

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

**GENERAL NOTES:**

ASSUMED LIVE LOAD = AREMA E80 OR ALTERNATE LIVE LOAD

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING, VOL. 2, STRUCTURES", AND "NORFOLK SOUTHERN GUIDELINES FOR DESIGN OF GRADE SEPARATION STRUCTURES, UNDERPASS GRADE SEPARATION DESIGN CRITERIA".

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING VOL. 2, CHP. 9, SEISMIC DESIGN FOR RAILWAY".

REINFORCING STEEL SHALL BE ASTM DESIGNATION A615, GRADE 60. ALL DIMENSIONS RELATING TO BAR SPACING ARE TO BAR CENTERS UNLESS NOTED. FABRICATION TO BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE", A.C.I. 315-80. ALL REINFORCING IN THE CONCRETE DECK SLAB AND PARAPETS SHALL BE EPOXY COATED.

EXPANSION JOINT MATERIAL SHALL BE EITHER RUBBER OR CORK CONFORMING WITH AASHTO SPECIFICATIONS M-153-84 EXCEPT AS SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS. CELLULAR AND BULB TYPE WATERSTOPS AND RUBBER JOINT COMPOUNDS SHALL BE AS SHOWN ON THE PLANS AND IN THE SPECIAL PROVISIONS.

STRUCTURE DRAINAGE SYSTEM: METAL DRAINS BEHIND ABUTMENTS AND IN BALLAST TROUGH OF BRIDGE, INCLUDING DUCTILE IRON PIPE COLLECTOR SYSTEM SHALL BE AS SHOWN ON THE PLANS AND OUTLINED IN THE SPECIAL PROVISIONS. DETAILS OF THE DRAINAGE SYSTEM SHALL BE SUBMITTED TO THE CHIEF ENGINEER BRIDGES AND STRUCTURES, NORFOLK SOUTHERN CORPORATION, ATLANTA, GA. FOR APPROVAL.

DAMPPROOFING: PIER COLUMNS AND BENCH WALLS UP TO GROUND LINE, BACK OF BACKWALL AND ABUTMENT SEATS, AND BACK OF WINGWALLS SHALL BE DAMPPROOFED WITH METHOD "B" DAMPPROOFING.

WATERPROOFING: BRIDGE DECK AND ALL CONSTRUCTION JOINTS WHICH WILL BE COVERED BY FILL SHALL BE WATERPROOFED WITH A COLD LIQUID-APPLIED ELASTOMERIC MEMBRANE. FOR WATERPROOFING, SEE SPECIAL PROVISIONS.

WATERPROOFING IS REQUIRED AT THE FOLLOWING LOCATION:

- BRIDGE DECK AND INSIDE OF CONCRETE PARAPET AS SHOWN ON "TYPICAL SECTION" SHEET.
- ALONG FULL CIRCUMFERENCE/PERIMETER OF EACH BOTTOM OF COLUMN AND BENCH WALL TO TOP OF FOOTING INTERFACE, ALONG TOP AND SIDES OF FOOTING AT CONSTRUCTION JOINTS.
- ALONG FILL FACE OF ALL HORIZONTAL AND VERTICAL CONSTRUCTION JOINTS AT EACH ABUTMENT.

WATERPROOFING SHALL BE 24" WIDE AND SHALL BE CENTERED OVER JOINTS OR CRACKS.

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

ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES", JANUARY 2018, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (HEREIN CALLED STANDARD SPECIFICATIONS), EXCEPT AS NOTED HEREIN, ELSEWHERE ON PLANS, OR IN THE SPECIAL PROVISIONS (STRUCTURAL STEEL IN ACCORDANCE WITH THE 2016 AREMA SPECIFICATIONS).

ALL CONCRETE SHALL BE 4,500 PSI CLASS AA CONCRETE WITH NO. 57 OR 67 COARSE AGGREGATE AND SHALL BE AIR-ENTRAINED. MINIMUM CEMENT CONTENT PER CUBIC YARD OF CONCRETE SHALL BE 6.5 BAGS. NO SUBSTITUTION OF FLYASH, BLAST FURNACE SLAG OR OTHER MATERIAL WILL BE PERMITTED IN MEETING THIS MINIMUM CEMENT REQUIREMENT. CHAMFER ALL EXPOSED EDGES AND CORNERS 3/4" EXCEPT AS NOTED. THE USE OF GROUND GRANULATED BLAST FURNACE SLAG IS NOT PERMITTED IN THIS STRUCTURE.

CONTROL OF WORK: ALL WORK INVOLVED IN THE CONSTRUCTION OF THE RAILWAY STRUCTURE SHALL BE PERFORMED SATISFACTORY TO THE ENGINEER AND COMPLIANT WITH THE DESIGN STANDARDS OF NORFOLK SOUTHERN RAILWAY COMPANY. ALL METHODS OF HANDLING THE WORK AFFECTING THE SAFETY OF RAIL OPERATIONS MUST BE APPROVED BY THE RAILWAY COMPANY, AS A SUBMITTAL THROUGH THE ENGINEER, AT LEAST TWO WEEKS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. RAIL TRAFFIC SHALL, AT ALL TIMES, BE MAINTAINED AND PROTECTED. THE CONTRACTOR SHALL NOT AT ANY TIME DELAY OR INTERFERE WITH RAIL OPERATIONS.

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

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

FOR METAL RAIL (STEEL) AND FENCE, SEE SPECIAL PROVISIONS.

FOR METAL RAIL (ALUMINUM), SEE SPECIAL PROVISIONS.

FOR SELF-LUBRICATING EXPANSION BEARING ASSEMBLIES, SEE SPECIAL PROVISIONS.

FOR CONDUIT IN PARAPETS, SEE SPECIAL PROVISIONS.

FOR PORTLAND CEMENT, SEE SPECIAL PROVISIONS.

FOR FINE AND COARSE AGGREGATE, SEE SPECIAL PROVISIONS.

SEE "STRUCTURAL STEEL DETAILS" SHEET FOR STRUCTURAL STEEL NOTES.

FOR BACKFILL BEHIND ABUTMENTS AND OTHER BACKFILL AROUND THE STRUCTURE, SEE SPECIAL PROVISION "BACKFILLING AROUND STRUCTURES".

FOR PAINTING STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR WATERSTOPS, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC FLASHING, SEE SPECIAL PROVISIONS.

FOR RUBBER JOINT COMPOUNDS, SEE SPECIAL PROVISIONS.

FOR STRUCTURE DRAINAGE SYSTEM, SEE SPECIAL PROVISIONS.

FOR STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR RAILROAD TRACKWORK, SEE RAILROAD TRACKWORK PLANS.

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

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.

FOR CONCRETE PARAPET, SEE SPECIAL PROVISIONS.

FOR WATERPROOFING, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR APPLICATION OF BRIDGE COATING, SEE SPECIAL PROVISIONS.

FOR TEMPORARY RAILROAD SHORING, SEE SPECIAL PROVISIONS.

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

FOR EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

FOR JOINT SEALANT, SEE SPECIAL PROVISIONS.

**INDEX OF DRAWINGS**

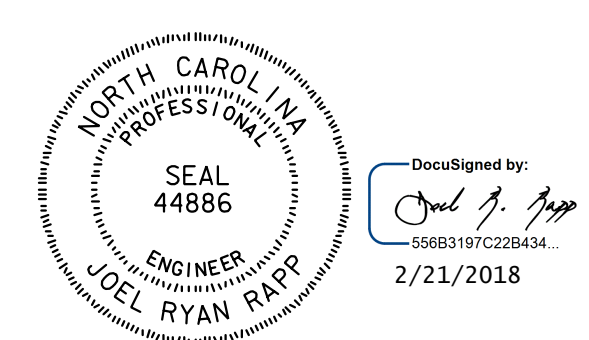
- GENERAL DRAWING: GENERAL PLAN & ELEVATION (SHEET 1 OF 4)
- GENERAL DRAWING: FOUNDATION LAYOUT AND FOUNDATION NOTES (SHEET 2 OF 4)
- GENERAL DRAWING: LOCATION SKETCH AND TOTAL BILL OF MATERIAL (SHEET 3 OF 4)
- GENERAL DRAWING: GENERAL NOTES (SHEET 4 OF 4)
- SUPERSTRUCTURE: TYPICAL SECTION
- SUPERSTRUCTURE: DECK DETAILS
- SUPERSTRUCTURE: PLAN OF DECK - SPAN A
- SUPERSTRUCTURE: PLAN OF DECK - SPAN B
- SUPERSTRUCTURE: PLAN OF DECK - SPAN C
- SUPERSTRUCTURE: PLAN OF DECK - SPAN D
- SUPERSTRUCTURE: FRAMING PLAN AND GIRDER DETAILS - SPAN A AND SPAN D
- SUPERSTRUCTURE: FRAMING PLAN AND GIRDER DETAILS - SPAN B
- SUPERSTRUCTURE: FRAMING PLAN AND GIRDER DETAILS - SPAN C
- SUPERSTRUCTURE: STRUCTURAL STEEL DETAILS
- SUPERSTRUCTURE: BEARING DETAILS - SPAN A AND SPAN D
- SUPERSTRUCTURE: BEARING DETAILS - SPAN B AND SPAN C
- SUPERSTRUCTURE: EXPANSION PLATE DETAILS
- SUPERSTRUCTURE: PARAPET DETAILS (SHEET 1 OF 2)
- SUPERSTRUCTURE: PARAPET DETAILS (SHEET 2 OF 2)
- SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS (SHEET 1 OF 3)
- SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS (SHEET 2 OF 3)
- SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS (SHEET 3 OF 3)
- SUPERSTRUCTURE: BILL OF MATERIAL
- SUBSTRUCTURE: ABUTMENT 1 SHORING
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 1 OF 6)
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 2 OF 6)
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 3 OF 6)
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 4 OF 6)
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 5 OF 6)
- SUBSTRUCTURE: ABUTMENT 1 (SHEET 6 OF 6)
- SUBSTRUCTURE: PIER 1 SHORING
- SUBSTRUCTURE: PIER 1 (SHEET 1 OF 4)
- SUBSTRUCTURE: PIER 1 (SHEET 2 OF 4)
- SUBSTRUCTURE: PIER 1 (SHEET 3 OF 4)
- SUBSTRUCTURE: PIER 1 (SHEET 4 OF 4)
- SUBSTRUCTURE: PIER 2 (SHEET 1 OF 3)
- SUBSTRUCTURE: PIER 2 (SHEET 2 OF 3)
- SUBSTRUCTURE: PIER 2 (SHEET 3 OF 3)
- SUBSTRUCTURE: PIER 3 SHORING
- SUBSTRUCTURE: PIER 3 (SHEET 1 OF 4)
- SUBSTRUCTURE: PIER 3 (SHEET 2 OF 4)
- SUBSTRUCTURE: PIER 3 (SHEET 3 OF 4)
- SUBSTRUCTURE: PIER 3 (SHEET 4 OF 4)
- SUBSTRUCTURE: ABUTMENT 2 SHORING
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 1 OF 6)
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 2 OF 6)
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 3 OF 6)
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 4 OF 6)
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 5 OF 6)
- SUBSTRUCTURE: ABUTMENT 2 (SHEET 6 OF 6)
- STRUCTURE: DRAINAGE DETAILS (SHEET 1 OF 4)
- STRUCTURE: DRAINAGE DETAILS (SHEET 2 OF 4)
- STRUCTURE: DRAINAGE DETAILS (SHEET 3 OF 4)
- STRUCTURE: DRAINAGE DETAILS (SHEET 4 OF 4)
- SLOPE PROTECTION (SHEET 1 OF 2)
- SLOPE PROTECTION (SHEET 2 OF 2)

FOR TRACK 1 SUPERSTRUCTURE SHEETS, REFER TO "BRIDGE ON STATION TRACK 1 OVER W TRADE STREET" PLANS.

FOR PIER 2 COLUMNS AND DRILLED PIERS, REFER TO P-5705BA (RD-18002) PLANS (BY OTHERS).

**PROJECT NO.** P-5705BA  
**MECKLENBURG COUNTY**  
**STATION:** POT STA. 23+62.98 -S2-

SHEET 4 OF 4

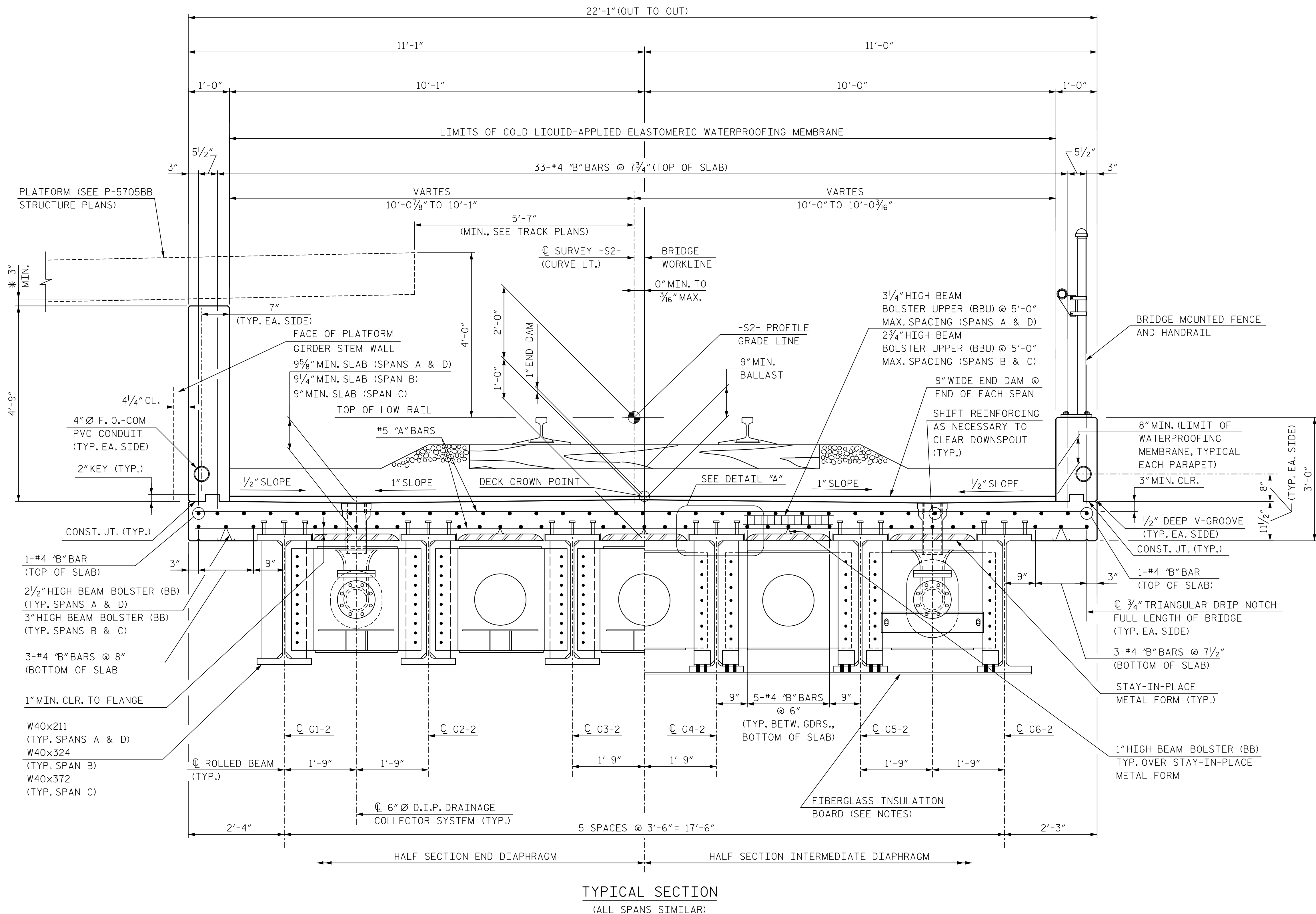


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
 RALEIGH  
**GENERAL DRAWING**  
**GENERAL NOTES**

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	<b>REVISIONS</b>					SHEET NO. S5-4 TOTAL SHEETS 56	
	<b>NO.</b>	<b>BY</b>	<b>DATE</b>	<b>NO.</b>	<b>BY</b>		<b>DATE</b>
	1		8/17	3			
DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>R. RAPP</u> DATE <u>9/17</u>	DWG. NO. 4						





**NOTES FOR SIGNAL CONDUIT IN PARAPET**

SIGNAL CONDUIT TO BE 4\"/>

PROVISIONS SHALL BE MADE FOR EXPANSION BETWEEN DECK SLABS AT EXPANSION JOINTS AT PIERS 1, 2 & 3 (GALVANIZED EXPANSION FITTINGS).

COUPLING SHALL BE PROVIDED BEHIND BACKWALL OF ABUTMENT 1 AND 2 FOR CONNECTION TO 4\"/>

FOR SIGNAL CONDUIT IN PARAPET SEE PROJECT SPECIAL PROVISIONS.

**NOTES:**

ALL REINFORCING STEEL IN THE DECK AND PARAPETS SHALL BE EPOXY COATED. CLEAR COVER TO ALL REINFORCING IS 2\"/>

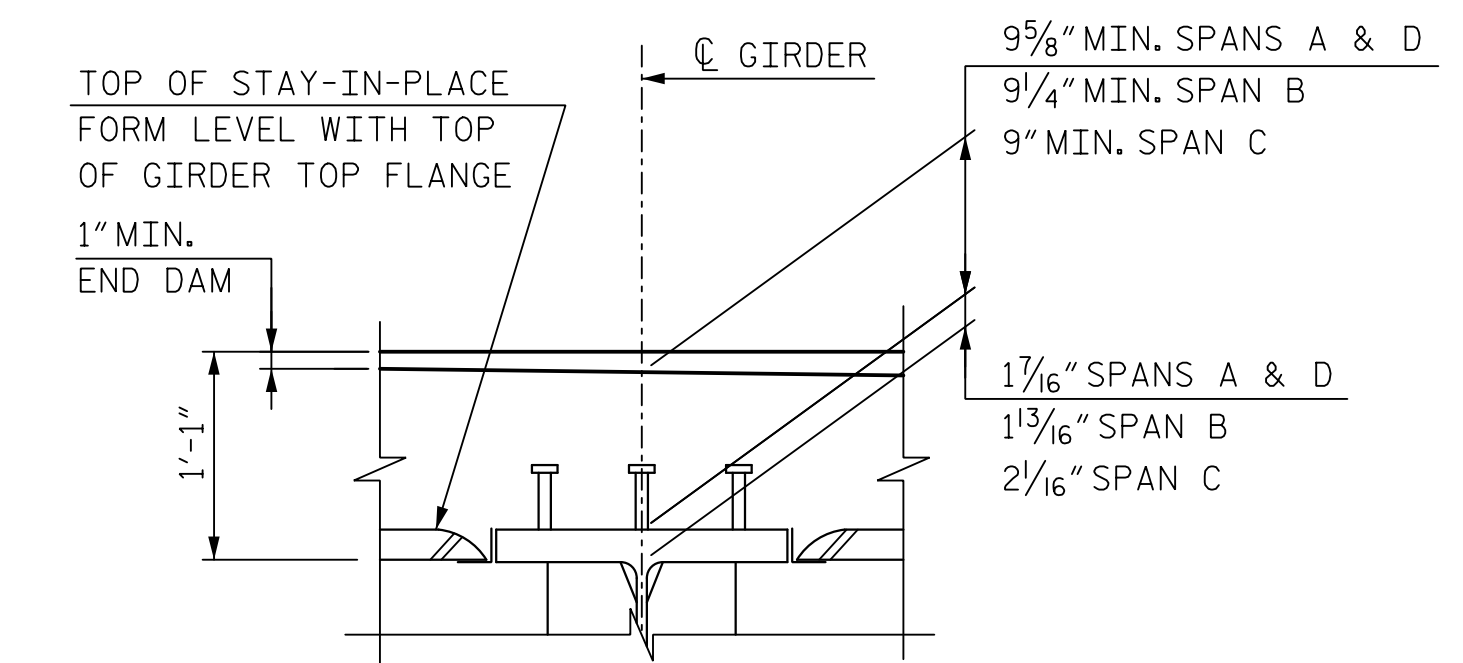
FOR BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS, SEE 'BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS' SHEETS.

FOR PARAPET DETAILS, SEE 'PARAPET DETAILS' SHEETS.

DESIGN INCLUDES WEIGHT OF 6\"/>

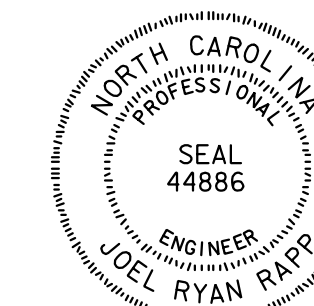
FOR FIBERGLASS INSULATION BOARD DETAILS, INCLUDING CONNECTIONS TO GIRDERS, REFER TO ELECTRIC TRACTION PLANS. SHOP DRAWINGS FOR THE BRIDGE SHIELDING SYSTEM ARE REQUIRED AND SHALL BE SUBMITTED FOR APPROVAL.

\* MINIMUM GAP REMAINING AFTER CONSIDERING ALL PLATFORM DEFLECTIONS.



**DETAIL "A"**

**PROJECT NO.** P-5705BA  
**MECKLENBURG COUNTY**  
**STATION:** POT STA. 23+62.98 -S2-



DocuSigned by:  
 [Signature]  
 368631912228434...  
 2/21/2018

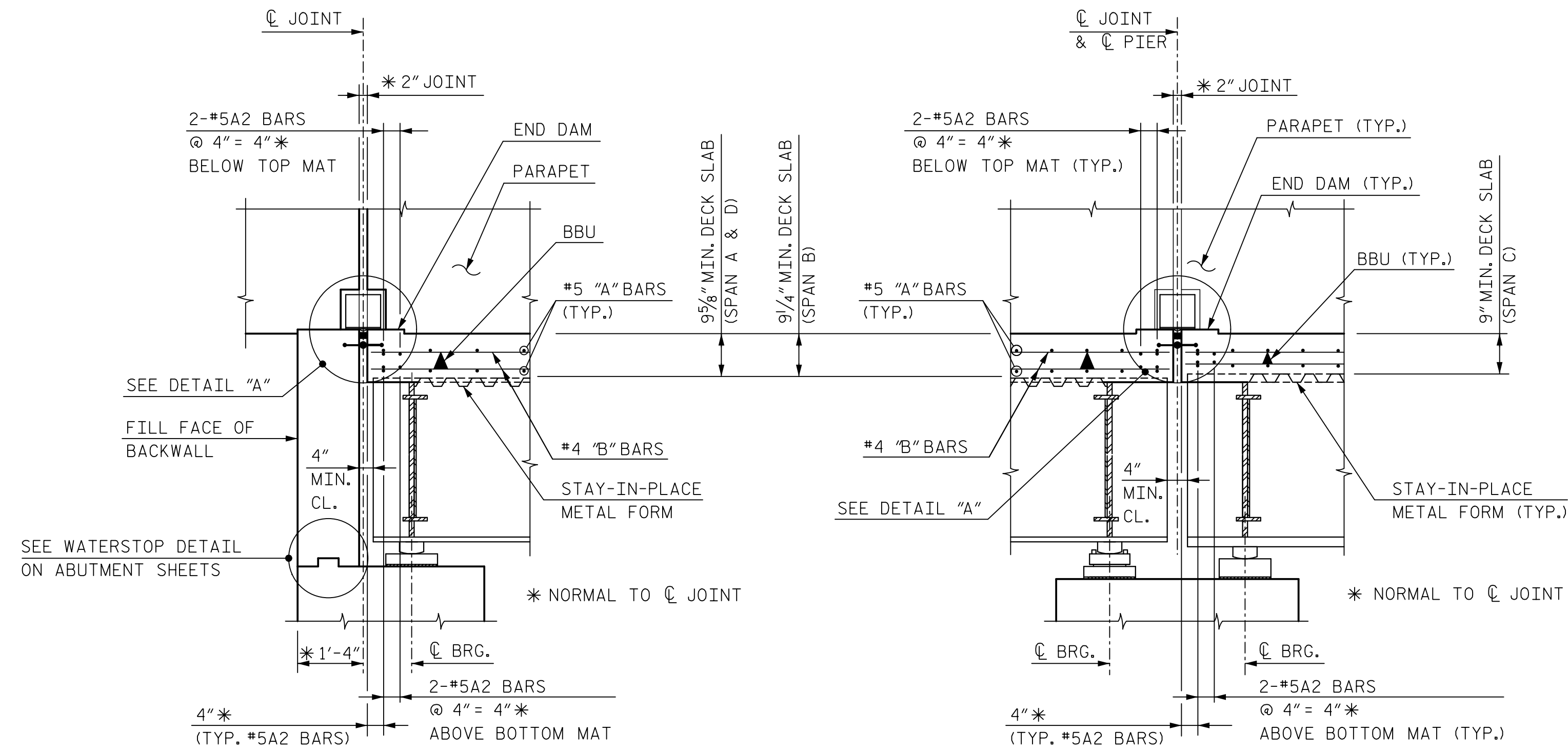
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**HNTB** HNTB NORTH CAROLINA, P.C.  
 NC License No. C-1554  
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: J. JEFFERS DATE: 8/17  
 CHECKED BY: R. RAPP DATE: 9/17 DWG. NO. 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

REVISIONS						SHEET NO. S5-5
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			56

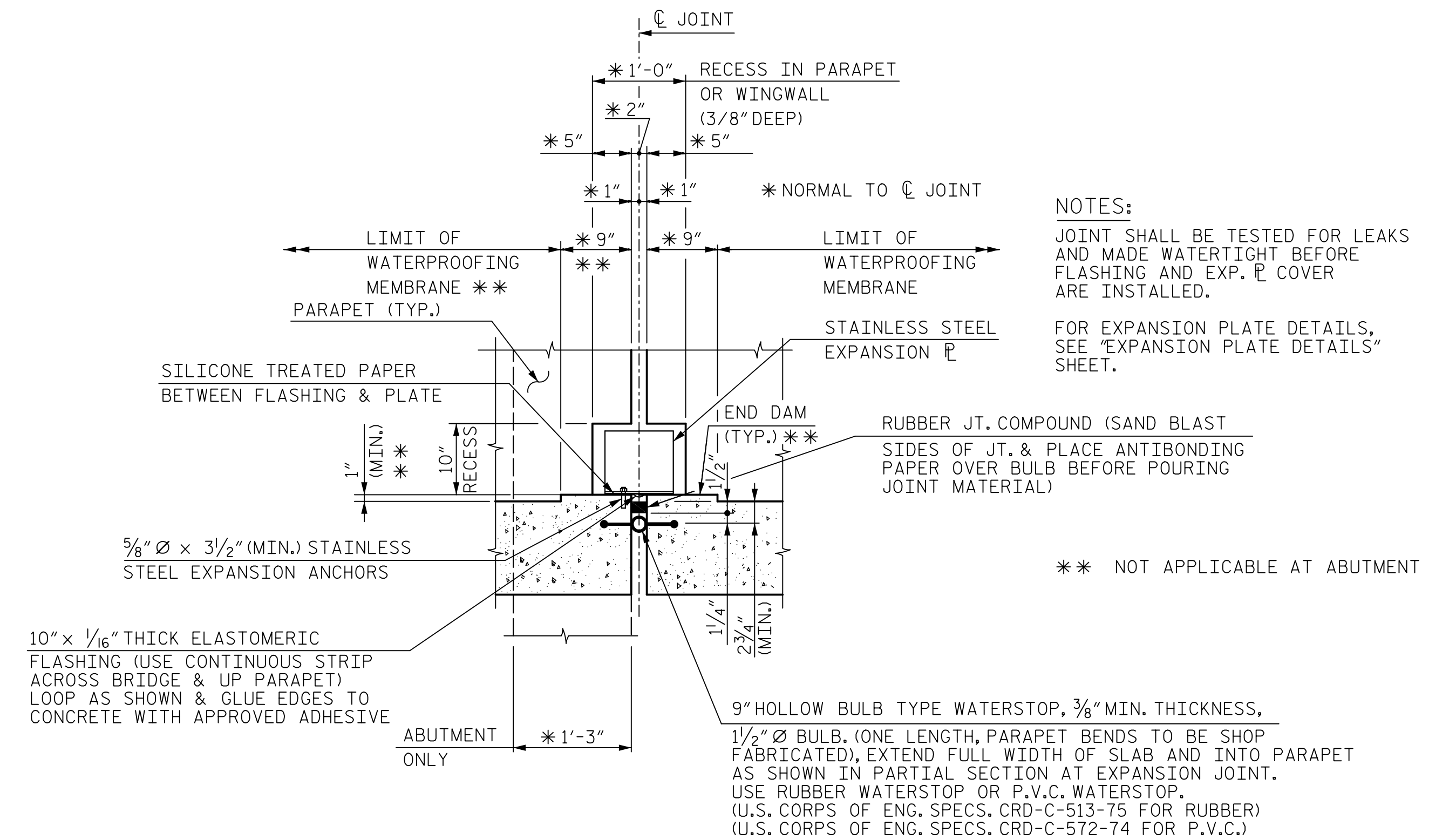


SECTION A-A

(ABUT. 1 SHOWN, ABUT. 2 SIMILAR)

SECTION B-B

(PIERS 1, 2, & 3)  
(PIER 1 SHOWN, PIERS 2 & 3 SIMILAR)



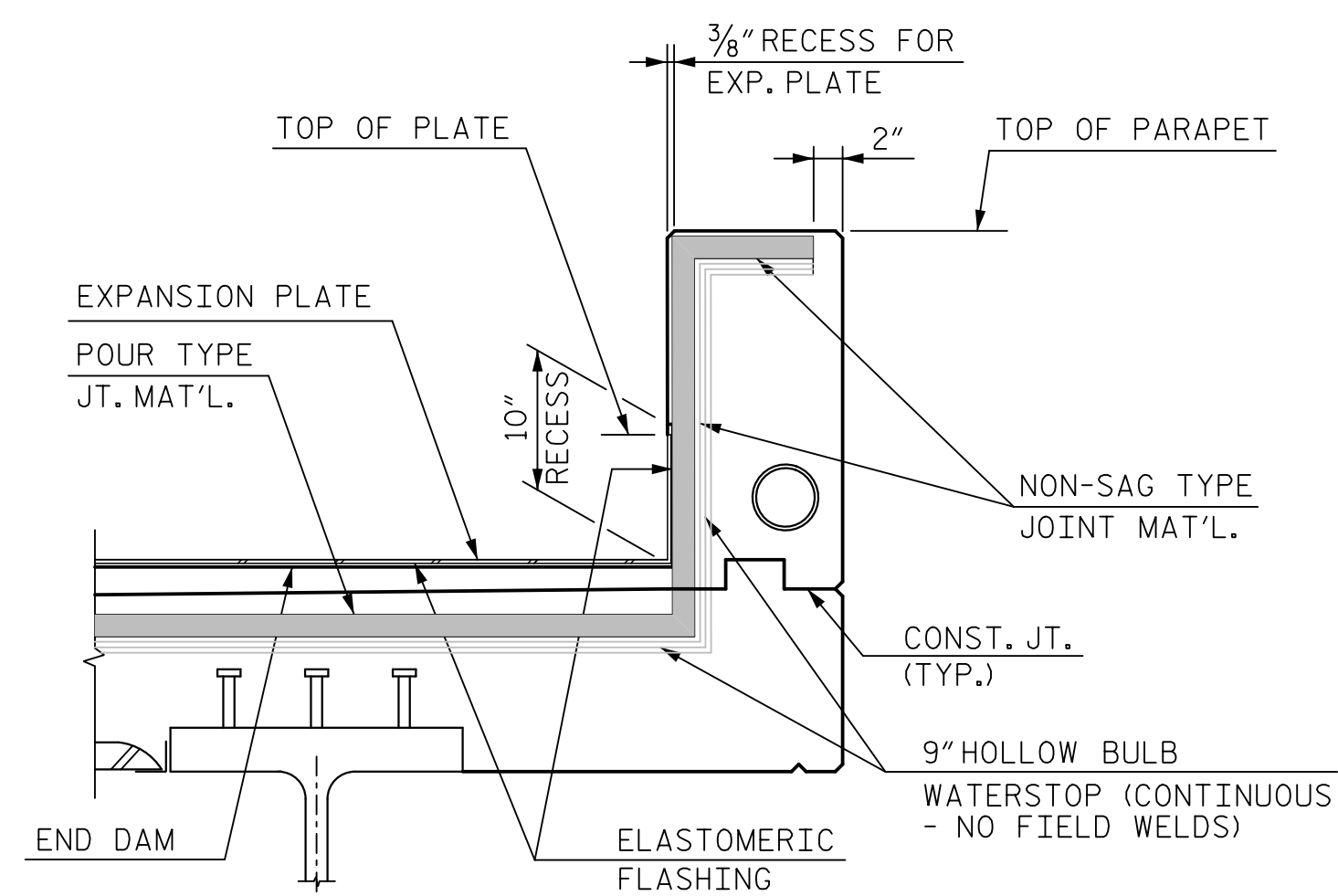
DETAIL "A"

(DECK REBAR NOT SHOWN FOR CLARITY)

NOTES:  
JOINT SHALL BE TESTED FOR LEAKS AND MADE WATERTIGHT BEFORE FLASHING AND EXP. PLATE COVER ARE INSTALLED.

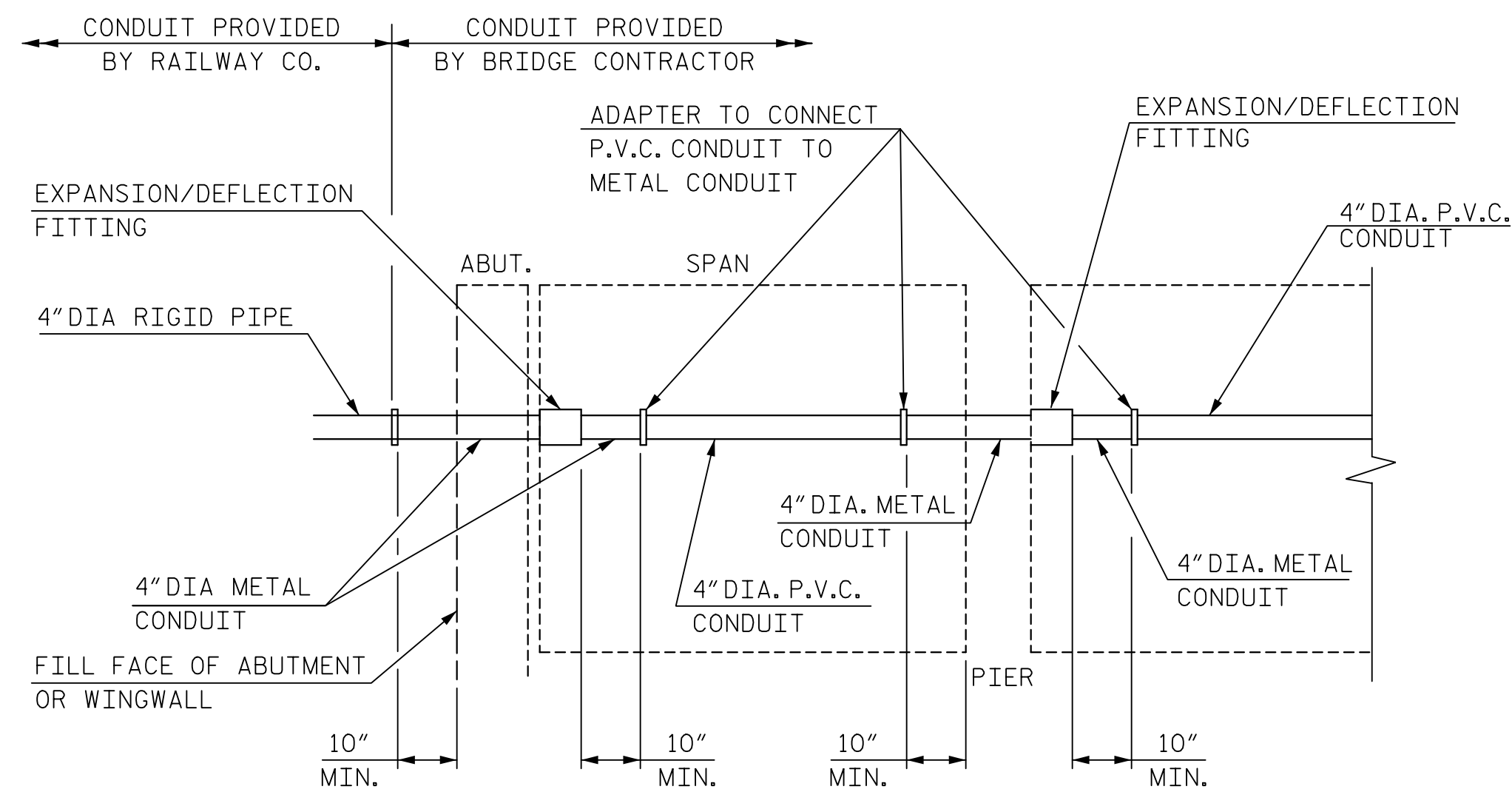
FOR EXPANSION PLATE DETAILS, SEE "EXPANSION PLATE DETAILS" SHEET.

\*\* NOT APPLICABLE AT ABUTMENT



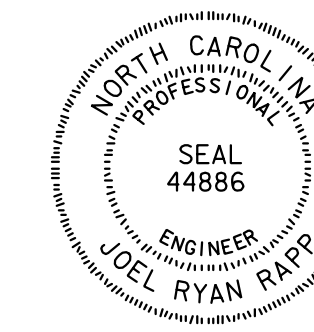
PART SECTION AT EXPANSION JOINT

NOTE: FOR ADDITIONAL PARAPET DETAILS, SEE "PARAPET DETAILS" SHEETS.



CONDUIT LAYOUT

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-



DocuSigned by:  
 55663197C228434  
 2/21/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

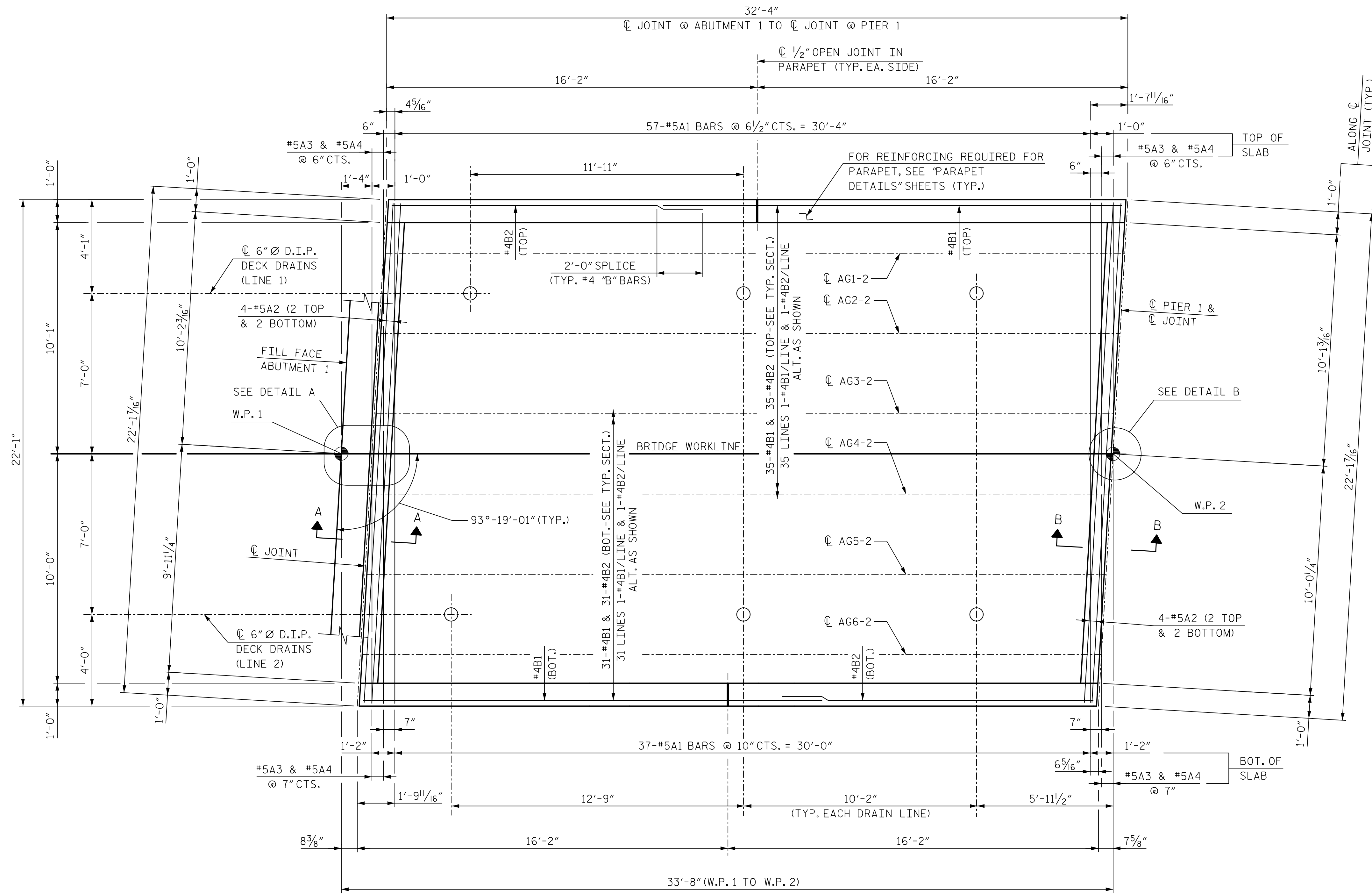
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE

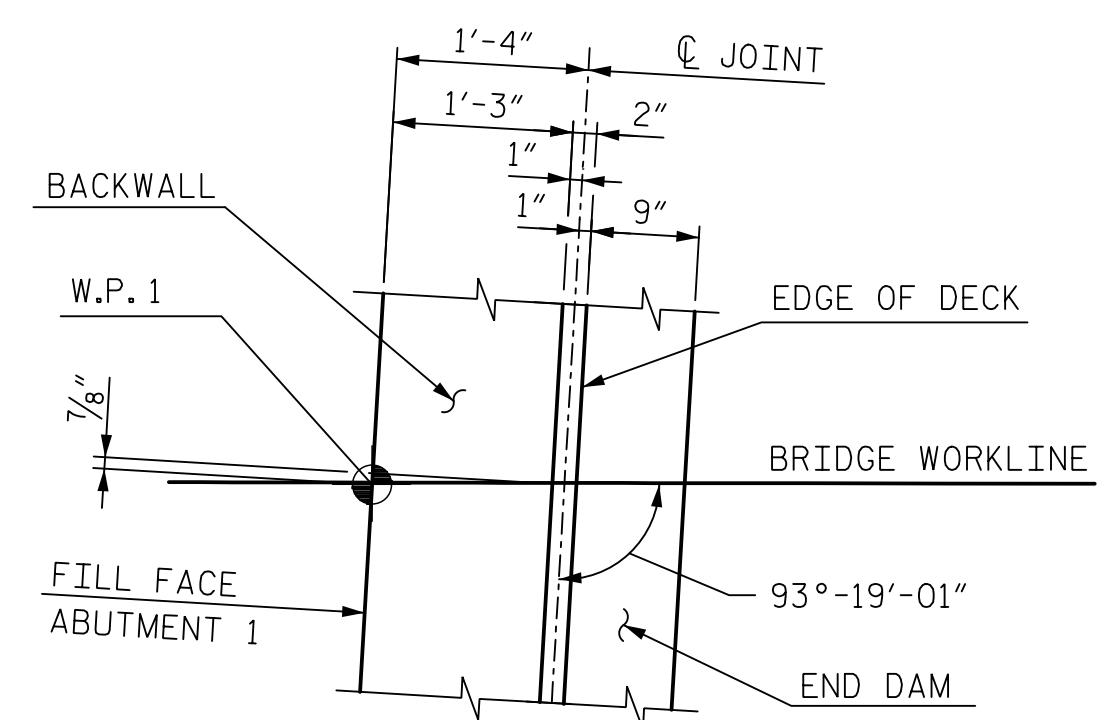
DECK DETAILS

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	DRAWN BY <u>B. VAUGHN</u> CHECKED BY <u>R. RAPP</u>	DATE <u>8/17</u> DATE <u>9/17</u>	DWG. NO. <u>6</u>	REVISIONS			SHEET NO. S5-6
				NO. <u>1</u> BY DATE	NO. <u>3</u> BY DATE	NO. <u>4</u> BY DATE	TOTAL SHEETS 56

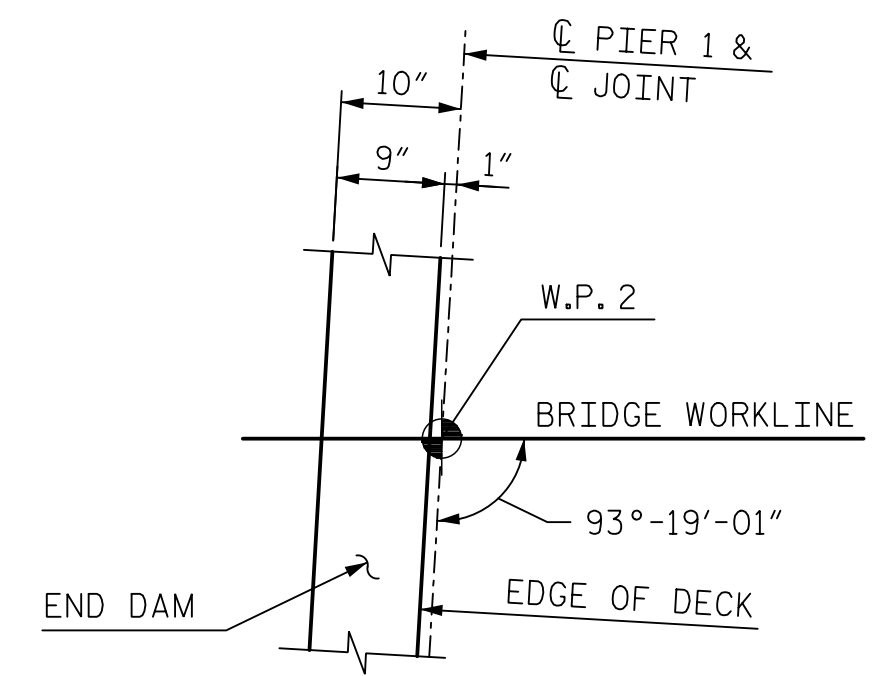




PLAN - SPAN A



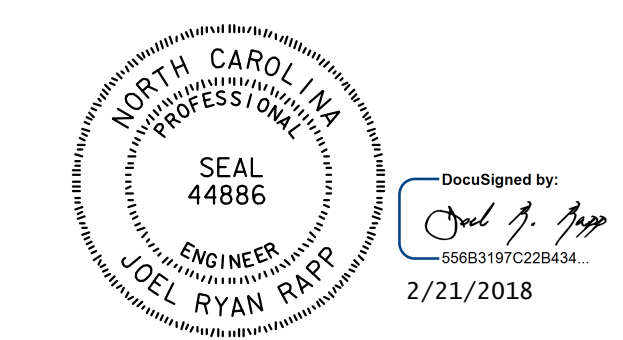
DETAIL A



DETAIL B

**NOTES:**  
 ALL REINFORCING SHALL BE EPOXY COATED.  
 FOR SECTIONS A-A & B-B SEE "DECK DETAILS" SHEET.  
 FOR DECK DRAIN DETAIL SEE DETAIL "B" ON "STRUCTURE: DRAINAGE DETAILS", SHEET 2 OF 4.  
 FOR PARAPET DETAILS, SEE "PARAPET DETAILS" SHEETS.  
 SLAB BARS MAY BE ADJUSTED TO AVOID DECK DRAIN LOCATIONS.

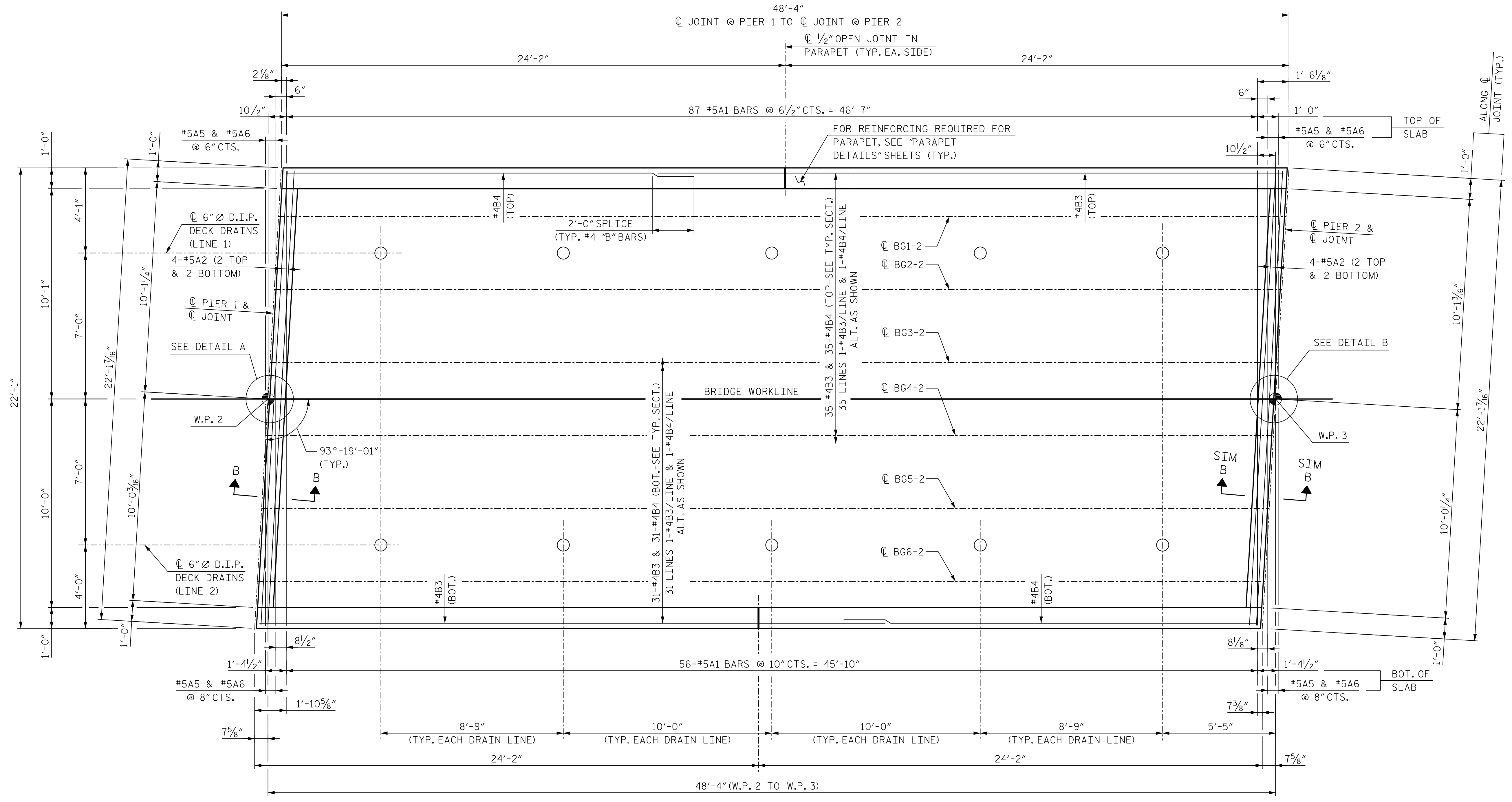
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-



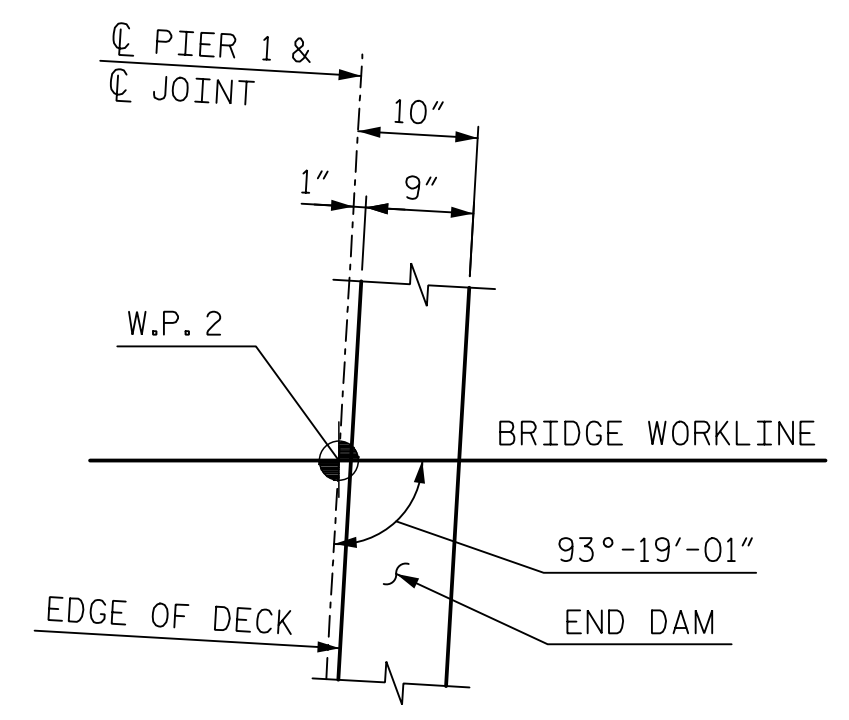
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF DECK - SPAN A

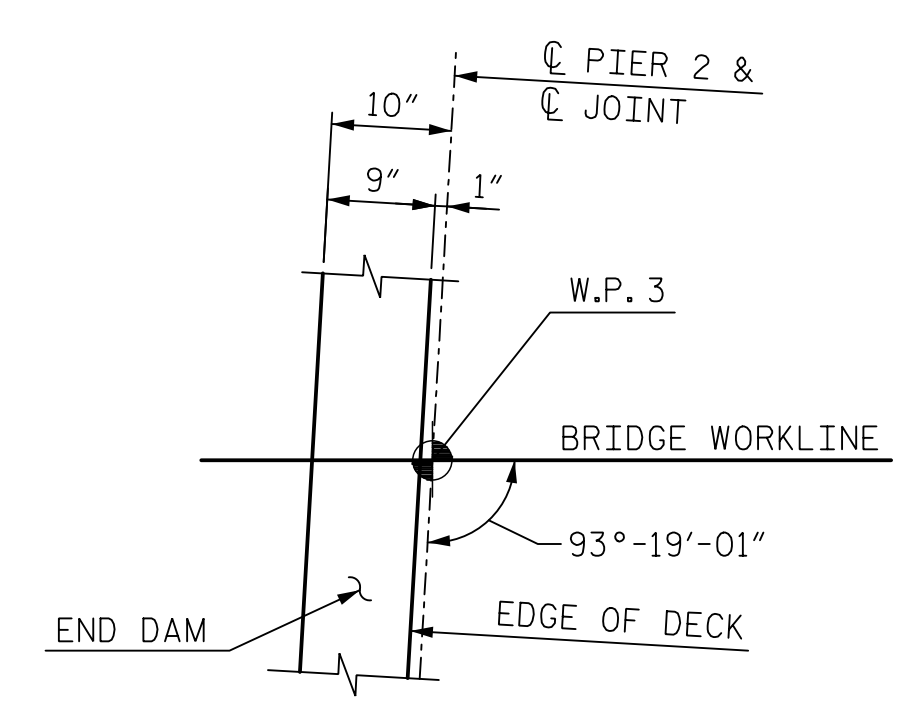
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-7 TOTAL SHEETS 56	
	DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>K. ERVIN</u> DATE <u>9/17</u>	NO. <u>1</u> BY <u>   </u> DATE <u>   </u>	NO. <u>3</u> BY <u>   </u> DATE <u>   </u>	NO. <u>   </u> BY <u>   </u> DATE <u>   </u>	NO. <u>   </u> BY <u>   </u> DATE <u>   </u>		NO. <u>   </u> BY <u>   </u> DATE <u>   </u>
	DWG. NO. <u>7</u>	NO. <u>2</u> BY <u>   </u> DATE <u>   </u>	NO. <u>4</u> BY <u>   </u> DATE <u>   </u>	NO. <u>   </u> BY <u>   </u> DATE <u>   </u>	NO. <u>   </u> BY <u>   </u> DATE <u>   </u>		



PLAN - SPAN B



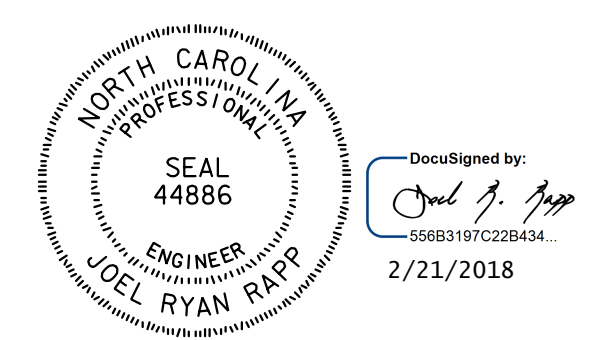
DETAIL A



DETAIL B

- NOTES:**
- ALL REINFORCING SHALL BE EPOXY COATED.
  - FOR SECTION B-B SEE "DECK DETAILS" SHEET.
  - FOR DECK DRAIN DETAIL SEE DETAIL "B" ON "STRUCTURE DRAINAGE DETAILS", SHEET 2 OF 4.
  - FOR PARAPET DETAILS, SEE "PARAPET DETAILS" SHEETS.
  - SLAB BARS MAY BE ADJUSTED TO AVOID DECK DRAIN LOCATIONS.

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

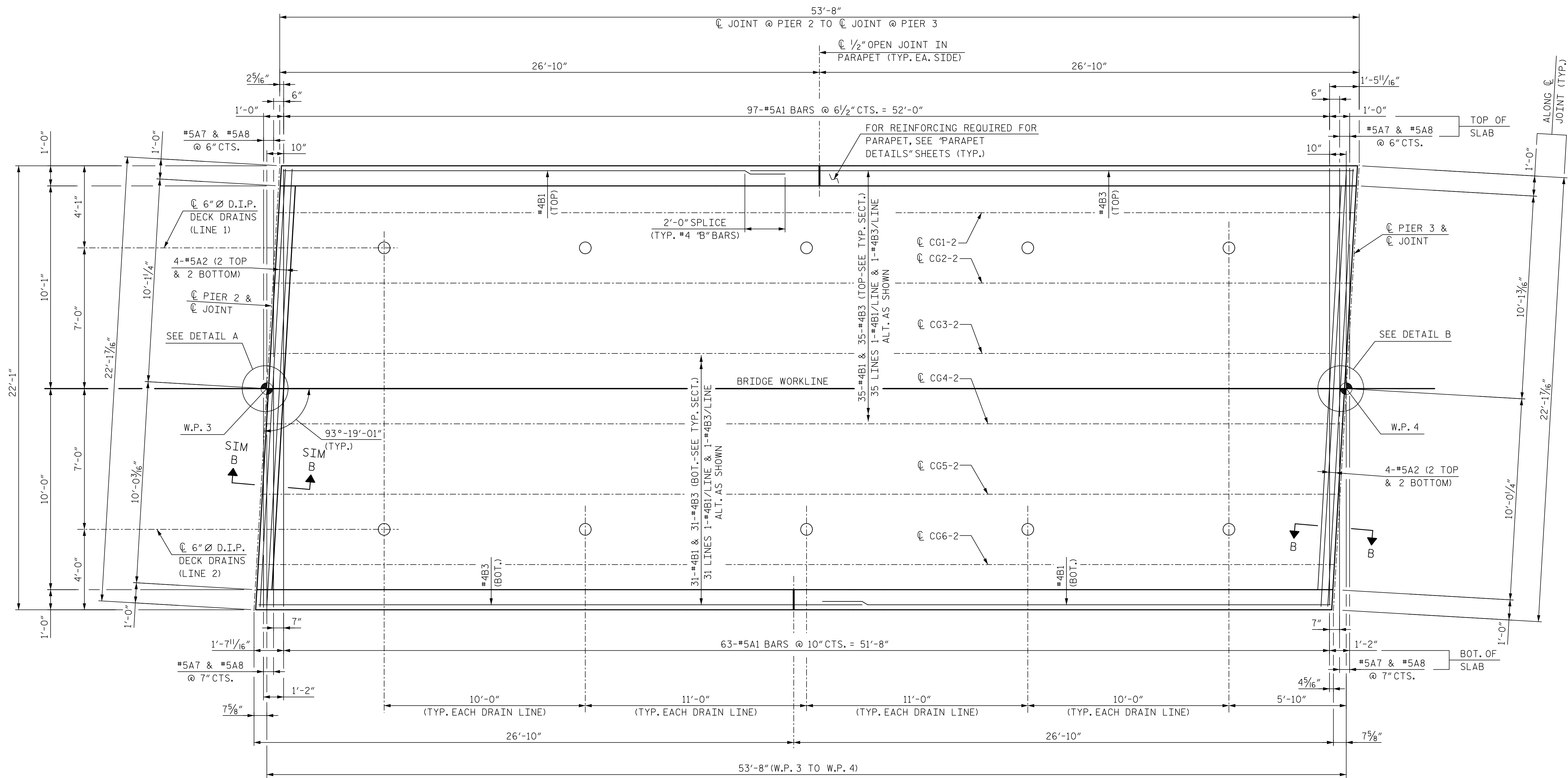


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

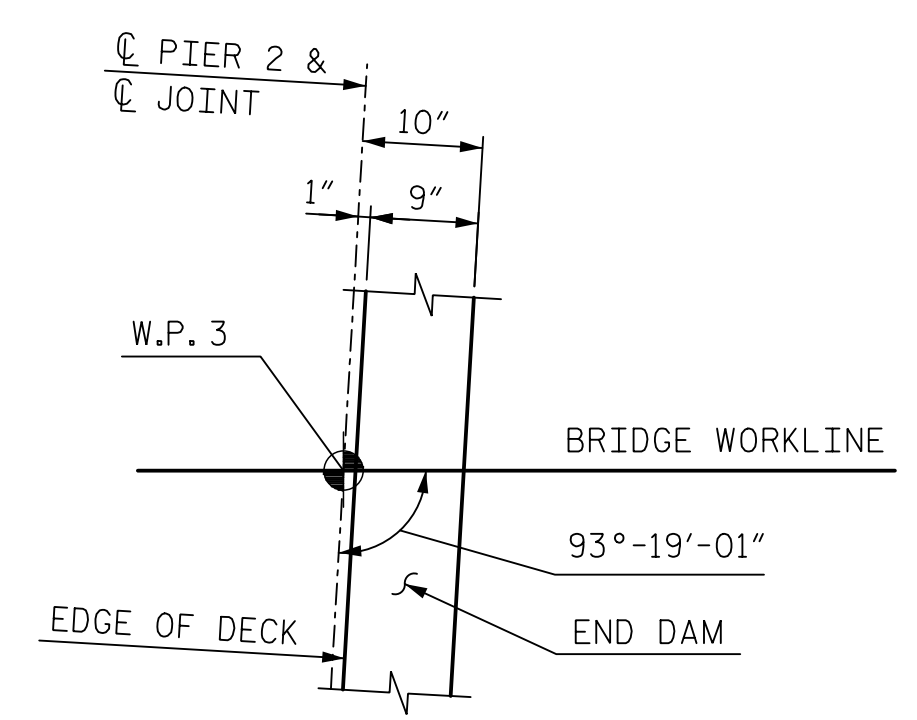
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF DECK - SPAN B

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		REVISIONS				SHEET NO.
DRAWN BY <u>B. VAUGHN</u>	DATE <u>8/17</u>	NO.	BY	DATE	55-8	
CHECKED BY <u>K. ERVIN</u>	DATE <u>9/17</u>	1			TOTAL SHEETS	
		2			56	

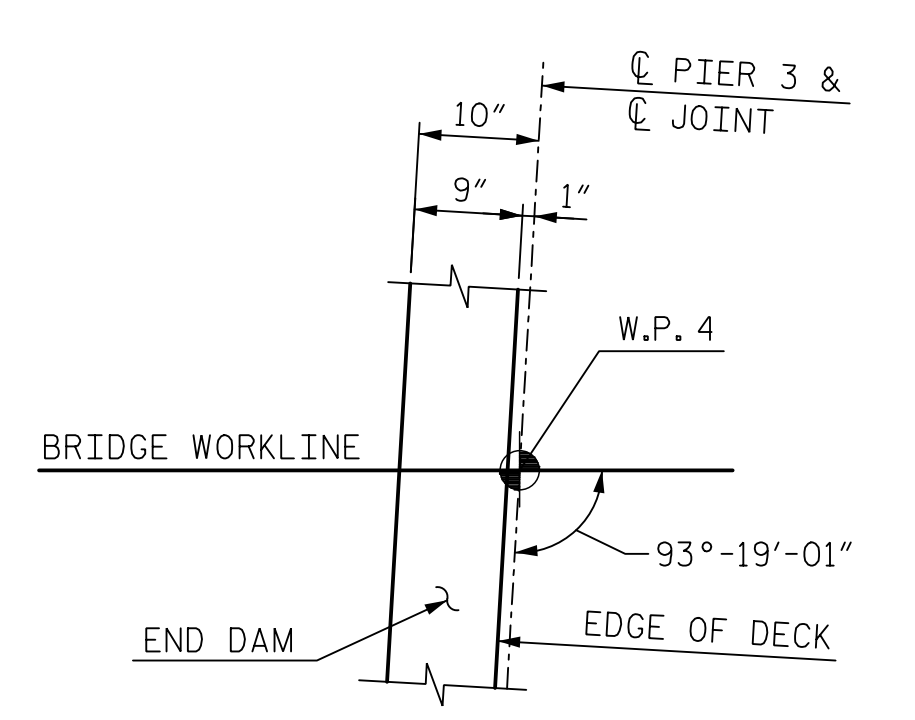




PLAN - SPAN C

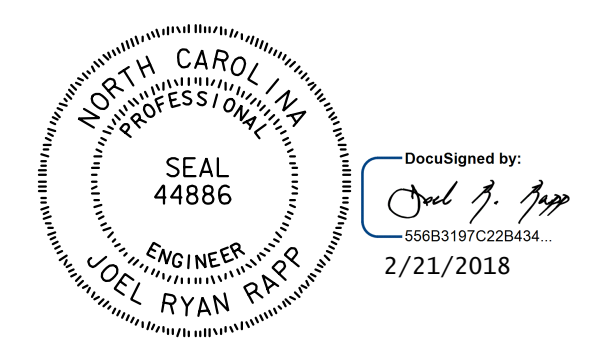


DETAIL A



DETAIL B

- NOTES:**
- ALL REINFORCING SHALL BE EPOXY COATED.
  - FOR SECTION B-B SEE "DECK DETAILS" SHEET.
  - FOR DECK DRAIN DETAIL SEE DETAIL "B" ON "STRUCTURE: DRAINAGE DETAILS", SHEET 2 OF 4.
  - FOR PARAPET DETAILS, SEE "PARAPET DETAILS" SHEETS.
  - SLAB BARS MAY BE ADJUSTED TO AVOID DECK DRAIN LOCATIONS.

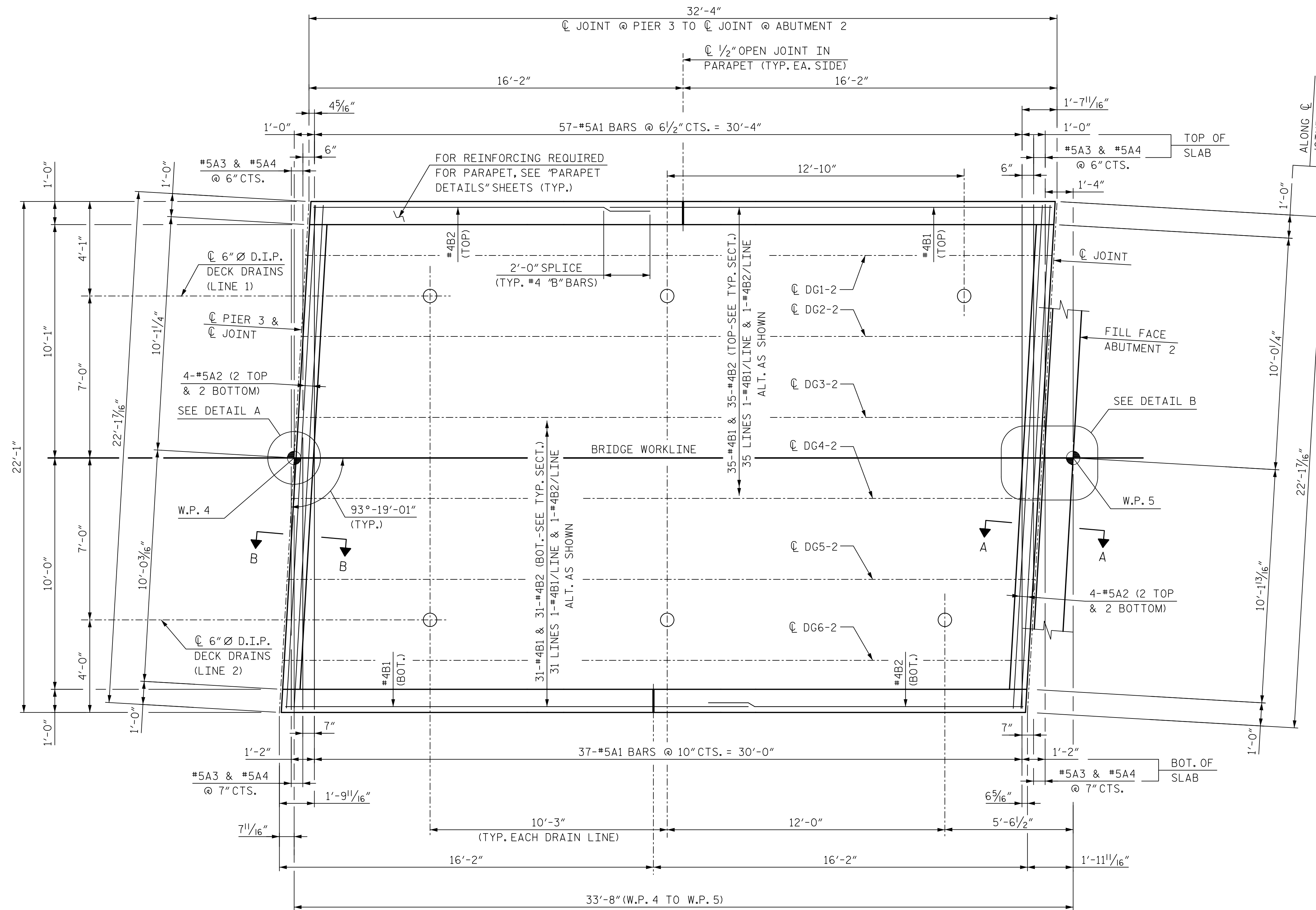


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

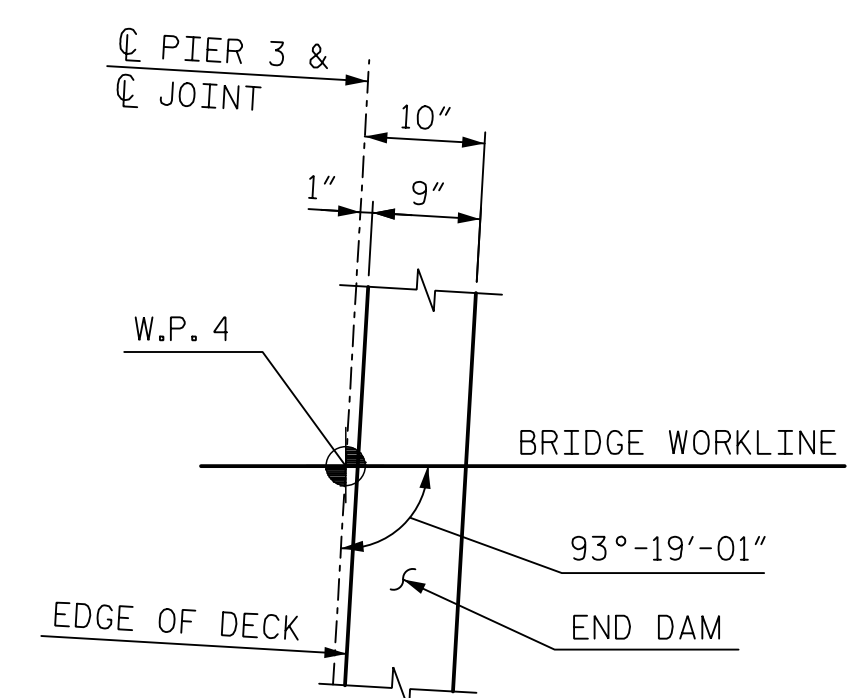
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF DECK - SPAN C

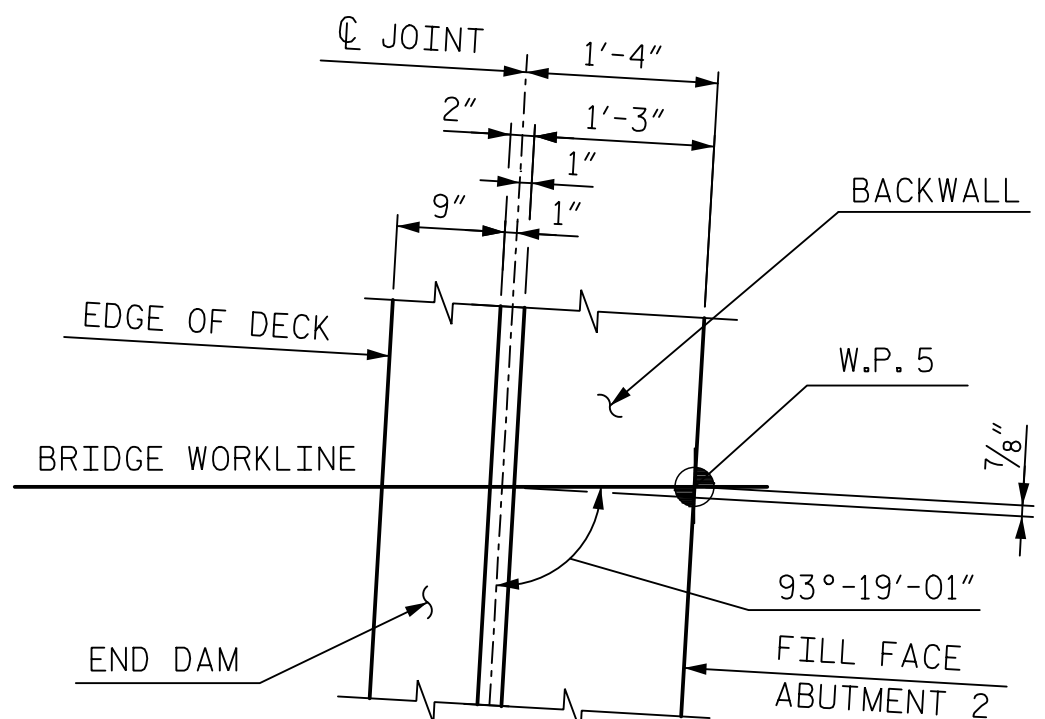
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-9 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		8/17	3			
DRAWN BY: <u>B. VAUGHN</u> CHECKED BY: <u>K. ERVIN</u>	DATE: <u>8/17</u> DATE: <u>9/17</u>	DWG. NO. <u>9</u>					



PLAN - SPAN D



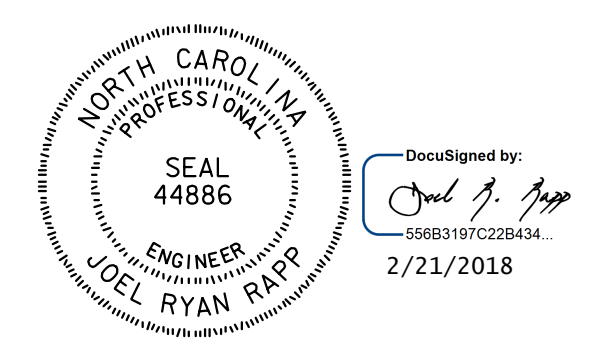
DETAIL A



DETAIL B

**NOTES:**  
 ALL REINFORCING SHALL BE EPOXY COATED.  
 FOR SECTIONS A-A & B-B SEE "DECK DETAILS" SHEET.  
 FOR DECK DRAIN DETAIL SEE DETAIL "B" ON "STRUCTURE: DRAINAGE DETAILS", SHEET 2 OF 4.  
 FOR PARAPET DETAILS, SEE "PARAPET DETAILS" SHEETS.  
 SLAB BARS MAY BE ADJUSTED TO AVOID DECK DRAIN LOCATIONS.

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

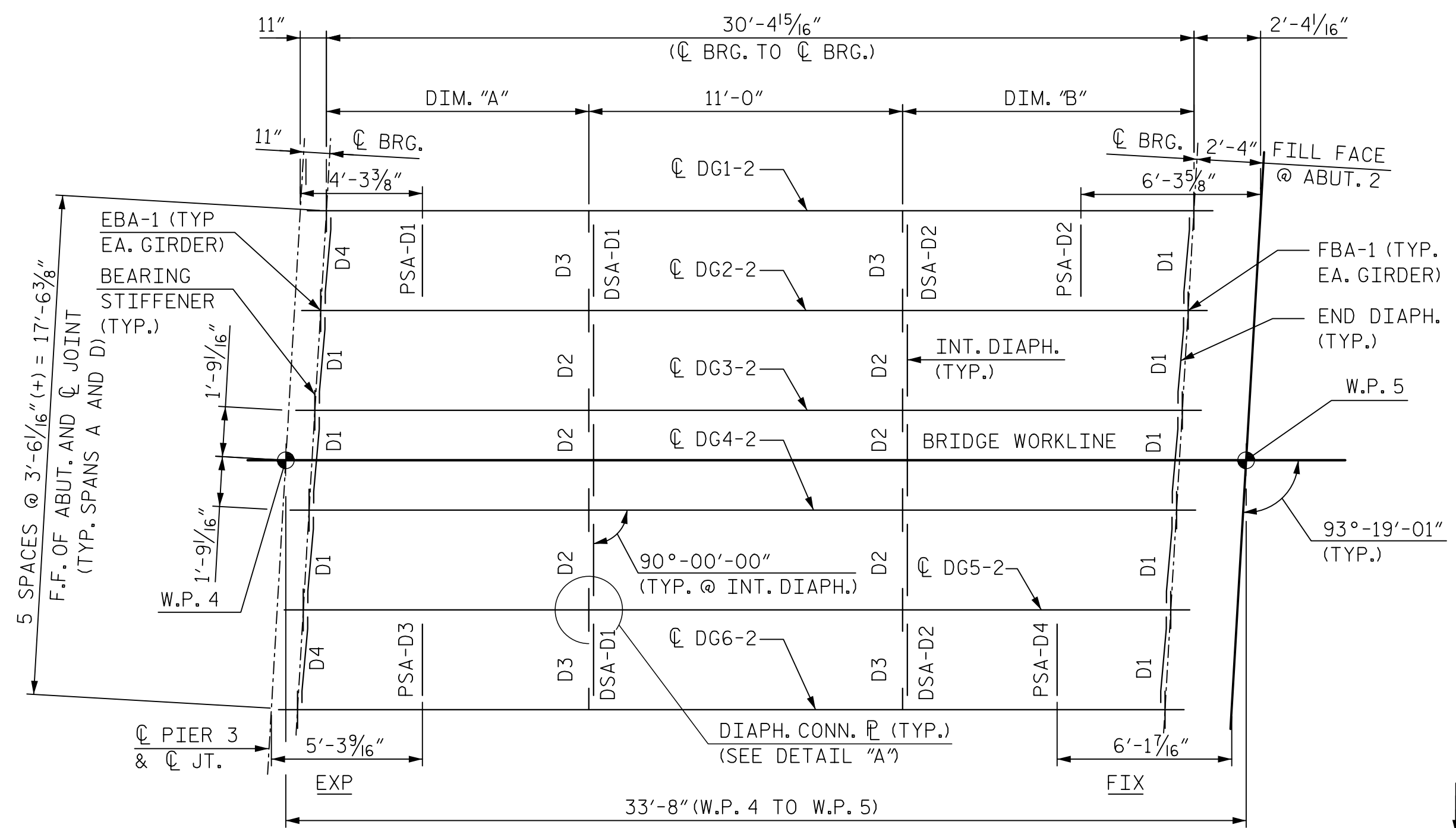
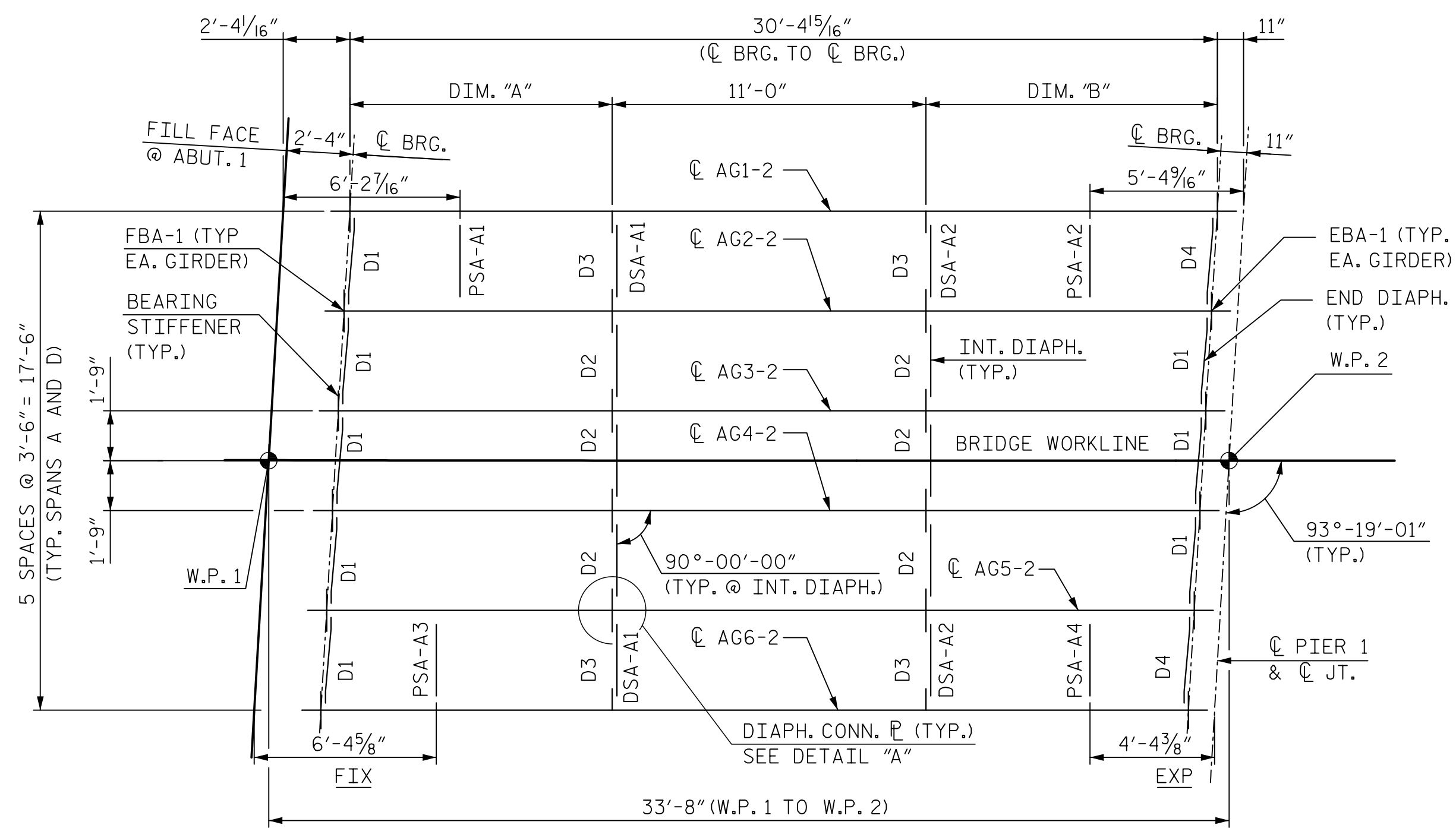


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

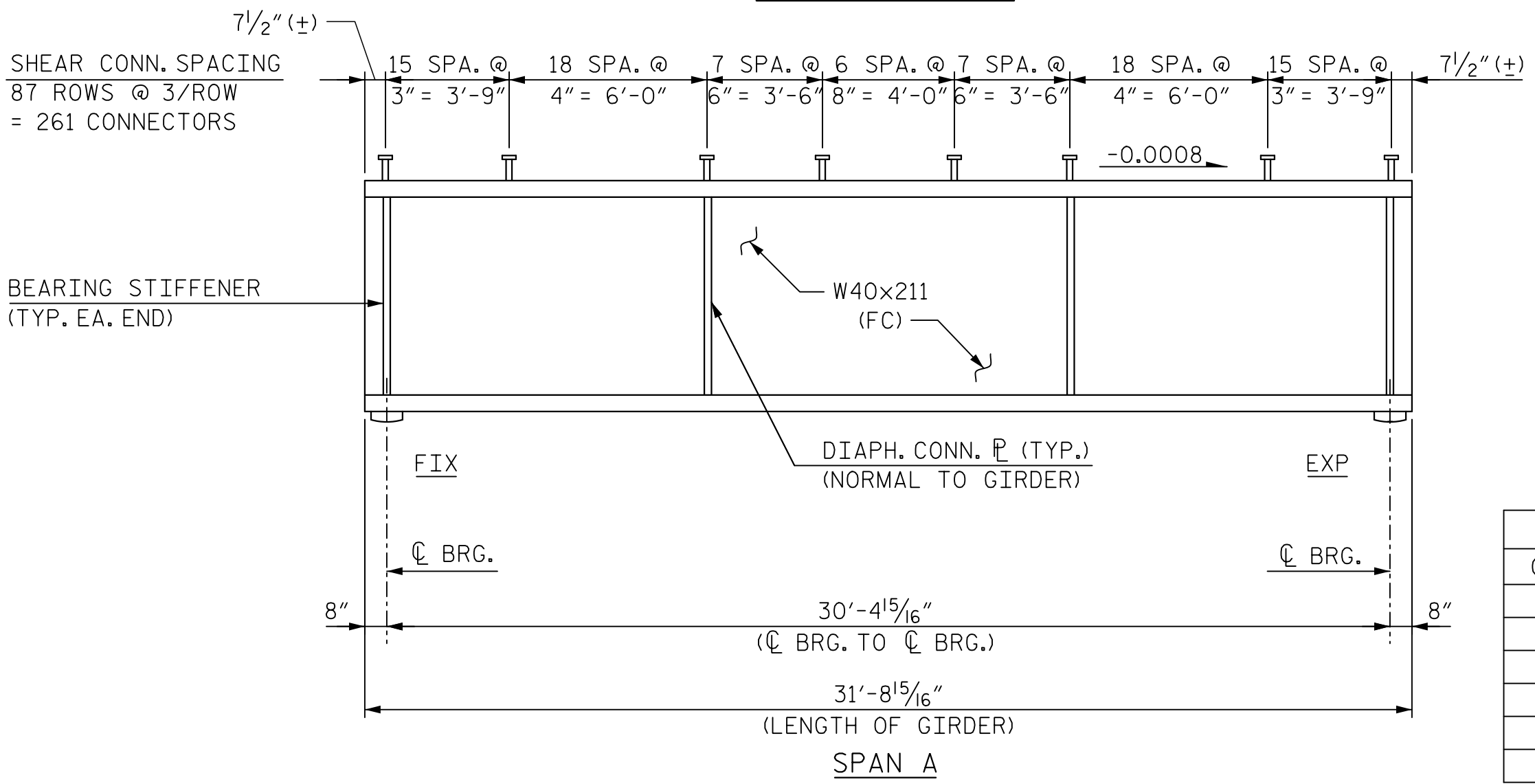
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF DECK - SPAN D

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>K. ERVIN</u> DATE <u>9/17</u> DWG. NO. 10	REVISIONS						SHEET NO. S5-10
	NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
	1			3			56
			2				

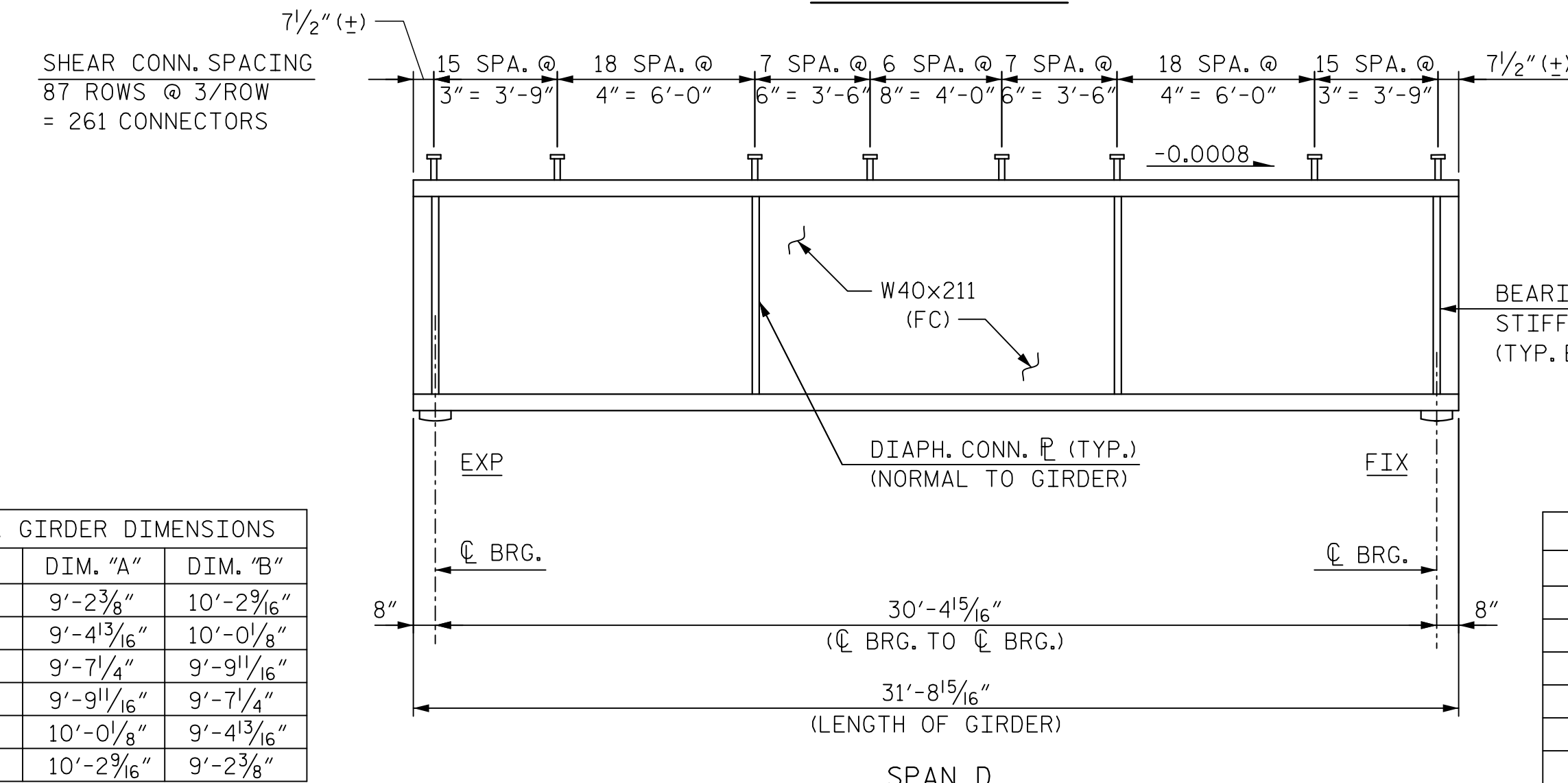




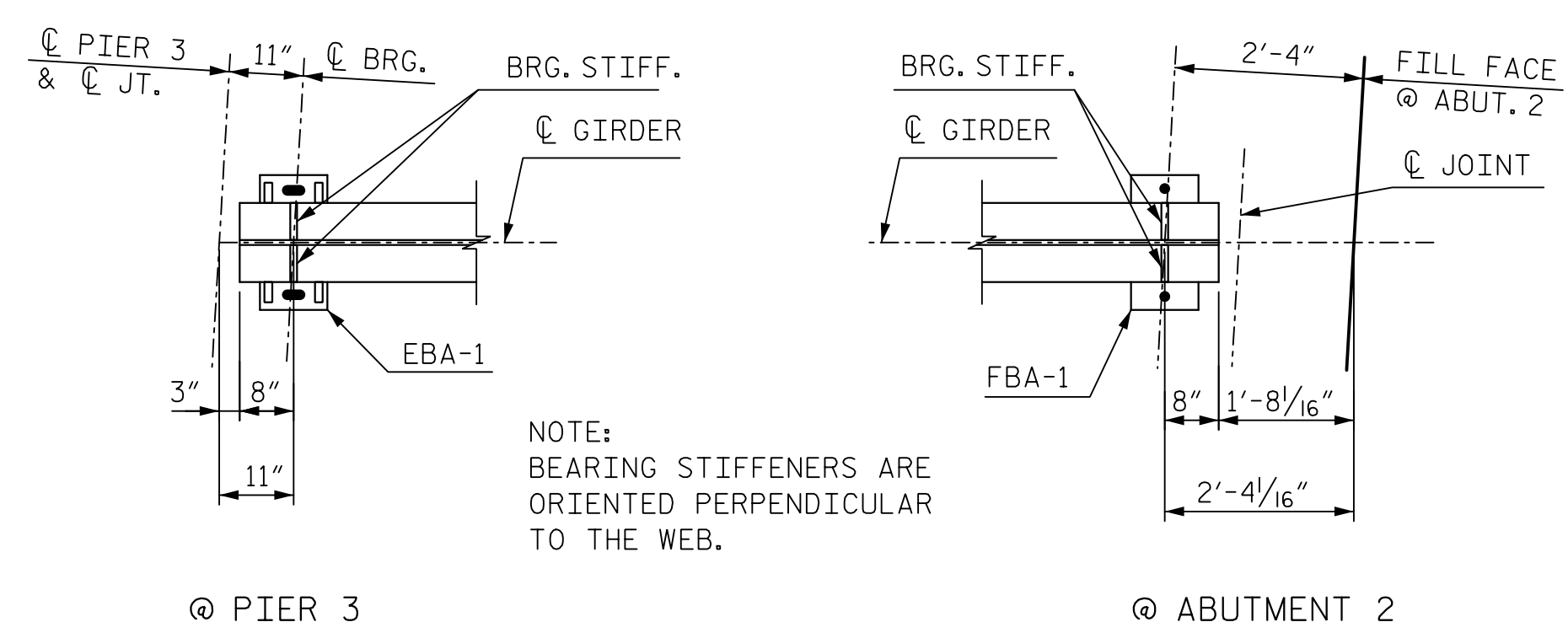
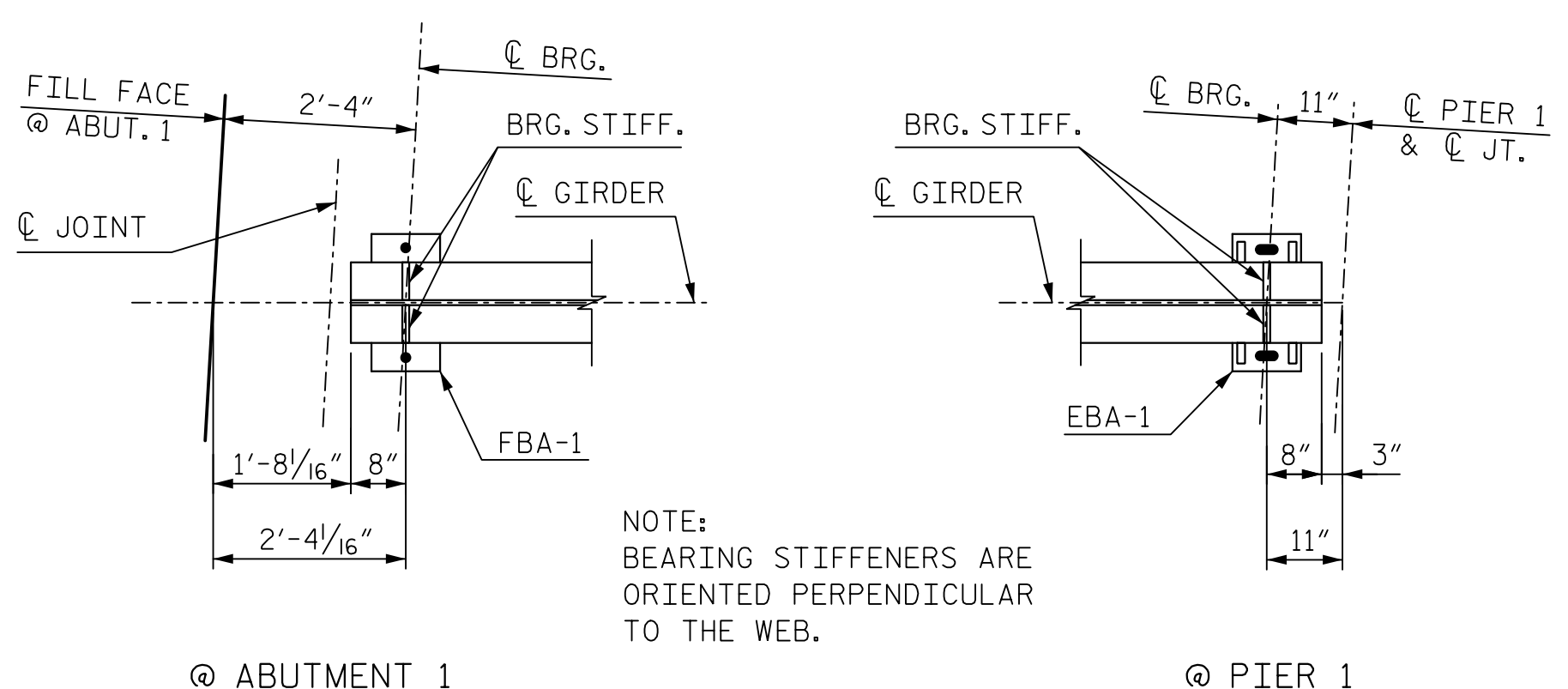
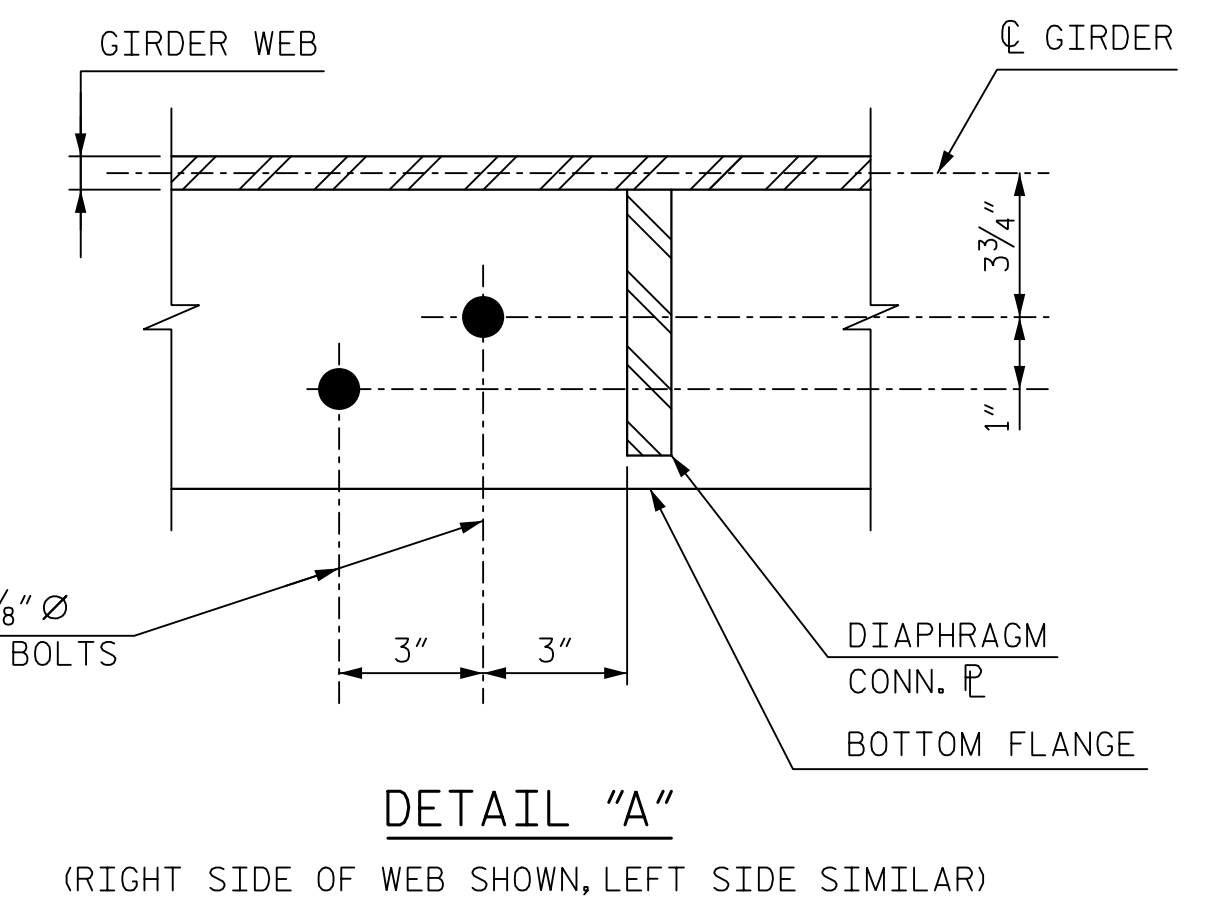
**NOTES:**  
 ALL DIMENSIONS ON THIS DRAWING ARE HORIZONTAL.  
 ALL ABUTMENT FILL FACES, C PIER, AND C BEARINGS ARE PARALLEL.  
 NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.  
 REFER TO "STRUCTURAL STEEL DETAILS" SHEET FOR:  
 • STRUCTURAL STEEL NOTES  
 • DIAPHRAGM DETAILS  
 • STIFFENER AND CONNECTOR P DETAILS  
 • SHEAR CONNECTOR DETAILS  
 FOR BEARINGS, SEE "BEARING DETAILS SPAN A AND SPAN D" SHEET.  
 FOR DRAIN PIPE SUPPORT DETAILS, SEE "STRUCTURE DRAINAGE DETAILS" SHEETS.  
 FC = "FRACTURE CRITICAL"



SPAN A GIRDER DIMENSIONS		
GIRDER	DIM. "A"	DIM. "B"
AG1-2	9'-2 3/8"	10'-2 9/16"
AG2-2	9'-4 13/16"	10'-0 1/8"
AG3-2	9'-7 1/4"	9'-9 11/16"
AG4-2	9'-9 1/16"	9'-7 1/4"
AG5-2	10'-0 1/8"	9'-4 13/16"
AG6-2	10'-2 3/8"	9'-2 3/8"



SPAN D GIRDER DIMENSIONS		
GIRDER	DIM. "A"	DIM. "B"
DG1-2	9'-2 3/8"	10'-2 9/16"
DG2-2	9'-4 13/16"	10'-0 1/8"
DG3-2	9'-7 1/4"	9'-9 11/16"
DG4-2	9'-9 1/16"	9'-7 1/4"
DG5-2	10'-0 1/8"	9'-4 13/16"
DG6-2	10'-2 3/8"	9'-2 3/8"



NOTE: BEARING STIFFENERS ARE ORIENTED PERPENDICULAR TO THE WEB.

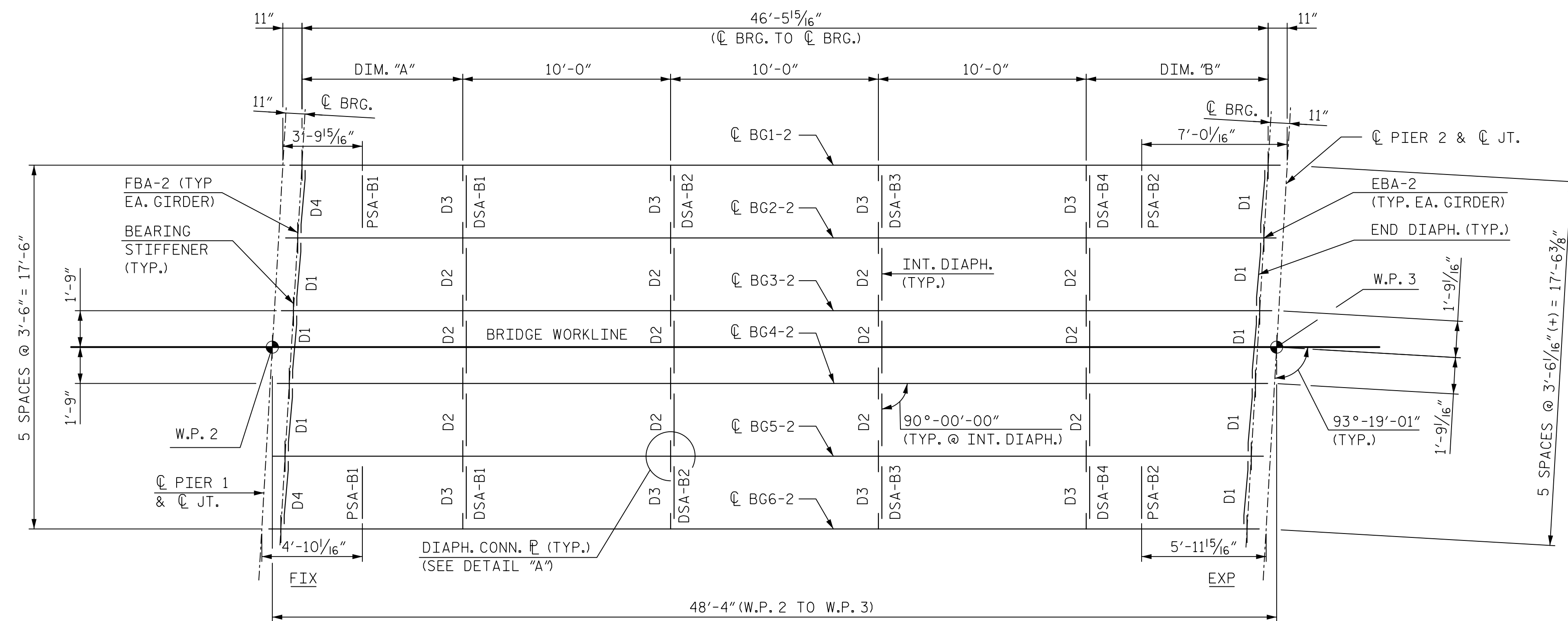
NOTE: BEARING STIFFENERS ARE ORIENTED PERPENDICULAR TO THE WEB.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 FRAMING PLAN  
 AND GIRDER DETAILS  
 SPAN A AND SPAN D

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-11 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		8/17	3			
2		9/17	4				

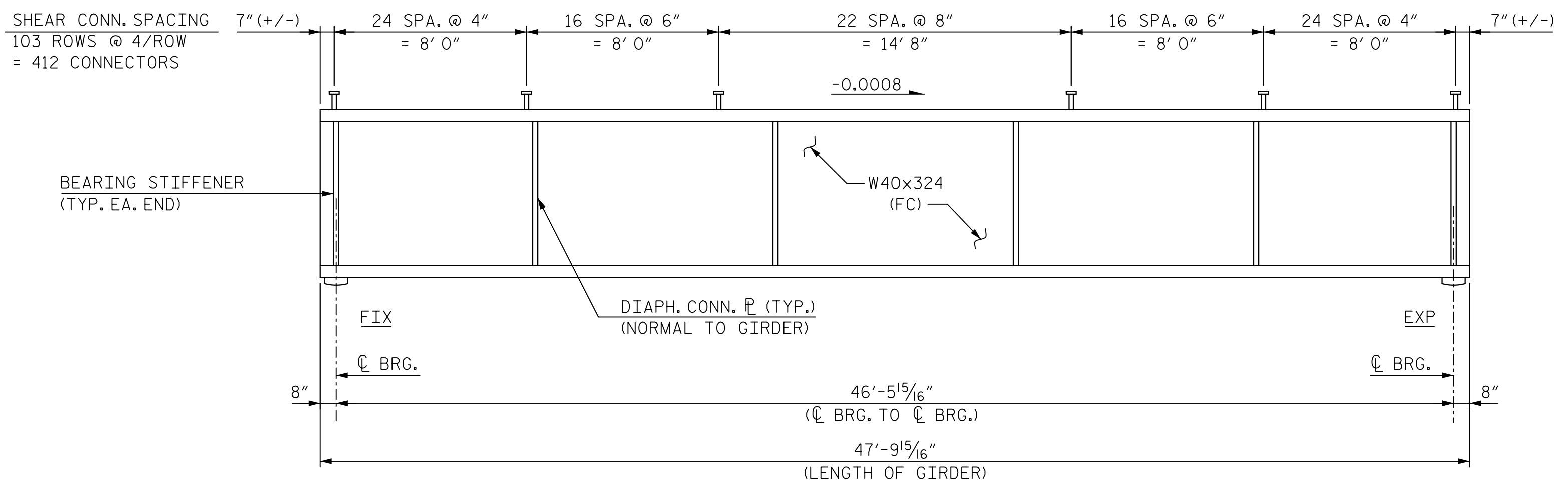


SPAN B FRAMING PLAN

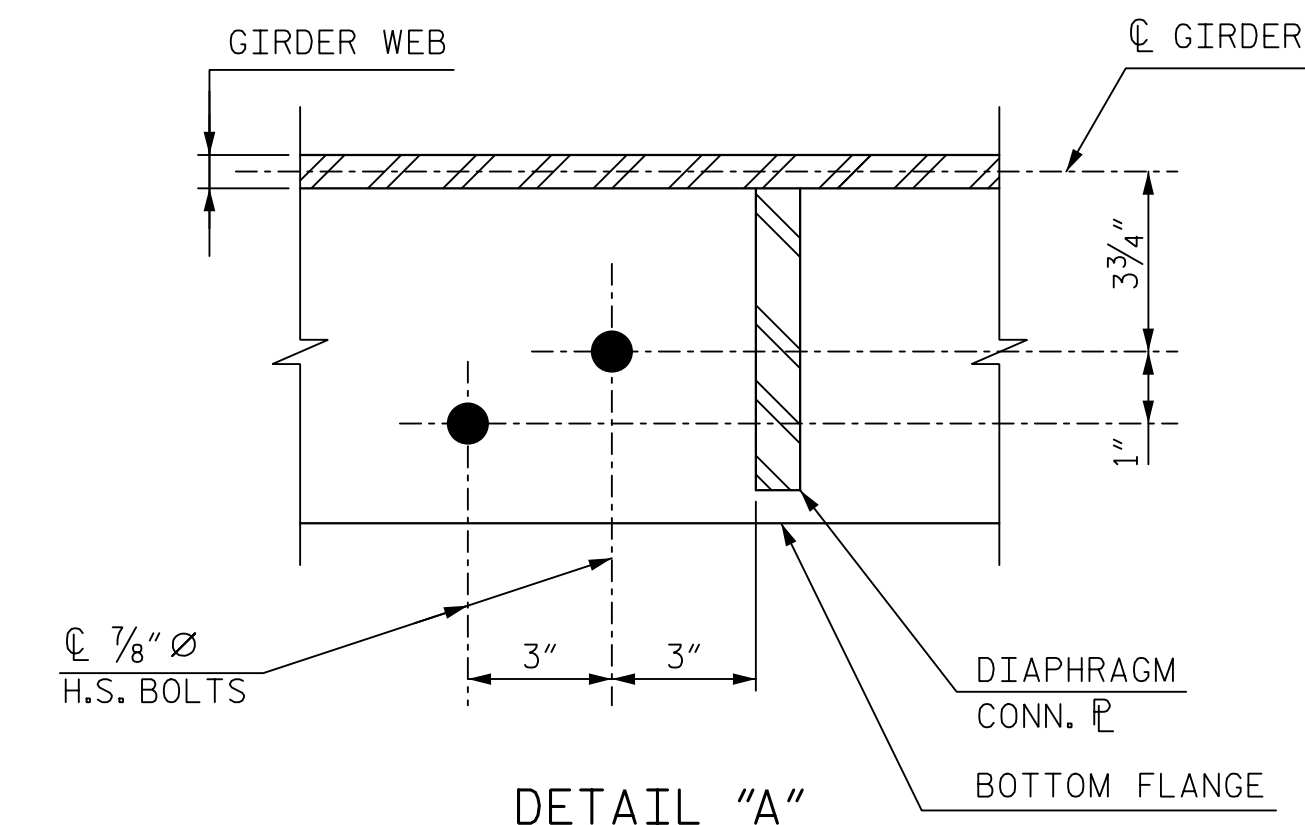
NOTES:

- ALL DIMENSIONS ON THIS DRAWING ARE HORIZONTAL.
- ALL CL PIERS AND CL BEARINGS ARE PARALLEL.
- NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.
- REFER TO "STRUCTURAL STEEL DETAILS" SHEET FOR:
  - STRUCTURAL STEEL NOTES
  - DIAPHRAGM DETAILS
  - STIFFENER AND CONNECTOR P DETAILS
  - SHEAR CONNECTOR DETAILS
- FOR BEARINGS, SEE "BEARING DETAILS SPAN B AND SPAN C" SHEET.
- FOR DRAIN PIPE SUPPORT DETAILS, SEE "STRUCTURE DRAINAGE DETAILS" SHEETS.
- FC = "FRACTURE CRITICAL"

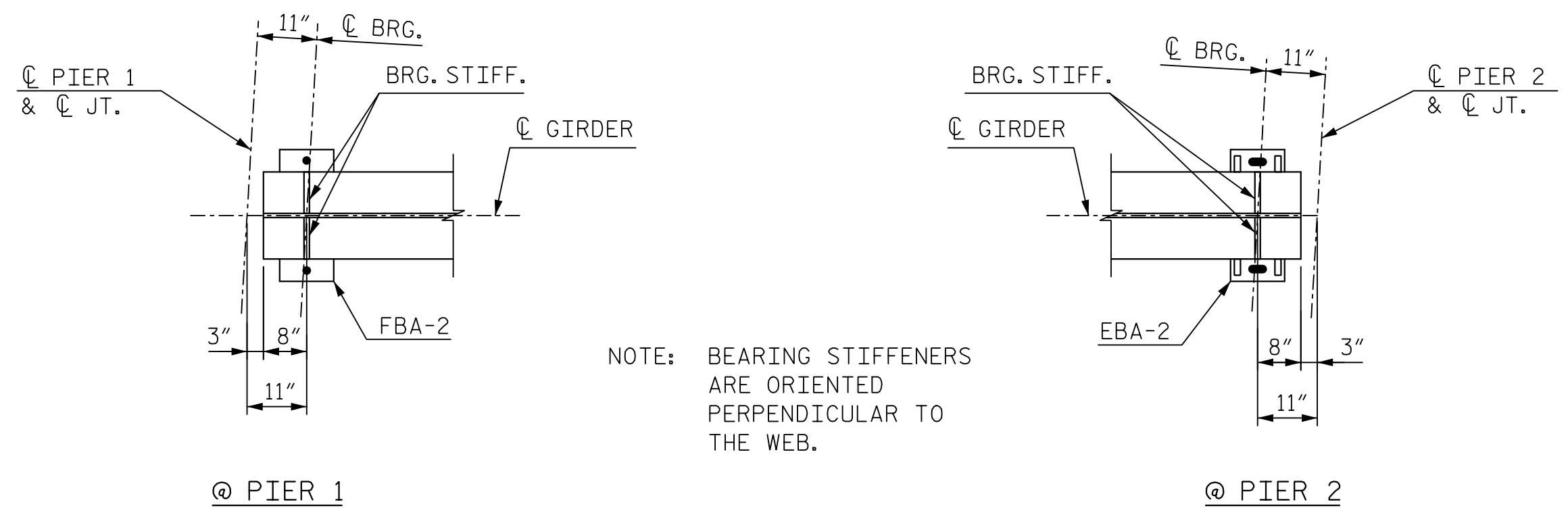
SPAN B GIRDER DIMENSIONS		
GIRDER	DIM. "A"	DIM. "B"
BG1-2	7'-8 7/8"	8'-9 1/16"
BG2-2	7'-11 5/16"	8'-6 5/8"
BG3-2	8'-1 3/4"	8'-4 3/16"
BG4-2	8'-4 3/16"	8'-1 3/4"
BG5-2	8'-6 5/8"	7'-11 5/16"
BG6-2	8'-9 1/16"	7'-8 7/8"



SPAN B TYPICAL GIRDER ELEVATION (INTERIOR GIRDER SHOWN, EXTERIOR GIRDER SIMILAR)



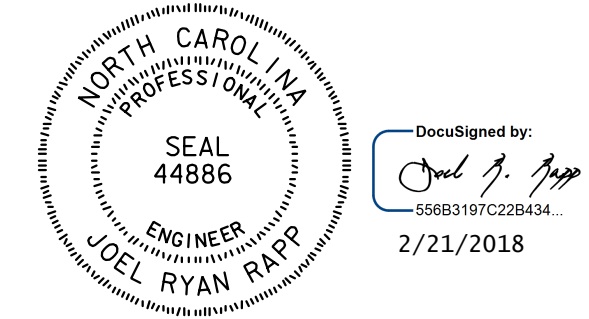
DETAIL "A" (RIGHT SIDE OF WEB SHOWN, LEFT SIDE SIMILAR)



BOTTOM FLANGE GIRDER END DETAILS - SPAN B

NOTE: BEARING STIFFENERS ARE ORIENTED PERPENDICULAR TO THE WEB.

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**HNTB** HNTB NORTH CAROLINA, P.C.  
 NC License No. C-1554  
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY B. VAUGHN DATE 8/17  
 CHECKED BY R. RAPP DATE 9/17

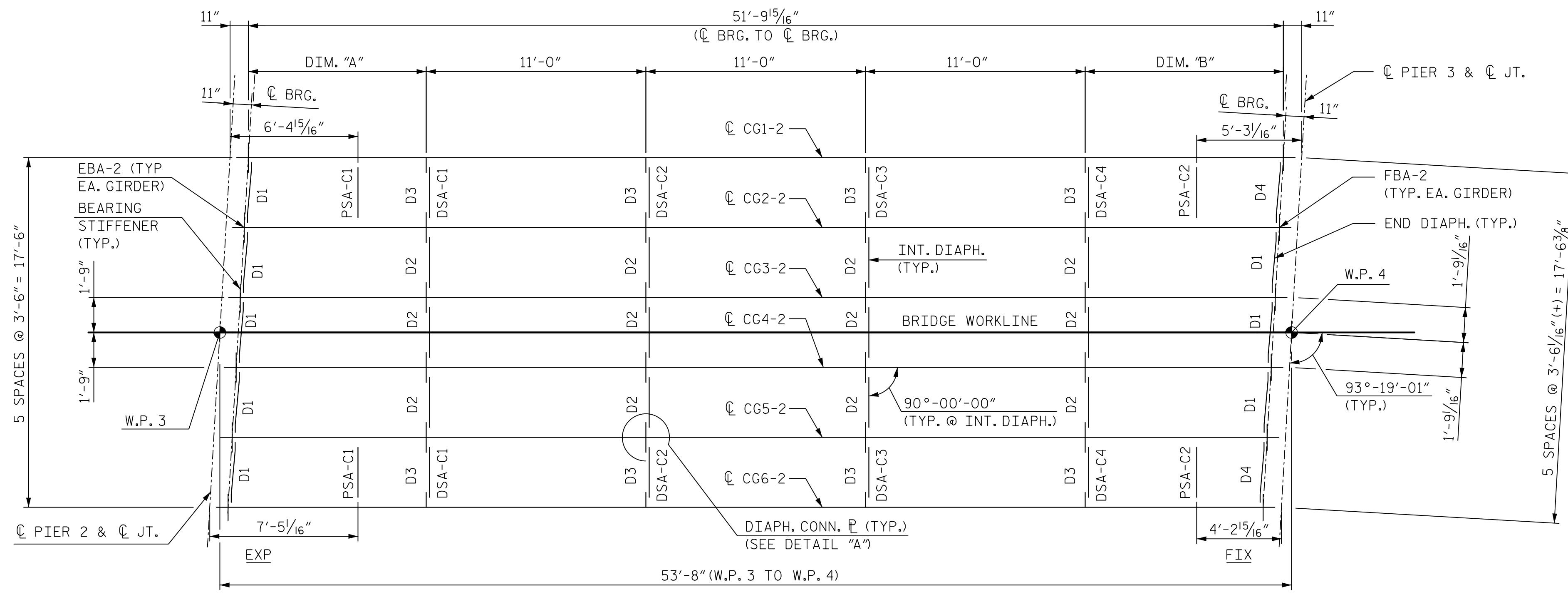
DWG. NO. 12

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-12
1			3			TOTAL SHEETS
2			4			56

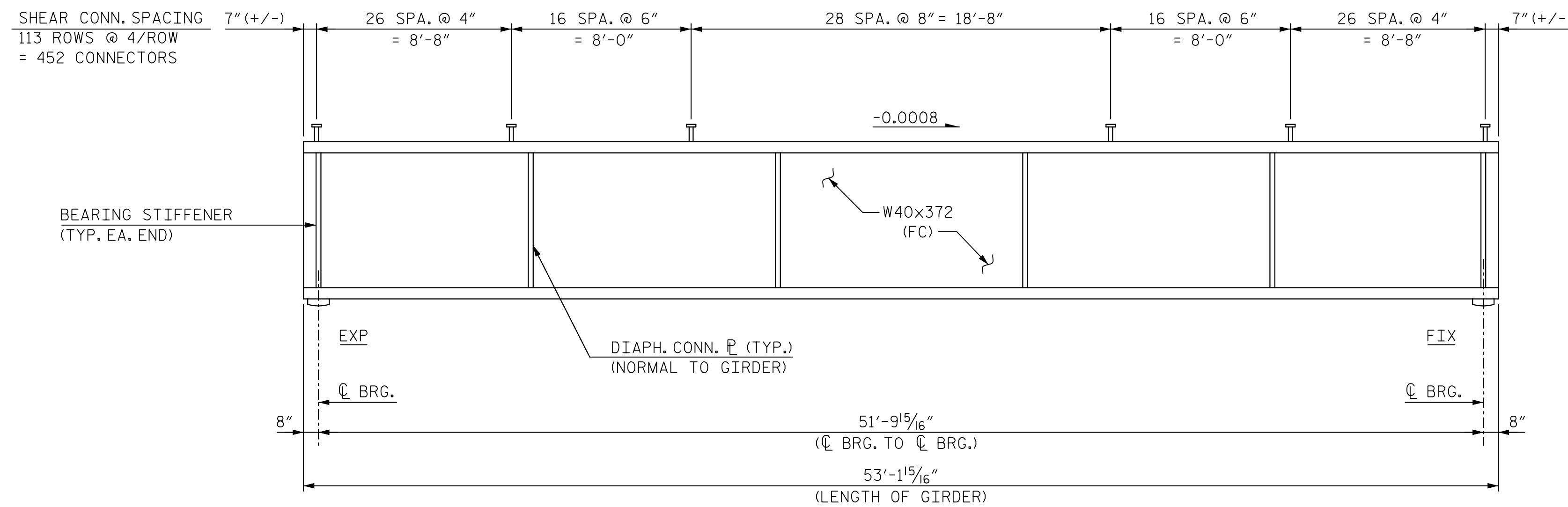
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 FRAMING PLAN  
 AND GIRDER DETAILS  
 SPAN B

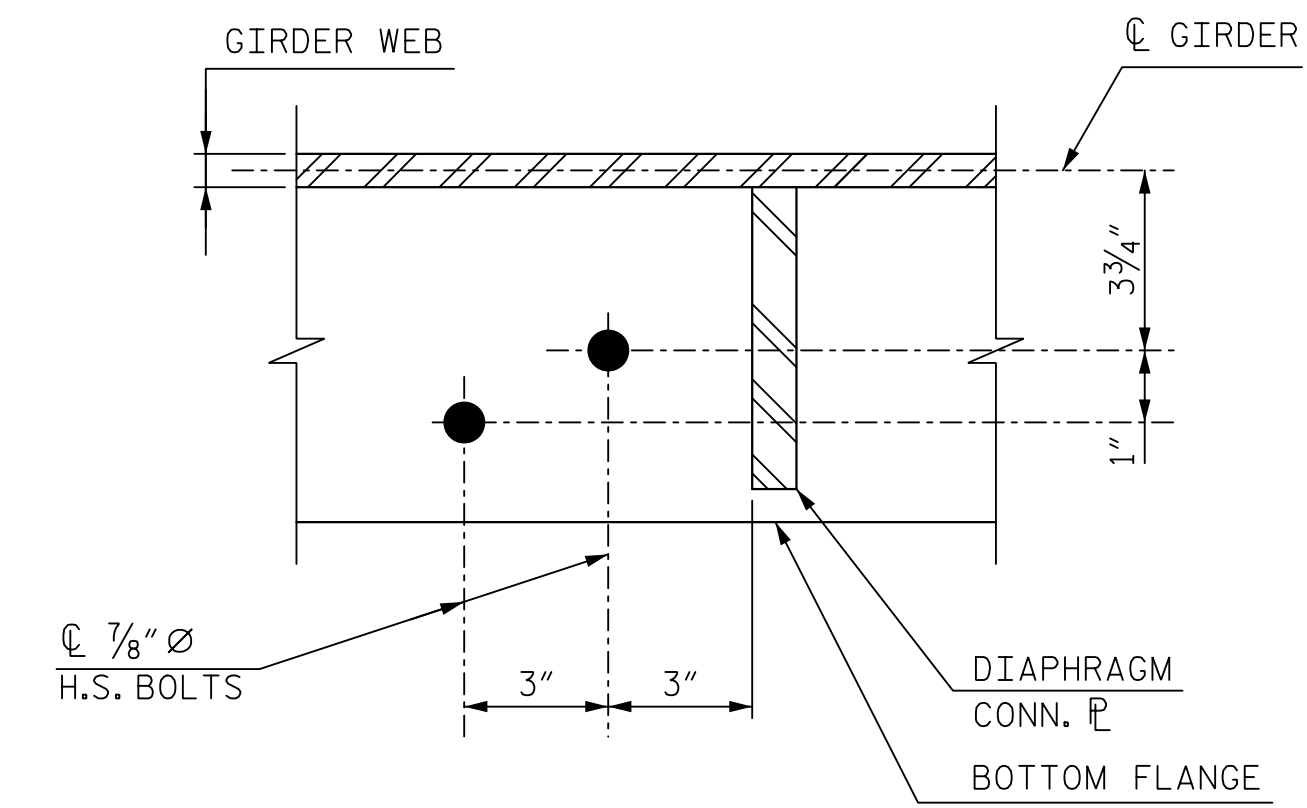




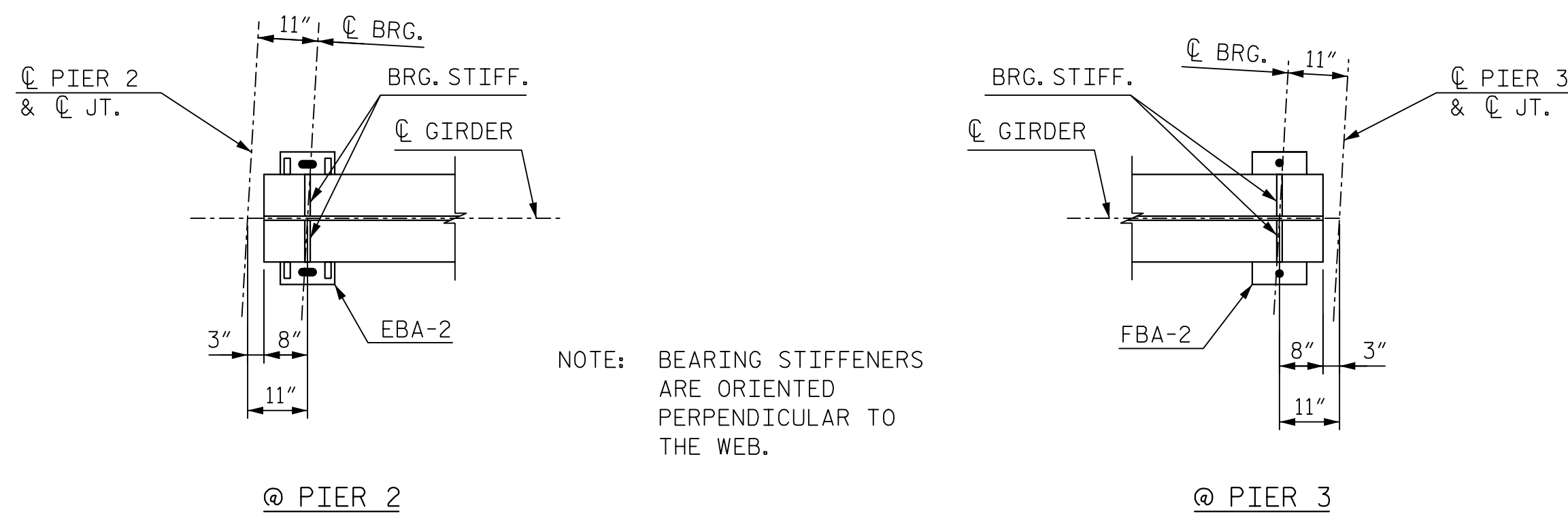
SPAN C  
FRAMING PLAN



SPAN C  
TYPICAL GIRDER ELEVATION  
(INTERIOR GIRDER SHOWN, EXTERIOR GIRDER SIMILAR)



DETAIL "A"  
(RIGHT SIDE OF WEB SHOWN, LEFT SIDE SIMILAR)



BOTTOM FLANGE GIRDER END DETAILS - SPAN C

NOTES:

ALL DIMENSIONS ON THIS DRAWING ARE HORIZONTAL.  
ALL CL PIERS AND CL BEARINGS ARE PARALLEL.  
NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.  
REFER TO "STRUCTURAL STEEL DETAILS" SHEET FOR:

- STRUCTURAL STEEL NOTES
- DIAPHRAGM DETAILS
- STIFFENER AND CONNECTOR PLATE DETAILS
- SHEAR CONNECTOR DETAILS

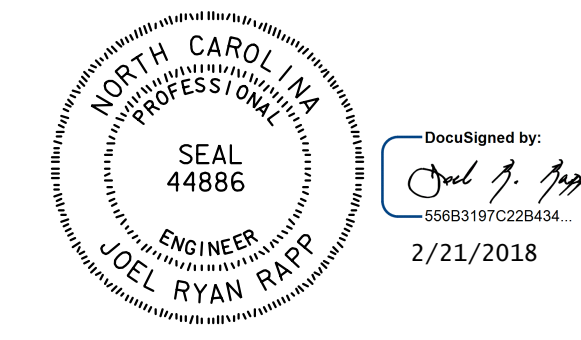
FOR BEARINGS, SEE "BEARING DETAILS SPAN B AND SPAN C" SHEET.

FOR DRAIN PIPE SUPPORT DETAILS, SEE "STRUCTURE DRAINAGE DETAILS" SHEETS.

FC = "FRACTURE CRITICAL"

SPAN C GIRDER DIMENSIONS		
GIRDER	DIM. "A"	DIM. "B"
CG1-2	8'-10 7/8"	9'-11 1/16"
CG2-2	9'-15 1/16"	9'-8 5/8"
CG3-2	9'-3 3/4"	9'-6 3/16"
CG4-2	9'-6 3/16"	9'-3 3/4"
CG5-2	9'-8 5/8"	9'-15 1/16"
CG6-2	9'-11 1/16"	8'-10 7/8"

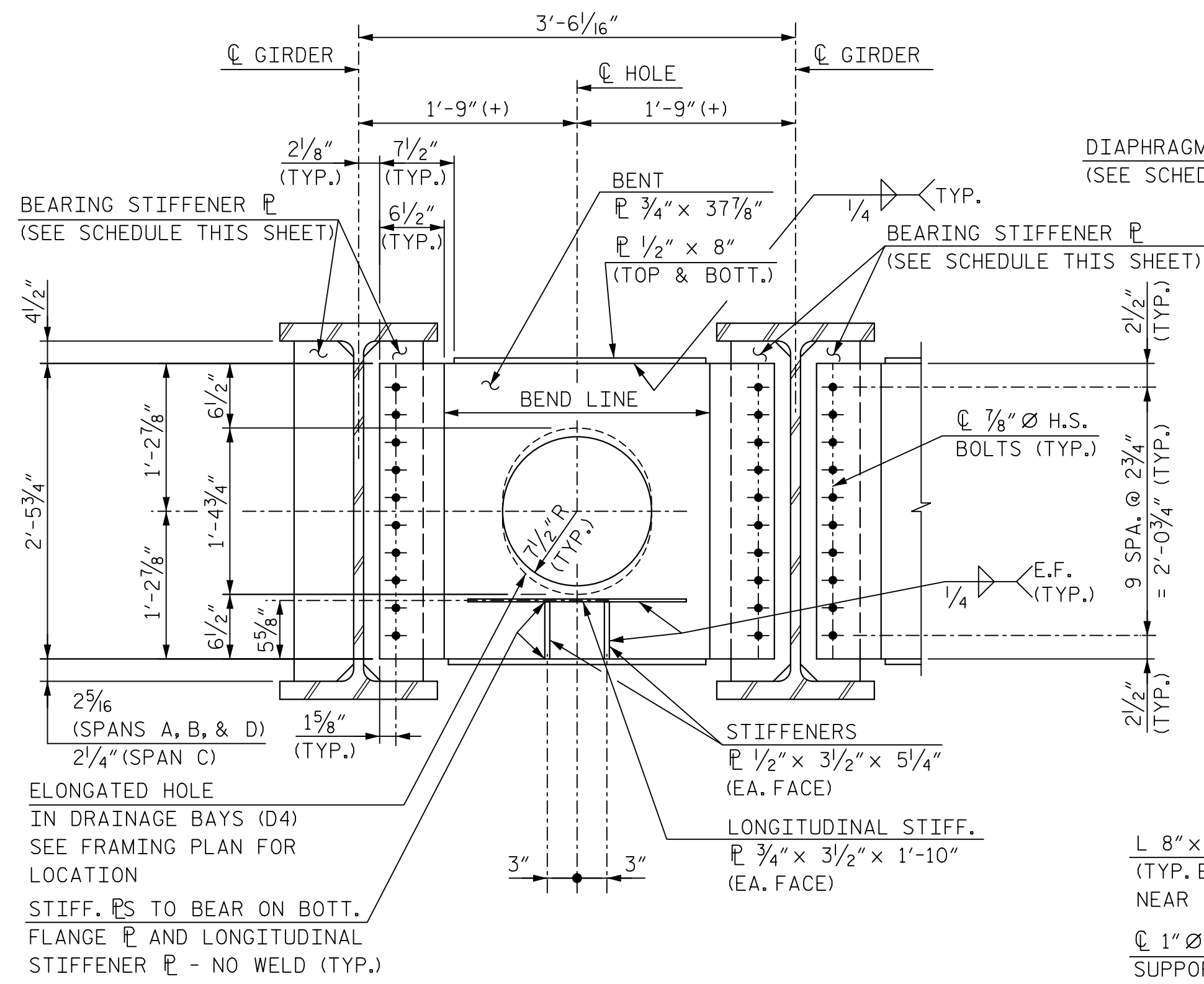
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-



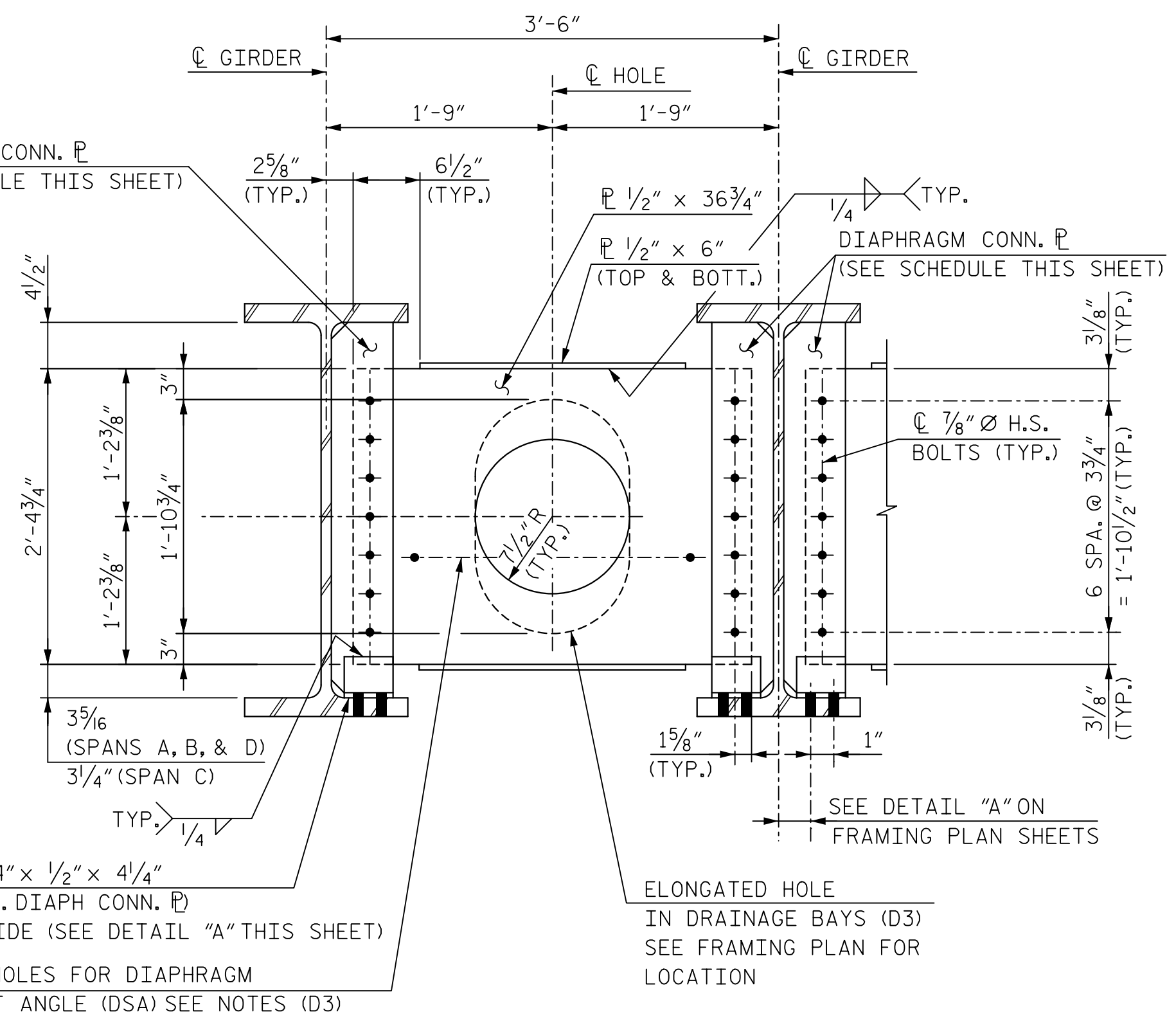
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-13 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1	B. VAUGHN	8/17	3			
2	R. RAPP	9/17	4				

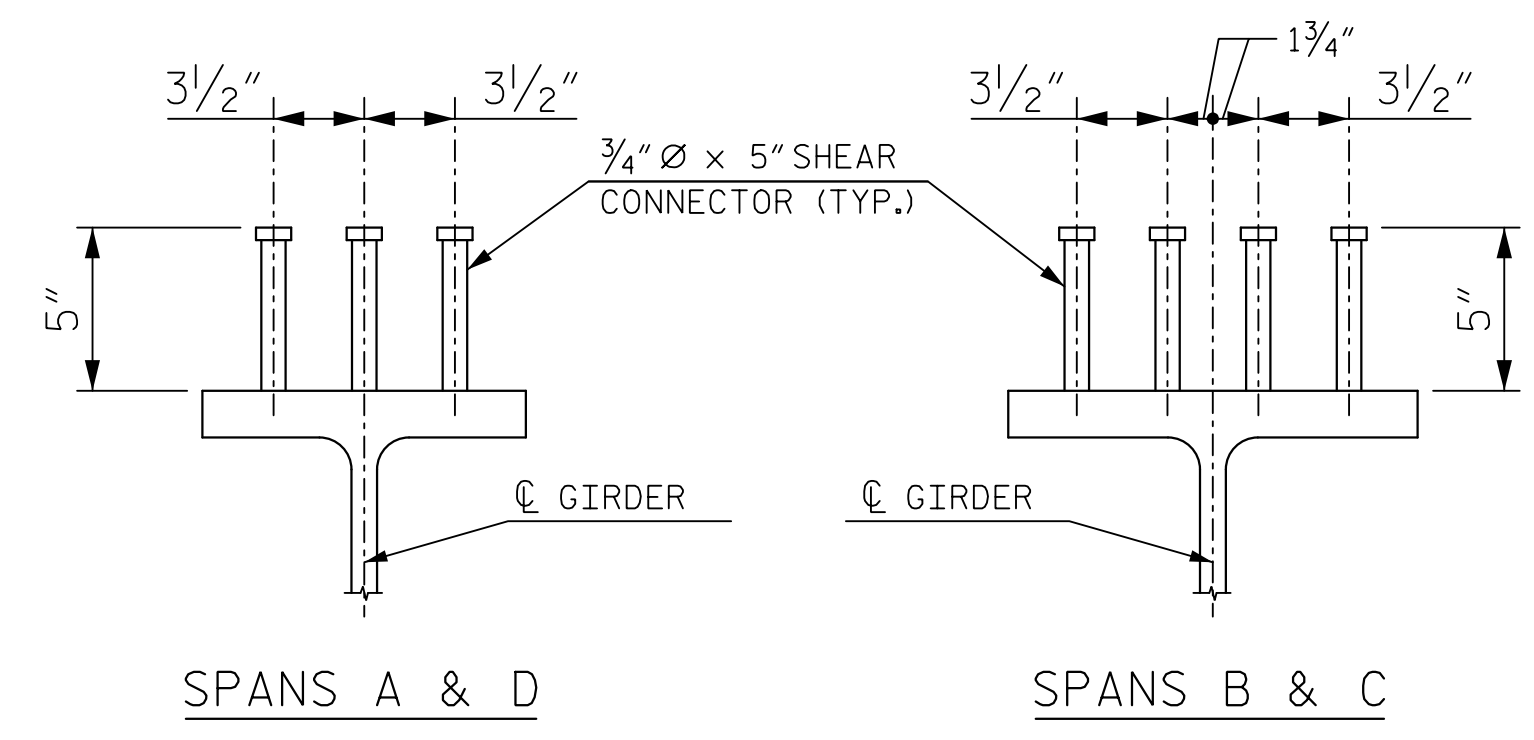
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
FRAMING PLAN  
AND GIRDER DETAILS  
SPAN C



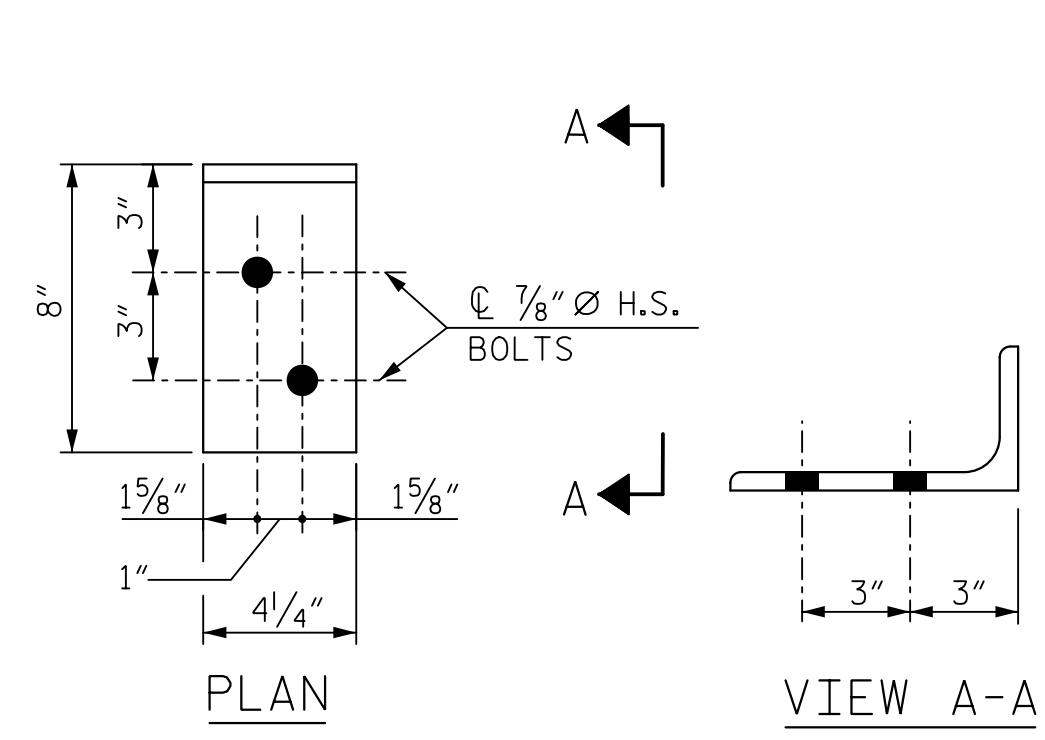
SECTION AT END DIAPHRAGM (D1 & D4)



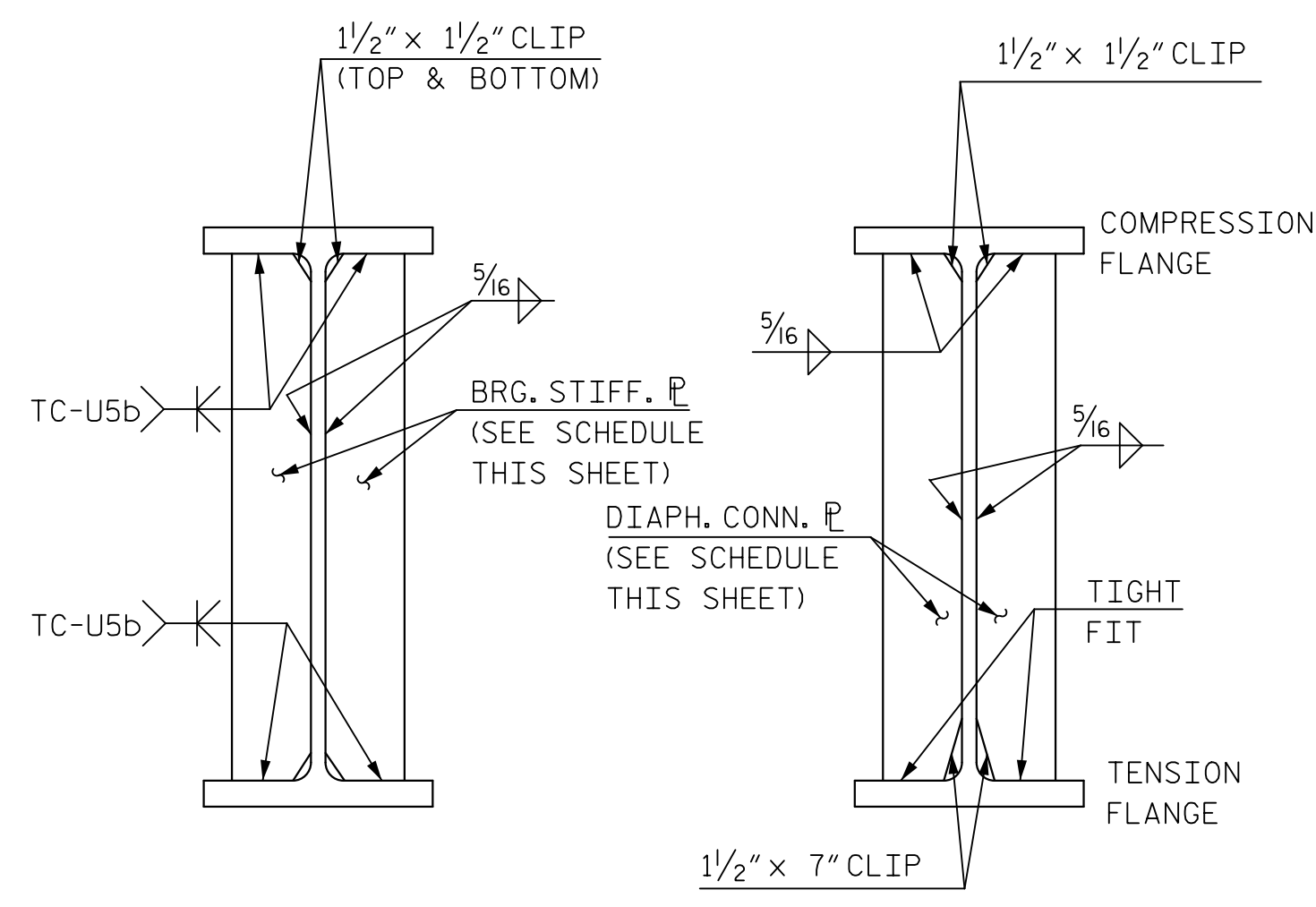
SECTION AT INTERMEDIATE DIAPHRAGM (D2 & D3)



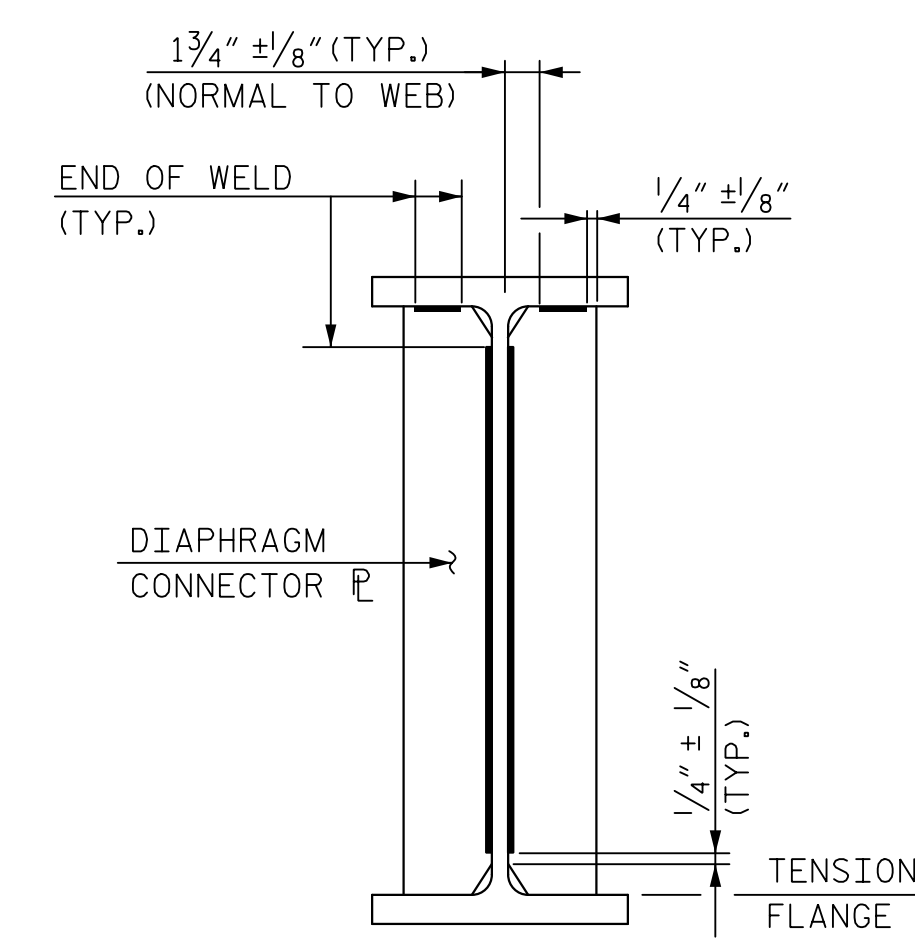
SHEAR CONNECTOR DETAILS



DETAIL "A"  
(L 8" x 4" x 1/2" x 4 1/4")



STIFFENER/CONN. P DETAILS



WELD TERMINATION DETAIL  
(FILLET WELDS ONLY)

STRUCTURAL STEEL NOTES

STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS:

- W40x372, W40x324, AND W40x211 MAIN GIRDERS: A709, GRADE 50
- MISCELLANEOUS MATERIAL: A709, GRADE 50.
- ANCHOR BOLTS FOR BEARING DEVICES SHALL CONFORM TO ASTM F1554, GRADE 105. ANCHOR BOLTS, NUTS, AND PLATE WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM F2329.

STRUCTURAL STEEL ELEMENTS DENOTED AS "FC" ARE FRACTURE CRITICAL AND SHALL MEET IMPACT TEST REQUIREMENTS SET FORTH IN THE FRACTURE CONTROL PLAN OF THE AREMA MANUAL, CHAPTER 15, SECTION 1.14. NOTCH TOUGHNESS REQUIREMENTS AND TESTING SHALL BE BASED ON ZONE 2 REQUIREMENTS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED. ALL DIMENSIONS ARE SHOWN AT 60°F.

NC DOT RAILS DIVISION SHALL BE FURNISHED COPIES OF MILL TEST REPORTS FOR ALL MATERIALS EXCEPT MISCELLANEOUS PLATES AND SHAPES. REPORTS SHALL INDICATE COMPLIANCE WITH ALL SPECIFIED REQUIREMENTS.

SHOP INSPECTION BY NORFOLK SOUTHERN CORPORATION OR ITS AUTHORIZED AGENT. SEE STRUCTURAL STEEL SPECIAL PROVISIONS FOR ADDITIONAL WELDING INSPECTION OF FLANGE PLATE TO WEB PLATE WELDS.

FOR PAINTING STRUCTURAL STEEL SEE SPECIAL PROVISIONS.

BOLTED CONNECTIONS SHALL BE MADE WITH 7/8" Ø ASTM A325, TYPE 1 HIGH STRENGTH BOLTS WITH HEAVY HEX HEAD, HEAVY HEX NUT, AND HARDENED WASHERS IN ACCORDANCE WITH A.R.E.M.A. SPECIFICATIONS USING THE TURN OF THE NUT METHOD. DIRECT TENSION INDICATORS SHALL NOT BE USED.

SHOP DRAWINGS SHALL BE APPROVED BY THE CHIEF ENGINEER - BRIDGES AND STRUCTURES, NORFOLK SOUTHERN CORPORATION, ATLANTA, GA. SHOP DRAWINGS SHALL BE LABELED "NORFOLK SOUTHERN MP 377.64".

BOLT HOLES IN STRUCTURAL STEEL MEMBERS SHALL BE STANDARD SIZE UNLESS OTHERWISE INDICATED ON THE PLANS.

HIGH STRENGTH BOLTS, NUTS, & WASHERS SHALL BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695.

ANCHOR BOLTS SHALL BE 1/4" Ø IN ACCORDANCE WITH A.R.E.M.A. SPECIFICATIONS AND SHALL BE GROUTED IN FORMED HOLES AFTER GIRDERS ARE ERECTED.

BEARING PADS SHALL BE USED WHENEVER STEEL MASONRY PLATE, OR OTHER STEEL BEARING PLATE, BEARS ON CONCRETE. PADS SHALL BE PREFORMED FABRIC BEARING PADS, 1/2" THICK. FOR PAD REQUIREMENTS, SEE STRUCTURAL STEEL SPECIAL PROVISIONS.

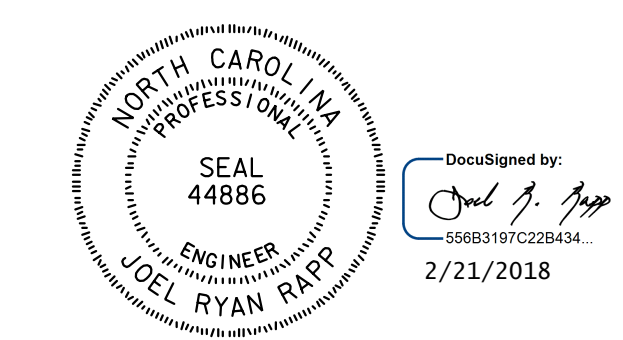
ALL WELDING CONNECTIONS SHALL BE MADE WITH SERIES E70 WELDING ELECTRODES.

FOR DIAPHRAGM LOCATIONS, SEE FRAMING PLANS.

FOR DETAILS OF DIAPHRAGM SUPPORT ANGLES (DSA), SEE "STRUCTURE DRAINAGE DETAILS" SHEET 2 OF 4.

STIFFENER/CONN. P SCHEDULE		
TYPE	SPANS A & D	SPANS B & C
BRG. STIFF.	P 1/2" x 5"	P 3/4" x 7"
DIAPH. CONN. P	P 1/2" x 5 1/2"	P 1/2" x 6 1/2"

NOTE: SEE FRAMING PLANS FOR STIFFENER/CONN. P LOCATIONS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

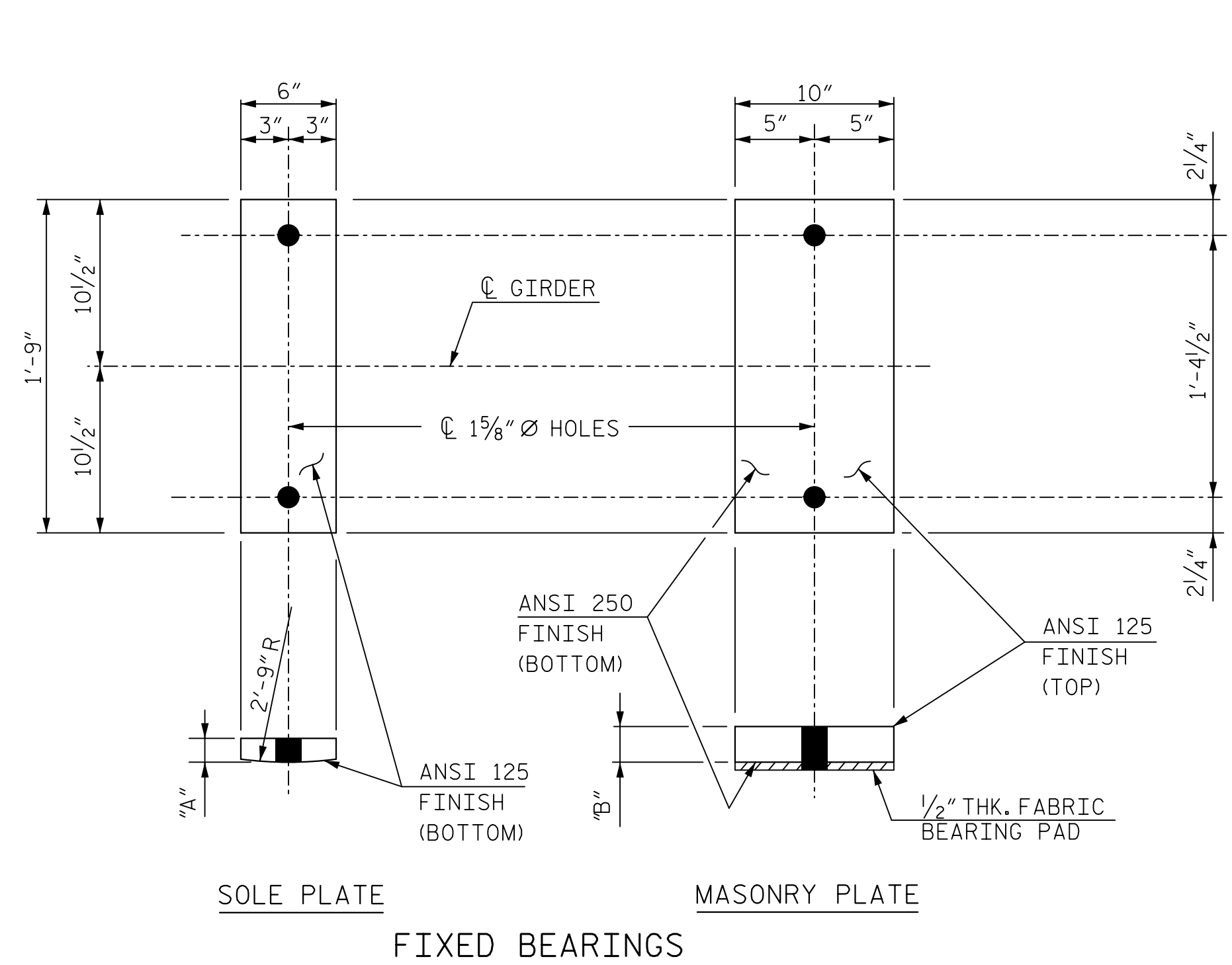
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 STRUCTURAL STEEL DETAILS

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY <u>B. VAUGHN</u>	DATE <u>8/17</u>	DWG. NO. 14	
CHECKED BY <u>K. ERVIN</u>	DATE <u>9/17</u>		

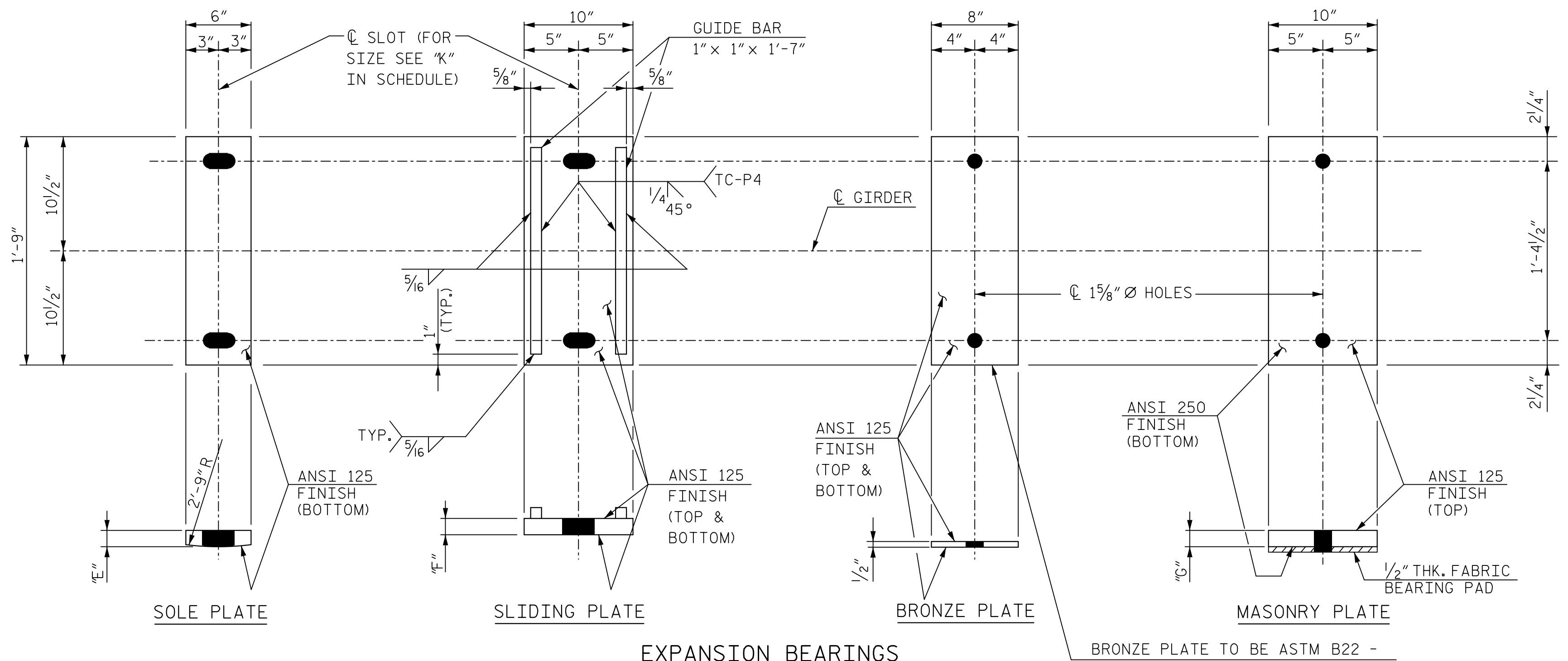
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

TOTAL SHEETS: 56



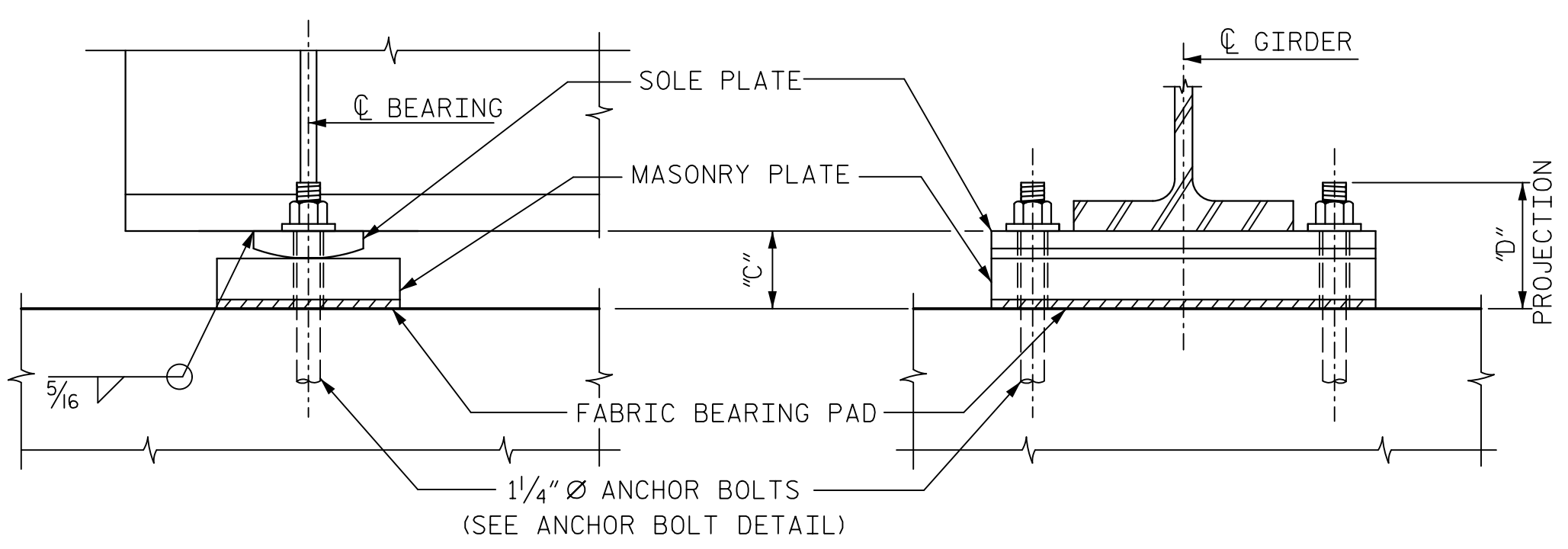


**FIXED BEARINGS**

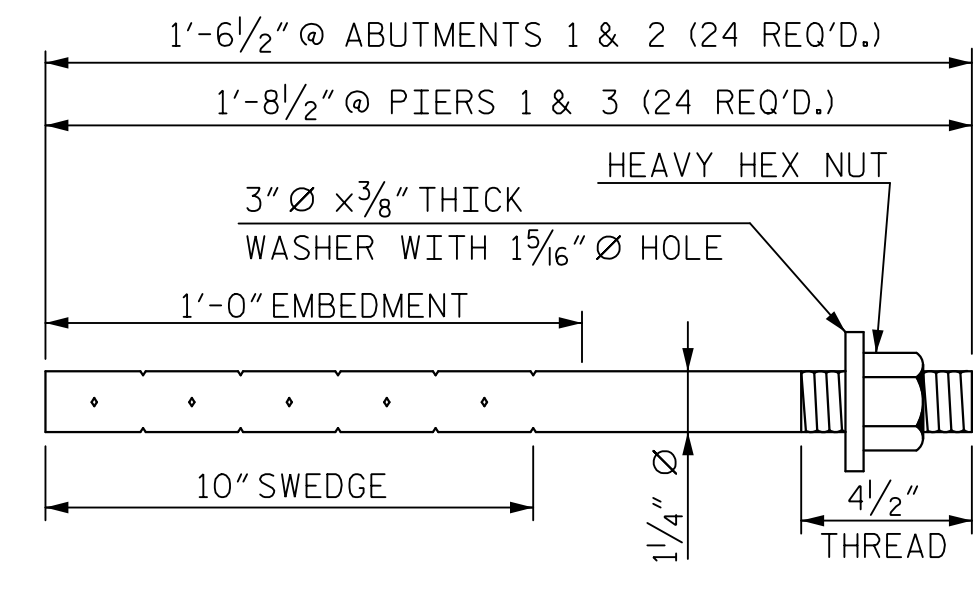


**EXPANSION BEARINGS**

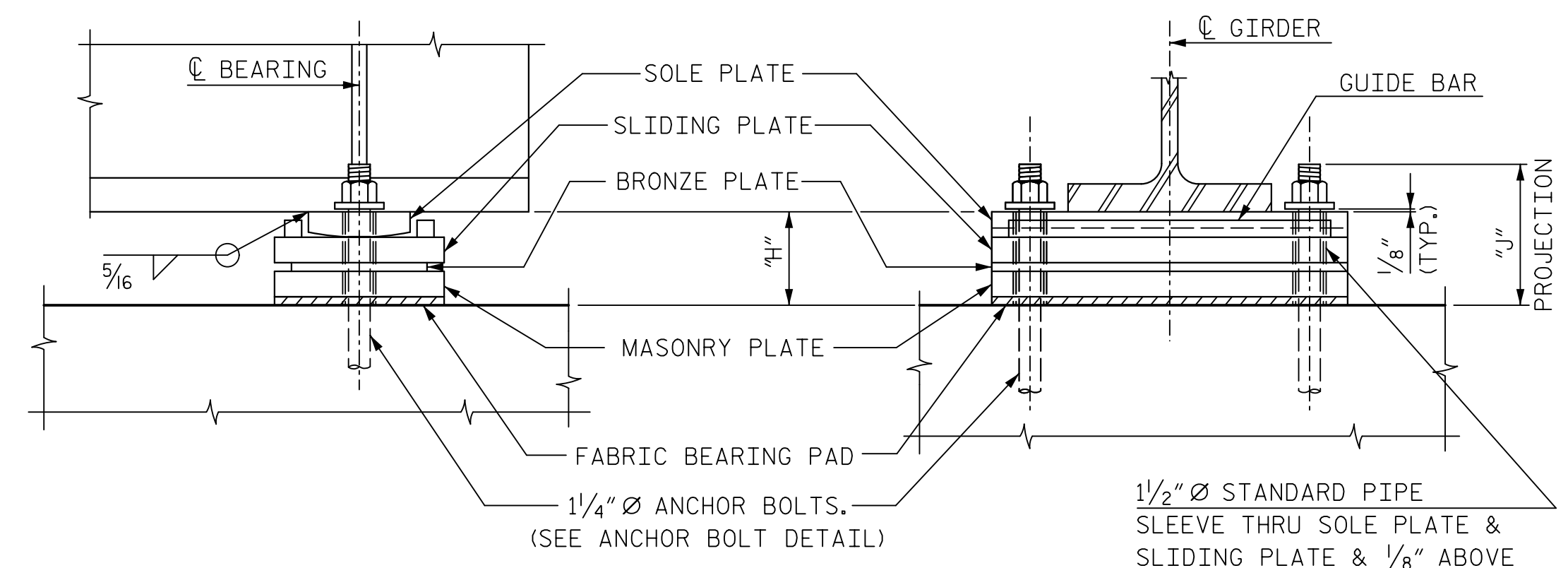
BRONZE PLATE TO BE ASTM B22 - COPPER ALLOY 911 OR ASTM B100 - COPPER ALLOY 510. TOP SURFACE TO BE SELF LUBRICATING.



**FIXED BEARING ASSEMBLY (FBA-1)**  
(12 REQ'D)



**ANCHOR BOLT DETAIL**



**EXPANSION BEARING ASSEMBLY (EBA-1)**  
(12 REQ'D)

1/2" Ø STANDARD PIPE SLEEVE THRU SOLE PLATE & SLIDING PLATE & 1/8" ABOVE SOLE PLATE (GALVANIZED STEEL PIPE) (TYP.)

**NOTES:**

ANCHOR BOLTS, SLIDING PLATE (EXPANSION BEARING) AND MASONRY PLATE (FIXED AND EXPANSION BEARINGS) SHALL BE HOT DIPPED GALVANIZED.

ALL PLATE SURFACES SHALL BE PAINTED WITH A 3 COAT PAINT SYSTEM EXCEPT AS SPECIFIED BELOW.

(A) THE SLIDING PLATE (EXPANSION BEARING) SHALL NOT BE PAINTED BUT SHALL RECEIVE A COAT OF LUBRICATION.

(B) THE MASONRY PLATE (FIXED AND EXPANSION BEARINGS) SHALL NOT BE PAINTED.

(C) THE BOTTOM SURFACE OF THE SOLE PLATE SHALL NOT BE PAINTED BUT SHALL RECEIVE A SINGLE COAT OF PRIMER APPLIED IN THE SHOP.

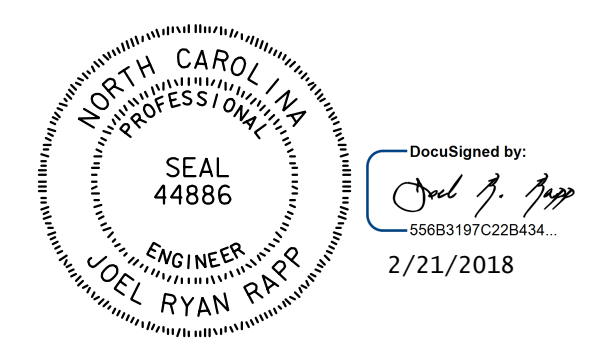
(D) THE TOP SURFACE OF THE SOLE PLATE SHALL NOT BE PAINTED IN THE VICINITY OF THE WELD BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE.

FOR ACRYLIC PAINT SYSTEM FOR STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR SELF LUBRICATING EXPANSION BEARING ASSEMBLIES, SEE SPECIAL PROVISIONS.

REFER TO "STRUCTURAL STEEL DETAILS" SHEET FOR ADDITIONAL NOTES.

BEARING PLATE SCHEDULE										
GIRDER	DIMENSIONS									
	FIXED BEARING (FBA-1)					EXPANSION BEARING (EBA-1)				
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"
AG1-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
AG2-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
AG3-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
AG4-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
AG5-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
AG6-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG1-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG2-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG3-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG4-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG5-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"
DG6-2	1 1/2"	2"	4"	6 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3"



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**HNTB** HNTB NORTH CAROLINA, P.C.  
NC License No. C-1554  
343 E. Six Forks Rd., Suite 200, Raleigh, NC, 27609

DRAWN BY B. VAUGHN DATE 8/17  
CHECKED BY R. RAPP DATE 9/17 DWG. NO. 15

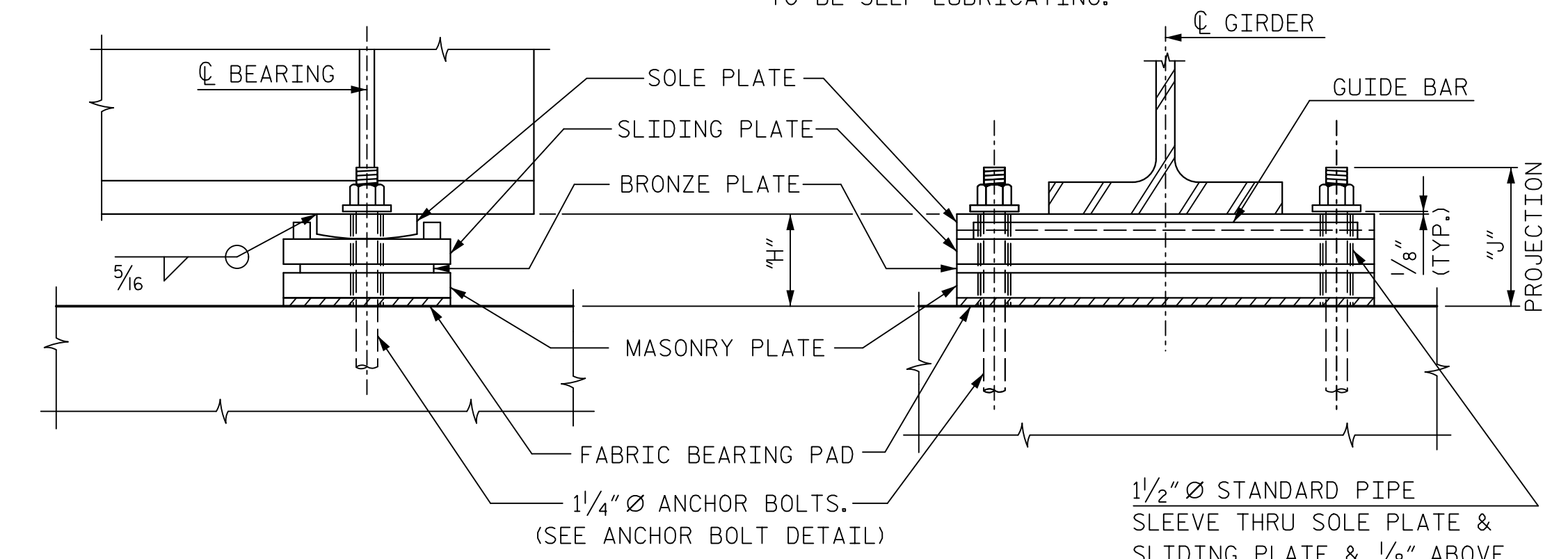
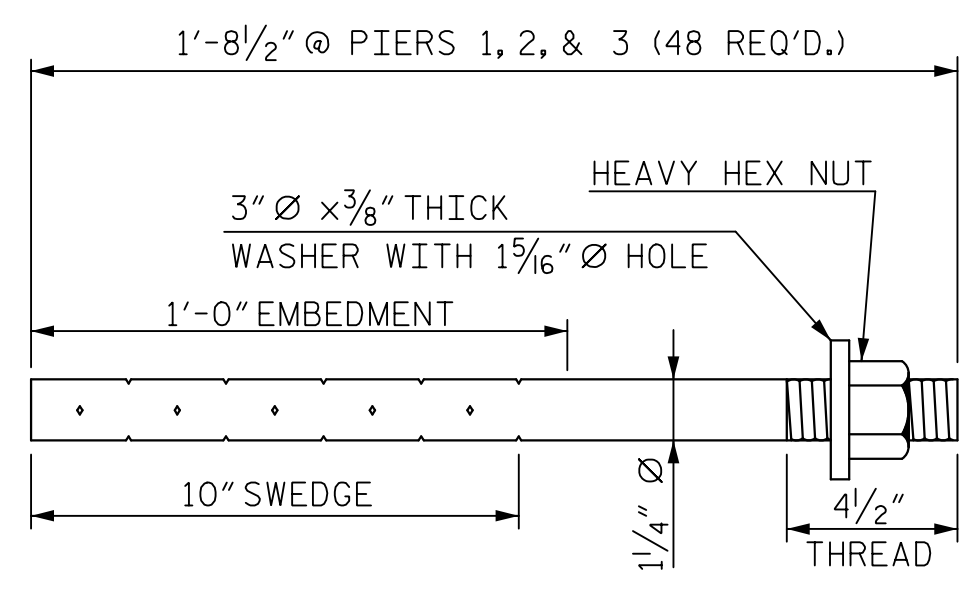
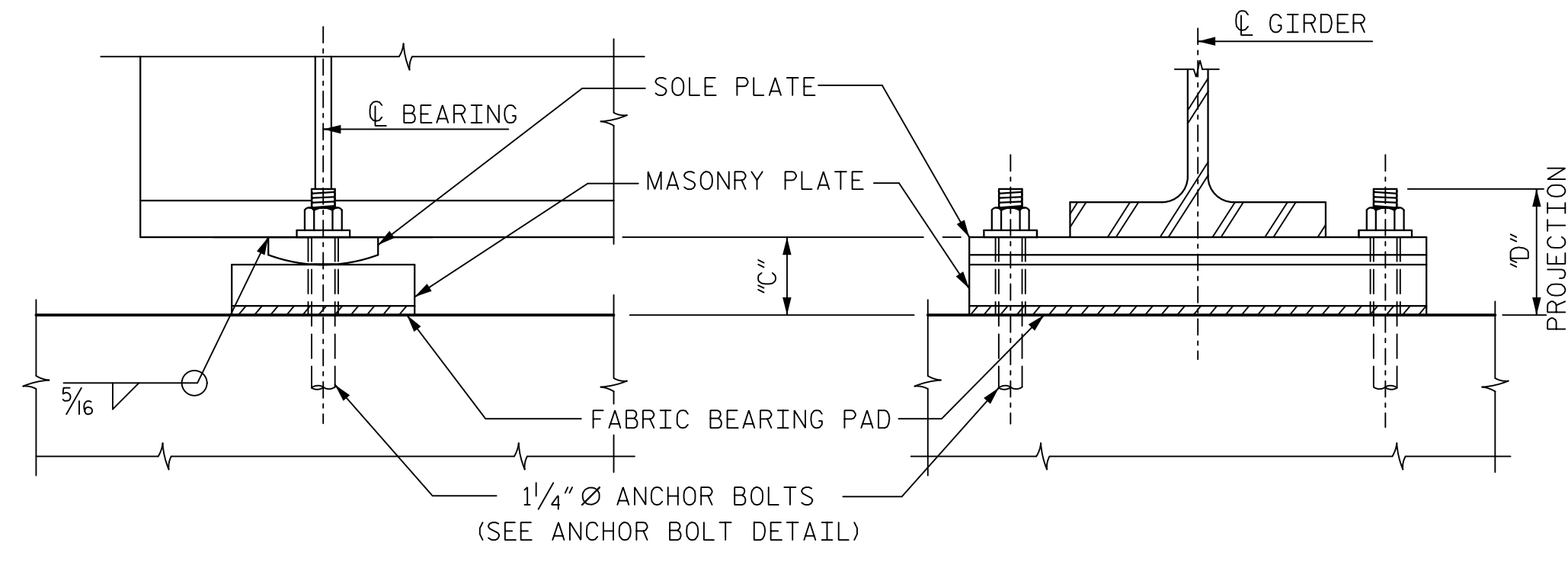
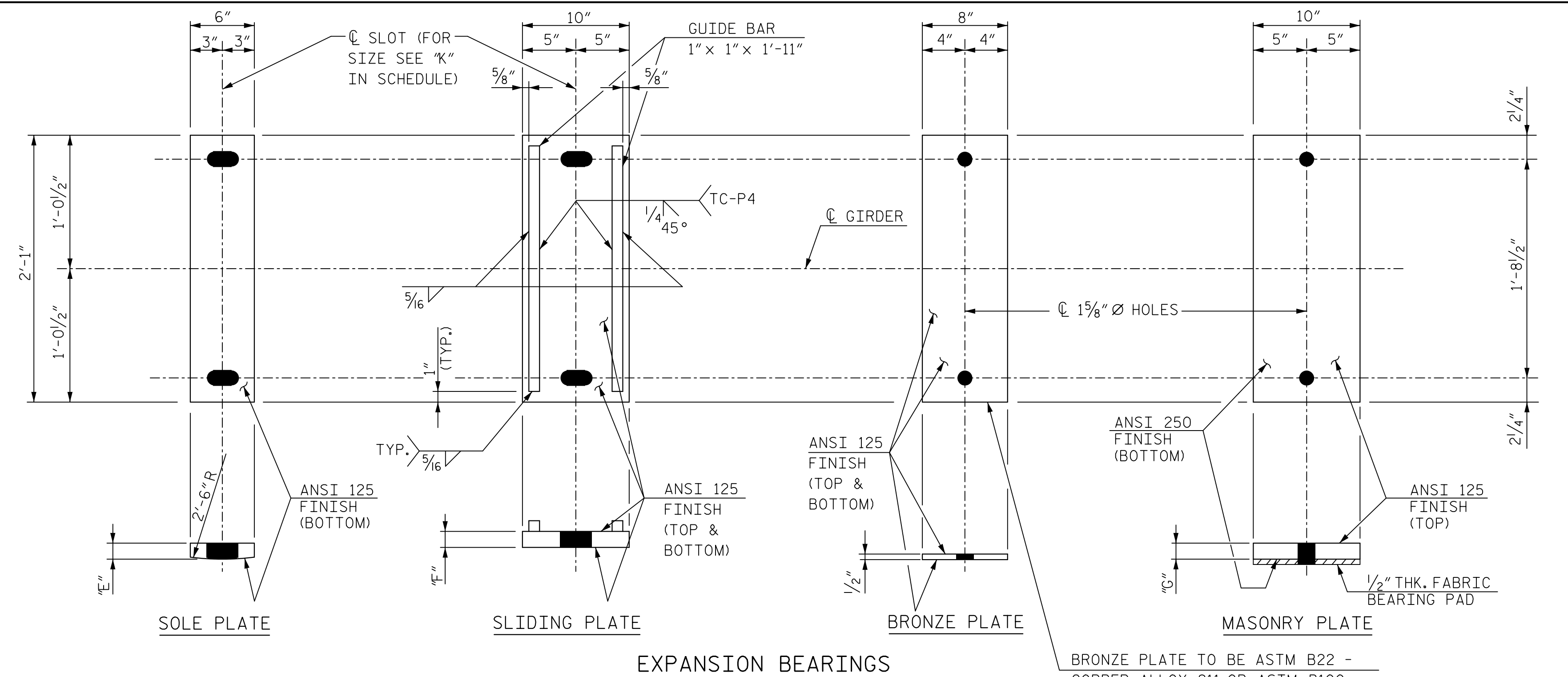
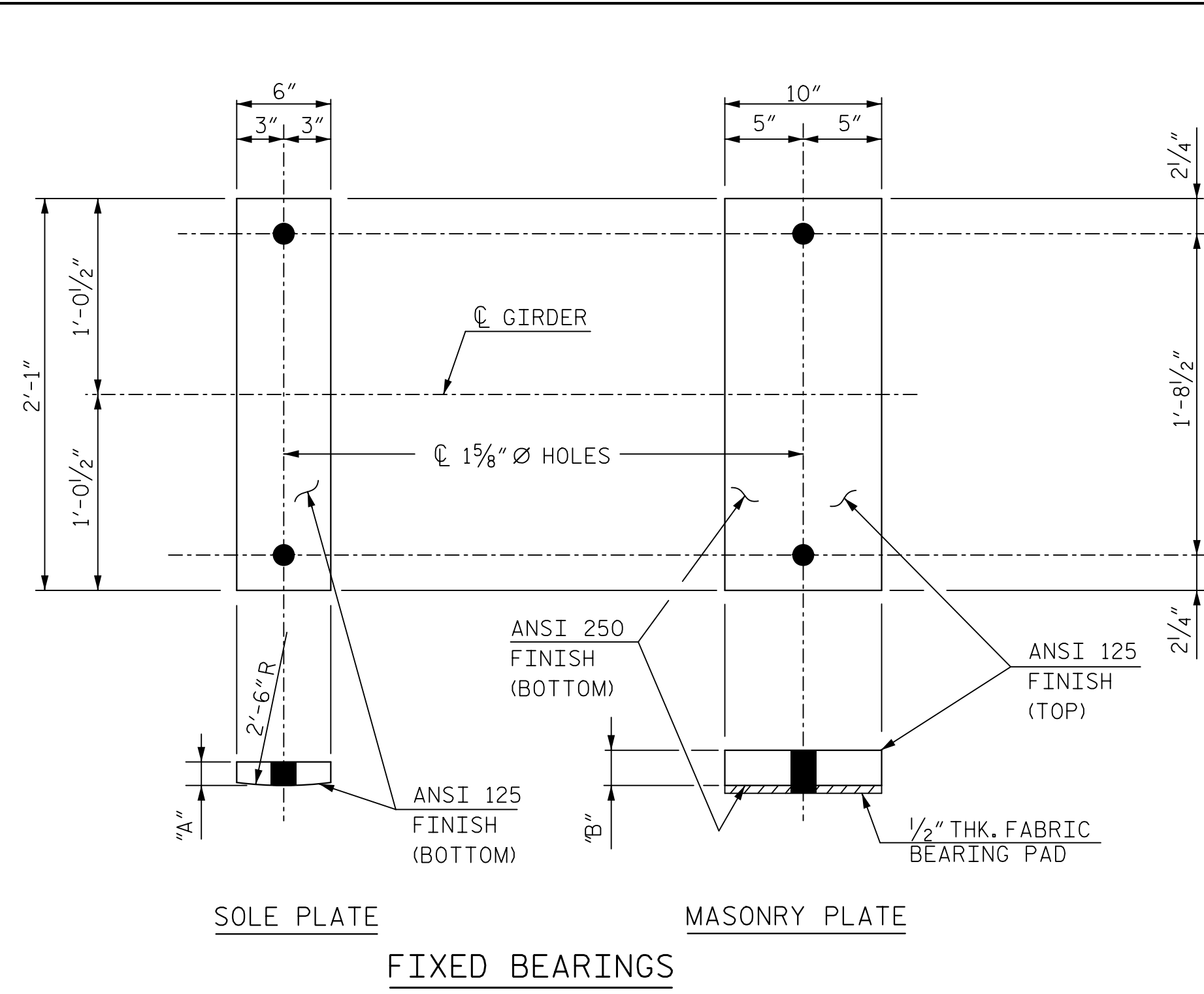
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE**

BEARING DETAILS  
SPAN A AND SPAN D

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-15
1			3			TOTAL SHEETS
2			4			56



**NOTES:**

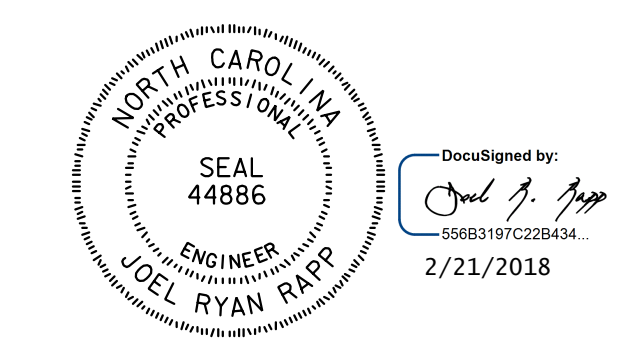
ANCHOR BOLTS, SLIDING PLATE (EXPANSION BEARING) AND MASONRY PLATE (FIXED AND EXPANSION BEARINGS) SHALL BE HOT DIPPED GALVANIZED.

ALL PLATE SURFACES SHALL BE PAINTED WITH A 3 COAT PAINT SYSTEM EXCEPT AS SPECIFIED BELOW.

- (A) THE SLIDING PLATE (EXPANSION BEARING) SHALL NOT BE PAINTED BUT SHALL RECEIVE A COAT OF LUBRICATION.
  - (B) THE MASONRY PLATE (FIXED AND EXPANSION BEARINGS) SHALL NOT BE PAINTED.
  - (C) THE BOTTOM SURFACE OF THE SOLE PLATE SHALL NOT BE PAINTED BUT SHALL RECEIVE A SINGLE COAT OF PRIMER APPLIED IN THE SHOP.
  - (D) THE TOP SURFACE OF THE SOLE PLATE SHALL NOT BE PAINTED IN THE VICINITY OF THE WELD BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE.
- FOR ACRYLIC PAINT SYSTEM FOR STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.
- FOR SELF LUBRICATING EXPANSION BEARING ASSEMBLIES, SEE SPECIAL PROVISIONS.
- REFER TO "STRUCTURAL STEEL DETAILS" SHEET FOR ADDITIONAL NOTES.

GIRDER	BEARING PLATE SCHEDULE									
	DIMENSIONS									
	FIXED BEARING (FBA-2)					EXPANSION BEARING (EBA-2)				
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"
BG1-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
BG2-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
BG3-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
BG4-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
BG5-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
BG6-2	1 1/2"	3 3/8"	5 3/8"	8 1/2"	1 1/2"	1 1/2"	1 7/8"	5 7/8"	8 1/2"	2" x 3 1/2"
CG1-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"
CG2-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"
CG3-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"
CG4-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"
CG5-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"
CG6-2	1 1/2"	3 1/4"	5 1/4"	8 1/2"	1 1/2"	1 1/2"	1 3/4"	5 3/4"	8 1/2"	2" x 3 1/2"

**PROJECT NO.** P-5705BA  
**MECKLENBURG COUNTY**  
**STATION:** POT STA. 23+62.98 -S2-



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

**SUPERSTRUCTURE**

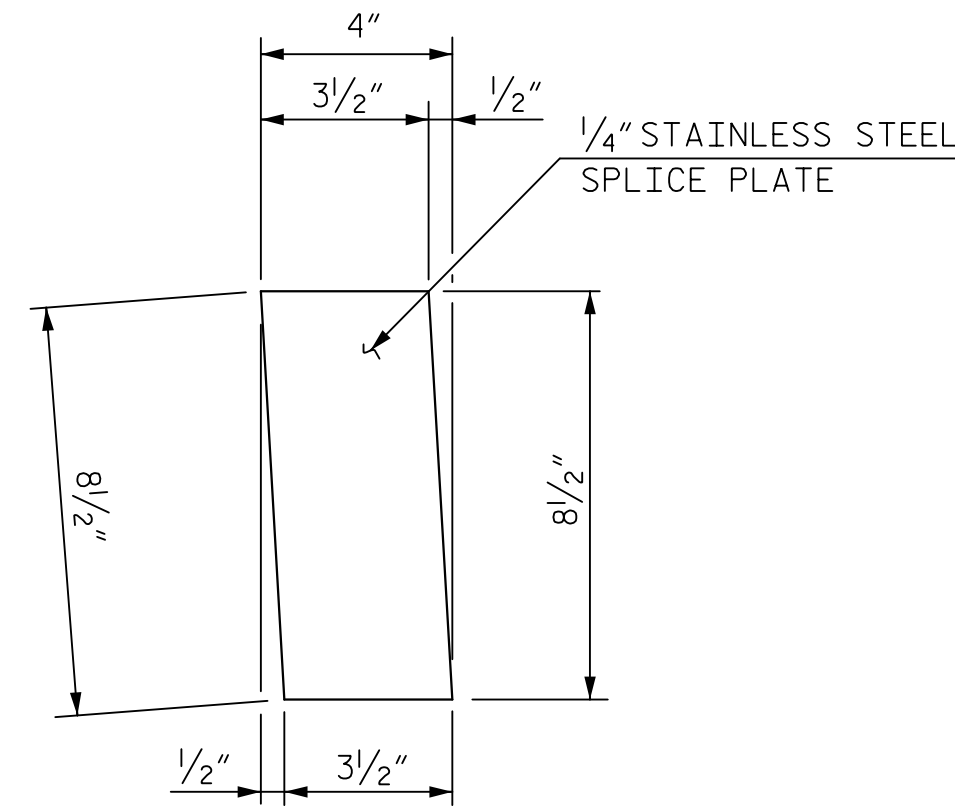
**BEARING DETAILS**  
 SPAN B AND SPAN C

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

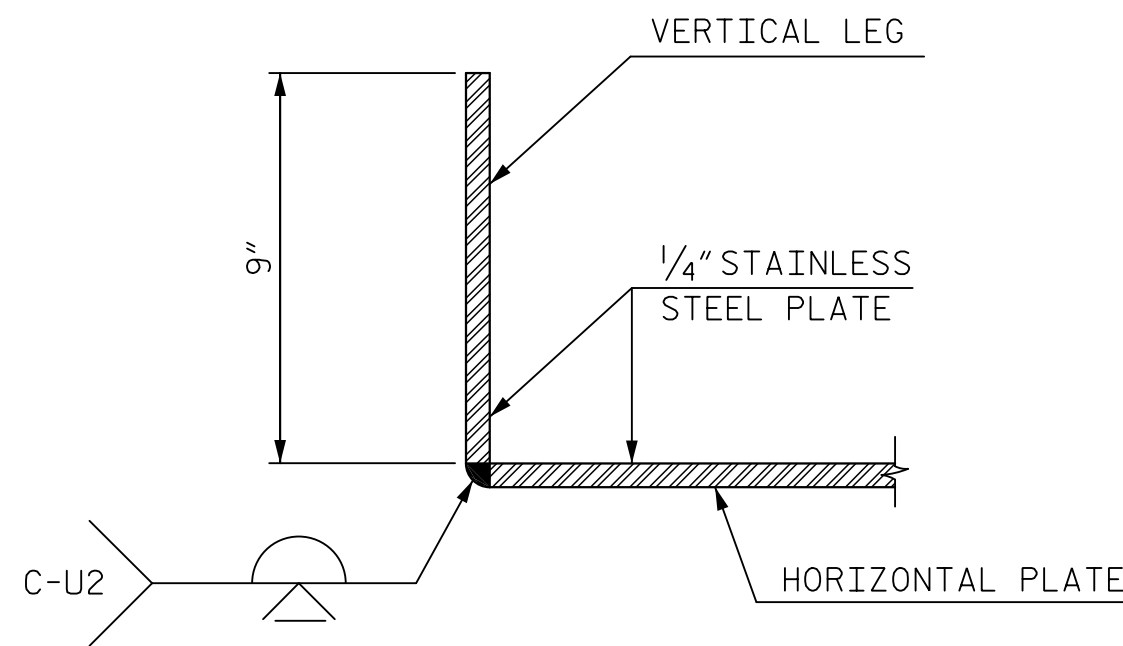
<b>HNTB</b>	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, NC, 27609	NO. BY DATE	NO. BY DATE	SHEET NO. S5-16
DRAWN BY B. VAUGHN	DATE 8/17	1 3		TOTAL SHEETS 56
CHECKED BY R. RAPP	DATE 9/17	2 4		

DWG. NO. 16

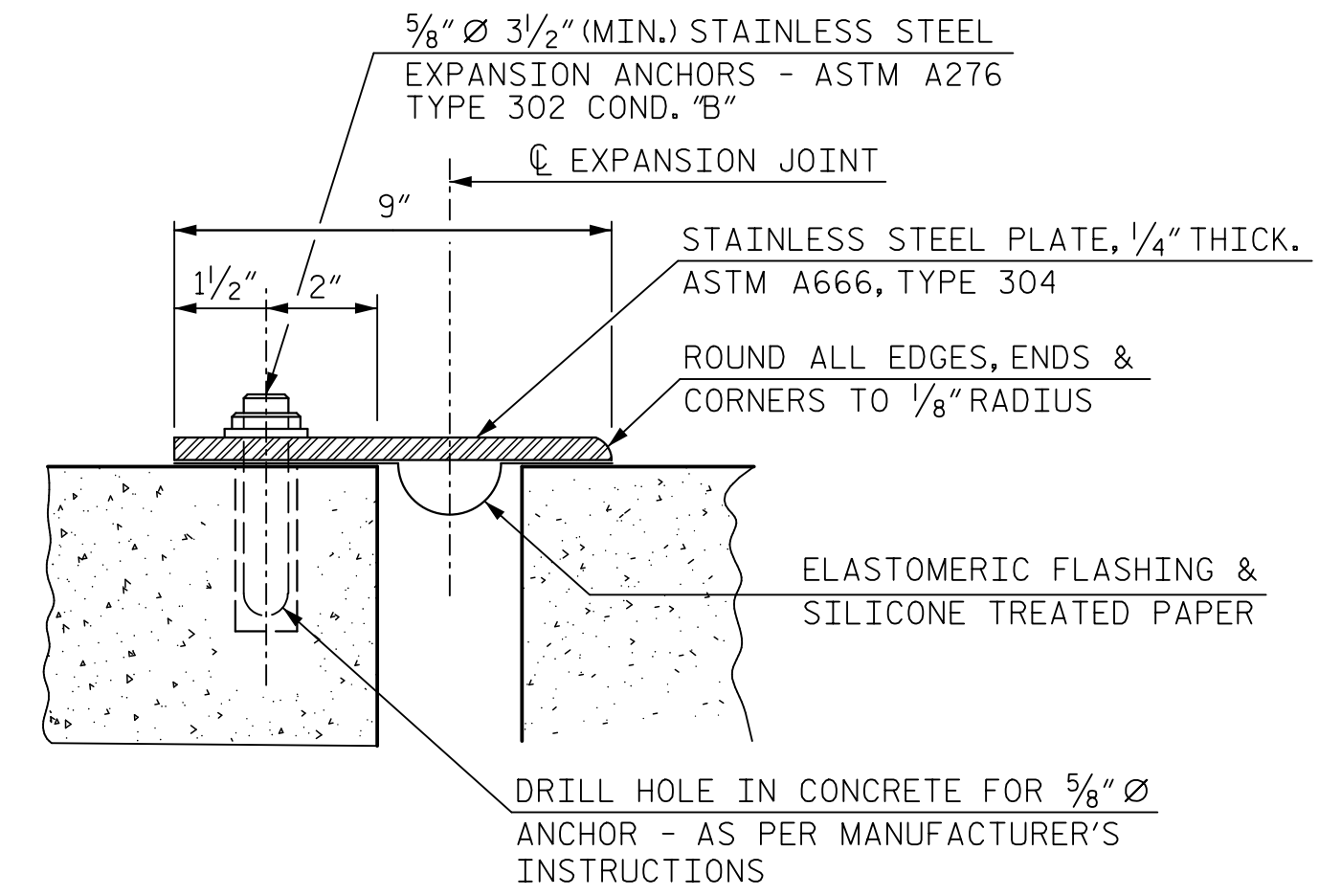




**DETAIL A**



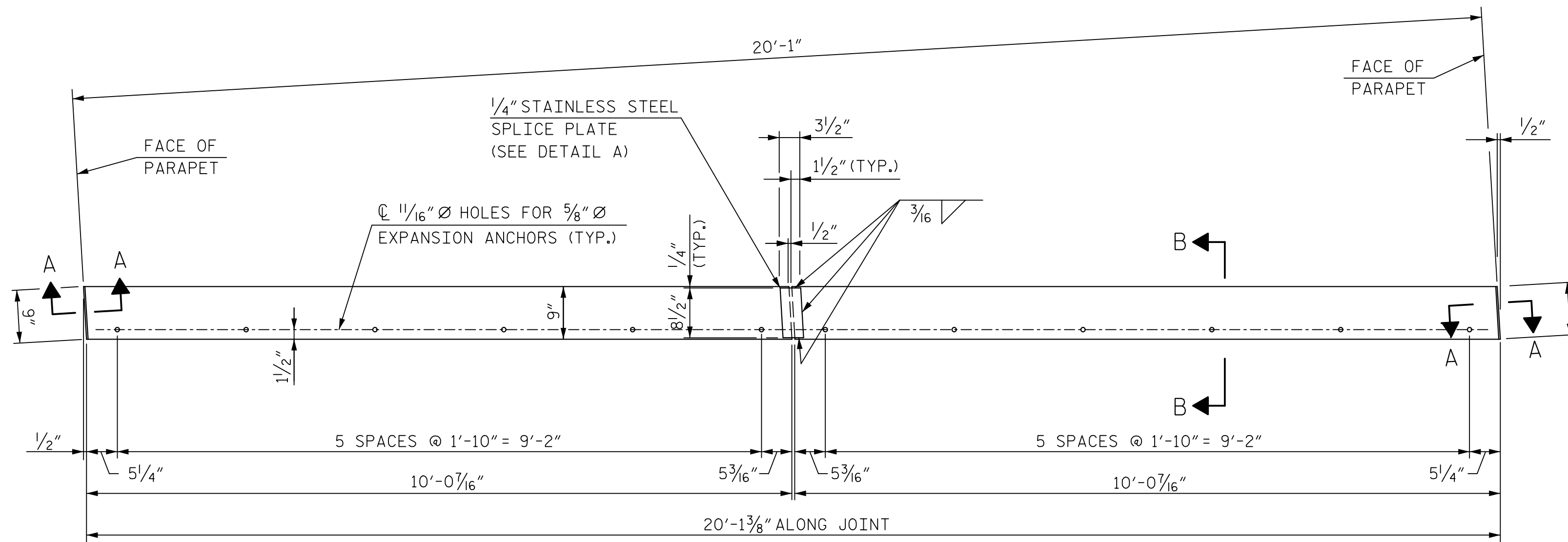
**SECTION A-A**



**SECTION B-B**

DETAIL OF EXPANSION ANCHOR AND PLATE

SEE DETAIL A ON "DECK DETAILS" SHEET FOR ADDITIONAL JOINT INFORMATION.

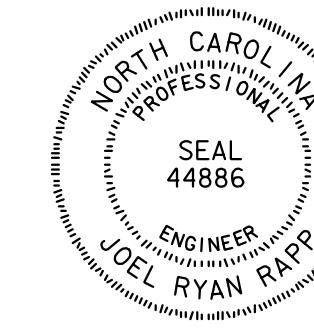


**PLAN - EXPANSION PLATE**  
(5 REQUIRED)

NOTE: PAYMENT FOR THE EXPANSION PLATE AND EXPANSION ANCHORS IS INCLUDED IN THE COST FOR STRUCTURE STEEL.

PLATE SHALL BE ANCHORED AT BACKWALL OF ABUTMENT 1 & 2, SPAN B SIDE OF PIER 1, SPAN B SIDE OF PIER 2 AND SPAN C SIDE OF PIER 3.

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-



DocuSigned by:  
*Joel R. Rapp*  
 55603197C228434...  
 2/21/2018

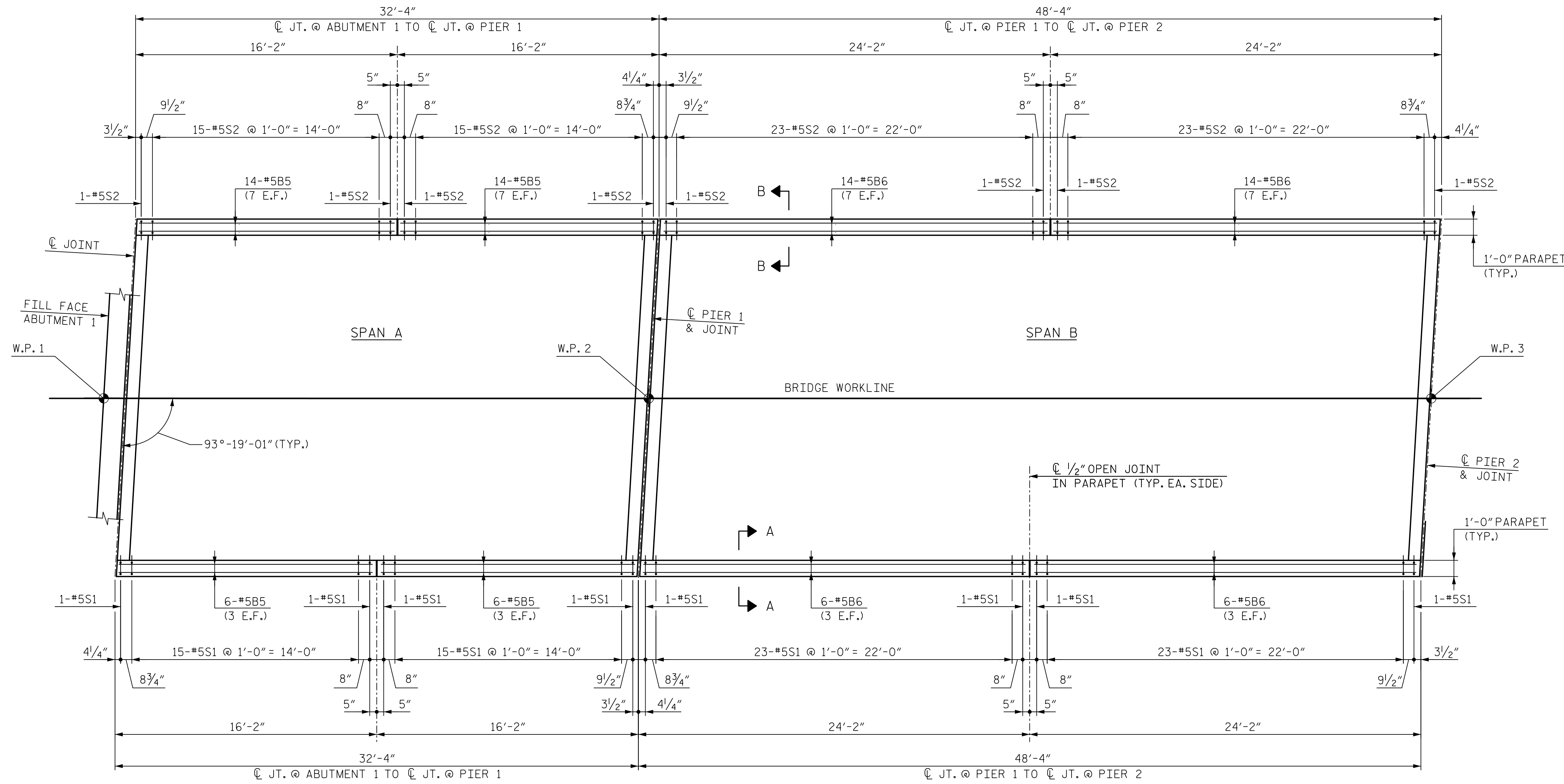
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 EXPANSION PLATE DETAILS

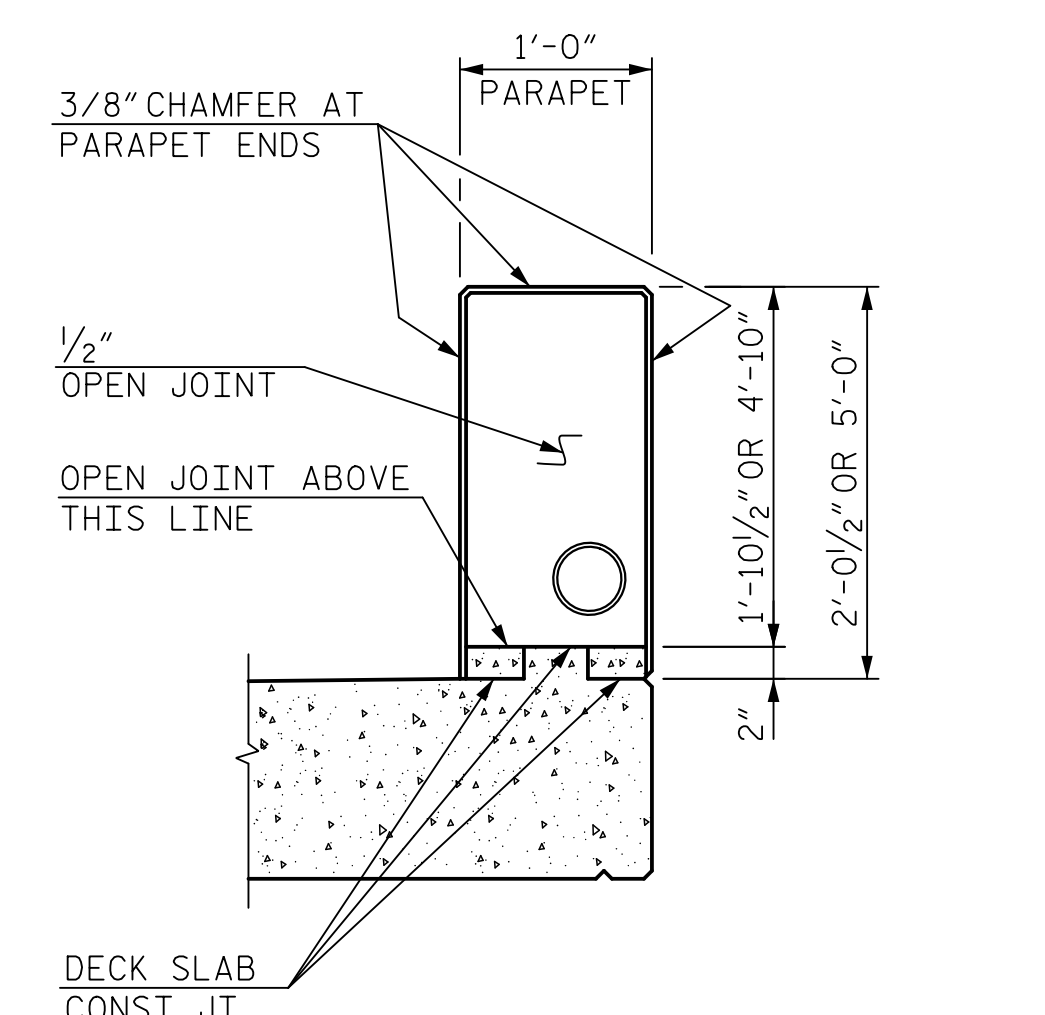
**HNTB** HNTB NORTH CAROLINA, P.C.  
 NC License No. C-1554  
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY B. VAUGHN DATE 8/17  
 CHECKED BY R. RAPP DATE 9/17 DWG. NO. 17

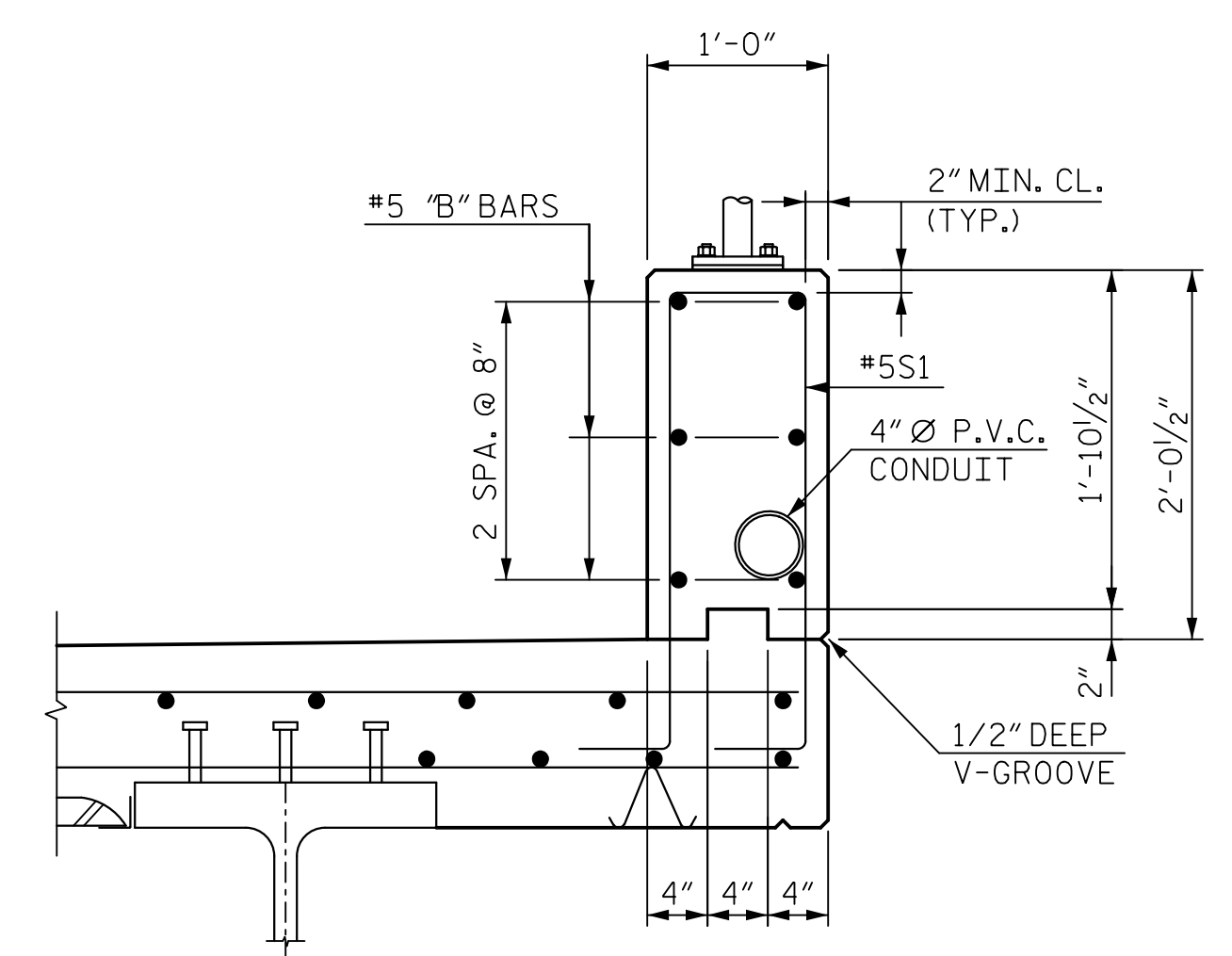
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-17
1			3			TOTAL SHEETS
2			4			56



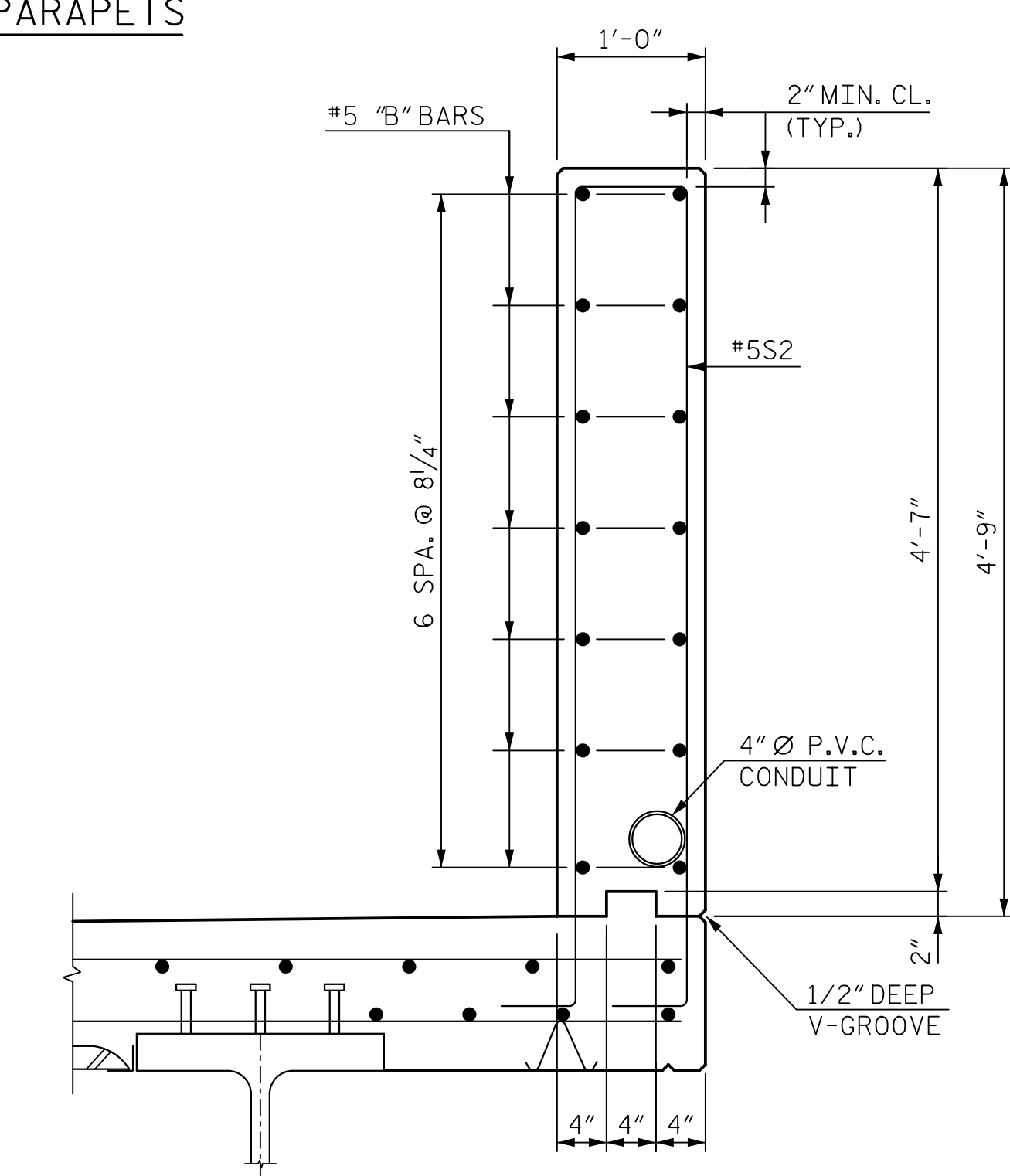
PLAN - SPAN A & SPAN B PARAPETS



SECTION THRU OPEN JOINT IN PARAPET



SECTION A-A THRU PARAPET



SECTION B-B THRU PARAPET

NOTES:

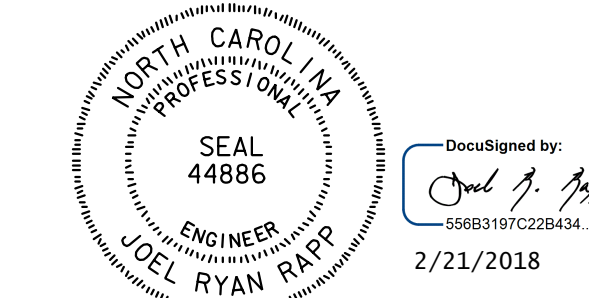
- BRIDGE MOUNTED FENCE AND HANDRAIL NOT SHOWN FOR CLARITY.
- ALL HORIZONTAL DIMENSIONS SHOWN ARE MEASURED ALONG EXTERIOR FACE OF PARAPET.
- ALL REINFORCING SHALL BE EPOXY COATED.
- FOR LOCATION AND DETAILS OF SIGNAL CONDUIT IN CONCRETE PARAPET, SEE "TYPICAL SECTION" SHEET.
- FOR BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS, SEE "BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.
- VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF PARAPET AND IN ACCORDANCE WITH THE SPECIAL PROVISION FOR "CONCRETE PARAPET". THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS.
- #5S1 AND #5S2 BARS IN PARAPET MAY BE SHIFTED SLIGHTLY TO MAINTAIN PROPER CLEARANCE TO EXPANSION JOINTS IN PARAPET.
- E.F. = EACH FACE
- PAYMENT FOR CONCRETE PARAPET SHALL BE INCLUDED IN THE UNIT COST PAY ITEM FOR CONCRETE PARAPET.
- PAY LENGTH = 331.7'

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

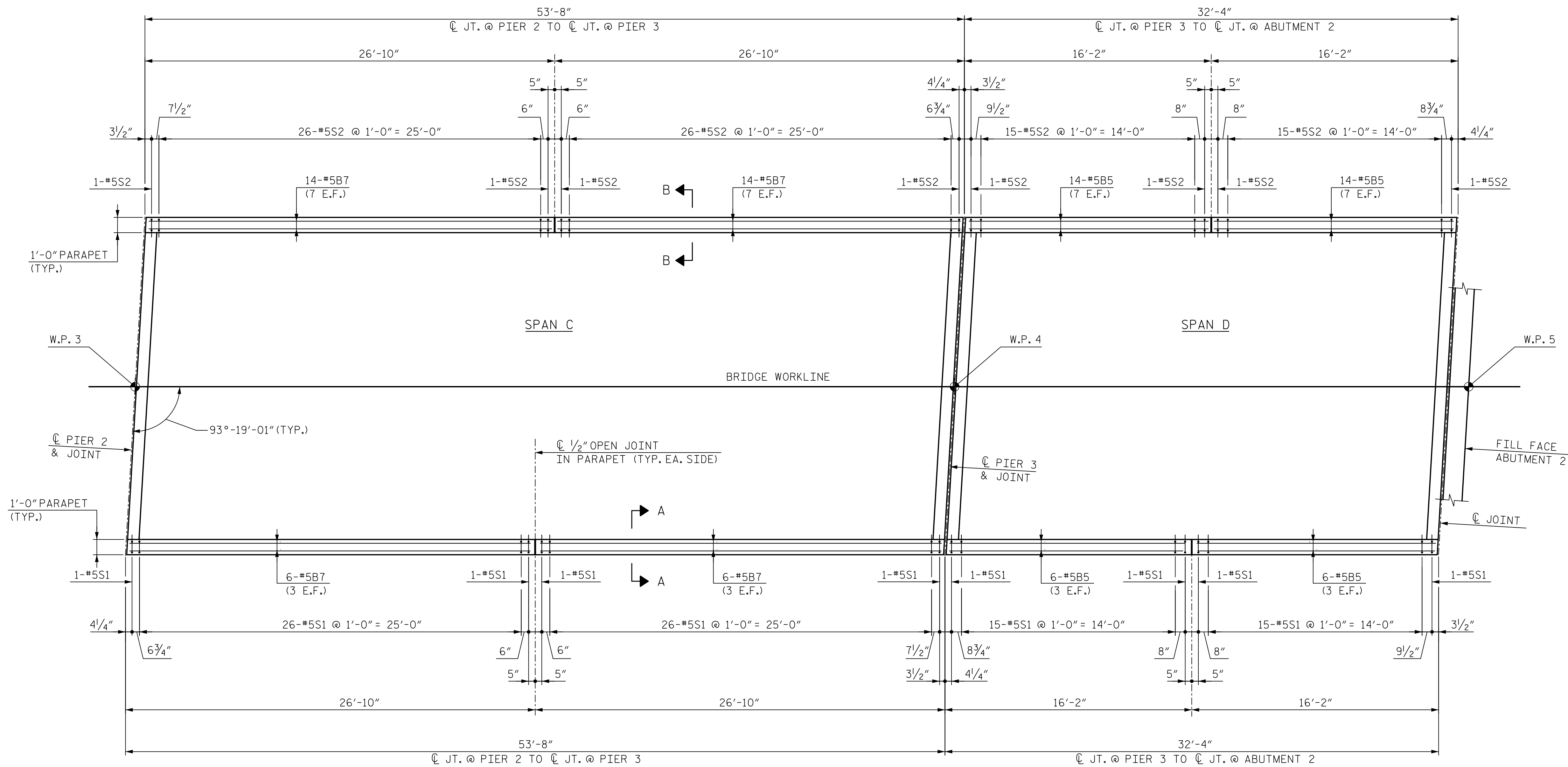
SUPERSTRUCTURE  
 PARAPET DETAILS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-18 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1			3			
2			4				
DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>R. RAPP</u> DATE <u>9/17</u>	DWG. NO. 18						



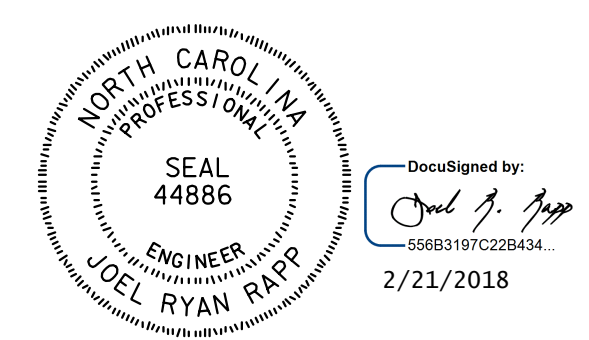


NOTE:  
SEE SHEET 1 OF 2 FOR NOTES  
AND SECTIONS.

PLAN - SPAN C & SPAN D PARAPETS

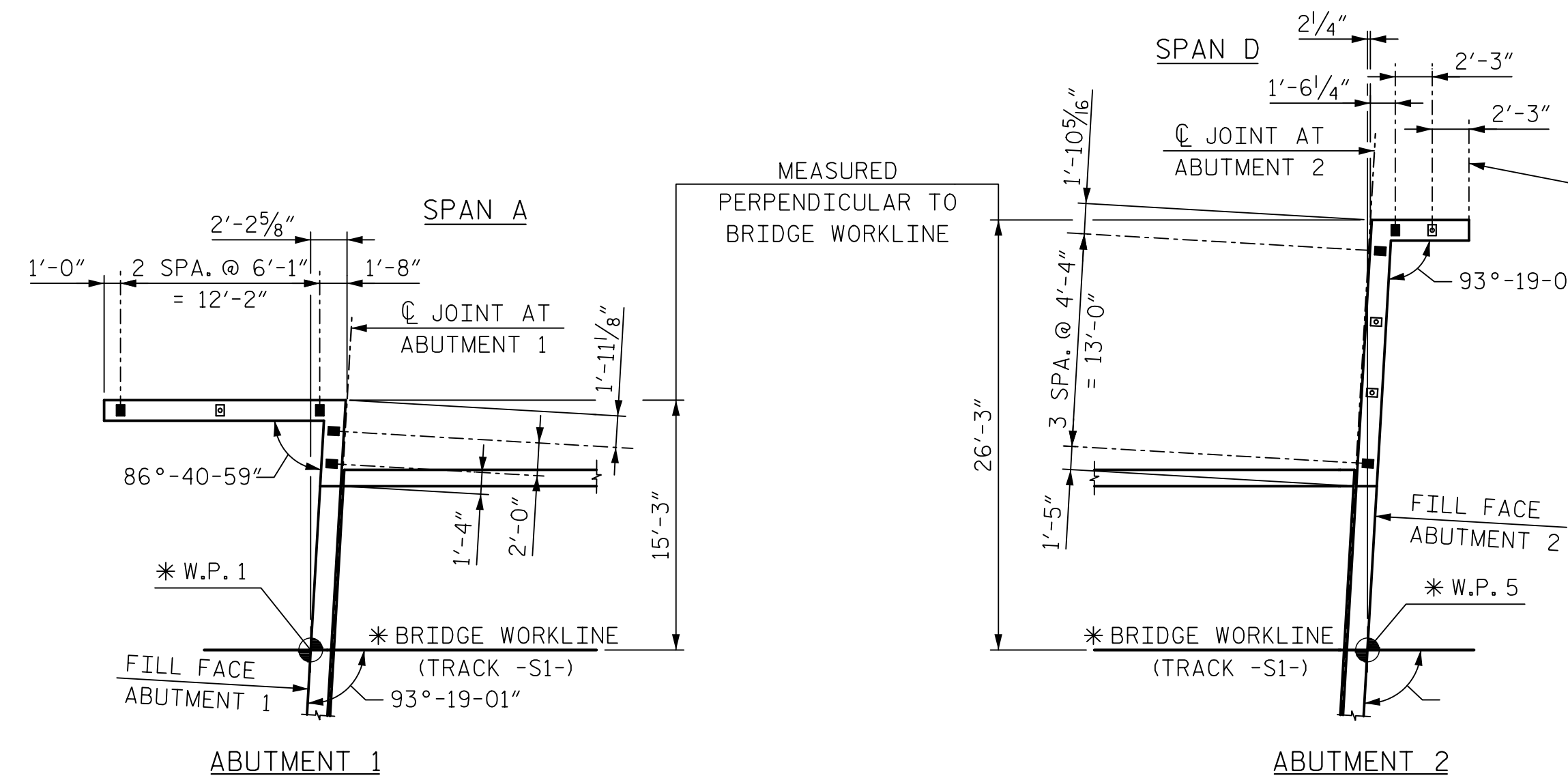
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 2  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PARAPET DETAILS



DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-19 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1			3			
DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>R. RAPP</u> DATE <u>9/17</u> DWG. NO. 19	2			4			



\* FOR TRACK -S1- BRIDGE WORKLINE AND WORKPOINT DEFINITIONS, REFER TO 'BRIDGE ON STATION TRACK 1 OVER W TRADE STREET' PLANS.

LEGEND:

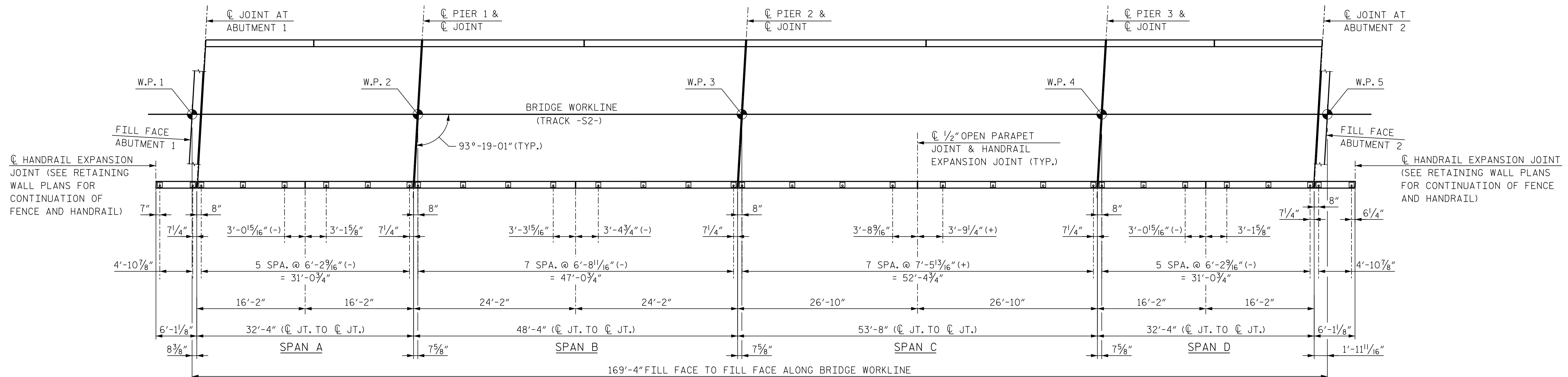
- - END POST (ALUMINUM HANDRAIL)
- - INTERIOR POST (FENCE AND STEEL HANDRAIL)
- - INTERIOR POST (ALUMINUM HANDRAIL)

NOTES:

SEE SHEET 2 OF 3 FOR FENCE AND STEEL HANDRAIL DETAILS AND NOTES.  
SEE SHEET 3 OF 3 FOR ALUMINUM HANDRAIL DETAILS AND NOTES.

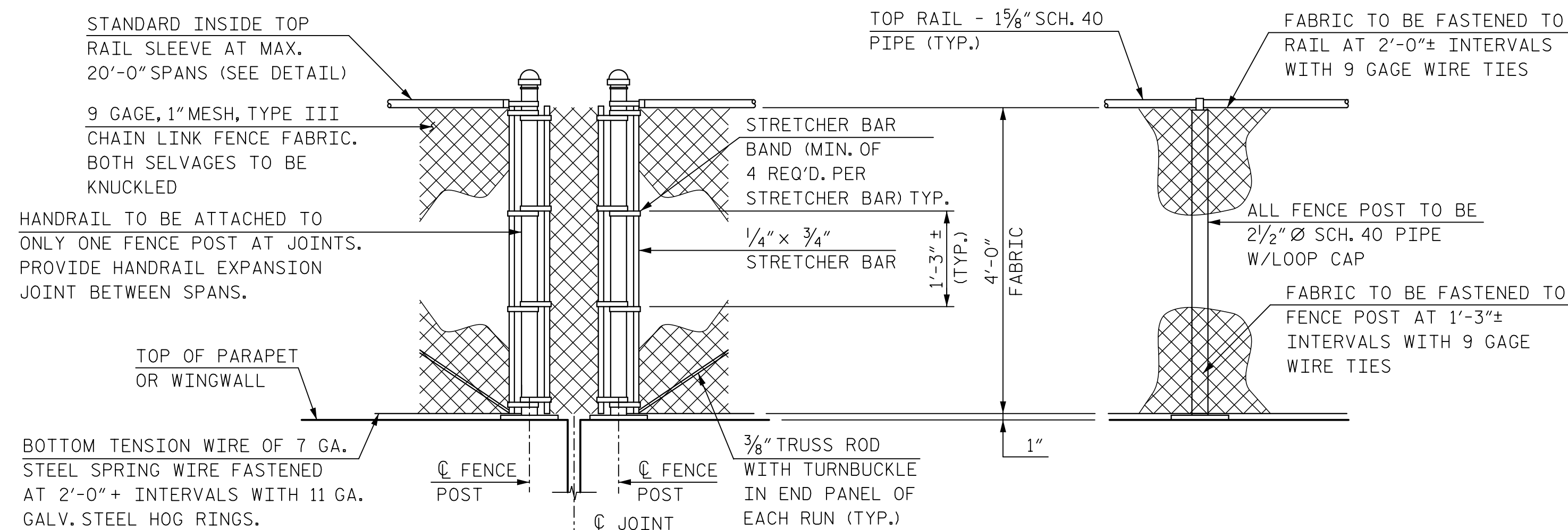
ALUMINUM HANDRAIL POST SPACING - BACKWALL/WINGWALL

(ALL DIMENSIONS SHOWN ARE ALONG EXTERIOR FACE OF BACKWALL/WINGWALL UNO)

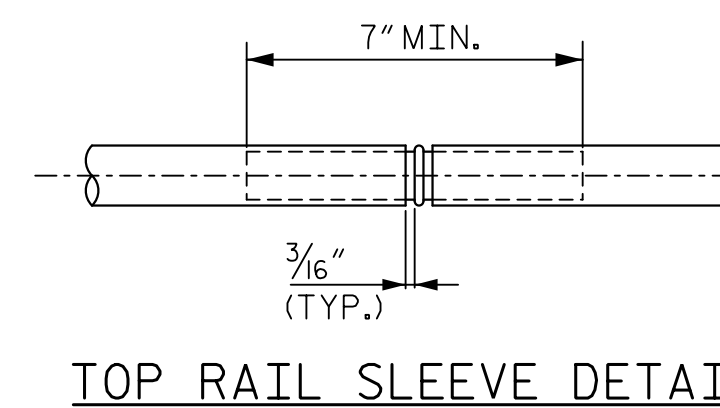


FENCE AND STEEL HANDRAIL POST SPACING - BRIDGE & WINGWALLS

(ALL DIMENSIONS SHOWN ARE ALONG EXTERIOR FACE OF PARAPET/WINGWALL)

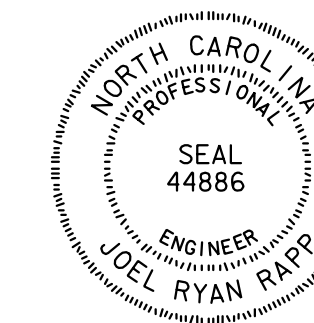


DETAILS FOR CHAIN LINK FENCE  
(HANDRAIL NOT SHOWN FOR CLARITY)



PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 3



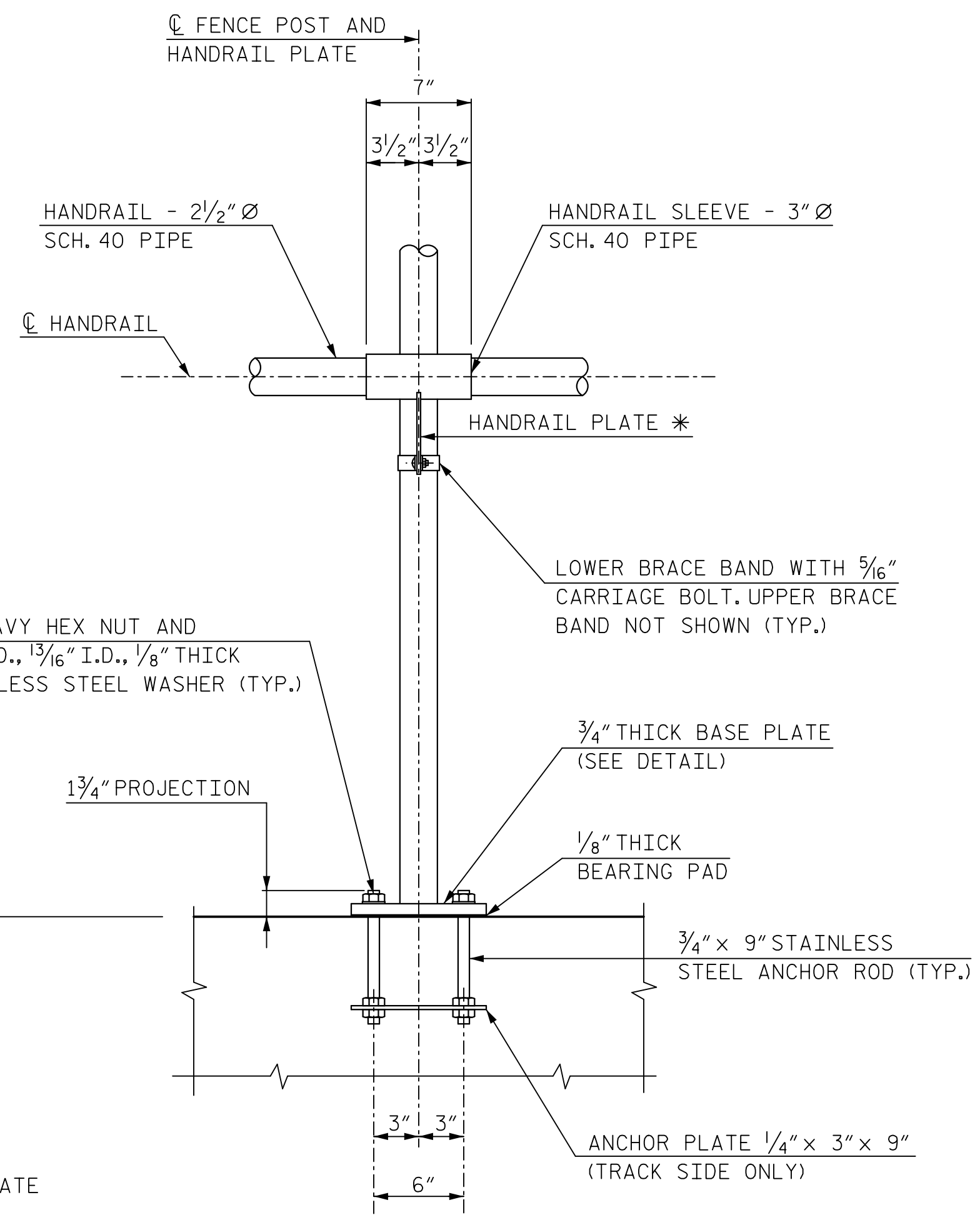
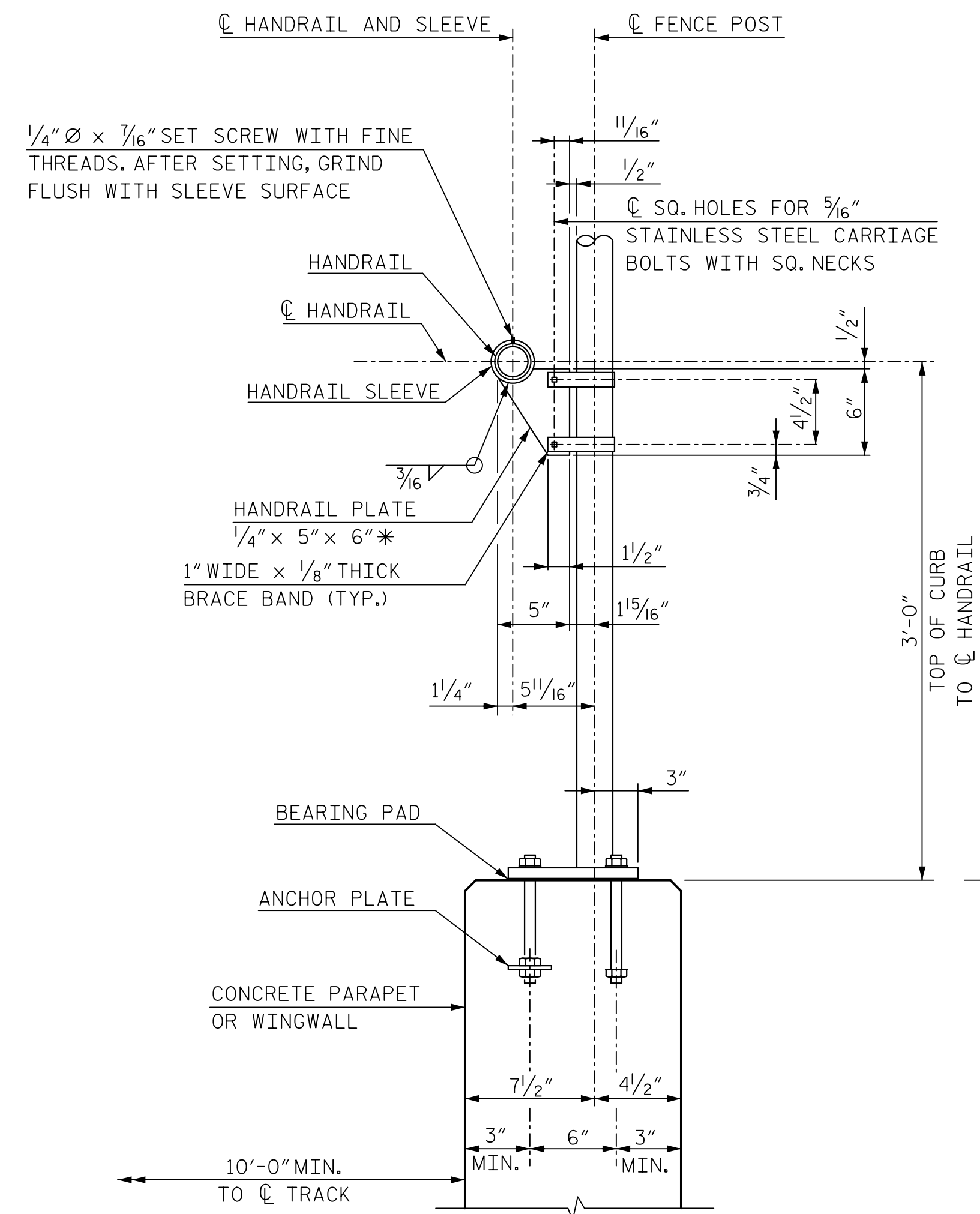
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY <u>B. VAUGHN</u>	DATE <u>8/17</u>	DWG. NO. <u>20</u>	
CHECKED BY <u>R. RAPP</u>	DATE <u>9/17</u>		

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-20
1			3			TOTAL SHEETS
2			4			56





\* ALL EDGES ON HANDRAIL PLATE TO BE ROUNDED -  $1/16"$  RADIUS

DETAILS FOR PIPE RAILING

NOTES:

SEE "FENCE AND STEEL HANDRAIL POST SPACING - BRIDGE AND WINGWALLS" DETAIL ON SHEET 1 OF 3 FOR POST SPACING AND LOCATION OF EXPANSION JOINTS IN HANDRAIL.

ALL HANDRAIL PIPE, SLEEVES, AND EXPANSION JOINTS TO BE SMOOTH AND FREE OF SHARP EDGES.

FENCE POSTS, RAIL, AND HANDRAIL PIPE SHALL BE SCHEDULE 40 STEEL PIPE IN ACCORDANCE WITH ASTM F1043.

PROVISIONS SHALL BE MADE FOR THE DRAINAGE OF WATER FROM INSIDE THE FENCE POSTS.

CHAIN LINK FABRIC AND FITTINGS SHALL MEET THE REQUIREMENTS OF ASTM F668 AND HAVE A BONDED BLACK FUSION VINYL COATING.

MISCELLANEOUS METAL COMPONENTS SHALL MEET THE REQUIREMENTS OF ASTM A36.

STAINLESS STEEL BOLTS, NUTS, AND ANCHOR RODS TO BE ASTM A276, TYPE 304. STAINLESS STEEL WASHERS TO BE ASTM A276, TYPE 302. ANCHOR ROD THREADS SHALL BE ROLLED, NOT CUT.

POST TO BE SET PERPENDICULAR TO TOP OF PARAPET/WINGWALL AND RAILS SHALL BE PLACED PARALLEL TO THE GRADE OF THE BRIDGE.

CERTIFIED MILL REPORTS ARE REQUIRED FOR POST, RAIL, AND FENCE FABRIC. SHOP INSPECTION IS NOT REQUIRED.

AFTER ANCHOR BOLT AND OTHER BOLT NUTS HAVE BEEN TIGHTENED, THREADS SHALL BE NICKED TO LOCK NUTS.

THE BRACE BANDS USED TO SECURE HANDRAIL SLEEVE SHALL BE OF SUCH SIZE NECESSARY TO CLAMP TIGHTLY TO FENCE POST.

WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT AWS BRIDGE WELDING CODE.

ANCHOR PLATE SHALL BE STEEL CONFORMING TO ASTM SPECIFICATION A36.

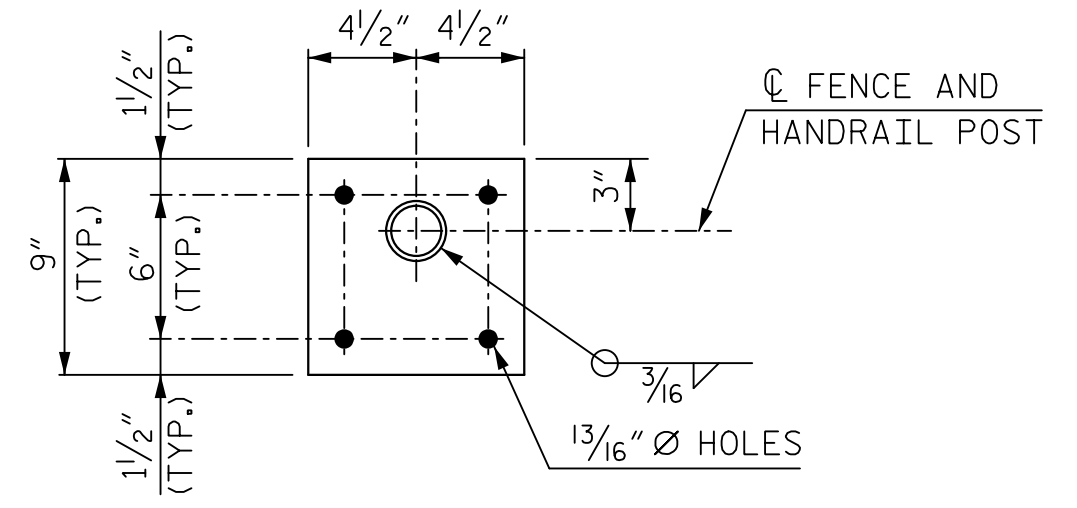
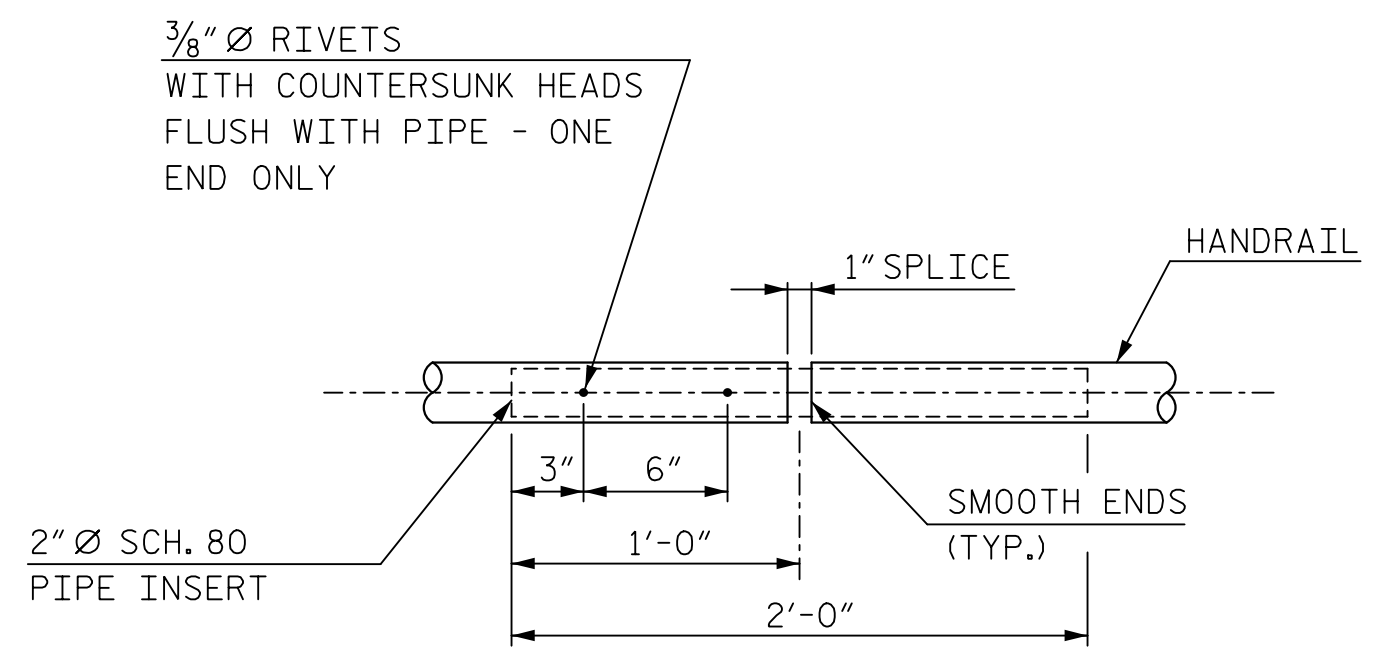
UPPER ANCHOR ROD NUTS SHALL BE HEAVY HEX NUTS, PER ASTM A276 TYPE 302 OR 304 STAINLESS STEEL.

LOWER ANCHOR ROD NUTS SHALL BE HEAVY HEX NUTS, PER ASTM A307.

FENCE FRAMEWORK INCLUDING BASE PLATES, HANDRAIL, HANDRAIL SLEEVES, AND ALL SUPPORT COMPONENTS TO HAVE A FUSION BONDED BLACK VINYL COATING IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM F1043.

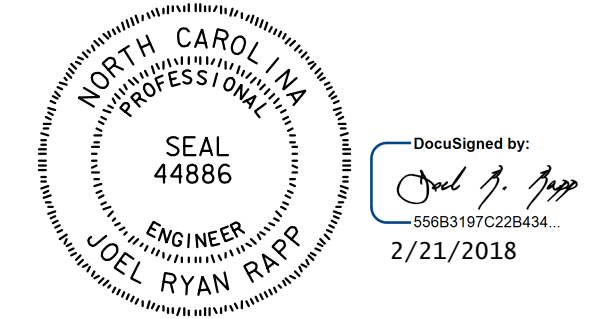
SHOP DRAWINGS FOR FENCE AND HANDRAIL ARE REQUIRED AND SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 177.7'



PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

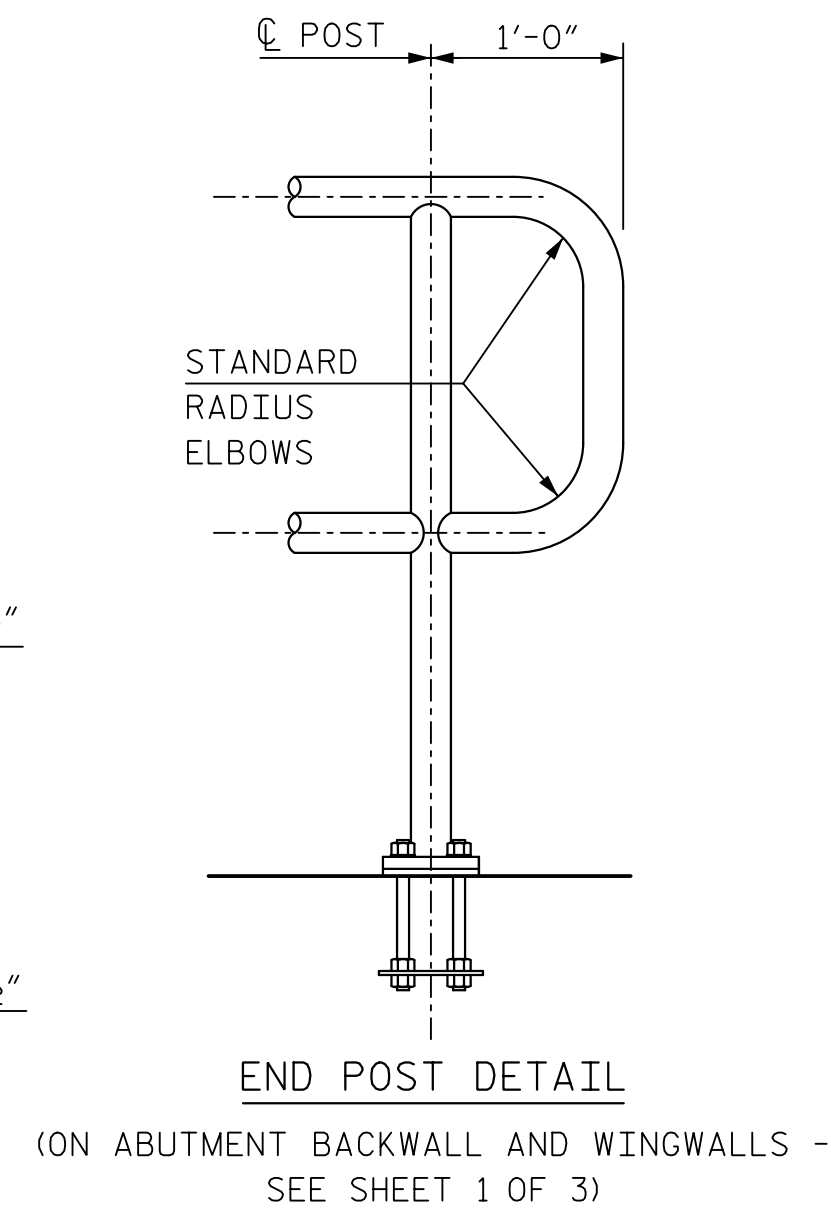
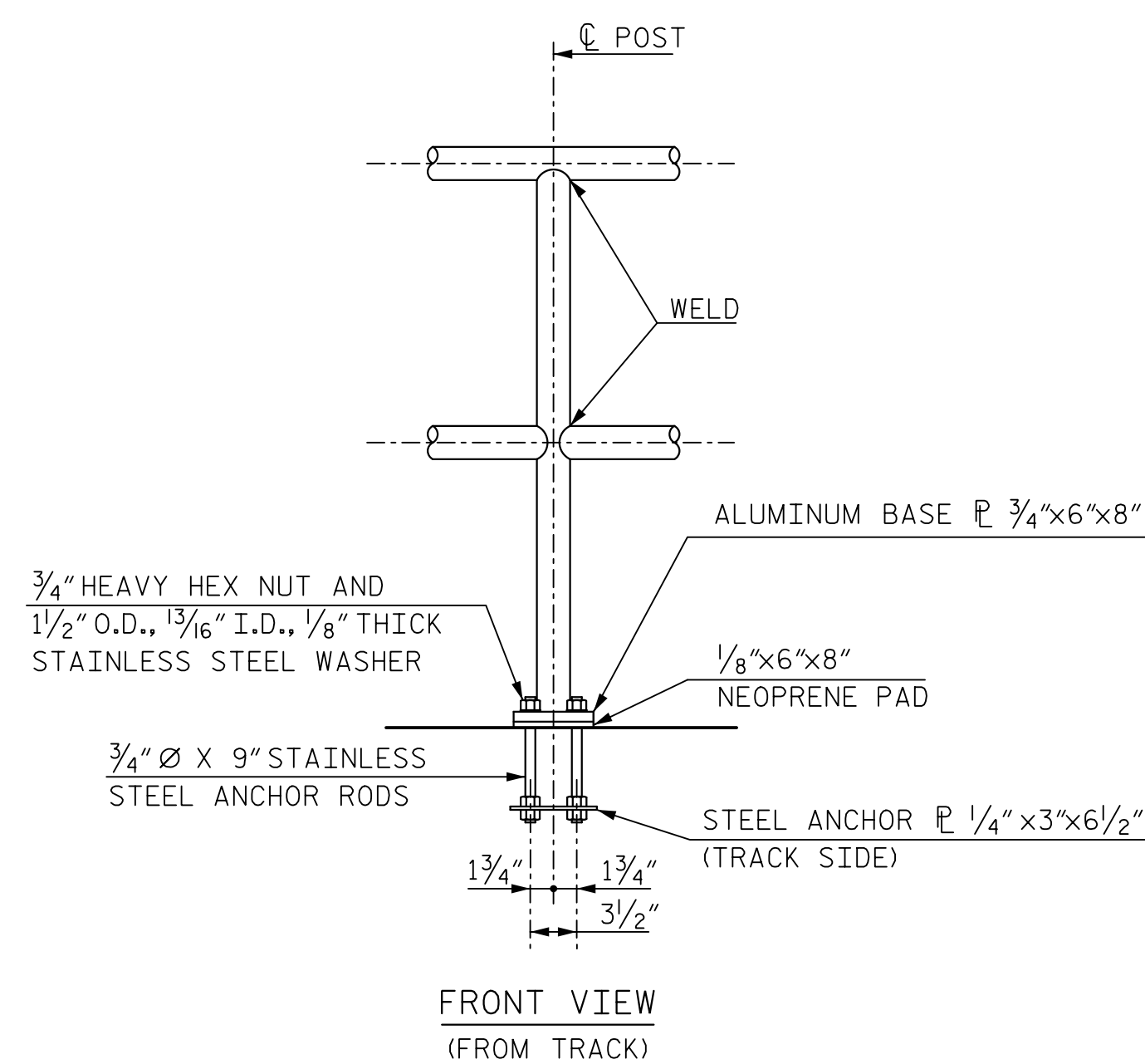
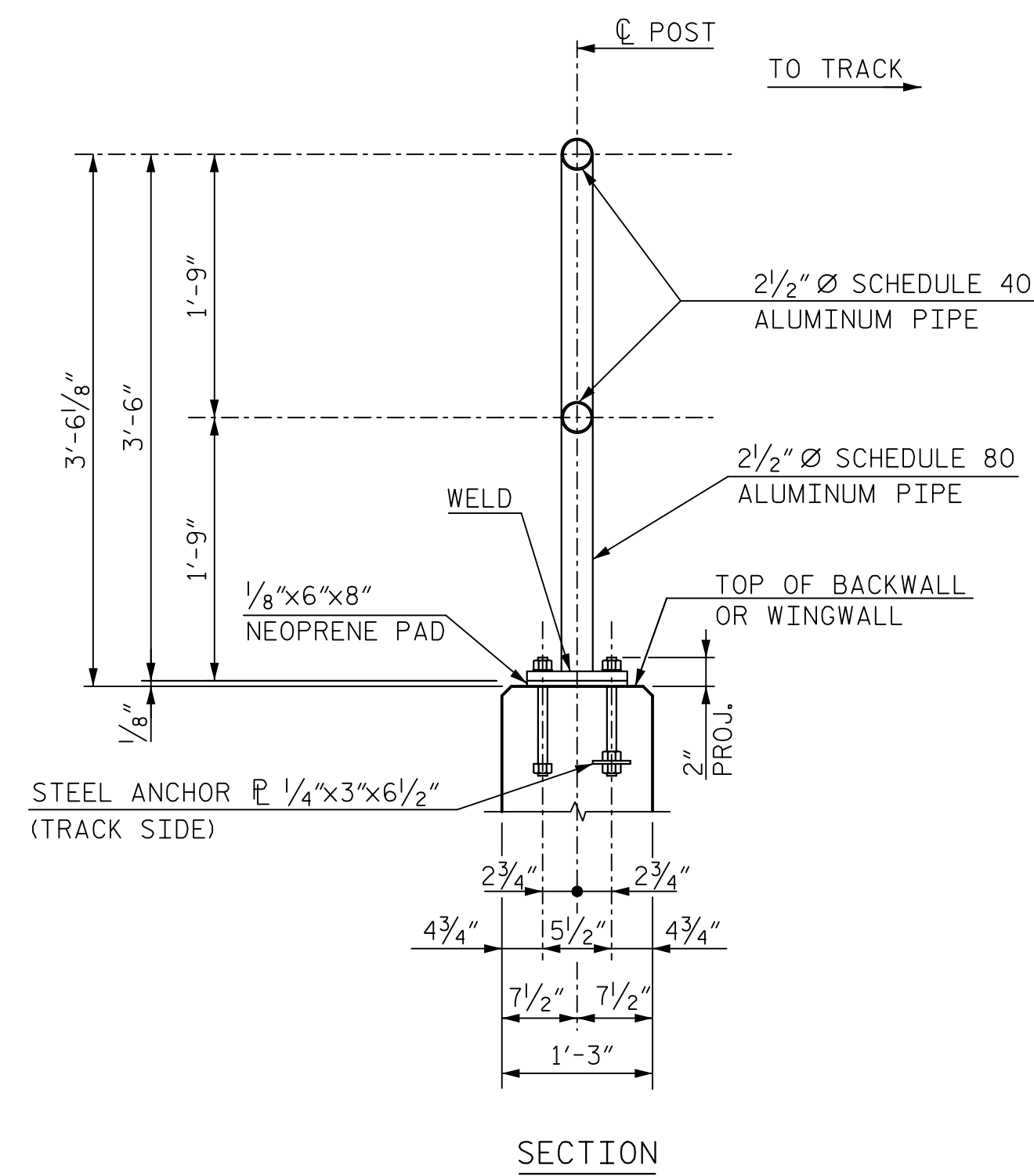
SHEET 2 OF 3



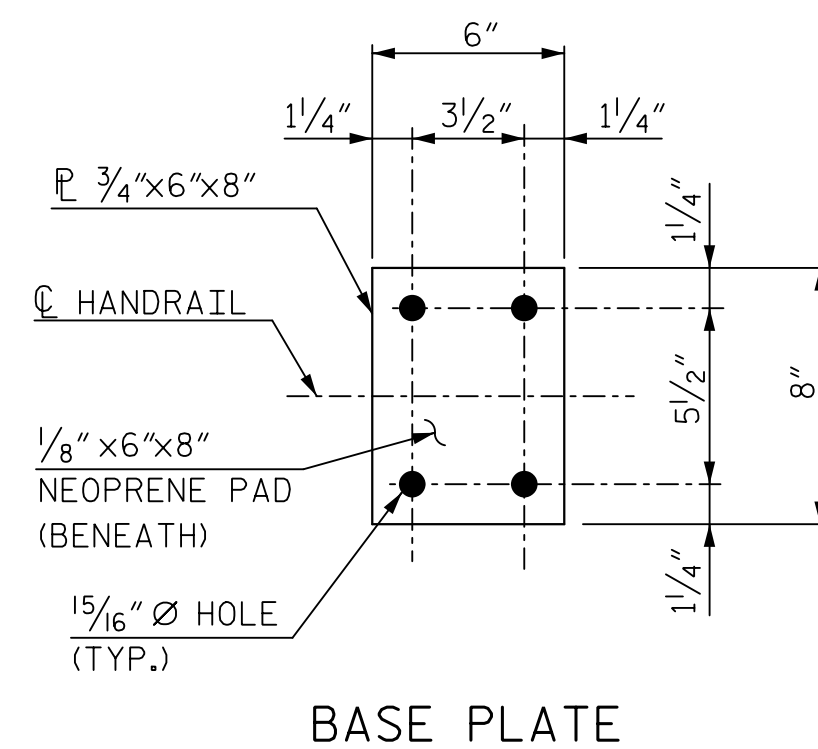
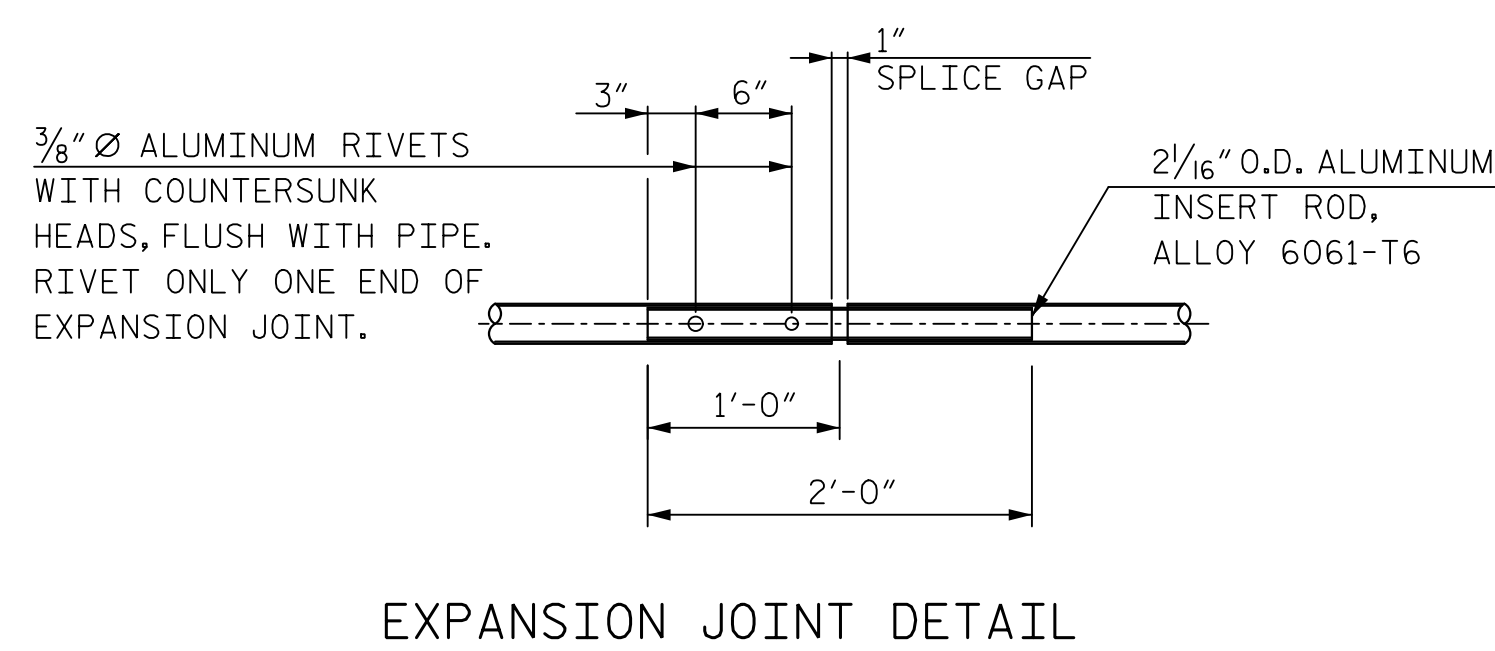
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-21 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		8/17	3			
DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>R. RAPP</u> DATE <u>9/17</u> DWG. NO. 21	2		4				



**ALUMINUM HANDRAIL AND POST**



**NOTES:**

SEE "ALUMINUM HANDRAIL POST SPACING - BACKWALL/WINGWALL" DETAIL ON SHEET 1 OF 3 FOR POST SPACING AND LOCATION OF EXPANSION JOINTS IN HANDRAIL.

ALUMINUM PIPE TO BE ASTM B429, ALLOY 6061-T6 AND BASE PLATE TO BE ASTM B209, ALLOY 6061-T6.

STAINLESS STEEL BOLTS, CAP SCREWS, AND NUTS TO BE ASTM A276 TYPE 304. STAINLESS STEEL WASHERS TO BE ASTM A276 TYPE 302.

POSTS TO BE SET PERPENDICULAR TO TOP OF BACKWALL/WINGWALL AND RAILS SHALL BE PLACED PARALLEL TO THE GRADE OF THE BRIDGE.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAIL AND POSTS. SHOP INSPECTIONS ARE NOT REQUIRED BY THE RAILROAD BUT MAY BE REQUIRED BY NCDOT.

AFTER ANCHOR ROD NUTS HAVE BEEN TIGHTENED, THREADS SHALL BE NICKED TO LOCK NUTS.

ANCHOR PLATES SHALL BE STEEL CONFORMING TO ASTM SPECIFICATION A36.

ANCHOR RODS SHALL CONFORM TO ASTM SPECIFICATION A276 TYPE 302 OR 304 STAINLESS STEEL AND THREADS SHALL BE ROLLED, NOT CUT.

UPPER ANCHOR ROD NUTS SHALL BE HEAVY HEX NUTS, PER ASTM A276 TYPE 302 OR 304 STAINLESS STEEL.

LOWER ANCHOR ROD NUTS SHALL BE HEAVY STEEL HEX NUTS, PER ASTM A563.

THE CENTERLINE OF ANY SPLICE AND/OR EXPANSION JOINT IS TO BE LOCATED AT LEAST 2'-0" AWAY FROM CENTERLINE OF POST. EXPANSION AND/OR SPLICE JOINTS FOR EACH RAIL OF TWO RAILINGS ARE TO BE PLACED IN THE SAME LOCATION AND IN THE SAME PANEL.

WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT AWS STRUCTURAL WELDING CODE FOR ALUMINUM.

THE LENGTH OF METAL RAIL TO BE PAID FOR SHALL BE THE CONTINUOUS LENGTH MEASURED FROM END TO END OF RAIL, ALONG THE TOP RAIL.

SHOP DRAWINGS FOR RAILINGS ARE REQUIRED AND SHALL BE SUBMITTED FOR APPROVAL.

FOR METAL RAIL (ALUMINUM), SEE SPECIAL PROVISIONS.

PAY LENGTH = 38.7'

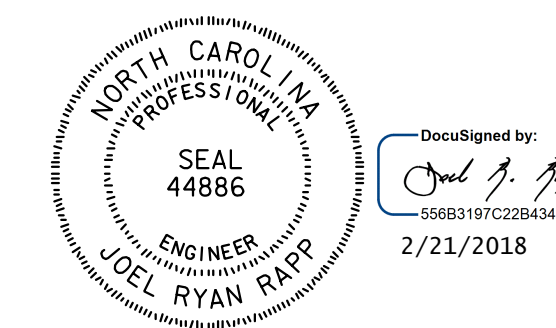
**PROJECT NO.** P-5705BA  
**MECKLENBURG COUNTY**  
**STATION:** POT STA. 23+62.98 -S2-

SHEET 3 OF 3

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

**SUPERSTRUCTURE**

**BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

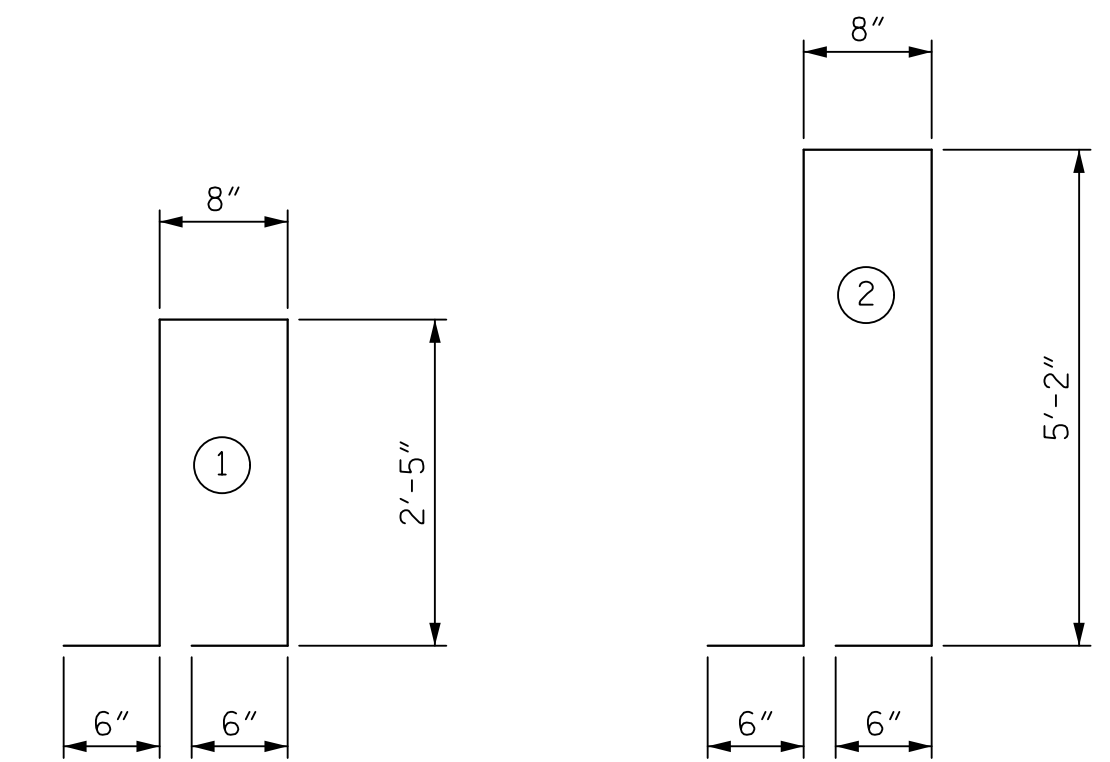
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-22 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		10/17	3			
2		10/17	4				

DRAWN BY B. VAUGHN DATE 10/17  
 CHECKED BY L. RAPP DATE 10/17 DWG. NO. 22



EPOXY-COATED REINFORCING STEEL

SPAN A						SPAN B						SPAN C						SPAN D					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	94	5	STR.	21'-9"	2,133	A1	143	5	STR.	21'-9"	3,244	A1	160	5	STR.	21'-9"	3,630	A1	94	5	STR.	21'-9"	2,133
A2	8	5	STR.	21'-9"	182	A2	8	5	STR.	21'-9"	182	A2	8	5	STR.	21'-9"	182	A2	8	5	STR.	21'-9"	182
A3	4	5	STR.	6'-6"	28	A5	4	5	STR.	4'-4"	19	A7	4	5	STR.	3'-8"	16	A3	4	5	STR.	6'-6"	28
A4	4	5	STR.	15'-1"	63	A6	4	5	STR.	13'-0"	55	A8	4	5	STR.	12'-3"	52	A4	4	5	STR.	15'-1"	63
B1	66	4	STR.	25'-2"	1,110	B3	66	4	STR.	30'-0"	1,323	B1	66	4	STR.	25'-2"	1,110	B1	66	4	STR.	25'-2"	1,110
B2	66	4	STR.	8'-8"	383	B4	66	4	STR.	19'-10"	875	B3	66	4	STR.	30'-0"	1,323	B2	66	4	STR.	8'-8"	383
B5	40	5	STR.	15'-8"	654	B6	40	5	STR.	23'-8"	988	B7	40	5	STR.	26'-4"	1,099	B5	40	5	STR.	15'-8"	654
S1	34	5	1	6'-6"	231	S1	50	5	1	6'-6"	339	S1	56	5	1	6'-6"	380	S1	34	5	1	6'-6"	231
S2	34	5	2	12'-0"	426	S2	50	5	2	12'-0"	626	S2	56	5	2	12'-0"	701	S2	34	5	2	12'-0"	426
TOTAL					5,210	TOTAL					7,651	TOTAL					8,493	TOTAL					5,210



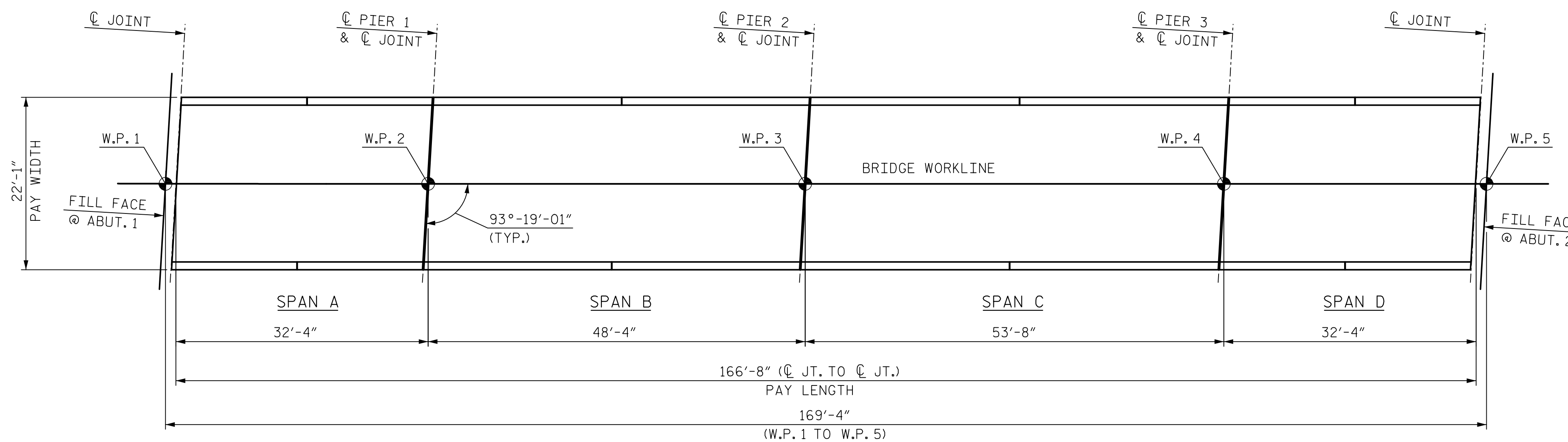
ALL BAR DIMENSIONS ARE OUT TO OUT

QUANTITY BREAKDOWN BY SPAN

	EPOXY COATED REINFORCING STEEL (LBS.)	CLASS AA CONCRETE (CU. YDS.)	
		DECK SLAB	PARAPETS
SPAN "A"	5,210	24.2	8.0
SPAN "B"	7,651	34.5	12.0
SPAN "C"	8,493	37.6	13.5
SPAN "D"	5,210	23.8	8.0
TOTALS	26,564	120.0	41.5

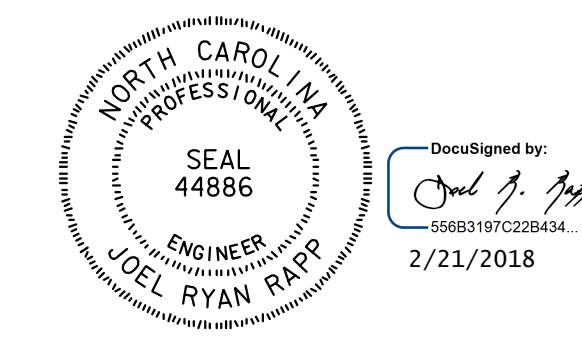
TOTAL SUPERSTRUCTURE QUANTITIES

	REINFORCED CONCRETE DECK SLAB	EPOXY COATED REINFORCING STEEL	CLASS AA CONCRETE
	SQ. FT.	LBS.	CU. YDS.
DECK SLAB	3,680.4	19,809	120.0
PARAPET	—	6,755	41.5
TOTALS	3,680.4	26,564	161.5



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FEET = 3,680.4)

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

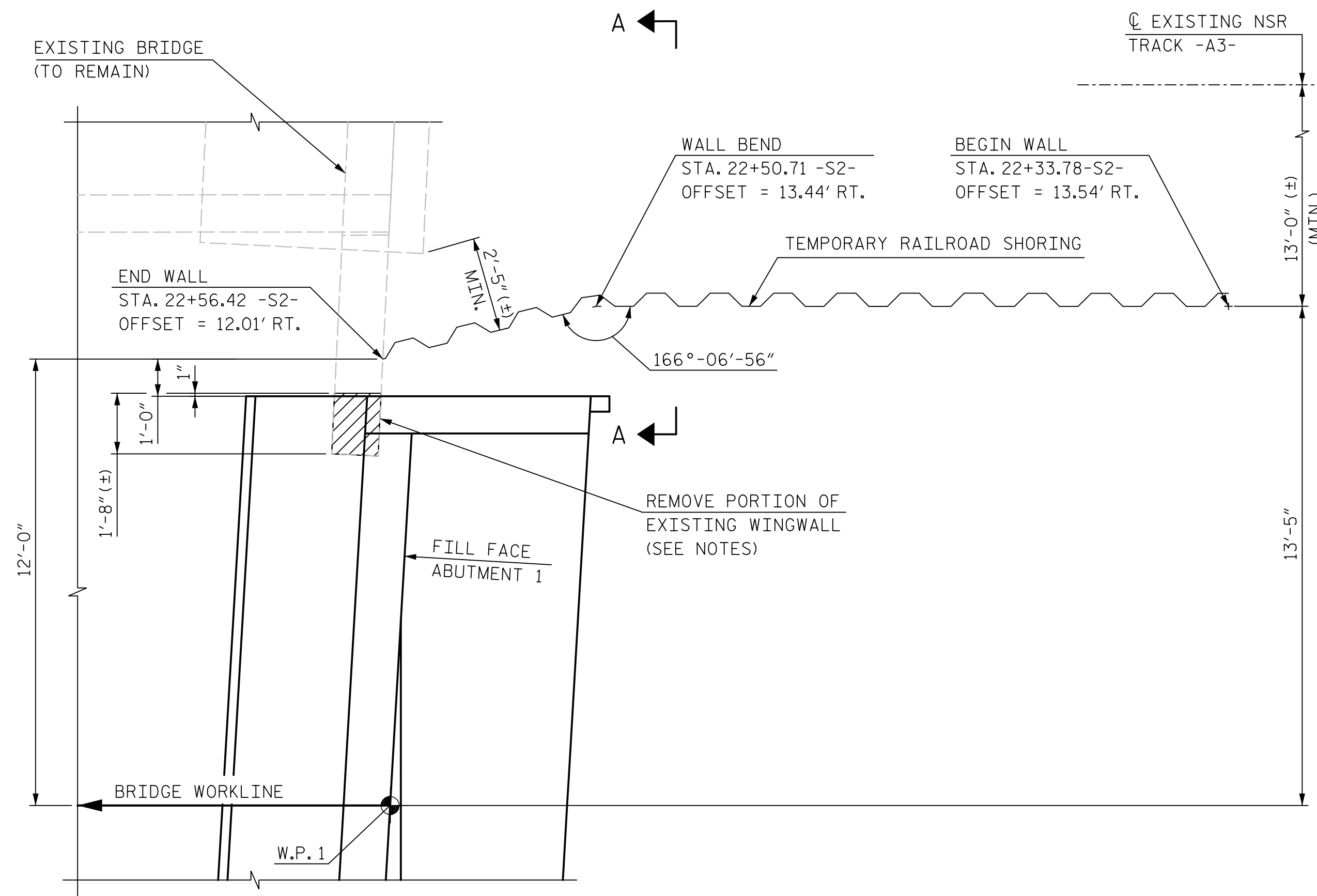


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

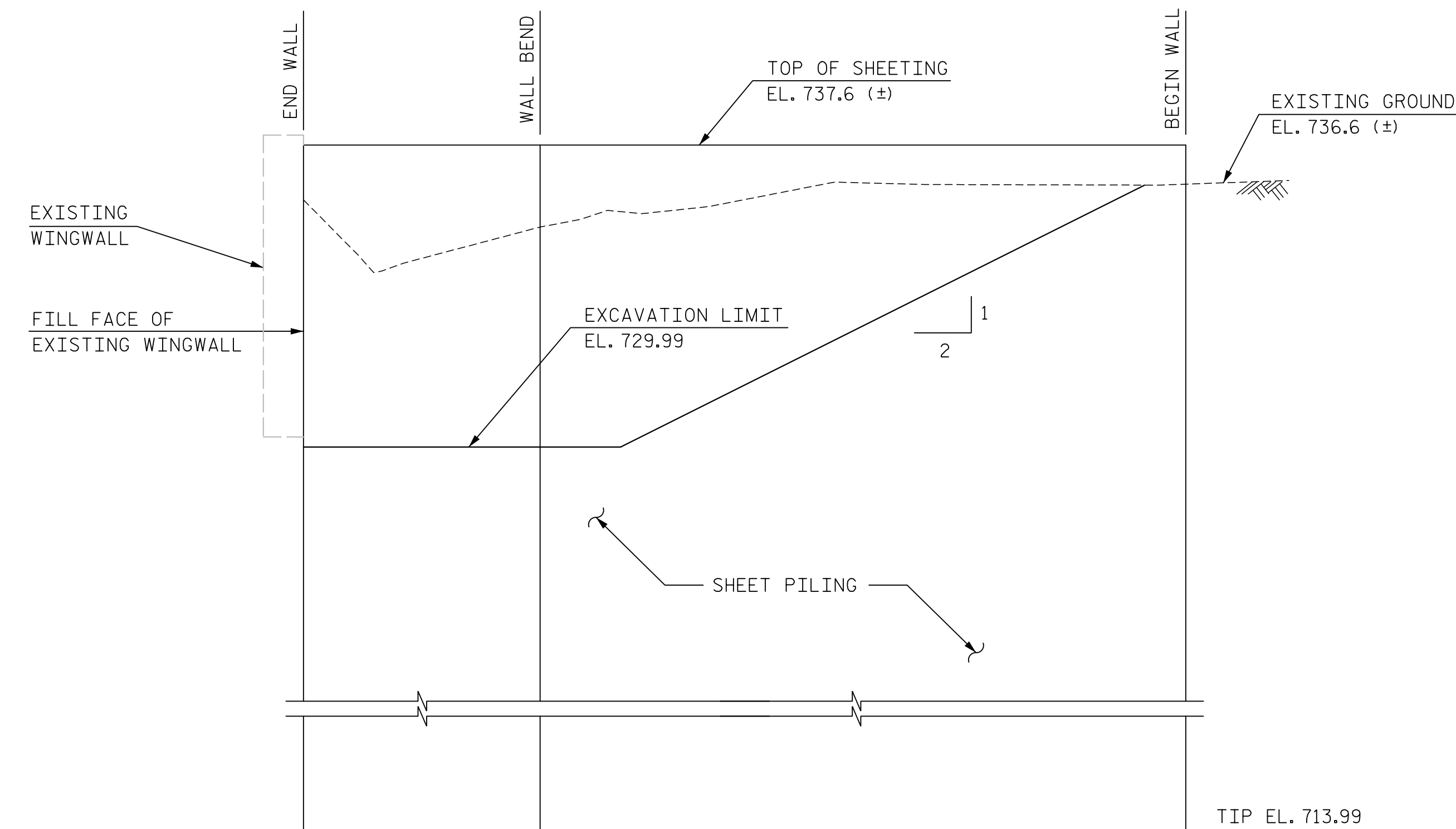
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 BILL OF MATERIAL

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>K. ERVIN</u> DATE <u>9/17</u> DWG. NO. 23	REVISIONS					SHEET NO. S5-23 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1			3			
2			4				



TEMPORARY SHORING PLAN



TEMPORARY SHORING ELEVATION  
(LOOKING NORTH TOWARDS EXISTING TRACK)

**NOTES:**

SHORING HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING, VOL. 2, STRUCTURES", AND "NORFOLK SOUTHERN GUIDELINES FOR DESIGN OF GRADE SEPARATION STRUCTURES, UNDERPASS GRADE SEPARATION DESIGN CRITERIA."

MAXIMUM WALL DEFLECTION LIMITED TO 3/8".

ALL SHORING MATERIAL SHALL BE IN "LIKE NEW" CONDITION.

SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (HOT ROLLED) AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

MOMENT OF INERTIA/FT. 490.85 in<sup>4</sup>  
SECTION MODULUS/FT. 60.7 in<sup>3</sup>

ASSUMED SOIL PARAMETERS

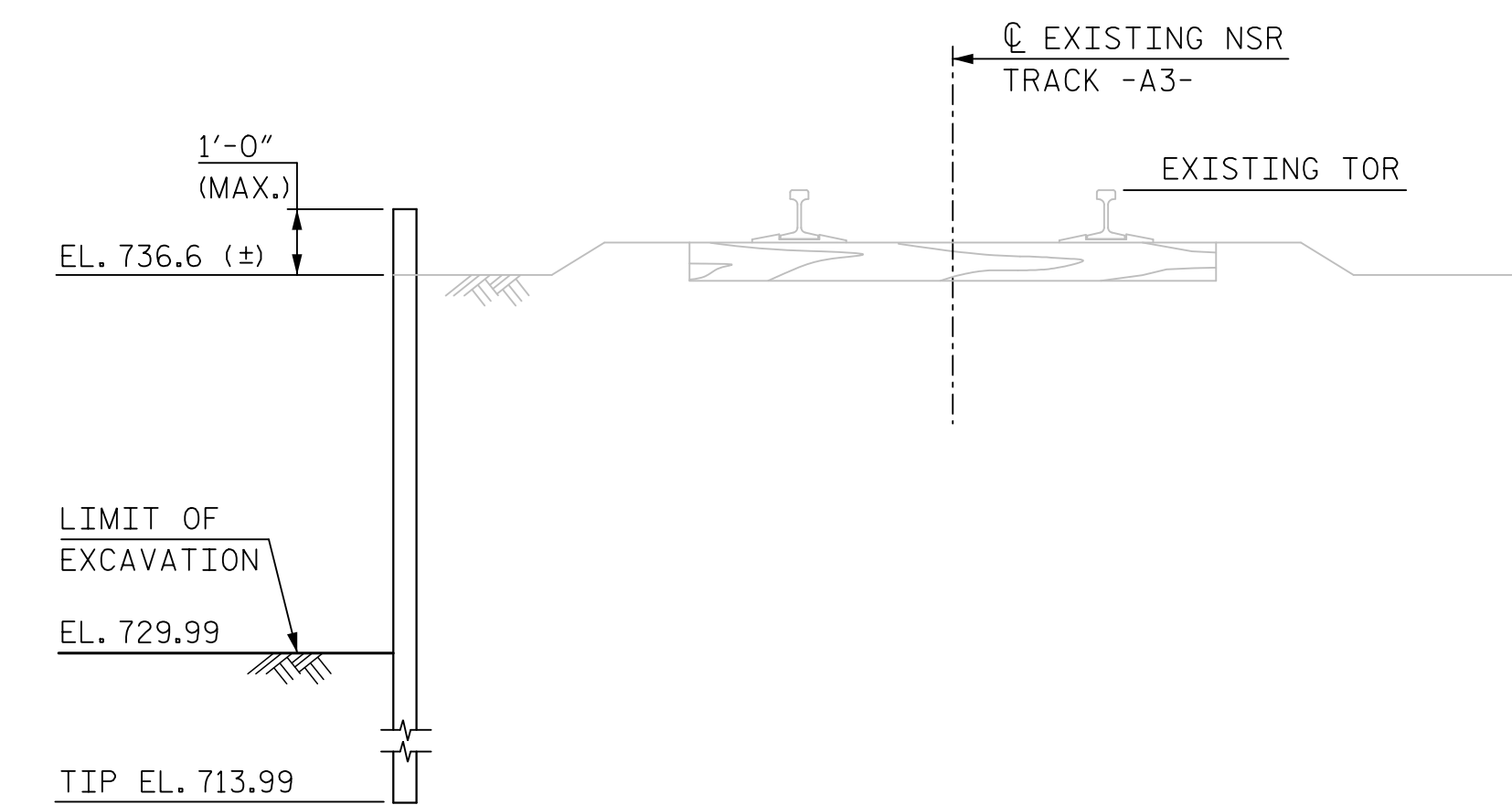
COARSE GRAINED SOILS:  
SOIL MOIST UNIT WEIGHT - 120 PCF  
SOIL FRICTION ANGLE - 30 DEGREES  
UNDRAINED SHEAR STRENGTH - 0 PSF

EXISTING WINGWALL TO BE PARTIALLY REMOVED IN ACCORDANCE WITH SECTION 402 OF THE STANDARD SPECIFICATIONS.

REBAR IN THE PORTION OF THE EXISTING WINGWALL TO REMAIN SHALL BE CUT BACK TO A MINIMUM DEPTH OF 1" BELOW CONCRETE SURFACE AND PATCHED WITH AN EPOXY COMPOUND.

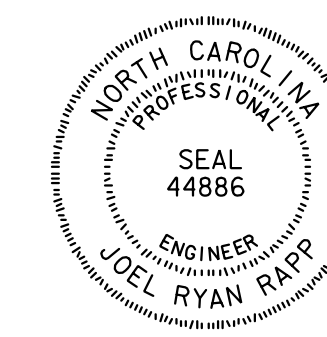
**CONSTRUCTION SEQUENCE:**

1. INSTALL SHORING TO REQUIRED TIP ELEVATION.
2. REMOVE EXISTING WINGWALL TO LIMITS SHOWN.
3. CONSTRUCT PROPOSED ABUTMENT.
4. BACKFILL PROPOSED ABUTMENT.
5. REMOVE SHORING.



SECTION A-A

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-



DocuSigned by:  
Joel R. Rapp  
55683197C228434  
2/21/2018

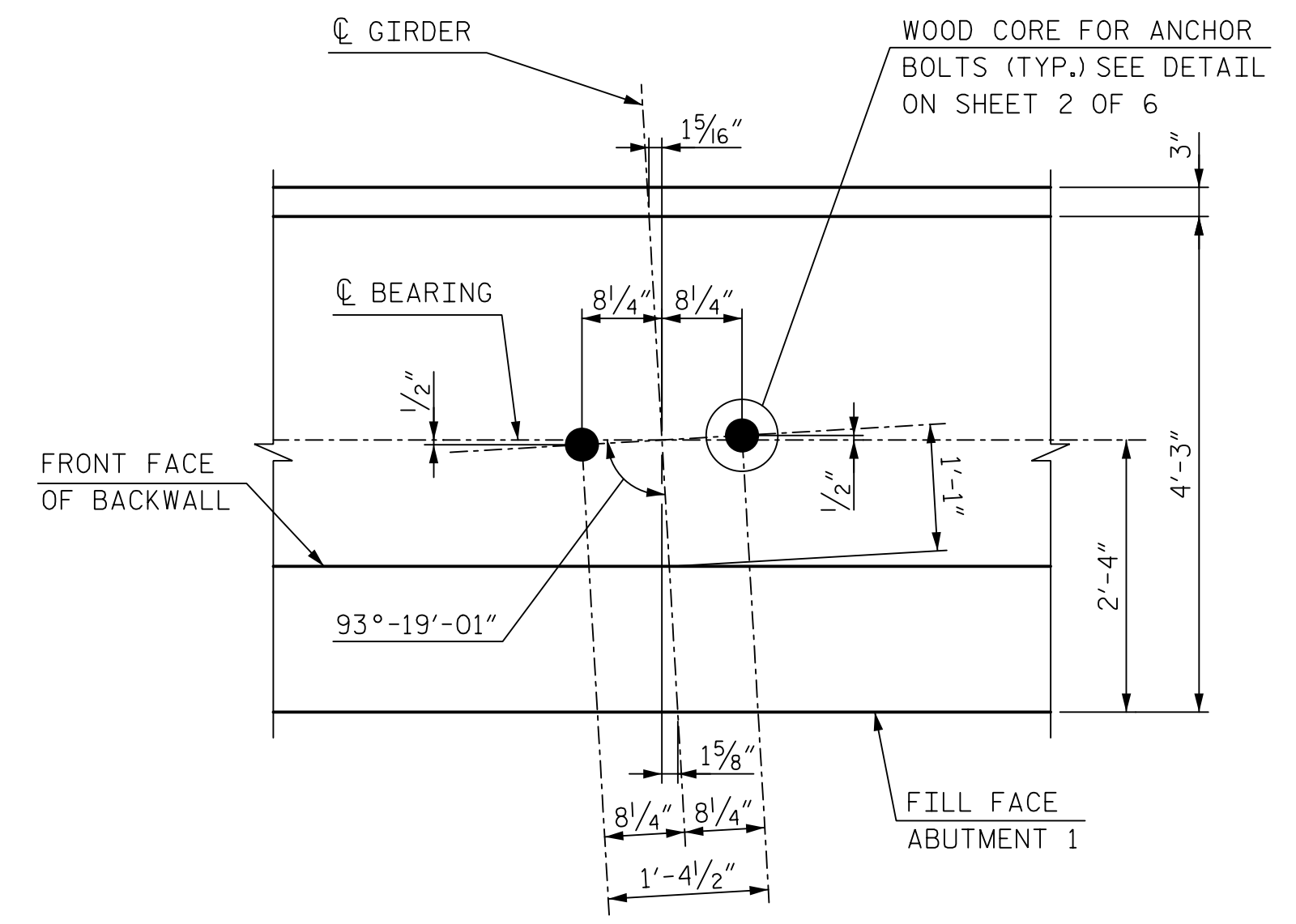
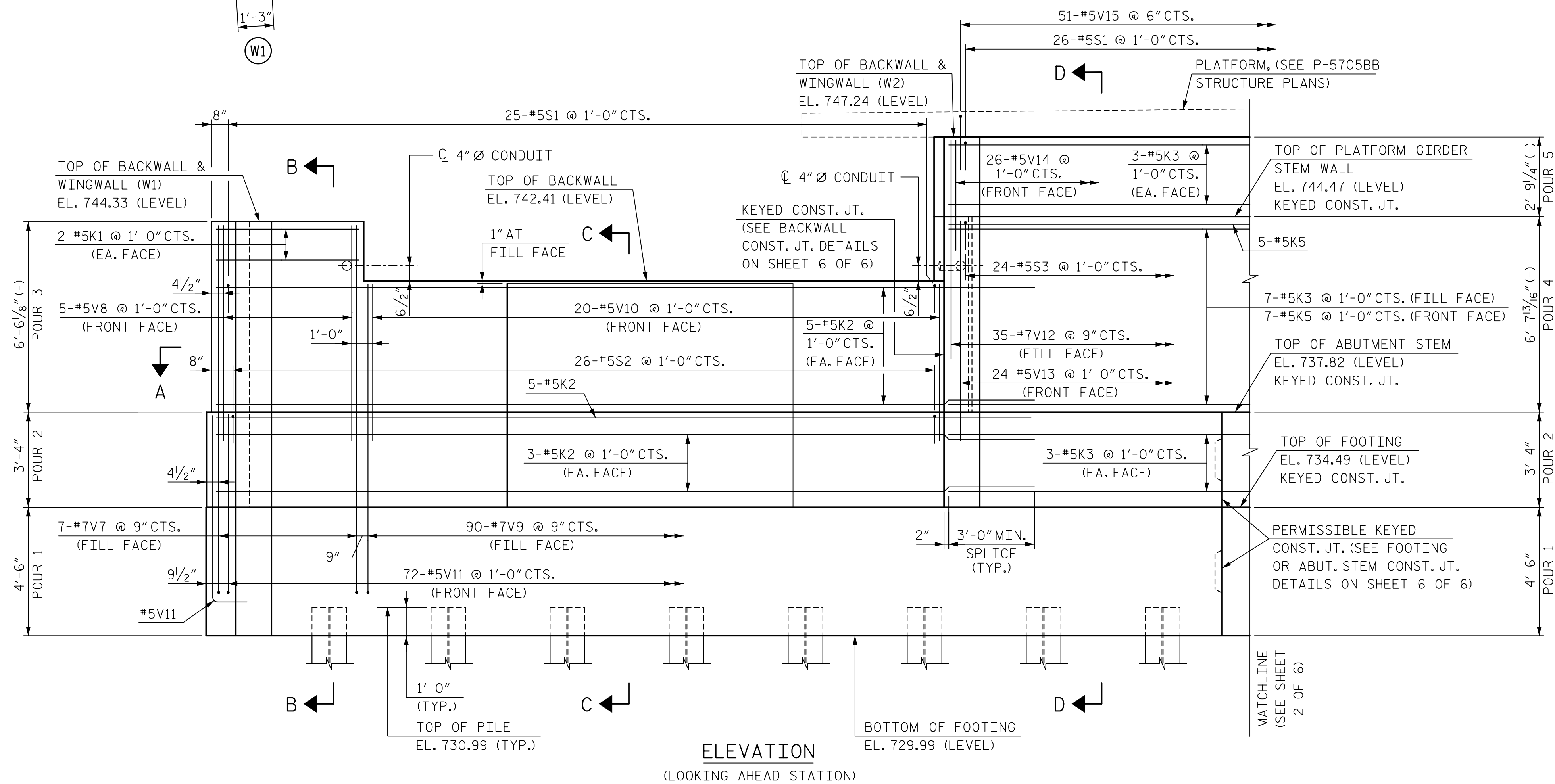
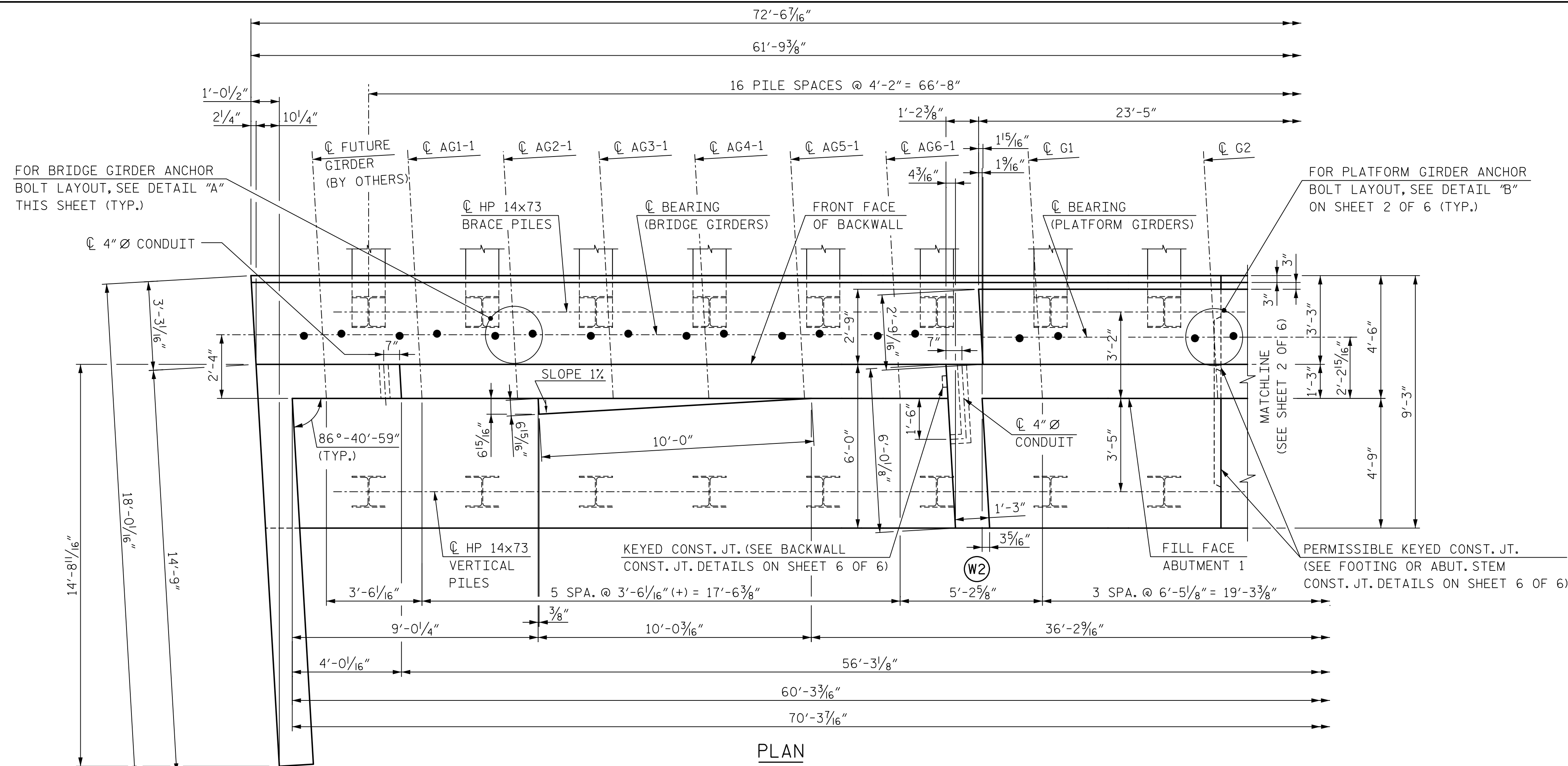
DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
ABUTMENT 1  
SHORING

**HNTB** HNTB NORTH CAROLINA, P.C.  
NC License No. C-1554  
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609  
DRAWN BY B. VAUGHN DATE 10/17  
CHECKED BY L. RAPP DATE 10/17 DWG. NO. 24

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-24
1			3			TOTAL SHEETS
2			4			56

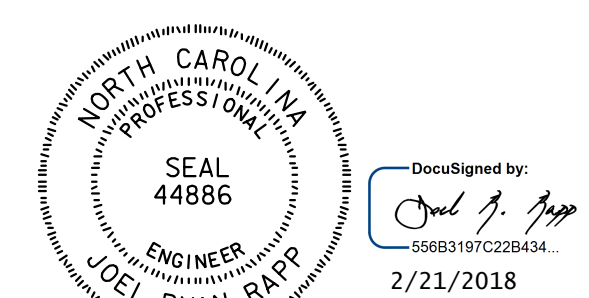




NOTES:  
FOR SECTION A-A, SEE SHEETS 3 OF 6 AND 4 OF 6.  
FOR SECTIONS B-B, C-C, AND D-D, SEE SHEET 5 OF 6.  
FOR WINGWALL ELEVATIONS AND SECTIONS, SEE SHEETS 3 OF 6 AND 4 OF 6.  
FOR LAYOUT AND DETAILS OF CONTINUOUS FRENCH DRAIN SYSTEM BEHIND ABUTMENT, SEE "STRUCTURE DRAINAGE DETAILS" SHEETS 3 OF 4 AND 4 OF 6.  
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.  
CONDUIT TO BE 4" Ø IN ACCORDANCE WITH UNDERWRITERS LABORATORY SPECIFICATIONS.  
FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.  
FOR FOOTING REINFORCING, SEE ABUTMENT SECTIONS AND FOOTING REINFORCING PLAN ON SHEET 5 OF 6.  
\*5K2, \*5K4, \*5K5, \*5S2, AND \*5S3 MAY BE ADJUSTED AS NECESSARY TO CLEAR ANCHOR BOLTS. DO NOT EXCEED 12" BETWEEN BARS.  
FOR LIMITS OF EXISTING BRIDGE WINGWALL REMOVAL, SEE "ABUTMENT 1 SHORING" SHEET.

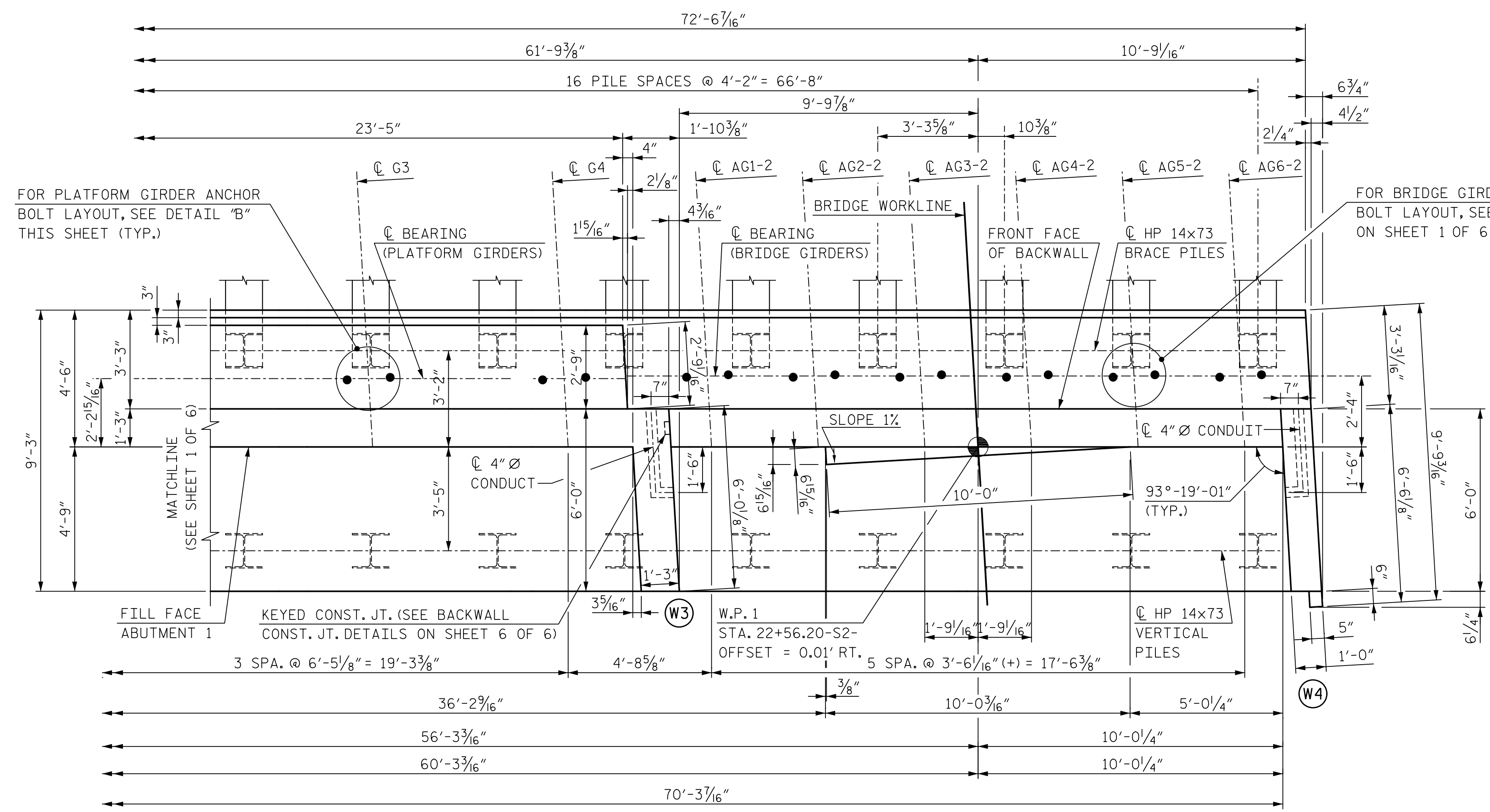
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 6  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
ABUTMENT 1

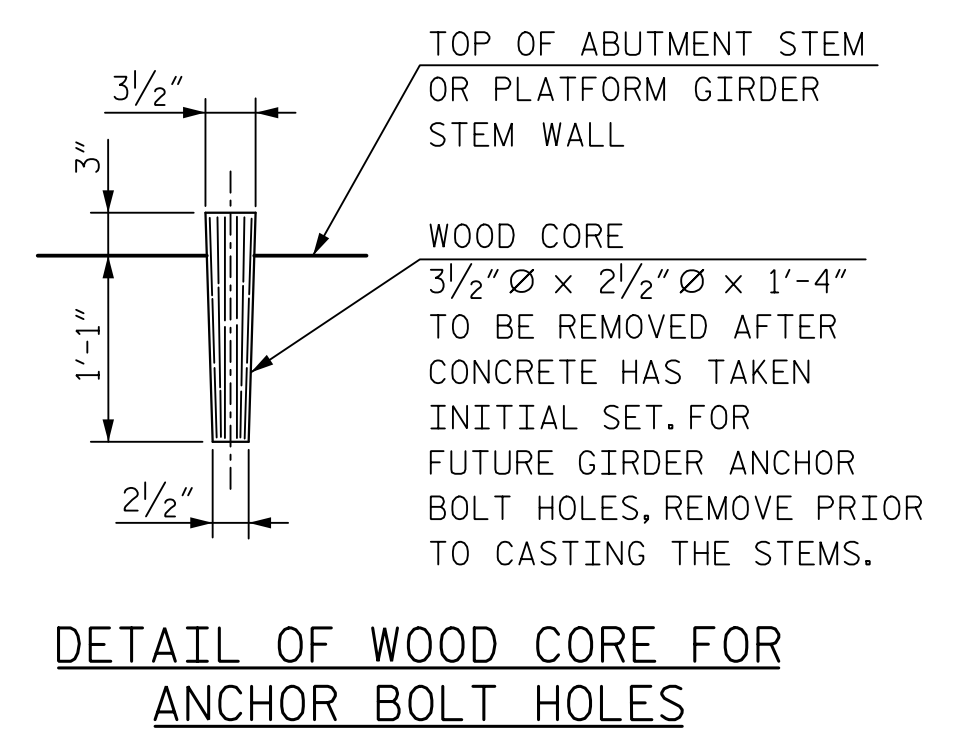
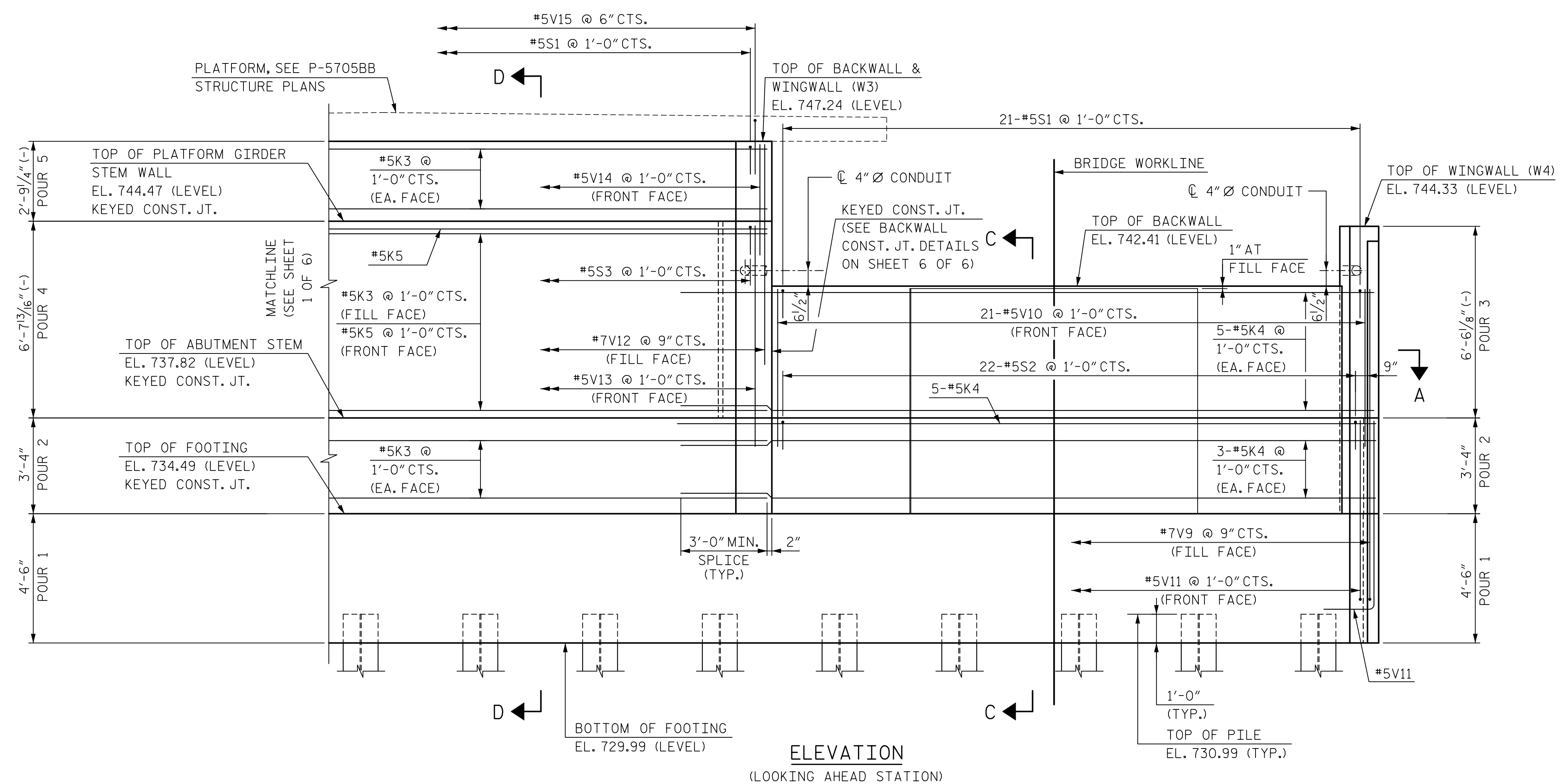
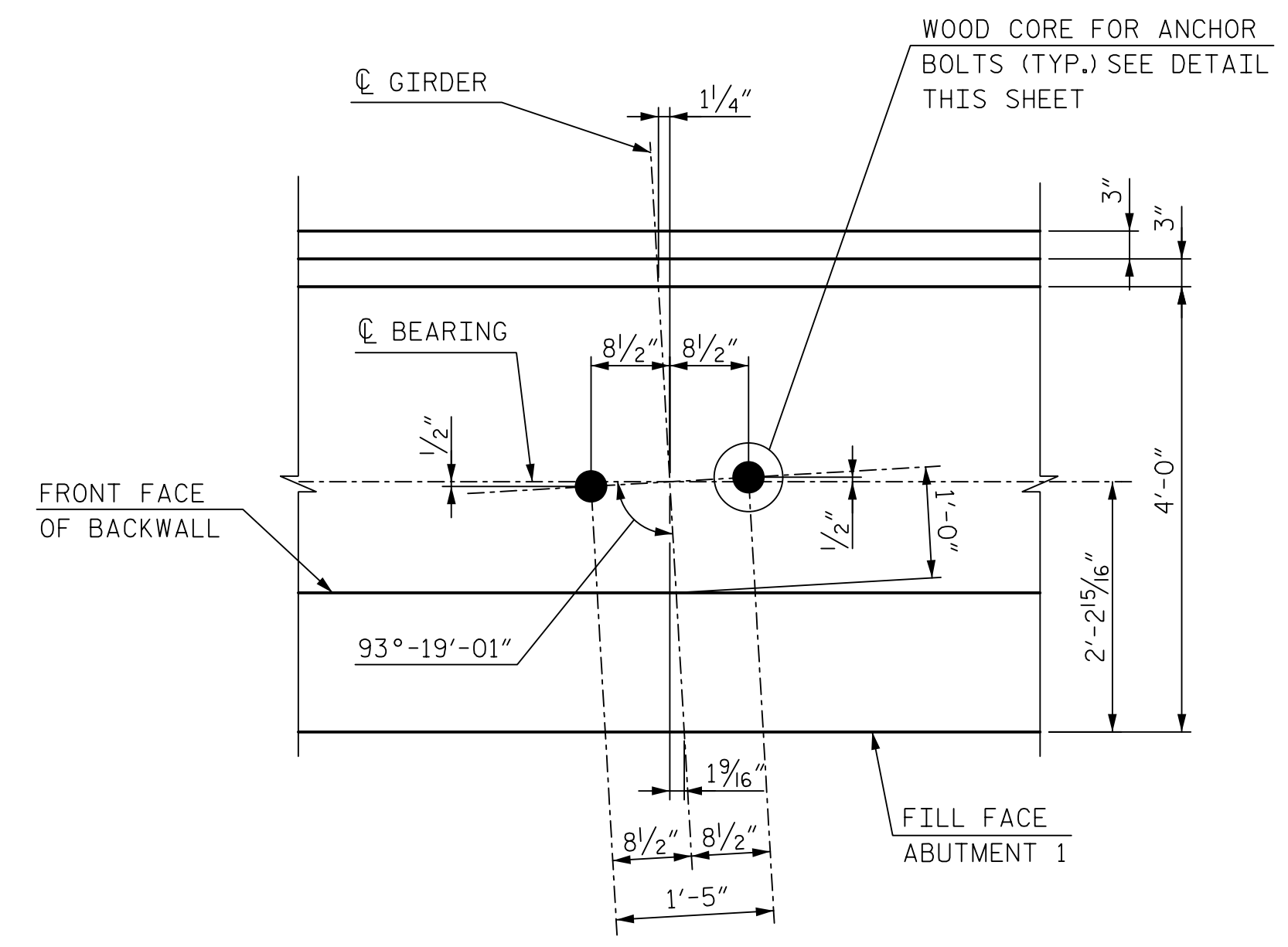


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	DRAWN BY: J. JEFFERS CHECKED BY: K. ERVIN	DATE: 10/17 DATE: 10/17	DWG. NO. 25	REVISIONS				SHEET NO. S5-25
				NO.	BY	DATE	TOTAL SHEETS 56	
				1		3		
				2		4		

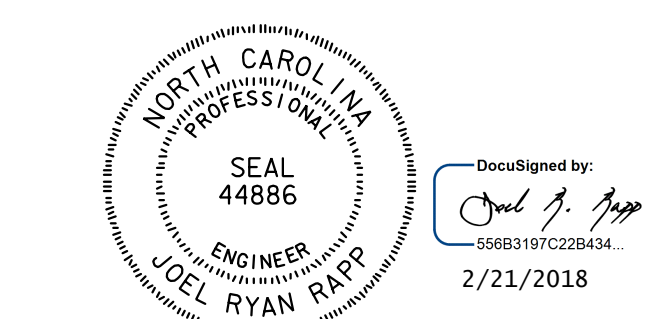


NOTE:  
FOR NOTES, SEE SHEET 1 OF 6.



PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 6  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 ABUTMENT 1

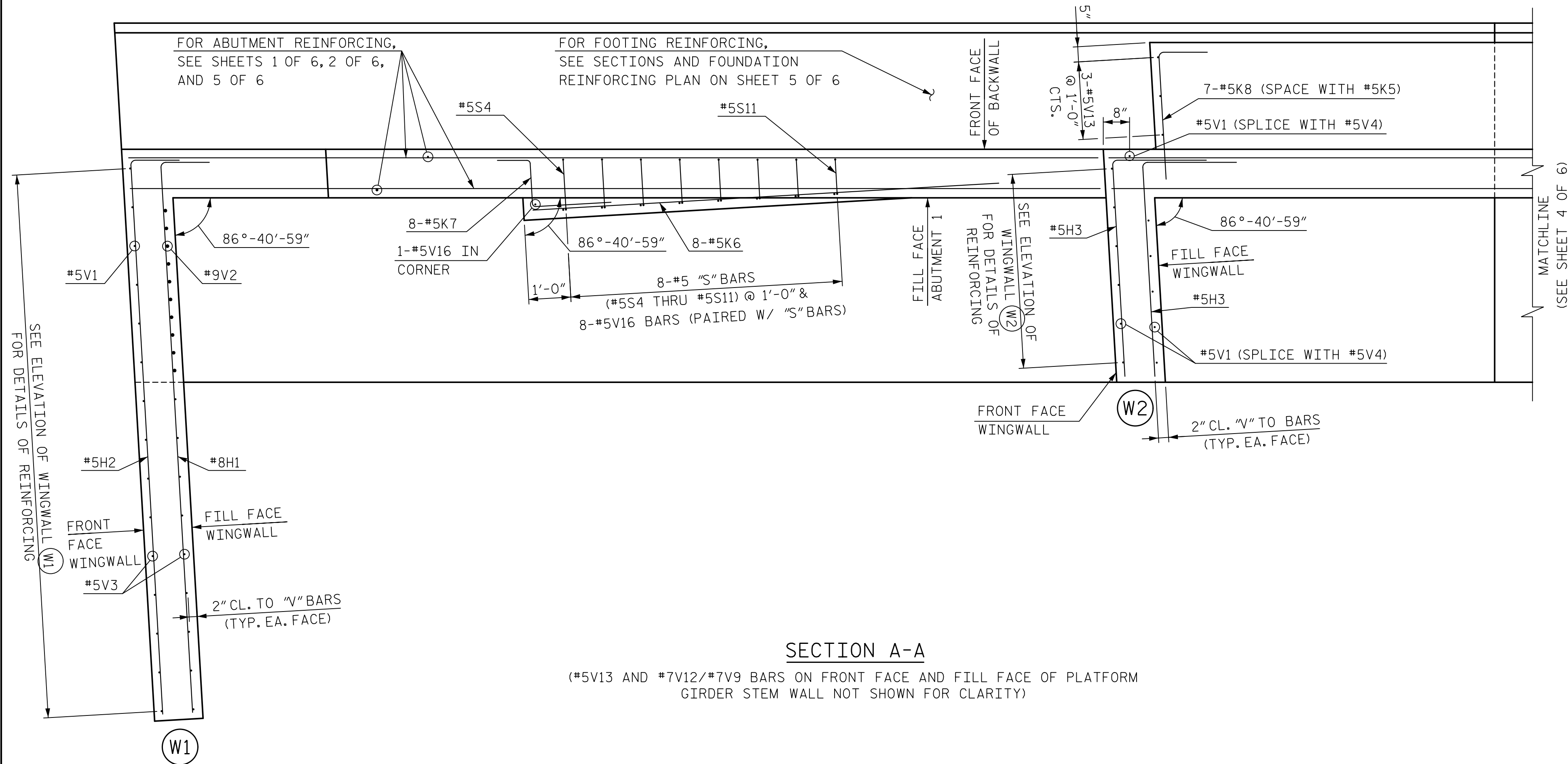


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**HNTB** HNTB NORTH CAROLINA, P.C.  
 NC License No. C-1554  
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609  
 DRAWN BY J. JEFFERS DATE 10/17  
 CHECKED BY K. ERVIN DATE 10/17 DWG. NO. 26

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-26
1			3			TOTAL SHEETS
2			4			56





SECTION A-A

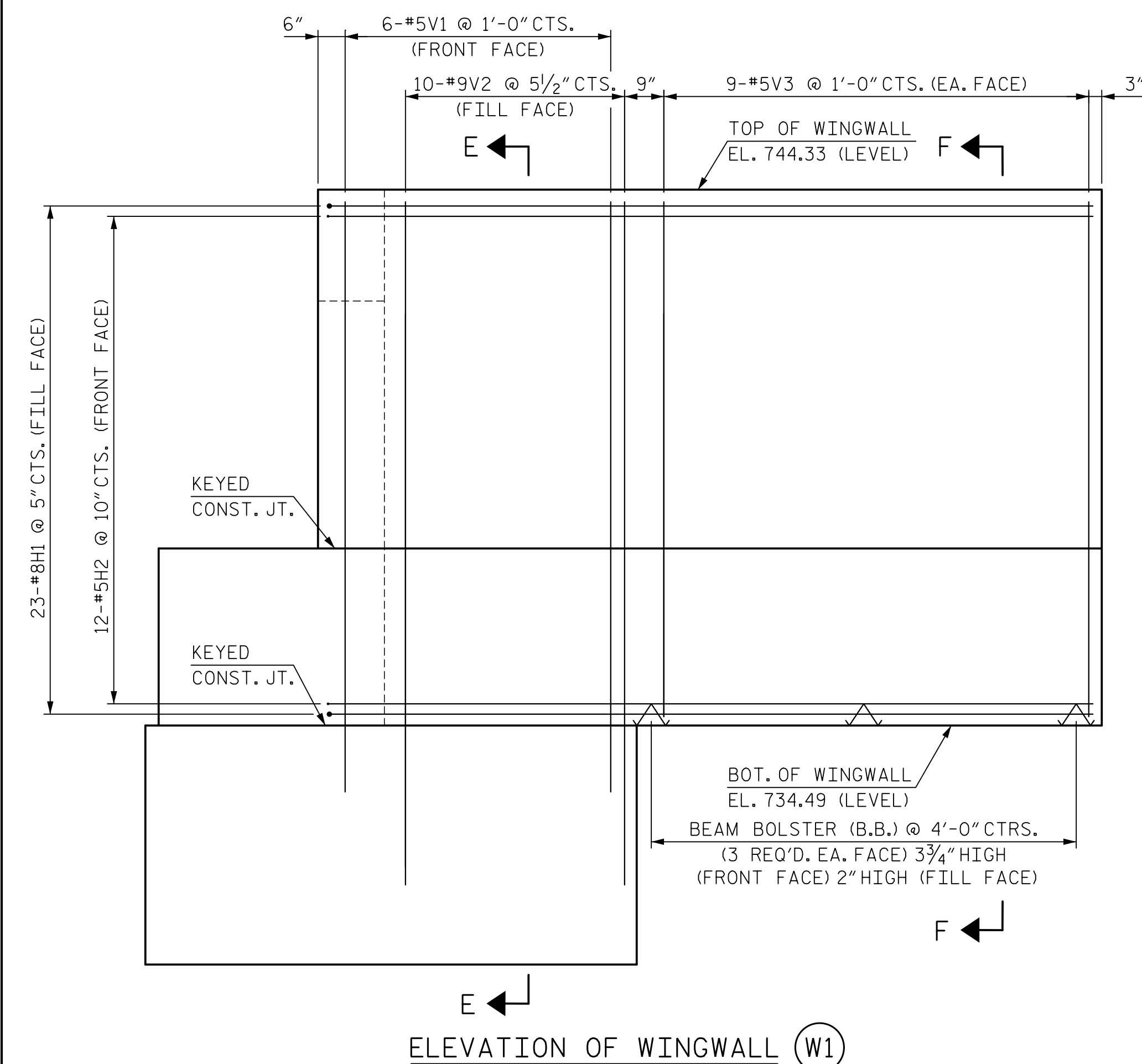
(\*#5V13 AND \*#7V12/\*#7V9 BARS ON FRONT FACE AND FILL FACE OF PLATFORM GIRDER STEM WALL NOT SHOWN FOR CLARITY)

NOTES:

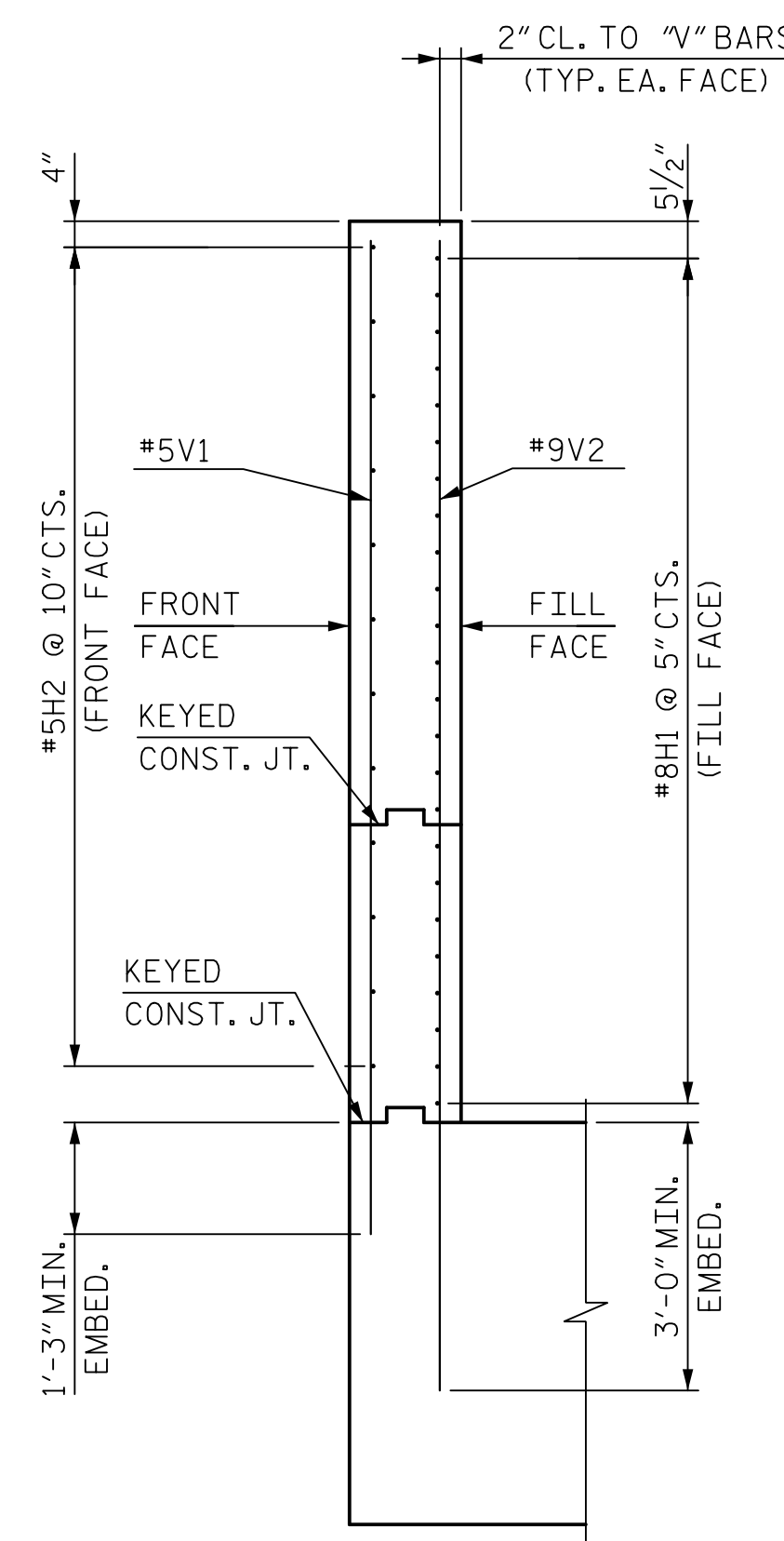
FOR ABUTMENT AND WINGWALL DIMENSIONS, AND ABUTMENT ELEVATION, SEE SHEETS 1 OF 6 AND 2 OF 6.

FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.

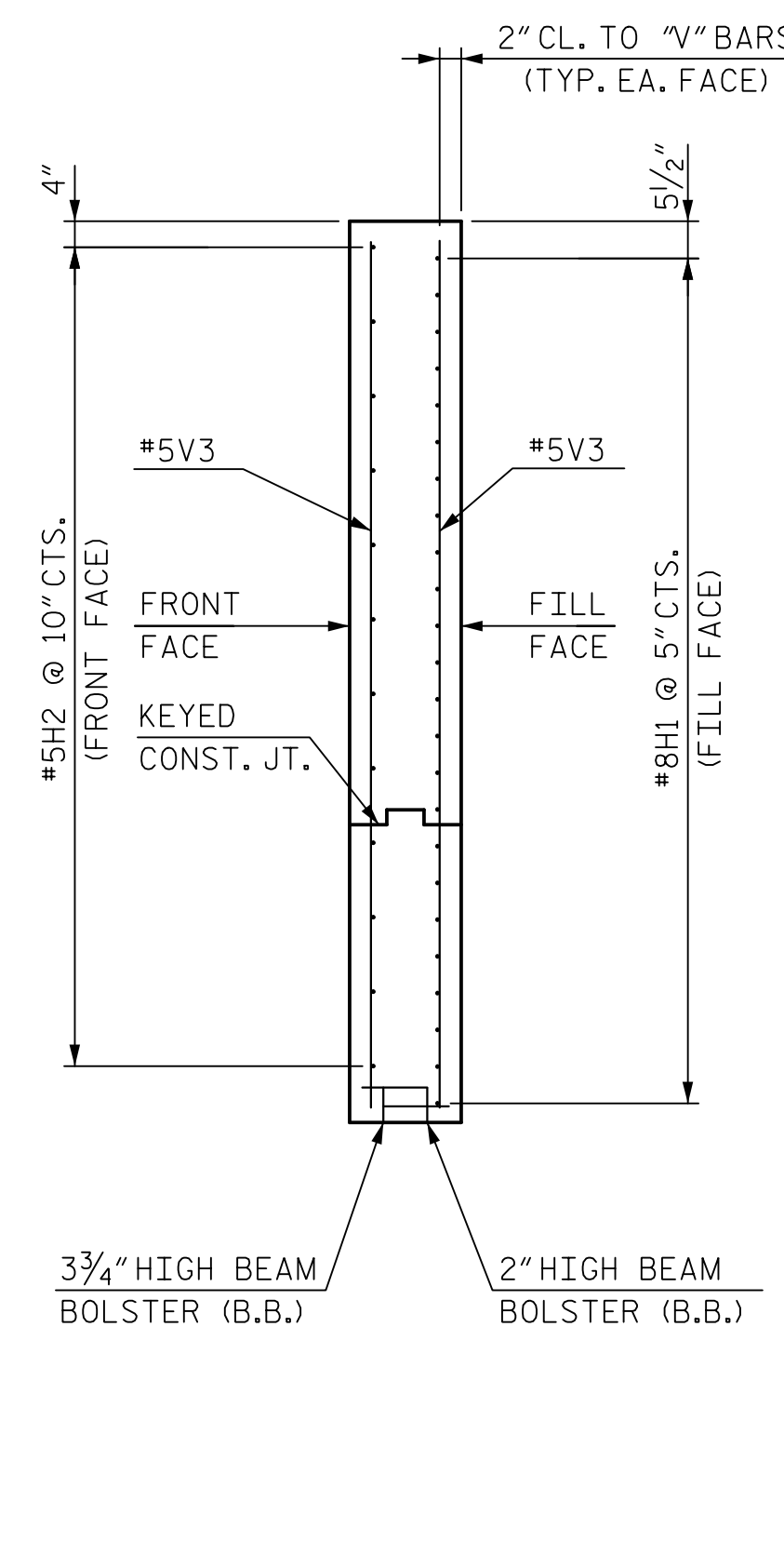
FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 6 OF 6.



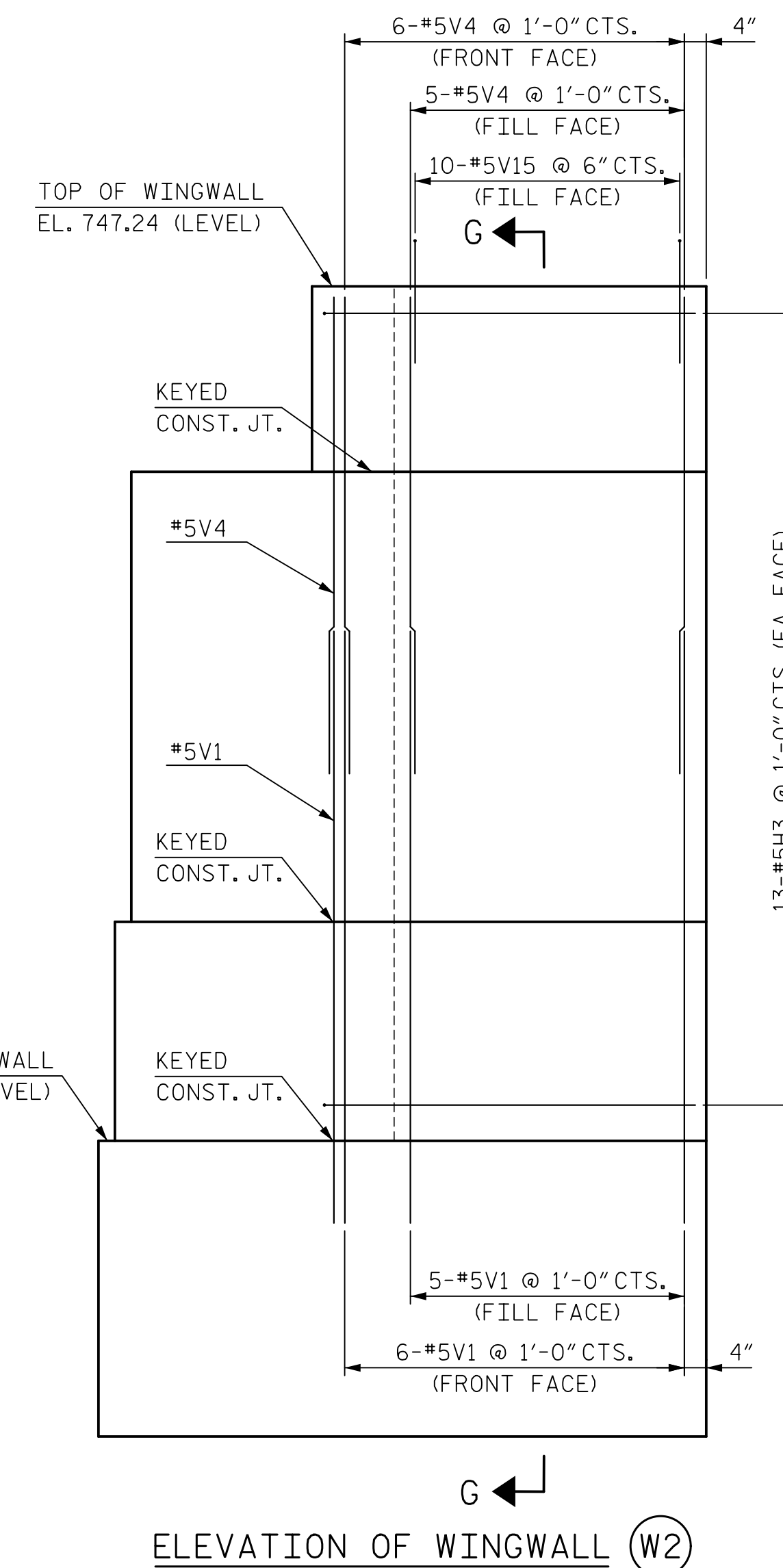
ELEVATION OF WINGWALL (W1)



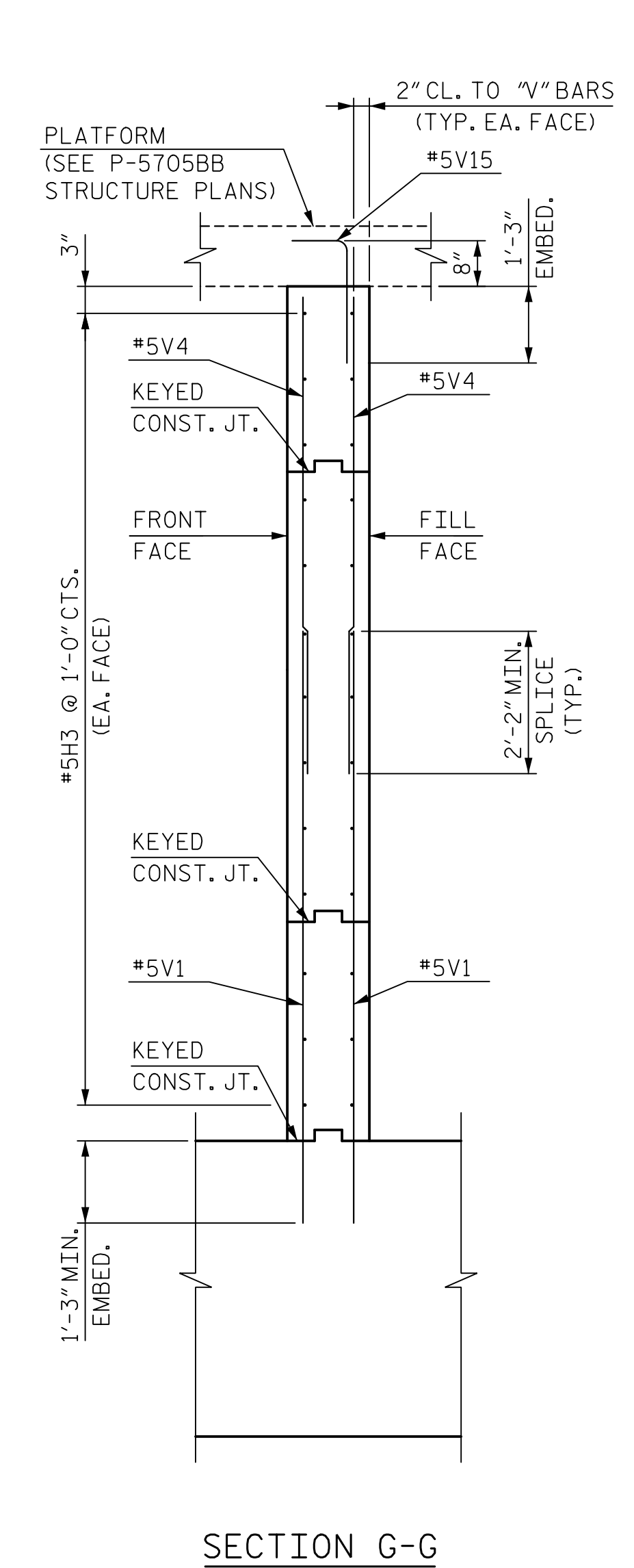
SECTION E-E



SECTION F-F

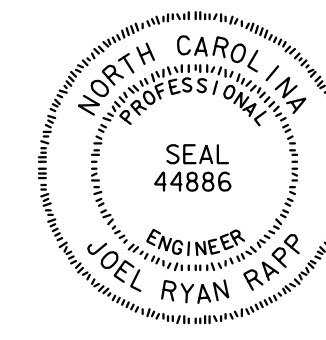


ELEVATION OF WINGWALL (W2)



SECTION G-G

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:  
Joel R. Rapp  
55683197C228434...  
2/21/2018

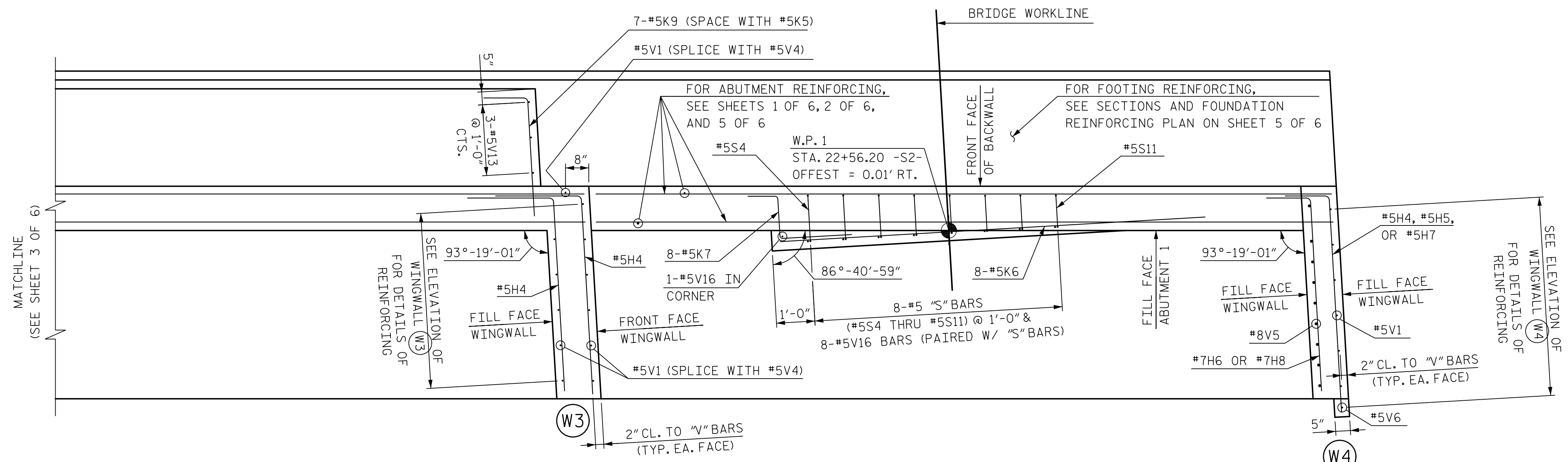
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
ABUTMENT 1

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		DWG. NO. 27	
DRAWN BY: J. JEFFERS		DATE: 10/17		TOTAL SHEETS: 56	
CHECKED BY: K. ERVIN		DATE: 10/17		SHEET NO.: S5-27	

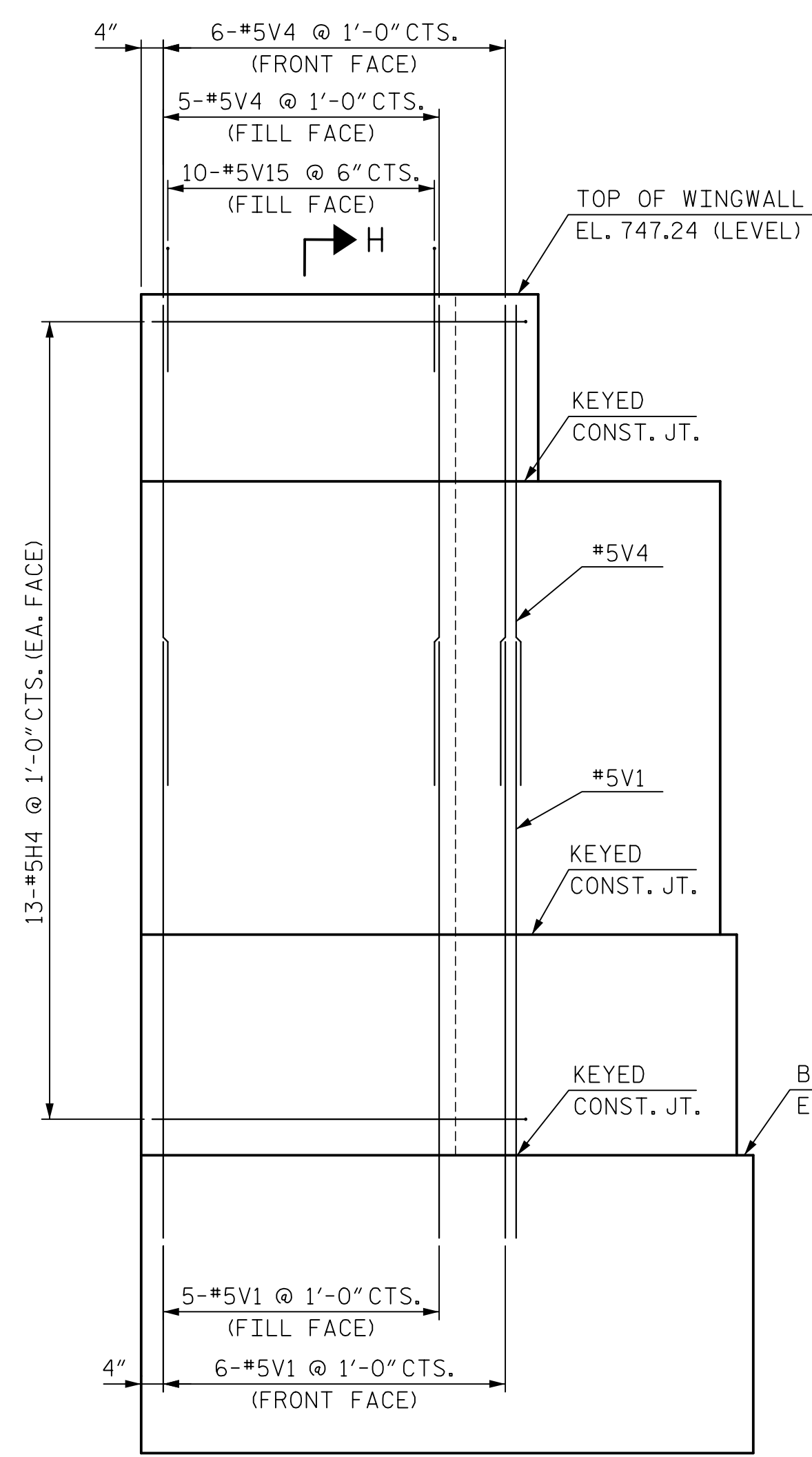
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



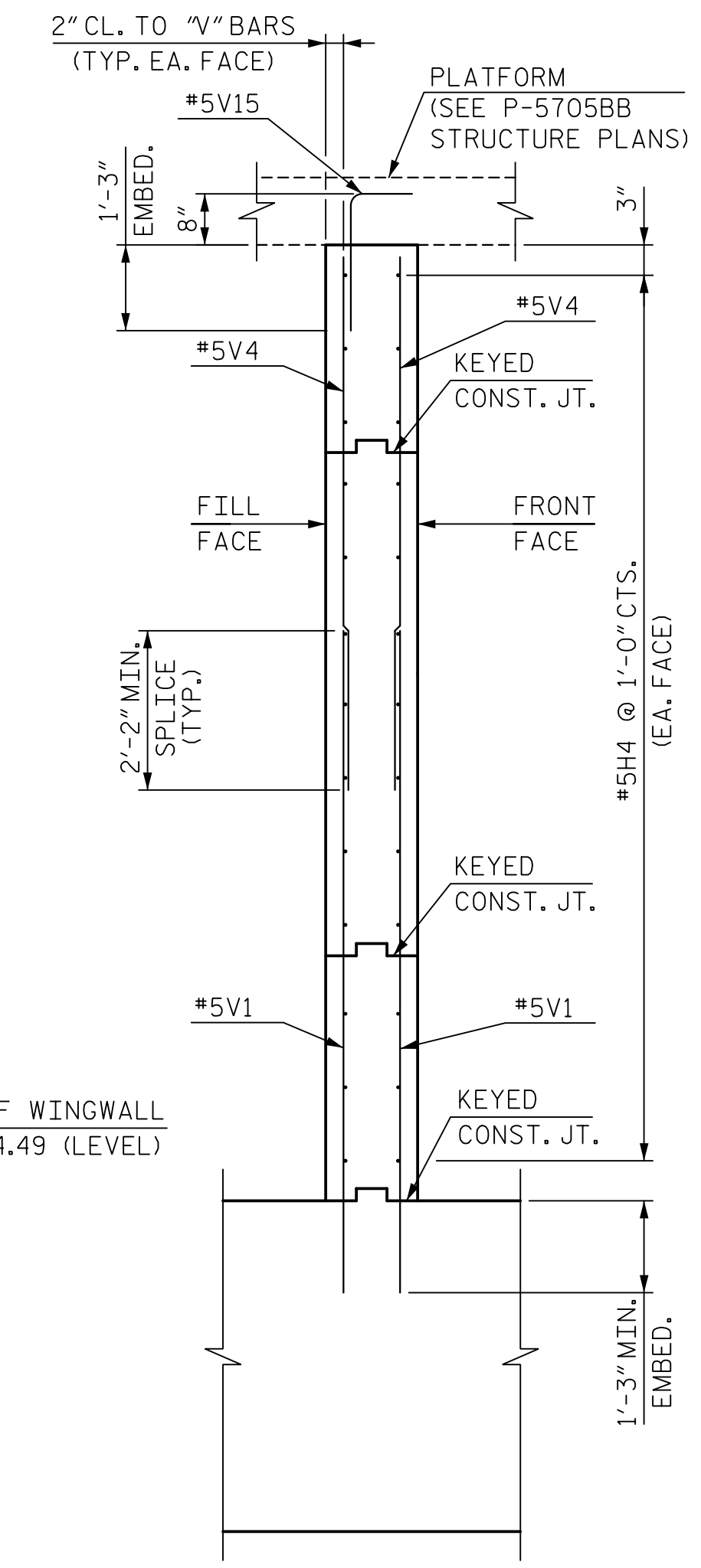
**SECTION A-A**

(\*#5V13 AND \*#7V12/\*#7V9 BARS ON FRONT FACE AND FILL FACE OF PLATFORM GIRDER STEM WALL NOT SHOWN FOR CLARITY)

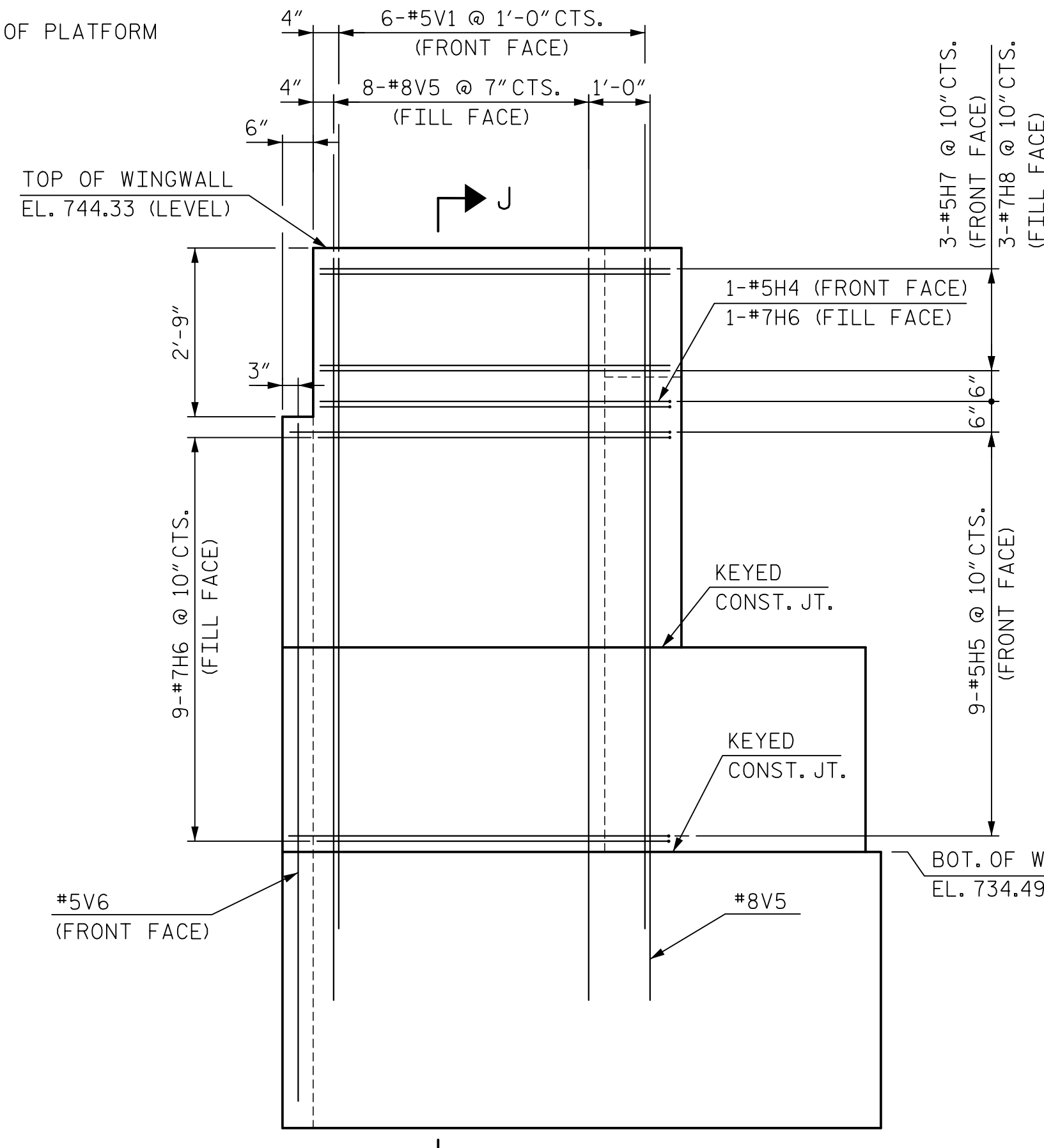
**NOTES:**  
 FOR ABUTMENT AND WINGWALL DIMENSIONS, AND ABUTMENT ELEVATION, SEE SHEETS 1 OF 6 AND 2 OF 6.  
 FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.  
 FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 6 OF 6.



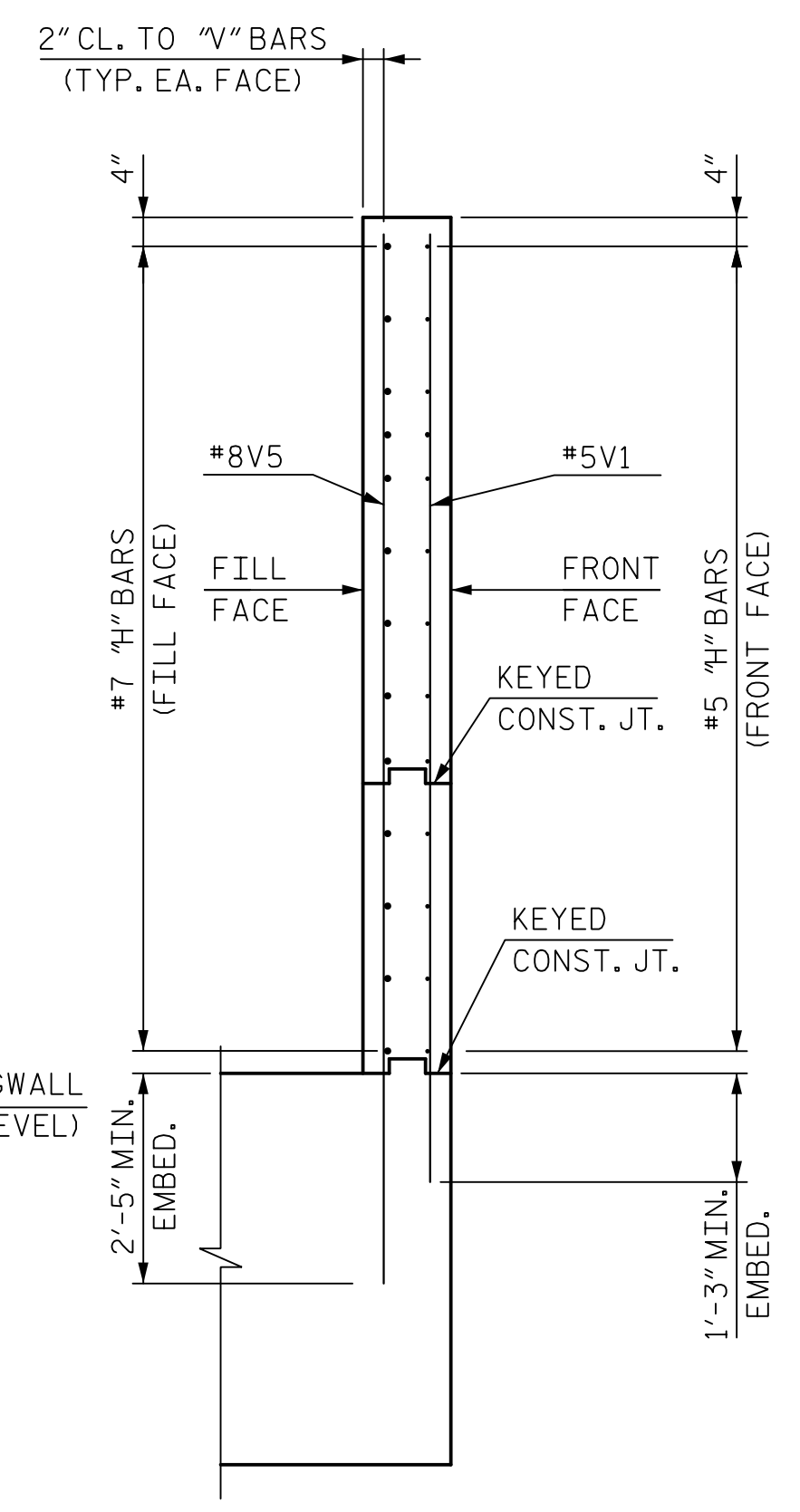
**ELEVATION OF WINGWALL (W3)**



**SECTION H-H**



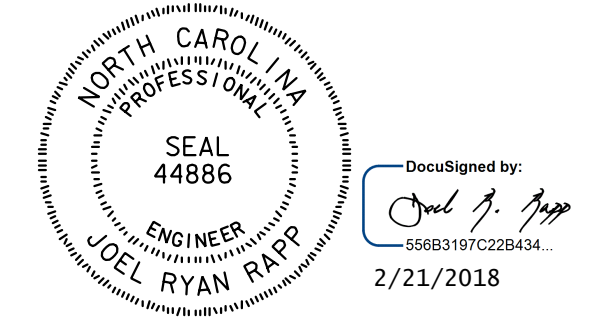
**ELEVATION OF WINGWALL (W4)**



**SECTION J-J**

**PROJECT NO.** P-5705BA  
**MECKLENBURG COUNTY**  
**STATION:** POT STA. 23+62.98 -S2-

SHEET 4 OF 6

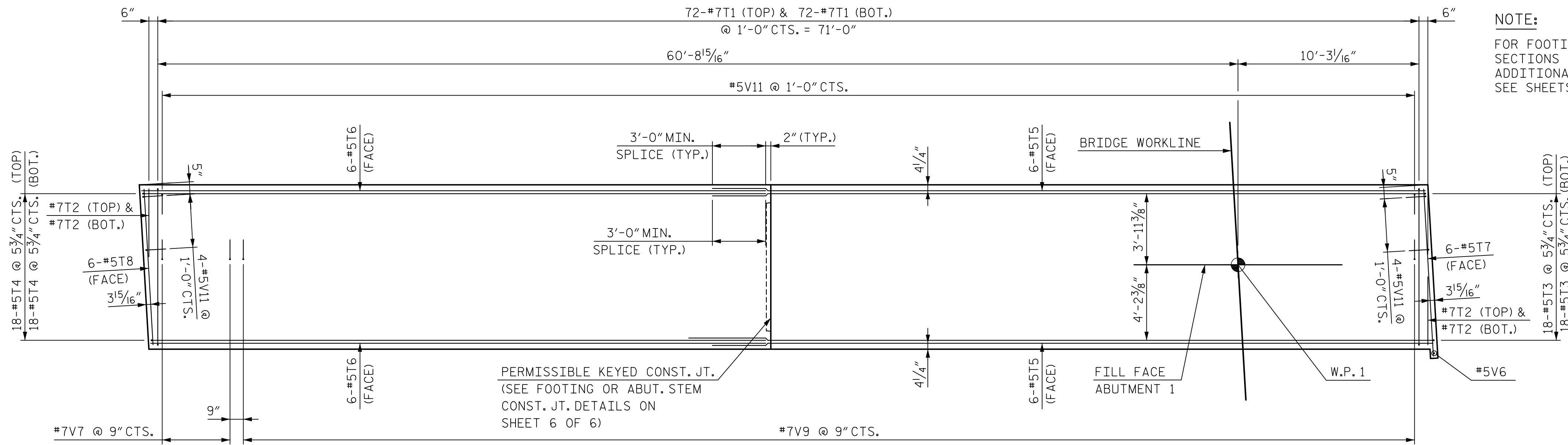


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: J. JEFFERS	DATE: 10/17	DWG. NO. 28	
CHECKED BY: K. ERVIN	DATE: 10/17		

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				SHEET NO. S5-28
SUBSTRUCTURE ABUTMENT 1				TOTAL SHEETS 56
REVISIONS				
NO.	BY	DATE	NO.	DATE
1			3	
2			4	

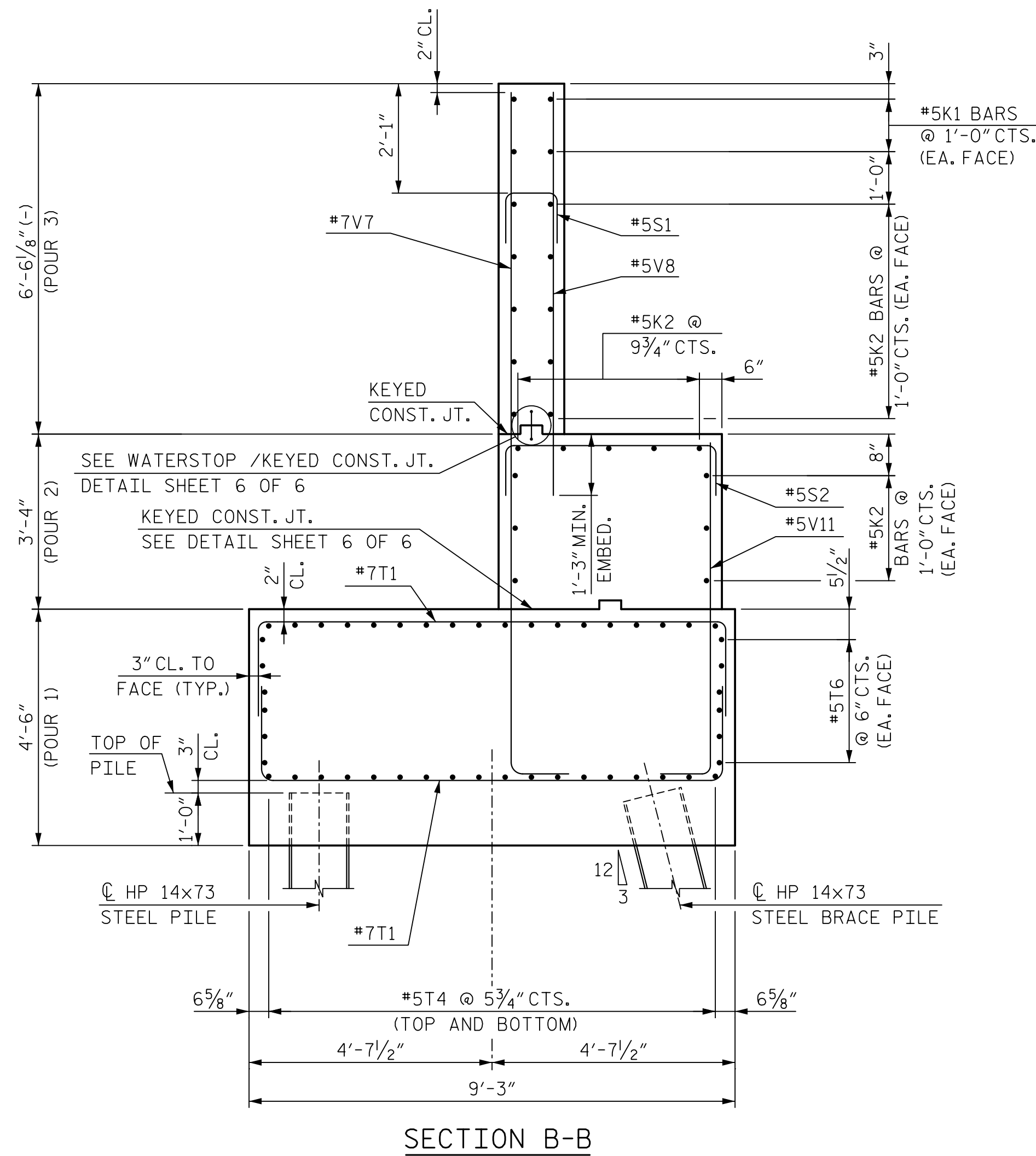
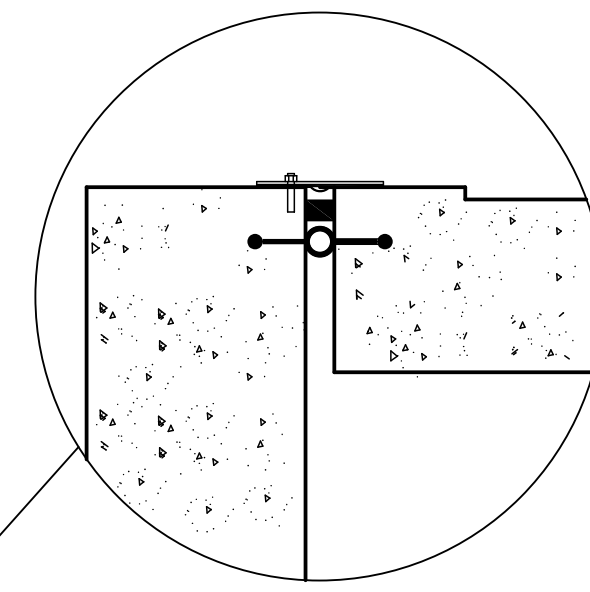




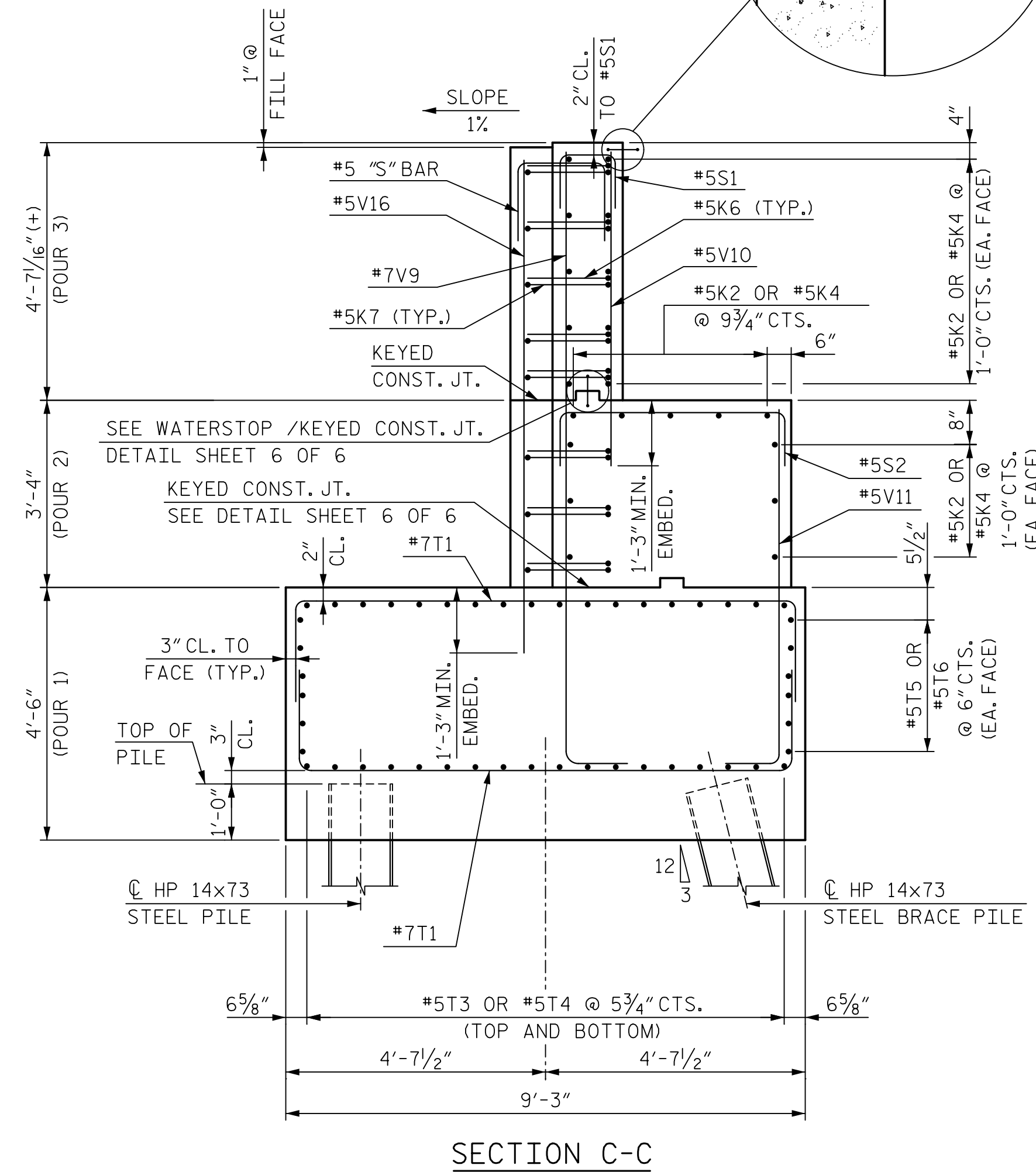
NOTE:  
 FOR FOOTING LAYOUT, LOCATIONS OF SECTIONS B-B, C-C, AND D-D, AND ADDITIONAL DIMENSIONS, SEE SHEETS 1 OF 6 AND 2 OF 6.

FOOTING REINFORCING PLAN  
 (WINGWALL BARS NOT SHOW FOR CLARITY)

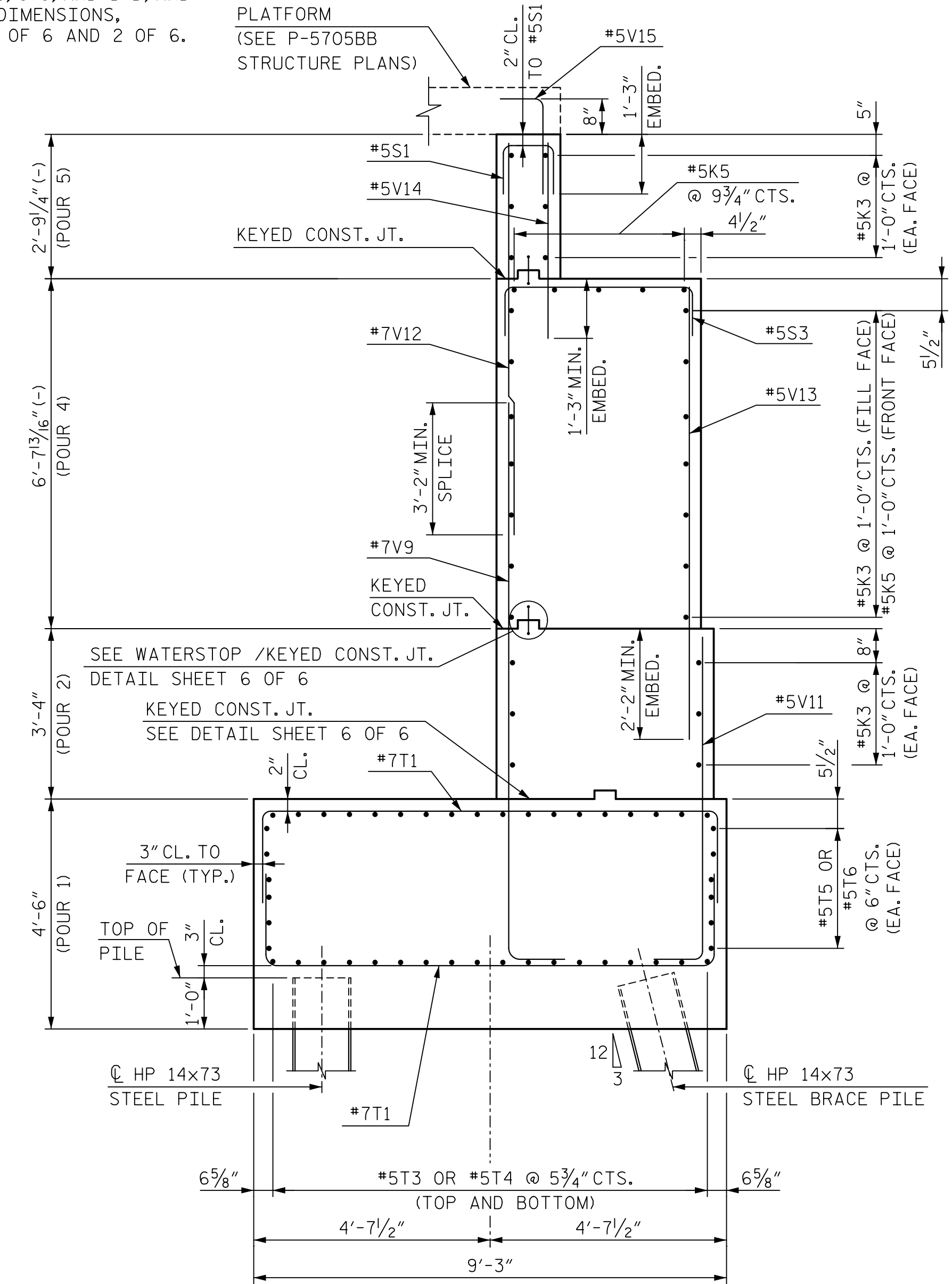
BULB-TYPE WATERSTOP REQUIRED FOR DETAILS OF BULB-TYPE WATERSTOP, SEE DETAIL "A" ON "DECK DETAILS" SHEET.



SECTION B-B



SECTION C-C



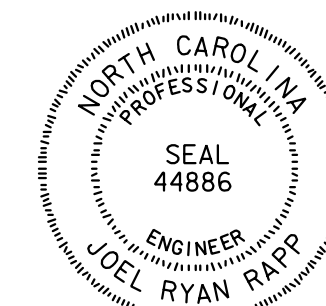
SECTION D-D

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 5 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 ABUTMENT 1



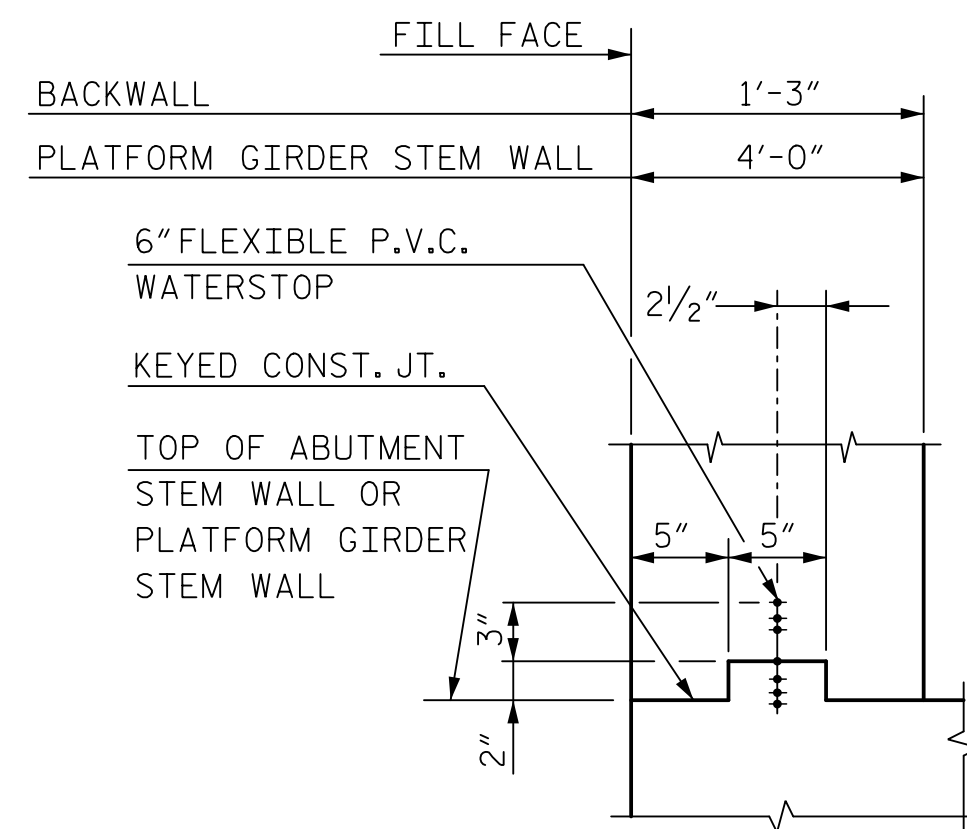
DocuSigned by:  
 2/21/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

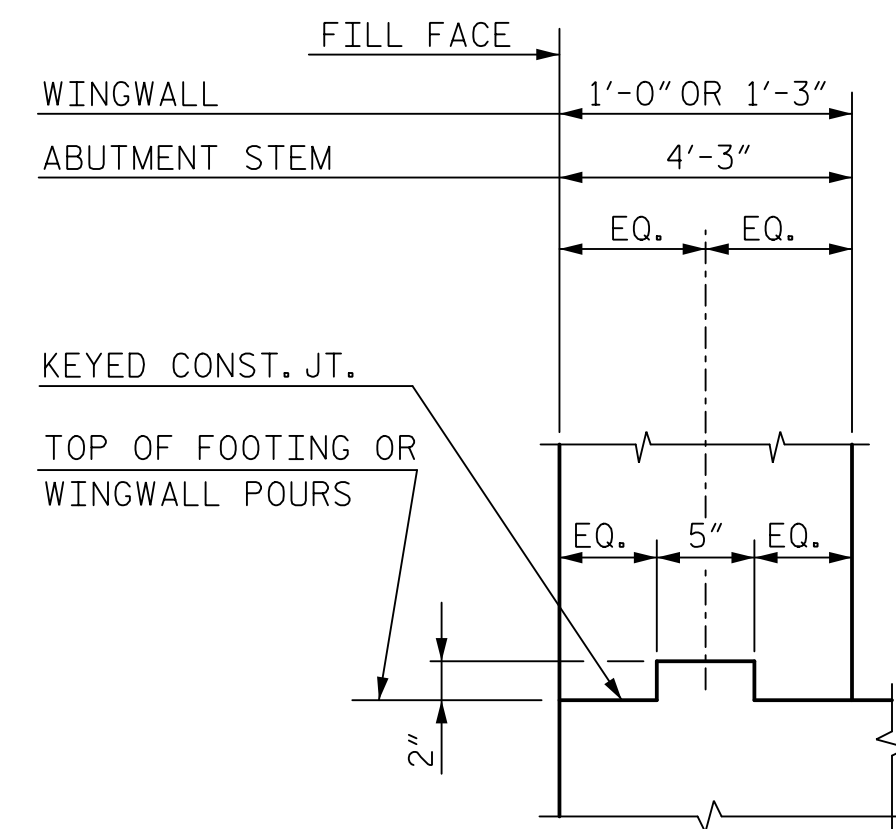
<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: J. JEFFERS	DATE: 10/17	DWG. NO. 29	
CHECKED BY: K. ERVIN	DATE: 10/17		

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

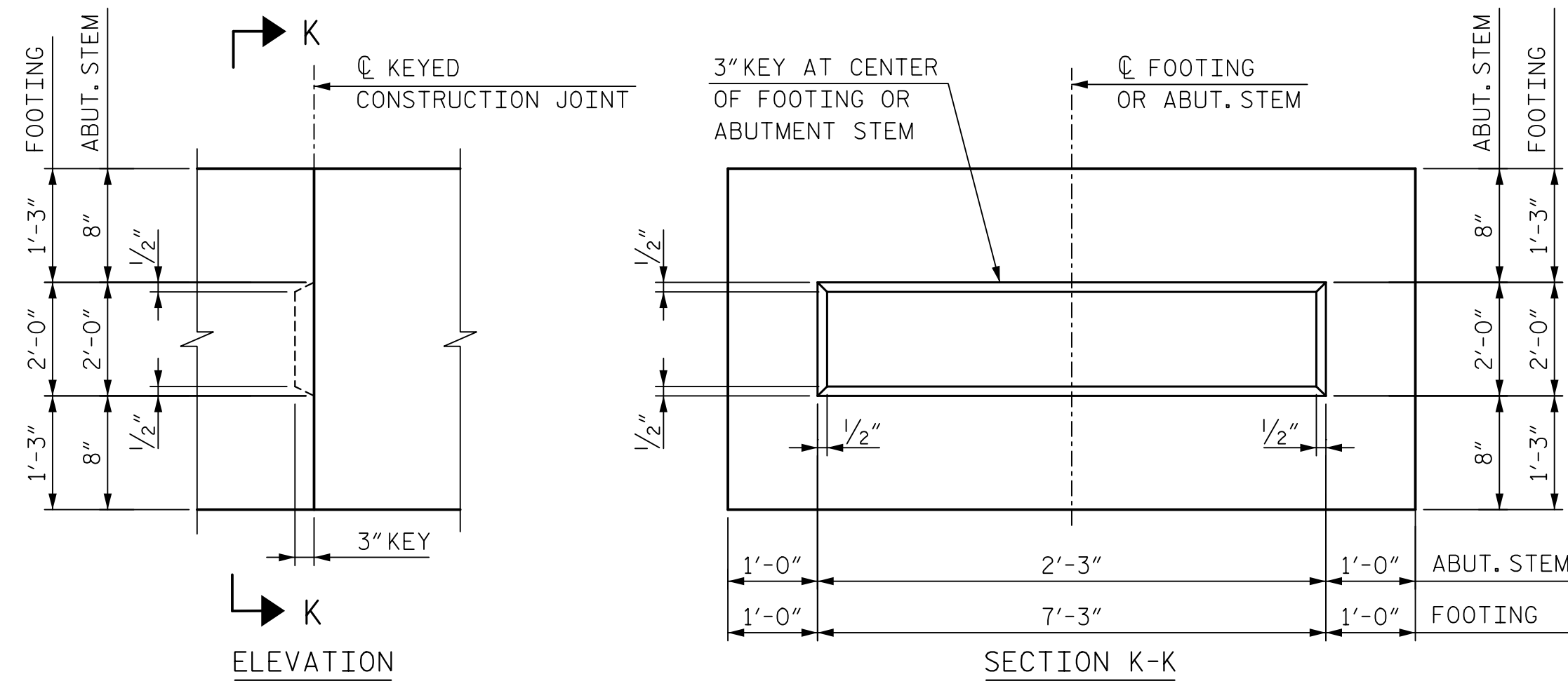
TOTAL SHEETS: 56



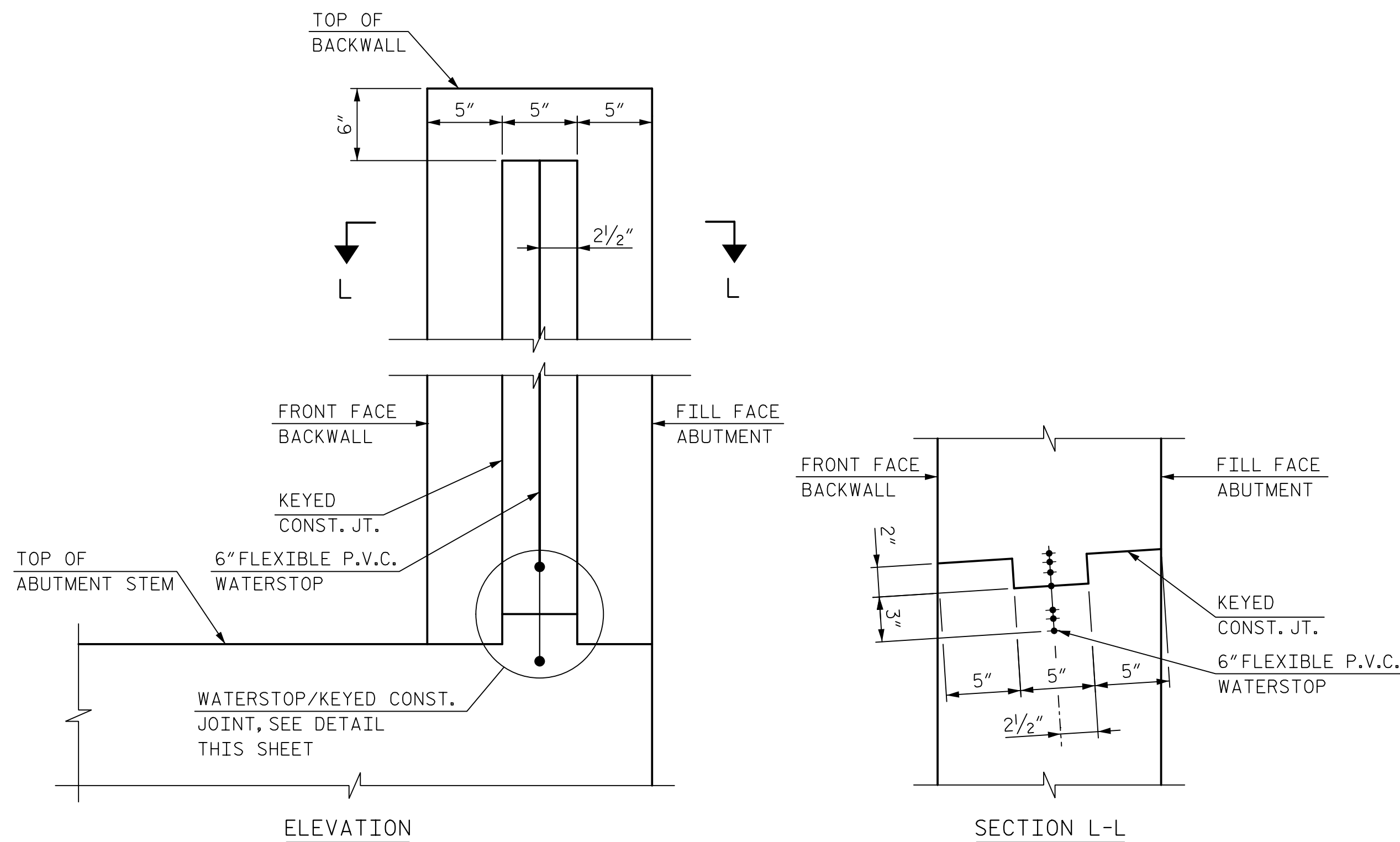
WATERSTOP/KEYED CONSTRUCTION JOINT DETAIL



KEYED CONSTRUCTION JOINT DETAIL



FOOTING OR ABUT. STEM CONSTRUCTION JOINT DETAILS



BACKWALL CONSTRUCTION JOINT DETAILS

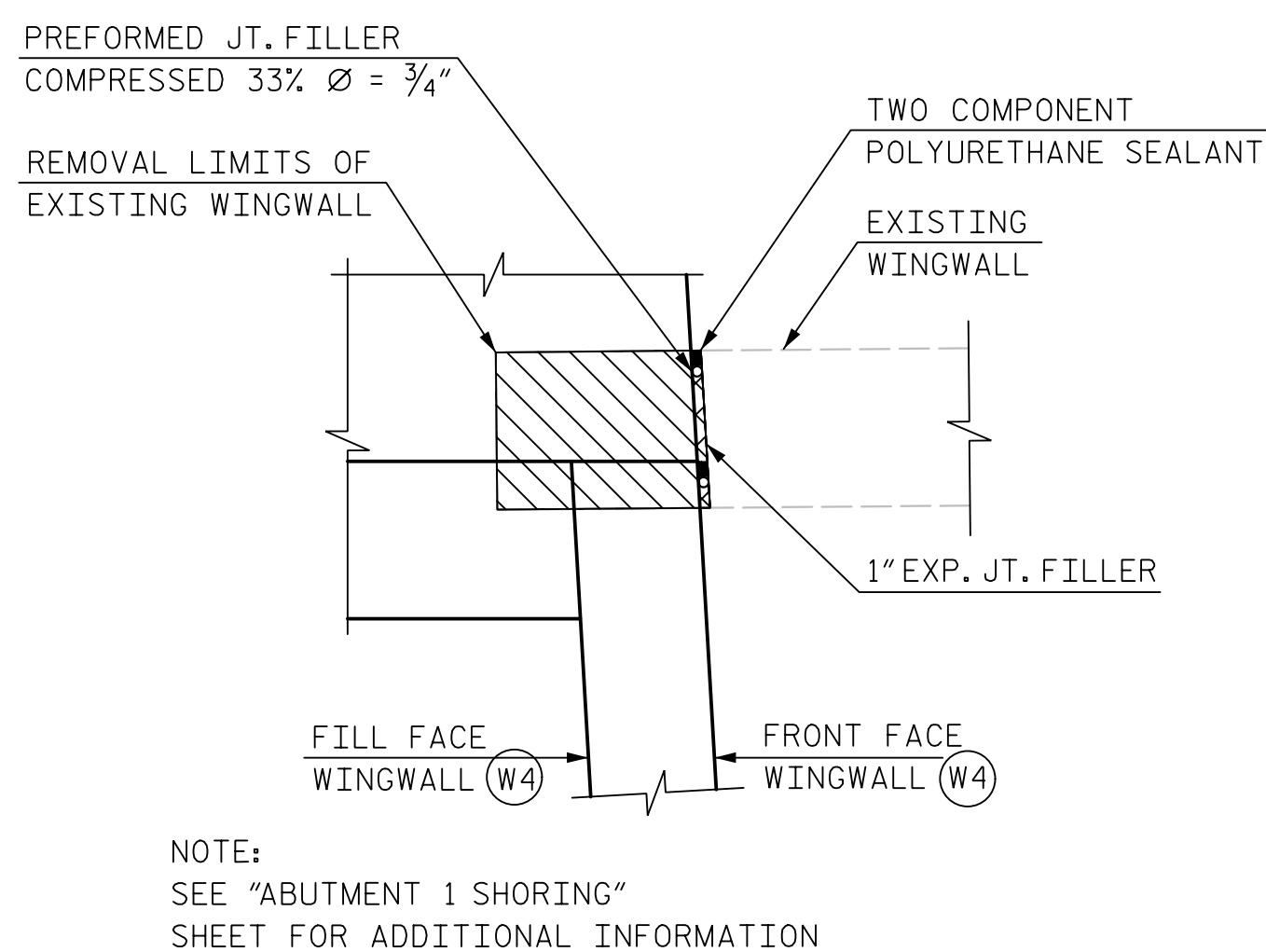
**BAR TYPES**

MARK	B	C	D
H1	14'-3"	1'-4"	1 15/16"
H2	14'-4"	10"	1 3/16"
H3	5'-7"	2'-5"	2 5/16"
H4	5'-7"	2'-5"	1 11/16"
H5	6'-1"	10"	0 9/16"
H6	5'-7"	1'-2"	0 13/16"
K8	3'-7"	10"	1 3/16"
K9	3'-7"	10"	0 9/16"

NOTE: 'D' IS PARALLEL TO WINGWALL.

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
ABUTMENT 1					
H1	23	8	1	15'-7"	957
H2	12	5	1	15'-2"	190
H3	26	5	1	8'-0"	217
H4	27	5	2	8'-0"	226
H5	9	5	2	6'-11"	65
H6	10	7	2	6'-9"	138
H7	3	5	STR.	5'-8"	18
H8	3	7	STR.	5'-8"	35
ABUTMENT 1					
K1	4	5	STR.	4'-11"	21
K2	21	5	STR.	28'-4"	632
K3	19	5	STR.	25'-9"	511
K4	21	5	STR.	24'-2"	530
K5	12	5	STR.	23'-0"	288
K6	16	5	STR.	12'-0"	201
K7	16	5	3	5'-4"	90
K8	7	5	1	4'-5"	33
K9	7	5	2	4'-5"	33
S1	72	5	4	3'-11"	295
S2	48	5	4	6'-11"	347
S3	24	5	4	6'-8"	167
S4	2	5	4	4'-4"	10
S5	2	5	4	4'-3"	9
S6	2	5	4	4'-2"	9
S7	2	5	4	4'-2"	9
S8	2	5	4	4'-1"	9
S9	2	5	4	4'-0"	9
S10	2	5	4	4'-0"	9
S11	2	5	4	3'-11"	9
T3				40'-6"	
T4				34'-7"	
V7				1'-2"	
V9				1'-2"	
V11				10"	
V15				10"	

ALL BAR DIMENSIONS ARE OUT TO OUT



EXISTING ABUTMENT INTERFACE DETAIL

**BILL OF REINFORCING**

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT	MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
ABUTMENT 1											
H1	23	8	1	15'-7"	957	T1	144	7	4	12'-5"	3655
H2	12	5	1	15'-2"	190	T2	4	7	4	7'-9"	64
H3	26	5	1	8'-0"	217	T3	36	5	5	42'-4"	1590
H4	27	5	2	8'-0"	226	T4	36	5	5	36'-5"	1368
H5	9	5	2	6'-11"	65	T5	12	5	STR.	40'-6"	507
H6	10	7	2	6'-9"	138	T6	12	5	STR.	34'-7"	433
H7	3	5	STR.	5'-8"	18	T7	6	5	STR.	9'-5"	59
H8	3	7	STR.	5'-8"	35	T8	6	5	STR.	8'-11"	56
ABUTMENT 1											
V1	36	5	STR.	11'-0"	414	V1	36	5	STR.	11'-0"	414
V2	10	9	STR.	12'-11"	440	V2	10	9	STR.	12'-11"	440
V3	18	5	STR.	9'-6"	179	V3	18	5	STR.	9'-6"	179
V4	24	5	STR.	5'-4"	134	V4	24	5	STR.	5'-4"	134
V5	9	8	STR.	12'-1"	291	V5	9	8	STR.	12'-1"	291
V6	1	5	STR.	10'-11"	12	V6	1	5	STR.	10'-11"	12
V7	7	7	5	13'-11"	200	V7	7	7	5	13'-11"	200
V8	5	5	STR.	7'-8"	40	V8	5	5	STR.	7'-8"	40
V9	90	7	5	12'-0"	2208	V9	90	7	5	12'-0"	2208
V10	41	5	STR.	5'-9"	246	V10	41	5	STR.	5'-9"	246
V11	80	5	5	7'-1"	592	V11	80	5	5	7'-1"	592
V12	35	7	STR.	8'-3"	591	V12	35	7	STR.	8'-3"	591
V13	30	5	STR.	8'-11"	280	V13	30	5	STR.	8'-11"	280
V14	26	5	STR.	3'-11"	107	V14	26	5	STR.	3'-11"	107
V15	71	5	5	2'-9"	204	V15	71	5	5	2'-9"	204
V16	18	5	STR.	9'-0"	169	V16	18	5	STR.	9'-0"	169
ABUTMENT 1											
S1	72	5	4	3'-11"	295	S1	72	5	4	3'-11"	295
S2	48	5	4	6'-11"	347	S2	48	5	4	6'-11"	347
S3	24	5	4	6'-8"	167	S3	24	5	4	6'-8"	167
S4	2	5	4	4'-4"	10	S4	2	5	4	4'-4"	10
S5	2	5	4	4'-3"	9	S5	2	5	4	4'-3"	9
S6	2	5	4	4'-2"	9	S6	2	5	4	4'-2"	9
S7	2	5	4	4'-2"	9	S7	2	5	4	4'-2"	9
S8	2	5	4	4'-1"	9	S8	2	5	4	4'-1"	9
S9	2	5	4	4'-0"	9	S9	2	5	4	4'-0"	9
S10	2	5	4	4'-0"	9	S10	2	5	4	4'-0"	9
S11	2	5	4	3'-11"	9	S11	2	5	4	3'-11"	9
ABUTMENT 1											
T3				40'-6"		T3				40'-6"	
T4				34'-7"		T4				34'-7"	
V7				1'-2"		V7				1'-2"	
V9				1'-2"		V9				1'-2"	
V11				10"		V11				10"	
V15				10"		V15				10"	

**QUANTITIES**

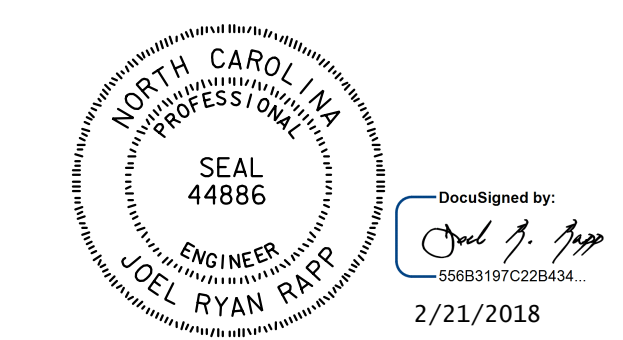
ITEM	TOTAL
REINFORCING STEEL	LBS. 18,906
CLASS AA CONCRETE BREAKDOWN:	
POUR 1 FOOTING	CU. YDS 111.9
POUR 2 ABUTMENT STEM & BOTT. OF WINGS	CU. YDS 42.9
POUR 3 BRIDGE BACKWALL AND WINGS	CU. YDS 16.8
POUR 4 PLATFORM GIRDER STEM WALL & WINGS	CU. YDS 26.8
POUR 5 PLATFORM GIRDER BACKWALL AND WINGS	CU. YDS 4.6
TOTAL	CU. YDS 203.0
HP 14 X 73 STEEL PILES	NO. 34
	L.F. 1,927

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 6 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

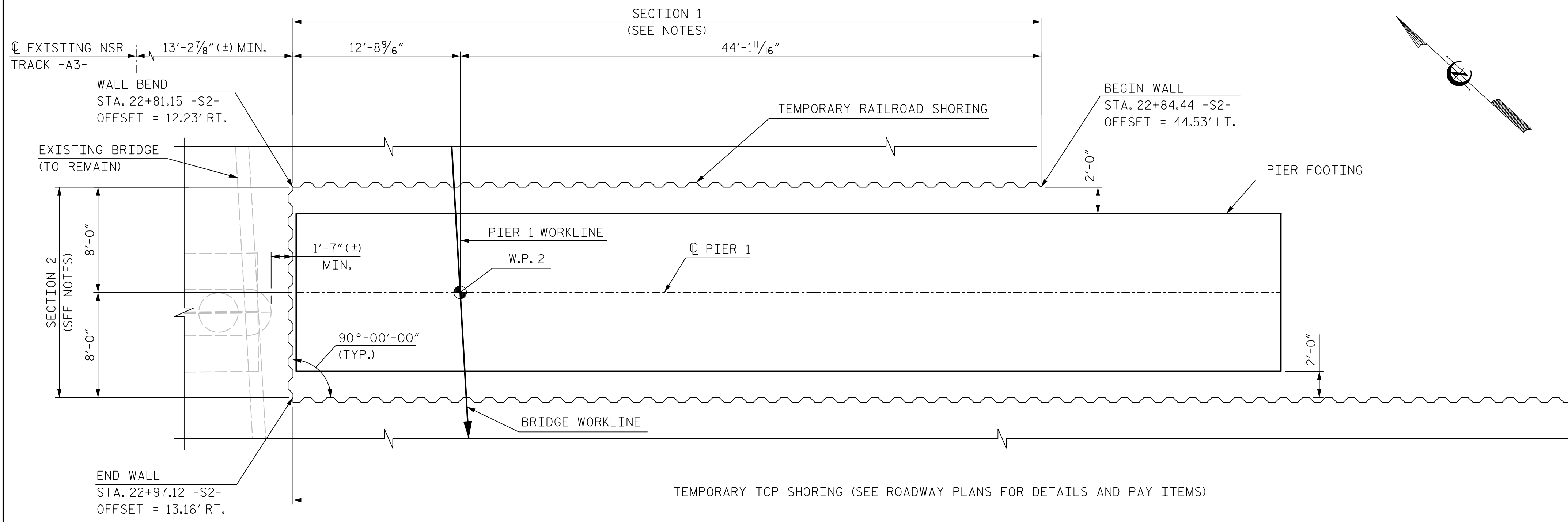
SUBSTRUCTURE  
 ABUTMENT 1



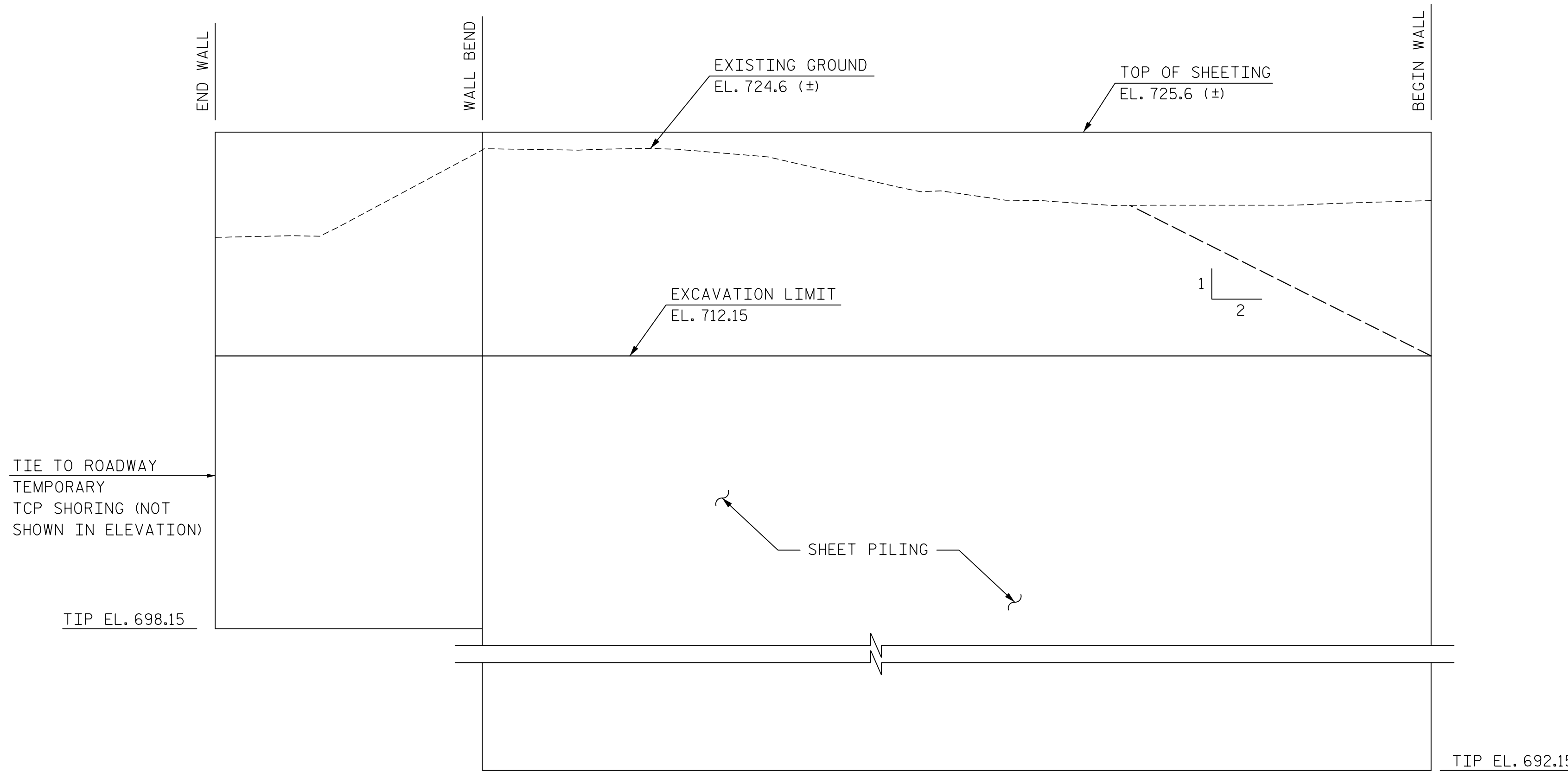
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	DRAWN BY <u>J. JEFFERS</u> DATE <u>10/17</u> CHECKED BY <u>K. ERVIN</u> DATE <u>10/17</u>	DWG. NO. 30																	
	REVISIONS																		
	<table border="1"> <thead> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> <th>BY</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table>	NO.	BY	DATE	NO.	BY	DATE	1			3			2			4		
NO.	BY	DATE	NO.	BY	DATE														
1			3																
2			4																





TEMPORARY SHORING PLAN



TEMPORARY SHORING ELEVATION  
(LOOKING AWAY FROM FOOTING)

NOTES:

SHORING HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING, VOL. 2, STRUCTURES", AND "NORFOLK SOUTHERN GUIDELINES FOR DESIGN OF GRADE SEPARATION STRUCTURES, UNDERPASS GRADE SEPARATION DESIGN CRITERIA".

MAXIMUM WALL DEFLECTION LIMITED TO 1/2".

ALL SHORING MATERIAL SHALL BE IN "LIKE NEW" CONDITION.

SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (HOT ROLLED) AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

SECTION 1:  
MOMENT OF INERTIA/FT. 490.5 in<sup>4</sup>  
SECTION MODULUS/FT. 60.7 in<sup>3</sup>

SECTION 2:  
MOMENT OF INERTIA/FT. 184.2 in<sup>4</sup>  
SECTION MODULUS/FT. 30.2 in<sup>3</sup>

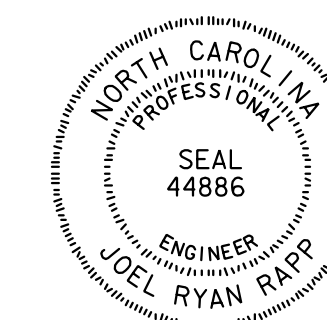
ASSUMED SOIL PARAMETERS  
COARSE GRAINED SOILS:  
SOIL MOIST UNIT WEIGHT - 120 PCF  
SOIL FRICTION ANGLE - 30 DEGREES  
UNDRAINED SHEAR STRENGTH - 0 PSF

\* CONSTRUCTION SEQUENCE:

1. INSTALL SHORING TO REQUIRED TIP ELEVATION.
2. EXCAVATE TO EXCAVATION LIMIT SHOWN.
3. CONSTRUCT PROPOSED PIER.
4. BACKFILL PROPOSED PIER.
5. REMOVE SHORING.

\* COMPLETE SHORING REMOVAL PRIOR TO ABUTMENT 1 EMBANKMENT CONSTRUCTION AND PILE INSTALLATION.

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

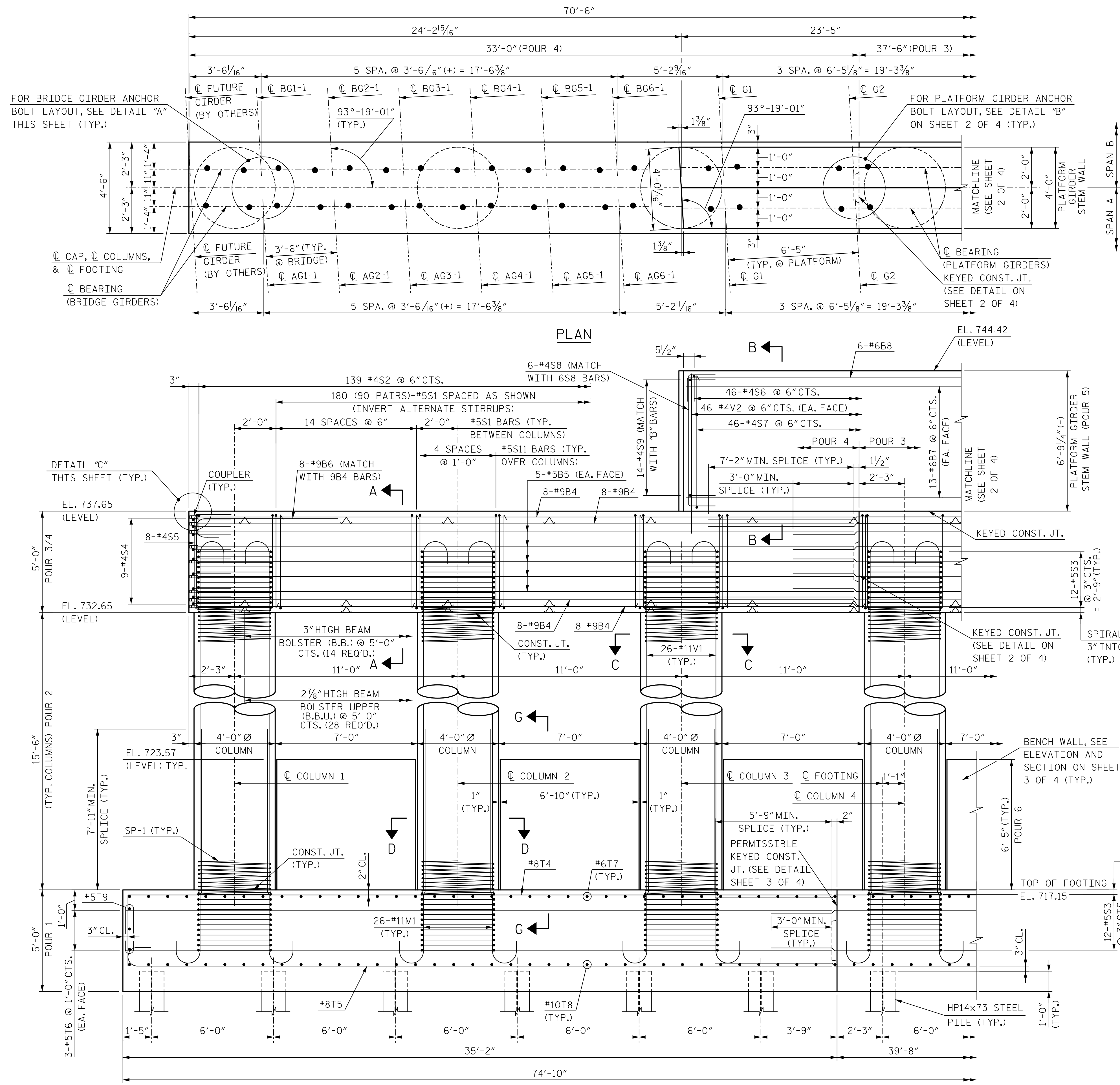


DocuSigned by:  
Joel R. Rapp  
55683197C228434  
2/21/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

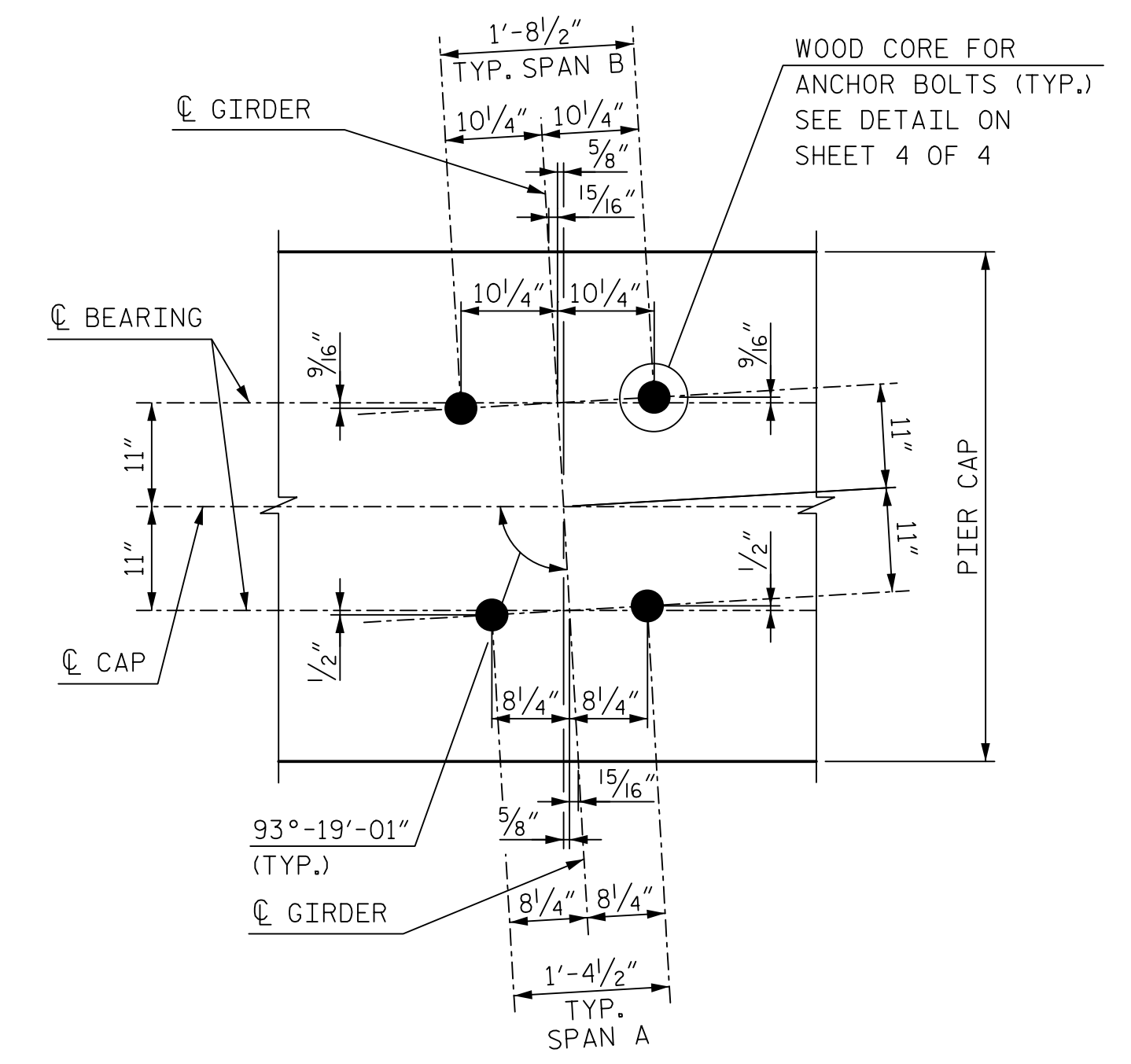
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
PIER 1  
SHORING

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		REVISIONS			SHEET NO. S5-31
DRAWN BY <u>B. VAUGHN</u>	DATE <u>10/17</u>	NO.	BY	DATE	NO.	BY	DATE
CHECKED BY <u>L. RAPP</u>	DATE <u>10/17</u>	1			3		
		2			4		
DWG. NO. 31				TOTAL SHEETS		56	

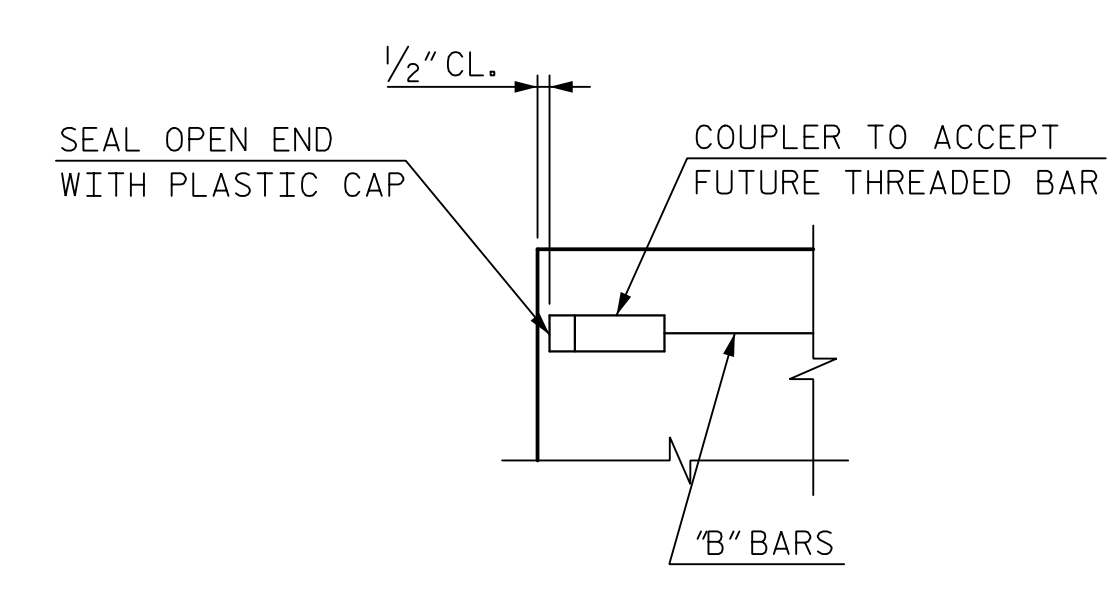


**NOTES:**

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO  $\text{\O}$  PIER UNLESS NOTED.  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 HOOKS ON "V" AND "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.  
 TOP MAT OF FOOTING LONGITUDINAL AND TRANSVERSE REINFORCEMENT MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN REINFORCEMENT. DO NOT EXCEED 12" BETWEEN BARS.



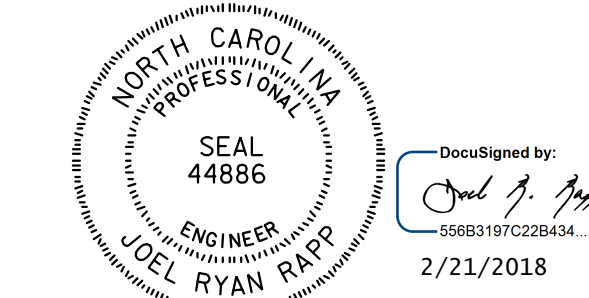
**DETAIL A - BRIDGE GIRDER ANCHOR BOLT LAYOUT**



**DETAIL C**

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 PIER 1

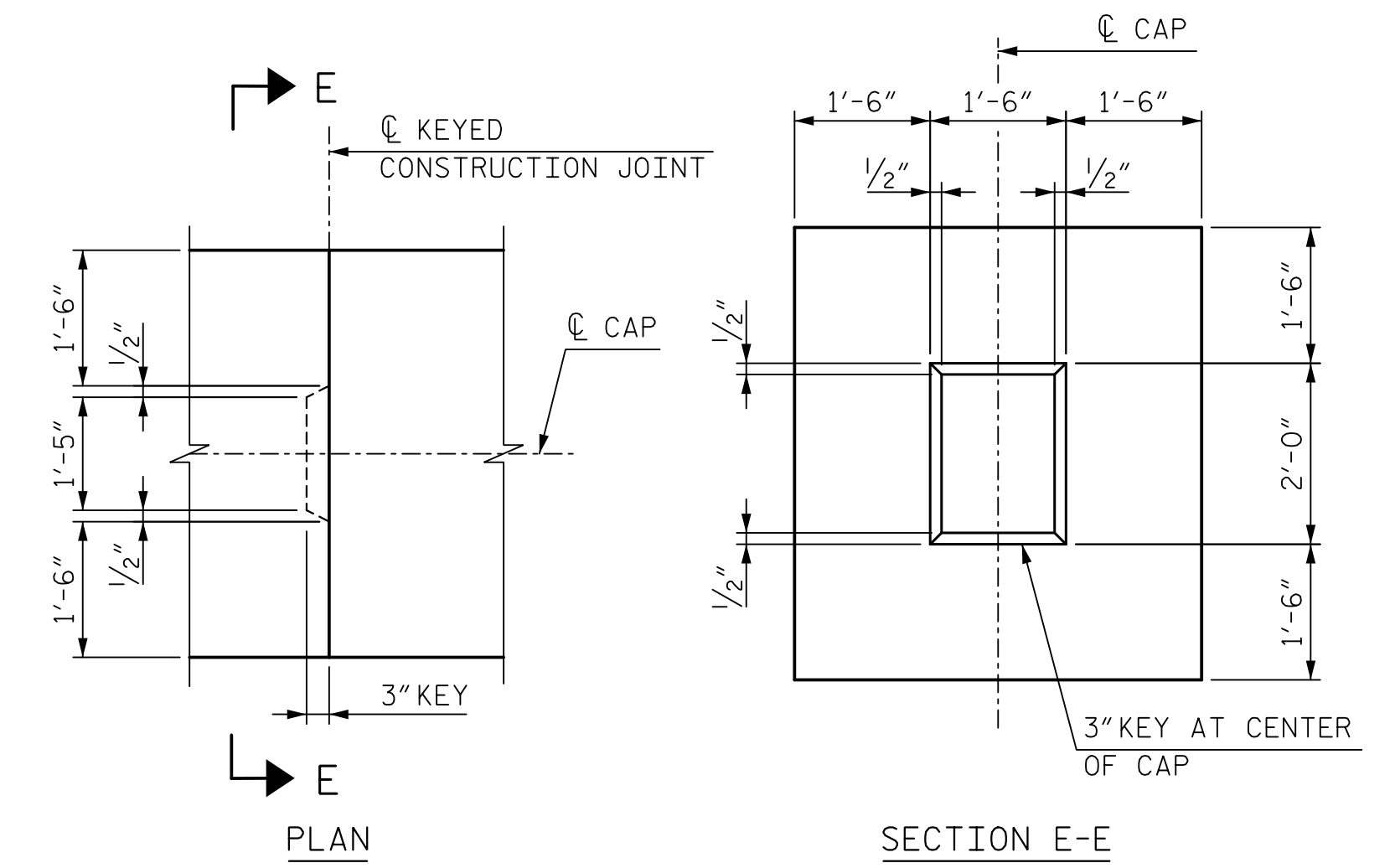
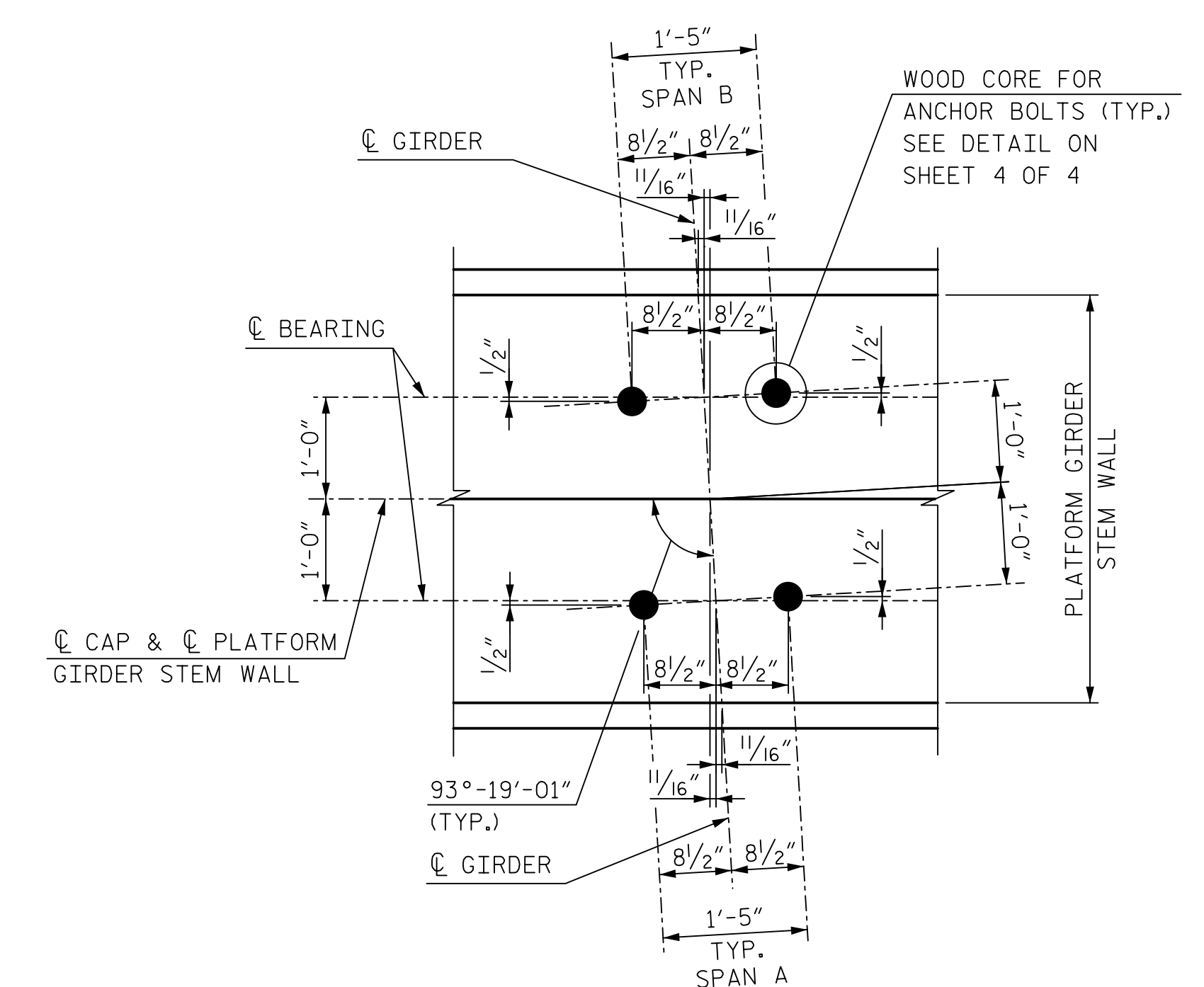
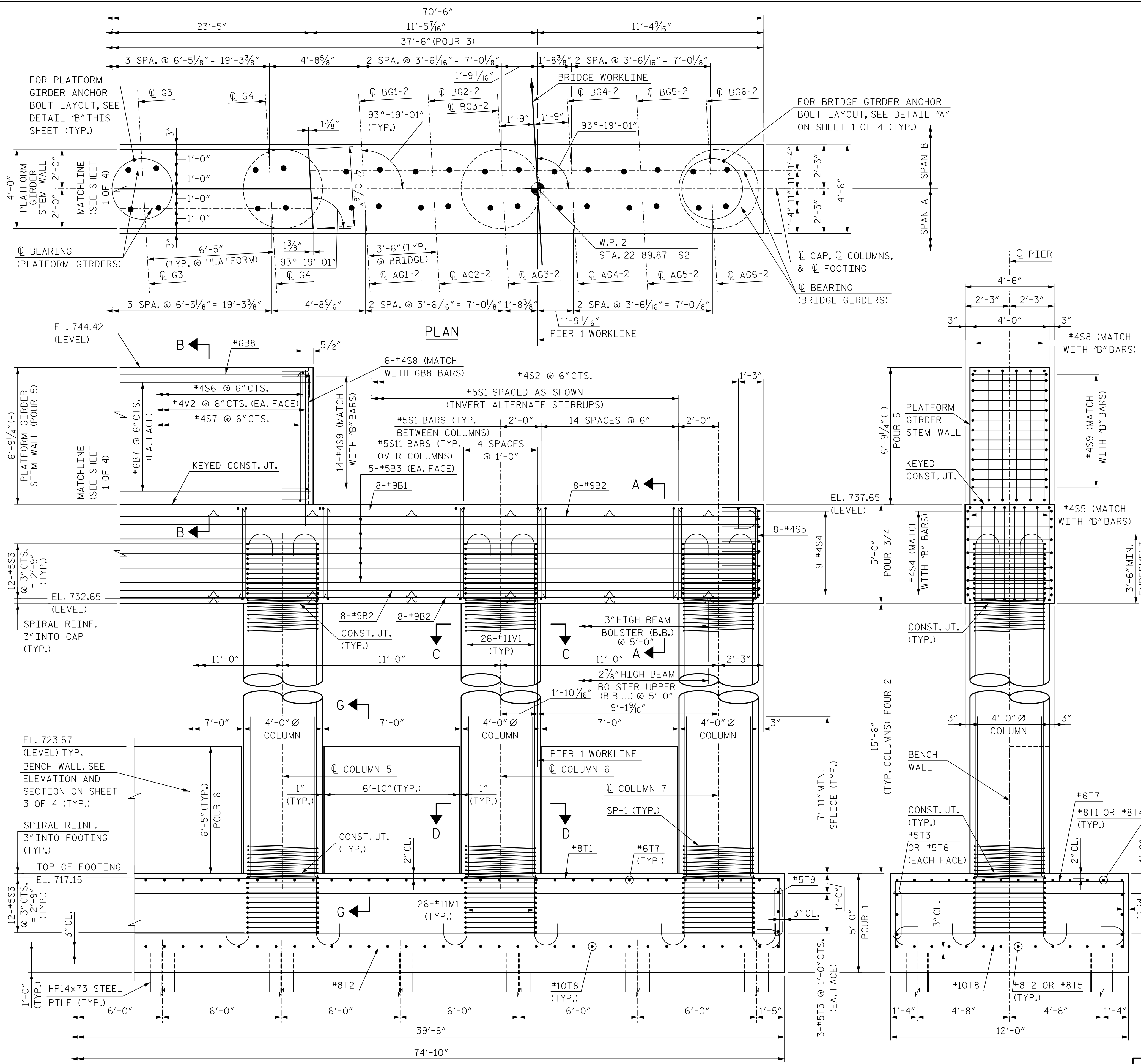


DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	DRAWN BY: <u>B. VAUGHN</u> CHECKED BY: <u>L. RAPP</u>	DATE: <u>9/17</u> DATE: <u>10/17</u>	DWG. NO. 32			
	REVISIONS				SHEET NO.	
	NO.	BY	DATE	NO.	BY	DATE
1			3			56
2			4			

**ELEVATION**  
 (BENCH WALL REINFORCEMENT NOT SHOWN FOR CLARITY)





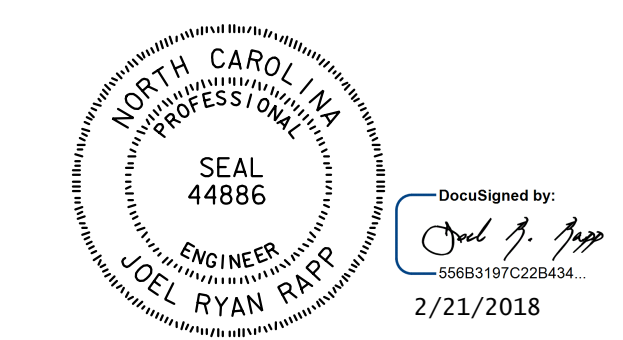
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

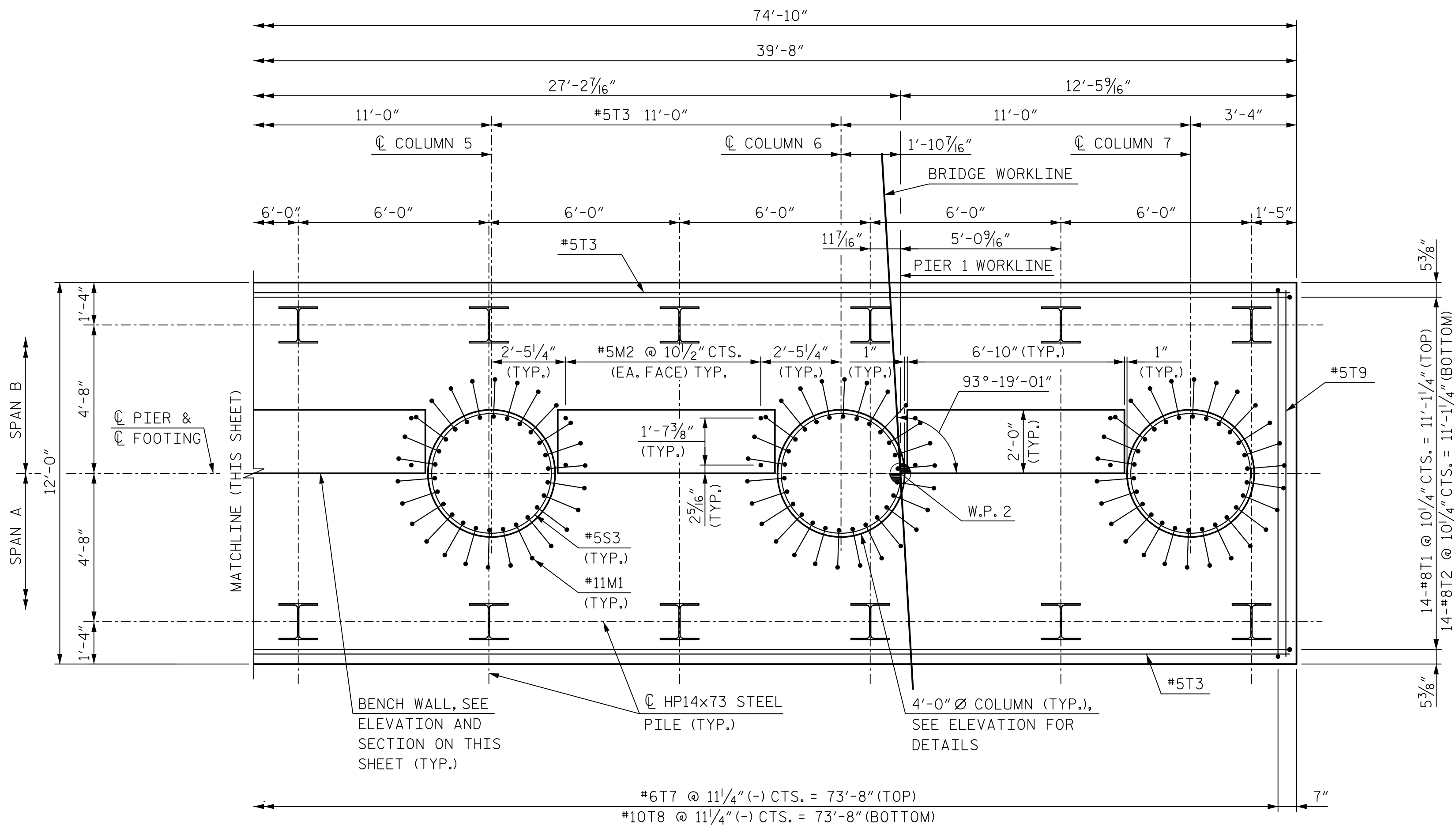
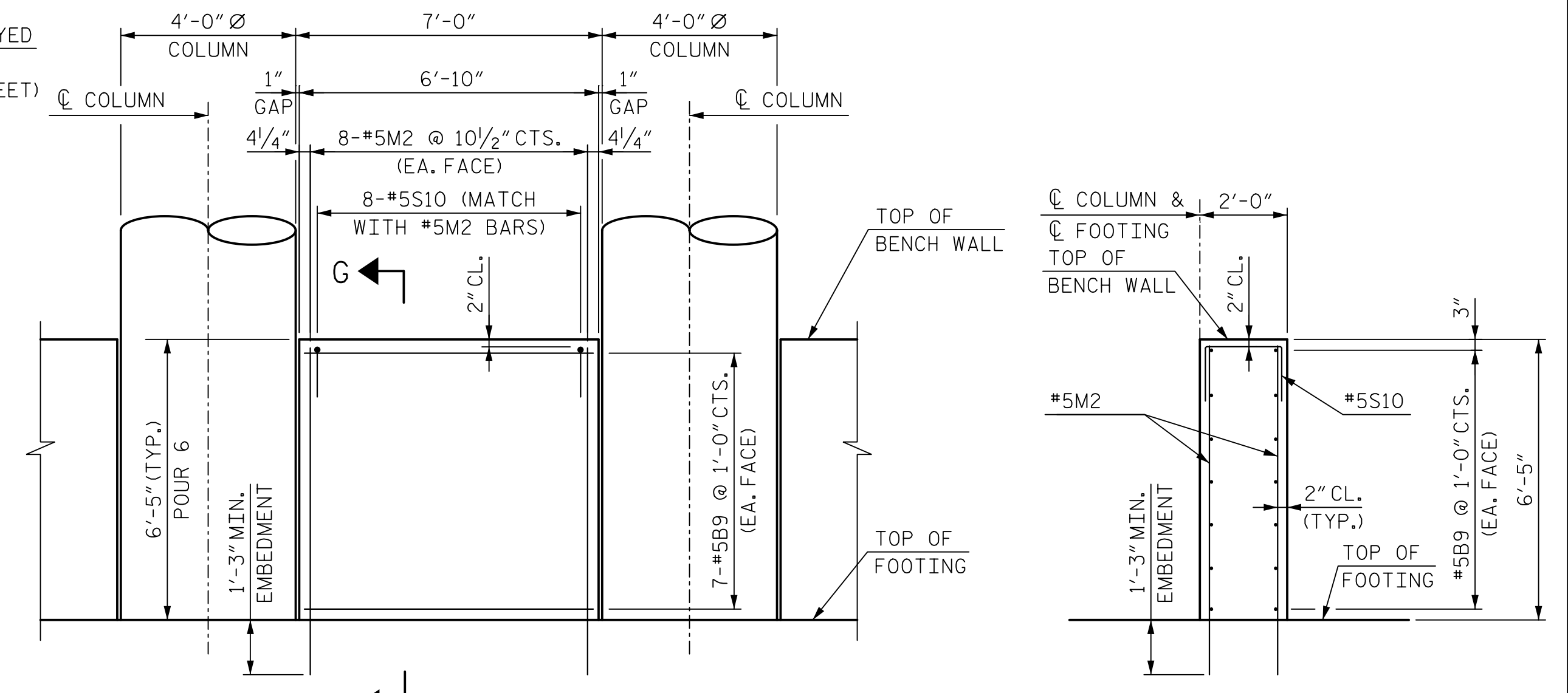
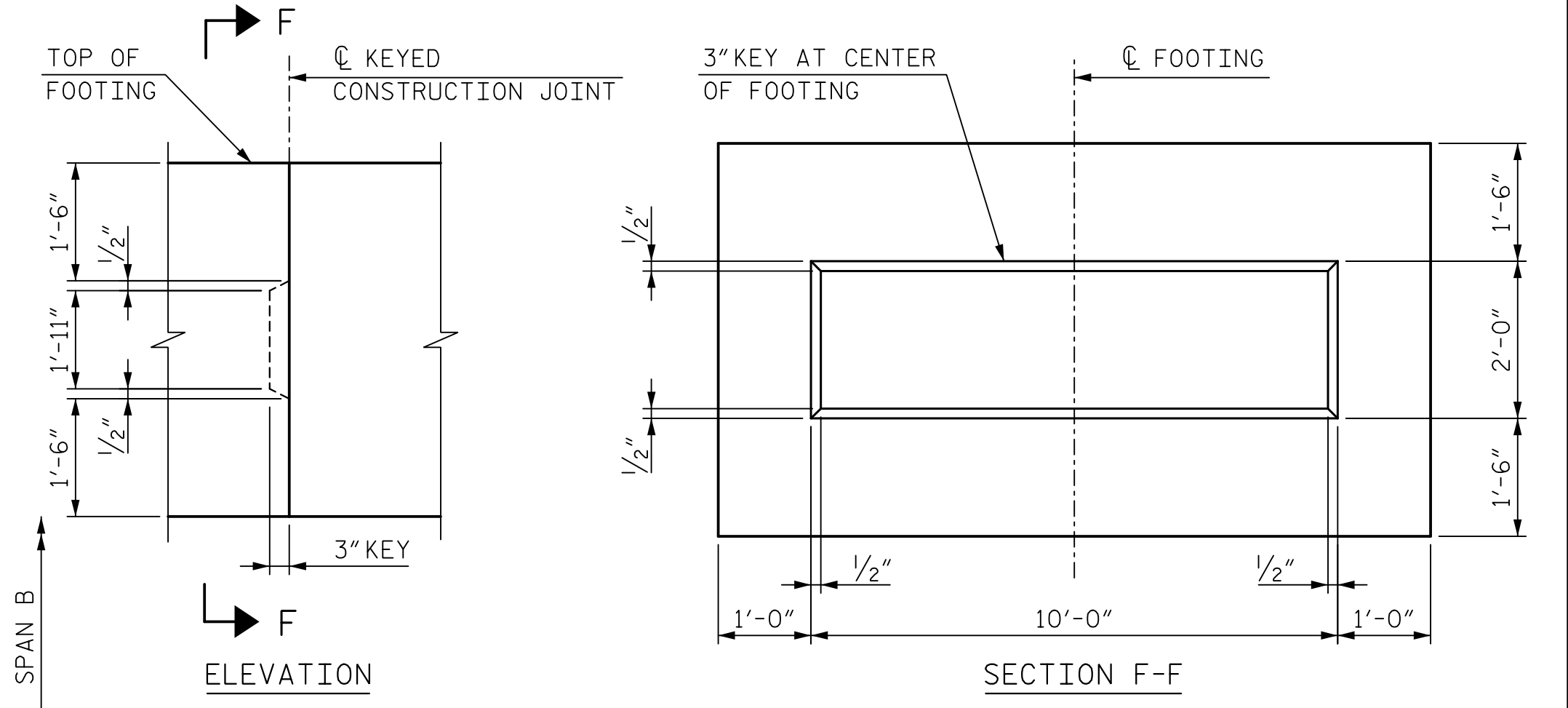
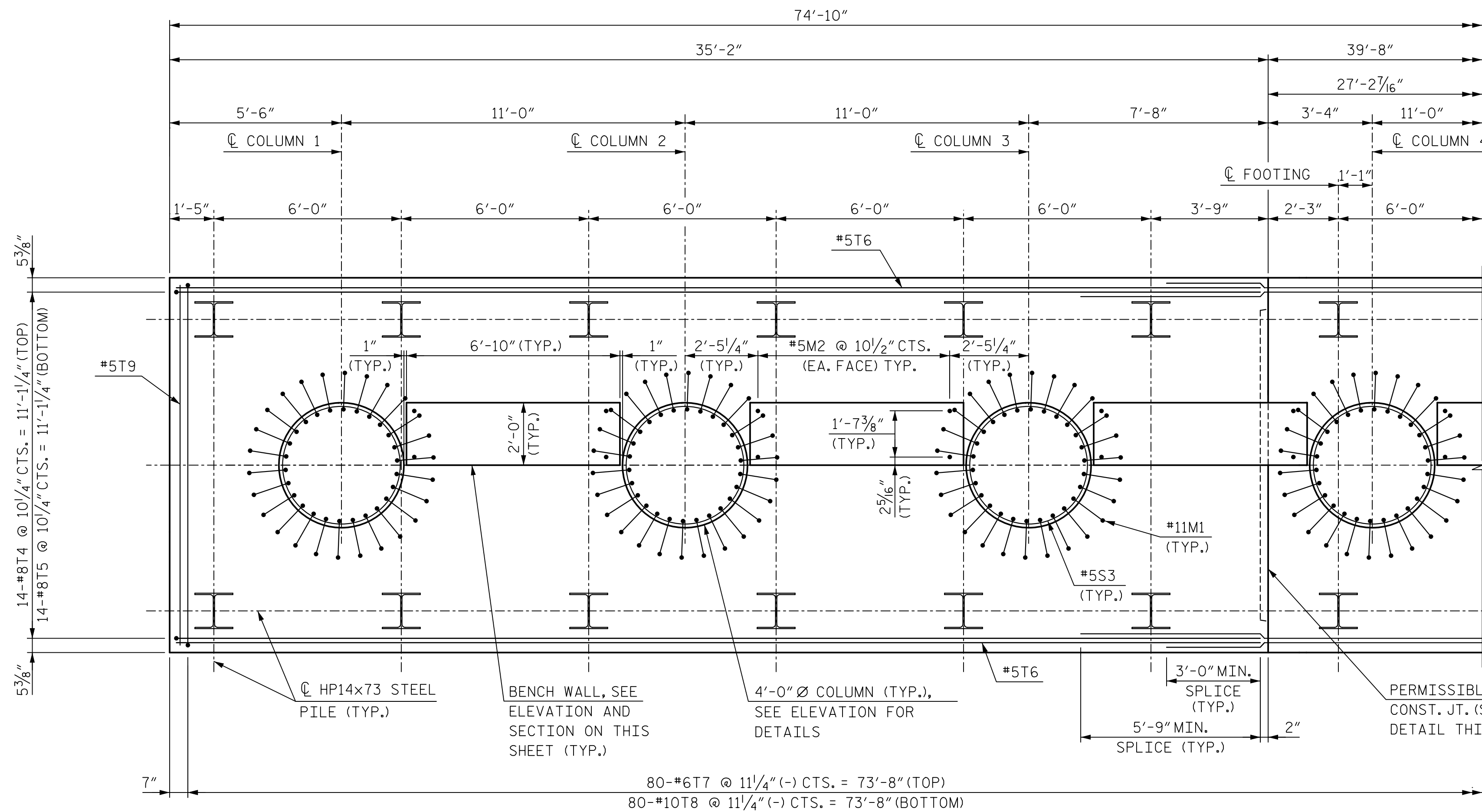
**SUBSTRUCTURE**

**PIER 1**

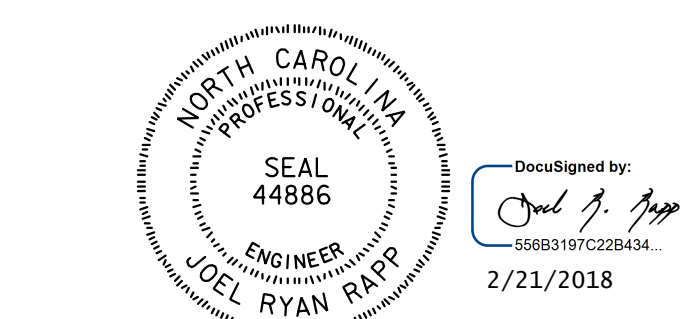


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: <u>B. VAUGHN</u>	DATE: <u>9/17</u>	DWG. NO. <u>33</u>	
CHECKED BY: <u>L. RAPP</u>	DATE: <u>10/17</u>		
REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4
			SHEET NO. <u>S5-33</u>
			TOTAL SHEETS <u>56</u>



FOOTING REINFORCING PLAN



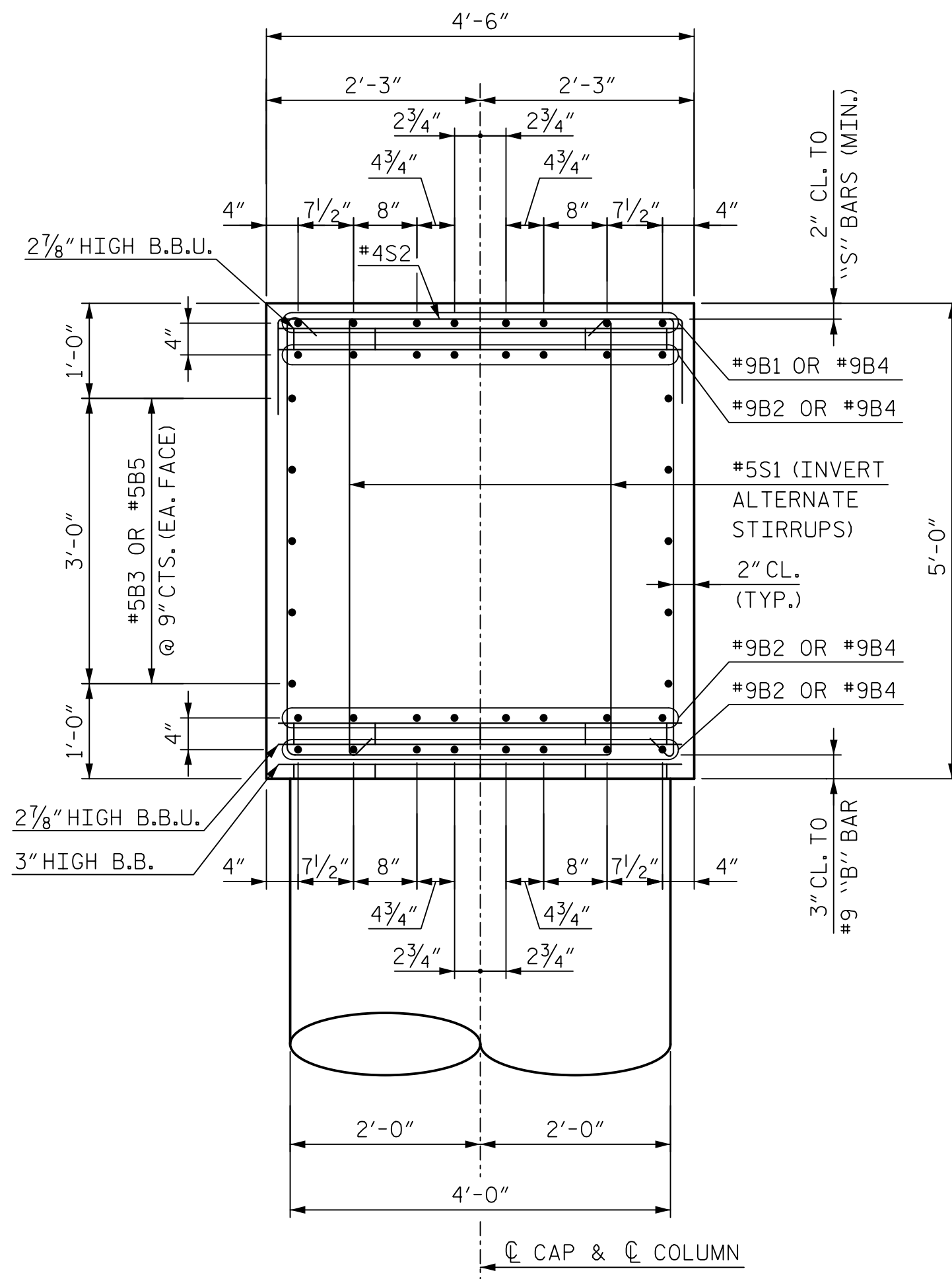
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 PIER 1

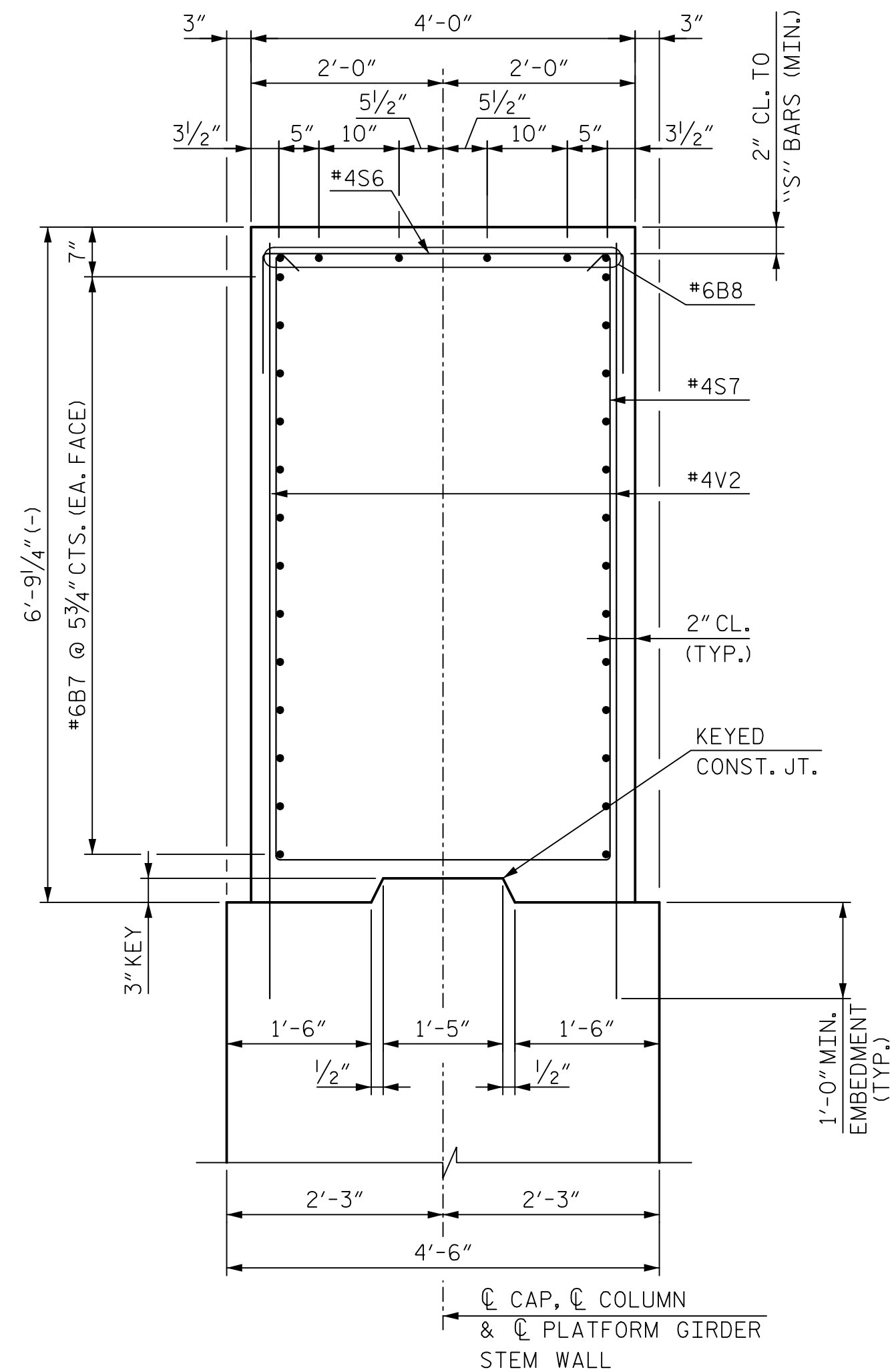
HNTB HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-34		
	NO.	BY	DATE	NO.		BY	DATE
	1		9/17	3			
DRAWN BY: B. VAUGHN CHECKED BY: L. RAPP	DATE: 9/17 DATE: 10/17	DWG. NO. 34	TOTAL SHEETS: 56				





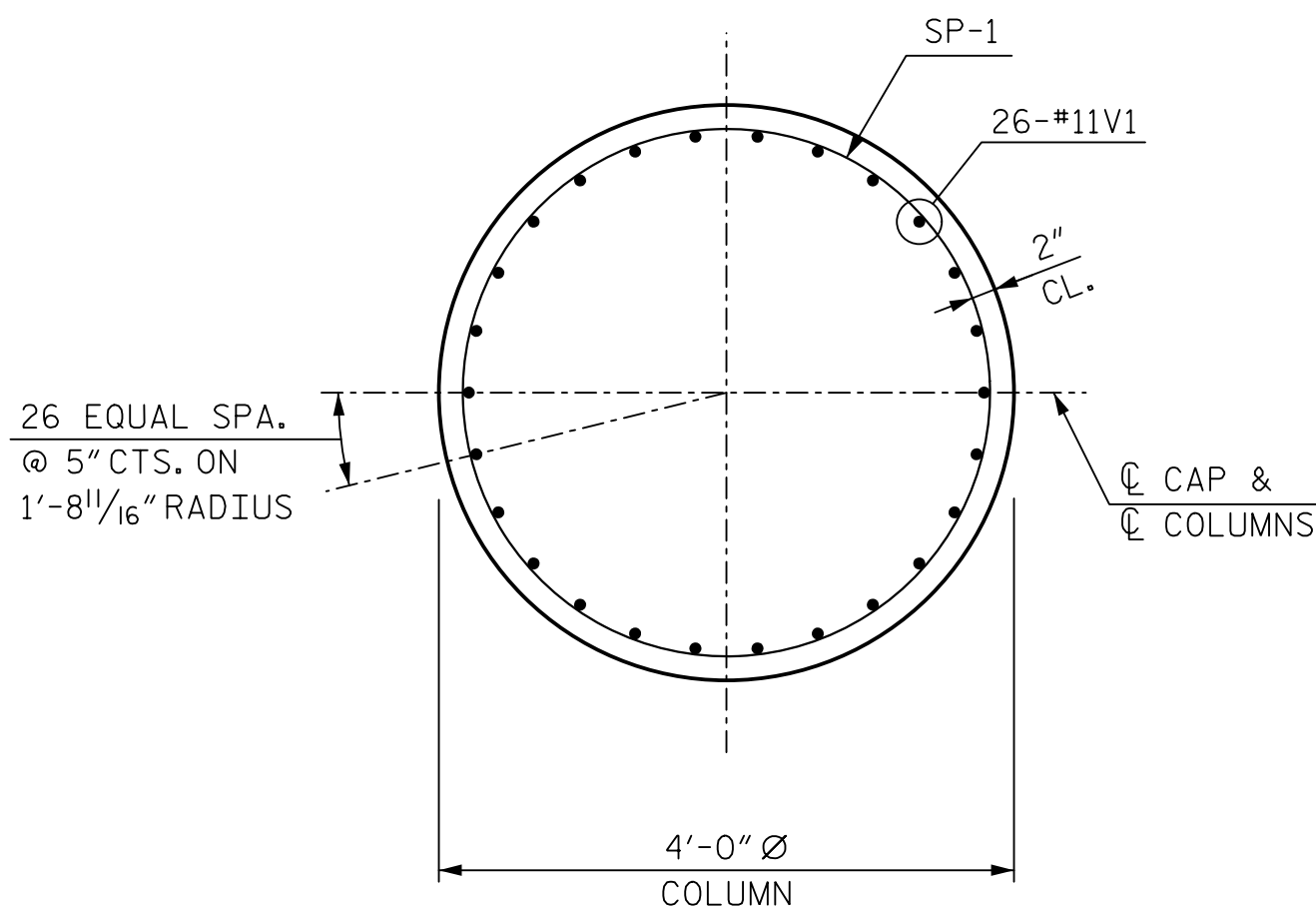
SECTION A-A

(COLUMN REINFORCING AND #5S11 BARS NOT SHOWN FOR CLARITY)

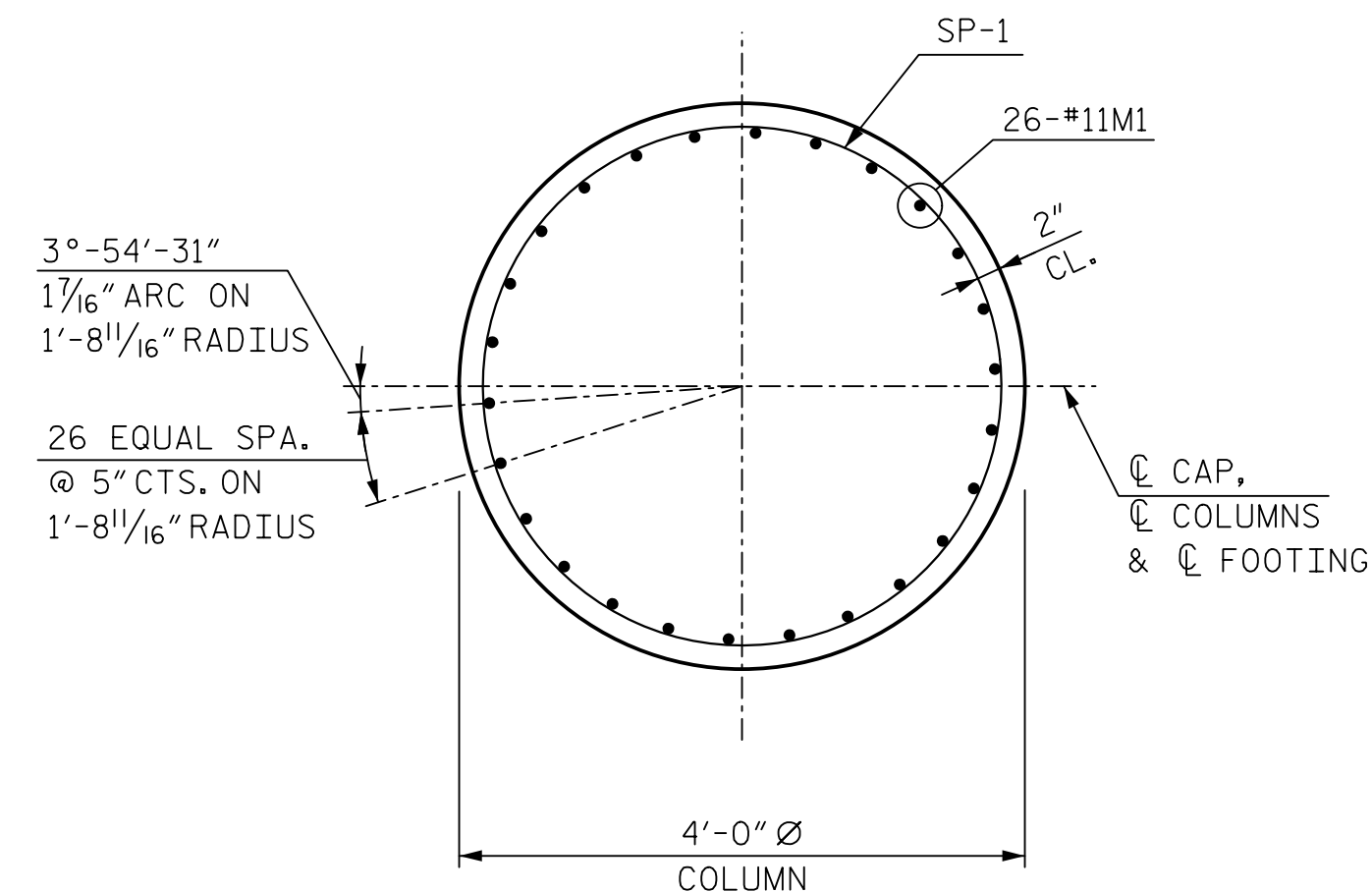


SECTION B-B

(CAP REINFORCING NOT SHOWN FOR CLARITY)

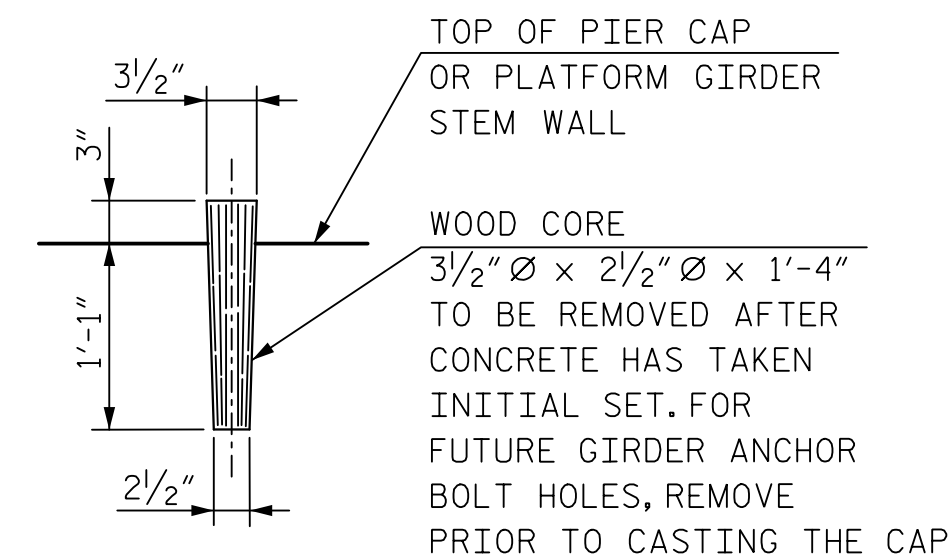


SECTION C-C



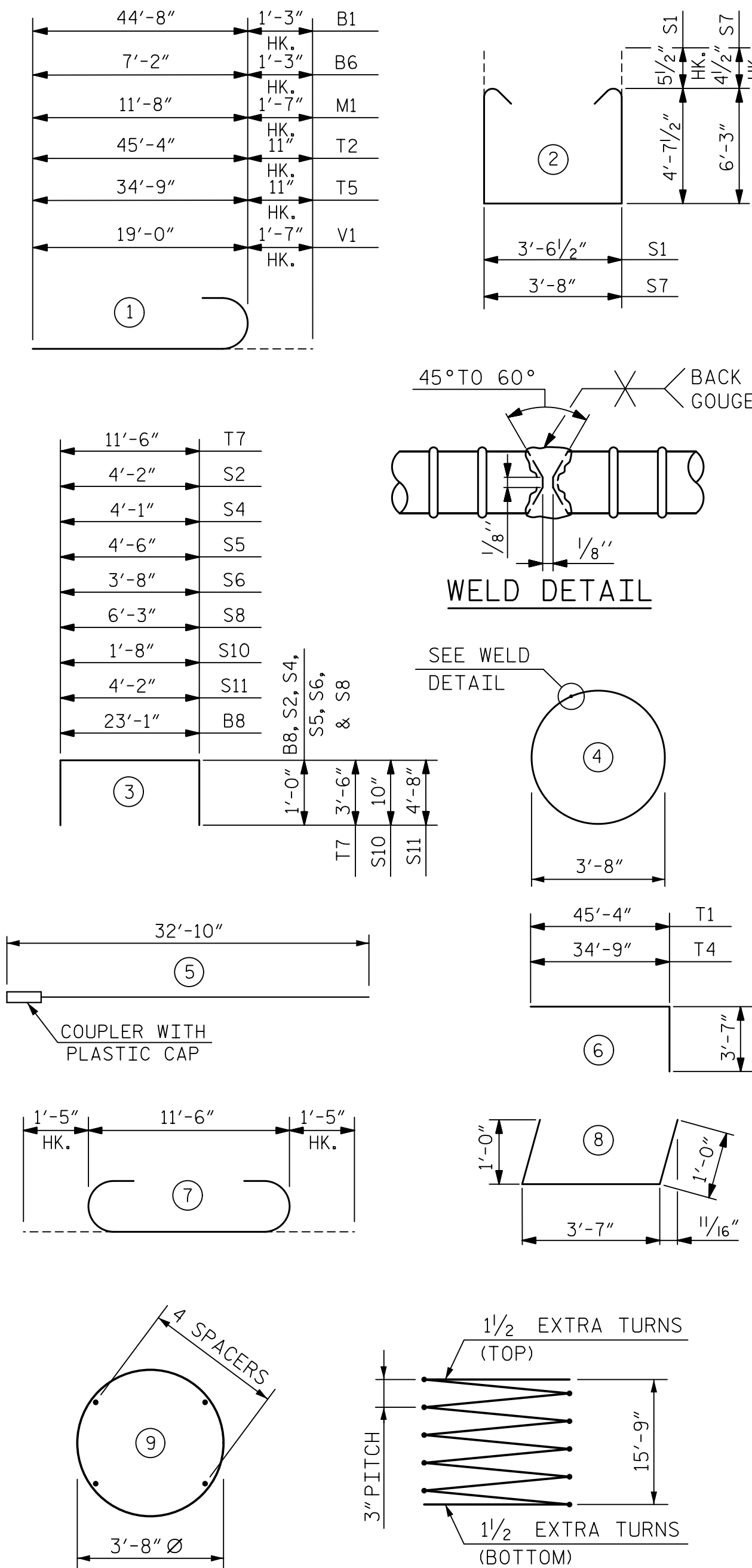
SECTION D-D

(V1 BARS NOT SHOWN FOR CLARITY)



DETAIL OF WOOD CORE FOR ANCHOR BOLT HOLES

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

- \* #5S3 CIRCULAR TIES SHALL BE ASTM DESIGNATION A706, GRADE 60. FABRICATION TO BE IN ACCORDANCE WITH THE 'MANUAL OF STANDARD PRACTICE', A.C.I. 315.80.
- \* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF REINFORCING

PIER 1					
MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	45'-11"	1,249
B2	24	9	STR.	44'-8"	3,645
B3	10	5	STR.	40'-6"	422
B4	32	9	5	32'-10"	3,572
B5	10	5	5	32'-10"	342
B6	8	9	1	8'-5"	229
B7	26	6	STR.	23'-1"	901
B8	6	6	3	25'-1"	226
B9	84	5	STR.	6'-4"	555
S1	180	5	2	13'-9"	2,581
S2	139	4	3	6'-2"	573
* S3	168	5	4	11'-7"	2,030
S4	18	4	3	6'-1"	73
S5	16	4	3	6'-6"	69
S6	46	4	3	5'-8"	174
S7	46	4	2	16'-11"	520
S8	12	4	3	8'-3"	66
S9	28	4	8	5'-7"	104
S10	48	5	3	3'-4"	167
S11	35	5	3	13'-6"	493
M1	182	11	1	13'-3"	12,812
M2	96	5	STR.	7'-6"	751
T1	14	8	6	48'-11"	1,829
T2	14	8	1	46'-3"	1,729
T3	6	5	STR.	42'-7"	266
T4	14	8	6	38'-4"	1,433
T5	14	8	1	35'-8"	1,333
T6	6	5	STR.	34'-9"	217
T7	80	6	3	18'-6"	2,223
T8	80	10	7	14'-4"	4,934
T9	6	5	STR.	11'-6"	72
V1	182	11	1	20'-7"	19,903
V2	92	4	STR.	7'-9"	476
SP-1	7	**	9	760'-4"	5,551
QUANTITIES					
ITEM	TOTAL				
REINFORCING STEEL	LBS 65,969				
SPIRAL COLUMN REINFORCING STEEL	LBS 5,551				
CLASS AA CONCRETE:					
POUR 1	C.Y.				166.3
POUR 2	C.Y.				50.5
POUR 3	C.Y.				31.3
POUR 4	C.Y.				27.5
POUR 5	C.Y.				23.5
POUR 6	C.Y.				19.5
TOTAL	C.Y.				318.6
HP14x73 STEEL PILES	NO. L.F.				26 1,213

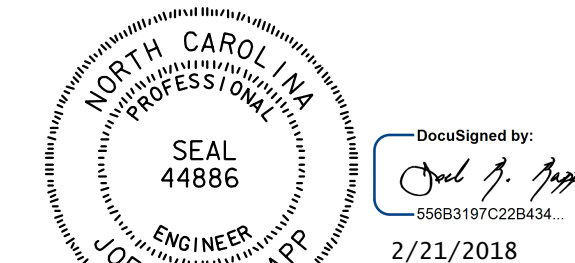
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

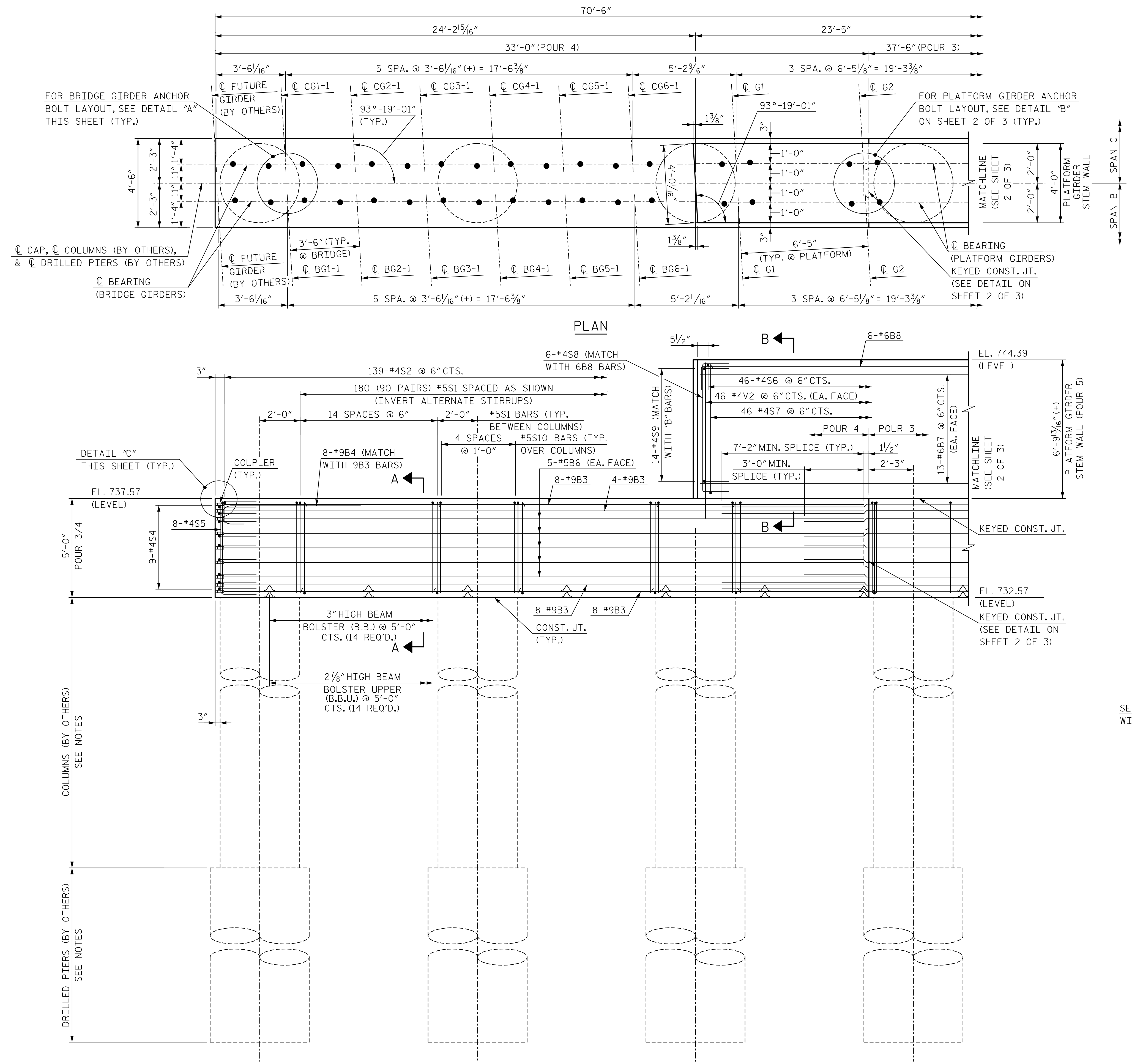
PIER 1



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY <u>B. VAUGHN</u>	DATE <u>9/17</u>	DWG. NO. <u>35</u>	
CHECKED BY <u>L. RAPP</u>	DATE <u>10/17</u>		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-35
1			3			TOTAL SHEETS
2			4			56



**NOTES:**

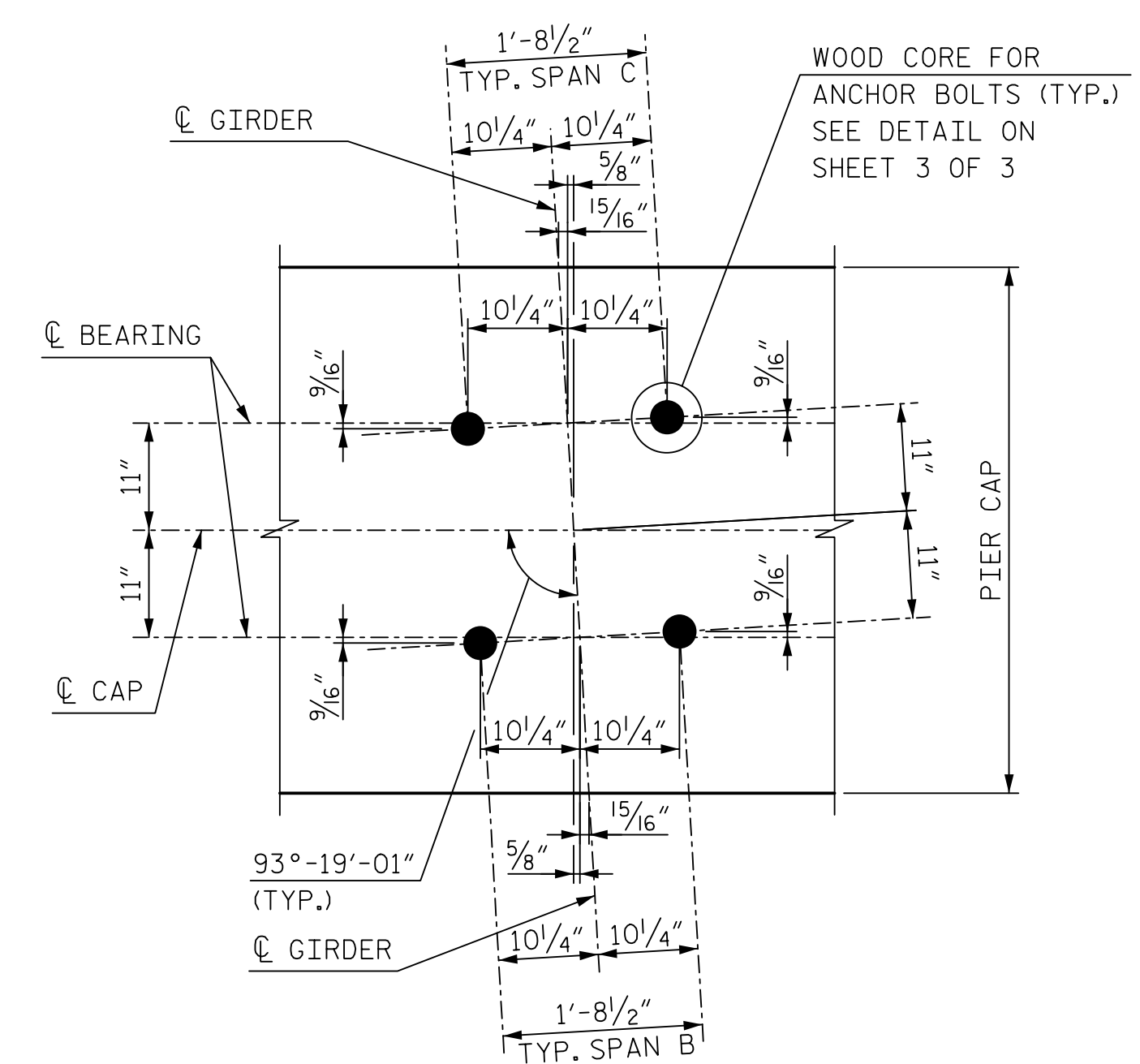
ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO  $\perp$  PIER UNLESS NOTED.

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

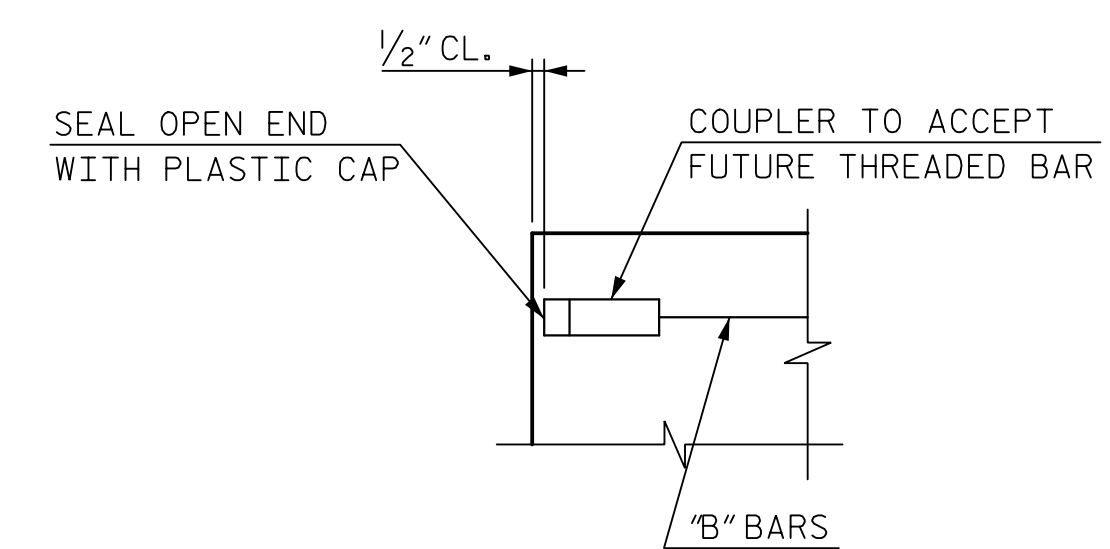
FOR COLUMNS (POUR 2) AND DRILLED PIERS (POUR 1), REFER TO P-5705BA (RD-18002) PLANS (BY OTHERS).

PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL ENSURE THAT THE EXPOSED EXISTING REINFORCEMENT IS FREE OF LOOSE RUST. THE REMAINING RUST, MILL SCALE, OR A COMBINATION OF BOTH SHALL BE CONSIDERED SATISFACTORY, PROVIDED THE MINIMUM DIMENSIONS (INCLUDING HEIGHT OF DEFORMATIONS) AND WEIGHT OF A HAND-WIRE-BRUSHED TEST SPECIMEN COMPLY WITH THE REQUIREMENTS OF ASTM A706. THE RESULTS OF THE TESTING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SURVEY THE TOP OF COLUMN ELEVATIONS AND SUBMIT TO THE ENGINEER FOR APPROVAL.



DETAIL A - BRIDGE GIRDER ANCHOR BOLT LAYOUT



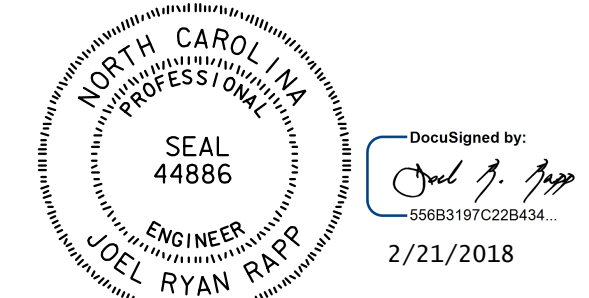
DETAIL C

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

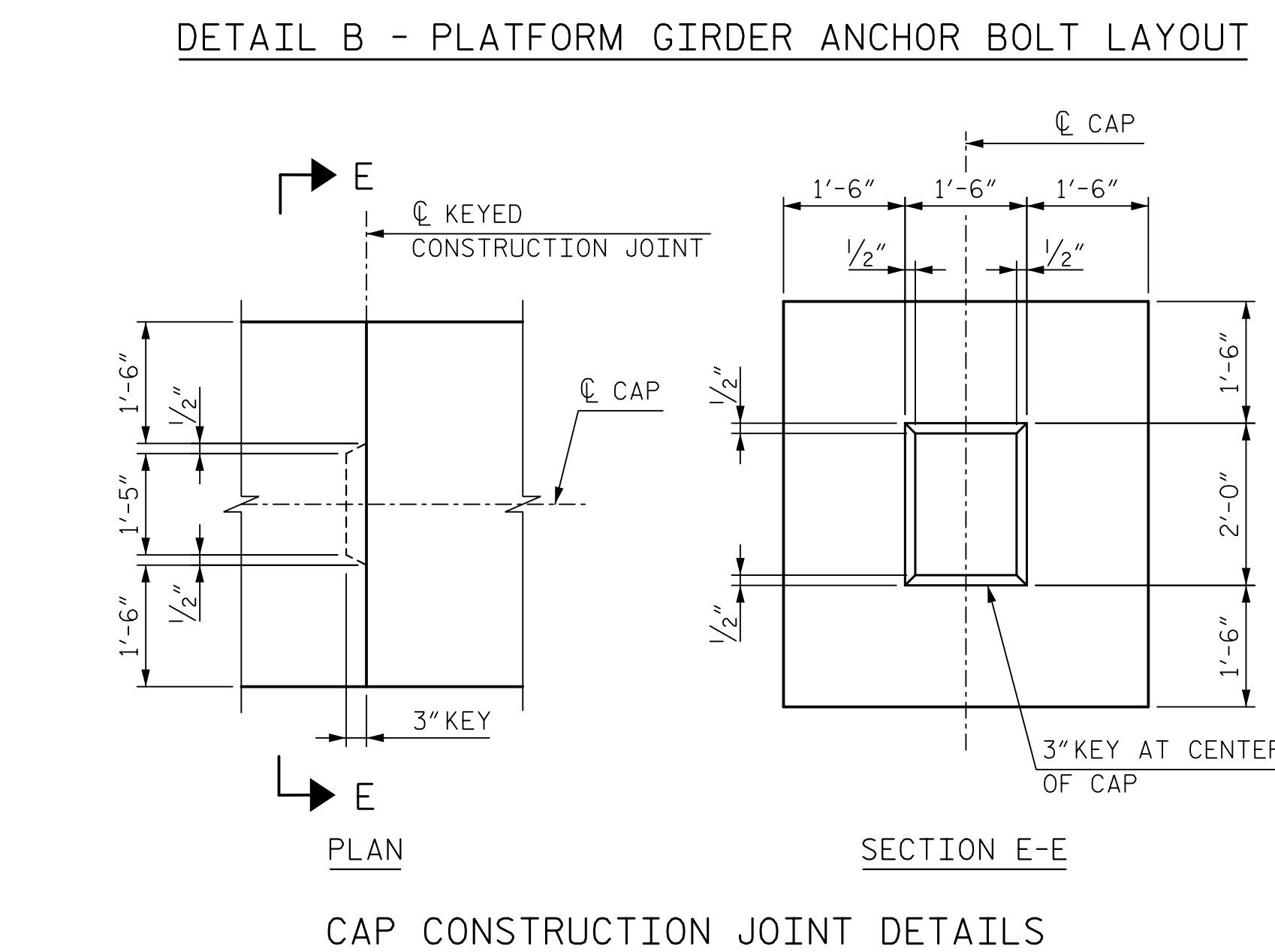
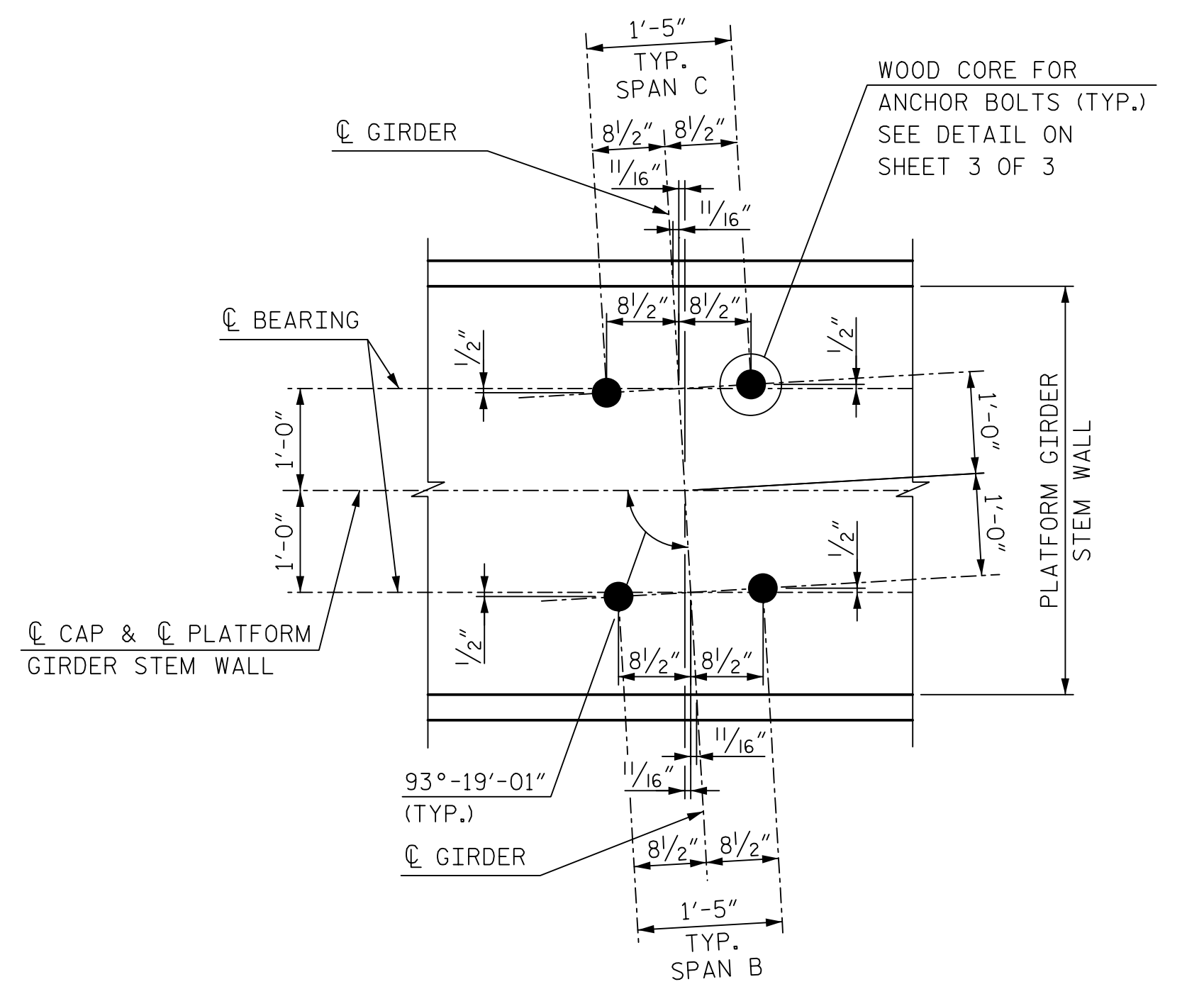
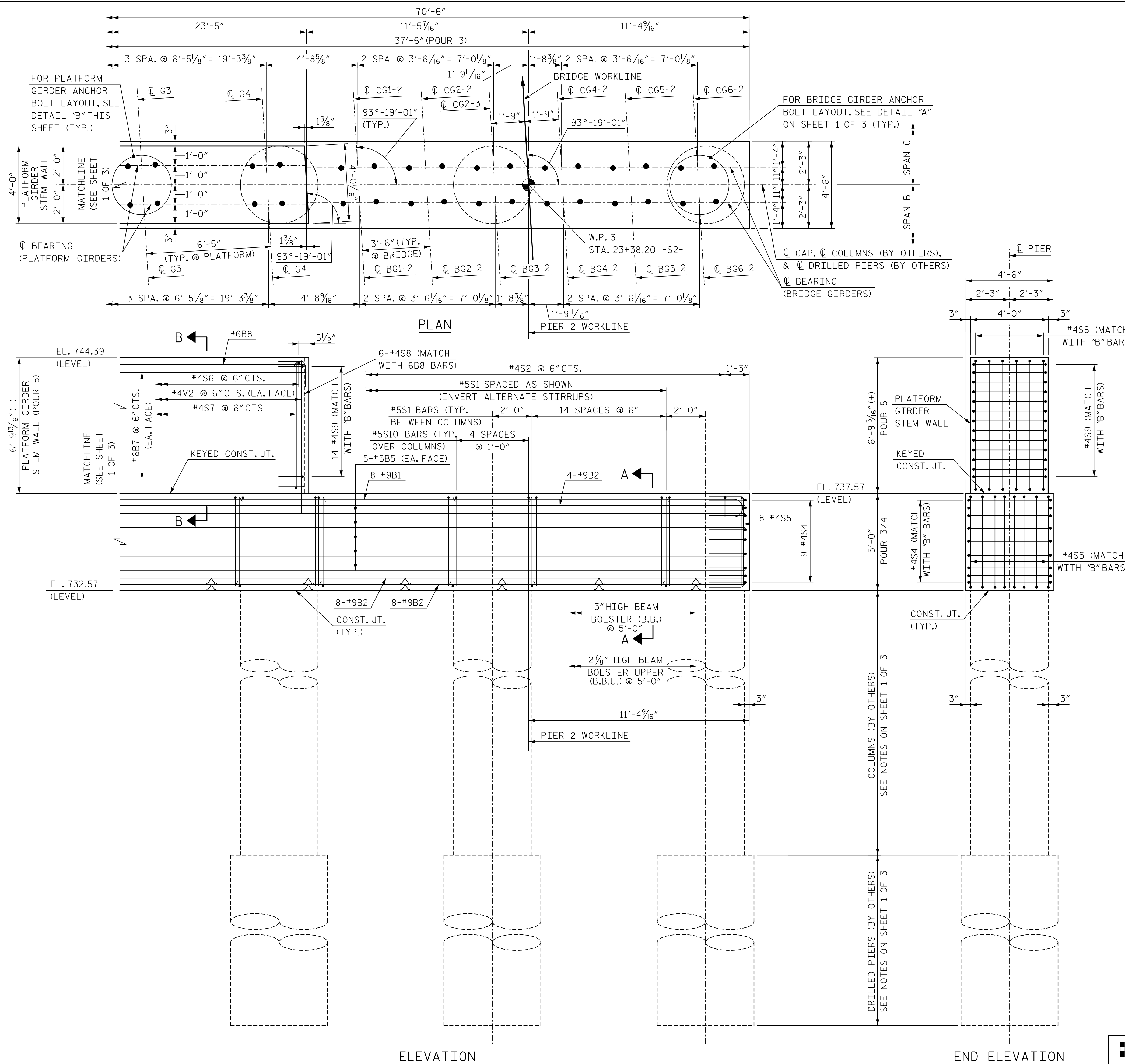
SUBSTRUCTURE  
 PIER 2



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		DWG. NO. 36		SHEET NO. S5-36	
DRAWN BY: J. JEFFERS DATE: 9/17		CHECKED BY: L. RAPP DATE: 10/17		TOTAL SHEETS: 56	
				REVISIONS	
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



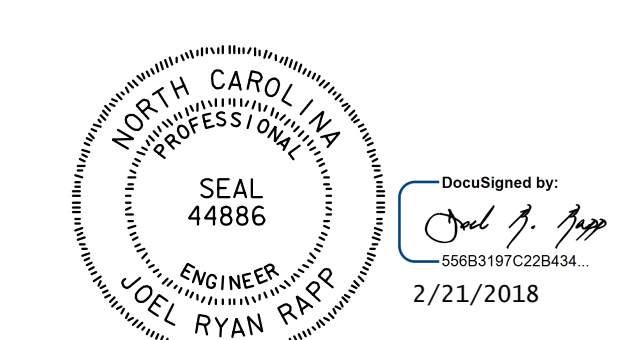


PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 3

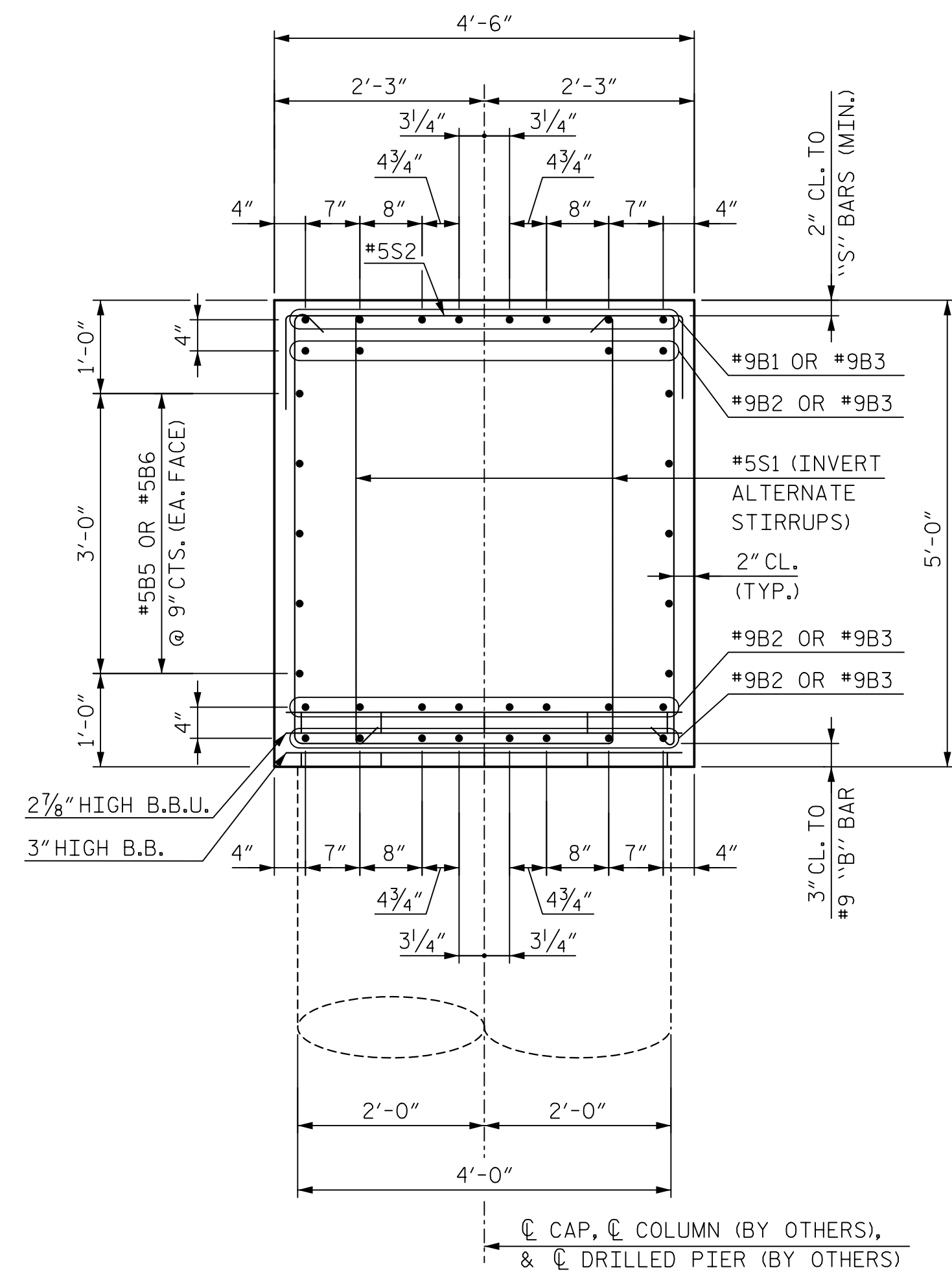
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 PIER 2



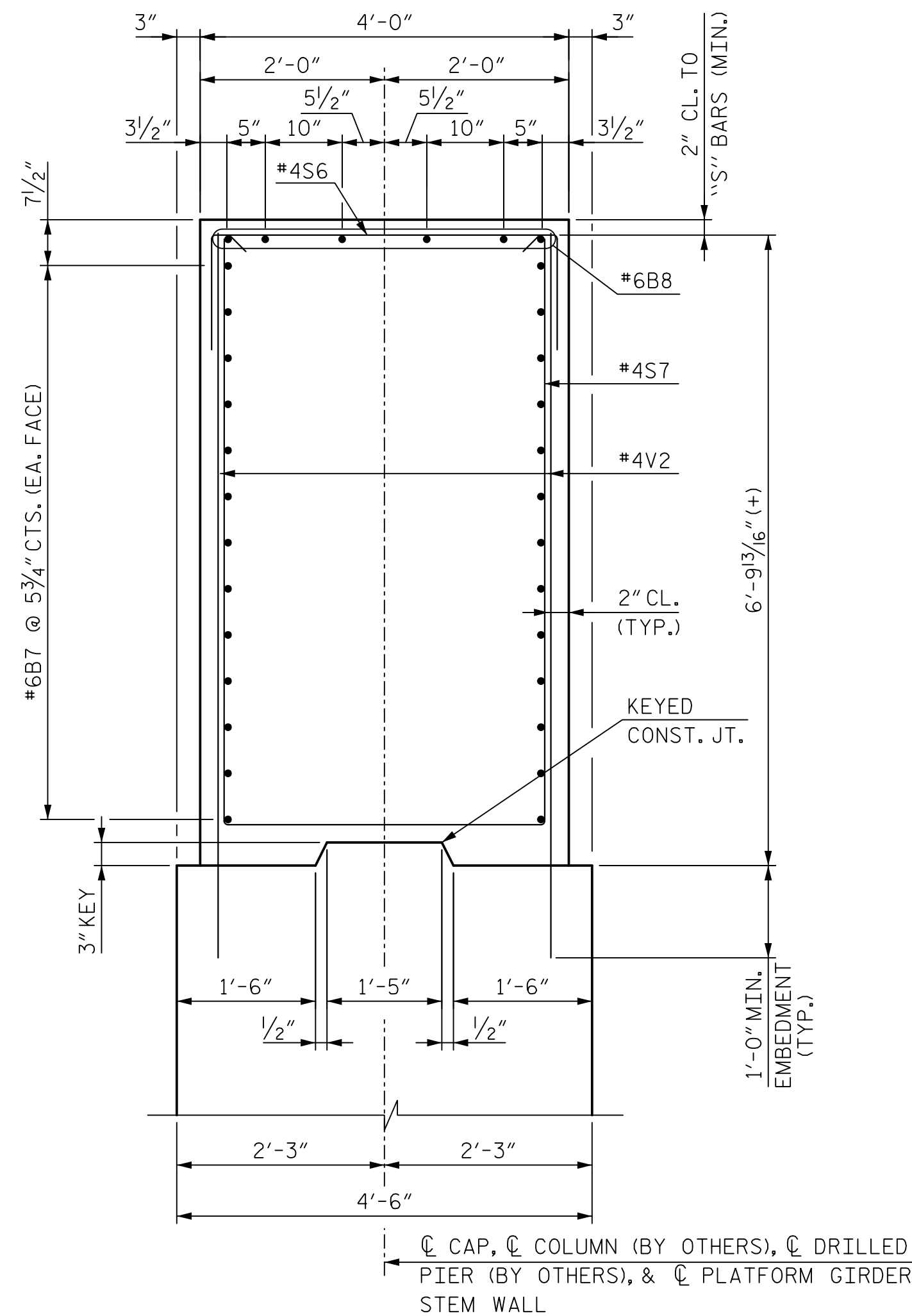
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609			
DRAWN BY: J. JEFFERS	DATE: 9/17	DWG. NO. 37			
CHECKED BY: L. RAPP	DATE: 10/17				
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
SHEET NO. S5-37					
TOTAL SHEETS 56					



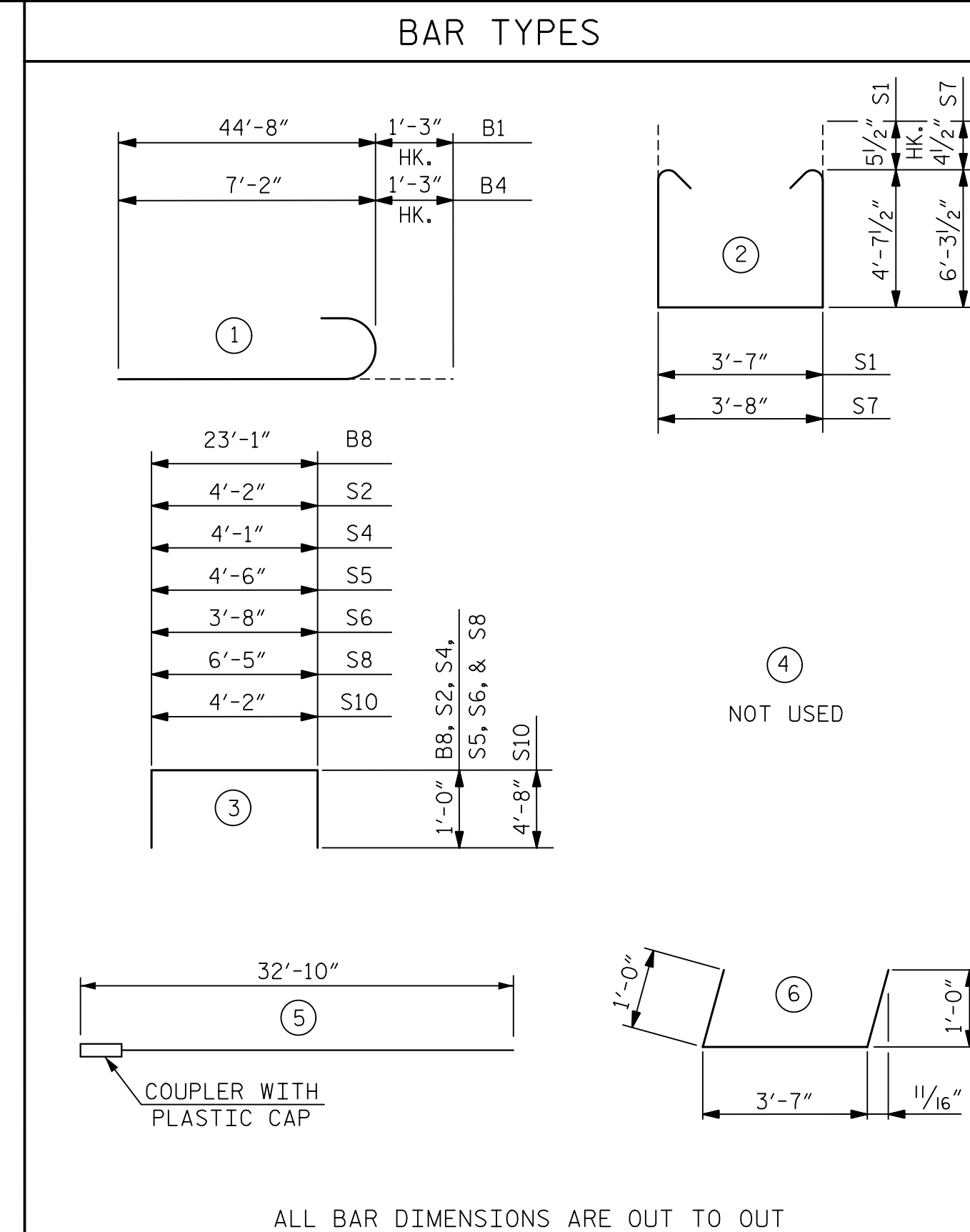
SECTION A-A

(COLUMN REINFORCING (BY OTHERS) AND #5S10 BARS NOT SHOWN FOR CLARITY)

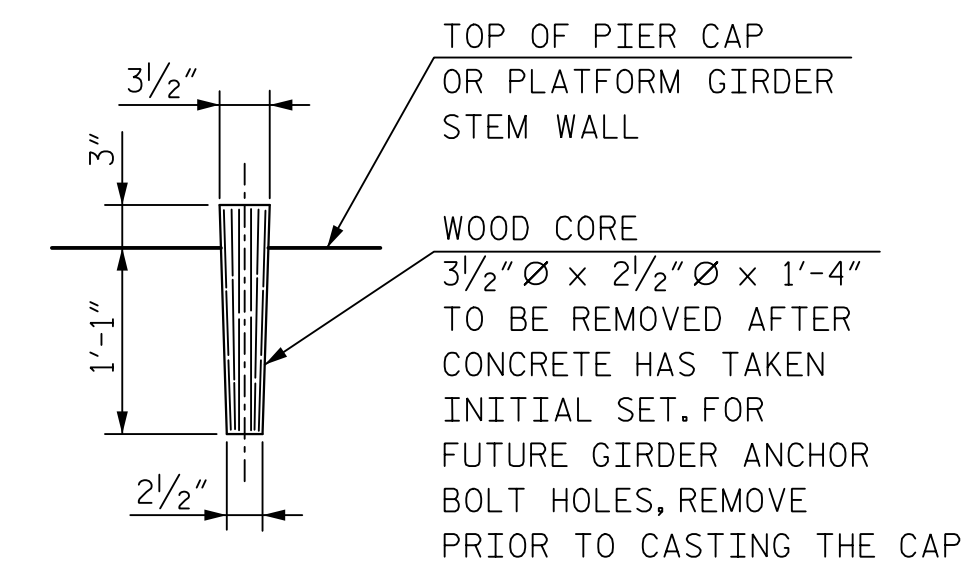


SECTION B-B

(CAP REINFORCING NOT SHOWN FOR CLARITY)



ALL BAR DIMENSIONS ARE OUT TO OUT



DETAIL OF WOOD CORE FOR ANCHOR BOLT HOLES

BILL OF REINFORCING

PIER 2

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	45'-11"	1,249
B2	20	9	STR.	44'-8"	3,037
B3	28	9	5	32'-10"	3,126
B4	8	9	1	8'-5"	229
B5	10	5	STR.	40'-6"	422
B6	10	5	5	32'-10"	342
B7	26	6	STR.	23'-1"	901
B8	6	6	3	25'-1"	226
S1	180	5	2	13'-9"	2,581
S2	139	4	3	6'-2"	573
S4	18	4	3	6'-1"	73
S5	16	4	3	6'-6"	69
S6	46	4	3	5'-8"	174
S7	46	4	2	17'-0"	522
S8	12	4	3	8'-5"	67
S9	28	4	6	5'-7"	104
S10	35	5	3	13'-6"	493
V2	92	4	STR.	7'-10"	481

QUANTITIES

ITEM	TOTAL
REINFORCING STEEL	LBS 14,669
CLASS AA CONCRETE:	
POUR 3	C.Y. 31.3
POUR 4	C.Y. 27.5
POUR 5	C.Y. 23.7
TOTAL	C.Y. 82.5

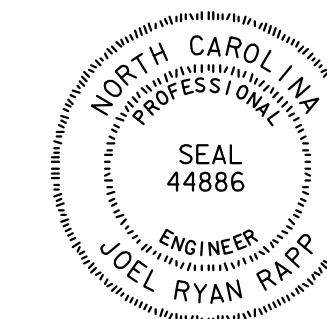
PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

PIER 2



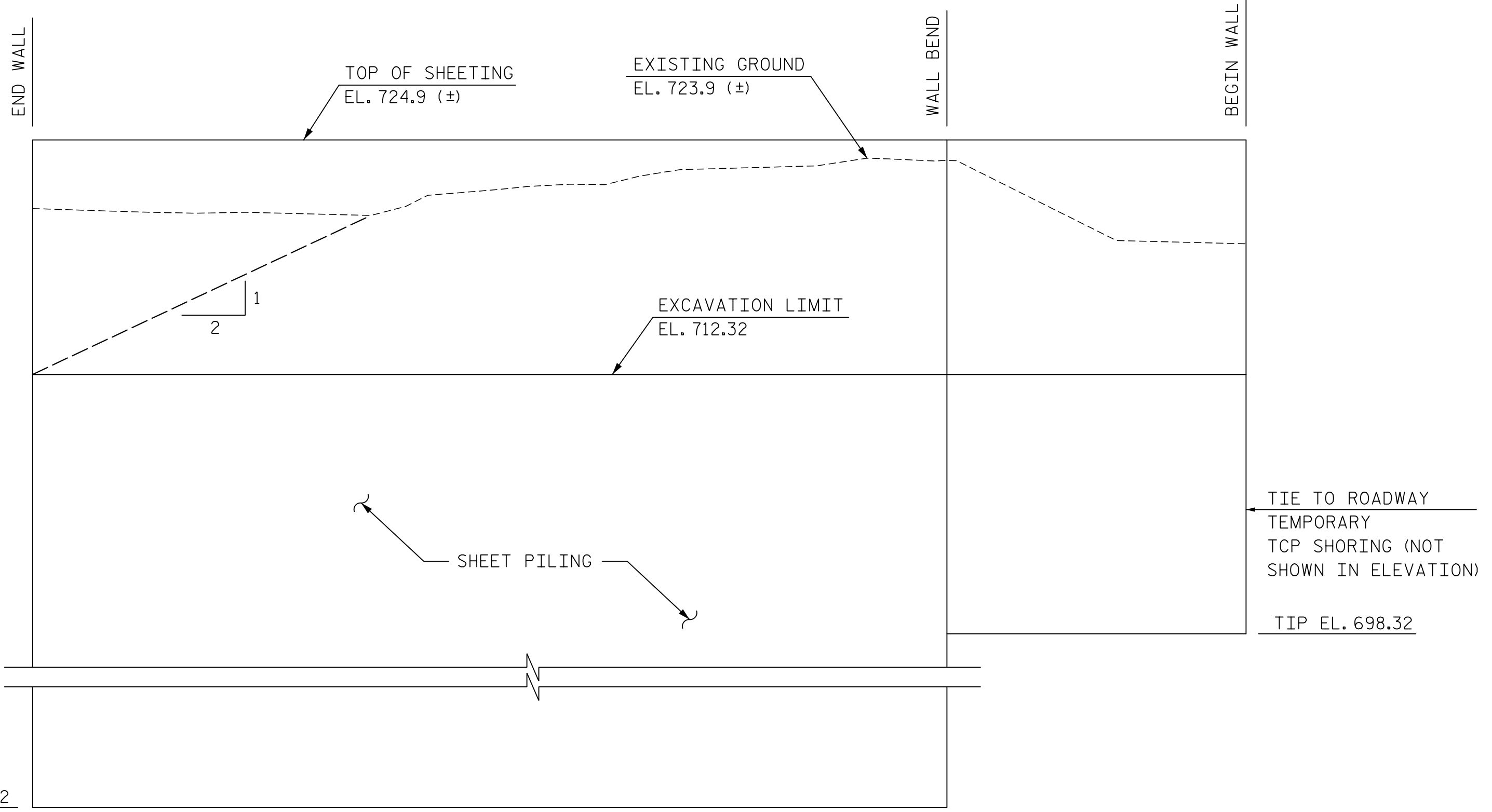
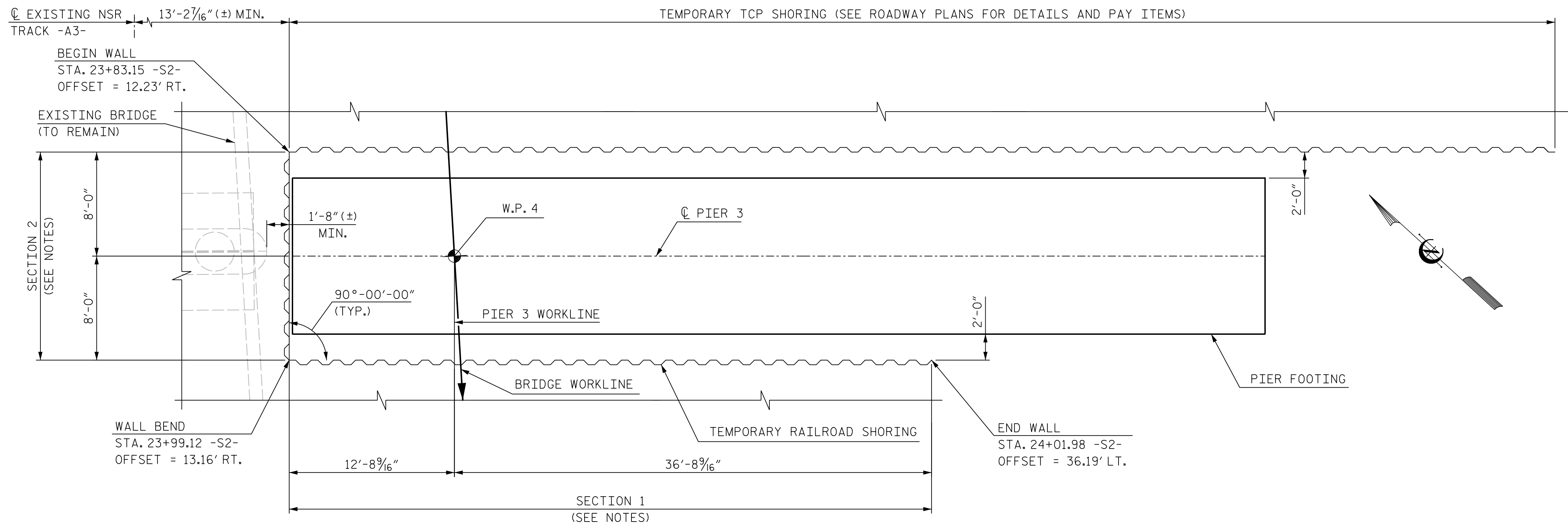
DocuSigned by:  
 55683197C228434  
 2/21/2018

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b>	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY <u>J. JEFFERS</u>	DATE <u>9/17</u>
CHECKED BY <u>L. RAPP</u>	DATE <u>10/17</u>
DWG. NO. 38	

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-38
1			3			TOTAL SHEETS
2			4			56





**NOTES:**

SHORING HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING, VOL. 2, STRUCTURES", AND "NORFOLK SOUTHERN GUIDELINES FOR DESIGN OF GRADE SEPARATION STRUCTURES, UNDERPASS GRADE SEPARATION DESIGN CRITERIA".

MAXIMUM WALL DEFLECTION LIMITED TO 1<sup>1</sup>/<sub>2</sub>".

ALL SHORING MATERIAL SHALL BE IN "LIKE NEW" CONDITION.

SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (HOT ROLLED) AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

- SECTION 1:  
 MOMENT OF INERTIA/FT. 490.5 in<sup>4</sup>  
 SECTION MODULUS/FT. 60.7 in<sup>3</sup>
- SECTION 2:  
 MOMENT OF INERTIA/FT. 184.2 in<sup>4</sup>  
 SECTION MODULUS/FT. 30.2 in<sup>3</sup>

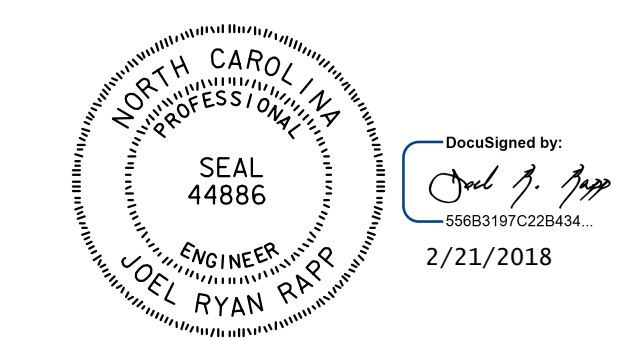
ASSUMED SOIL PARAMETERS  
 COARSE GRAINED SOILS:  
 SOIL MOIST UNIT WEIGHT - 120 PCF  
 SOIL FRICTION ANGLE - 30 DEGREES  
 UNDRAINED SHEAR STRENGTH - 0 PSF

**\* CONSTRUCTION SEQUENCE:**

1. INSTALL SHORING TO REQUIRED TIP ELEVATION.
2. EXCAVATE TO EXCAVATION LIMIT SHOWN.
3. CONSTRUCT PROPOSED PIER.
4. BACKFILL PROPOSED PIER.
5. REMOVE SHORING.

\* COMPLETE SHORING REMOVAL PRIOR TO ABUTMENT 2 EMBANKMENT CONSTRUCTION AND PILE INSTALLATION.

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-



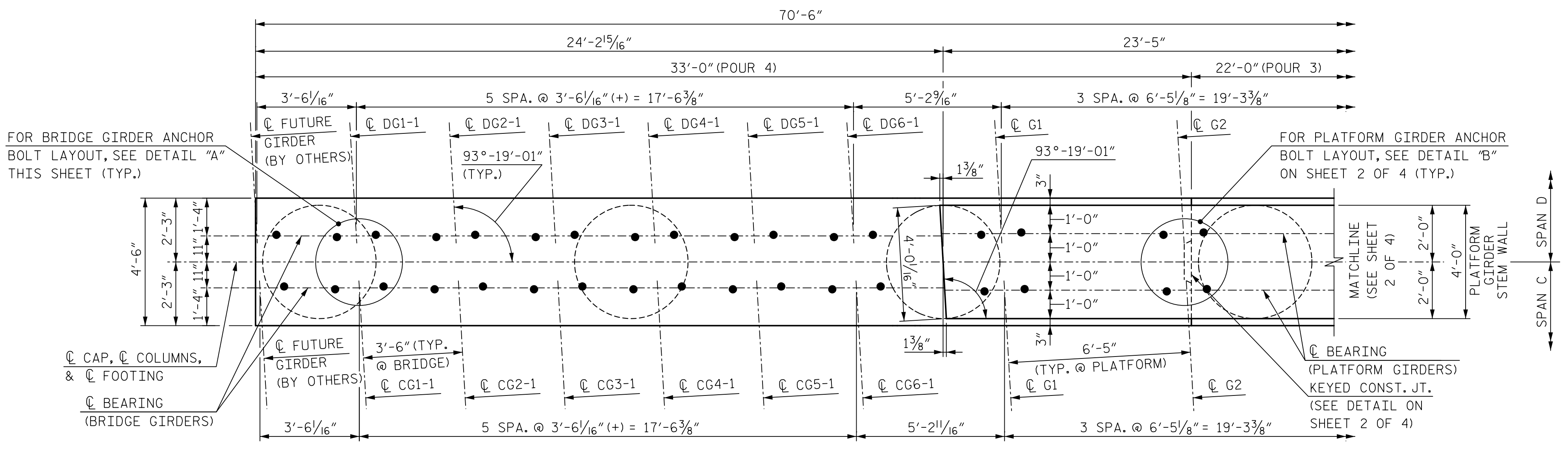
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

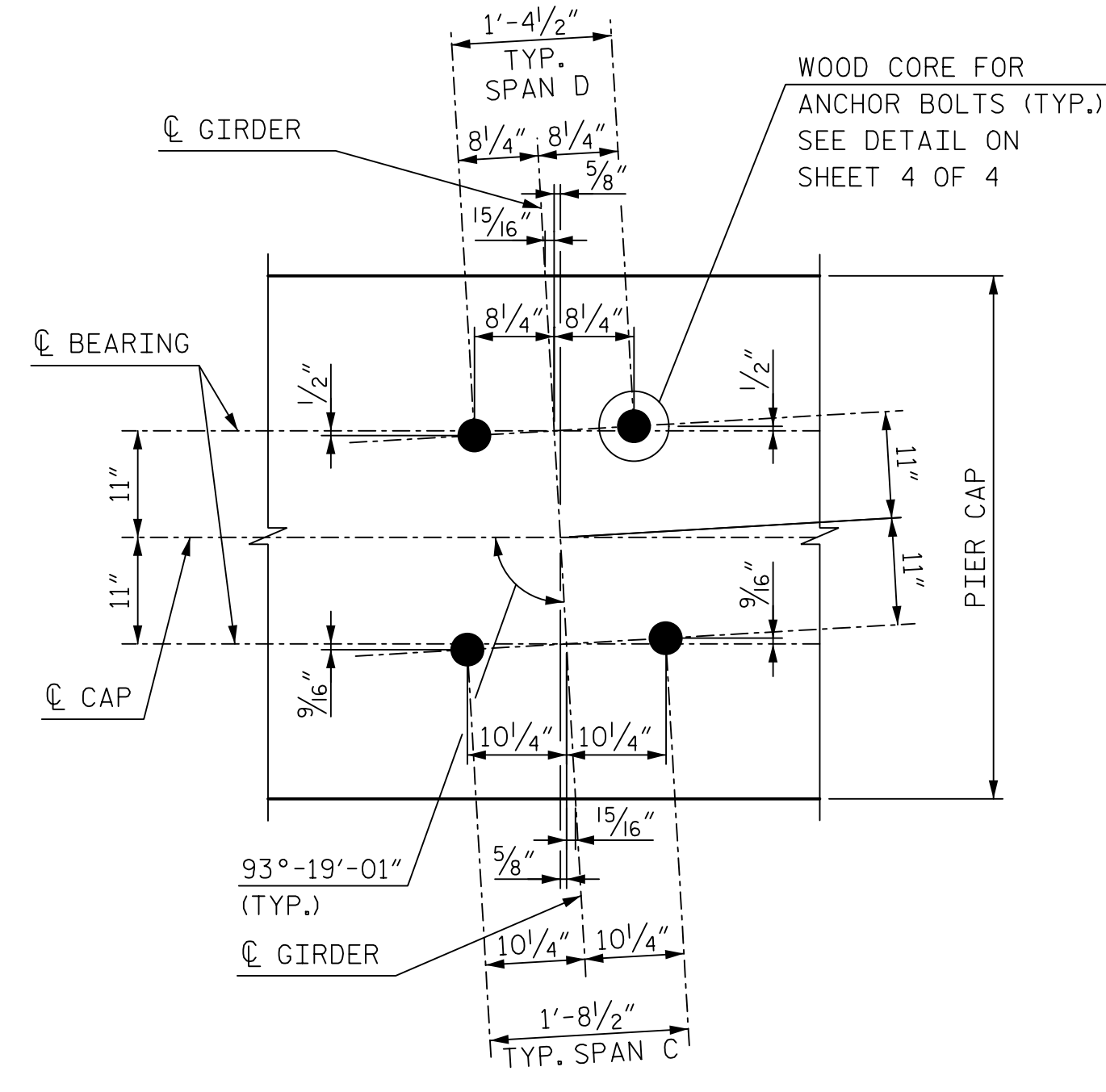
PIER 3  
 SHORING

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-39 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1		10/17	3			
DRAWN BY <u>B. VAUGHN</u> DATE <u>10/17</u> CHECKED BY <u>L. RAPP</u> DATE <u>10/17</u> DWG. NO. 39	2			4			

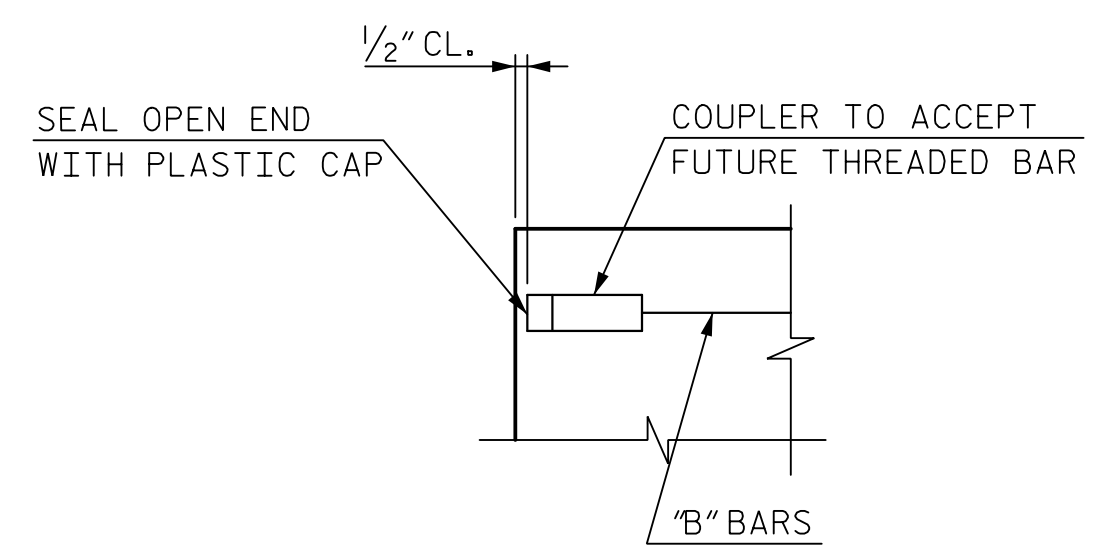


**NOTES:**

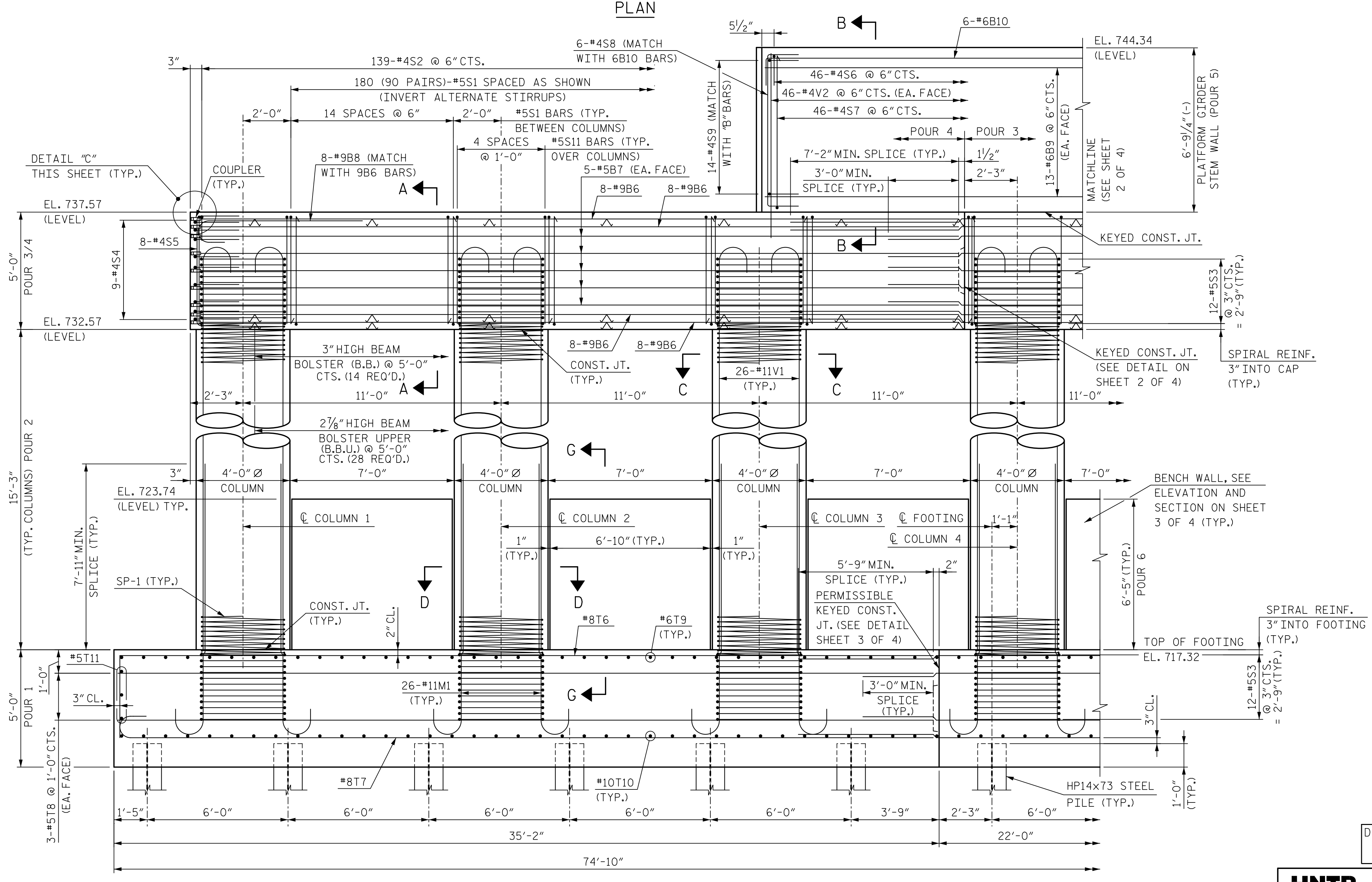
- ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO  $\text{\textcircled{C}}$  PIER UNLESS NOTED.
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" AND "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- TOP MAT OF FOOTING LONGITUDINAL AND TRANSVERSE REINFORCEMENT MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN REINFORCEMENT. DO NOT EXCEED 12" BETWEEN BARS.



**DETAIL A - BRIDGE GIRDER ANCHOR BOLT LAYOUT**



**DETAIL C**



**ELEVATION**

(BENCH WALL REINFORCEMENT NOT SHOWN FOR CLARITY)

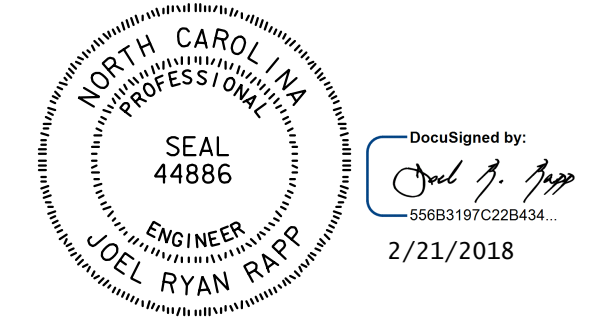
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**

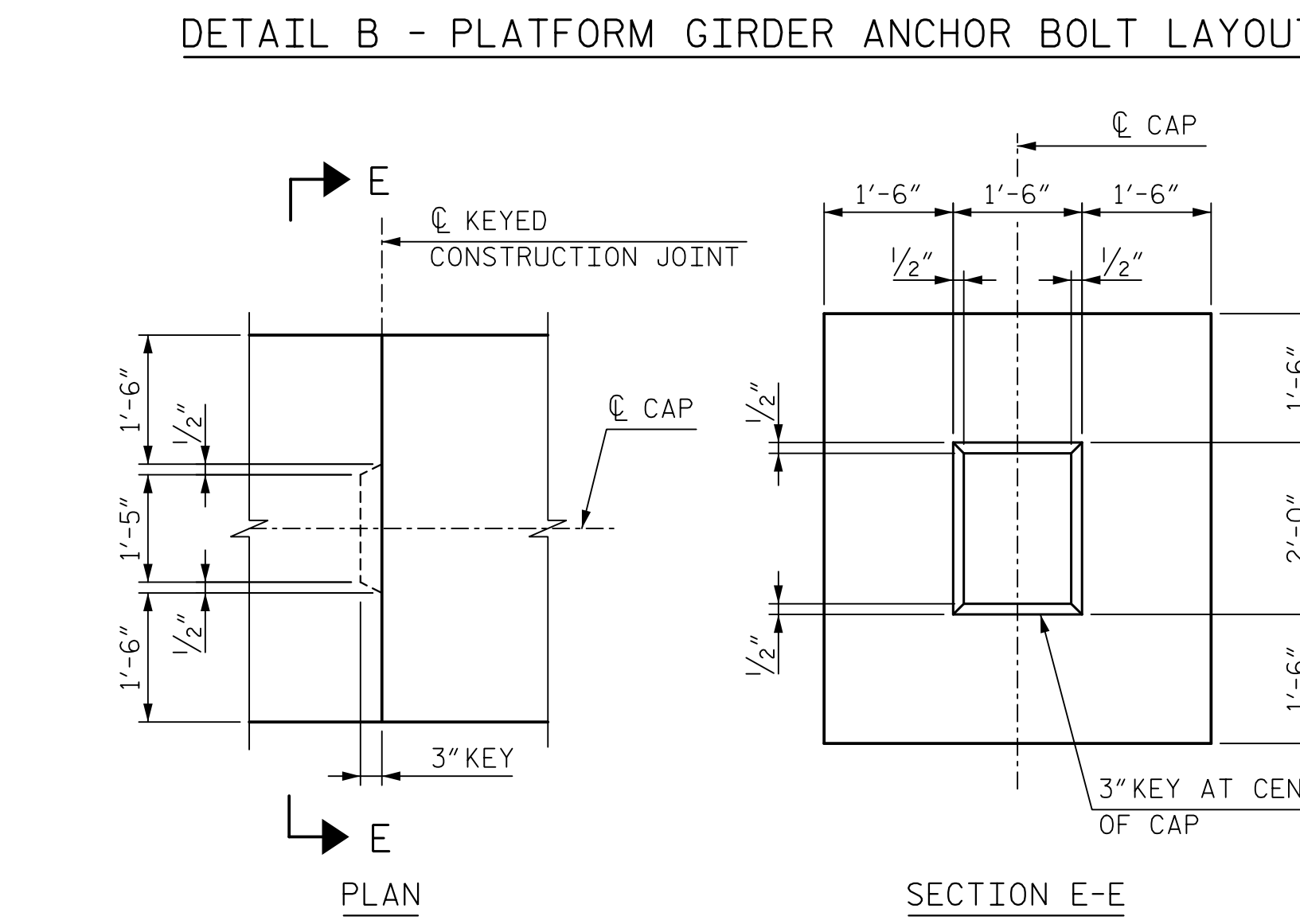
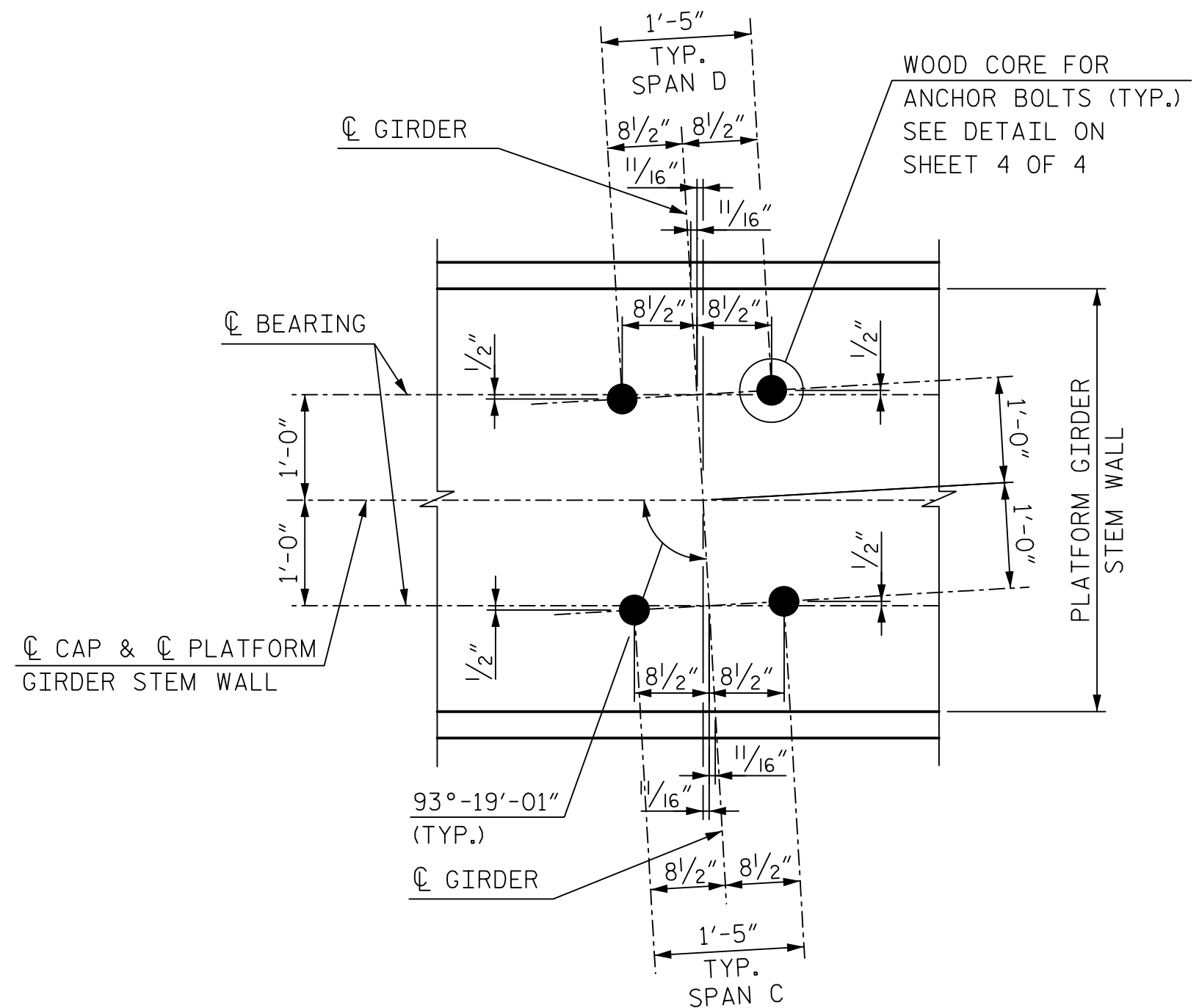
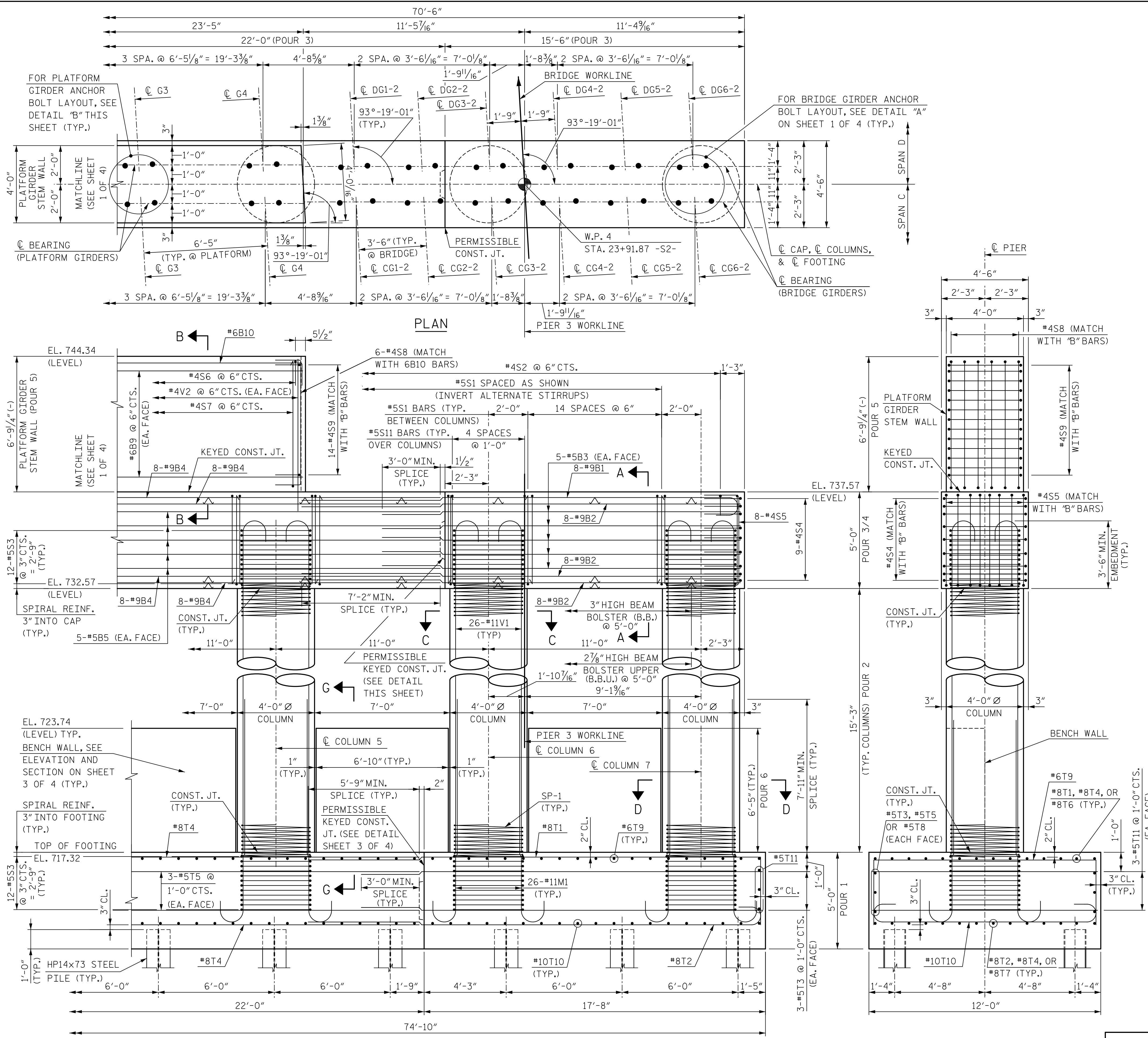
**PIER 3**



DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-40 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		9/17	3			
2		10/17	4				





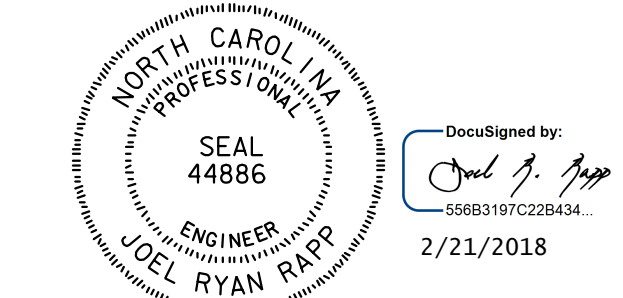
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**

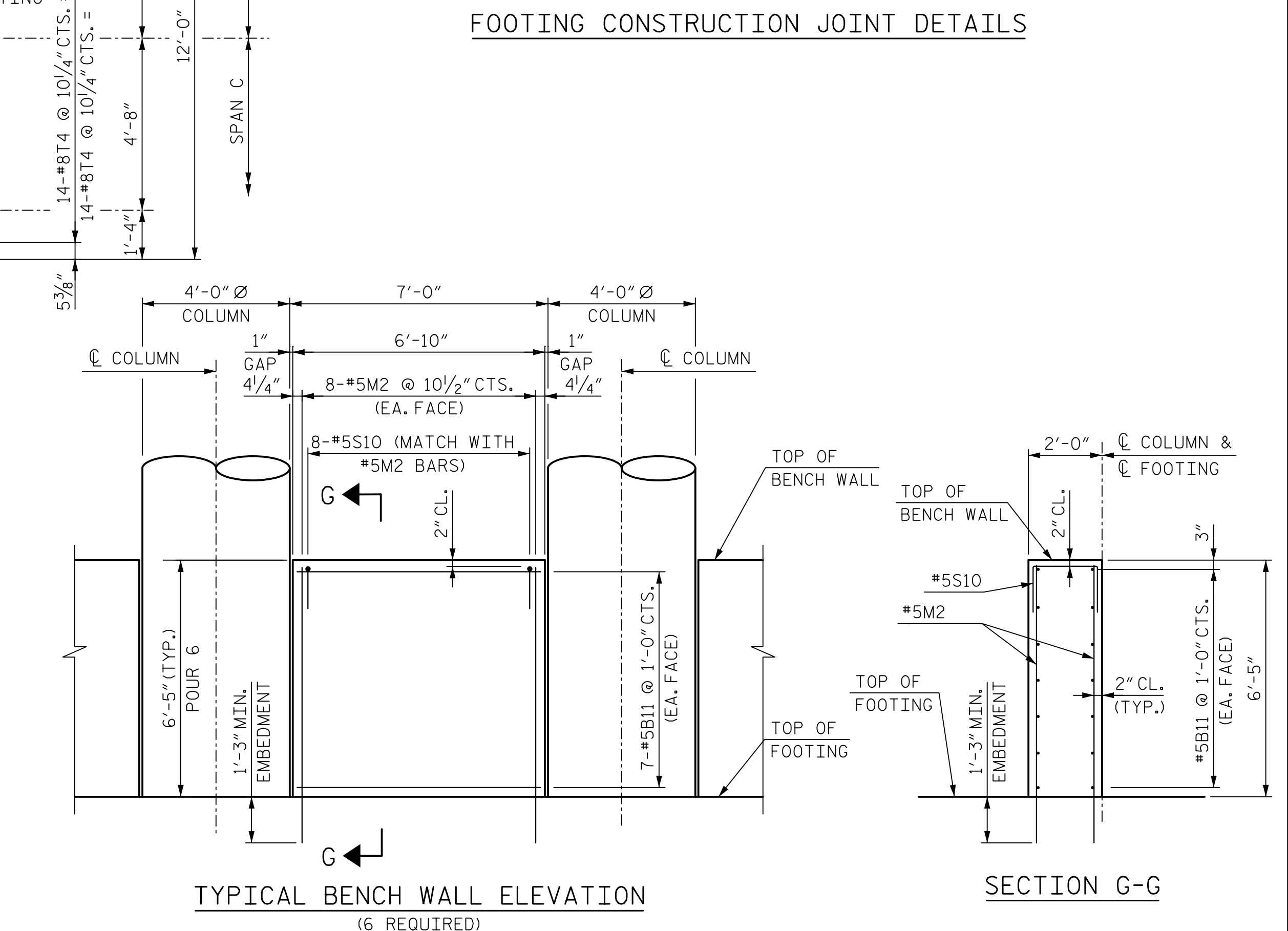
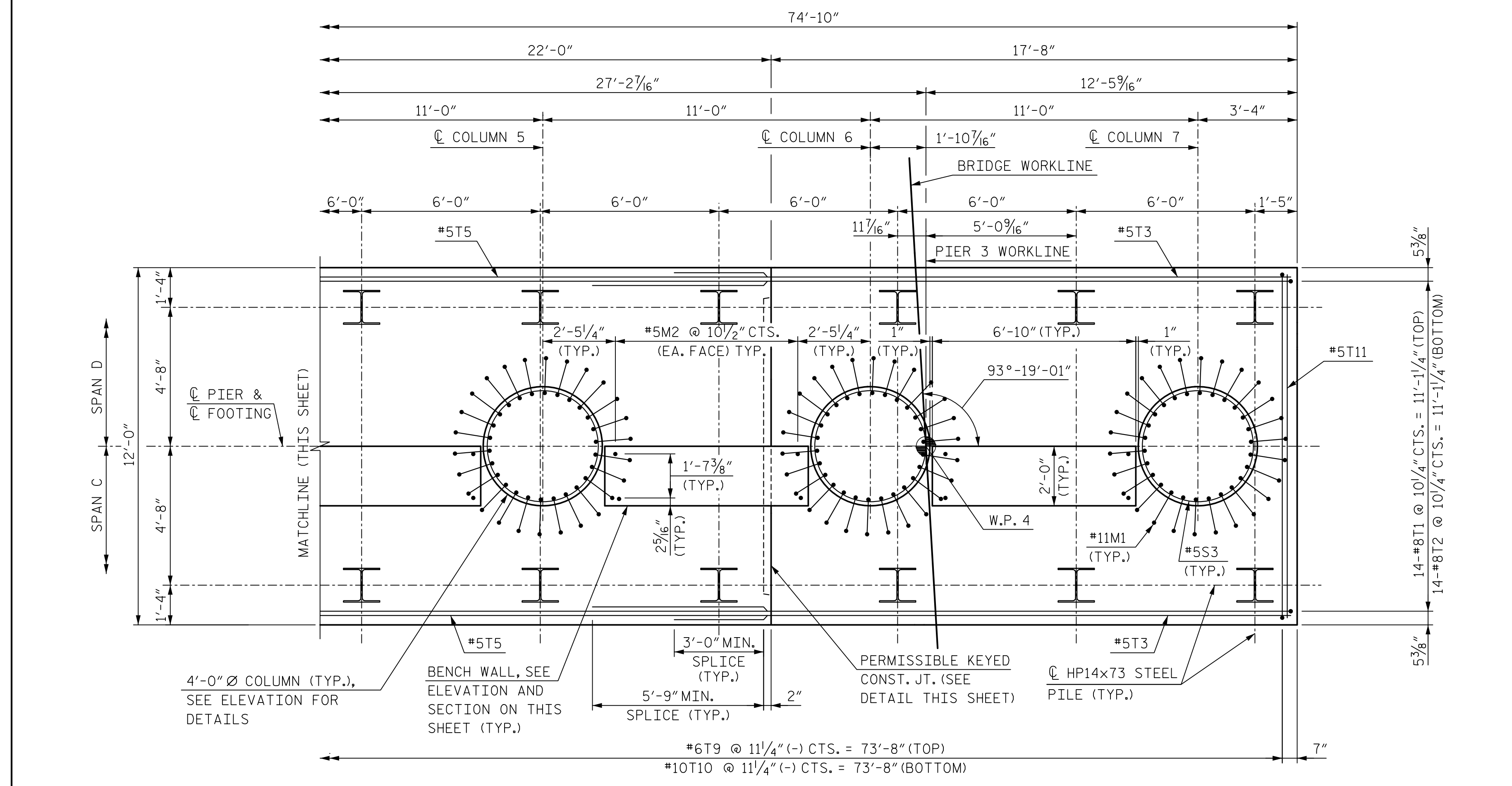
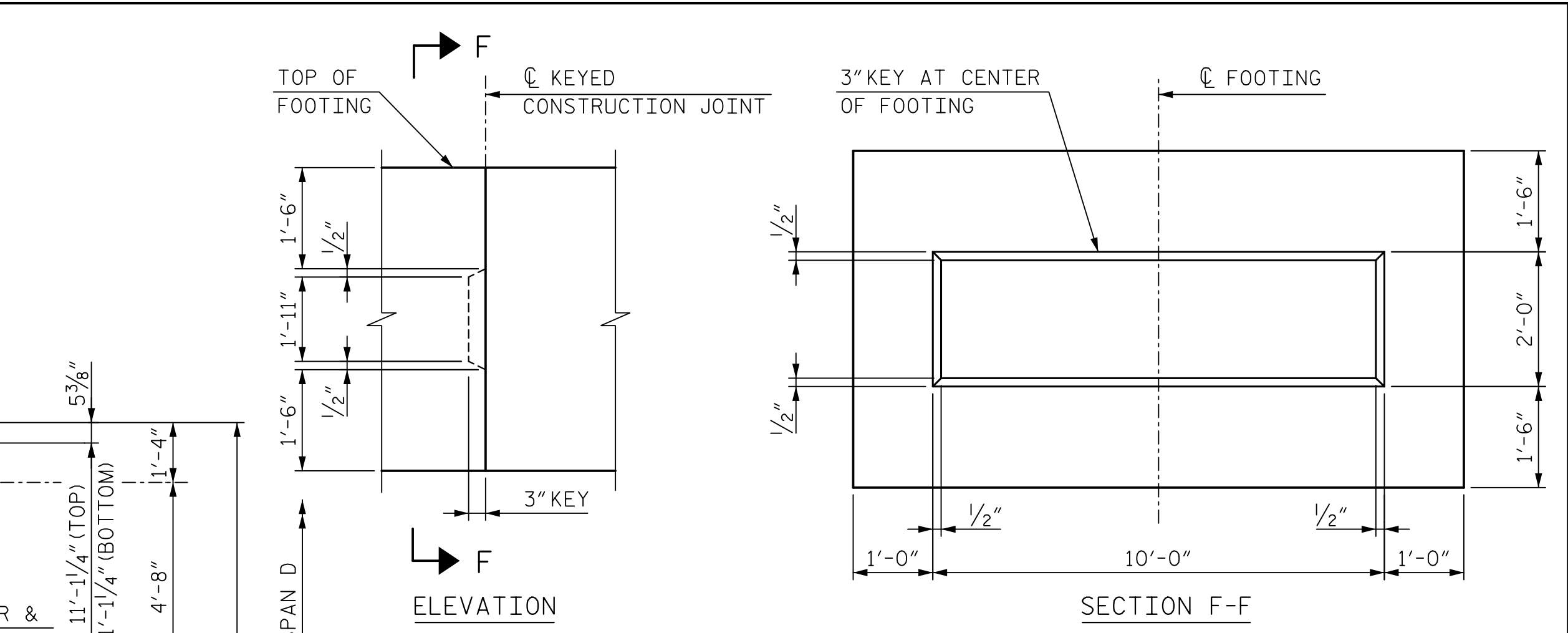
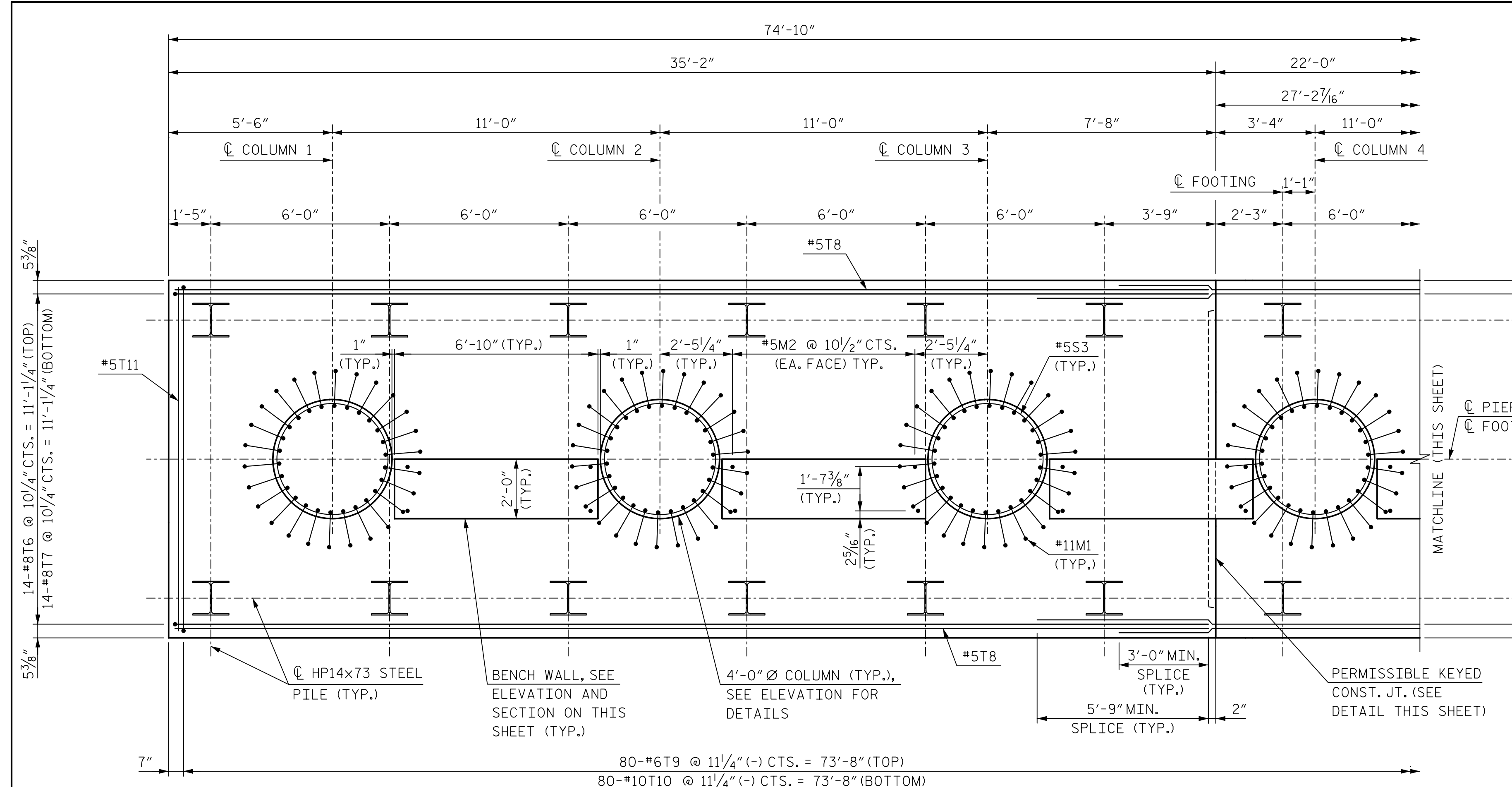
**PIER 3**



DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: <u>B. VAUGHN</u>	DATE: <u>9/17</u>	DWG. NO. <u>41</u>	
CHECKED BY: <u>L. RAPP</u>	DATE: <u>10/17</u>		
REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4

SHEET NO.	S5-41
TOTAL SHEETS	56



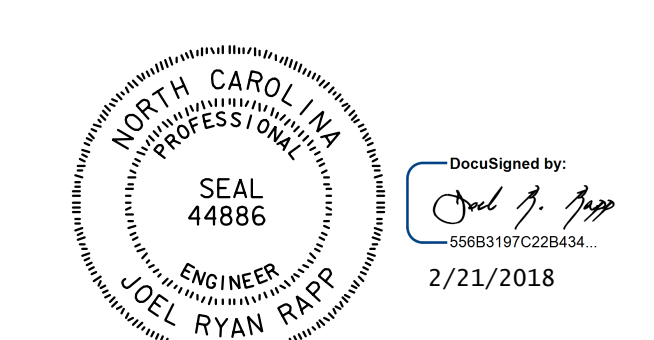
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**

**PIER 3**



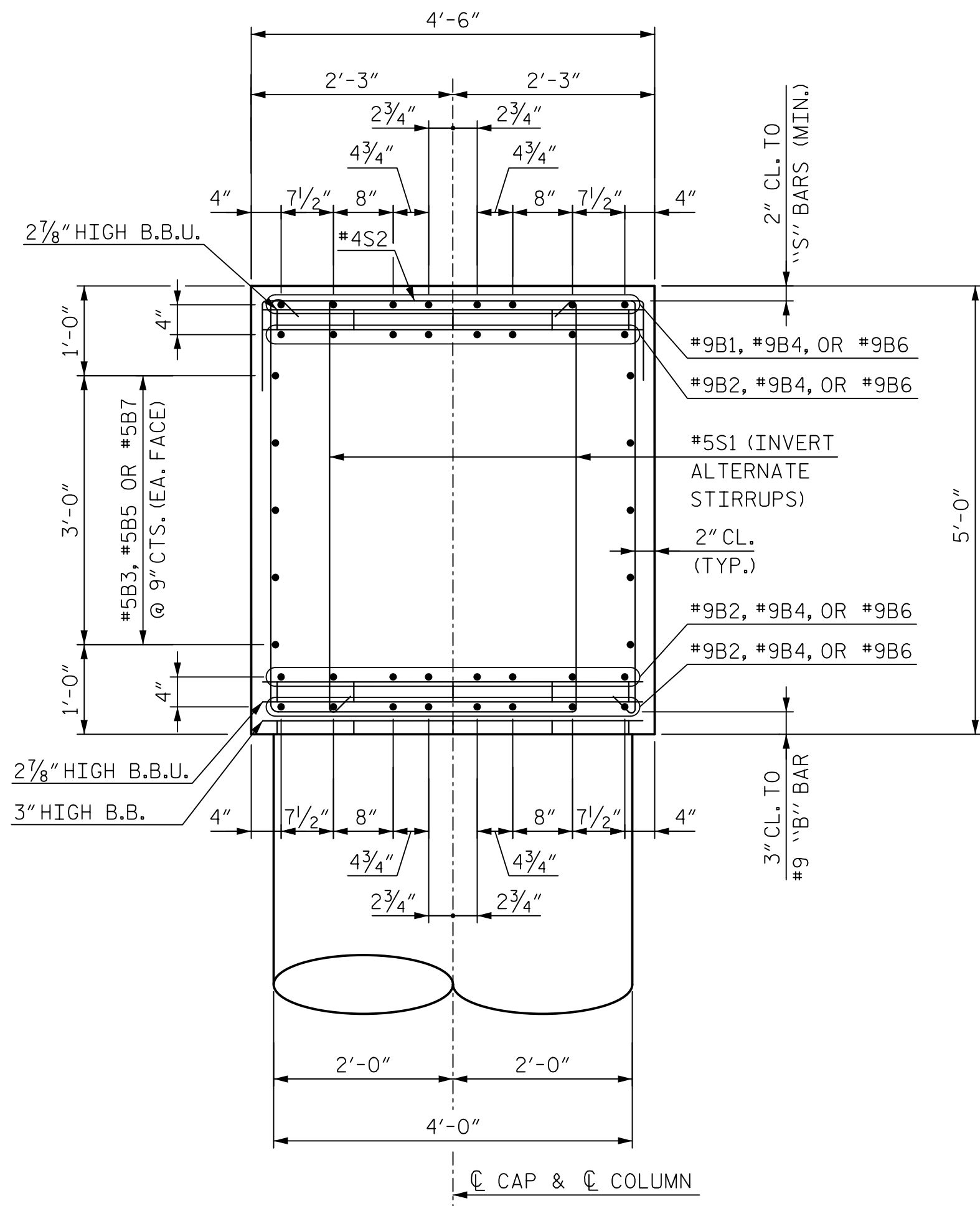
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: <u>B. VAUGHN</u>	DATE: <u>9/17</u>	DWG. NO. <u>42</u>	
CHECKED BY: <u>L. RAPP</u>	DATE: <u>10/17</u>		

REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4

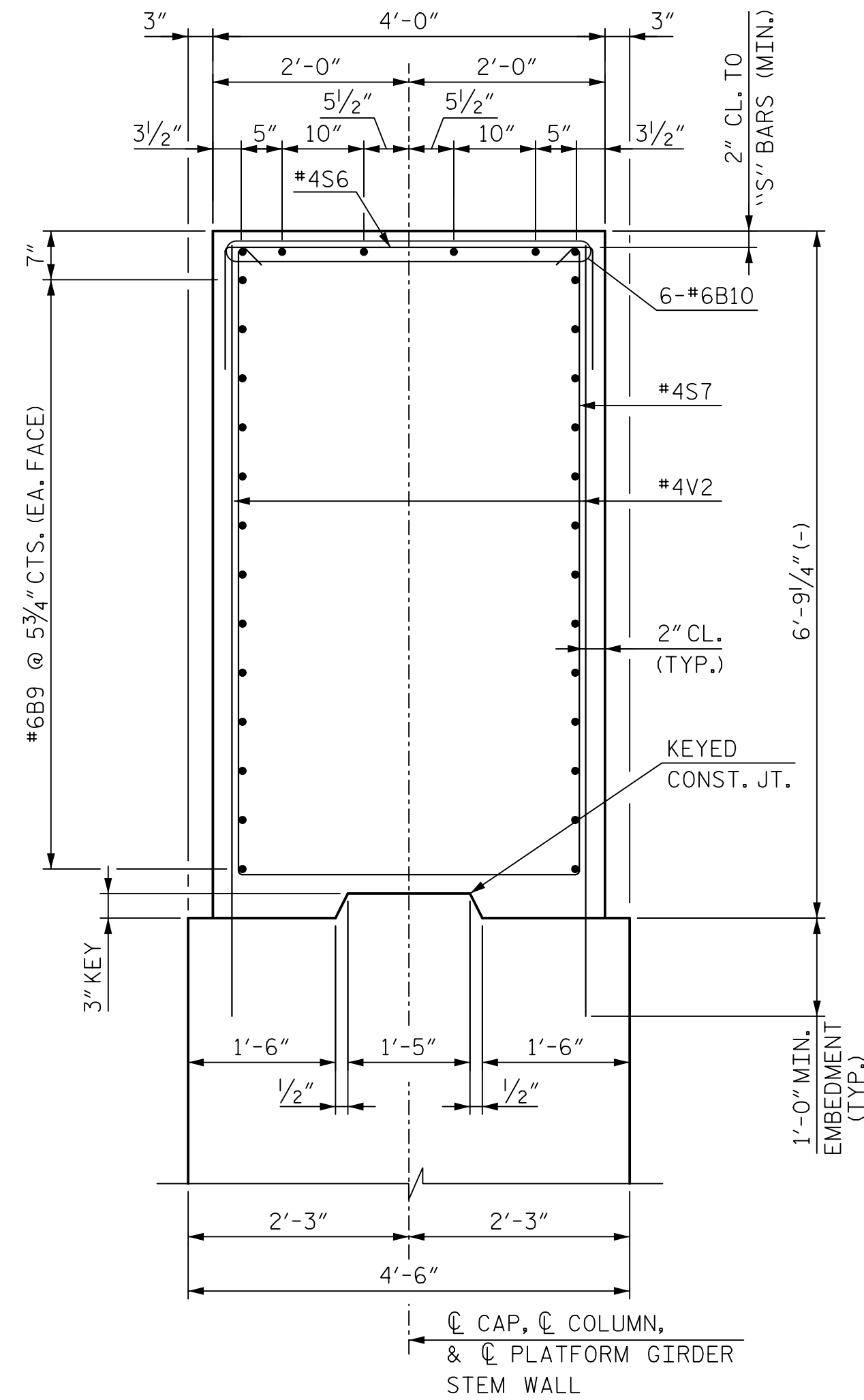
SHEET NO.	S5-42
TOTAL SHEETS	56





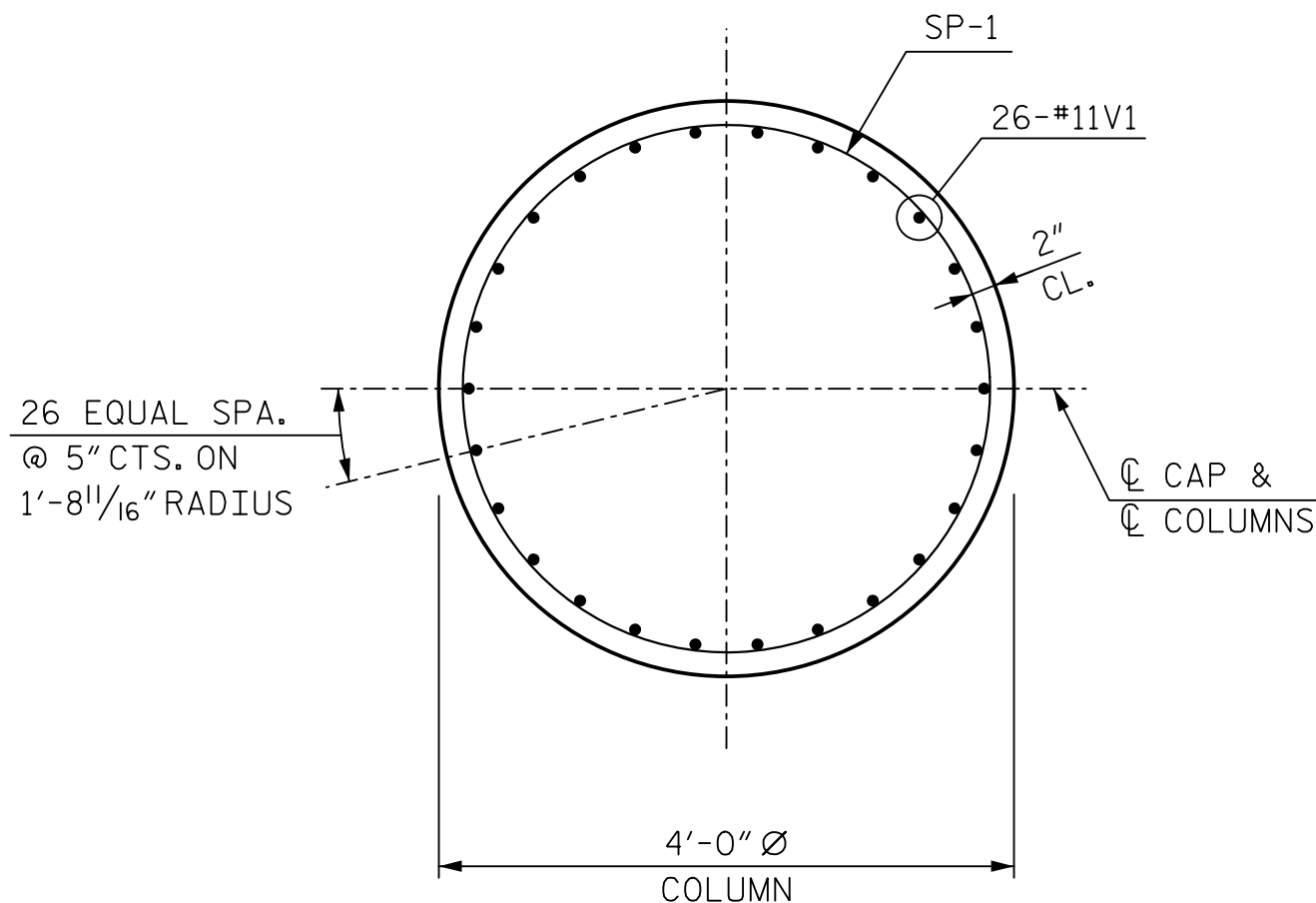
SECTION A-A

(COLUMN REINFORCING AND #5S11 BARS NOT SHOWN FOR CLARITY)

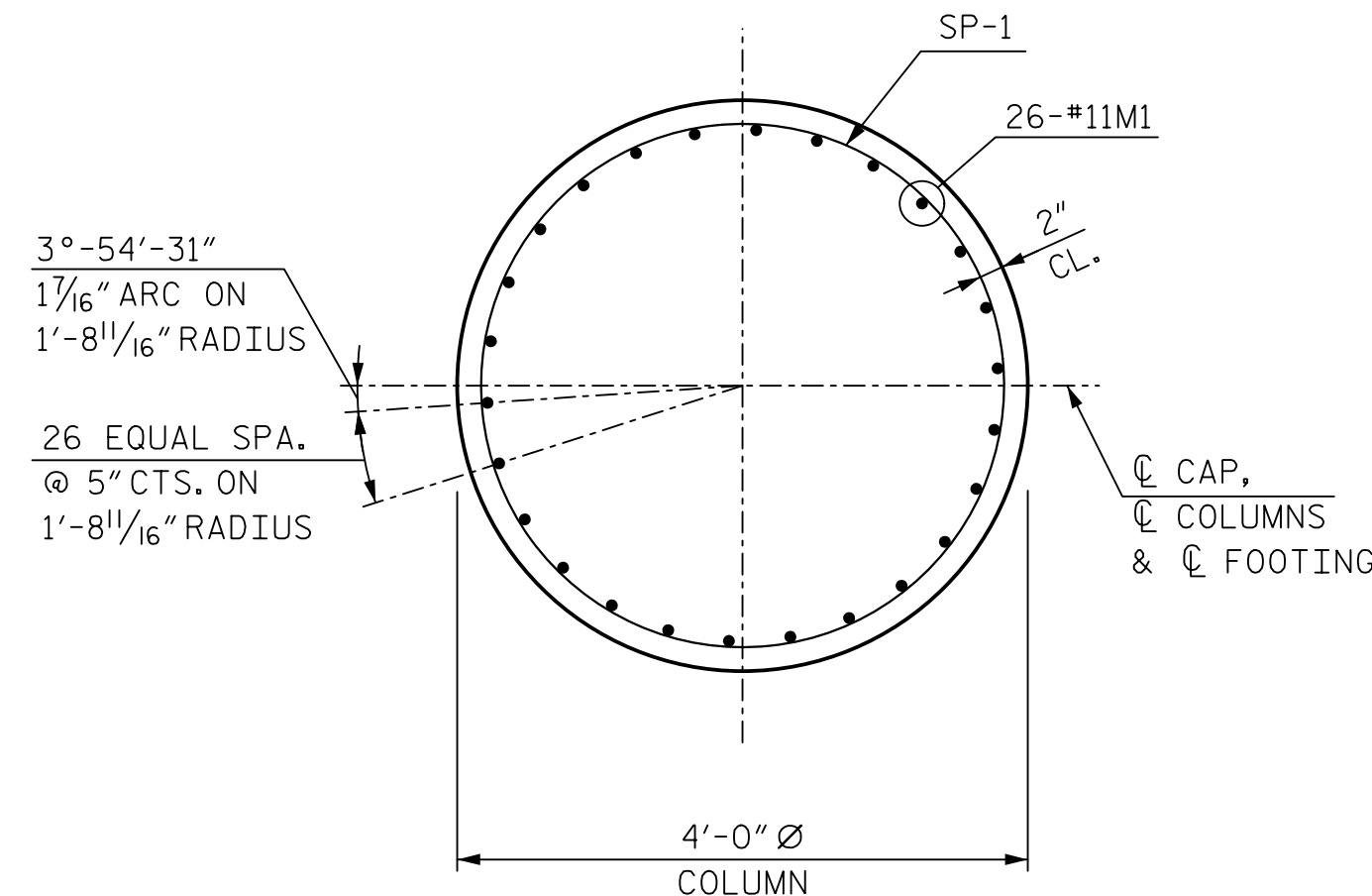


SECTION B-B

(CAP REINFORCING NOT SHOWN FOR CLARITY)



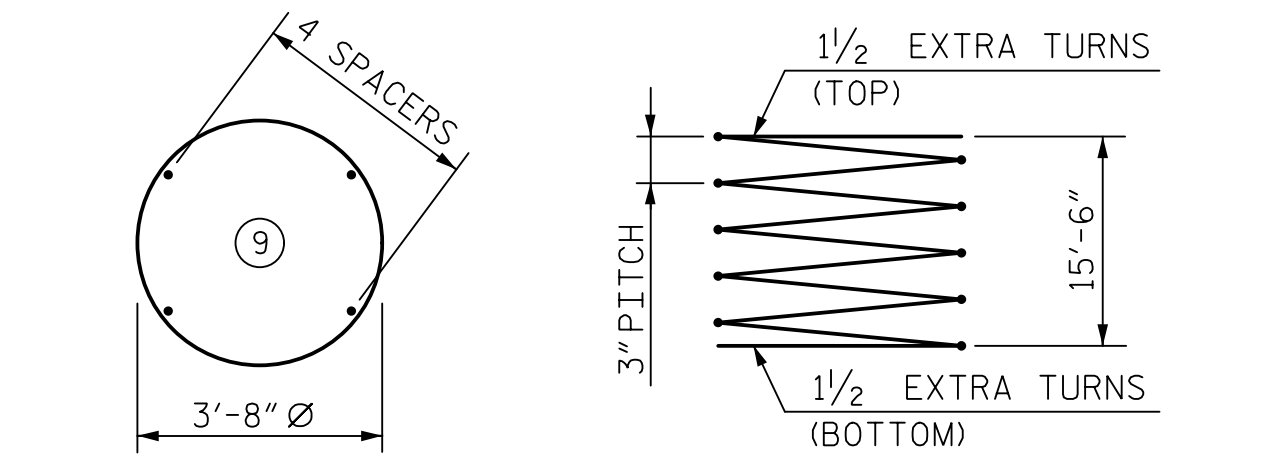
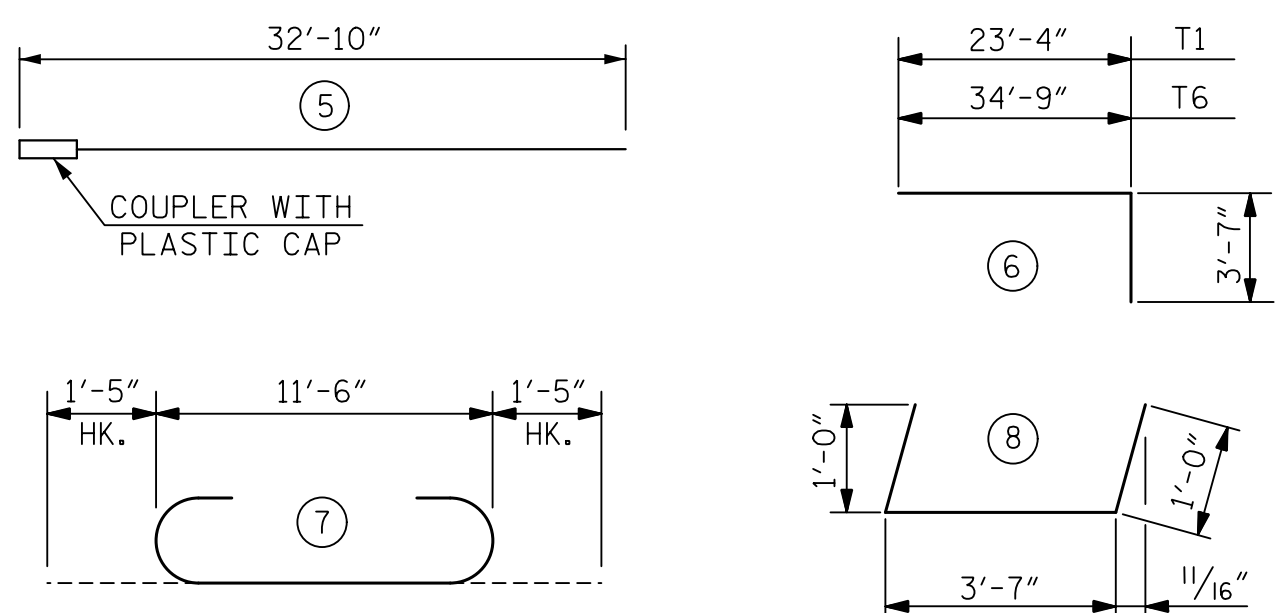
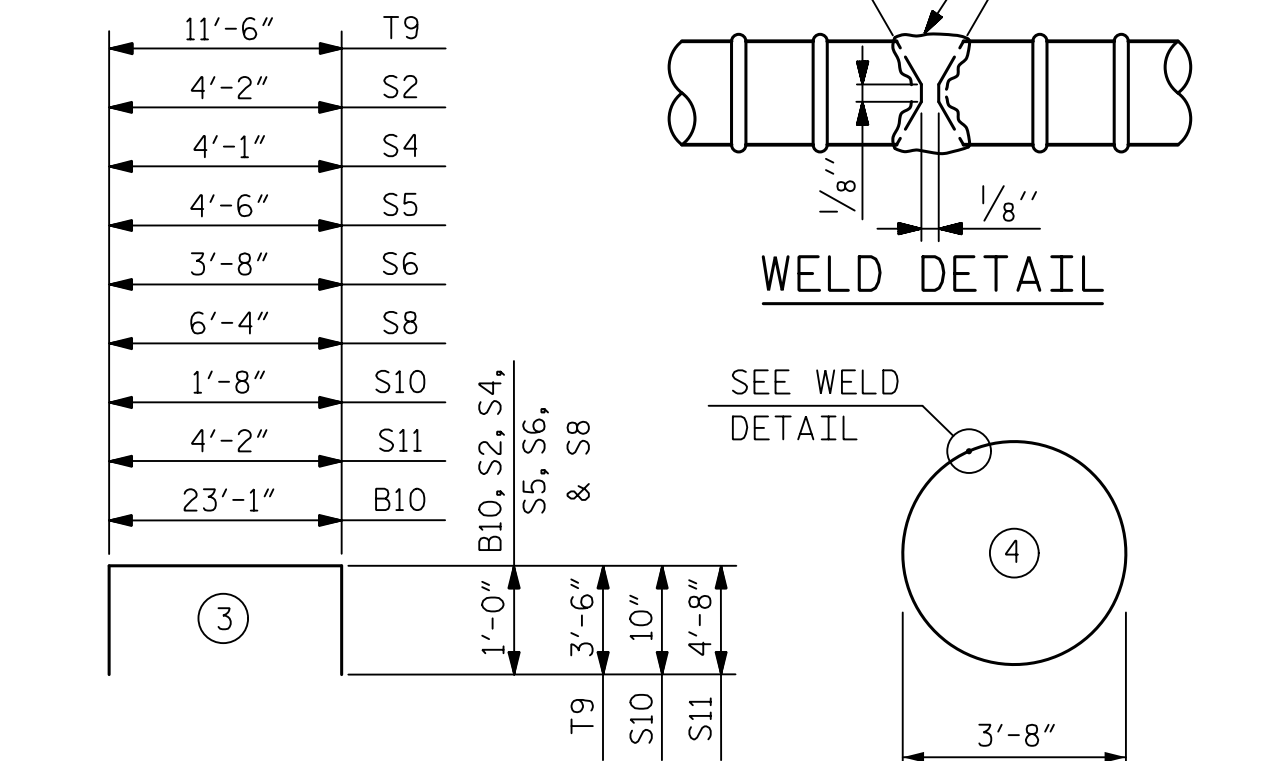
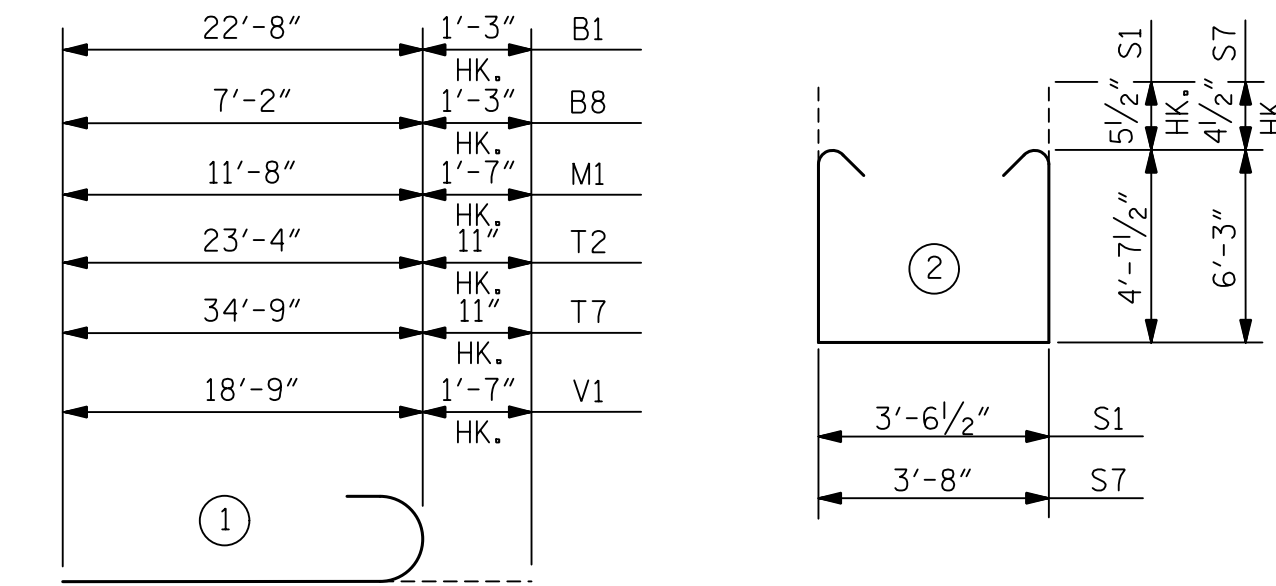
SECTION C-C



SECTION D-D

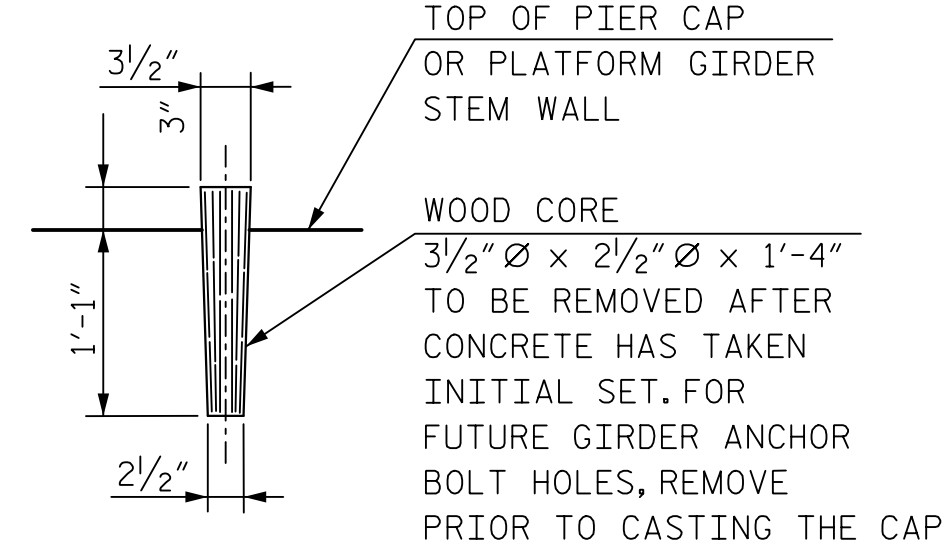
(V1 BARS NOT SHOWN FOR CLARITY)

BAR TYPES

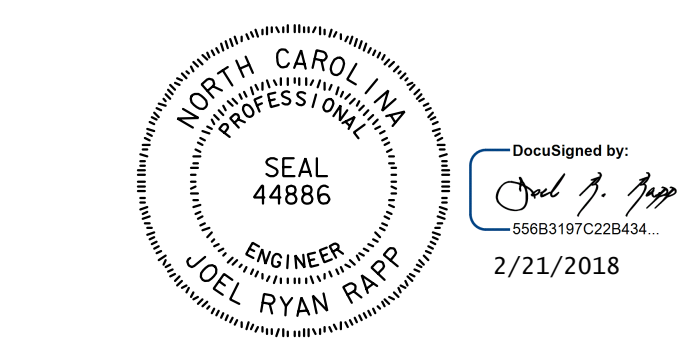


ALL BAR DIMENSIONS ARE OUT TO OUT

\* #5S3 CIRCULAR TIES SHALL BE ASTM DESIGNATION A706, GRADE 60. FABRICATION TO BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE", A.C.I. 315.80.  
 \* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.



DETAIL OF WOOD CORE FOR ANCHOR BOLT HOLES



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BILL OF REINFORCING

PIER 3					
MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	23'-11"	651
B2	24	9	STR.	22'-8"	1,850
B3	10	5	STR.	18'-6"	193
B4	32	9	STR.	29'-2"	3,173
B5	10	5	STR.	25'-0"	261
B6	32	9	5	32'-10"	3,572
B7	10	5	5	32'-10"	342
B8	8	9	1	8'-5"	229
B9	26	6	STR.	23'-1"	901
B10	6	6	3	25'-1"	226
B11	84	5	STR.	6'-4"	555
S1	180	5	2	13'-9"	2,030
S2	139	4	3	6'-2"	573
* S3	168	5	4	11'-7"	2,030
S4	18	4	3	6'-1"	73
S5	16	4	3	6'-6"	69
S6	46	4	3	5'-8"	174
S7	46	4	2	16'-11"	520
S8	12	4	3	8'-4"	67
S9	28	4	8	5'-7"	104
S10	48	5	3	3'-4"	167
S11	35	5	3	13'-6"	493
M1	182	11	1	13'-3"	12,812
M2	96	5	STR.	7'-6"	751
T1	14	8	6	26'-11"	1,006
T2	14	8	1	24'-3"	906
T3	6	5	STR.	20'-7"	129
T4	28	8	STR.	27'-9"	2,075
T5	6	5	STR.	25'-0"	156
T6	14	8	6	38'-4"	1,433
T7	14	8	1	35'-8"	1,333
T8	6	5	STR.	34'-9"	217
T9	80	6	3	18'-6"	2,223
T10	80	10	7	14'-4"	4,934
T11	6	5	STR.	11'-6"	72
V1	182	11	1	20'-4"	19,662
V2	92	4	STR.	7'-10"	481
SP-1	7	**	9	748'-10"	5,467

QUANTITIES

ITEM	TOTAL
REINFORCING STEEL	LBS 66,994
SPIRAL COLUMN REINFORCING STEEL	LBS 5,467
CLASS AA CONCRETE:	
POUR 1	C.Y. 166.3
POUR 2	C.Y. 49.7
POUR 3	C.Y. 31.3
POUR 4	C.Y. 27.5
POUR 5	C.Y. 23.5
POUR 6	C.Y. 19.5
TOTAL	C.Y. 317.8
HP14x73 STEEL PILES	NO. 26 L.F. 1,300

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 4 OF 4

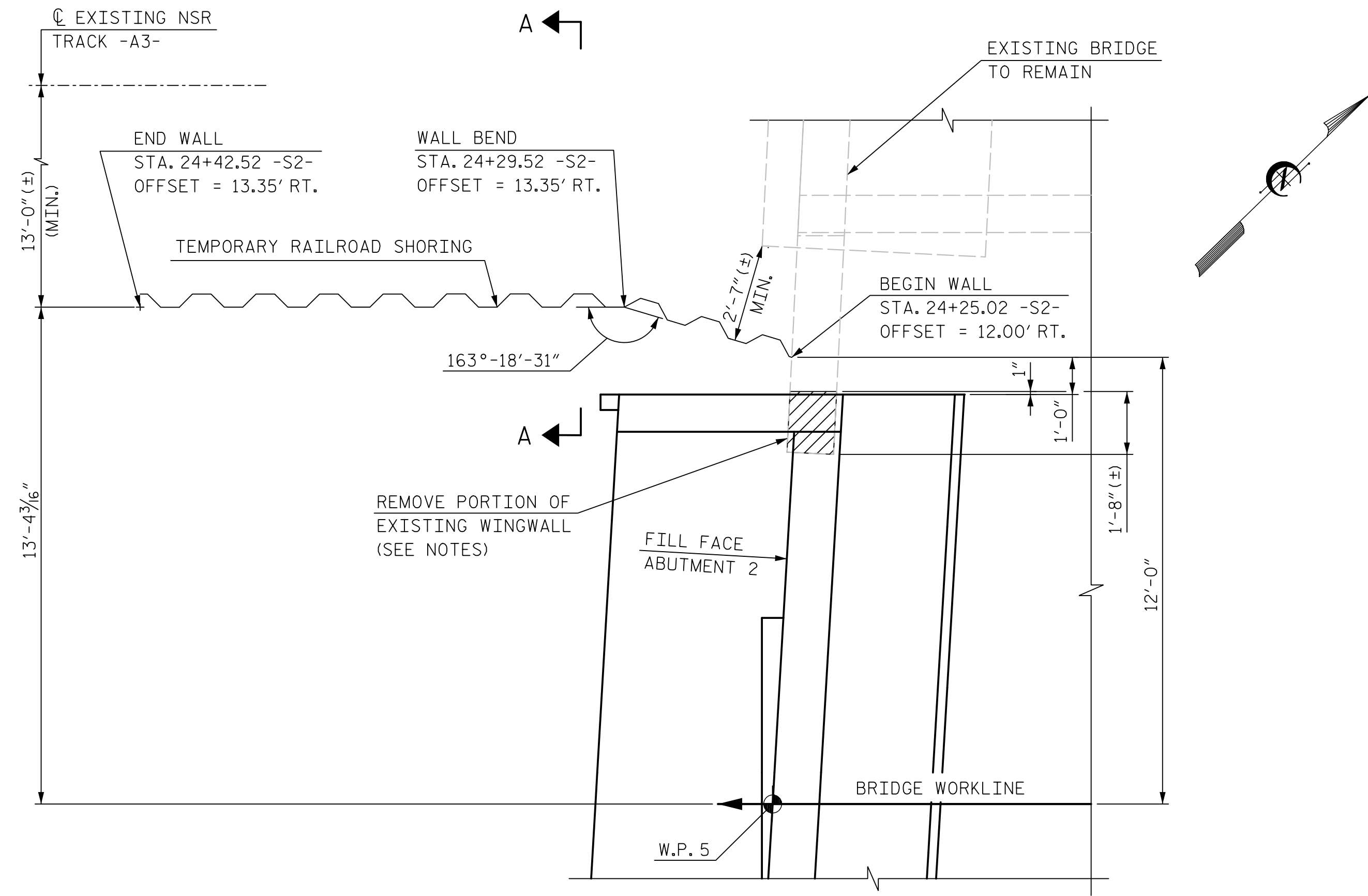
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 PIER 3

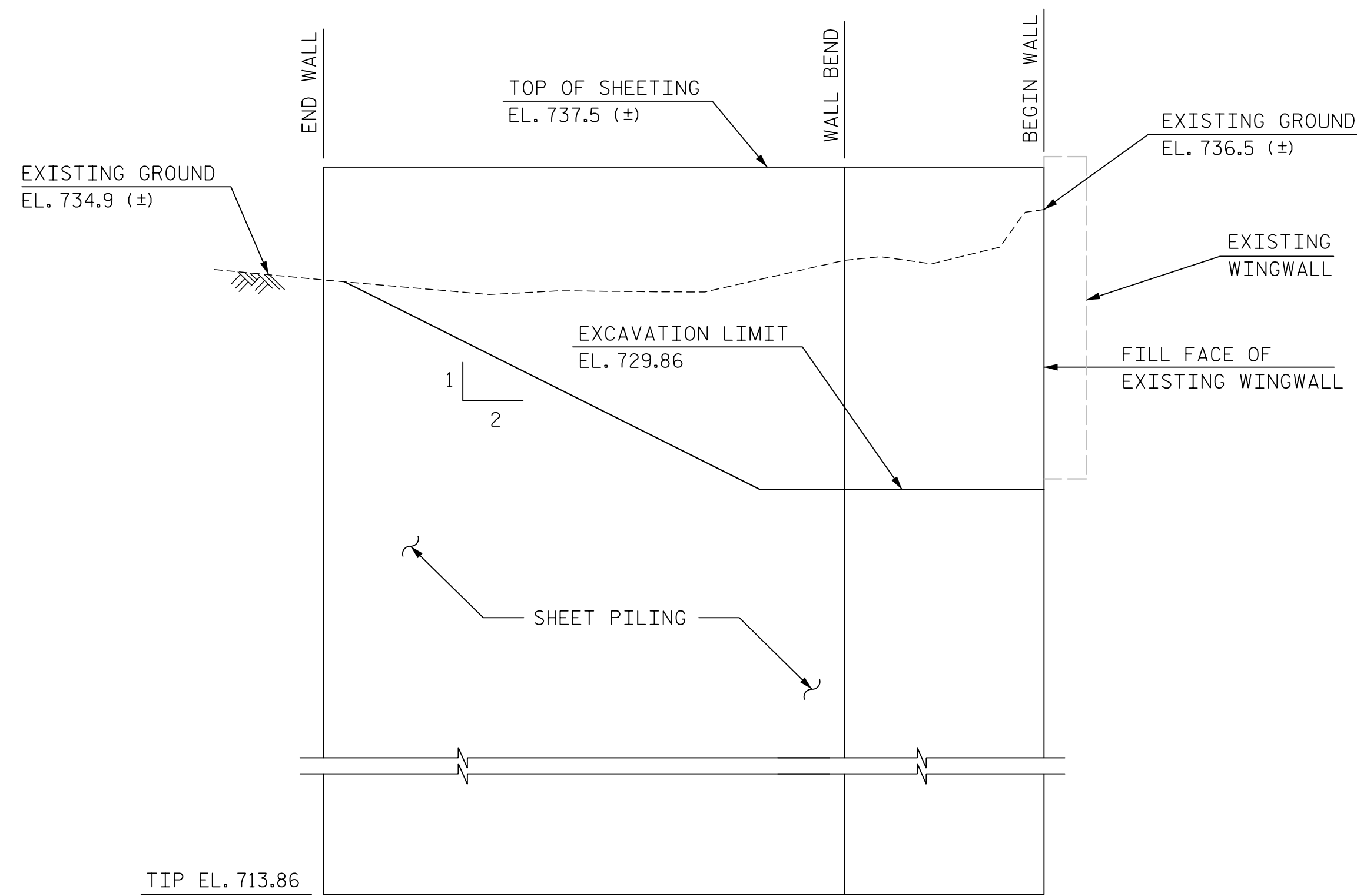
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-43
1		9/17	3			TOTAL SHEETS
2		10/17	4			56

HNTB HNTB NORTH CAROLINA, P.C.  
 NC License No. C-1554  
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY B. VAUGHN DATE 9/17 DWG. NO. 43  
 CHECKED BY L. RAPP DATE 10/17



TEMPORARY SHORING PLAN



TEMPORARY SHORING ELEVATION  
(LOOKING NORTH TOWARDS EXISTING TRACK)

**NOTES:**

SHORING HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 EDITION OF AREMA'S "MANUAL FOR RAILWAY ENGINEERING, VOL. 2, STRUCTURES", AND "NORFOLK SOUTHERN GUIDELINES FOR DESIGN OF GRADE SEPARATION STRUCTURES, UNDERPASS GRADE SEPARATION DESIGN CRITERIA."

MAXIMUM WALL DEFLECTION LIMITED TO 3/8".

ALL SHORING MATERIAL SHALL BE IN "LIKE NEW" CONDITION.

SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (HOT ROLLED) AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

MOMENT OF INERTIA/FT. 490.85 in<sup>4</sup>  
SECTION MODULUS/FT. 60.7 in<sup>3</sup>

**ASSUMED SOIL PARAMETERS**

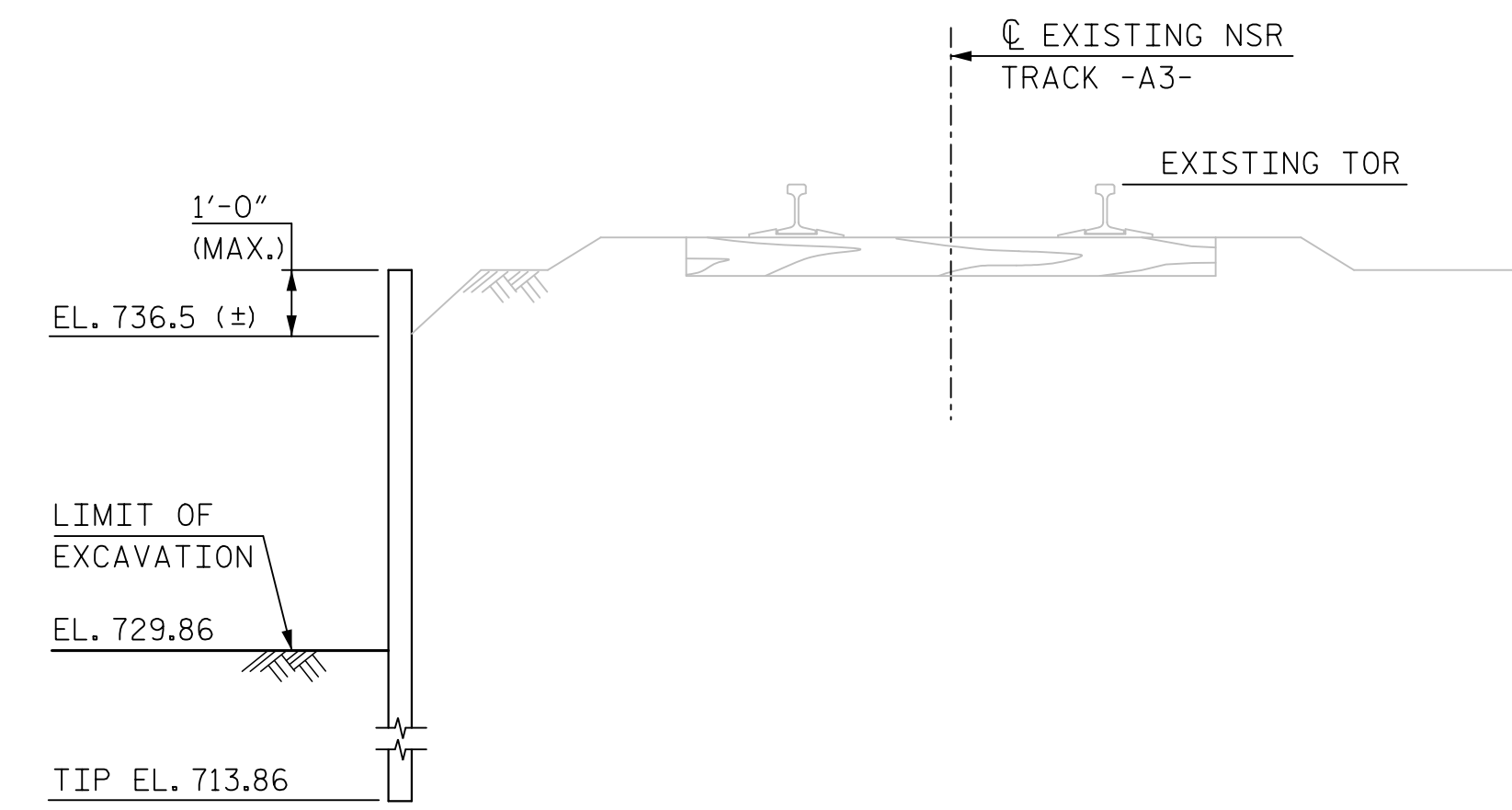
COARSE GRAINED SOILS:  
SOIL MOIST UNIT WEIGHT - 120 PCF  
SOIL FRICTION ANGLE - 30 DEGREES  
UNDRAINED SHEAR STRENGTH - 0 PSF

EXISTING WINGWALL TO BE PARTIALLY REMOVED IN ACCORDANCE WITH SECTION 402 OF THE STANDARD SPECIFICATIONS.

REBAR IN THE PORTION OF THE EXISTING WINGWALL TO REMAIN SHALL BE CUT BACK TO A MINIMUM DEPTH OF 1" BELOW CONCRETE SURFACE AND PATCHED WITH AN EPOXY COMPOUND.

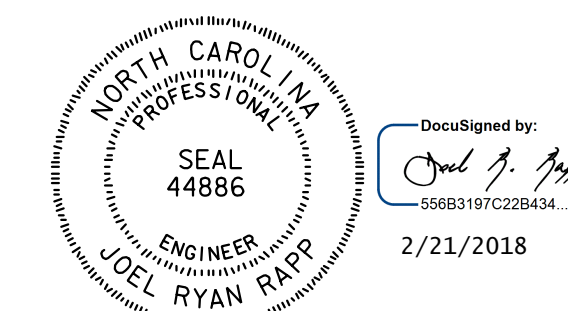
**CONSTRUCTION SEQUENCE:**

1. INSTALL SHORING TO REQUIRED TIP ELEVATION.
2. REMOVE EXISTING WINGWALL TO LIMITS SHOWN.
3. CONSTRUCT PROPOSED ABUTMENT.
4. BACKFILL PROPOSED ABUTMENT.
5. REMOVE SHORING.



SECTION A-A

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

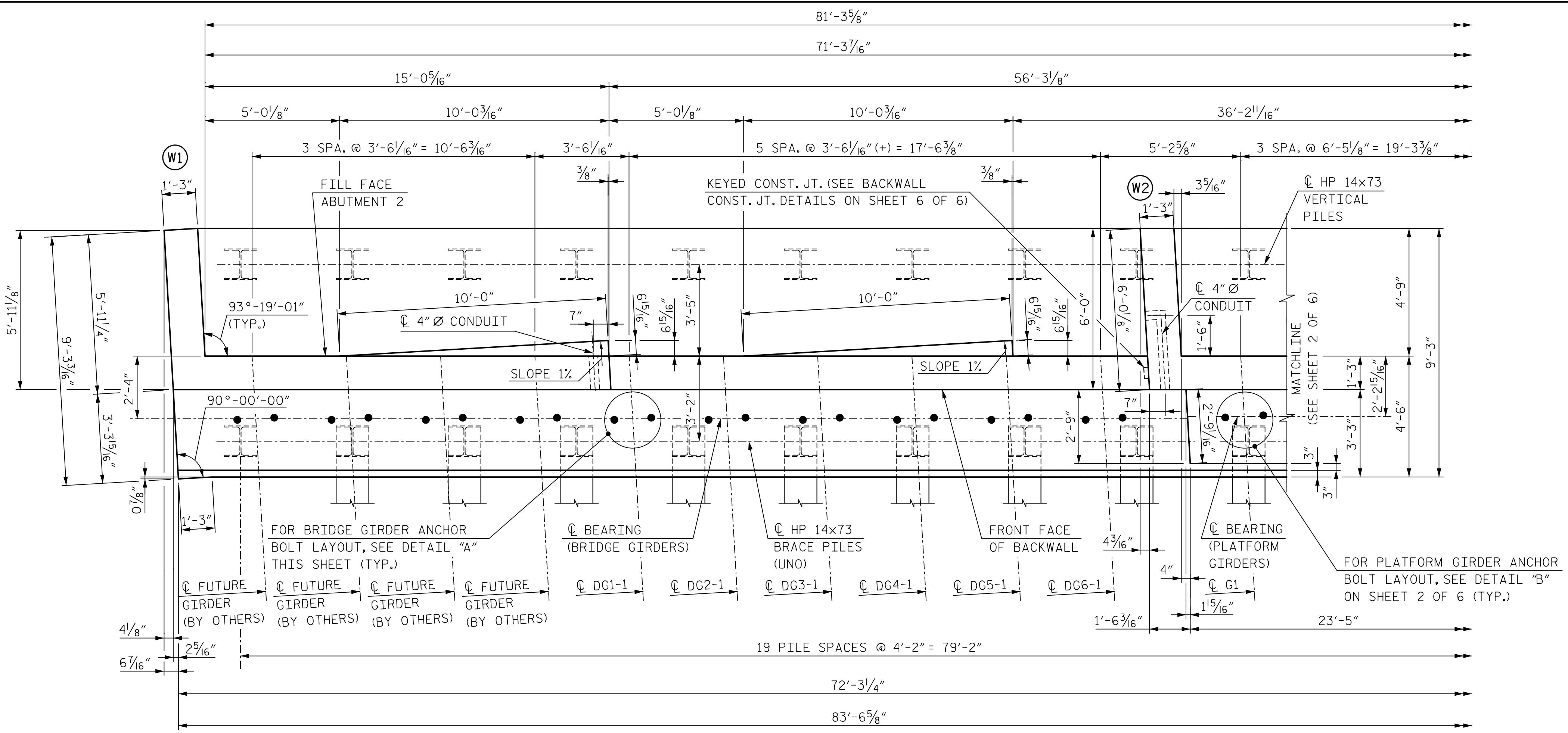


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
ABUTMENT 2  
SHORING

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-44 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1	B. VAUGHN	10/17	3			
CHECKED BY L. RAPP	DATE 10/17	DWG. NO. 44	2		4		

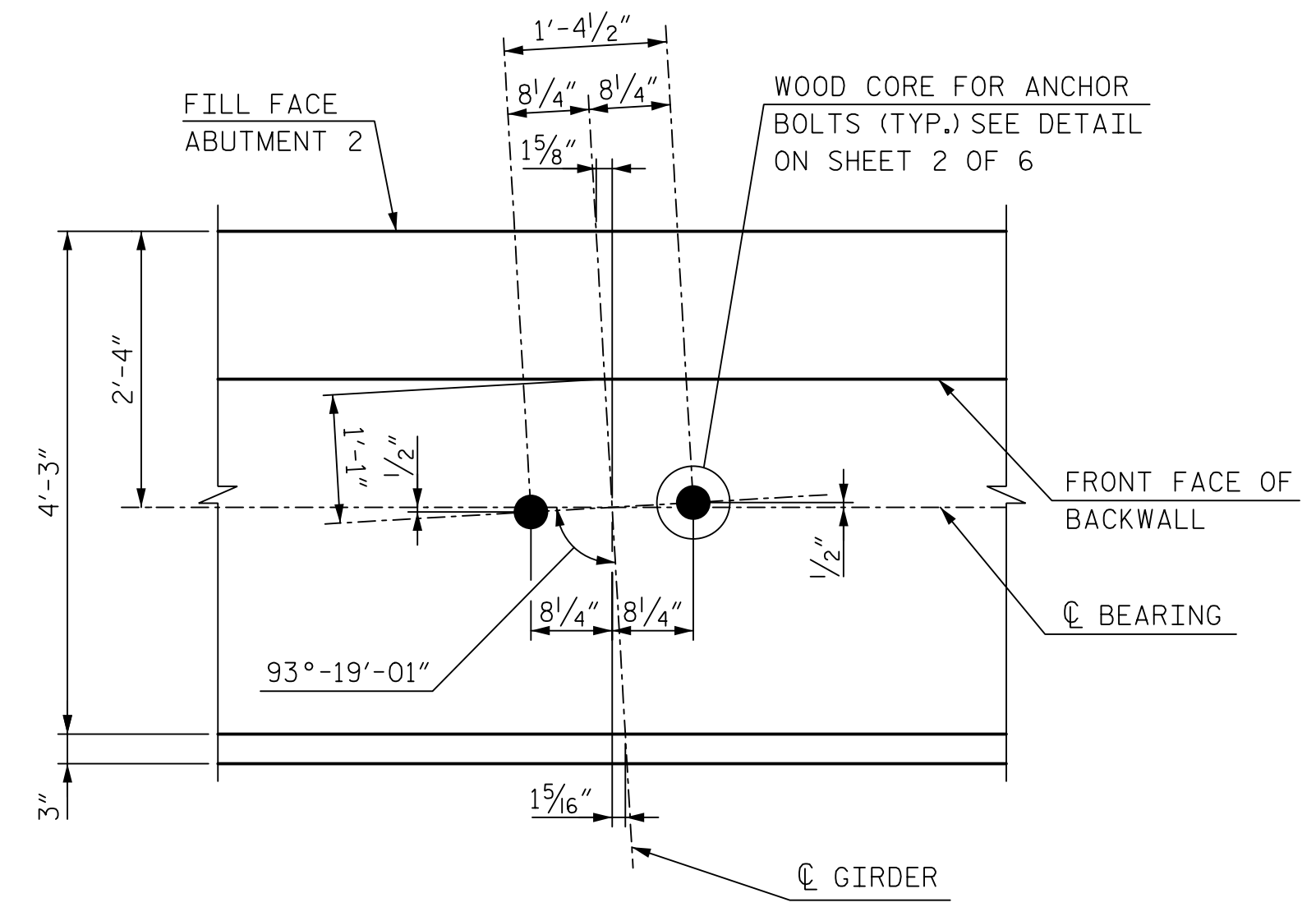




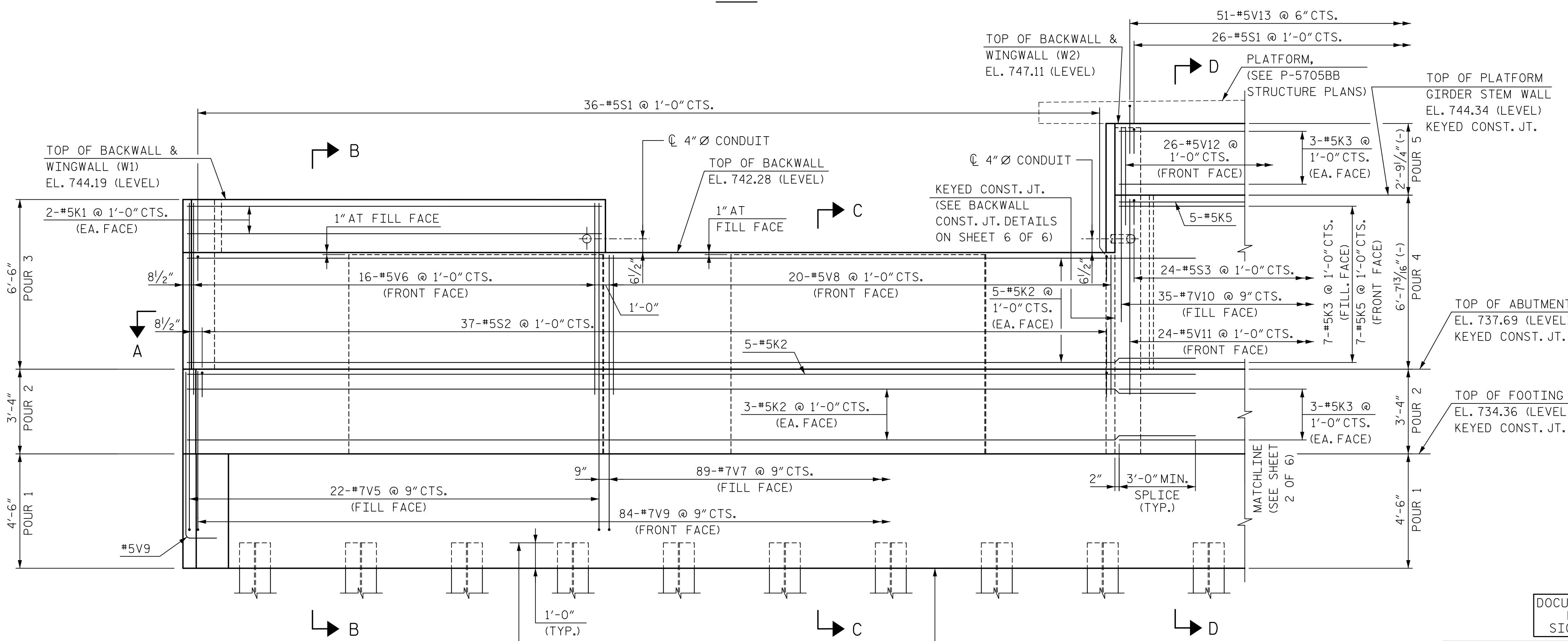
PLAN

NOTES:

- FOR SECTION A-A, SEE SHEETS 3 OF 6 AND 4 OF 6.
- FOR SECTIONS B-B, C-C, AND D-D, SEE SHEET 5 OF 6.
- FOR WINGWALL ELEVATIONS AND SECTIONS, SEE SHEETS 3 OF 6 AND 4 OF 6.
- FOR LAYOUT AND DETAILS OF CONTINUOUS FRENCH DRAIN SYSTEM BEHIND ABUTMENT, SEE "STRUCTURE DRAINAGE DETAILS" SHEETS 3 OF 4 AND 4 OF 4.
- [Symbol] INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.
- CONDUIT TO BE 4"Ø IN ACCORDANCE WITH UNDERWRITERS LABORATORY SPECIFICATIONS.
- FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.
- FOR FOOTING REINFORCING, SEE ABUTMENT SECTIONS AND FOOTING REINFORCING PLAN ON SHEET 5 OF 6.
- \*5K2, \*5K4, \*5K5, \*5S2, AND \*5S3 MAY BE ADJUSTED AS NECESSARY TO CLEAR ANCHOR BOLTS. DO NOT EXCEED 12" BETWEEN BARS.
- FOR LIMITS OF EXISTING BRIDGE WINGWALL REMOVAL, SEE "ABUTMENT 2 SHORING" SHEET.



DETAIL A - BRIDGE GIRDER ANCHOR BOLT LAYOUT

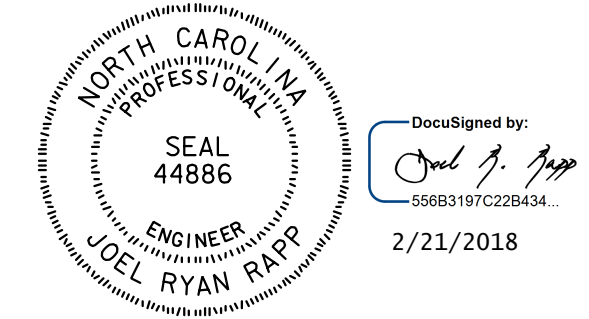


ELEVATION

(LOOKING AHEAD STATION)

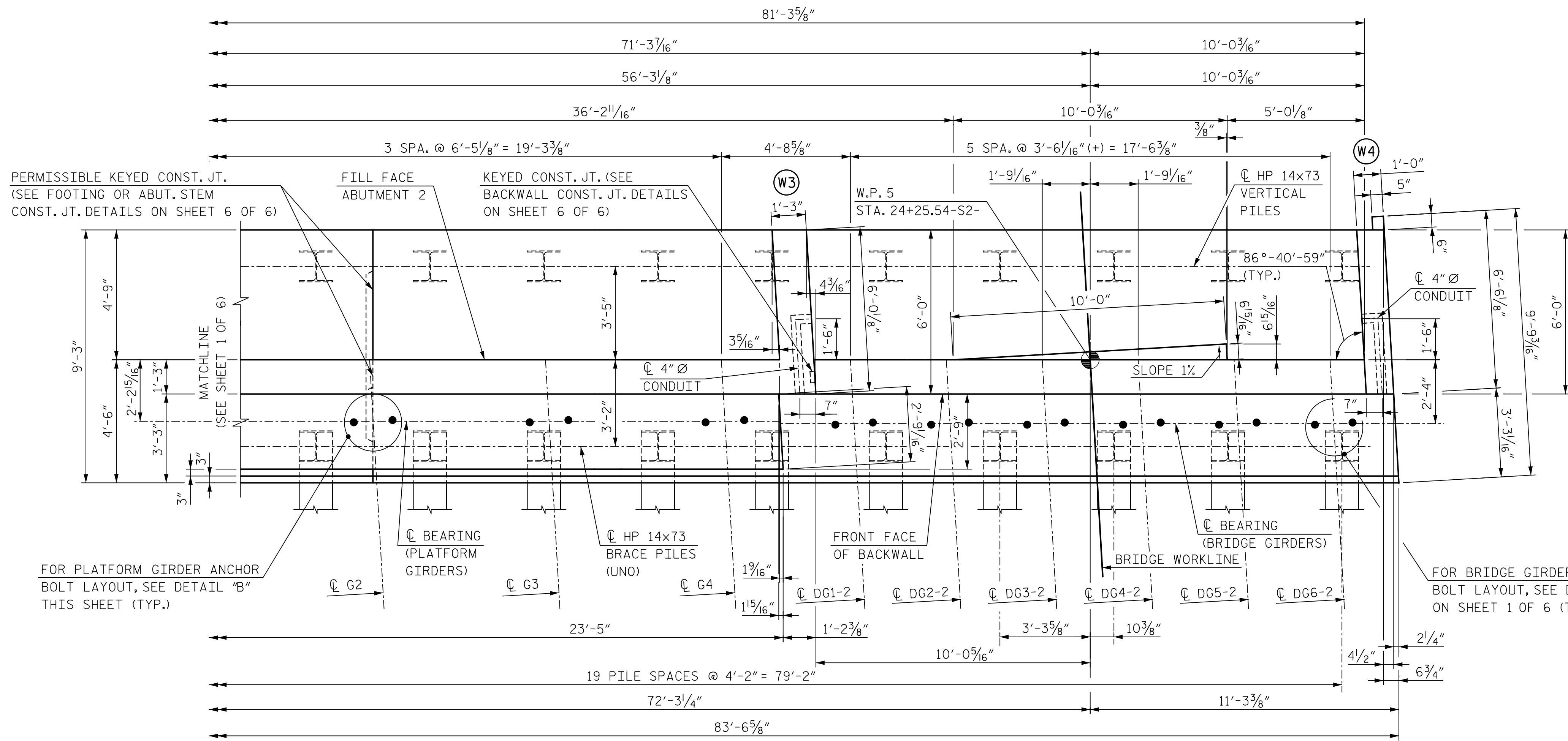
PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 6

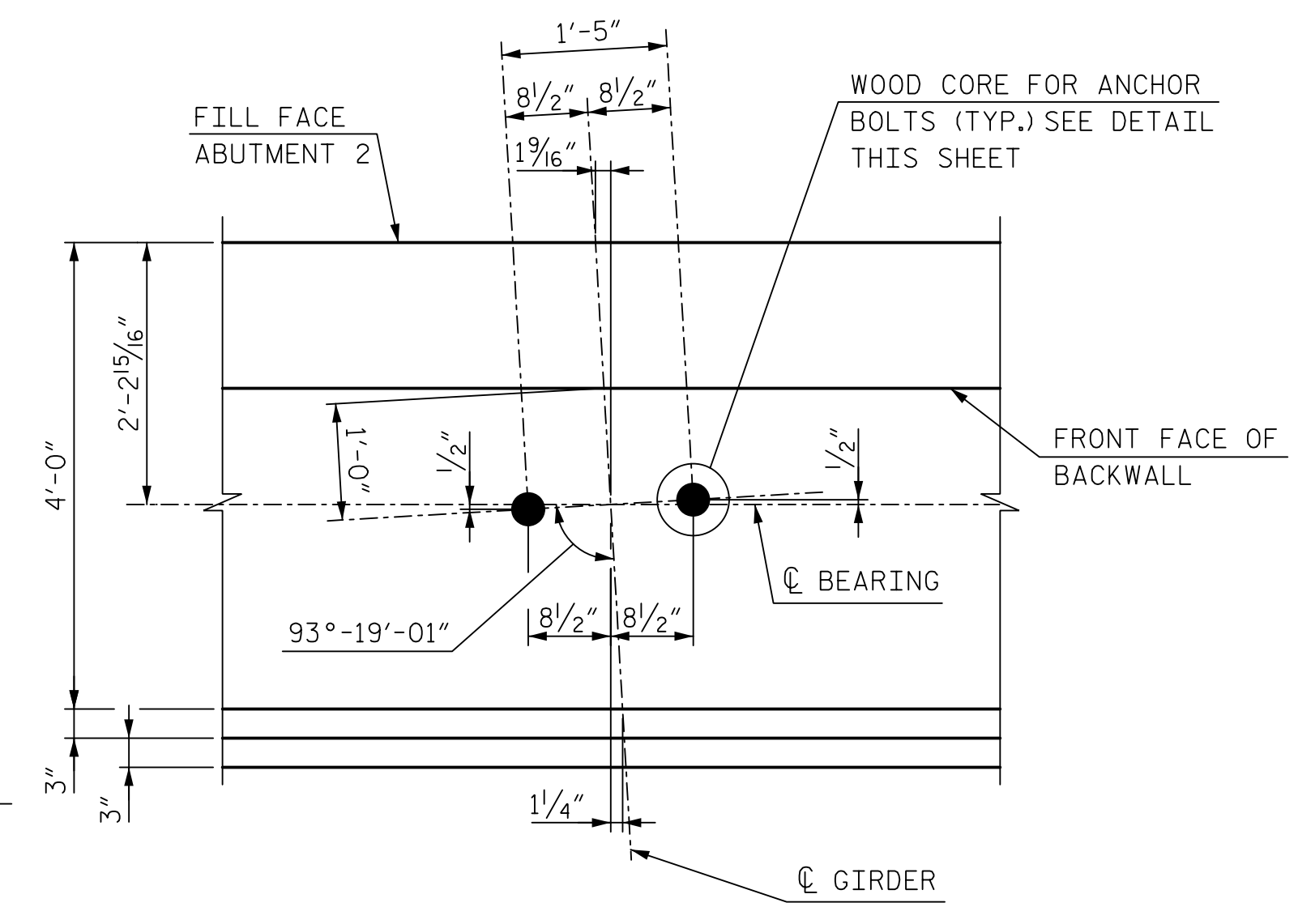


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

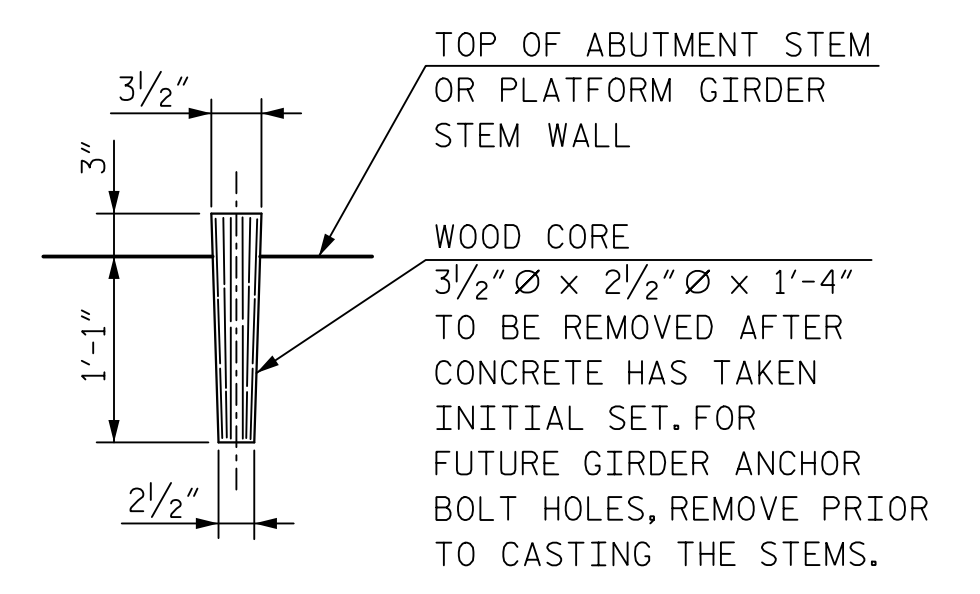
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		REVISIONS				SHEET NO. S5-45
		NO.	BY	DATE	NO.	
DRAWN BY <u>J. JEFFERS</u> DATE <u>10/17</u>		1			3	
CHECKED BY <u>K. ERVIN</u> DATE <u>10/17</u>		2			4	
DWG. NO. 45						TOTAL SHEETS 56



NOTE:  
FOR NOTES, SEE SHEET 1 OF 6.



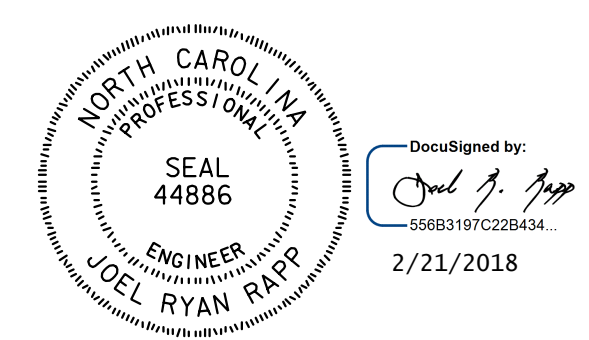
DETAIL B - PLATFORM GIRDER ANCHOR BOLT LAYOUT



DETAIL OF WOOD CORE FOR ANCHOR BOLT HOLES

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

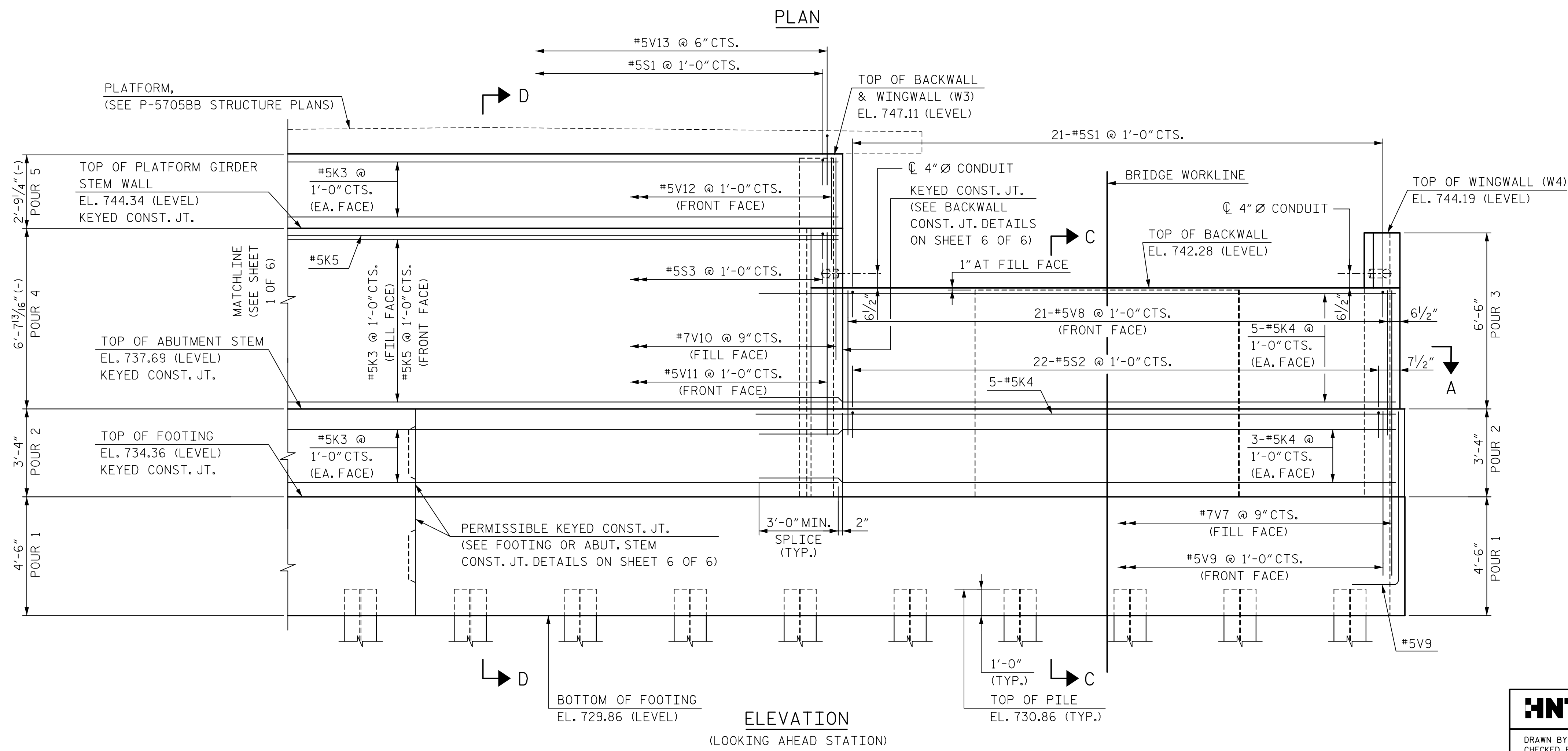
SHEET 2 OF 6  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 ABUTMENT 2



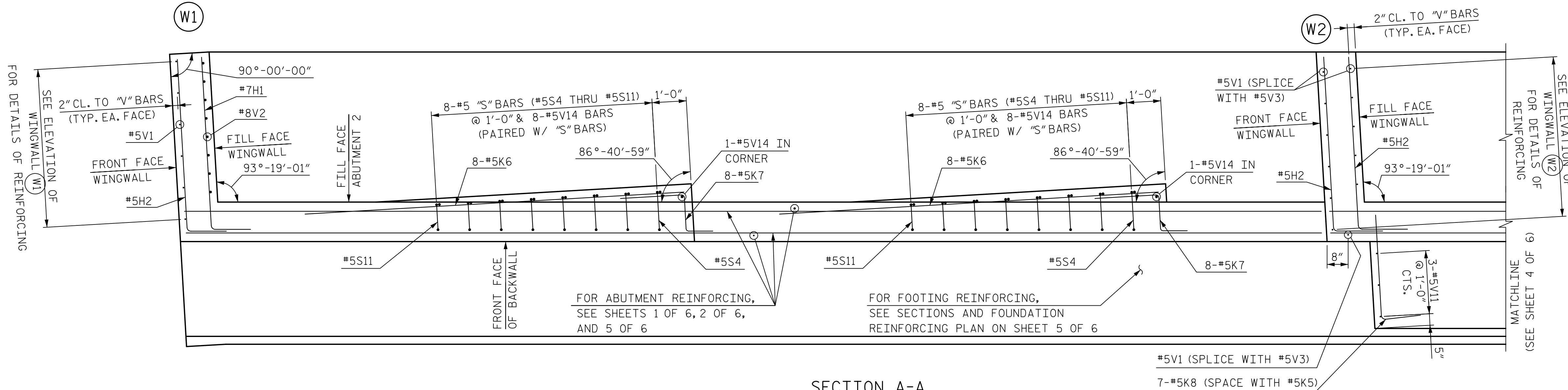
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		DWG. NO. 46			
NO.	BY	DATE	NO.	BY	DATE
1		10/17	3		
2		10/17	4		

SHEET NO. S5-46  
TOTAL SHEETS 56



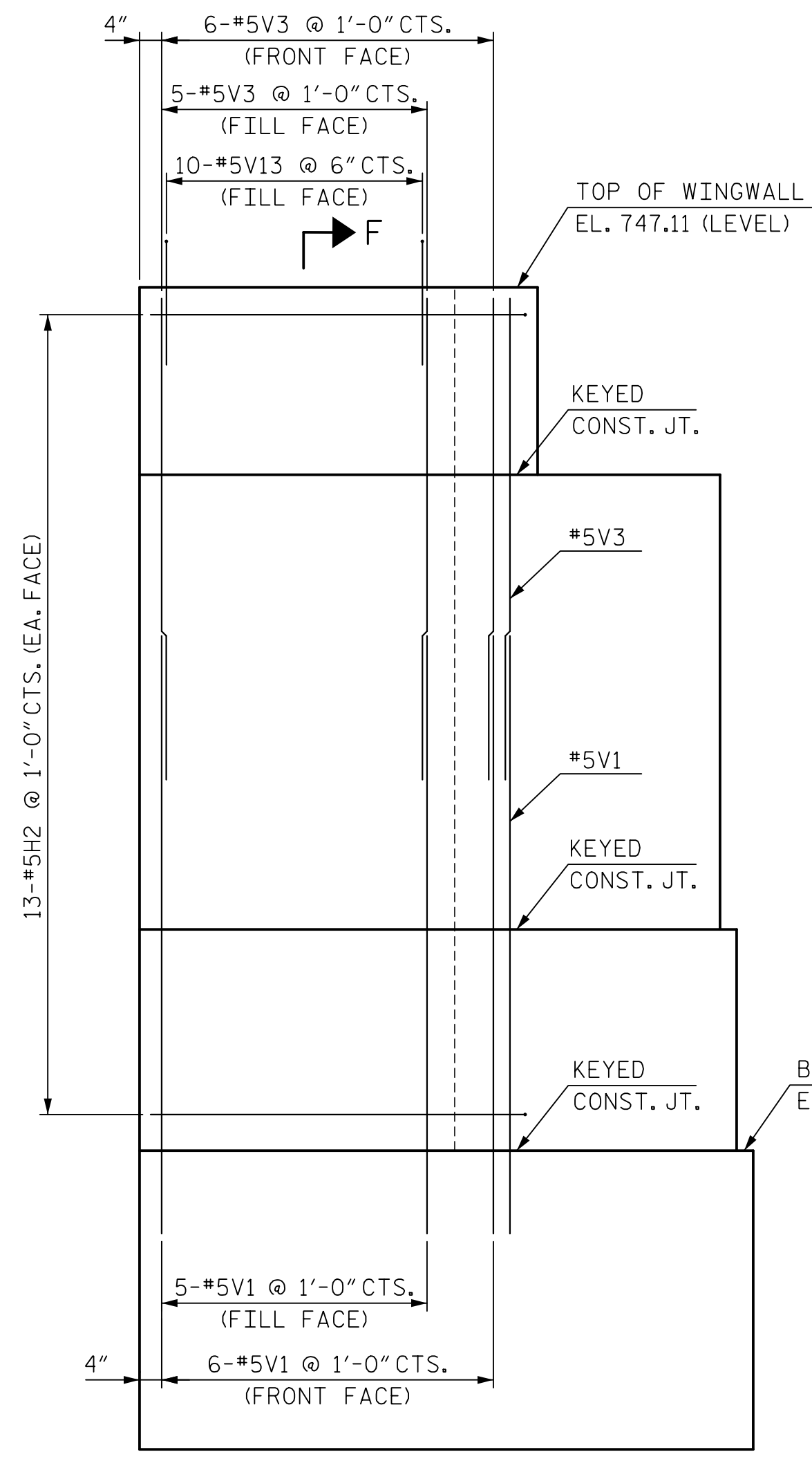




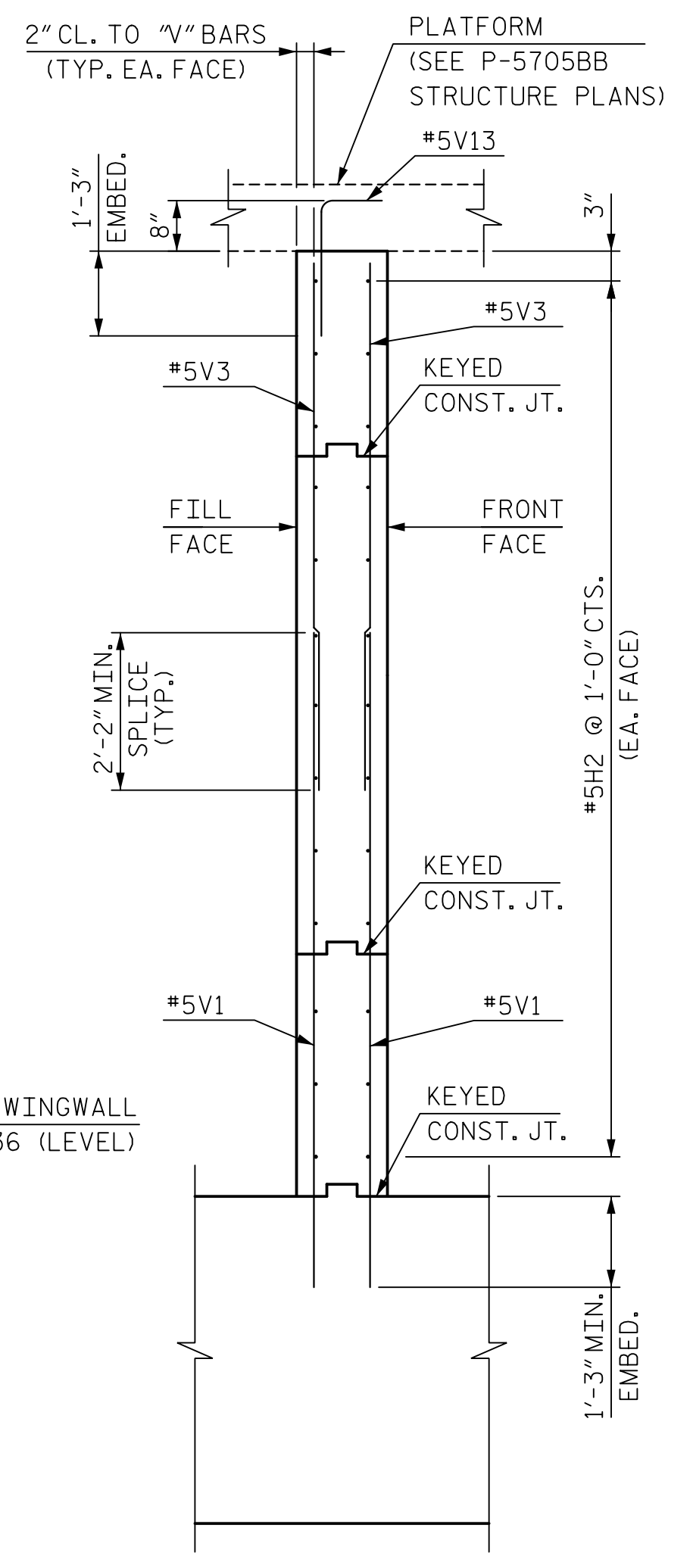
**NOTES:**  
 FOR ABUTMENT AND WINGWALL DIMENSIONS, AND ABUTMENT ELEVATION, SEE SHEETS 1 OF 6 AND 2 OF 6.  
 FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.  
 FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 6 OF 6.

SECTION A-A

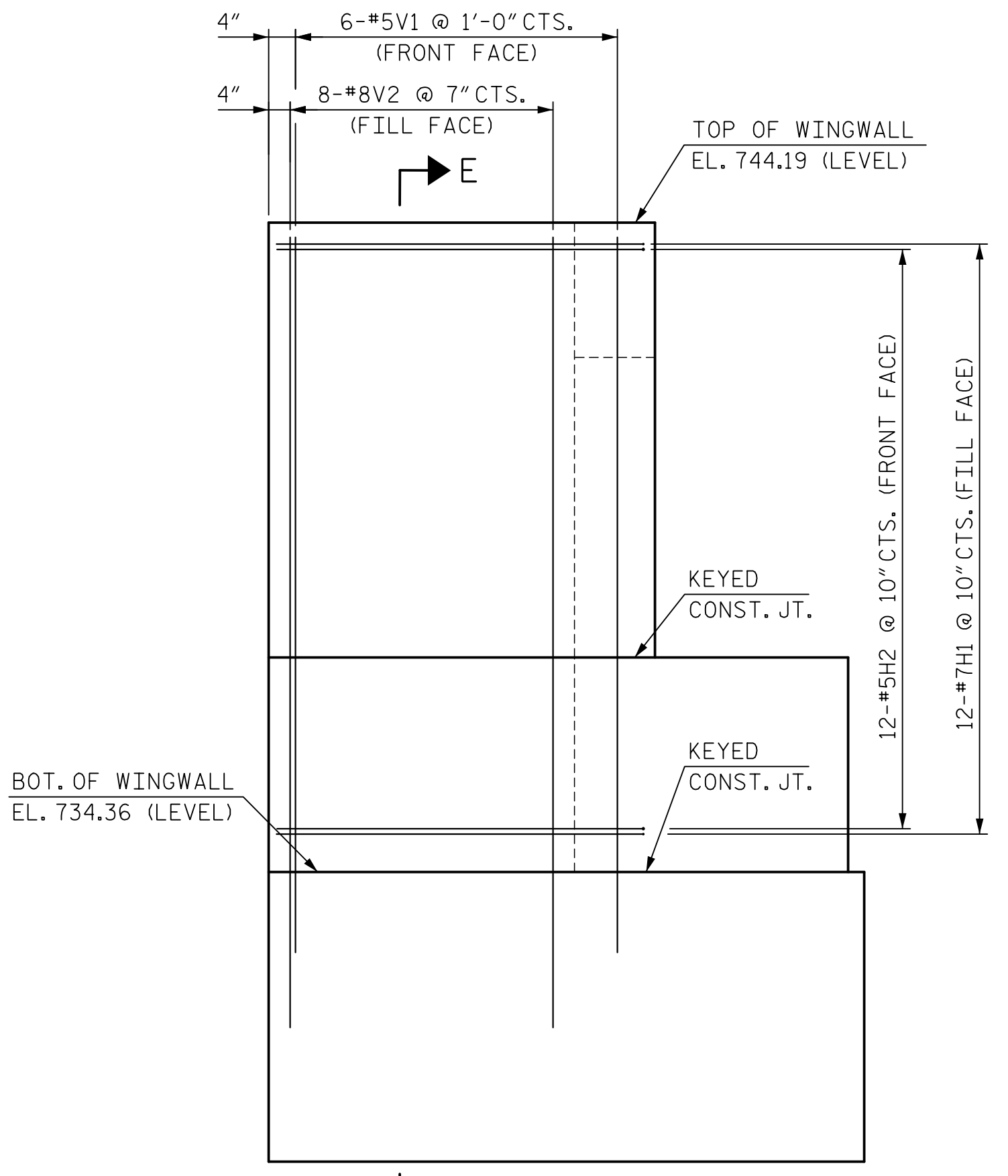
(#5V11 AND #7V10/#7V7 BARS ON FRONT FACE AND FILL FACE OF PLATFORM GIRDER STEM WALL NOT SHOWN FOR CLARITY)



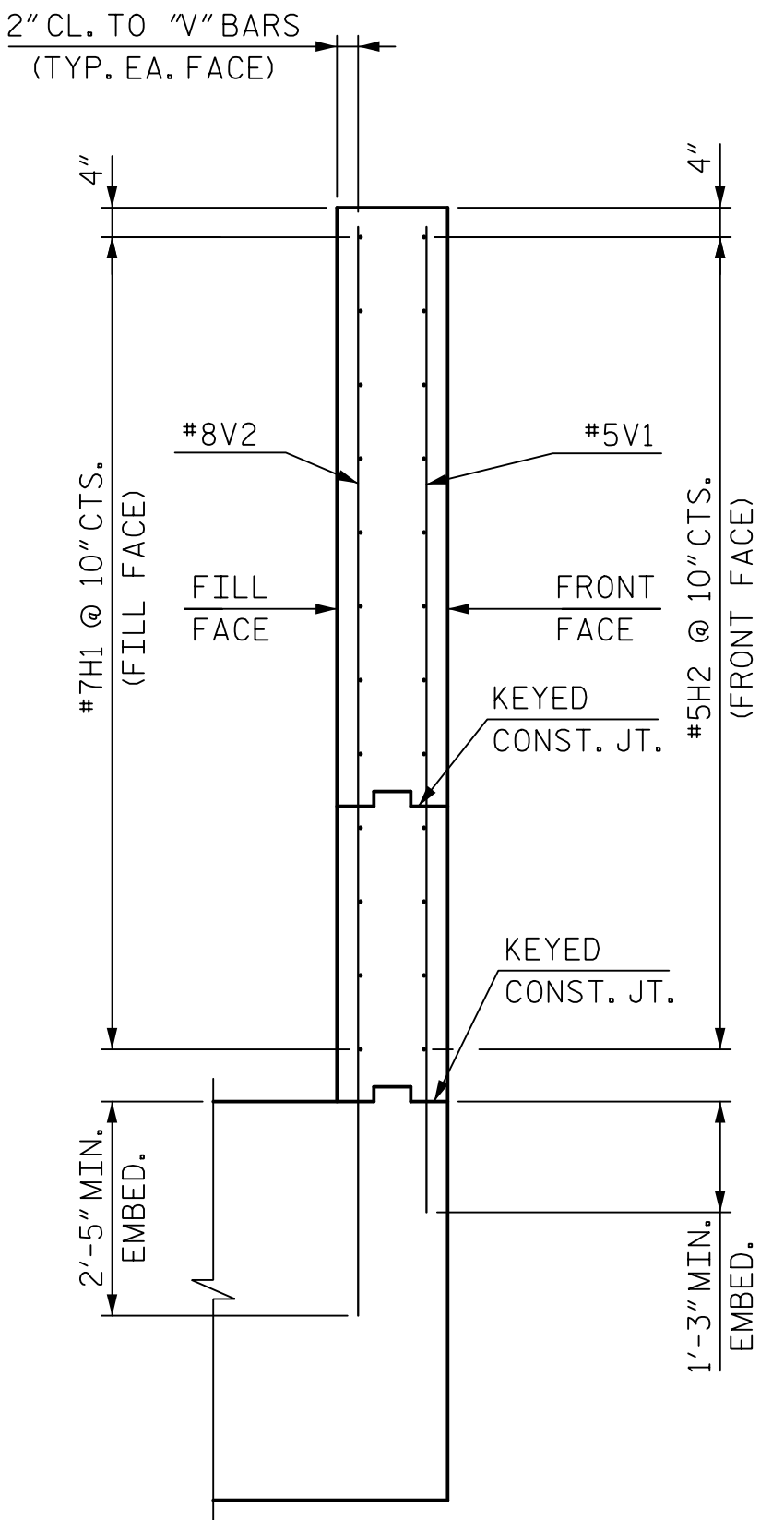
ELEVATION OF WINGWALL (W2)



SECTION F-F



ELEVATION OF WINGWALL (W1)



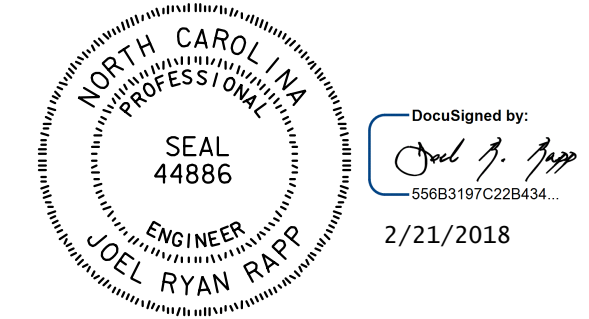
SECTION E-E

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

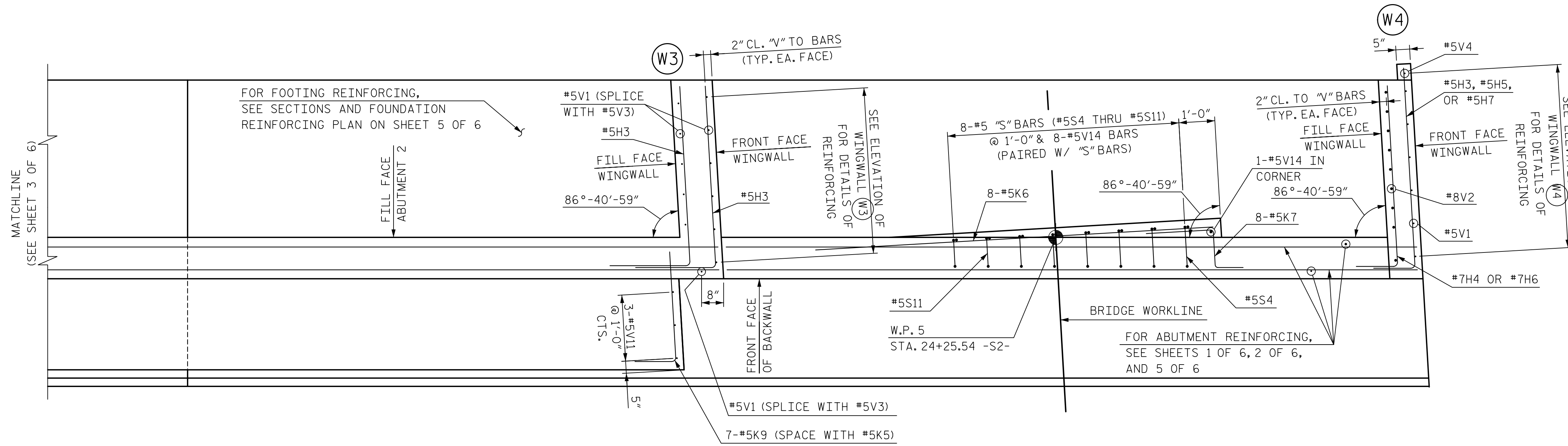
SUBSTRUCTURE  
 ABUTMENT 2



DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY <u>J. JEFFERS</u>	DATE <u>10/17</u>	DWG. NO. <u>47</u>	
CHECKED BY <u>K. ERVIN</u>	DATE <u>10/17</u>		

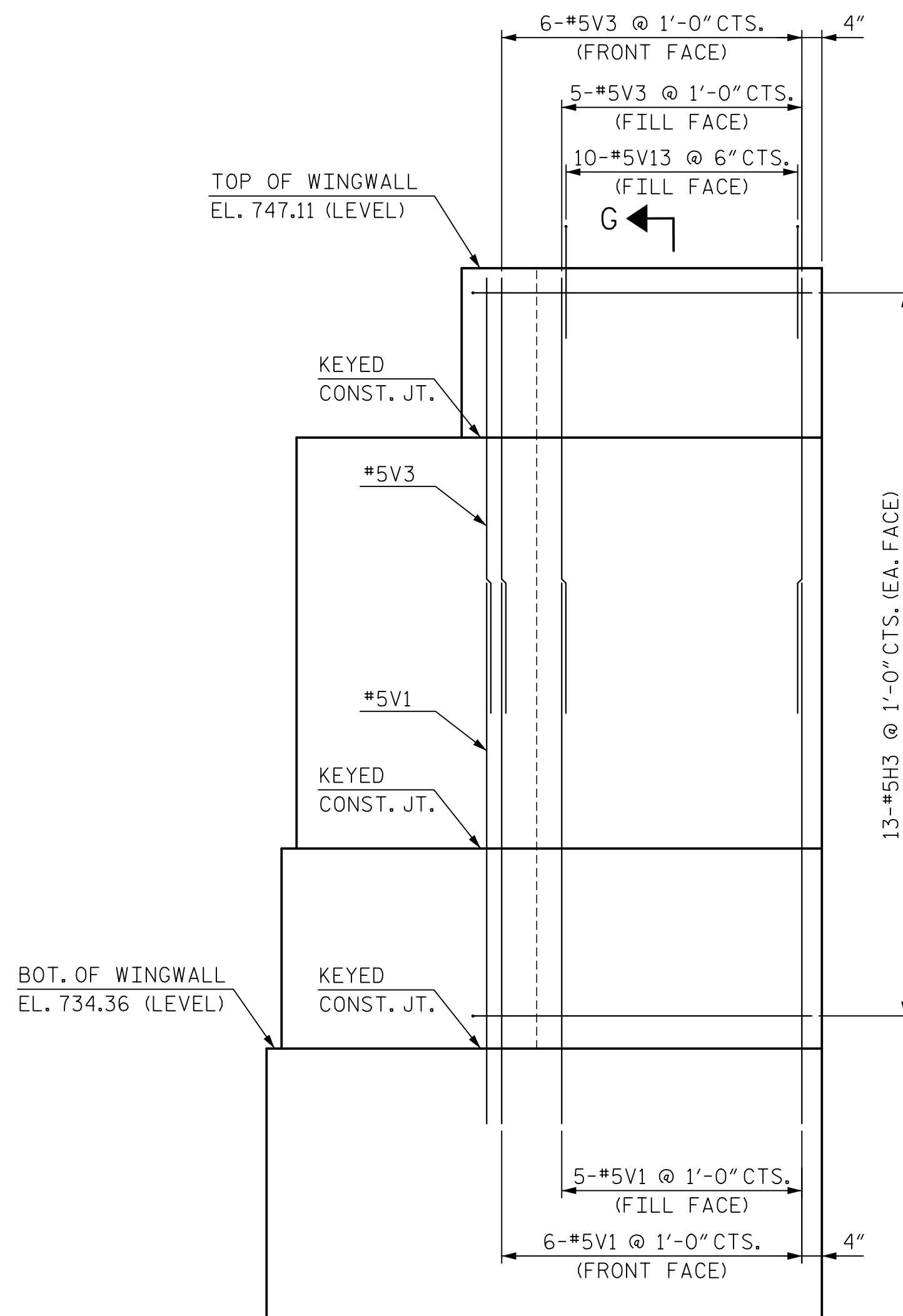
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-47
1			3			TOTAL SHEETS
2			4			56



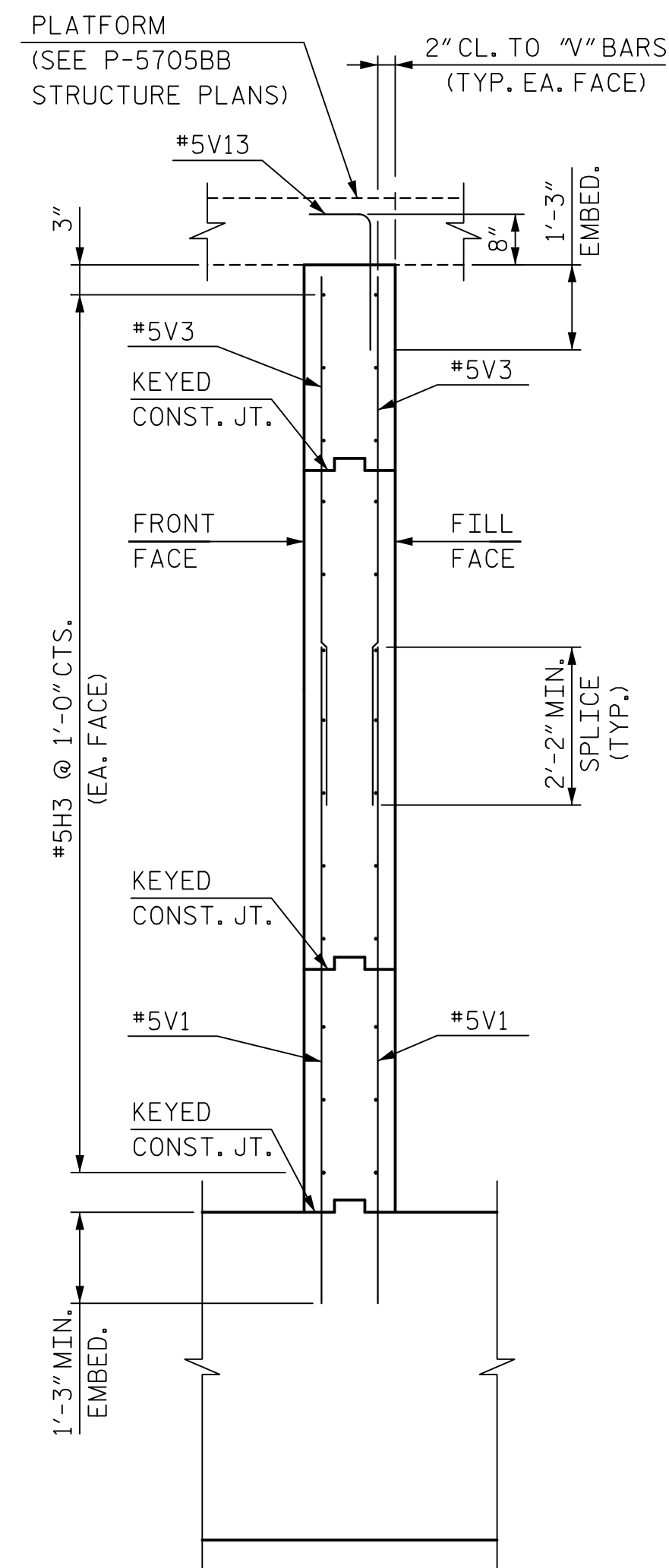
**NOTES:**  
 FOR ABUTMENT AND WINGWALL DIMENSIONS, AND ABUTMENT ELEVATION, SEE SHEETS 1 OF 6 AND 2 OF 6.  
 FOR LOCATIONS OF FENCE AND HANDRAIL ANCHORAGES IN TOP OF BACKWALL/WINGWALLS, SEE "SUPERSTRUCTURE: BRIDGE MOUNTED FENCE AND HANDRAIL DETAILS" SHEETS.  
 FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 6 OF 6.

**SECTION A-A**

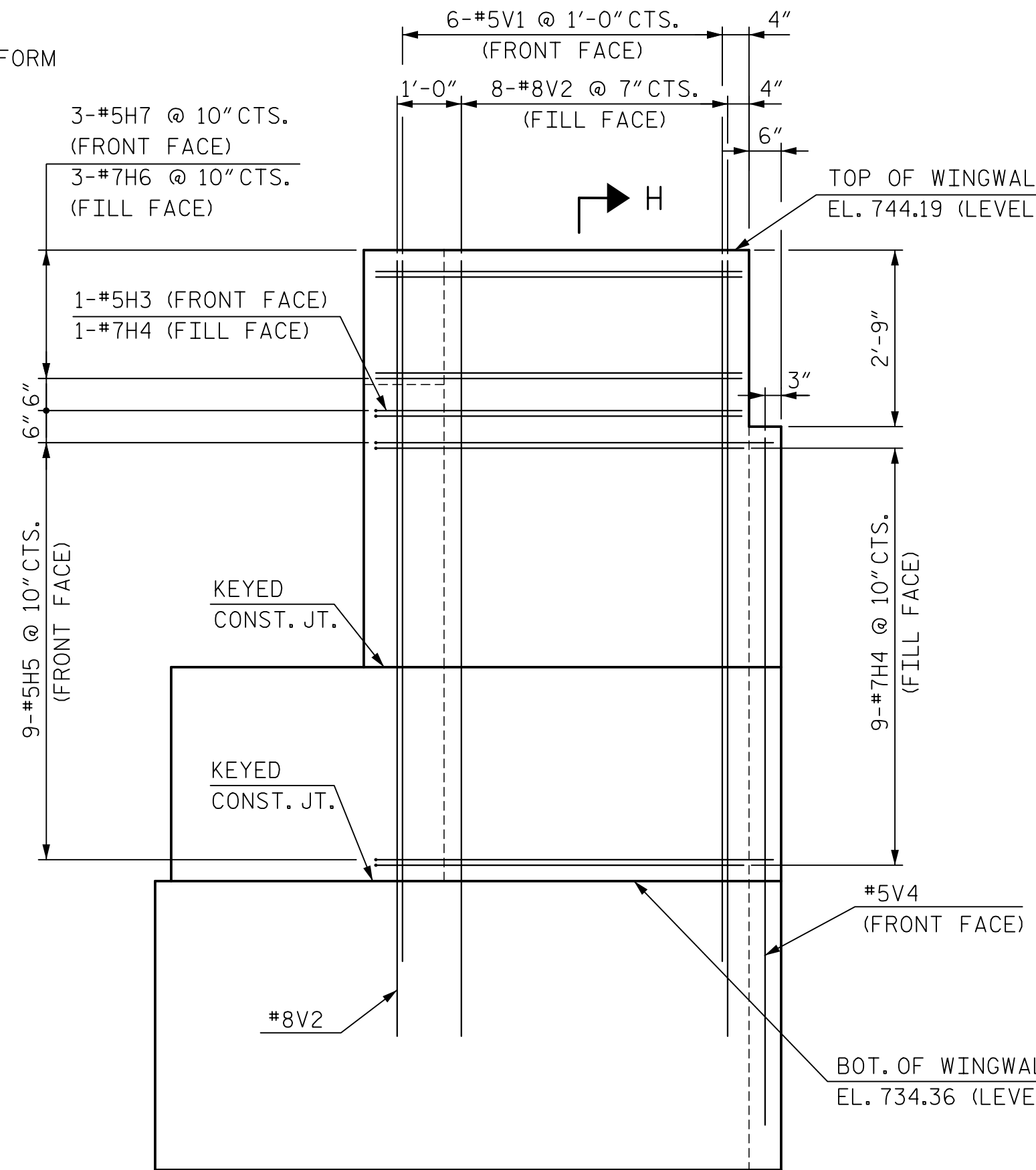
(\*#5V13 BARS ON FRONT FACE AND FILL FACE OF PLATFORM GIRDER STEM WALL NOT SHOWN FOR CLARITY)



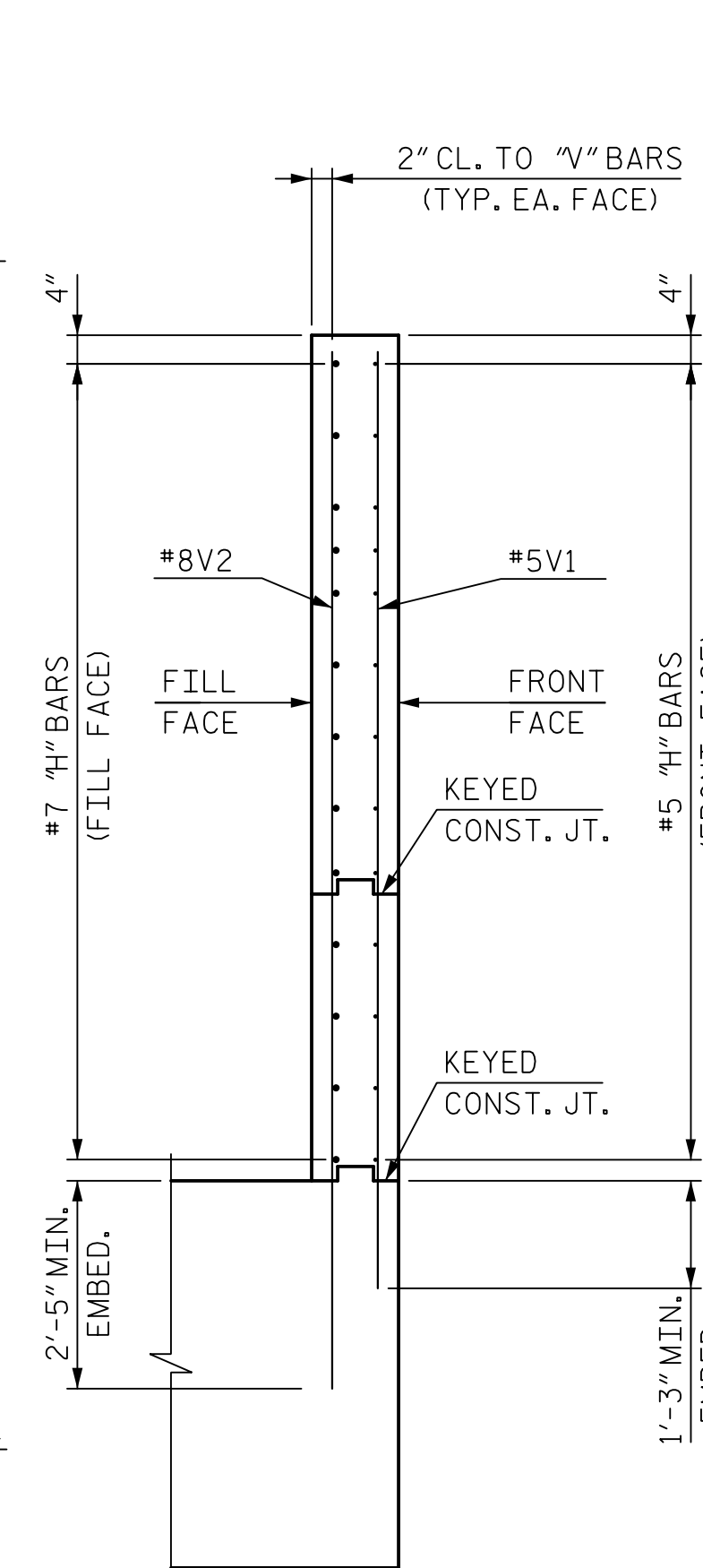
**ELEVATION OF WINGWALL (W3)**



**SECTION G-G**



**ELEVATION OF WINGWALL (W4)**



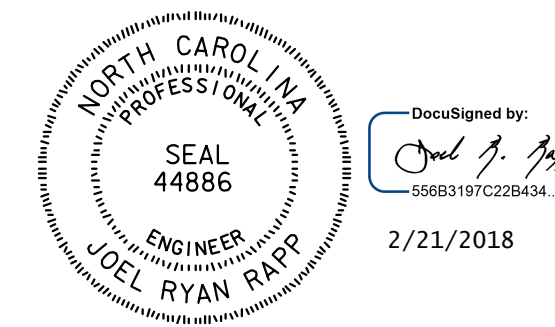
**SECTION H-H**

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 4 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 ABUTMENT 2

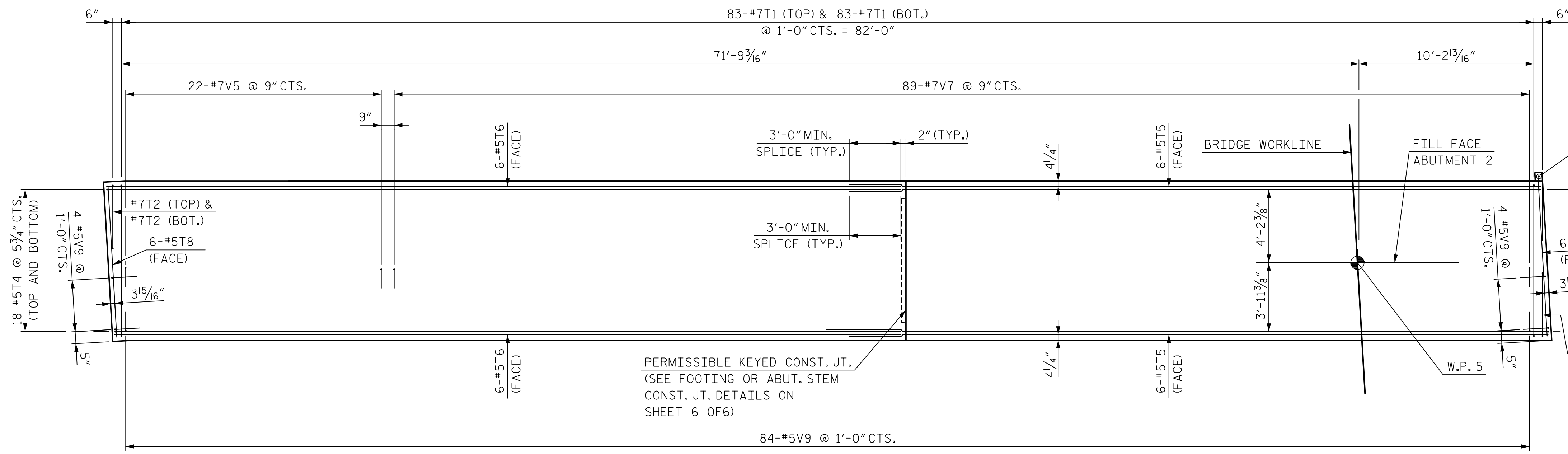


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-48 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1			3			
2			4				

DRAWN BY J. JEFFERS DATE 10/17  
 CHECKED BY K. ERVIN DATE 10/17 DWG. NO. 48

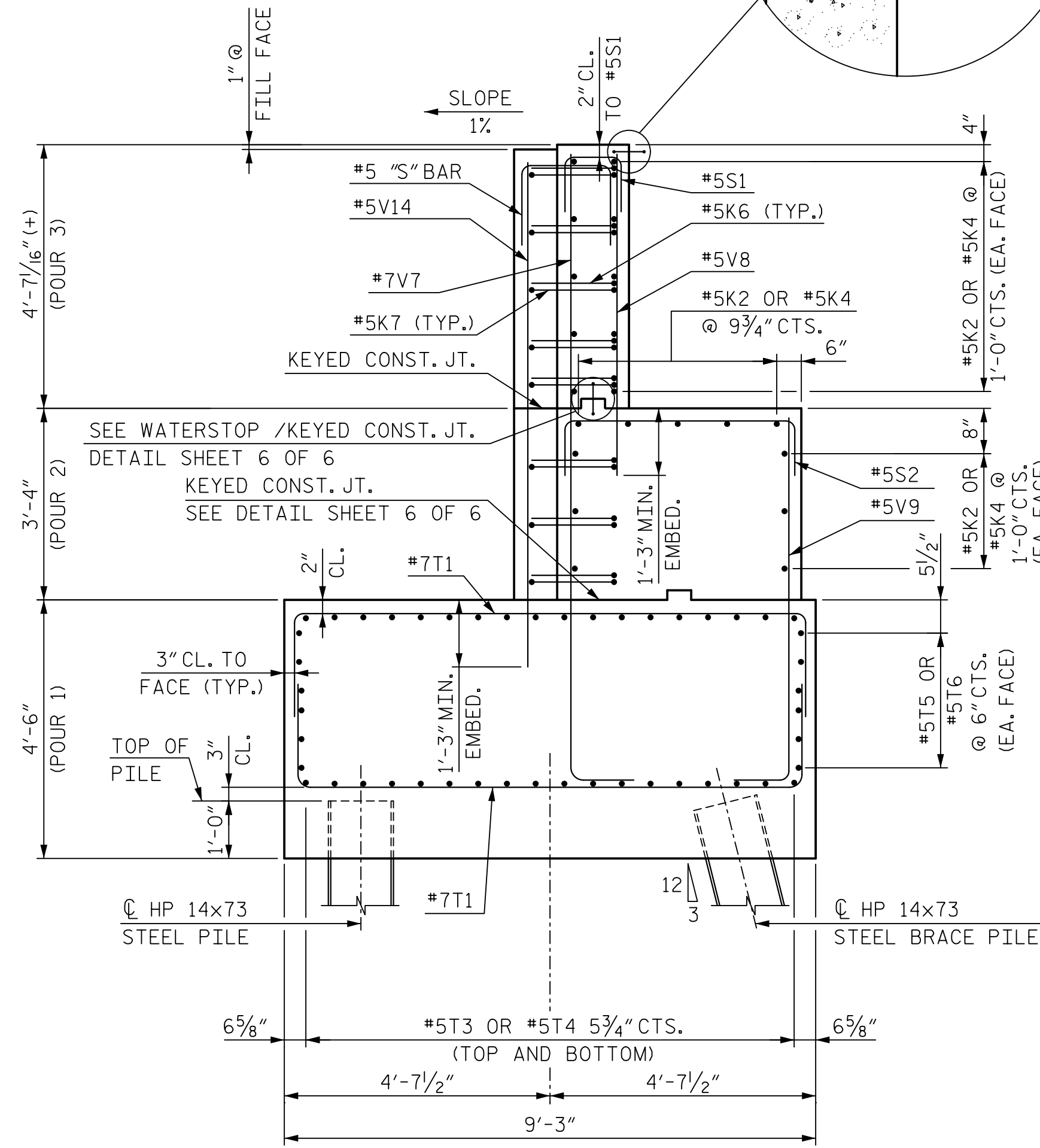
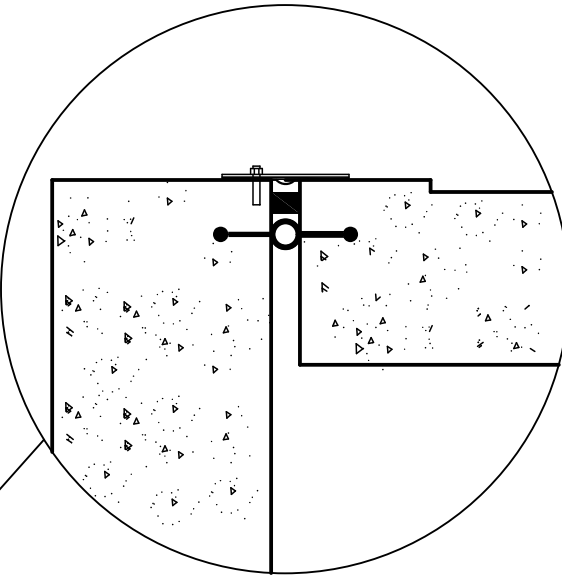




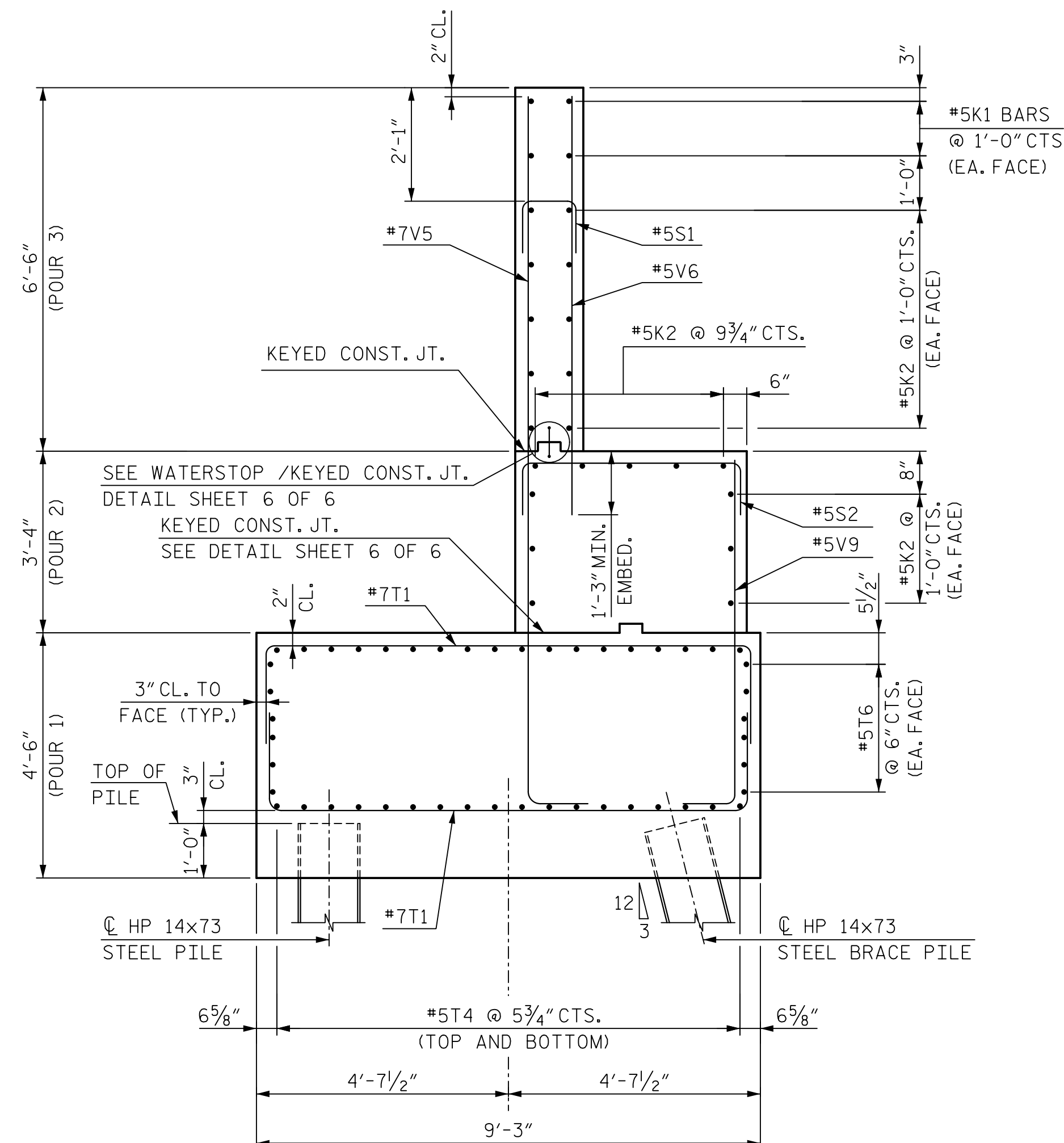
FOOTING REINFORCING PLAN  
(WINGWALL BARS NOT SHOWN FOR CLARITY)

NOTE:  
FOR FOOTING LAYOUT, LOCATIONS OF SECTIONS B-B, C-C, AND D-D, AND ADDITIONAL DIMENSIONS, SEE SHEETS 1 OF 6 AND 2 OF 6.

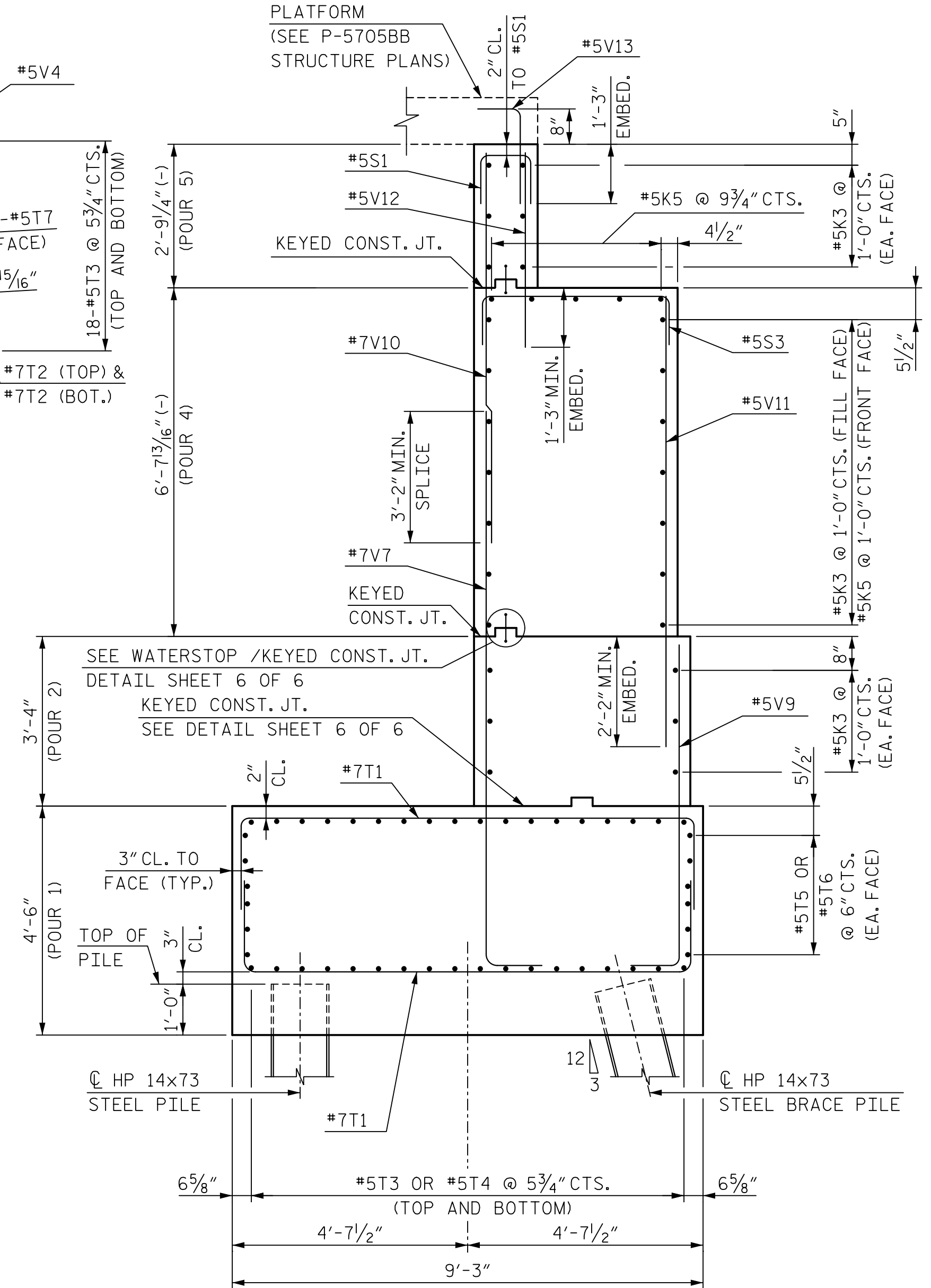
BULB-TYPE WATERSTOP REQUIRED FOR DETAILS OF BULB-TYPE WATERSTOP, SEE DETAIL "A" ON "DECK DETAILS" SHEET.



SECTION C-C



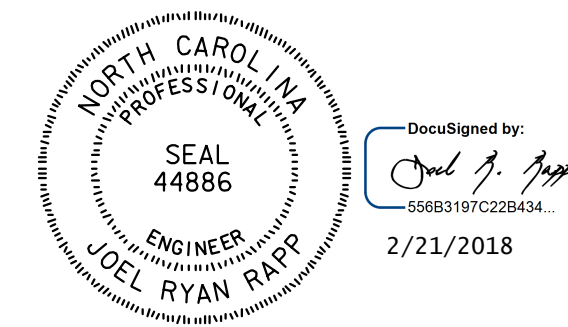
SECTION B-B



SECTION D-D

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

SHEET 5 OF 6



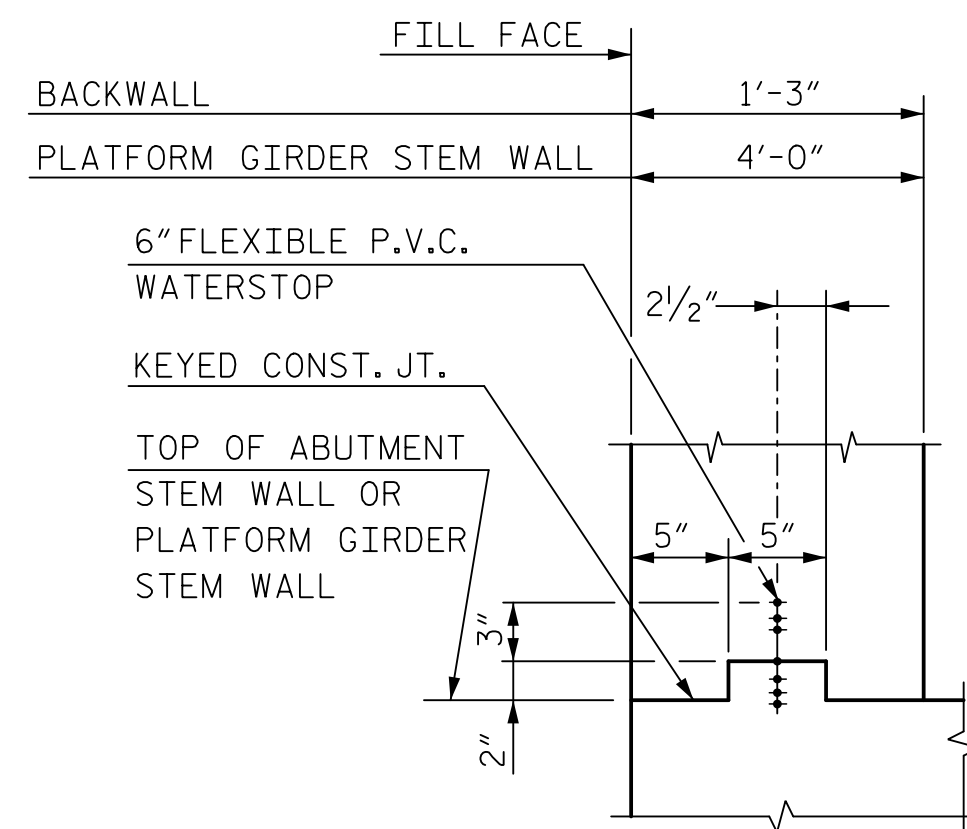
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609		REVISIONS		SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE
1		10/17	3		
2		10/17	4		
DRAWN BY: J. JEFFERS CHECKED BY: K. ERVIN			DATE: 10/17		DWG. NO. 49
			TOTAL SHEETS		56

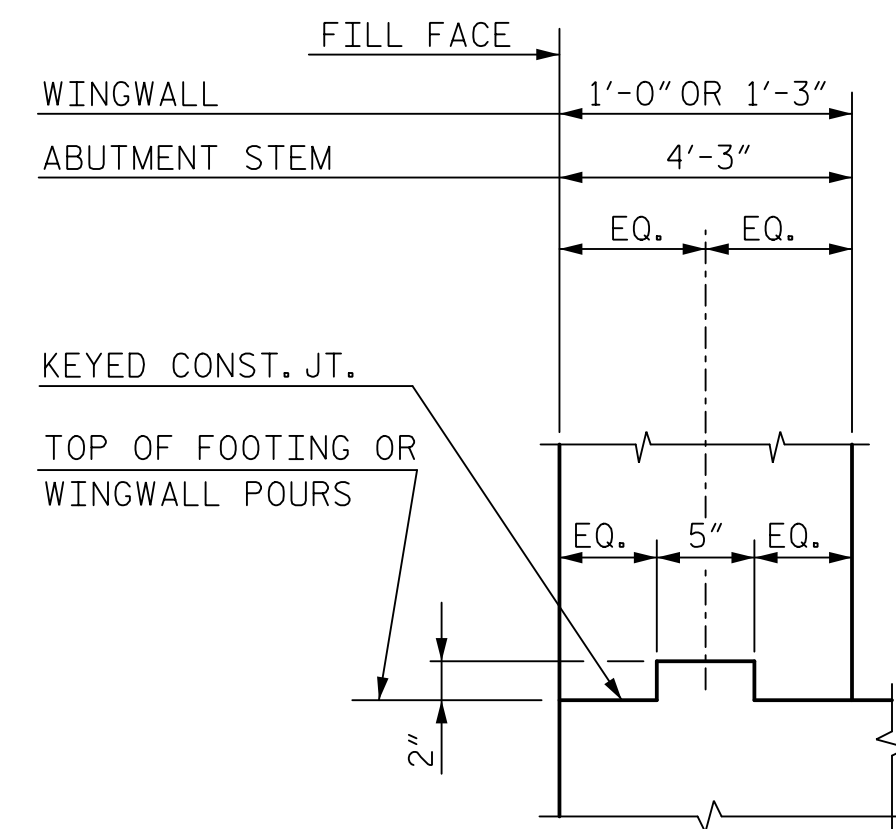
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
ABUTMENT 2

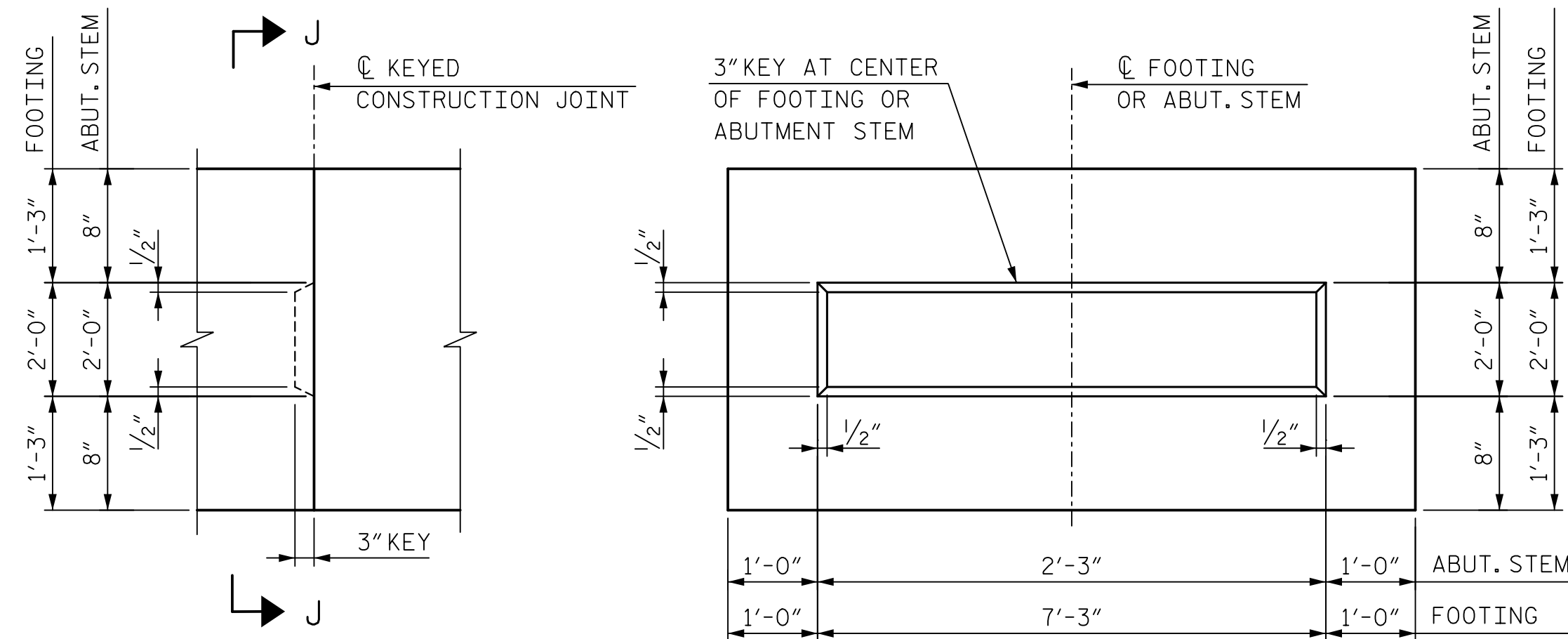
S5-49



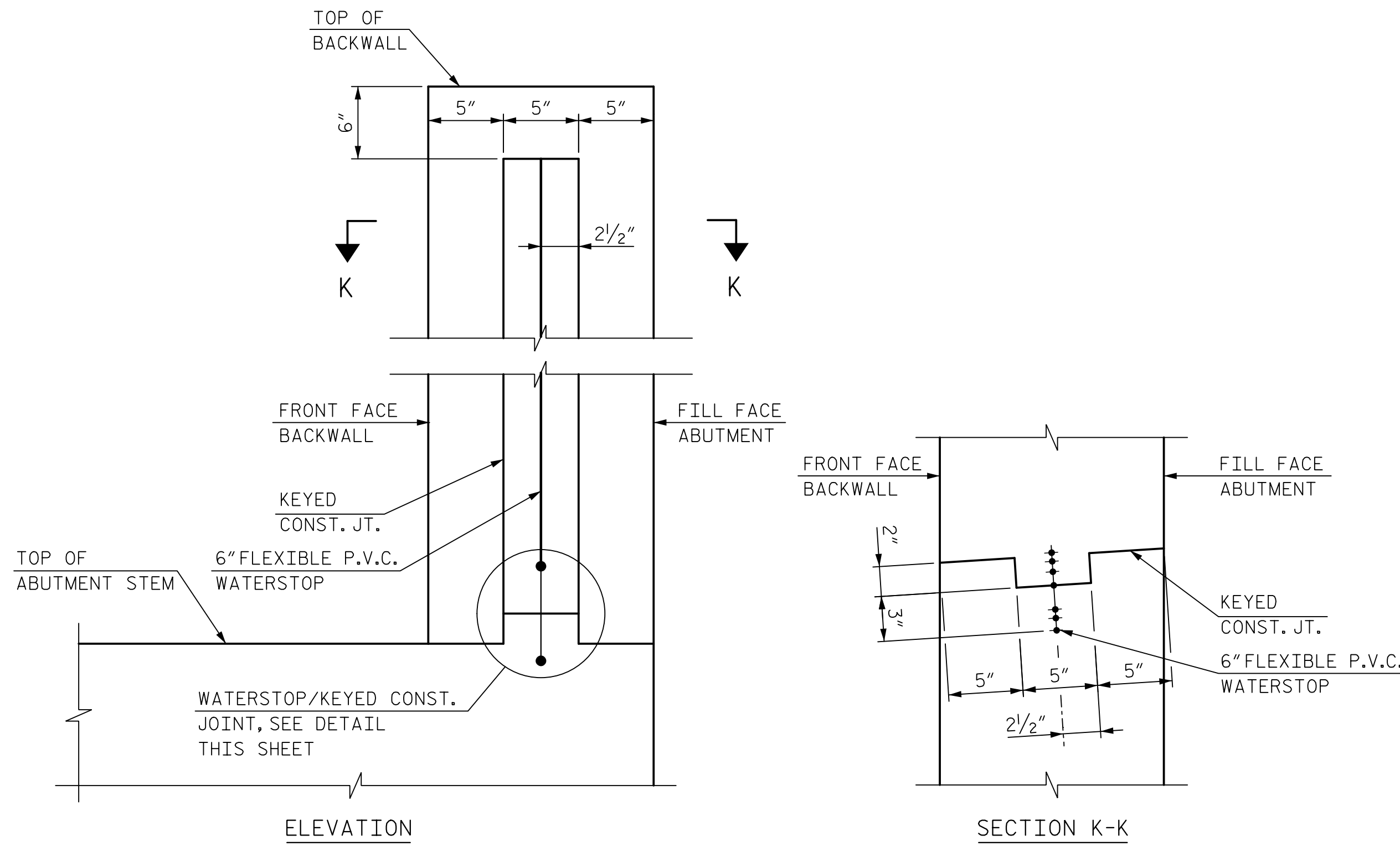
WATERSTOP/KEYED CONSTRUCTION JOINT DETAIL



KEYED CONSTRUCTION JOINT DETAIL



FOOTING OR ABUT. STEM CONSTRUCTION JOINT DETAILS



BACKWALL CONSTRUCTION JOINT DETAILS

BAR TYPES			
MARK	B	C	D
H1	5'-7"	1'-2"	0 7/8"
H2	5'-7"	2'-5"	1 1/16"
H3	5'-7"	2'-5"	2 5/16"
H4	5'-7"	1'-2"	1 1/16"
H5	6'-1"	10"	1 3/16"
K8	3'-7"	10"	0 9/16"
K9	3'-7"	10"	1 3/16"

NOTE: 'D' IS PARALLEL TO WINGWALL.

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING																	
MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT	MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT	MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
ABUTMENT 2																	
H1	12	7	2	6'-9"	166	T1	166	7	4	12'-5"	4214						
H2	38	5	2	8'-0"	318	T2	4	7	4	7'-11"	65						
H3	27	5	1	8'-0"	226	T3	36	5	5	42'-4"	1590						
H4	10	7	1	6'-9"	138	T4	36	5	5	47'-6"	1784						
H5	9	5	1	6'-11"	65	T5	12	5	STR.	40'-6"	507						
H6	3	7	STR.	5'-8"	35	T6	12	5	STR.	45'-8"	572						
H7	3	5	STR.	5'-8"	18	T7	6	5	STR.	9'-5"	59						
						T8	6	5	STR.	8'-11"	56						
K1	4	5	STR.	15'-11"	67												
K2	21	5	STR.	39'-4"	862	V1	36	5	STR.	11'-0"	414						
K3	19	5	STR.	25'-9"	511	V2	17	8	STR.	12'-1"	549						
K4	21	5	STR.	24'-2"	530	V3	24	5	STR.	5'-4"	134						
K5	12	5	STR.	23'-0"	288	V4	1	5	STR.	10'-11"	12						
K6	24	5	STR.	12'-0"	301	V5	22	7	5	13'-11"	626						
K7	24	5	3	5'-4"	134	V6	16	5	STR.	7'-8"	128						
K8	7	5	2	4'-5"	33	V7	89	7	5	12'-0"	2183						
K9	7	5	1	4'-5"	33	V8	41	5	STR.	5'-9"	246						
						V9	92	5	5	7'-1"	680						
S1	83	5	4	3'-11"	340	V10	35	7	STR.	8'-3"	591						
S2	59	5	4	6'-11"	426	V11	30	5	STR.	8'-11"	280						
S3	24	5	4	6'-8"	167	V12	26	5	STR.	3'-11"	107						
S4	3	5	4	4'-4"	14	V13	71	5	5	2'-9"	204						
S5	3	5	4	4'-3"	14	V14	27	5	STR.	9'-0"	254						
S6	3	5	4	4'-2"	14												
S7	3	5	4	4'-2"	14												
S8	3	5	4	4'-1"	13												
S9	3	5	4	4'-0"	13												
S10	3	5	4	4'-0"	13												
S11	3	5	4	3'-11"	13												

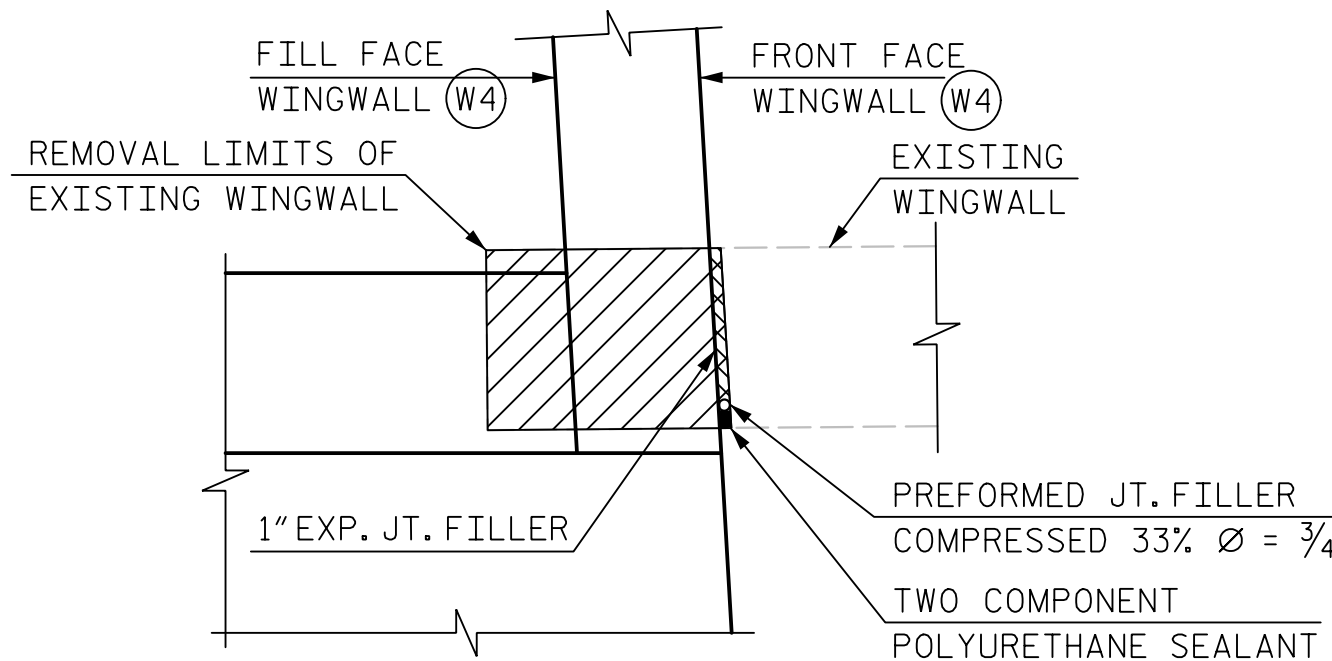
QUANTITIES		
ITEM		TOTAL
REINFORCING STEEL	LBS.	20,021
CLASS AA CONCRETE BREAKDOWN:		
POUR 1 FOOTING	CU. YDS	128.8
POUR 2 ABUTMENT STEM & BOTT. OF WINGS	CU. YDS	47.7
POUR 3 BRIDGE BACKWALL AND WINGS	CU. YDS	18.0
POUR 4 PLATFORM GIRDER STEM WALL & WINGS	CU. YDS	26.8
POUR 5 PLATFORM GIRDER BACKWALL AND WINGS	CU. YDS	4.6
TOTAL	CU. YDS	225.9
HP 14 X 73 STEEL PILES	NO.	40
	L.F.	2,333

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

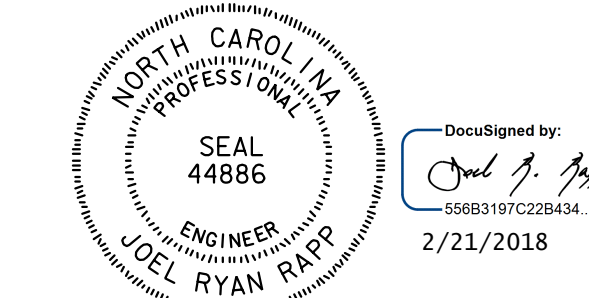
SHEET 6 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 ABUTMENT 2



EXISTING ABUTMENT INTERFACE DETAIL



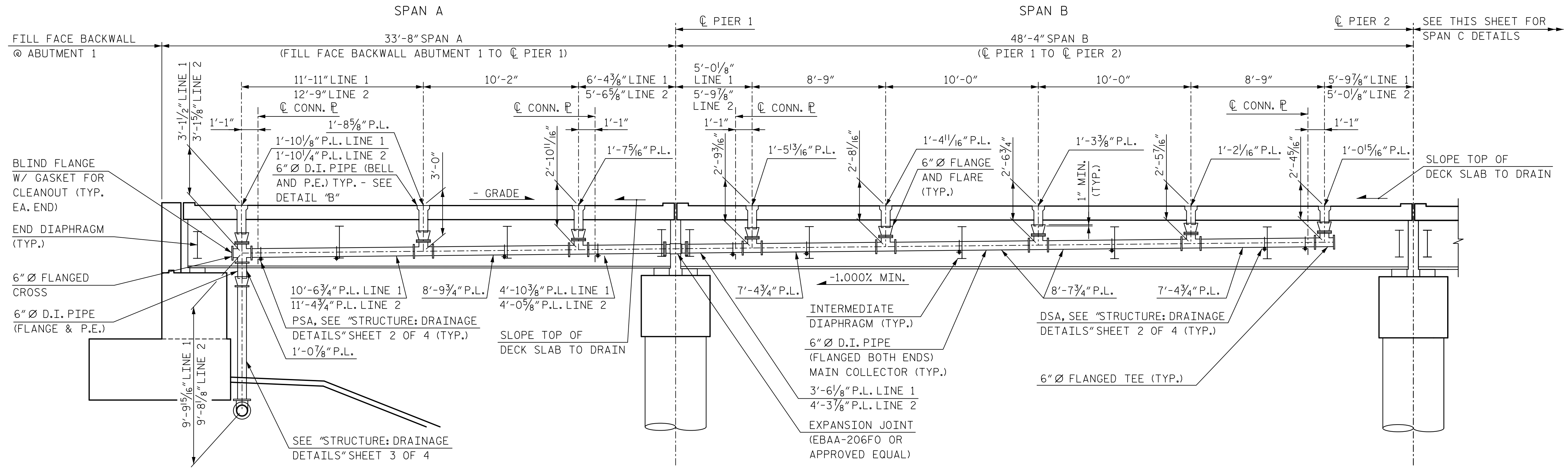
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: J. JEFFERS	DATE: 10/17	DWG. NO. 50	
CHECKED BY: K. ERVIN	DATE: 10/17		

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

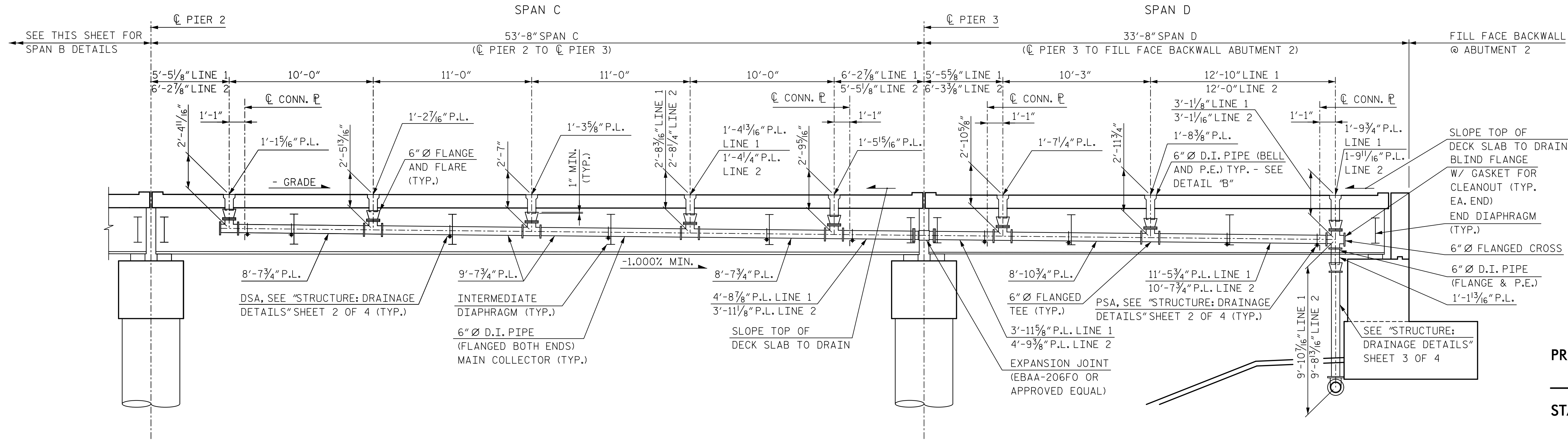
SHEET NO.	S5-50
TOTAL SHEETS	56





DRAINAGE DETAILS - SPAN A AND SPAN B

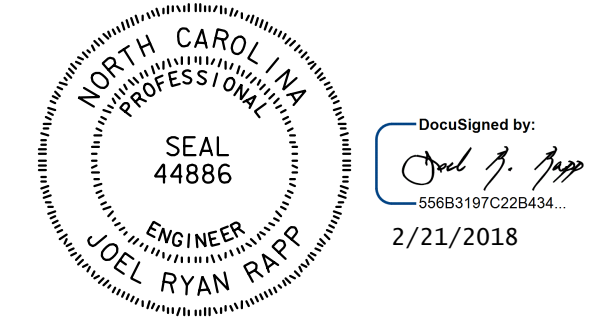
**NOTES:**  
 ALL DIMENSIONS ARE SUBJECT TO ADJUSTMENTS TO FIT MEASUREMENTS TAKEN AFTER DECKS HAVE BEEN POURED.  
 D.I. = DUCTILE IRON  
 P.L. = PIPE LENGTH  
 P.E. = PLAIN END  
 DRAINAGE LINE 1 IS LOCATED TO THE LEFT LOOKING AHEAD STATION AND DRAINAGE LINE 2 IS LOCATED TO THE RIGHT LOOKING AHEAD STATION.  
 FOR ADDITIONAL NOTES AND DETAILS, SEE "STRUCTURE: DRAINAGE DETAILS" SHEET 2 OF 4.



DRAINAGE DETAILS - SPAN C AND SPAN D

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 1 OF 4



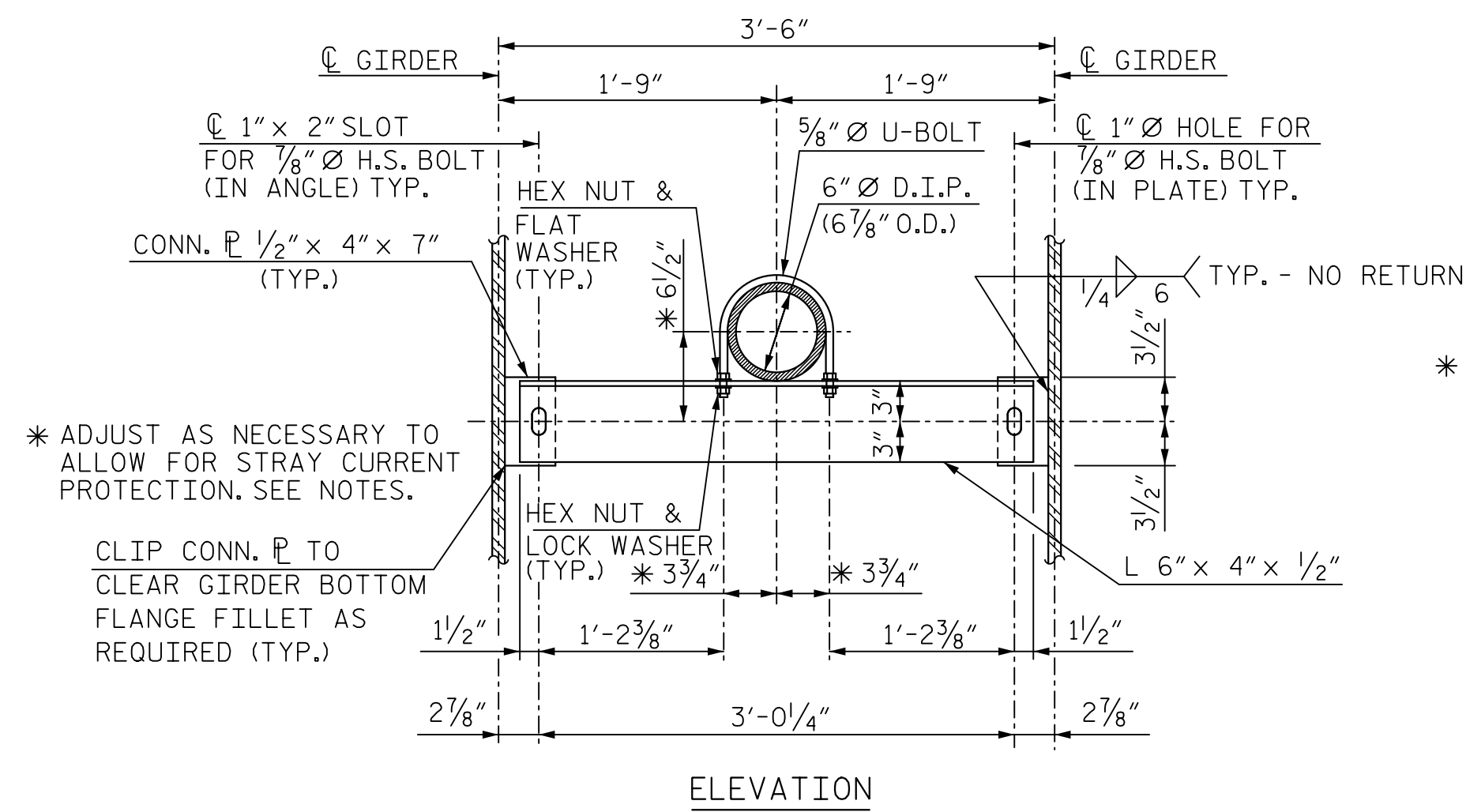
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b>		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: <u>B. VAUGHN</u>	DATE: <u>8/17</u>	DWG. NO. <u>51</u>	
CHECKED BY: <u>R. RAPP</u>	DATE: <u>9/17</u>		

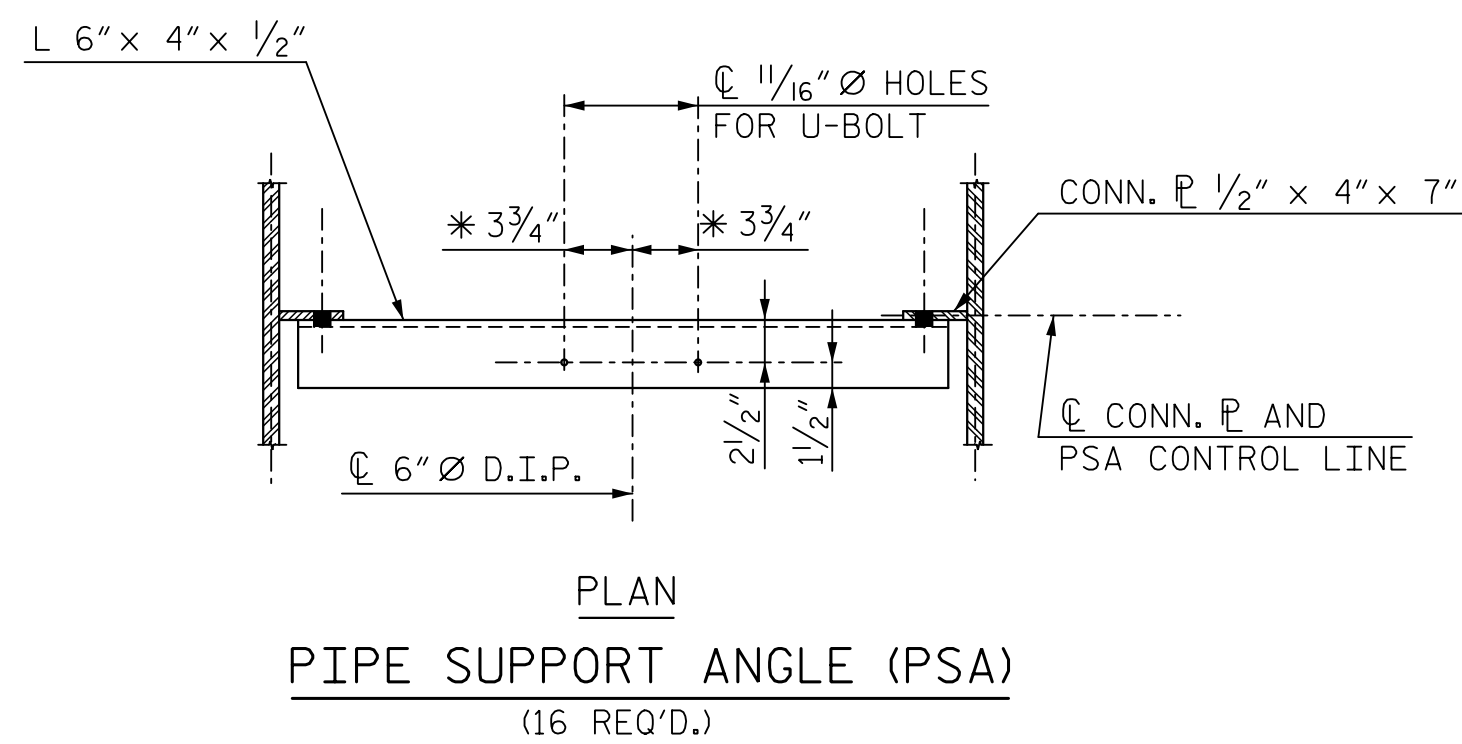
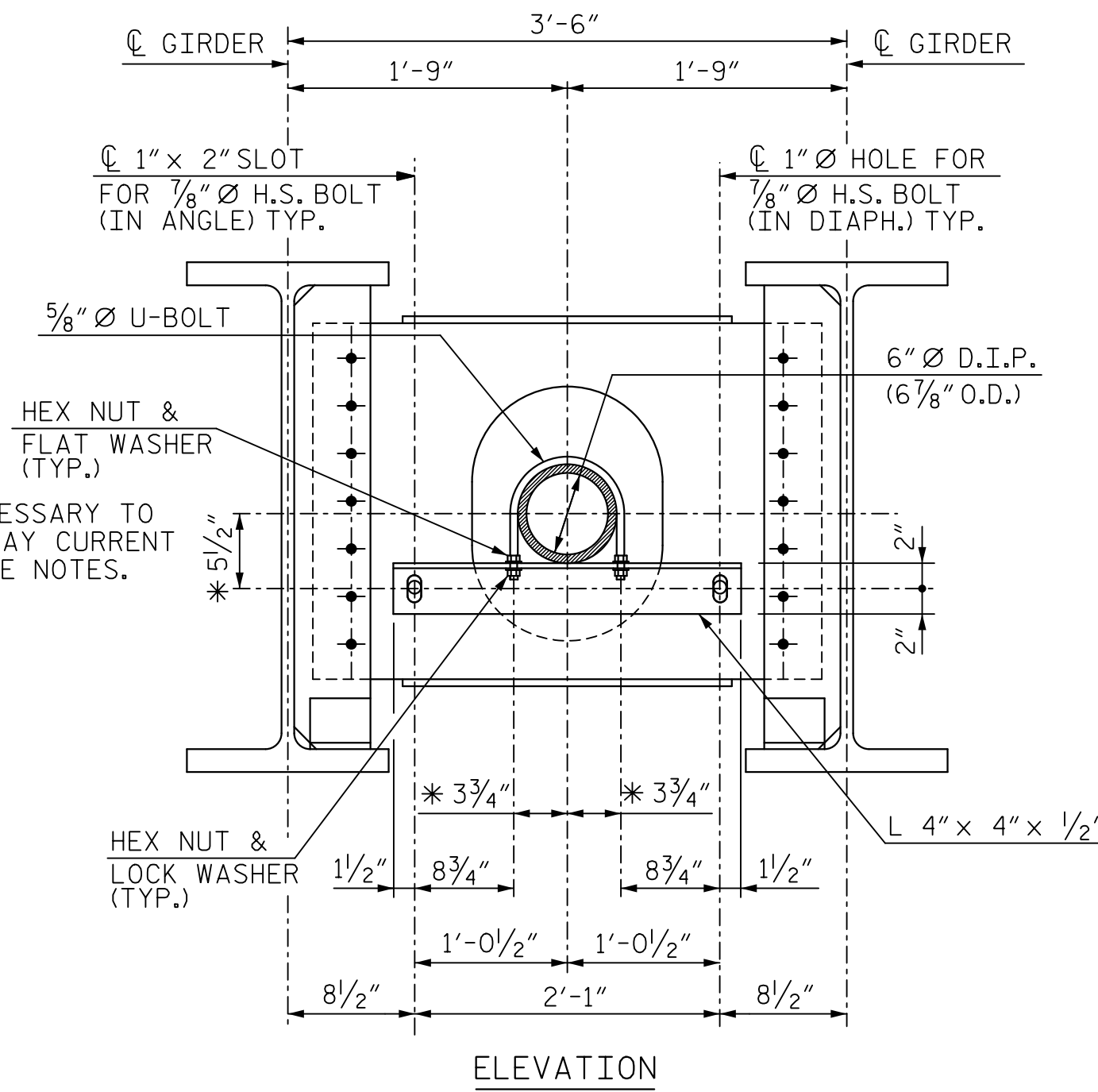
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STRUCTURE  
 DRAINAGE  
 DETAILS

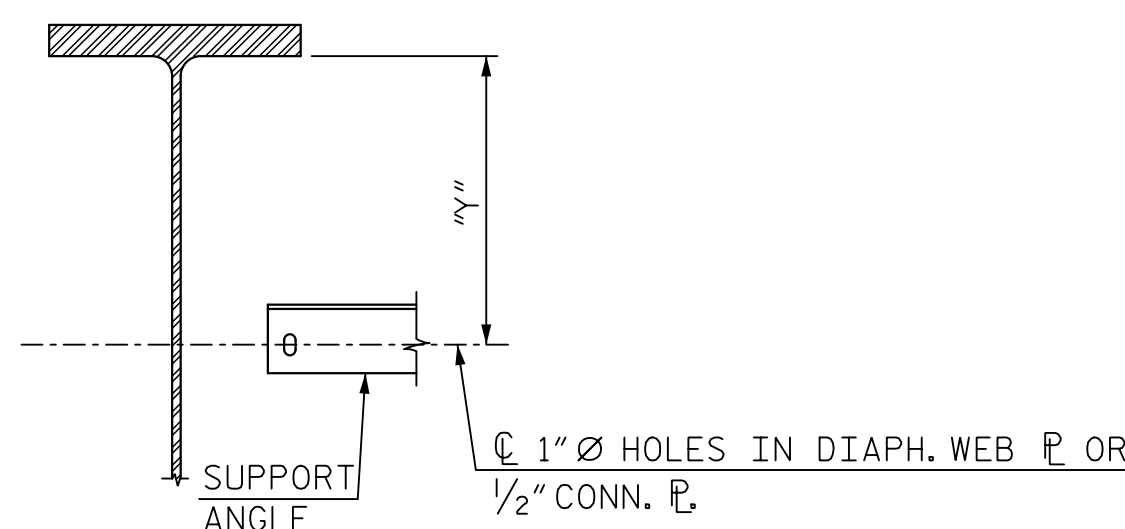
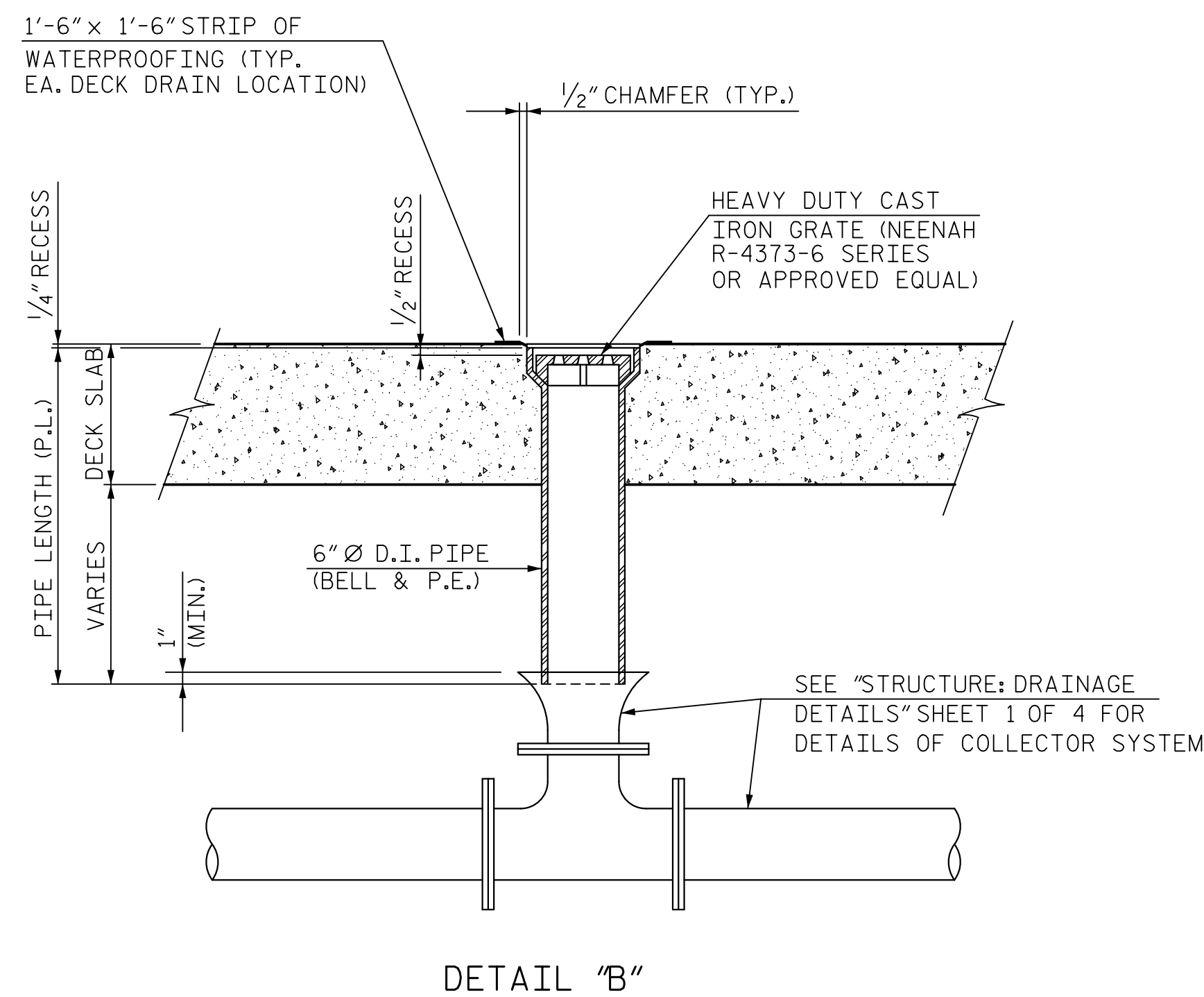
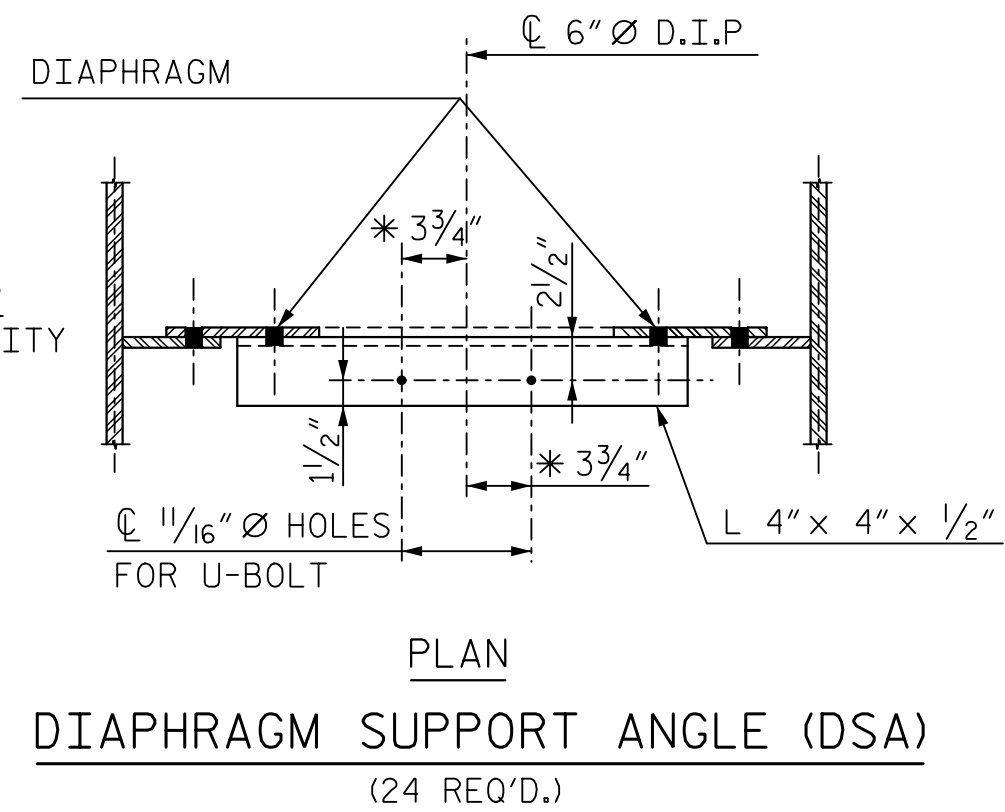
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-51
1			3			TOTAL SHEETS
2			4			56



\* ADJUST AS NECESSARY TO ALLOW FOR STRAY CURRENT PROTECTION. SEE NOTES.



**NOTE:**  
DIAPHRAGM FLANGE P NOT SHOWN FOR CLARITY



DSA	"γ"	DSA	"γ"	DSA	"γ"	DSA	"γ"	PSA	"γ"
A1	2'-7 <sup>1</sup> / <sub>8</sub> "	B1	2'-3 <sup>1</sup> / <sub>8</sub> "	C1	1'-11 <sup>5</sup> / <sub>8</sub> "	D1	2'-5 <sup>9</sup> / <sub>16</sub> "	A1	2'-8 <sup>13</sup> / <sub>16</sub> "
A2	2'-5 <sup>3</sup> / <sub>4</sub> "	B2	2'-1 <sup>7</sup> / <sub>8</sub> "	C2	2'-0 <sup>13</sup> / <sub>16</sub> "	D2	2'-6 <sup>3</sup> / <sub>16</sub> "	A2	2'-6"
		B3	2'-0 <sup>9</sup> / <sub>16</sub> "	C3	2'-2 <sup>1</sup> / <sub>16</sub> "			A3	2'-8 <sup>15</sup> / <sub>16</sub> "
		B4	1'-11 <sup>1</sup> / <sub>4</sub> "	C4	2'-3 <sup>1</sup> / <sub>4</sub> "			A4	2'-5 <sup>15</sup> / <sub>16</sub> "
								B1	2'-4 <sup>13</sup> / <sub>16</sub> "
								B2	1'-11 <sup>15</sup> / <sub>16</sub> "
								C1	2'-0 <sup>1</sup> / <sub>4</sub> "
								C2	2'-4 <sup>7</sup> / <sub>16</sub> "
								D1	2'-5 <sup>13</sup> / <sub>16</sub> "
								D2	2'-8 <sup>1</sup> / <sub>2</sub> "
								D3	2'-5 <sup>15</sup> / <sub>16</sub> "
								D4	2'-8 <sup>3</sup> / <sub>8</sub> "

**NOTES:**

- ALL PIPES, FLANGES AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON.
- ALL BENDS TO BE SHORT RADIUS, INCLUDING FLANGE & FLARE BENDS, UNLESS OTHERWISE NOTED.
- FOR LOCATIONS AND DESIGNATIONS OF DSA & PSA, SEE FRAMING PLAN SHEETS.
- PIPE LENGTHS SHOWN ALLOW FOR 1/8" THICK GASKETS TO BE USED AT ALL BOLTED FLANGE CONNECTIONS.
- MAKE FINAL PIPE ALIGNMENT AND TIGHTEN U-BOLTS AFTER RAILROAD TRACK HAS BEEN LAID ACROSS THE BRIDGE.
- PAYMENT FOR ALL MATERIALS, FABRICATION, INSTALLATION AND ADJUSTMENTS RELATED TO STRUCTURE DRAINAGE SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR "STRUCTURE DRAINAGE SYSTEM". NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR ANY COMPONENT OF THE STRUCTURE DRAINAGE SYSTEM INCLUDING, BUT NOT LIMITED TO:
  - DUCTILE IRON PIPE AND FITTINGS AND CAST IRON GRATES
  - GASKETS AND PVC OR NEOPRENE COATED STRIPS
  - STEEL SUPPORT ANGLES AND PLATES
  - U-BOLTS AND H.S. BOLTS, WASHERS AND NUTS
  - OFFSET PIPE CLAMPS AND EXPANSION ANCHOR BOLTS
  - EXPANSION JOINT
- PROVIDE PVC OR NEOPRENE-COATED STRIPS EPOXY-CEMENTED TO THE U-BOLT OR PIPE FOR STRAY CURRENT PROTECTION.
- THE OUTSIDE COATING FOR D.I. PIPE SHALL BE PAINTED WITH A SHOP PRIME COAT OF INORGANIC ZINC PRIMER AND A FINISH (FIELD) COATING OF ACRYLIC PAINT AS SPECIFIED FOR THE STRUCTURAL STEEL.
- FOR STRUCTURE DRAINAGE SYSTEM, SEE SPECIAL PROVISIONS.

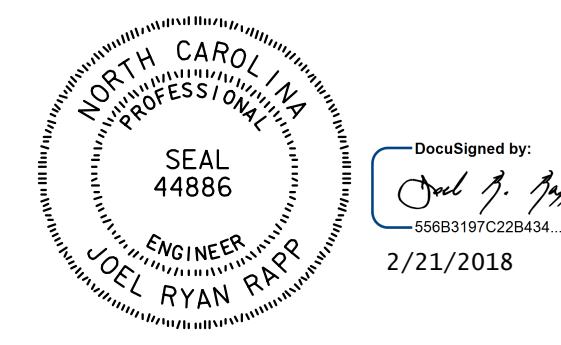
SUPERSTRUCTURE DRAINAGE SYSTEM ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
6" I.D. DUCTILE IRON PIPE, CLASS 53 (FLANGED BOTH ENDS)	FEET	251'-0 <sup>1</sup> / <sub>8</sub> "
6" I.D. DUCTILE IRON PIPE, CLASS 53 (FLANGE & P.E.)	FEET	4'-5 <sup>1</sup> / <sub>2</sub> "
6" I.D. DUCTILE IRON PIPE, CLASS 53 (BELL & P.E.)	FEET	46'-4 <sup>15</sup> / <sub>16</sub> "
6" I.D. DUCTILE IRON PIPE FLANGED FITTINGS, 250 psi P.R.	LBS	4,420
6" I.D. DUCTILE IRON BLIND FLANGES	LBS	200
EXPANSION JOINT	EA.	4
HEAVY DUTY CAST IRON GRATES	EA.	32
PIPE SUPPORT ANGLES (PSA) *	EA.	16
DIAPHRAGM SUPPORT ANGLES (DSA) *	EA.	24

\* INCLUDES U-BOLTS, ANGLES, NUTS, BOLTS, WASHERS AND PLATES.

FOR SUBSTRUCTURE DRAINAGE SYSTEM ESTIMATED QUANTITIES, SEE "STRUCTURE: DRAINAGE DETAILS" SHEET 3 OF 4.

PROJECT NO. P-5705BA  
 MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 2 OF 4



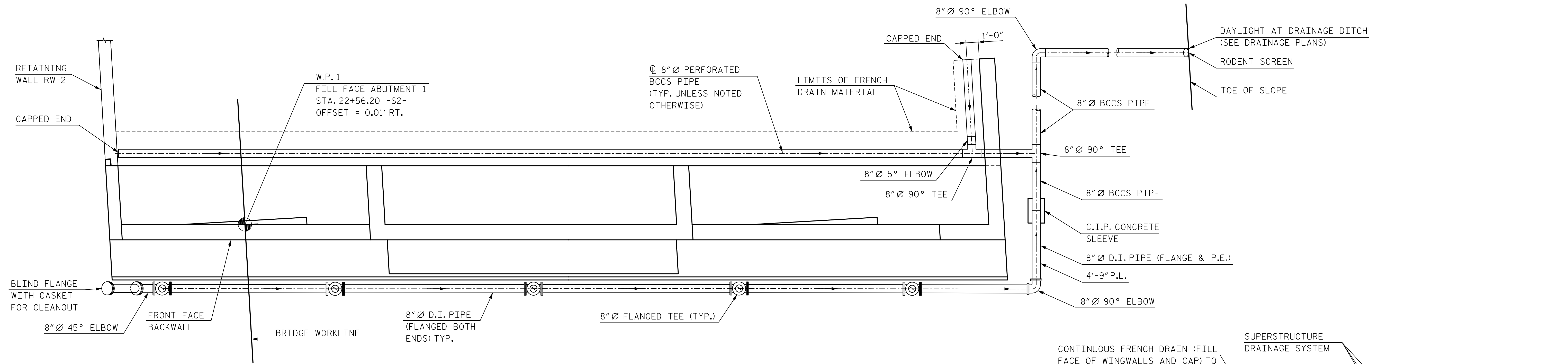
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS					SHEET NO. S5-52 TOTAL SHEETS 56	
	NO.	BY	DATE	NO.	BY		DATE
	1			3			
DRAWN BY <u>B. VAUGHN</u> DATE <u>8/17</u> CHECKED BY <u>R. RAPP</u> DATE <u>9/17</u> DWG. NO. 52							

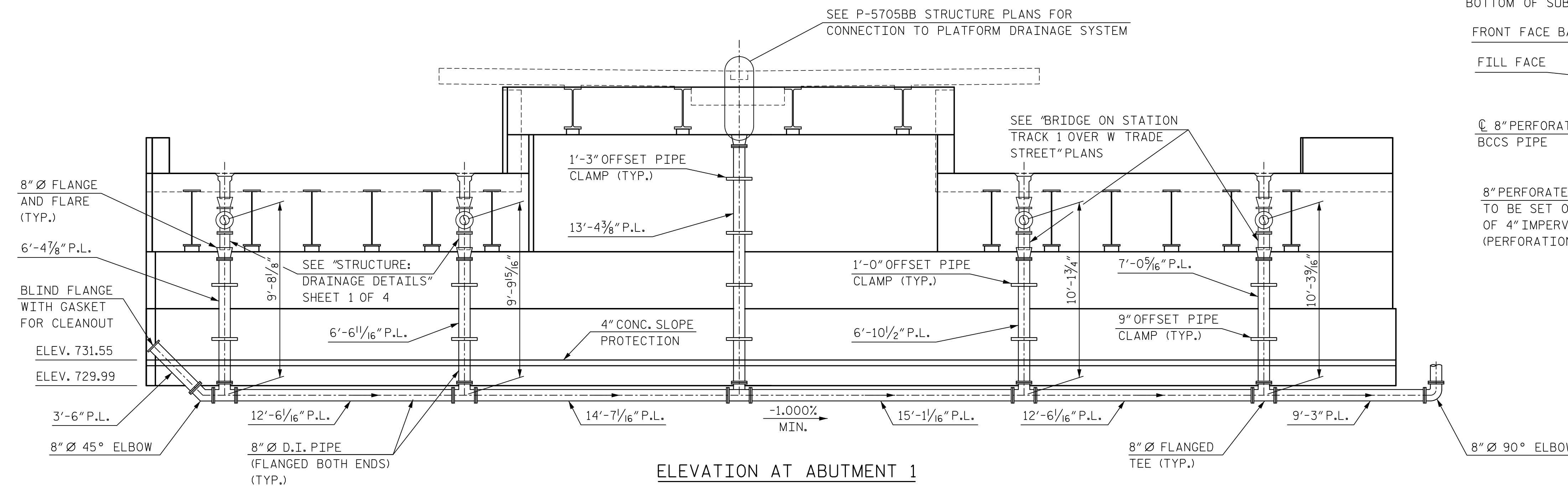
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STRUCTURE  
 DRAINAGE  
 DETAILS

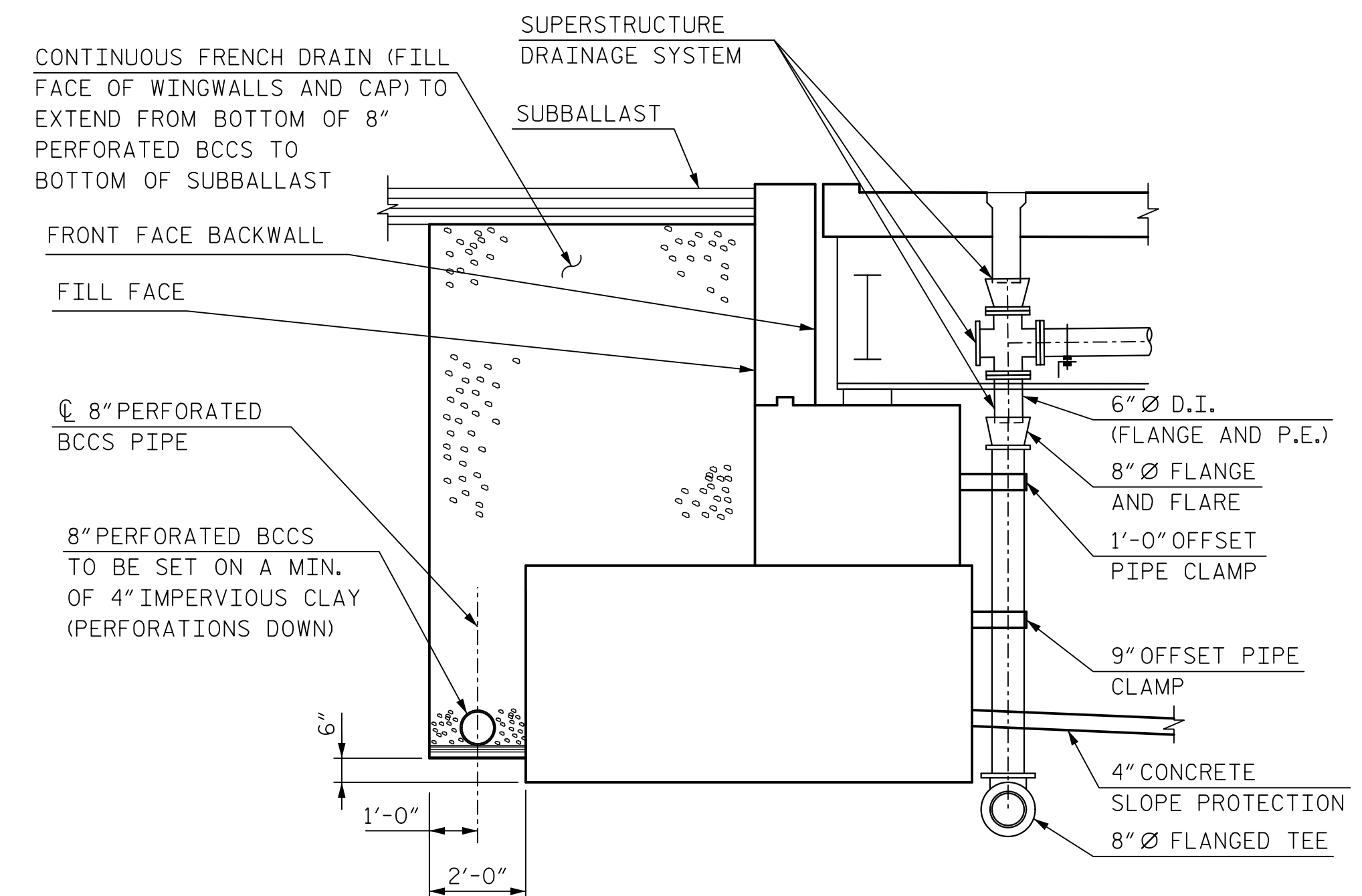




DRAINAGE LAYOUT AT ABUTMENT 1



ELEVATION AT ABUTMENT 1  
(LOOKING AT FRONT FACE)



ABUTMENT DRAINAGE DETAIL

SUBSTRUCTURE DRAINAGE SYSTEM ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
8" I.D. DUCTILE IRON PIPE, CLASS 53 (FLANGED BOTH ENDS)	FEET	205'-11 3/16"
8" I.D. DUCTILE IRON PIPE, CLASS 53 (FLANGE & P.E.)	FEET	8'-9"
8" I.D. DUCTILE IRON PIPE FLANGED FITTINGS, 250 psi P.R.	LBS	2,535
8" I.D. DUCTILE IRON BLIND FLANGES	LBS	84
8" I.D. OFFSET PIPE CLAMPS (9")	EA.	10
8" I.D. OFFSET PIPE CLAMPS (1'-0")	EA.	10
8" I.D. OFFSET PIPE CLAMPS (1'-3")	EA.	4

NOTES:

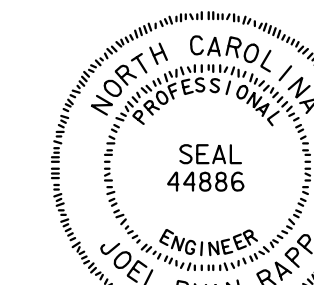
FOR ADDITIONAL DETAILS, SEE "STRUCTURE: DRAINAGE DETAILS" SHEET 4 OF 4.

ALL DIMENSIONS ARE SUBJECT TO ADJUSTMENTS TO FIT MEASUREMENTS TAKEN AFTER DECKS HAVE BEEN POURED.

D.I. = DUCTILE IRON

P.L. = PIPE LENGTH

P.E. = PLAIN END



DocuSigned by:  
Joel R. Rapp  
56863197C228434...  
2/21/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
STATION: POT STA. 23+62.98 -S2-

SHEET 3 OF 4

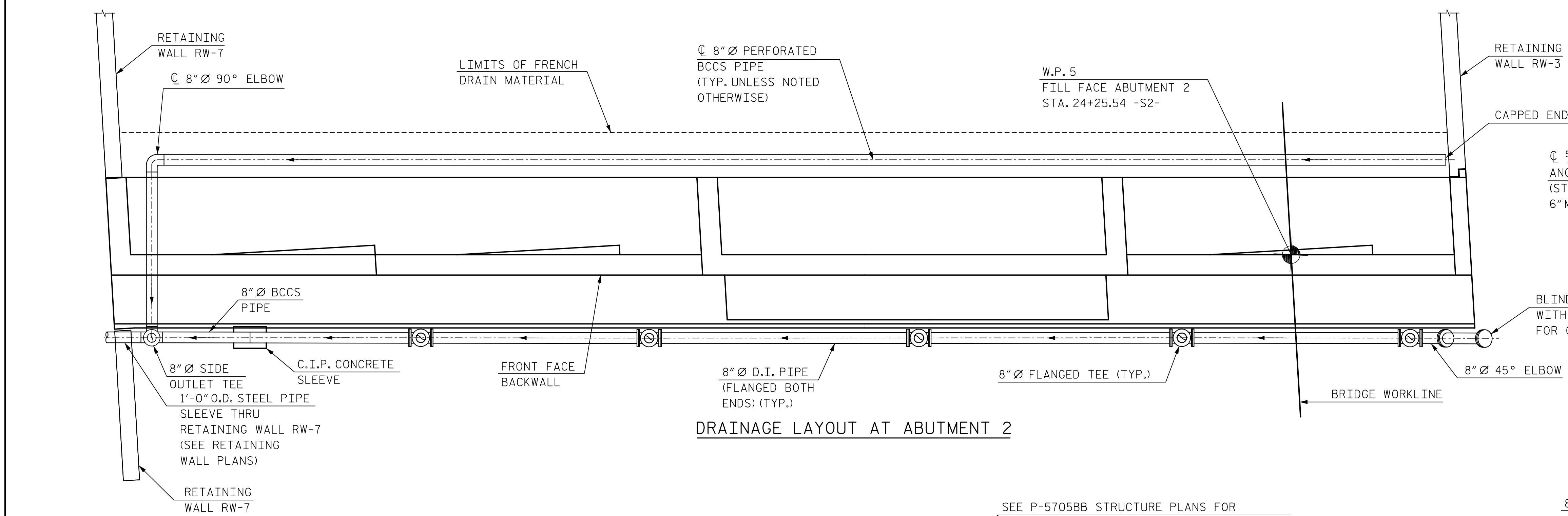
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STRUCTURE  
DRAINAGE  
DETAILS

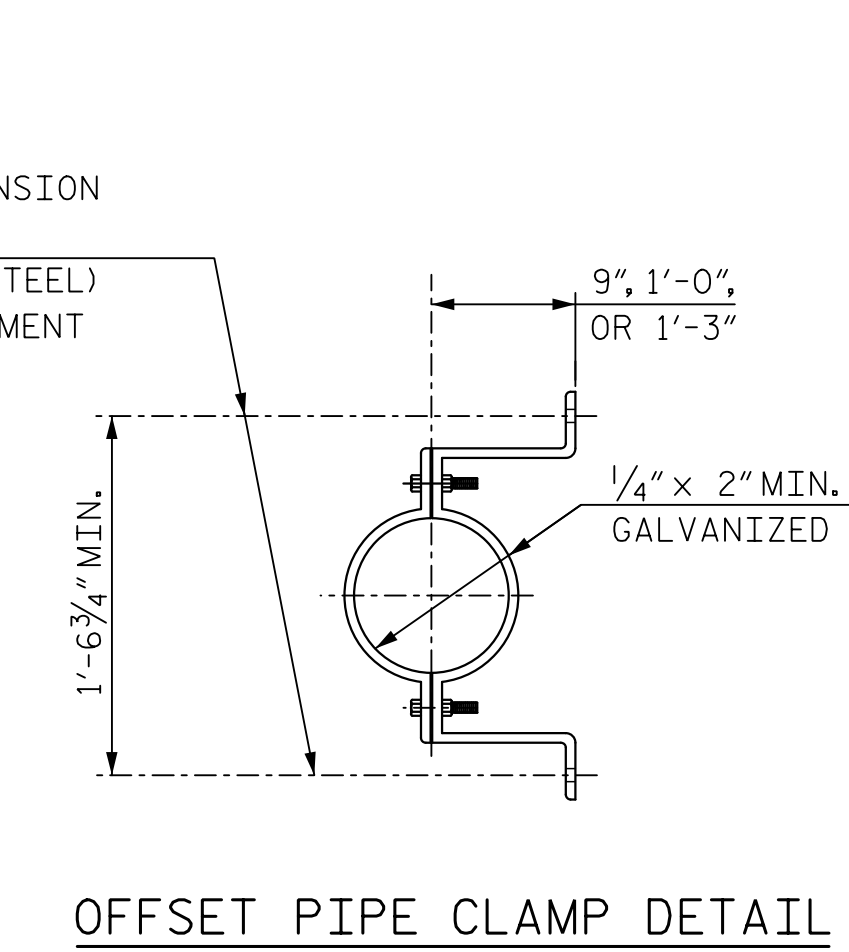
**HNTB** HNTB NORTH CAROLINA, P.C.  
NC License No. C-1554  
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY B. VAUGHN DATE 10/17  
CHECKED BY R. RAPP DATE 10/17 DWG. NO. 53

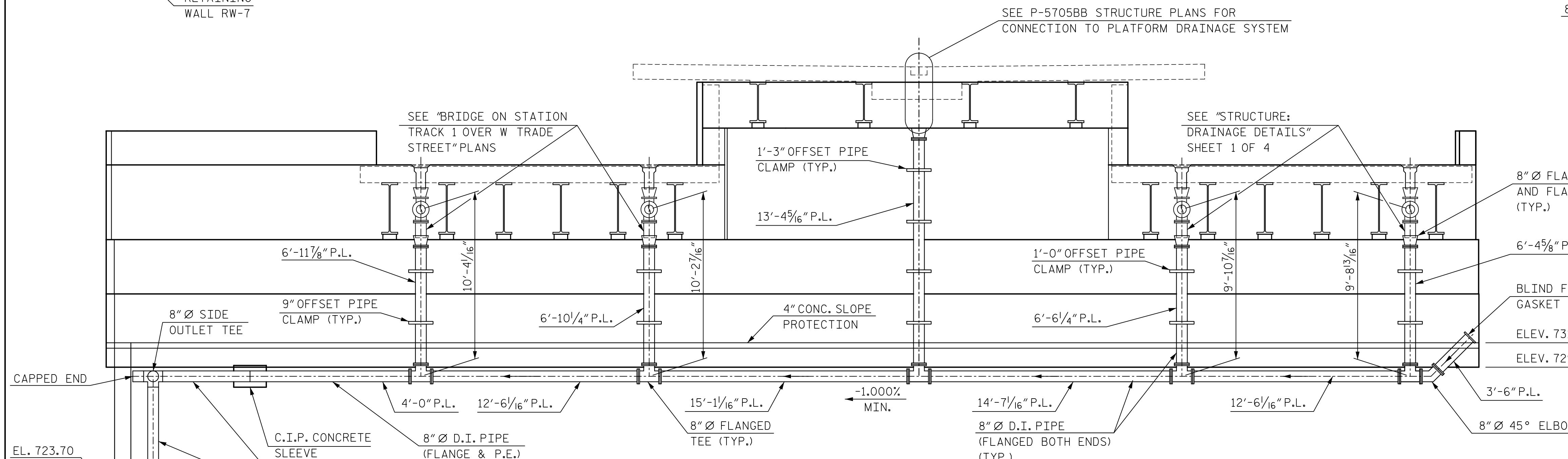
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-53
1			3			TOTAL SHEETS
2			4			56



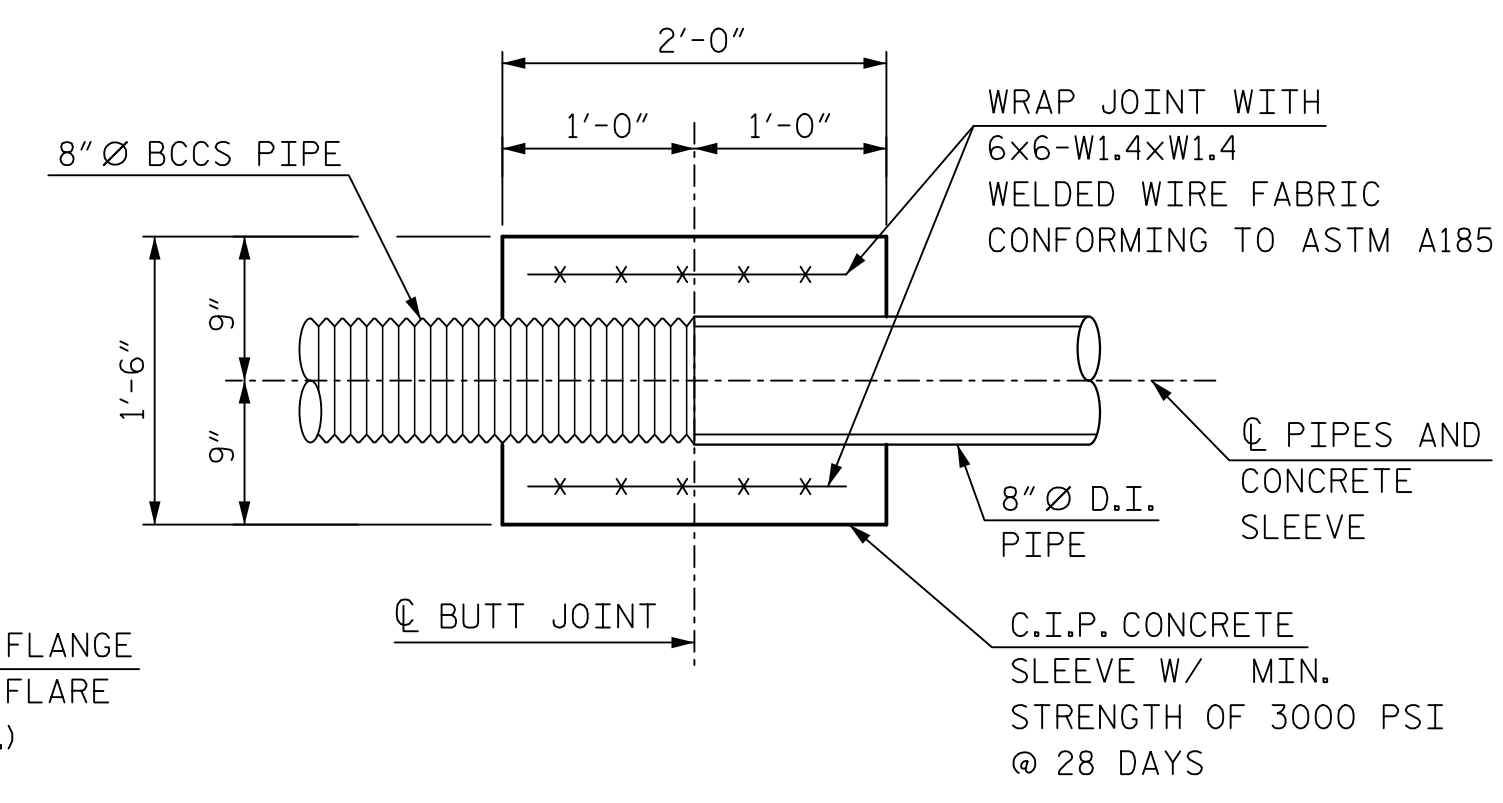
DRAINAGE LAYOUT AT ABUTMENT 2



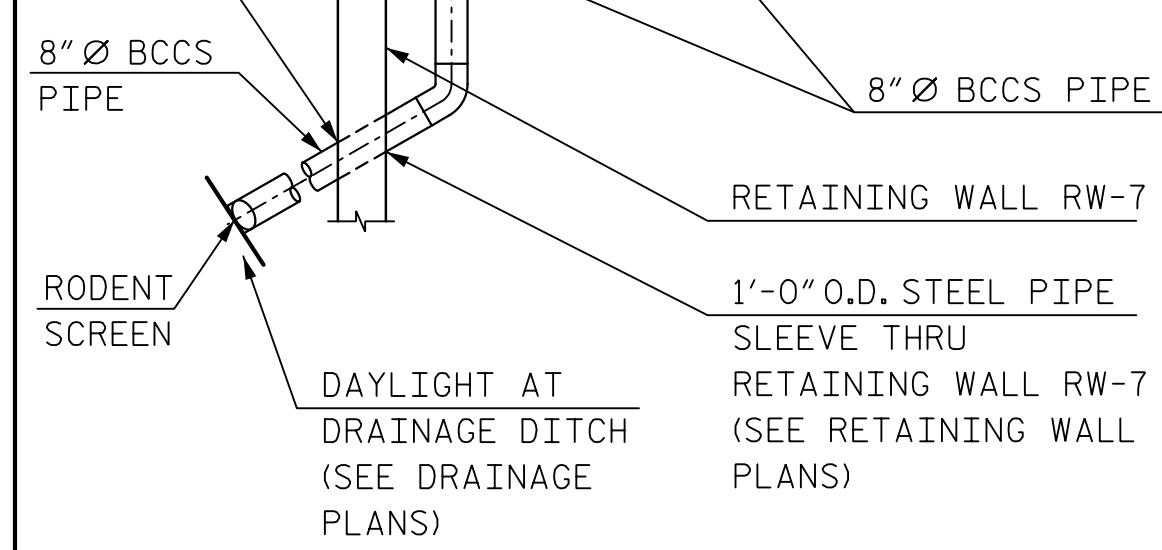
OFFSET PIPE CLAMP DETAIL



ELEVATION AT ABUTMENT 2  
(LOOKING AT FRONT FACE)

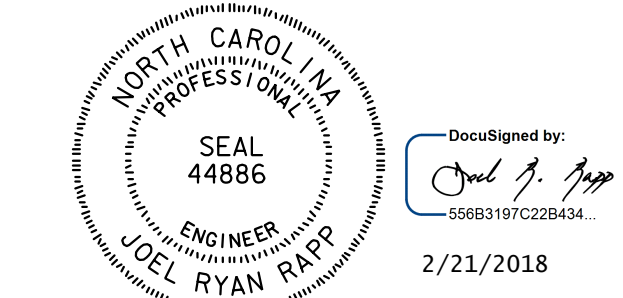


DIP-BCCS JOINT DETAIL



CAPPED END

**NOTES:**  
 FOR SUBSTRUCTURE DRAINAGE SYSTEM ESTIMATED QUANTITIES AND ADDITIONAL DETAILS, SEE "STRUCTURE: DRAINAGE DETAILS" SHEET 3 OF 4.  
 ALL DIMENSIONS ARE SUBJECT TO ADJUSTMENTS TO FIT MEASUREMENTS TAKEN AFTER DECKS HAVE BEEN POURED.  
 D.I. = DUCTILE IRON  
 P.L. = PIPE LENGTH  
 P.E. = PLAIN END



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. P-5705BA  
MECKLENBURG COUNTY  
 STATION: POT STA. 23+62.98 -S2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STRUCTURE  
 DRAINAGE  
 DETAILS

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	REVISIONS				SHEET NO. S5-54 TOTAL SHEETS 56		
	NO.	BY	DATE	NO.		BY	DATE
	1		10/17	3			
DRAWN BY <u>B. VAUGHN</u> CHECKED BY <u>R. RAPP</u>	DATE <u>10/17</u> DATE <u>10/17</u>	DWG. NO. 54	2 4				