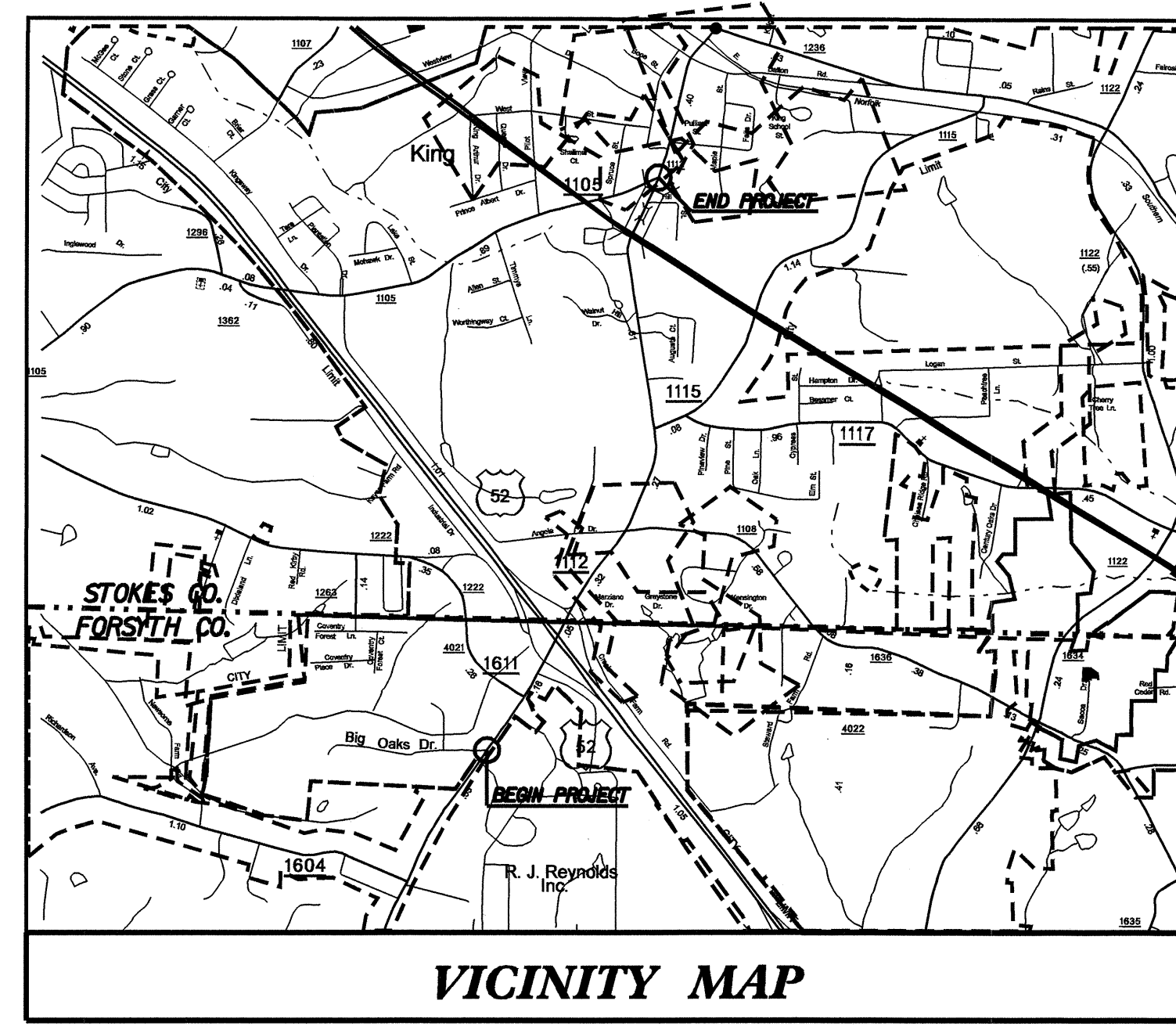


9/20/09/09

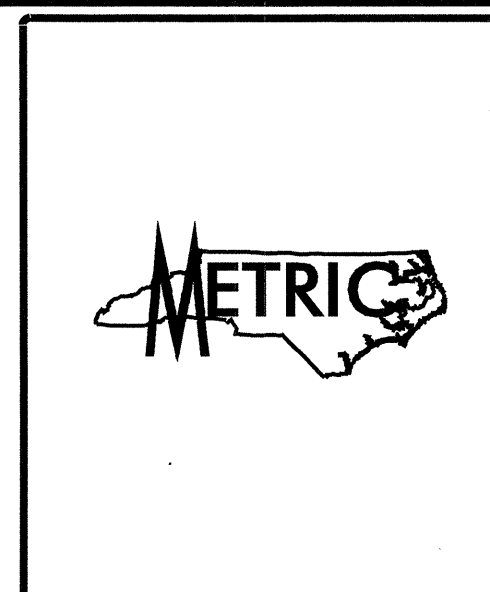
TIP PROJECT: R-2201

CONTRACT: C202042

STRUCTURES



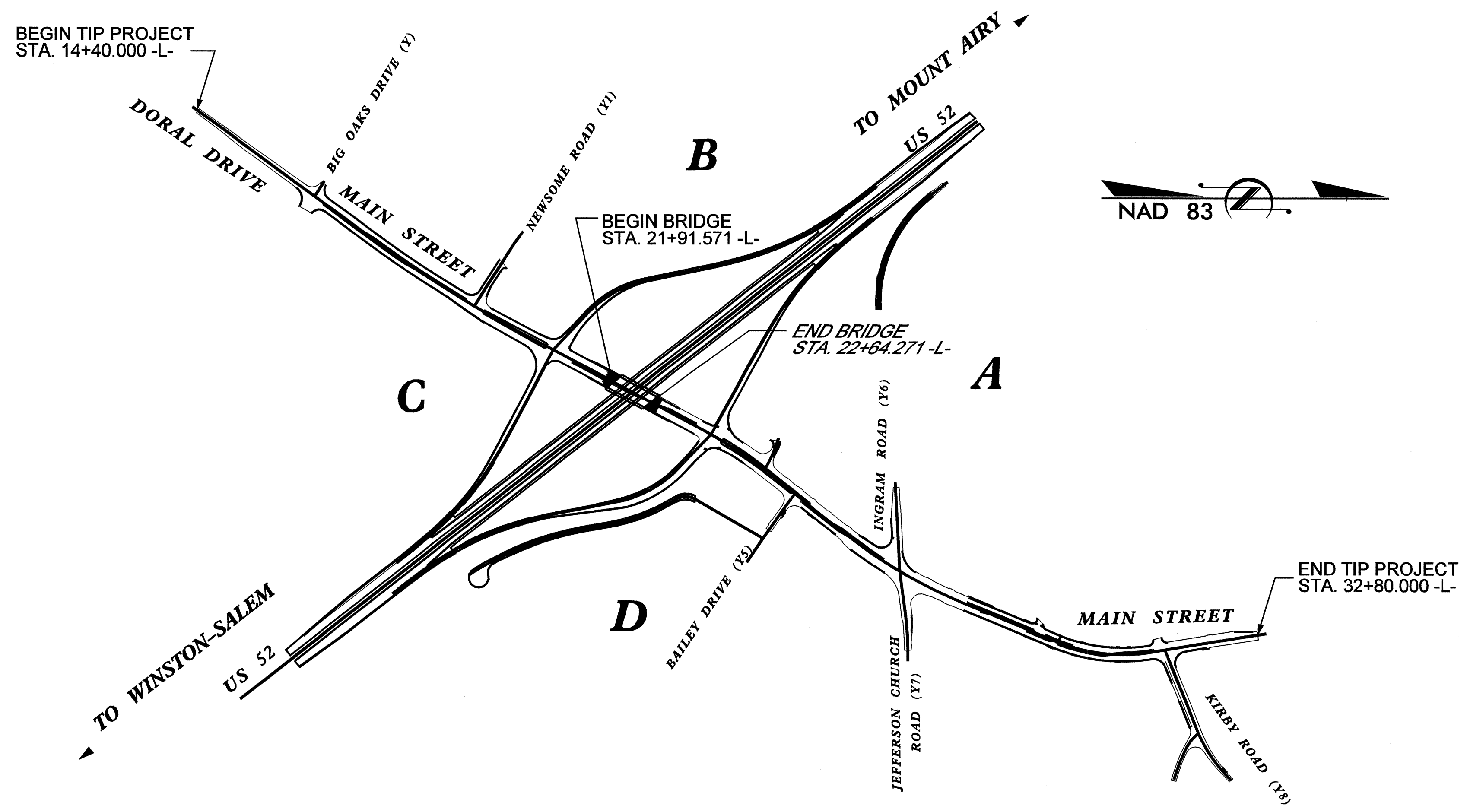
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
FORSYTH/STOKES COUNTY



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2201		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34380.1.1	STP-1611 (5)	PE	
34380.2.1	STP-1611 (5)	ROW & UTILITIES	
34380.3.2	STP-1611 (5)	CONST.	

LOCATION: SR 1611/SR 1112 TOBACCOVILLE ROAD FROM RJR ENTRANCE IN FORSYTH CO. TO SR 1115 (KIRBY ROAD) IN KING, STOKES CO.

TYPE OF WORK: GRADING, WIDENING, DRAINAGE, PAVING, SIGNALS, BRIDGE & RETAINING WALL



DESIGN DATA

ADT 1997 =	21,600 VPD
ADT 2025 =	34,800 VPD
DHV =	9 %
D =	62 %
T =	3 %
V =	60 km/h

(DUALS 2 %, TTST 1 %)

PROJECT LENGTH

TOTAL LENGTH ROADWAY TIP PROJECT R-2201 =	1.767 KM
TOTAL STRUCTURE LENGTH =	0.073 KM
TOTAL LENGTH TIP PROJECT R-2201 =	1.840 KM

PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE:
March 17, 2009

JOHN C. FRYE, P.E.
PROJECT ENGINEERS

TING H. FANG, P.E.
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DR.
RALEIGH, NC 27610

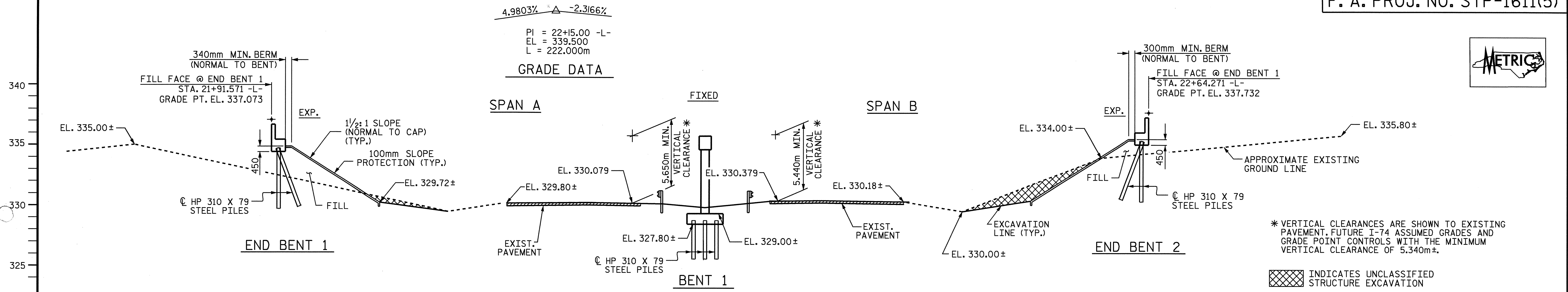
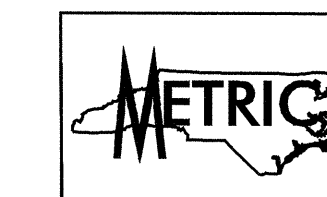
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR

DATE

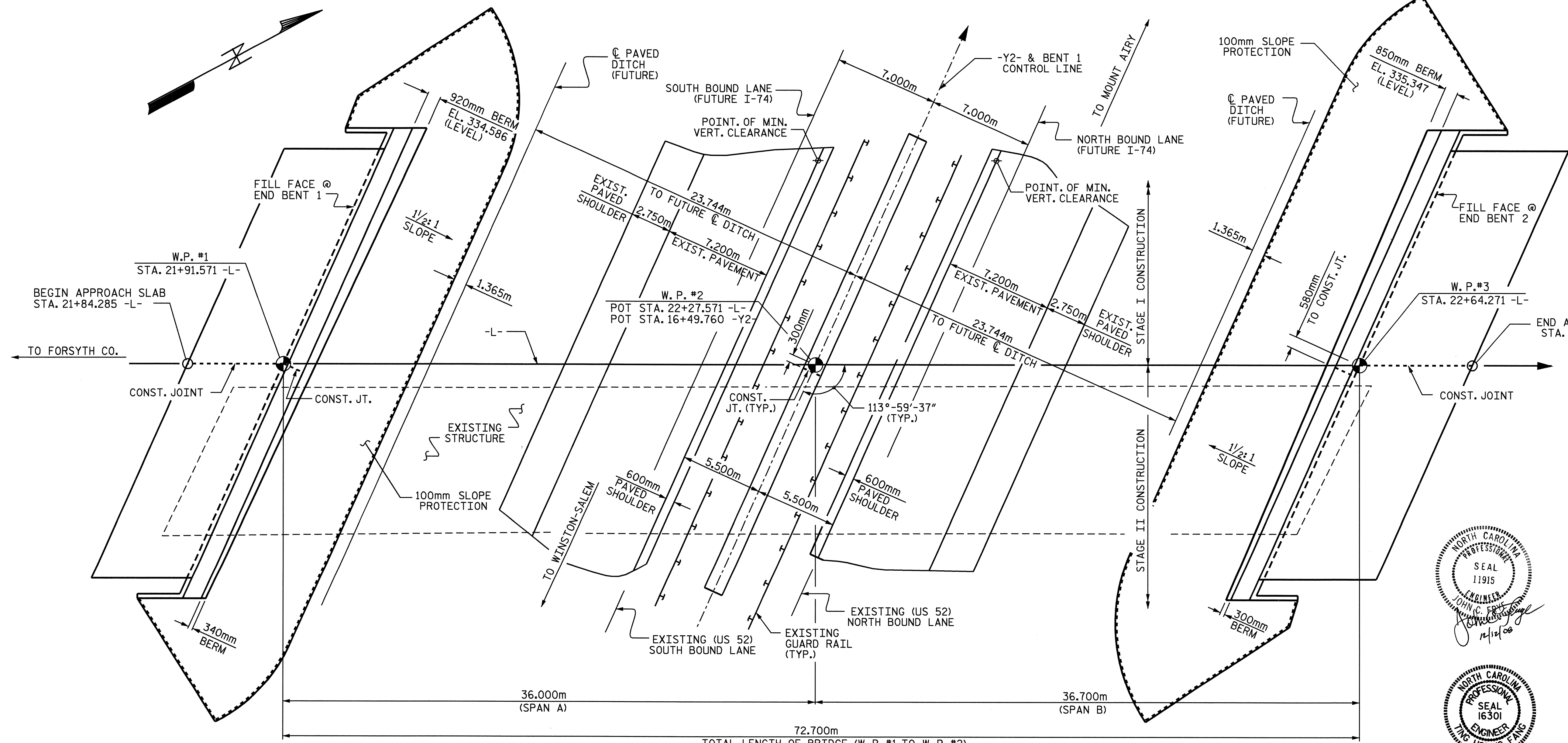


* VERTICAL CLEARANCES ARE SHOWN TO EXISTING PAVEMENT, FUTURE I-74 ASSUMED GRADES AND GRADE POINT CONTROLS WITH THE MINIMUM VERTICAL CLEARANCE OF 5.340m±.

INDICATES UNCLASSIFIED STRUCTURE EXCAVATION

SECTION ALONG -L-

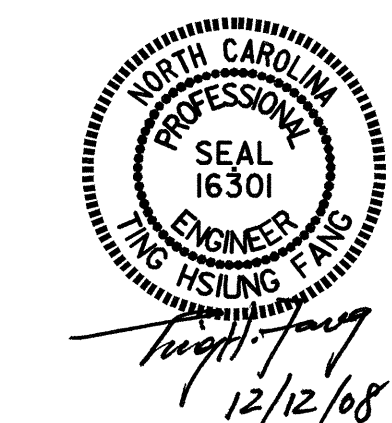
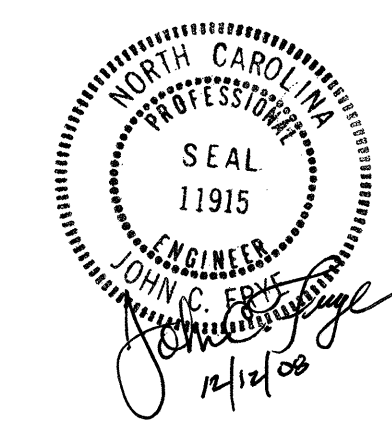
END BENTS & BENT ON SECTION ARE AT RIGHT ANGLES



PLAN

PILES, COLUMNS & FOOTINGS NOT SHOWN FOR CLARITY.

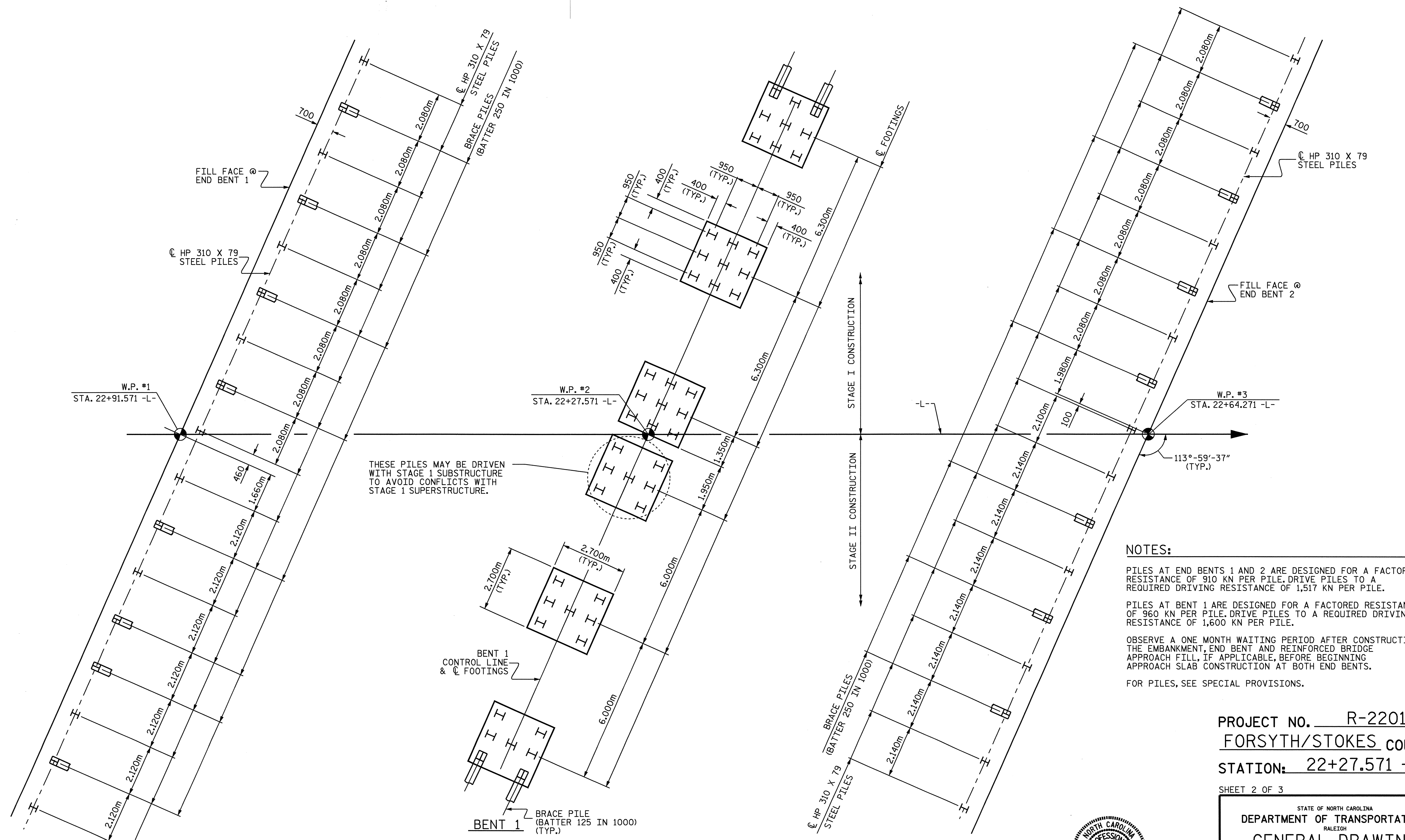
PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-
 16+49.760 -Y2-
 SHEET 1 OF 3 REPLACES BRIDGE # 347



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 BRIDGE ON SR 1611/SR 1112
 OVER US-52 BETWEEN RJR
 ENTRANCE & SR 1105

REVISIONS						SHEET NO. S-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY : HARISH SHAH DATE 01/02/08
 CHECKED BY : TING FANG DATE 10/20/08



THESE PILES MAY BE DRIVEN WITH STAGE 1 SUBSTRUCTURE TO AVOID CONFLICTS WITH STAGE 1 SUPERSTRUCTURE.

NOTES:

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 910 KN PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 1,517 KN PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 960 KN PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 1,600 KN PER PILE.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT BOTH END BENTS.

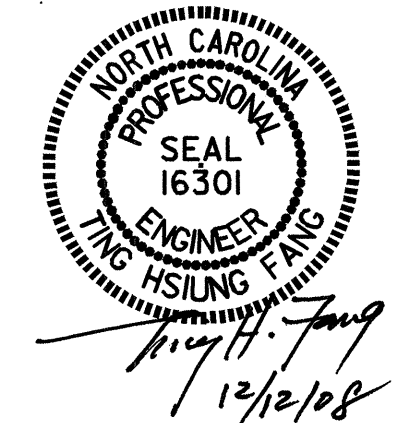
FOR PILES, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING

BRIDGE ON SR 1611/SR 1112
 OVER US-52 BETWEEN RJR
 ENTRANCE & SR 1105



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE AT THE BOTTOM OF CAP OR FOOTING.

ALL PILES AT BENT 1 ARE HP 310 X 79 STEEL PILES

DRAWN BY: H. B. SHAH DATE: 9-4-08
 CHECKED BY: TING FANG DATE: 9-25-08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			42

TOTAL BILL OF MATERIAL																			
	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION	PDA TESTING	PDA ASSISTANCE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 310 X 79 STEEL PILES	THREE BAR METAL RAIL	100mm SLOPE PROTECTION	POT BEARINGS	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	
	LUMP SUM	LUMP SUM	EACH	EACH	LUMP SUM	SQ. METERS	SQ. METERS	CU. METERS	LUMP SUM	kg	kg	APPROX. kg	NO.	METERS	METERS	SQ. METERS	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						2,138.5	2,123.8					398,500			139.124		LUMP SUM	LUMP SUM	LUMP SUM
END BENT 1								56.7		5,026			17	510		520			
BENT 1		LUMP SUM						134.6		11,230	990		48	1,440					
END BENT 2								51.7		4,891			17	595		530			
TOTAL	LUMP SUM	LUMP SUM	1	1	LUMP SUM	2,138.5	2,123.8	243.0	LUMP SUM	21,147	990	398,500	77	2,545	139.124	1,050	LUMP SUM	LUMP SUM	LUMP SUM

NOTES

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = HL- 93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 345W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR SEISMIC PERFORMANCE ZONE 1.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000 kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000 kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS: 1 @ 17.526m, 2 @ 17.983m, 1 @ 17.526m; 8.534m CLEAR ROADWAY WIDTH AND A RC DECK ON PRESTRESSED CONCRETE GIRDERS; END BENTS CONSISTING OF RC CAPS ON PPC PILES, INTERIOR BENTS CONSISTING OF 2 COLUMNS RCP&B ON PILE FOOTINGS AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 12 METERS. RIGHT SIDE AT END BENTS 1 AND 2 OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

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

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

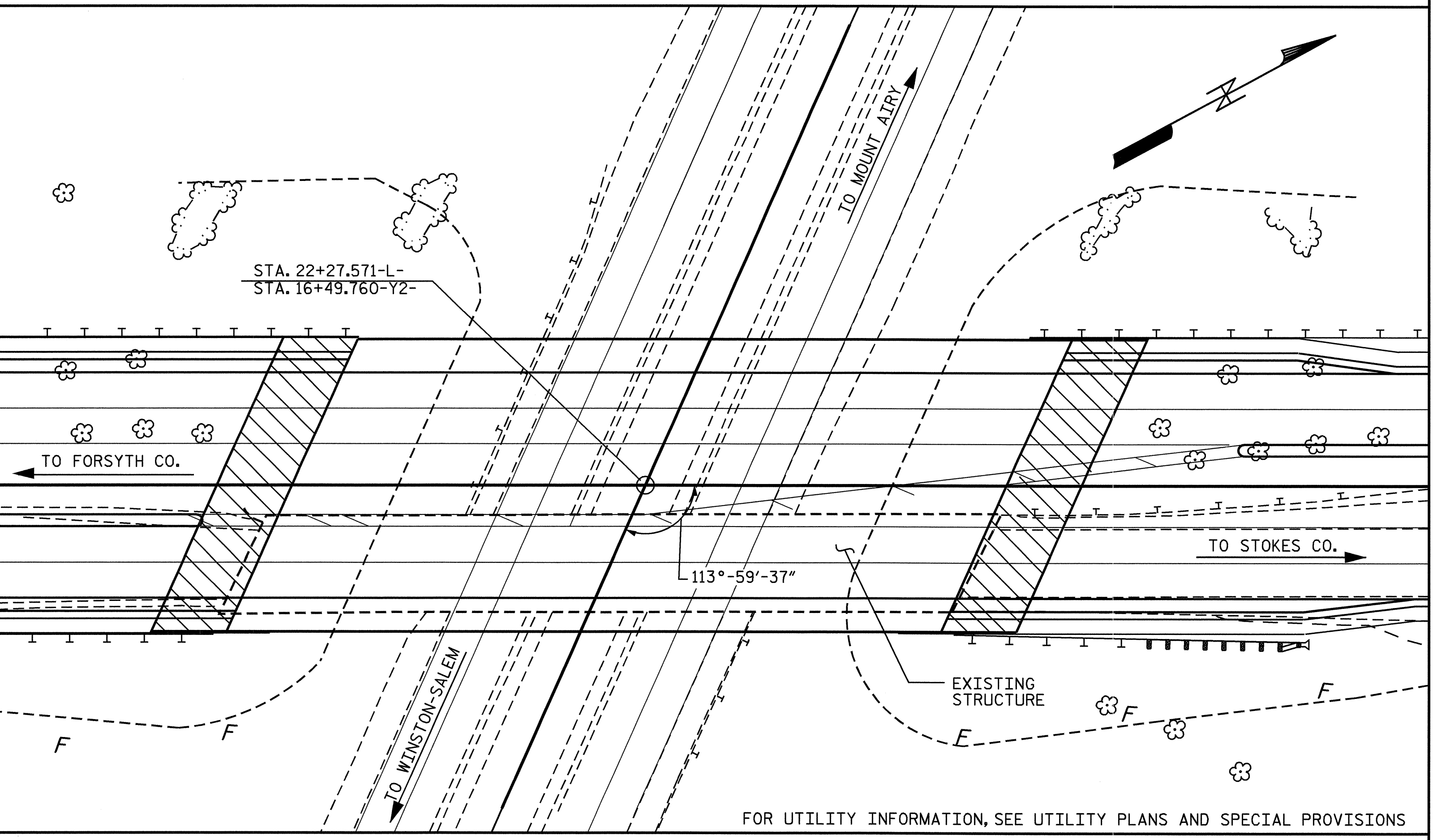
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

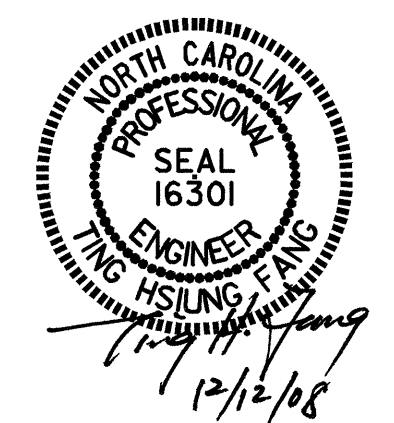
BM: NCGS "KING", -L- STA. 21+84.220, 0.733 RT., EL. 335.400



LOCATION SKETCH

PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 BRIDGE ON SR 1611/SR 1112
 OVER US-52 BETWEEN RJR
 ENTRANCE & SR 1105



DRAWN BY : H. B. SHAH DATE : 5/10/08
 CHECKED BY : TING FANG DATE : 10/21/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			42

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT							
						LIVE-LOAD FACTORS (%L)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (%L)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.00	--	1.75	0.797	1.03	B	EL	0	1.035	1.00	B	EL	1.80	1.30	0.797	1.16	B	EL	0	
	HL-93 (OPERATING)	N/A		1.29	--	1.35	0.797	1.34	B	EL	0	1.035	1.29	B	EL	1.80	1.00	0.797	1.50	B	EL	0	
	HS-20 (INVENTORY)	36.00	②	1.35	48.60	1.80	0.918	1.93	B	EL	0	0.918	1.35	B	EL	0	1.30	0.918	2.27	B	EL	21.56	
	HS-20 (OPERATING)	36.00		1.80	64.80	1.35	0.918	2.57	B	EL	0	0.918	1.80	B	EL	0	1.00	0.918	3.02	B	EL	21.56	
LEGAL LOAD RATING	SN5H	13.50		4.63	62.51	1.80	0.918	6.16	B	EL	21.56	0.918	4.63	B	EL	0	1.30	0.918	7.19	B	EL	21.56	
	NGARBS2	20.00		3.21	64.20	1.80	0.918	4.67	B	EL	21.56	0.918	3.21	B	EL	0	1.30	0.918	5.45	B	EL	21.56	
	NAGRIS2	22.00		1.83	40.26	1.80	0.918	1.83	B	EL	0	0.918	2.90	B	EL	0	1.30	0.918	2.66	B	EL	0	
	NCOTTS3	27.25		2.32	63.22	1.80	0.918	3.08	B	EL	21.56	0.918	2.32	B	EL	35.23	1.30	0.918	3.59	B	EL	21.56	
	NAGGRS4	34.93		1.83	63.92	1.80	0.918	2.51	B	EL	21.56	0.918	1.83	B	EL	0	1.30	0.918	2.93	B	EL	21.56	
	NS5A	35.55		1.81	64.35	1.80	0.918	2.47	B	EL	21.56	0.918	1.81	B	EL	0	1.30	0.918	2.88	B	EL	21.56	
	NS6A	39.95		1.62	64.72	1.80	0.918	2.24	B	EL	21.56	0.918	1.62	B	EL	0	1.30	0.918	2.61	B	EL	21.56	
	NS7B	42.00		1.56	65.52	1.80	0.918	2.14	B	EL	21.56	0.918	1.56	B	EL	0	1.30	0.918	2.50	B	EL	21.56	
	NAGRIT3	33.00		1.96	64.68	1.80	0.918	2.74	B	EL	21.56	0.918	1.96	B	EL	0	1.30	0.918	3.20	B	EL	21.56	
	NT4A	33.08		1.94	64.18	1.80	0.918	2.72	B	EL	21.56	0.918	1.94	B	EL	0	1.30	0.918	3.17	B	EL	21.56	
	NT6A	41.60		1.60	66.56	1.80	0.918	2.21	B	EL	21.56	0.918	1.60	B	EL	0	1.30	0.918	2.58	B	EL	21.56	
	NT7A	42.00		1.58	66.36	1.80	0.918	1.83	B	EL	0	0.918	1.58	B	EL	0	1.30	0.918	2.53	B	EL	21.56	
	NT7B	42.00		1.55	65.10	1.80	0.918	2.05	B	EL	0	0.918	1.55	B	EL	0	1.30	0.918	2.41	B	EL	21.56	
	NAGRIT4	43.00		1.51	64.93	1.80	0.918	1.83	B	EL	0	0.918	1.51	B	EL	0	1.30	0.918	2.53	B	EL	21.56	
NAGT5A	45.00		1.46	65.70	1.80	0.918	2.05	B	EL	0	0.918	1.46	B	EL	0	1.30	0.918	2.41	B	EL	21.56		
NAGRIT5B	45.00		③	1.44	64.80	1.80	0.918	2.03	B	EL	0	0.918	1.44	B	EL	0	1.30	0.918	2.38	B	EL	21.56	

LOAD FACTORS:

LIMIT STATE	γ_{DC}	γ_{DW}
STRENGTH I	1.25	1.50
SERVICE II	1.00	1.00
FATIGUE	0.00	0.00

NOTES:

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

COMMENTS:

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) **

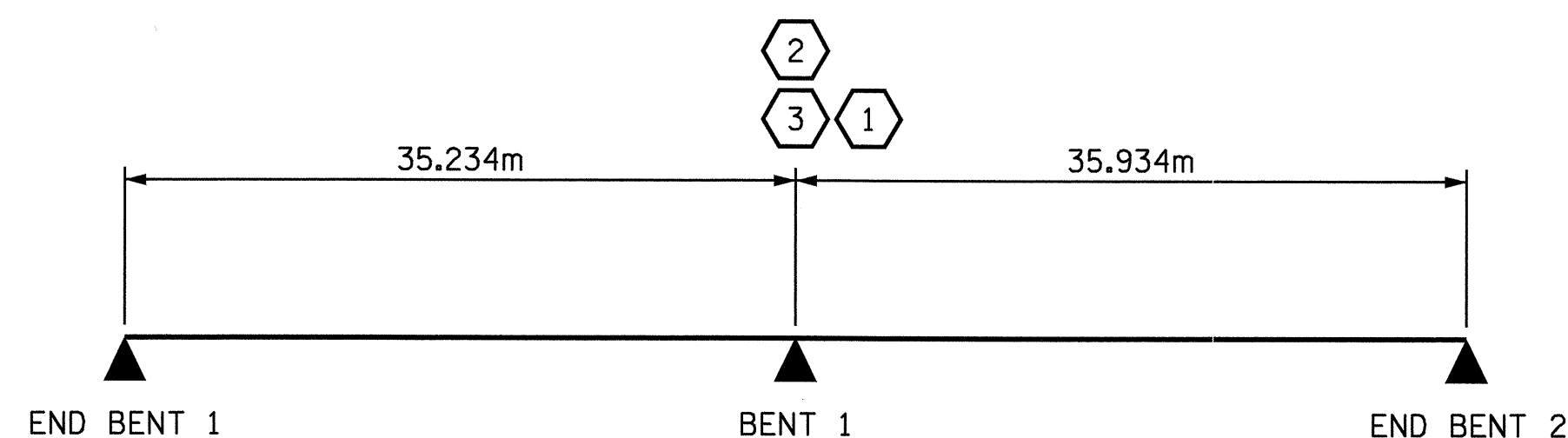
② DESIGN LOAD RATING (HS-20) **

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

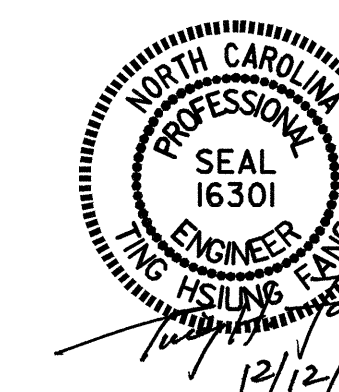
GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



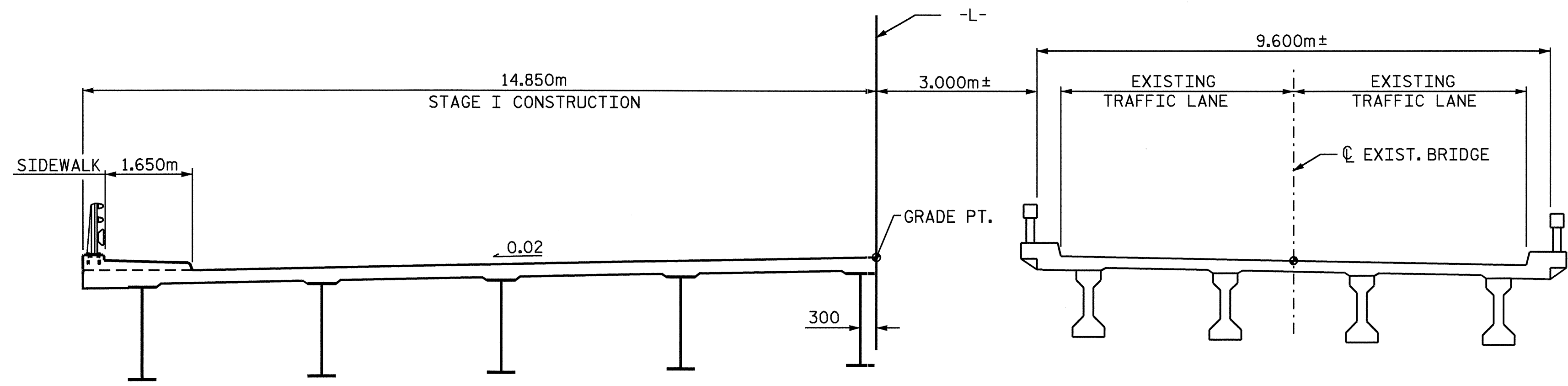
LRFR SUMMARY

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-



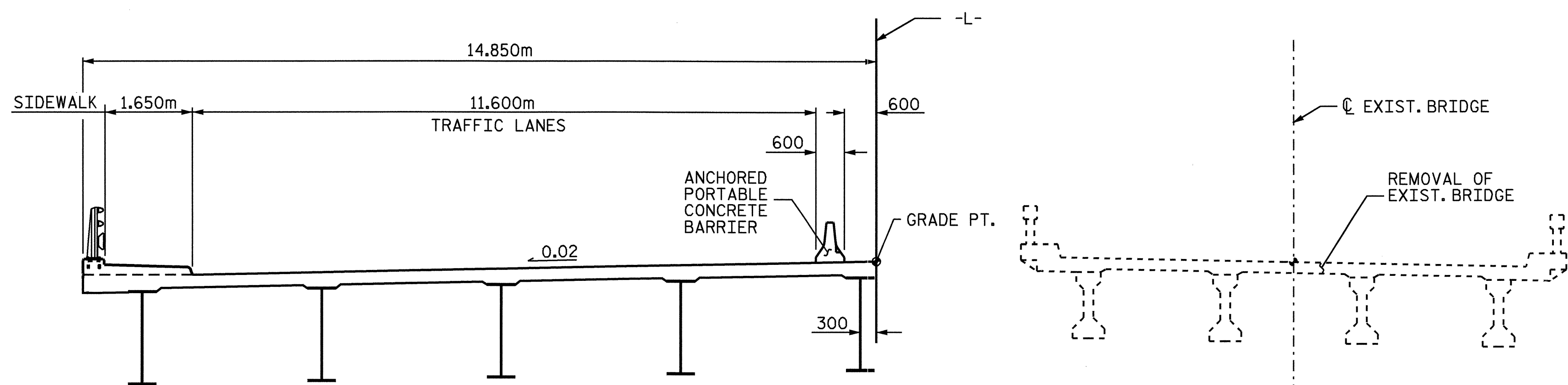
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
LRFR SUMMARY FOR STEEL GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY : S. DOMBROWSKI	DATE : 12/10/08
CHECKED BY : D. N. SNOKE	DATE : 12/11/08
DRAWN BY : MAA 1/08	REV. 11/12/08 MAA/GM
CHECKED BY : GM/DI 2/08	

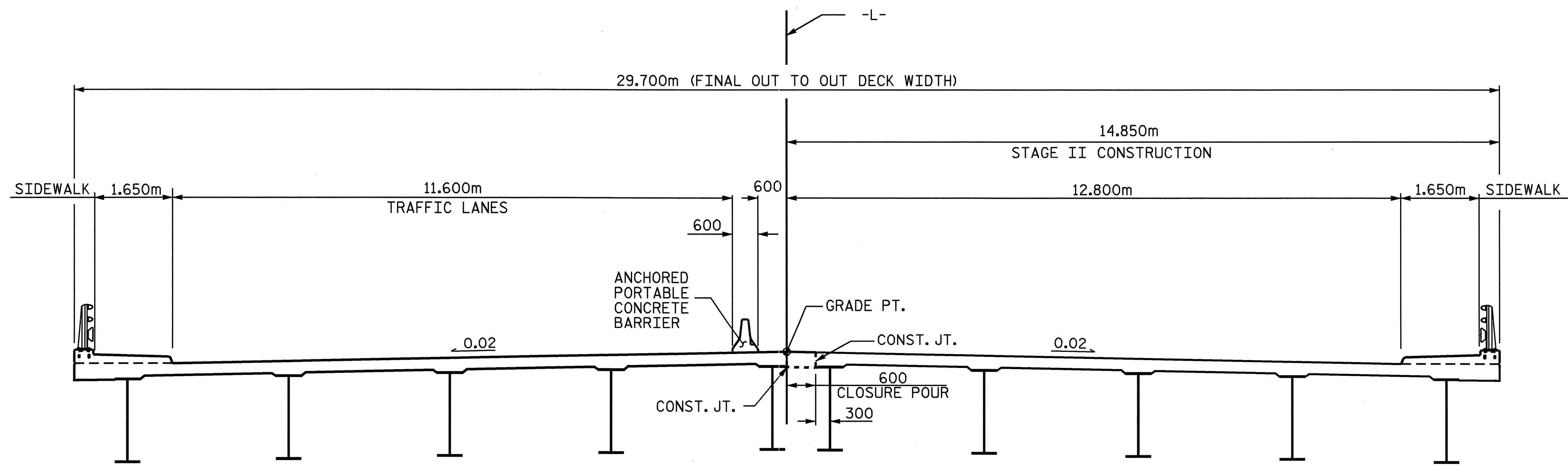


NOTE:
SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

STAGE I CONSTRUCTION
CONSTRUCT LEFT SIDE OF PROPOSED BRIDGE
MAINTAIN TRAFFIC ON EXISTING STRUCTURE



STAGE I EXISTING BRIDGE REMOVAL
MOVE TRAFFIC ONTO NEW BRIDGE
REMOVE EXISTING BRIDGE



STAGE II CONSTRUCTION
CONSTRUCT REMAINING PORTION OF PROPOSED BRIDGE

PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
STATION: 22+27.571 -L-

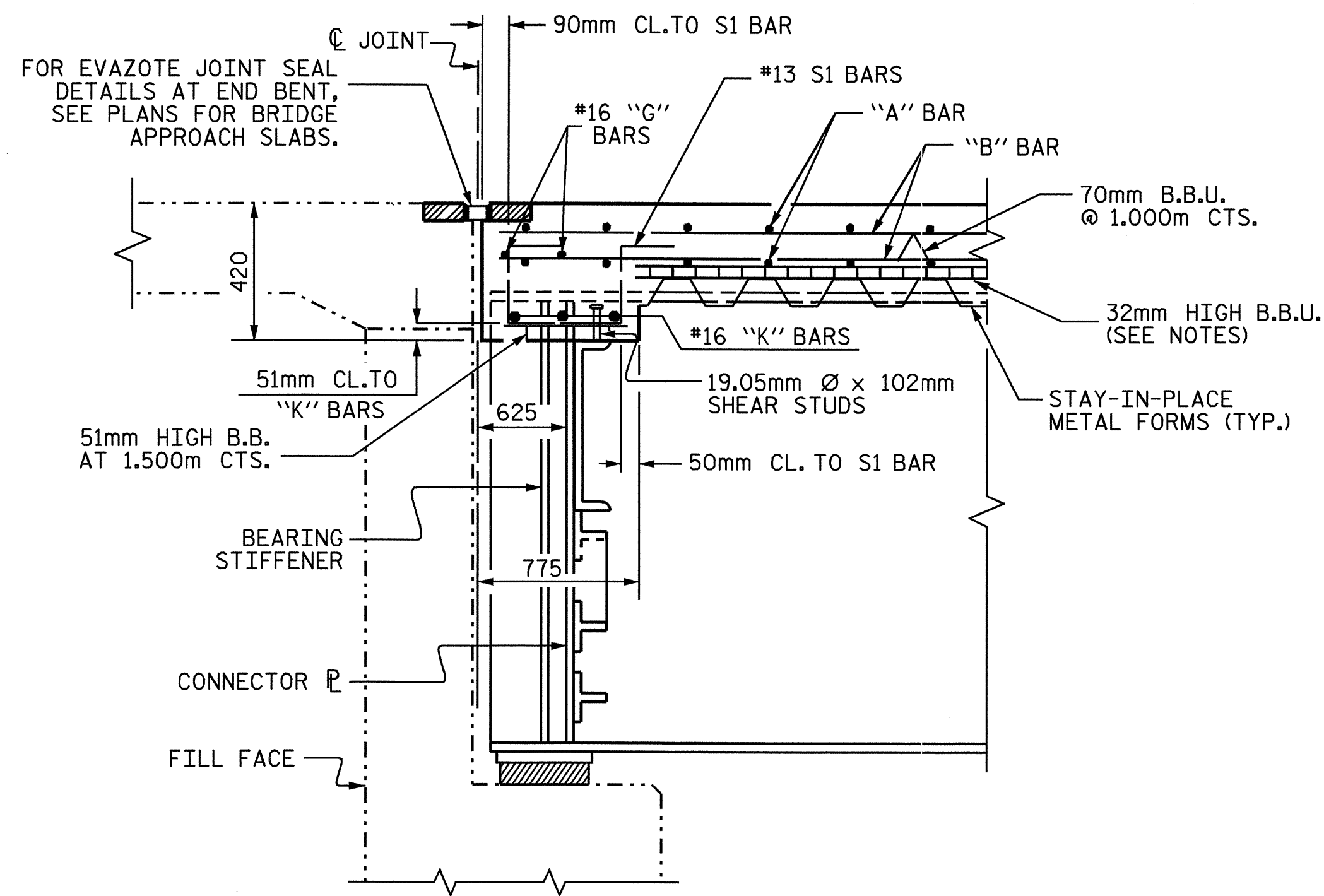
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

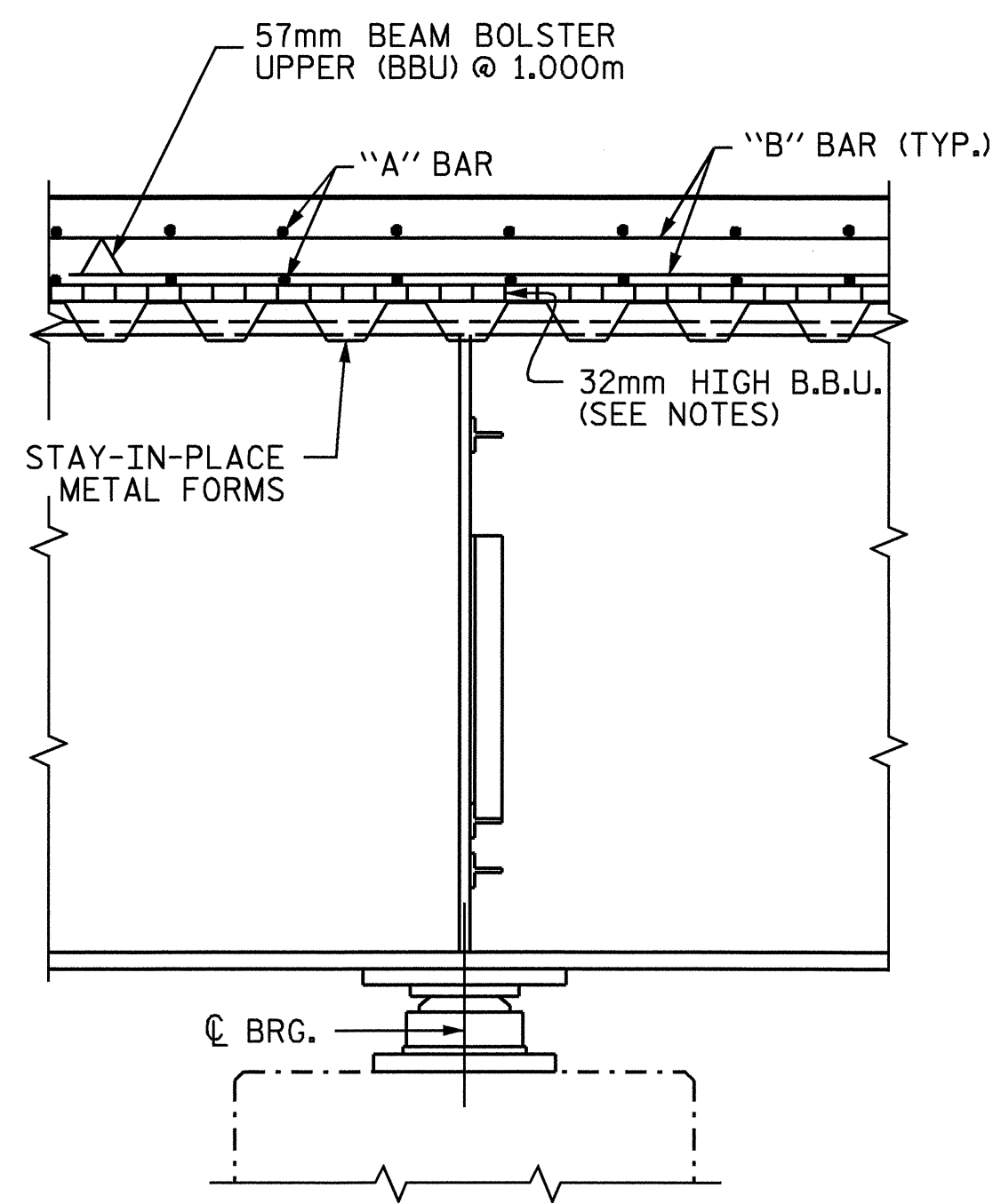


DRAWN BY: HARTSH SHAH DATE: 01/2008
CHECKED BY: TING FANG DATE: 01/2008

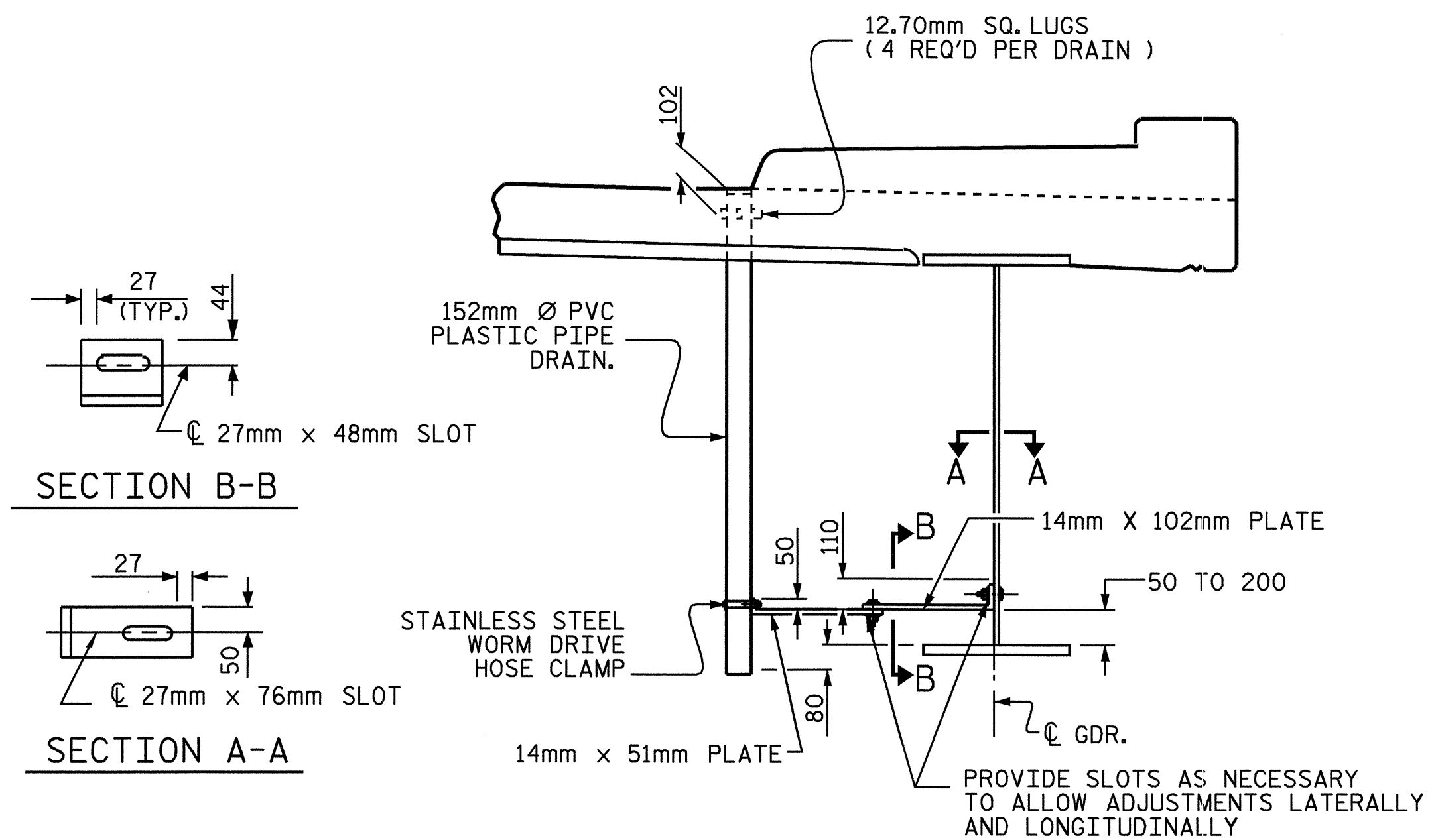
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			42



SECTION THRU END BENT

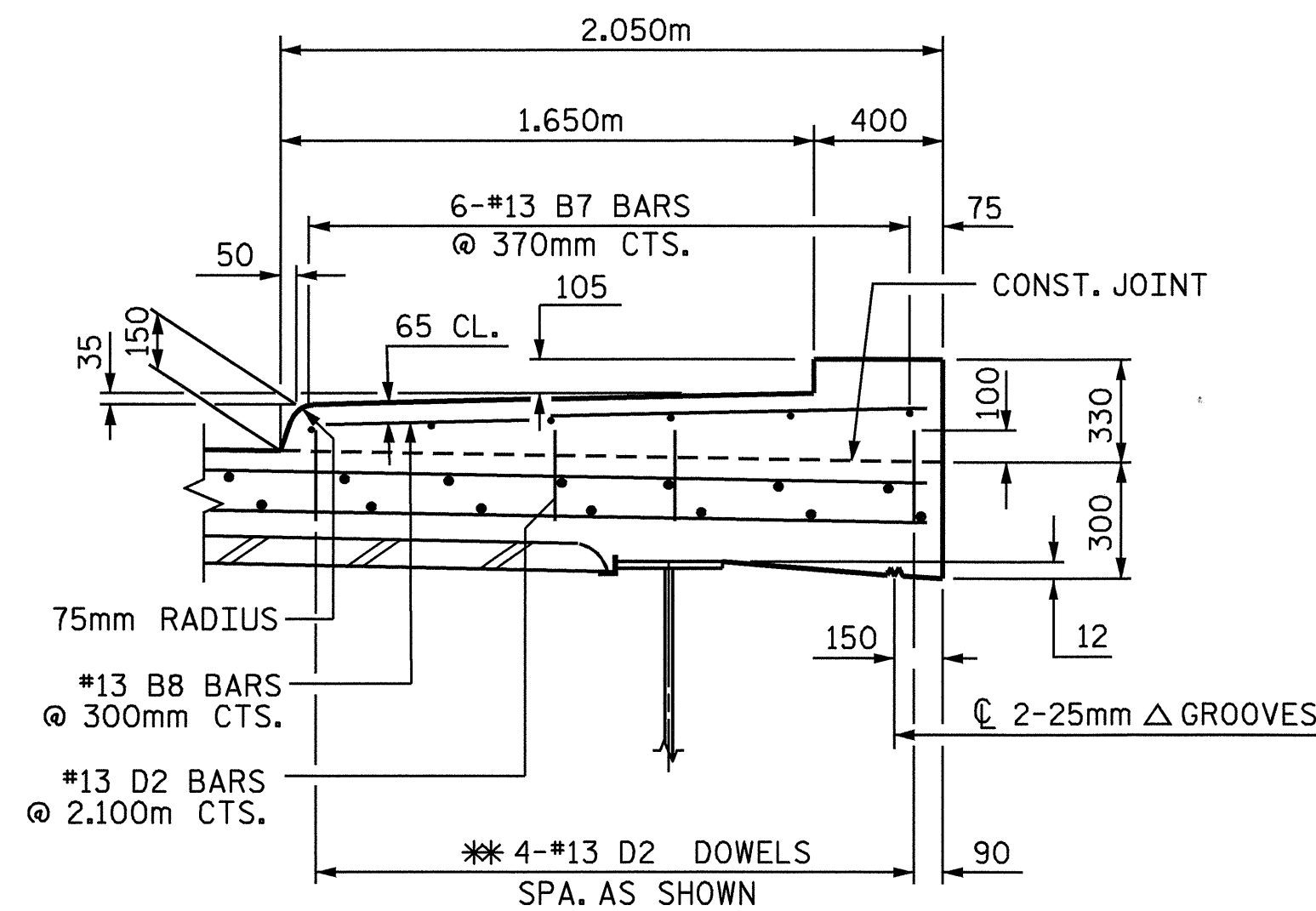


SECTION THRU BENT 1



DRAIN CONNECTOR DETAIL

COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY THE ENGINEER.
 TOP OF FLOOR DRAINS TO BE SET 10mm BELOW SURFACE OF SLAB.
 4- 13mm SQ. LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 100mm FROM THE TOP OF THE PIPE.
 BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM HOSE CLAMP SHALL BE COMMERCIAL QUALITY.
 THE 152mm Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.
 PVC DECK DRAINS SHALL BE PAINTED WITH TWO COATS OF BROWN PRIMER MEETING THE REQUIREMENTS OF ARTICLE 1080-12 OF THE STANDARD SPECIFICATIONS. EACH COAT SHALL BE 2 DRY MILS (0.050mm) THICK. DECK DRAINS SHALL BE ROUGHENED PRIOR TO PAINTING. NO SEPARATE PAYMENT SHALL BE MADE FOR PAINTING PVC DECK DRAINS AS THIS IS CONSIDERED INCIDENTAL TO THE PAY ITEM FOR REINFORCED CONCRETE DECK SLAB.
 PLATES SHALL CONFORM TO AASHTO M270 GRADE 345W STEEL OR APPROVED EQUAL.



SECTION THRU SIDEWALK

FOR PLAN OF SIDEWALK AND DETAILS, SEE SHEET NO. S-24
 **DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF

NOTES :

PROVIDE 32mm HIGH BEAM BOLSTERS UPPER AT 1.2m CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 1.200m CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 65mm ABOVE THE TOP OF THE REMOVABLE FORM.

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

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

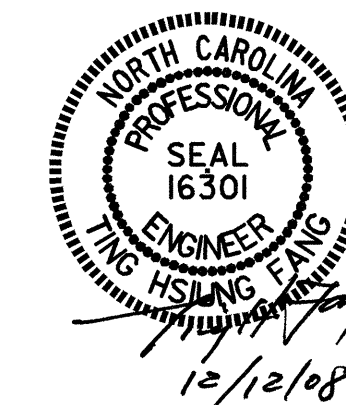
STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 13mm, SEE SPECIAL PROVISION FOR POT BEARINGS.

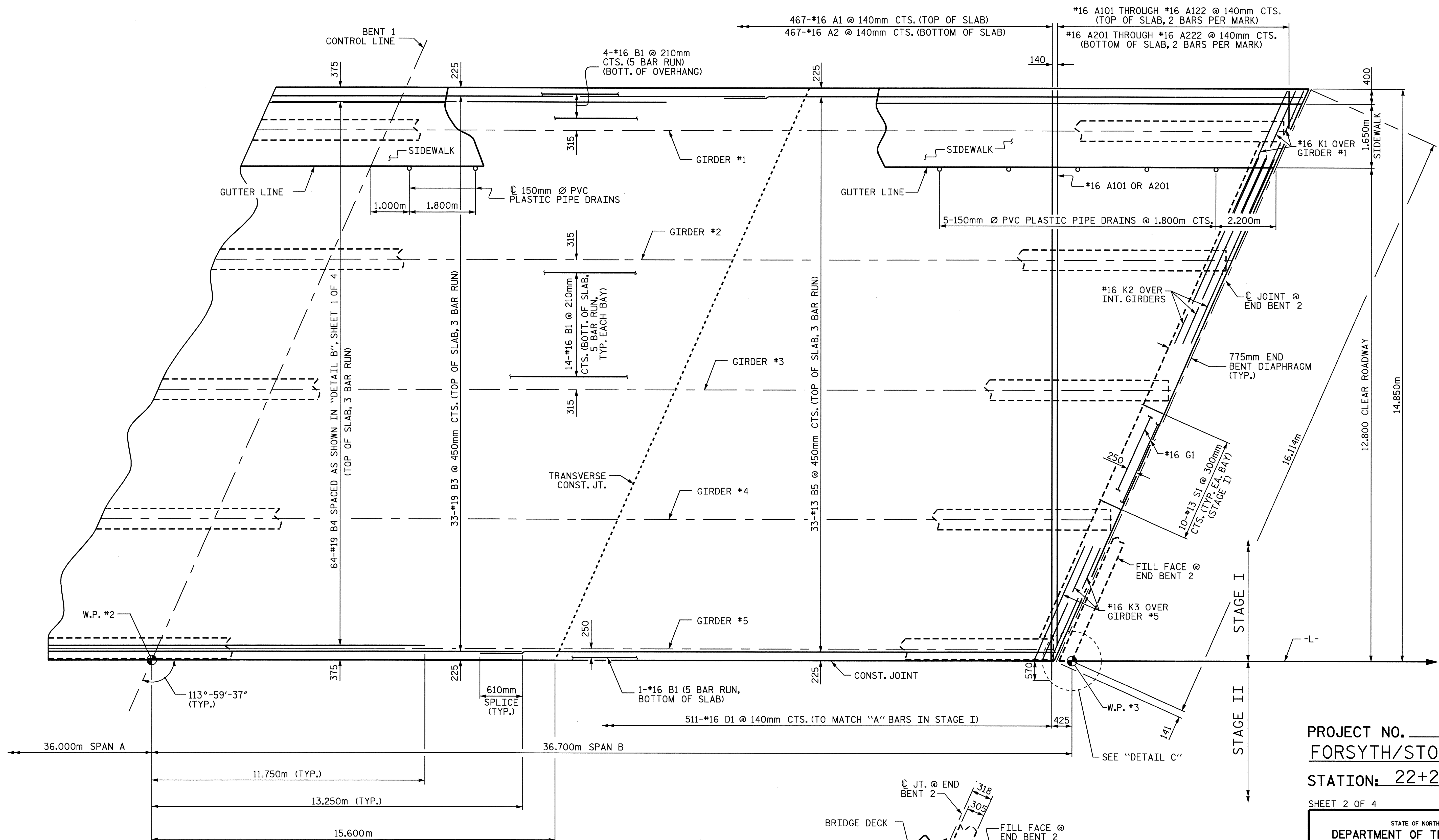
PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 2 OF 2

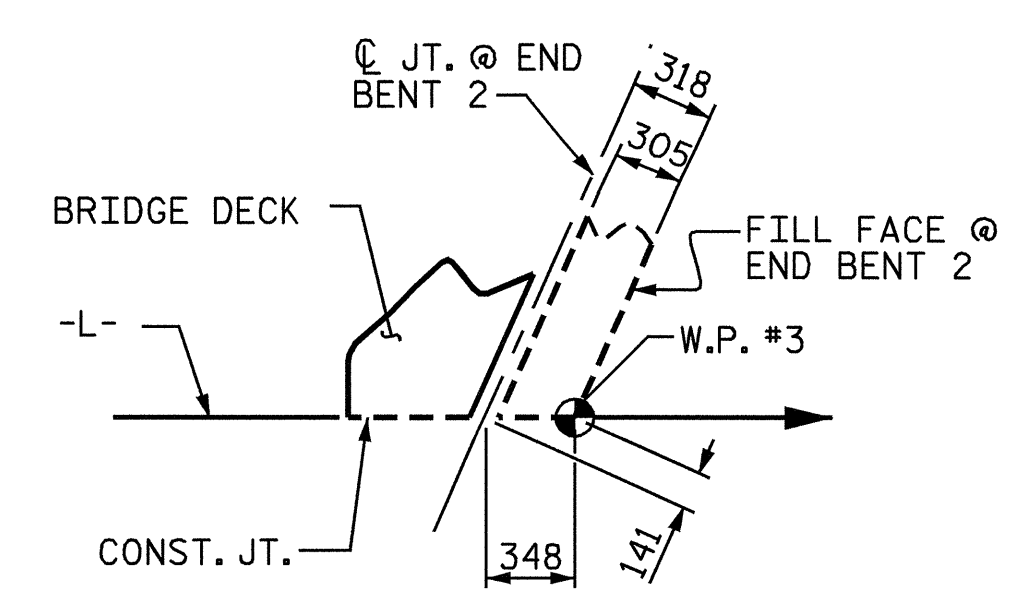


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-7	
SUPERSTRUCTURE TYPICAL SECTION						TOTAL SHEETS 42	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

DRAWN BY : A. R. CHESSON DATE : 09/08
 CHECKED BY : TING FANG DATE : 10/08



PLAN OF SPAN B
STAGE I

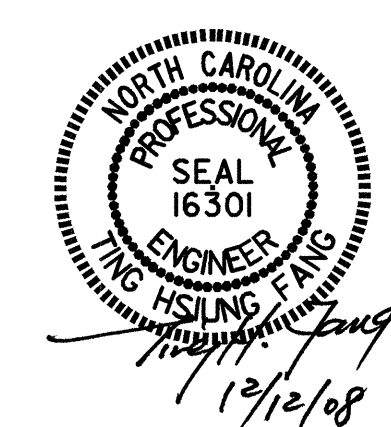


DETAIL C

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 2 OF 4

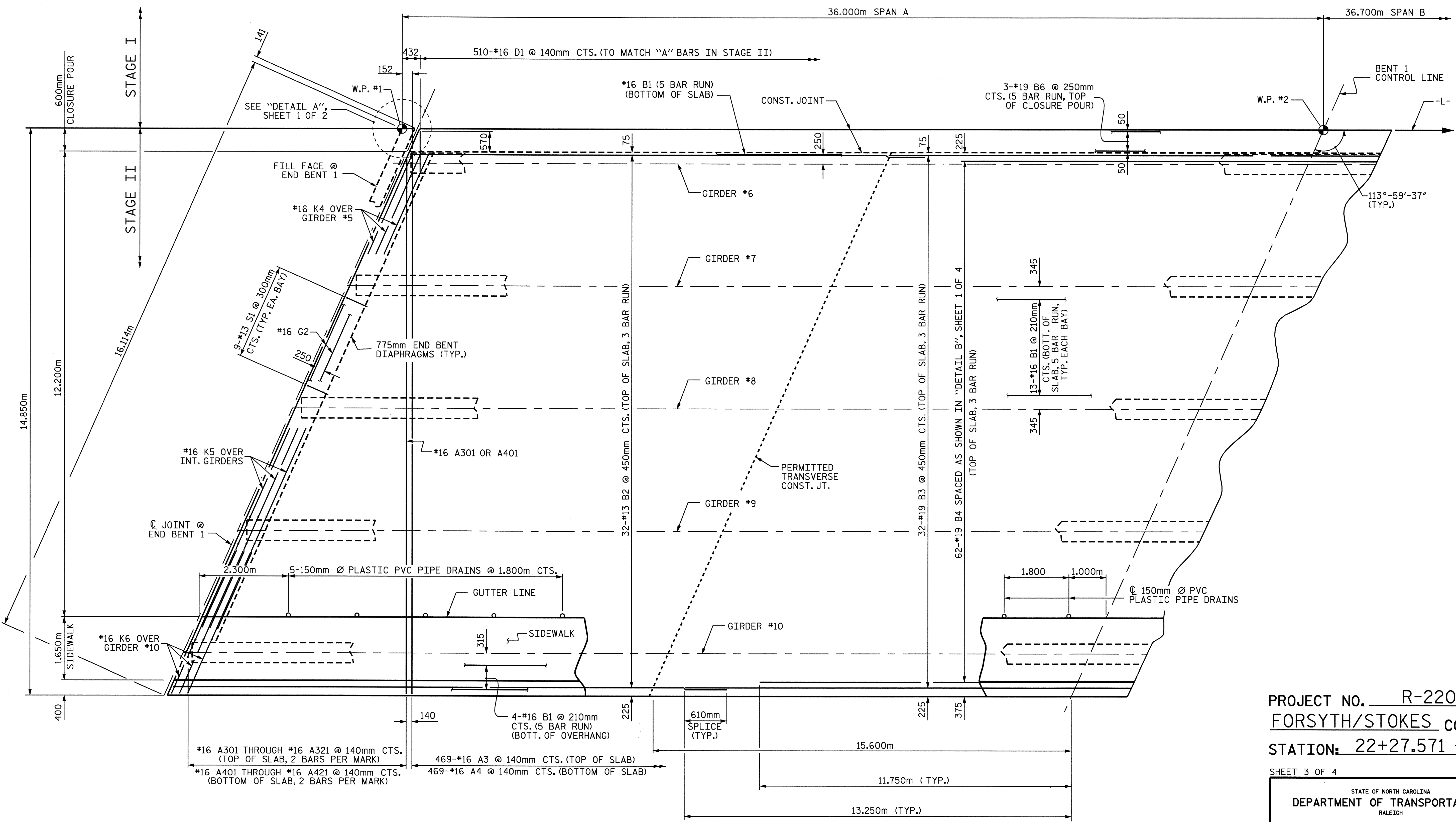
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN B
 STAGE I



DRAWN BY: A. R. CHESSON DATE: 09/08
 CHECKED BY: TING FANG DATE: 09/08

REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

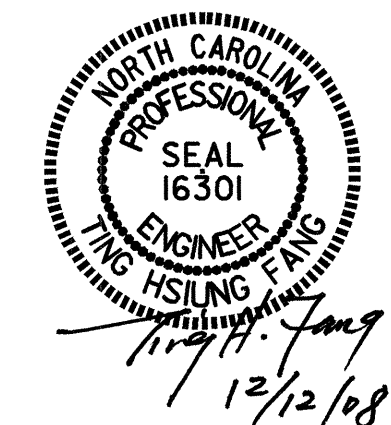
11-DEC-2008 16:01
 R:\Structures\R2201\FINAL_PLANS\r2201.sd.ps.dgn
 sdbrowski



PLAN OF SPAN A
STAGE II

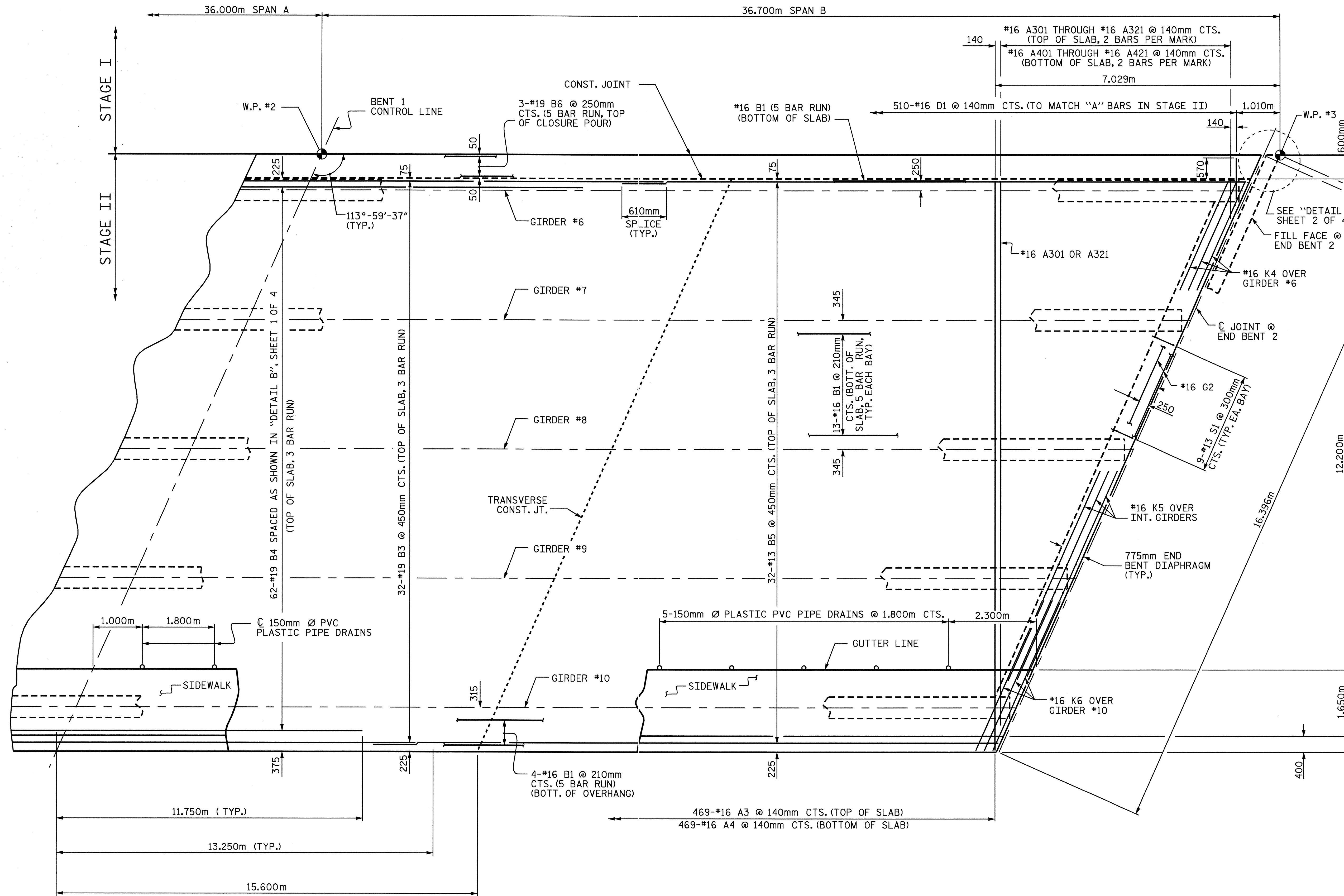
PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-
 SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN A
 STAGE II



DRAWN BY: A. R. CHESSON DATE: 09/08
 CHECKED BY: TING FANG DATE: 09/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			42



**PLAN OF SPAN B
STAGE II**

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN B
 STAGE II

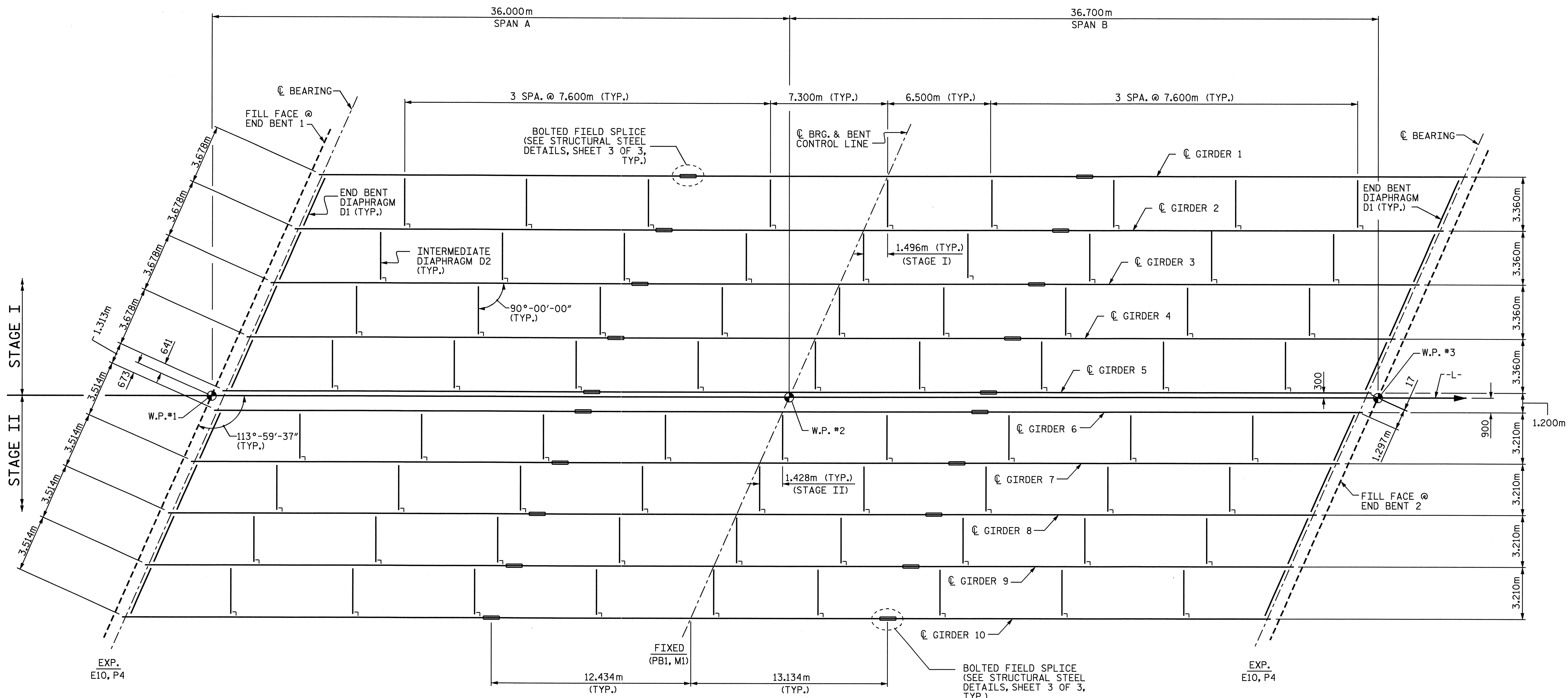


Ting Fang
 12/21/08

DRAWN BY: A. R. CHESSON DATE: 09/08
 CHECKED BY: TING FANG DATE: 09/08

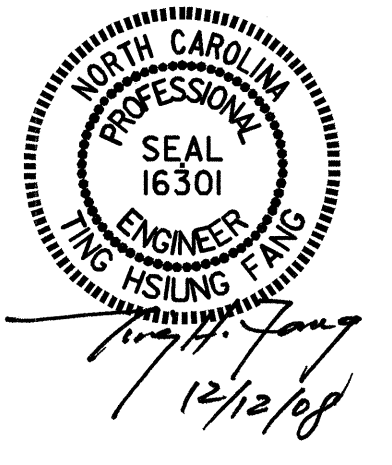
II-DEC-2008 16:01
 R:\Structures\R2201\FINAL_PLANS\R2201_sd.ps.dgn
 sdombrowski

REVISIONS						SHEET NO. S-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			



FRAMING PLAN

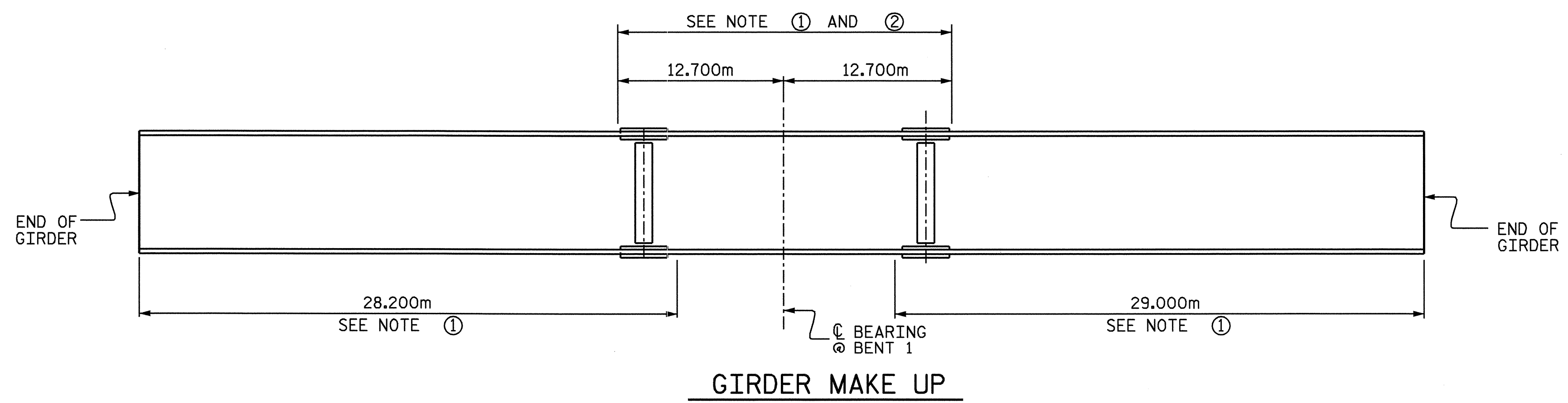
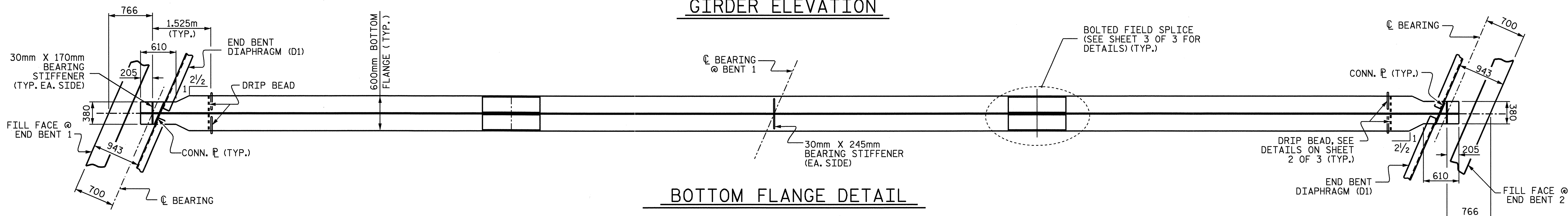
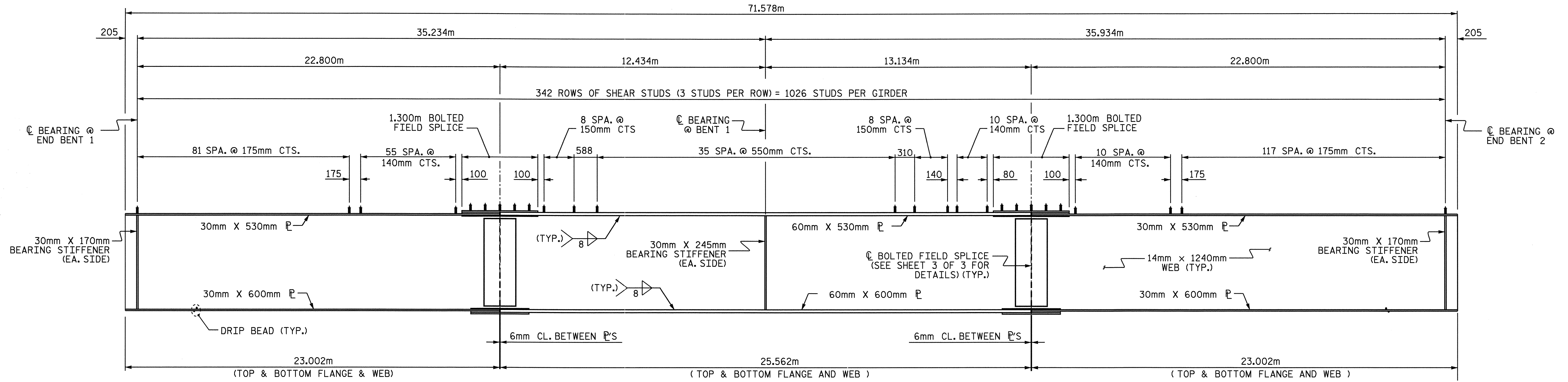
PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN

DRAWN BY: A.R. CHESSON DATE: 09/08
 CHECKED BY: TING FANG DATE: 10/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			42



CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

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

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



PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

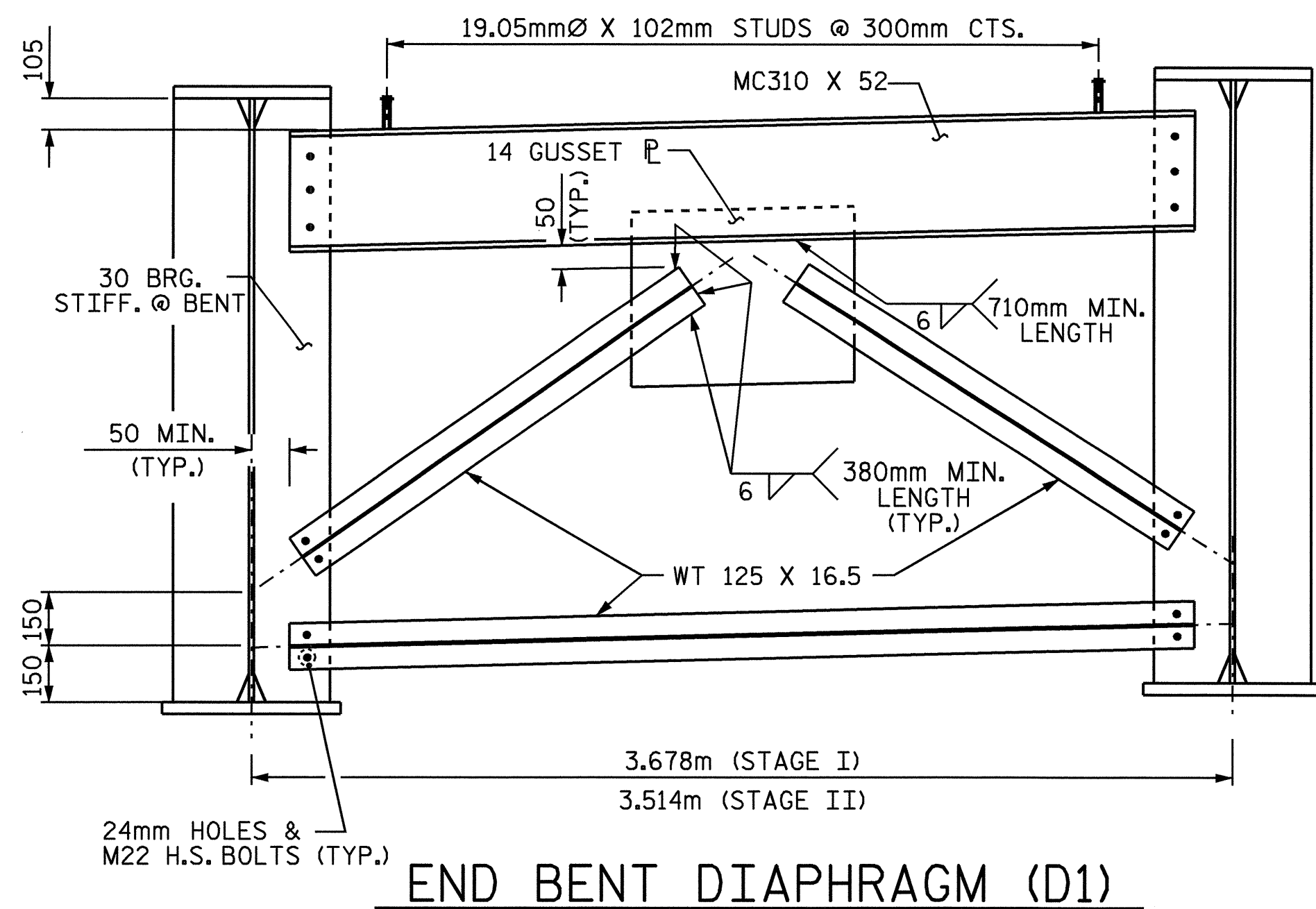
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE

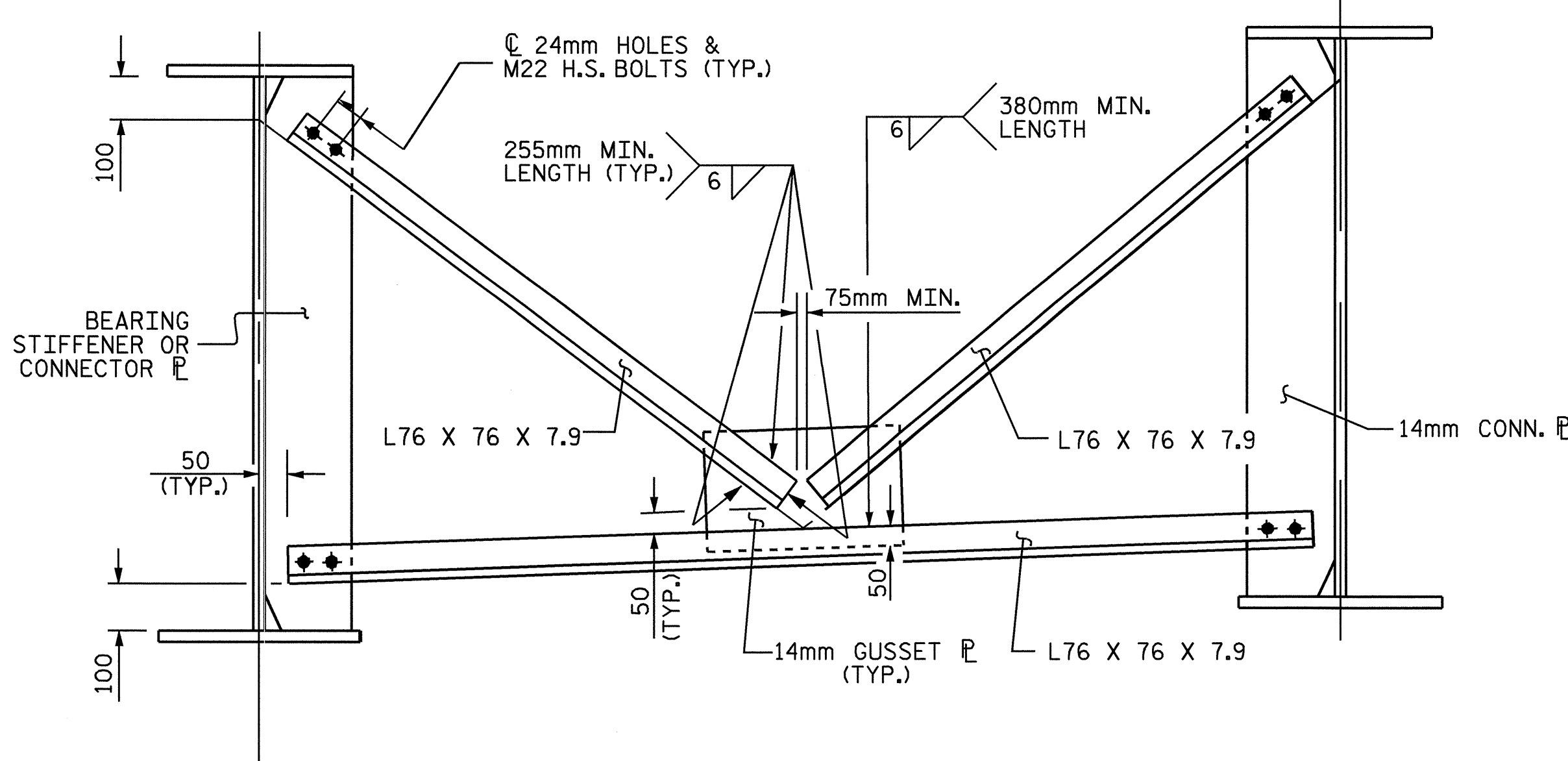
STRUCTURAL STEEL DETAILS

DRAWN BY: HARISH SHAH DATE: 10/08
 CHECKED BY: TING FANG DATE: 10-08

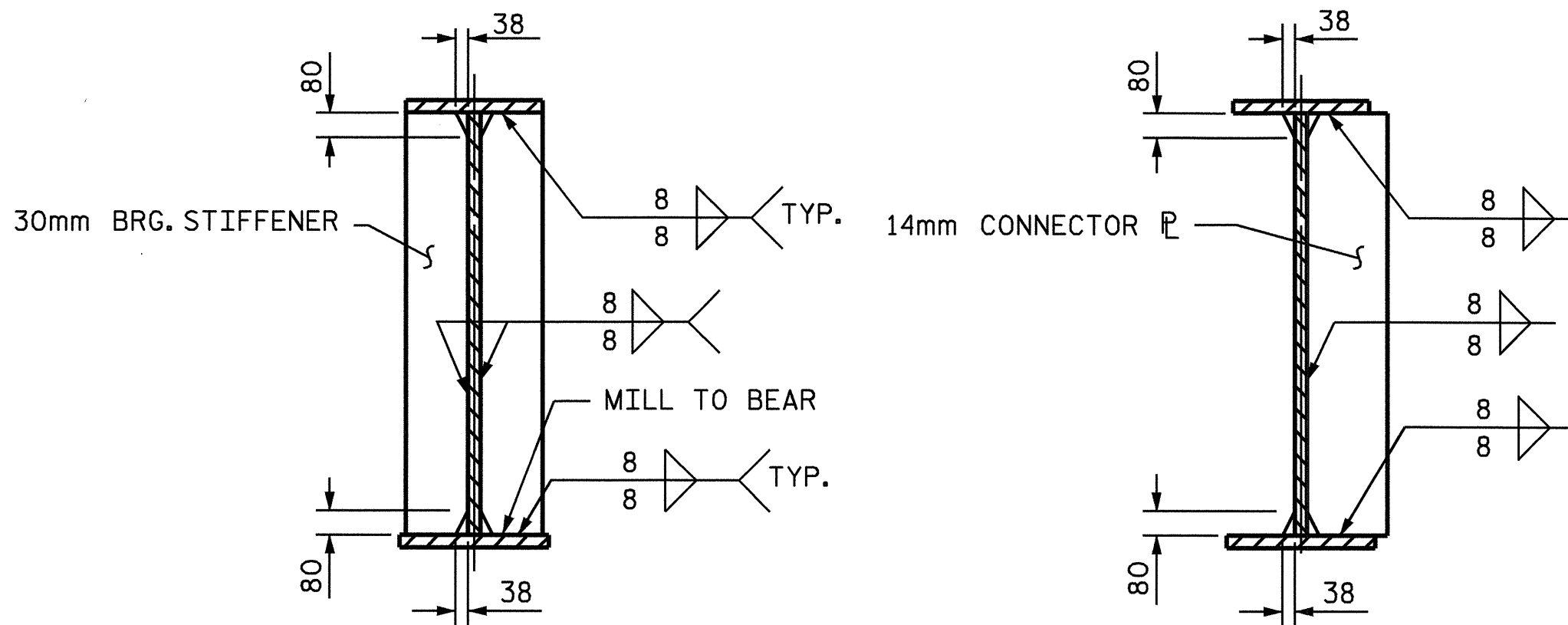
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			42



END BENT DIAPHRAGM (D1)

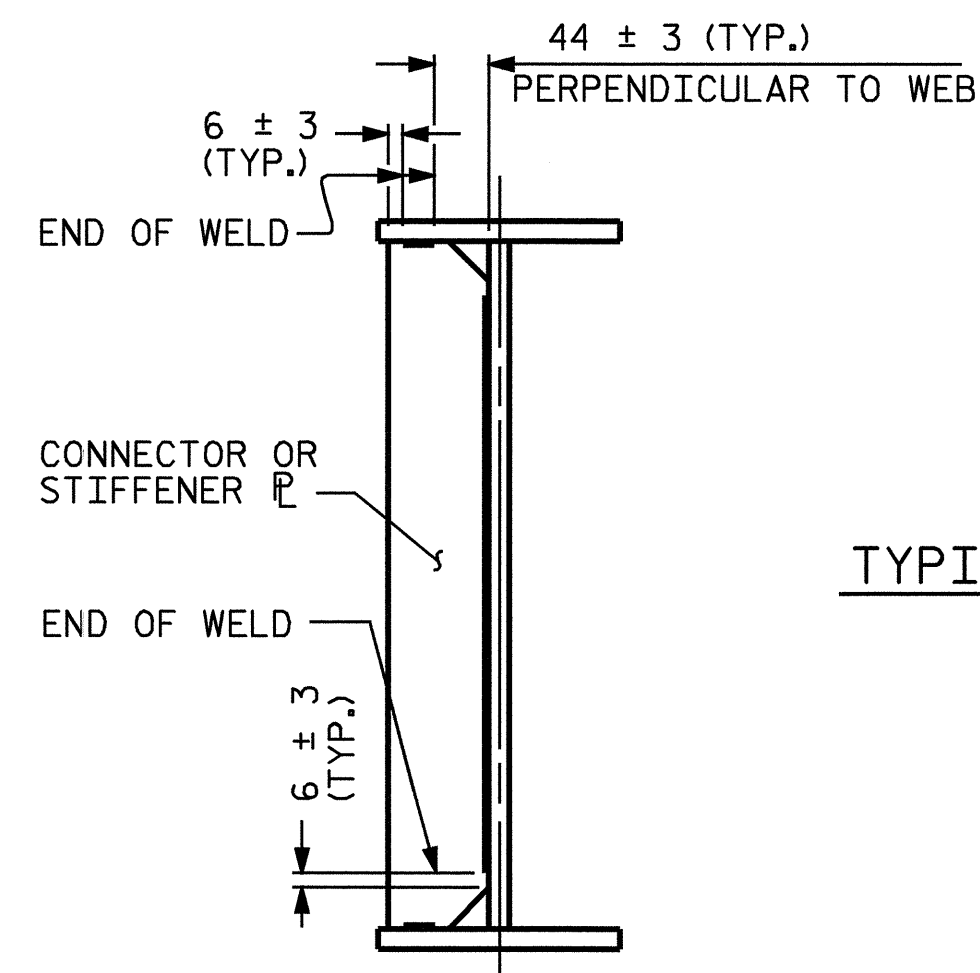


INTERMEDIATE DIAPHRAGM (D2)

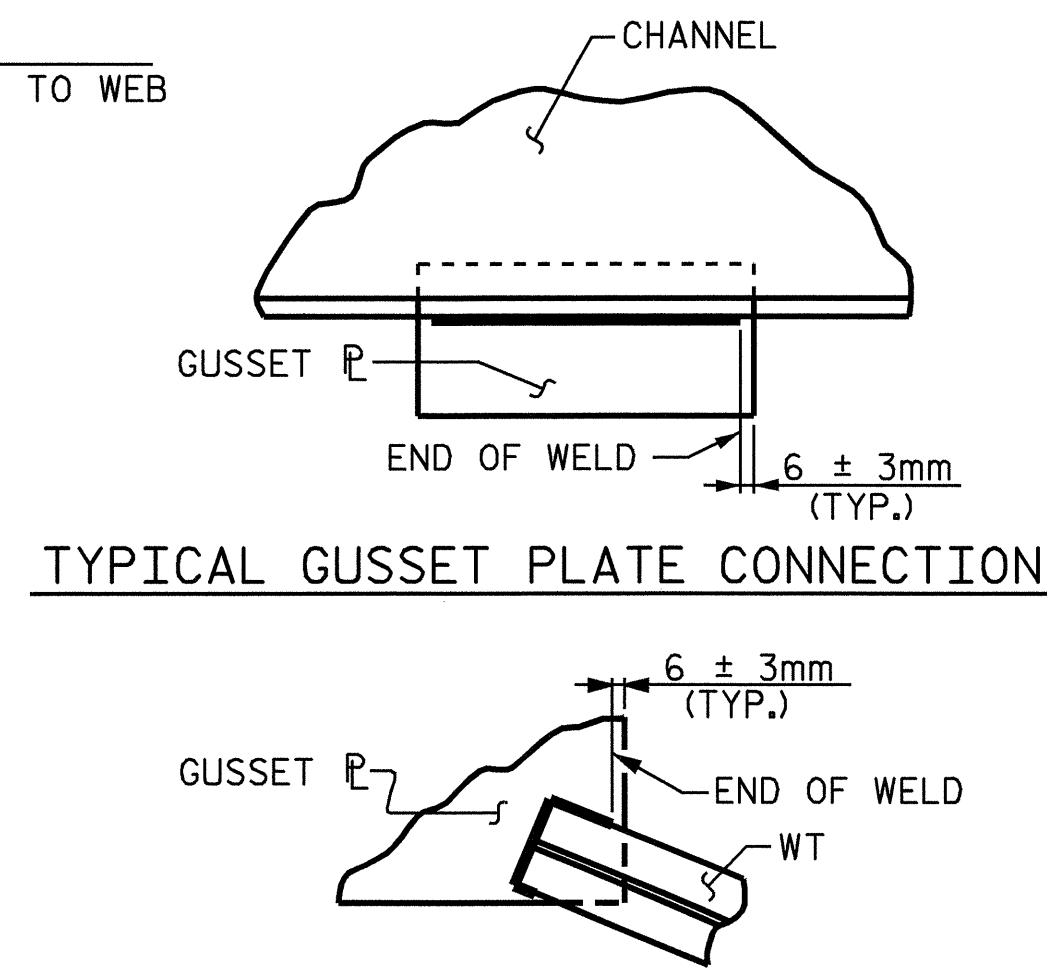


BEARING STIFFENER

CONNECTOR PLATE

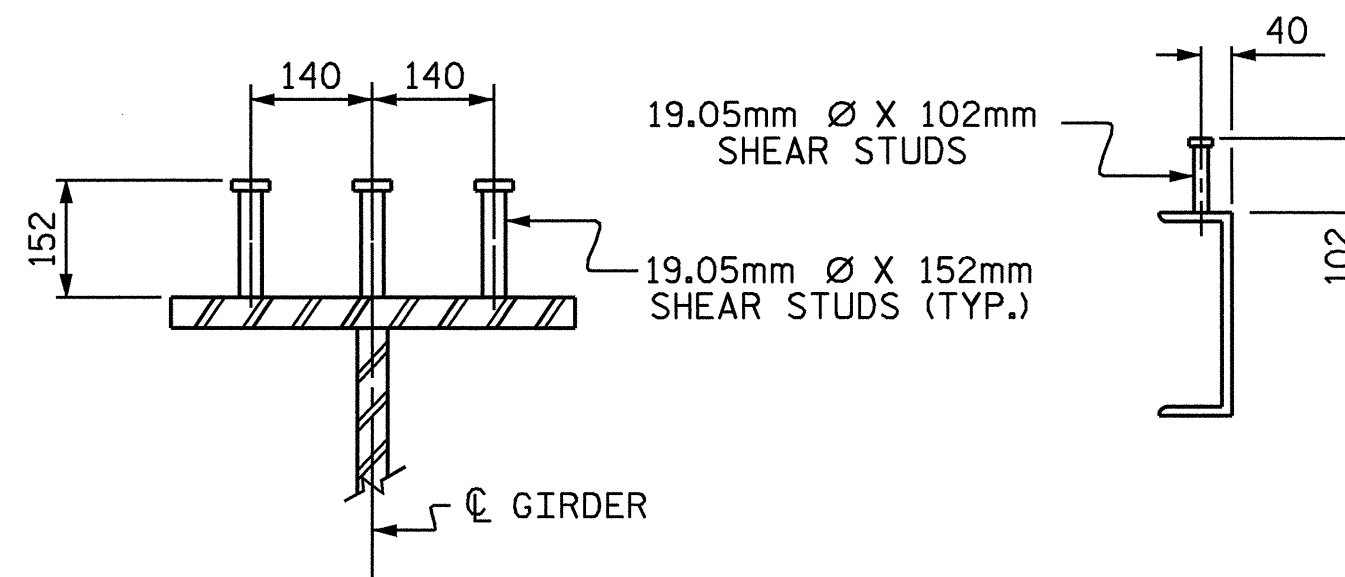


TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

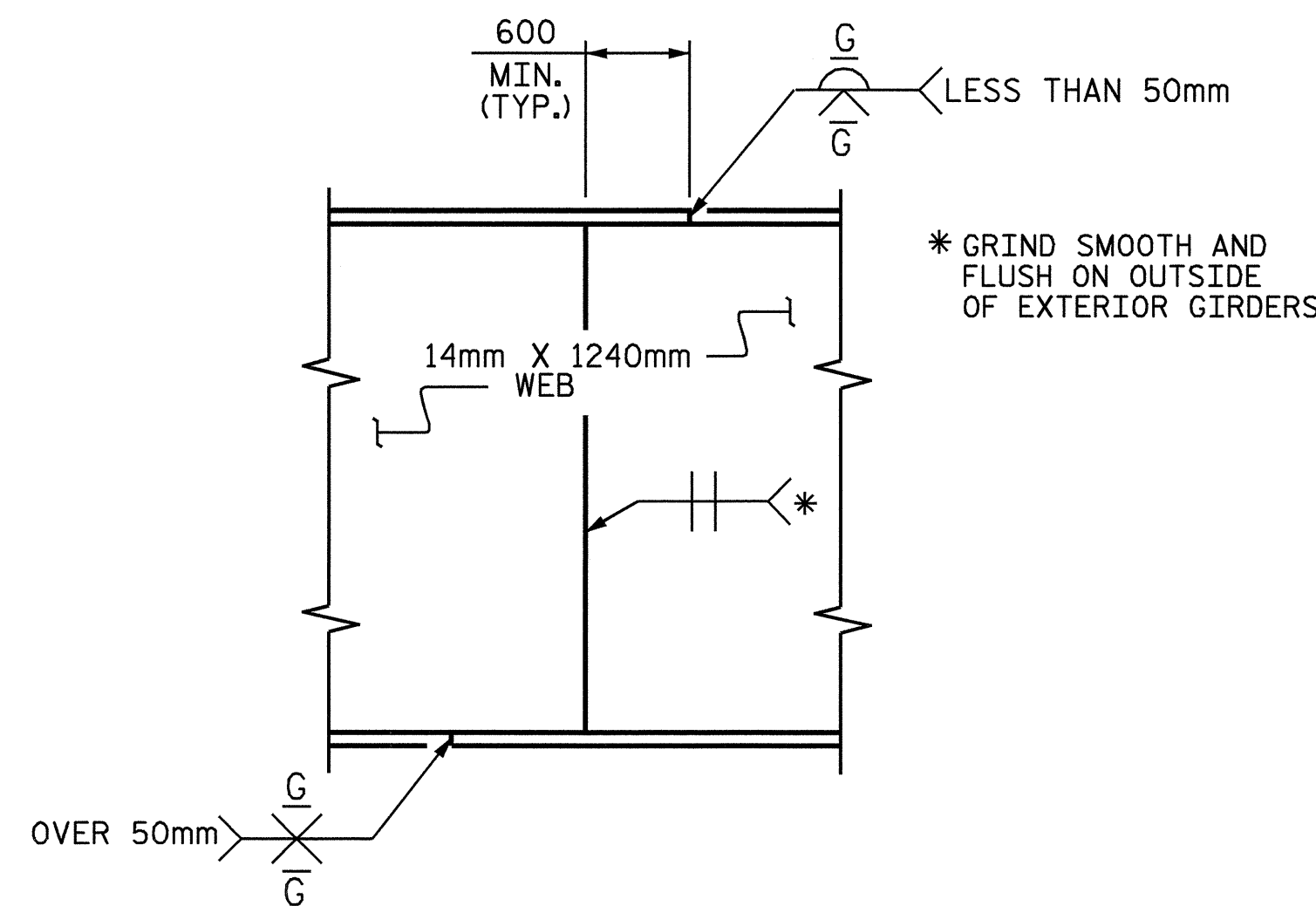


TYPICAL "TEE" TO GUSSET PLATE CONNECTIONS

WELD TERMINATION DETAILS



SHEAR STUD DETAILS
(TYP. EA. GDR. AND CHANNEL)



PERMISSIBLE SHOP FLANGE AND WEB SPLICE

NOTES :

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 345W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

ALL FIELD CONNECTIONS TO BE 22.23mm Ø HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 18 METERS AND WEB PIECE LENGTHS TO 14 METERS. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 4.5 METERS OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 4.5 METERS OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 600mm MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 150mm MINIMUM BETWEEN CONNECTOR PLATE WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 25mm IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

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

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.

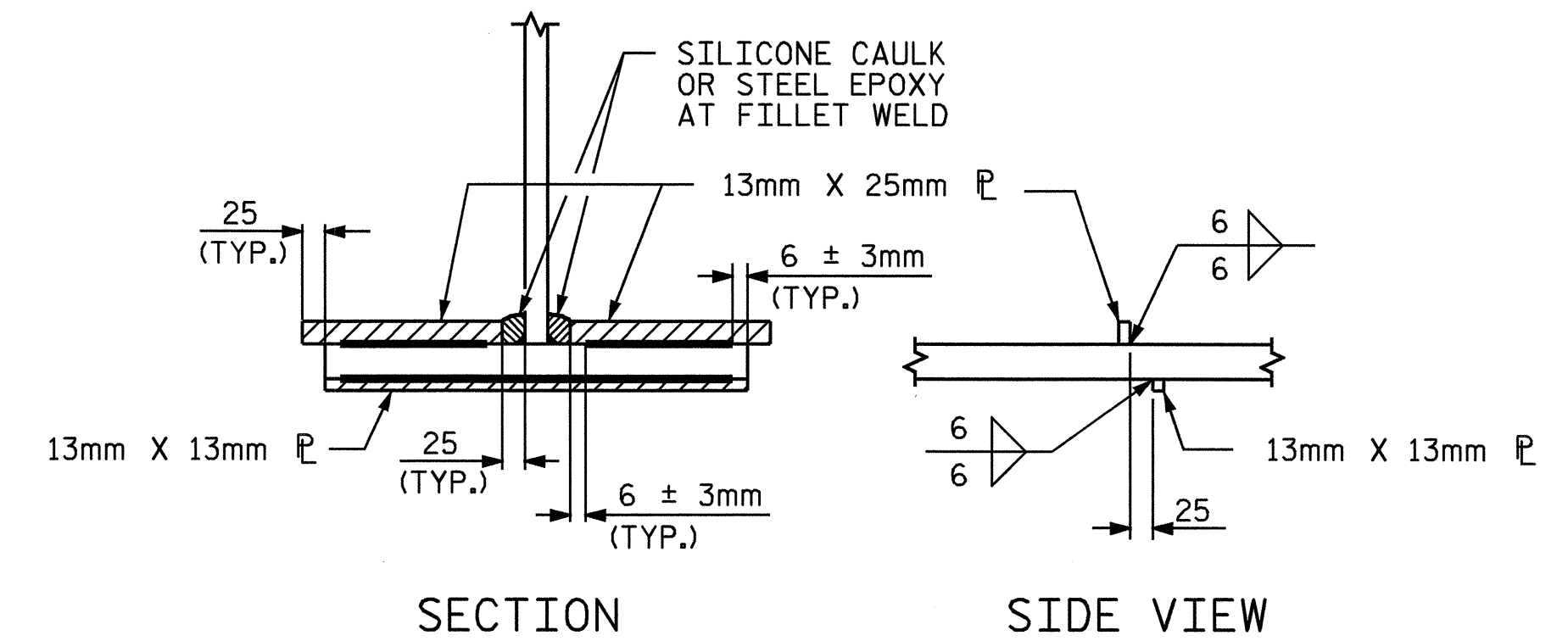
END OF GIRDERS SHALL BE PLUMB.

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

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.



SECTION

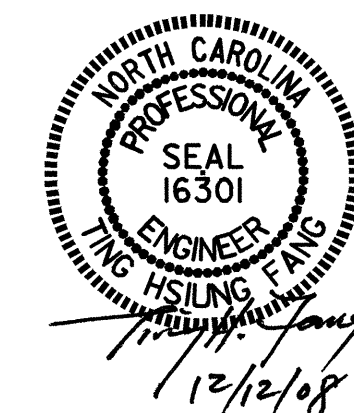
SIDE VIEW

DRIP BEAD DETAILS

PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
STATION: 22+27.571 -L-

SHEET 2 OF 3

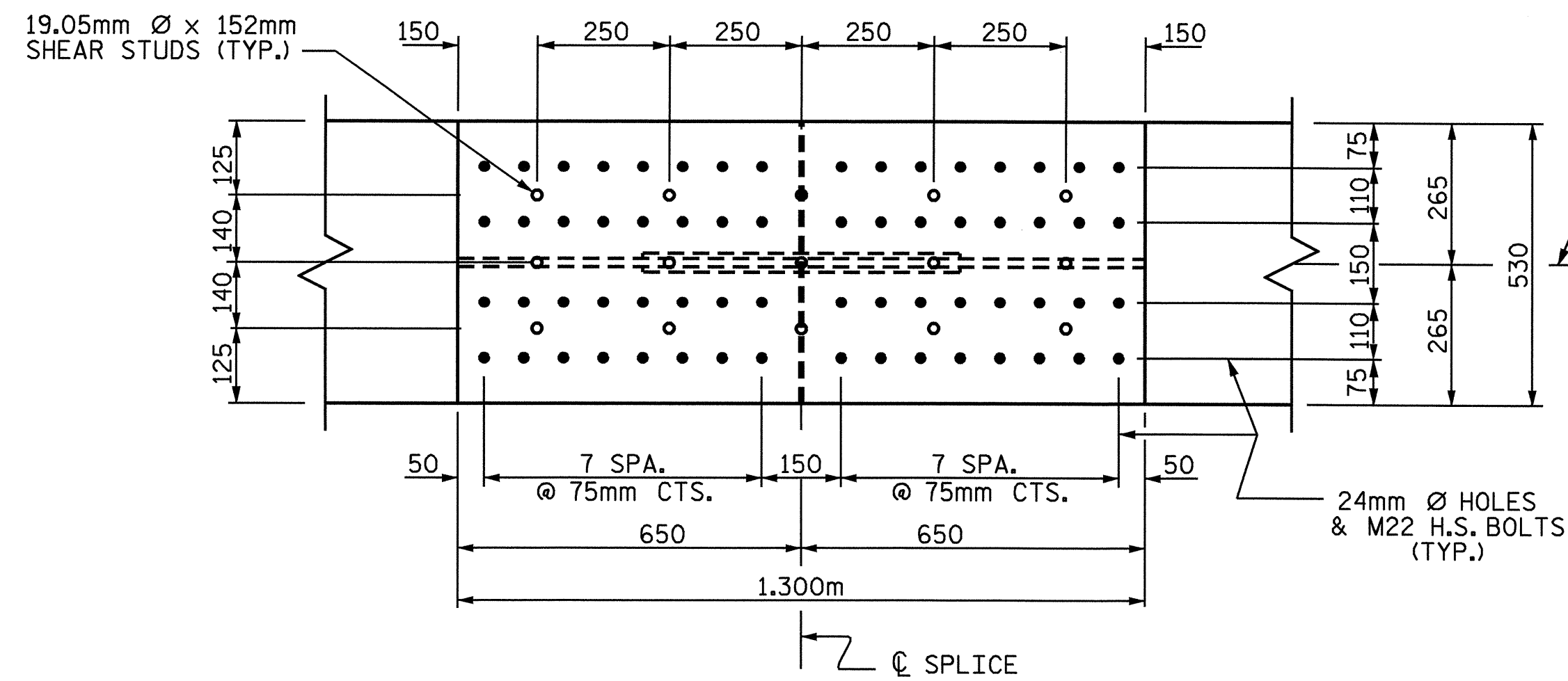
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS



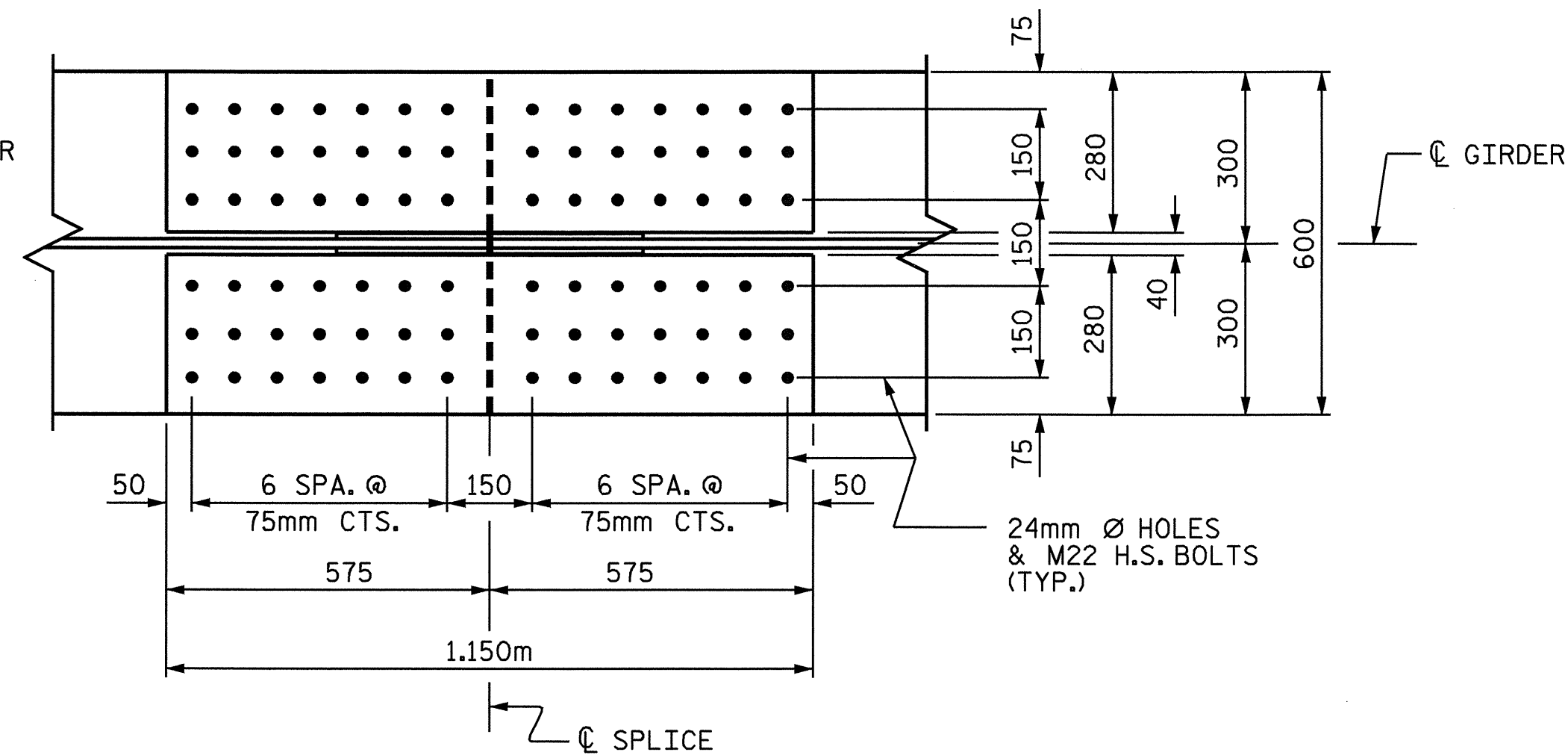
DRAWN BY: HARISH SHAH DATE: 10/08
CHECKED BY: TING FANG DATE: 10-08

II-DEC-2008 16:00
R:\Structur es\R220\FINAL_PLANS\R220L_sd_ss.dgn
sdombrowski

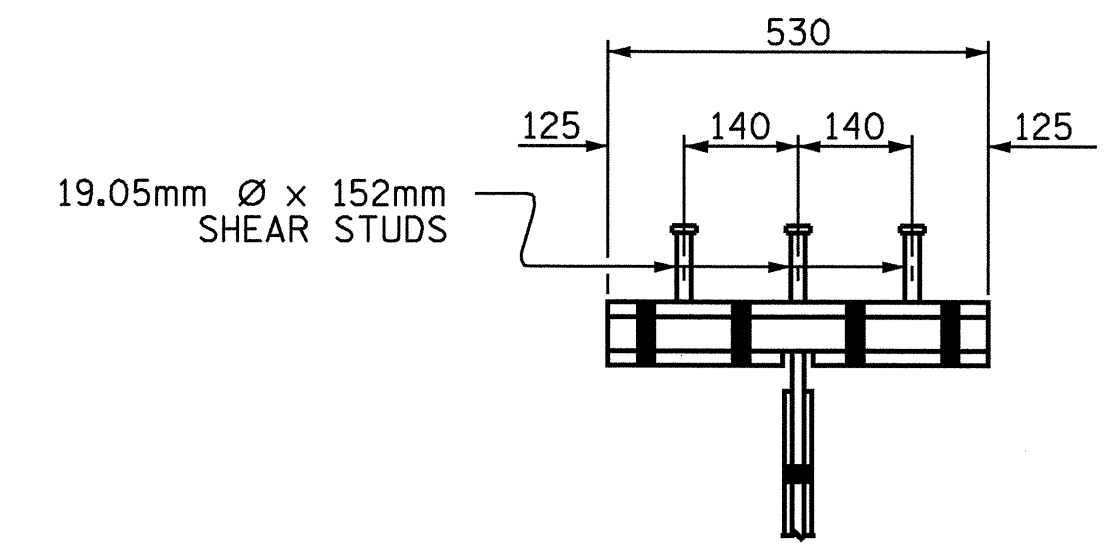
REVISIONS						SHEET NO. S-14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			



PLAN (TOP OF TOP FLANGE)

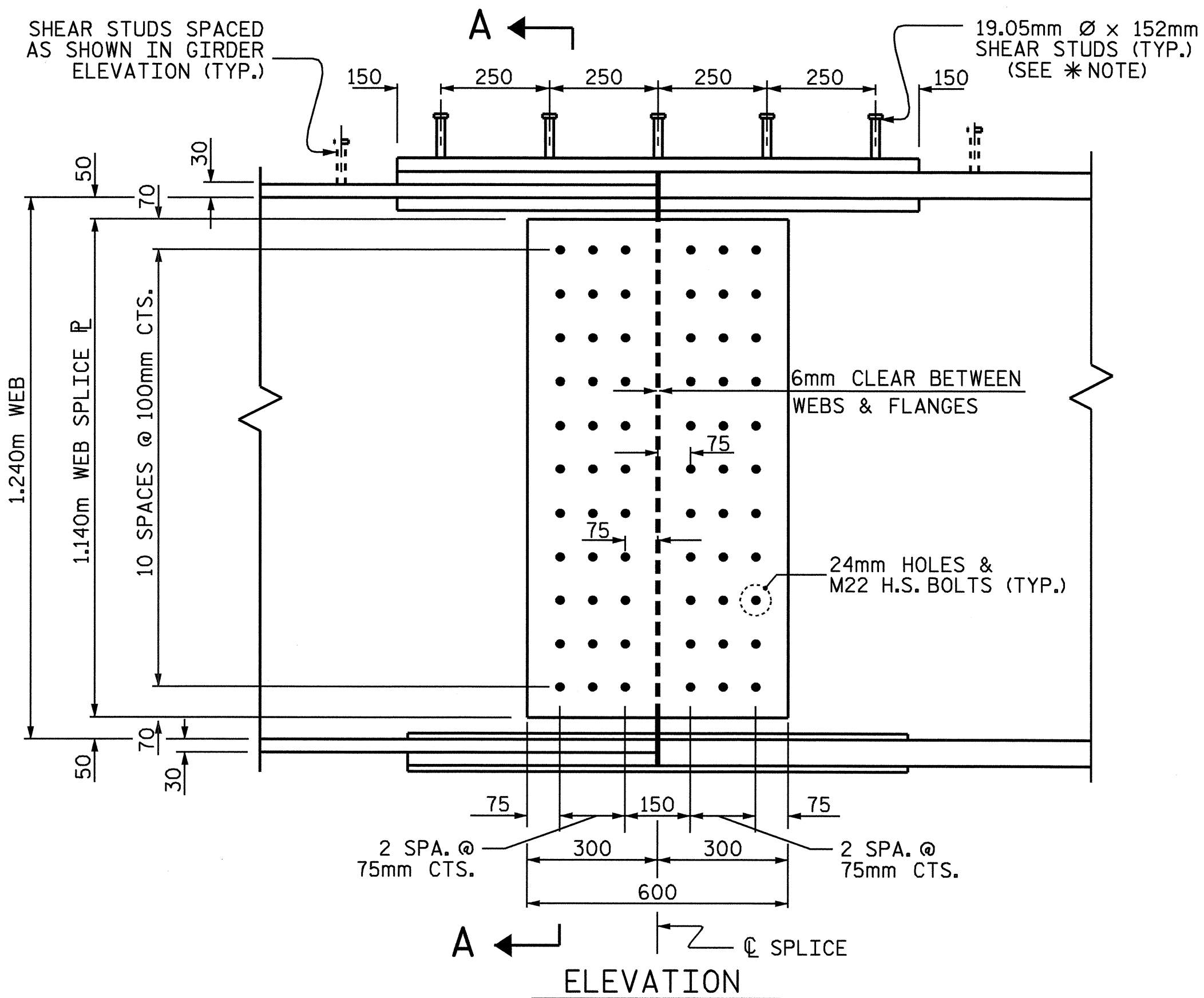


PLAN (TOP OF BOTTOM FLANGE)

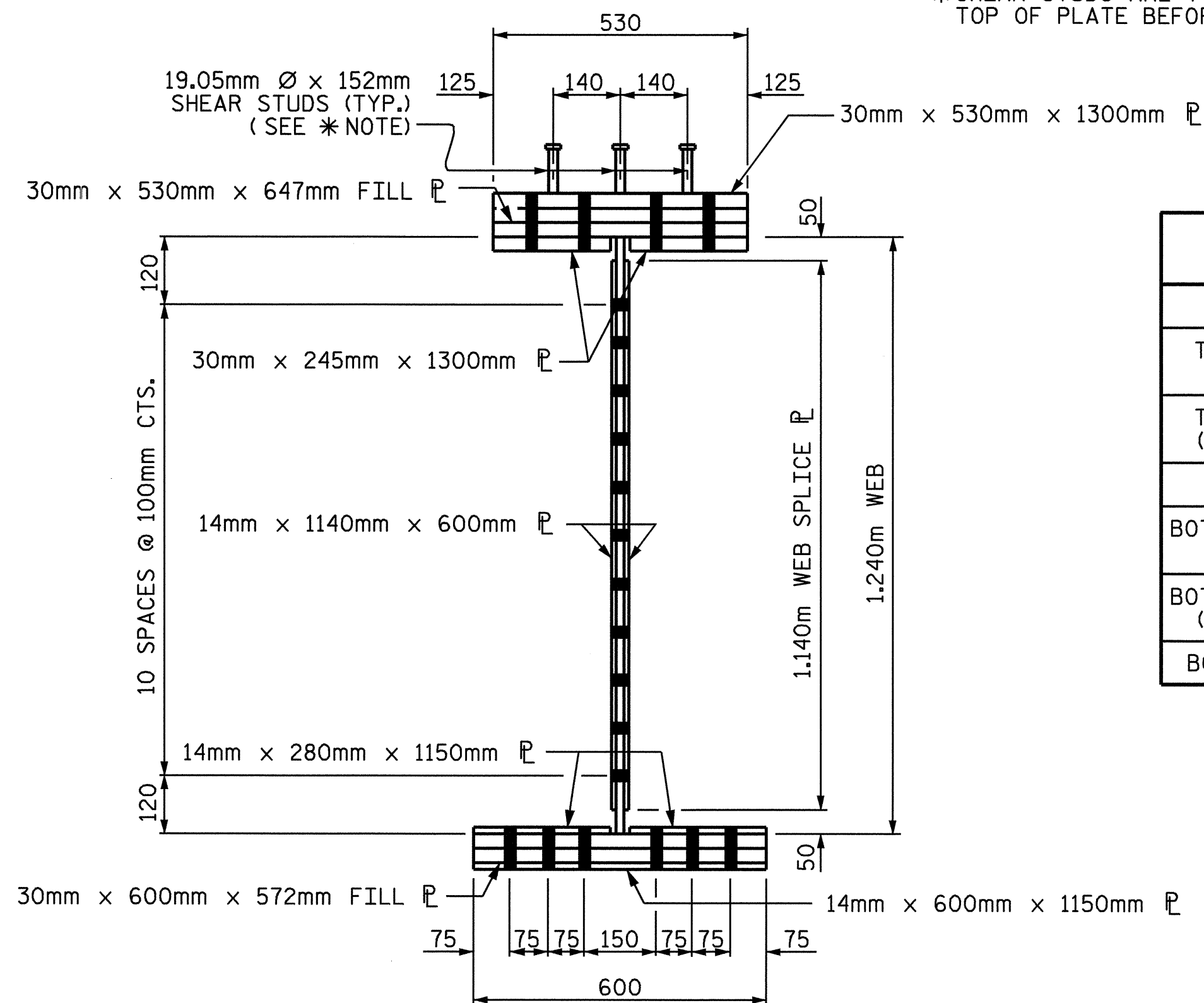


SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

*SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.



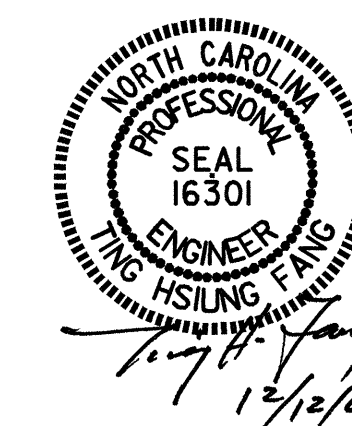
BOLTED FIELD SPLICE DETAILS



DESCRIPTION	SIZE	NO. REQ'D FOR ONE FIELD SPLICE	TOTAL REQ'D
WEB SPLICE	14mm X 1140mm X 600mm	2	40
TOP FLANGE SPLICE (TOP OF FLANGE)	30mm X 530mm X 1300mm	1	20
TOP FLANGE SPLICE (BOTTOM OF FLANGE)	30mm X 245mm X 1300mm	2	40
TOP FLANGE FILL	30mm X 530mm X 647mm	1	20
BOTTOM FLANGE SPLICE (TOP OF FLANGE)	14mm X 280mm X 1150mm	2	40
BOTTOM FLANGE SPLICE (BOTTOM OF FLANGE)	14mm X 600mm X 1150mm	1	20
BOTTOM FLANGE FILL	30mm X 600mm X 572mm	1	20

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 3 OF 3



REVISIONS						SHEET NO. S-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY: HARISH SHAH DATE: 10/17/08
 CHECKED BY: TING FANG DATE: 10/20/08

NOTES

THE 51mm Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

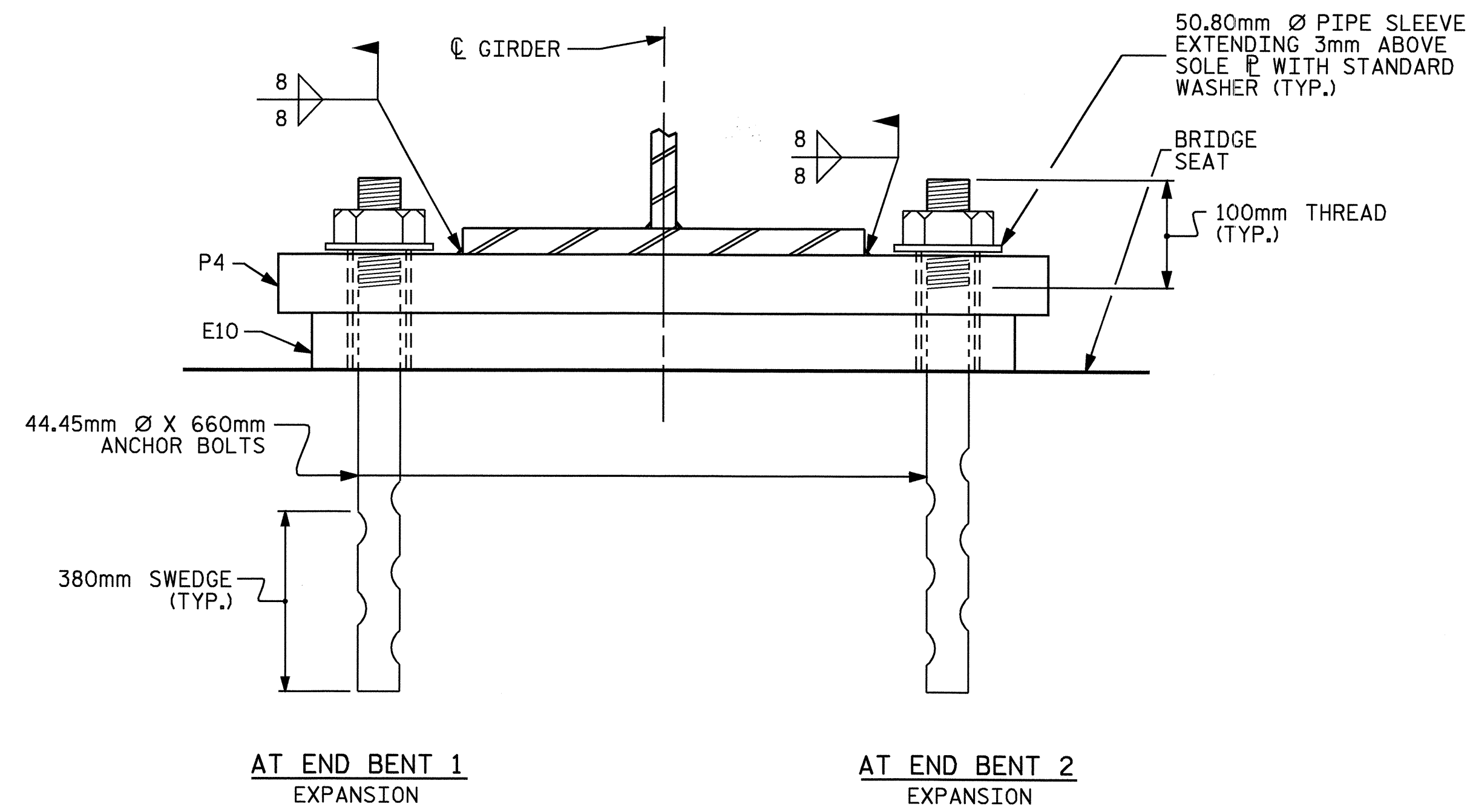
THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 345W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 345W AND SHALL NOT BE GALVANIZED, ANCHOR BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

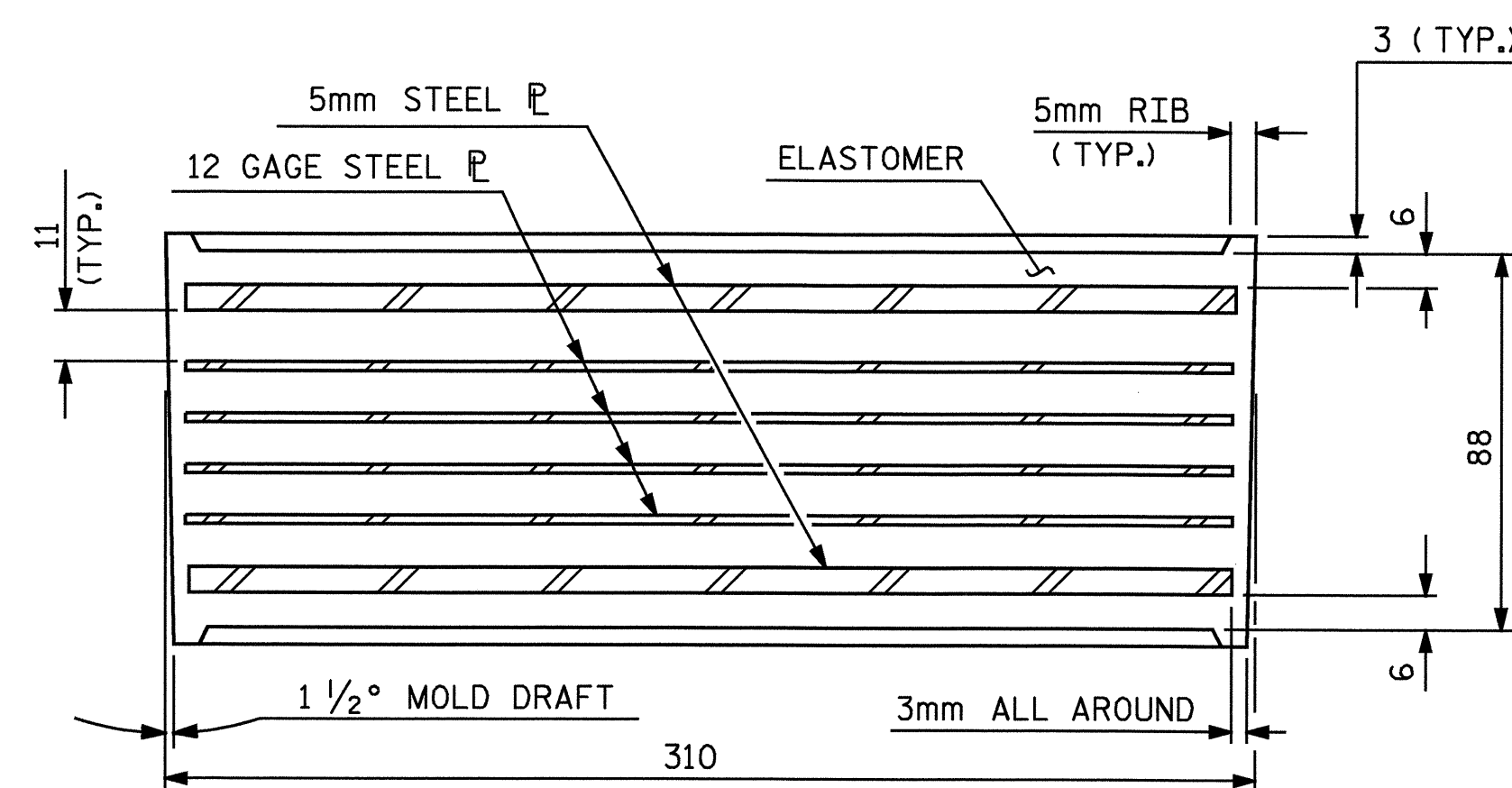
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291M-12 OR AASHTO M292M-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293M. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 149°C. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

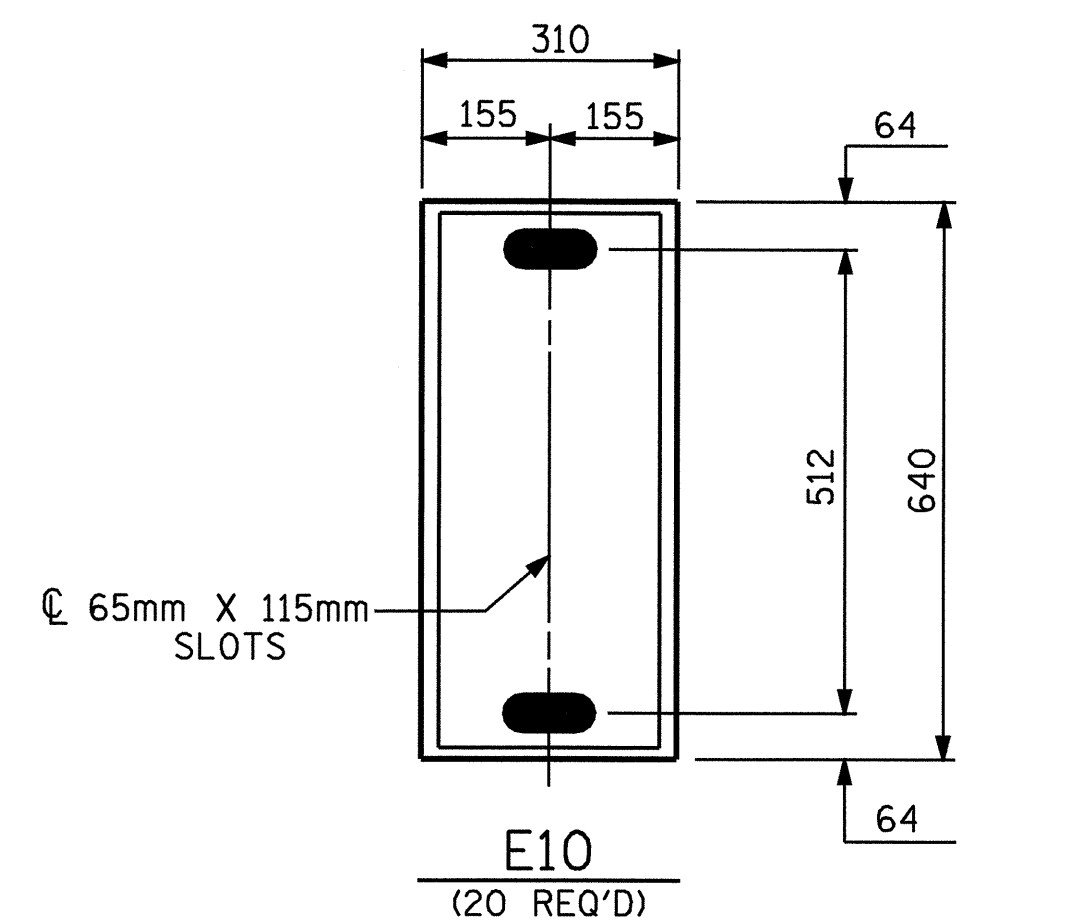
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.



END VIEW

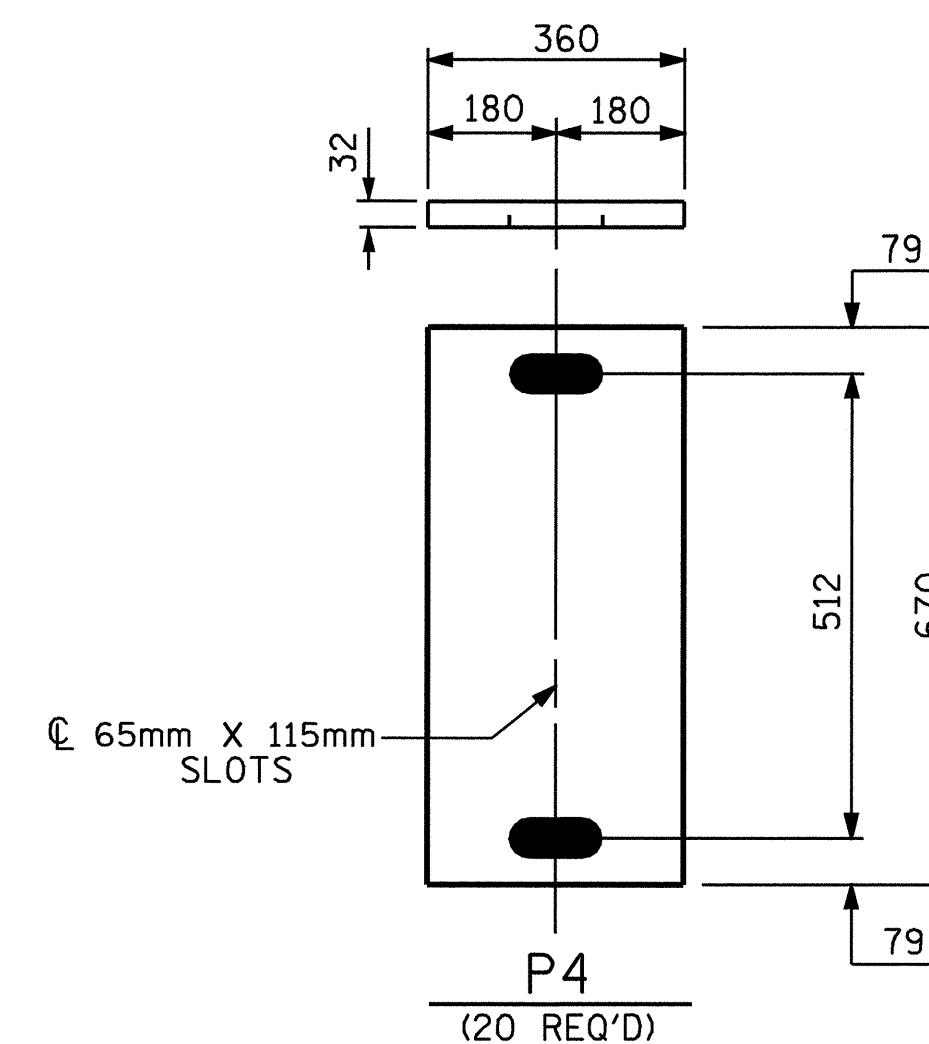


TYPICAL SECTION OF ELASTOMERIC BEARING



PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

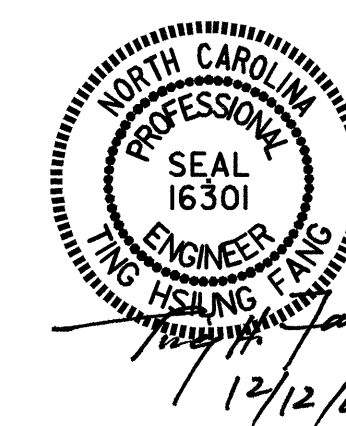


SOLE PLATE DETAILS

-LOAD RATINGS-	
	MAX. D.L. + L.L.
TYPE V	943 kN

PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE					
ELASTOMERIC BEARING DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 42



ASSEMBLED BY : S. DOMBROWSKI	DATE : 10/08
CHECKED BY : TING FANG	DATE : 10/08
DRAWN BY : EEM 10/95	REV. 8/16/99 MAB/LES
CHECKED BY : PEK 10/95	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLG/GM

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

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

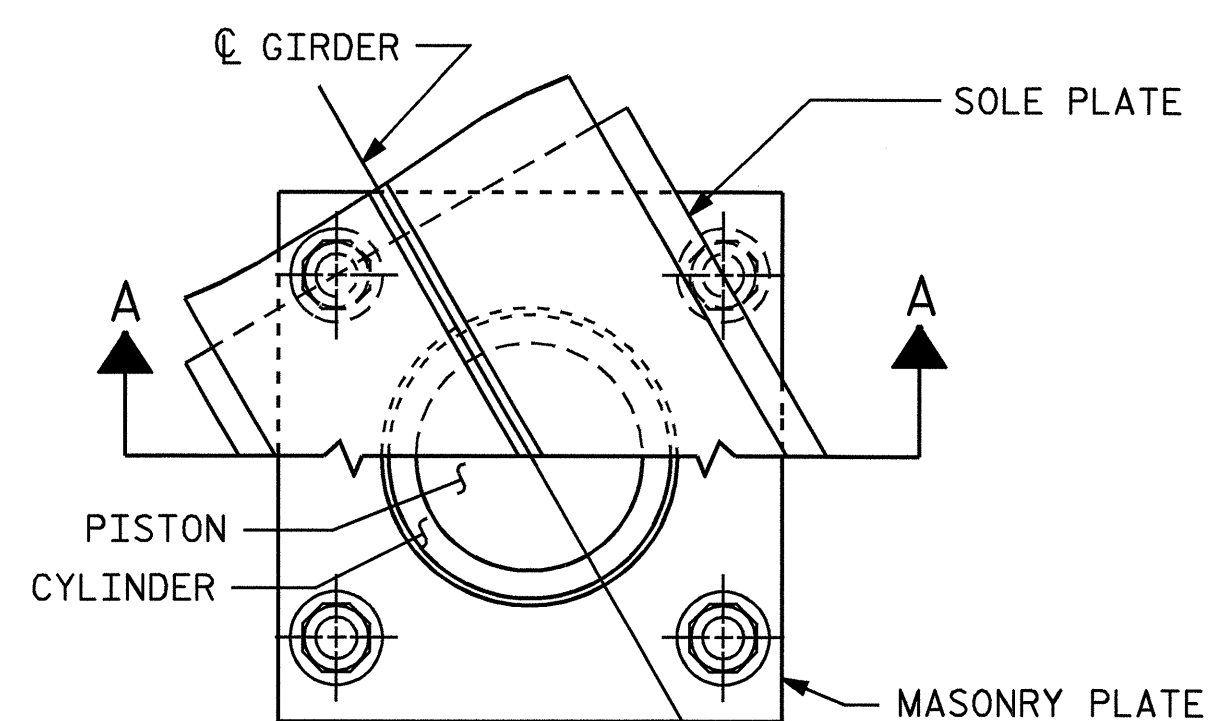
WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 121°C. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

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

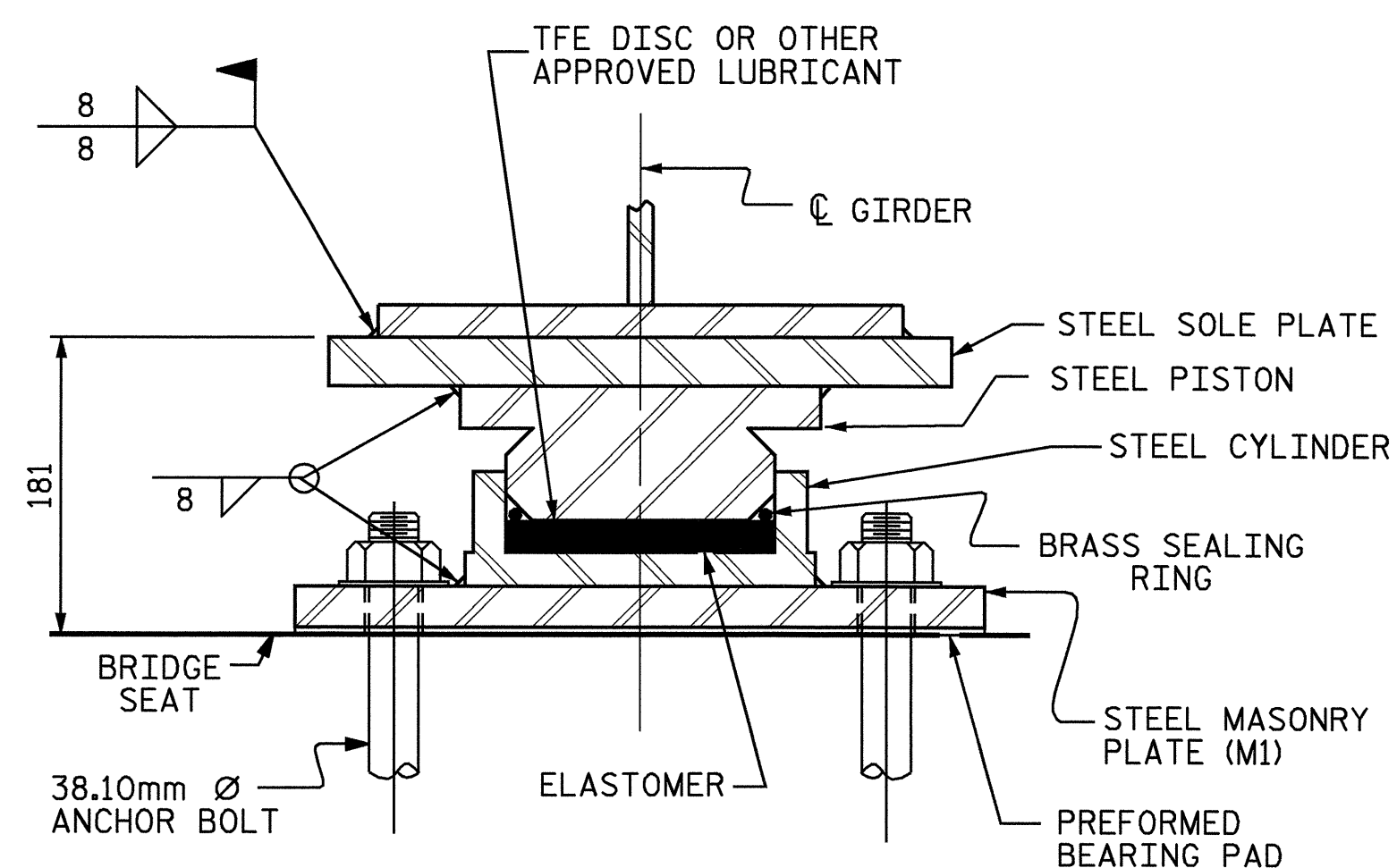
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.



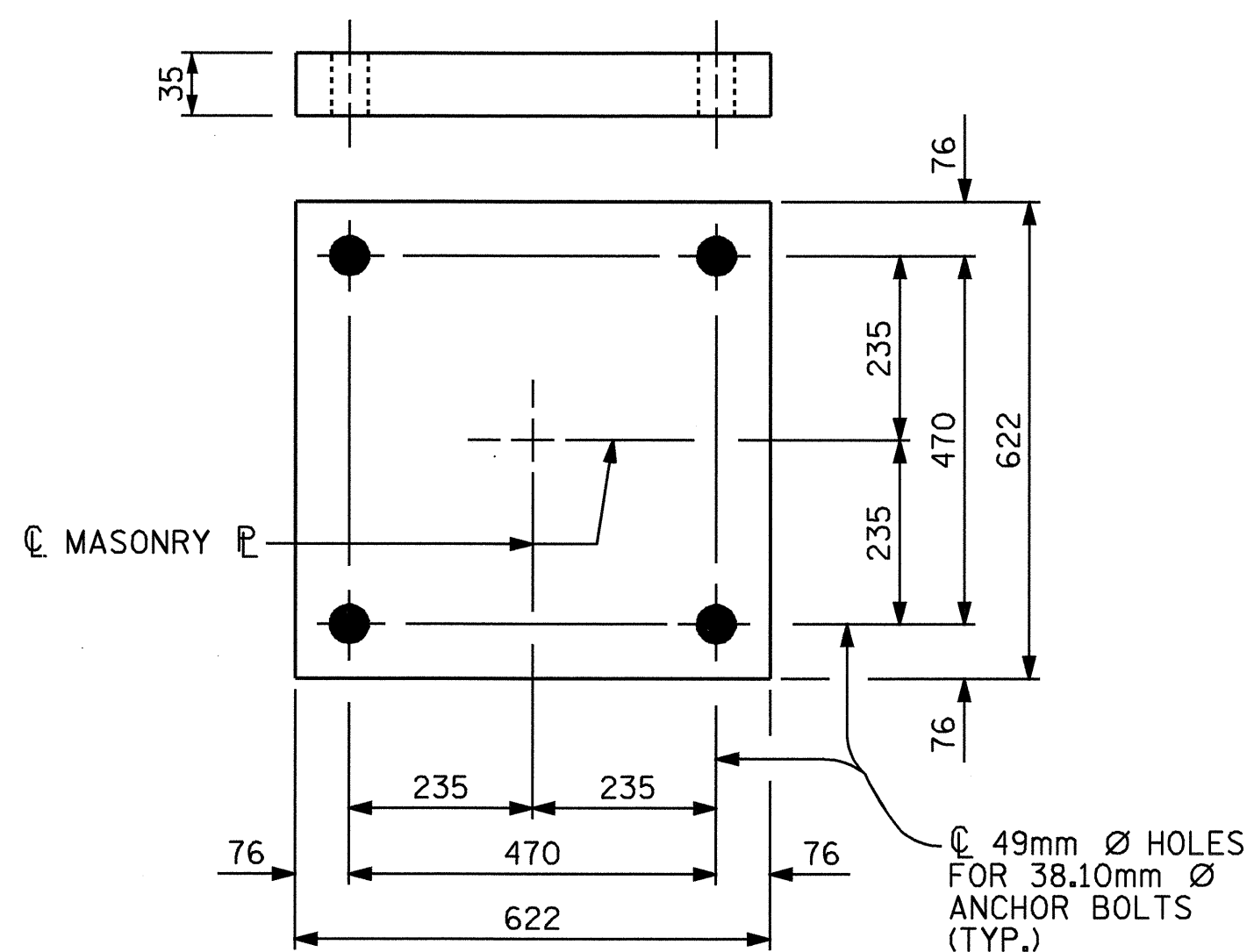
CUT-AWAY PLAN
PB1 @ BENT 1



SECTIONS A-A

PB1
(10 REQ'D)

POT BEARING DETAILS

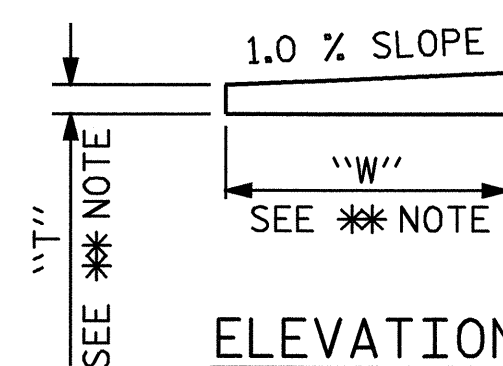


PLAN

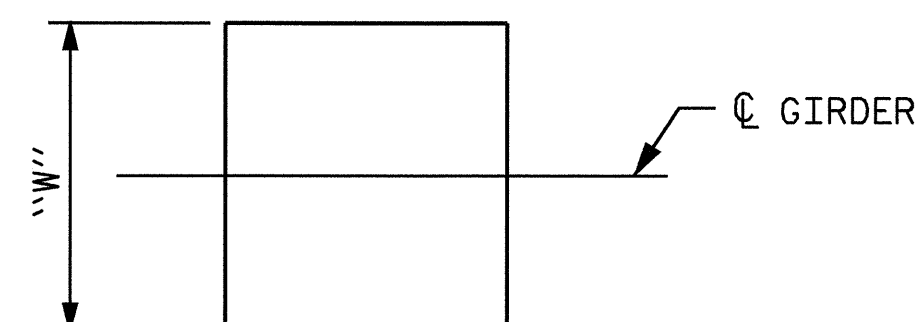
M1
(10 REQ'D)

MASONRY PLATE DETAILS

INCREASING STATIONS →



ELEVATION



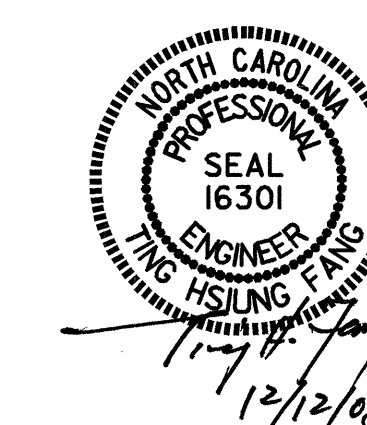
PLAN

** NOTE:
DIMENSIONS "W" AND "T" ARE TO BE
DETERMINED BY THE MANUFACTURER.

SOLE PLATE DETAILS

BEARING	LOCATION	VERTICAL LOAD (KN)			LATERAL LOAD (KN)	TOTAL MOVEMENT (mm)
		DEAD	LIVE	TOTAL		
PB1 (FIXED)	BENT 1	1599	932	2531	320	0

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-17
SUPERSTRUCTURE POT BEARING DETAILS						
REVISIONS						TOTAL SHEETS 42
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY : S. DOMBROWSKI	DATE : 10/08
CHECKED BY : TING FANG	DATE : 10/08
DRAWN BY : RWW 8/99	REV. 7/10/01 LES/RWW
CHECKED BY : LES 8/99	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

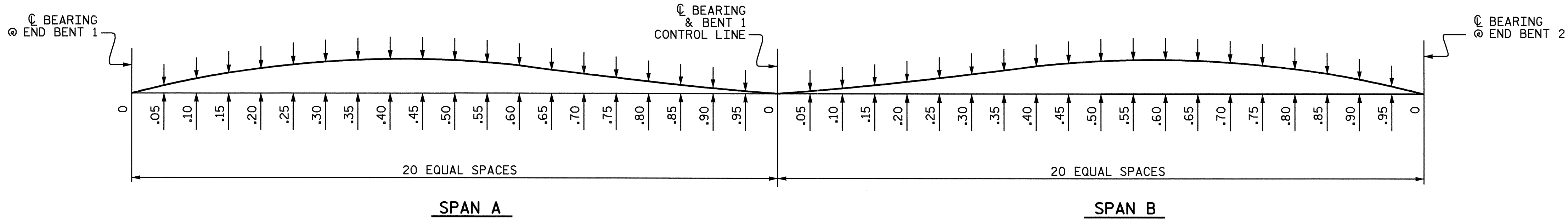
	SPAN A																				SPAN B																					
	GIRDER 1																				GIRDER 1																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.008	0.015	0.022	0.027	0.032	0.035	0.037	0.038	0.037	0.035	0.032	0.028	0.024	0.019	0.014	0.010	0.006	0.003	0.001	0.000	0.000	0.001	0.004	0.008	0.012	0.017	0.023	0.028	0.033	0.037	0.041	0.043	0.043	0.040	0.036	0.031	0.024	0.017	0.009	0.000	
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.003	0.004	0.005	0.006	0.007	0.007	0.007	0.007	0.007	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.008	0.008	0.008	0.007	0.007	0.006	0.004	0.003	0.002	0.000	
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.011	0.022	0.032	0.040	0.047	0.051	0.055	0.056	0.054	0.052	0.047	0.041	0.035	0.028	0.021	0.015	0.009	0.005	0.001	0.000	0.000	0.001	0.006	0.012	0.018	0.025	0.034	0.041	0.049	0.055	0.061	0.063	0.064	0.063	0.059	0.053	0.046	0.035	0.025	0.014	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.019	0.027	0.034	0.040	0.045	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.045	0.040	0.034	0.027	0.019	0.010	0.000	
REQUIRED CAMBER ↑	0	21	40	58	73	85	95	101	105	105	103	98	90	81	71	59	48	35	23	11	0	0	11	25	39	52	65	79	89	100	108	114	116	115	111	104	93	80	62	44	24	0

	GIRDER 2																				GIRDER 2																					
	GIRDER 2																				GIRDER 2																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.014	0.020	0.025	0.029	0.032	0.034	0.035	0.034	0.032	0.030	0.026	0.022	0.017	0.013	0.009	0.005	0.002	0.001	0.000	0.000	0.001	0.004	0.007	0.011	0.016	0.021	0.026	0.031	0.035	0.038	0.039	0.040	0.039	0.037	0.033	0.029	0.023	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.010	0.020	0.029	0.036	0.042	0.046	0.050	0.051	0.049	0.046	0.043	0.038	0.032	0.024	0.019	0.013	0.008	0.003	0.001	0.000	0.000	0.001	0.006	0.010	0.017	0.023	0.031	0.038	0.045	0.051	0.055	0.056	0.058	0.056	0.054	0.047	0.042	0.033	0.023	0.012	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.019	0.027	0.034	0.040	0.045	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.045	0.040	0.034	0.027	0.019	0.010	0.000	
REQUIRED CAMBER ↑	0	20	38	55	69	80	89	96	100	100	97	94	87	78	67	57	46	34	21	11	0	0	11	25	37	51	63	76	86	96	104	108	109	109	104	99	87	76	60	42	22	0

	GIRDER 3																				GIRDER 3																					
	GIRDER 3																				GIRDER 3																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.013	0.018	0.023	0.027	0.030	0.031	0.032	0.031	0.030	0.027	0.024	0.020	0.016	0.012	0.008	0.005	0.002	0.001	0.000	0.000	0.001	0.003	0.006	0.010	0.015	0.019	0.024	0.028	0.032	0.035	0.036	0.037	0.036	0.034	0.031	0.026	0.021	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.009	0.018	0.025	0.033	0.038	0.042	0.044	0.045	0.043	0.042	0.038	0.034	0.029	0.022	0.017	0.012	0.007	0.003	0.001	0.000	0.000	0.001	0.004	0.009	0.015	0.021	0.028	0.034	0.040	0.045	0.050	0.051	0.053	0.051	0.049	0.043	0.037	0.030	0.020	0.011	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.019	0.027	0.034	0.040	0.045	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.045	0.040	0.034	0.027	0.019	0.010	0.000	
REQUIRED CAMBER ↑	0	19	36	51	66	76	85	90	94	94	93	89	83	75	65	55	45	33	21	11	0	0	11	23	36	49	61	73	82	91	98	103	104	104	99	94	83	71	57	39	21	0

	GIRDERS 4 & 5																				GIRDERS 4 & 5																						
	GIRDERS 4 & 5																				GIRDERS 4 & 5																						
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	
TWENTIETH POINTS																																											
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000		
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.010	0.015	0.019	0.022	0.024	0.026	0.026	0.026	0.024	0.022	0.020	0.016	0.013	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.001	0.003	0.006	0.009	0.013	0.018	0.022	0.026	0.029	0.031	0.033	0.033	0.033	0.031	0.028	0.024	0.019	0.013	0.007	0.000	
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.007	0.014	0.021	0.027	0.031	0.034	0.037	0.037	0.036	0.034	0.031	0.028	0.023	0.018	0.014	0.010	0.006	0.003	0.000	0.000	0.000	0.001	0.004	0.008	0.013	0.018	0.025	0.030	0.036	0.040	0.043	0.045	0.045	0.043	0.038	0.033	0.026	0.018	0.010	0.000		
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.019	0.027	0.034	0.040	0.045	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.045	0.040	0.034	0.027	0.019	0.010	0.000		
REQUIRED CAMBER ↑	0	17	32	47	60	69	77	83	86	87	85	82	77	69	61	52	43	32	21	10	0	0	11	23	35	47	58	70	78	87	93	96	98	97	93	88	78	67	53	37	20	0	

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
 ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.
 VALUES GIVEN IN TABLE ARE AT TWENTIETH POINTS BETWEEN \varnothing BEARINGS.



SCHEMATIC OF CAMBER ORDINATES
 FOR CAMBER VALUES AT EACH GIRDER TWENTIETH POINTS, SEE TABLE ABOVE.
 SLOPE FOR ZERO CAMBER BASE LINE VARIES.

DRAWN BY : A. R. CHESSON DATE : 9/30/08
 CHECKED BY : H. B. SHAH

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

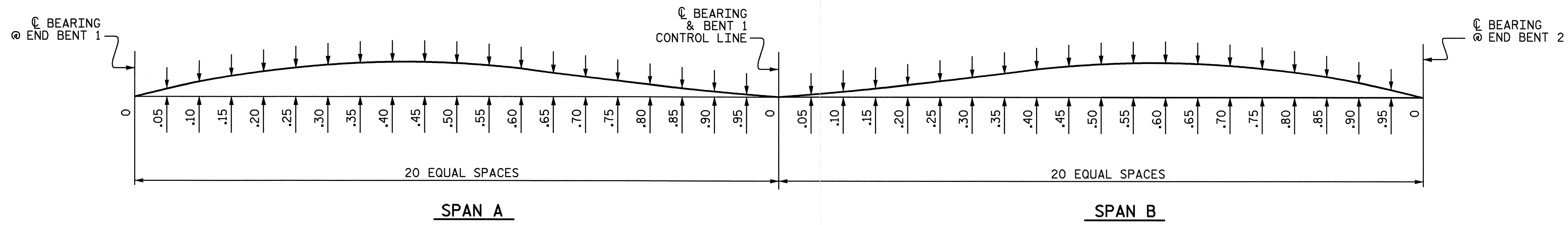
	SPAN A																				SPAN B																					
	GIRDERS 6 & 7																				GIRDERS 6 & 7																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.012	0.018	0.023	0.026	0.029	0.031	0.031	0.031	0.029	0.026	0.023	0.020	0.016	0.012	0.008	0.005	0.002	0.000	0.000	0.000	0.001	0.003	0.006	0.010	0.014	0.019	0.023	0.027	0.031	0.034	0.035	0.036	0.035	0.033	0.030	0.026	0.020	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.008	0.016	0.024	0.031	0.035	0.039	0.042	0.042	0.041	0.039	0.035	0.031	0.027	0.021	0.016	0.011	0.007	0.003	0.000	0.000	0.000	0.001	0.004	0.008	0.014	0.019	0.026	0.031	0.037	0.042	0.046	0.047	0.049	0.047	0.045	0.040	0.035	0.027	0.019	0.010	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.004	0.008	0.014	0.019	0.026	0.031	0.037	0.042	0.046	0.047	0.049	0.047	0.045	0.040	0.035	0.027	0.019	0.010	0.000	
REQUIRED CAMBER ↑	0	18	34	50	64	73	82	88	91	92	90	86	80	73	64	54	44	33	21	10	0	0	11	23	35	48	59	71	79	88	95	99	100	100	95	90	80	69	54	38	20	0

	GIRDER 8																				GIRDER 8																					
	GIRDER 8																				GIRDER 8																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.013	0.019	0.024	0.028	0.031	0.033	0.033	0.032	0.031	0.028	0.025	0.021	0.017	0.012	0.008	0.005	0.002	0.000	0.000	0.000	0.001	0.003	0.007	0.011	0.015	0.020	0.025	0.029	0.033	0.036	0.037	0.038	0.037	0.035	0.032	0.027	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.010	0.018	0.026	0.034	0.039	0.043	0.046	0.046	0.044	0.043	0.039	0.035	0.030	0.023	0.017	0.012	0.007	0.003	0.000	0.000	0.000	0.001	0.004	0.010	0.016	0.021	0.029	0.035	0.041	0.046	0.051	0.052	0.054	0.052	0.050	0.044	0.038	0.030	0.021	0.012	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.004	0.010	0.016	0.021	0.029	0.035	0.041	0.046	0.051	0.052	0.054	0.052	0.050	0.044	0.038	0.030	0.021	0.012	0.000	
REQUIRED CAMBER ↑	0	20	36	52	67	77	86	92	95	95	94	90	84	76	66	55	45	33	21	10	0	0	11	23	37	50	61	74	83	92	99	104	105	105	100	95	84	72	57	40	22	0

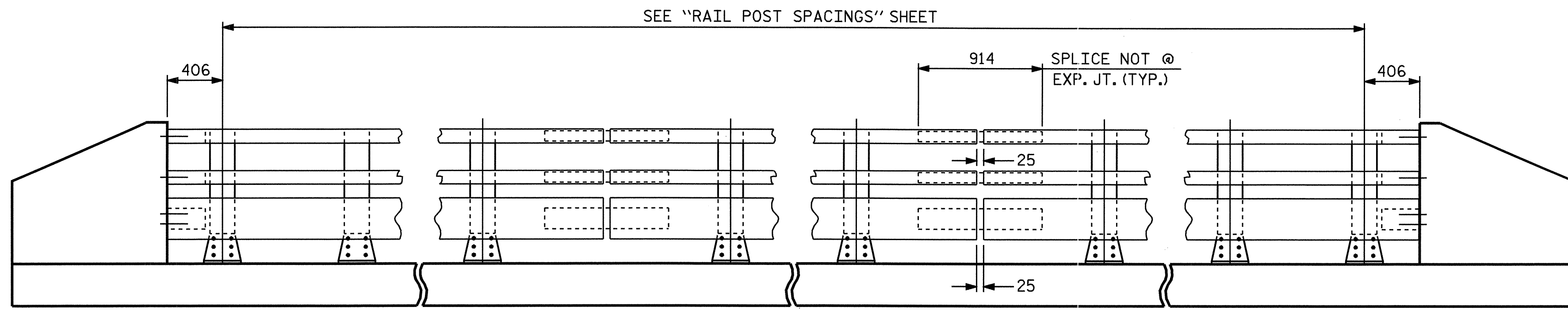
	GIRDER 9																				GIRDER 9																					
	GIRDER 9																				GIRDER 9																					
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	
TWENTIETH POINTS																																										
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.014	0.020	0.025	0.029	0.032	0.034	0.035	0.034	0.032	0.030	0.026	0.022	0.017	0.013	0.009	0.005	0.002	0.000	0.000	0.000	0.001	0.004	0.007	0.011	0.016	0.021	0.026	0.031	0.035	0.038	0.040	0.040	0.039	0.037	0.034	0.029	0.023	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.010	0.020	0.029	0.036	0.042	0.046	0.050	0.051	0.049	0.046	0.043	0.038	0.032	0.024	0.019	0.013	0.008	0.003	0.000	0.000	0.000	0.001	0.006	0.010	0.017	0.023	0.031	0.038	0.045	0.051	0.055	0.057	0.058	0.056	0.054	0.048	0.042	0.033	0.023	0.012	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.006	0.010	0.017	0.023	0.031	0.038	0.045	0.051	0.055	0.057	0.058	0.056	0.054	0.048	0.042	0.033	0.023	0.012	0.000	
REQUIRED CAMBER ↑	0	20	38	55	69	80	89	96	100	100	97	94	87	78	67	57	46	34	21	10	0	0	11	25	37	51	63	76	86	96	104	108	110	109	104	99	88	76	60	42	22	0

	GIRDER 10																				GIRDER 10																						
	GIRDER 10																				GIRDER 10																						
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0		
TWENTIETH POINTS																																											
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.11	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.013	0.012	0.012	0.010	0.009	0.007	0.005	0.003	0.000		
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.015	0.021	0.027	0.031	0.034	0.036	0.037	0.036	0.034	0.031	0.027	0.023	0.018	0.014	0.009	0.006	0.003	0.001	0.000	0.000	0.000	0.001	0.004	0.007	0.012	0.017	0.022	0.027	0.032	0.036	0.040	0.042	0.042	0.041	0.039	0.035	0.030	0.024	0.017	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.001	0.003	0.004	0.005	0.006	0.006	0.007	0.007	0.007	0.007	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.006	0.004	0.003	0.002	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.010	0.022	0.031	0.040	0.046	0.050	0.054	0.055	0.053	0.051	0.046	0.040	0.034	0.027	0.021	0.014	0.009	0.005	0.001	0.000	0.000	0.001	0.006	0.011	0.018	0.025	0.033	0.040	0.048	0.054	0.060	0.062	0.063	0.061	0.058	0.052	0.045	0.035	0.025	0.013	0.000	
VERTICAL CURVE ORDINATE ↑	0.000	0.010	0.018	0.026	0.033	0.038	0.043	0.046	0.049	0.051	0.051	0.049	0.046	0.043	0.038	0.033	0.026	0.018	0.010	0.000	0.000	0.001	0.006	0.011	0.018	0.025	0.033	0.040	0.048	0.054	0.060	0.062	0.063	0.061	0.058	0.052	0.045	0.035	0.025	0.013	0.000		
REQUIRED CAMBER ↑	0	20	40	57	73	84	93	100	104	104	102	97	89	80	70	59	47	35	23	11	0	0	11	25	38	52	65	78	88	99	107	113	115	114	109	103	92	79	62	44	23	0	

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
 ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.
 VALUES GIVEN IN TABLE ARE AT TWENTIETH POINTS BETWEEN ϕ BEARINGS.

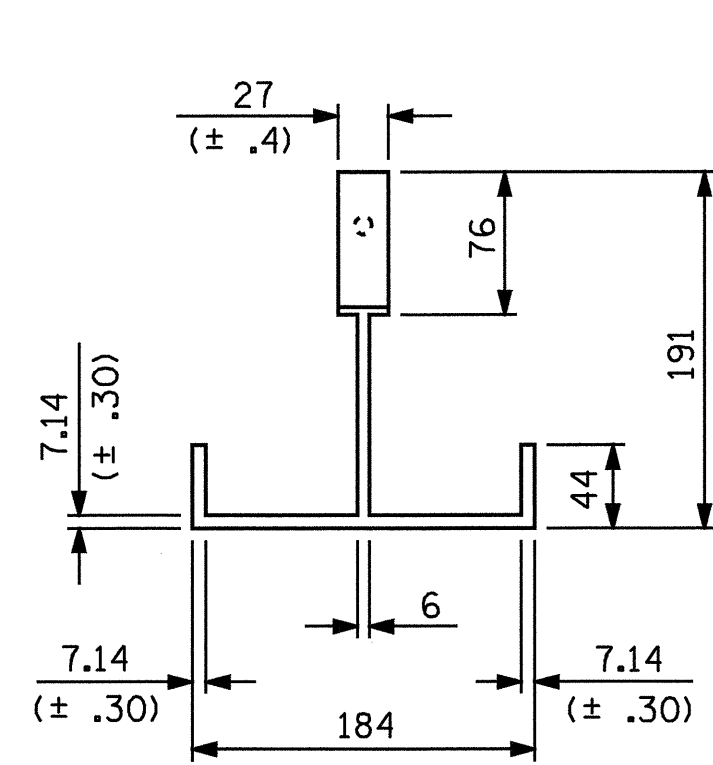


DRAWN BY : A. R. CHESSON DATE : 9/30/08
 CHECKED BY : H. B. SHAH DATE : 10/3/08

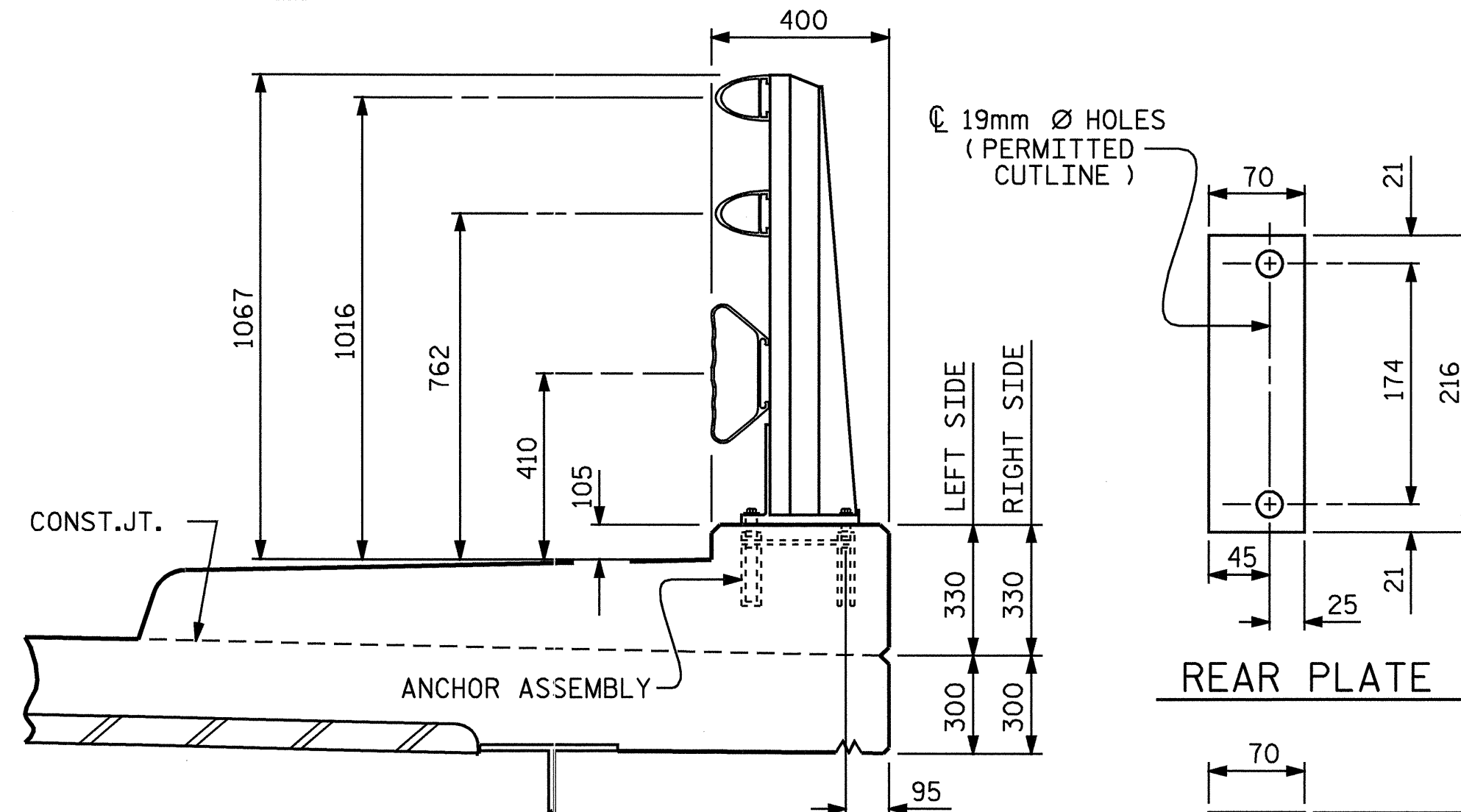


NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD No. BMR7SM.

ELEVATION



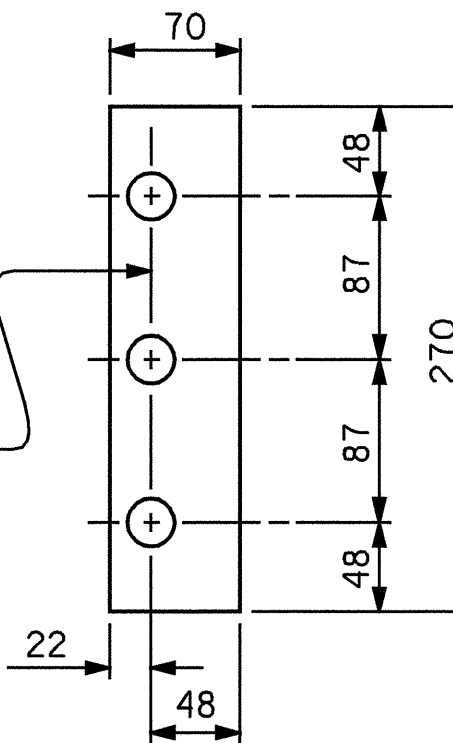
PLAN



SECTION THRU RAIL

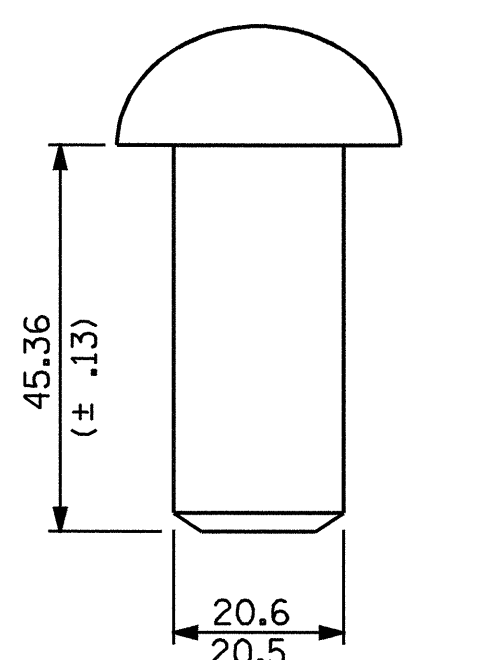
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STANDARD No. BMR6SM

REAR PLATE

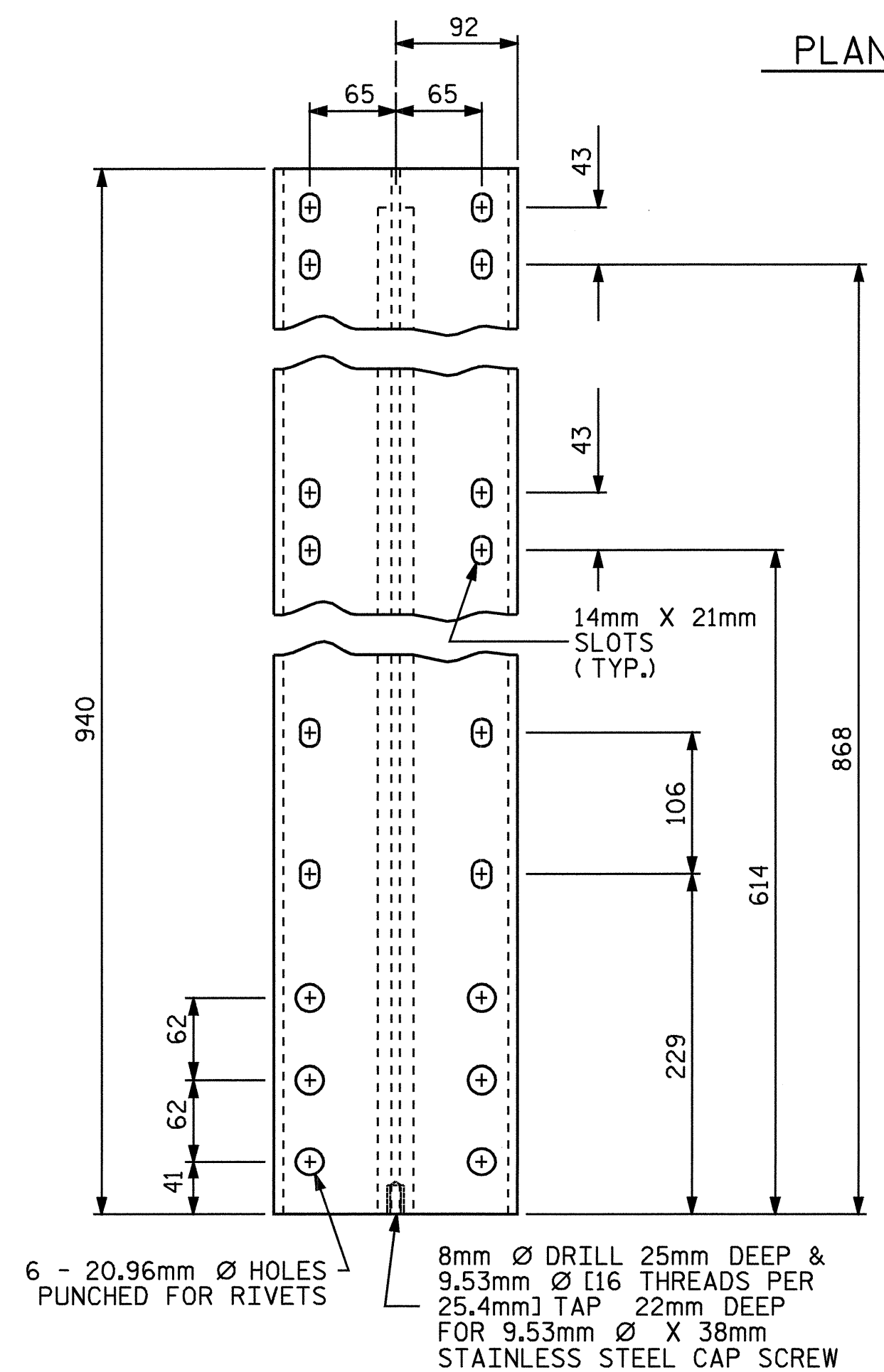


FRONT PLATE SHIM DETAILS

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



RIVET DETAIL

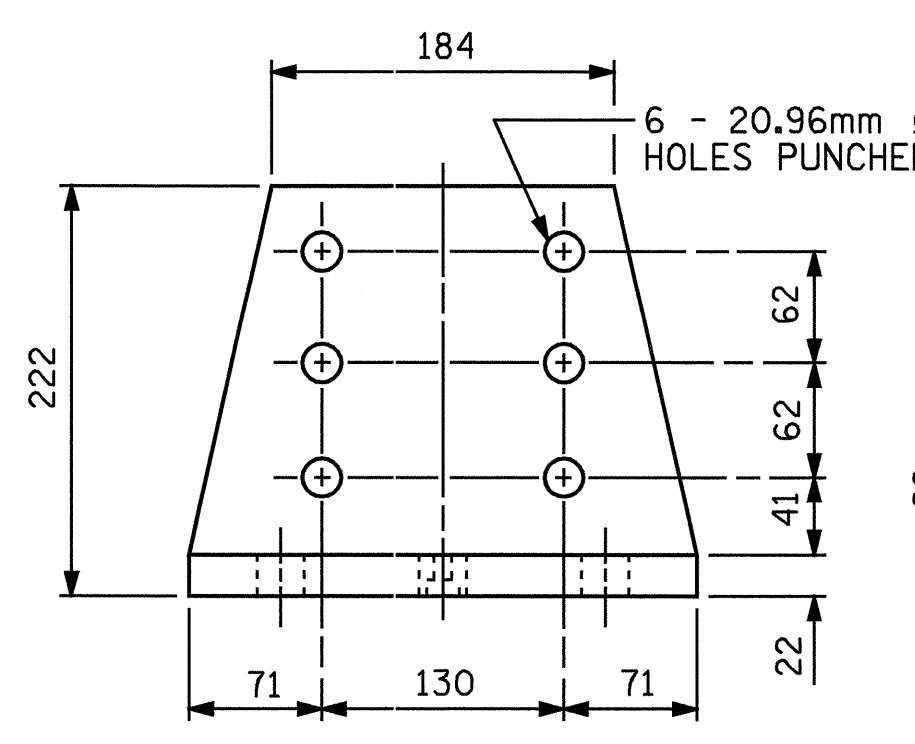


FRONT ELEVATION

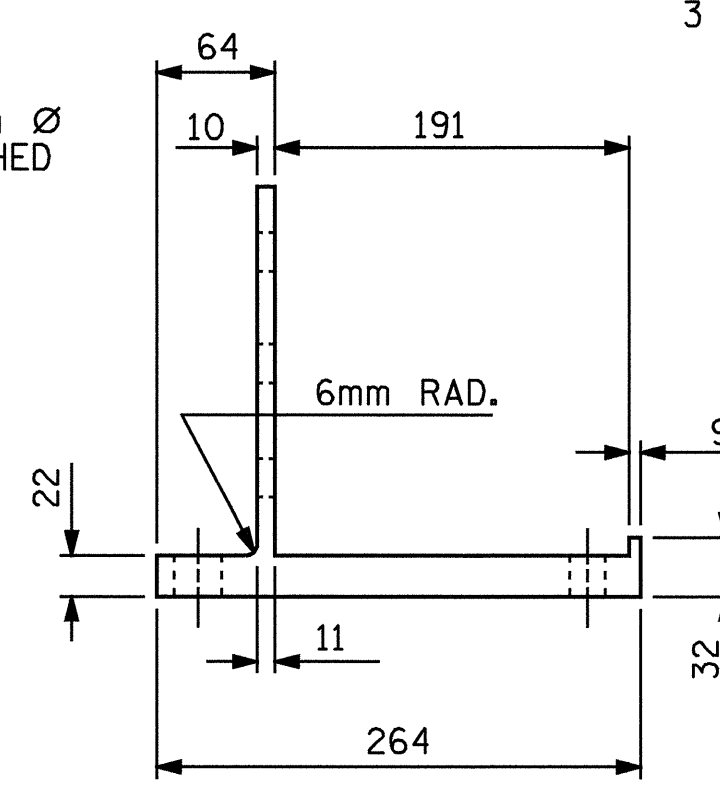
SIDE ELEVATION

DETAILS OF POST

6 - 20.96mm Ø HOLES PUNCHED FOR RIVETS
 8mm Ø DRILL 25mm DEEP & 9.53mm Ø [16 THREADS PER 25.4mm] TAP 22mm DEEP FOR 9.53mm Ø X 38mm STAINLESS STEEL CAP SCREW

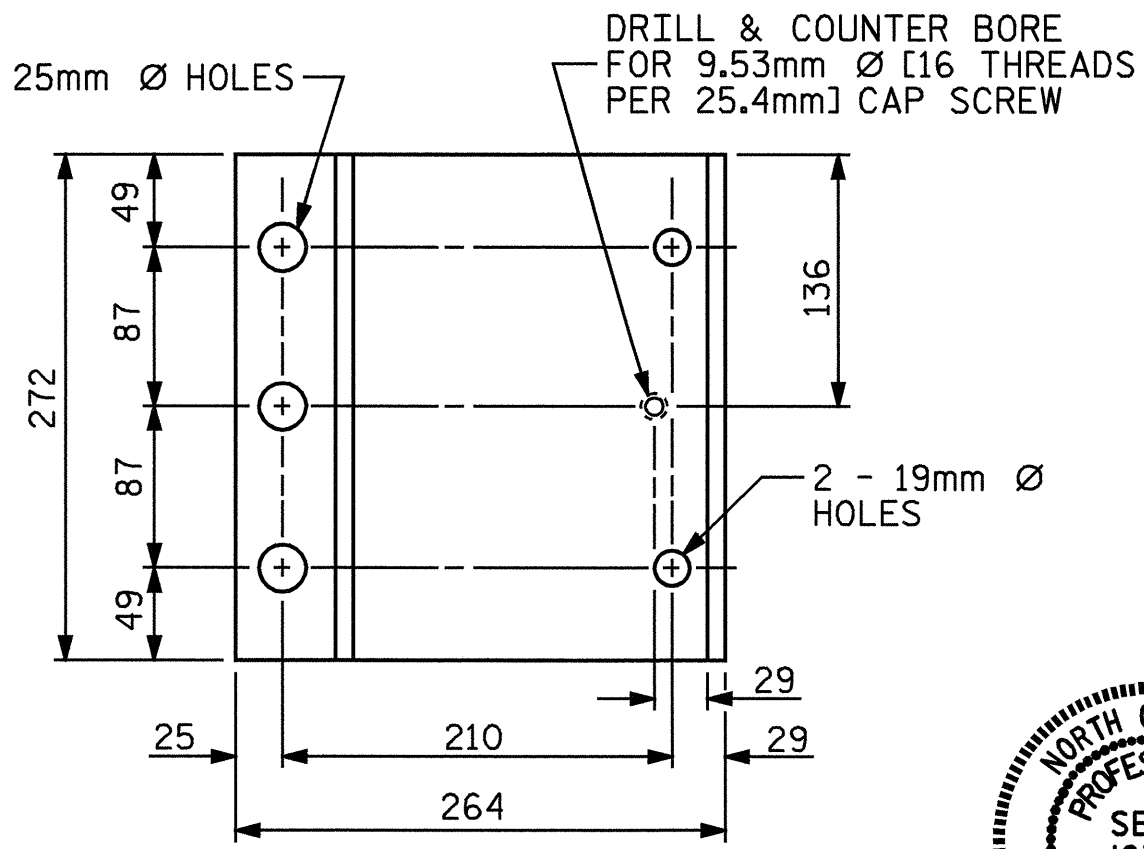


FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS



PLAN

PAY LENGTH = 134.564 METERS

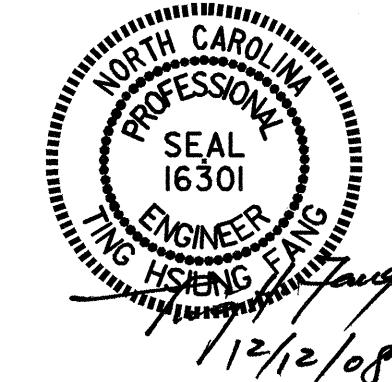
METAL RAIL PAY LENGTH	
STAGE I	67.282 METERS
STAGE II	67.282 METERS
TOTAL	134.564 METERS

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 1 OF 3

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS	42
2			4				

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



ASSEMBLED BY : HARISH SHAH DATE : 10/08
 CHECKED BY : TING FANG DATE : 10/08
 DRAWN BY : JMB 1/88
 CHECKED BY : GCH 1/88

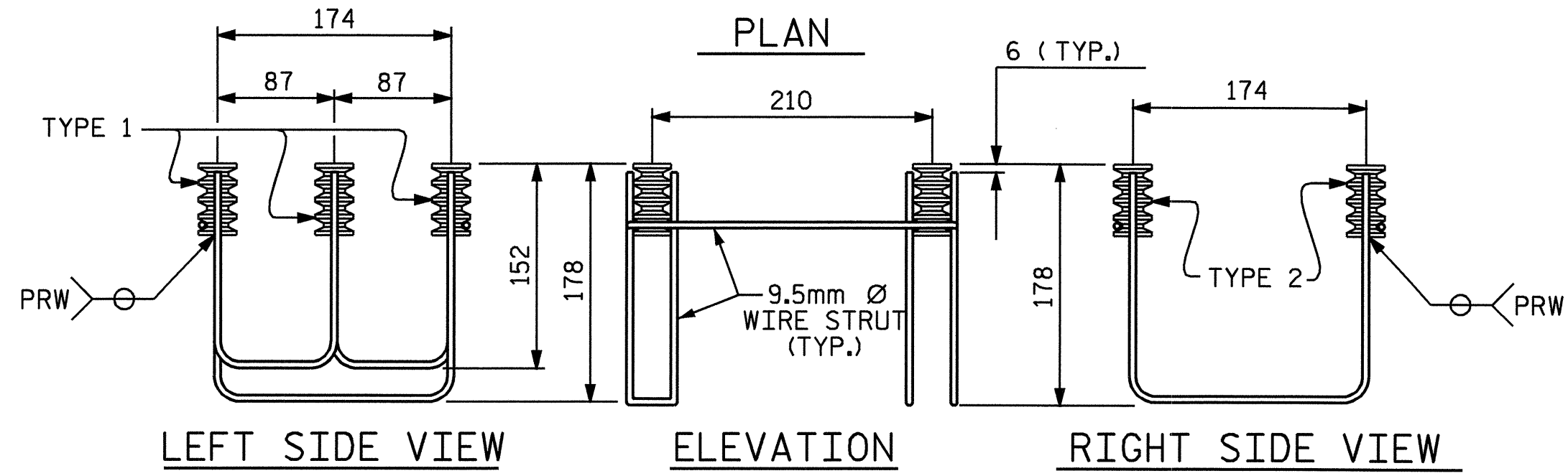
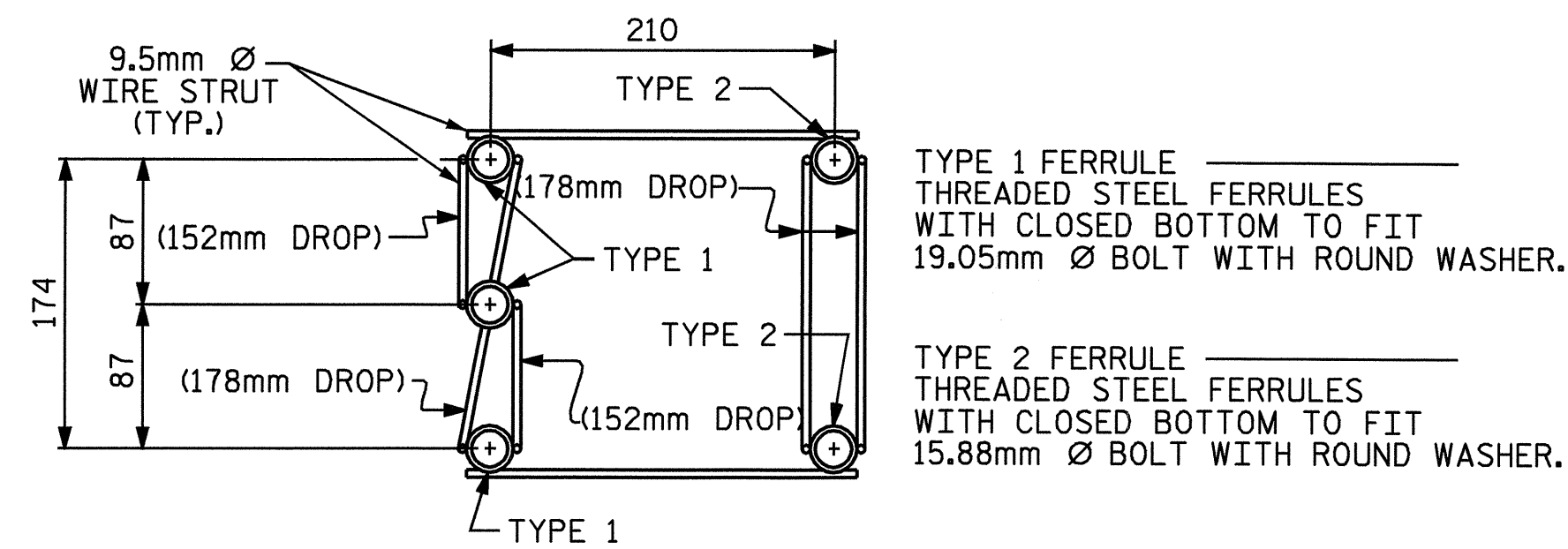
REV. 10/17/00 LES/RDR
 REV. 5/1/03 RWW/JTE
 REV. 5/1/06 TLA/GM

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

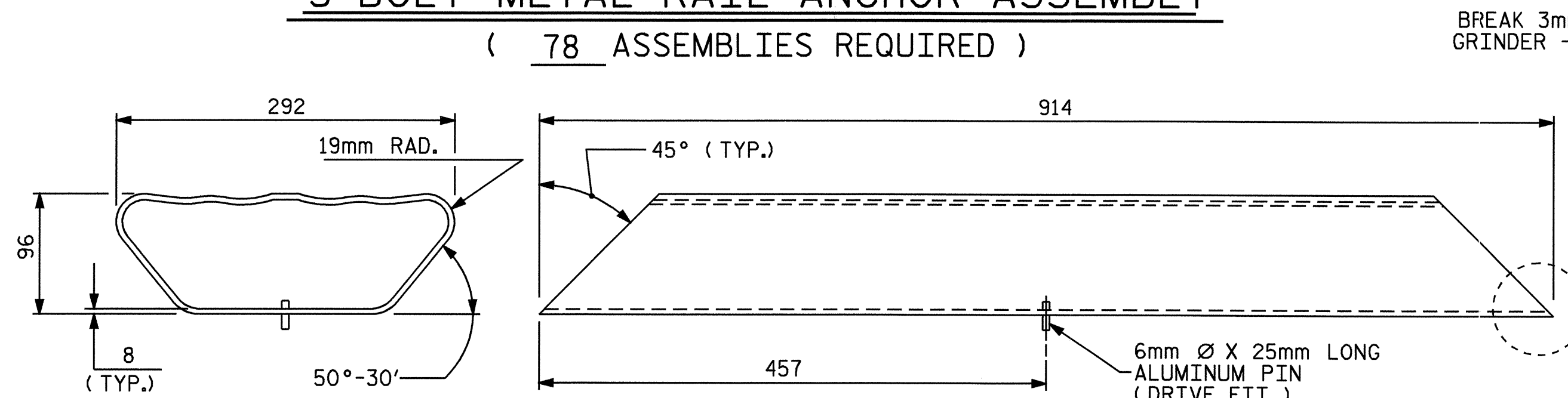
THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- 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 19.05mm FERRULES AND 45mm FOR 15.88mm FERRULES.
- B. 3 -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. 2 -15.88mm Ø X 57mm 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 15.88mm Ø X 57mm 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.
- D. 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 MINIMUM TENSILE STRENGTH OF 620 MPa. IS ACCEPTABLE.
- E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- F. 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.
- G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



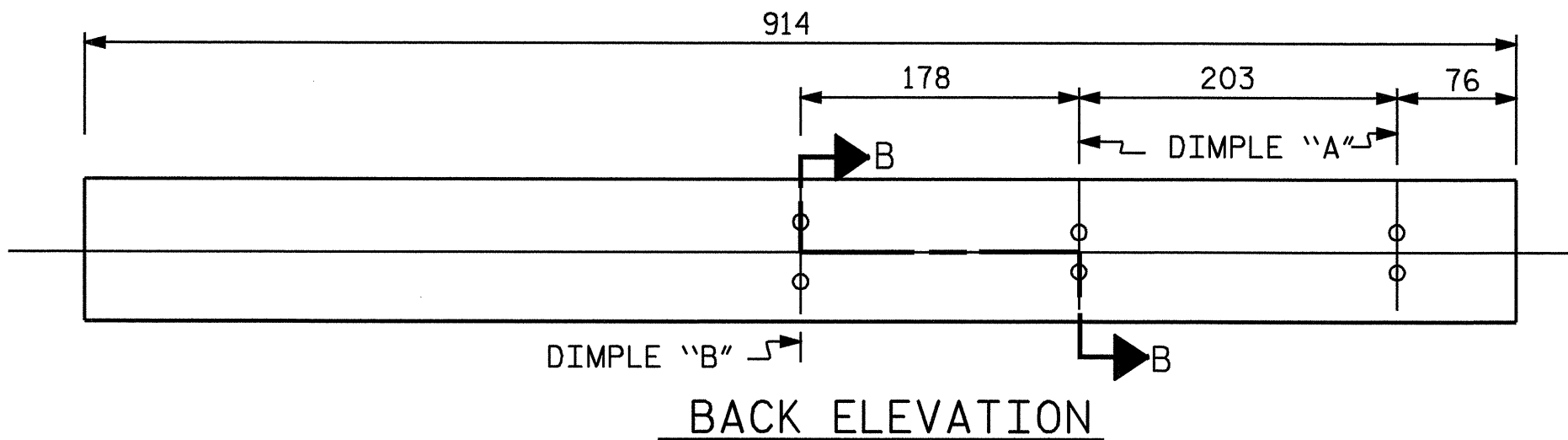
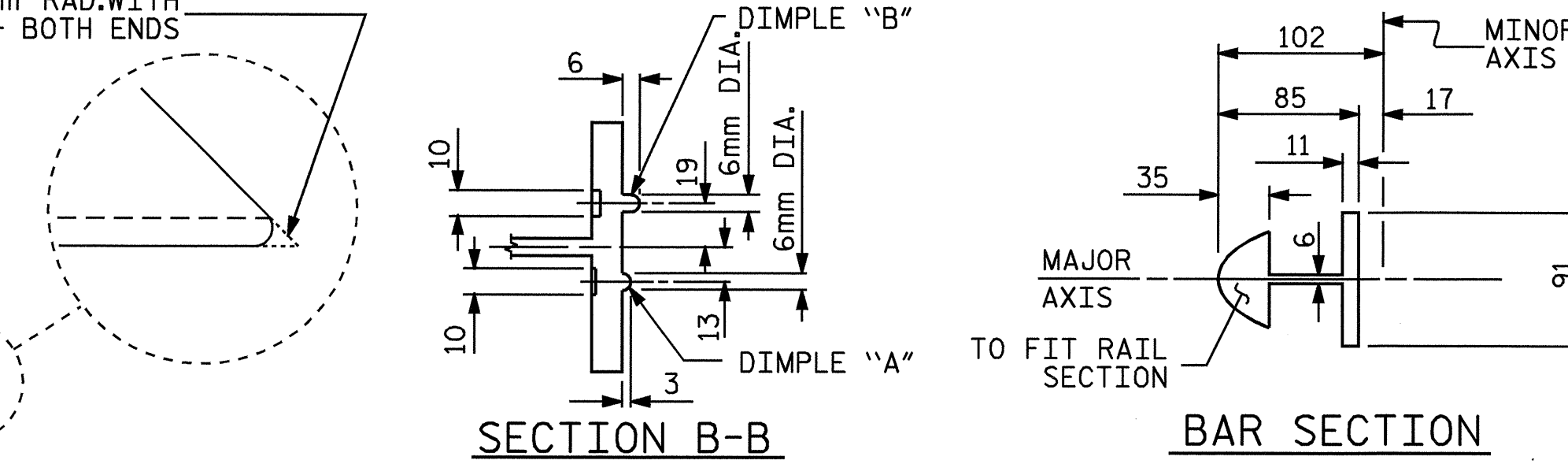
5-BOLT METAL RAIL ANCHOR ASSEMBLY

(78 ASSEMBLIES REQUIRED)

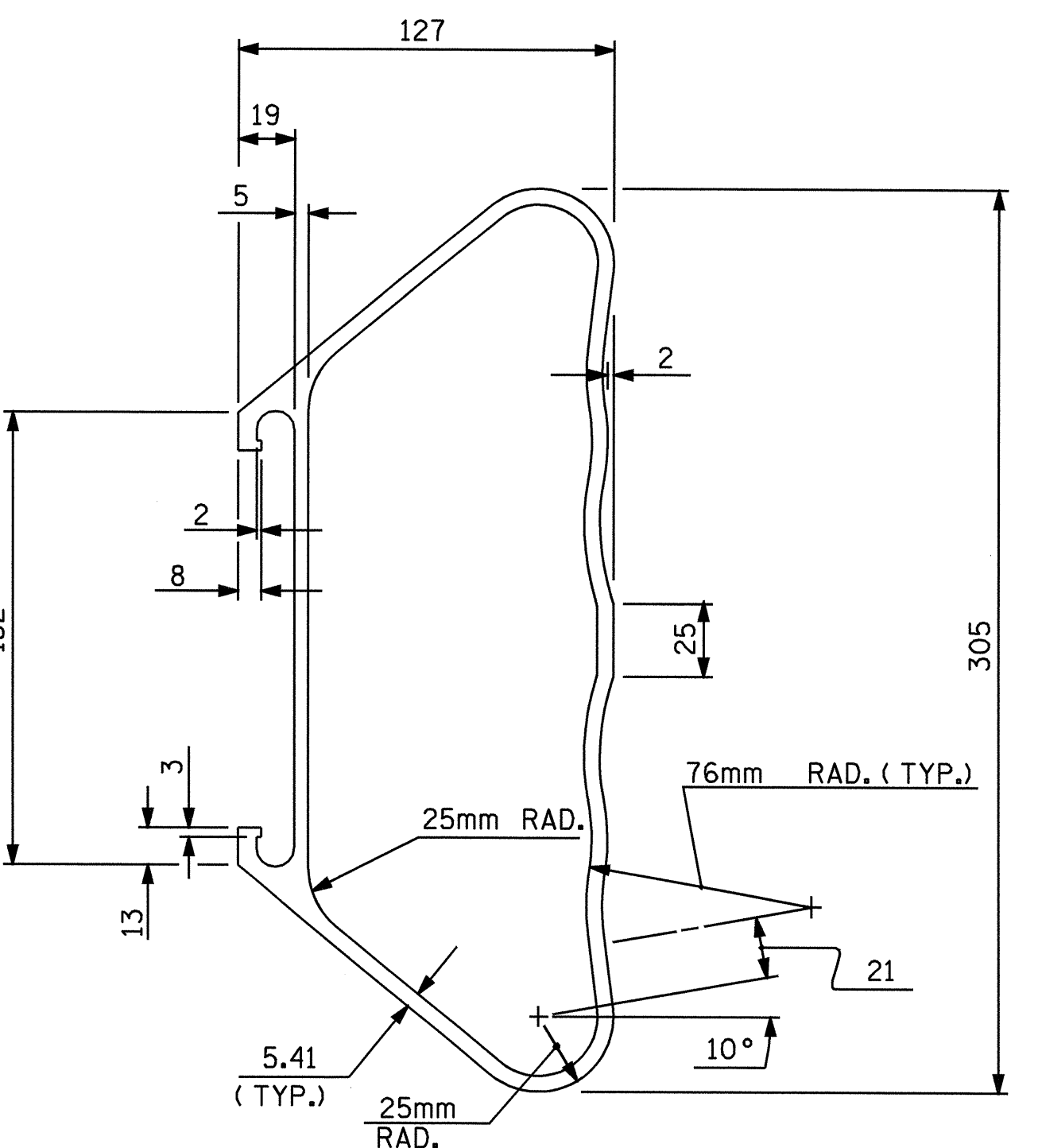
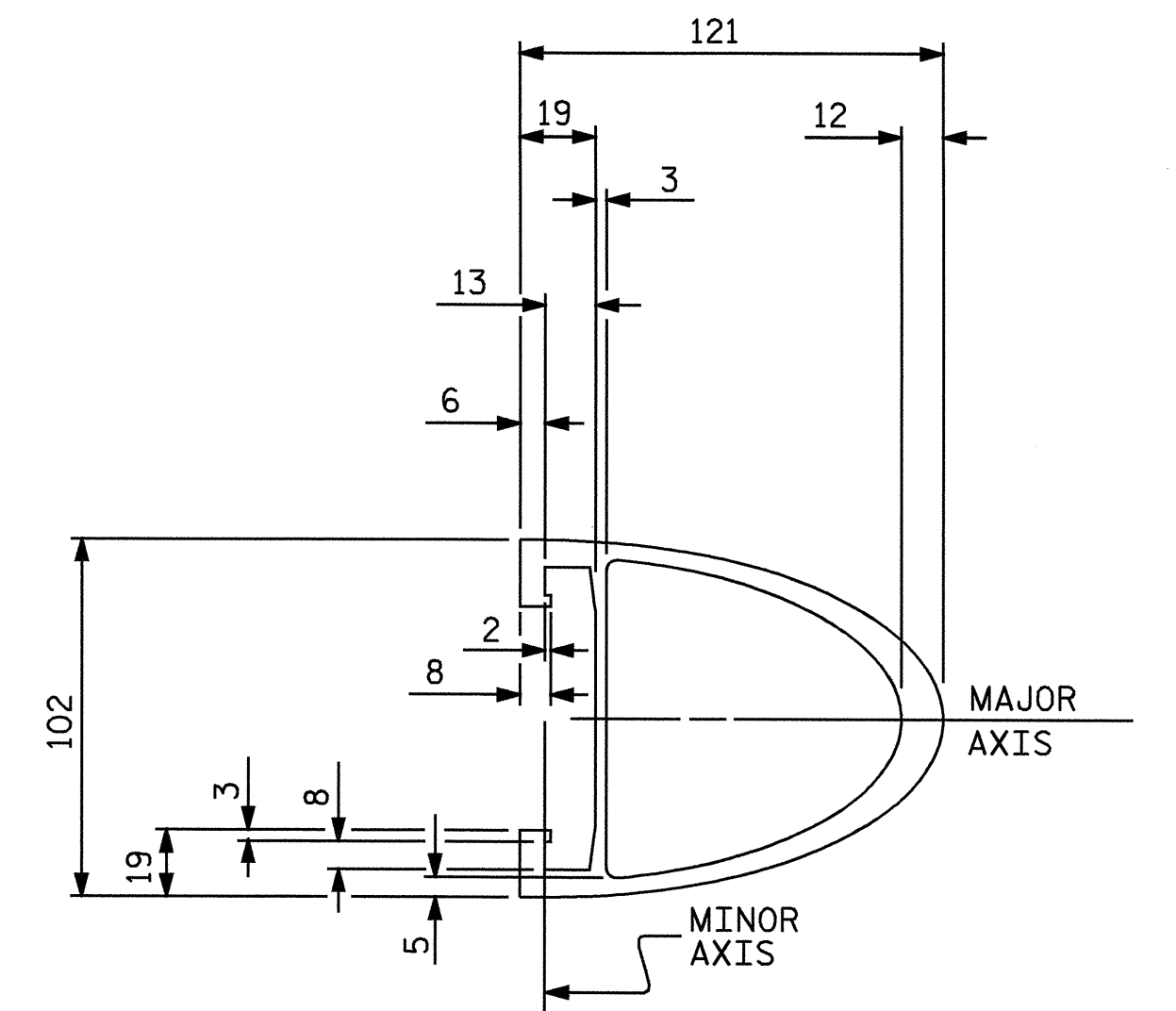


BOTTOM RAIL EXPANSION BAR

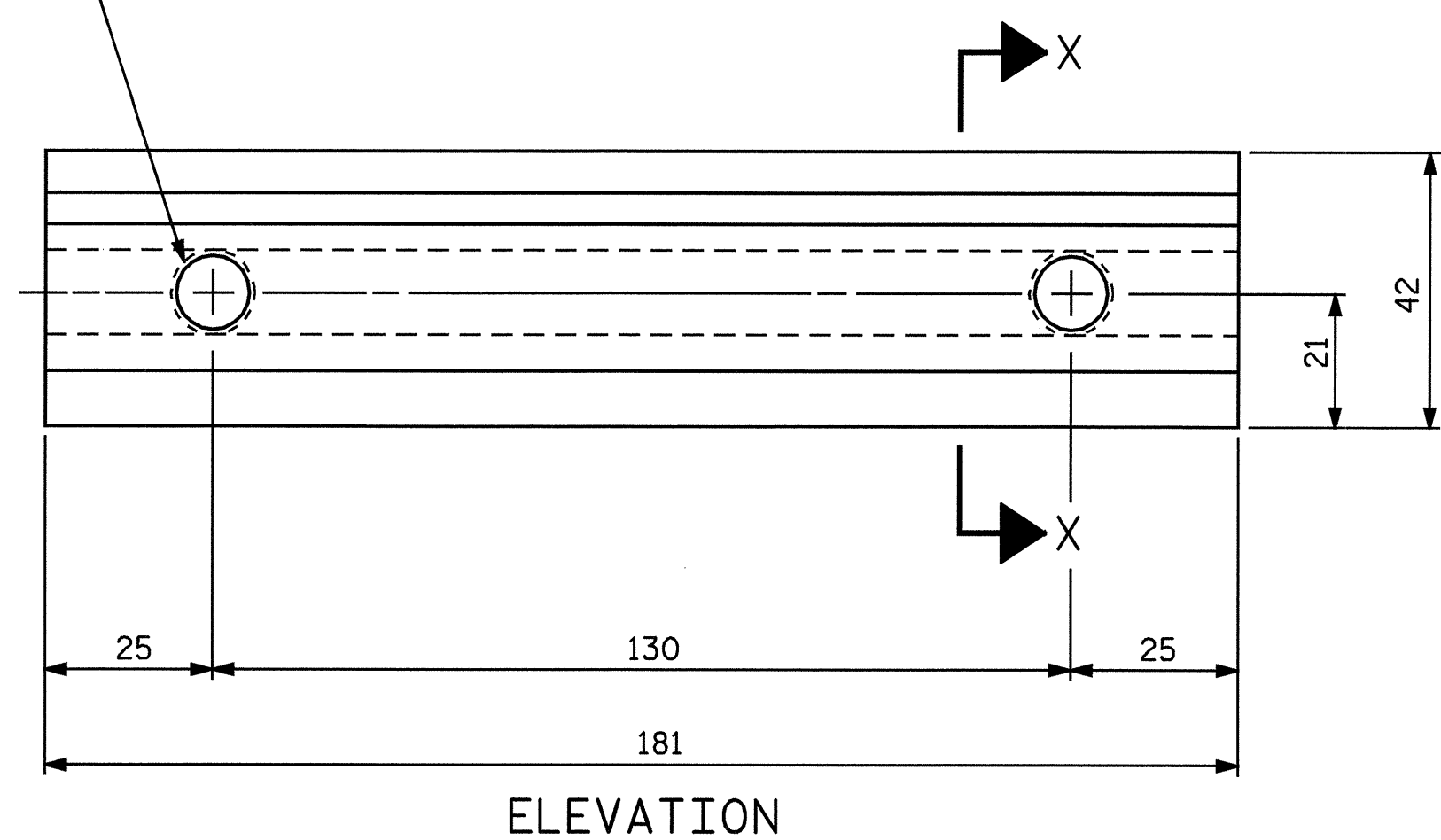
BREAK 3mm RAD. WITH GRINDER - BOTH ENDS



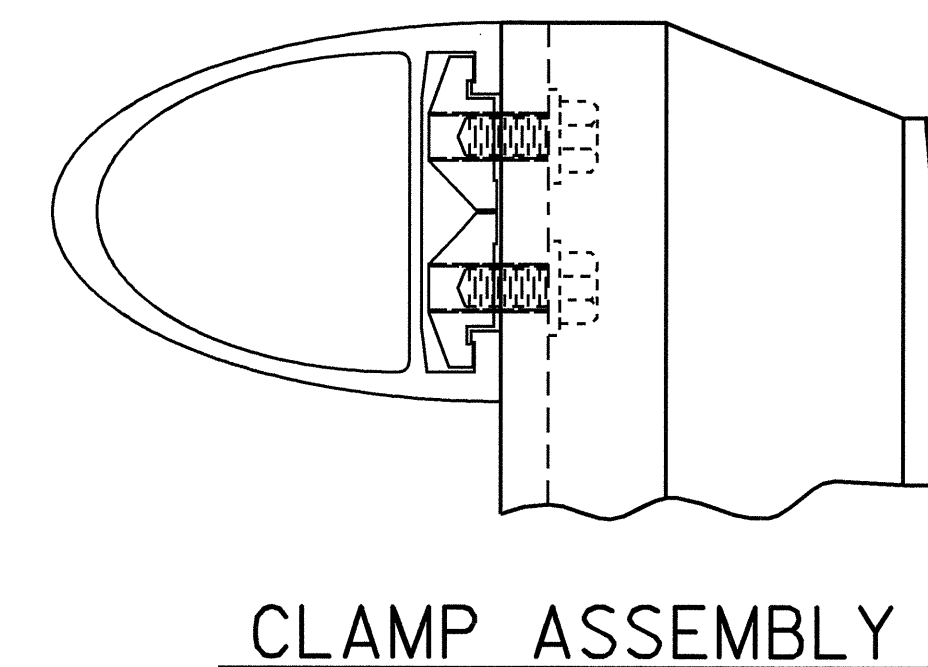
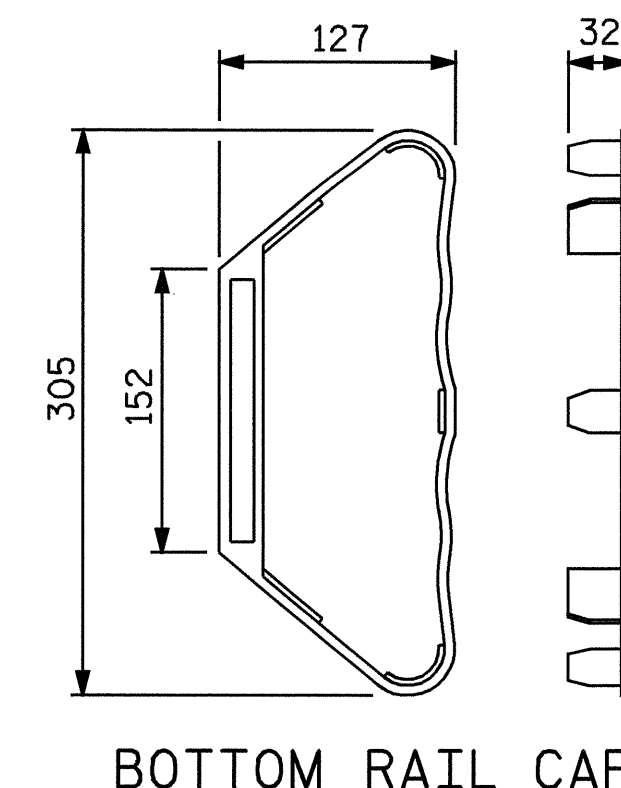
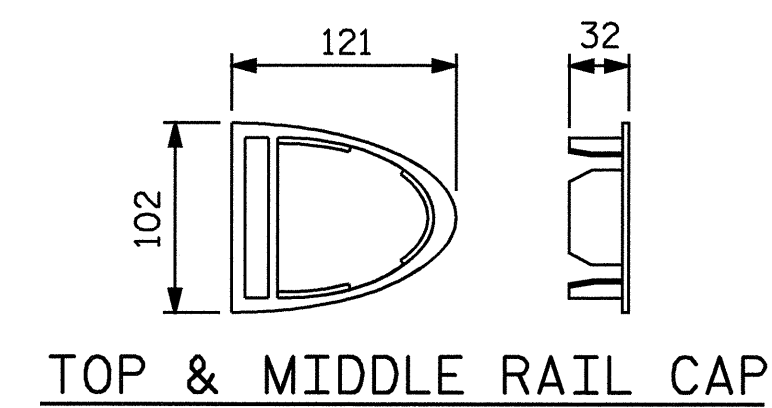
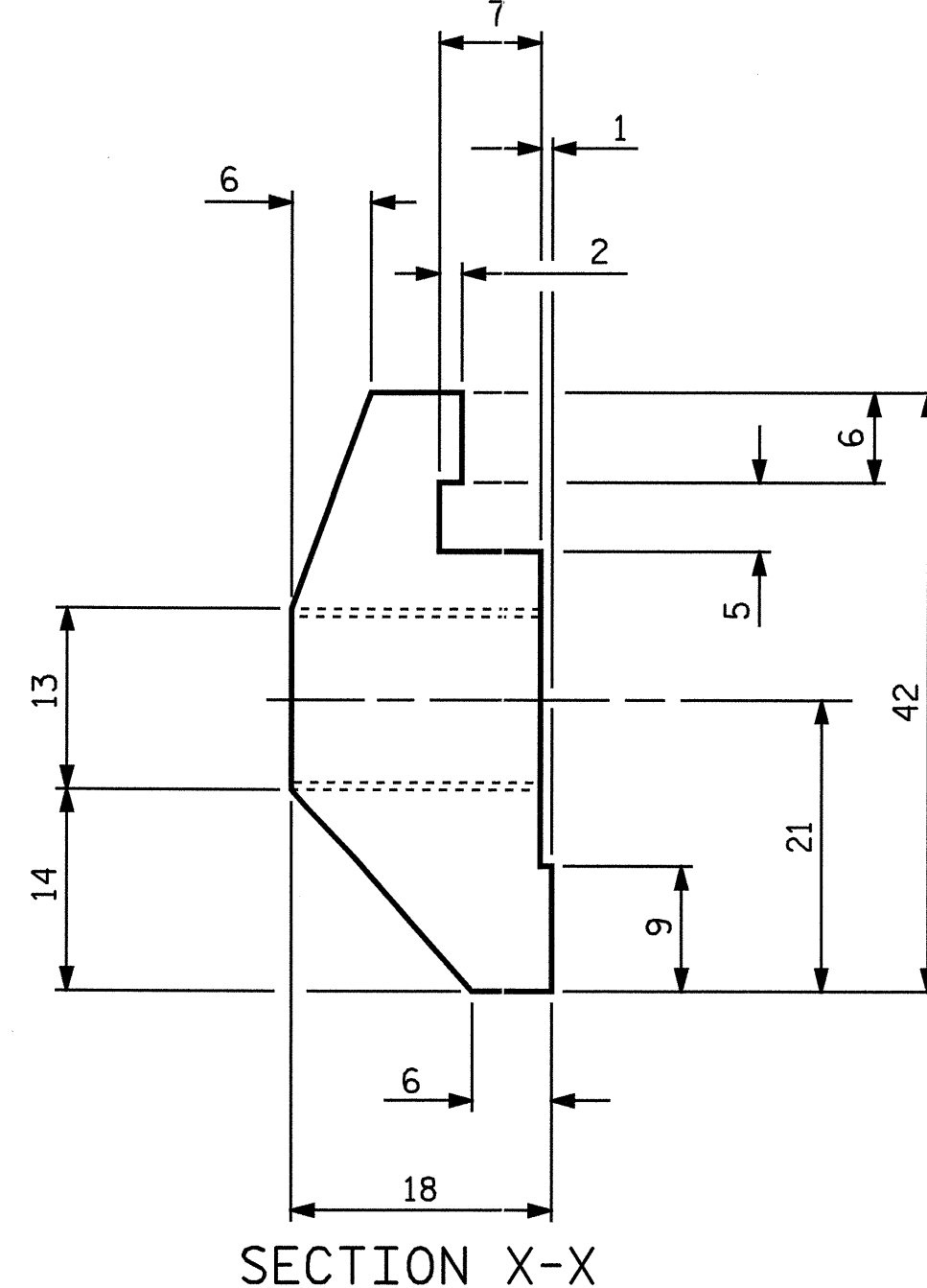
TOP & MIDDLE RAIL EXPANSION BAR



12.70mm Ø [13 THREADS PER 25.4mm] HOLE FOR 12.70mm Ø X 25mm STAINLESS STEEL HEX HEAD CAP SCREW & 27mm O.D., 14mm I.D., 2mm THICK WASHER (TYP.)



CLAMP BAR DETAIL
(6 REQUIRED PER POST)



PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
STATION: 22+27.571 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3 BAR METAL RAIL

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	5-21	
1			3			TOTAL SHEETS 42	
2			4				

ASSEMBLED BY : HARISH SHAH	DATE : 10/08	
CHECKED BY : TING FANG	DATE : 10/08	
DRAWN BY : JMB 1/88	REV. 7/10/01	RWW/LES
CHECKED BY : GCH 1/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

NOTES

METAL RAIL TO END POST CONNECTION

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

- A. 12mm PLATES SHALL CONFORM TO AASHTO M270 GRADE 250 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 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.
- C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 16° C. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
- D. STANDARD CLAMP BARS (SEE STD. No. BMR6).

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

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.

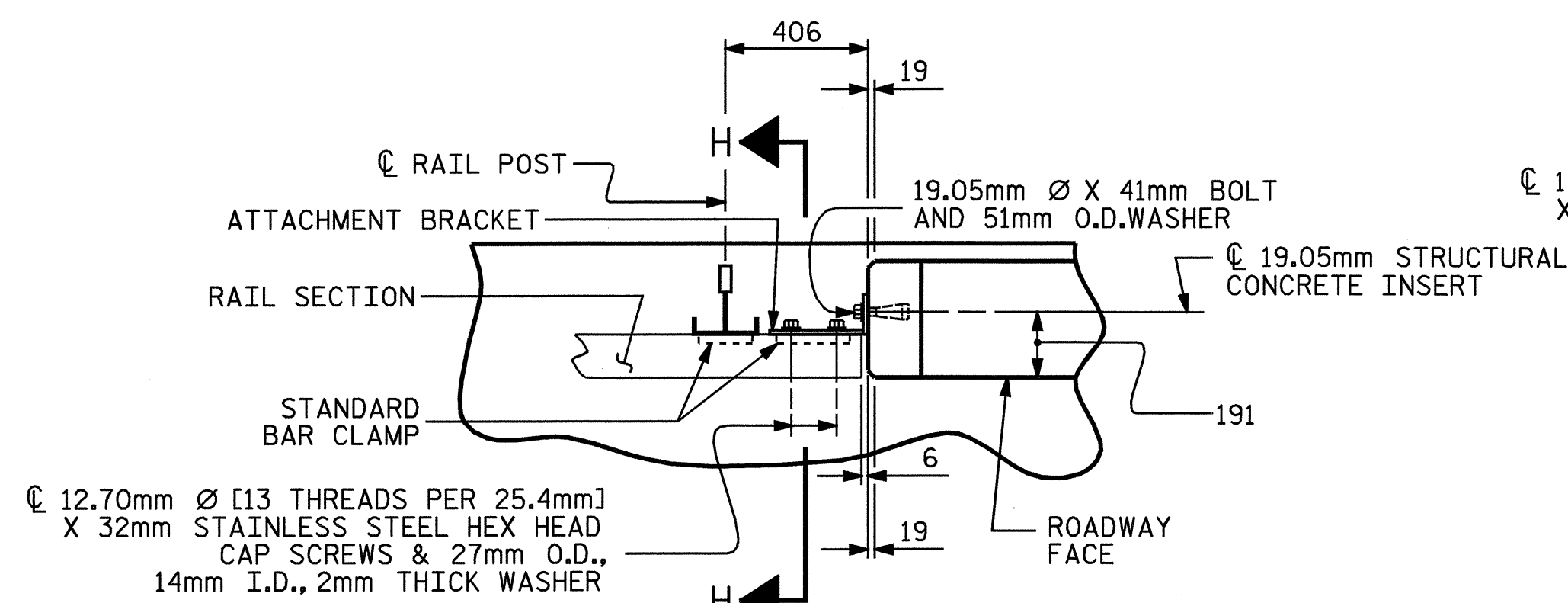
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 19.05mm Ø X 41mm BOLT WITH WASHER SHALL BE REPLACED WITH A 19.05mm Ø X 165mm BOLT AND 51mm O.D. WASHER. ALL SPECIFICATIONS WHICH 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.

NOTES

STRUCTURAL CONCRETE INSERT

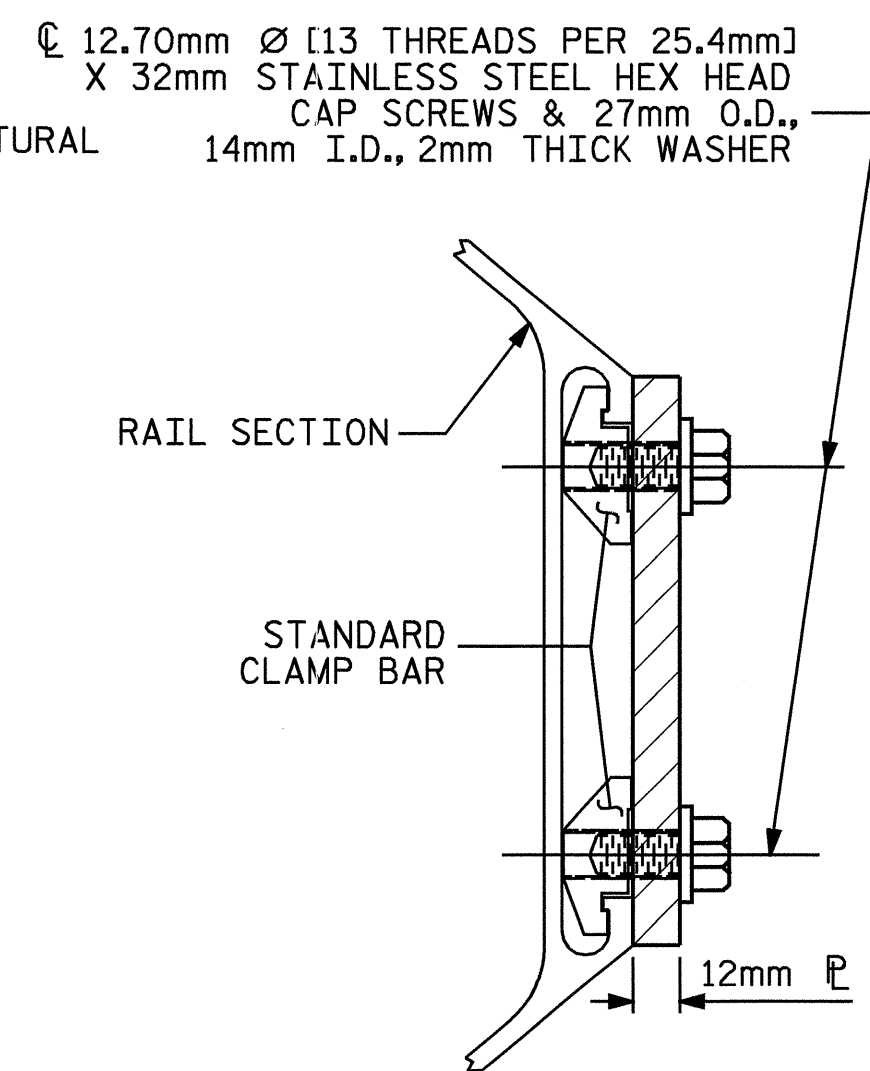
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 38mm.
- B. 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.)
- C. 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.



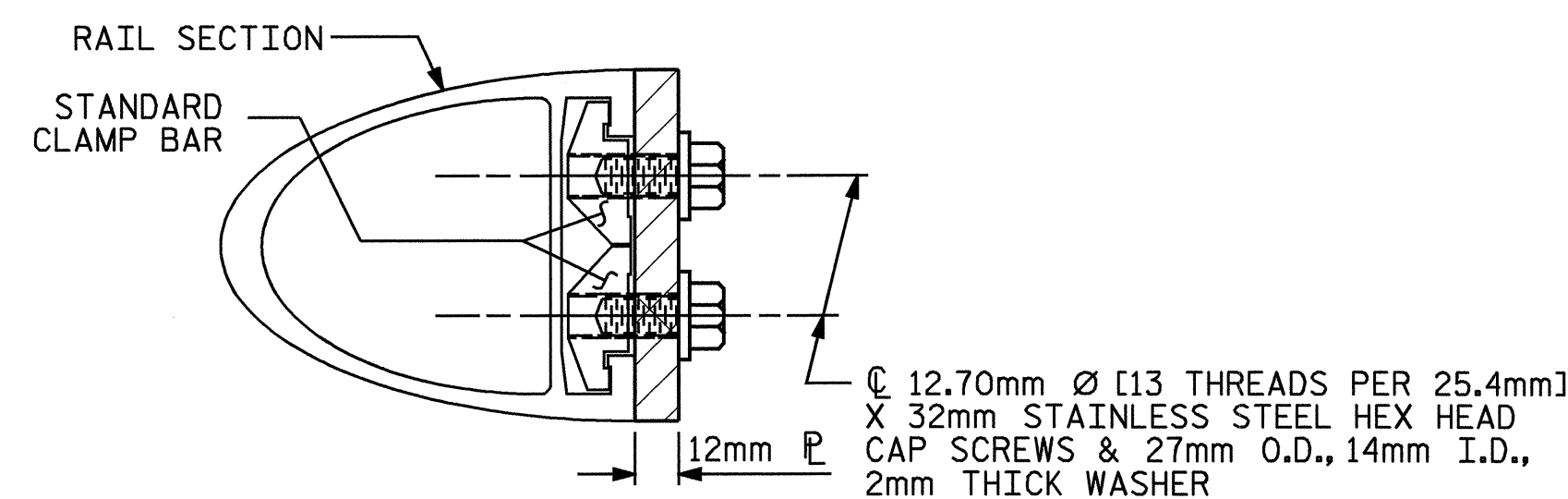
PLAN OF RAIL AND END POST

(STIFFENER ON 12mm P NOT SHOWN FOR CLARITY)



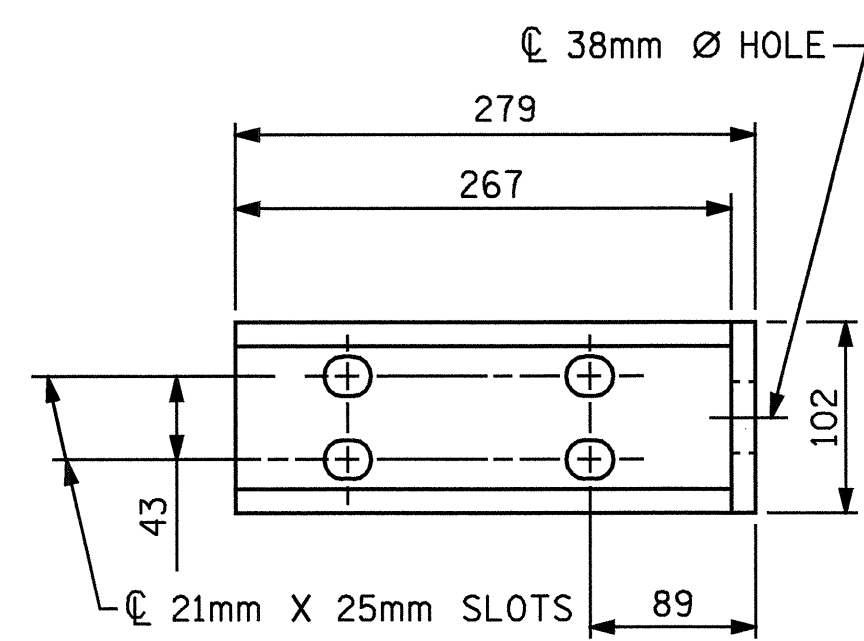
SECTION H-H

(FOR BOTTOM RAIL)



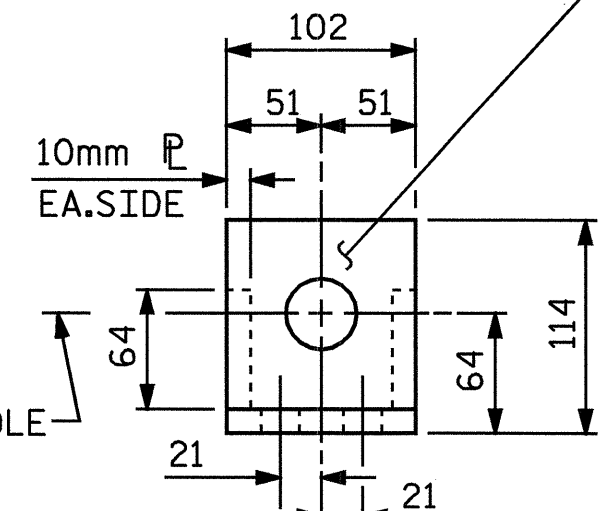
SECTION H-H

(FOR TOP & MIDDLE RAIL)



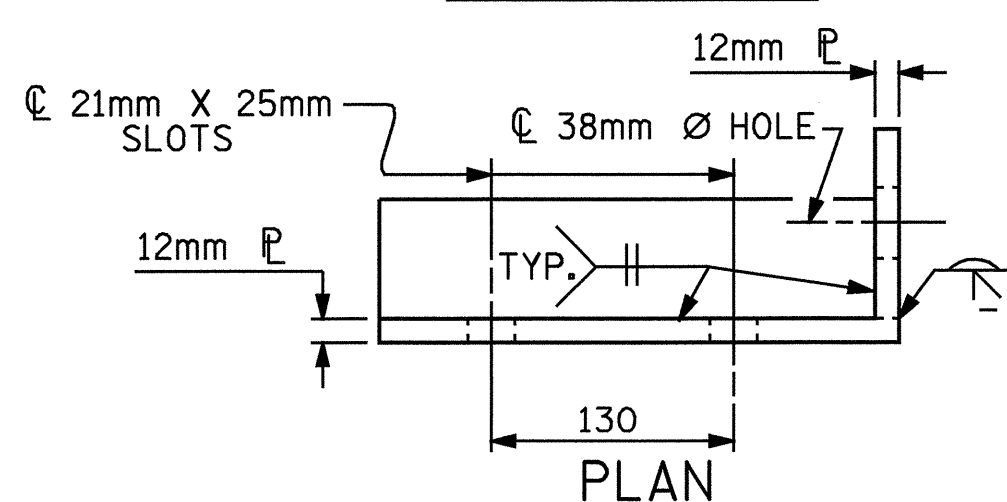
ELEVATION

ANGLE TO BE MADE FROM 12mm X 102mm X 280mm P AND 12mm X 102mm X 102mm P



END VIEW

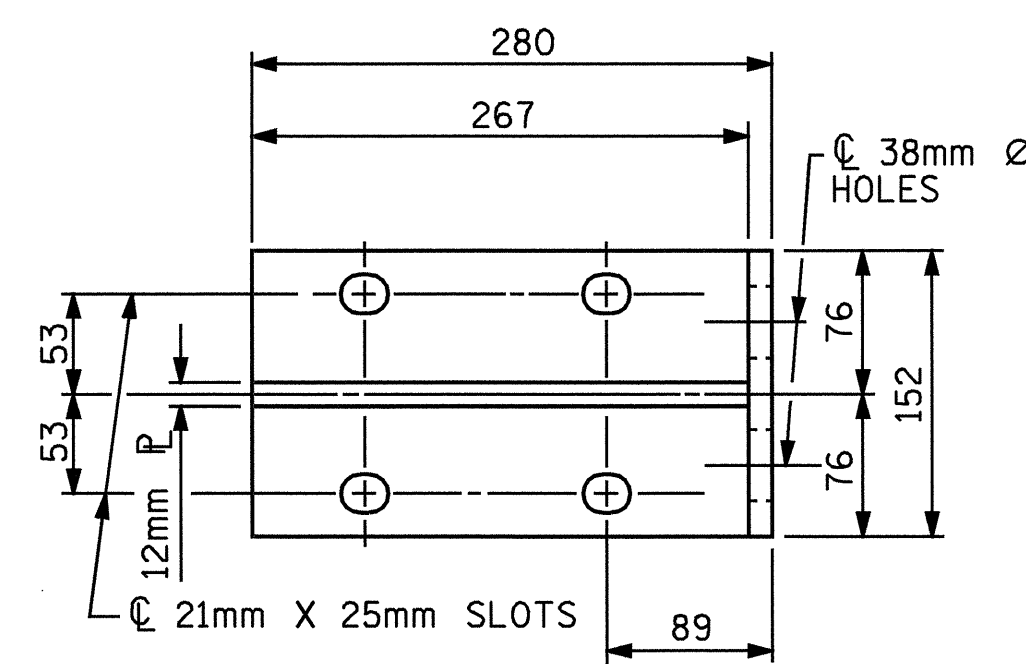
(FIX. AND EXP.)



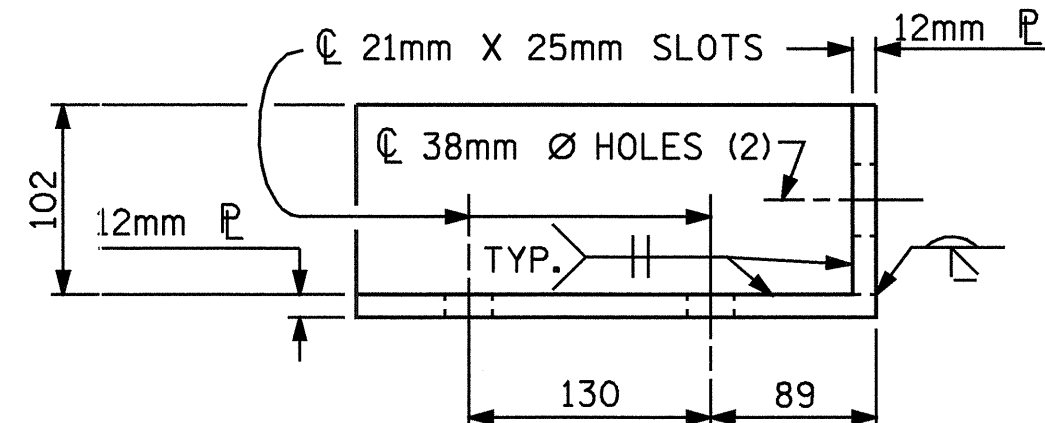
PLAN

DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



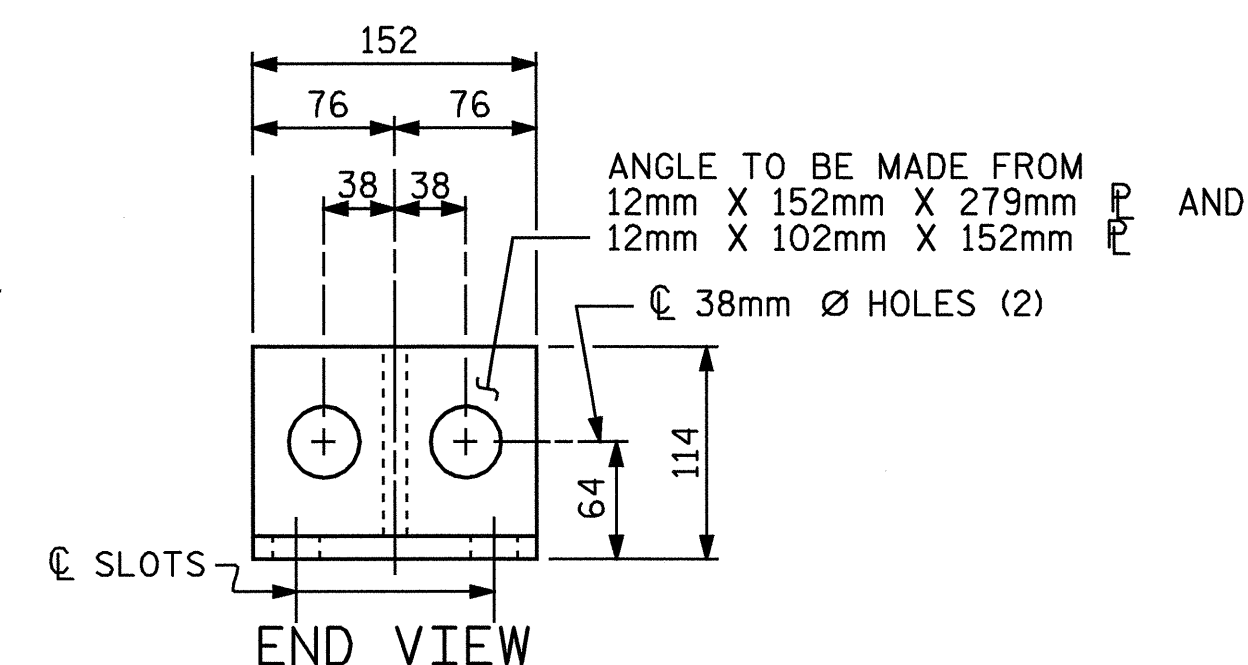
ELEVATION



PLAN

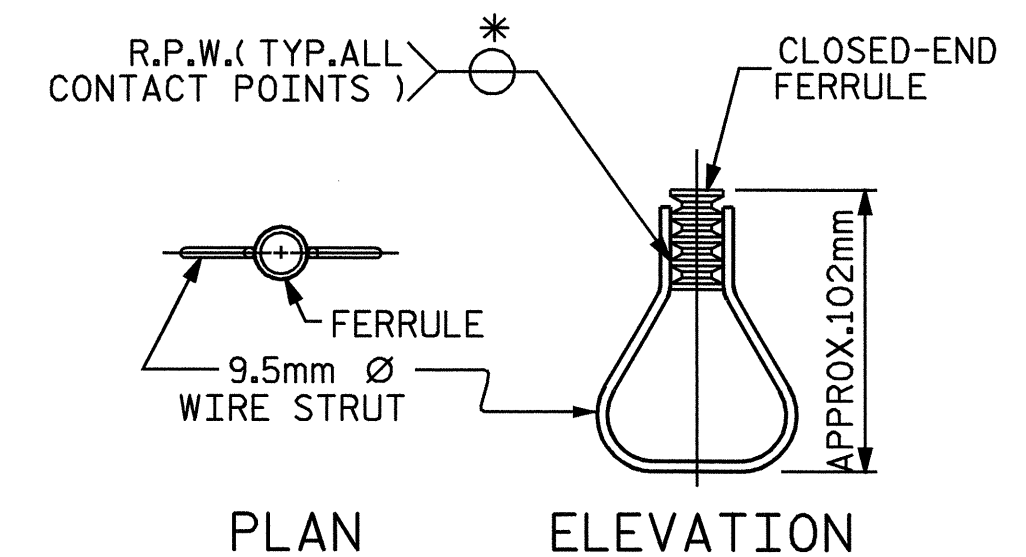
DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



END VIEW

ANGLE TO BE MADE FROM 12mm X 152mm X 279mm P AND 12mm X 102mm X 152mm P



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

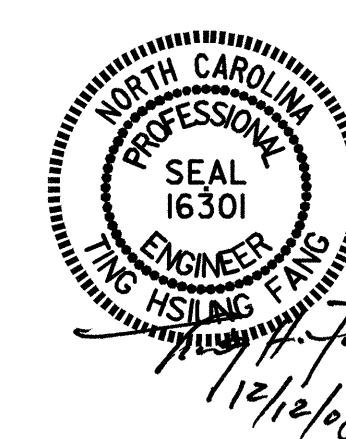
* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. R-2201
FORSYTH/STOKES COUNTY
STATION: 22+27.571 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3 BAR METAL RAIL



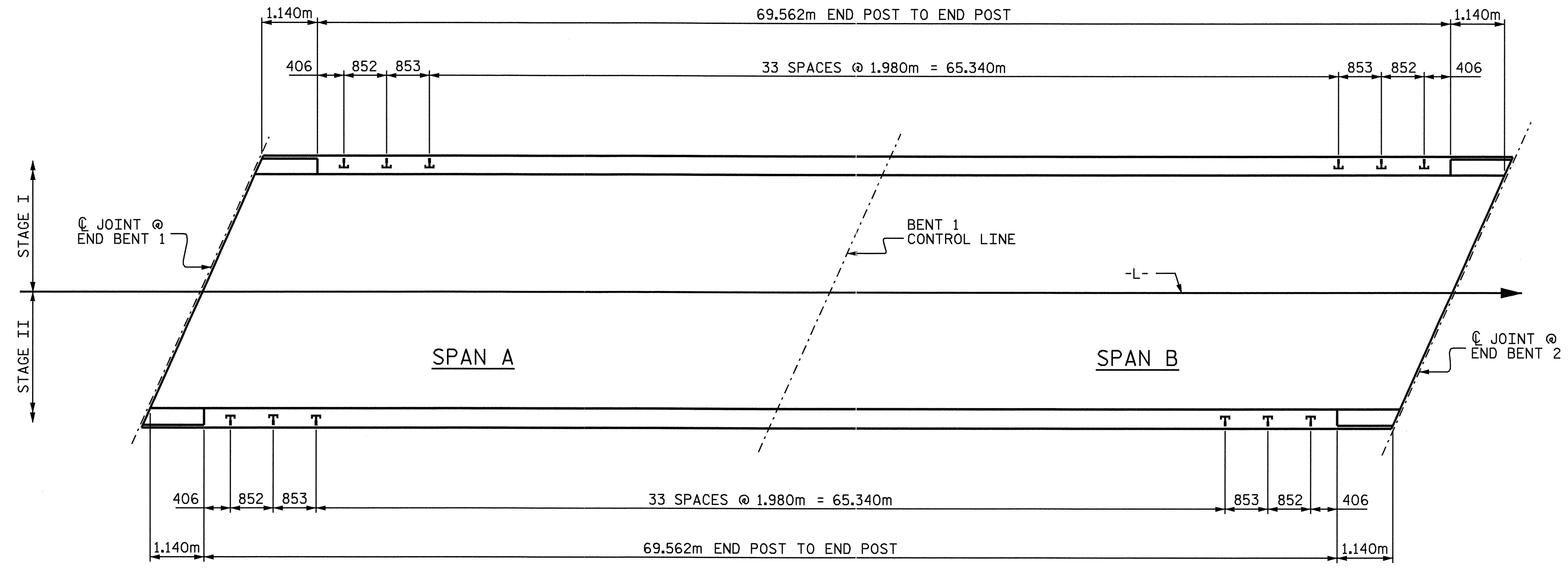
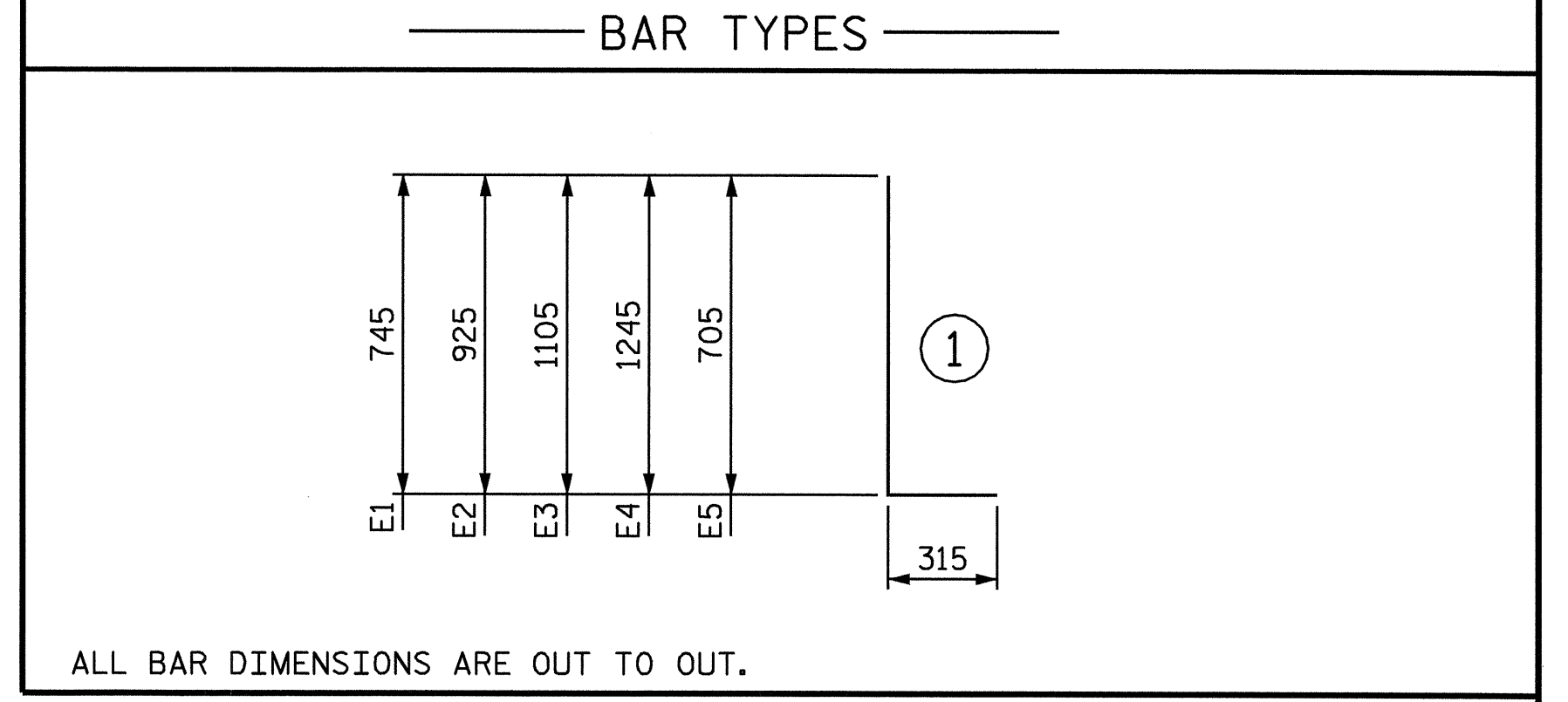
ASSEMBLED BY : HARISH SHAH	DATE : 10/08
CHECKED BY : TING FANG	DATE : 10/08
DRAWN BY : JMB 1/88	REV. 10/17/00 LES/RDR
CHECKED BY : GCH 1/88	REV. 5/7/03 RWN/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			42

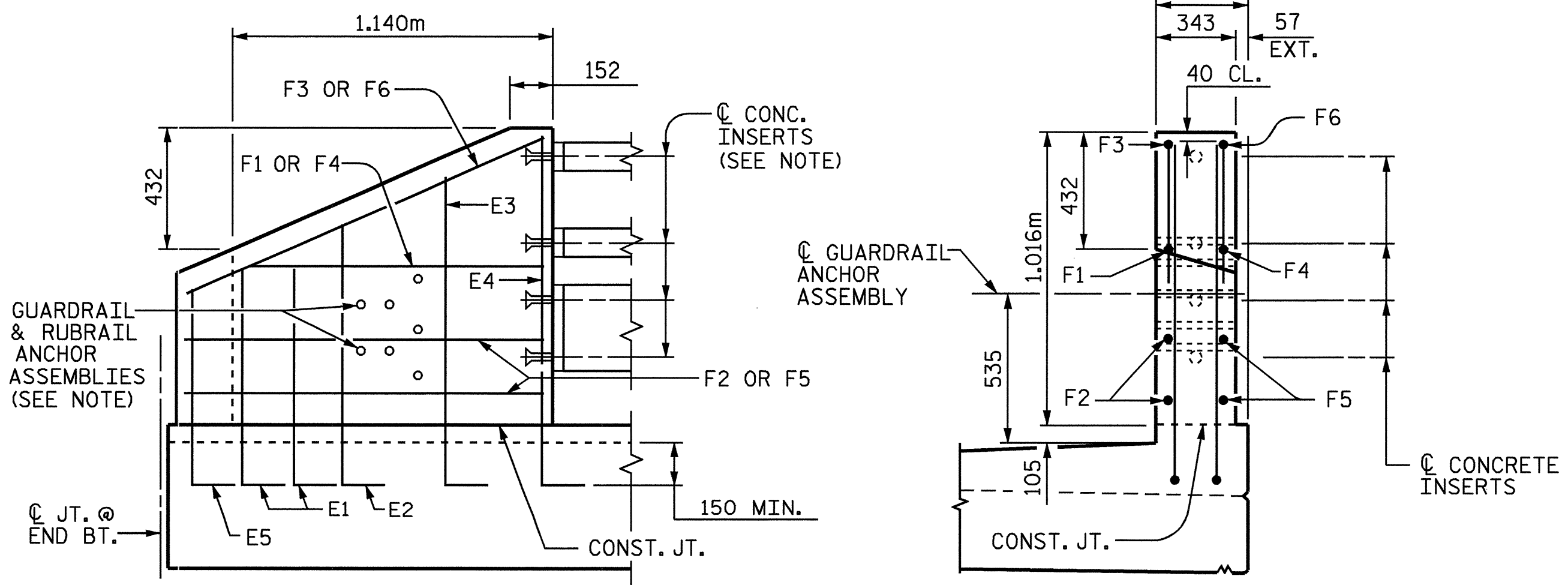
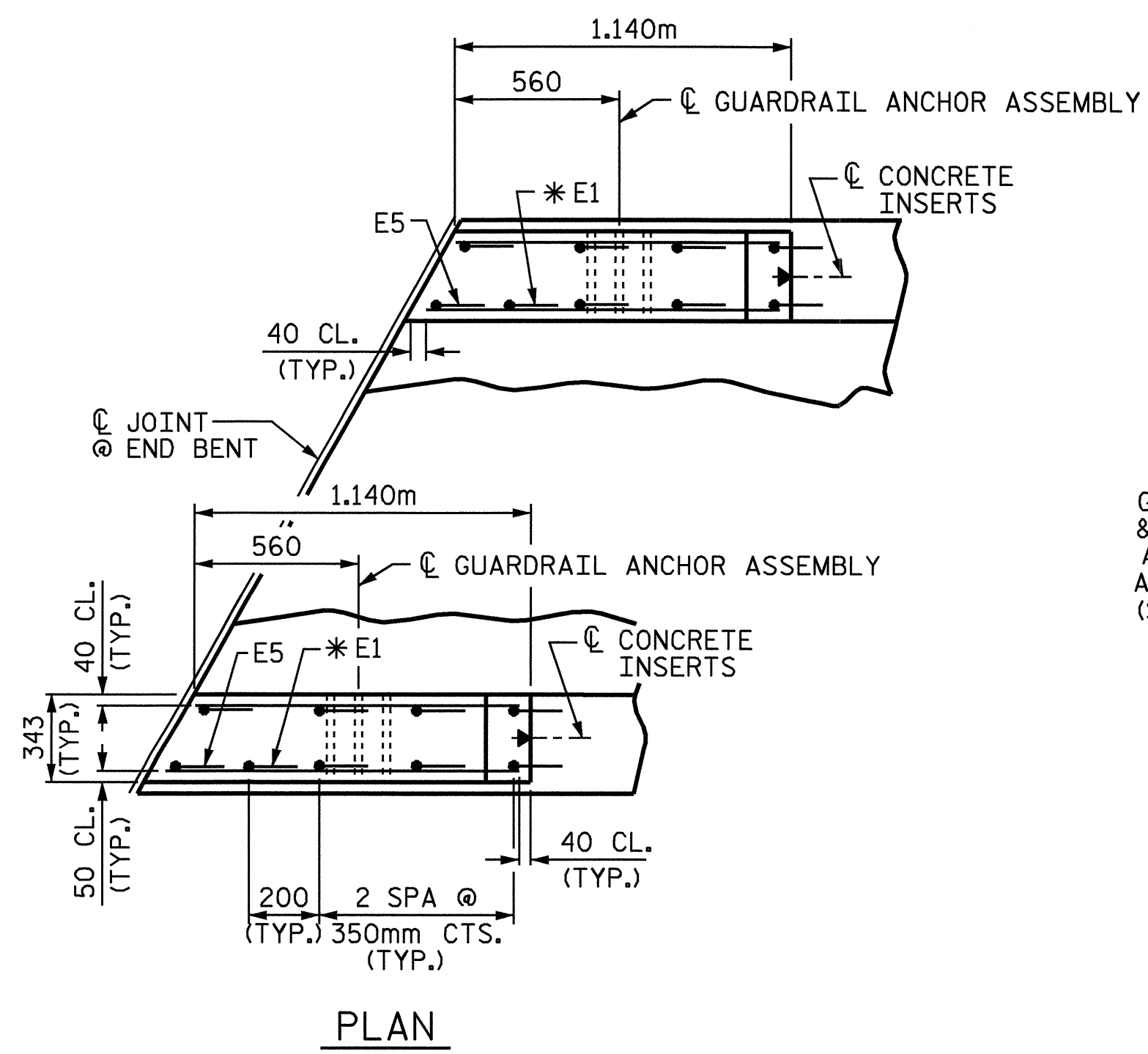
BILL OF MATERIAL

STAGE I						STAGE II					
TWO END POSTS						TWO END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*E1	4	#22	1	1060	13	*E1	4	#22	1	1060	13
*E2	4	#22	1	1240	15	*E2	4	#22	1	1240	15
*E3	4	#22	1	1420	17	*E3	4	#22	1	1420	17
*E4	4	#22	1	1560	19	*E4	4	#22	1	1560	19
*E5	2	#22	1	1020	6	*E5	2	#22	1	1020	6
*F1	2	#19	STR	660	3	*F1	2	#19	STR	660	3
*F2	4	#19	STR	1060	9	*F2	4	#19	STR	1060	9
*F3	2	#19	STR	1140	5	*F3	2	#19	STR	1140	5
*F4	2	#19	STR	780	3	*F4	2	#19	STR	780	3
*F5	4	#19	STR	1180	11	*F5	4	#19	STR	1180	11
*F6	2	#19	STR	1260	6	*F6	2	#19	STR	1260	6

* EPOXY COATED REINFORCING STEEL	kg.	108	* EPOXY COATED REINFORCING STEEL	kg.	108
CLASS AA CONCRETE	C.M.	0.7	CLASS AA CONCRETE	C.M.	0.7



PLAN OF RAIL POST



END POST DETAILS

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

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



DRAWN BY: S. DOMBROWSKI DATE: 10/08
 CHECKED BY: TING FANG DATE: 10/08

REVISIONS						SHEET NO. S-23
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

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.

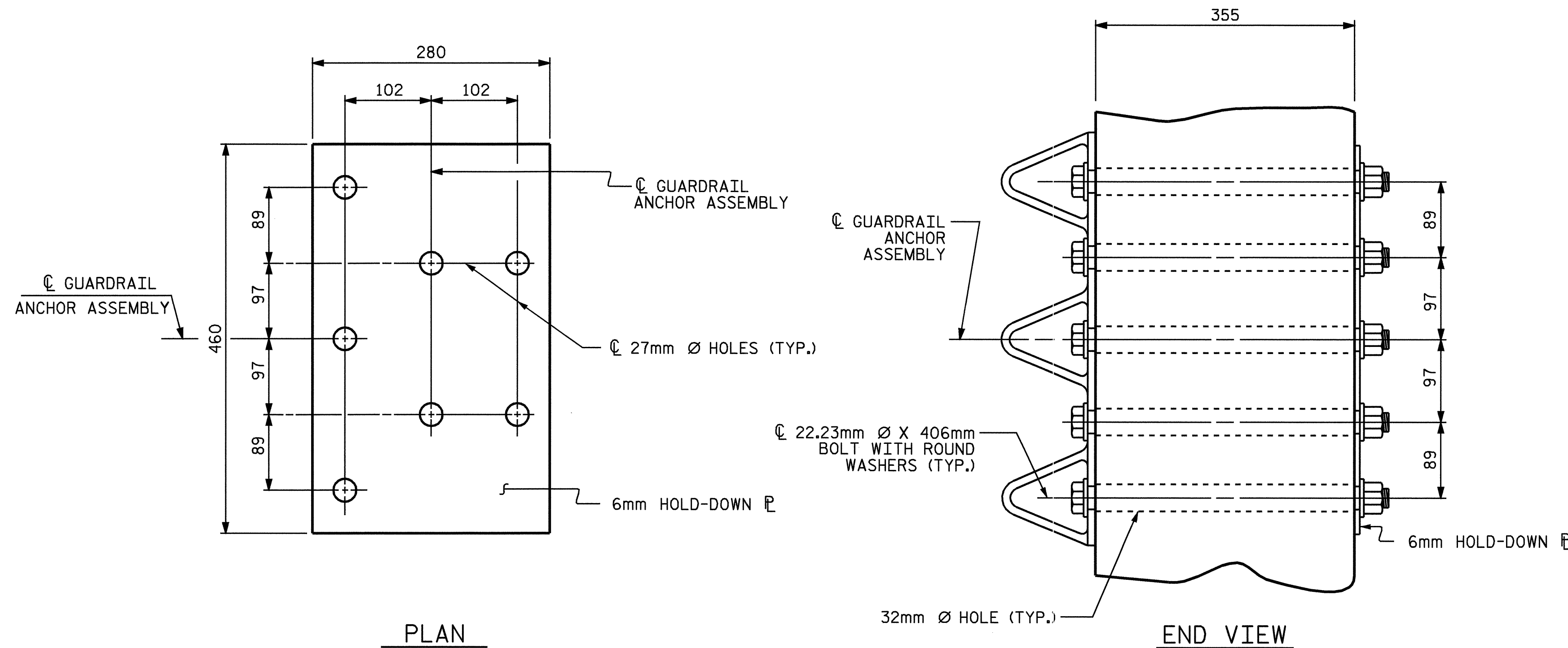
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

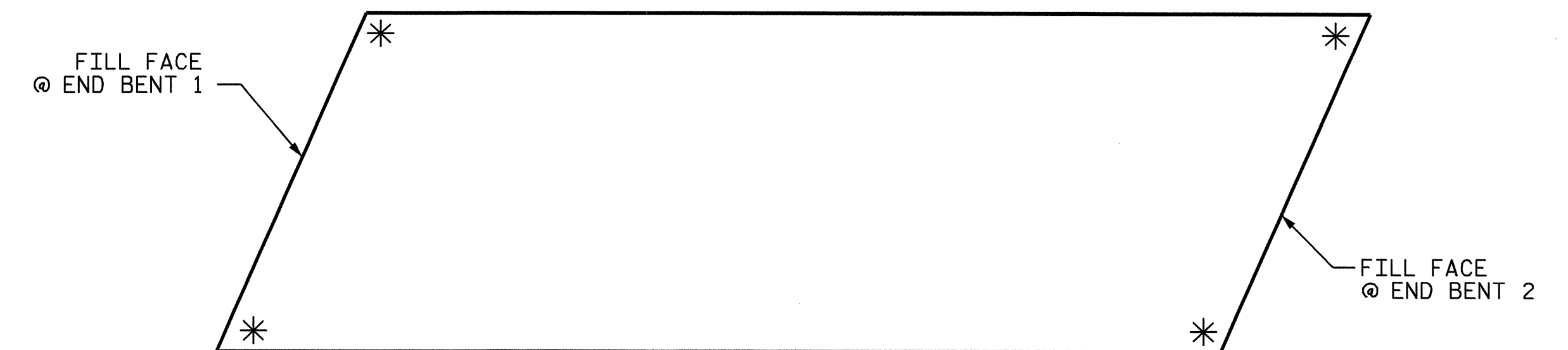
THE 32mm Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



PLAN

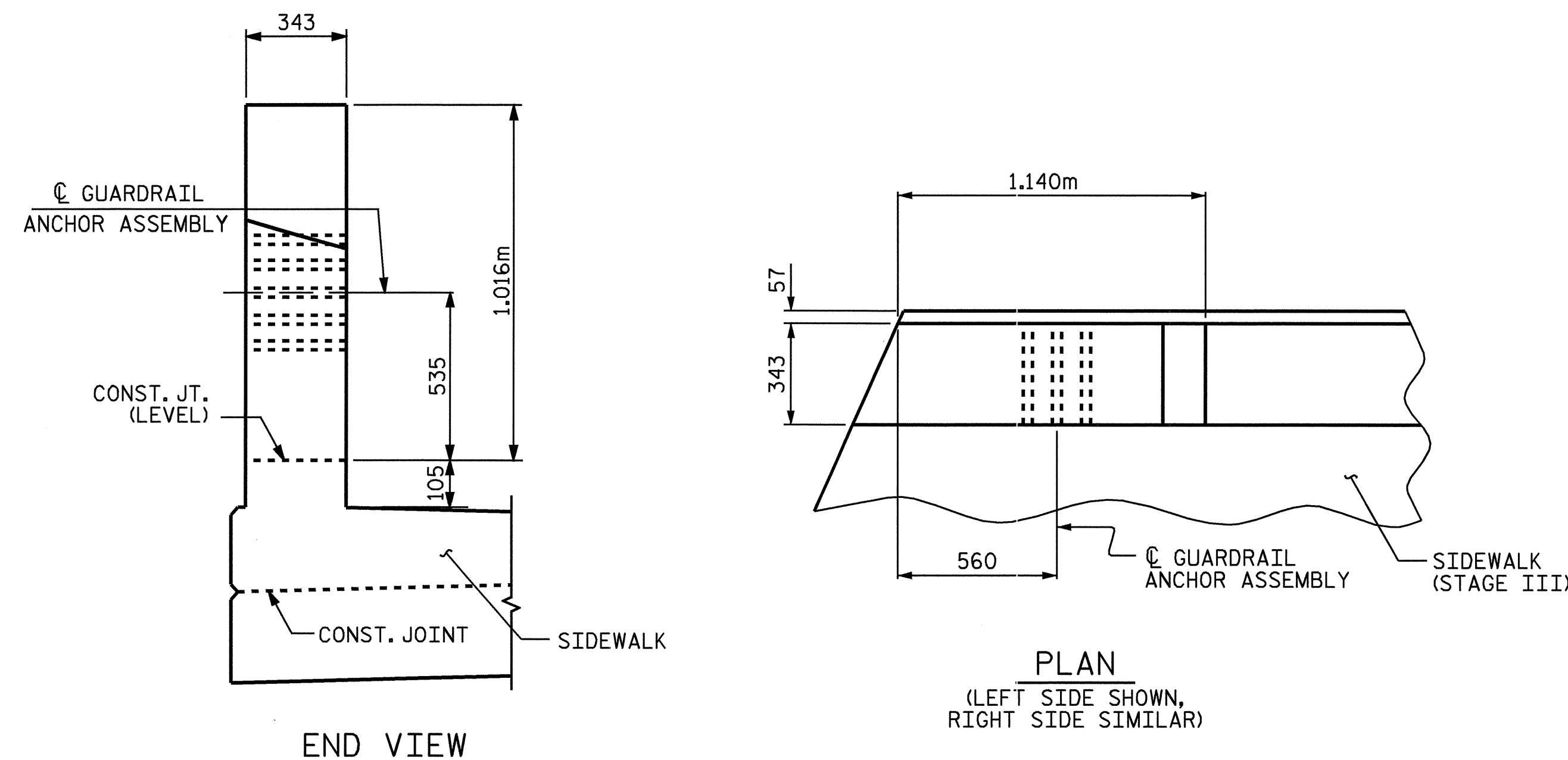
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

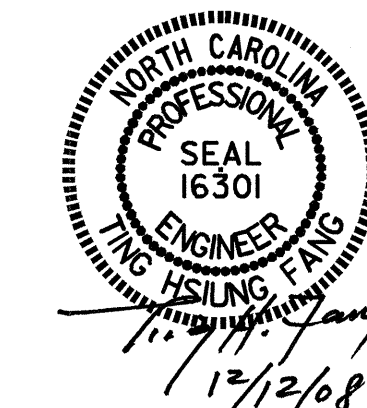


END VIEW

PLAN
(LEFT SIDE SHOWN,
RIGHT SIDE SIMILAR)

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-



STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
STANDARD					
GUARDRAIL ANCHORAGE					
DETAILS					
FOR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-24
TOTAL SHEETS					42

ASSEMBLED BY : S. DOMBROWSKI	DATE : 10/14/08
CHECKED BY : TING FANG	DATE : 10/16/08
DRAWN BY : EEM 6/94	REV. 8/16/99 RWW/LES
CHECKED BY : RGW 6/94	REV. 10/17/00 RWW/LES
	REV. 5/7/03 RWW/JTE

NOTES:

GROOVED CONTRACTION JOINTS 12mm IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 2.40m TO 3.05m BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 3.05m IN LENGTH.

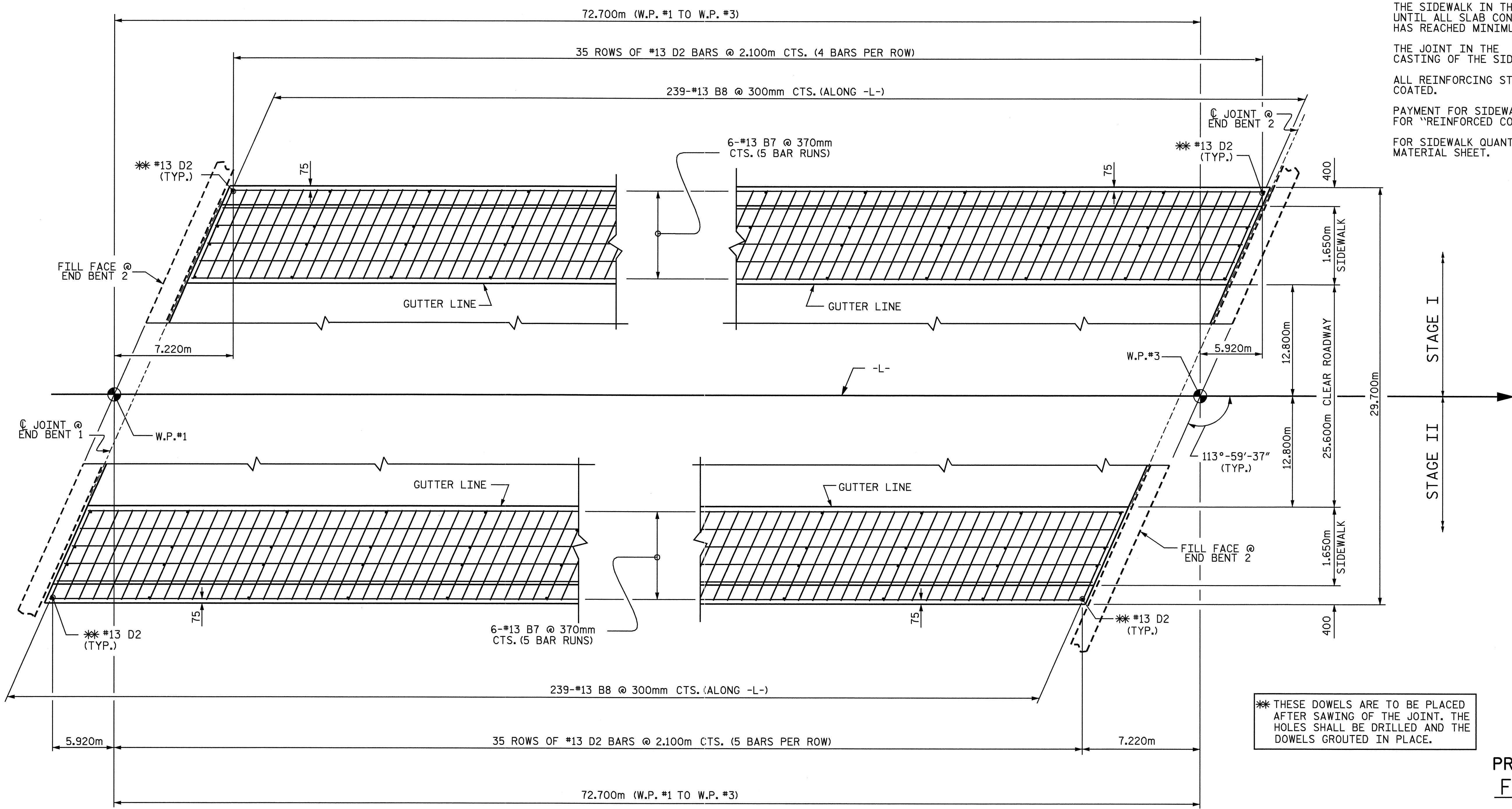
THE SIDEWALK IN THE CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPA.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

PAYMENT FOR SIDEWALK SHALL BE INCLUDED IN PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".

FOR SIDEWALK QUANTITIES, SEE SUPERSTRUCTURE BILL OF MATERIAL SHEET.

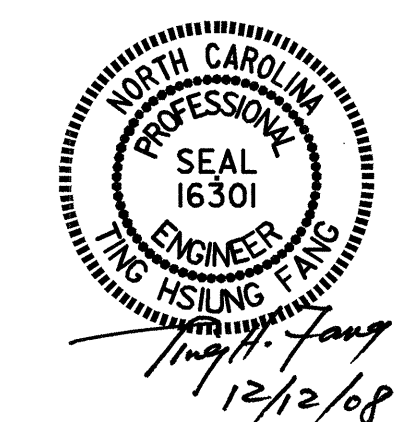


** THESE DOWELS ARE TO BE PLACED AFTER SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED IN PLACE.

PLAN OF SIDEWALK

FOR SECTION THRU SIDEWALK & DETAILS, SEE "TYPICAL SECTION" SHEET

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 SIDEWALK DETAILS

DRAWN BY : H. B. SHAH DATE 10/28/08
 CHECKED BY : TING FANG DATE 11/03/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25	
1			3			TOTAL SHEETS	
2			4			42	

NOTES

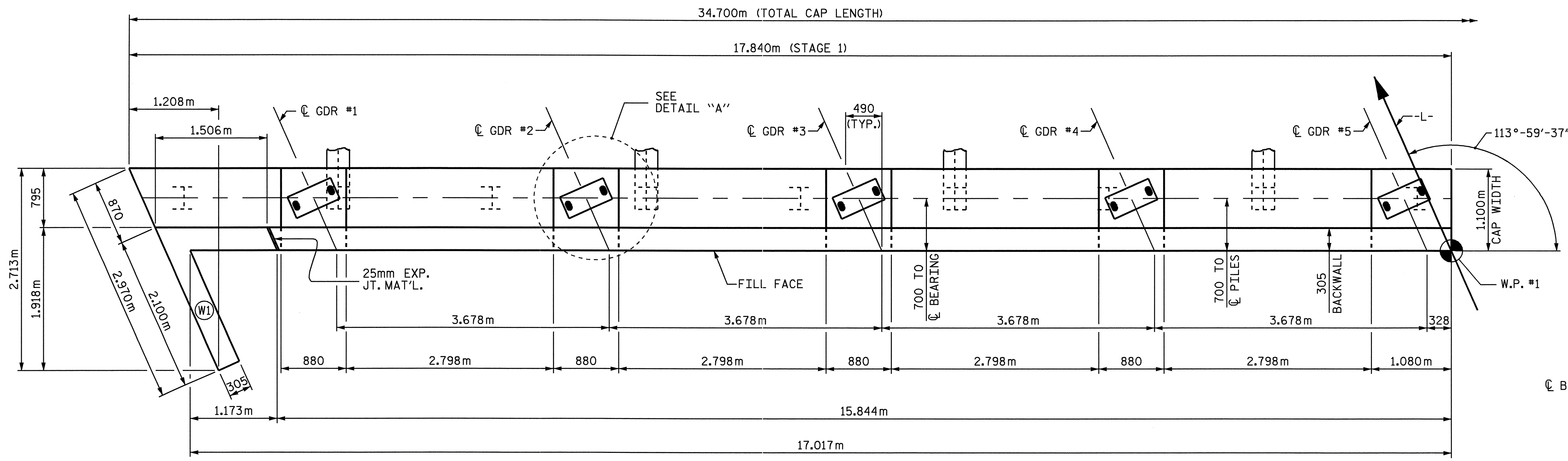
STIRRUPS AND #13 U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

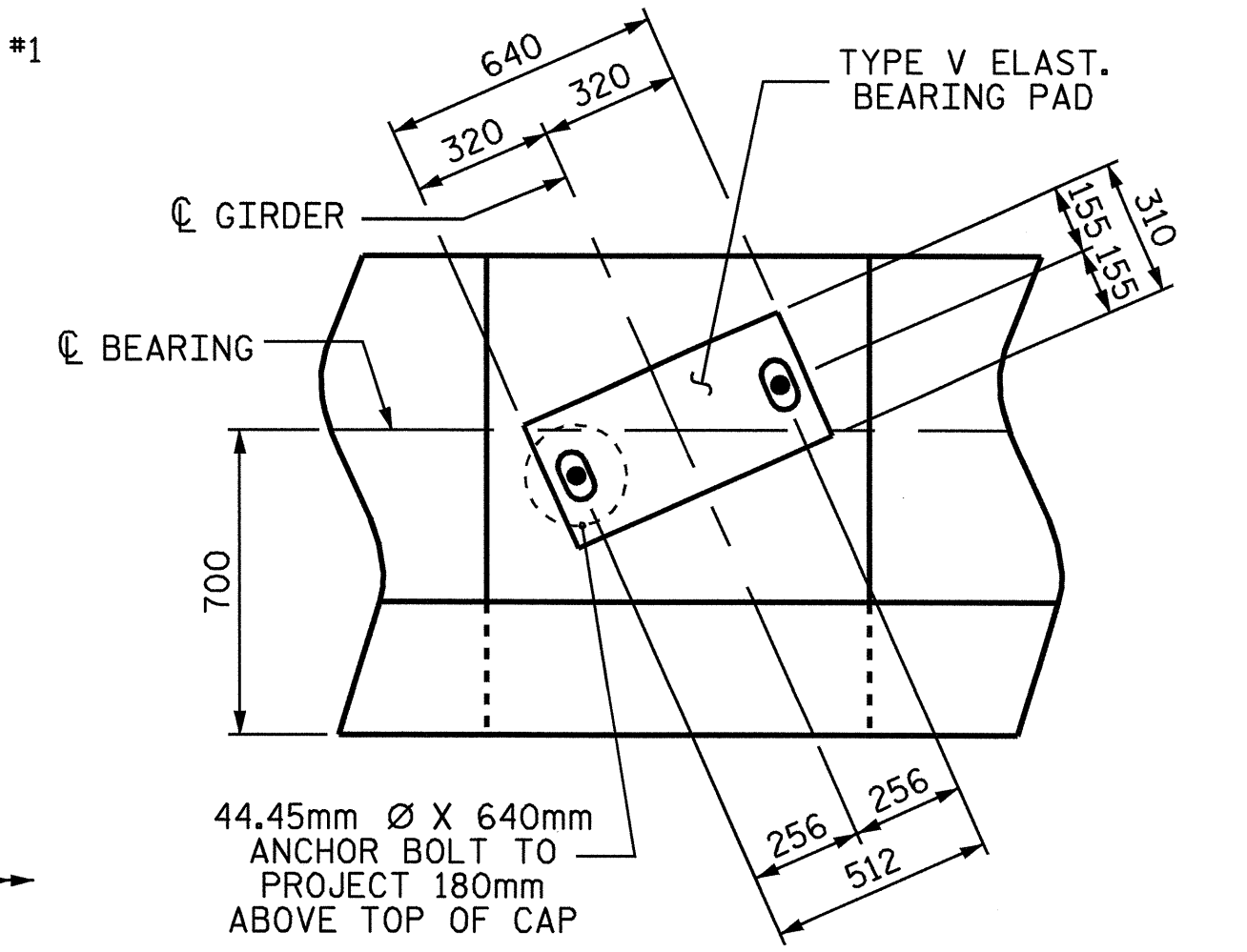
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2 %.

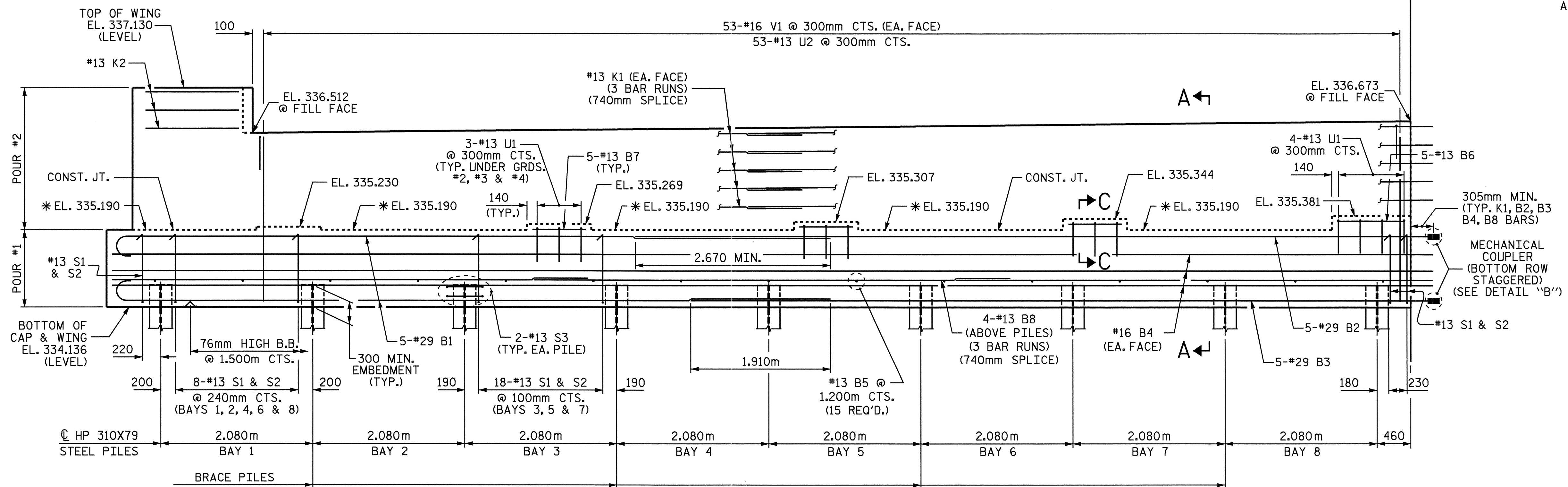
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 100mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPES.



PLAN



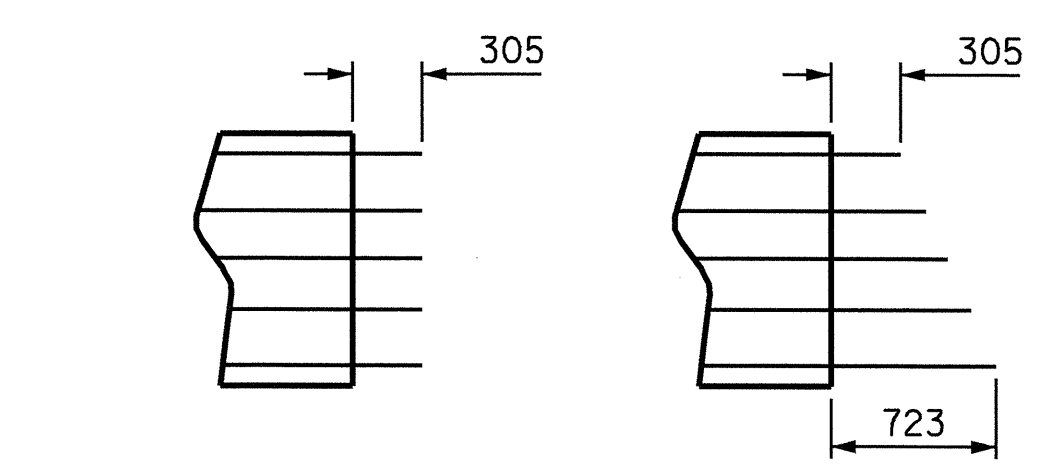
DETAIL "A"



ELEVATION

LEFT WING & DETAILS NOT SHOWN FOR CLARITY

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SHEET 4 OF 4.



B2 BARS **B3 BARS**

ADJUST LENGTH OF SPLICE WITH B1 TO MAINTAIN CONSTANT PROJECTION

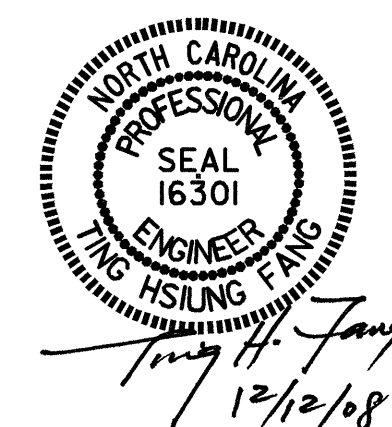
DETAIL "B"

PROJECT NO. R-2201
 FORSTYH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 1 OF 4

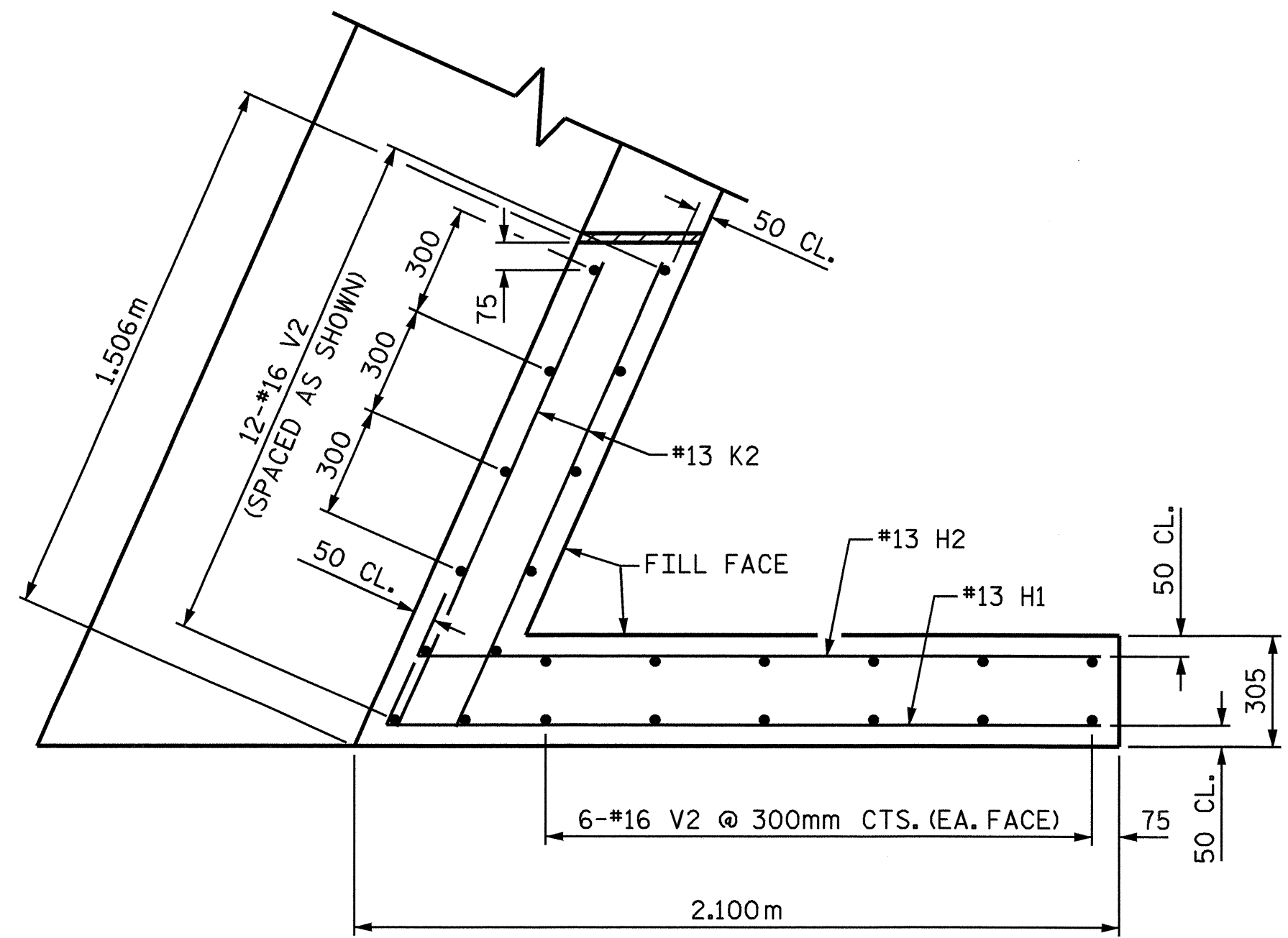
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 STAGE I

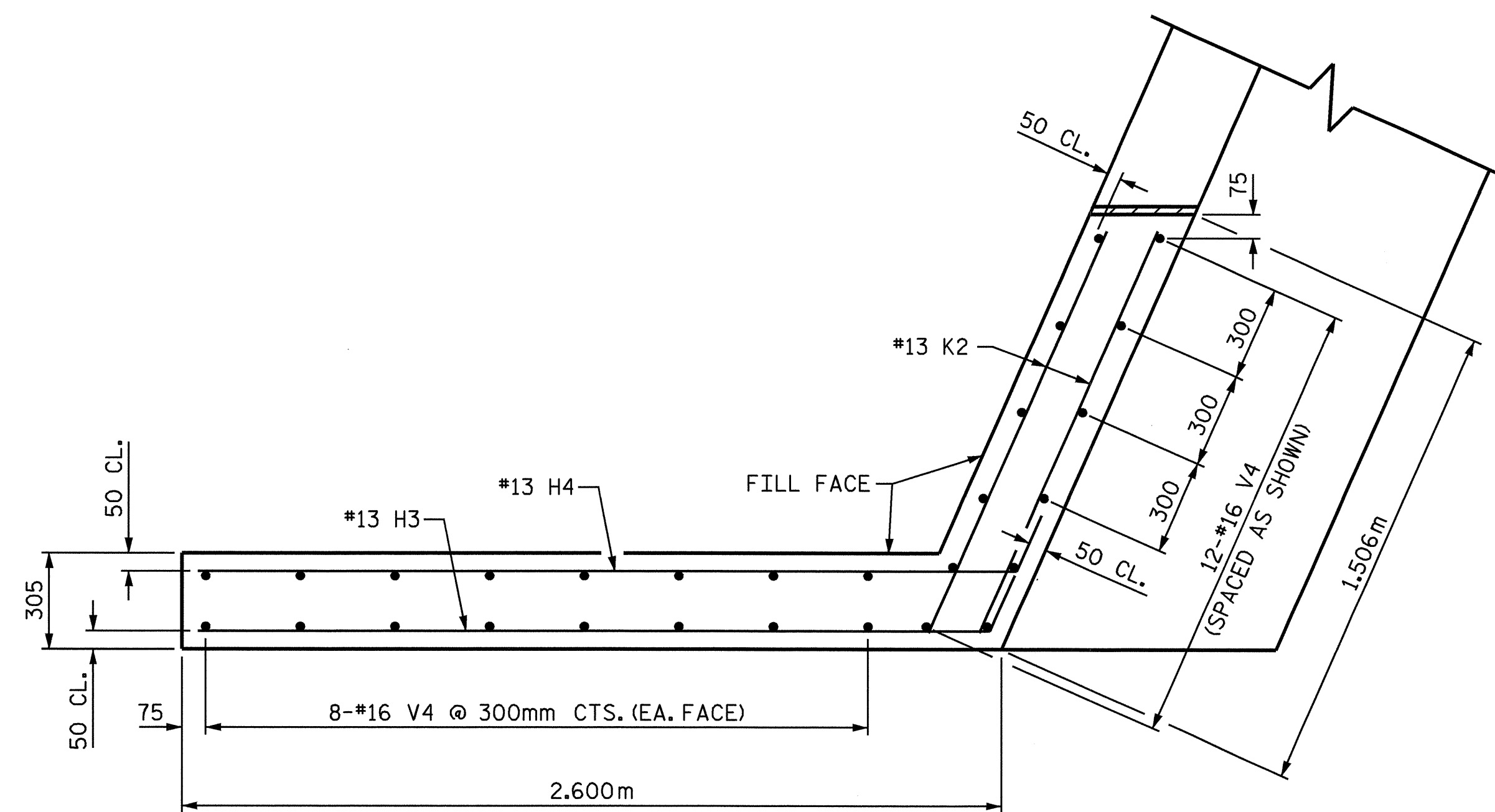


DRAWN BY : S. DOMBROWSKI DATE : 9/08
 CHECKED BY : T.H. FANG DATE : 10/08

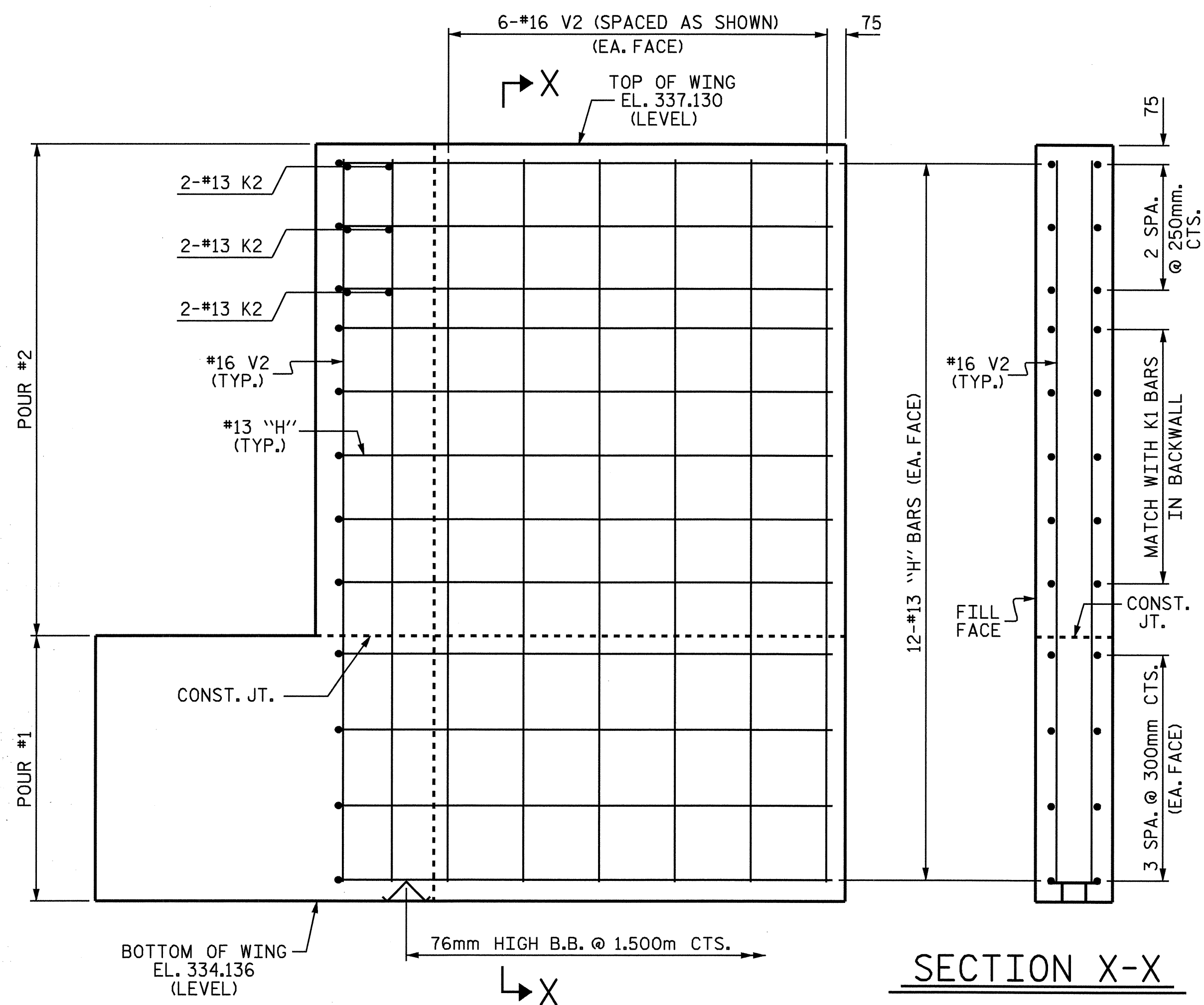
REVISIONS						SHEET NO. S-27
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			



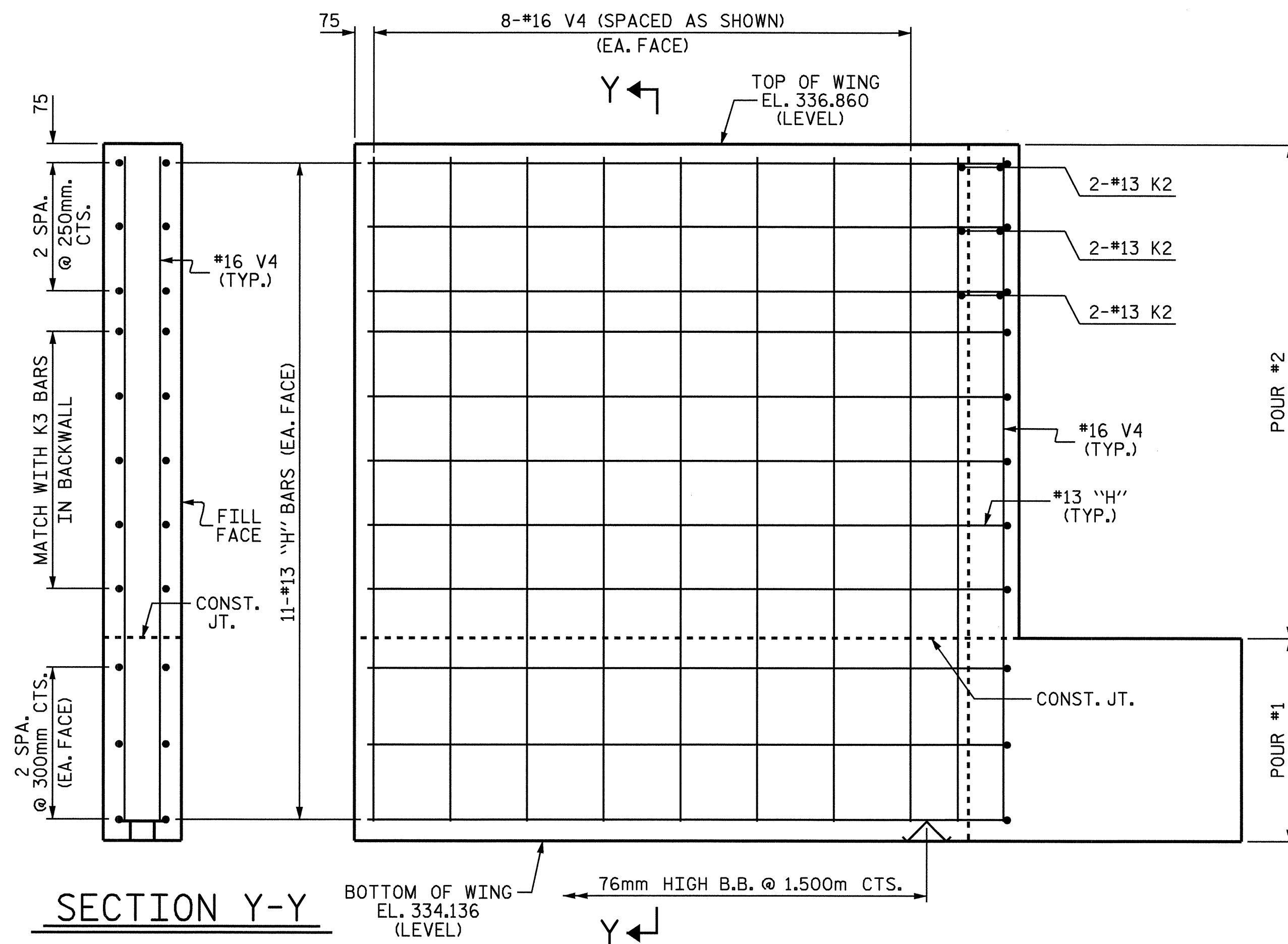
PLAN OF WING W1



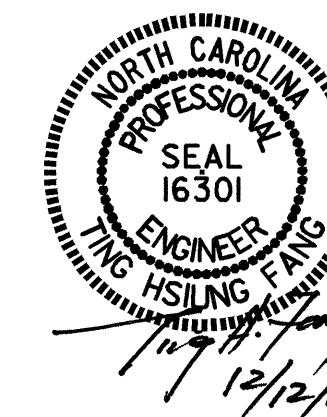
PLAN OF WING W2



ELEVATION OF WING W1



ELEVATION OF WING W2



PROJECT NO. R-2201
 FORSTYH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

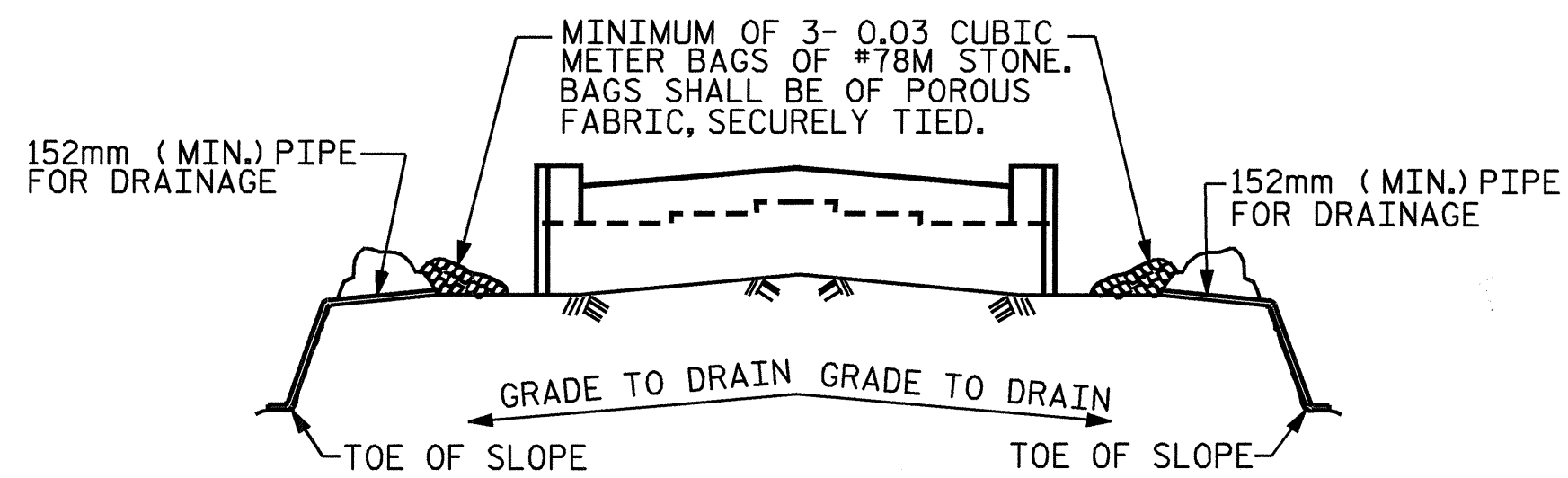
SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			42

DRAWN BY: S. DOMBROWSKI DATE: 9/08
 CHECKED BY: T.H. FANG DATE: 10/08

II-DEC-2008 16:00
 R:\Structures\R2201\FINAL_PLANS\R2201.sd_e*.dgn
 sdombrowski

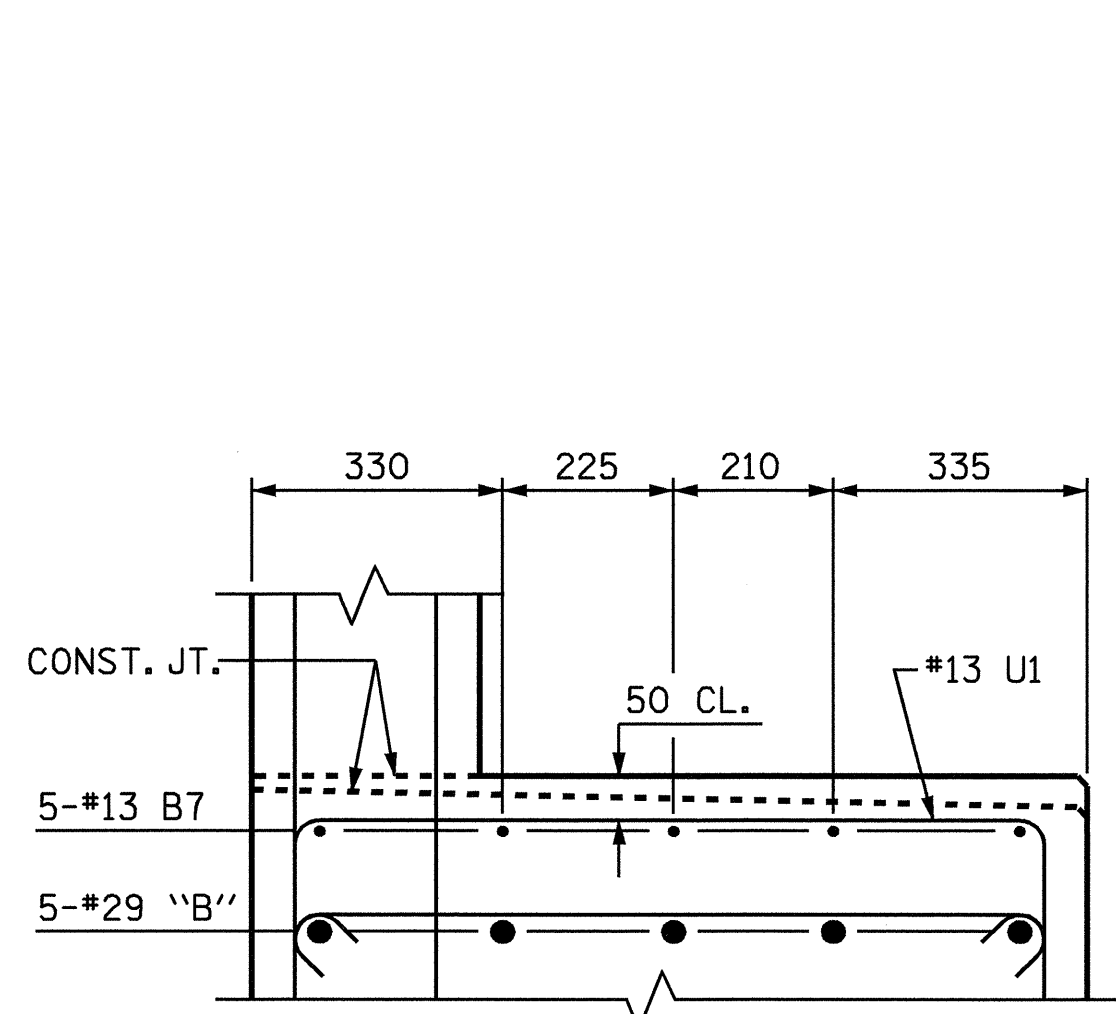


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

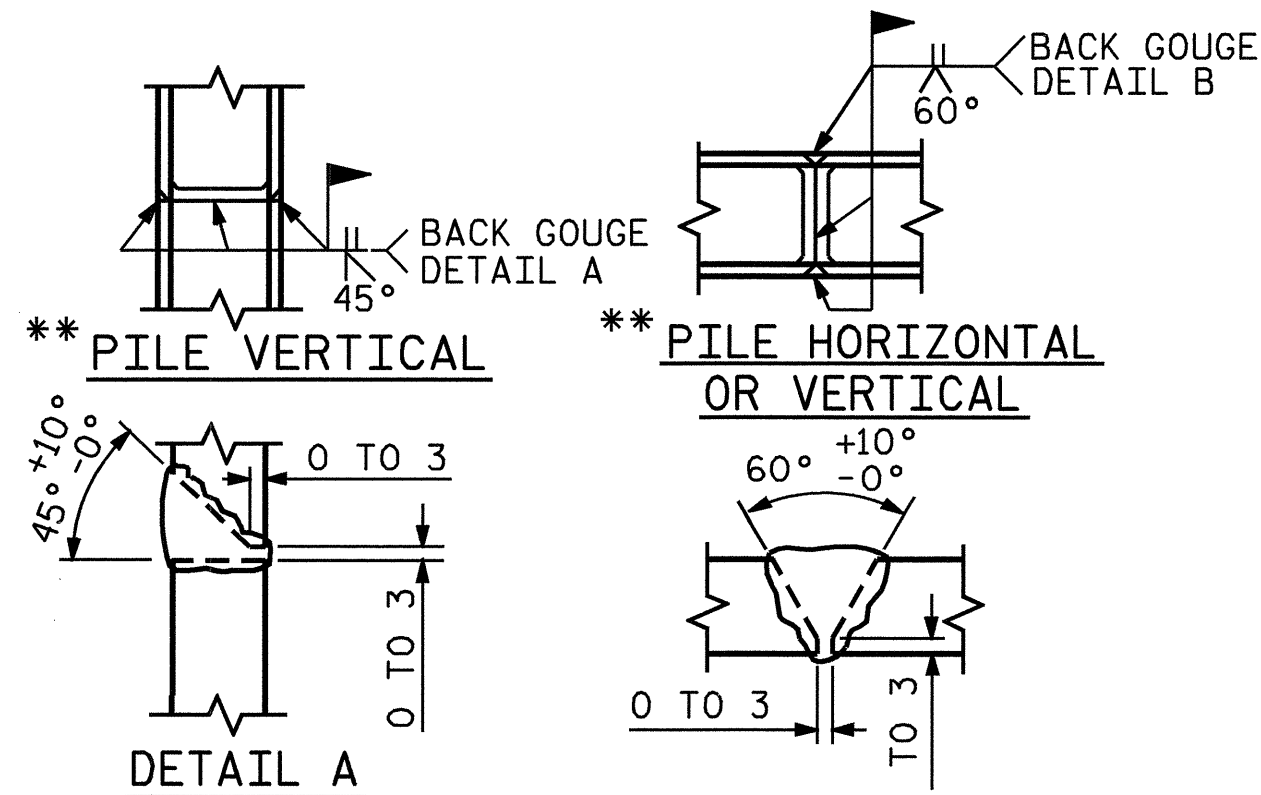
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

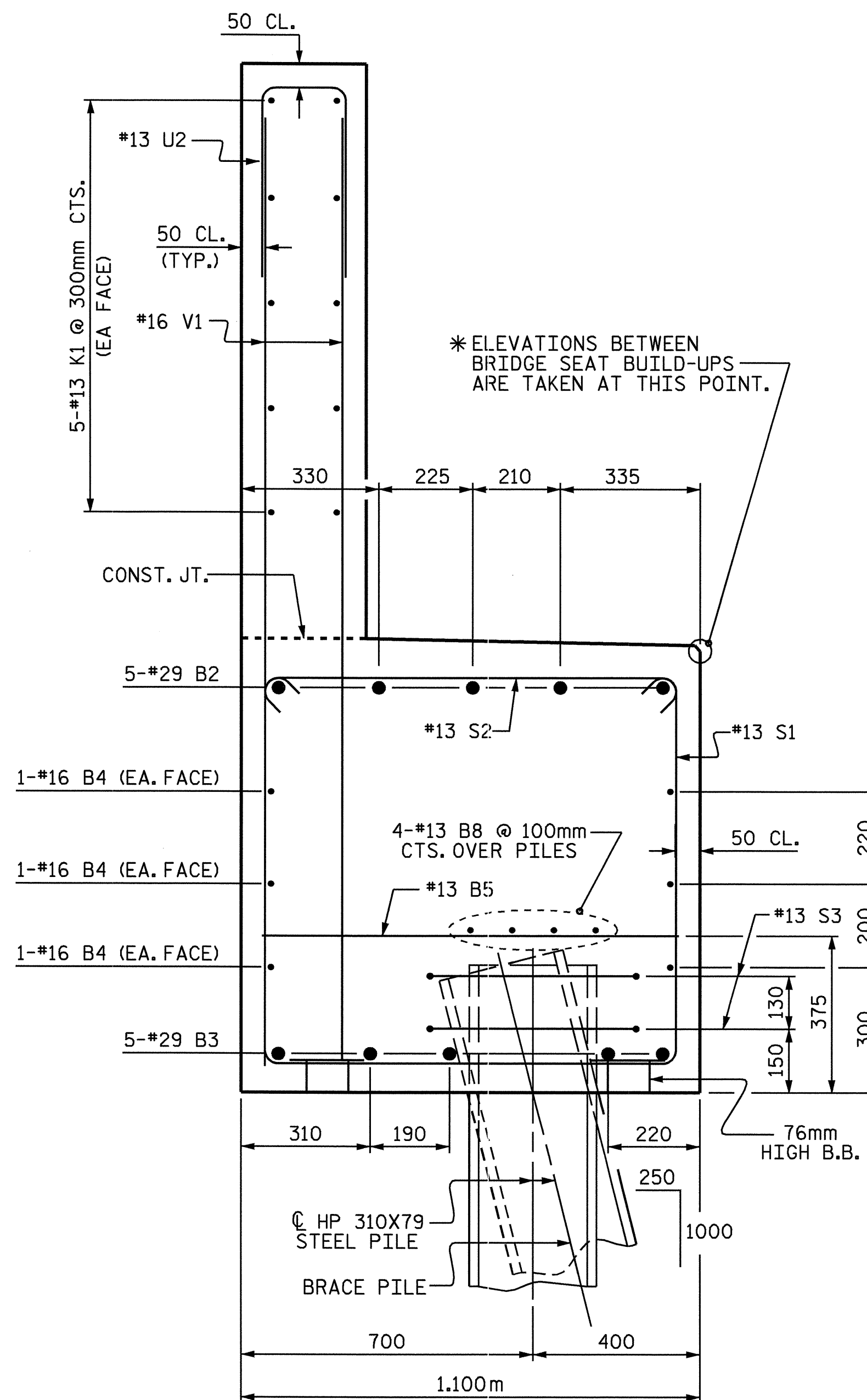
TEMPORARY DRAINAGE AT END BENT



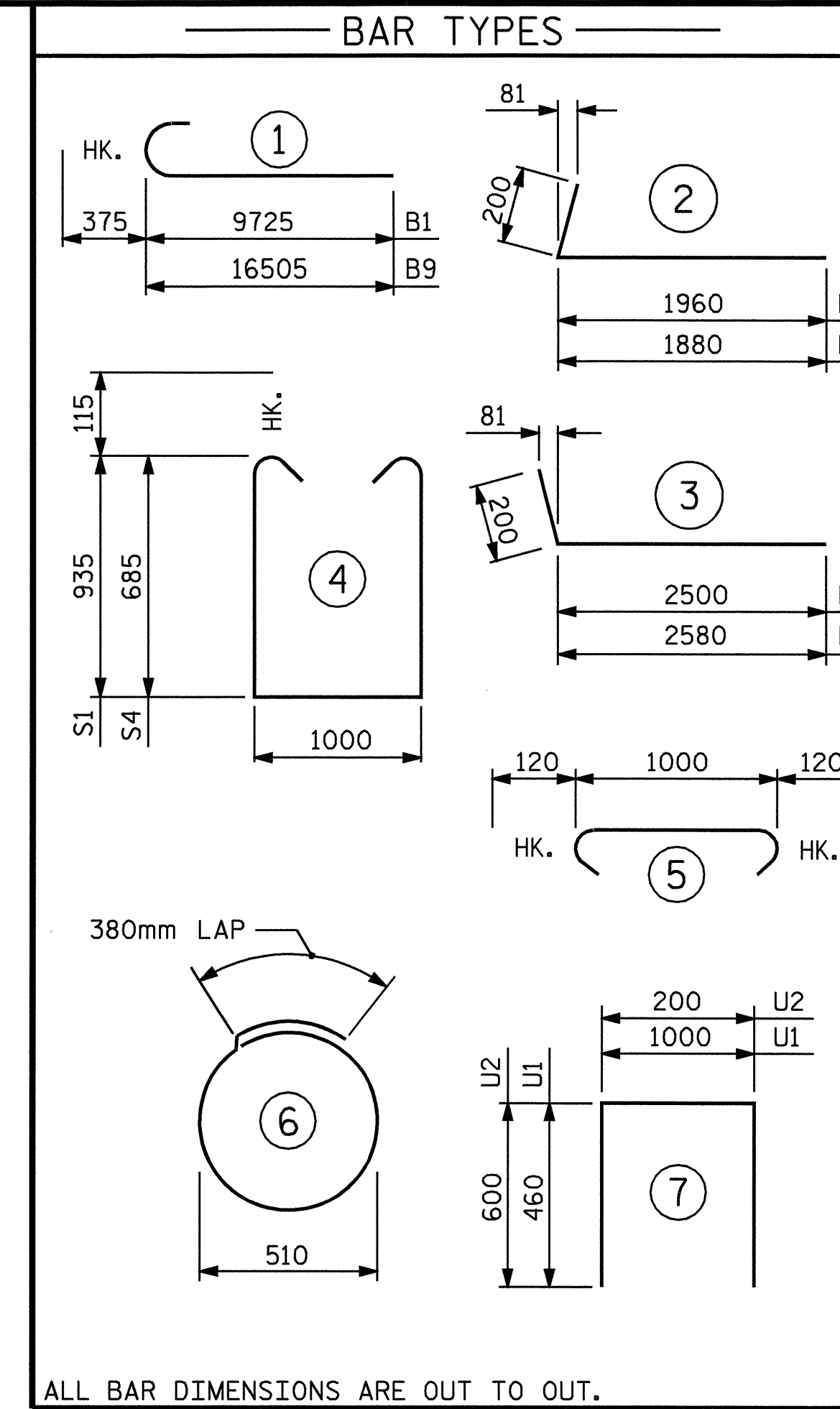
PARTIAL SECTION C-C



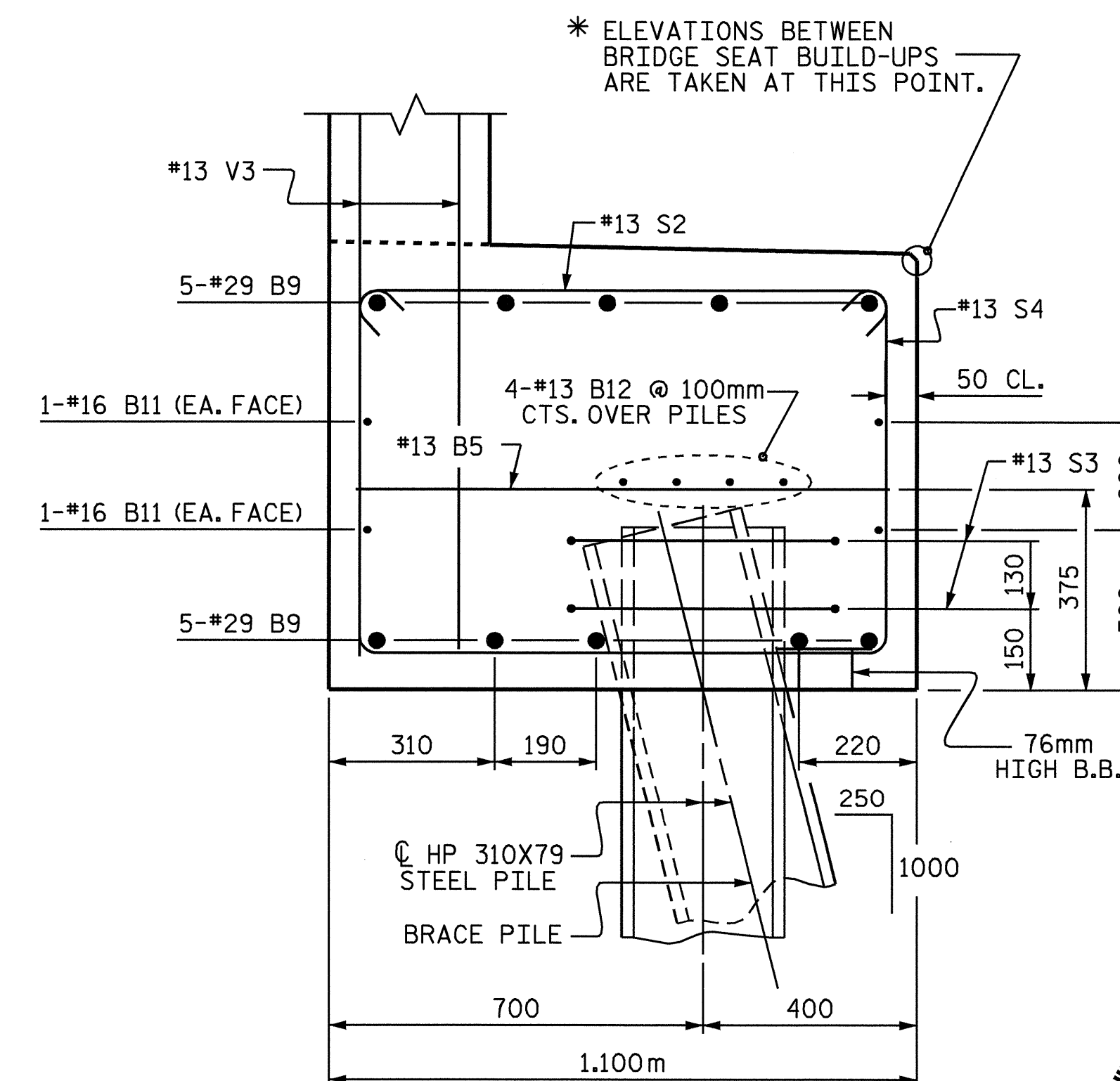
PILE SPLICE DETAILS



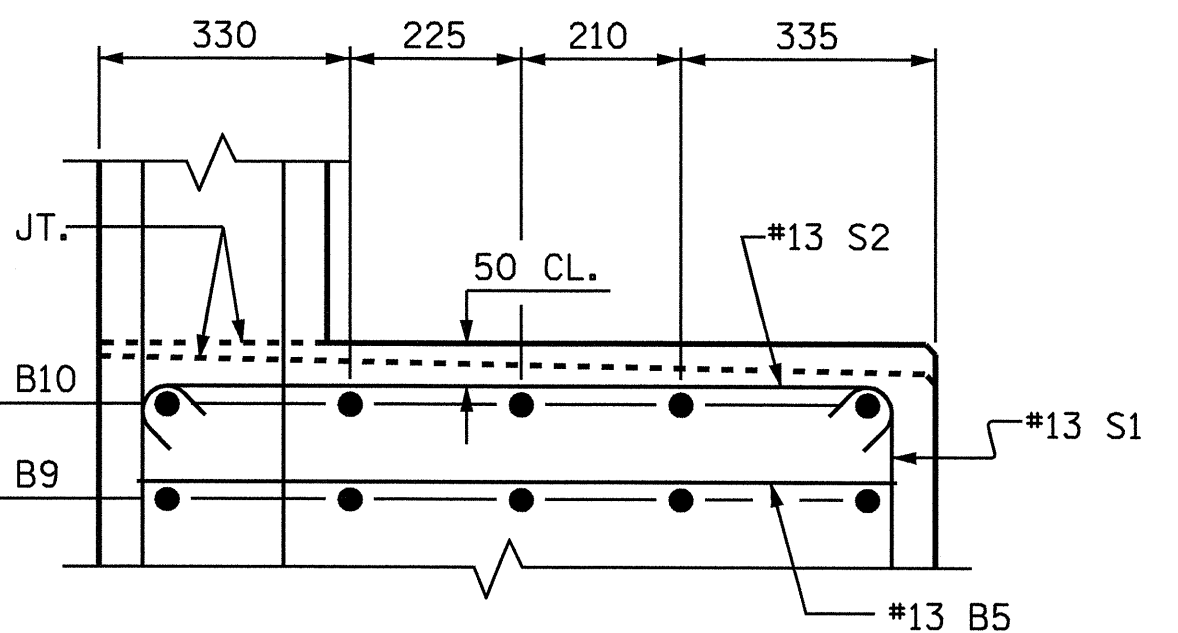
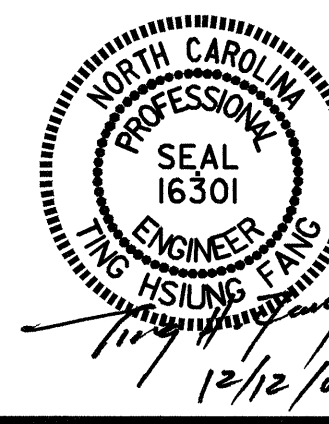
SECTION A-A



ALL BAR DIMENSIONS ARE OUT TO OUT.



PARTIAL SECTION B-B



PARTIAL SECTION D-D

PROJECT NO. R-2201
FORSTYH/STOKES COUNTY
STATION: 22+27.571 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO. S-30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

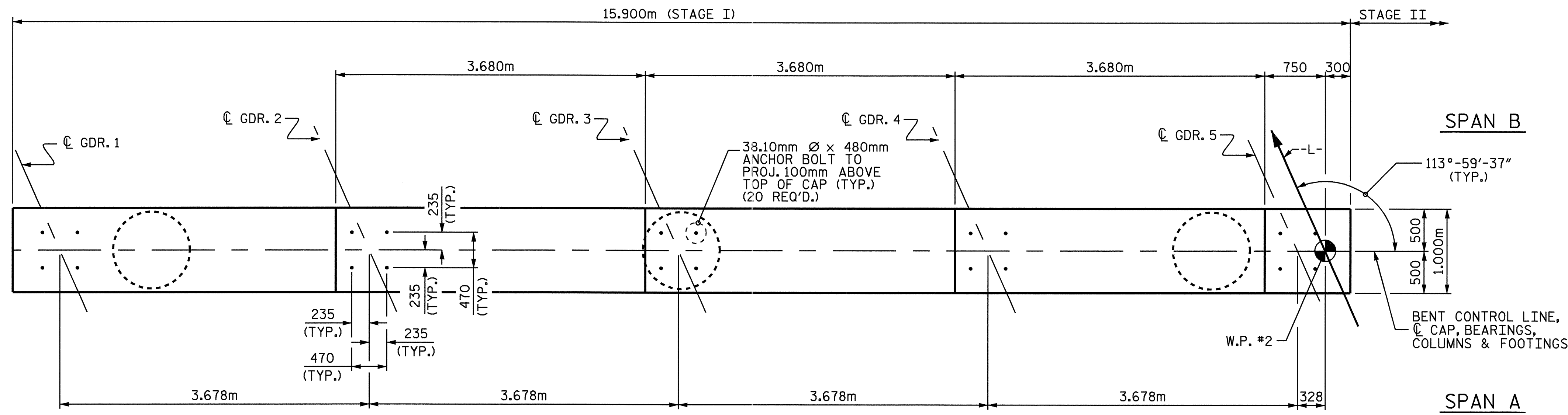
DRAWN BY: S. DOMBROWSKI DATE: 9/08
CHECKED BY: T.H. FANG DATE: 10/08

NOTES

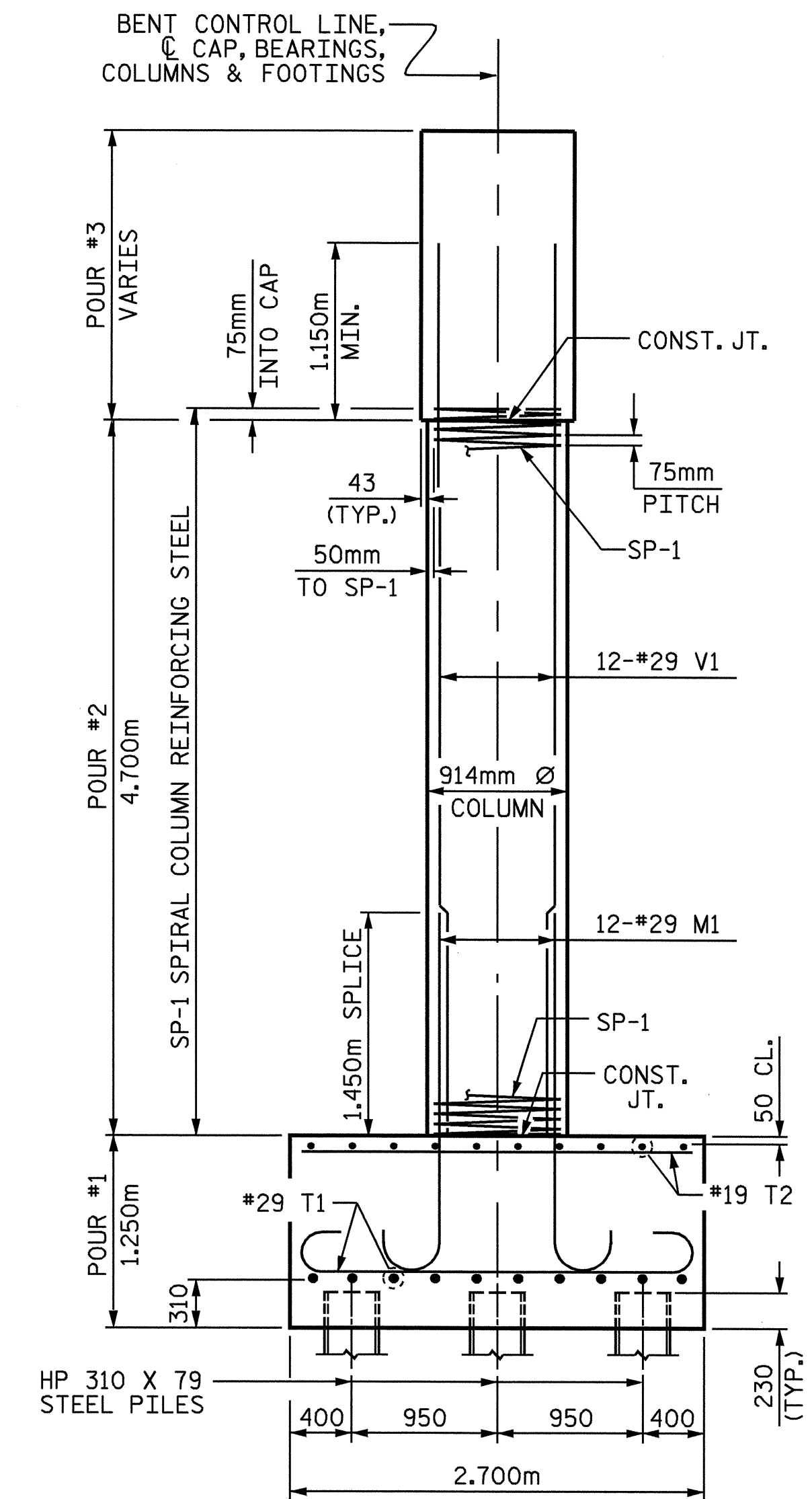
STIRRUPS AND 'U' BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

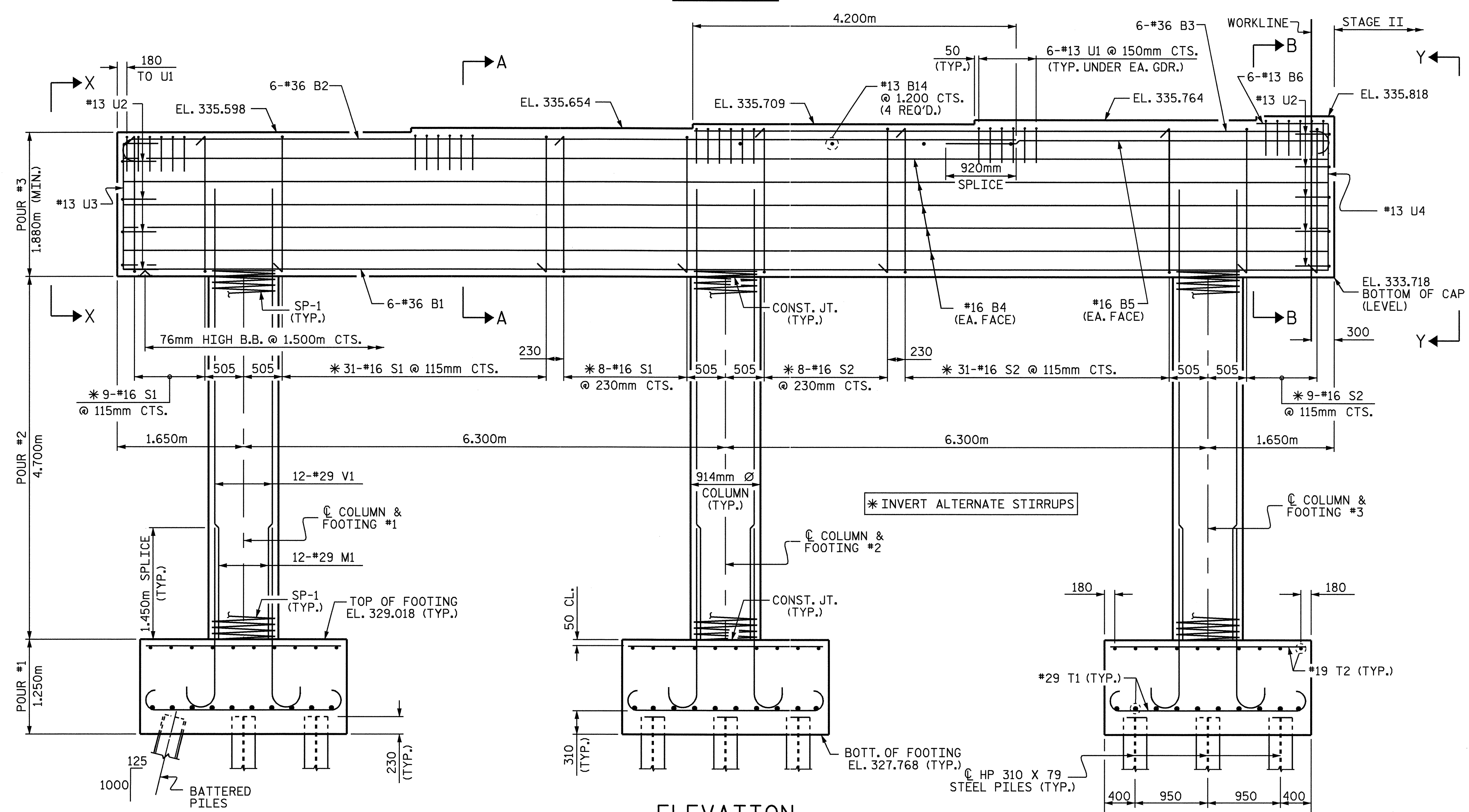
THE TOP SURFACE AREAS OF THE BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.



PLAN



END ELEVATION



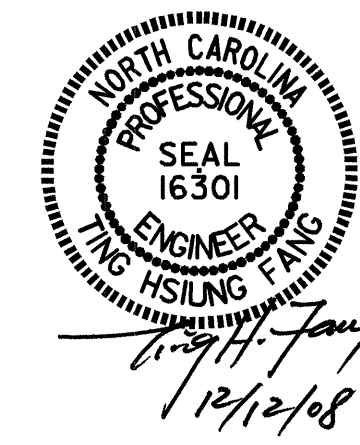
ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & FOOTING

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

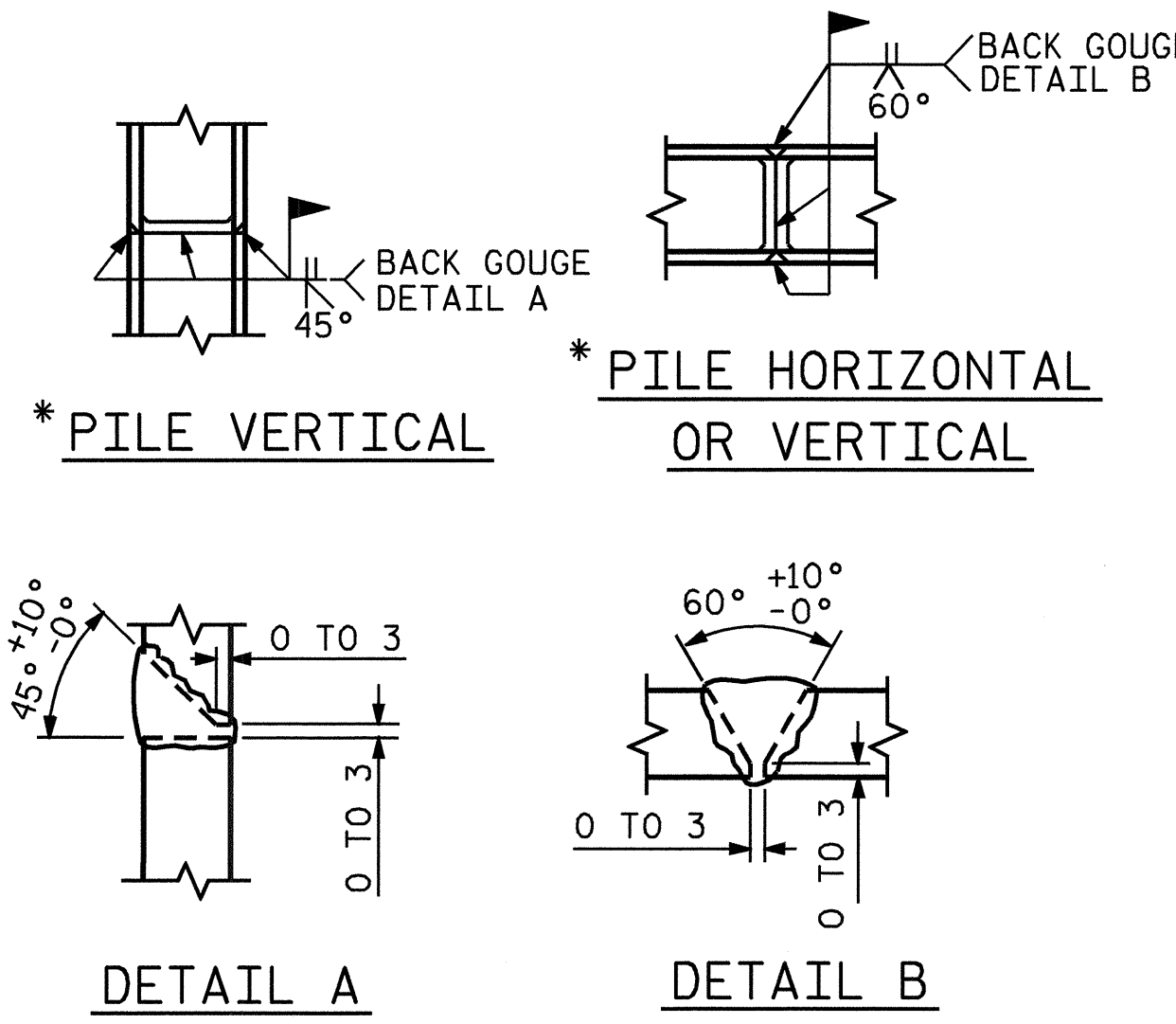
SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 1
 STAGE I



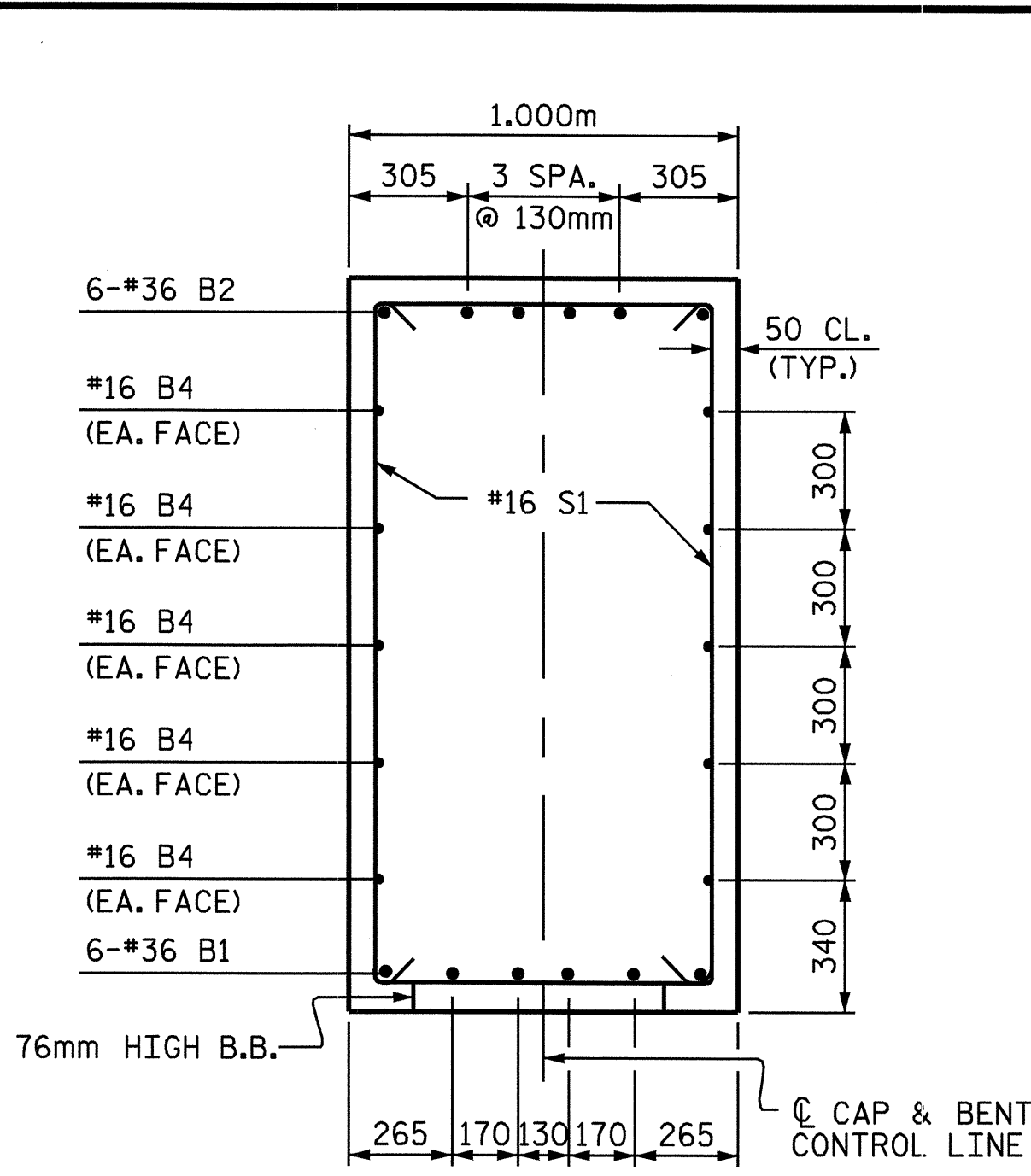
DRAWN BY: S. DOMBROWSKI DATE: 10/08
 CHECKED BY: TING FANG DATE: 10/08

REVISIONS						SHEET NO. S-31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

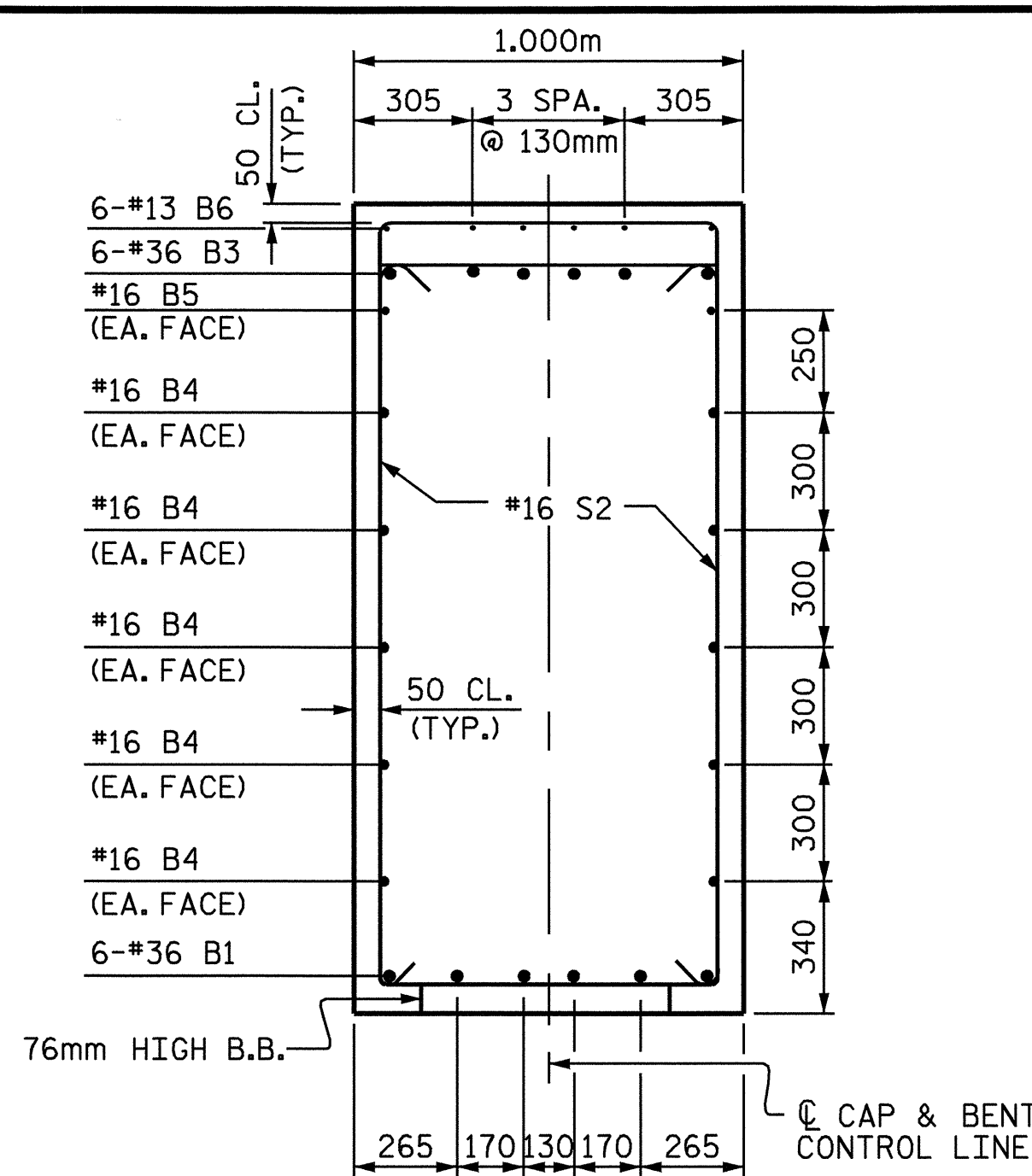


* POSITION OF PILE DURING WELDING.

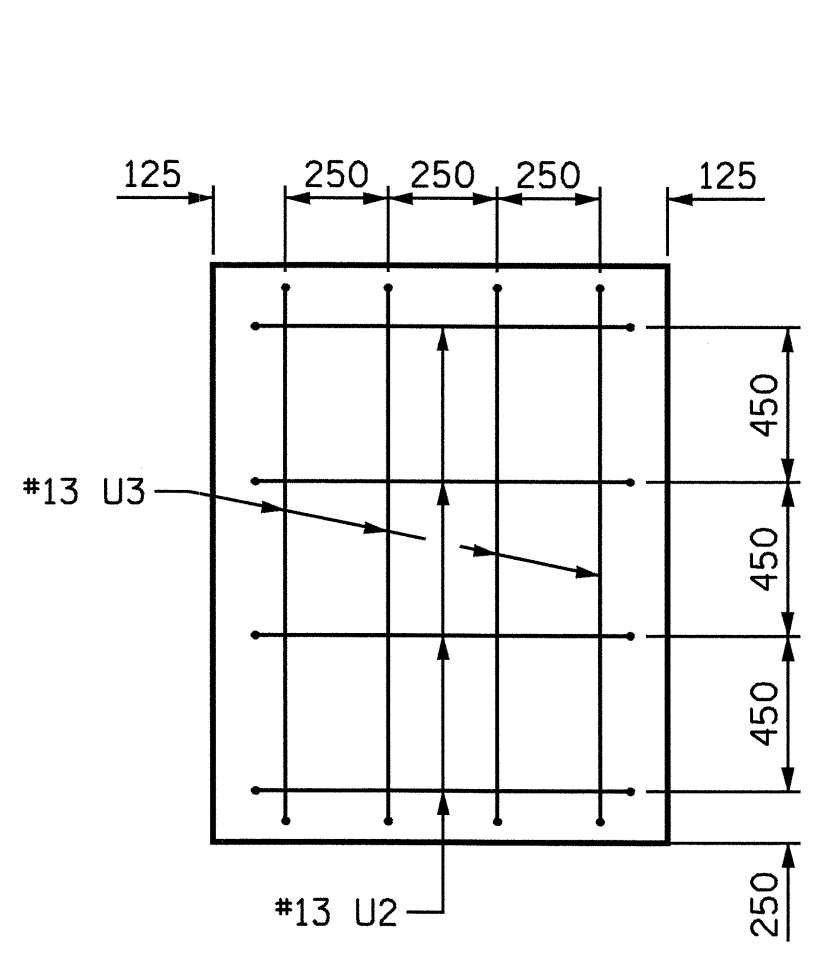
PILE SPLICING DETAILS



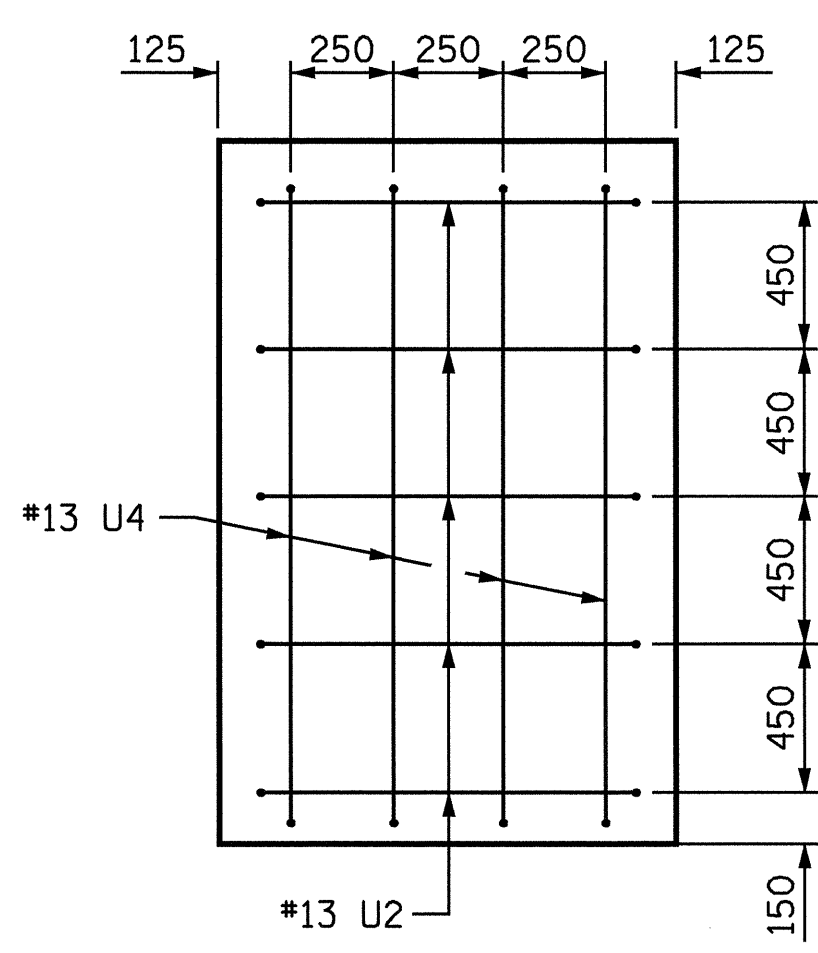
SECTION A-A



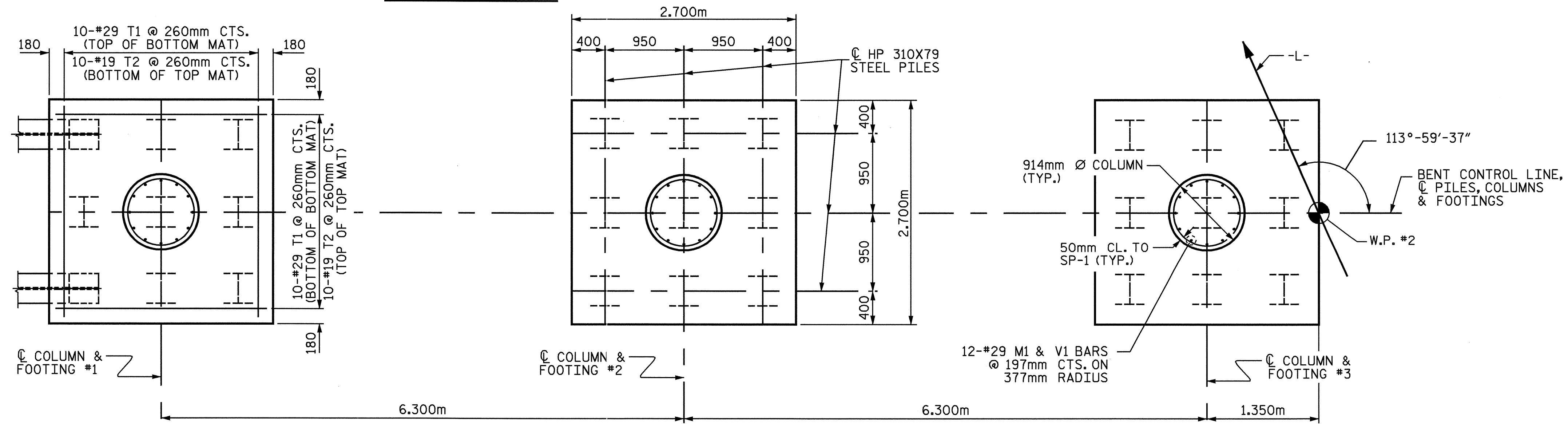
SECTION B-B



VIEW X-X

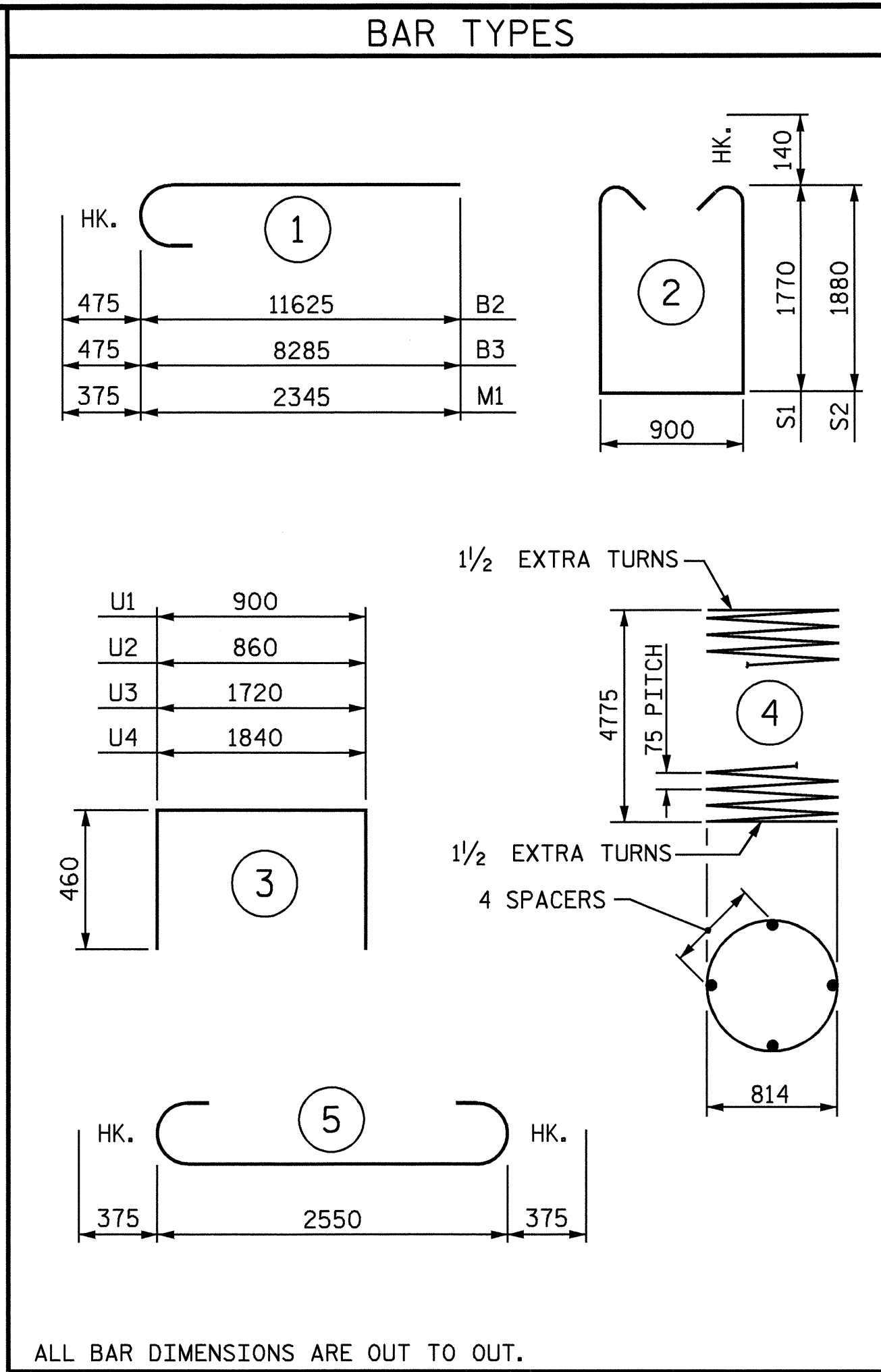


VIEW Y-Y



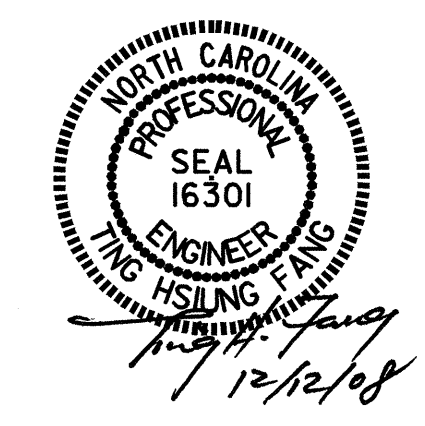
PLAN OF FOOTINGS AND COLUMNS

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & FOOTING



BILL OF MATERIAL					
BENT 1 STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#36	STR.	15800	750
B2	6	#36	1	12100	574
B3	6	#36	1	8760	416
B4	10	#16	STR.	15800	245
B5	2	#16	STR.	5080	16
B6	6	#13	STR.	940	6
B14	4	#13	STR.	900	4
M1	36	#29	1	2720	495
S1	48	#16	2	4720	352
S2	48	#16	2	4940	368
T1	60	#29	5	3300	1002
T2	60	#19	STR.	2540	343
U1	30	#13	3	1820	54
U2	9	#13	3	1780	16
U3	4	#13	3	2640	10
U4	4	#13	3	2760	11
V1	36	#29	STR.	5860	1067
REINFORCING STEEL				kg	5727
SP-1	3	**	4	167560	500
SPIRAL COLUMN REINFORCING STEEL				kg	500
CLASS A CONCRETE BREAKDOWN					
POUR #1 - FOOTINGS				C.M.	27.3
POUR #2 - COLUMNS				C.M.	9.3
POUR #3 - CAP				C.M.	31.4
TOTAL				C.M.	68.0
HP 310 x 79 STEEL PILES				METERS	810

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #13 PLAIN OR DEFORMED BAR.



PROJECT NO. R-2201

FORSYTH/STOKES COUNTY

STATION: 22+27.571 -L-

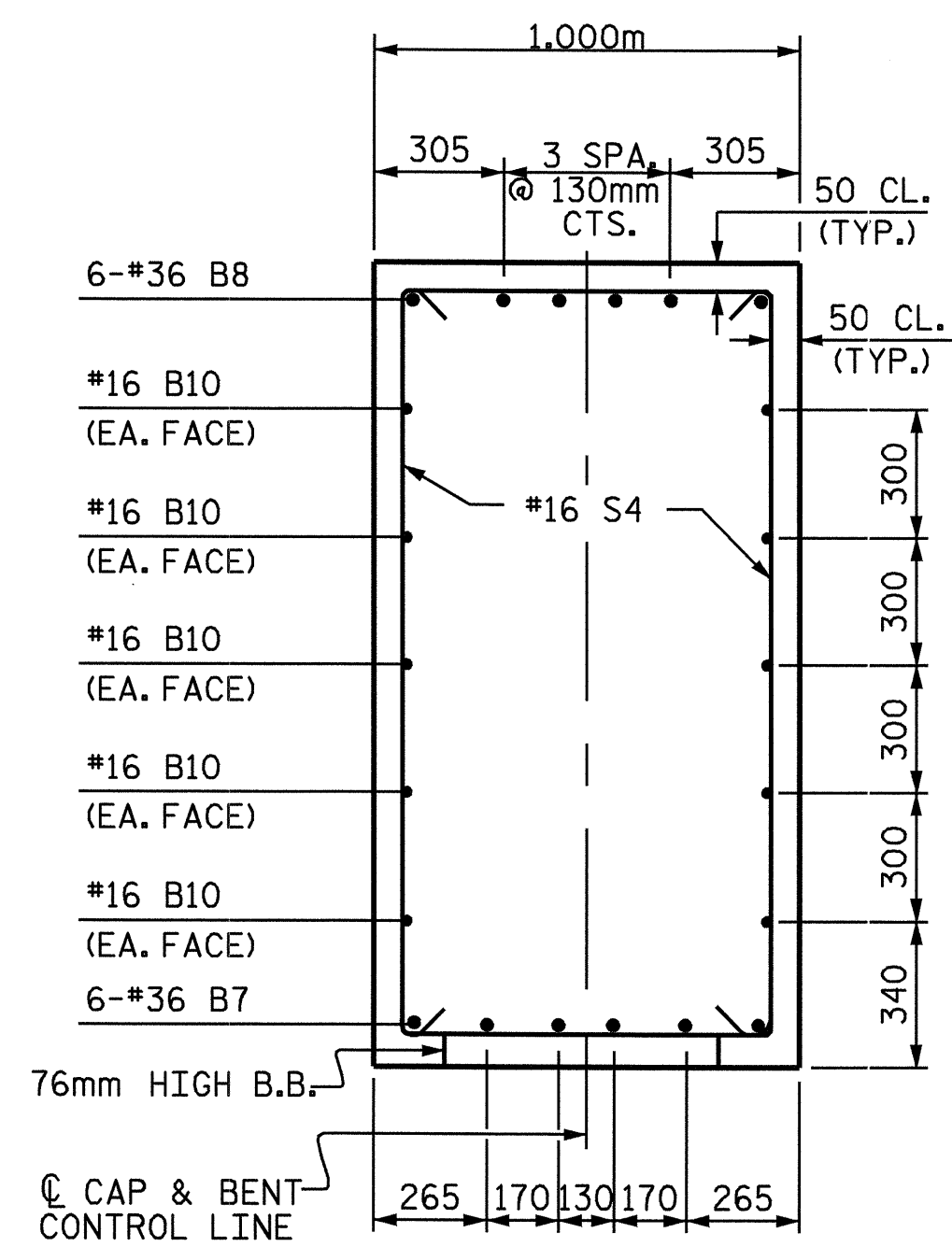
SHEET 2 OF 4

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

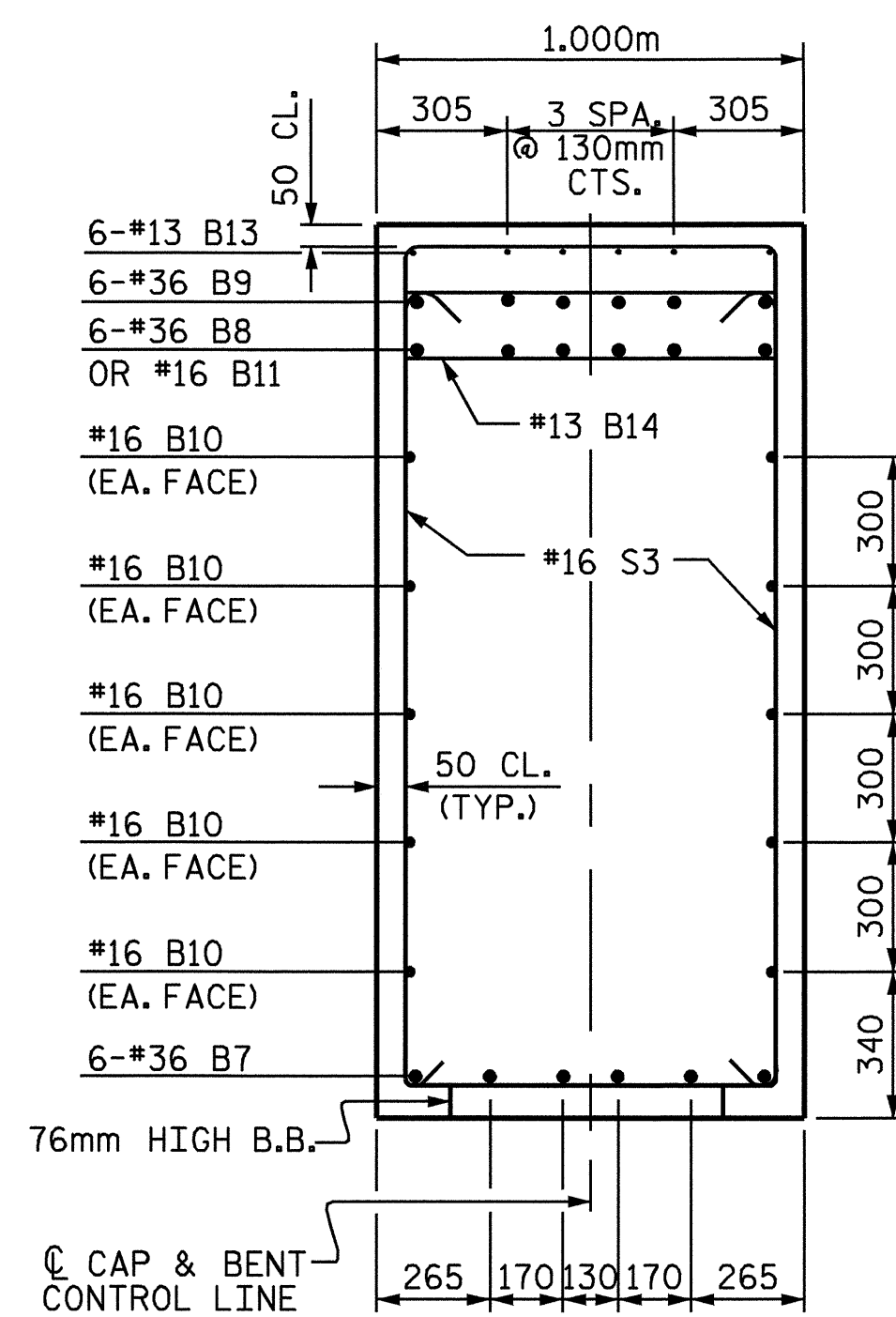
SHEET NO.	S-32
TOTAL SHEETS	42

DRAWN BY: S. DOMBROWSKI DATE: 10/08

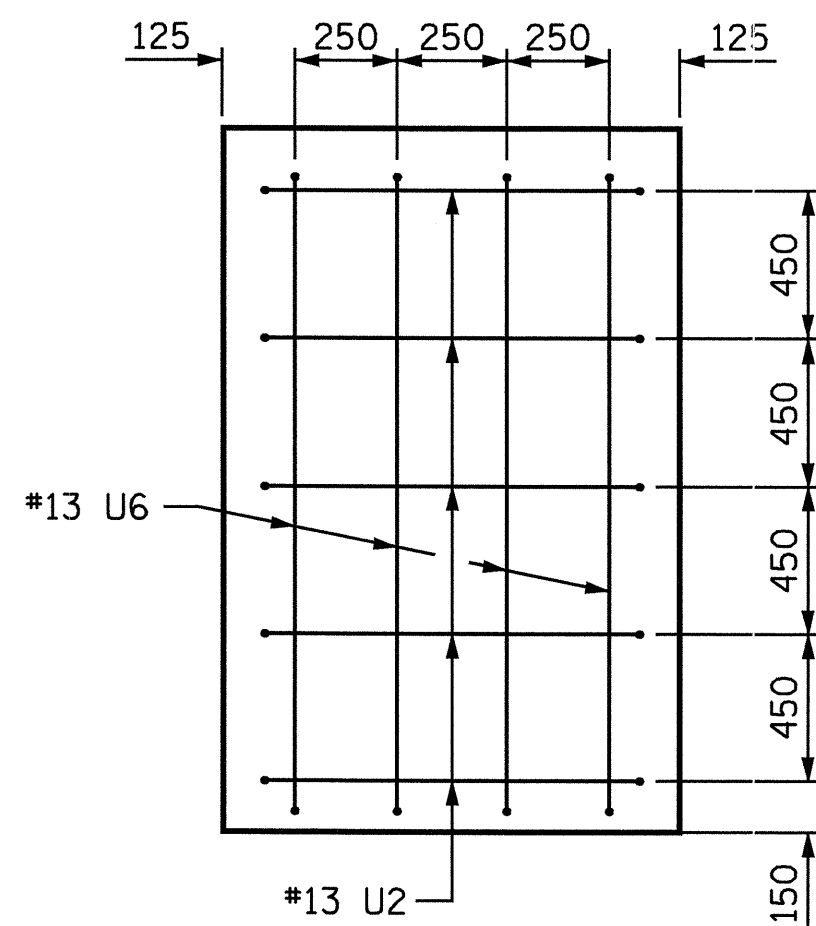
CHECKED BY: TING FANG DATE: 10/08



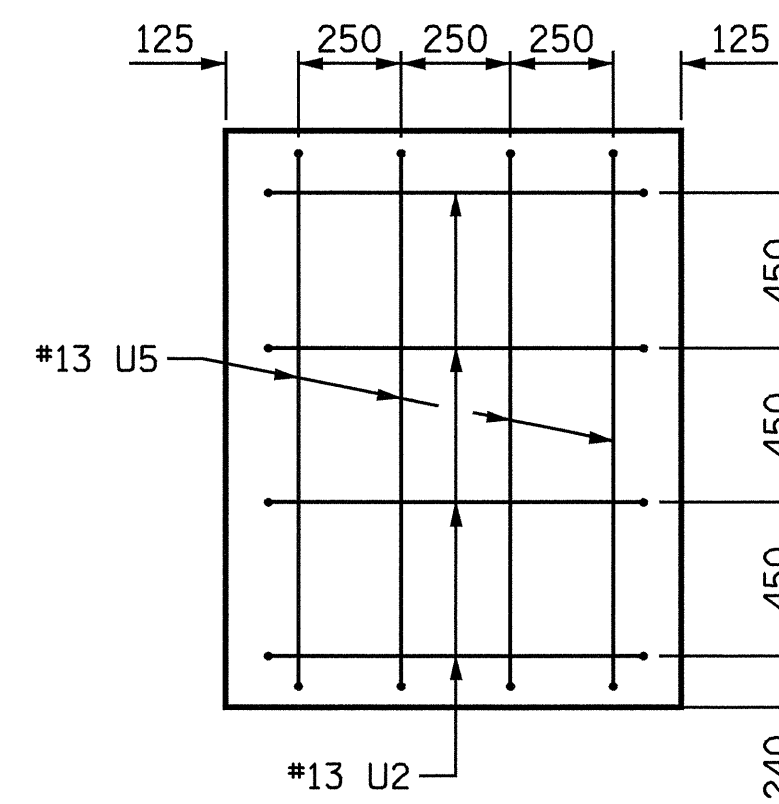
SECTION A-A



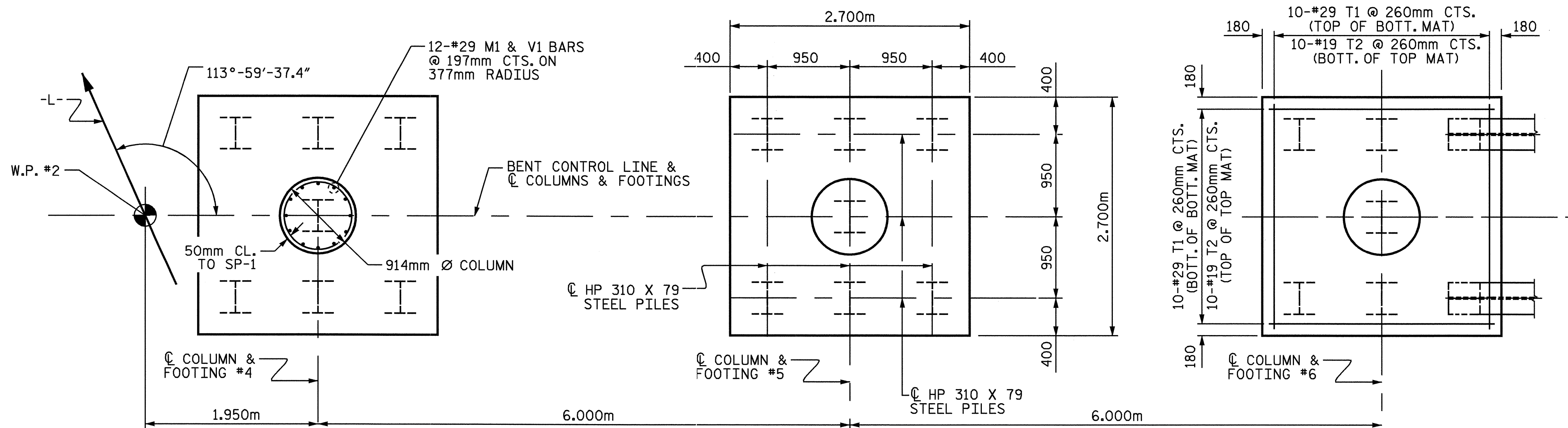
SECTION B-B



VIEW X-X



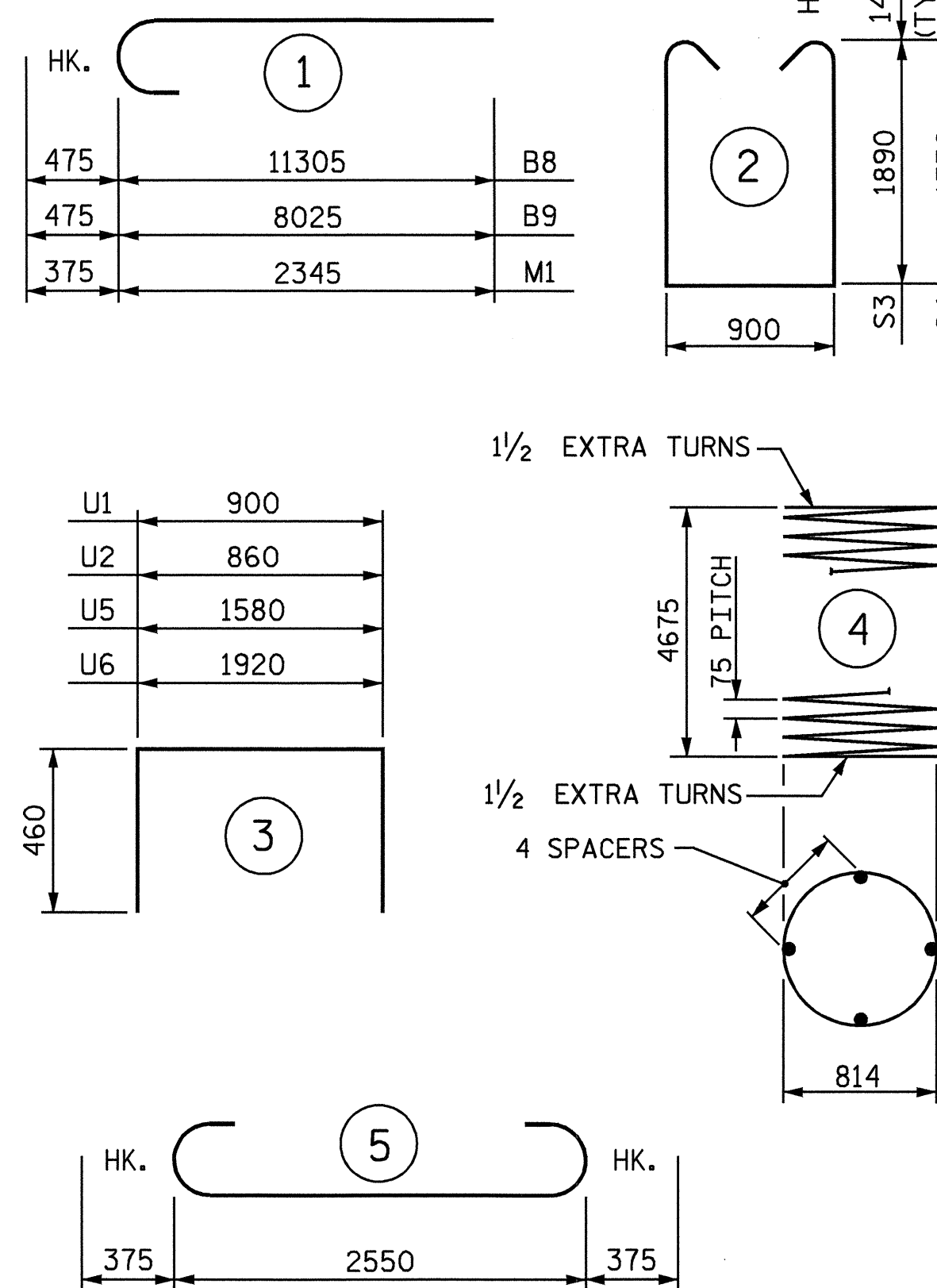
VIEW Y-Y



PLAN OF FOOTINGS AND COLUMNS

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & FOOTING

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B7	6	#36	STR.	15200	721
B8	6	#36	1	11780	559
B9	6	#36	1	8500	403
B10	10	#16	STR.	15200	236
B11	2	#16	1	4820	15
B12	6	#13	1	3420	20
B13	6	#13	STR.	4500	27
B14	3	#13	STR.	900	3
M1	36	#29	1	2720	495
S3	35	#16	2	4960	269
S4	35	#16	2	4640	252
T1	60	#29	5	3300	1002
T2	60	#19	STR.	2540	341
U1	41	#13	3	1820	74
U2	9	#13	3	1780	16
U5	4	#13	3	2500	10
U6	4	#13	3	2840	11
V1	36	#29	STR.	5760	1049

REINFORCING STEEL				kg	5503
SP-1	3	*	4	164200	490

SPIRAL COLUMN REINFORCING STEEL				kg	490
---------------------------------	--	--	--	----	-----

CLASS A CONCRETE BREAKDOWN			C.M.	
POUR #1 - FOOTINGS			C.M.	27.3
POUR #2 - COLUMNS			C.M.	9.1
POUR #3 - CAP			C.M.	30.2
TOTAL			C.M.	66.6

HP 310 x 79 STEEL PILES	NO. 21	METERS	630
-------------------------	--------	--------	-----

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #13 PLAIN OR DEFORMED BAR.



PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

BENT 1
 STAGE II

REVISIONS						SHEET NO. S-34
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

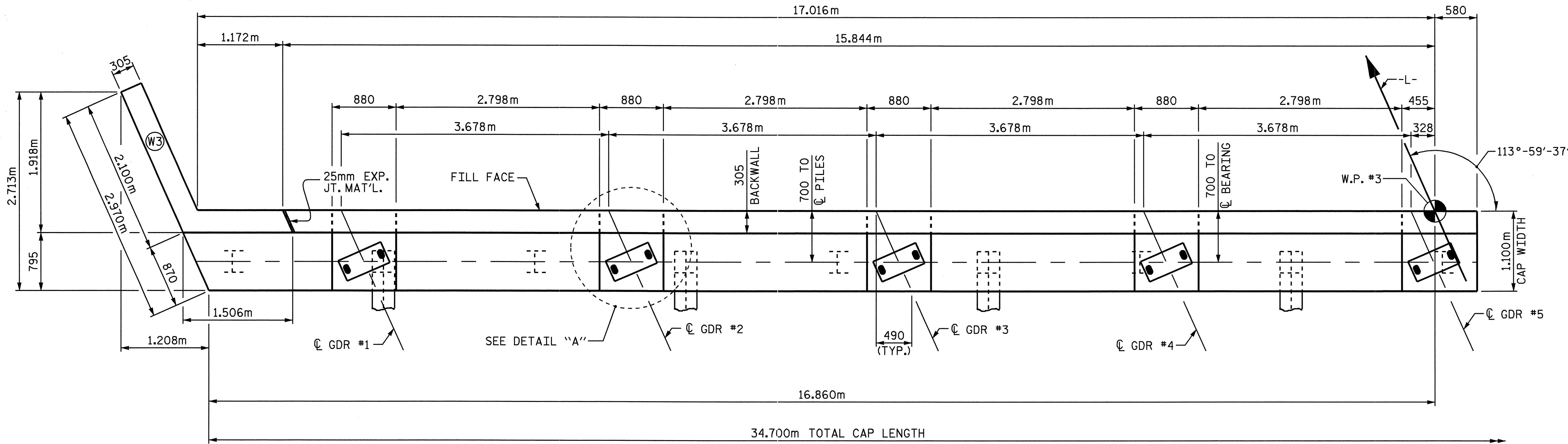
DRAWN BY: HARISH SHAH DATE: 9-08
 CHECKED BY: S. DOMBROWSKI DATE: 10-08

NOTES

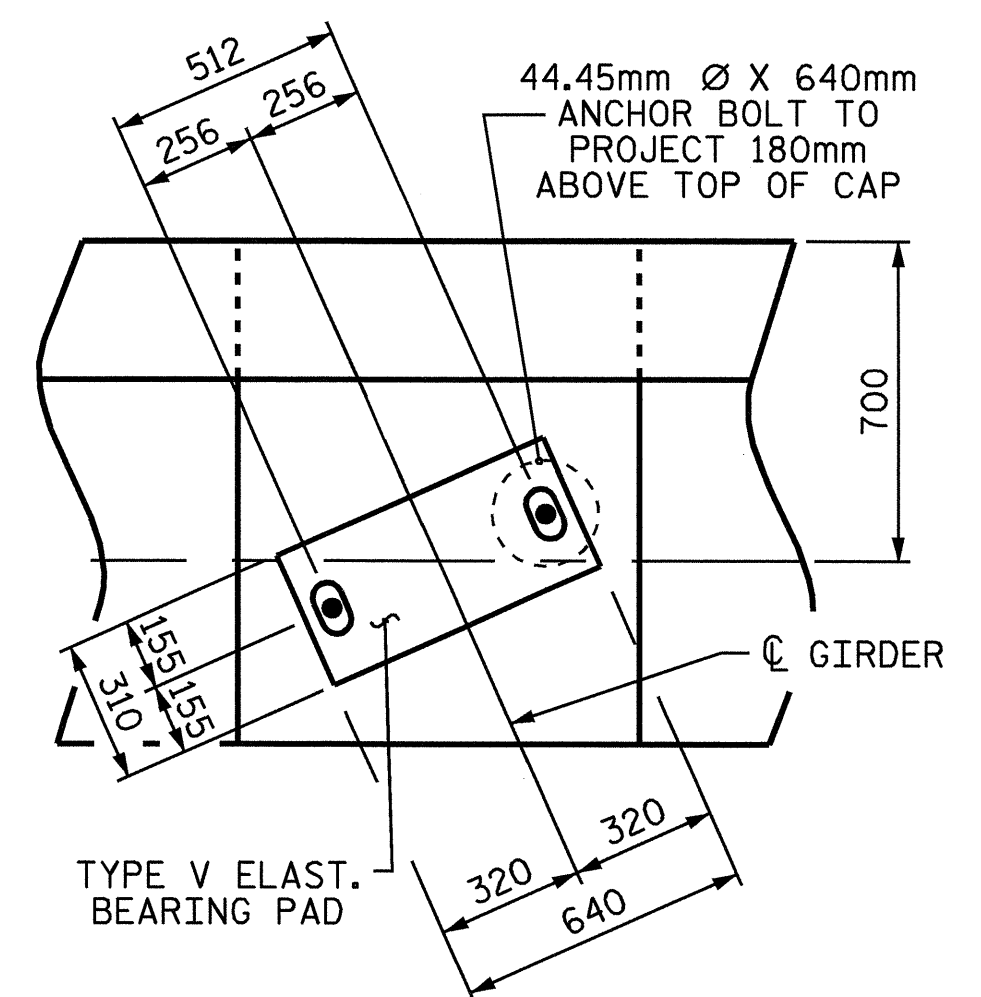
STIRRUPS AND #13 U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
 THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2 %.

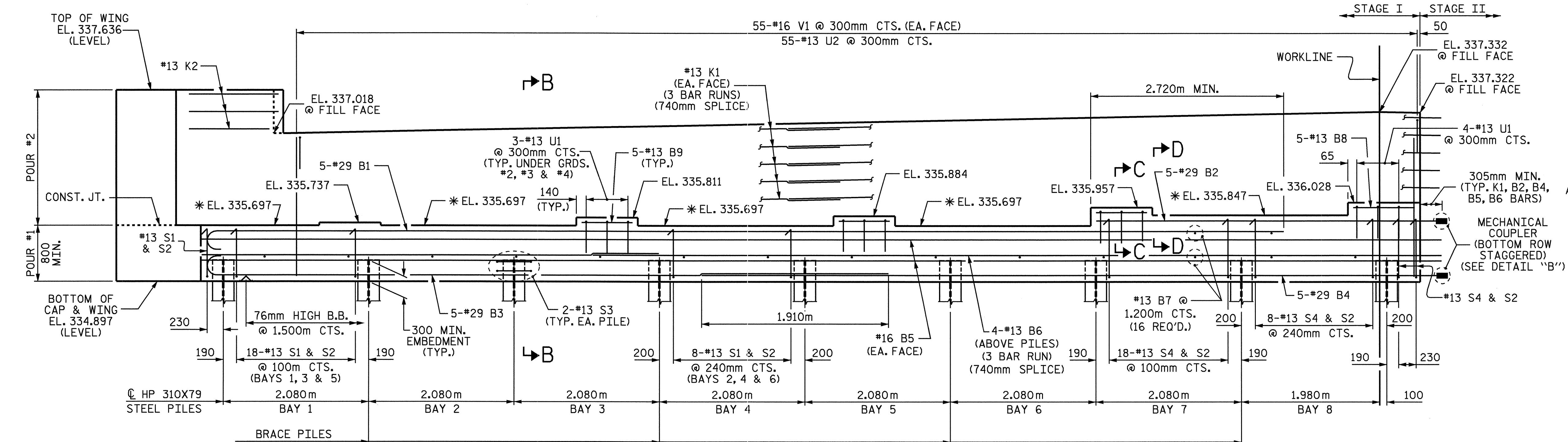
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 100mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PILES.



PLAN

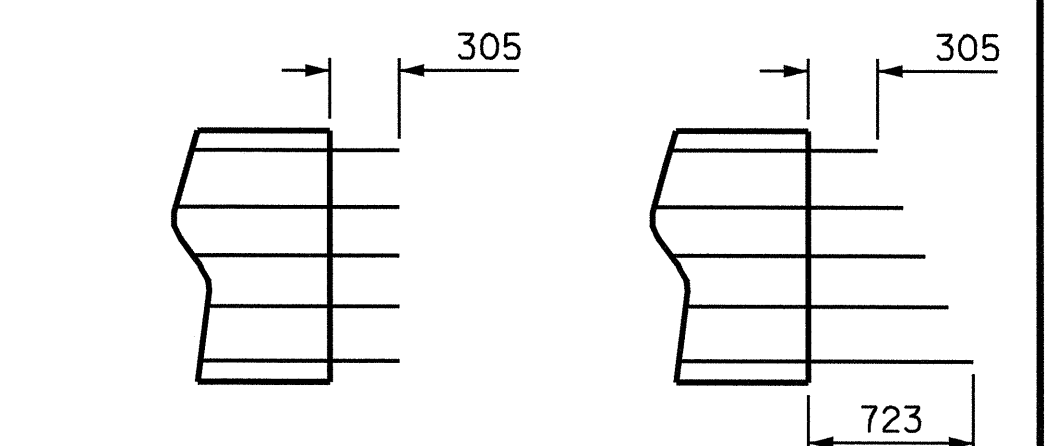


DETAIL "A"



ELEVATION

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SHEET 4 OF 4.



DETAIL "B"

B2 BARS
 B3 BARS
 ADJUST LENGTH OF SPLICE WITH B1 TO MAINTAIN CONSTANT PROJECTION

PROJECT NO. R-2201
 FORSTYH/STOKES COUNTY
 STATION: 22+27.571 -L-

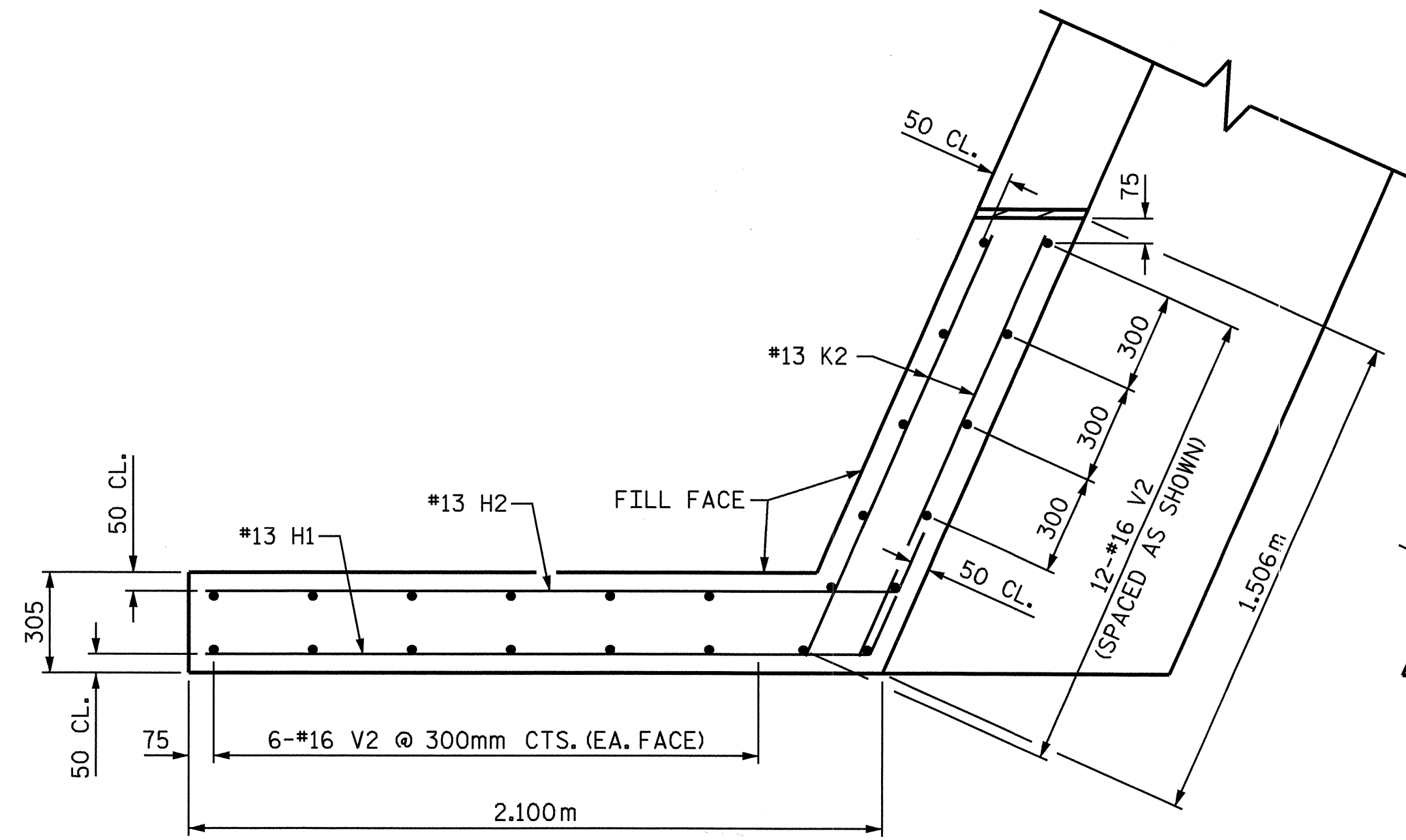
SHEET 1 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 STAGE I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-35
					TOTAL SHEETS 42

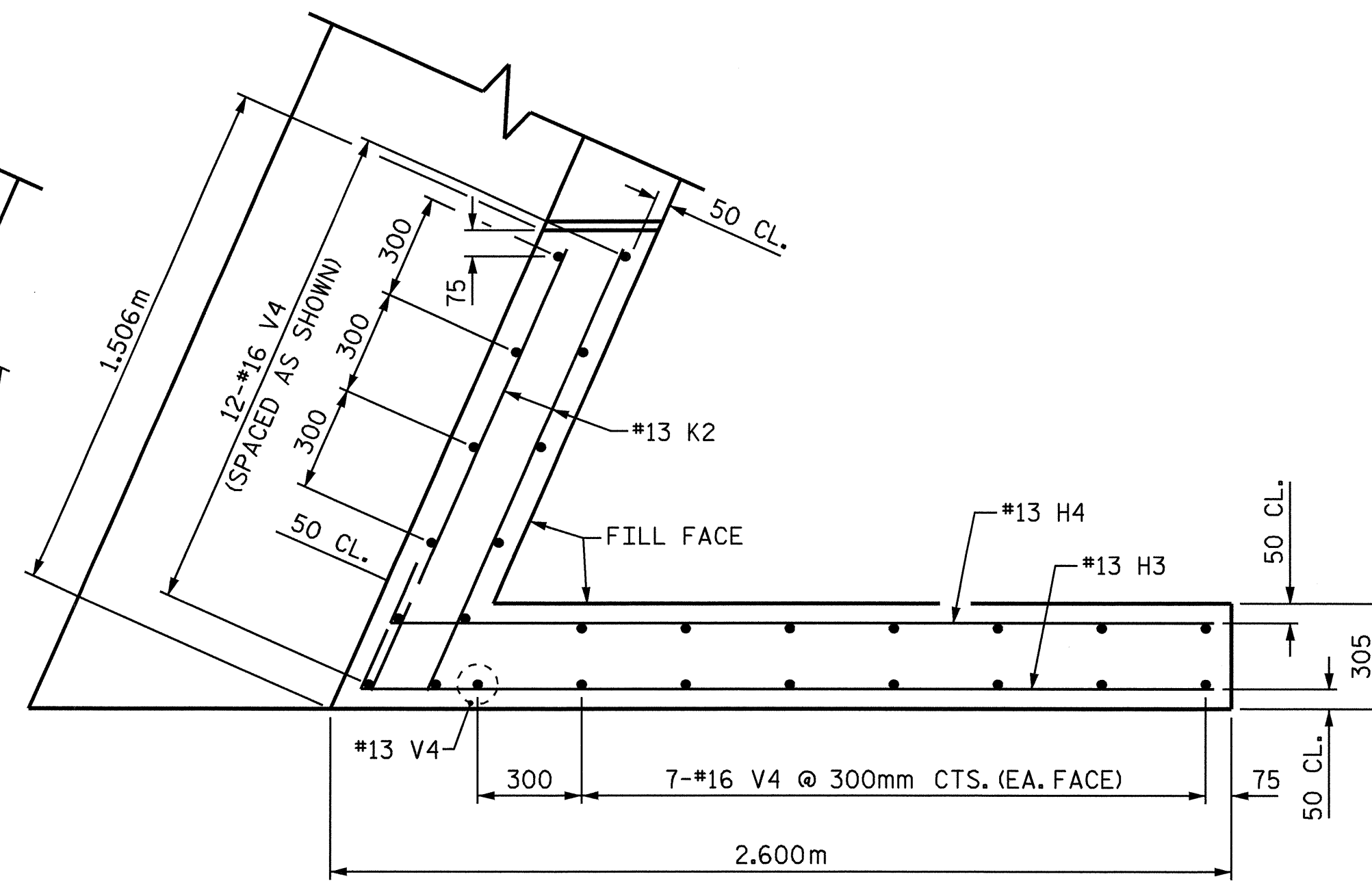


DRAWN BY: S. DOMBROWSKI DATE: 9/08
 CHECKED BY: T.H. FANG DATE: 10/08

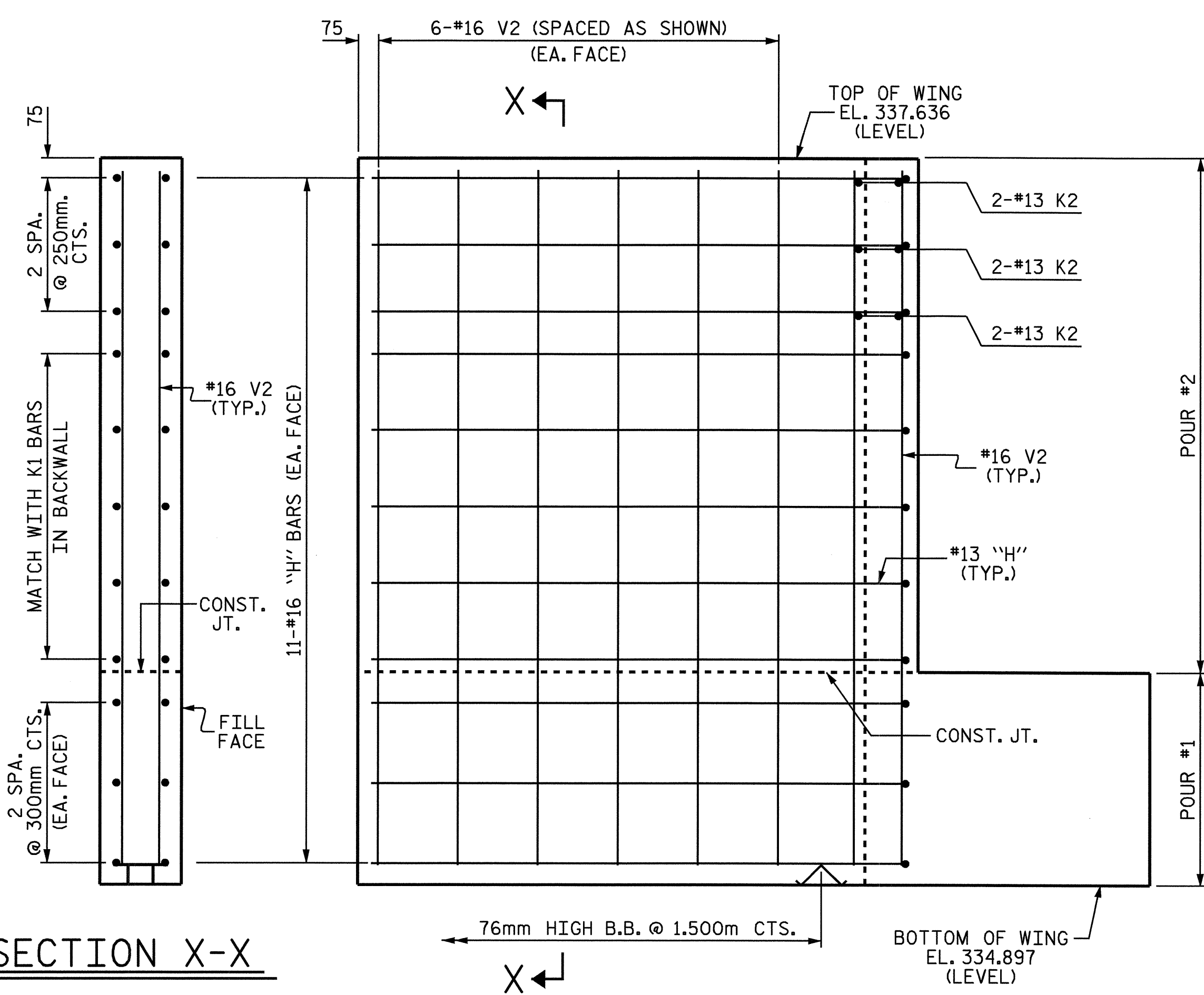
11-DEC-2008 15:59
 R:\Structures\R2201\FINAL_PLANS\R2201.sd_e*.dgn
 sdombrowski



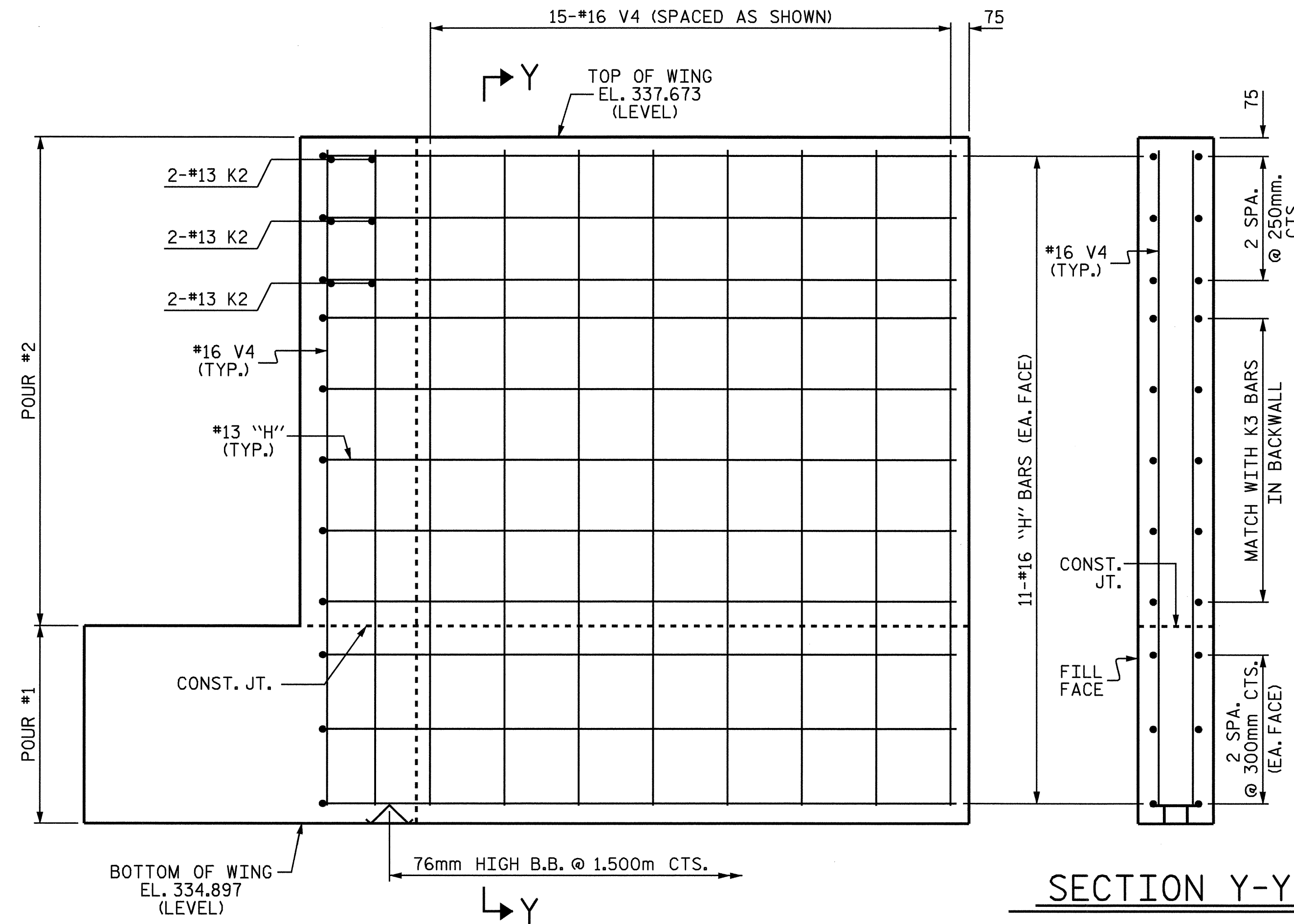
PLAN OF WING W3



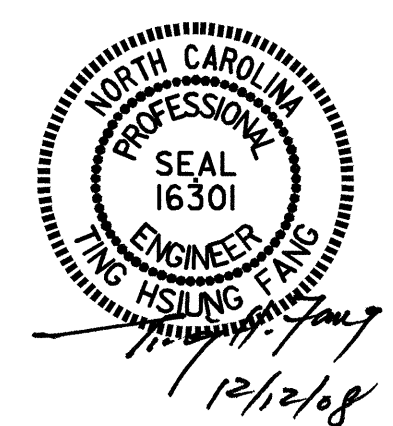
PLAN OF WING W4



ELEVATION OF WING W3



ELEVATION OF WING W4



PROJECT NO. R-2201
 FORSTYH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 3 OF 4

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

REVISIONS						SHEET NO. S-37
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY: S. DOMBROWSKI DATE: 9/08
 CHECKED BY: T.H. FANG DATE: 10/08

GENERAL NOTES

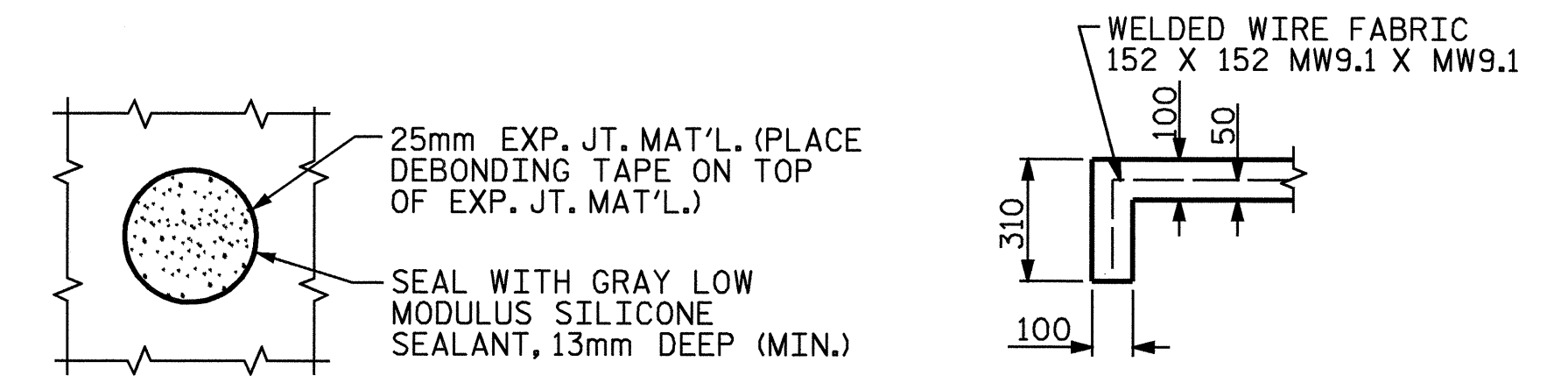
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION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

ALTERNATE "A"

ALTERNATE "A" SHALL CONSIST OF 100mm POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 152 X 152 - W9.1 X W9.1, 1520mm WIDE. SLOPE PROTECTION SHALL BE POURED IN 1520mm STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 600mm LONG #13 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 450mm MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 1220mm AND 1520mm STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 152mm. THE COST OF THE WELDED WIRE FABRIC AND #13 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE METER FOR SLOPE PROTECTION.

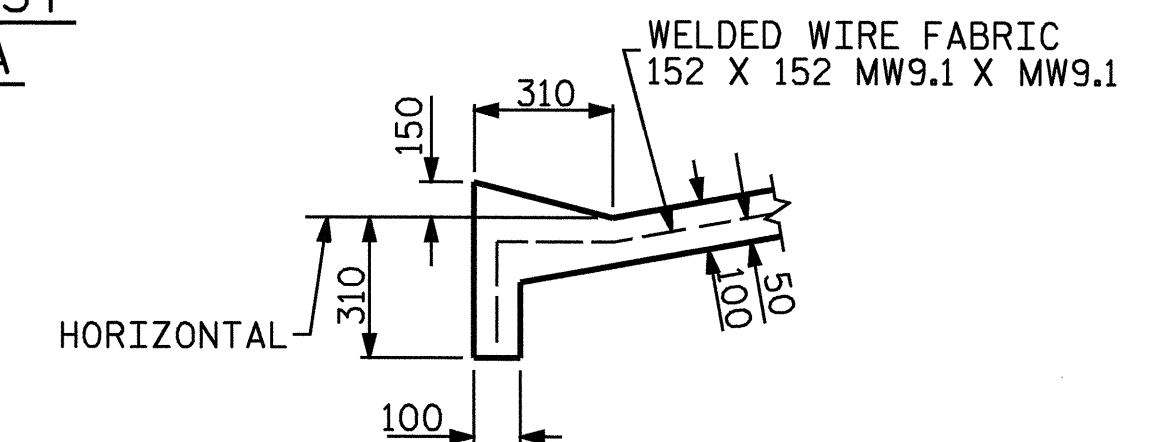
BRIDGE @ STA. 22+27.571 -L-	100mm SLOPE PROTECTION	* WELDED WIRE FABRIC 1520mm WIDE
	SQUARE METERS	APPROX. METERS
END BENT 1	520	380
END BENT 2	530	390

* QUANTITY SHOWN IS BASED ON 1520mm POURS.



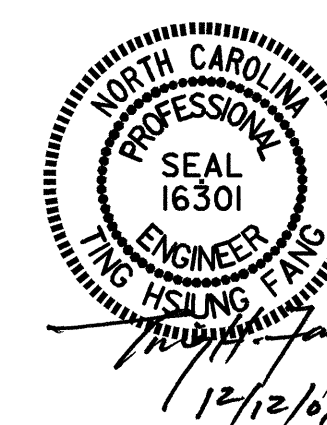
SECTION A-A

PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN



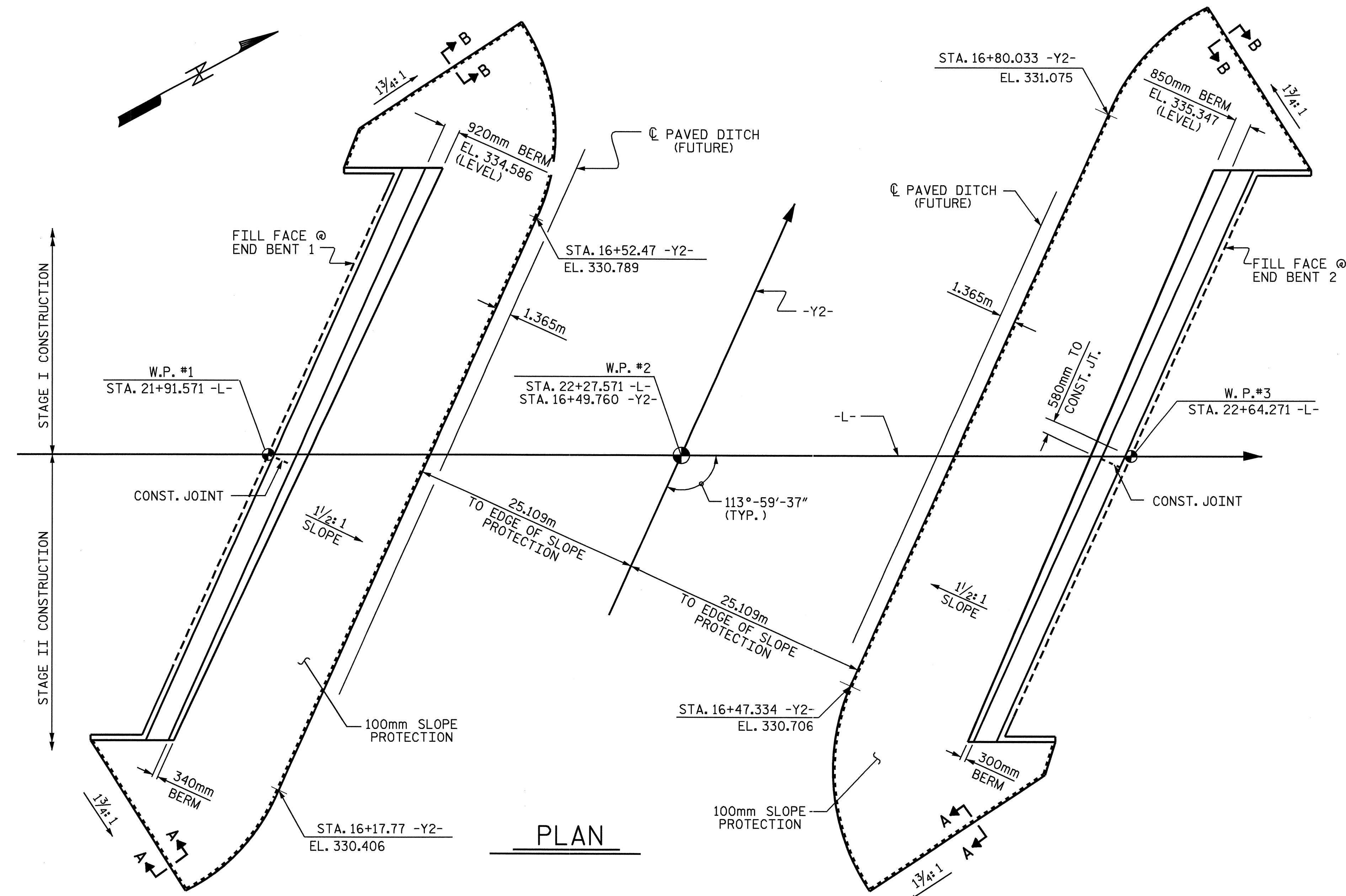
SECTION B-B

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

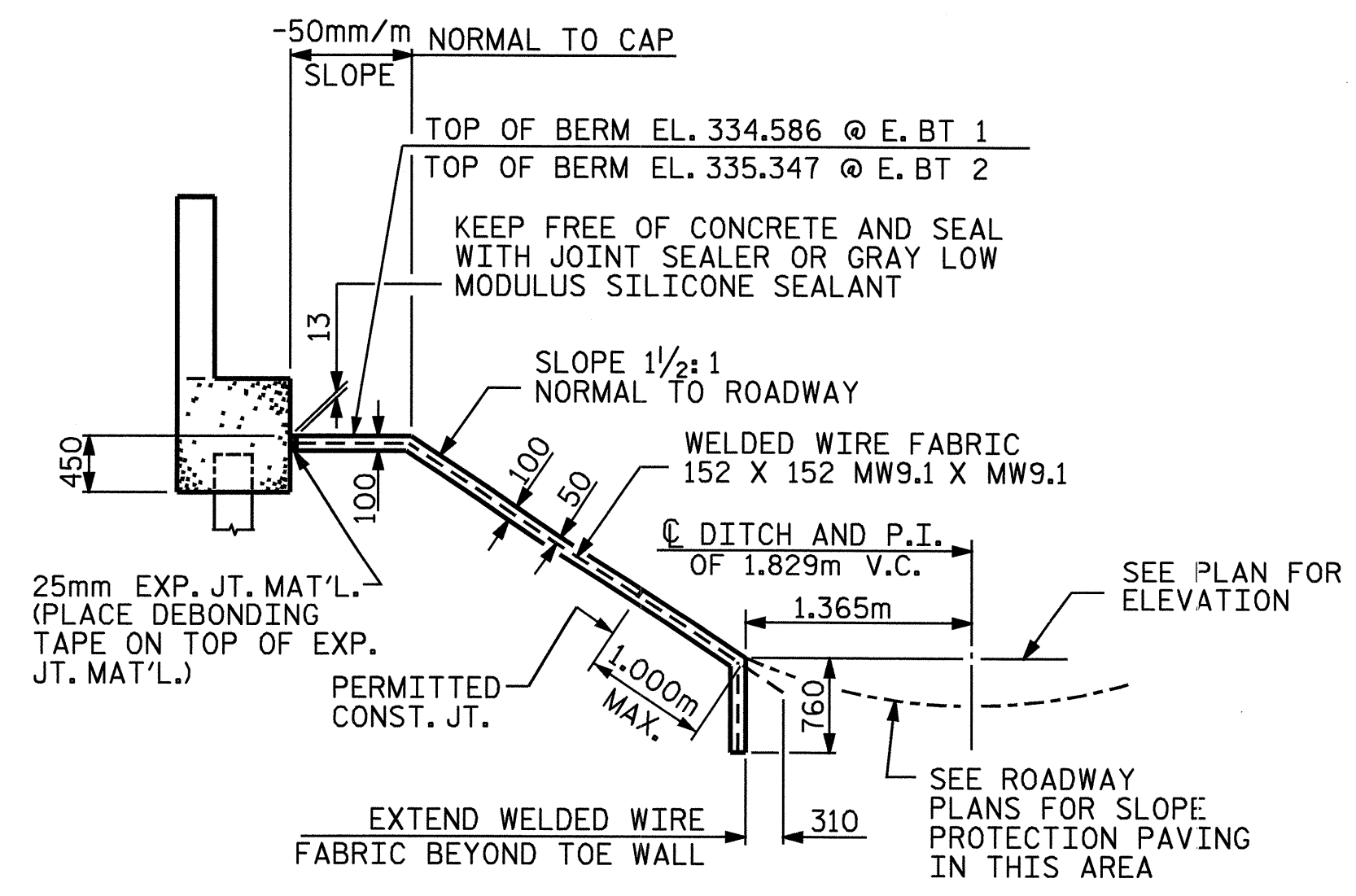


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			42

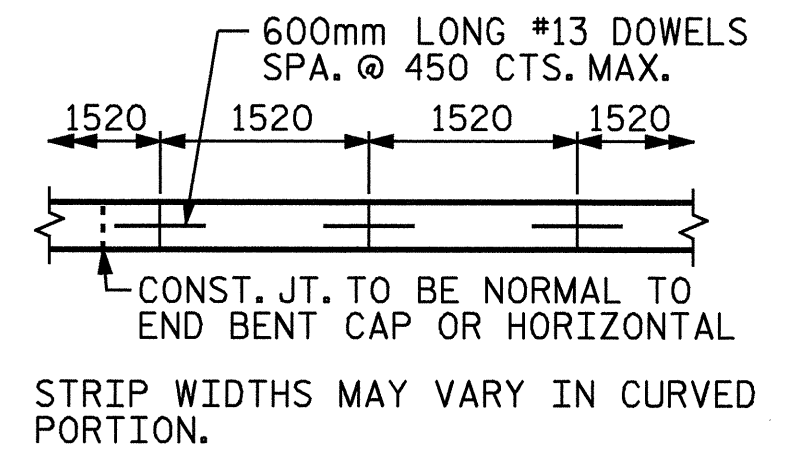
STD. NO. SP15M



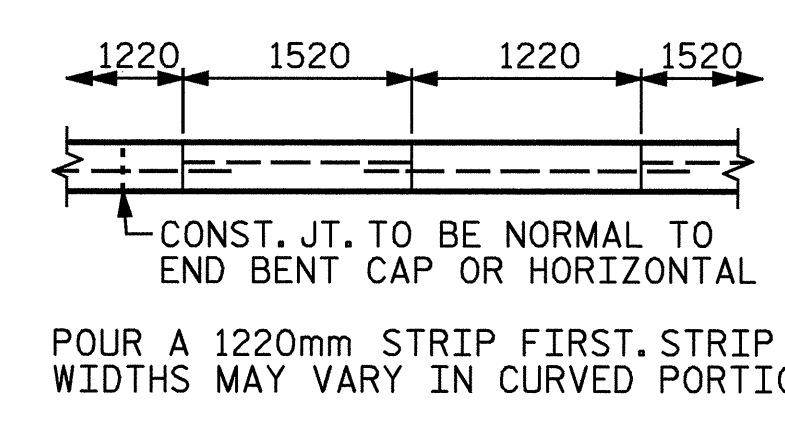
PLAN



SECTION ALONG C ROADWAY
 WITH FILL CATCHES IN DITCH



POURING DETAIL



OPTIONAL POURING DETAIL

ASSEMBLED BY : E.C. LOCKLEAR	DATE : 3-13-08
CHECKED BY : TING FANG	DATE : 9-16-08
DRAWN BY : ELR 5/92	REV. 7/10/01 LES/RDR
CHECKED BY : GRP 6/92	REV. 5/17/03 RWW/JTE
	REV. 5/17/06 TLA/GM

SEE PLAN OF APPROACH
SLABS, SHEET 2 OF 3.

NOTES

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

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.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE END POST.

DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER APPROACH SLAB HAS BEEN SCREEDED OFF. AT THE CONTRACTOR'S OPTION, ALL DOWELS MAY BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. THE YIELD LOAD FOR THE #13 D1 DOWELS IS 53.4 kN. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 64mm @ BOTH END BENTS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

FOR ONE APP. SLAB
(2 REQ'D.)

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#13	STR	8520	423
A2	52	#13	STR	8460	437
*B1	96	#16	STR	7220	1076
B2	96	#19	STR	7500	1609
*B3	4	#13	STR	7500	30
*D1	16	#13	STR	300	5
*G1	26	#13	STR	1640	42

REINFORCING STEEL	kg.	2046
*EPOXY COATED REINFORCING STEEL	kg.	1576
CLASS AA CONCRETE	m ³	36.3

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A3	50	#13	STR	8200	408
A4	52	#13	STR	8160	422
*B1	96	#16	STR	7220	1076
B2	96	#19	STR	7500	1609
*B3	4	#13	STR	7500	30
*D1	16	#13	STR	300	5
*G1	26	#13	STR	1640	42

REINFORCING STEEL	2031
*EPOXY COATED REINFORCING STEEL	1560
CLASS AA CONCRETE	m ³ 36.3

TOTAL QUANTITIES

	REINFORCING STEEL (kg.)	EPOXY COATED REINFORCING STEEL (kg.)	CLASS AA CONCRETE (m ³)
STAGE I	4302	2852	77.8
STAGE II	4242	2794	66.0
TOTAL	8544	5646	143.8

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
*A1 & *A3	#13	610
A2 & A4	#13	540

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

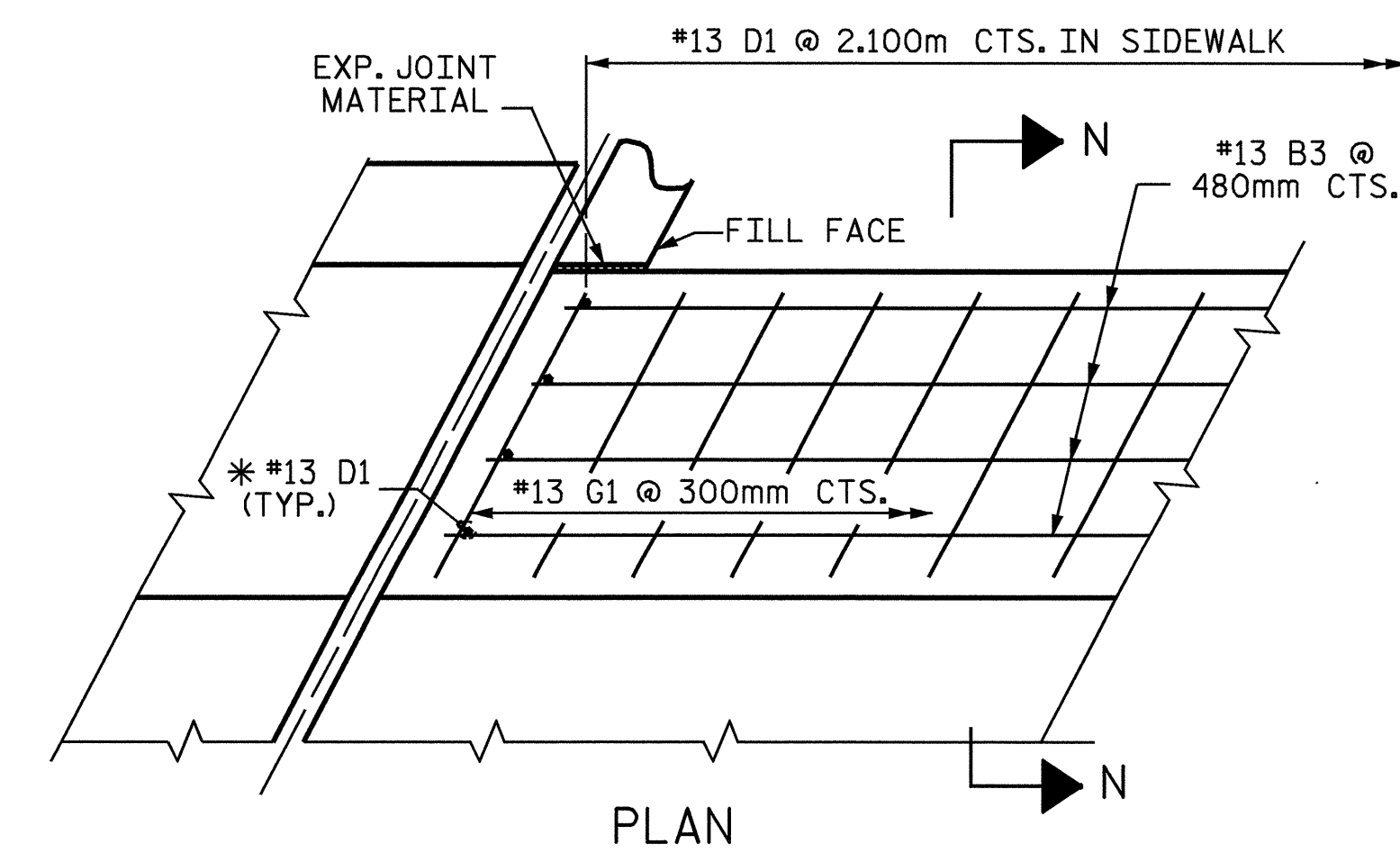
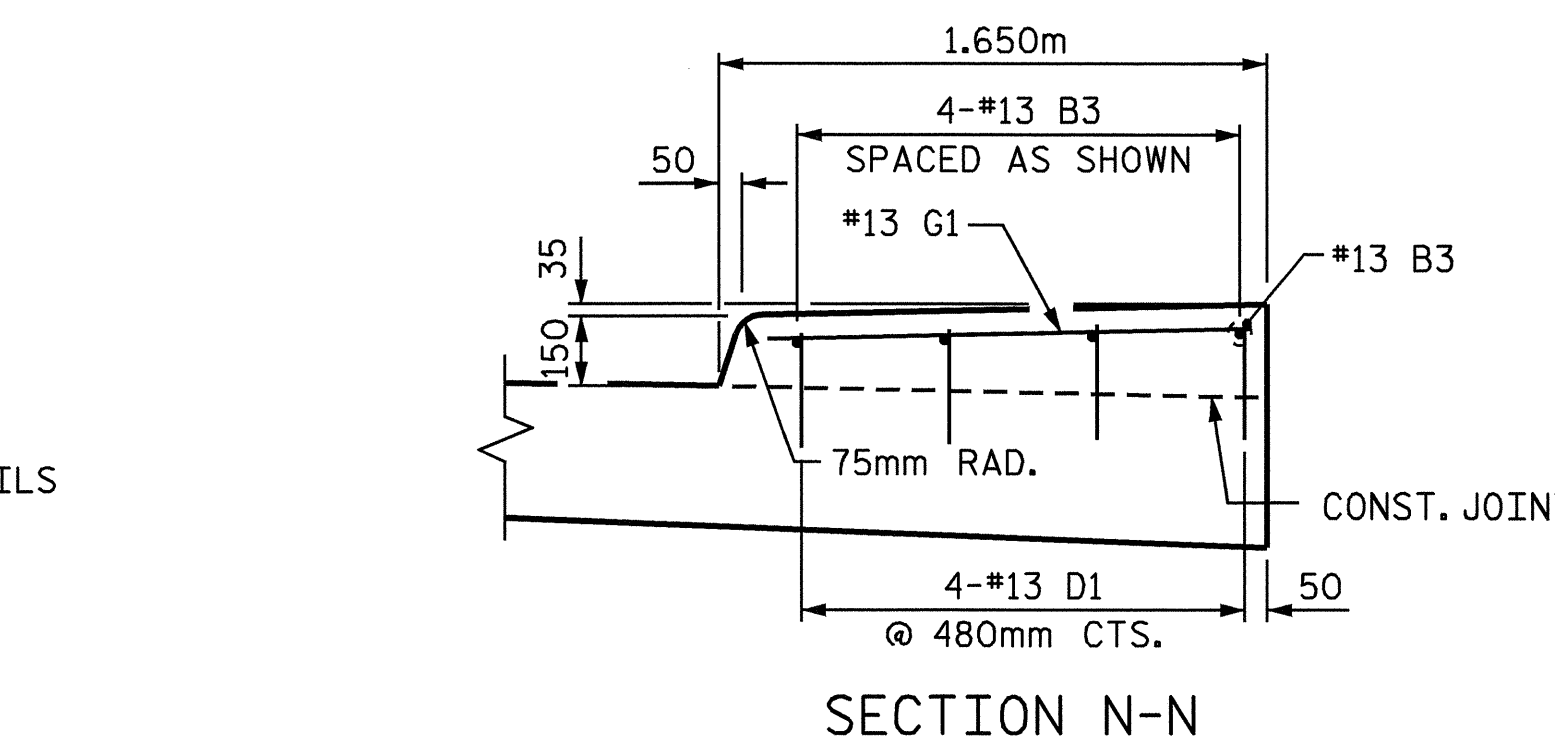
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

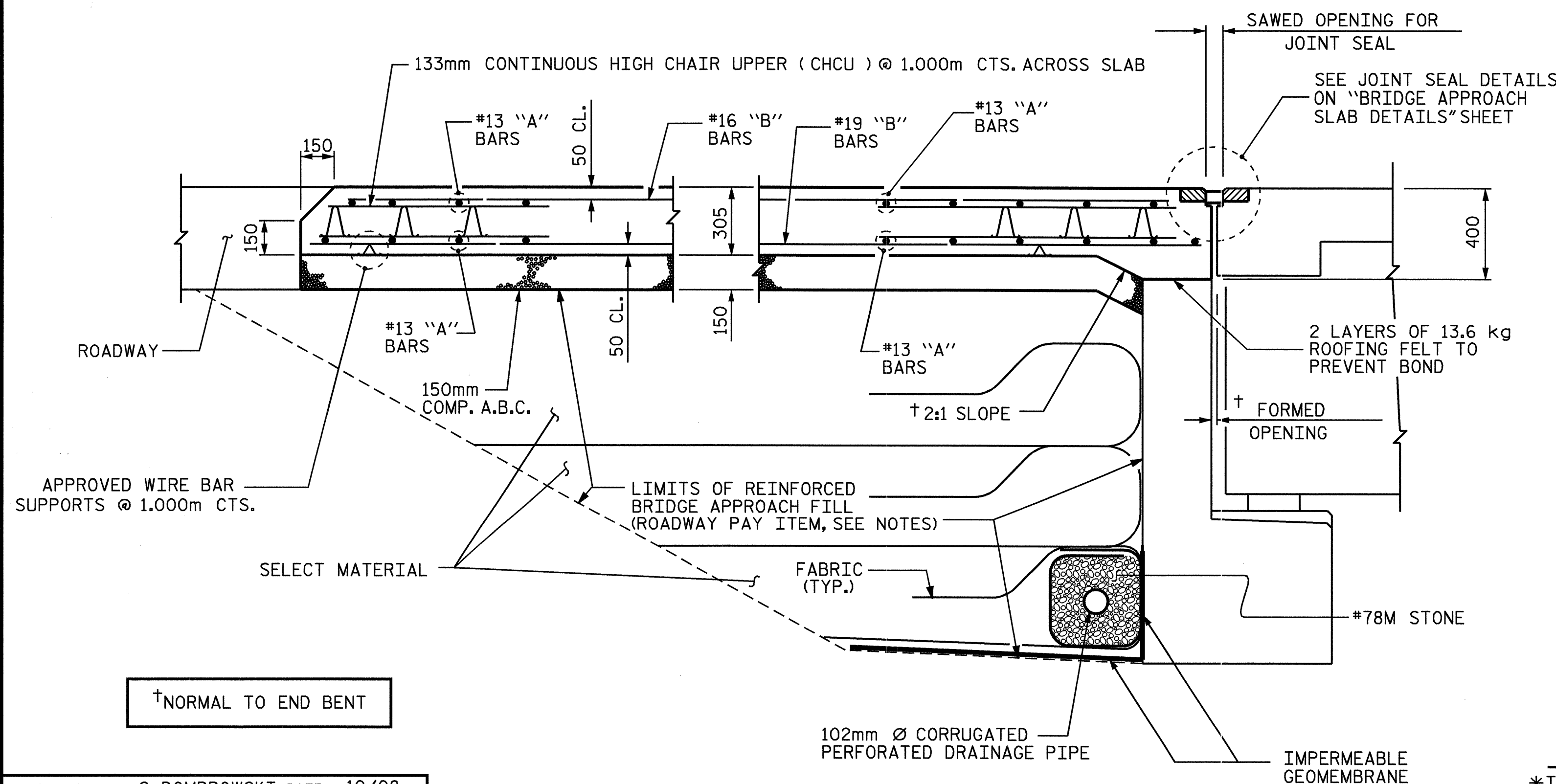
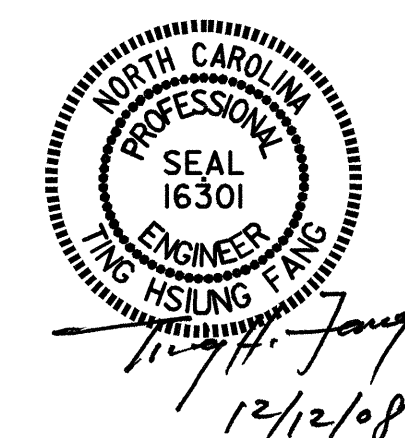
STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS 42
2			4			

STD. NO. BAS4SM



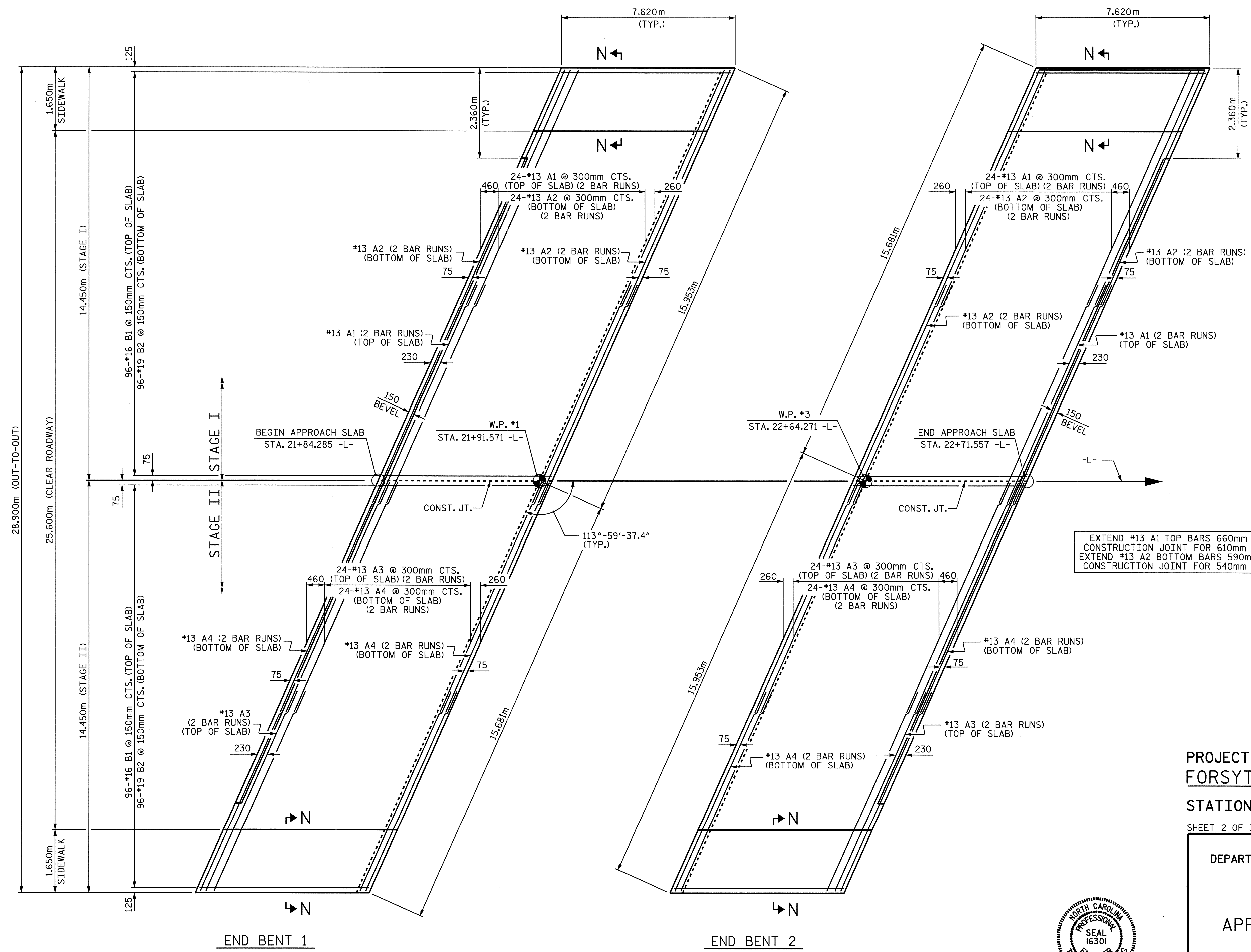
*THESE DOWELS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED INTO PLACE.



SECTION THRU SLAB

ASSEMBLED BY : S. DOMBROWSKI	DATE : 10/08
CHECKED BY : T.H. FANG	DATE : 10/08
DRAWN BY : FCJ 6/87	REV. 10/17/00 RWW/LES
CHECKED BY : EGA 6/87	REV. 7/10/01 RWW/LES
	REV. 5/17/03R RWW/JTE

11-DEC-2008 15:59
 R:\Structures\R2201\FINAL_PLANS\r220L.sd.as.dgn
 sdombrowski



EXTEND #13 A1 TOP BARS 660mm BEYOND CONSTRUCTION JOINT FOR 610mm SPLICE.
EXTEND #13 A2 BOTTOM BARS 590mm BEYOND CONSTRUCTION JOINT FOR 540mm SPLICE.

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

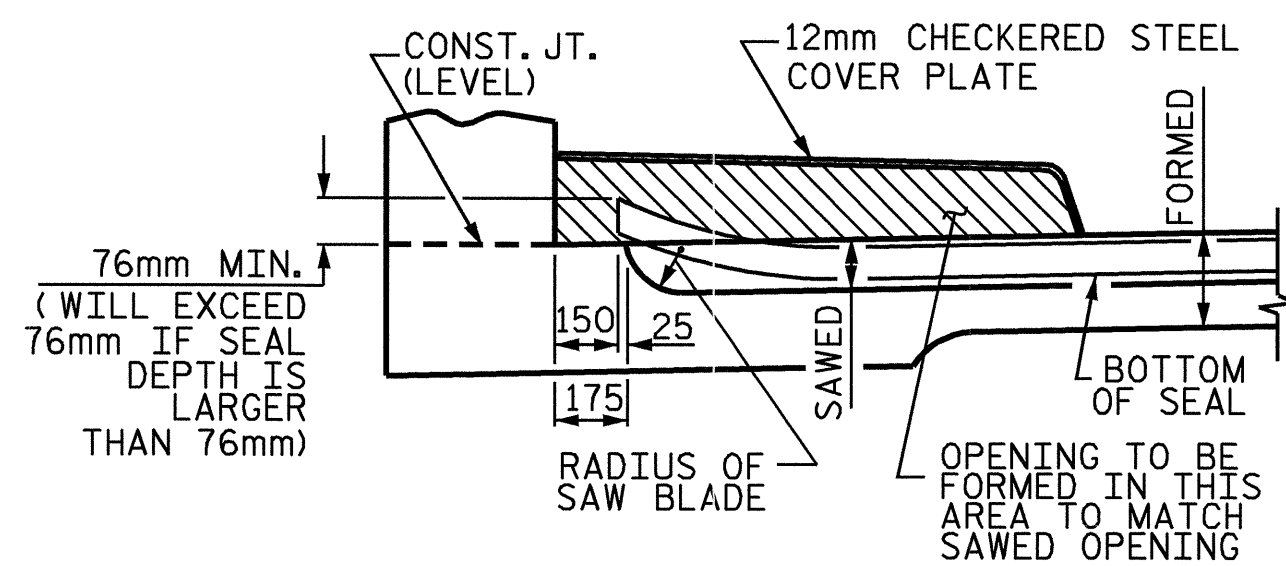
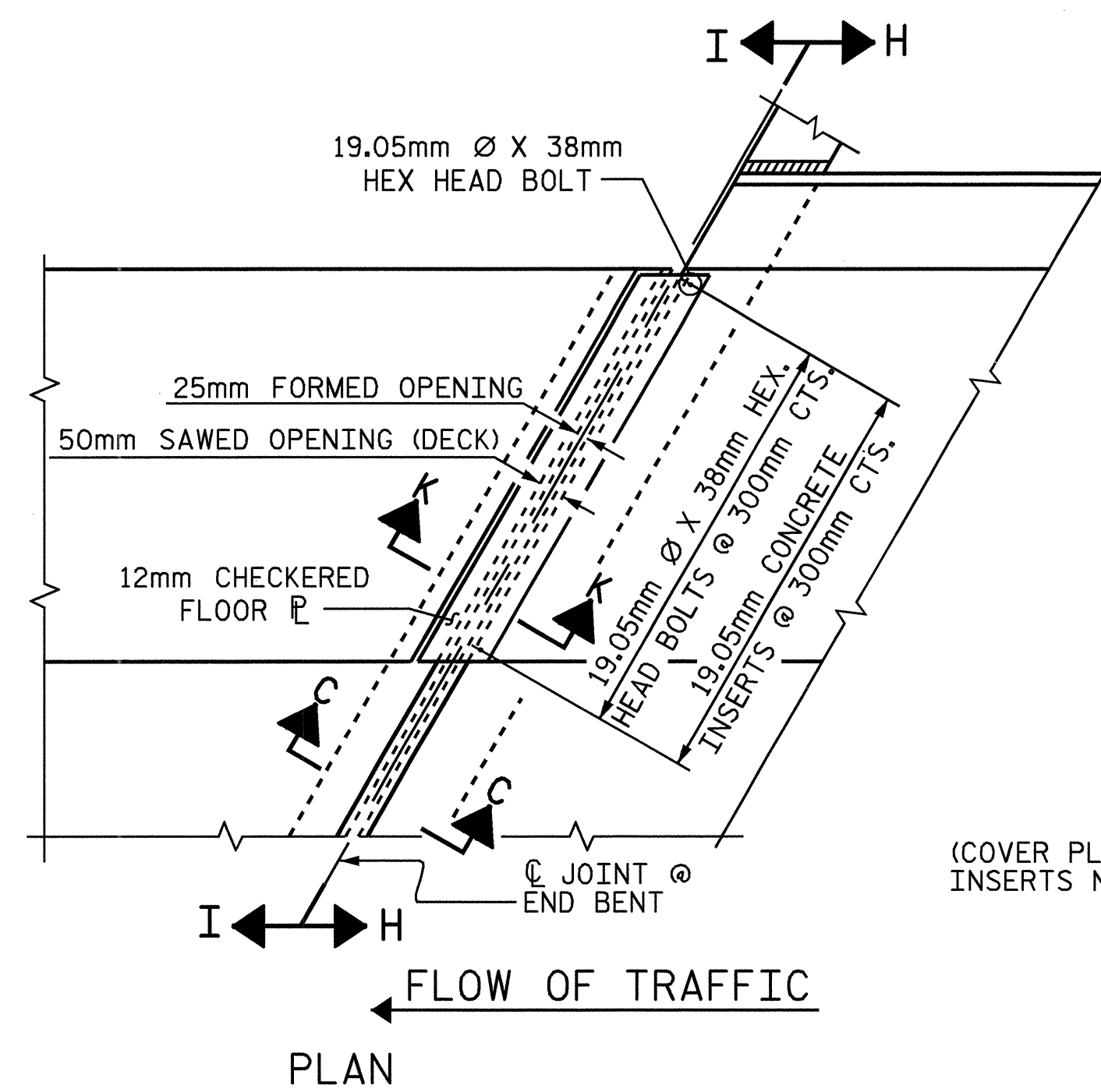
**BRIDGE
 APPROACH SLABS**



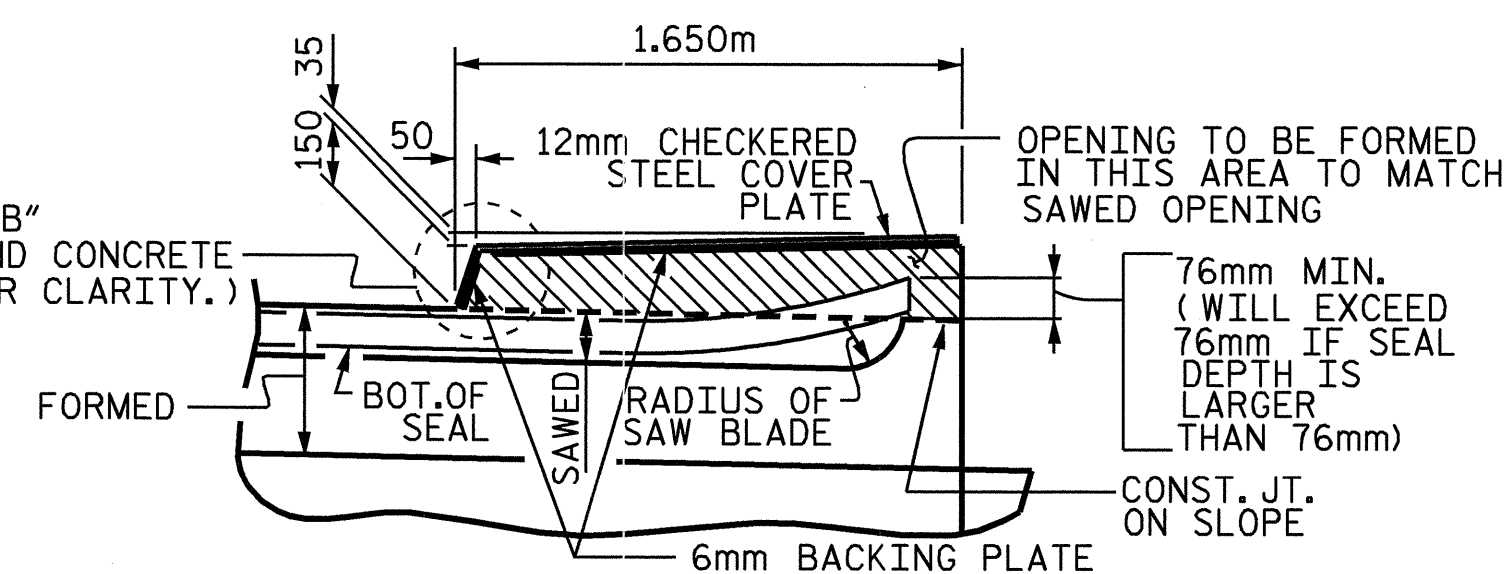
PLAN OF APPROACH SLABS
 REINFORCING STEEL IN SIDEWALKS NOT SHOWN, SEE SHEET 1 OF 3

DRAWN BY : S. DOMBROWSKI DATE : 10/08
 CHECKED BY : T.H. FANG DATE : 10/08

REVISIONS						SHEET NO. S-41
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

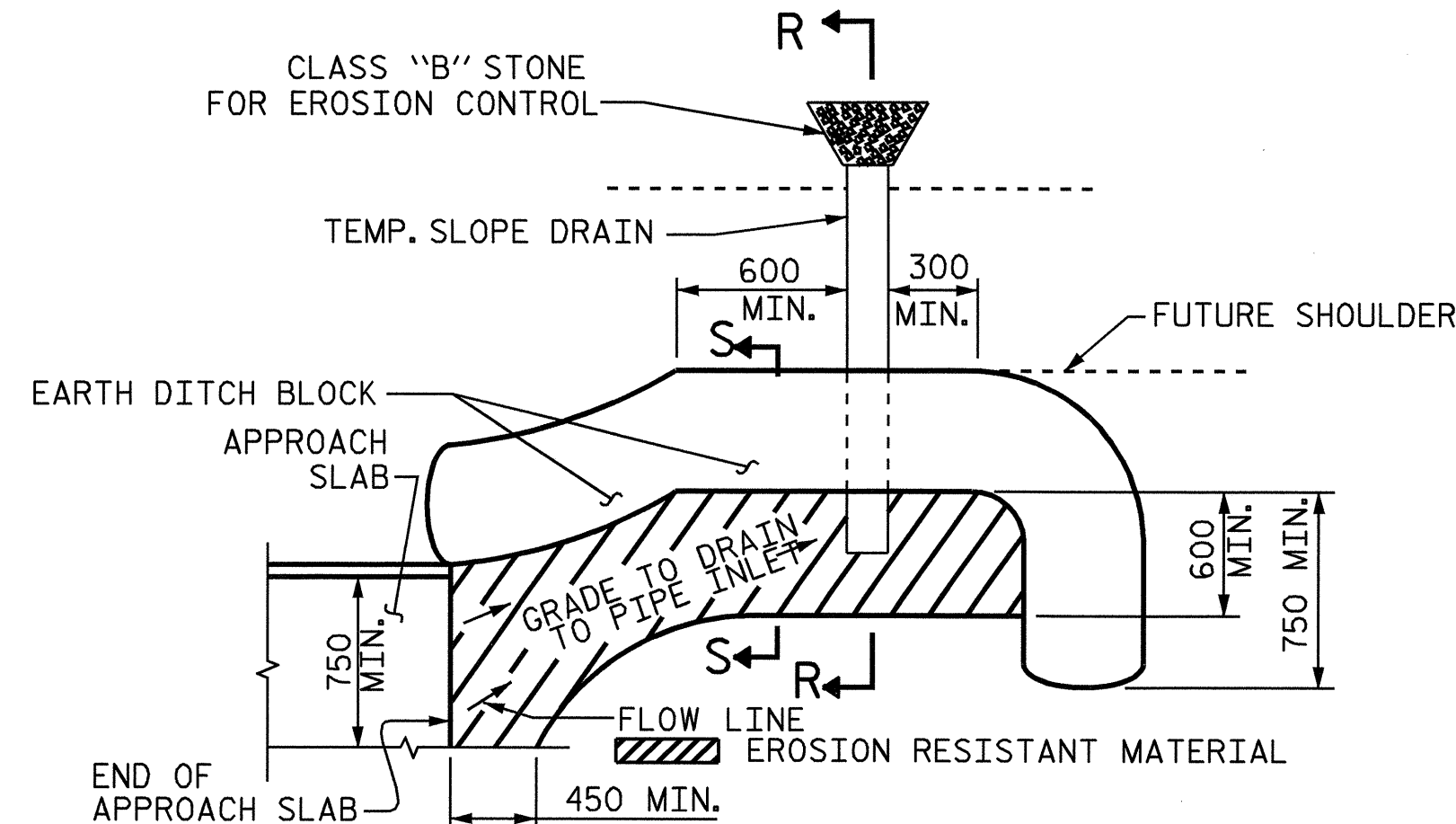


SECTION H-H



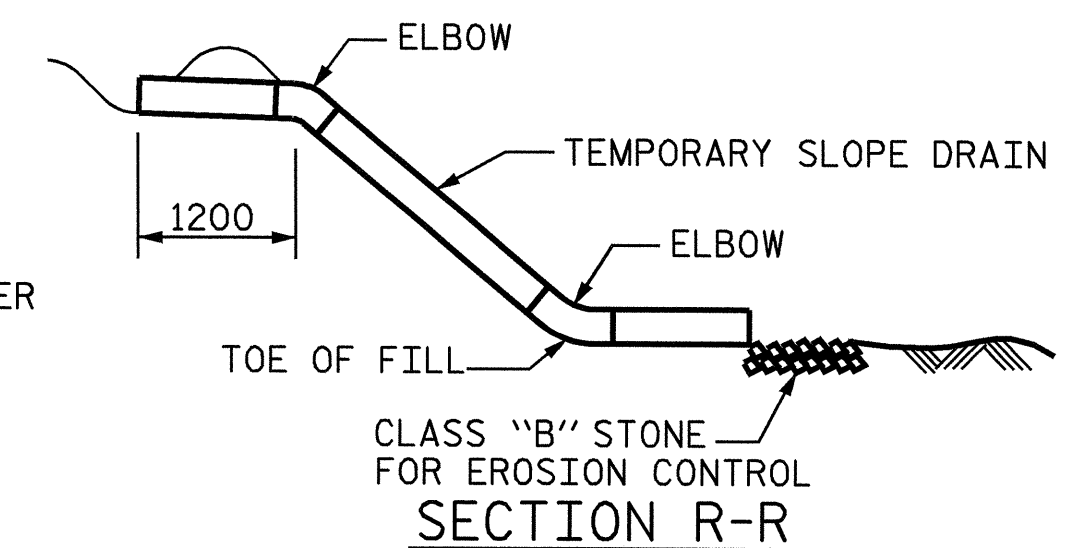
SECTION I-I

SEE DETAIL "B" (COVER PLATE BOLTS AND CONCRETE INSERTS NOT SHOWN FOR CLARITY.)

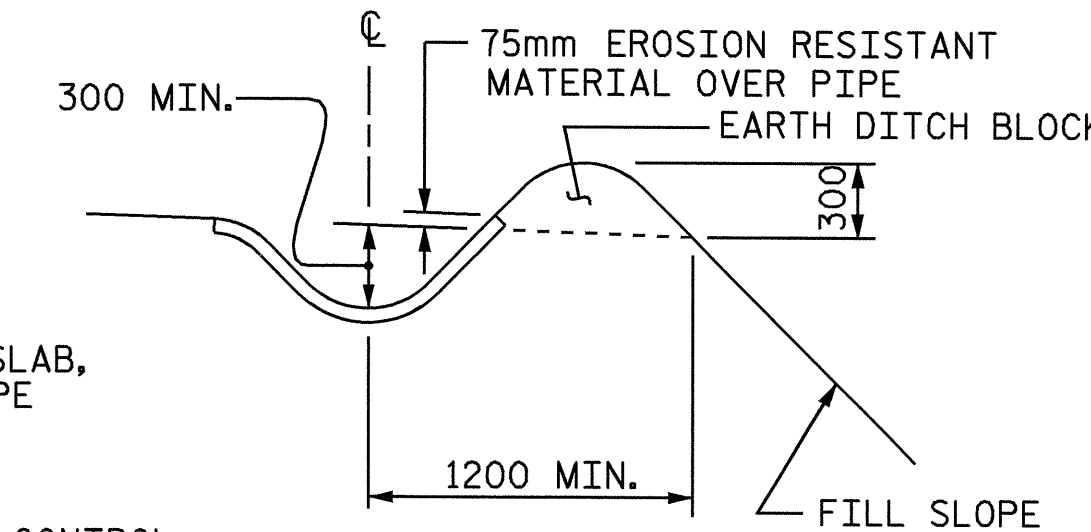


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



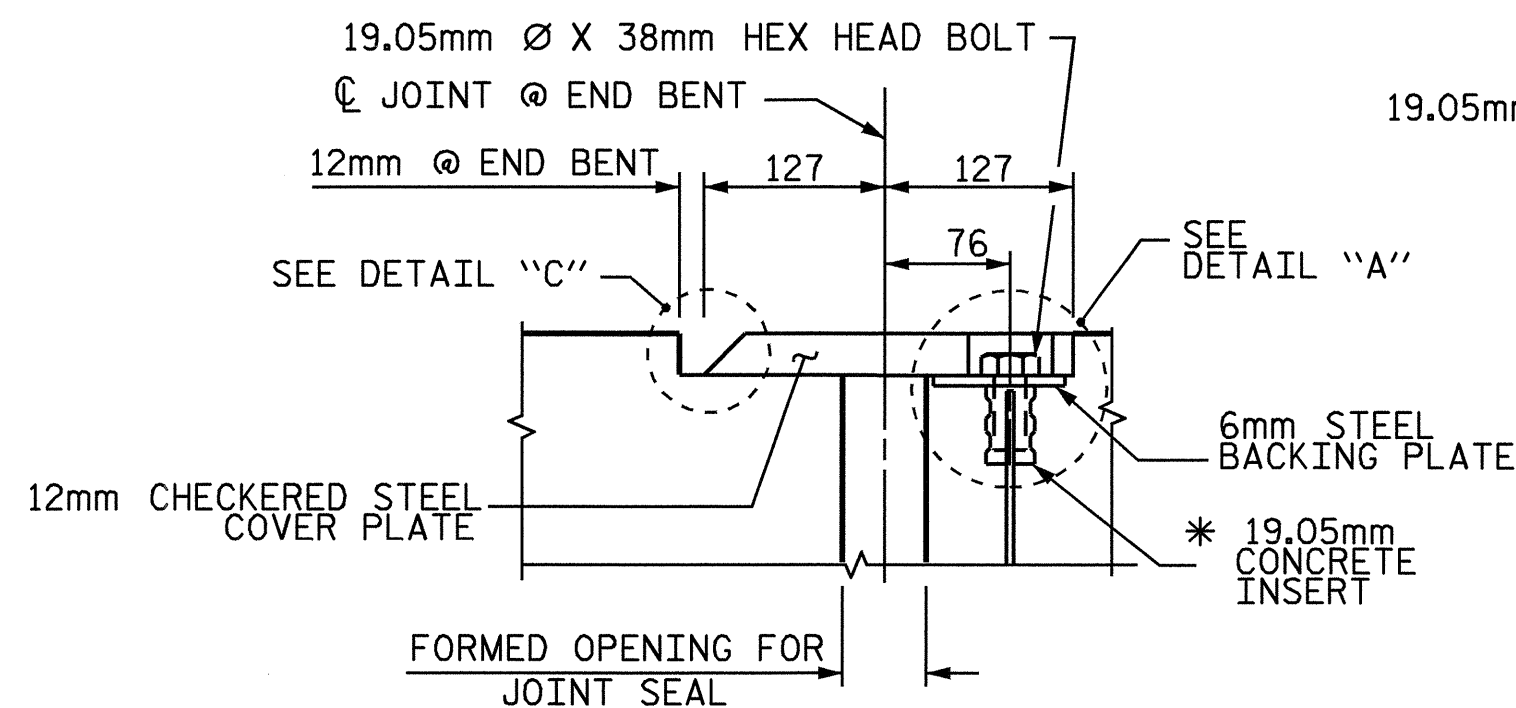
SECTION R-R



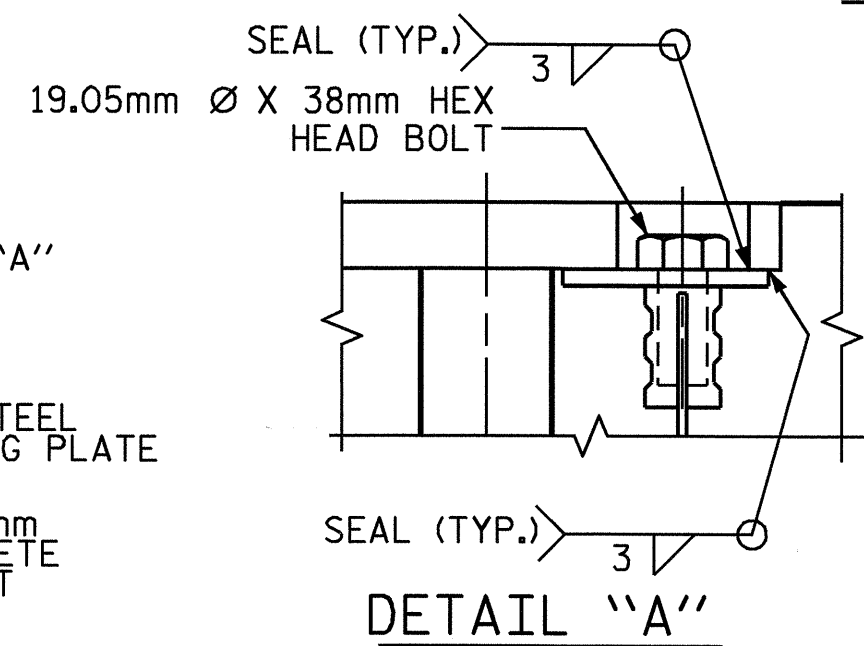
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

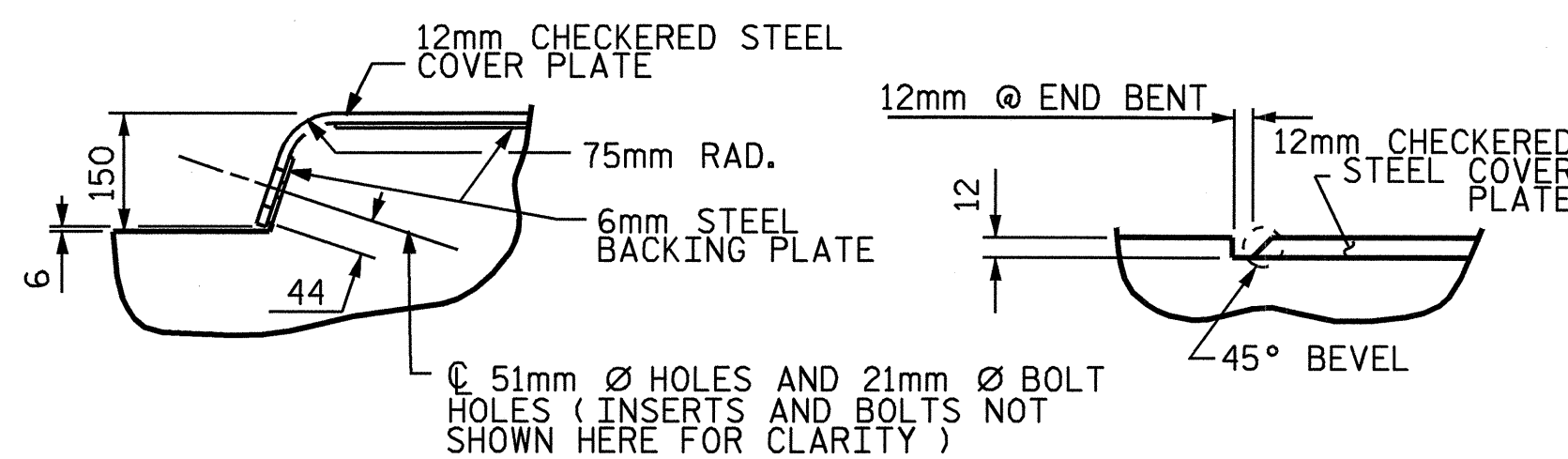


SECTION K-K



DETAIL "A"

* THE 19.05mm CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 13.3 KN.



DETAIL "B"

DETAIL "C"

JOINT SEAL DETAILS @ END BENT

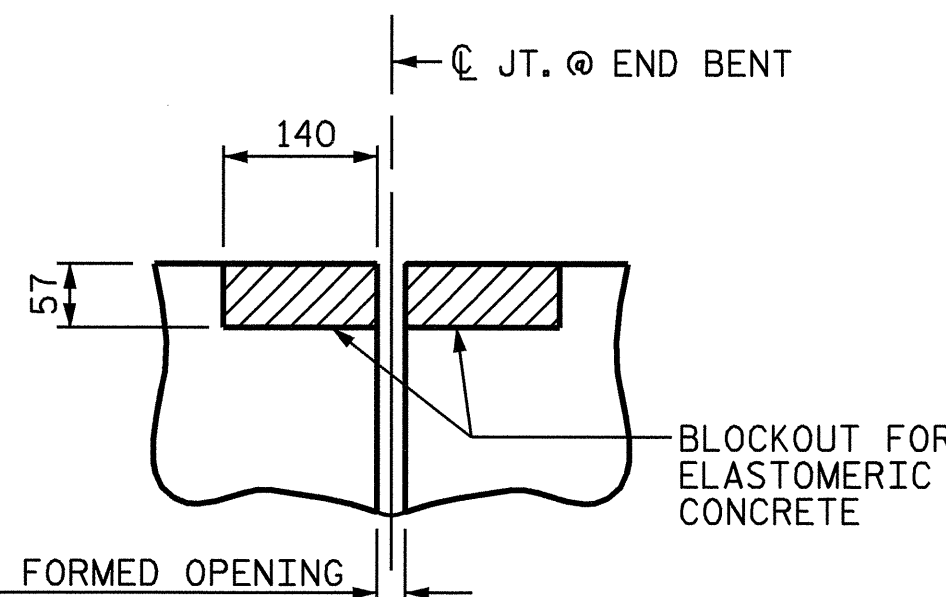
(FOR SIDEWALK)

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 250 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALY BLAST CLEANED AND COATED WITH A MINIMUM THICKNESS OF 0.100mm (DRY) OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTORS OPTION, THESE SURFACES MAY BE METALLIZED TO A MINIMUM THICKNESS OF 0.150mm MILS. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE 19.05mm DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

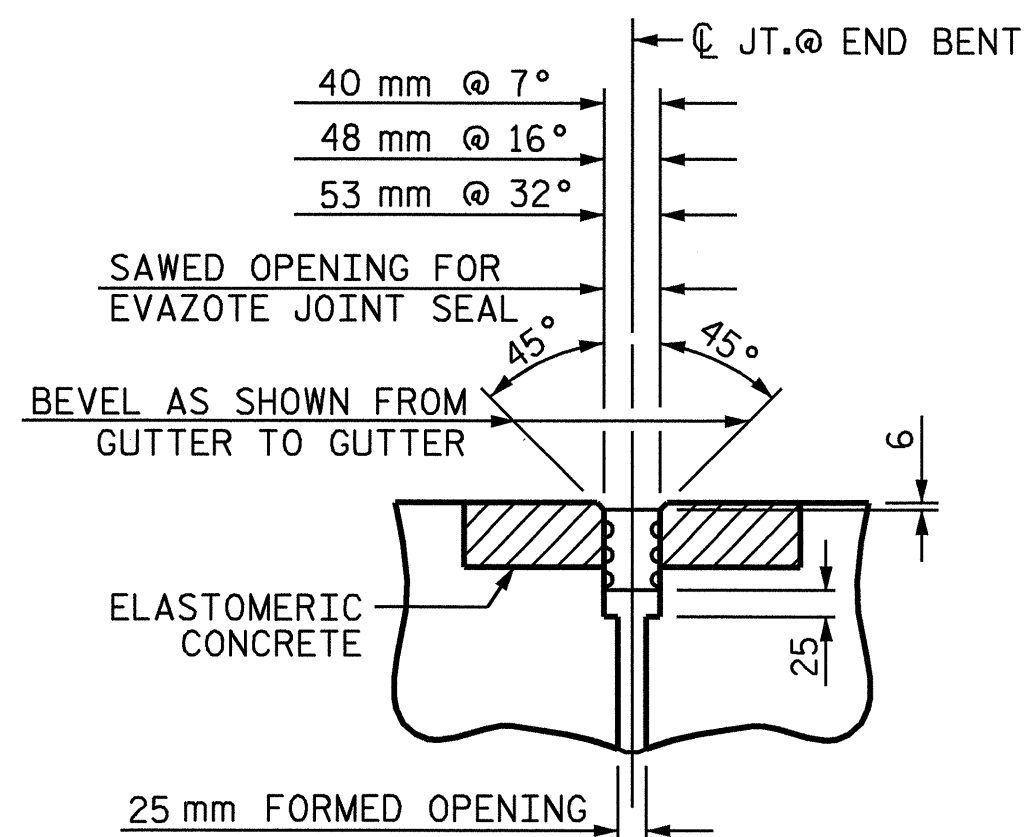
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.



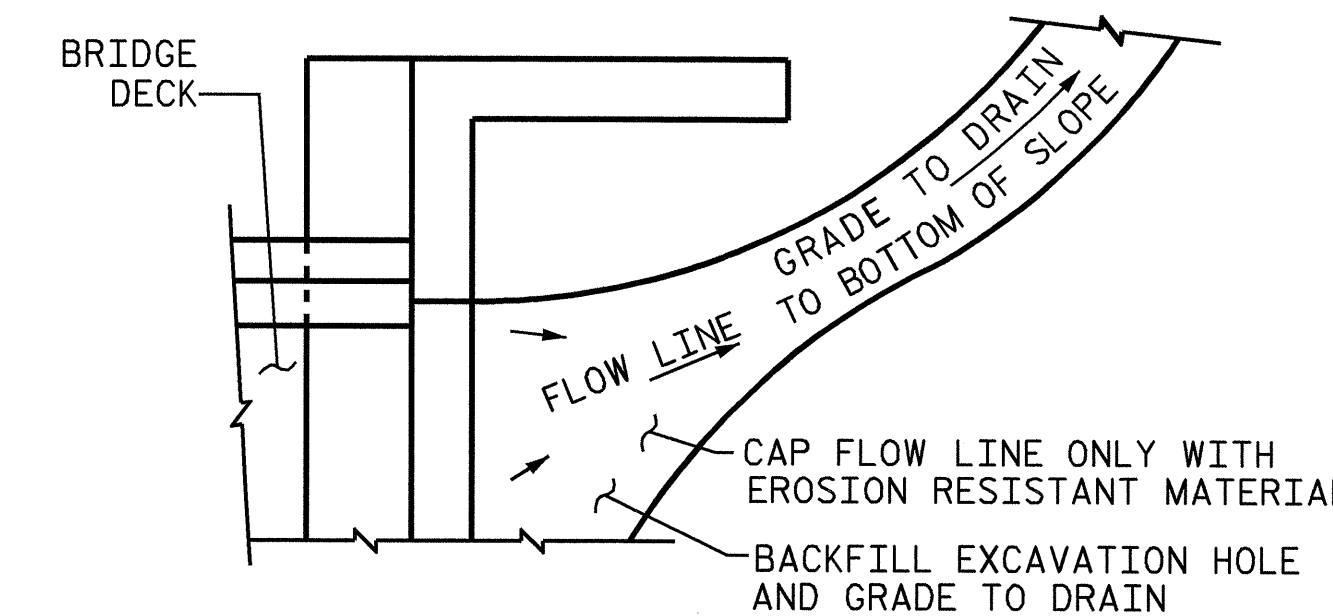
SECTION C-C

EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



SECTION C-C

EVAZOTE JOINT SEAL



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACK FILLING 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

ELASTOMERIC CONCRETE	
	ELASTOMERIC CONCRETE * (CU. m)
END BENT 1	0.5
END BENT 2	0.5
TOTAL	1.0

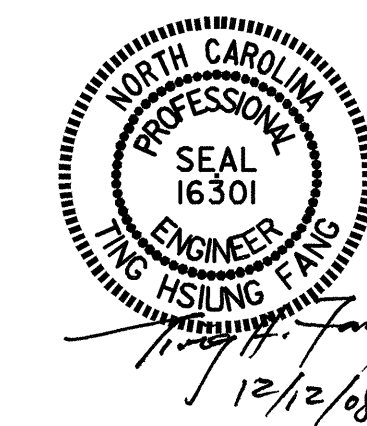
* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. R-2201
 FORSYTH/STOKES COUNTY
 STATION: 22+27.571 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

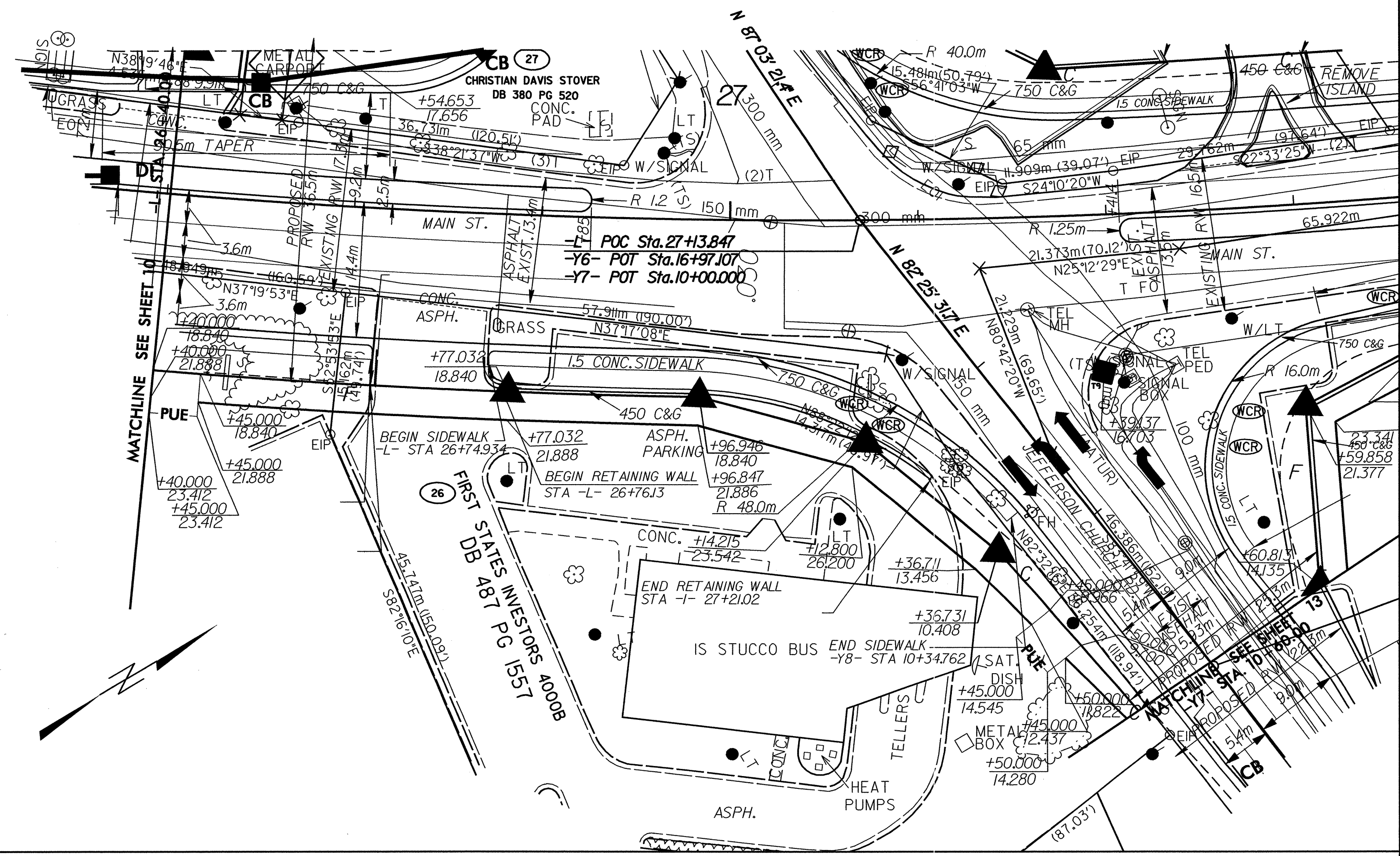


ASSEMBLED BY: S. DOMBROWSKI	DATE: 10/08
CHECKED BY: T.H. FANG	DATE: 11/3/08
DRAWN BY: FCJ 11/88	REV. 8/16/99 RAL/LES
CHECKED BY: ARB 11/88	REV. 10/17/00 RWW/LES
	REV. 5/7/03 RWW/JTE

11-DEC-2008 15:59
 R:\Structure\2201\FINAL_PLANS\2201_sd_as.dgn
 sdombrowski

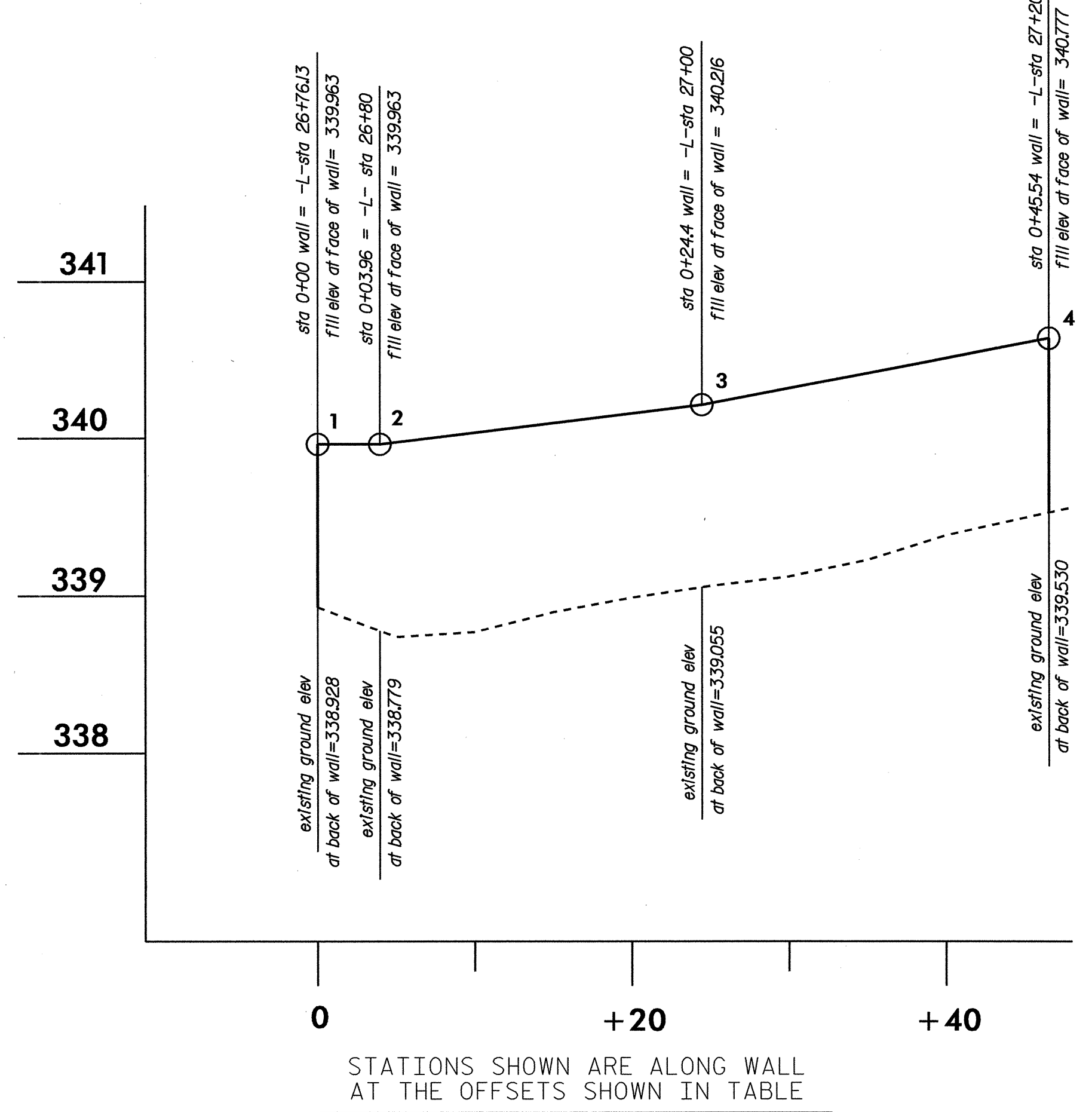
REVISIONS						SHEET NO. S-42
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

STD. NO. BAS10SM



LOCATION SKETCH

WACHOVIA BANK RETAINING WALL PROFILE



STATIONS SHOWN ARE ALONG WALL AT THE OFFSETS SHOWN IN TABLE

PREPARED BY:	E.J.S.	DATE:	08/08
REVIEWED BY:	S.C.C.	DATE:	08/08

TOTAL STRUCTURE QUANTITIES	
GRAVITY RETAINING WALLS	55 SQ. METERS
75 mm GALVANIZED STEEL PIPE RAIL	45 METERS

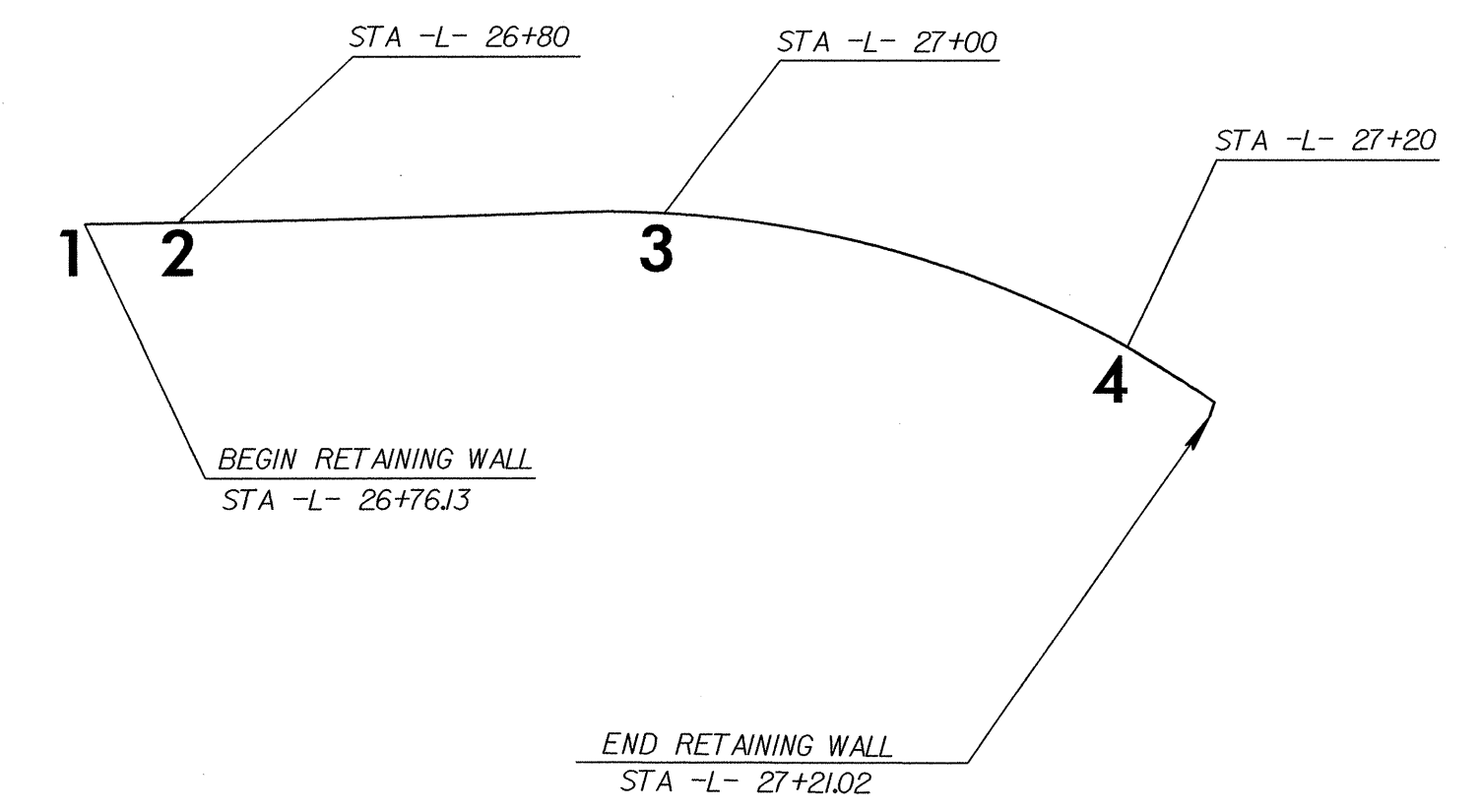
GEOTECHNICAL ENGINEER

Signature: *M. Clark* DATE: 4/18



NOTES

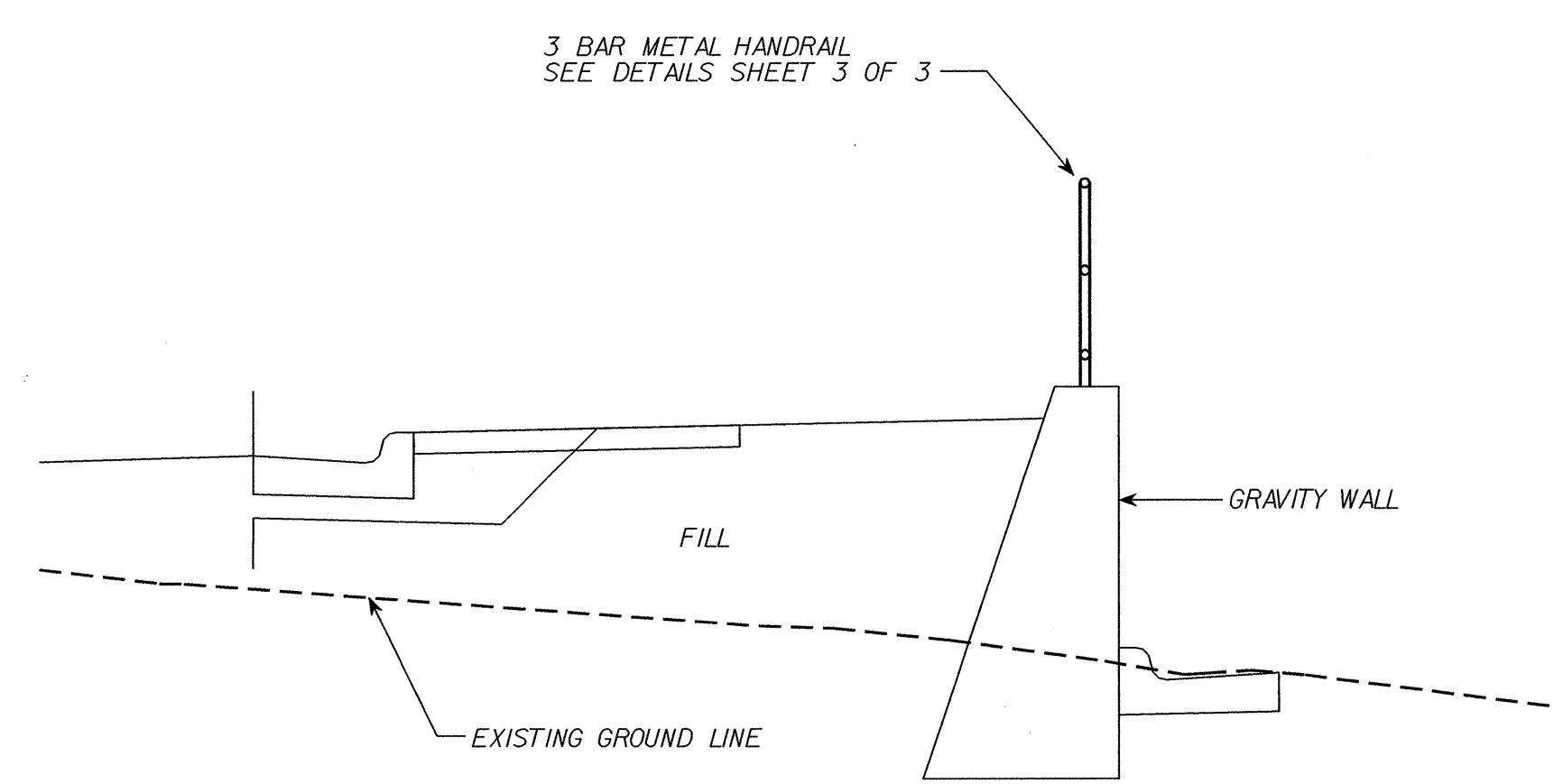
NO BRICK VENEER WILL BE ALLOWED.
 CONTRACTOR IS RESPONSIBLE FOR INSTALLING A 51 mm DIAMETER SCHEDULE 80 CONDUIT WITH TWO JUNCTION BOXES THROUGH THE WALL AT THE APPROXIMATE STATION 22+00 -L-. CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING FINAL FIELD LOCATION AFTER CONSULTING WITH THE SIGNAL CONTRACTOR OR THE ENGINEER. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE CONDUIT OR INSTALLATION THERE OF.



PLAN VIEW OF WALL

SHOWING STATIONS. FOR OFFSETS, SEE CHART BELOW.

GRAVITY RETAINING WALL ELEVATIONS		
-L- STA	OFFSET FROM C (RIGHT) (m)	ELEV @ TOP OF WALL
26+76.130	18.041	339.963
26+80.000	18.491	339.963
27+00.000	18.734	340.216
27+20.000	26.943	340.777
27+21.020	27.198	—



TYPICAL SECTION OF WALL

PROJECT NO.: R-2201
 FORSYTH COUNTY
 STATION: 26+76.130 -L- TO 27+21.020 -L-
 SHEET 1 OF 3

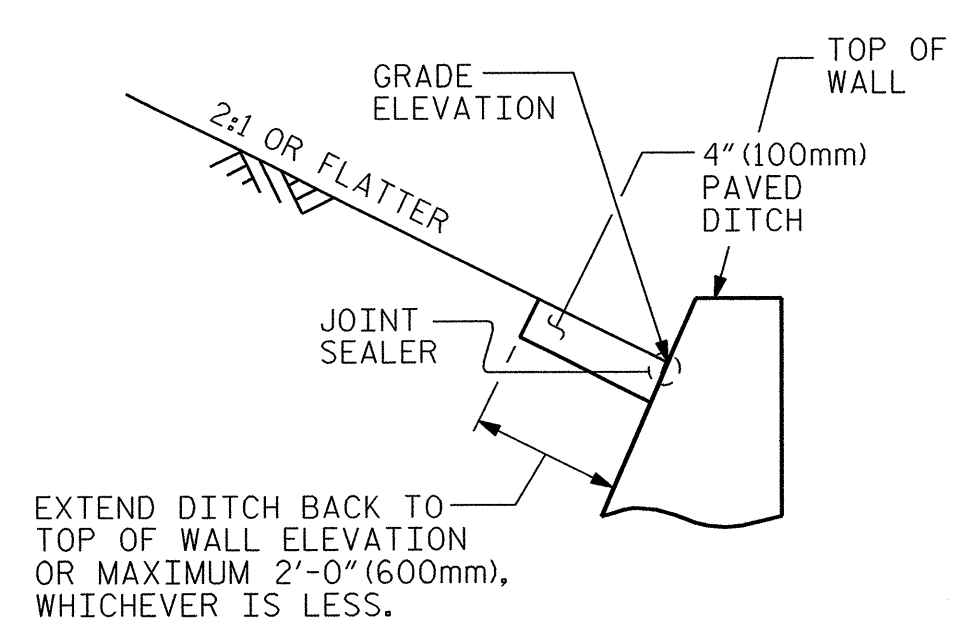
GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

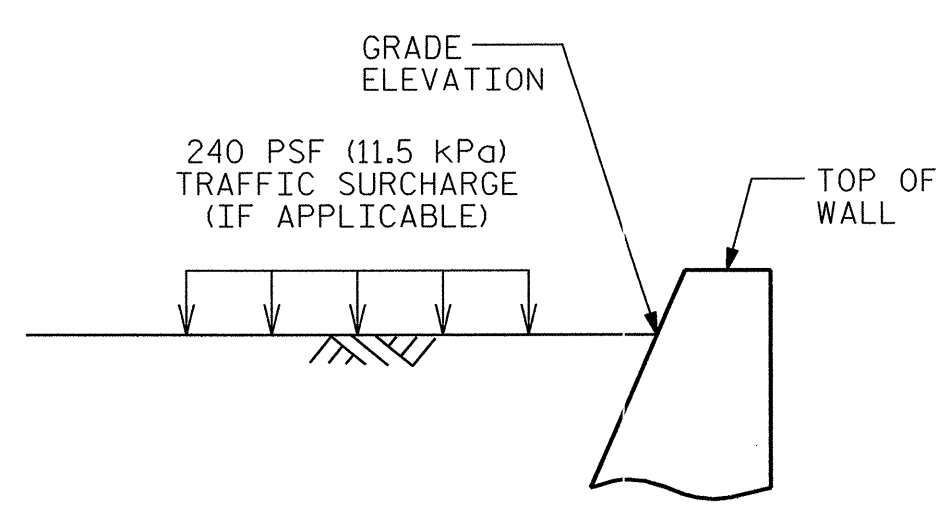
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GRAVITY RETAINING WALL					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

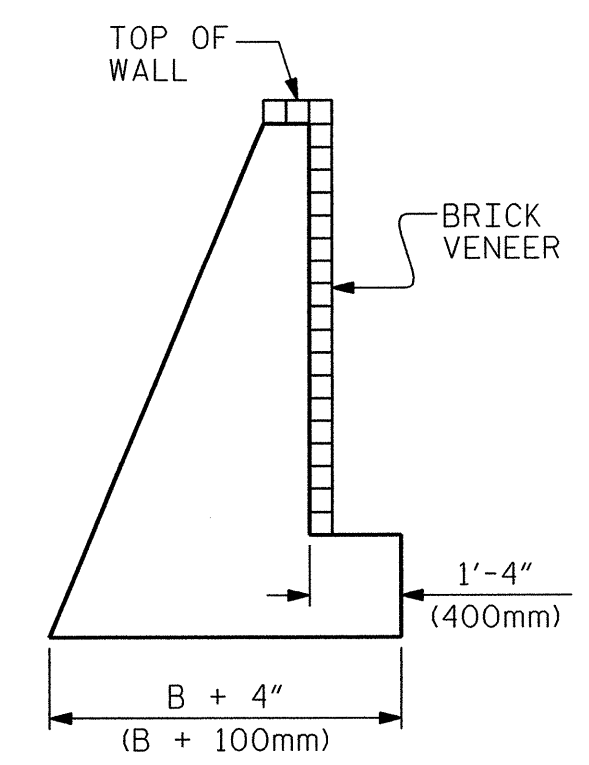
SHEET NO. W-1
 TOTAL SHEETS 3



SLOPE CONDITION



NO SLOPE CONDITION



BRICK VENEER DETAIL

(WHEN APPLICABLE)

NOTES

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

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m³)
 COHESION = 0 PSF (0 kPa)
 FRICTION ANGLE = 35 DEGREES
 (GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
 FRICTION ANGLE = 30 DEGREES
 (GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

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

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

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

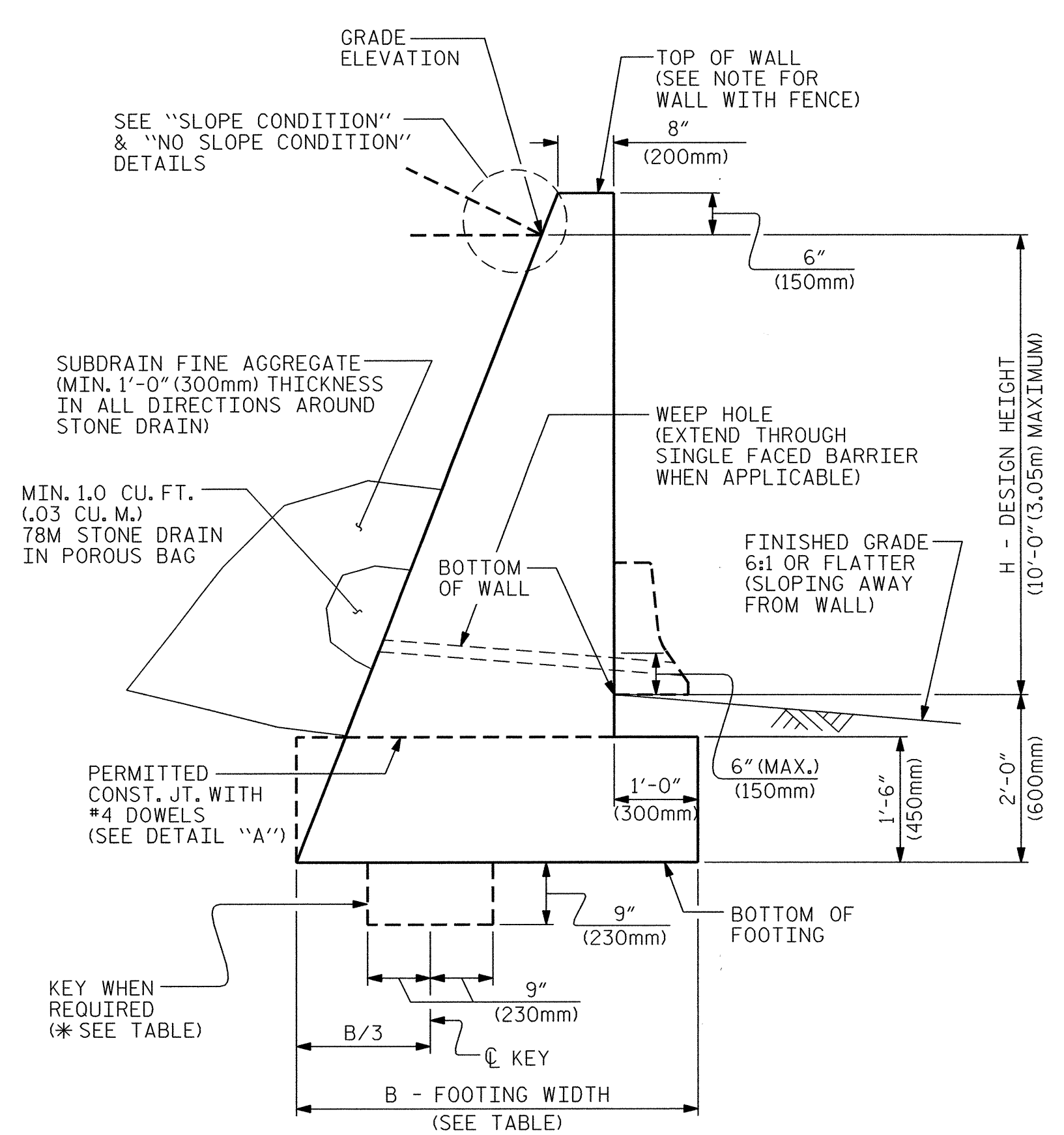
PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

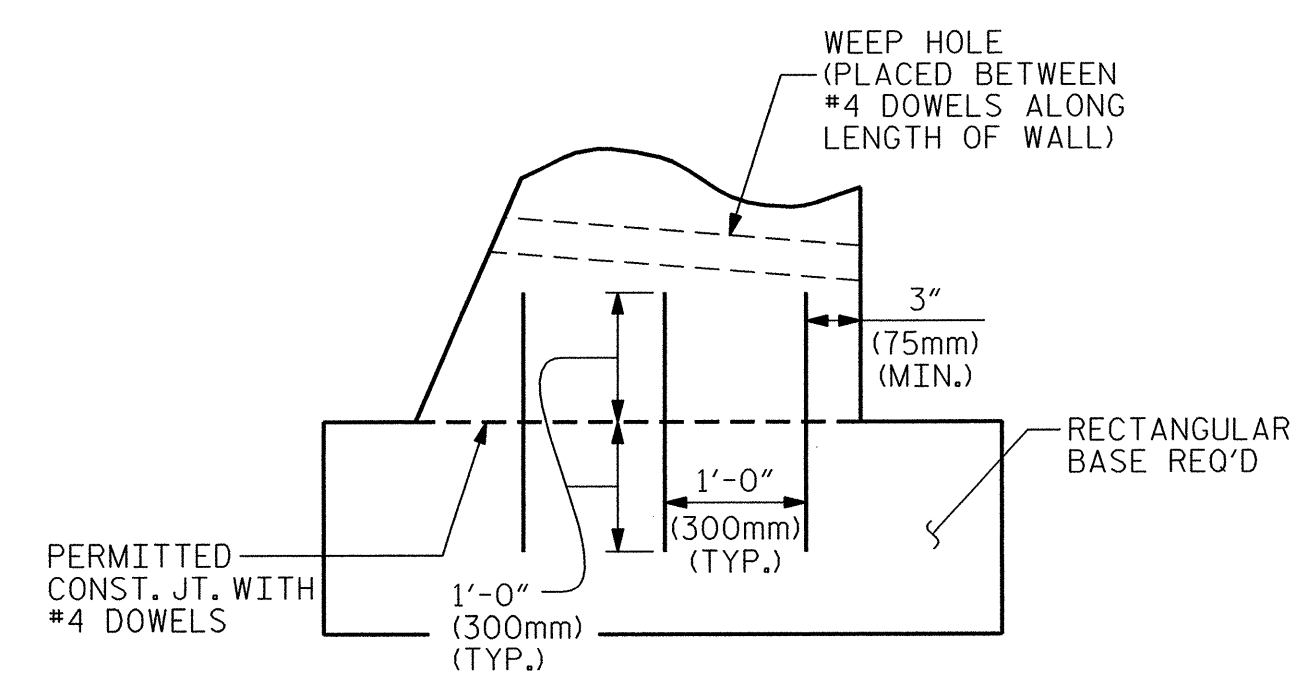
WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

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

FOR WALL WITH HANDRAIL, USE SLEEVES IN ACCORDANCE WITH HANDRAIL DETAIL SHOWN IN ROADWAY PLANS.



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

PROJECT NO.: R-2201
FORSYTH COUNTY
STATION: 26+76.130 -L- TO 27+21.020 -L-
 SHEET 2 OF 3

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

PREPARED BY:	E.J.S.	DATE:	08/08
REVIEWED BY:	S.C.C.	DATE:	08/08

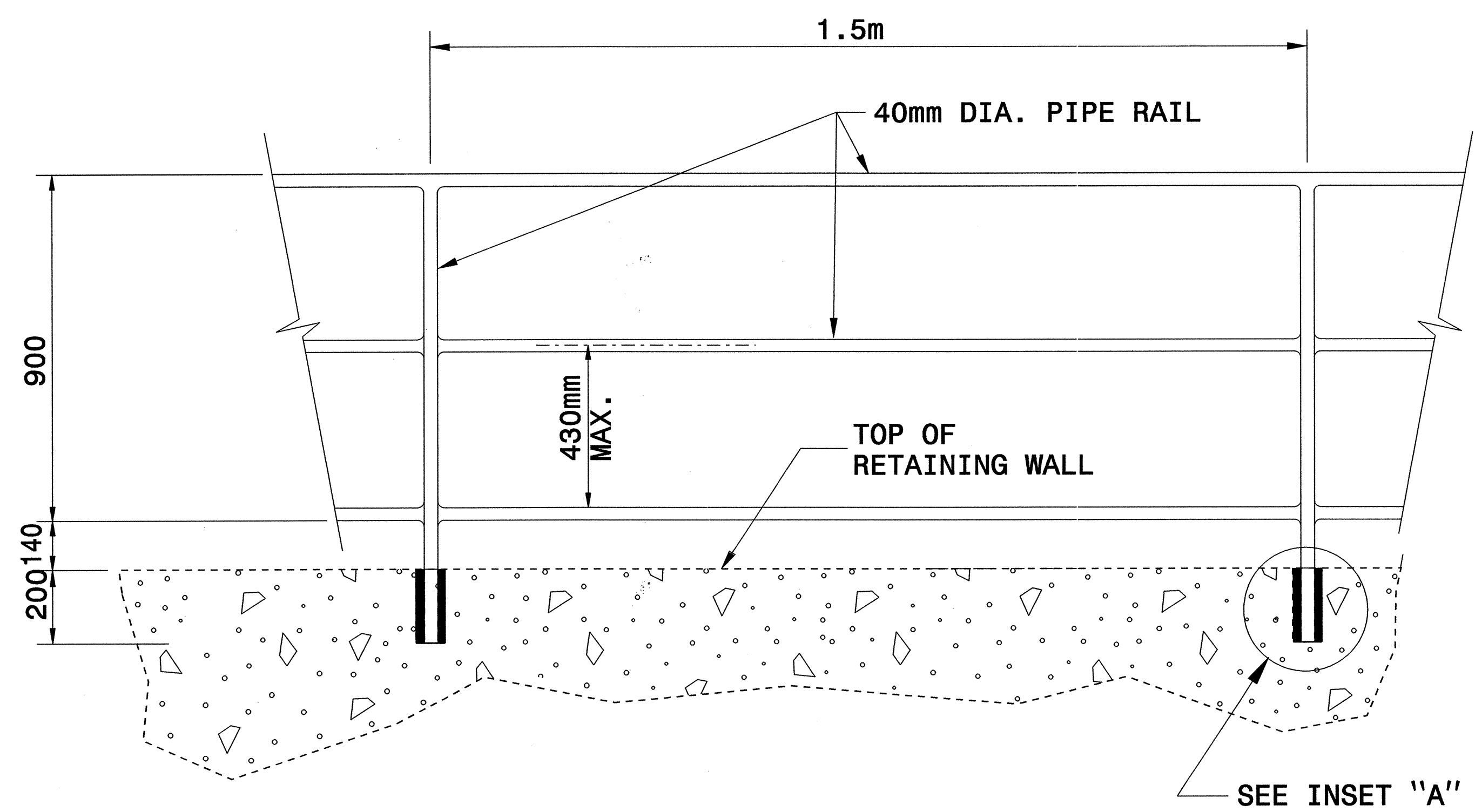
GEOTECHNICAL ENGINEER

SEAL
29869

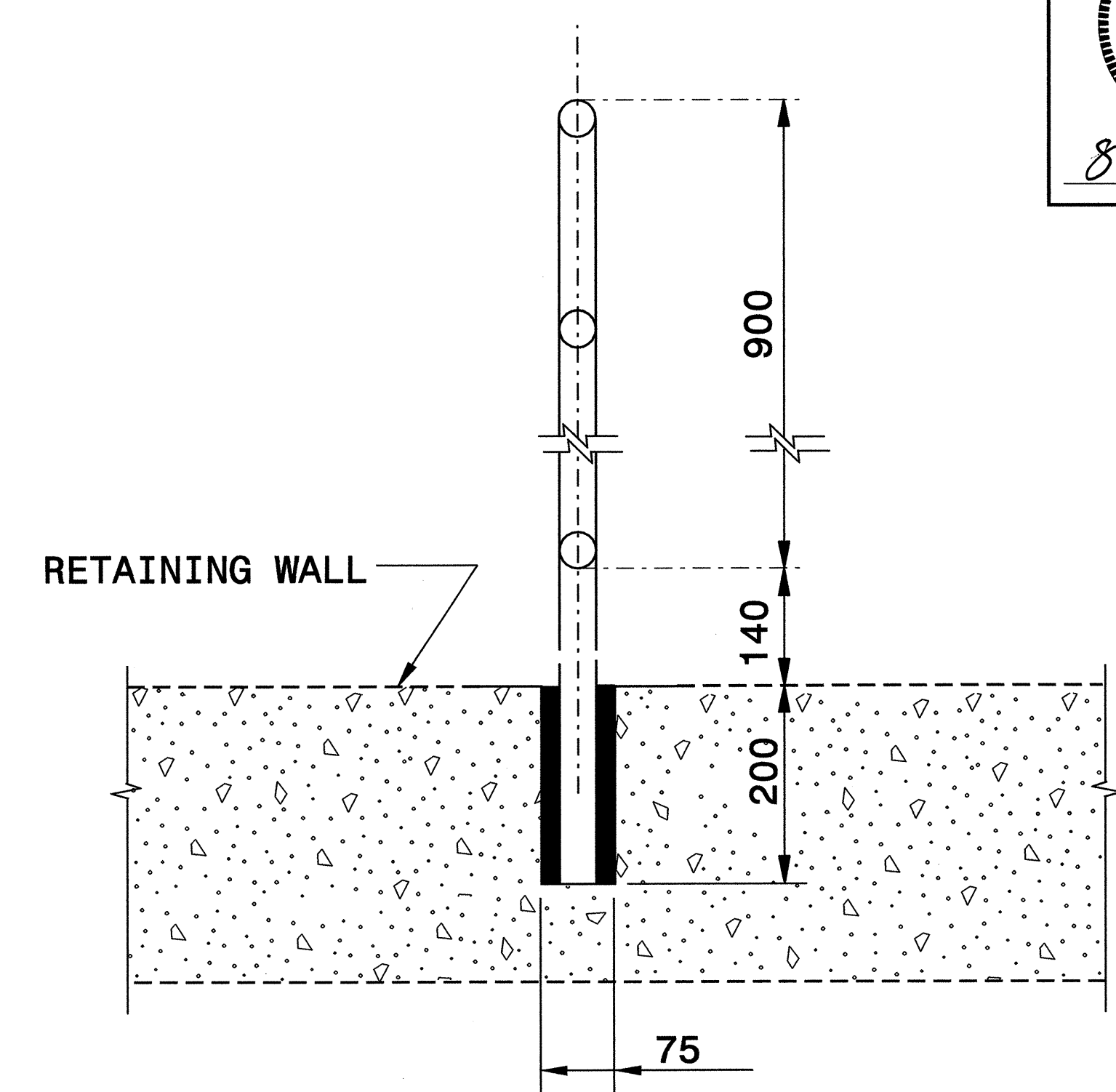
SHANE C. CLARK

8/17/08

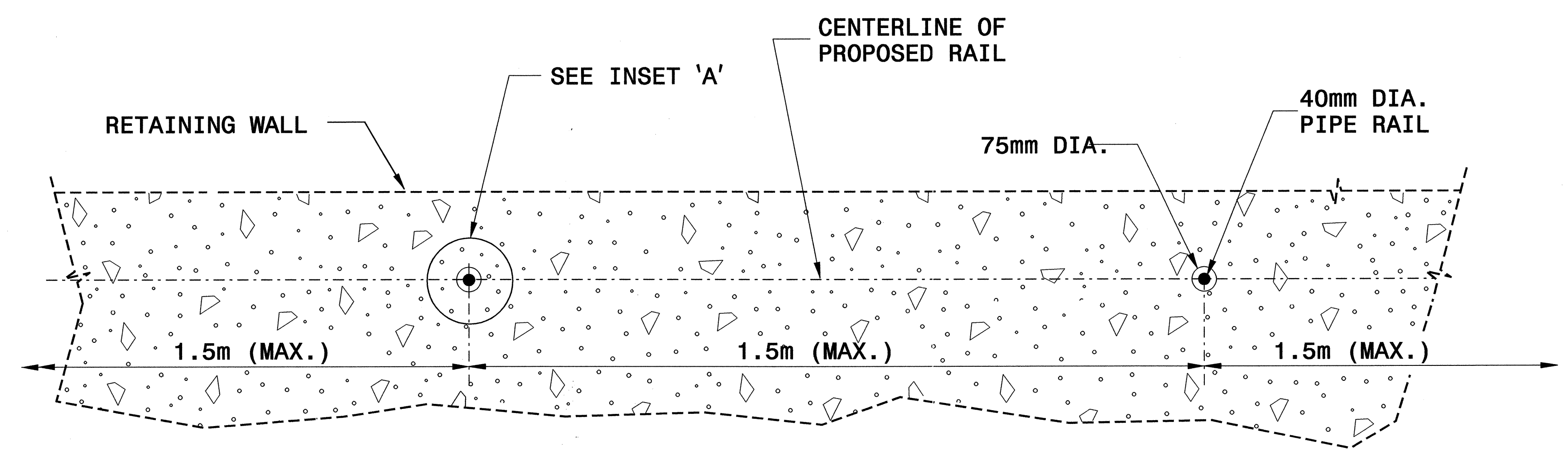
SIGNATURE DATE



ELEVATION OF PROPOSED PEDESTRIAN HANDRAIL



INSET 'A'



PLAN VIEW

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 40mm DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

PROJECT NO.: R-2201
FORSYTH COUNTY
STATION: 26+76.130 -L- TO 27+21.020 -L-
SHEET 3 OF 3

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PEDESTRIAN SAFETY RAIL

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

PREPARED BY: E.J.S. DATE: 8/08
REVIEWED BY: S.C.C. DATE: 10/08

