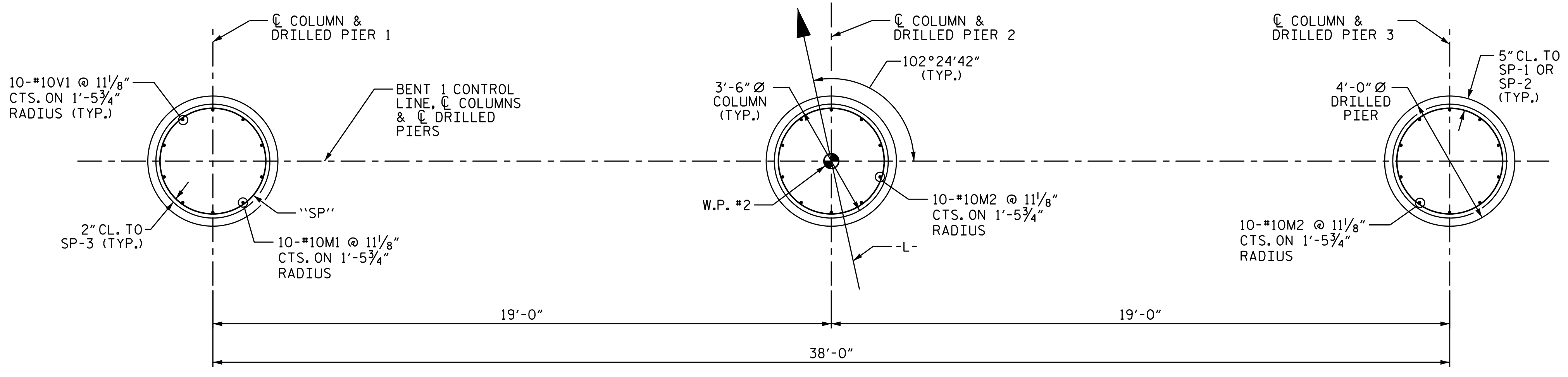
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 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



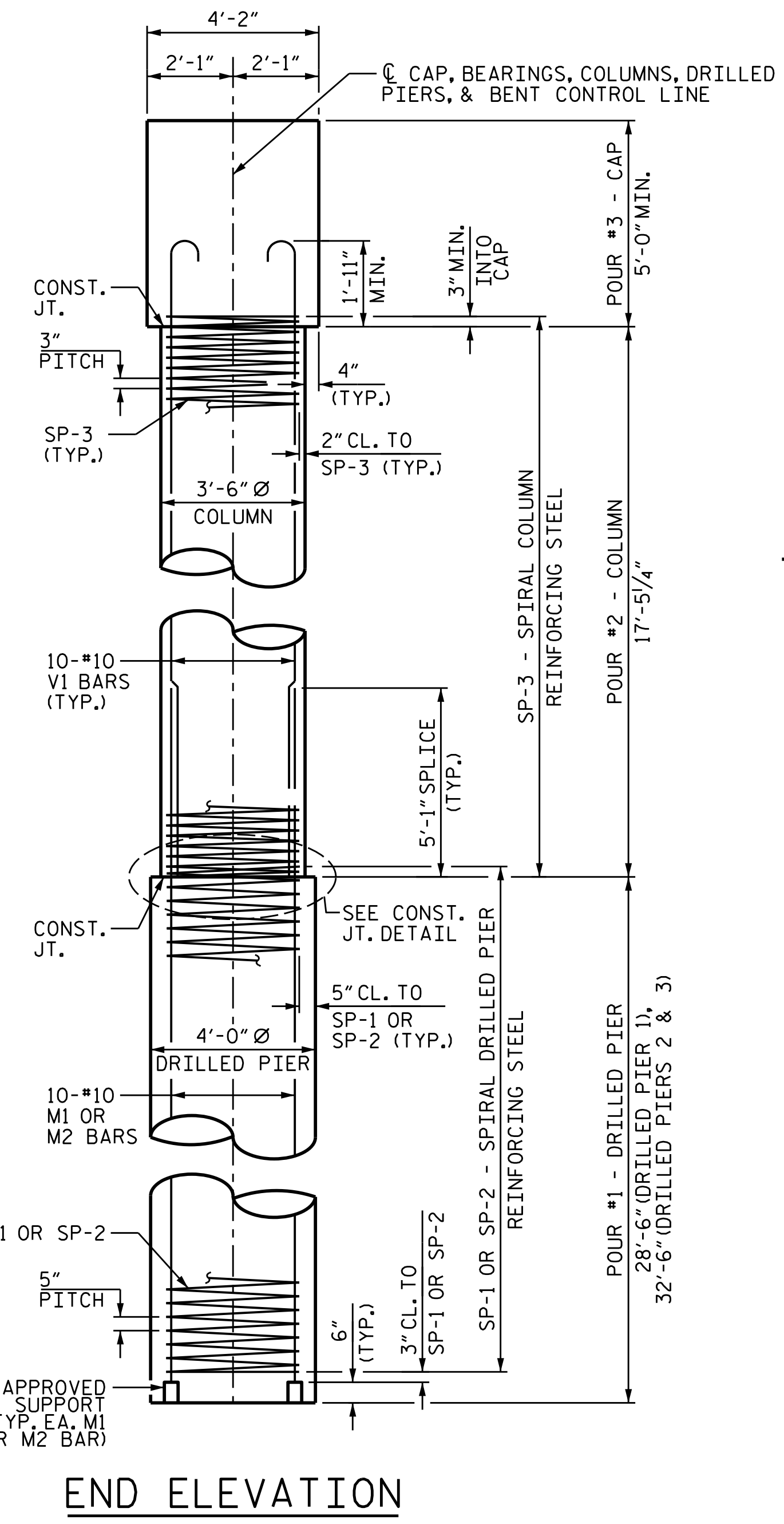
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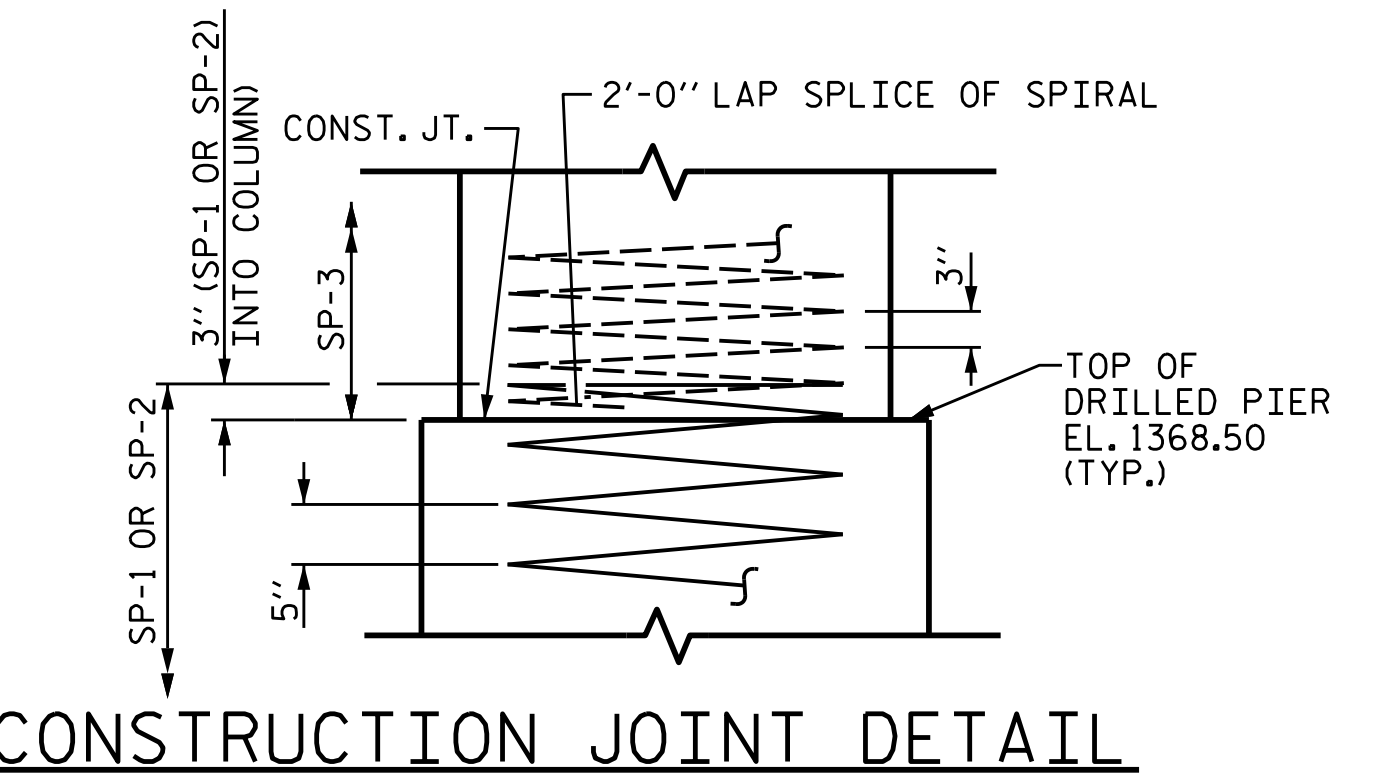
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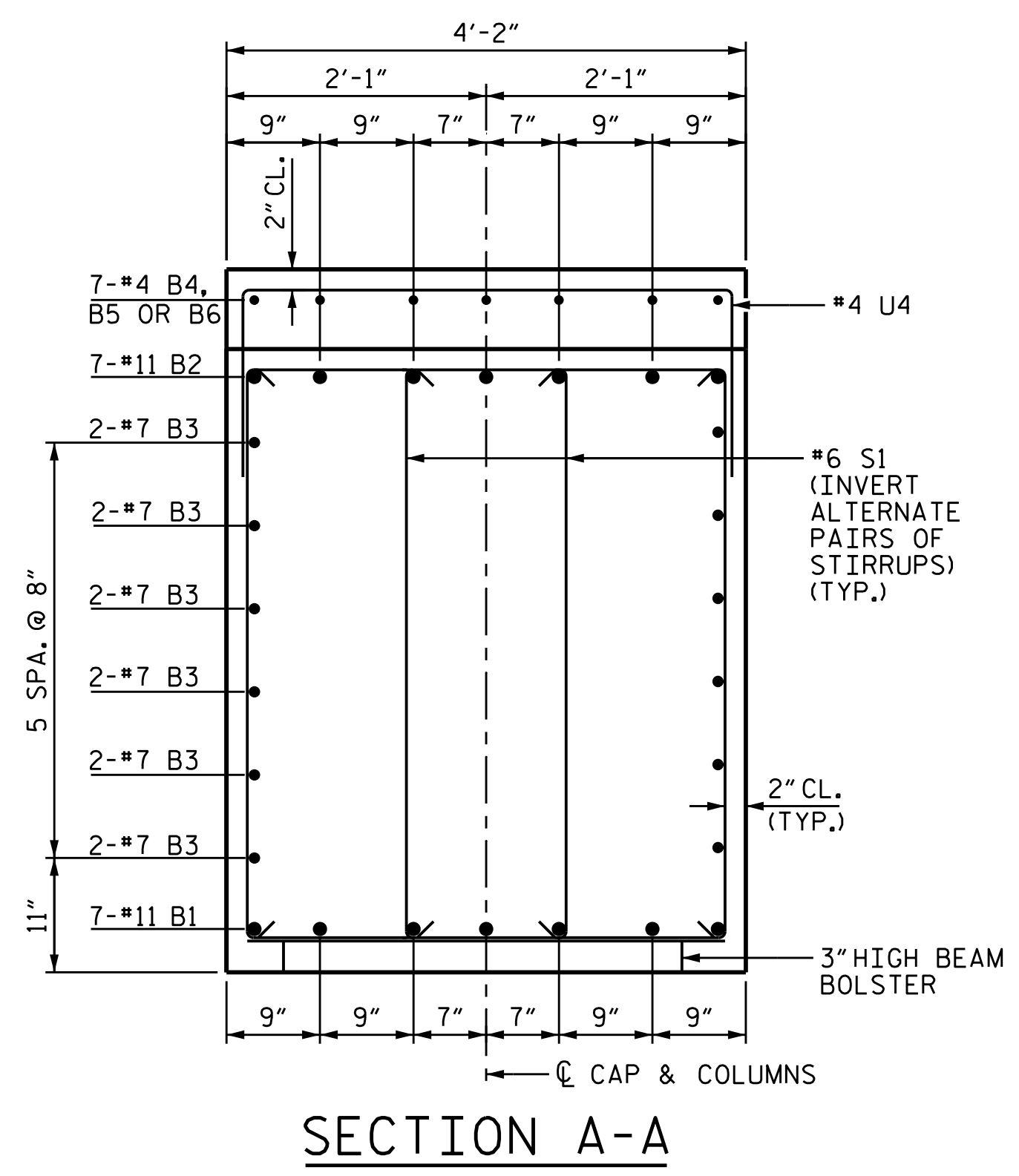
PLAN OF DRILLED PIERS & COLUMNS
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)



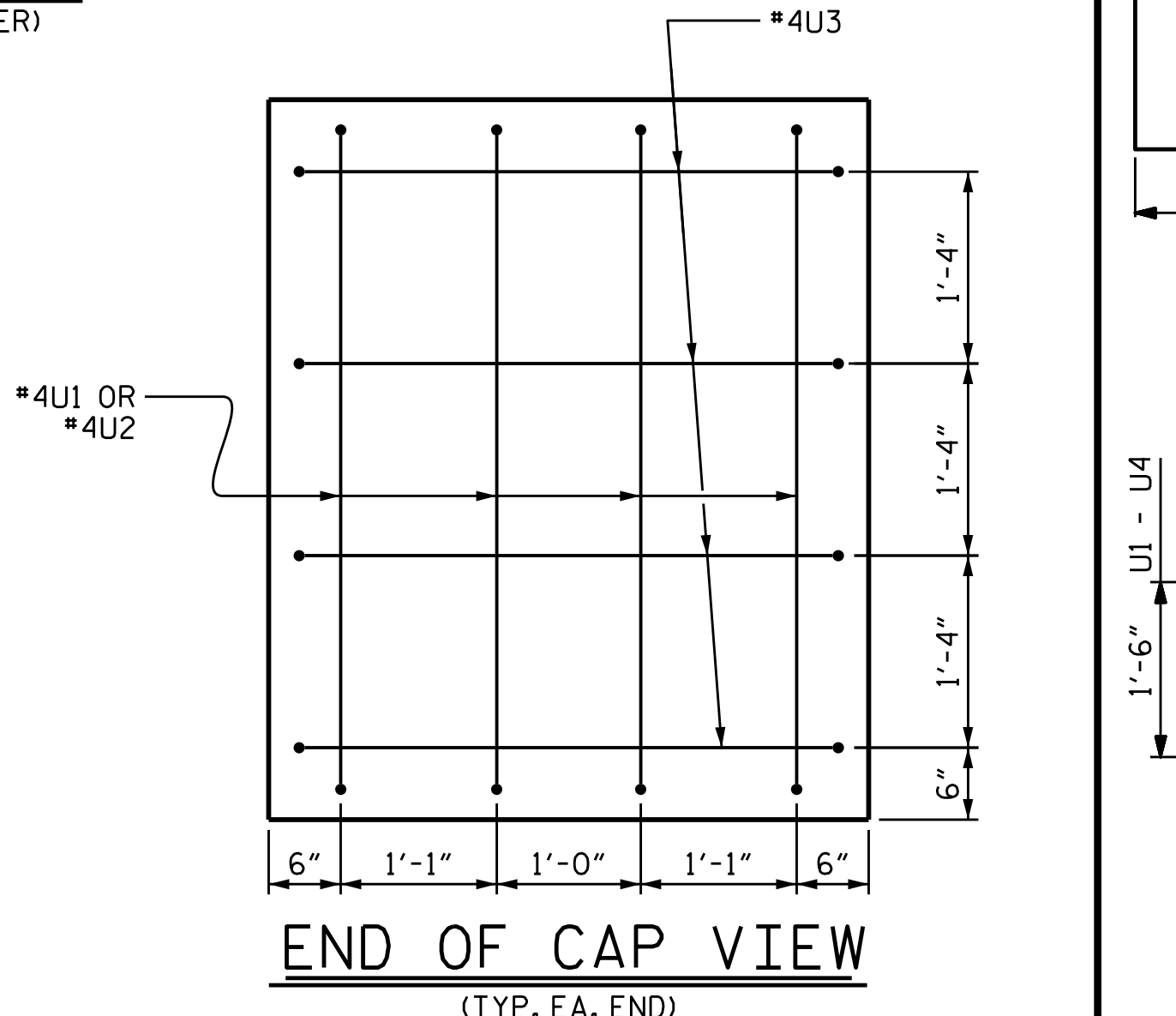
END ELEVATION



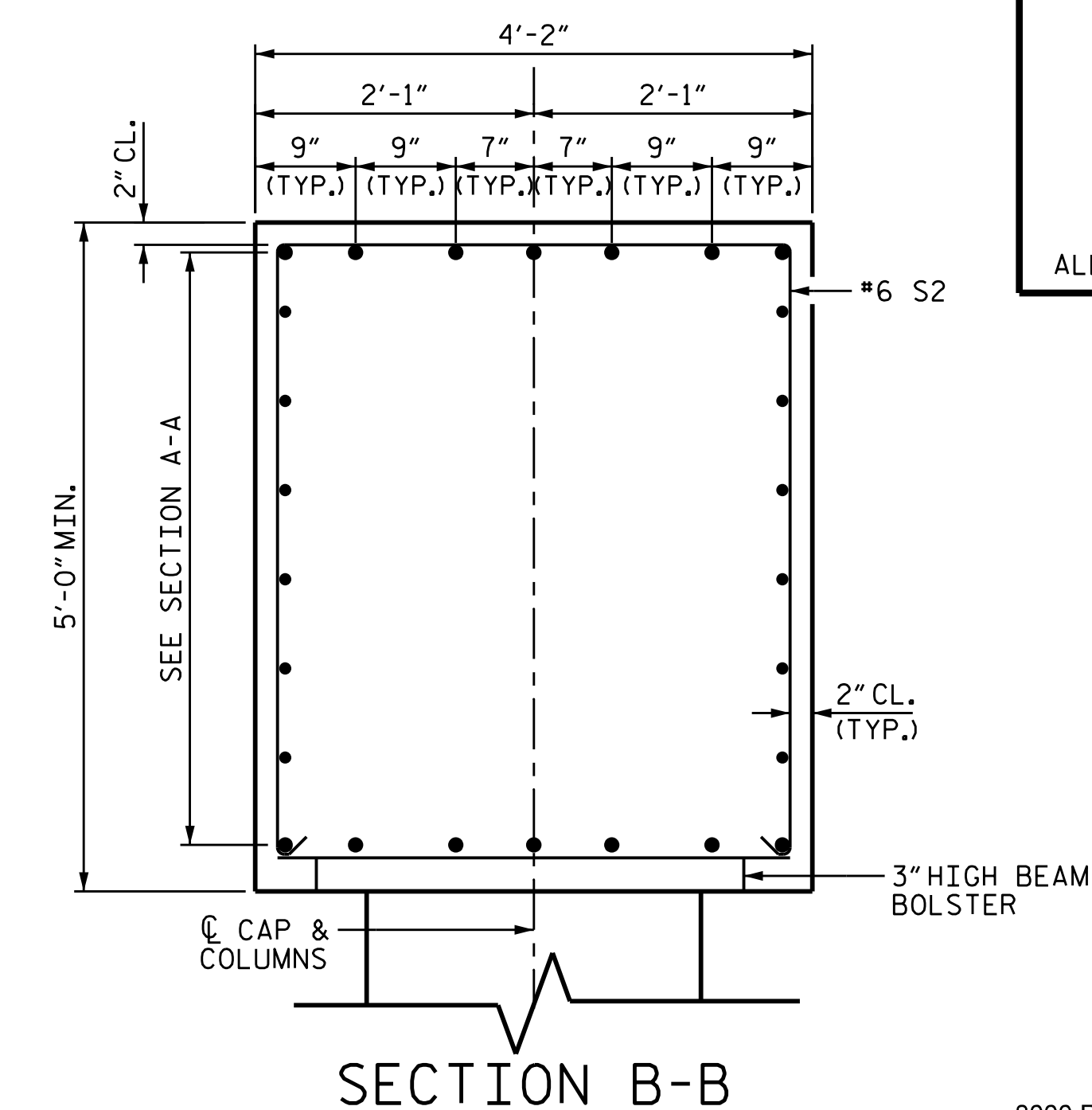
CONSTRUCTION JOINT DETAIL



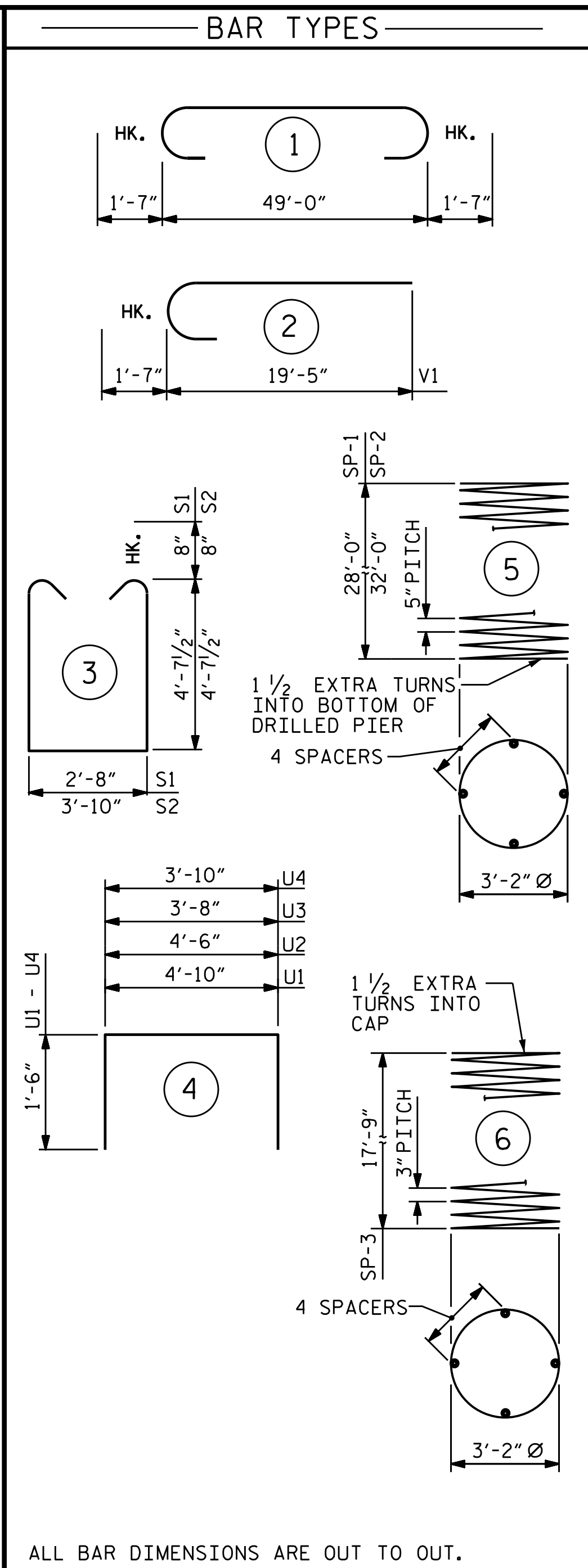
SECTION A-A



END OF CAP VIEW
(TYP. EA. END)



SECTION B-B



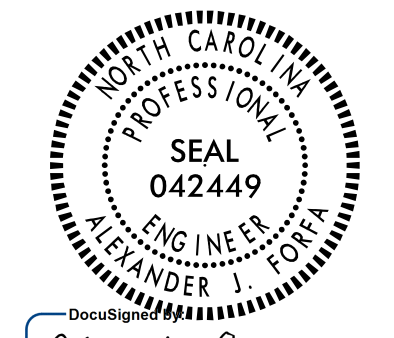
BAR TYPES

| BILL OF MATERIAL | | | | | |
|--|-----|------|------|----------|---------------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 7 | #11 | STR. | 49'-2" | 1829 |
| B2 | 7 | #11 | 1 | 52'-2" | 1940 |
| B3 | 12 | #7 | STR. | 49'-2" | 1206 |
| B4 | 7 | #4 | STR. | 11'-2" | 52 |
| B5 | 7 | #4 | STR. | 13'-8" | 64 |
| B6 | 7 | #4 | STR. | 11'-11" | 56 |
| M1 | 10 | #10 | STR. | 36'-1" | 1553 |
| M2 | 20 | #10 | STR. | 40'-1" | 3450 |
| S1 | 104 | #6 | 3 | 13'-3" | 2070 |
| S2 | 30 | #6 | 3 | 14'-5" | 650 |
| U1 | 4 | #4 | 4 | 7'-10" | 21 |
| U2 | 4 | #4 | 4 | 7'-6" | 20 |
| U3 | 8 | #4 | 4 | 6'-8" | 36 |
| U4 | 47 | #4 | 4 | 6'-10" | 215 |
| V1 | 30 | #10 | 2 | 21'-0" | 2711 |
| REINFORCING STEEL | | | | | 15,873 LBS |
| SP-1 | 1 | * | 5 | 672'-10" | 702 |
| SP-2 | 2 | * | 5 | 766'-11" | 1600 |
| SP-3 | 3 | ** | 6 | 712'-0" | 1427 |
| SPIRAL COLUMN REINFORCING STEEL | | | | | 2,302 LBS |
| *THE SP-1 AND SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 IR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR | | | | | |
| **THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 IR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR | | | | | |
| CLASS A CONCRETE BREAKDOWN | | | | | |
| POUR #2 (COLUMNS) | | | | | 18.7 C.Y. |
| POUR #3 (CAP) | | | | | 40.6 C.Y. |
| TOTAL CLASS A CONCRETE | | | | | 59.3 C.Y. |
| DRILLED PIERS: | | | | | |
| DRILLED PIERS CONCRETE POUR #1 (DRILLED PIERS) | | | | | 43.5 C.Y. |
| 4'-0" DRILLED PIER NOT IN SOIL | | | | | 26.0 LIN. FT. |
| 4'-0" DRILLED PIER IN SOIL | | | | | 67.5 LIN. FT. |
| CSL TUBES | | | | | 392 LIN. FT. |

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
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 RALEIGH
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 BENT 1



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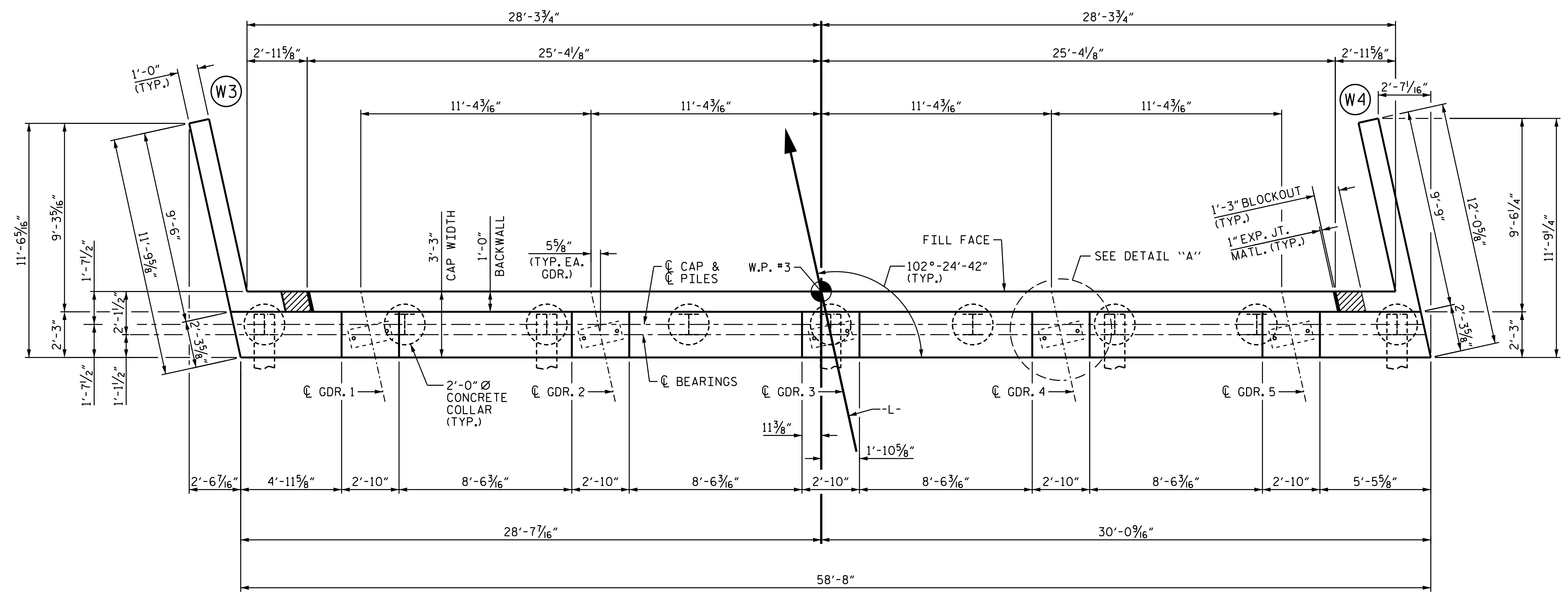
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 DESIGN ENGINEER OF RECORD: A. FORFA DATE: 09/2021



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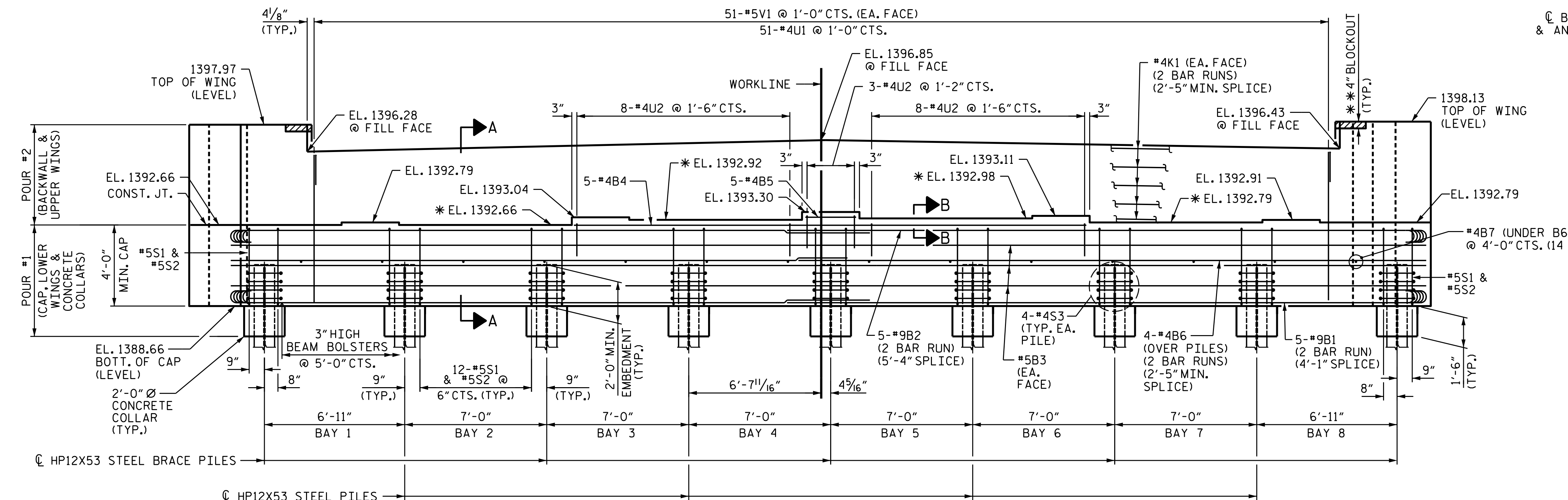
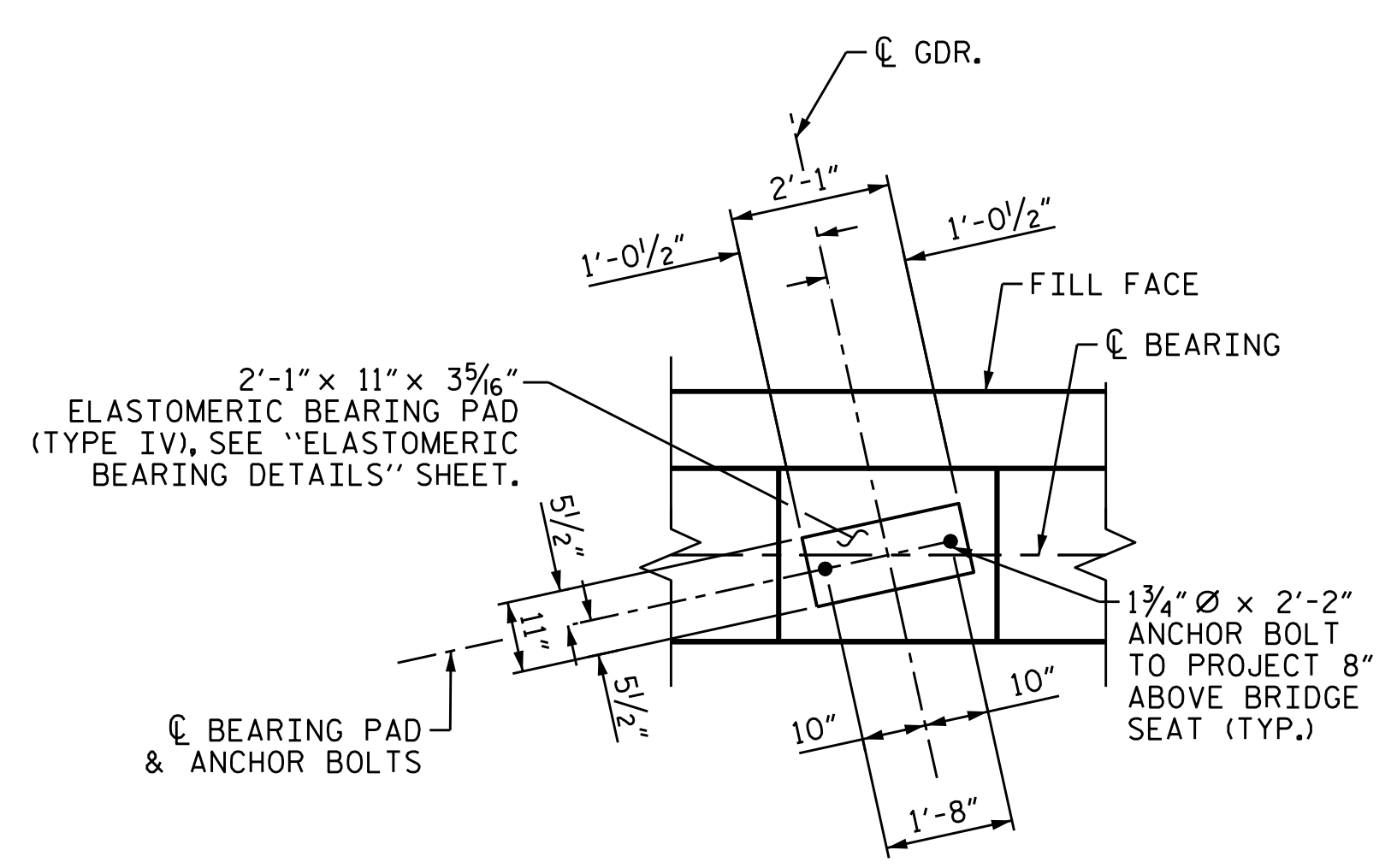


NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT A RATE OF 2%.

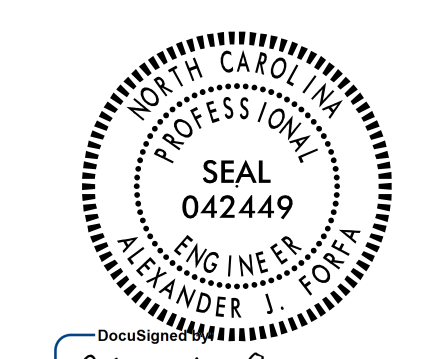
* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

** THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 1 OF 3
STATE OF NORTH CAROLINA
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RALEIGH
SUBSTRUCTURE
END BENT 2



Alexander J. Forks 11/23/2021

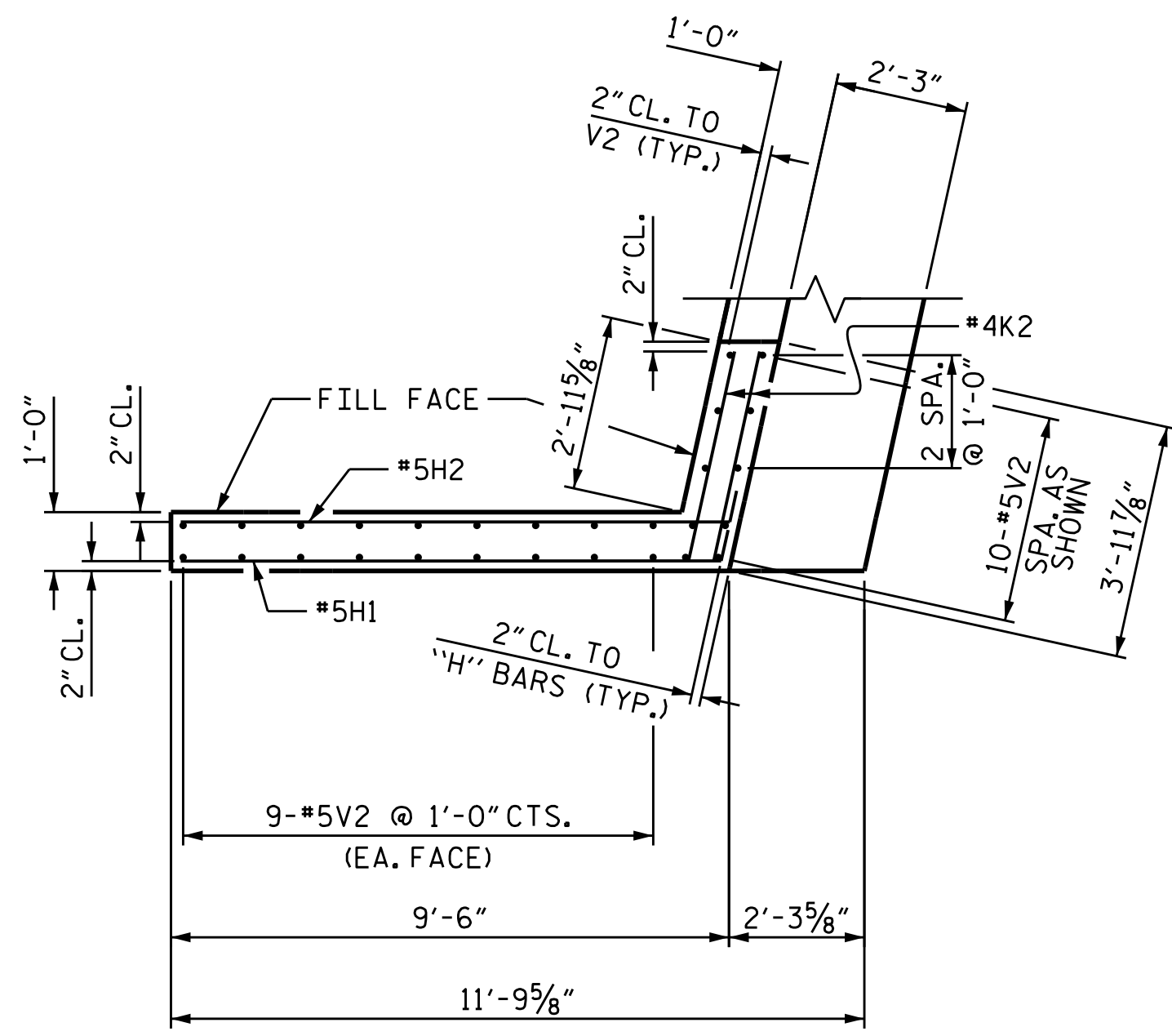
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CHECKED BY : A. FORFA DATE : 06/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



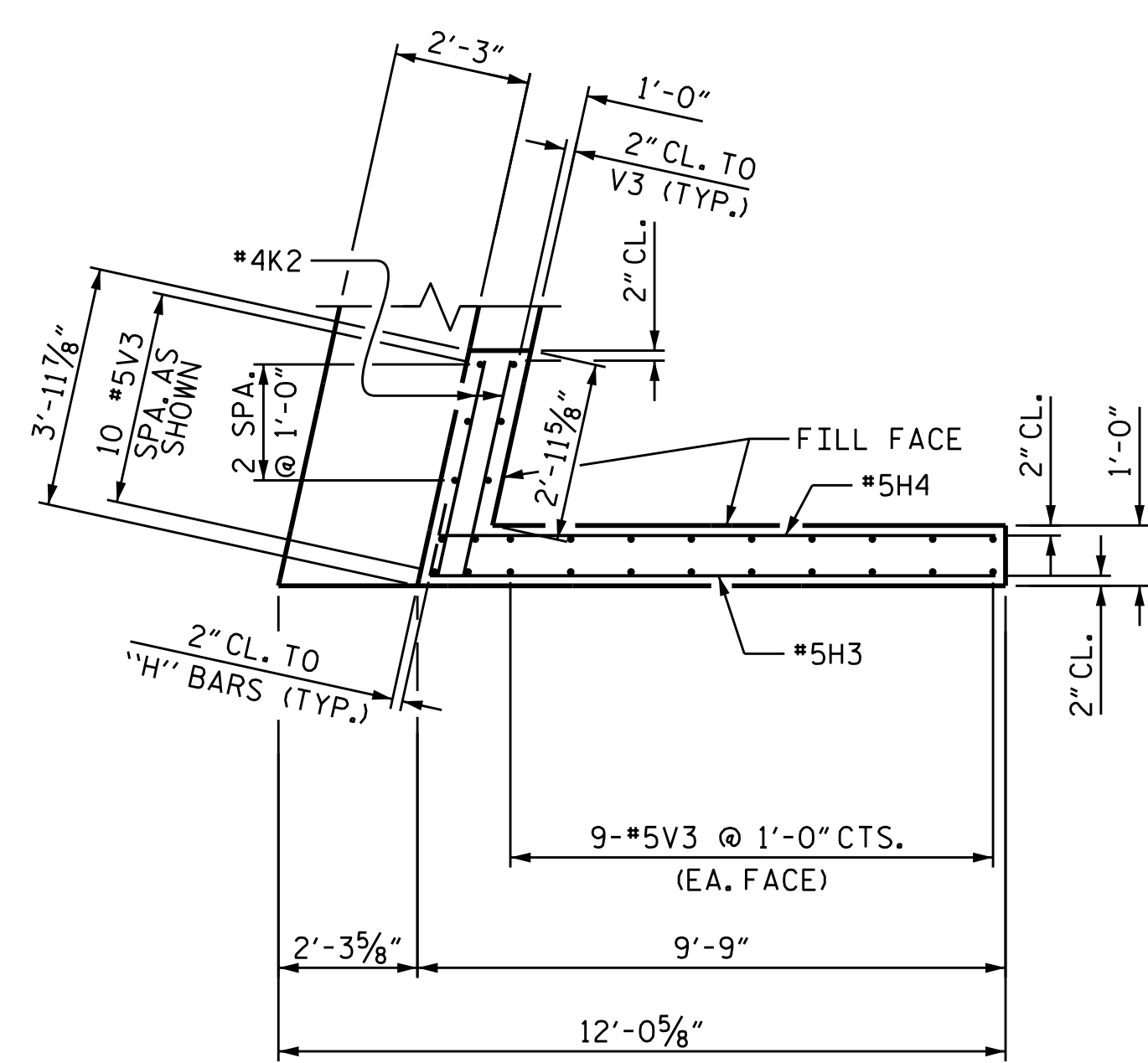
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SIGNATURES COMPLETED

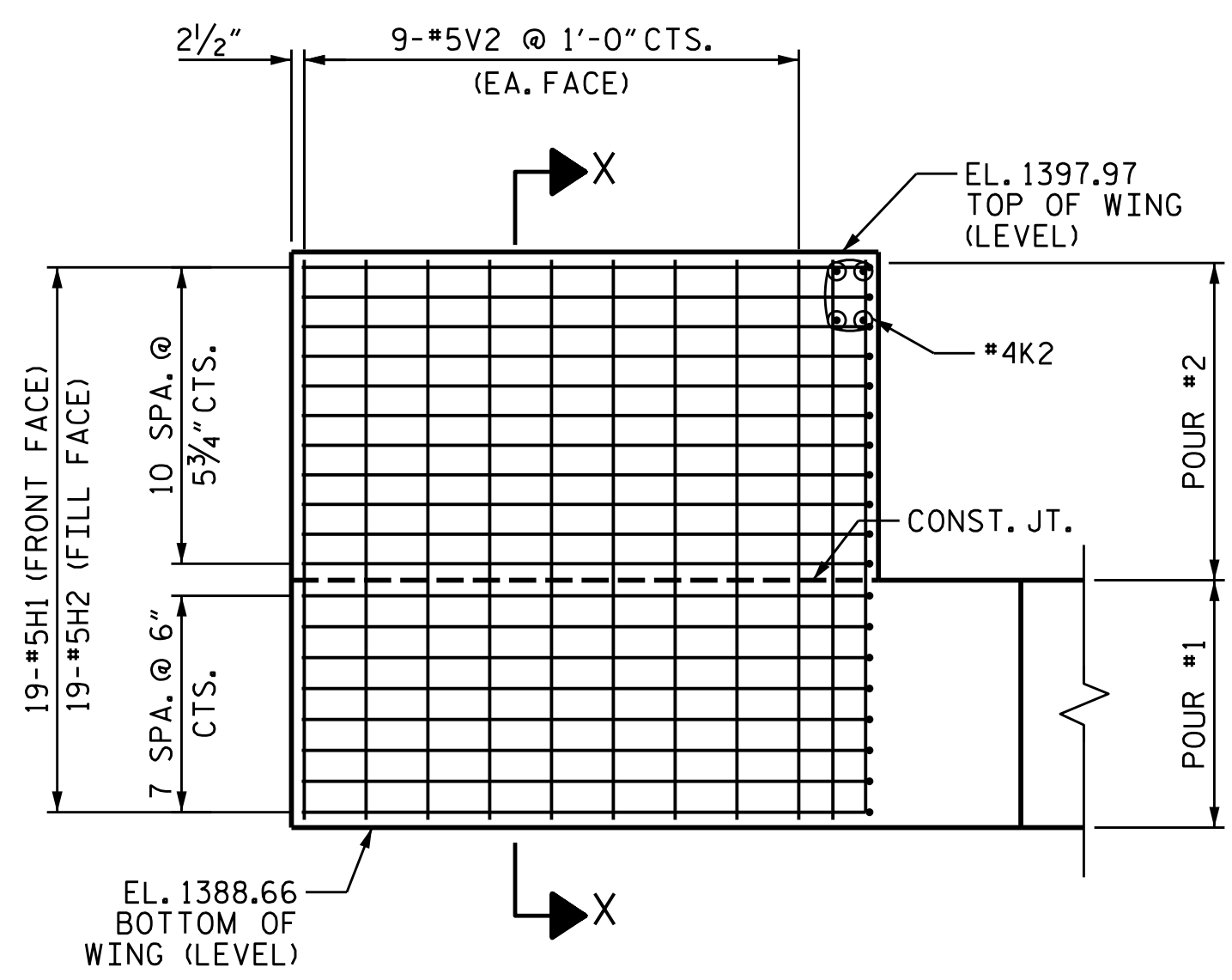
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| NO. | BY: | DATE: | NO. | BY: | DATE: | S-26 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



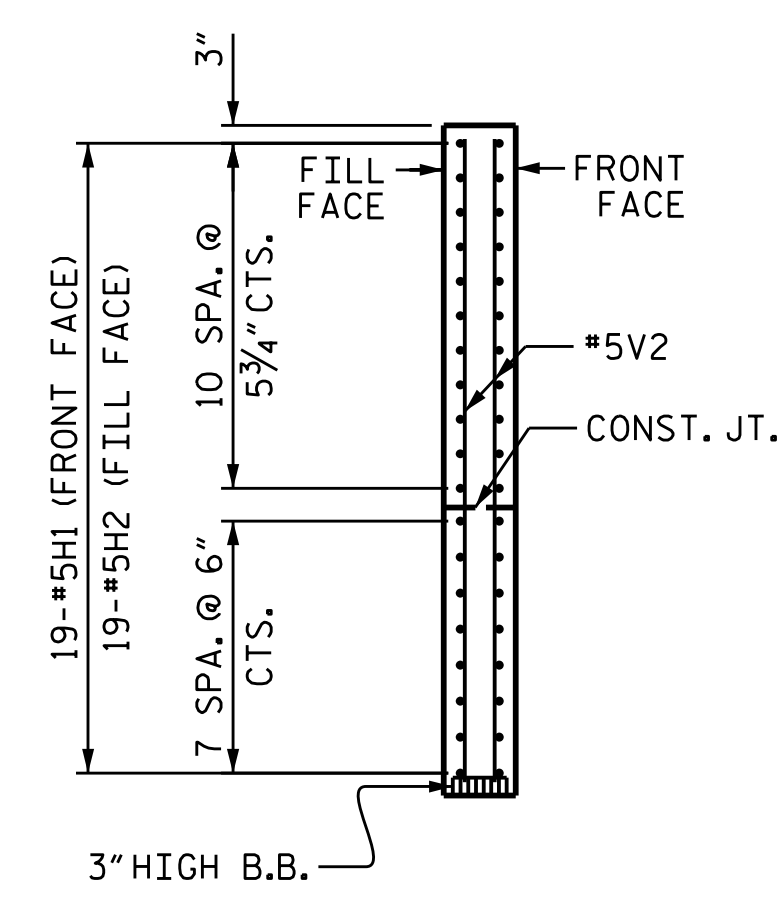
PLAN OF WING W3



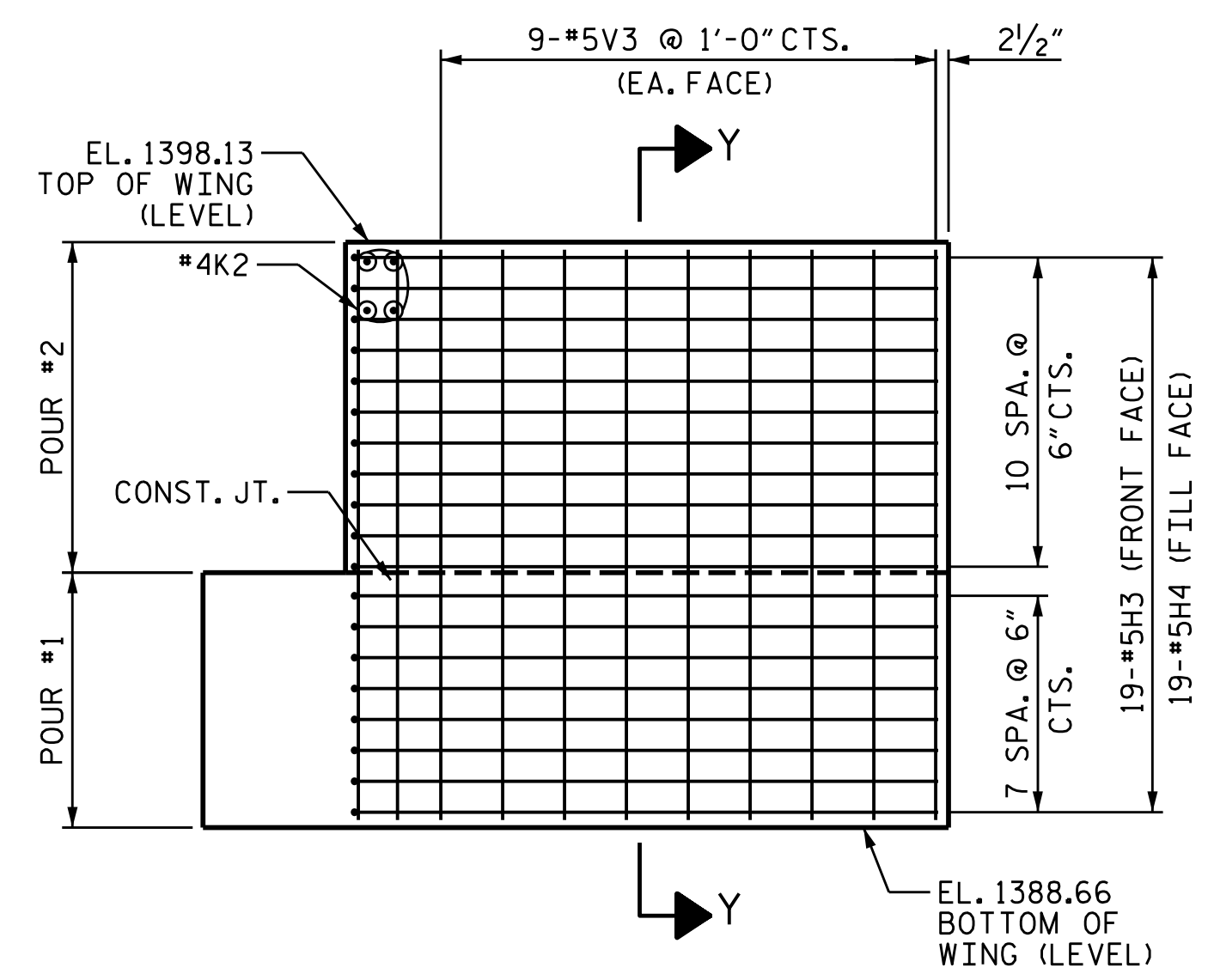
PLAN OF WING W4



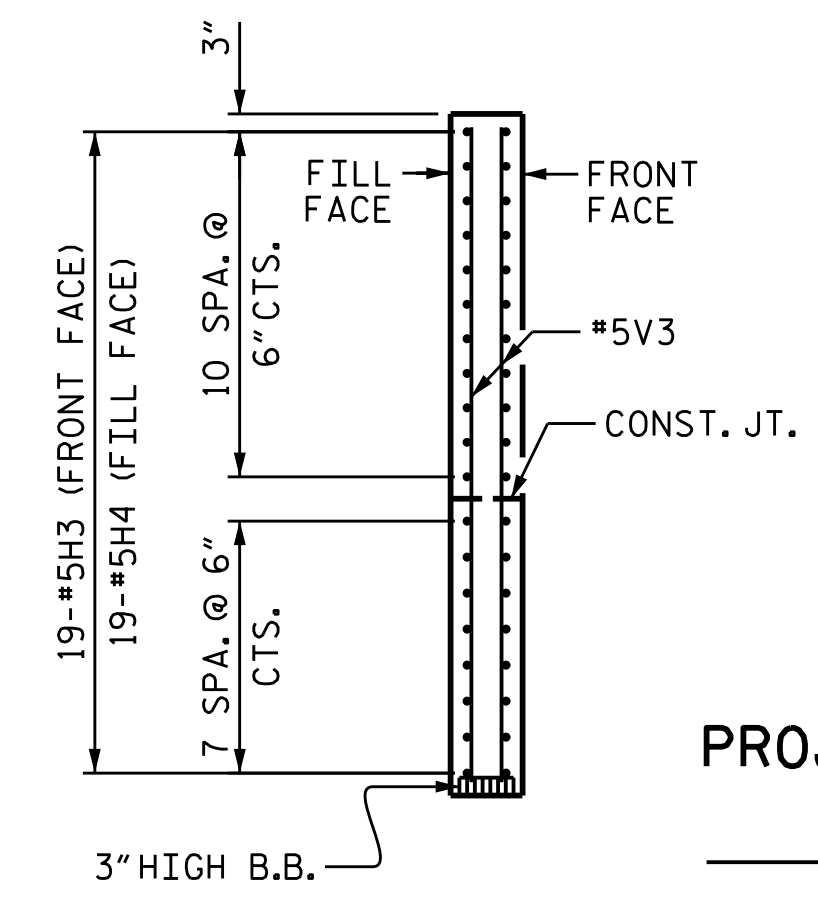
ELEVATION OF WING W3



SECTION X-X



ELEVATION OF WING W4

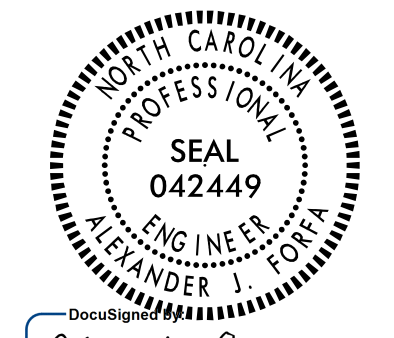


SECTION Y-Y

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 2 OF 3

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



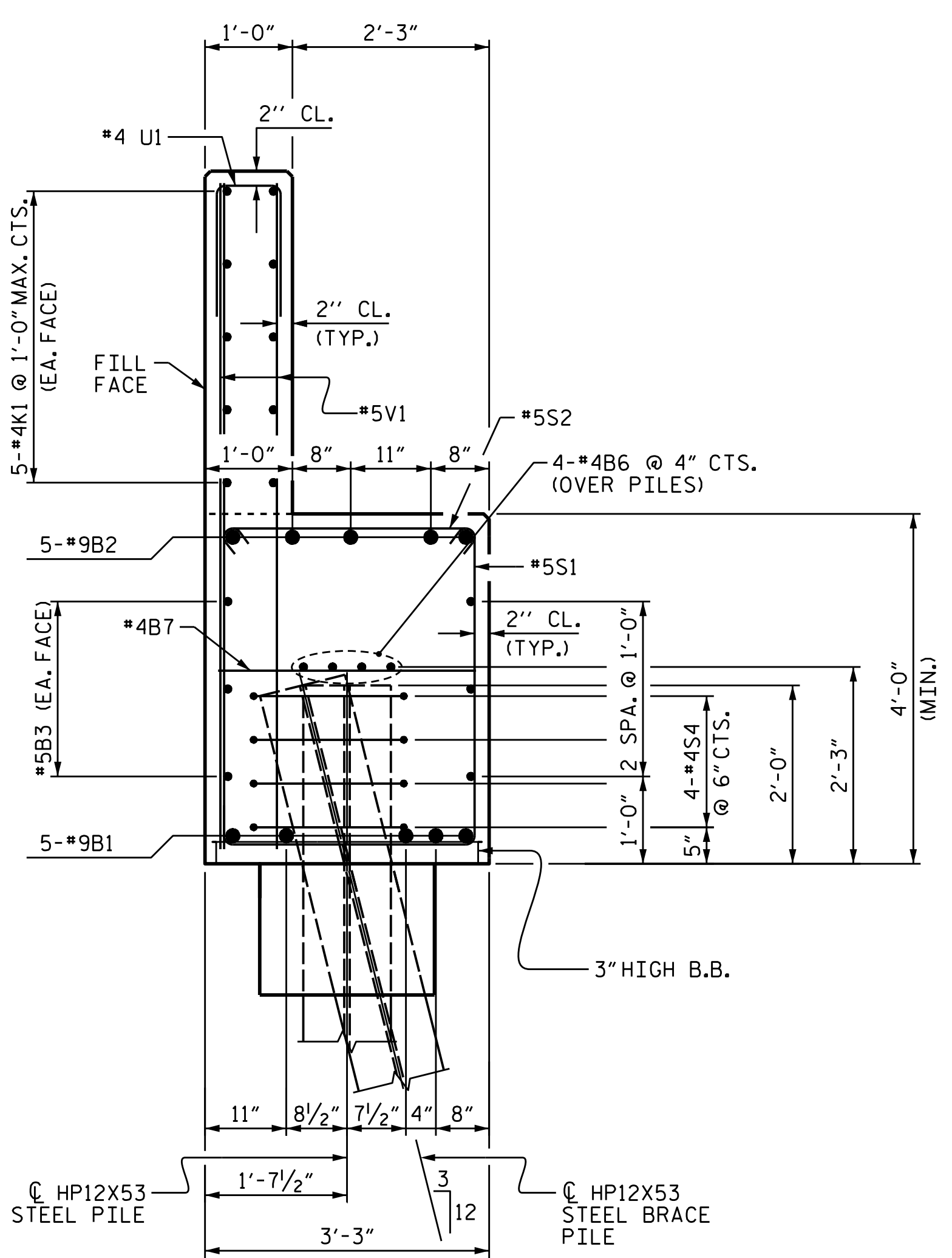
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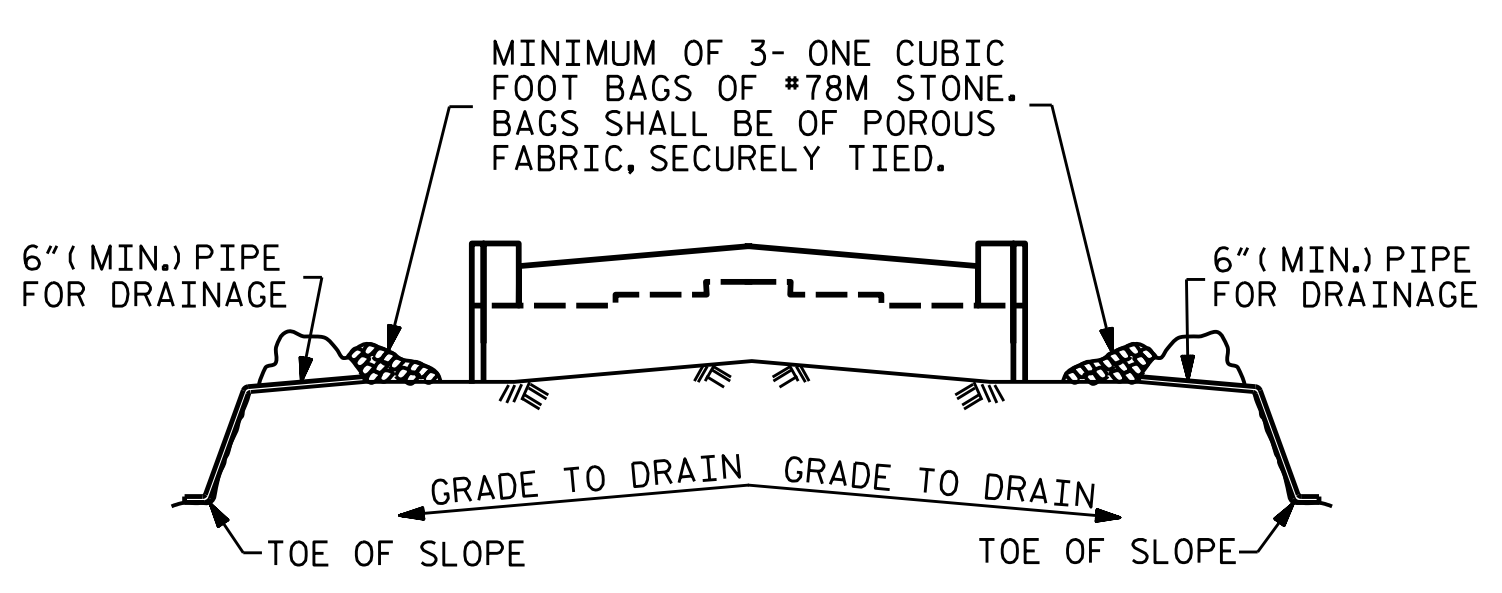
DRAWN BY : N. ROHRBAUGH DATE : 06/2021
 CHECKED BY : A. FORFA DATE : 06/2021
 DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021



| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-27 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



SECTION A-A



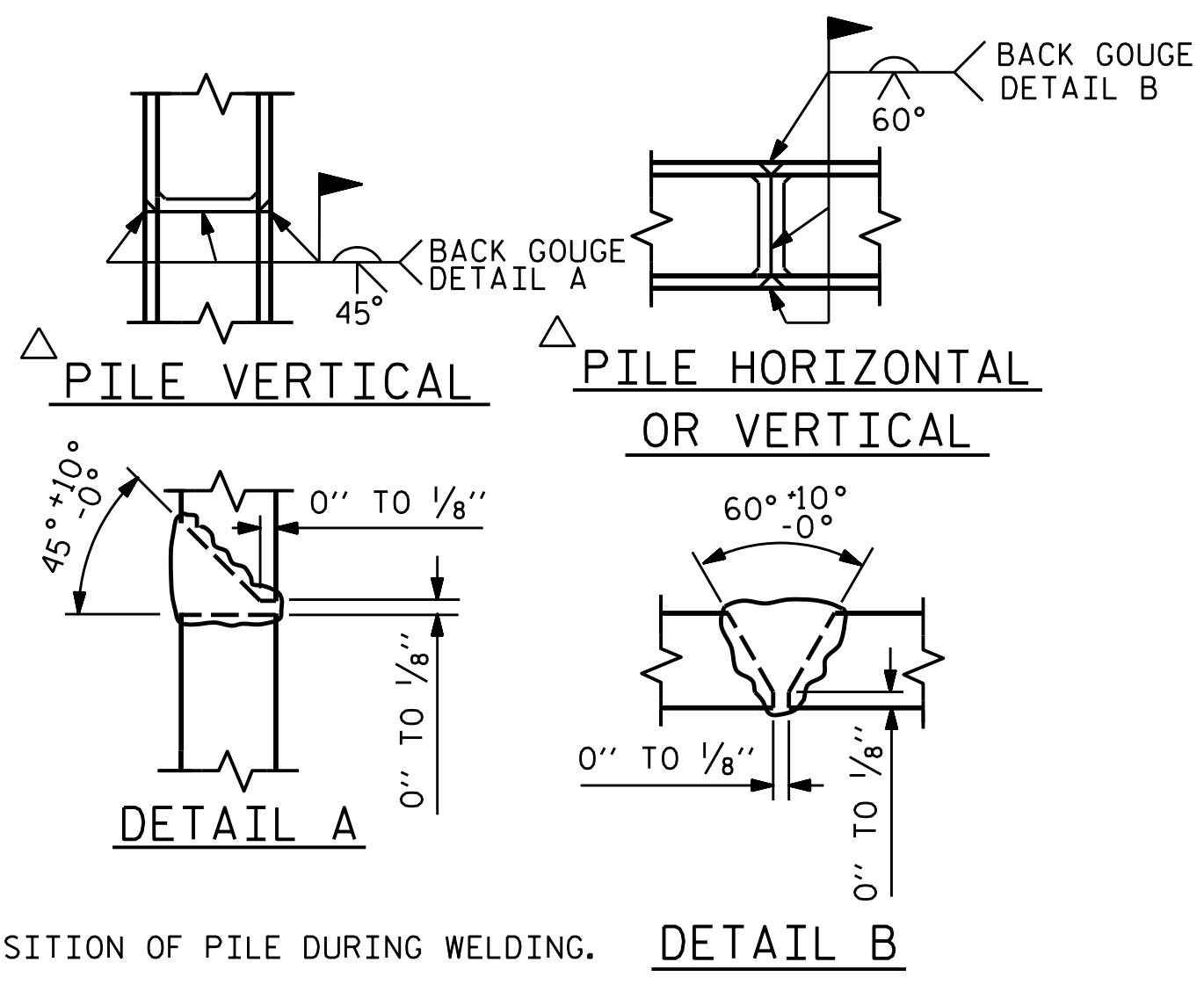
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

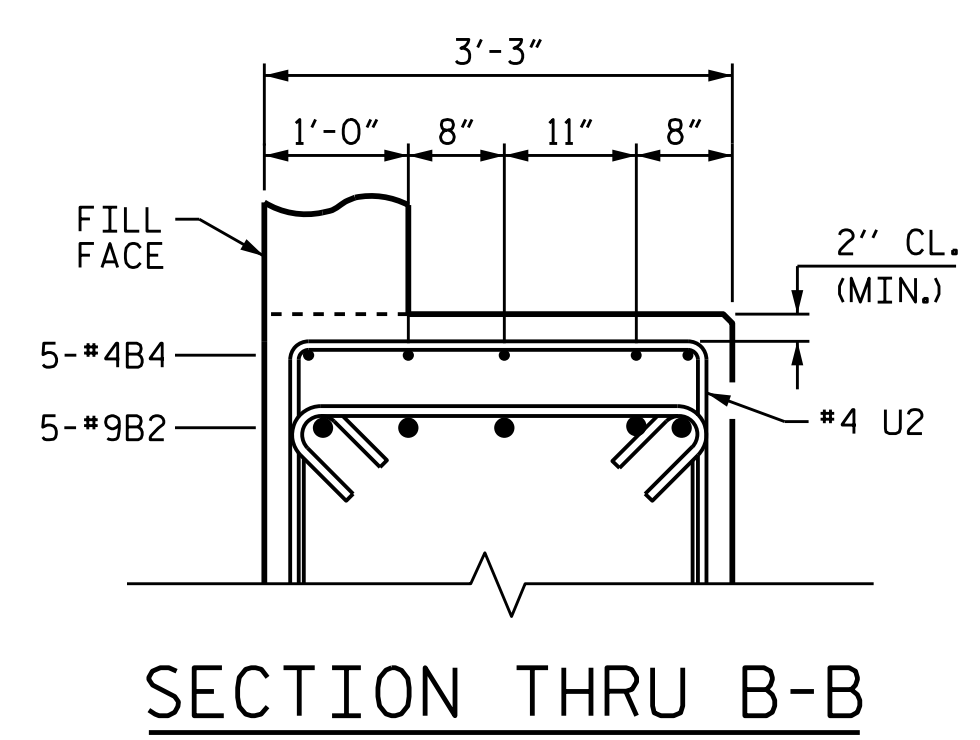
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

| | | | |
|-----------------------------|--------------|--------|---------|
| DRAWN BY : | N. ROHRBAUGH | DATE : | 06/2021 |
| CHECKED BY : | A. FORFA | DATE : | 06/2021 |
| DESIGN ENGINEER OF RECORD : | A. FORFA | DATE : | 09/2021 |

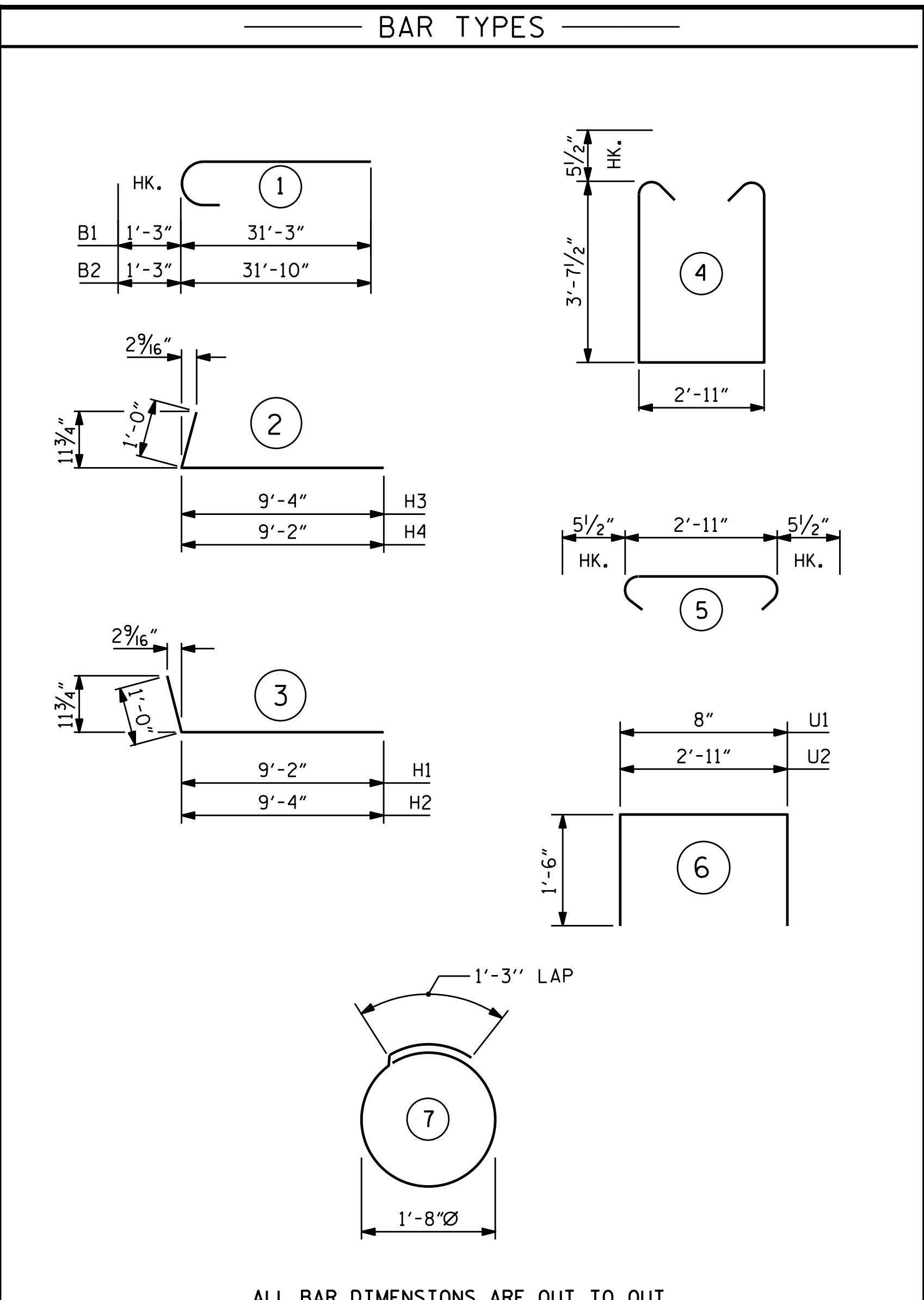


PILE SPLICE DETAILS



SECTION THRU B-B

| BILL OF MATERIAL | | | | | |
|--|-----|------|------|--------|------------|
| END BENT #2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 10 | #9 | 1 | 32'-6" | 1105 |
| B2 | 10 | #9 | 1 | 33'-1" | 1125 |
| B3 | 6 | #5 | STR. | 58'-4" | 365 |
| B4 | 5 | #4 | STR. | 25'-2" | 84 |
| B5 | 5 | #4 | STR. | 2'-6" | 8 |
| B6 | 8 | #4 | STR. | 30'-5" | 163 |
| B7 | 14 | #4 | STR. | 2'-11" | 27 |
| | | | | | |
| H1 | 19 | #5 | 3 | 10'-2" | 201 |
| H2 | 19 | #5 | 3 | 10'-4" | 205 |
| H3 | 19 | #5 | 2 | 10'-4" | 205 |
| H4 | 19 | #5 | 2 | 10'-2" | 201 |
| | | | | | |
| K1 | 20 | #4 | STR. | 30'-5" | 406 |
| K2 | 8 | #4 | STR. | 3'-7" | 19 |
| | | | | | |
| S1 | 98 | #5 | 4 | 11'-1" | 1133 |
| S2 | 98 | #5 | 5 | 3'-10" | 392 |
| S3 | 36 | #4 | 7 | 6'-6" | 156 |
| | | | | | |
| U1 | 51 | #4 | 6 | 3'-8" | 125 |
| U2 | 19 | #4 | 6 | 5'-11" | 75 |
| | | | | | |
| V1 | 102 | #5 | STR. | 7'-3" | 771 |
| V2 | 28 | #5 | STR. | 8'-11" | 260 |
| V3 | 28 | #5 | STR. | 9'-1" | 265 |
| | | | | | |
| REINFORCING STEEL | | | | | 7,291 LBS. |
| | | | | | |
| CLASS "A" CONCRETE | | | | | |
| POUR #1 (CAP, LOWER PART OF WINGS & COLLARS) 34.1 C.Y. | | | | | |
| POUR #2 (BACKWALL & UPPER PART OF WINGS) 11.9 C.Y. | | | | | |
| TOTAL CLASS "A" CONCRETE 46.0 C.Y. | | | | | |
| | | | | | |
| PILE DRIVING EQUIPMENT | | | | | |
| SETUP FOR 12X53 STEEL PILES EA. 9 | | | | | |
| | | | | | |
| HP12X53 STEEL PILES | | | | | |
| NO. 9 | | | | | |
| LIN. FT. 248 | | | | | |



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

SHEET 3 OF 3

| | | | | | |
|--|-----|-------|-----|-----|-----------------|
| 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. S-28 | | | | | TOTAL SHEETS 32 |

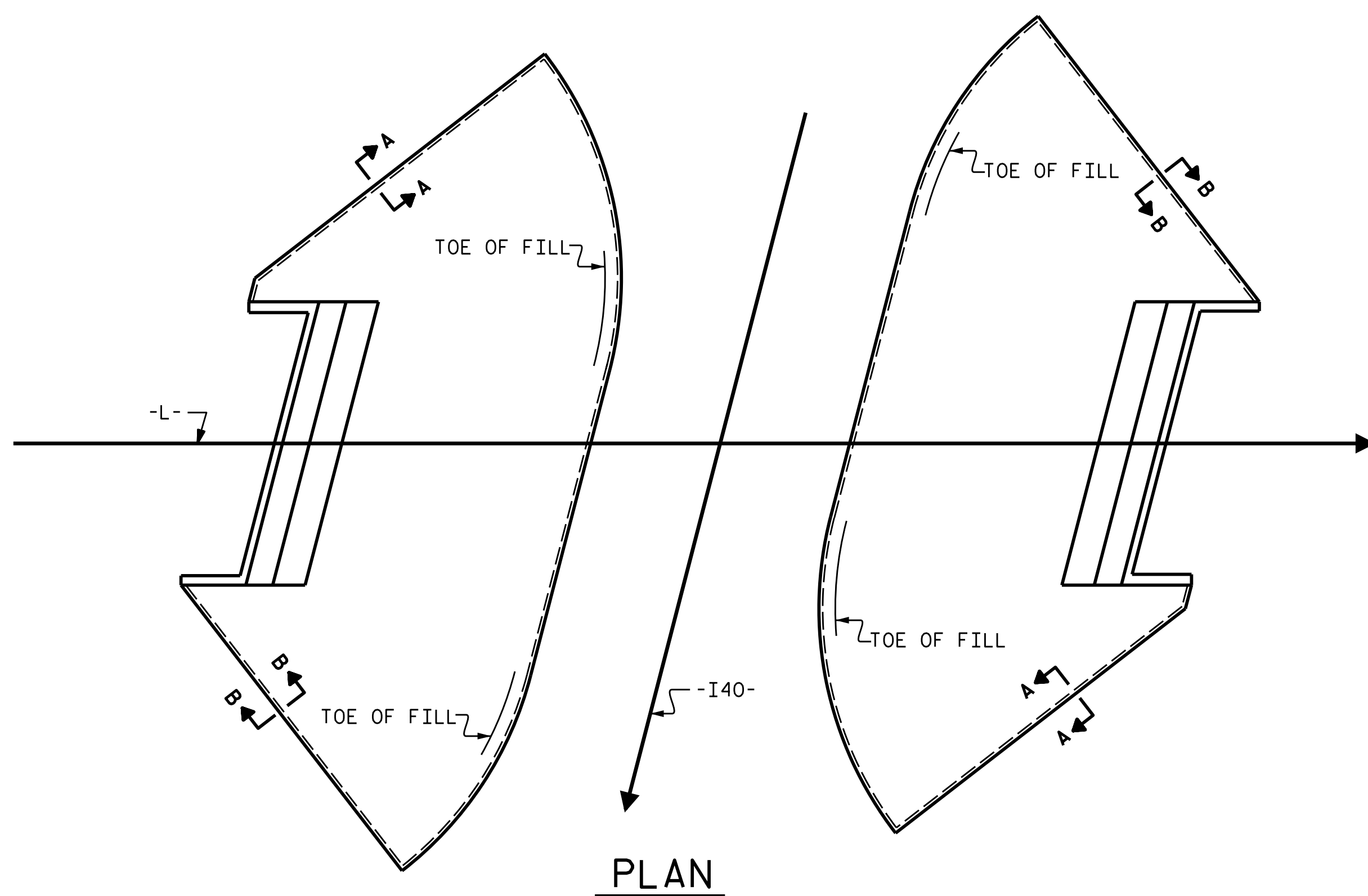


Alexander J. Forfa 11/23/2021



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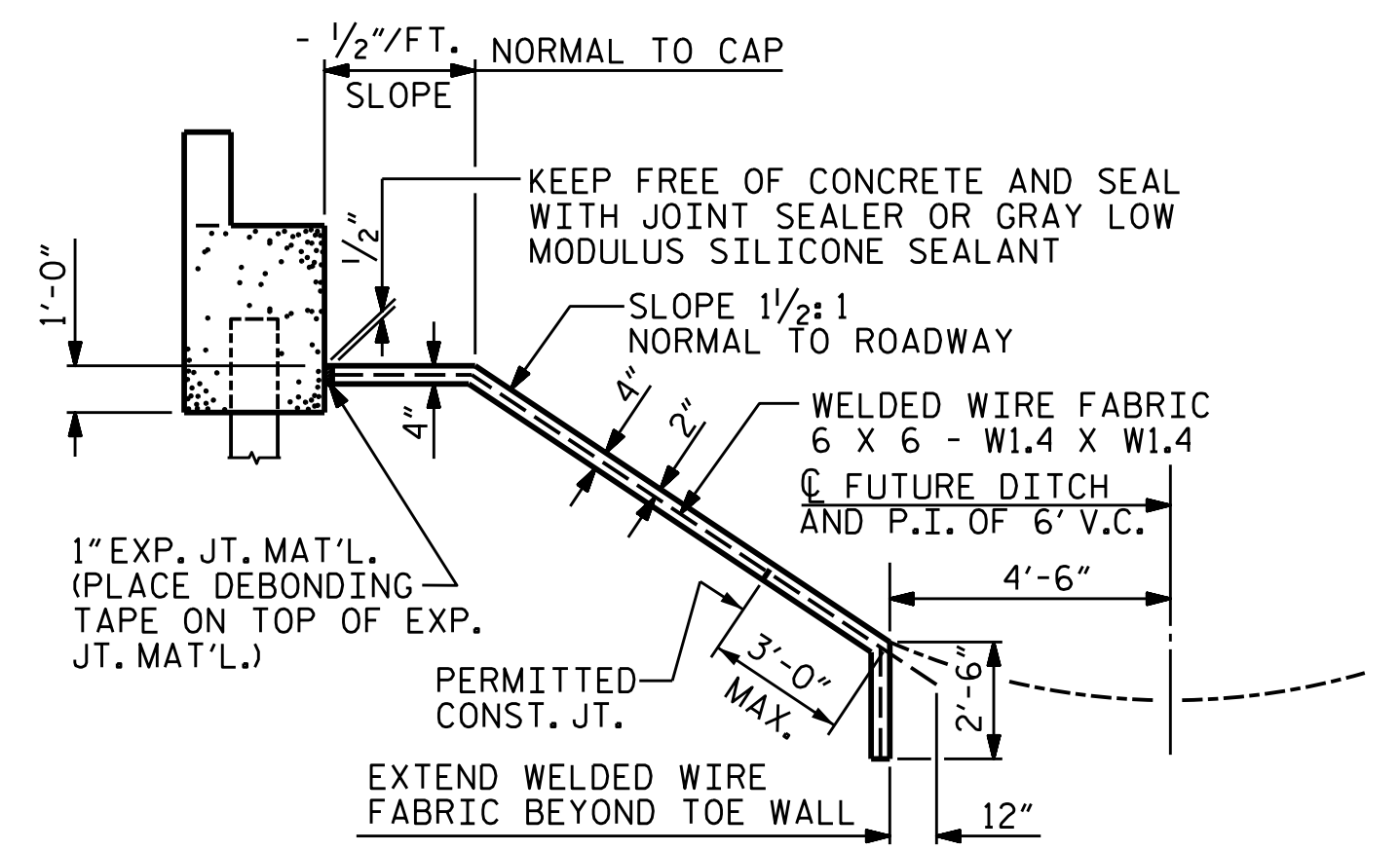
PLAN

GENERAL NOTES

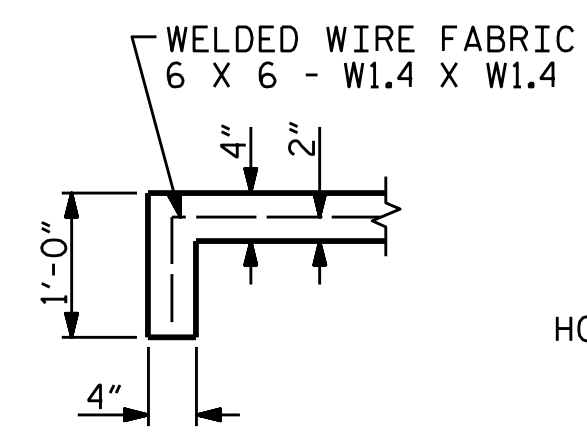
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE 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 @ STA. 16+11.51 -L- | 4 INCH SLOPE PROTECTION | * WELDED WIRE FABRIC 60 INCHES WIDE |
|-------------------------------|----------------------------|---|
| | SQUARE YARDS | APPROX. L.F. |
| END BENT 1 | 260 | 511 |
| END BENT 2 | 410 | 821 |

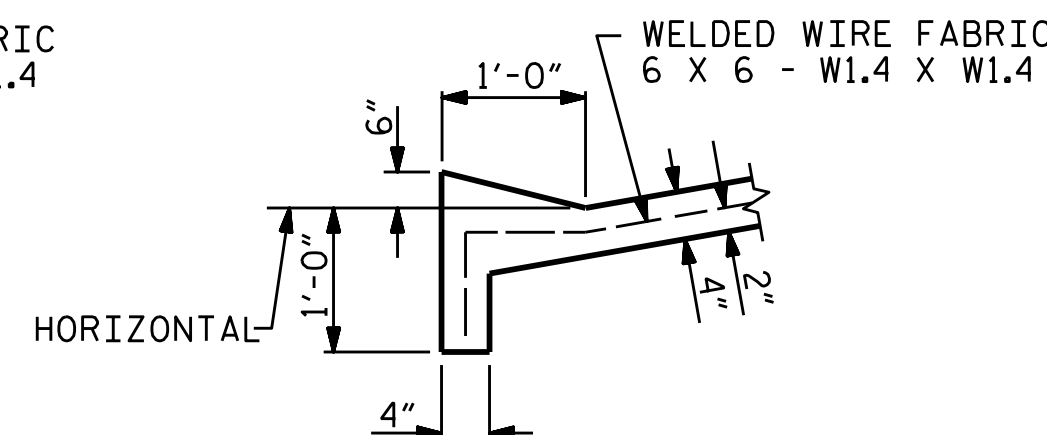
* QUANTITY SHOWN IS BASED ON 5' POURS.



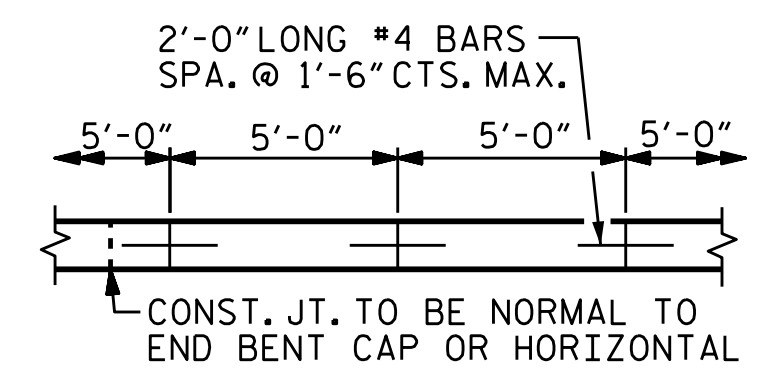
SECTION ALONG C SURVEY WHEN FILL CATCHES IN DITCH



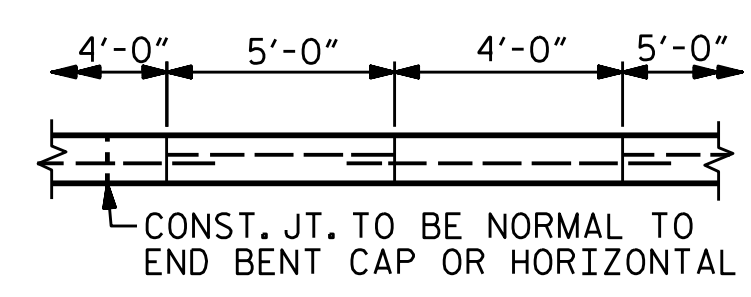
SECTION A-A



SECTION B-B



POURING DETAIL



OPTIONAL POURING DETAIL

CONST. JT. TO BE NORMAL TO END BENT CAP OR HORIZONTAL STRIP WIDTHS MAY VARY IN CURVED PORTION.

POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SLOPE PROTECTION
 DETAILS



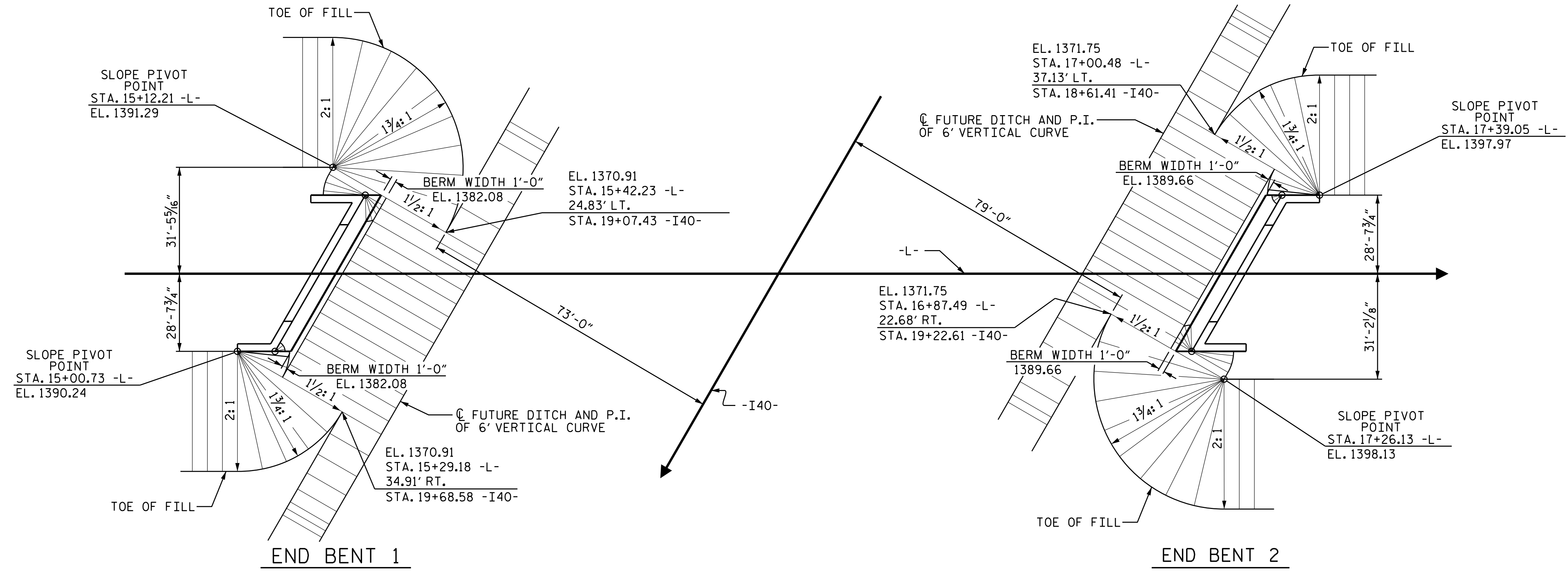
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| | |
|---------------------------|----------------------|
| ASSEMBLED BY : M. SPENCER | DATE : 06/08/21 |
| CHECKED BY : A. FORFA | DATE : 06/08/21 |
| DRAWN BY : ELR 5/92 | REV. 12/21/11 MAA/GM |
| CHECKED BY : GRP 6/92 | REV. 1/16 MAA/TMG |
| | REV. 12/17 MAA/THC |

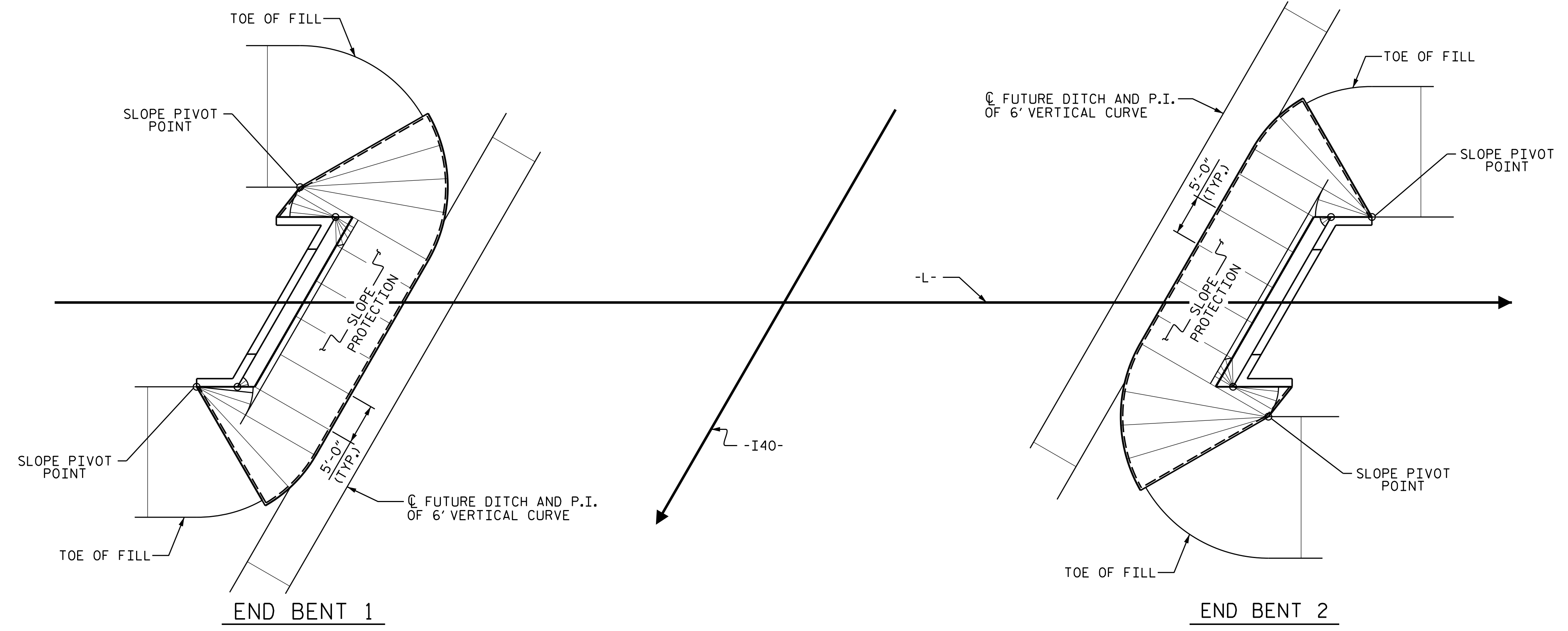


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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



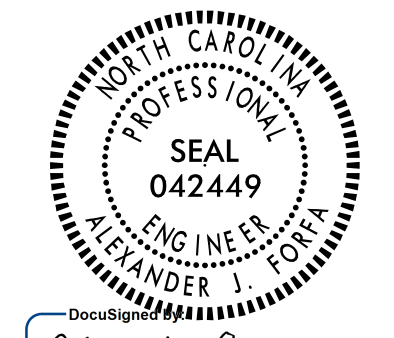
PLAN - GRADING



PLAN - CONCRETE PLACEMENT

PROJECT NO. BR-0033
McDOWELL COUNTY
 STATION: 16+11.51 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SLOPE PROTECTION
 DETAILS



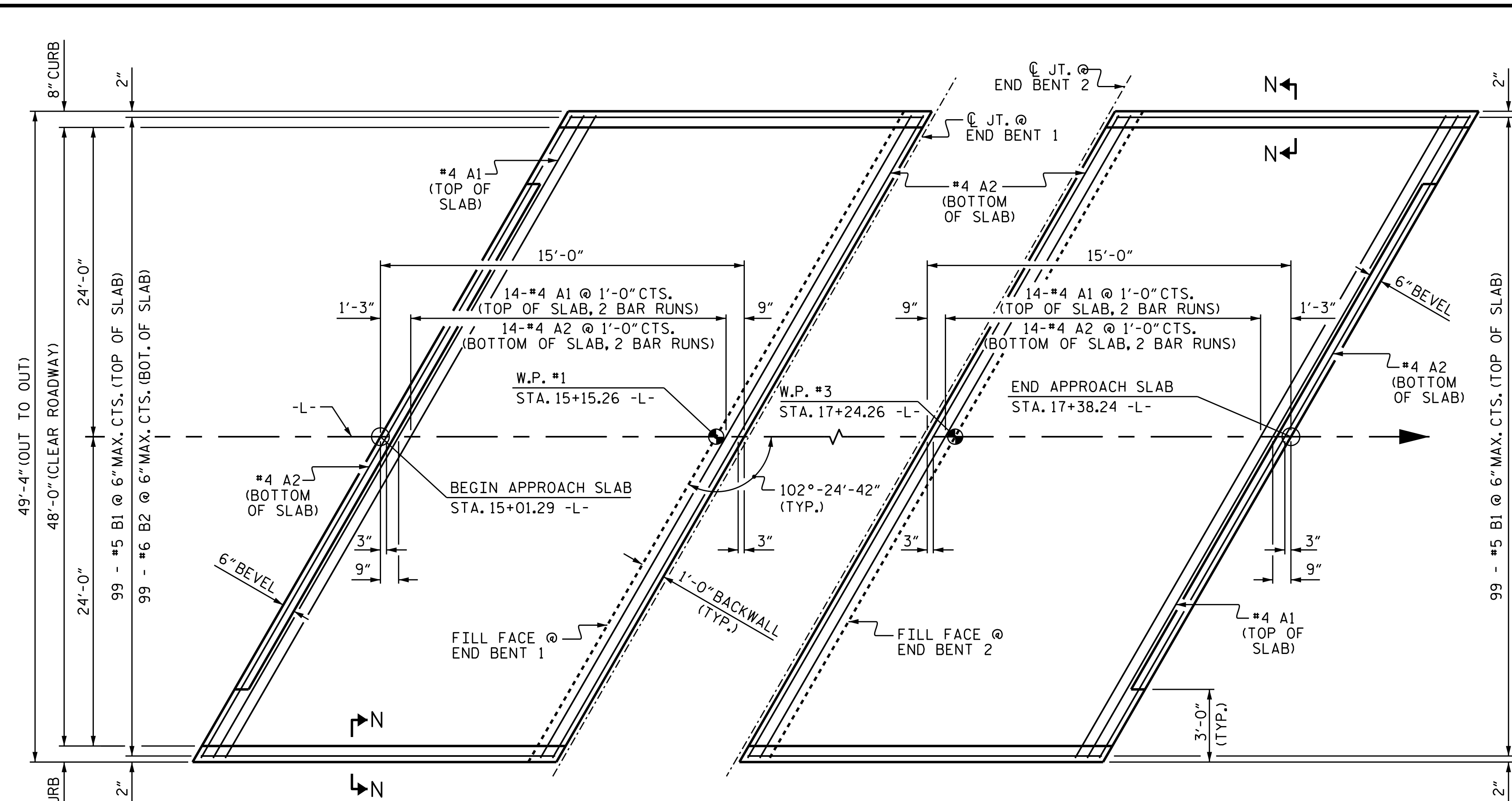
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| ASSEMBLED BY : M. SPENCER | DATE : 06/08/21 |
| CHECKED BY : A. FORFA | DATE : 06/08/21 |
| DRAWN BY : WJH 10/88 | REV. 10/11/11 MAA/GM |
| CHECKED BY : FCJ 10/88 | REV. 1/16 MAA/TMG |
| | REV. 12/17 MAA/THC |

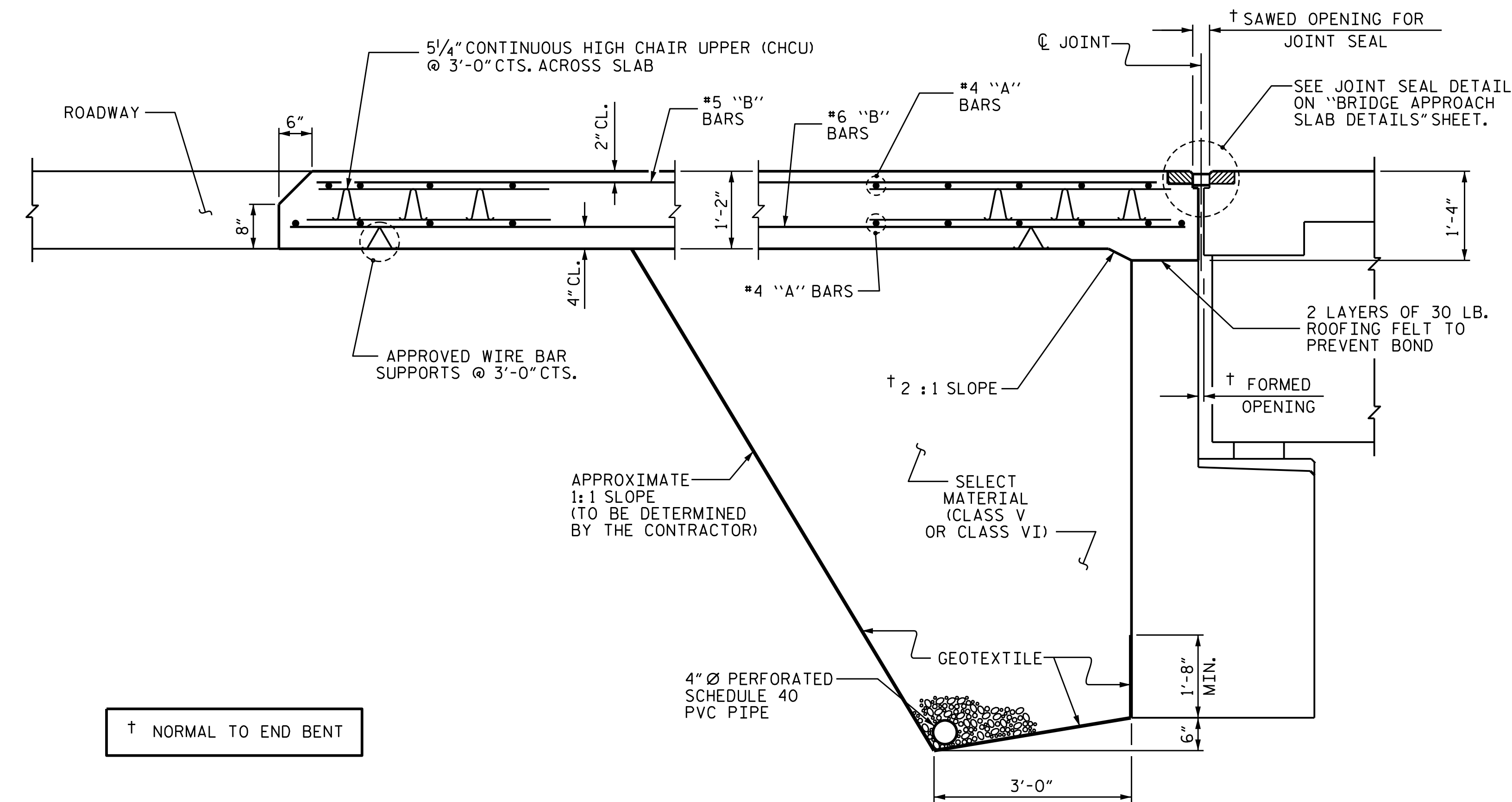


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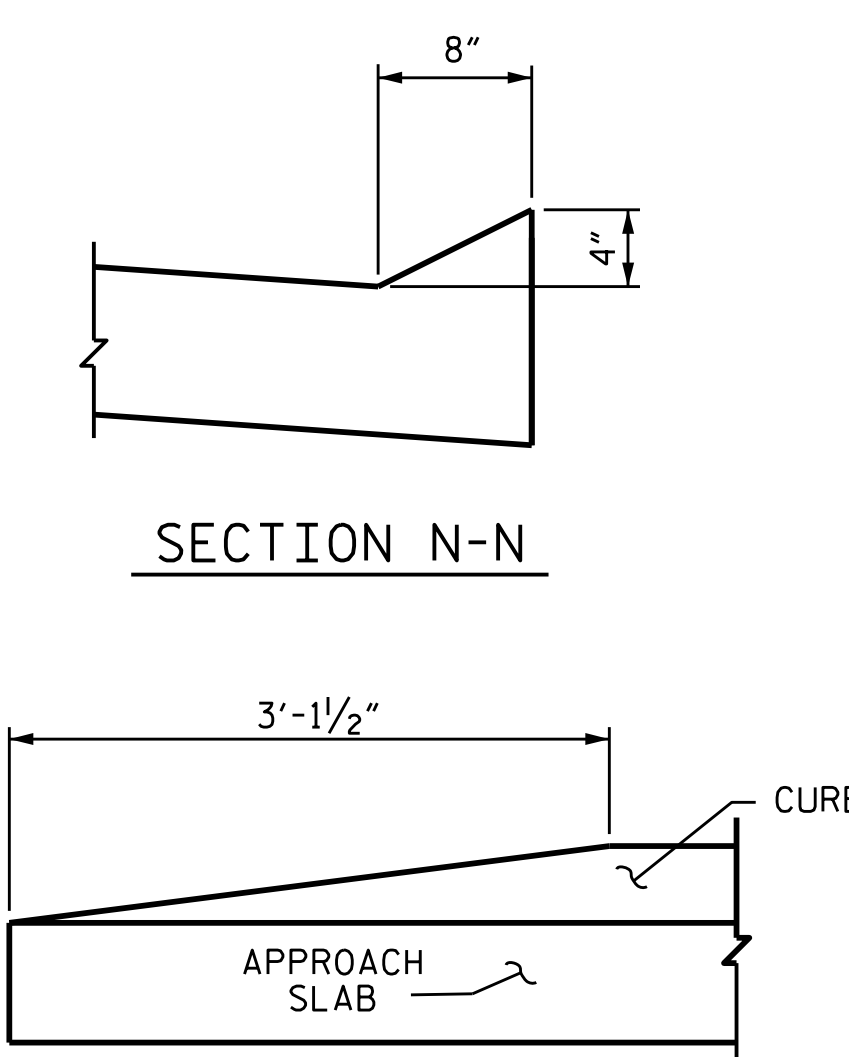
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| NO. | BY: | DATE: | NO. | BY: | DATE: | S-30 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



PLAN @ END BENT 1 PLAN @ END BENT 2
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB
 (TYPE II - MODIFIED APPROACH FILL)



SECTION N-N
 END OF CURB WITHOUT SHOULDER BERM GUTTER

NOTES

- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE I 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.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.
- FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- WITH FOAM JOINT SEAL
- FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.
- THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".
- FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB 1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|---------|--------|
| *A1 | 30 | #4 | STR | 26'-1" | 523 |
| A2 | 32 | #4 | STR | 25'-11" | 554 |
| *B1 | 99 | #5 | STR | 13'-9" | 1420 |
| B2 | 99 | #6 | STR | 14'-8" | 2181 |

| | | |
|---------------------------------|------|------|
| REINFORCING STEEL | LBS. | 2735 |
| *EPOXY COATED REINFORCING STEEL | LBS. | 1943 |

| | | |
|-------------------|-------|------|
| CLASS AA CONCRETE | C. Y. | 32.2 |
|-------------------|-------|------|

APPROACH SLAB AT EB 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|---------|--------|
| *A1 | 30 | #4 | STR | 26'-1" | 523 |
| A2 | 32 | #4 | STR | 25'-11" | 554 |
| *B1 | 99 | #5 | STR | 13'-9" | 1420 |
| B2 | 99 | #6 | STR | 14'-8" | 2181 |

| | | |
|---------------------------------|------|------|
| REINFORCING STEEL | LBS. | 2735 |
| *EPOXY COATED REINFORCING STEEL | LBS. | 1943 |

| | | |
|-------------------|-------|------|
| CLASS AA CONCRETE | C. Y. | 32.2 |
|-------------------|-------|------|

SPLICE LENGTHS

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

| | | | |
|----------------|------------|------------|---------|
| ASSEMBLED BY : | M. SPENCER | DATE : | 07/21 |
| CHECKED BY : | A. FORFA | DATE : | 07/21 |
| DRAWN BY : | EEM 3/95 | REV. 6/13 | MAA/GM |
| CHECKED BY : | VAP 3/95 | REV. 12/17 | MAA/THC |
| | | REV. 06/19 | BNB/THC |



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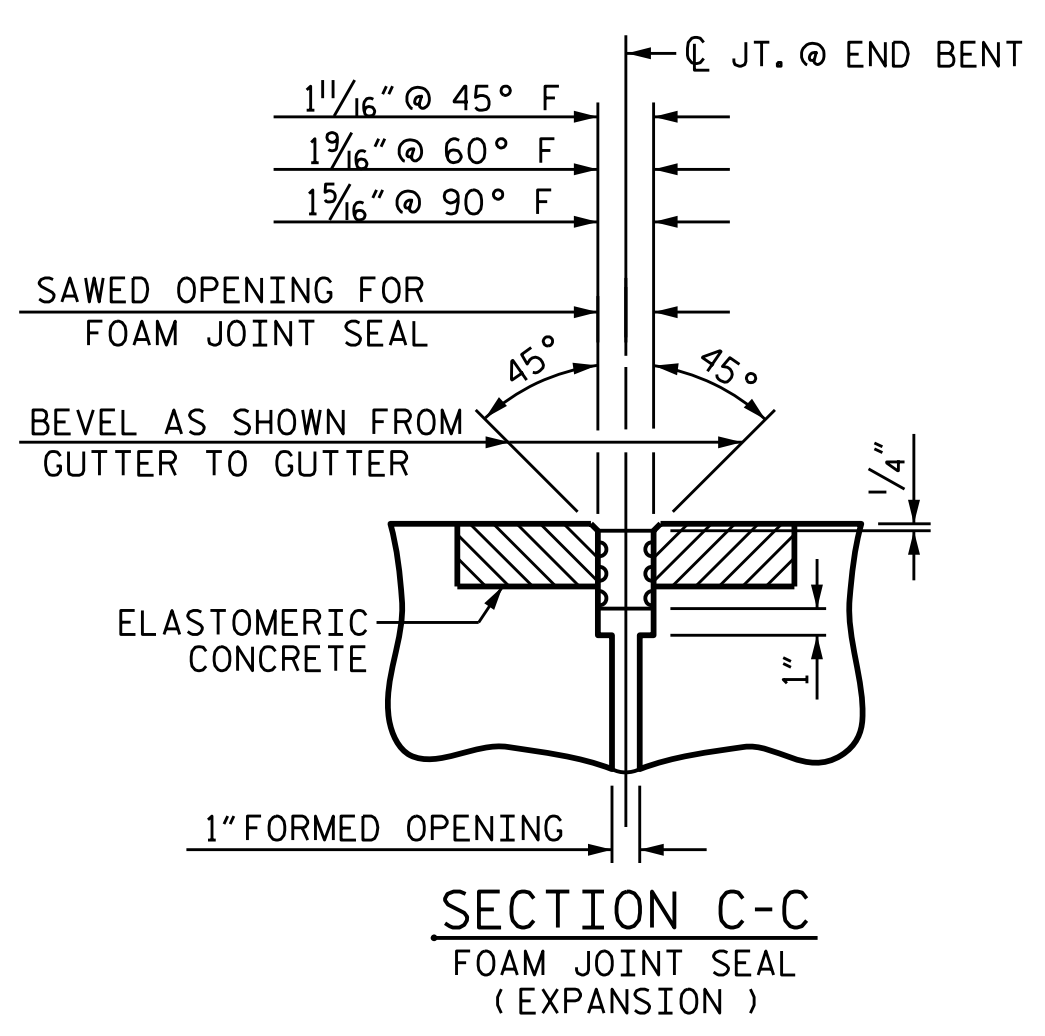
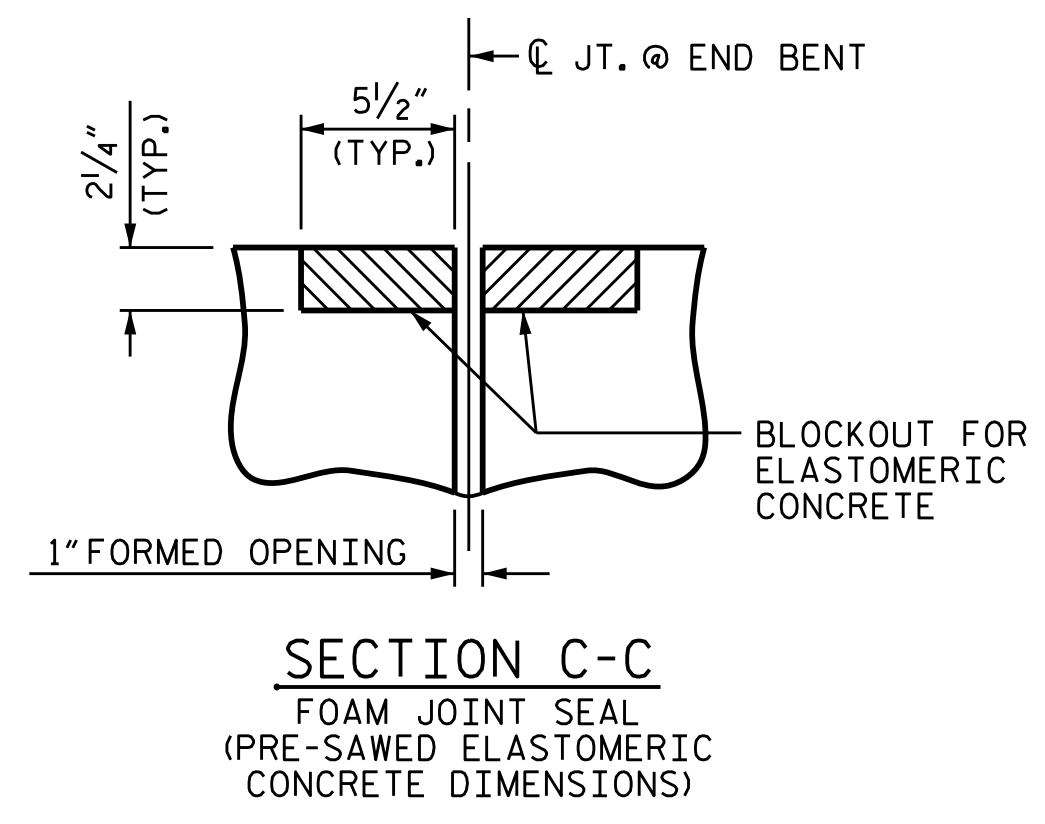


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PROJECT NO. BR-0033
 McDOWELL COUNTY
 STATION: 16+11.51 -L-

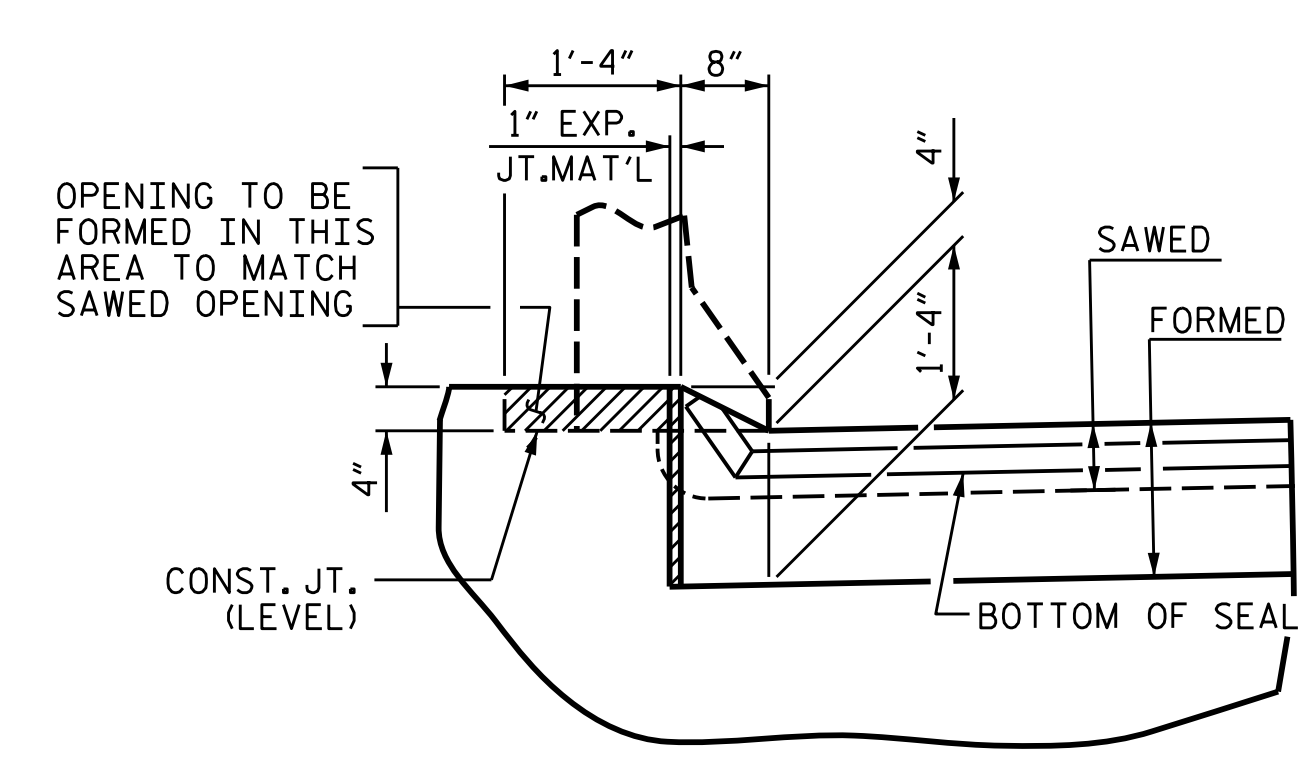
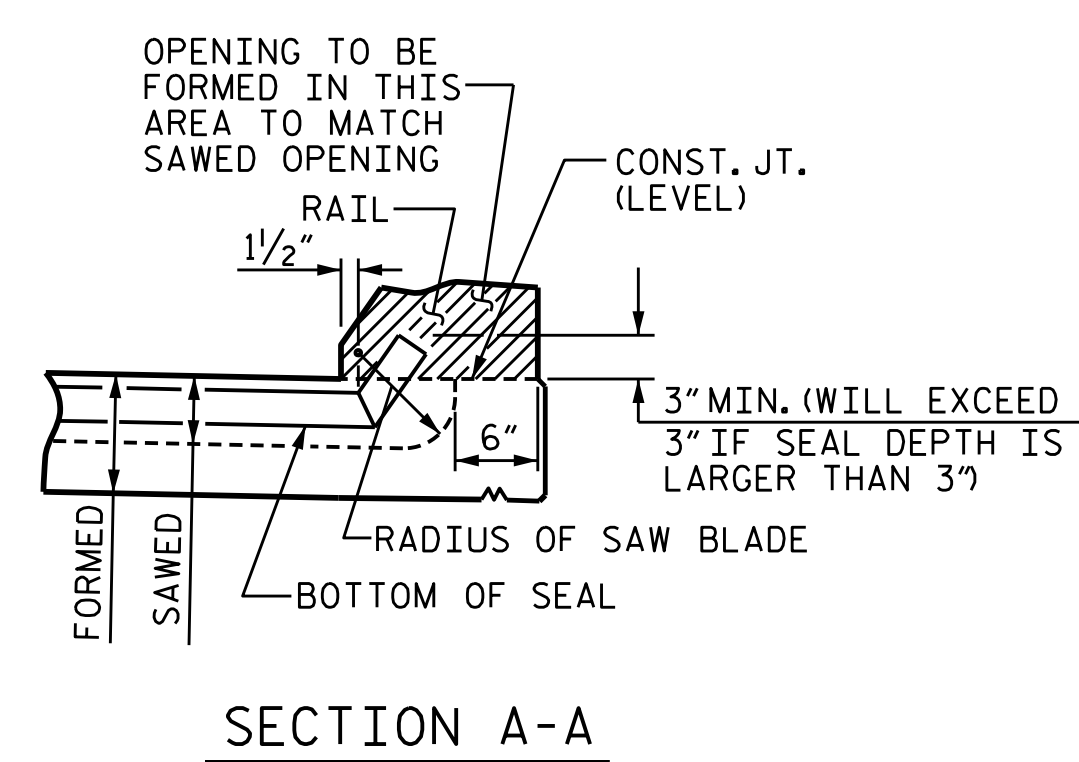
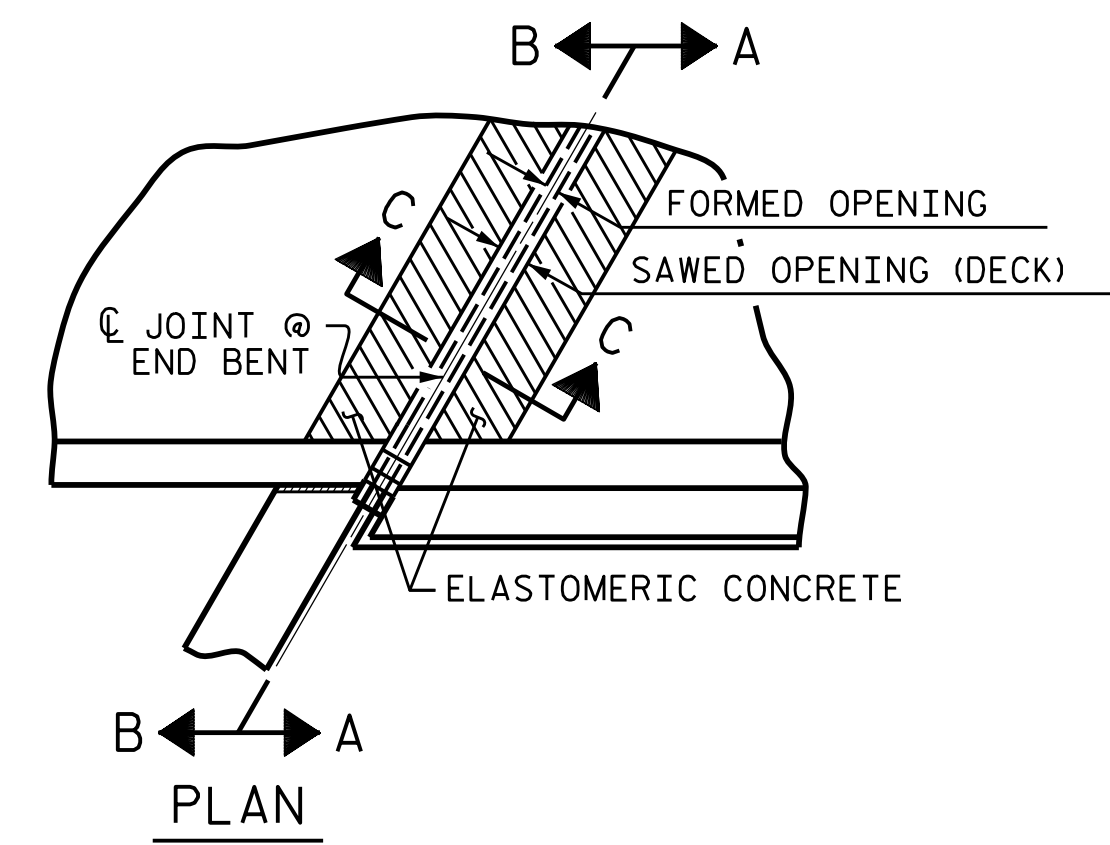
SHEET 1 OF 2
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-31 |
| 1 | | | 3 | | | TOTAL SHEETS 32 |
| 2 | | | 4 | | | |



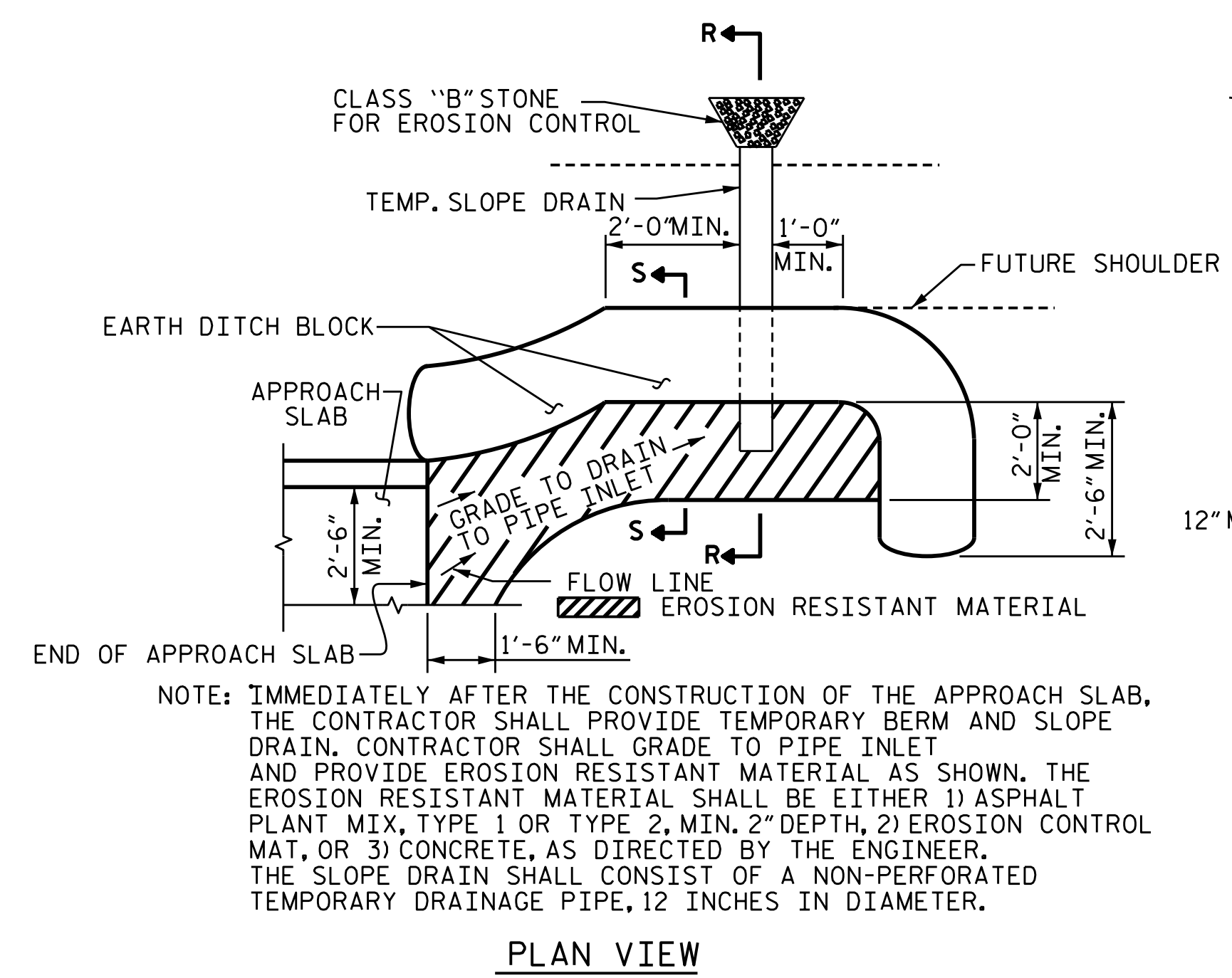
| ELASTOMERIC CONCRETE | |
|----------------------|----------------------------------|
| END BENT NO. | ELASTOMERIC CONCRETE * (CU. FT.) |
| 1 | 8.5 |
| 2 | 8.5 |
| TOTAL | 17.0 |

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

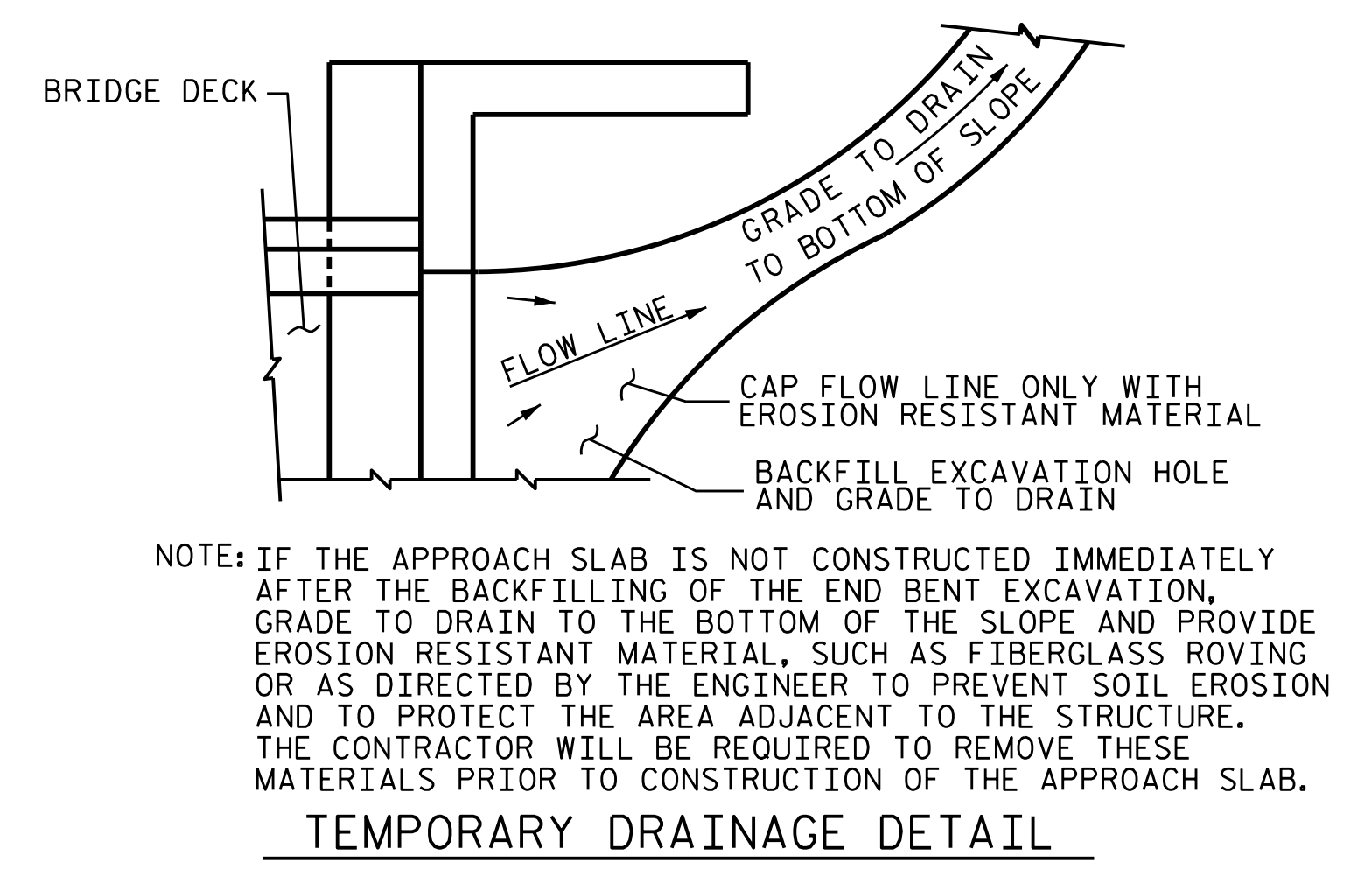
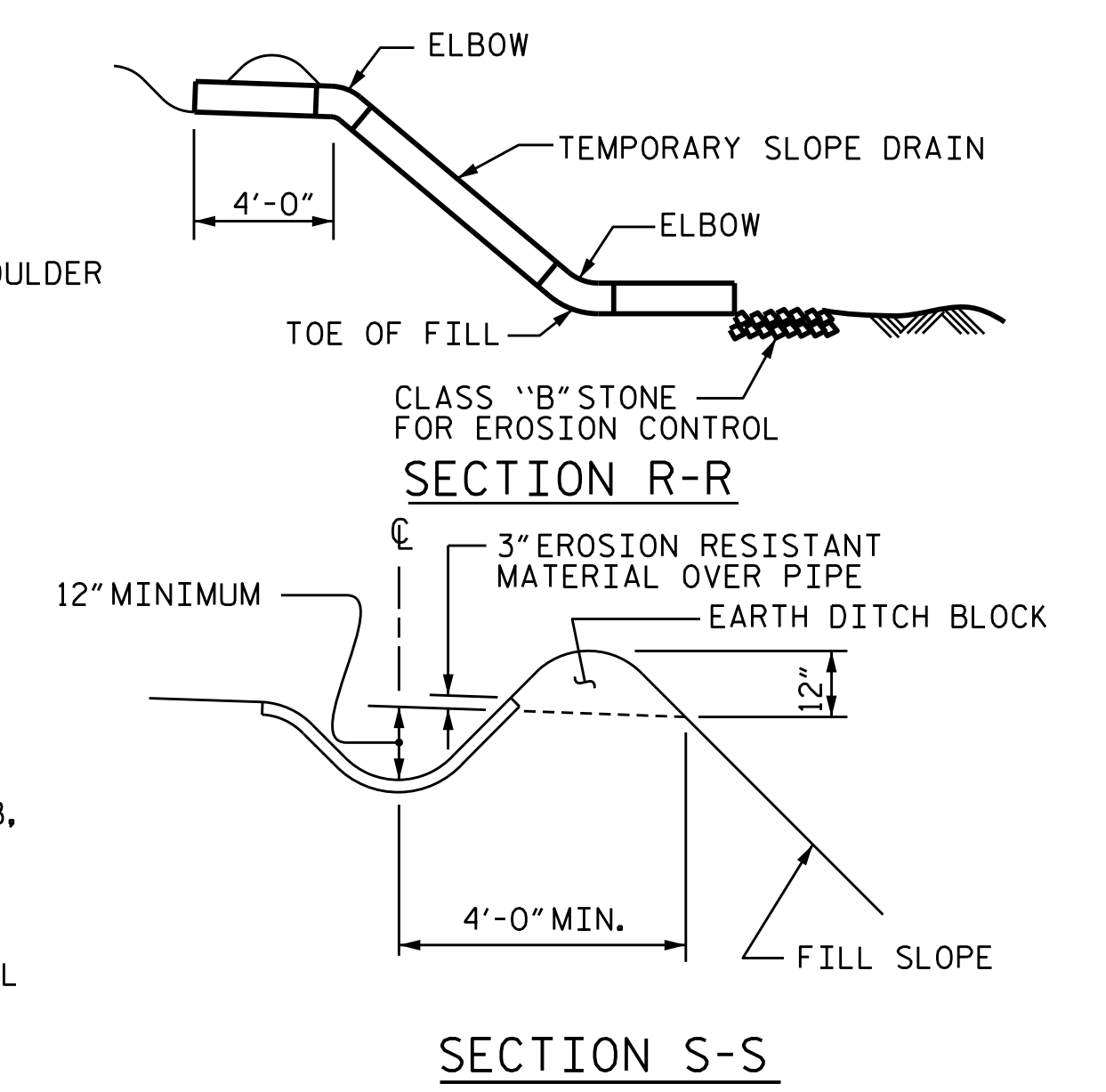


SECTION B-B
JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



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



PROJECT NO. BR-0033
McDOWELL COUNTY
STATION: 16+11.51 -L-

SHEET 2 OF 2

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



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

| | | | |
|----------------|------------|------------|---------|
| ASSEMBLED BY : | M. SPENCER | DATE : | 07/21 |
| CHECKED BY : | A. FORFA | DATE : | 07/21 |
| DRAWN BY : | FCJ 11/88 | REV. 6/13 | MAA/GM |
| CHECKED BY : | ARB 11/88 | REV. 12/17 | MAA/THC |
| | | REV. 5/18 | MAA/THC |



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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 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 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.

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