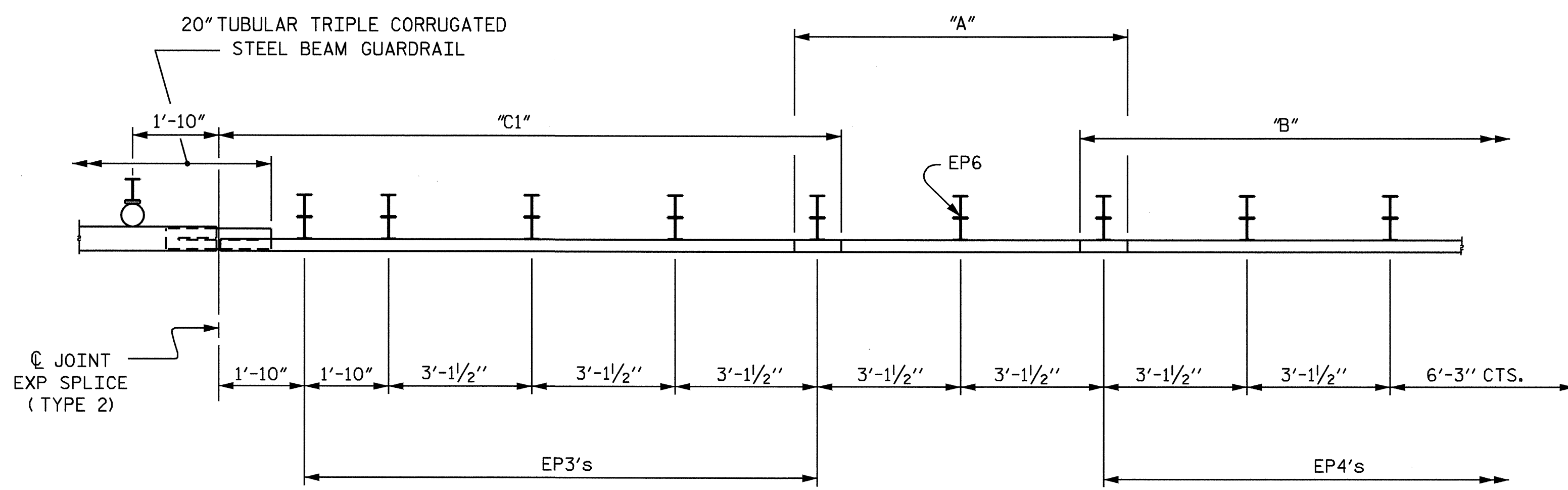


GUARDRAIL LAYOUT

SPAN A - DETAILS ARE TYPICAL FOR SPANS A AND B



DETAIL "T"

- LEGEND**
- USE BP20
 - USE EP2
 - USE EP3 (EXCEPT AS NOTED)
 - "A" --- USE W-TR GUARDRAIL TRANSITIONAL SECTION
 - "B" --- USE STANDARD GUARDRAIL
 - "C1" --- USE 20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL

PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

SHEET 1 OF 12 BRIDGE No. 1



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TUBULAR BEAM
 GUARDRAIL
 RETROFIT & DECK
 JOINT REPAIRS**

I-85 NBL OVER US 158 BYPASS

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

DRAWN BY: J. LAMBERT DATE: 07/07
 CHECKED BY: M. G. CHEEK DATE: 07/07

31-AUG-2007 13:56
 RAS\structures\retrofit sheets\guardrail\out\gar3.rtf
 jlambert

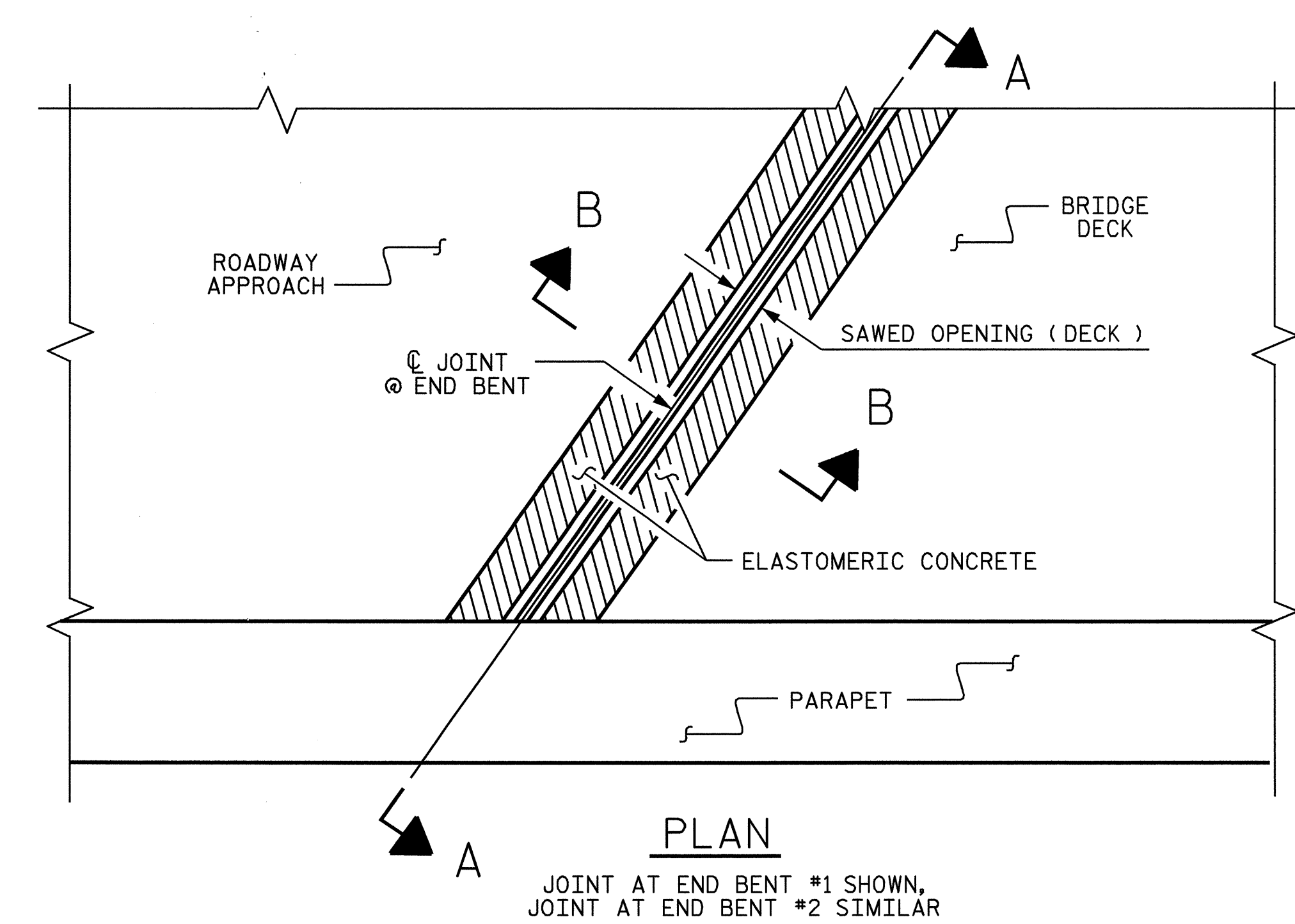
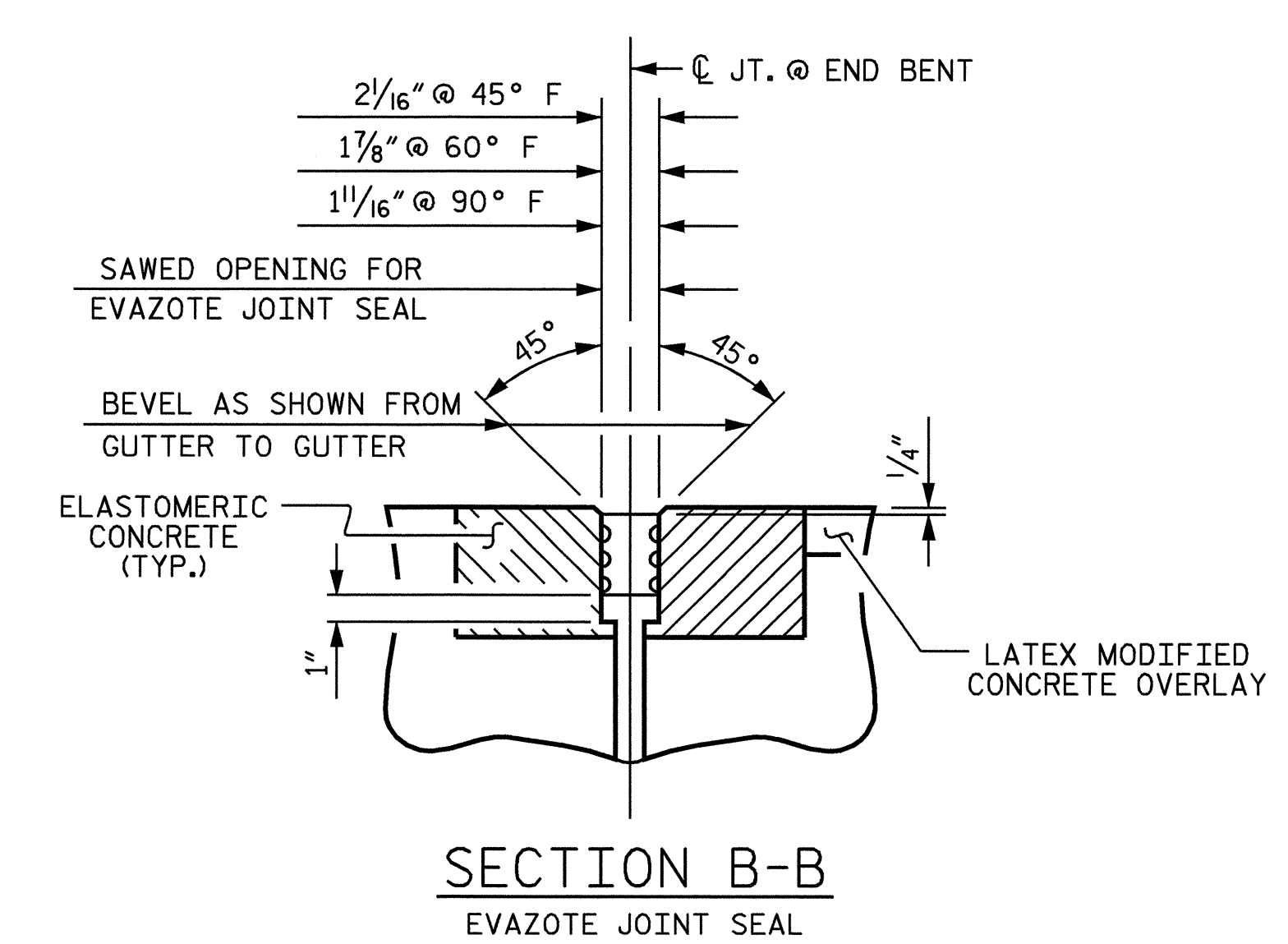
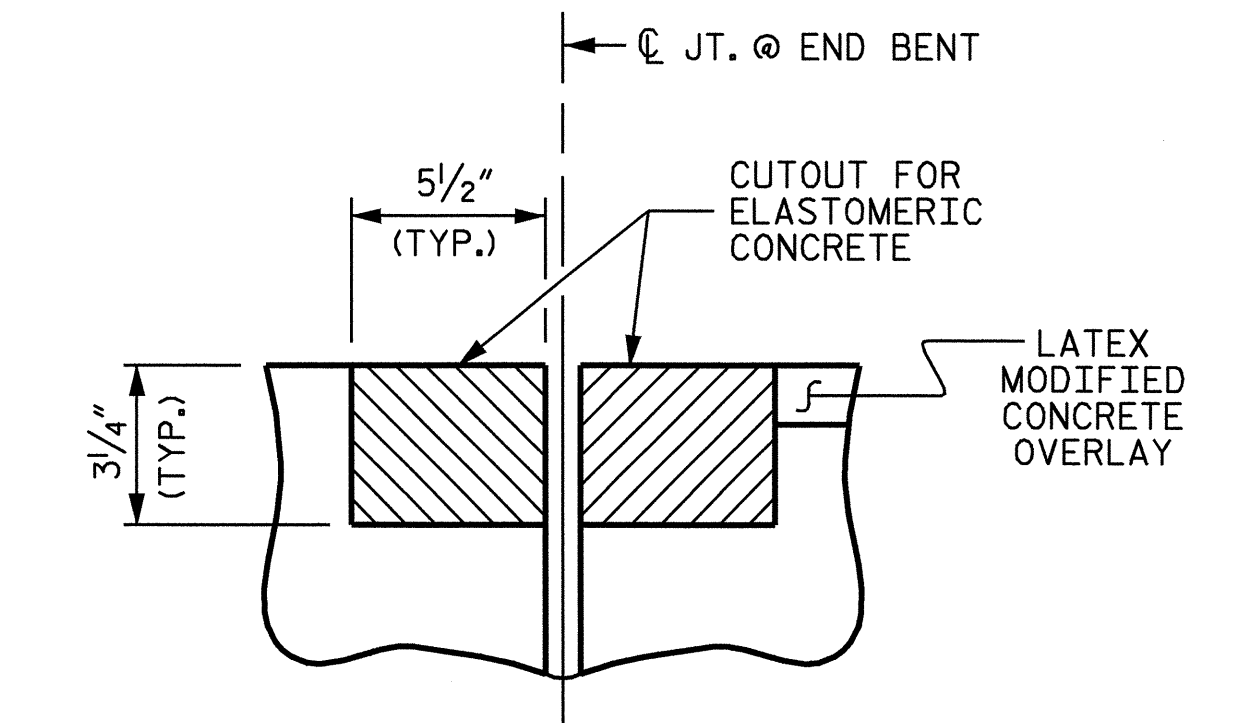
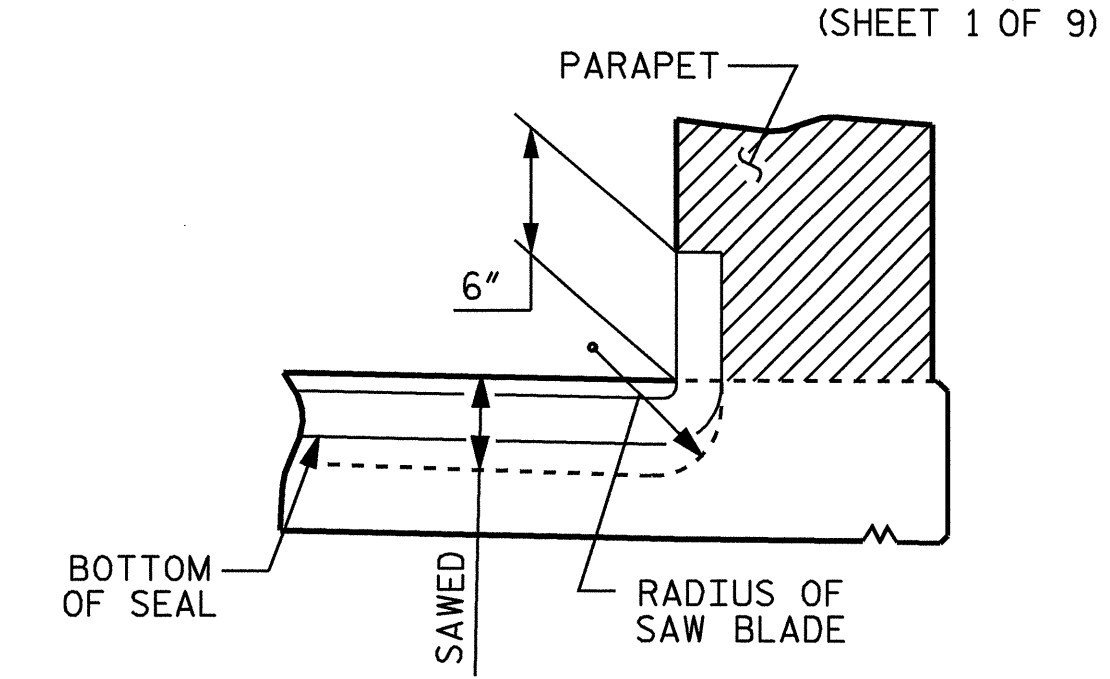
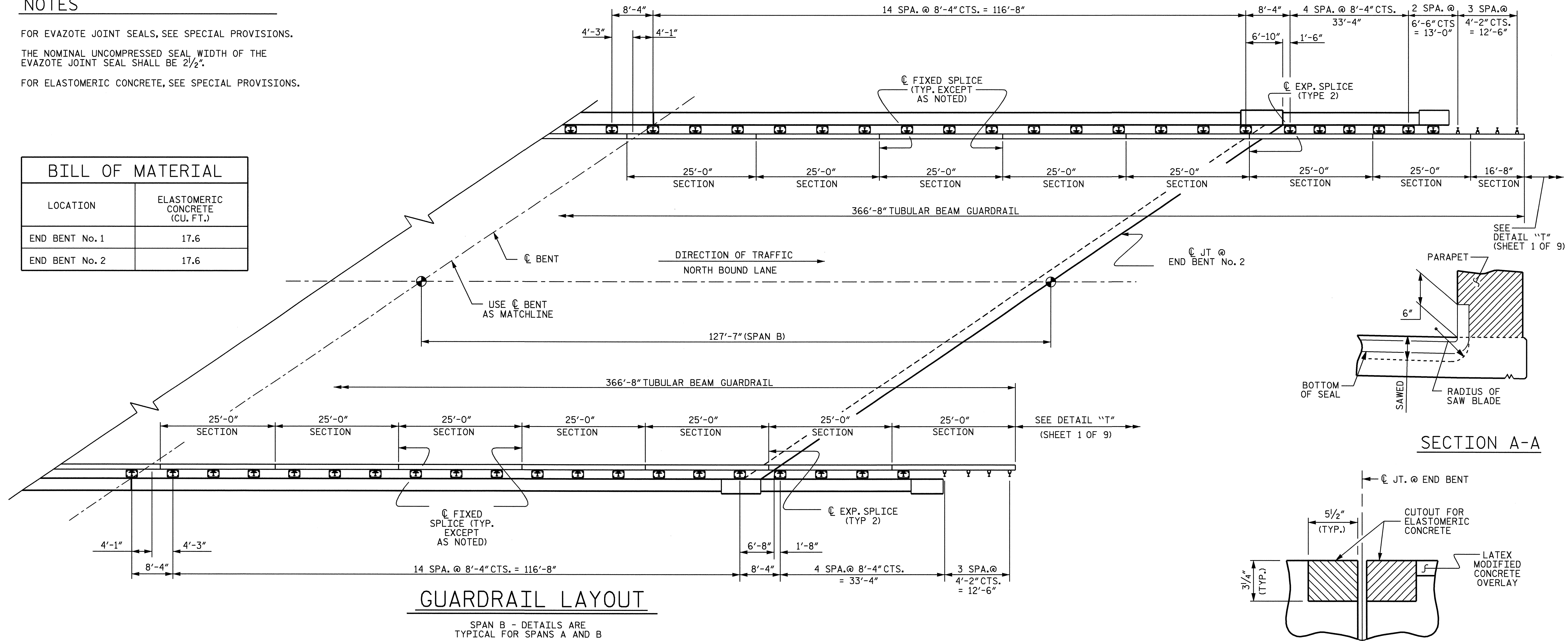
NOTES

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL	
LOCATION	ELASTOMERIC CONCRETE (CU. FT.)
END BENT No. 1	17.6
END BENT No. 2	17.6



PROJECT NO. I-2810
VANCE COUNTY
 STATION: _____
 SHEET 2 OF 12 BRIDGE No. 1



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TUBULAR BEAM
 GUARDRAIL
 RETROFIT & DECK
 JOINT REPAIRS**
 I-85 NBL OVER US 158 BYPASS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-2
2			4			TOTAL SHEETS 12

DRAWN BY: J. LAMBERT DATE: 07/07
 CHECKED BY: M. G. CHEEK DATE: 07/07

NOTES

FOR CLASS I, IB, II, AND III SURFACE PREPARATION SEE THE SPECIAL PROVISION ENTITLED "REPAIR OF BRIDGE DECKS AND APPROACH PAVEMENT WITH LATEX MODIFIED CONCRETE".

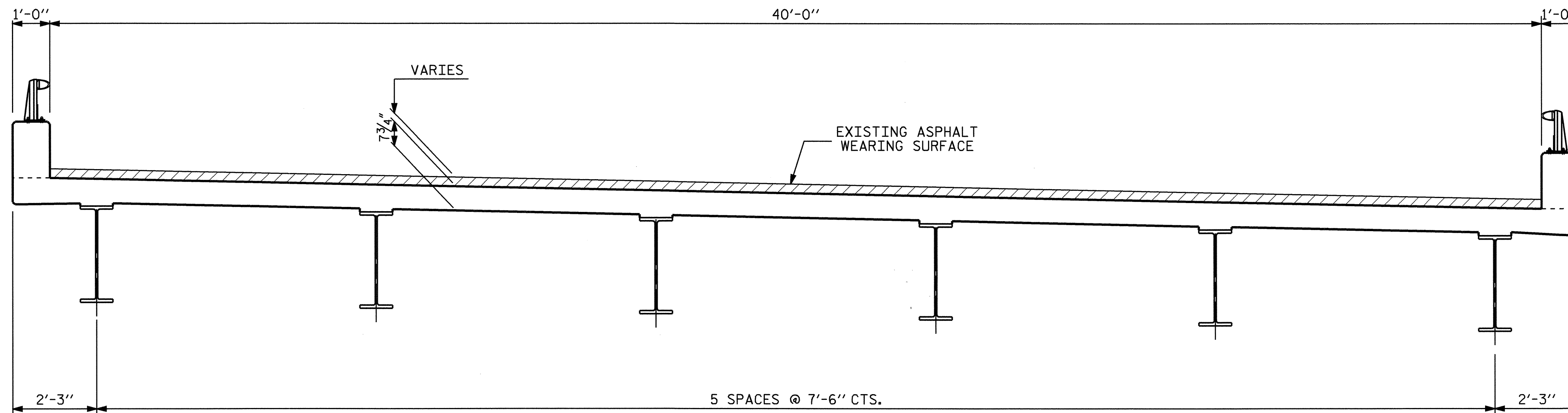
QUANTITIES SHOWN FOR CLASS II AND CLASS III SURFACE PREPARATION ARE ESTIMATED. THE QUANTITIES TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF SQUARE YARDS OF CLASS II AND CLASS III SURFACE PREPARATION COMPUTED BY THE ENGINEER FROM MEASUREMENTS OF THE AREAS THAT ARE PREPARED TO RECEIVE THE OVERLAY.

SPLICES OF REINFORCING STEEL SHALL BE WELDED AS DETAILED AND ALL WELDING SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY REINFORCING STEEL CODE (A.W.S. D12.2). CHEMICAL ANALYSIS OF THE EXISTING REINFORCING STEEL WILL NOT BE REQUIRED.

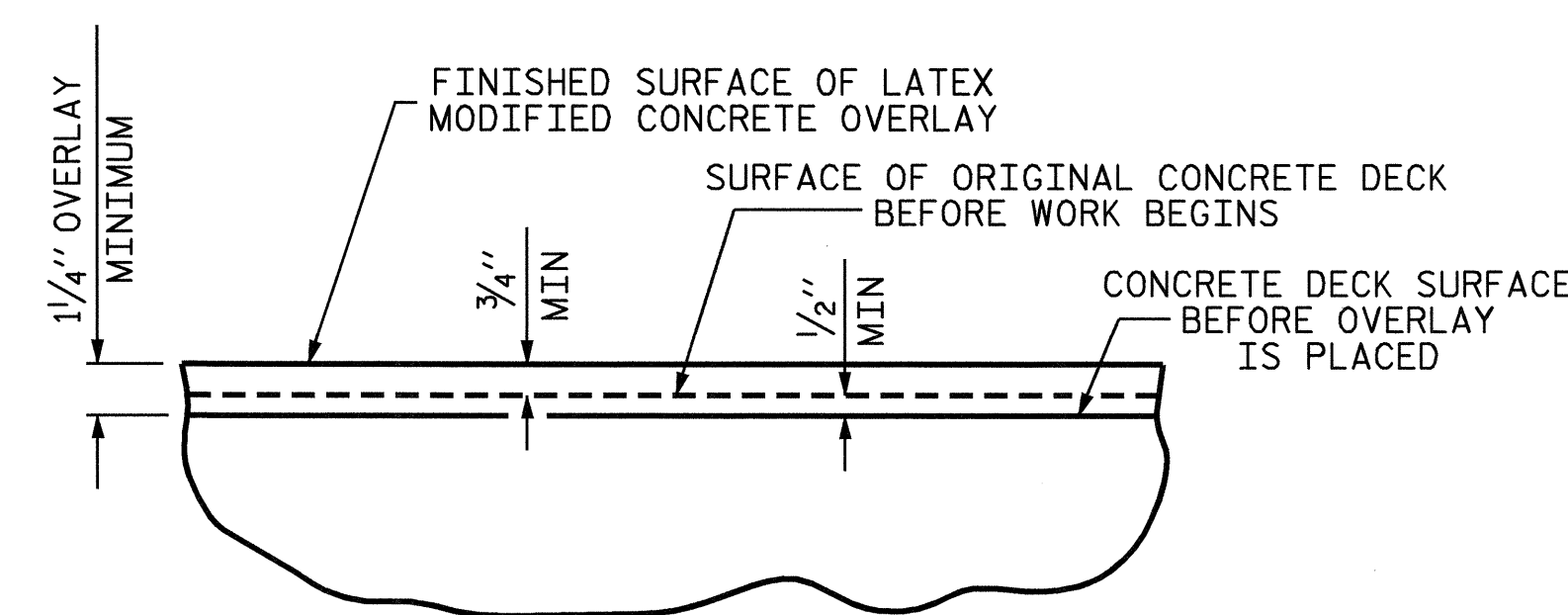
FOR LATEX MODIFIED CONCRETE OVERLAY, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

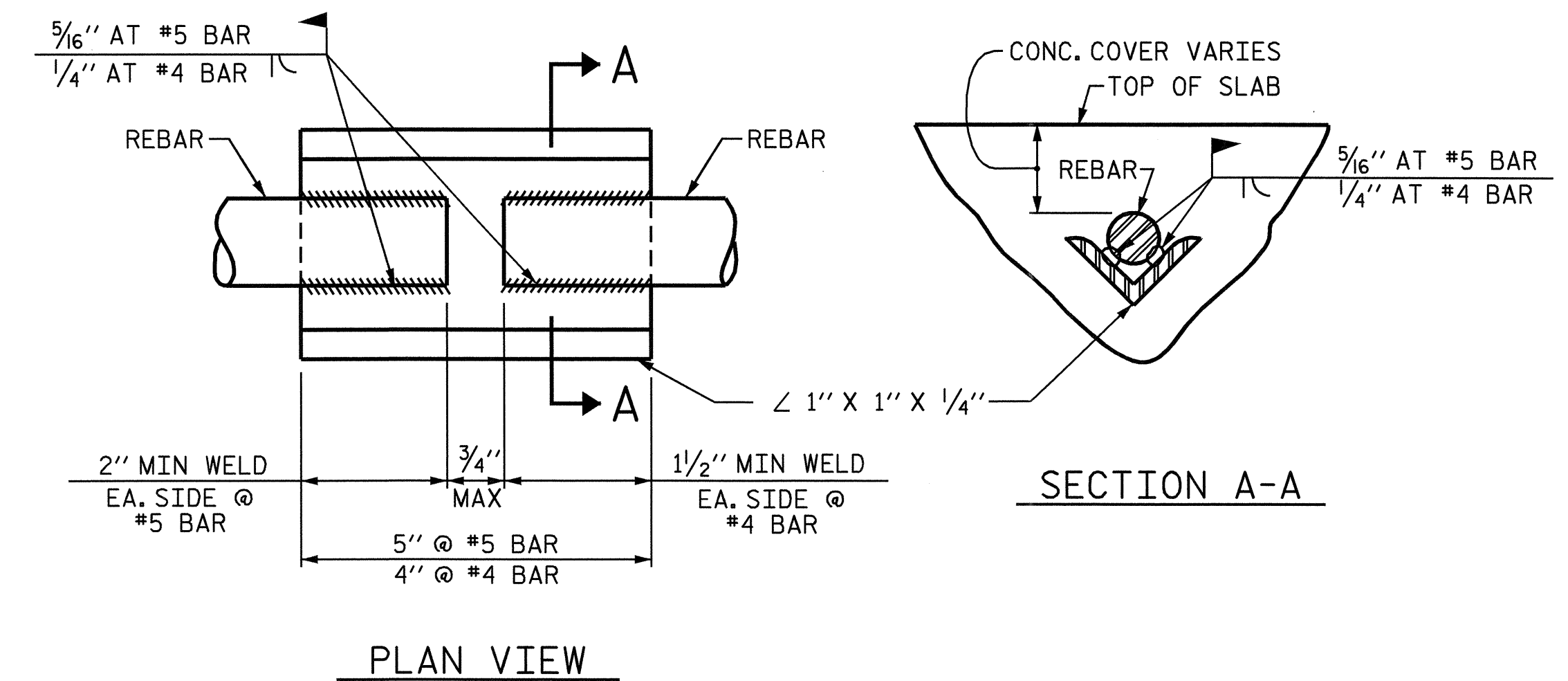
QUANTITIES IN BILL OF MATERIAL ARE BASED ON AN ASSUMED 2" LATEX MODIFIED CONCRETE OVERLAY DEPTH. THIS DEPTH SHALL BE ADJUSTED IN THE FIELD AS NECESSARY.



TYPICAL SECTION - BRIDGE No. 1



DETAIL FOR LATEX MODIFIED CONCRETE OVERLAY



WELD DETAIL FOR SPLICING REINFORCING STEEL

SUPERSTRUCTURE BILL OF MATERIAL

	GROOVING BRIDGE FLOORS	CLASS I SURFACE PREPARATION	CLASS IB SURFACE PREPARATION	CLASS II SURFACE PREPARATION	CLASS III SURFACE PREPARATION	LATEX MODIFIED CONCRETE OVERLAY	PLACING AND FINISHING OF LATEX MODIFIED CONC. OVERLAY	EVAZOTE JOINT SEALS
UNITS	FT ²	YD ²	YD ²	YD ²	YD ²	YD ³	YD ²	LUMP SUM
DECK REPAIR	8,795	1,133	1,133	283	113	63	1,133	
TOTAL	8,795	1,133	1,133	283	113	63	1,133	LUMP SUM

PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

SHEET 3 OF 12 BRIDGE No. 1



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BRIDGE DECK
REHABILITATION
DETAILS

I-85 NBL OVER US 158 BYPASS

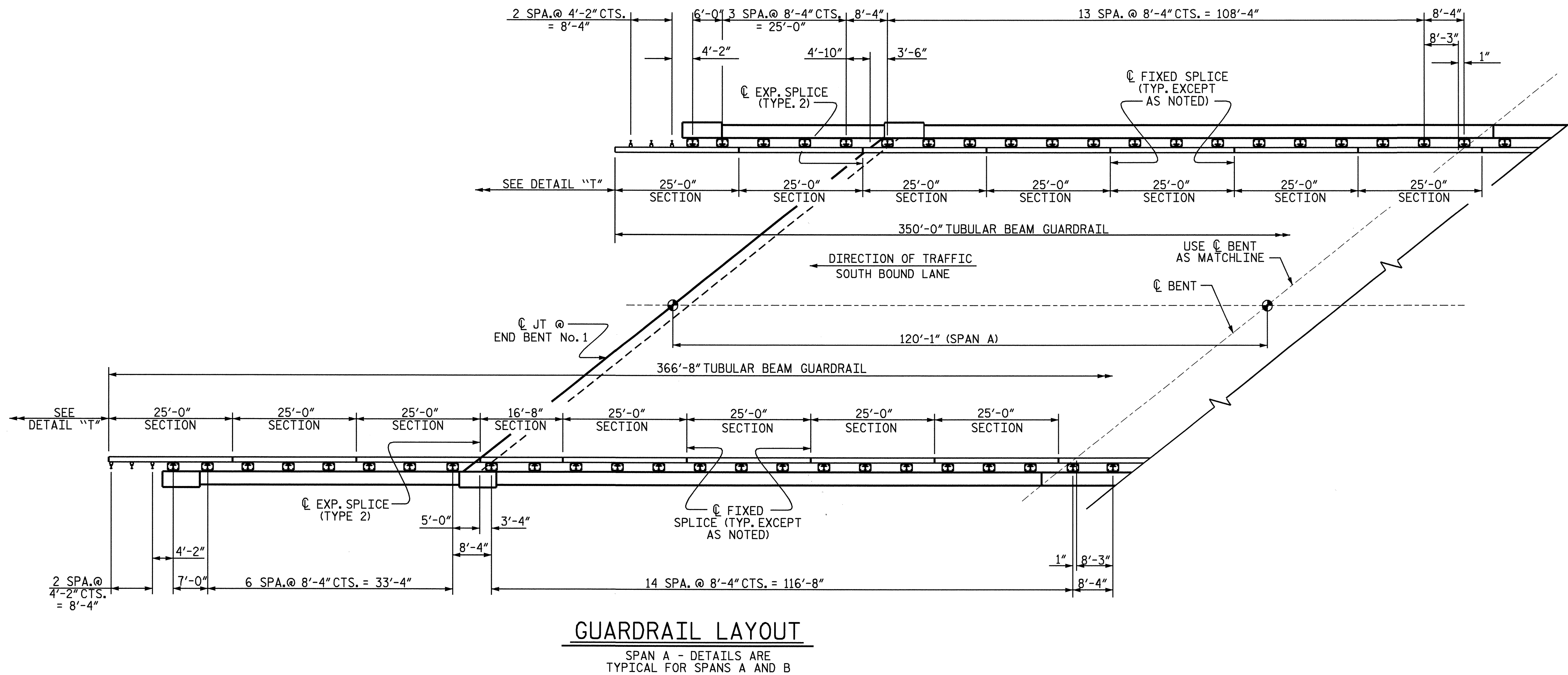
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-3
2			4			12

DRAWN BY : MIKE BRITT DATE : 8-30-07
CHECKED BY : M.G. CHEEK DATE : 8-30-07

NOTES

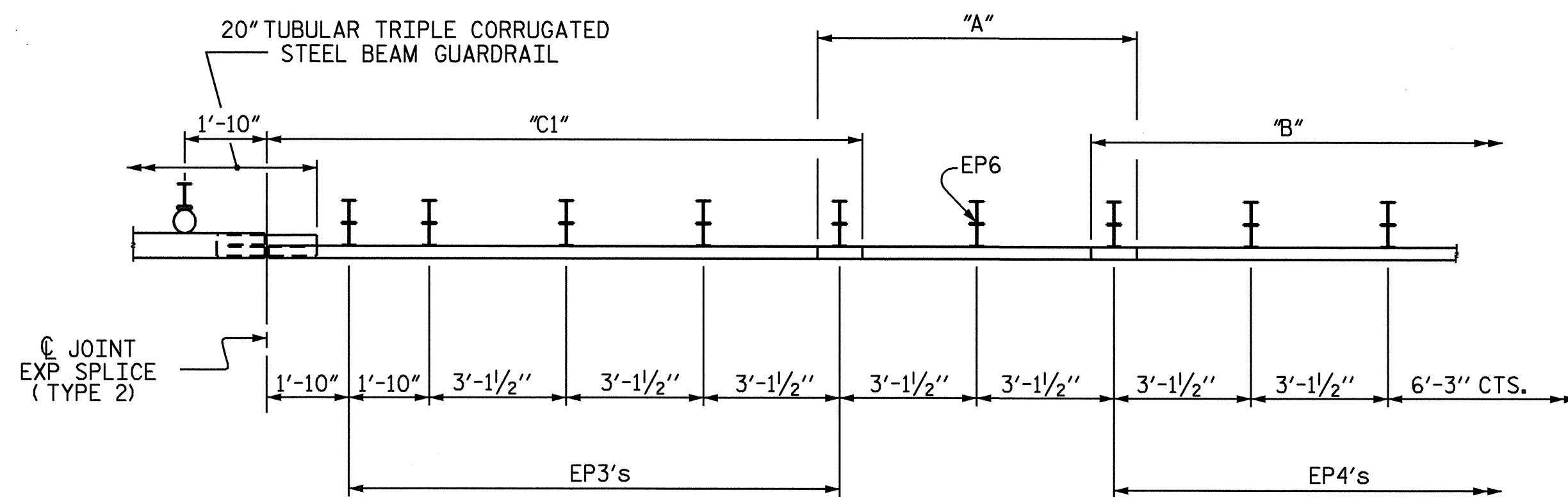
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.
 THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2".
 FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL	
LOCATION	ELASTOMERIC CONCRETE (CU. FT.)
END BENT No. 1	16.5
END BENT No. 2	16.5



GUARDRAIL LAYOUT

SPAN A - DETAILS ARE TYPICAL FOR SPANS A AND B



DETAIL "T"

LEGEND

- USE BP20
- USE EP2
- USE EP3 (EXCEPT AS NOTED)
- "A" --- USE W-TR GUARDRAIL TRANSITIONAL SECTION
- "B" --- USE STANDARD GUARDRAIL
- "C1" --- USE 20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL

PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

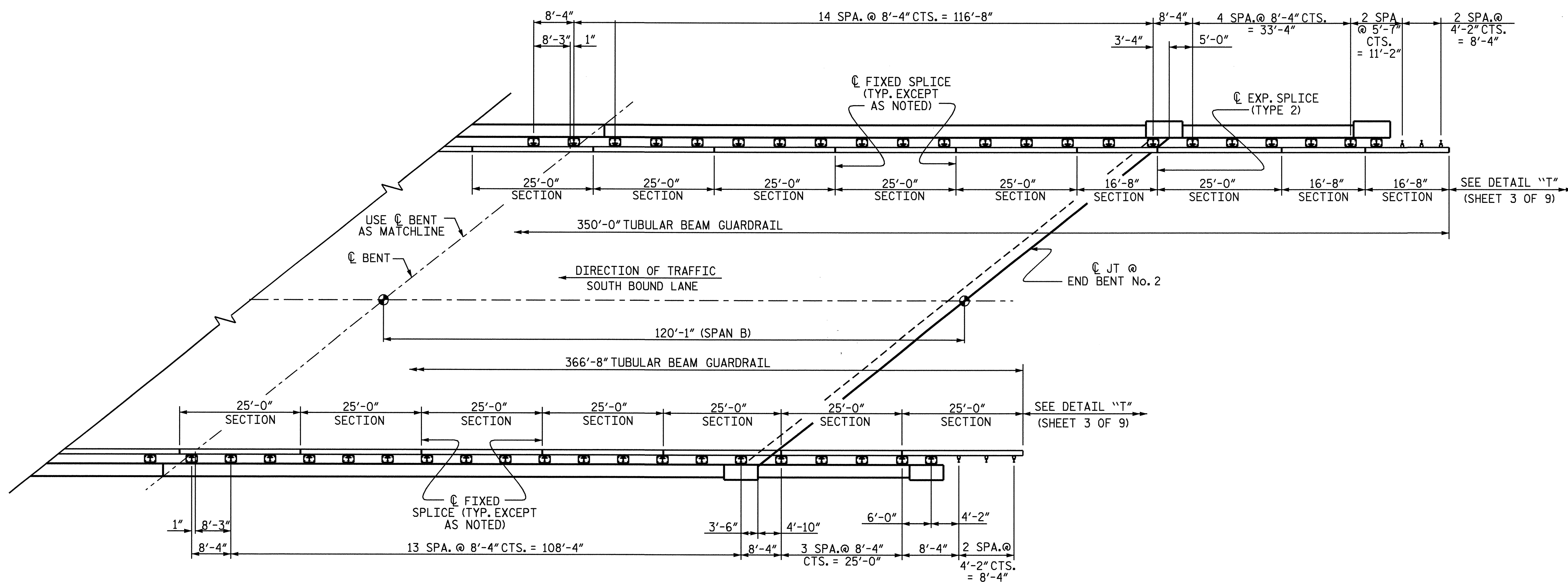
SHEET 4 OF 12 BRIDGE No. 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TUBULAR BEAM
 GUARDRAIL
 RETROFIT & DECK
 JOINT REPAIRS**
 I-85 SBL OVER US 158 BYPASS

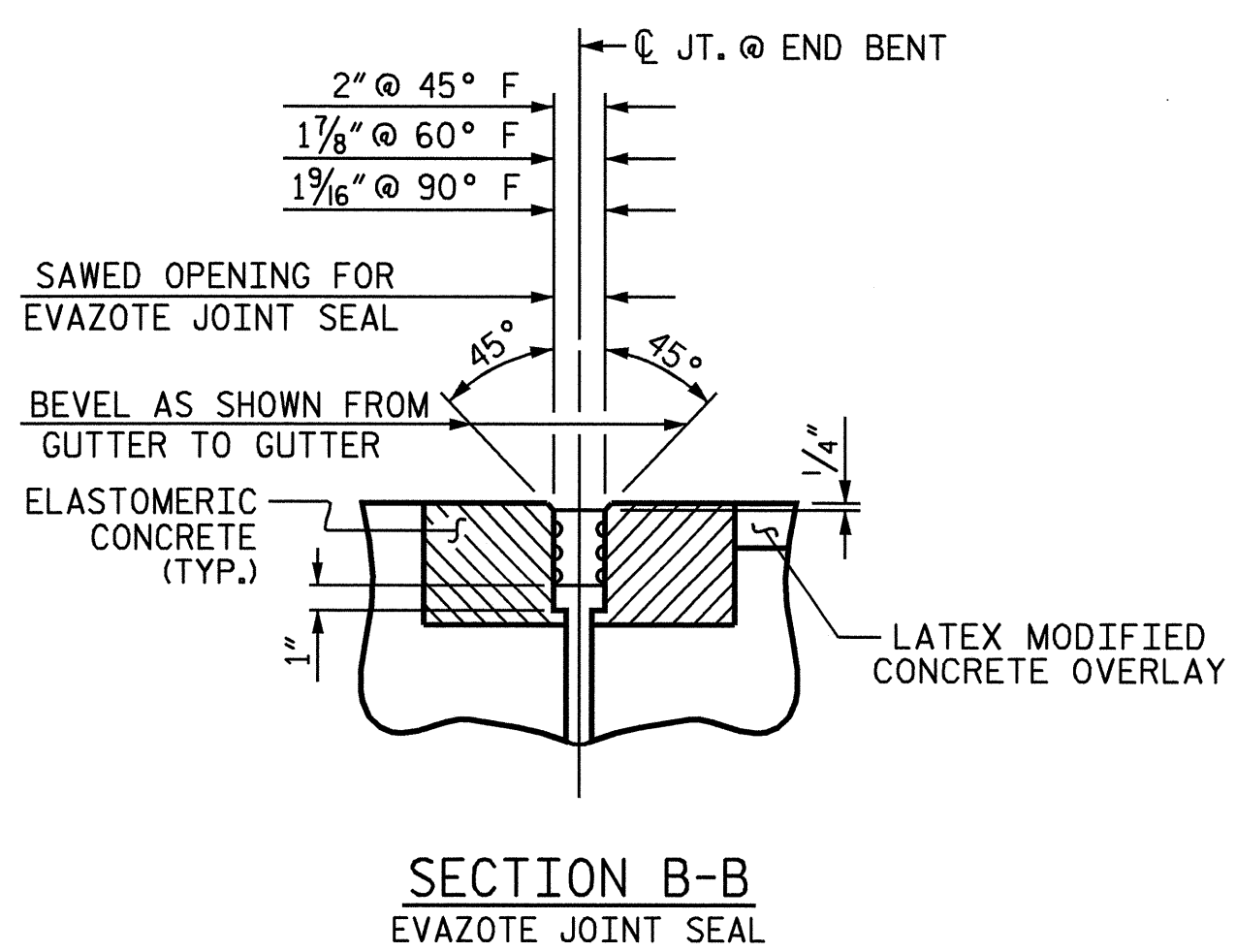
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-4
2			4			TOTAL SHEETS 12

DRAWN BY : J. LAMBERT DATE : 07/07
 CHECKED BY : M.G. CHEEK DATE : 07/07

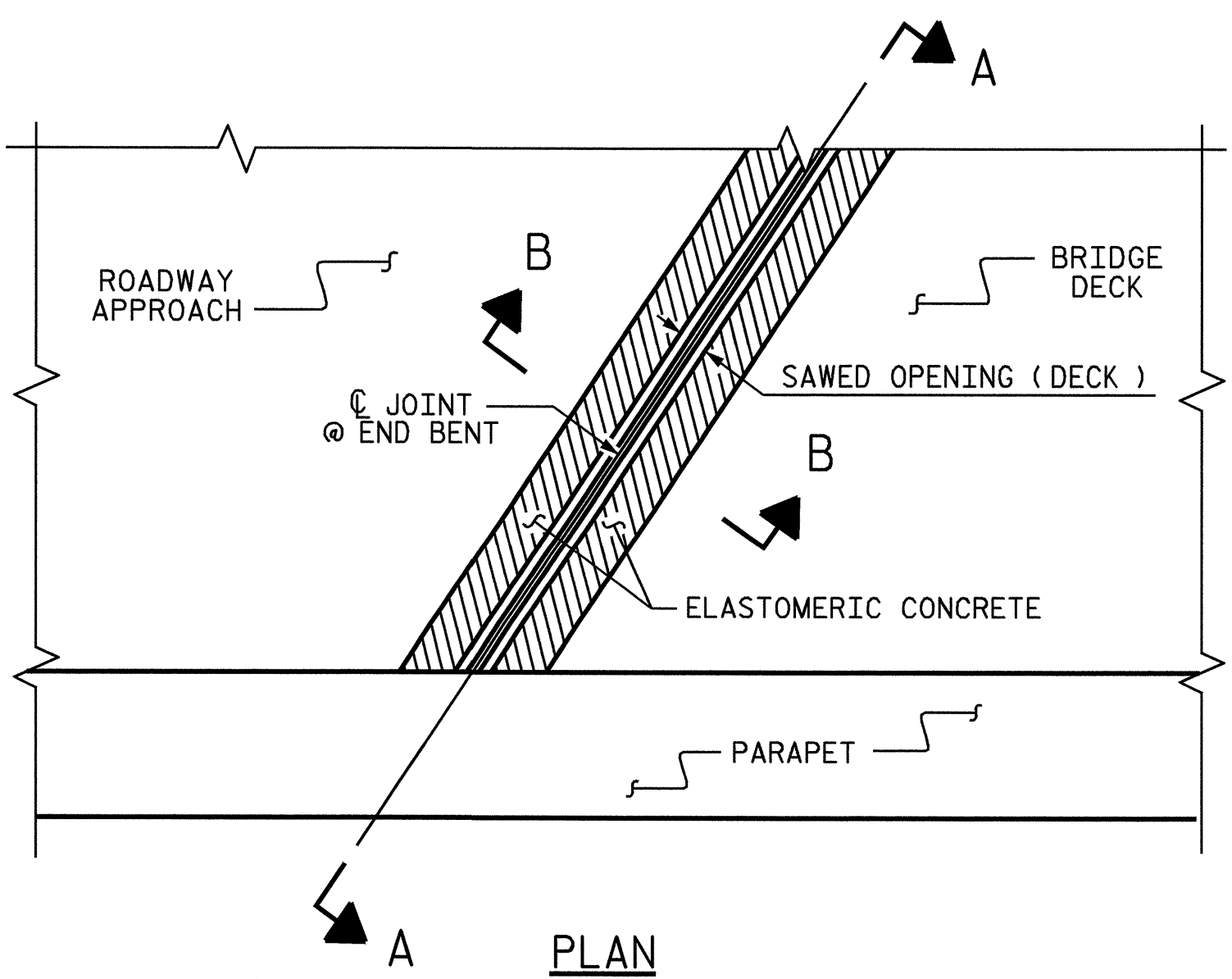


GUARDRAIL LAYOUT

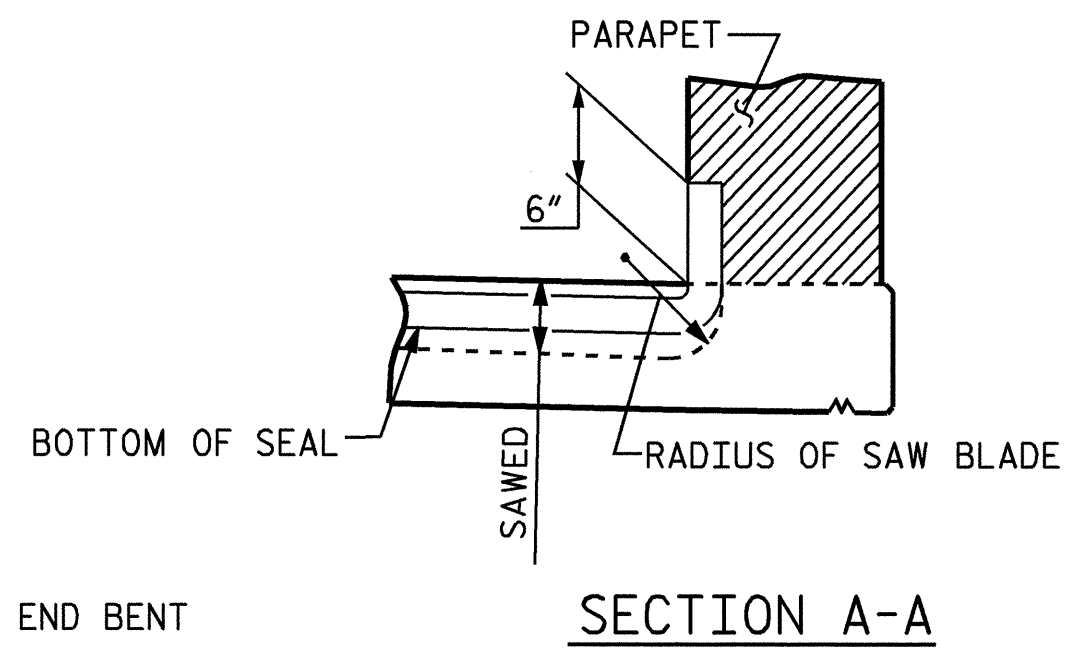
SPAN B - DETAILS ARE TYPICAL FOR SPANS A AND B



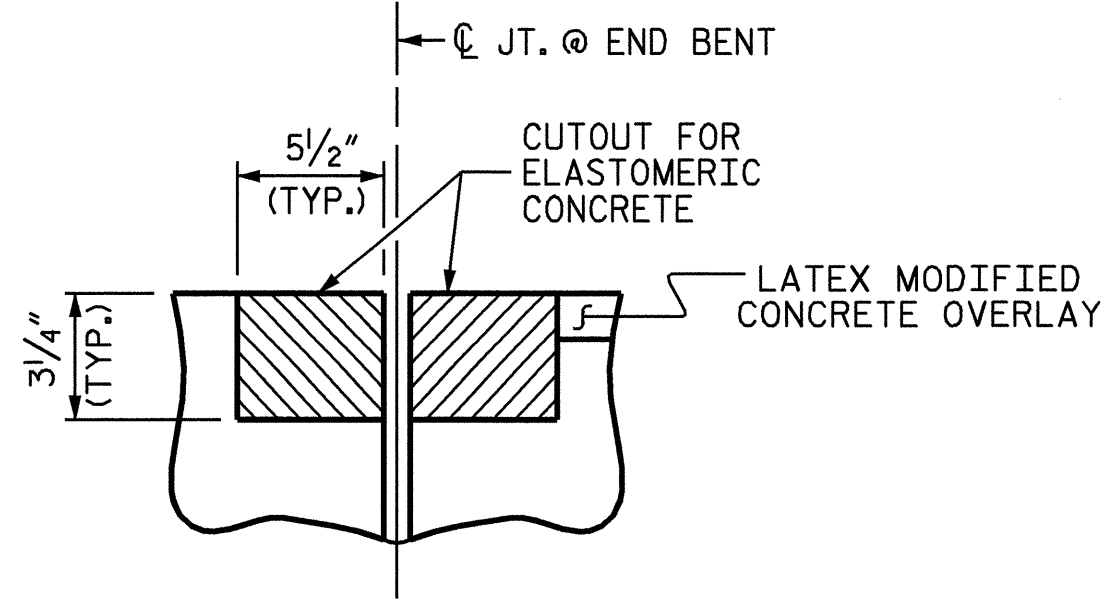
SECTION B-B
EVAZOTE JOINT SEAL



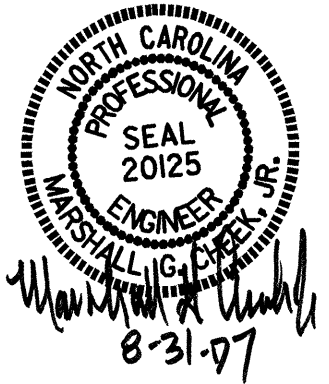
PLAN
JOINT AT END BENT #1 SHOWN,
JOINT AT END BENT #2 SIMILAR



SECTION A-A



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



PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

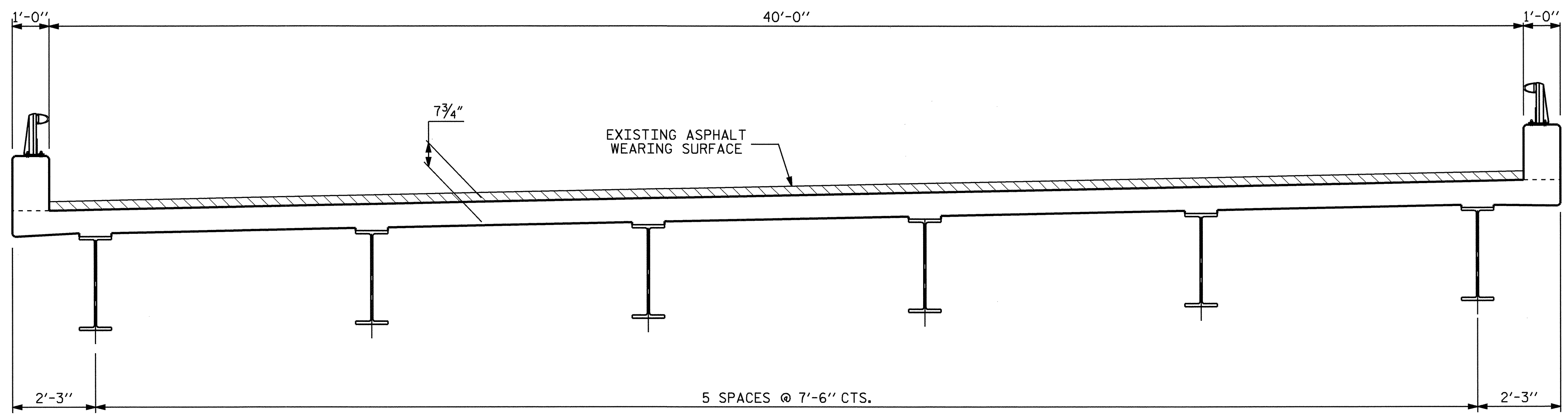
SHEET 5 OF 12 BRIDGE No. 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**TUBULAR BEAM
GUARDRAIL
RETROFIT & DECK
JOINT REPAIRS**

I-85 SBL OVER US 158 BYPASS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-5
1			3			TOTAL SHEETS
2			4			12

DRAWN BY: J. LAMBERT DATE: 07/07
CHECKED BY: M.G. CHEEK DATE: 07/07



TYPICAL SECTION - BRIDGE No. 2

NOTES

FOR CLASS I, IB, II, AND III SURFACE PREPARATION SEE THE SPECIAL PROVISION ENTITLED "REPAIR OF BRIDGE DECKS AND APPROACH PAVEMENT WITH LATEX MODIFIED CONCRETE".

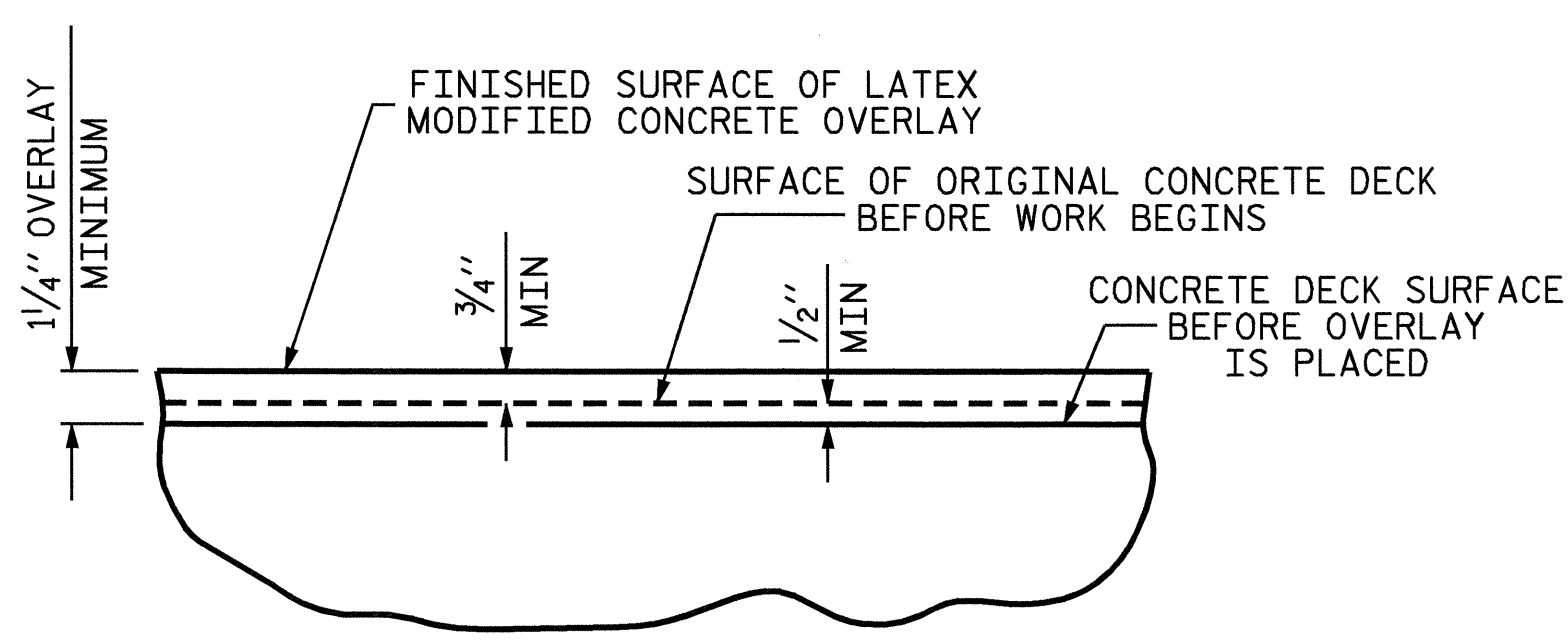
QUANTITIES SHOWN FOR CLASS II AND CLASS III SURFACE PREPARATION ARE ESTIMATED. THE QUANTITIES TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF SQUARE YARDS OF CLASS II AND CLASS III SURFACE PREPARATION COMPUTED BY THE ENGINEER FROM MEASUREMENTS OF THE AREAS THAT ARE PREPARED TO RECEIVE THE OVERLAY.

SPLICES OF REINFORCING STEEL SHALL BE WELDED AS DETAILED AND ALL WELDING SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY REINFORCING STEEL CODE (A.W.S. D12.2). CHEMICAL ANALYSIS OF THE EXISTING REINFORCING STEEL WILL NOT BE REQUIRED.

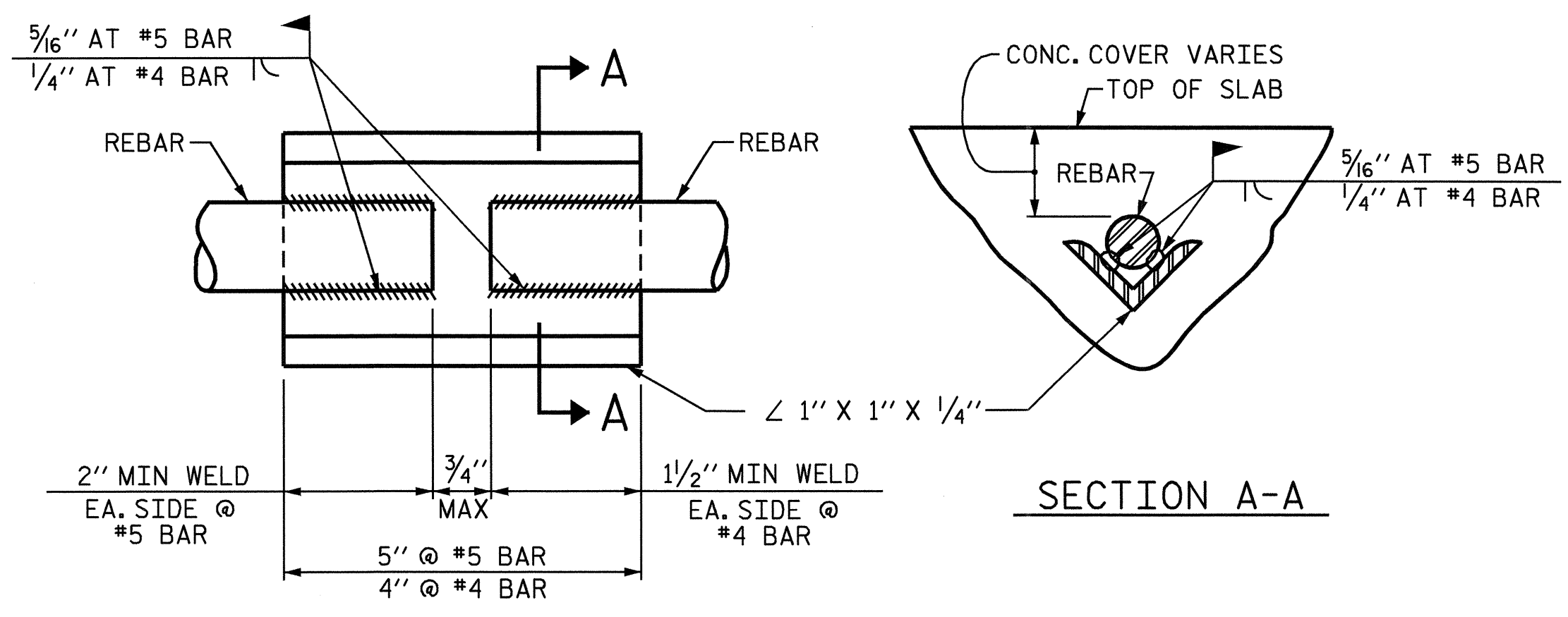
FOR LATEX MODIFIED CONCRETE OVERLAY, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

QUANTITIES IN BILL OF MATERIAL ARE BASED ON AN ASSUMED 3" LATEX MODIFIED CONCRETE OVERLAY DEPTH. THIS DEPTH SHALL BE ADJUSTED IN THE FIELD AS NECESSARY.

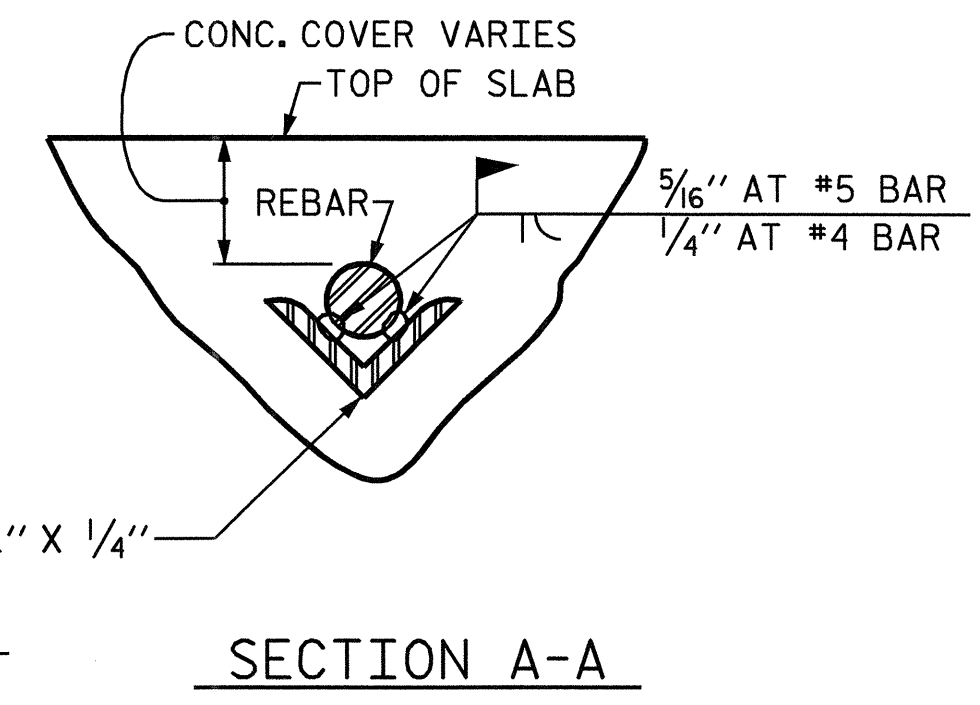


DETAIL FOR LATEX MODIFIED CONCRETE OVERLAY



PLAN VIEW

WELD DETAIL FOR SPLICING REINFORCING STEEL



SECTION A-A

SUPERSTRUCTURE BILL OF MATERIAL

	GROOVING BRIDGE FLOORS	CLASS I SURFACE PREPARATION	CLASS IB SURFACE PREPARATION	CLASS II SURFACE PREPARATION	CLASS III SURFACE PREPARATION	LATEX MODIFIED CONCRETE OVERLAY	PLACING AND FINISHING OF LATEX MODIFIED CONC. OVERLAY	EVAZOTE JOINT SEALS
UNITS	FT ²	YD ²	YD ²	YD ²	YD ²	YD ³	YD ²	LUMP SUM
DECK REPAIR	8,281	1,067	1,067	267	107	89	1,067	
TOTAL	8,281	1,067	1,067	267	107	89	1,067	LUMP SUM

PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

SHEET 6 OF 12 BRIDGE No. 2

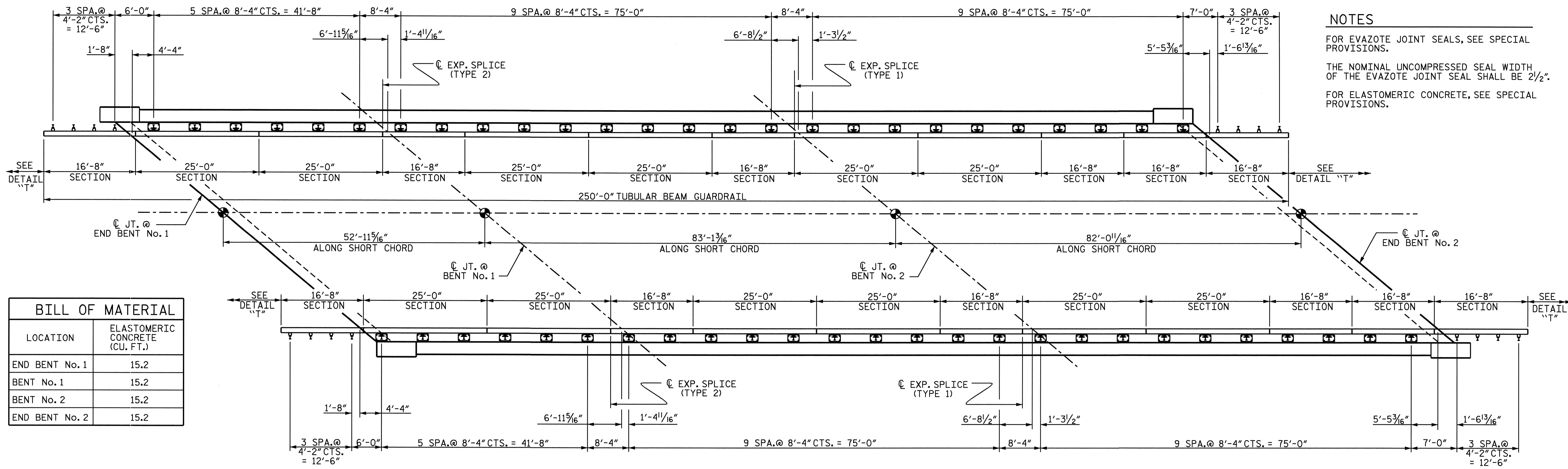


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BRIDGE DECK
REHABILITATION
DETAILS

I-85 SBL OVER US 158 BYPASS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-6
2			4			12

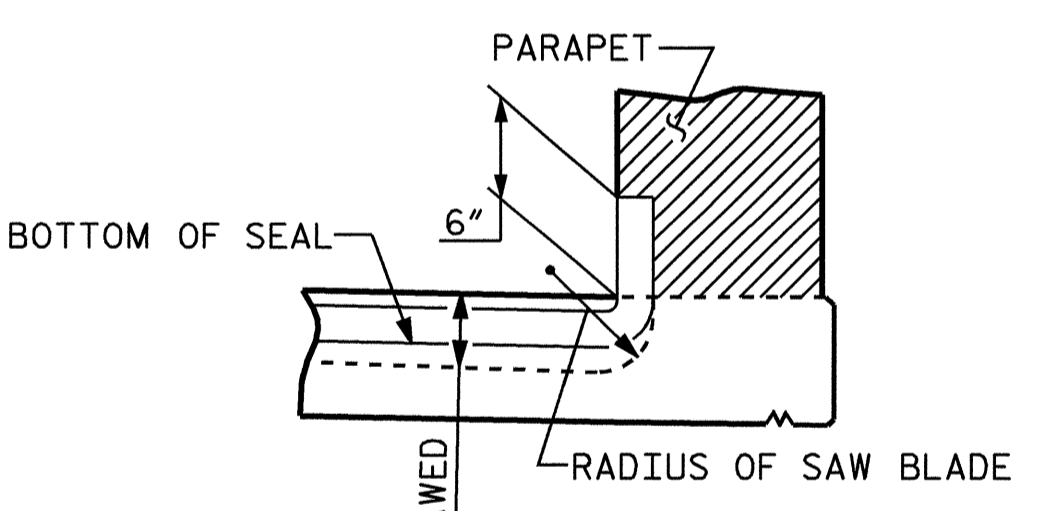
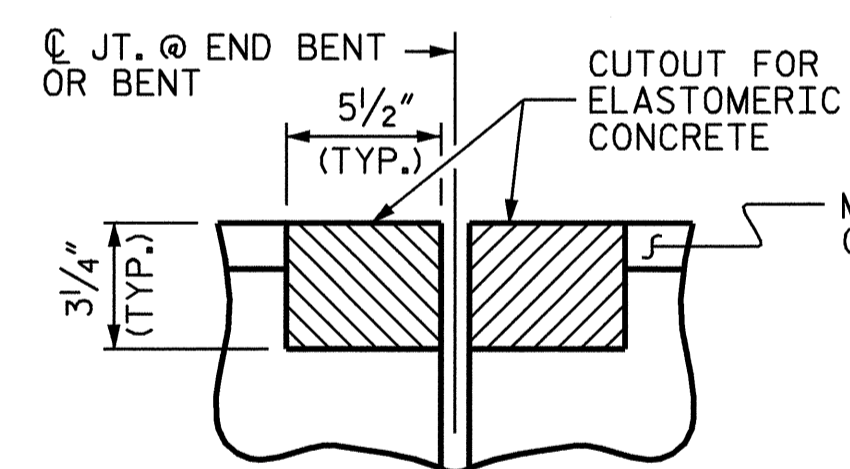
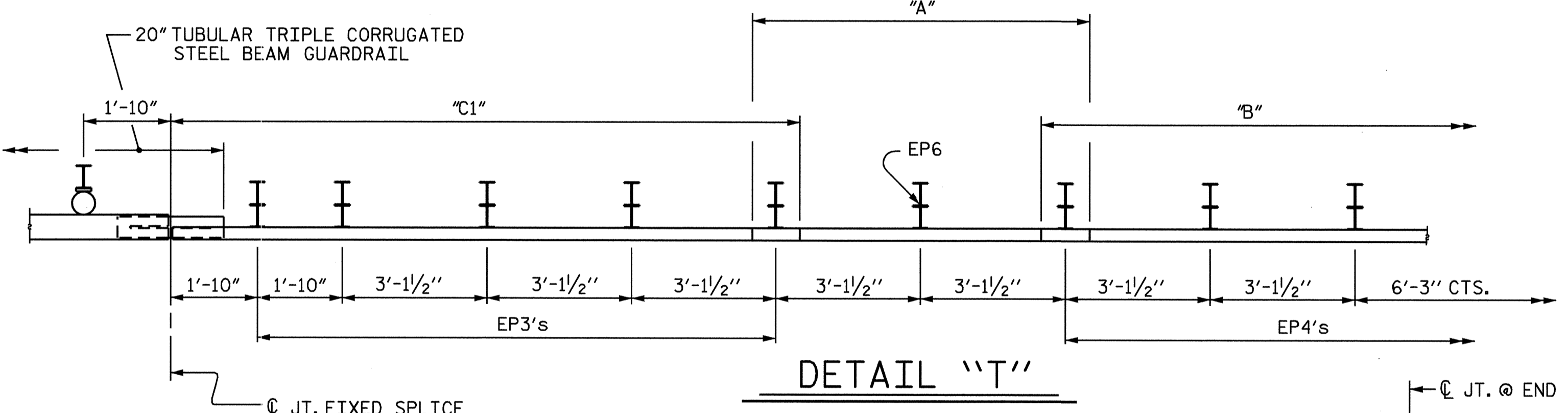
DRAWN BY: MIKE BRITT DATE: 8-30-07
CHECKED BY: M.G. CHEEK DATE: 8-30-07



NOTES
 FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.
 THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2".
 FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

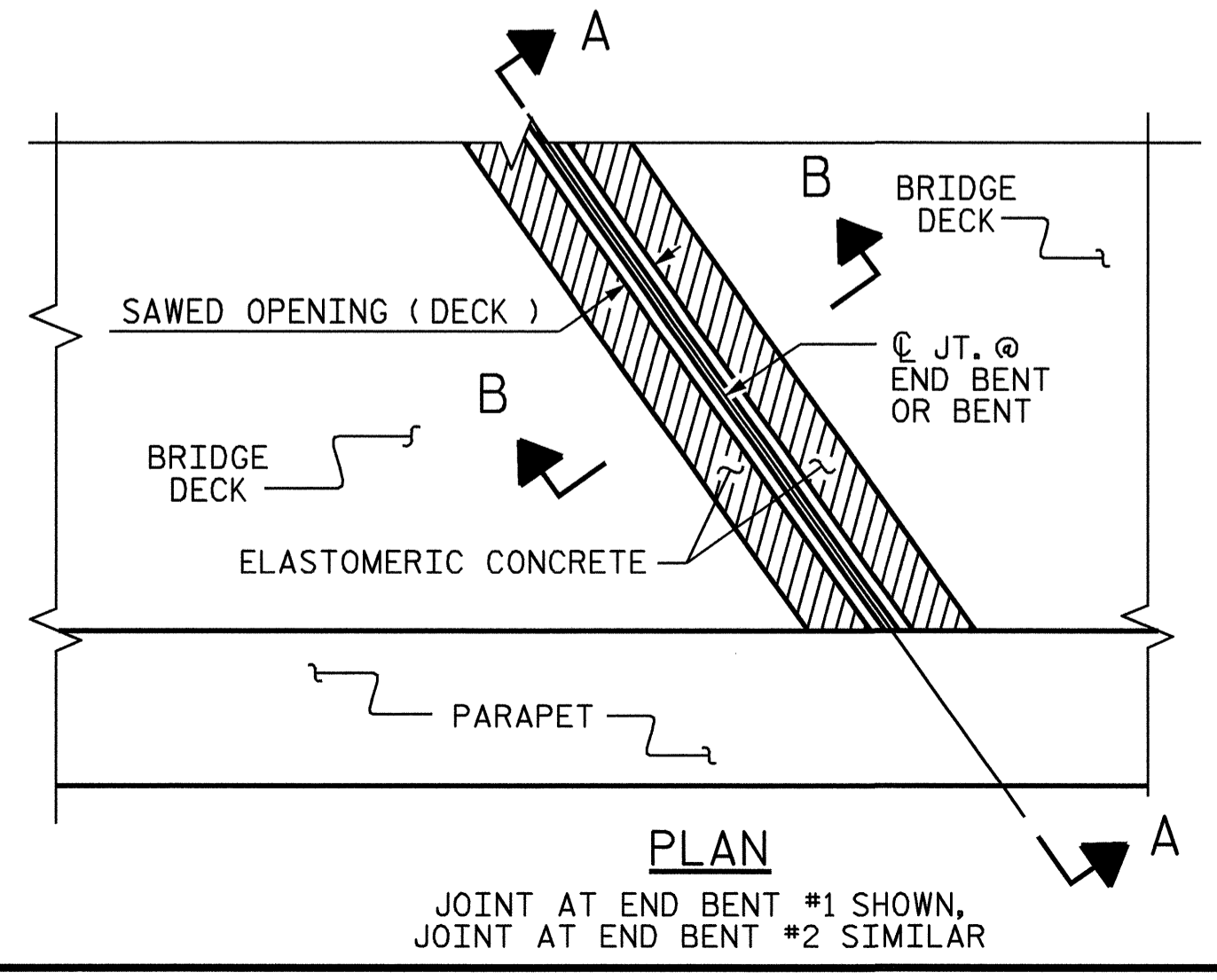
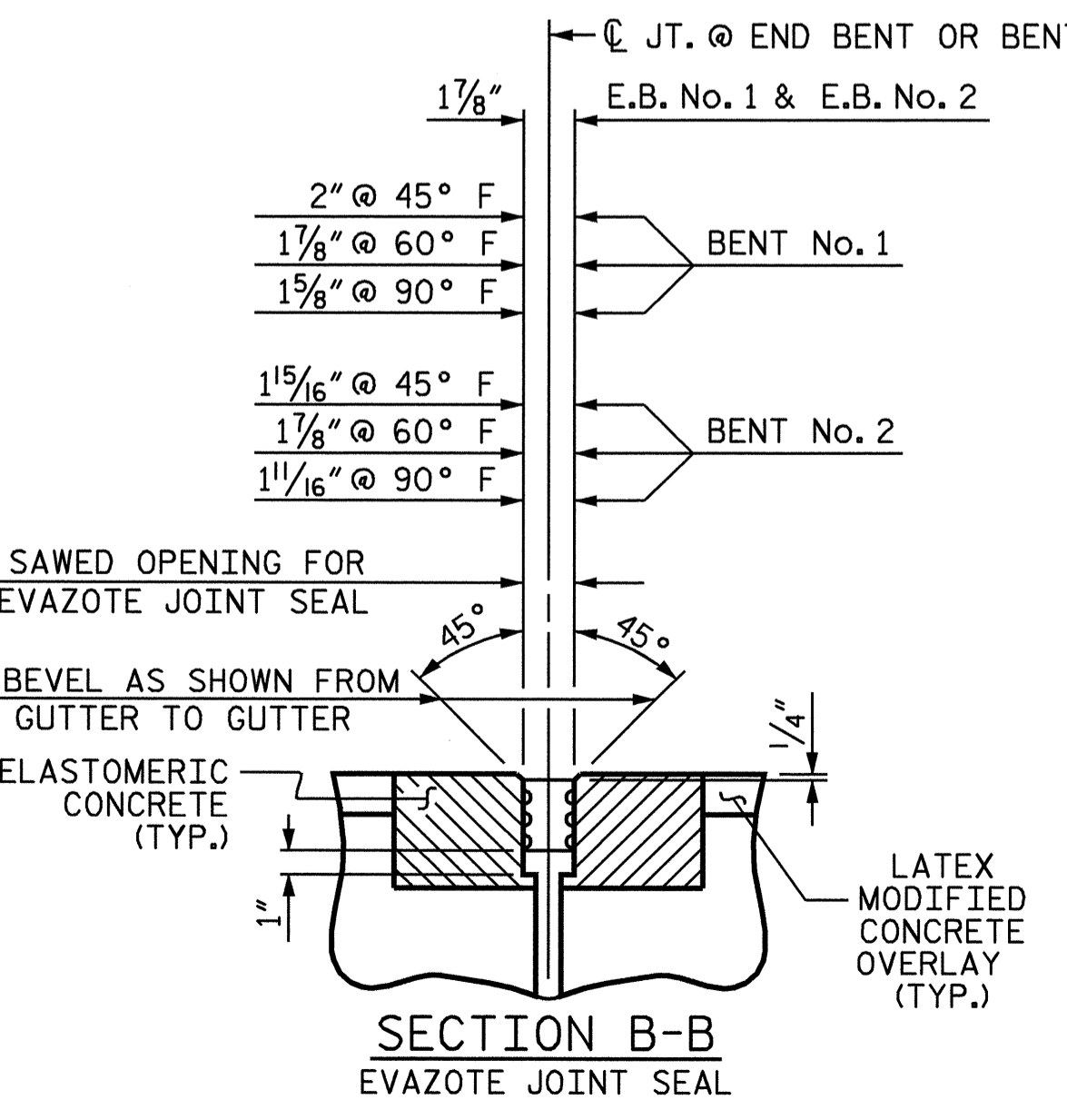
BILL OF MATERIAL	
LOCATION	ELASTOMERIC CONCRETE (CU. FT.)
END BENT No. 1	15.2
BENT No. 1	15.2
BENT No. 2	15.2
END BENT No. 2	15.2

GUARDRAIL LAYOUT



LEGEND

- USE BP20
- USE EP2
- USE EP3 (EXCEPT AS NOTED)
- USE W-TR GUARDRAIL TRANSITIONAL SECTION ("A")
- USE STANDARD GUARDRAIL ("B")
- USE 20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL ("C1")



PROJECT NO. I-2810
 VANCE COUNTY

STATION: _____
 SHEET 7 OF 12 BRIDGE #37

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TUBULAR BEAM GUARDRAIL RETROFIT & DECK JOINT REPAIRS

I-85 OVER US 158

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-7
2			4			12

Professional Engineer Seal: NORTH CAROLINA PROFESSIONAL SEAL 20125, M. G. CHEEK, 8-31-07

DRAWN BY: J. LAMBERT DATE: 07/07
 CHECKED BY: M.G. CHEEK DATE: 08/07

31-AUG-2007 13:57
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 jllambert

NOTES

FOR CLASS I, IB, II, AND III SURFACE PREPARATION SEE THE SPECIAL PROVISION ENTITLED "REPAIR OF BRIDGE DECKS AND APPROACH PAVEMENT WITH LATEX MODIFIED CONCRETE".

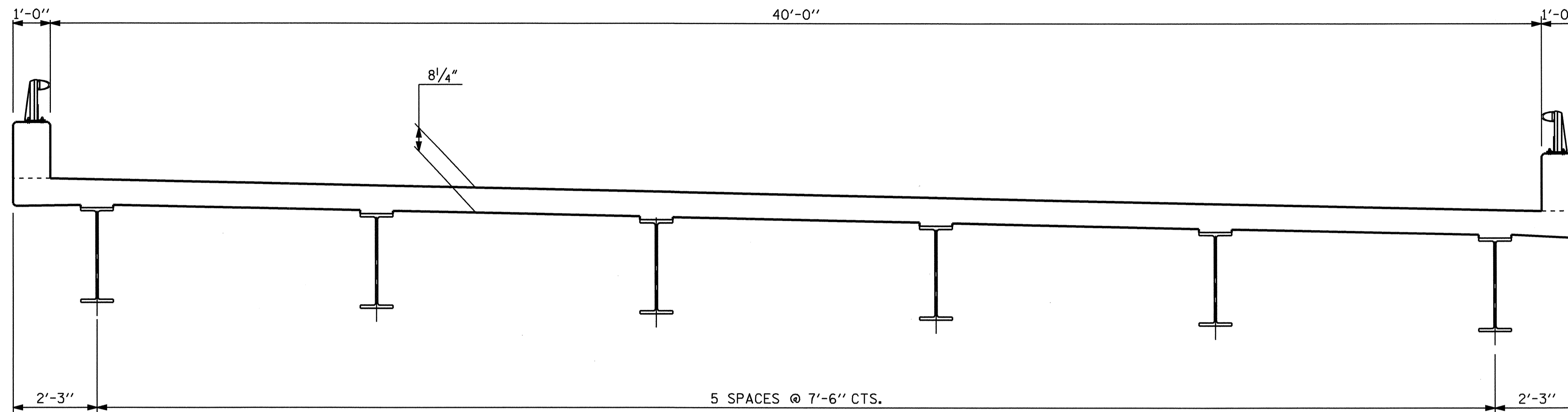
QUANTITIES SHOWN FOR CLASS II AND CLASS III SURFACE PREPARATION ARE ESTIMATED. THE QUANTITIES TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF SQUARE YARDS OF CLASS II AND CLASS III SURFACE PREPARATION COMPUTED BY THE ENGINEER FROM MEASUREMENTS OF THE AREAS THAT ARE PREPARED TO RECEIVE THE OVERLAY.

SPLICES OF REINFORCING STEEL SHALL BE WELDED AS DETAILED AND ALL WELDING SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY REINFORCING STEEL CODE (A.W.S. D12.2). CHEMICAL ANALYSIS OF THE EXISTING REINFORCING STEEL WILL NOT BE REQUIRED.

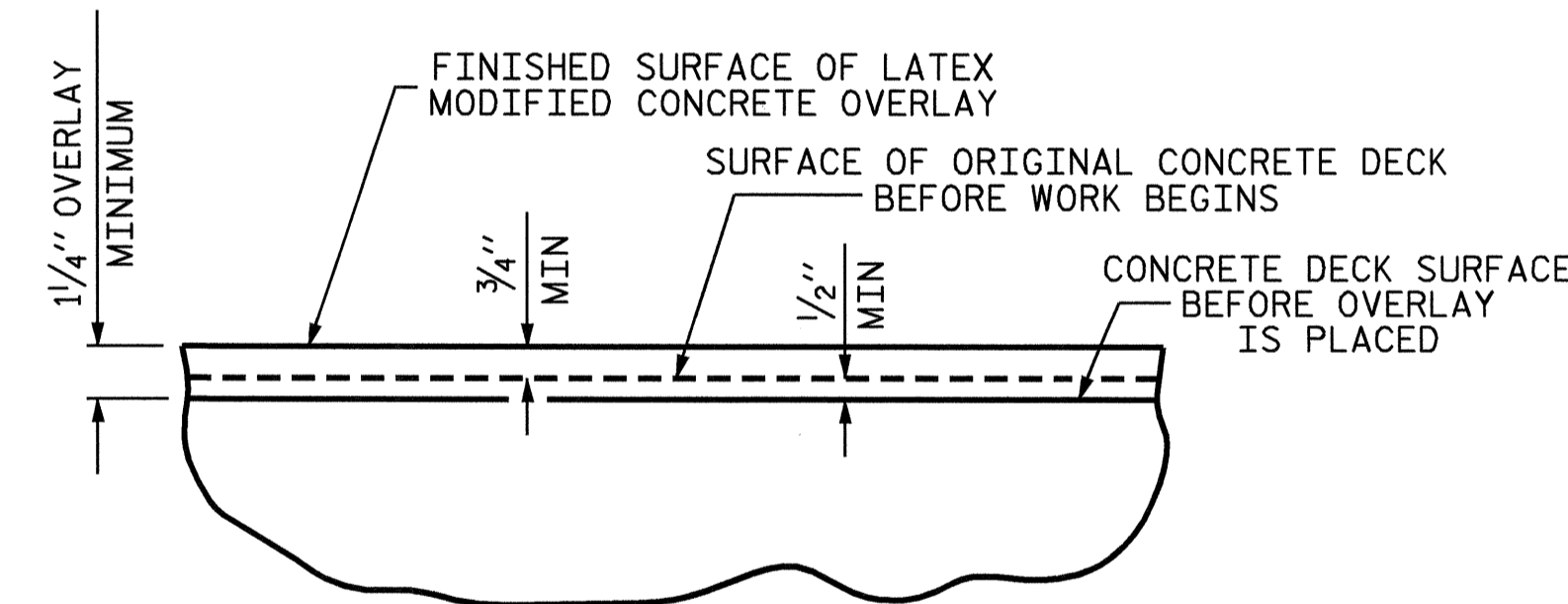
FOR LATEX MODIFIED CONCRETE OVERLAY, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

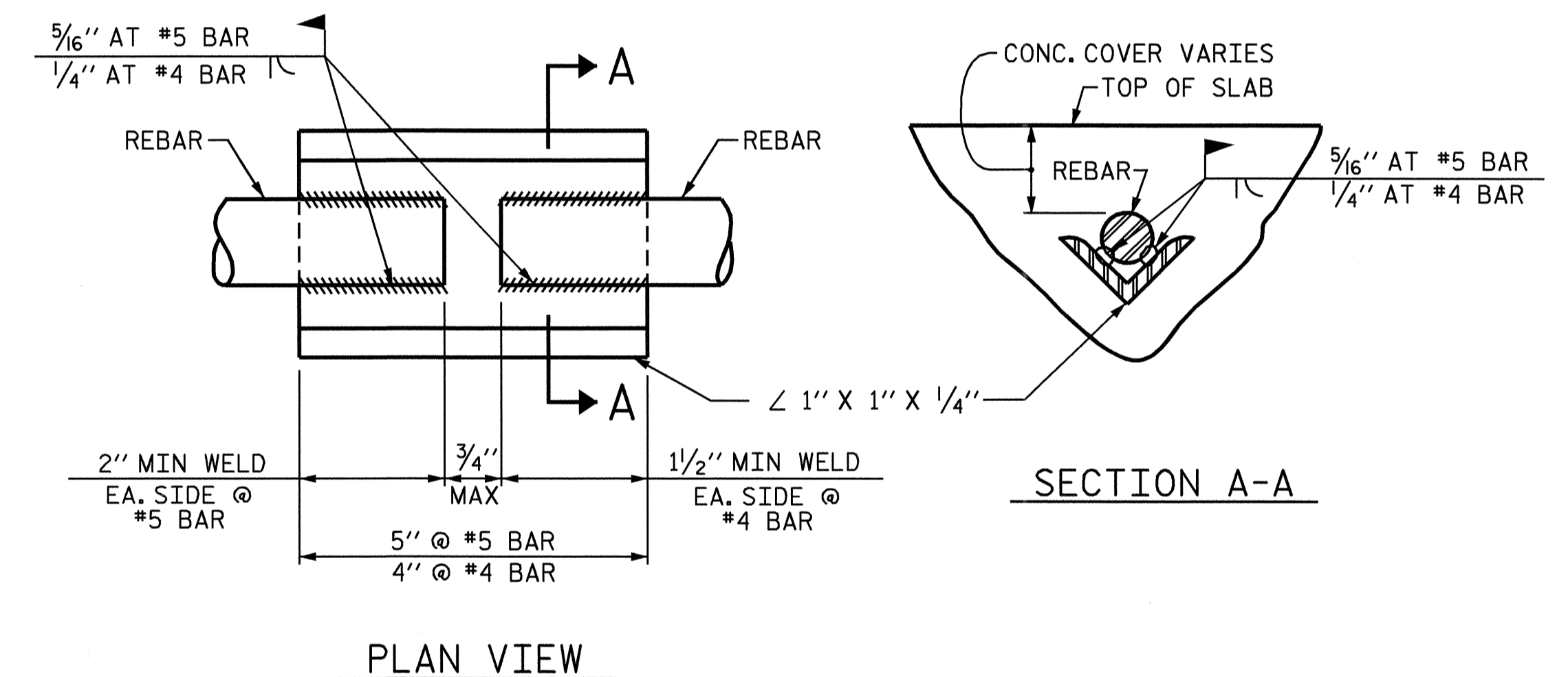
QUANTITIES IN BILL OF MATERIAL ARE BASED ON AN ASSUMED 1/4" LATEX MODIFIED CONCRETE OVERLAY DEPTH. THIS DEPTH SHALL BE ADJUSTED IN THE FIELD AS NECESSARY.



TYPICAL SECTION - BRIDGE No. 37



DETAIL FOR LATEX MODIFIED CONCRETE OVERLAY



WELD DETAIL FOR SPLICING REINFORCING STEEL

SUPERSTRUCTURE BILL OF MATERIAL

	GROOVING BRIDGE FLOORS	CLASS I SURFACE PREPARATION	CLASS II SURFACE PREPARATION	CLASS III SURFACE PREPARATION	LATEX MODIFIED CONCRETE OVERLAY	PLACING AND FINISHING OF LATEX MODIFIED CONC. OVERLAY	EVAZOTE JOINT SEALS
UNITS	FT ²	YD ²	YD ²	YD ²	YD ³	YD ²	LUMP SUM
DECK REPAIR	7,390	969	97	48	34	969	
TOTAL	7,390	969	97	48	34	969	LUMP SUM

PROJECT NO. I-2810
VANCE COUNTY

STATION: _____

SHEET 8 OF 12 BRIDGE No. 37



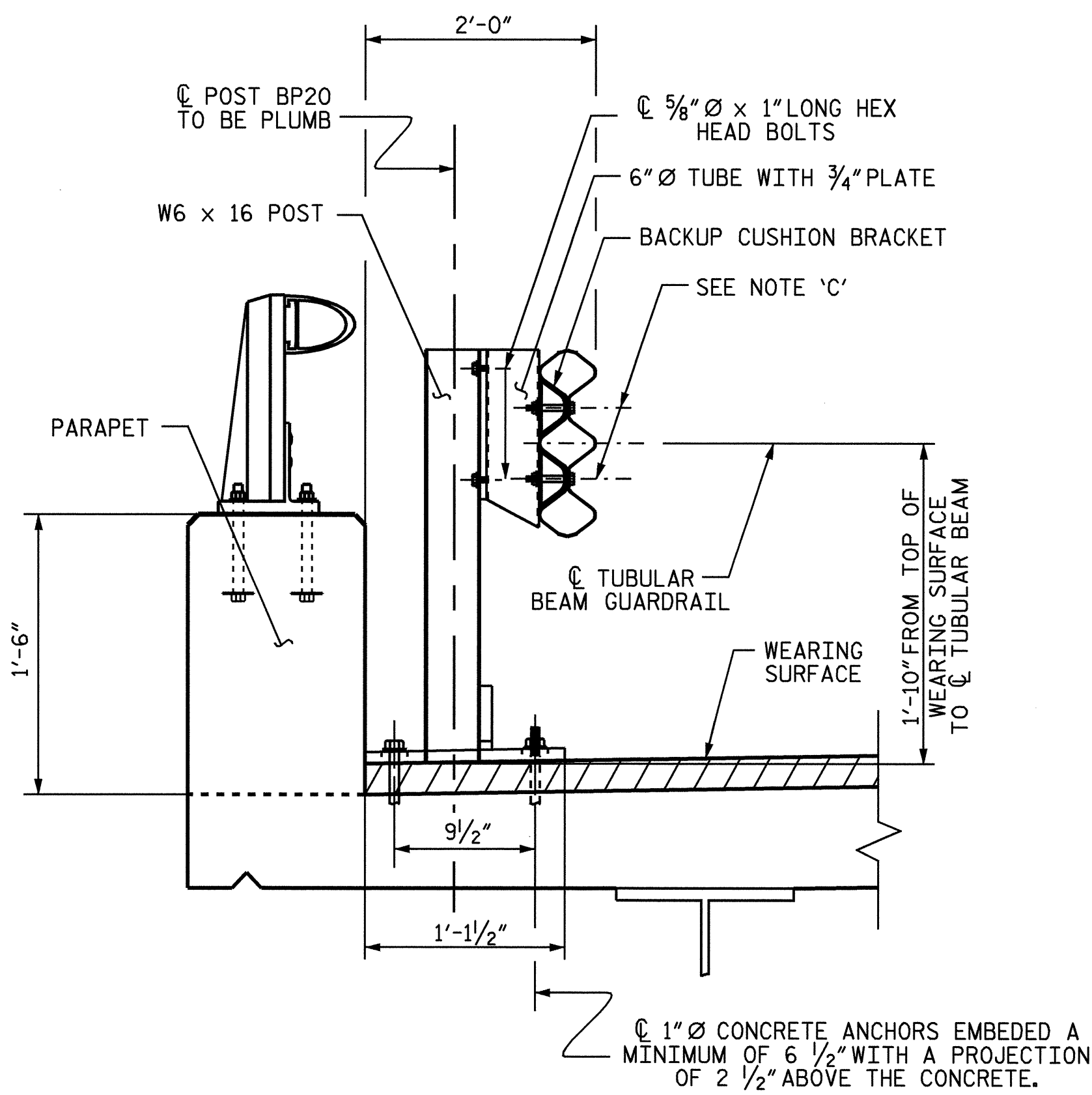
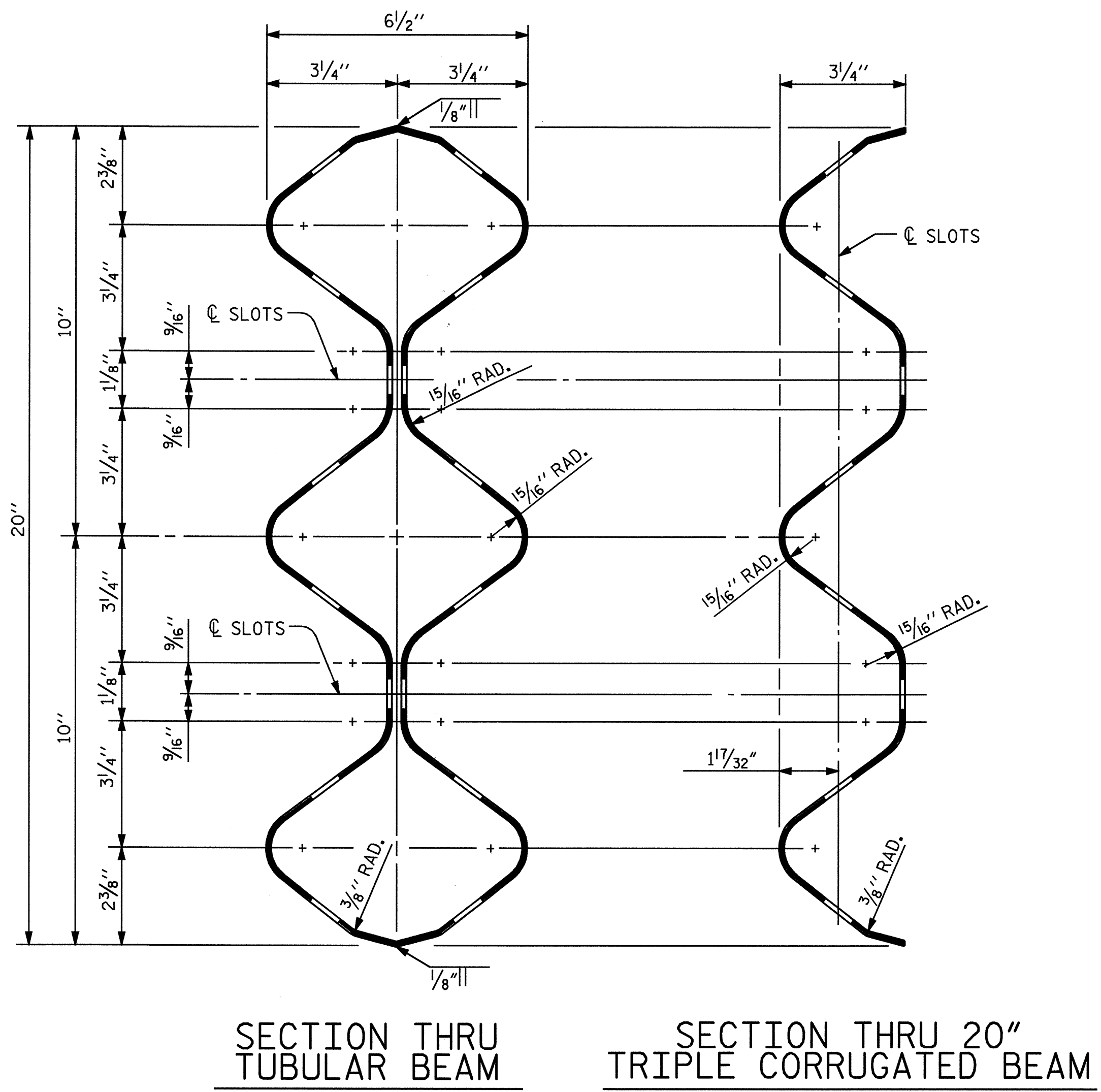
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE DECK
REHABILITATION
DETAILS

I-85 OVER US 158

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-8
2			4			TOTAL SHEETS

DRAWN BY: MIKE BRITT DATE: 8-30-07
CHECKED BY: M.G. CHEEK DATE: 8-30-07



RETROFIT EXISTING RAIL WITH TUBULAR BEAM
(WITH WEARING SURFACE)

NOTES : 'C'
 5/8" Ø X 5" LONG HEX, OR HEAVY HEX HEAD BOLTS WITH ONE GALVANIZED FLAT PLATE WASHER (TYPE 1) AND ONE GALVANIZED STANDARD ROUND WASHER EACH; OR ROUND HEAD, OVAL NECK CARRIAGE BOLT WITH ONE GALVANIZED STANDARD ROUND WASHER AND ONE GALVANIZED FLAT PLATE WASHER (TYP 6).

CONCRETE ANCHOR NOTES :

- FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE ROADWAY SPECIAL PROVISIONS.
- THE CONCRETE ANCHORS SHALL BE TESTED AS FOLLOWS :
 A) THE CONTRACTOR SHALL TEST 5% OF THE TOTAL NUMBER OF BOLTS PER SPAN IN THE AREA OF THE CURB FOR LOAD TESTS AS DESCRIBED IN THE ROADWAY SPECIAL PROVISIONS.
 B) THE ANCHOR BEING TESTED SHALL WITHSTAND A LOAD EQUAL TO 4700 POUNDS WHEN TESTED AS SPECIFIED IN THE ROADWAY SPECIAL PROVISIONS.
 C) THE SUCCESSFULLY TESTED ANCHOR MAY BE USED IN THE FINAL RAIL ASSEMBLY, IF APPROPRIATELY LOCATED. IF NOT SO LOCATED, OR IF THE ANCHOR FAILS THE TEST, THE TEST AREA SHALL BE REPAIRED AS DAMAGED CONCRETE, SEE 'GENERAL NOTES'.
- EMBEDMENT SHOWN ON THE PLANS IS A MINIMUM, BUT THE MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED.
- THE 1" DIAMETER CONCRETE ANCHOR SHALL CONSIST OF A STUD, THREADED ON ONE END, WITH NUT AND WASHERS. THE ANCHOR SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS OF ASTM A-153.
- AT THE CONTRACTOR'S OPTION, STAINLESS STEEL ANCHORS MAY BE USED AS AN ALTERNATE FOR THE GALVANIZED CONCRETE ANCHORS. THEY SHALL MEET OR EXCEED THE MECHANICAL REQUIREMENTS FOR THE GALVANIZED ANCHORS. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- EXPANSION ANCHORS WILL NOT BE PERMITTED.

NOTES :
 5/8" DIAMETER BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-307 AND SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS OF ASTM A-153.
 HOLES FOR THE 1" DIAMETER BOLTS THRU THE EXISTING SIDEWALK SHALL BE 1 1/8" DIAMETER.

- GENERAL NOTES :
- THE 20" TRIPLE TUBULAR CORRUGATED BEAM RAIL SECTION SHALL BE FABRICATED BY WELDING TWO (2) 20" TRIPLE CORRUGATED BEAM RAIL ELEMENTS AS SHOWN AND THE GUARDRAIL SHALL CONFORM TO THE NCDOT STANDARD SPECIFICATIONS EXCEPT AS NOTED AND SHOWN ON THE PLANS.
 - 20" TRIPLE TUBULAR CORRUGATED BEAM RAIL SHALL BE 10 GAGE.
 - POSTS, BASE ANGLES AND/OR BASE PLATES, 6" DIA. TUBES, AND OFFSET BLOCKS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36. SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A-570 GRADE 33 OR A-611 GRADE C.
 - POSTS, BASE ANGLES AND/OR BASE PLATES, TUBES, BLOCKS AND SHIMS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123.
 - POSTS ARE TO BE PLUMB. SHIMS MAY BE USED BENEATH THE ROADWAY EDGE OF THE BASE ANGLES AND/OR BASE PLATES AS NECESSARY FOR POST ALIGNMENT, PROVIDE ONE/8" AND TWO/16" STEEL SHIMS FOR 25 % OF THE POSTS ON THE BRIDGE.
 - "BP" POST HEIGHT TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.
 - PROPOSED RAIL POST MAY BE SHIFTED SLIGHTLY TO CLEAR REINFORCING STEEL. STANDARD SLOTS MAY BE USED IN THE RAIL TO ALLOW ADJUSTMENT.
 - HOLES SHALL BE DRILLED HORIZONTAL OR VERTICAL USING A ROTARY DRILL OR A ROTARY IMPACT DRILL. IMPACT TOOLS WILL NOT BE PERMITTED. CARBIDE TIPPED BITS SHALL BE USED UNLESS REINFORCING STEEL IS ENCOUNTERED. AN APPROPRIATE BIT FOR DRILLING THROUGH REINFORCING STEEL SHALL BE USED WHEN NECESSARY. THE CONTRACTOR SHALL BE PREPARED TO DRILL THROUGH REINFORCING STEEL AT TIMES.
 - POST SPACINGS AS SHOWN ON THE PLANS SHALL BE CHECKED BEFORE HOLES ARE DRILLED IN THE 20" TRIPLE TUBULAR CORRUGATED BEAM RAIL. STANDARD SLOTS WILL BE ALLOWED. FIELD PUNCHING OF THE HOLES OR SLOTS WILL NOT BE PERMITTED.
 - A SEALANT WILL BE REQUIRED IN THE AREA OF THE ANCHOR BOLTS AND WILL BE PLACED IN THE FOLLOWING MANNER:
 A. BEFORE THE BASE PLATE HAS BEEN SET IN PLACE, IF THE GROUT DOES NOT COMPLETELY FILL THE ANCHOR HOLE, SEAL THE AREA AROUND EACH CONCRETE ANCHOR BOLT TO KEEP MOISTURE FROM ENTERING THE HOLE.
 B. AFTER THE BASE PLATE HAS BEEN SET IN PLACE AND BEFORE THE WASHERS AND NUTS HAVE BEEN PLACED ON THE BOLT, SEAL THE HOLE REMAINING AROUND THE ANCHOR BOLT. THE SEALANT SHALL BE A ONE-COMPONENT POLYSULFIDE GUN GRADE MEETING FEDERAL SPECIFICATION TT-S-230. SEALANT SHALL BE GRAY IN COLOR AND APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION. THE FOLLOWING SEALANTS MEET THE ABOVE REQUIREMENTS:
 "SONOLASTIC ONE PART", MANUFACTURED BY SONNEBORN-DESOTO CO., DES PLAINES, ILLINOIS, 60018.
 "THOROSPAN ONE COMPONENT", MANUFACTURED BY STANDARD DRY WALL PRODUCTS, INC., MIAMI, FLORIDA, 33166.
 "HORNFLEX ONE COMPONENT", MANUFACTURED BY W. R. GRACE AND CO., CAMBRIDGE, MASSACHUSETTS, 02140.
 - ALL CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.
 - VERTICAL SLOTS IN THE 6" TUBE ALLOW FOR SOME VERTICAL ADJUSTMENT OF RAIL HEIGHT IN ORDER TO OBTAIN THE CENTERLINE OF RAIL HEIGHT OF 1'-10" ABOVE RIDING SURFACE.
 - THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ELECTROSLAG WELDING WILL NOT BE PERMITTED.
 - LAP BEAM RAIL JOINTS IN DIRECTION OF TRAFFIC.

ADDED TO CADD 5/88 BY: NMR CHECKED BY:

PROJECT NO. I-2810
VANCE COUNTY
 STATION: _____

SHEET 9 OF 12

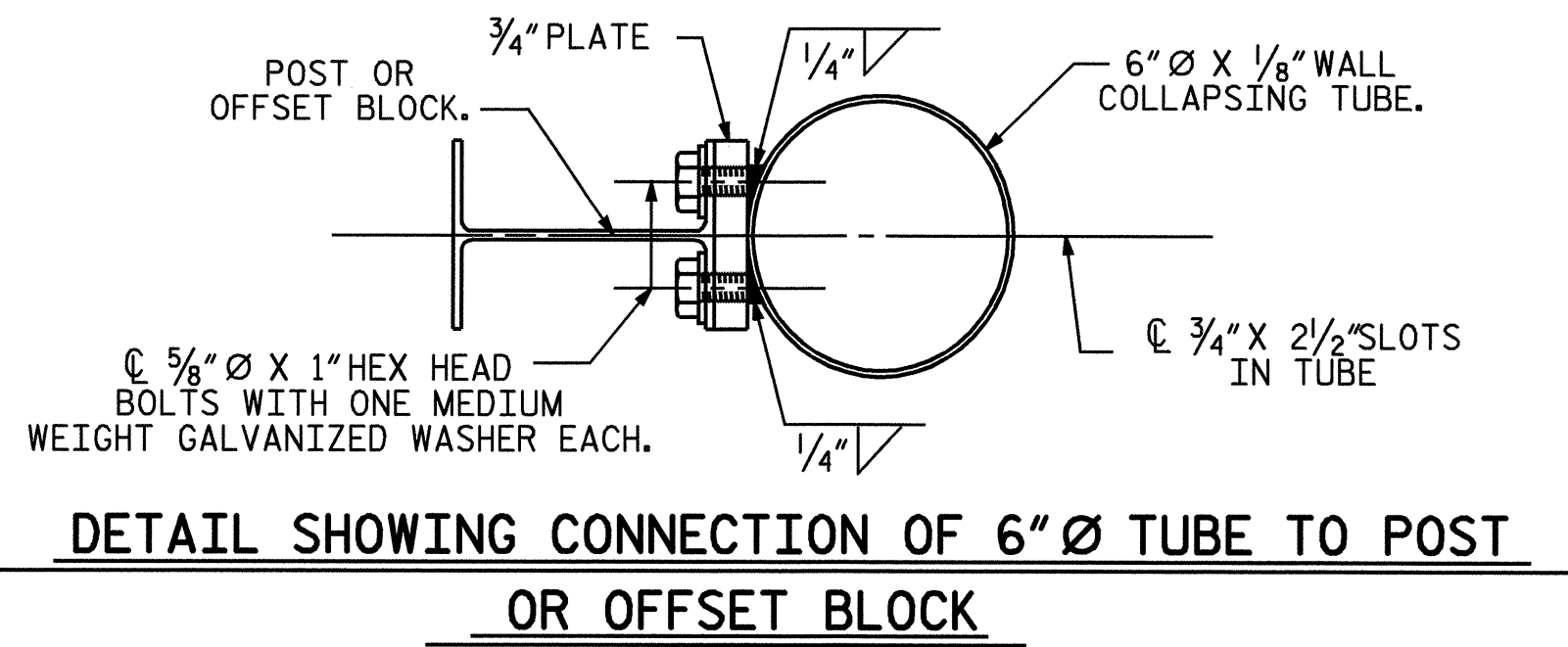


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DETAILS FOR RETROFIT
 OF EXISTING BRIDGE
 RAIL WITH TUBULAR
 BEAM GUARDRAIL**

ASSEMBLED BY : <u>J. LAMBERT</u> DATE : <u>07/07</u>	SPECIAL
CHECKED BY : <u>M. G. CHEEK</u> DATE : <u>07/07</u>	
DRAWN BY : <u>N.M. RUFFIN</u> DATE : <u>5/88</u>	STANDARD
CHECKED BY : _____ DATE : _____	

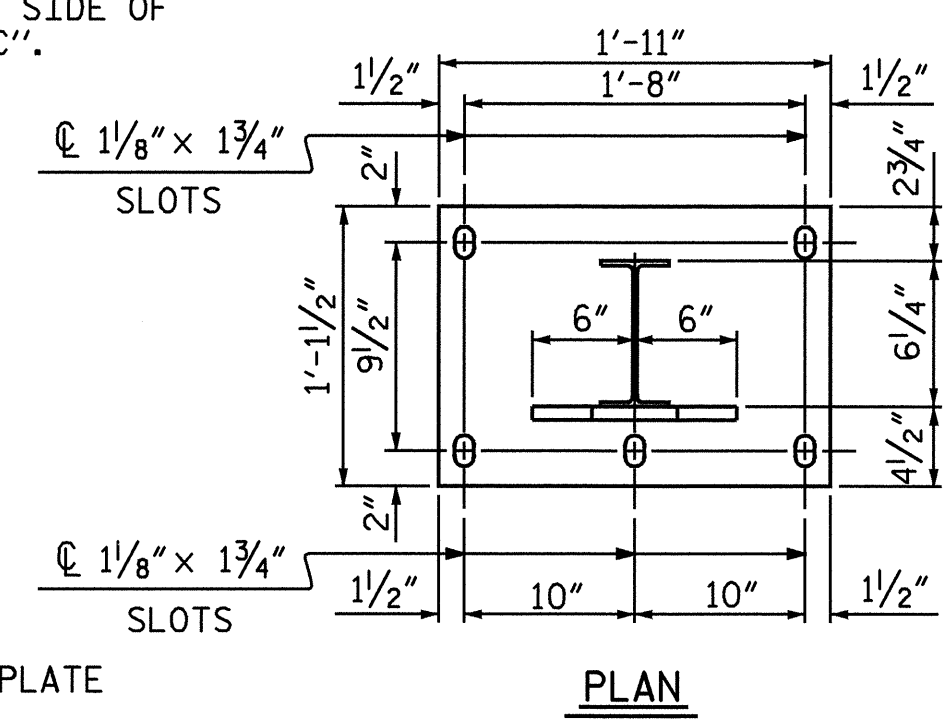
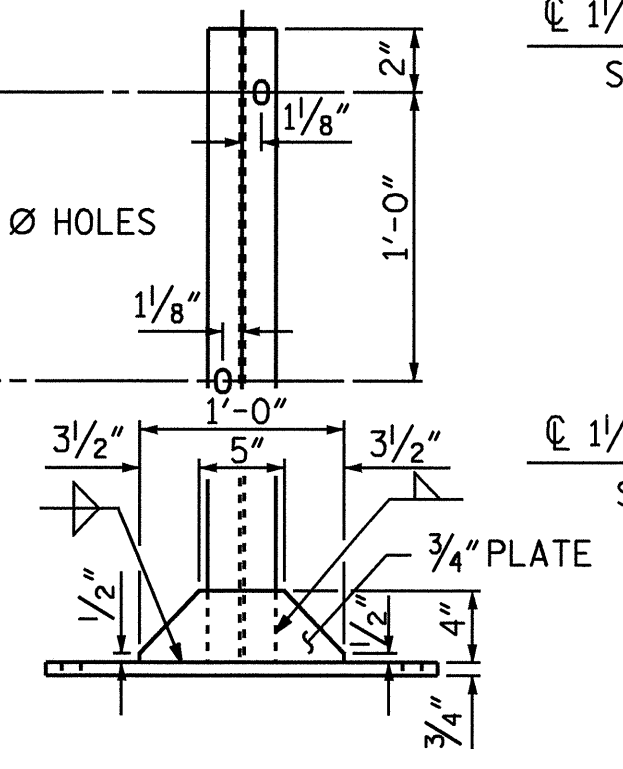
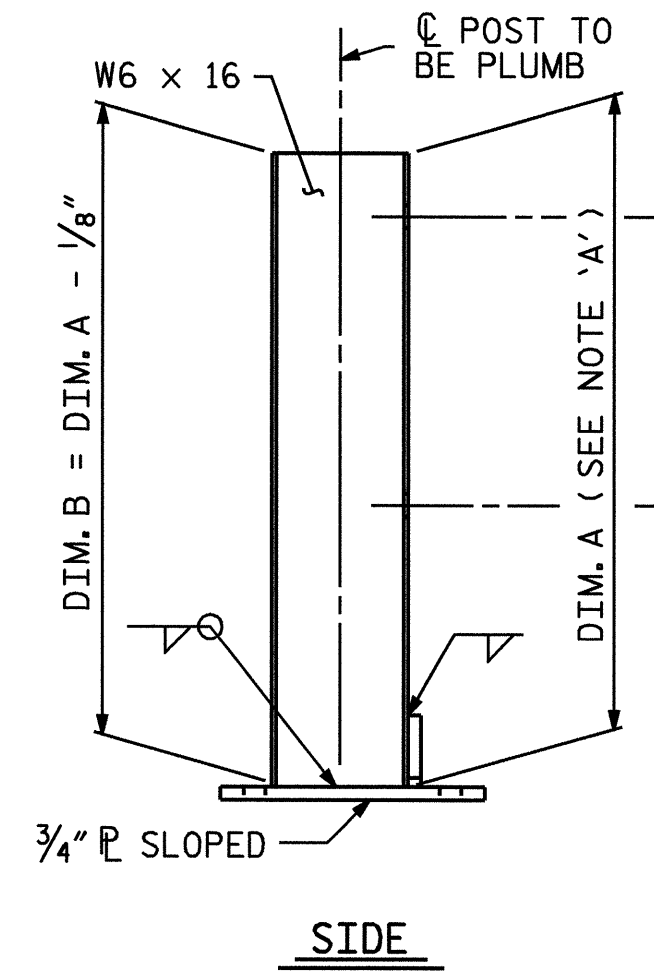
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						12

31-AUG-2007 13:58
 *****DCN*****
 J Lambert

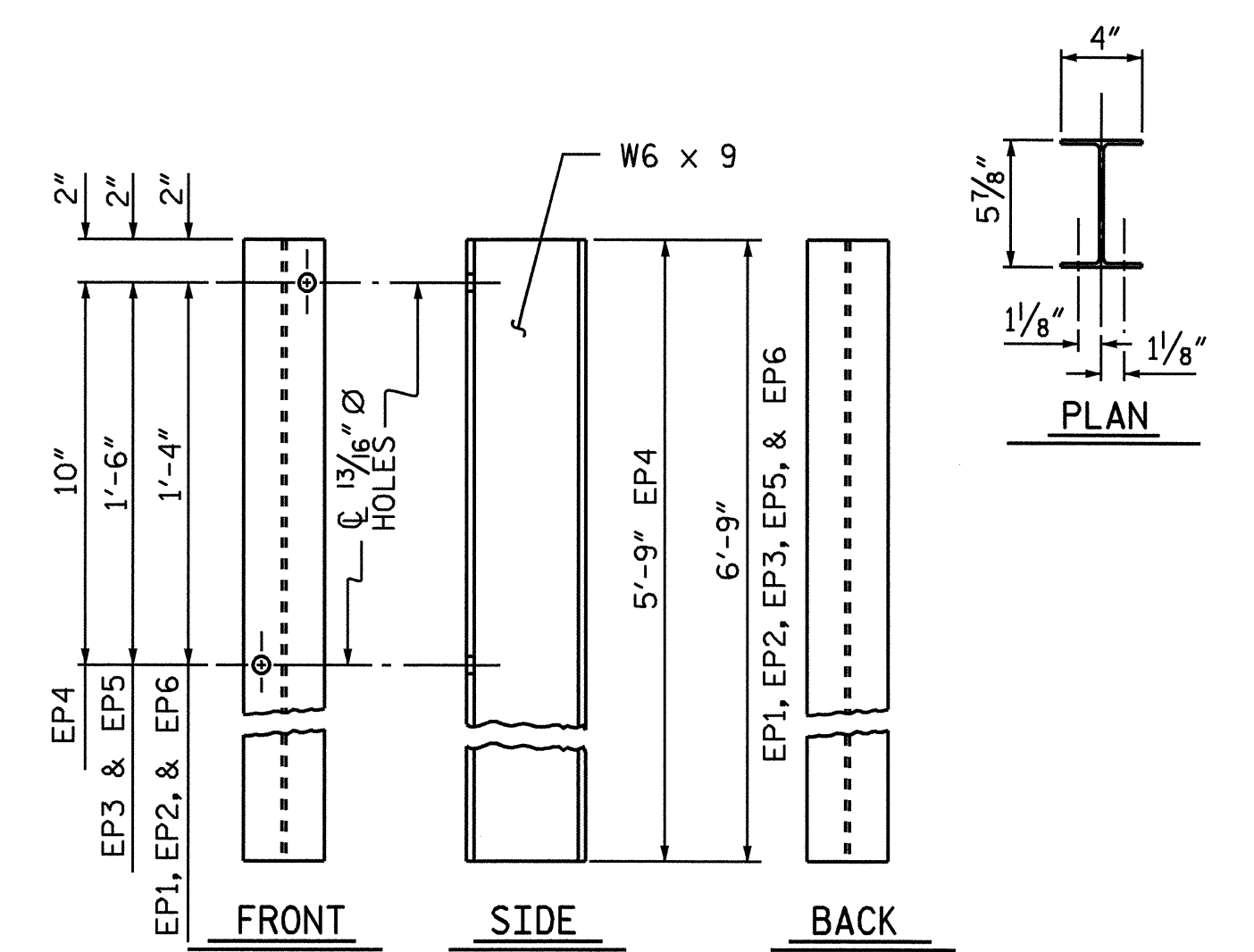


NOTE A : HEIGHT OF POST BP1 (DIMENSION A) SHALL BE DETERMINED IN THE FIELD SO THAT THE C OF THE TUBULAR BEAM IS 1'-10" ABOVE TOP OF SLAB OR TOP OF WEARING SURFACE.

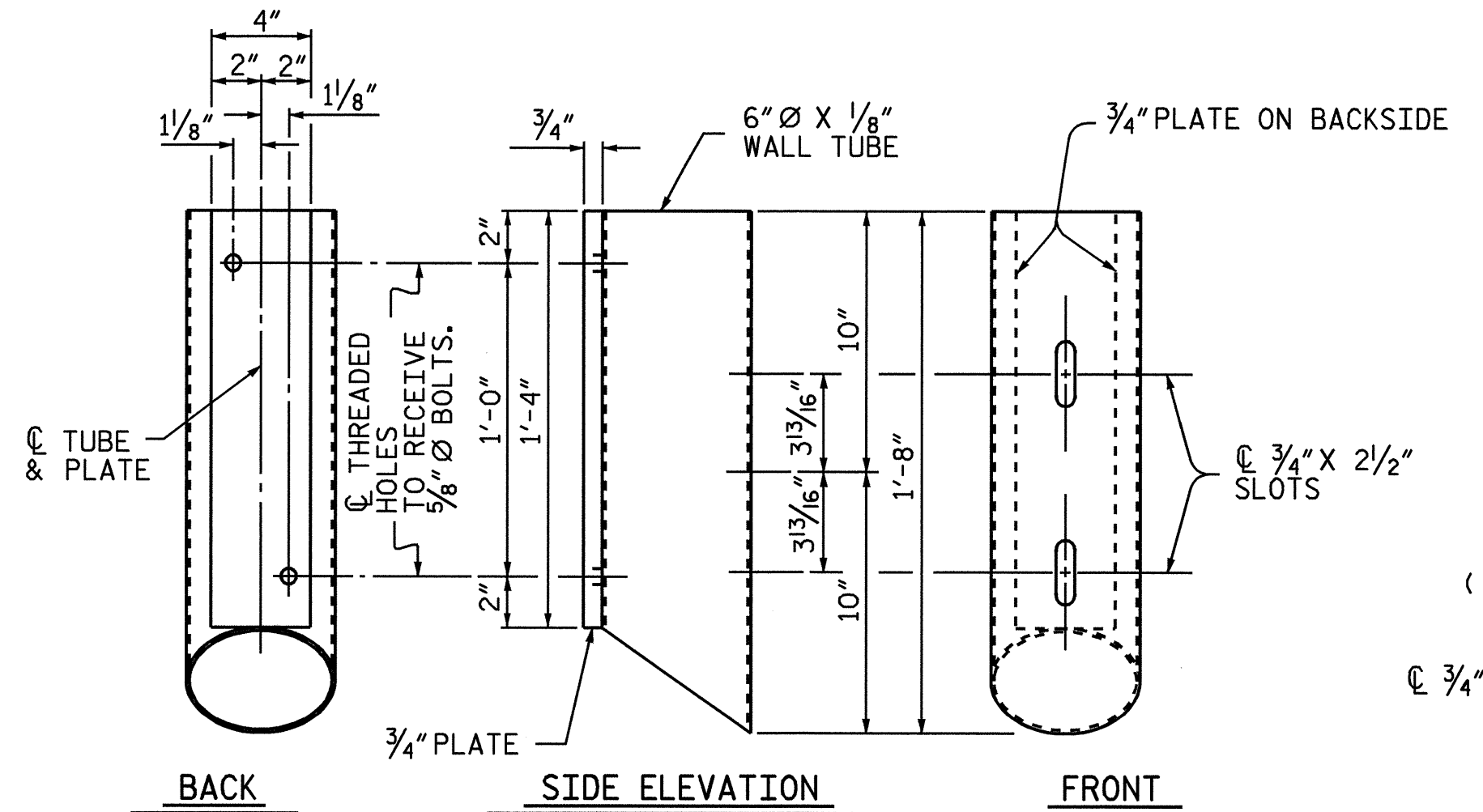
NOTE B : SLOT TO BE DRILLED ON SIDE OF WEB FACING "ONCOMING TRAFFIC".



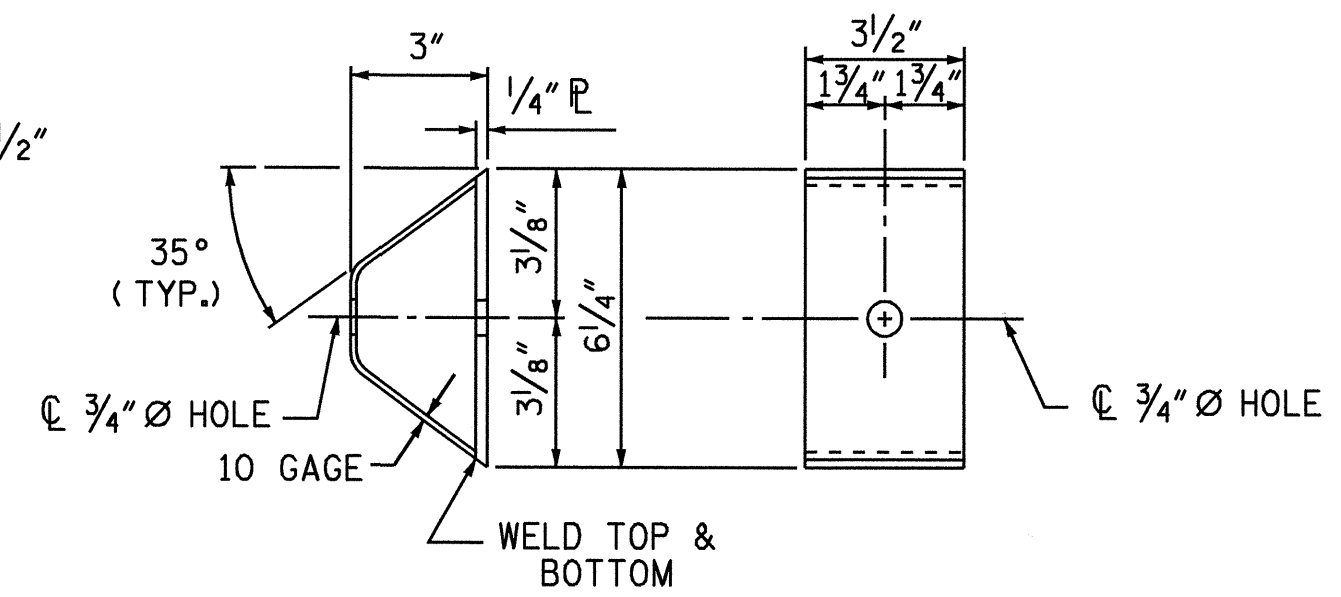
DETAILS OF POST BP20



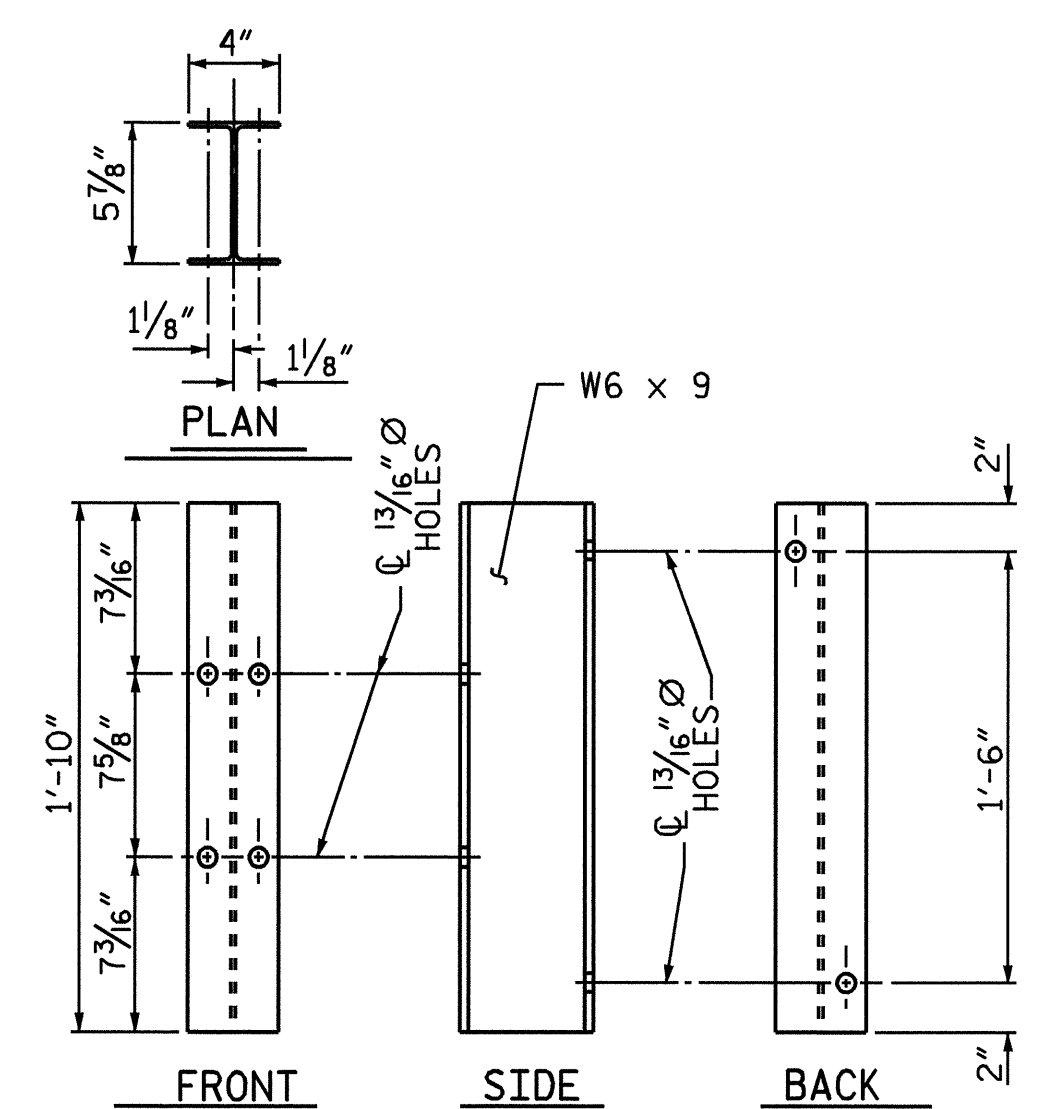
DETAIL OF POST EP2, EP3, EP4, & EP6



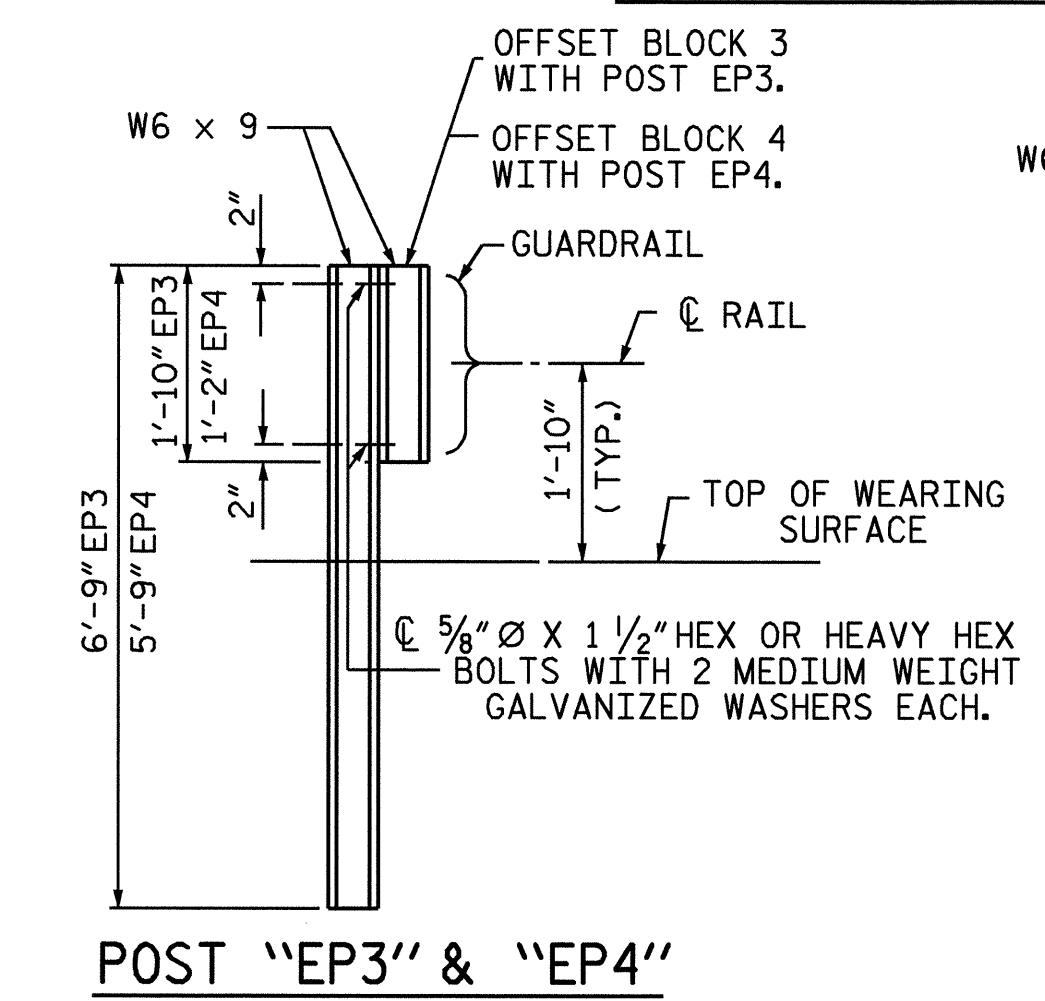
6" Ø TUBE DETAILS
 USE WITH POST "BP20"



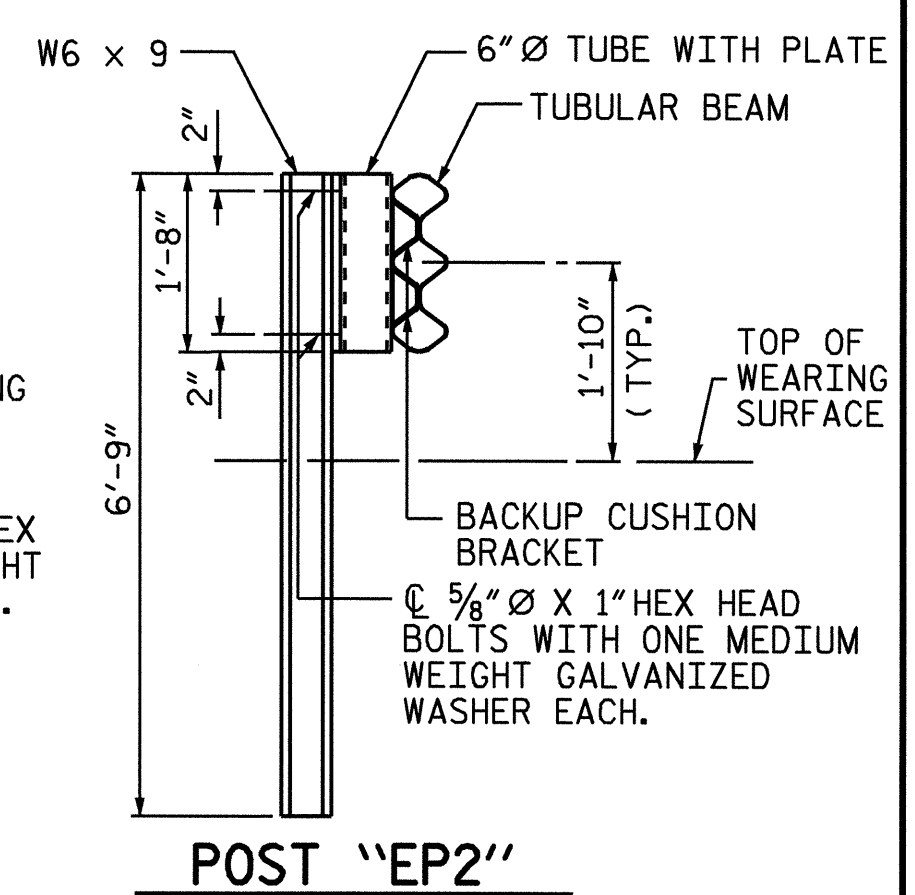
BACKUP CUSHION BRACKET



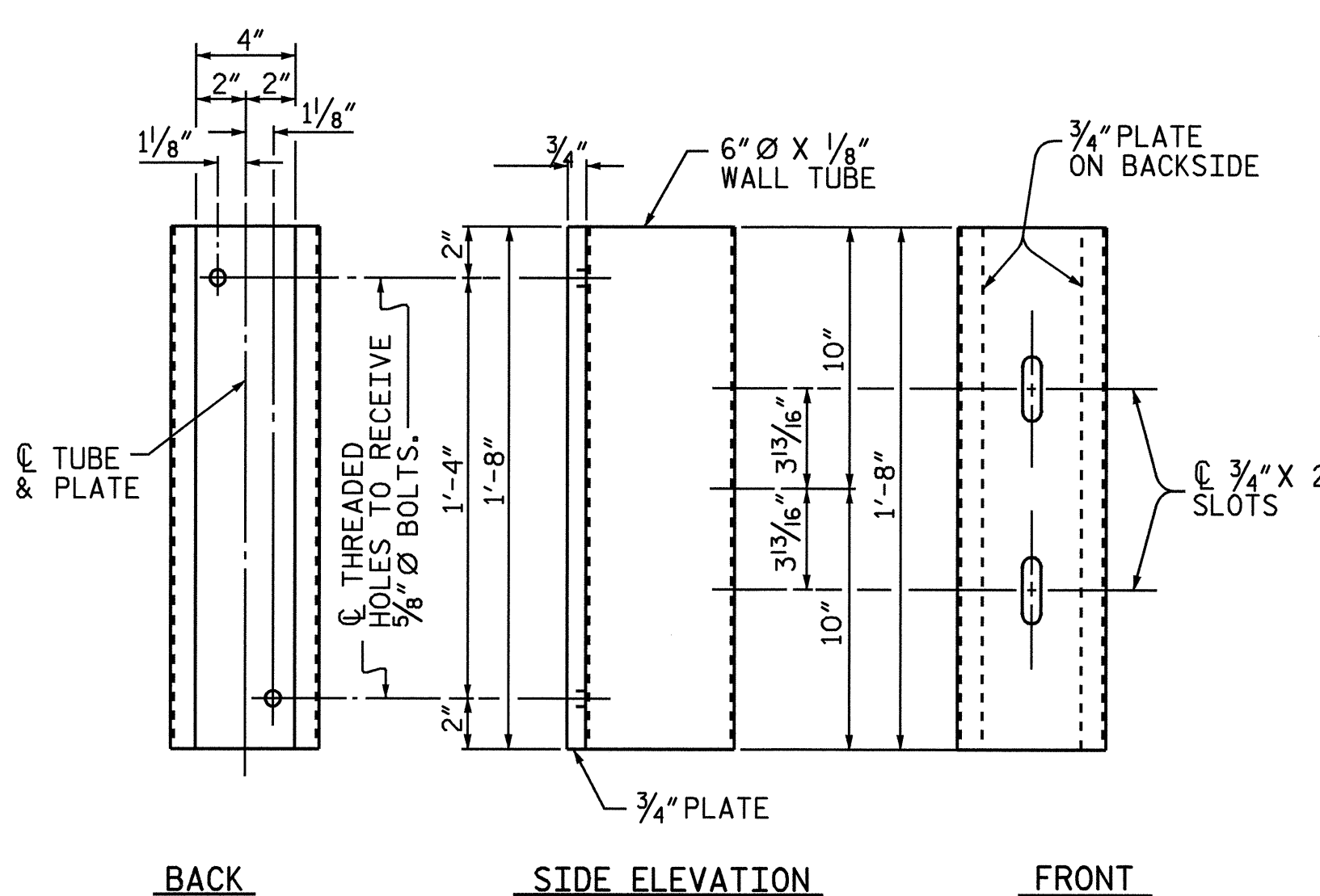
DETAILS OF OFFSET BLOCK 3
 USE WITH POST EP3



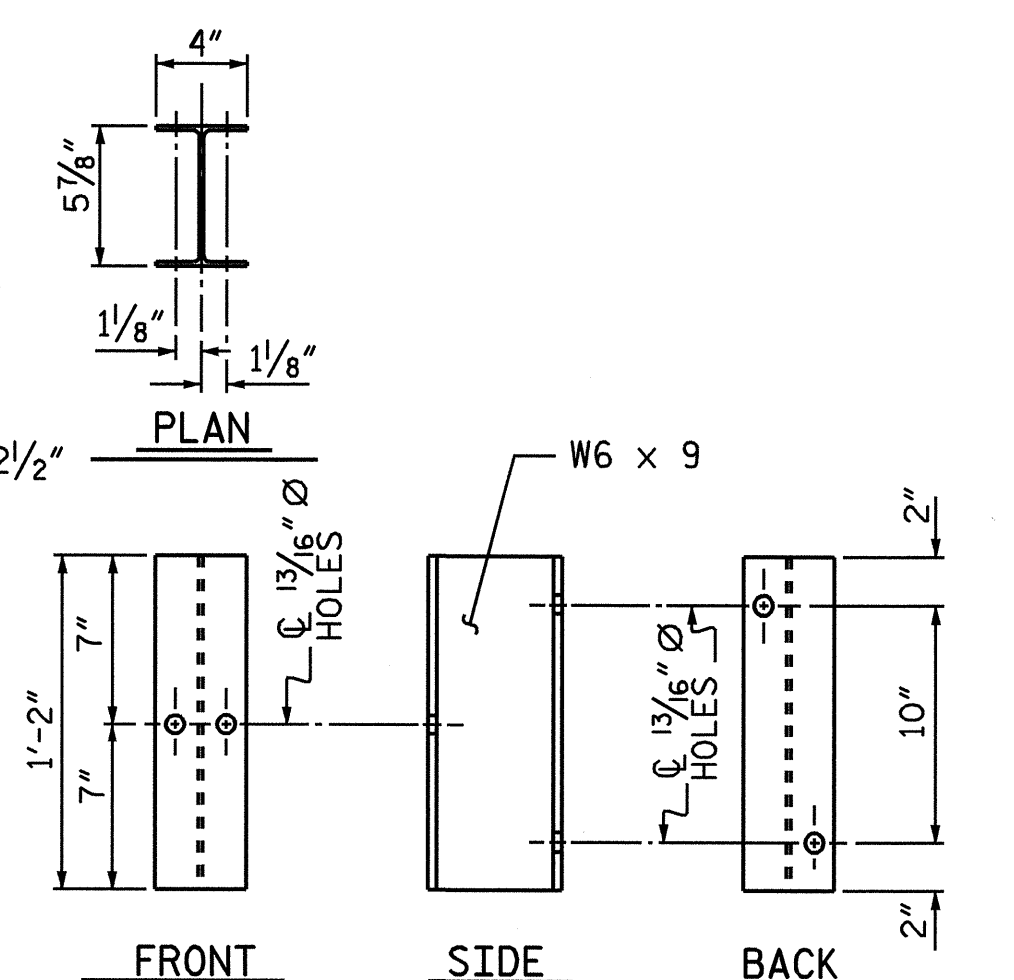
POST "EP3" & "EP4"



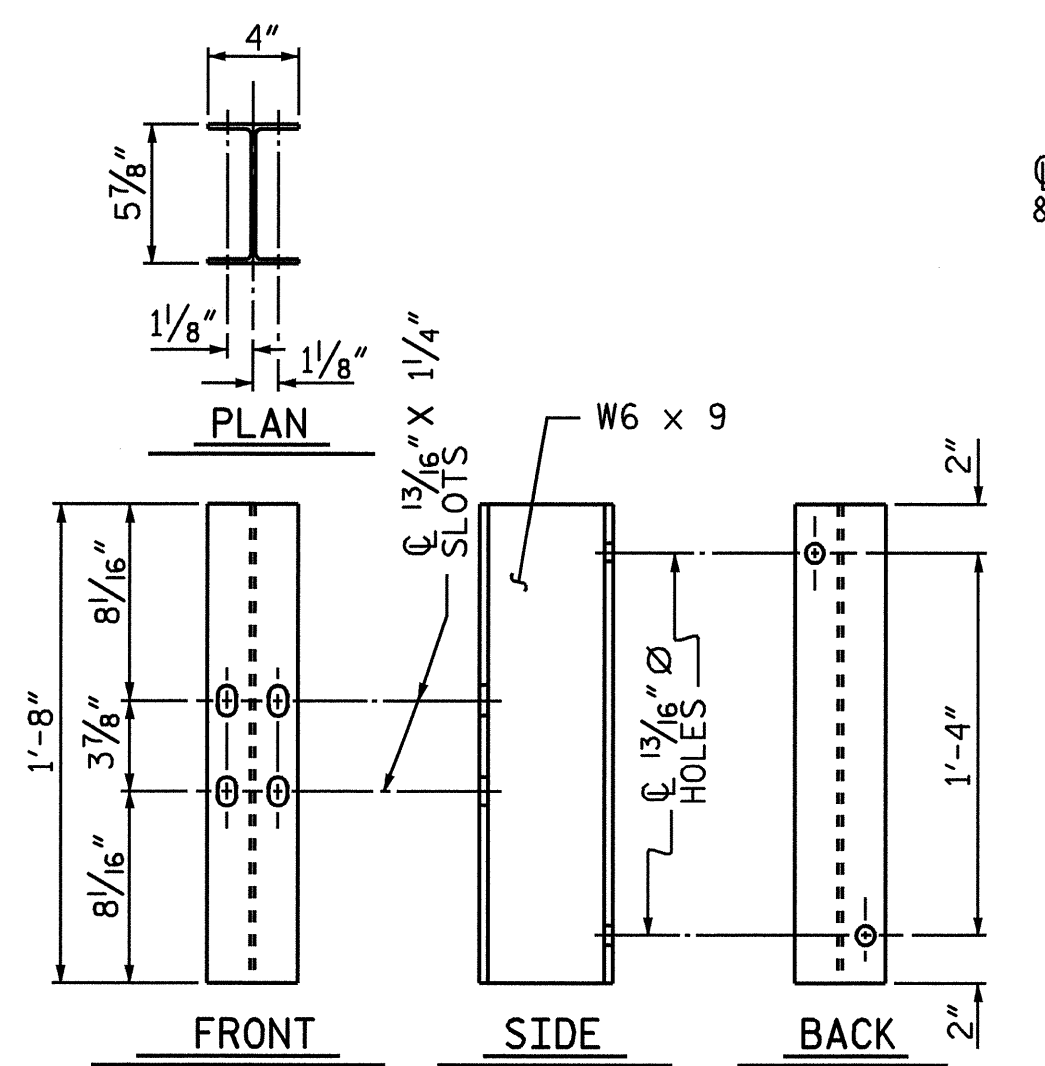
POST "EP2"



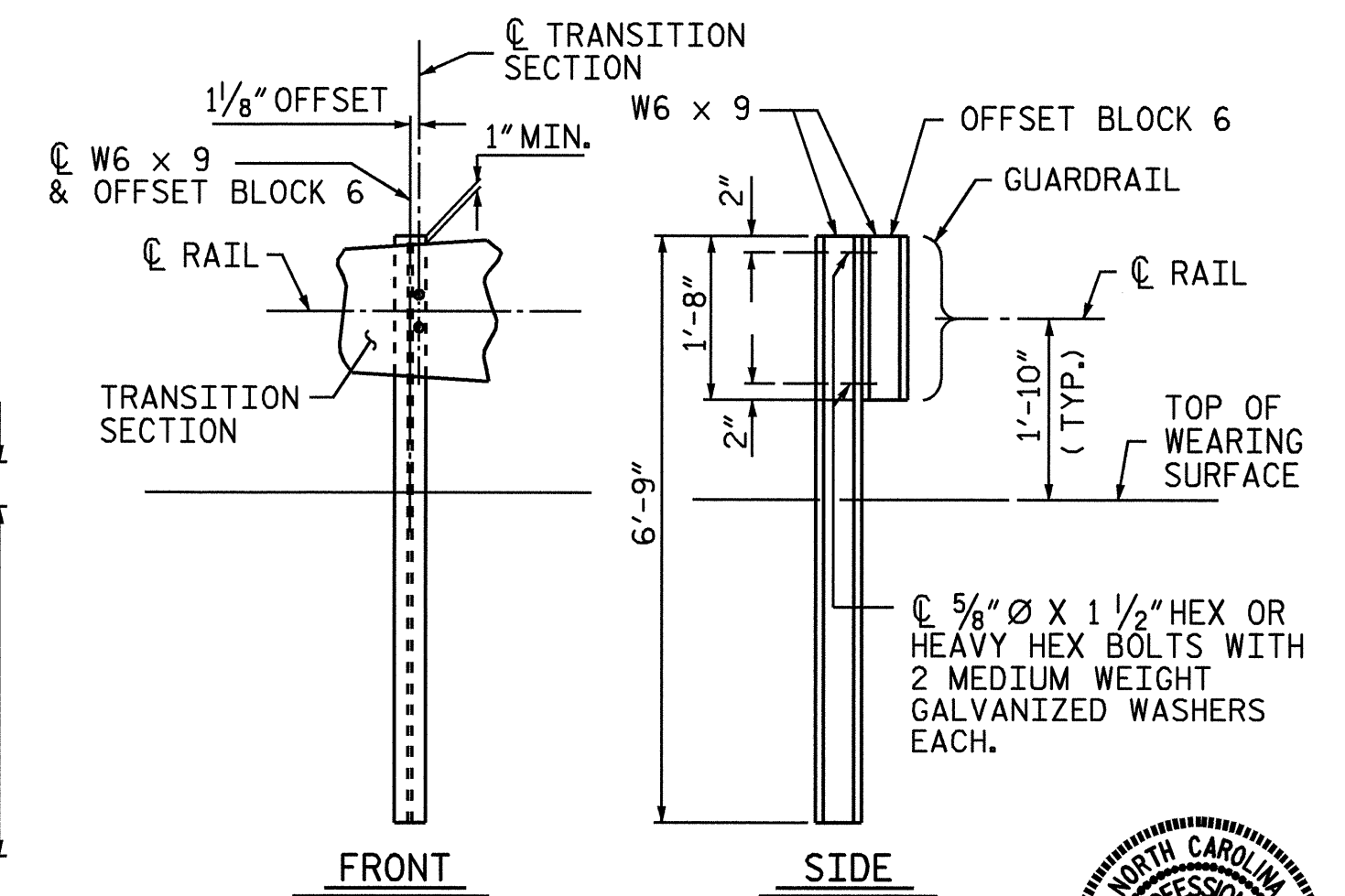
6" Ø TUBE DETAILS
 USE WITH POST "EP2"



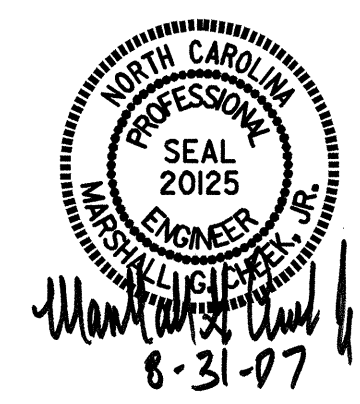
DETAILS OF OFFSET BLOCK 4
 USE WITH POST "EP4"



DETAILS OF OFFSET BLOCK 6
 USE WITH POST "EP6"



POST "EP6"



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STATION: _____
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DETAILS FOR RETROFIT
 OF EXISTING BRIDGE
 RAIL WITH TUBULAR
 BEAM GUARDRAIL

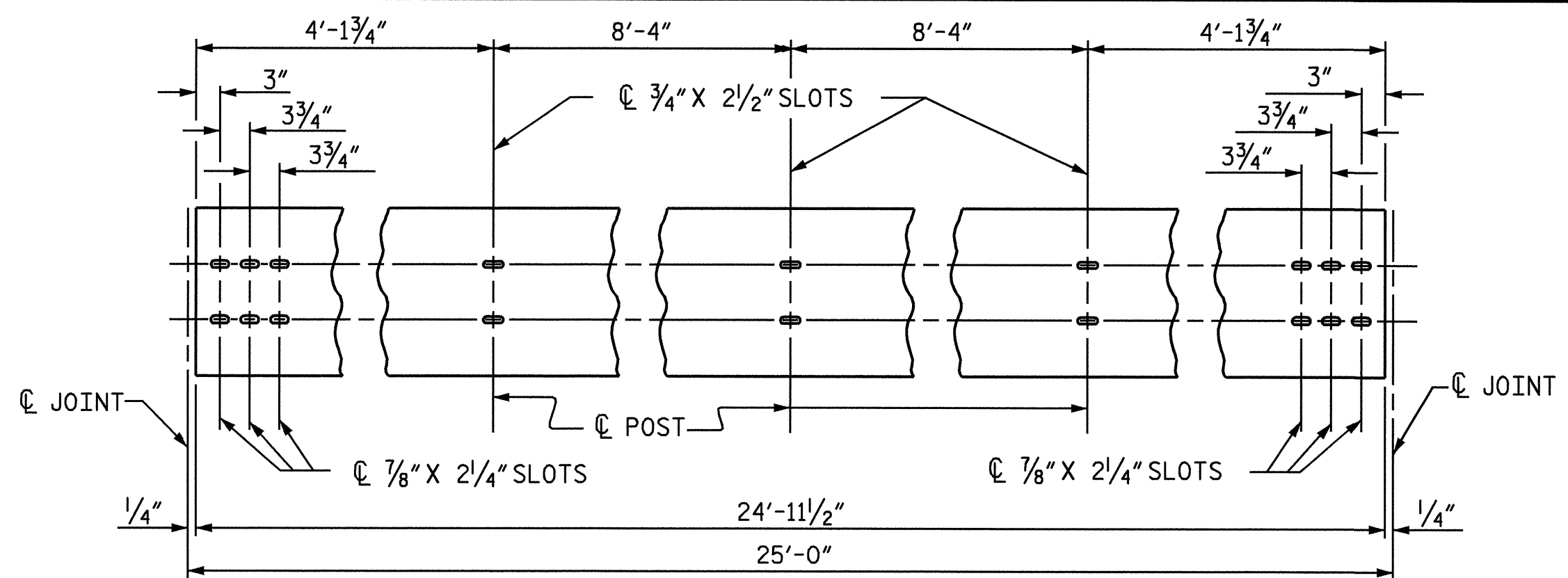
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ADDED TO CADD 5/88 BY: NMR CHECKED BY:

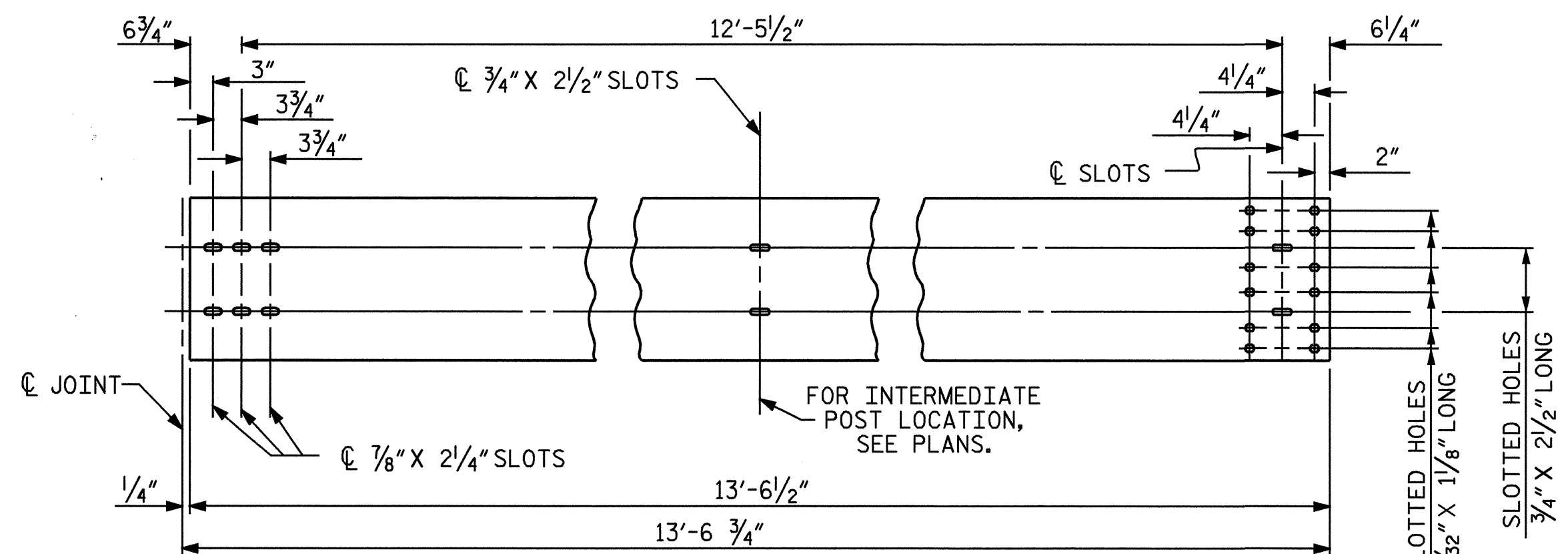
ASSEMBLED BY : J. LAMBERT	DATE : 06/07	SPECIAL
CHECKED BY : M.G. CHEEK	DATE : 07/07	
DRAWN BY : N.M. RUFFIN	DATE : 5/88	STANDARD
CHECKED BY :	DATE :	

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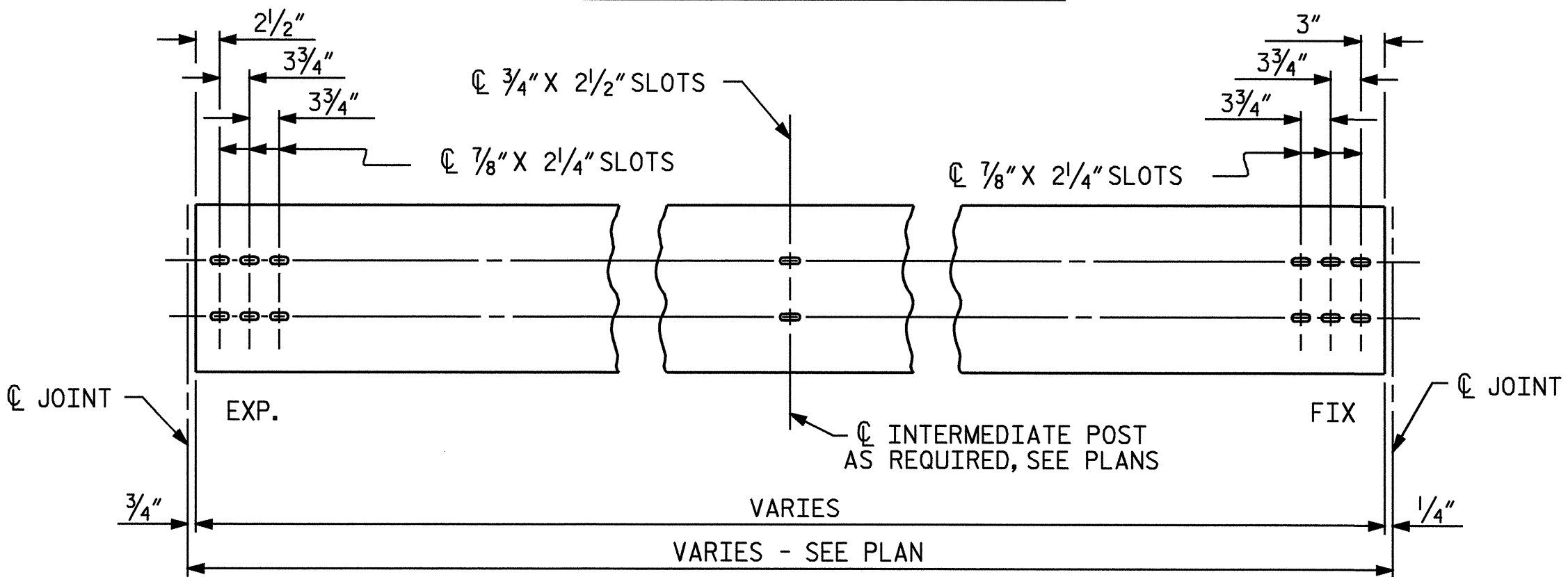
31-AUG-2007 13:58
 *****DCN*****
 jlambert



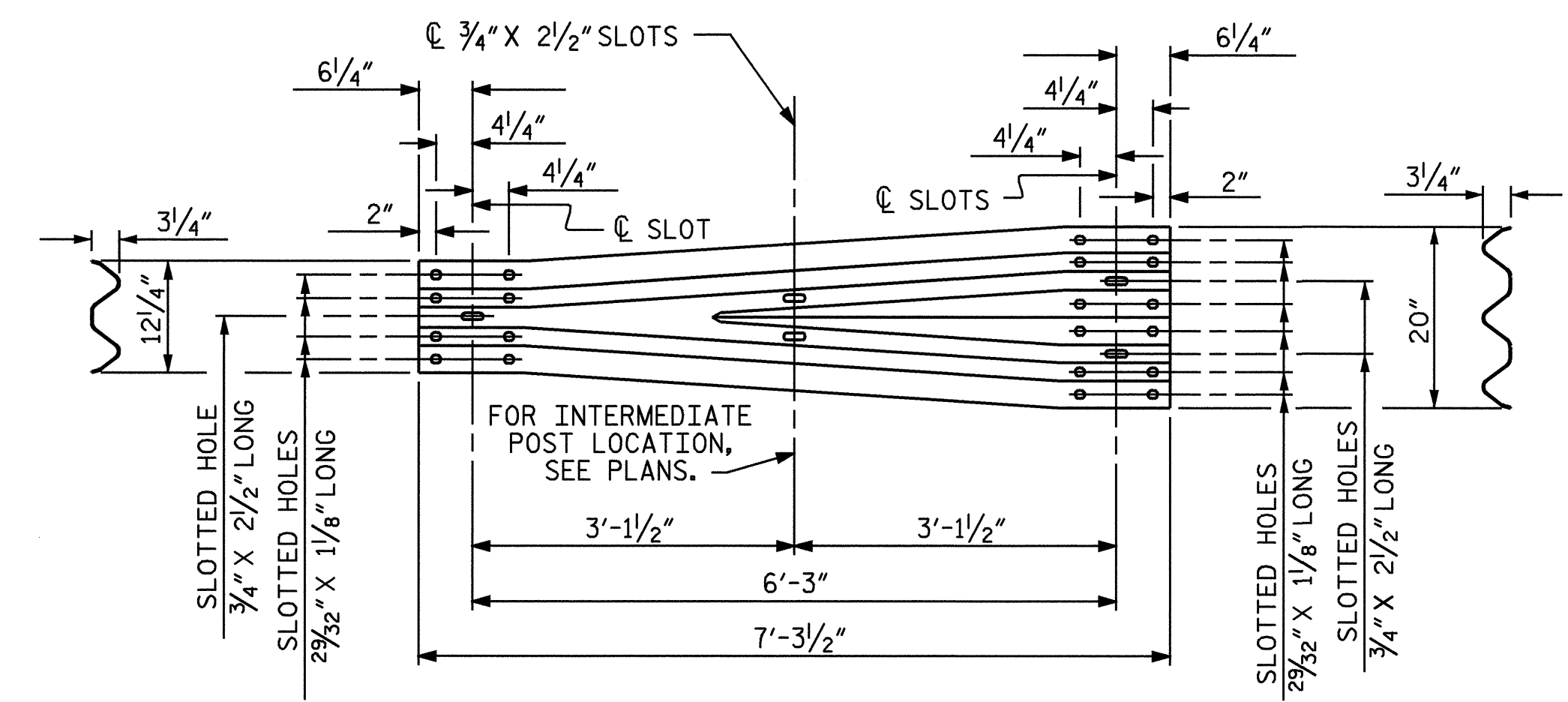
**ELEVATION TUBULAR BEAM
STANDARD RAIL**



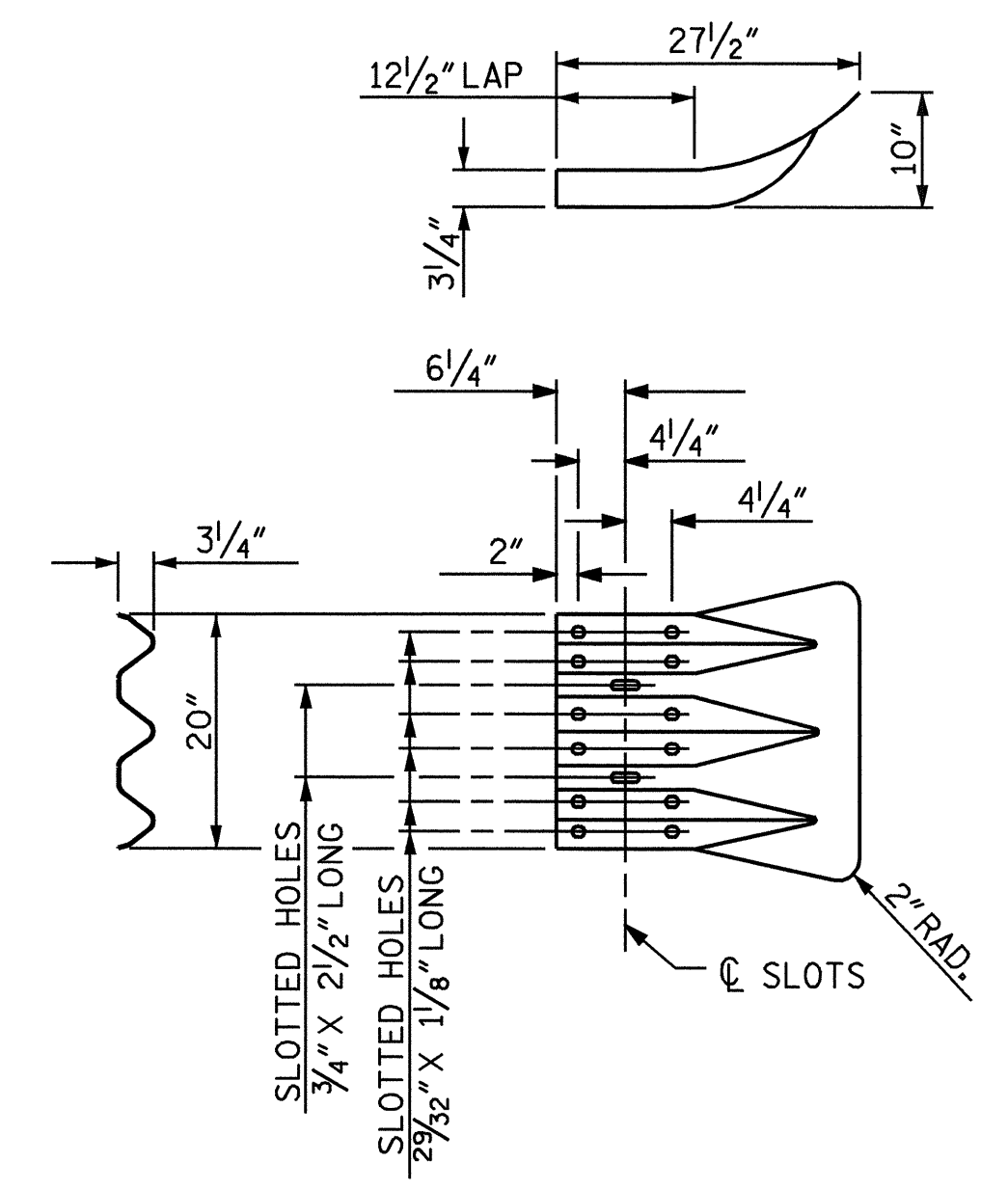
**20" TRIPLE CORRUGATED STEEL
BEAM GUARDRAIL - "C1"**



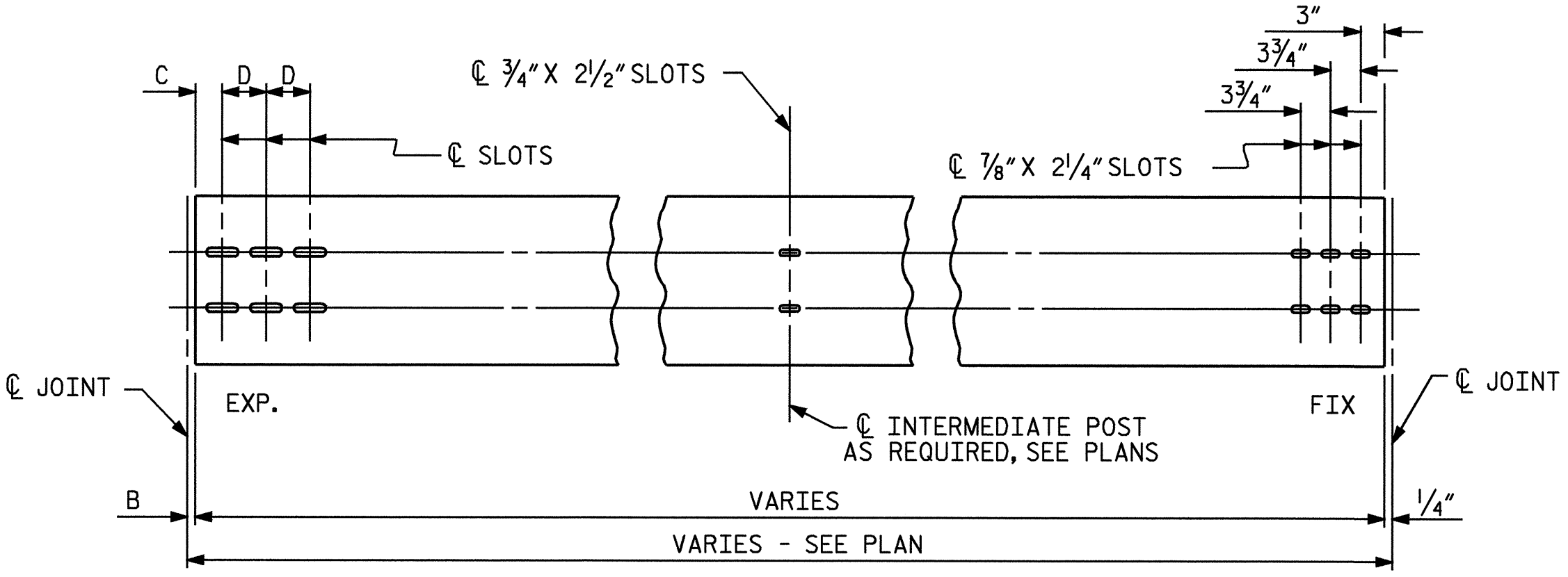
**ELEVATION TUBULAR BEAM
EXPANSION RAIL FOR TYPE 1 SPLICE**



W-TR GUARDRAIL TRANSITIONAL SECTION

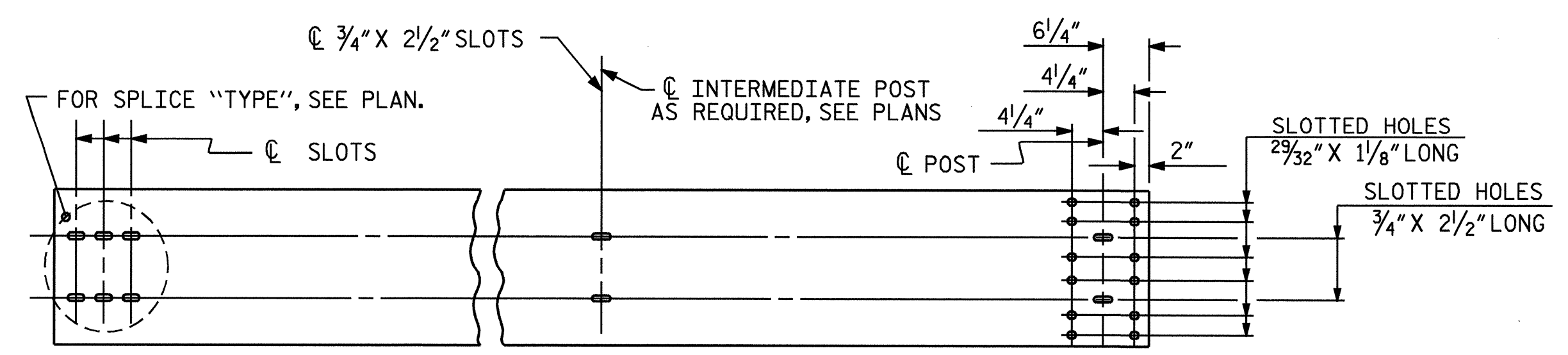


**TRIPLE CORRUGATED GUARDRAIL
TERMINAL SECTION**



**ELEVATION TUBULAR BEAM
EXPANSION RAIL FOR TYPE 2 THRU 5 SPLICE**

NOTE : FOR DIM.'S. "B", "C", "D", & "SLOT SIZE", SEE "TABLE 1", SHEET 4 OF 4 .



**ELEVATION TUBULAR BEAM
SHOWING CONNECTION OF TUBULAR BEAM TO TERMINAL SECTION.**

ADDED TO CADD 5/88 BY: MMR CHECKED BY:

ASSEMBLED BY : J. LAMBERT DATE : 6/07
 CHECKED BY : M.G. CHEEK DATE : 7/07
 DRAWN BY : N.M. RUFFIN DATE : 5/88
 CHECKED BY : DATE :

SPECIAL
STANDARD

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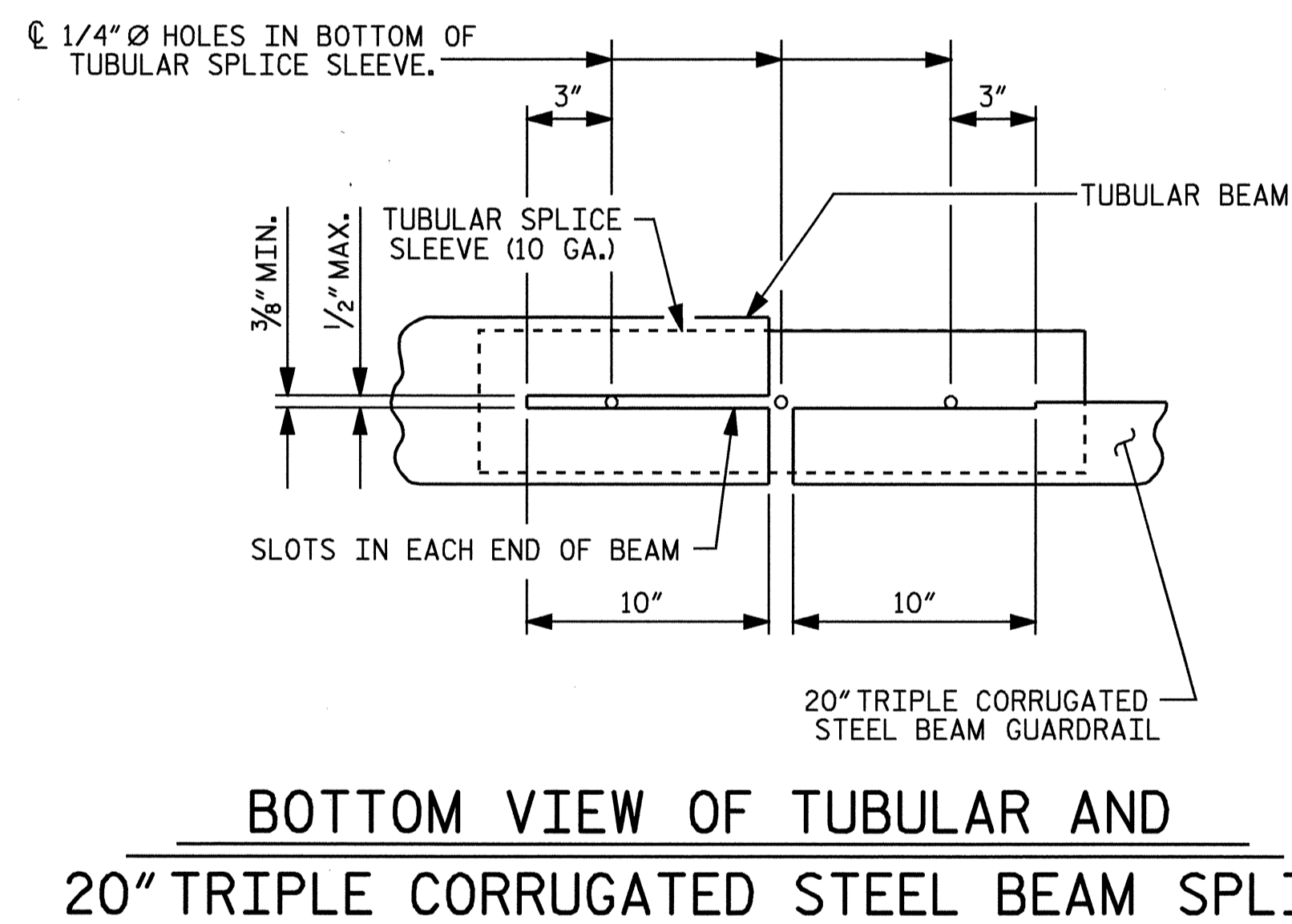
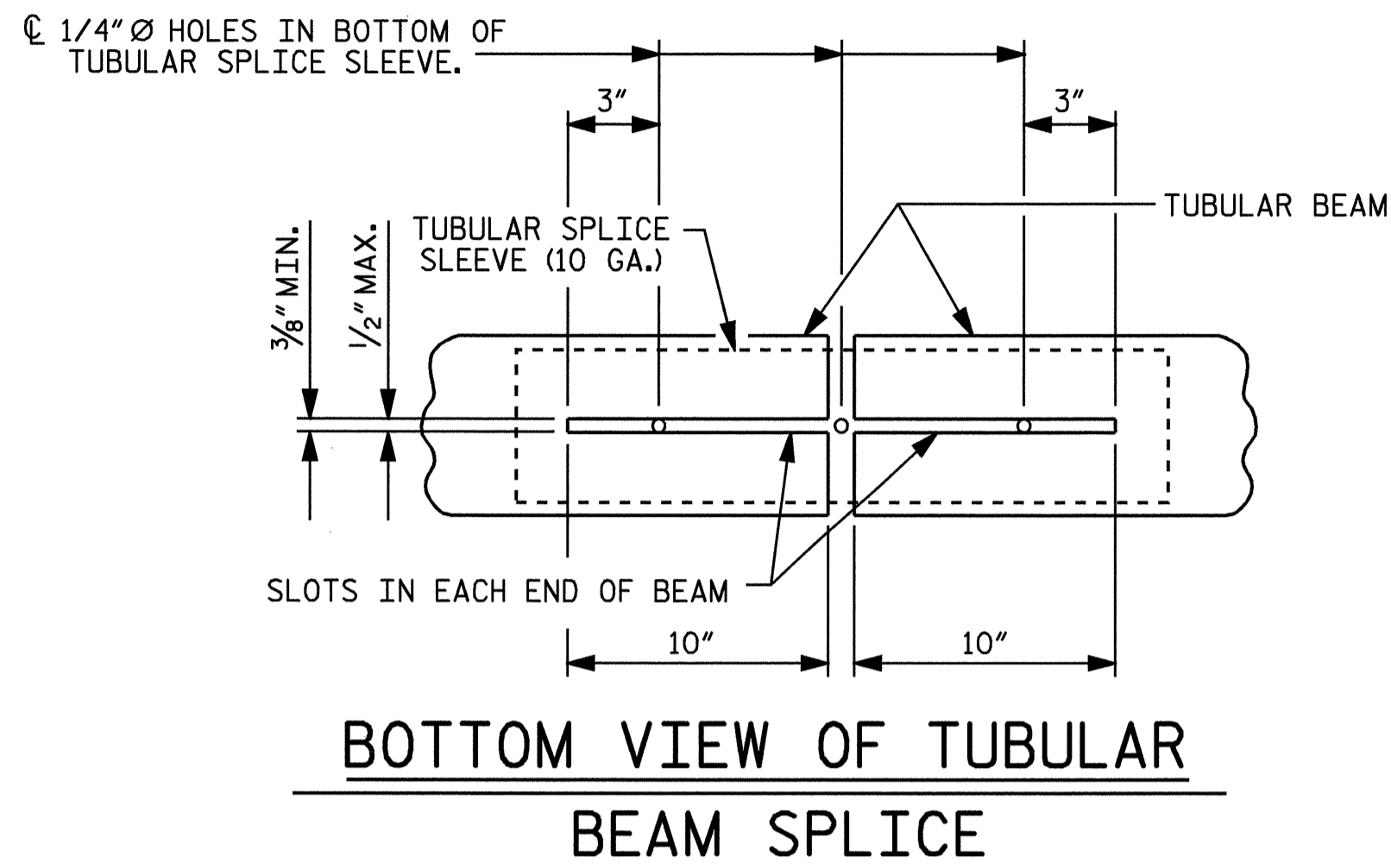
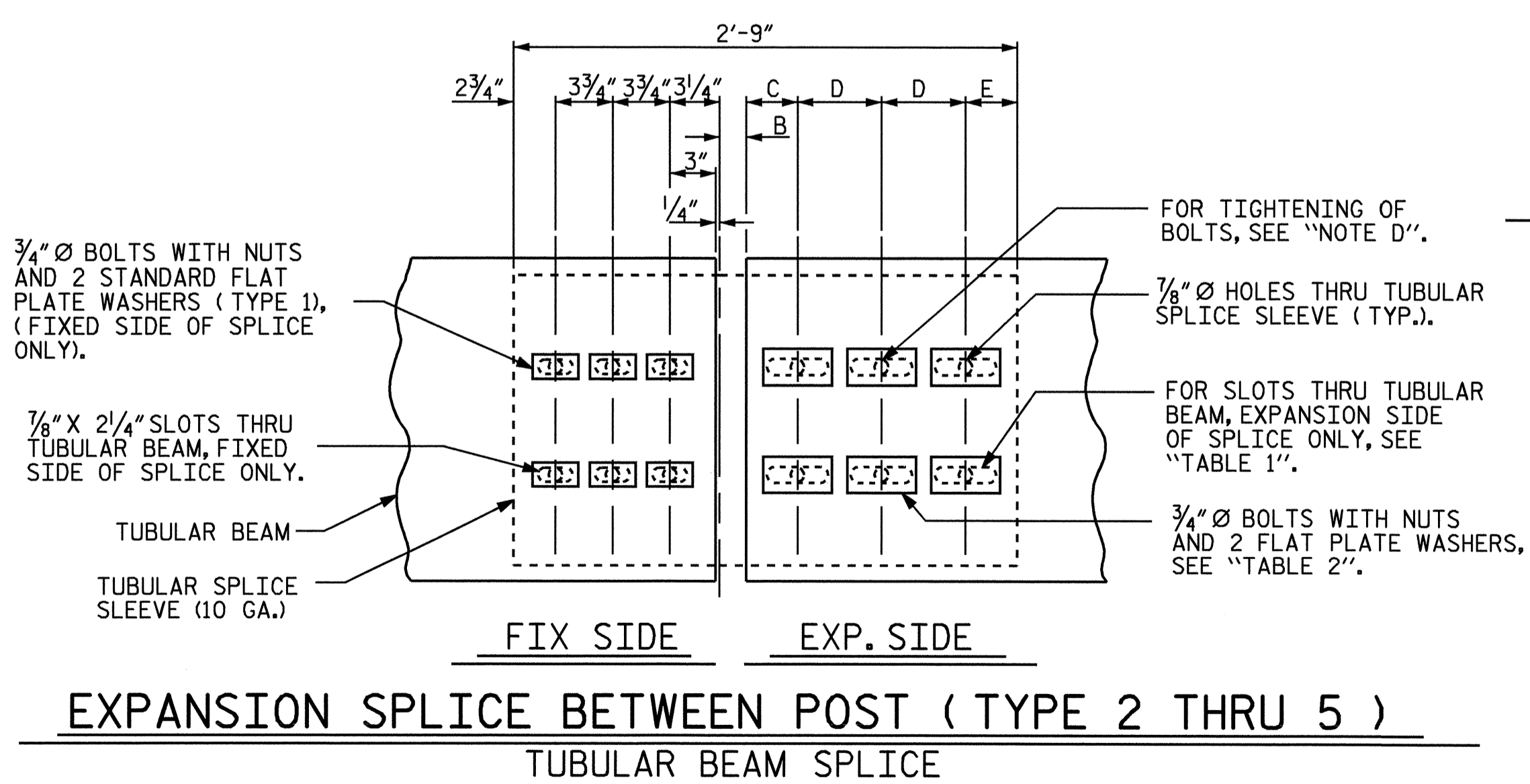
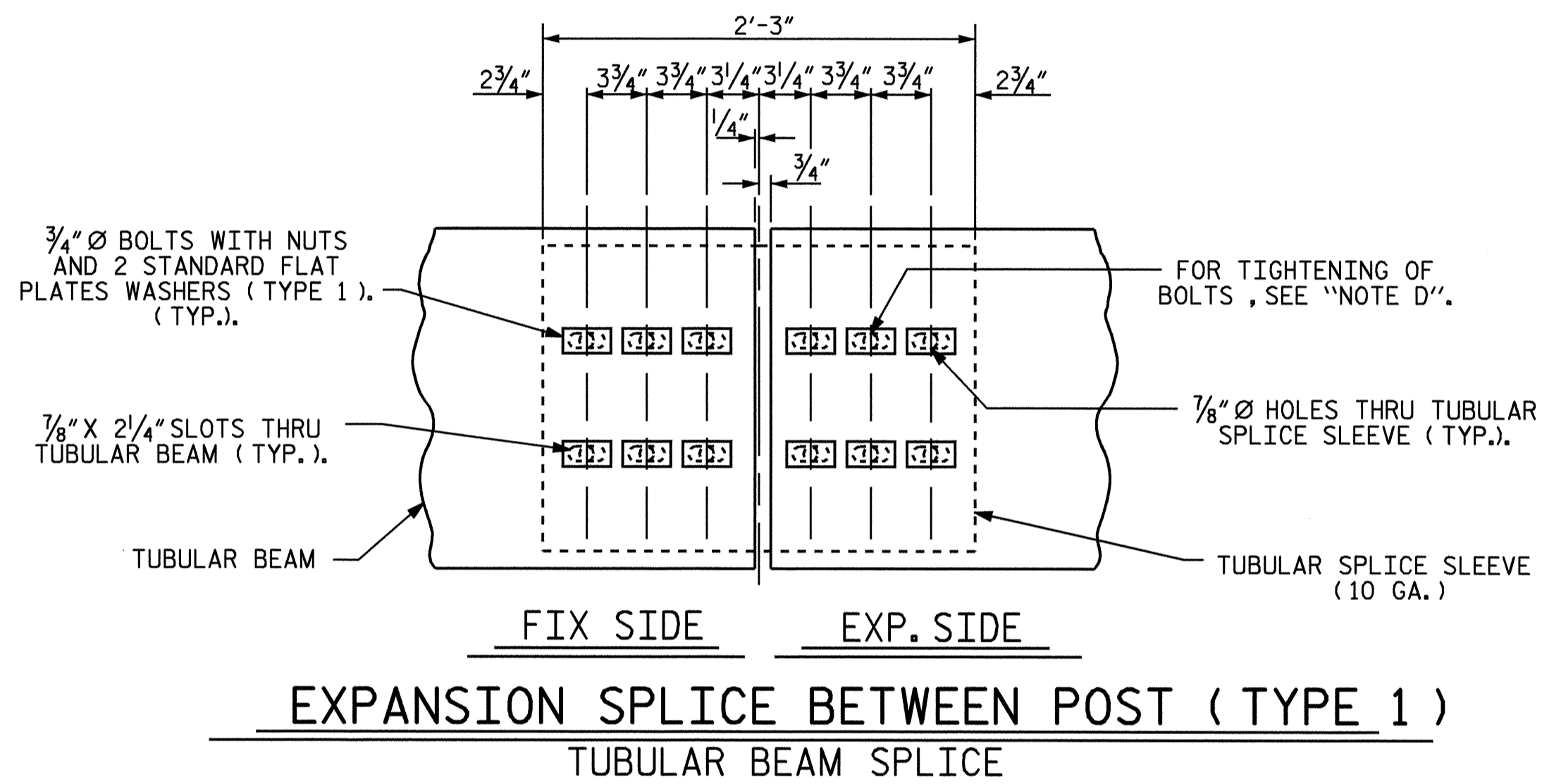
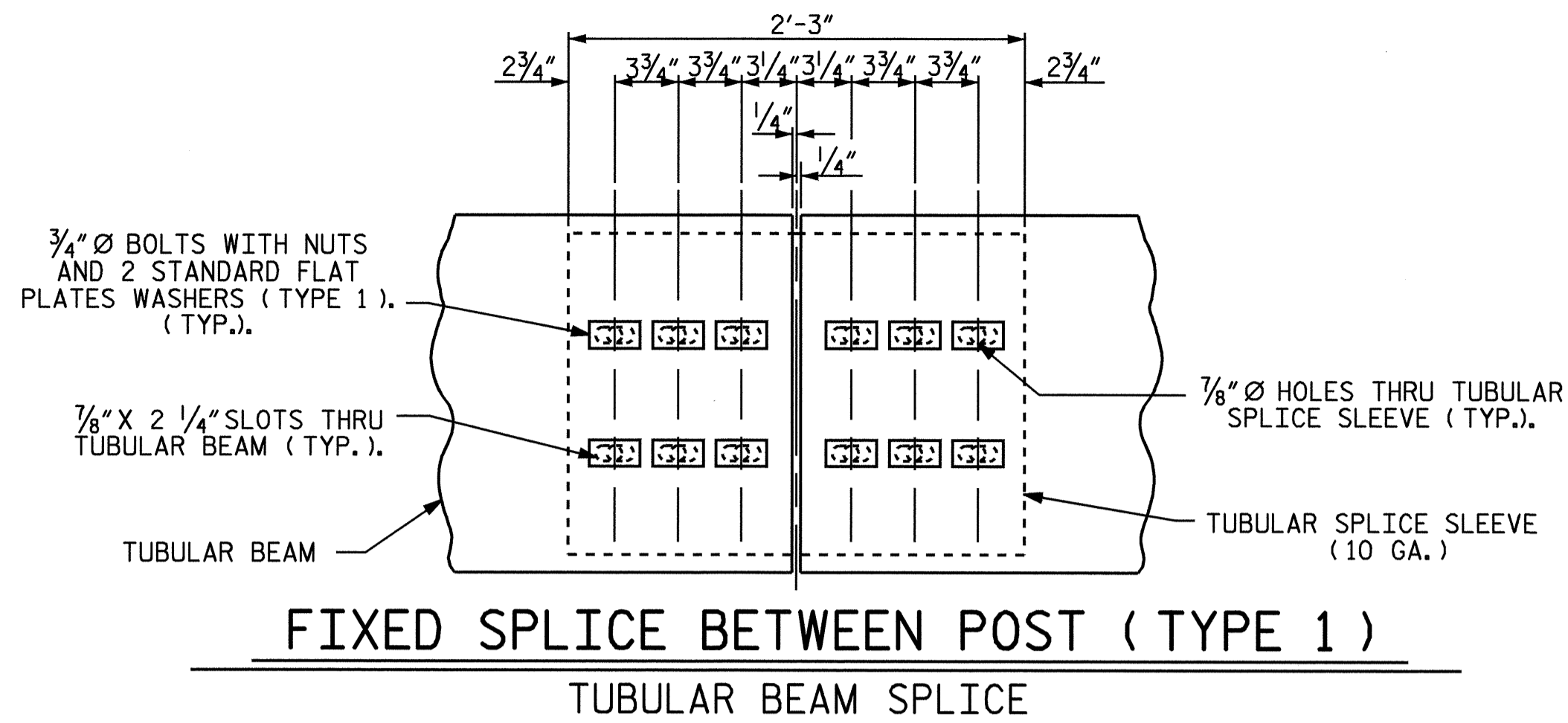


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31-AUG-2007 13:57
jlmbers



"NOTE D": BOLTS ON EXPANSION SIDE OF TUBULAR BEAM SPLICE SHALL BE TIGHTENED FINGER TIGHT. DOUBLE NUTS SHALL BE USED AND TIGHTENED AGAINST EACH OTHER TO PREVENT THE NUTS FROM BECOMING LOOSE ON THE BOLT.

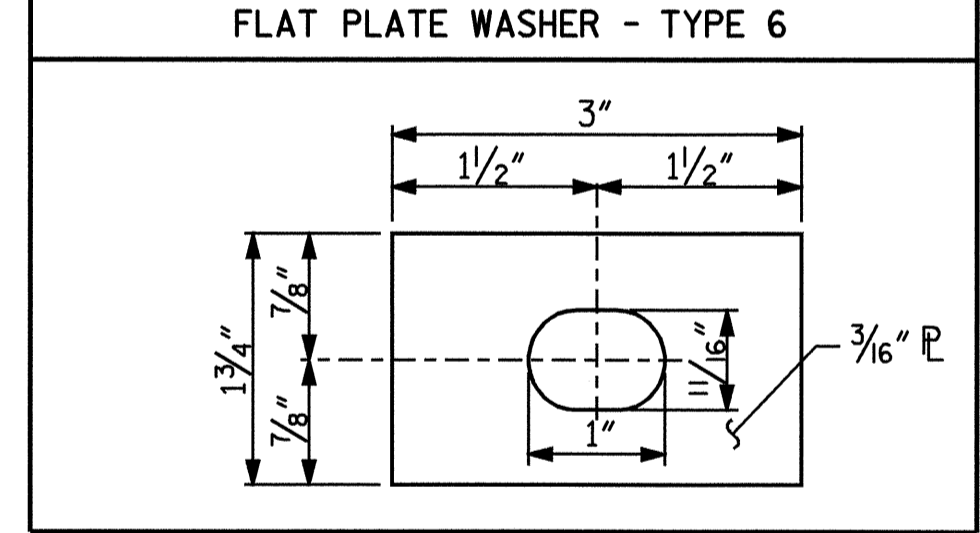
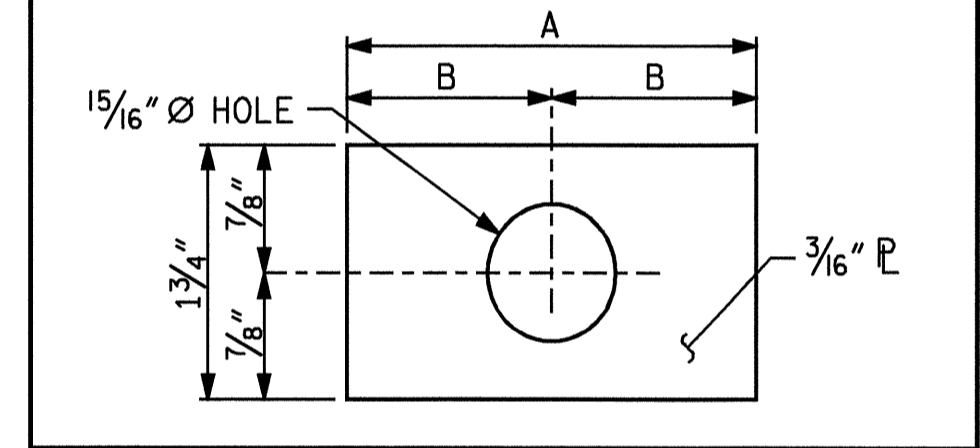
TABLE 1
DIMENSIONS FOR TYPE 2 THRU 5
EXPANSION SPLICE
(TUBULAR BEAM SPLICE BETWEEN POSTS)

TYPE	2	3	4	5
A	2'-9"	3'-1"	3'-5"	3'-8"
B	@ 90° F	1 1/4"	1 1/2"	1 5/16"
	@ 60° F	1 3/4"	2 1/4"	3"
	@ 30° F	2 1/4"	3"	4 1/16"
C	3 3/8"	4"	4 3/4"	5"
D	5 1/2"	6 1/2"	7 1/2"	8 1/2"
E	3 3/8"	4 1/4"	4 3/4"	5"
SLOT SIZE	1" X 4"	1" X 5"	1" X 6"	1" X 7"

TABLE 2
FLAT PLATE WASHER DIMENSIONS

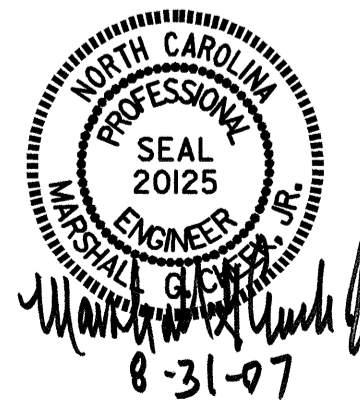
TYPE	DESCRIPTION	A	B
1	STANDARD WASHER	3"	1 1/2"

TYPE	USE WITH SPLICE	A	B
2	TYPE 2	4 1/2"	2 1/4"
3	TYPE 3	5 1/2"	2 3/4"
4	TYPE 4	6 1/2"	3 1/4"
5	TYPE 5	7 1/2"	3 3/4"



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DEPARTMENT OF TRANSPORTATION
RALEIGH
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OF EXISTING BRIDGE
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ASSEMBLED BY : J. LAMBERT	DATE : 06/07	SPECIAL
CHECKED BY : M.G. CHEEK	DATE : 07/07	
DRAWN BY : N.M. RUFFIN	DATE : 5/88	STANDARD
CHECKED BY : S.B. WILLIAMS	DATE : 5/92	

REVISIONS						SHEET NO.
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2			4			TOTAL SHEETS 72

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