

TIP PROJECT: B-4112

CONTRACT: C201759

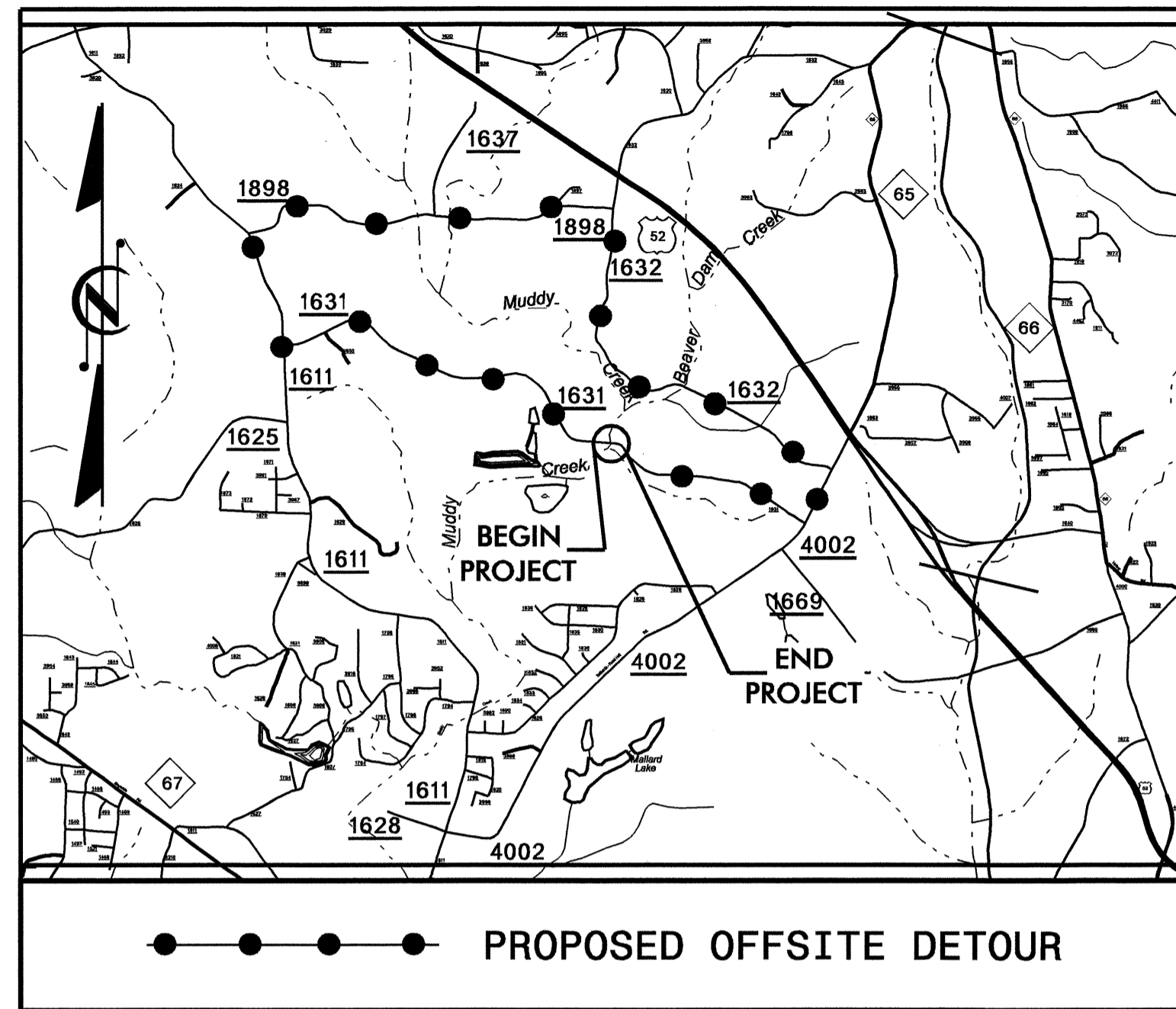
STRUCTURE

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**FORSYTH COUNTY**

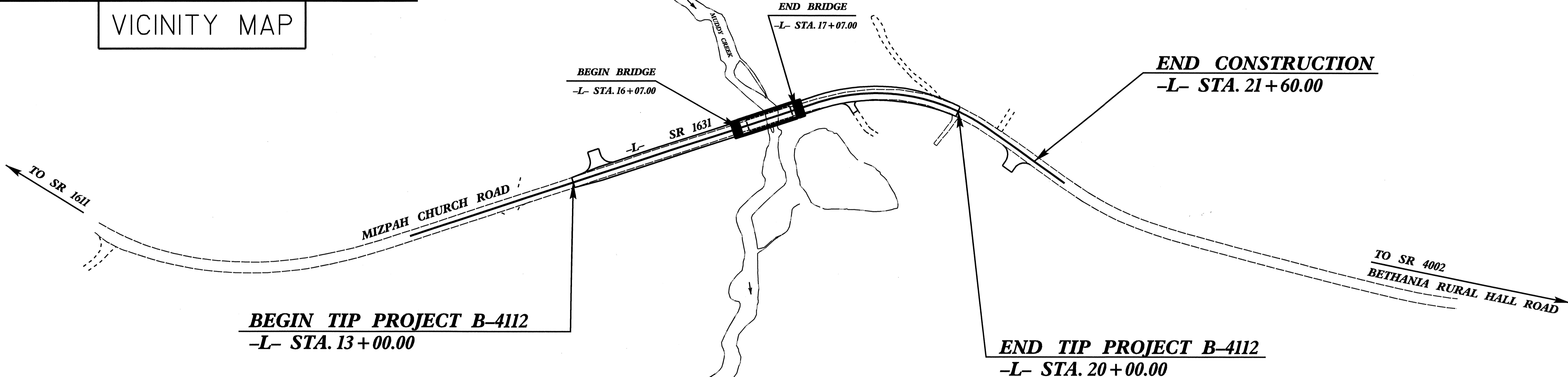
**LOCATION: BRIDGE NO. 30 OVER MUDDY CREEK ON SR 1631 (MIZPAH CHURCH ROAD)**

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



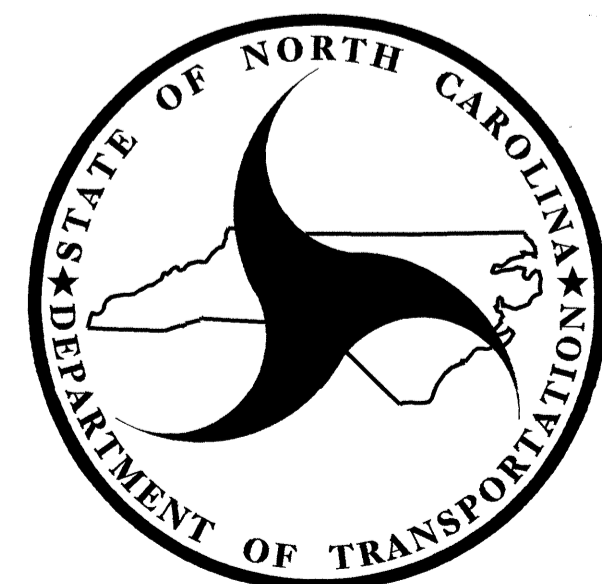
VICINITY MAP

PROPOSED OFFSITE DETOUR



\*\* DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVE RADIUS, HORIZONTAL SSD, SAG VERTICAL CURVE K FACTOR AND MINIMUM BRIDGE WIDTH

STATE	STATE PROJECT REFERENCE NO.	
N.C.	B-4112	
WBS PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33467.1.1	BRZ-1631(2)	P.E.
33467.2.1	BRZ-1631(2)	RW & UTIL
33467.3.1	BRZ-1631(2)	CONST.



**DESIGN DATA**  
(RURAL LOCAL)

ADT 2008 =	1635
ADT 2028 =	2535
DHV =	10 %
D =	65 %
T =	3 % *
** V =	50 MPH
* TTST 1% +	DUAL 2%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4112 =	0.114 MI
LENGTH STRUCTURE TIP PROJECT B-4112 =	0.019 MI
TOTAL LENGTH TIP PROJECT B-4112 =	0.133 MI

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2006 STANDARDS SPECIFICATION

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LETTING DATE:  
JANUARY 15, 2008

Prepared in the Office of:  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Drive Raleigh, N.C. 27610

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

T. J. BEACH, P. E.  
PROJECT DESIGN ENGINEER

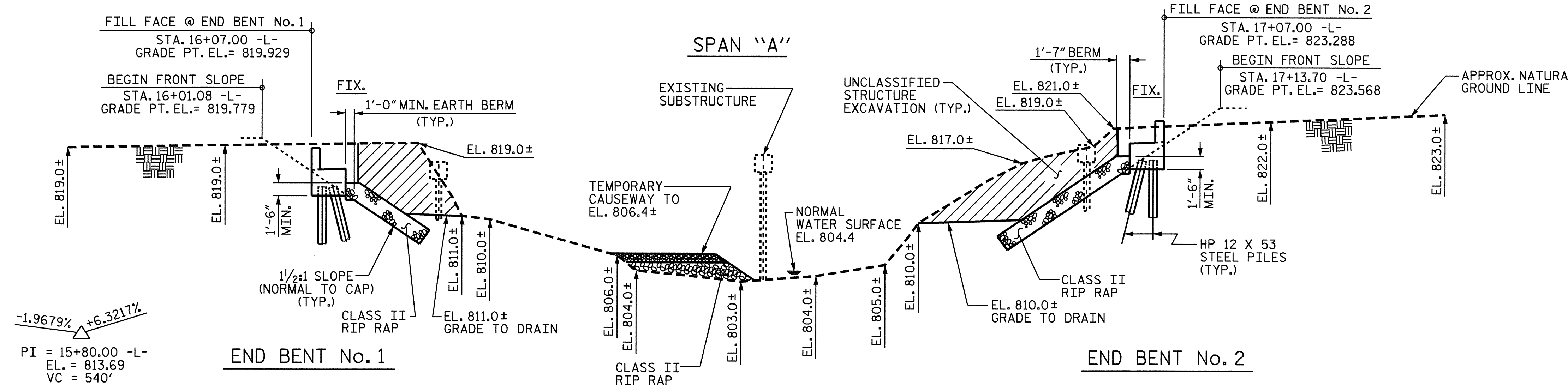
STRUCTURE DESIGN UNIT

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

P.E.  
STATE HIGHWAY ENGINEER - DESIGN  
DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

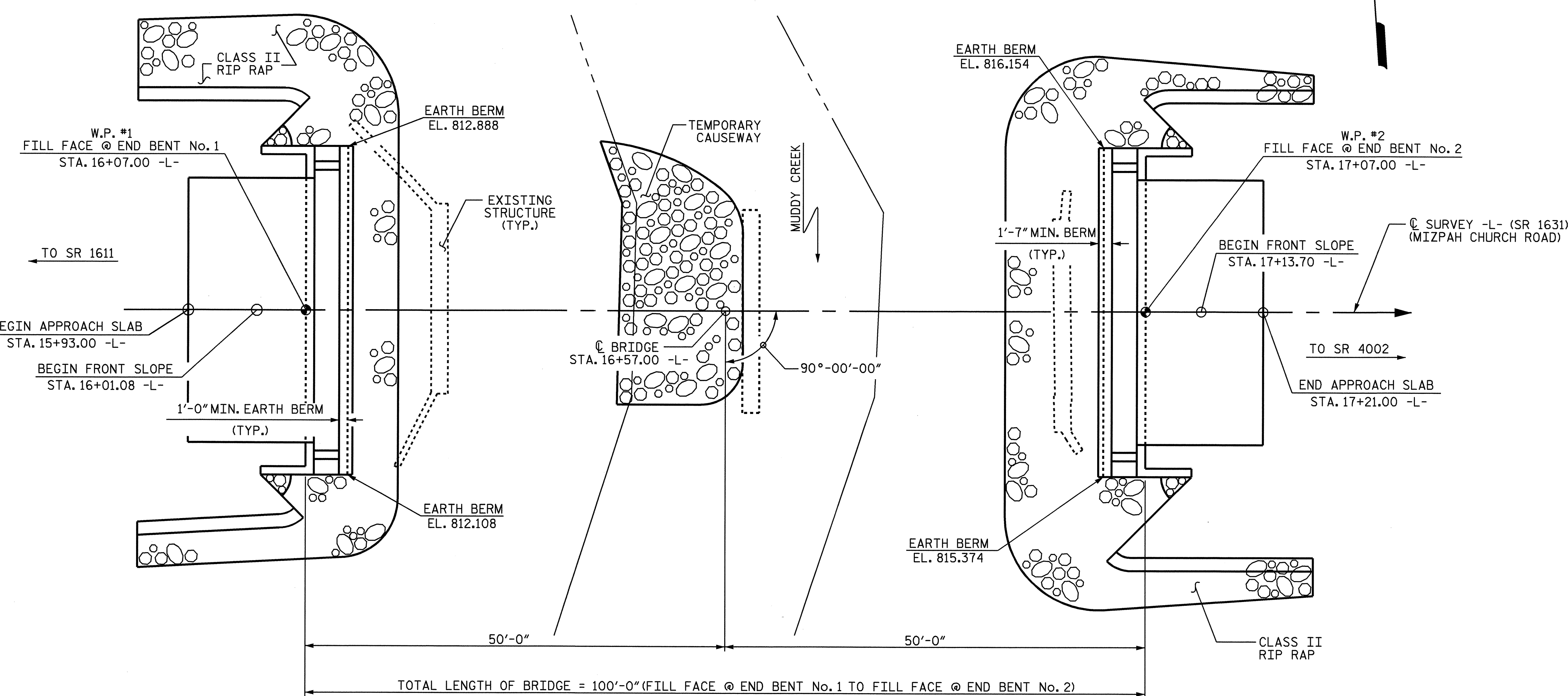
APPROVED FOR  
DIVISION ADMINISTRATOR

DATE



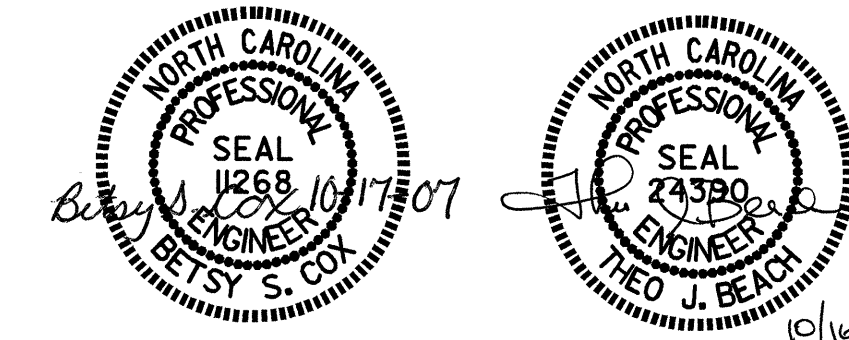
**HYDROGRAPHIC DATA**

DESIGN DISCHARGE-----	3170 CFS.
FREQUENCY OF DESIGN FLOOD-----	25 YR.
DESIGN HIGH WATER ELEVATION-----	815.5
BASIC DISCHARGE (Q100)-----	4790 CFS.
BASIC HIGH WATER ELEVATION-----	817.3
<b>OVERTOPPING FLOOD DATA</b>	
OVERTOPPING DISCHARGE-----	5850 CFS.
FREQUENCY OF OVERTOPPING FLOOD-----	200± YRS.
OVERTOPPING FLOOD ELEVATION-----	818.4



**PLAN**  
(FOR CLARITY, PILES NOT SHOWN IN PLAN VIEW)

DRAWN BY : T. BANKOVICH DATE : 9/07  
CHECKED BY : T. J. BEACH DATE : 10/07

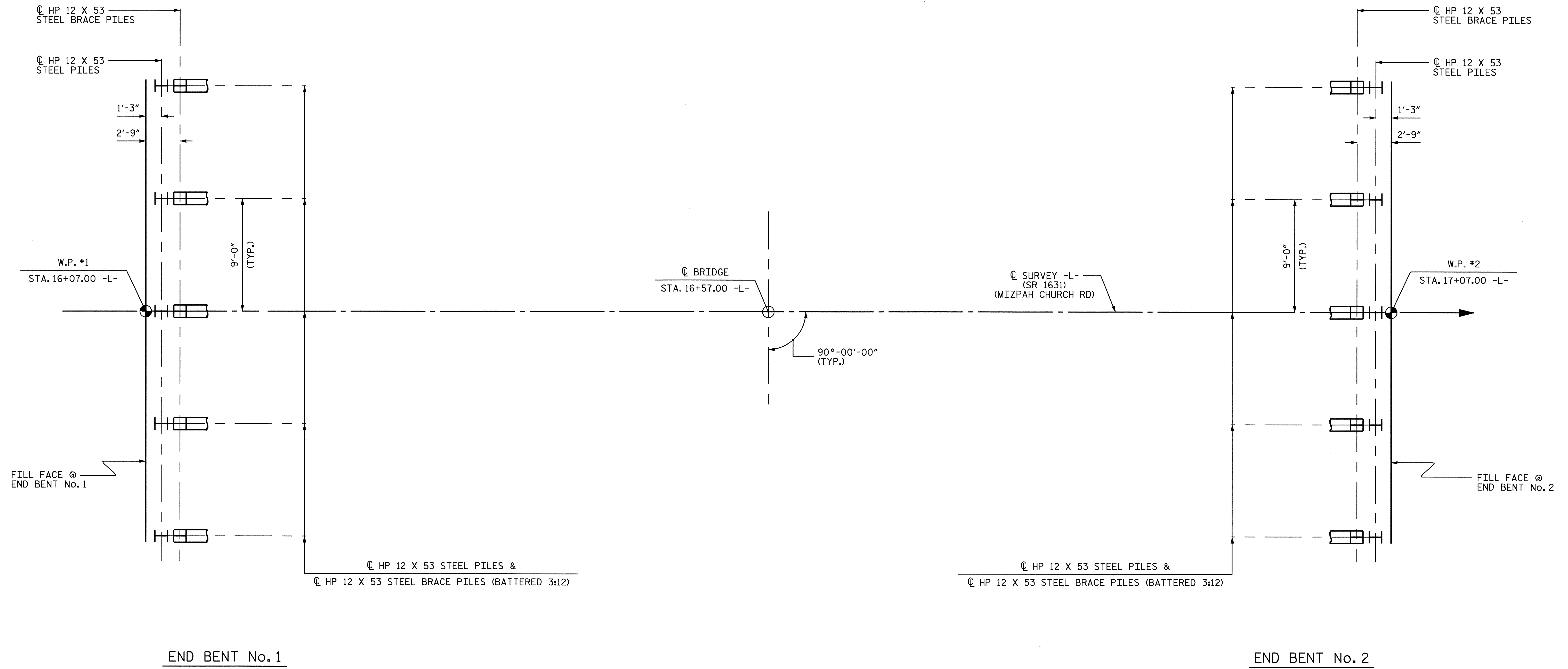


PROJECT NO. B-4112  
FORSYTH COUNTY  
STATION: 16+57.00 -L-  
SHEET 1 OF 3 REPLACES BRIDGE No. 30

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
BRIDGE ON SR 1631  
OVER MUDDY CREEK  
BETWEEN SR 1611 AND SR 4002

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



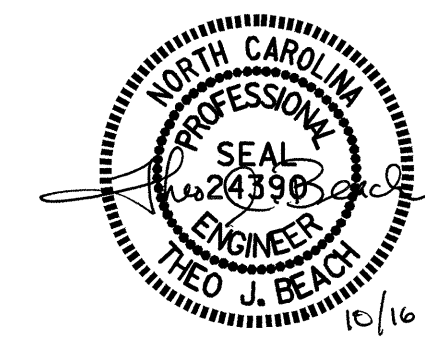
### FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILES CENTERLINE AT THE BOTTOM OF THE CAP)

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE ON SR 1631  
 OVER MUDDY CREEK  
 BETWEEN SR 1611 AND SR 4002



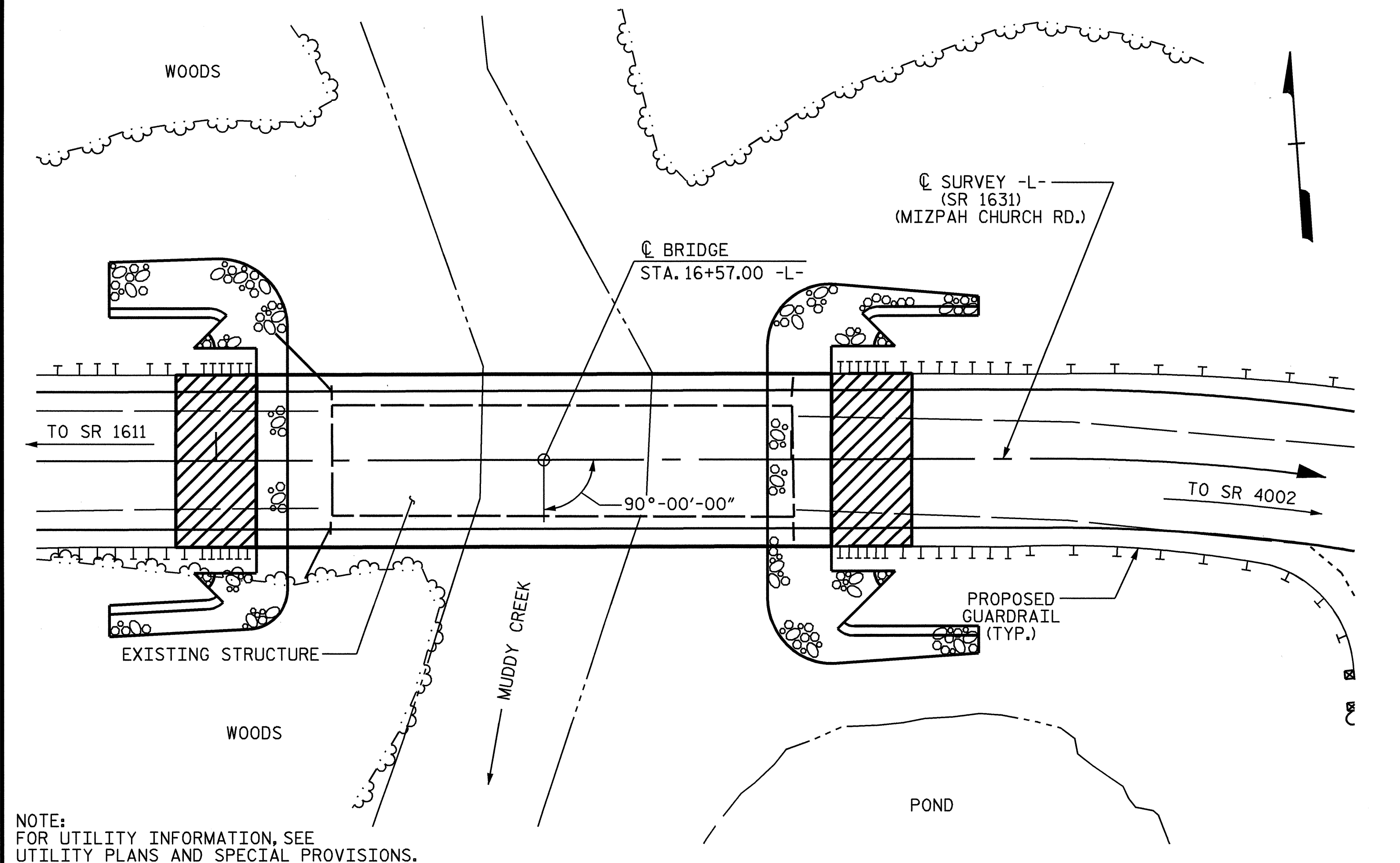
DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T. J. BEACH DATE : 10/07

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 sbwilliams

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



NOTES:



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

LOCATION SKETCH

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT BOX BEAMS UNITS HAVE BEEN DESIGNED FOR HS 25.  
FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF 2 SPANS OF 40'-3" LENGTH WITH A CLEAR ROADWAY WIDTH OF 19.1 FEET; TIMBER DECK WITH ASPHALT WEARING SURFACE ON STEEL I-BEAMS; WITH BENTS CONSISTING OF TIMBER CAPS AND PILES, AND TIMBER BULK HEADS AT THE END BENTS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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 DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

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

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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+57.00-L-."

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+57.00-L-.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURE, SEE SPECIAL PROVISIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT BRIDGES IN THE VICINITY OF THIS PROJECT ARE POSTED BELOW LEGAL LOAD LIMIT, SEE STANDARD SPECIFICATIONS 105-15.

DRIVE PILES AT END BENT No. 1 AND No. 2 TO A REQUIRED BEARING CAPACITY OF 100 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 BENT No. 1 AND No. 2 IS 50 TONS PER PILE.

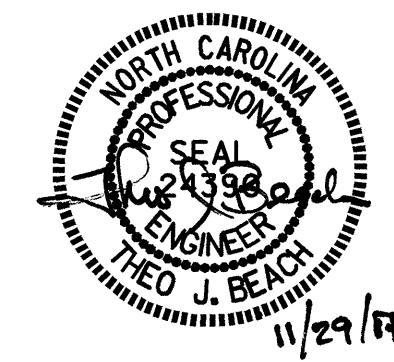
TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS	
							NO.	LIN.FT.					NO.	LIN.FT.
	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.			LIN.FT.	TONS	SQ.YDS.	LUMP SUM		
SUPERSTRUCTURE					LUMP SUM				195.17			LUMP SUM	11	1073.42
END BENT NO. 1				25.1		3,458	10	260		153	170			
END BENT NO. 2				25.0		3,472	10	280		228	253			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	50.1	LUMP SUM	6,930	20	540	195.17	381	423	LUMP SUM	11	1073.42

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE ON SR 1631  
 OVER MUDDY CREEK  
 BETWEEN SR 1611 AND SR 4002



DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T. J. BEACH DATE : 10/07

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

NOTES

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

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUDED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH GROUT.

THE 3" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS. THE JOINT SHALL BE FILLED WITH GROUT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5800 PSI FOR SPAN A.

ALL REINFORCING STEEL IN BARRIER RAIL SHALL BE EPOXY COATED.

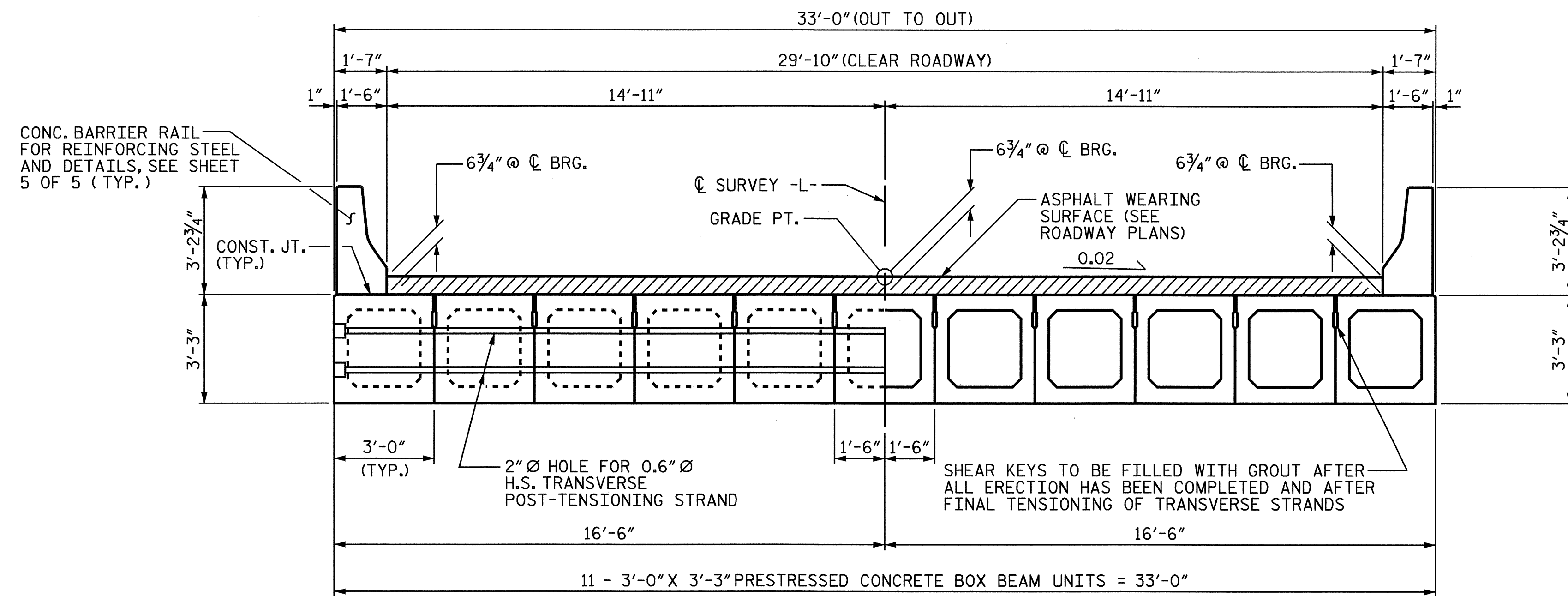
PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

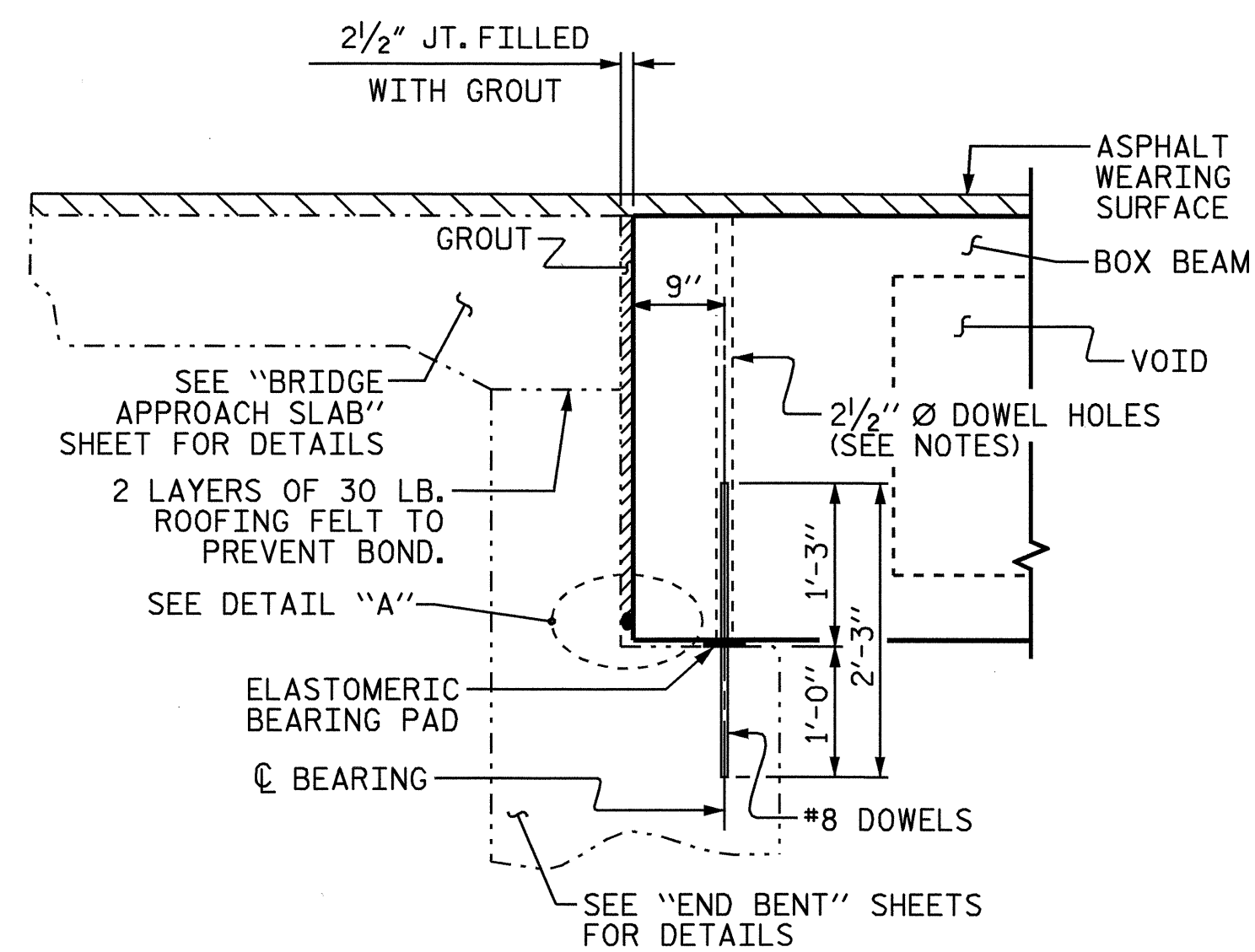
THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.



HALF SECTION @ INTERMEDIATE DIAPHRAGMS

HALF SECTION @ VOIDS

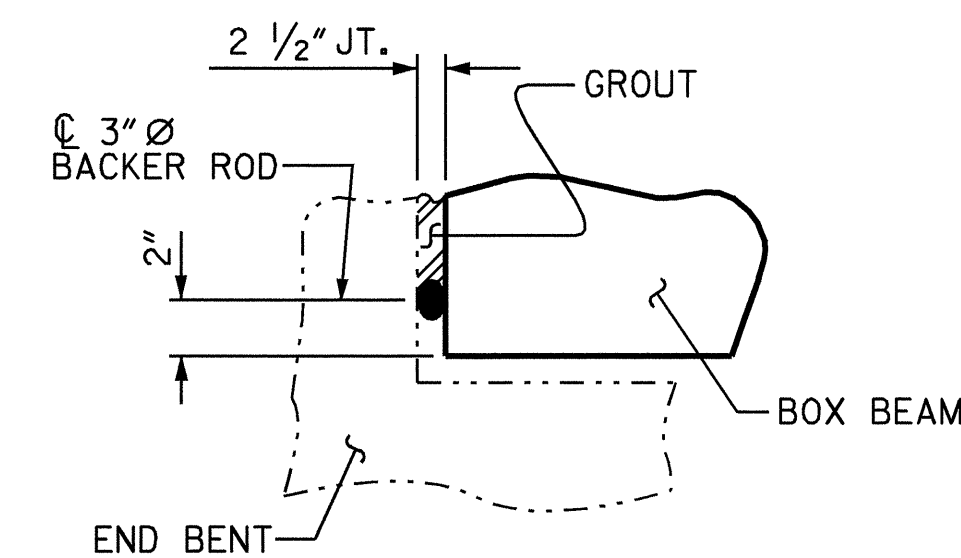
TYPICAL SECTION



FIXED END

SECTION AT END BENT

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



DETAIL "A"

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 1 OF 6

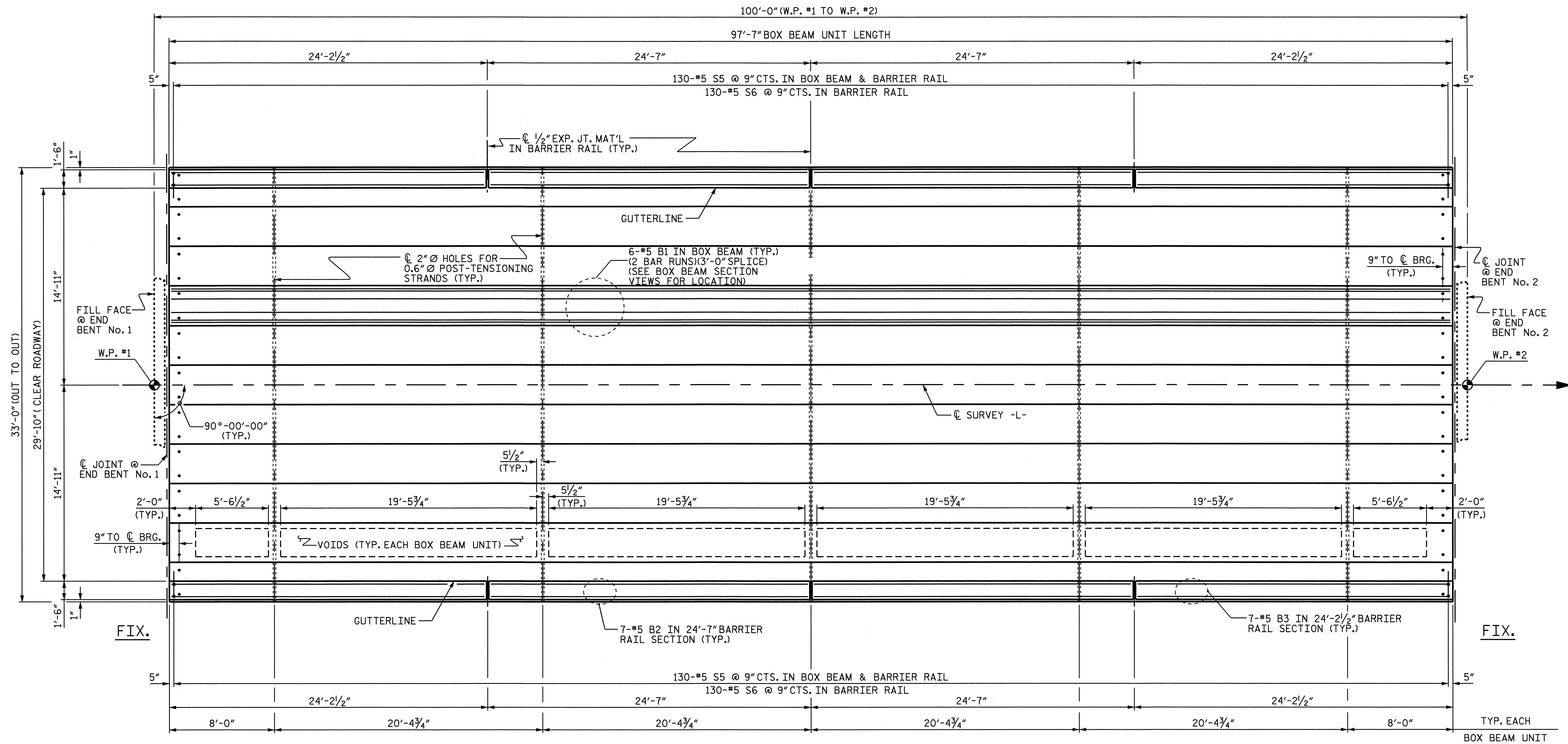
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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



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

ASSEMBLED BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T. J. BEACH DATE : 9/07



**PLAN OF SPAN A**

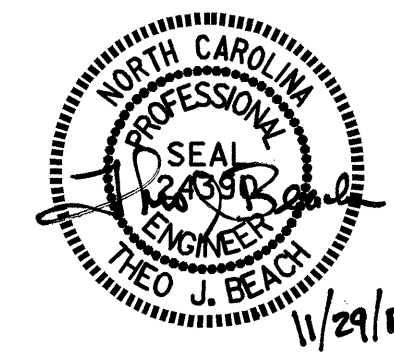
PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPAN A

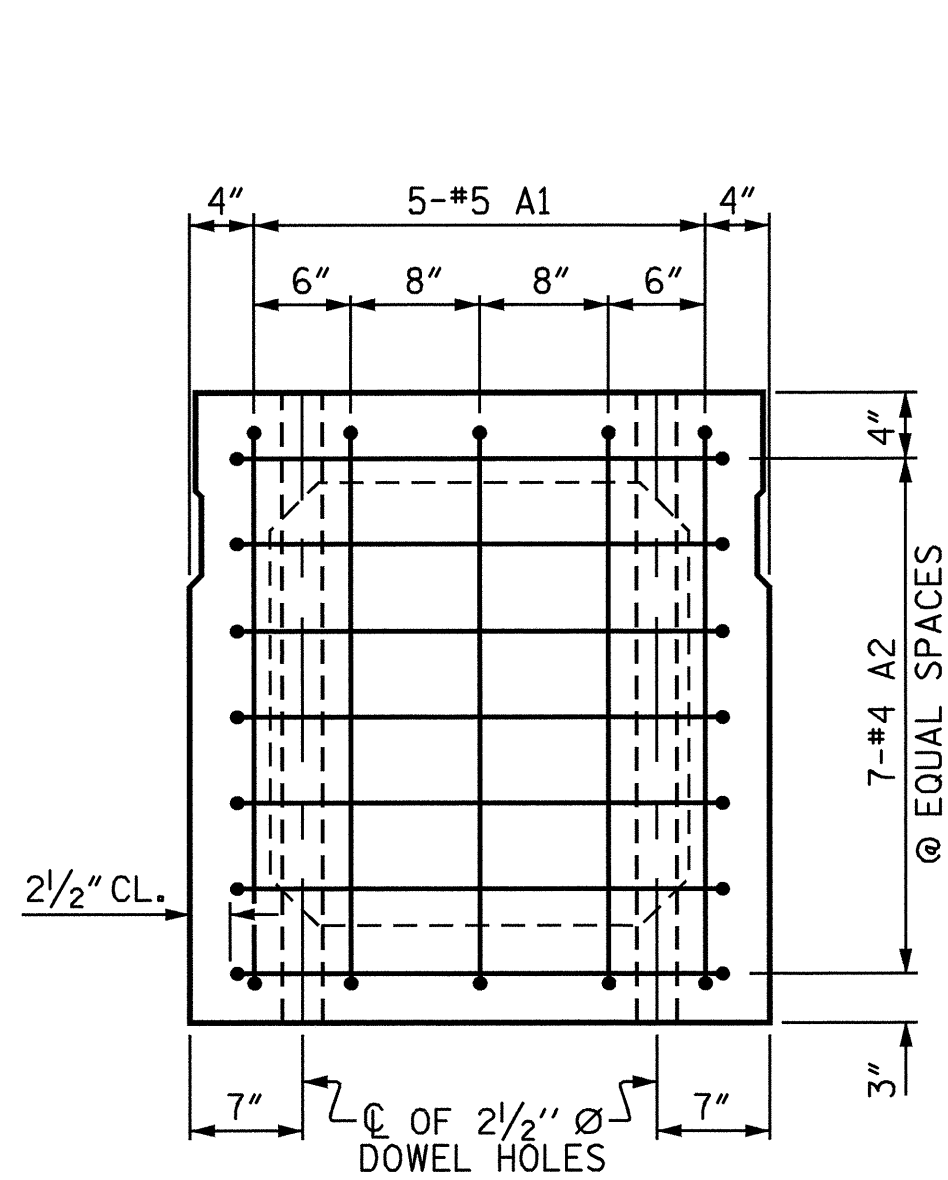
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-5
2			4			18



DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: T. J. BEACH DATE: 9/07

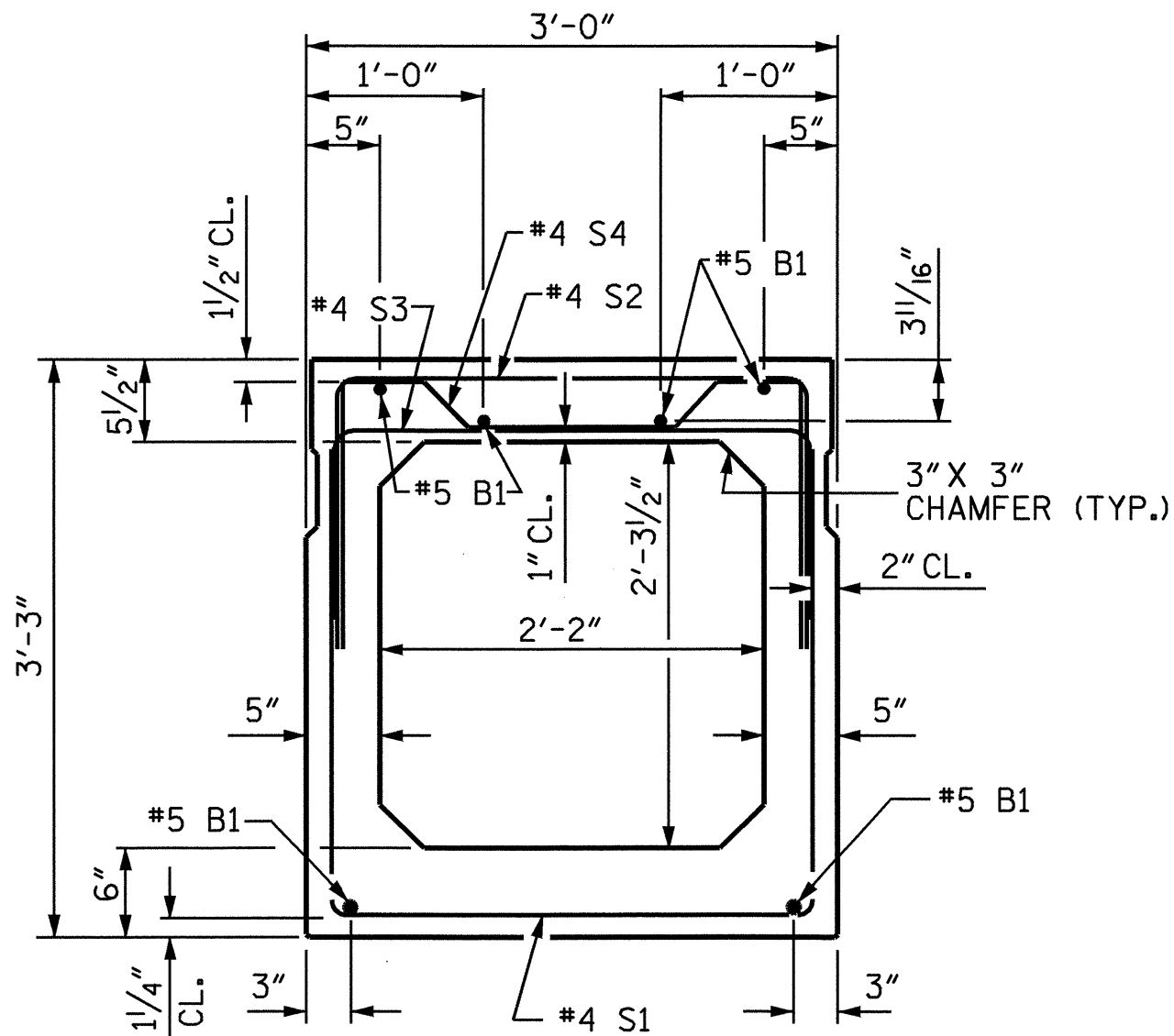
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 tbeach





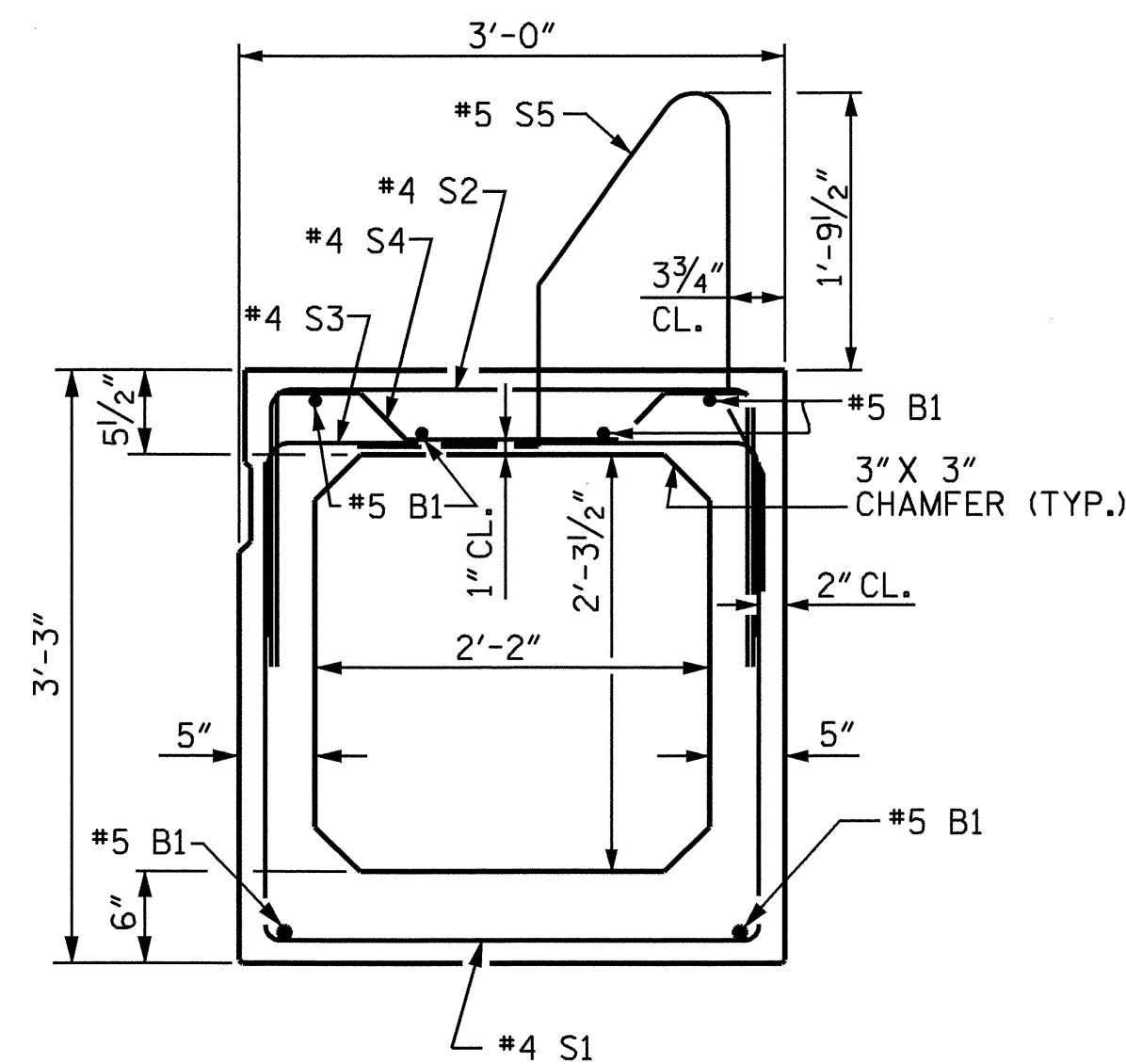
**END ELEVATION**

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



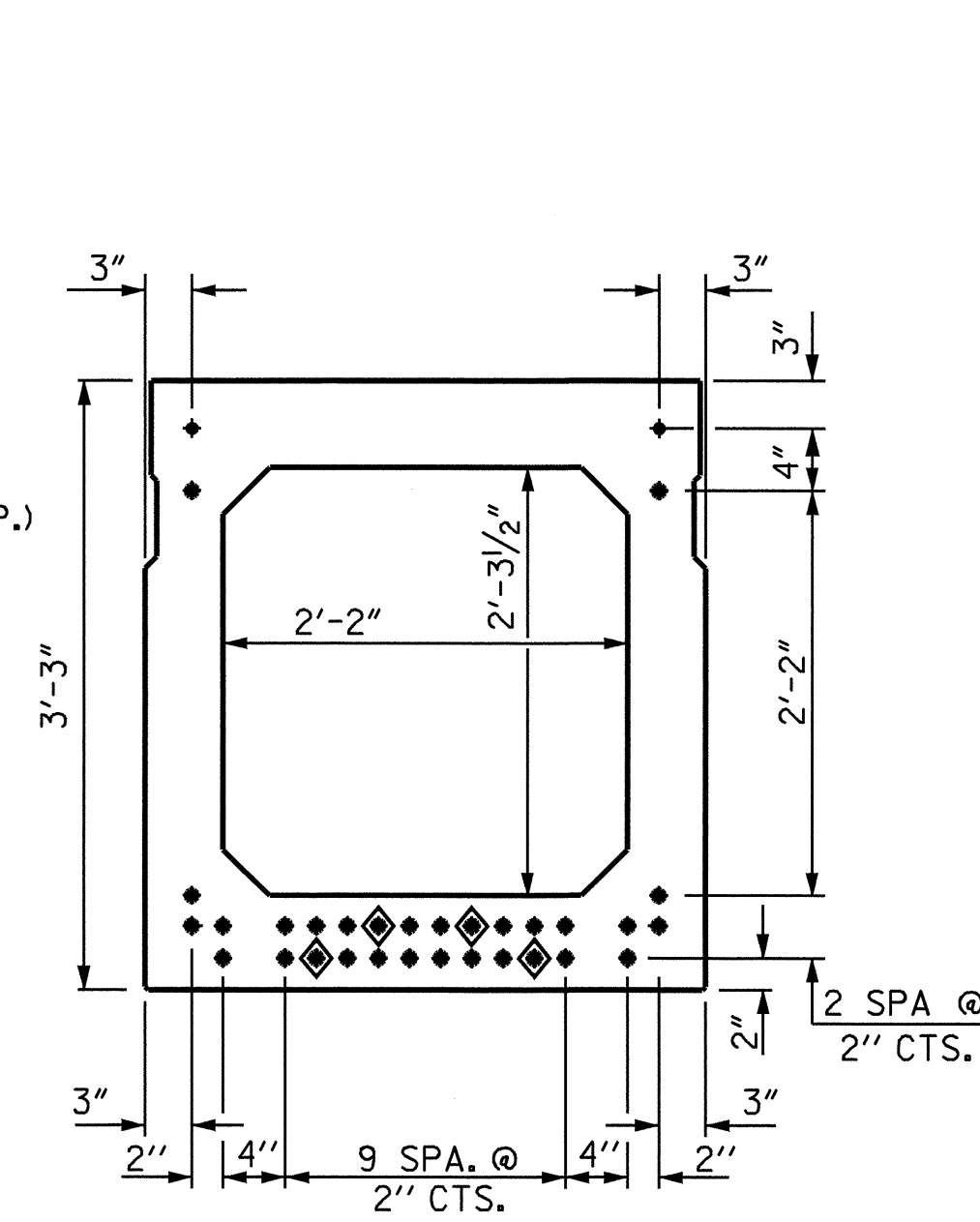
**INTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)



**TYPICAL STRAND LOCATION**

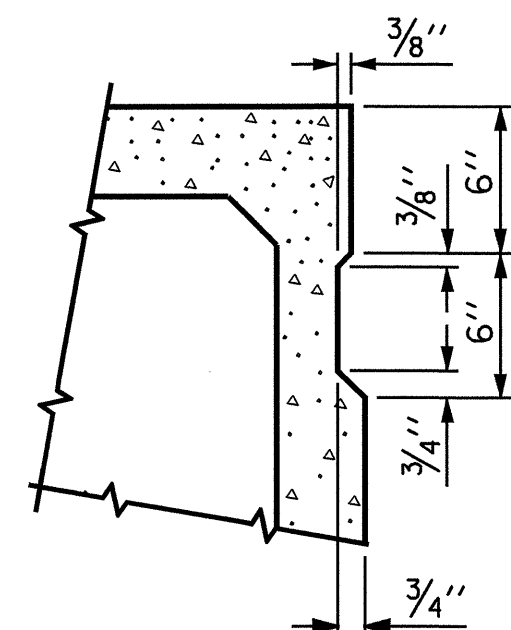
(32 STRANDS REQUIRED)

(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◊ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER

**0.6" Ø LOW RELAXATION STRAND LAYOUT**

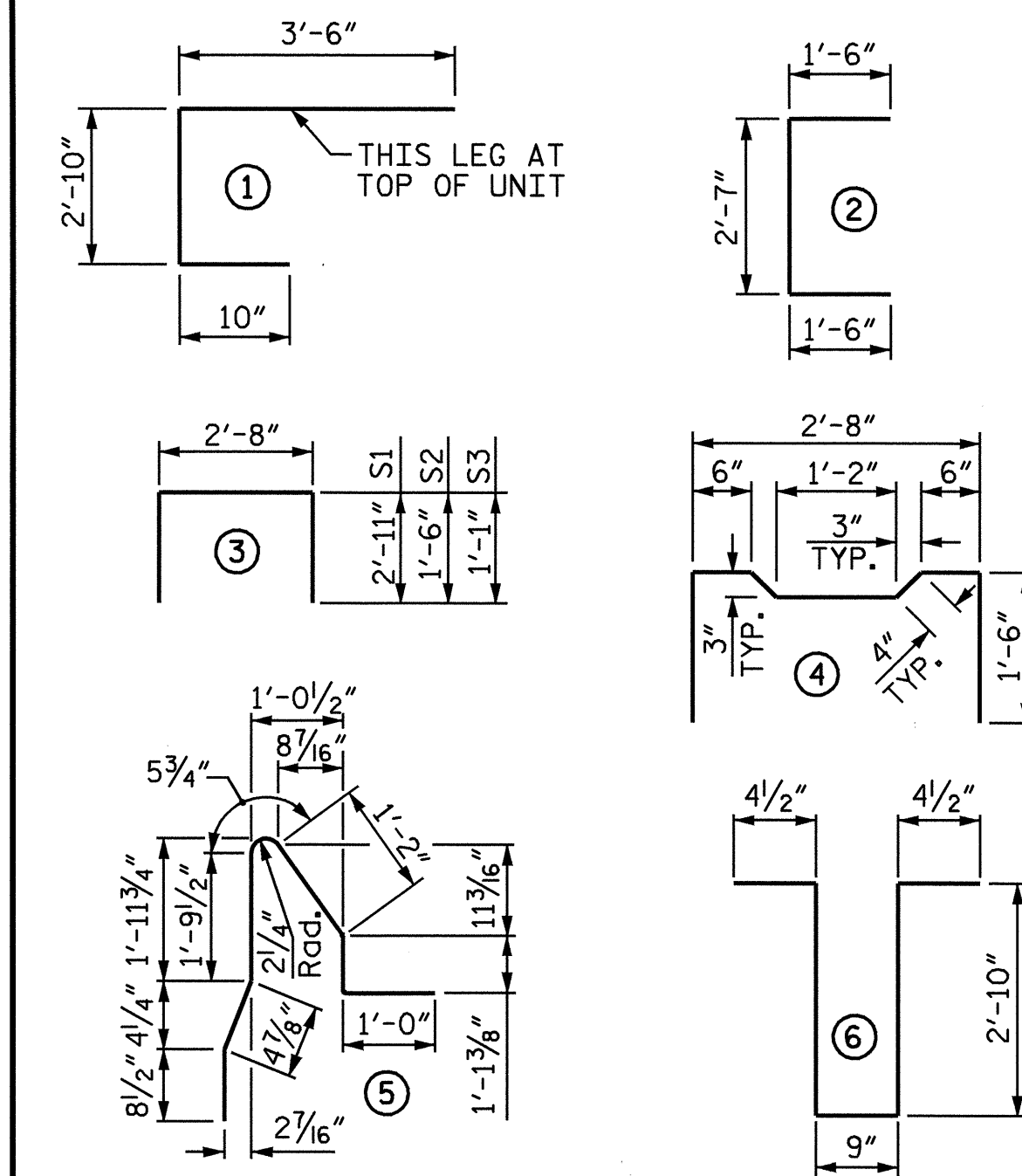


**SHEAR KEY DETAIL**

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

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

**BAR TYPES**

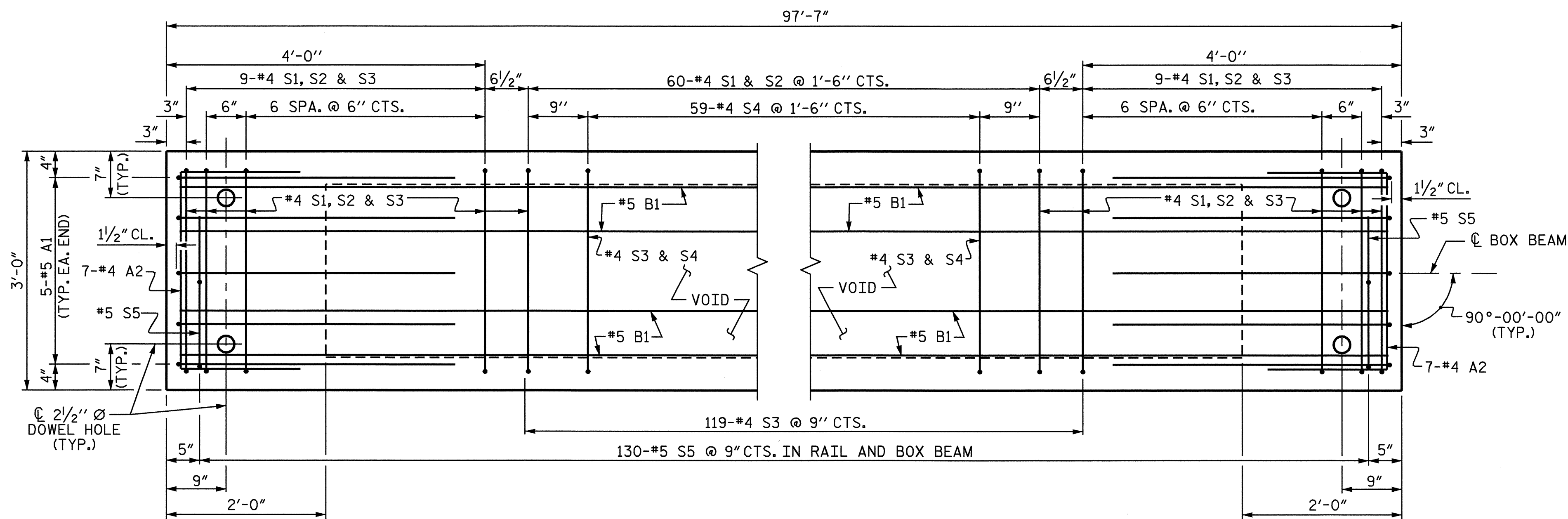


ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-7"	164	5'-7"	164
B1	12	#5	STR	50'-1"	627	50'-1"	627
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	78	#4	3	8'-6"	443	8'-6"	443
S2	78	#4	3	5'-8"	295	5'-8"	295
S3	137	#4	3	4'-10"	442	4'-10"	442
S4	59	#4	4	5'-10"	230	5'-10"	230
* S5	130	#5	5	6'-8"	904	--	--

REINFORCING STEEL	2365 LBS.	2365 LBS.
* EPOXY COATED REINF. STEEL	904 LBS.	--
7400 P.S.I. CONCRETE	19.1 CU. YDS.	18.9 CU. YDS.
0.6" Ø L.R. STRANDS	No. 32	No. 32



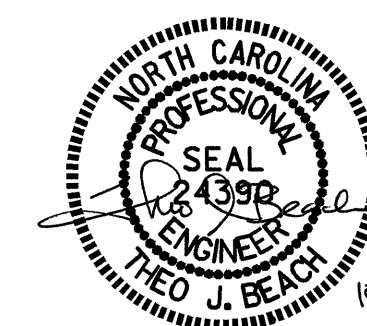
**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

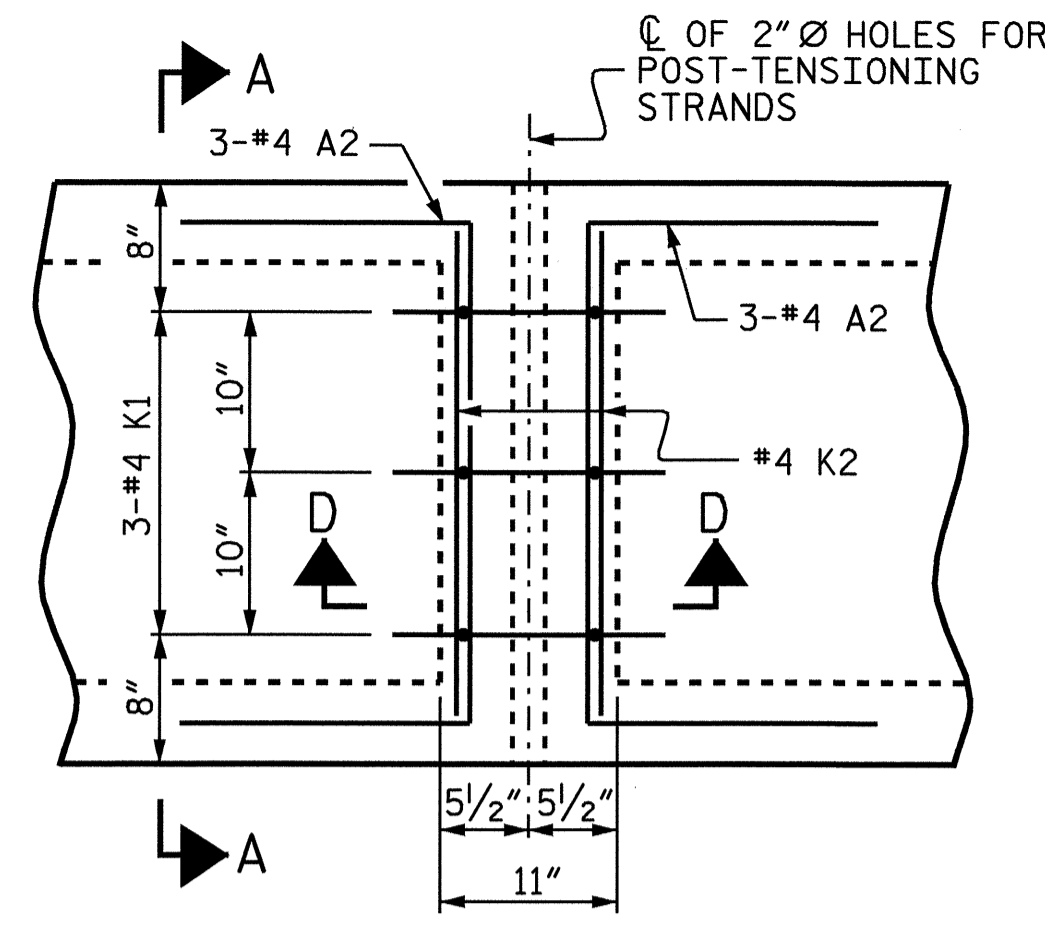
SHEET 3 OF 6

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

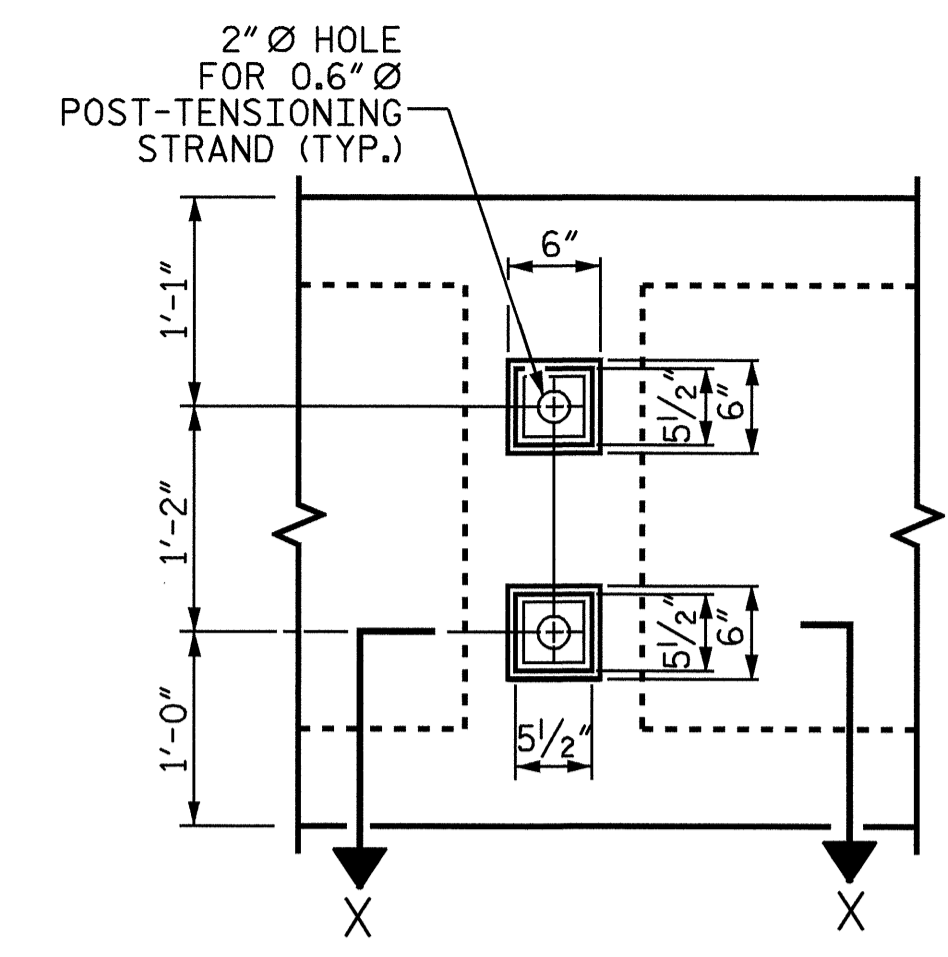


REVISIONS						SHEET NO. S-6
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			

DRAWN BY: T. BANKOVICH DATE: 9/07  
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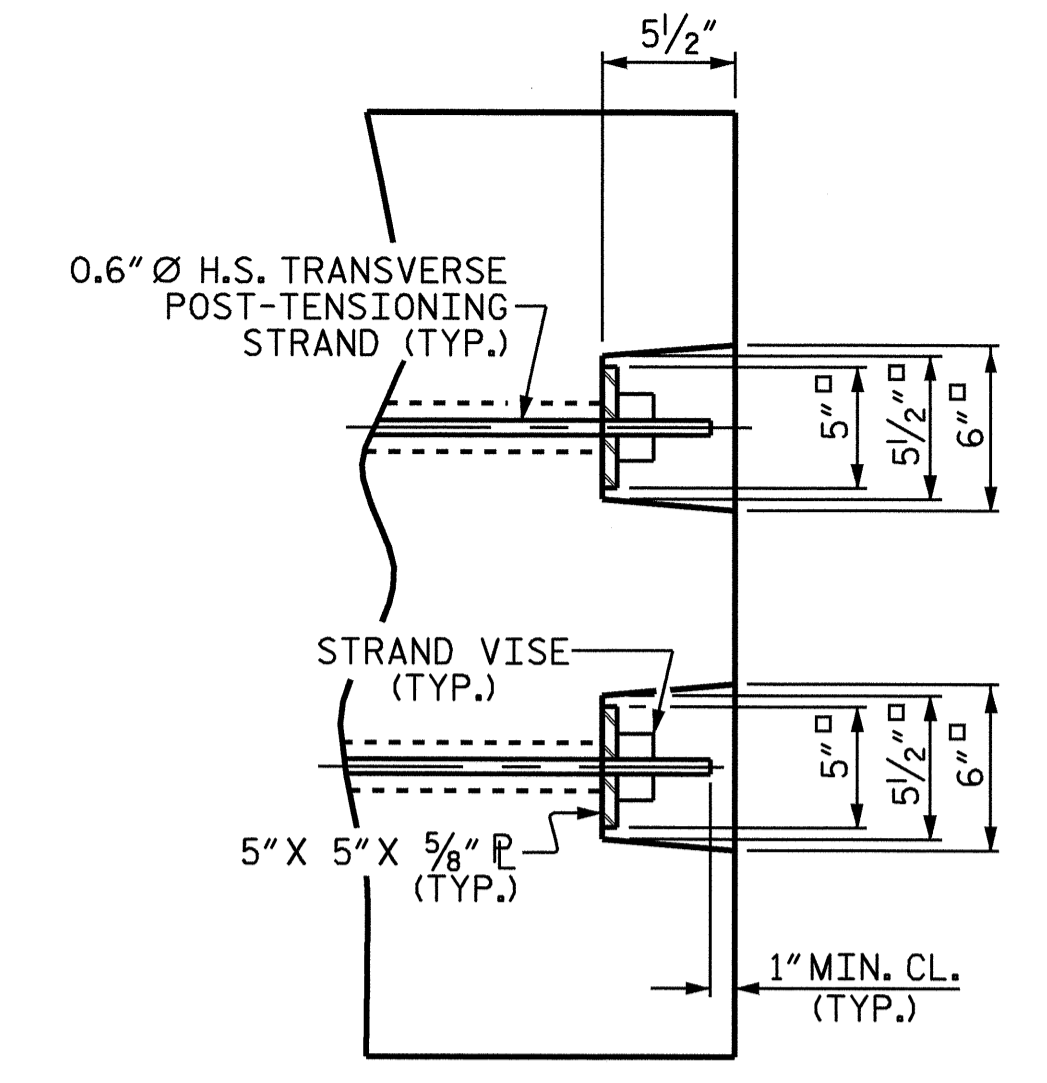


PLAN

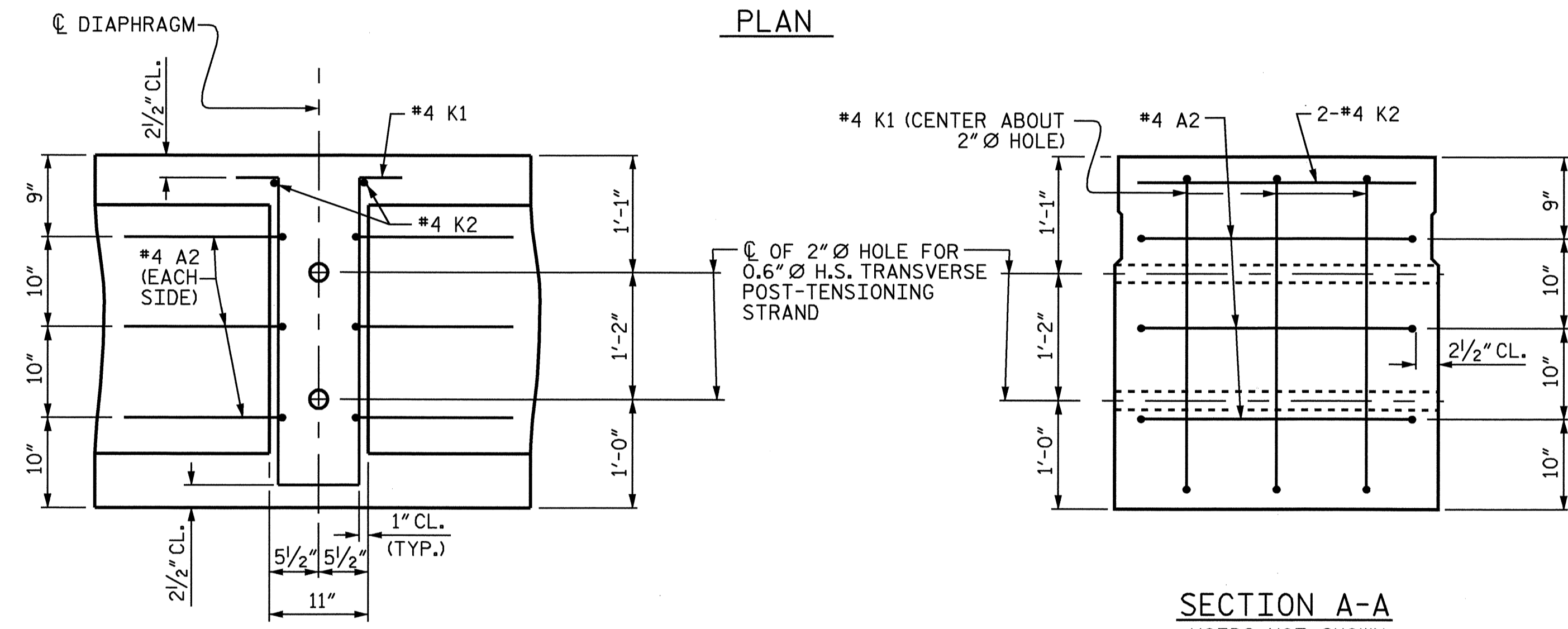


VIEW Y-Y

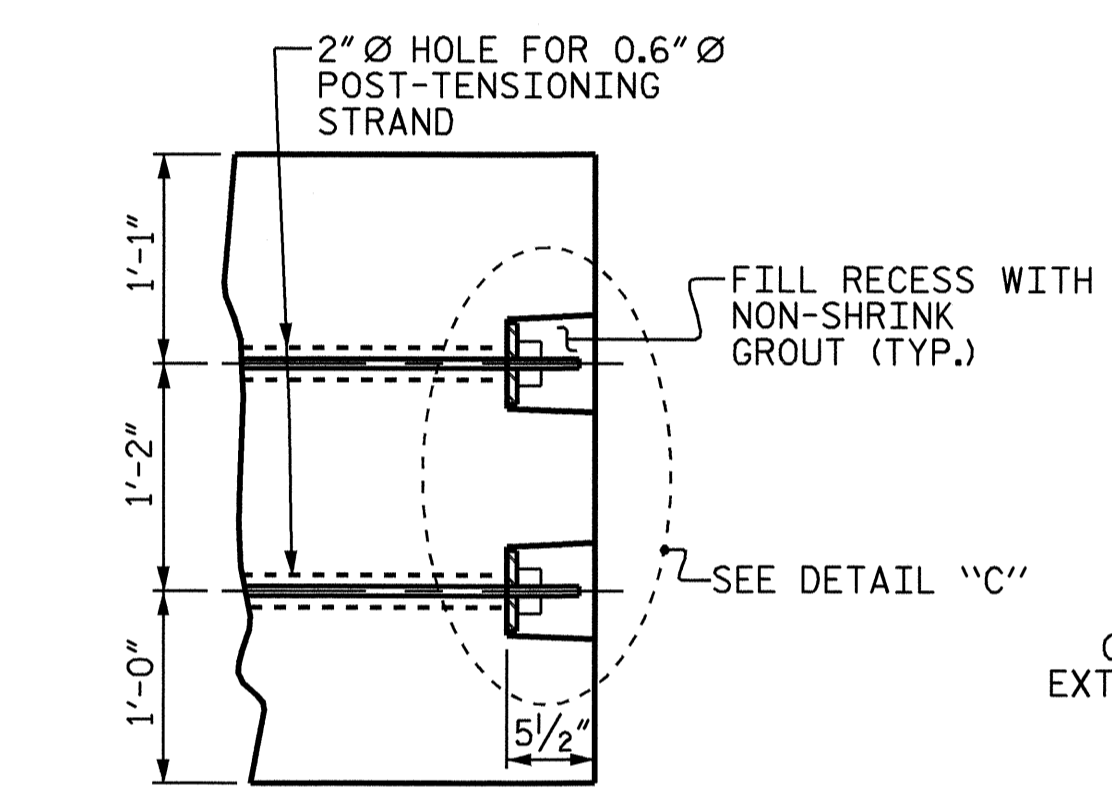
SHOWING ELEVATION VIEW OF GROUDED RECESS



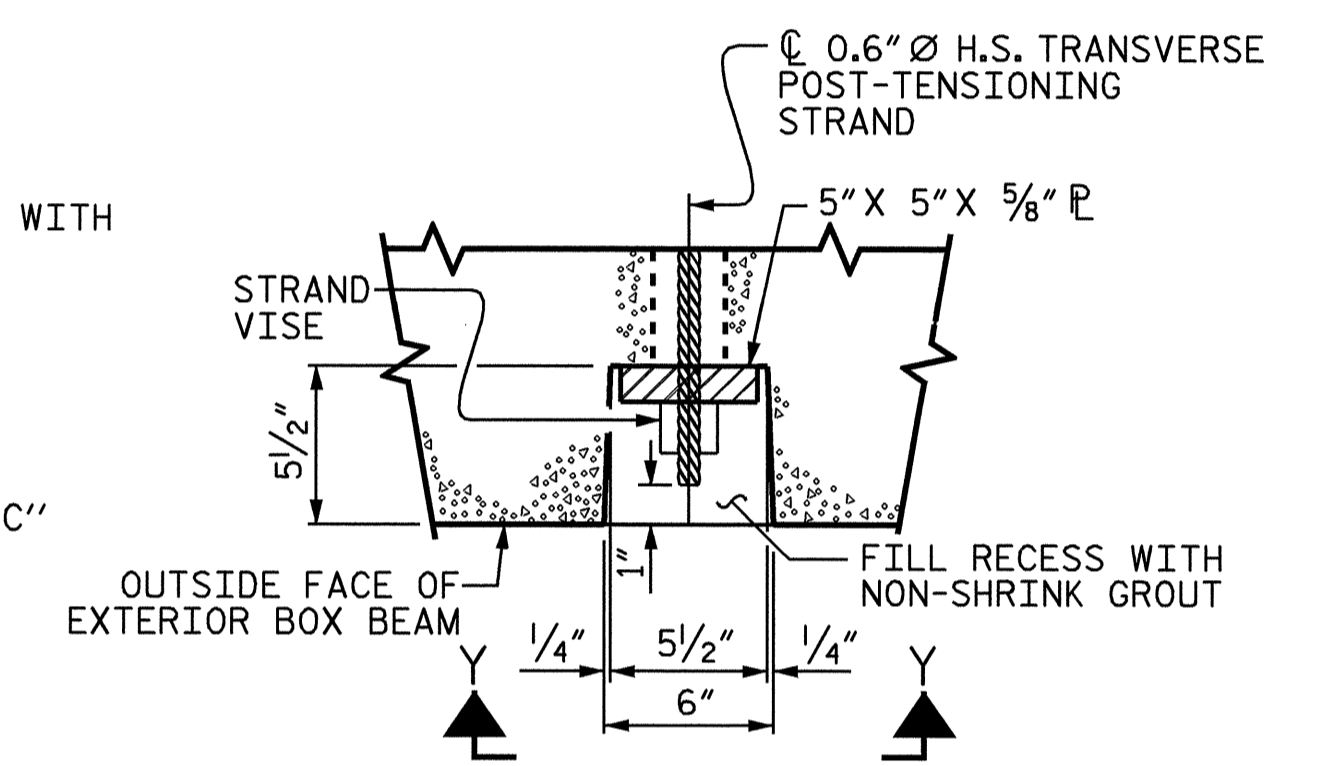
DETAIL "C"



SECTION A-A  
VOIDS NOT SHOWN



PART SECTION AT RECESS



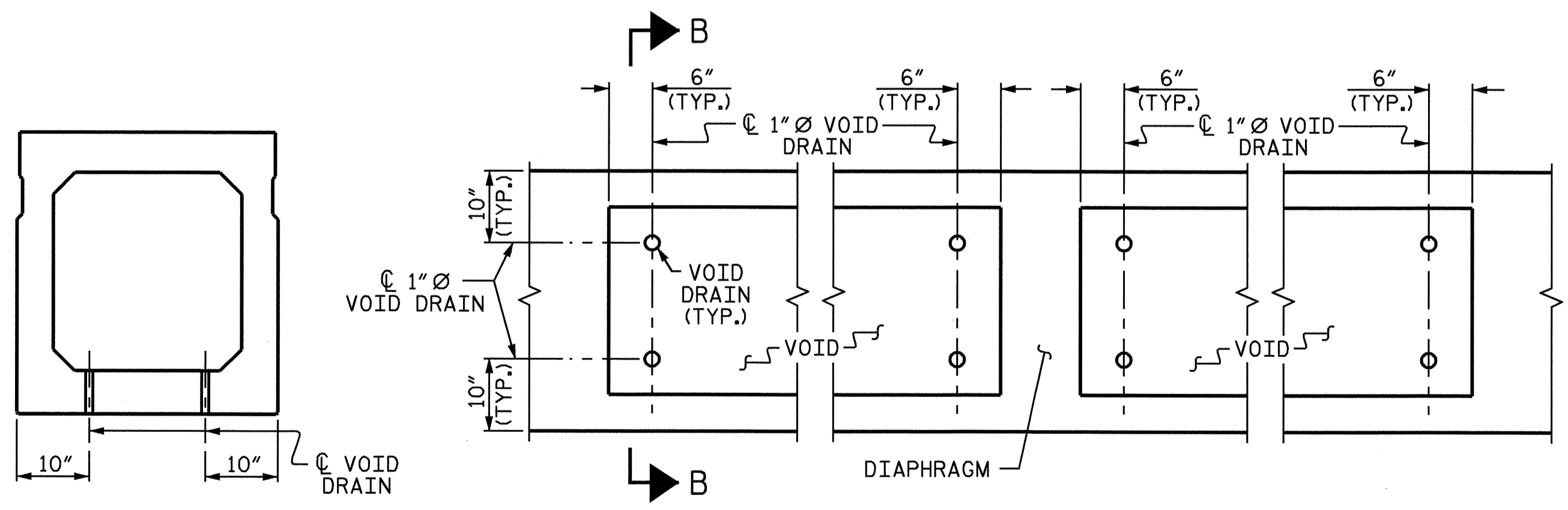
SECTION X-X

SHOWING PLAN VIEW OF GROUDED RECESS

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2" Ø HOLE.

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



VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 3'-3"
	0.6" Ø L.R. STRAND
	SPAN "A"
CAMBER (BEAM ALONE IN PLACE) ↑	4 5/16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ** ↓	1/8"
FINAL CAMBER ↑	3 3/16"

\*\* INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4112  
FORSYTH COUNTY  
STATION: 16+57.00 -L-

SHEET 4 OF 6

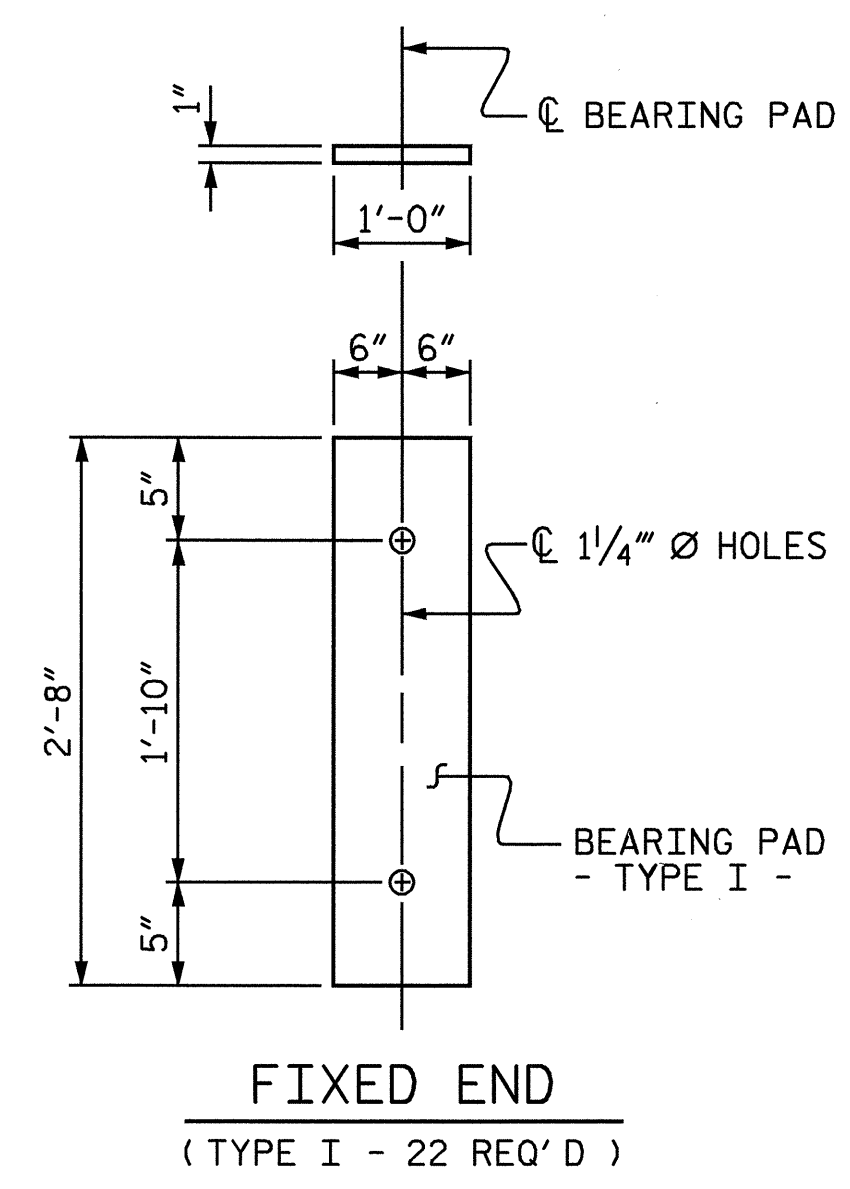
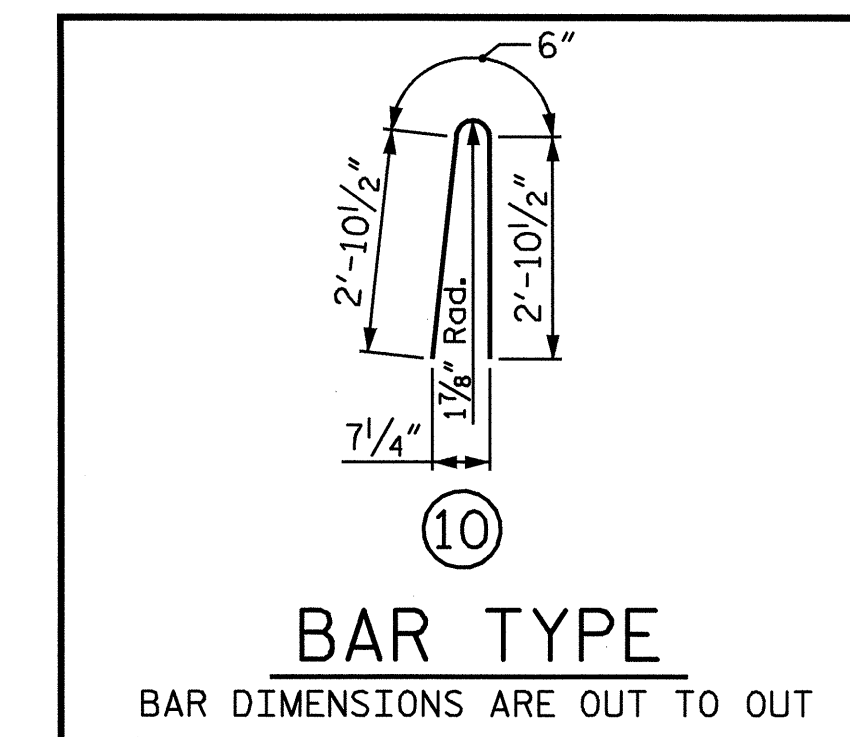


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT

REVISIONS						SHEET NO. S-7
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			

ASSEMBLED BY : T. BANKOVICH	DATE : 9/07
CHECKED BY : T. J. BEACH	DATE : 9/07
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	

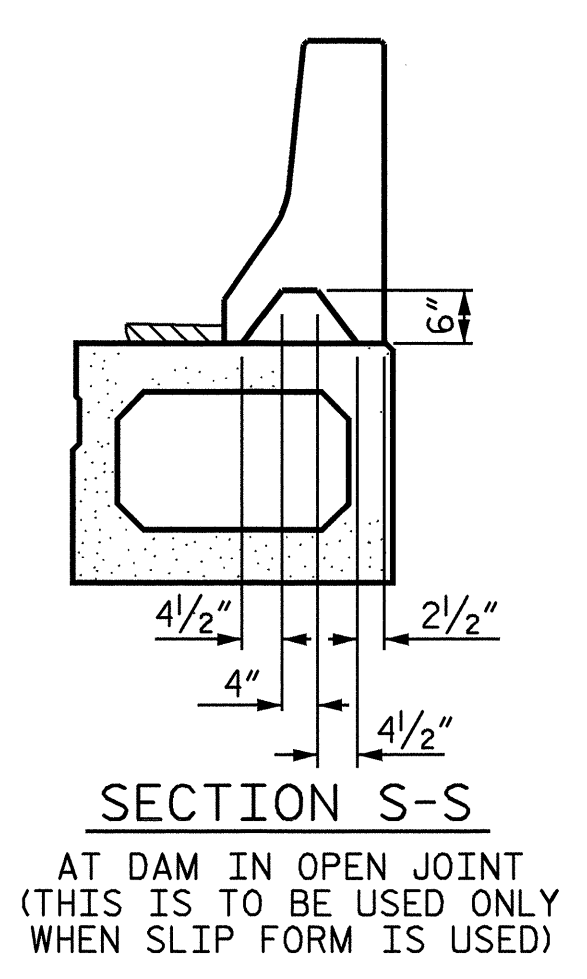
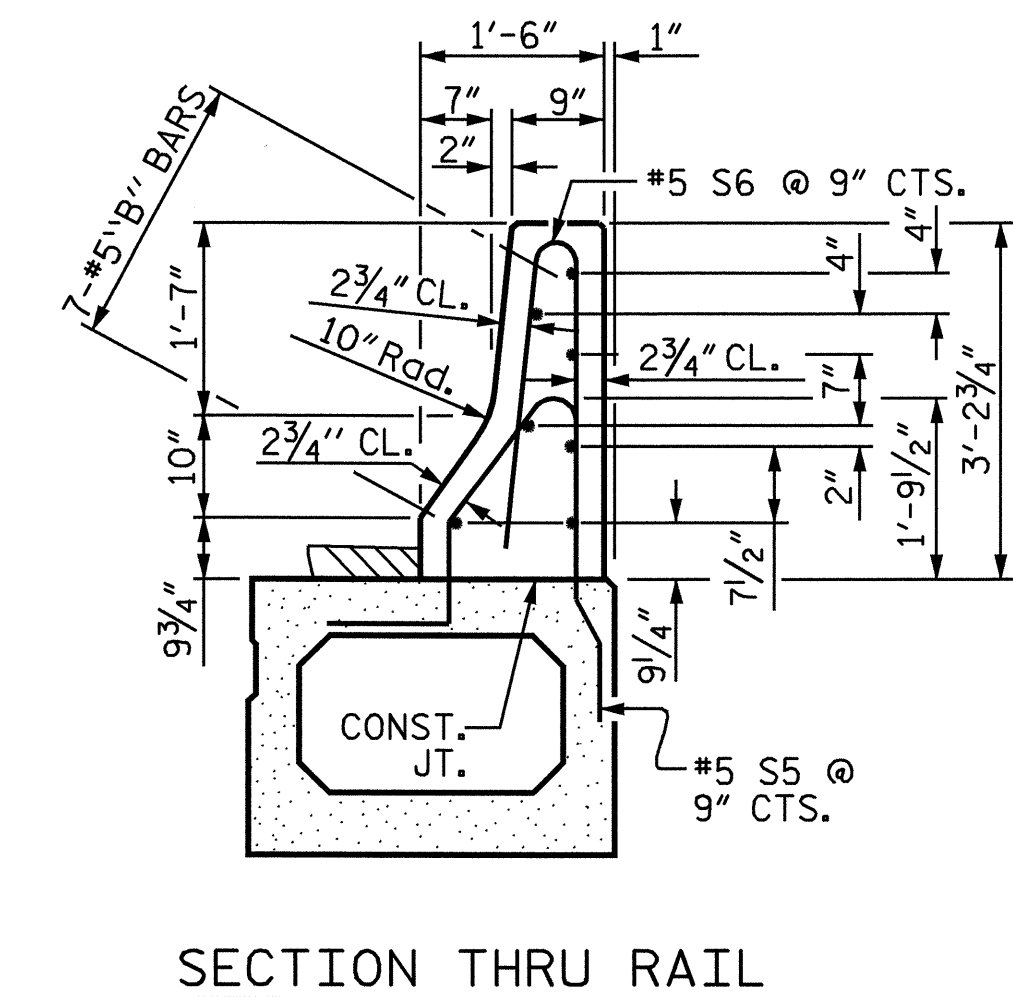
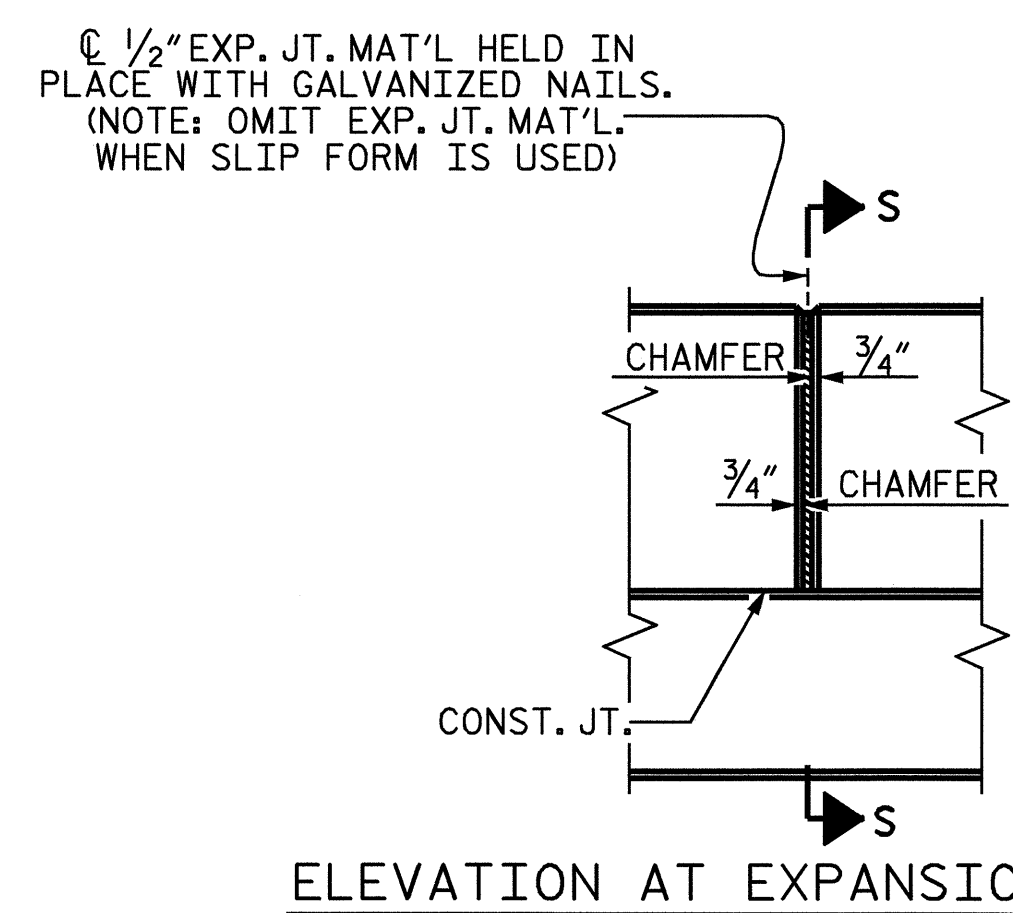




ELASTOMERIC BEARING DETAILS

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
SPAN A			
EXTERIOR B. B.	2	97'-7"	195'-2"
INTERIOR B. B.	9	97'-7"	878'-3"
TOTAL	11		1073.42'

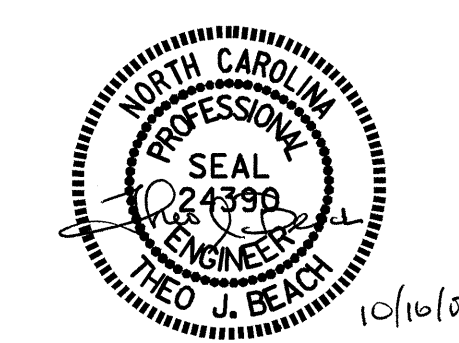
BILL OF MATERIAL FOR CONCRETE BARRIER RAIL						
BAR	BARS PER SPAN	SIZE	TYPE	LENGTH	WEIGHT	
SPAN A						
*B2	28	#5	STR	24'-2"	706	
*B3	28	#5	STR	23'-10"	696	
*S6	260	#5	10	6'-3"	1695	
* EPOXY COATED REINFORCING STEEL					LBS.	3097
CLASS AA CONCRETE				CU.YDS.	25.6	
TOTAL LIN. FT. OF CONCRETE BARRIER RAIL					195.17	



BARRIER RAIL DETAILS

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-  
 SHEET 5 OF 6

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



ASSEMBLED BY : T. BANKOVICH	DATE : 9/07
CHECKED BY : T. J. BEACH	DATE : 9/07
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			18

NOTES

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

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

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

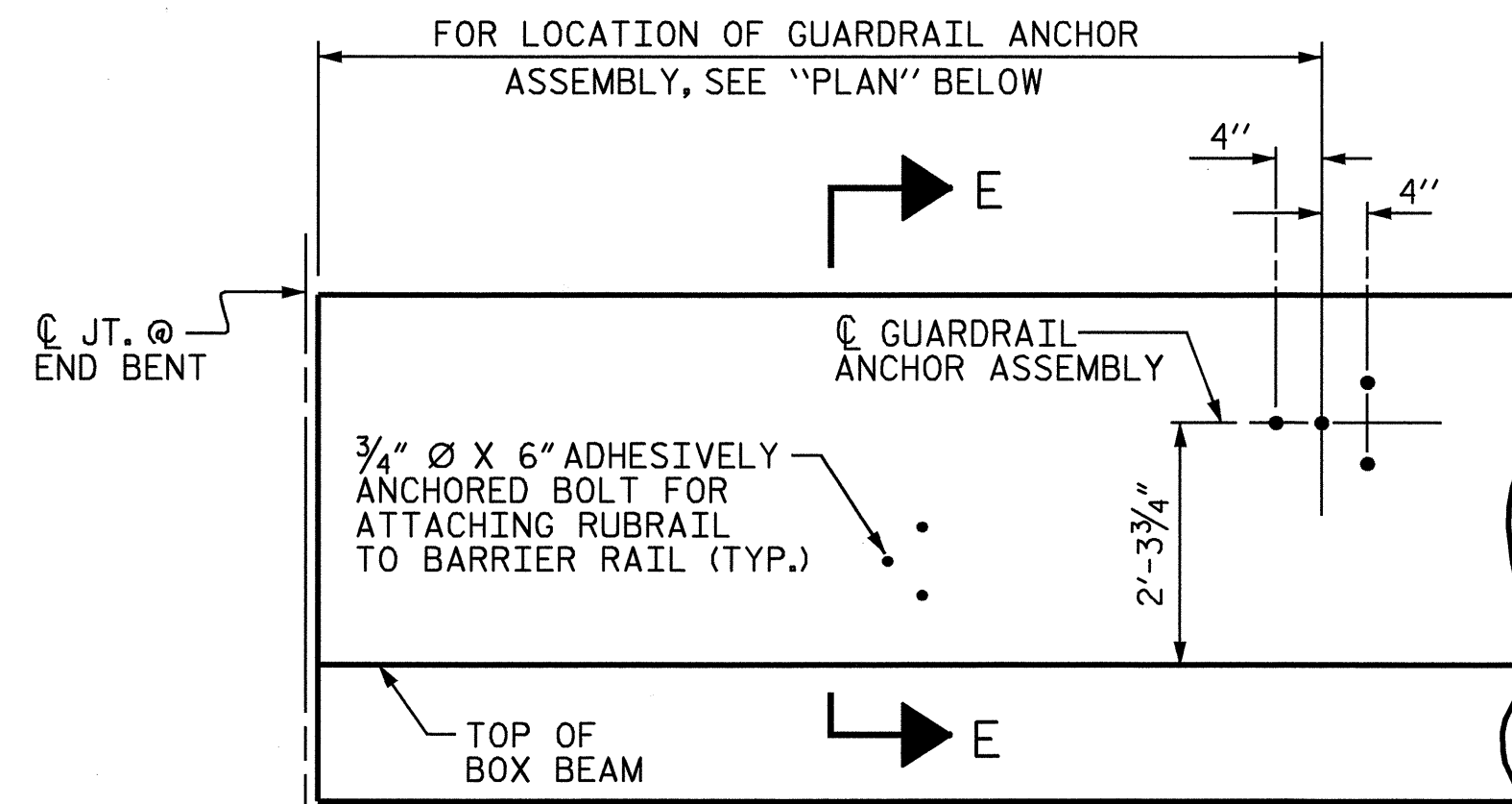
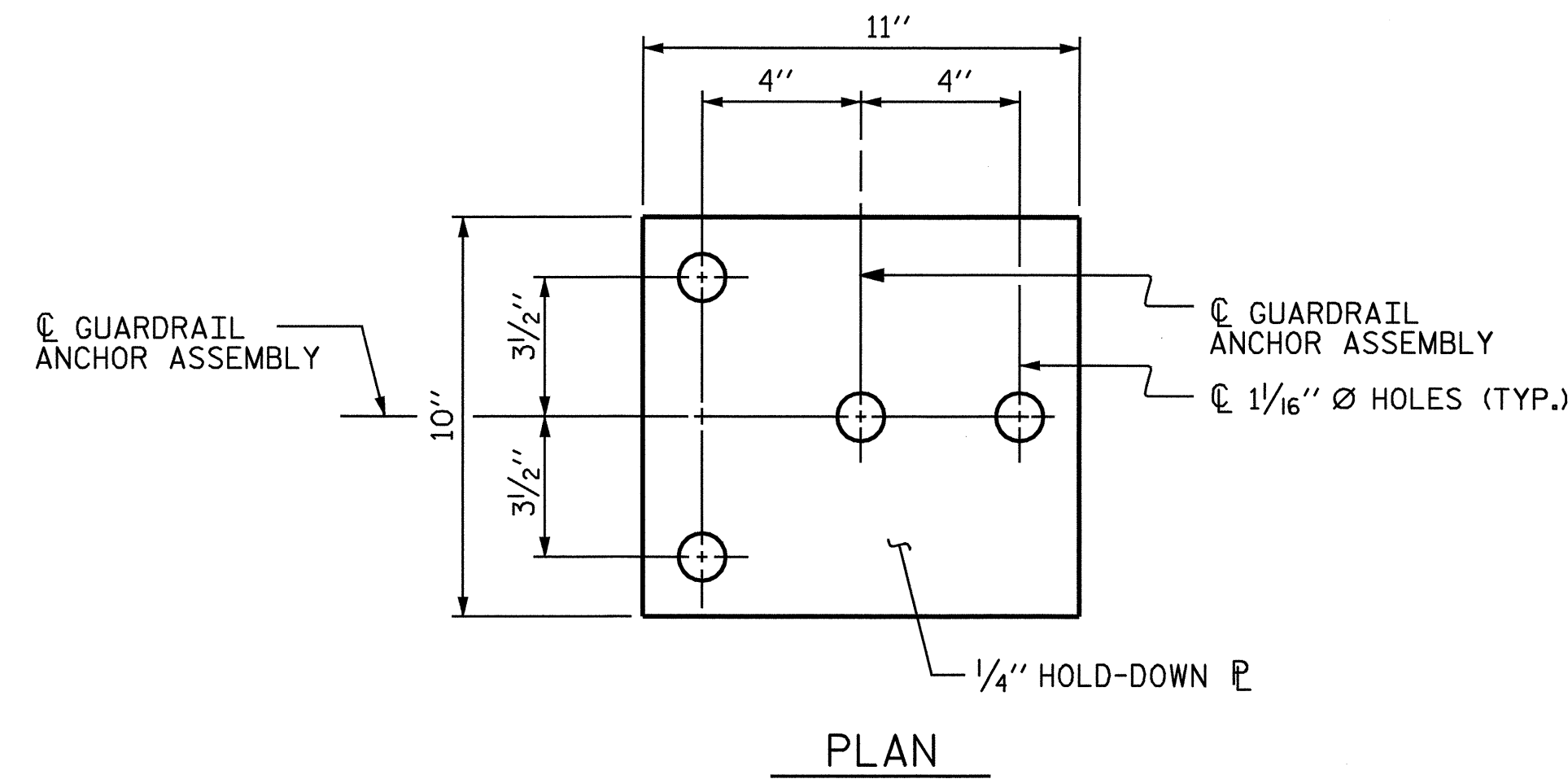
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

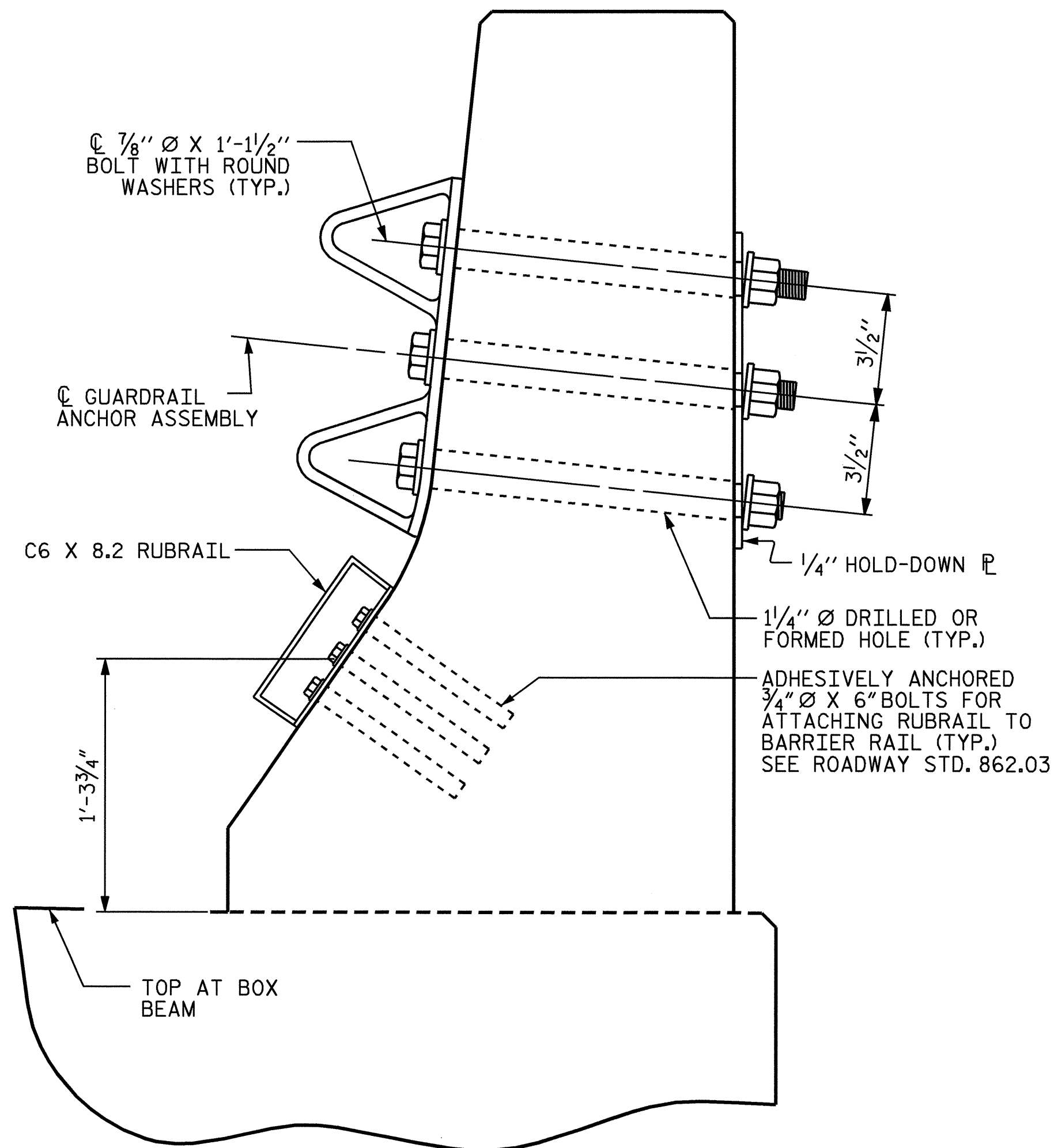
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

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

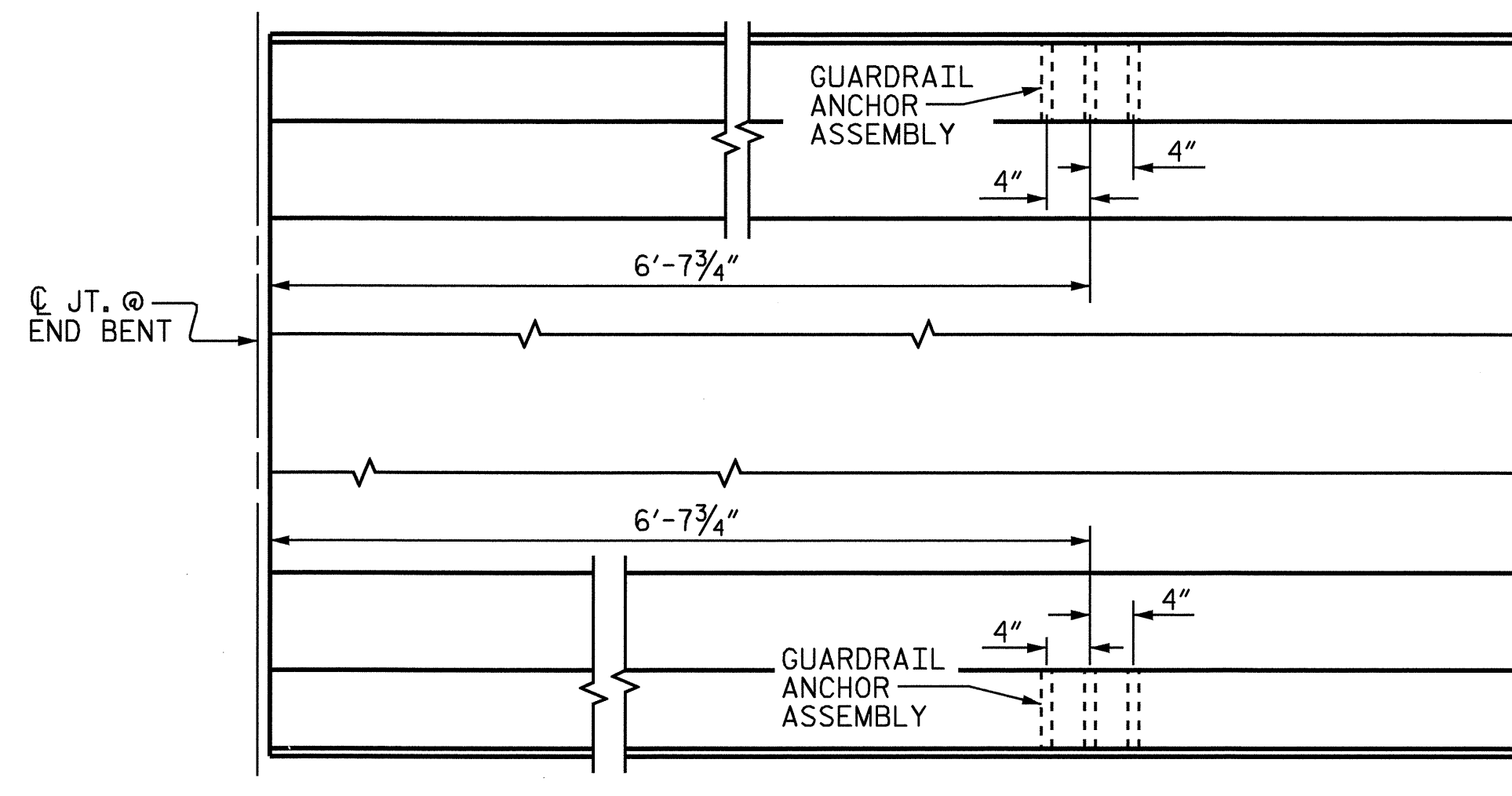


ELEVATION  
FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



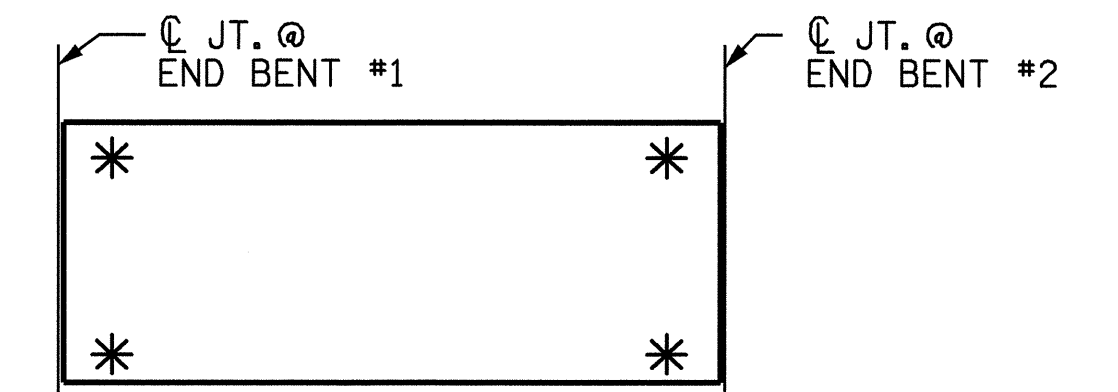
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

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

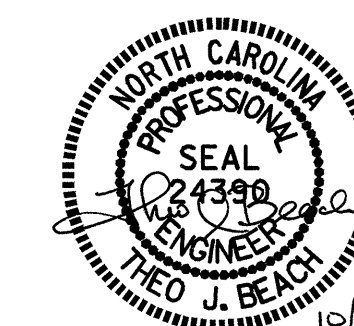


SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00-L-

SHEET 6 OF 6



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

ASSEMBLED BY : T. BANKOVICH	DATE : 9/07
CHECKED BY : T. J. BEACH	DATE : 9/07
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

12-OCT-2007 12:56  
 R:\structures\superstructuredrawings\b4112.sd.bb.01.dgn  
 sbwilliams

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			18

(SHT 1) STD. NO. GRA2

**NOTES:**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES AT EACH END OF THE CAP ARE NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR THE REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

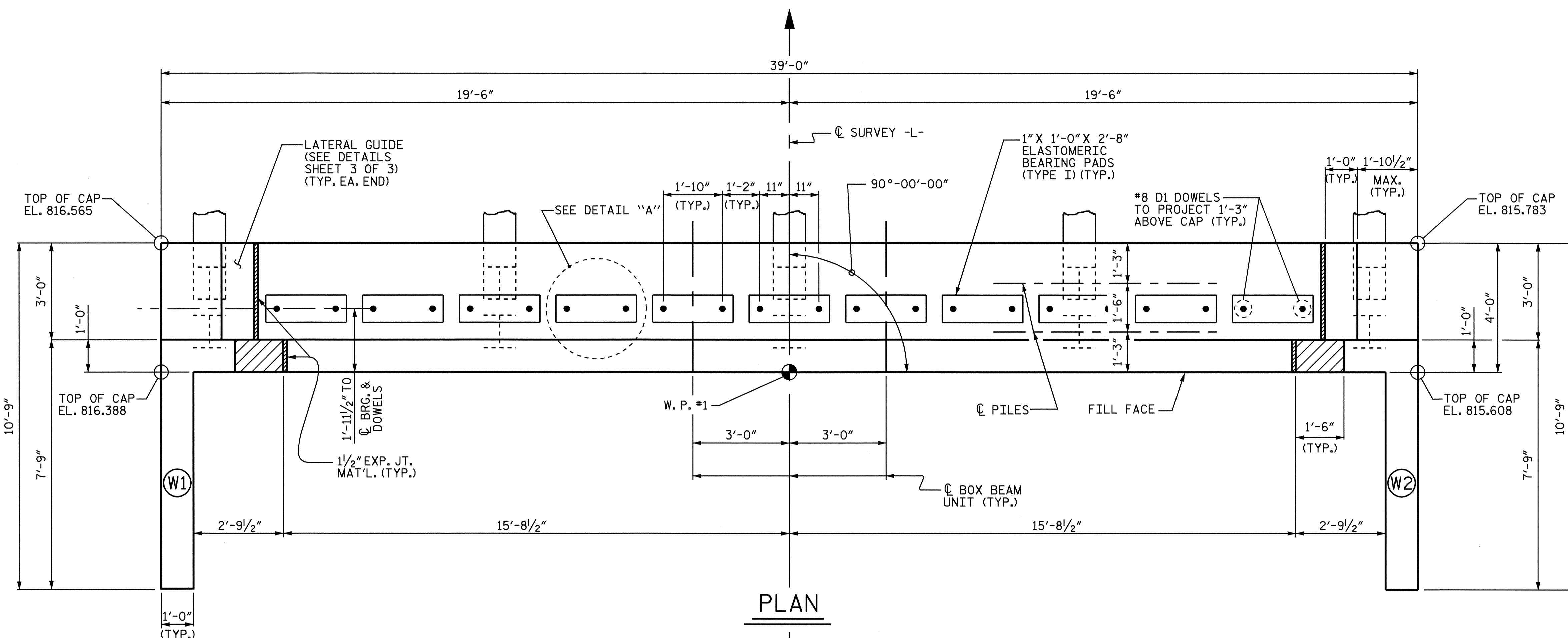
#5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

FOR SECTION A-A, SEE SHEET 3 OF 3.

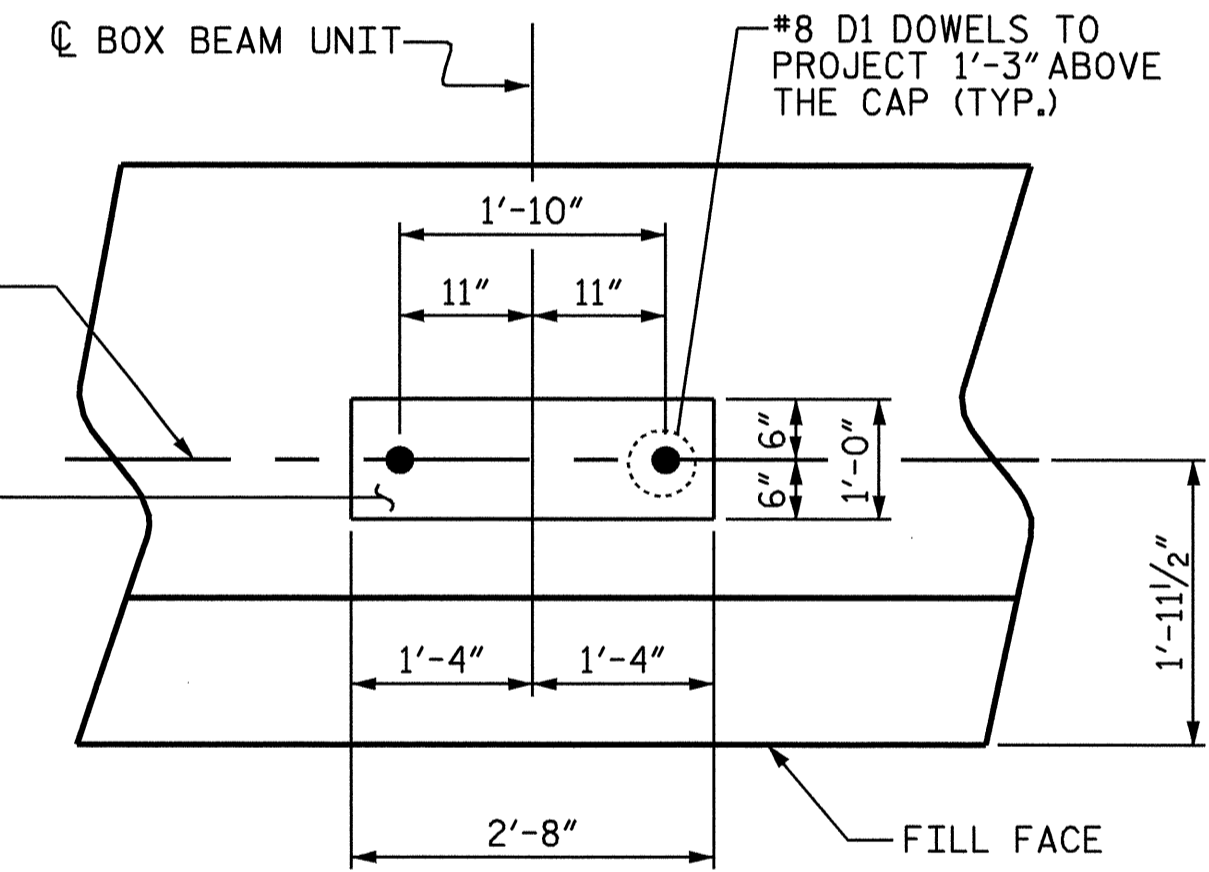
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP IS SLOPED LONGITUDINALLY.

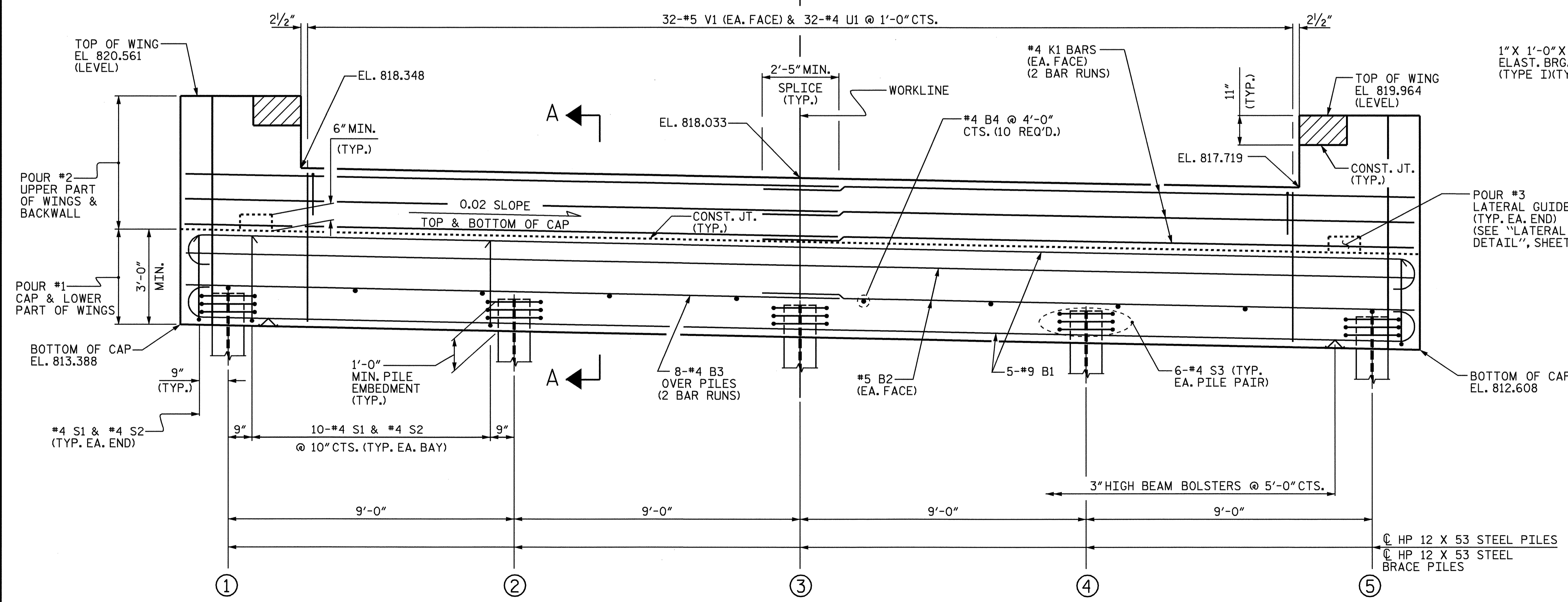
TOP OF PILE ELEVATIONS	
1	814.368
2	814.188
3	814.008
4	813.828
5	813.648



**PLAN**



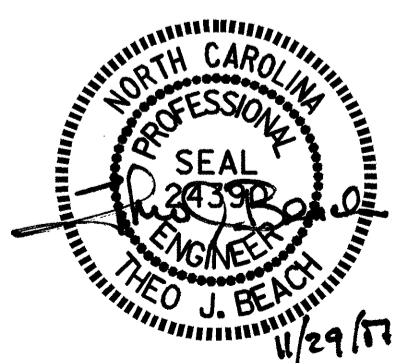
**DETAIL "A"**  
(TYP. EA. BEARING)



**ELEVATION**

DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T. J. BEACH DATE : 9/07

29-NOV-2007 14:43  
 RA\Structures\SubstructureDrawings\B4112.sd.E\*.01.dgn  
 tbeach



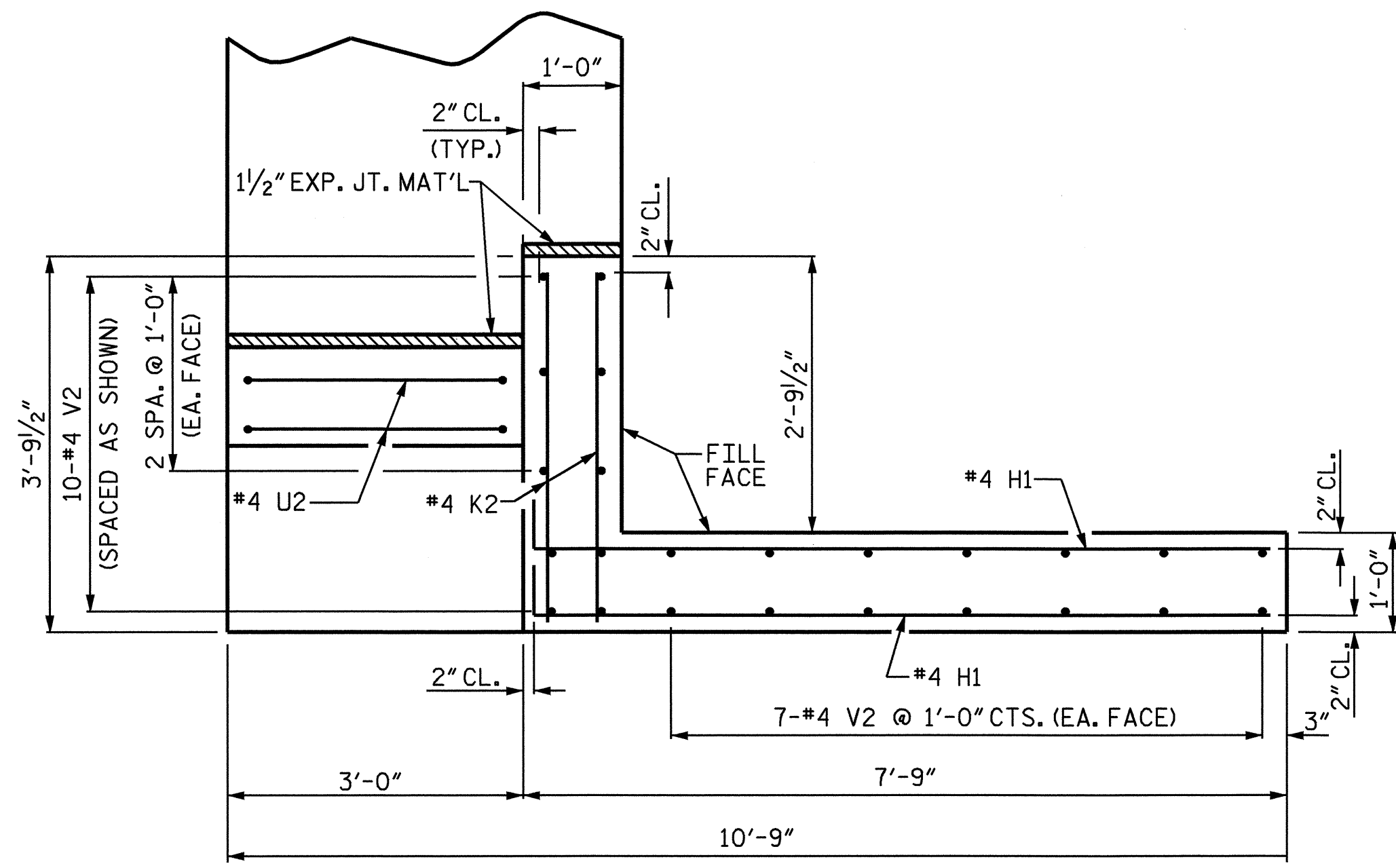
PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 1 OF 3

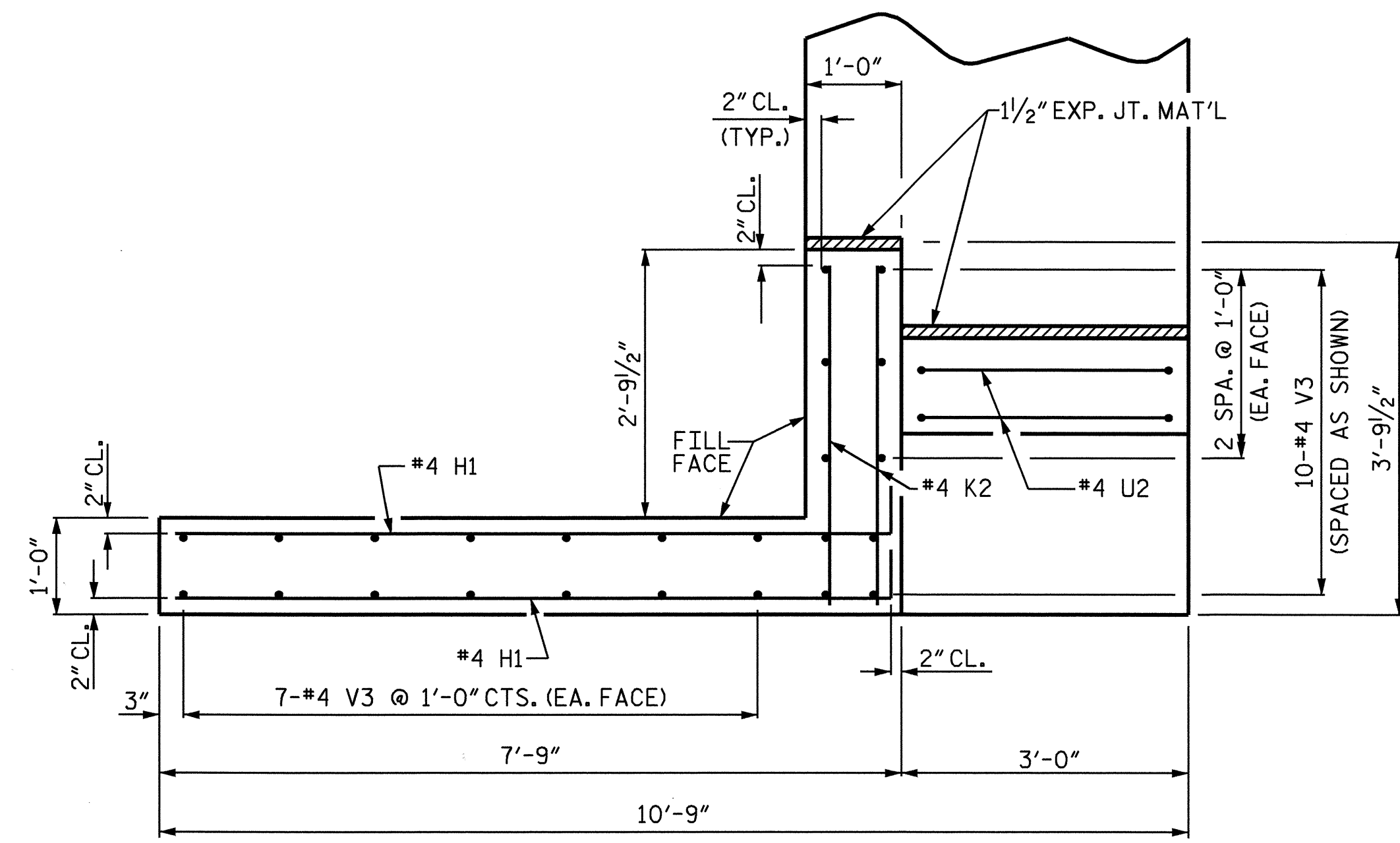
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-10
TOTAL SHEETS	18

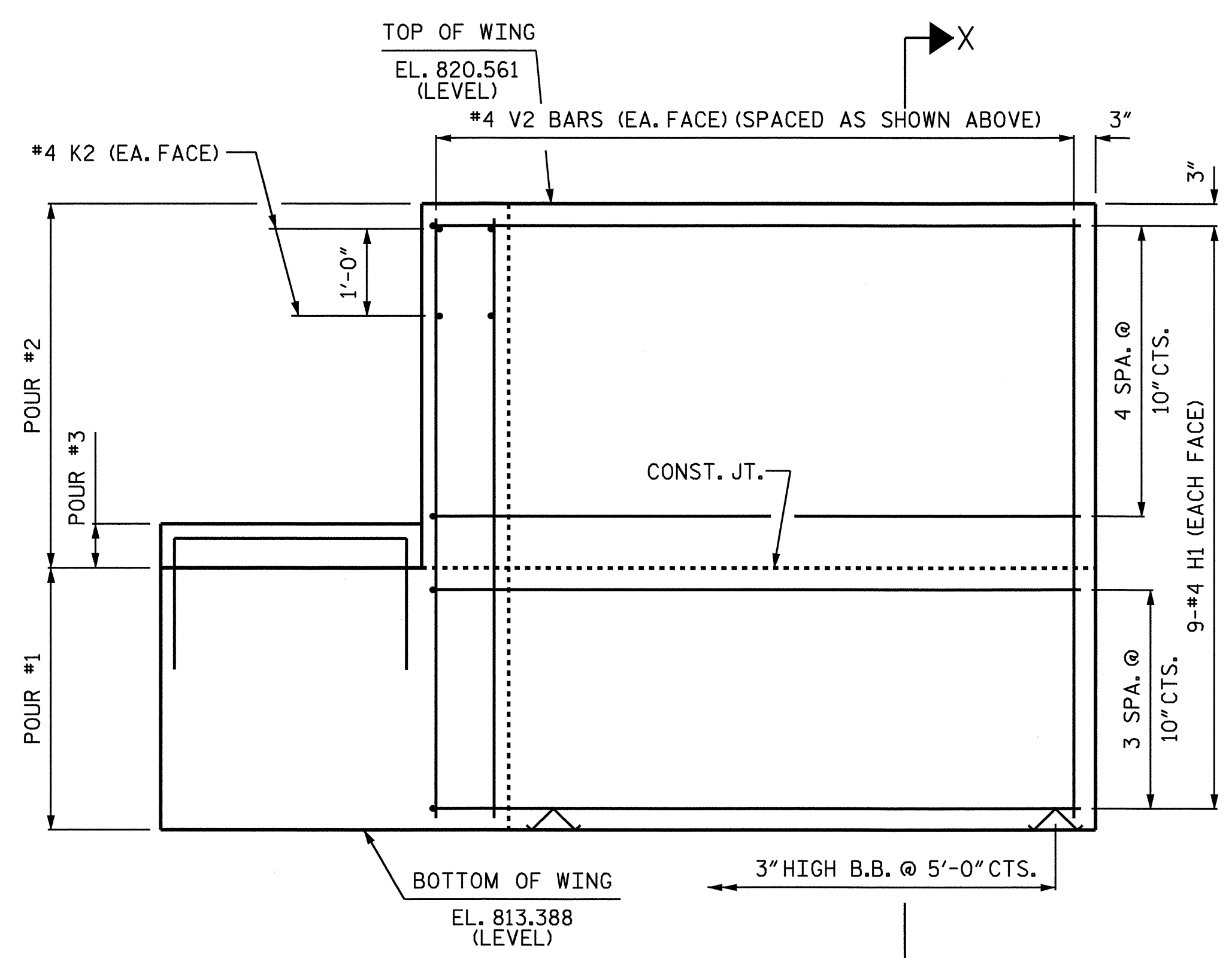




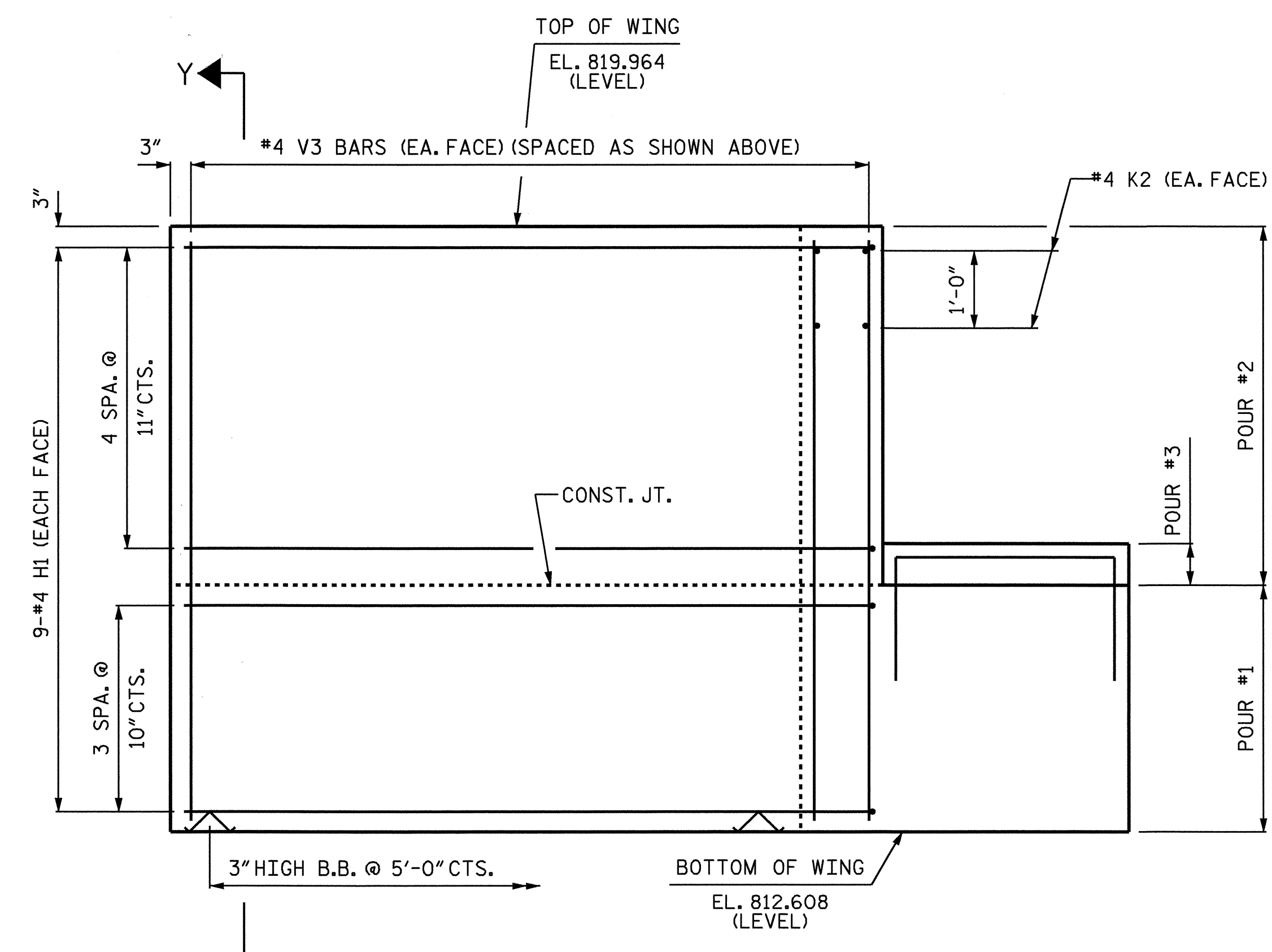
PLAN OF WING (W1)



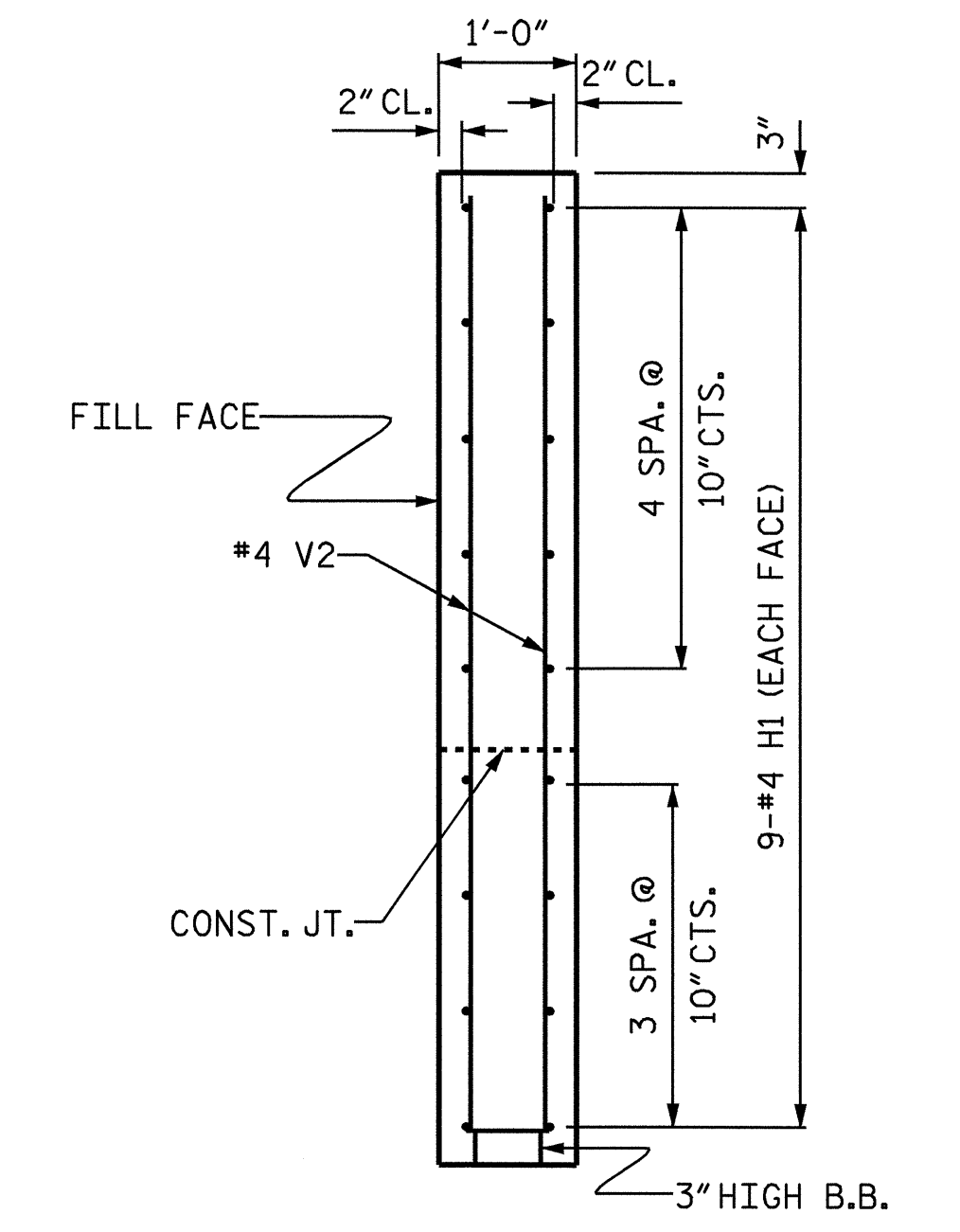
PLAN OF WING (W2)



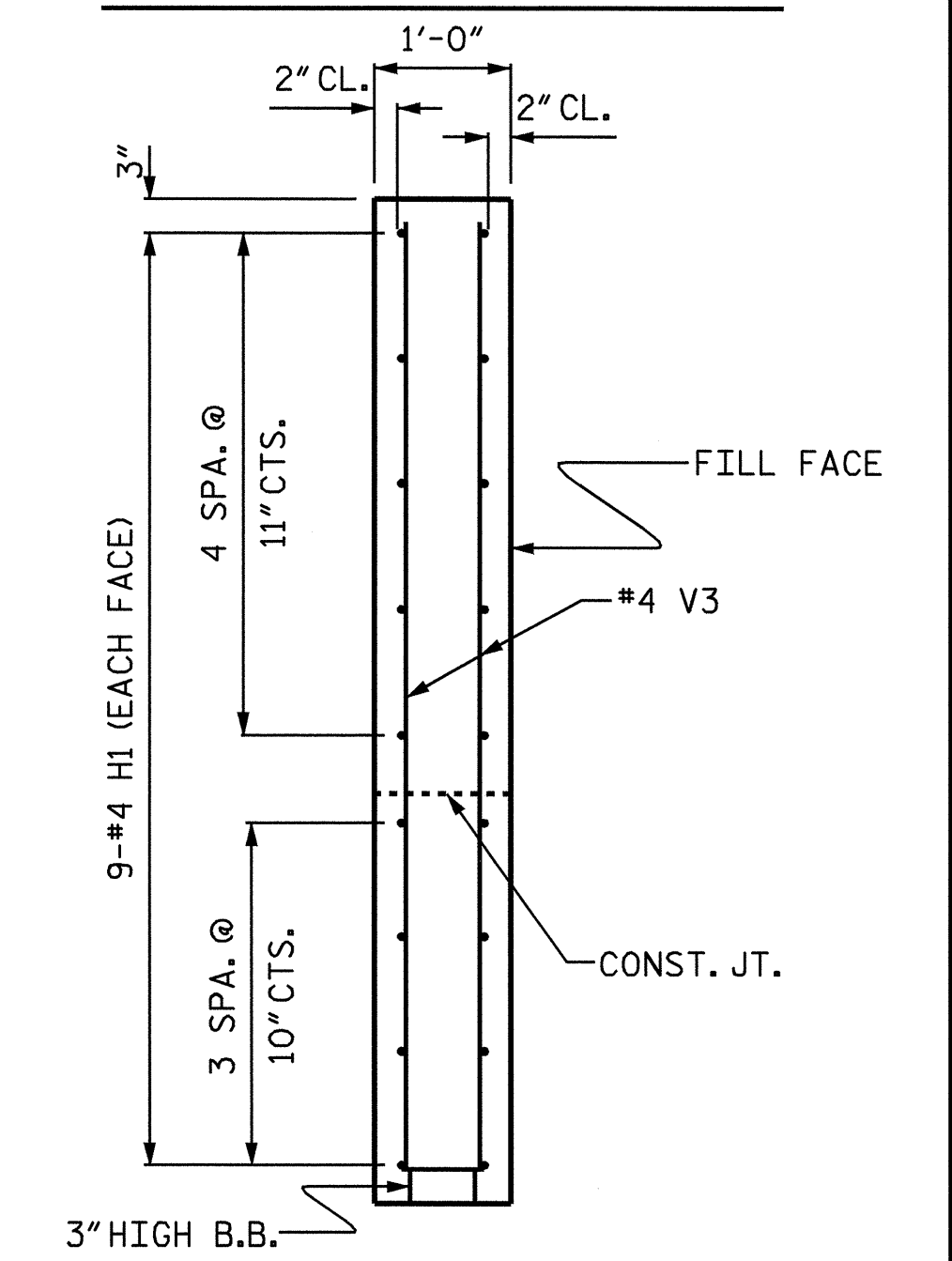
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

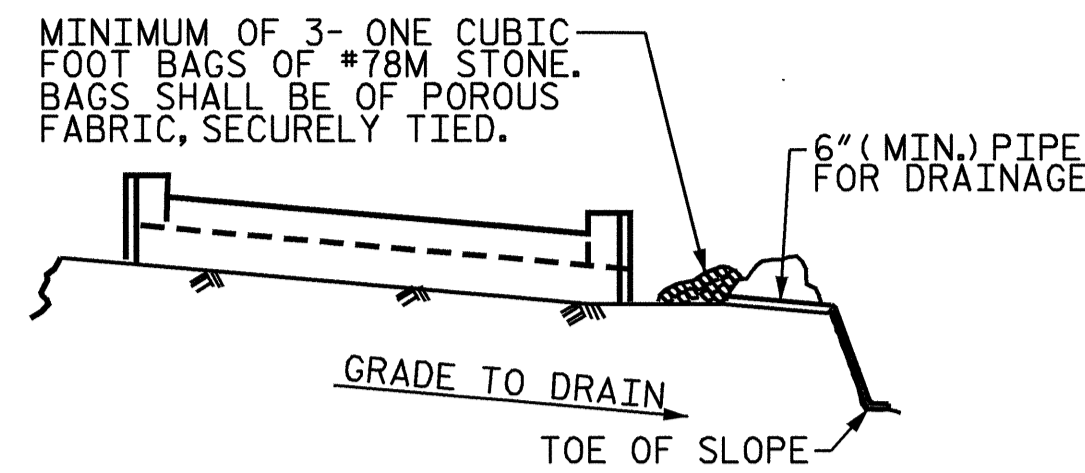
SHEET 2 OF 3

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



DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: T.J. BEACH DATE: 9/07

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
1			3			TOTAL SHEETS	
2			4			18	

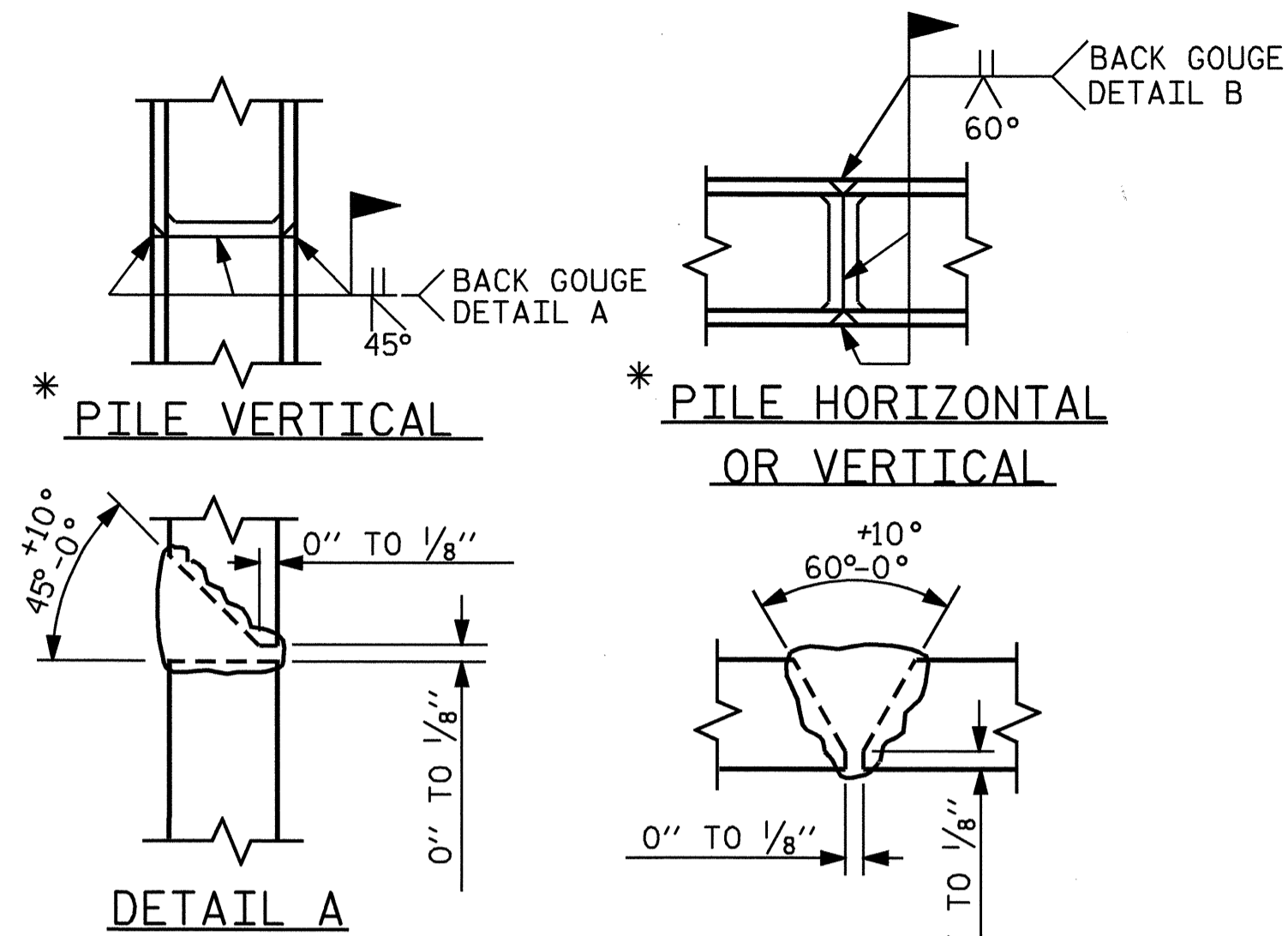


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

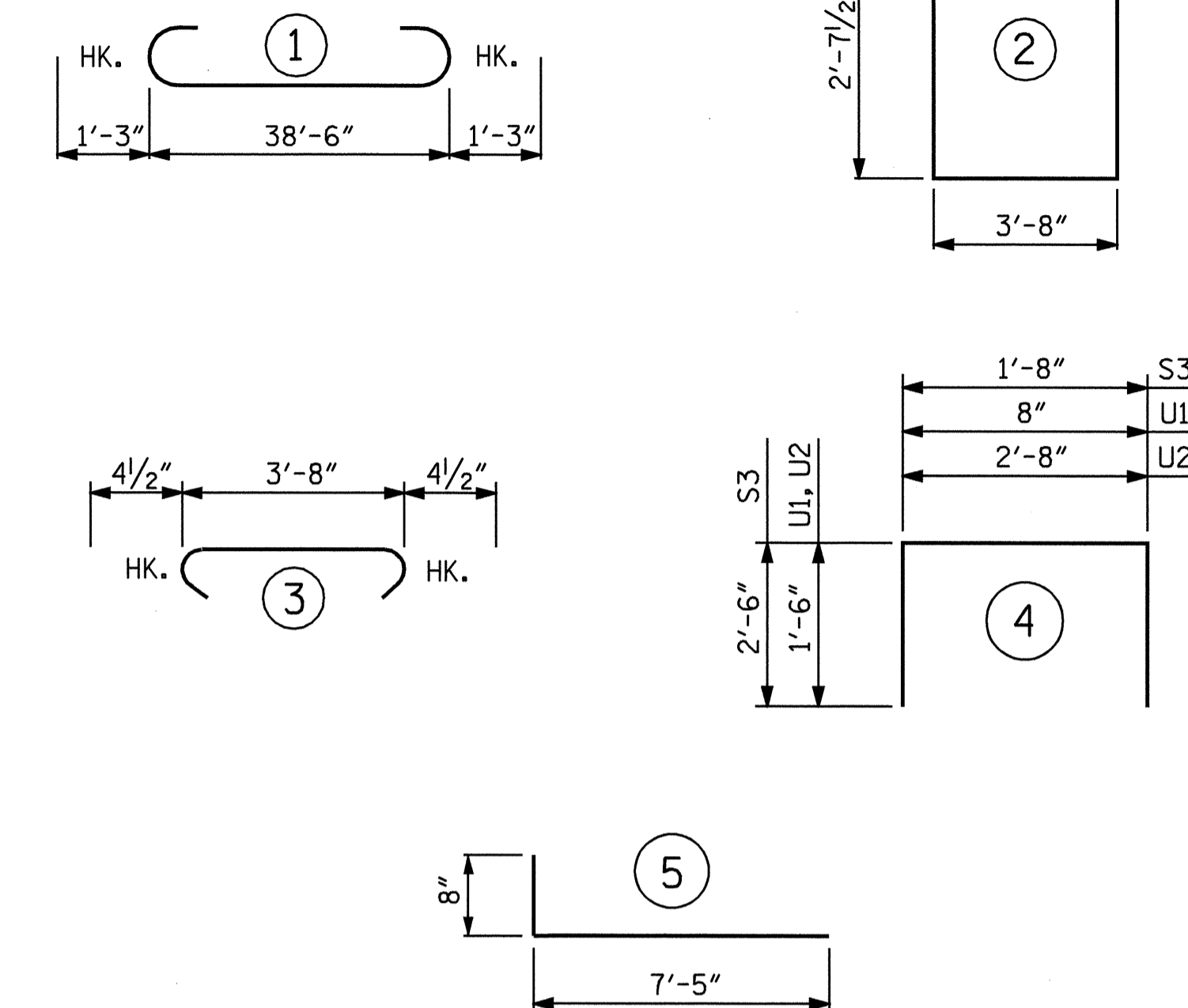
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

### TEMPORARY DRAINAGE AT END BENT

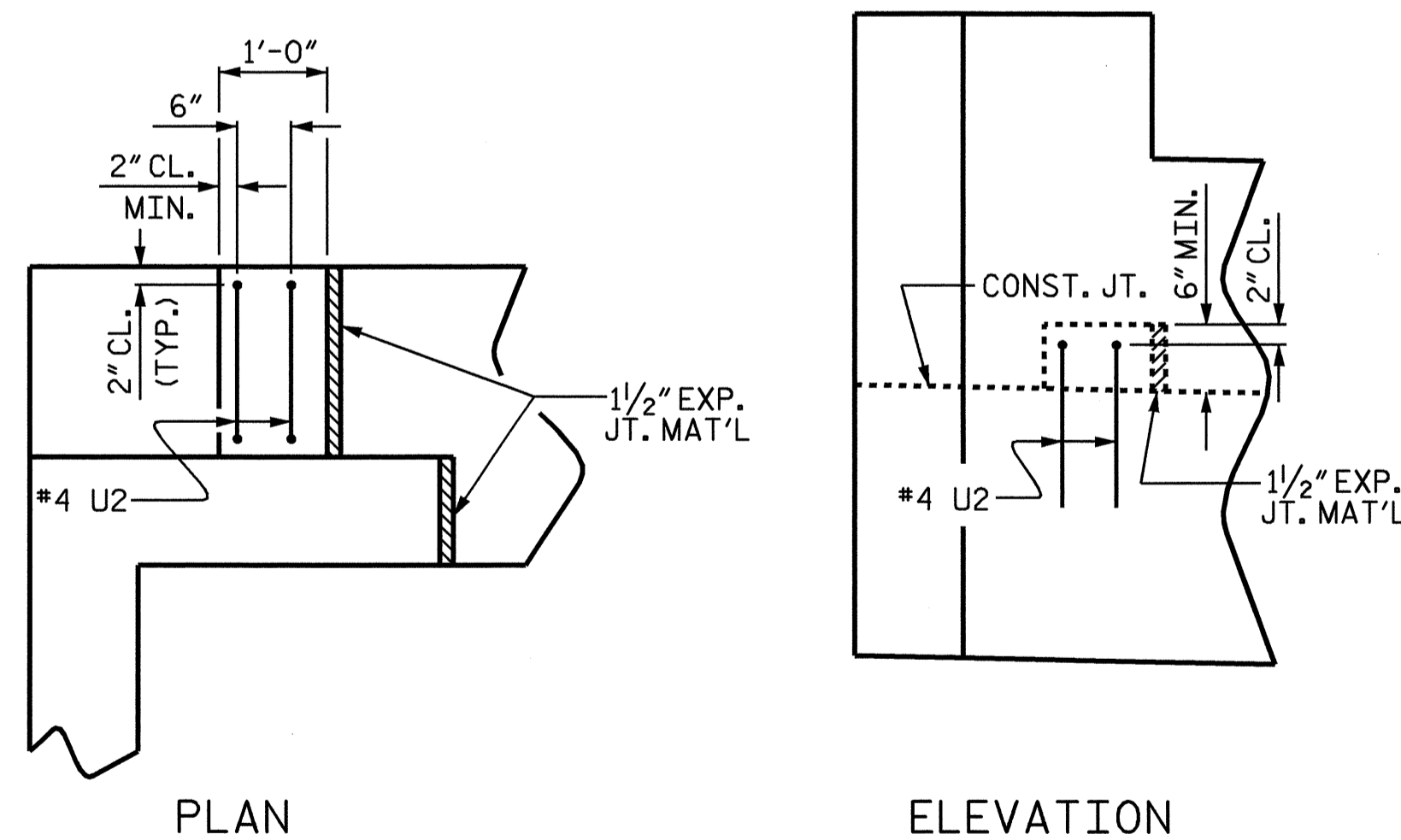


### PILE SPLICE DETAILS



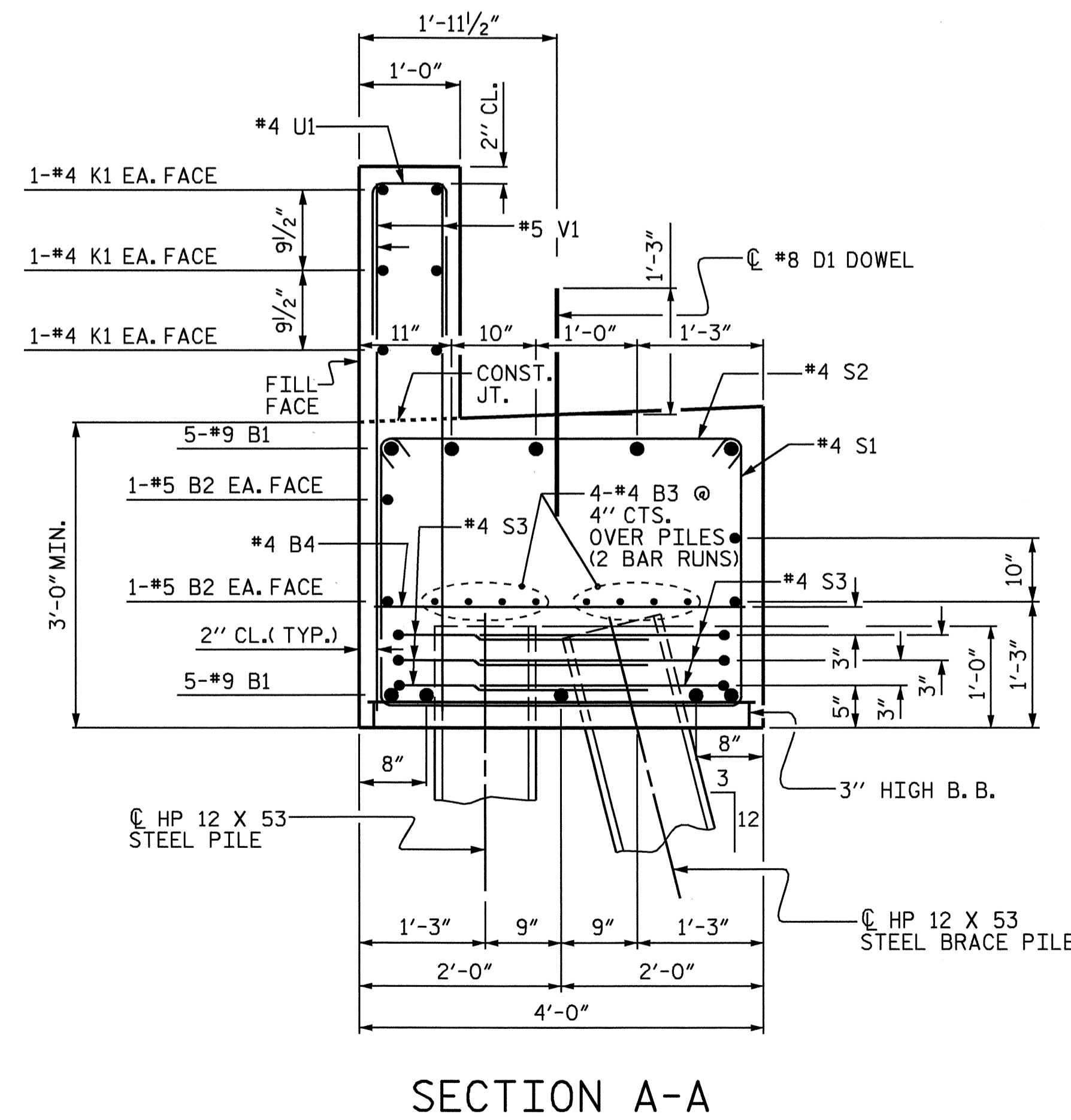
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	41'-0"	1394
B2	4	#5	STR	38'-8"	161
B3	16	#4	STR	20'-7"	220
B4	10	#4	STR	3'-8"	24
D1	22	#8	STR	2'-3"	132
H1	36	#4	5	8'-1"	194
K1	12	#4	STR	20'-7"	165
K2	8	#4	STR	3'-5"	18
S1	42	#4	2	9'-8"	271
S2	42	#4	3	4'-5"	124
S3	30	#4	4	6'-8"	134
U1	32	#4	4	3'-8"	78
U2	4	#4	4	5'-8"	15
V1	64	#5	STR	4'-7"	306
V2	24	#4	STR	6'-10"	110
V3	24	#4	STR	7'-0"	112
REINFORCING STEEL					3458 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP & LOWER PART OF WINGS				19.3 C.Y.	
POUR #2 UPPER PART OF WINGS & BACKWALL				5.7 C.Y.	
POUR #3 LATERAL GUIDES				0.1 C.Y.	
TOTAL CLASS A CONCRETE				25.1 C.Y.	
HP 12 X 53 STEEL PILES					
NO: 10					LIN. FT. = 260



### LATERAL GUIDE DETAIL

(LEFT LATERAL GUIDE SHOWN, RIGHT LATERAL GUIDE SIMILAR)



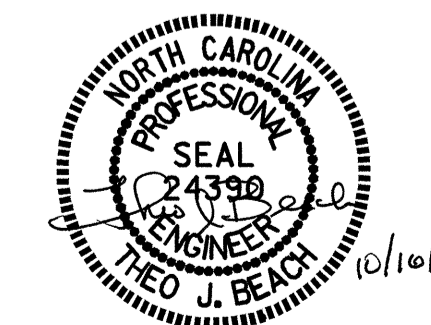
### SECTION A-A

PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T.J. BEACH DATE : 9/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			18

**NOTES:**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES AT EACH END OF THE CAP ARE NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

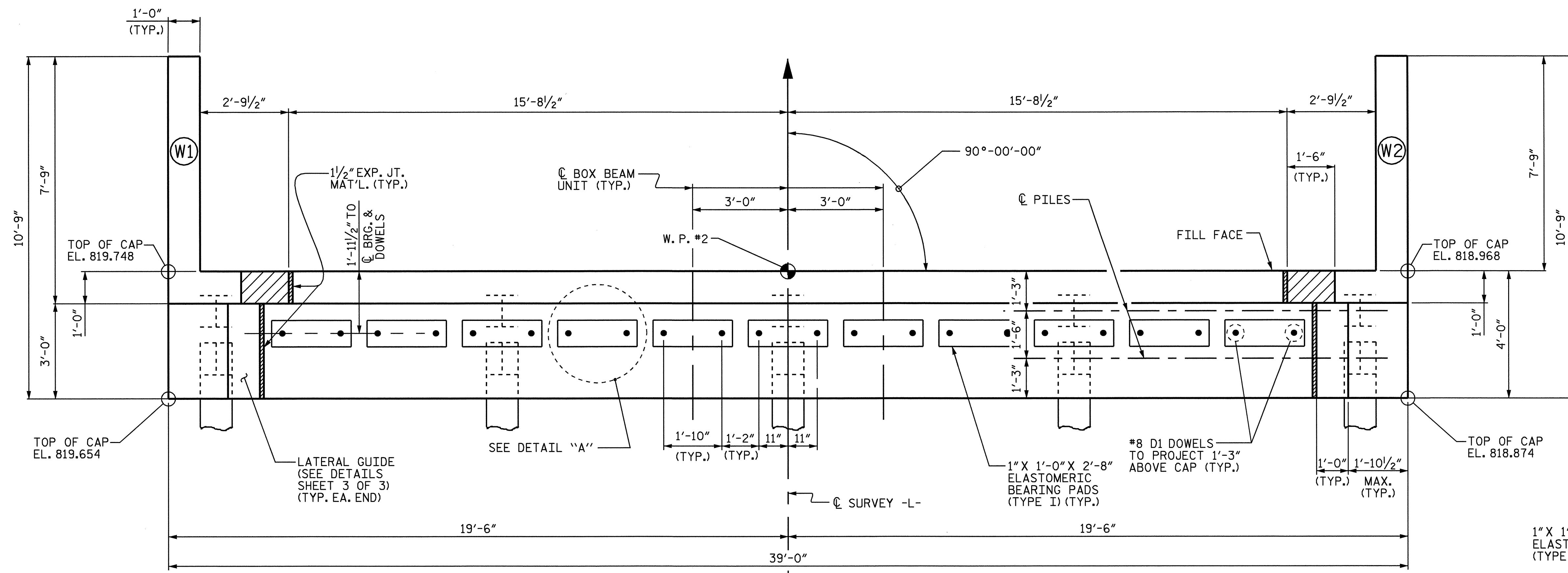
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR THE REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

\*5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

FOR SECTION A-A, SEE SHEET 3 OF 3.

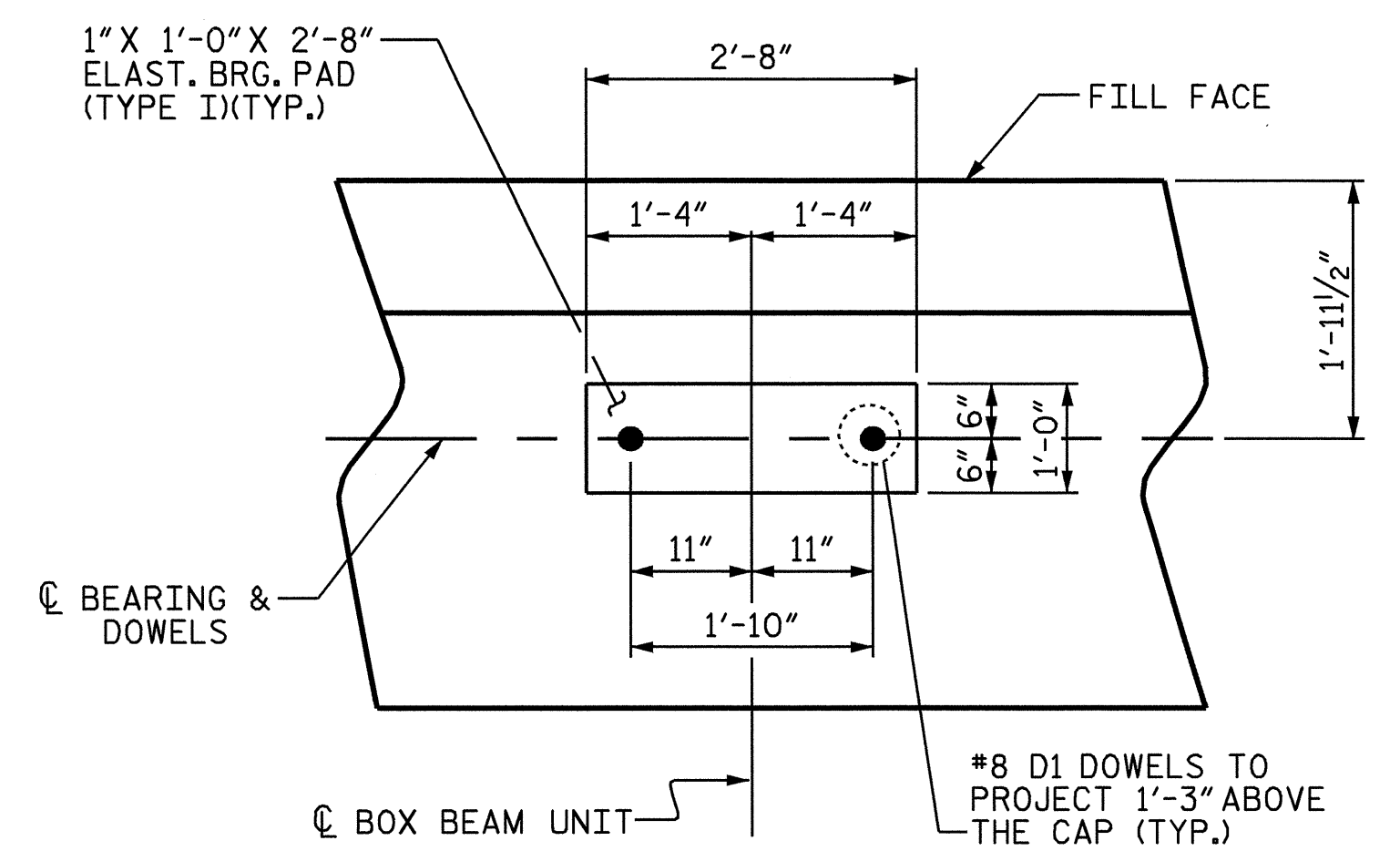
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP IS SLOPED LONGITUDINALLY.



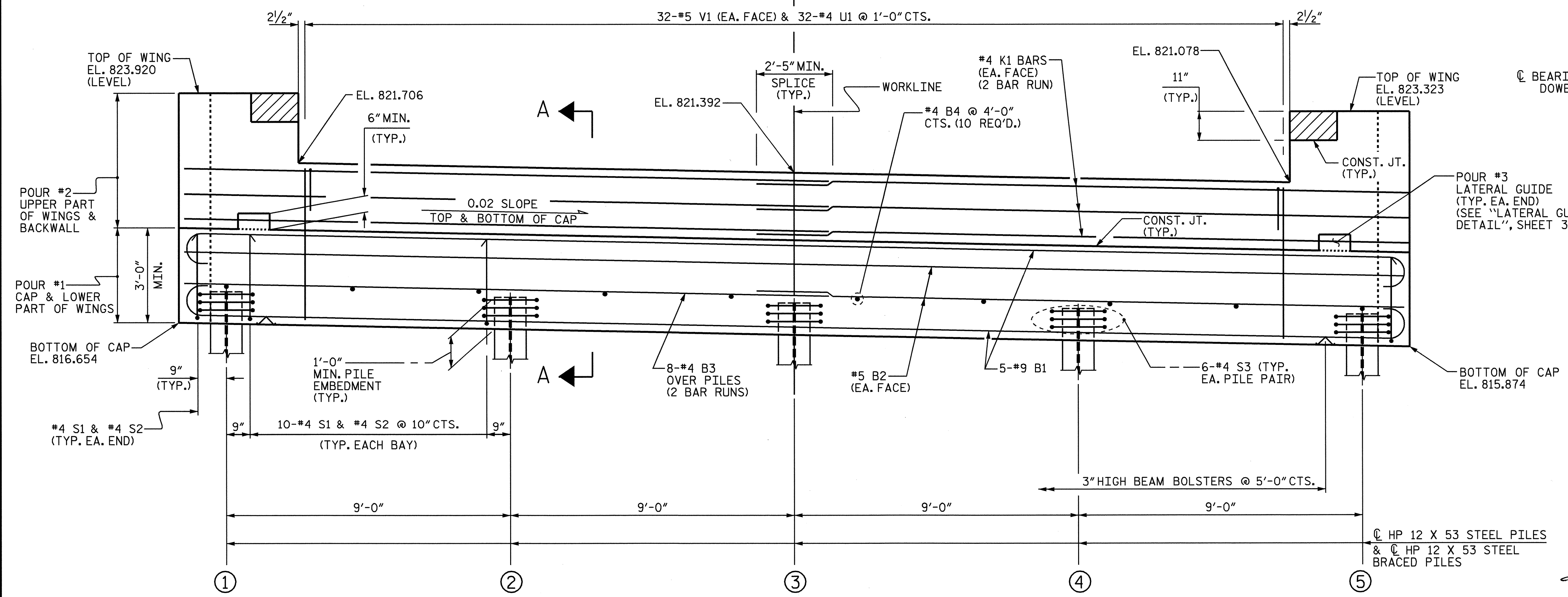
**PLAN**

TOP OF PILE ELEVATIONS	
1	817.634
2	817.454
3	817.274
4	817.094
5	816.914



**DETAIL "A"**

(TYP. EA. BEARING)



**ELEVATION**

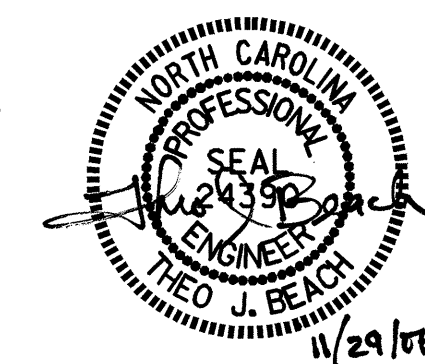
PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

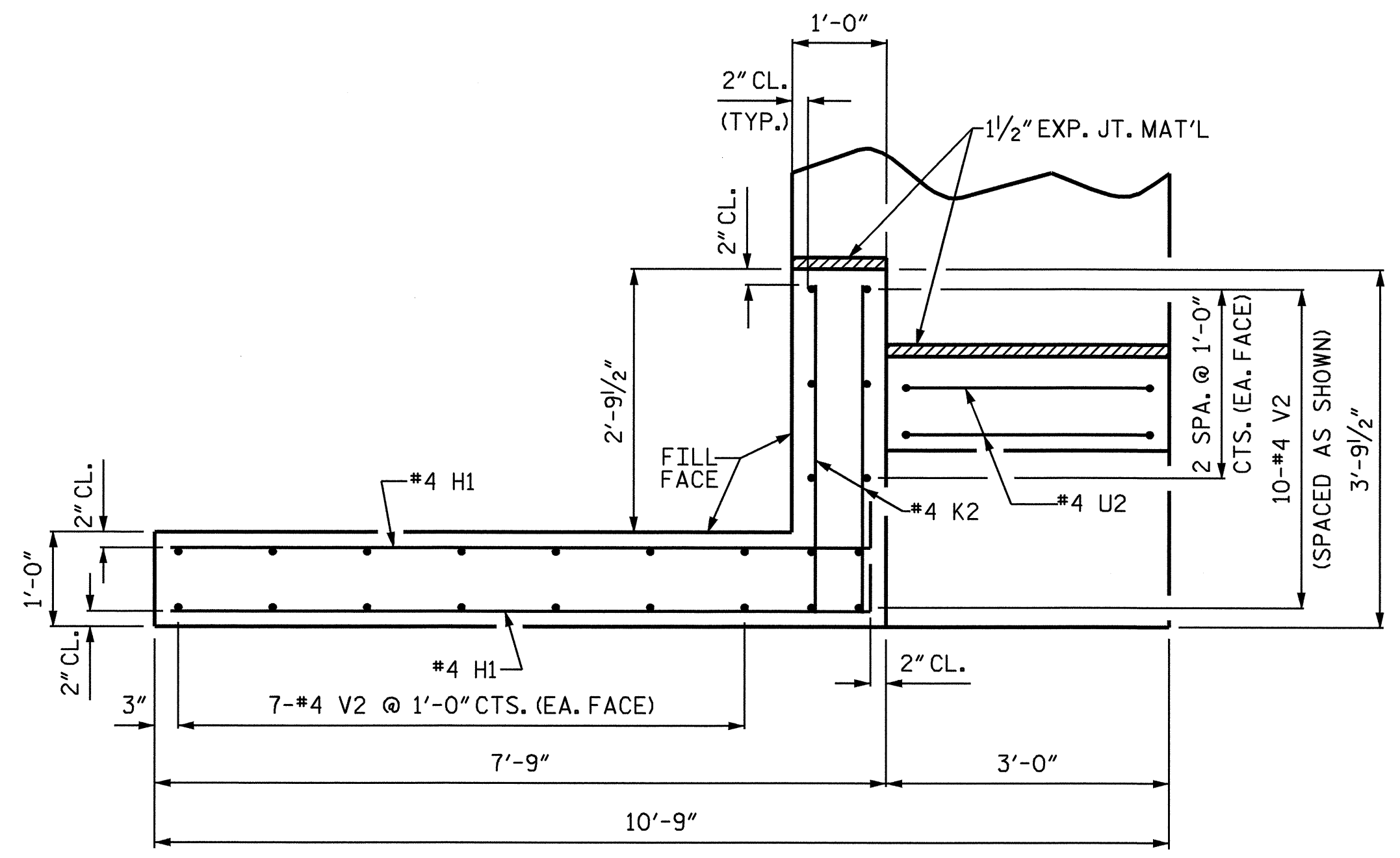
SUBSTRUCTURE  
 END BENT No. 2

REVISIONS						SHEET NO. S-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			

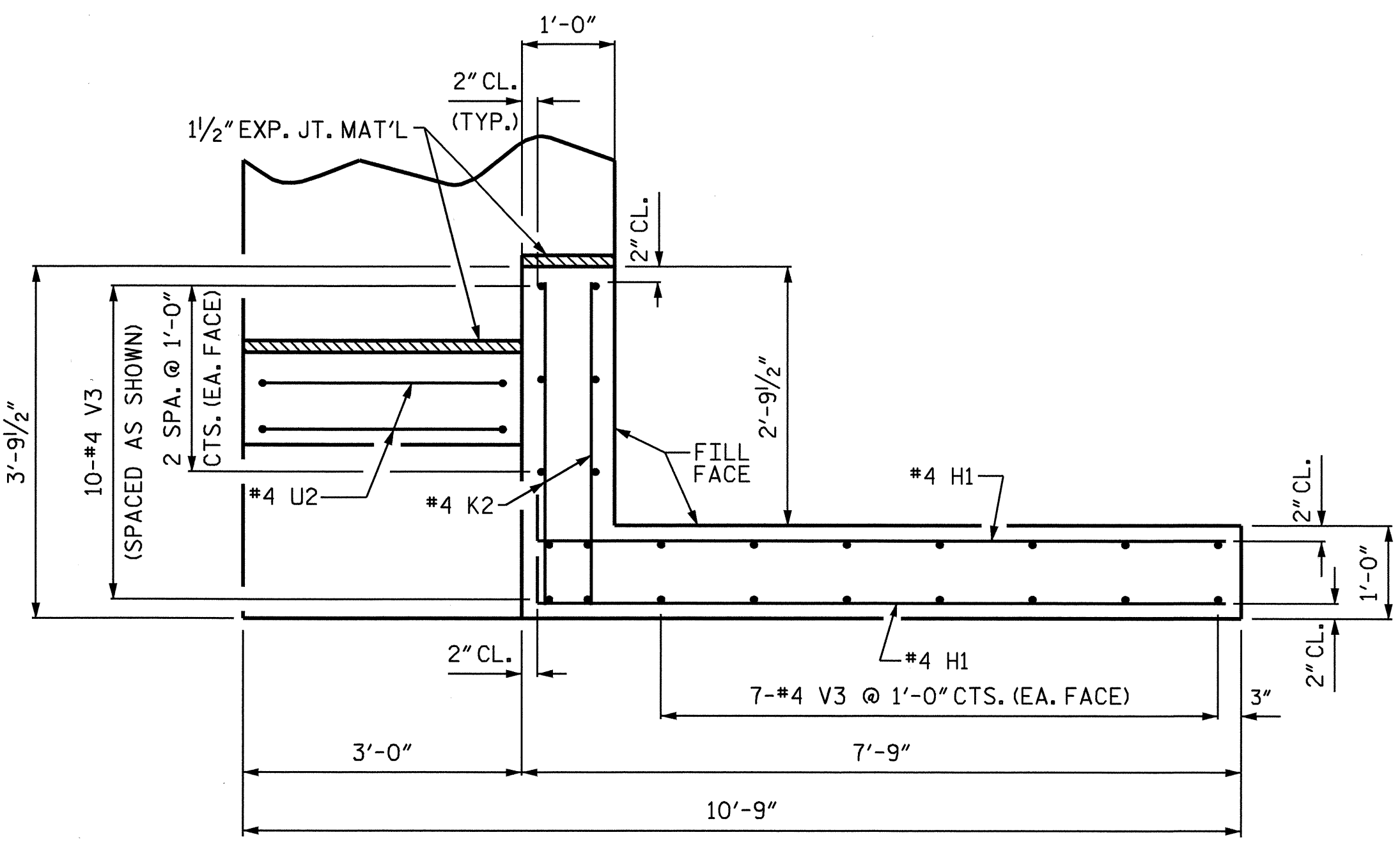


DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: T.J. BEACH DATE: 9/07

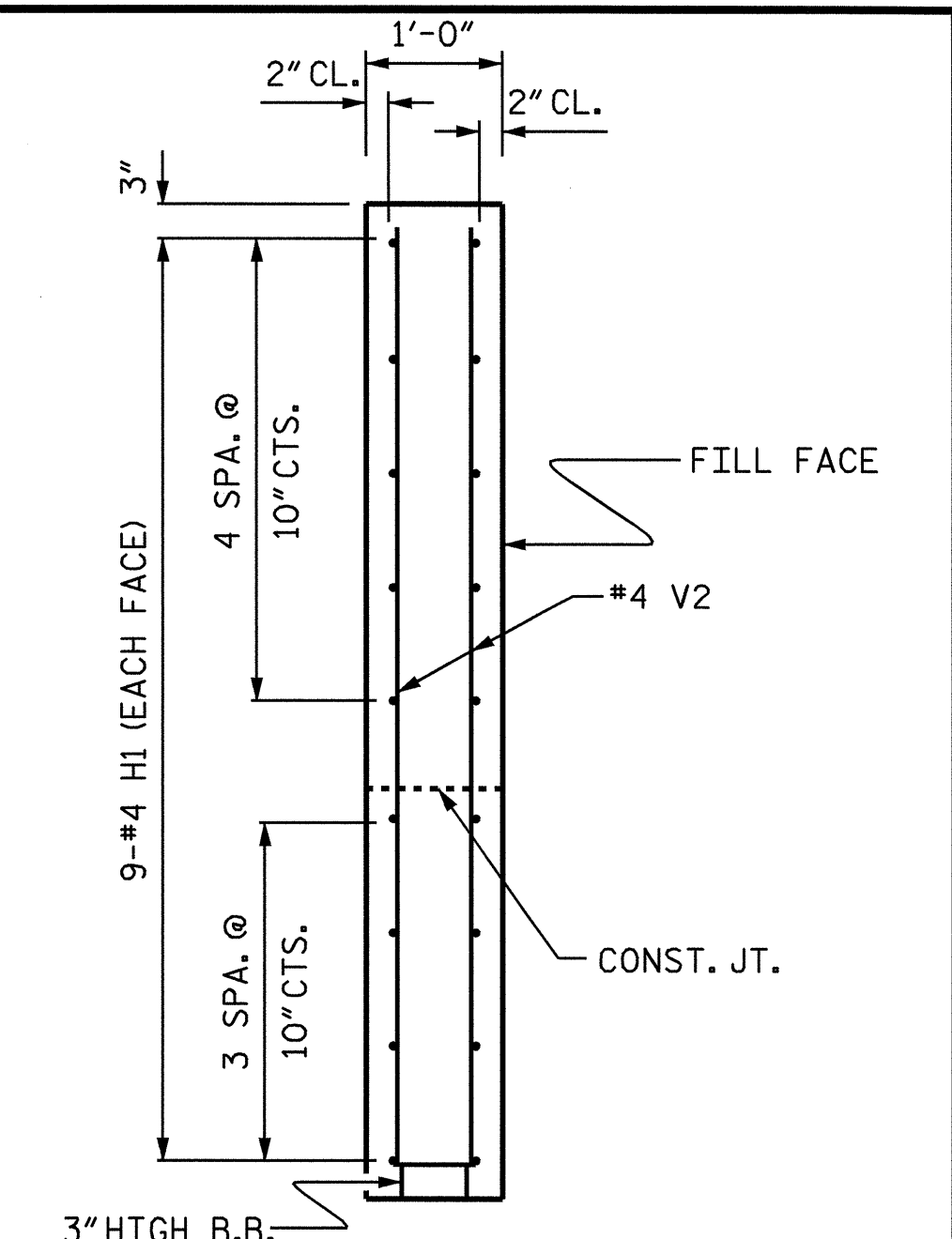




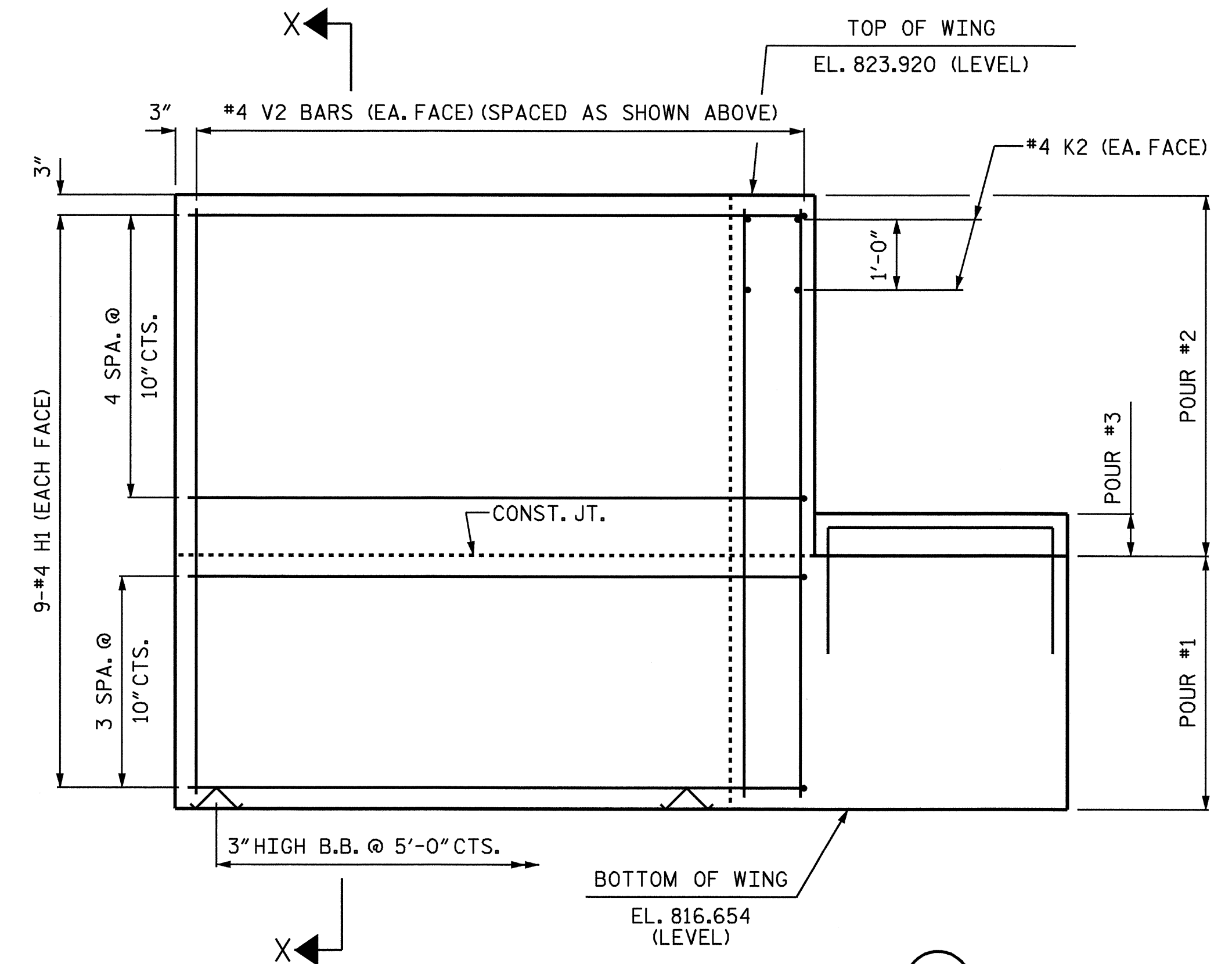
PLAN OF WING (W1)



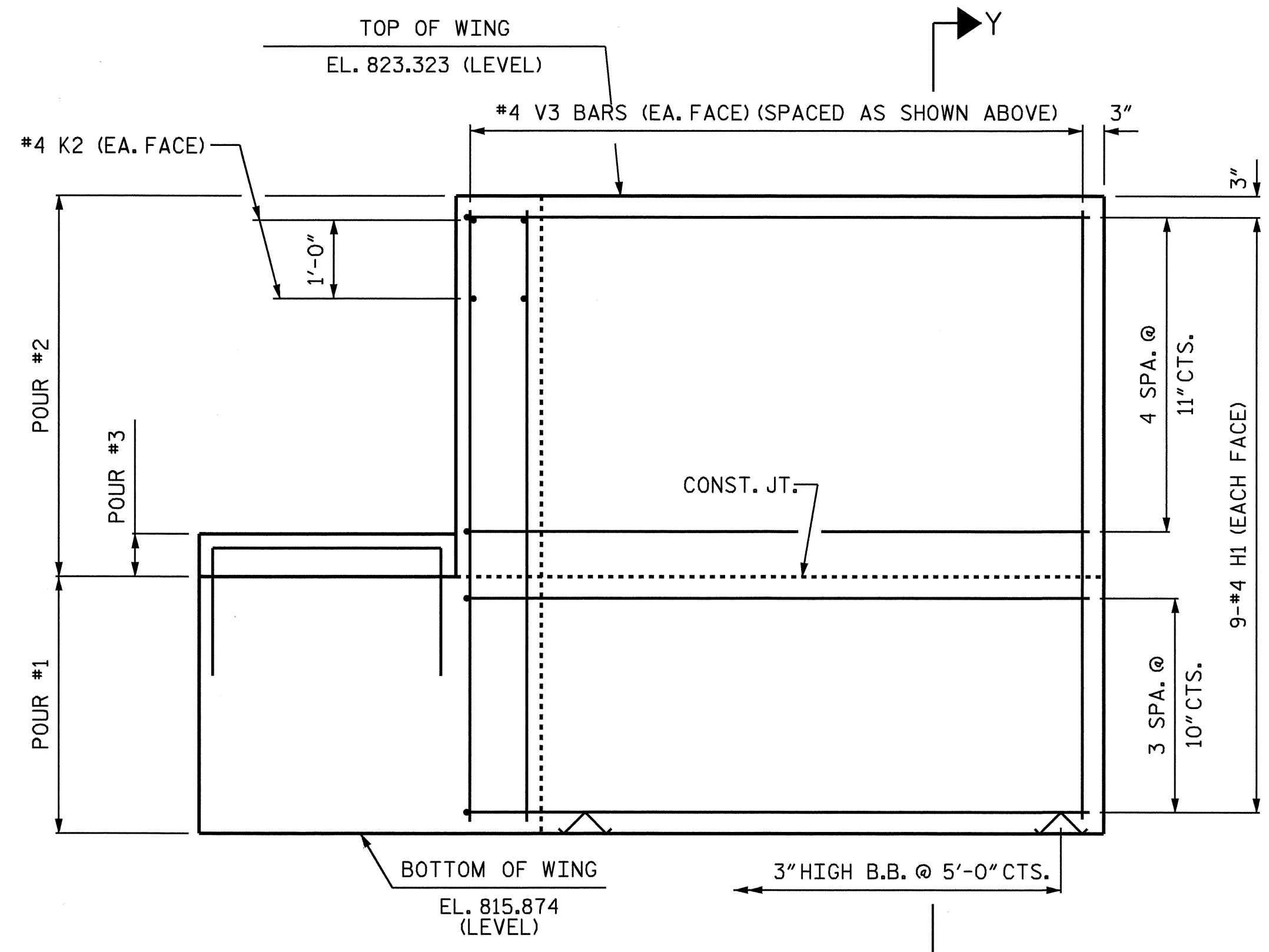
PLAN OF WING (W1)



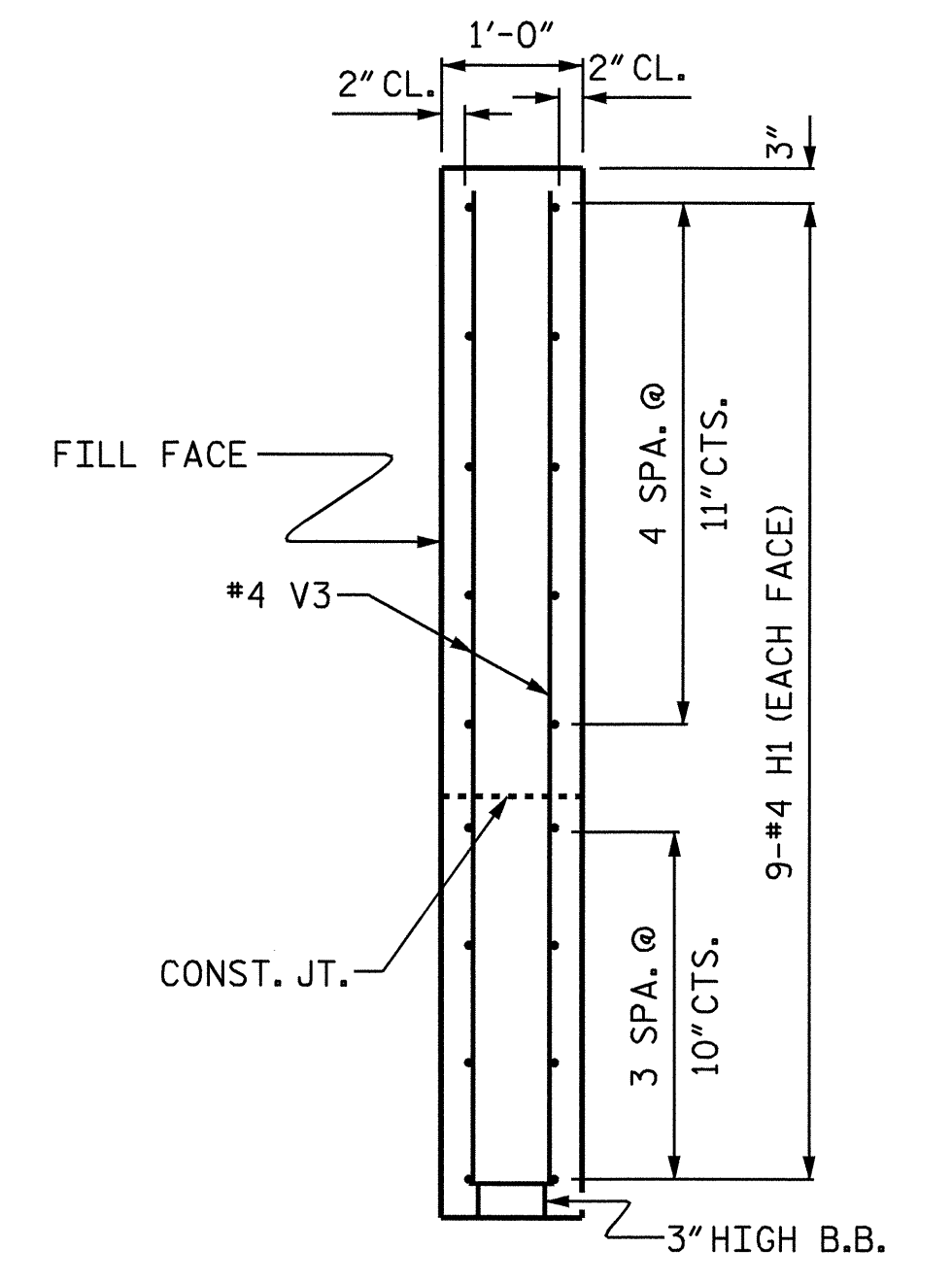
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

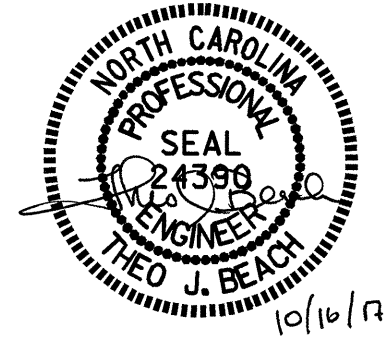


SECTION Y-Y

PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

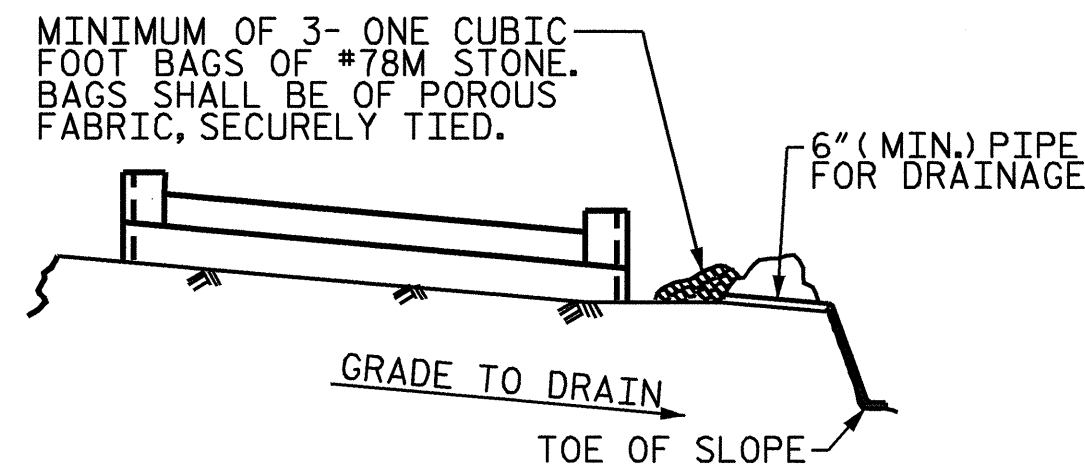
SHEET 2 OF 3

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



DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: T.J. BEACH DATE: 9/07

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			18	

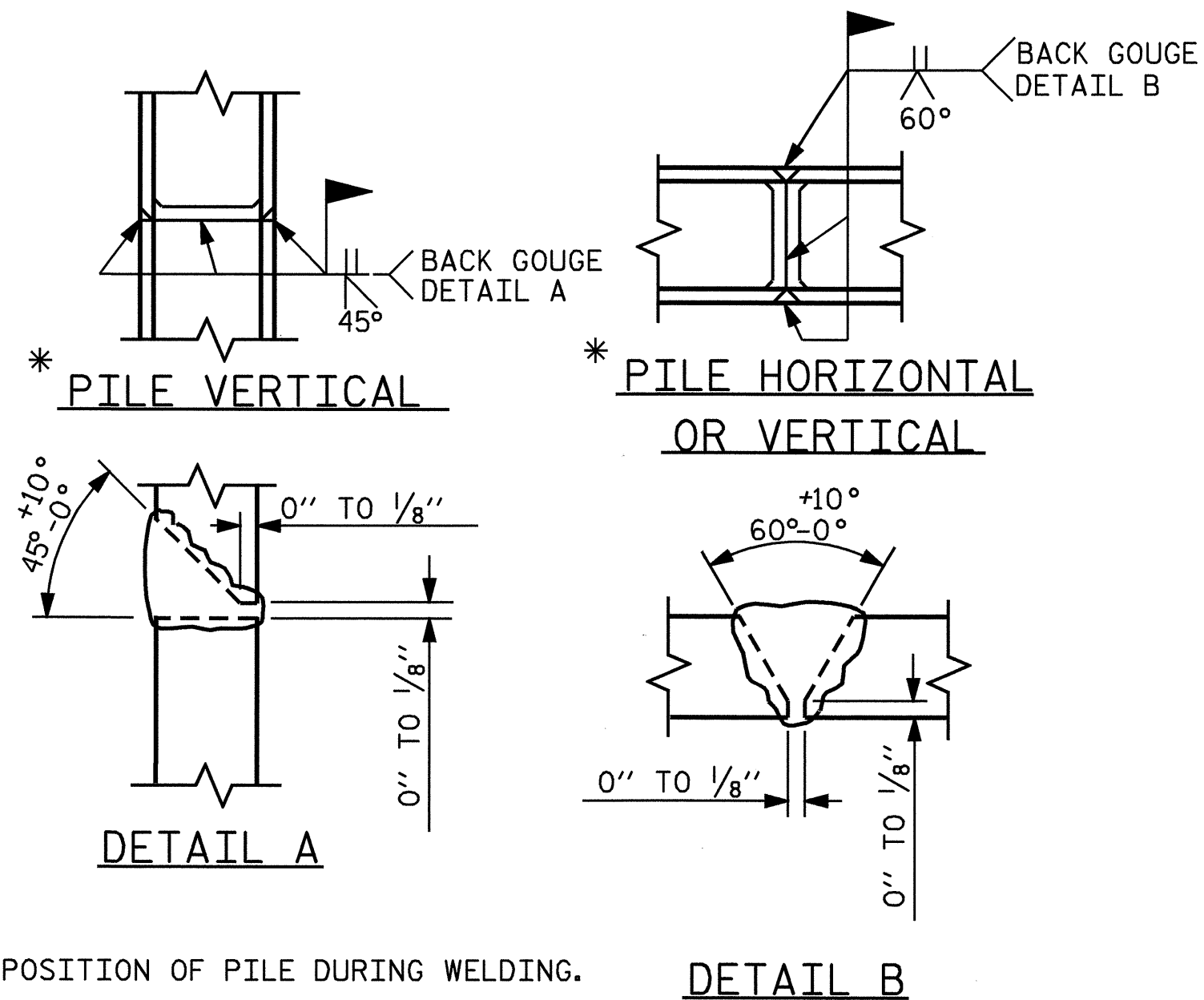


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

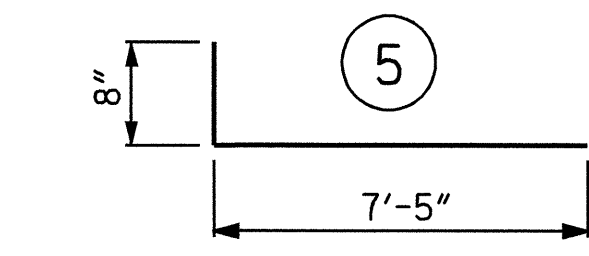
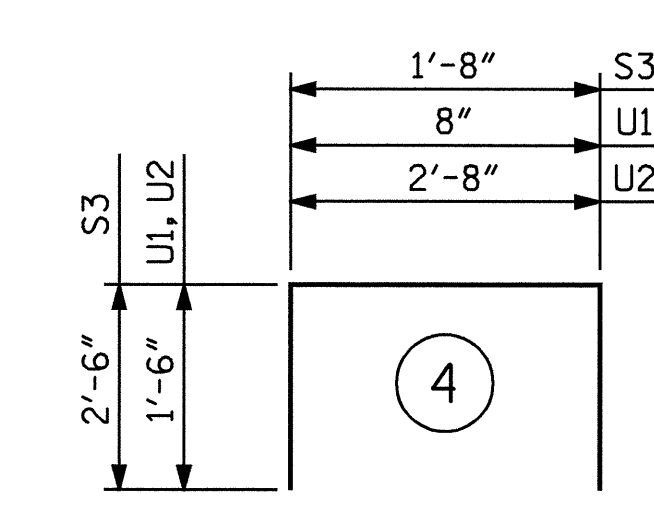
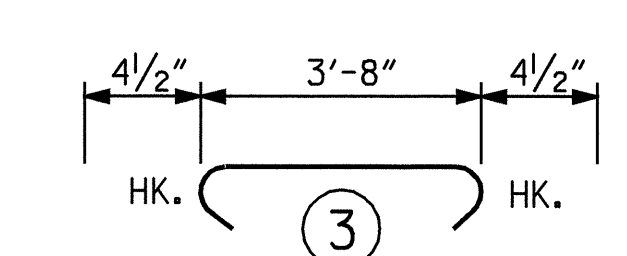
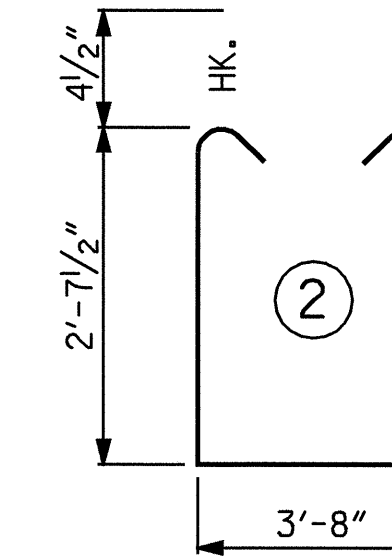
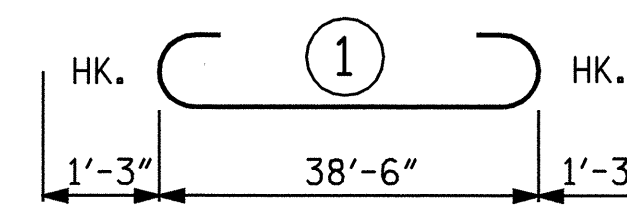
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

### TEMPORARY DRAINAGE AT END BENT



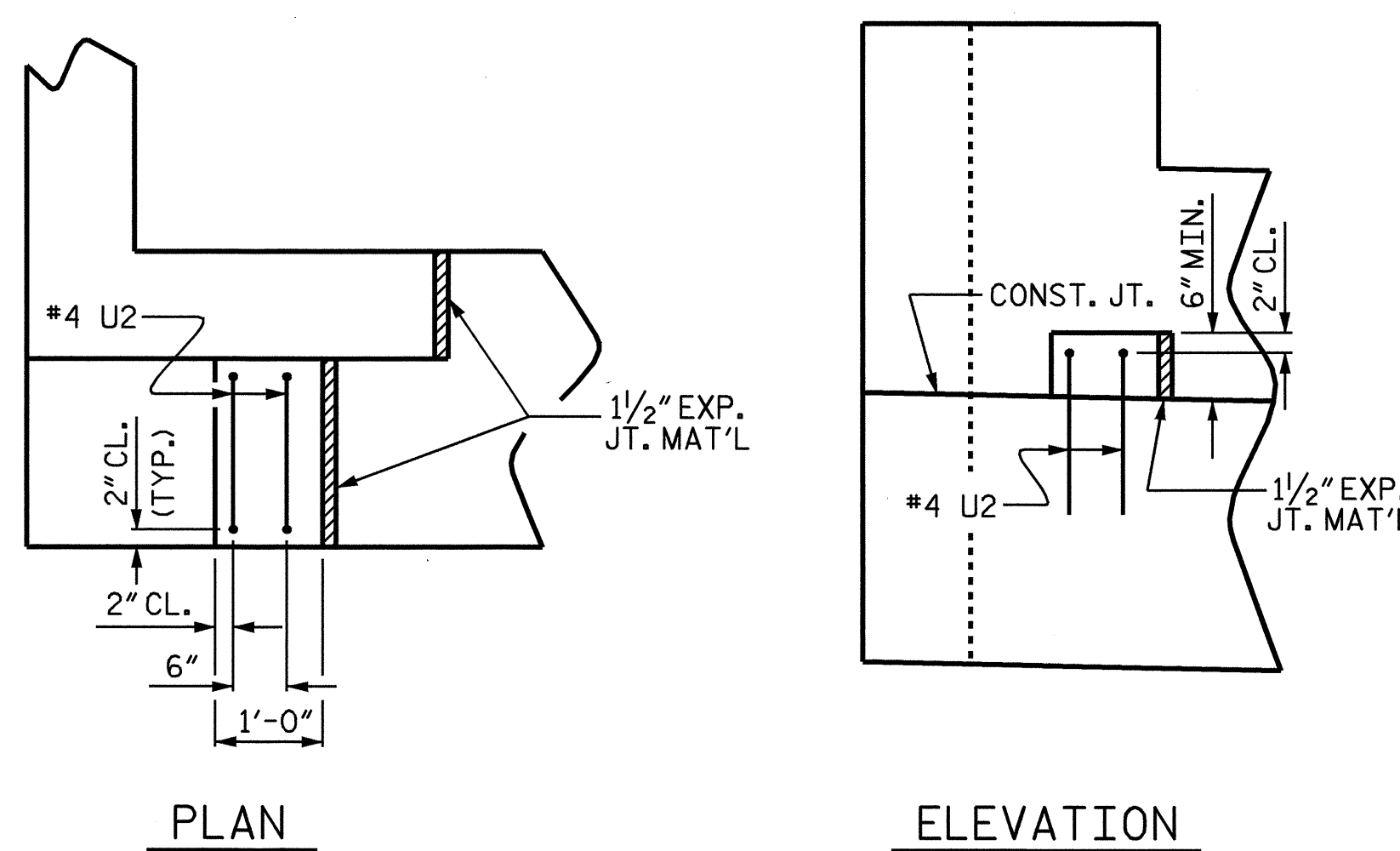
### PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

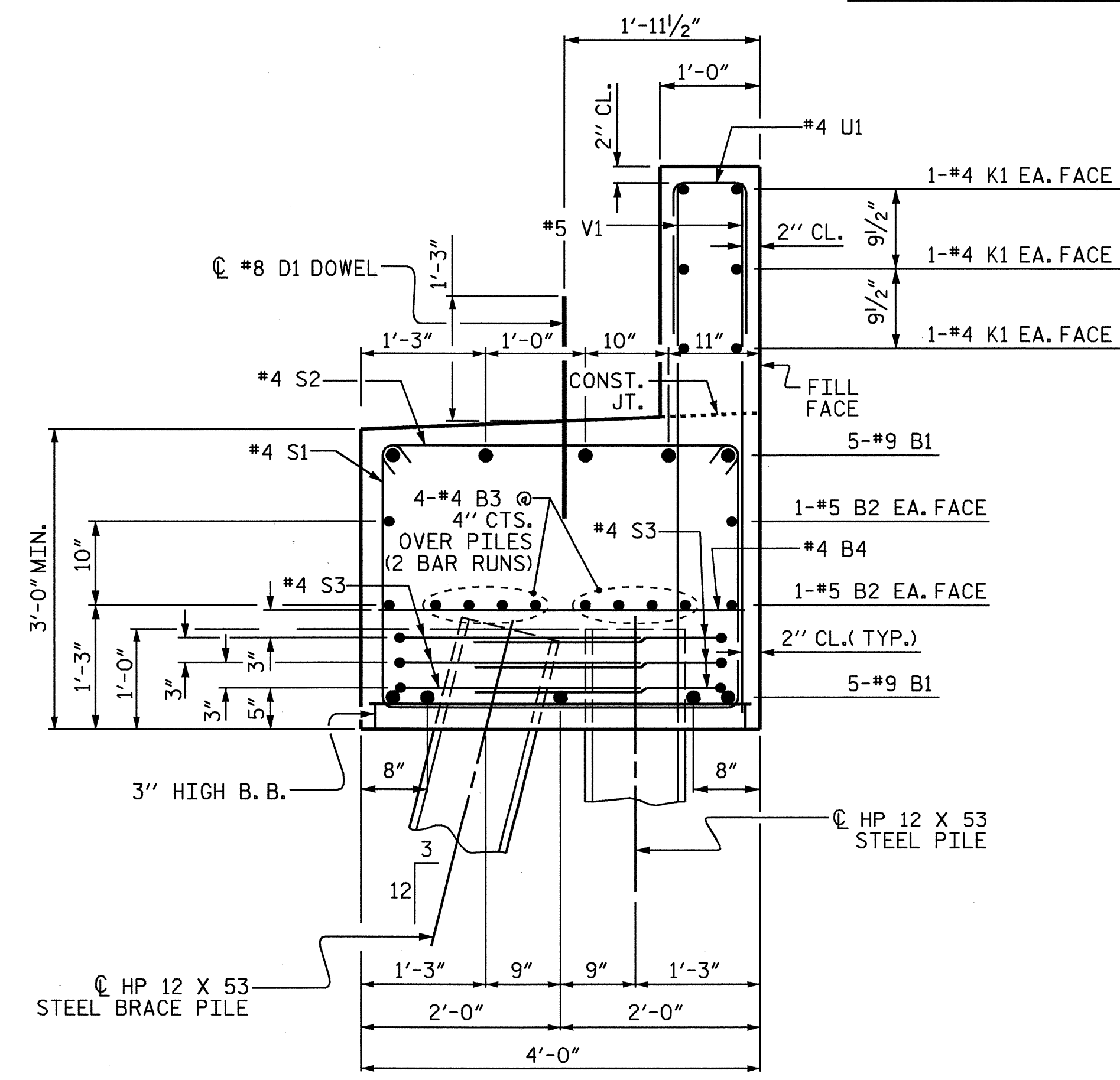
### BILL OF MATERIAL

END BENT No. 2					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	41'-0"	1394
B2	4	#5	STR	38'-8"	161
B3	16	#4	STR	20'-7"	220
B4	10	#4	STR	3'-8"	24
D1	22	#8	STR	2'-3"	132
H1	36	#4	5	8'-1"	194
K1	12	#4	STR	20'-7"	165
K2	8	#4	STR	3'-5"	18
S1	42	#4	2	9'-8"	271
S2	42	#4	3	4'-5"	124
S3	30	#4	4	6'-8"	134
U1	32	#4	4	3'-8"	78
U2	4	#4	4	5'-8"	15
V1	64	#5	STR	4'-9"	317
V2	24	#4	STR	6'-11"	111
V3	24	#4	STR	7'-1"	114
REINFORCING STEEL					3472 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP & LOWER PART OF WINGS				19.1 C.Y.	
POUR #2 UPPER PART OF WINGS & BACKWALL				5.8 C.Y.	
POUR #3 LATERAL GUIDES				0.1 C.Y.	
TOTAL CLASS A CONCRETE				25.0 C.Y.	
HP 12 X 53 STEEL PILES					
NO: 10					LIN. FT. = 280



### LATERAL GUIDE DETAIL

(LEFT LATERAL GUIDE SHOWN, RIGHT LATERAL GUIDE SIMILAR)

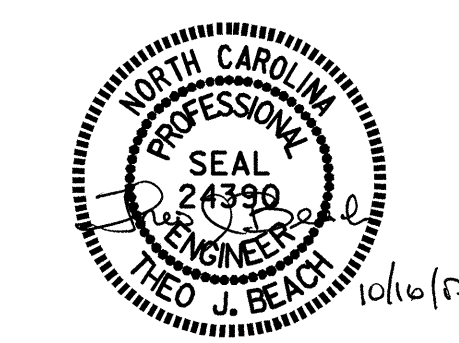


### SECTION A-A

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

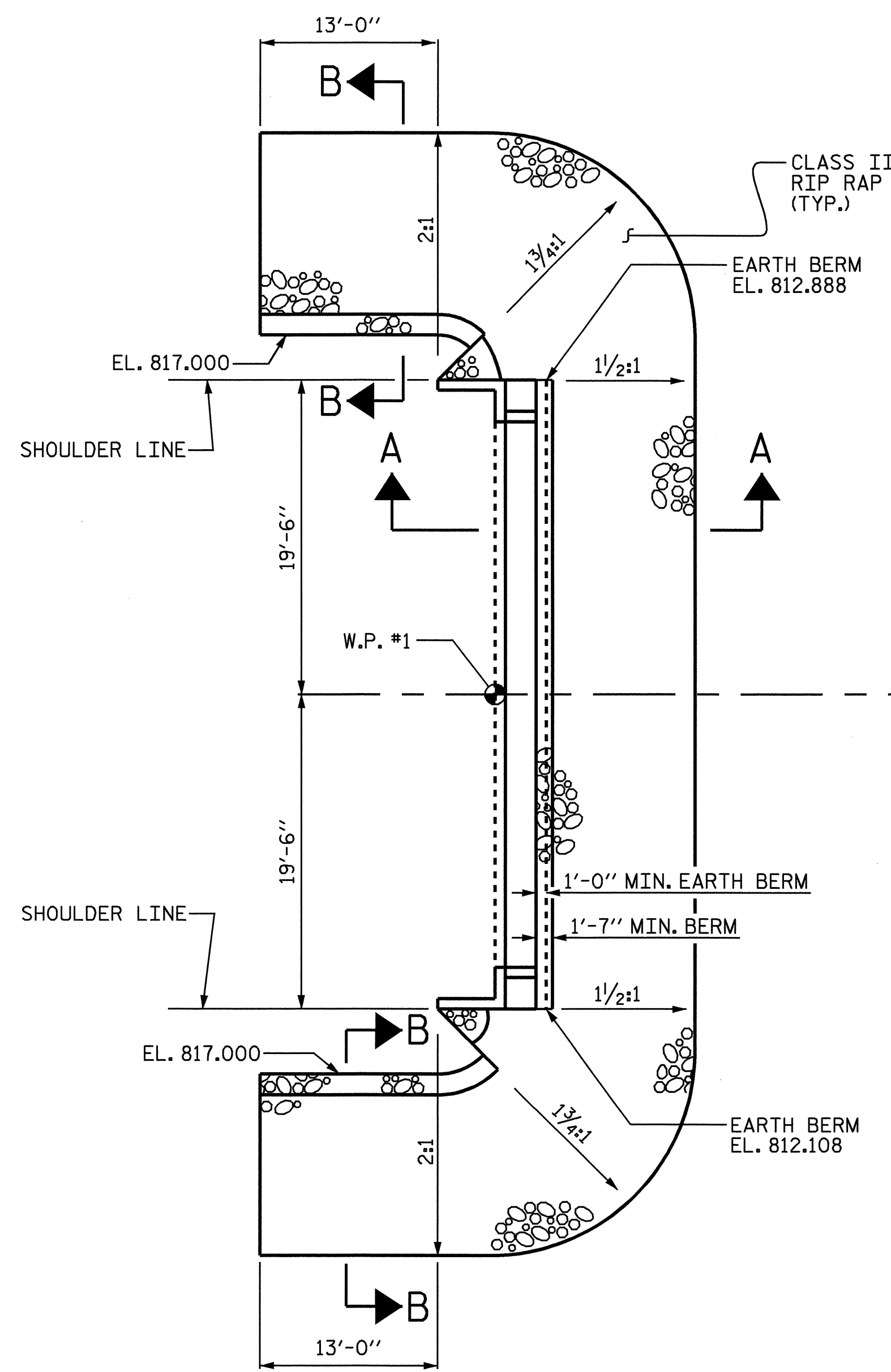
SHEET 3 OF 3

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

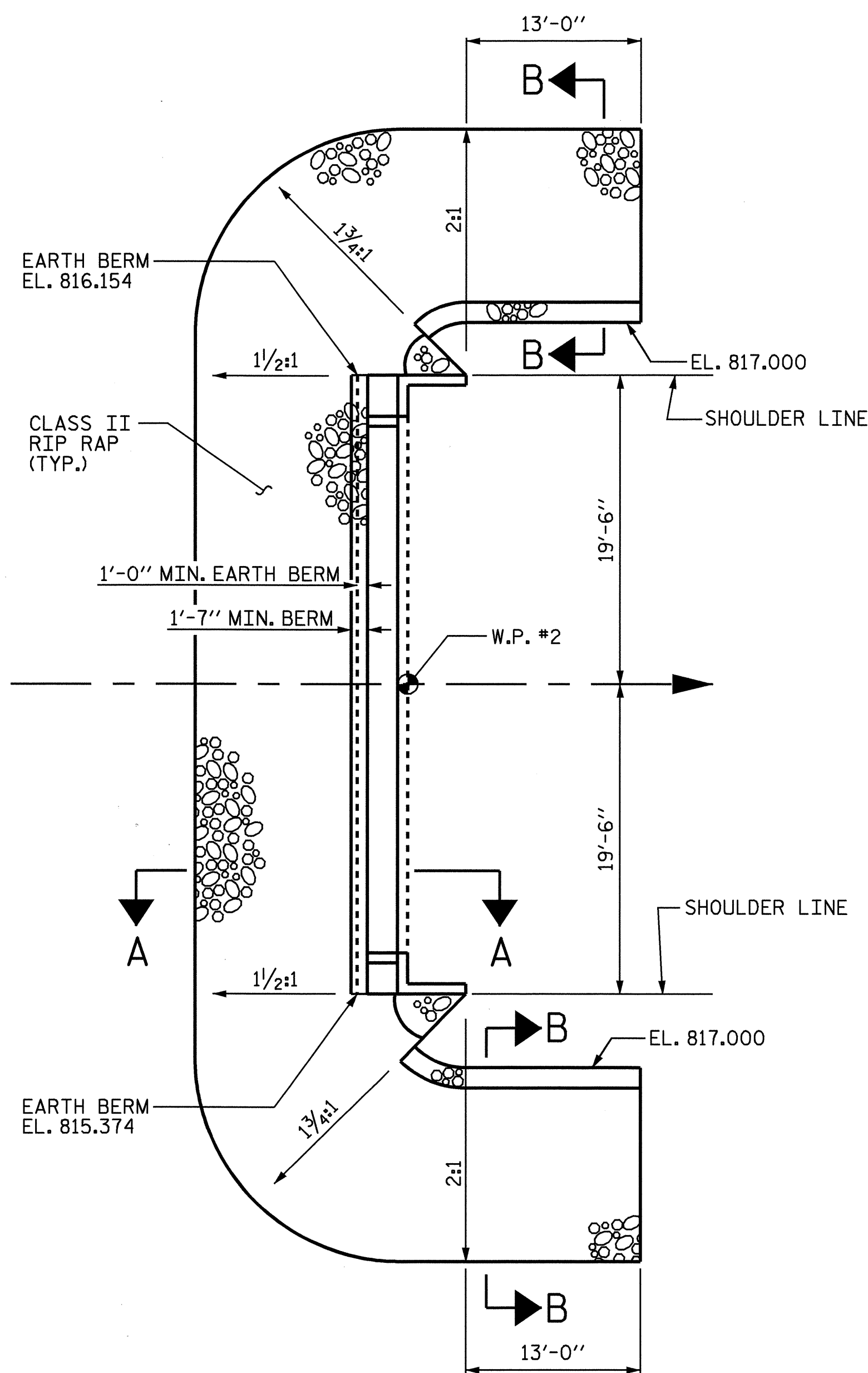


DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T.J. BEACH DATE : 9/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			18

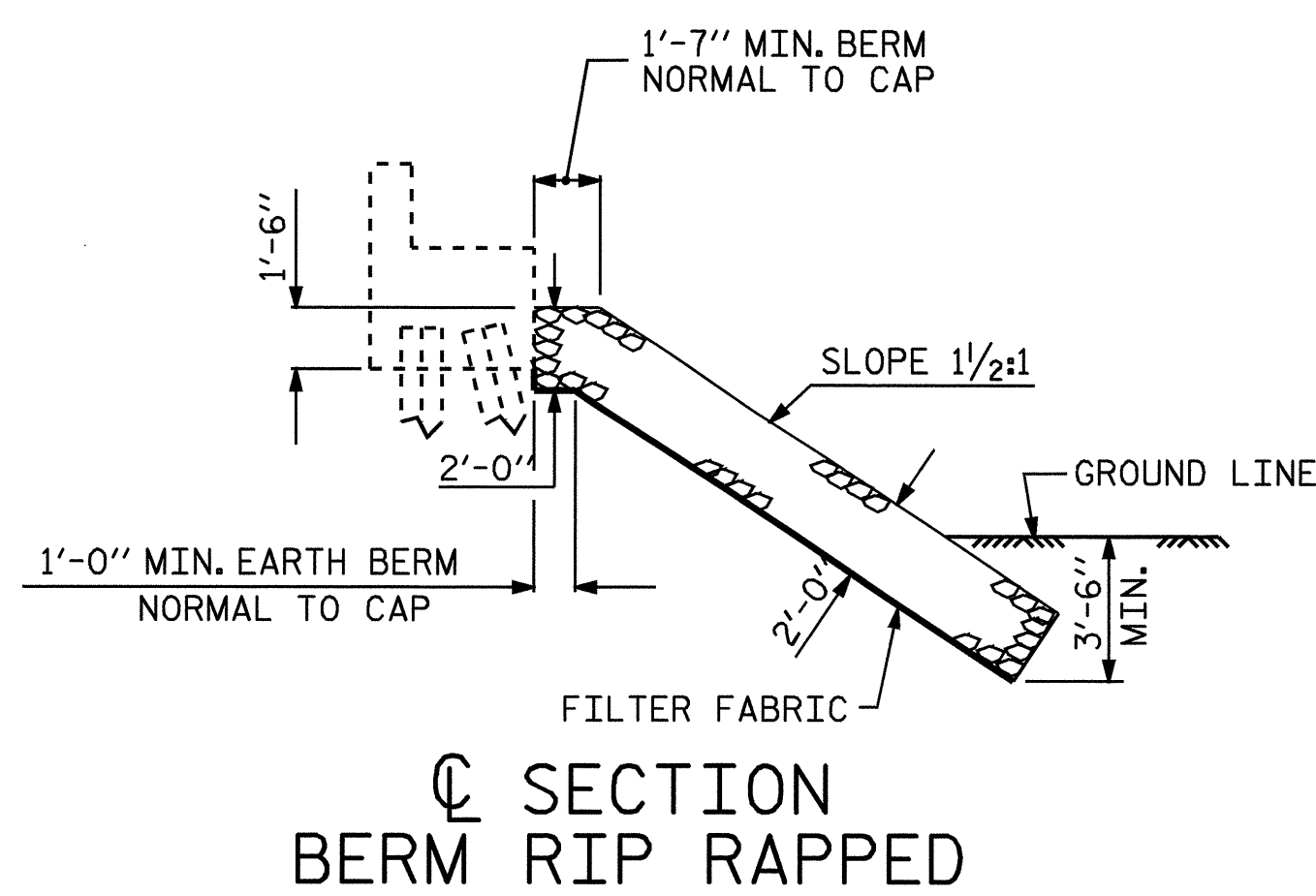


PLAN OF RIP RAP AT END BENT No. 1

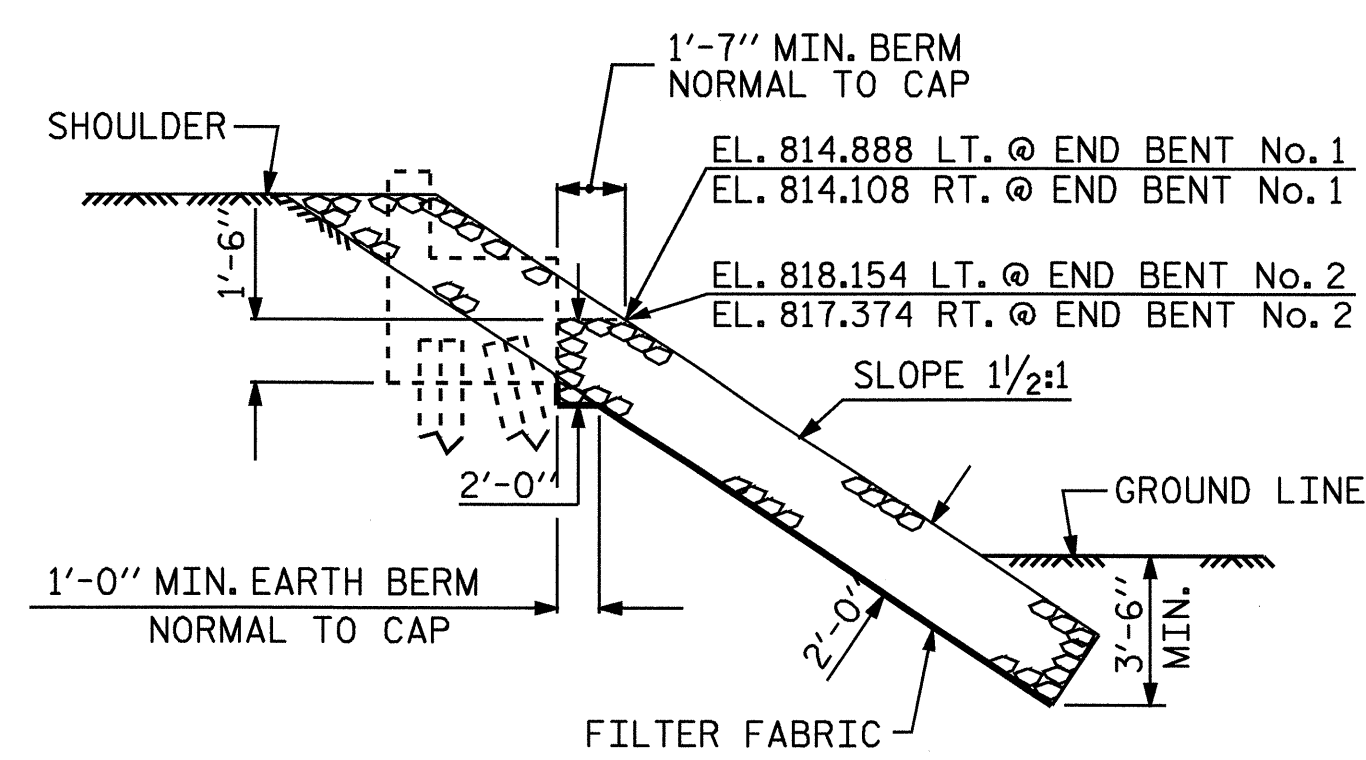


PLAN OF RIP RAP AT END BENT No. 2

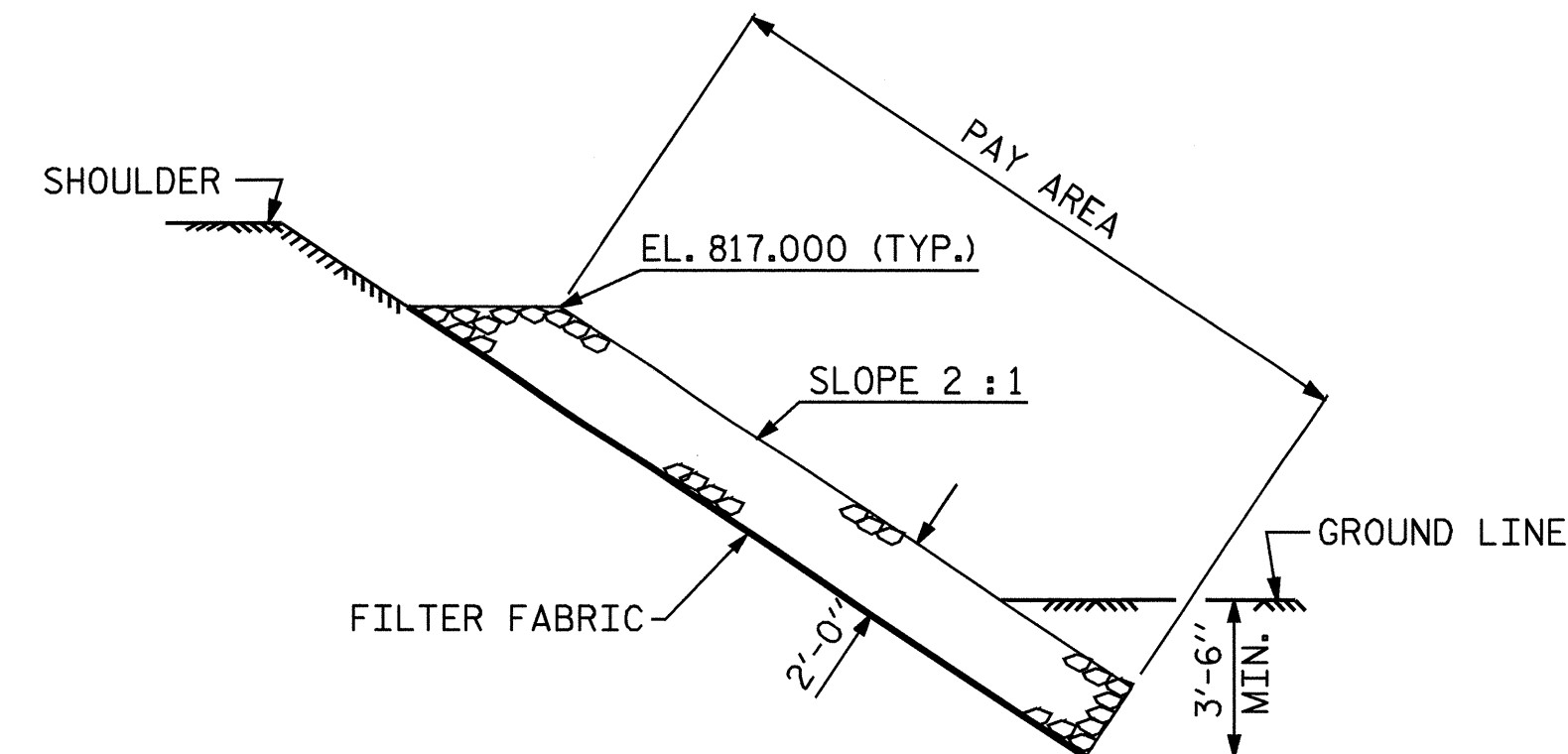
ESTIMATED QUANTITIES		
BRIDGE AT STA. 16+57.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT No. 1	153	170
END BENT No. 2	228	253



SECTION C-C BERM RIP RAPPED



SECTION A-A



SECTION B-B

PROJECT NO. B-4112  
 FORSYTH COUNTY  
 STATION: 16+57.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD RIP RAP DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

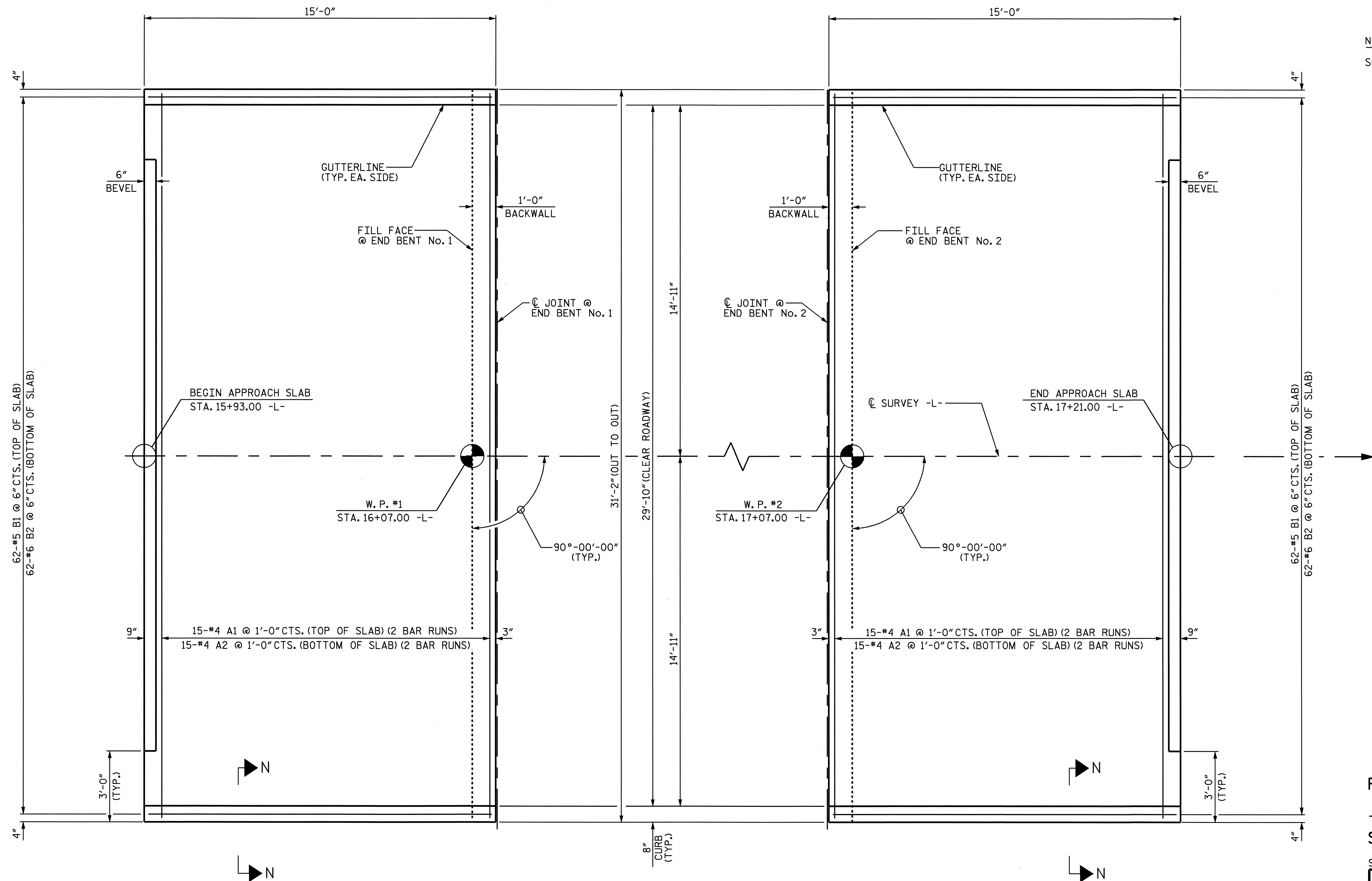


ASSEMBLED BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T.J. BEACH DATE : 9/07

12-OCT-2007 13:00  
 r:\structures\MiscellaneousDrawings\B4112.sd.RR.dgn  
 sbwilliams

SHEET NO.  
 S-16  
 TOTAL SHEETS  
 18





NOTES:  
SEE SHEET 2 OF 2 FOR SECTION VIEWS.

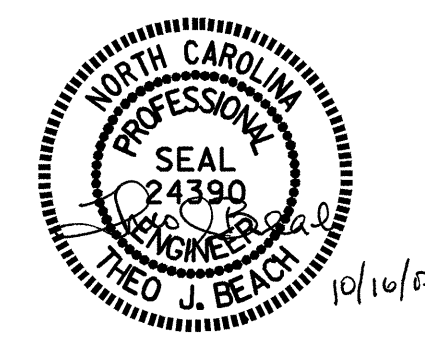
AT END BENT No. 1

PLAN OF APPROACH SLABS

AT END BENT No. 2

PROJECT NO. B-4112  
FORSYTH COUNTY  
 STATION: 16+57.00 -L-

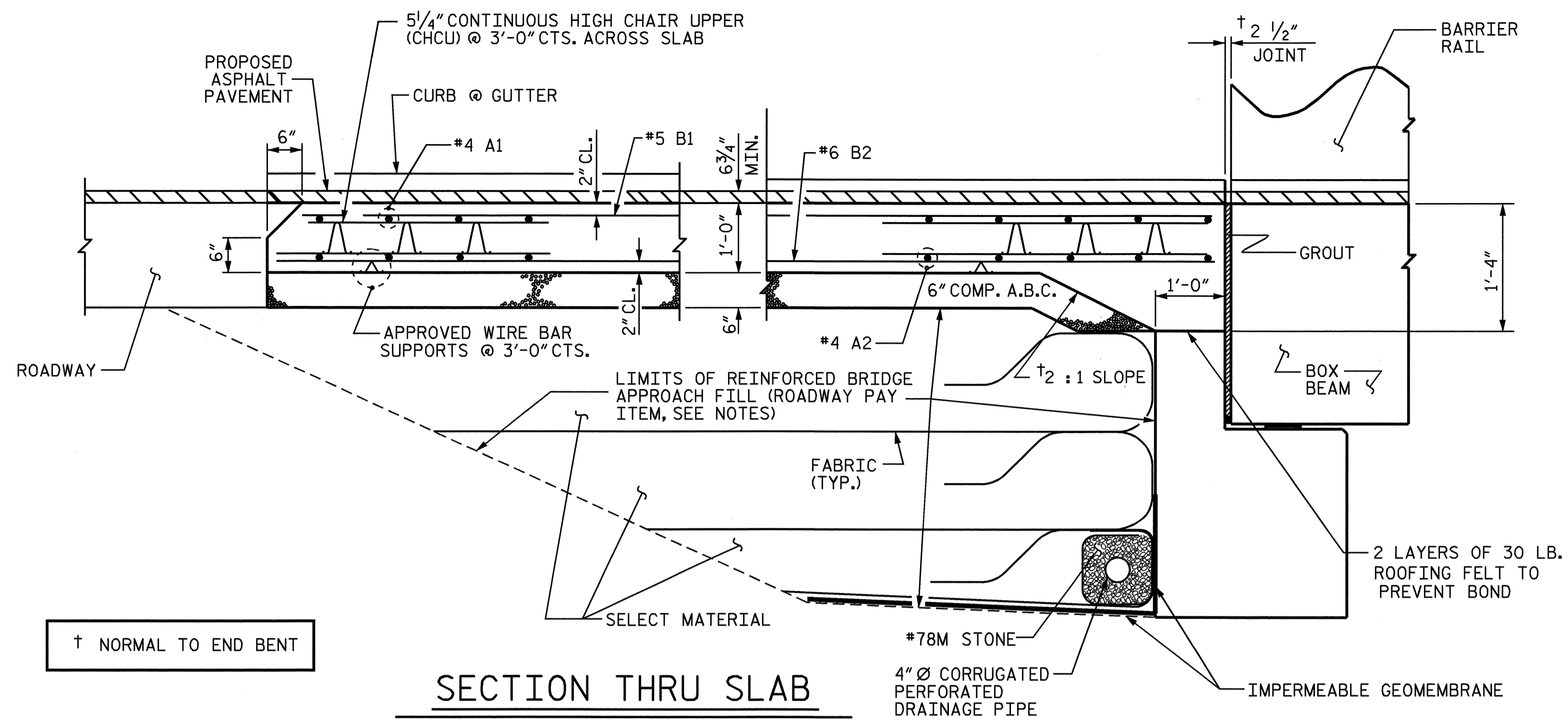
SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED  
 CONCRETE BOX BEAM  
 WITH BARRIER RAIL

DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : T. J. BEACH DATE : 9/07

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



† NORMAL TO END BENT

**SECTION THRU SLAB**

**NOTES**

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 BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH 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 BE FLUSH WITH THE ROADWAY END OF THE APPROACH 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 BE FLUSH WITH THE ROADWAY END OF THE APPROACH 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.

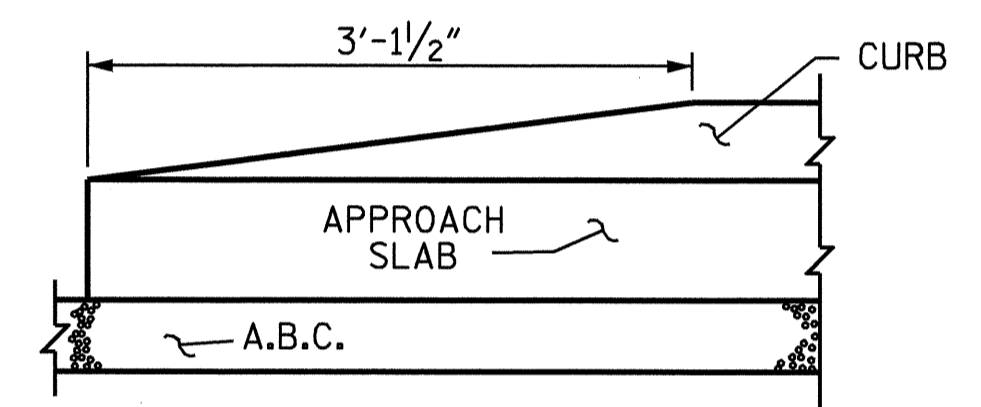
FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

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

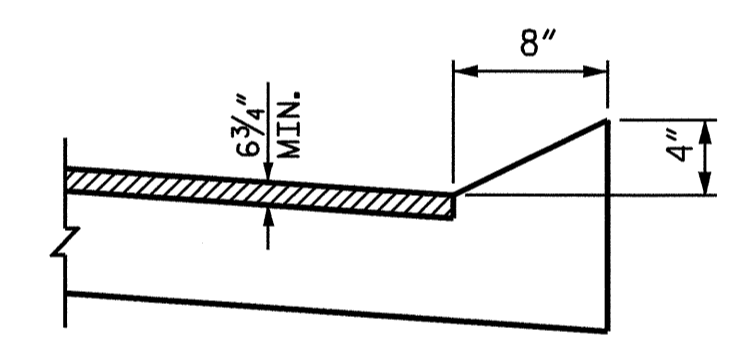
APPROACH SLAB GROOVING IS NOT REQUIRED.

**BILL OF MATERIAL**  
FOR ONE APPROACH SLAB (2 REQ'D)

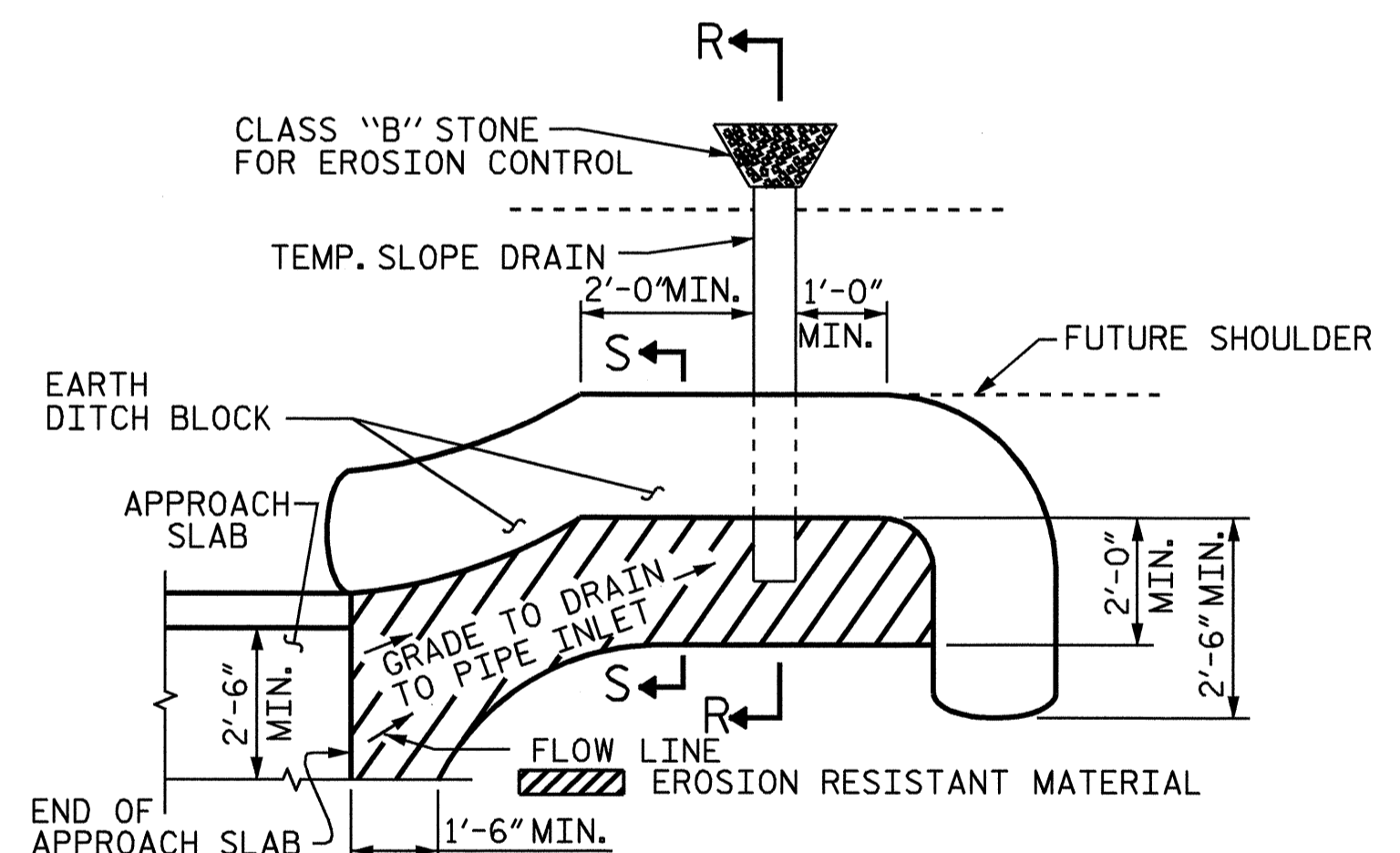
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	30	#4	STR	16'-5"	329
A2	30	#4	STR	16'-4"	327
*B1	62	#5	STR	14'-2"	916
B2	62	#6	STR	14'-8"	1366
REINFORCING STEEL				LBS.	1693
*EPOXY COATED REINFORCING STEEL				LBS.	1245
CLASS AA CONCRETE					
SLAB AND CURB				C. Y.	18.3



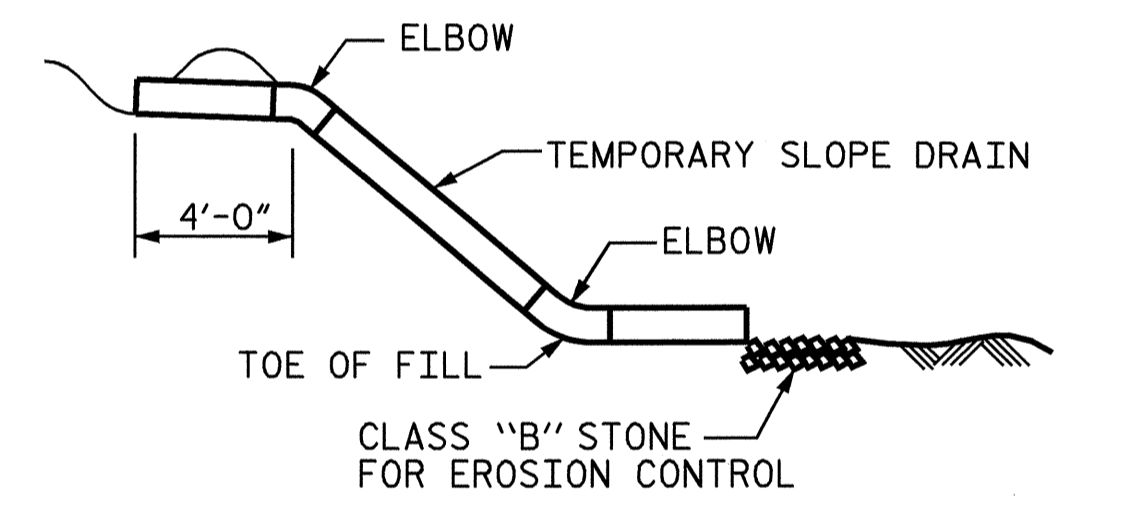
END OF CURB WITHOUT SHOULDER BERM GUTTER



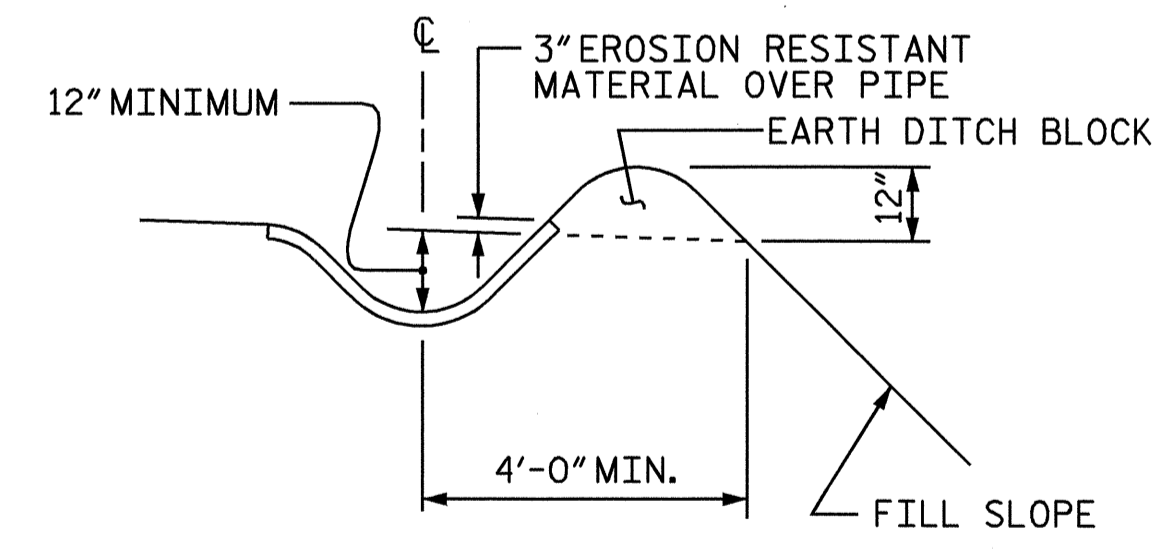
SECTION N-N CURB DETAILS



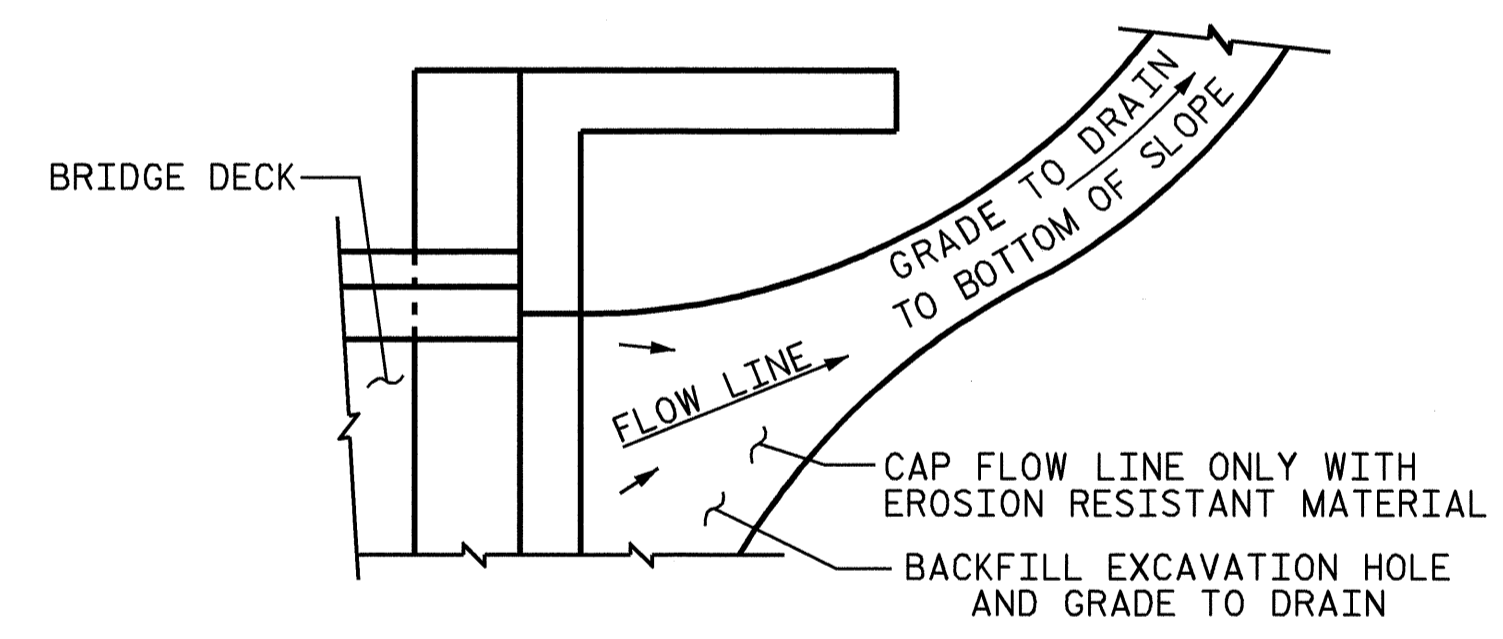
PLAN VIEW



SECTION R-R



SECTION S-S



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

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

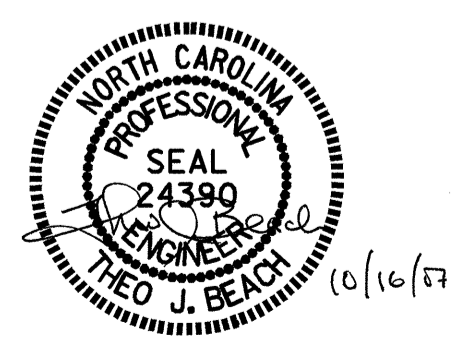
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. B-4112  
FORSYTH COUNTY  
STATION: 16+57.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
BRIDGE APPROACH SLAB  
DETAILS FOR PRESTRESSED  
CONCRETE BOX BEAM  
WITH BARRIER RAIL



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

ASSEMBLED BY : T. BANKOVICH	DATE : 9/07
CHECKED BY : T. J. BEACH	DATE : 9/07
DRAWN BY : LES 8/01	REV. 10/17/00 RWW/LES
CHECKED BY : RDR 8/01	REV. 7/10/01 LES/RDR
	REV. 5/7/03R RWW/JTE



## 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