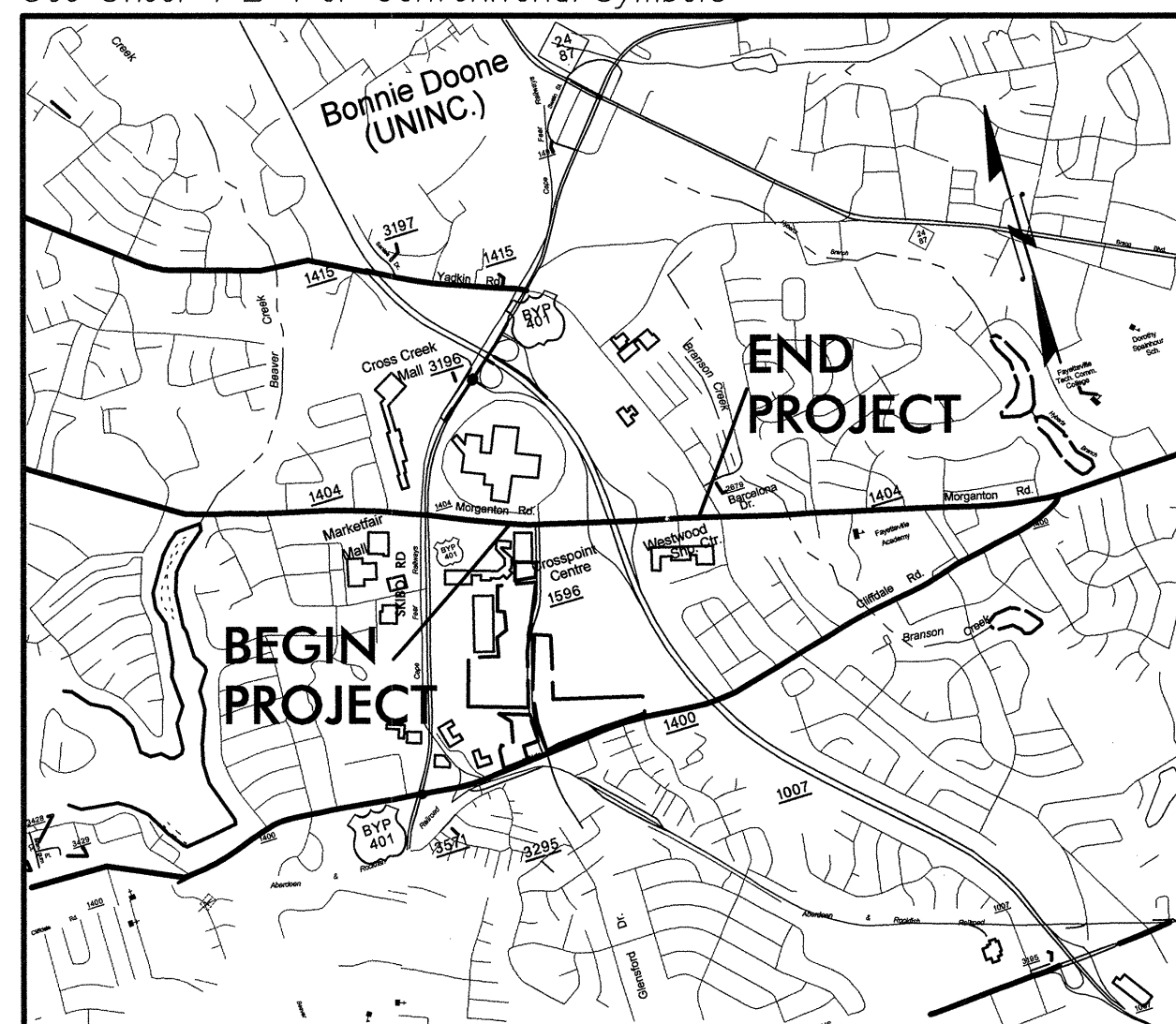


See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CUMBERLAND COUNTY**

**LOCATION: SR 1404 (MORGANTON ROAD) FROM SYCAMORE DAIRY ROAD TO GLENSFORD ROAD**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4756	S-1	
WBS NO.	F.A. PROJ. NO.	DESCRIPTION	
39750.1.1	STP-1404(9)	P.E.	
39750.2.1	STP-1404(9)	R/W, UTL	
39750.3.1	STP-1404(9)	CONST	

**TIP PROJECT: U-4756**

**CONTRACT: C201461**

**STRUCTURES**

BEGIN TIP PROJECT U-4756  
-L- STA. 27+92.30

TO SKIBO ROAD  
(US 401 BYPASS)

BEGIN CONSTRUCTION  
-RPC- STA. 10+00.00

BEGIN CONSTRUCTION  
-RPB- STA. 10+00.00

BEGIN BRIDGE  
-L- STA. 43+67.18

MORGANTON RD.  
END BRIDGE  
-L- STA. 46+10.52

BEGIN CONSTRUCTION  
-Y3- STA. 10+00.00

END TIP PROJECT U-4756  
-L- STA. 59+50.00

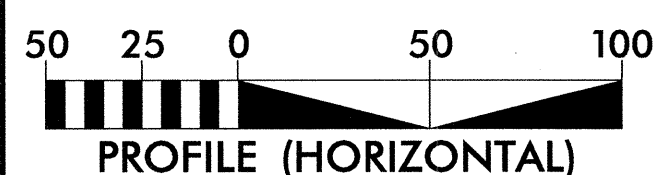
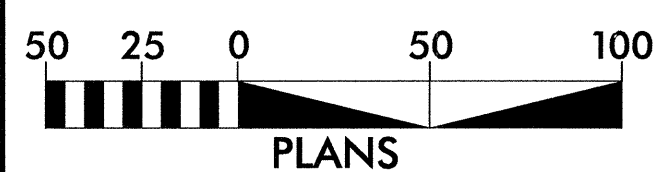
TO DOWNTOWN FAYETTEVILLE

END CONSTRUCTION  
-RPA- STA. 10+00.00

END CONSTRUCTION  
-RPD- STA. 10+00.00

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2009 = 25,900  
ADT 2029 = 52,000  
DHV = 9 %  
D = 60 %  
T = 3 % \*  
V = 40 MPH  
(\* TTST 2 % + DUAL 1 %)  
FUNC. CLASS:  
URBAN ARTERIAL

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-4756 = 0.552 MILES  
LENGTH STRUCTURE TIP PROJECT U-4756 = 0.046 MILES  
TOTAL LENGTH TIP PROJECT U-4756 = 0.598 MILES

Prepared in the Office of:  
**MULKEY**  
ENGINEERS & CONSULTANTS

FOR  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
FEBRUARY 16, 2007

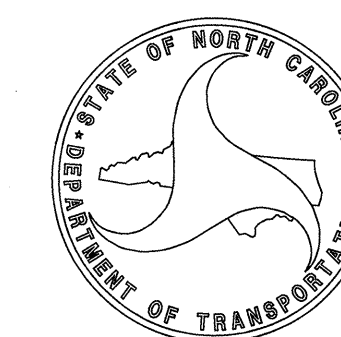
LETTING DATE:  
OCTOBER 16, 2007

NCDOT CONTACTS: TRACEY PITTMAN, PE  
MIKE SUMMERS, PE

STRUCTURES ENGINEER

SIGNATURE: *Kevin Austin* P.E.

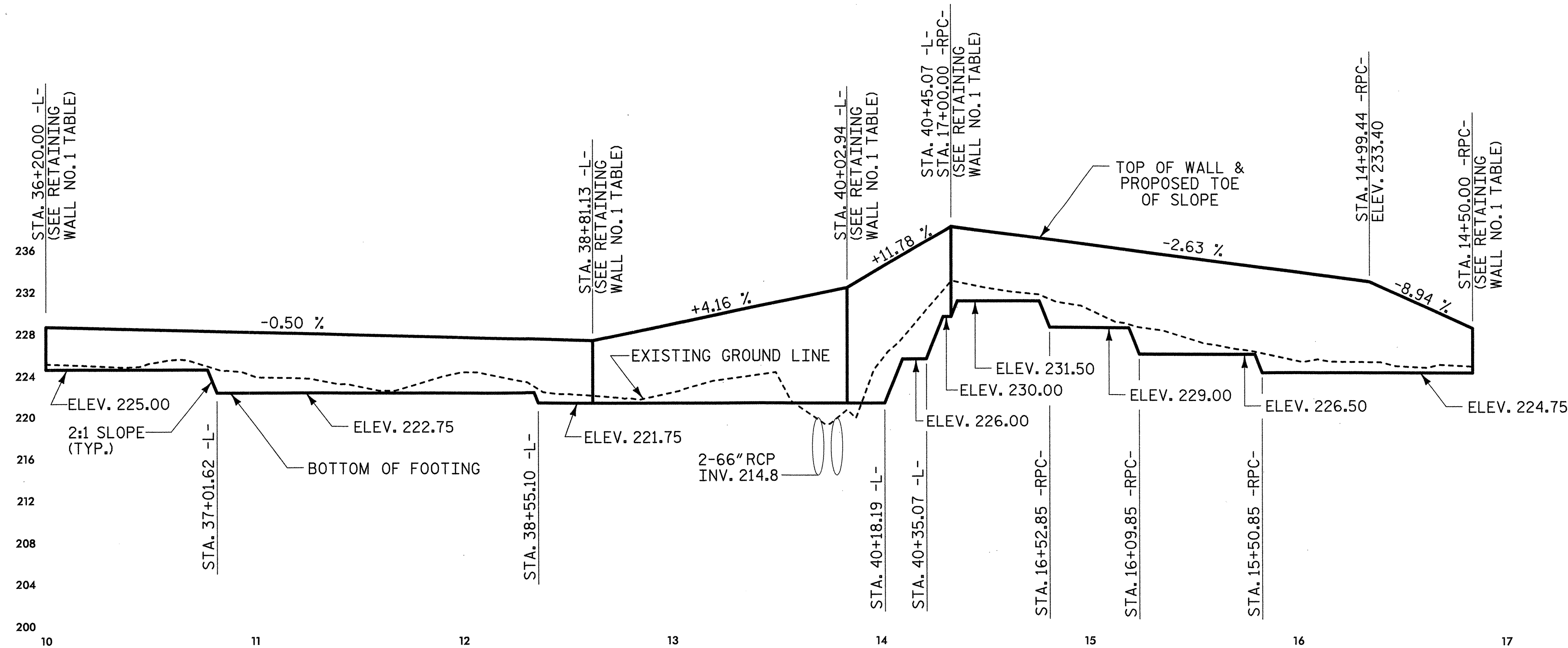
DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER

**NOTES:**

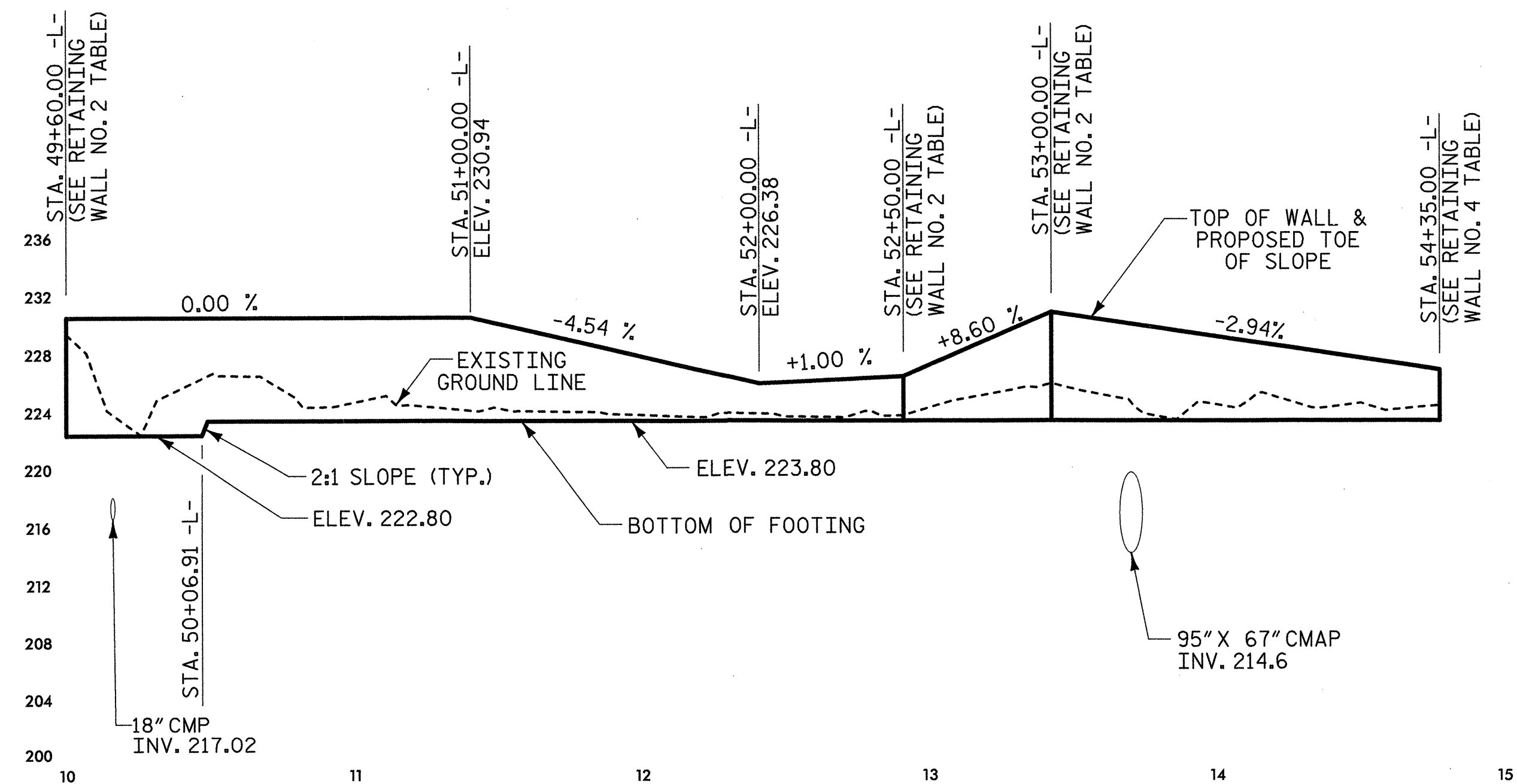
FOR PLAN VIEW OF WALLS, SEE ROADWAY  
PLAN SHEETS 4 THRU 6



**WALL 1 PROFILE**

RETAINING WALL NO. 1			
-L- STA.	OFFSET FROM C	ELEV. @ TOP OF WALL	ELEV. @ BOTTOM OF FOOTING
36+20.00	74.49' LT	229.05	225.00'
38+81.13	96.00' LT	227.73'	221.75'
40+02.94	96.00' LT	232.80'	221.75'
40+45.07	122.78' LT	238.68'	231.50'
* 17+00.00	65.00' RT	238.68'	231.50'
* 14+50.00	65.00' RT	228.98'	224.75'
GRAVITY RETAINING WALL - SQ. FEET			3542

\* STATION IS ON -RPC- AND NOT -L-



**WALL 2 PROFILE**

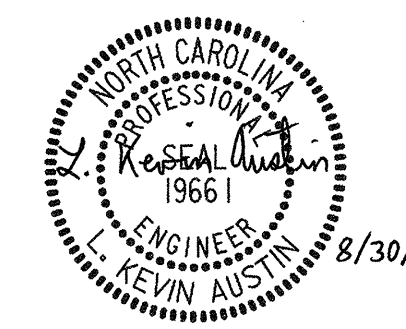
RETAINING WALL NO. 2			
-L- STA.	OFFSET FROM C	ELEV. @ TOP OF WALL	ELEV. @ BOTTOM OF FOOTING
49+60.00	99.16' LT	230.94'	220.80'
52+50.00	75.00' LT	226.88'	223.80'
53+00.00	63.00' LT	231.30'	223.80'
54+35.00	63.00' LT	227.33'	223.80'
GRAVITY RETAINING WALL - SQ. FEET			1743

PROJECT NO. U-4756  
CUMBERLAND COUNTY

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**RETAINING WALL  
PROFILES**



PLANS PREPARED BY:

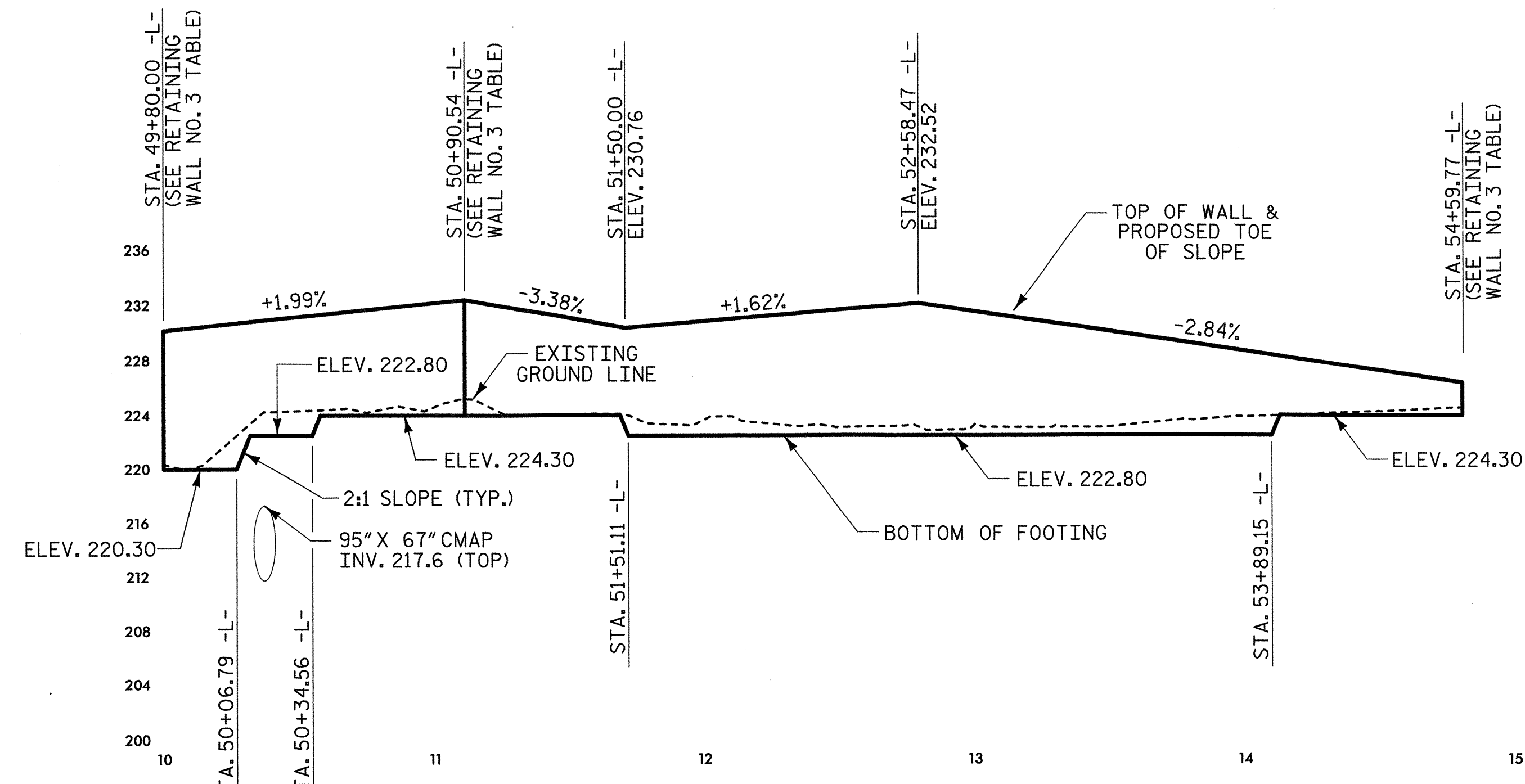


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-1
1			3			TOTAL SHEETS
2			4			

DRAWN BY : J.R. SEALEY DATE : 6/07  
CHECKED BY : L.K. AUSTIN DATE : 6/07

**NOTES:**

FOR PLAN VIEW OF WALLS, SEE ROADWAY  
PLAN SHEETS 4 THRU 6



**WALL 3 PROFILE**

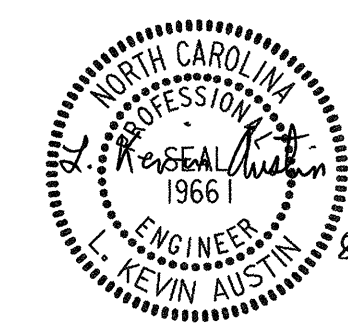
RETAINING WALL NO.3			
-L- STA.	OFFSET FROM $\phi$	ELEV. @ TOP OF WALL	ELEV. @ BOTTOM OF FOOTING
49+80.00	87.63' RT	230.55'	220.30'
50+90.54	73.59' RT	232.77'	224.30'
54+59.77	73.43' RT	226.80'	224.30'
GRAVITY RETAINING WALL - SQ. FEET			2662

PROJECT NO. U-4756  
CUMBERLAND COUNTY

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**RETAINING WALL  
PROFILES**

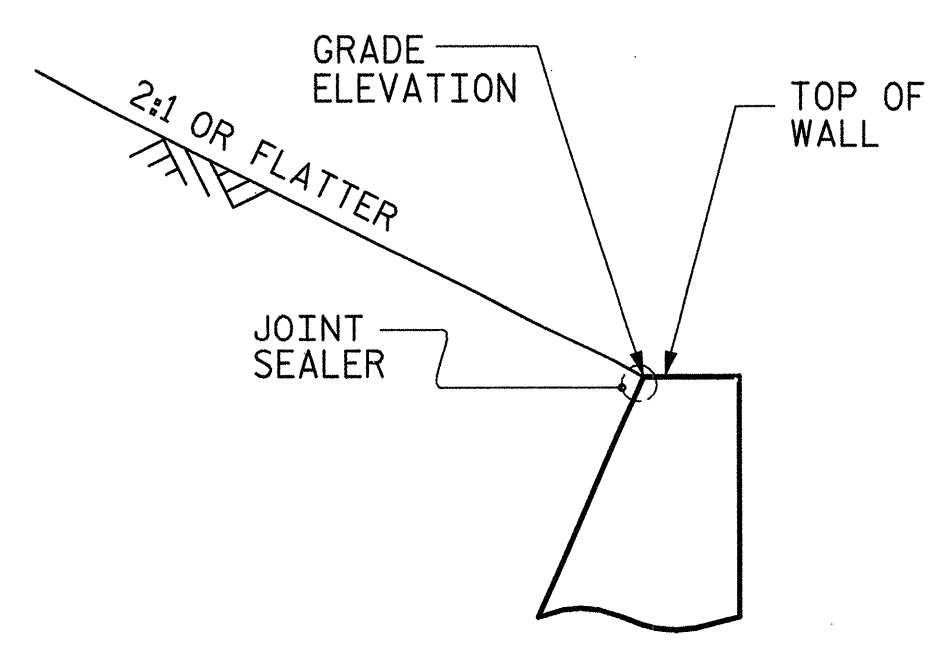


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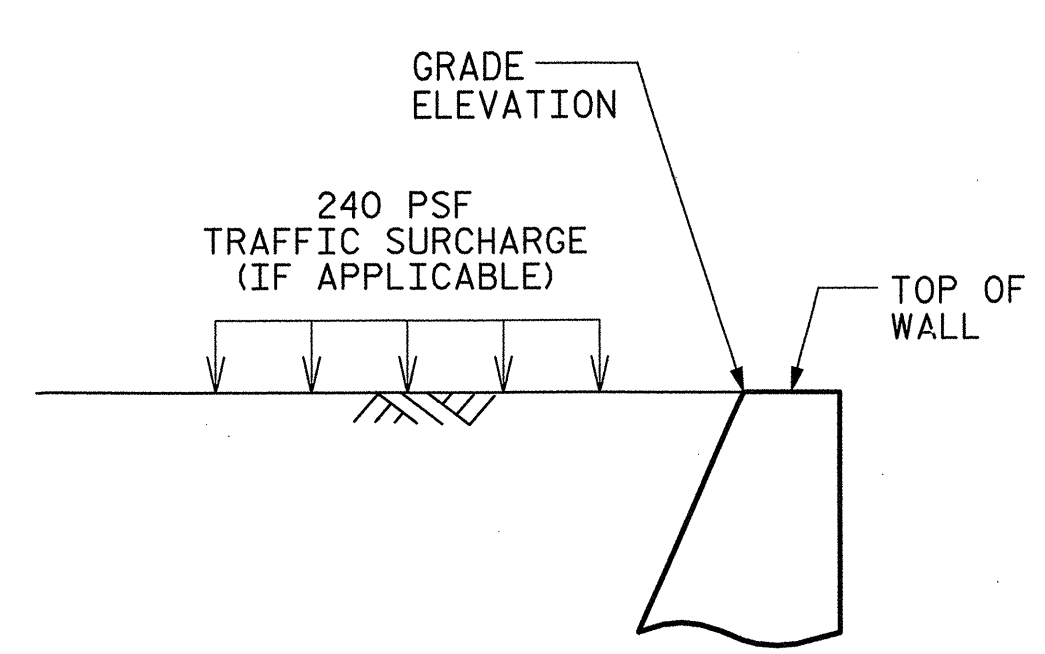


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2			4			

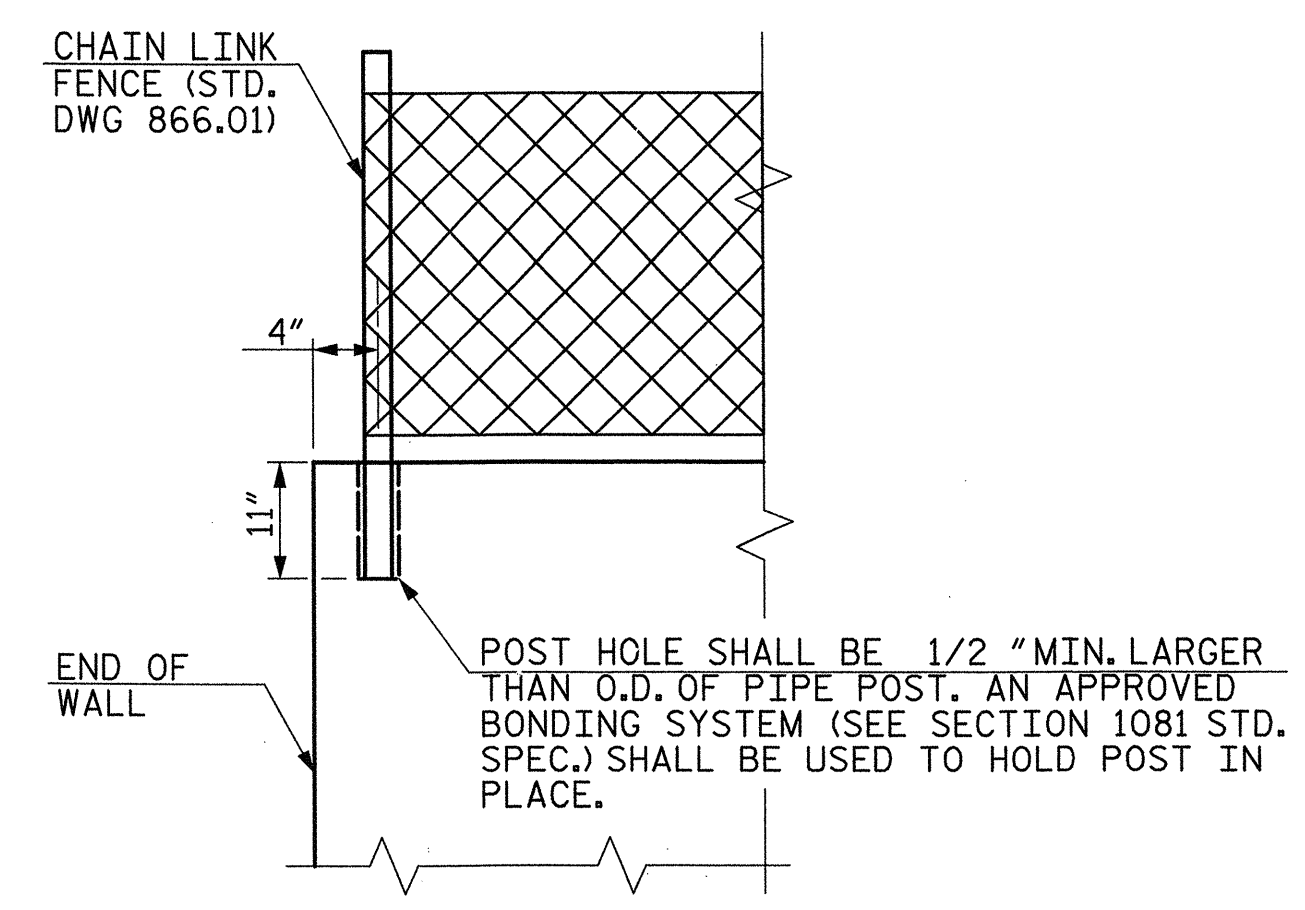
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CHECKED BY : L.K. AUSTIN DATE : 6/07



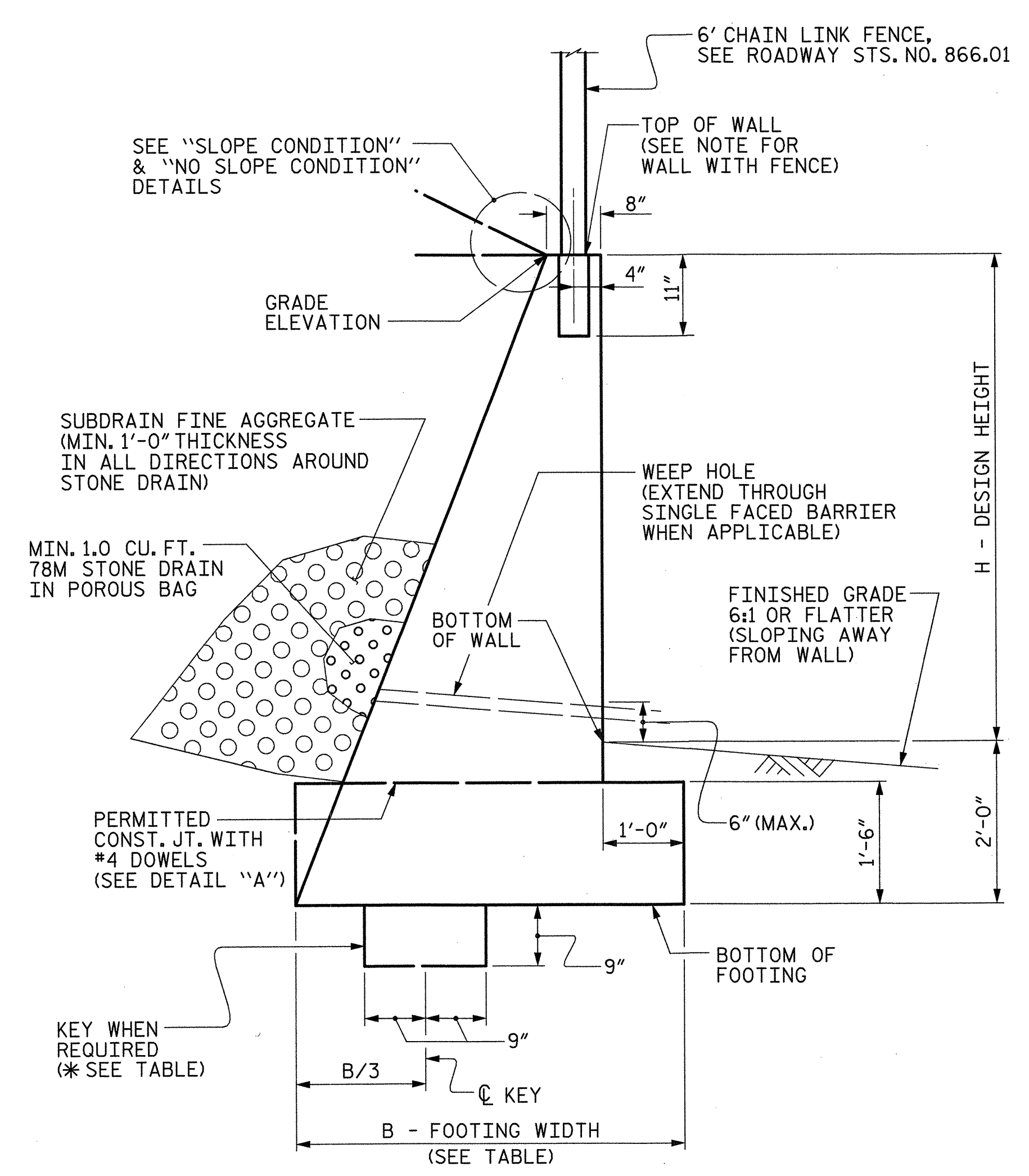
SLOPE CONDITION



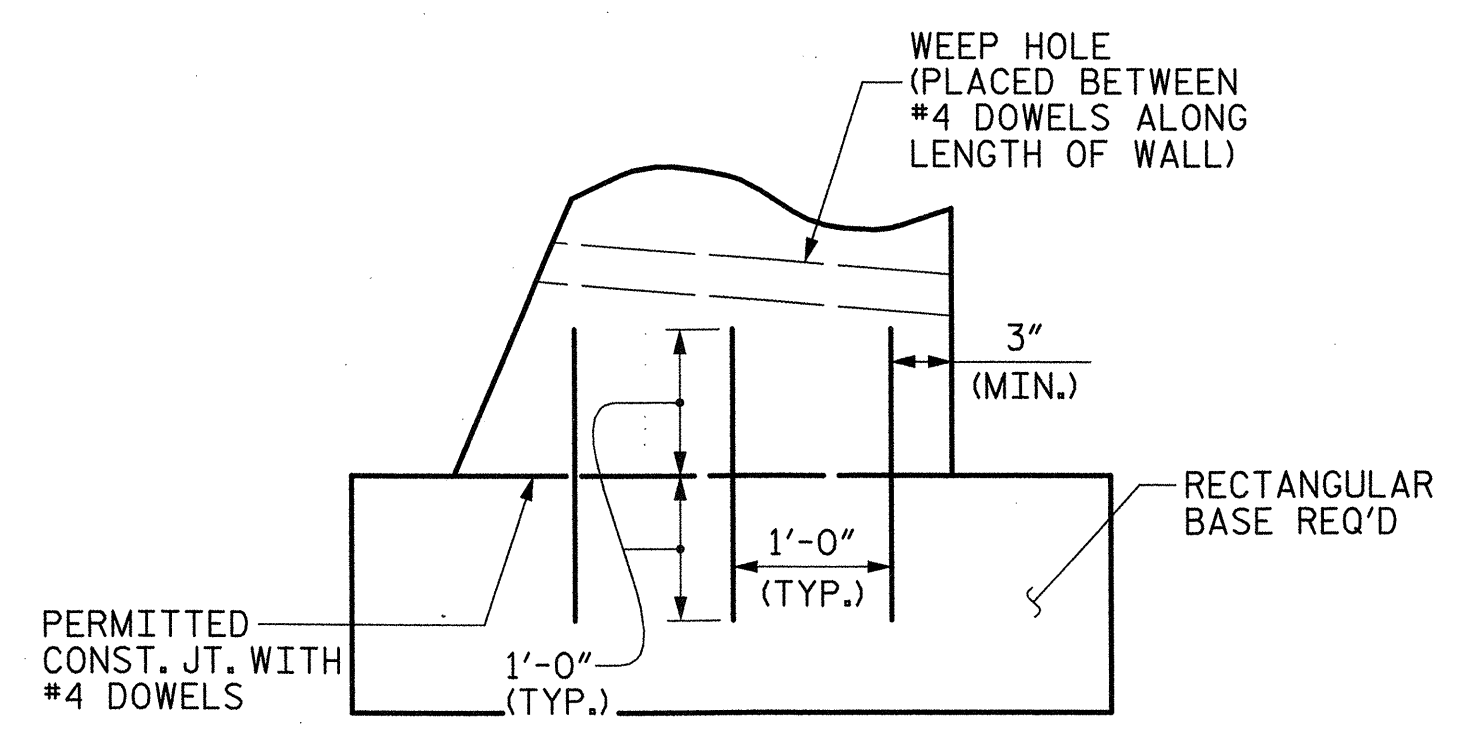
NO SLOPE CONDITION



ELEVATION



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

\* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft IS 6'-0" OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
 TOTAL UNIT WEIGHT = 120 PCF  
 COHESION = 0 PSF  
 FRICTION ANGLE = 35 DEGREES (GROUNDWATER WITHIN 5'-0" OF BOTTOM OF FOOTING)  
 FRICTION ANGLE = 30 DEGREES (GROUNDWATER MORE THAN 5'-0" BELOW BOTTOM OF FOOTING)

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" DIAMETER WEEP HOLES ON 10'-0" CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" PER FOOT SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" TALL AND 1'-0" WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" AND EXPANSION JOINTS EVERY 30'-0" ALONG THE WALL.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

CHAIN LINK FENCE SHALL BE EMBEDDED 11" INTO PROPOSED WALL WITH EPOXY OR CONCRETE GROUT ANCHORING SYSTEM AS DIRECTED BY THE ENGINEER.

THE PROPOSED RAILING SHALL BE PRE-MEASURED AND CENTERED ON TOP OF WALL FOR POST SPACINGS.

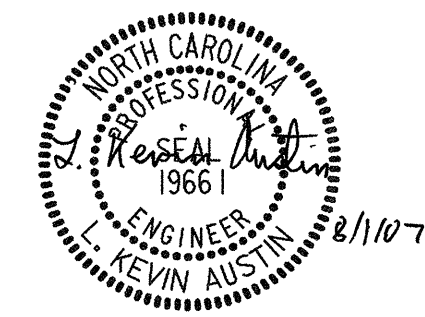
A ROTARY DRILL OR CYLINDRICAL FORM MAY BE USED TO CREATE THE POST HOLES IN THE RETAINING WALL. NO IMPACT DRILLS SHALL BE ALLOWED, TO ELIMINATE ANY POSSIBILITY OF STRUCTURAL DAMAGES TO THE PROPOSED WALL.

PROJECT NO. U-4756  
CUMBERLAND COUNTY

SHEET 1 OF 1

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**RETAINING WALL  
 DETAILS**

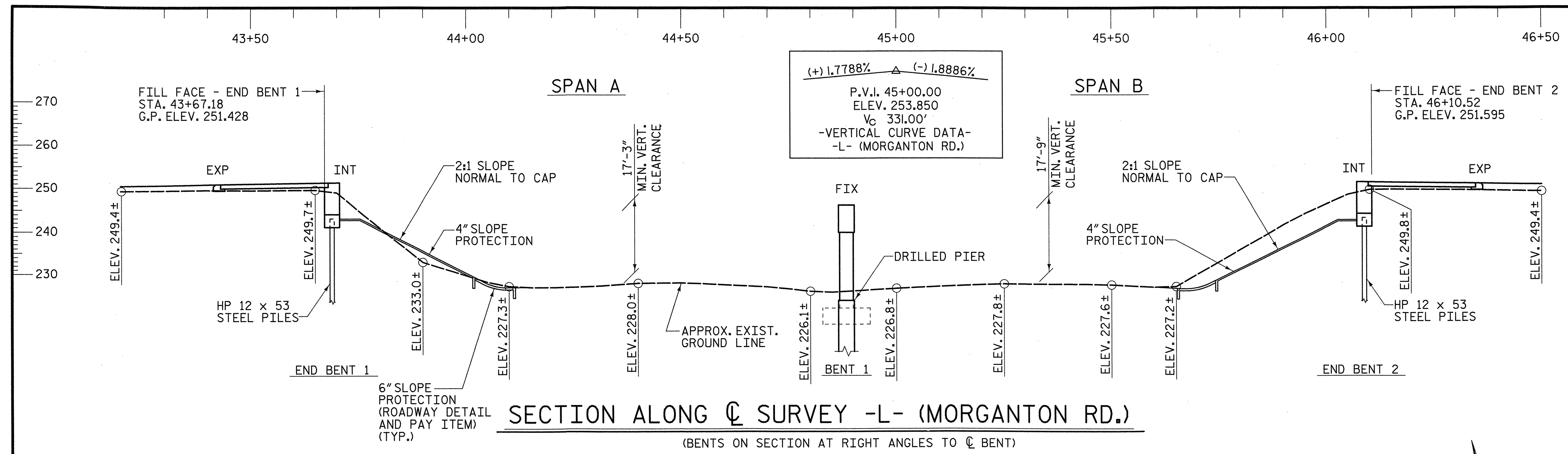


PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 P.O. Box 33127  
 Raleigh, NC 27636  
 (919) 851-1912 (FAX)  
 (919) 851-1918 (FAX)  
 WWW.MULKEYINC.COM

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			W-3
2			4			

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DRAWN BY : J.R. SEALEY DATE : 6/07  
 CHECKED BY : L.K. AUSTIN DATE : 6/07



**GENERAL NOTES**

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDERS HAVE BEEN DESIGNED FOR HS-25.

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

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.

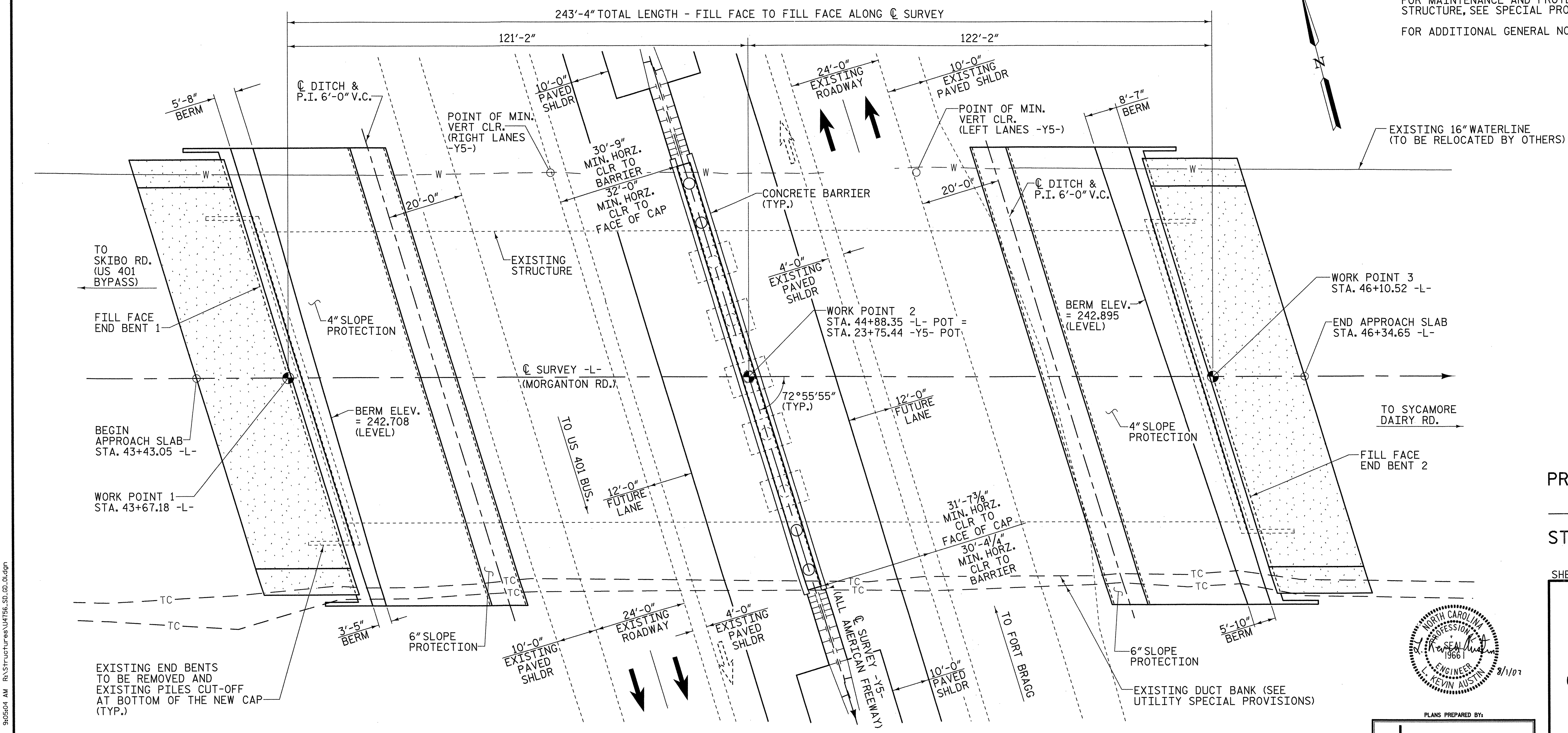
REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF CONTINUOUS COMPOSITE SPANS (1 @ 118'-6" & 1 @ 119'-6") WITH A CLEAR ROADWAY OF 64' AND A REINFORCED CONCRETE FLOOR ON CONTINUOUS STEEL PLATE GIRDERS ON END BENTS OF REINFORCED CONCRETE CAPS W/ PILES AND AN INT. BENT OF REINFORCED CONCRETE CAP ON COLUMNS AND PILE FOOTINGS SHALL BE REMOVED. (BOTH END BENTS WILL BE COMPLETELY REMOVED AND ONLY THE CAP OF THE INTERIOR BENT WILL BE REMOVED.)

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

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

FOR ADDITIONAL GENERAL NOTES, SEE SHEET S-3.

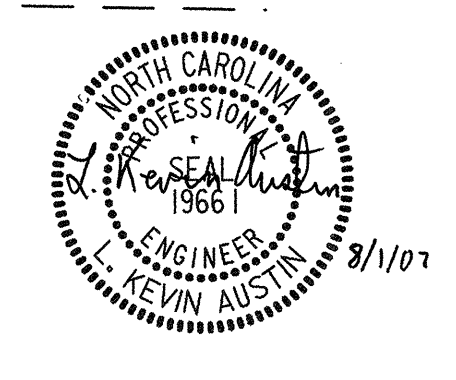


PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-  
23+75.44 -Y5-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING FOR  
 BRIDGE ON MORGANTON RD.  
 OVER ALL AMERICAN FREEWAY  
 BETWEEN SKIBO RD. AND  
 SYCAMORE DAIRY RD.



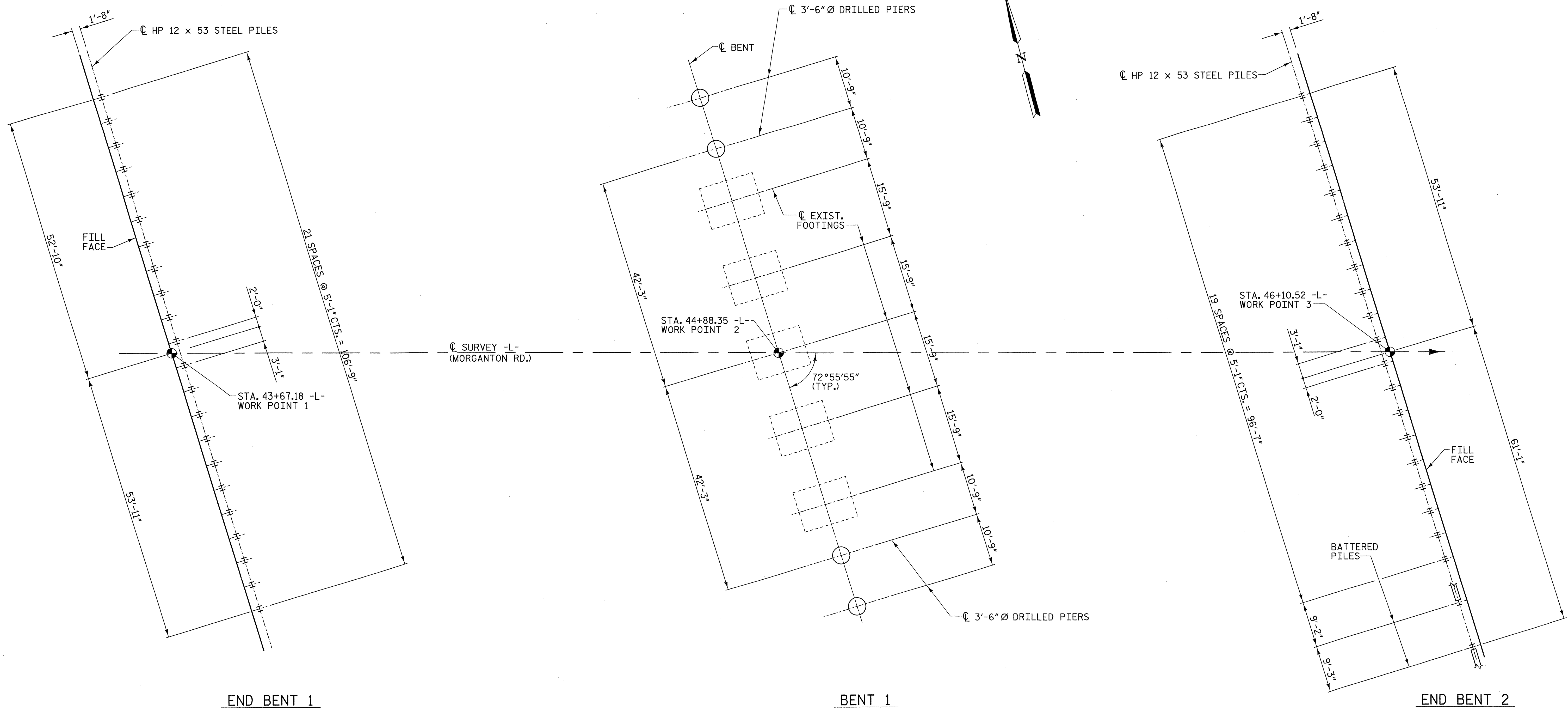
PLANS PREPARED BY:

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 100 BOX 32127  
 RALEIGH, N.C. 27636  
 (919) 851-1912  
 (919) 851-1918 (FAX)  
 WWW.MULKEYINC.COM

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

DRAWN BY: W. B. ALLEN DATE: 2/07  
 CHECKED BY: M. A. AVERETTE DATE: 2/07

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**FOUNDATION LAYOUT**

NOTES:  
 ALL PILES ARE HP 12 x 53  
 PILES FOR END BENT NO. 1 AND 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 90 TONS EACH.  
 WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.  
 1:12 BATTER FOR PILES 21 AND 22 AT END BENT 2.  
 DIMENSIONS LOCATING PILES AND PIERS ARE SHOWN TO THE PILE CENTERLINE.

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 2 OF 3



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
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 WWW.MULKEYINC.COM

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

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

DRAWN BY : W. B. ALLEN DATE : 5/07  
 CHECKED BY : M. A. AVERETTE DATE : 5/07

8/1/2007 10:55:58 AM Ra: Structures\U4756\_S02\_FL.dwg

BM  
-BL- 101  
STA. 42+91.79 -L- 40.16 FT LT.  
ELEV. 248.98

NOTE:  
FOR UTILITY INFORMATION, SEE UTILITY PLANS  
AND SPECIAL PROVISIONS.

### GENERAL NOTES

DRIVE PILES AT END BENTS NO.1 AND 2 TO A REQUIRED BEARING CAPACITY OF 90 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENTS NO.1 AND 2 IS 45 TONS PER PILE.

DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR BOTH SKIN FRICTION AND END BEARING. CHECK FIELD CONDITIONS FOR REQUIRED END BEARING CAPACITY OF 30 TSF.

DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR AN APPLIED LOAD OF 265 TONS AT THE TOP OF THE COLUMN.

DRILLED PIERS AT BENT NO.1 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 151 FT. AND SATISFY THE REQUIRED END BEARING CAPACITY OF 30 TSF.

SPT TESTING IS REQUIRED TO DETERMINE THE END BEARING CAPACITY OF THE DRILLED PIERS AT BENT NO.1.

SLURRY CONSTRUCTION IS REQUIRED FOR DRILLED PIERS AT BENT NO.1. SEE DRILLED PIERS SPECIAL PROVISION.

DO NOT USE POLYMER SLURRY FOR DRILLED PIERS AT BENT NO.1

SID INSPECTIONS ARE REQUIRED TO INSPECT THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT BENT NO.1. SEE DRILLED PIERS SPECIAL PROVISION.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. SEE CROSSHOLE LOGGING SPECIAL PROVISION.

FOR DRILLED PIERS, SEE DRILLED PIERS SPECIAL PROVISION.

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

FOR SHIPPING STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

THE CONCRETE USED IN THE DECK SLAB FOR THIS BRIDGE SHALL BE A SAND-LIGHTWEIGHT CONCRETE HAVING A DRY SPECIFIC WEIGHT OF APPROXIMATELY 115 LBS/CUBIC FOOT AND A 28 DAY CYLINDER STRENGTH OF NOT LESS THAN 4500 PSI.

FOR SAND-LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS.

THE CONCRETE USED IN THE BRIDGE RAILINGS, APPROACH SLABS, SIDEWALK AND CONC. MEDIAN SHALL BE CLASS AA CONCRETE, NORMAL WEIGHT, AS PER THE STANDARD SPECIFICATIONS.

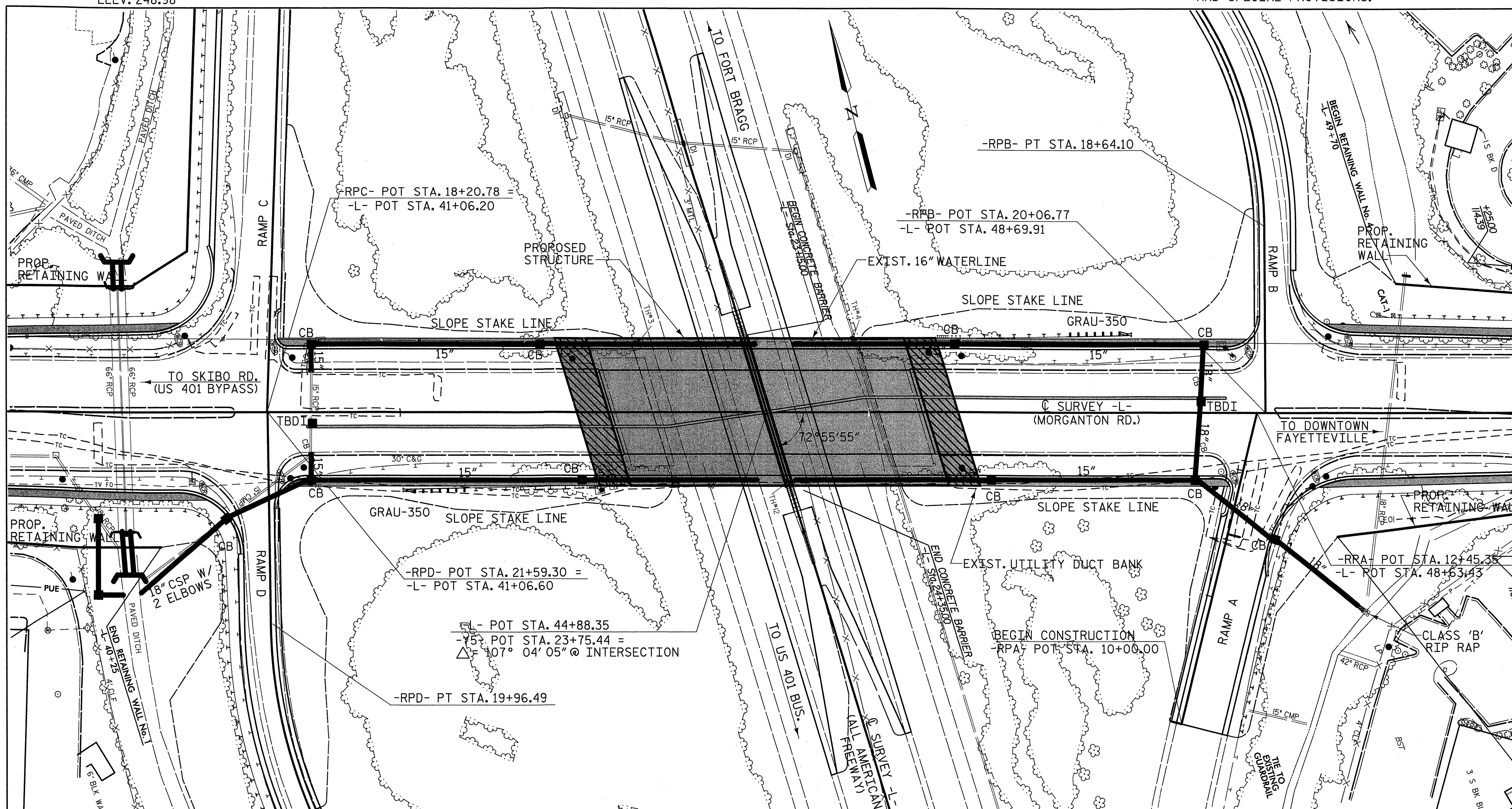
THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE 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.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



LOCATION SKETCH

### TOTAL BILL OF MATERIAL

	REMOVAL OF EXIST. STRUCTURE AT STA. 44+88.35 -L-	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTION	SPT TESTING	CROSSHOLE SONIC LOGGING	REINFORCED CONCRETE DECK SLAB SAND-LIGHTWEIGHT CONCRETE	GROOVING BRIDGE FLOORS	CLASS "A" CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES	THREE BAR METAL RAIL	4" SLOPE PROTECTION	EVAZOTE JOINT SEALS	STRUCTURE DRAINAGE SYSTEM	
	LUMP SUM	FEET	FEET	EACH	EACH	EACH	SQ. FEET	SQ. FEET	CU.YDS.	LUMP SUM	LBS	LBS	APPROX. LBS	NO.	FEET	FEET	SQ. YARDS	LUMP SUM	LUMP SUM
SUPERSTRUCTURE							27,683	27,005					763,916		567.4				
END BENT 1									63.4		10,888			22	1650		558		
BENT 1		262	30	4	4	4			107.4		34,490	7586							
END BENT 2									62.7		10,868			22	1650		528		
TOTAL	LUMP SUM	262	30	4	4	4	27,683	27,005	233.5	LUMP SUM	56,246	7586	763,916	44	3300	567.4	1086	LUMP SUM	LUMP SUM

PROJECT NO. U-4756  
CUMBERLAND COUNTY

STATION: 44+88.35 -L-  
23+75.44 -Y5-

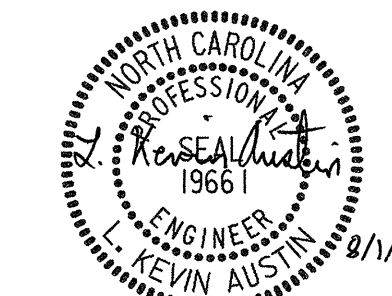
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING FOR  
BRIDGE ON MORGANTON RD.  
OVER ALL AMERICAN FREWAY  
BETWEEN SKIBO RD. AND  
SYCAMORE DAIRY RD.

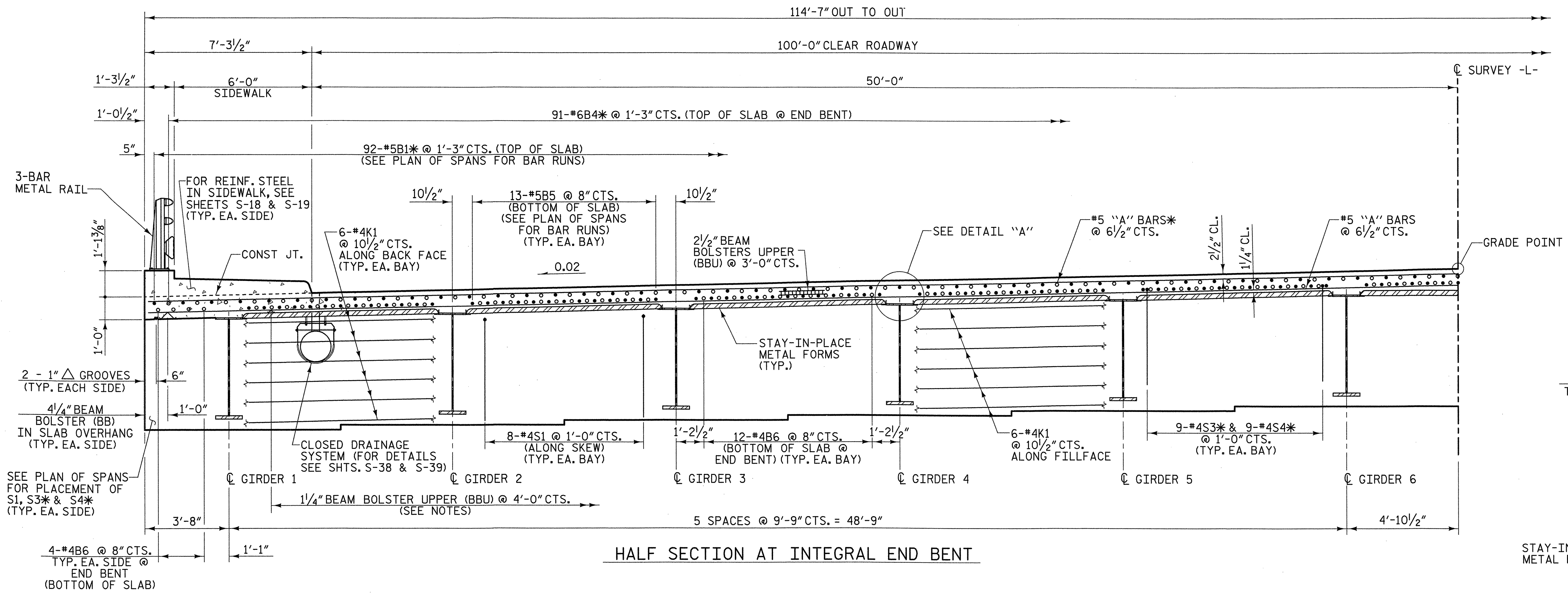
REVISIONS

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

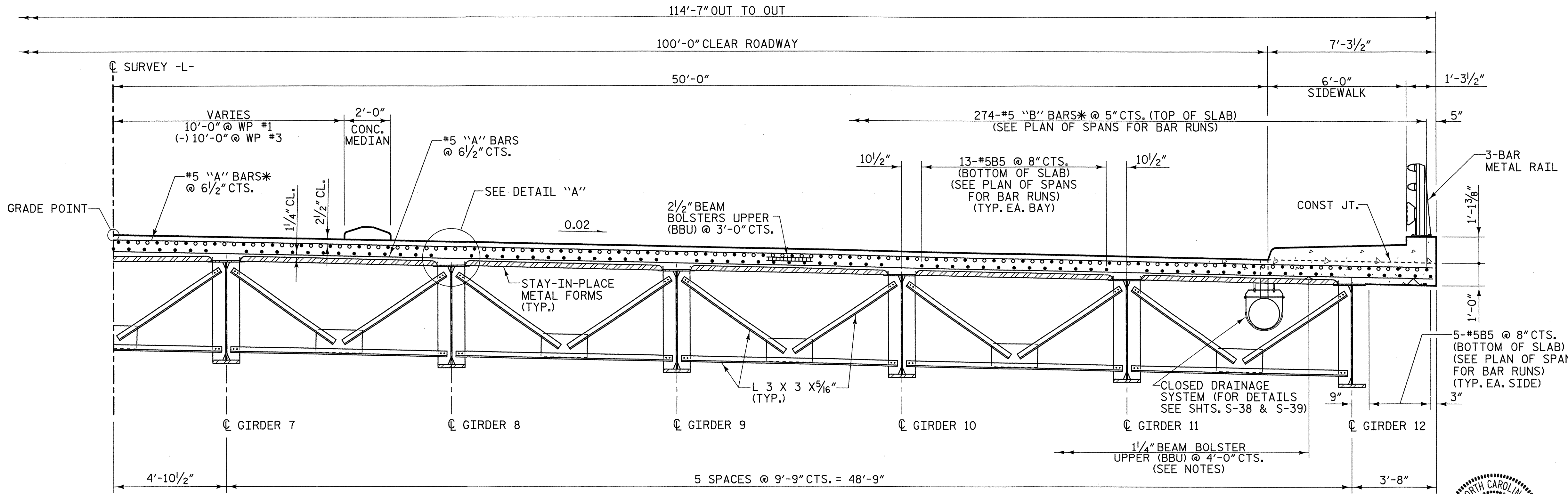
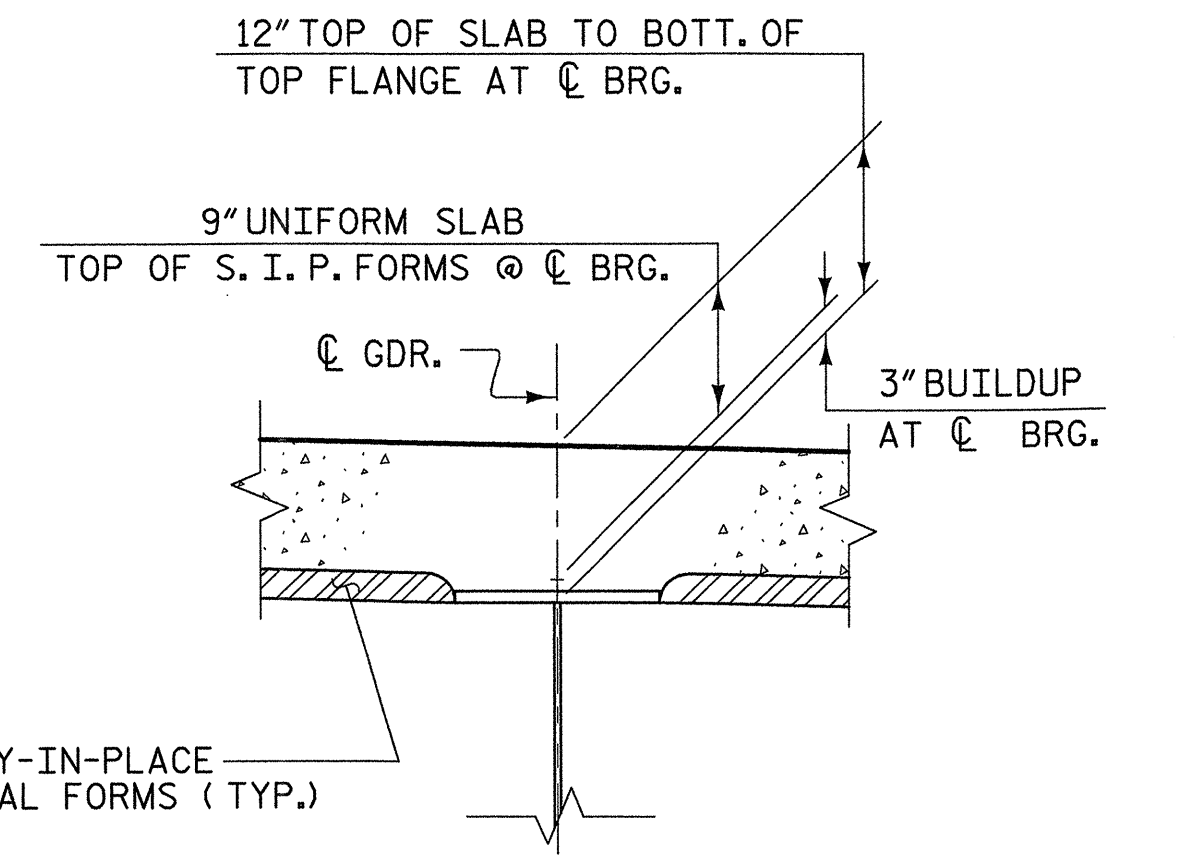


DRAWN BY: W.B. ALLEN DATE: 3/07  
CHECKED BY: M.A. AVERETTE DATE: 3/07

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\* INDICATES EPOXY COATED REINFORCING STEEL  
 • DENOTES CONTINUOUS REINFORCEMENT  
 ○ DENOTES NON-CONTINUOUS REINFORCEMENT

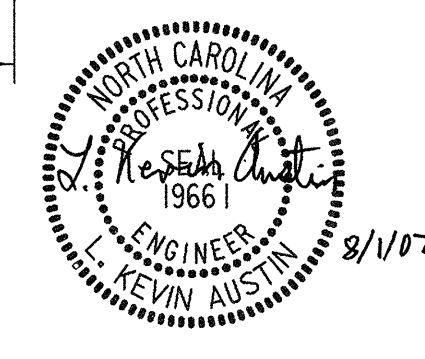


PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 400 BOX 33127  
 RALEIGH, N.C. 27636  
 (919) 851-1212 (FAX)  
 WWW.MULKEYINC.COM

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

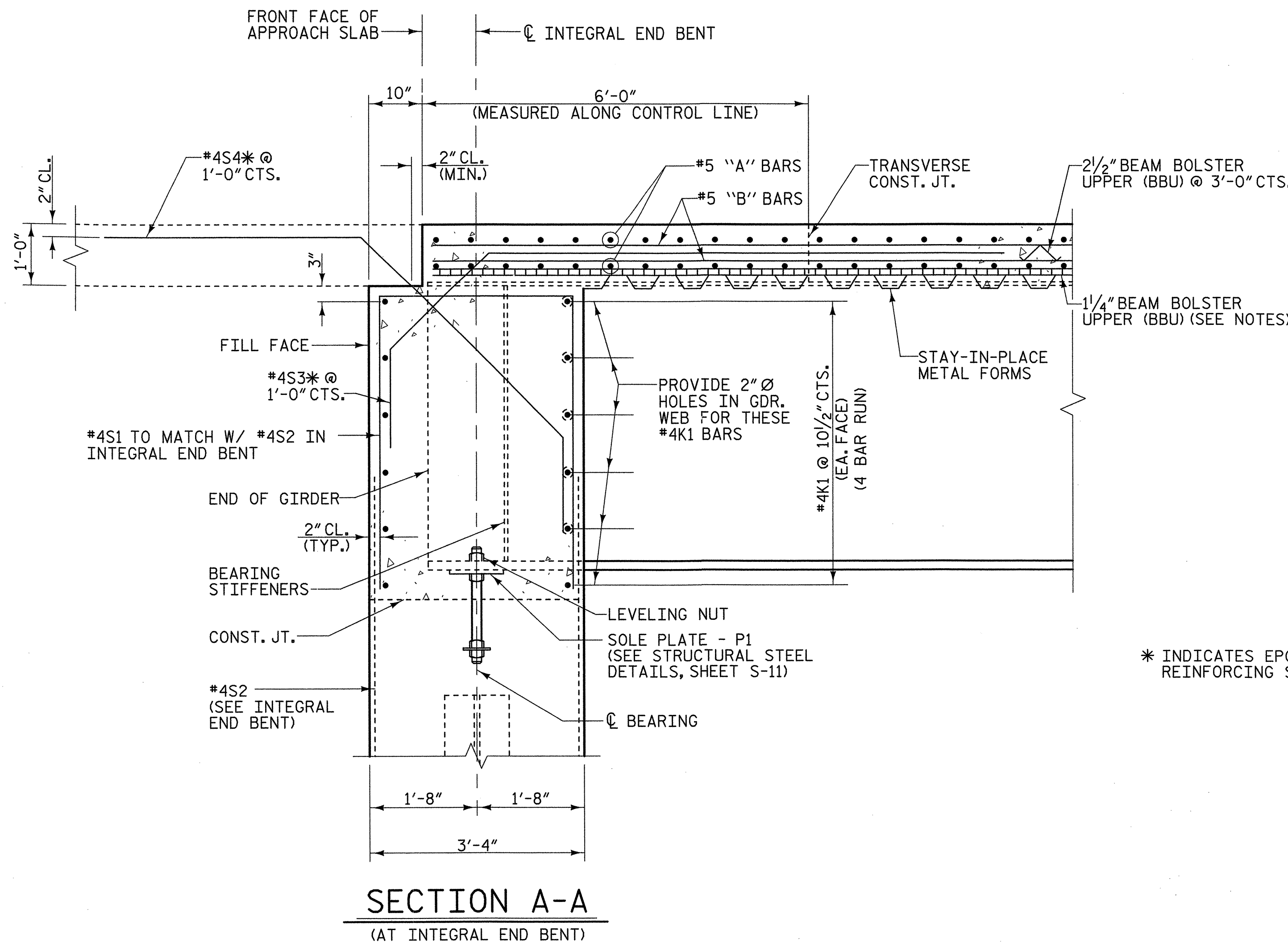
TOTAL SHEETS: S-4

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M.A. AVERETTE DATE: 3/07

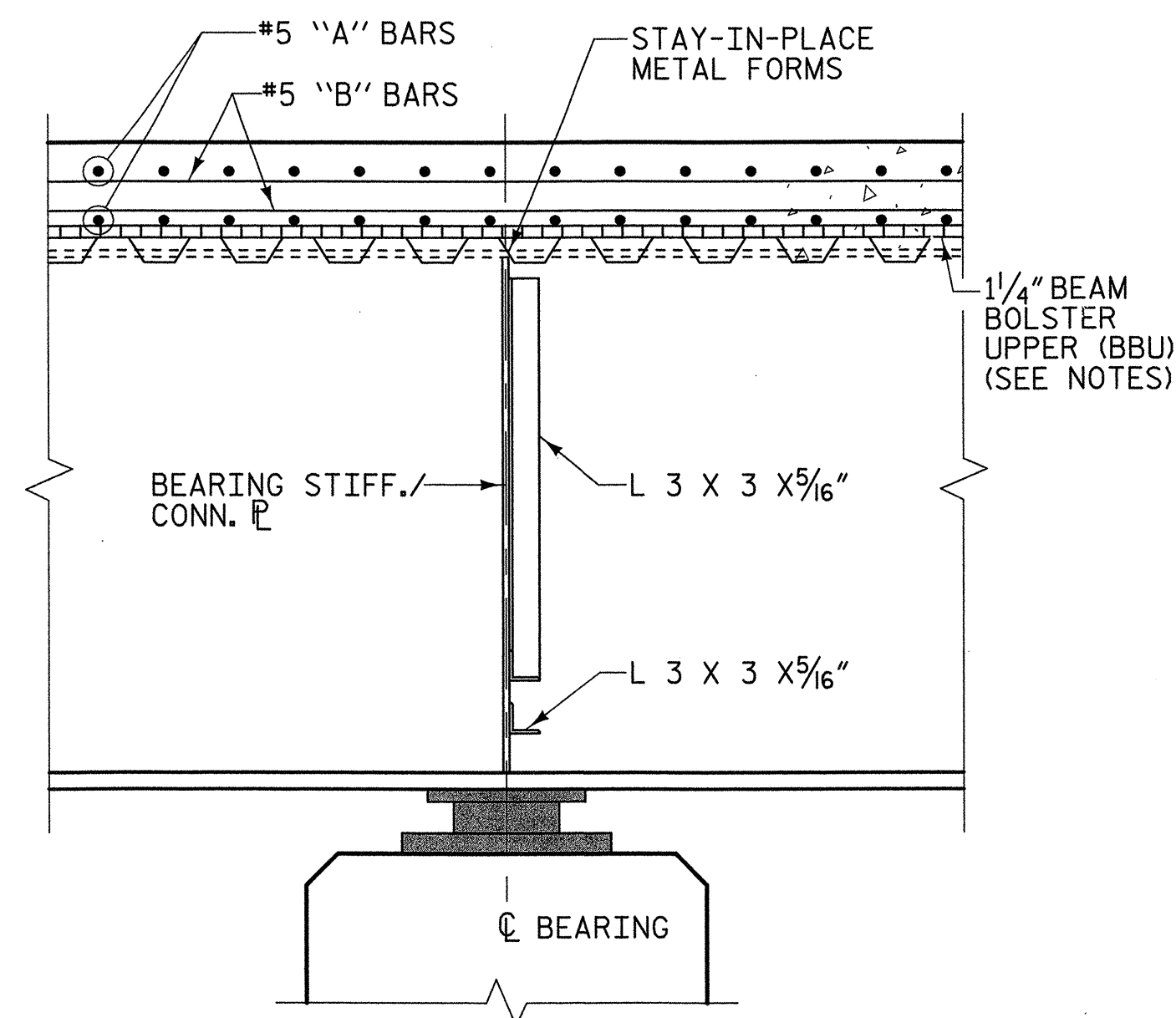
TYPICAL SECTION

8/1/2007 558628 AM RA:Structures\U4756.S0.TS.dwg





**SECTION A-A**  
(AT INTEGRAL END BENT)



**SECTION B-B**  
(AT INTERMEDIATE DIAPHRAGM)

**NOTES:**

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

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENER OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

FOR REINFORCING STEEL BARS INDICATED, BUT NO MARK SHOWN, SEE PLAN OF SPANS.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO GIRDER FLANGES IN THE ZONES REQUIRING CHARRY "V" NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

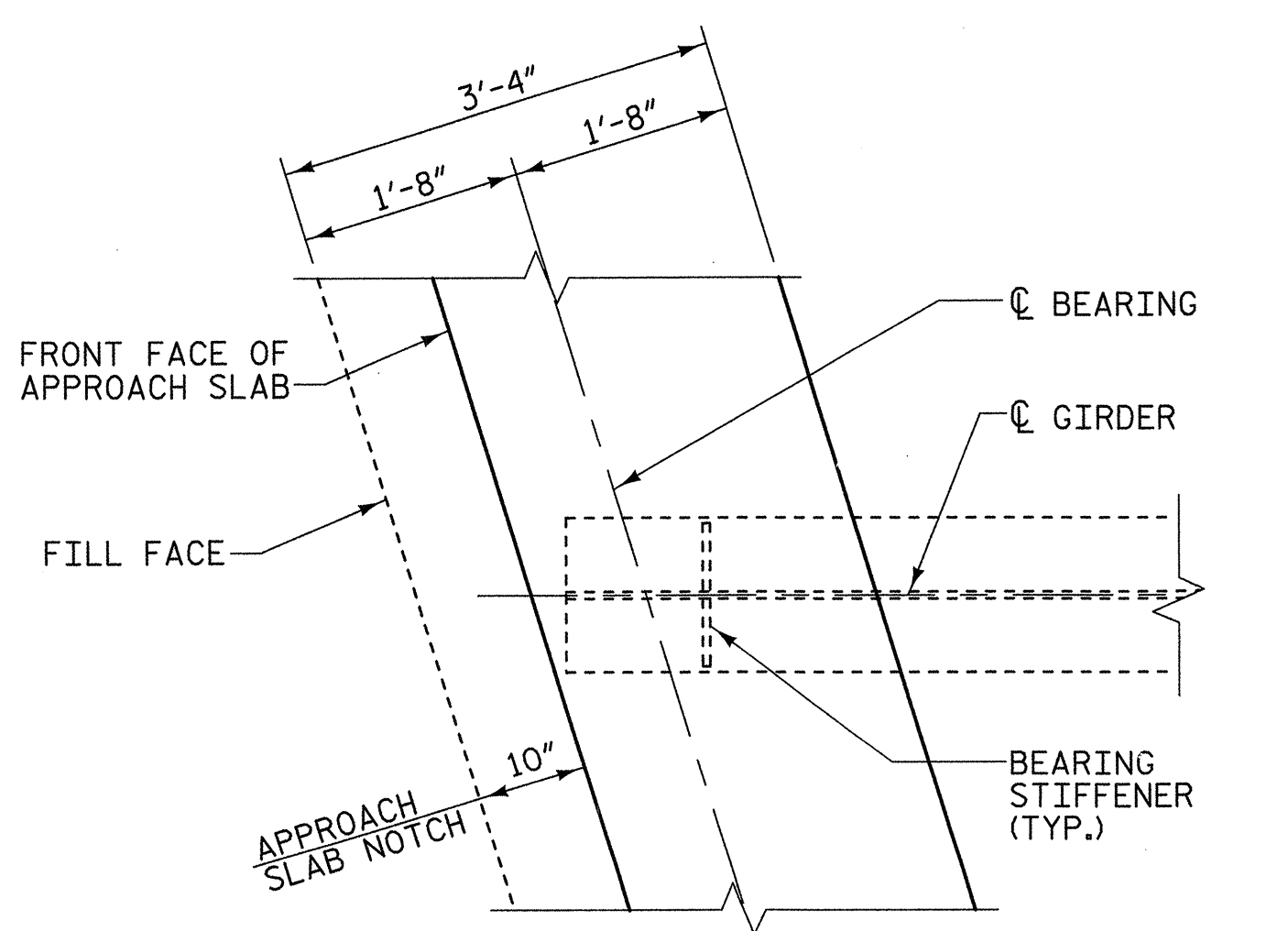
FOR STRUCTURE DRAINAGE SYSTEM, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL SUBMIT A PLAN FOR THE DRAINAGE SYSTEM, INCLUDING, BUT NOT LIMITED TO, ATTACHMENTS TO THE BRIDGE, SCUPPER AND INTEL GRATE DETAILS, SCUPPER SUPPORT SYSTEM, PIPE ALIGNMENT AND PIPE LENGTHS, AND NECESSARY FITTINGS, ELBOWS, WYES, ADAPTERS, GUIDES AND JOINTS.

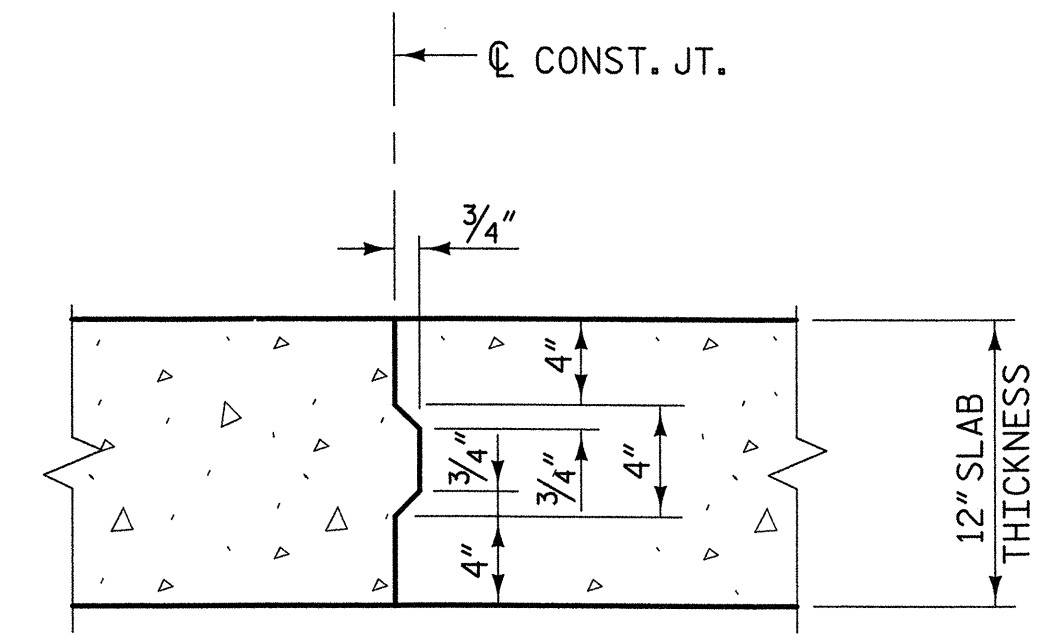
SHEAR STUDS OR STIRRUPS MAY BE CUT AS APPROVED BY THE ENGINEER TO AVOID INTERFERENCE WITH THE BRIDGE SCUPPER.

SEE ROADWAY PLANS FOR DETAILS AND PAY ITEM FOR JUCTION BOXES AT APPROXIMATE STATIONS 43+15 -L- AND 46+32 -L-.

\* INDICATES EPOXY COATED REINFORCING STEEL



**PLAN OF GIRDER AT END BENT**  
(TYPICAL EACH END BENT)



NOTE: REINFORCING STEEL NOT SHOWN FOR CLARITY. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

**TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB**

	GIRDER	TOP OF SOLE PLATE (P1) ELEV.	GIRDER	TOP OF SOLE PLATE (P1) ELEV.
END BENT #1	1	244.750	7	245.991
	2	244.992	8	245.836
	3	245.232	9	245.681
	4	245.472	10	245.525
	5	245.711	11	245.368
	6	245.949	12	245.210
END BENT #2	1	245.352	7	246.115
	2	245.514	8	245.882
	3	245.675	9	245.647
	4	245.836	10	245.411
	5	245.995	11	245.175
	6	246.153	12	244.937

PROJECT NO. U-4756  
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 STATION: 44+88.35 -L-

SHEET 2 OF 2



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

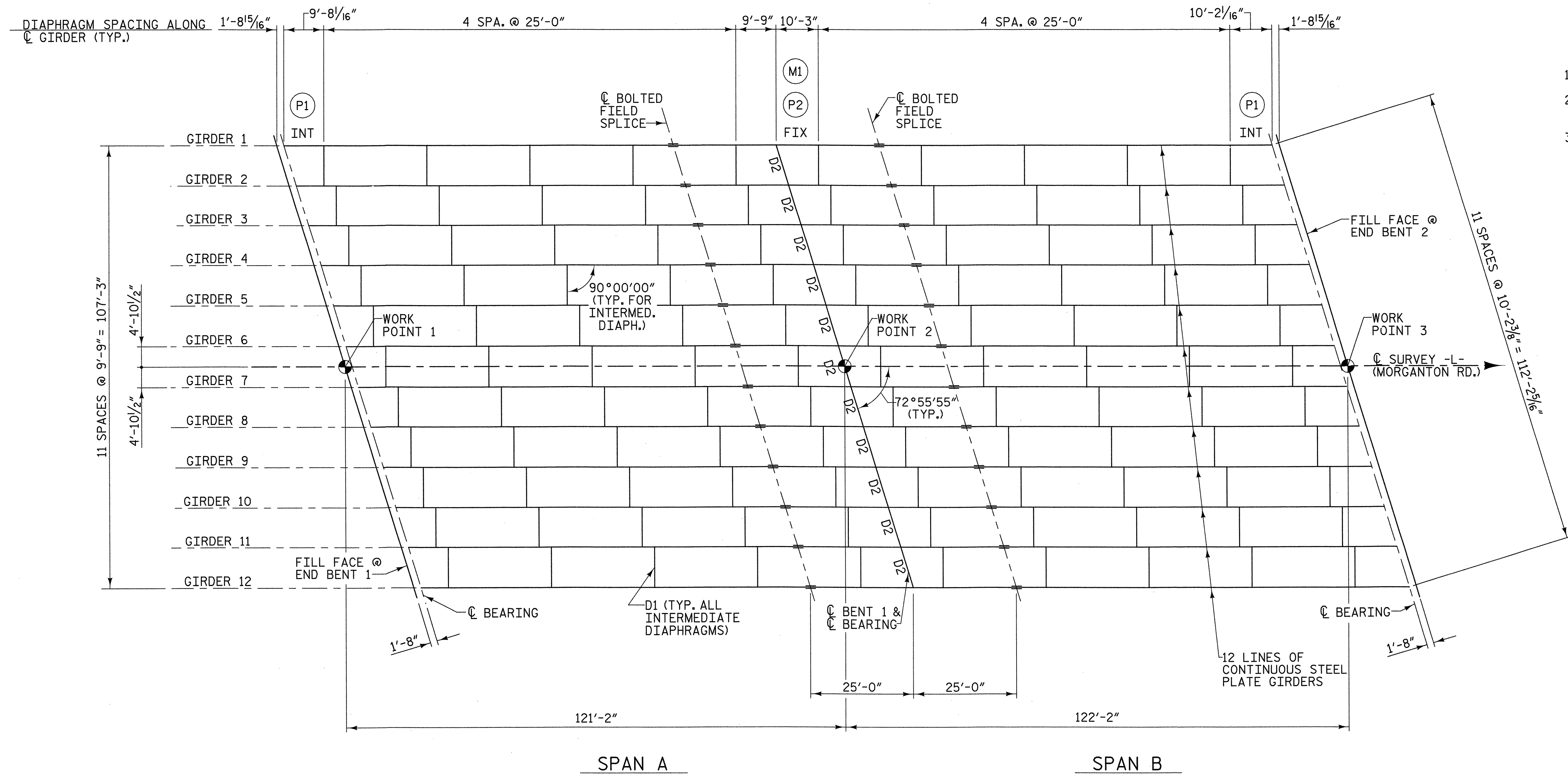
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 3/07

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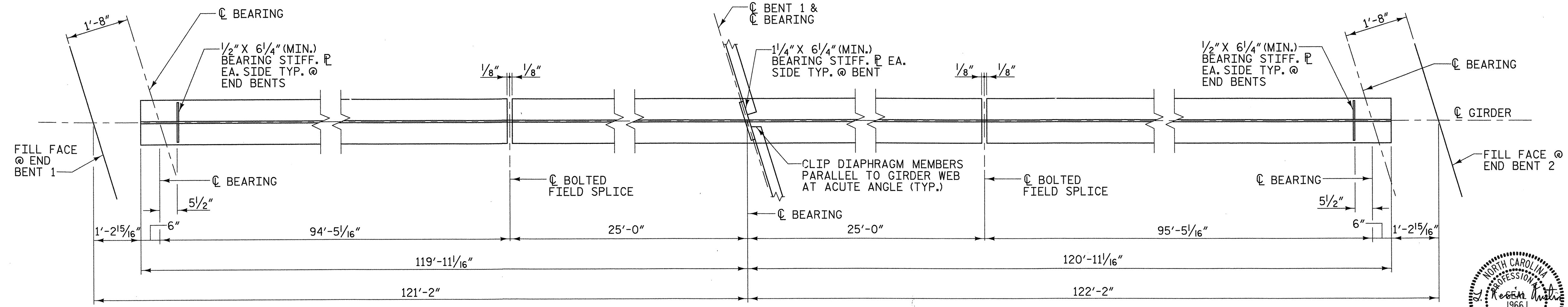






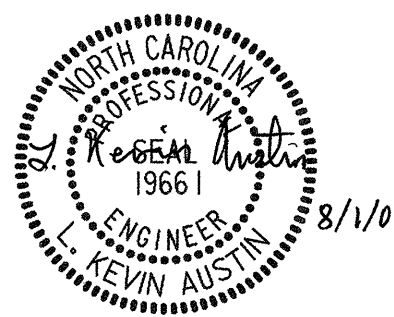
- NOTES:**
1. DIAPHRAGM INDICATED THUS: D (NUMBER)
  2. SOLE PLATES INDICATED THUS: (PN (N=NUMBER))
  3. MASONRY PLATE INDICATED THUS: (MN (N=NUMBER))

**FRAMING PLAN**



**PLAN OF BOTTOM FLANGE - TYPICAL INTERIOR GIRDER**  
(ALL DIMENSIONS ARE IN HORIZONTAL PLANE) (EXTERIOR GIRDER SIMILAR)

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-  
 SHEET 1 OF 4

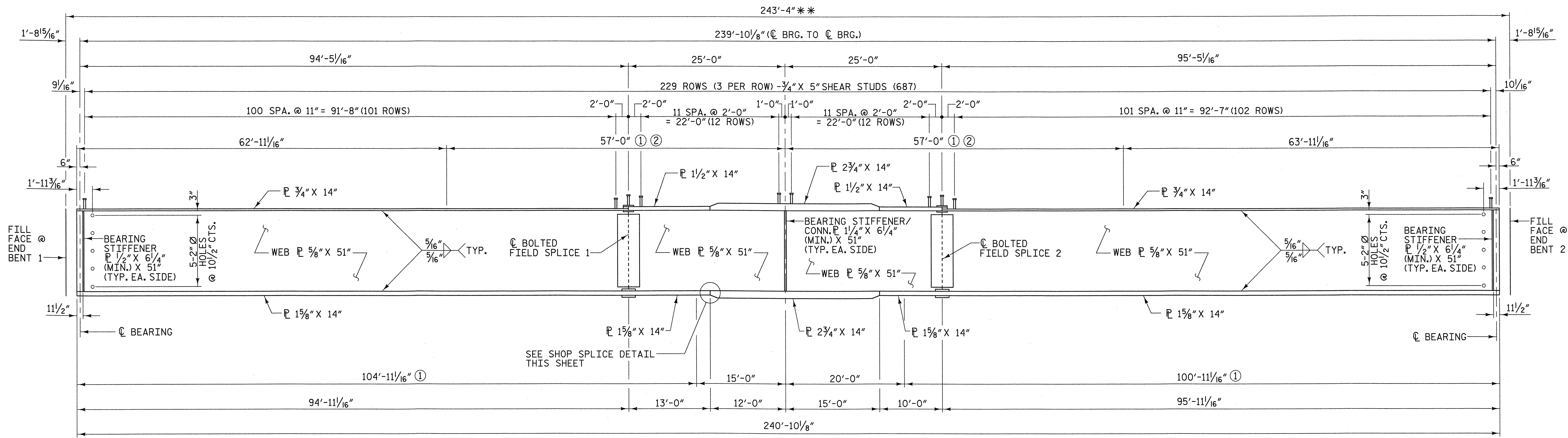


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS  
 FRAMING PLAN**

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

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 3/07

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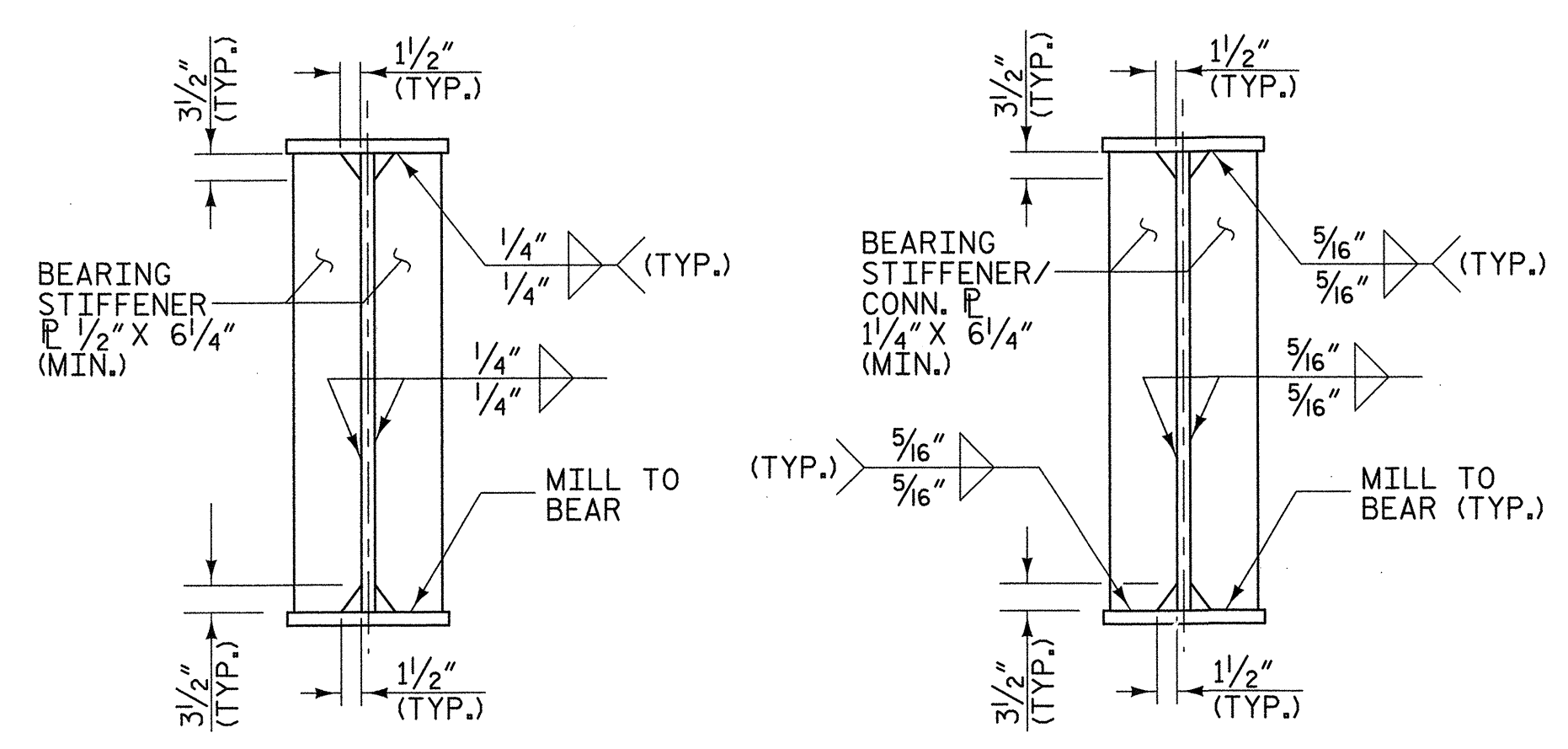


**ELEVATION - GIRDERS 1 THRU 12**

(ALL DIMENSIONS ARE IN HORIZONTAL PLANE)

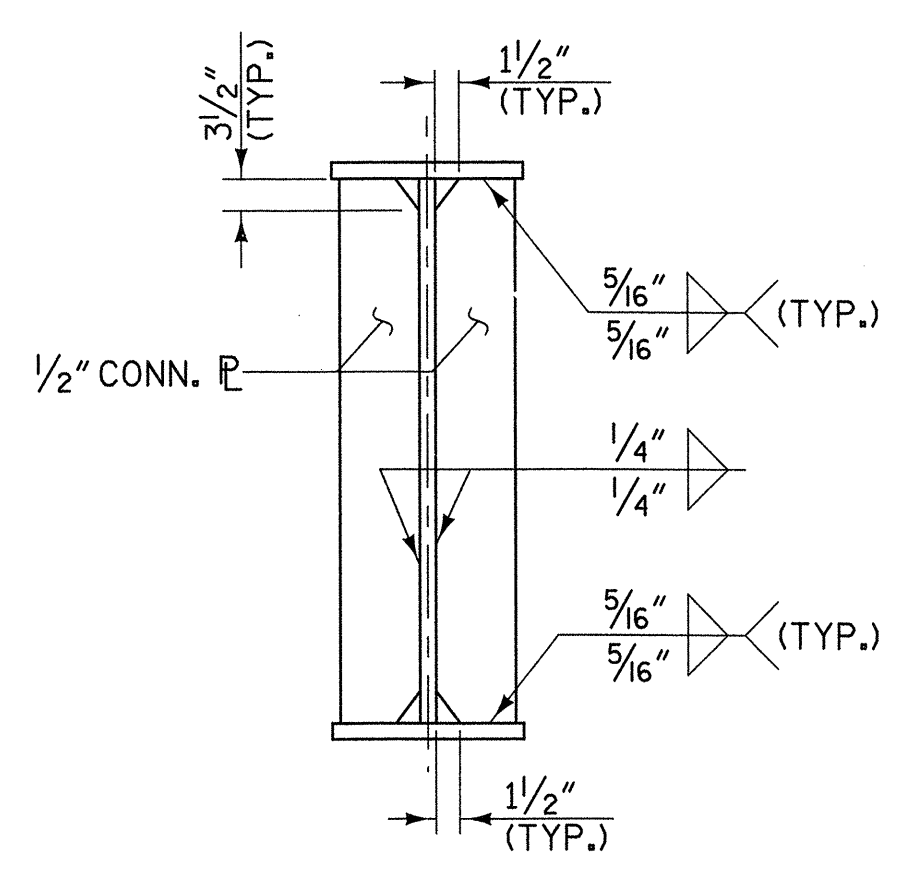
- ① FOR CHARPY V-NOTCH SEE NOTES ON SHEET S-10.
- ② NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

\*\* ALL DIMENSIONS ARE MEASURED ALONG THE C OF THE GIRDER.

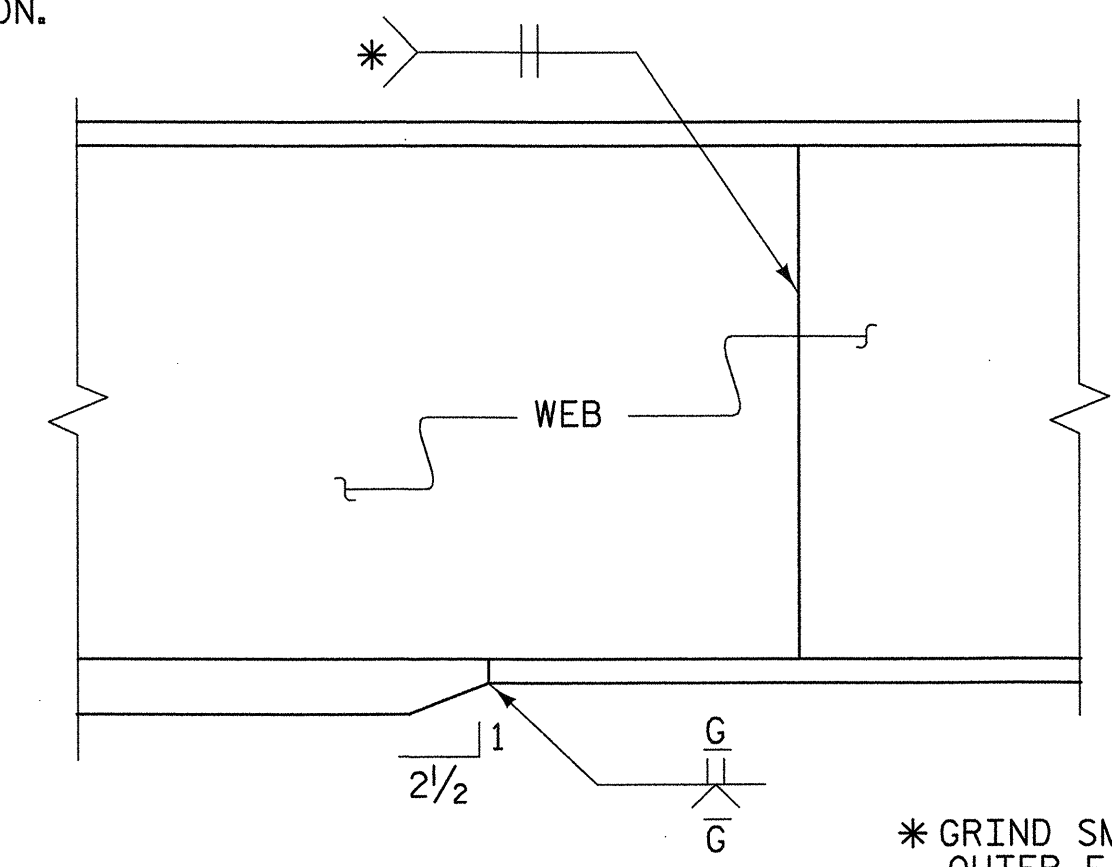


AT END BENTS                      AT INTERIOR BENT

**BEARING STIFFENER DETAIL**

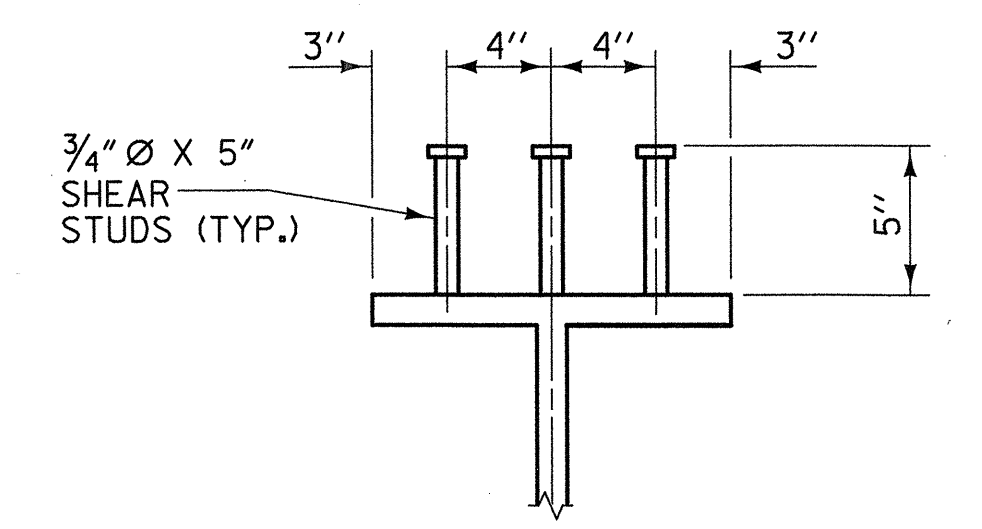


**CONNECTOR PLATE DETAIL**



ELEVATION  
**SHOP SPLICE DETAIL**

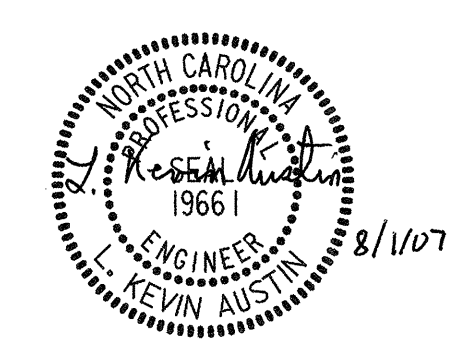
\* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR BEAMS /GIRDERS



**SHEAR STUD DETAILS**

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 2 OF 4



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

REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 3/07

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## STRUCTURAL STEEL NOTES

ALL STRUCTURAL STEEL TO BE AASHTO M270 GRADE 50W.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.

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

BEARING STIFFENERS SHALL BE PLACED NORMAL TO THE WEB AT END BENTS AND ON SKEW AT THE BENT AND SHALL BE PLUMB.

- ① CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THE LIMITS SHOWN ON SHEET S-9, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.

ALL CONNECTOR PLATES AT CROSSFRAMES SHALL BE PLACED IN PAIRS EXCEPT AT EXTERIOR GIRDERS WHERE THEY WILL BE PLACED ON THE INSIDE FACE ONLY.

ENDS OF THE PLATE GIRDERS SHALL BE IN A PLUMB POSITION AFTER THE TOTAL DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.

INTERMEDIATE DIAPHRAGMS CONNECTOR PLATES SHALL BE NORMAL TO THE GIRDER FLANGES AND WEB.

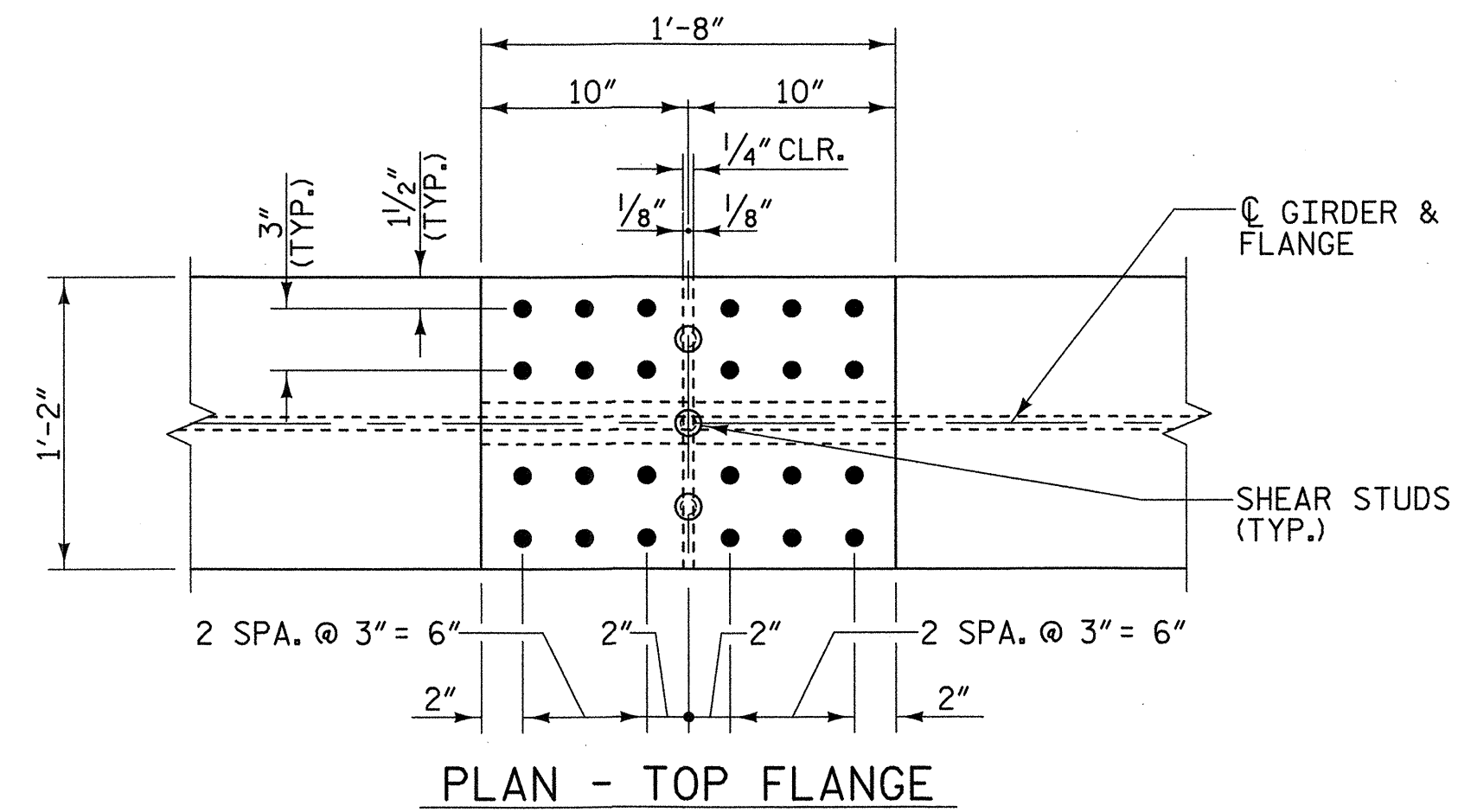
SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS. KEEP 2'-0" MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

THE CONTRACTOR SHALL MAINTAIN STABILITY OF THE PLATE GIRDERS UNTIL ALL FIELD SPLICES AND CROSSFRAME CONNECTIONS HAVE BEEN COMPLETED. ALL STRUCTURAL STEEL ERECTION SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE SPAN.

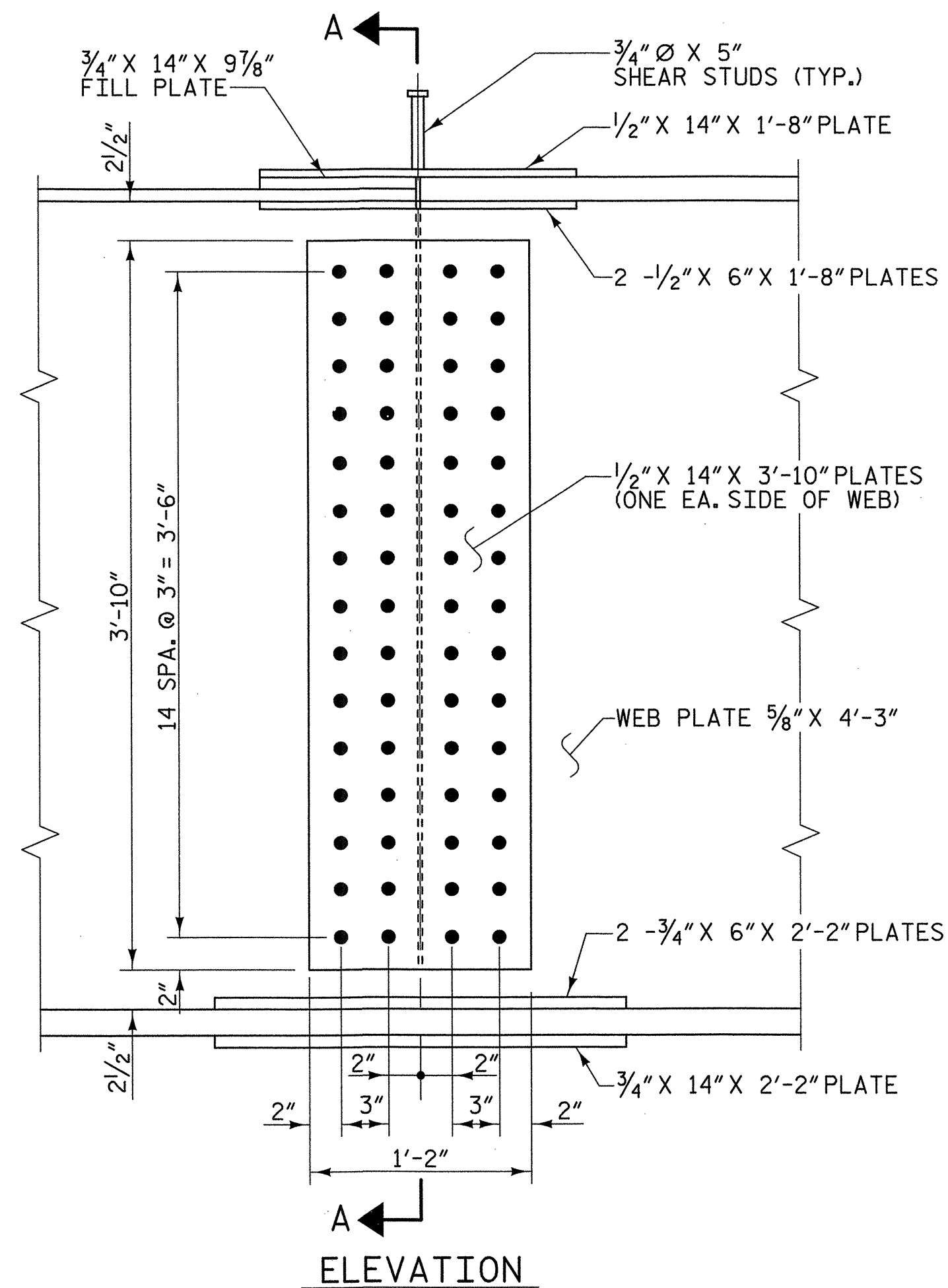
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELDS.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-10 OF THE STANDARD SPECIFICATIONS.

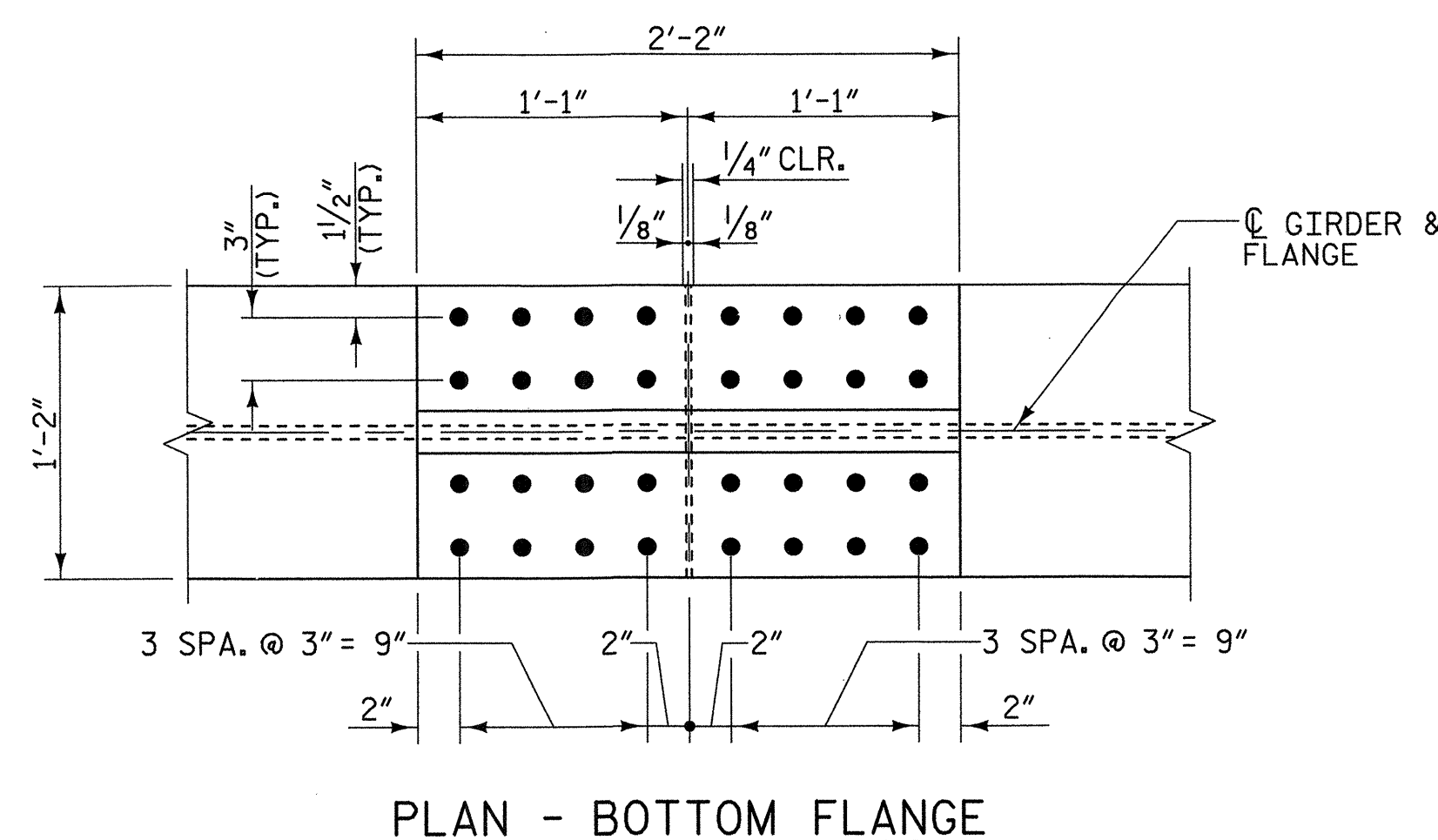
FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.



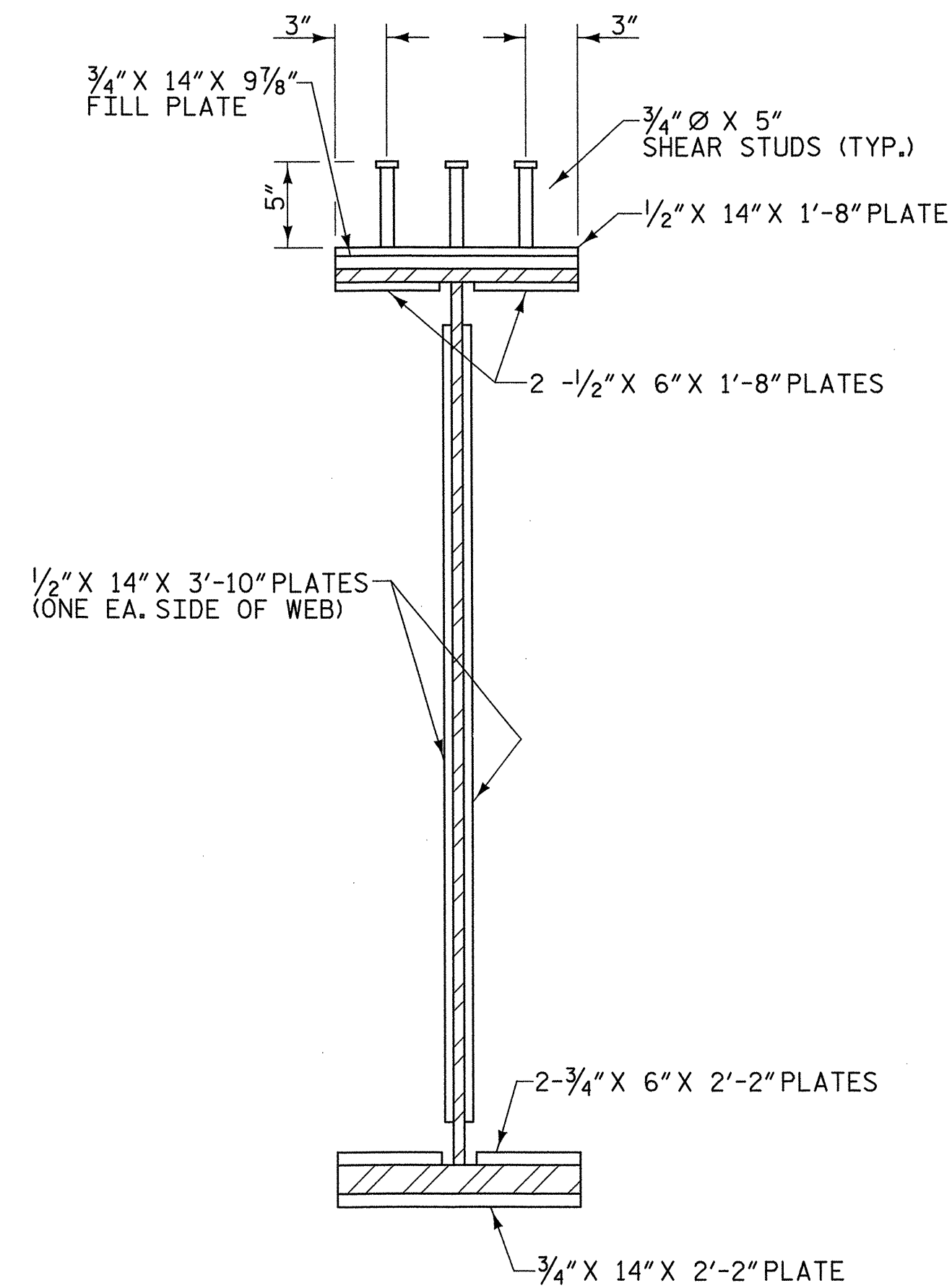
PLAN - TOP FLANGE



ELEVATION



PLAN - BOTTOM FLANGE



SECTION THRU SPLICE  
(SECTION A-A)

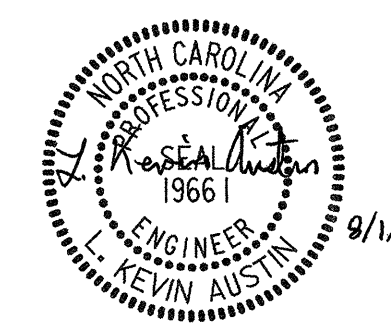
## FIELD SPILCE DETAILS

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS

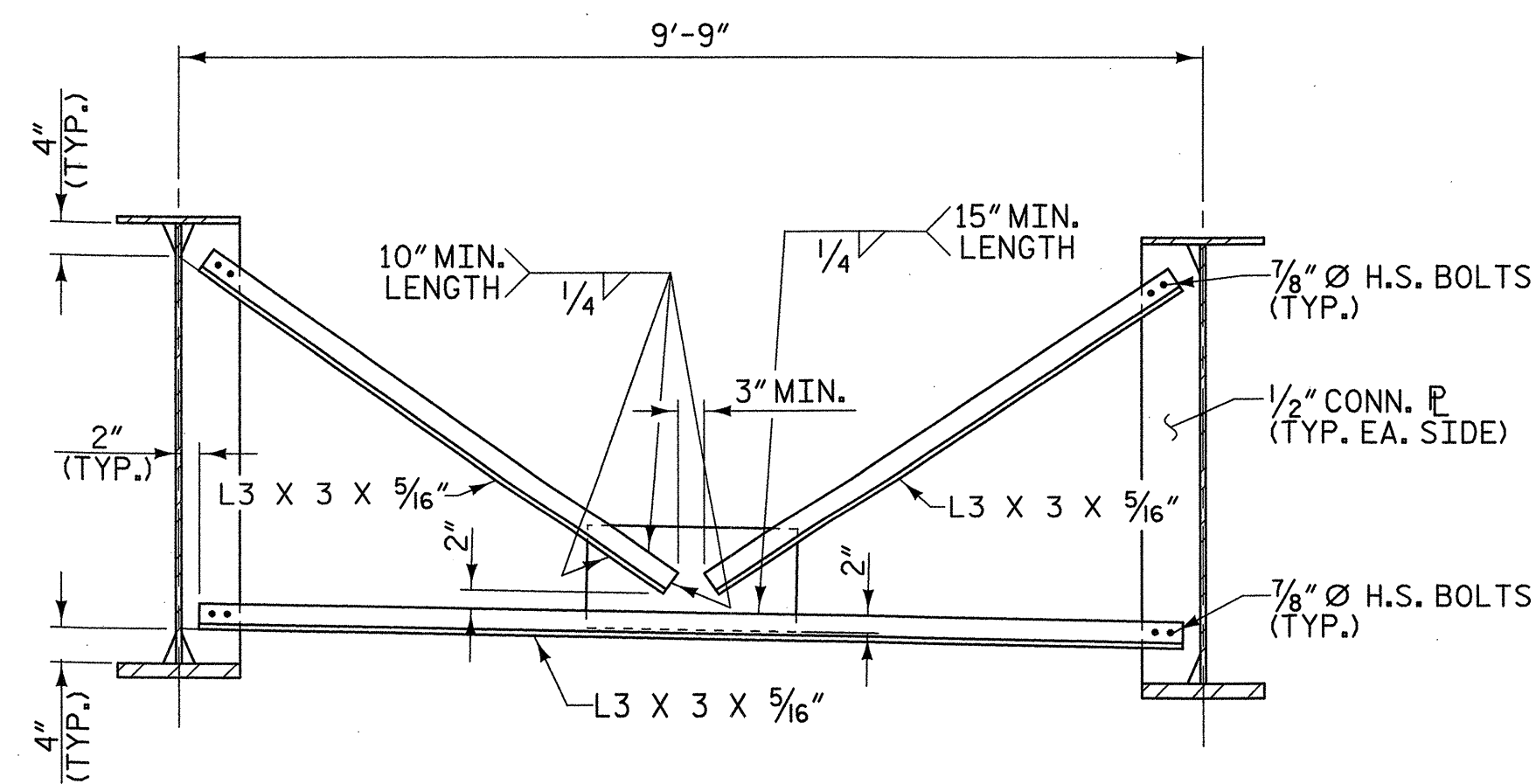


PLANS PREPARED BY:

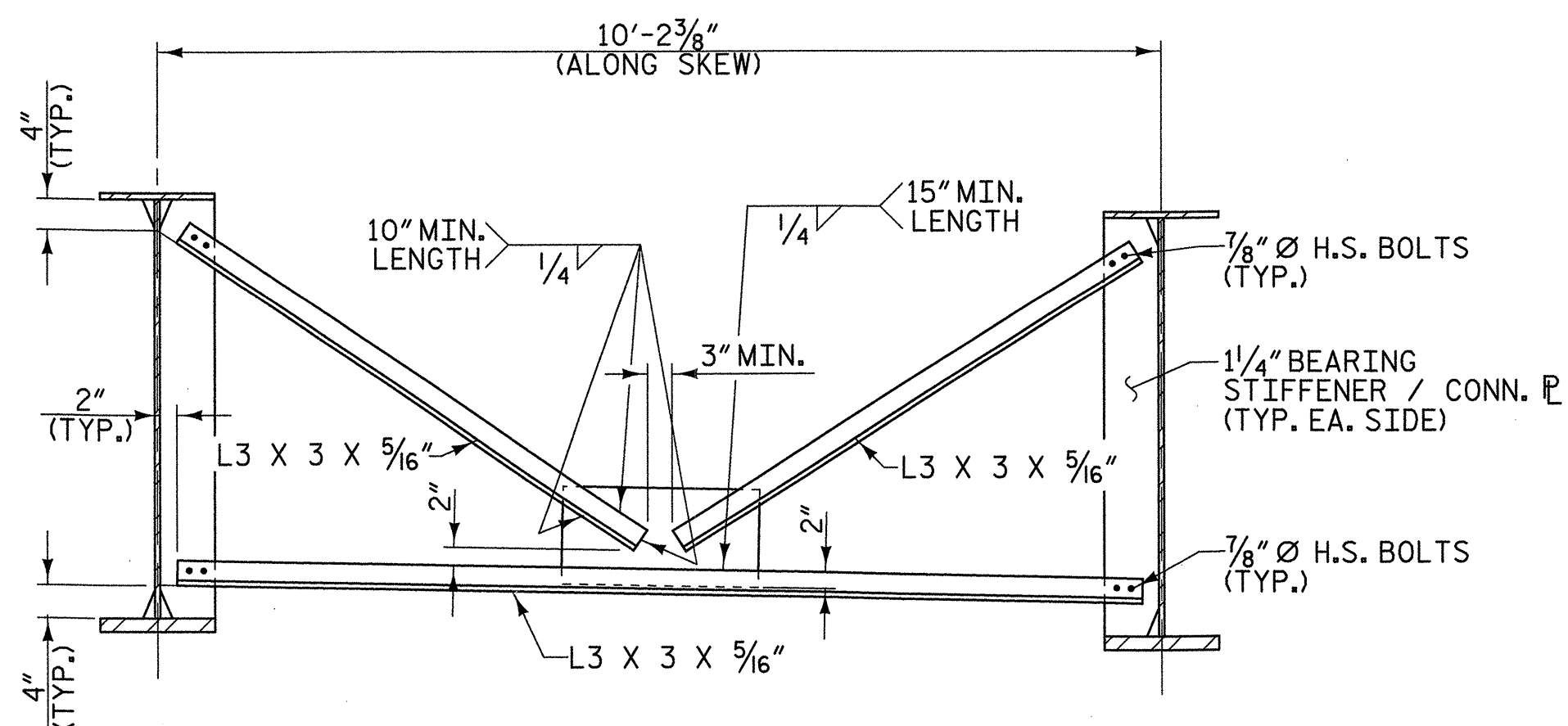


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			U-10
2			4			

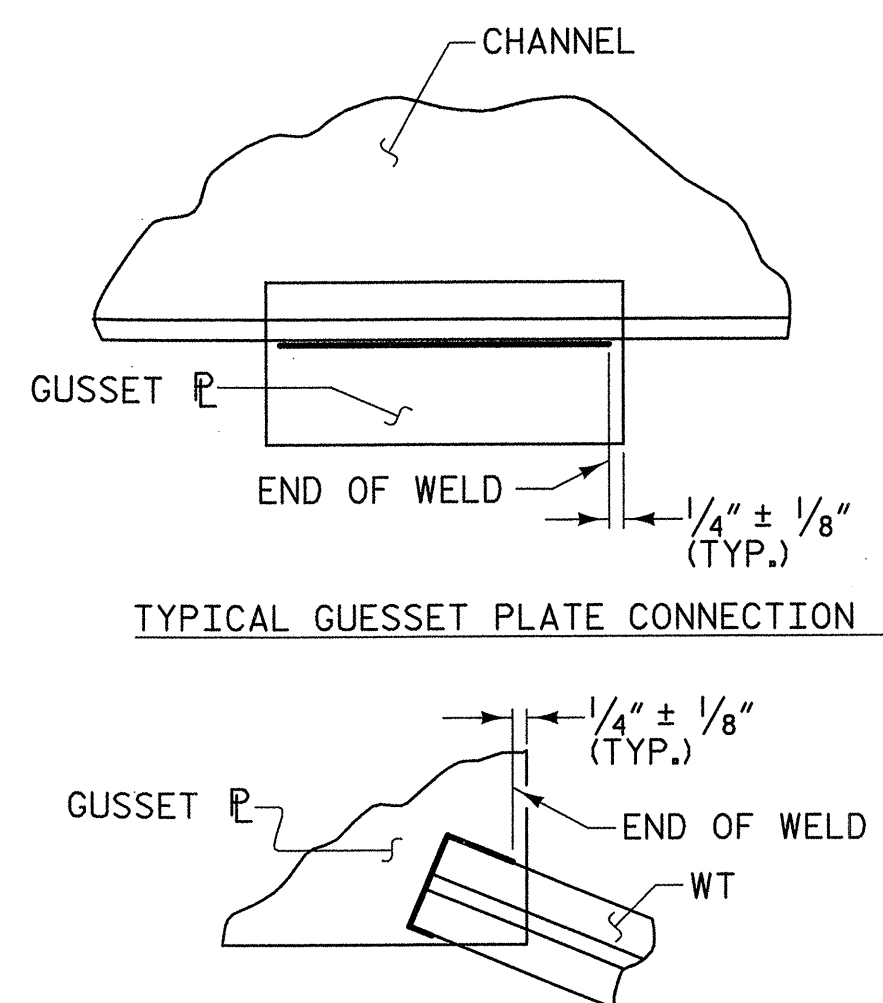
DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M.A. AVERETTE DATE: 3/07



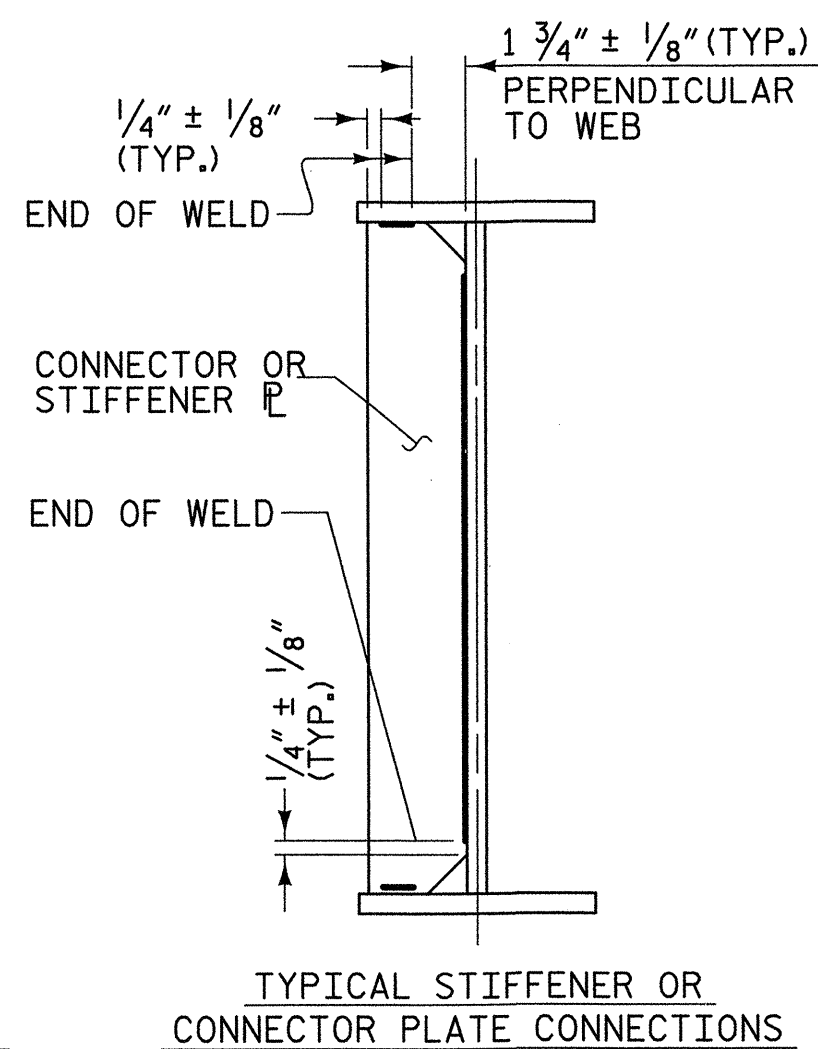
**D1 INTERMEDIATE DIAPHRAGM**



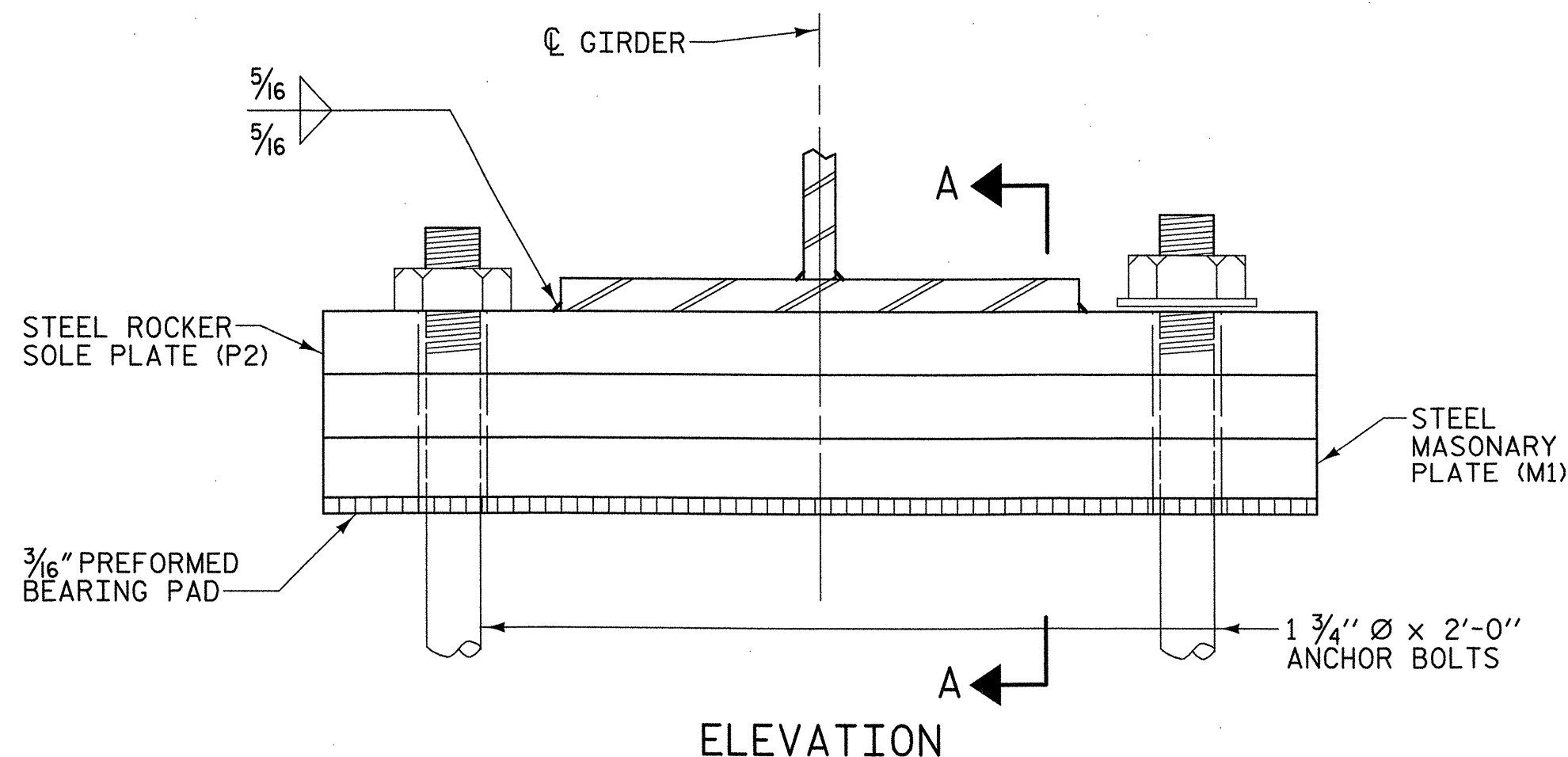
**D2 BENT DIAPHRAGM**



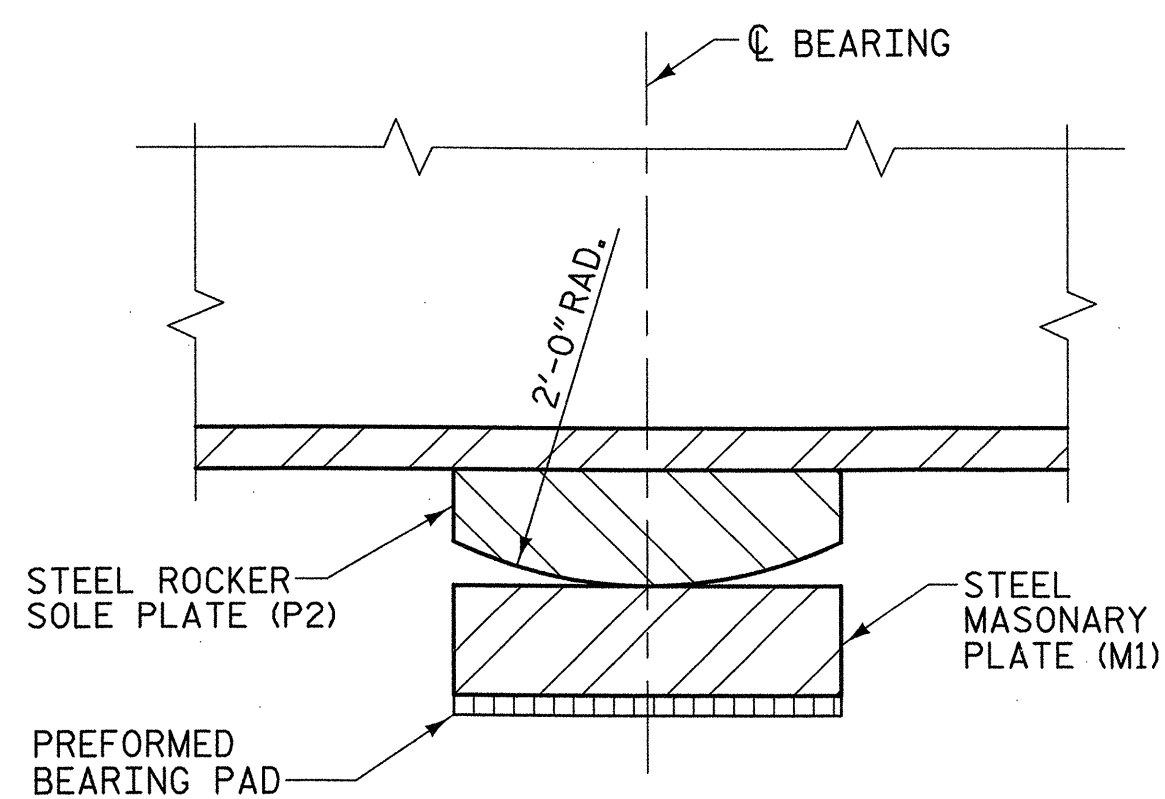
**WELD TERMINATION DETAILS**



**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS**



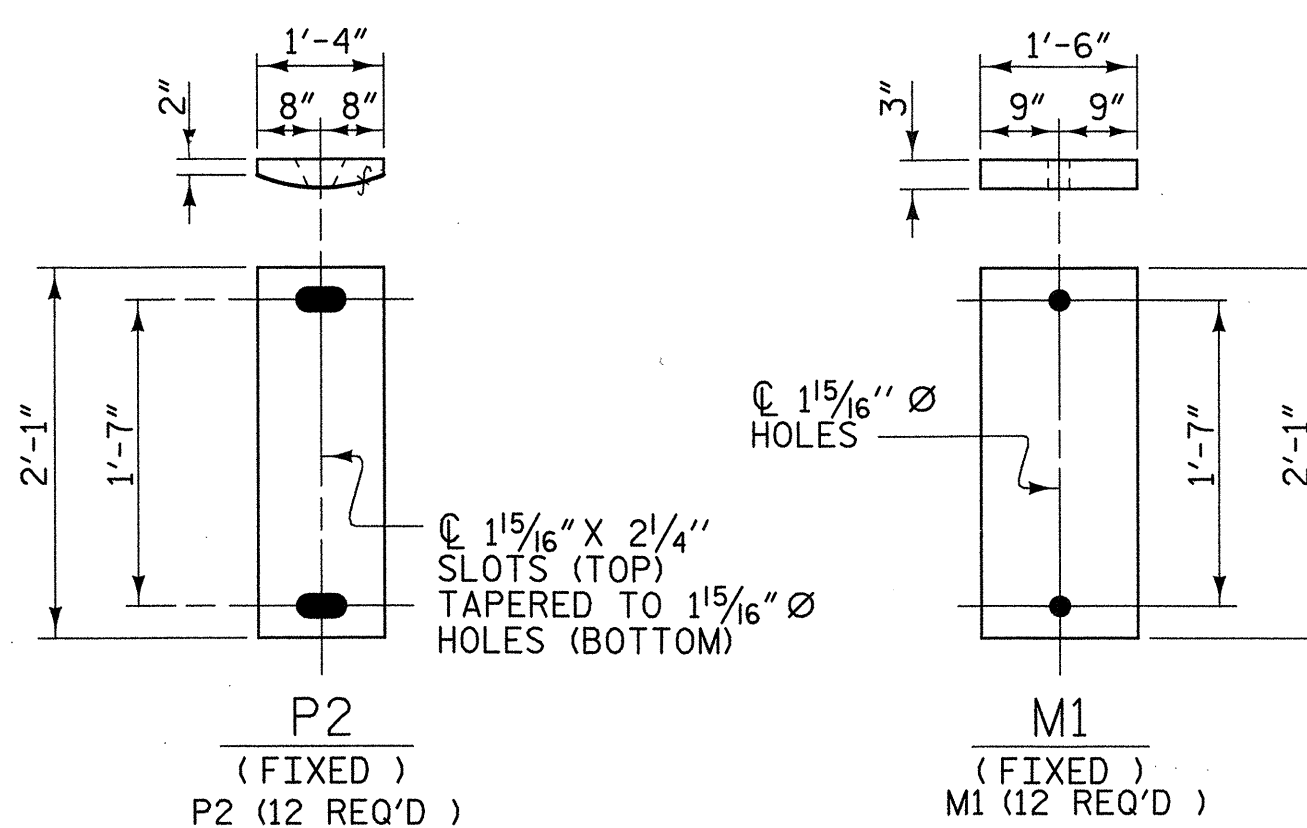
**ELEVATION**



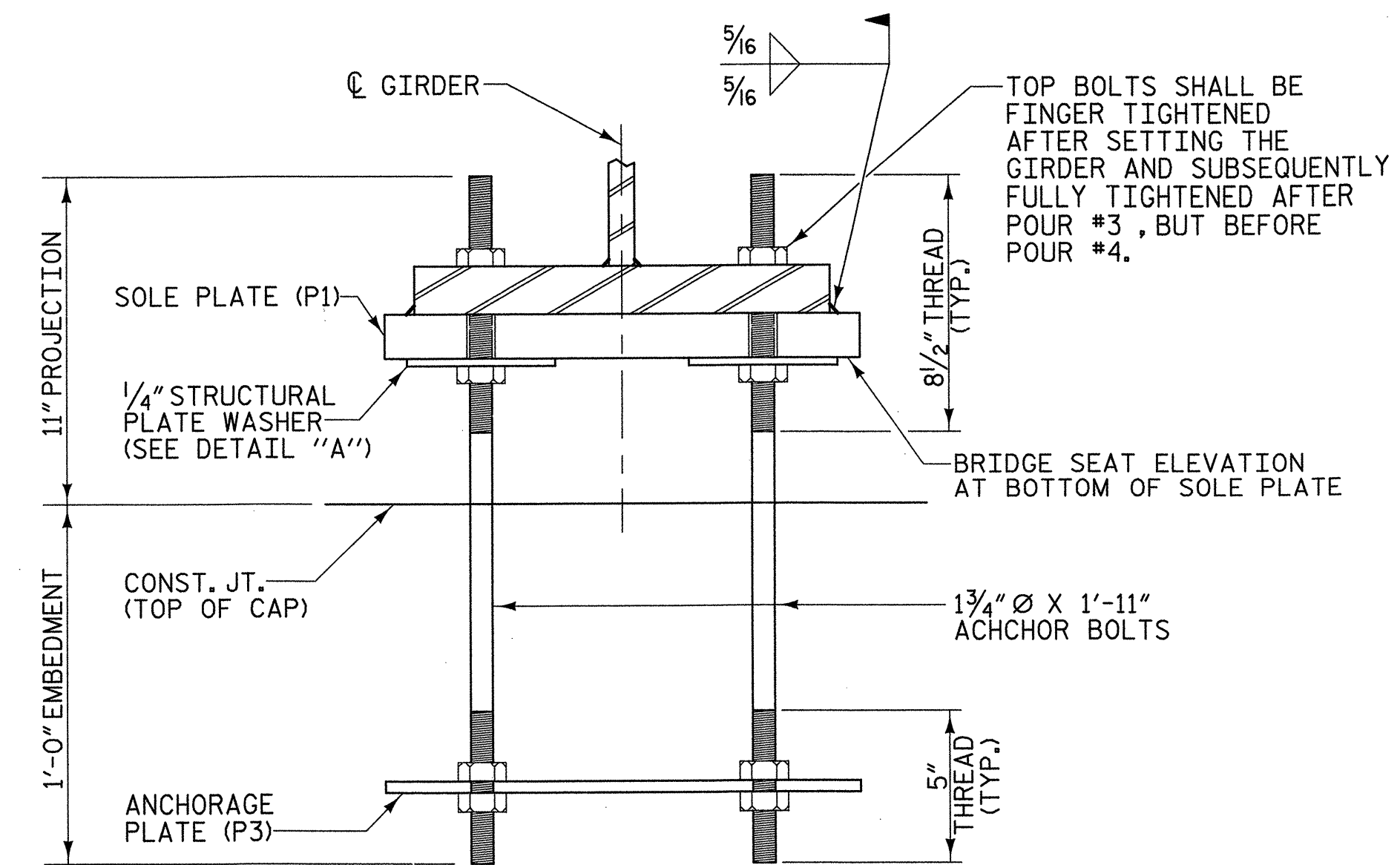
**SECTION A-A**

**FIXED BEARING DETAILS @ BENT**

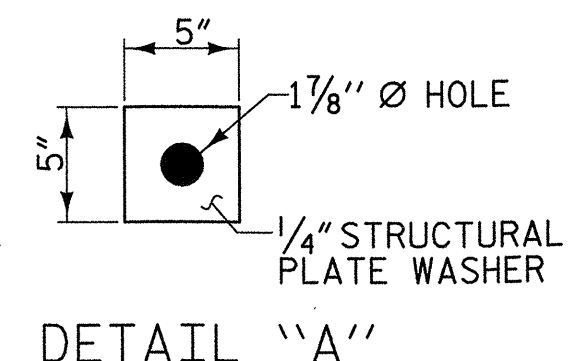
AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.



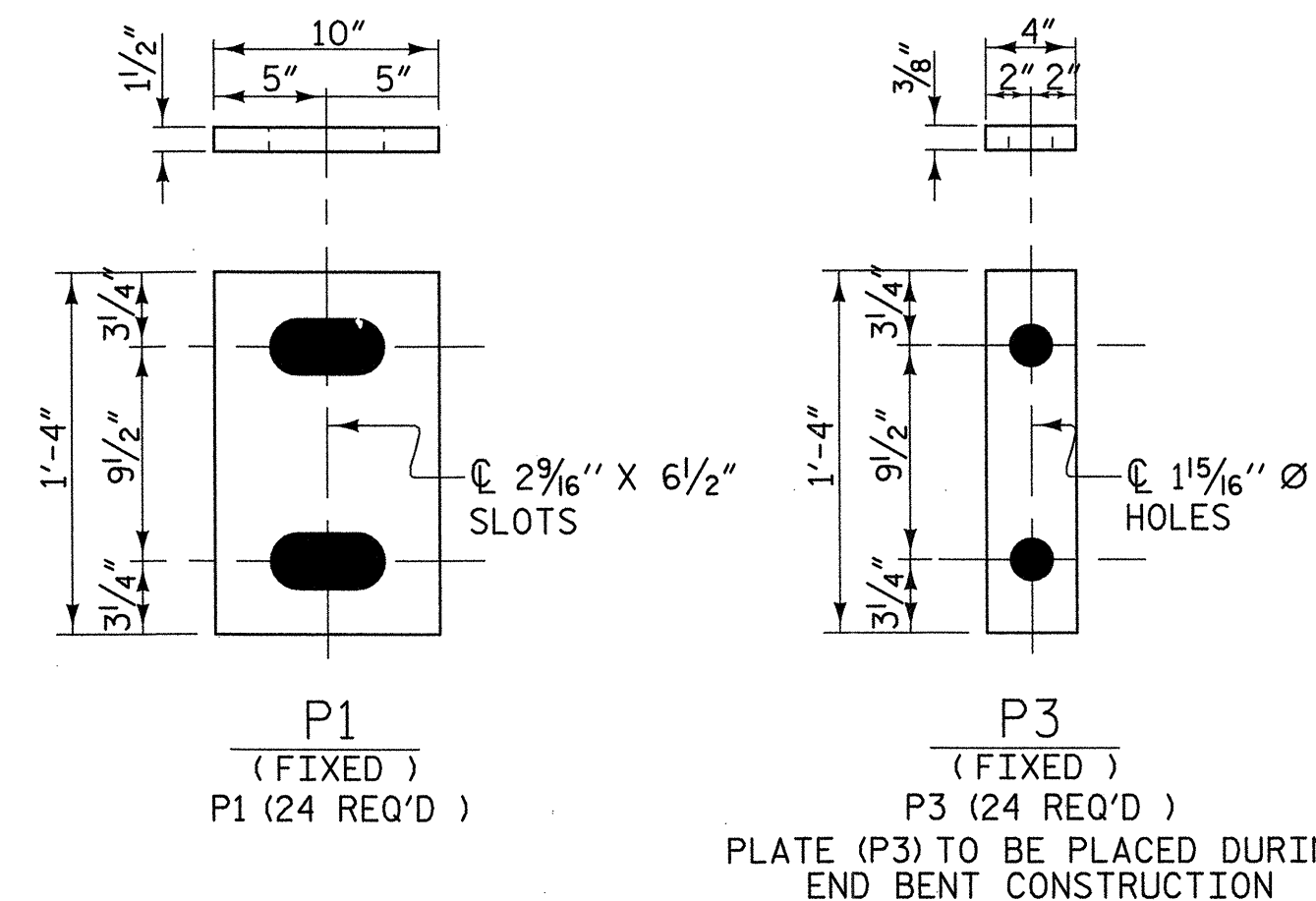
**BEARING PLATE DETAILS FOR FIXED BEARING @ BENT**



**END VIEW (FIXED)**



**DETAIL "A"**



**SOLE PLATE AND ANCHORAGE DETAILS @ INTEGRAL END BENTS**

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS**

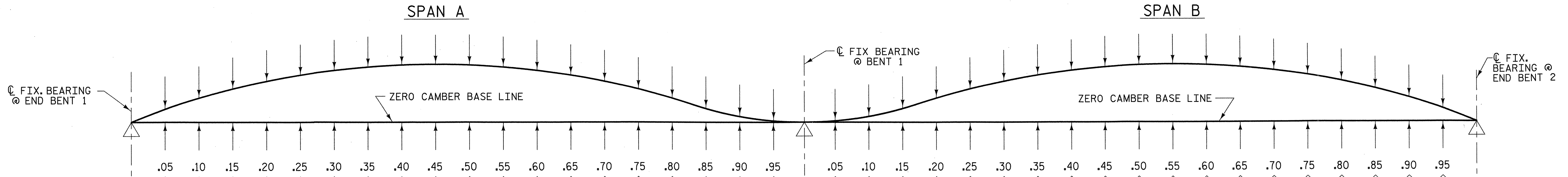


PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 P.O. Box 33127  
 Raleigh, N.C. 27635  
 (919) 881-1912 FAX  
 WWW.MULKEYINC.COM

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			
2			4			

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M.A. AVERETTE DATE: 3/07

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GIRDERS 1 AND 12	GIRDER ORDINATE																																						
	DEFLEC. DUE TO WEIGHT OF STEEL	.008	.016	.023	.029	.034	.038	.040	.041	.040	.038	.034	.030	.025	.019	.014	.009	.005	.002	.000	.001	.004	.007	.012	.017	.023	.029	.034	.039	.042	.044	.045	.044	.042	.038	.032	.025	.018	.009
	DEFLEC. DUE TO WEIGHT OF SLAB **	.028	.055	.080	.101	.118	.130	.138	.140	.137	.130	.119	.104	.087	.068	.049	.032	.018	.008	.002	.004	.012	.023	.039	.057	.077	.096	.114	.129	.141	.148	.150	.147	.139	.126	.107	.085	.059	.030
	DEFLEC. DUE TO WT. OF SW & 3 BAR RAIL	.004	.008	.012	.016	.018	.020	.021	.022	.022	.021	.019	.017	.014	.012	.009	.006	.003	.002	.000	.001	.002	.004	.007	.010	.013	.016	.018	.021	.022	.023	.023	.023	.021	.019	.016	.013	.009	.005
	TOTAL DEAD LOAD DEFLECTION	.040	.079	.115	.146	.170	.188	.199	.203	.199	.189	.172	.151	.126	.099	.072	.047	.026	.012	.002	.006	.018	.034	.058	.084	.113	.141	.166	.189	.205	.215	.218	.214	.202	.183	.155	.123	.086	.044
	VERTICAL CURVE ORDINATE	.038	.071	.101	.126	.148	.166	.180	.190	.196	.198	.196	.190	.180	.166	.148	.126	.101	.071	.038	.038	.072	.102	.129	.151	.169	.183	.193	.199	.201	.199	.193	.183	.169	.151	.129	.102	.072	.038
	REQUIRED CAMBER	15/16	1 1/16	2 3/16	3/4	3 3/16	4/4	4 9/16	4 11/16	4 3/4	4 5/8	4 7/16	4 1/16	3 11/16	3 3/16	2 5/8	2 1/16	1 1/2	1	1/2	1/2	1 1/16	1 5/8	2 1/4	2 3/16	3 3/8	3 7/8	4 5/16	4 5/8	4 7/8	5	4 15/16	4 3/4	4 7/16	4	3 3/16	2 11/16	1 7/8	1

GIRDERS 2, 3, 10 & 11	GIRDER ORDINATE																																						
	DEFLEC. DUE TO WEIGHT OF STEEL	.008	.017	.024	.030	.035	.039	.041	.042	.041	.039	.035	.031	.026	.020	.014	.009	.005	.002	.000	.001	.004	.007	.012	.018	.024	.030	.035	.040	.043	.045	.046	.045	.043	.039	.033	.026	.018	.009
	DEFLEC. DUE TO WEIGHT OF SLAB **	.028	.055	.080	.101	.118	.130	.138	.140	.137	.130	.119	.104	.087	.068	.049	.032	.018	.008	.002	.004	.012	.023	.039	.057	.077	.096	.114	.129	.141	.148	.150	.147	.139	.126	.107	.085	.059	.030
	DEFLEC. DUE TO WT. OF SW & 3 BAR RAIL	.004	.008	.012	.015	.018	.020	.021	.021	.021	.020	.019	.017	.014	.011	.009	.006	.003	.002	.000	.001	.002	.004	.007	.010	.013	.015	.018	.020	.022	.023	.023	.022	.021	.019	.016	.013	.009	.004
	TOTAL DEAD LOAD DEFLECTION	.040	.080	.116	.146	.171	.189	.200	.203	.199	.189	.173	.152	.127	.099	.072	.047	.026	.012	.002	.006	.018	.034	.058	.085	.114	.141	.167	.189	.206	.216	.219	.214	.203	.184	.156	.124	.086	.043
	VERTICAL CURVE ORDINATE	.038	.071	.101	.126	.148	.166	.180	.190	.196	.198	.196	.190	.180	.166	.148	.126	.101	.071	.038	.038	.072	.102	.129	.151	.169	.183	.193	.199	.201	.199	.193	.183	.169	.151	.129	.102	.072	.038
	REQUIRED CAMBER	15/16	1 1/16	2 3/16	3/4	3 3/16	4/4	4 9/16	4 11/16	4 3/4	4 5/8	4 7/16	4 1/16	3 11/16	3 3/16	2 5/8	2 1/16	1 1/2	1	1/2	1/2	1 1/16	1 5/8	2 1/4	2 3/16	3 3/8	3 7/8	4 5/16	4 5/8	4 7/8	5	4 15/16	4 3/4	4 7/16	4	3 3/16	2 11/16	1 7/8	1

GIRDERS 4 & 9	GIRDER ORDINATE																																							
	DEFLEC. DUE TO WEIGHT OF STEEL	.008	.017	.024	.030	.035	.039	.041	.042	.041	.039	.035	.031	.026	.020	.014	.009	.005	.002	.000	.001	.004	.007	.012	.018	.024	.030	.035	.040	.043	.045	.046	.045	.043	.039	.033	.026	.018	.009	
	DEFLEC. DUE TO WEIGHT OF SLAB **	.028	.055	.080	.101	.118	.130	.138	.140	.137	.130	.119	.104	.087	.068	.049	.032	.018	.008	.002	.004	.012	.023	.039	.057	.077	.096	.114	.129	.141	.148	.150	.147	.139	.126	.107	.085	.059	.030	
	DEFLEC. DUE TO WEIGHT OF RAIL	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	TOTAL DEAD LOAD DEFLECTION	.036	.072	.104	.131	.153	.169	.179	.182	.178	.169	.154	.135	.113	.088	.063	.041	.023	.010	.002	.005	.016	.030	.051	.075	.101	.126	.149	.169	.184	.193	.196	.192	.182	.165	.140	.111	.077	.039	
	VERTICAL CURVE ORDINATE	.038	.071	.101	.126	.148	.166	.180	.190	.196	.198	.196	.190	.180	.166	.148	.126	.101	.071	.038	.038	.072	.102	.129	.151	.169	.183	.193	.199	.201	.199	.193	.183	.169	.151	.129	.102	.072	.038	
	REQUIRED CAMBER	7/8	1 1/16	2 1/16	3/16	3 5/16	4	4 5/16	4 7/16	4 1/2	4 3/8	4 3/16	3 7/8	3 1/2	3 1/16	2 5/8	2	1 1/2	1	1/2	1/2	1 1/16	1 5/8	2 3/16	2 11/16	3/4	3 11/16	4 1/8	4 7/16	4 5/8	4 11/16	4 1/2	4 3/16	3 3/16	3/4	2 5/8	1 3/16	1 5/16		

GIRDERS 5 THRU 8	GIRDER ORDINATE																																						
	DEFLEC. DUE TO WEIGHT OF STEEL	.008	.017	.024	.030	.035	.039	.041	.042	.041	.039	.035	.031	.026	.020	.014	.009	.005	.002	.000	.001	.004	.007	.012	.018	.024	.030	.035	.040	.043	.045	.046	.045	.043	.039	.033	.026	.018	.009
	DEFLEC. DUE TO WEIGHT OF SLAB **	.028	.055	.080	.101	.118	.130	.138	.140	.137	.130	.119	.104	.087	.068	.049	.032	.018	.008	.002	.004	.012	.023	.039	.057	.077	.096	.114	.129	.141	.148	.150	.147	.139	.126	.107	.085	.059	.030
	DEFLEC. DUE TO WT. OF CONC. MEDIAN	.001	.003	.004	.005	.005	.006	.006	.007	.007	.006	.006	.005	.004	.004	.003	.002	.001	.001	.000	.000	.001	.001	.002	.003	.004	.005	.006	.006	.007	.007	.007	.006	.006	.005	.004	.003	.001	
	TOTAL DEAD LOAD DEFLECTION	.037	.075	.108	.136	.158	.175	.185	.189	.185	.175	.160	.140	.117	.092	.066	.043	.024	.011	.002	.005	.017	.031	.053	.078	.105	.131	.155	.175	.191	.200	.203	.199	.188	.171	.145	.115	.080	.040
	VERTICAL CURVE ORDINATE	.038	.071	.101	.126	.148	.166	.180	.190	.196	.198	.196	.190	.180	.166	.148	.126	.101	.071	.038	.038	.072	.102	.129	.151	.169	.183	.193	.199	.201	.199	.193	.183	.169	.151	.129	.102	.072	.038
	REQUIRED CAMBER	7/8	1 3/4	2 1/2	3 1/8	3 11/16	4 1/16	4 3/8	4 9/16	4 7/8	4 1/4	3 5/16	3 3/8	2 7/8	2	1 1/2	1	1/2	1/2	1 1/16	1 5/8	2 3/16	2 3/4	3 3/8	4 3/16	4 1/2	4 11/16	4 3/16	4 3/4	4 9/16	4 5/8	4 1/2	3 7/8	3 3/16	2 5/8	1 3/16	1 5/16		

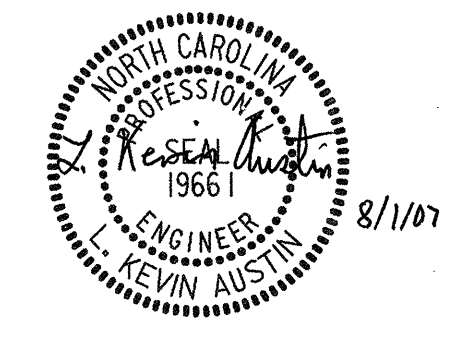
\*\* INCLUDES SLAB, BUILDUPS AND STAY-IN-PLACE FORMS.

### SCHEMATIC CAMBER ORDINATES

DEFLECTION AND VERTICAL CURVE ORDINATE ARE IN FEET (DECIMAL FORM AND  
REQUIRED CAMBER IS IN INCHES (FRACTION FORM) AT TWENTIETH POINTS BETWEEN BEARINGS.

NOTES:  
1. SLOPE FOR THE ZERO CAMBER BASELINE VARIES.

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE SCHEMATIC CAMBER ORDINATES</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-12 TOTAL SHEETS

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 3/07







NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

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

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

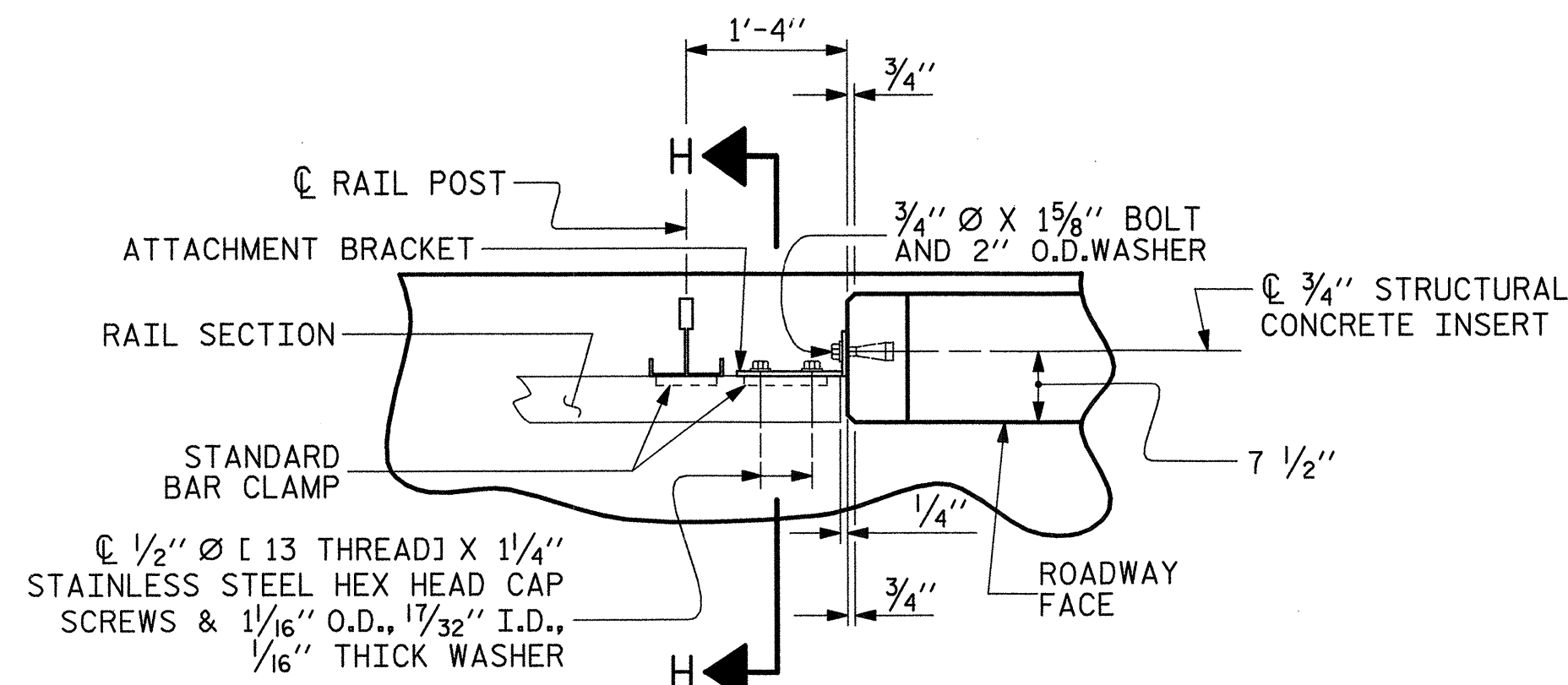
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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

NOTES

STRUCTURAL CONCRETE INSERT

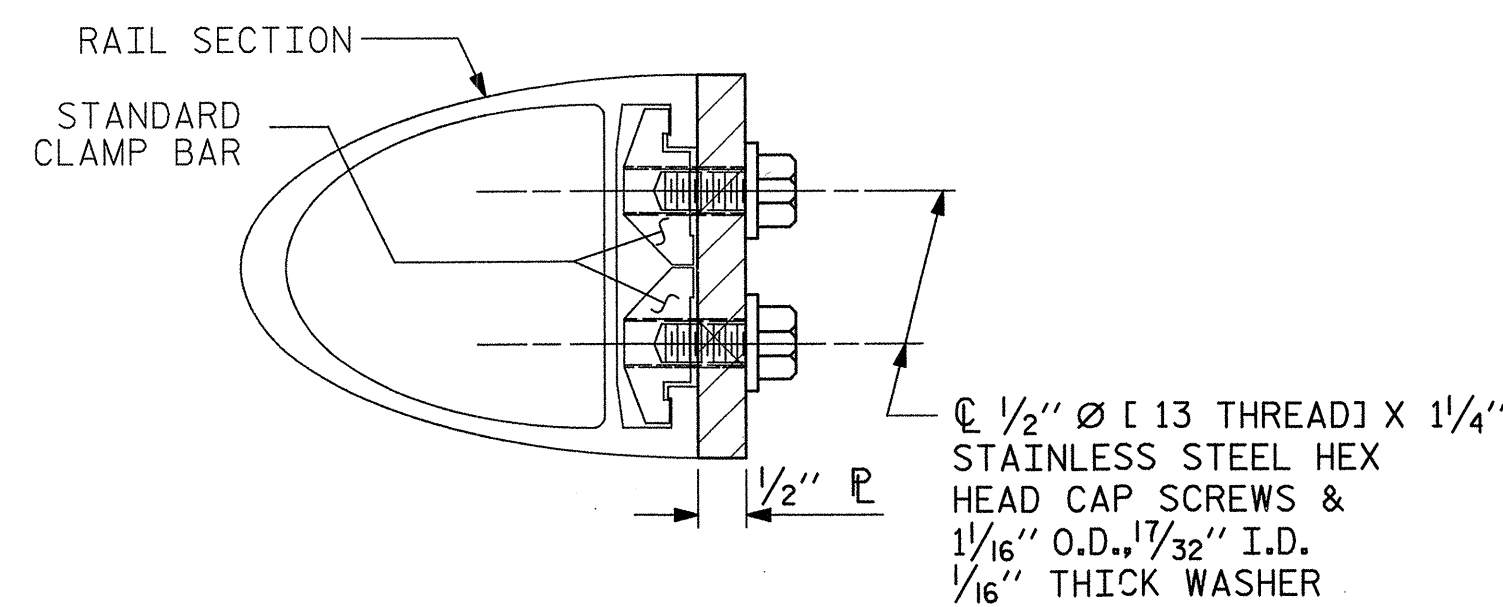
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

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



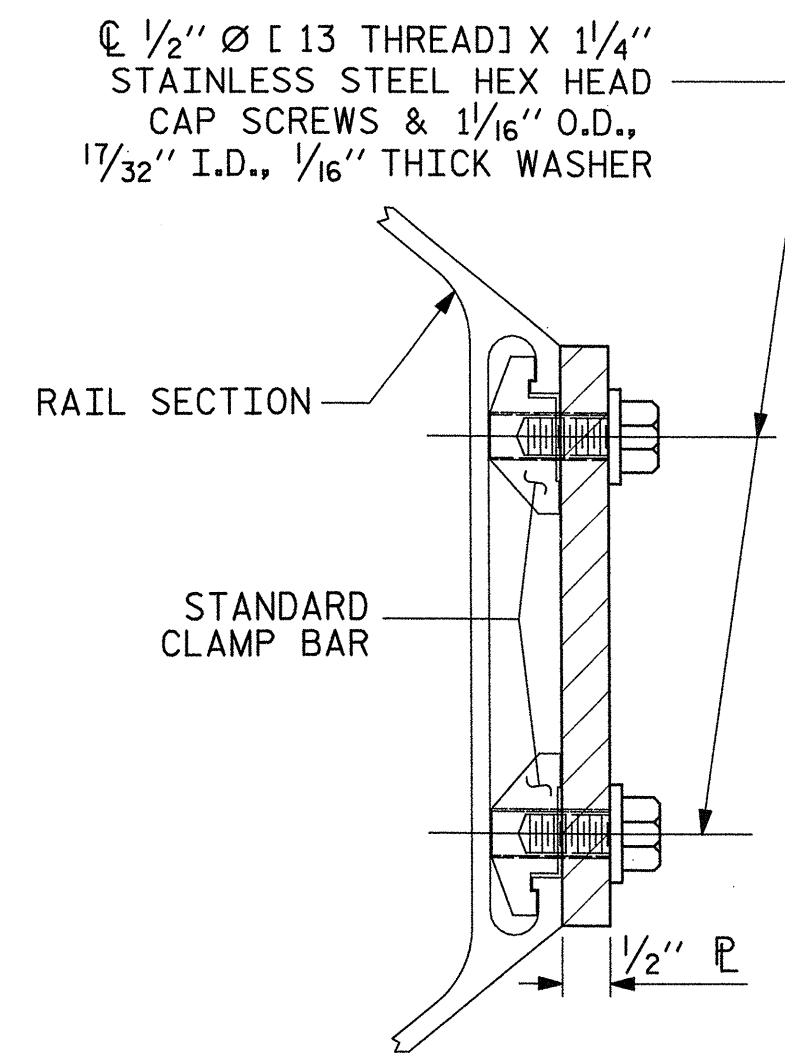
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



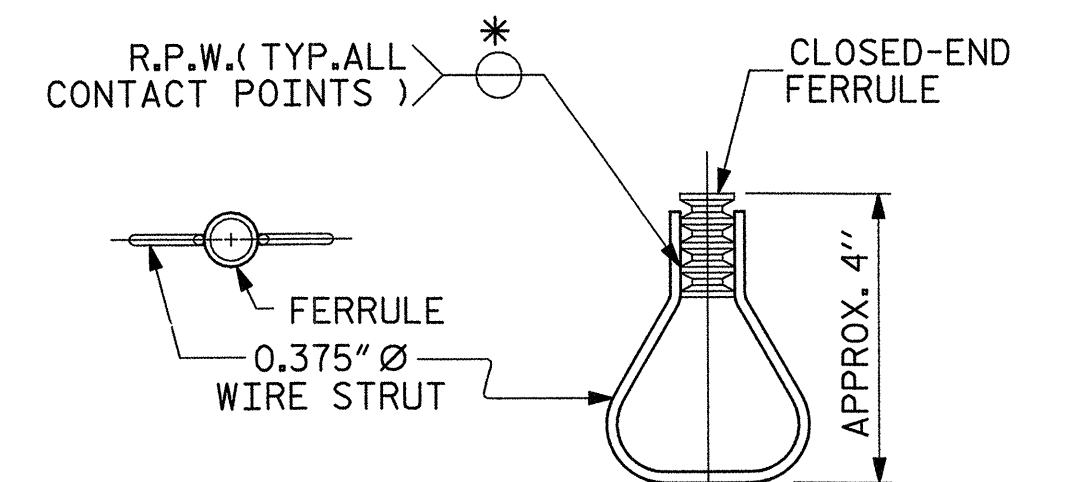
SECTION H-H

(FOR TOP & MIDDLE RAIL)



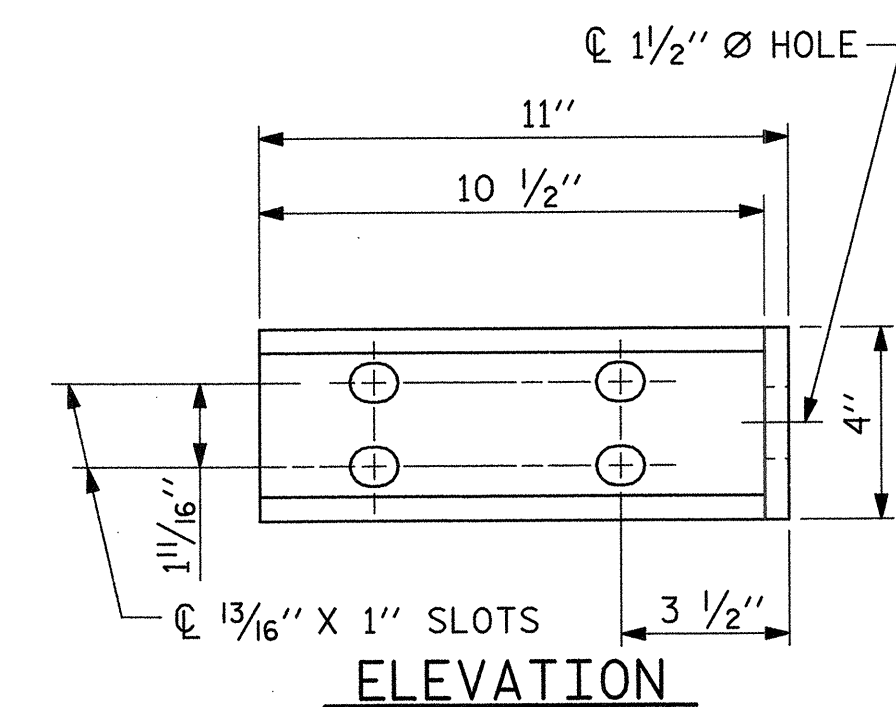
SECTION H-H

(FOR BOTTOM RAIL)

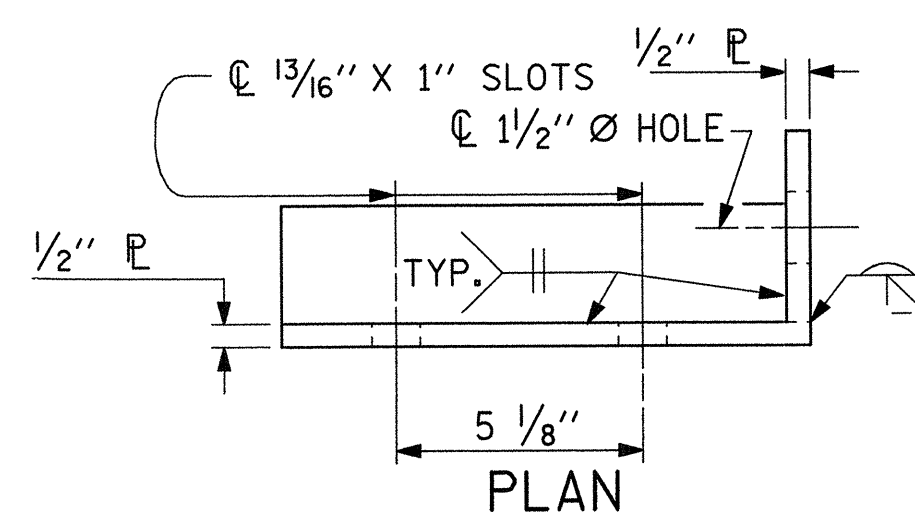


STRUCTURAL CONCRETE INSERT

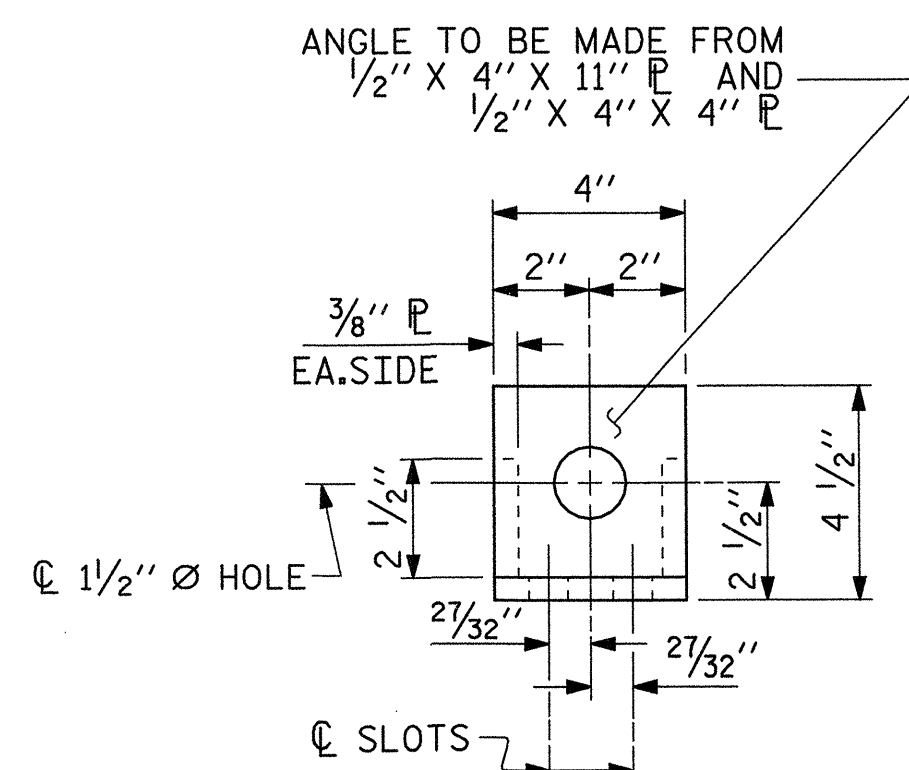
\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



ELEVATION



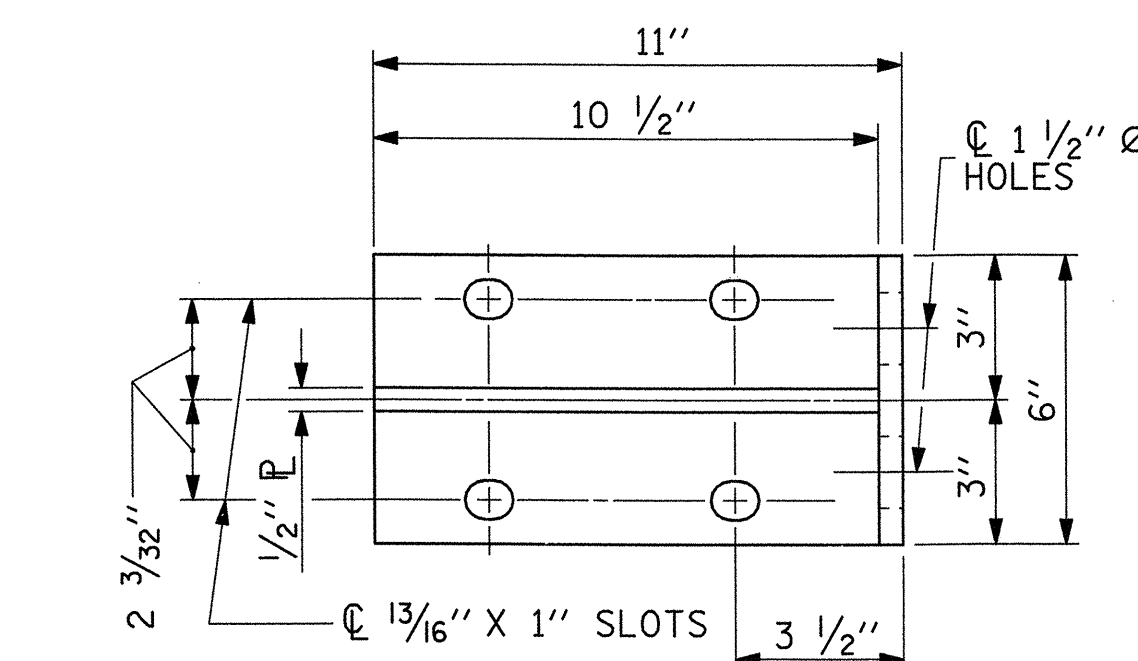
PLAN



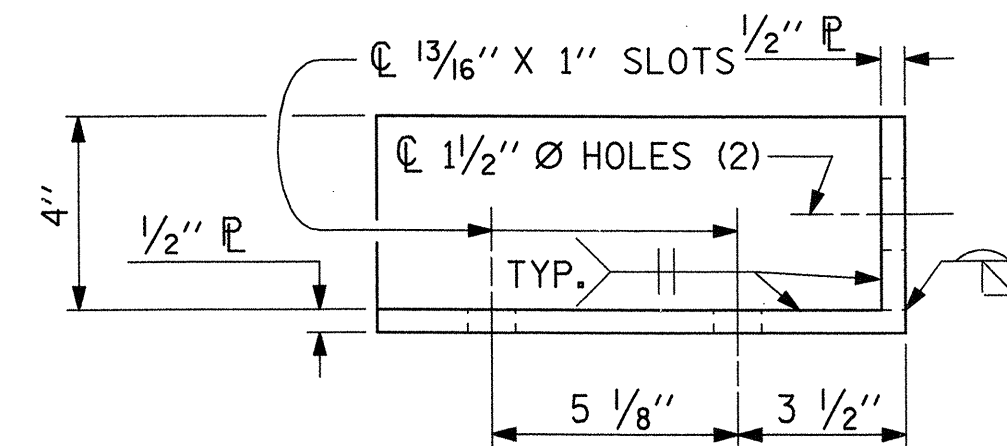
END VIEW  
(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



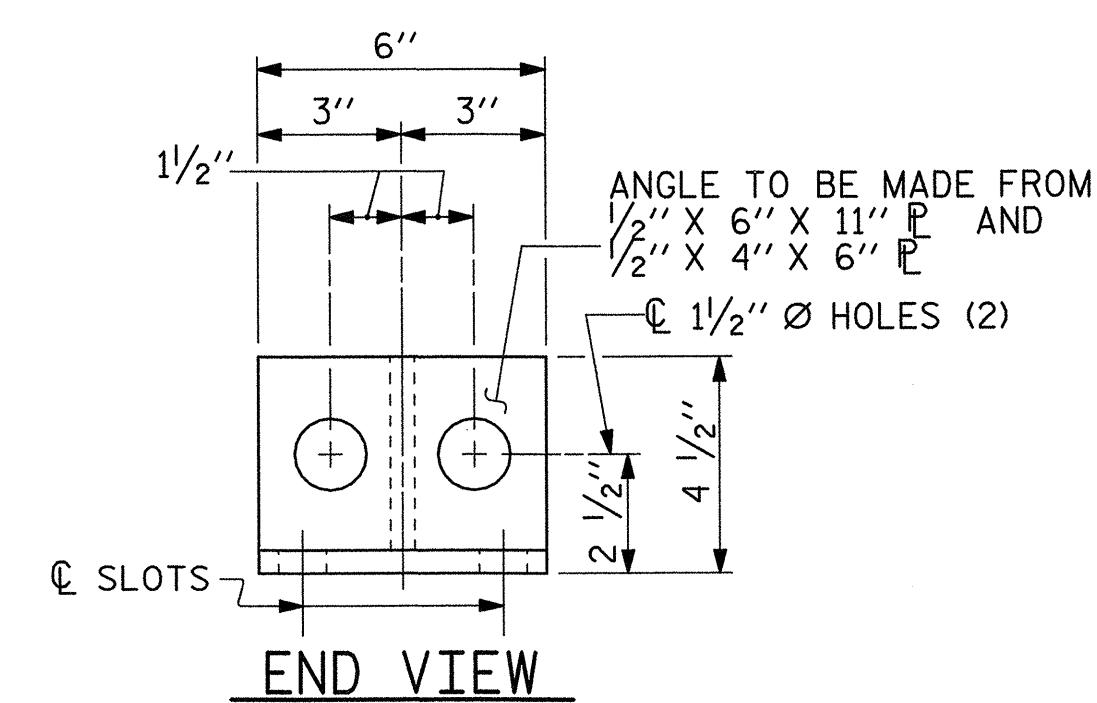
ELEVATION



PLAN

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



END VIEW

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
STATION: 44+88.35 -L-

SHEET 3 OF 3

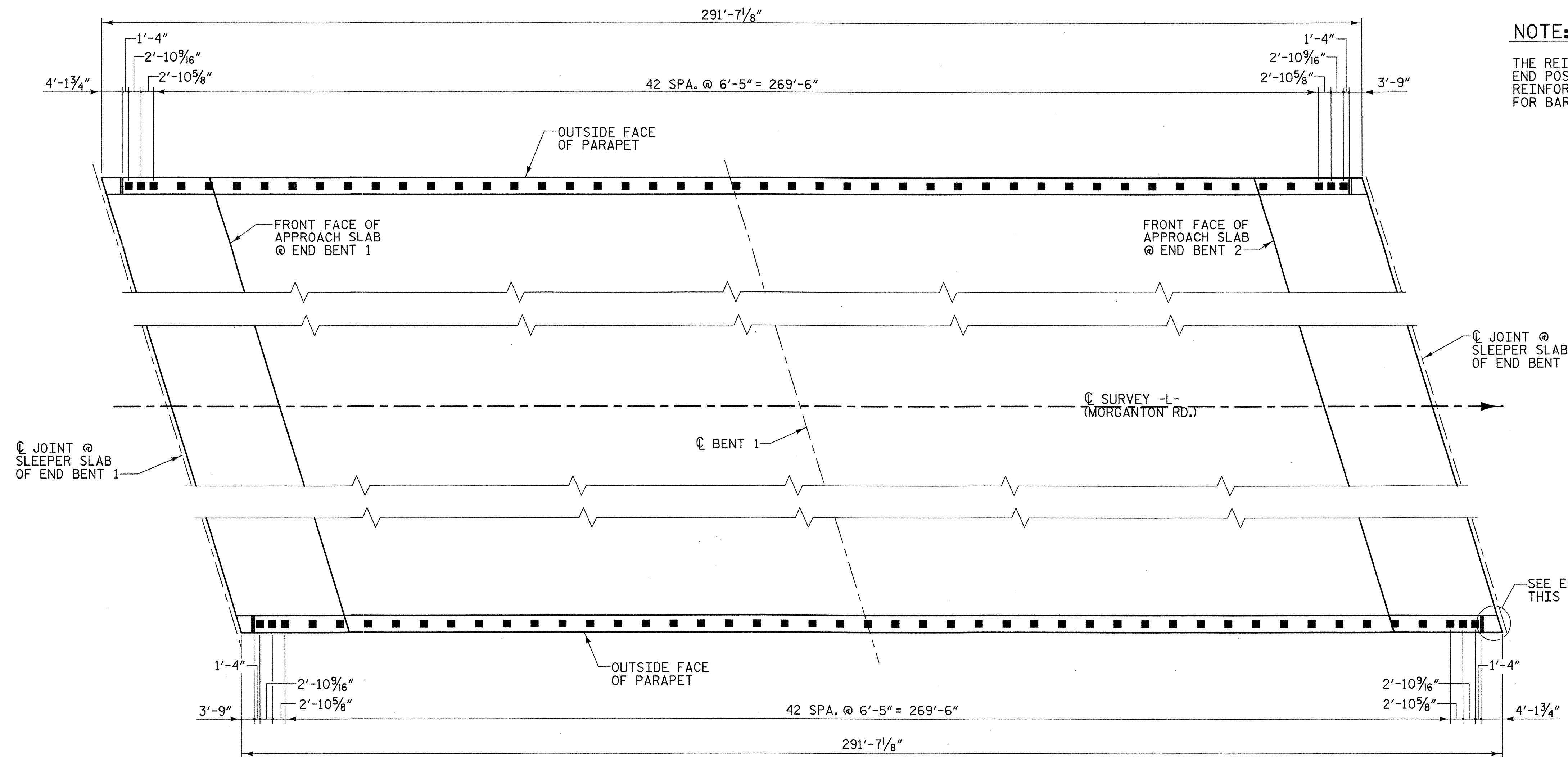
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3 BAR METAL RAIL

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



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

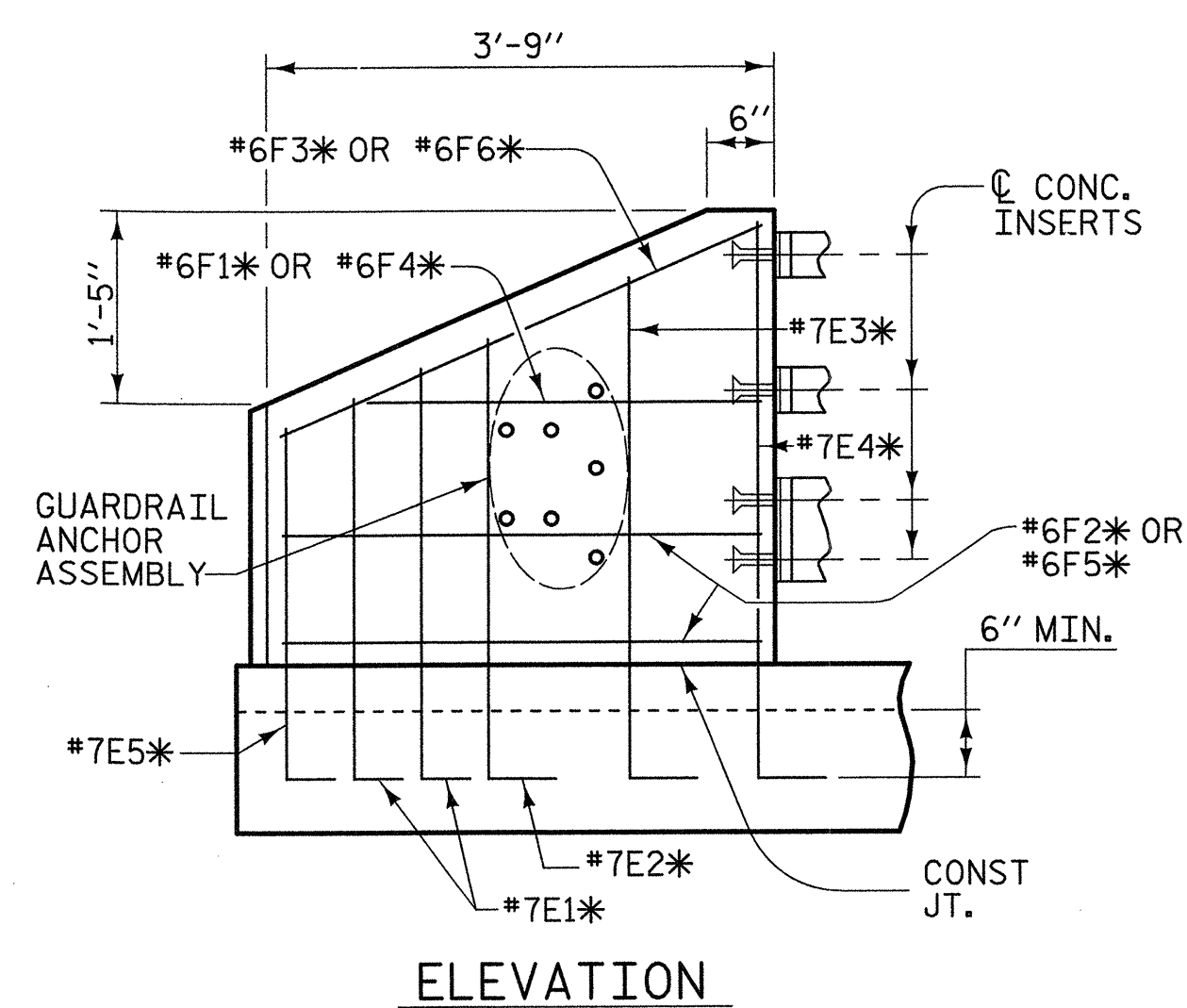
STD. NO. BMR7



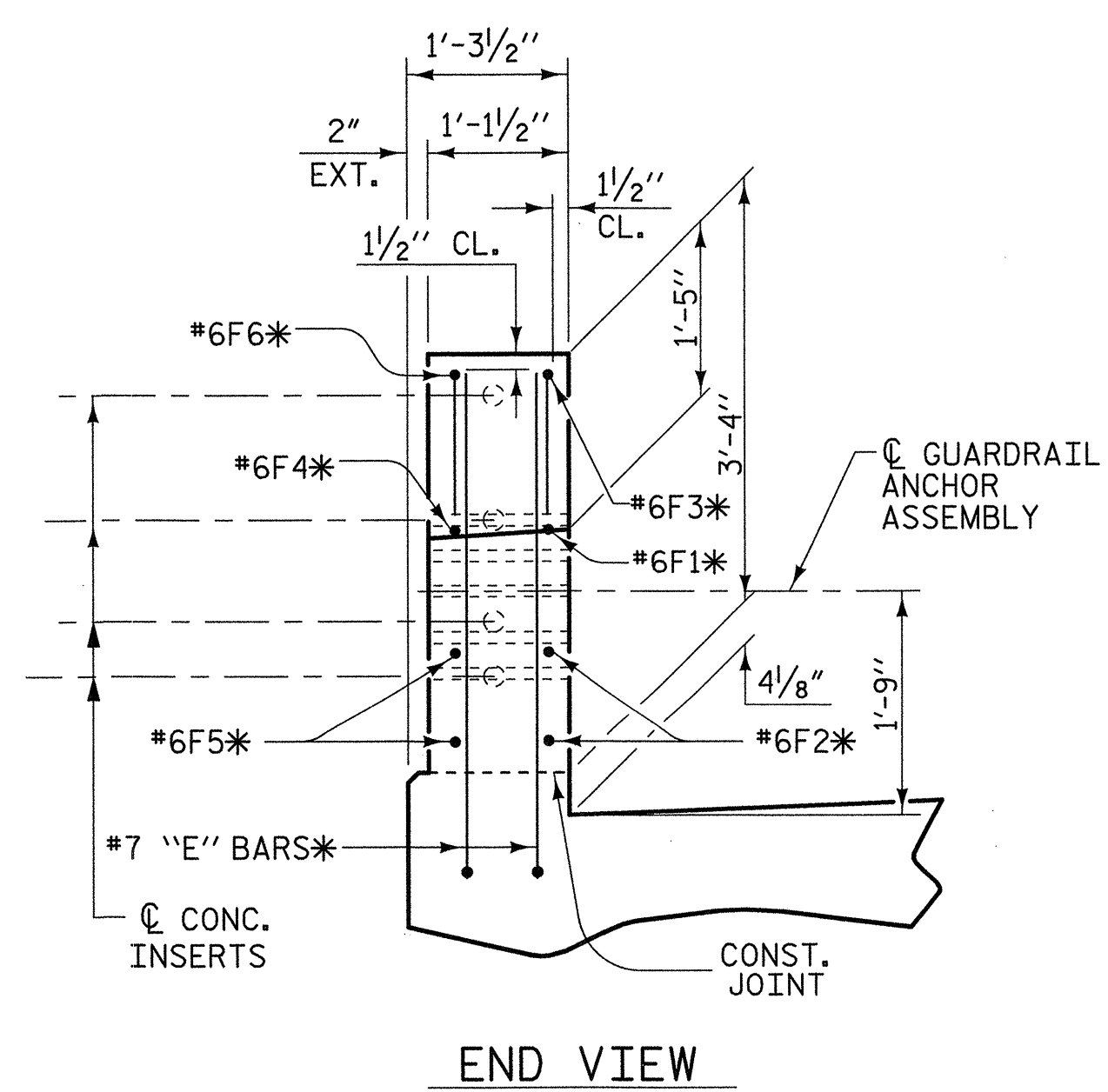
**NOTE:**  
 THE REINFORCING STEEL AND CONCRETE FOR THE END POSTS IS INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB. SEE SHEET S-20 FOR BAR DETAILS AND CONCRETE QUANTITIES.

**PLAN OF RAIL POST SPACINGS**

NOTE: ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE EDGE OF SUPERSTRUCTURE

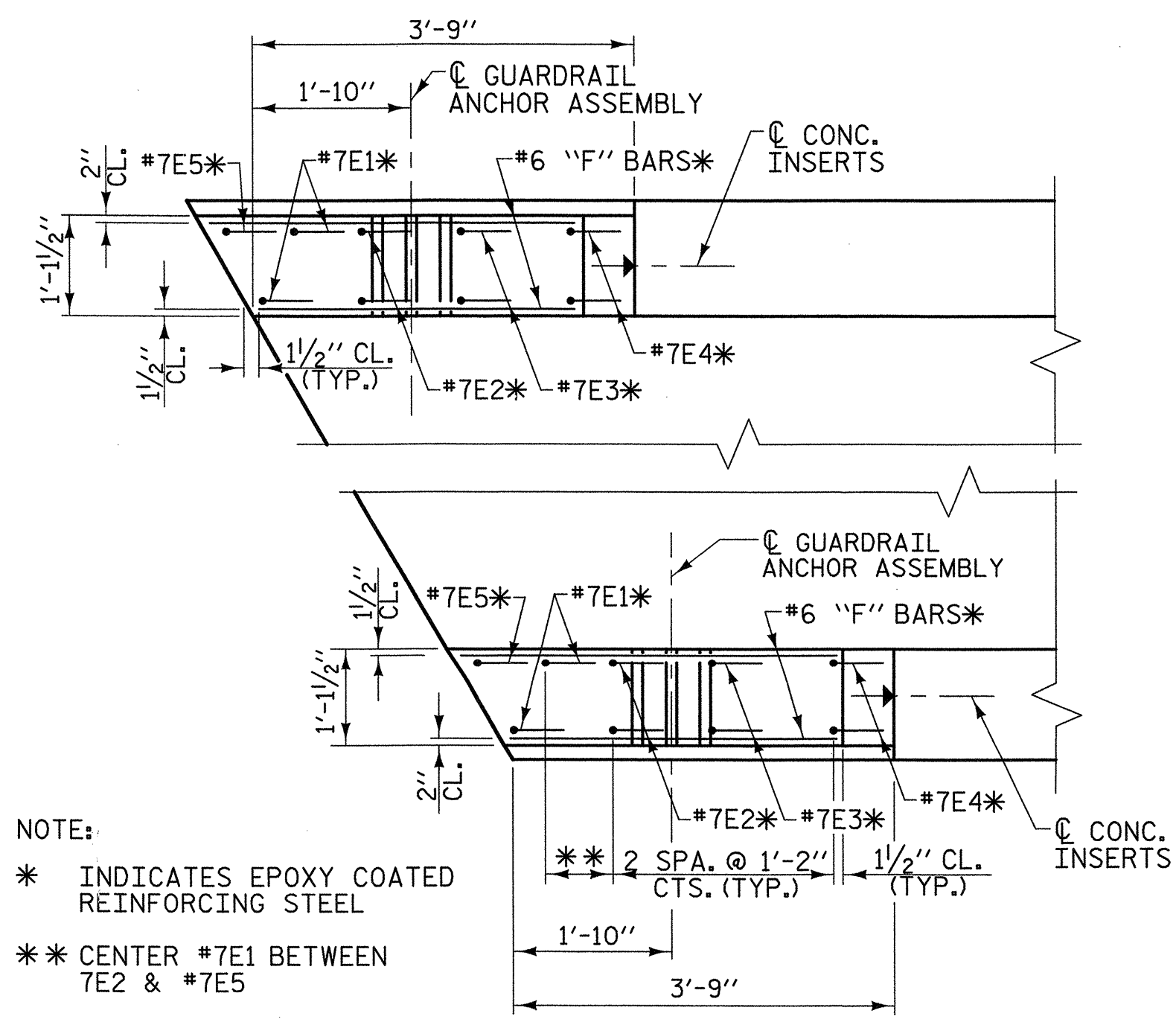


ELEVATION



END VIEW

**END POST DETAILS**



PLAN

NOTE:  
 \* INDICATES EPOXY COATED REINFORCING STEEL  
 \*\* CENTER #7E1 BETWEEN #7E2 & #7E5



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 P.O. Box 33127  
 Raleigh, N.C. 27636  
 (919) 881-1912 (FAX)  
 WWW.MULKEYINC.COM

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 RAIL POST SPACINGS  
 AND  
 END POST DETAILS**

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

DRAWN BY: W. B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 4/07

8/1/2007 5:50:05 AM R:\Structure\04756.SD\MR\_01.dgn

NOTES

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

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

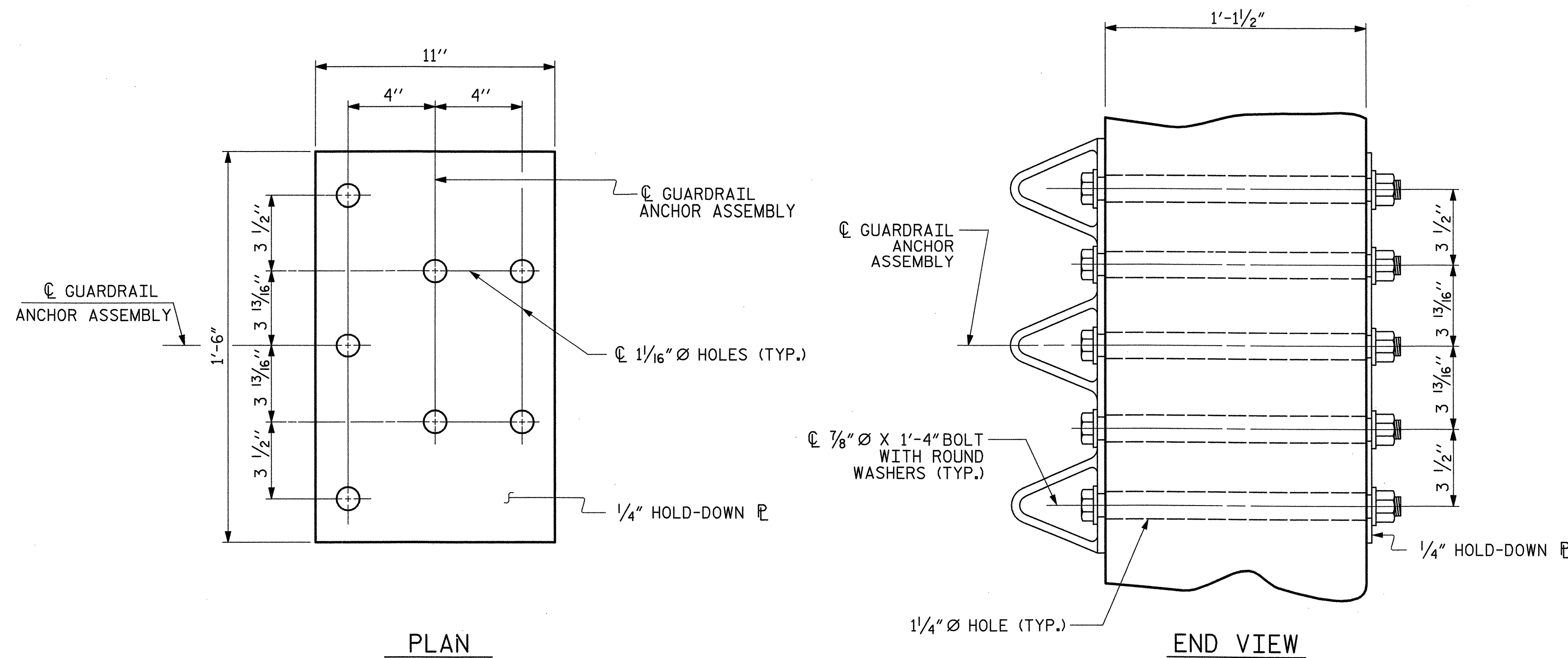
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED, AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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

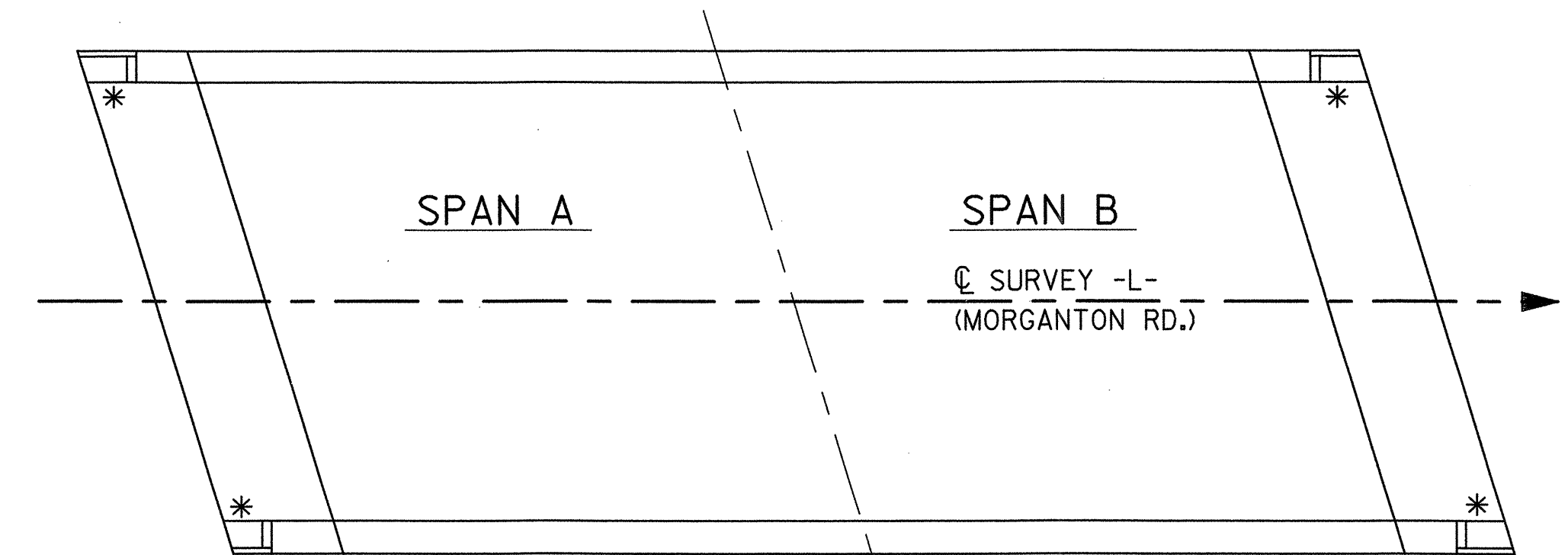
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

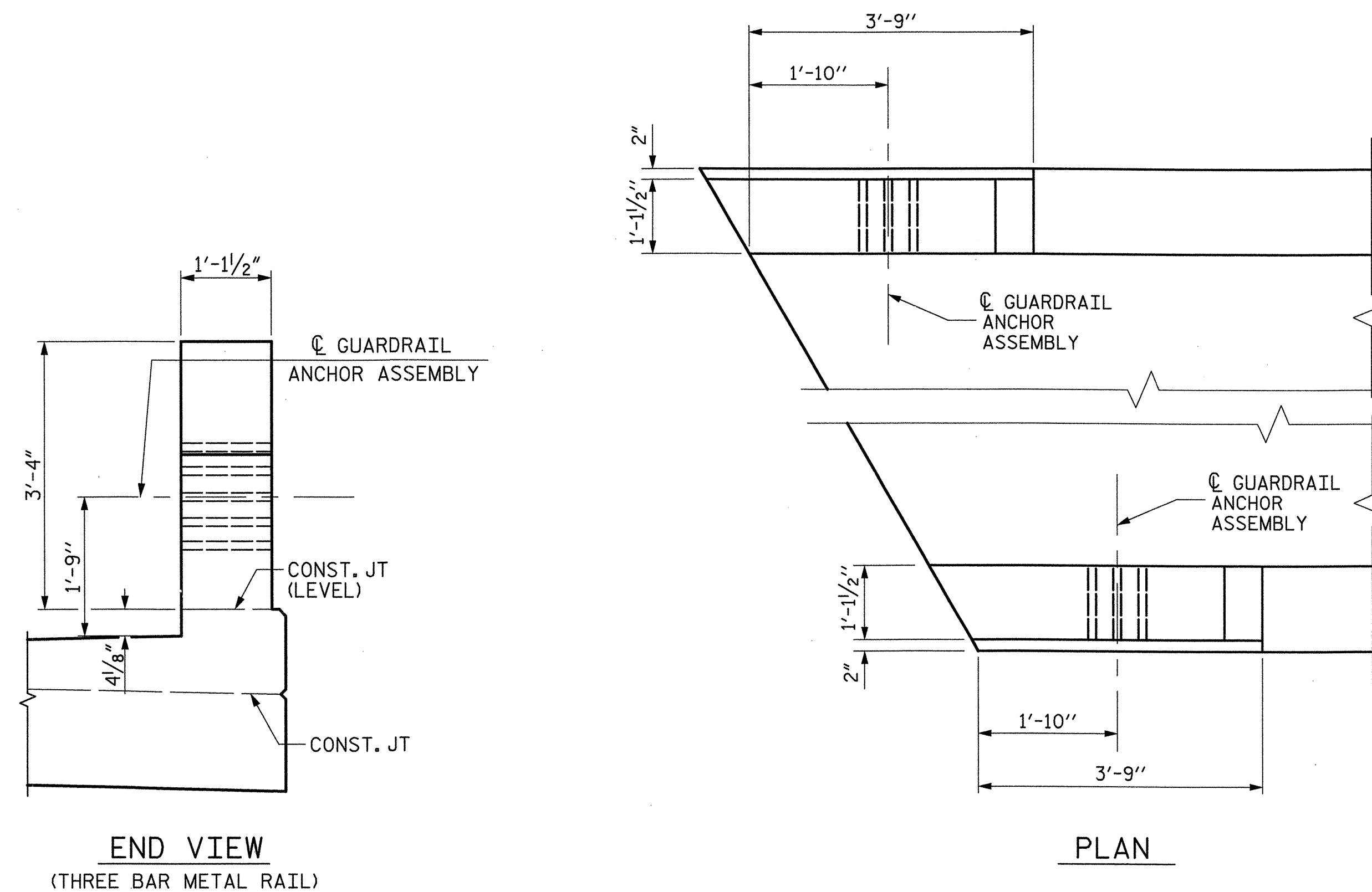


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

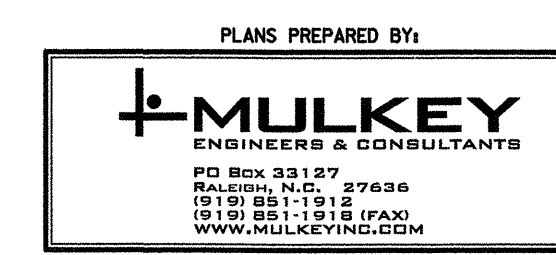
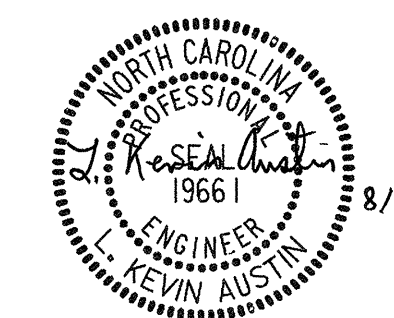


LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-17
					TOTAL SHEETS

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



8/1/2007 5:49:45 AM RA:\Structure\as\UT555.SD.CR.DWG

ASSEMBLED BY : W.B. ALLEN	DATE : 3/07
CHECKED BY : M. A. AVERETTE	DATE : 3/07
DRAWN BY : EEM 6/94	REV. 10/17/00 RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

**NOTES:**

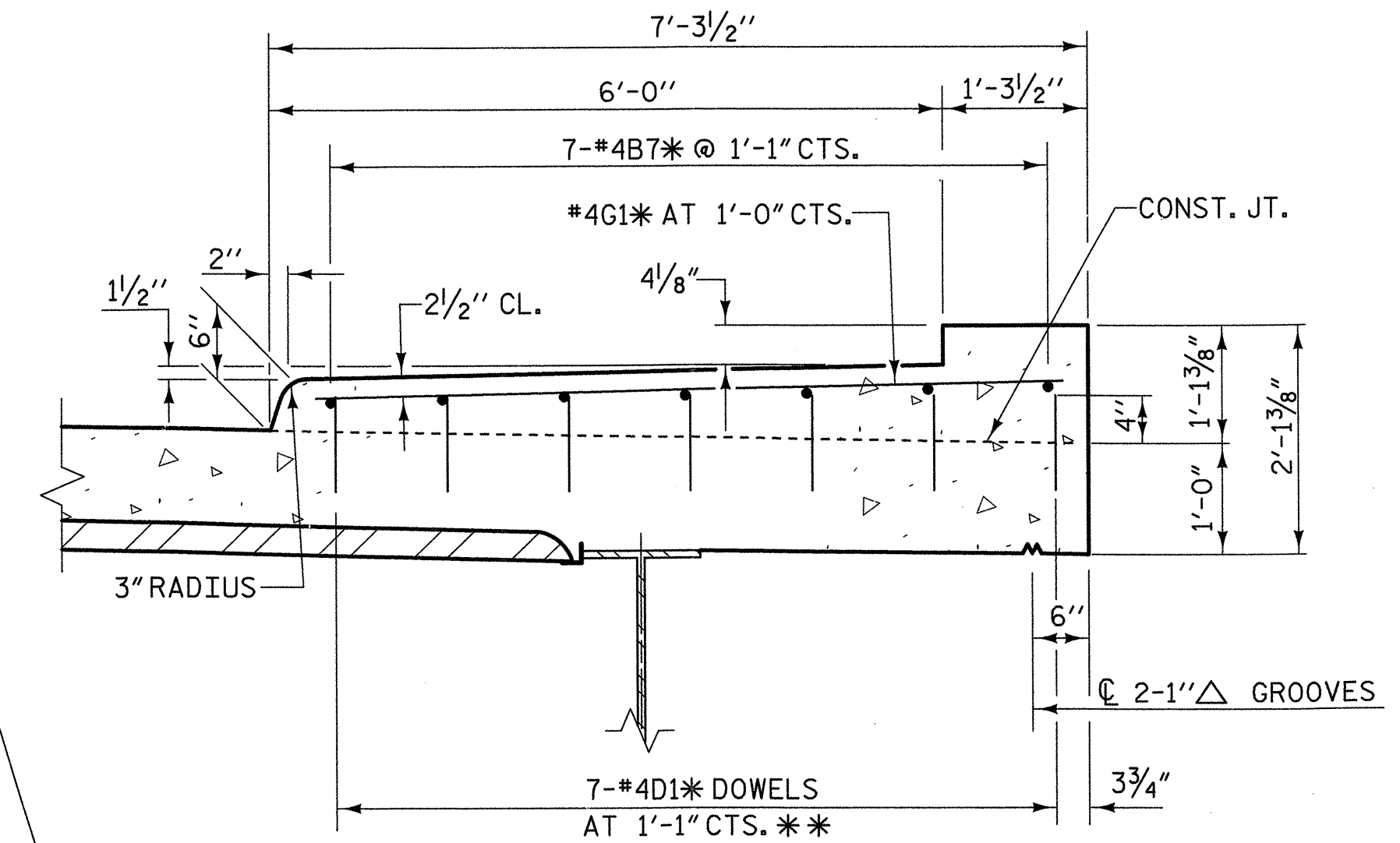
SIDEWALK IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

NO SEPARATE PAYMENT SHALL BE MADE FOR MATERIALS, LABOR AND INCIDENTALS REQUIRED FOR THIS CONSTRUCTION OF CONCRETE SIDEWALK AND CONCRETE MEDIAN AS DETAILED ON BRIDGE SPANS AND APPROACH SLABS. ALL COSTS FOR THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

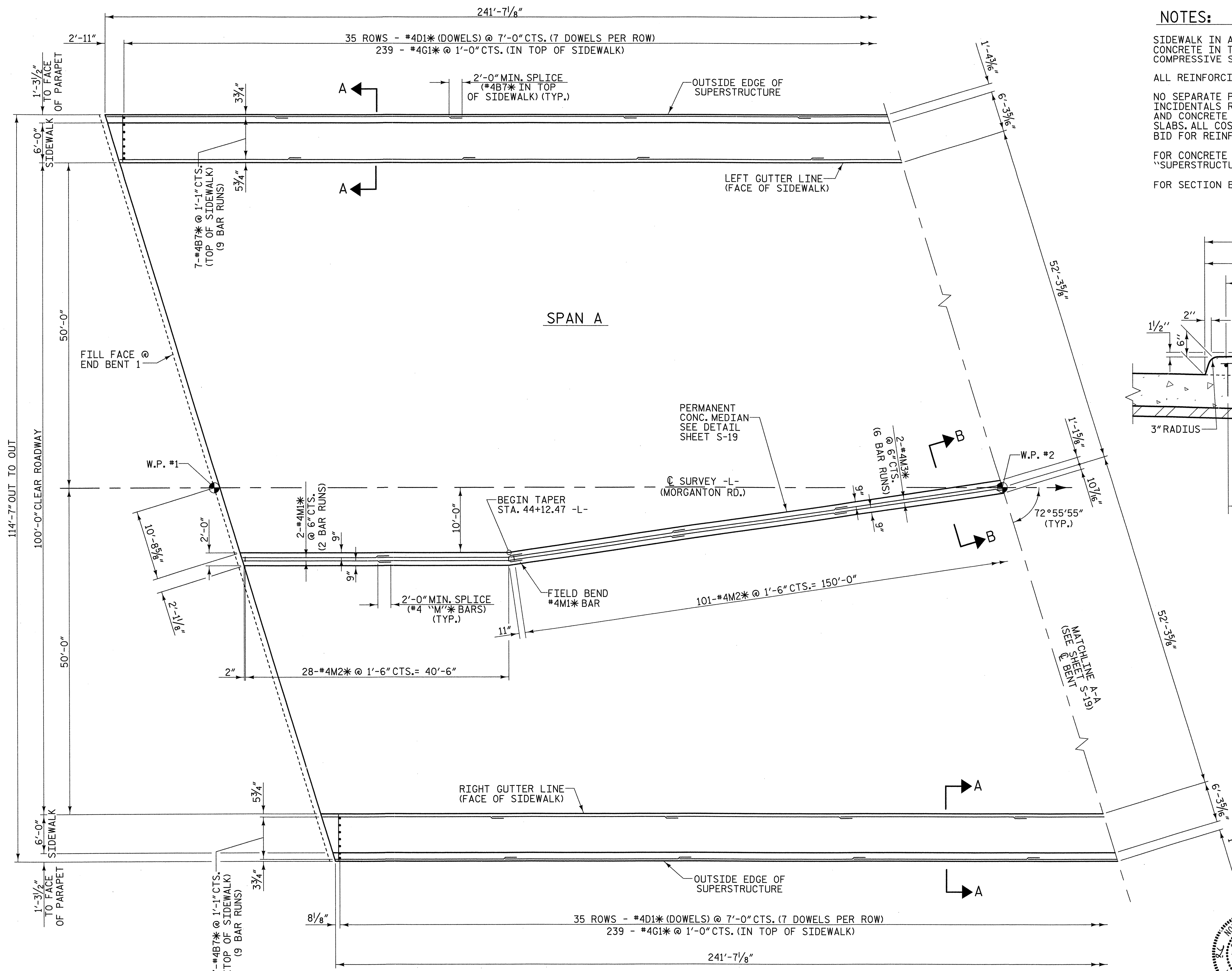
FOR CONCRETE AND REINFORCING STEEL QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL", SHEET S-20.

FOR SECTION B-B, SEE SHEET S-19



**SECTION A-A**

\*\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.



**PLAN OF SIDEWALK & PERMANENT CONCRETE MEDIAN ON BRIDGE**

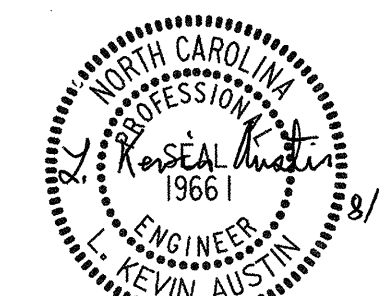
\* INDICATES EPOXY COATED REINFORCING STEEL

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 SIDEWALK &  
 CONCRETE MEDIAN  
 PLAN AND DETAILS**



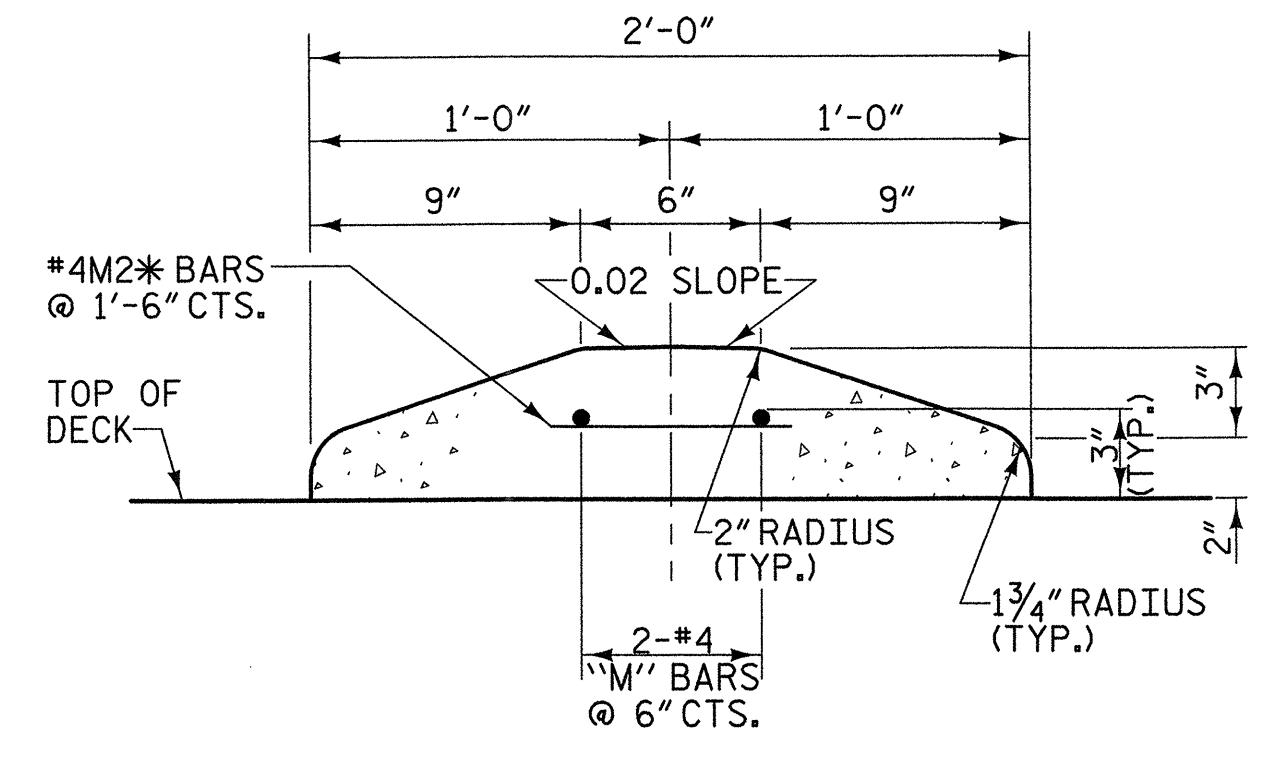
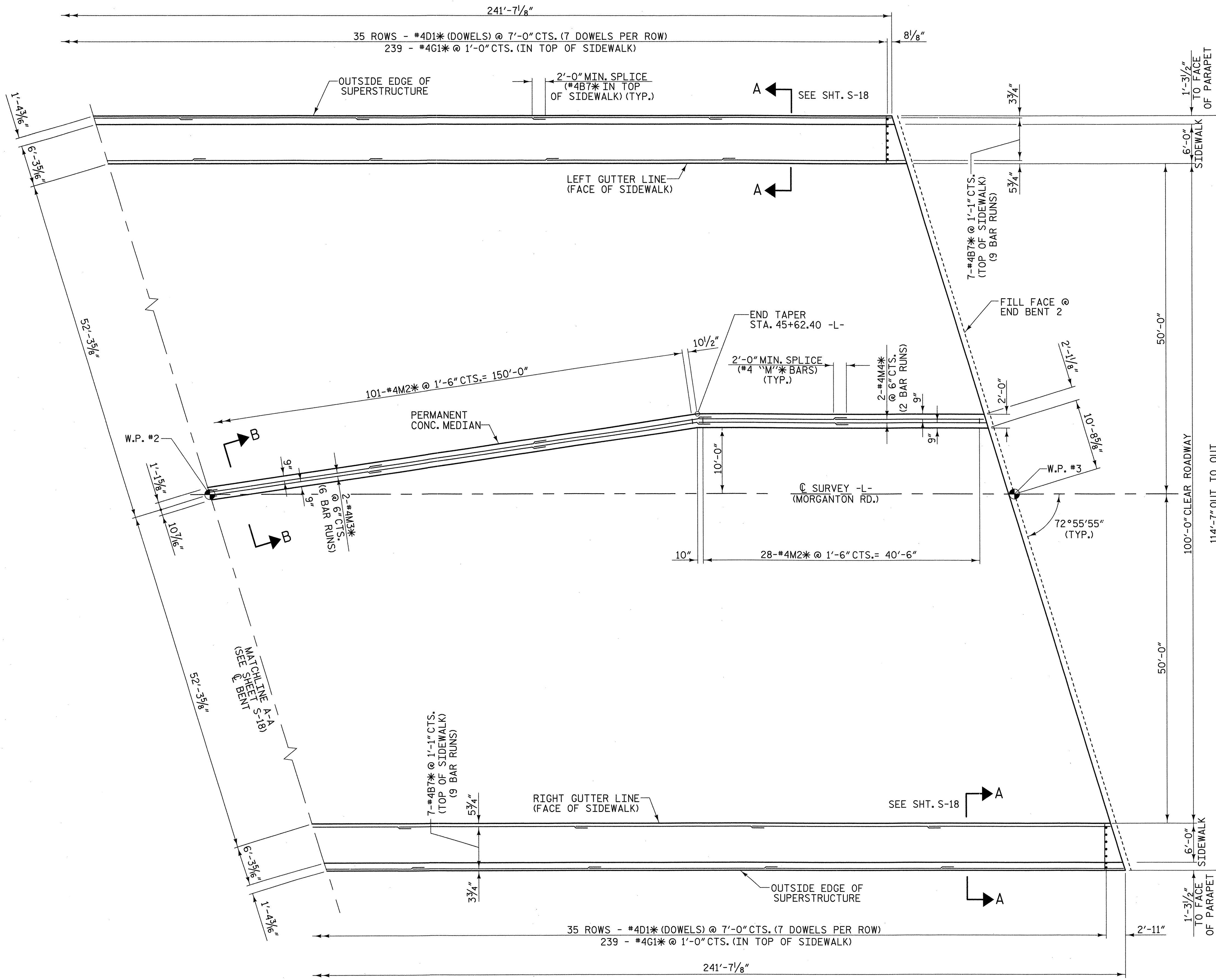
PLANS PREPARED BY:



REVISIONS						SHEET NO. S-18
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

8/1/2007 8:48:15 AM RA:\Structures\U4756.SD.SW.dwg

DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M. A. AVERETTE DATE: 3/07



**SECTION B-B**  
SECTION THRU PERMANENT CONCRETE MEDIAN

**PLAN OF SIDEWALK & PERMANENT CONCRETE MEDIAN ON BRIDGE**

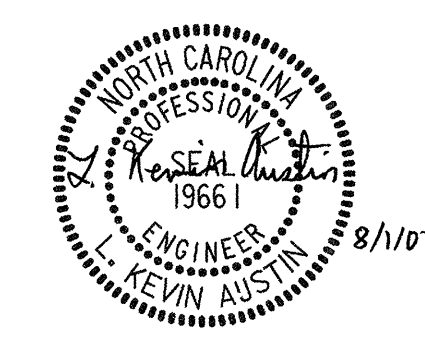
\* INDICATES EPOXY COATED REINFORCING STEEL

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 SIDEWALK &  
 CONCRETE MEDIAN  
 PLAN AND DETAILS**



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 P.O. Box 33127  
 Raleigh, N.C. 27636  
 (919) 851-1912  
 (919) 851-1913 FAX  
 WWW.MULKEYINC.COM

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

SHEET NO.  
**S-19**  
 TOTAL SHEETS

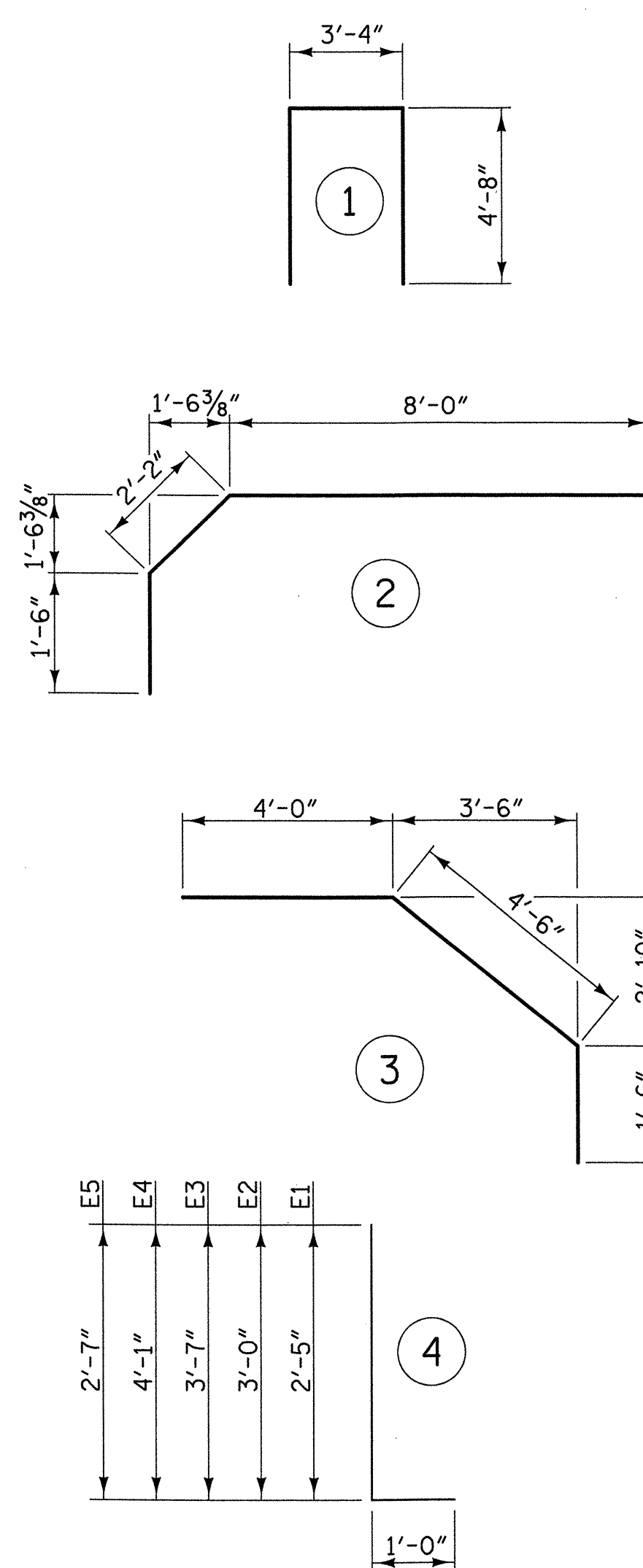
DRAWN BY: W.B. ALLEN DATE: 3/07  
 CHECKED BY: M.A. AVERETTE DATE: 3/07

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**REINFORCING BAR SCHEDULE**

REINFORCING STEEL					REINFORCING STEEL					REINFORCING STEEL							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1*	824	#5	STR	58'-5"	50169	A201	2	#5	STR	56'-7"	118	B1*	460	#5	STR	50'-3"	24109
A2	824	#5	STR	58'-3"	50026	A202	2	#5	STR	54'-10"	114	B2*	182	#5	STR	60'-0"	11390
A101*	2	#5	STR	56'-10"	118	A203	2	#5	STR	53'-1"	111	B3*	182	#5	STR	26'-6"	5030
A102*	2	#5	STR	55'-1"	115	A204	2	#5	STR	51'-4"	107	B4*	182	#6	STR	24'-0"	6561
A103*	2	#5	STR	53'-4"	111	A205	2	#5	STR	49'-7"	104	B5	765	#5	STR	50'-0"	39895
A104*	2	#5	STR	51'-7"	108	A206	2	#5	STR	47'-10"	100	B6	280	#4	STR	24'-0"	4489
A105*	2	#5	STR	49'-10"	104	A207	2	#5	STR	46'-0"	96	B7*	126	#4	STR	28'-7"	2406
A106*	2	#5	STR	48'-1"	100	A208	2	#5	STR	44'-3"	92	D1*	490	#4	STR	0'-8"	218
A107*	2	#5	STR	46'-2"	96	A209	2	#5	STR	42'-6"	89	E1*	8	#7	4	3'-5"	56
A108*	2	#5	STR	44'-5"	93	A210	2	#5	STR	40'-9"	85	E2*	8	#7	4	4'-0"	65
A109*	2	#5	STR	42'-8"	89	A211	2	#5	STR	39'-0"	81	E3*	8	#7	4	4'-7"	75
A110*	2	#5	STR	40'-11"	85	A212	2	#5	STR	37'-2"	78	E4*	8	#7	4	5'-1"	83
A111*	2	#5	STR	39'-2"	82	A213	2	#5	STR	35'-5"	74	E5*	4	#7	4	3'-7"	29
A112*	2	#5	STR	37'-5"	78	A214	2	#5	STR	33'-8"	70	F1*	4	#6	STR	3'-1"	19
A113*	2	#5	STR	35'-8"	74	A215	2	#5	STR	31'-11"	67	F2*	8	#6	STR	3'-6"	42
A114*	2	#5	STR	33'-11"	71	A216	2	#5	STR	30'-2"	63	F3*	4	#6	STR	3'-5"	21
A115*	2	#5	STR	32'-2"	67	A217	2	#5	STR	28'-5"	59	F4*	4	#6	STR	3'-4"	20
A116*	2	#5	STR	30'-5"	63	A218	2	#5	STR	26'-7"	56	F5*	8	#6	STR	3'-9"	45
A117*	2	#5	STR	28'-8"	60	A219	2	#5	STR	24'-10"	52	F6*	4	#6	STR	3'-8"	22
A118*	2	#5	STR	26'-10"	56	A220	2	#5	STR	23'-1"	48	G1*	478	#4	STR	6'-11"	2209
A119*	2	#5	STR	25'-1"	52	A221	2	#5	STR	21'-4"	45	K1	96	#4	STR	25'-7"	1641
A120*	2	#5	STR	23'-4"	49	A222	2	#5	STR	19'-7"	41	M1*	4	#4	STR	22'-7"	60
A121*	2	#5	STR	21'-7"	45	A223	2	#5	STR	17'-10"	37	M2*	157	#4	STR	1'-7"	166
A122*	2	#5	STR	19'-10"	41	A224	2	#5	STR	16'-0"	33	M3*	12	#4	STR	27'-4"	219
A123*	2	#5	STR	18'-1"	38	A225	2	#5	STR	14'-3"	30	M4*	4	#4	STR	23'-0"	61
A124*	2	#5	STR	16'-2"	34	A226	2	#5	STR	12'-6"	26	S1	188	#4	1	12'-8"	1591
A125*	2	#5	STR	14'-5"	30	A227	2	#5	STR	10'-9"	23	S3*	210	#4	2	11'-8"	1637
A126*	2	#5	STR	12'-8"	27	A228	2	#5	STR	9'-0"	19	S4*	210	#4	3	10'-0"	1403
A127*	2	#5	STR	10'-11"	23	A229	2	#5	STR	7'-3"	15	REINFORCING STEEL			LBS.	101644	
A128*	2	#5	STR	9'-2"	19	A230	2	#5	STR	5'-5"	11	EPOXY COATED REINFORCING STEEL			LBS.	110129	
A129*	2	#5	STR	7'-6"	16	A231	2	#5	STR	3'-8"	8	CLASS AA CONCRETE					
A130*	2	#5	STR	5'-8"	12	A232	2	#5	STR	58'-0"	121	POUR #1			C.Y.	286.1	
A131*	2	#5	STR	3'-11"	8	A233	2	#5	STR	56'-3"	117	POUR #2			C.Y.	201.9	
A132*	2	#5	STR	58'-0"	121	A234	2	#5	STR	54'-6"	114	POUR #3			C.Y.	289.5	
A133*	2	#5	STR	56'-3"	117	A235	2	#5	STR	52'-9"	110	POUR #4			C.Y.	216.1	
A134*	2	#5	STR	54'-6"	114	A236	2	#5	STR	50'-11"	106	SIDEWALKS			C.Y.	92.3	
A135*	2	#5	STR	52'-9"	110	A237	2	#5	STR	49'-2"	103	MEDIAN			C.Y.	5.8	
A136*	2	#5	STR	50'-11"	106	A238	2	#5	STR	47'-5"	99	END POSTS			C.Y.	1.8	
A137*	2	#5	STR	49'-2"	103	A239	2	#5	STR	45'-8"	95	TOTAL			C.Y.	1093.5	
A138*	2	#5	STR	47'-5"	99	A240	2	#5	STR	43'-11"	92	* INDICATES EPOXY COATED REINFORCING STEEL					
A139*	2	#5	STR	45'-8"	95	A241	2	#5	STR	42'-2"	88						
A140*	2	#5	STR	43'-11"	92	A242	2	#5	STR	40'-4"	84						
A141*	2	#5	STR	42'-2"	88	A243	2	#5	STR	38'-7"	80						
A142*	2	#5	STR	40'-4"	84	A244	2	#5	STR	36'-10"	77						
A143*	2	#5	STR	38'-7"	80	A245	2	#5	STR	35'-1"	73						
A144*	2	#5	STR	36'-10"	77	A246	2	#5	STR	33'-4"	70						
A145*	2	#5	STR	35'-1"	73	A247	2	#5	STR	31'-7"	66						
A146*	2	#5	STR	33'-4"	70	A248	2	#5	STR	29'-9"	62						
A147*	2	#5	STR	31'-7"	66	A249	2	#5	STR	28'-0"	58						
A148*	2	#5	STR	29'-9"	62	A250	2	#5	STR	26'-3"	55						
A149*	2	#5	STR	28'-0"	58	A251	2	#5	STR	24'-6"	51						
A150*	2	#5	STR	26'-3"	55	A252	2	#5	STR	22'-9"	47						
A151*	2	#5	STR	24'-6"	51	A253	2	#5	STR	20'-11"	44						
A152*	2	#5	STR	22'-9"	47	A254	2	#5	STR	19'-2"	40						
A153*	2	#5	STR	20'-11"	44	A255	2	#5	STR	17'-5"	36						
A154*	2	#5	STR	19'-2"	40	A256	2	#5	STR	15'-8"	33						
A155*	2	#5	STR	17'-5"	36	A257	2	#5	STR	13'-11"	29						
A156*	2	#5	STR	15'-8"	33	A258	2	#5	STR	12'-2"	25						
A157*	2	#5	STR	13'-11"	29	A259	2	#5	STR	10'-4"	22						
A158*	2	#5	STR	12'-2"	25	A260	2	#5	STR	8'-7"	18						
A159*	2	#5	STR	10'-4"	22	A261	2	#5	STR	6'-10"	14						
A160*	2	#5	STR	8'-7"	18	A262	2	#5	STR	5'-1"	11						
A161*	2	#5	STR	6'-10"	14	A263	2	#5	STR	3'-4"	7						
A162*	2	#5	STR	5'-1"	11	A264	2	#5	STR	1'-7"	3						
A163*	2	#5	STR	3'-4"	7												
A164*	2	#5	STR	1'-7"	3												

**BAR TYPES**



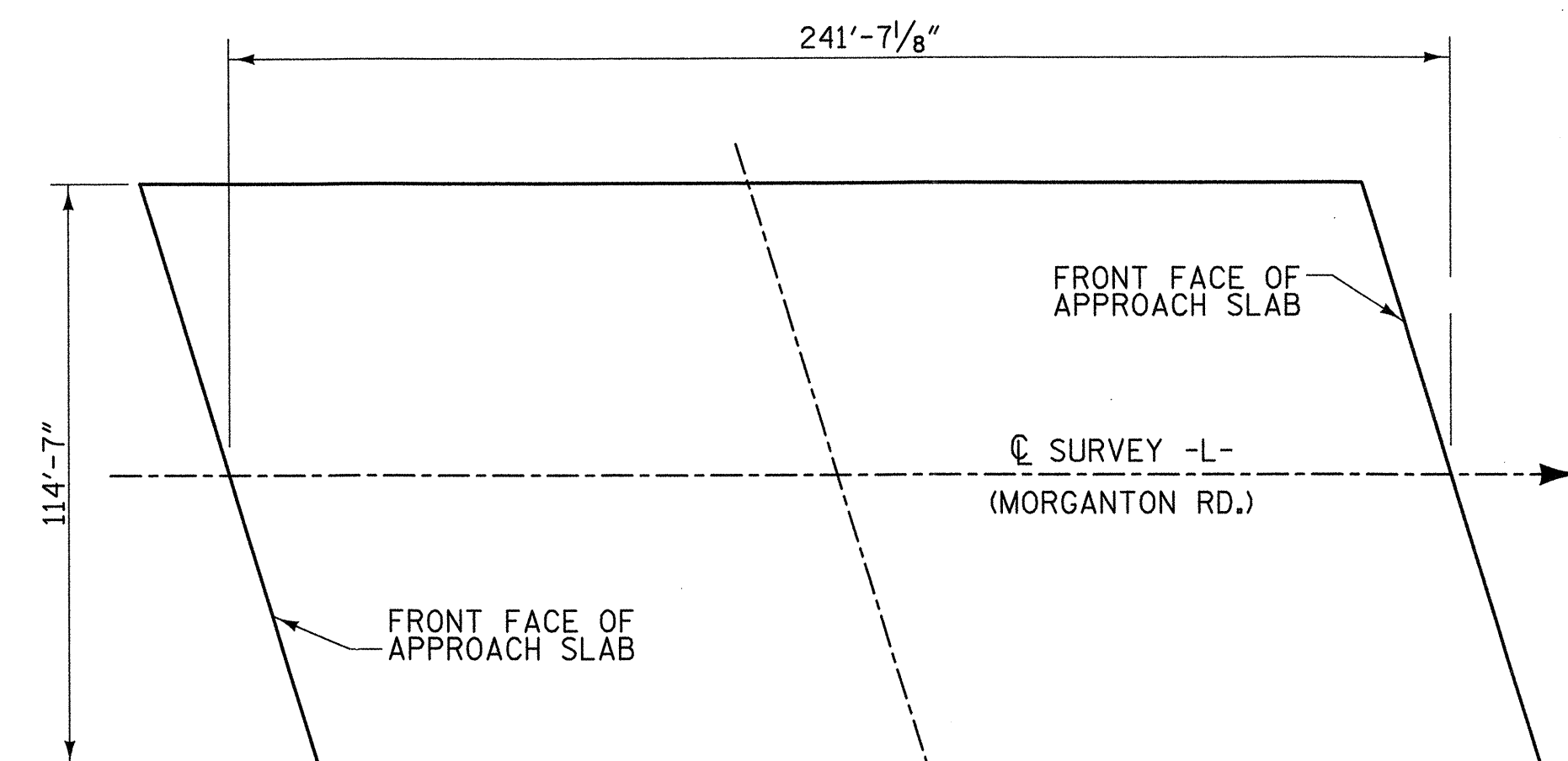
ALL BAR DIMENSIONS ARE OUT TO OUT

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

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

**GROOVING BRIDGE FLOORS**

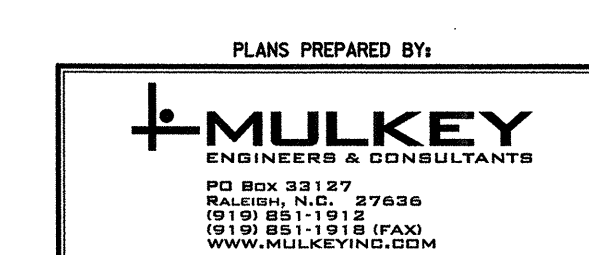
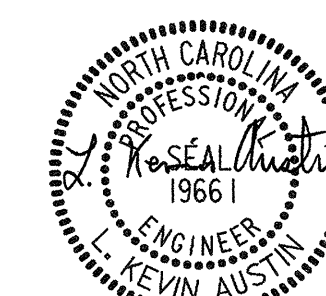
APPROACH SLABS	4782	SQ. FT.
BRIDGE DECK	22223	SQ. FT.
TOTAL	27005	SQ. FT.



**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB**

(SQ. FT. = 27683)

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-



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

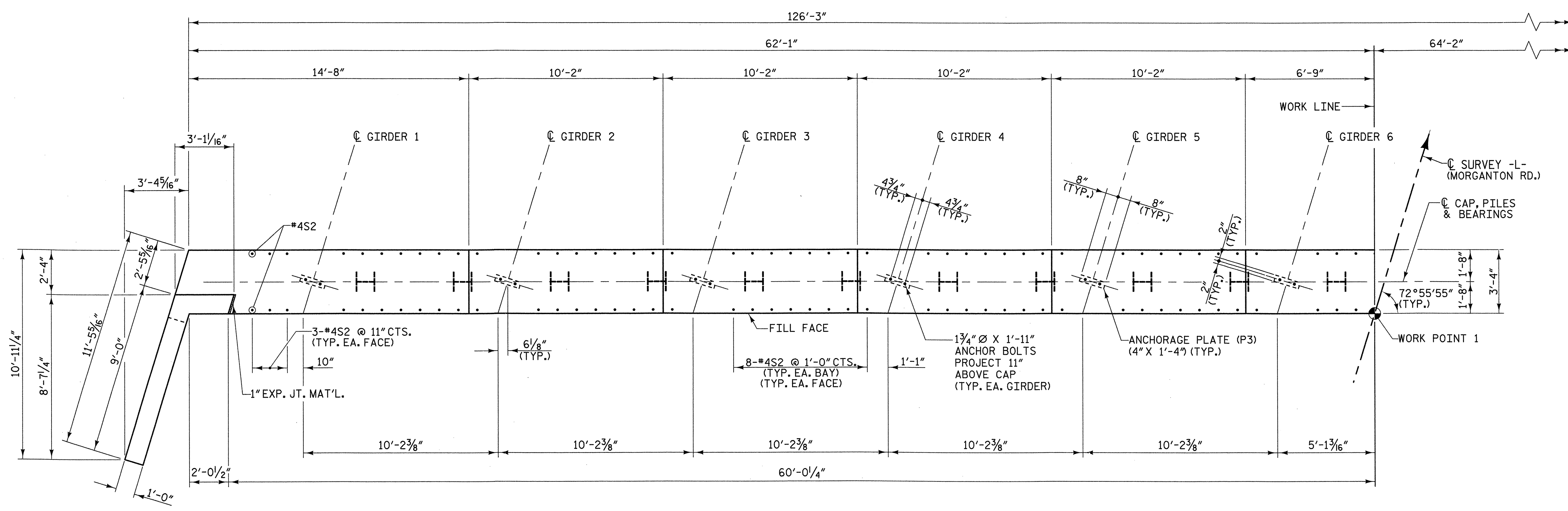
REVISIONS						SHEET NO. S-20 TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

DRAWN BY: W.B. ALLEN DATE: 4/07  
 CHECKED BY: M.A. AVERETTE DATE: 4/07



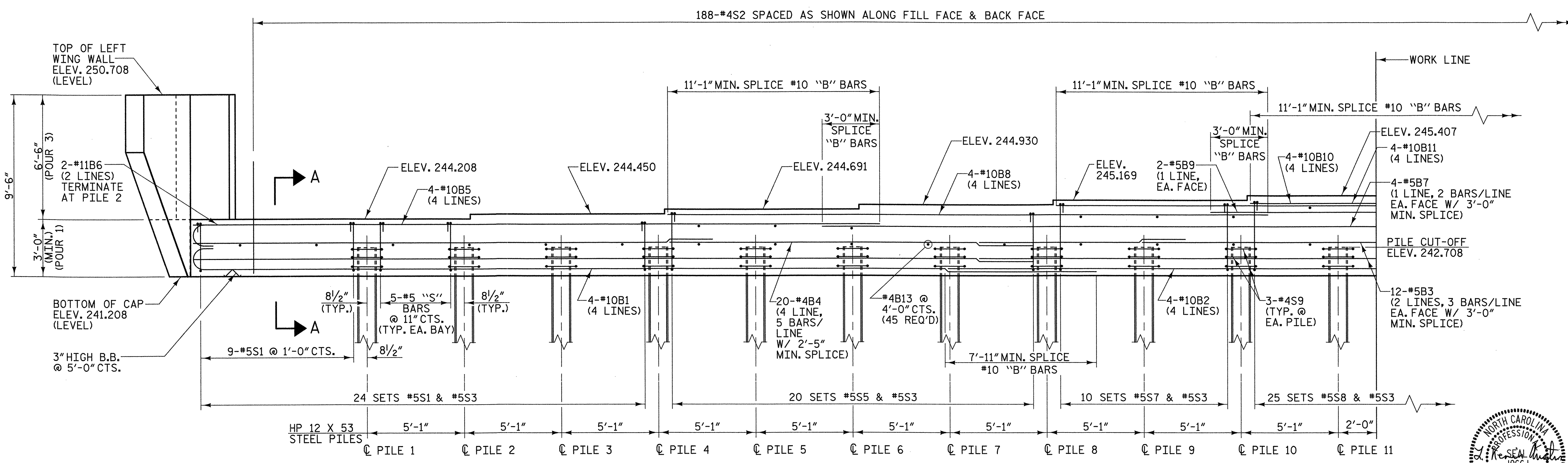
**NOTES:**

FOR PILE SPLICE DETAILS, SEE SHEET S-24.  
 FOR TEMPORARY DRAINAGE AT END BENT SEE SHEET S-24.  
 ROUGHEN TOP OF CAP AND WING CONST. JT. TO A FULL AMPLITUDE OF 1/4".  
 EXISTING END BENT TO BE REMOVED AND EXISTING PILES CUT-OFF AT BOTTOM OF THE NEW CAP.



W1 SEE SHEET S-23

**PLAN**



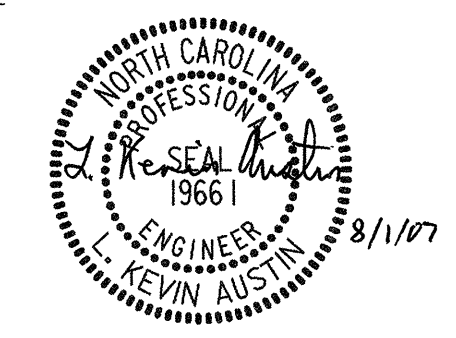
**ELEVATION**

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 1**

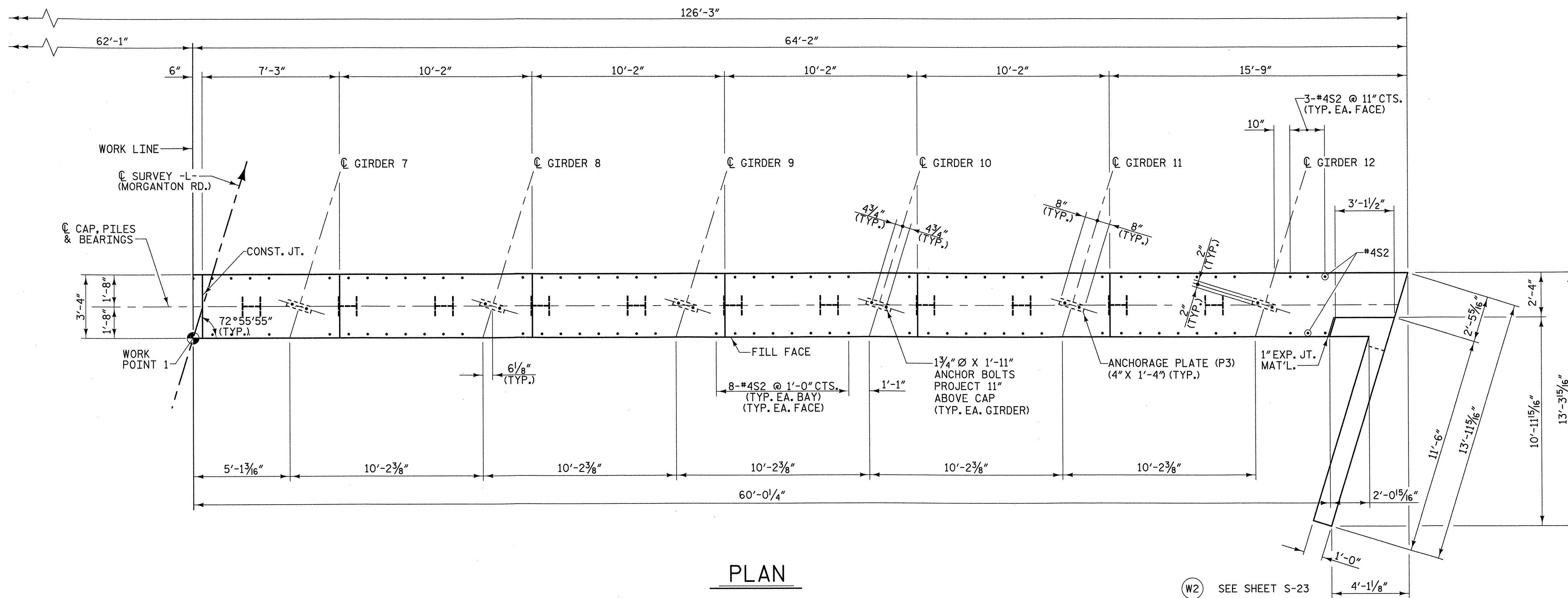


PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO BOX 22377  
 RALEIGH, N.C. 27626  
 (919) 851-1912  
 (919) 851-1918 (FAX)  
 WWW.MULKEYINC.COM

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

DRAWN BY: W. B. ALLEN DATE: 4/07  
 CHECKED BY: M. A. AVERETTE DATE: 4/07

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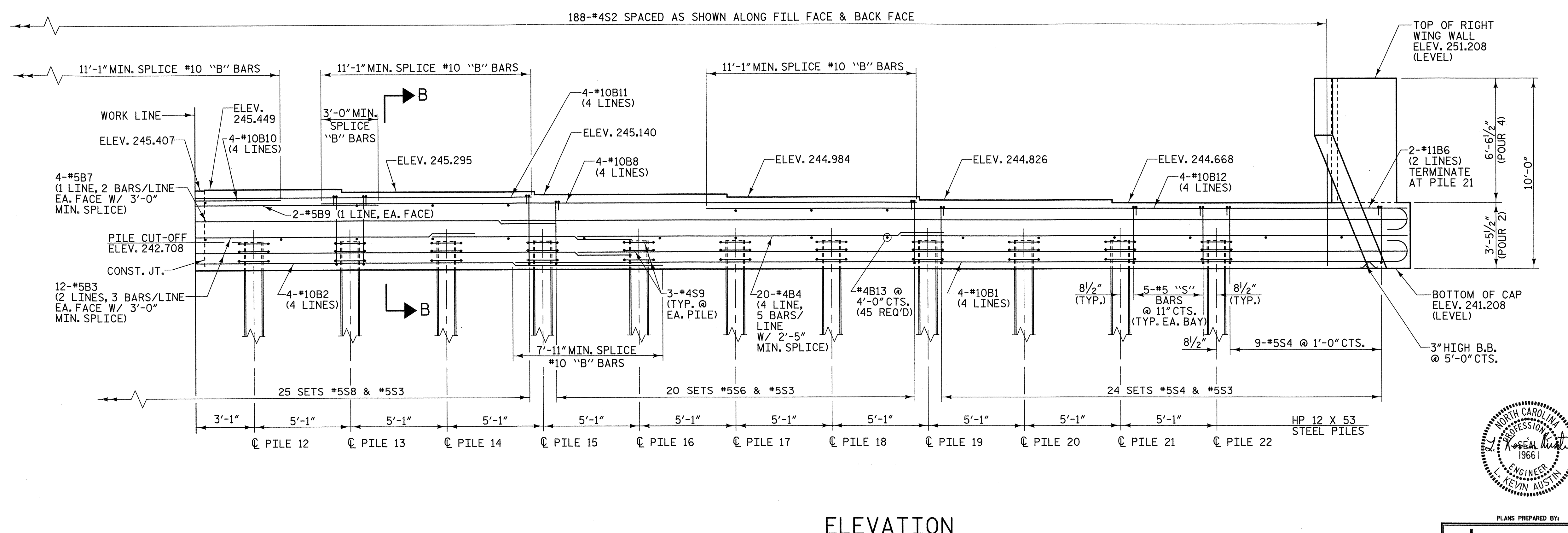
**NOTES:**

FOR PILE SPLICE DETAILS, SEE SHEET S-24.

FOR TEMPORARY DRAINAGE AT END BENT SEE SHEET S-24.

ROUGHEN TOP OF CAP AND WING CONST. JT. TO A FULL AMPLITUDE OF 1/4".

EXISTING END BENT TO BE REMOVED AND EXISTING PILES CUT-OFF AT BOTTOM OF THE NEW CAP.



(W2) SEE SHEET S-23

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 1**

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

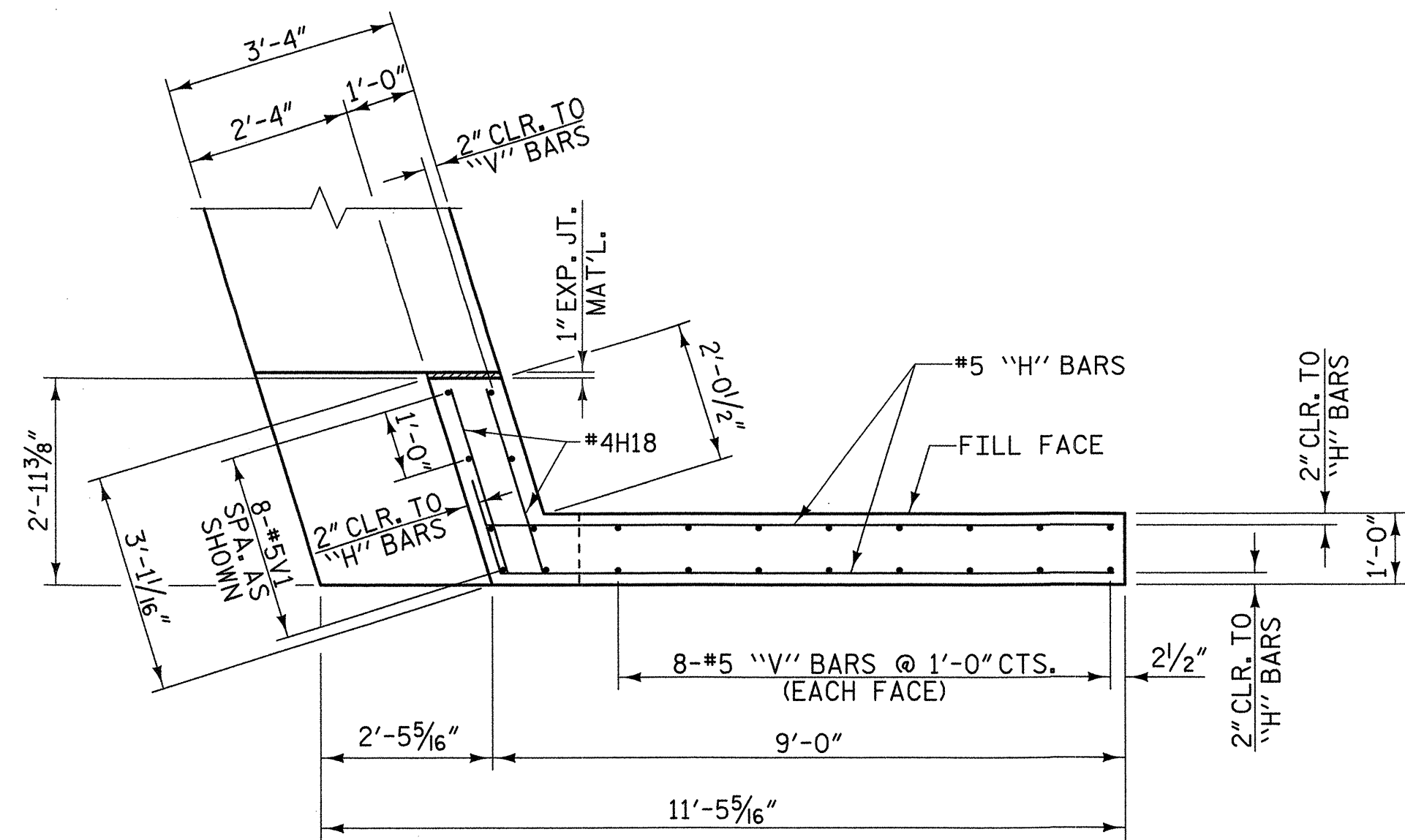
PLANS PREPARED BY:

**MULKEY**  
 ENGINEERS & CONSULTANTS

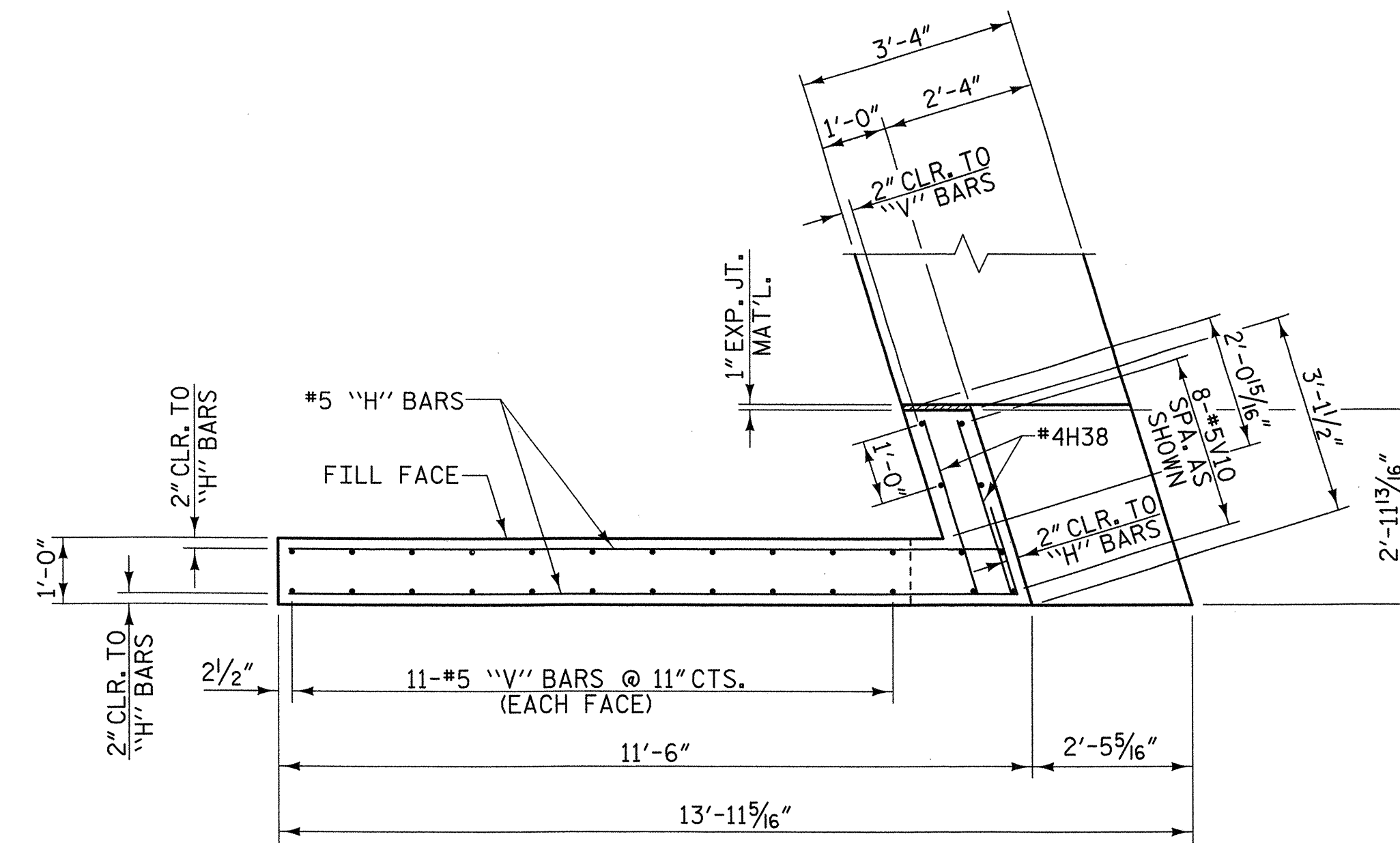
8/1/07

DRAWN BY: W. B. ALLEN DATE: 4/07  
 CHECKED BY: M. A. AVERETTE DATE: 4/07

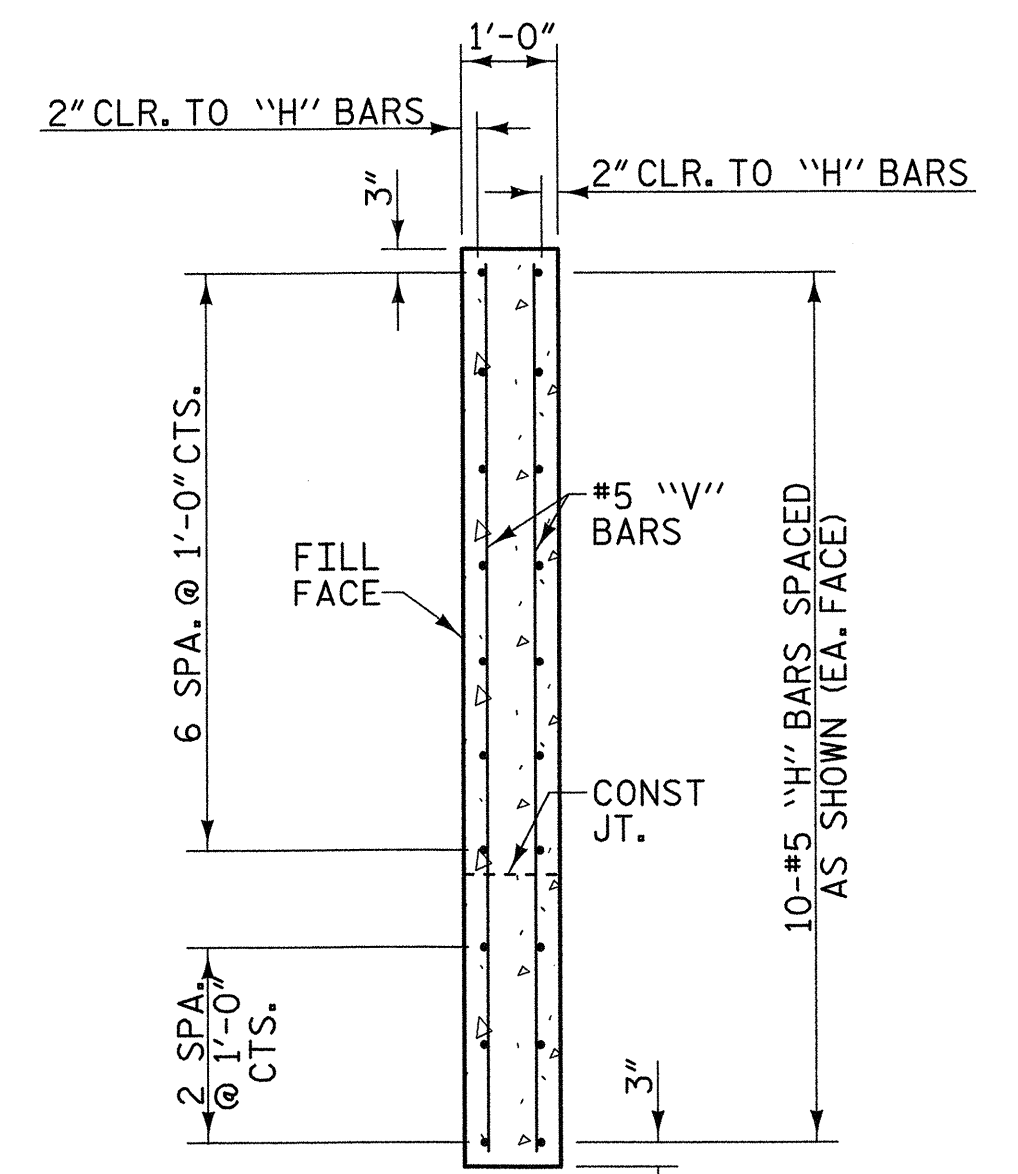
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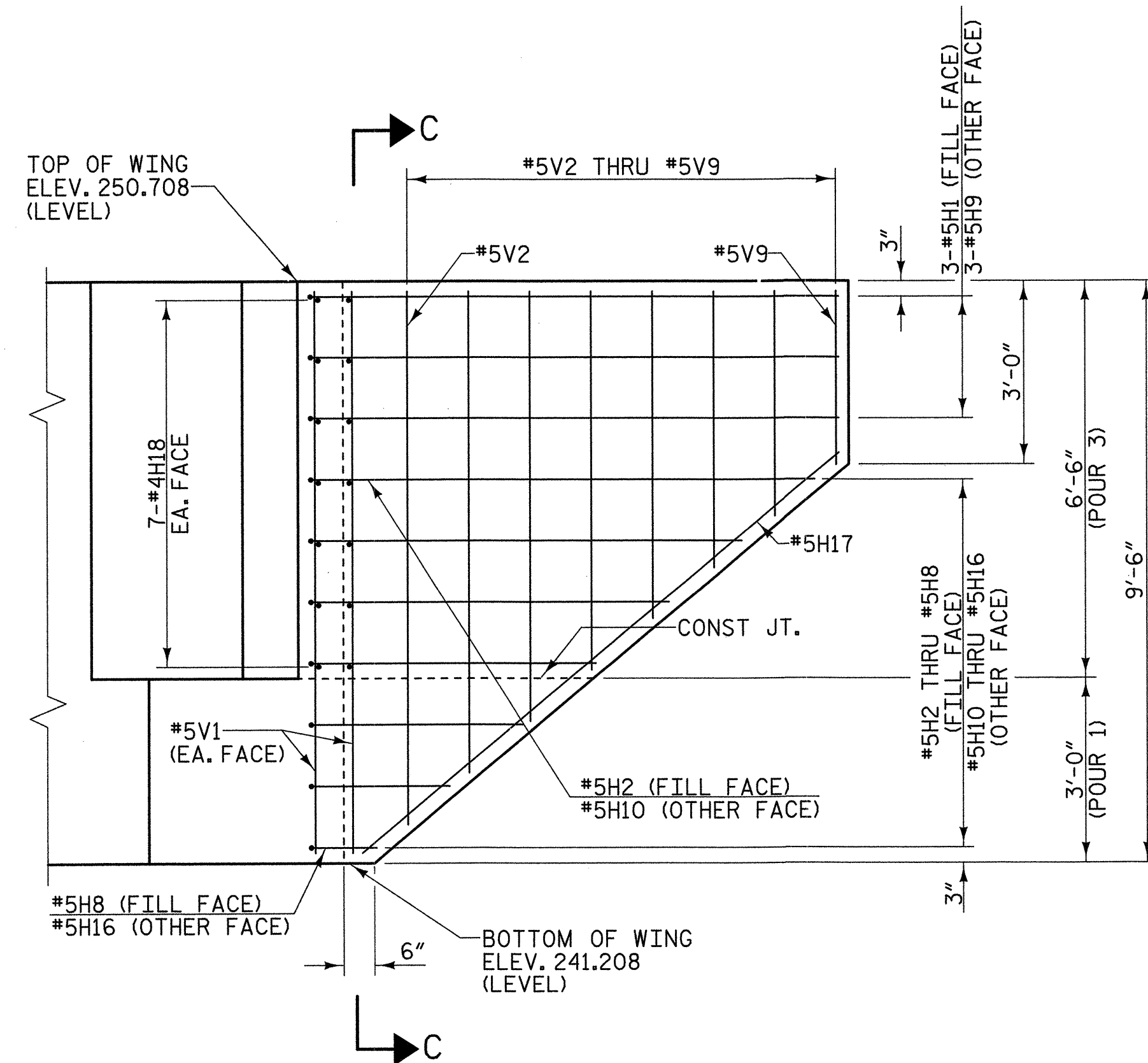
W1 PLAN OF LEFT WING



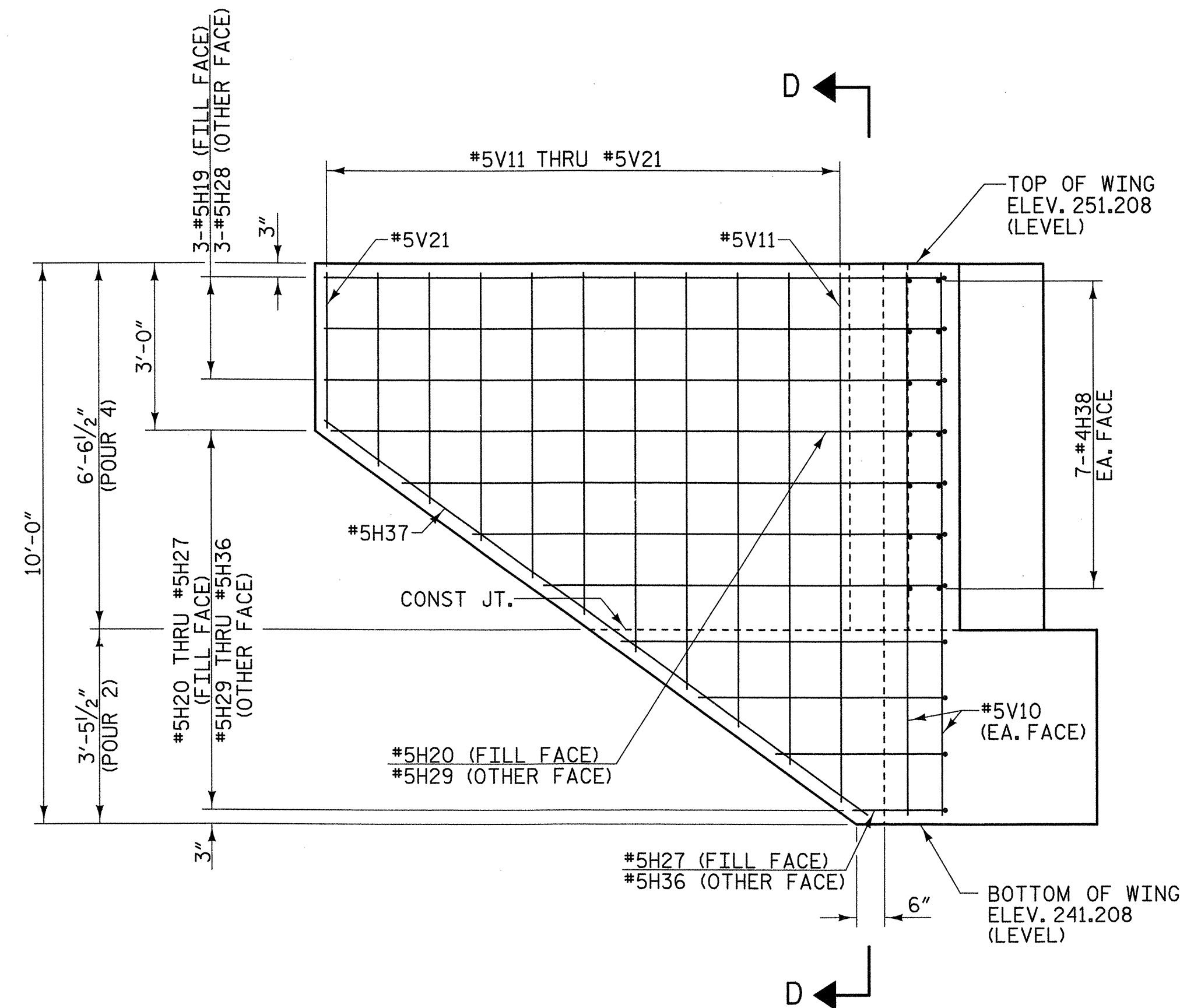
W2 PLAN OF RIGHT WING



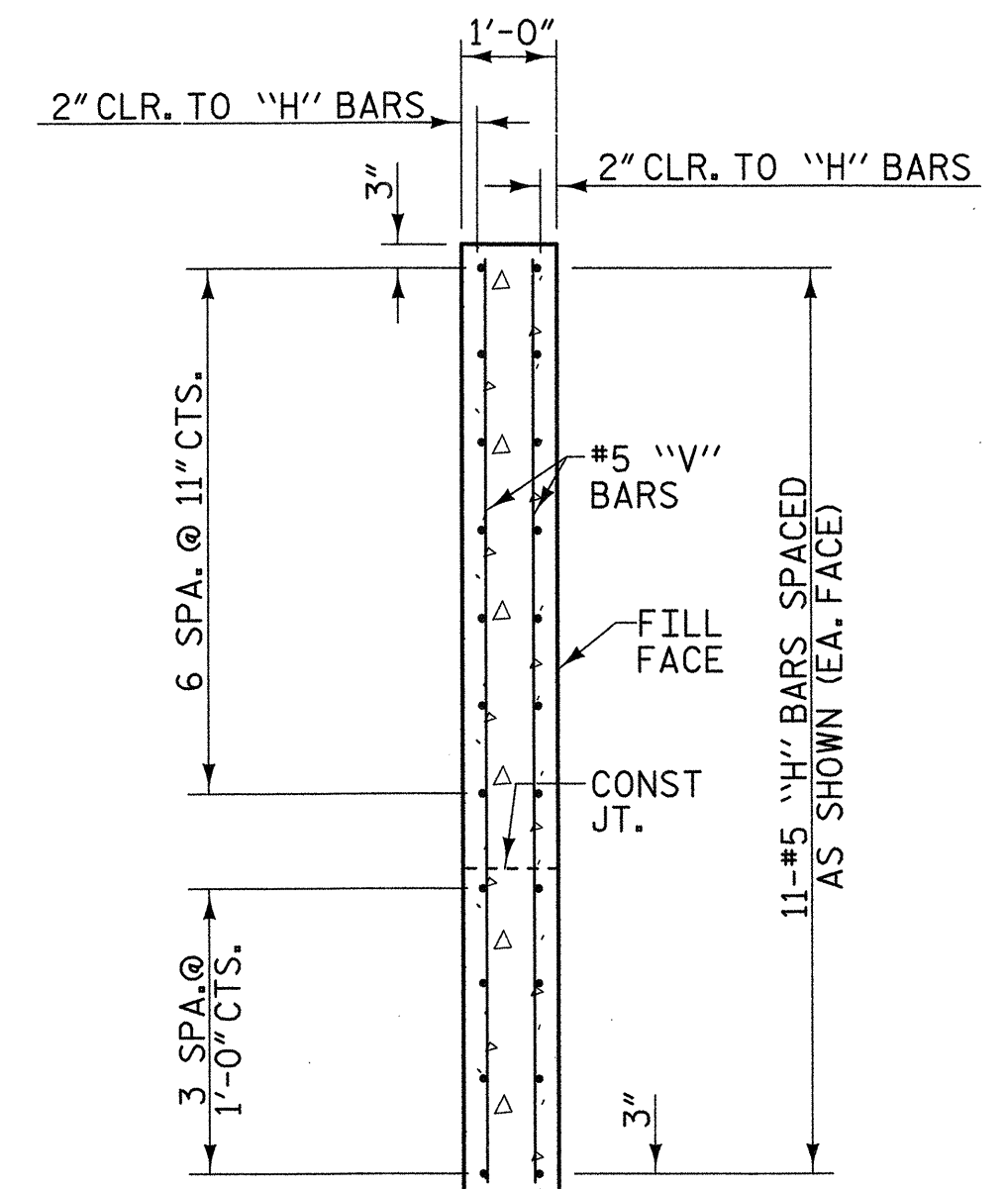
SECTION C-C



W1 ELEVATION OF LEFT WING



W2 ELEVATION OF RIGHT WING



SECTION D-D

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

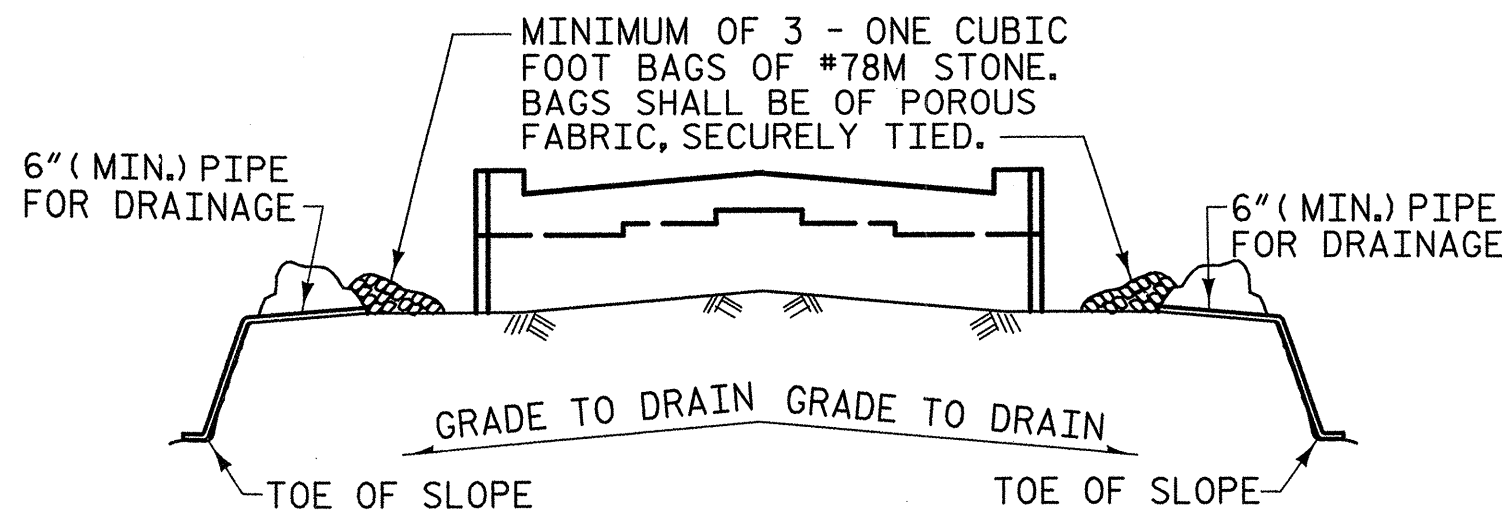


PLANS PREPARED BY:  
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 RALEIGH, NC 27638  
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 (919) 851-1913 (FAX)  
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23	
1			3			TOTAL SHEETS	
2			4				

DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07

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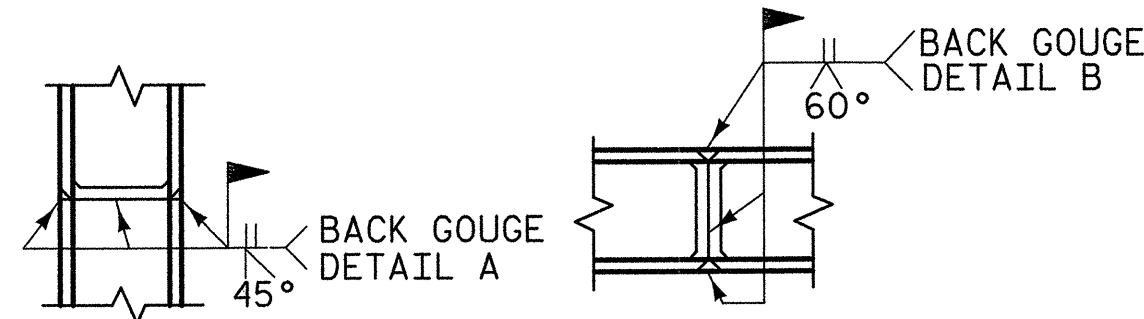


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

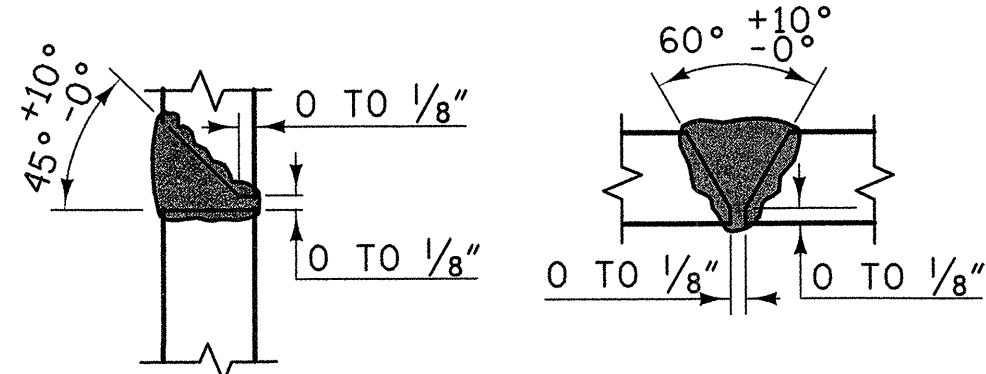
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR PLACEMENT OF SUBSTRUCTURE.

### TEMPORARY DRAINAGE AT END BENT



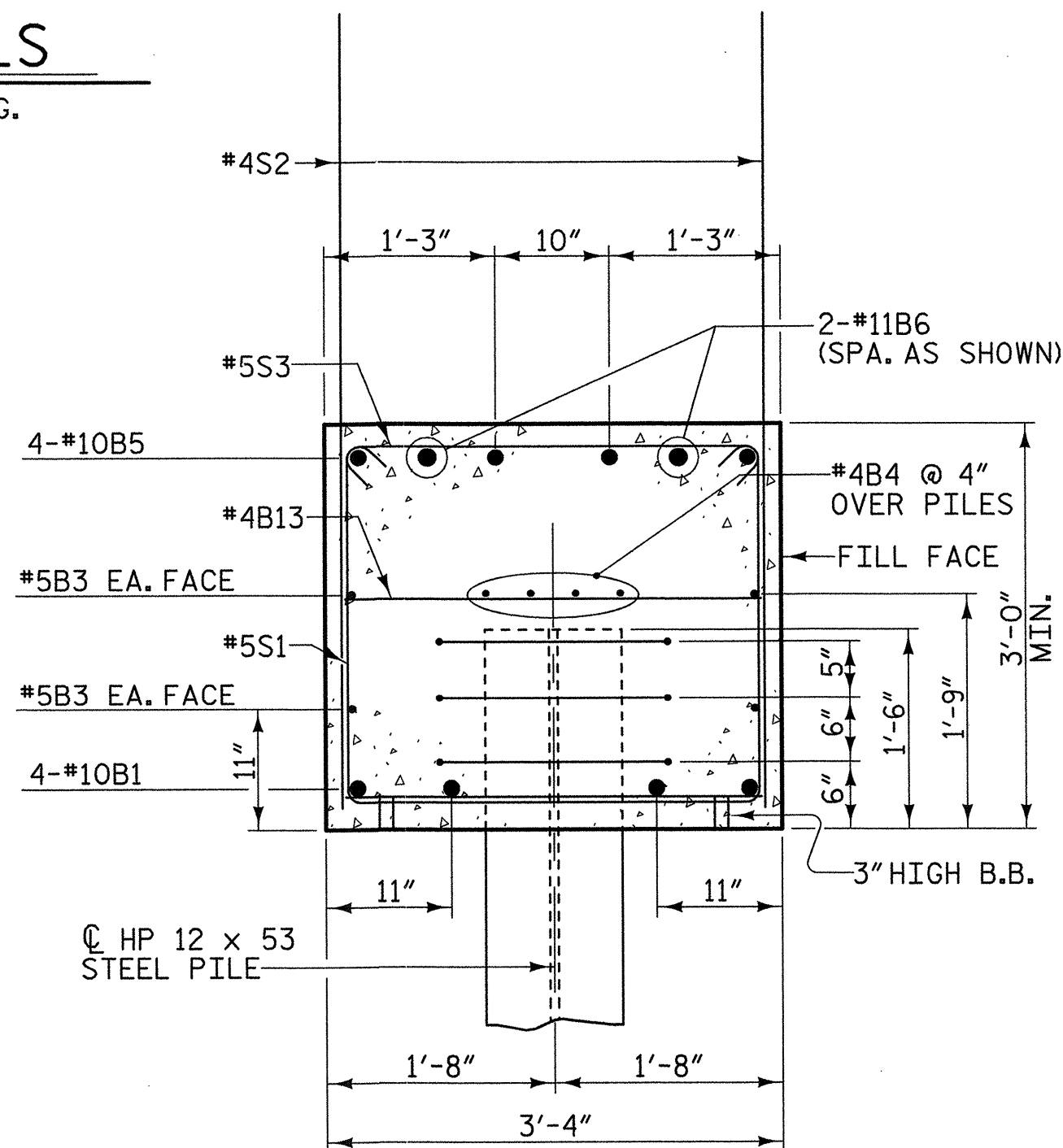
\*PILE VERTICAL

\*PILE HORIZONTAL OR VERTICAL

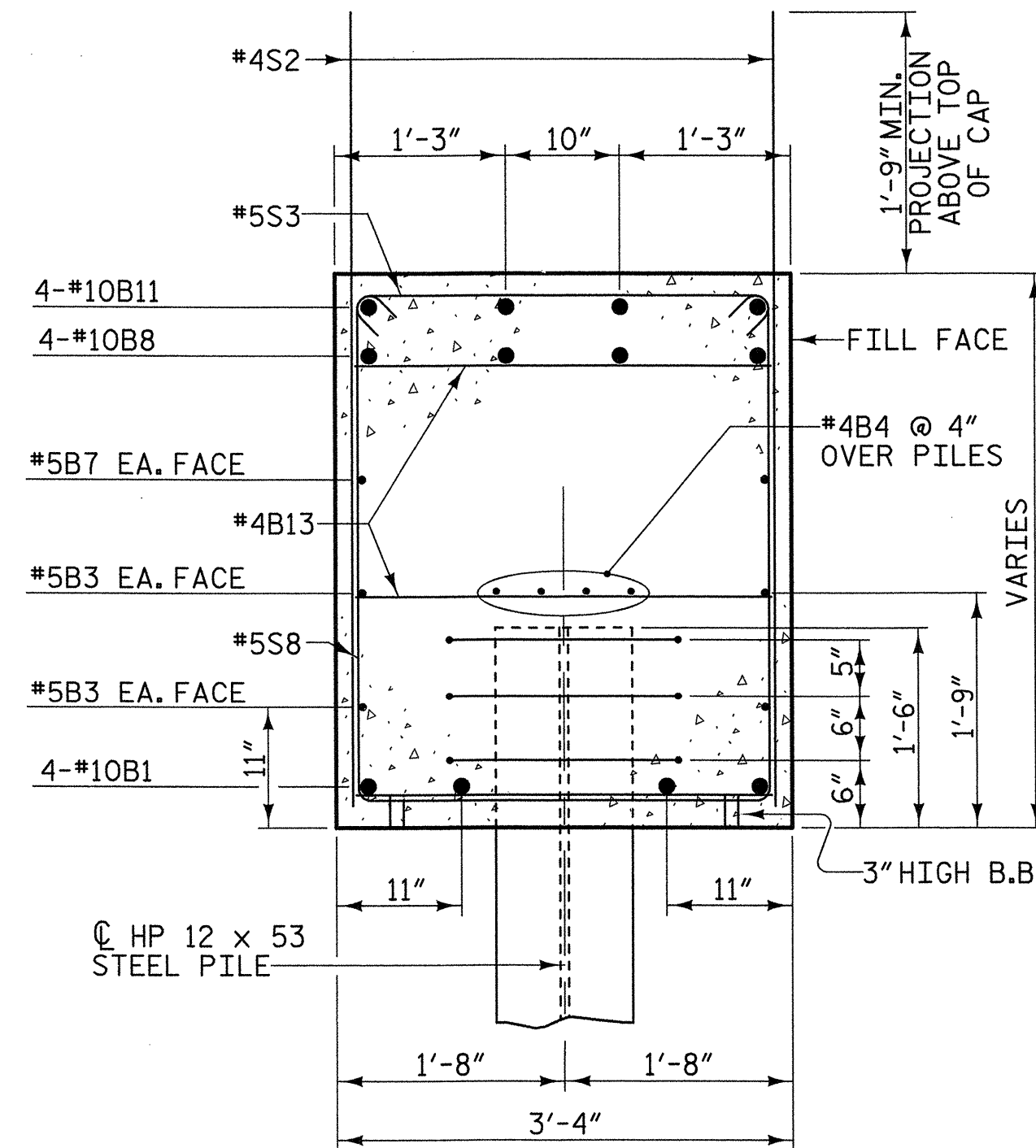


### PILE SPLICE DETAILS

\* POSITION OF PILE DURING WELDING.

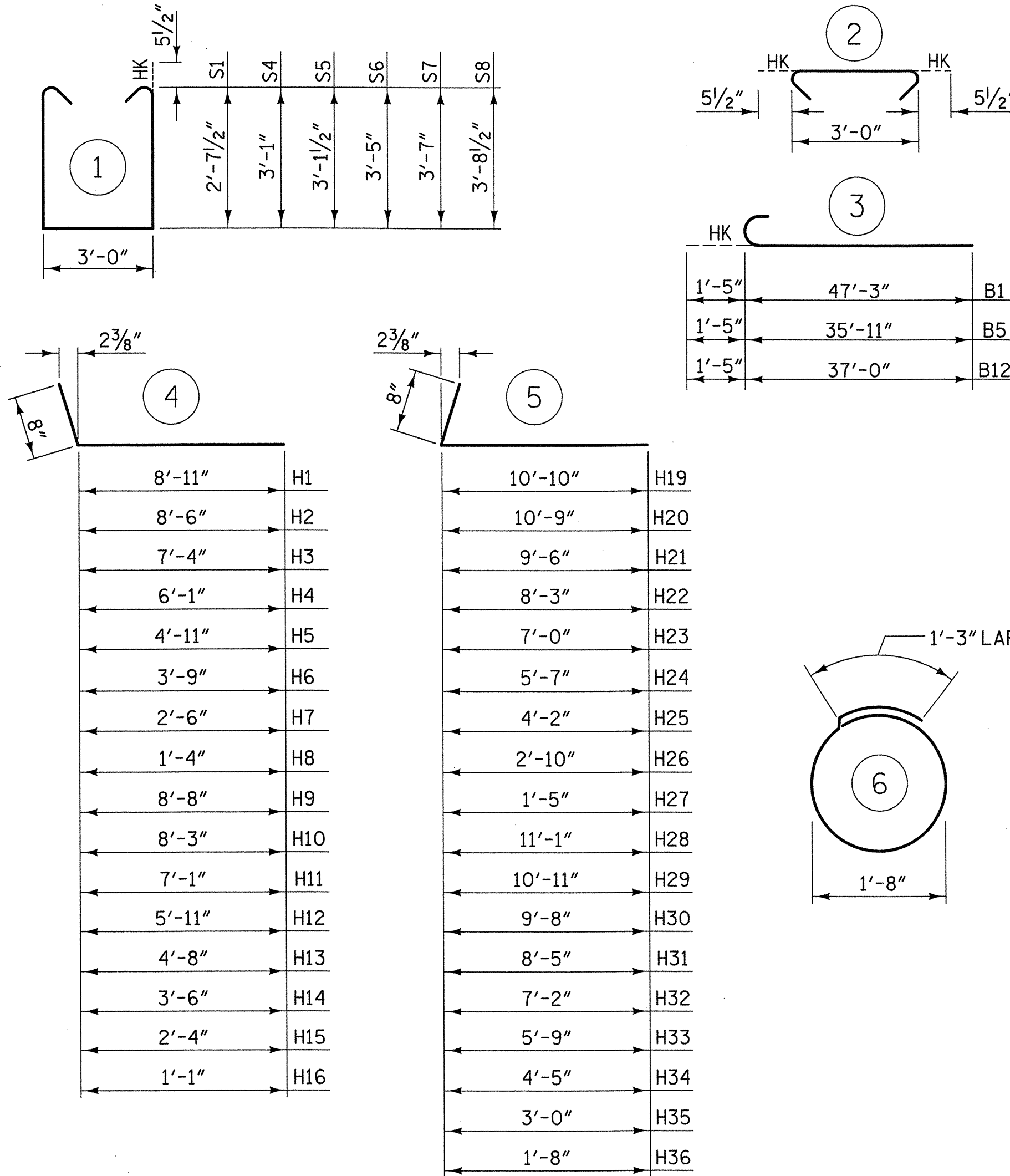


### SECTION A-A



### SECTION B-B

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

### BILL OF MATERIAL

FOR END BENT 1											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	3	48'-8"	1675	S1	24	#5	1	9'-2"	229
B2	4	#10	STR	47'-3"	813	S2	188	#4	1	5'-10"	733
B3	12	#5	STR	44'-0"	551	S3	123	#5	2	3'-11"	502
B4	20	#4	STR	27'-2"	363	S4	24	#5	1	10'-1"	252
B5	4	#10	3	37'-4"	643	S5	20	#5	1	10'-2"	212
B6	4	#11	STR	15'-0"	319	S6	20	#5	1	10'-9"	224
B7	4	#5	STR	48'-0"	200	S7	10	#5	1	11'-1"	116
B8	8	#10	STR	31'-5"	1081	S8	25	#5	1	11'-4"	296
B9	2	#5	STR	18'-4"	38	S9	66	#4	6	6'-6"	287
B10	4	#10	STR	21'-3"	366						
B11	4	#10	STR	24'-4"	419	V1	8	#5	STR	9'-2"	76
B12	4	#10	3	38'-5"	661	V2	2	#5	STR	8'-8"	18
B13	45	#4	STR	3'-0"	90	V3	2	#5	STR	7'-10"	16
						V4	2	#5	STR	7'-0"	15
H1	3	#5	4	9'-7"	30	V5	2	#5	STR	6'-2"	13
H2	1	#5	4	9'-2"	10	V6	2	#5	STR	5'-4"	11
H3	1	#5	4	8'-0"	8	V7	2	#5	STR	4'-6"	9
H4	1	#5	4	6'-9"	7	V8	2	#5	STR	3'-8"	8
H5	1	#5	4	5'-7"	6	V9	2	#5	STR	2'-10"	6
H6	1	#5	4	4'-5"	5	V10	8	#5	STR	9'-8"	81
H7	1	#5	4	3'-2"	3	V11	2	#5	STR	9'-5"	20
H8	1	#5	4	2'-0"	2	V12	2	#5	STR	8'-9"	18
H9	3	#5	4	9'-4"	29	V13	2	#5	STR	8'-1"	17
H10	1	#5	4	8'-11"	9	V14	2	#5	STR	7'-5"	15
H11	1	#5	4	7'-9"	8	V15	2	#5	STR	6'-9"	14
H12	1	#5	4	6'-7"	7	V16	2	#5	STR	6'-1"	13
H13	1	#5	4	5'-4"	6	V17	2	#5	STR	5'-5"	11
H14	1	#5	4	4'-2"	4	V18	2	#5	STR	4'-9"	10
H15	1	#5	4	3'-0"	3	V19	2	#5	STR	4'-1"	9
H16	1	#5	4	1'-9"	2	V20	2	#5	STR	3'-5"	7
H17	2	#5	STR	10'-1"	21	V21	2	#5	STR	2'-9"	6
H18	14	#4	STR	2'-8"	25						
H19	3	#5	4	11'-6"	36						
H20	1	#5	4	11'-5"	12						
H21	1	#5	4	10'-2"	11						
H22	1	#5	4	8'-11"	9						
H23	1	#5	4	7'-8"	8						
H24	1	#5	4	6'-3"	7						
H25	1	#5	4	4'-10"	5						
H26	1	#5	4	3'-6"	4						
H27	1	#5	4	2'-1"	2						
H28	3	#5	4	11'-9"	37						
H29	1	#5	4	11'-7"	12						
H30	1	#5	4	10'-4"	11						
H31	1	#5	4	9'-1"	9						
H32	1	#5	4	7'-10"	8						
H33	1	#5	4	6'-5"	7						
H34	1	#5	4	5'-1"	5						
H35	1	#5	4	3'-8"	4						
H36	1	#5	4	2'-4"	2						
H37	2	#5	STR	11'-11"	25						
H38	14	#4	STR	2'-9"	26						
TOTAL REINFORCING STEEL =										10888 lbs.	
CLASS "A" CONCRETE - CU. YARDS											
POUR 1										28.0 cu. yds.	
POUR 2										29.8 cu. yds.	
POUR 3										2.4 cu. yds.	
POUR 4										3.2 cu. yds.	
TOTAL										63.4 cu. yds.	
HP 12 X 53 STEEL PILES											
22 PILES REQUIRED - LIN. FEET										1650	

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### SUBSTRUCTURE END BENT 1

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



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO BOX 33127  
 RALEIGH, NC 27636  
 (919) 851-1912 FAX  
 WWW.MULKEYINC.COM

DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07

8/1/2007 5:44:09 AM R:\Structure\U4756.SD.Dwg.dgn

**NOTES:**

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

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

FOR DRILLED PIERS SEE SPECIAL PROVISIONS.

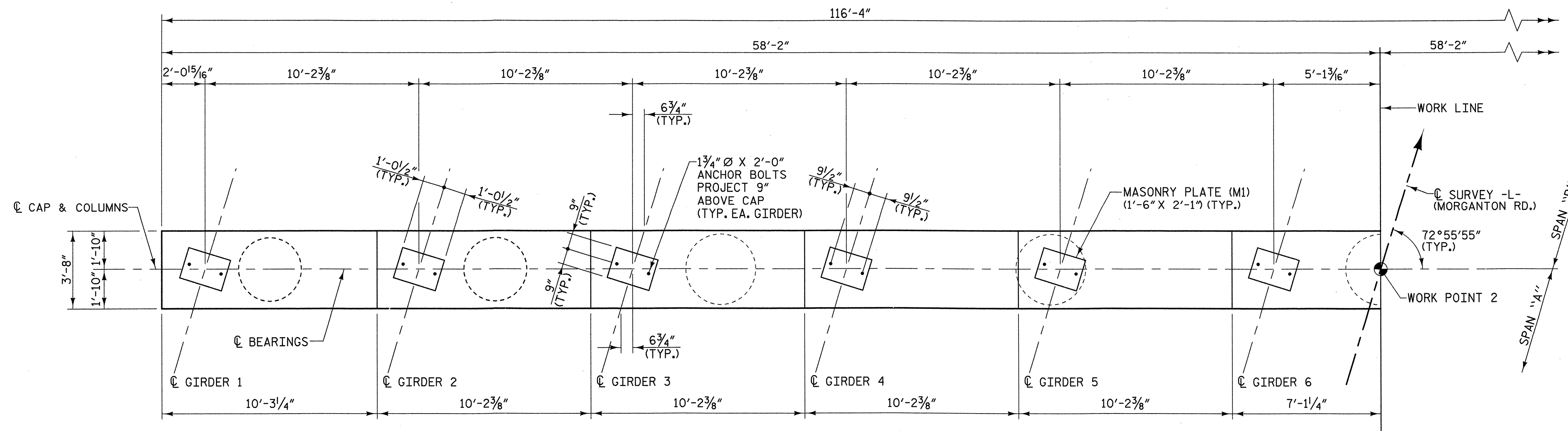
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

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

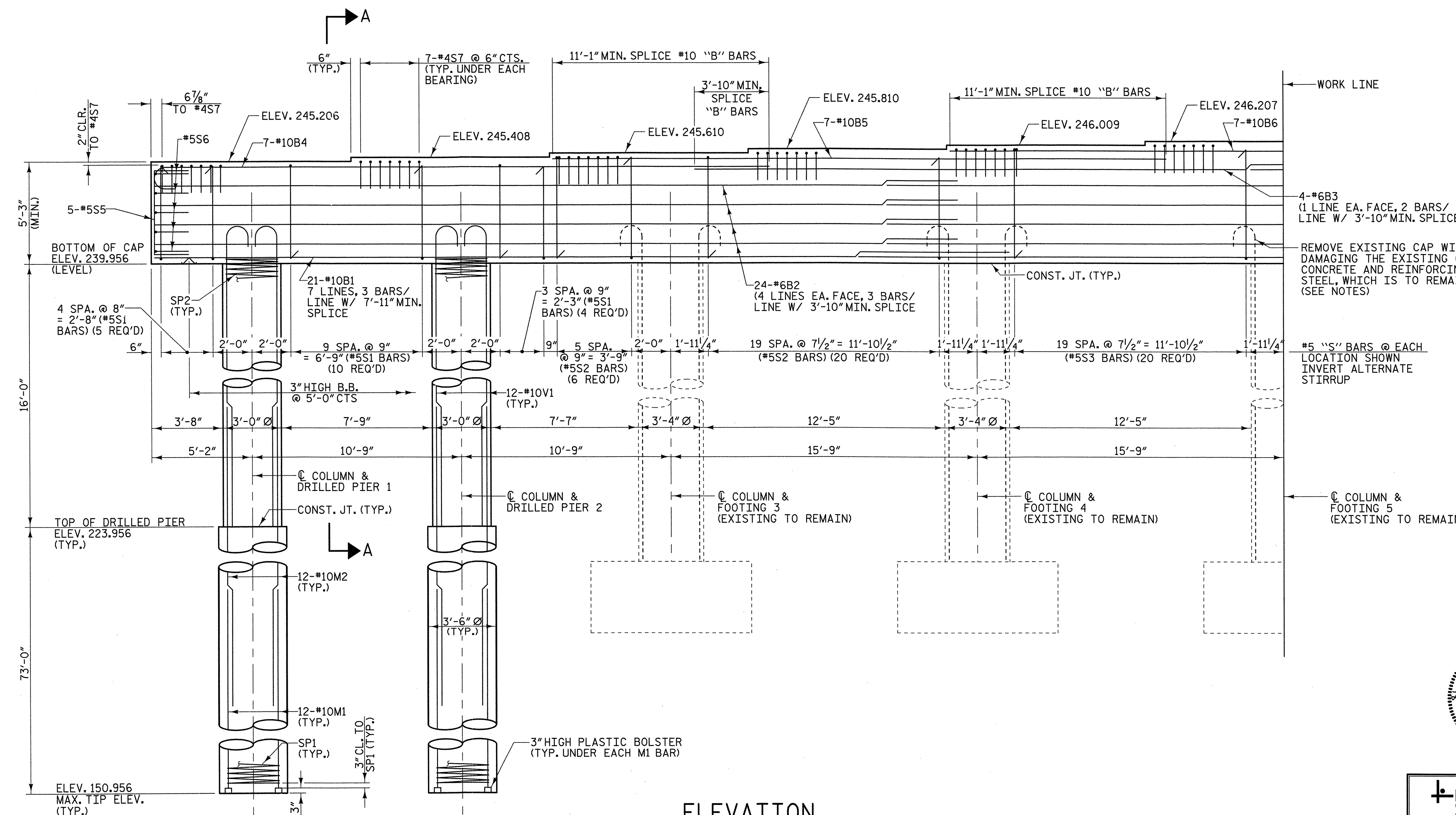
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.

THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO PREVENT CUTTING OR OTHERWISE DAMAGING THE EXISTING REINFORCING STEEL TO REMAIN IN PLACE. ANY SUCH BARS DAMAGED (NICKS DEEPER THAN 20% OF THE BAR DIAMETER) BY THE CONTRACTOR'S OPERATION SHALL BE REPAIRED OR REPLACED. THE CONTRACTOR SHALL SUBMIT HIS PLAN TO REPAIR OR REPLACE DAMAGED REINFORCING STEEL TO THE ENGINEER FOR APPROVAL.

THE EXISTING COLUMN REINFORCING SHALL BE CLEANED OF ANY DEBRIS AND RETURNED TO ITS ORIGINAL POSITION, IF NECESSARY, PRIOR TO THE POURING OF THE NEW BENT CAP.



**PLAN**

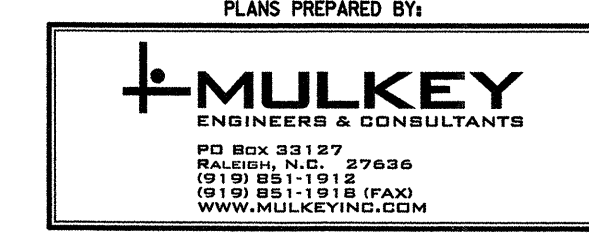


**ELEVATION**

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 3

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

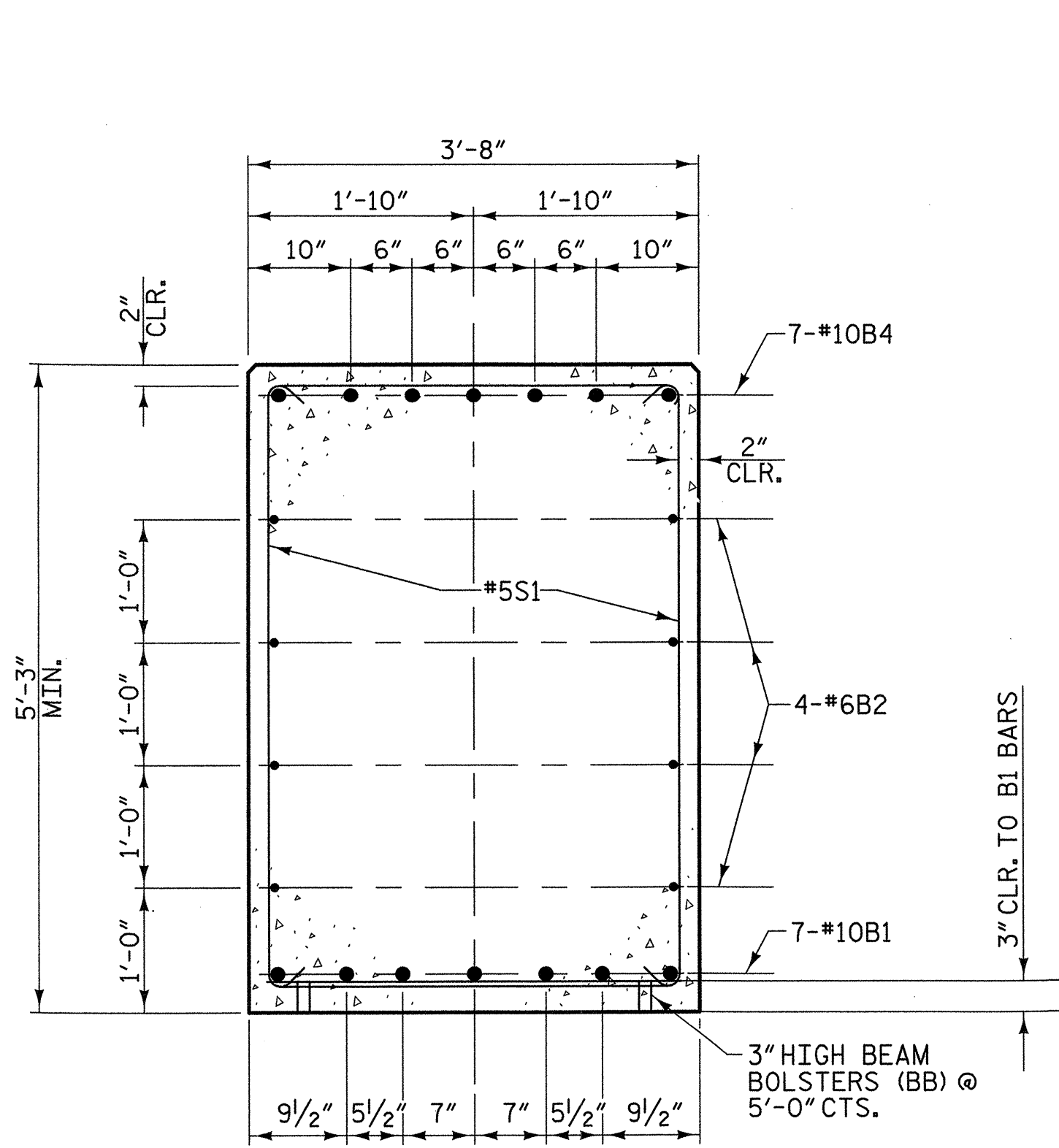


REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

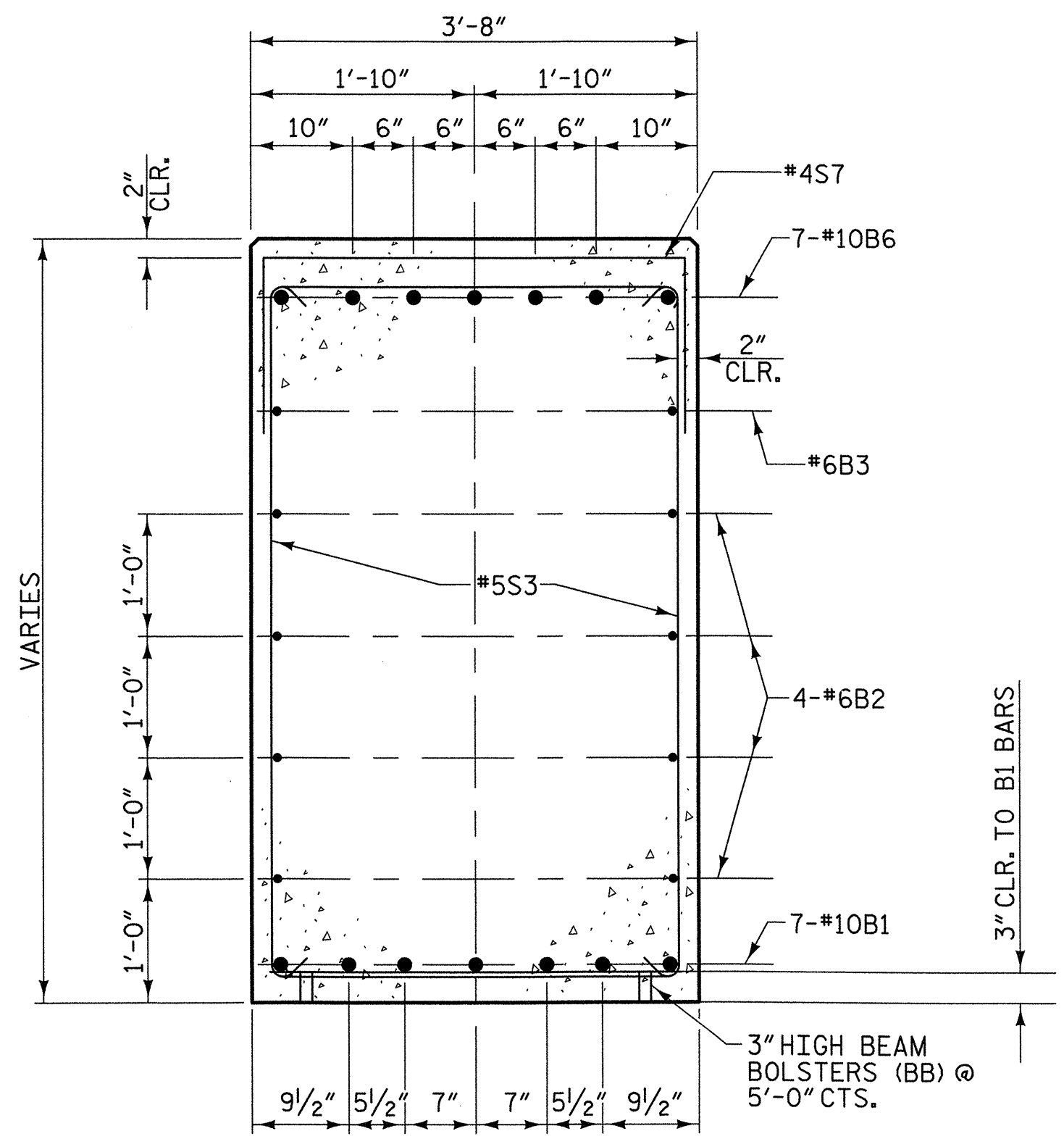
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 CHECKED BY: M. A. AVERETTE DATE: 5/07

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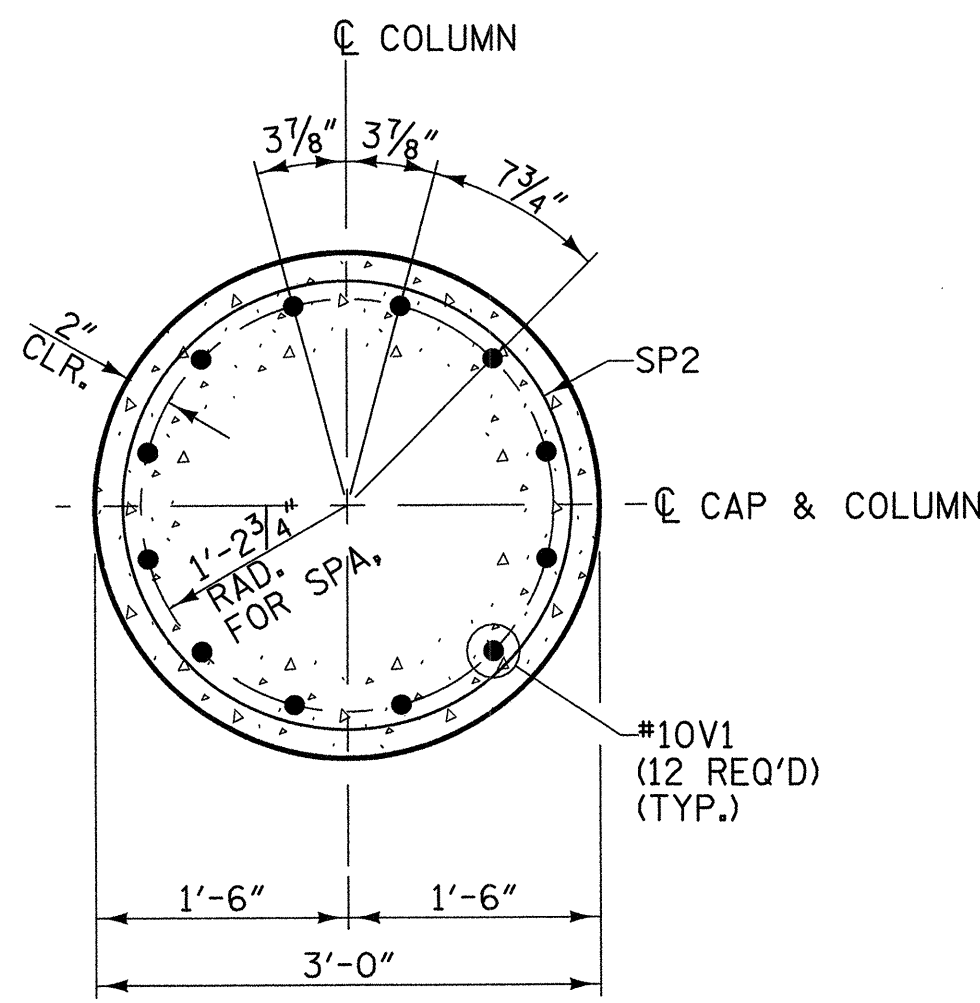




SECTION A-A

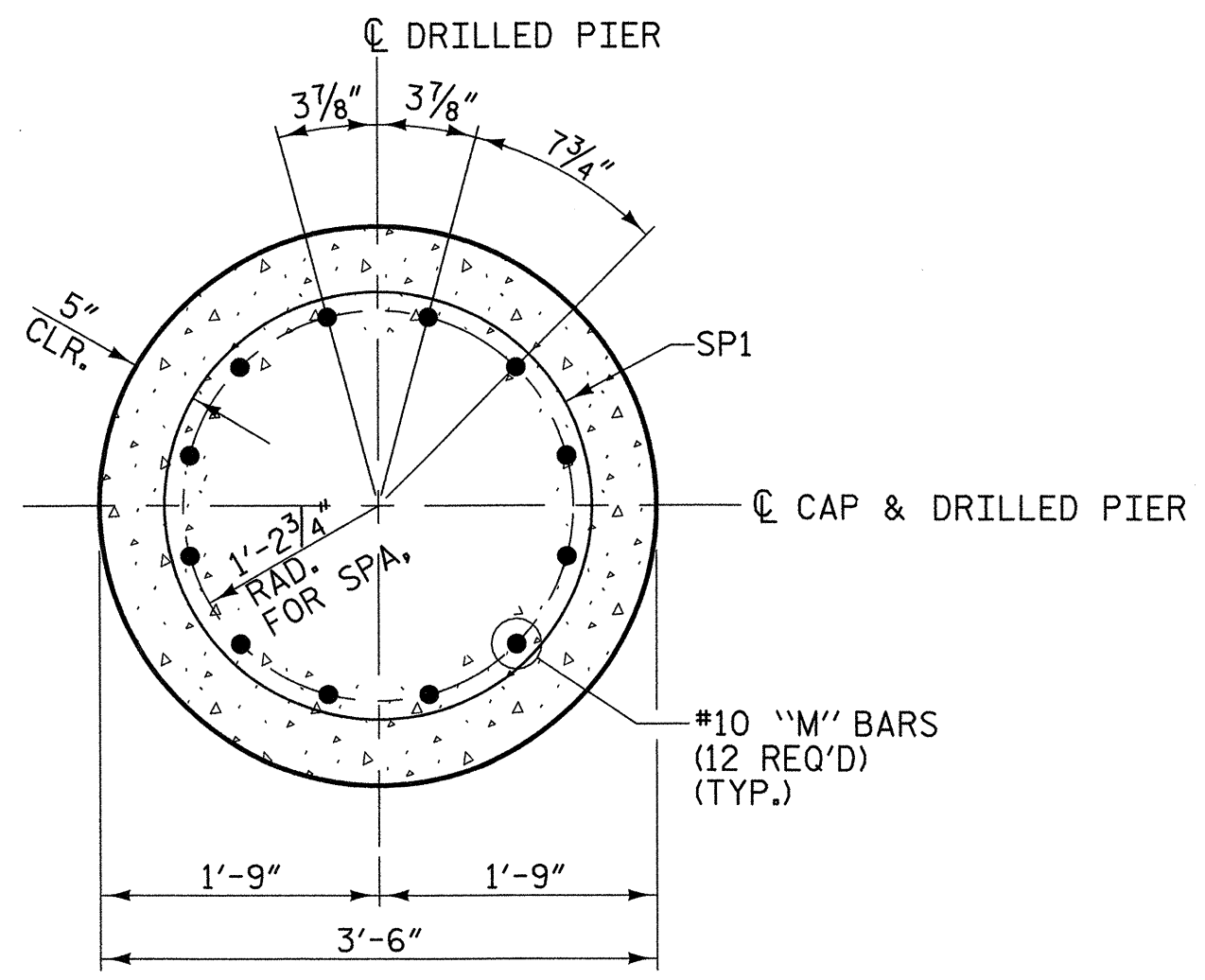


SECTION B-B



SECTION THRU COLUMN

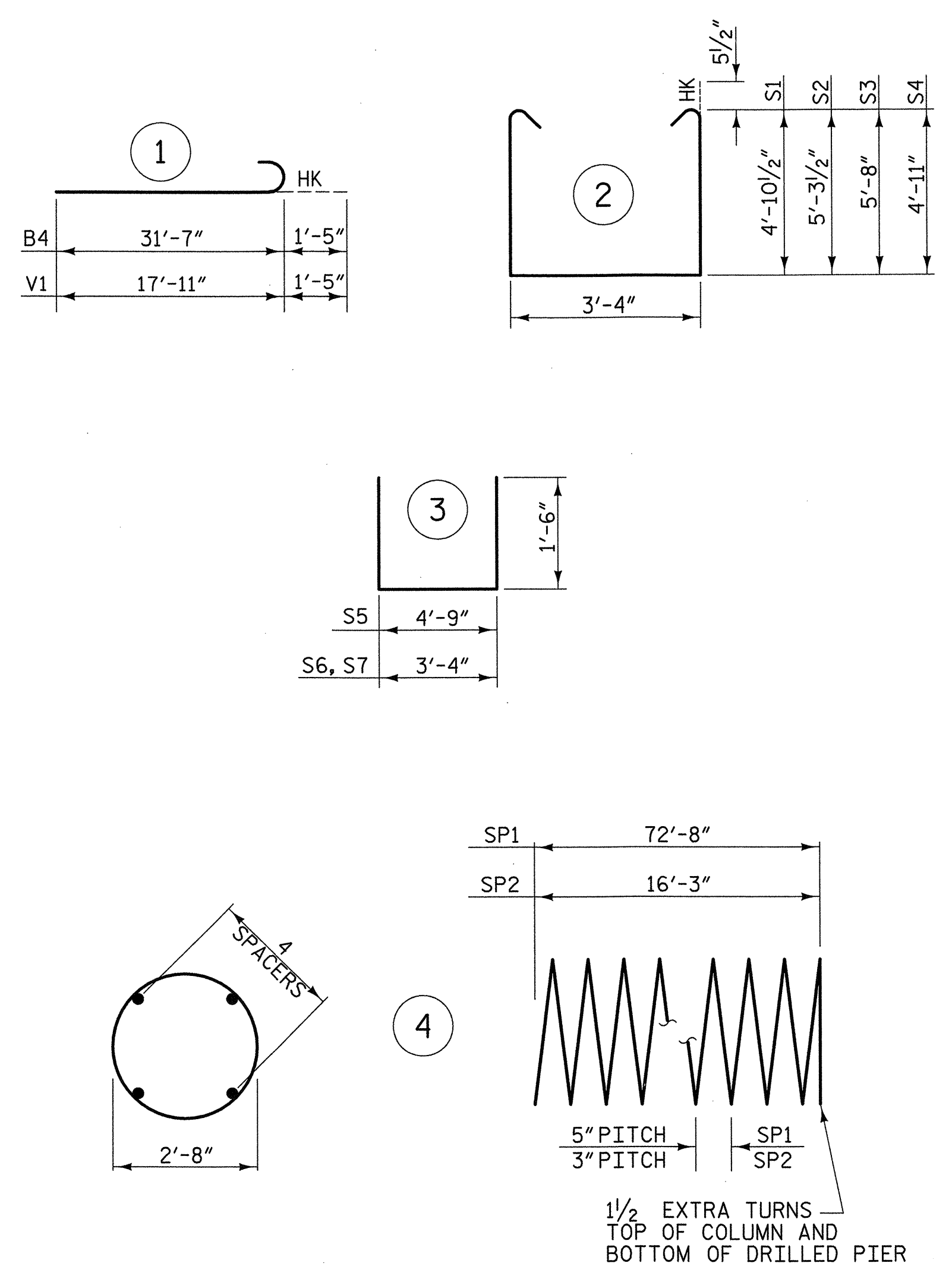
(ALL COLUMNS SIMILAR)  
(SEE ELEVATION FOR BAR MARKS)



SECTION THRU DRILLED PIER

(ALL DRILLED PIERS SIMILAR)  
(SEE ELEVATION FOR BAR MARKS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

- \*\* THE SP1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.
- \*\*\* THE SP2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

FOR BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	21	#10	STR	44'-0"	3976
B2	24	#6	STR	41'-3"	1487
B3	4	#6	STR	32'-2"	193
B4	14	#10	1	33'-0"	1988
B5	7	#10	STR	31'-6"	949
B6	7	#10	STR	34'-3"	1032
M1	48	#10	STR	28'-2"	5818
M2	48	#10	STR	60'-0"	12393
S1	19	#5	2	14'-0"	277
S2	52	#5	2	14'-10"	805
S3	40	#5	2	15'-7"	650
S4	19	#5	2	14'-1"	279
S5	10	#5	3	7'-9"	81
S6	10	#5	3	6'-4"	66
S7	84	#5	3	6'-4"	555
V1	48	#10	1	19'-4"	3993
TOTAL REINFORCING STEEL =					34542 lbs.
SP1	4	**	4	1464'-0"	6108
SP2	4	***	4	561'-1"	1499
SPIRAL COLUMN REINFORCING STEEL =					7607 lbs.
CLASS "A" CONCRETE - CU. YARDS					
POUR 2 (COLUMNS)					16.8 cu. yds.
POUR 3 (CAP)					48.1 cu. yds.
POUR 4 (CAP)					42.5 cu. yds.
TOTAL					107.4 cu. yds.
DRILLED PIERS @ BENT 1					
3'-6" Ø DRILLED PIERS IN SOIL					262 LIN. FT.
3'-6" Ø DRILLED PIERS NOT IN SOIL					30 LIN. FT.
SPT TESTING					4 EA.
SID INSPECTION					4 EA.
CROSSHOLE SONIC LOGGING					4 EA.
CSL TUBES					1208 LIN. FT.
DRILLED PIER CONC. (FOR INFORMATION ONLY)					104.1 cu. yds.

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
STATION: 44+88.35 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1

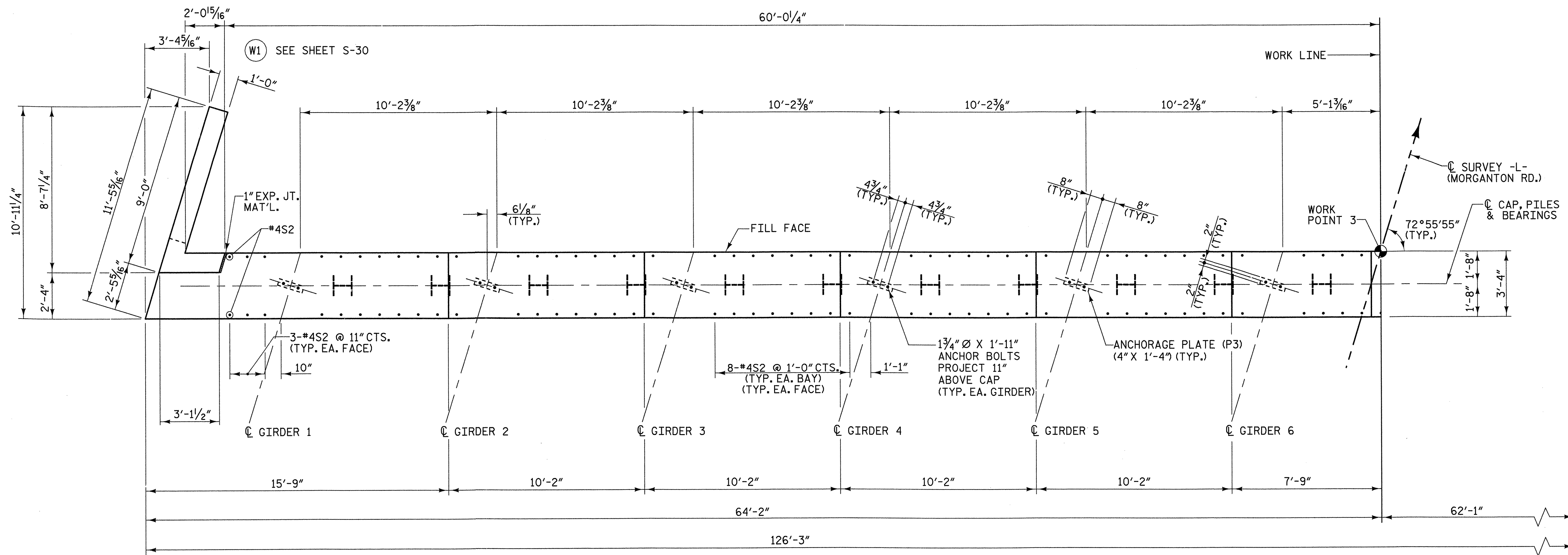


PLANS PREPARED BY:  
**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 38127  
Raleigh, N.C. 27636  
(919) 851-1913 FAX  
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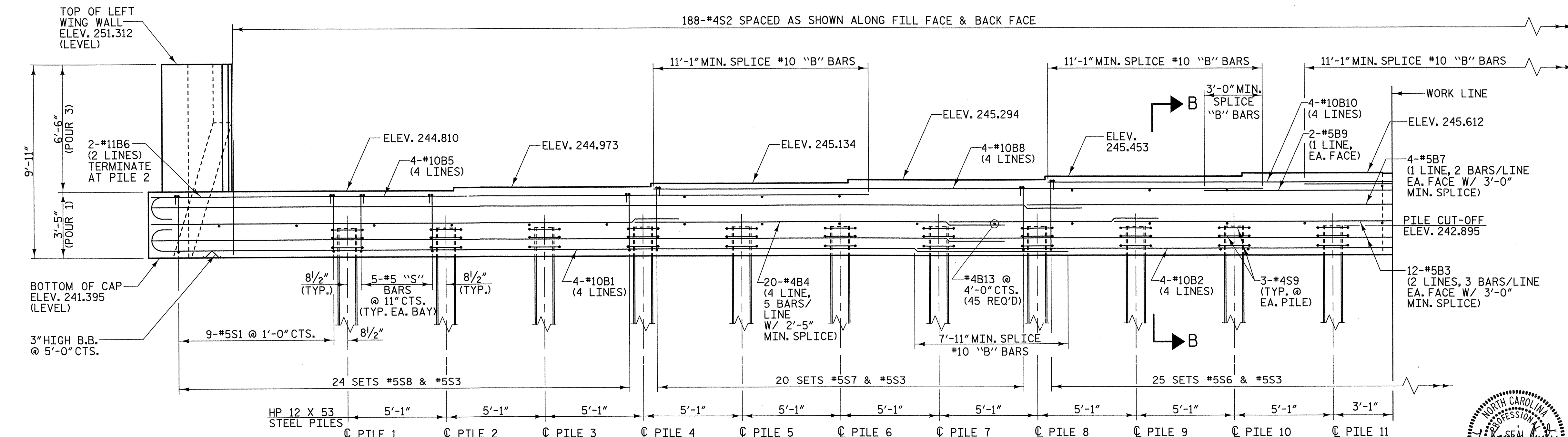
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-27	
1			3			TOTAL SHEETS	
2			4				

DRAWN BY: W.B. ALLEN DATE: 5/07  
CHECKED BY: M.A. AVERETTE DATE: 5/07

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PLAN

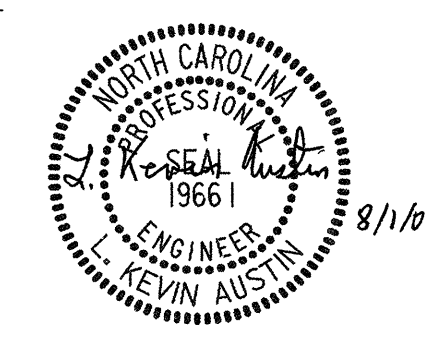


ELEVATION

**NOTES:**  
 FOR PILE SPLICE DETAILS, SEE SHEET S-24.  
 FOR TEMPORARY DRAINAGE AT END BENT SEE SHEET S-24.  
 ROUGHEN TOP OF CAP AND WING CONST. JT. TO A FULL AMPLITUDE OF 1/4".  
 EXISTING END BENT TO BE REMOVED AND EXISTING PILES CUT-OFF AT BOTTOM OF THE NEW CAP.

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUBSTRUCTURE  
 END BENT 2**



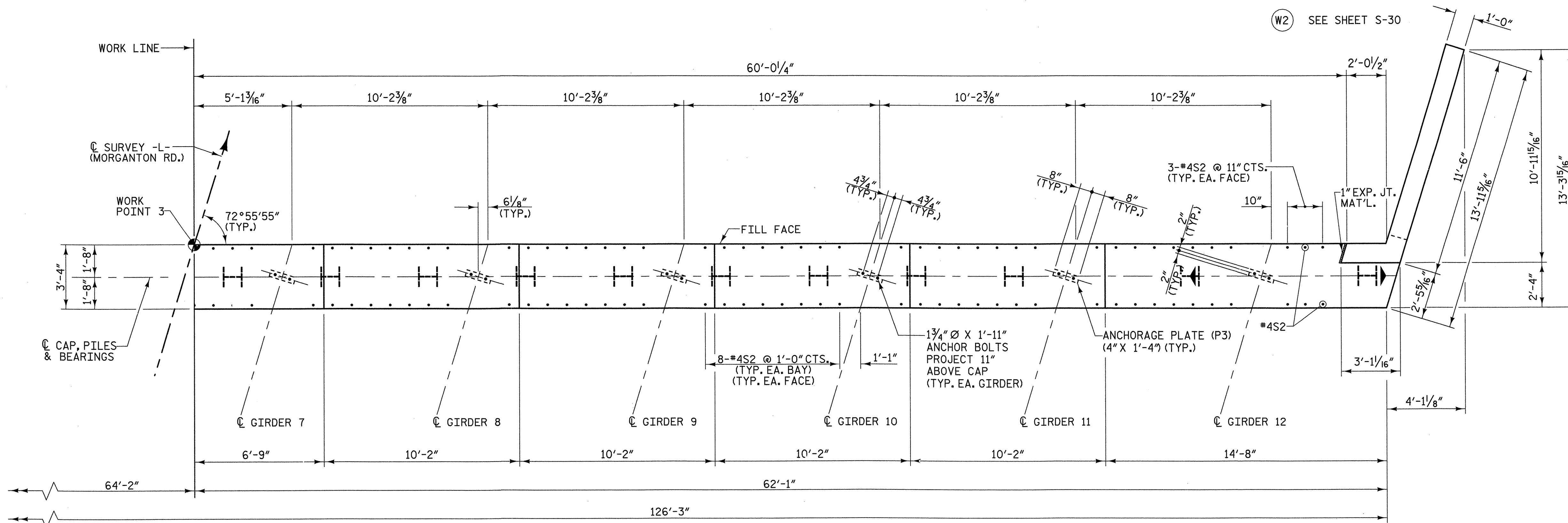
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
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2			4			

DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07

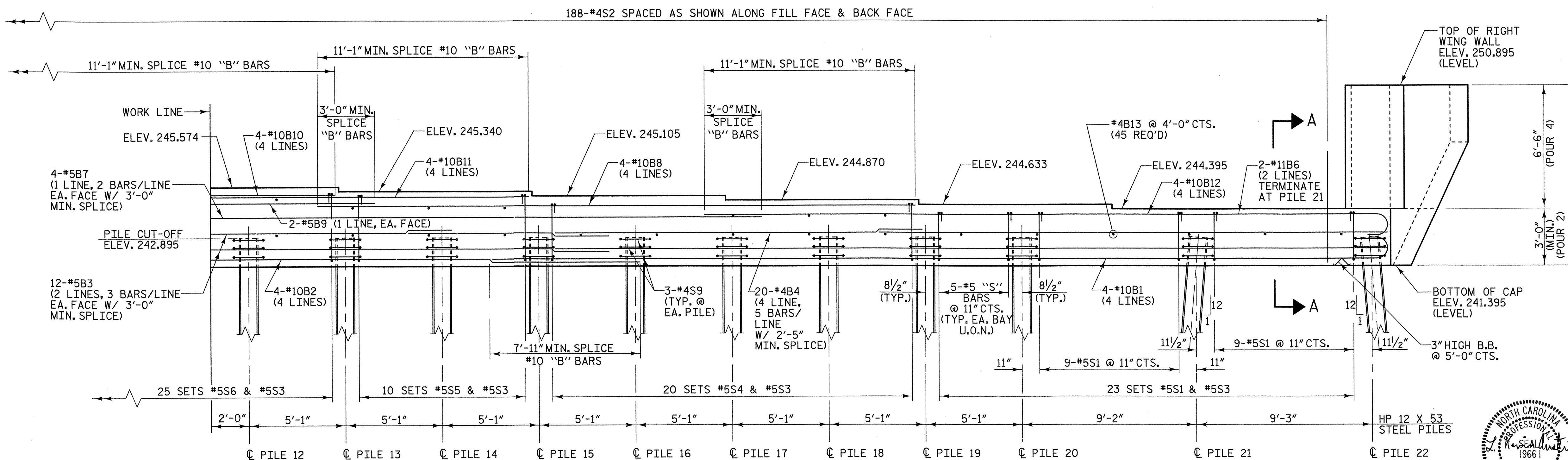
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**NOTES:**  
 FOR PILE SPLICE DETAILS, SEE SHEET S-24.  
 FOR TEMPORARY DRAINAGE AT END BENT SEE SHEET S-24.  
 ROUGHEN TOP OF CAP AND WING CONST. JT. TO A FULL AMPLITUDE OF 1/4".  
 EXISTING END BENT TO BE REMOVED AND EXISTING PILES CUT-OFF AT BOTTOM OF THE NEW CAP.  
 U.O.N. - UNLESS OTHERWISE NOTED



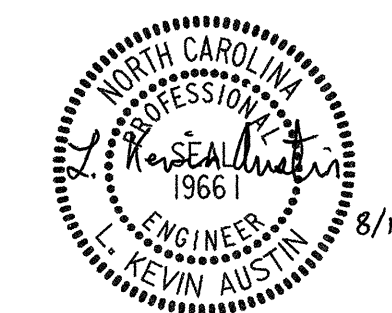
PLAN



ELEVATION

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

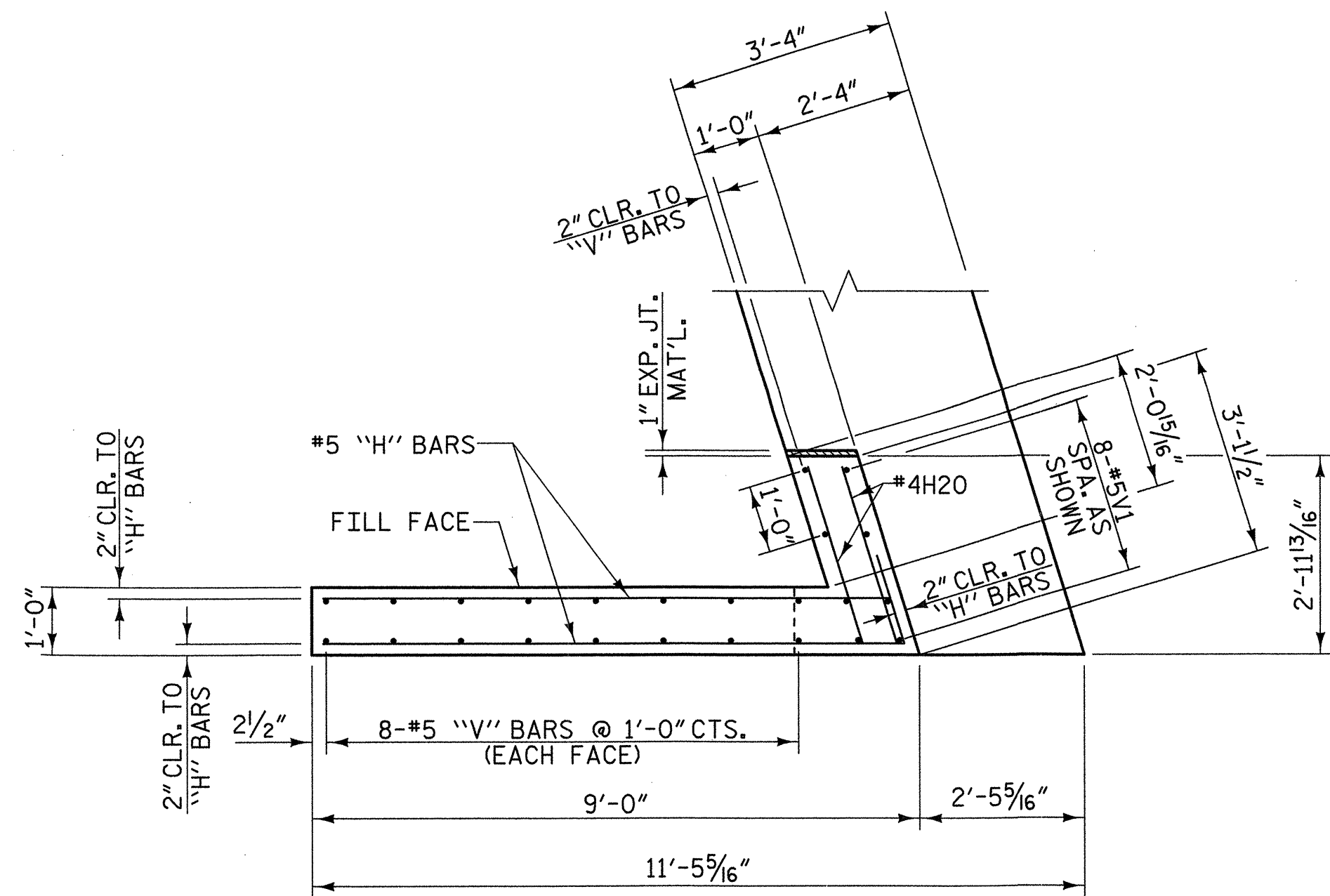
SHEET 2 OF 4



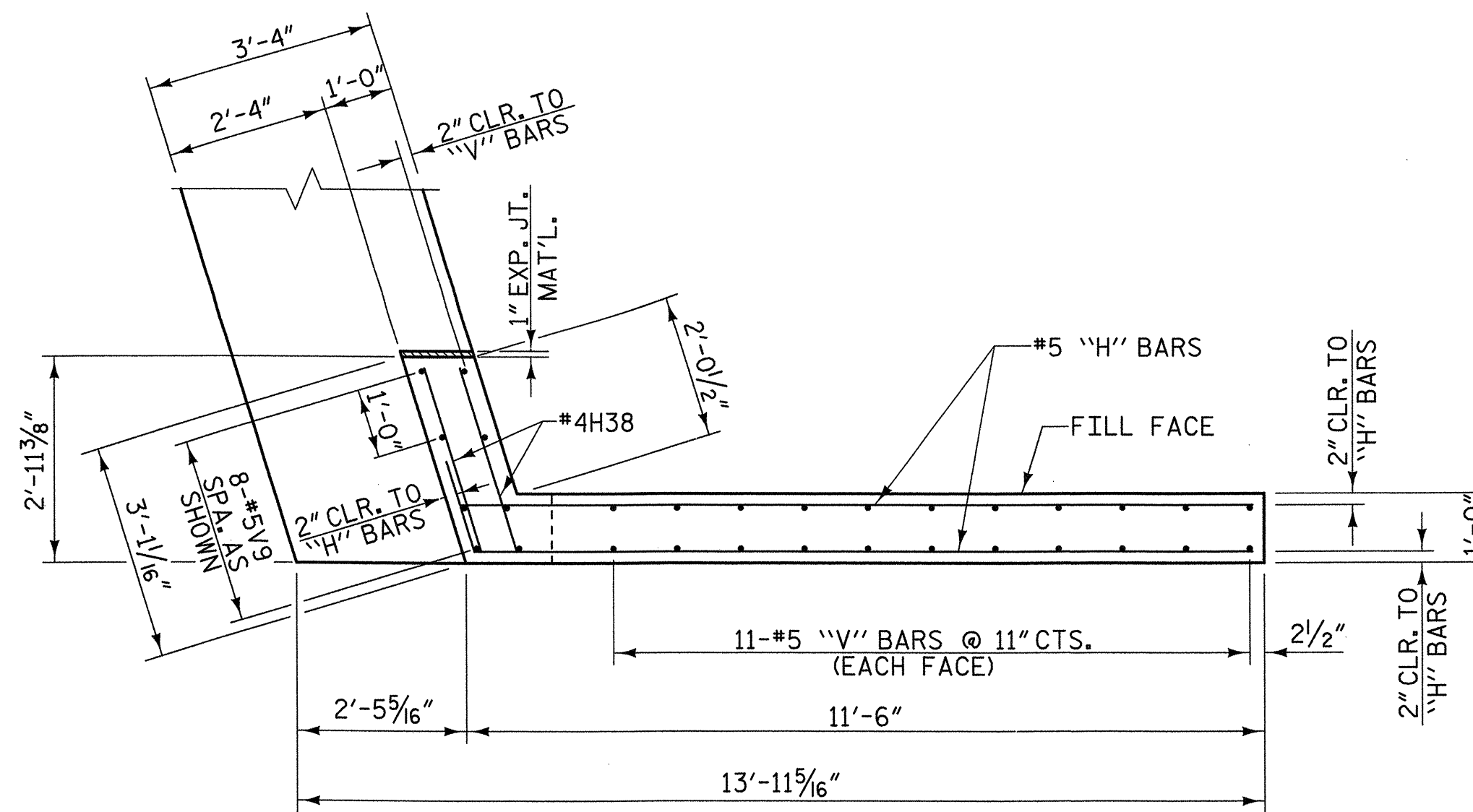
PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO Box 33127  
 Raleigh, N.C. 27666  
 (919) 851-1912  
 (919) 851-1712 FAX  
 WWW.MULKEYINC.COM

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT 2	
REVISIONS			
NO.	BY:	DATE:	NO.
1			3
2			4
SHEET NO. S-29			TOTAL SHEETS

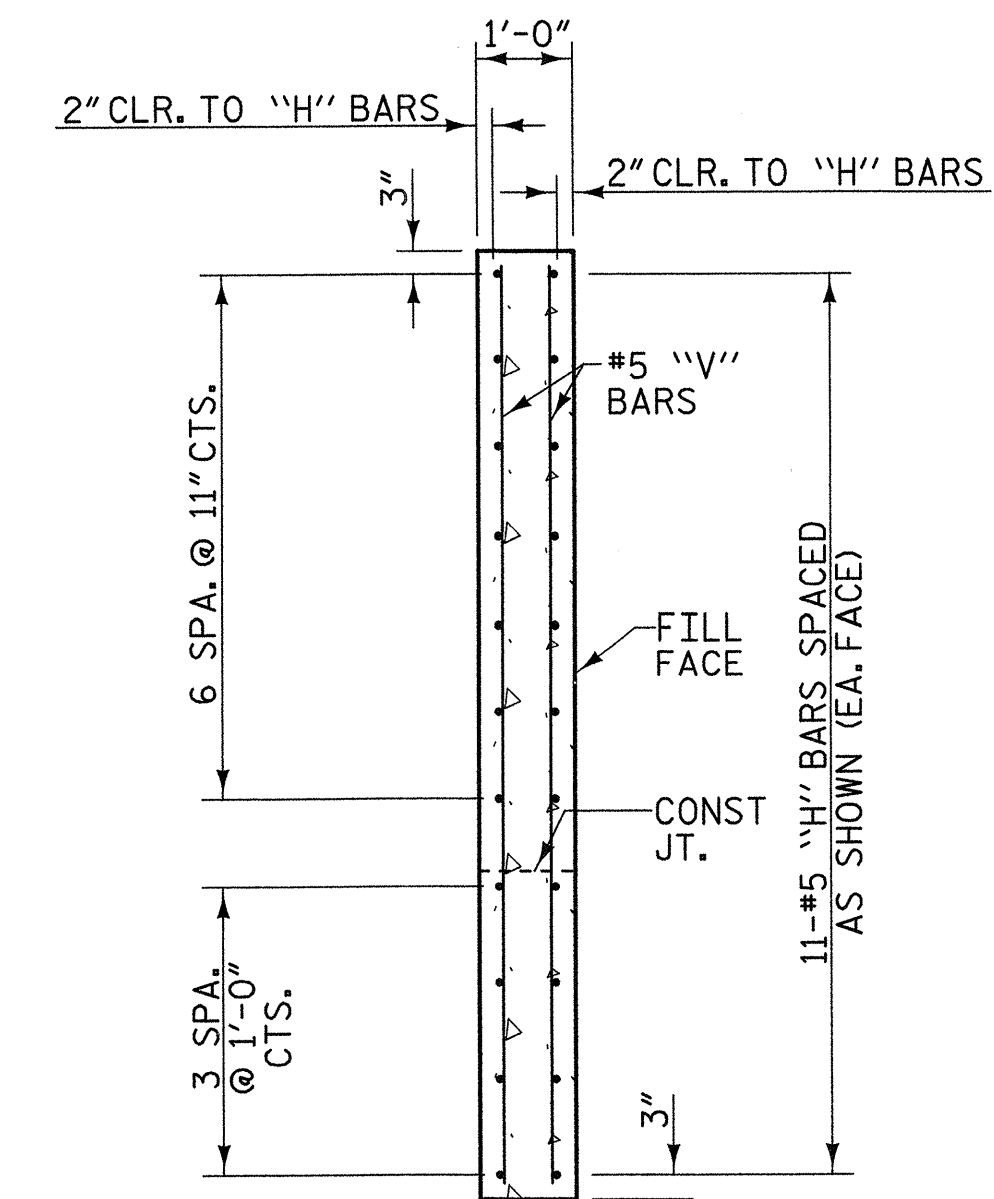
DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07



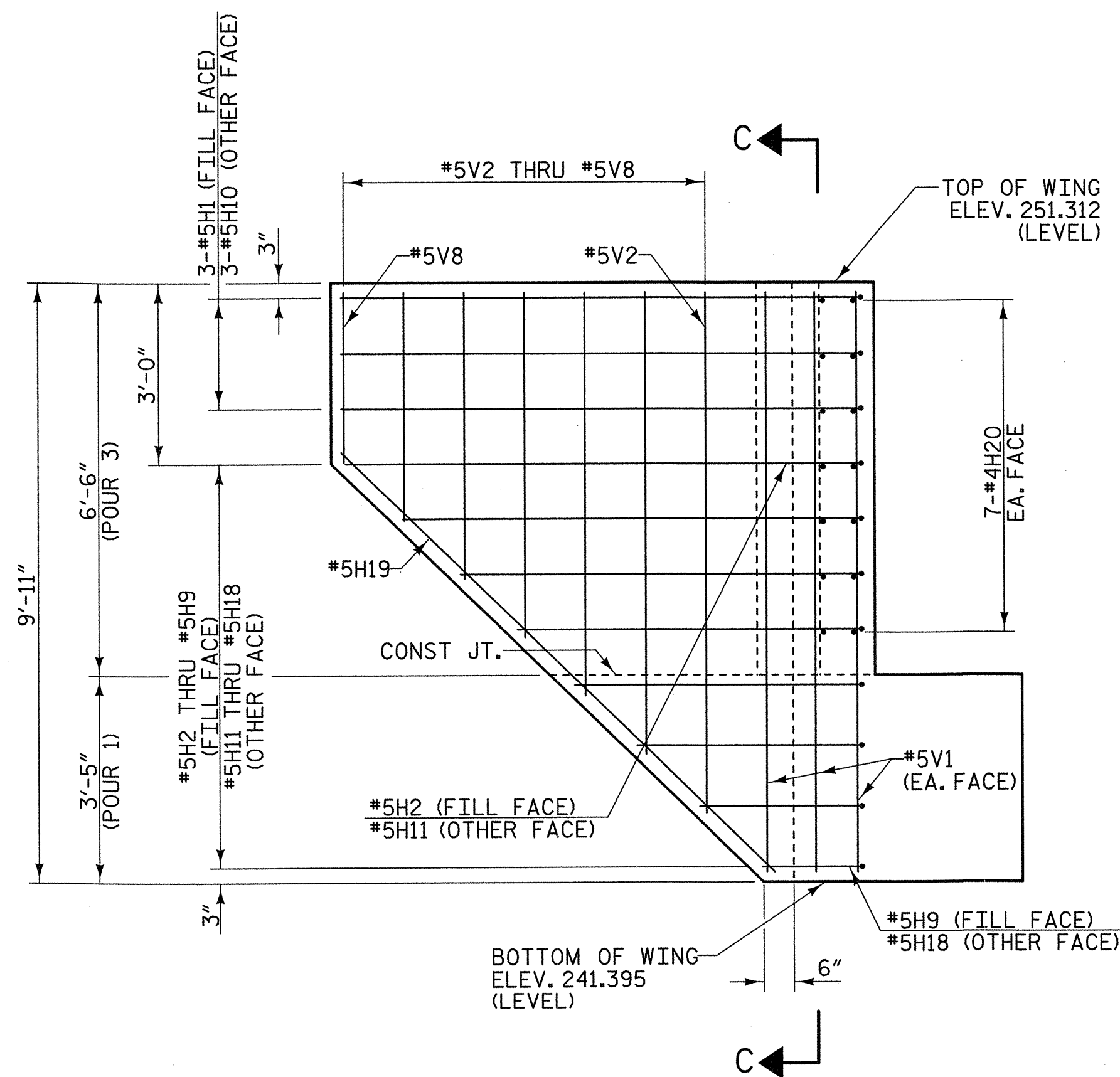
W1 PLAN OF LEFT WING



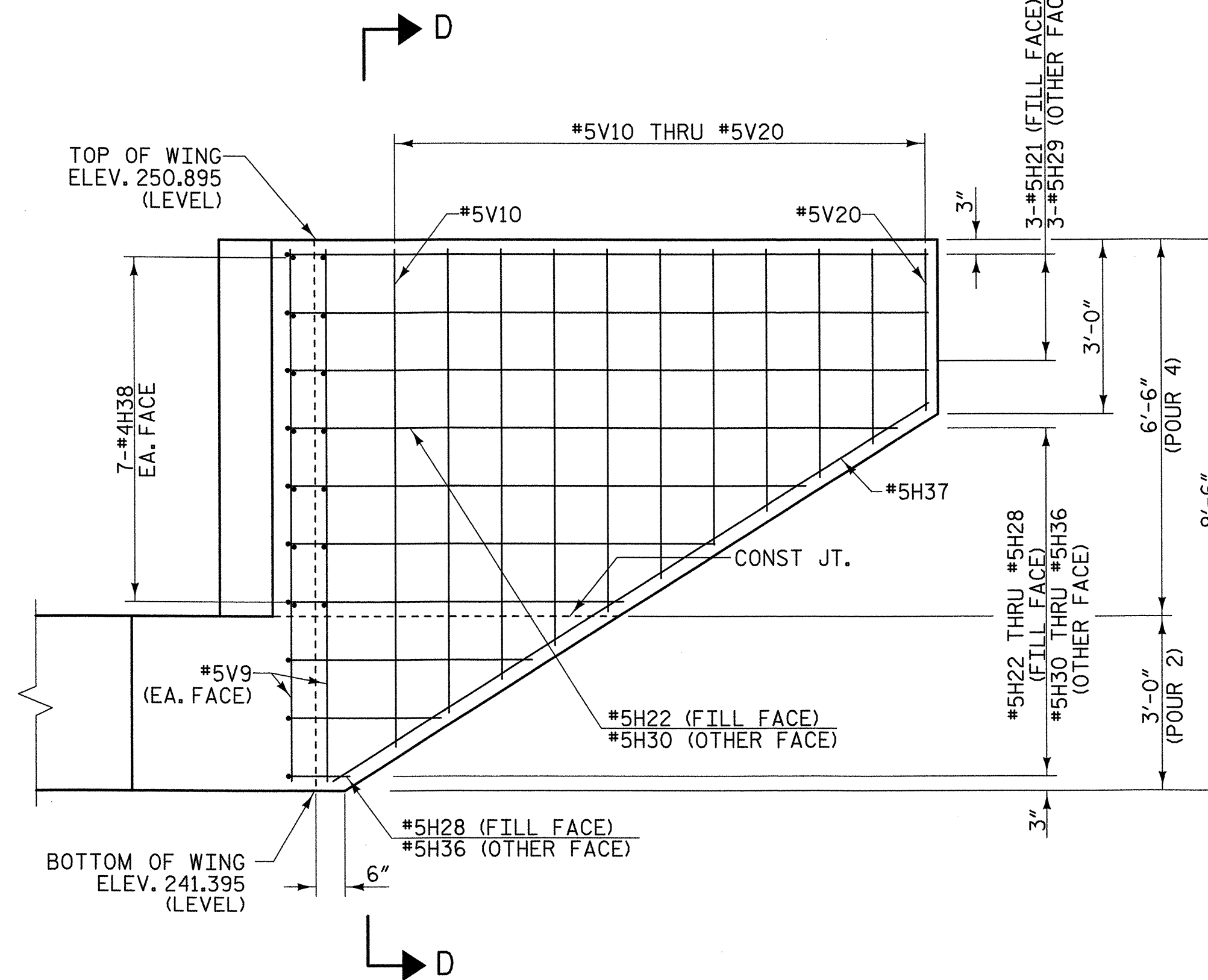
W2 PLAN OF RIGHT WING



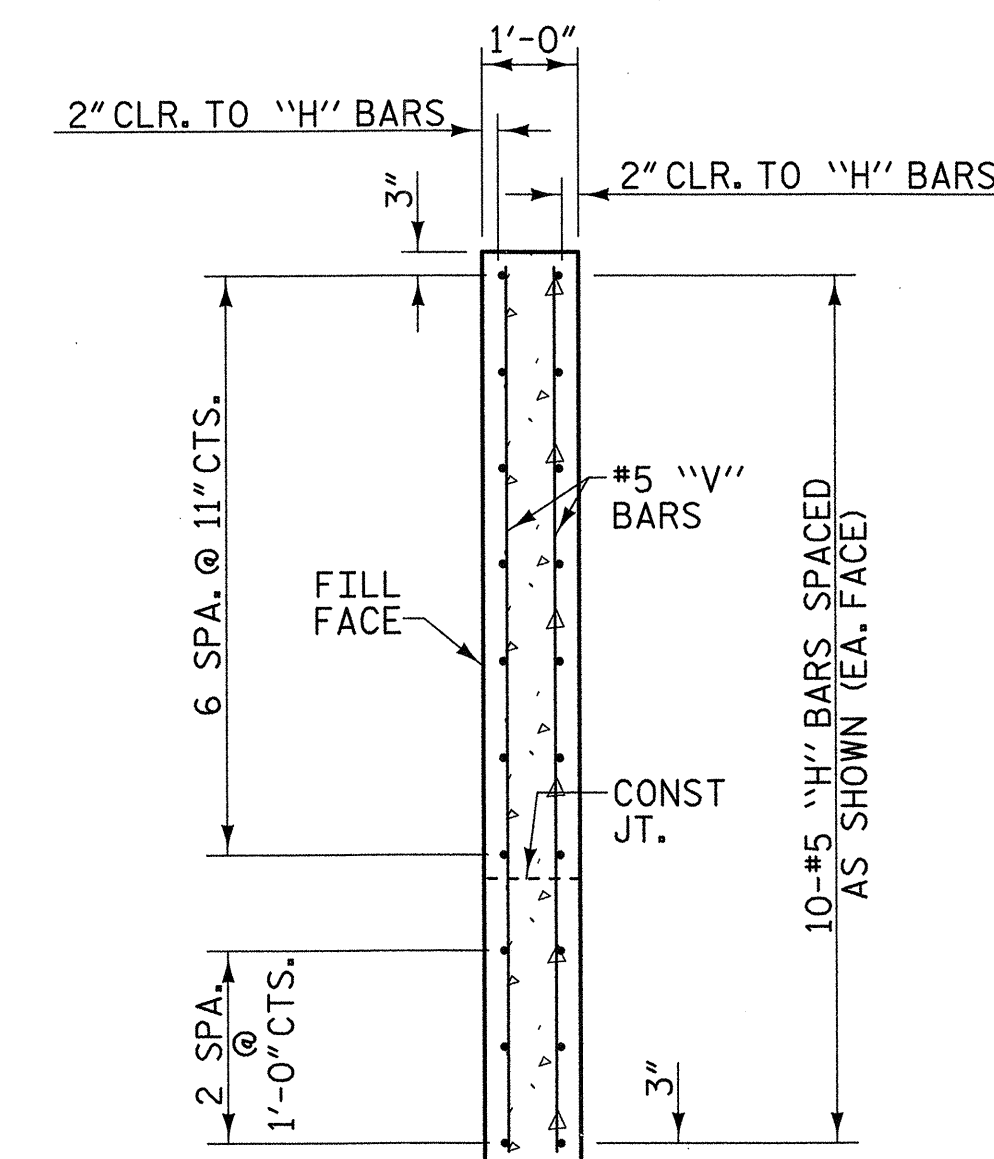
SECTION C-C



W1 ELEVATION OF LEFT WING



W2 ELEVATION OF RIGHT WING



SECTION D-D

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 3 OF 4

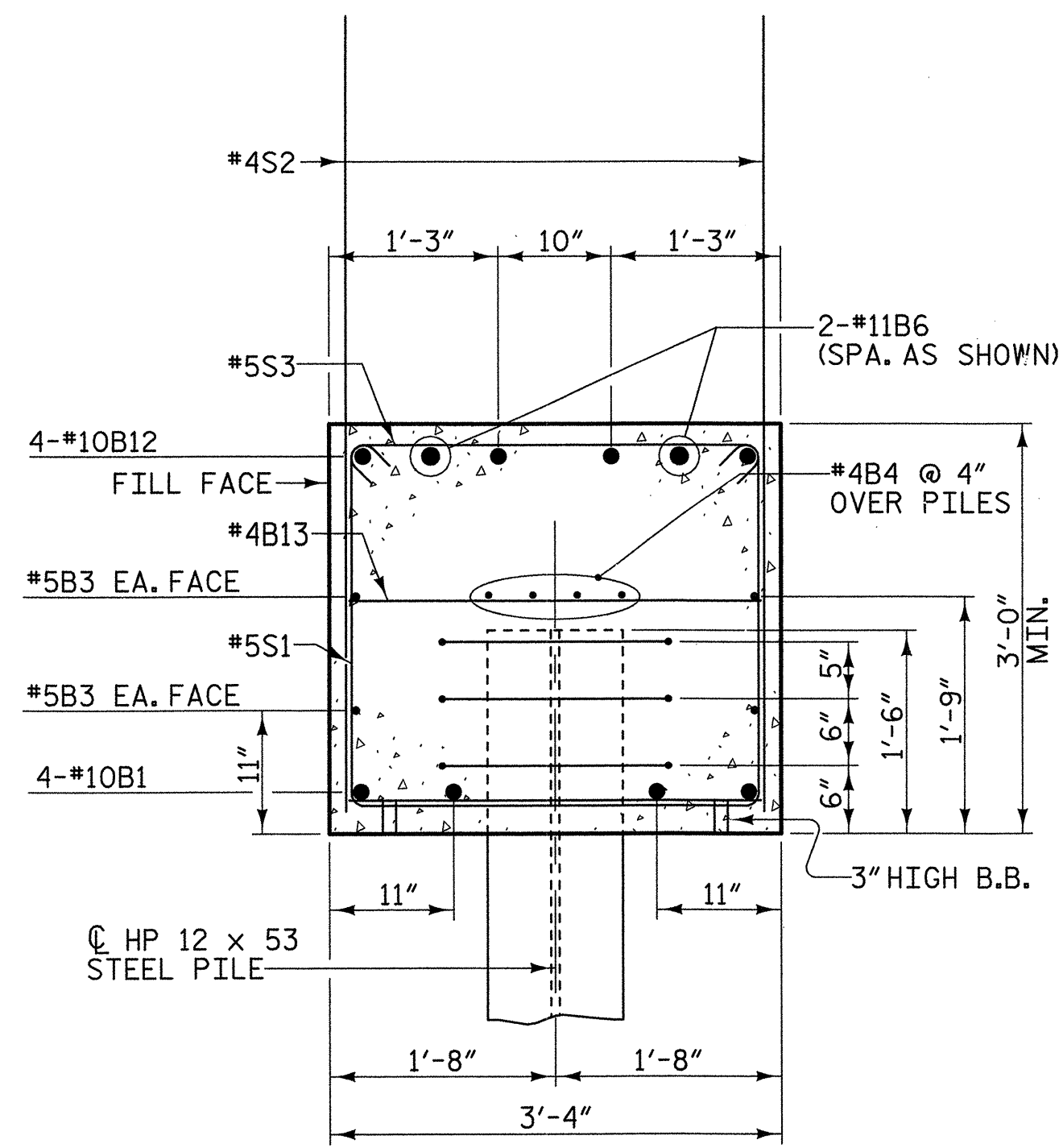


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2

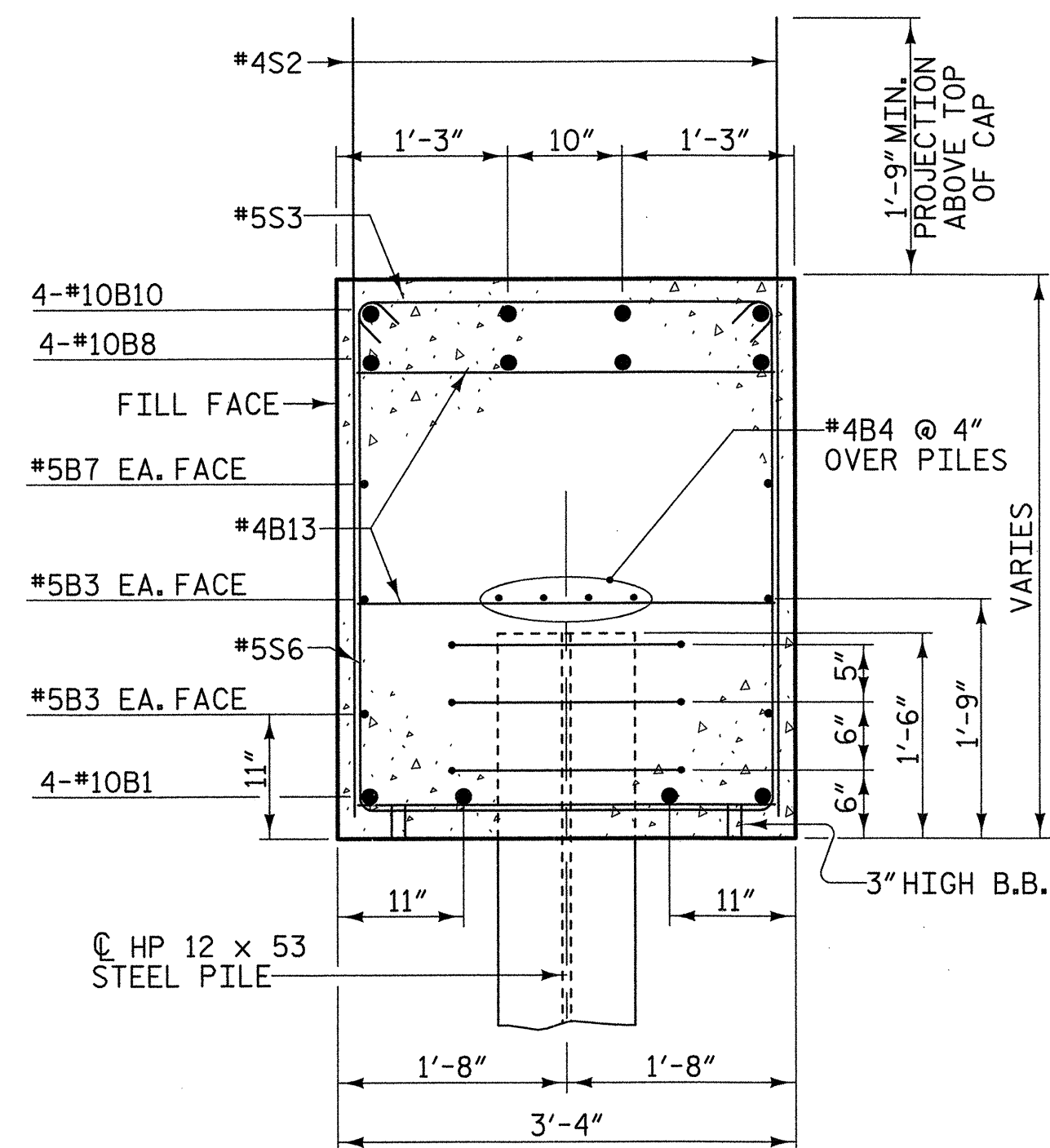
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30	
1			3			TOTAL SHEETS	
2			4				

DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07

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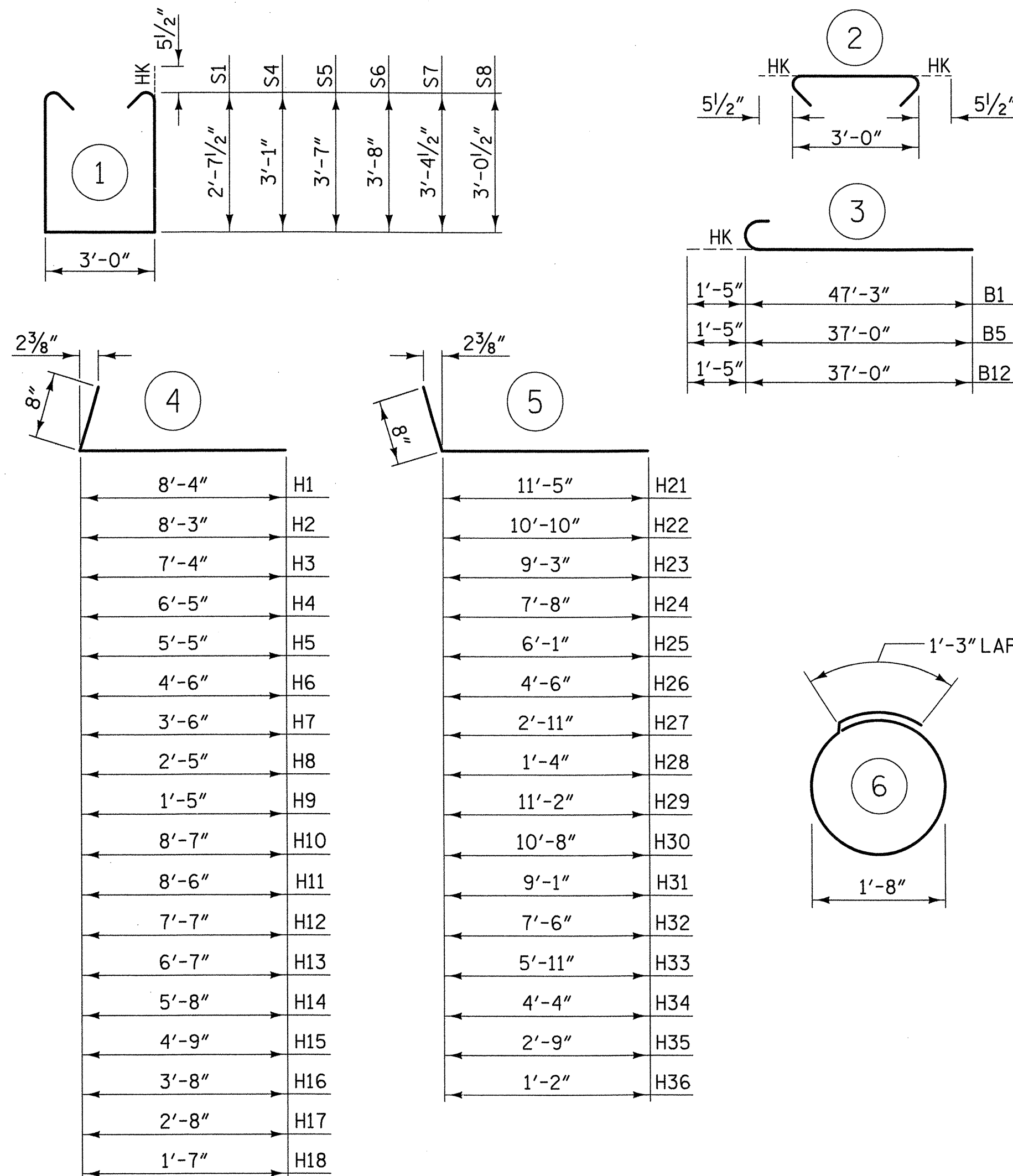


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR END BENT 2											
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	3	48'-8"	1675	S1	23	#5	1	9'-2"	220
B2	4	#10	STR	47'-3"	813	S2	188	#4	1	5'-10"	733
B3	12	#5	STR	44'-0"	551	S3	122	#5	2	3'-11"	498
B4	20	#4	STR	27'-2"	363	S4	20	#5	1	10'-1"	210
B5	4	#10	3	38'-5"	661	S5	10	#5	1	11'-1"	116
B6	4	#11	STR	15'-0"	319	S6	25	#5	1	11'-3"	293
B7	4	#5	STR	47'-6"	198	S7	20	#5	1	10'-8"	223
B8	8	#10	STR	31'-5"	1081	S8	24	#5	1	10'-0"	250
B9	2	#5	STR	18'-4"	38	S9	66	#4	6	6'-6"	287
B10	4	#10	STR	24'-4"	419						
B11	4	#10	STR	21'-3"	366	V1	8	#5	STR	9'-7"	80
B12	4	#10	STR	38'-5"	661	V2	2	#5	STR	8'-7"	18
B13	45	#4	STR	3'-0"	90	V3	2	#5	STR	7'-7"	16
						V4	2	#5	STR	6'-8"	14
H1	3	#5	4	9'-0"	28	V5	2	#5	STR	5'-8"	12
H2	1	#5	4	8'-11"	9	V6	2	#5	STR	4'-8"	10
H3	1	#5	4	8'-0"	8	V7	2	#5	STR	3'-9"	8
H4	1	#5	4	7'-1"	7	V8	2	#5	STR	2'-9"	6
H5	1	#5	4	6'-1"	6	V9	8	#5	STR	9'-2"	76
H6	1	#5	4	5'-2"	5	V10	2	#5	STR	8'-6"	18
H7	1	#5	4	4'-2"	4	V11	2	#5	STR	8'-0"	17
H8	1	#5	4	3'-1"	3	V12	2	#5	STR	7'-5"	15
H9	1	#5	4	2'-1"	2	V13	2	#5	STR	6'-10"	14
H10	3	#5	4	9'-3"	29	V14	2	#5	STR	6'-3"	13
H11	1	#5	4	9'-2"	10	V15	2	#5	STR	5'-8"	12
H12	1	#5	4	8'-3"	9	V16	2	#5	STR	5'-1"	11
H13	1	#5	4	7'-3"	8	V17	2	#5	STR	4'-6"	9
H14	1	#5	4	6'-4"	7	V18	2	#5	STR	3'-11"	8
H15	1	#5	4	5'-5"	6	V19	2	#5	STR	3'-4"	7
H16	1	#5	4	4'-4"	5	V20	2	#5	STR	2'-9"	6
H17	1	#5	4	3'-4"	3						
H18	1	#5	4	2'-3"	2						
H19	2	#5	STR	9'-11"	21						
H20	14	#4	STR	2'-8"	25						
H21	3	#5	5	12'-1"	38						
H22	1	#5	5	11'-6"	12						
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H24	1	#5	5	8'-4"	9						
H25	1	#5	5	6'-9"	7						
H26	1	#5	5	5'-2"	5						
H27	1	#5	5	3'-7"	4						
H28	1	#5	5	2'-0"	2						
H29	3	#5	5	11'-10"	37						
H30	1	#5	5	11'-4"	12						
H31	1	#5	5	9'-9"	10						
H32	1	#5	5	8'-2"	9						
H33	1	#5	5	6'-7"	7						
H34	1	#5	5	5'-0"	5						
H35	1	#5	5	3'-5"	4						
H36	1	#5	5	1'-10"	2						
H37	2	#5	STR	12'-2"	25						
H38	14	#4	STR	2'-8"	25						
					TOTAL REINFORCING STEEL =	10855 lbs.					
					CLASS "A" CONCRETE - CU. YARDS						
					POUR 1	29.7 cu. yds.					
					POUR 2	27.7 cu. yds.					
					POUR 3	2.4 cu. yds.					
					POUR 4	2.9 cu. yds.					
					TOTAL	62.7 cu. yds.					
					HP 12 X 53 STEEL PILES						
					22 PILES REQUIRED - LIN. FEET	1650					

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 4 OF 4



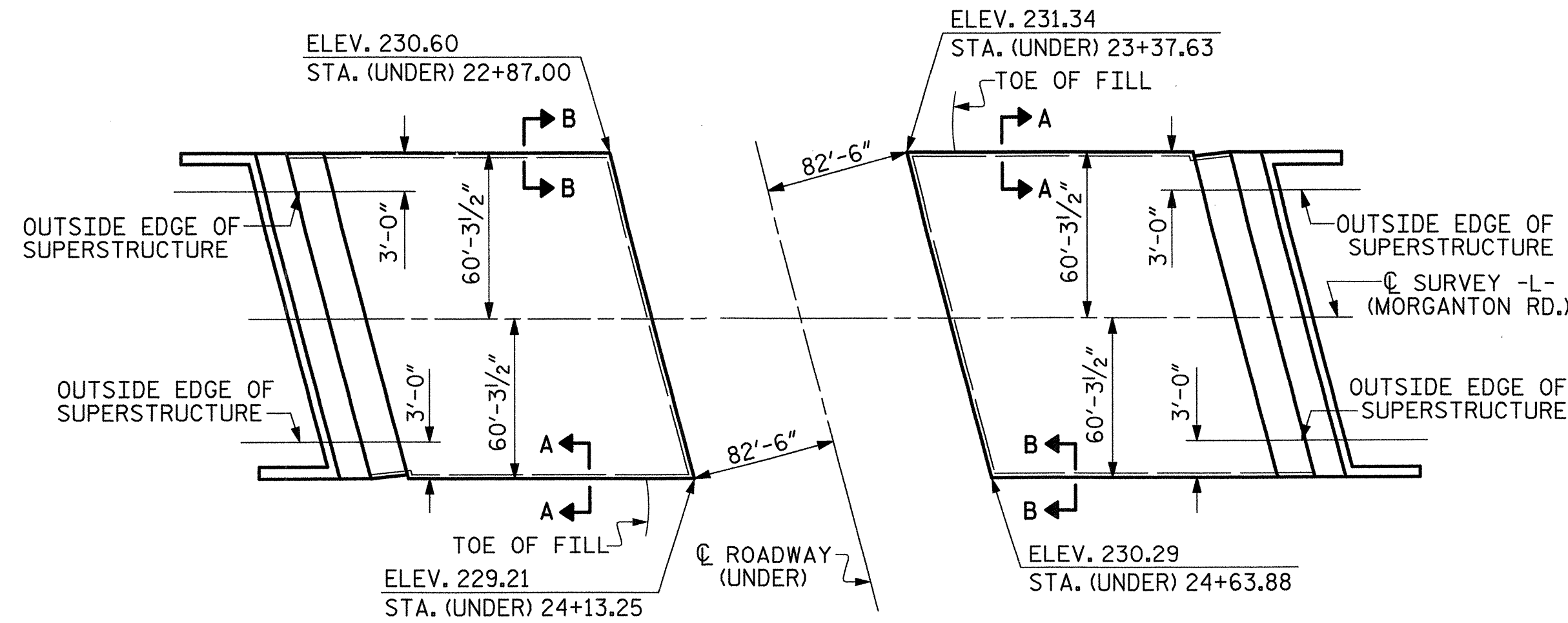
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 2**

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

DRAWN BY: W. B. ALLEN DATE: 5/07  
 CHECKED BY: M. A. AVERETTE DATE: 5/07

8/5/2007 8:55:33 AM R:\S\Structure\U4756.SD.E2.04.dgn



**GENERAL NOTES**

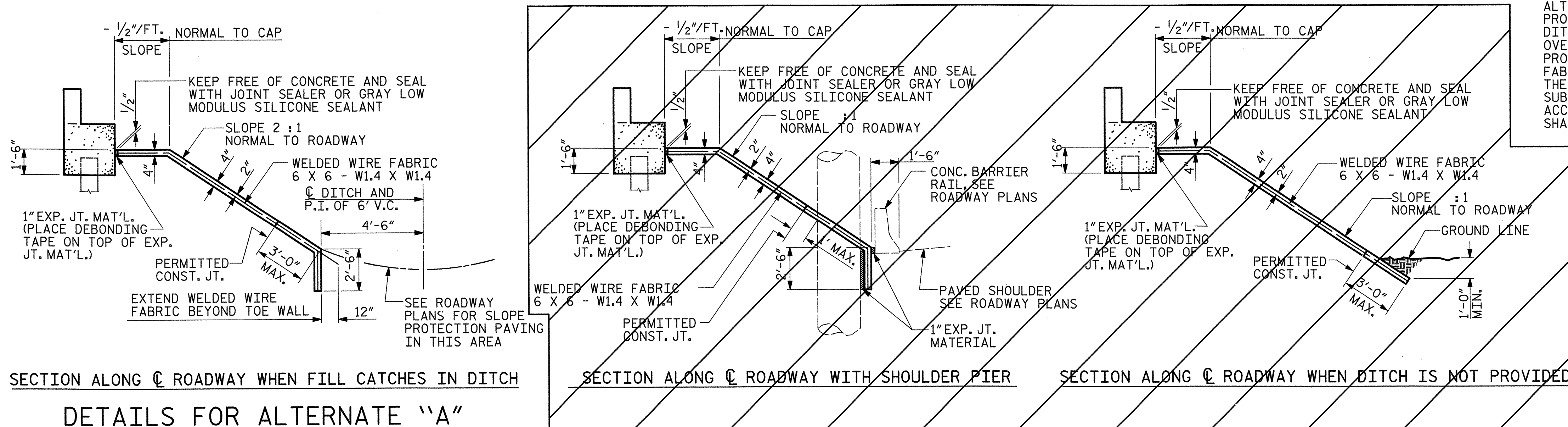
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

**ALTERNATE "A"**

ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

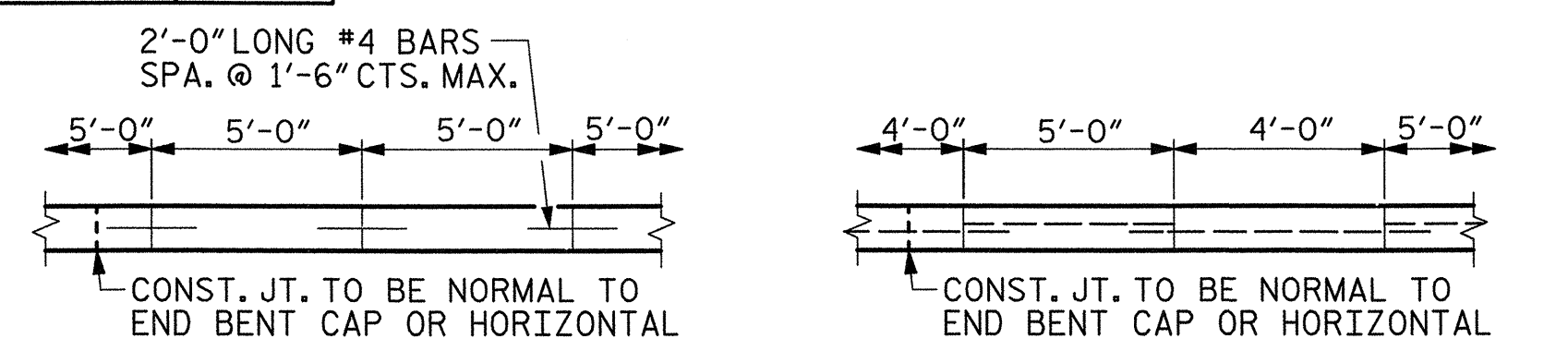
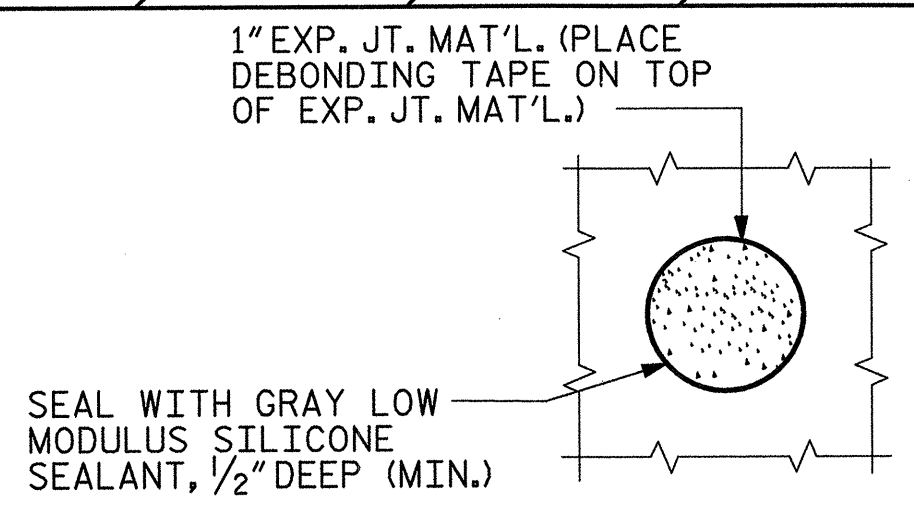
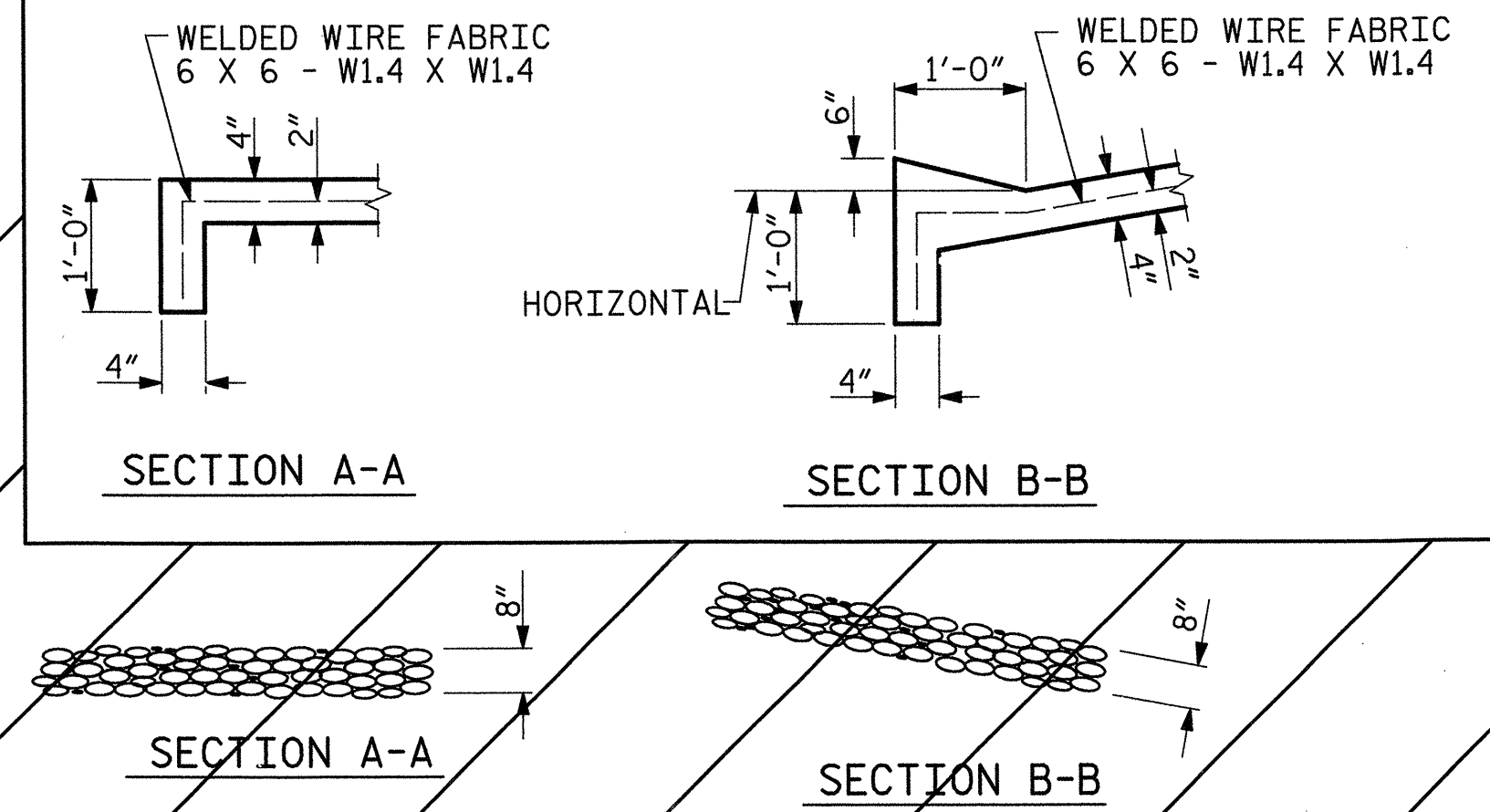
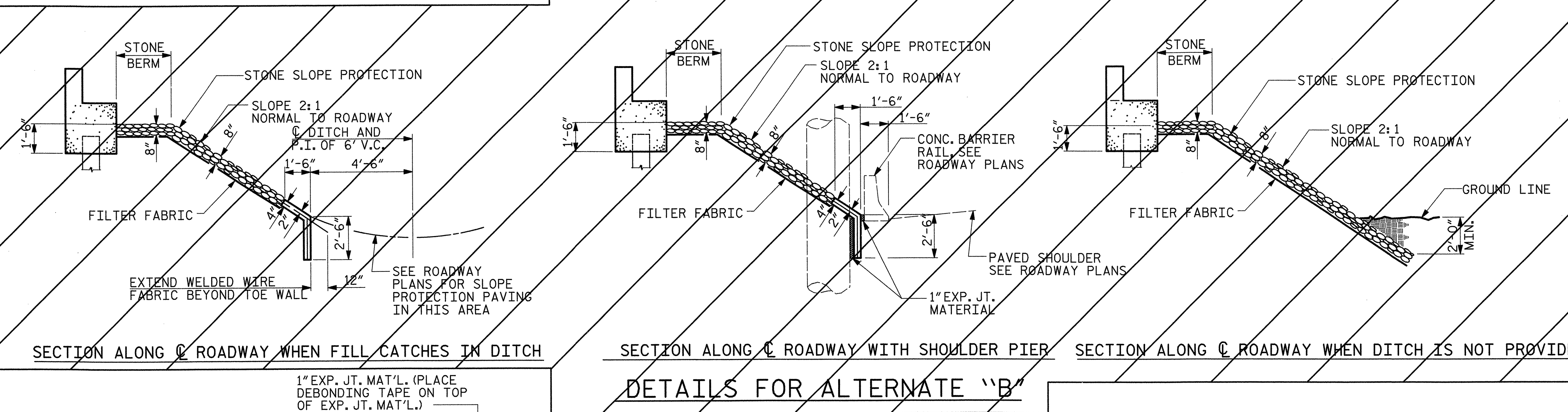
**ALTERNATE "B"**

ALTERNATE "B" SHALL CONSIST OF A COMBINATION CONCRETE SLAB AND STONE SLOPE PROTECTION. THE CONCRETE PORTIONS SHALL CONSIST OF PAVED STRIPS ALONG THE DITCH AS SHOWN IN THE DETAILS. FILTER FABRIC AND 8" OF STONE SHALL BE PLACED OVER THE REMAINING AREA SHOWN ON THE PLANS TO BE COVERED WITH SLOPE PROTECTION. CONCRETE SHALL BE CLASS "B". THE COST OF THE CONCRETE, FILTER FABRIC, STONE AND WELDED WIRE FABRIC 6 X 6 - W1.4 X W1.4, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION. SUBGRADING, STONE TYPE, STONE SIZING, AND HERBICIDE PROTECTION, SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE HERBICIDE TYPE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION.



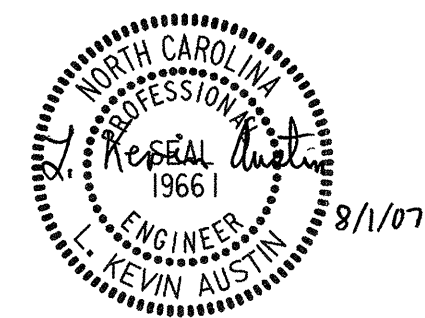
BRIDGE @ STA. 44+88.35	4" INCH SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	558	997.9
END BENT 2	528	944.2

\* QUANTITY SHOWN IS BASED ON 5' POURS.



PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 P.O. Box 33127  
 Raleigh, N.C. 27636  
 (919) 851-1912  
 (919) 851-1913 FAX  
 WWW.MULKEYING.COM

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

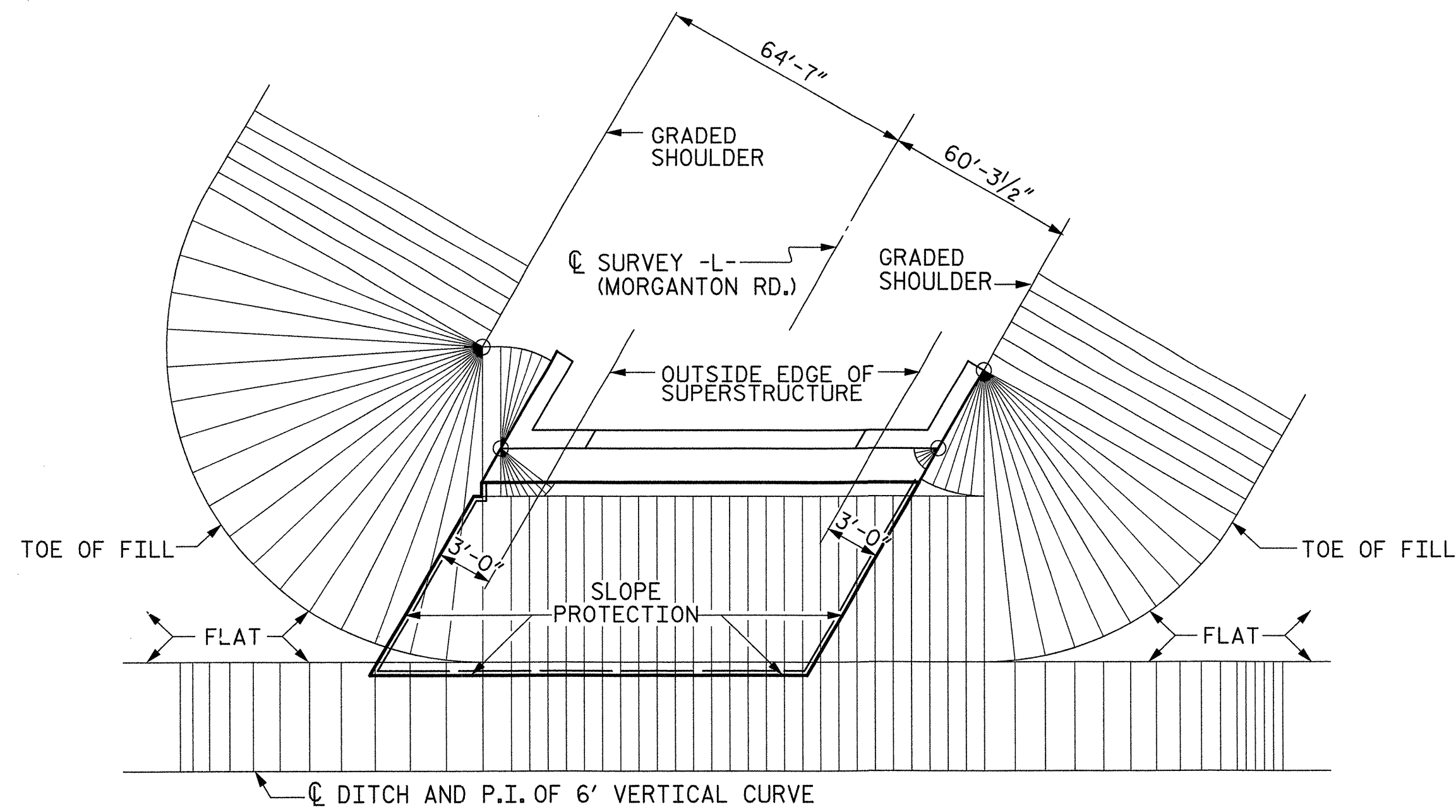
SHEET 1 OF 2  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SLOPE PROTECTION  
 DETAILS

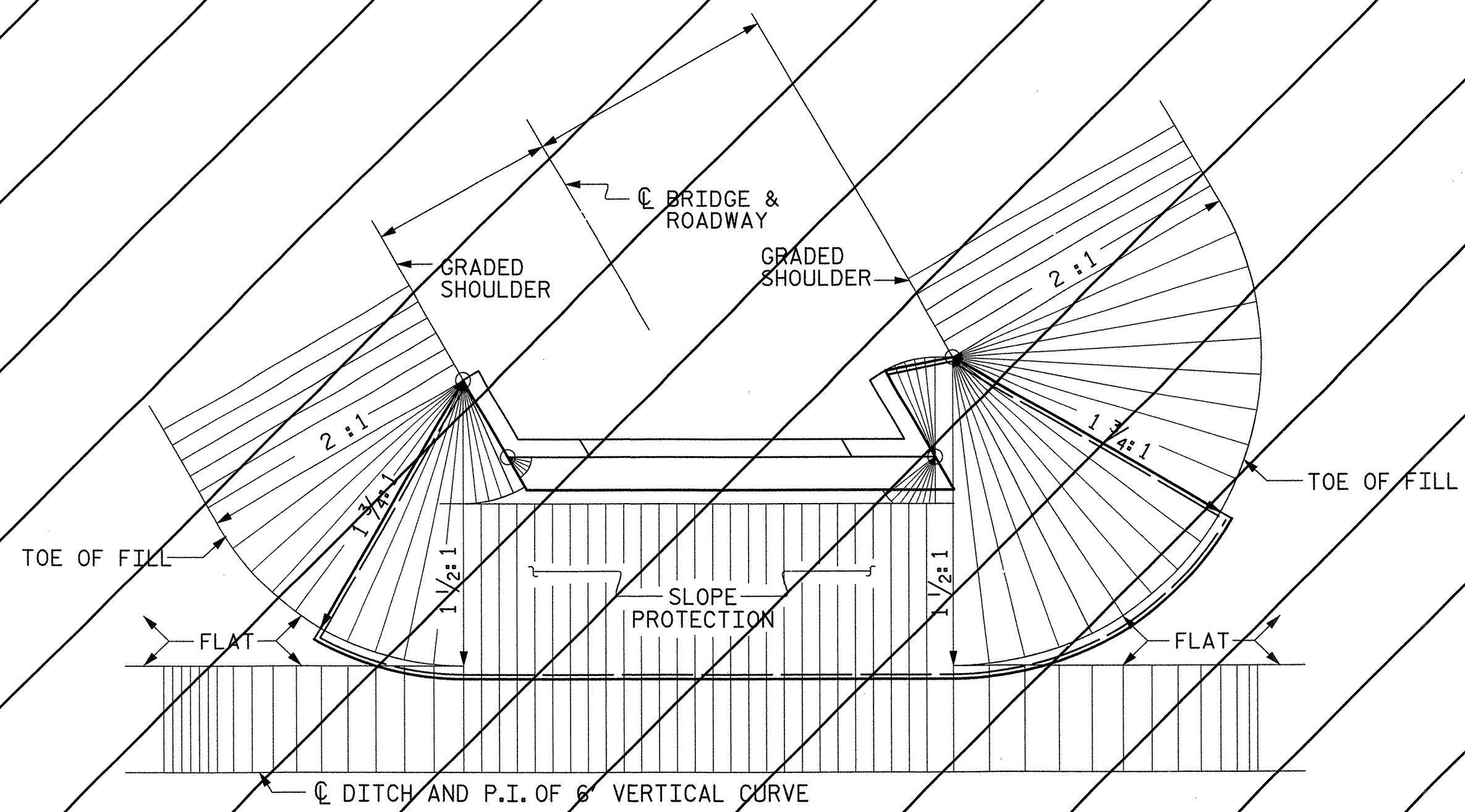
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NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

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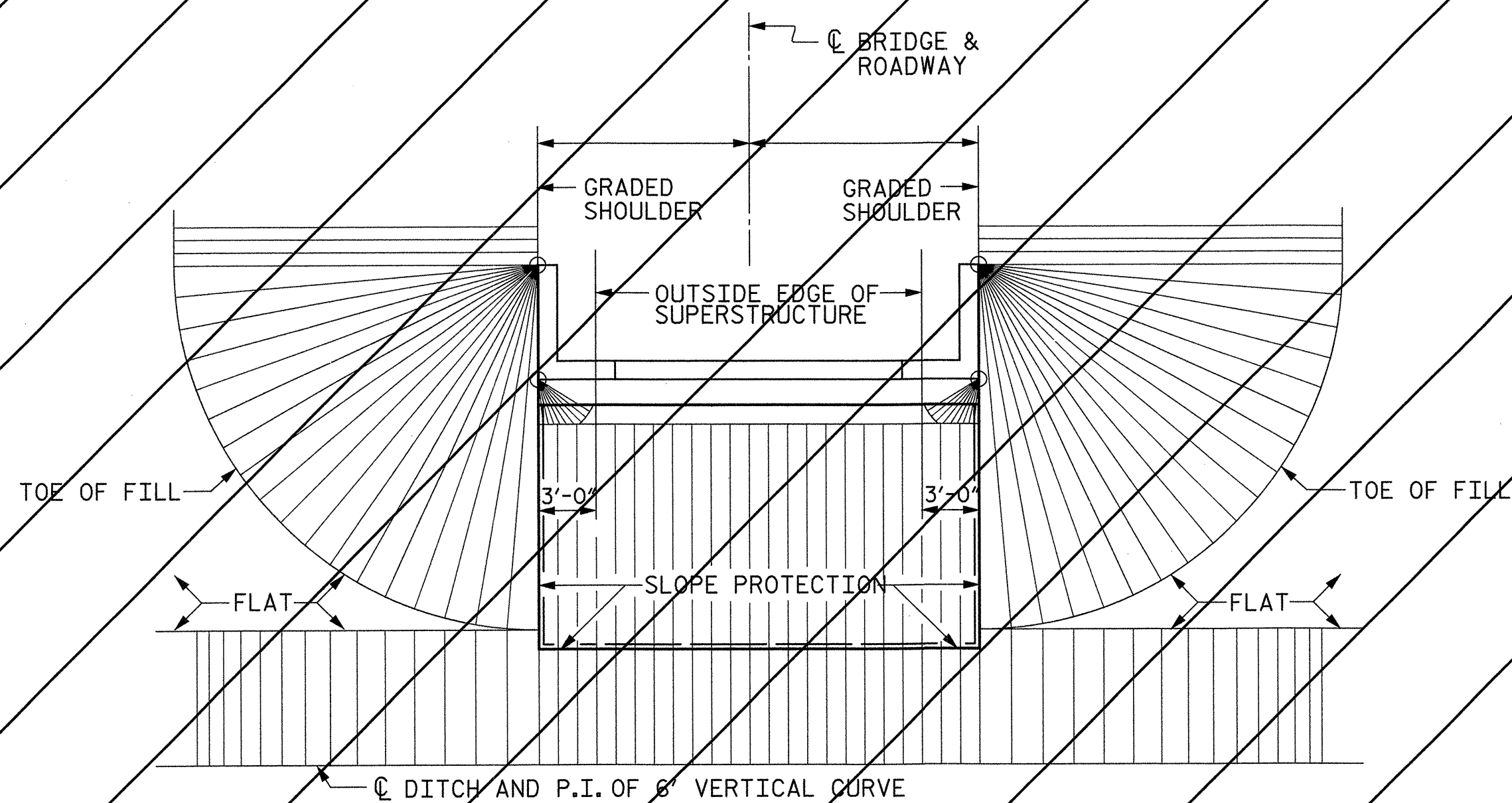
ASSEMBLED BY: W. B. ALLEN DATE: 4/07  
 CHECKED BY: M. A. AVERETTE DATE: 4/07  
 DRAWN BY: ELR 5/92 REV. 7/10/01 LES/RDR  
 CHECKED BY: GRP 6/92 REV. 5/7/03 RWW/JTE  
 REV. 5/1/06 TLA/GM



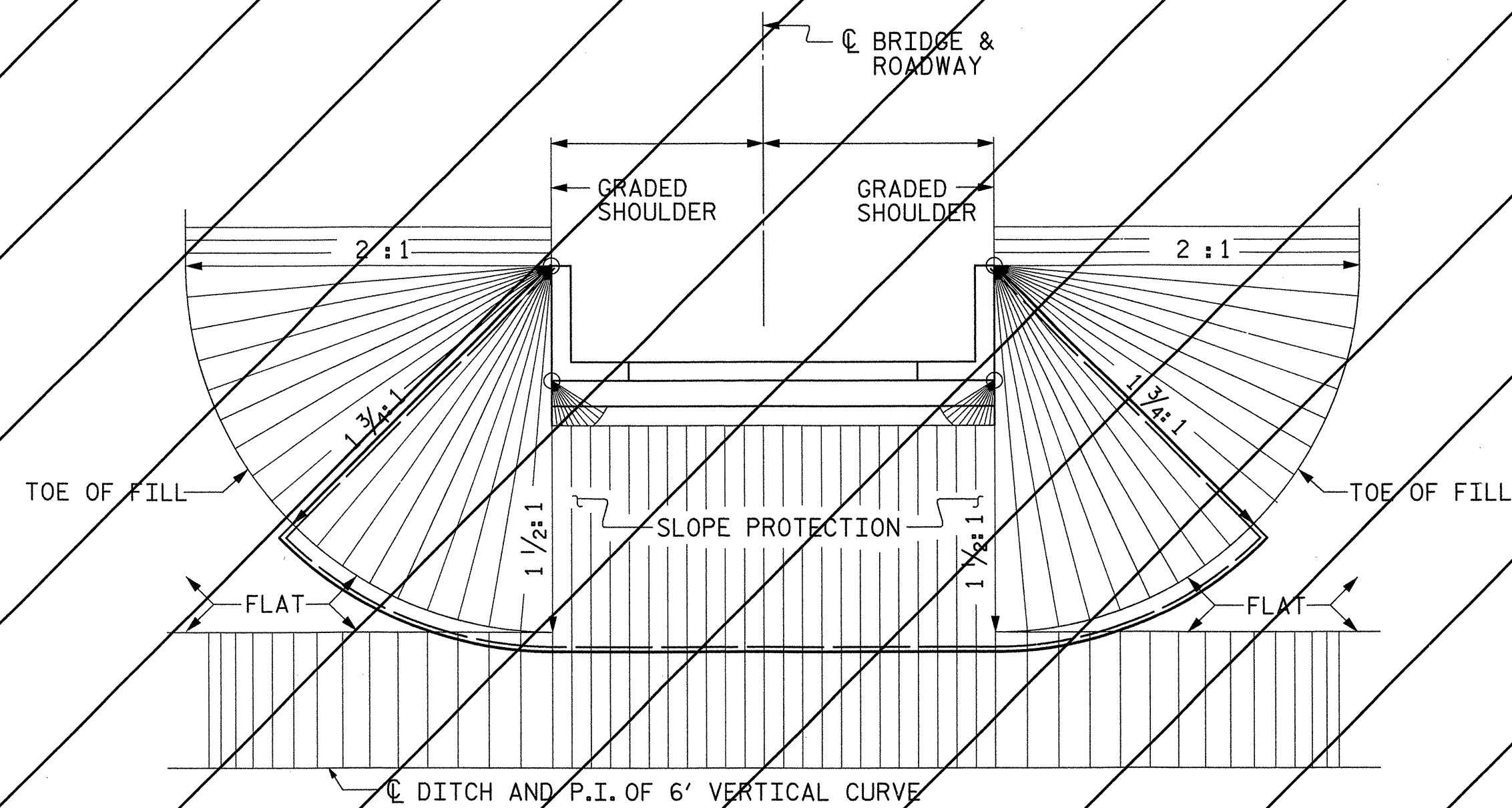
PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED  
( 2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED  
( 1 1/2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 1 1/2:1 SLOPE )

PROJECT NO. U-4756  
CUMBERLAND COUNTY  
STATION: 44+88.35 -L-

SHEET 2 OF 2

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

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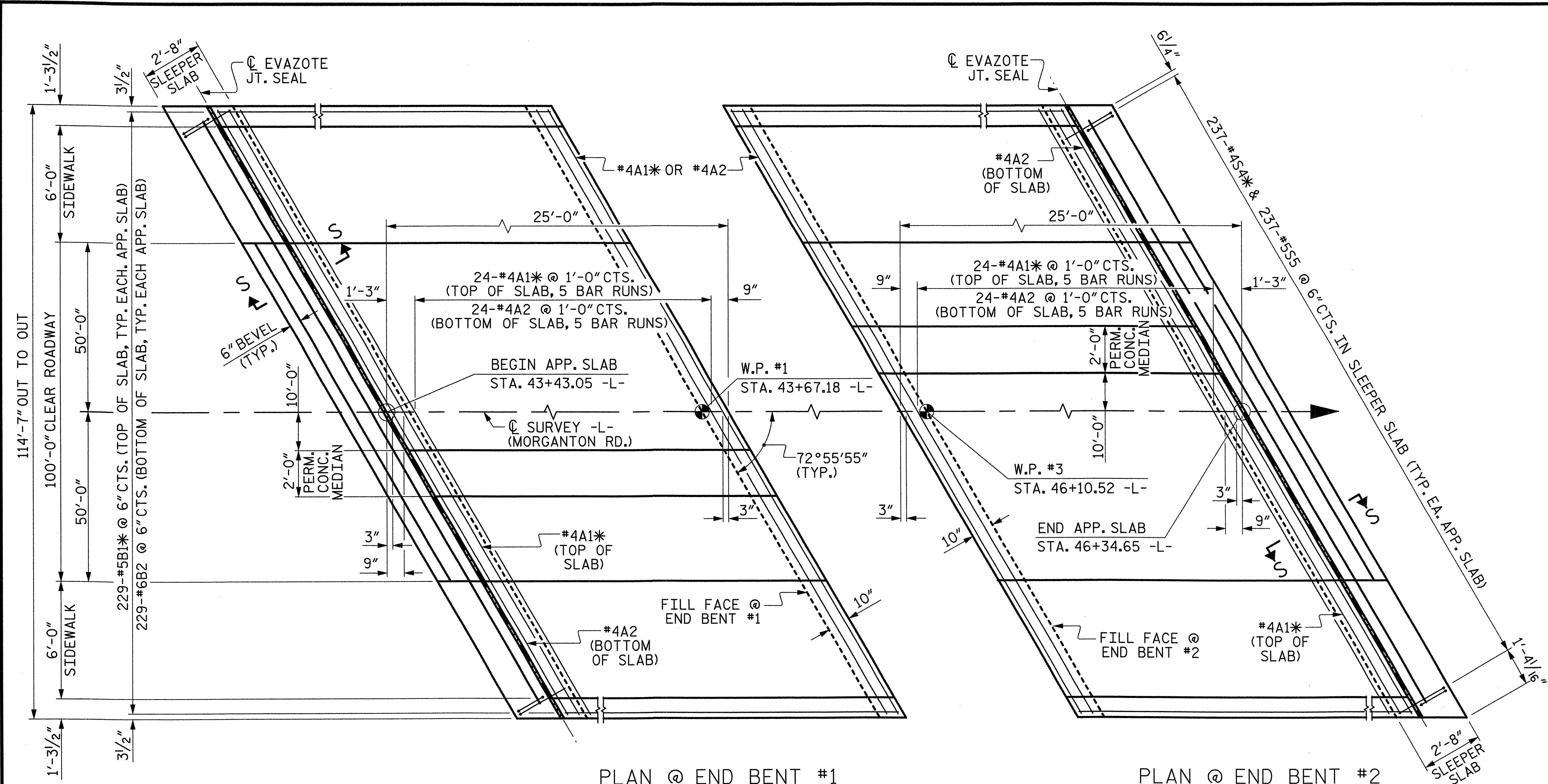


ASSEMBLED BY : W. B. ALLEN	DATE : 4/07
CHECKED BY : M. A. AVERETTE	DATE : 4/07
DRAWN BY : WJH 10/88	REV. 2/6/97 EEM/RGW
CHECKED BY : FCJ 10/88	REV. 7/17/98 REK/RWW
	REV. 5/1/06 TLA/GM

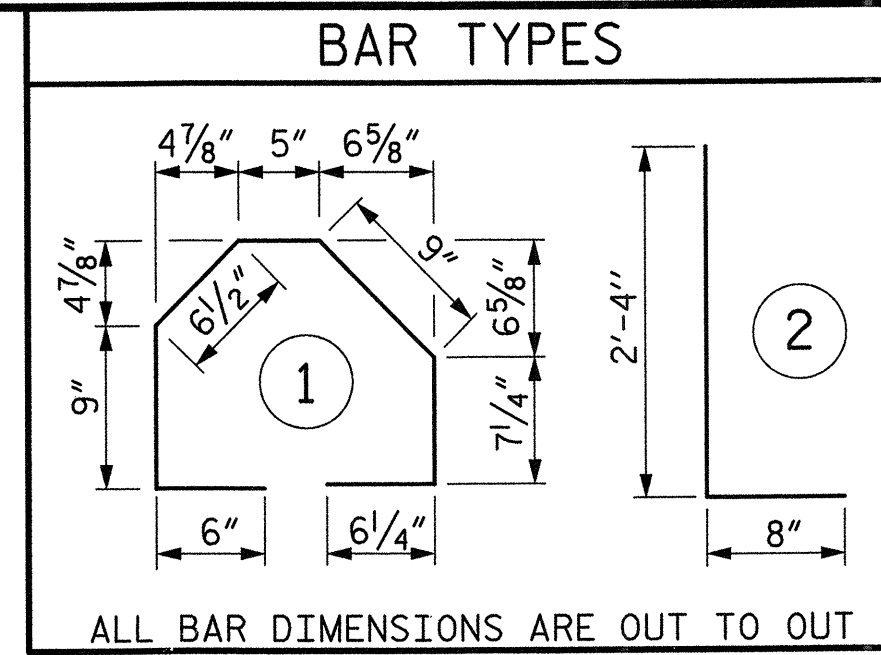
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			

STD. NO. SP2

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PLAN @ END BENT #1  
 PLAN @ END BENT #2  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS. #4A1 BARS IN SLEEPER SLAB NOT SHOWN FOR CLARITY. FOR REINFORCING STEEL IN THE SIDEWALK & THE PERMANENT CONCRETE MEDIAN SEE SHT. S-20 \* INDICATES EPOXY COATED REINFORCING STEEL.



BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	160	#4	STR	25'-6"	2725	
A2	130	#4	STR	25'-4"	2200	
* B1	229	#5	STR	24'-1"	5752	
B2	229	#6	STR	24'-7"	8456	
* B3	14	#4	STR	24'-7"	230	
* D1	64	#4	STR	8"	29	
* G1	44	#4	STR	6'-11"	203	
* G2	4	#4	STR	7'-2"	19	
* M2	17	#4	STR	7"	7	
* M5	2	#4	STR	24'-7"	33	
* S4	237	#4	1	4'-1"	646	
* S5	237	#5	2	3'-0"	742	
REINFORCING STEEL					LBS.	10386
* EPOXY COATED REINFORCING STEEL					LBS.	10656
CLASS AA CONCRETE						
APPROACH SLAB					C. Y.	118.3
SIDEWALK					C. Y.	9.4
MEDIAN					C. Y.	0.6
TOTAL					C. Y.	128.3

NOTES

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

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

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE 6" COMP. A.B.C. SHALL EXTEND 10'-0" BEYOND THE END OF THE APPROACH SLAB AND 1'-0" OUTSIDE OF EACH EDGE OF SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25,0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL EXTEND 1'-0" BEYOND THE END OF THE SLEEPER SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

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

THE VERTICAL JOINT ON THE RIGHT AND LEFT SIDE OF THE APPROACH SLAB AT THE ENDS OF THE EVAZOTE JOINT SHALL BE FILLED WITH SILICONE OR OTHER APPROVED MATERIAL IN ORDER TO PREVENT BACKFILL FROM ENTERING THE JOINT OPENING.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT.

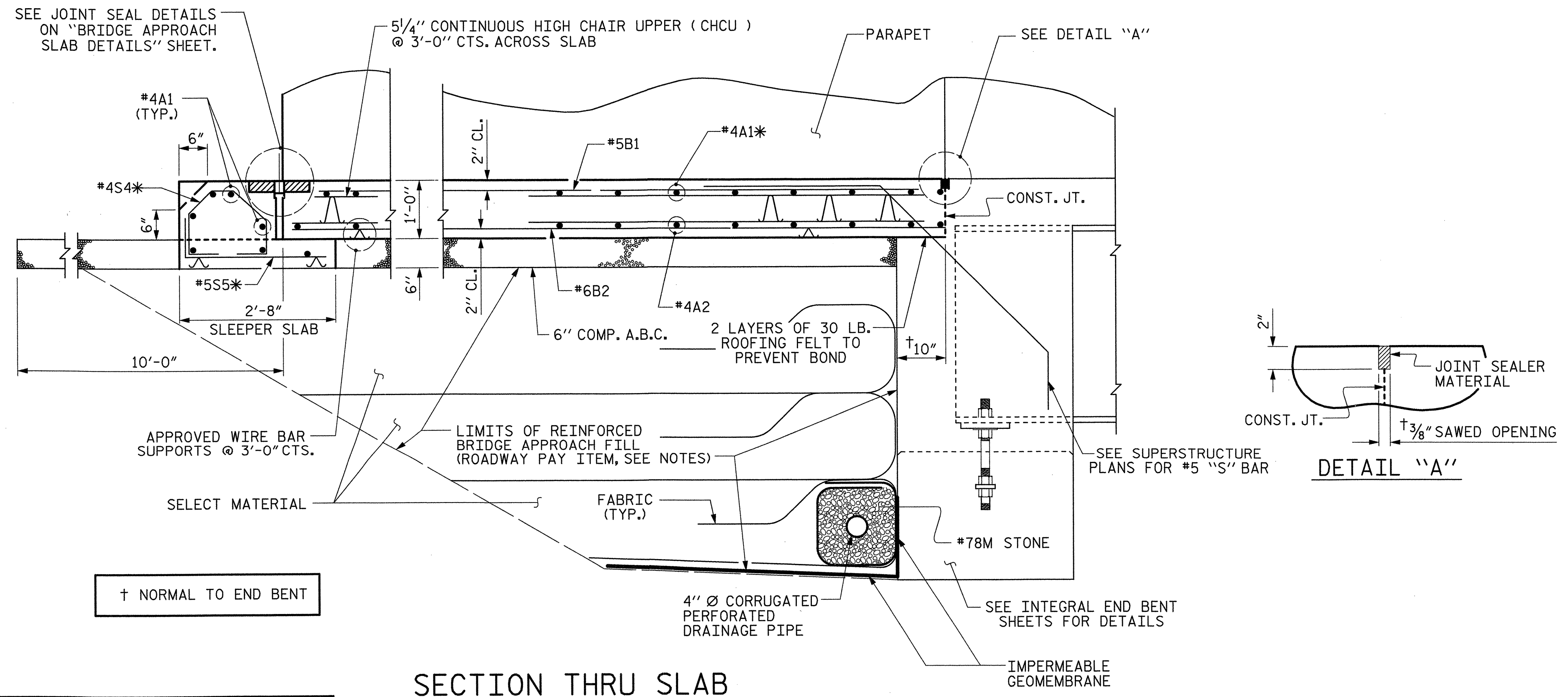
APPROACH SLAB AT EB #2						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	160	#4	STR	25'-6"	2725	
A2	130	#4	STR	25'-4"	2200	
* B1	229	#5	STR	24'-1"	5752	
B2	229	#6	STR	24'-7"	8456	
* B3	14	#4	STR	24'-7"	230	
* D1	64	#4	STR	8"	29	
* G1	44	#4	STR	6'-11"	203	
* G2	4	#4	STR	7'-2"	19	
* M2	17	#4	STR	7"	7	
* M5	2	#4	STR	24'-7"	33	
* S4	237	#4	1	4'-1"	646	
* S5	237	#5	2	3'-0"	742	
REINFORCING STEEL					LBS.	10386
* EPOXY COATED REINFORCING STEEL					LBS.	10656
CLASS AA CONCRETE						
APPROACH SLAB					C. Y.	118.3
SIDEWALK					C. Y.	9.4
MEDIAN					C. Y.	0.6
TOTAL					C. Y.	128.3

WITH EVAZOTE JOINT SEAL

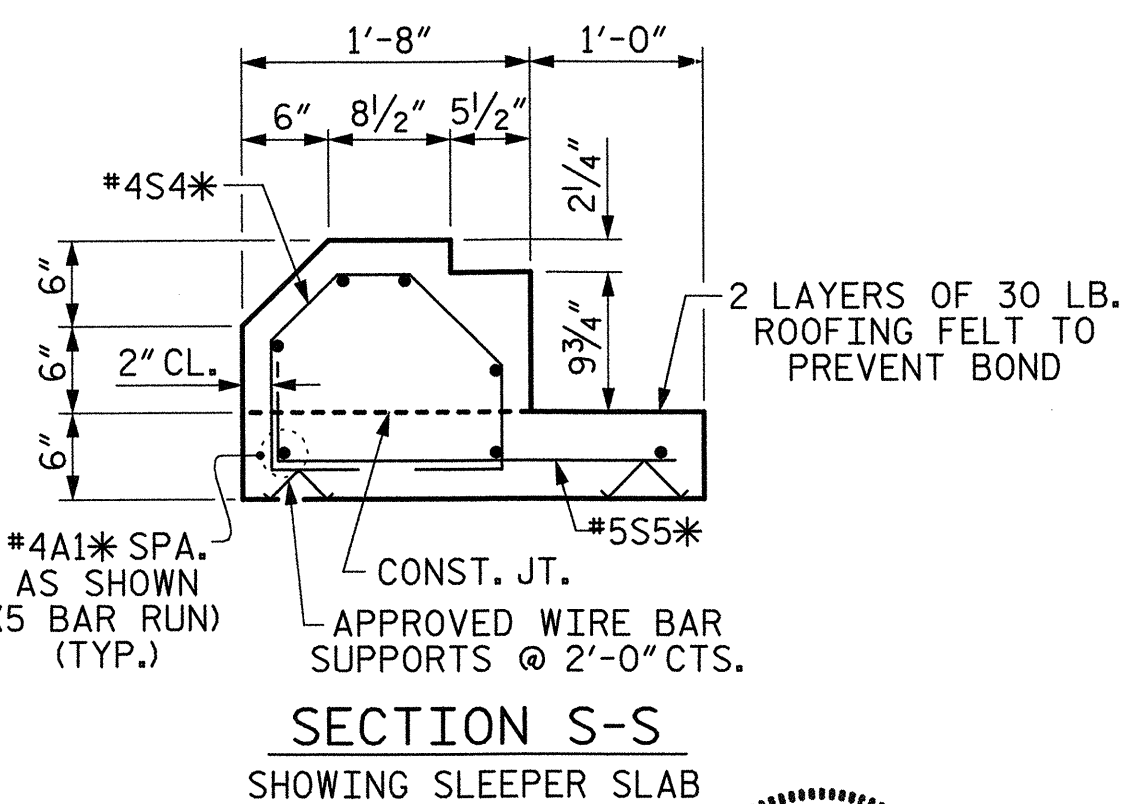
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

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

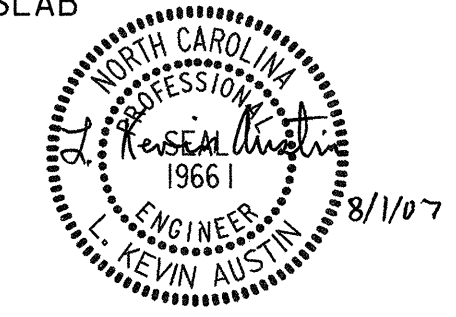
FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.



SECTION THRU SLAB



SECTION S-S SHOWING SLEEPER SLAB



PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 3

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

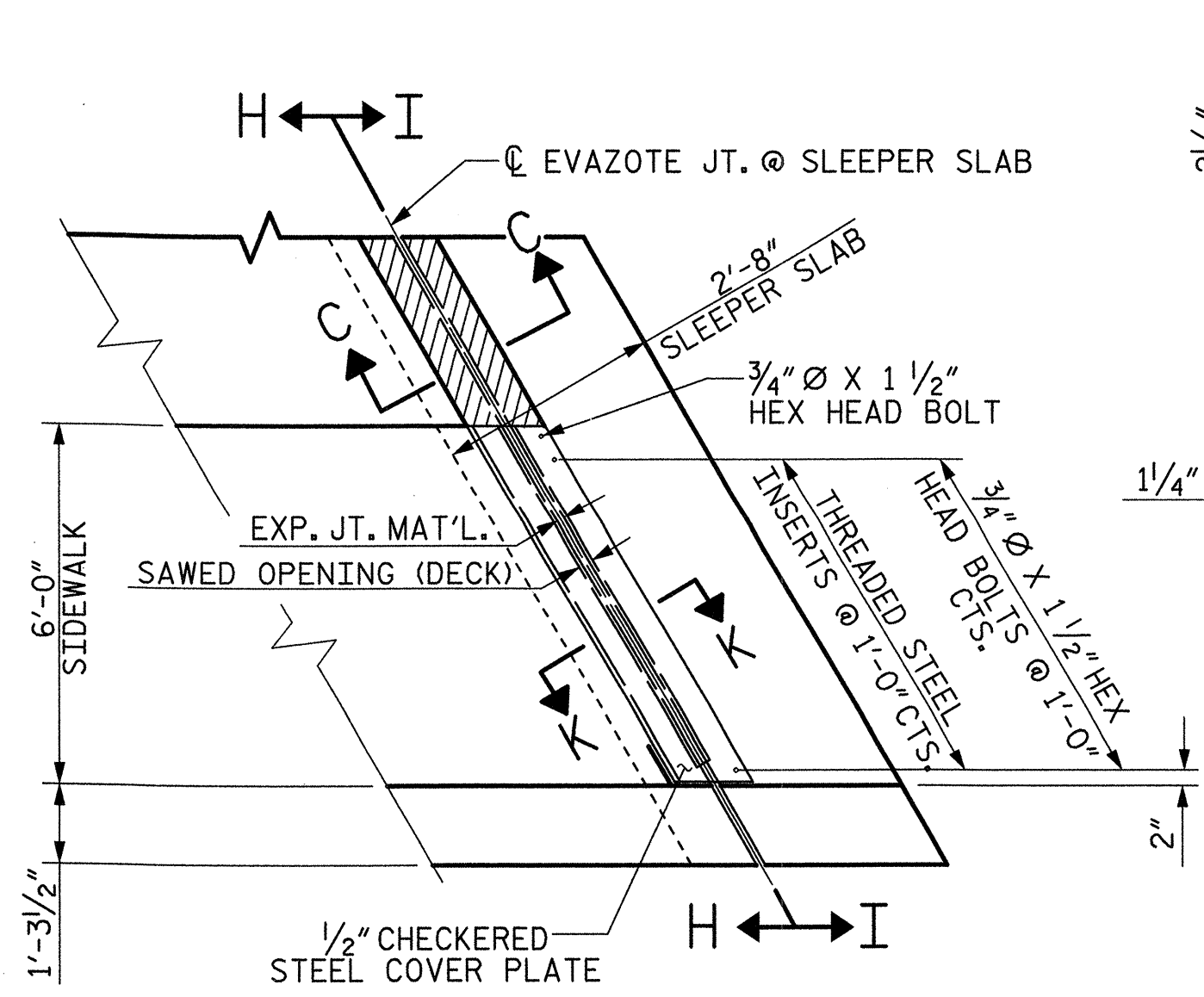
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

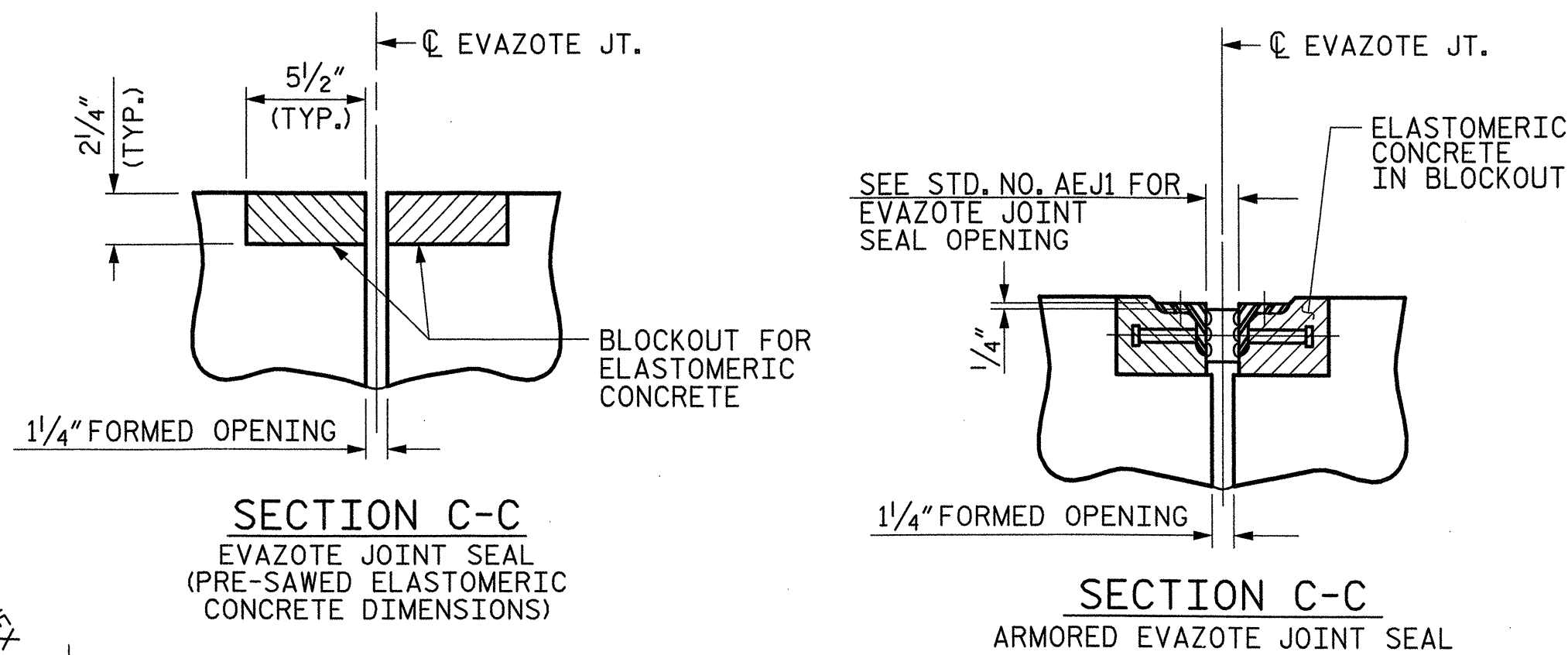
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1	4

DRAWN BY: W.B. ALLEN DATE: 4/07  
 CHECKED BY: M.A. AVERETTE DATE: 4/07

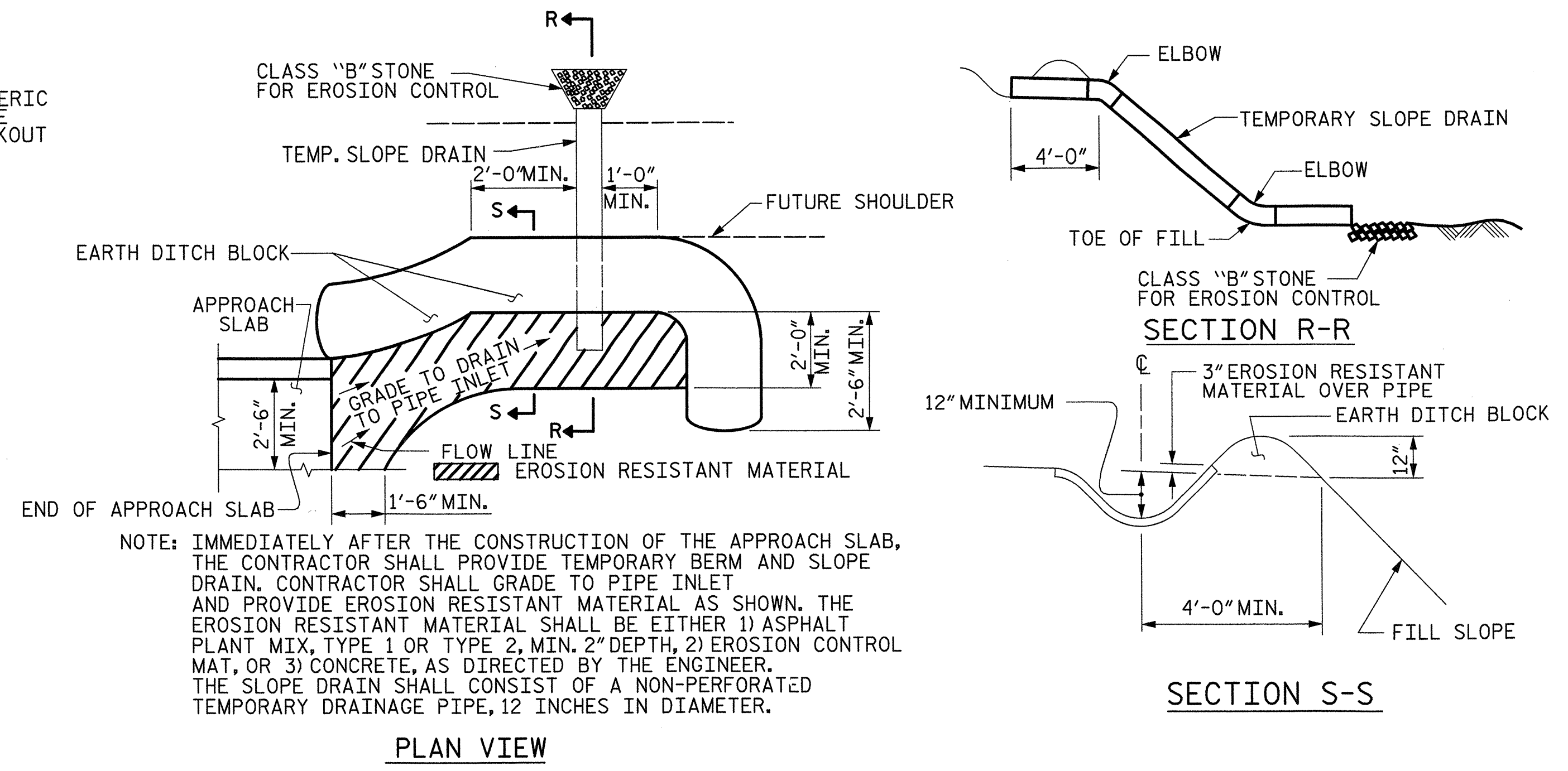
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PLAN VIEW OF EVAZOTE JOINT SEAL @ SLEEPER SLAB FOR SIDEWALK

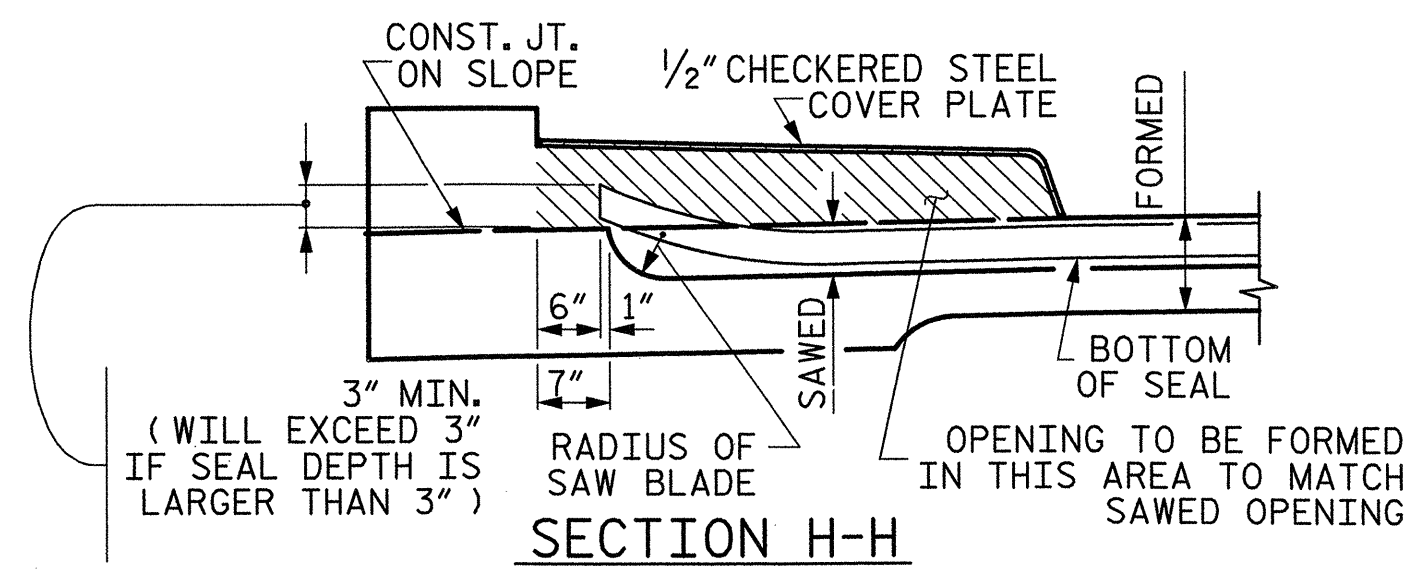


SECTION C-C EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)  
SECTION C-C ARMORED EVAZOTE JOINT SEAL

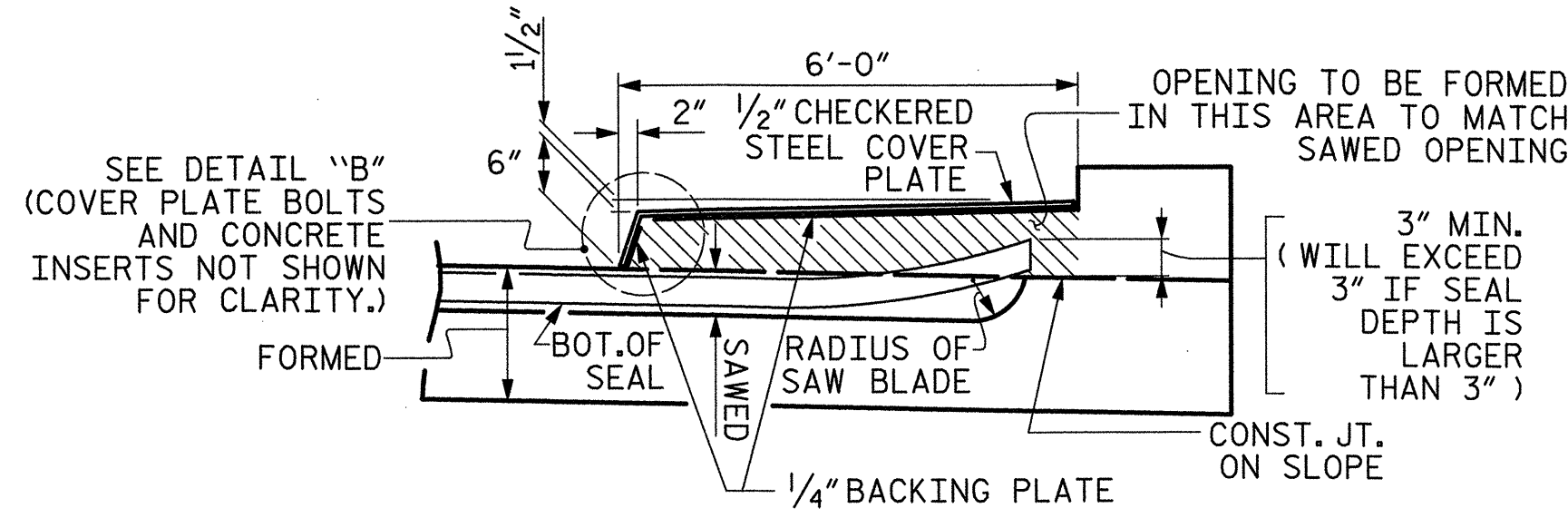


TEMPORARY BERM AND SLOPE DRAIN DETAILS

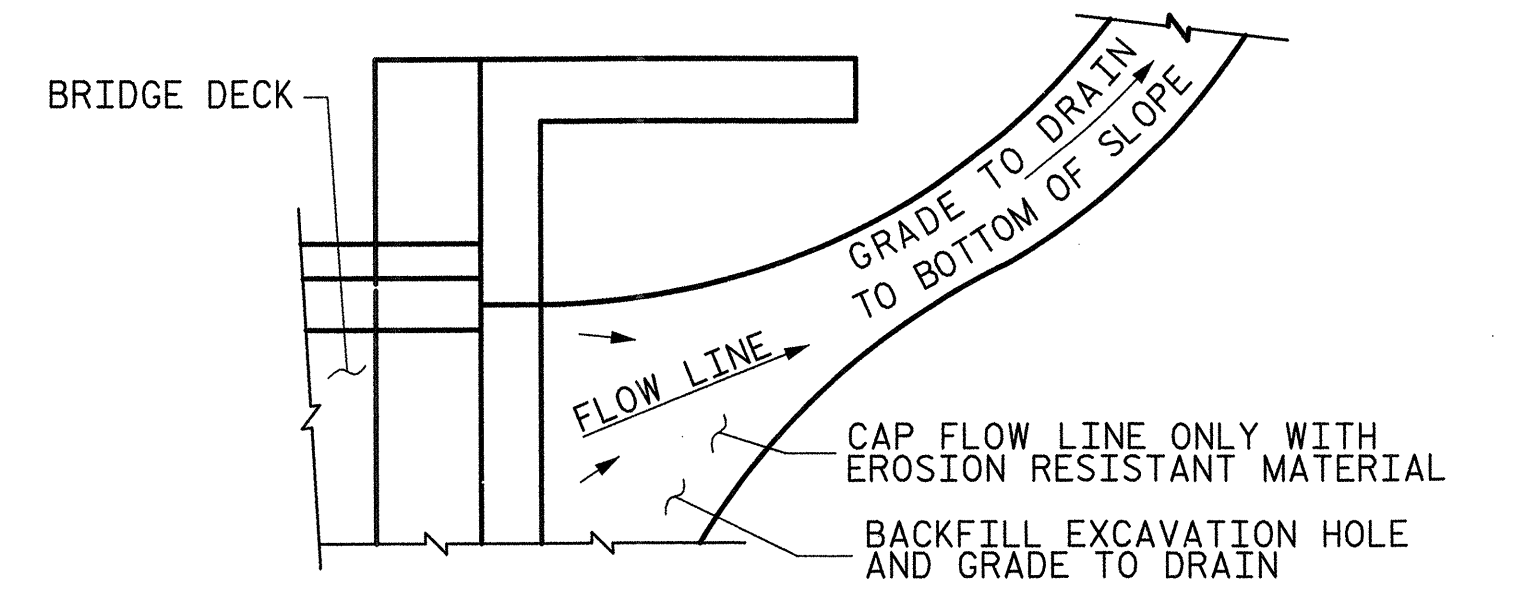
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION H-H

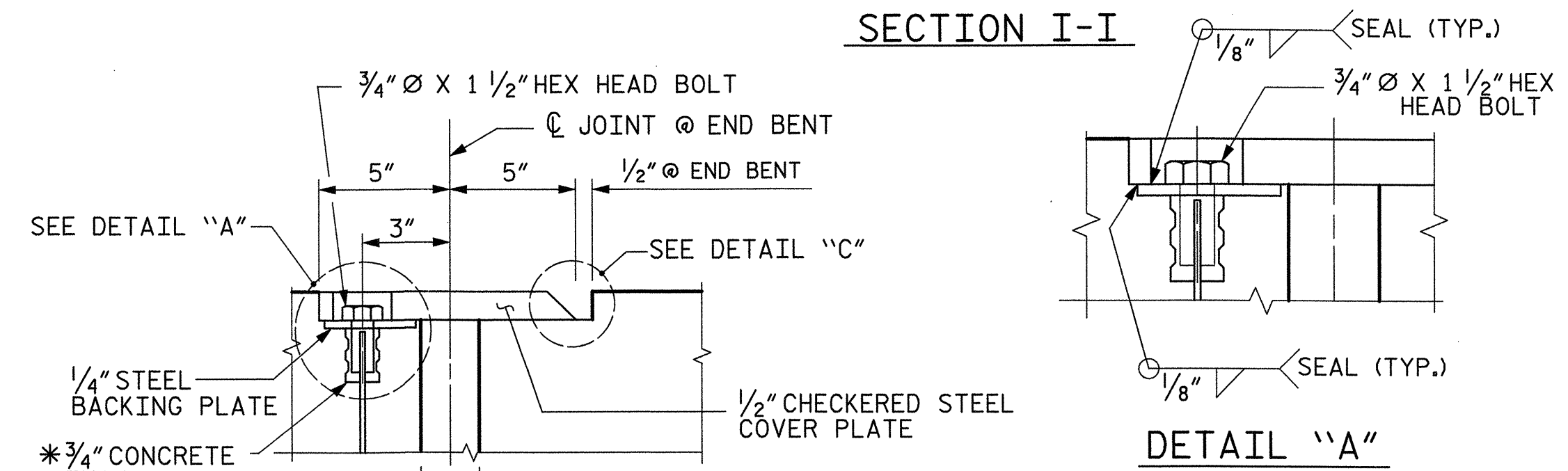


SECTION I-I



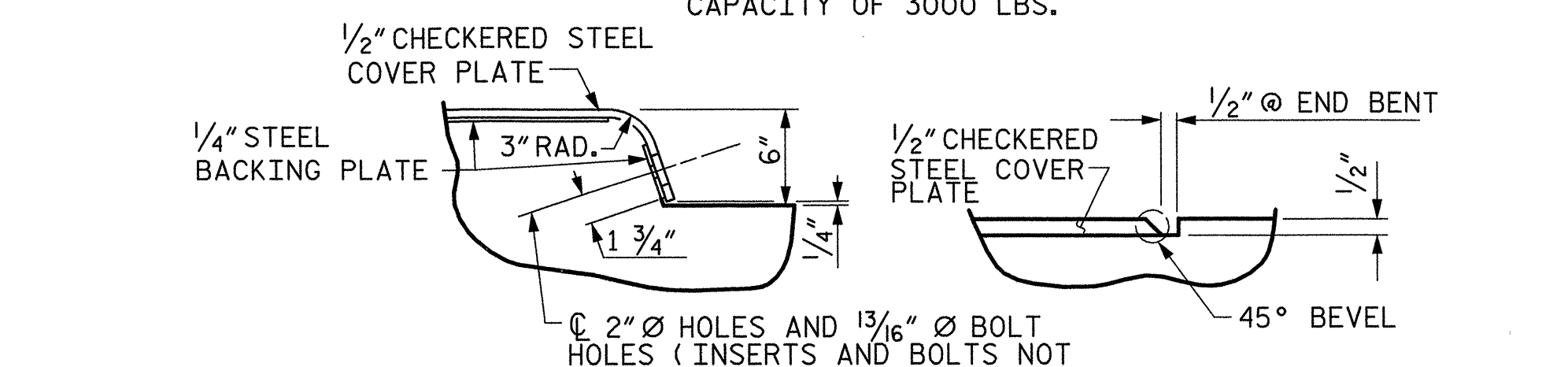
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



DETAIL "A"

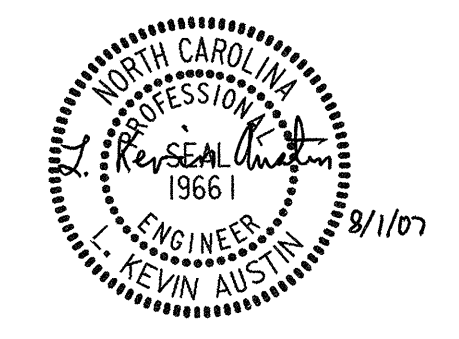
\*THE 3/4" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.



DETAIL "B" DETAIL "C" JOINT SEAL DETAILS @ SLEEPER SLAB

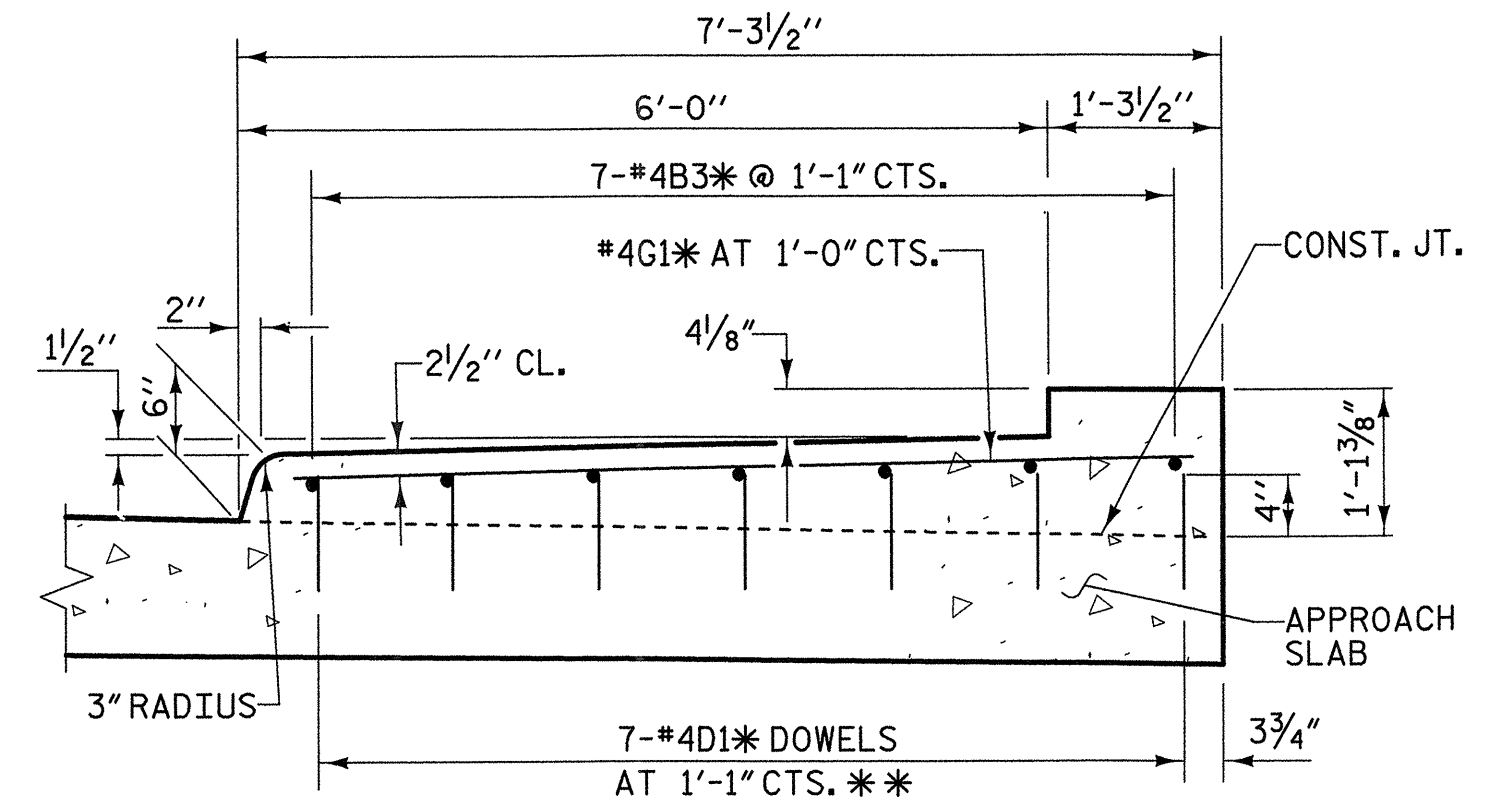
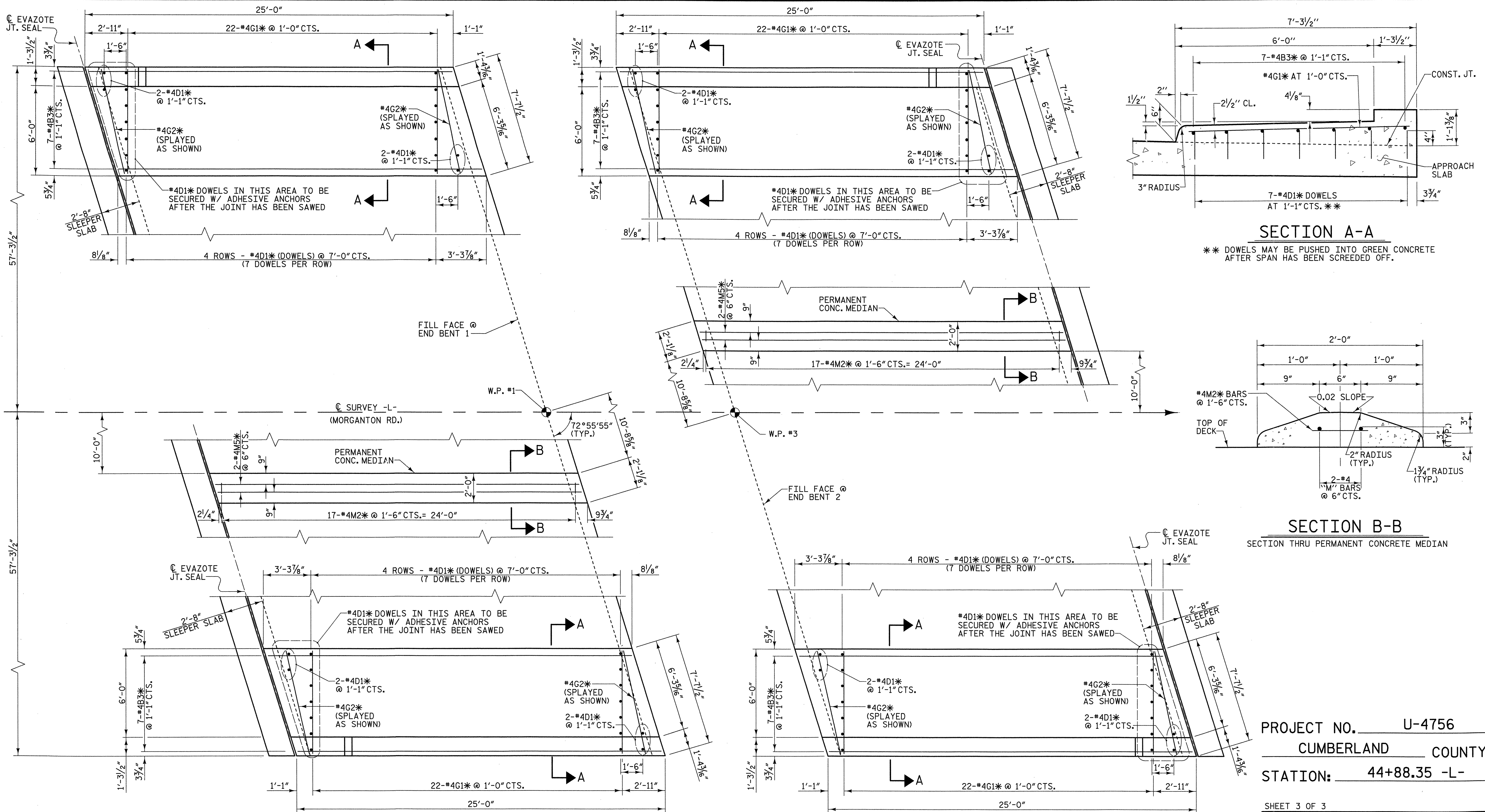
ASSEMBLED BY : W. B. ALLEN	DATE : 4/07
CHECKED BY : M. A. AVERETTE	DATE : 4/07
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

PLANS PREPARED BY:  
**MULKEY**  
ENGINEERS & CONSULTANTS  
P.O. BOX 38127  
RALEIGH, N.C. 27636  
(919) 851-1912  
(919) 851-1918 (FAX)  
WWW.MULKEYINC.COM



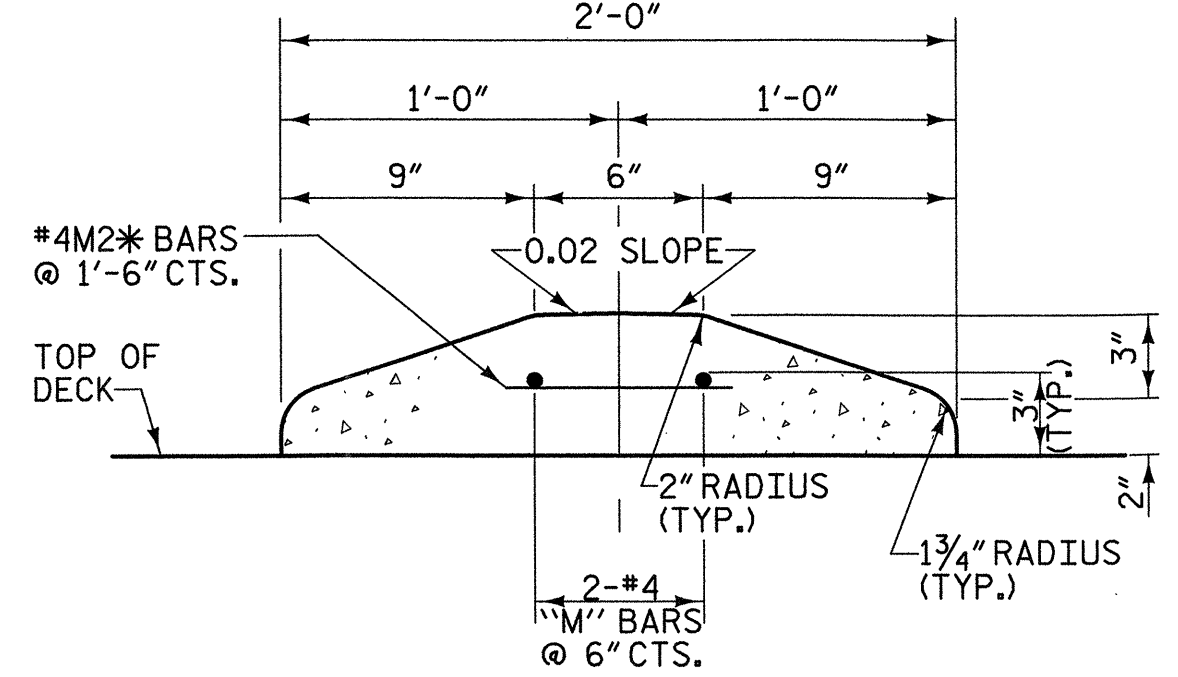
PROJECT NO. U-4756  
CUMBERLAND COUNTY  
STATION: 44+88.35 -L-  
SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					1988
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-35					TOTAL SHEETS



**SECTION A-A**

\* #4D1\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREENED OFF.



**SECTION B-B**

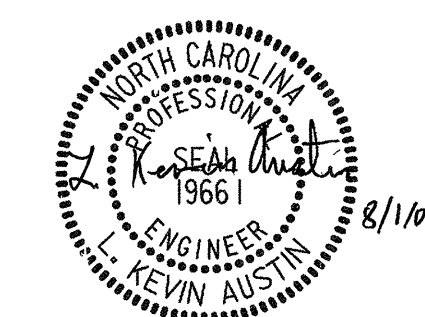
SECTION THRU PERMANENT CONCRETE MEDIAN

**PLAN OF SIDEWALK & PERMANENT CONCRETE MEDIAN ON APPROACH SLABS**

\* INDICATES EPOXY COATED REINFORCING STEEL

PROJECT NO. **U-4756**  
**CUMBERLAND** COUNTY  
 STATION: **44+88.35 -L-**

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 BRIDGE APPROACH SLAB  
 SIDEWALK &  
 CONCRETE MEDIAN  
 PLAN AND DETAILS**

REVISIONS						SHEET NO. S-36
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

DRAWN BY: **W.B. ALLEN** DATE: **3/07**  
 CHECKED BY: **M. A. AVERETTE** DATE: **4/07**

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NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED. THE 1/2" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

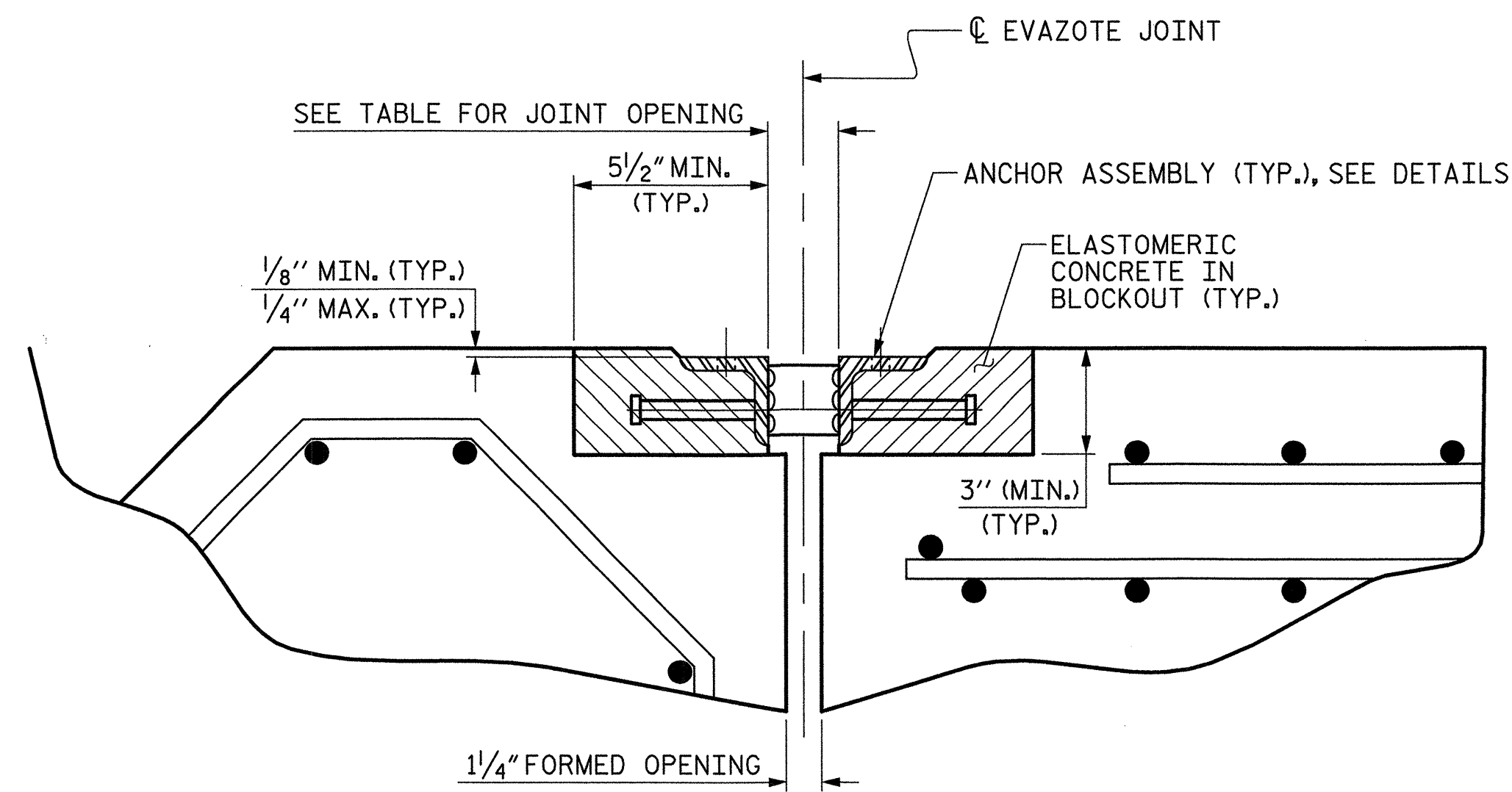
ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GRIND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

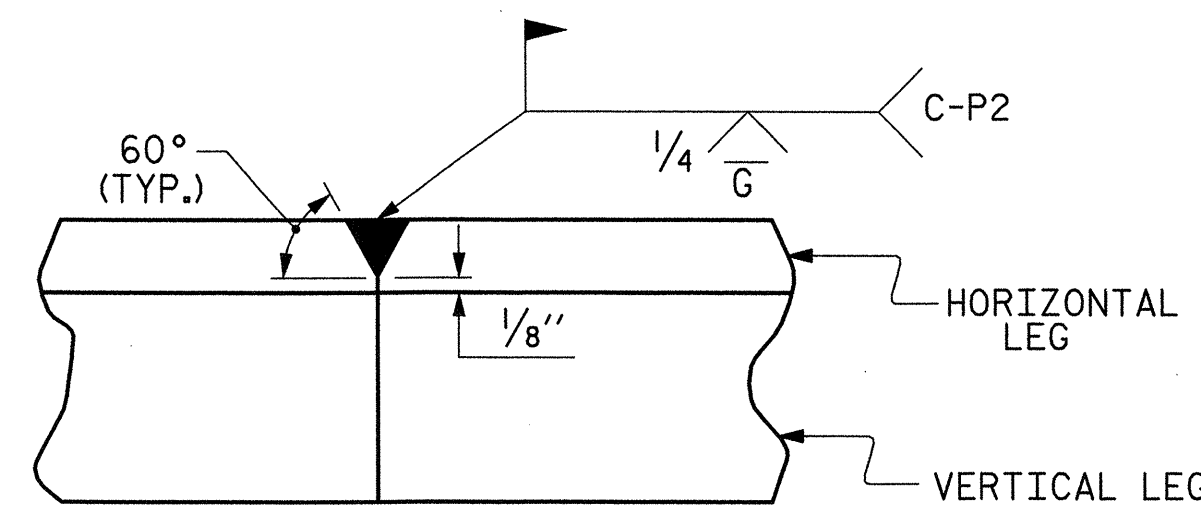
SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.

SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.



ARMORED JOINT DETAILS

SECTION NORMAL TO JOINT AT BENT



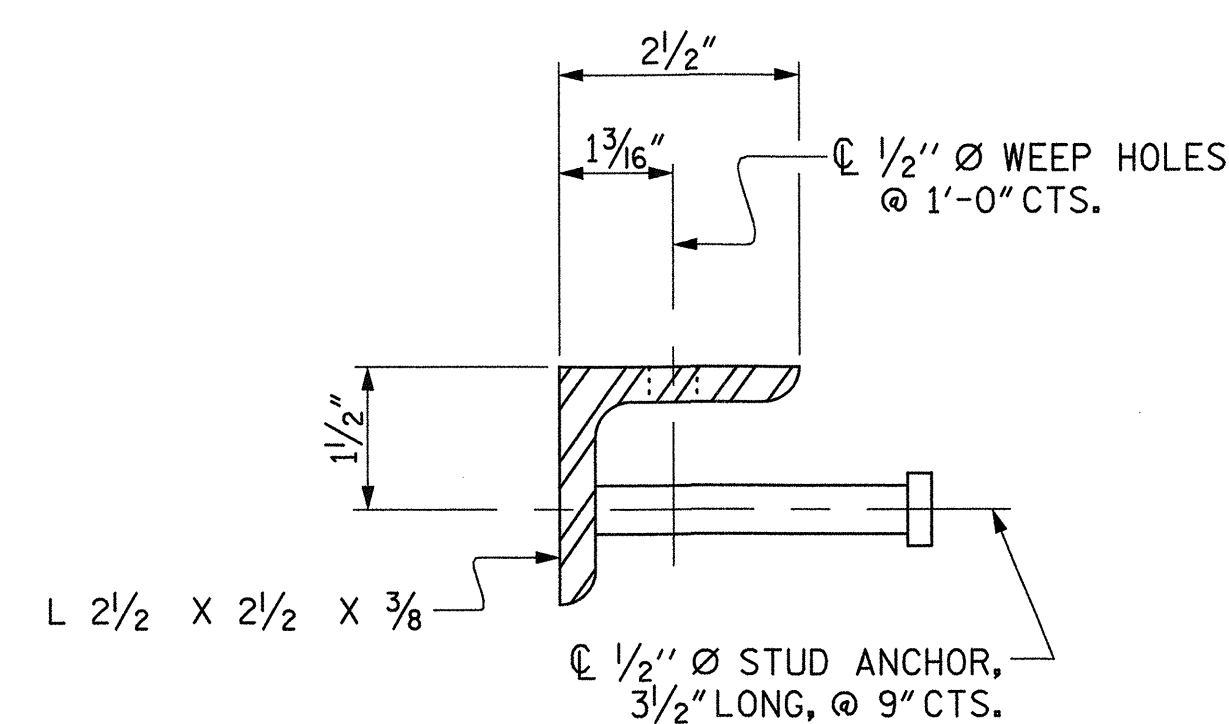
DETAIL- FIELD WELD SPLICE OF ANGLE

MOVEMENT AND SETTING AT EVAZOTE JOINT						
APPROACH SLAB @ END BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	72°55'55"	2 <sup>3</sup> / <sub>16</sub> "	1 <sup>7</sup> / <sub>16</sub> "	2 <sup>5</sup> / <sub>16</sub> "	2 <sup>7</sup> / <sub>8</sub> "	1 <sup>11</sup> / <sub>16</sub> "
2	72°55'55"	2 <sup>3</sup> / <sub>16</sub> "	1 <sup>7</sup> / <sub>16</sub> "	2 <sup>5</sup> / <sub>16</sub> "	2 <sup>7</sup> / <sub>8</sub> "	1 <sup>11</sup> / <sub>16</sub> "

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY. JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL		
APPROACH SLAB @ END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)
1	18.0	209'-2 <sup>5</sup> / <sub>8</sub> "
2	18.0	209'-2 <sup>5</sup> / <sub>8</sub> "

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION VIEW OF STUD

ARMORED JOINT ANCHOR ASSEMBLY DETAILS

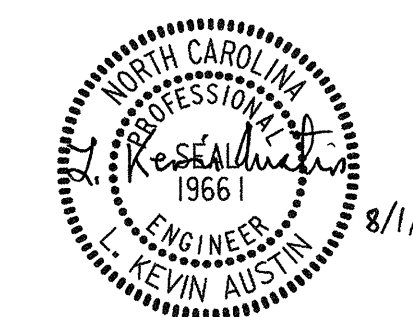
PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 1 OF 1

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 ARMORED EVAZOTE  
 JOINT DETAILS

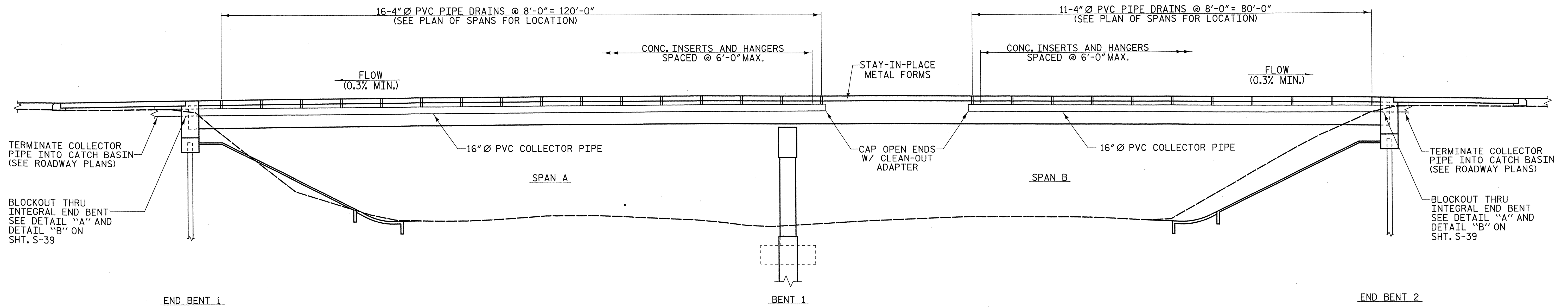
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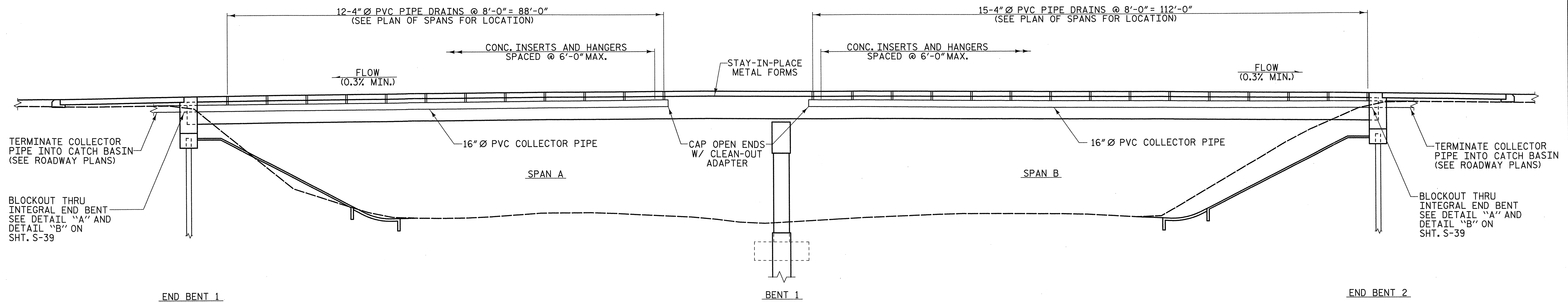
ASSEMBLED BY : W. B. ALLEN	DATE : 4/07
CHECKED BY : M. A. AVERETTE	DATE : 4/07
DRAWN BY : EEM 1/96	REV. 7/10/01 LES/RDR
CHECKED BY : RCW 1/96	REV. 5/7/03RR RWW/JTE
	REV. 5/1/06 TLA/GM

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NO.	BY:	DATE:	NO.	BY:	DATE:	
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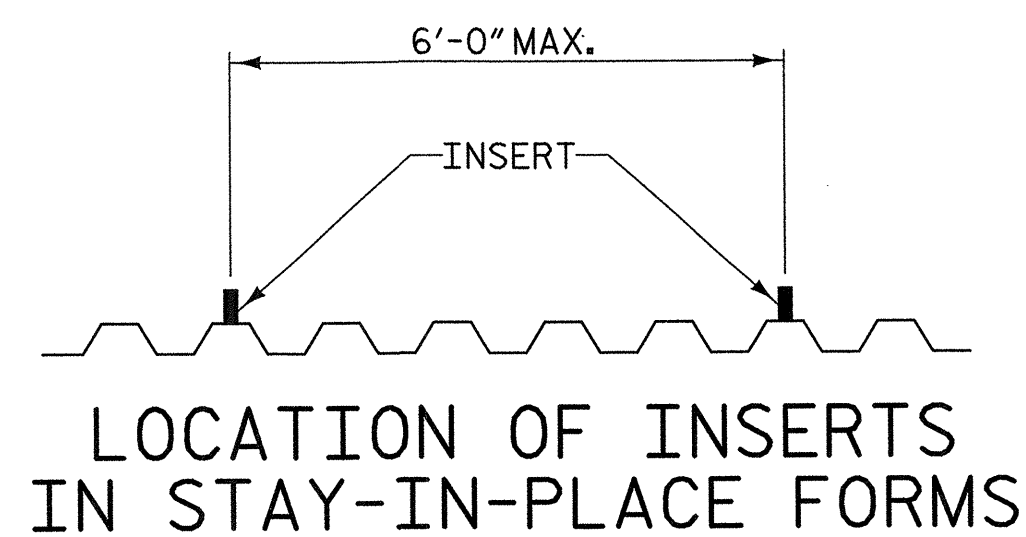
STD. NO. AEJ1



LEFT SIDE



RIGHT SIDE  
ELEVATION



PROJECT NO. U-4756  
CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-  
23+75.44 -Y5-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CLOSED  
 STRUCTURE DRAINAGE  
 SYSTEM**

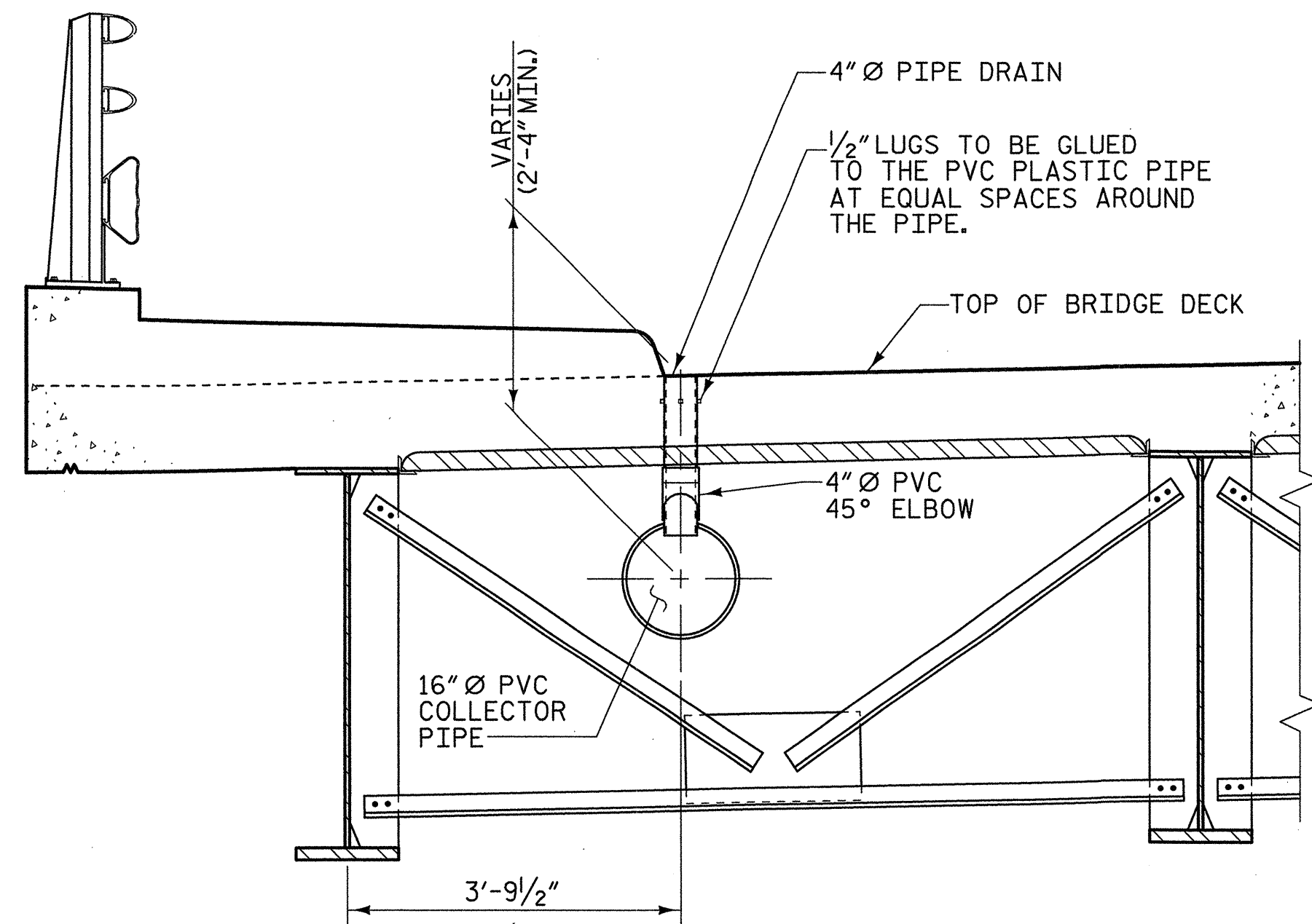


PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
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 RALEIGH, N.C. 27636  
 (919) 851-1918 (FAX)  
 WWW.MULKEYINC.COM

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38	
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2			4				

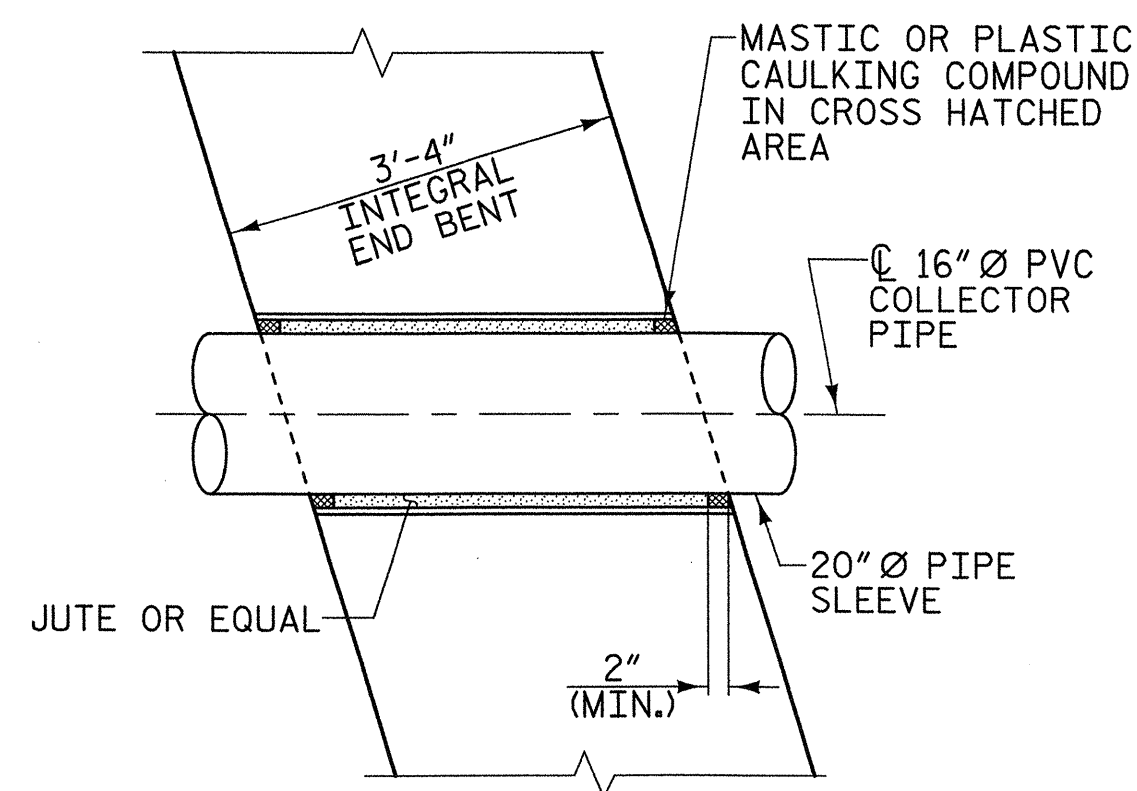
DRAWN BY : W. B. ALLEN DATE : 6/07  
 CHECKED BY : M. A. AVERETTE DATE : 6/07

8/1/2007 5:29:53 AM R:\S\Structures\U4756-SB-05.dwg



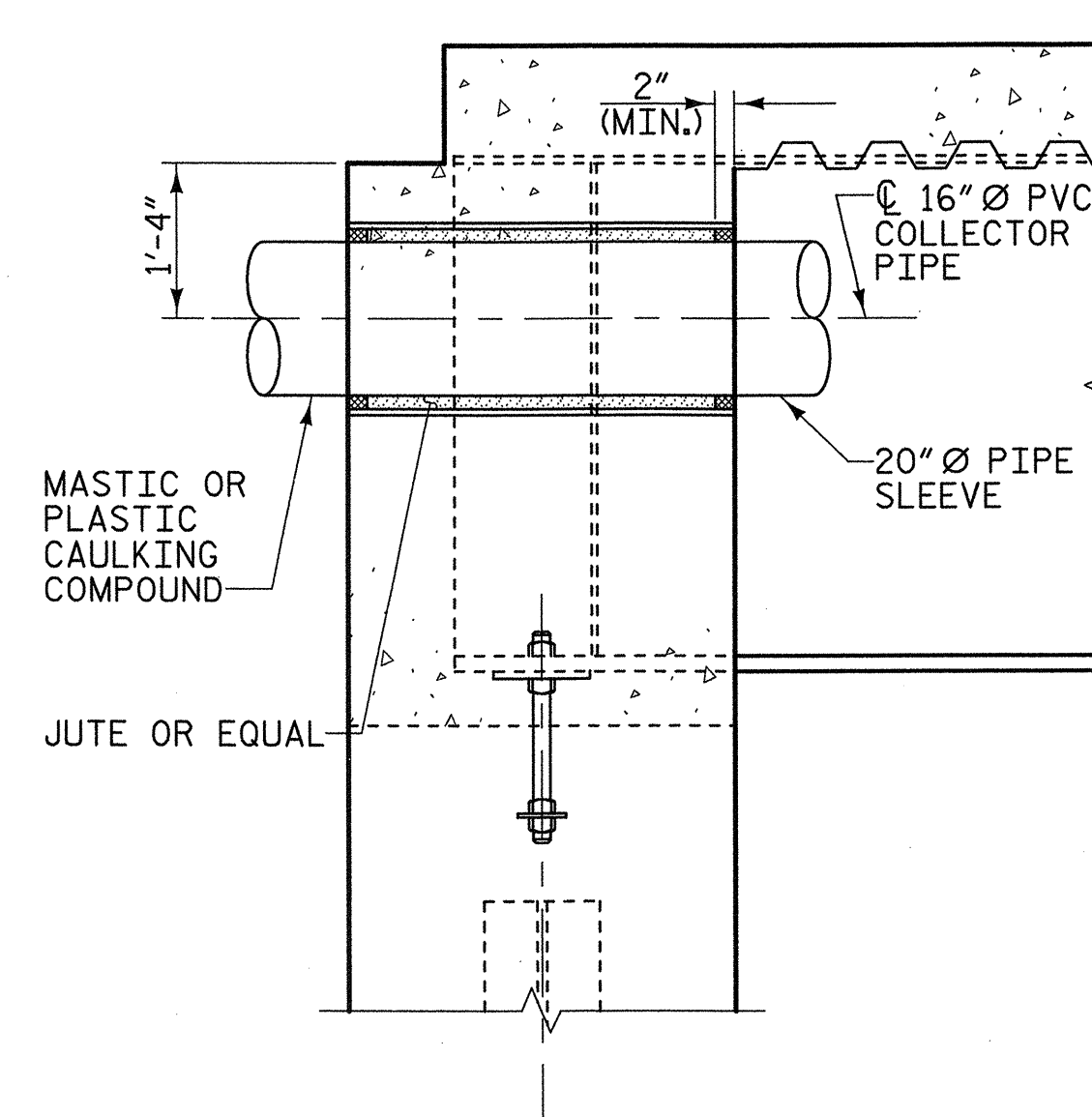
**PART SECTION @ PIPE DRAIN**

(LOOKING UPSTATION-LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)



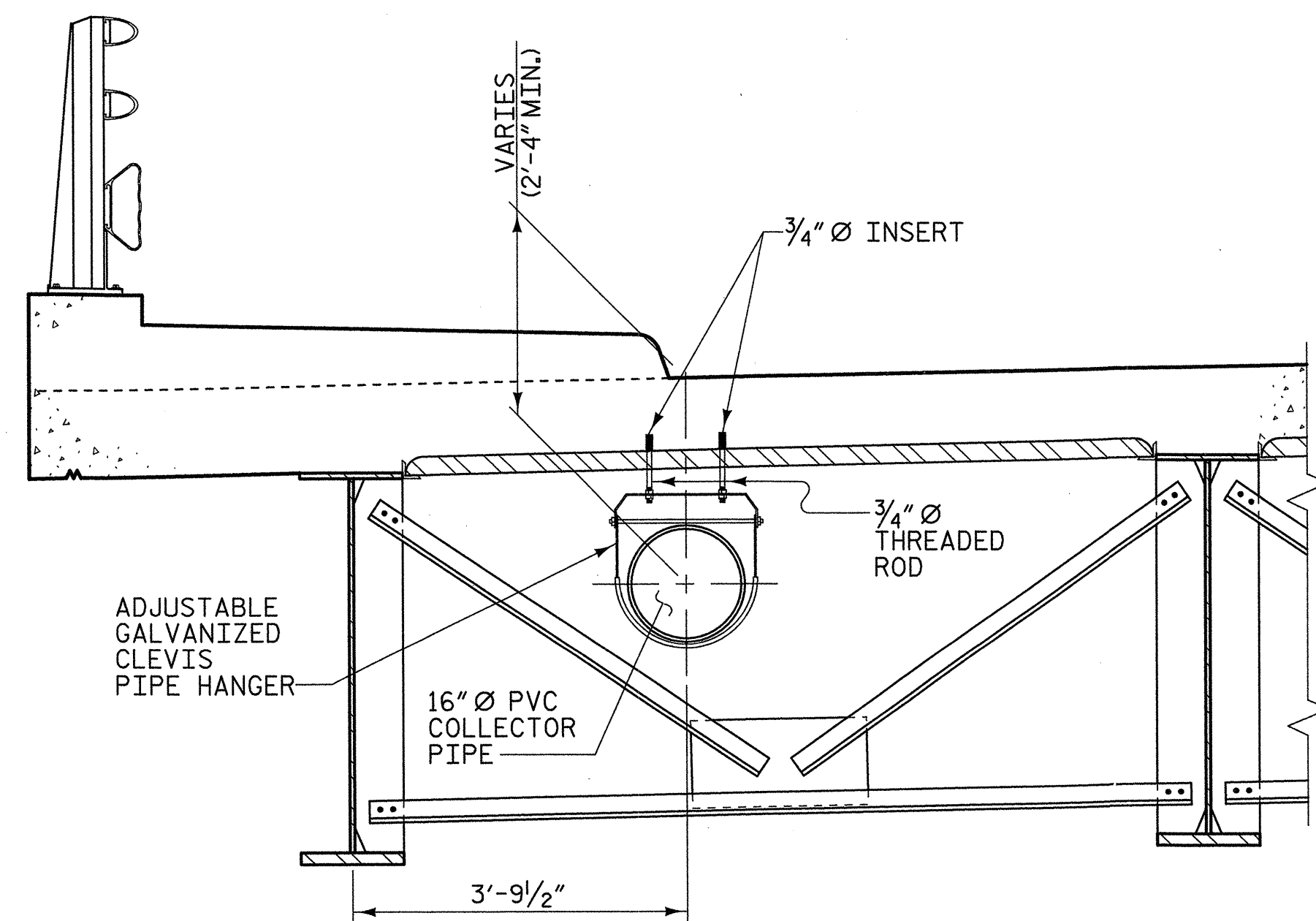
**DETAIL "A"**

@ END BENTS



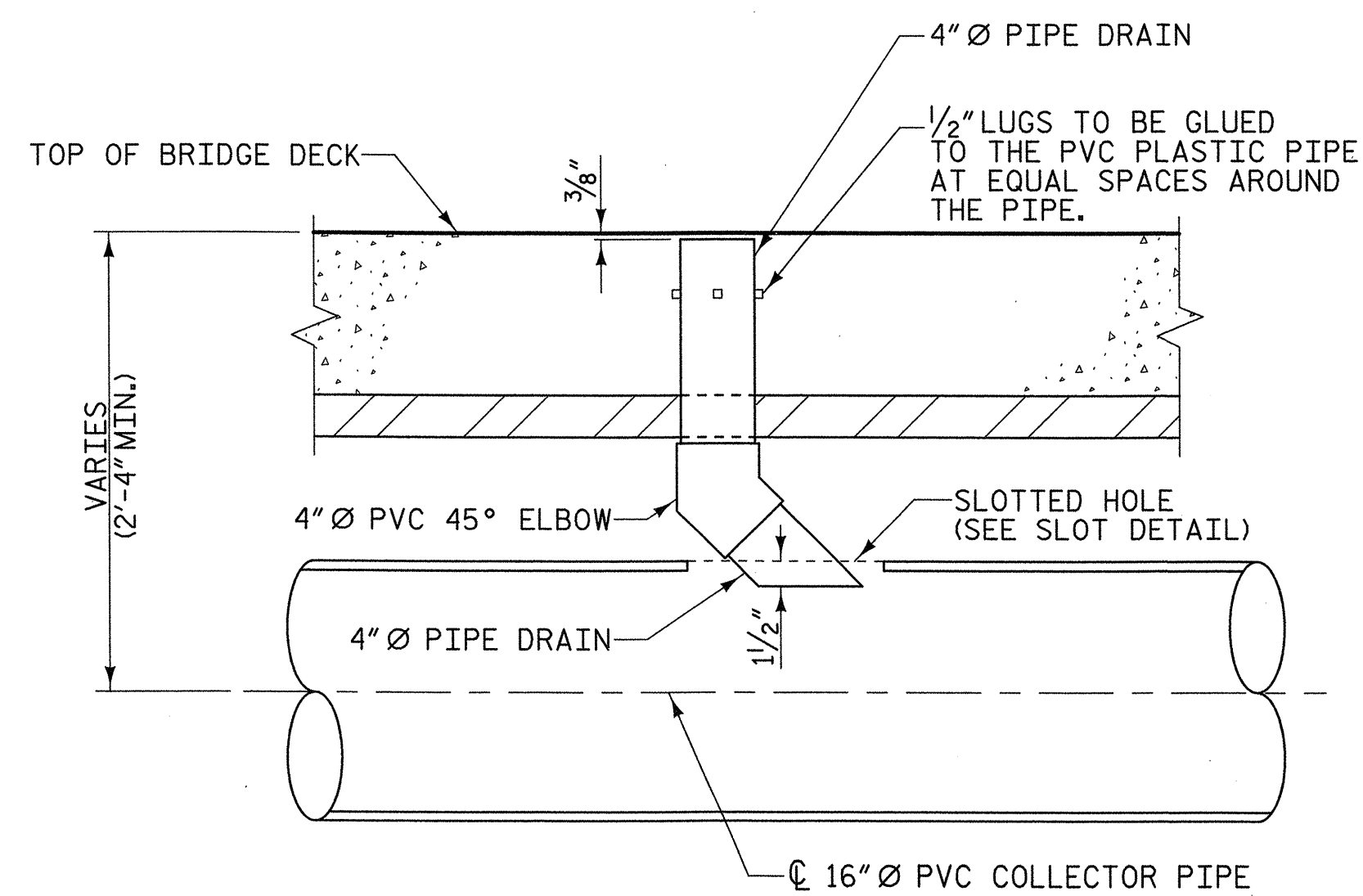
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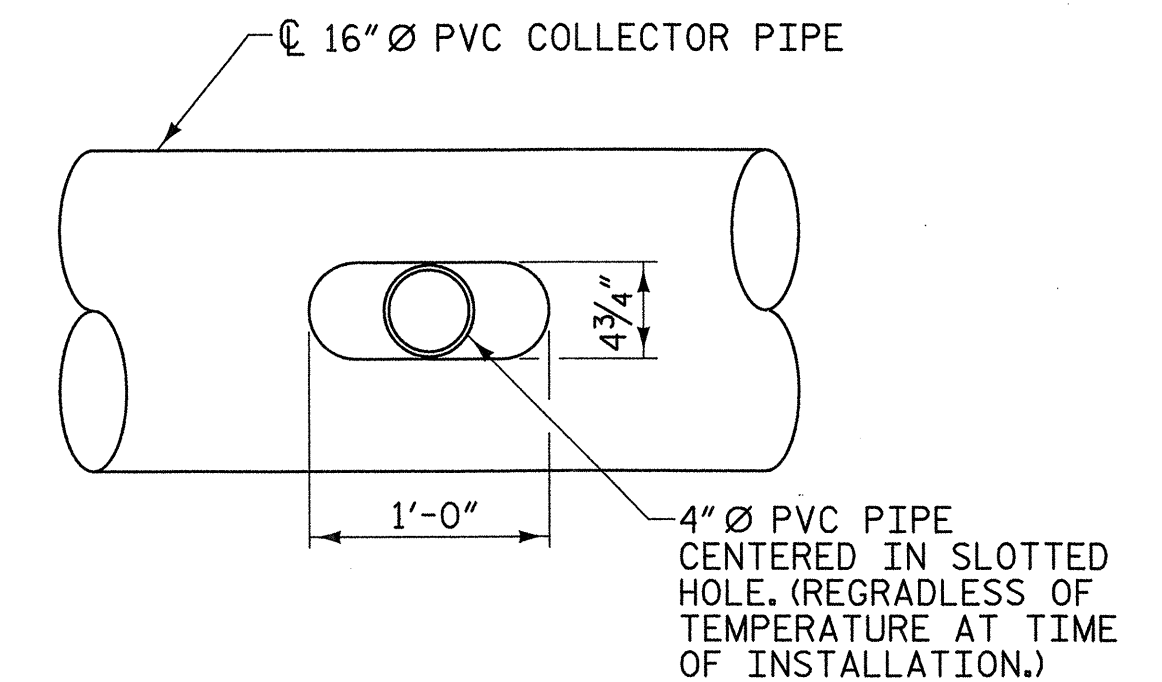


**PART SECTION SHOWING PIPE HANGER**

(LOOKING UPSTATION-LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)



**PIPE DRAIN & PVC COLLECTOR PIPE CONNECTION**



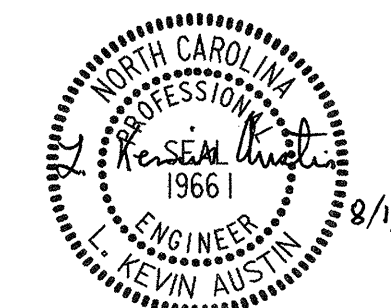
**SLOT DETAIL**

**NOTES:**

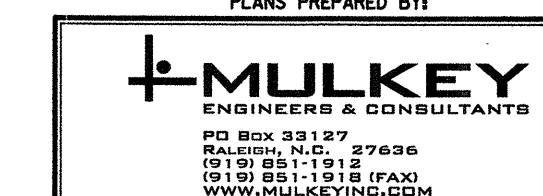
1. ALL STRUCTURAL STEEL SHALL BE AASHTO GRADE 345.
2. ALL FABRICATION SHALL CONFORM TO THE APPLICABLE SECTION OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
3. THE ENTIRE COST FOR THE LABOR AND MATERIALS NECESSARY TO FABRICATE AND INSTALL PIPE SUPPORT AND PIPE ANCHOR ASSEMBLIES SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE "STRUCTURE DRAINAGE SYSTEM." SEE SPECIAL PROVISIONS FOR STRUCTURE DRAINAGE SYSTEM.
4. ALL STRUCTURAL MEMBERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER STANDARD SPECIFICATIONS AND SHALL BE PAINTED WITH A TOP COAT OF ACRYLIC PAINT 2 - 4 MILS (DFT) AS PER STANDARD SPECIFICATION 1080-13.
5. THE GALVANIZED SURFACE SHALL BE CLEANED TO (SSPC SP-1) PRIOR TO COATING.
6. PIPE HANGERS SHALL BE SPACED AT 6'-0" CENTERS (MAXIMUM), AND THEY SHALL NOT BE LOCATED MORE THAN 2'-0" FROM ANY COUPLING.
7. EACH PIPE SECTION SHALL HAVE A MINIMUM OF TWO PIPE HANGERS.
8. COLLECTOR PIPE SHALL BE SUPPORTED FROM THE CONCRETE DECK SLAB. NO ATTACHMENT TO THE GIRDERS WILL BE PERMITTED.
9. ALL HARDWARE SHALL BE GALVANIZED.
10. DRAINS, COLLECTOR PIPE AND FITTINGS SHALL BE SCHEDULE 40 PVC AND CONFORM TO ASTM D1785.
11. FOR LAYOUT OF 4" Ø PVC PIPE DRAINS. SEE "PLAN OF SPANS" SHEETS.
12. THE CONTRACTOR SHALL PROVIDE PVC COUPLINGS CAPABLE OF HANDLING THE ANTICIPATED MOVEMENTS.
13. FOR STRUCTURE DRAINAGE SYSTEM, SEE SPECIAL PROVISIONS.
14. DRAINAGE SYSTEM SUPPORT SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA AND SUBMITTED FOR APPROVAL PRIOR TO ORDERING MATERIALS.
15. TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

PROJECT NO. U-4756  
 CUMBERLAND COUNTY  
 STATION: 44+88.35 -L-

SHEET 2 OF 2



PLANS PREPARED BY:



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CLOSED  
 STRUCTURE DRAINAGE  
 SYSTEM**

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

DRAWN BY: W. B. ALLEN DATE: 6/07  
 CHECKED BY: M. A. AVERETTE DATE: 6/07

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## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

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

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

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

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

**ENGLISH**

JANUARY, 1990

STD. NO. SN