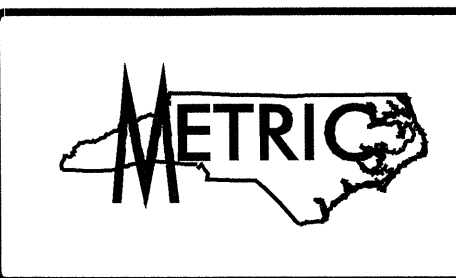
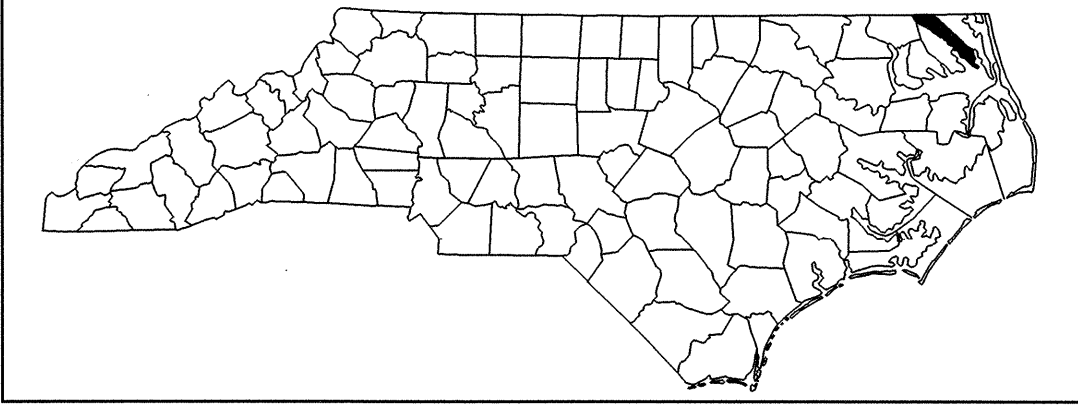


**CONTRACT: C202096 TIP PROJECT: R-2414A**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

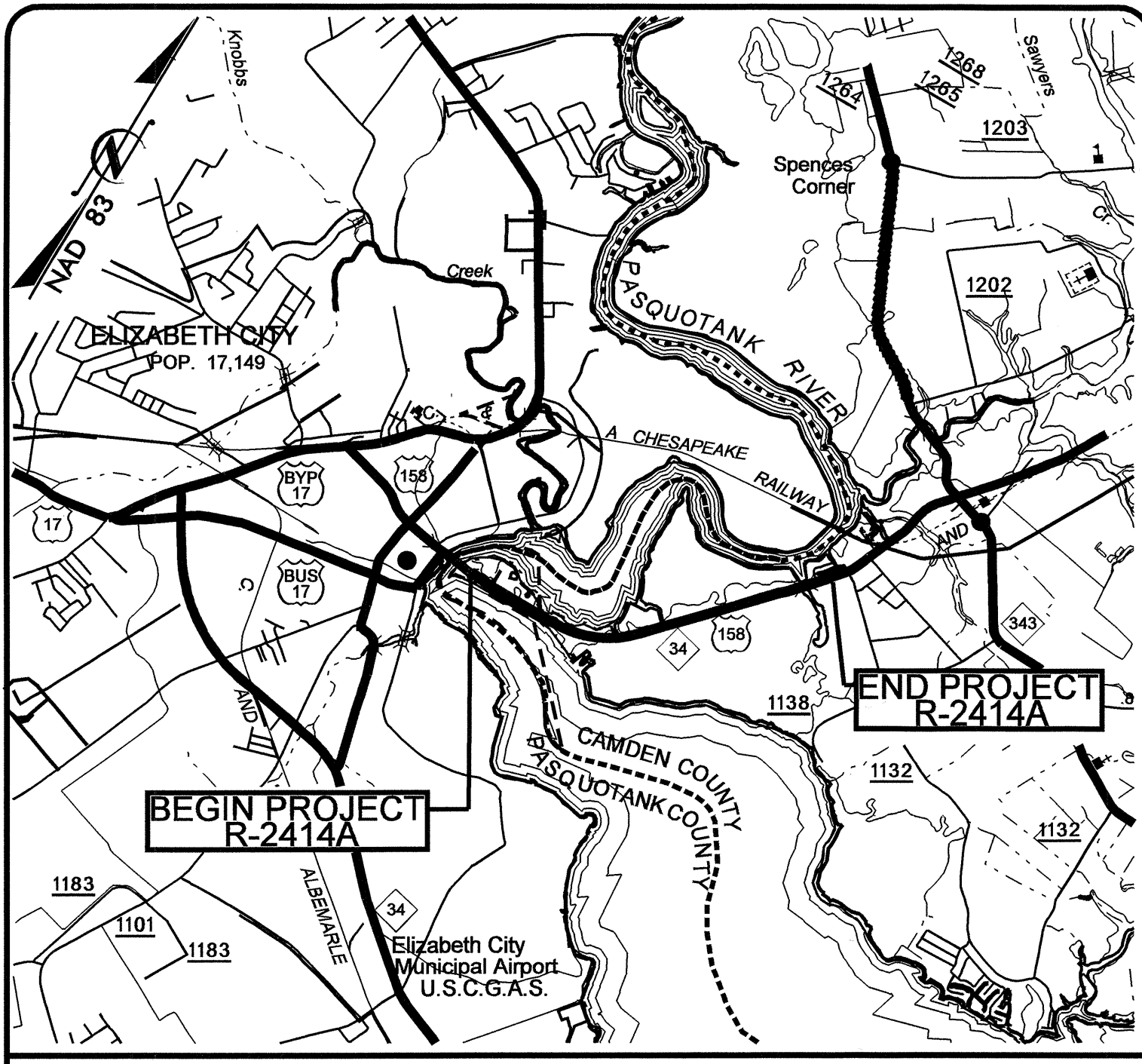


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2414A		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34430.1.1	STP-158(2)	PE	
34430.2.4		RW & UTIL.	
34430.3.ST1		CONST.	



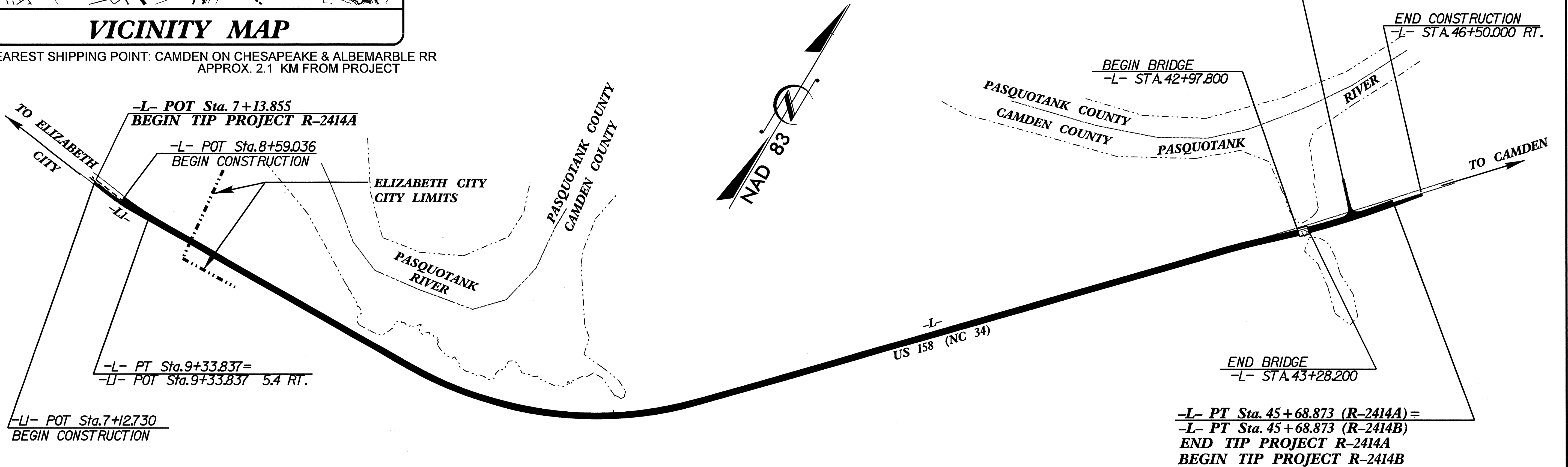
# CAMDEN COUNTY

**LOCATION:** US 158 / NC 34 FROM EAST OF PASQUOTANK RIVER TO NORTH OF SR 1257 (HAVENWOOD DR.)  
**BETWEEN ELIZABETH CITY AND CAMDEN**  
**TYPE OF WORK:** WIDENING, GRADING, DRAINAGE, CURB & GUTTER, PAVING AND STRUCTURE

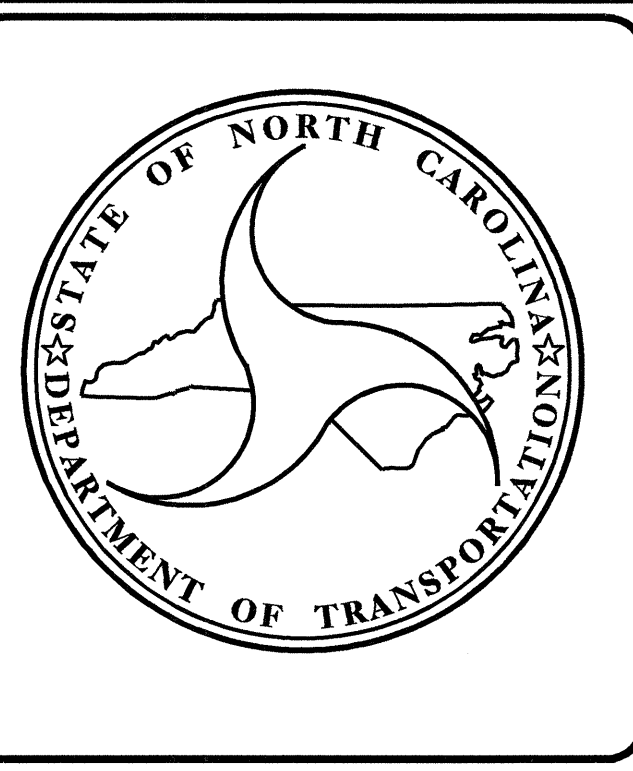


**VICINITY MAP**

NEAREST SHIPPING POINT: CAMDEN ON CHESAPEAKE & ALBEMARLE RR  
APPROX. 2.1 KM FROM PROJECT



## STRUCTURE



**DESIGN DATA**

ADT 2009 =	25990
ADT 2029 =	41510
DHV =	12 %
D =	60 %
T =	6 % *
V =	80-100 KMH
* (TTST 2 % + DUAL 4 %)	
FUNC. CLASS. =	ARTERIAL

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT R-2414A =	3.825 KM
LENGTH OF STRUCTURE TIP PROJECT R-2414A =	0.030 KM
TOTAL LENGTH OF TIP PROJECT R-2414A =	3.855 KM

Prepared In the Office of:

**DIVISION OF HIGHWAYS**  
1000 BIRCH RIDGE DR. RALEIGH, NC 27610

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2006 STANDARD SPECIFICATIONS

LETTING DATE: MARCH 17, 2009	N. N. BULLOCK, PE PROJECT ENGINEER
	D. R. CALHOUN, PE PROJECT DESIGN ENGINEER

**STRUCTURE DESIGN UNIT**

**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

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STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

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APPROVED

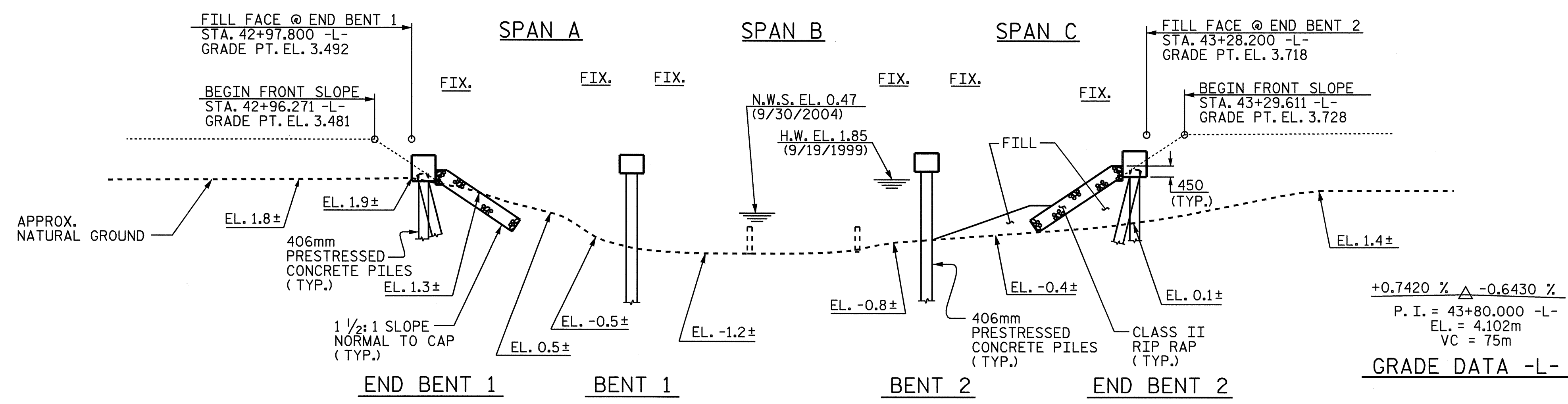
DIVISION ADMINISTRATOR

DATE

04-FEB-2009 11:55  
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gallen

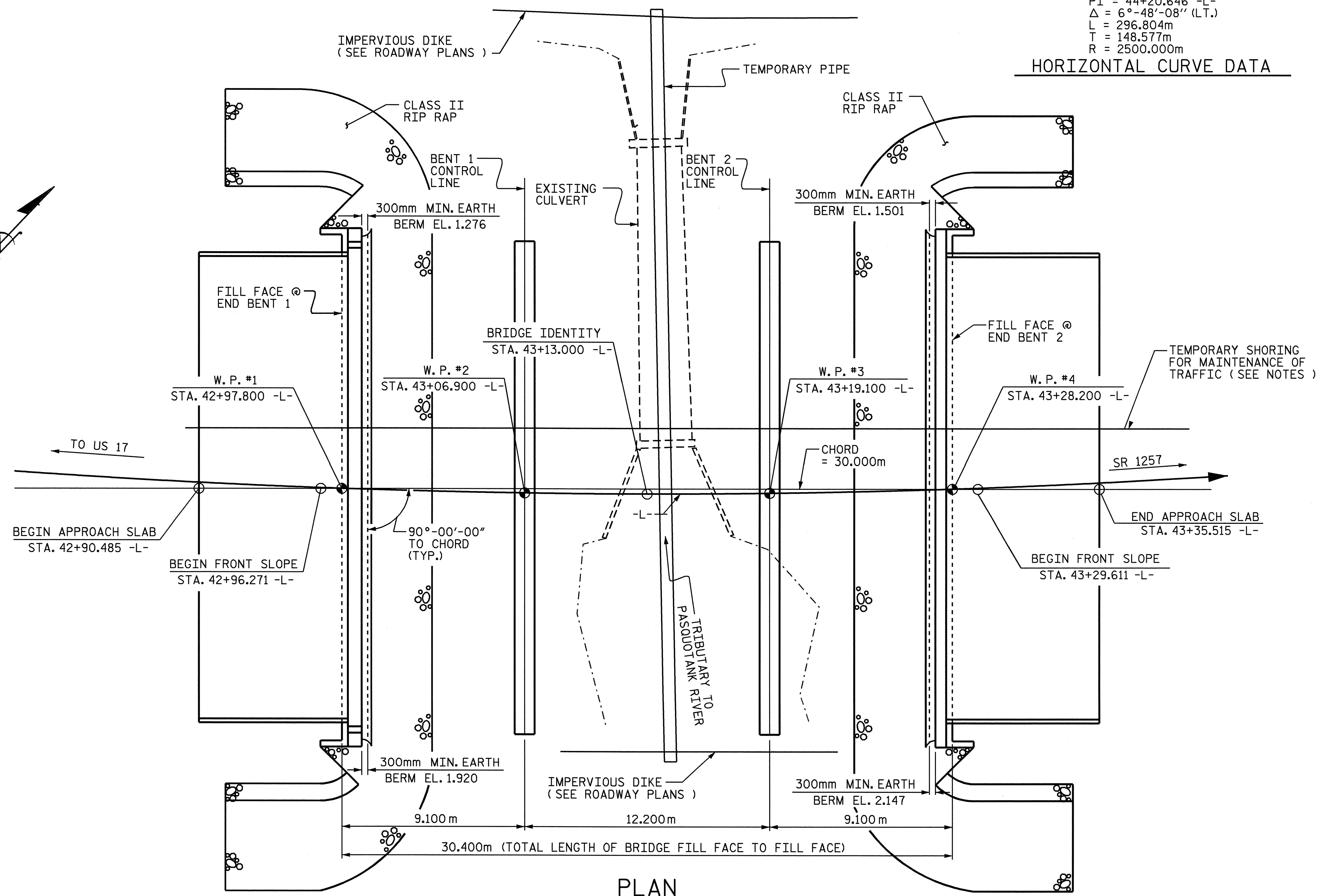
42+85 42+90 42+95 43+00 43+05 43+10 43+15 43+20 43+25 43+30 43+35 43+40

6  
5  
4  
3  
2  
1  
0  
-1  
-2



**HORIZONTAL CURVE DATA**

PI = 44+20.646 -L-  
Δ = 6°-48'-08" (L.T.)  
L = 296.804m  
T = 148.577m  
R = 2500.000m



(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)

**NOTES:**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = MS18 OR ALTERNATE LOADING, EXCEPT THAT CORED SLAB UNITS HAVE BEEN DESIGNED FOR MS22.5.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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.

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

THE EXISTING 2.13m x 2.44m CULVERT WITH A 15.2m LENGTH AND A 300mm TOP SLAB AND LOCATED AT THE PROPOSED BRIDGE SITE SHALL BE REMOVED AFTER STAGE 1 CONSTRUCTION OF THE PROPOSED STRUCTURE. PAYMENT FOR REMOVAL OF CULVERT WILL BE INCLUDED IN UNIT PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHOWN ON LOCATION SKETCH SHALL BE EXCAVATED AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC METER FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE END BENT AND BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE TO THE STANDARD SPECIFICATIONS. NO SEPARATE PAYMENT WILL BE MADE FOR CALCIUM NITRITE CORROSION INHIBITOR.

ALL BAR SUPPORTS USED IN THE PARAPET, CORED SLABS, END BENT AND BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE BENT CAPS AND BENT PILES OF BENT 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 KG OF FLY ASH PER 1.0 KG OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

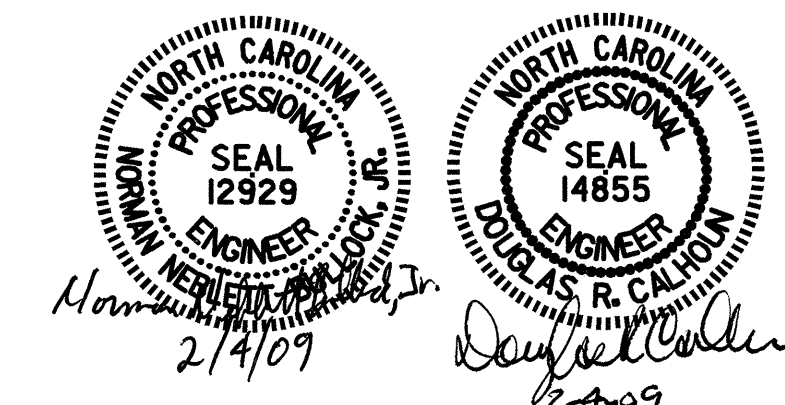
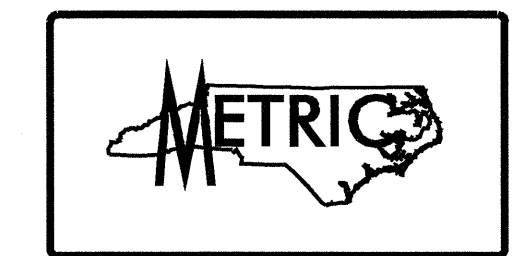
FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-



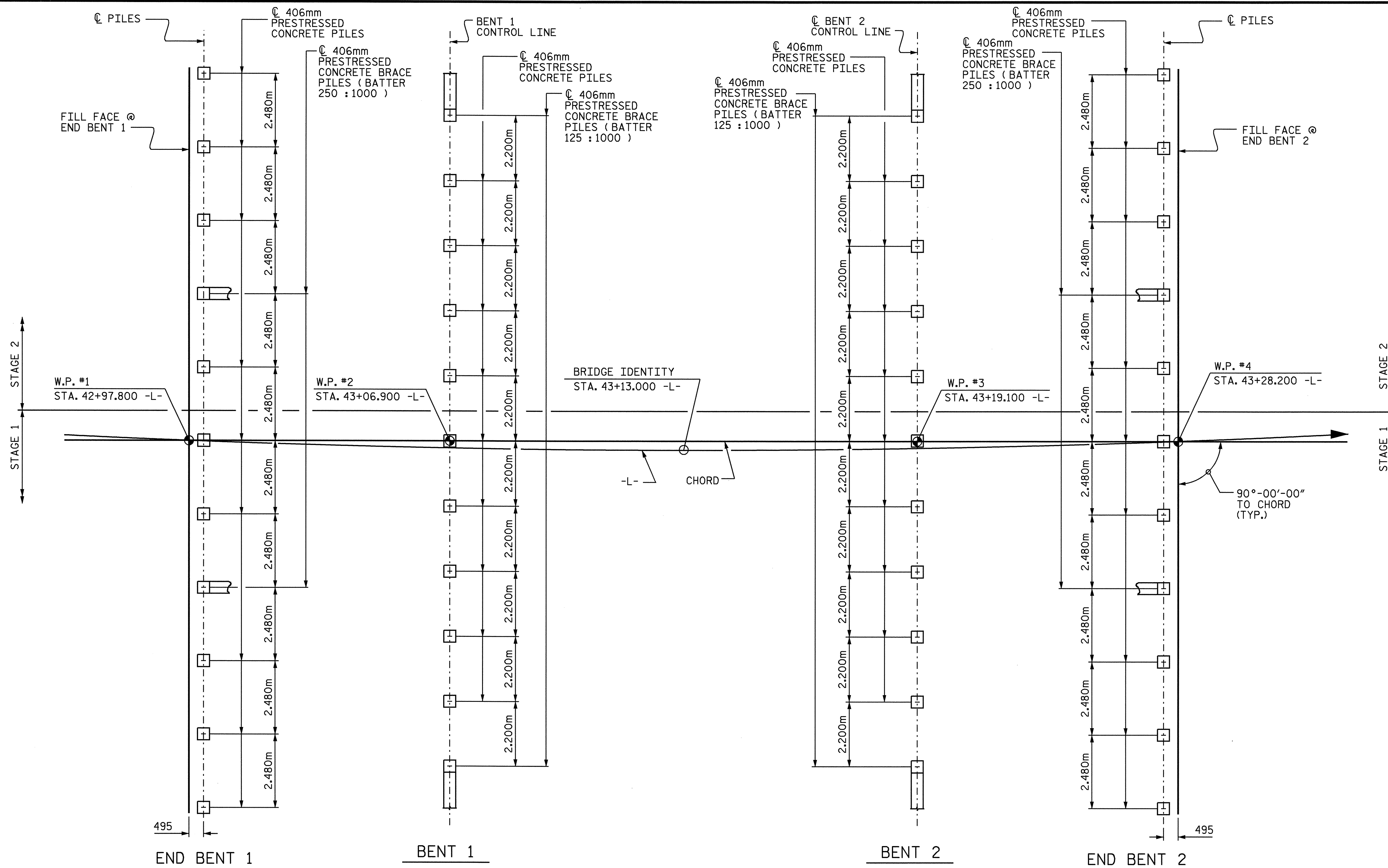
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON US 158  
 OVER TRIBUTARY TO  
 PASQUOTANK RIVER BETWEEN  
 US 17 AND SR 1257

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

DRAWN BY: J. MYA DATE: 11/17/08  
 CHECKED BY: D. R. CALHOUN DATE: 12/9/08



### FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES)

#### FOUNDATION NOTES:

DRIVE PILES AT END BENT 1 AND 2 TO A REQUIRED BEARING CAPACITY OF 1060 KN PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

DRIVE PILES AT BENT 1 AND 2 TO A REQUIRED BEARING CAPACITY OF 1740 KN PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO PLUS ANY ADDITIONAL CAPACITY TO ACCOUNT FOR DOWN DRAG OR NEGATIVE SKIN FRICTION AND SCOUR.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT 1 AND 2 IS 530 KN PER PILE.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT BENT 1 AND 2 IS 670 KN PER PILE.

DRIVE PILES AT BENT 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN -11.9m.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 AND 2 IS ELEVATION -5.5m. SCOUR CRITICAL ELEVATION IS USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

OBSERVE A 6 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE FINISHED SUBGRADE ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 1. (STAGE 1 ONLY)

OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE FINISHED SUBGRADE ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 2. (STAGE 1 ONLY)

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1, 2 AND BENT 1 AND 2. SEE PILE DRIVING ANALYZER SPECIAL PROVISION.

PILE RESTRIKES FOR LRFD ARE REQUIRED FOR THE FIRST PRODUCTION PILE TESTED WITH THE PILE DRIVING ANALYZER (PDA). SEE PILE RESTRIKES FOR LRFD SPECIAL PROVISION.

FOR EMBANKMENT MONITORING DETAILS, SEE ROADWAY PLANS.



PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON US 158  
 OVER TRIBUTARY TO  
 PASQUOTANK RIVER BETWEEN  
 US 17 AND SR 1257

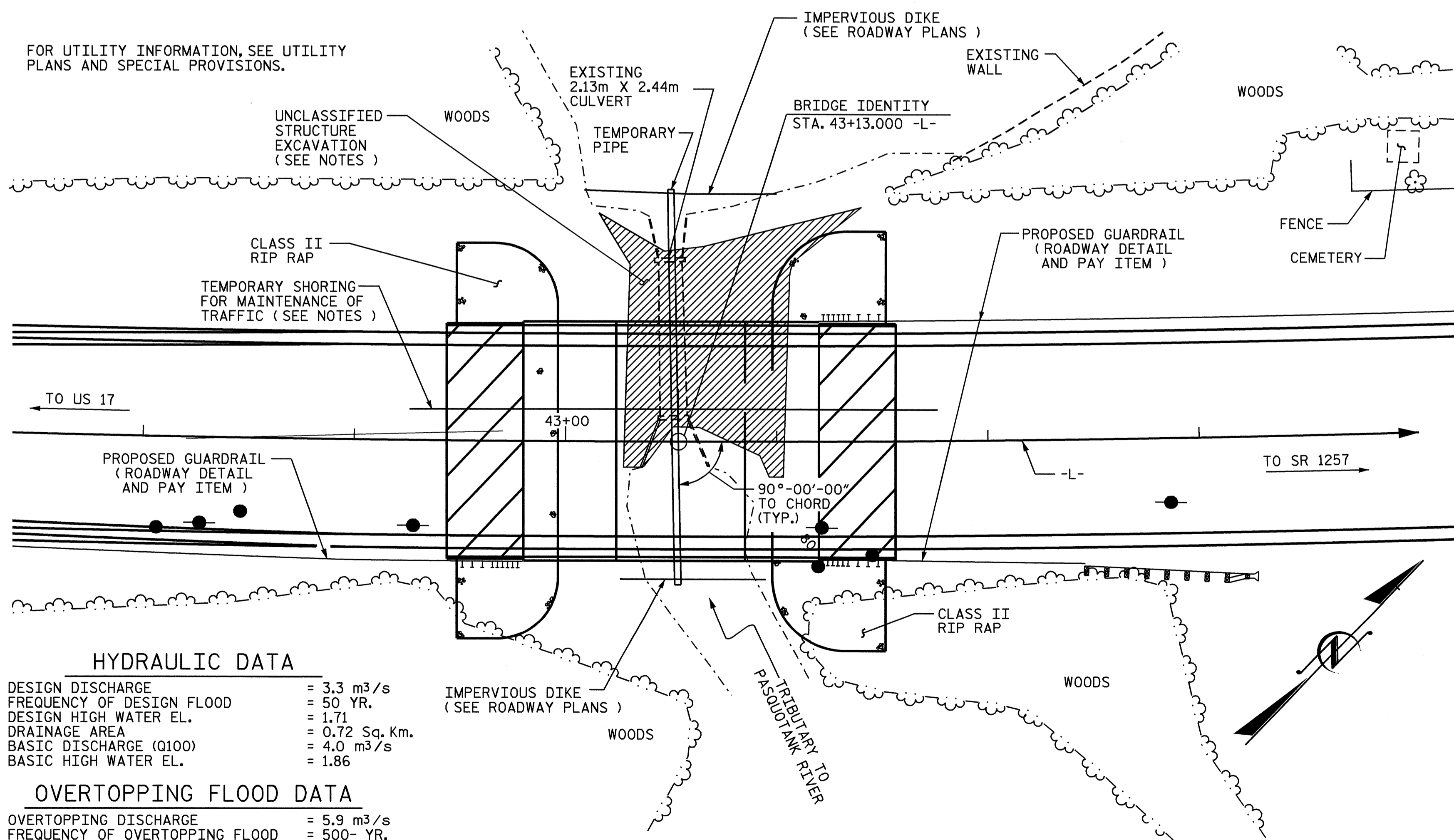
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 CHECKED BY : D. R. CALHOUN DATE : 12-9-08

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

TOTAL BILL OF MATERIAL																			
	PDA TESTING	PDA ASSISTANCE	UNCLASSIFIED STRUCTURE EXCAVATION	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	406mm PRESTRESSED CONCRETE PILES	PILE REDRIVES	TWO BAR METAL RAIL	355mm X 875mm CONCRETE PARAPET	RIP RAP CLASS II (600mm THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	914mm X 533mm PRESTRESSED CONCRETE CORED SLABS		
	EACH	EACH	Cu. m	SQ. m.	SQ. m.	Cu. m	LUMP SUM	Kn.	NO.	m	EACH	m	m	METRIC TONS	SQ. m.	LUMP SUM	LUMP SUM	NO.	m
SUPERSTRUCTURE				684	808.4		LUMP SUM				54.868	59.428			LUMP SUM	LUMP SUM	78	770.588	
END BENT 1						29.2		2369	11	247.5	6		218	223					
BENT 1						18.2		2126	11	247.5	5								
BENT 2						18.2		2126	11	247.5	5								
END BENT 2						28.6		2369	11	247.5	6		228	232					
TOTAL	2	2	1600	684	808.4	94.2	LUMP SUM	8990	44	990.0	22	54.868	59.428	446	455	LUMP SUM	LUMP SUM	78	770.588

BM #12 : 16mm REBAR WITH STANDARD ALUMINUM CAP 3.573m RT. OF STA. 43+03.456 -L-, EL. 2.130



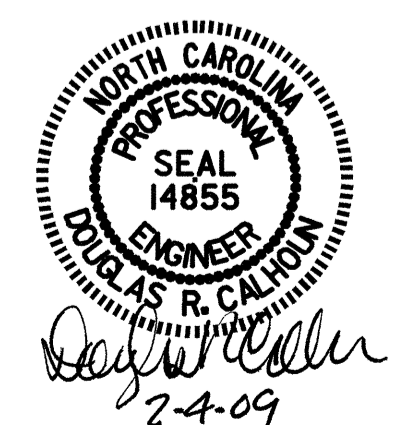
**HYDRAULIC DATA**  
 DESIGN DISCHARGE = 3.3 m<sup>3</sup>/s  
 FREQUENCY OF DESIGN FLOOD = 50 YR.  
 DESIGN HIGH WATER EL. = 1.71  
 DRAINAGE AREA = 0.72 Sq. Km.  
 BASIC DISCHARGE (Q100) = 4.0 m<sup>3</sup>/s  
 BASIC HIGH WATER EL. = 1.86

**OVERTOPPING FLOOD DATA**  
 OVERTOPPING DISCHARGE = 5.9 m<sup>3</sup>/s  
 FREQUENCY OF OVERTOPPING FLOOD = 500- YR.  
 OVERTOPPING FLOOD EL. = 2.07

LOCATION SKETCH

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 3 OF 3



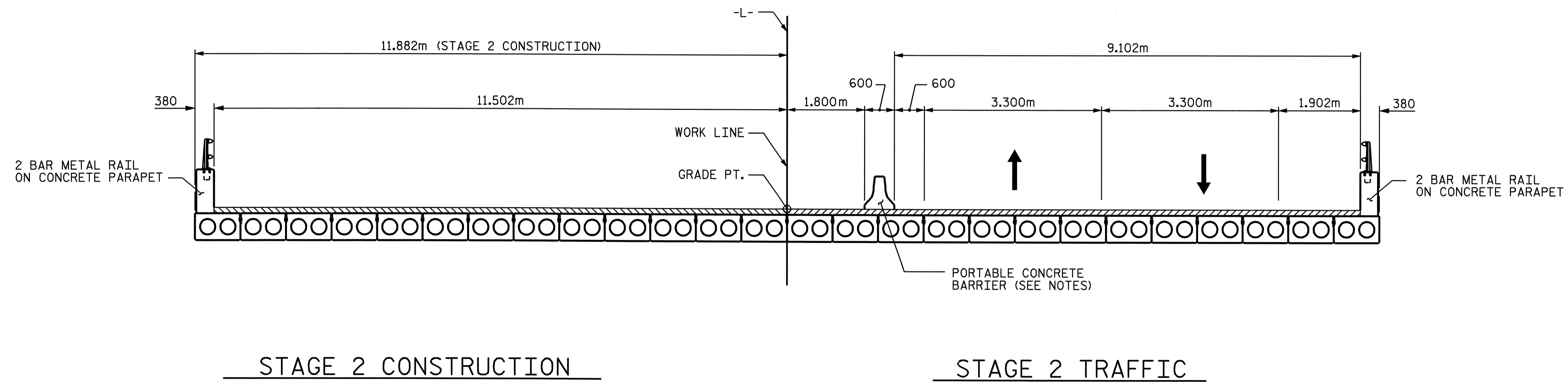
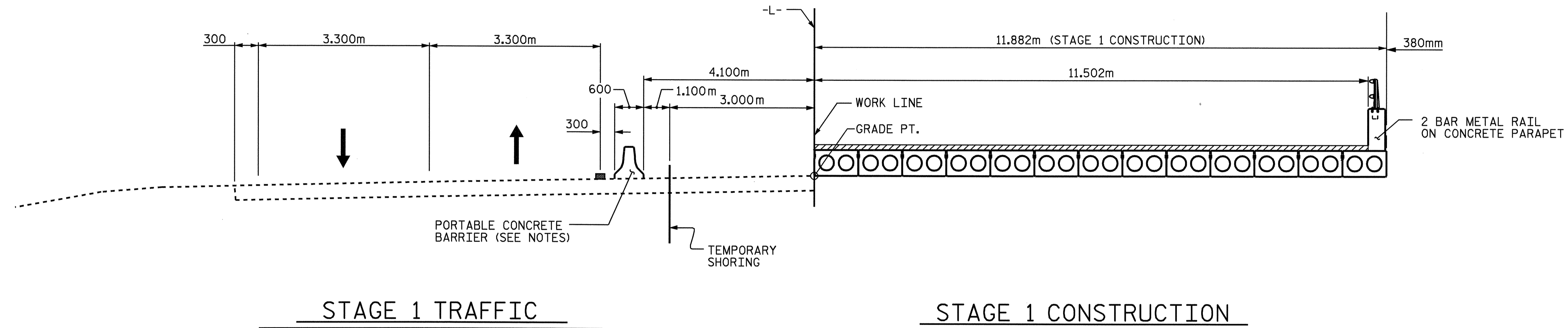
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON US 158  
 OVER TRIBUTARY TO  
 PASQUOTANK RIVER BETWEEN  
 US 17 AND SR 1257

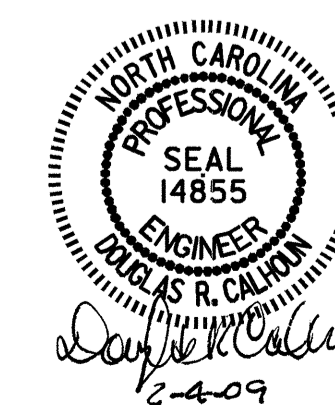
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BY:	DATE:	NO.	BY:	DATE:		S-3
		3				TOTAL SHEETS
		4				31

DRAWN BY : J. MYA DATE : 11-17-08  
 CHECKED BY : D. R. CALHOUN DATE : 12-9-08

NOTES:  
 SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS  
 OF THE PORTABLE CONCRETE BARRIERS.

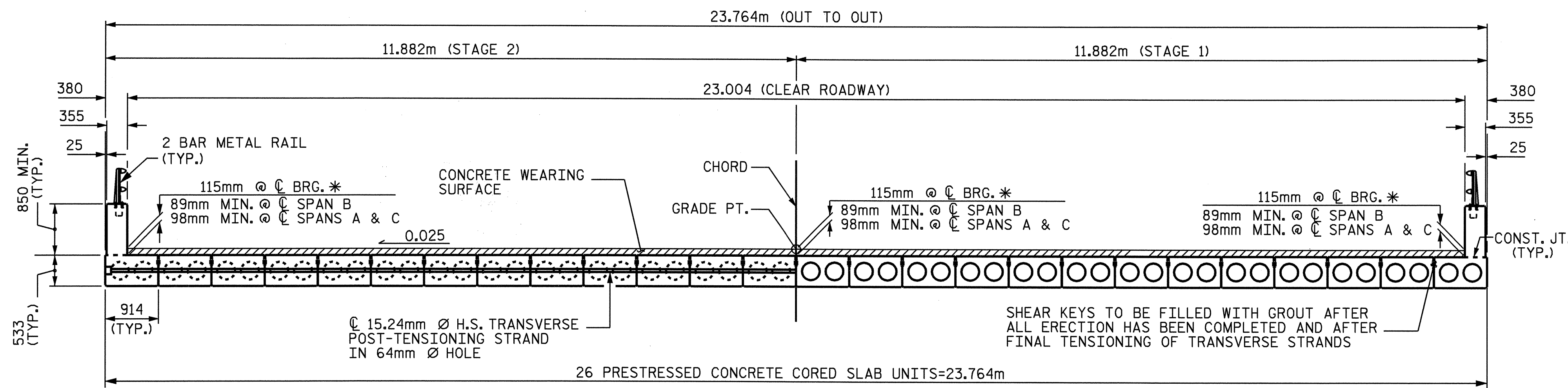


PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUPERSTRUCTURE CONSTRUCTION SEQUENCE						<b>S-4</b>
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	31
1			3			
2			4			

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 CHECKED BY: B.N. GRADY DATE: 11-17-08

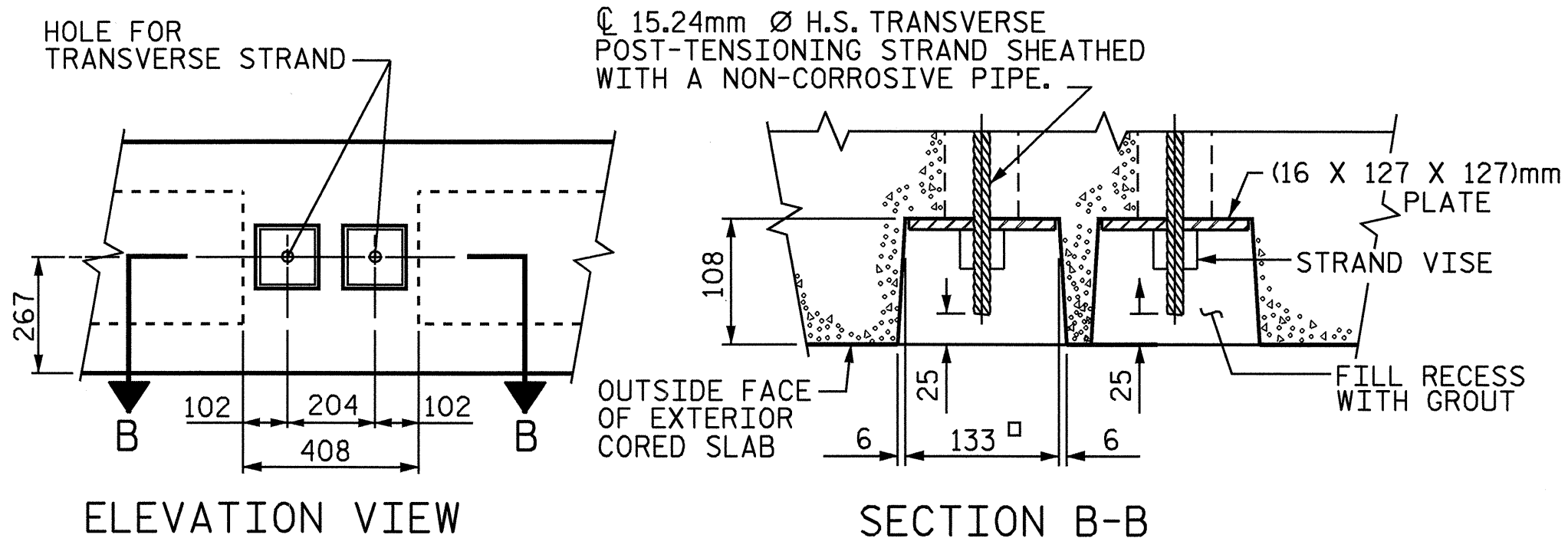


HALF SECTION @ INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

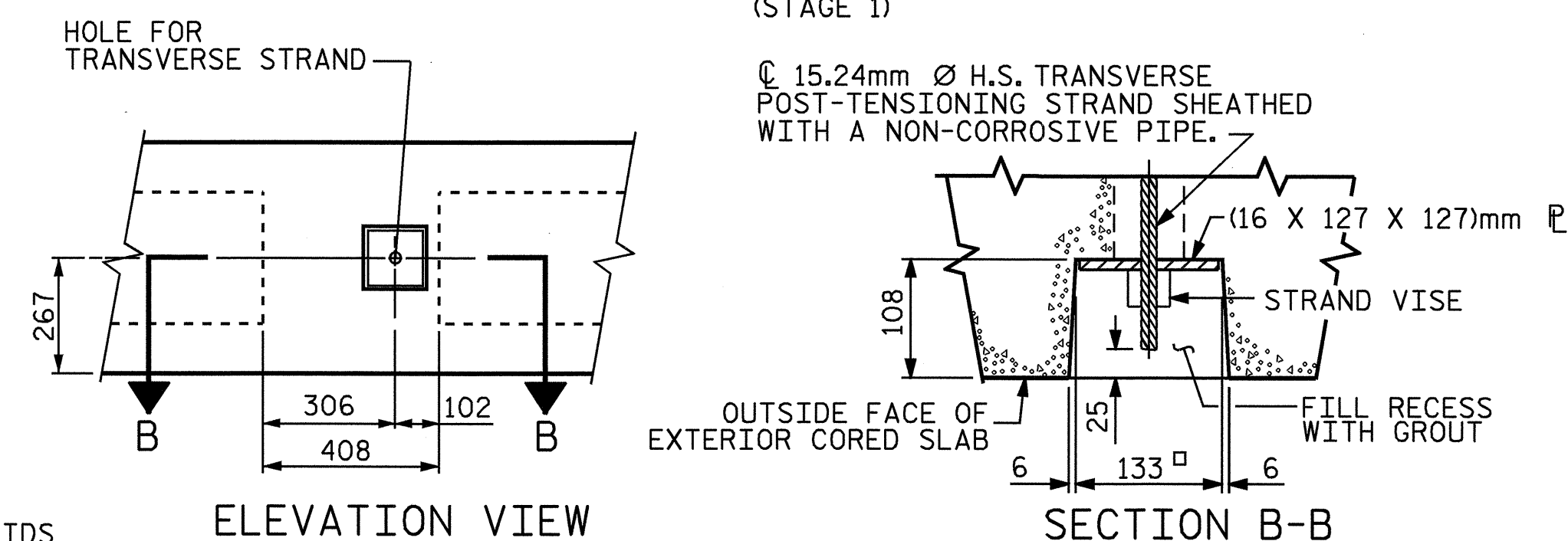
HALF SECTION AT 305mm Ø VOIDS

\*BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS



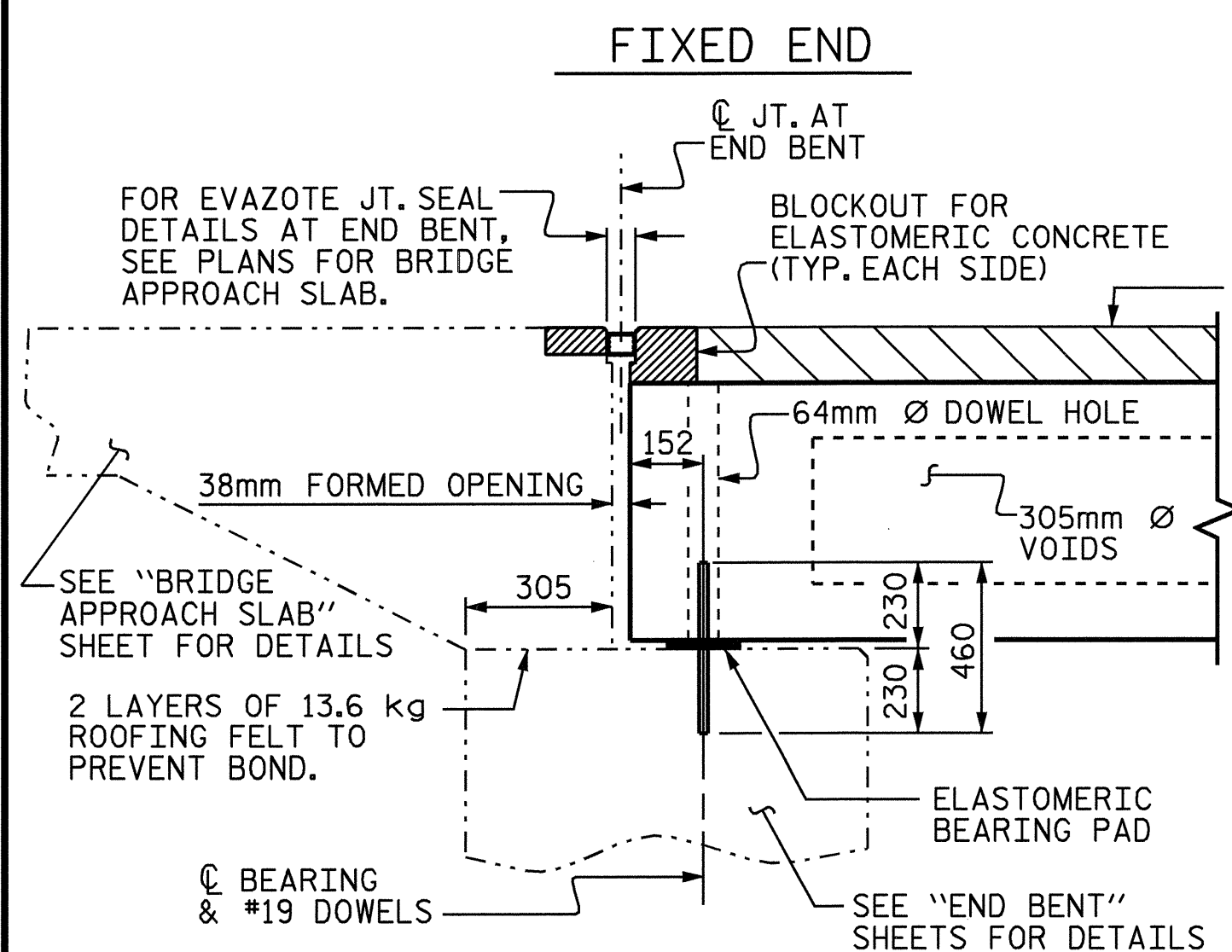
GRouted RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

(STAGE 1)

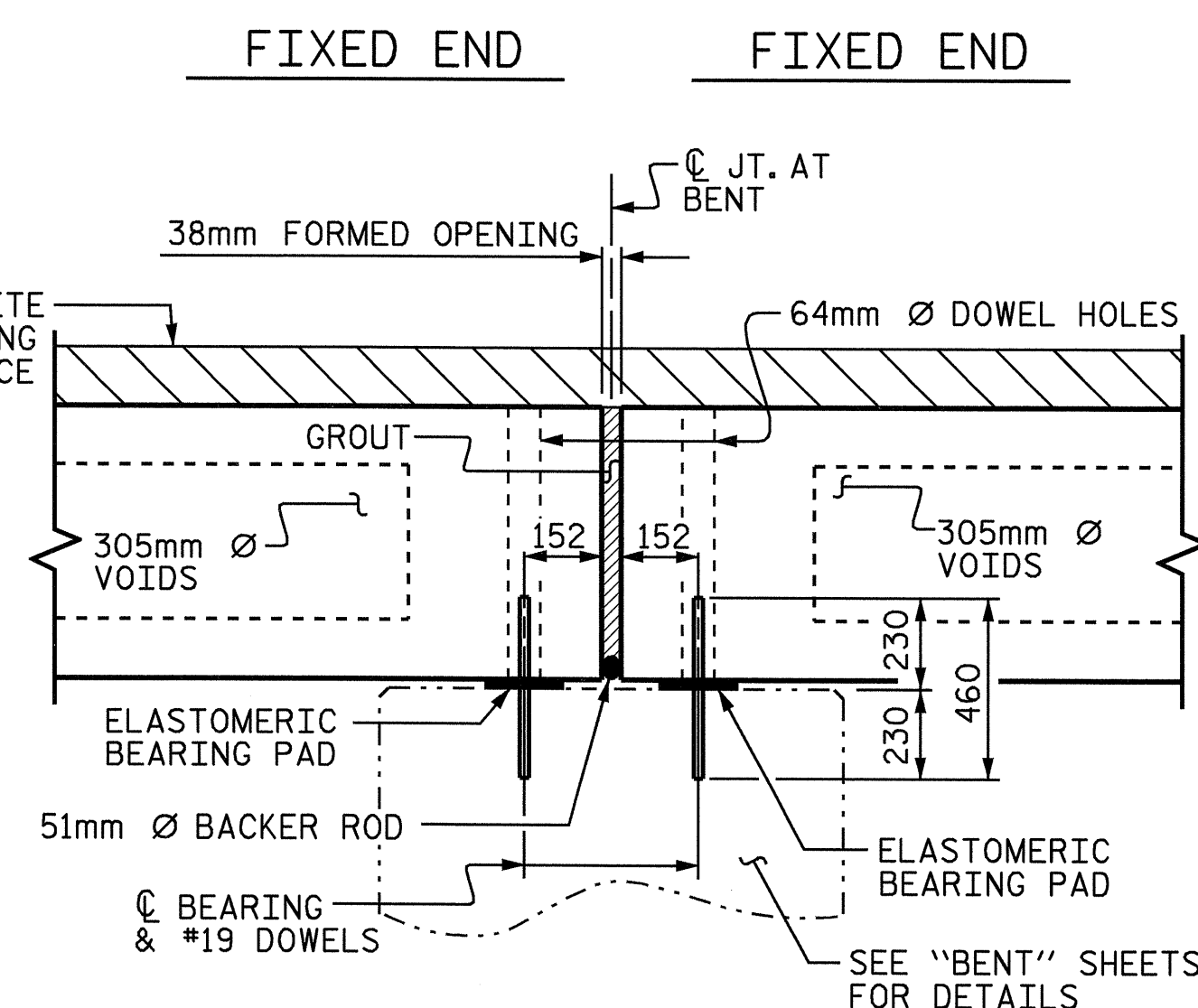


GRouted RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

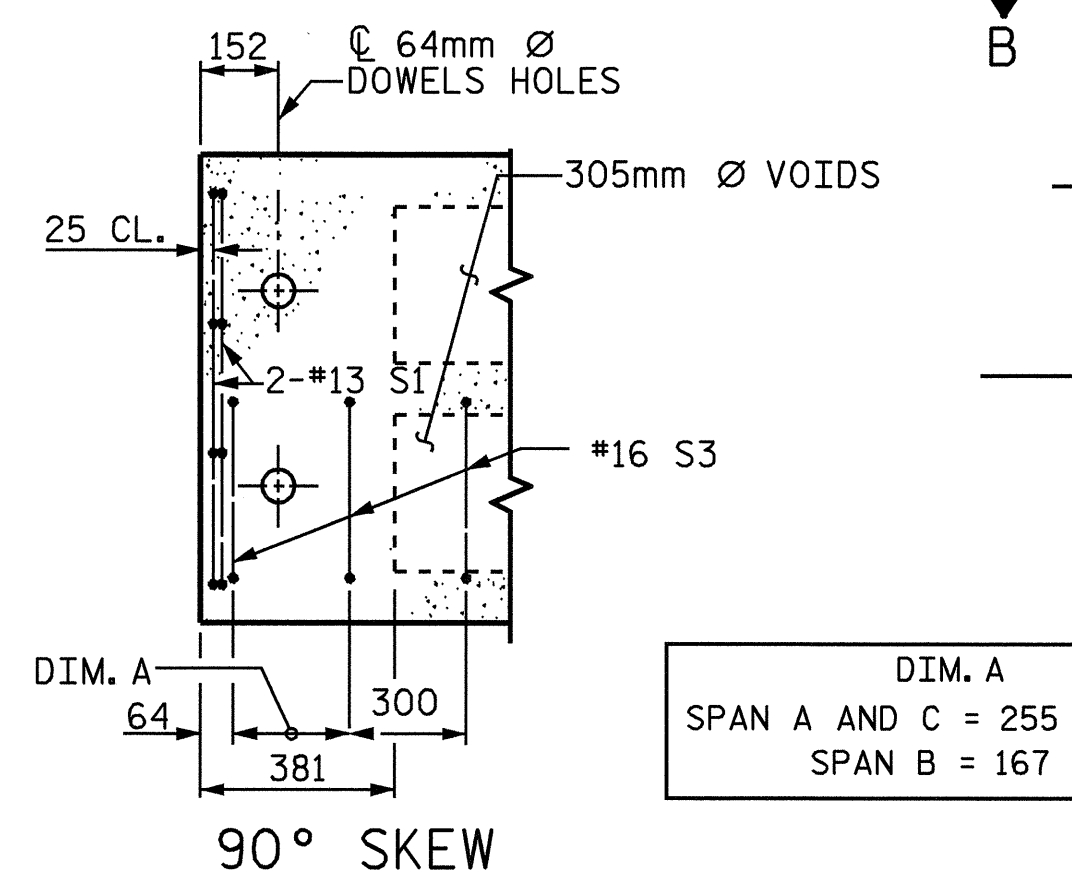
(STAGE 2)



SECTION AT END BENT

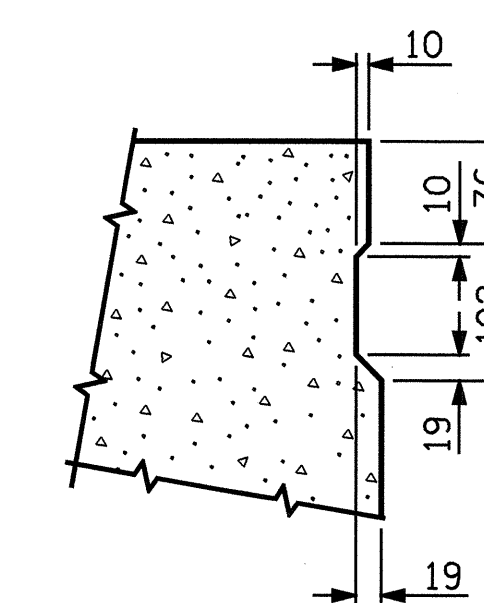


SECTION AT BENT



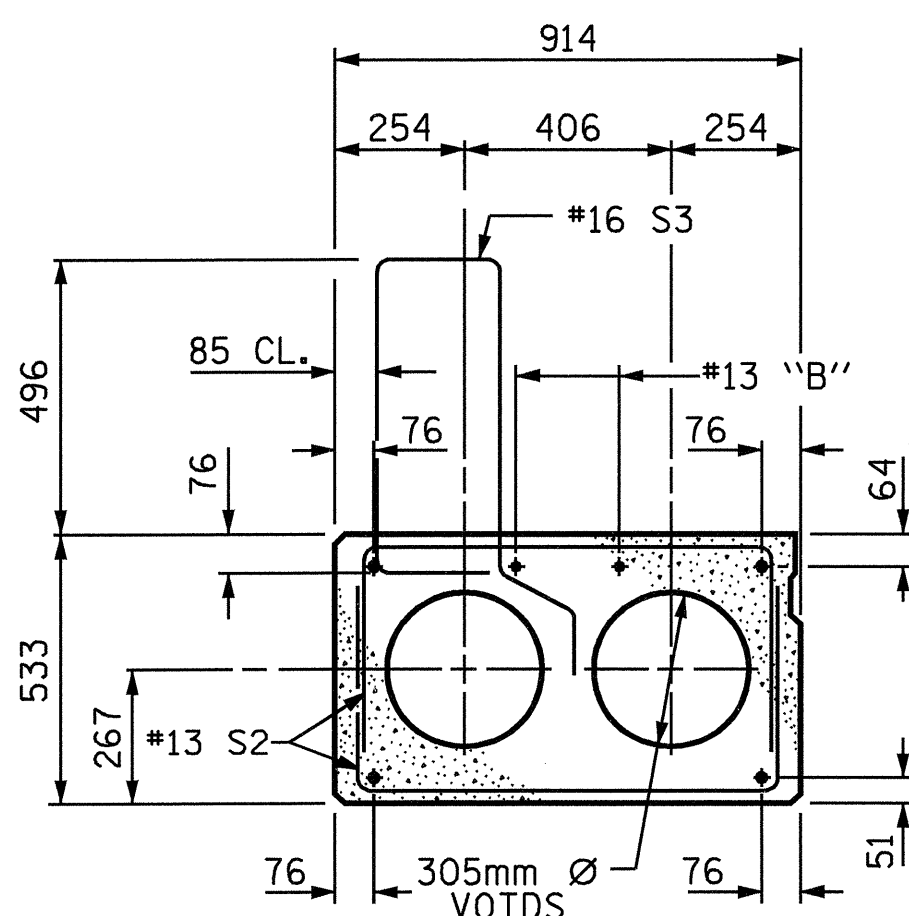
PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



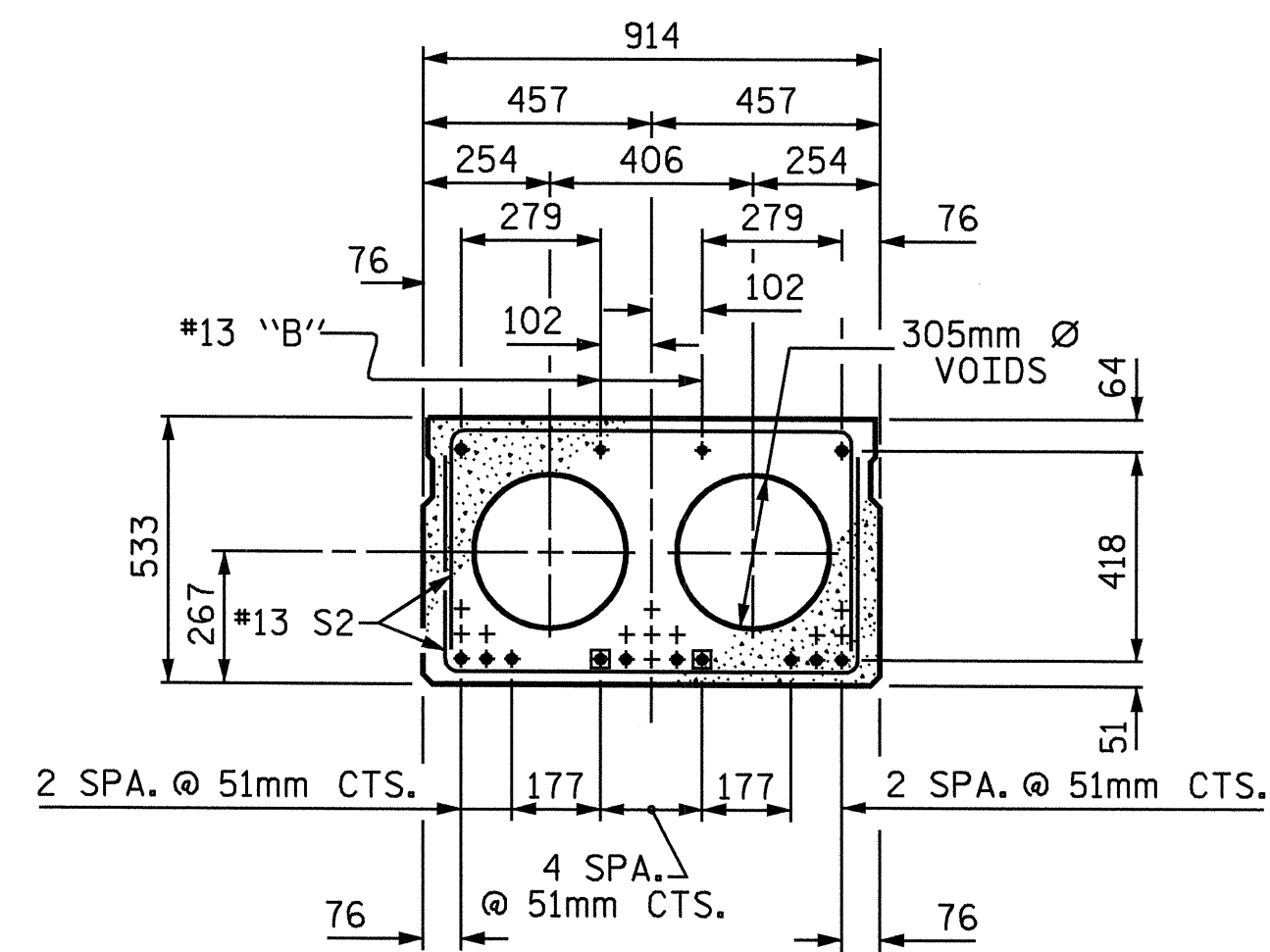
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION)

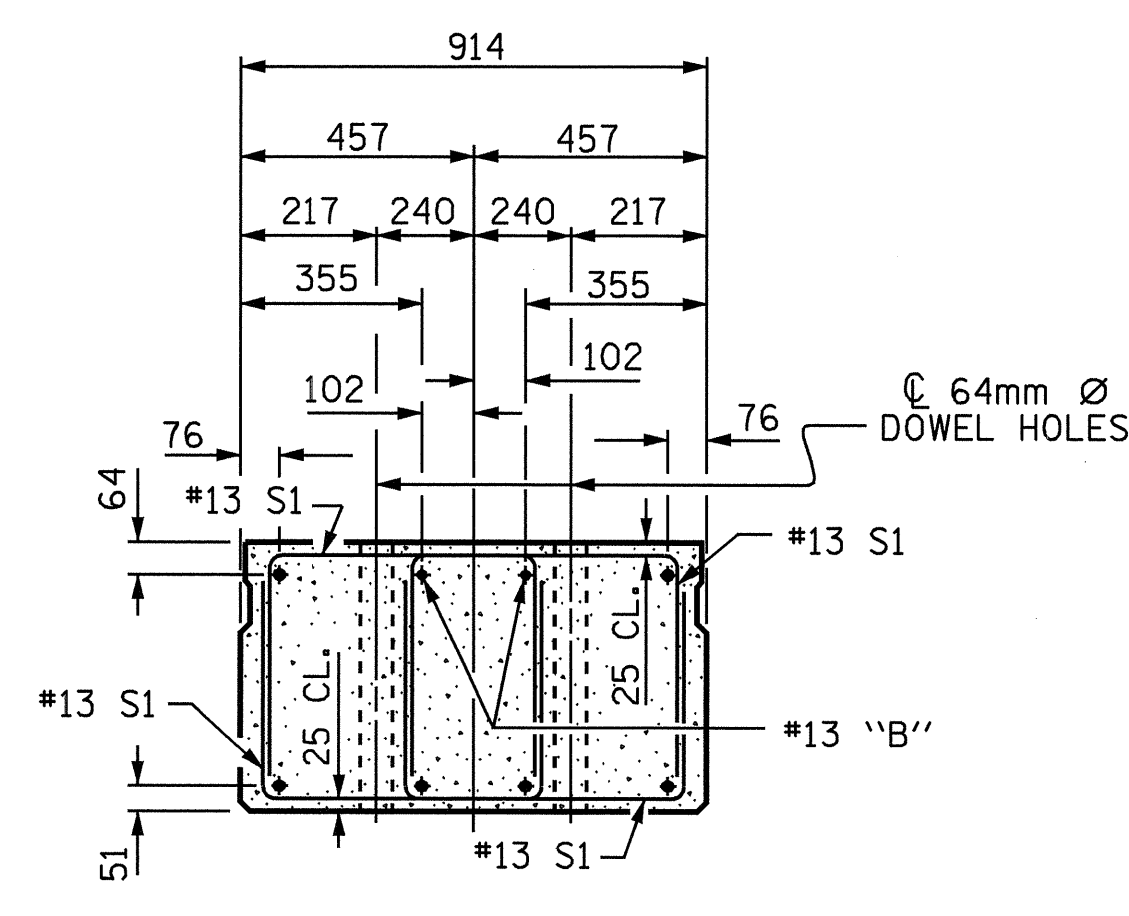


INTERIOR SLAB SECTION

(12 STRANDS, 2 SHEATHED)

15.24mm Ø LOW RELAXATION STRAND LAYOUT

BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 1.220m FROM END OF CORED SLAB UNIT, SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES (STRAND LAYOUT NOT SHOWN)  
INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

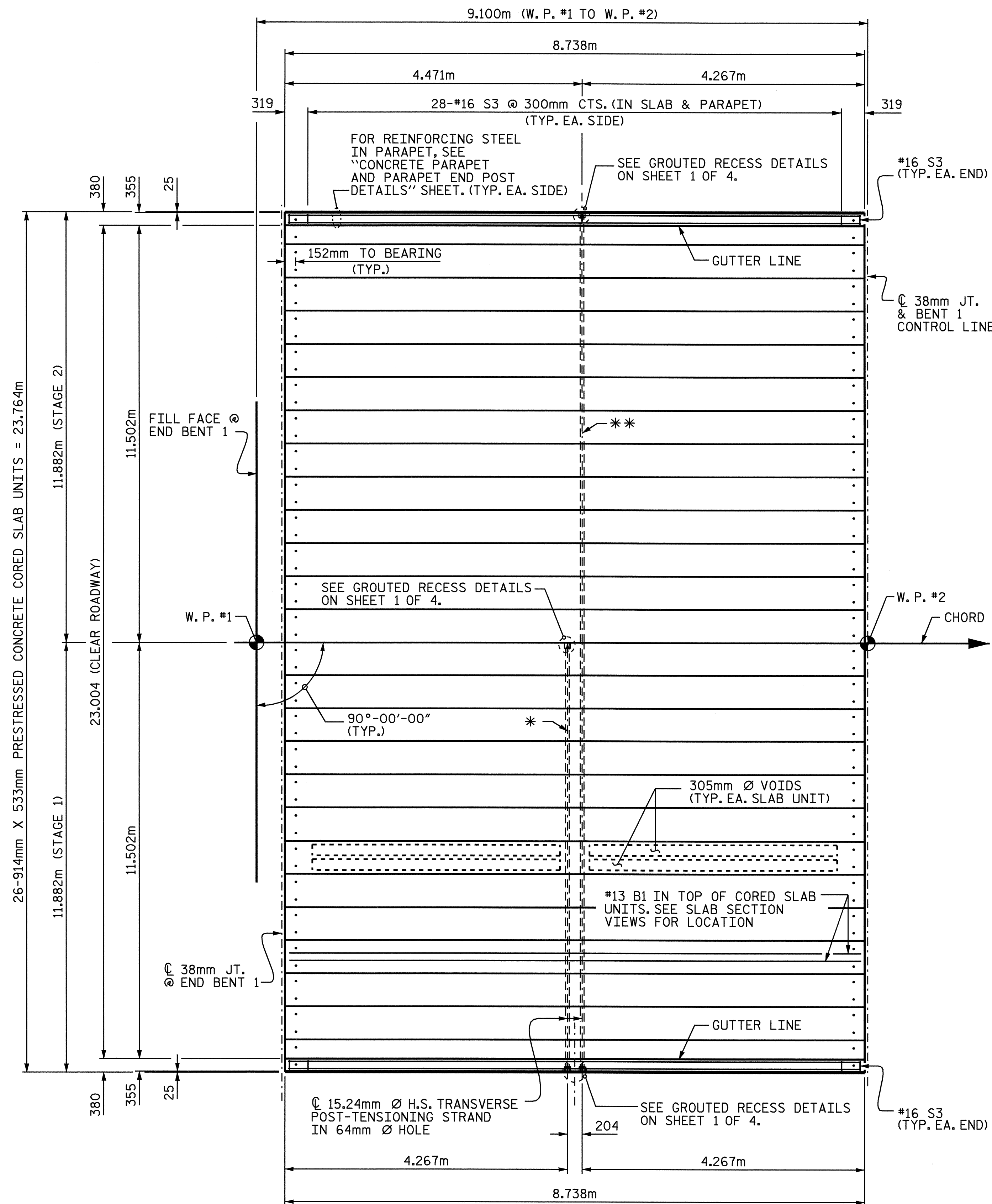
STANDARD  
914mm X 533 mm  
PRESTRESSED CONCRETE  
CORED SLAB UNIT



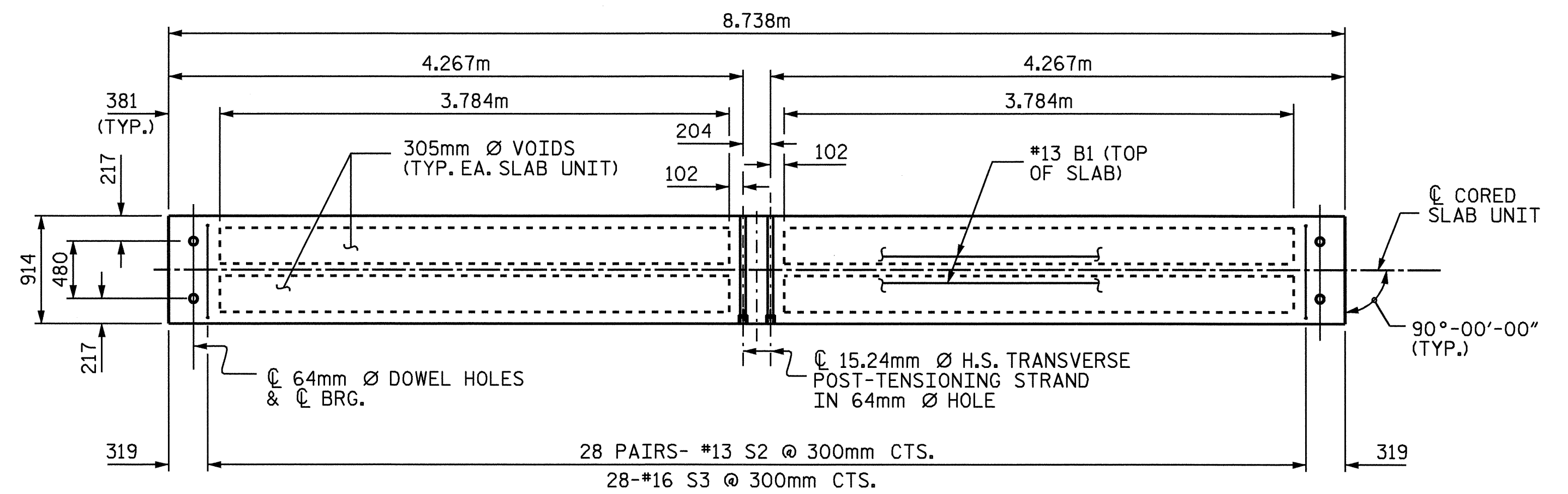
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 31

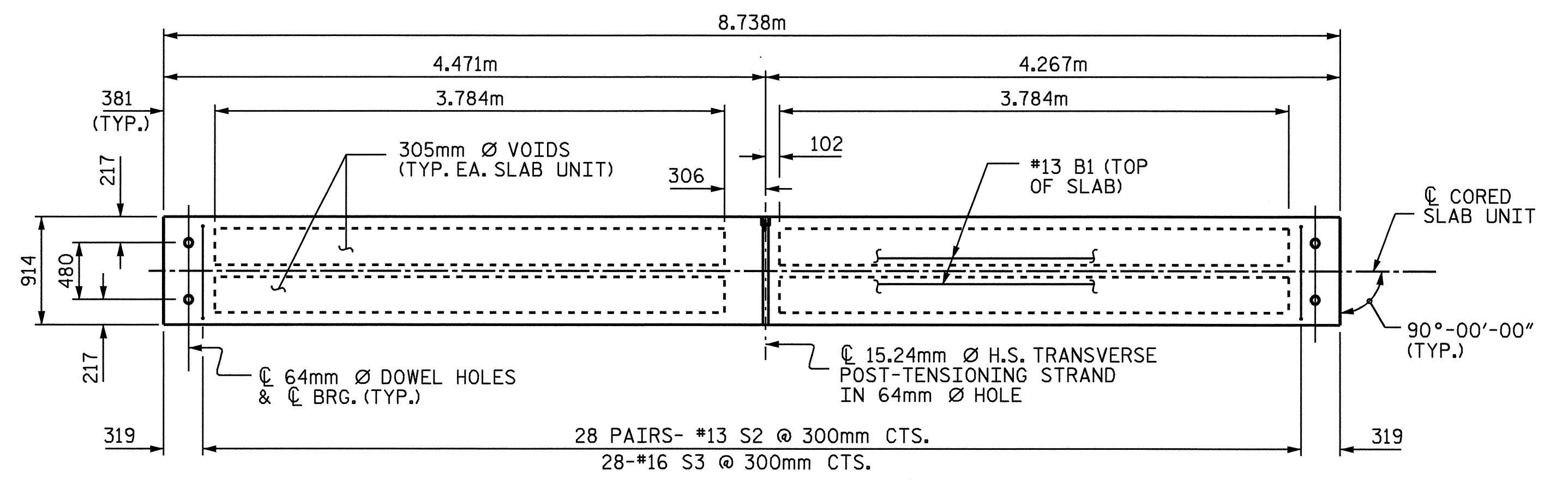
ASSEMBLED BY: J. MYA	DATE: 10-27-08
CHECKED BY: B.N. GRADY	DATE: 11-17-08
DRAWN BY: WJH 4/89	REV. 10/17/00 RWW/LES
CHECKED BY: FCJ 5/89	REV. 7/10/01R RWW/LES
	REV. 5/1/06 TLA/GM



**PLAN OF SPAN A**  
SPAN C SIMILAR



**PLAN OF CORED SLAB UNIT STAGE 1**  
(EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT S3 BARS.)  
FOR REINFORCING STEEL AT END OF CORED SLABS, SEE "PART PLAN EXTERIOR SECTION" SHEET 1 OF 4.  
SPAN C SIMILAR

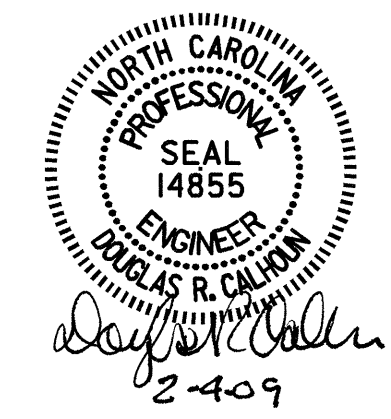


**PLAN OF CORED SLAB UNIT STAGE 2**  
(EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT S3 BARS.)  
FOR REINFORCING STEEL AT END OF CORED SLABS, SEE "PART PLAN EXTERIOR SECTION" SHEET 1 OF 4.  
SPAN C SIMILAR

- NOTES:**
- \* STRAND GOES THRU 13 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE 1 CONSTRUCTION).
  - \*\* STRAND GOES THRU ALL 26 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE 2 CONSTRUCTION).

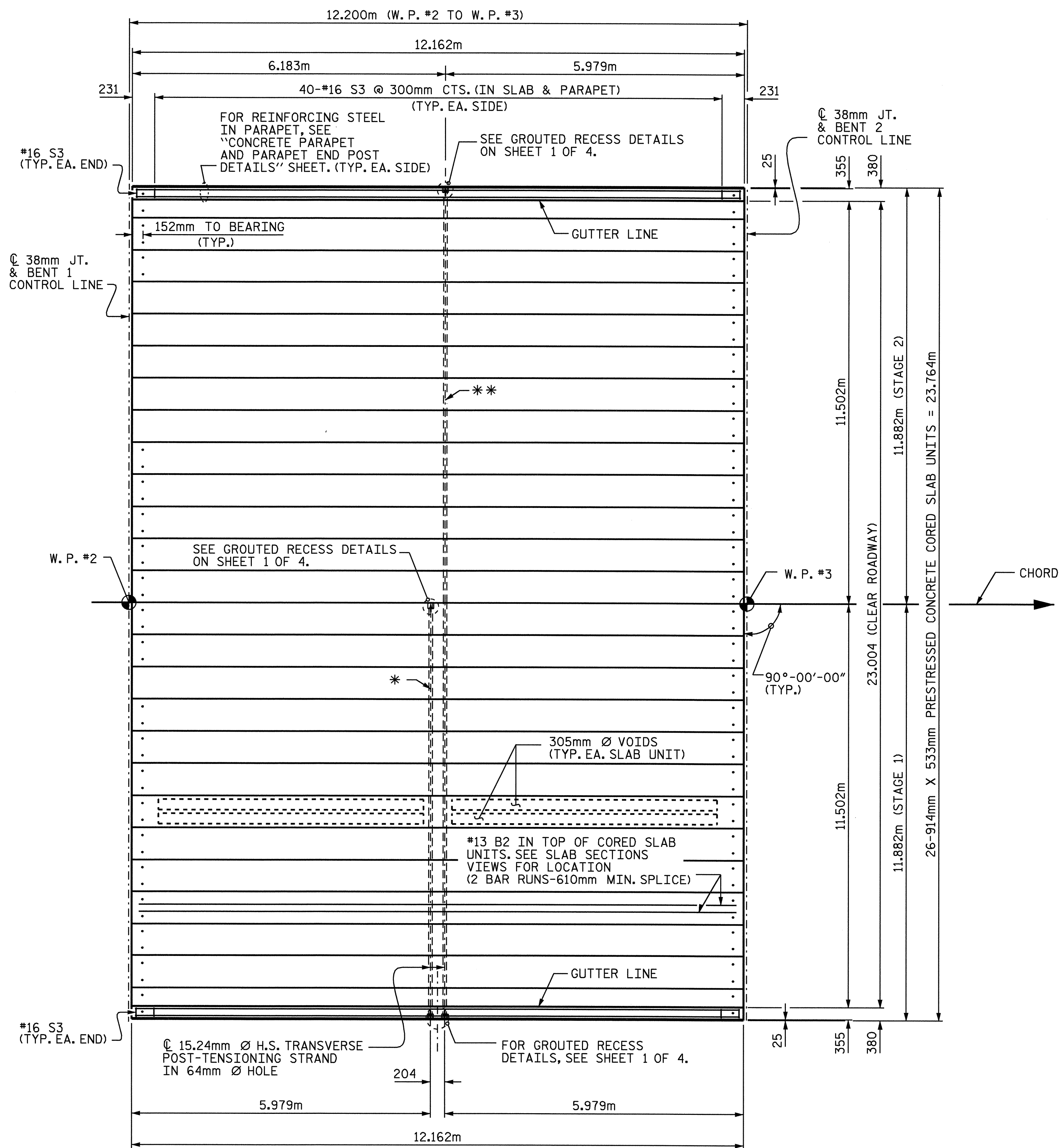
DRAWN BY: J. MYA DATE: 10-27-08  
CHECKED BY: B. N. GRADY DATE: 11-17-08

04-FEB-2009 11:16  
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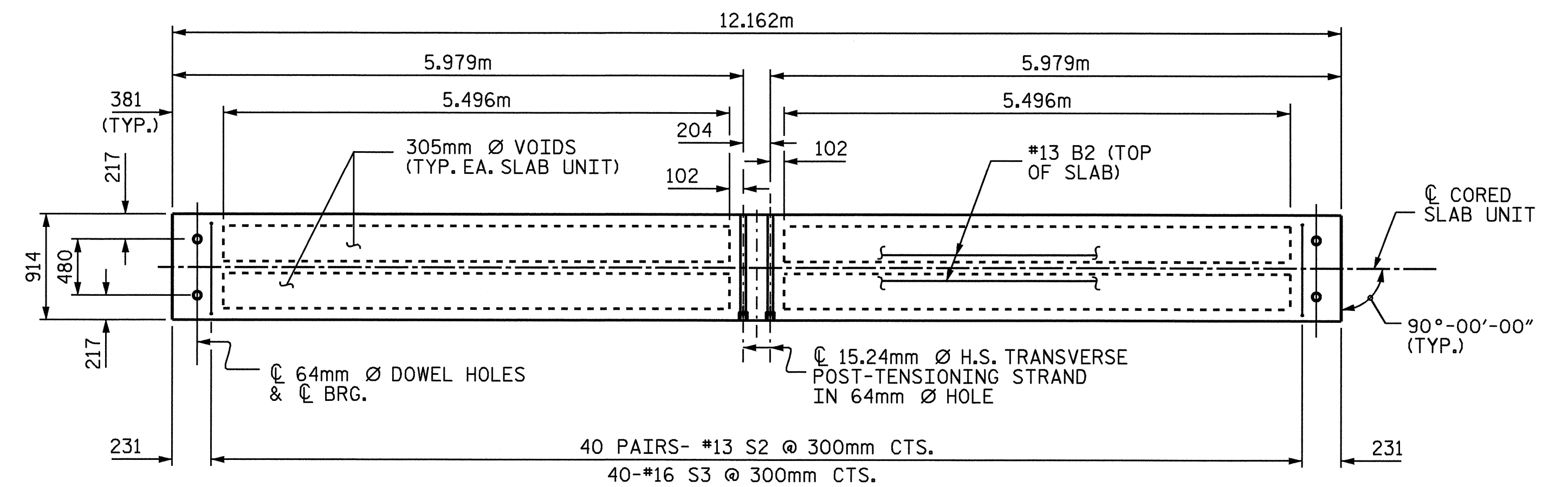


PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-  
SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN A & C					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					31
					S-6

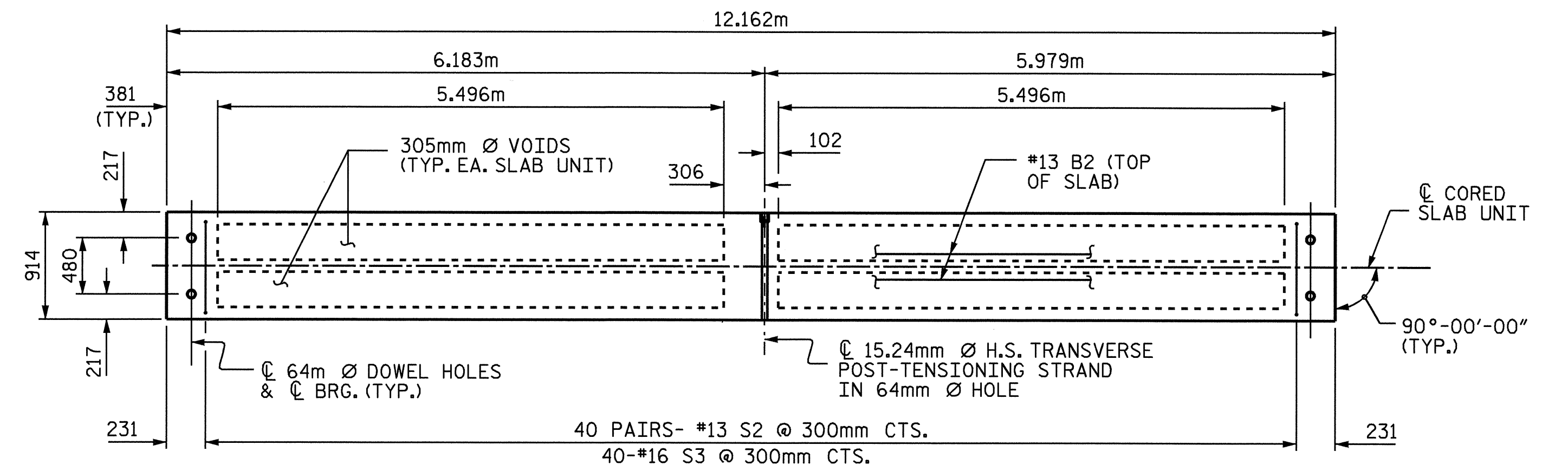


**PLAN OF SPAN B**



**PLAN OF CORED SLAB UNIT STAGE 1**

(EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT S3 BARS.)  
FOR REINFORCING STEEL AT END OF CORED SLABS, SEE "PART PLAN EXTERIOR SECTION" SHEET 1 OF 4.



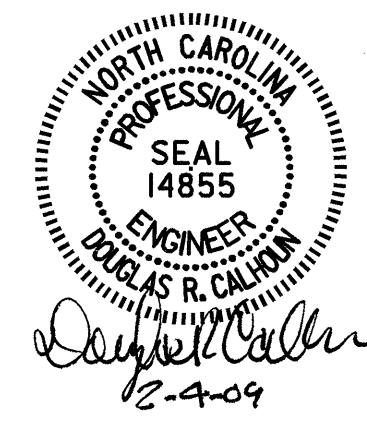
**PLAN OF CORED SLAB UNIT STAGE 2**

(EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT S3 BARS.)  
FOR REINFORCING STEEL AT END OF CORED SLABS, SEE "PART PLAN EXTERIOR SECTION" SHEET 1 OF 4.

**NOTES:**

- \* STRAND GOES THRU 13 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE 1 CONSTRUCTION).
- \*\* STRAND GOES THRU ALL 26 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE 2 CONSTRUCTION).

DRAWN BY : J. MYA DATE : 10-27-08  
CHECKED BY : B. N. GRADY DATE : 11-17-08



PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

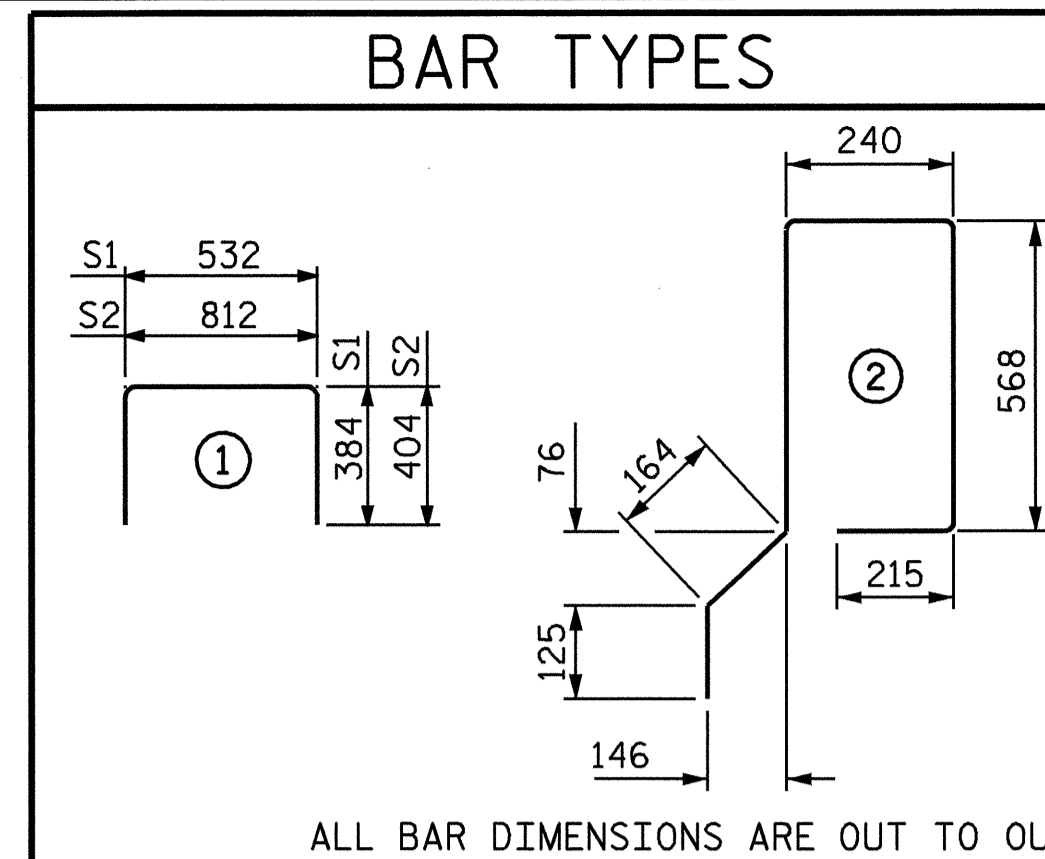
SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. <b>S-7</b>	
SUPERSTRUCTURE PLAN OF SPAN B						TOTAL SHEETS <b>31</b>	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				



# BILL OF MATERIAL FOR ONE CORED SLAB SECTION

SPAN A AND C								SPAN B							
EXTERIOR UNIT				INTERIOR UNIT				EXTERIOR UNIT				INTERIOR UNIT			
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	2	#13	STR	8620	17	8620	17	B2	4	#13	STR	6340	25	6300	25
S1	8	#13	1	1300	10	1280	10	S1	8	#13	1	1300	10	1280	10
S2	56	#13	1	1620	90	1620	90	S2	80	#13	1	1620	129	1620	129
*S3	30	#16	2	1880	88			*S3	42	#16	2	1880	123		
REINFORCING STEEL				117kg				REINFORCING STEEL				164kg			
*EPOXY COATED REINFORCING STEEL				88 kg				*EPOXY COATED REINFORCING STEEL				123kg			
35MPa. CONCRETE				3.1 CU. METERS				35MPa. CONCRETE				4.3 CU. METERS			
15.24mm Ø L.R. STRANDS				No. 12				15.24mm Ø L.R. STRANDS				No. 12			



## 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 CORED SLAB SECTIONS SHALL BE GRADE 420 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

THE 64mm Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE 51mm Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER, SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH, AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

WHEN A CONCRETE WEARING SURFACE IS DETAILED ON THE CORED SLAB BRIDGE TYPICAL SECTION, THE TOP SURFACE OF THE CORED SLAB UNITS SHALL HAVE A 10mm RAKED FINISH.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 27.6MPa.

ALL REINFORCING STEEL IN PARAPET & END POSTS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 12mm IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 6.1m IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 3.5m IN LENGTH.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 MPa. TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

ALL BAR SUPPORTS USED IN THE PARAPET, CORED SLAB UNITS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE TO THE STANDARD SPECIFICATIONS. NO SEPARATE PAYMENT WILL BE MADE FOR THE CALCIUM NITRITE CORROSION INHIBITOR.

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE PARAPET. THE COST OF THE BARS CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR DECK GROOVING QUANTITY, SEE APPROACH SLAB SHEET DETAILS.

### BILL OF MATERIAL FOR CONCRETE WEARING SURFACE

STAGE 1						STAGE 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*R1	396	#10	STR	5940	1317	*R1	396	#10	STR	5940	1317
*R2	308	#10	STR	7760	1338	*R2	308	#10	STR	7760	1338
*R3	152	#13	STR	6000	907	*R3	152	#13	STR	6000	907
*EPOXY COATED REINFORCING STEEL				kg 3562		*EPOXY COATED REINFORCING STEEL				kg 3562	
CONCRETE WEARING SURFACE				SQ. METERS 342		CONCRETE WEARING SURFACE				SQ. METERS 342	

### TOTAL BILL OF MATERIAL

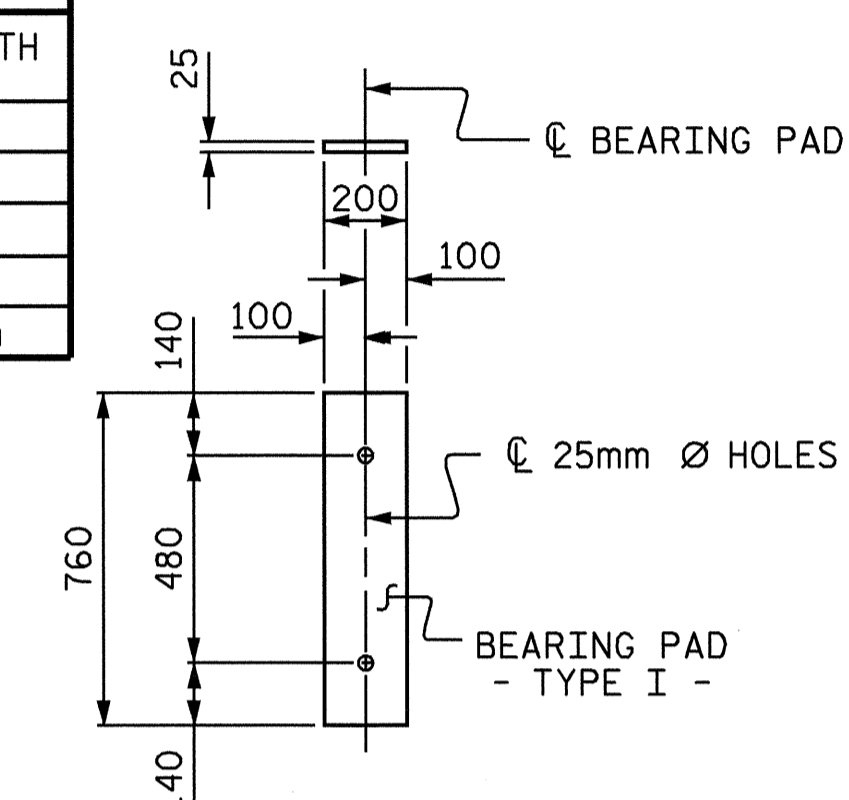
\*EPOXY COATED REINFORCING STEEL Kg 7124  
CONCRETE WEARING SURFACE SQ. METERS 684

### CORED SLAB UNITS REQUIRED

	NUMBER PER SPAN	LENGTH	TOTAL LENGTH
EXTERIOR C.S.-SPANS A & C	4	8.738m	34.952m
INTERIOR C.S.-SPANS A & C	48	8.738m	419.424m
EXTERIOR C.S.-SPAN B	2	12.162m	24.324m
INTERIOR C.S.-SPAN B	24	12.162m	291.888m
<b>TOTAL</b>	<b>78</b>		<b>770.588m</b>

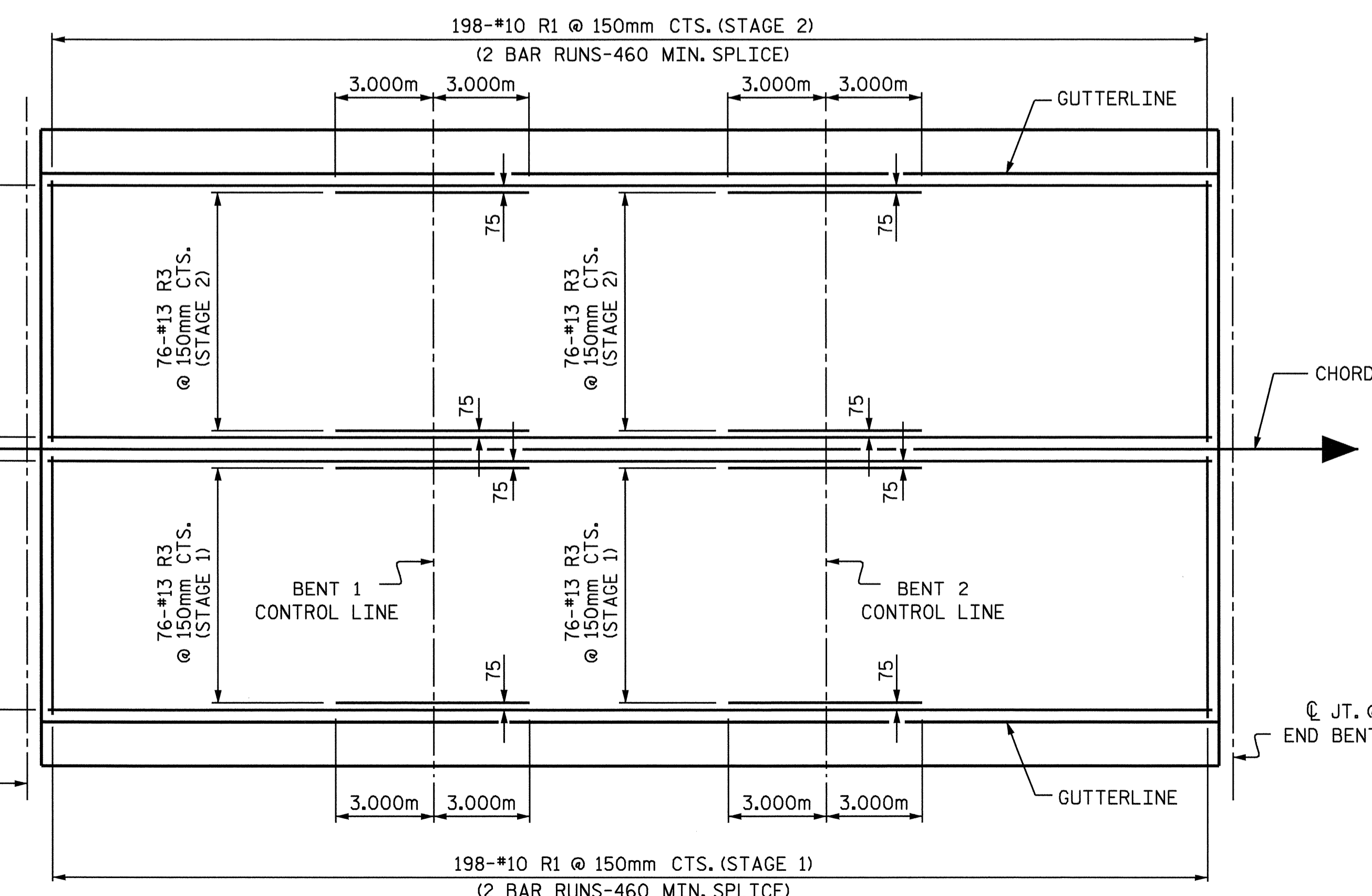
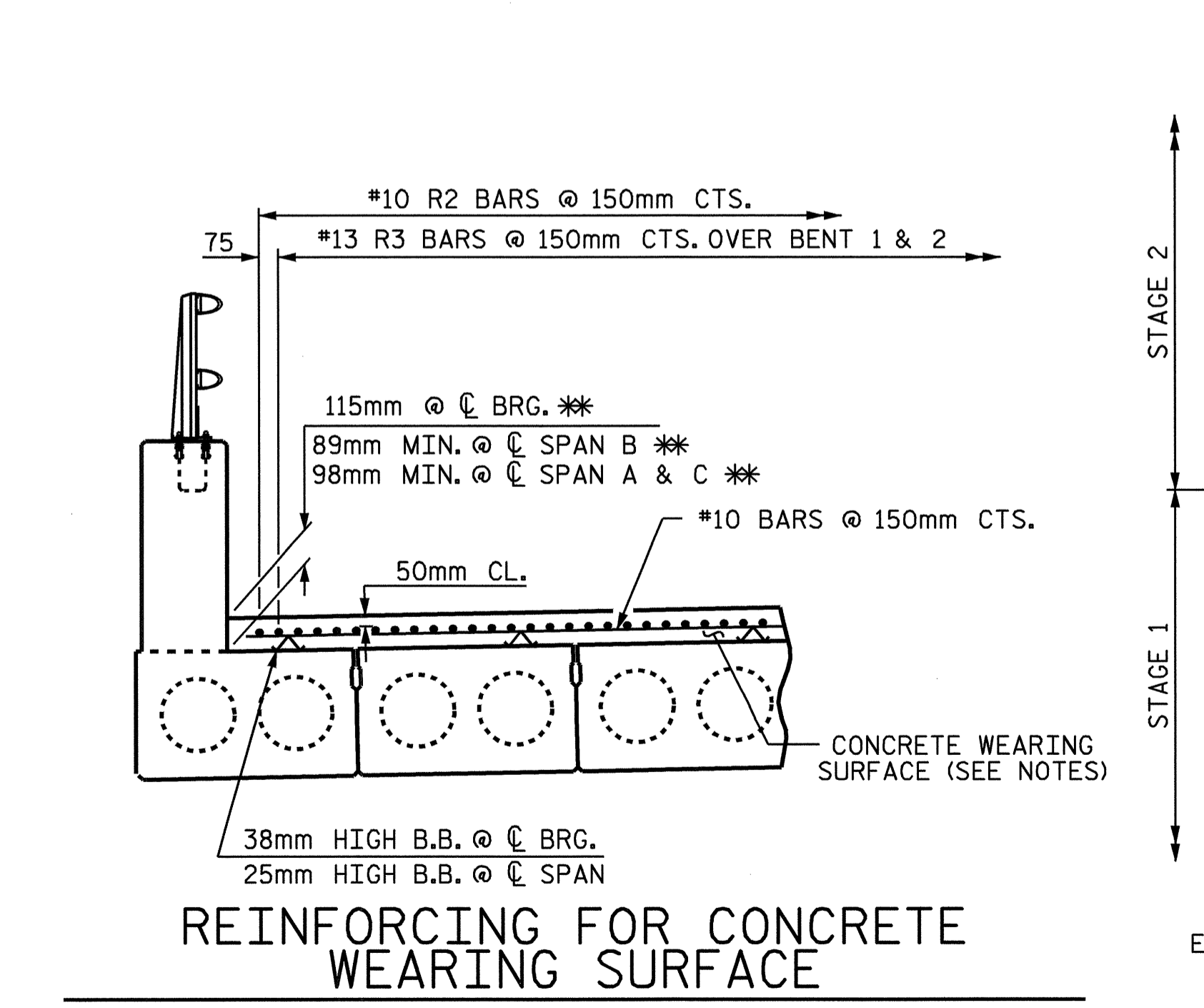
### GRADE 270 STRANDS

	15.24mm Ø L.R.
AREA ( SQUARE mm )	140
ULTIMATE STRENGTH ( KN. PER STRAND )	260.7
APPLIED PRESTRESS ( KN. PER STRAND )	195.5



### DEAD LOAD DEFLECTION AND CAMBER

	SPAN A	SPAN B	SPAN C
CAMBER ( BEAM ALONE IN PLACE ) ↑	18mm	26mm	18mm
DEFLECTION DUE TO CONCRETE WEARING SURFACE ↓	1mm	2mm	1mm
FINAL CAMBER ↑	17mm	24mm	17mm



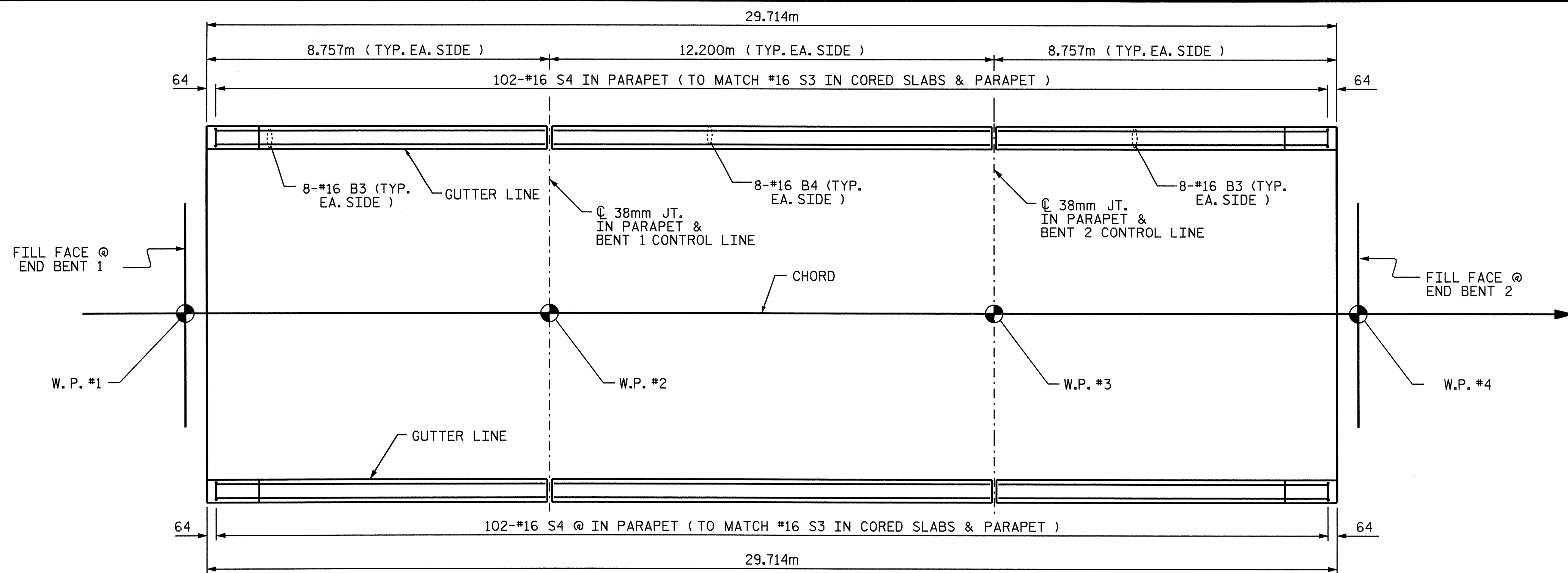
PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

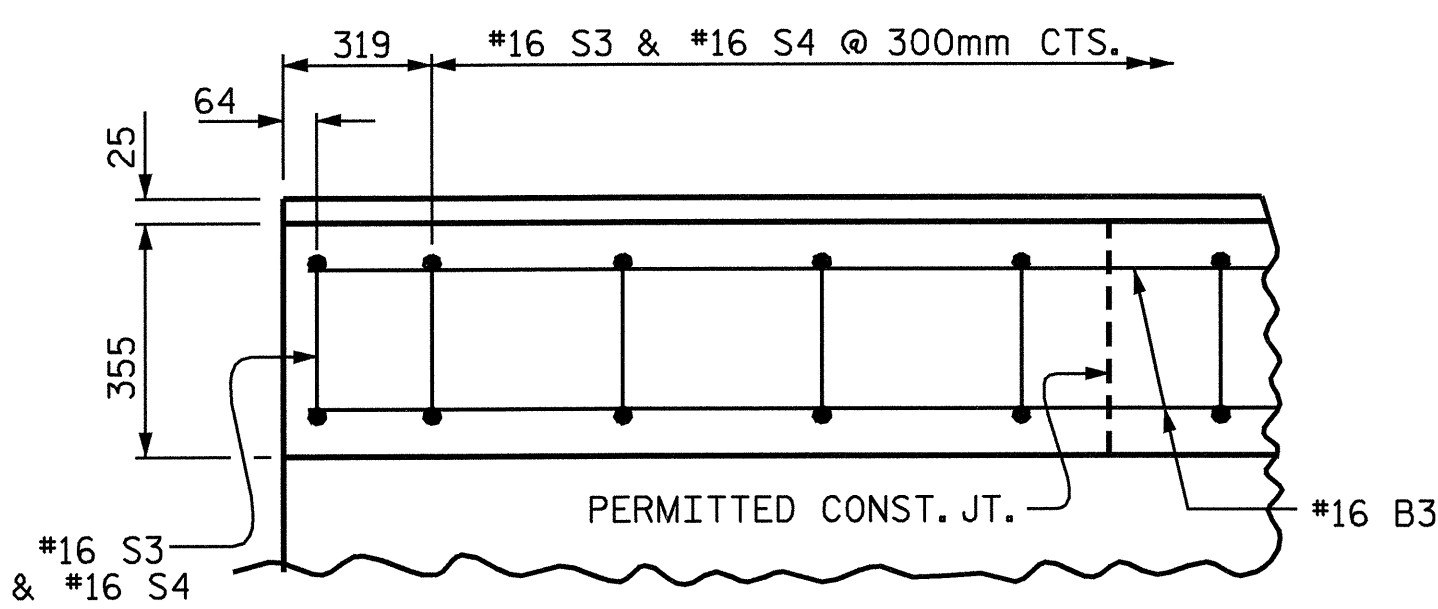
STANDARD  
914 X 533  
PRESTRESSED CONCRETE  
CORED SLAB UNIT

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

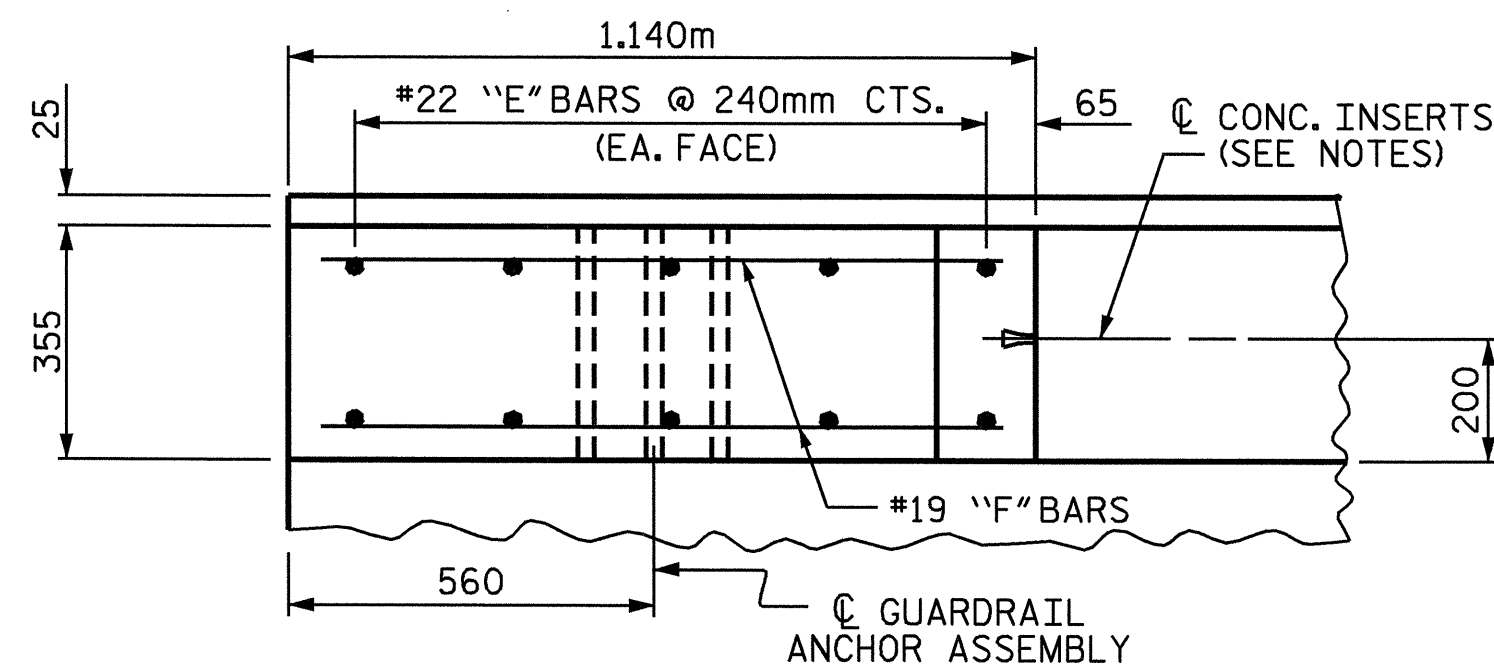




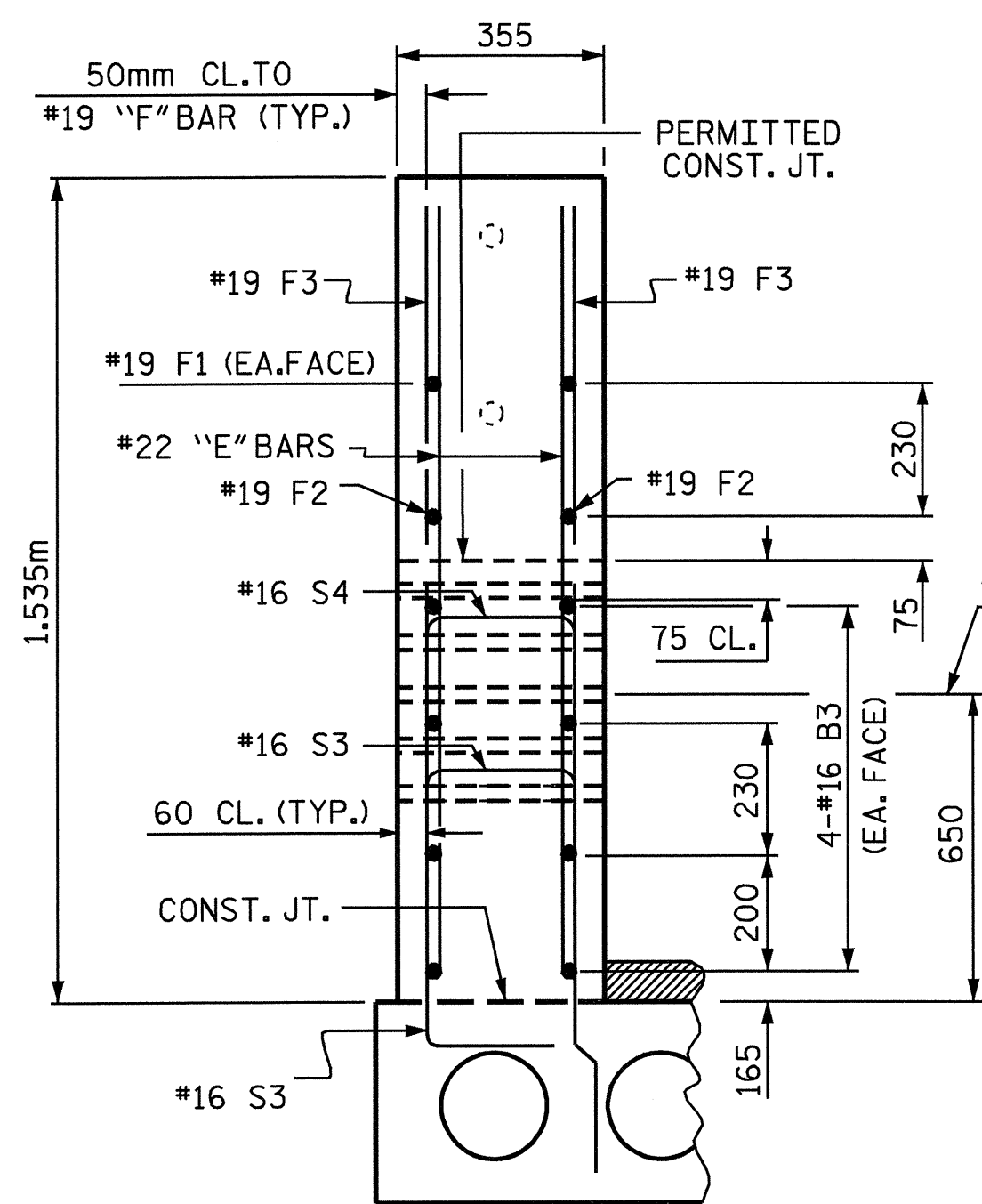
PLAN OF PARAPET



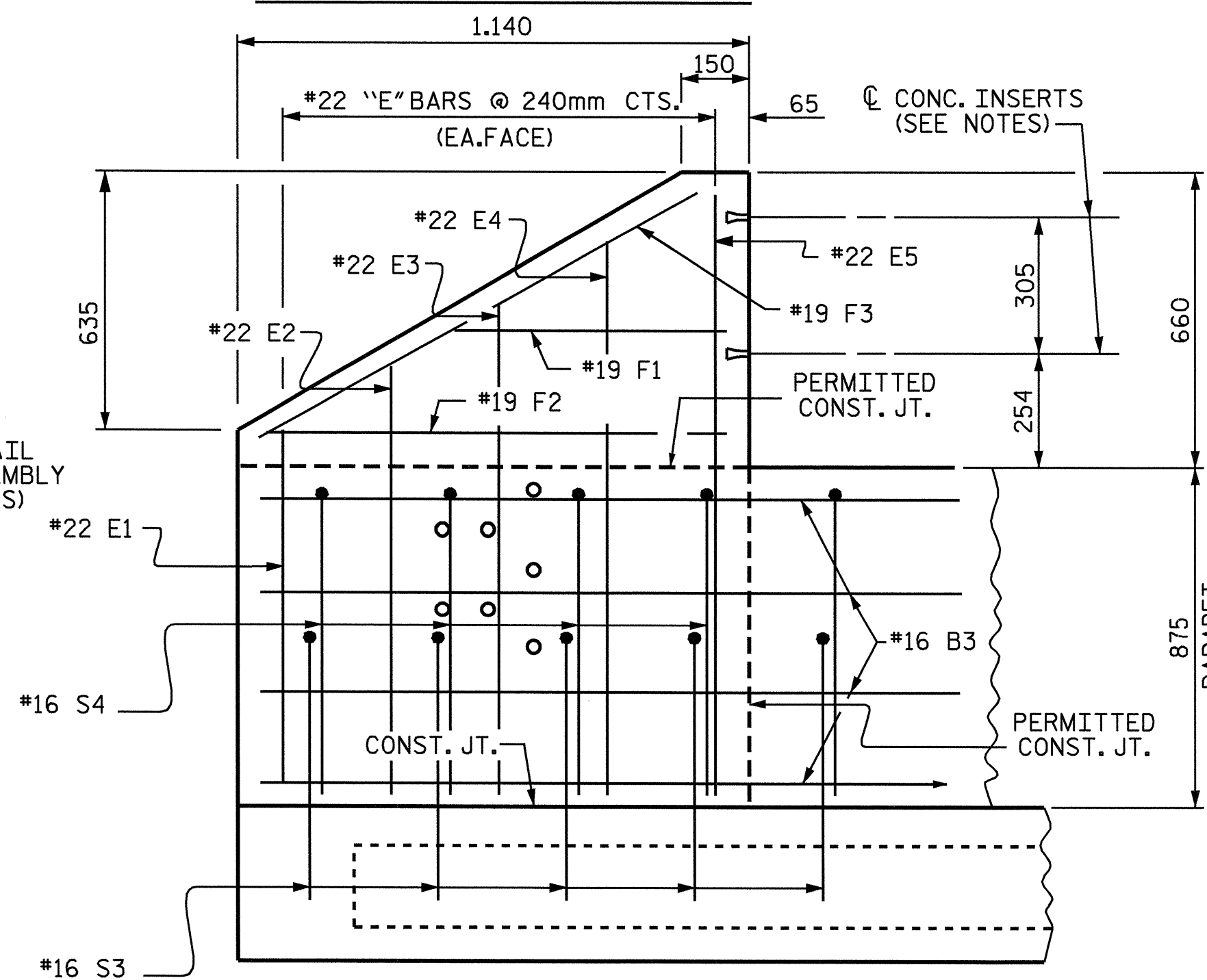
PLAN OF PARAPET



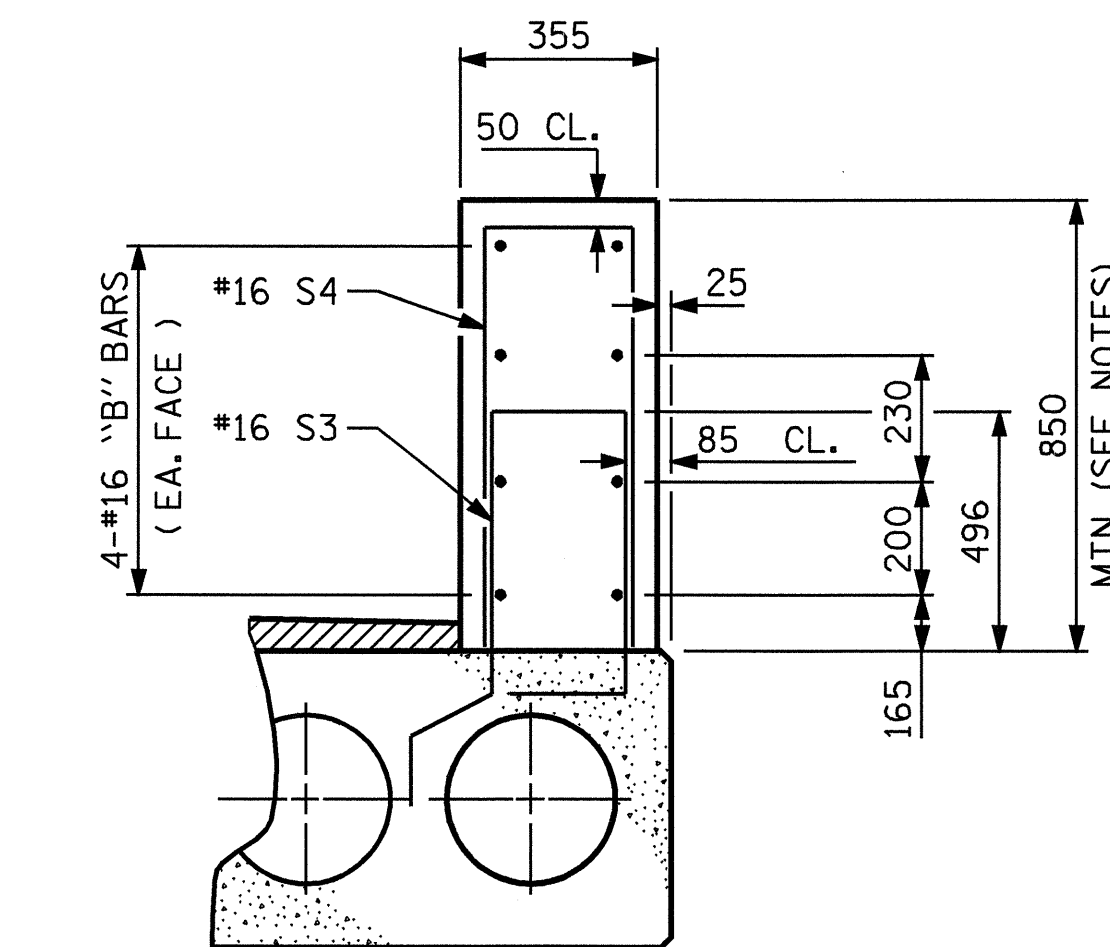
PLAN OF END POST



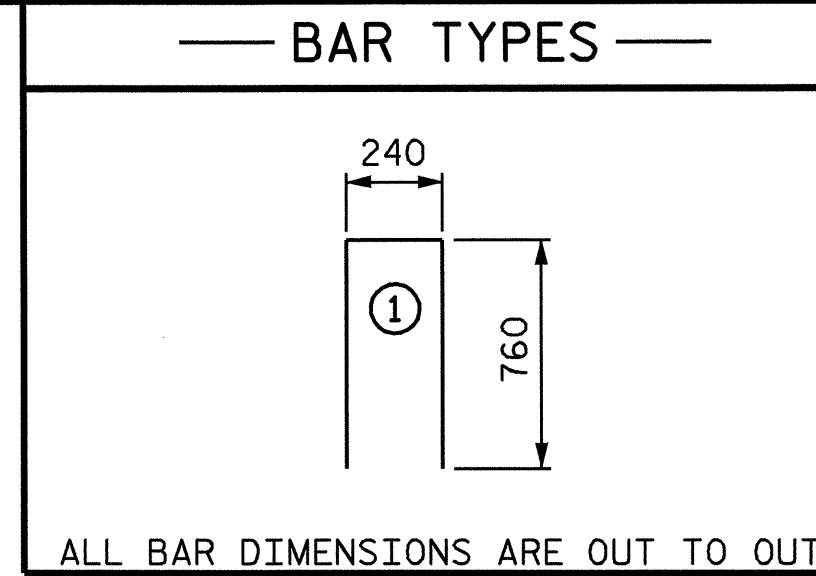
END VIEW



ELEVATION



TWO BAR METAL RAIL PARAPET SECTION



BILL OF MATERIAL					
PARAPETS AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B3	32	*16	STR	8620	428
* B4	16	*16	STR	12060	299
* E1	8	*22	STR	880	21
* E2	8	*22	STR	1020	25
* E3	8	*22	STR	1160	28
* E4	8	*22	STR	1320	32
* E5	8	*22	STR	1420	35
* F1	8	*19	STR	540	10
* F2	8	*19	STR	900	16
* F3	8	*19	STR	1100	20
* S4	204	*16	1	1760	557
* EPOXY COATED REINF. STEEL =					1471 kg
CLASS AA CONCRETE				19.1 CU. METERS	
CONCRETE PARAPET					59.428m

NOTES

ALL REINFORCING STEEL IN THE PARAPETS AND END POSTS SHALL BE EPOXY COATED.

FOR DETAILS OF CONCRETE INSERT AND GUARDRAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET 4 OF 5 AND "GUARDRAIL ANCHORAGE DETAILS" SHEET 5 OF 5.

\*16 S3 BARS ARE INCLUDED IN THE BILL OF MATERIAL FOR CORED SLAB UNITS.

GROOVED CONTRACTION JOINTS, 12mm IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 2.4m TO 3.5m BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 3.05m IN LENGTH.

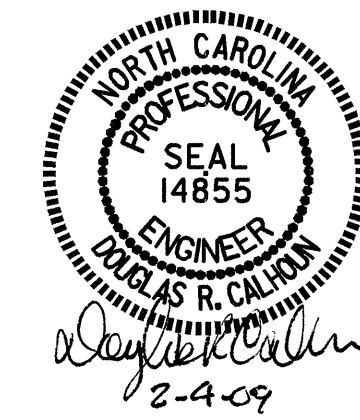
ALL BAR SUPPORTS USED IN THE PARAPET, CORED SLAB UNITS, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

ASSEMBLED BY : J.MYA DATE : 10/27/08  
 CHECKED BY : B.N. GRADY DATE : 11-17-08  
 DRAWN BY : WJH 4/89  
 CHECKED BY : FCJ 5/89

REV. 7/10/01 RWW/LES  
 REV. 5/7/03RRR RWW/JTE  
 REV. 5/1/06 TLA/GM

PARAPET AND END POST FOR TWO BAR RAIL



PROJECT NO. R-2414A  
 CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 1 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE CONCRETE PARAPET AND PARAPET END POST DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-9
					TOTAL SHEETS 31

**NOTES**

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 250 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570M FOR GRADE 230 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570M FOR GRADE 230 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2SM.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

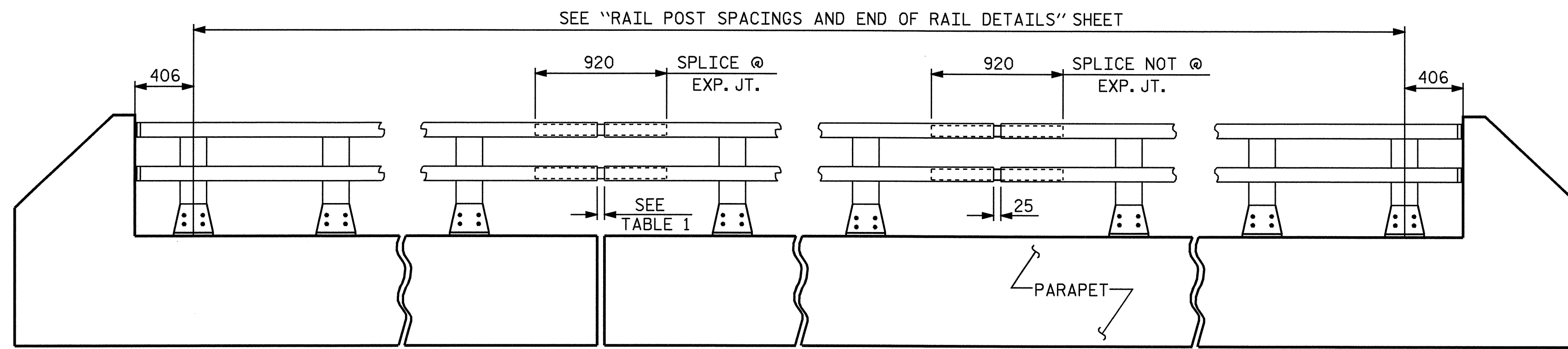
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

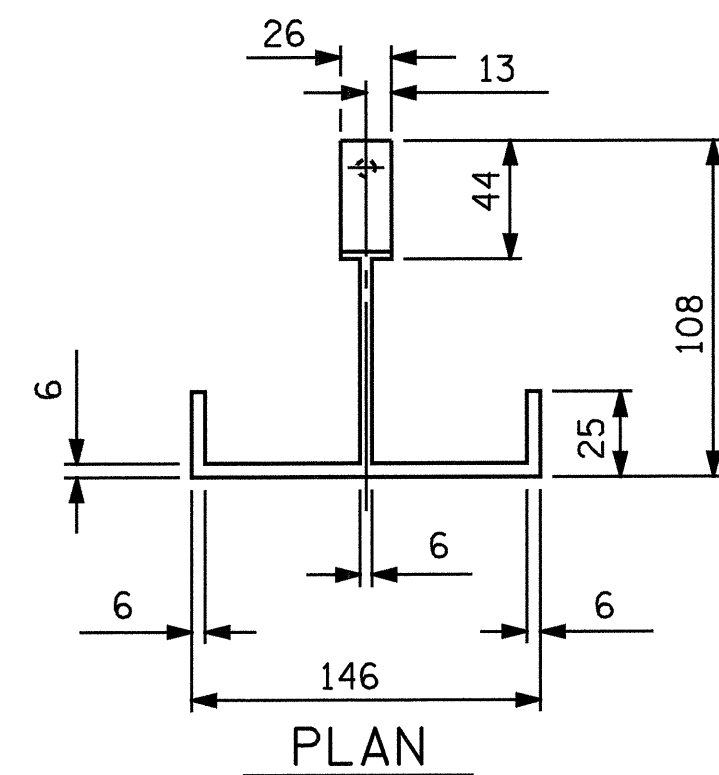
PAY LENGTH = 54.868 METERS



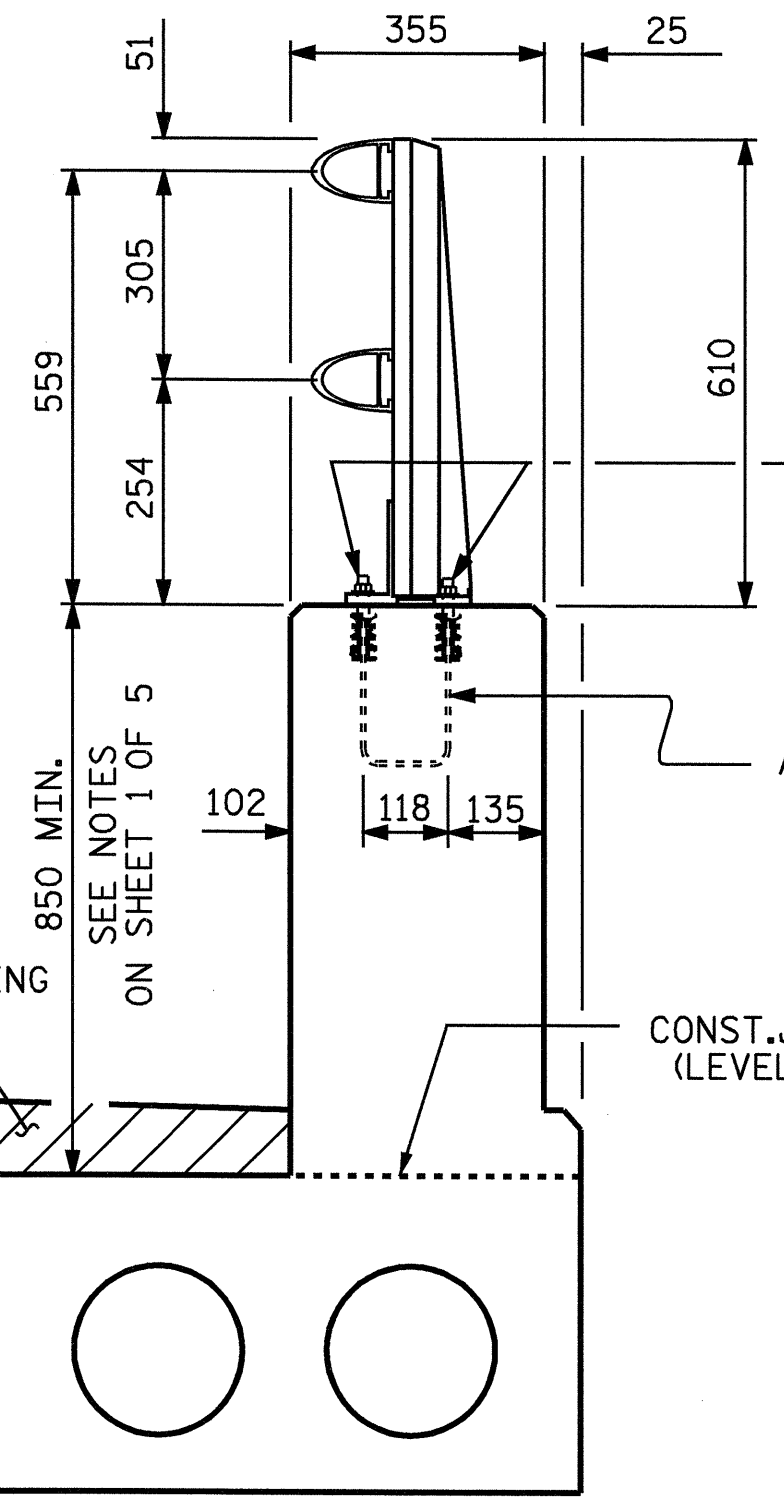
**ELEVATION**

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD No. BMR2SM

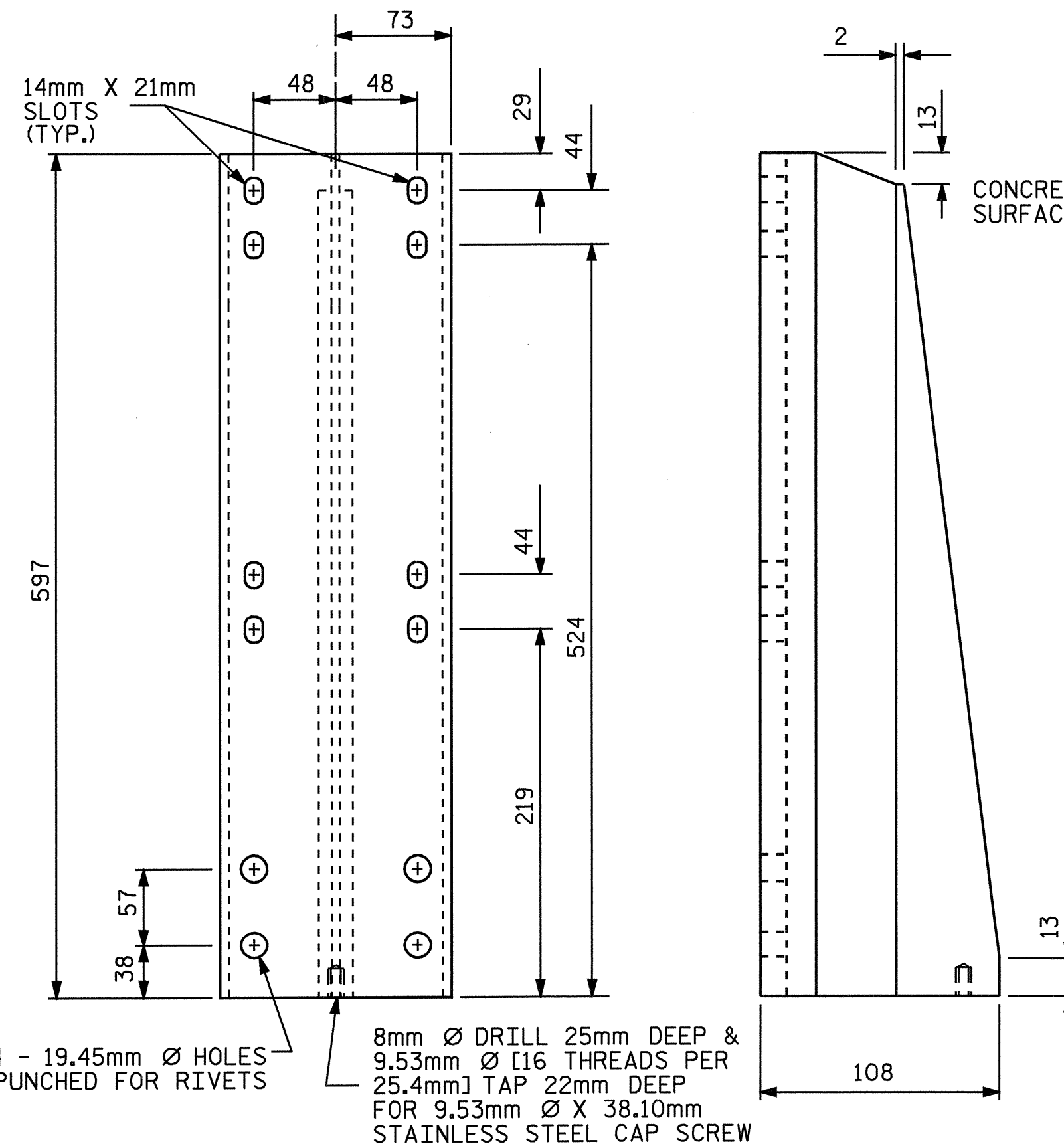
TABLE 1	
EXP. JT. @	RAIL OPENING
BENT No. 1	38
BENT No. 2	38



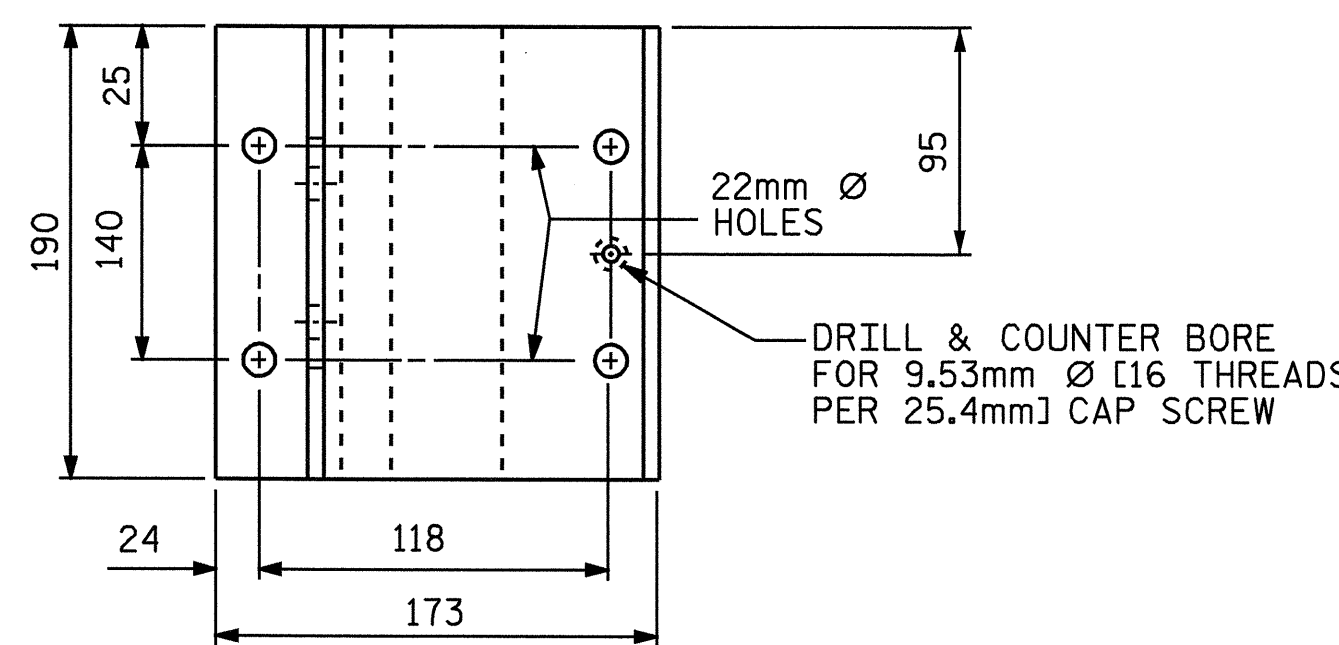
**PLAN**



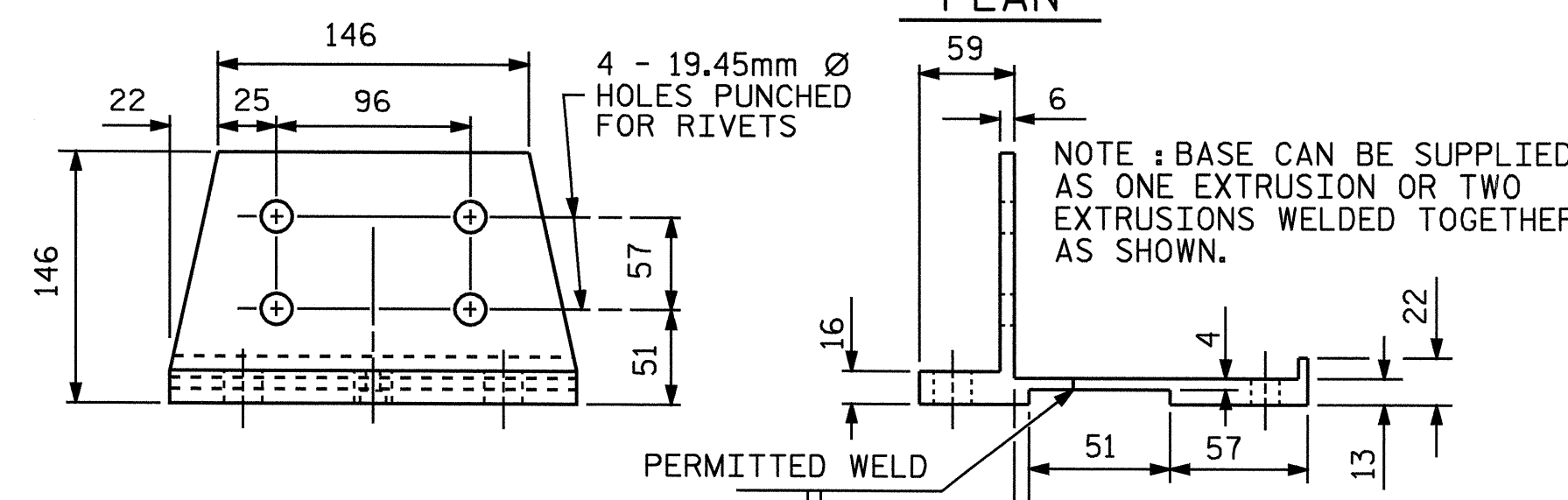
**SECTION THRU PARAPET AND RAIL**



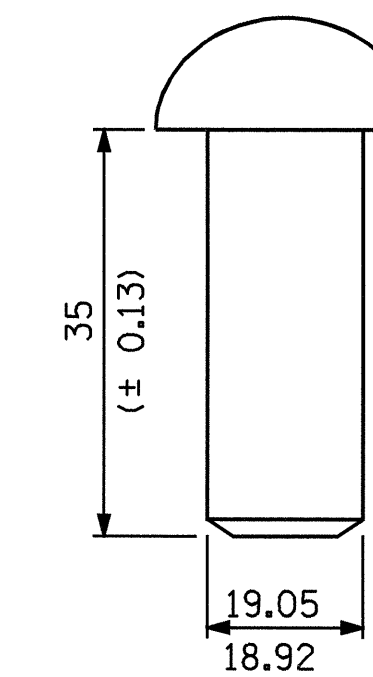
**FRONT ELEVATION SIDE ELEVATION  
DETAILS OF POST**



**PLAN**



**FRONT ELEVATION SIDE ELEVATION  
POST BASE DETAILS**



**RIVET DETAIL**

ASSEMBLED BY : J. MYA DATE : 10-27-08  
CHECKED BY : B.N. GRADY DATE : 11-17-08

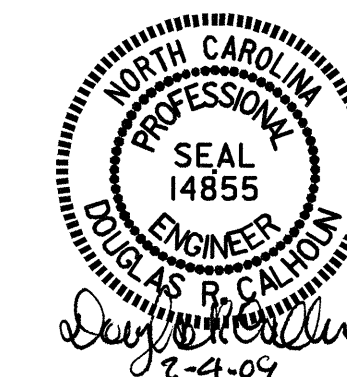
DRAWN BY : EEM 6/94 REV. 10/17/00 LRS/RDR  
CHECKED BY : RGW 6/94 REV. 5/7/03R RWN/JTE  
REV. 5/1/06 TLA/GM

26-JAN-2009 10:10 R:\Structures\FINAL PLANS\R2414A\_sd.2MR.dgn

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 2 OF 5

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



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

TOTAL SHEETS 31

STD. NO. BMR3SM

NOTES

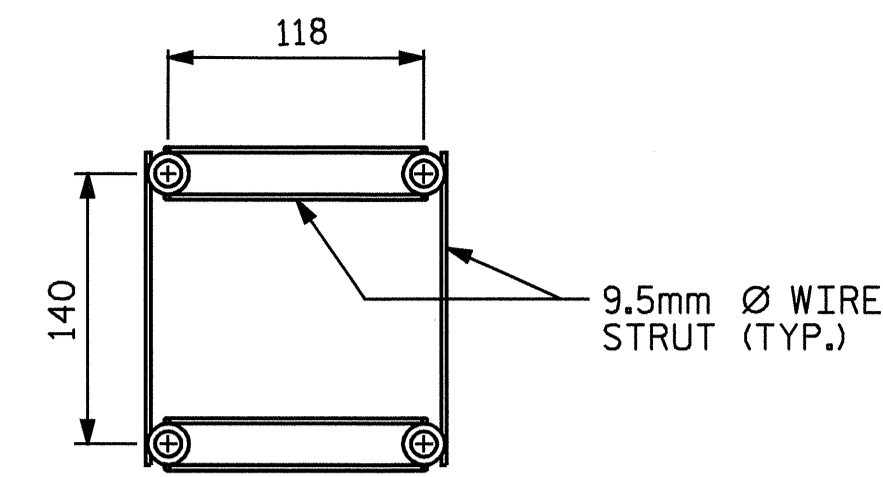
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

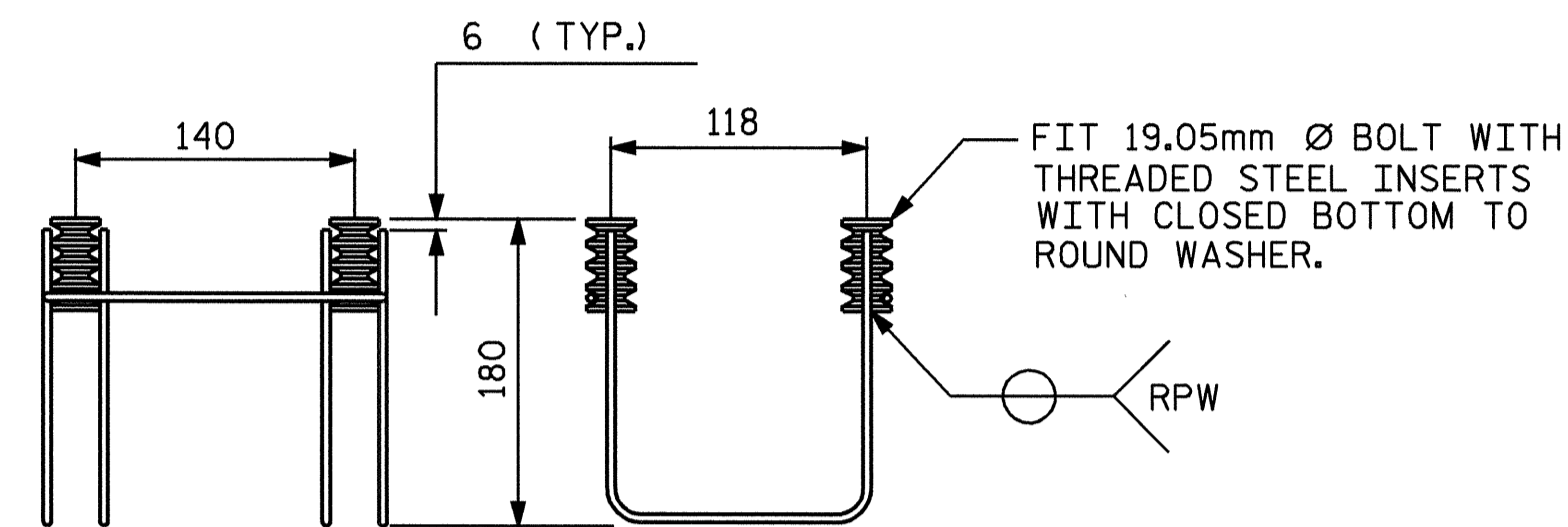
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 51mm FOR 19mm FERRULES.
- B. 4 - 19.05mm Ø X 64mm BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 19.05mm Ø X 64mm GALVANIZED BOLTS 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.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A TENSILE STRENGTH OF 620 MPa IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR METERS OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 19.05mm Ø BOLT IS 44.5kN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 517 MPa ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



PLAN

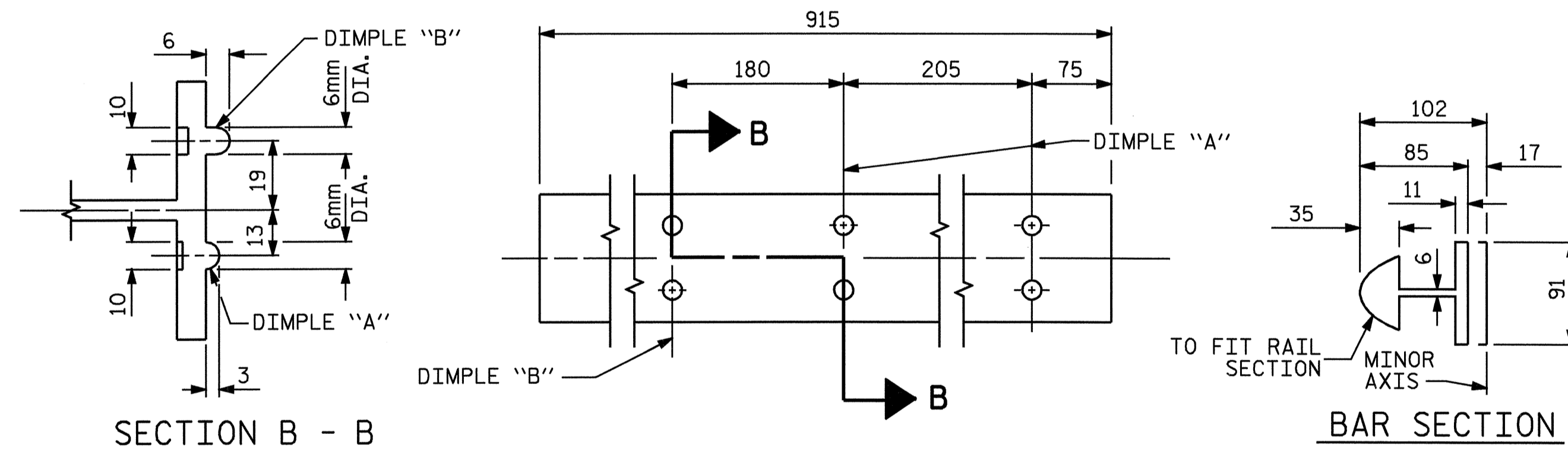


SIDE VIEW ELEVATION

MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 44mm

4-BOLT METAL RAIL ANCHOR ASSEMBLY

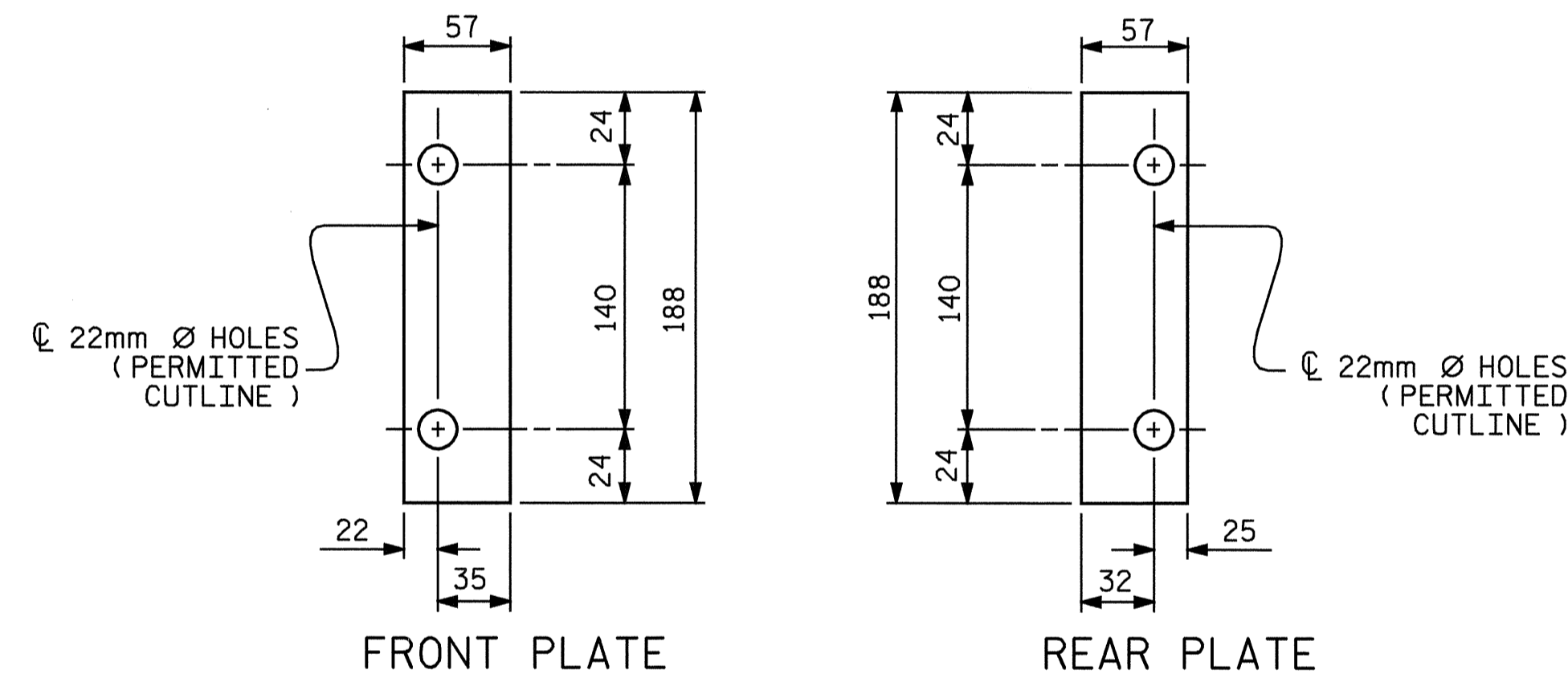
(34 ASSEMBLIES REQUIRED)



SECTION B - B

EXPANSION BAR DETAILS

BAR SECTION

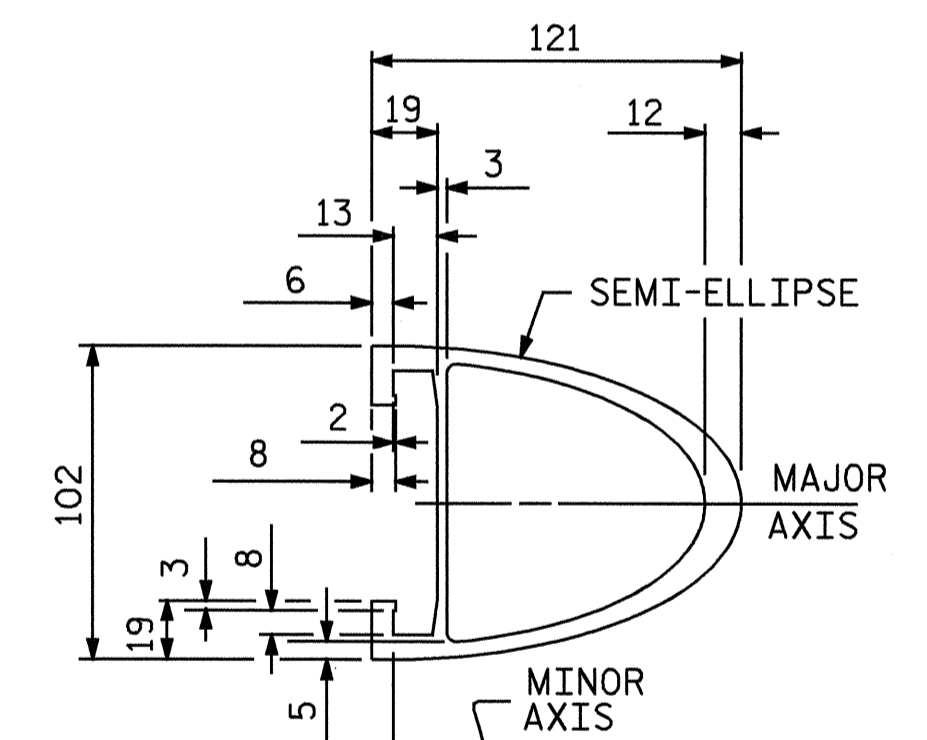


FRONT PLATE

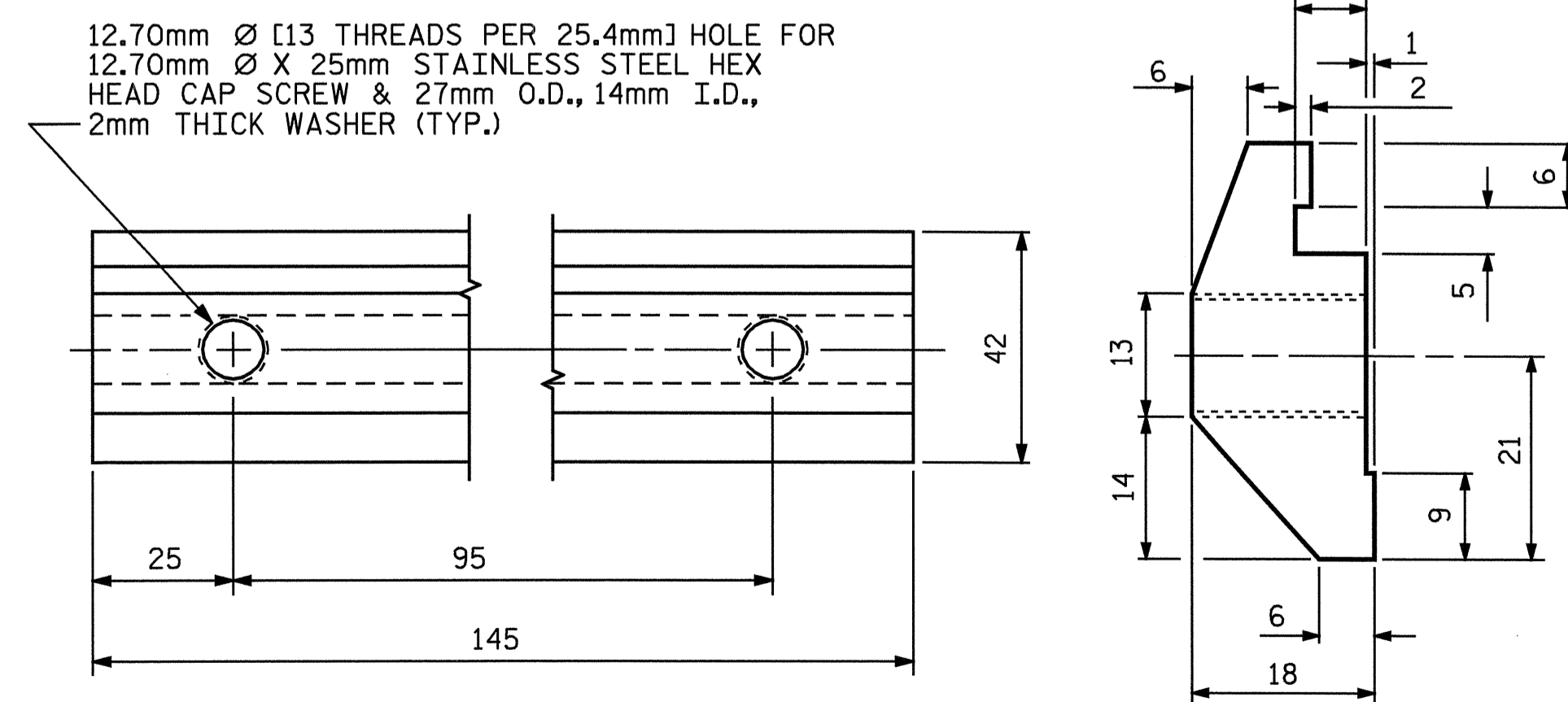
REAR PLATE

SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

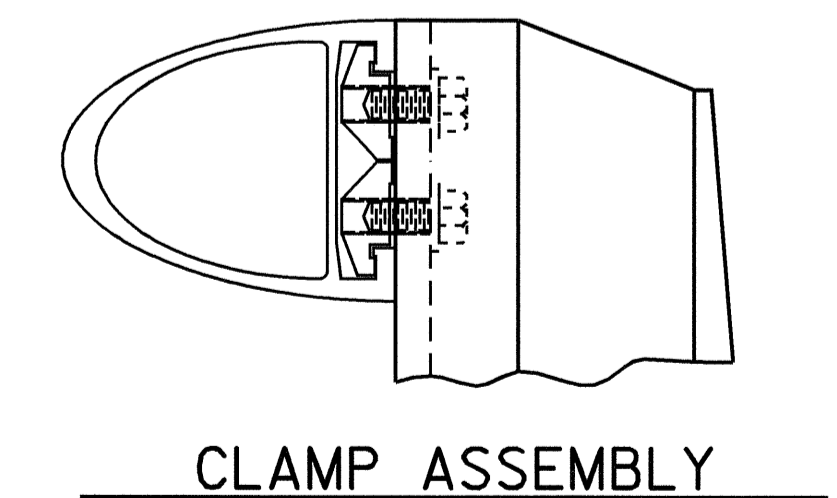


RAIL SECTION

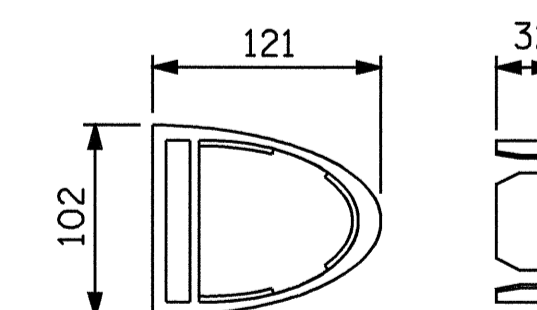


CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY

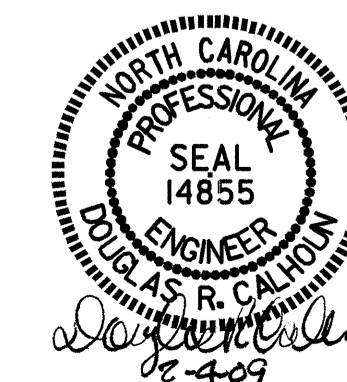


RAIL CAP

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

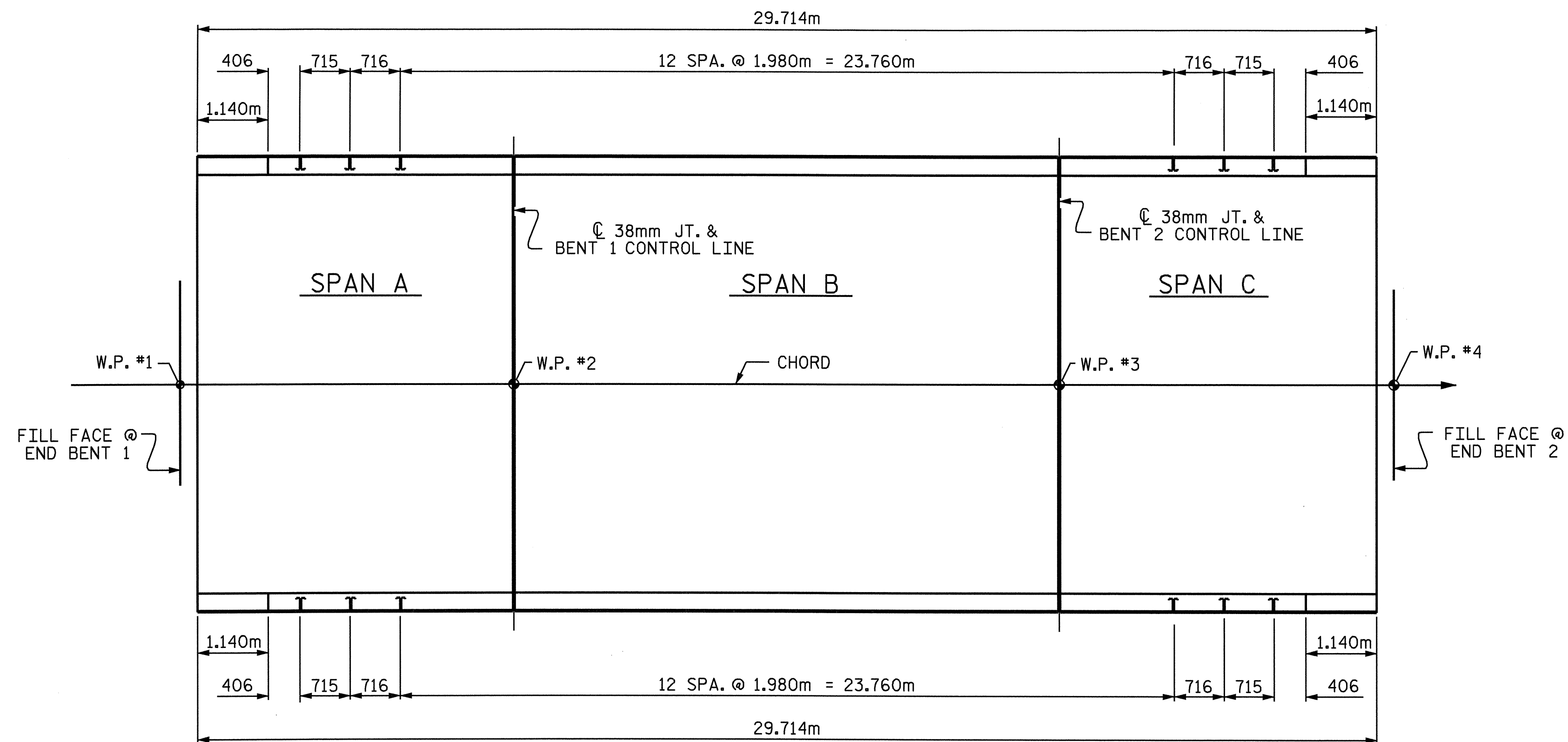
SHEET 3 OF 5

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

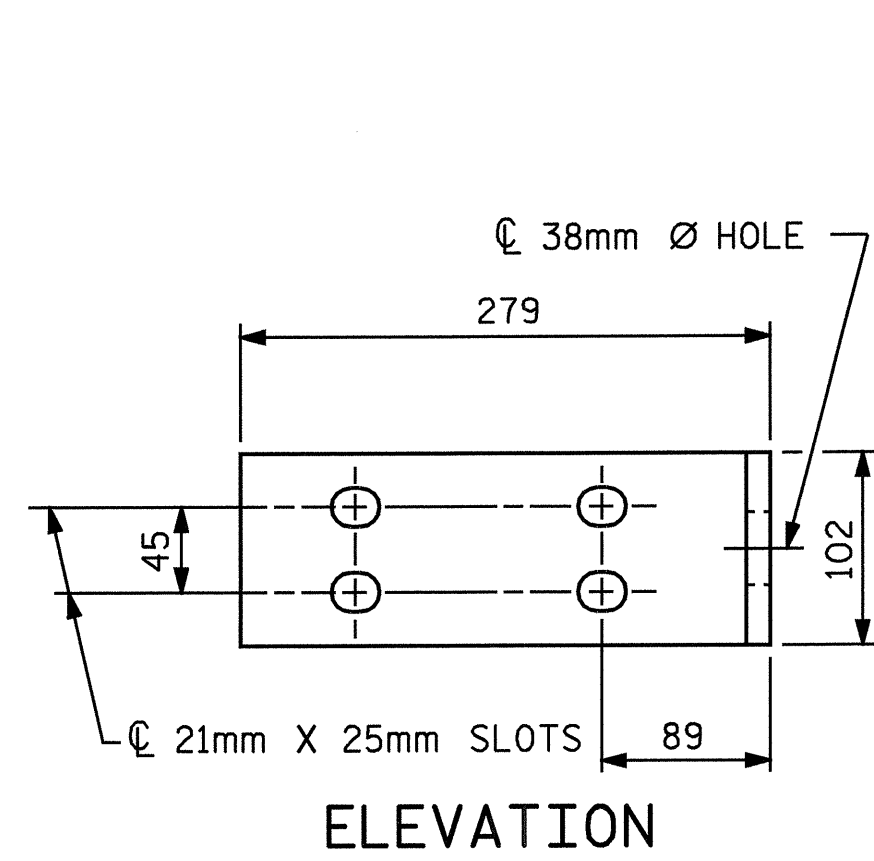


ASSEMBLED BY : J. MYA	DATE : 10-27-08
CHECKED BY : B.N. GRADY	DATE : 11-17-08
DRAWN BY : EEM 6/94	REV. 10/17/00 LES/RDR
CHECKED BY : RGW 6/94	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R KMM/GM

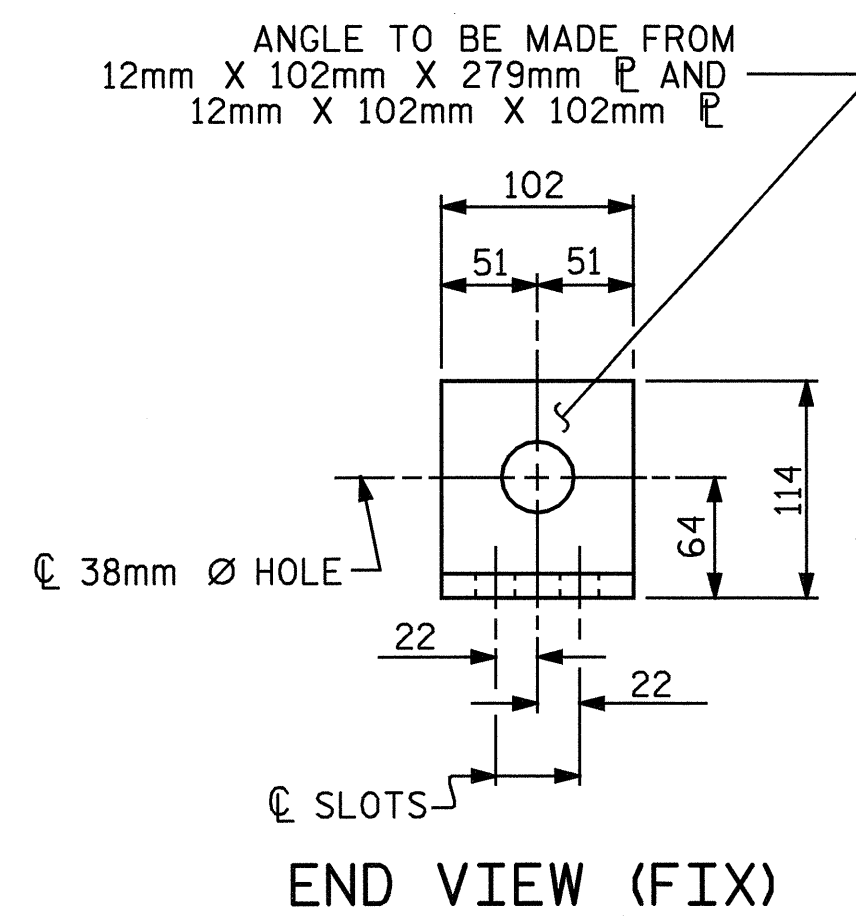
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-II
1			3			TOTAL SHEETS
2			4			31



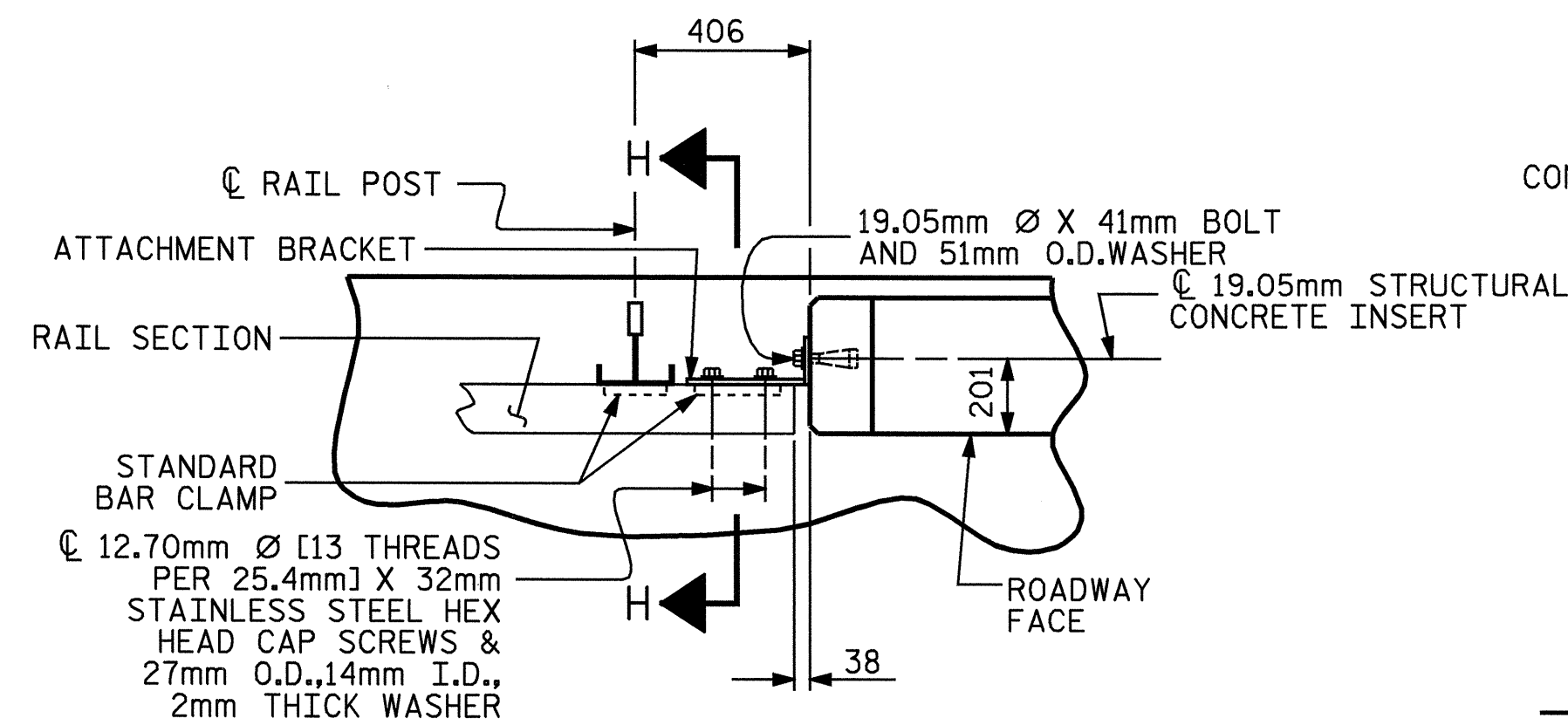
PLAN OF RAIL POST SPACINGS



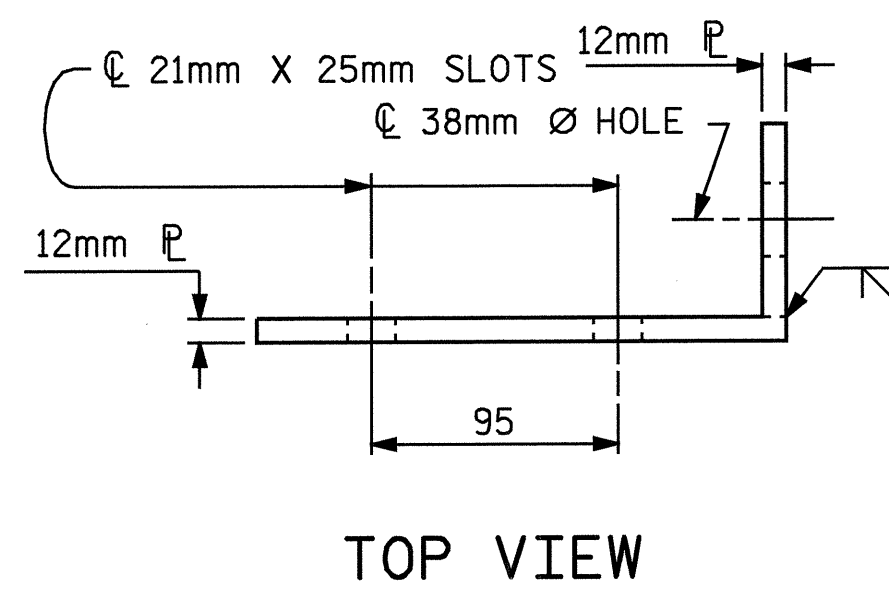
ELEVATION



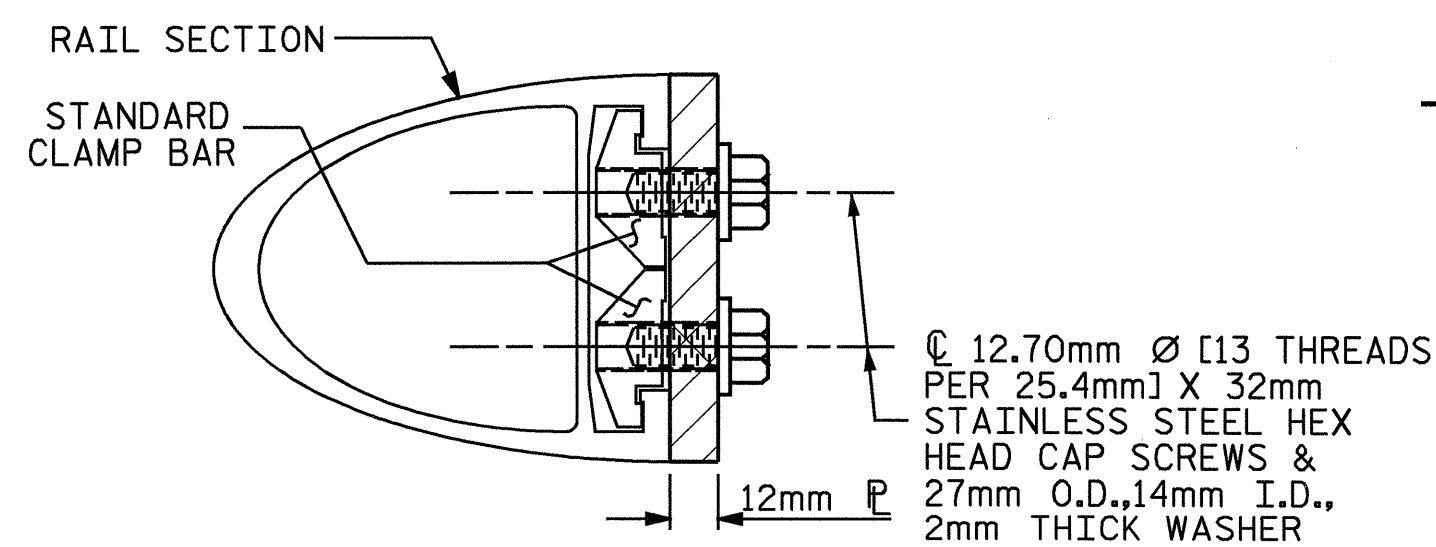
END VIEW (FIX)



PLAN - RAIL AND END POST



TOP VIEW



SECTION H-H (FIX)

FIXED  
DETAILS FOR ATTACHING METAL RAIL TO END POST

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

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 38mm.
- 1 - 19.05mm Ø X 41mm 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 19.05mm Ø X 41mm 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.)
- WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 620 MPa IS ACCEPTABLE.

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

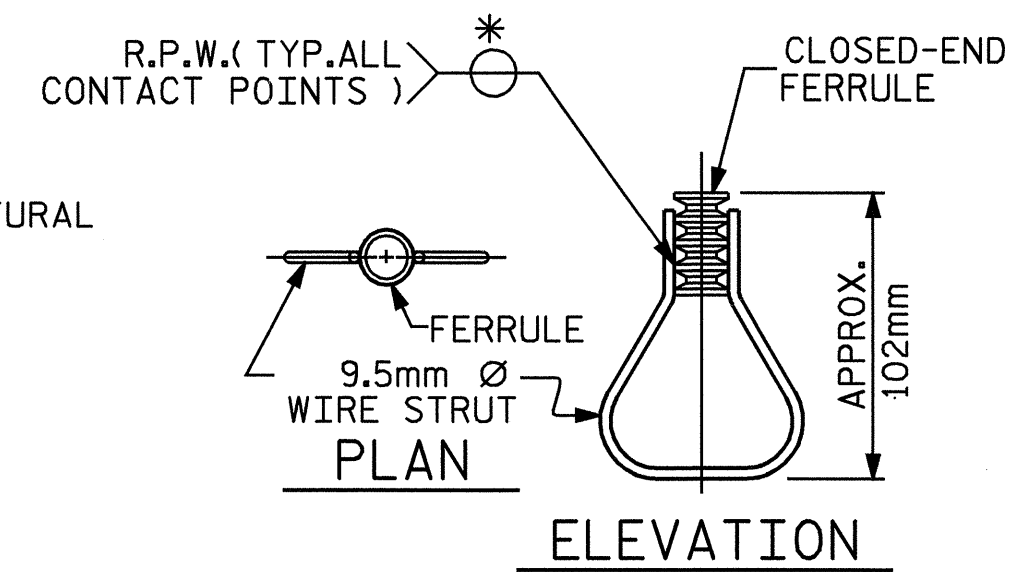
- 12mm PLATES SHALL CONFORM TO AASHTO M270 GRADE 250 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 19.05mm STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 21.4 kN. THE FERRULES SHALL ENGAGE A 19.05mm Ø X 41mm BOLT WITH 51mm O.D. WASHER IN PLACE. THE 19.05mm Ø X 41mm BOLT SHALL HAVE N. C. THREADS.
- 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 16°C.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- 13mm Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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 METERS OF 1 OR 2 BAR METAL RAILS.

THE 19.05mm STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 19.05mm STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 12mm 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 19.05mm Ø X 41mm BOLT WITH WASHER SHALL BE REPLACED WITH A 19.05mm Ø X 165mm BOLT AND 51mm O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 19.05mm Ø X 41mm BOLT SHALL APPLY TO THE 19.05mm Ø X 165mm BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



ELEVATION

STRUCTURAL CONCRETE INSERT

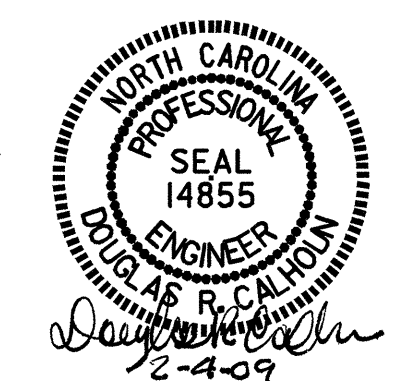
\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L

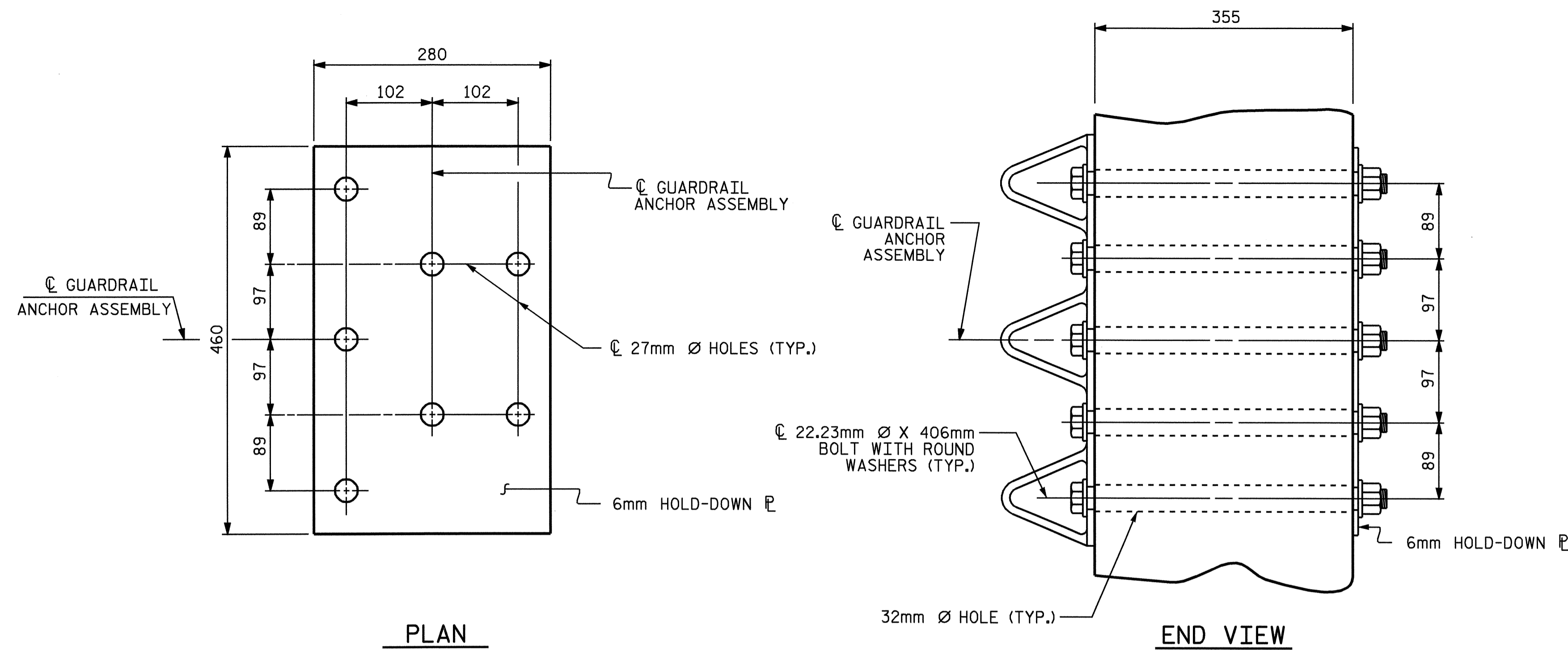
SHEET 4 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR TWO BAR METAL RAILS

ASSEMBLED BY : J. MYA	DATE : 10-27-08
CHECKED BY : B.N. GRADY	DATE : 11-17-08
DRAWN BY : WJH 3/89	REV. 10/17/00 LES/RDR
CHECKED BY : CRK 3/89	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			31



PLAN

END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 6mm HOLD DOWN PLATE AND 7 - 22.23mm Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 250. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

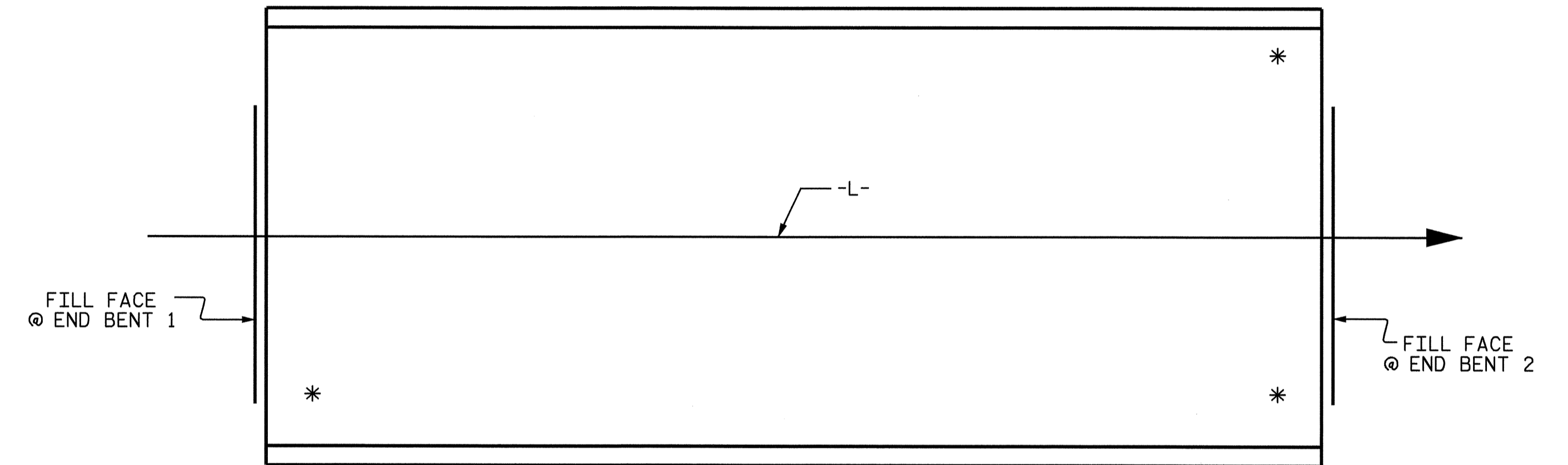
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø GALVANIZED BOLTS, NUTS AND WASHERS. 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.

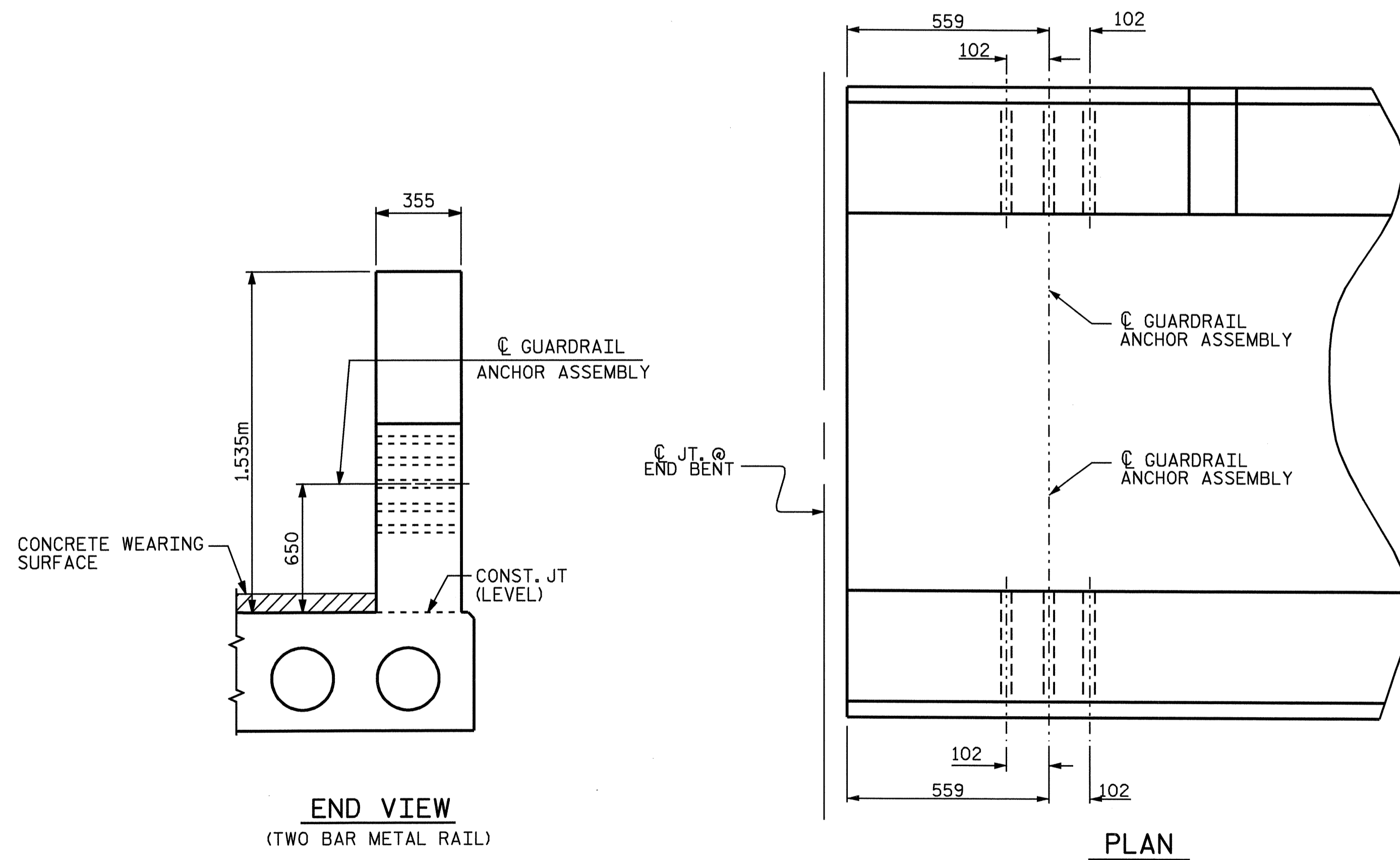
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 32mm 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.



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW  
(TWO BAR METAL RAIL)

PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS



ASSEMBLED BY : J. MYA	DATE : 10-27-08
CHECKED BY : B.N. GRADY	DATE : 11-17-08
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

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

TOTAL SHEETS 31

**NOTES**

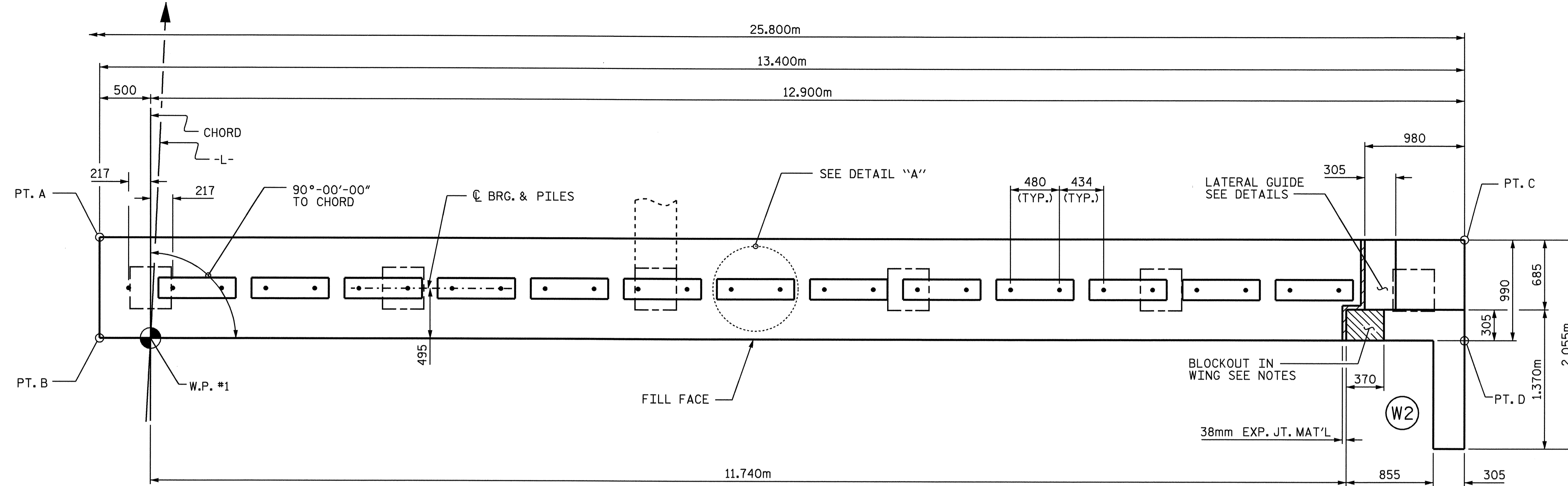
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT HAS BEEN SAWED AND PARAPET AND END POSTS ARE CAST IF SLIP FORMING IS USED.

FOR MECHANICAL BUTT SPLICING FOR REINFORCING STEEL, SEE SECTION 425-5 OF THE STANDARD SPECIFICATIONS.

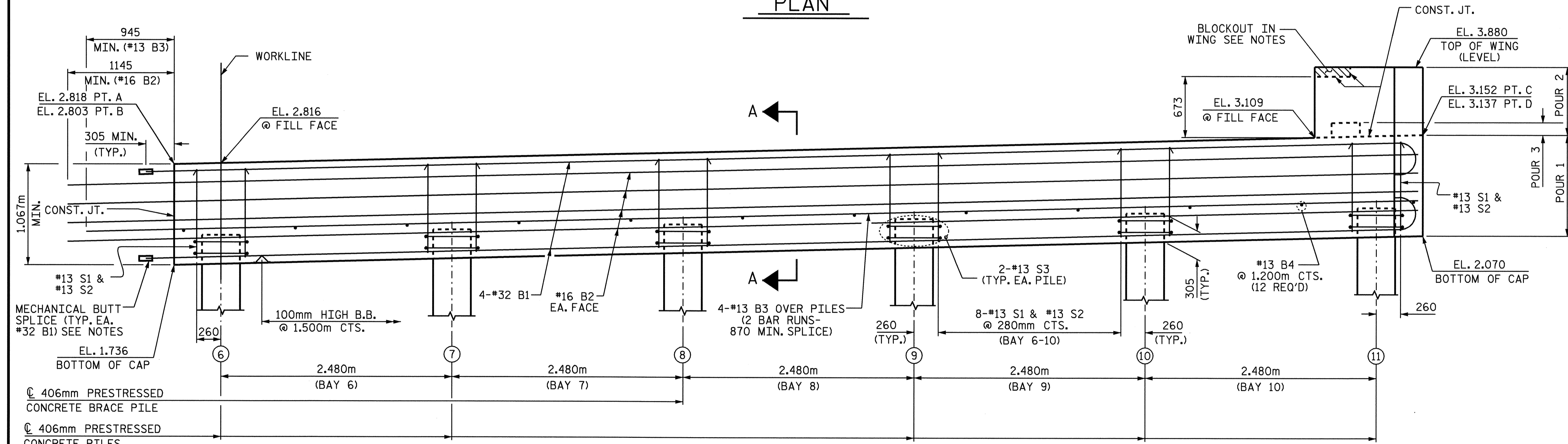
THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 102mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

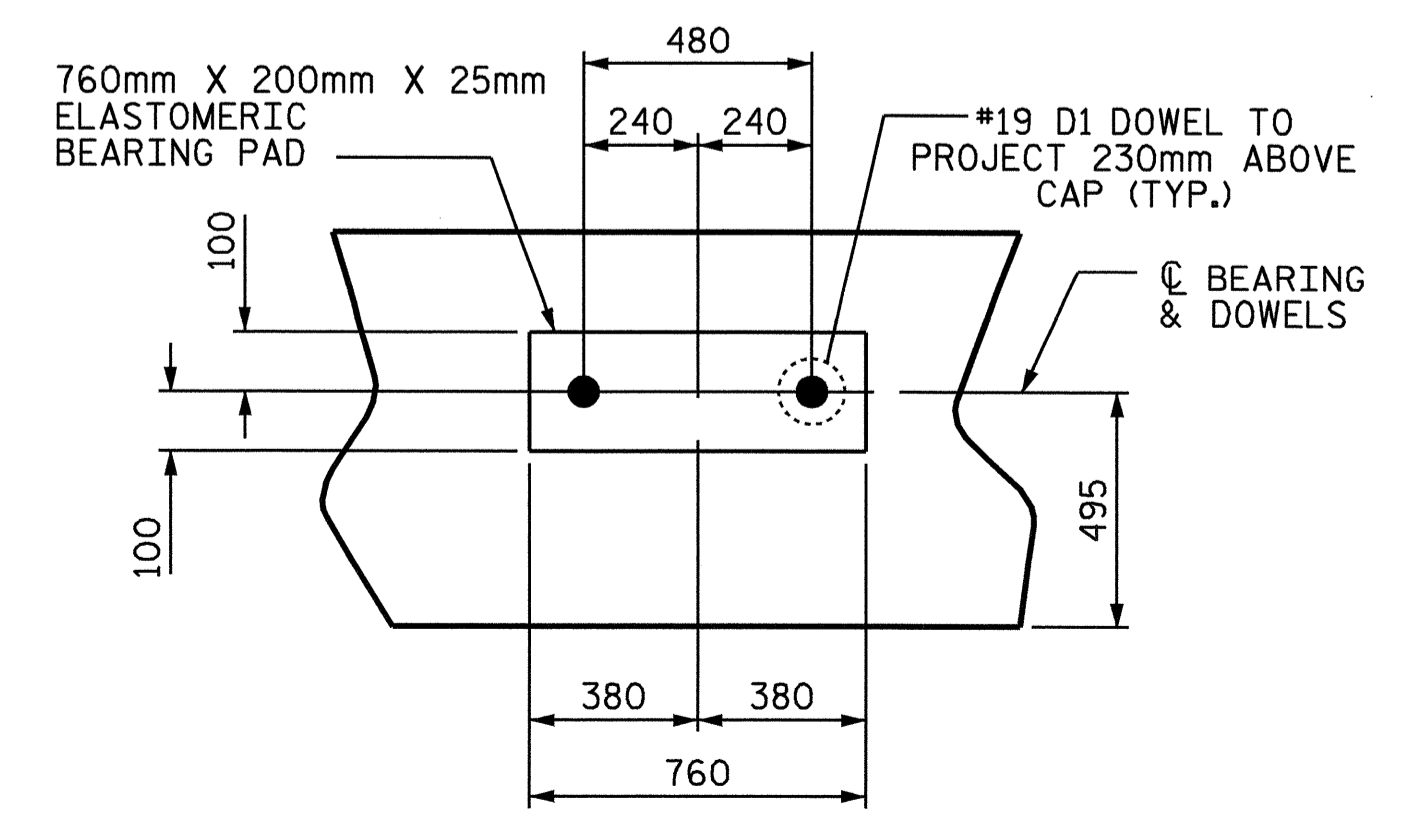


**PLAN**

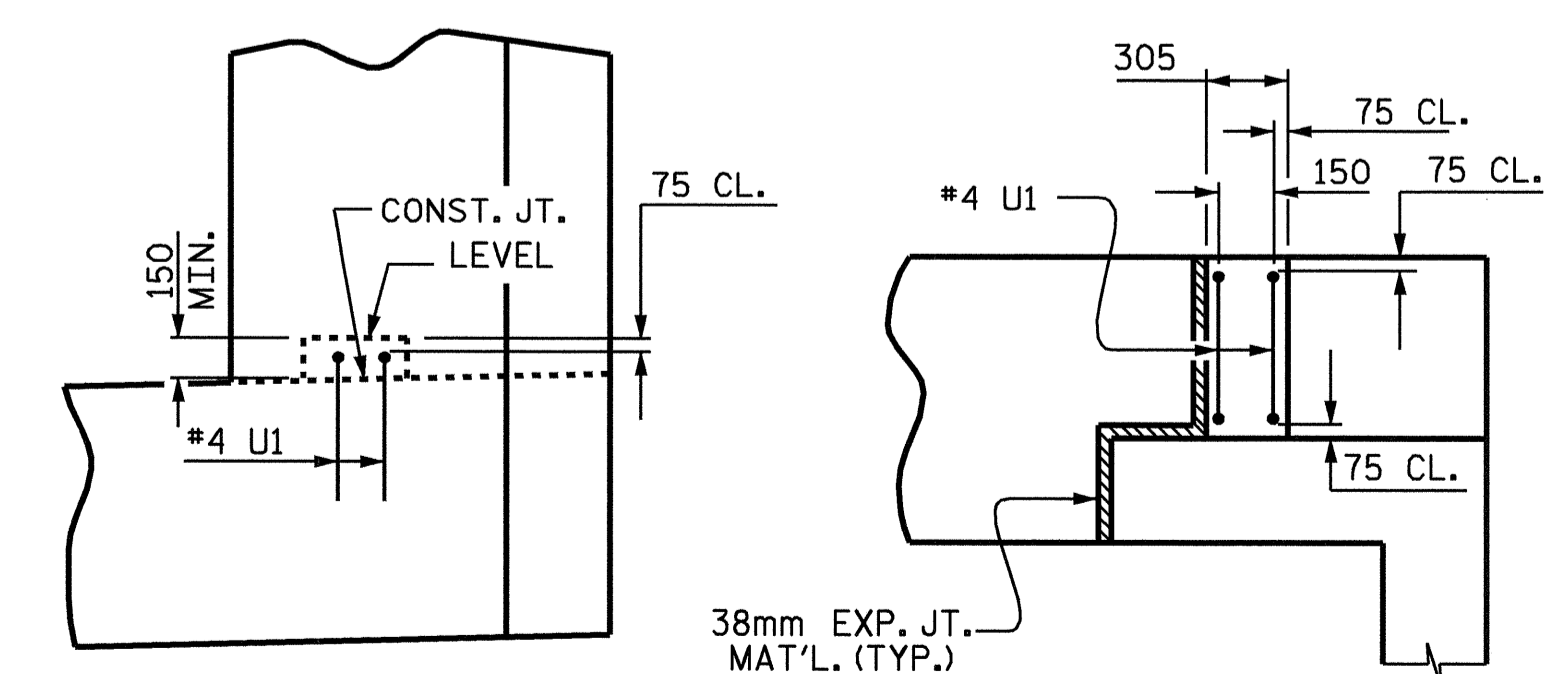
TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
6	2.059
7	2.121
8	2.183
9	2.245
10	2.307
11	2.369



**ELEVATION**



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



**LATERAL GUIDE DETAILS**  
(RIGHT LATERAL GUIDE SHOWN, LEFT LATERAL GUIDE SIMILAR)

DRAWN BY : J. MYA DATE : 10-30-08  
CHECKED BY : B.N. GRADY DATE : 11-25-08

04-FEB-2009 11:20  
r:\structures\final plans\R2414A\_sd.E(A)\*.dgn

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

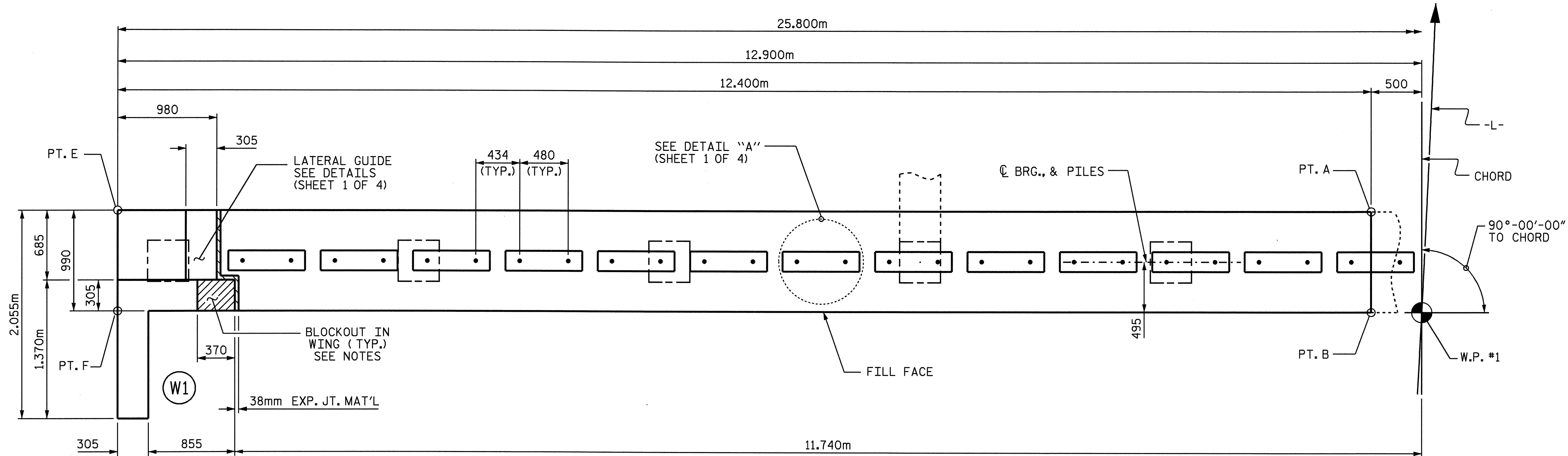
SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1  
(STAGE 1)

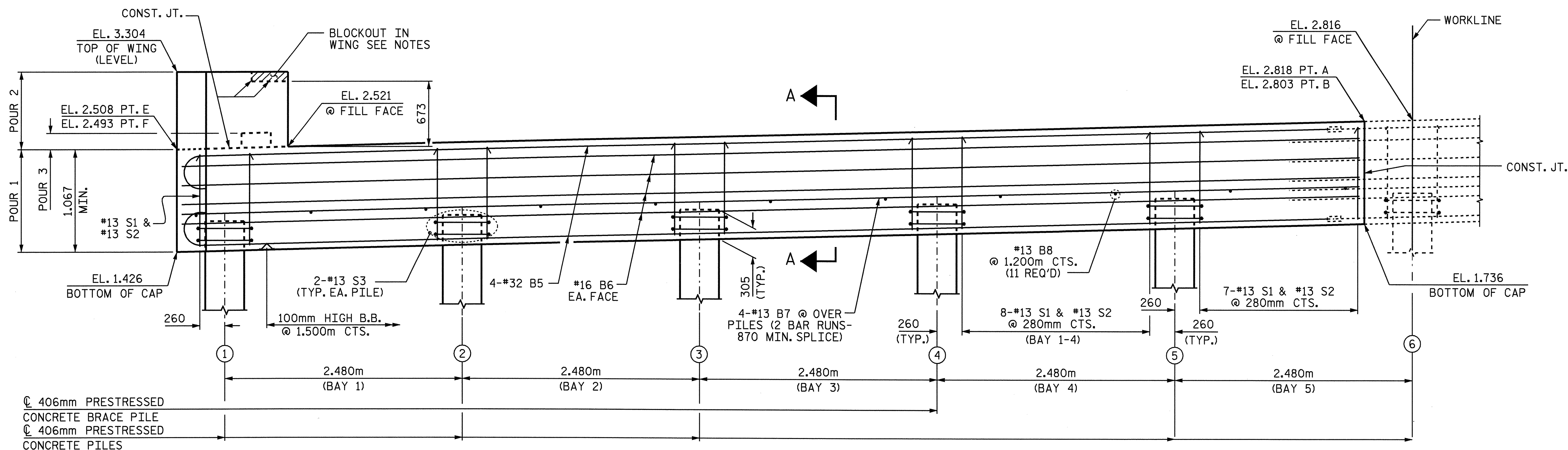
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			31	

PROFESSIONAL SEAL 14855  
DUGLAS R. CALHOUN  
12-4-09



PLAN

TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
1	1.749
2	1.811
3	1.873
4	1.935
5	1.997



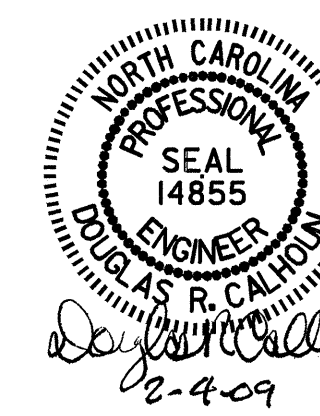
ELEVATION

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1  
 (STAGE 2)

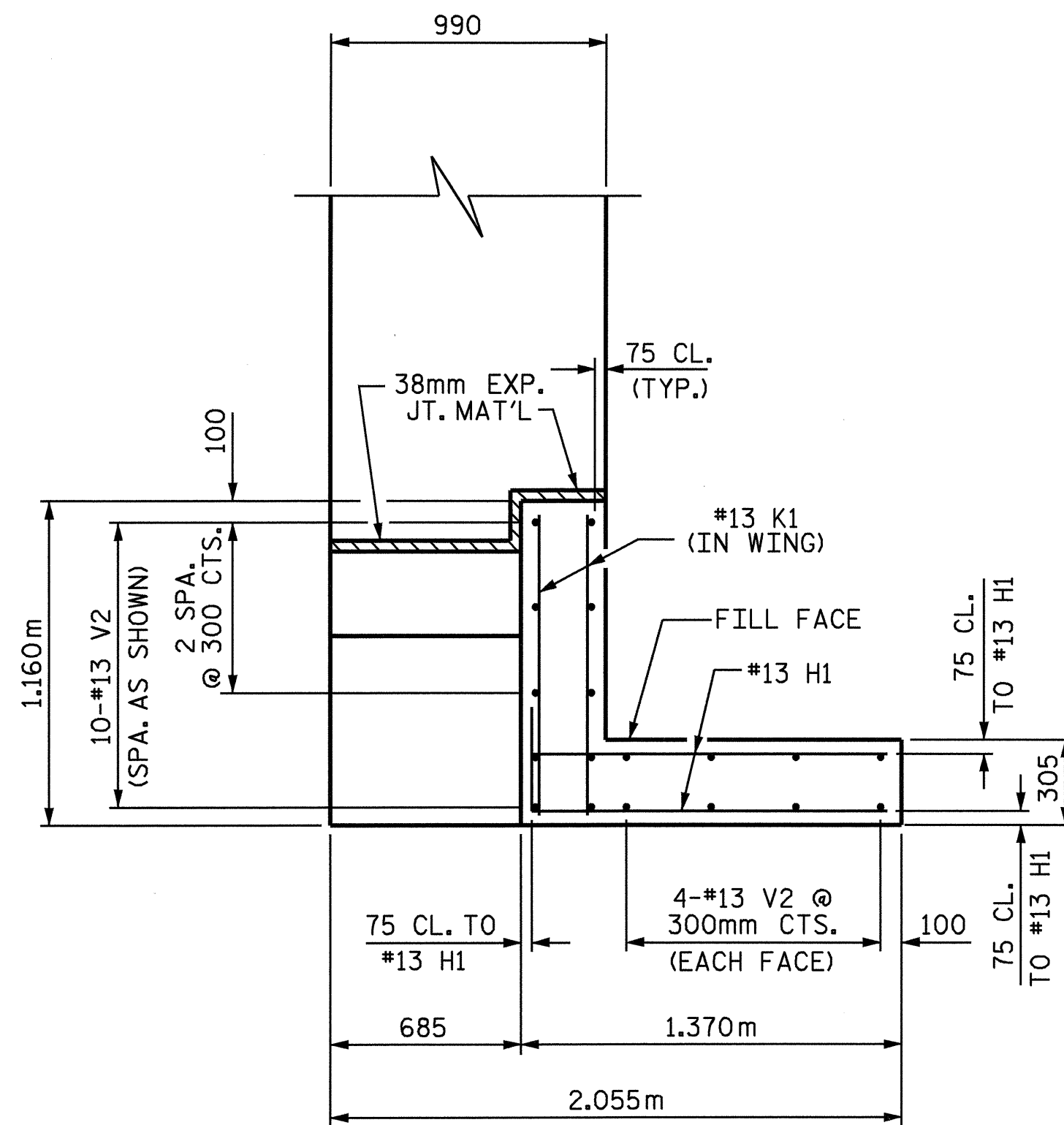


DRAWN BY: J. MYA DATE: 10-30-08  
 CHECKED BY: B.N. GRADY DATE: 11-25-08

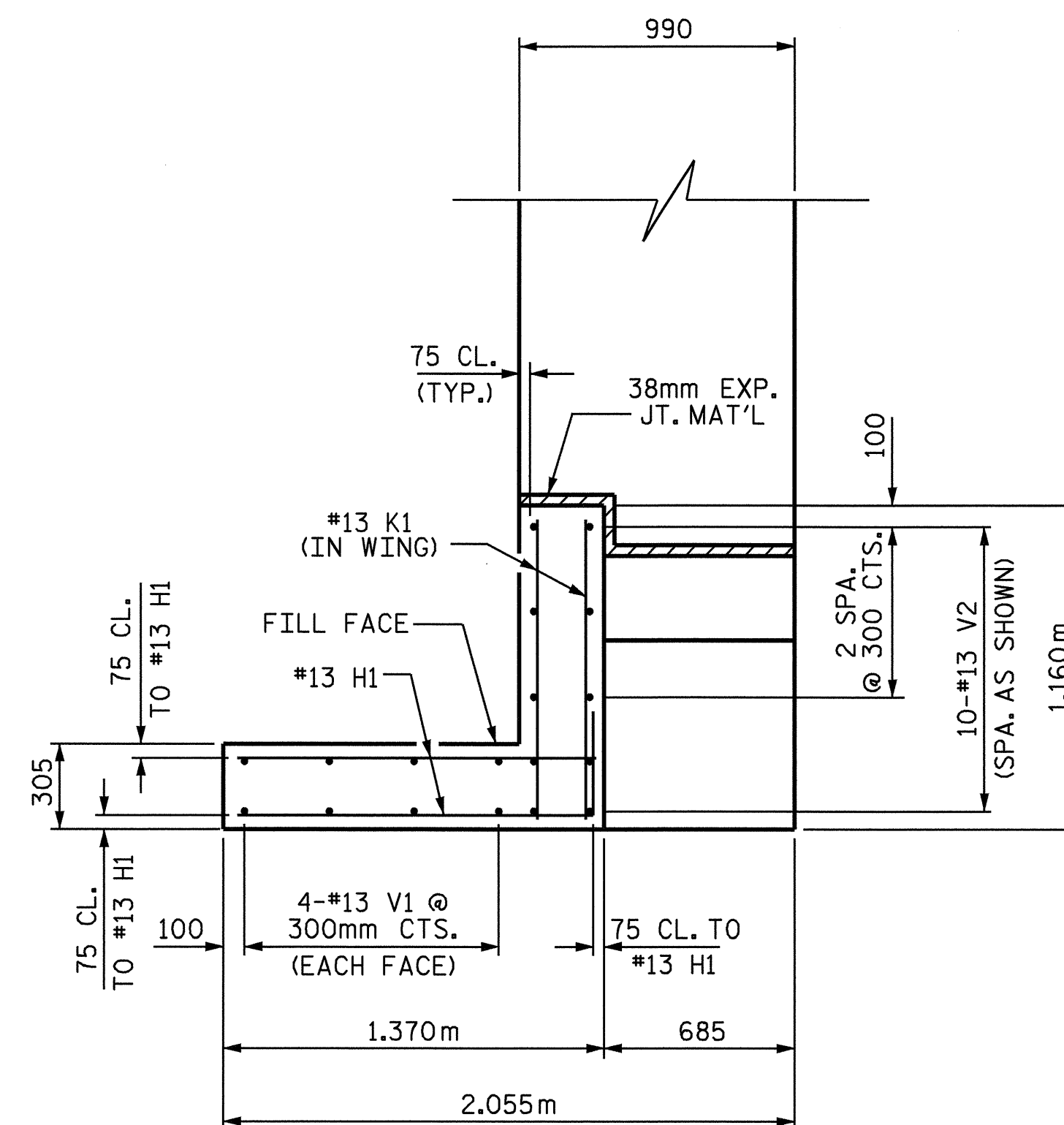
26-JAN-2009 09:31

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1			3			TOTAL SHEETS
2			4			31

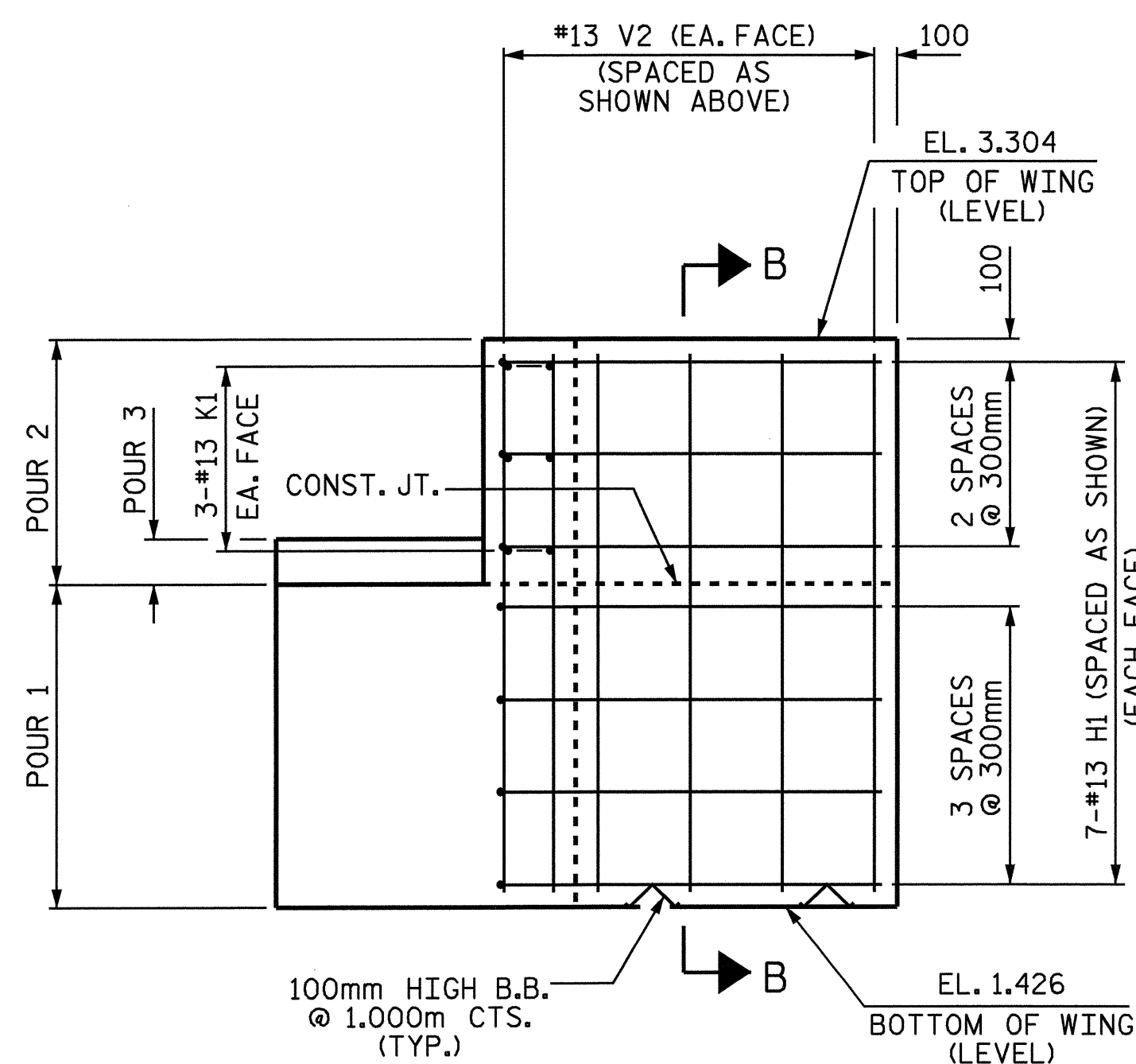




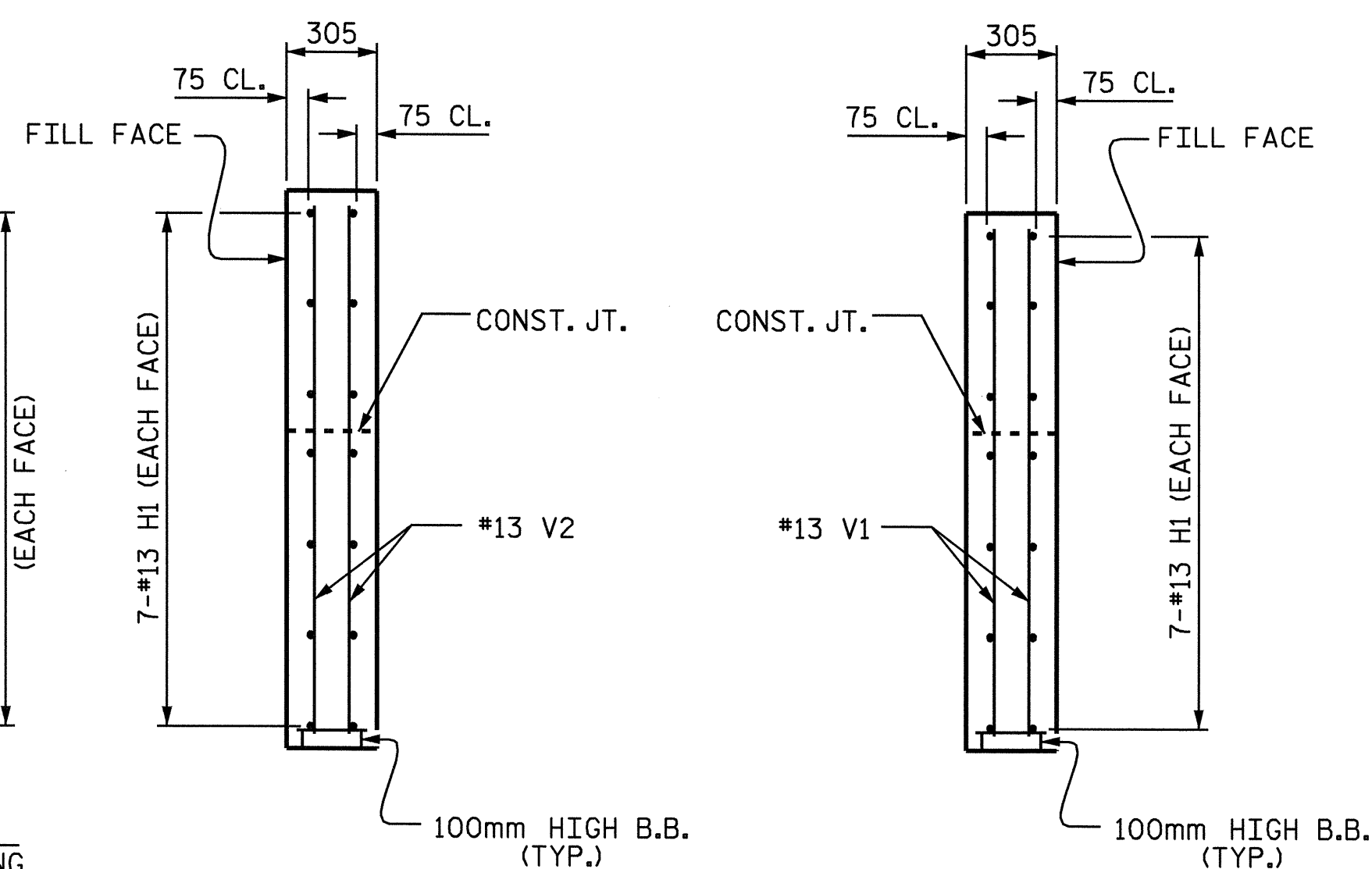
PLAN OF WING - W1  
(STAGE 2)



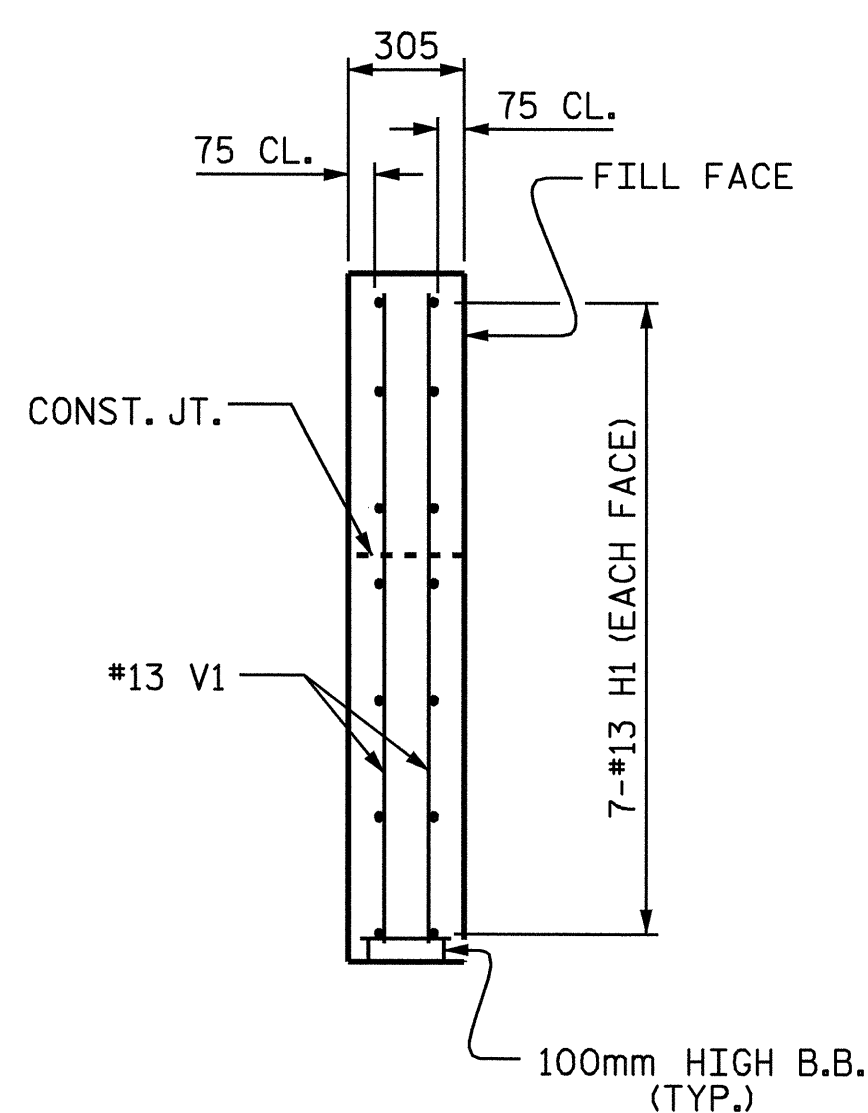
PLAN OF WING - W2  
(STAGE 1)



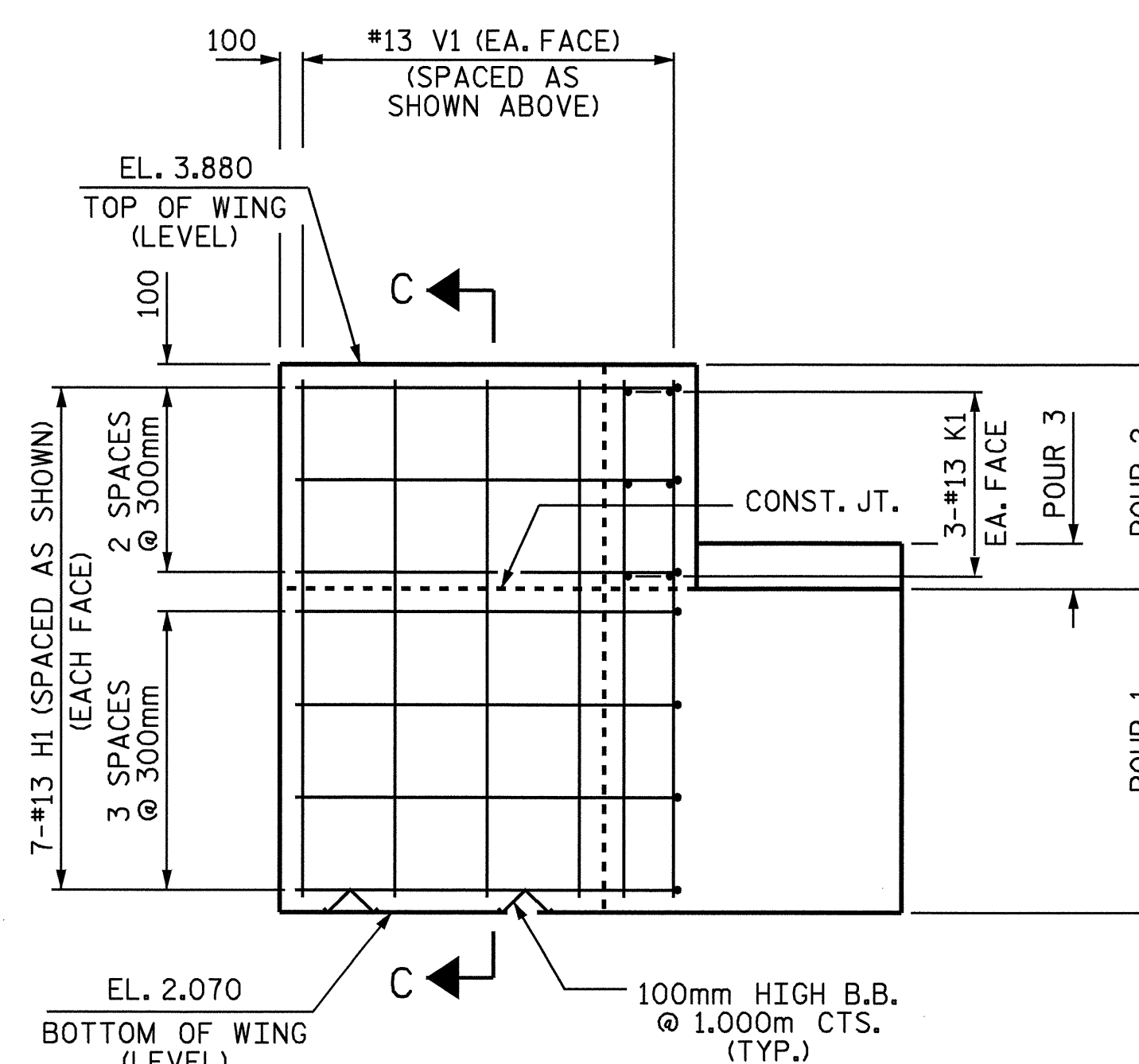
ELEVATION OF WING - W1  
(STAGE 2)



SECTION B-B  
(STAGE 2)



SECTION C-C  
(STAGE 1)



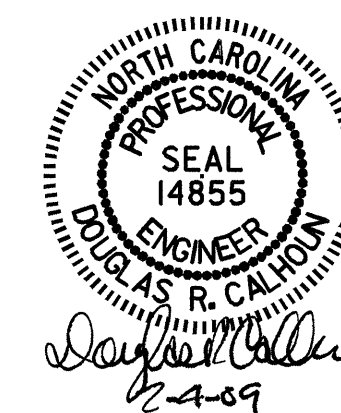
ELEVATION OF WING - W2  
(STAGE 1)

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

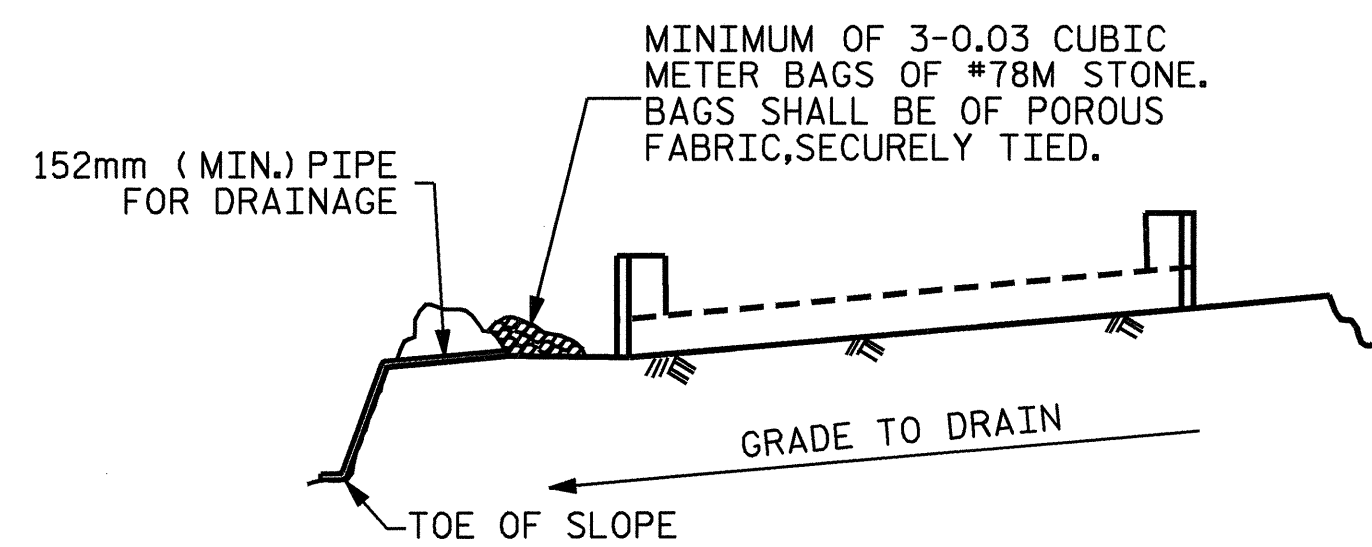
SUBSTRUCTURE  
END BENT 1  
(STAGE 1 AND 2)



DRAWN BY: J. MYA DATE: 10-30-08  
CHECKED BY: B.N. GRADY DATE: 11-26-08

26-JAN-2009 09:31  
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jmya

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

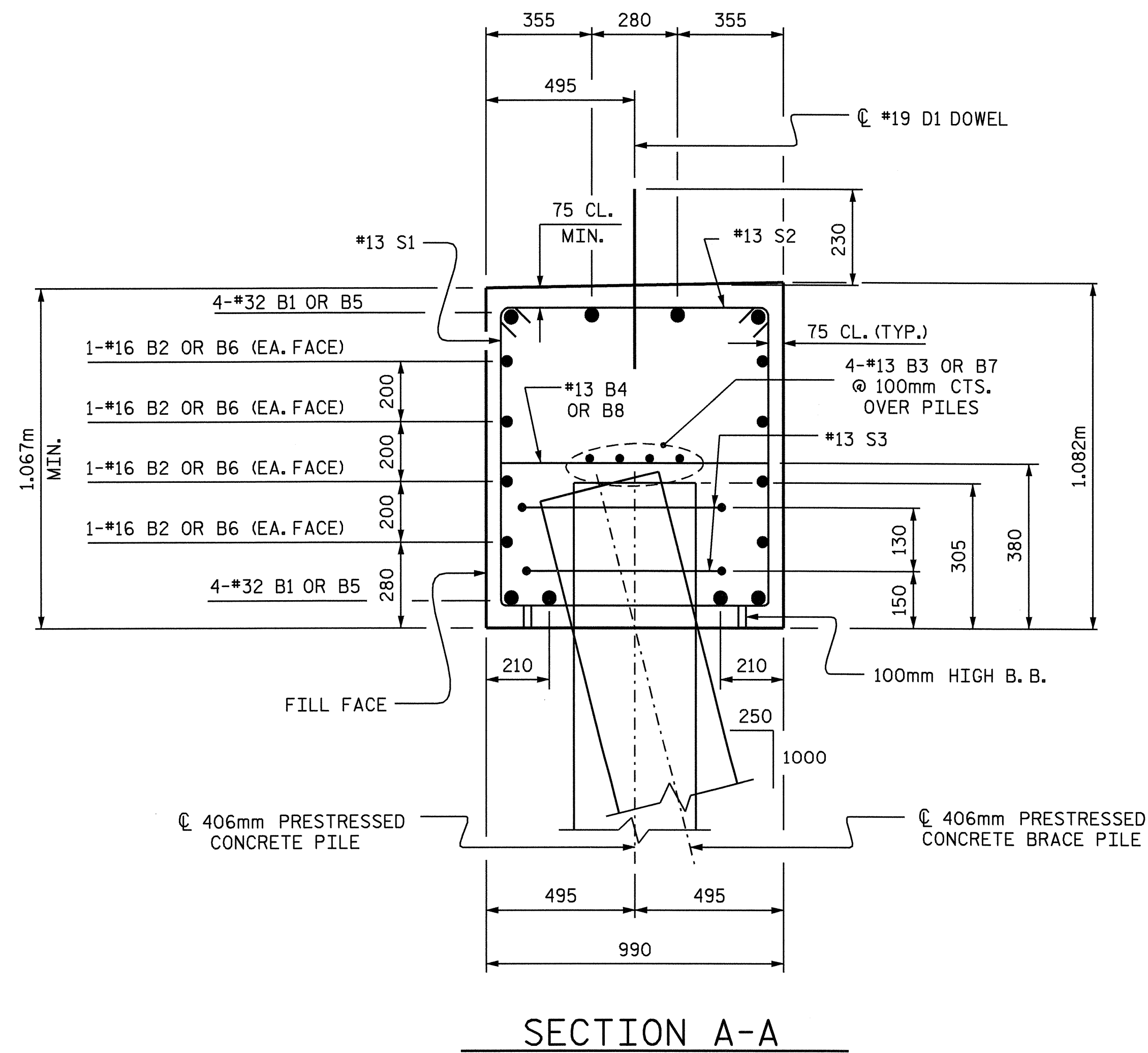


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

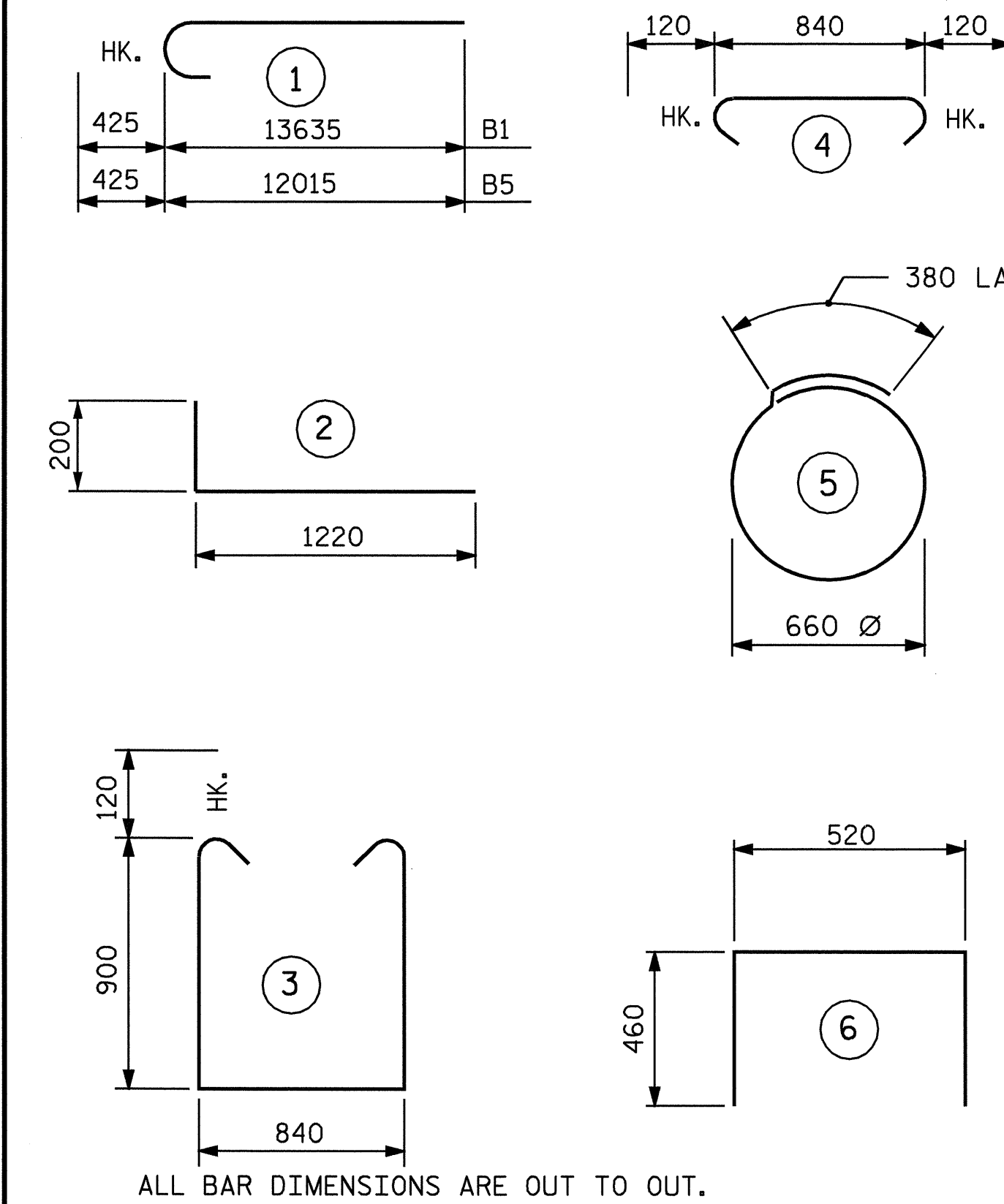
### TEMPORARY DRAINAGE AT END BENT



SECTION A-A

DRAWN BY: J. MYA DATE: 10-30-08  
 CHECKED BY: B.N. GRADY DATE: 12-1-08

### BAR TYPES



### BILL OF MATERIAL - END BENT 1

STAGE 1						STAGE 2							
BAR NO	SIZE	TYPE	LENGTH	WEIGHT		BAR NO	SIZE	TYPE	LENGTH	WEIGHT			
*B1	8	32	1	14060	720	*B5	8	32	1	12440	637		
*B2	8	16	STR	14480	180	*B6	8	16	STR	12240	152		
*B3	8	13	STR	7580	60	*B7	8	13	STR	6560	52		
*B4	12	13	STR	840	10	*B8	11	13	STR	840	9		
*D1	27	19	STR	460	28	*D1	25	19	STR	460	26		
*H1	14	13	2	1420	20	*H1	14	13	2	1420	20		
*K1	6	13	STR	1000	6	*K1	6	13	STR	1000	6		
*S1	42	13	3	2880	119	*S1	40	13	3	2880	115		
*S2	42	13	4	1080	44	*S2	40	13	4	1080	42		
*S3	12	13	5	2460	29	*S3	10	13	5	2460	24		
*U1	2	13	6	1440	3	*U1	2	13	6	1440	3		
*V1	18	13	STR	1660	30	*V2	18	13	STR	1720	31		
*EPOXY COATED REINFORCING STEEL					Kg	1251	*EPOXY COATED REINFORCING STEEL					Kg	1118
CLASS AA CONCRETE BREAKDOWN						CLASS AA CONCRETE BREAKDOWN							
POUR 1 (CAP & LOWER PART OF WING)			C.M.	14.4	▲	POUR 1 (CAP & LOWER PART OF WING)			C.M.	13.5	▲		
POUR 2 (UPPER PART OF WING)			C.M.	0.5		POUR 2 (UPPER PART OF WING)			C.M.	0.6			
POUR 3 (LATERAL GUIDES)			C.M.	0.1		POUR 3 (LATERAL GUIDES)			C.M.	0.1			
TOTAL :			C.M.	15.0		TOTAL :			C.M.	14.2			
406mm PRESTRESSED CONCRETE PILES					No.:	6	406mm PRESTRESSED CONCRETE PILES					No.:	5
					METERS:	135						METERS:	112.5

### TOTAL BILL OF MATERIAL

\*EPOXY COATED REINFORCING STEEL = 2369 Kg  
 CLASS AA CONCRETE TOTAL = 29.2 C.M.  
 406mm PRESTRESSED CONCRETE PILE No.: 11 METERS: 247.5

▲ CONCRETE DISPLACED BY THE 406mm CONCRETE PILES HAS BEEN DEDUCTED.

PROJECT NO. R-2414A  
 CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1  
 (STAGE 1 AND 2)



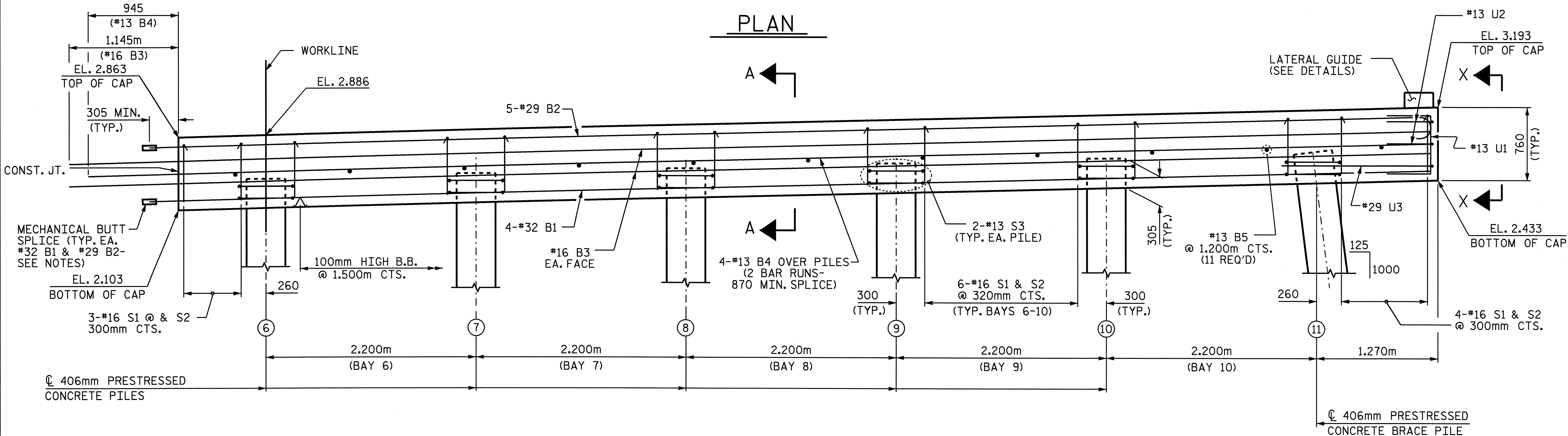
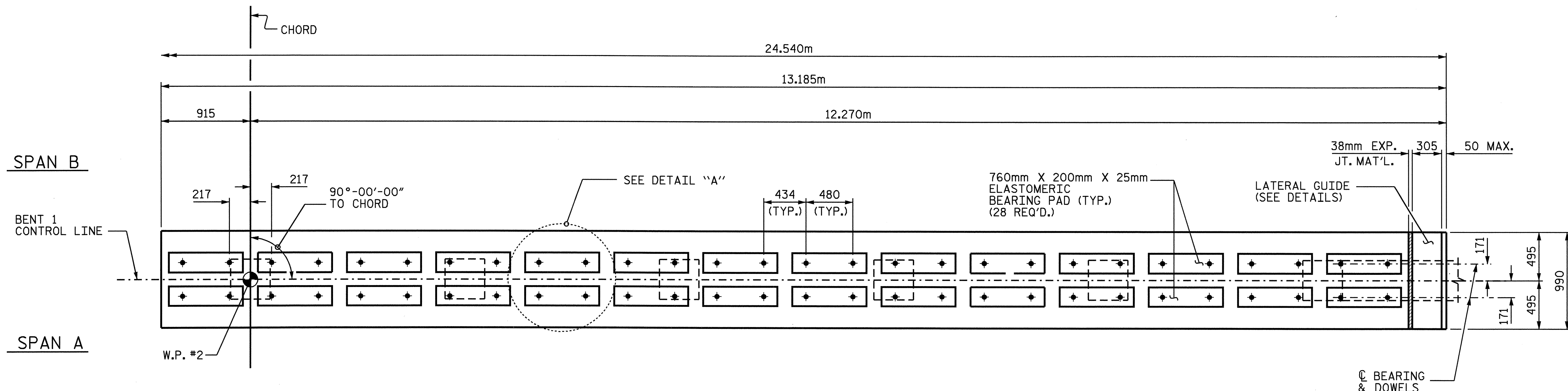
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	
1			3			TOTAL SHEETS	
2			4			31	

**NOTES**

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

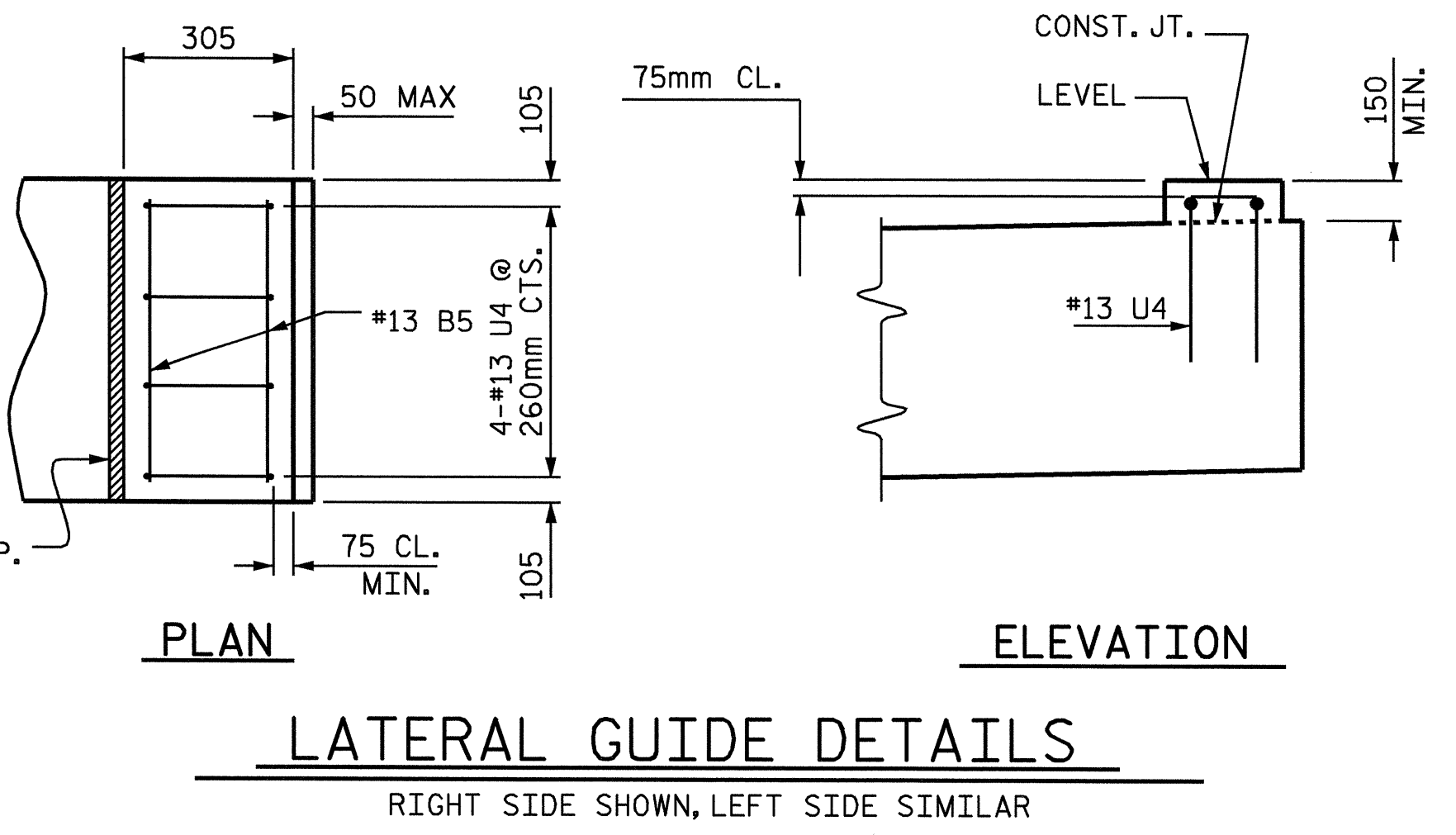
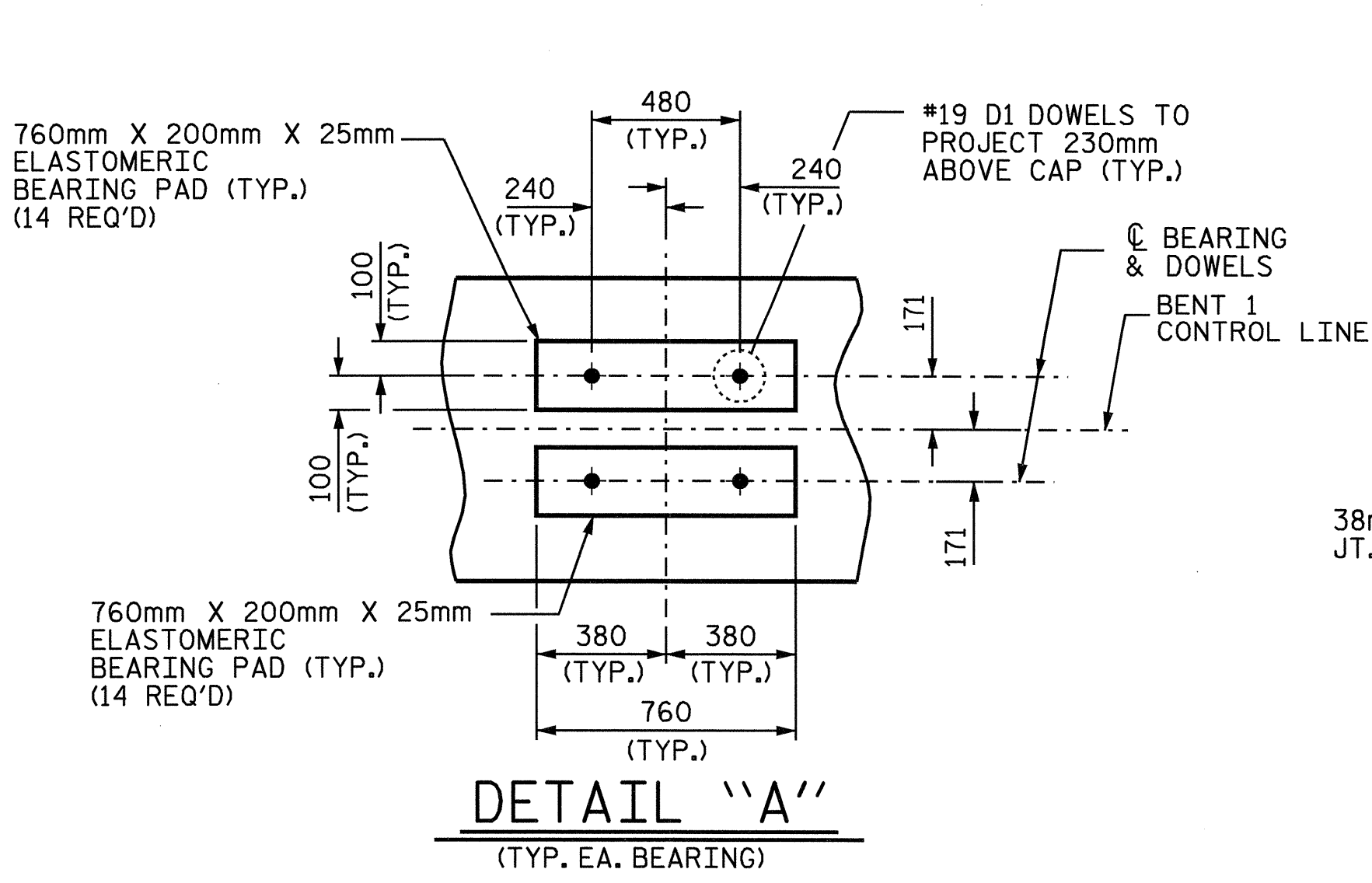
FOR MECHANICAL BUTT SPLICING FOR REINFORCING STEEL, SEE SECTION 425-5 OF THE STANDARD SPECIFICATIONS.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.



TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
6	2.436
7	2.491
8	2.546
9	2.601
10	2.656
11	2.701

**ELEVATION**



PROJECT NO. R-2414A  
 CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

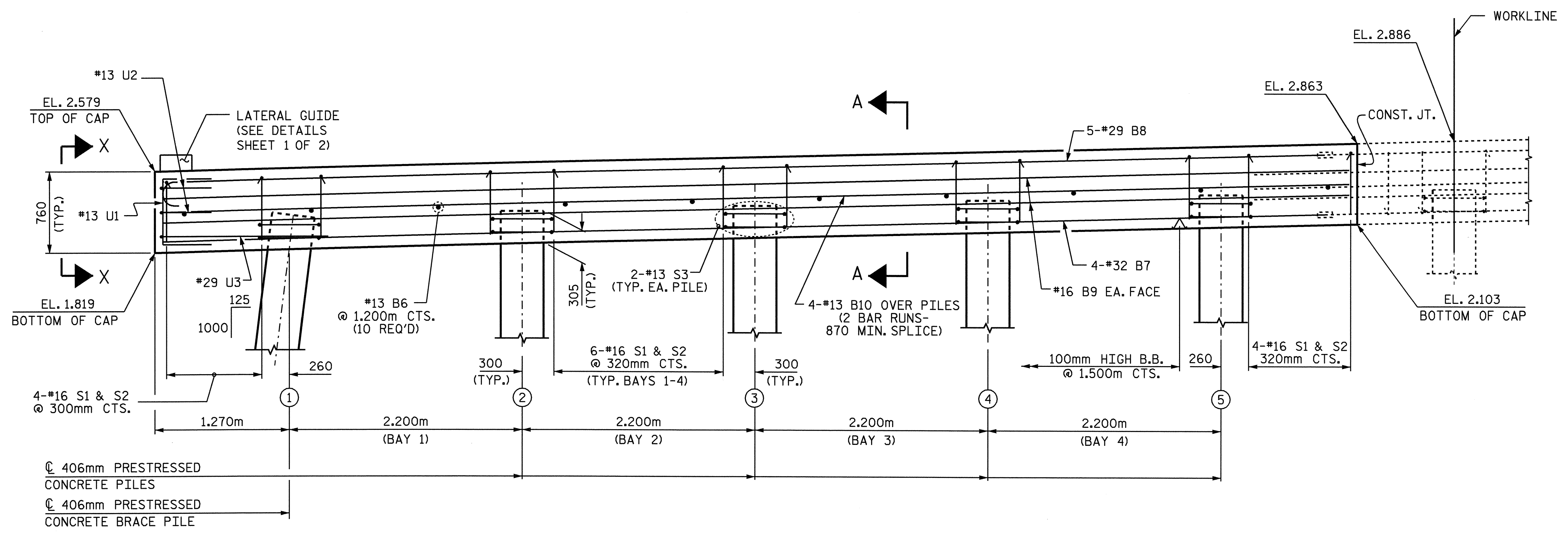
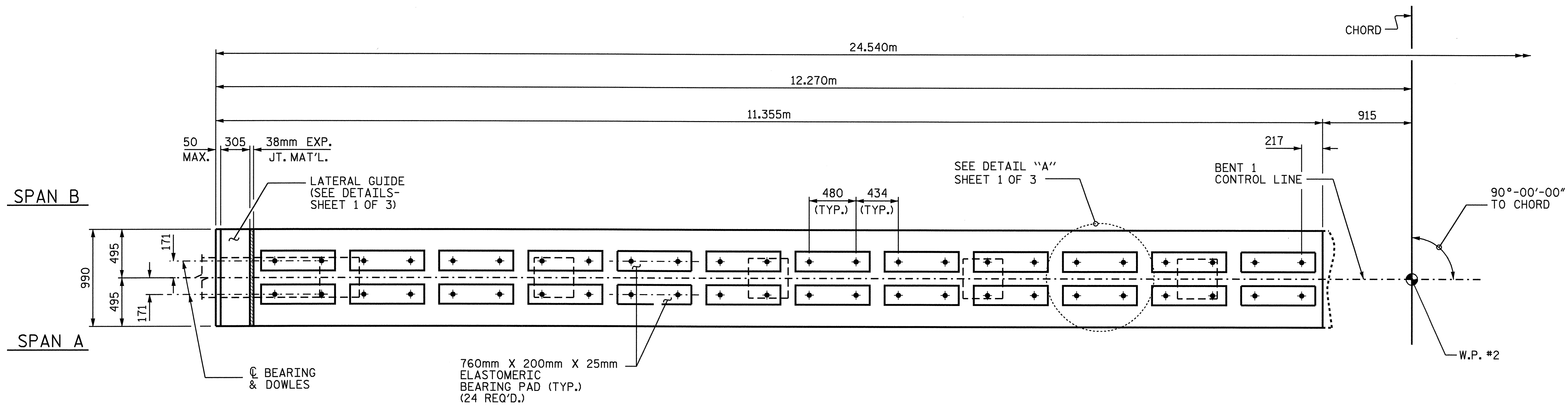
SUBSTRUCTURE  
 BENT 1  
 (STAGE 1)



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18	
1			3			TOTAL SHEETS	31
2			4				

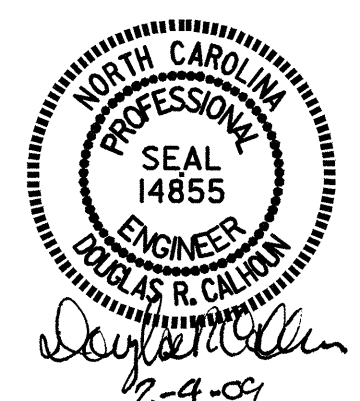
DRAWN BY: J. MYA DATE: 11-17-08  
 CHECKED BY: B.N. GRADY DATE: 12-8-08

27-JAN-2009 09:36 Z:\STRUCTURE\FINAL PLANS\R2414A.ecd.B\*.dgn



TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
1	2.161
2	2.216
3	2.271
4	2.326
5	2.381

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-  
SHEET 2 OF 3



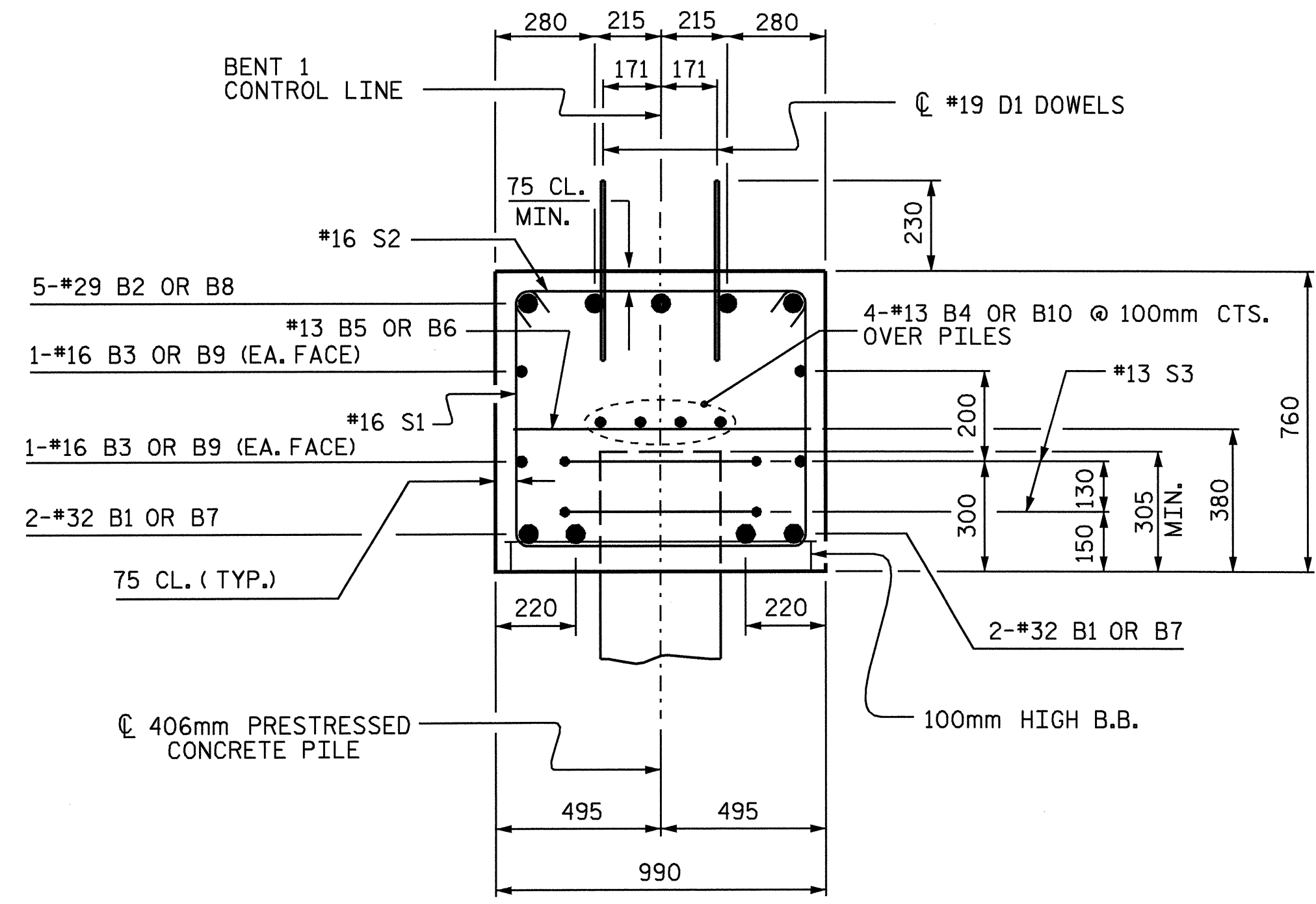
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1  
(STAGE 2)

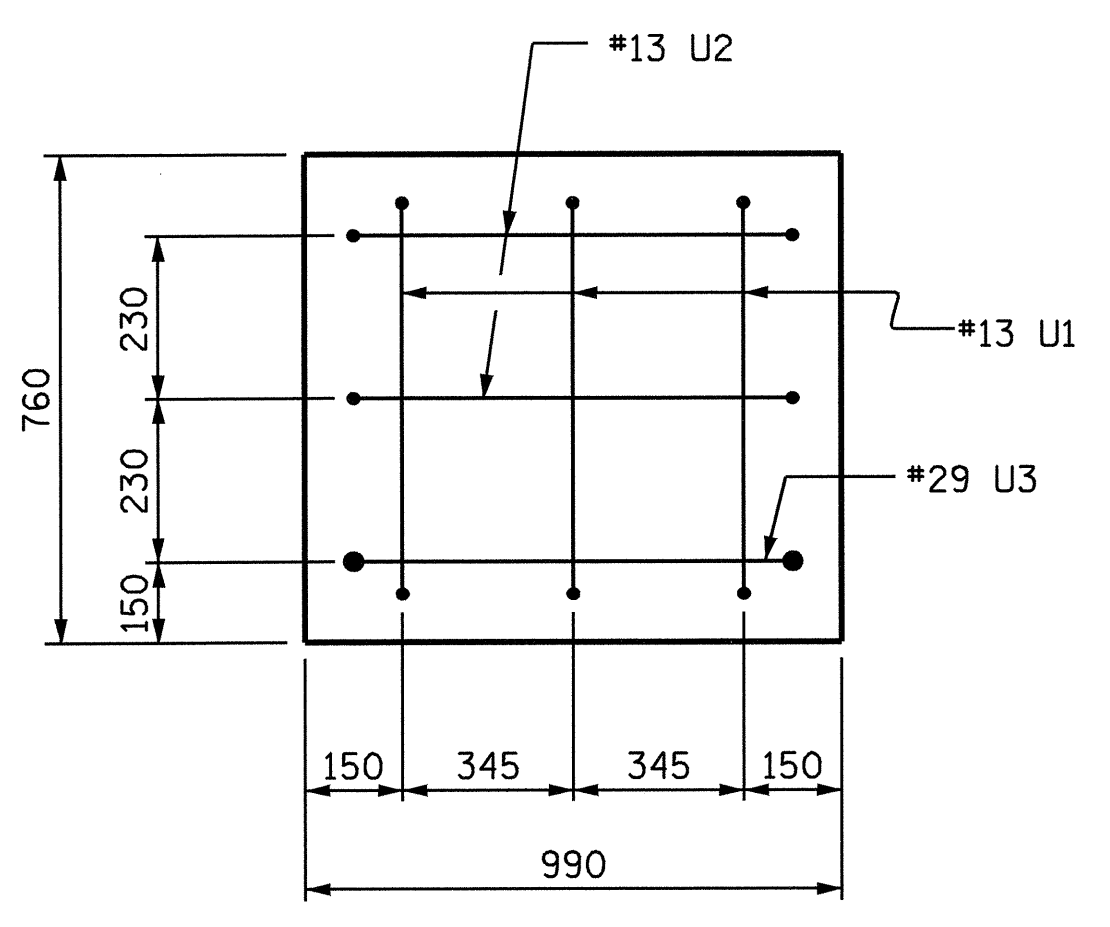
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			31
2			4			

DRAWN BY: J. MYA DATE: 11-17-08  
CHECKED BY: B.N. GRADY DATE: 12-9-08

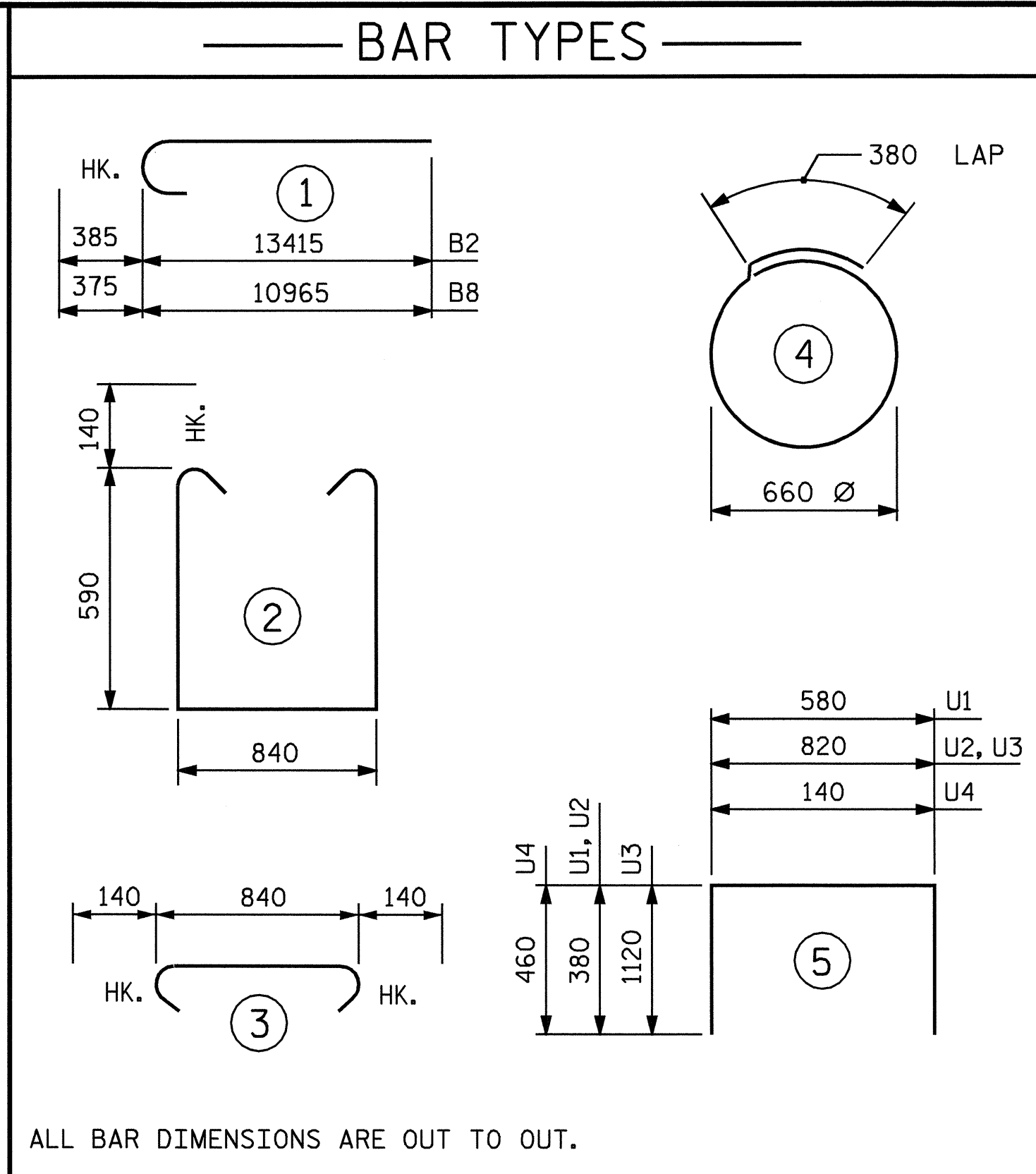
21-JAN-2009 09:35  
Z:\Structure\65\I\ML PLANS\R2414A.ed.B\*-dgn  
jmyg



SECTION A-A



VIEW X-X



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL - BENT 1													
STAGE 1						STAGE 2							
BAR NO	SIZE	TYPE	LENGTH	WEIGHT		BAR NO	SIZE	TYPE	LENGTH	WEIGHT			
*B1	4	32	STR	13420	344	*B6	2	12	STR	840	10		
*B2	5	29	1	13800	349	*B7	4	32	STR	10980	281		
*B3	4	16	STR	14260	89	*B8	5	29	1	11340	287		
*B4	8	13	STR	7460	59	*B9	4	16	STR	11200	70		
*B5	13	13	STR	840	11	*B10	8	13	STR	6040	48		
*D1	56	19	STR	460	58	*D1	48	19	STR	460	49		
*S1	37	16	2	2300	132	*S1	32	16	2	2300	114		
*S2	37	16	3	1120	64	*S2	32	16	3	1120	56		
*S3	12	13	4	2460	29	*S3	10	13	4	2460	24		
*U1	3	13	4	1340	4	*U1	3	13	4	1340	4		
*U2	2	13	4	1580	3	*U2	2	13	4	1580	3		
*U3	1	29	4	3060	15	*U3	1	29	4	3060	15		
*U4	4	13	4	1060	4	*U4	4	13	4	1060	4		
*EPOXY COATED REINFORCING STEEL					Kg	1161	*EPOXY COATED REINFORCING STEEL					Kg	965
CLASS AA CONCRETE BREAKDOWN						CLASS AA CONCRETE BREAKDOWN							
POUR 1 (CAP)			C.M.	9.7	▲	POUR 1 CAP			C.M.	8.3	▲		
POUR 2 (LATERAL GUIDES)			C.M.	0.1		POUR 2 (LATERAL GUIDES)			C.M.	0.1			
TOTAL			C.M.	9.8		TOTAL			C.M.	8.4			
406mm PRESTRESSED CONCRETE PILES			No.:	6		406mm PRESTRESSED CONCRETE PILES			No.:	5			
			METERS:	135					METERS:	112.5			

TOTAL BILL OF MATERIAL

\*EPOXY COATED REINFORCING STEEL = 2126 Kg  
 CLASS AA CONCRETE TOTAL = 18.2 C.M.  
 406mm PRESTRESSED CONCRETE PILES No.: 11 METERS: 247.5

▲ CONCRETE DISPLACED BY THE 406mm CONCRETE PILES HAS BEEN DEDUCTED.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1 (STAGE 1 AND 2)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-20
TOTAL SHEETS					31



DRAWN BY: J. MYA DATE: 11-17-08  
 CHECKED BY: B.N. GRADY DATE: 12-9-08

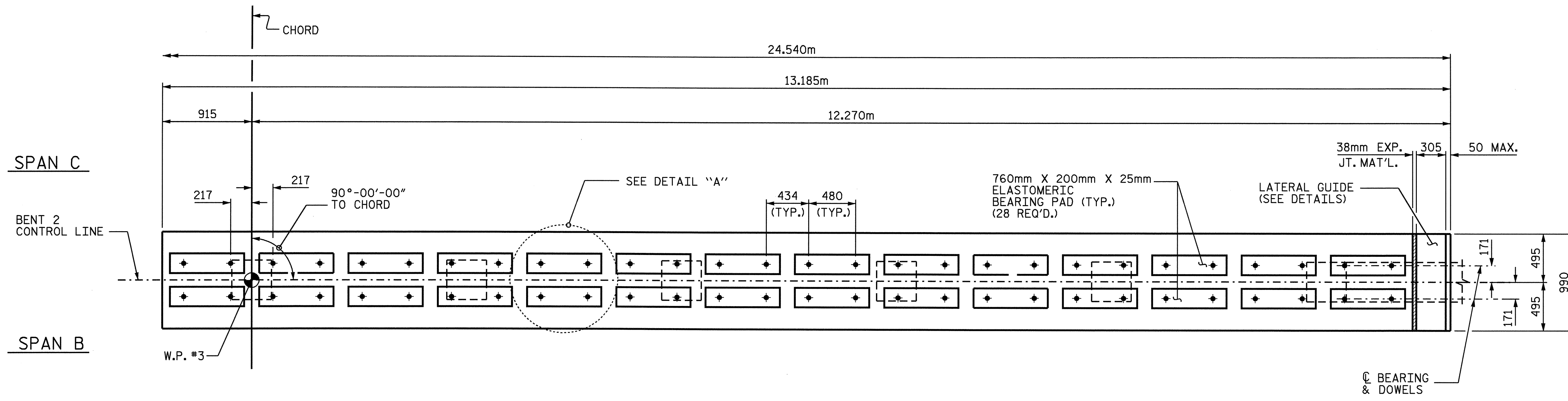
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 dgn

**NOTES**

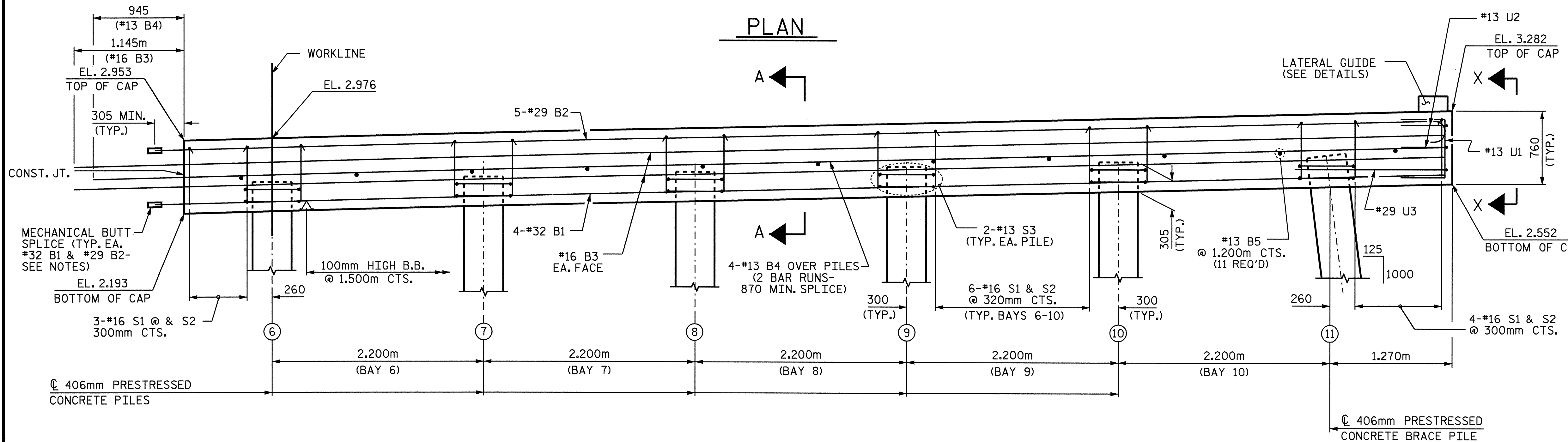
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

FOR MECHANICAL BUTT SPlicing FOR REINFORCING STEEL, SEE SECTION 425-5 OF THE STANDARD SPECIFICATIONS.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

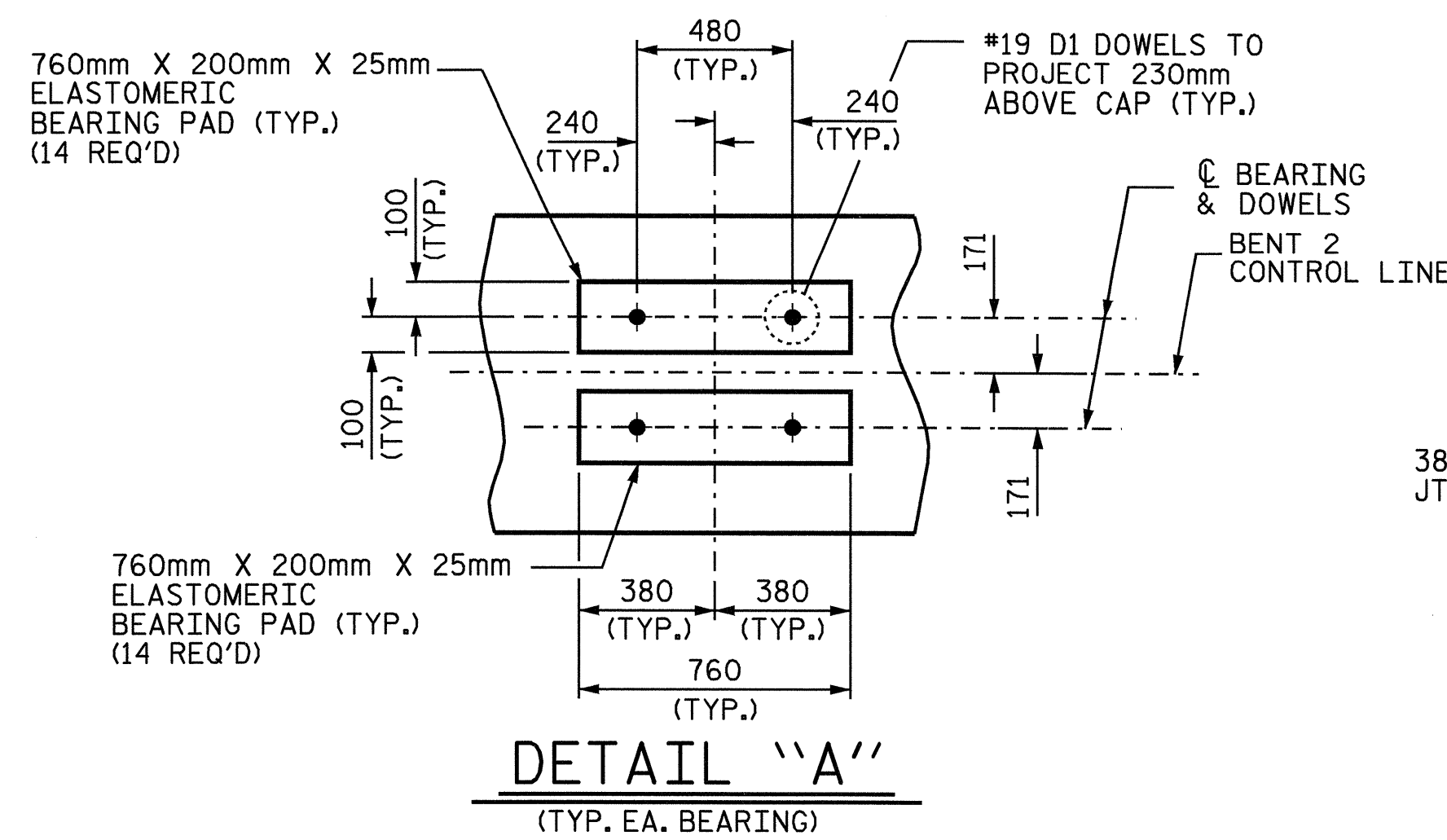


**PLAN**

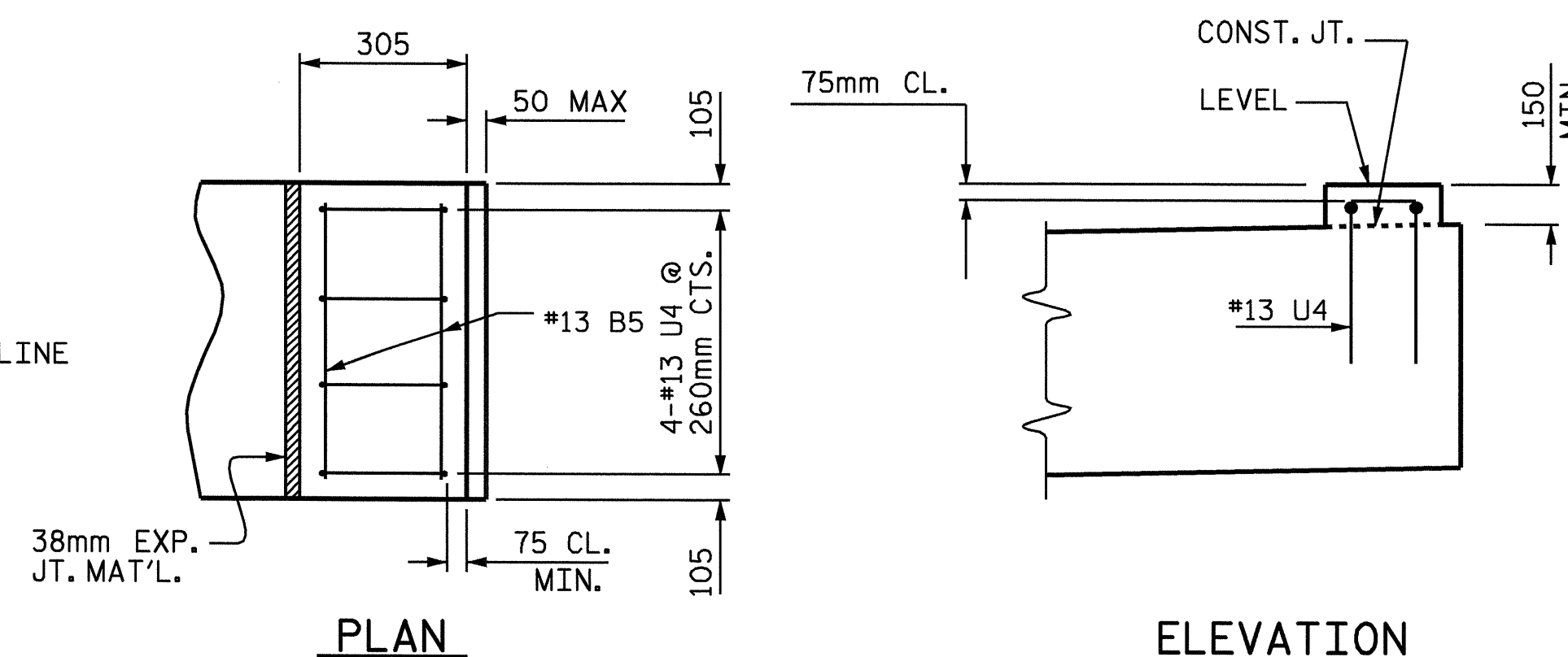


**ELEVATION**

TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
6	2.526
7	2.581
8	2.636
9	2.691
10	2.746
11	2.791



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



**PLAN**

**ELEVATION**

**LATERAL GUIDE DETAILS**

RIGHT SIDE SHOWN, LEFT SIDE SIMILAR

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

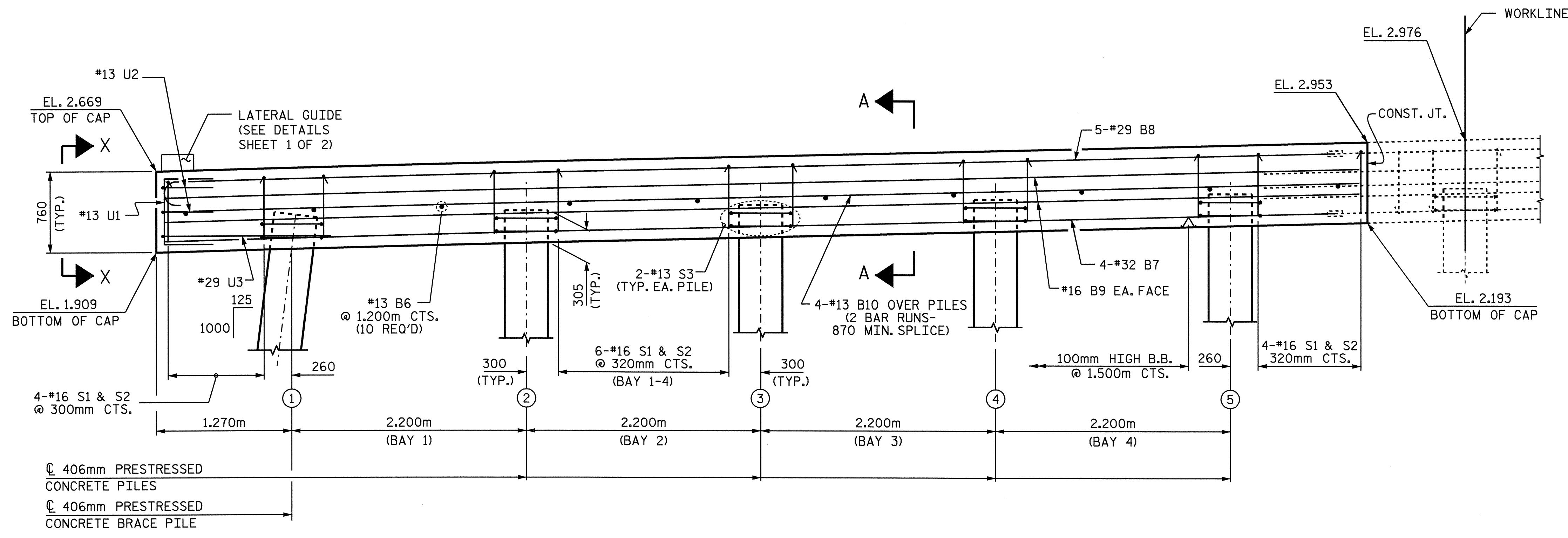
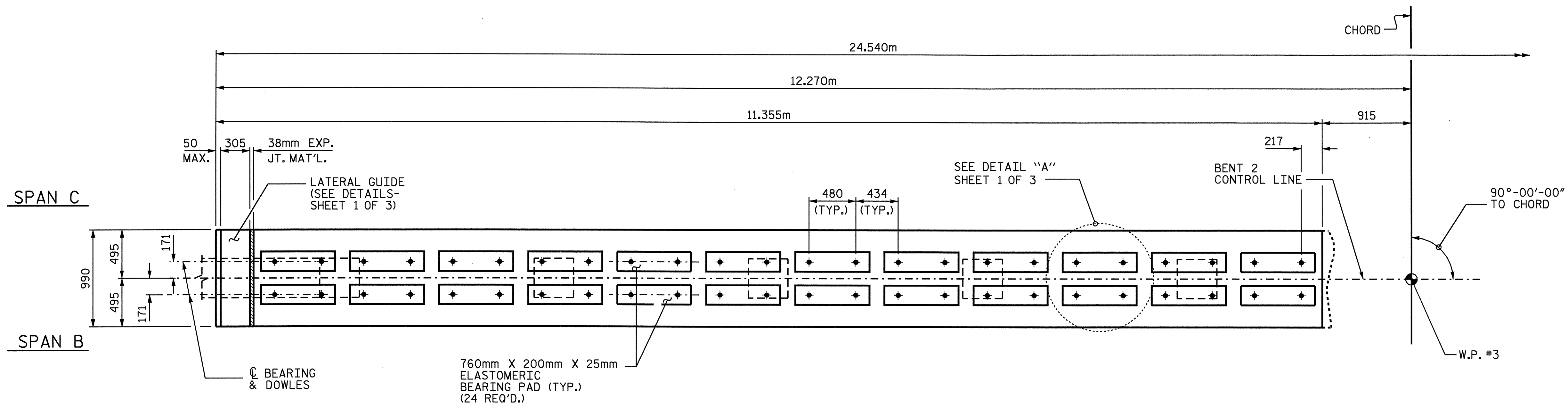
SUBSTRUCTURE  
 BENT 2  
 (STAGE 1)



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			31	

DRAWN BY : J. MYA DATE : 11-17-08  
 CHECKED BY : B.N. GRADY DATE : 12-8-08

27-JAN-2009 09:36  
 \\STRUCTURE\FINAL PLANS\R2414A\_sd.B\*  
 Jmg

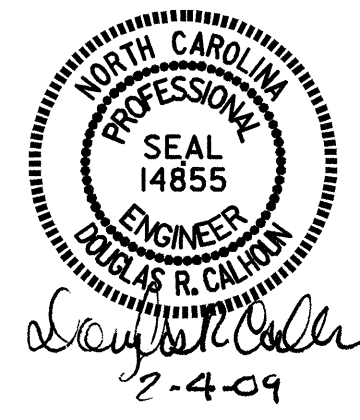


TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
1	2.251
2	2.306
3	2.361
4	2.416
5	2.471

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

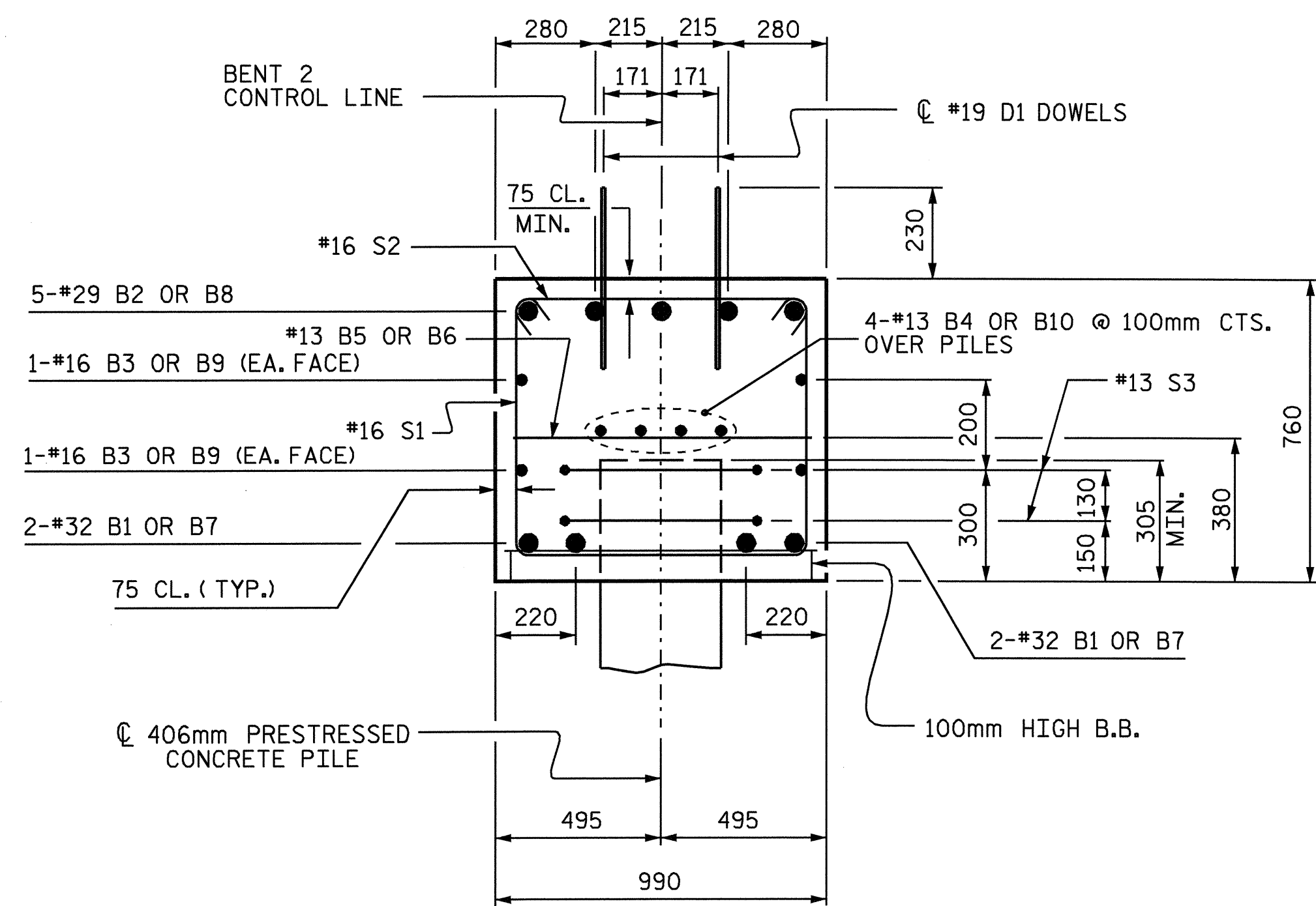
**SUBSTRUCTURE  
 BENT 2  
 (STAGE 2)**



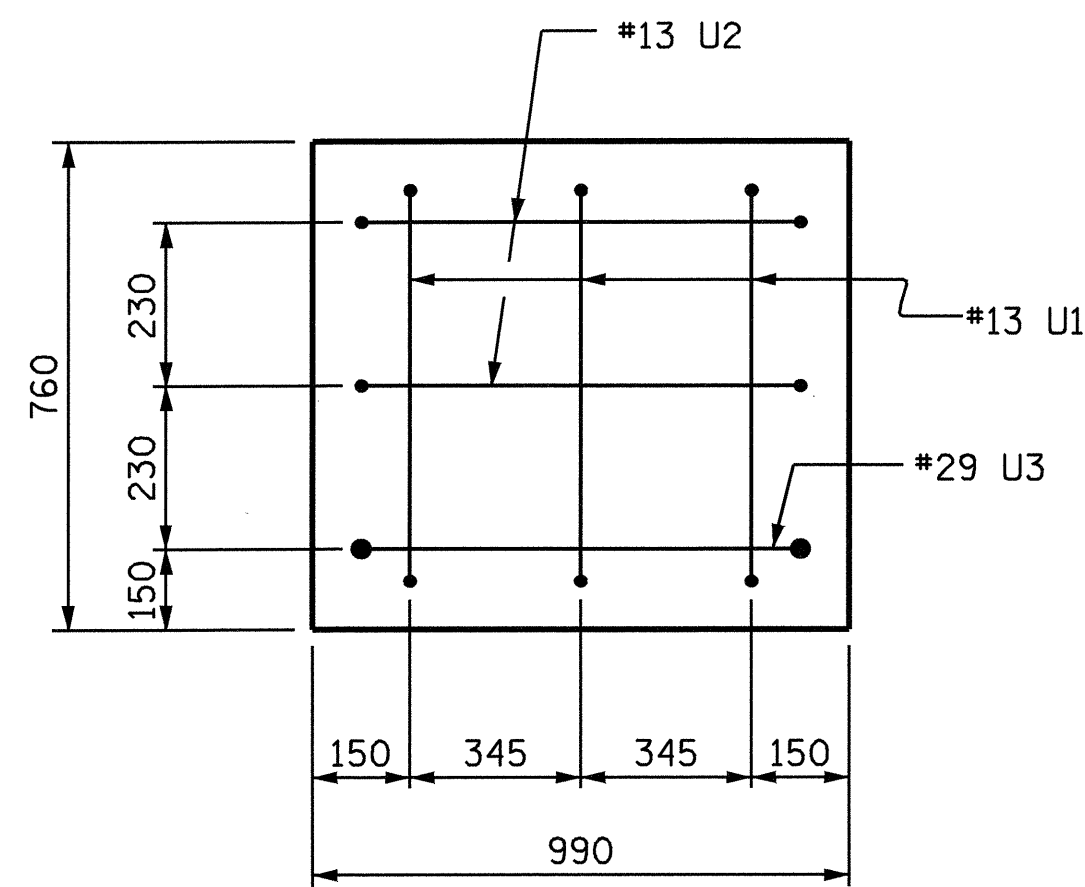
REVISIONS						SHEET NO. S-22
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 31
2			4			

DRAWN BY : J. MYA DATE : 11-17-08  
 CHECKED BY : B.N. GRADY DATE : 12-9-08

27-JAN-2009 09:31 AM ST-STRUCTUR 08\FINAL PLANS\R2414A\_scl.B\* .dgn

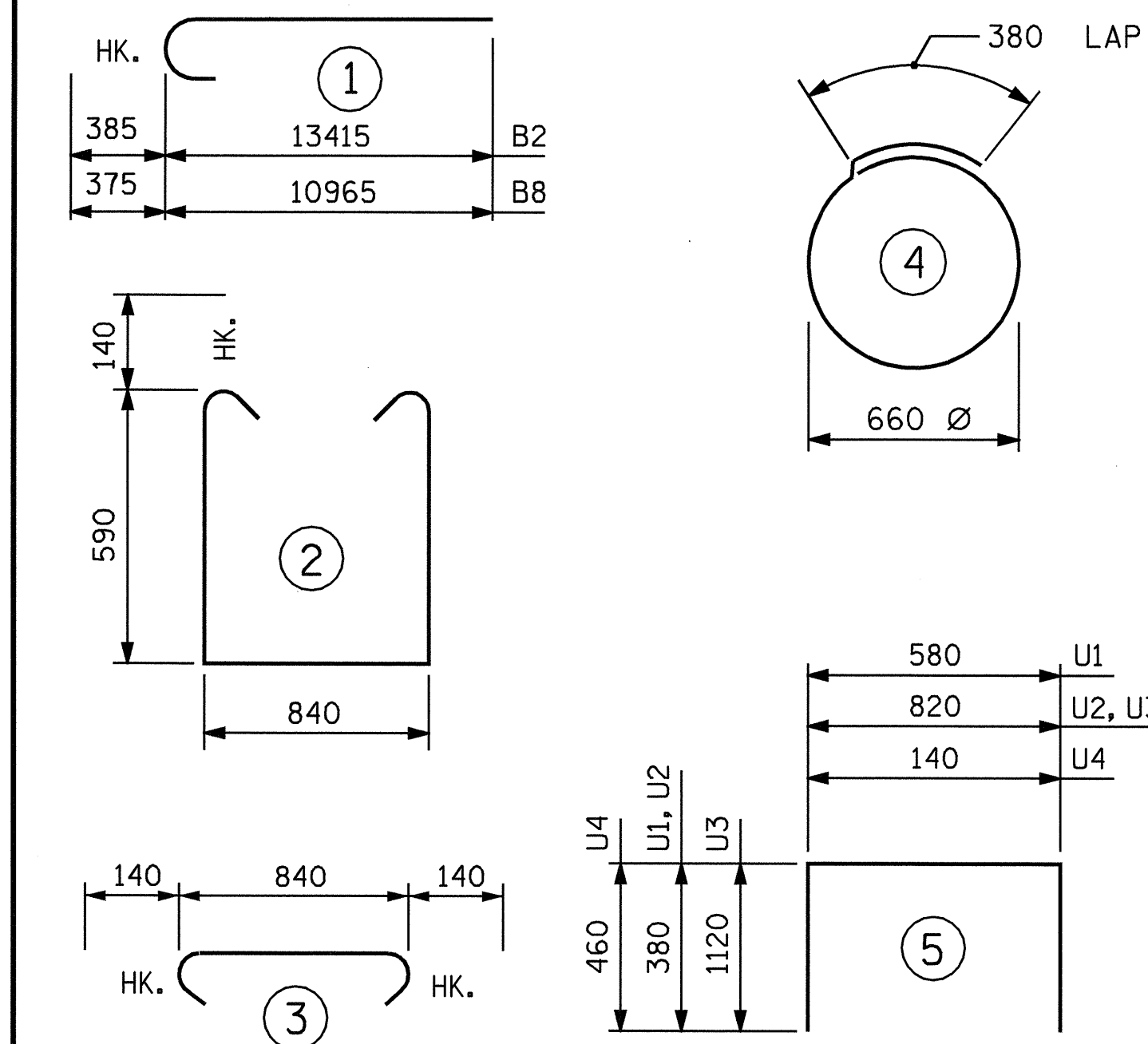


SECTION A-A



VIEW X-X

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL - BENT 2

STAGE 1						STAGE 2							
BAR NO	SIZE	TYPE	LENGTH	WEIGHT		BAR NO	SIZE	TYPE	LENGTH	WEIGHT			
*B1	4	32	STR	13420	344	*B6	2	12	STR	840	10		
*B2	5	29	1	13800	349	*B7	4	32	STR	10980	281		
*B3	4	16	STR	14260	89	*B8	5	29	1	11340	287		
*B4	8	13	STR	7460	59	*B9	4	16	STR	11200	70		
*B5	13	13	STR	840	11	*B10	8	13	STR	6040	48		
*D1	56	19	STR	460	58	*D1	48	19	STR	460	49		
*S1	37	16	2	2300	132	*S1	32	16	2	2300	114		
*S2	37	16	3	1120	64	*S2	32	16	3	1120	56		
*S3	12	13	4	2460	29	*S3	10	13	4	2460	24		
*U1	3	13	4	1340	4	*U1	3	13	4	1340	4		
*U2	2	13	4	1580	3	*U2	2	13	4	1580	3		
*U3	1	29	4	3060	15	*U3	1	29	4	3060	15		
*U4	4	13	4	1060	4	*U4	4	13	4	1060	4		
* EPOXY COATED REINFORCING STEEL					Kg	1161	* EPOXY COATED REINFORCING STEEL					Kg	965
CLASS AA CONCRETE BREAKDOWN						CLASS AA CONCRETE BREAKDOWN							
POUR 1 (CAP)			C.M.	9.7	▲	POUR 1 CAP			C.M.	8.3	▲		
POUR 2 (LATERAL GUIDES)			C.M.	0.1		POUR 2 (LATERAL GUIDES)			C.M.	0.1			
TOTAL			C.M.	9.8		TOTAL			C.M.	8.4			
406mm PRESTRESSED CONCRETE PILES			No.:	6		406mm PRESTRESSED CONCRETE PILES			No.:	5			
			METERS:	135					METERS:	112.5			

TOTAL BILL OF MATERIAL

\* EPOXY COATED REINFORCING STEEL = 2126 Kg  
 CLASS AA CONCRETE TOTAL = 18.2 C.M.  
 406mm PRESTRESSED CONCRETE PILES No.: 11 METERS: 247.5

▲ CONCRETE DISPLACED BY THE 406mm CONCRETE PILES HAS BEEN DEDUCTED.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

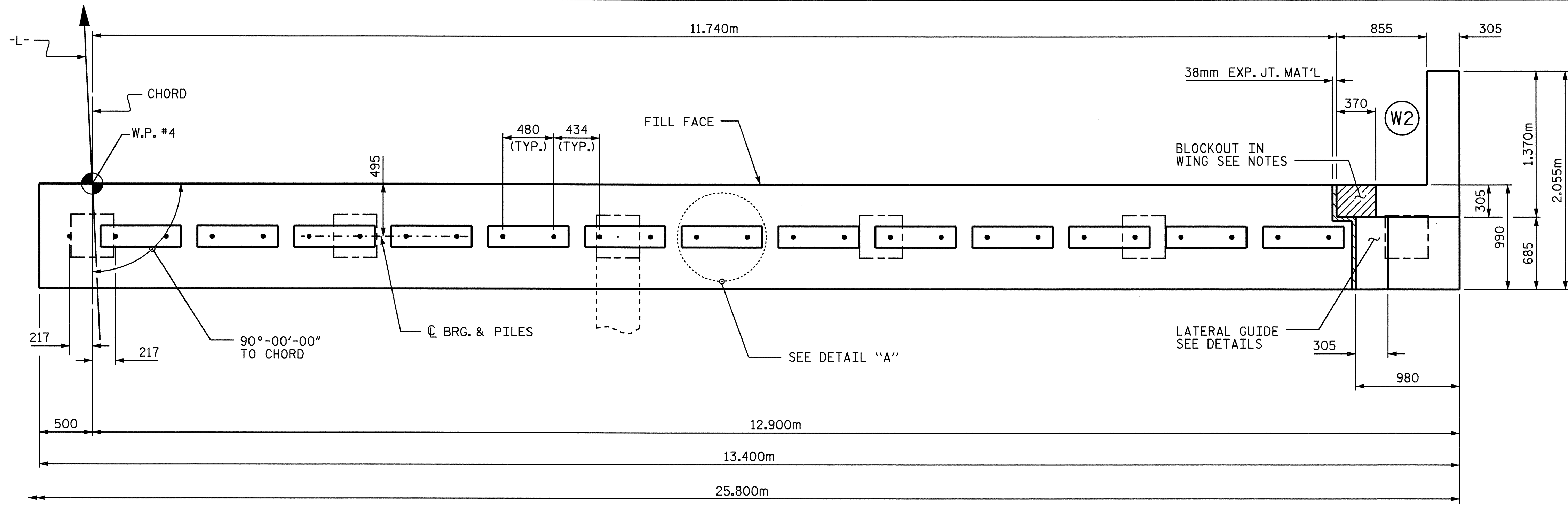
SUBSTRUCTURE  
 BENT 2  
 (STAGE 1 AND 2)



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23	
1			3			TOTAL SHEETS	
2			4			31	

DRAWN BY: J. MYA DATE: 11-17-08  
 CHECKED BY: B.N. GRADY DATE: 12-9-08





PLAN

**NOTES**

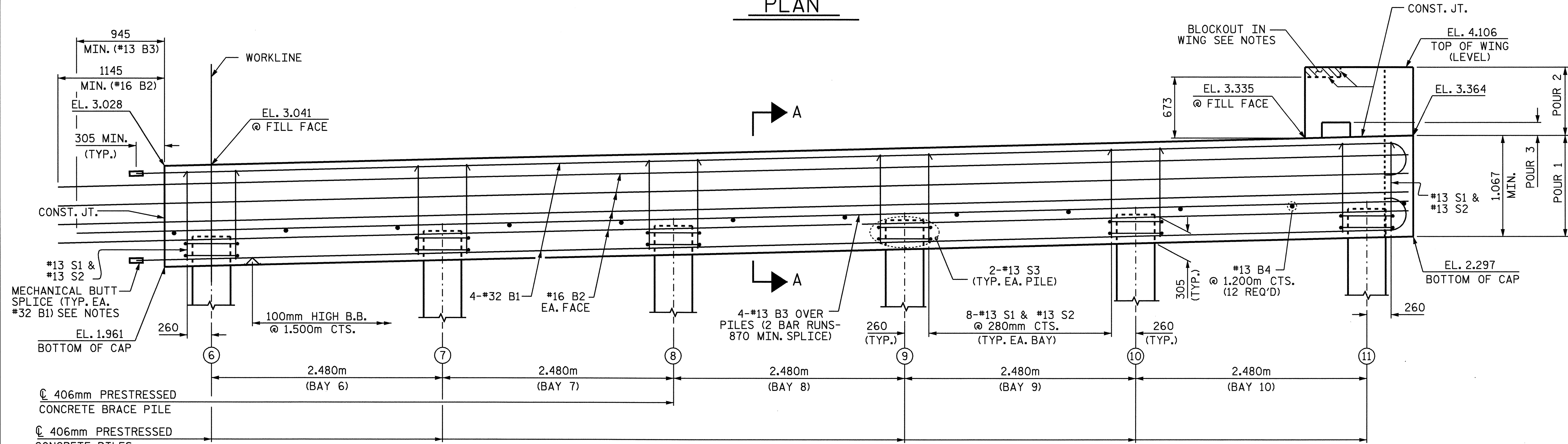
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT HAS BEEN SAWED AND PARAPET AND END POSTS IS CAST IF SLIP FORMING IS USED.

FOR MECHANICAL BUTT SPLICING FOR REINFORCING STEEL, SEE SECTION 425-5 OF THE STANDARD SPECIFICATIONS.

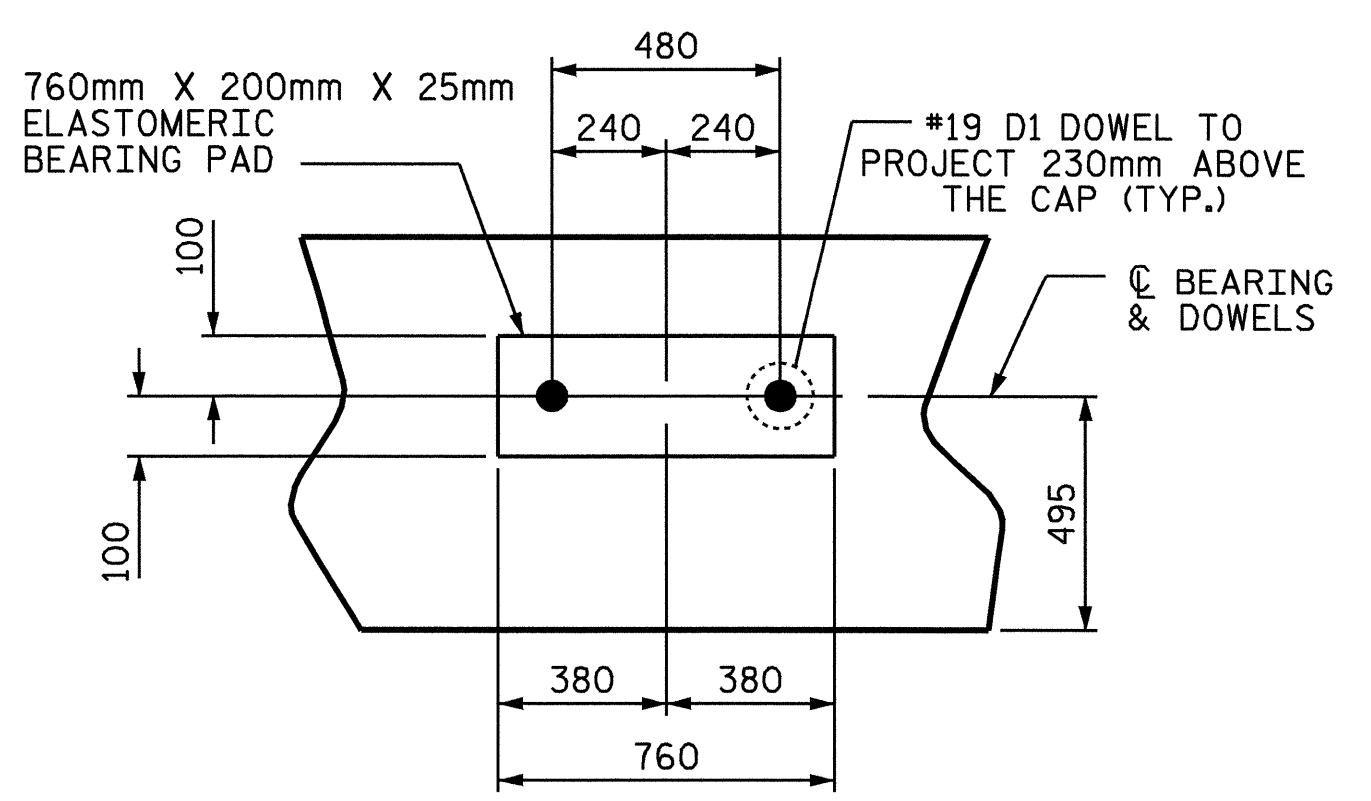
THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 102mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

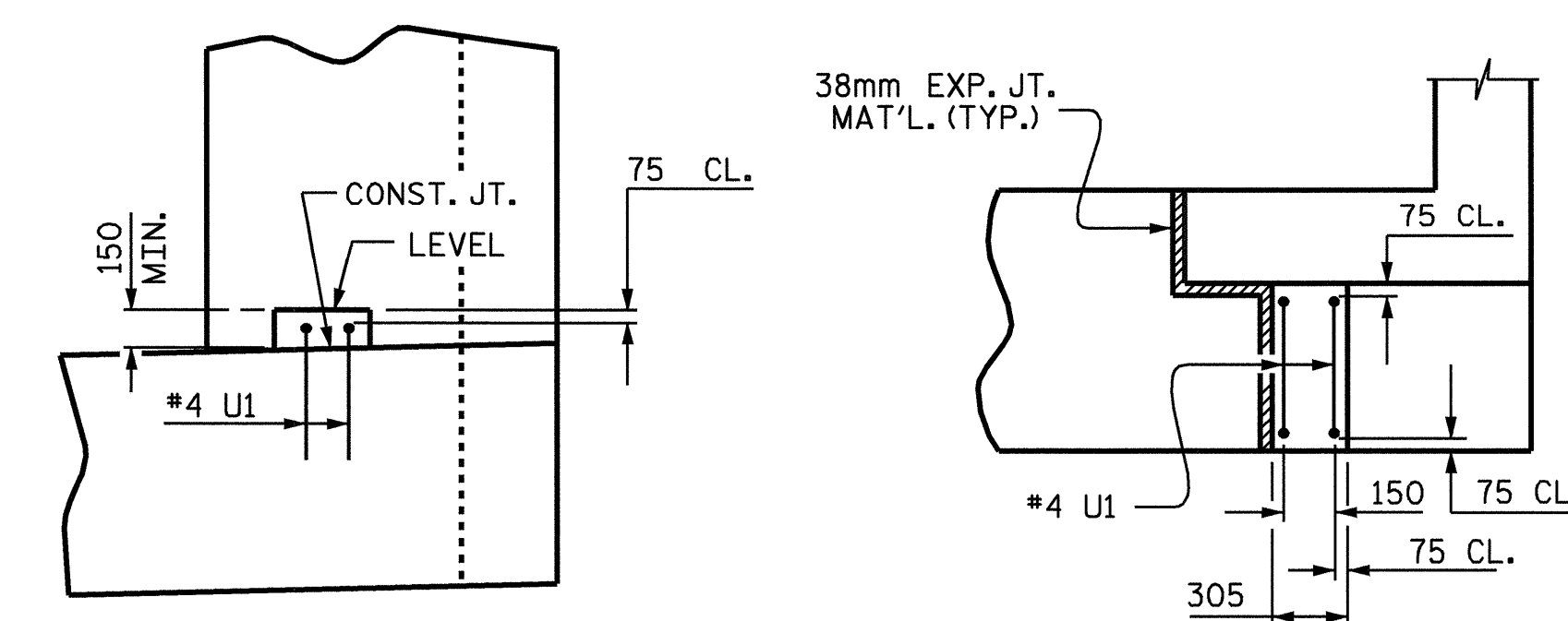


ELEVATION

TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
6	2.284
7	2.346
8	2.408
9	2.470
10	2.532
11	2.594



DETAIL "A"  
(TYP. EA. BEARING)



LATERAL GUIDE DETAILS  
(RIGHT LATERAL GUIDE SHOWN, LEFT LATERAL GUIDE SIMILAR)

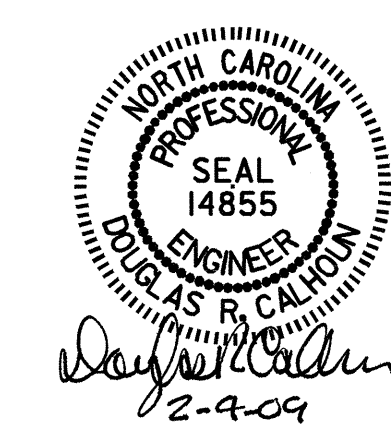
PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 1 OF 4

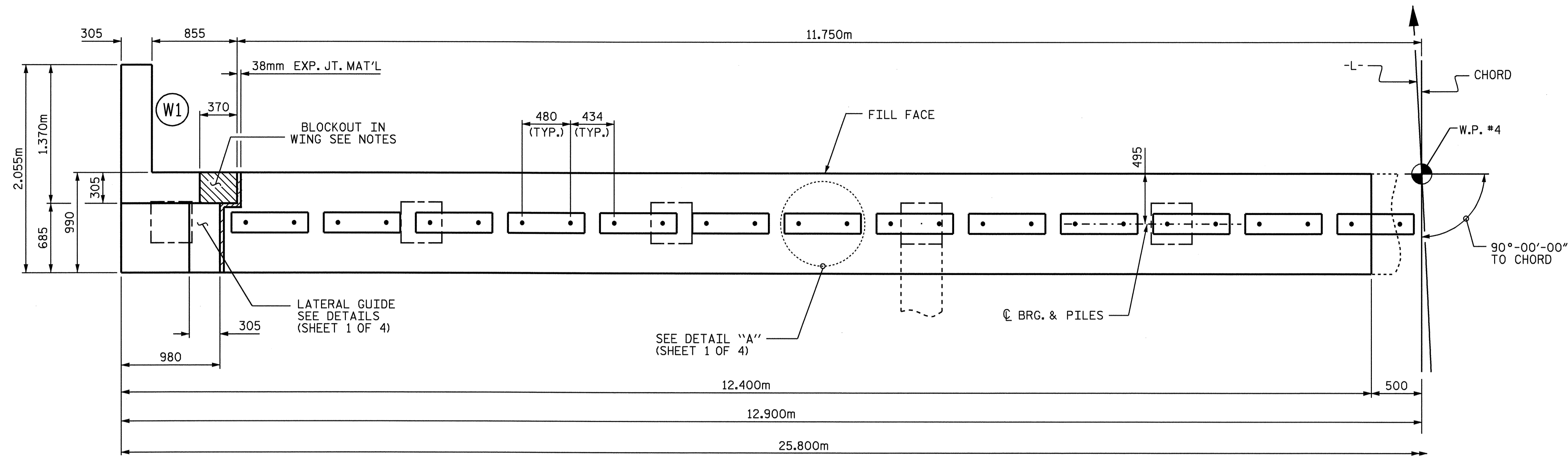
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 (STAGE 1)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS	
2			4			31	

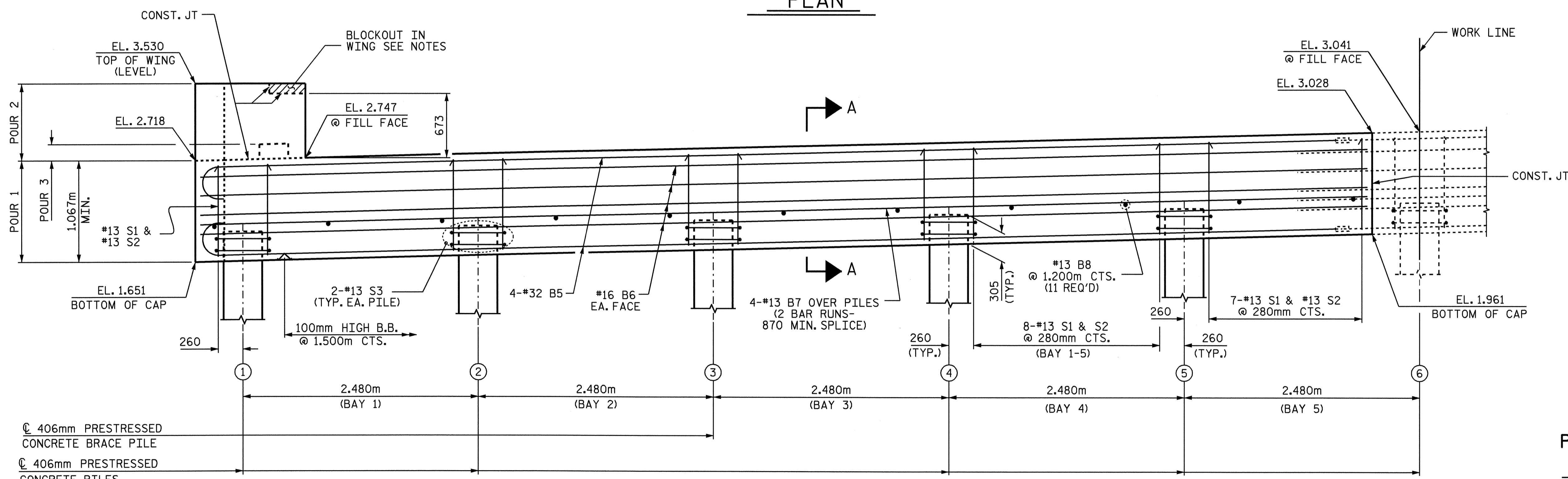


DRAWN BY: J. MYA DATE: 10-30-08  
 CHECKED BY: B.N. GRADY DATE: 12-1-08



PLAN

TOP OF PILE ELEVATIONS	
PILE NUMBER	ELEVATION
1	1.974
2	2.036
3	2.098
4	2.160
5	2.222



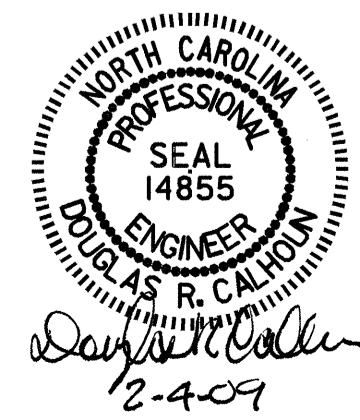
ELEVATION

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

SHEET 2 OF 4

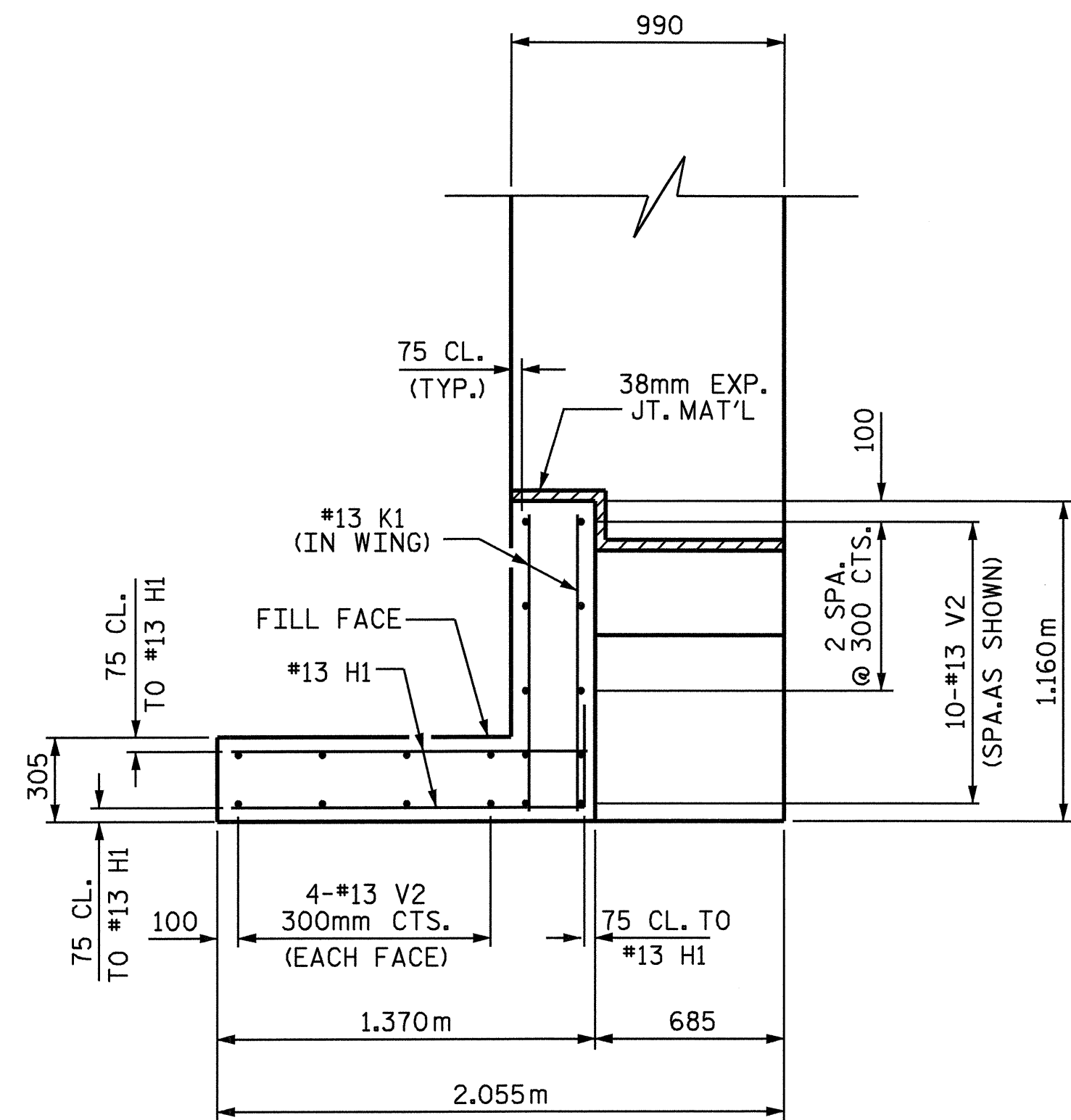
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 STAGE 2

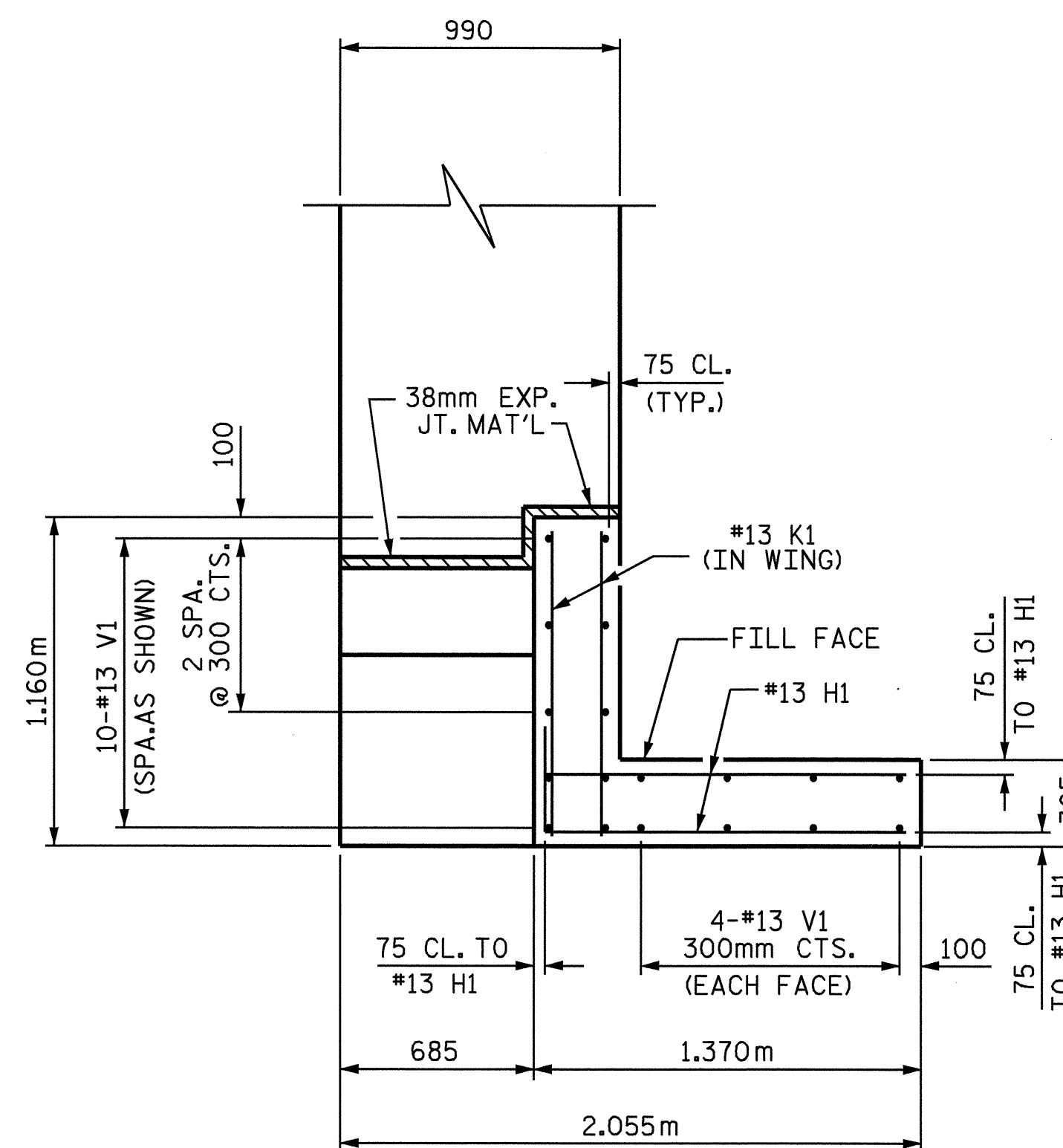


DRAWN BY: J. MYA DATE: 10-30-08  
 CHECKED BY: B.N. GRADY DATE: 12-1-08

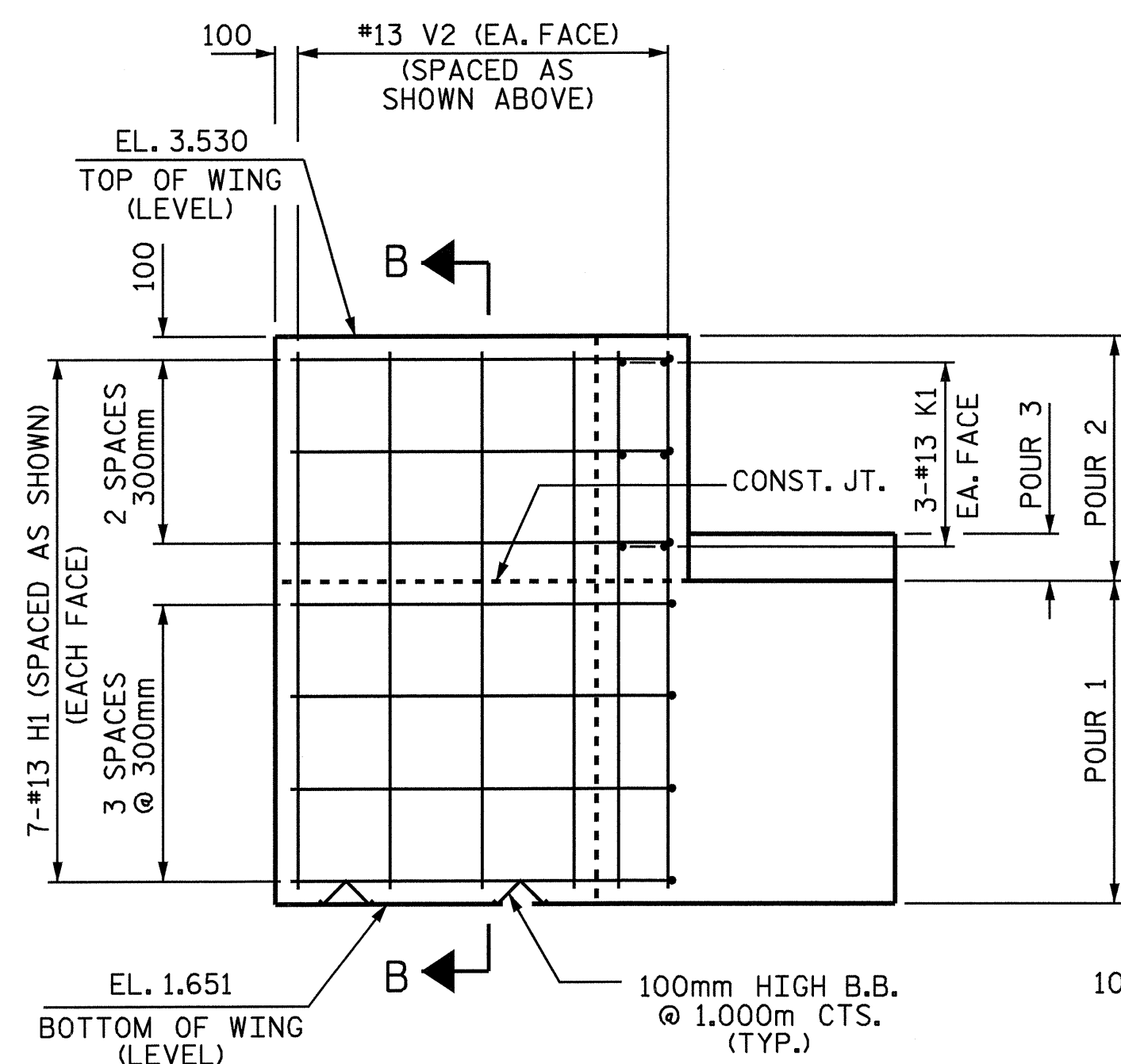
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25	
1			3			TOTAL SHEETS	
2			4			31	



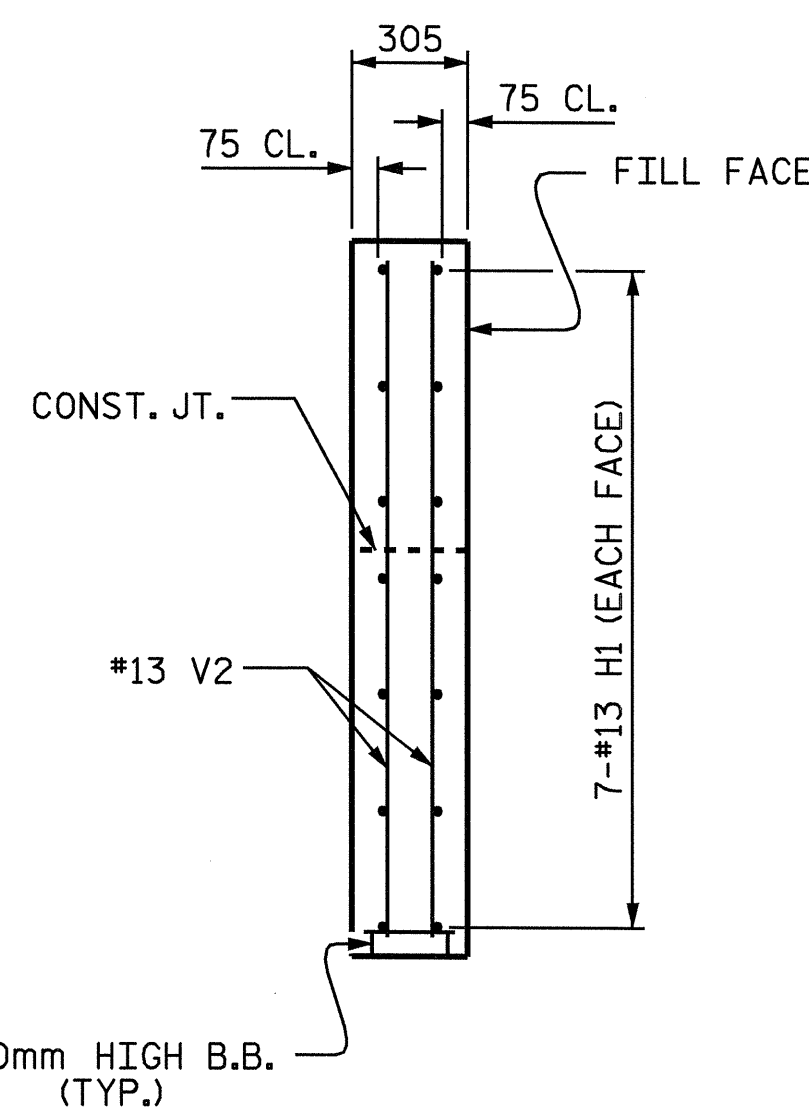
PLAN OF WING - W1  
(STAGE 2)



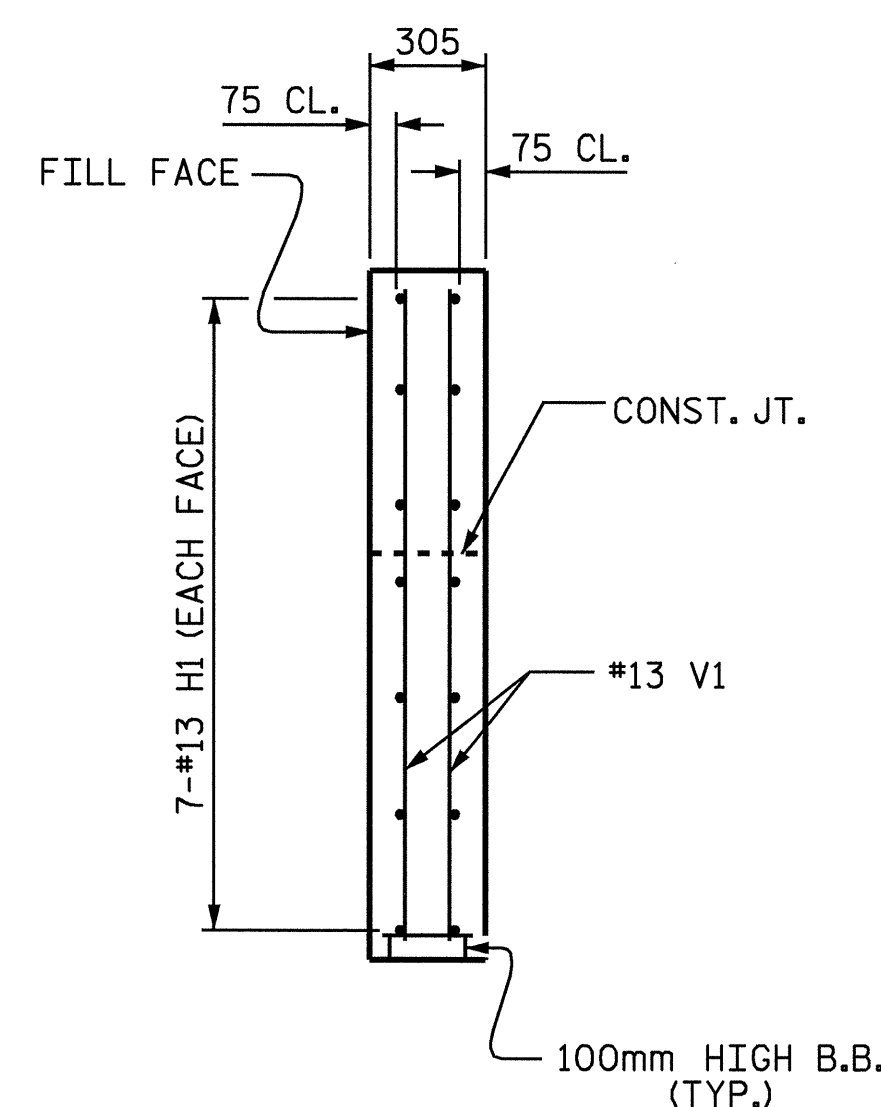
PLAN OF WING - W2  
(STAGE 1)



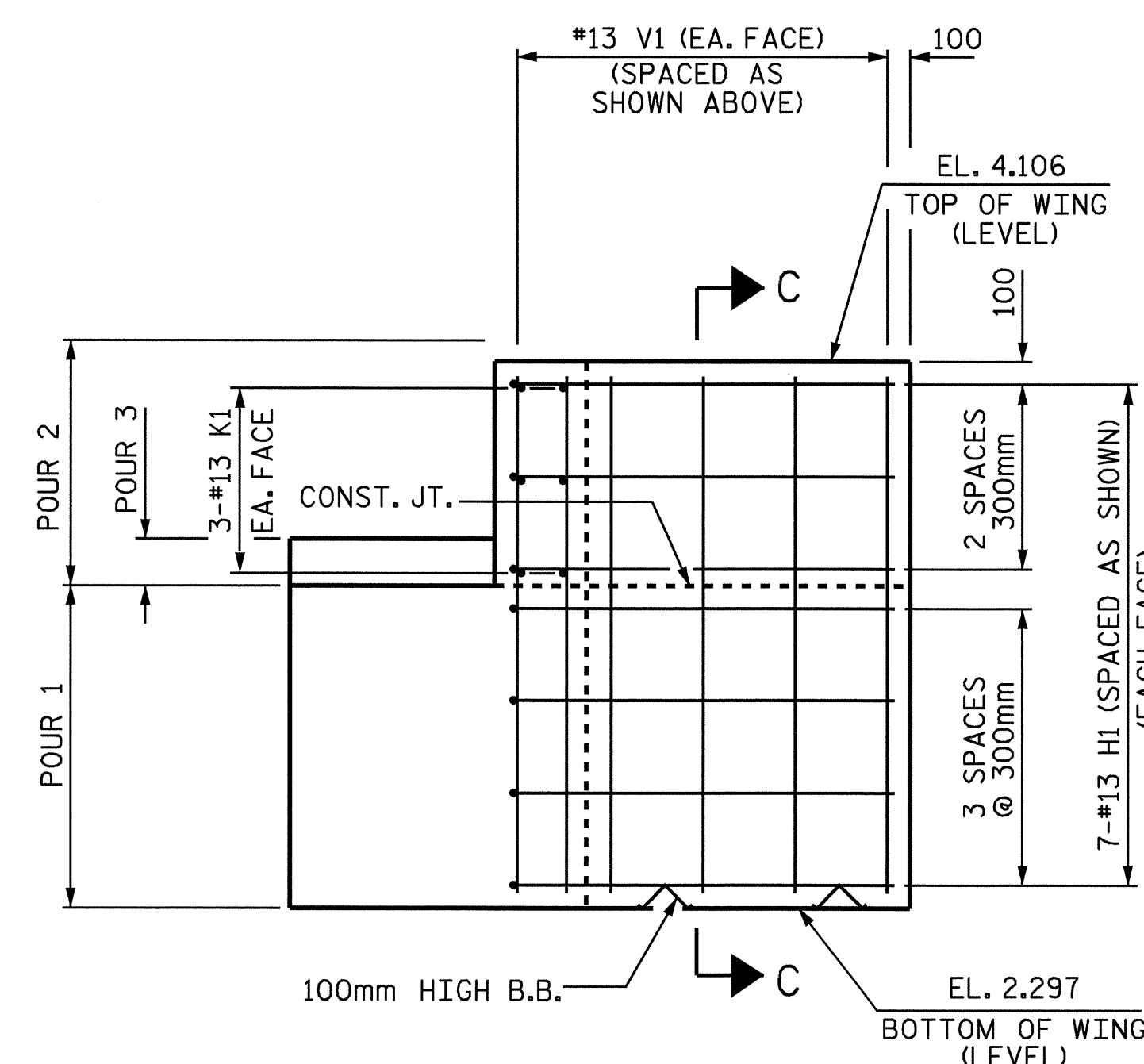
ELEVATION OF WING - W1  
(STAGE 2)



SECTION B-B  
(STAGE 2)



SECTION C-C  
(STAGE 1)



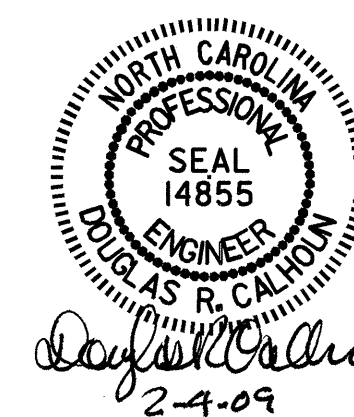
ELEVATION OF WING - W2  
(STAGE 1)

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

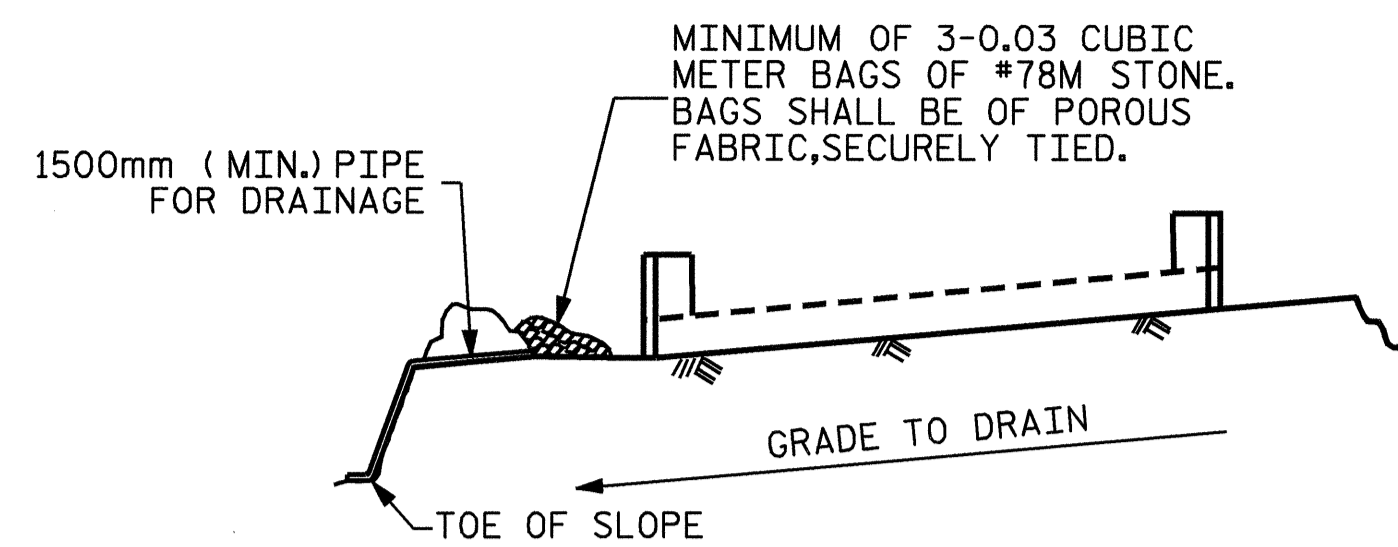
SUBSTRUCTURE  
END BENT 2  
(STAGE 1 AND 2)



DRAWN BY: J. MYA DATE: 10-30-08  
CHECKED BY: B.N. GRADY DATE: 12-2-08

26-JAN-2009 09:31  
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jmya

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26	
1			3			TOTAL SHEETS	
2			4			31	

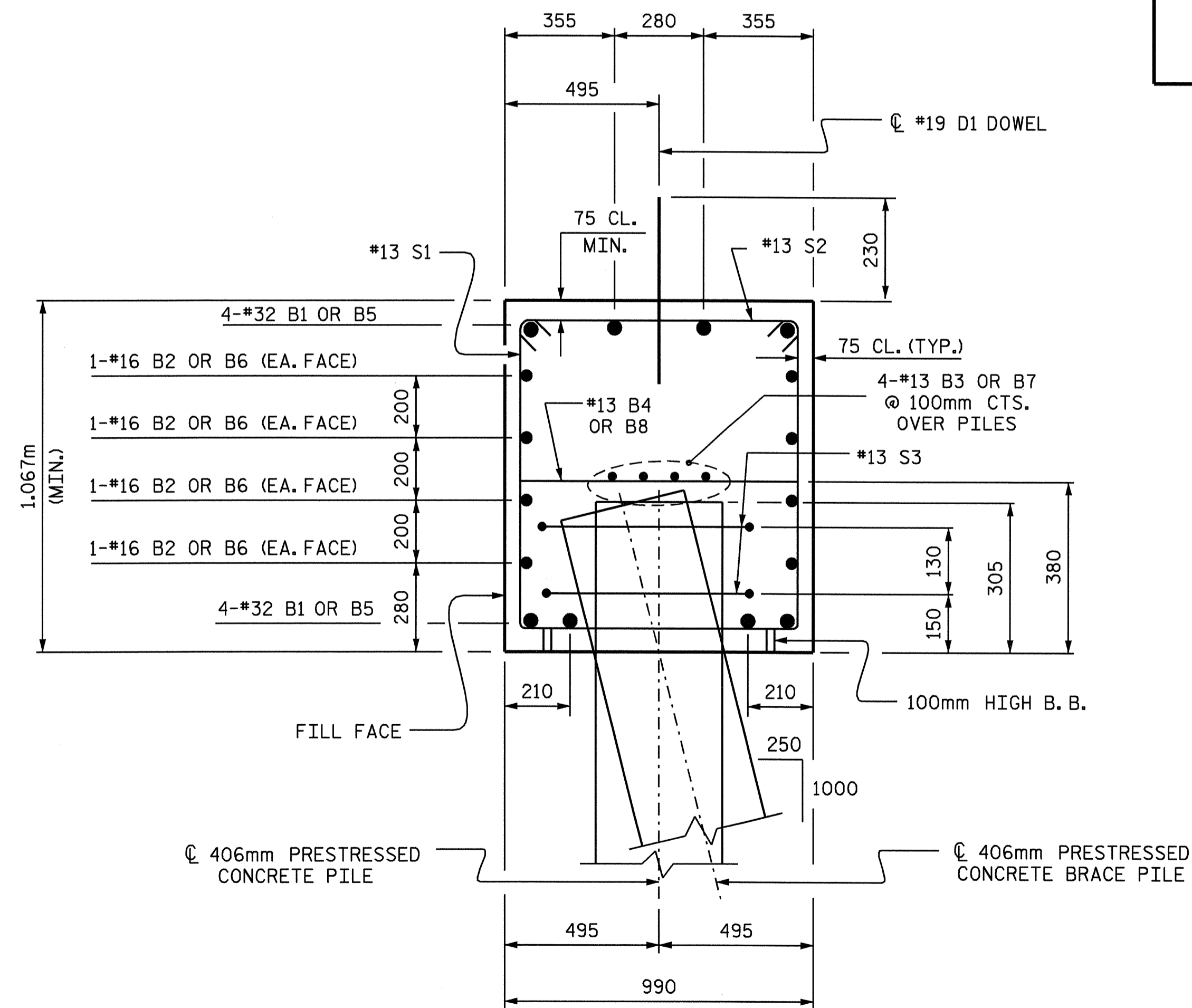


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

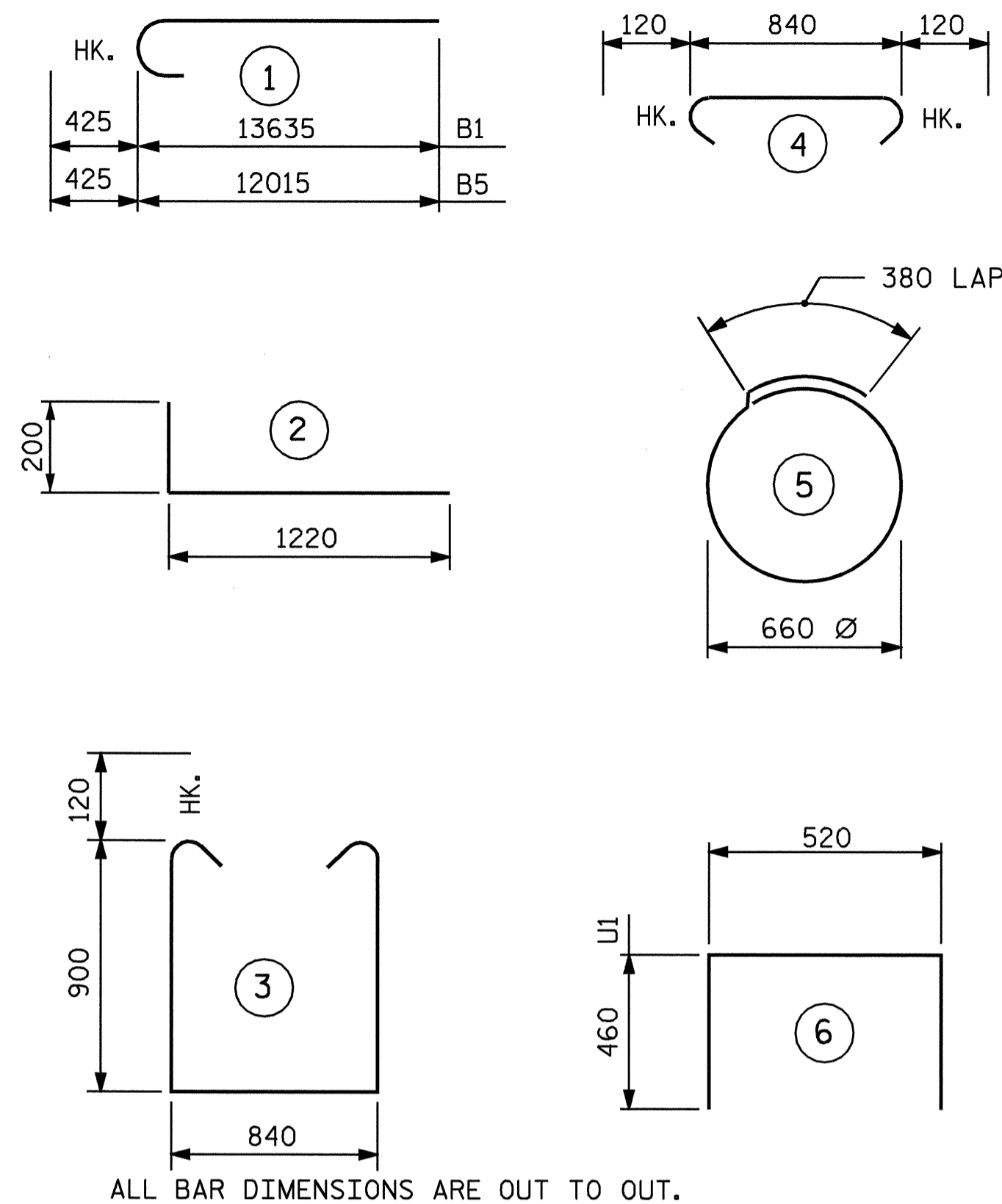
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



SECTION A-A

### BAR TYPES



### BILL OF MATERIAL - END BENT 2

STAGE 1						STAGE 2							
BAR NO	SIZE	TYPE	LENGTH	WEIGHT		BAR NO	SIZE	TYPE	LENGTH	WEIGHT			
*B1	8	32	1	14060	720	*B5	8	32	1	12440	637		
*B2	8	16	STR	14480	180	*B6	8	16	STR	12240	152		
*B3	8	13	STR	7580	60	*B7	8	13	STR	6560	52		
*B4	12	13	STR	840	10	*B8	11	13	STR	840	9		
*D1	27	19	STR	460	28	*D1	25	19	STR	460	26		
*H1	14	13	2	1420	20	*H1	14	13	2	1420	20		
*K1	6	13	STR	1000	6	*K1	6	13	STR	1000	6		
*S1	42	13	3	2880	119	*S1	40	13	3	2880	115		
*S2	42	13	4	1080	44	*S2	40	13	4	1080	43		
*S3	12	13	5	2460	29	*S3	10	13	5	2460	24		
*U1	2	13	6	1440	3	*U1	2	13	6	1440	3		
*V1	18	13	STR	1660	30	*V2	18	13	STR	1720	31		
* EPOXY COATED REINFORCING STEEL					Kg	1251	* EPOXY COATED REINFORCING STEEL					Kg	1118
CLASS AA CONCRETE BREAKDOWN						CLASS AA CONCRETE BREAKDOWN							
POUR 1 (CAP & LOWER PART OF WING)			C.M.	14.2	▲	POUR 1 (CAP & LOWER PART OF WING)			C.M.	13.1	▲		
POUR 2 (UPPER PART OF WING)			C.M.	0.5		POUR 2 (UPPER PART OF WING)			C.M.	0.6			
POUR 3 (LATERAL GUIDES)			C.M.	0.1		POUR 3 (LATERAL GUIDES)			C.M.	0.1			
TOTAL :				14.8		TOTAL :				13.8			
406mm PRESTRESSED CONCRETE PILES					No.:	6	406mm PRESTRESSED CONCRETE PILES					No.:	5
					METERS:	135						METERS:	112.5

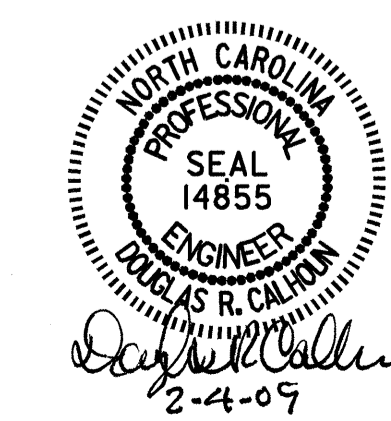
### TOTAL BILL OF MATERIAL

\* EPOXY COATED REINFORCING STEEL = 2369 Kg  
 CLASS AA CONCRETE TOTAL = 28.6 C.M.  
 406mm PRESTRESSED CONCRETE PILE No.: 11 METERS: 247.5

▲ CONCRETE DISPLACED BY THE 406mm CONCRETE PILES HAS BEEN DEDUCTED.

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-  
 SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 (STAGE 1 AND 2)



DRAWN BY : J. MYA DATE : 10-30-08  
 CHECKED BY : B.N. GRADY DATE : 12-2-08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27	
1			3			TOTAL SHEETS 31	
2			4				

**NOTES**

CONCRETE DESIGN DATA :  $f'c = 34.5 \text{ MPa}$ ;  $fc = 13.8 \text{ MPa}$

IMPACT IN HANDLING = 50%

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE PILE SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN  $24.1 \text{ MPa}$ .

IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST - IN - PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 50mm WIDE.

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203M EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL USE THE FOLLOWING STRAND TYPE:

SIZE mm	GRADE	NUMBER OF STRANDS	AREA mm <sup>2</sup>	ULTIMATE STRENGTH KN	APPLIED PRESTRESS FORCE KN
12.70	270 L.R.	8	98.71	183.7 PER STRAND	137.8 PER STRAND

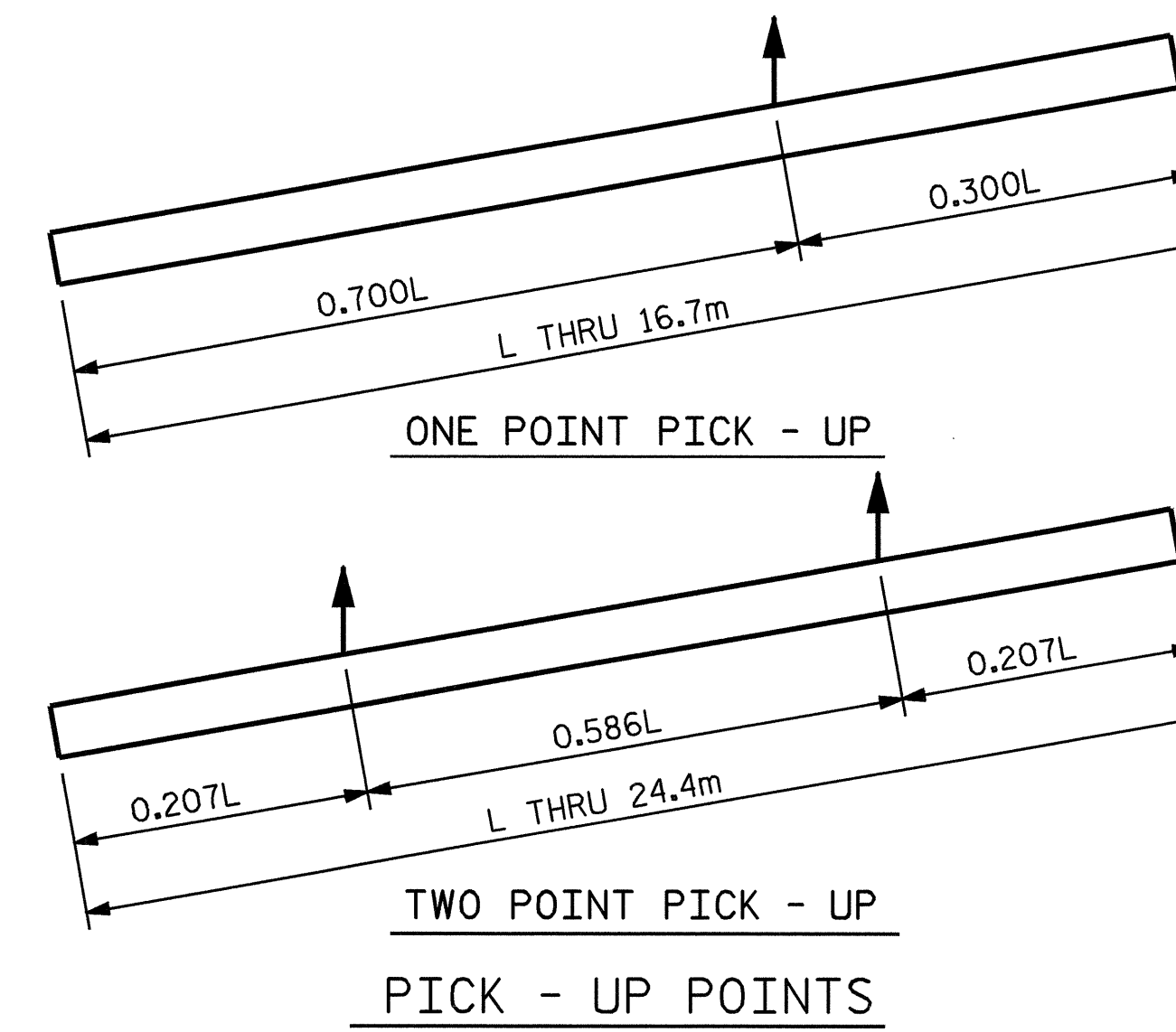
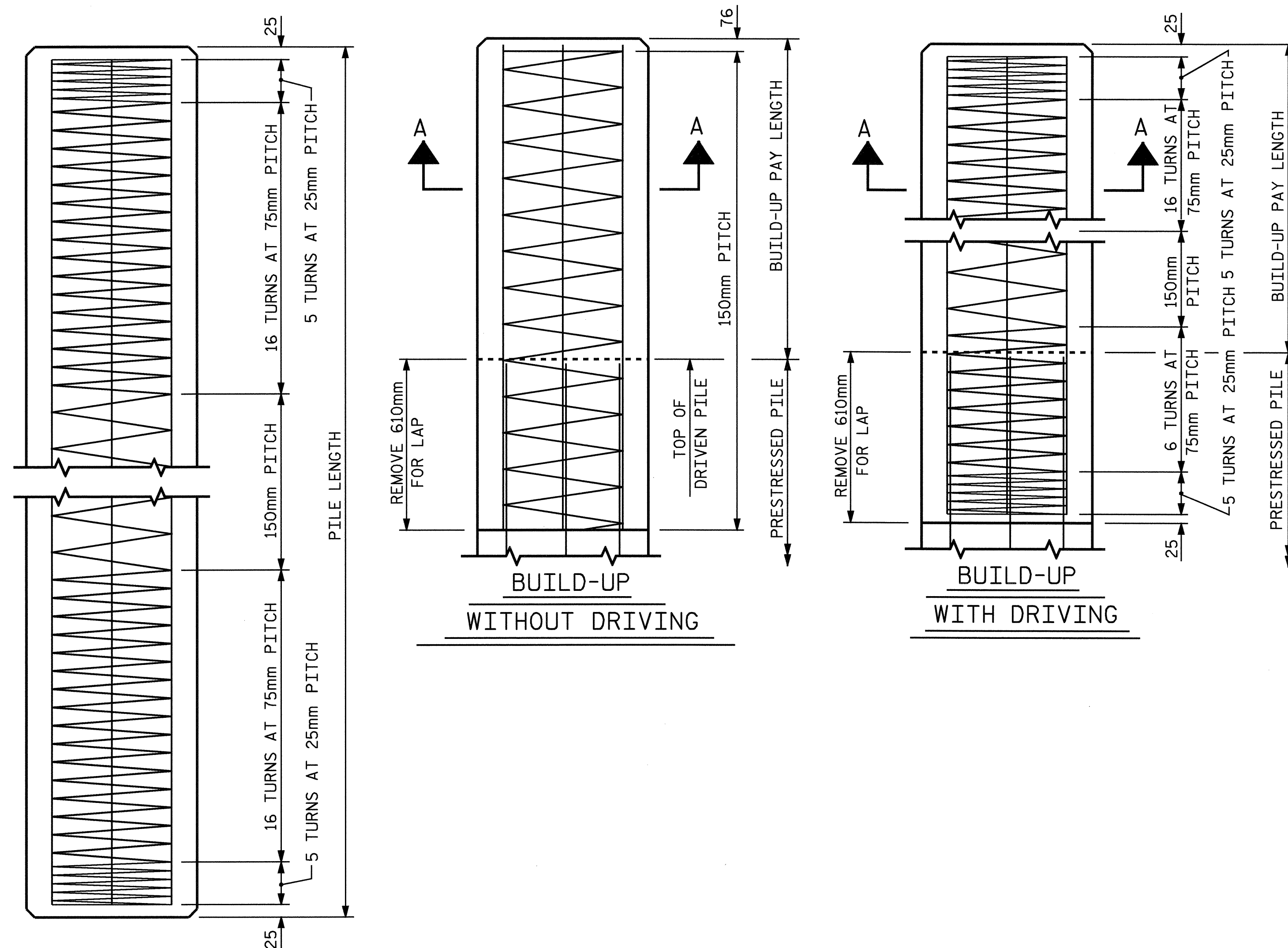
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS BURN IN OPPOSITE PAIRS AND SYMMETRICAL ABOUT BOTH VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

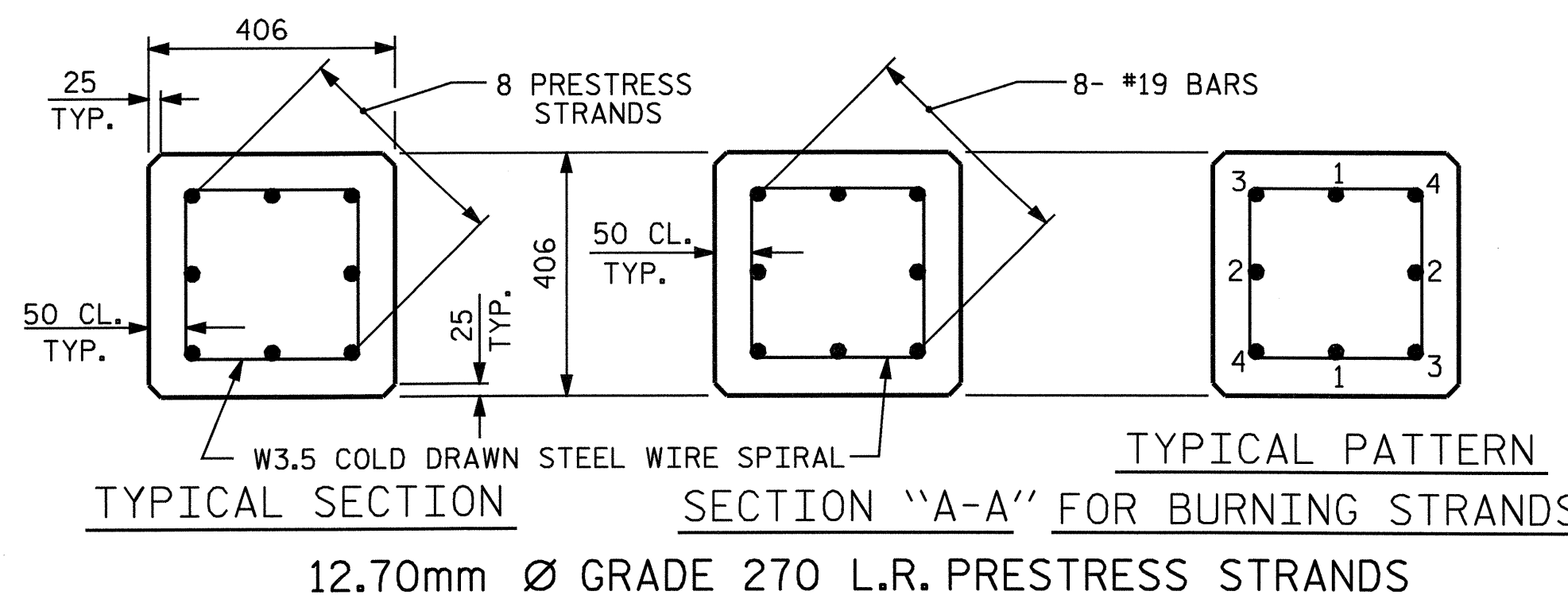
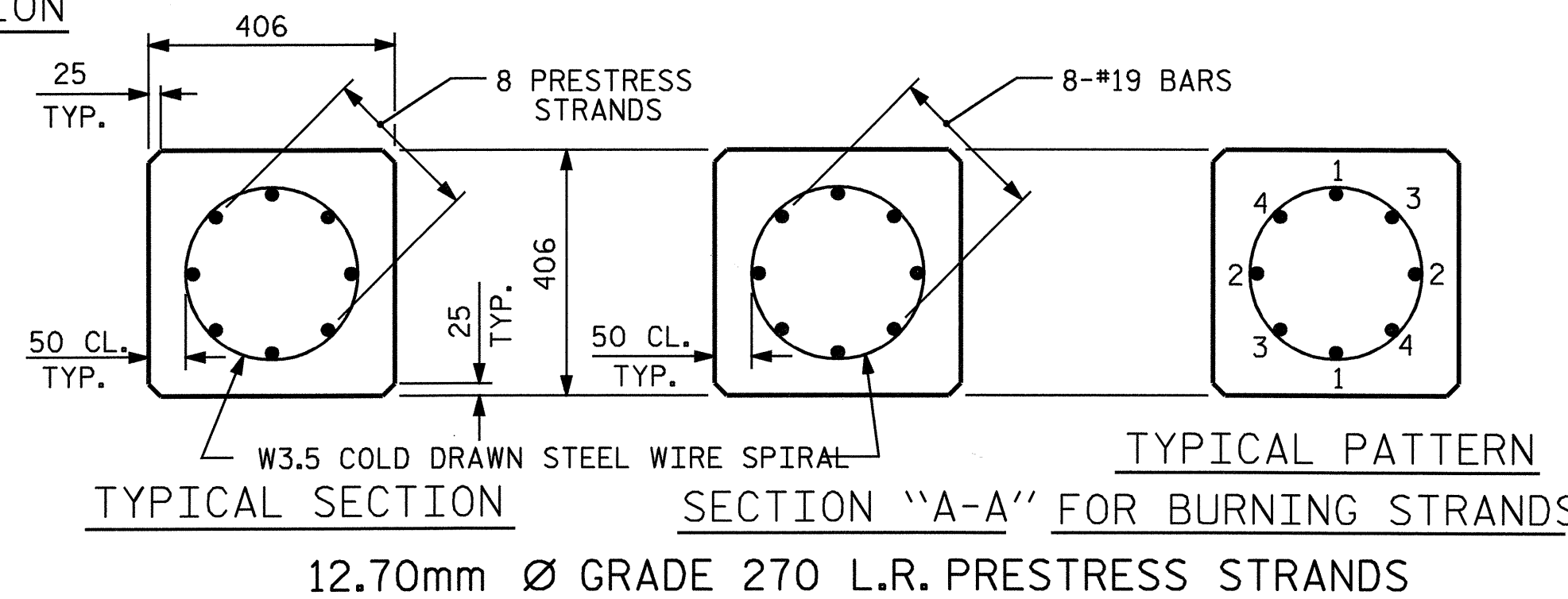
BUILD-UPS SHALL BE 'CLASS A' CONCRETE WITH 20% ADDITIONAL CEMENT. NO DRIVING OF THE BUILT-UP PILE WILL BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF  $20.7 \text{ MPa}$  AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE TO THE STANDARD SPECIFICATIONS. NO SEPARATE PAYMENT WILL BE MADE FOR CALCIUM NITRITE CORROSION INHIBITOR.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.



**ELEVATION**



QUANTITIES FOR ONE 406mm PRESTRESSED PILE						
LENGTH m	CONCRETE m <sup>3</sup>	PILE WT. kg	ONE POINT PICK-UP		TWO POINT PICK-UP	
			0.300L m	0.700L m	0.207L m	0.586L m
7.5	1.23	2950	2.25	5.25	1.55	4.40
9.0	1.47	3540	2.70	6.30	1.86	5.28
10.5	1.72	4130	3.15	7.35	2.17	6.16
12.0	1.97	4720	3.60	8.40	2.48	7.04
13.5	2.21	5310	4.05	9.45	2.79	7.92
15.0	2.46	5900	4.50	10.50	3.11	8.78
16.5	2.70	6500	4.95	11.55	3.42	9.66
18.0	2.95	7090			3.73	10.54
19.5	3.20	7680			4.04	11.42
21.0	3.44	8270			4.35	12.30
22.5	3.69	8860			4.66	13.18
24.0	3.93	9450			4.97	14.06

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

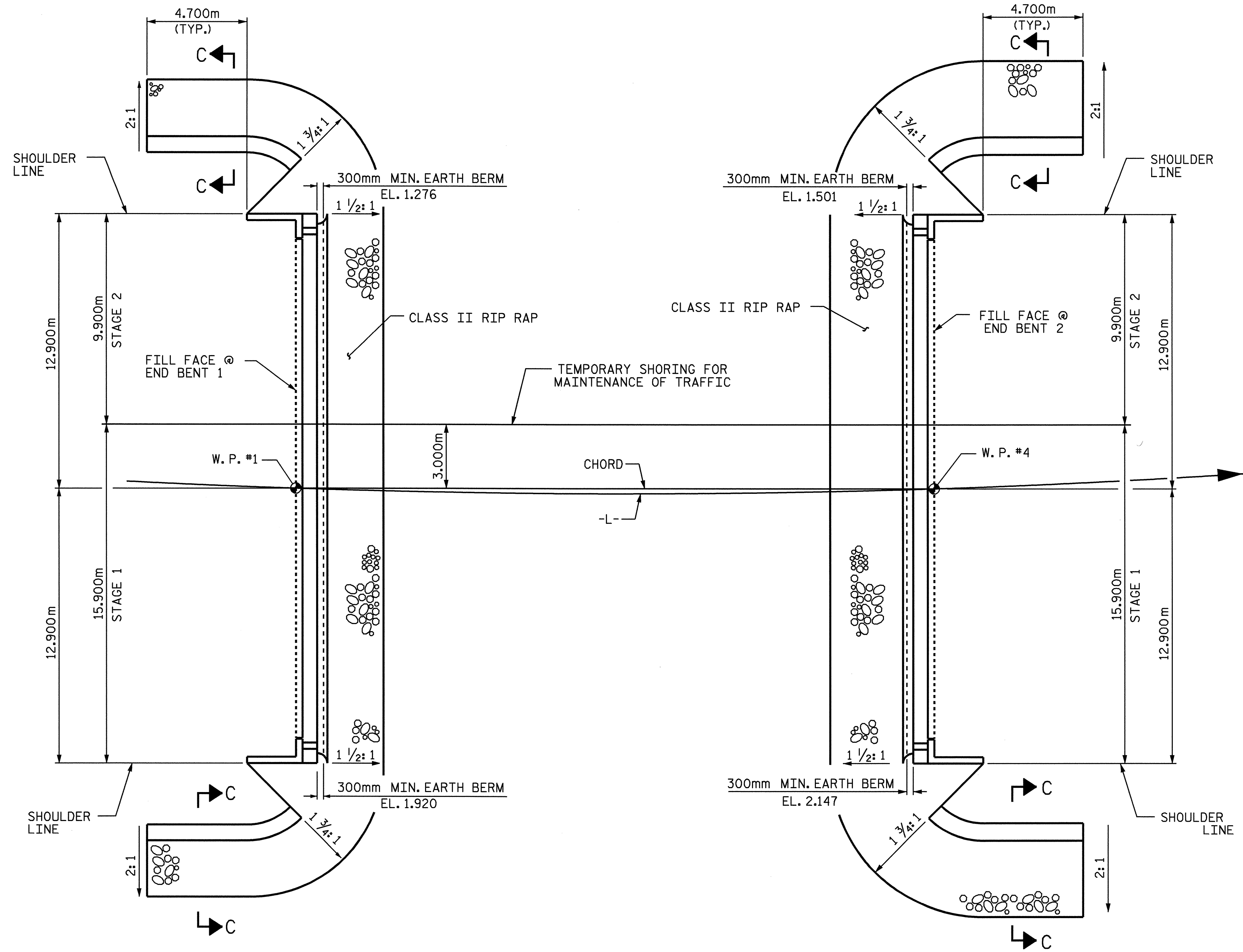
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 406mm PRESTRESSED  
 CONCRETE PILE

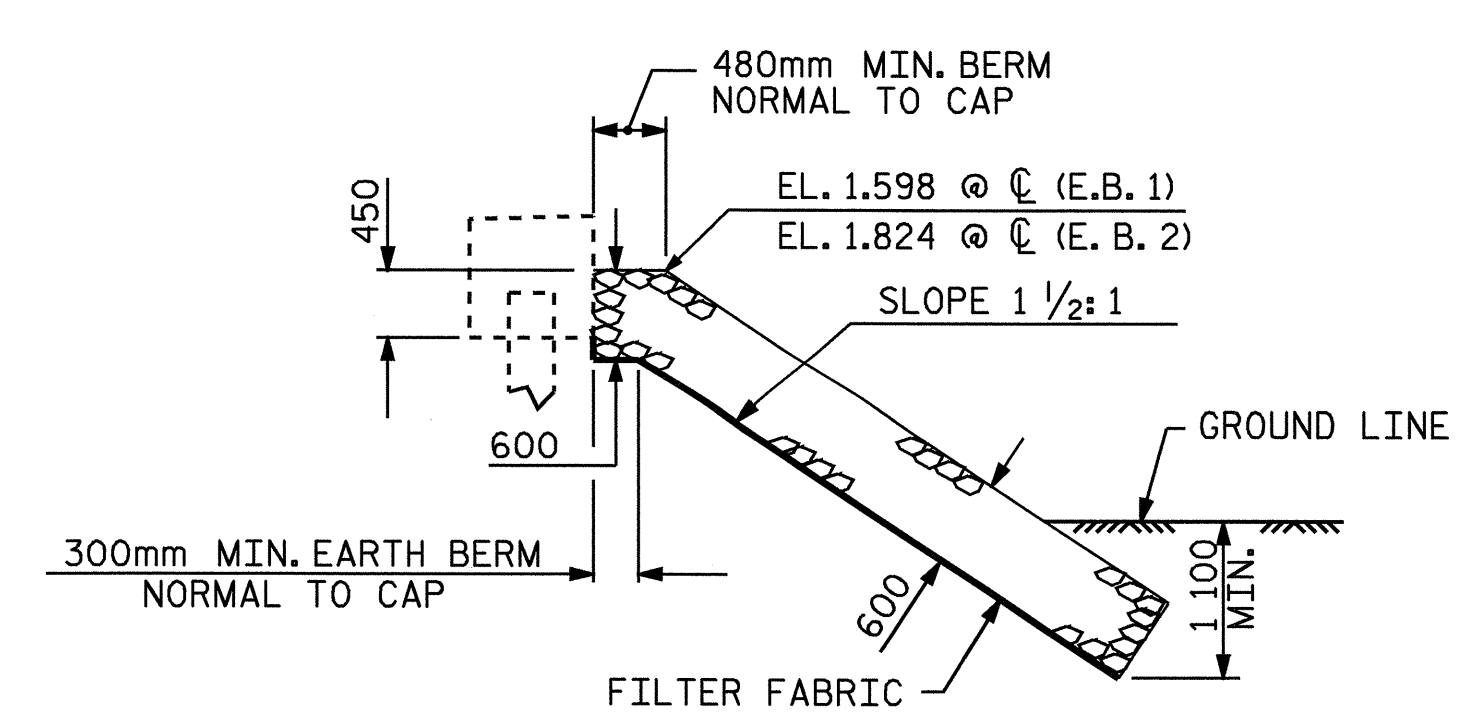


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			31

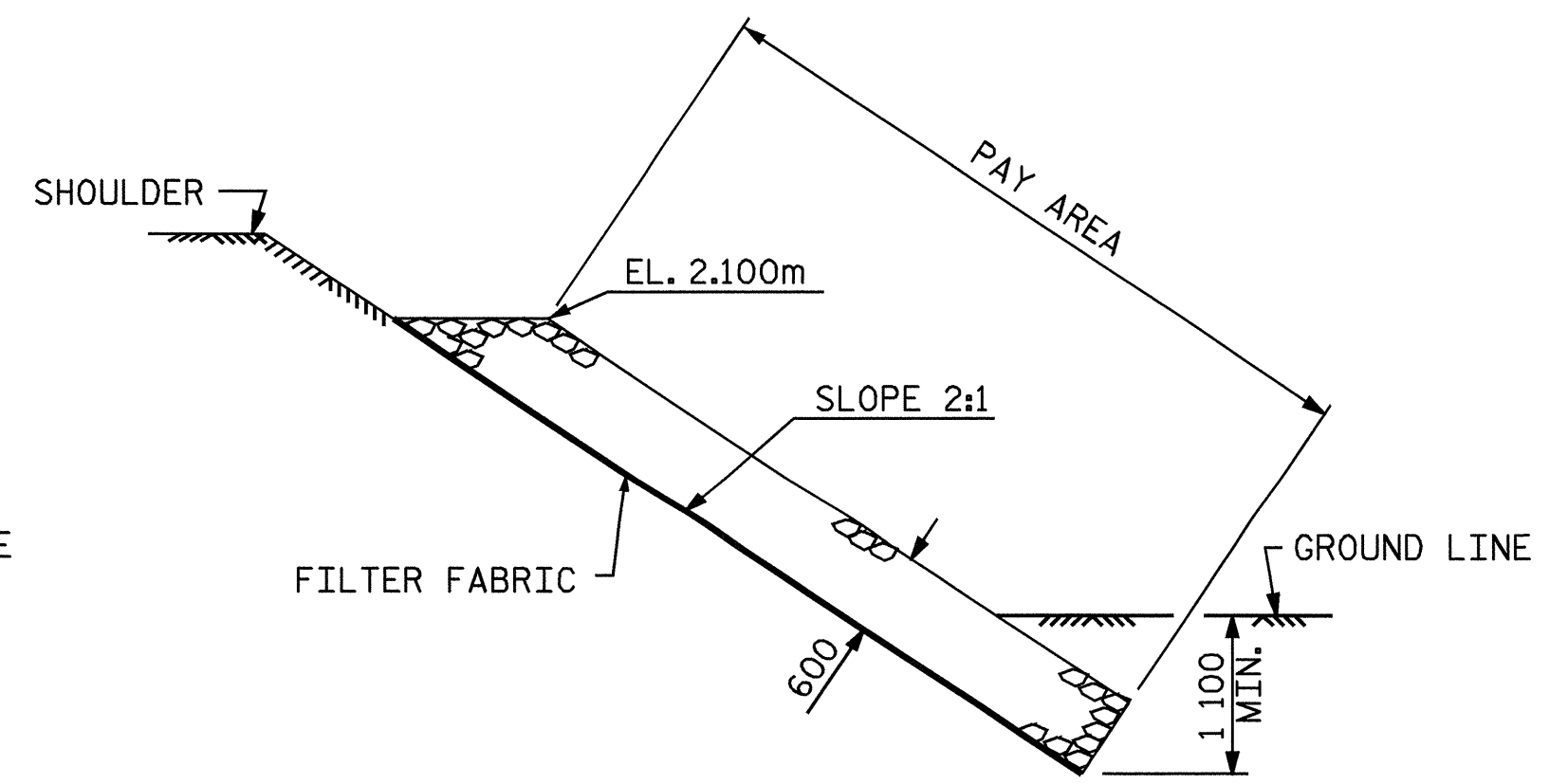
ASSEMBLED BY : J.MYA	DATE : 10-30-08
CHECKED BY : B.N. GRADY	DATE : 11-25-08
DRAWN BY : RH 9/98	ADDED: 12/2/98
CHECKED BY : LES 10/98	REV. 8/16/99RR
	REV. 5/1/06
	RAL/LES
	TLA/GM



ESTIMATED QUANTITIES		
BRIDGE @ STA. 43+13.000 -L-	RIP RAP CLASS II (600m THICK)	FILTER FABRIC FOR DRAINAGE
	METRIC TON	SQUARE METERS
END BENT 1	218	223
END BENT 2	228	232



SECTION BERM RIP RAPPED



SECTION C-C

PROJECT NO. R-2414A  
CAMDEN COUNTY  
 STATION: 43+13.000 -L-

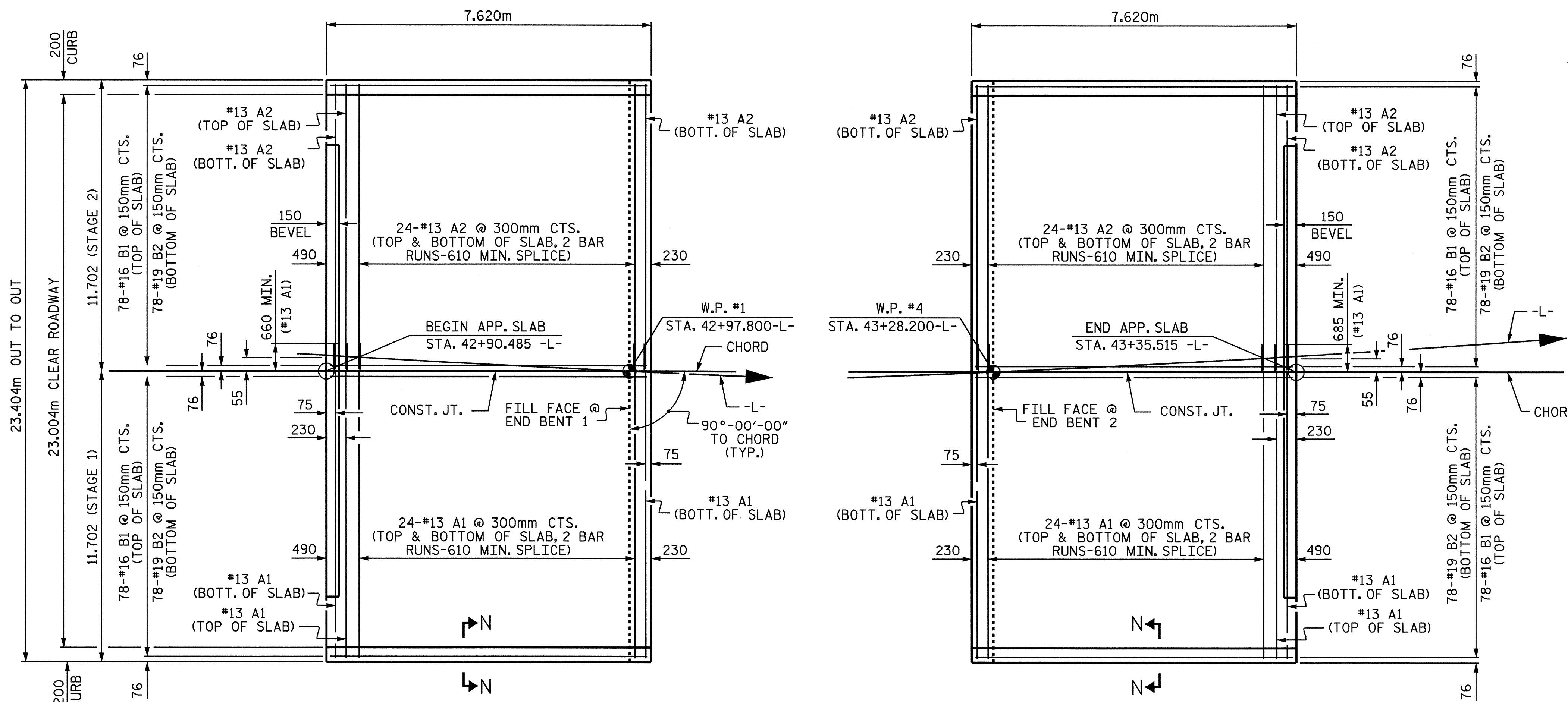


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD = RIP RAP DETAILS =					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY : J. MYA DATE : 12/01/05  
 CHECKED BY : D.R. CALHOUN DATE : 1/08/09

04-FEB-2009 11:21  
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 gallen

STD. NO. RR2



PLAN @ END BENT 1

PLAN @ END BENT 2

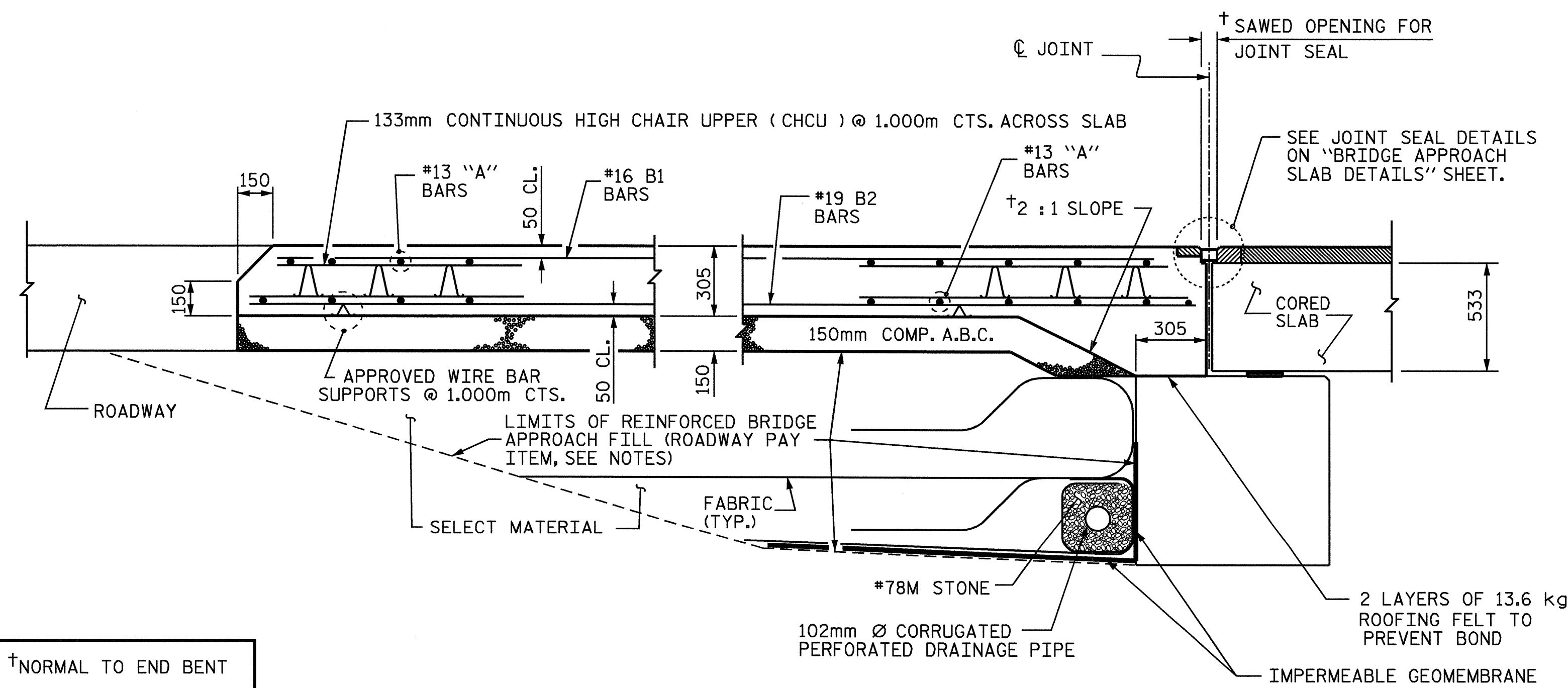
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

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

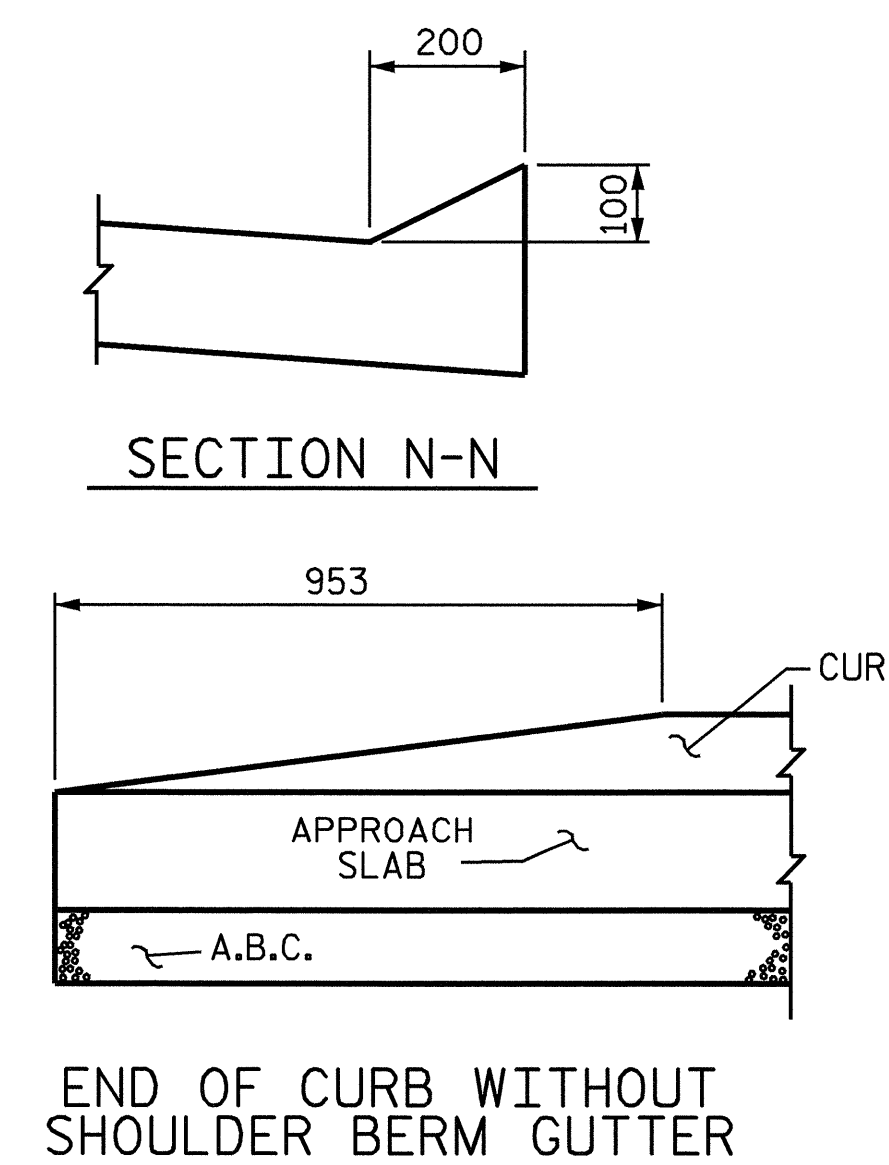
STAGE 1 (2 REQ'D)						STAGE 2 (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	102	#13	STR	6460	655	* A2	102	#13	STR	6100	618
* B1	78	#16	STR	7240	876	* B1	78	#16	STR	7240	876
* B2	78	#19	STR	7460	1301	* B2	78	#19	STR	7460	1301
* EPOXY COATED REINFORCING STEEL						* EPOXY COATED REINFORCING STEEL					
						kg. 2832					
CLASS AA CONCRETE						CLASS AA CONCRETE					
C.M. 30.0						C.M. 30.0					
TOTAL BILL OF MATERIAL											
* EPOXY COATED REINFORCING STEEL						5627 Kg					
CLASS AA CONCRETE						60.0 C.M.					

GROOVING BRIDGE FLOORS

	STAGE 1	STAGE 2	
APPROACH SLABS	80.2	80.2	SQ.M
BRIDGE DECK	324.0	324.0	SQ.M
TOTAL = 808.4 SQ.M.			



SECTION THRU SLAB



CURB DETAILS

(OMIT TAPER WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
BRIDGE APPROACH SLAB  
FOR PRESTRESSED CONCRETE  
CORED SLAB



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS 31
2			4			

ASSEMBLED BY : J. MYA	DATE : 12-4-08
CHECKED BY : D.R. CALHOUN	DATE : 1-14-09
DRAWN BY : FCJ 6/87	LES/RDR
CHECKED BY : EGA 6/87	REV. 5/7/03R RWW/JTE
	REV. 5/1/06R KMM/GM

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 102mm 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 150mm COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 300mm OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 100mm TYPE B-25.0B ASPHALT CONCRETE COURSE IN LIEU OF 150mm 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 125mm CLASS "A" CONCRETE BASE IN LIEU OF 150mm 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 13.6 kg 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.

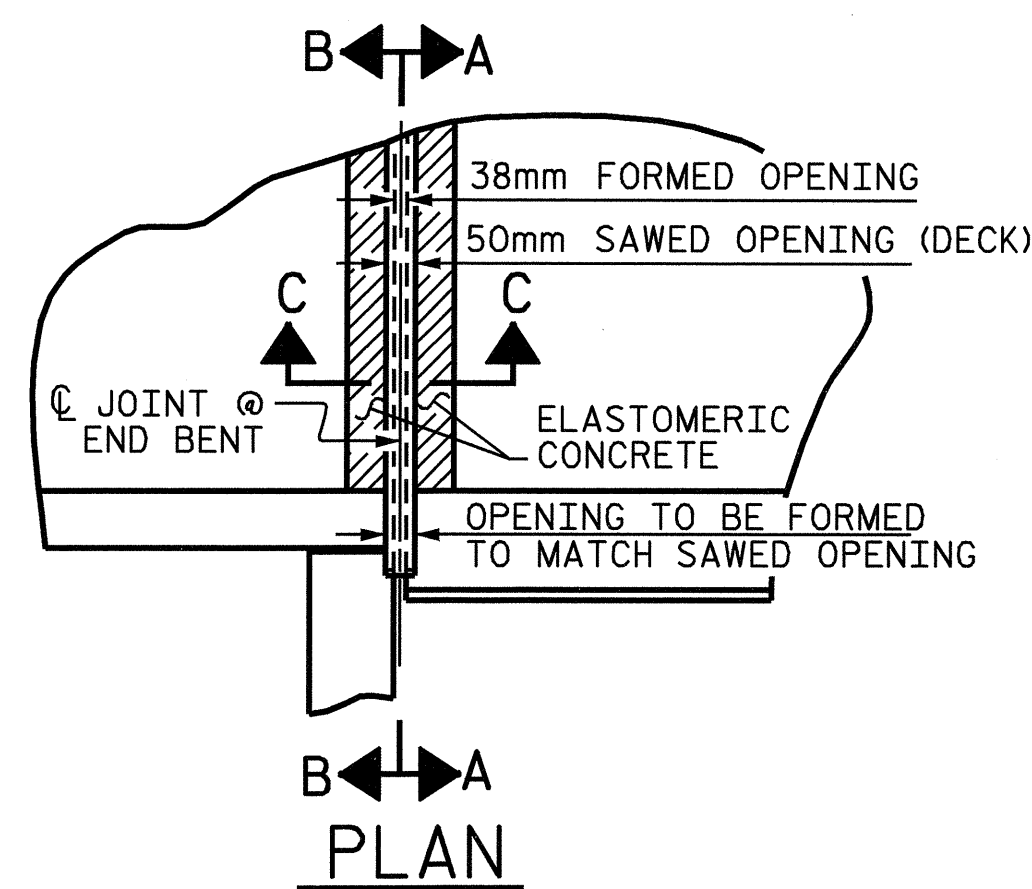
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 64mm.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

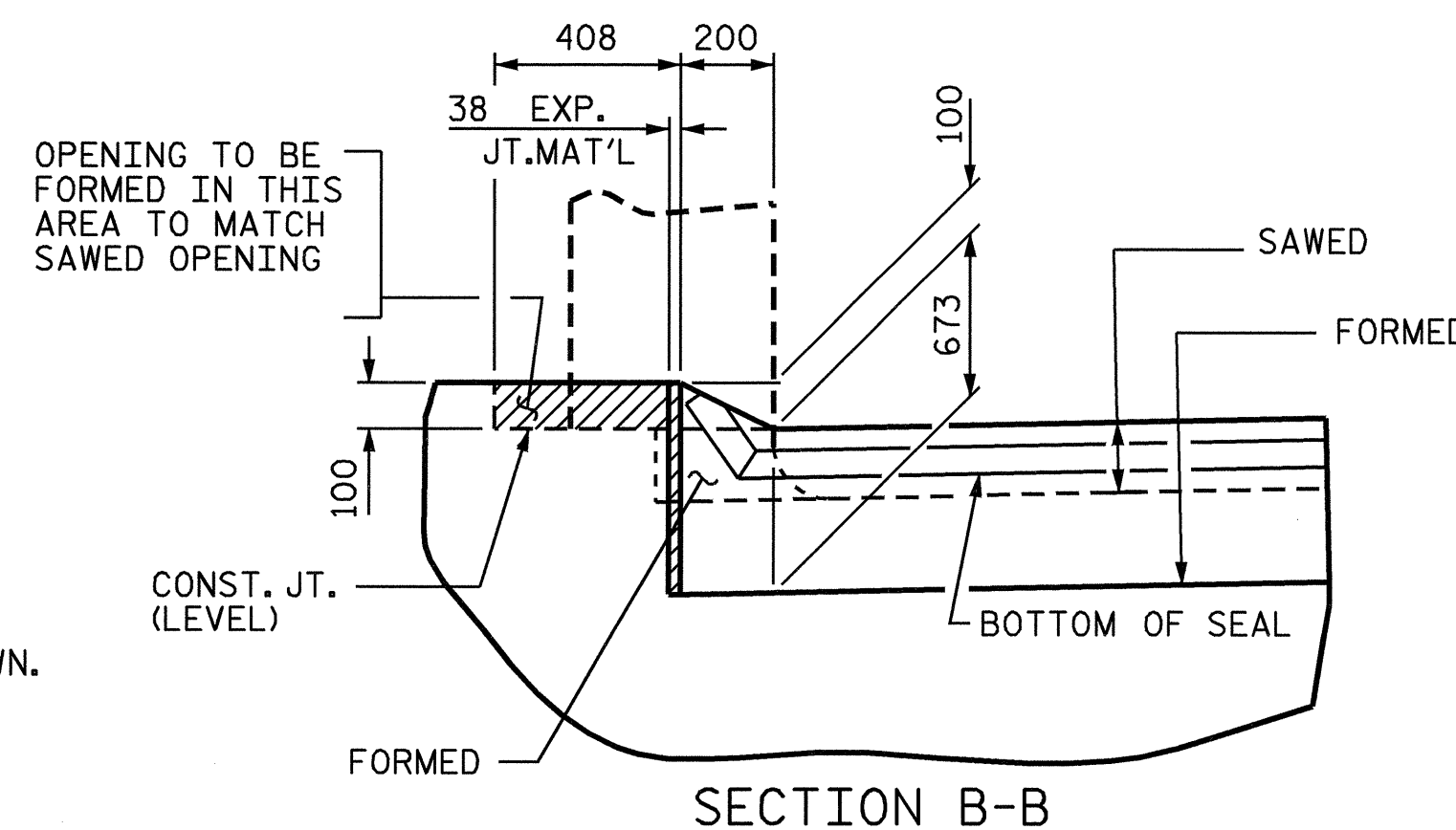
APPROACH SLABS SHALL BE POURED AFTER THE CONCRETE OVERLAY IS POURED.

THE JOINT SHALL BE SAWS AFTER CASTING OF THE PARAPET AND END POST.

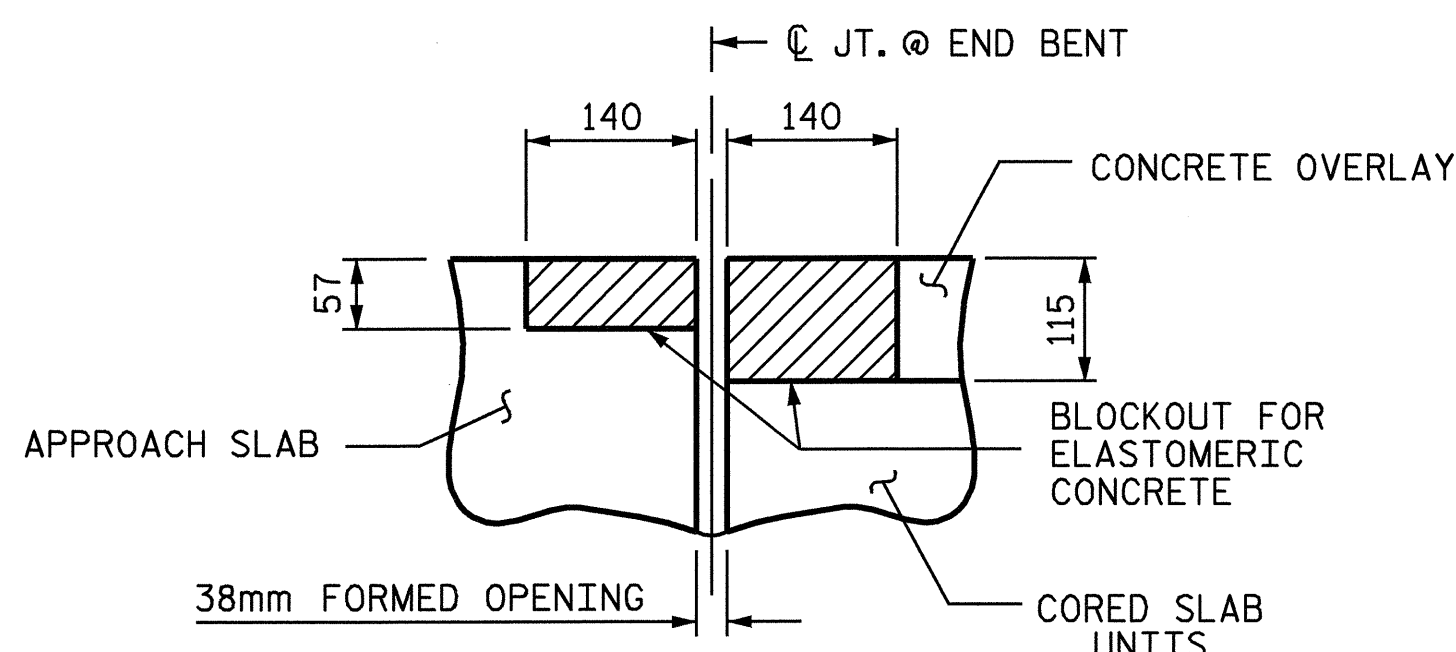


ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. m)
1	0.55
2	0.55
TOTAL	1.10

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

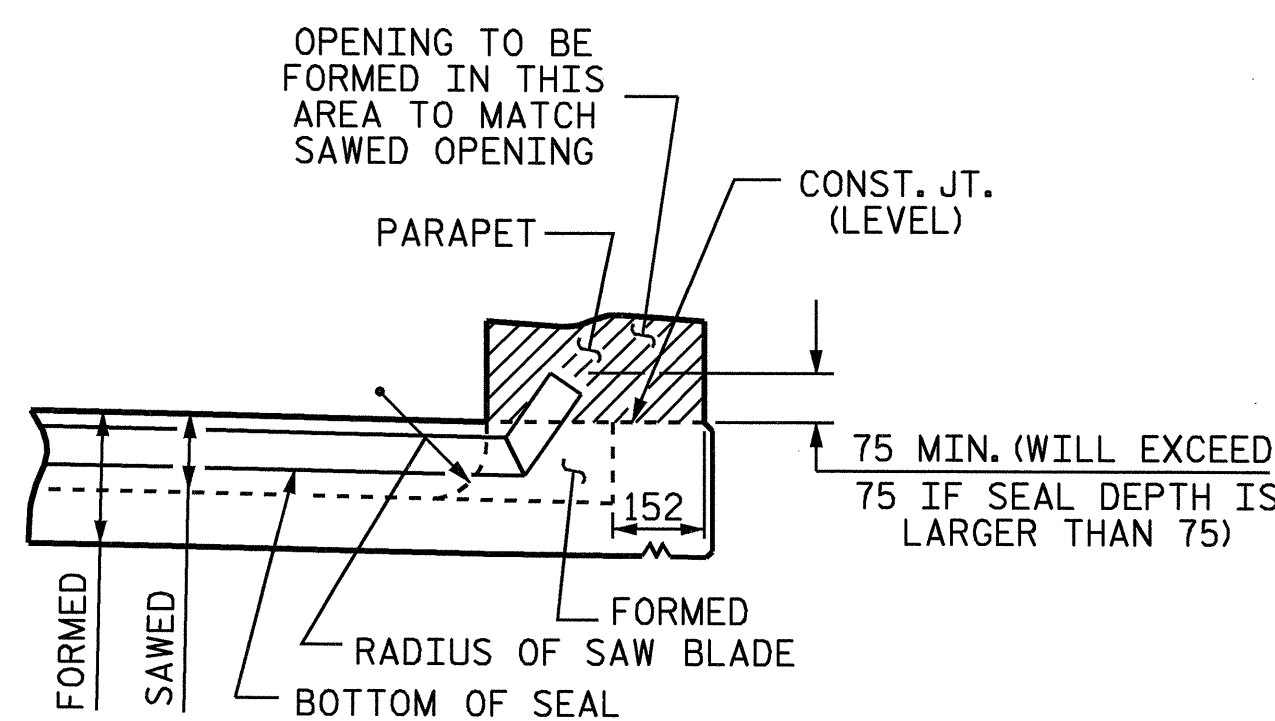


SECTION B-B

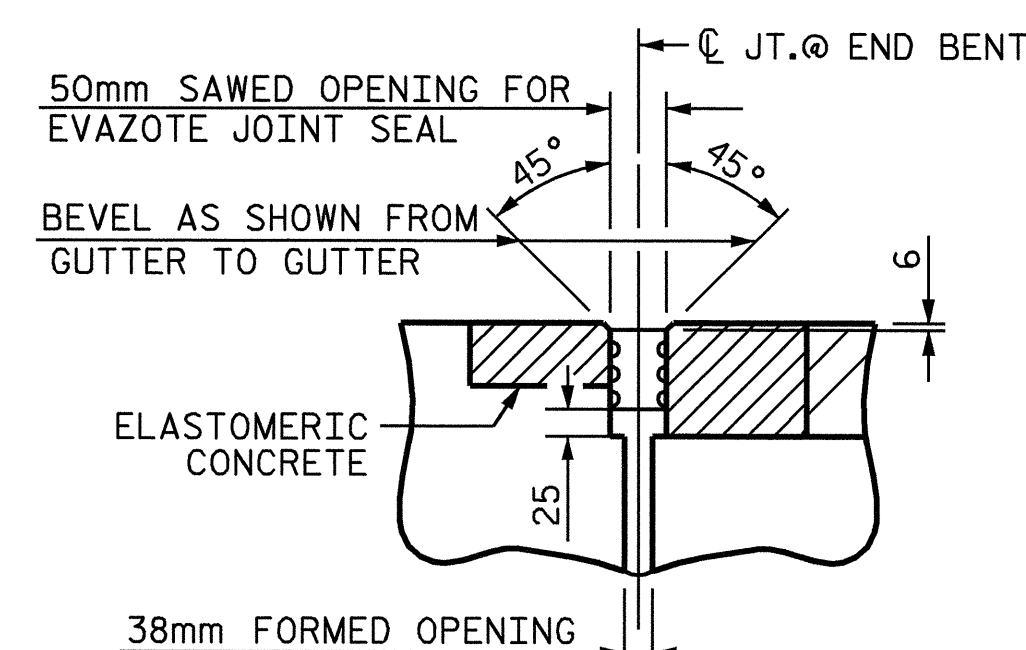


SECTION C-C

EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



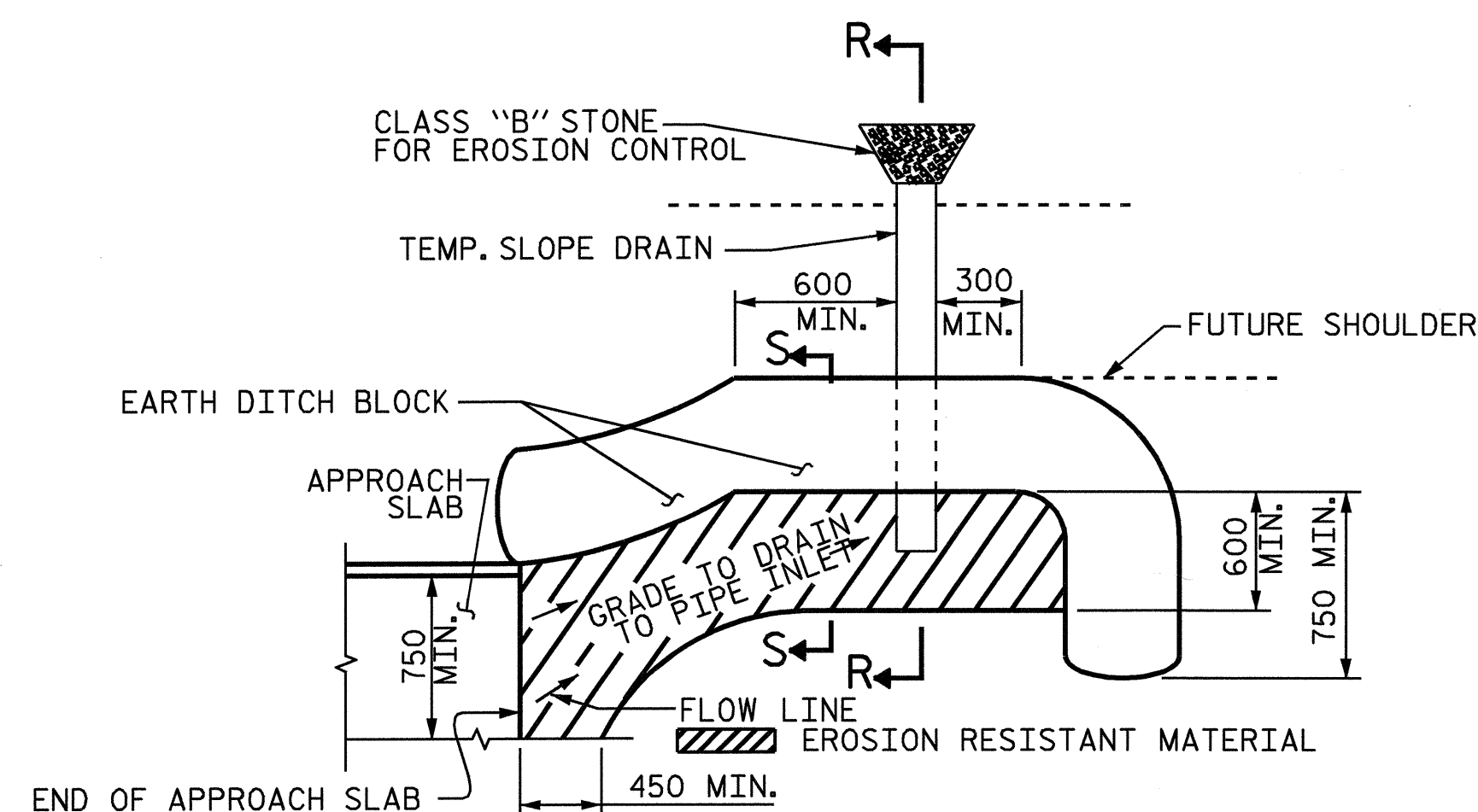
SECTION A-A



SECTION C-C

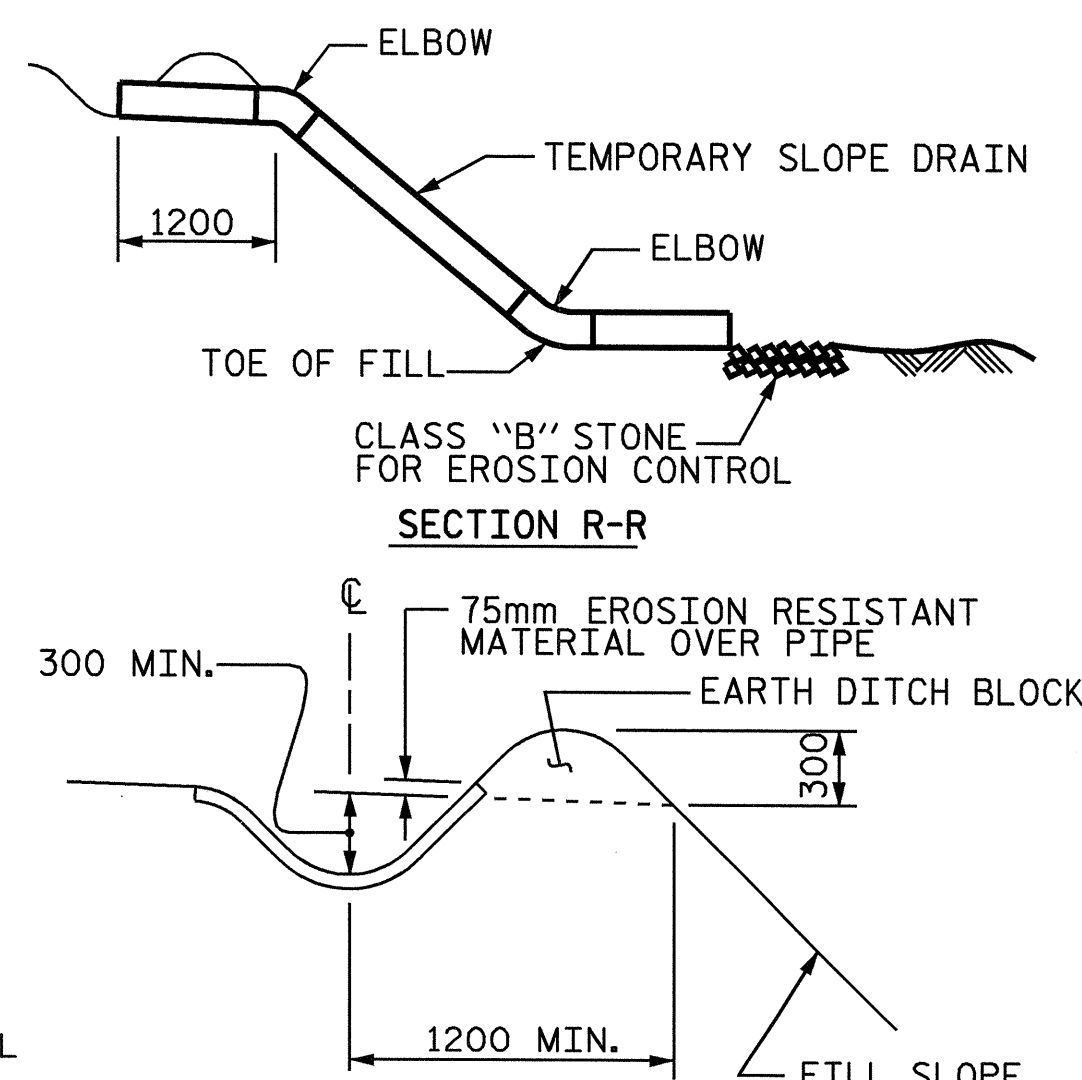
JOINT SEAL DETAILS @ END BENT

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP AS SHOWN IN DETAILS ABOVE.

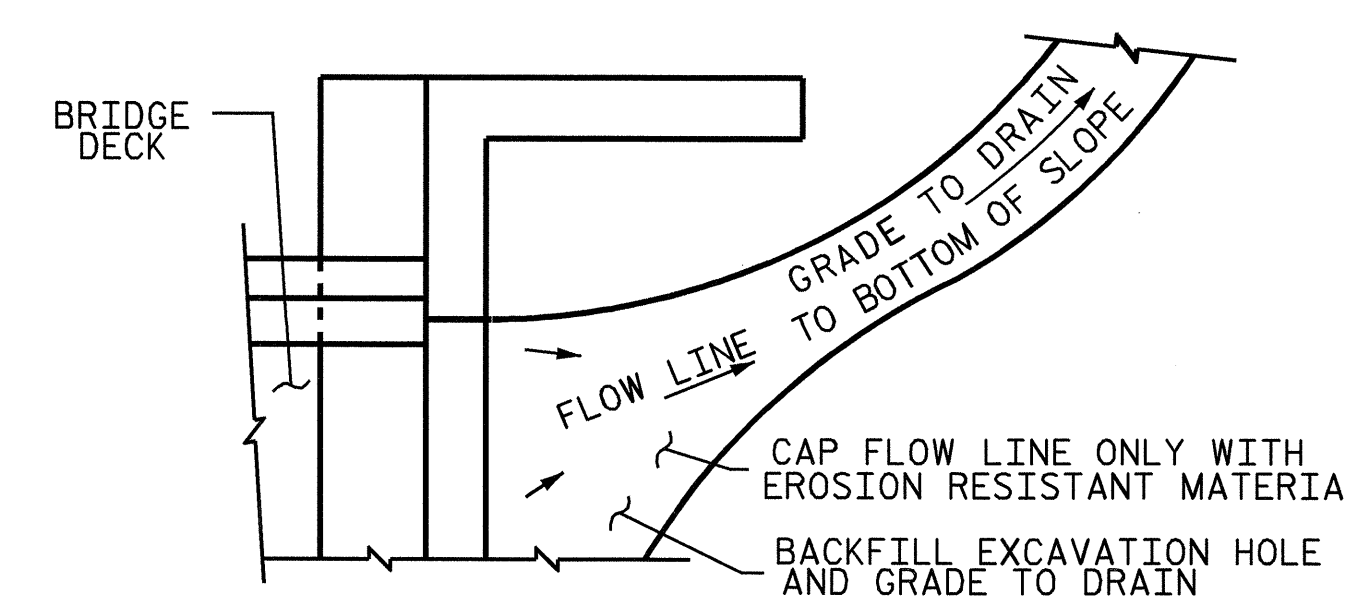


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 50mm DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 305mm IN DIAMETER.

PLAN VIEW



SECTION R-R



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

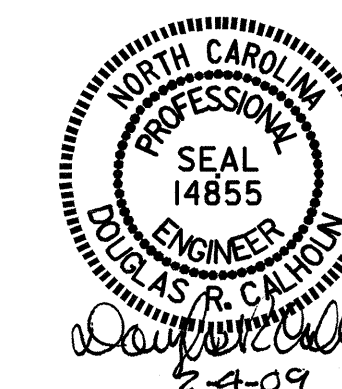
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-2414A  
CAMDEN COUNTY  
STATION: 43+13.000 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
BRIDGE APPROACH  
SLAB DETAILS



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

ASSEMBLED BY : J. MYA	DATE : 12-4-08
CHECKED BY : D.R. CALHOUN	DATE : 1-14-09
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R MAA/KMM



## 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 250	--	140 MPa
- AASHTO M270 GRADE 345W	--	190 MPa
- AASHTO M270 GRADE 345	--	190 MPa
REINFORCING STEEL IN TENSION		
GRADE 420	--	165 MPa
CONCRETE IN COMPRESSION	-----	8.3 MPa
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	12 MPa
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	2.6 MPa
EQUIVALENT FLUID PRESSURE OF EARTH	-----	480 kg/m <sup>3</sup>
		(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 2006 "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 19mm WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 38mm RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 6mm 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 6mm 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 300mm INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 22.23mm Ø SHEAR STUDS FOR THE 19.05mm Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 22.23mm Ø STUDS ALONG THE BEAM AS SHOWN FOR 19.05mm Ø STUDS BASED ON THE RATIO OF 3 - 22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 610mm.

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 8mm IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 50mm 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 2mm 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.

# METRIC

JANUARY, 1990