

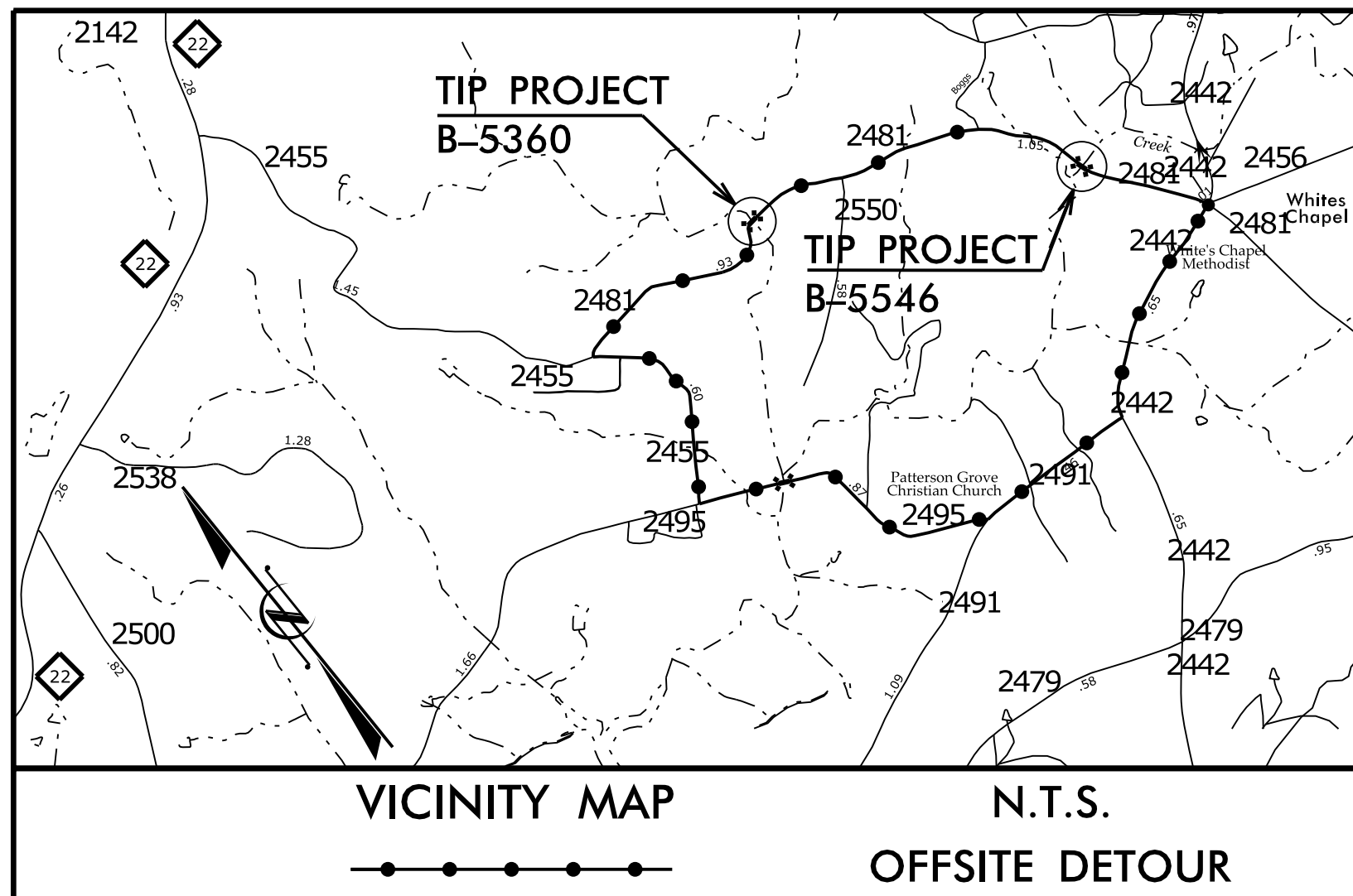
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CONTRACT: C203805 TIP PROJECT: B-5360 & B-5546

STRUCTURES

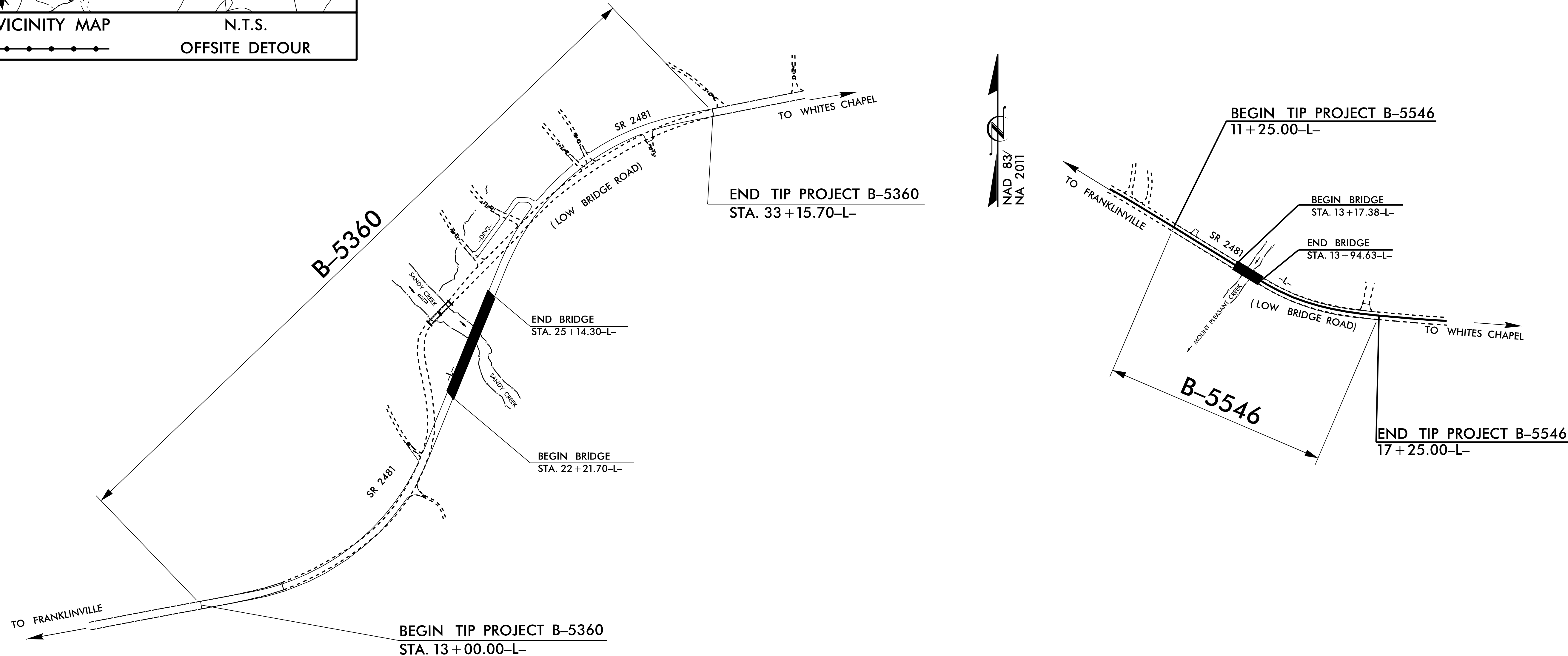


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5360 AND B-5546		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46074.1.1	BRZ-2481(2)	P.E.	
46074.2.1		RW	
46074.2.2		UTILITIES	
46074.3.1		CONST.	
45538.1.1	BRZ-2481(1)	P.E.	
45538.2.1		RW AND UTIL.	
45538.3.1		CONST.	

**LOCATION: BRIDGE NO. 374 OVER SANDY CREEK ON SR 2481 (LOW BRIDGE RD.)
AND BRIDGE NO. 307 OVER MOUNT PLEASANT CREEK ON SR 2481 (LOW BRIDGE RD.)**
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES



DESIGN DATA

ADT (2014) =	400
ADT (2040) =	700
K =	13 %
D =	60 %
T =	9 % **
V =	40 MPH
** (TTST 1 %, DUAL 8 %)	
FUNC CLASS =	RURAL, LOCAL
SUB REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5360 =	0.327 MILES
LENGTH STRUCTURE TIP PROJECT B-5360 =	0.055 MILES
TOTAL LENGTH TIP PROJECT B-5360 = 0.382 MILES	
LENGTH ROADWAY TIP PROJECT B-5546 =	0.099 MILES
LENGTH STRUCTURE TIP PROJECT B-5546 =	0.015 MILES
TOTAL LENGTH TIP PROJECT B-5546 = 0.114 MILES	

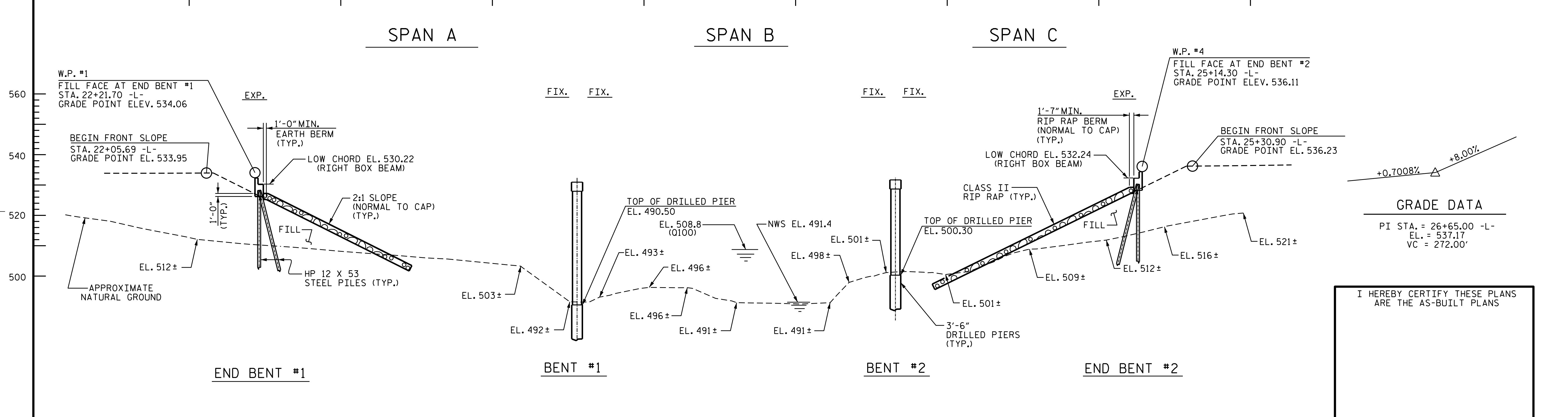
Prepared in the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE :
OCTOBER 18, 2016

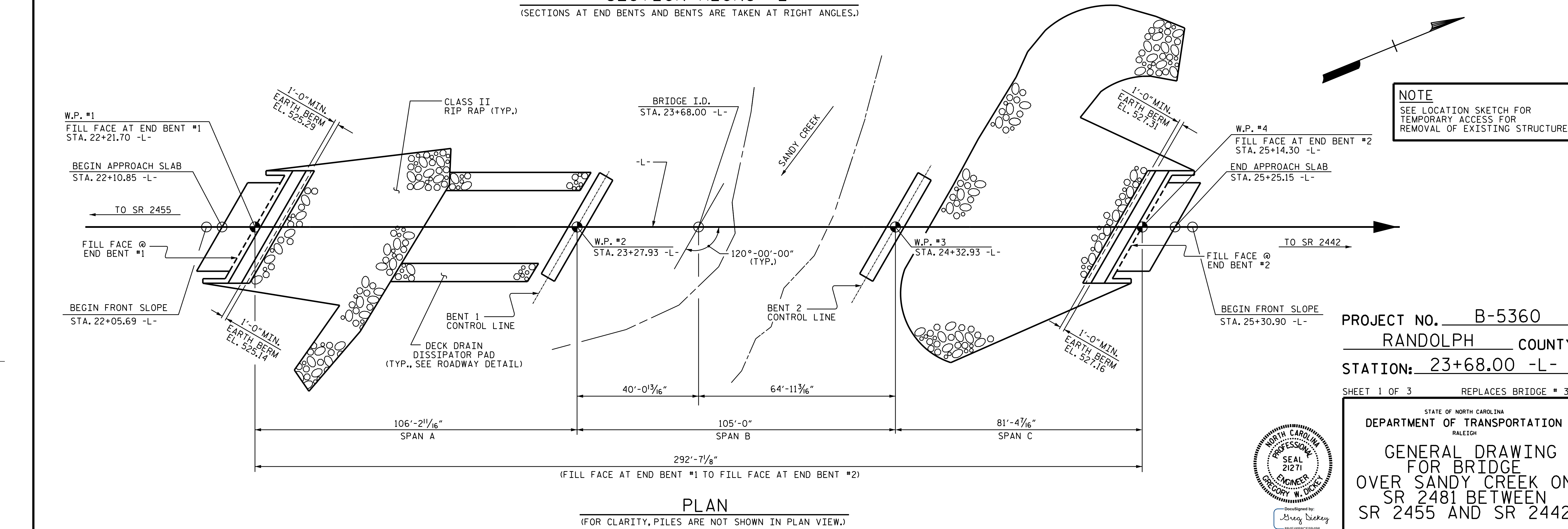
_____ J.M. BAILEY, P.E. PROJECT ENGINEER
_____ G.W. DICKEY, PE PROJECT DESIGN ENGINEER
_____ E.E. MURRAY, P.E. PROJECT ENGINEER
_____ D.A. DAVENPORT, JR., PE PROJECT DESIGN ENGINEER

22+00 22+50 23+00 23+50 24+00 24+50 25+00 25+50

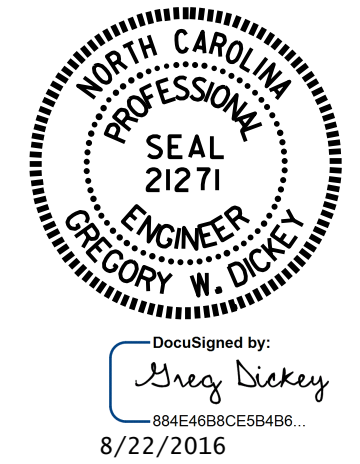


I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NOTE
SEE LOCATION SKETCH FOR TEMPORARY ACCESS FOR REMOVAL OF EXISTING STRUCTURE.



PROJECT NO. B-5360
RANDOLPH COUNTY
STATION: 23+68.00 -L-
SHEET 1 OF 3 REPLACES BRIDGE # 374



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**GENERAL DRAWING
FOR BRIDGE
OVER SANDY CREEK ON
SR 2481 BETWEEN
SR 2455 AND SR 2442**

DRAWN BY : A. K. PATEL DATE : 5-24-16
CHECKED BY : G. W. DICKEY DATE : 6-07-16
DESIGN ENGINEER OF RECORD: K. P. SEDAI DATE : 6/16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			38

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES:

FOR PILES, SEE SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS NO.1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 AND 125 TONS PER PILE, RESPECTIVELY.

DRIVE PILES AT END BENTS NO.1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 250 AND 210 TONS PER PILE, RESPECTIVELY.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS NO.1 AND 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 20 TO 30 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENTS NO.1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D) (2) OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENTS NO.1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 531 TONS AND 483 TONS PER PIER, RESPECTIVELY. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.

INSTALL PERMANENT STEEL CASINGS AT BENT NO.1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIALS BELOW ELEVATION 490 FT.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 490 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 480 FT AND WITH THE REQUIRED TIP RESISTANCE.

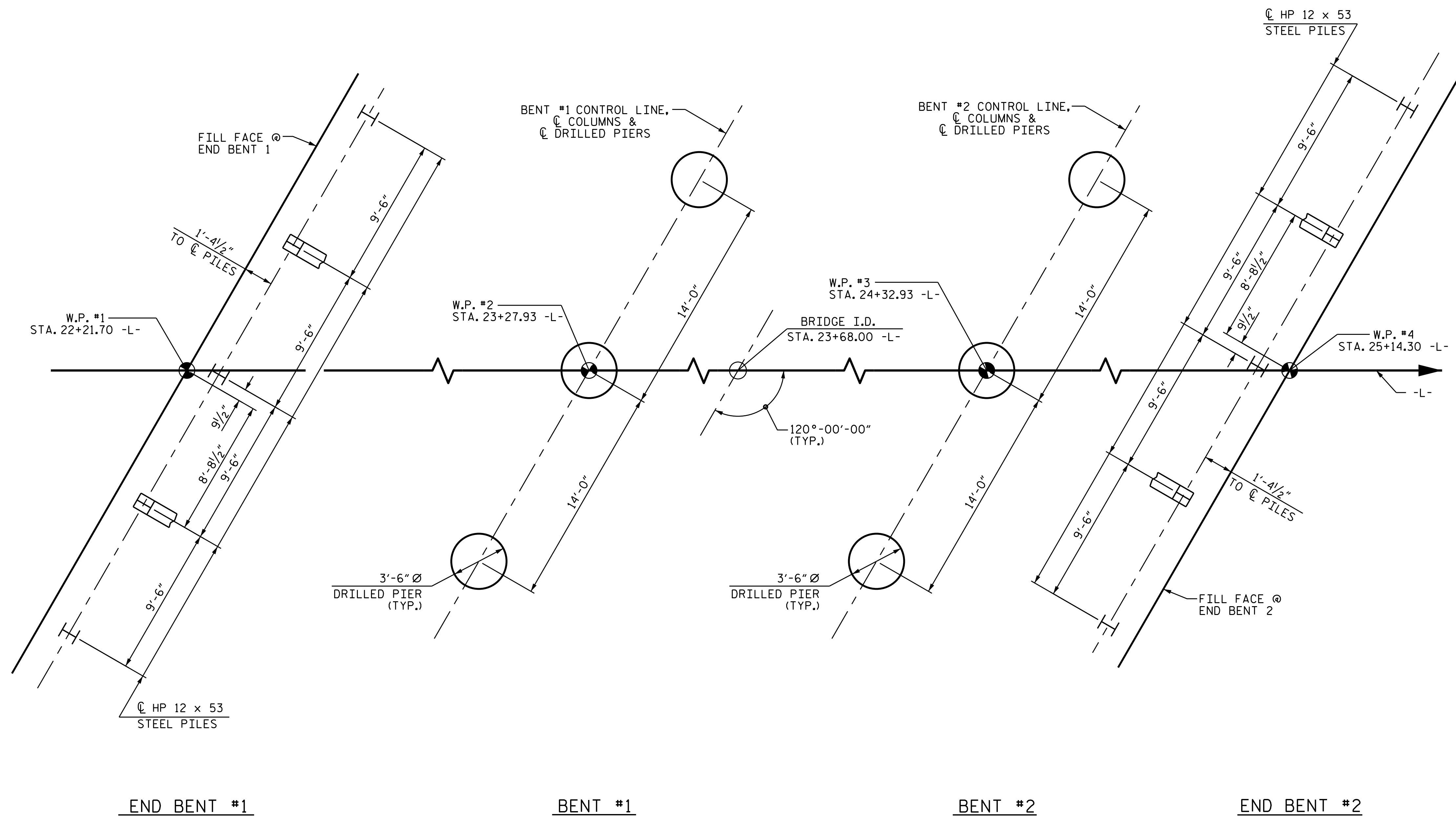
INSTALL DRILLED PIERS AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 481 FT AND WITH THE REQUIRED TIP RESISTANCE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS 489 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

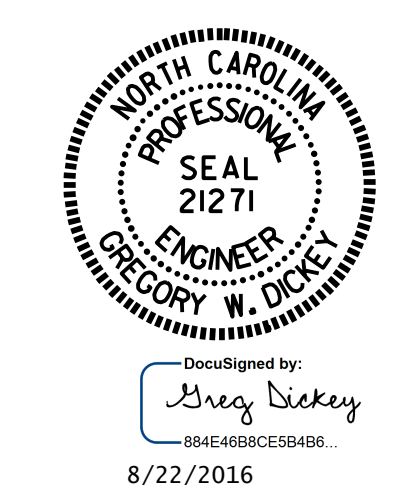
THE SCOUR CRITICAL ELEVATION FOR BENT NO.2 IS 496 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.



FOUNDATION LAYOUT
DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE AT THE BOTTOM OF CAP

PROJECT NO. B-5360
RANDOLPH COUNTY
STATION: 23+68.00 -L-

SHEET 2 OF 3



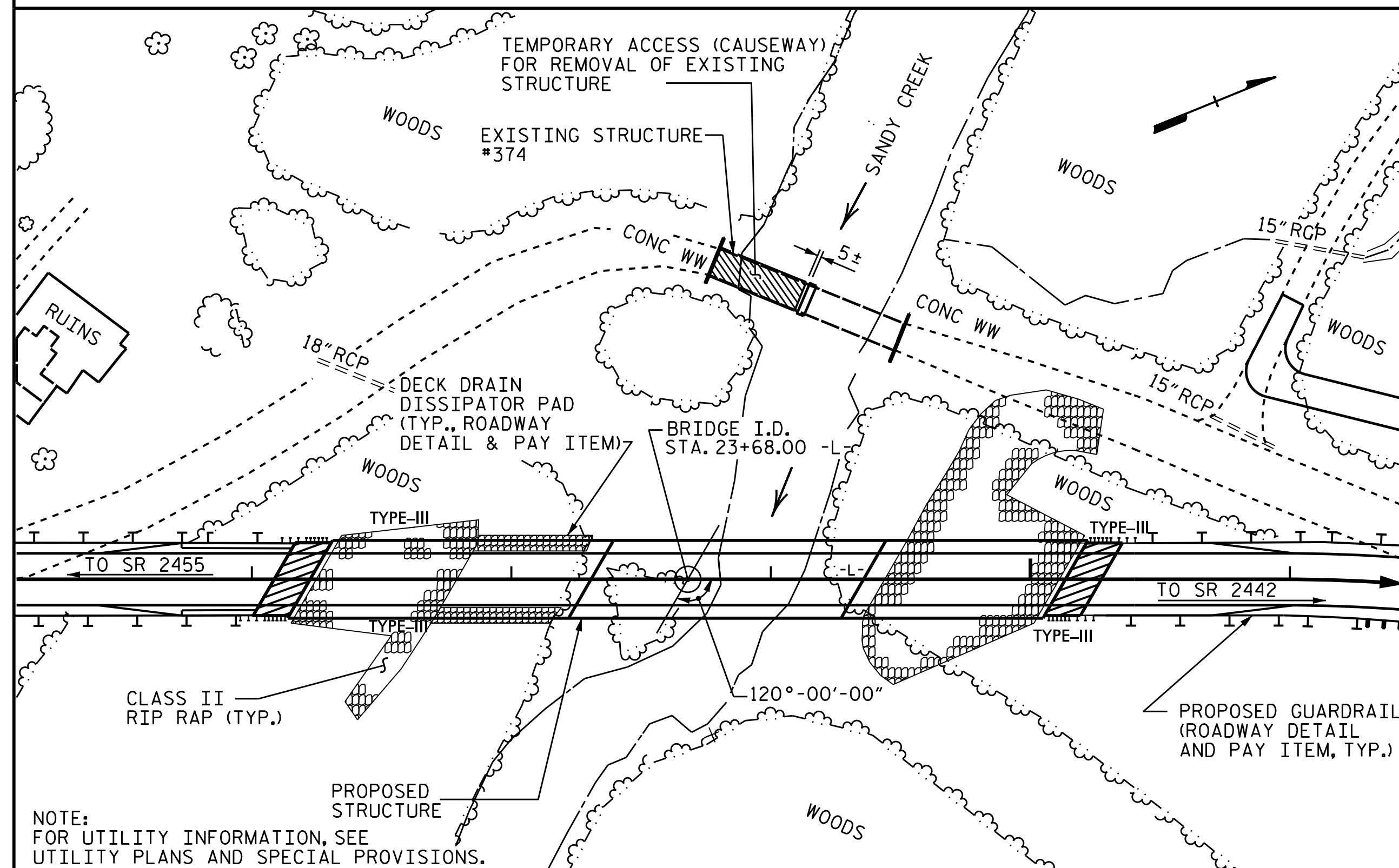
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE
OVER SANDY CREEK ON
SR 2481 BETWEEN
SR 2455 AND SR 2442

DRAWN BY : A. K. PATEL DATE : 5-24-16
CHECKED BY : G. W. DICKEY DATE : 6-07-16
DESIGN ENGINEER OF RECORD: K. P. SEDAI DATE : 6/16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			38

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BM #1, RR SPIKE IN BASE OF 18 INCH SYCAMORE TREE -L- STA. 23+90.00
87' LT, EL. 494.77



LOCATION SKETCH

NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY ACCESS (CAUSEWAY), AT THE EXISTING STRUCTURE, FOR USE DURING REMOVAL OF EXISTING STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.
- AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS.
- AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 2 SPANS, 1 @ 39'-0" @ 38'-6" WITH A 5' AWS ON TIMBER DECK ON I-BEAMS; A CLEAR ROADWAY WIDTH OF 11'-2" ON MASS CONCRETE ABUTMENTS AND INTERIOR BENT, LOCATED 90' UPSTREAM FROM PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE."
- 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.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" DIA. DRILLED PIER	SID INSPECTIONS	CSL TESTING	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS		ASBESTOS ASSESSMENT	
												NO.	LIN.FT.						NO.	LIN.FT.		NO.
SUPERSTRUCTURE	LUMP SUM	LUMP SUM	LIN.FT.	LIN.FT.	LIN.FT.	EACH	EACH	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN.FT.	NO.	LIN.FT.	TONS	SQ.YDS.	LUMP SUM	NO.	LIN.FT.	LUMP SUM	
END BENT NO. 1								30.0		4709		5	175	5		296	329		LUMP SUM	30	2897.08	
BENT NO. 1			1.5	30.0	4.5			45.4		17476	3177											
BENT NO. 2			17.9	40.0				38.3		12544	3125											
END BENT NO. 2								30.0		4709		5	125	5		685	760					
TOTAL	LUMP SUM	LUMP SUM	19.4	70.0	4.5	2	2	143.7	LUMP SUM	39438	6302	10	300	10	579.42	981	1089	LUMP SUM	30	2897.08	LUMP SUM	

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 3 OF 3

HYDRAULIC DATA

DESIGN DISCHARGE	= 5400 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 505.4
DRAINAGE AREA	= 45.1 SQ. MILES
BASE DISCHARGE (Q100)	= 8066 CFS
BASE HIGH WATER ELEVATION	= 508.7

OVERTOPPING DATA

OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= N/A
OVERTOPPING ELEVATION	= 535.7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**GENERAL DRAWING
 FOR BRIDGE
 OVER SANDY CREEK ON
 SR 2481 BETWEEN
 SR 2455 AND SR 2442**

DRAWN BY : A. K. PATEL, P.E. DATE : 5-19-16
 CHECKED BY : G. W. DICKEY DATE : 6-07-16
 DESIGN ENGINEER OF RECORD: K. P. SEDAI DATE : 6/16

REVISIONS						SHEET NO. S-3 TOTAL SHEETS 38
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE BOX BEAM UNITS

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.23	--	1.75	0.247	1.5	B	EL	51.562	0.615	1.33	B	EL	10.312	0.80	0.247	1.23	B	EL	51.562		
	HL-93(0pr)	N/A	--	1.72	--	1.35	0.247	1.94	B	EL	51.562	0.615	1.72	B	EL	10.312	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.72	62.092	1.75	0.247	2.11	B	EL	51.562	0.615	1.78	B	EL	10.312	0.80	0.247	1.72	B	EL	51.562		
	HS-20(0pr)	36.000	--	2.31	83.078	1.35	0.247	2.73	B	EL	51.562	0.615	2.31	B	EL	10.312	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.11	55.518	1.4	0.247	6.28	B	EL	51.562	0.615	5.49	B	EL	10.312	0.80	0.247	4.11	B	EL	51.562	
		SNGARBS2	20.000	--	2.97	59.376	1.4	0.247	4.54	B	EL	51.562	0.615	3.84	B	EL	10.312	0.80	0.247	2.97	B	EL	51.562	
		SNAGRIS2	22.000	--	2.77	61.009	1.4	0.247	4.24	B	EL	51.562	0.615	3.54	B	EL	10.312	0.80	0.247	2.77	B	EL	51.562	
		SNCOTTS3	27.250	--	2.04	55.689	1.4	0.247	3.12	B	EL	51.562	0.615	2.73	B	EL	10.312	0.80	0.247	2.04	B	EL	51.562	
		SNAGGRS4	34.925	--	1.67	58.355	1.4	0.247	2.55	B	EL	51.562	0.615	2.23	B	EL	10.312	0.80	0.247	1.67	B	EL	51.562	
		SNS5A	35.550	--	1.64	58.174	1.4	0.247	2.5	B	EL	51.562	0.615	2.23	B	EL	10.312	0.80	0.247	1.64	B	EL	51.562	
		SNS6A	39.950	--	1.49	59.381	1.4	0.247	2.27	B	EL	51.562	0.615	2.02	B	EL	10.312	0.80	0.247	1.49	B	EL	51.562	
	TTST	SNS7B	42.000	--	1.41	59.427	1.4	0.247	2.16	B	EL	51.562	0.615	1.96	B	EL	10.312	0.80	0.247	1.41	B	EL	51.562	
		TNAGRIT3	33.000	--	1.81	59.670	1.4	0.247	2.76	B	EL	51.562	0.615	2.42	B	EL	10.312	0.80	0.247	1.81	B	EL	51.562	
		TNT4A	33.075	--	1.81	59.935	1.4	0.247	2.77	B	EL	51.562	0.615	2.37	B	EL	10.312	0.80	0.247	1.81	B	EL	51.562	
		TNT6A	41.600	--	1.47	61.055	1.4	0.247	2.24	B	EL	51.562	0.615	2.05	B	EL	10.312	0.80	0.247	1.47	B	EL	51.562	
		TNT7A	42.000	--	1.47	61.641	1.4	0.247	2.24	B	EL	51.562	0.615	2.02	B	EL	10.312	0.80	0.247	1.47	B	EL	51.562	
		TNT7B	42.000	--	1.5	63.019	1.4	0.247	2.29	B	EL	51.562	0.615	1.93	B	EL	10.312	0.80	0.247	1.50	B	EL	51.562	
		TNAGRIT4	43.000	--	1.44	61.946	1.4	0.247	2.2	B	EL	51.562	0.615	1.88	B	EL	10.312	0.80	0.247	1.44	B	EL	51.562	
TNAGT5A	45.000	--	1.36	61.407	1.4	0.247	2.09	B	EL	51.562	0.615	1.84	B	EL	10.312	0.80	0.247	1.36	B	EL	51.562			
TNAGT5B	45.000	3	1.35	60.917	1.4	0.247	2.07	B	EL	51.562	0.615	1.79	B	EL	10.312	0.80	0.247	1.35	B	EL	51.562			

NOTES:

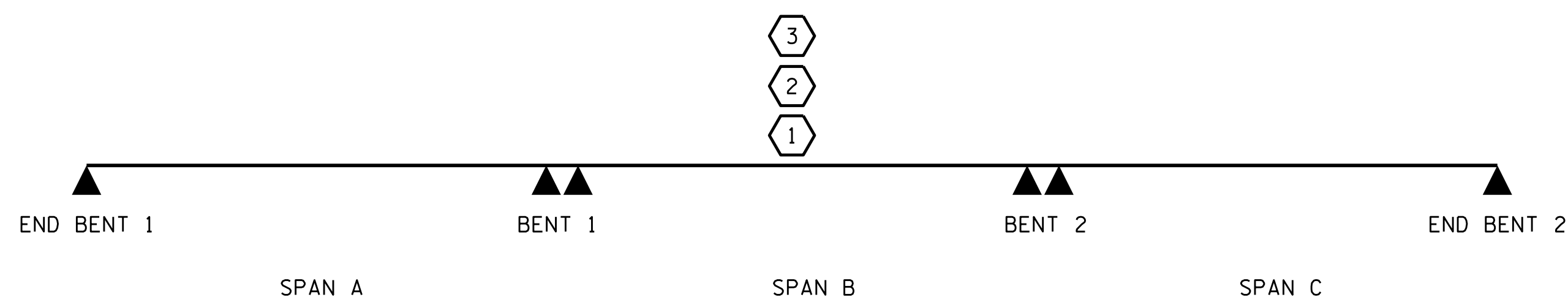
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

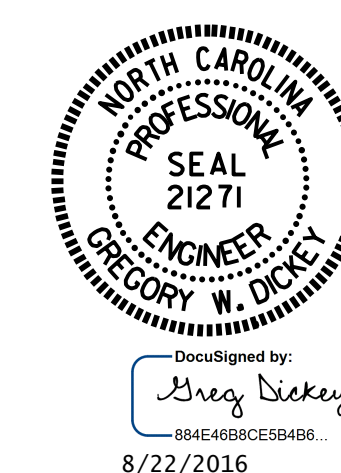
- 1.
- 2.
- 3.
- 4.

#	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. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED CONCRETE
 BOX BEAM UNITS
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : A. K. PATEL DATE : 1/19/16
 CHECKED BY : W. F. PARKER DATE : 3/16
 DESIGN ENGINEER OF RECORD : K. P. SEDA I DATE : 6/16
 DRAWN BY : MAA 1/08 REV. 11/12/08RR MAA/GM
 CHECKED BY : GM/DI 2/08 REV. 10/11/11 MAA/GM

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			38

NOTES

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

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

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

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

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

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6200 PSI (SPANS A & B) AND 5000 PSI (SPAN C).

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

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

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

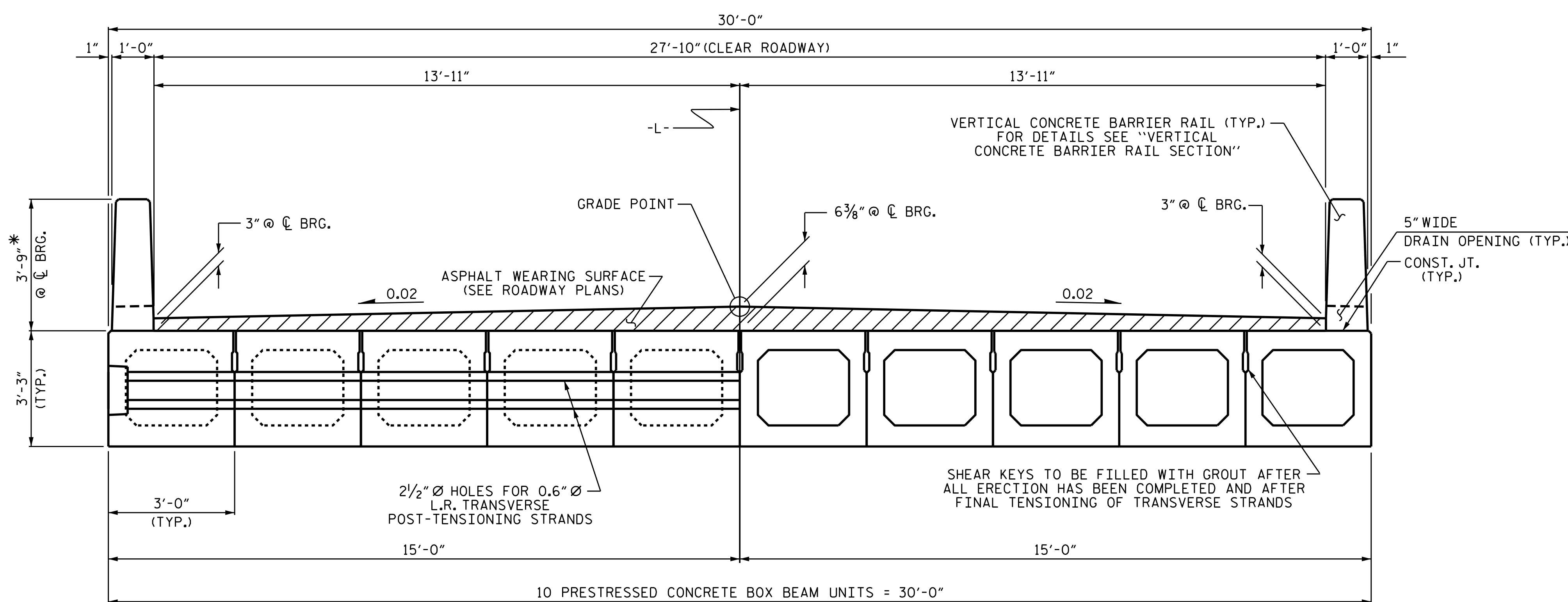
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 5" X 6". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE BOX BEAM UNIT TO THE TOP OF THE DRAIN OPENING.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR BOX BEAM UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.



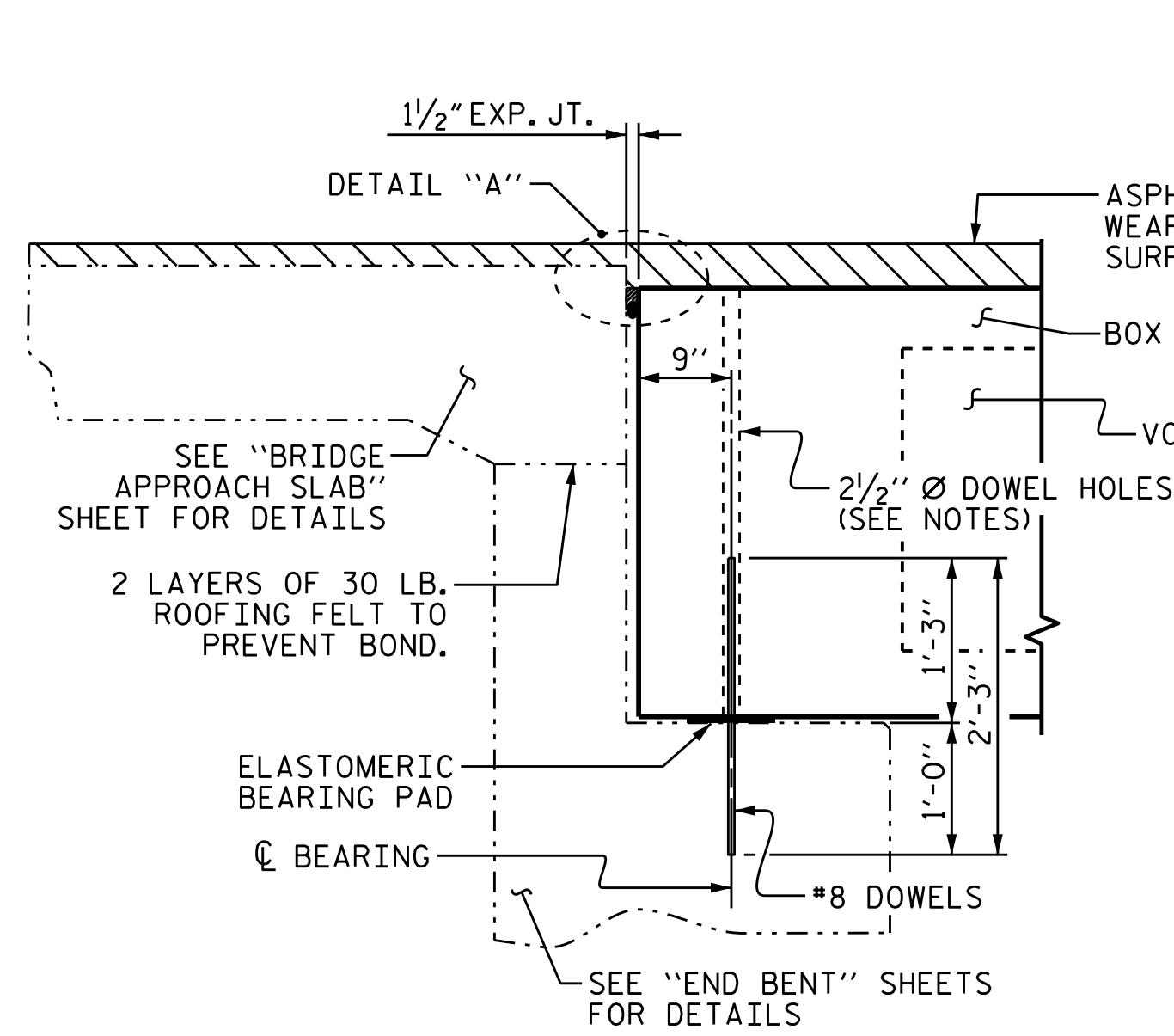
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

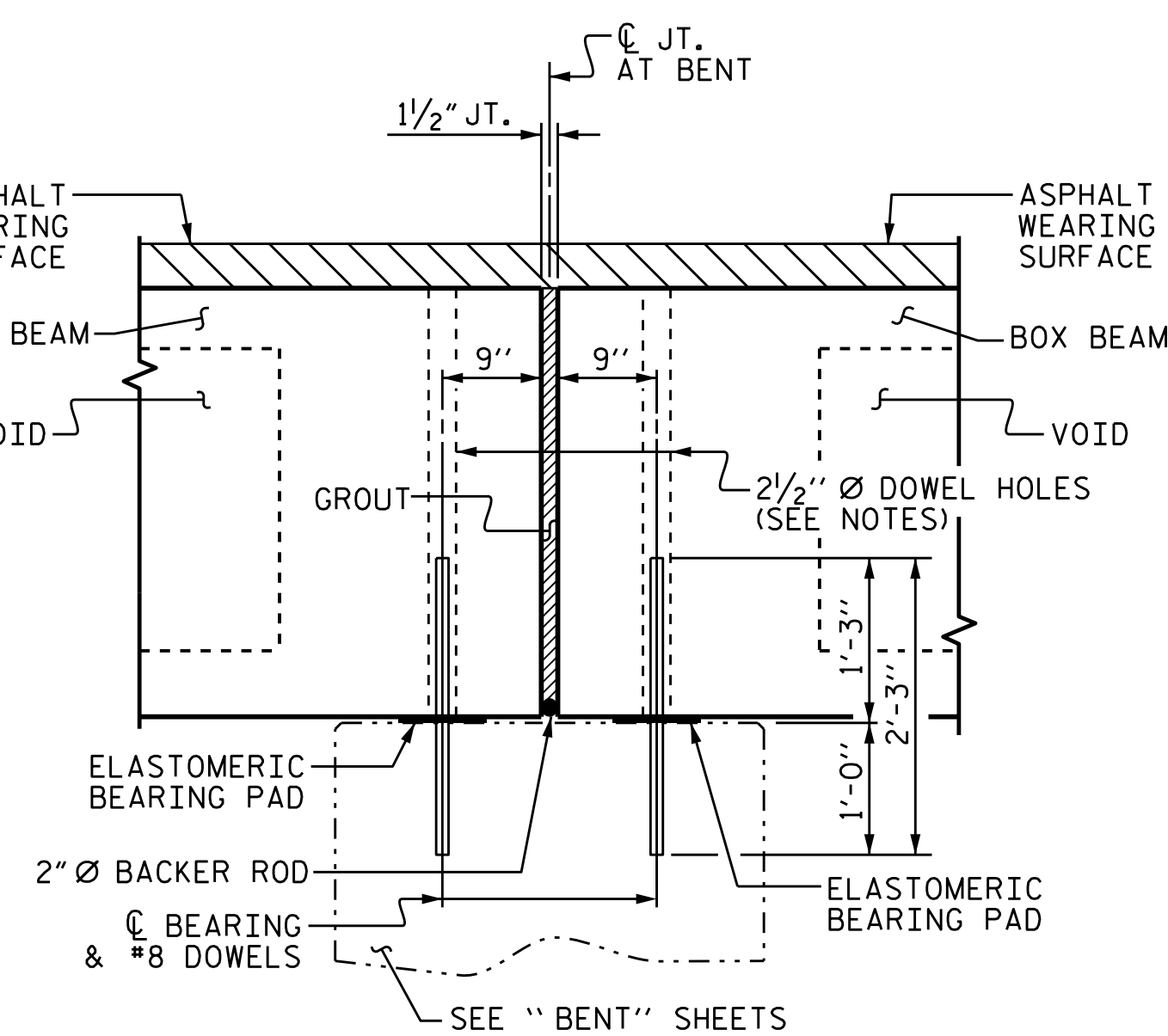
* THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

EXPANSION END

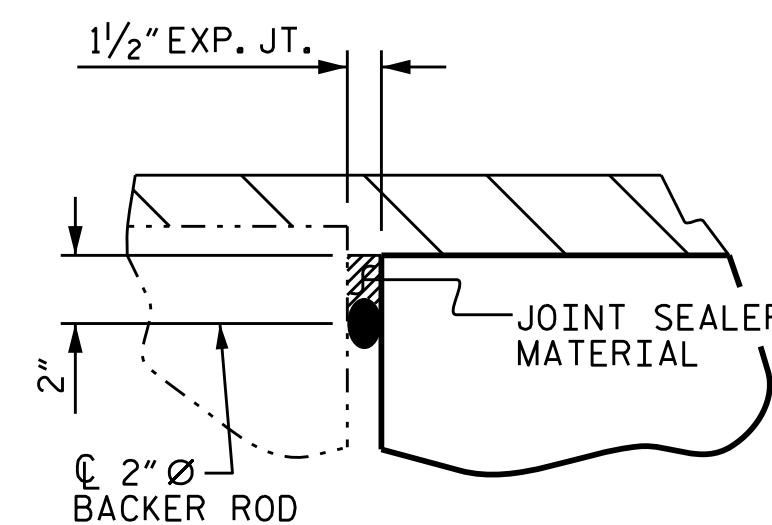


SECTION AT END BENT

FIXED END FIXED END

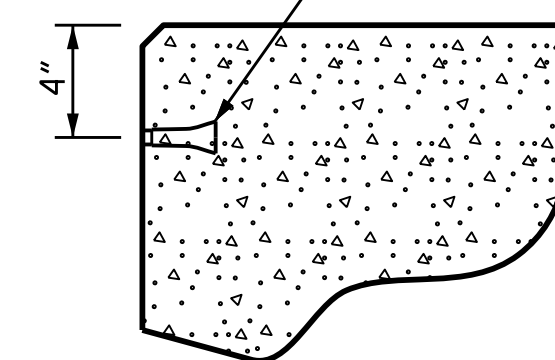


SECTION AT BENT



DETAIL "A"

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL

PROJECT NO. B-5360
RANDOLPH COUNTY
STATION: 23+68.00 -L-

SHEET 1 OF 7



DocuSigned by:
Gregory W. Dickey
8/22/2016

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

ASSEMBLED BY : A. K. PATEL DATE : 1/13/16
CHECKED BY : W. F. PARKER DATE : 3/16
DRAWN BY : DGE 8/11
CHECKED BY : TMG 11/11

REV. 10/15 MAA/TMG

22-AUG-2016 08:07
X:\Structures\Plans\FINAL_PLANS\B-5360.SD.dgn
gdcickey

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

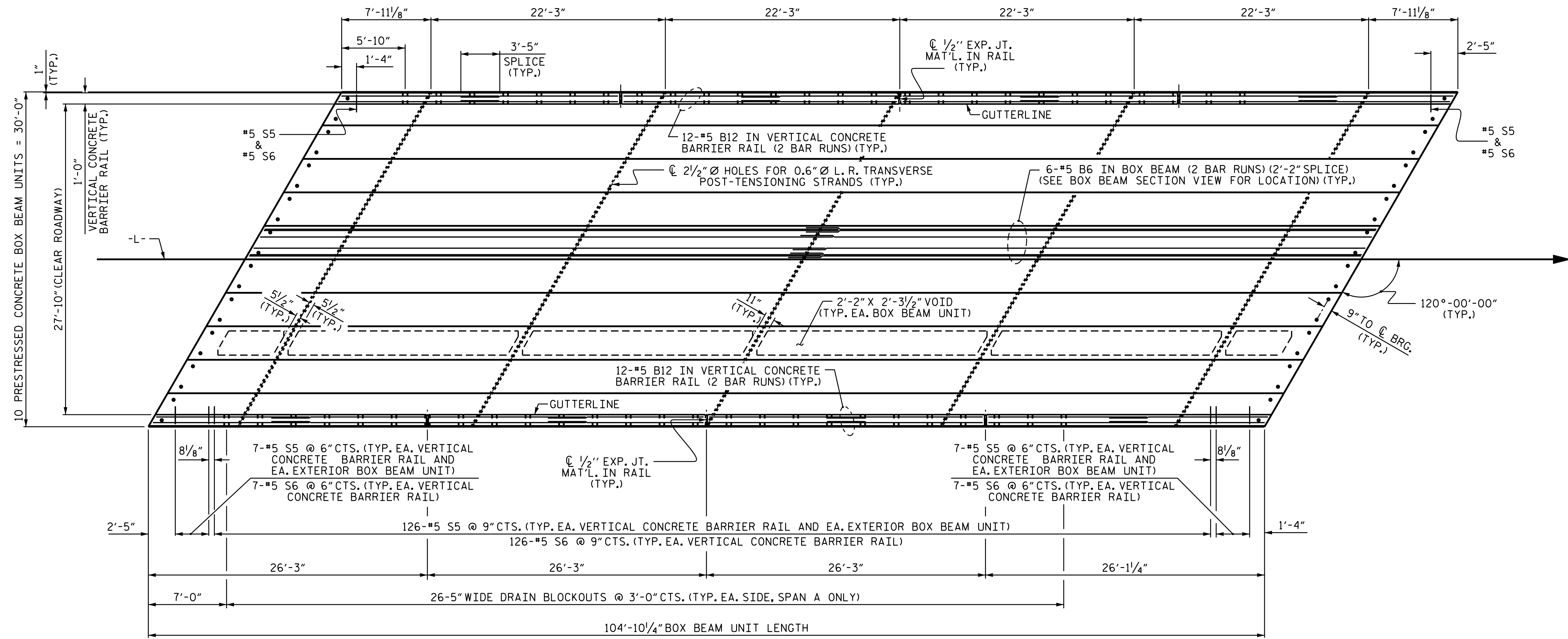
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			38

STD. NO. 39PCBB1_30

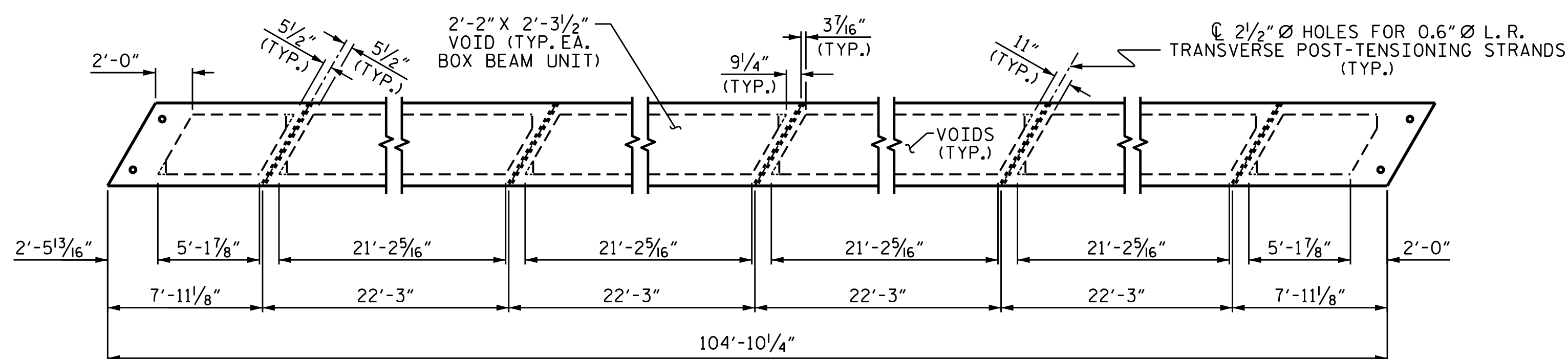
EXP. - SPAN A

FIX. - SPAN B

FIX. - SPANS A & B



PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-5360

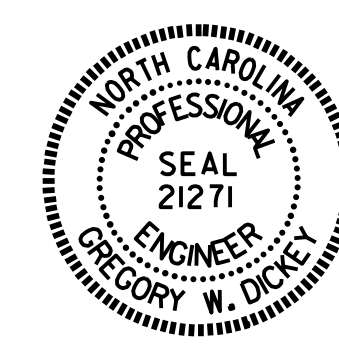
RANDOLPH COUNTY

STATION: 23+68.00 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 104'-10 1/4" UNIT
27'-10" CLEAR ROADWAY
120° SKEW



DocuSigned by:
Gregory W. Dickey
884E4B8C8E84B6
8/22/2016

ASSEMBLED BY : A. K. PATEL DATE : 1/13/16
CHECKED BY : W. F. PARKER DATE : 3/16
DESIGN ENGINEER OF RECORD : K. P. SEDAI DATE : 6/16

DRAWN BY : DGE 10/11 REV. 8/14 MAA/TMG
CHECKED BY : TMG 11/11

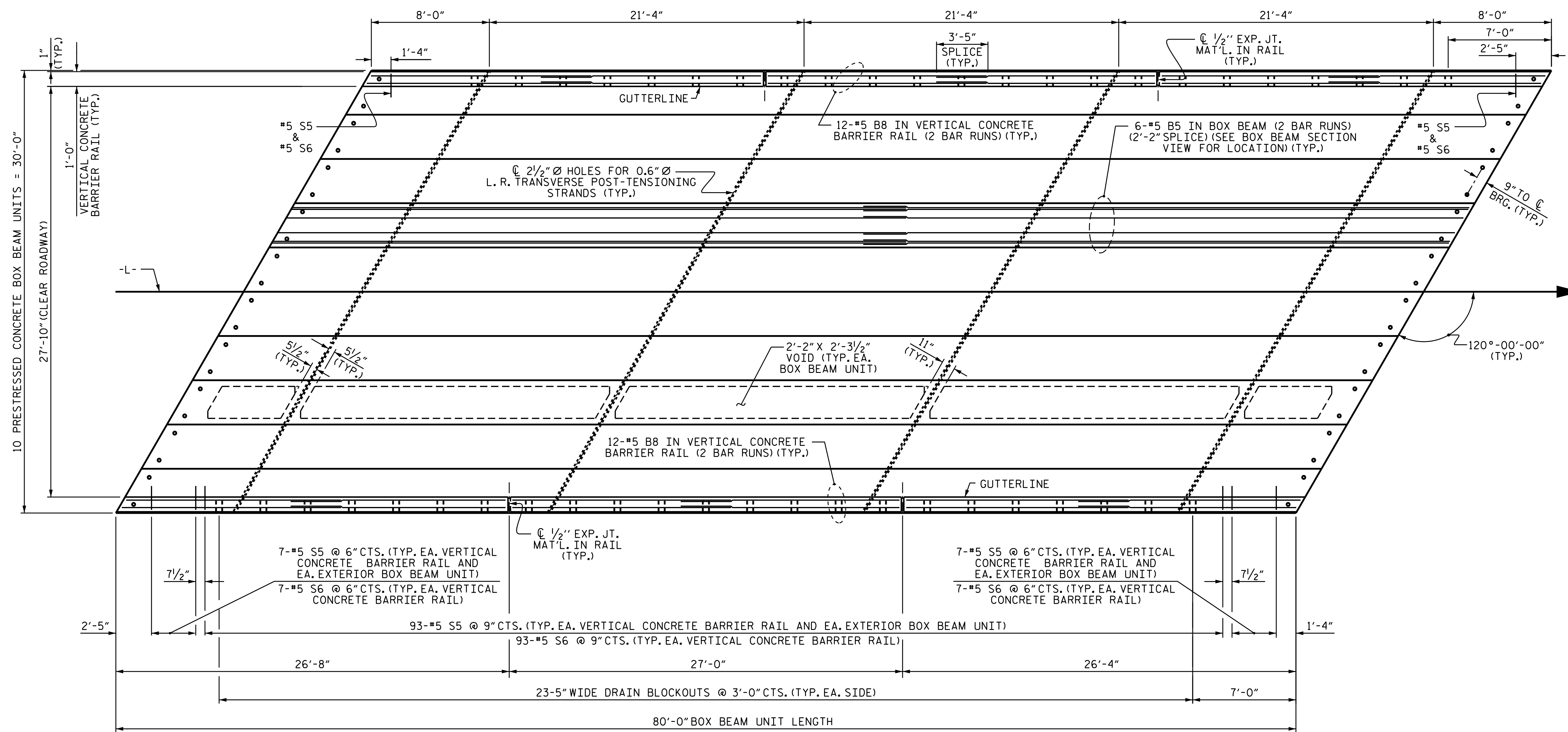
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gdcickey

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

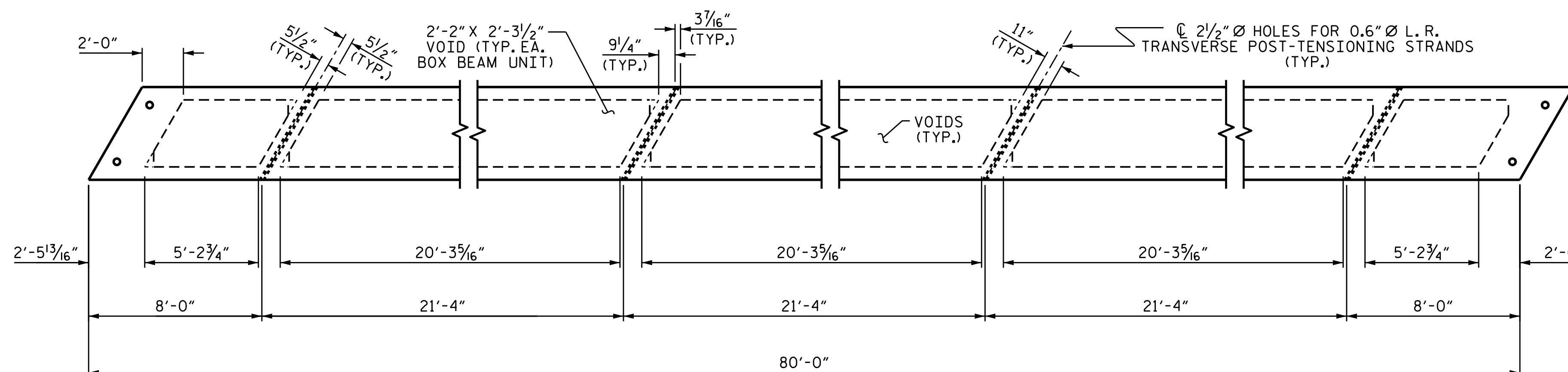
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			38

FIX.

EXP.



PLAN OF UNIT



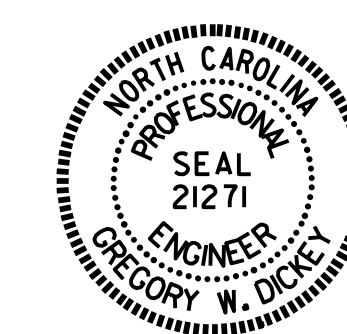
DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF 80' UNIT
 27'-10" CLEAR ROADWAY
 120° SKEW



Designed by:
 Gregory W. Dickey
 8/22/2016

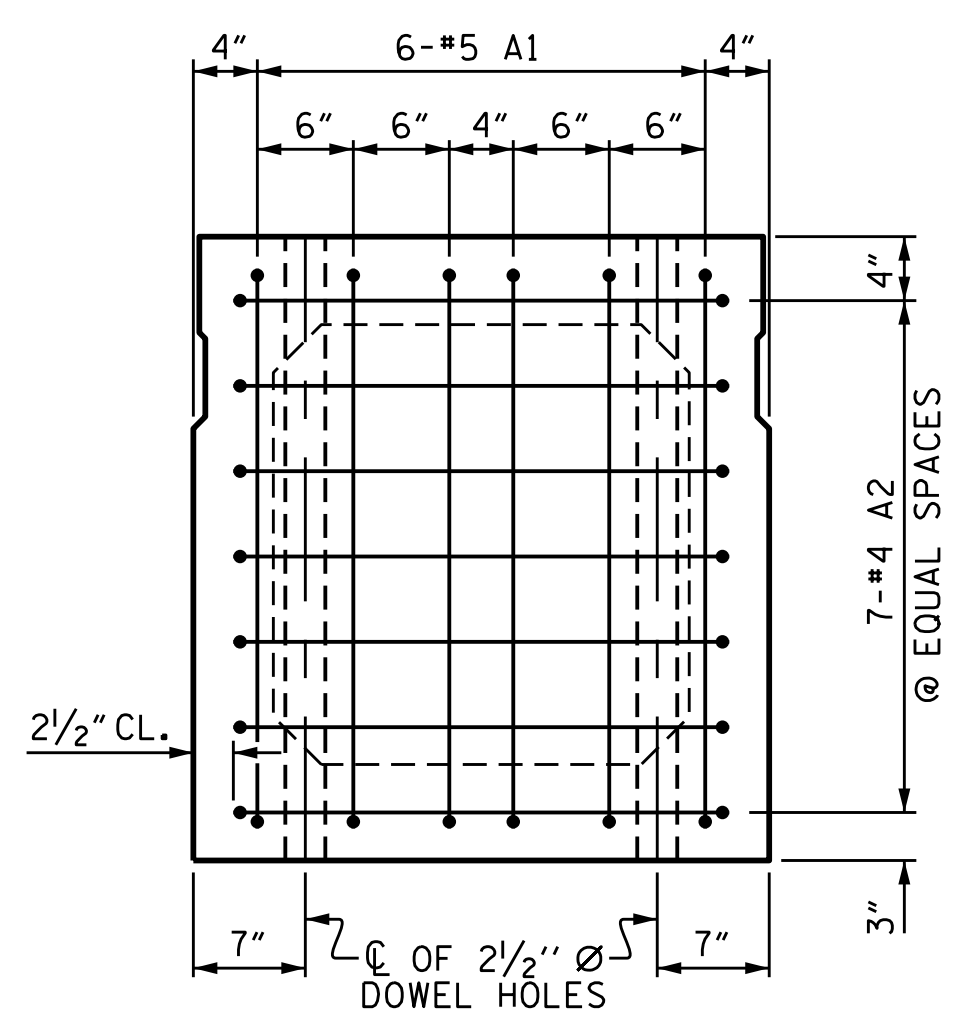
ASSEMBLED BY : A. K. PATEL DATE : 1/14/16
 CHECKED BY : W. F. PARKER DATE : 3/16
 DRAWN BY : DGE 8/11 REV. 8/14 MAA/TMG
 CHECKED BY : TMG 11/11

22-AUG-2016 08:07
 X:\Structures\Plans\FINAL_PLANS\B-5360.SD.gpc
 gdcickey

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

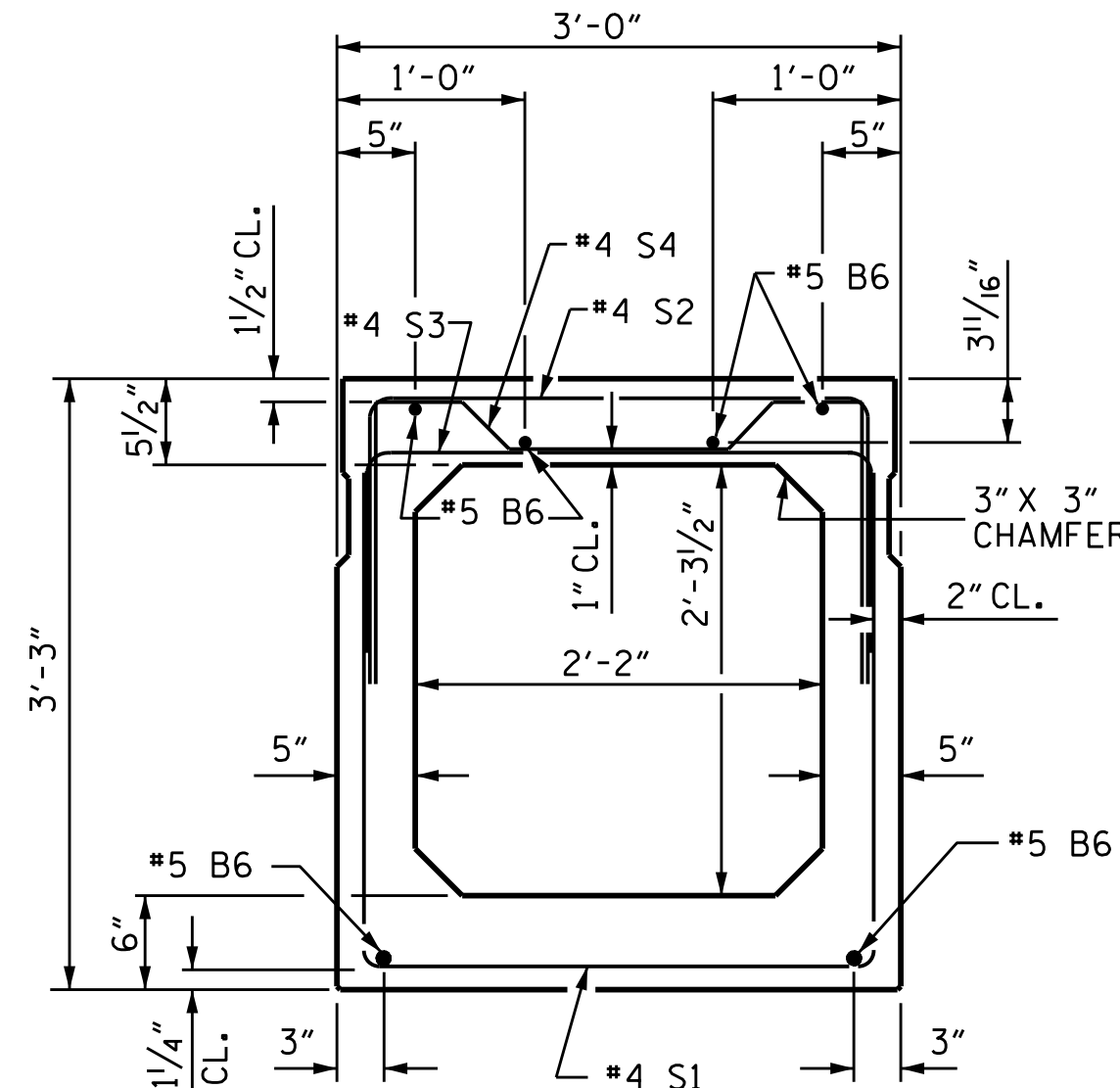
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			38

STD.NO.39PCBB.30.120S_80L



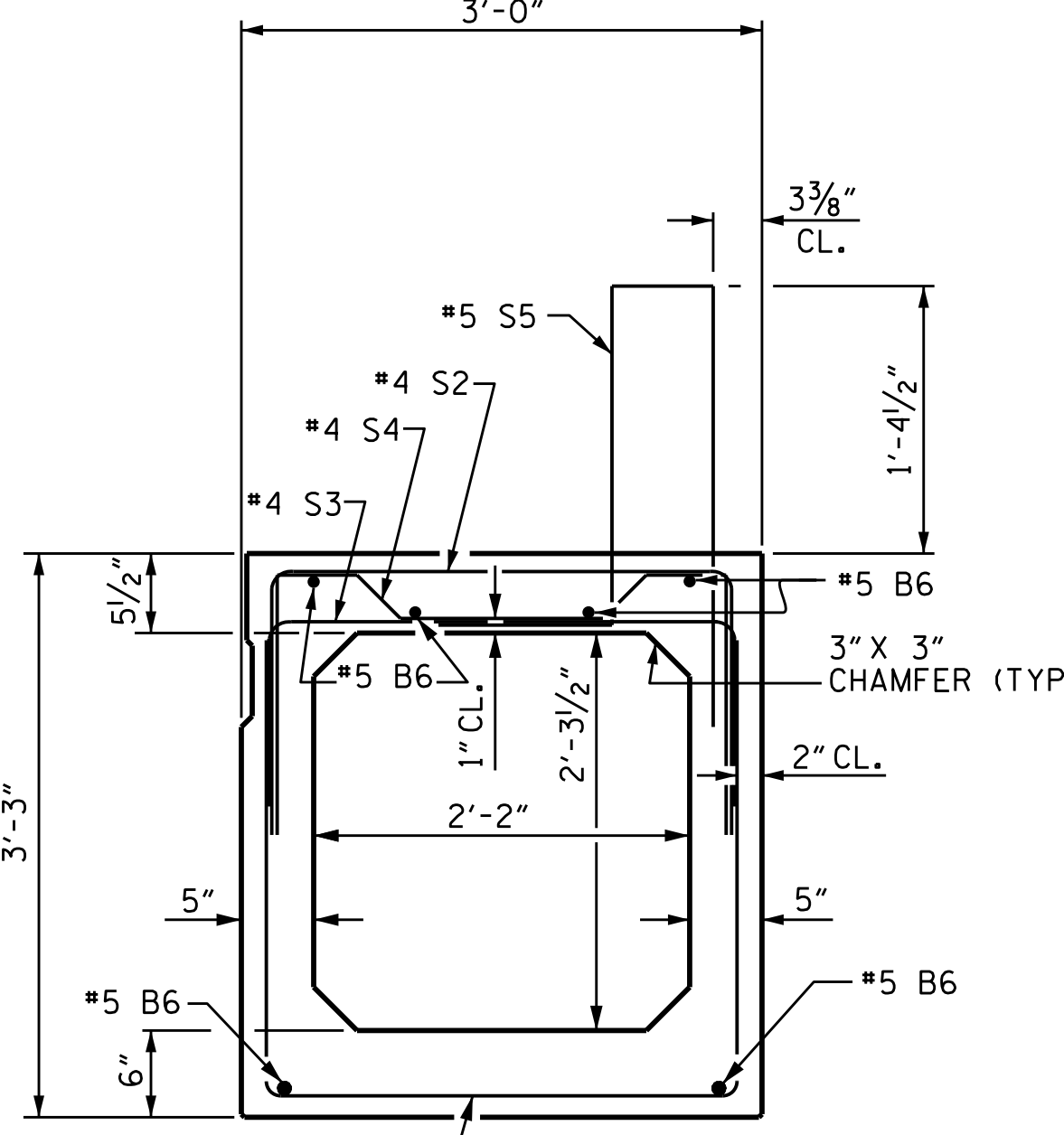
END ELEVATION

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



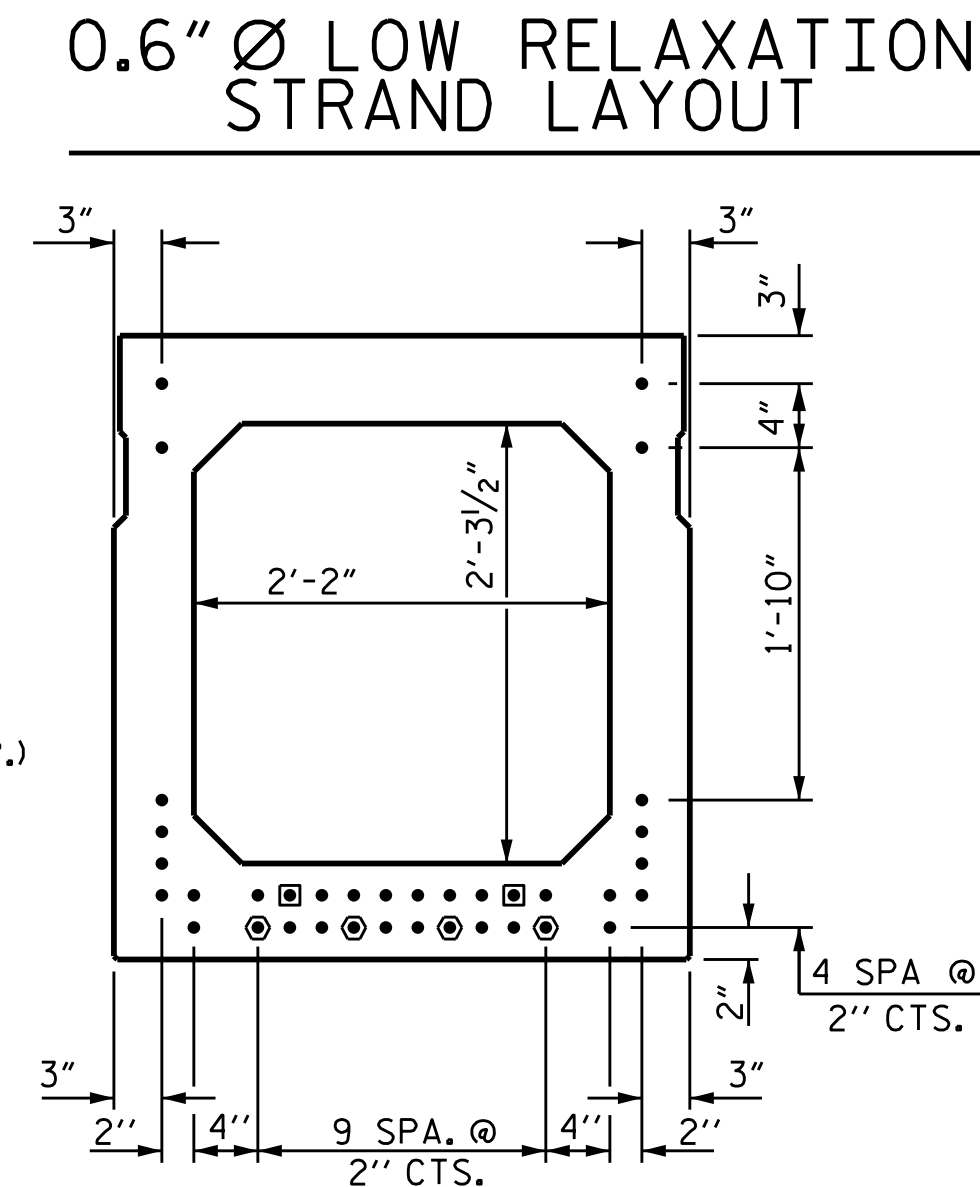
INTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



TYPICAL STRAND LOCATION

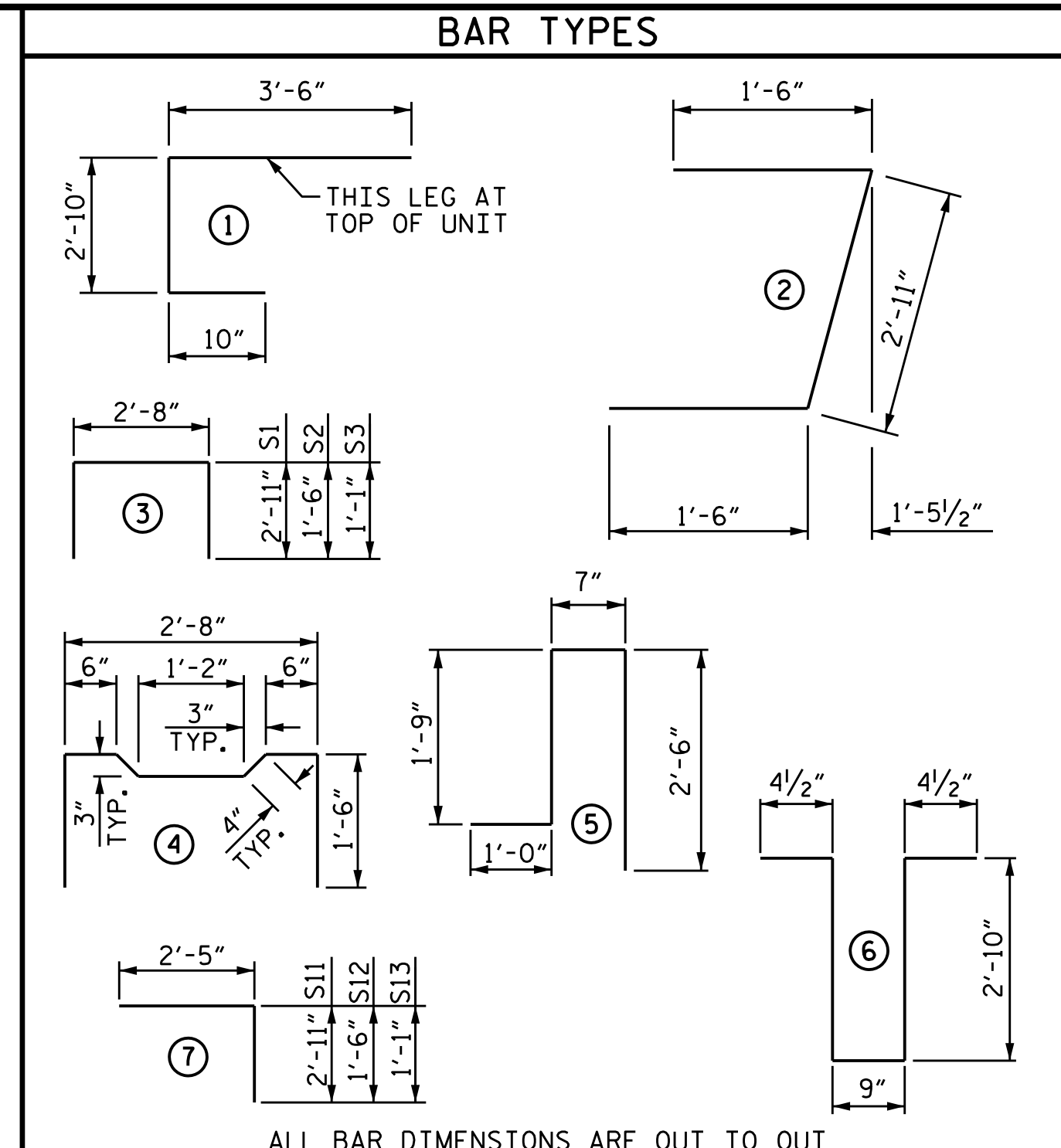
(36 STRANDS REQUIRED)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ⊙ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⊙ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

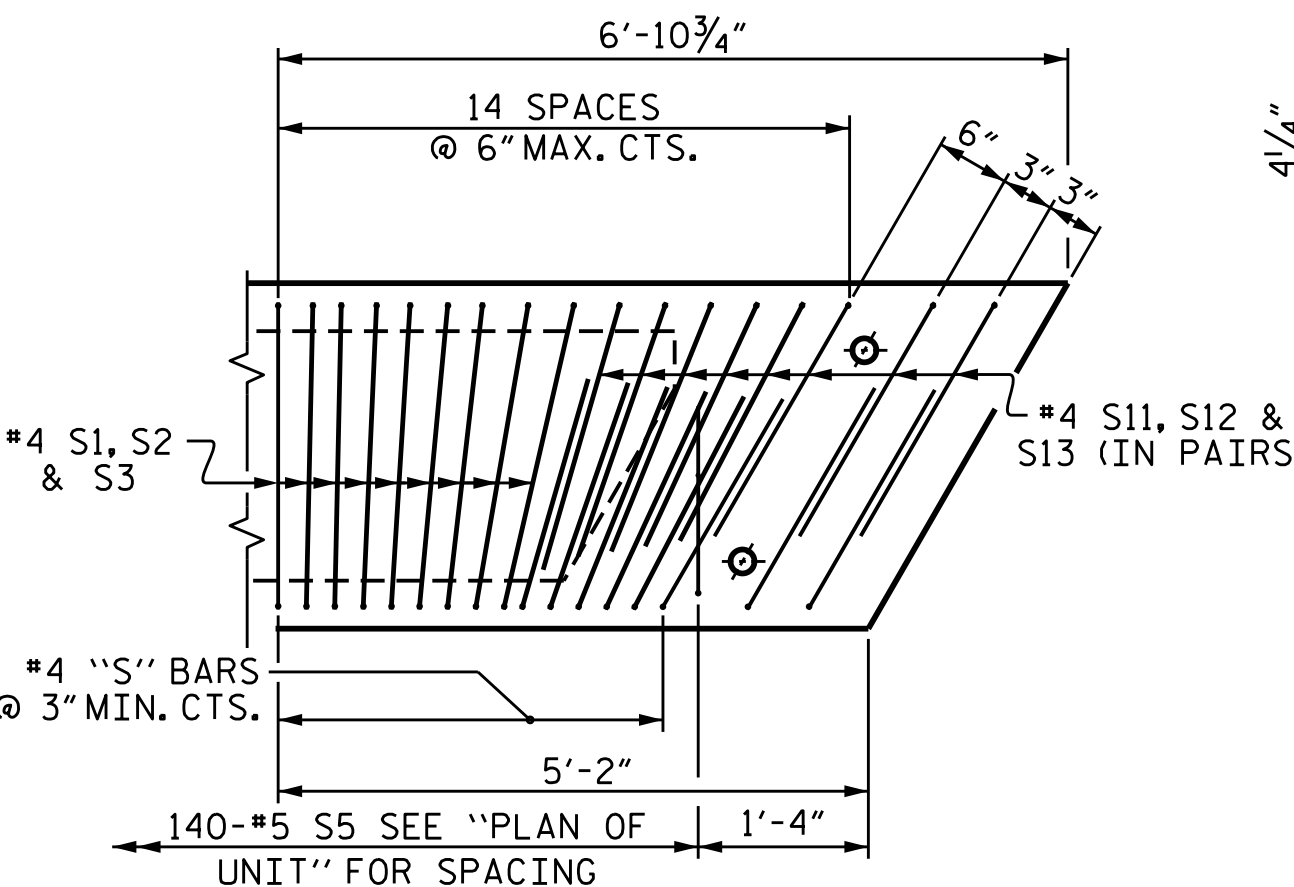
GRADE 270 STRANDS	
0.6" Ø L.R.	
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



ALL BAR DIMENSIONS ARE OUT TO OUT

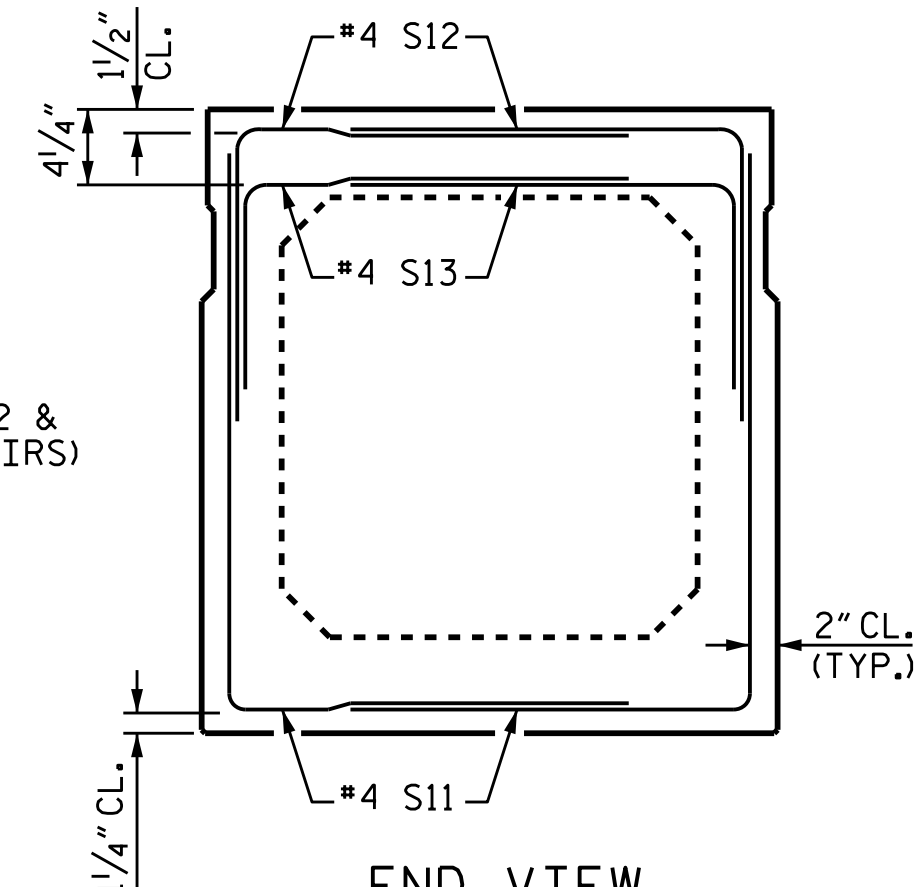
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	12	#5	1	7'-2"	90	7'-2"	90
A2	44	#4	2	5'-11"	174	5'-11"	174
B6	12	#5	STR	53'-4"	668	53'-4"	668
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-10"	19	2'-10"	19
S1	80	#4	3	8'-6"	454	8'-6"	454
S2	80	#4	3	5'-8"	303	5'-8"	303
S3	141	#4	3	4'-10"	455	4'-10"	455
S4	61	#4	4	5'-10"	238	5'-10"	238
S11	32	#4	7	5'-4"	114	5'-4"	114
S12	32	#4	7	3'-11"	84	3'-11"	84
S13	32	#4	7	3'-6"	75	3'-6"	75
* S5	140	#5	5	5'-10"	852	--	--
REINFORCING STEEL				2746	LBS.	2746	LBS.
* EPOXY COATED REINF. STEEL				852	LBS.		
8500 P.S.I. CONCRETE				20.6	CU. YDS.	20.5	CU. YDS.
0.6" Ø L.R. STRANDS				No.	36	No.	36



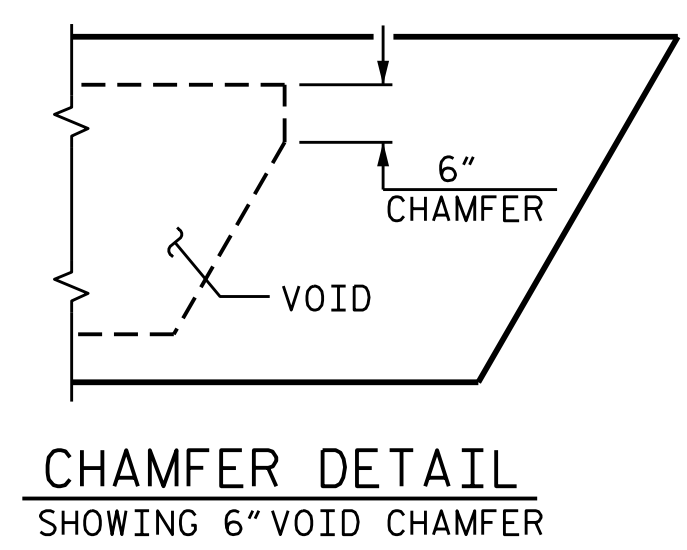
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



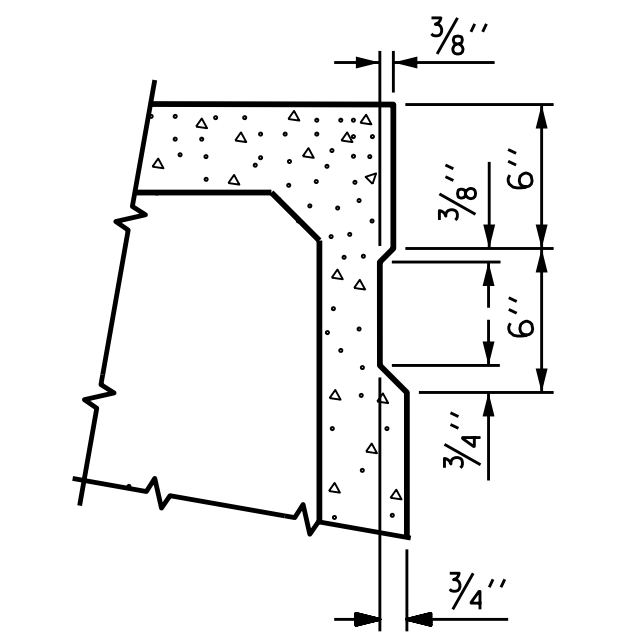
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



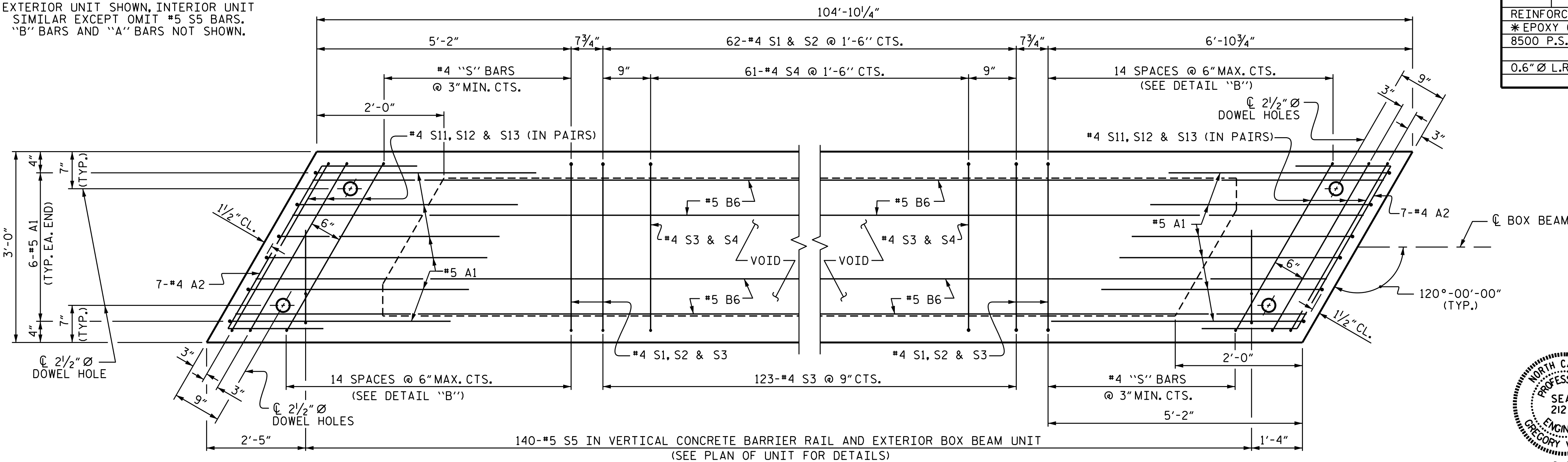
CHAMFER DETAIL

SHOWING 6" VOID CHAMFER



SHEAR KEY DETAIL

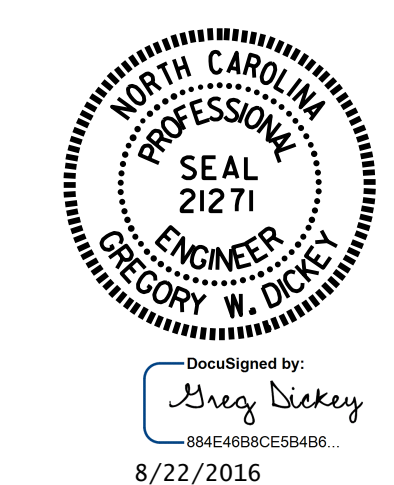
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT". FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL". FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

ASSEMBLED BY :	A. K. PATEL	DATE :	1/14/16
CHECKED BY :	W. F. PARKER	DATE :	3/16
DESIGN ENGINEER OF RECORD :	K. P. SEDA	DATE :	6/16
DRAWN BY :	DGE II/II	REV. 9/14	MAA/TMG
CHECKED BY :	TMG II/II		



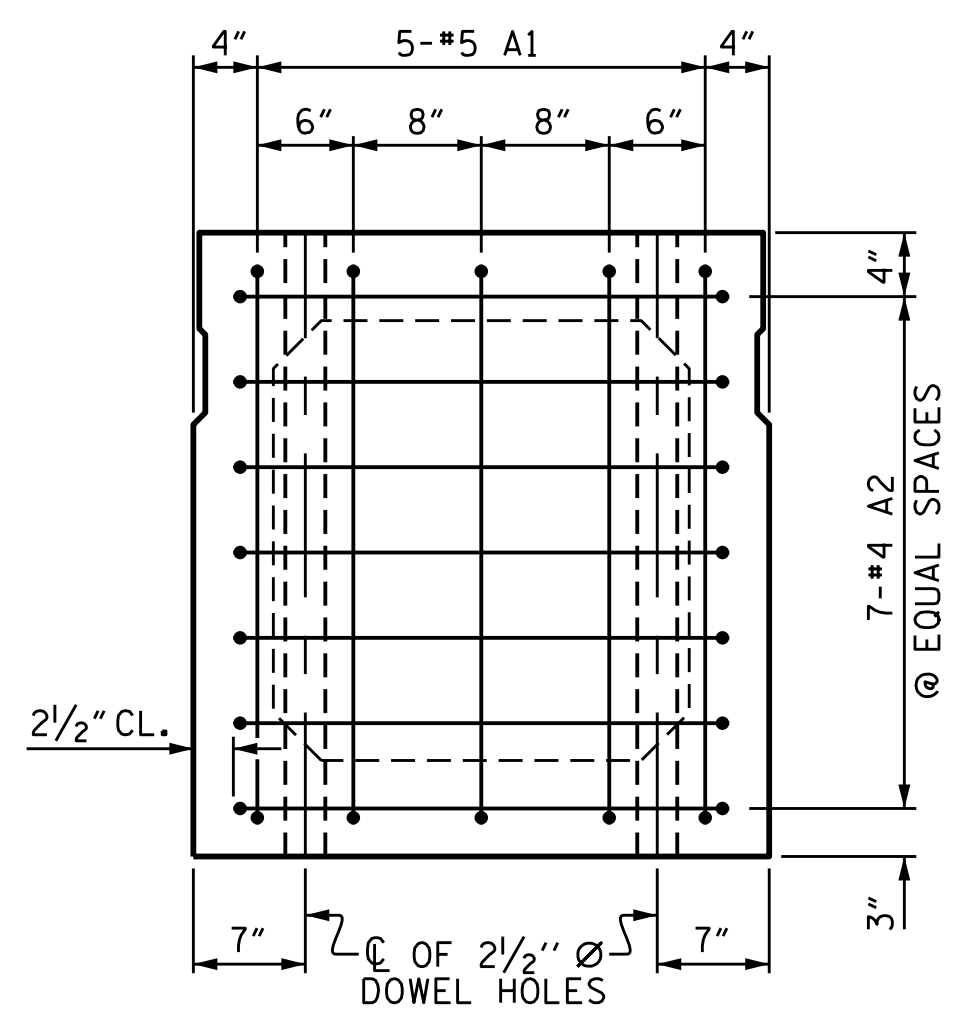
PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

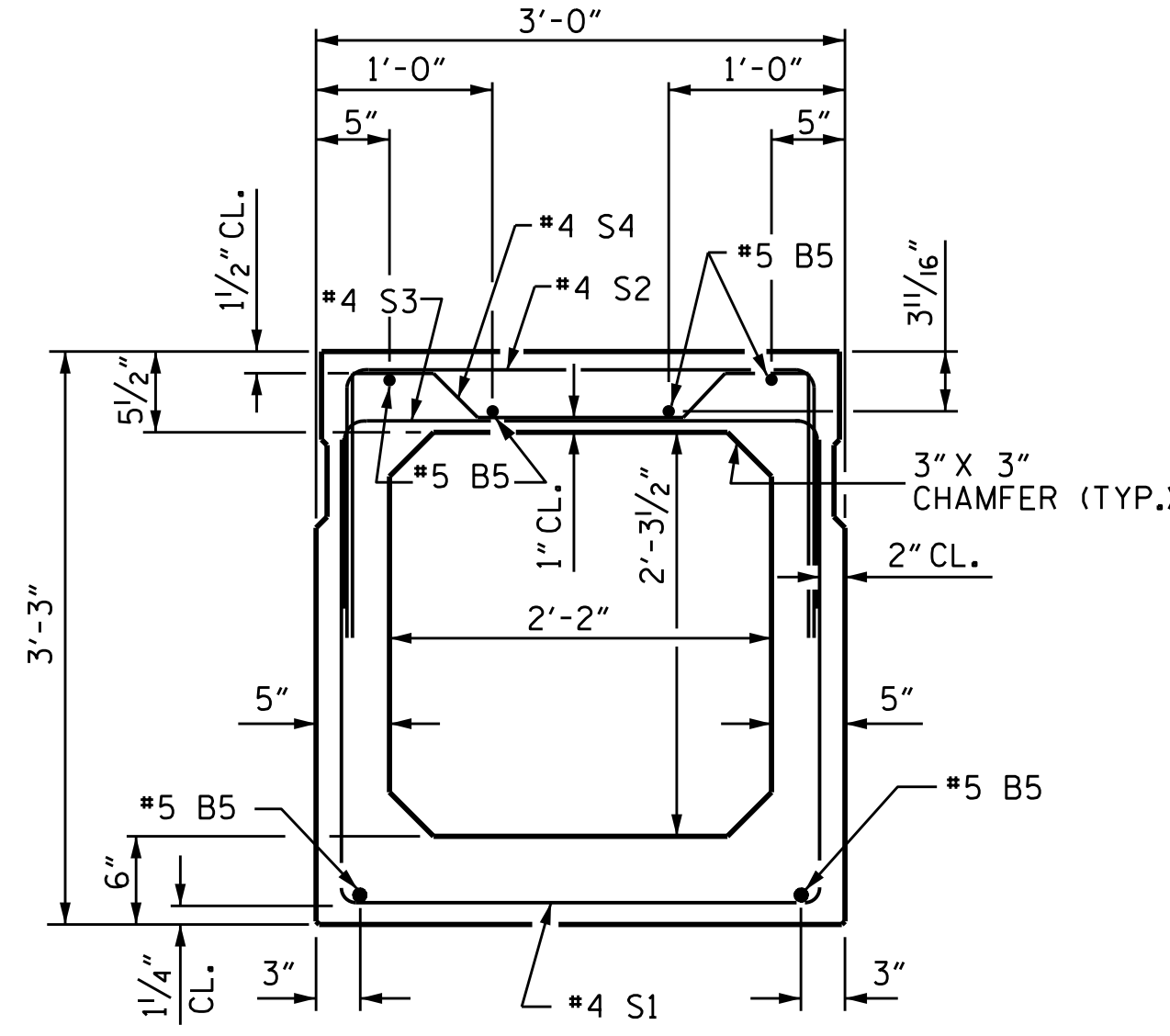
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET NO. S-8
TOTAL SHEETS 38



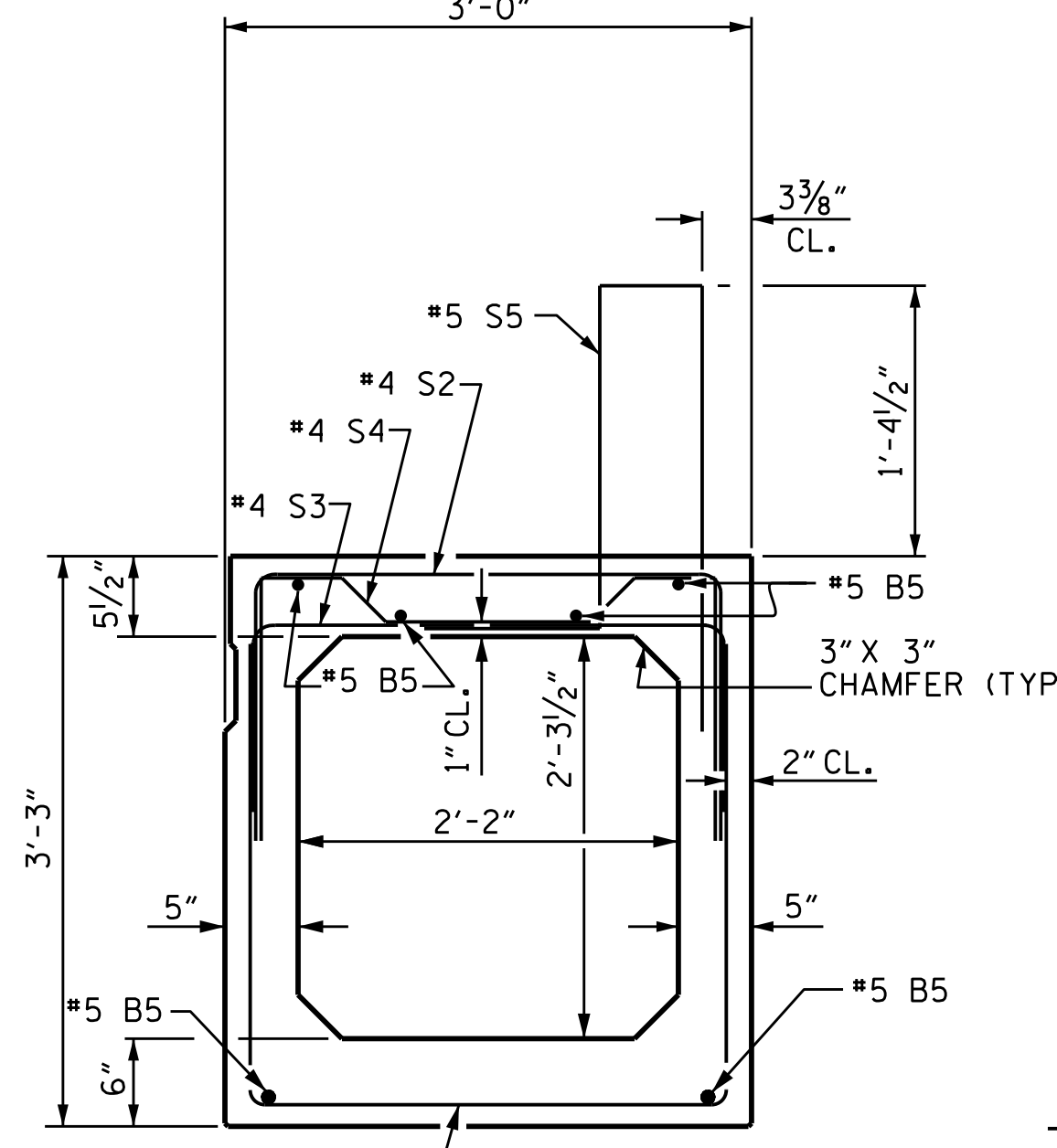
END ELEVATION

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



INTERIOR BOX BEAM SECTION

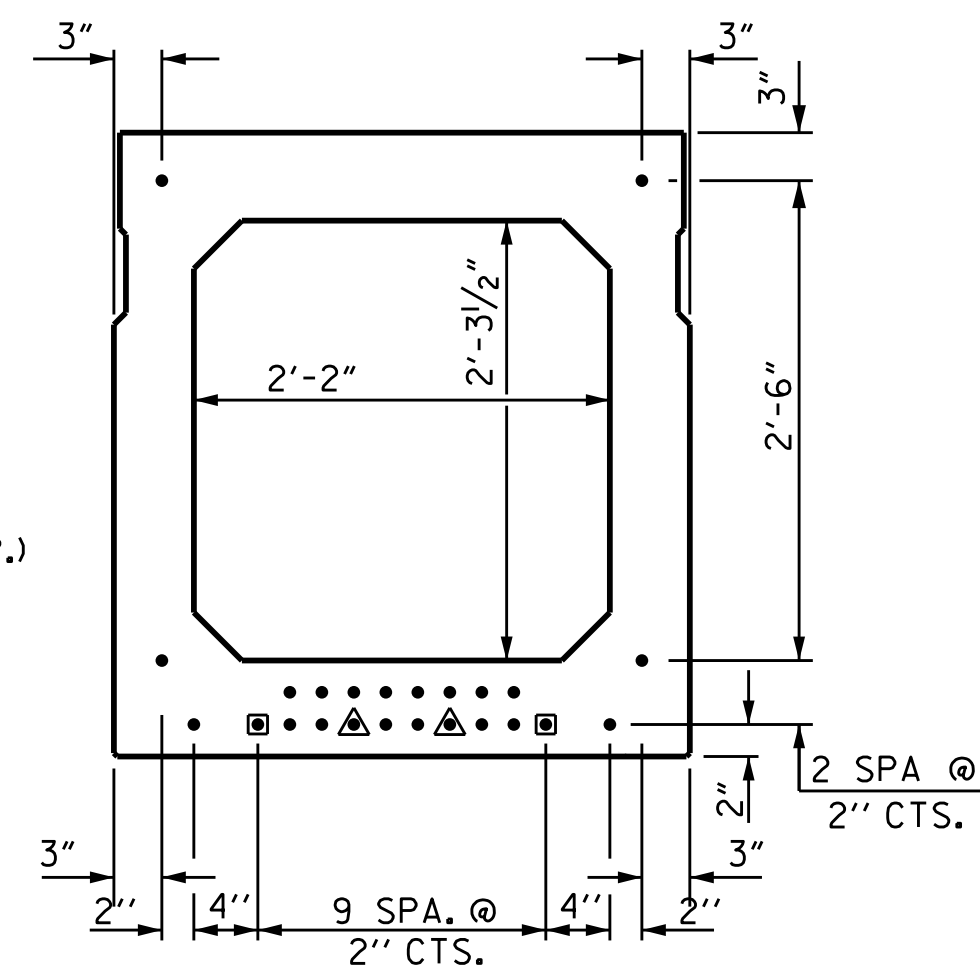
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

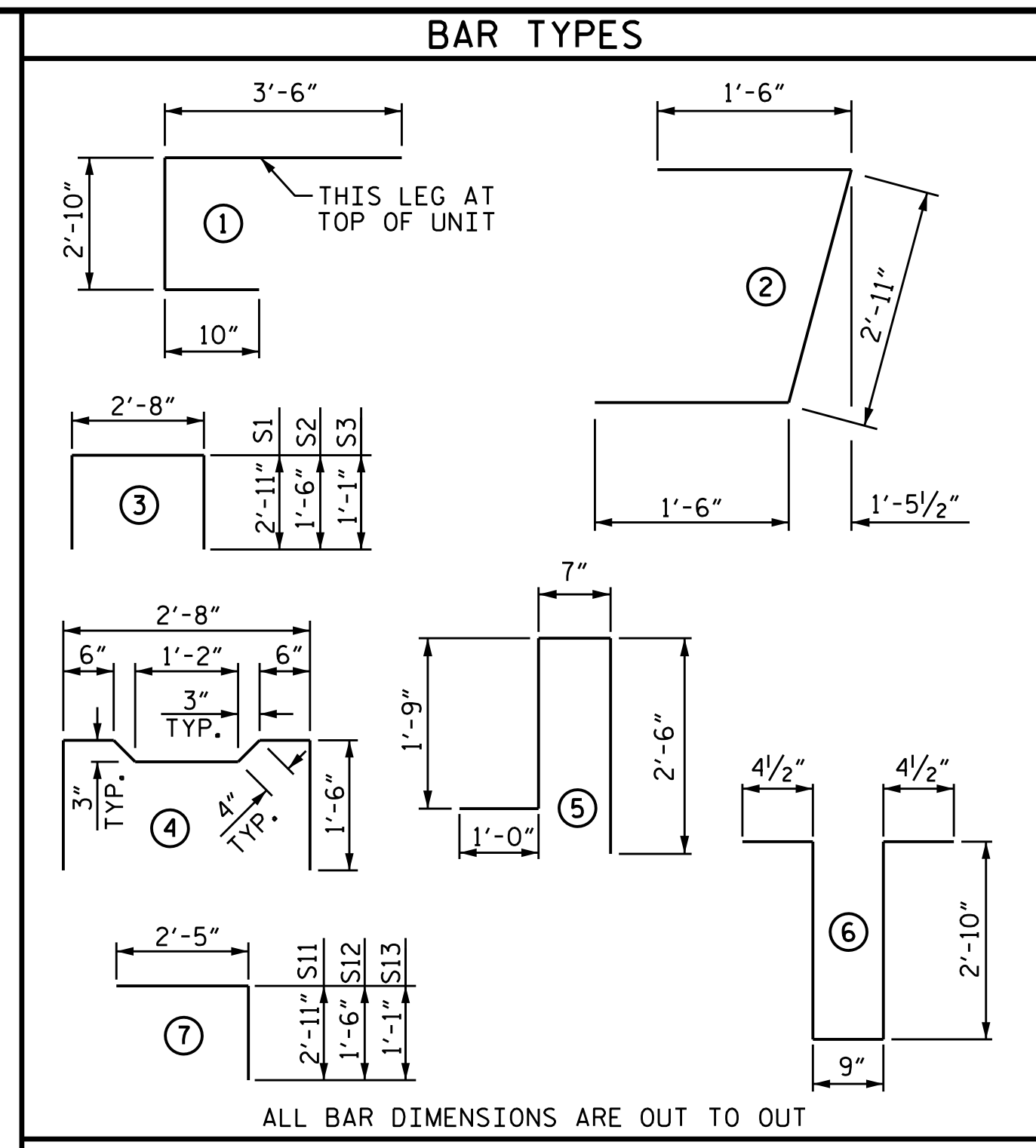
(24 STRANDS REQUIRED)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ◐ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◑ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

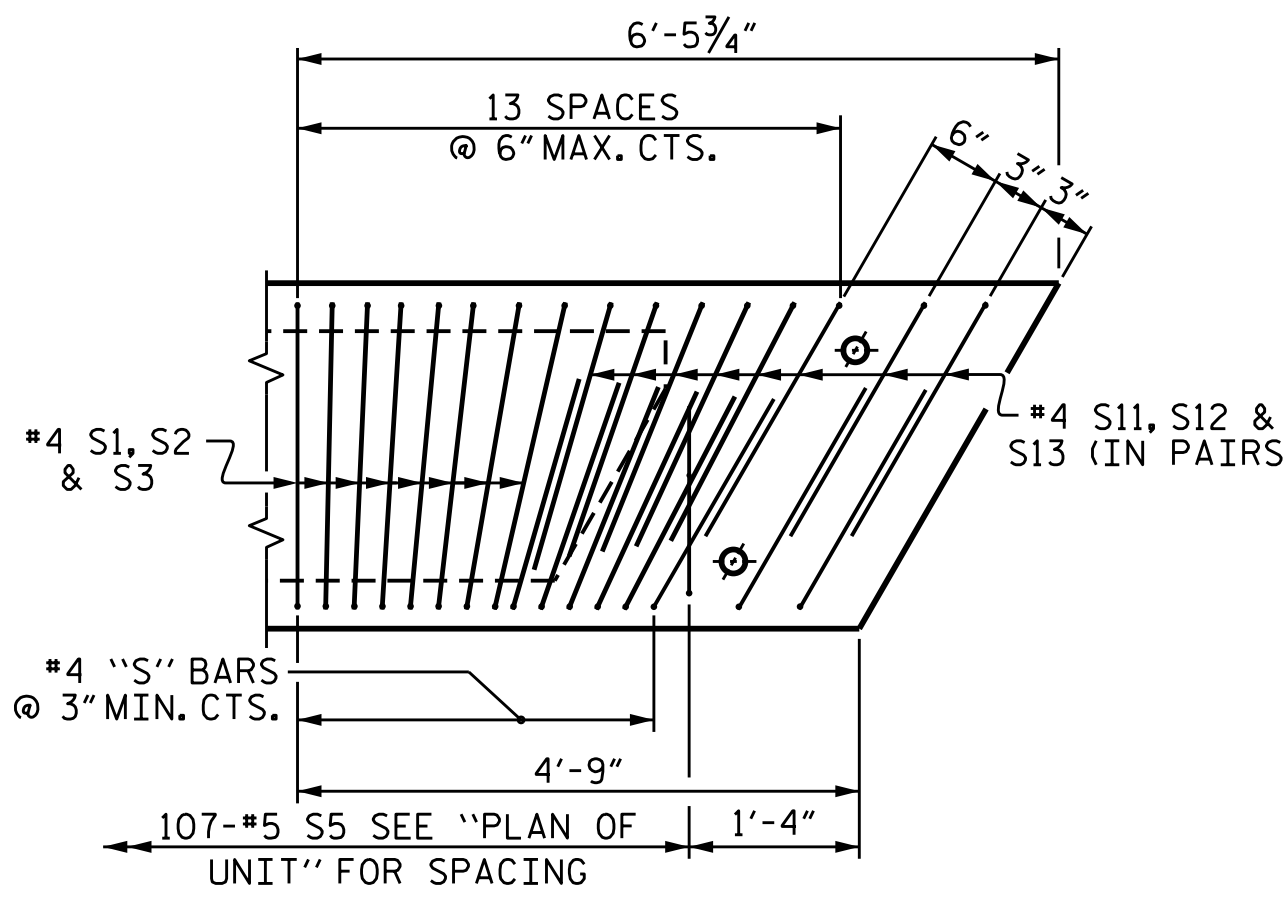
GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.6" Ø L.R.
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



ALL BAR DIMENSIONS ARE OUT TO OUT

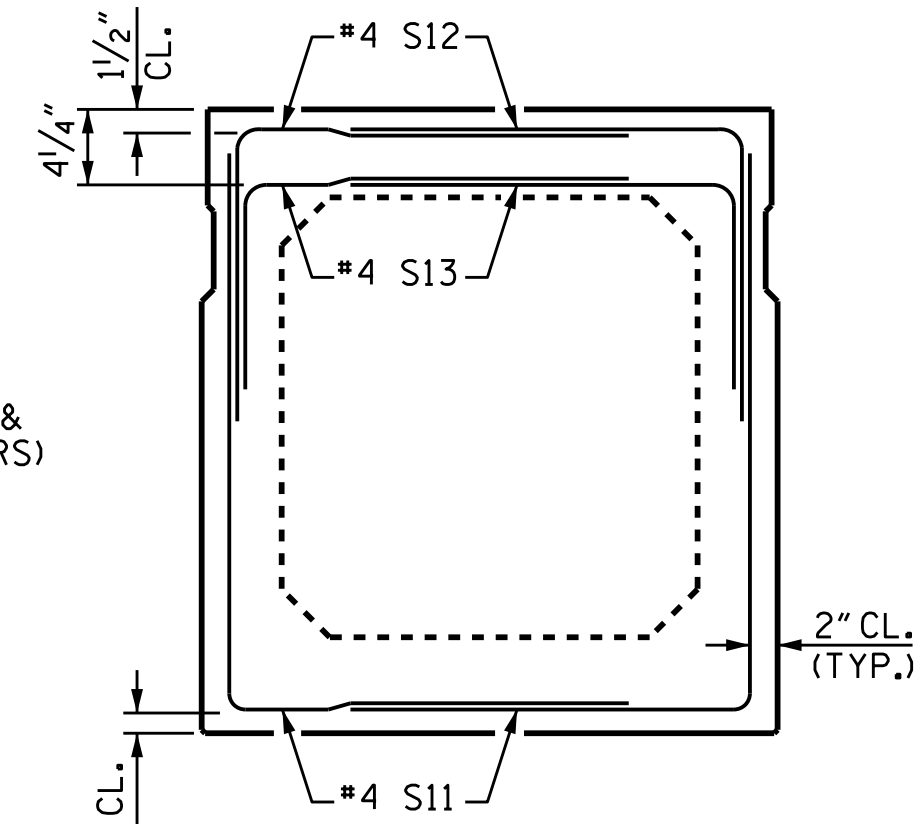
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

BAR NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
			LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	7'-2"	75	7'-2"	75
A2	38	#4	5'-11"	150	5'-11"	150
B5	12	#5	40'-11"	512	40'-11"	512
K1	12	#4	7'-2"	57	7'-2"	57
K2	8	#4	2'-10"	15	2'-10"	15
S1	62	#4	8'-6"	352	8'-6"	352
S2	62	#4	5'-8"	235	5'-8"	235
S3	107	#4	4'-10"	345	4'-10"	345
S4	45	#4	5'-10"	175	5'-10"	175
S11	32	#4	5'-4"	114	5'-4"	114
S12	32	#4	3'-11"	84	3'-11"	84
S13	32	#4	3'-6"	75	3'-6"	75
* S5	107	#5	5'-10"	651	--	--
REINFORCING STEEL				2189 LBS.		2189 LBS.
* EPOXY COATED REINF. STEEL				651 LBS.		
7000 P.S.I. CONCRETE			16.1 CU. YDS.		15.9 CU. YDS.	
0.6" Ø L.R. STRANDS			No. 24		No. 24	



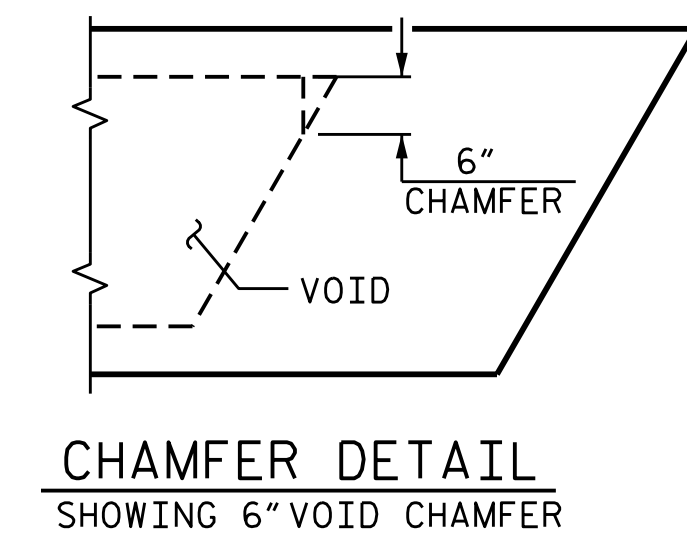
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



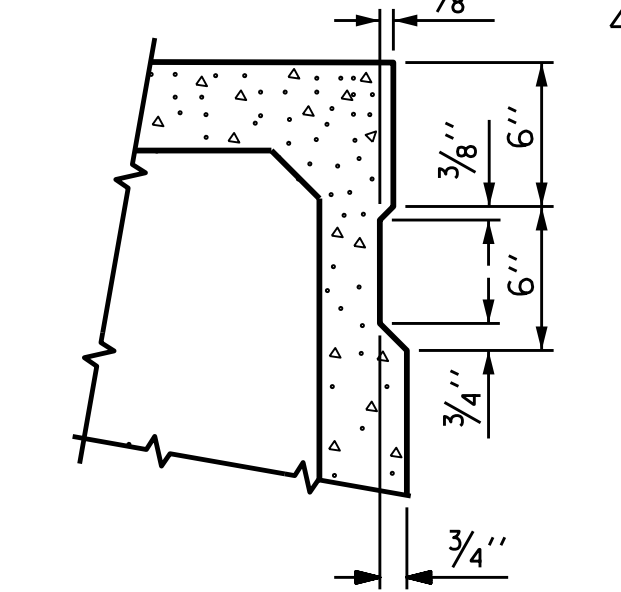
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



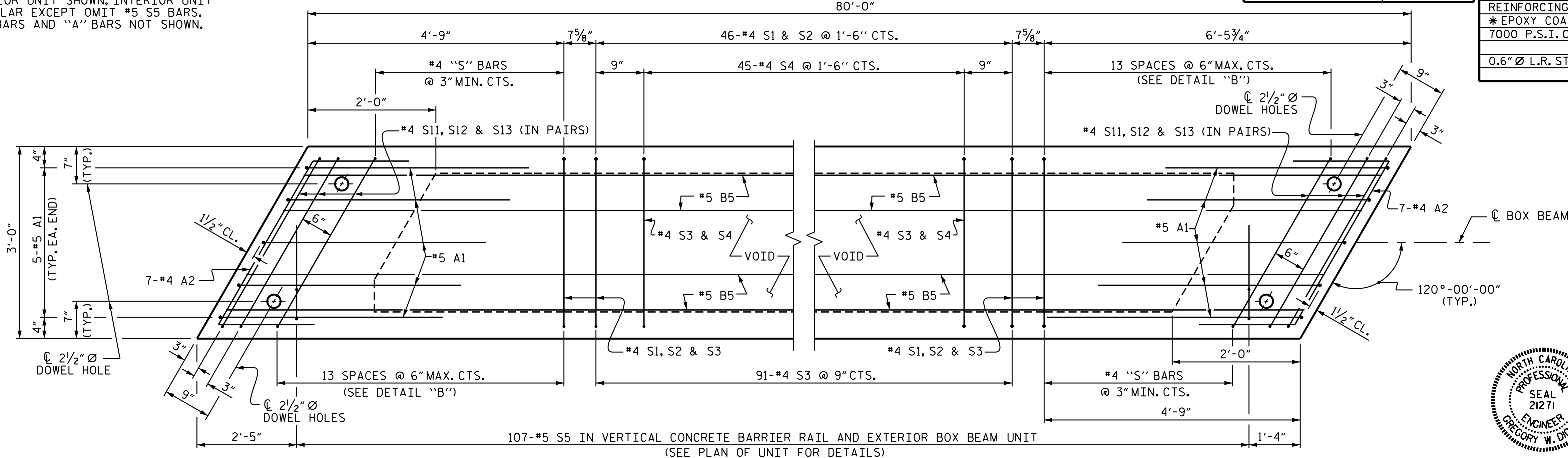
CHAMFER DETAIL

SHOWING 6" VOID CHAMFER



SHEAR KEY DETAIL

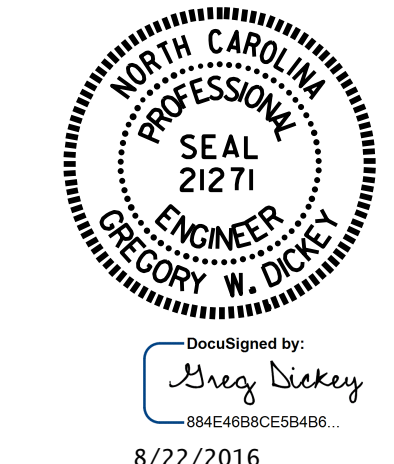
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT". FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL". FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

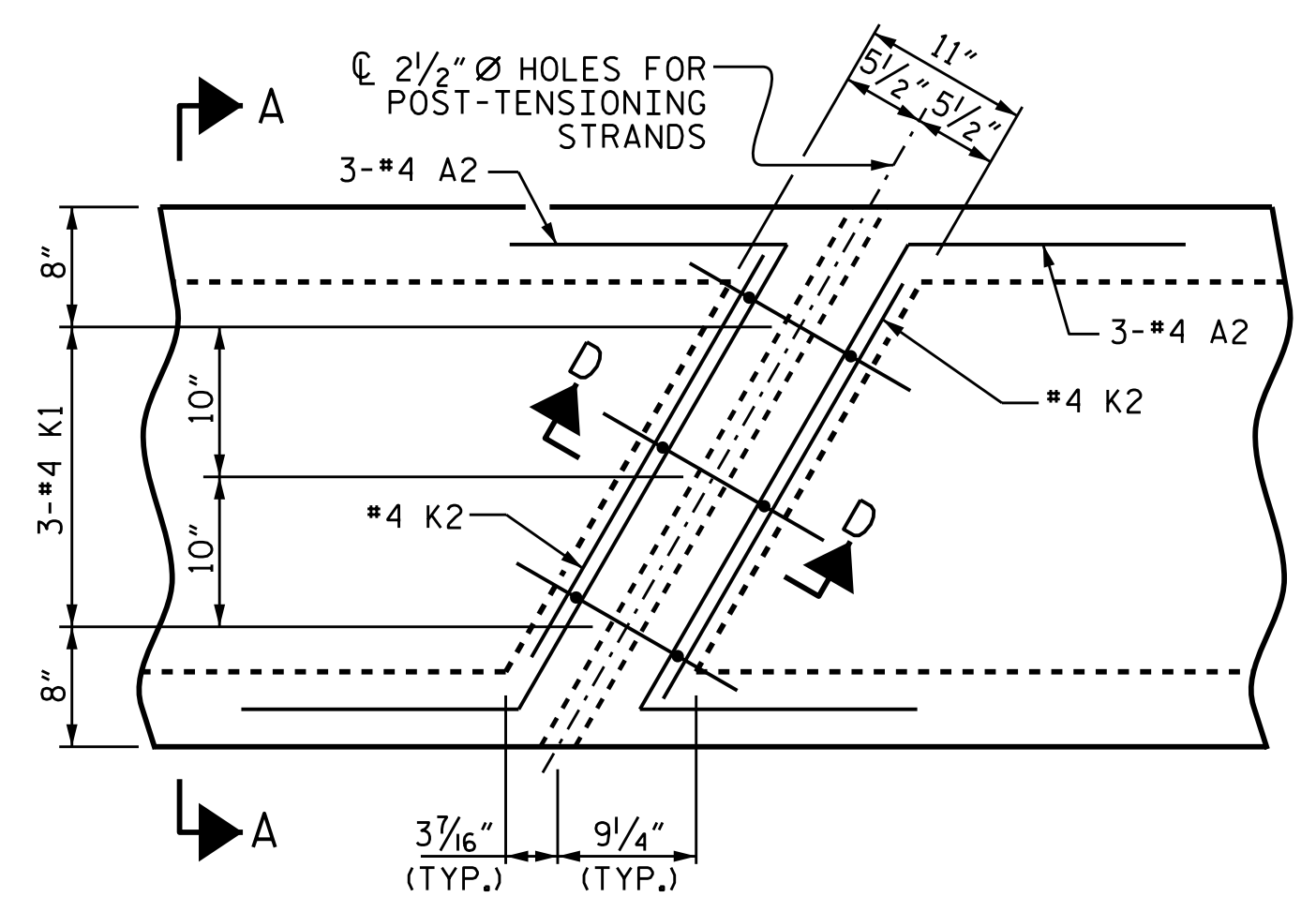
ASSEMBLED BY : A. K. PATEL	DATE : 1/14/16
CHECKED BY : W. F. PARKER	DATE : 3/16
DESIGN ENGINEER OF RECORD : K. P. SEDA	DATE : 6/16
DRAWN BY : DGE II/II	REV. 9/14
CHECKED BY : TMG II/II	MAA/TMG



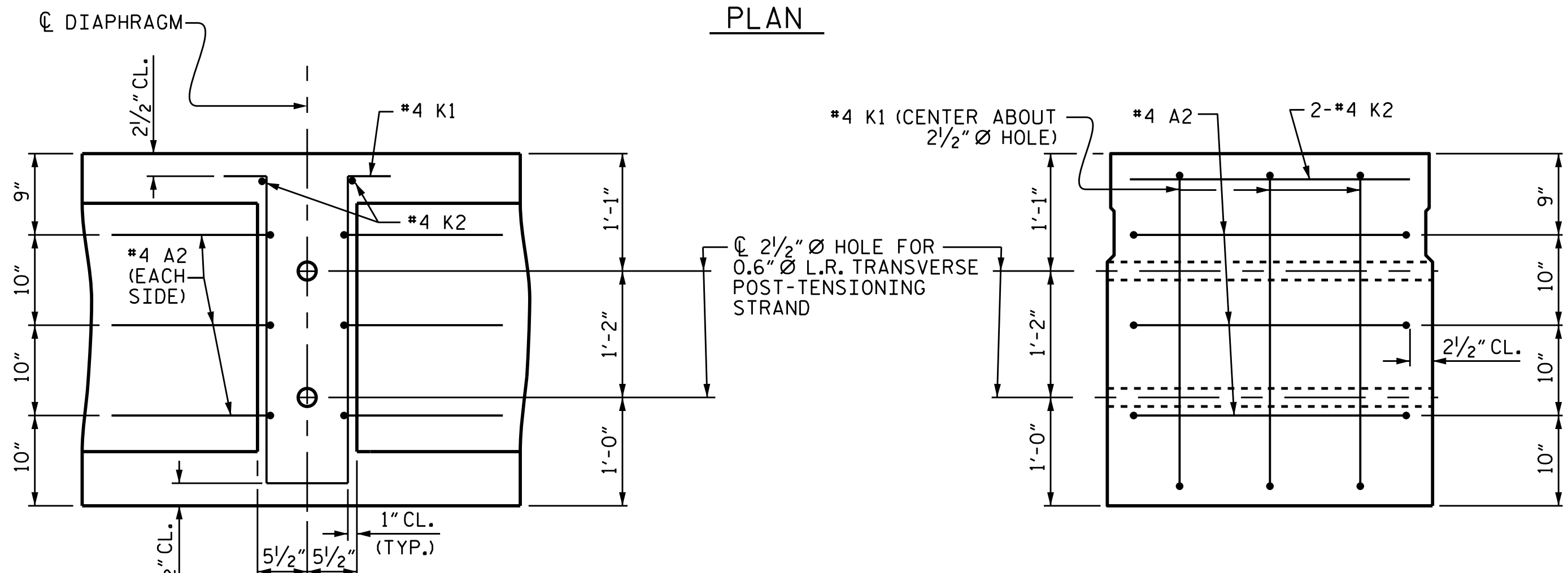
PROJECT NO. **B-5360**
RANDOLPH COUNTY
 STATION: **23+68.00 -L-**
 SHEET 5 OF 7

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN

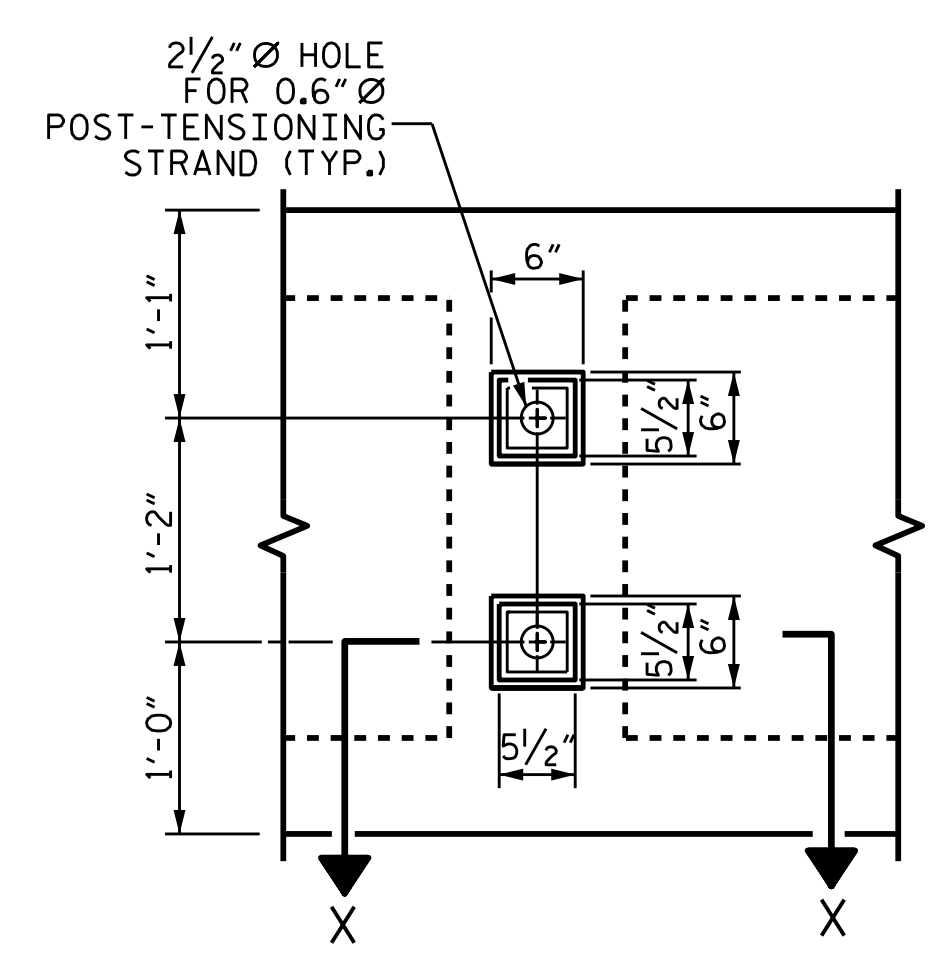


SECTION A-A
VOIDS NOT SHOWN

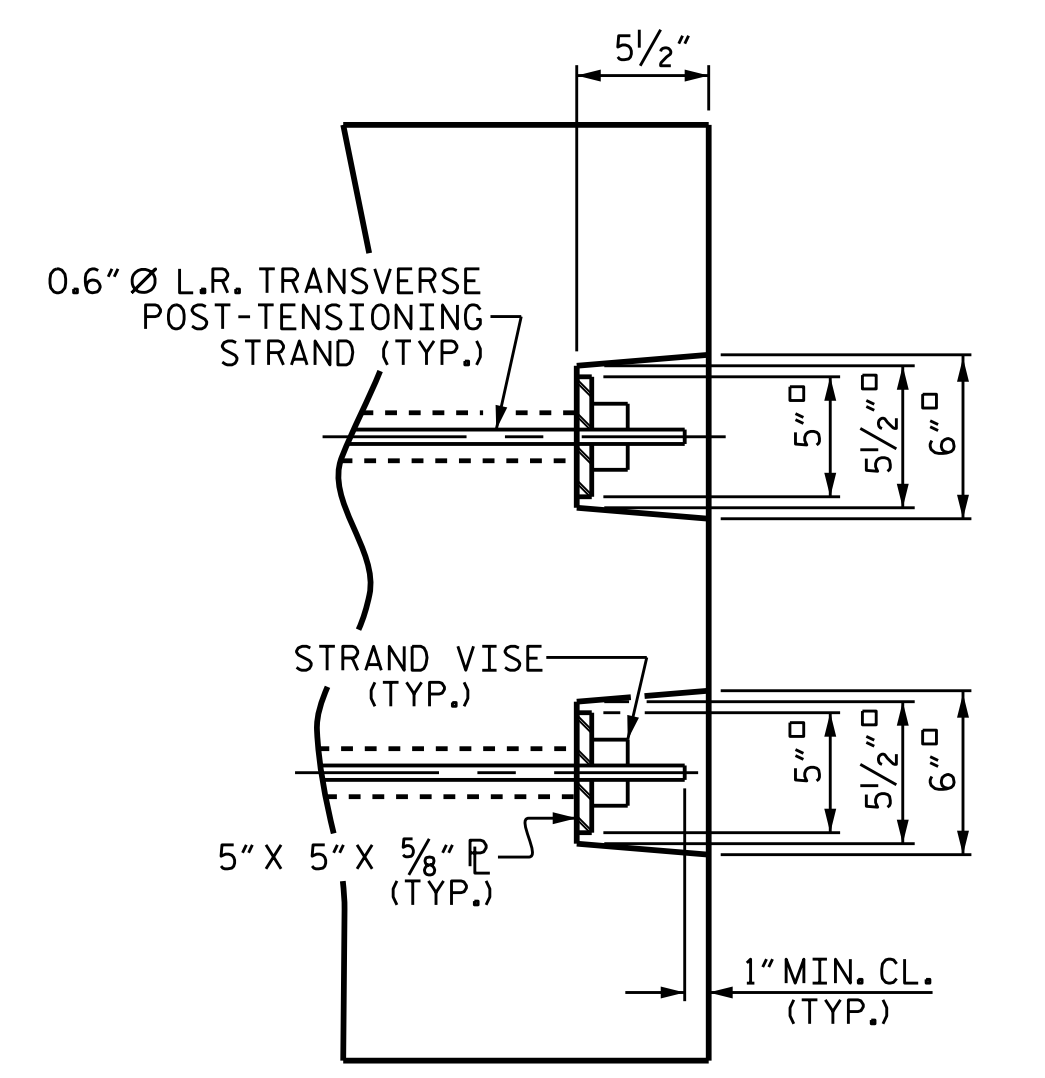
SECTION D-D

DOUBLE DIAPHRAGM DETAILS

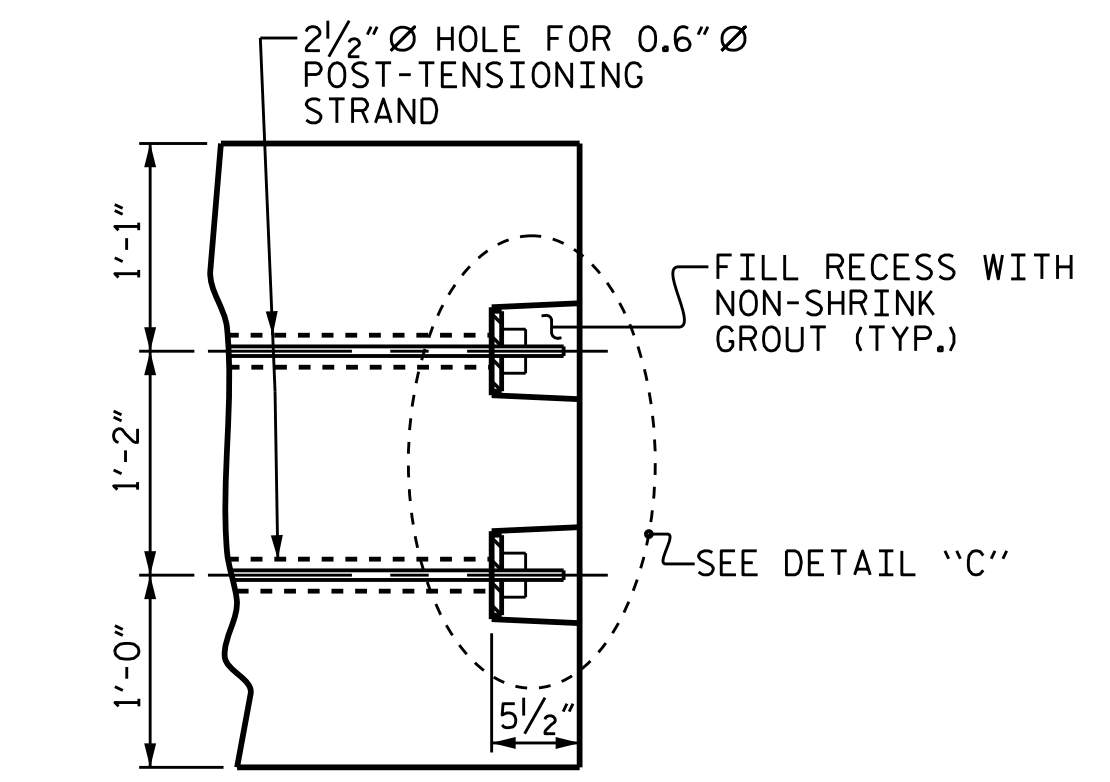
#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.



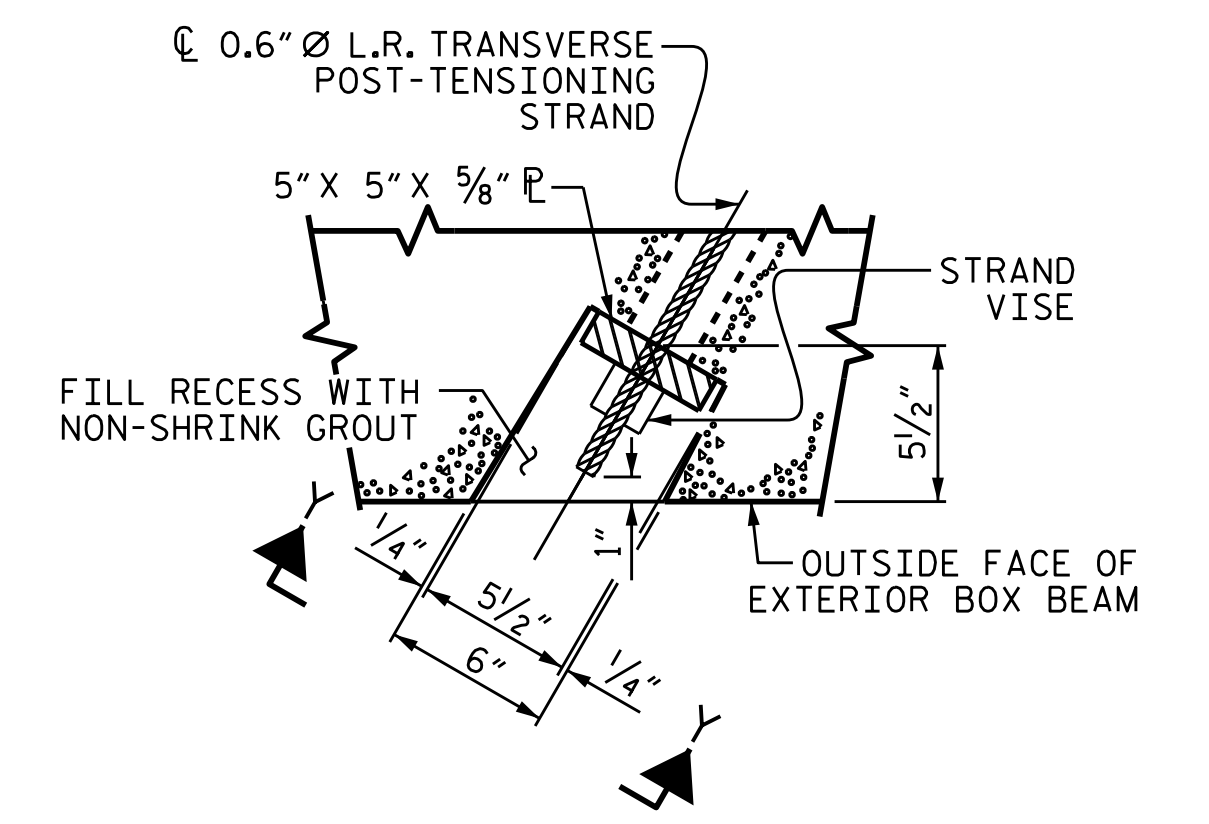
VIEW Y-Y
SHOWING ELEVATION VIEW OF GROUDED RECESS



DETAIL "C"

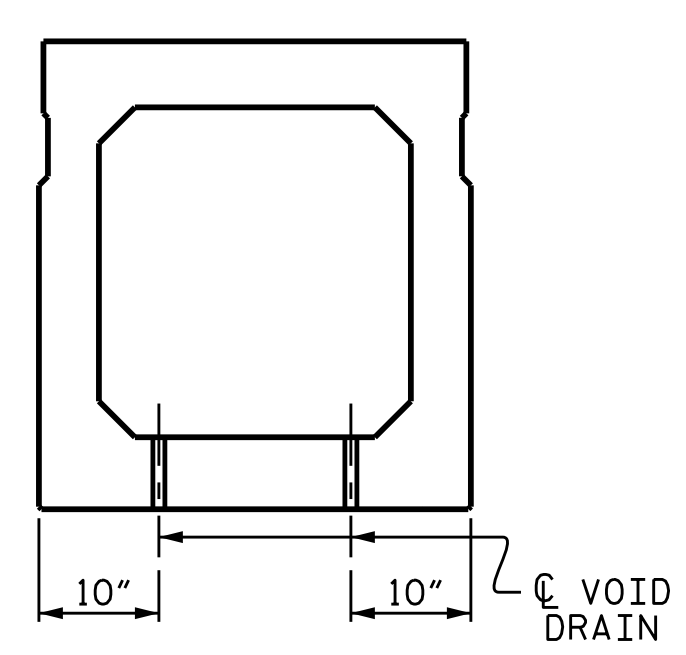


PART SECTION AT RECESS

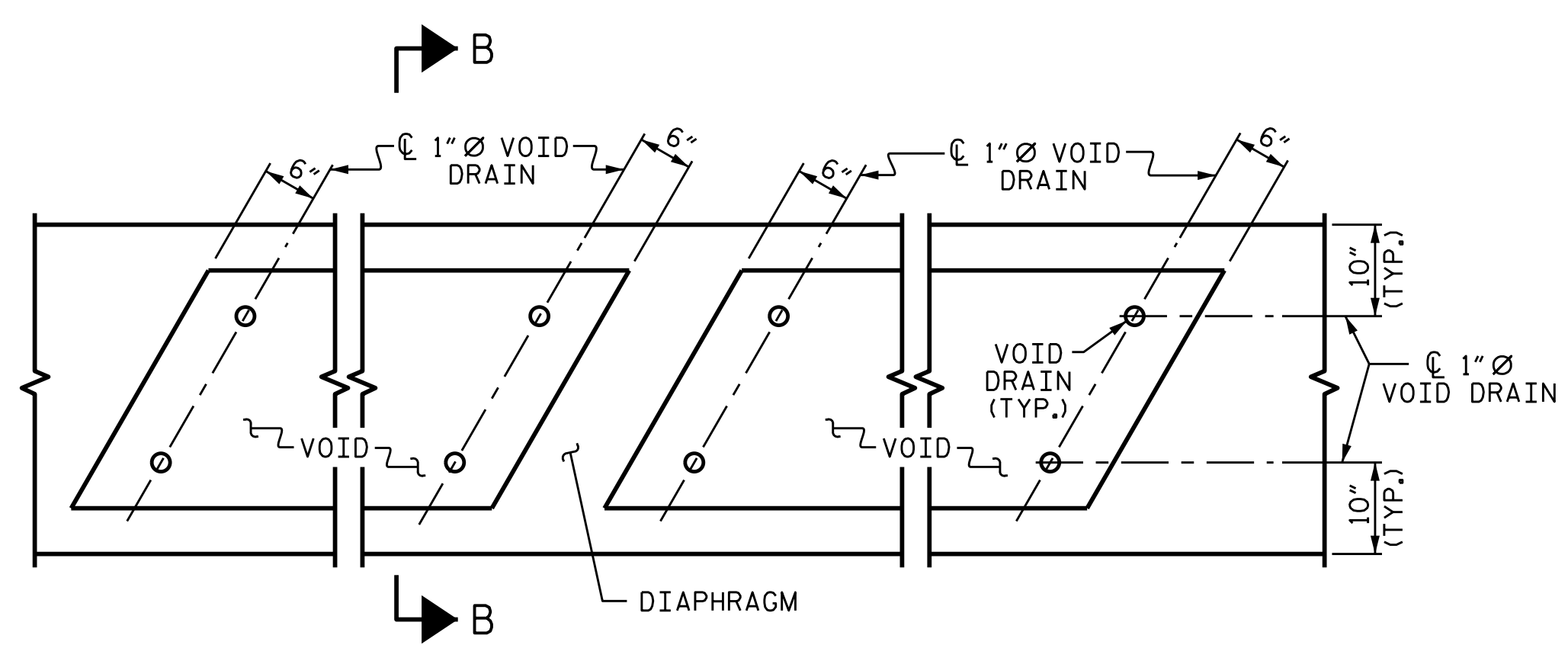


SECTION X-X
SHOWING PLAN VIEW OF GROUDED RECESS

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



SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER			
3'-0" x 3'-3"			
0.6" Ø L.R. STRAND			
	SPAN "A"	SPAN "B"	SPAN "C"
CAMBER (BEAM ALONE IN PLACE)	2/16" ↑	2/16" ↑	1 11/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	1/16" ↓	1/16" ↓	3/8" ↓
FINAL CAMBER	1" ↑	1" ↑	1 5/16" ↑

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-5360
RANDOLPH COUNTY
STATION: 23+68.00 -L-

SHEET 6 OF 7

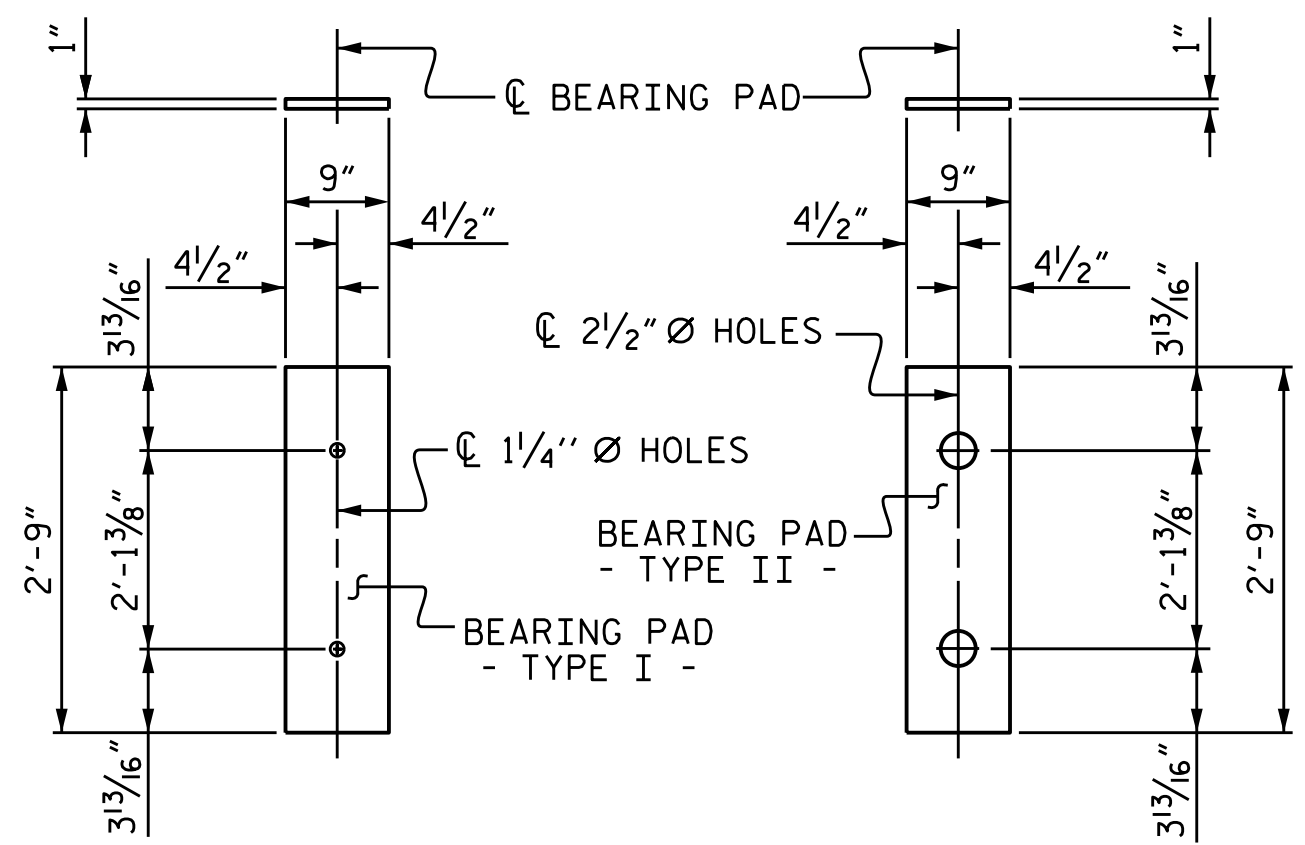


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT

ASSEMBLED BY : A. K. PATEL DATE : 1/14/16
CHECKED BY : W. F. PARKER DATE : 3/16
DRAWN BY : DGE II/II REV. 8/14 MAA/TMG
CHECKED BY : TMG II/II

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			38

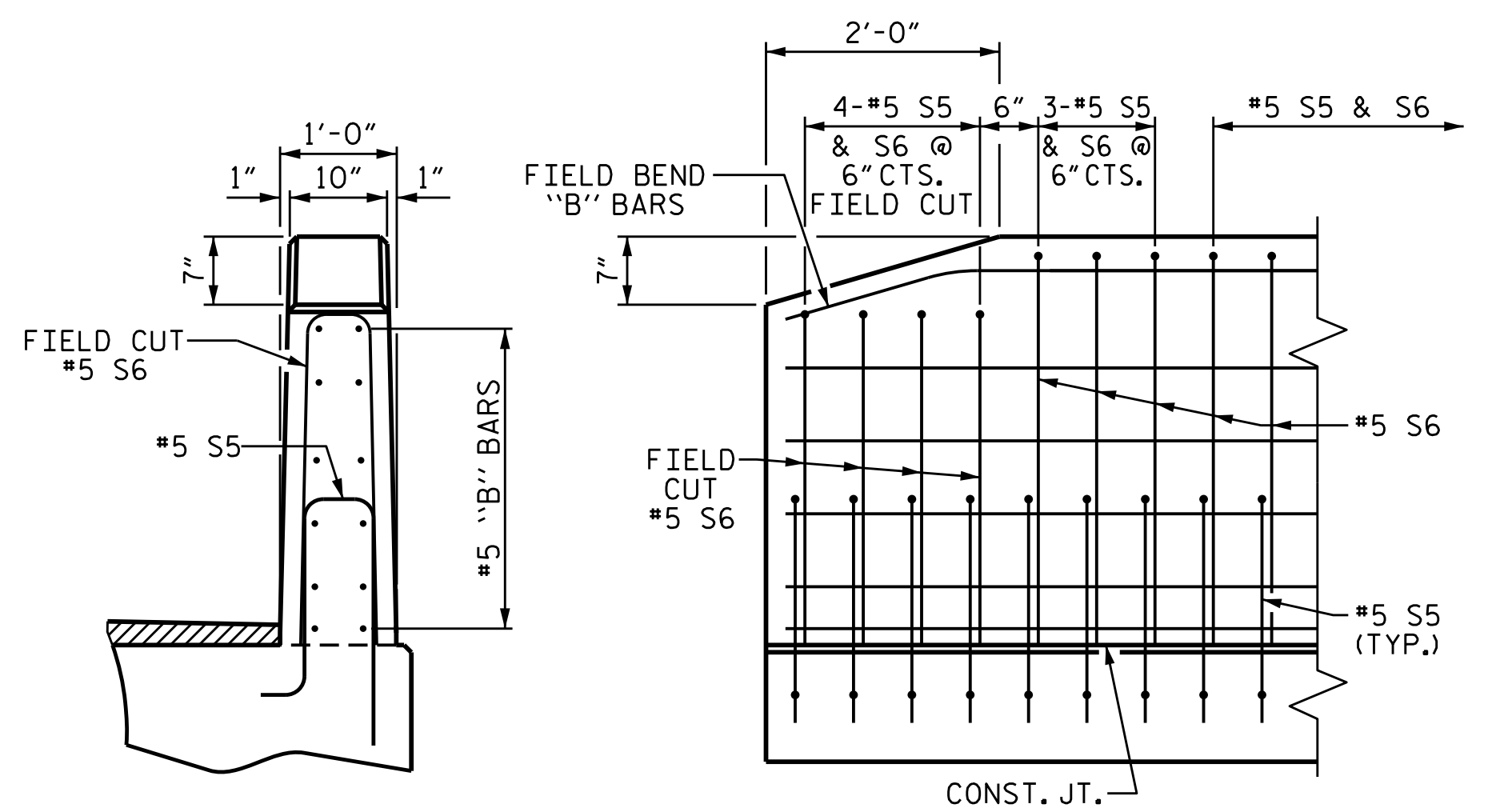


FIXED END
(TYPE I - 40 REQ'D.)

EXPANSION END
(TYPE II - 20 REQ'D.)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



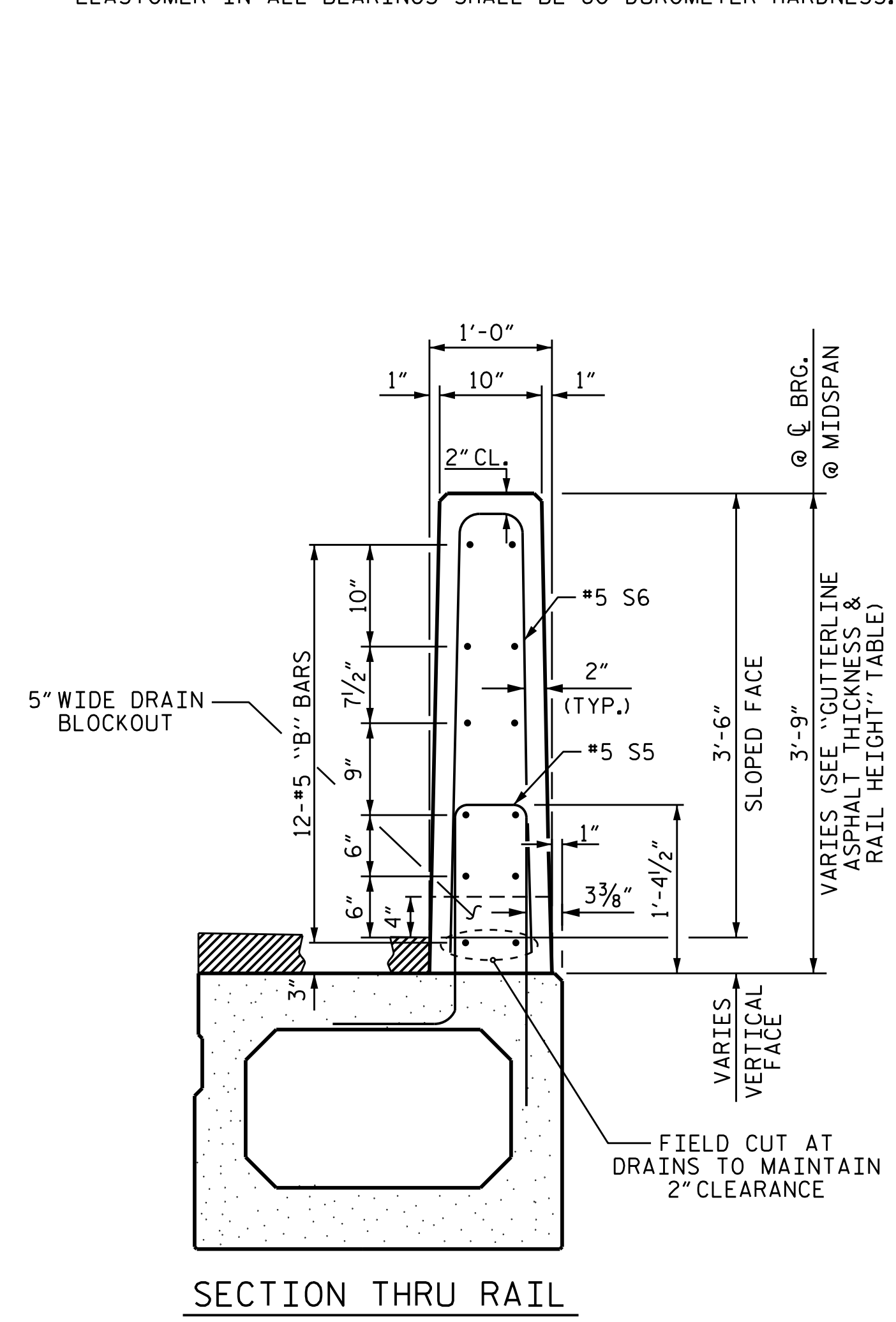
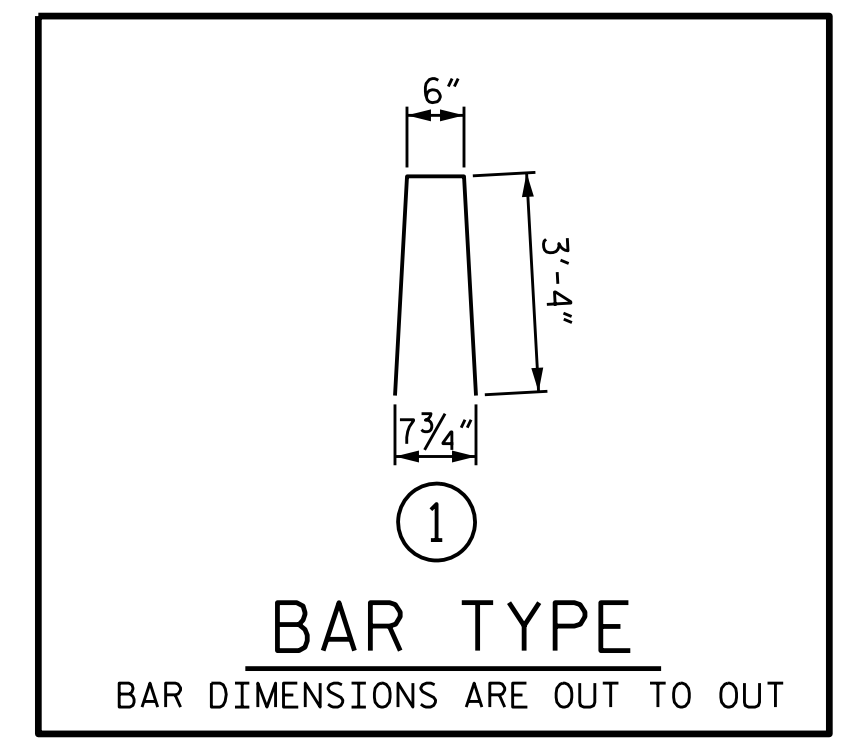
END VIEW

SIDE VIEW

END OF RAIL DETAILS

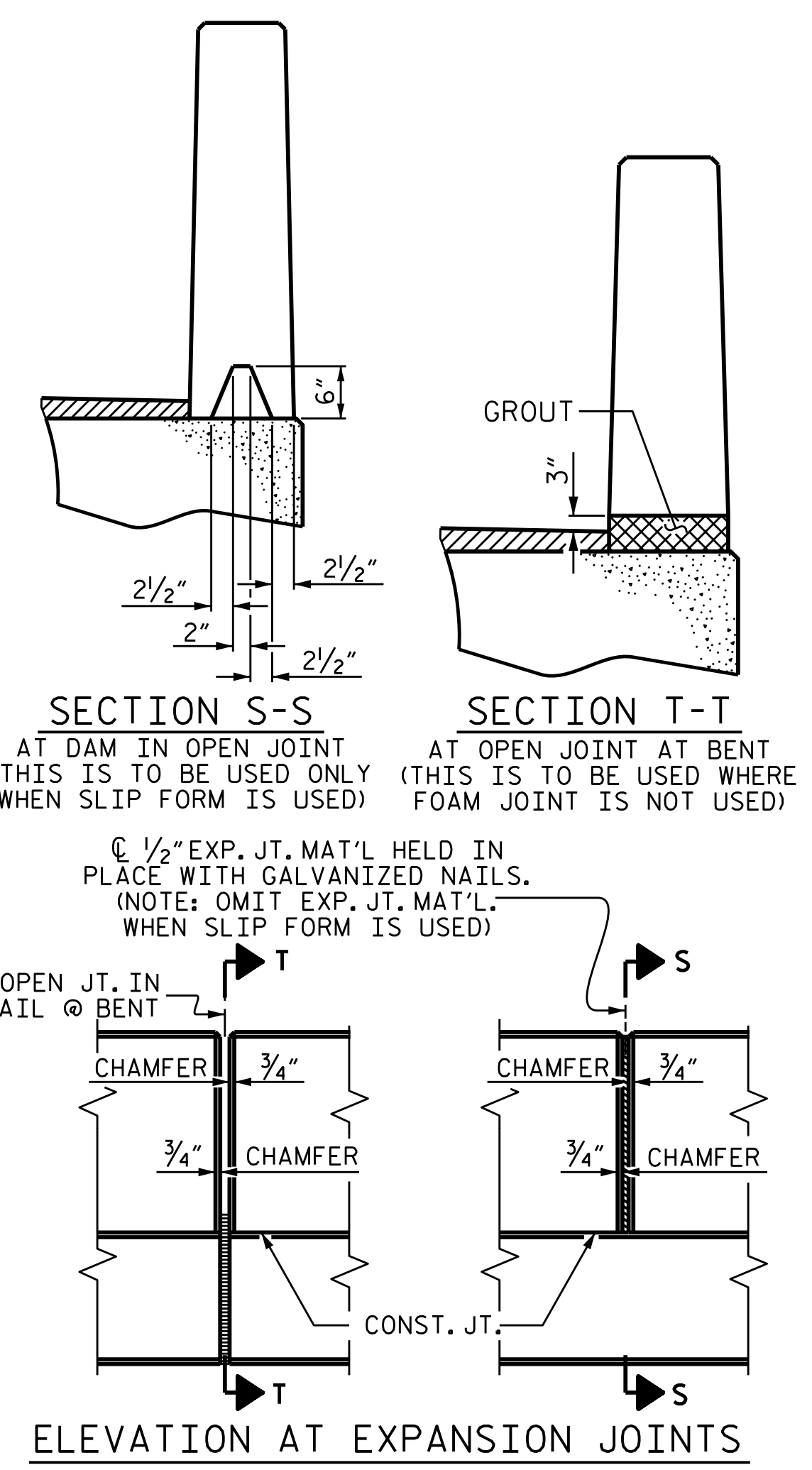
BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	4	104'-10 1/4"	419'-5"
INTERIOR B.B.	16	104'-10 1/4"	1677'-8"
EXTERIOR B.B.	2	80'-0"	160'-0"
INTERIOR B.B.	8	80'-0"	640'-0"
TOTAL	30		2897'-1"

CONCRETE RELEASE STRENGTH	
UNIT	PSI
104'-10 1/4" UNITS	6200
80'-0" UNITS	5000



SECTION THRU RAIL

VERTICAL CONCRETE BARRIER RAIL DETAILS



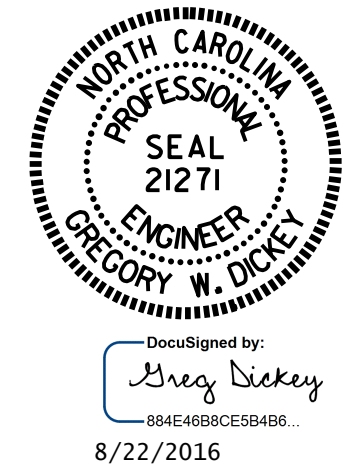
ELEVATION AT EXPANSION JOINTS

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL (FOR ONE SPAN - 2 REQUIRED)					
BAR	BARS PER PAIR OF EXTERIOR UNITS 104'-10 1/4" UNIT	SIZE	TYPE	LENGTH	WEIGHT
*B12	192	#5	STR	14'-11"	2987
*S6	280	#5	1	7'-2"	2093
*EPOXY COATED REINFORCING STEEL				LBS.	5080
CLASS AA CONCRETE				CU.YDS.	27.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	209.71

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS 80' UNIT	SIZE	TYPE	LENGTH	WEIGHT
*B8	144	#5	STR	15'-2"	2278
*S6	214	#5	1	7'-2"	1600
*EPOXY COATED REINFORCING STEEL				LBS.	3878
CLASS AA CONCRETE				CU.YDS.	20.7
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	160.00
					TOTAL LN. FT. = 579.42

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
104'-10 1/4" UNITS	2"	3'-8"
80' UNITS	1 1/16"	3'-7 1/16"

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-
 SHEET 7 OF 7



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

ASSEMBLED BY : A. K. PATEL DATE : 1/15/16
 CHECKED BY : W. F. PARKER DATE : 3/16
 DRAWN BY : DGE 10/11 REV. 4/15 MAA/TMG
 CHECKED BY : TMG 11/11

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			38

NOTES

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

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

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

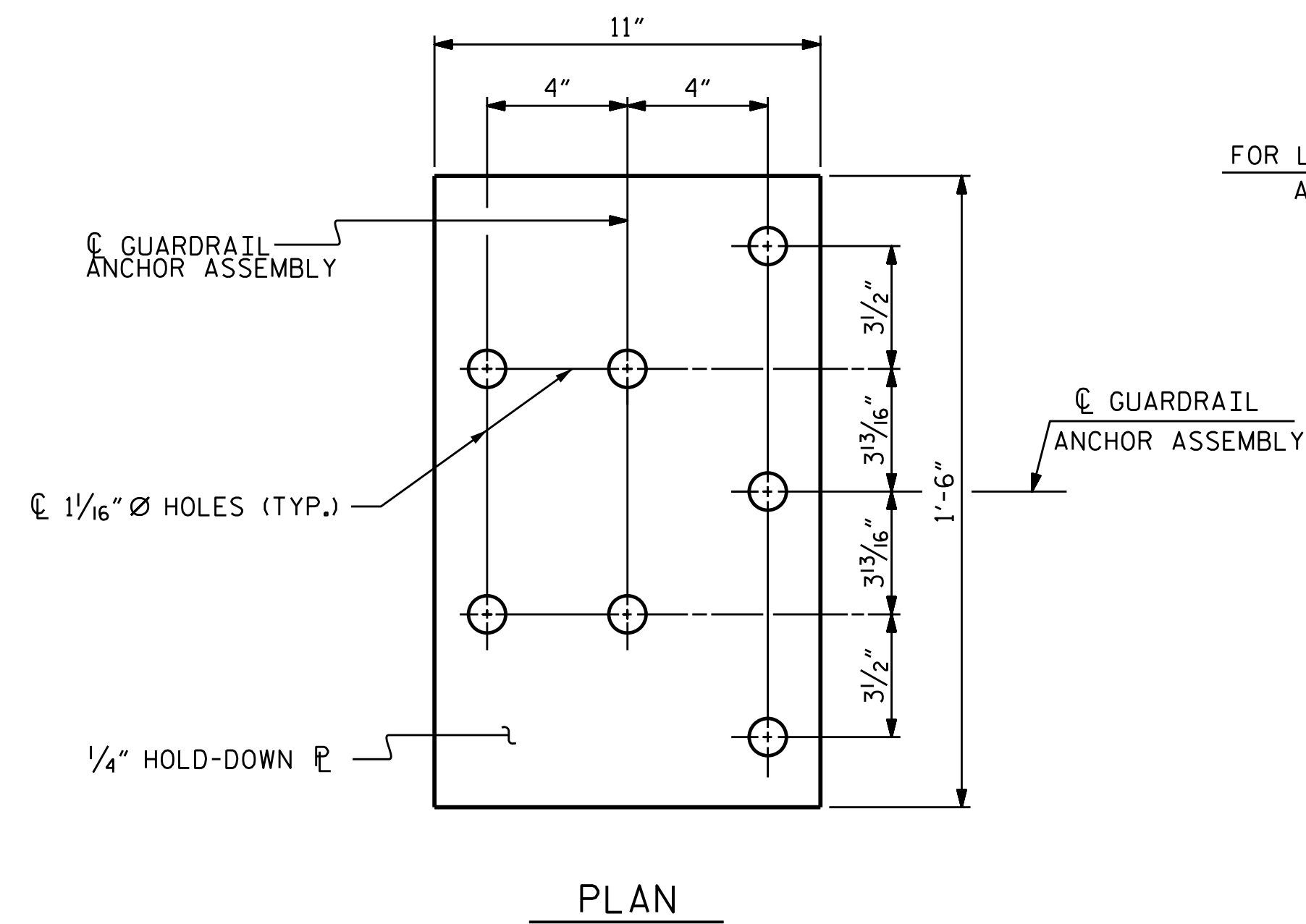
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

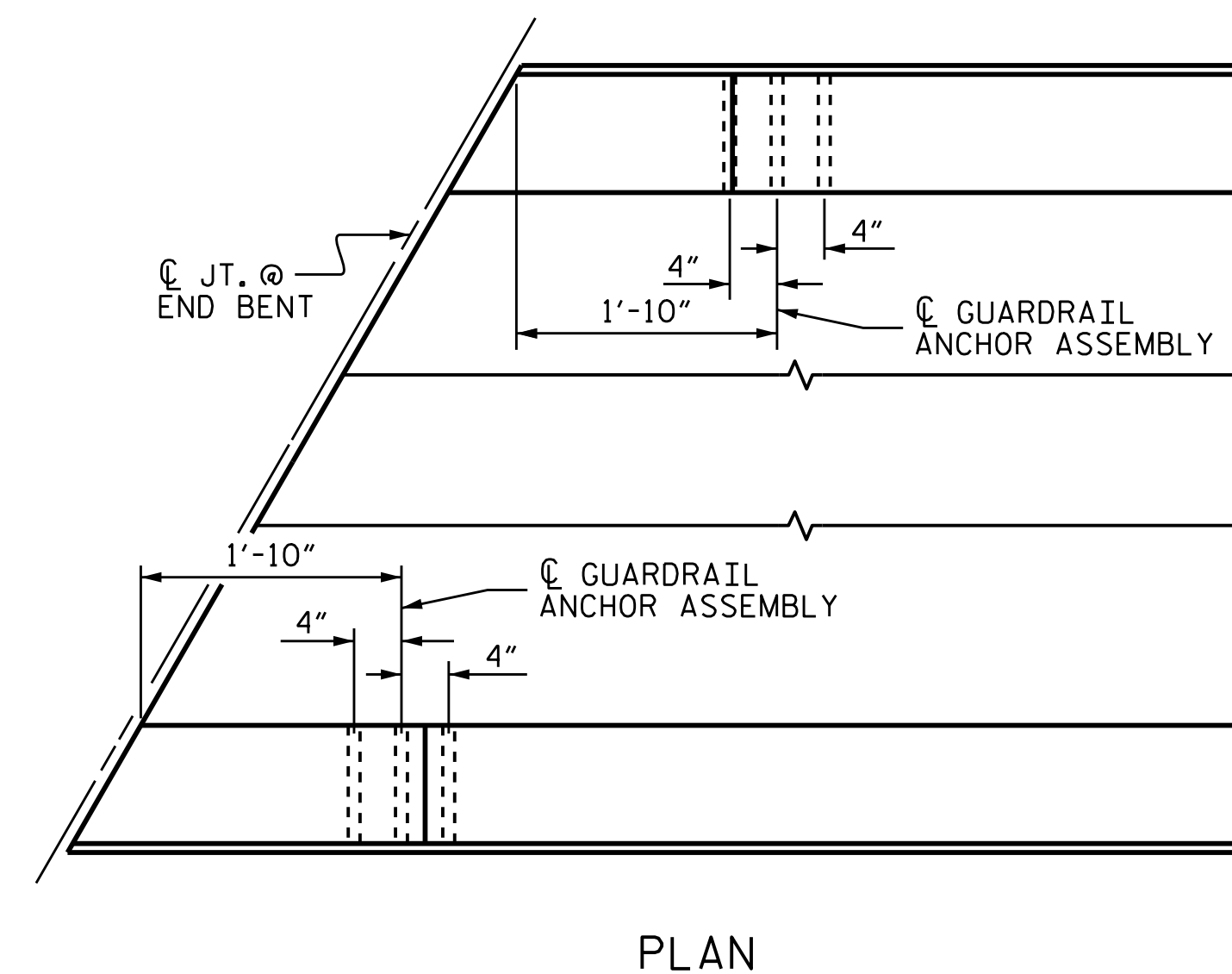
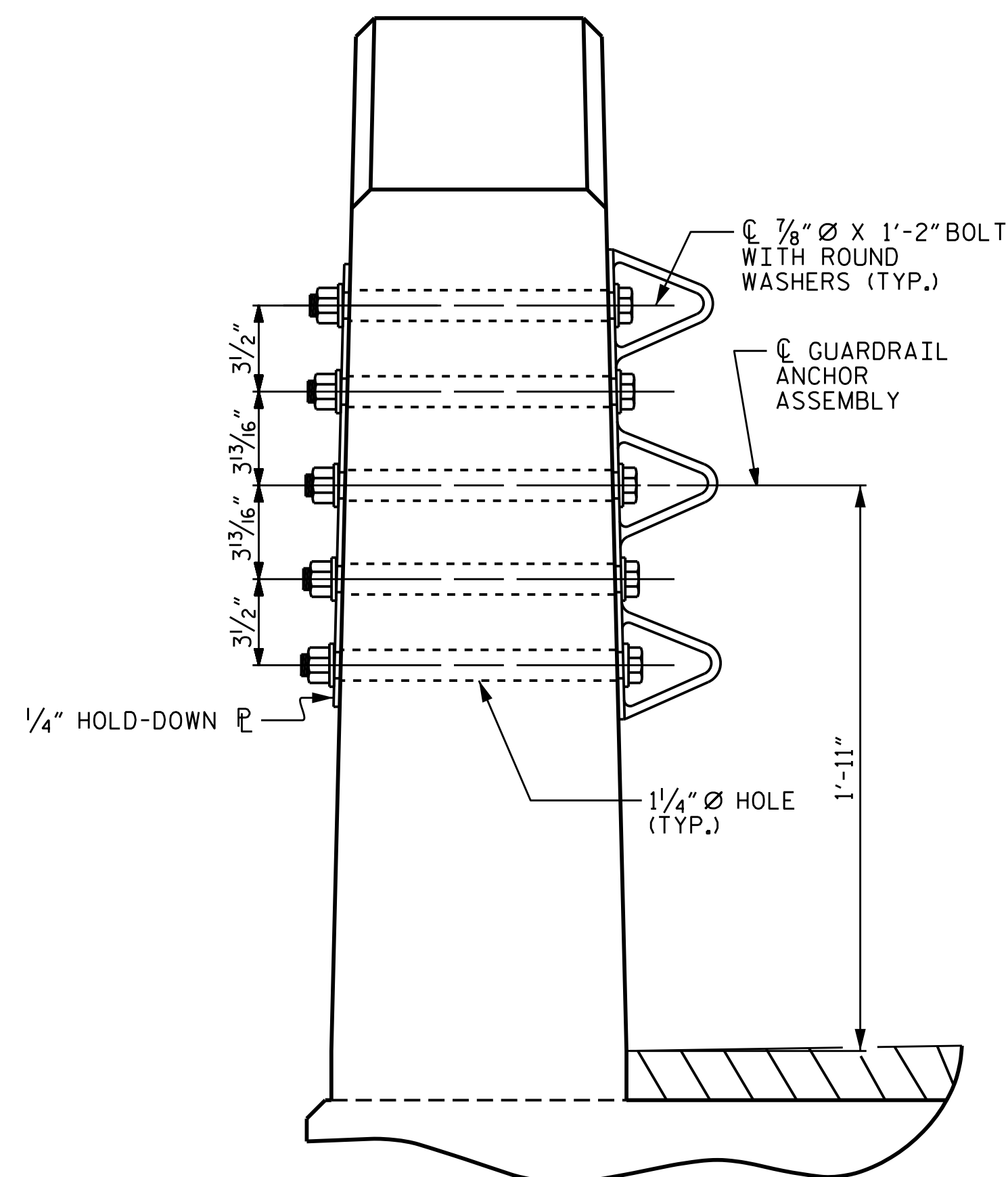
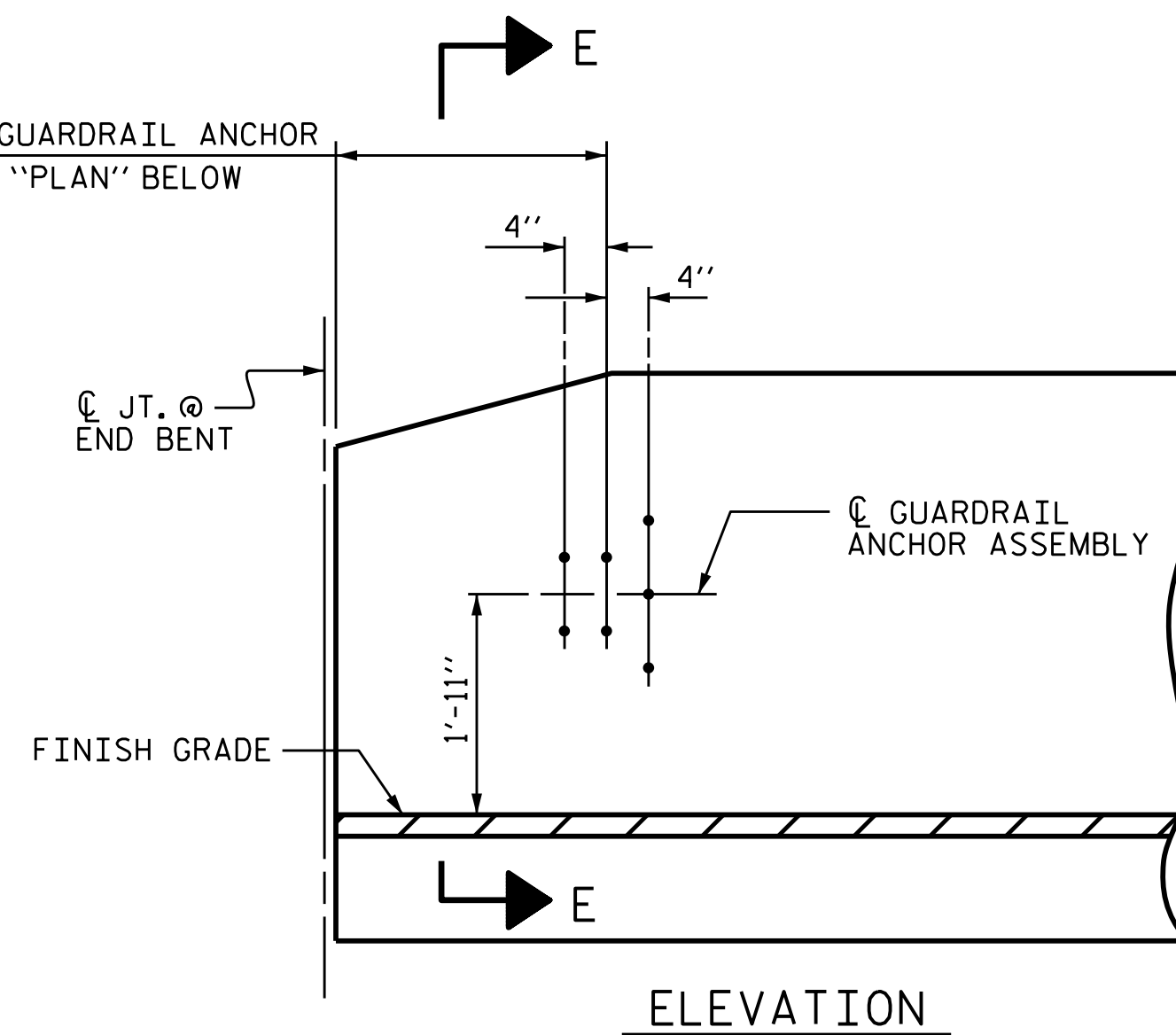
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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

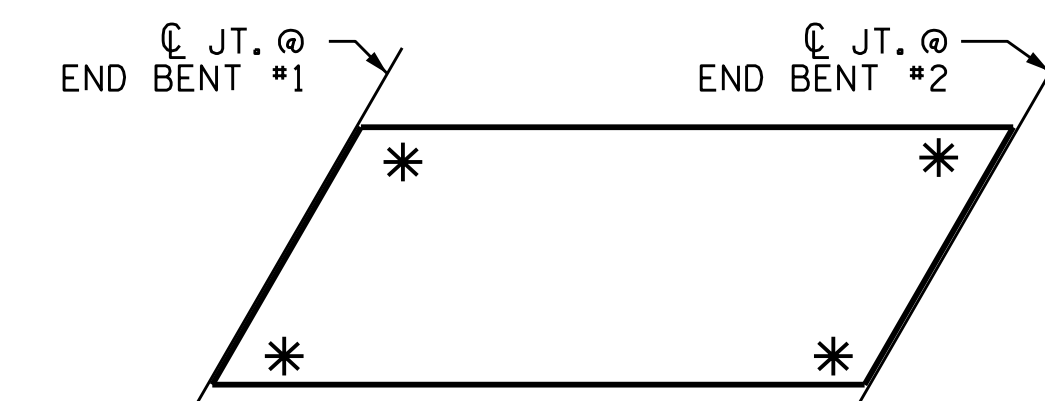


FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



LOCATION OF ANCHORS FOR GUARDRAIL

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



* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-



DocuSigned by:
 Gregory W. Dickey
 8/22/2016

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

ASSEMBLED BY : A. K. PATEL	DATE : 1/19/16
CHECKED BY : W. F. PARKER	DATE : 3/16
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			38

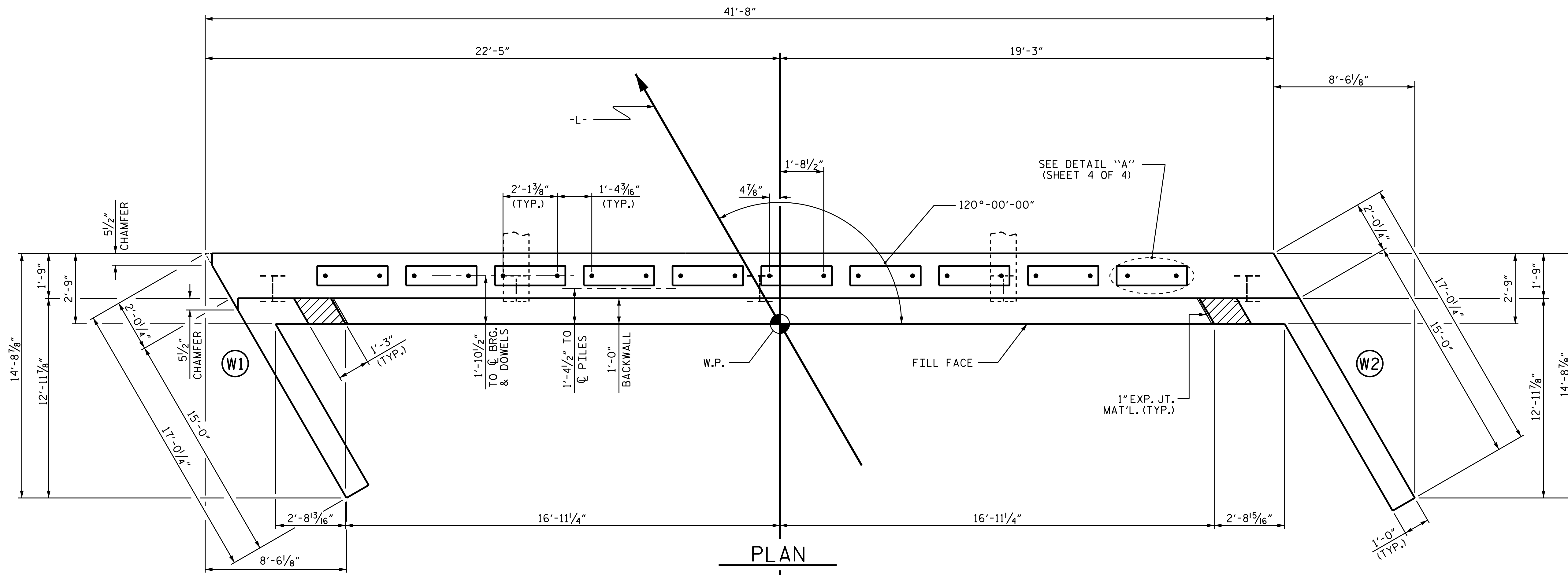
NOTES

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

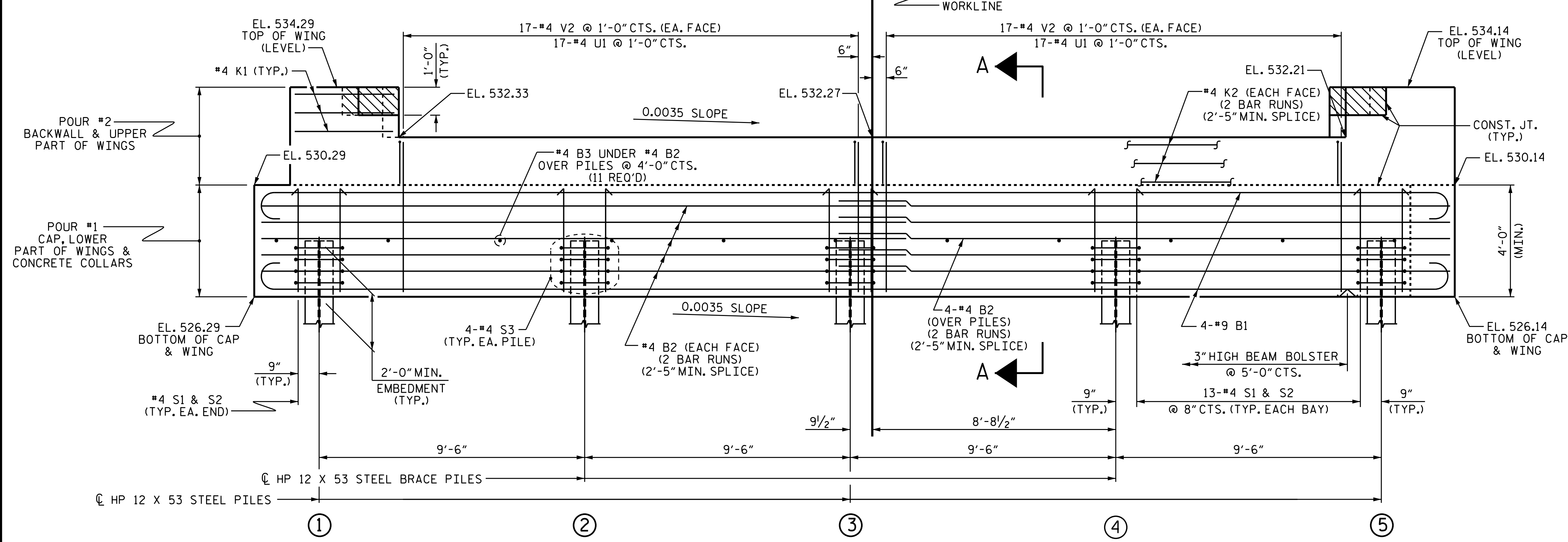
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
PILES 1 THRU 5	528.29

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-
 SHEET 1 OF 4



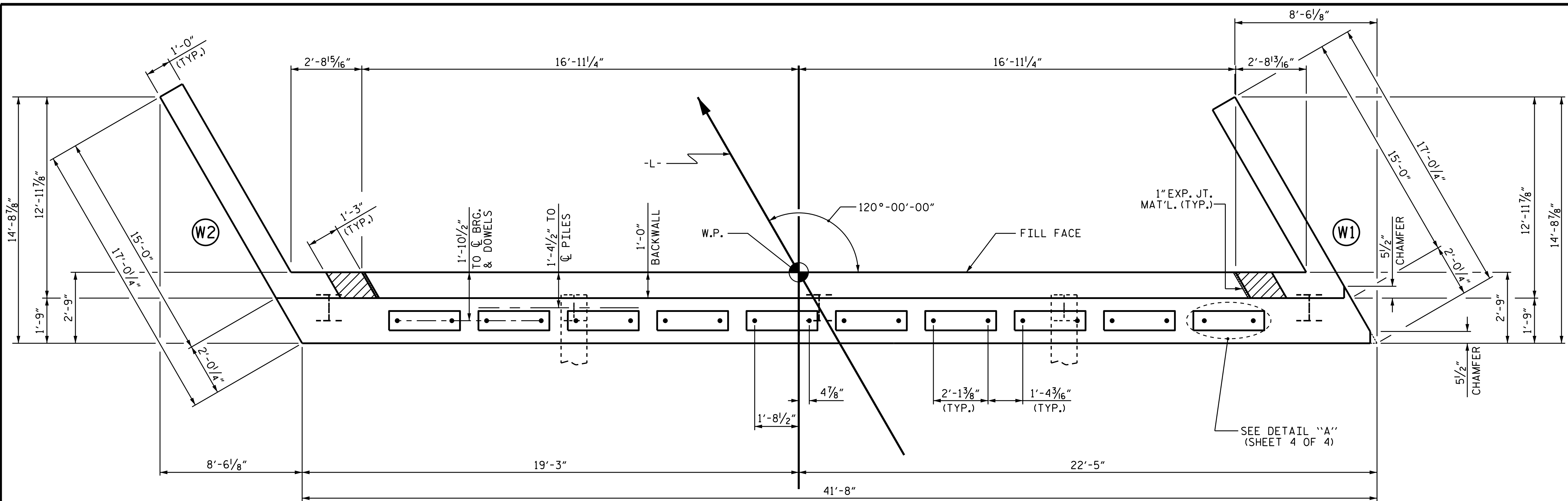
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT No. 1

ASSEMBLED BY : A. K. PATEL DATE : 11/24/15
 CHECKED BY : W. F. PARKER DATE : 3/16
 DRAWN BY : WJH 12/11 REV. 4/15 MAA/TMG
 CHECKED BY : AAC 12/11

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 4 OF 4.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			38

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

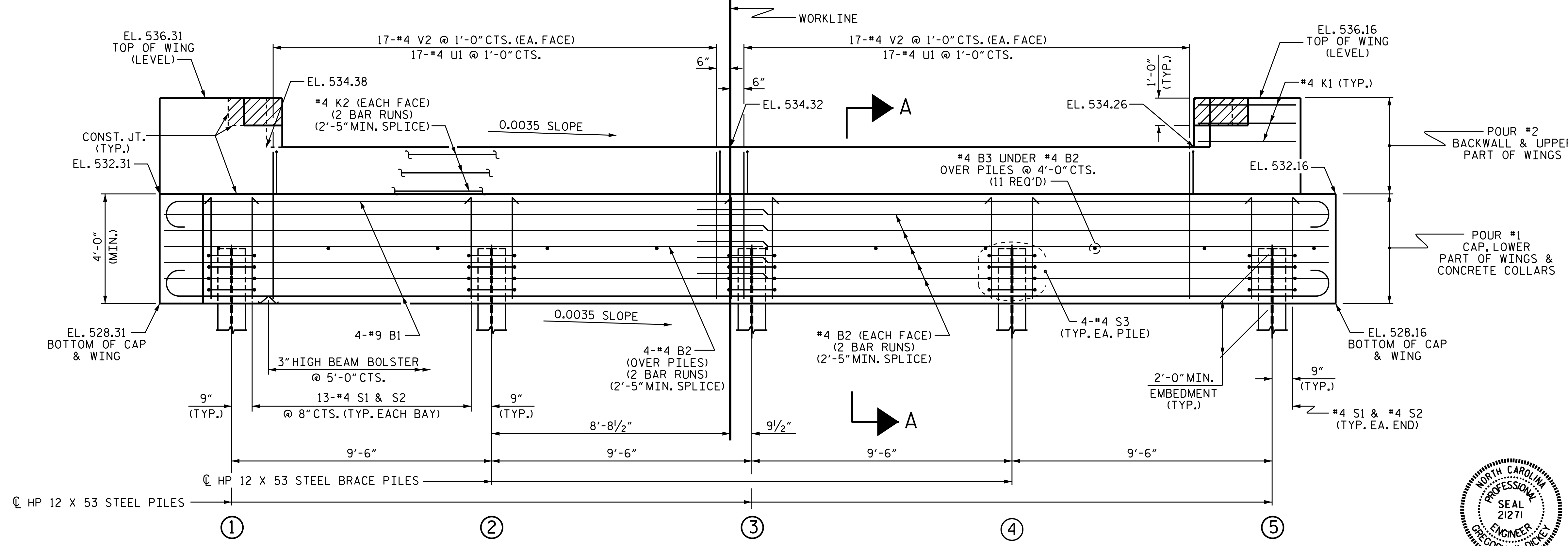


PLAN

TOP OF PILE ELEVATIONS	
PILES 1 THRU 5	530.31

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
 FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
 FOR WING DETAILS, SEE SHEET 3 OF 4.



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 4 OF 4.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 2 OF 4



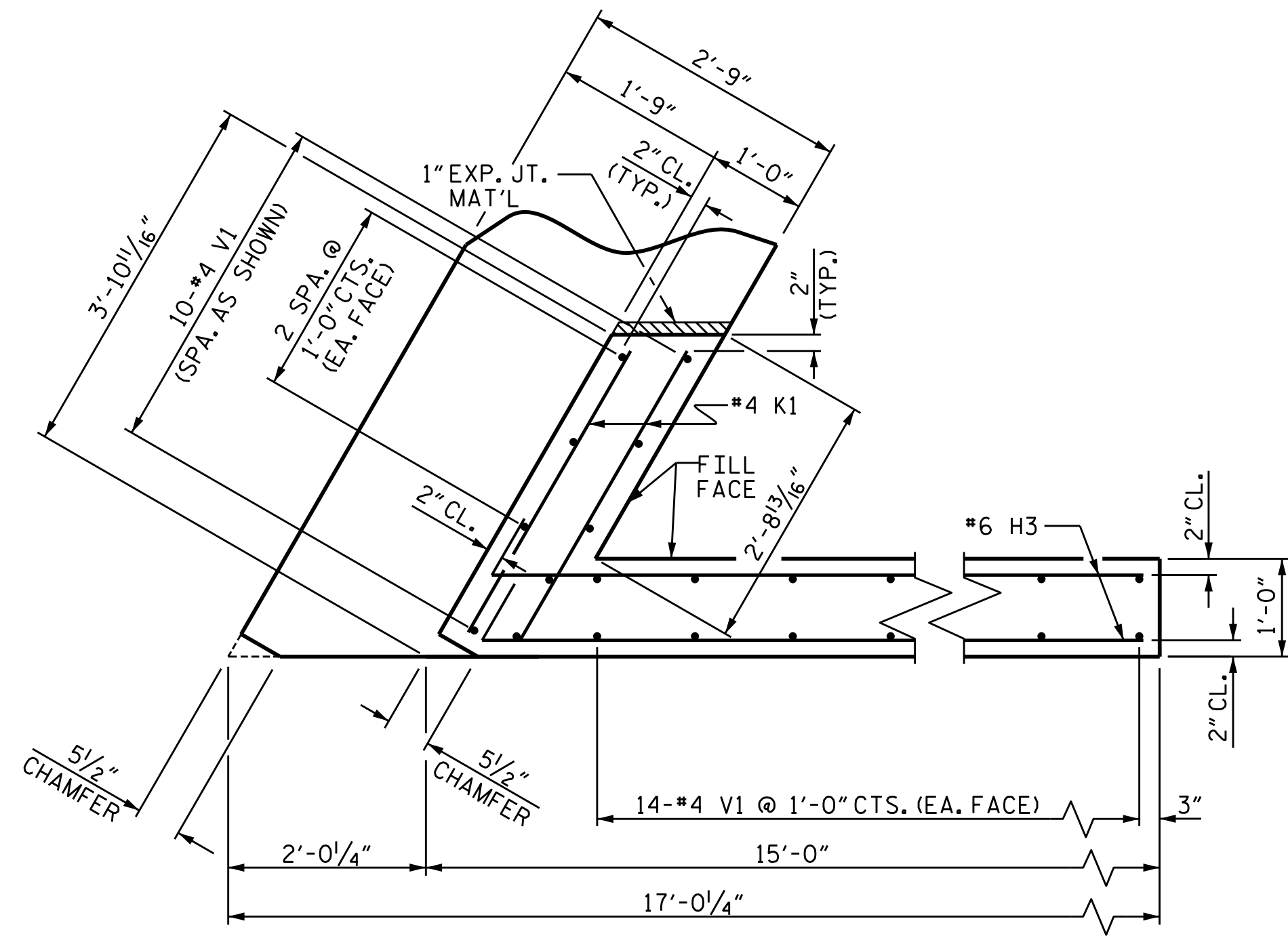
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2

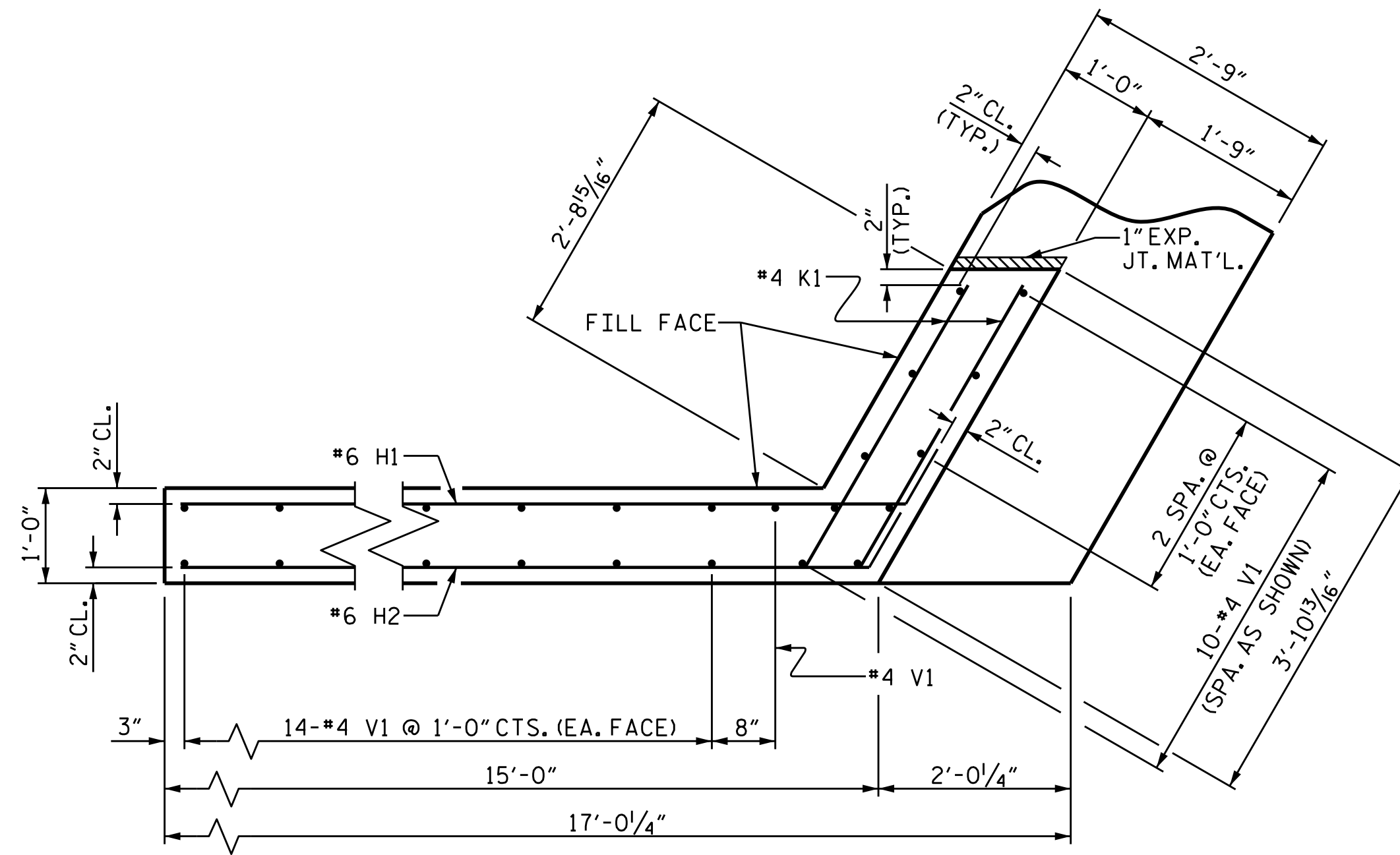
ASSEMBLED BY : A. K. PATEL	DATE : 11/24/15
CHECKED BY : W. F. PARKER	DATE : 3/16
DRAWN BY : WJH 12/11	REV. 4/15
CHECKED BY : AAC 12/11	MAA/TMG

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			38

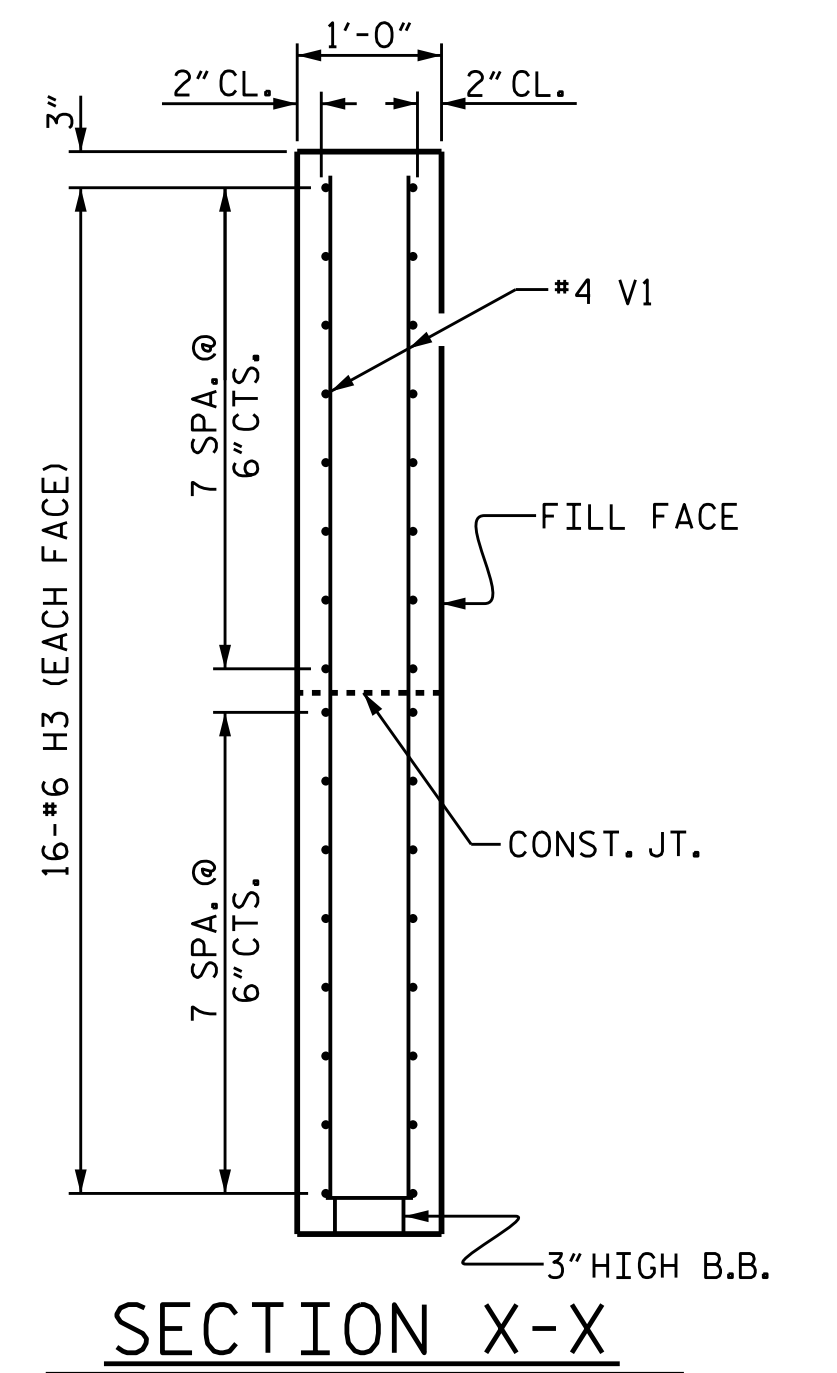
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



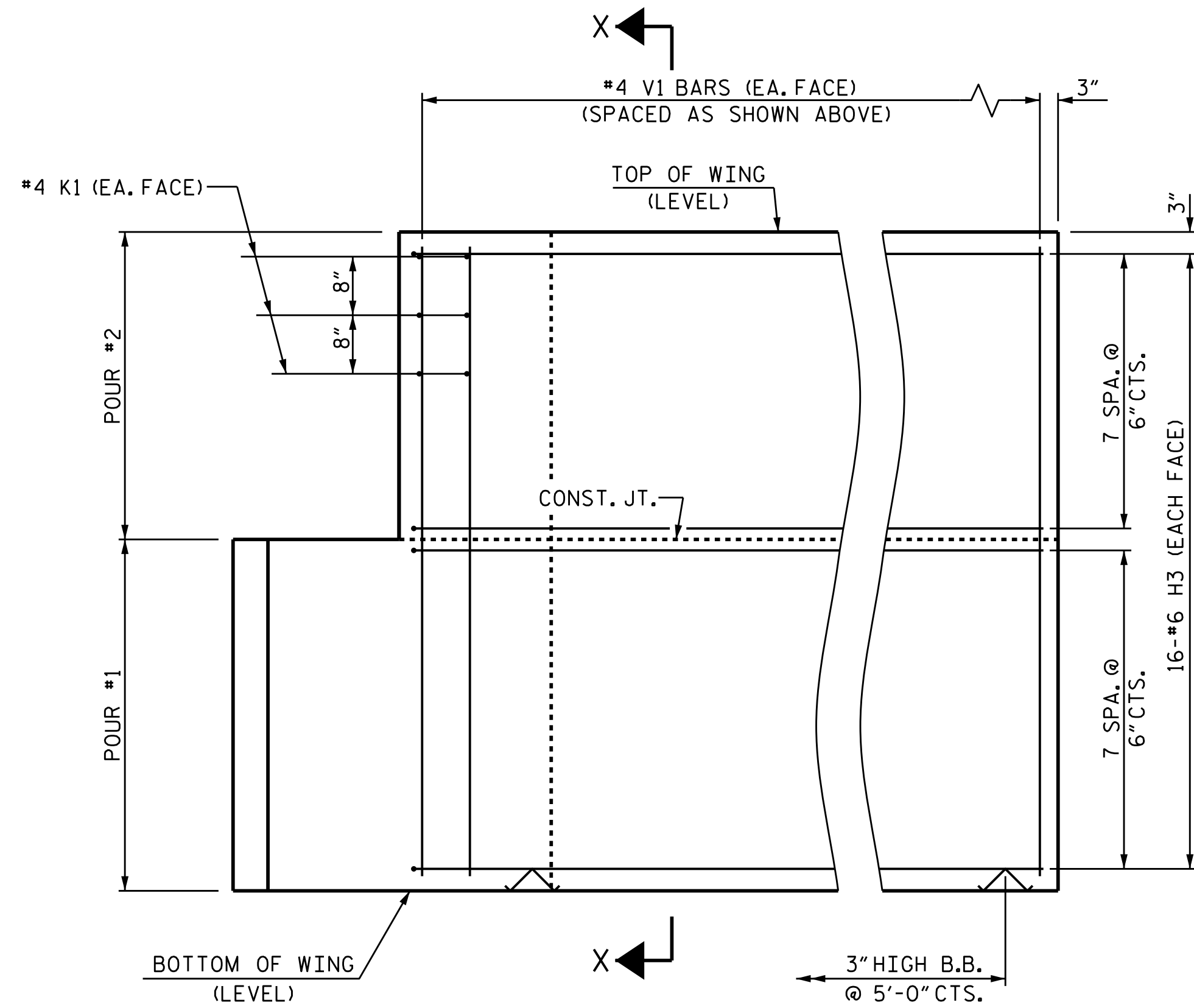
PLAN OF WING (W1)



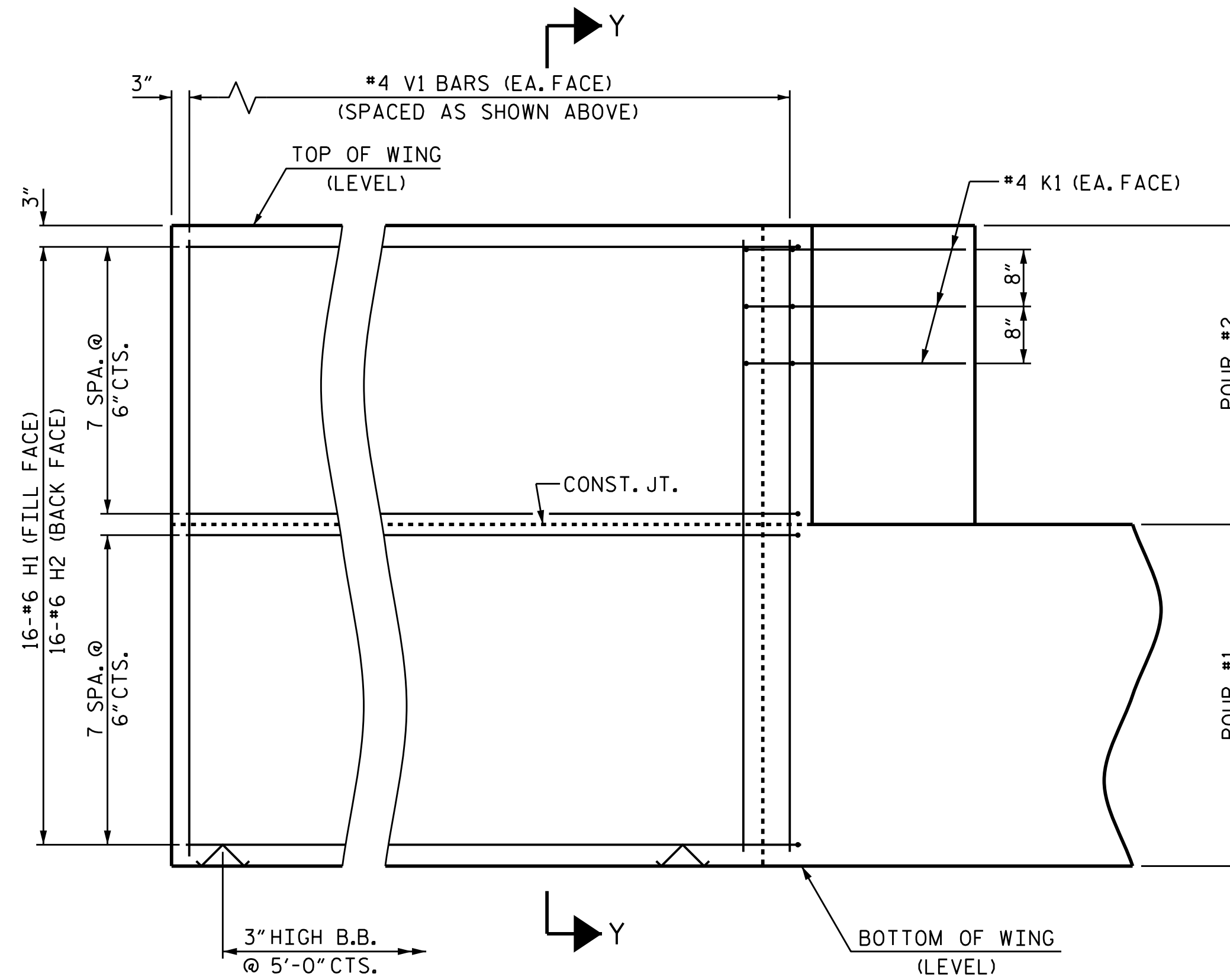
PLAN OF WING (W2)



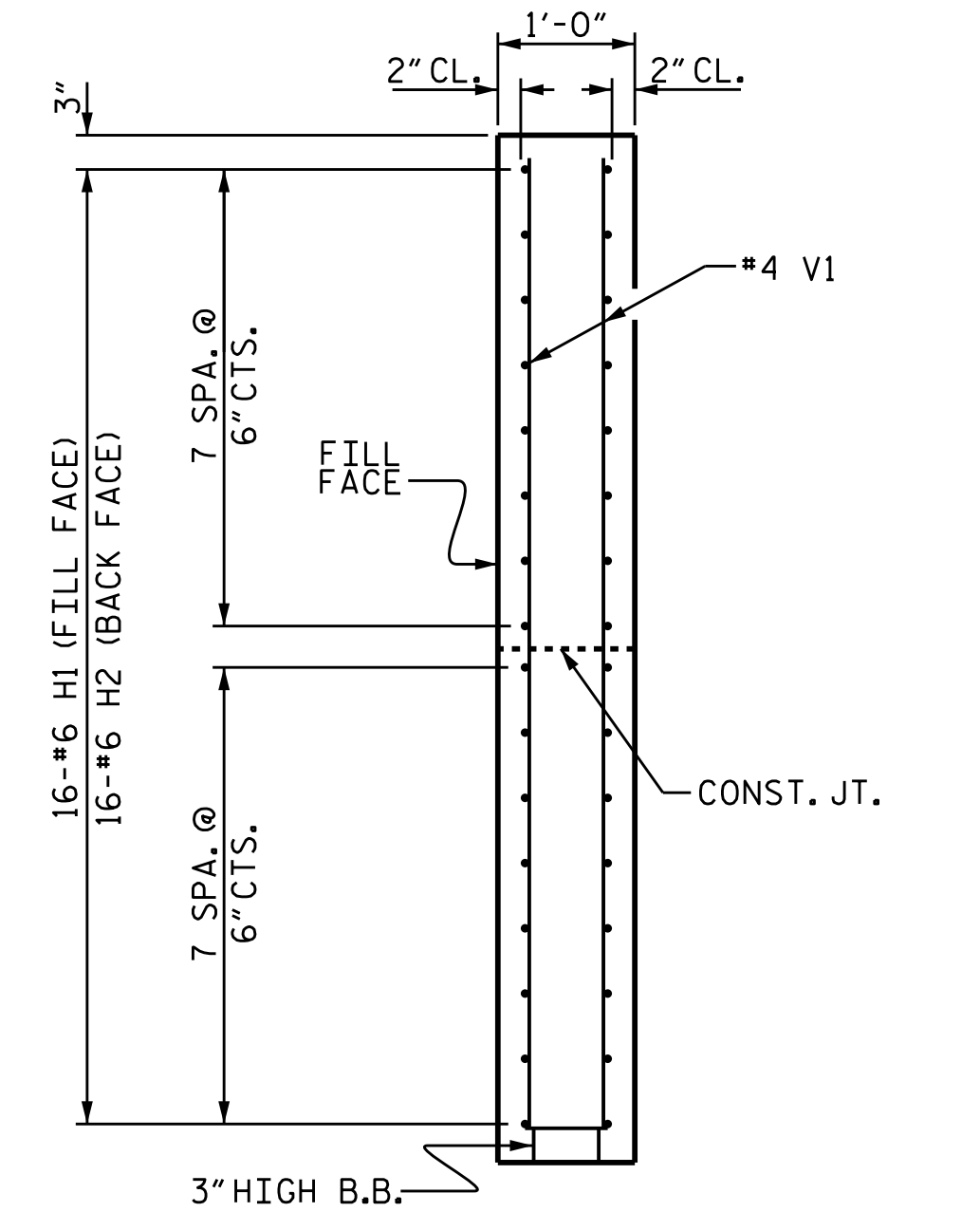
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. B-5360
 RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 3 OF 4



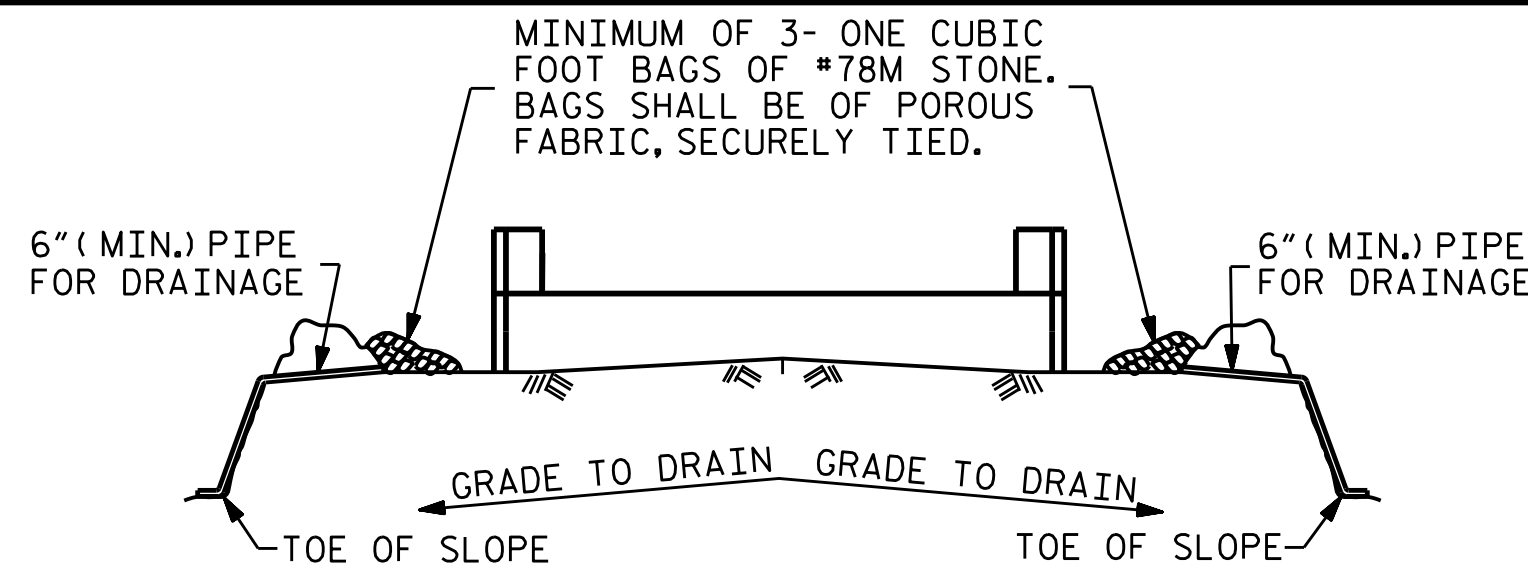
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT
 WING DETAILS

ASSEMBLED BY : A. K. PATEL	DATE : 11/24/15
CHECKED BY : W. F. PARKER	DATE : 3/16
DRAWN BY : WJH 12/11	REV. 4/15
CHECKED BY : AAC 12/11	MAA/TMG

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			38

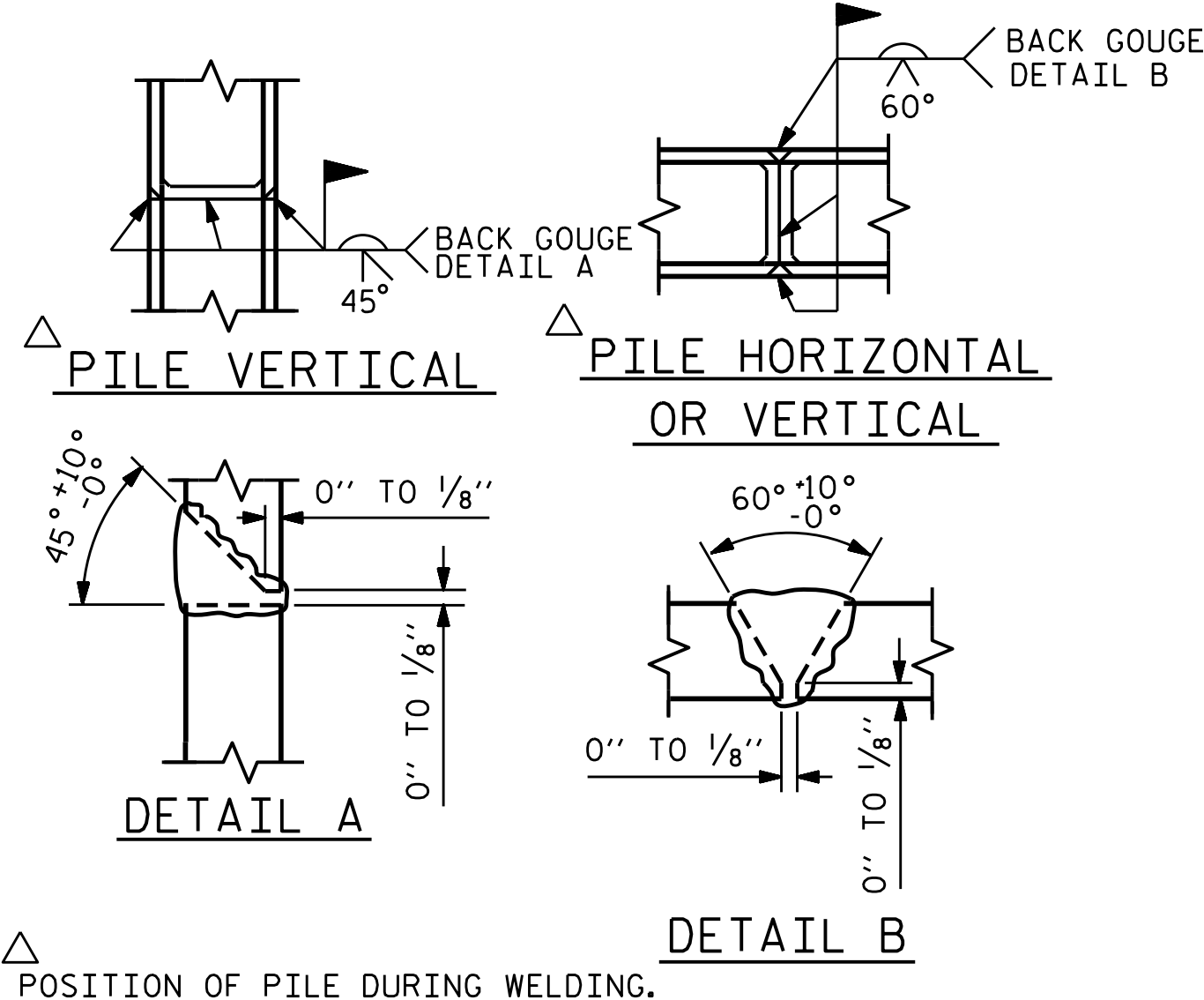


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

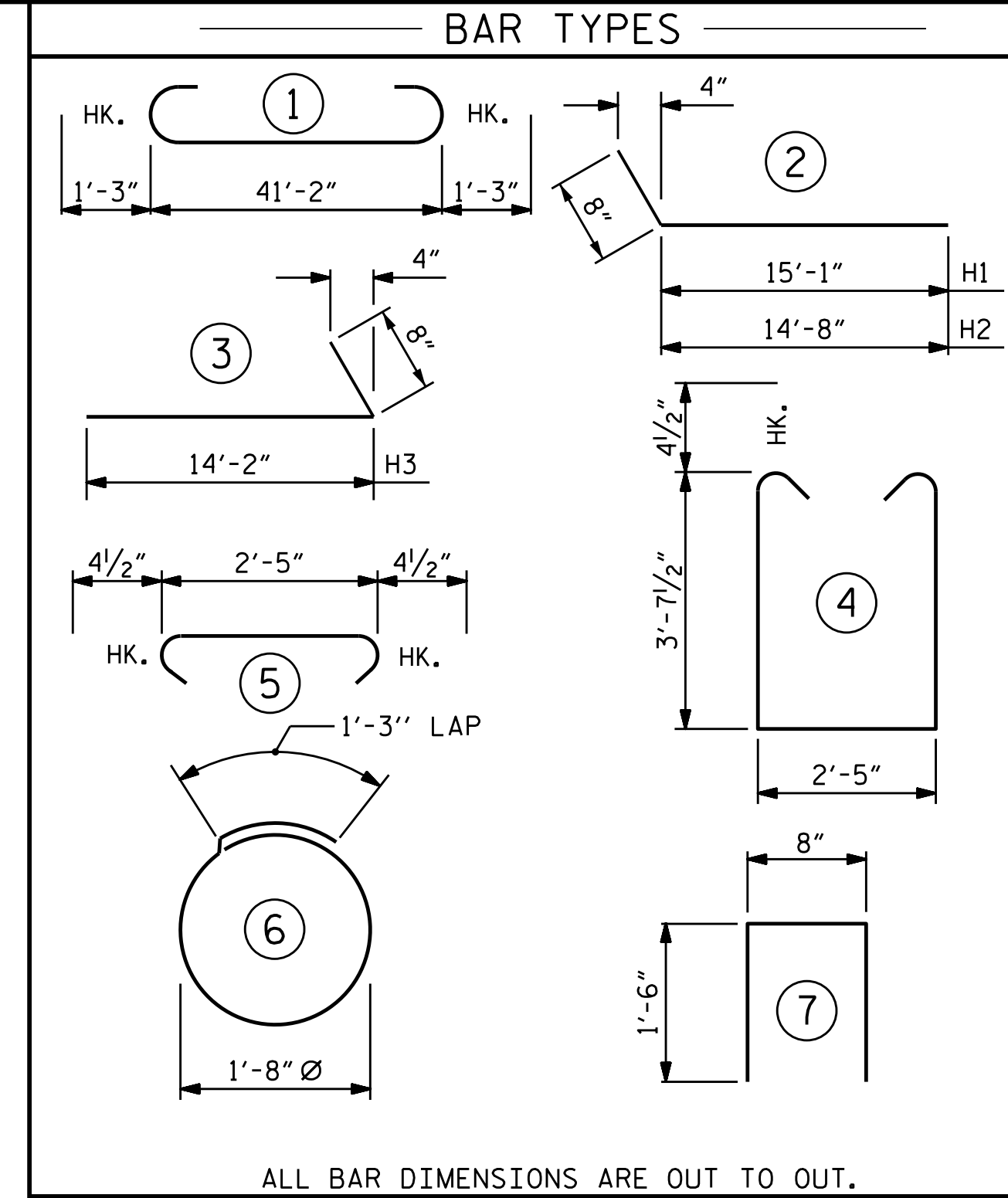
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

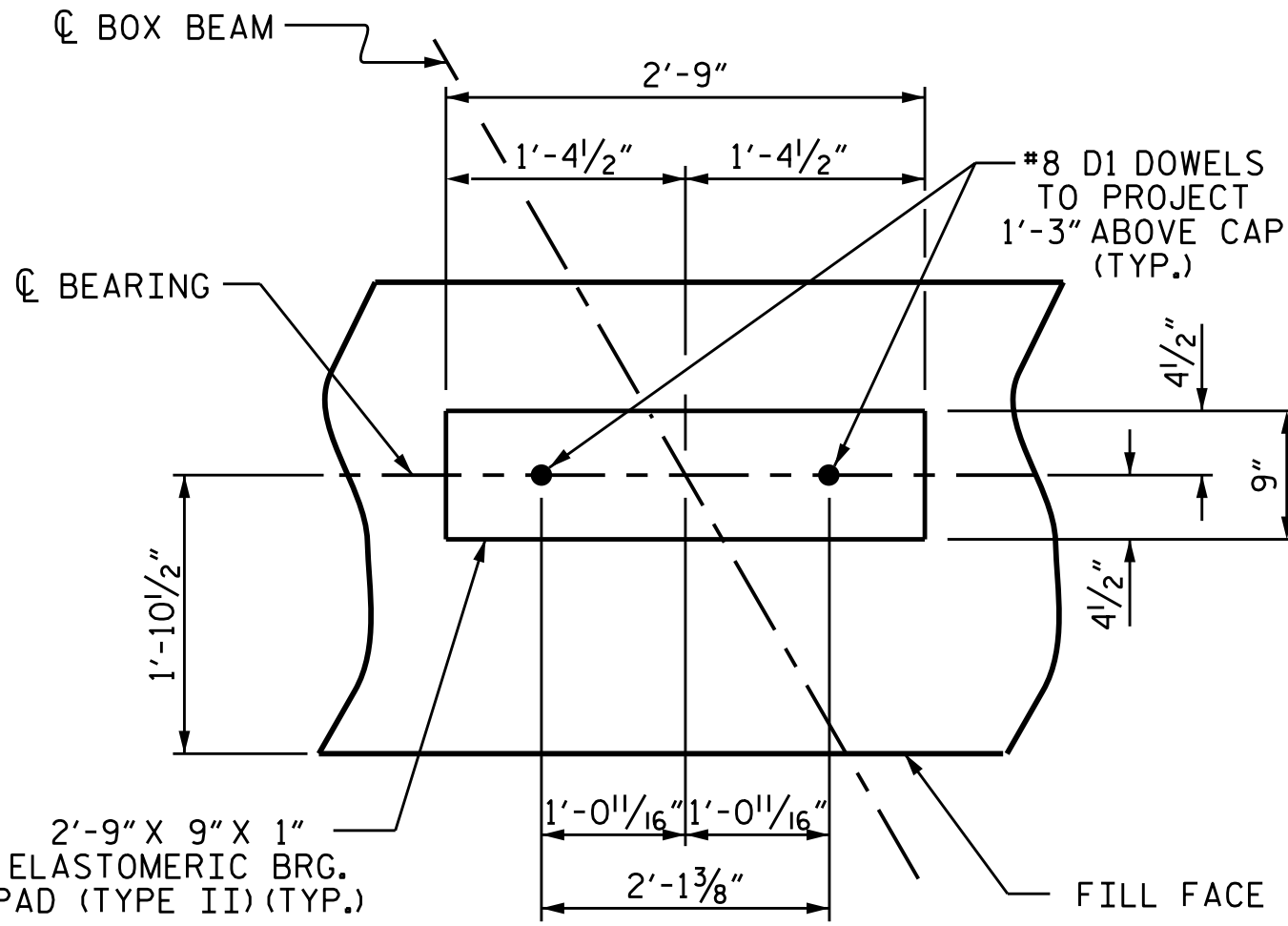


PILE SPLICE DETAILS

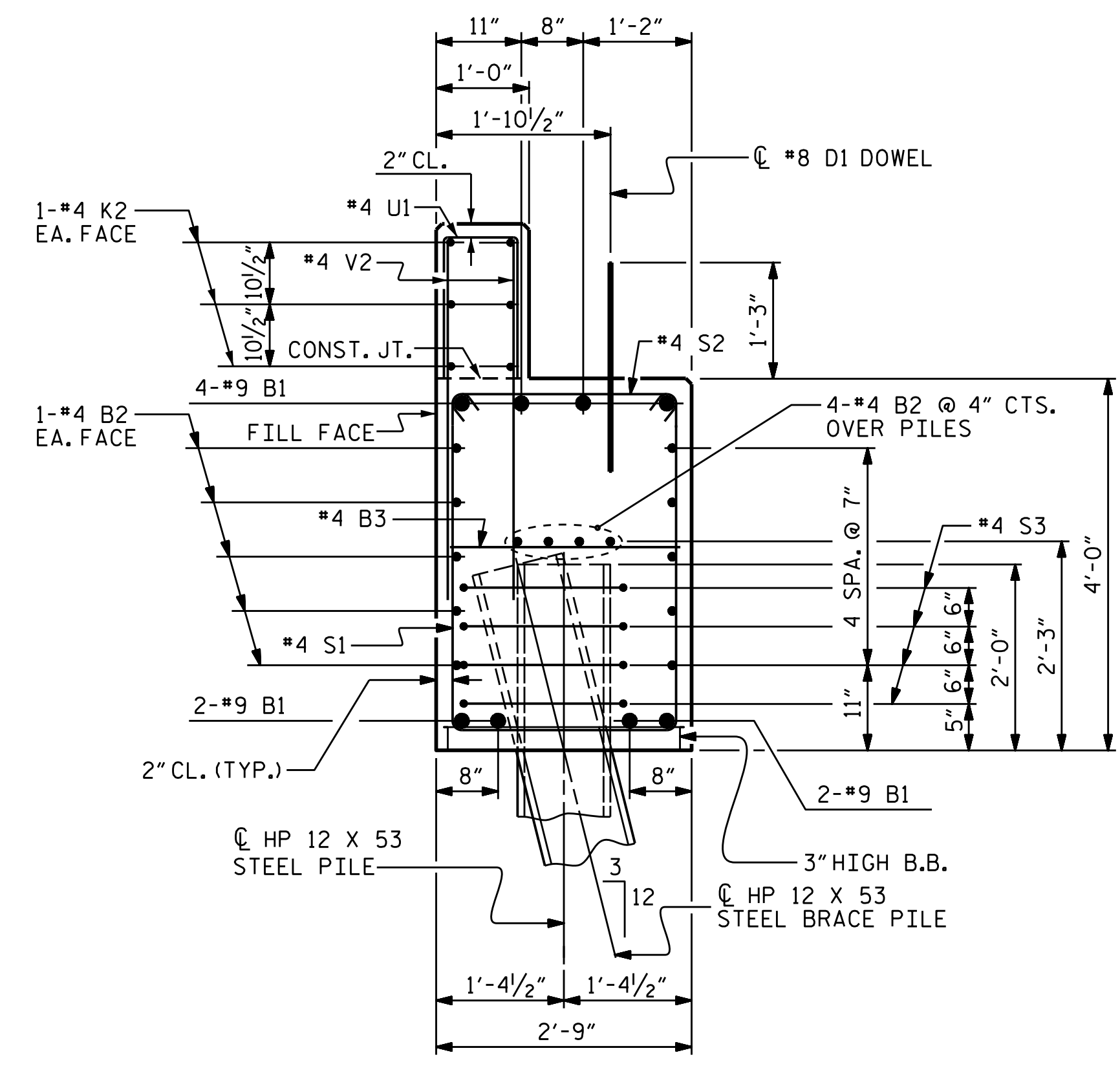


END BENT No. 1		END BENT No. 2	
HP 12 X 53 STEEL PILES	NO: 5	HP 12 X 53 STEEL PILES	NO: 5
STEEL PILE POINTS	5 EA.	STEEL PILE POINTS	5 EA.
	LIN. FT. = 175		LIN. FT. = 125

BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		43'-8"	1188
B2	28	#4	STR	21'-11"	410
B3	11	#4	STR	2'-5"	18
D1	20	#8	STR	2'-3"	120
H1	16	#6		15'-9"	379
H2	16	#6		15'-4"	368
H3	32	#6		14'-10"	713
K1	12	#4	STR	3'-3"	26
K2	12	#4	STR	21'-11"	176
S1	54	#4		10'-5"	376
S2	54	#4		3'-2"	114
S3	20	#4		6'-6"	87
U1	34	#4		3'-8"	83
V1	77	#4	STR	7'-8"	394
V2	68	#4	STR	5'-8"	257
REINFORCING STEEL (FOR ONE END BENT)					4709 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					22.0 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS					8.0 C.Y.
TOTAL CLASS A CONCRETE					30.0 C.Y.



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



(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



PROJECT NO. B-5360
 RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1 & 2
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			38

ASSEMBLED BY : A. K. PATEL	DATE : 11/24/15
CHECKED BY : W. F. PARKER	DATE : 3/16
DRAWN BY : WJH 12/11	REV. 8/14
CHECKED BY : AAC 12/11	MAA/TMG

NOTES

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

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

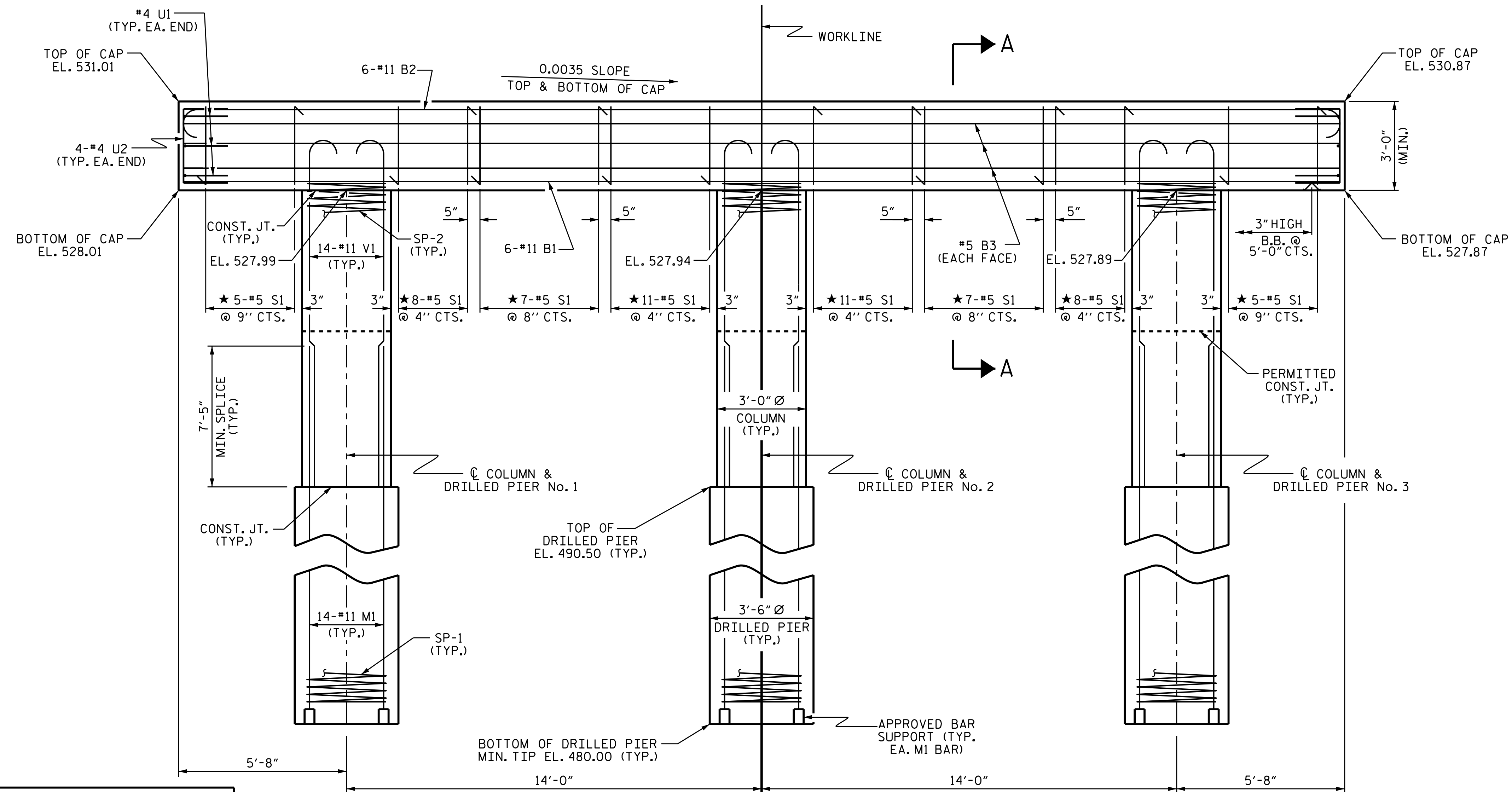
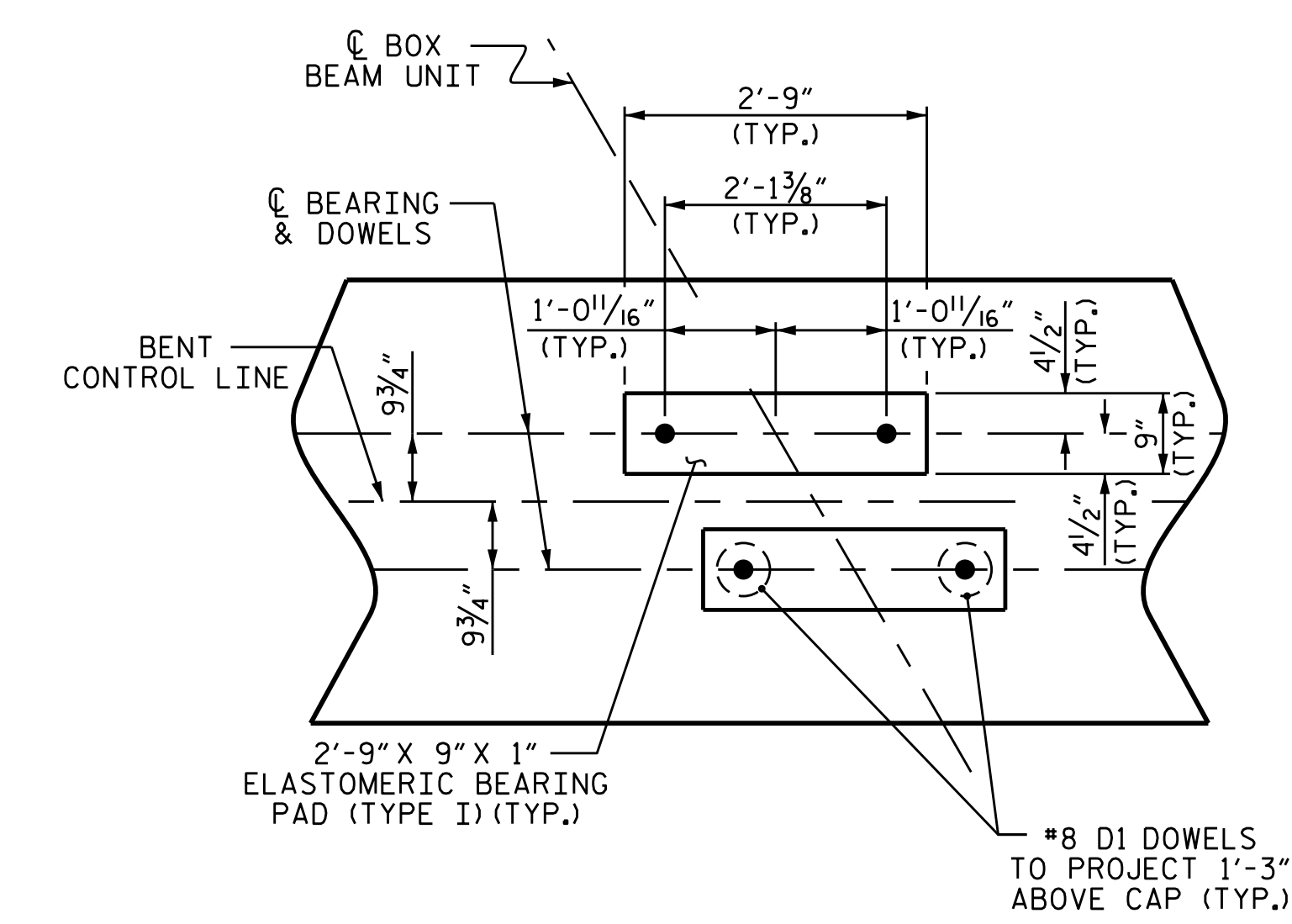
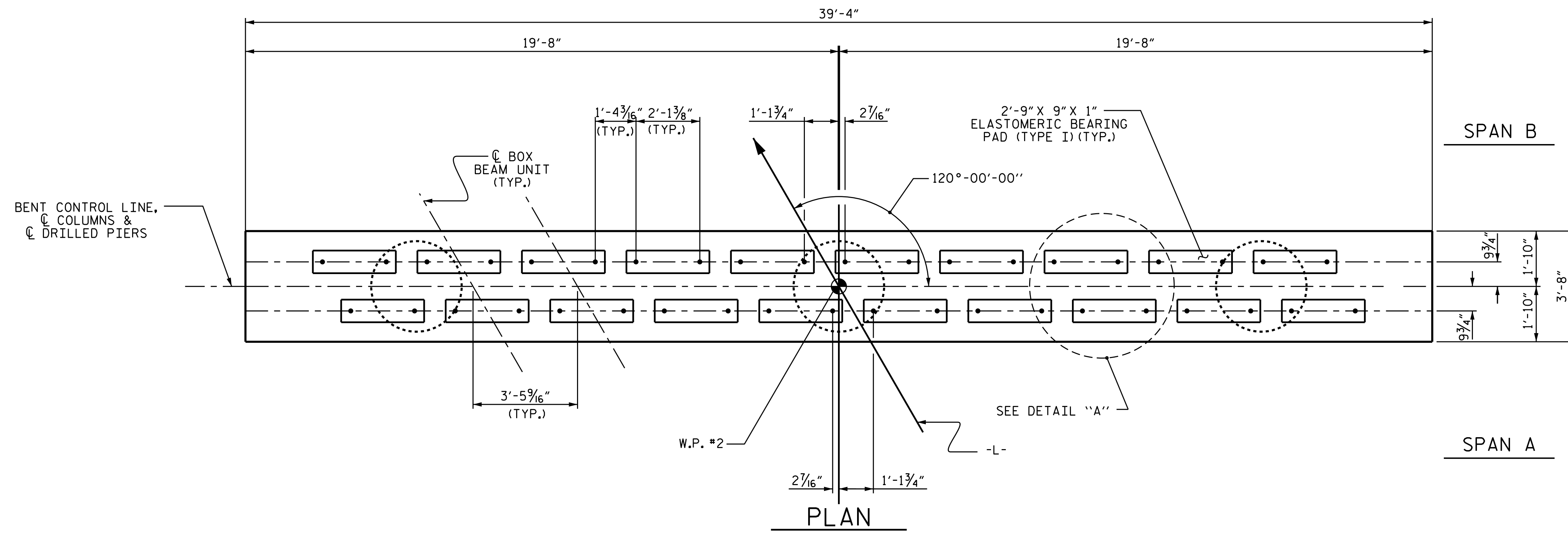
FOR DRILLED PIERS, SEE SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

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

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



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 1 OF 2

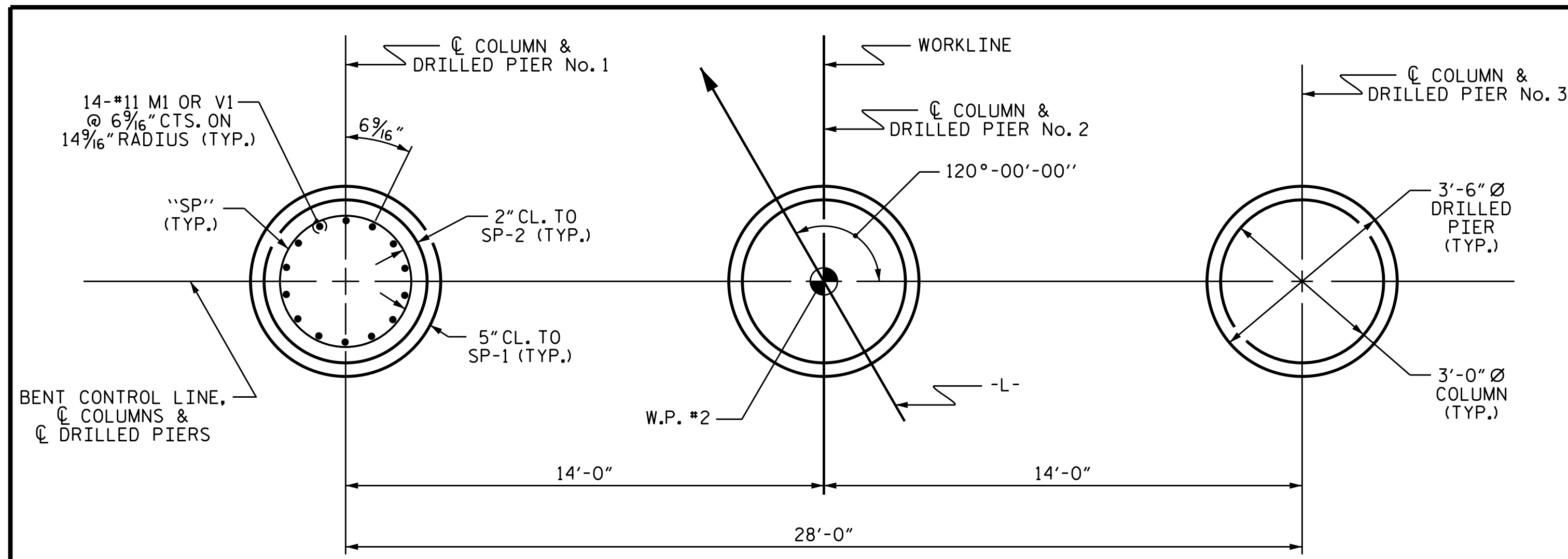


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SUBSTRUCTURE
 BENT No. 1**

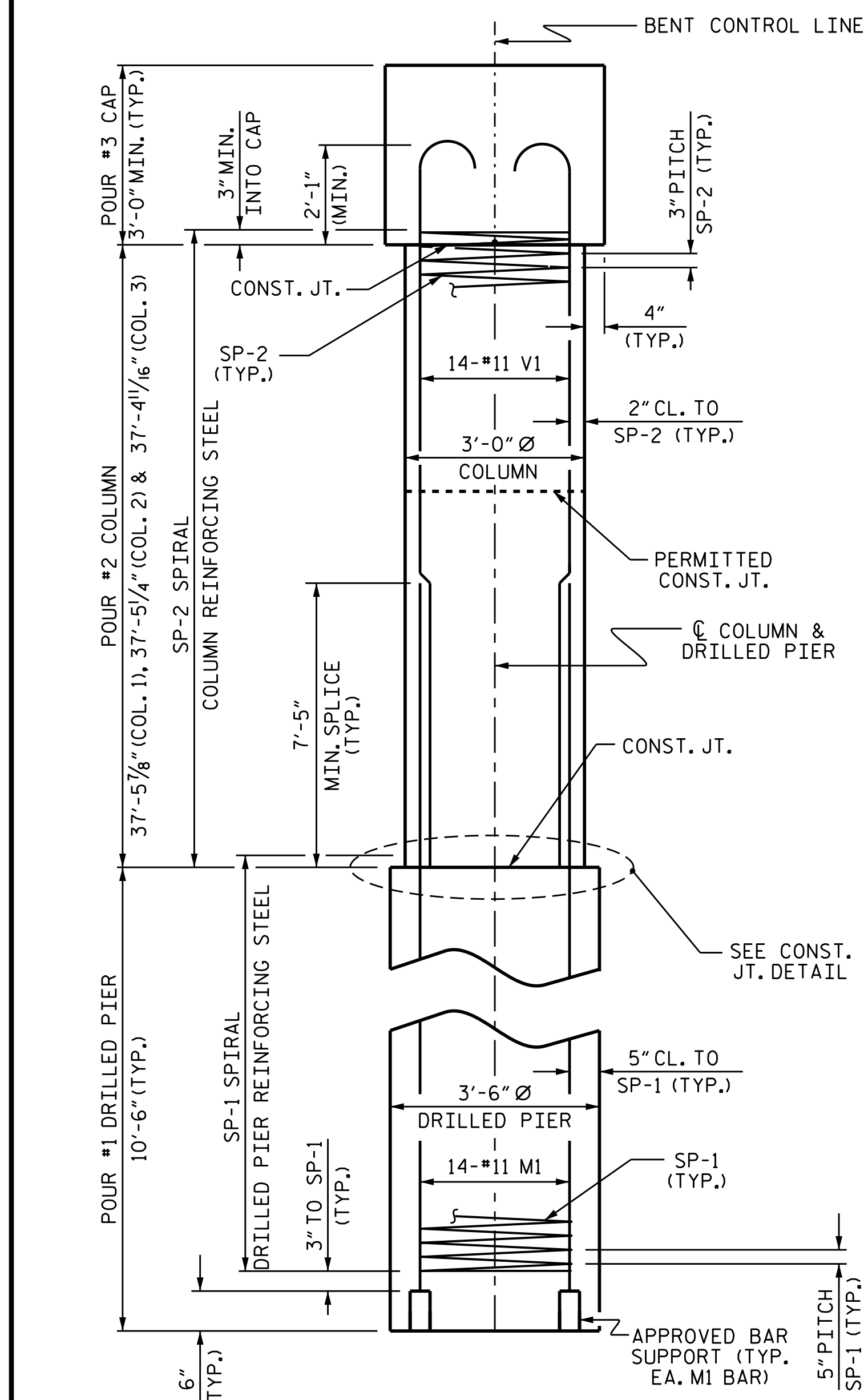
ASSEMBLED BY : A. K. PATEL DATE : 12/4/15
 CHECKED BY : W. F. PARKER DATE : 3/16
 DESIGN ENGINEER OF RECORD : K. P. SEDA I DATE : 6/16
 DRAWN BY : DGE 4/10
 CHECKED BY : MKT 4/10
 REV. 11/14 MAA/TMG

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

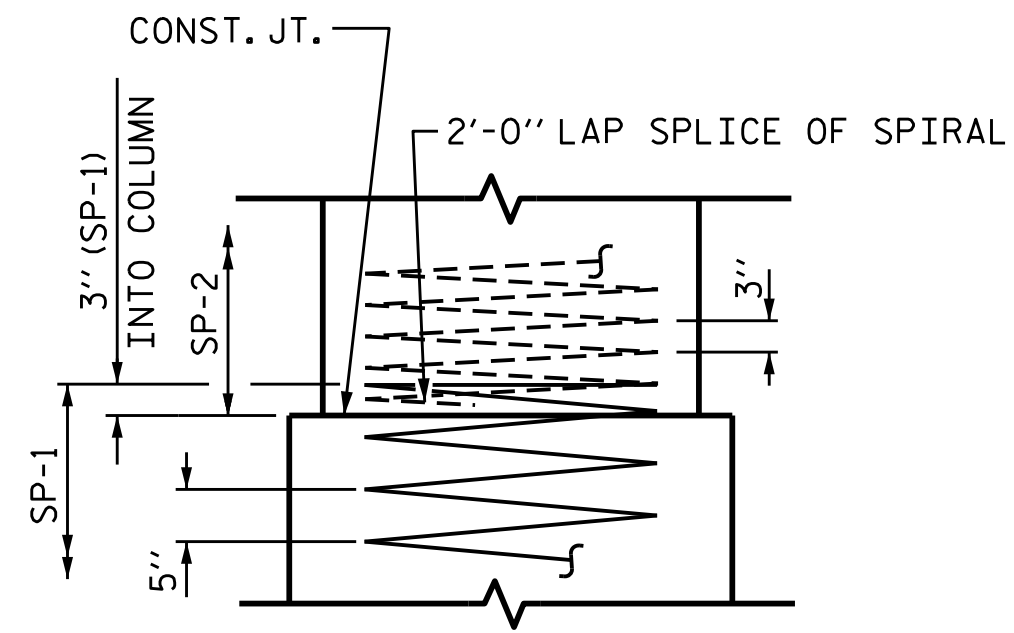
REVISIONS						SHEET NO. S-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 38
2			4			



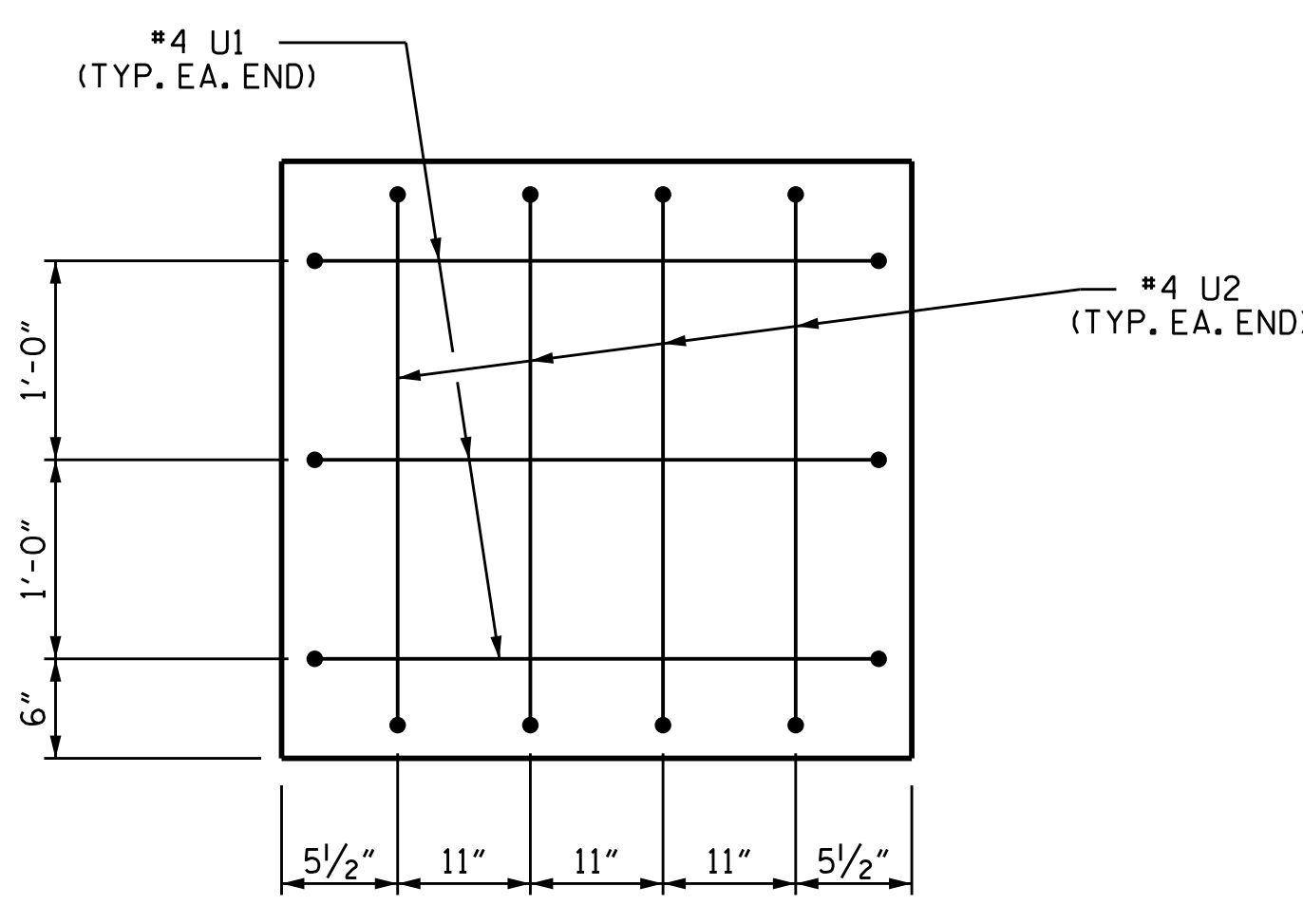
PLAN OF DRILLED PIERS & COLUMNS



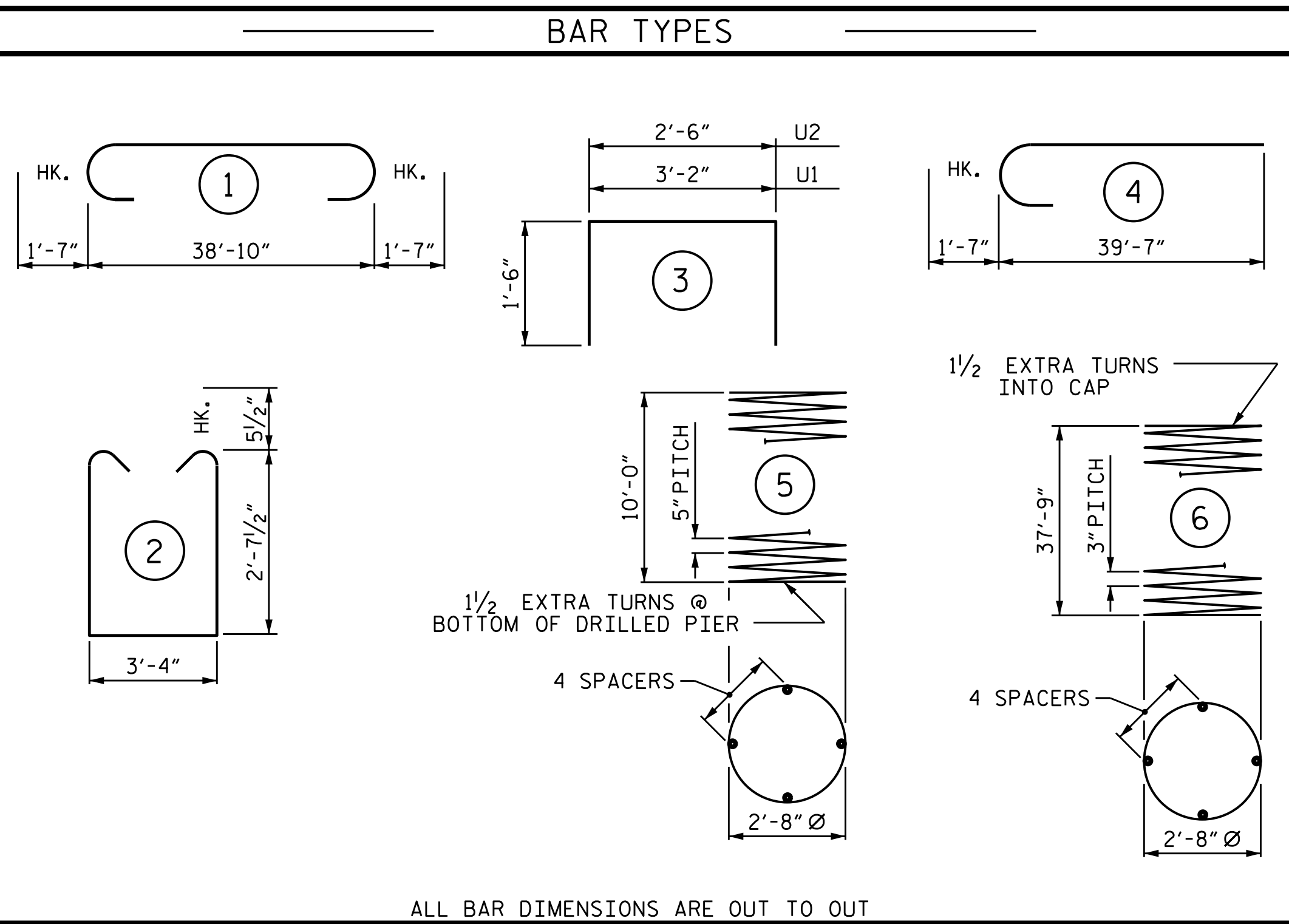
END ELEVATION



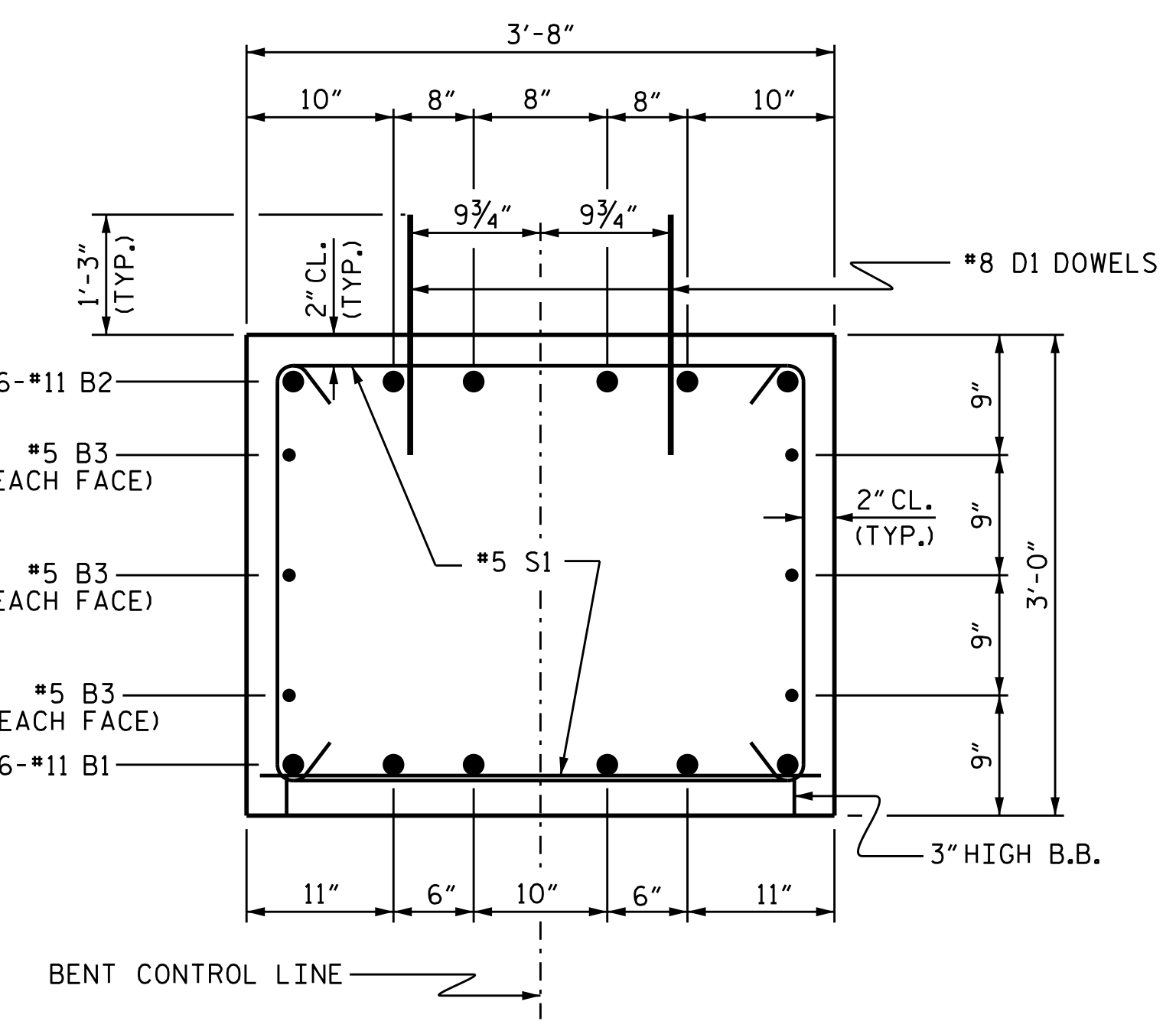
CONSTRUCTION JOINT DETAIL



END OF CAP VIEW
(TYPICAL BOTH ENDS)



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION A-A

BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	39'-0"	1243
B2	6	#11	1	42'-0"	1339
B3	6	#5	STR	39'-0"	244
D1	40	#8	STR	2'-3"	240
M1	42	#11	STR	20'-5"	4556
S1	62	#5	2	9'-6"	614
U1	6	#4	3	6'-2"	25
U2	8	#4	3	5'-6"	29
V1	42	#11	4	41'-2"	9186
REINFORCING STEEL (FOR ONE BENT)					17,476 LBS.
SP-1	3	*	5	209'-9"	656 LBS.
SP-2	3	**	6	1257'-11"	2521 LBS.
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					3177 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (COLUMNS)					29.4 C.Y.
POUR #3 (CAP)					16.0 C.Y.
TOTAL CLASS A CONCRETE					45.4 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					11.2 C.Y.
3'-6" Ø DRILLED PIERS NOT IN SOIL					30 LIN. FT.
3'-6" Ø DRILLED PIERS IN SOIL					1.5 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER					4.5 LIN. FT.
CSL TUBES					144.0 LIN. FT.

PROJECT NO. B-5360
 RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT No. 1

ASSEMBLED BY: A. K. PATEL DATE: 12/4/15
 CHECKED BY: W. F. PARKER DATE: 3/16
 DESIGN ENGINEER OF RECORD: K. P. SEDA I DATE: 6/16
 DRAWN BY: DGE 3/10
 CHECKED BY: MKT 3/10
 REV. 11/14 MAA/TMG

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			38

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES

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

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

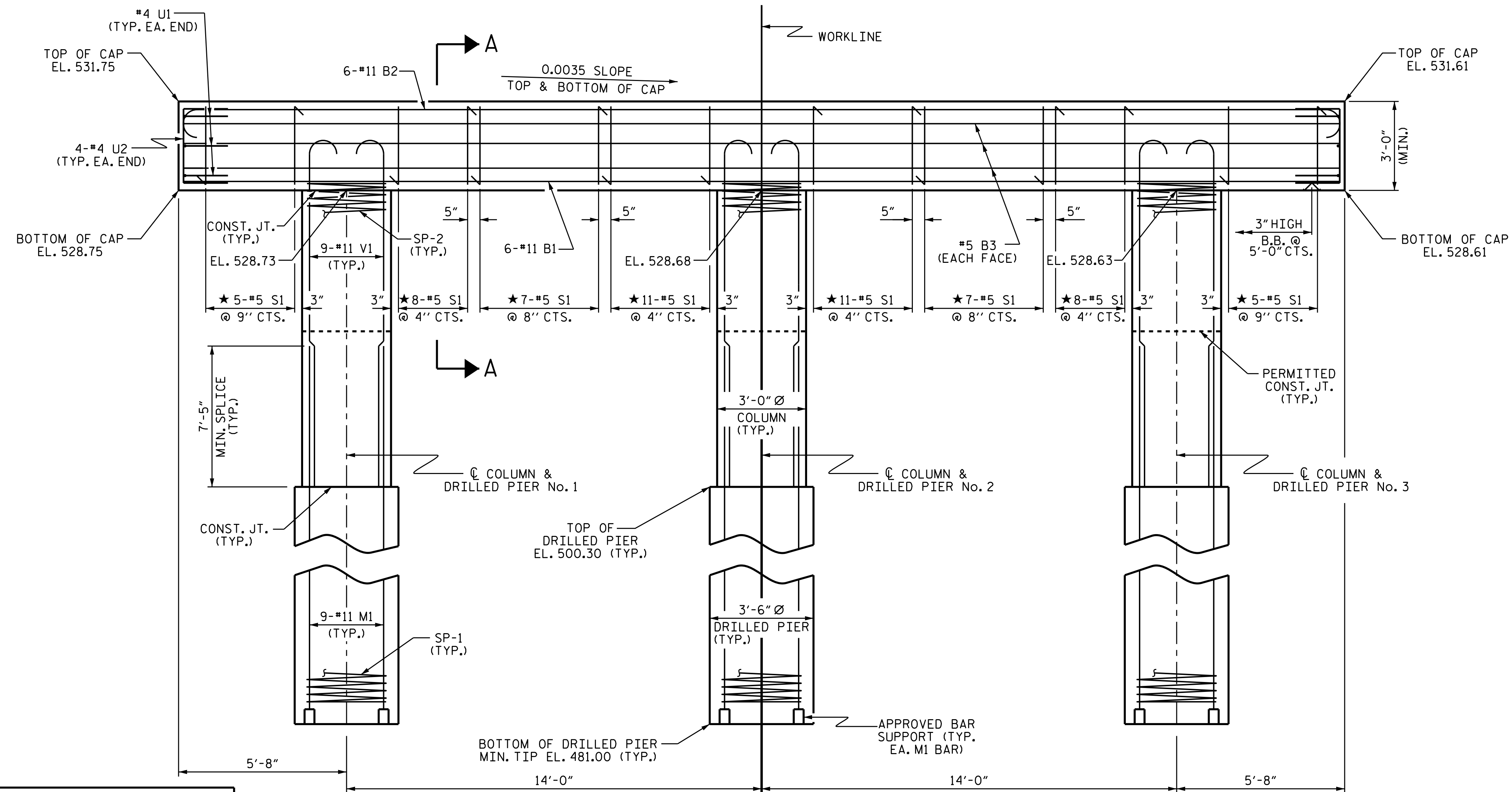
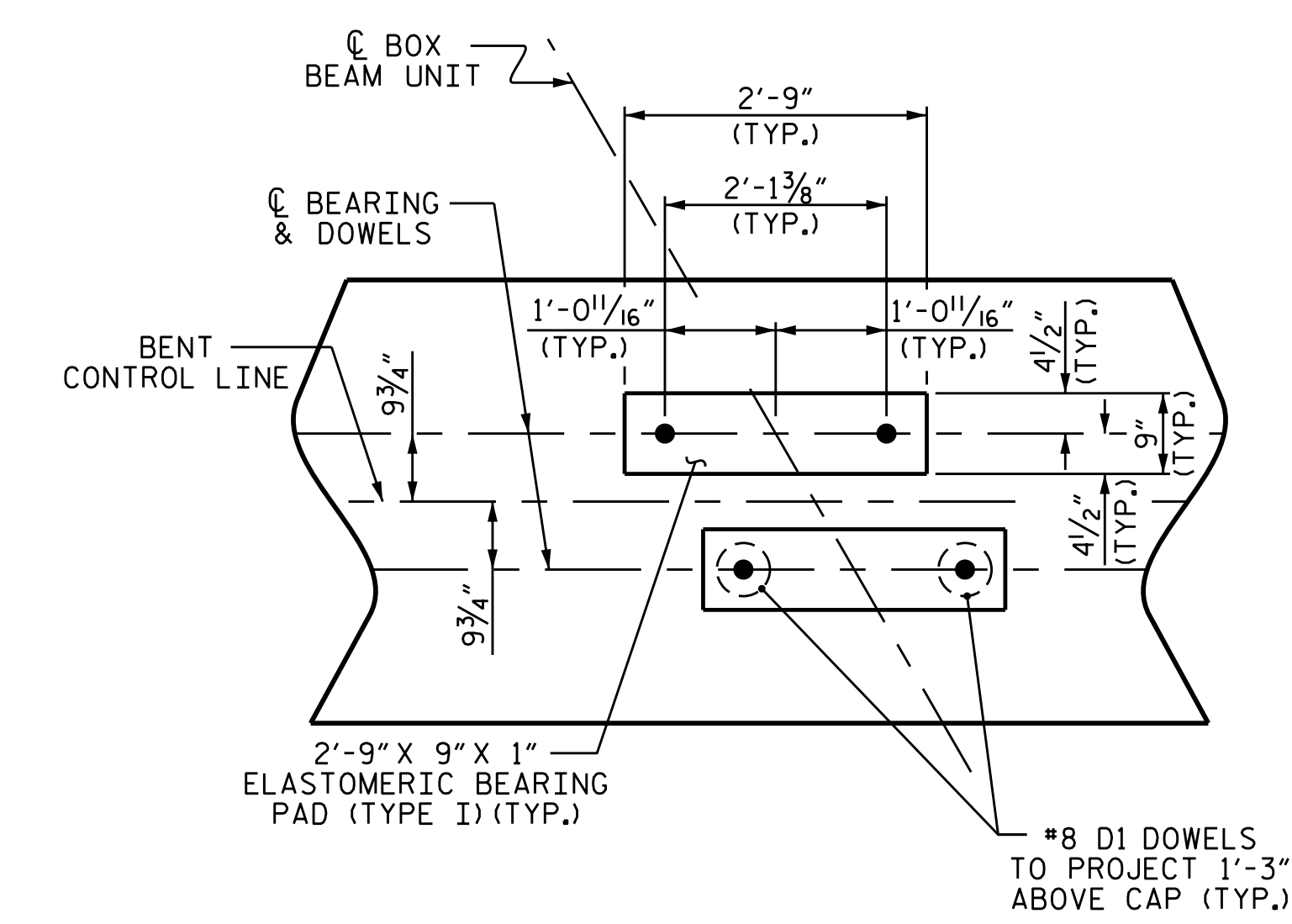
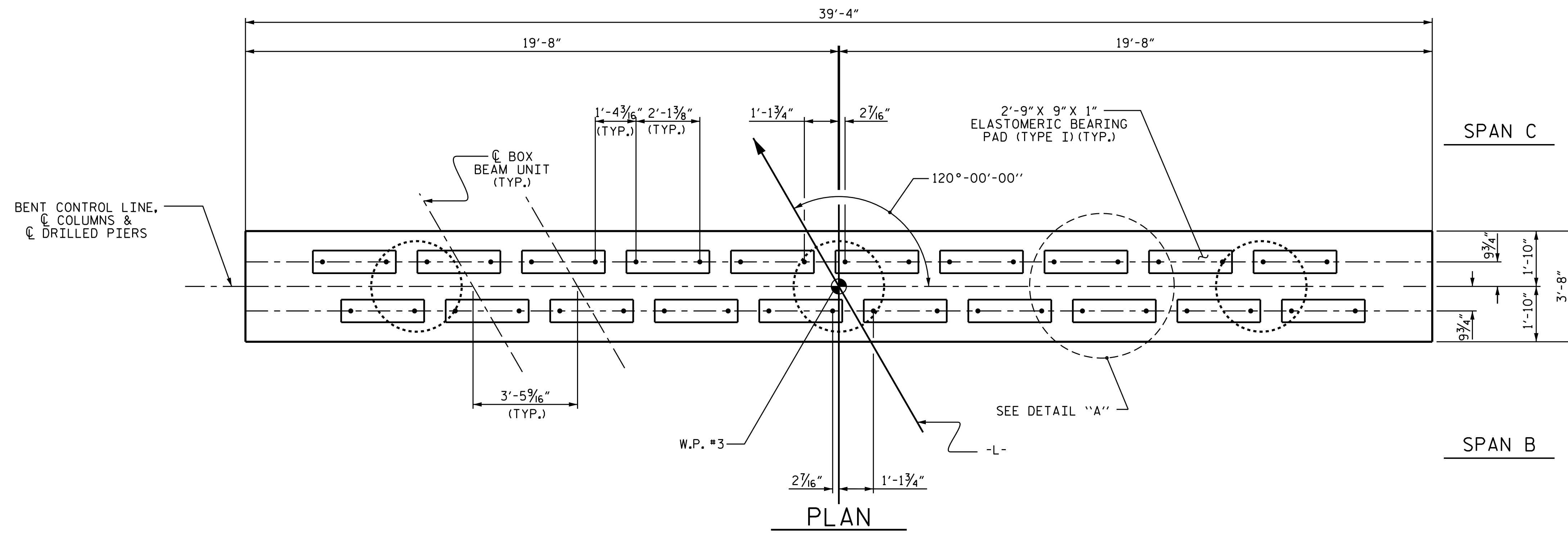
FOR DRILLED PIERS, SEE SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

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

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



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

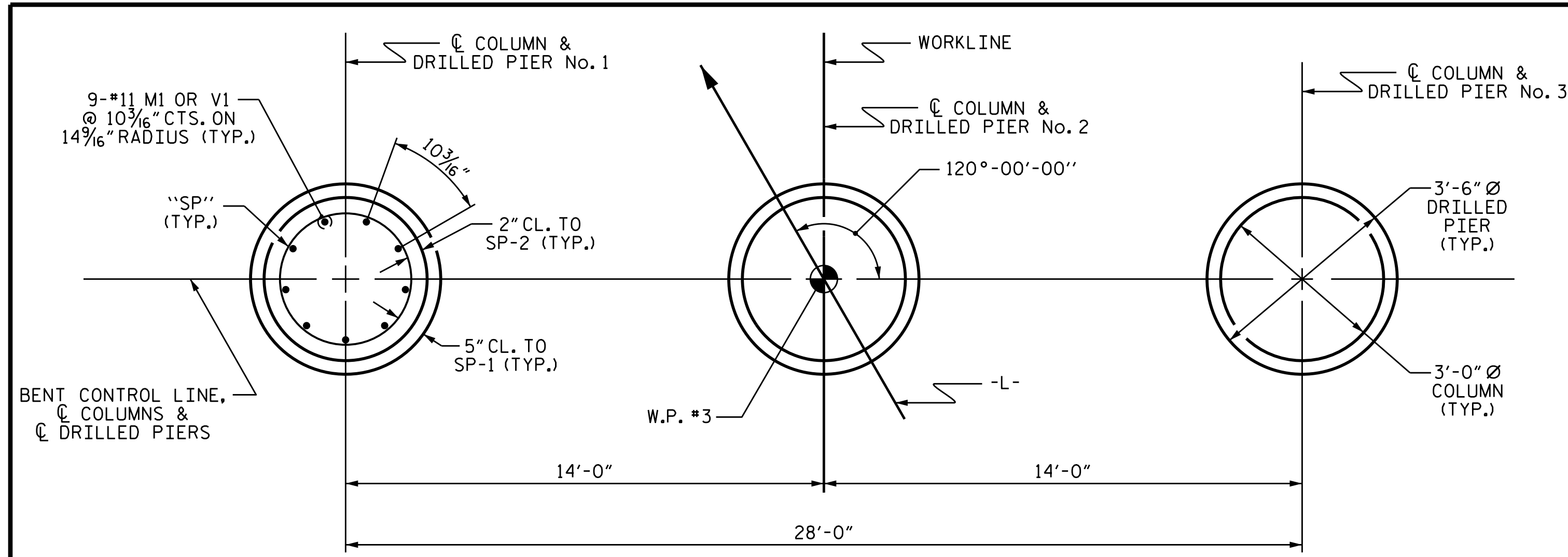
**SUBSTRUCTURE
 BENT No. 2**

ASSEMBLED BY : A. K. PATEL DATE : 12/4/15
 CHECKED BY : W. F. PARKER DATE : 3/16
 DESIGN ENGINEER OF RECORD : K. P. SEDA I DATE : 6/16
 DRAWN BY : DGE 4/10
 CHECKED BY : MKT 4/10
 REV. 11/14 MAA/TMG

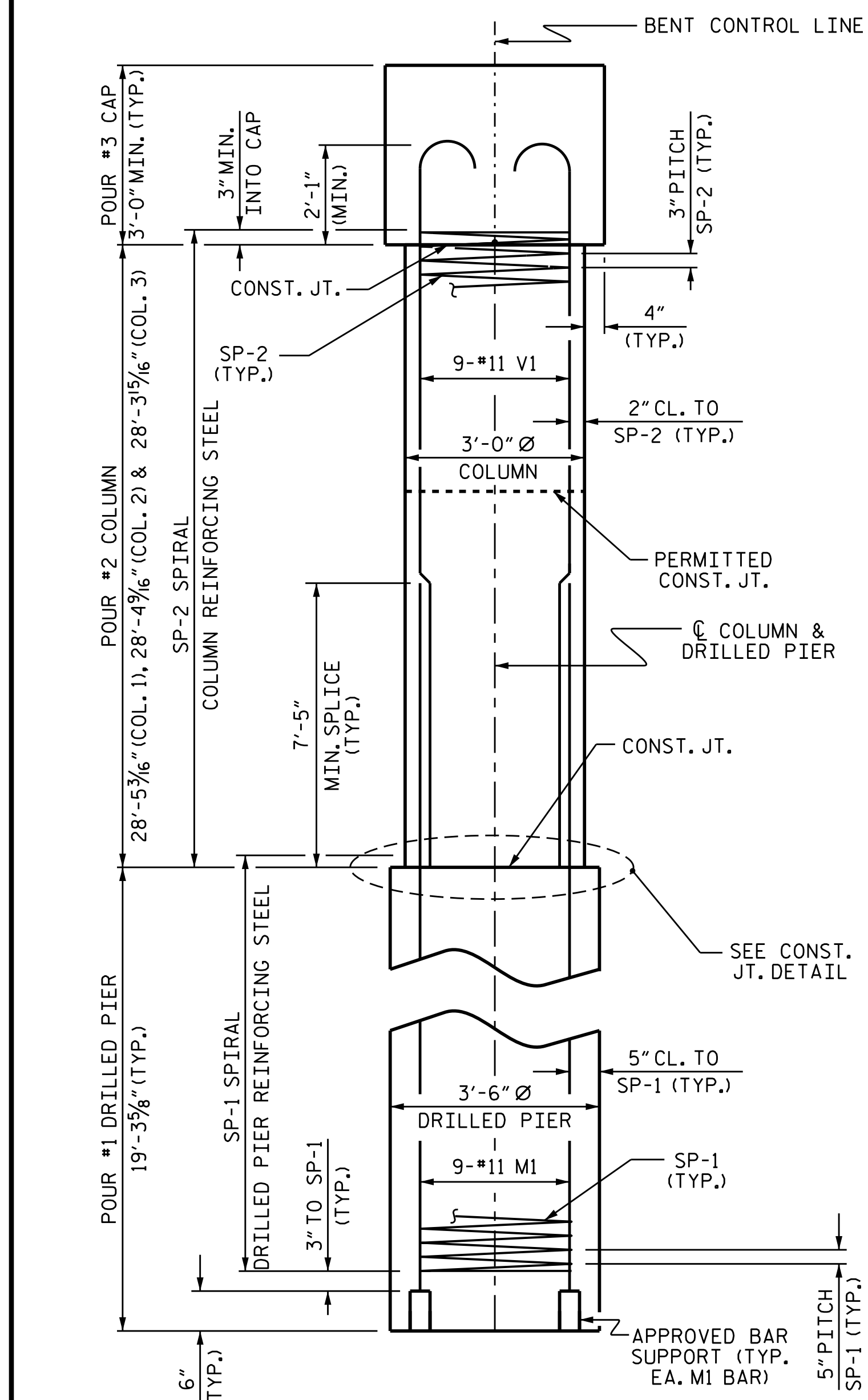
ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

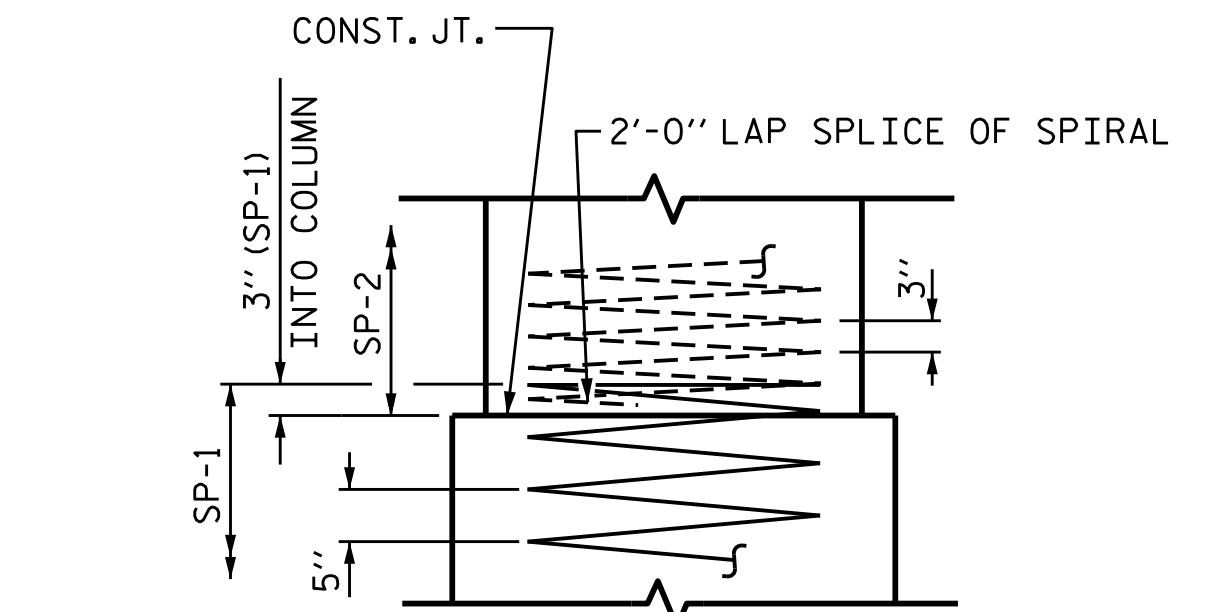
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			38



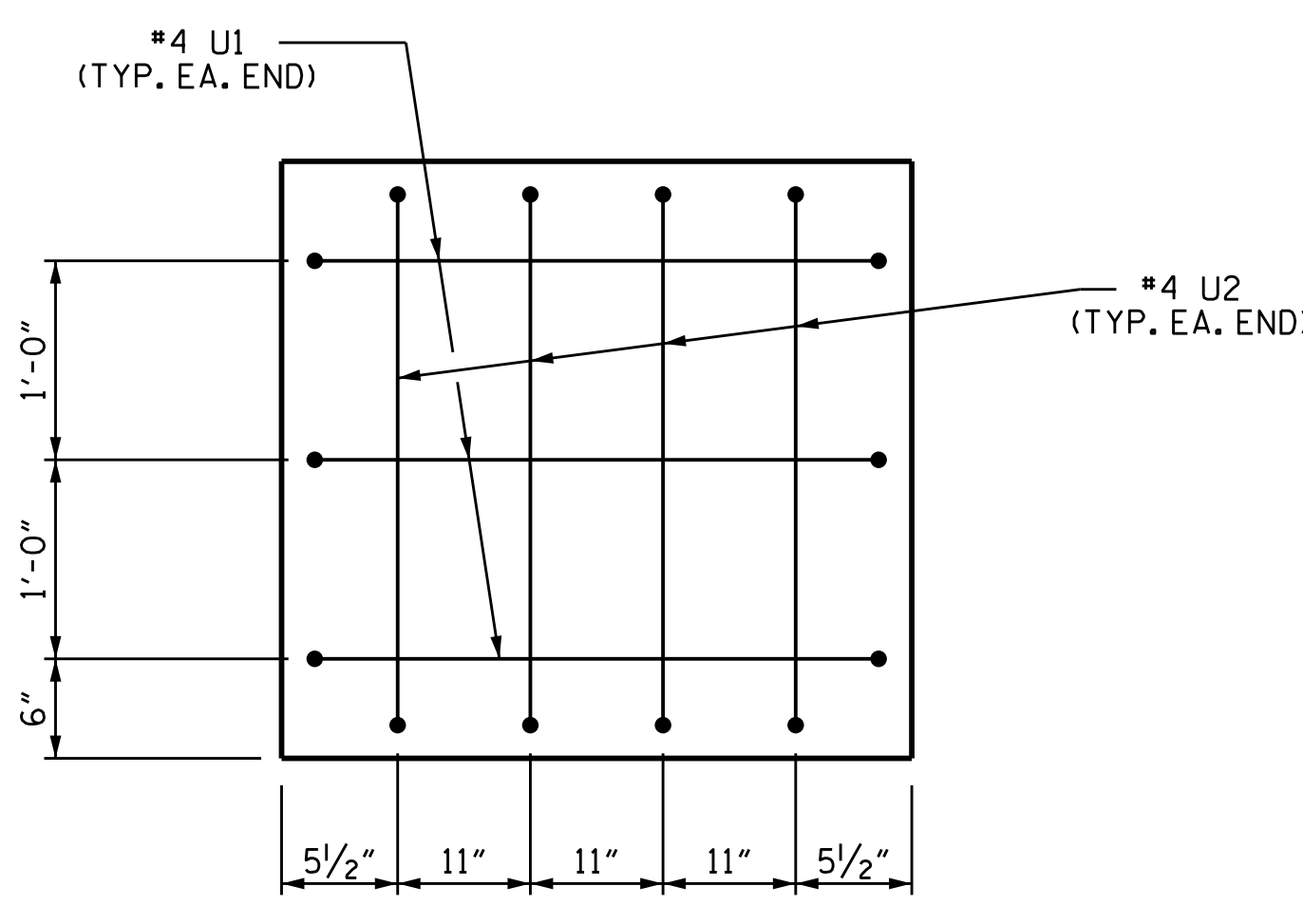
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

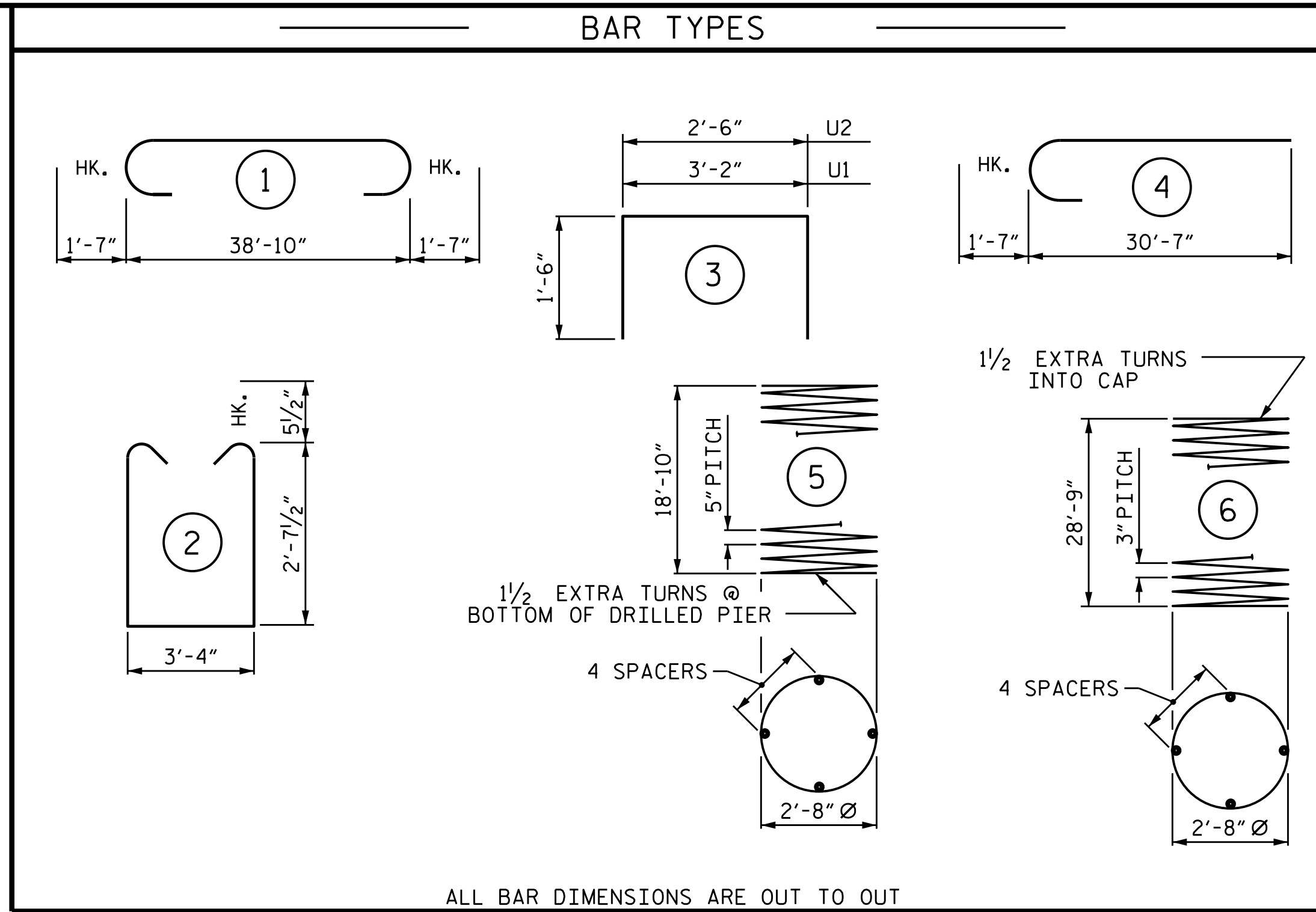


CONSTRUCTION JOINT DETAIL

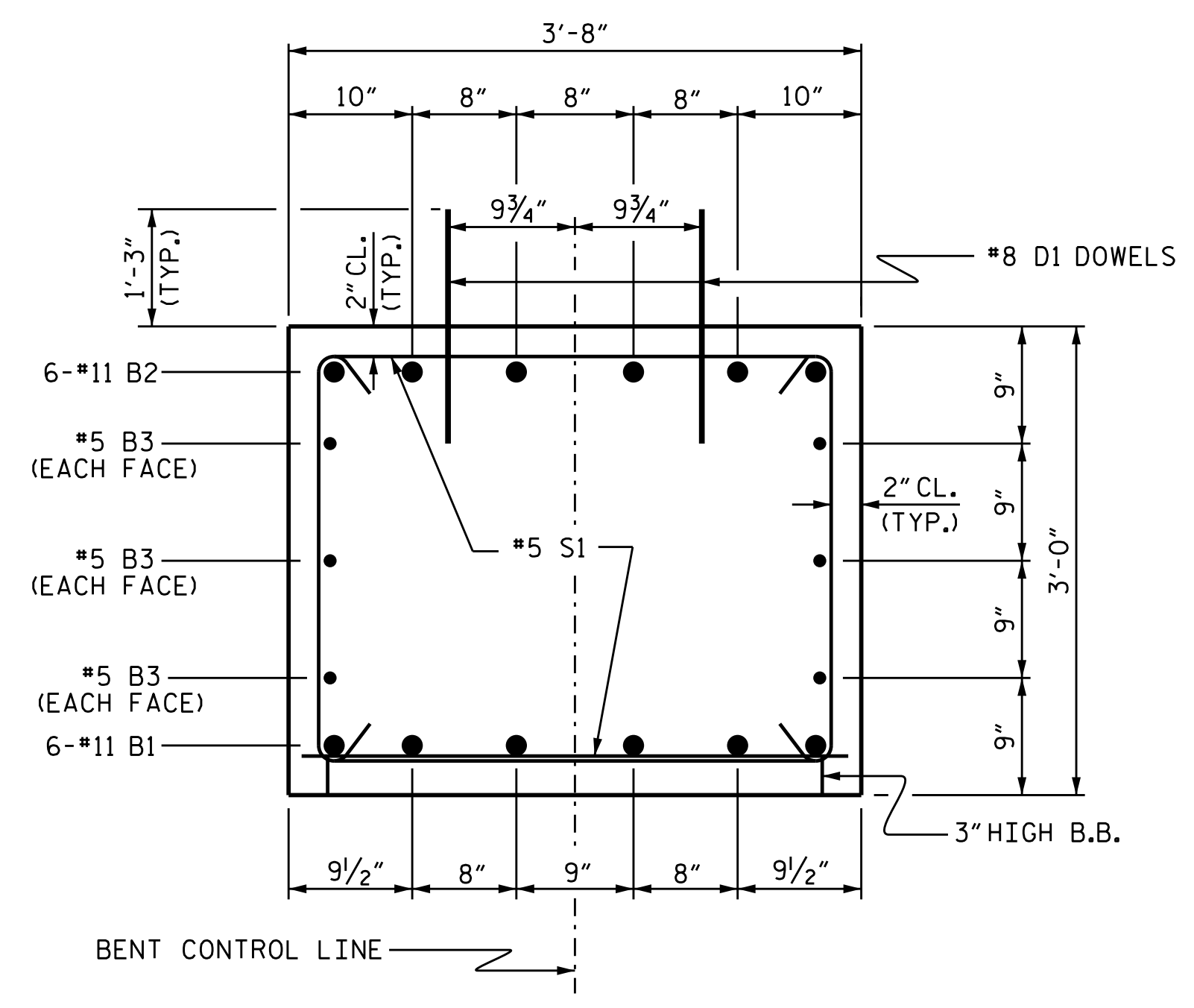


END OF CAP VIEW

(TYPICAL BOTH ENDS)



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION A-A

BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	39'-0"	1243
B2	6	#11	1	42'-0"	1339
B3	6	#5	STR	39'-0"	244
D1	40	#8	STR	2'-3"	240
M1	27	#11	STR	29'-3"	4196
S1	62	#5	2	9'-6"	614
U1	6	#4	3	6'-2"	25
U2	8	#4	3	5'-6"	29
V1	27	#11	4	32'-2"	4614
REINFORCING STEEL (FOR ONE BENT)					12,544 LBS.
SP-1	3	*	5	384'-6"	1203 LBS.
SP-2	3	**	6	958'-11"	1922 LBS.
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					3125 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (COLUMNS)					22.3 C.Y.
POUR #3 (CAP)					16.0 C.Y.
TOTAL CLASS A CONCRETE					38.3 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					20.6 C.Y.
3'-6" Ø DRILLED PIERS NOT IN SOIL					40 LIN. FT.
3'-6" Ø DRILLED PIERS IN SOIL					17.9 LIN. FT.
CSL TUBES					249.6 LIN. FT.

PROJECT NO. B-5360
 RANDOLPH COUNTY
 STATION: 23+68.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

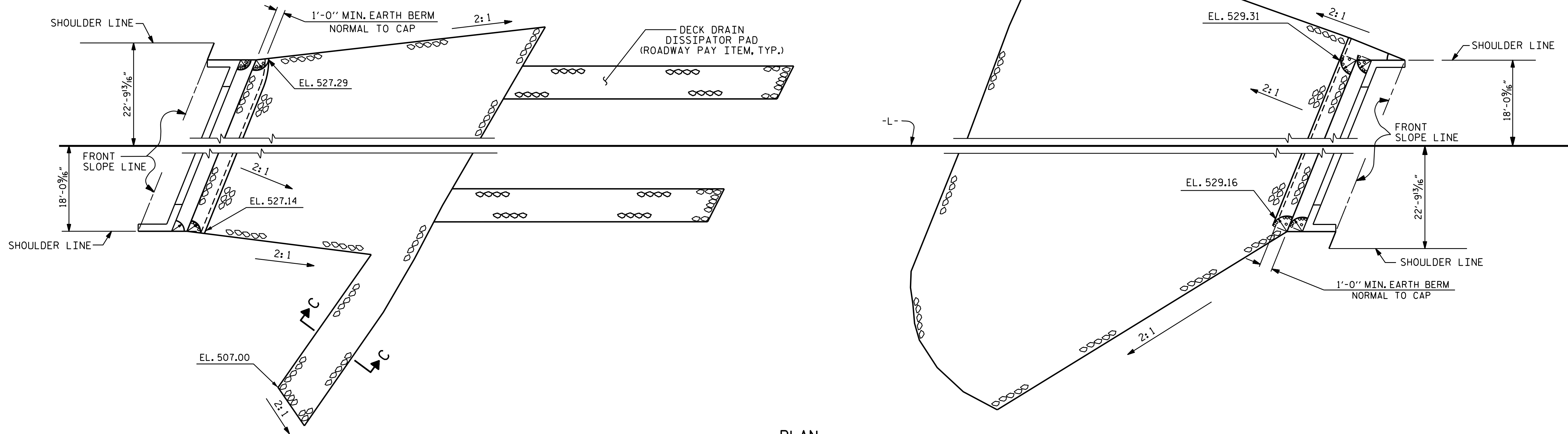
SUBSTRUCTURE
 BENT No. 2

ASSEMBLED BY : A. K. PATEL	DATE : 12/4/15
CHECKED BY : W. F. PARKER	DATE : 3/16
DESIGN ENGINEER OF RECORD : K. P. SEDA	DATE : 6/16
DRAWN BY : DGE 3/10	REV. 11/14
CHECKED BY : MKT 3/10	MAA/TMG

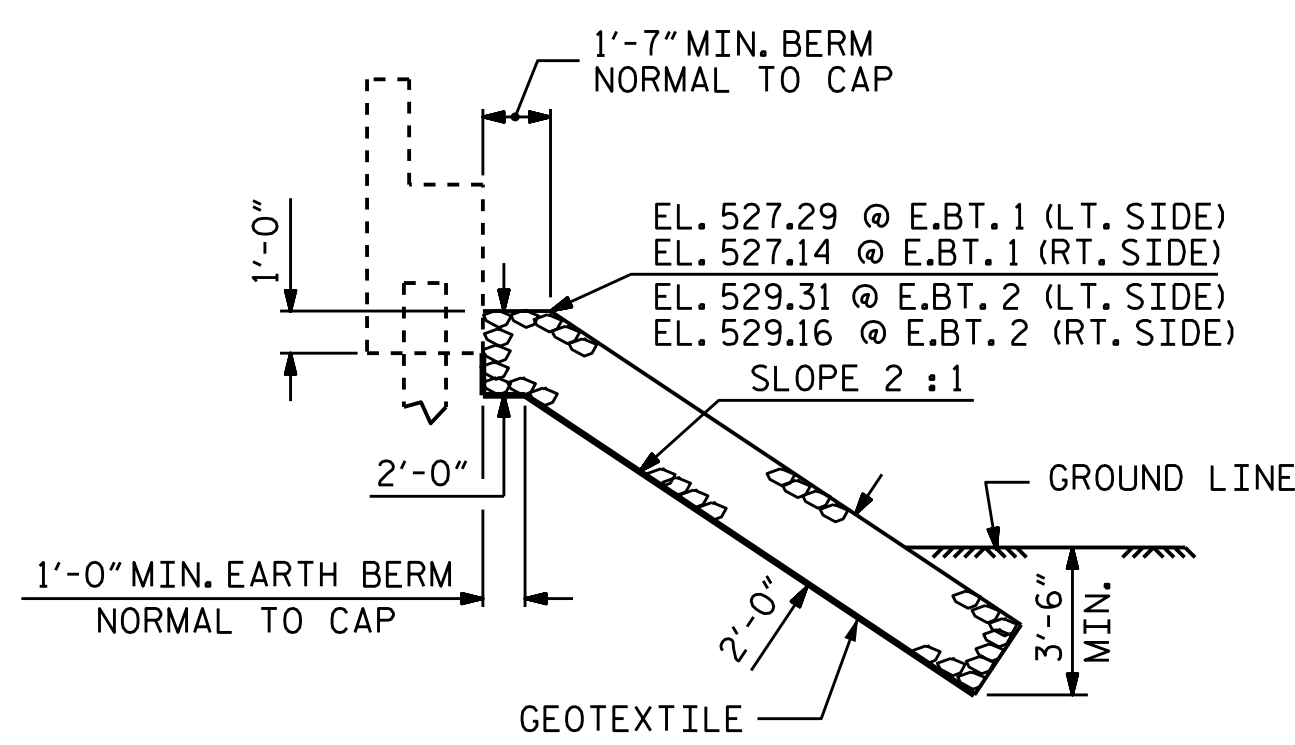
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			38

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ESTIMATED QUANTITIES		
BRIDGE @ STA. 23+68.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	296	329
END BENT 2	685	760

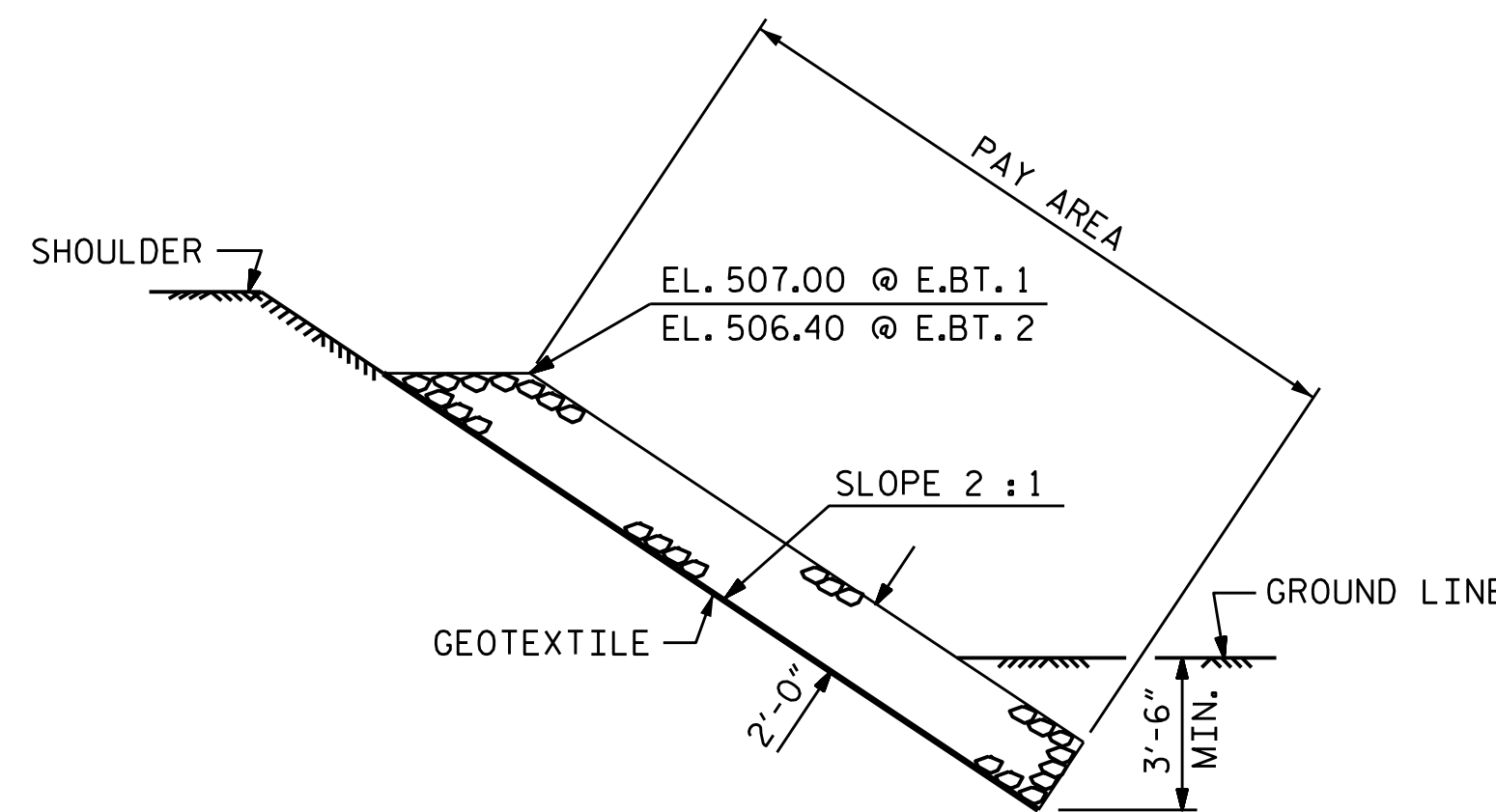


PLAN



SECTION C-C

BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-5360
RANDOLPH COUNTY
 STATION: 23+68.00 -L-



DocuSigned by:
 Gregory Dickey
 884E4B8CCE5B4B6...
 8/22/2016

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD

—RIP RAP DETAILS—

ASSEMBLED BY : A. K. PATEL DATE : 1/14/16
 CHECKED BY : W. F. PARKER DATE : 3/16
 DRAWN BY : REK 1/84
 CHECKED BY : RDU 1/84

REV. 5/1/06R TLA/GM
 REV. 10/1/11 MAA/GM
 REV. 12/21/11 MAA/GM

22-AUG-2016 08:08
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			38

STD. NO. RR1

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

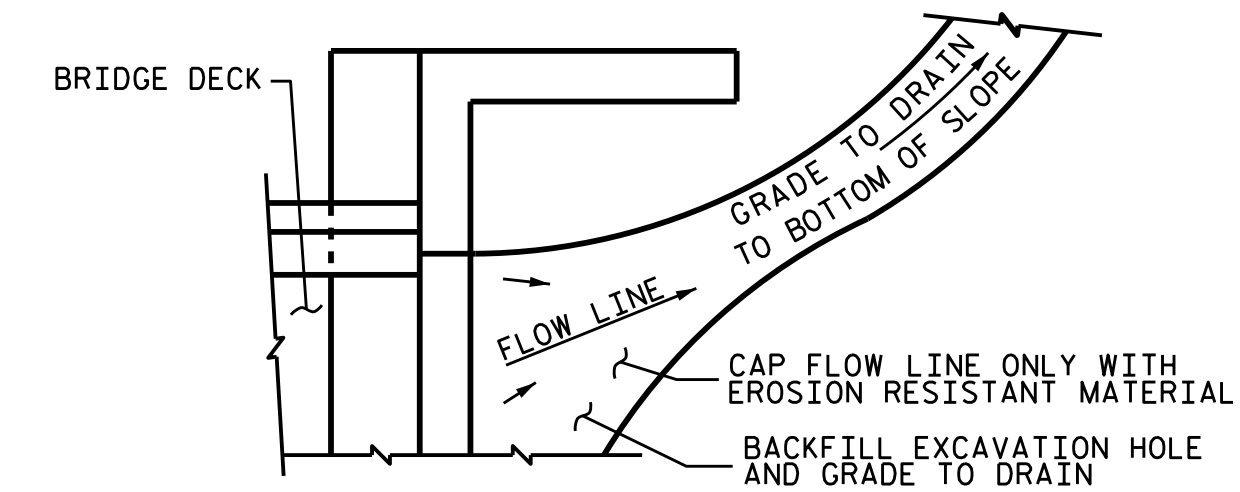
GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB. FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

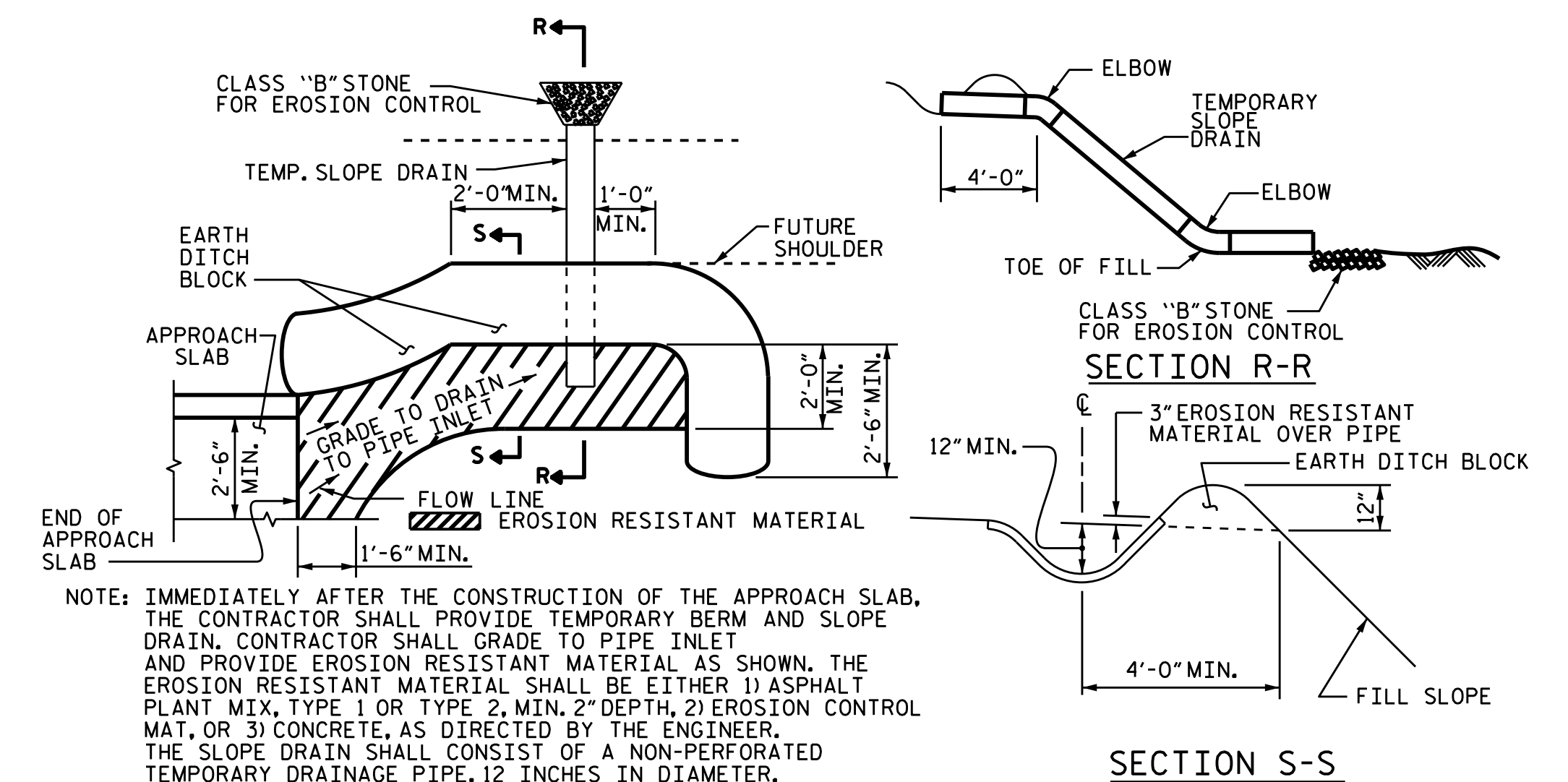
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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



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

TEMPORARY DRAINAGE DETAIL

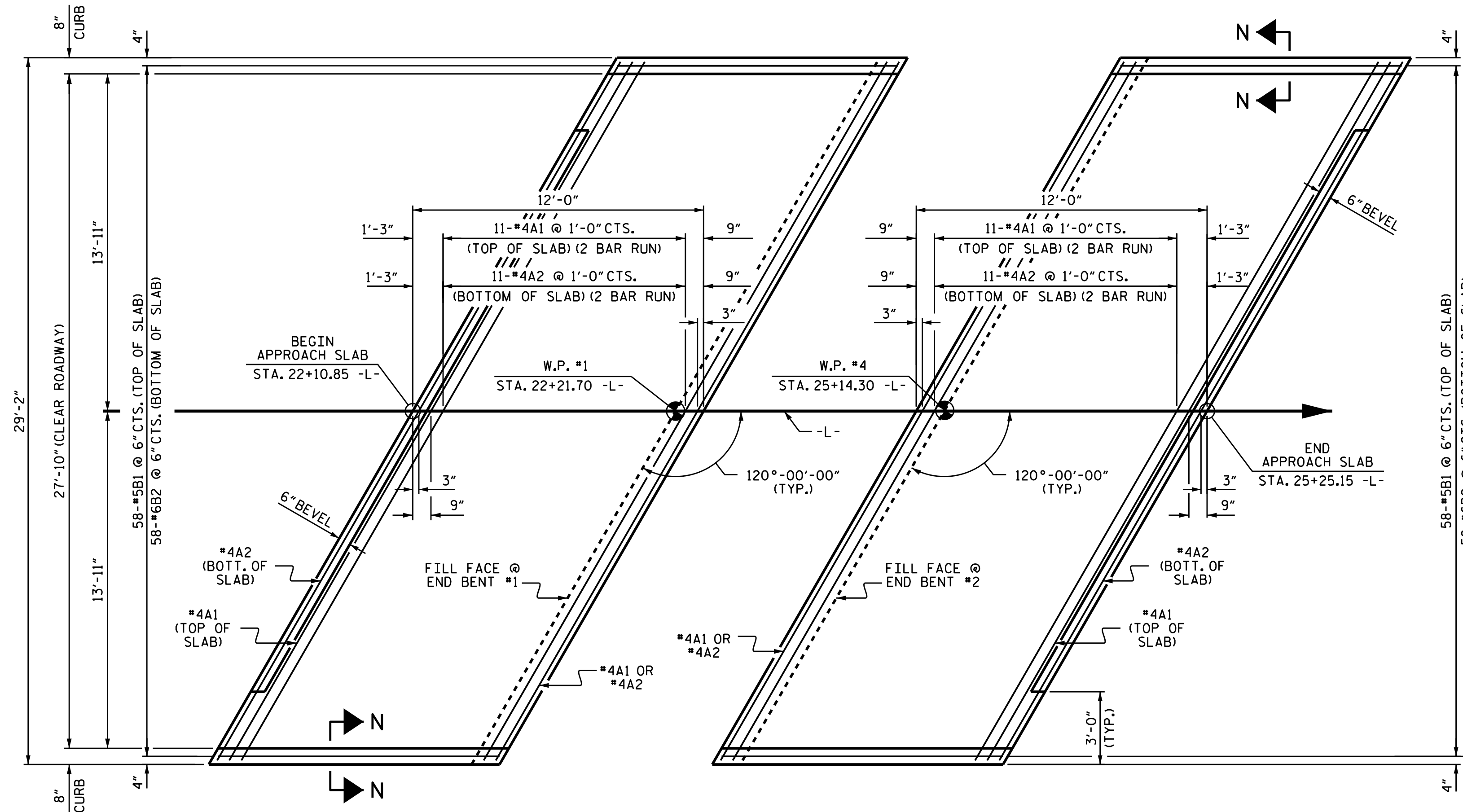


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" 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, 12 INCHES IN DIAMETER.

**PLAN VIEW
TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

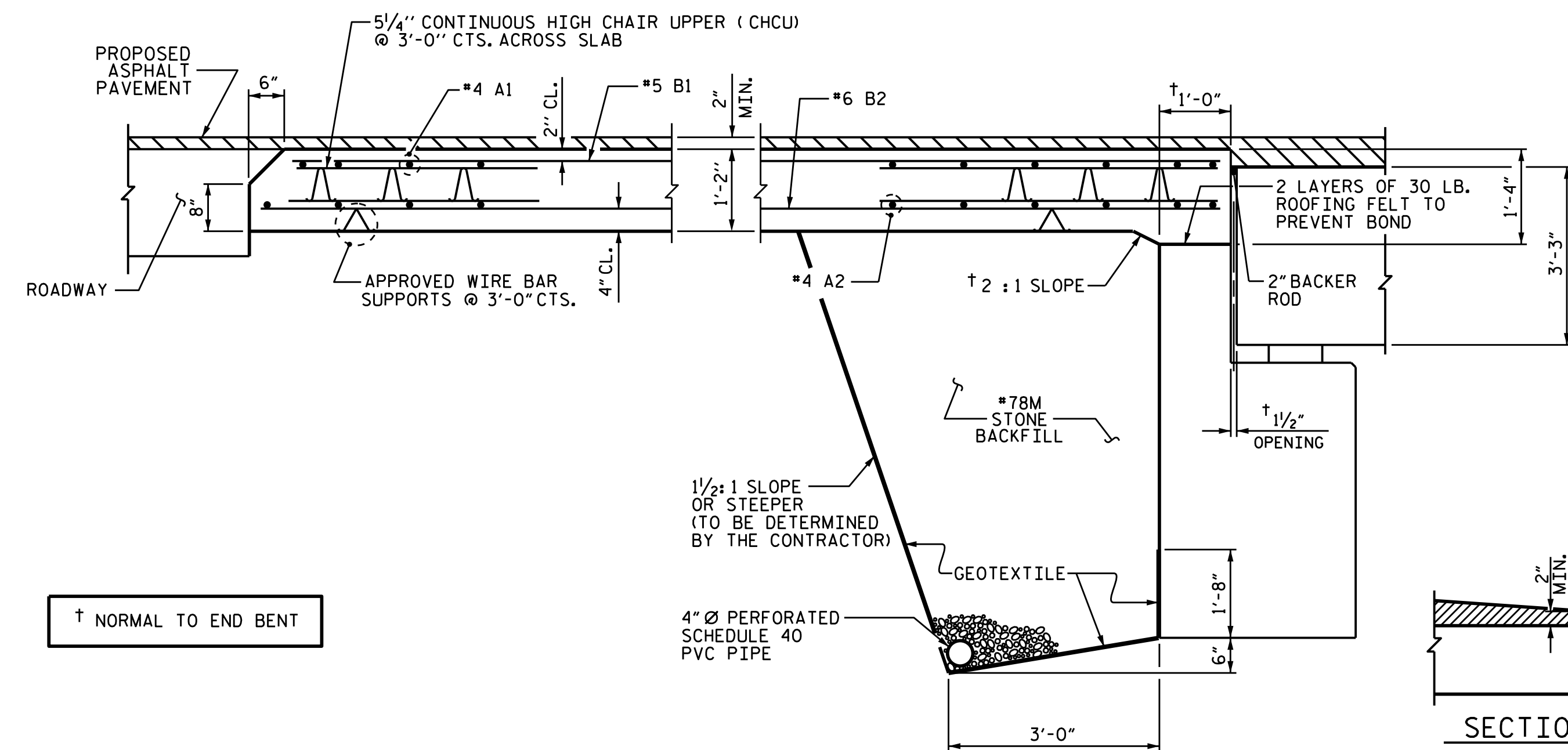
BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	26	#4	STR	17'-8"	307	
A2	26	#4	STR	17'-7"	305	
*B1	58	#5	STR	11'-1"	670	
B2	58	#6	STR	11'-7"	1009	
REINFORCING STEEL					LBS.	1314
* EPOXY COATED REINFORCING STEEL					LBS.	977
CLASS AA CONCRETE					C. Y.	15.5
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	26	#4	STR	17'-8"	307	
A2	26	#4	STR	17'-7"	305	
*B1	58	#5	STR	11'-1"	670	
B2	58	#6	STR	11'-7"	1009	
REINFORCING STEEL					LBS.	1314
* EPOXY COATED REINFORCING STEEL					LBS.	977
CLASS AA CONCRETE					C. Y.	15.5



PLAN @ END BENT #1

PLAN @ END BENT #2

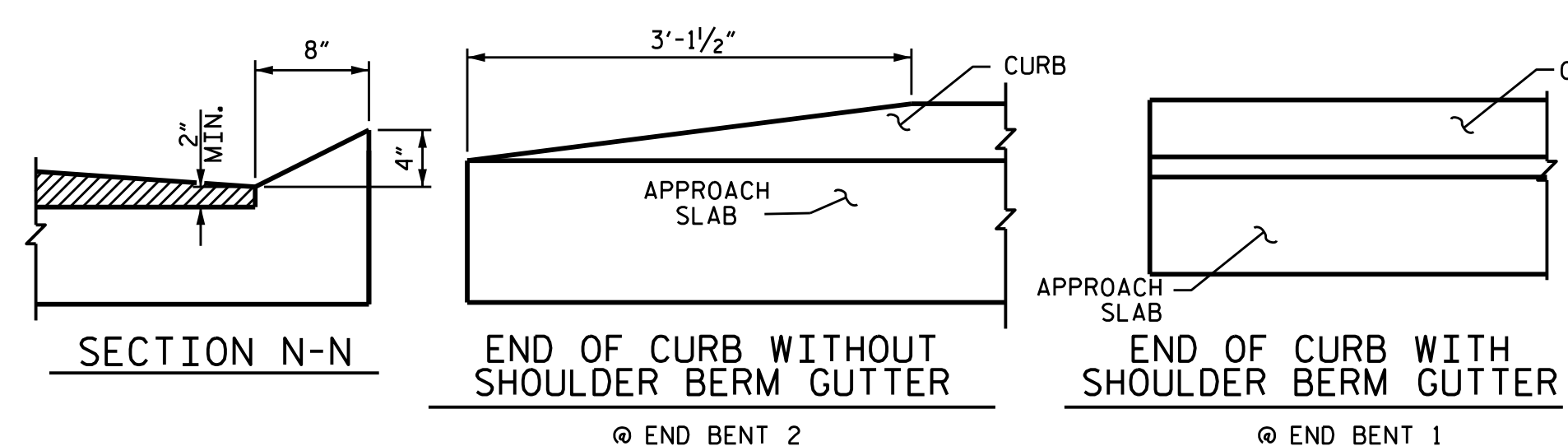
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

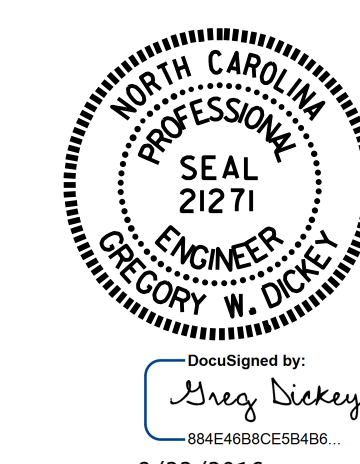
SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



CURB DETAILS

PROJECT NO. B-5360
 RANDOLPH COUNTY
 STATION: 23+68.00 -L-



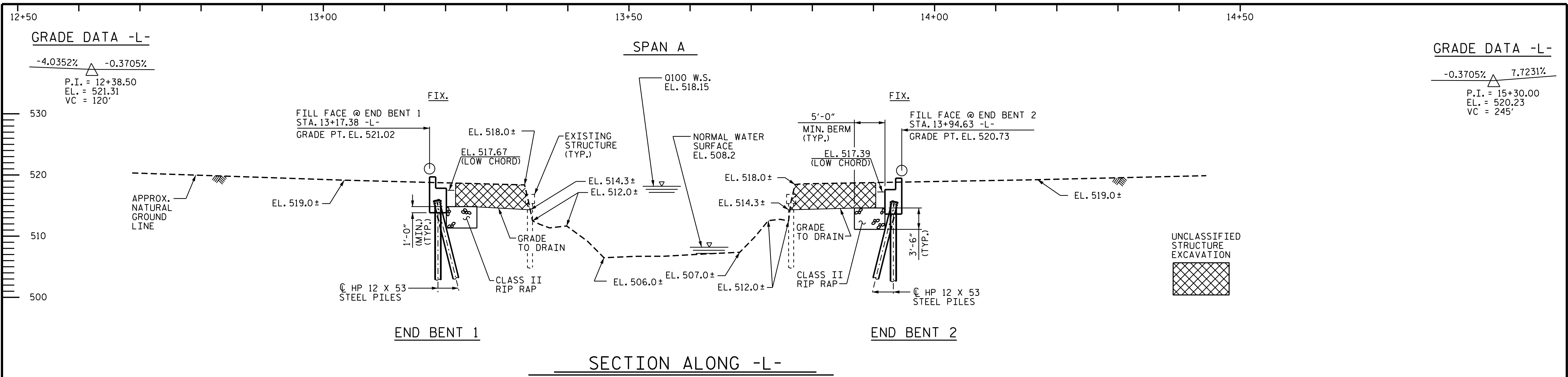
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR PRESTRESSED CONCRETE
 BOX BEAM UNIT
 (SUB-REGIONAL TIER)
 120° SKEW

ASSEMBLED BY : A. K. PATEL DATE : 1/20/16
 CHECKED BY : W. F. PARKER DATE : 3/16
 DRAWN BY : MAA 11/11
 CHECKED BY : AAC 11/11

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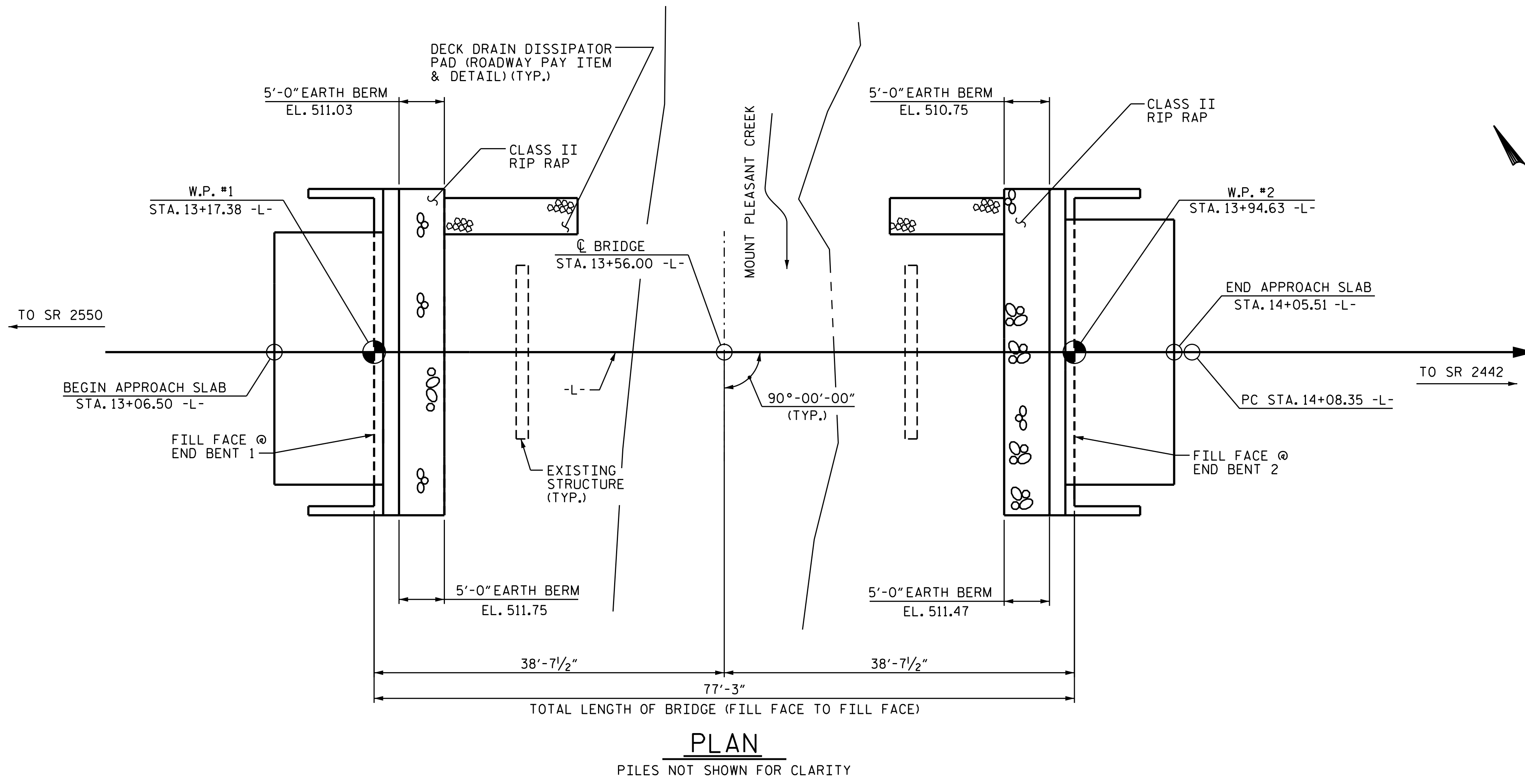
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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			38



HORIZONTAL CURVE DATA -L-

P.I. STA. 15+45.75
 $\Delta = 27^\circ-06'-17.9"$ (LT.)
 $D = 10^\circ-03'-06.8"$
 $L = 269.65'$
 $T = 137.40'$
 $R = 570.00'$



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5546
 COUNTY RANDOLPH
 STATION: 13+56.00-L-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 307

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER MOUNT PLEASANT CREEK ON SR 2481 BETWEEN SR 2550 AND SR 2442



DRAWN BY : D.A. DAVENPORT DATE : 10/08/14
 CHECKED BY : J.K. BOWLES DATE : 01/13/15
 DESIGN ENGINEER OF RECORD: D.A. DAVENPORT DATE : 01/14/15

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			38

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NOTES

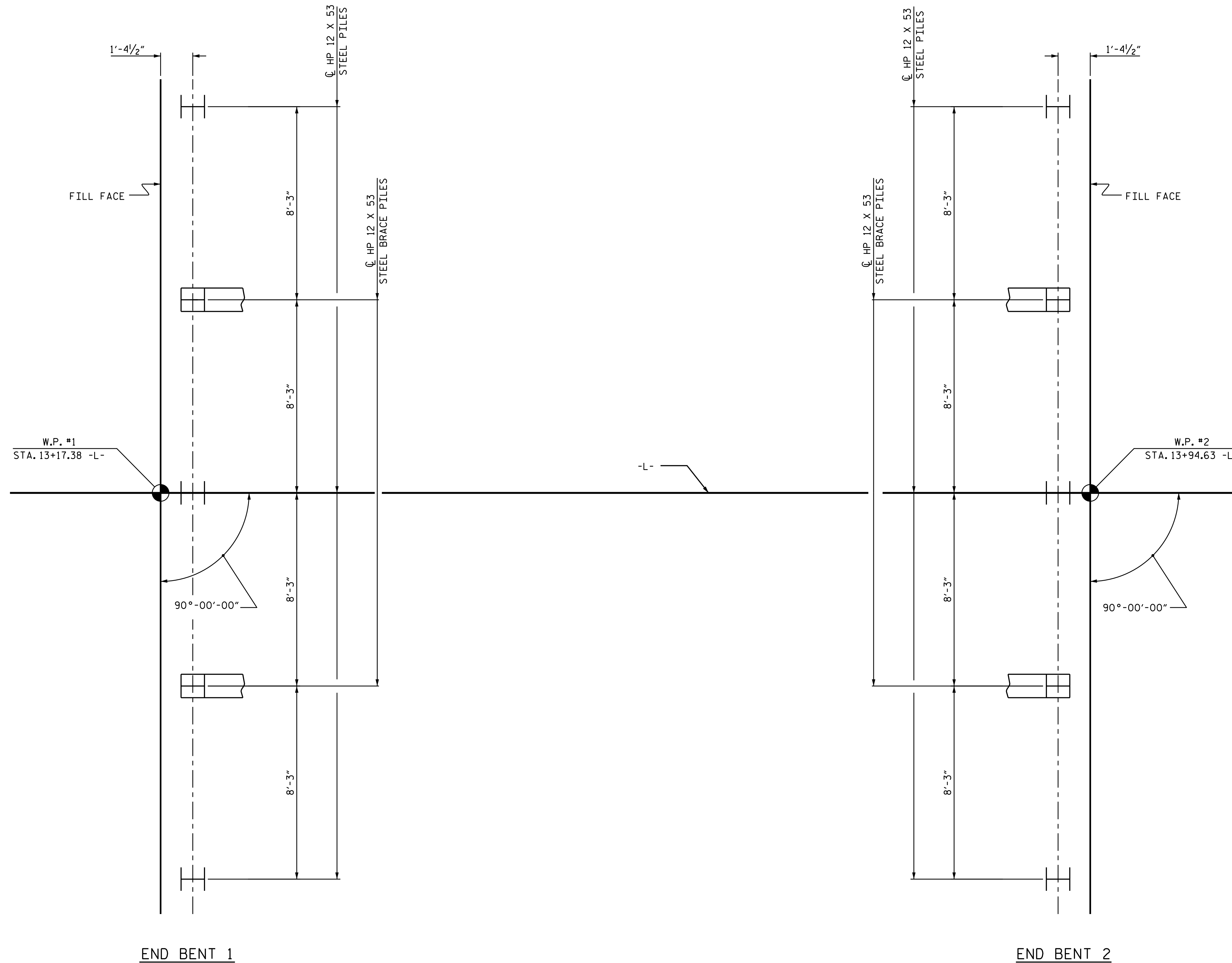
FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 114 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 190 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR ALL STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 35 FT.-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING EQUIPMENT IN ACCORDANCE WITH THE PILE PROVISION.



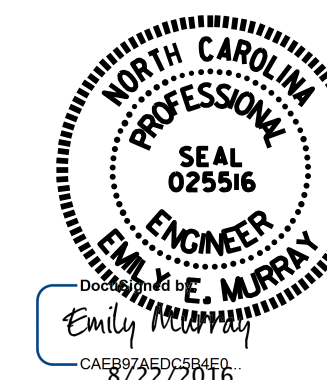
FOUNDATION LAYOUT
DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER MOUNT
 PLEASANT CREEK ON
 SR 2481 BETWEEN
 SR 2550 AND SR 2442

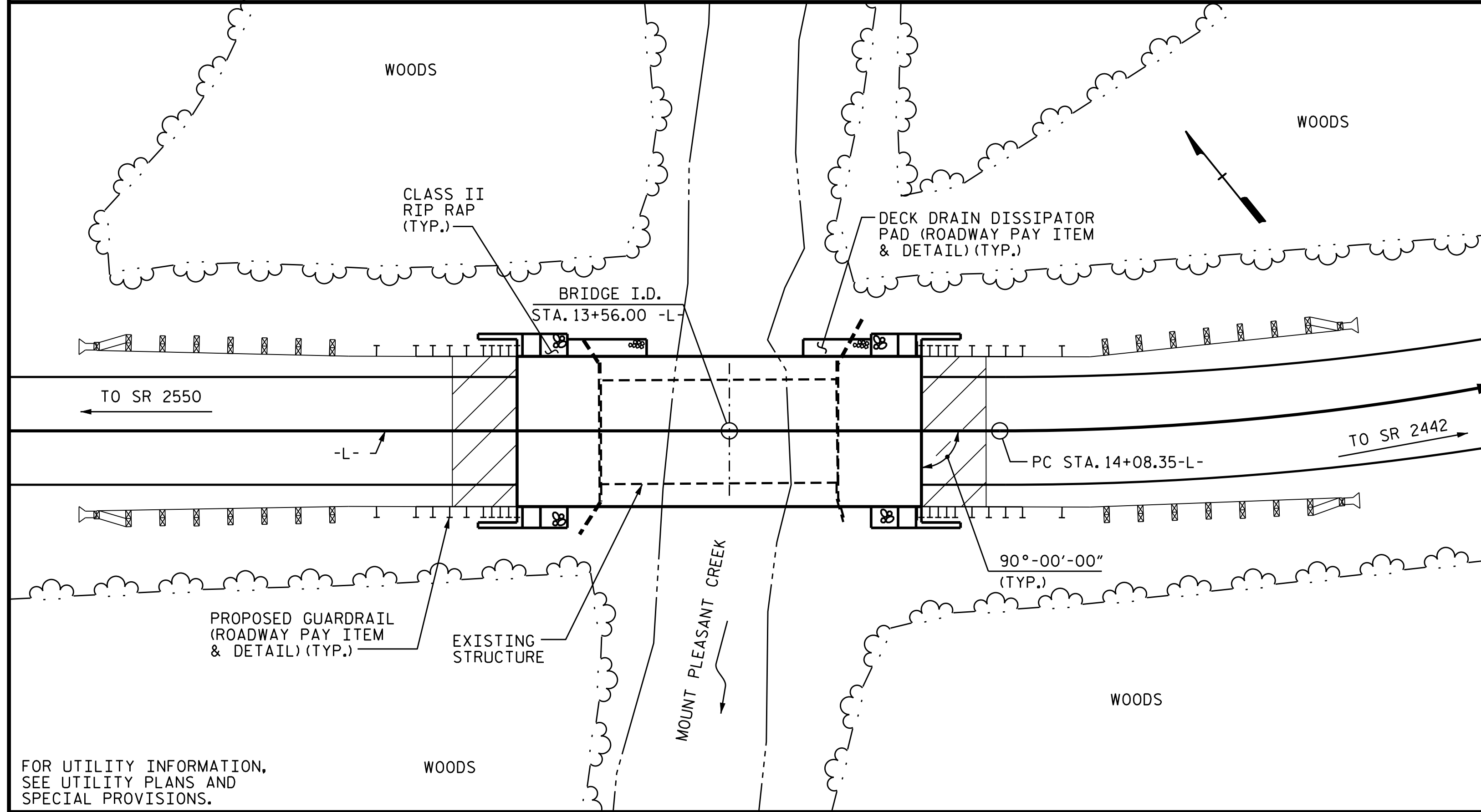


DRAWN BY : D.A. DAVENPORT DATE : 6/23/15
 CHECKED BY : J.K. BOWLES DATE : 4/25/16
 DESIGN ENGINEER OF RECORD: D.A. DAVENPORT DATE : 4/26/16

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			38
2			4			

BM#1: RAILROAD SPIKE IN BASE OF 15"Ø POPLAR TREE, 75' LEFT, STA. 13+87.00-L-, EL. 514.36



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE = 1,900 CFS
 FREQUENCY OF DESIGN FLOOD = 25 YR.
 DESIGN HIGH WATER ELEVATION = 516.80
 DRAINAGE AREA = 8.1 SQ. MI.
 BASE DISCHARGE (Q 100) = 2,801 CFS
 BASE HIGH WATER ELEVATION = 518.15

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 6,000 CFS
 FREQUENCY OF OVERTOPPING FLOOD = 500+ YR.
 OVERTOPPING FLOOD ELEVATION = 520.90

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12X53 STEEL PILES	STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS	ASBESTOS ASSESSMENT		
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	EACH	LIN.FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN.FT.	LUMP SUM
SUPERSTRUCTURE										150.00				10	750.00	
END BENT NO. 1				23.8		3,342	5	125	5		30	45				
END BENT NO. 2				23.8		3,342	5	100	5		30	45				
TOTAL	LUMP SUM	1	LUMP SUM	47.6	LUMP SUM	6,684	10	225	10	150.00	60	90	LUMP SUM	10	750.00	LUMP SUM

NOTES

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK & FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+56.00-L-".
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 44'-6", WITH A TIMBER DECK AND A CLEAR ROADWAY WIDTH OF 19'-1" WITH AN 1" ASPHALT WEARING SURFACE ON STEEL I-BEAMS, ON TIMBER CAPS AND PILES, ONE WHICH IS ENCASED IN CONCRETE AND TIMBER BULKHEADS, LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.
 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.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS. THE EXISTING END BENTS SHALL BE REMOVED DOWN TO EL. 514.30 WITH THE REMAINING PORTION LEFT IN PLACE FOR BANK STABILIZATION.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

PROJECT NO. B-5546
 RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER MOUNT PLEASANT CREEK ON SR 2481 BETWEEN SR 2550 AND SR 2442



DRAWN BY : D.A. DAVENPORT DATE : 10/08/14
 CHECKED BY : J.K. ROWLES DATE : 4/25/16

17-AUG-2016 09:57
 R:\Structures\Plans\B5546.SD.GD.dgn
 jdhawk

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			38

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	①	1.484	--	1.75	0.273	2.04	A	EL	36.75	0.507	1.56	A	EL	7.35	0.80	0.273	1.48	A	EL	36.75		
	HL-93(0pr)	N/A	--	2.028	--	1.35	0.273	2.64	A	EL	36.75	0.507	2.03	A	EL	7.35	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	②	1.947	70.08	1.75	0.273	2.67	A	EL	36.75	0.507	1.98	A	EL	7.35	0.80	0.273	1.95	A	EL	36.75		
	HS-20(0pr)	36.000	--	2.561	92.205	1.35	0.273	3.46	A	EL	36.75	0.507	2.56	A	EL	7.35	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13,500	--	4.403	59,442	1.4	0.273	7.55	A	EL	36.75	0.507	5.89	A	EL	7.35	0.80	0.273	4.40	A	EL	36.75	
		SNGARBS2	20,000	--	3.277	65,549	1.4	0.273	5.62	A	EL	36.75	0.507	4.18	A	EL	7.35	0.80	0.273	3.28	A	EL	36.75	
		SNAGRIS2	22,000	--	3.102	68,248	1.4	0.273	5.32	A	EL	36.75	0.507	3.88	A	EL	7.35	0.80	0.273	3.10	A	EL	36.75	
		SNCOTTS3	27,250	--	2.191	59,705	1.4	0.273	3.76	A	EL	36.75	0.507	2.94	A	EL	7.35	0.80	0.273	2.19	A	EL	36.75	
		SNAGGRS4	34,925	--	1.83	63,896	1.4	0.273	3.14	A	EL	36.75	0.507	2.44	A	EL	7.35	0.80	0.273	1.83	A	EL	36.75	
		SNS5A	35,550	--	1.789	63,605	1.4	0.273	3.07	A	EL	36.75	0.507	2.47	A	EL	7.35	0.80	0.273	1.79	A	EL	36.75	
		SNS6A	39,950	--	1.641	65,556	1.4	0.273	2.81	A	EL	36.75	0.507	2.25	A	EL	7.35	0.80	0.273	1.64	A	EL	36.75	
	TTST	SNS7B	42,000	--	1.563	65,632	1.4	0.273	2.68	A	EL	36.75	0.507	2.21	A	EL	7.35	0.80	0.273	1.56	A	EL	36.75	
		TNAGRIT3	33,000	--	2.001	66,029	1.4	0.273	3.43	A	EL	36.75	0.507	2.68	A	EL	7.35	0.80	0.273	2.00	A	EL	36.75	
		TNT4A	33,075	--	2.01	66,465	1.4	0.273	3.45	A	EL	36.75	0.507	2.61	A	EL	7.35	0.80	0.273	2.01	A	EL	36.75	
		TNT6A	41,600	--	1.642	68,325	1.4	0.273	2.82	A	EL	36.75	0.507	2.35	A	EL	7.35	0.80	0.273	1.64	A	EL	36.75	
		TNT7A	42,000	--	1.65	69,313	1.4	0.273	2.83	A	EL	36.75	0.507	2.3	A	EL	7.35	0.80	0.273	1.65	A	EL	36.75	
		TNT7B	42,000	--	1.706	71,672	1.4	0.273	2.93	A	EL	36.75	0.507	2.16	A	EL	7.35	0.80	0.273	1.71	A	EL	36.75	
		TNAGRIT4	43,000	--	1.624	69,831	1.4	0.273	2.78	A	EL	36.75	0.507	2.09	A	EL	7.35	0.80	0.273	1.62	A	EL	36.75	
TNAGT5A	45,000	--	1.531	68,917	1.4	0.273	2.63	A	EL	36.75	0.507	2.08	A	EL	7.35	0.80	0.273	1.53	A	EL	36.75			
TNAGT5B	45,000	③	1.513	68,095	1.4	0.273	2.59	A	EL	36.75	0.507	1.99	A	EL	7.35	0.80	0.273	1.51	A	EL	36.75			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

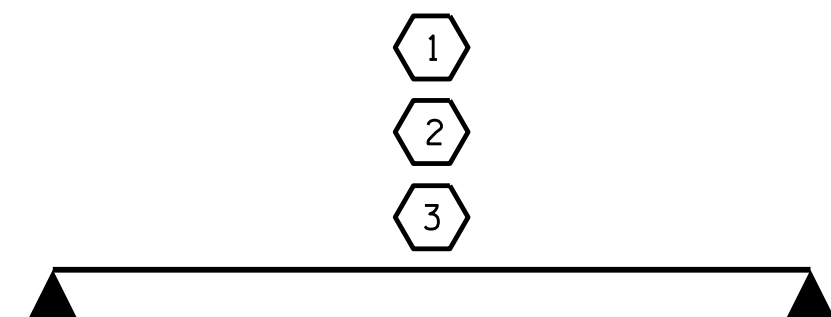
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

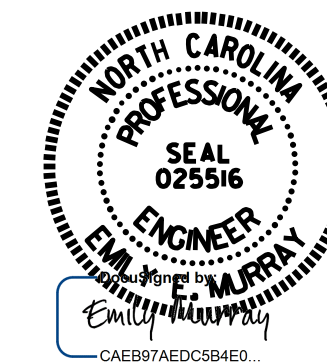
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-



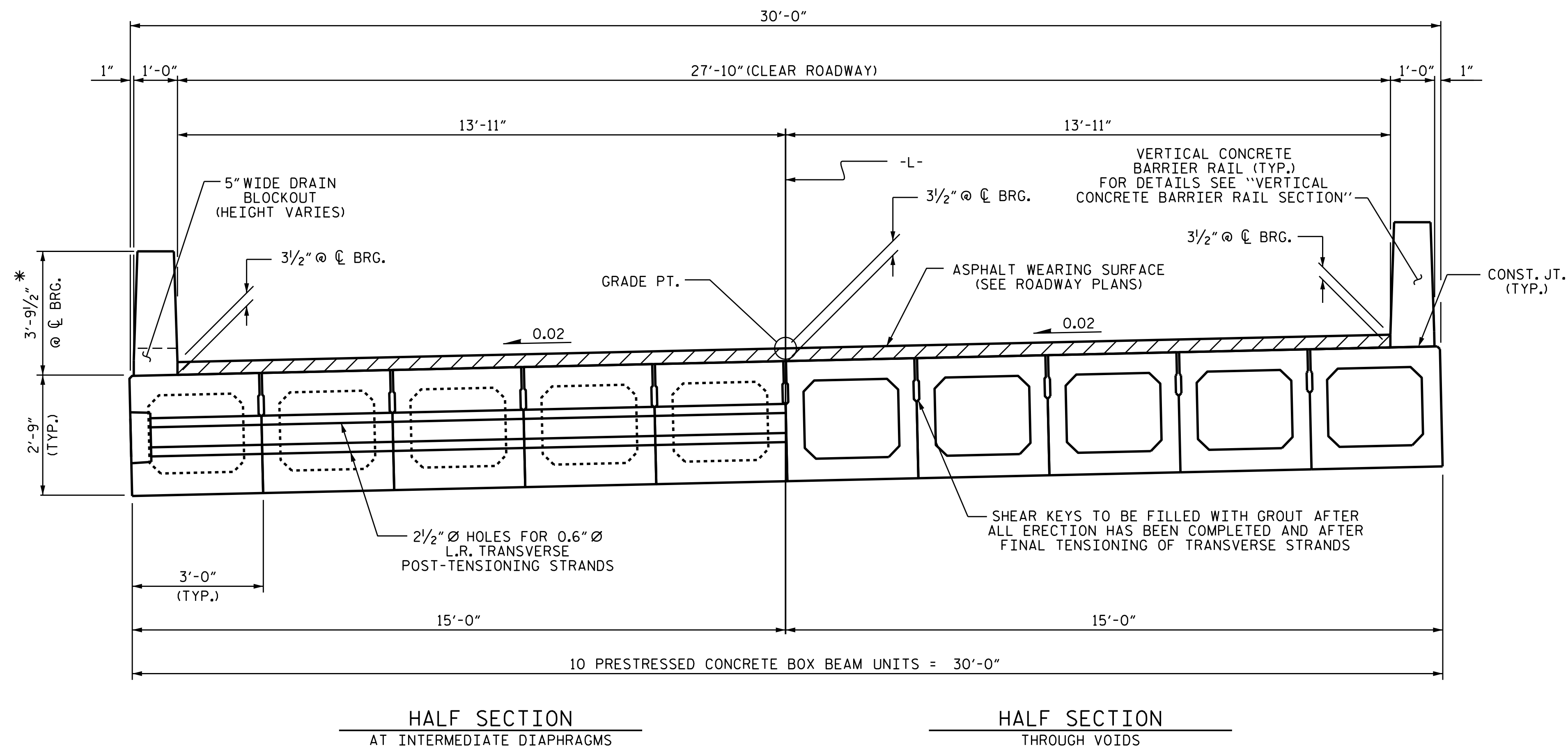
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 LRFR SUMMARY FOR
 75' BOX BEAM UNIT
 90° SKEW
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			38

ASSEMBLED BY : D.A. DAVENPORT DATE : 10/08/14
 CHECKED BY : J.K. BOWLES DATE : 01/20/15
 DRAWN BY : TMG II/II
 CHECKED BY : AAC II/II

DOCUMENT NOT CONSIDERED
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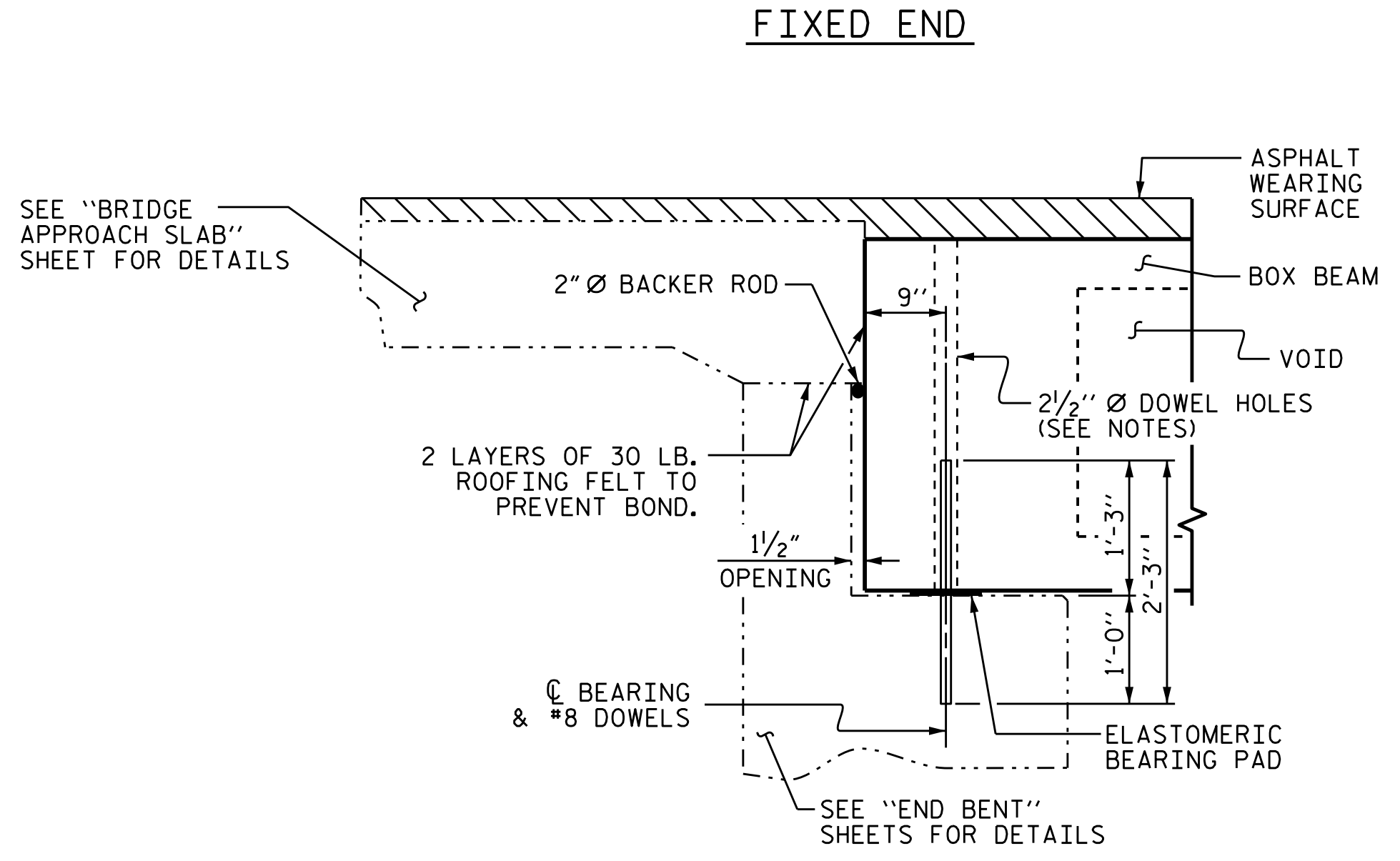


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

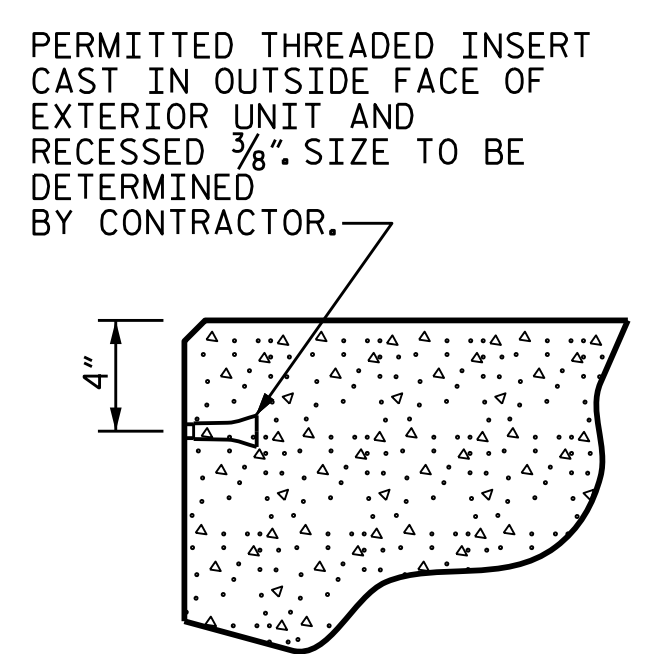
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

*THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



SECTION AT END BENT



THREADED INSERT DETAIL

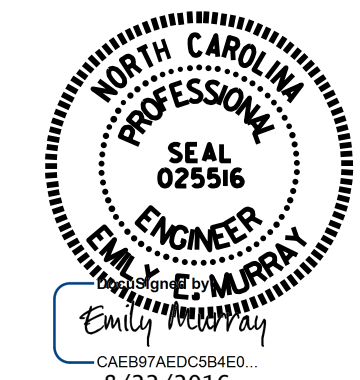
NOTES

- ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.
- FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.
- RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.
- THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.
- THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.
- THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.
- ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.
- PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.
- APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.
- VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.
- THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.
- THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.
- THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.
- THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.
- THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 5". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE BOX BEAM UNIT TO THE TOP OF THE DRAIN OPENING.
- APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR BOX BEAM UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.

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 STATION: 13+56.00-L-

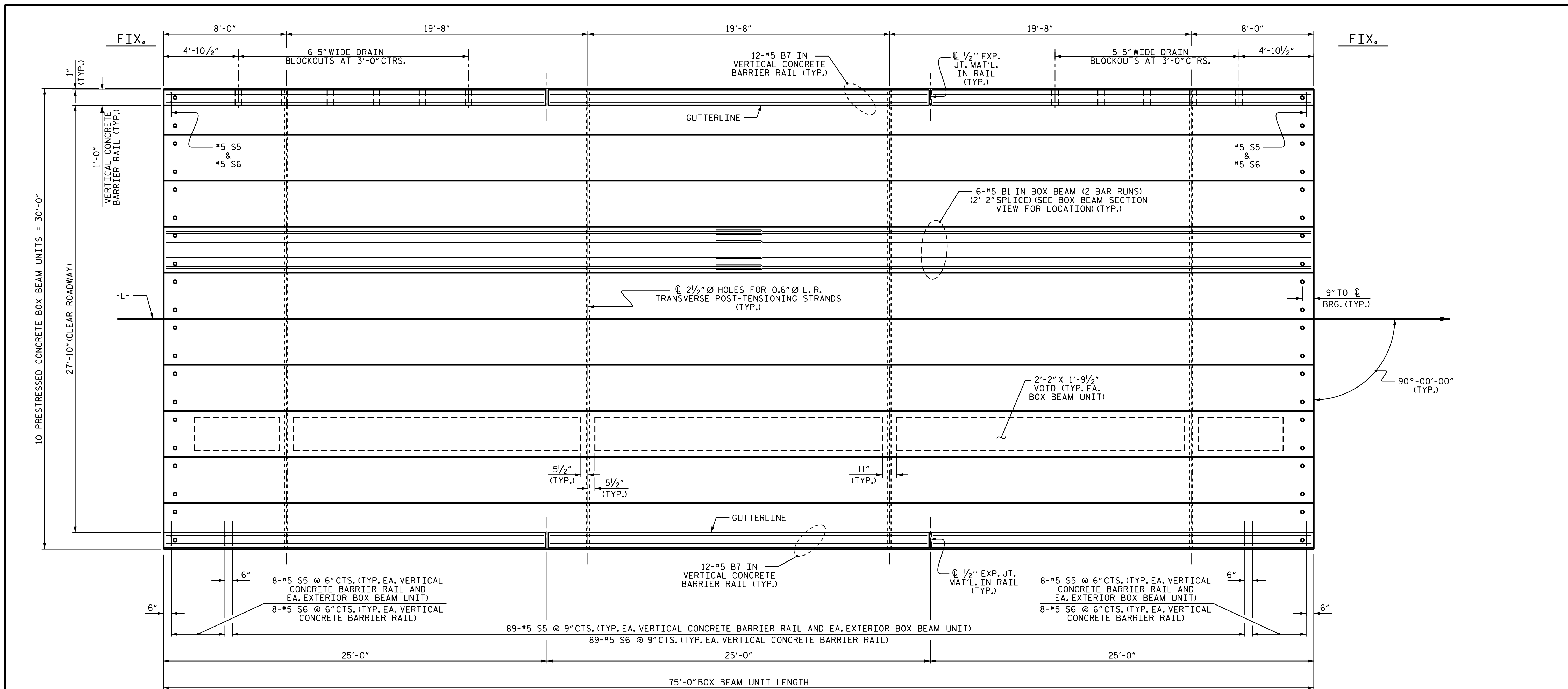
SHEET 1 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT

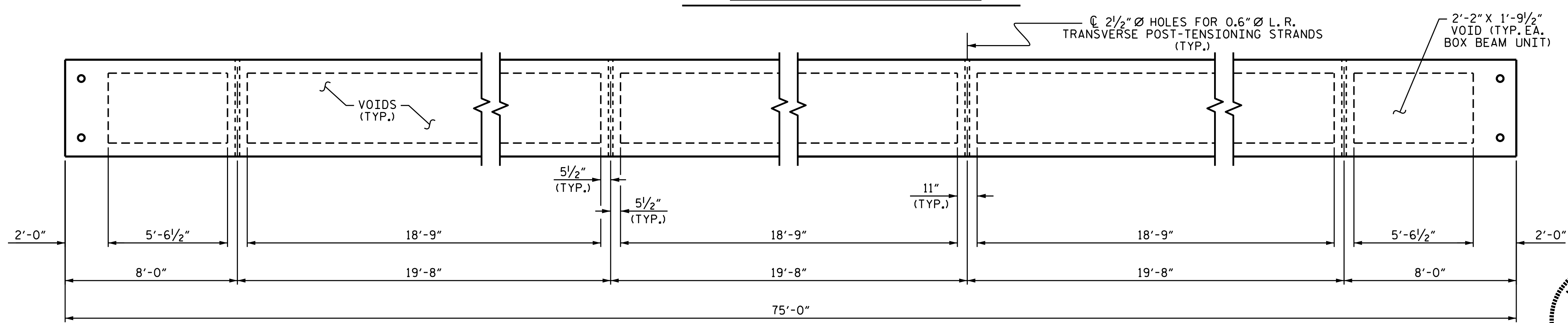


ASSEMBLED BY : D.A. DAVENPORT	DATE : 08/04/14
CHECKED BY : J.K. BOWLES	DATE : 01/13/15
DRAWN BY : DGE 8/11	REV. 8/14 MAA/TMG
CHECKED BY : TMC 11/11	

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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-27
2			4			38



PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

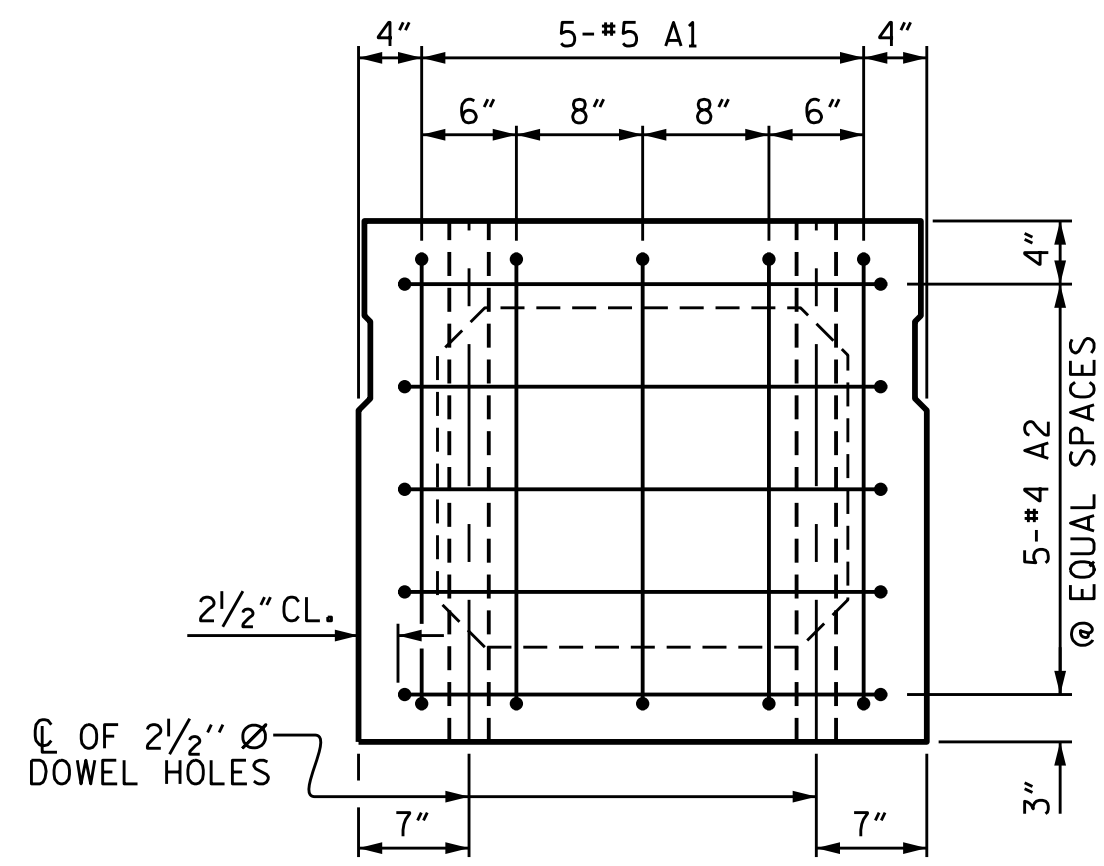
PLAN OF 75' UNIT
 27'-10" CLEAR ROADWAY
 90° SKEW



ASSEMBLED BY : D.A. DAVENPORT DATE : 10/08/14
 CHECKED BY : J.K. BOWLES DATE : 01/14/15
 DRAWN BY : DGE 8/11 REV. 8/14 MAA/TMG
 CHECKED BY : TMG 11/11

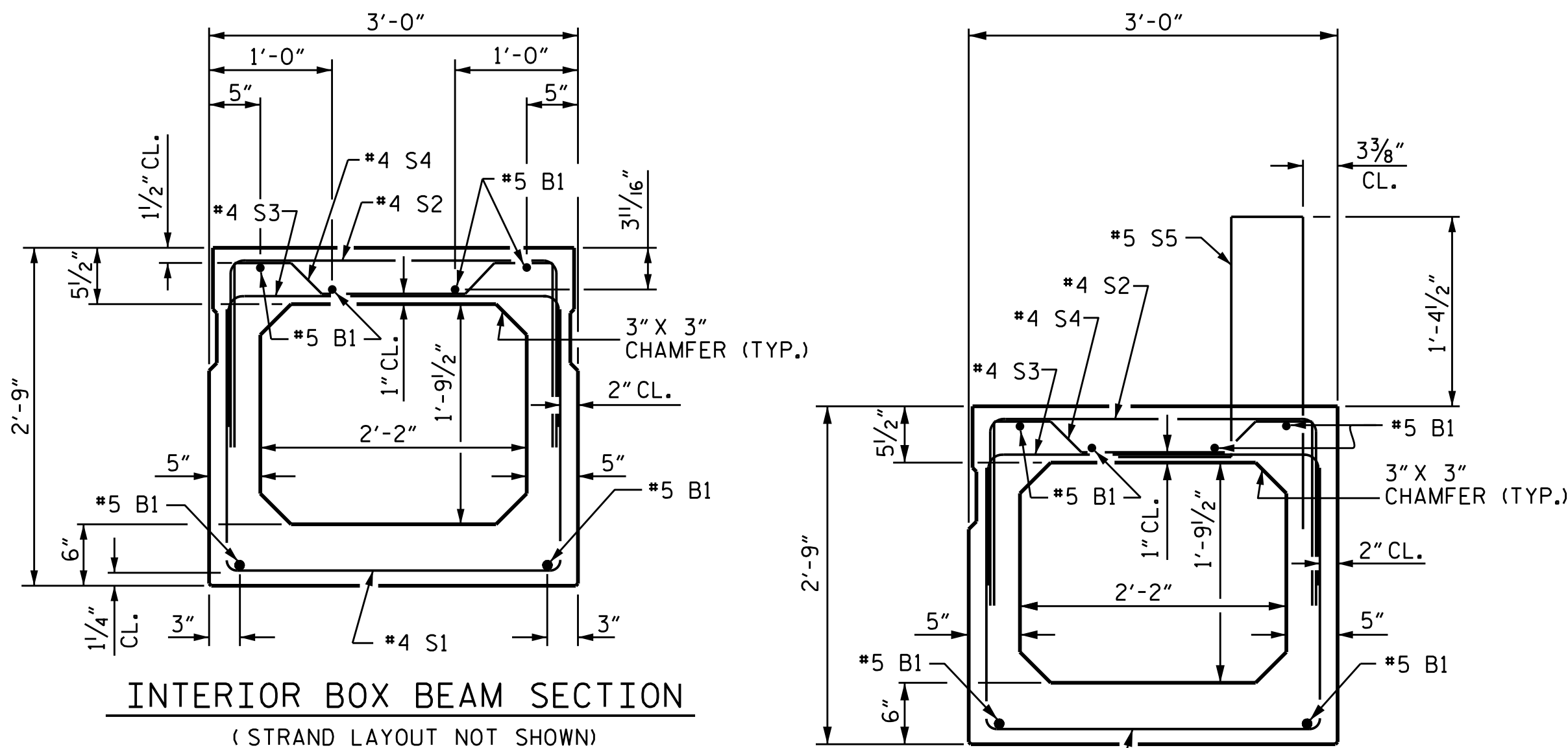
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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-28
2			4			38

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END ELEVATION

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



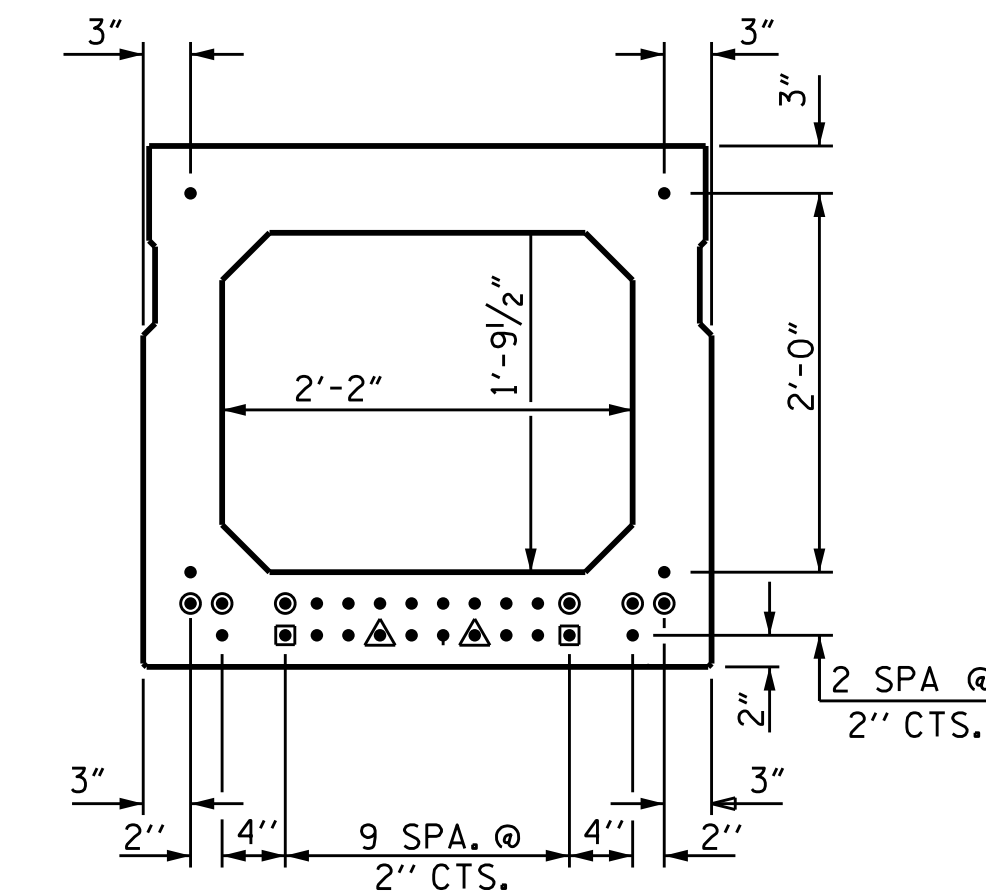
INTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

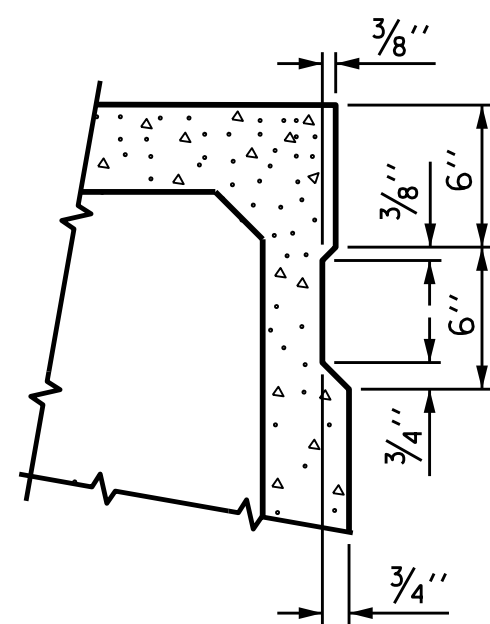
(24 STRANDS REQUIRED)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ◼ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◻ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE BOX BEAM UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST.

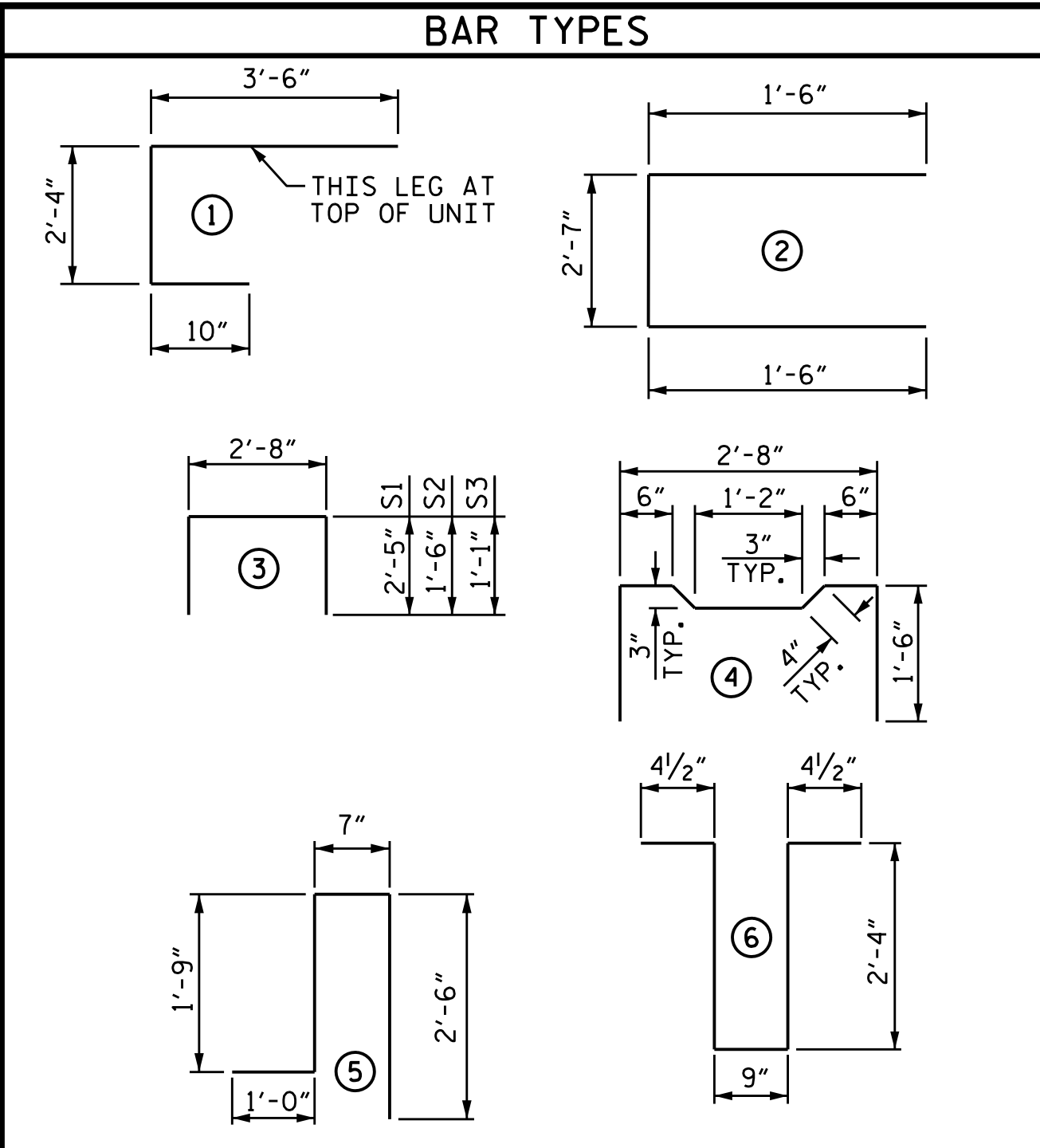
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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



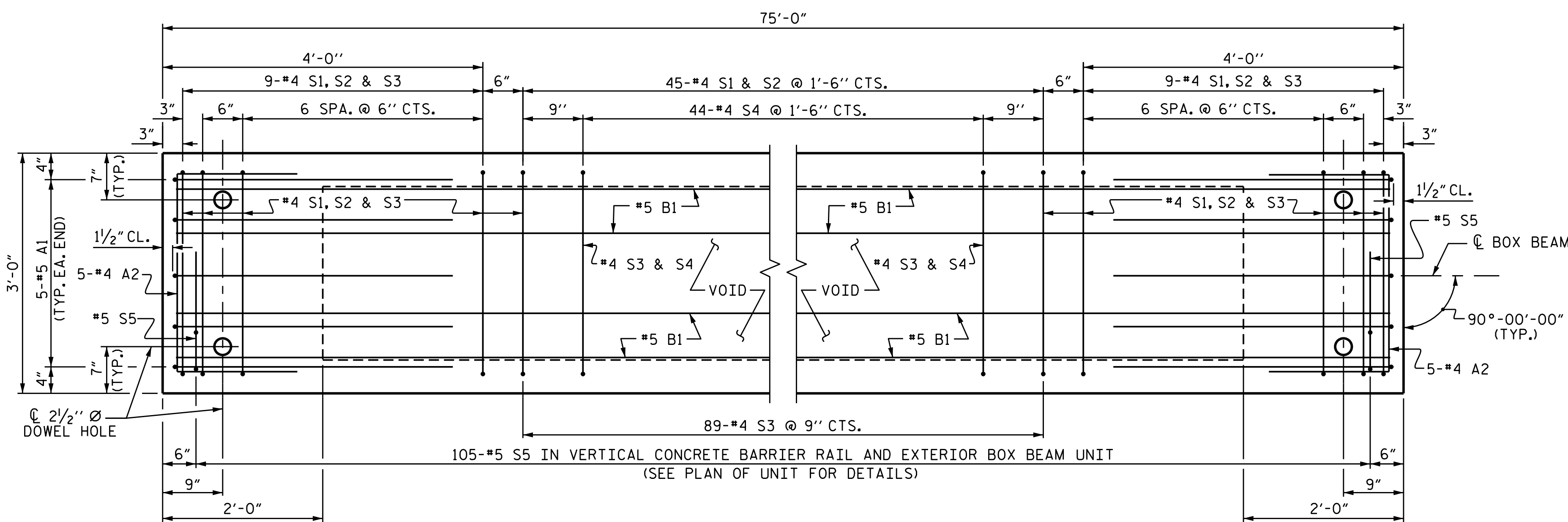
SHEAR KEY DETAIL

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



BILL OF MATERIAL FOR ONE BOX BEAM SECTION

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	34	#4	2	5'-7"	127	5'-7"	127
B1	12	#5	STR	38'-5"	481	38'-5"	481
K1	12	#4	6	6'-2"	49	6'-2"	49
K2	8	#4	STR	2'-7"	14	2'-7"	14
S1	63	#4	3	7'-6"	316	7'-6"	316
S2	63	#4	3	5'-8"	238	5'-8"	238
S3	107	#4	3	4'-10"	345	4'-10"	345
S4	44	#4	4	5'-10"	171	5'-10"	171
* S5	105	#5	5	5'-10"	639	--	--
REINFORCING STEEL				1811	LBS.	1811	LBS.
* EPOXY COATED REINF. STEEL				639	LBS.		
8000 P.S.I. CONCRETE				13.4	CU. YDS.	13.3	CU. YDS.
0.6" Ø L.R. STRANDS				No. 24		No. 24	



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT". FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL". FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. B-5546
 RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 3 OF 5

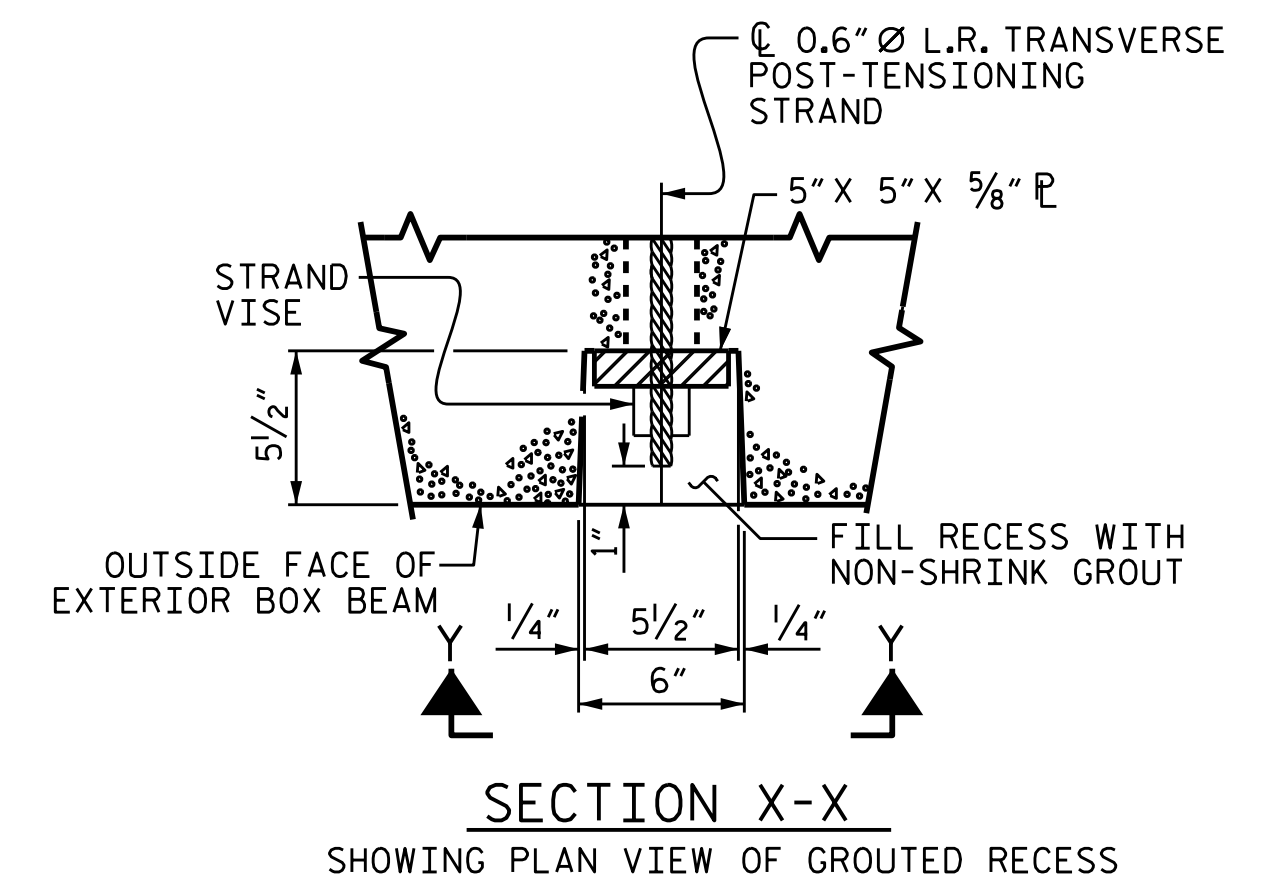
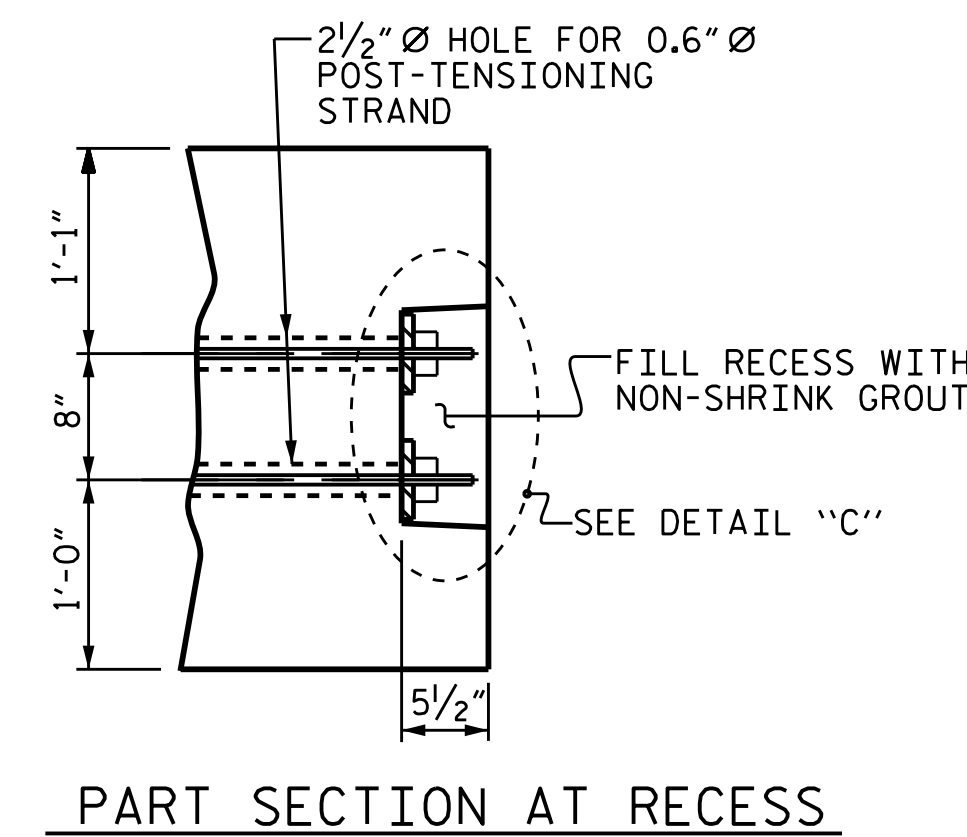
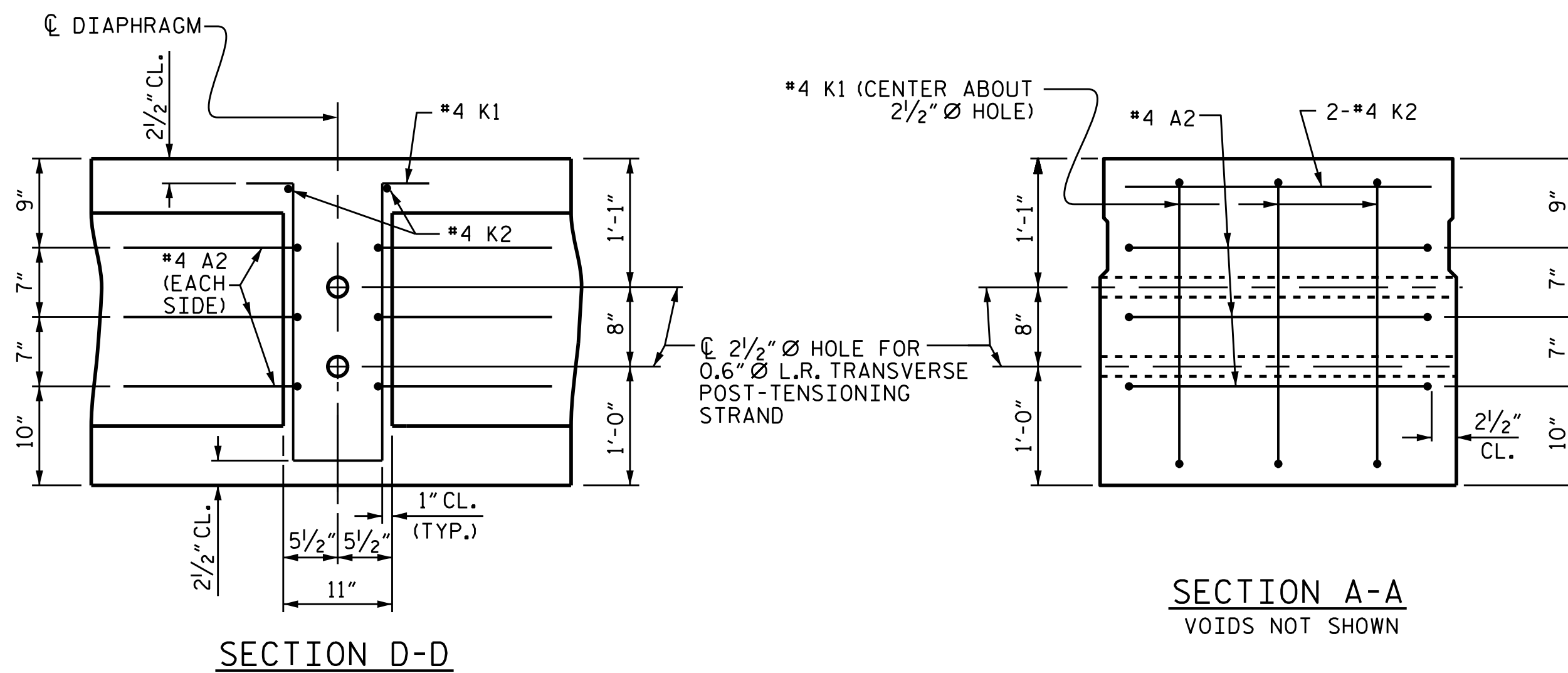
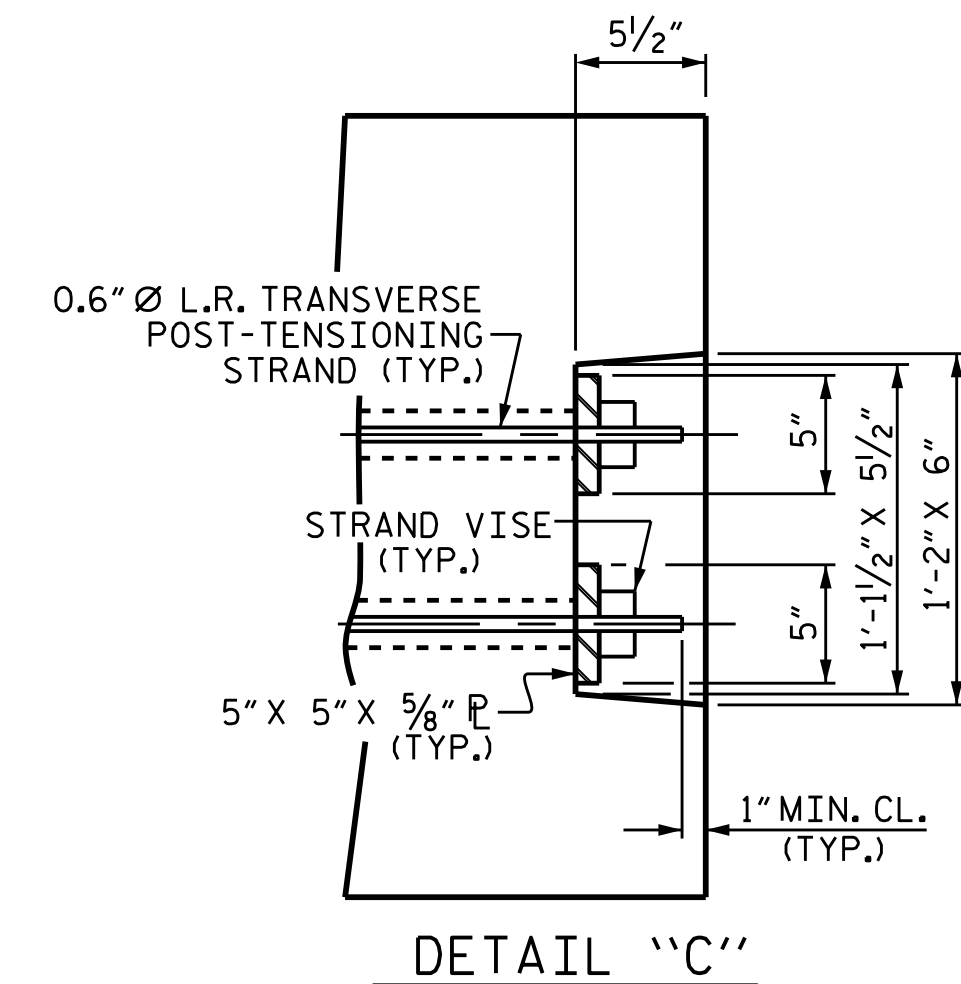
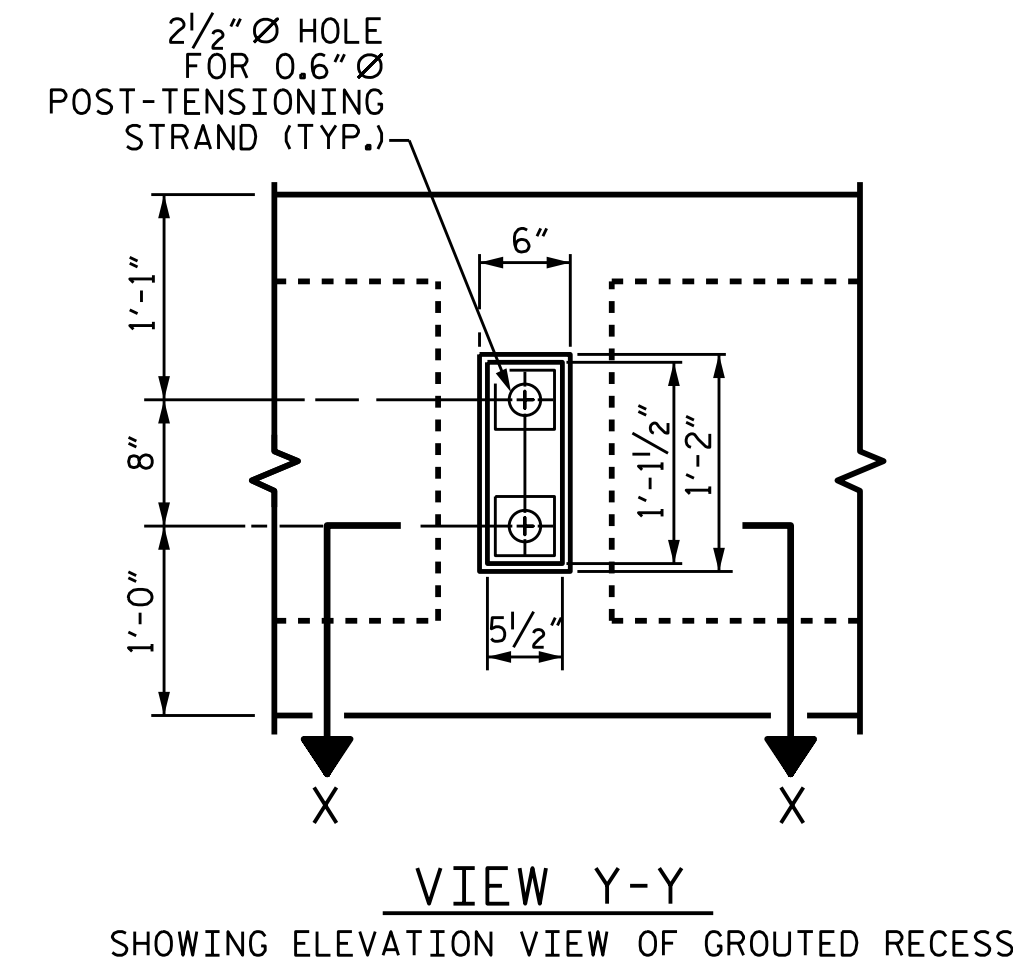
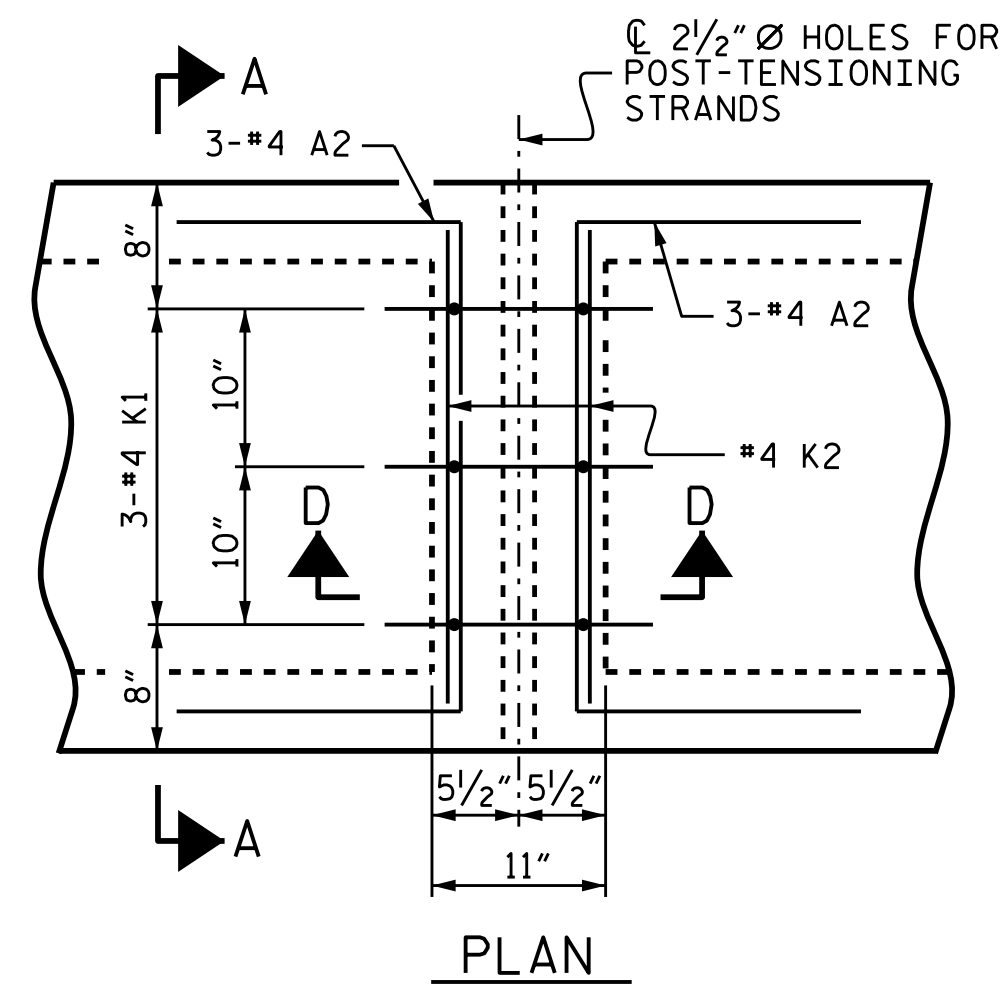


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			38

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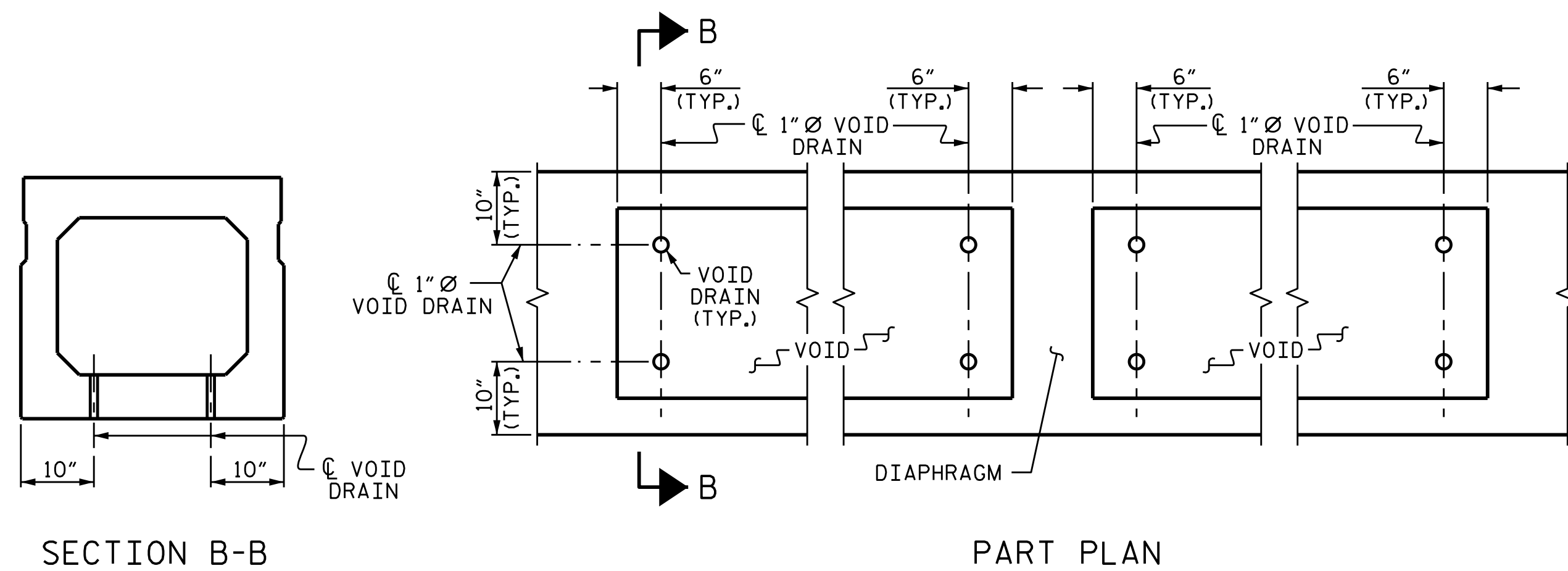
ASSEMBLED BY : D.A. DAVENPORT	DATE : 10/08/14
CHECKED BY : J.K. BOWLES	DATE : 01/14/15
DRAWN BY : DGE 10/11	REV. 8/14
CHECKED BY : TMG 11/11	MAA/TMG



DOUBLE DIAPHRAGM DETAILS

*4 "S" BARS NOT SHOWN. *4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.

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



VOID DRAIN DETAILS

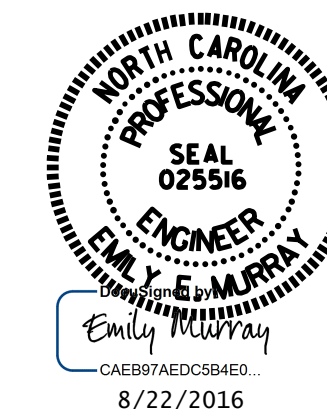
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-9"
75' BOX BEAM UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 3/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	1 1/4" ↑

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 4 OF 5

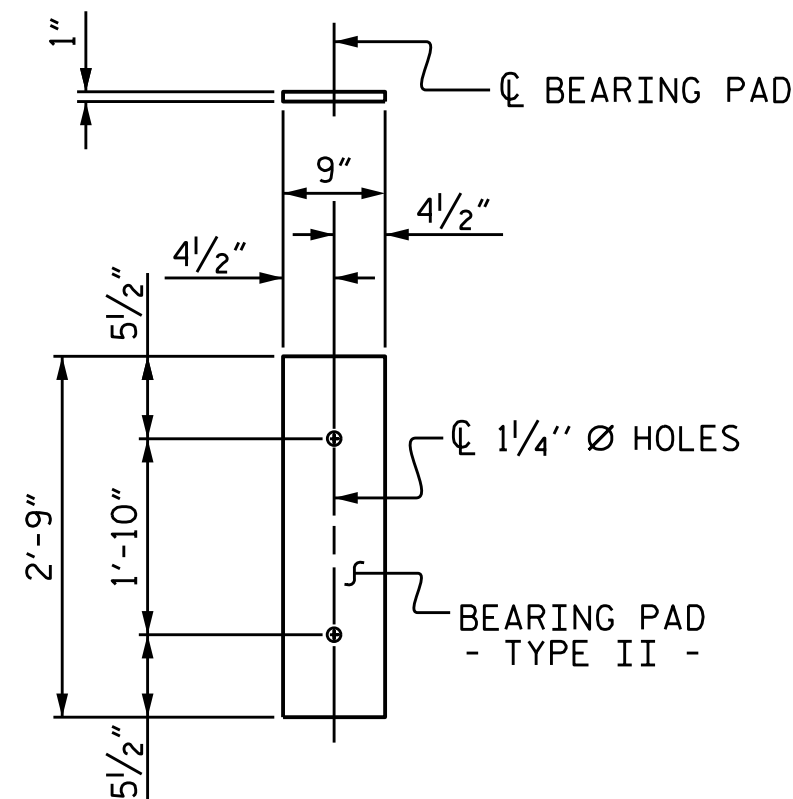


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT

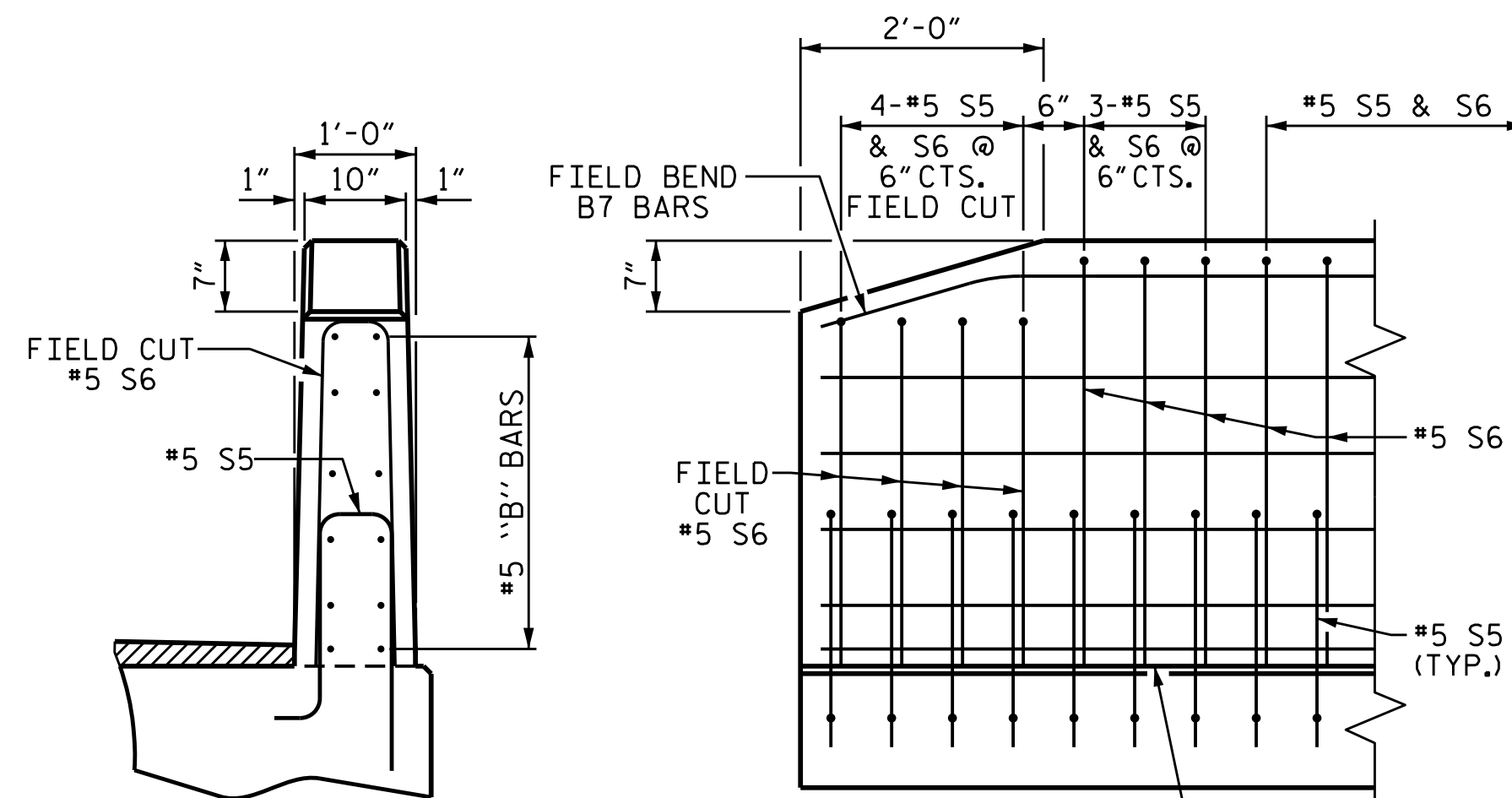
ASSEMBLED BY : D.A. DAVENPORT DATE :10/08/14
 CHECKED BY : J.K. BOWLES DATE :01/14/15
 DRAWN BY : DGE 10/11 REV. 8/14 MAA/TMG
 CHECKED BY : TMG 11/11

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			38



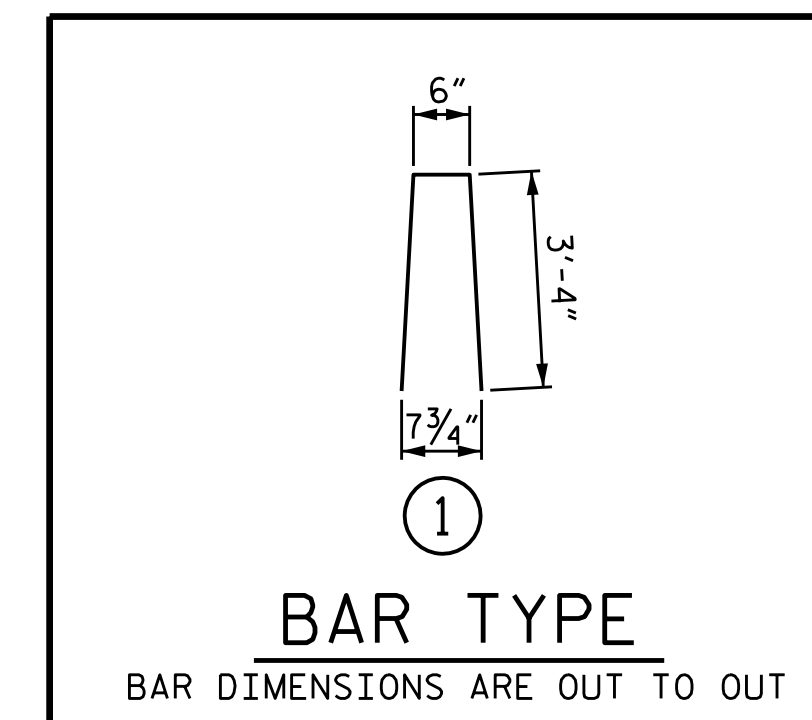
FIXED END
(TYPE II - 20 REQ'D)



END VIEW **SIDE VIEW**
END OF RAIL DETAILS

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	75'-0"	150'-0"
INTERIOR B.B.	8	75'-0"	600'-0"
TOTAL	10		750'-0"

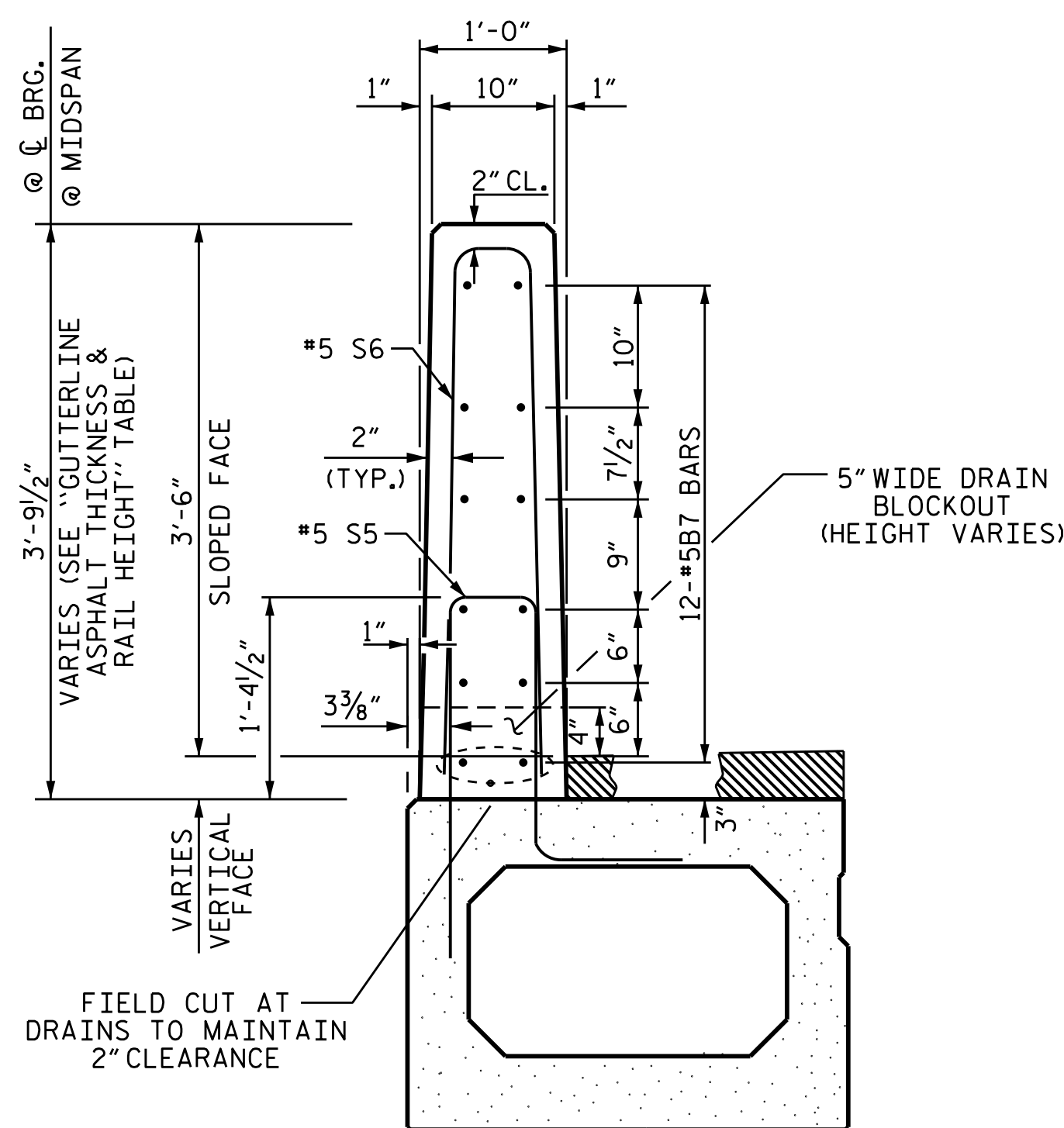


BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

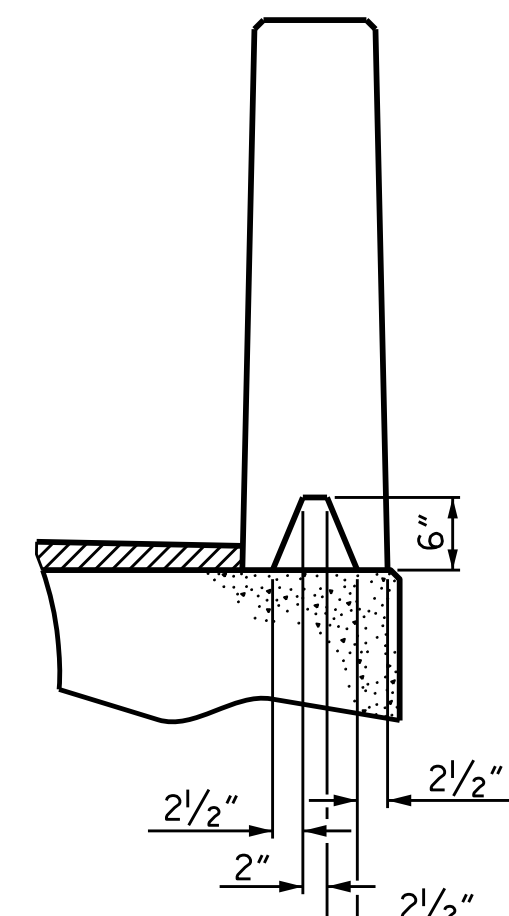
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
75' UNIT					
* B7	72	#5	STR	24'-7"	1846
* S6	210	#5	1	7'-2"	1570
* EPOXY COATED REINFORCING STEEL				LBS.	3416
CLASS AA CONCRETE				CU.YDS.	19.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	150.0

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
75' UNITS	2 1/4"	3'-8 1/4"

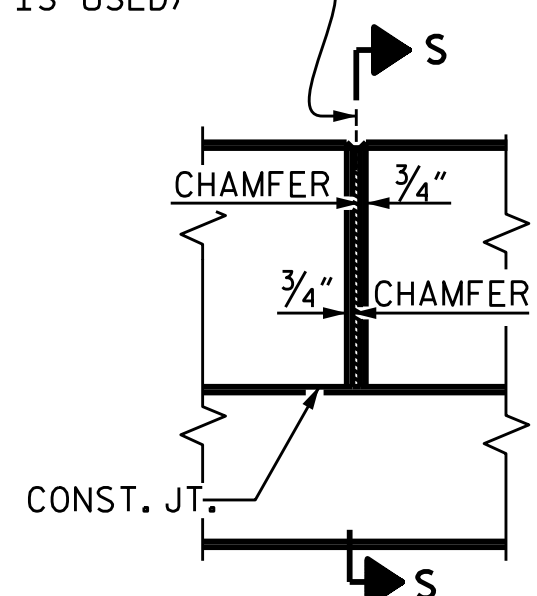


SECTION THRU RAIL
(LEFT SIDE SHOWN RIGHT SIDE SIMILAR WITHOUT DRAINS)



SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

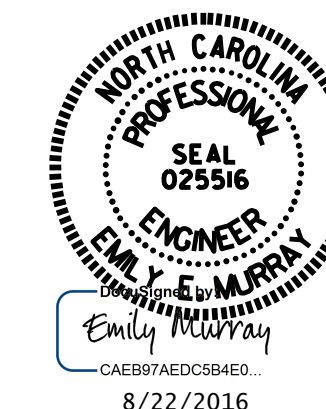
VERTICAL CONCRETE BARRIER RAIL DETAILS

PROJECT NO. B-5546
RANDOLPH COUNTY
STATION: 13+56.00-L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-9"
PRESTRESSED CONCRETE
BOX BEAM UNIT



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			38

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ASSEMBLED BY : D.A. DAVENPORT DATE : 10/08/14
CHECKED BY : J.K. BOWLES DATE : 01/20/15
DRAWN BY : DGE 10/11 REV. 8/14 MAA/TMG
CHECKED BY : TMG 11/11

NOTES

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

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

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

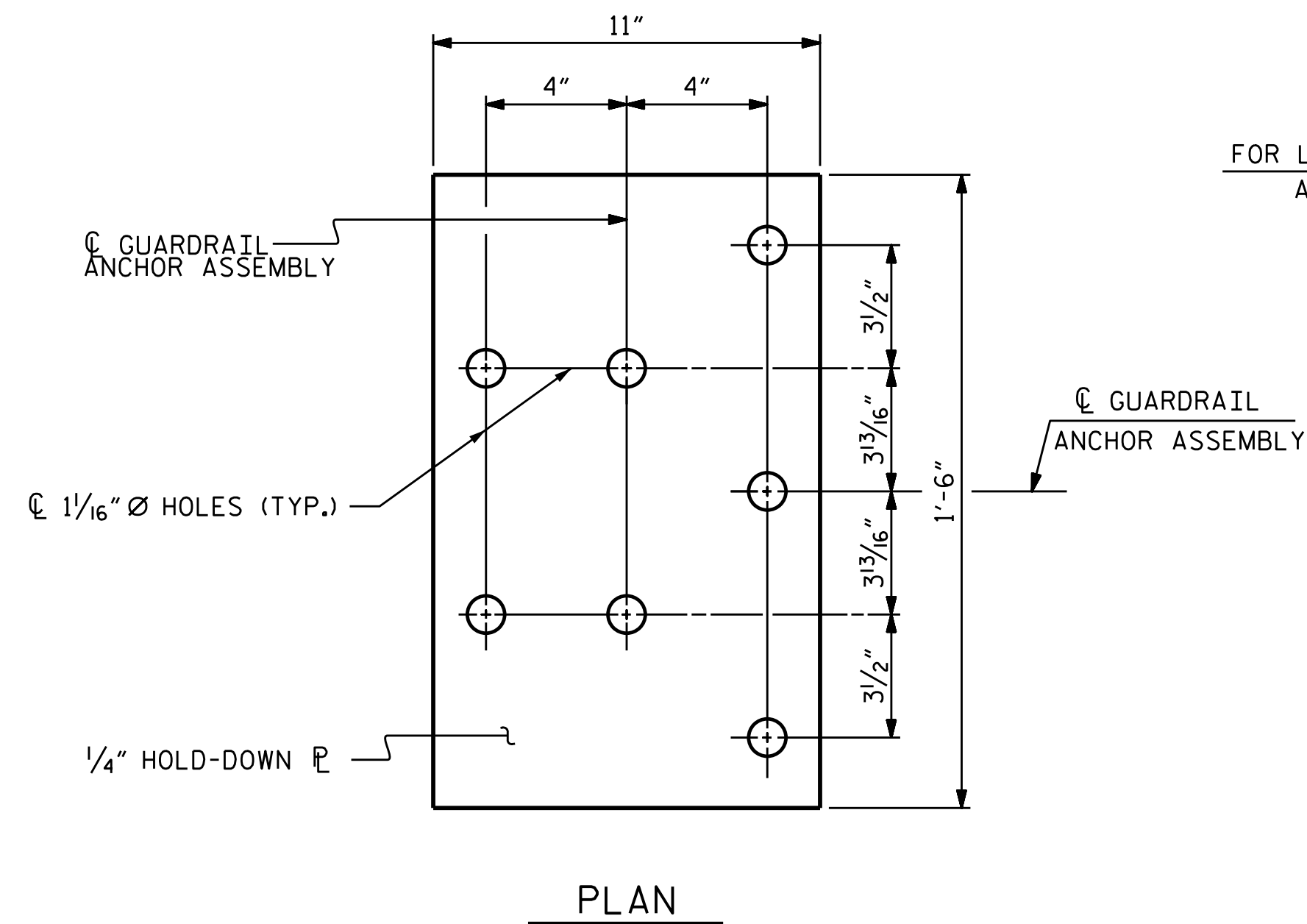
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

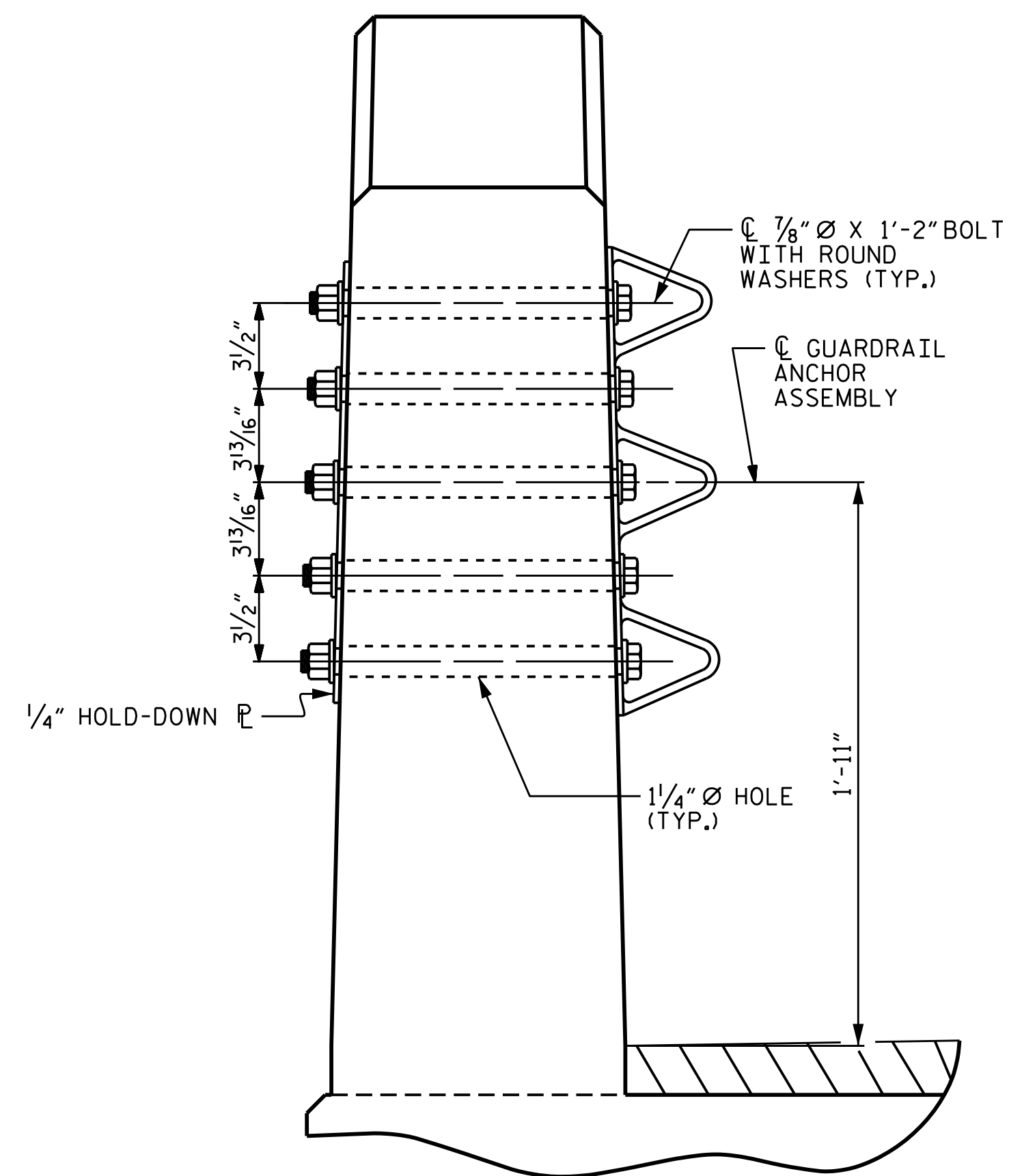
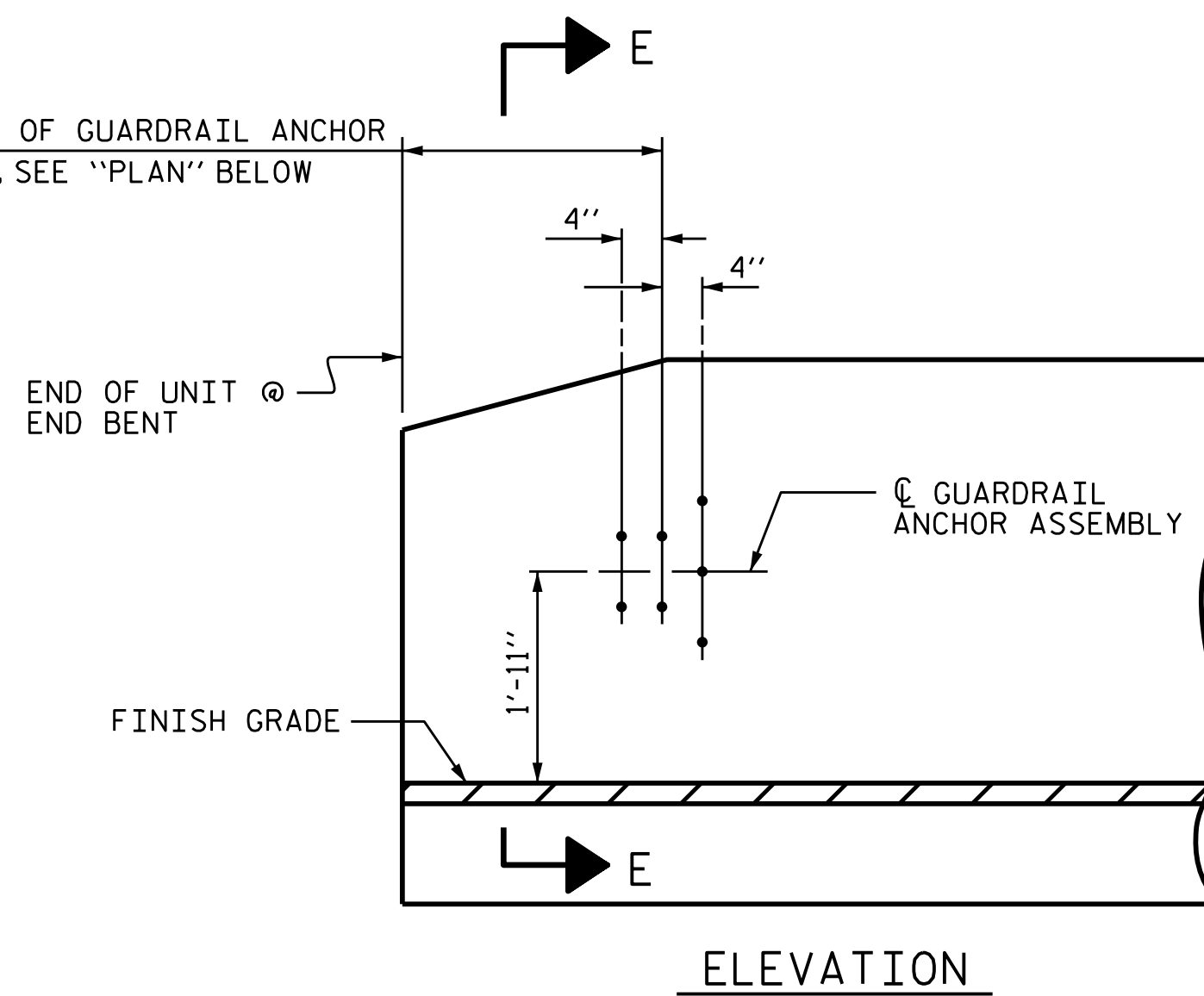
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

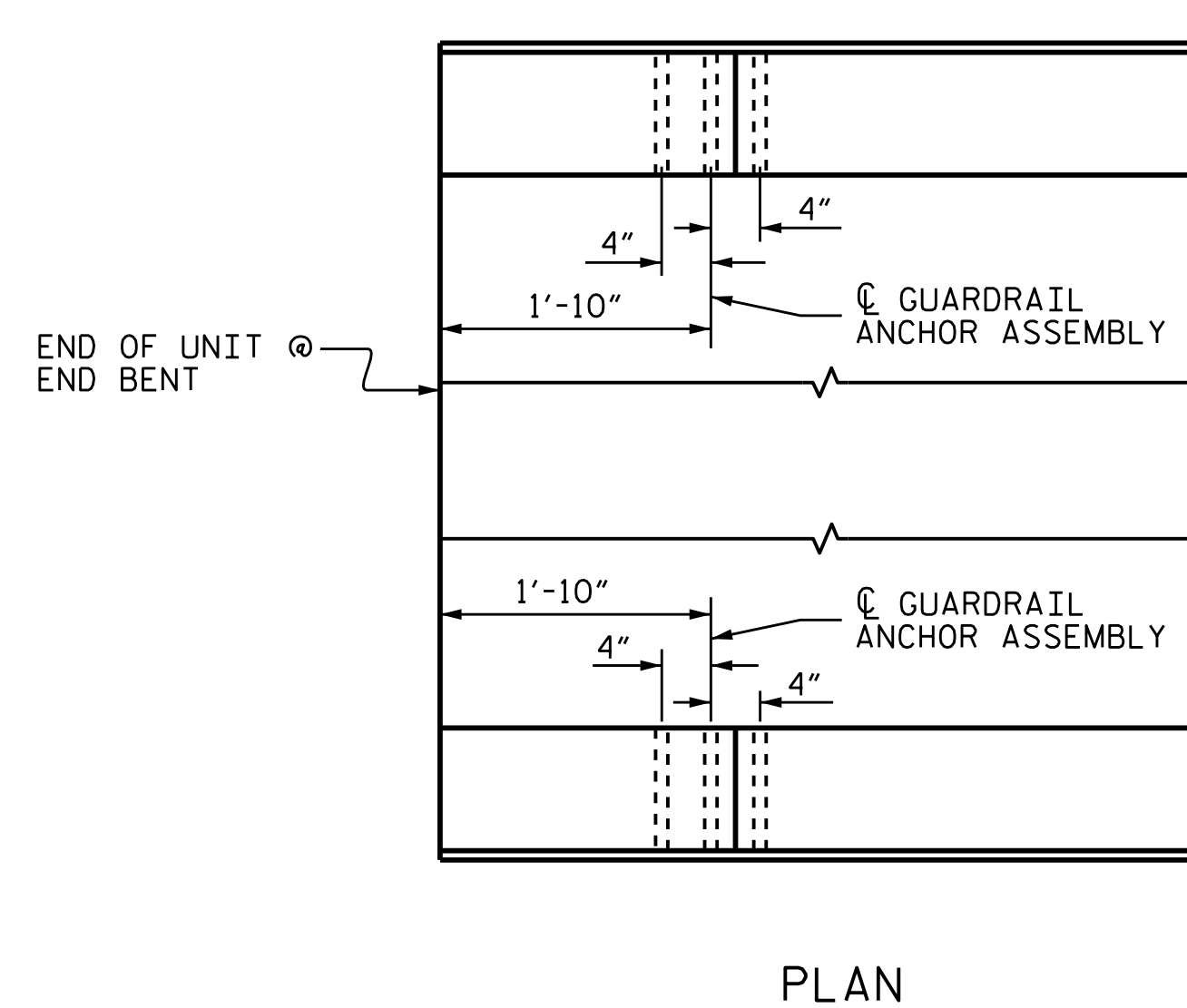
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



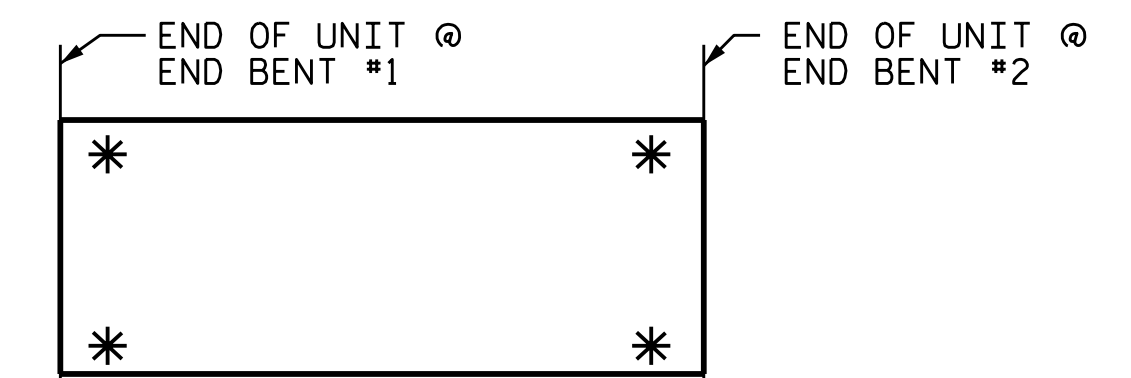
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF
ANCHORS FOR GUARDRAIL
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING
POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-



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

ASSEMBLED BY : D.A. DAVENPORT	DATE : 08/04/14
CHECKED BY : J.K. BOWLES	DATE : 01/14/15
DRAWN BY : MAA 5/10	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/10	REV. 12/5/11 MAA/GM
	REV. 6/13 MAA/GM

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-32
2			4			38

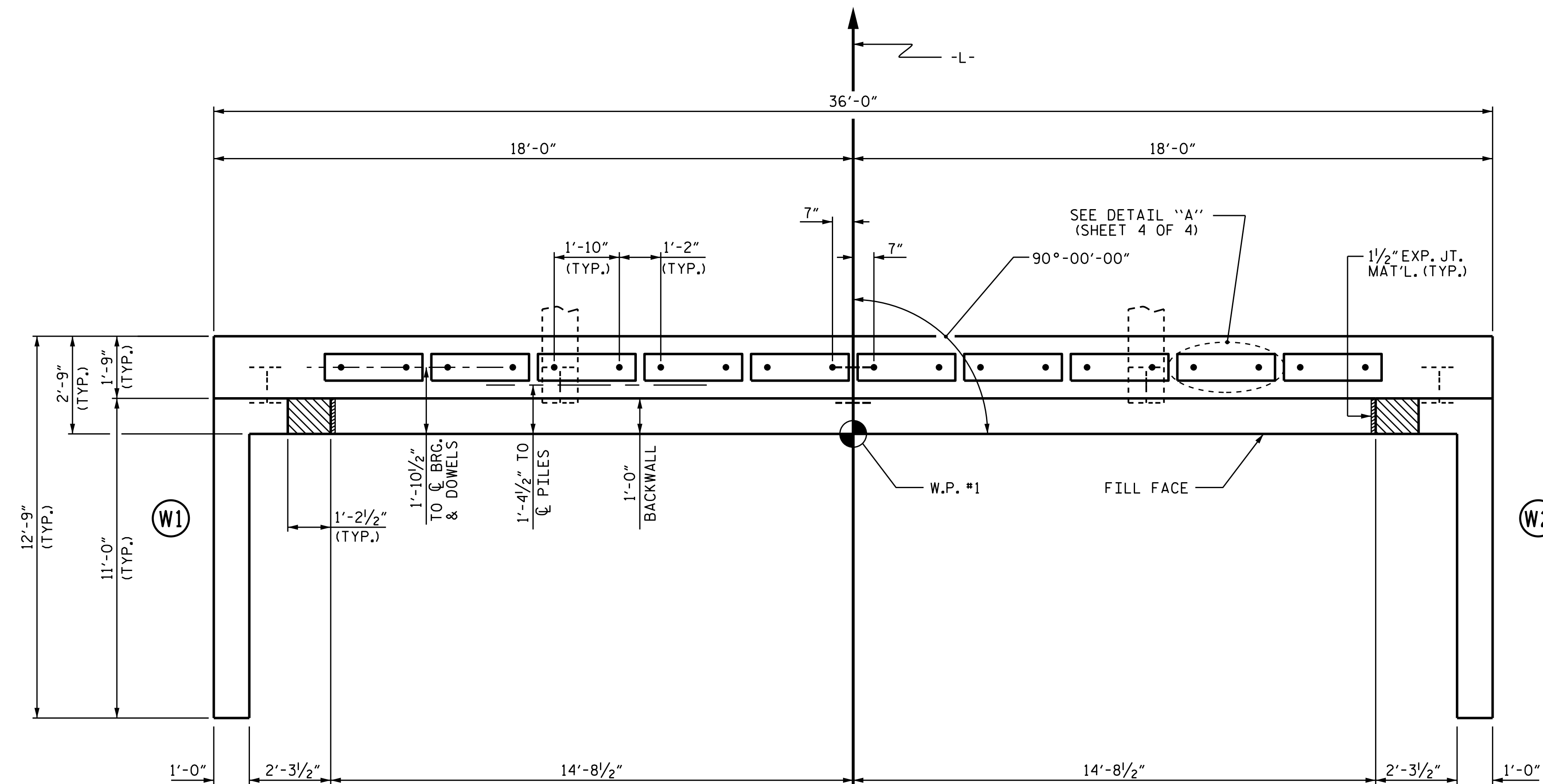
NOTES

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

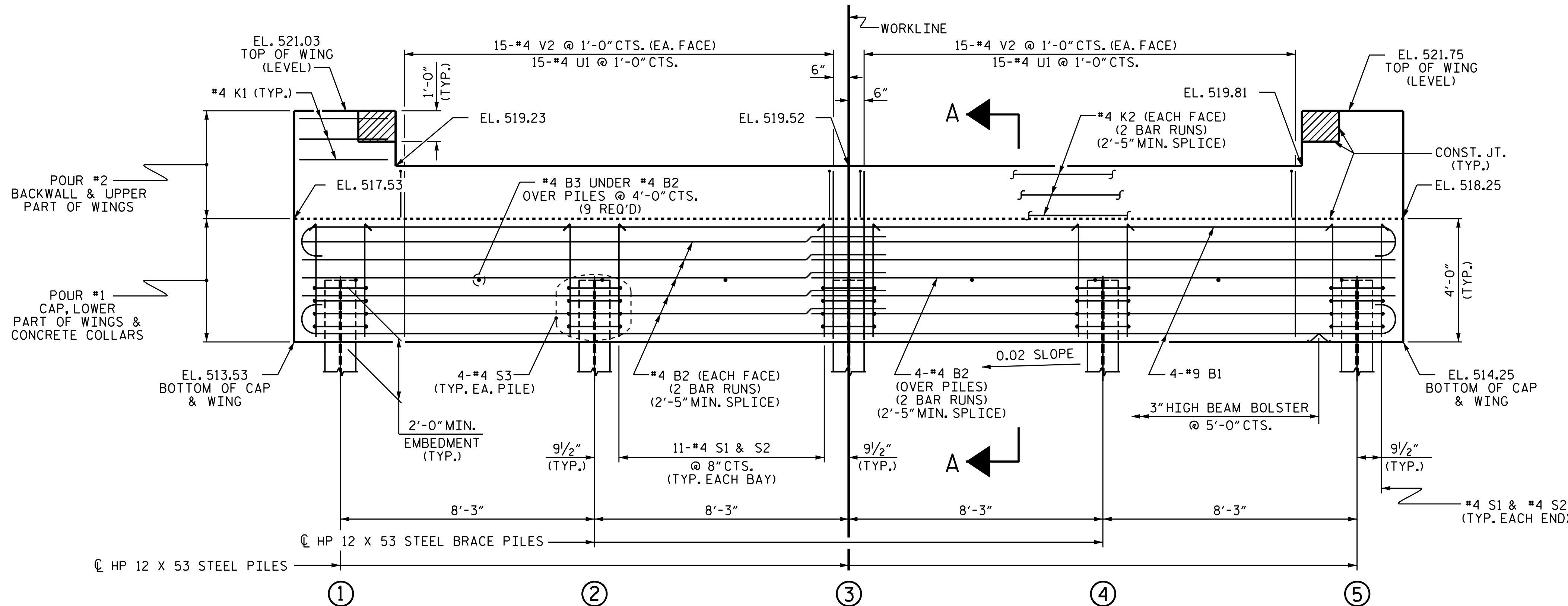
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPlice DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	515.57
②	515.74
③	515.90
④	516.07
⑤	516.23

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS 38
2			4			

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WINGS NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 4 OF 4. CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

ASSEMBLED BY : D.A. DAVENPORT DATE : 09/22/14
 CHECKED BY : J.K. BOWLES DATE : 01/21/15
 DRAWN BY : WJH 12/11 REV. 8/14 MAA/TMG
 CHECKED BY : AAC 12/11

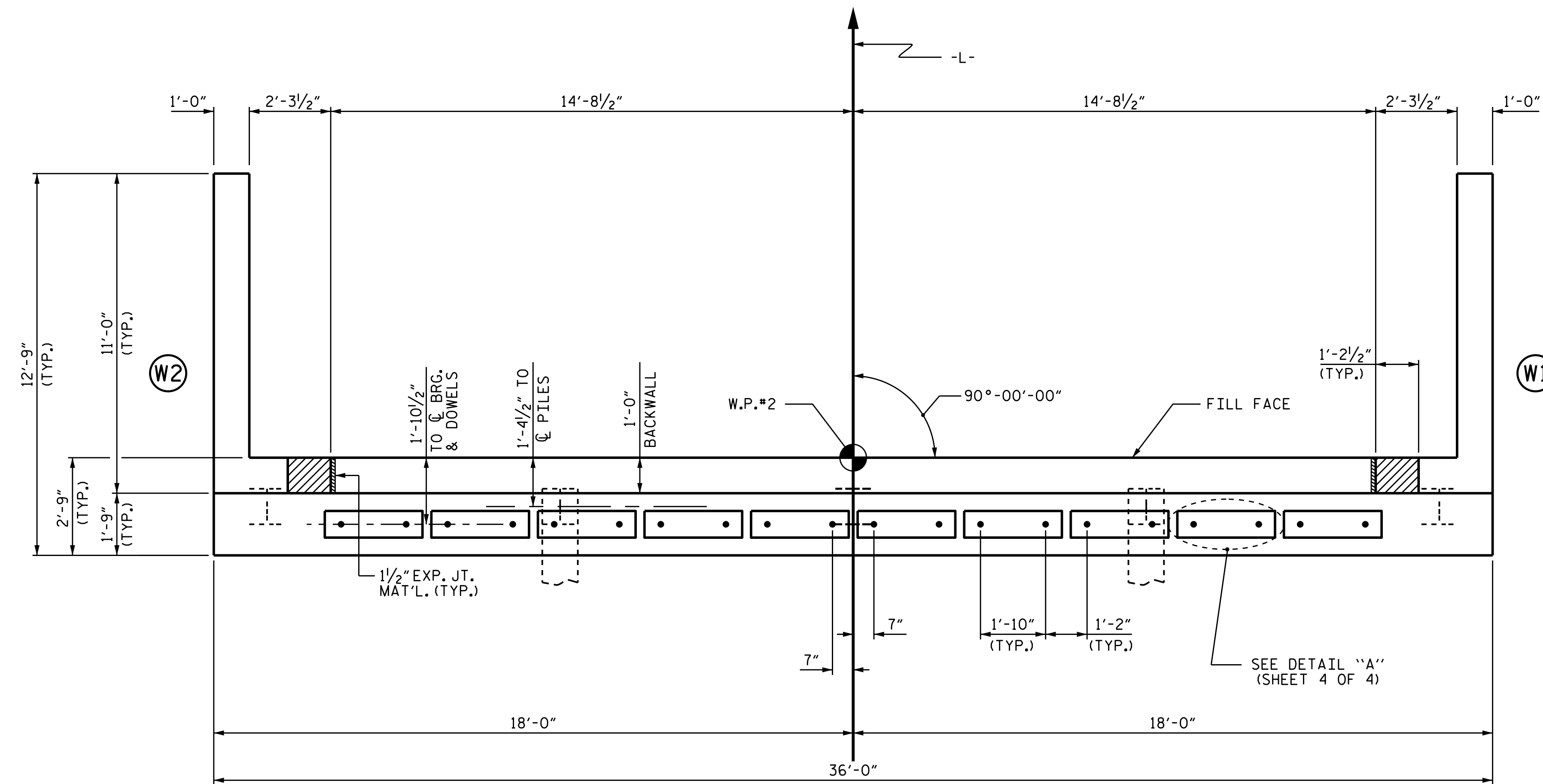
NOTES

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

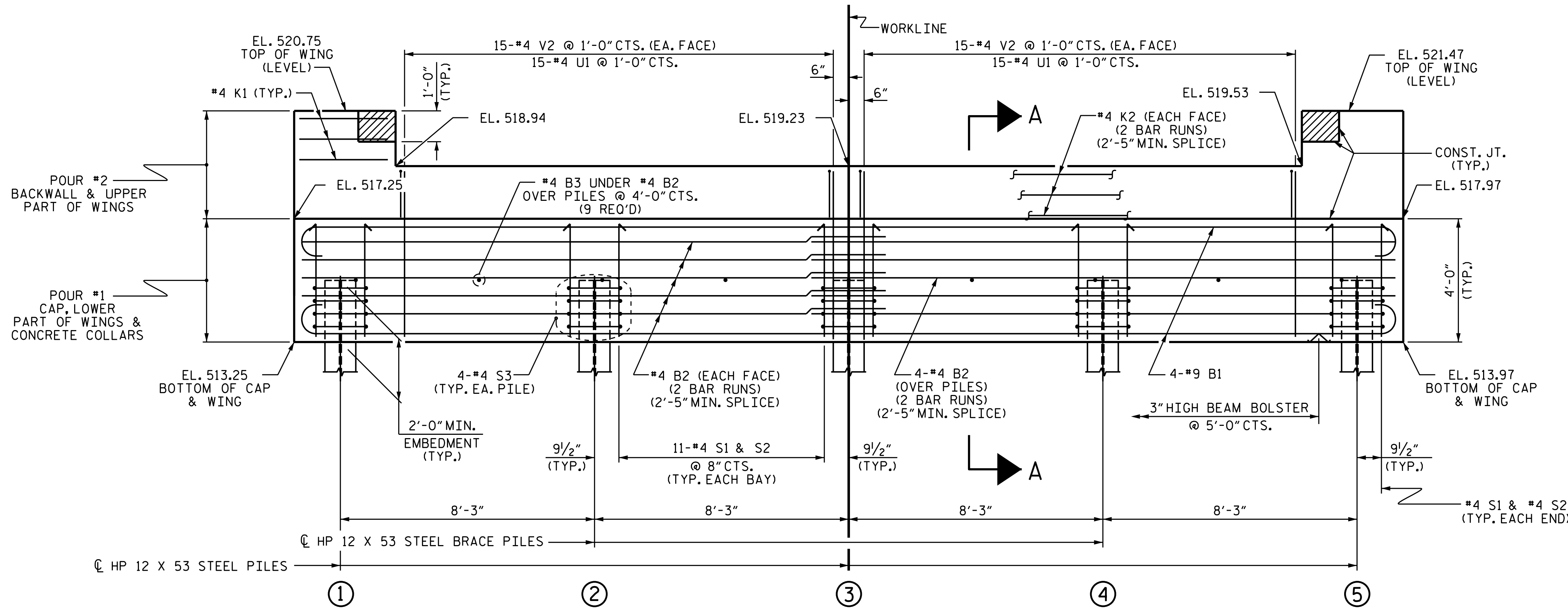
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

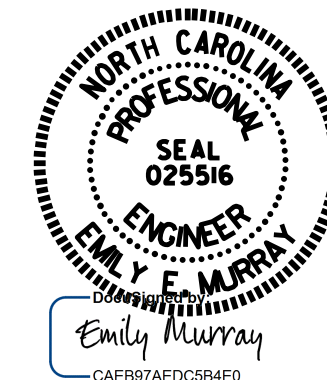
TOP OF PILE ELEVATIONS	
①	515.29
②	515.46
③	515.62
④	515.79
⑤	515.95

PROJECT NO. B-5546
RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2

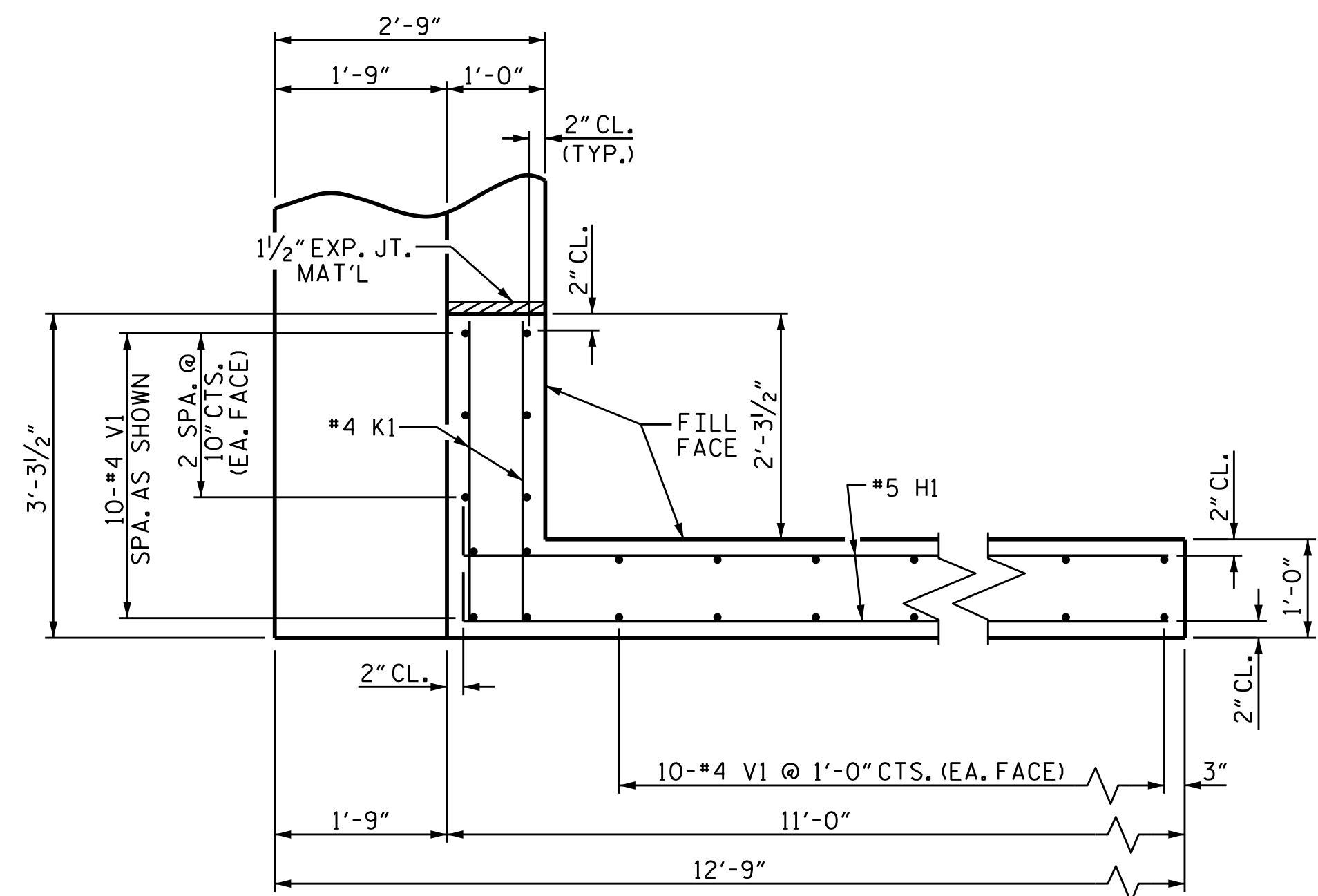


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1			3			TOTAL SHEETS
2			4			38

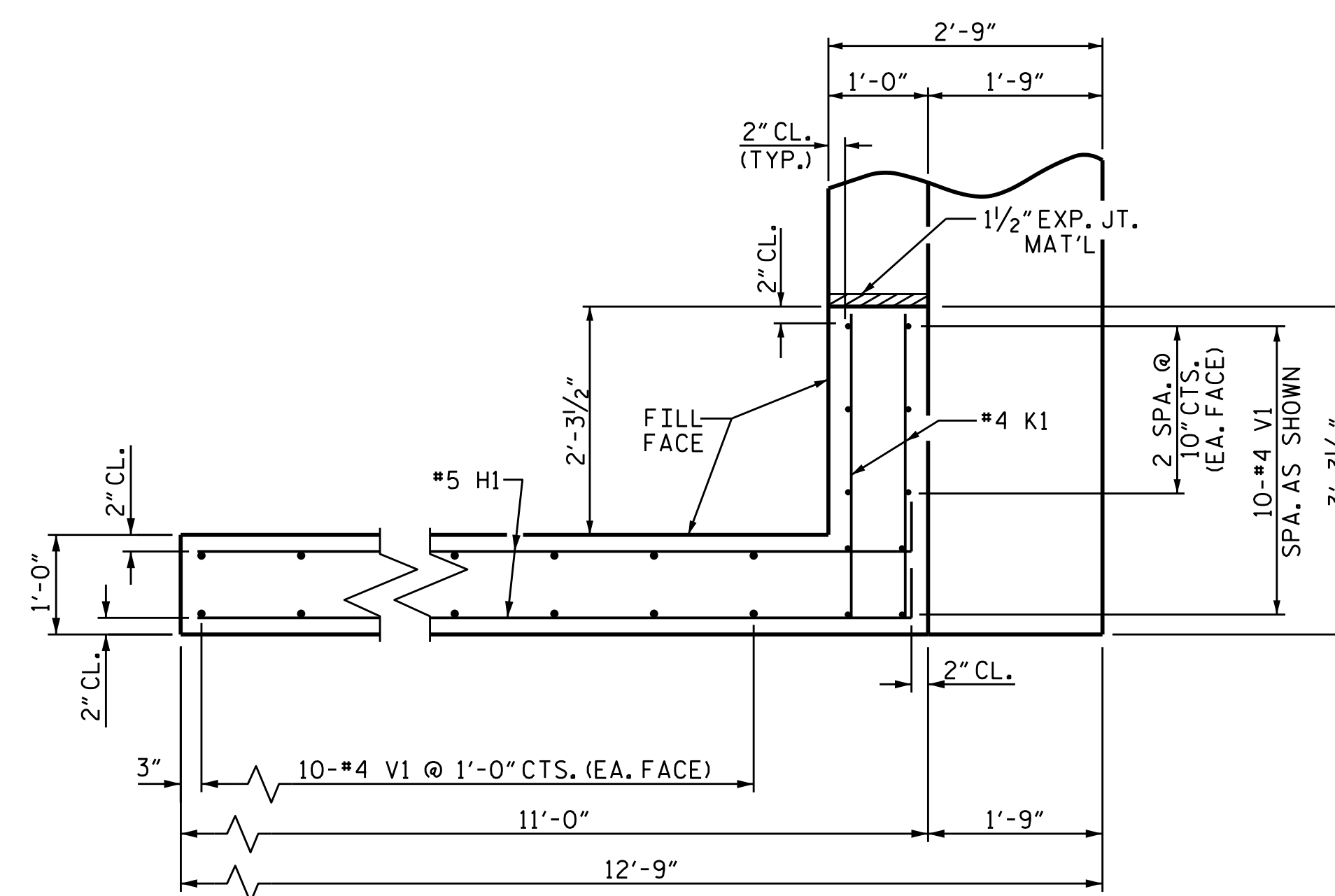
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : D.A. DAVENPORT DATE : 09/22/14
 CHECKED BY : J.K. BOWLES DATE : 01/21/15
 DRAWN BY : WJH 12/11 REV. 8/14 MAA/TMG
 CHECKED BY : AAC 12/11

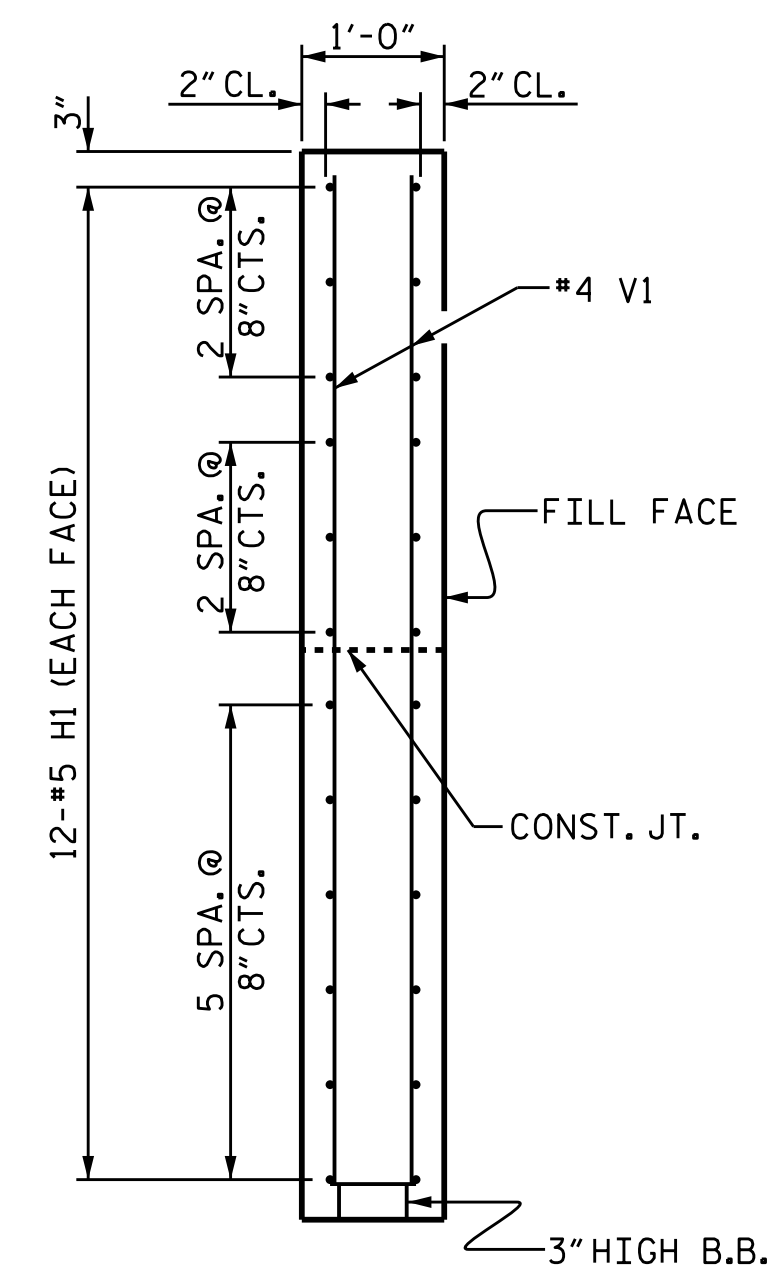
WINGS NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 4 OF 4. CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.



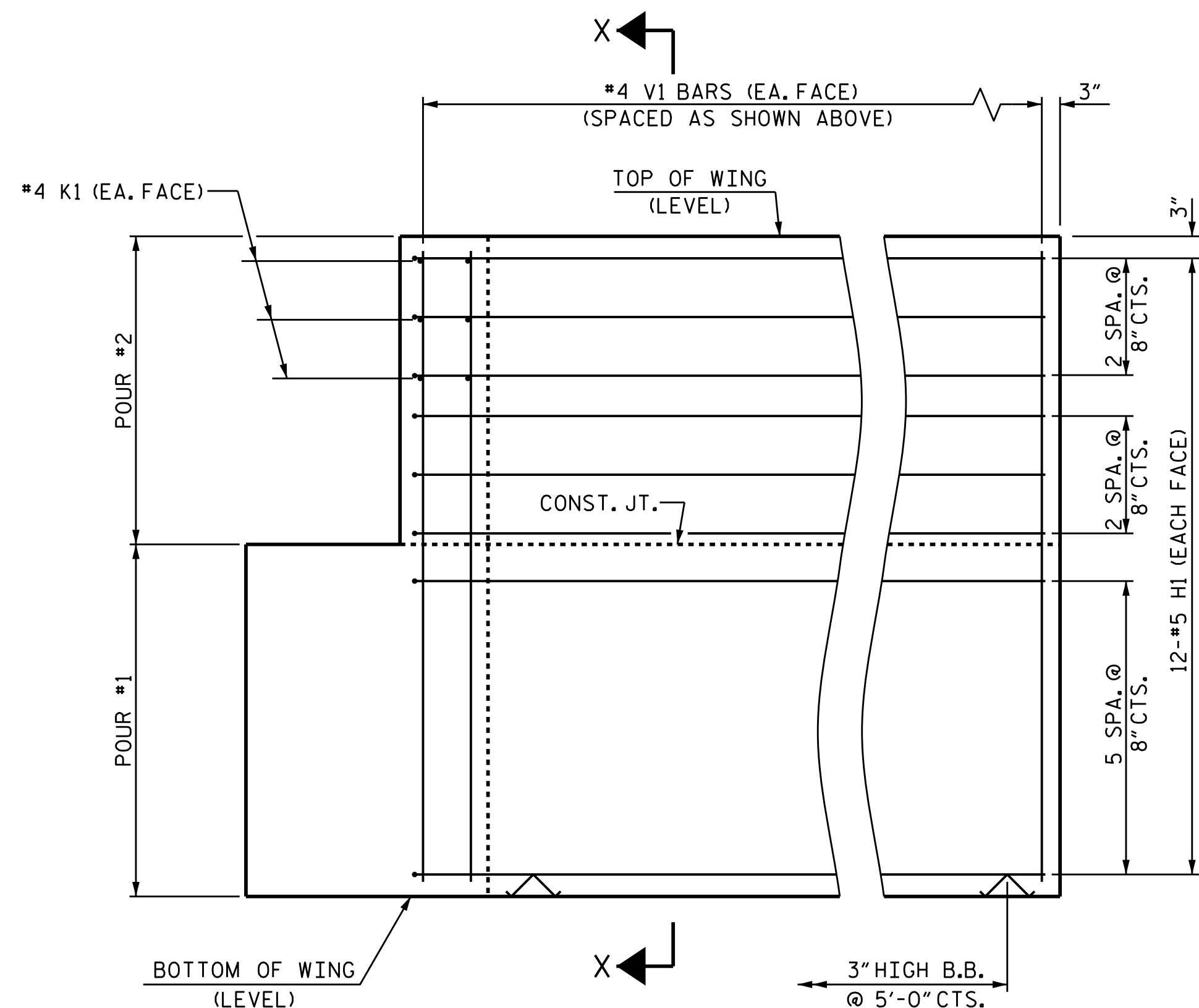
PLAN OF WING (W1)



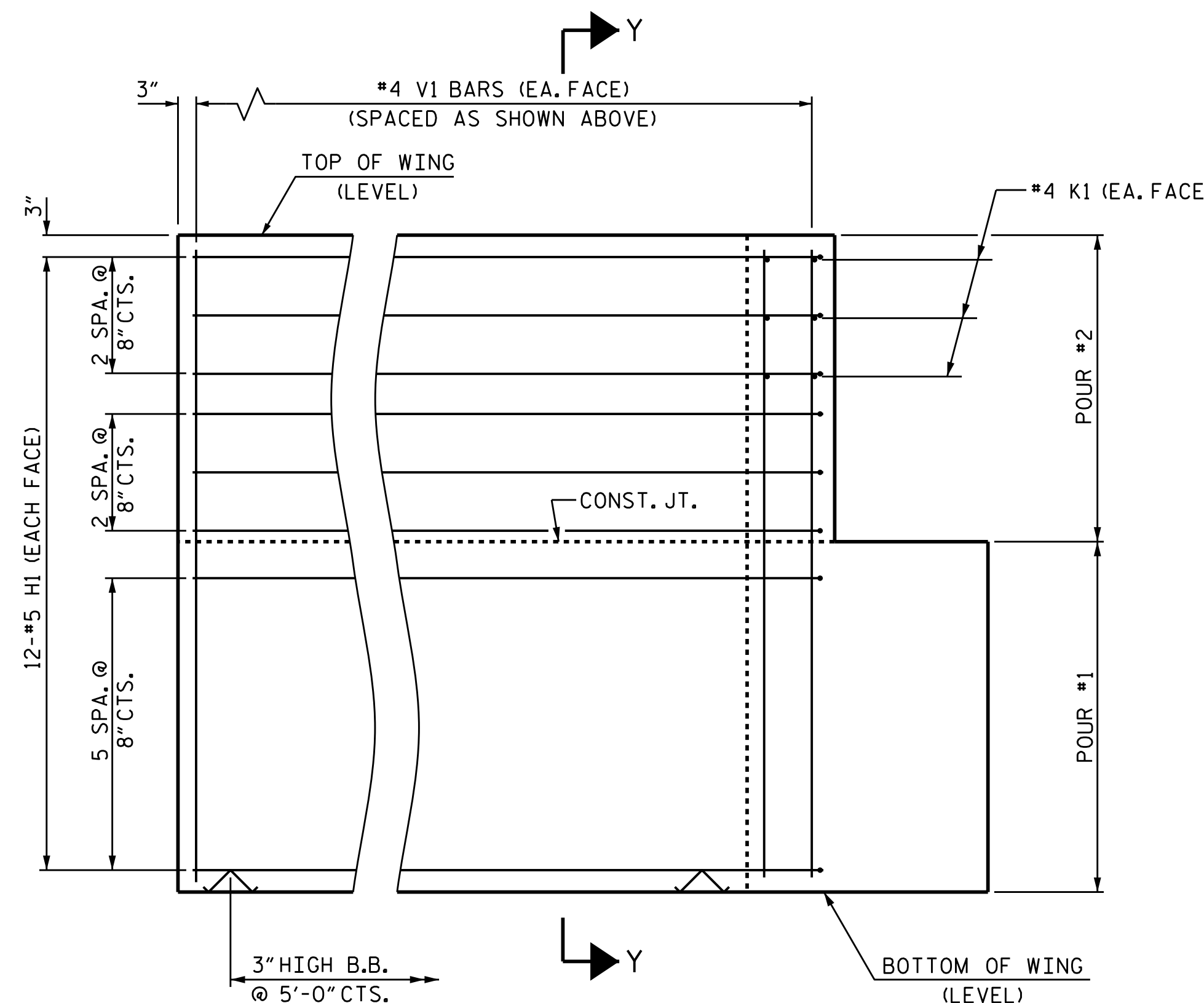
PLAN OF WING (W2)



SECTION X-X

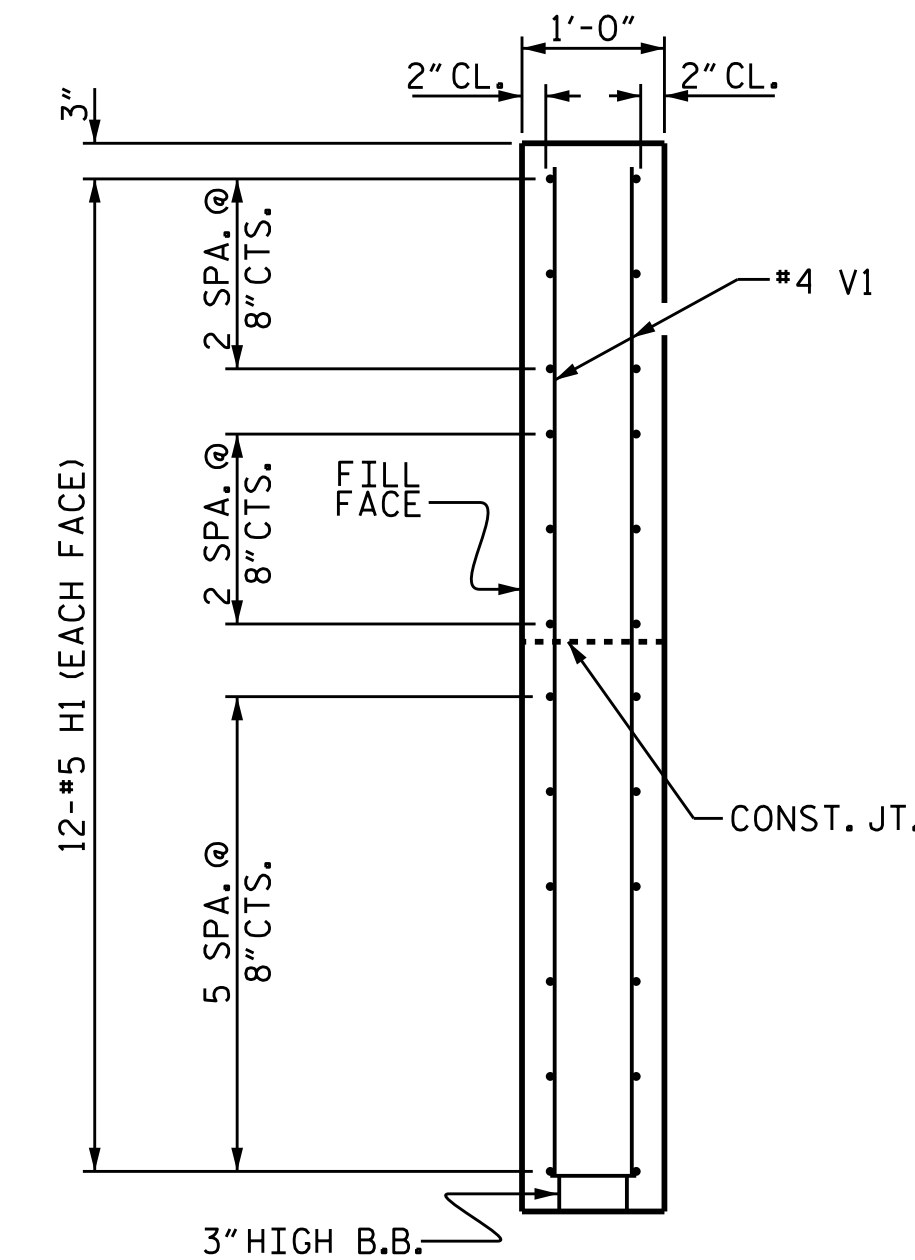


ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

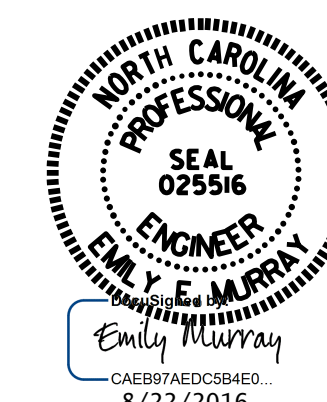
WING DETAILS



SECTION Y-Y

PROJECT NO. B-5546
 RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 3 OF 4

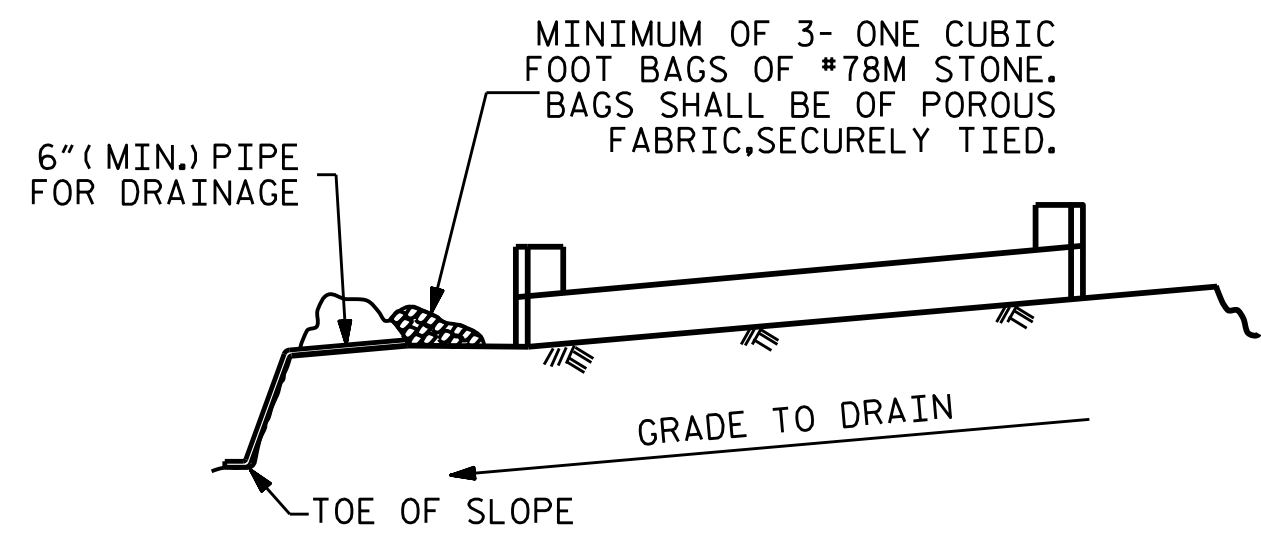


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT
 WING DETAILS

ASSEMBLED BY : D.A. DAVENPORT DATE : 09/22/14
 CHECKED BY : J.K. BOWLES DATE : 01/20/15
 DRAWN BY : WJH 12/11 REV. 8/14 MAA/TMG
 CHECKED BY : AAC 12/11

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			38

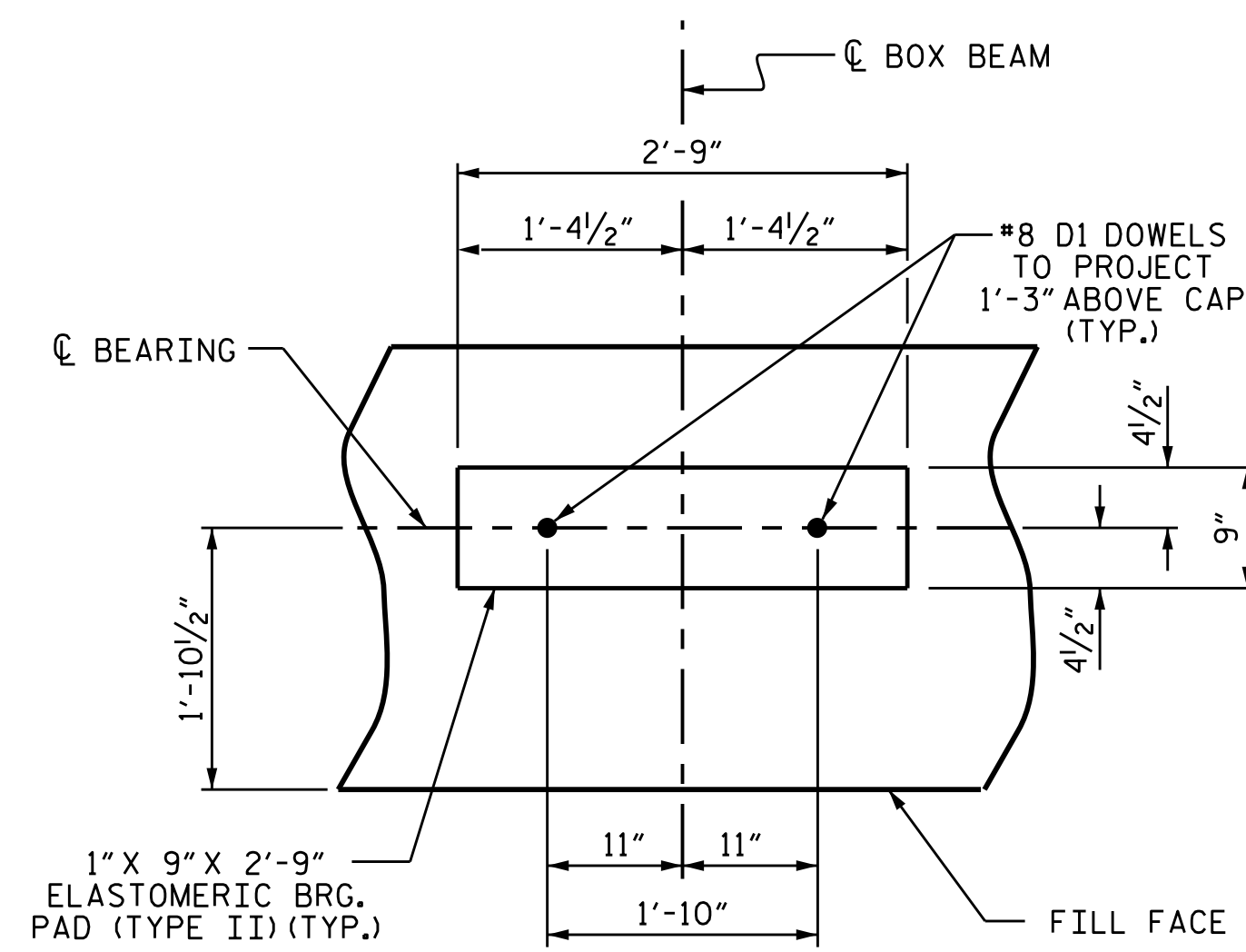


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

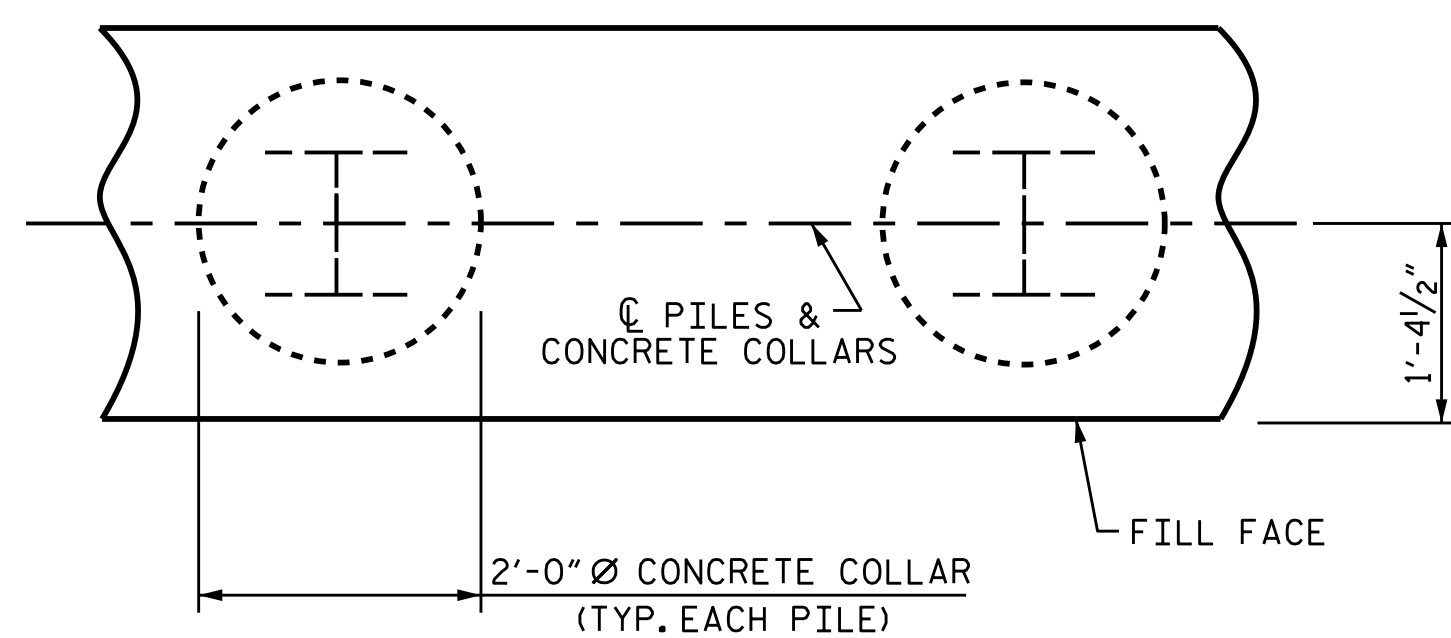
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

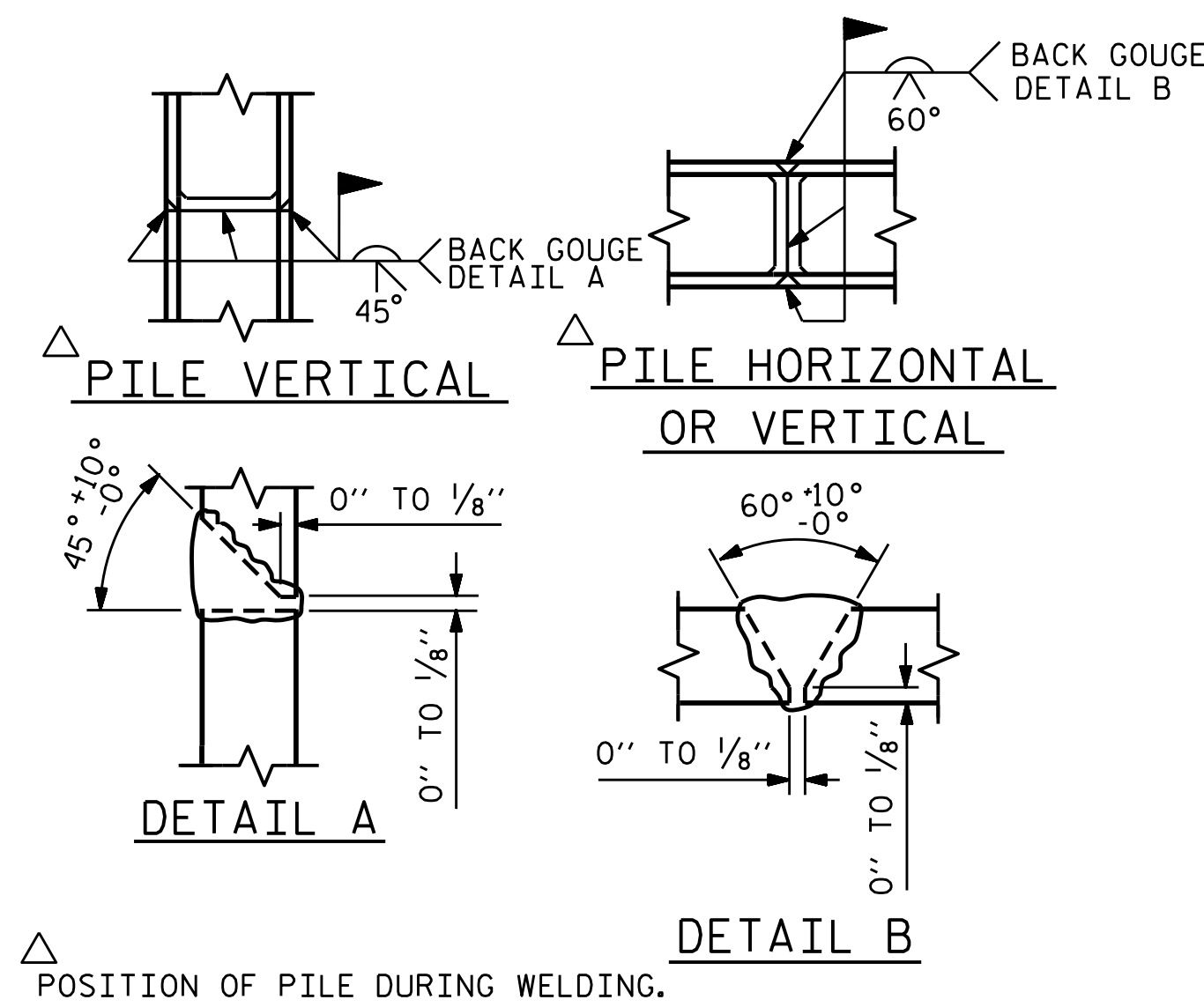
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)

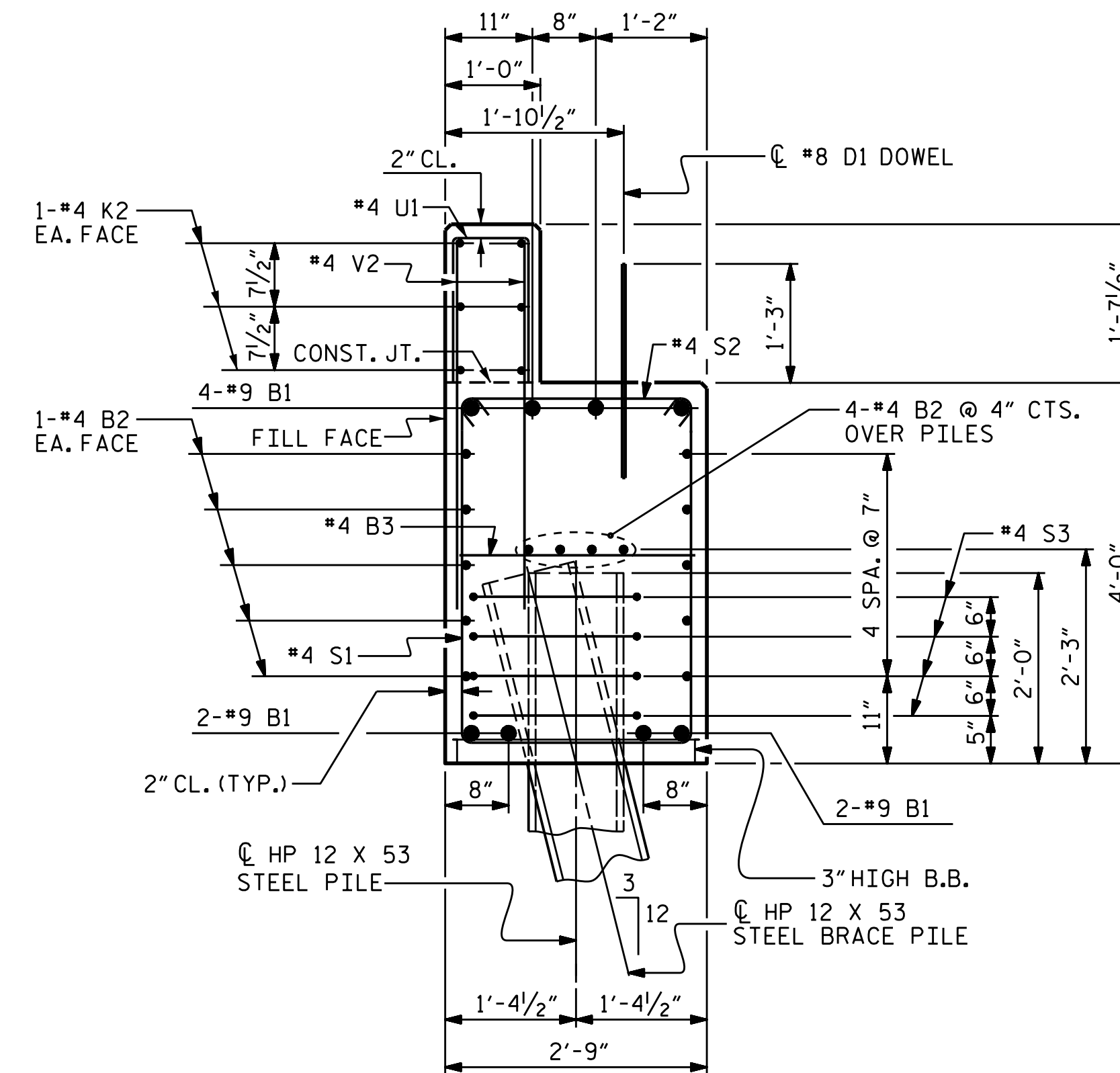


PILE SPLICE DETAILS

BAR TYPES						BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	38'-0"	1034	B1	8	#9	1	38'-0"	1034
B2	28	#4	STR	19'-1"	357	B2	28	#4	STR	19'-1"	357
B3	9	#4	STR	2'-5"	15	B3	9	#4	STR	2'-5"	15
D1	20	#8	STR	2'-3"	120	D1	20	#8	STR	2'-3"	120
H1	48	#5	2	11'-4"	567	H1	48	#5	2	11'-4"	567
K1	12	#4	STR	2'-11"	23	K1	12	#4	STR	2'-11"	23
K2	12	#4	STR	19'-1"	153	K2	12	#4	STR	19'-1"	153
S1	46	#4	3	10'-5"	320	S1	46	#4	3	10'-5"	320
S2	46	#4	4	3'-2"	97	S2	46	#4	4	3'-2"	97
S3	20	#4	5	6'-6"	87	S3	20	#4	5	6'-6"	87
U1	30	#4	6	3'-7"	72	U1	30	#4	6	3'-7"	72
V1	60	#4	STR	7'-2"	287	V1	60	#4	STR	7'-2"	287
V2	60	#4	STR	5'-3"	210	V2	60	#4	STR	5'-3"	210
REINFORCING STEEL (FOR ONE END BENT)						LBS. 3,342					
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)											
POUR #1 CAP, LOWER PART OF WINGS & COLLARS						C.Y. 18.5					
POUR #2 BACKWALL & UPPER PART OF WINGS						C.Y. 5.2					
TOTAL CLASS A CONCRETE						C.Y. 23.8					

ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1				END BENT 2			
HP 12 X 53 STEEL PILES				HP 12 X 53 STEEL PILES			
NO: 5		LIN. FT. = 125		NO: 5		LIN. FT. = 100	
STEEL PILE POINTS		EACH 5		STEEL PILE POINTS		EACH 5	



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



PROJECT NO. B-5546
 RANDOLPH COUNTY
 STATION: 13+56.00-L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

END BENT 1 & 2
 DETAILS

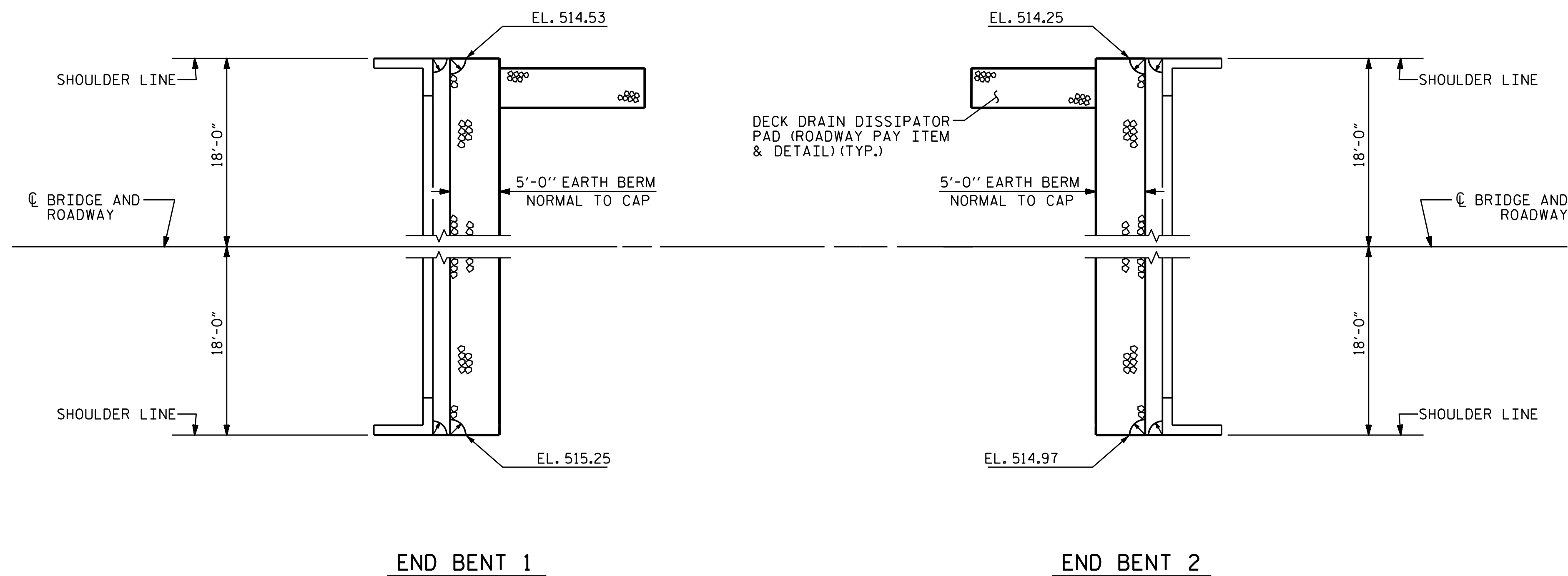
ASSEMBLED BY : D.A. DAVENPORT	DATE : 09/22/14
CHECKED BY : J.K. BOWLES	DATE : 04/25/16
DRAWN BY : WJH	12/11
CHECKED BY : AAC	12/11
REV. 8/14	MAA/TMG

17-AUG-2016 09:57
 R:\Structures\Plans\B5546.SD.E1.dgn
 jdhawk

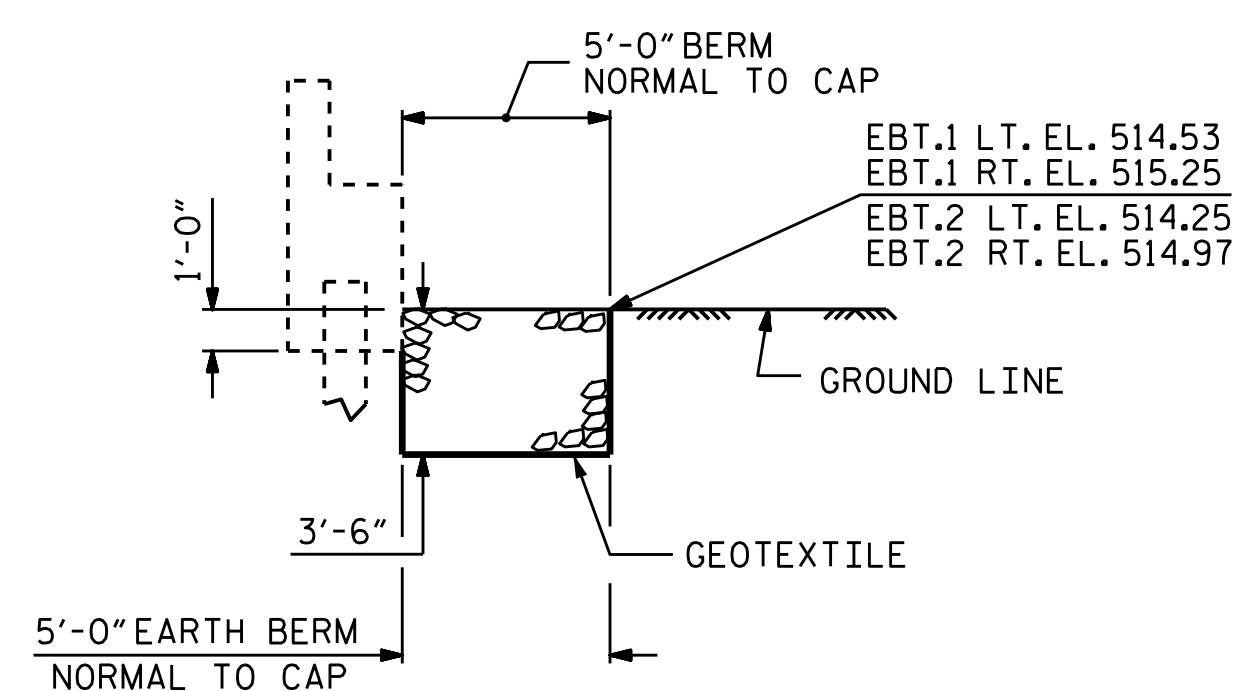
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36	
1			3			TOTAL SHEETS	38
2			4				

STD. NO. EB_30_90S4_33BB

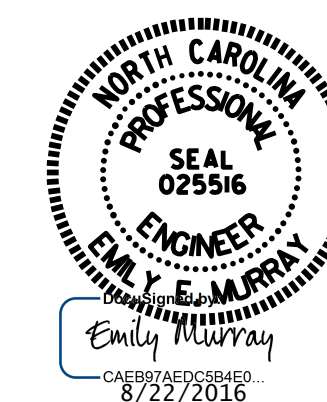


ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+56.00-L-	RIP RAP CLASS II	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	30	45
END BENT 2	30	45



CL SECTION
BERM RIP RAPPED

PROJECT NO. B-5546
RANDOLPH COUNTY
STATION: 13+56.00-L-



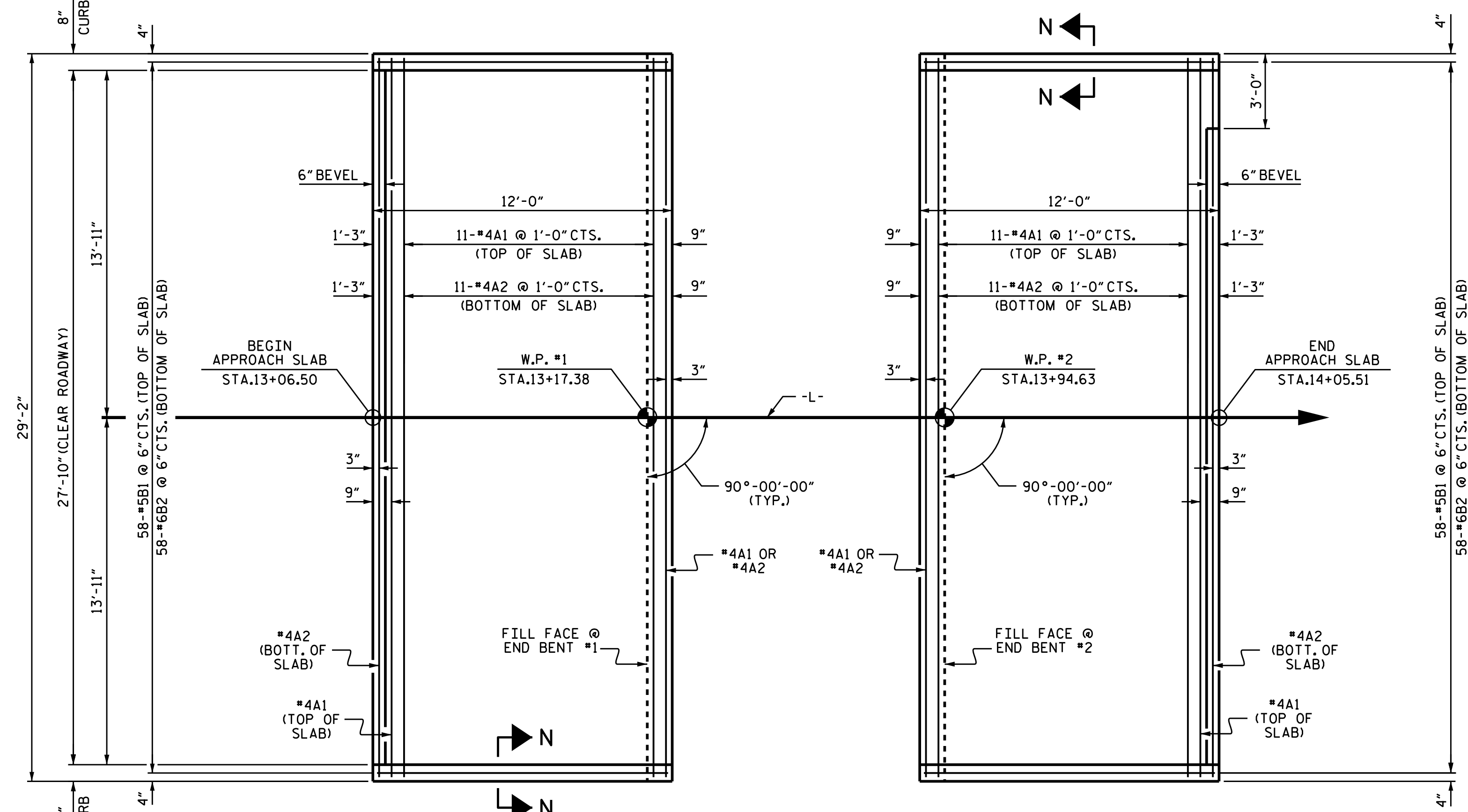
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
= RIP RAP DETAILS =

ASSEMBLED BY : D.A. DAVENPORT DATE : 10/08/14
CHECKED BY : J.K. BOWLES DATE : 4/25/16
DRAWN BY : REK 1/84
CHECKED BY : RDU 1/84

REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/21/11 MAA/GM

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

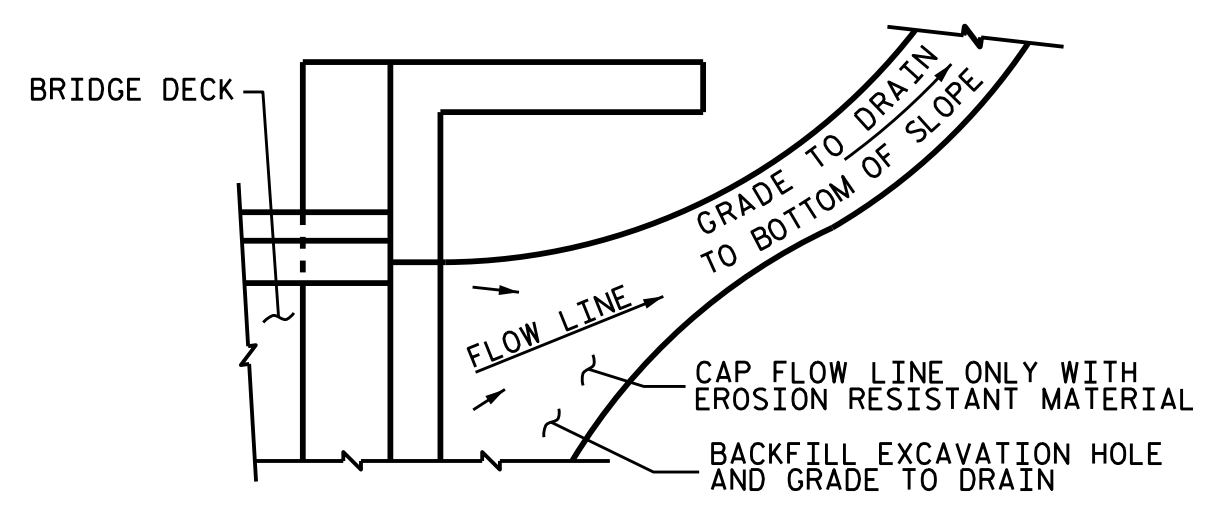
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			38



PLAN @ END BENT #1 **PLAN @ END BENT #2**
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

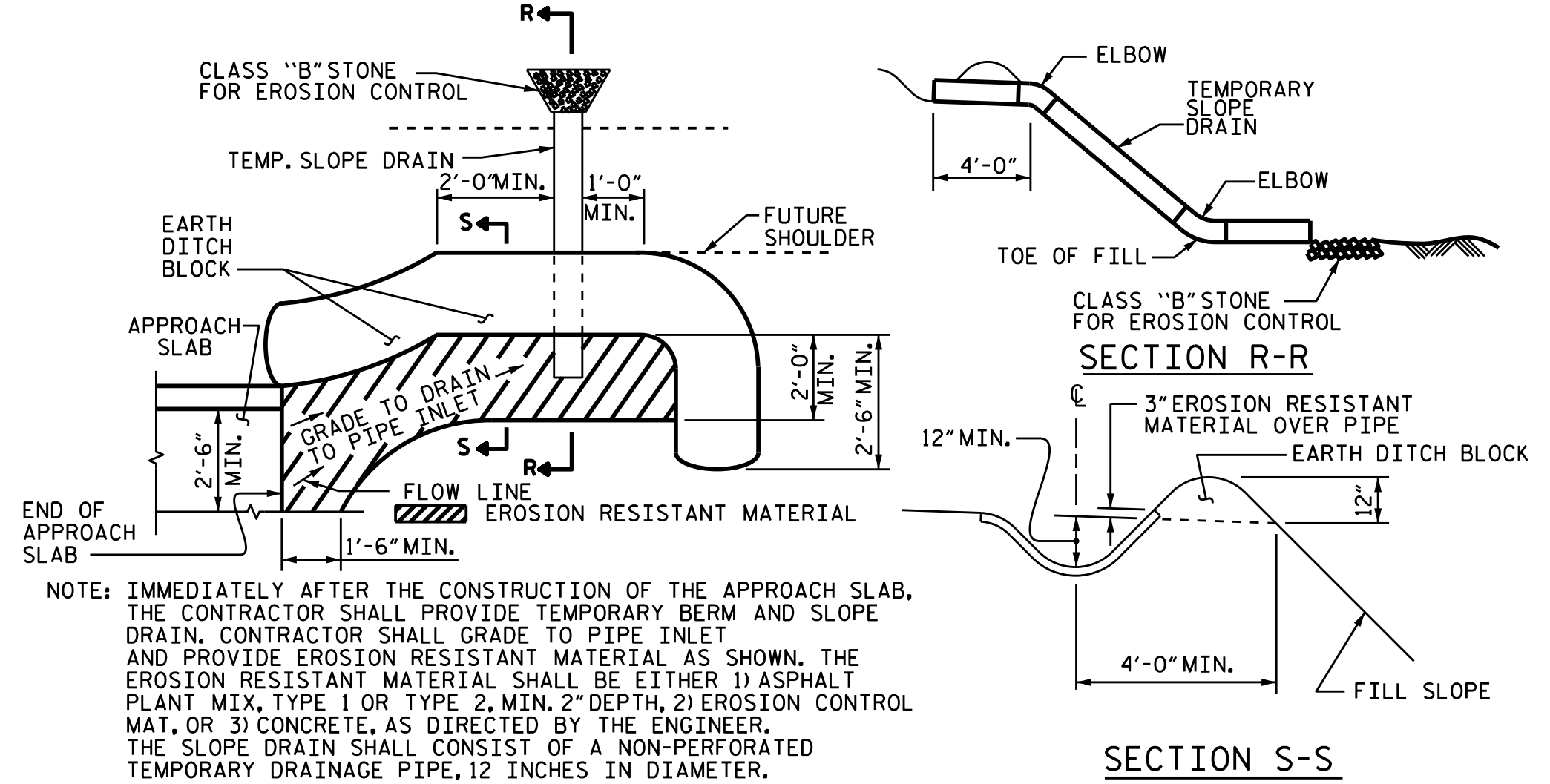
FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.
 GEOTEXTILE SHALL BE TYPE I IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
 #78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
 #78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
 FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
 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.
 APPROACH SLAB GROOVING IS NOT REQUIRED.



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

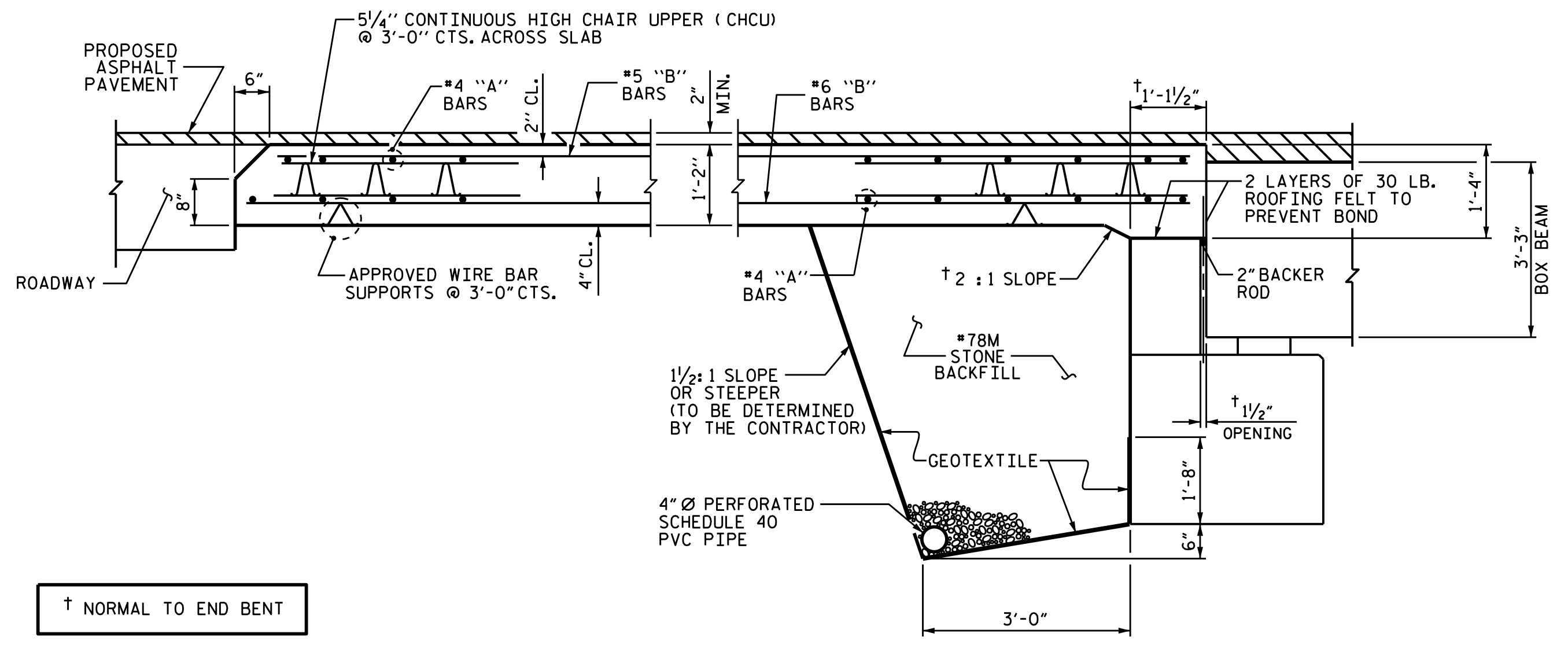
BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
*B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL					LBS. 1266
* EPOXY COATED REINFORCING STEEL					LBS. 926
CLASS AA CONCRETE					C. Y. 15.4
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
*B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL					LBS. 1266
* EPOXY COATED REINFORCING STEEL					LBS. 926
CLASS AA CONCRETE					C. Y. 15.4

TEMPORARY DRAINAGE DETAIL

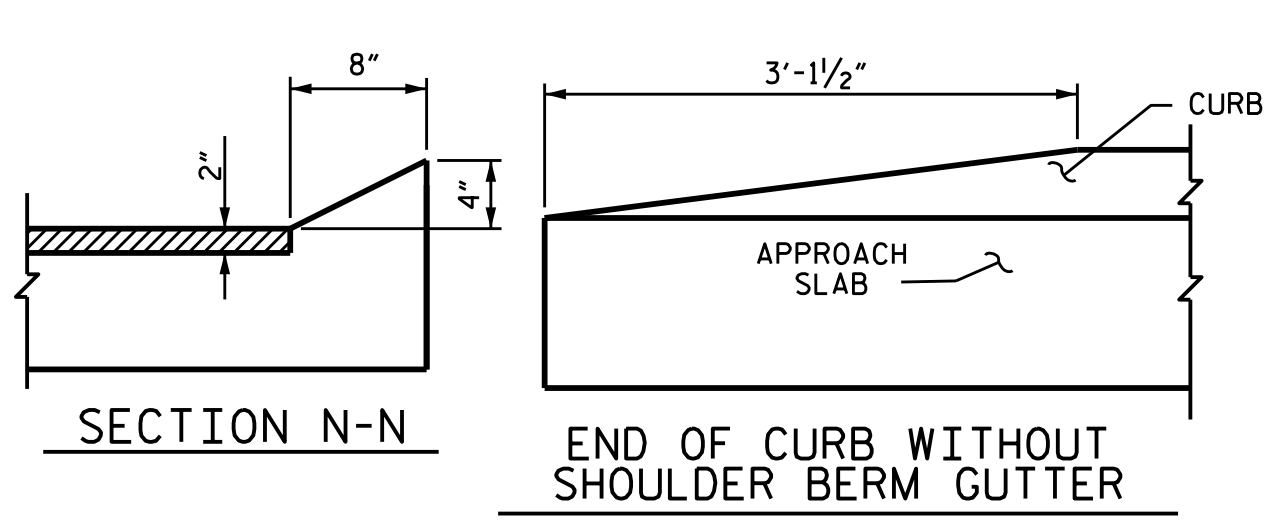


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" 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, 12 INCHES IN DIAMETER.

PLAN VIEW
TEMPORARY BERM AND SLOPE DRAIN DETAILS
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION THRU SLAB



SECTION N-N
END OF CURB WITHOUT SHOULDER BERM GUTTER

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



PROJECT NO. B-5546
 RANDOLPH COUNTY
 STATION: 13+56.00-L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR PRESTRESSED CONCRETE
 BOX BEAM UNIT
 (SUB-REGIONAL TIER)
 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS 38
2			4			

ASSEMBLED BY : D.A. DAVENPORT DATE : 08/04/14
 CHECKED BY : J.K. BOWLES DATE : 01/14/15
 DRAWN BY : MAA 11/11
 CHECKED BY : AAC 11/11
 REV. 9-15 MAA/TMG

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.
ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.
IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.
DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.
WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.
WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.
METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN