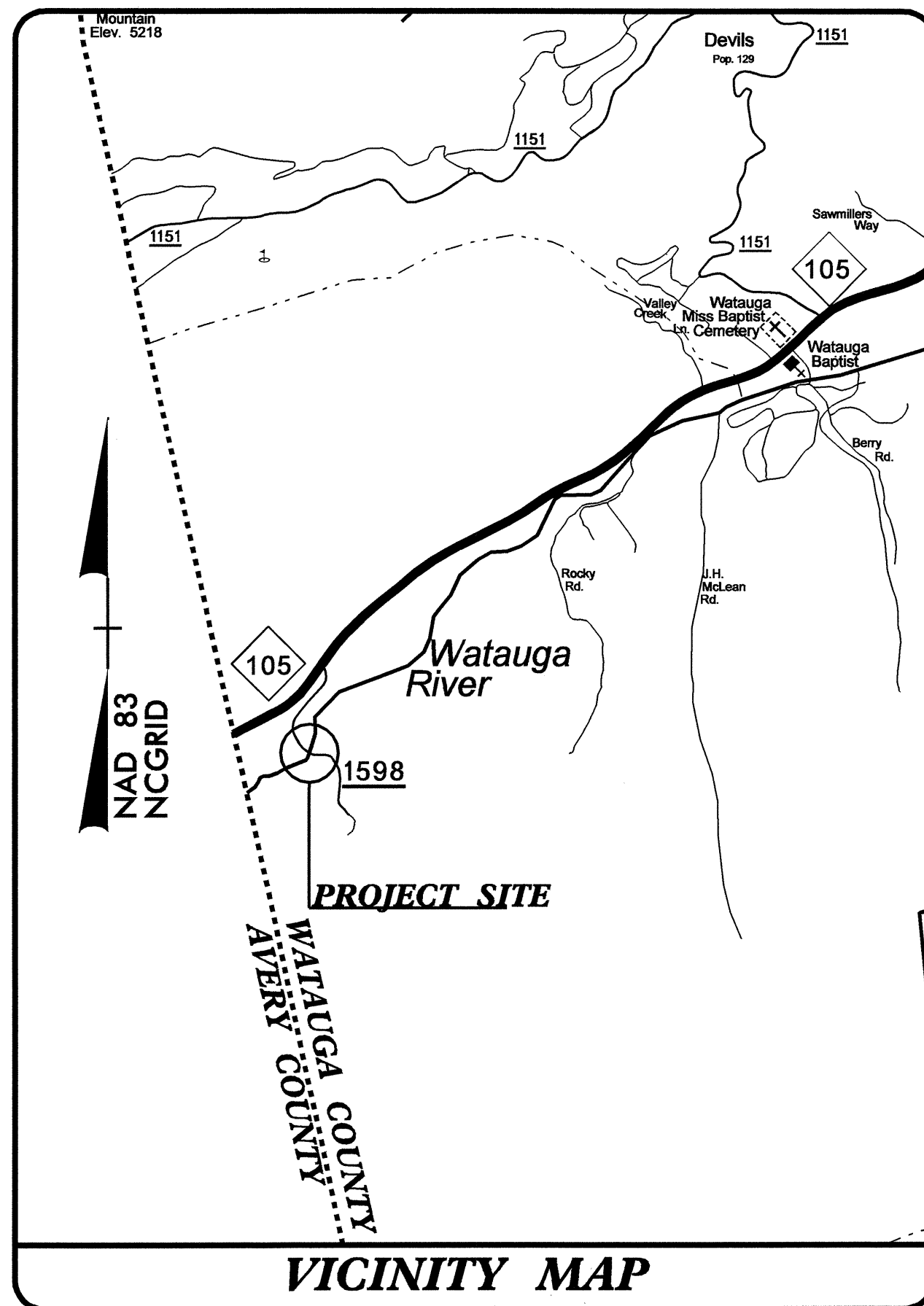


CONTRACT: C201972 TIP PROJECT: B-4318

STRUCTURE

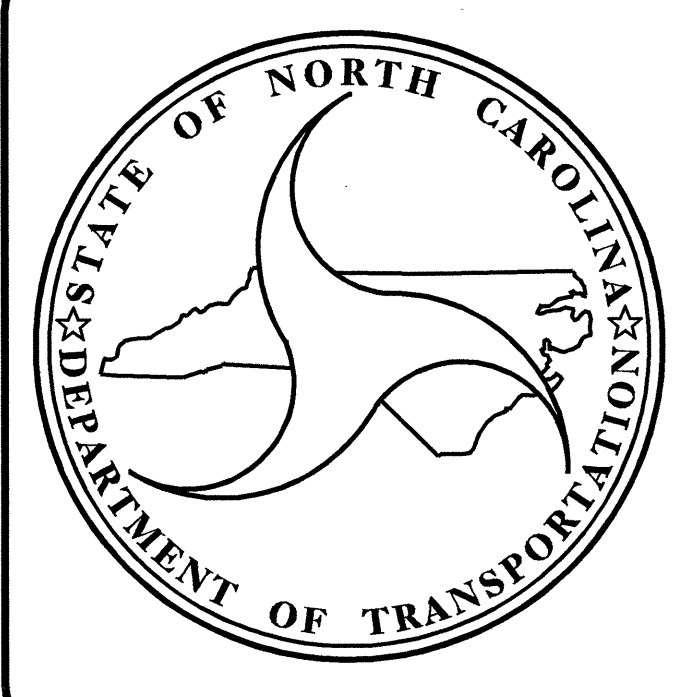
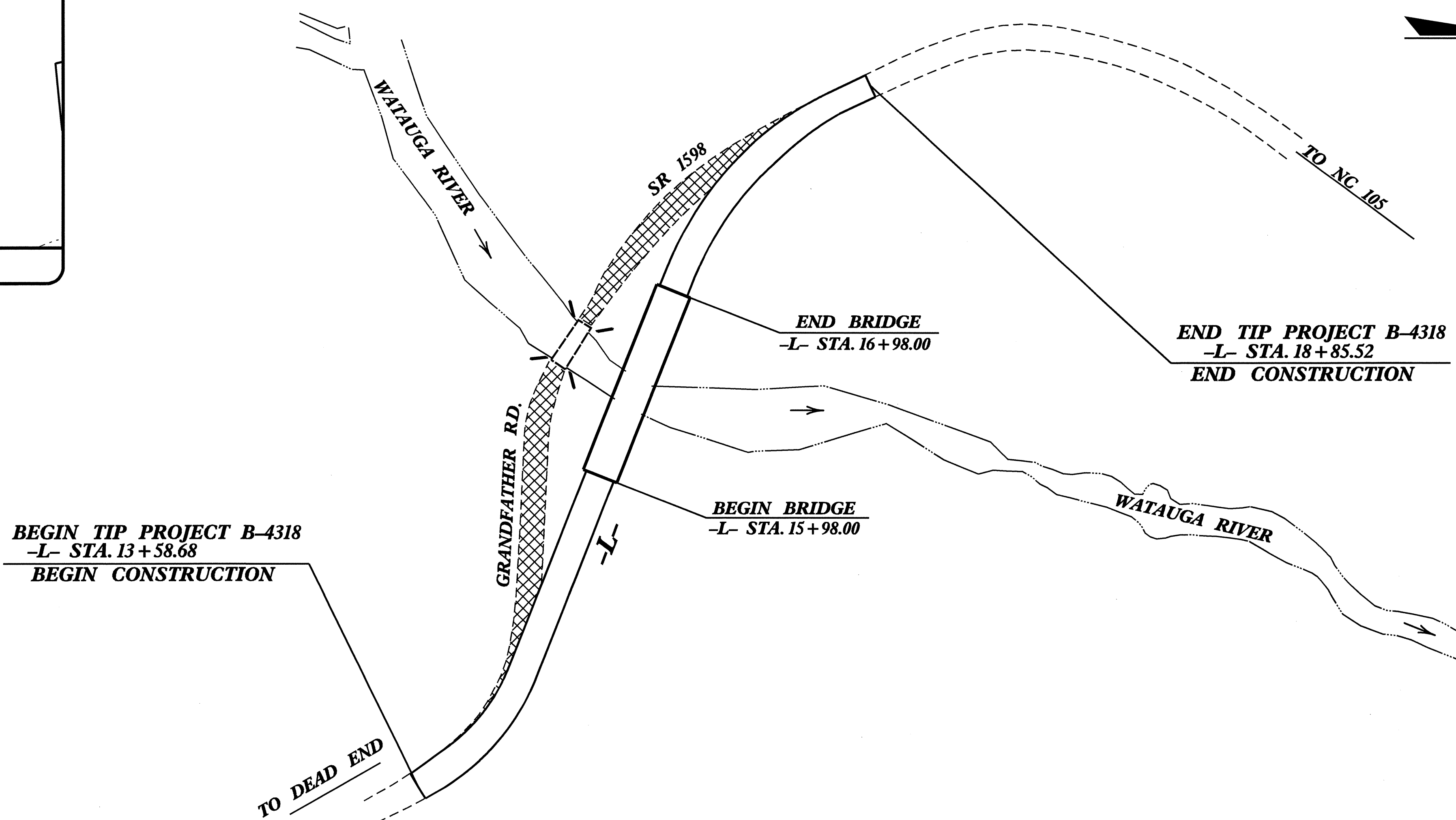


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

LOCATION: BRIDGE NO. 321 OVER WATAUGA RIVER ON SR 159 (GRANDFATHER ROAD)
TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4318		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33655.1.1	BRZ-1598(1)	P.E.	
33655.2.1	BRZ-1598(1)	UTIL. & RW	
33655.3.1	BRZ-1598(1)	CONST.	



DESIGN DATA

ADT 2008 = 130
ADT 2028 = 220
DHV = 12 %
D = 55 %
T = 3 % *
V = 30 MPH
* TTST=1% DUALS=2%
FUNC. CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY OF TIP PROJECT = 0.081 MI
LENGTH STRUCTURE OF TIP PROJECT = 0.019 MI
TOTAL LENGTH OF TIP PROJECT = 0.100 MI

Prepared In the Office of:

DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE :
NOVEMBER 18, 2008

J. C. FRYE, P.E.
PROJECT ENGINEER

W.A. DAVIS, P.E.
PROJECT DESIGN ENGINEER

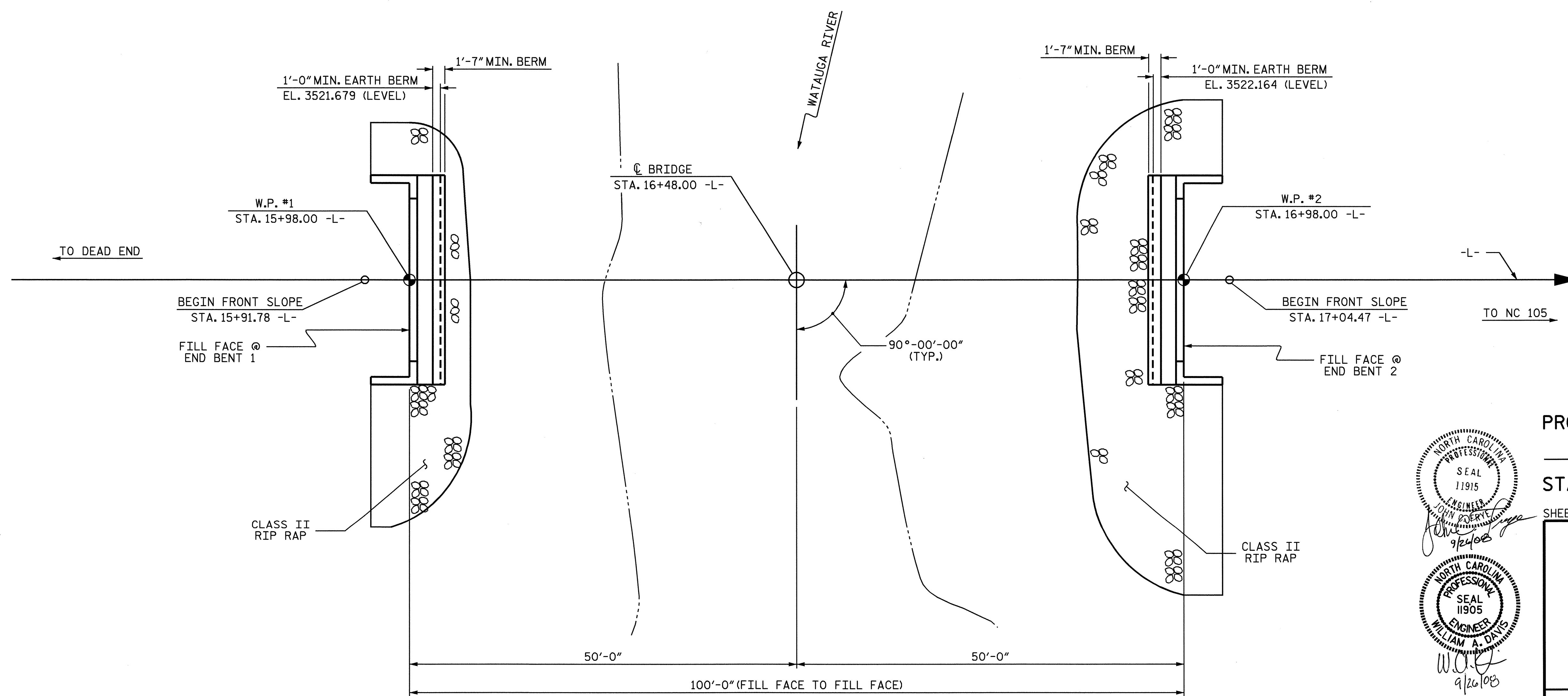
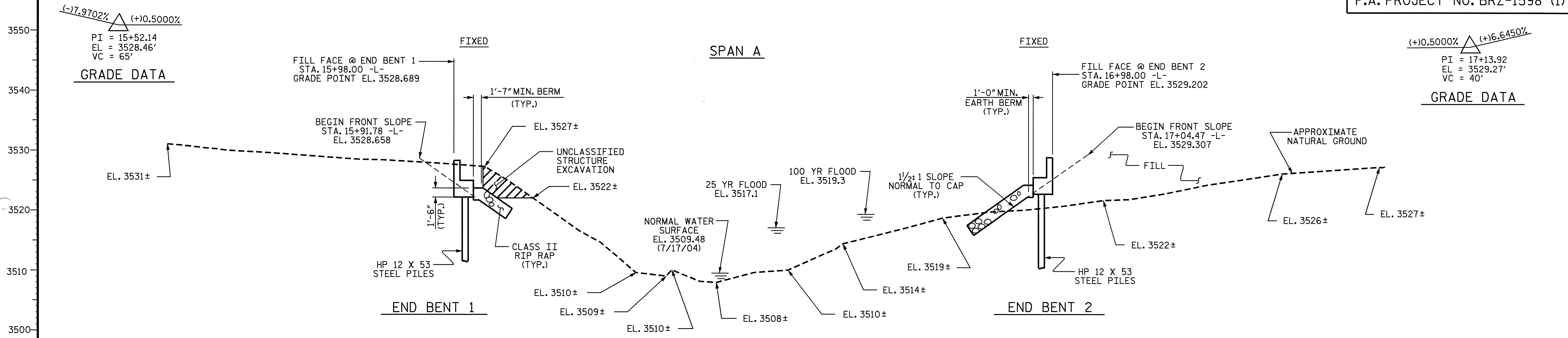
STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

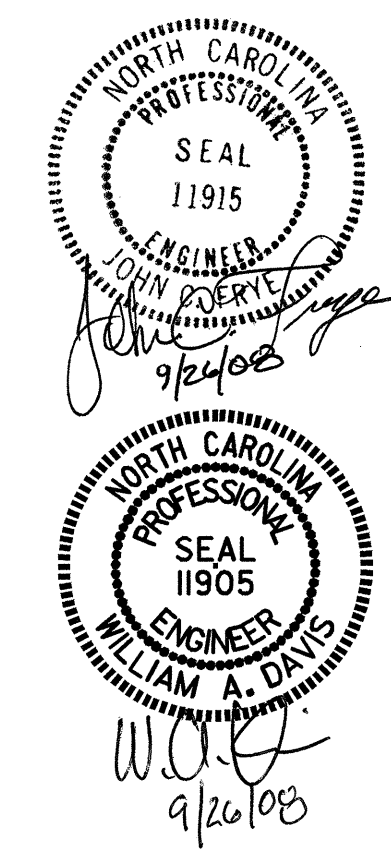
STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR

P.E.
DATE



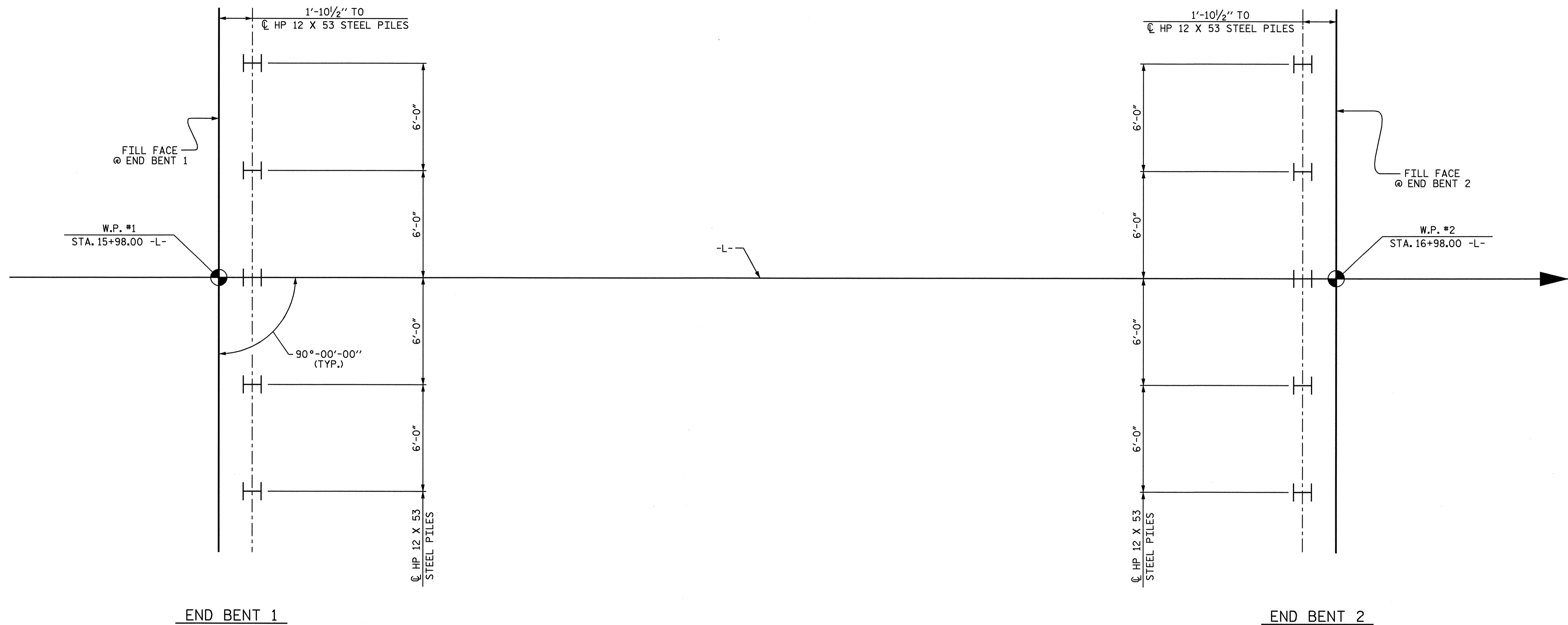
PROJECT NO. B-4318
 WATAUGA COUNTY
 STATION: 16+48.00 -L-



SHEET 1 OF 3 REPLACES BRIDGE NO. 321
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER WATAUGA RIVER ON SR 1598 BETWEEN NC 105 AND DEAD END

DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 8-08

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



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILE.
ORIENT PILES AS SHOWN.
ALL PILES ARE VERTICAL.

NOTES

DRIVE PILES AT END BENT 1 AND END BENT 2 TO AN ELEVATION NO HIGHER THAN 3495 FT. AND A MINIMUM BEARING CAPACITY OF 70 TONS EACH.

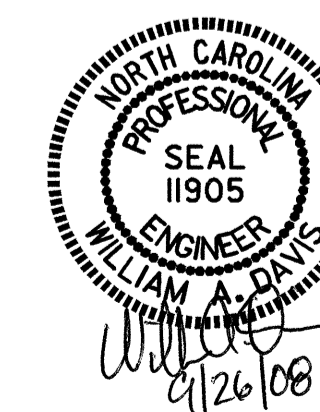
WHEN DRIVING PILES, DO NOT EXCEED THE MAXIMUM BLOW COUNT.

PILE EXCAVATION IS REQUIRED TO INSTALL THE PILES AT END BENT 1 AND END BENT 2. EXCAVATE HOLES TO AN ELEVATION 3495.0 FT. SEE PILE EXCAVATION SPECIAL PROVISION.

DO NOT BACKFILL THE TOP 7 FEET OF THE PILE EXCAVATION HOLE WITH CONCRETE. USE CLASS A CONCRETE TO BACKFILL THE PILE EXCAVATION HOLE UP TO A DEPTH OF 7 FEET. USE CLASS III SELECT MATERIAL AS BACKFILL ABOVE THE CONCRETE TO THE BOTTOM OF CAP.

PROJECT NO. B-4318
WATAUGA COUNTY
STATION: 16+48.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

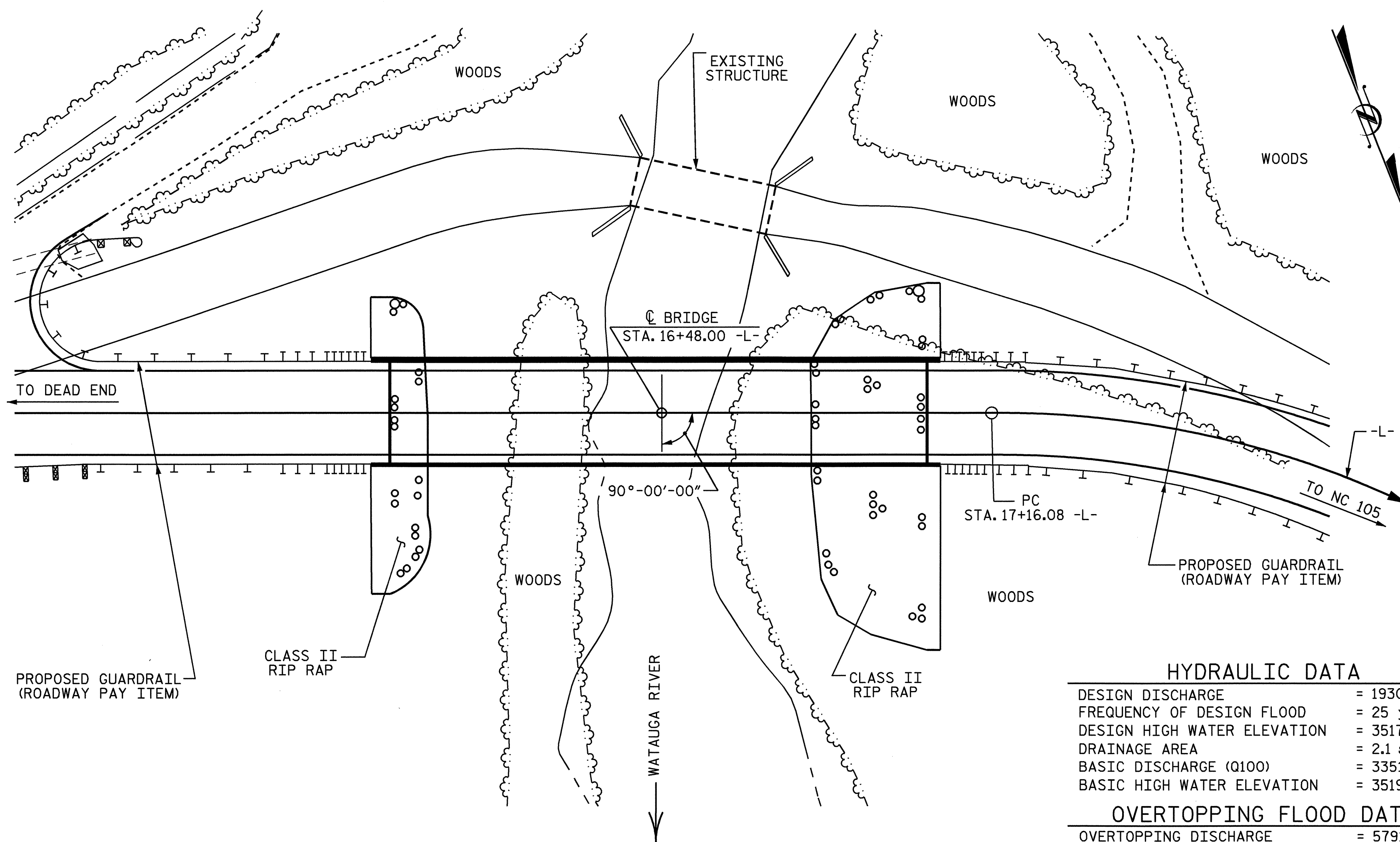
GENERAL DRAWING

FOR BRIDGE OVER WATAUGA RIVER ON SR 1598 BETWEEN NC 105 AND DEAD END

DRAWN BY : M.A. ALLEN DATE : 7-08
CHECKED BY : A.R. CHESSON DATE : 8-08

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

NOTES



HYDRAULIC DATA

DESIGN DISCHARGE	= 1930 cfs
FREQUENCY OF DESIGN FLOOD	= 25 yrs.
DESIGN HIGH WATER ELEVATION	= 3517.2
DRAINAGE AREA	= 2.1 sq. mi.
BASIC DISCHARGE (Q100)	= 3351 cfs
BASIC HIGH WATER ELEVATION	= 3519.3

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 5791+ cfs
FREQUENCY OF OVERTOPPING FLOOD	= 500+ yrs.
OVERTOPPING FLOOD ELEVATION	= 3528.61

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

- ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE BOX BEAM UNITS HAVE BEEN DESIGNED FOR HS 25.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.
- AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF ONE SPAN @ 31'-6" WITH A CLEAR ROADWAY WIDTH OF 11.2 FT. AND TIMBER DECK AND I-BEAMS ON TIMBER POSTS AND CONCRETE FOOTINGS AND LOCATED APPROXIMATELY 60 FT. UPSTREAM FROM THE PROPOSED STRUCTURE SHALL BE REMOVED TO THE TOP OF CONCRETE FOOTINGS. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT. TO THE LEFT AND 32 FT. TO THE RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+48.00 -L-."
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR TYPE T101 RAIL, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	REINFORCING STEEL	HP 12 X 53 STEEL PILES		RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS		TYPE T101 RAIL
	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU.YDS.	LBS.	NO.	LIN.FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LIN.FT.
SUPERSTRUCTURE											LUMP SUM	7	684.25	189.17
END BENT 1		25	150	LUMP SUM	15.6	2269	5	175	136	151				
END BENT 2		50	125		15.7	2269	5	175	414	459				
TOTAL	LUMP SUM	75	275	LUMP SUM	31.3	4538	10	350	550	610	LUMP SUM	7	684.25	189.17

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

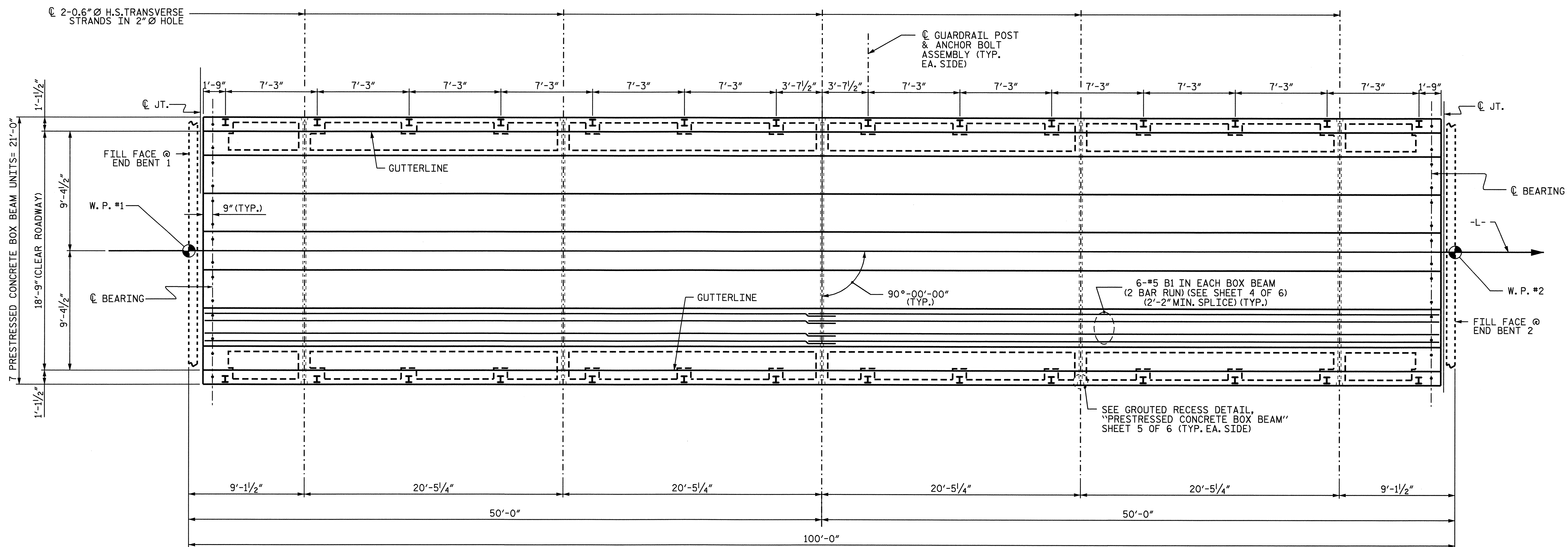
GENERAL DRAWING

FOR BRIDGE OVER WATAUGA RIVER ON SR 1598 BETWEEN NC 105 AND DEAD END

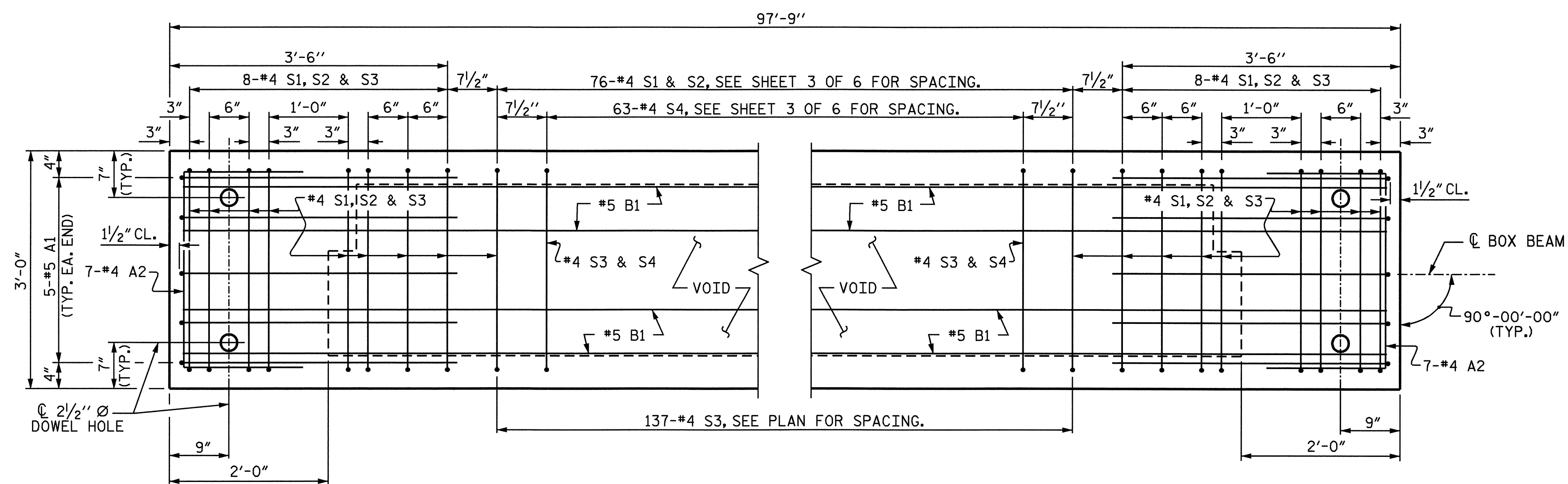


DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 8-08

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



PLAN OF SPAN A



PLAN OF BOX BEAM - EXTERIOR

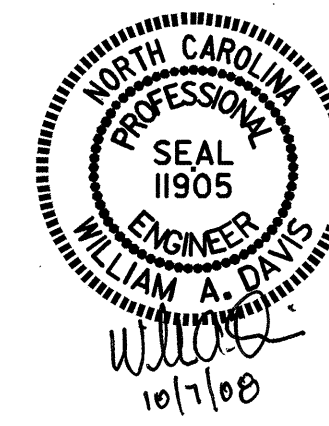
FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS.
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

SHEET 2 OF 6

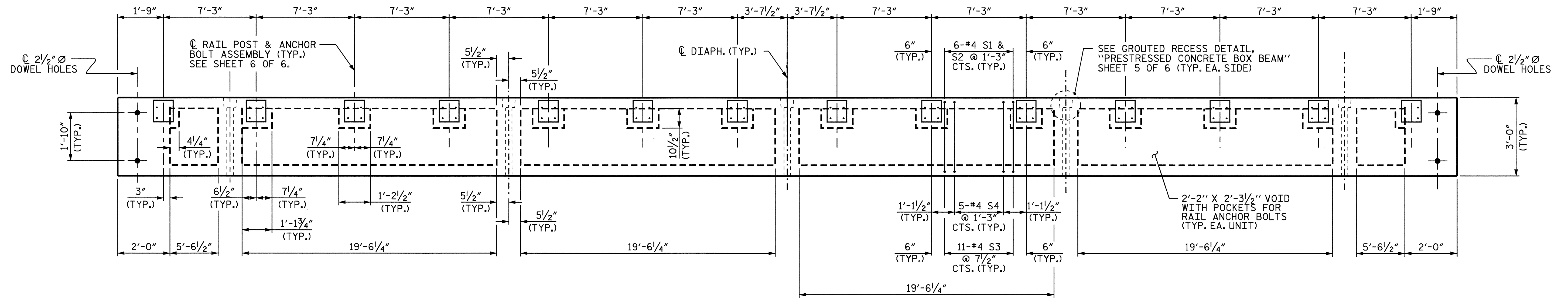
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPAN A

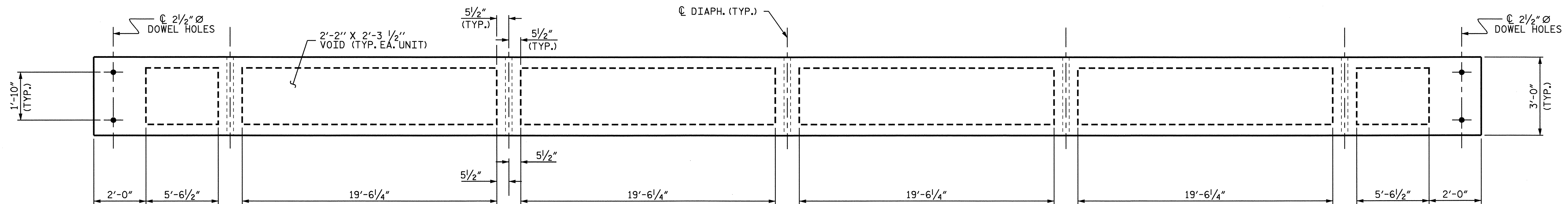


REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 16
2			4			

DRAWN BY: M.A. ALLEN DATE: 6/08
 CHECKED BY: A.R. CHESSON DATE: 7/08

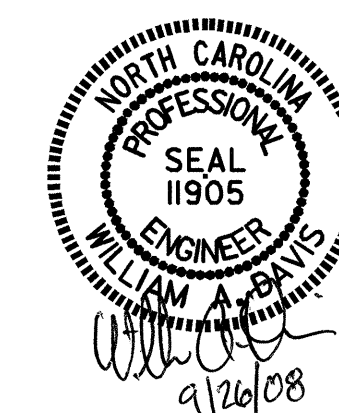


PLAN OF BOX BEAM - EXTERIOR
 SHOWING LOCATION OF VOIDS, DIAPHRAGMS, RAIL POSTS AND ANCHOR BOLT ASSEMBLIES.



PLAN OF BOX BEAM - INTERIOR
 SHOWING LOCATION OF VOIDS AND DIAPHRAGMS.

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-
 SHEET 3 OF 6

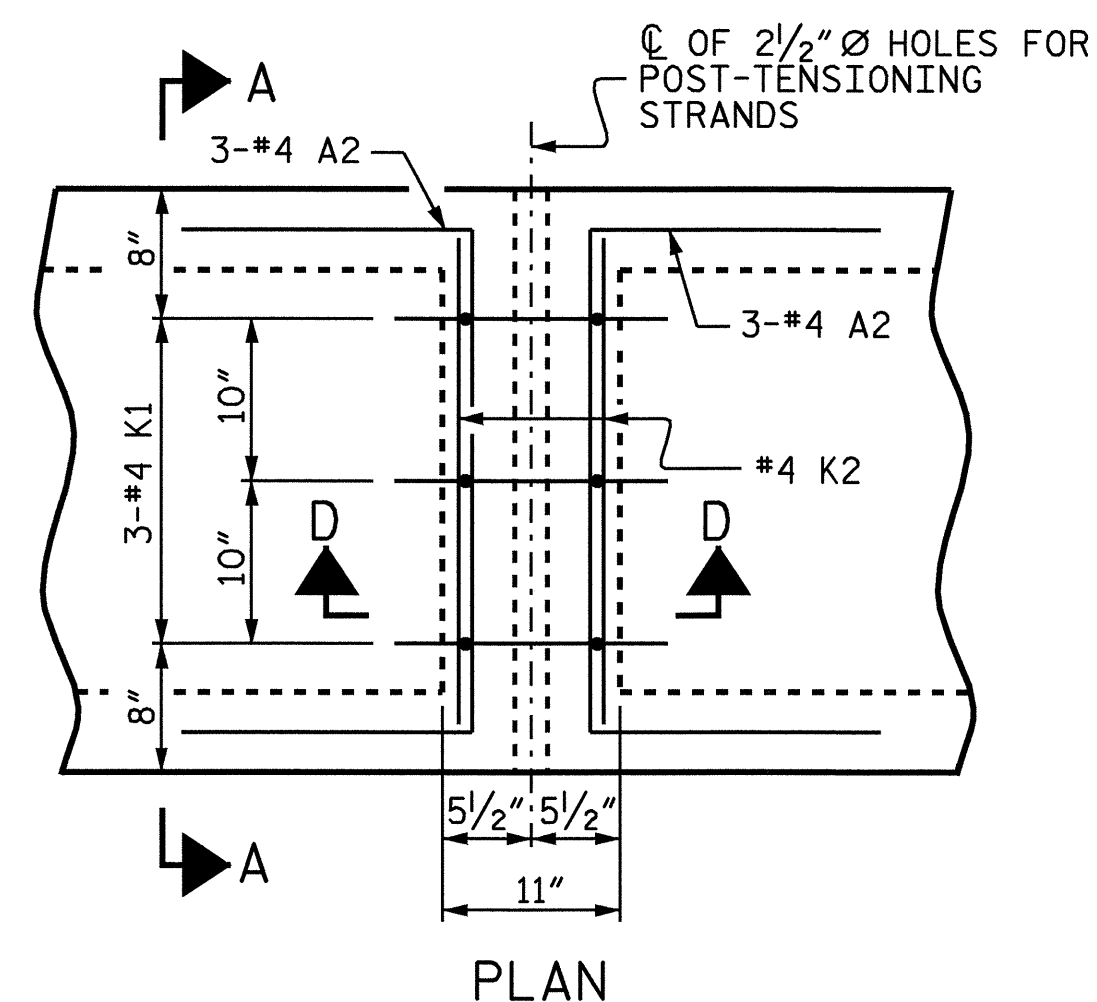


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
PLAN OF
BOX BEAM UNITS

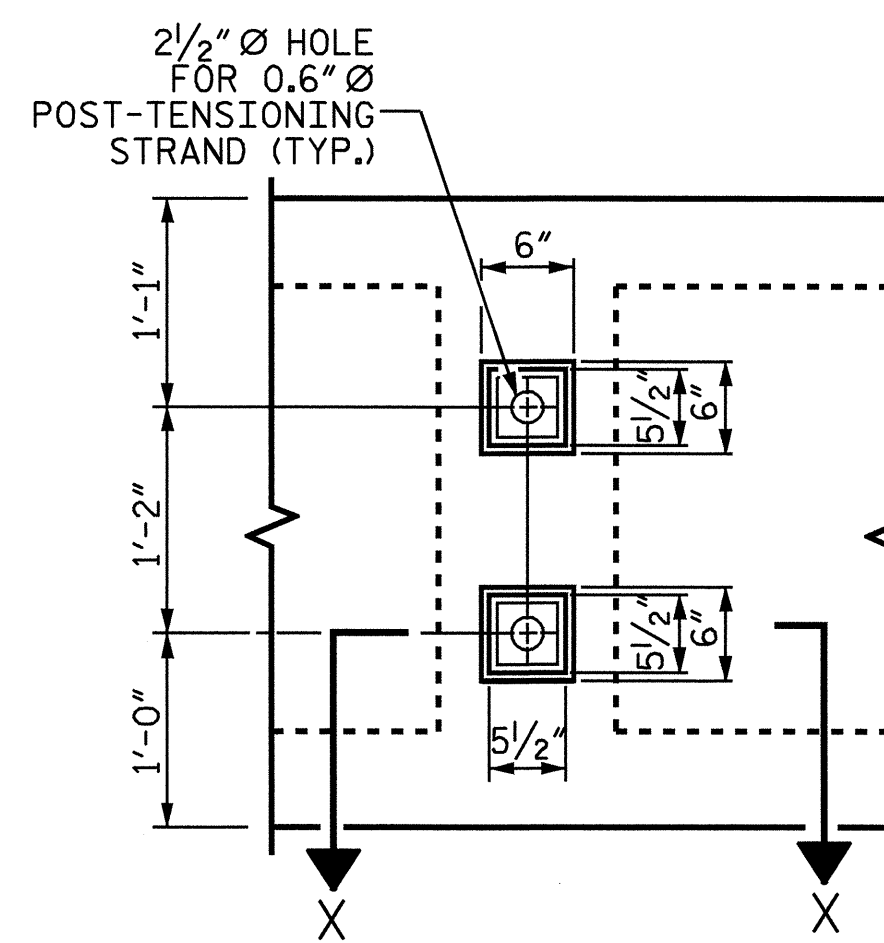
DRAWN BY : M.A. ALLEN DATE : 6/08
 CHECKED BY : A.R. CHESSON DATE : 7/08

25-SEP-2008 10:23
 J:\structures\final plans box beam\b4318_sd.bx.dgn
 mallen

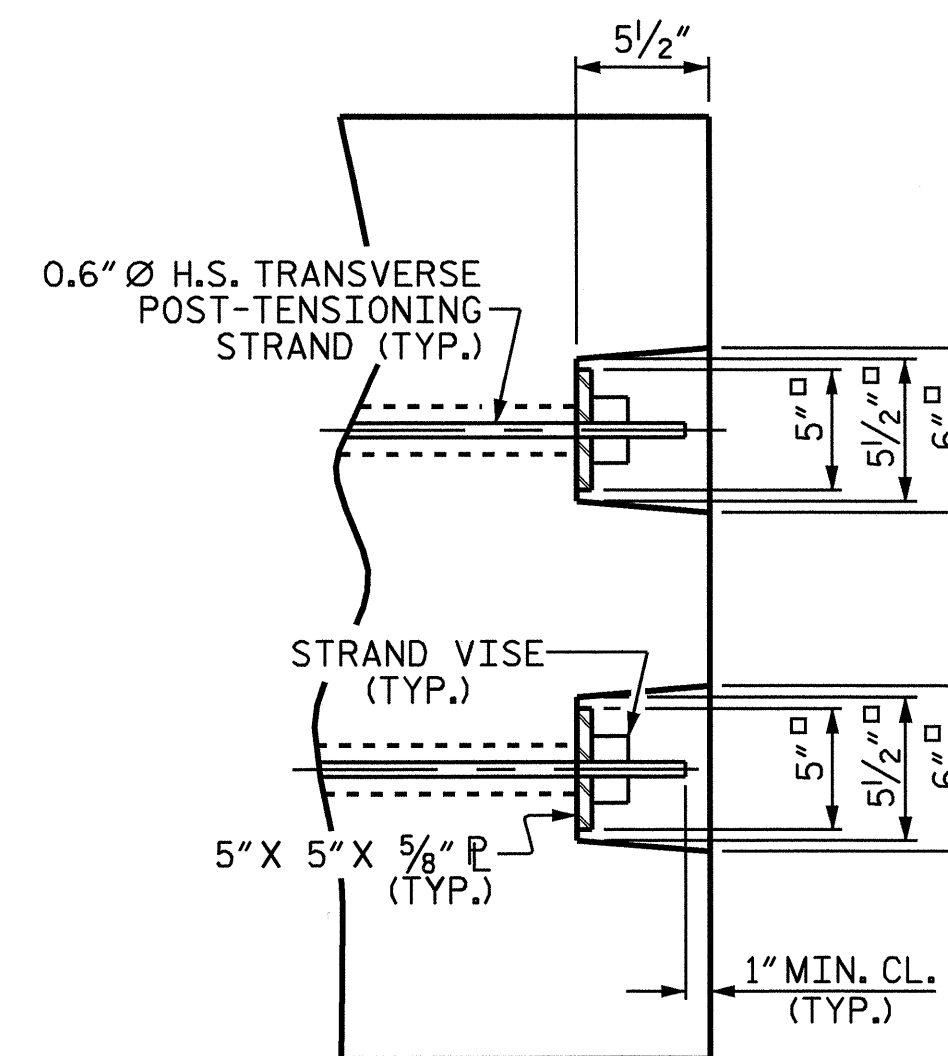
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			16



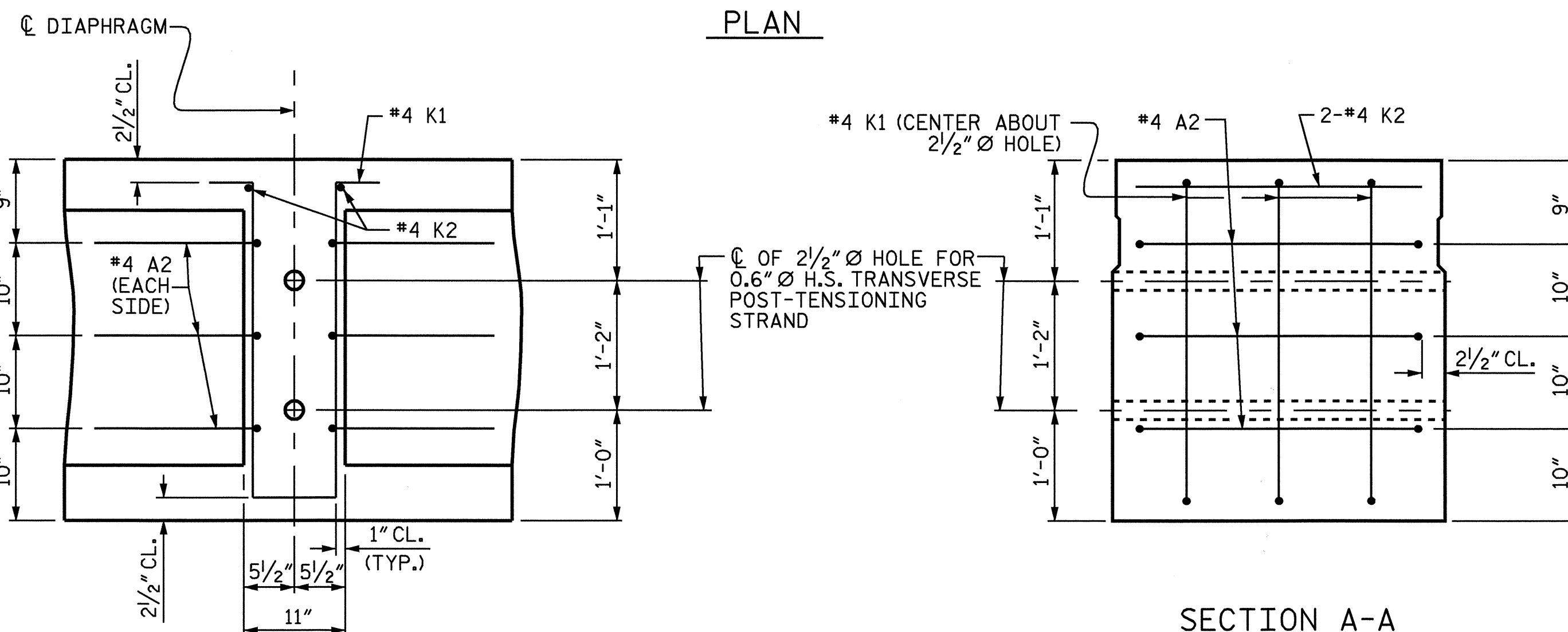
PLAN



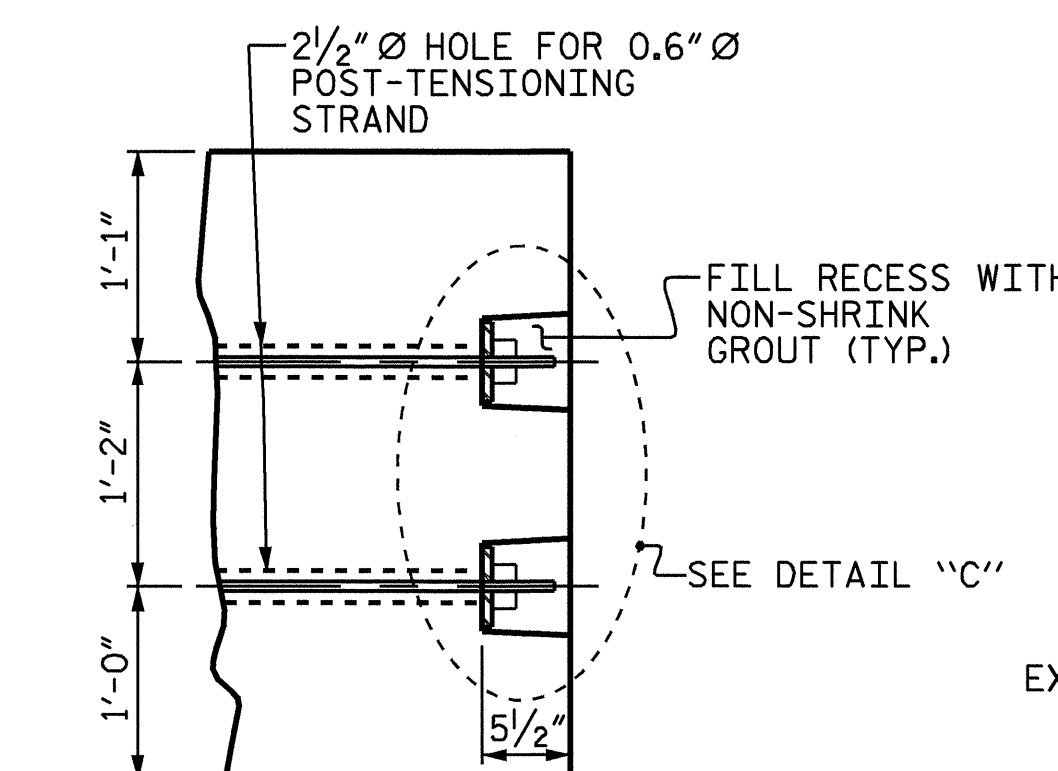
VIEW Y-Y
SHOWING ELEVATION VIEW OF GROUDED RECESS



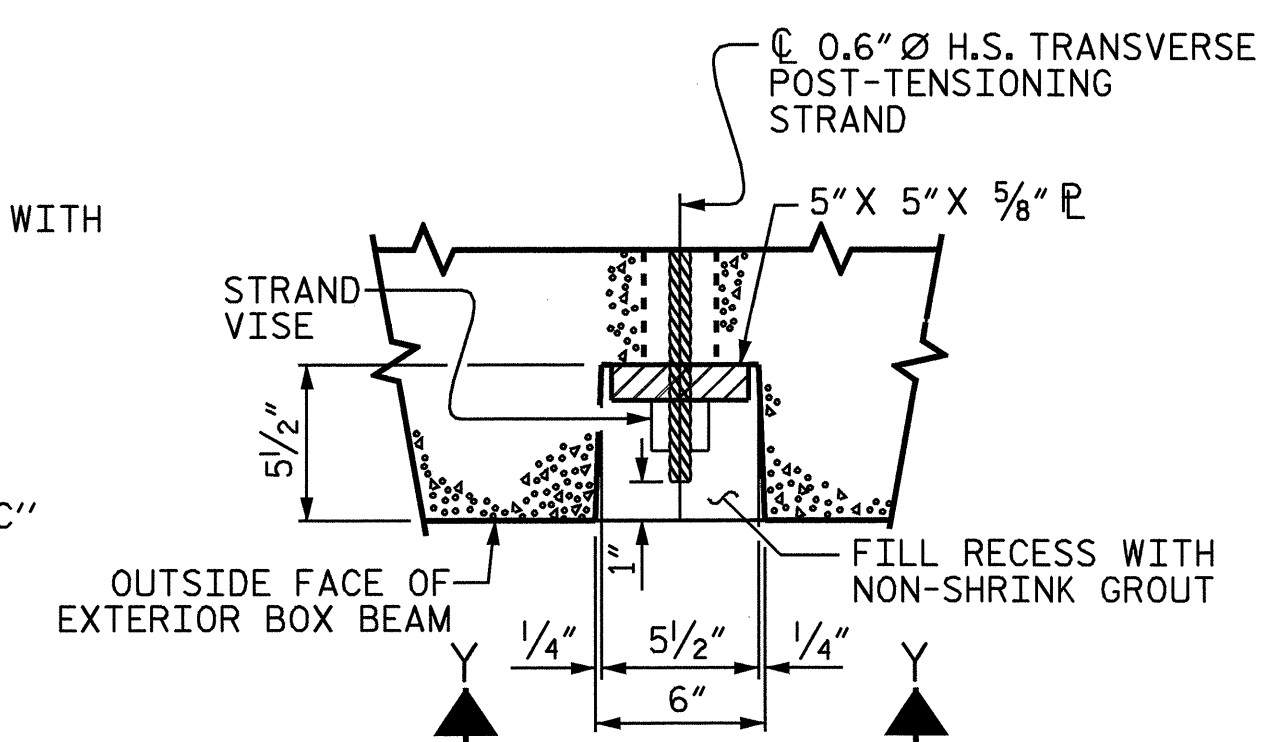
DETAIL "C"



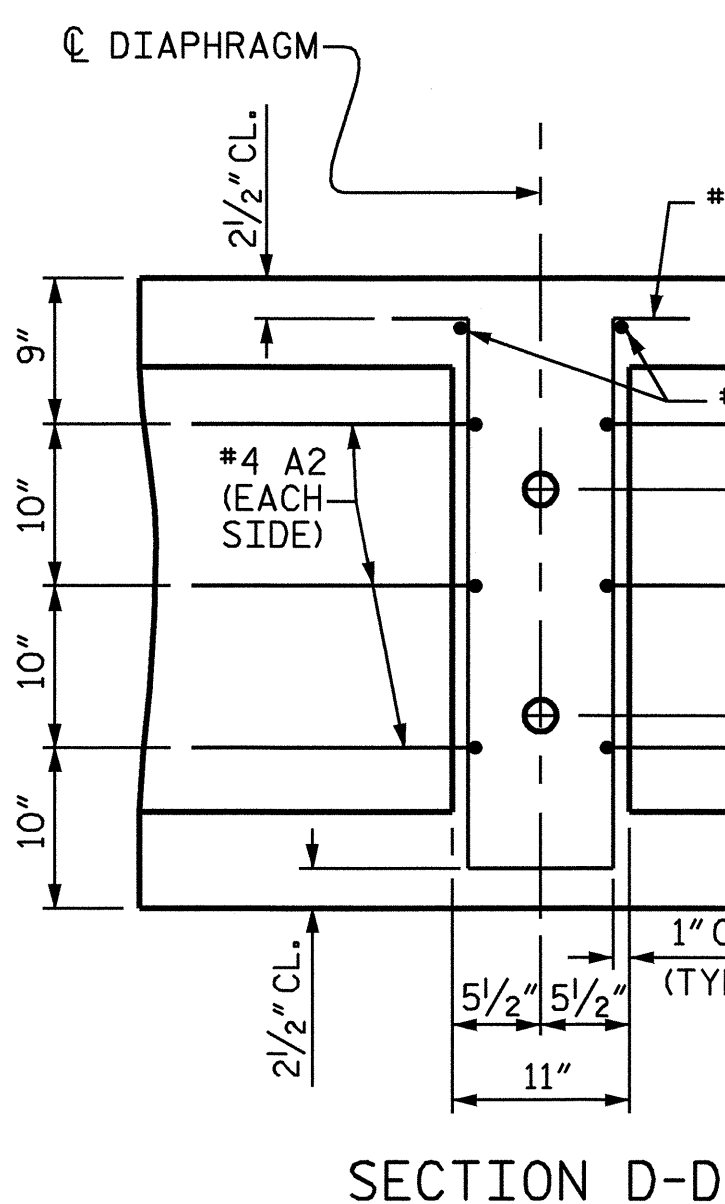
SECTION A-A
VOIDS NOT SHOWN



PART SECTION AT RECESS



SECTION X-X

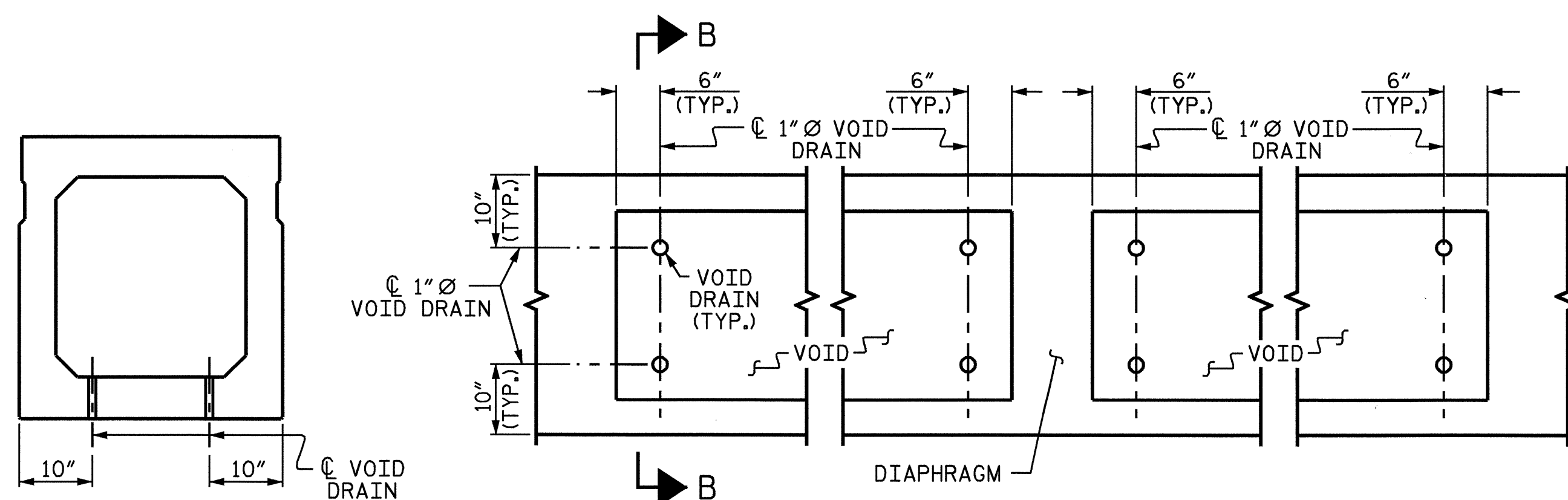


SECTION D-D

DOUBLE DIAPHRAGM DETAILS

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

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



PART PLAN

SECTION B-B

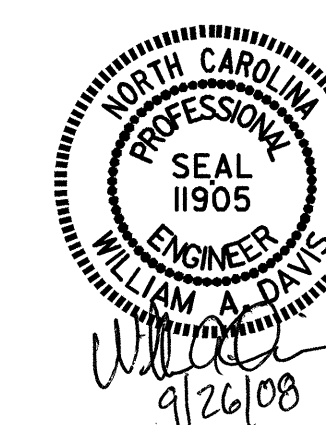
VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 3'-3"
	0.6" Ø L.R. STRAND
	SPAN "A"
CAMBER (BEAM ALONE IN PLACE)	↑ 3 1/16"
DEFLECTION DUE TO ASPHALT WEARING SURFACE	↓ 9/16"
FINAL CAMBER	↑ 3/8"

PROJECT NO. B-4318
WATAUGA COUNTY
STATION: 16+48.00 -L-

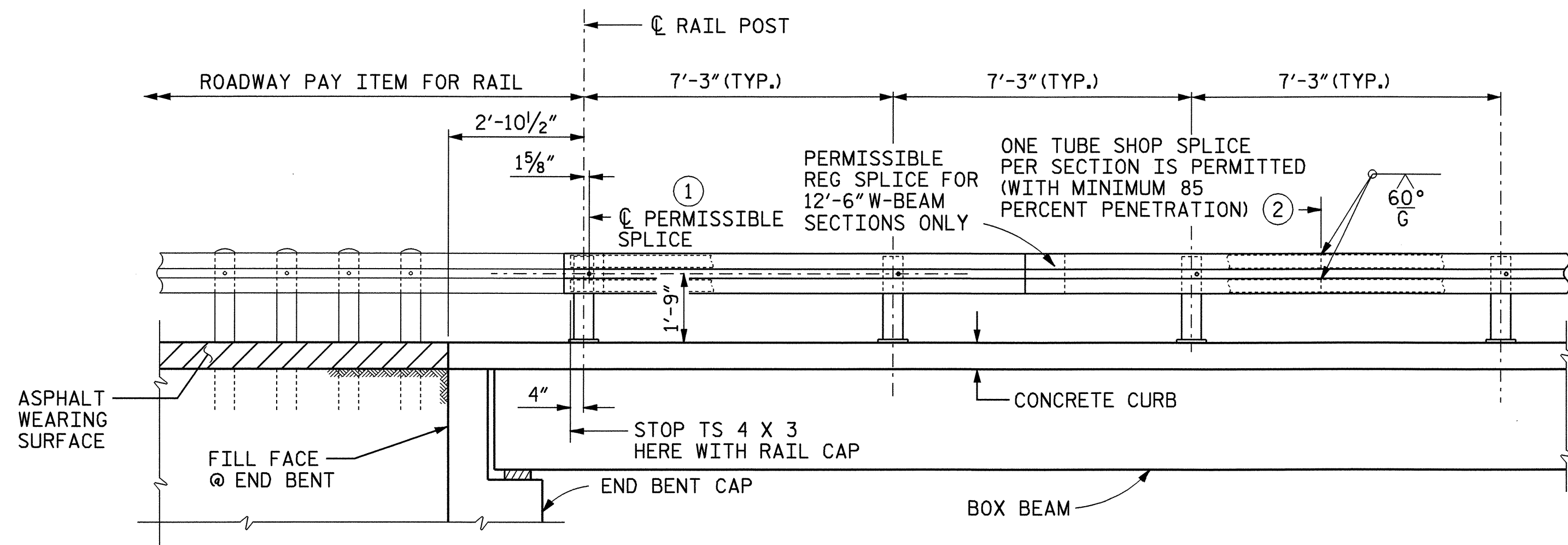
SHEET 5 OF 6



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

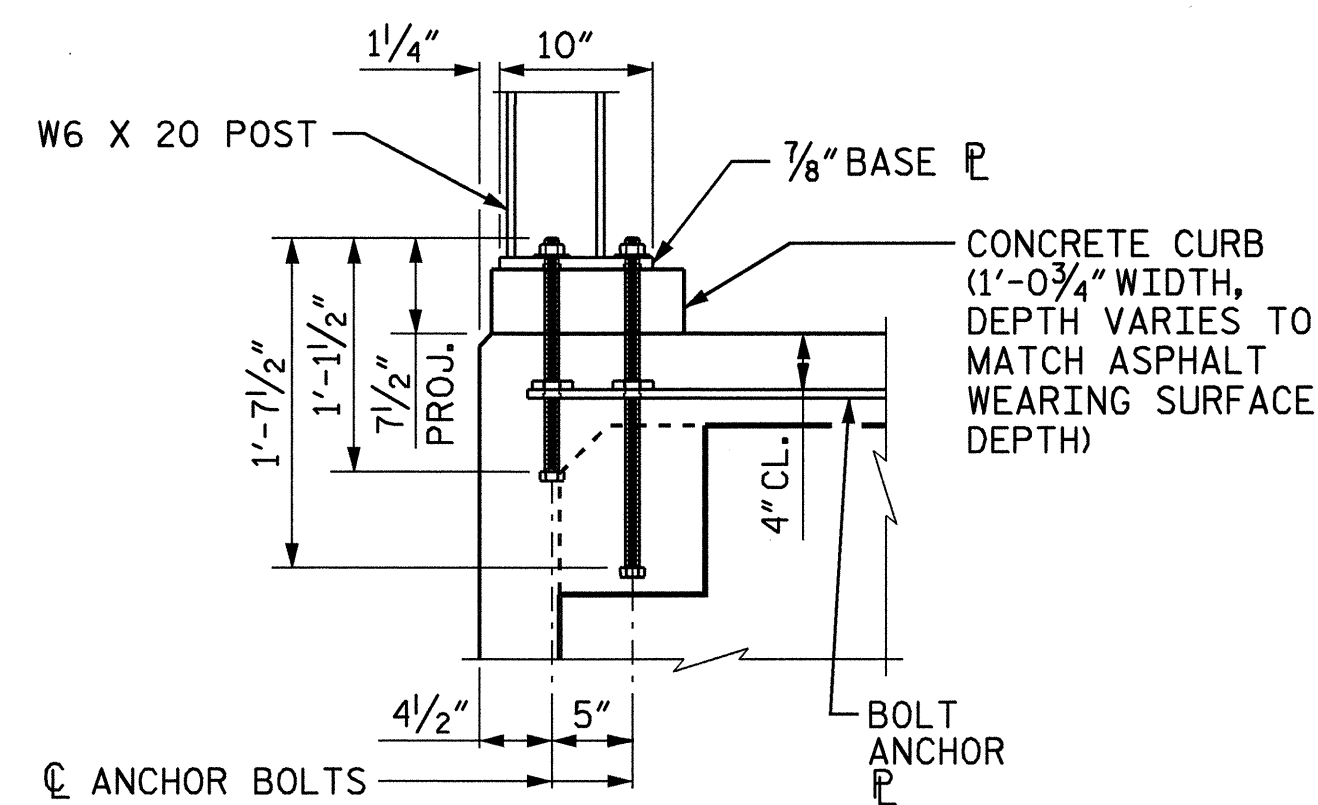
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS	
2			4			16	

ASSEMBLED BY :	M.A. ALLEN	DATE :	6/08
CHECKED BY :	A.R.CHESSON	DATE :	7/08
DRAWN BY :	TLA 5/05	ADDED :	7/11/05
CHECKED BY :	GM 6/05	REV. :	5/1/06 TLA/GM



ROADWAY ELEVATION OF RAIL

(EA. END SIMILAR)



POST MOUNTING DETAILS

NOTES:

SECTION LENGTHS OF TS 4 X 3 MEMBERS SHALL BE ATTACHED CONTINUOUSLY TO A MINIMUM OF THREE POSTS.

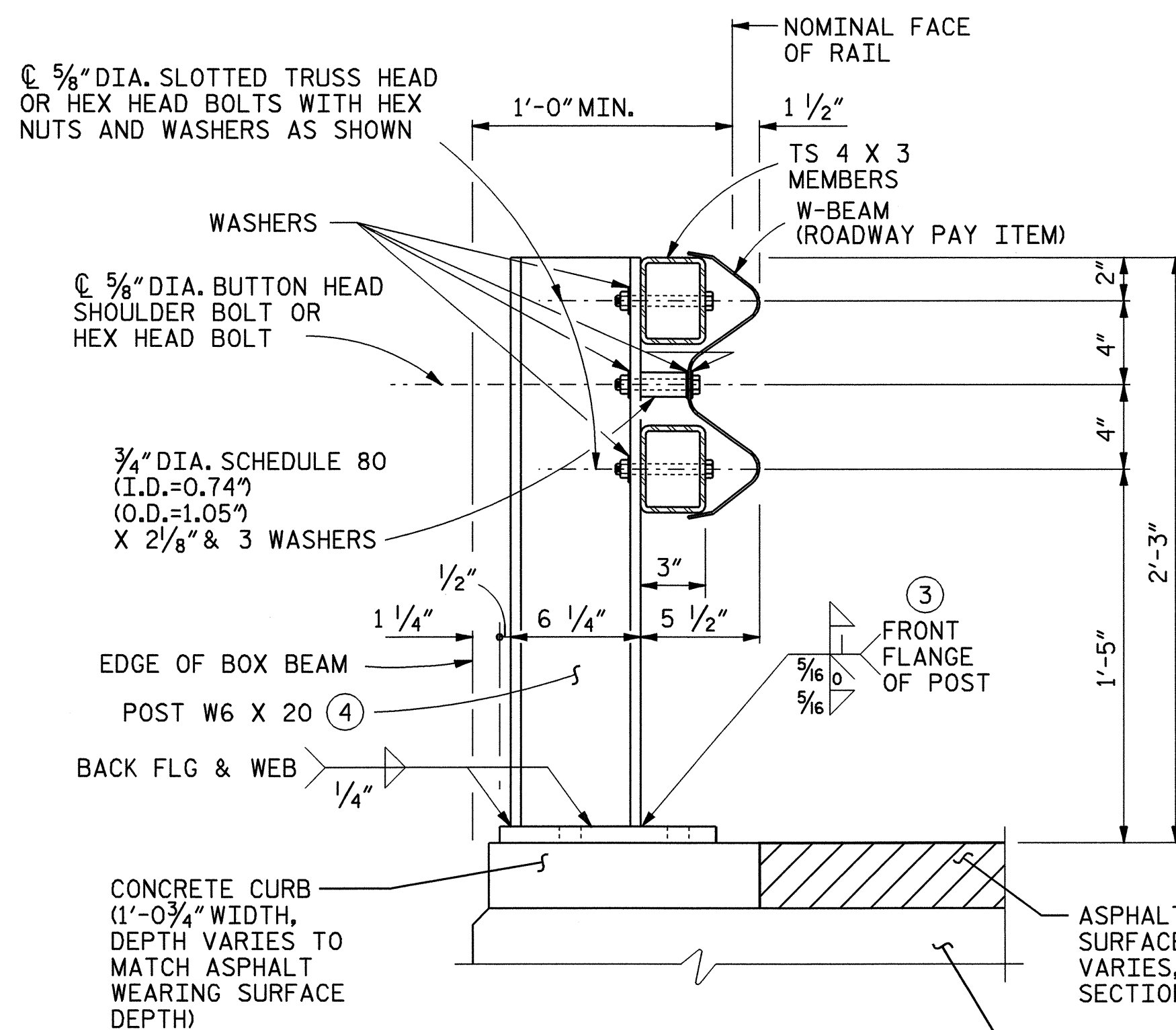
ALL STEEL COMPONENTS SHALL BE GALVANIZED UNLESS OTHERWISE SHOWN IN PLANS.

AT EXPANSION SLOTS IN W-BEAM RAIL, TIGHTEN BOLTS SNUGLY.

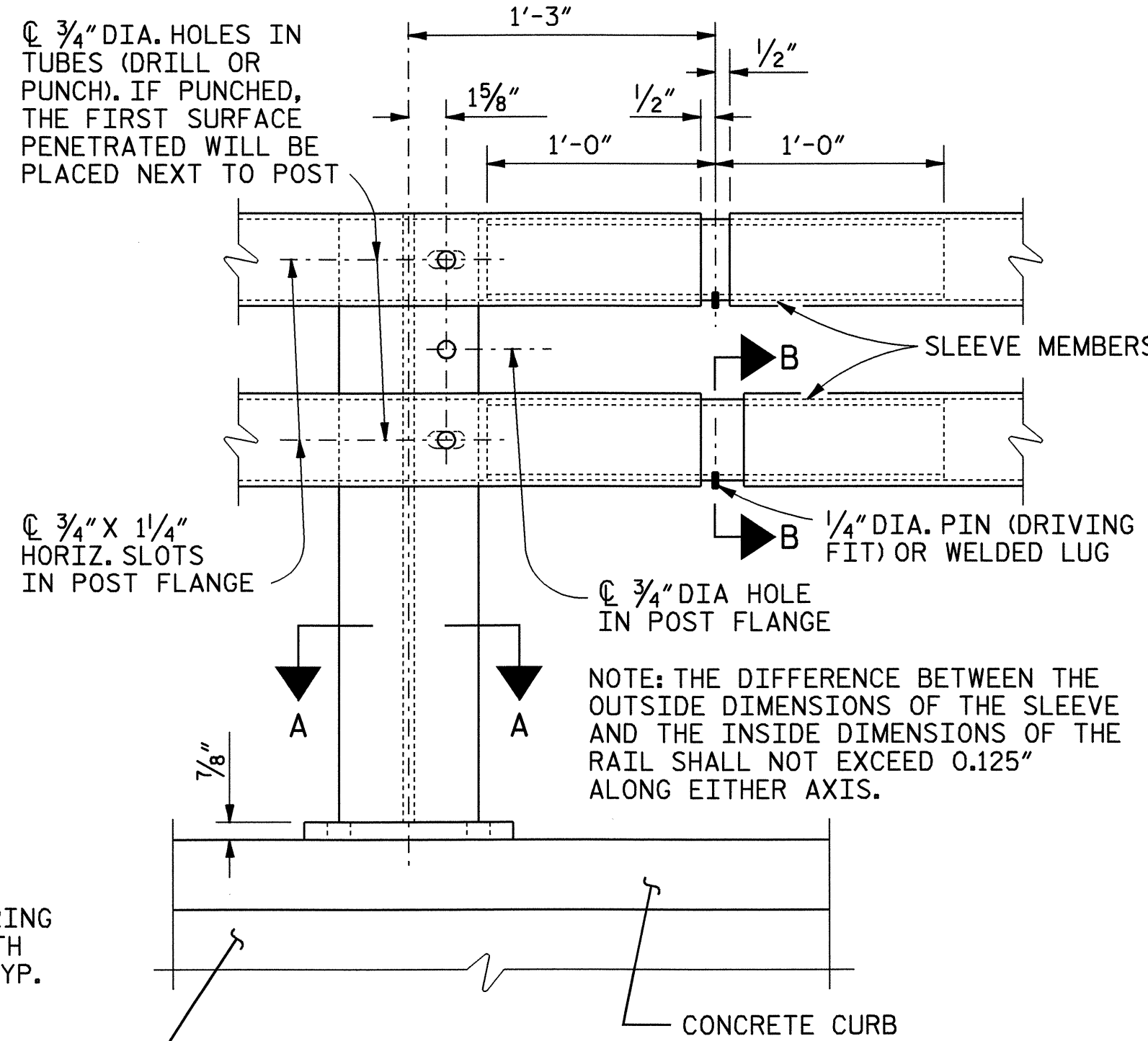
ANCHOR BOLTS SHALL BE 3/4" DIA ASTM A321 THREADED RODS WITH ONE TACK WELDED HEX NUT EACH WITH ONE HEX NUT AND ONE 2" O.D. WASHER (0.153" MIN. THICK) PLUS ONE 1 1/2" O.D. HARDENED WASHER (0.122" MIN. THICK) AT EACH BOLT. THREADED RODS MAY BE 0.670" MINIMUM DIAMETER WITH ROLLED THREADS. NUTS SHALL CONFORM TO A563 REQUIREMENTS. THE UNTAPPED BLANKS SHALL BE GALVANIZED PRIOR TO CUTTING THE THREADS. THREADS FOR BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES IN ACCORDANCE WITH ASME B1.1.

FOR ALL RAILS, ERECTION DRAWINGS SHOWING SECTION LENGTHS, SPLICE LOCATIONS, RAIL POST SPACING AND ANCHOR BOLT SETTING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

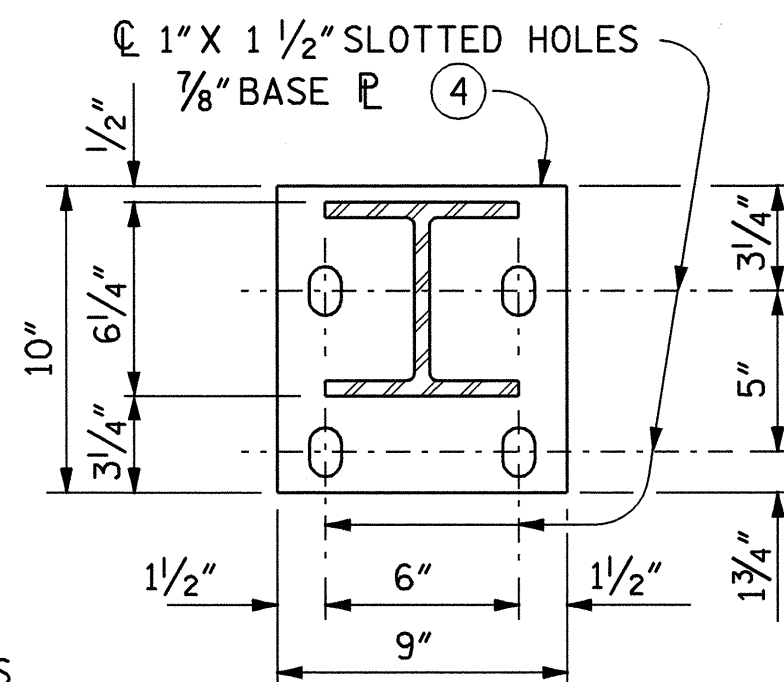
- ① SPLICE MAY BE ON EITHER SIDE OF BRIDGE RAIL POST WEB.
- ② THE WELD MAY BE SQUARE GROOVE OR SINGLE VEE GROOVE. GRIND SMOOTH
- ③ IN LIEU OF FRONT FLG WELD SHOWN, A 3/8" FILLET WELD ALL AROUND INCLUDING EDGES OF FLANGE MAY BE USED.
- ④ ALL STEEL POSTS AND PLATES SHALL BE ASTM A36 AND GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- ⑤ INSTALL ONE ANCHORAGE PLATE ASSEMBLY IN SLAB AT EACH RAIL POST. DO NOT GALVANIZE OR OIL THIS ASSEMBLY. BOLT ANCHOR PLATES SHALL NOT BE CUT.



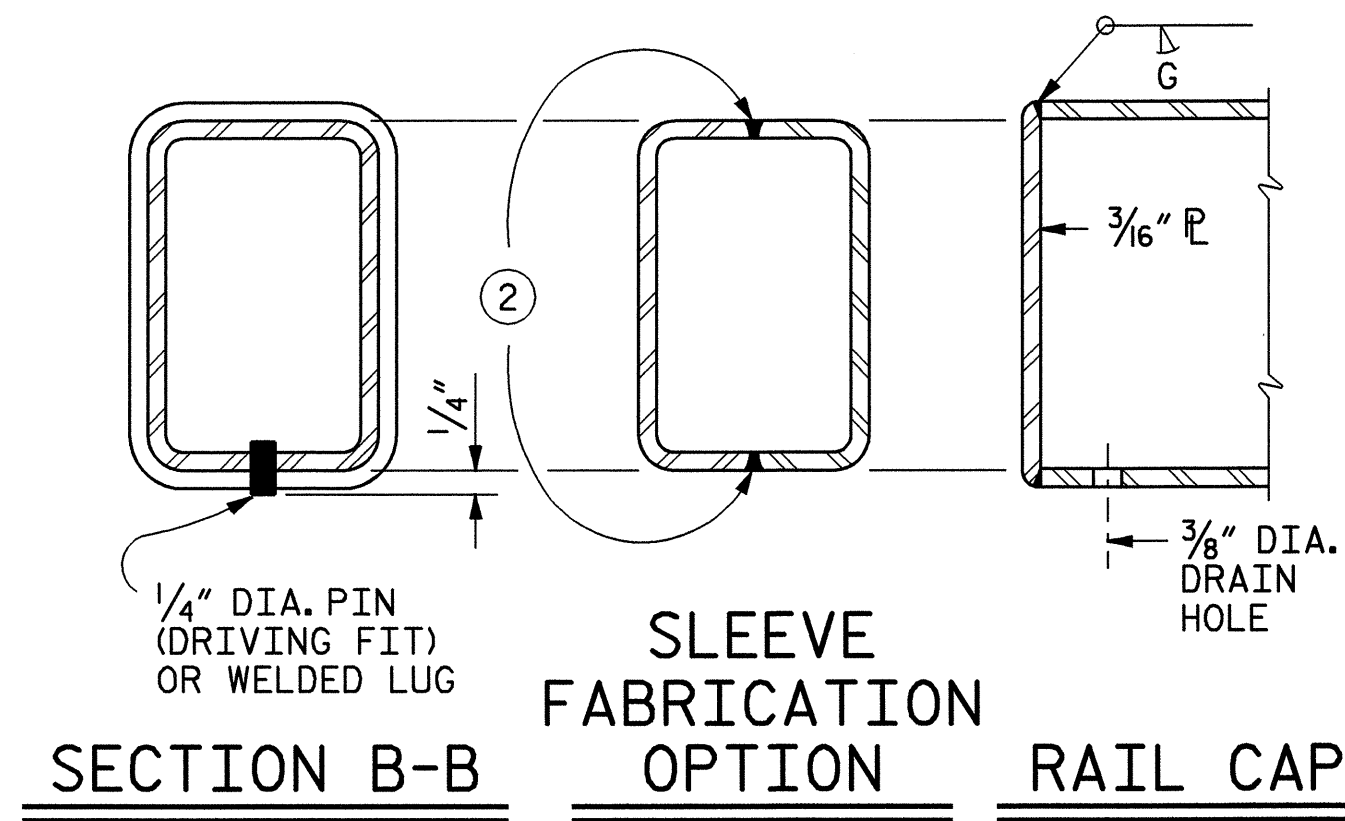
SECTION THRU RAIL



TUBE SPLICE DETAILS



SECTION A-A



SECTION B-B

SLEEVE FABRICATION OPTION

RAIL CAP

PAY LENGTH = 189.17 LIN. FT.

TUBE & SLEEVE MEMBERS

RAIL MEMBER		SLEEVE THICKNESS
MATERIAL	THICKNESS	MATERIAL Ø A36
A 500 GRADE C	0.188"	0.188"
A 500 GRADE B	0.250"	0.250"
A 500 GRADE A OR A 501	0.313"	0.250"

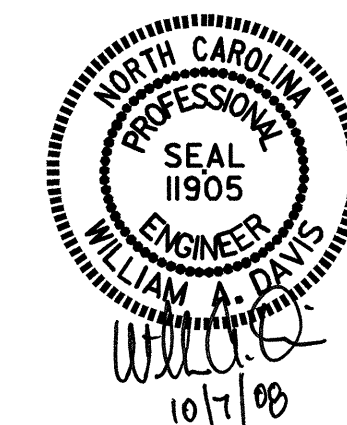
NOTE: OTHER SECTIONS OF EQUAL OR GREATER STRENGTH ARE ACCEPTABLE FOR SLEEVES.

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

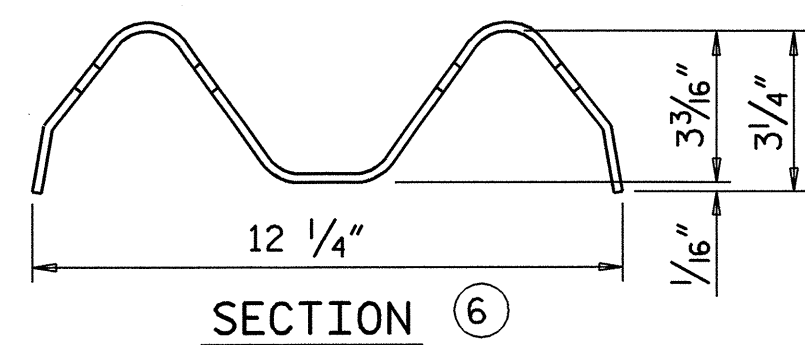
SHEET 6 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

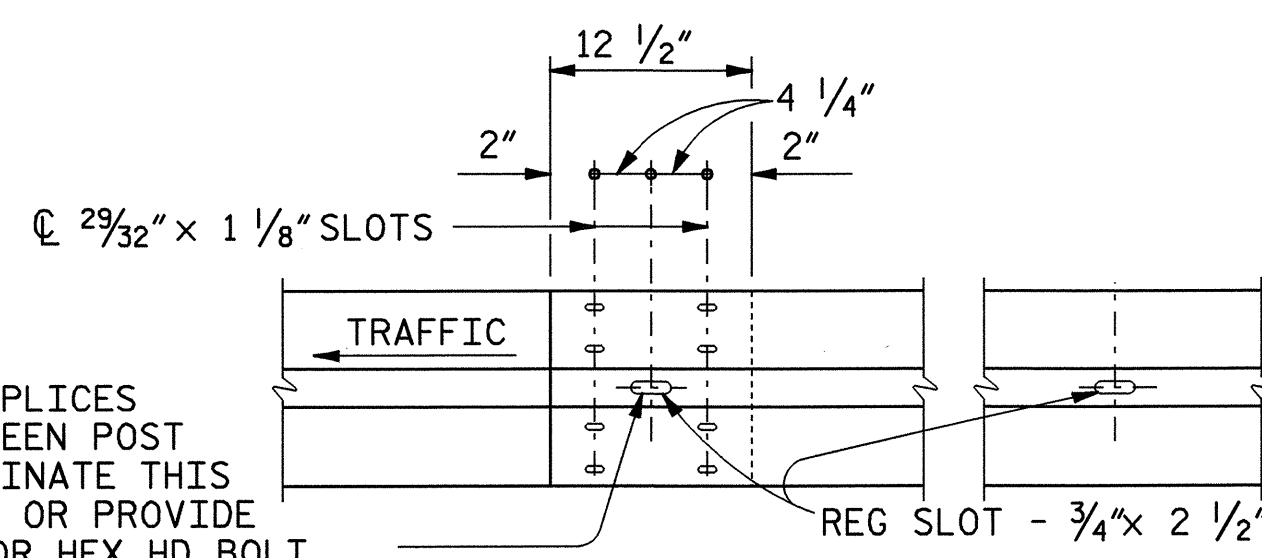
SUPERSTRUCTURE
 RAIL DETAILS
 (TYPE T101)



REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 16
2			4			



- ⑥ MEMBER SHALL BE 12 GAGE STEEL NOM THICKNESS = 0.1046" EXCLUSIVE OF PROTECTIVE COATING. ACTUAL SECTION MAY VARY SLIGHTLY WITH THE MANUFACTURER AND CONFORMS TO AASHTO M-180

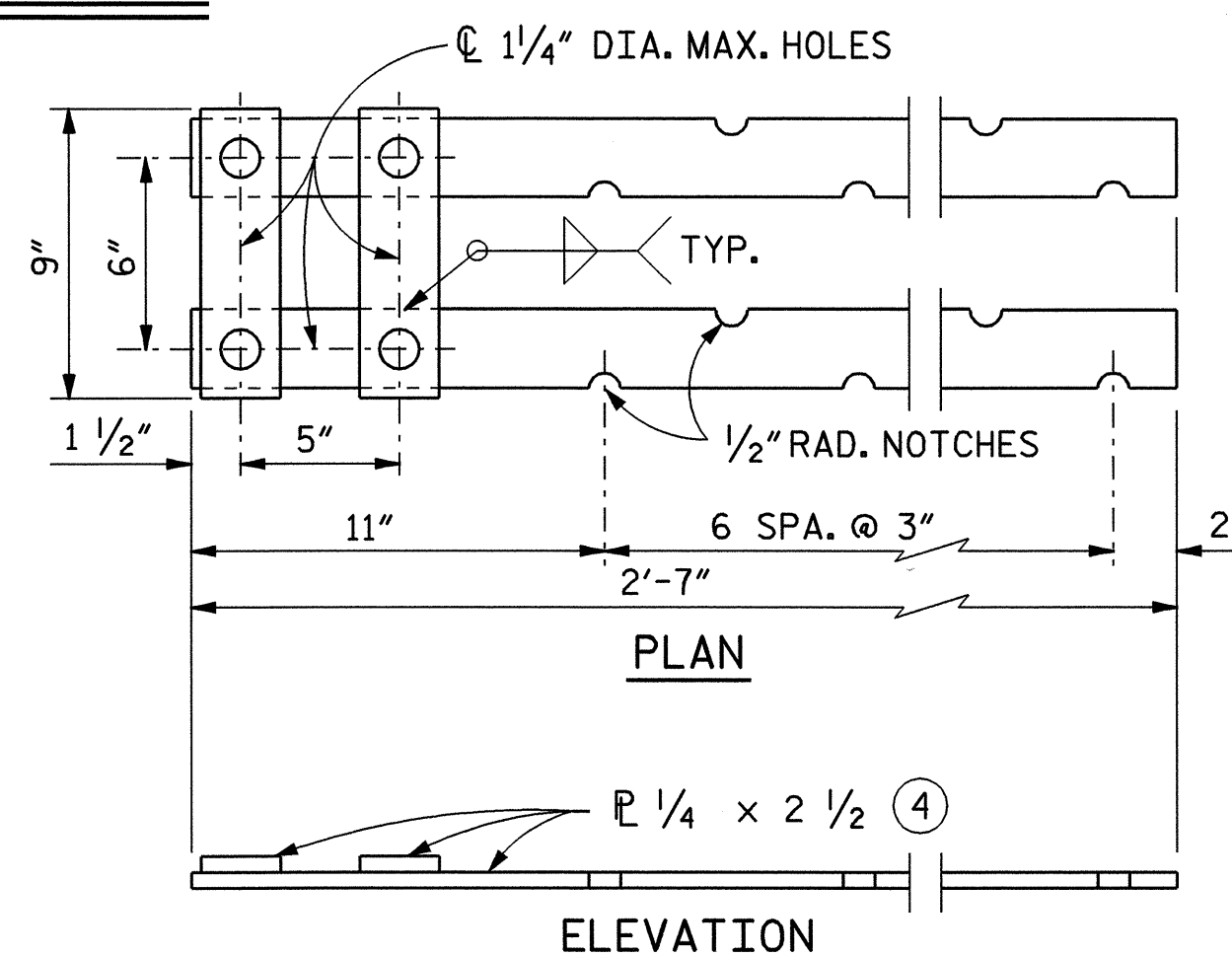


NOTE: PROVIDE 5/8" DIA. BUTTON HEAD SHOULDER BOLTS OR HEX HEAD BOLTS WITH HEX NUTS AT ALL SPLICE SLOTS.

SPLICE POST CONN

W-BEAM DETAILS

(W-BEAM AND W-BEAM INSTALLATION IS ROADWAY PAY ITEM)



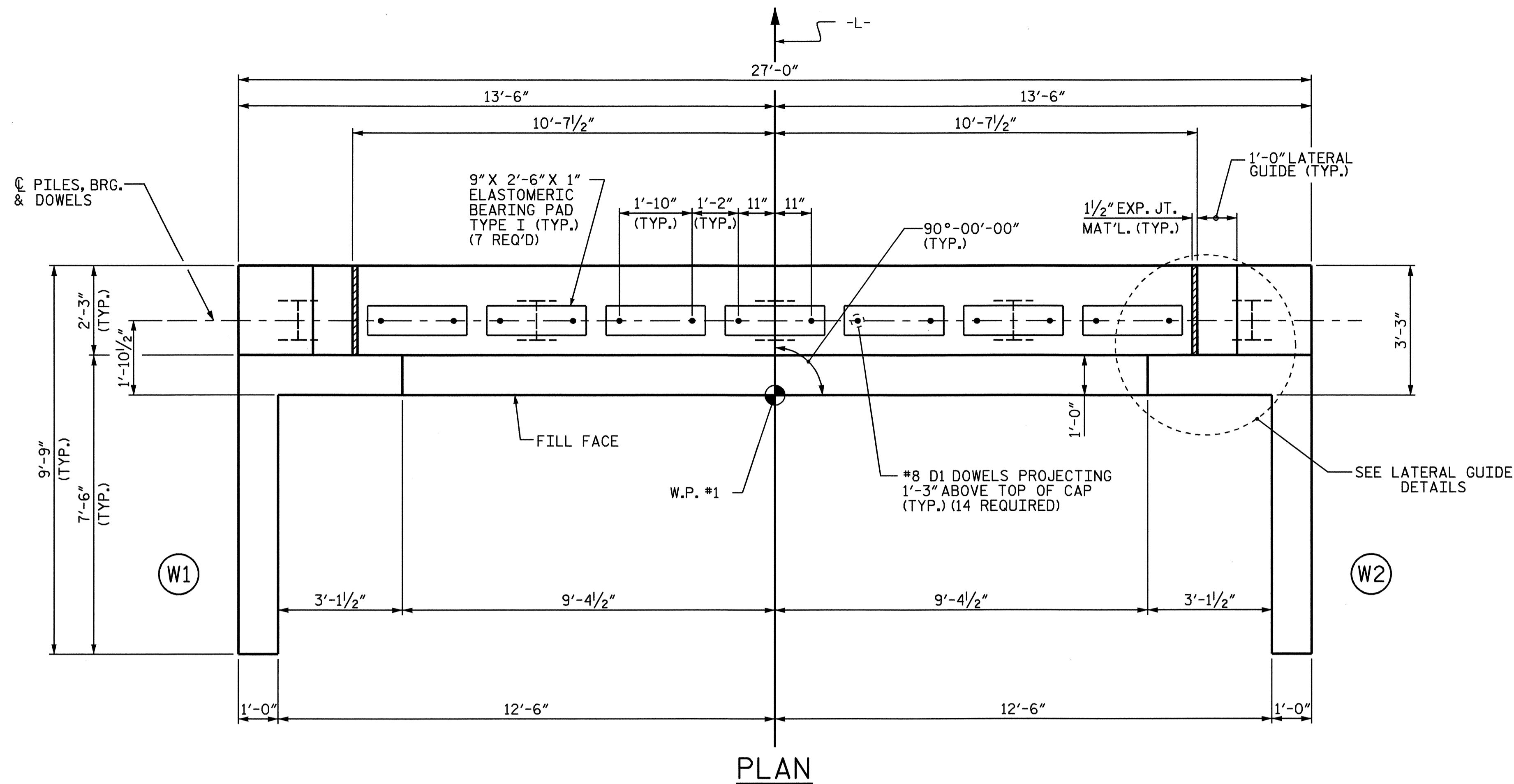
BOLT ANCHOR PLATES

DRAWN BY: M.A. ALLEN DATE: 6/08
 CHECKED BY: A.R. CHESSON DATE: 7/08

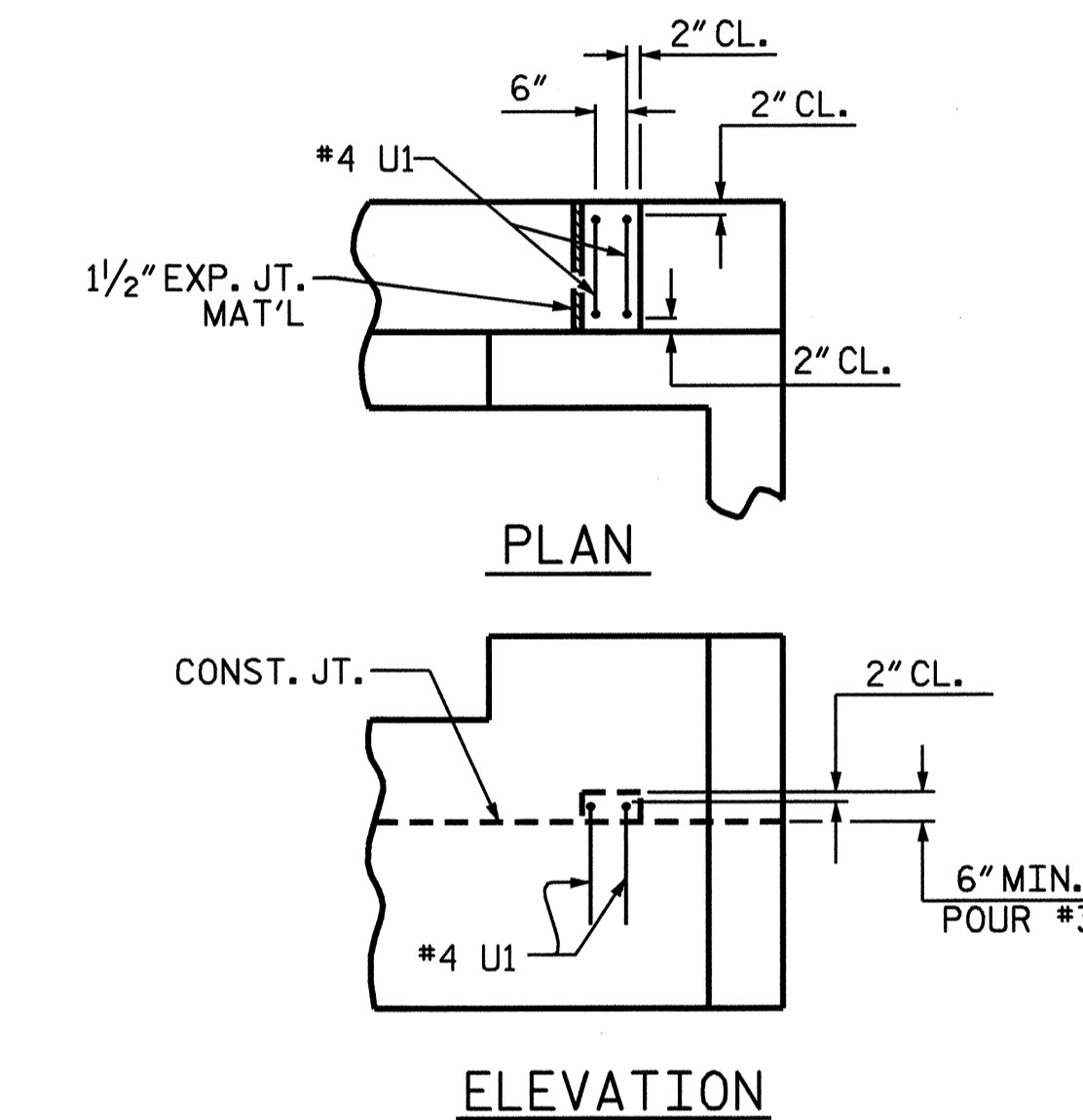
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 madlen

NOTES

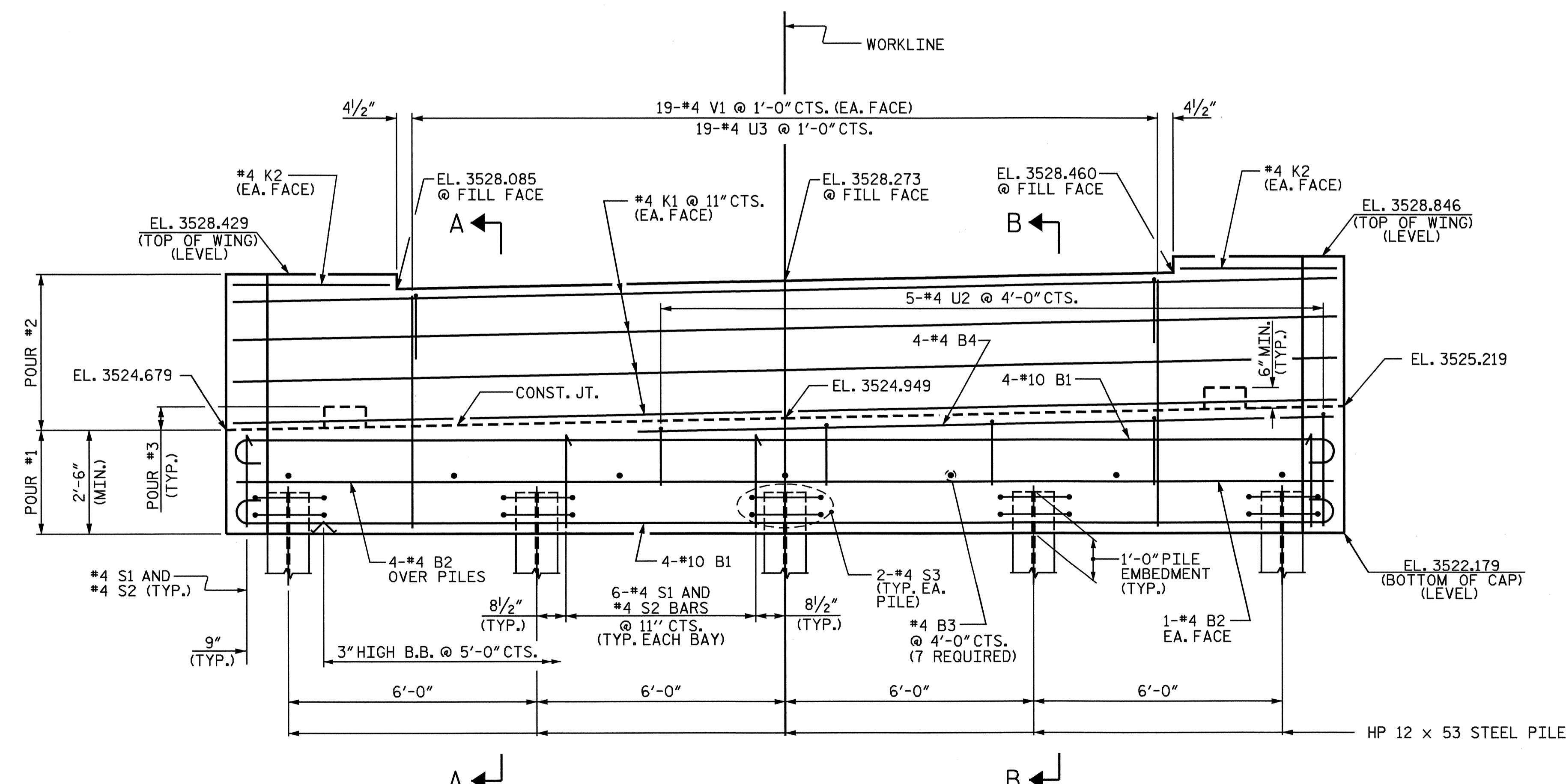
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
 THE LATERAL GUIDE AT EACH END OF CAP IS NOT TO BE POURED UNTIL AFTER BOX BEAM UNITS ARE IN PLACE.
 FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
 FOR TEMPORARY DRAINAGE DETAIL, SEE SHEET 3 OF 3.
 FOR REINFORCING STEEL IN WINGS, SEE SHEET 2 OF 3.



PLAN



LATERAL GUIDE DETAILS
(EACH END SIMILAR)



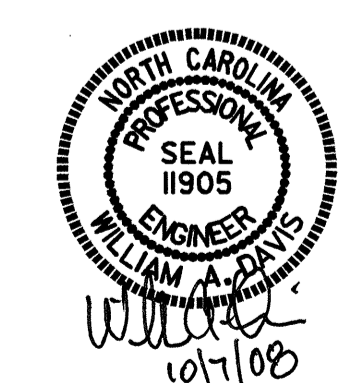
ELEVATION

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

SHEET 1 OF 3

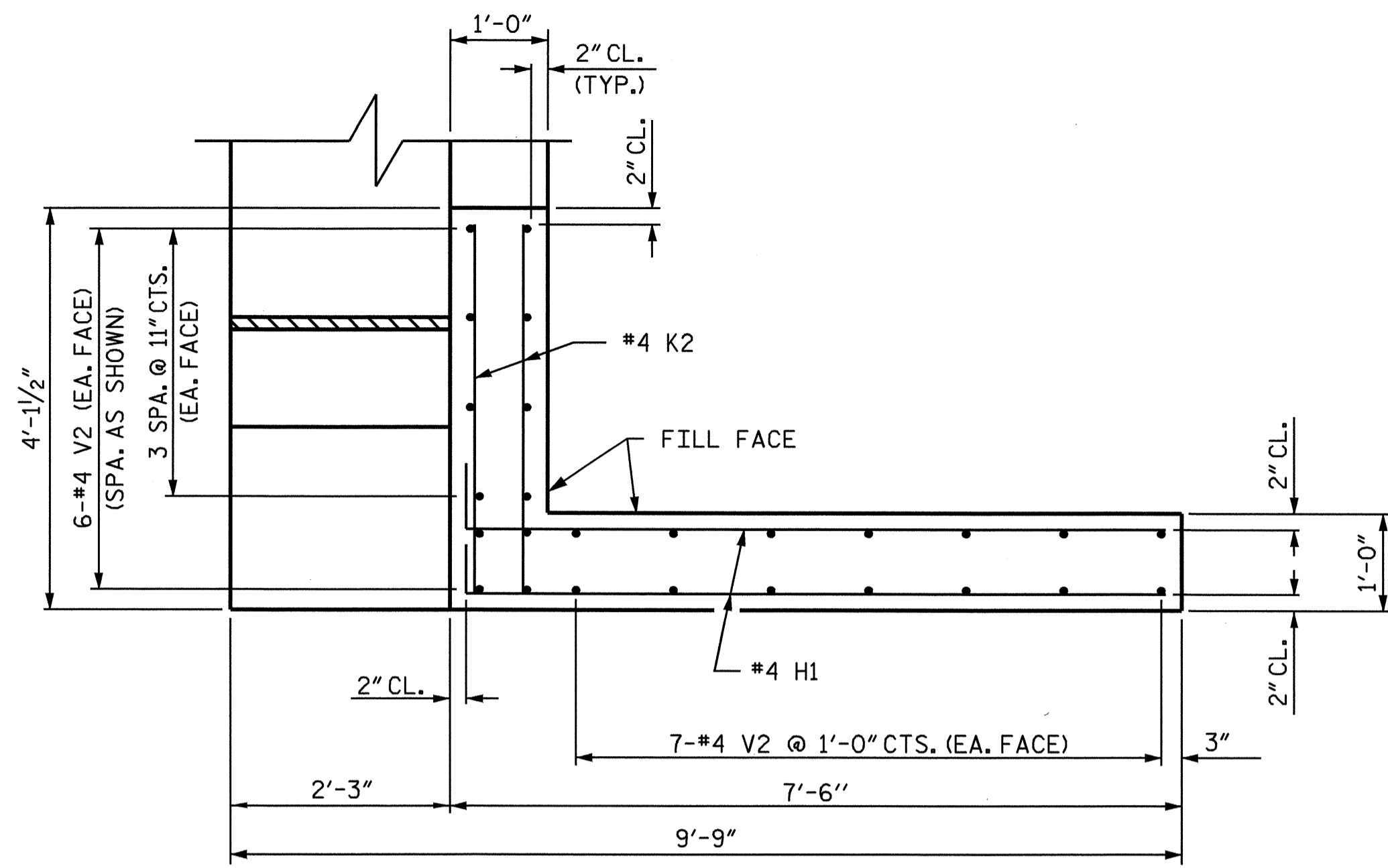
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 1

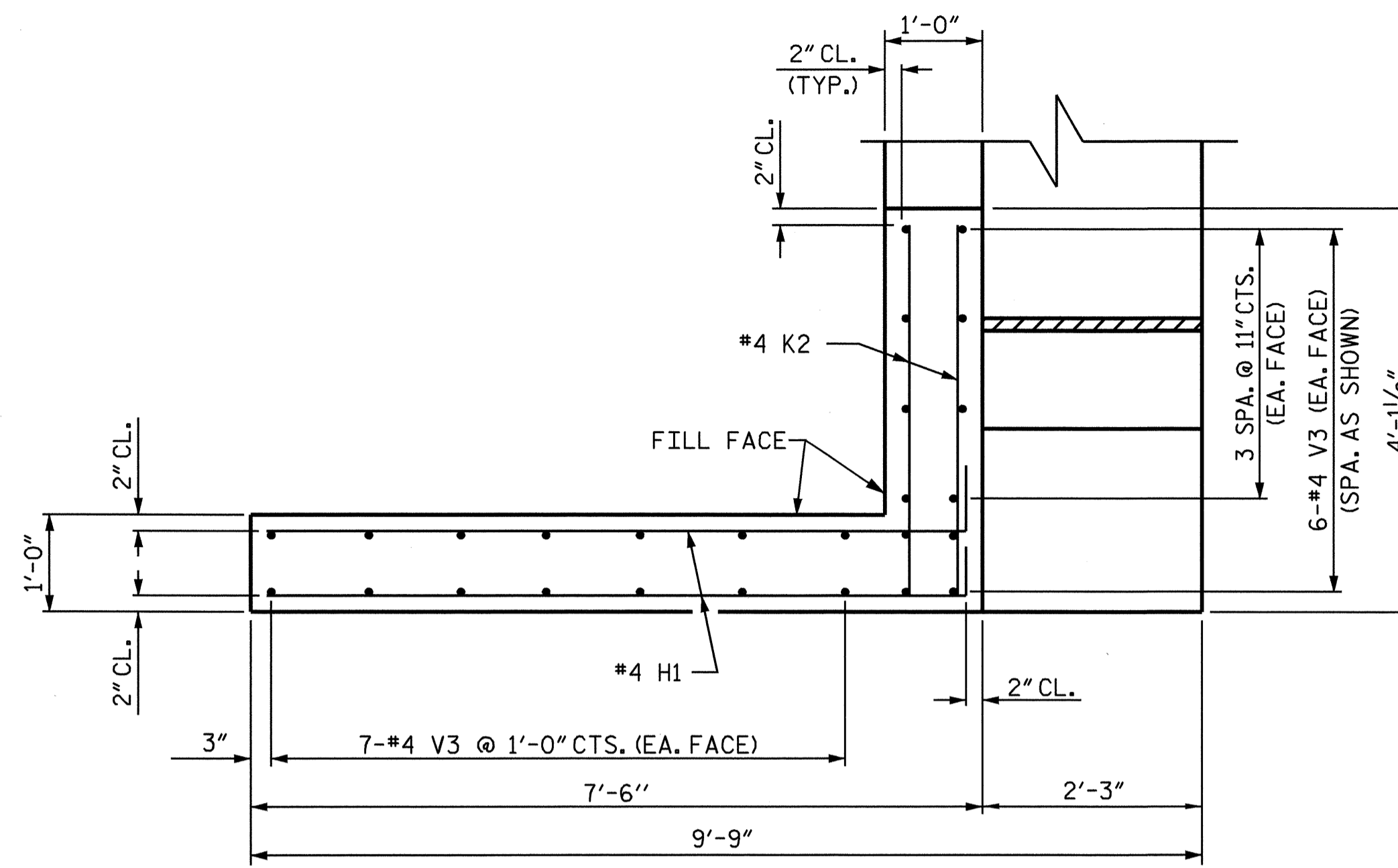


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			16

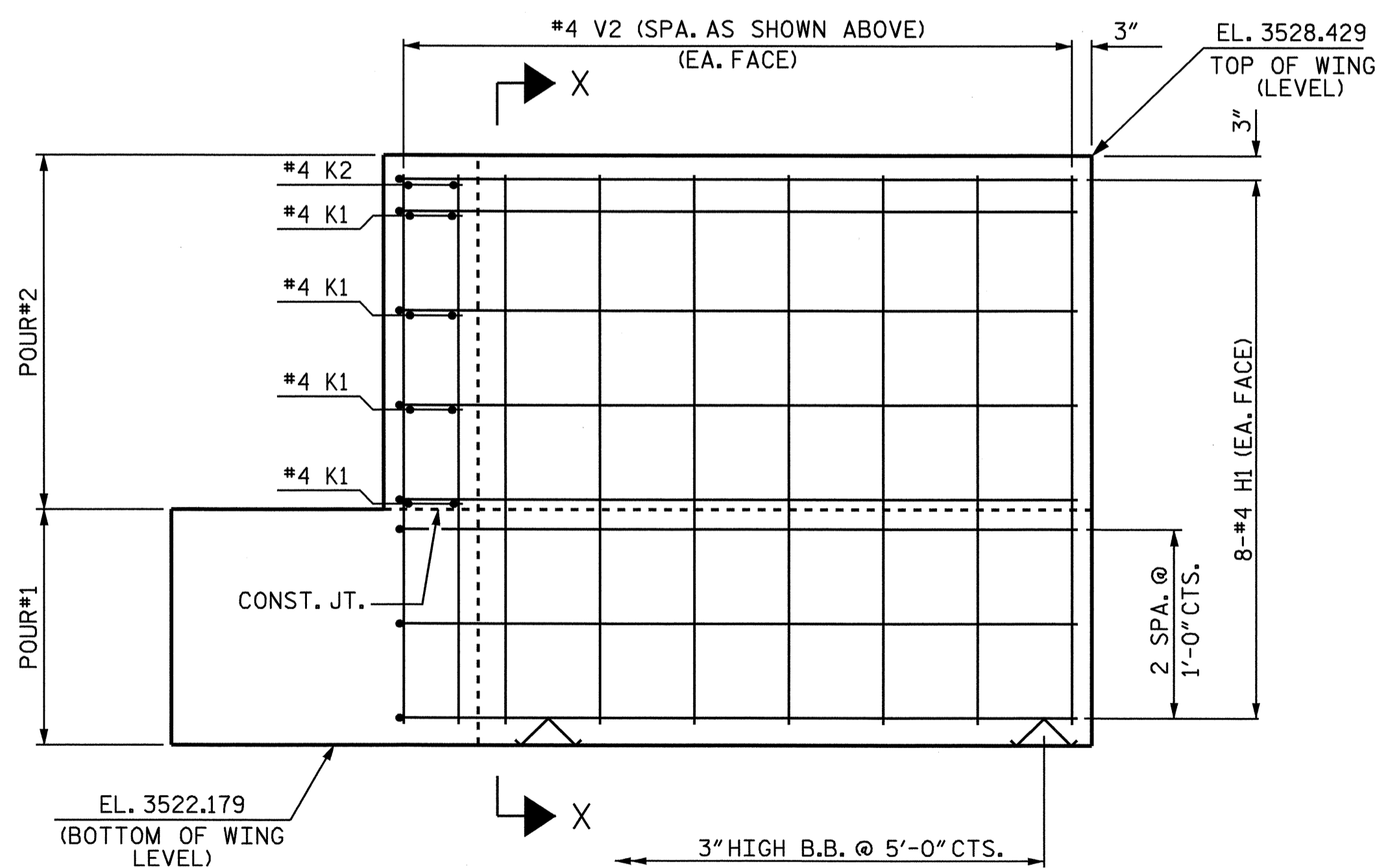
DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 7-08



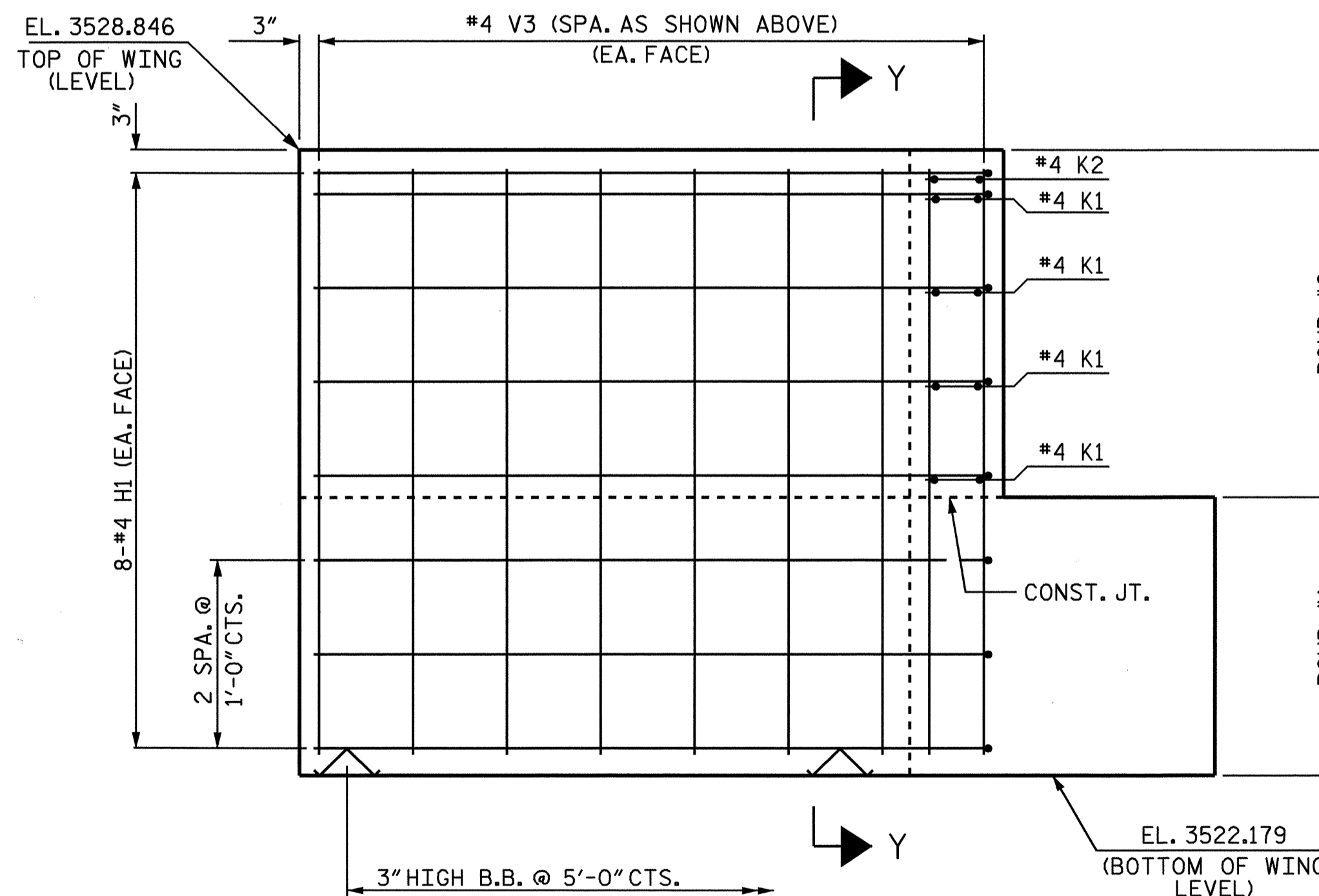
PLAN OF WING W1



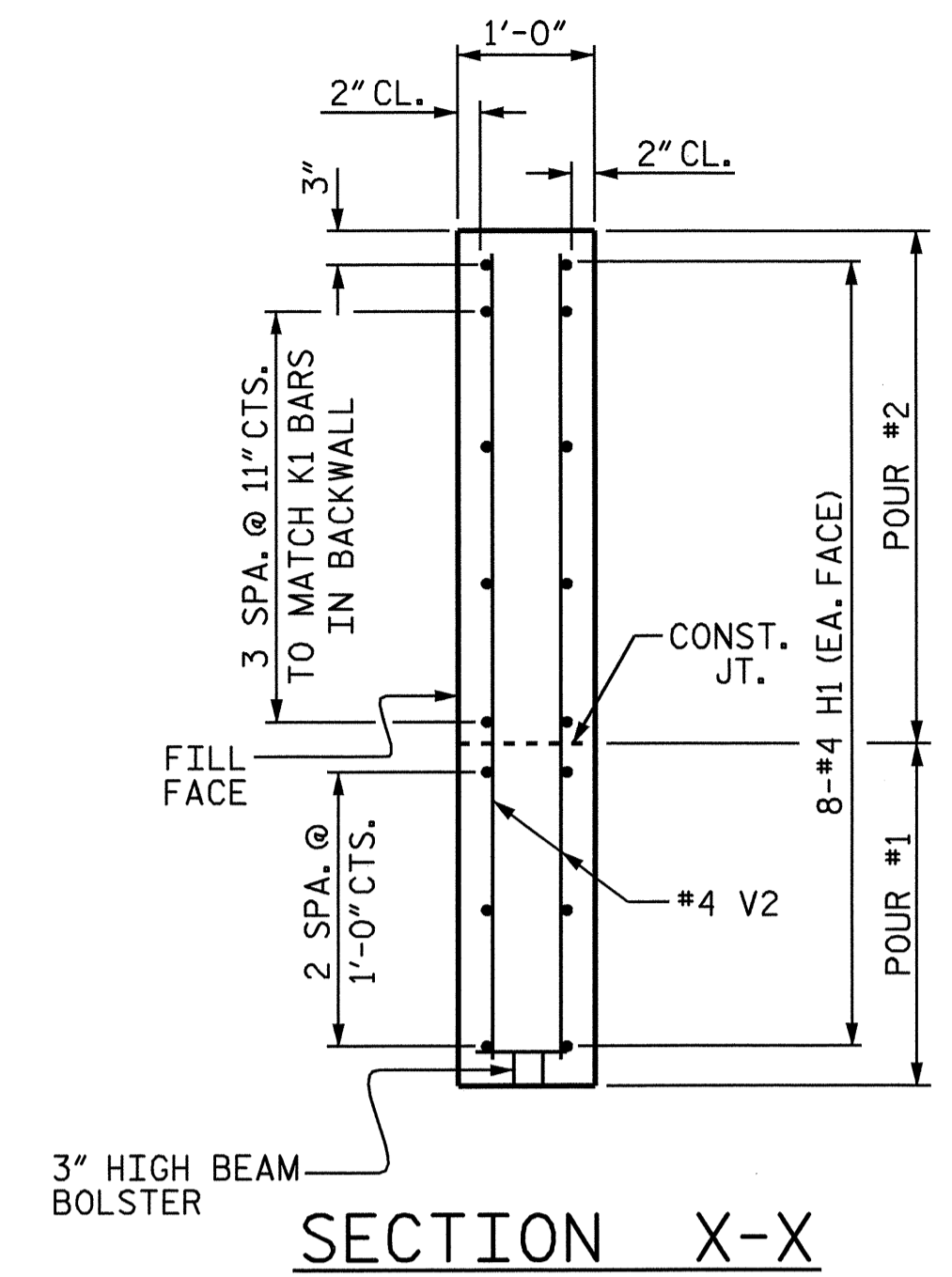
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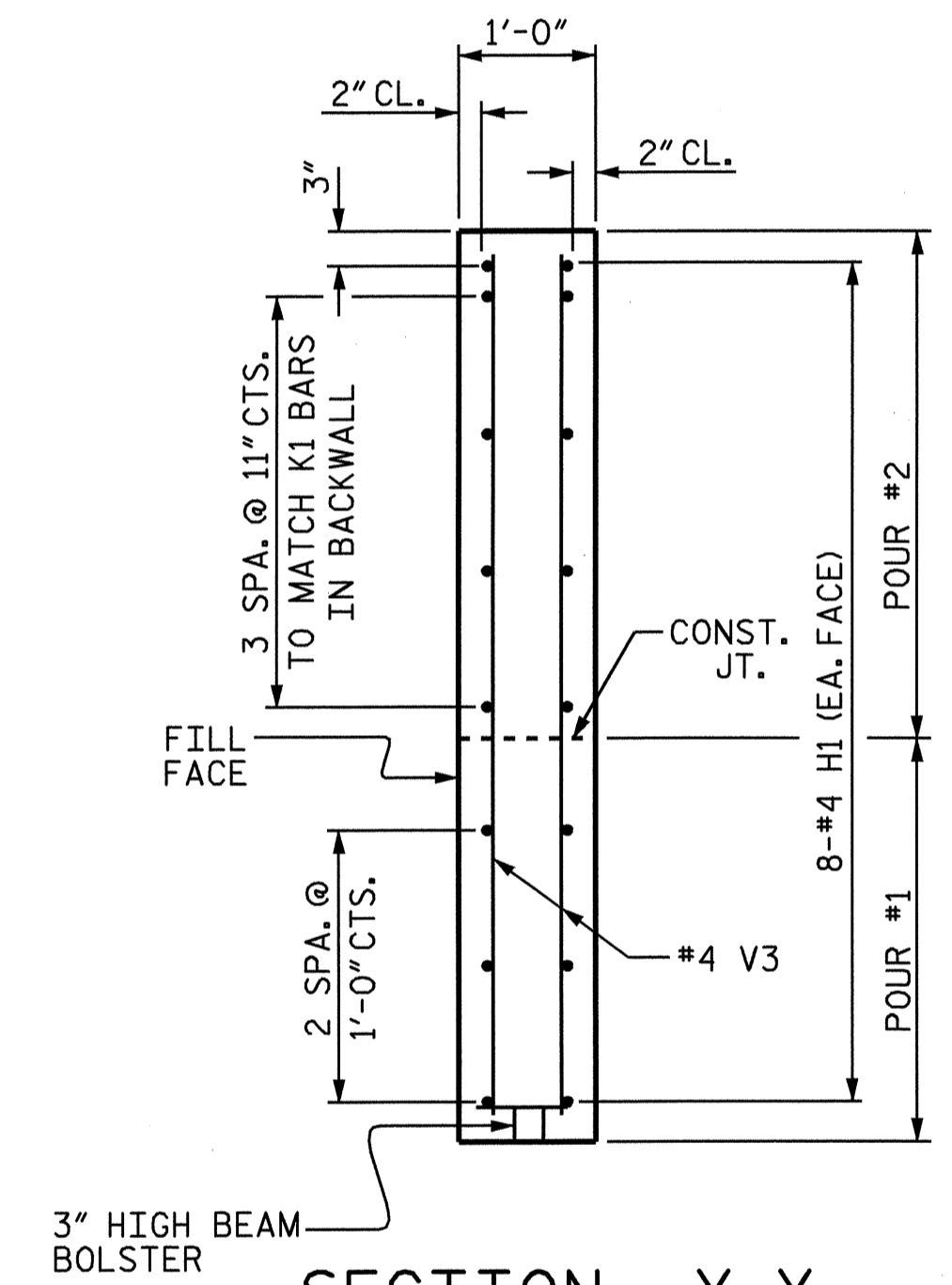
ELEVATION OF WING W1



ELEVATION OF WING W2



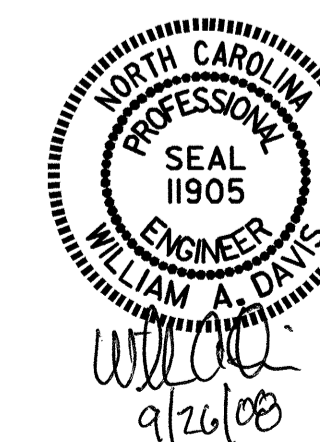
SECTION X-X



SECTION Y-Y

PROJECT NO. B-4318
 WATAUGA COUNTY
 STATION: 16+48.00 -L-

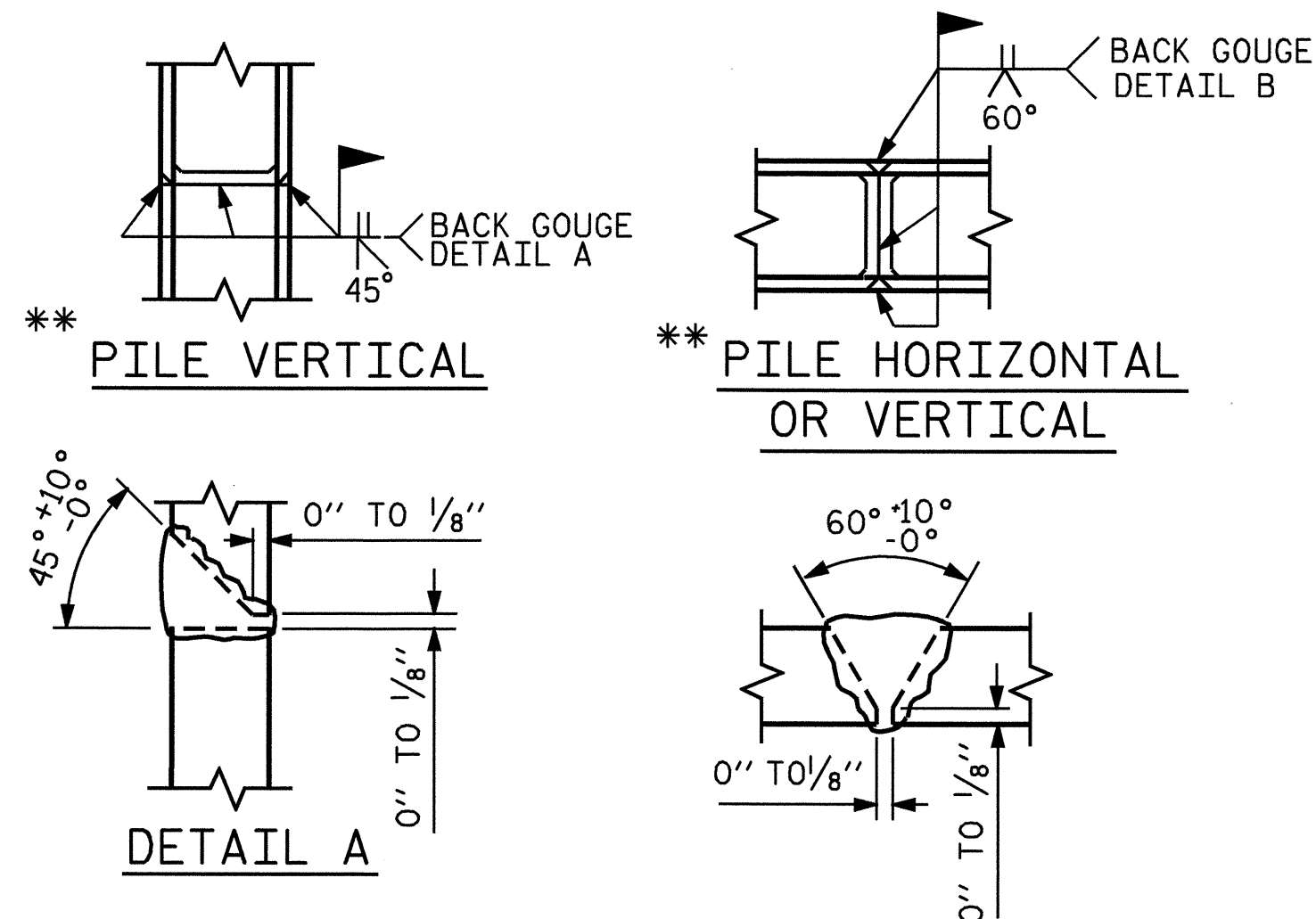
SHEET 2 OF 3



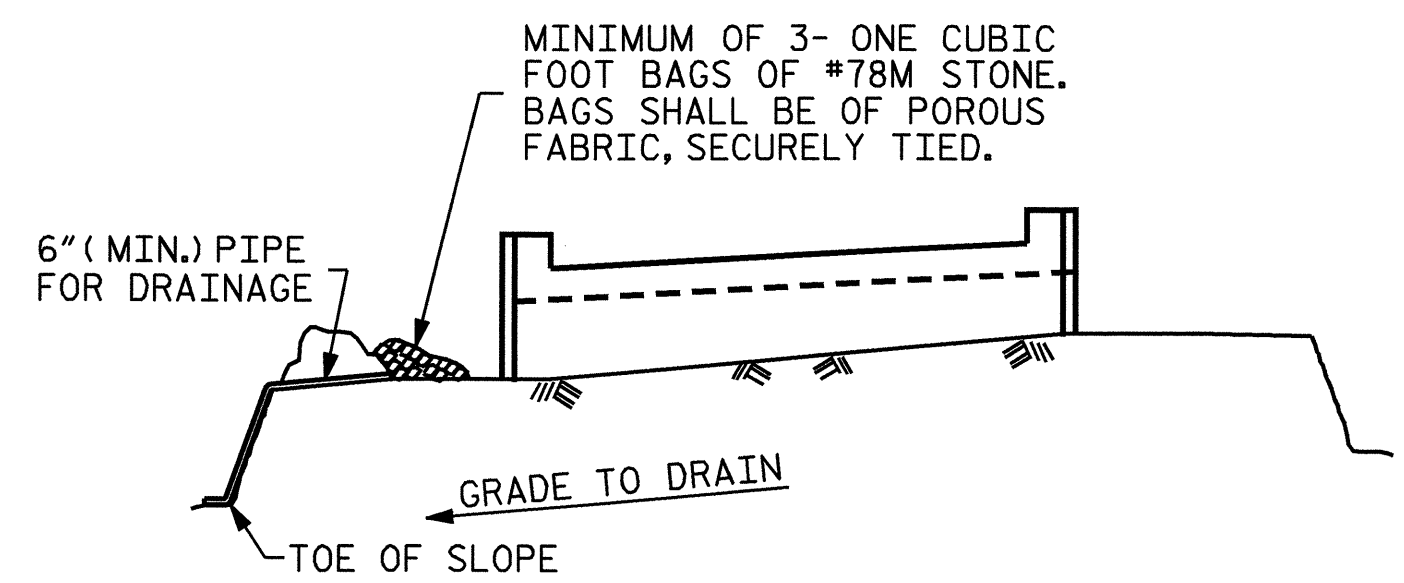
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1

DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 7-08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
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2			4			16	



** POSITION OF PILE DURING WELDING. **PILE SPLICE DETAILS**



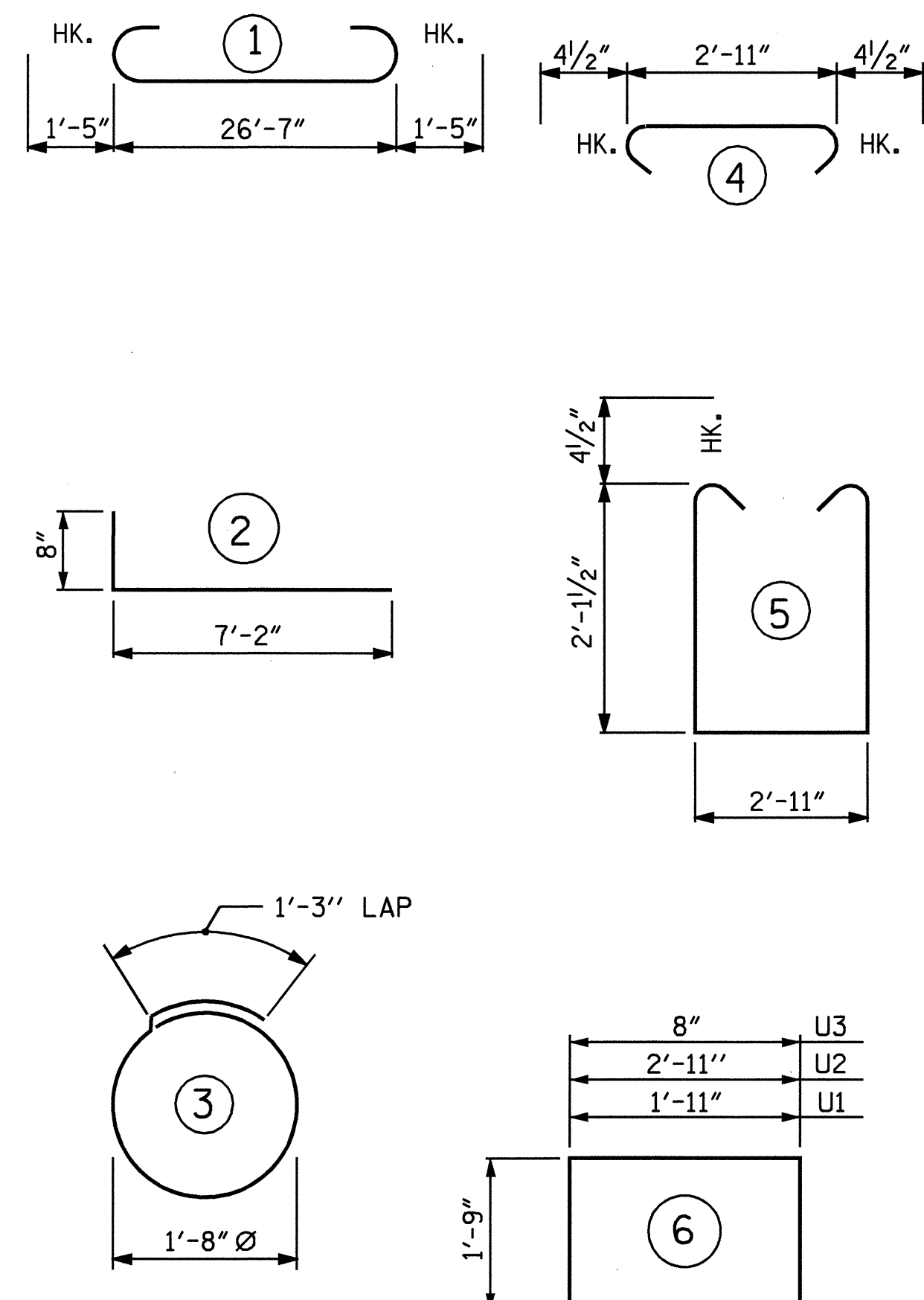
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

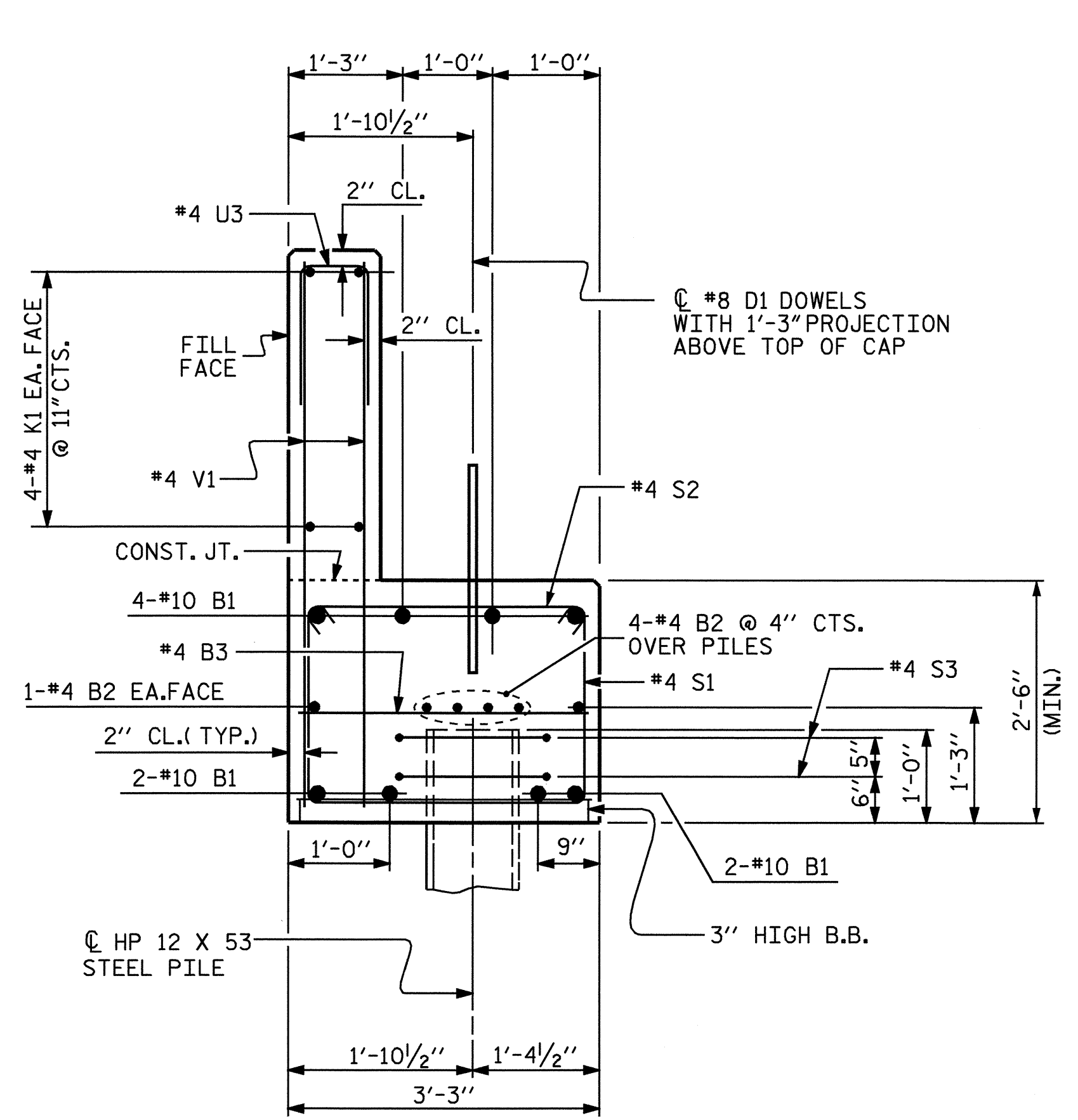
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

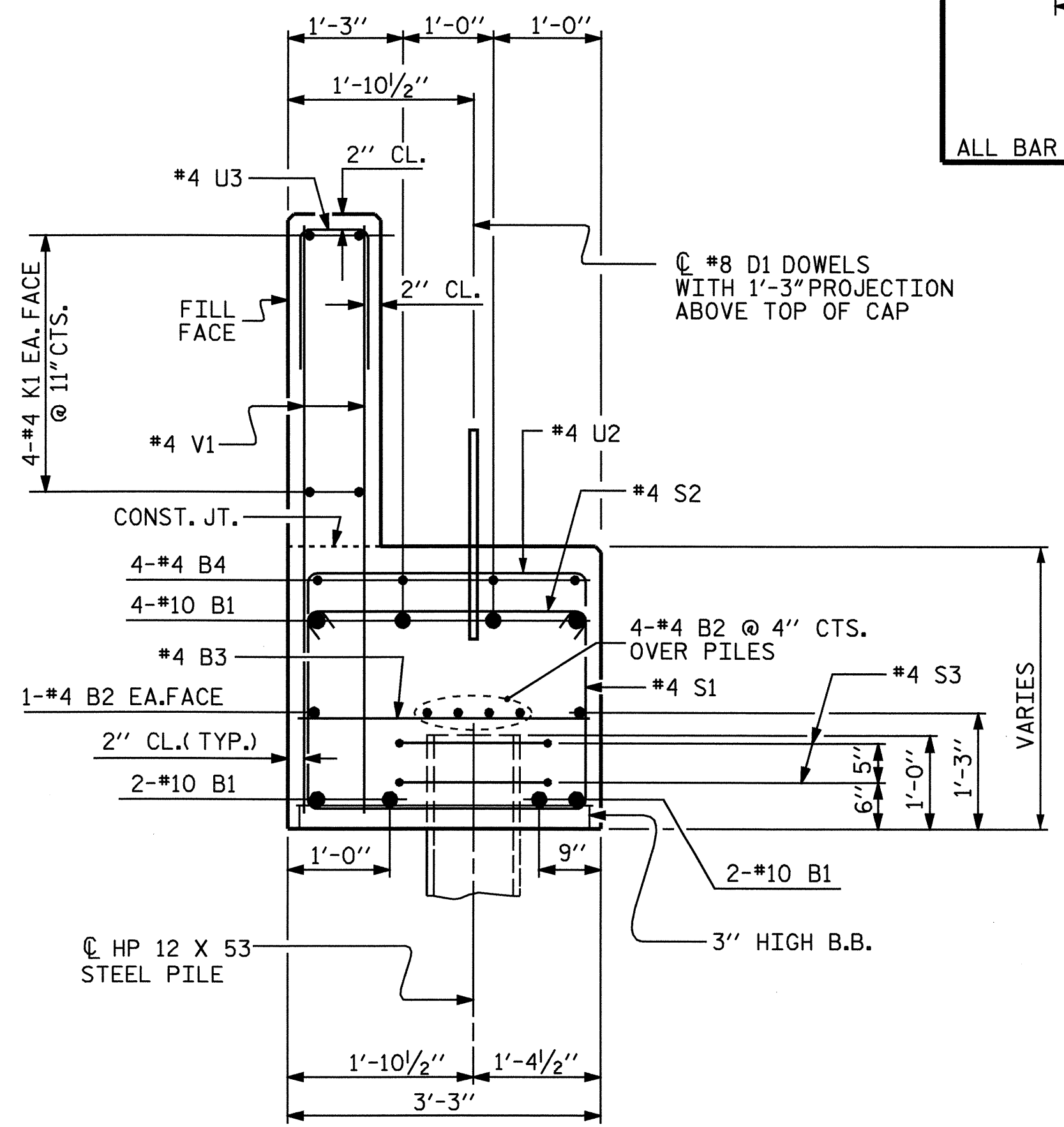
BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	WEIGHT	
B1	8	#10	1	29'-5"	1013
B2	6	#4	STR	26'-8"	107
B3	7	#4	STR	2'-11"	14
B4	4	#4	STR	17'-0"	45
D1	14	#8	STR	2'-3"	84
H1	32	#4	2	7'-10"	167
K1	8	#4	STR	26'-8"	143
K2	4	#4	STR	3'-9"	10
S1	26	#4	5	7'-11"	137
S2	26	#4	4	3'-8"	64
S3	10	#4	3	6'-6"	43
U1	4	#4	6	5'-5"	14
U2	5	#4	6	6'-5"	21
U3	19	#4	6	4'-2"	53
V1	38	#4	STR	5'-6"	140
V2	26	#4	STR	5'-11"	103
V3	26	#4	STR	6'-4"	110
REINFORCING STEEL				LBS.	2268
CLASS A CONC. BREAKDOWN					
POUR #1 (CAP & LOWER WINGS) 10.3 CU. YD.					
POUR #2 (BACKWALL & UPPER WINGS) 5.2 CU. YD.					
POUR #3 (LATERAL GUIDES) 0.1 CU. YD.					
TOTAL 15.6 CU. YD.					
HP 12X53 STEEL PILES NUMBER = 5				175 LIN. FT.	
PILE EXCAVATION IN SOIL				25 LIN. FT.	
PILE EXCAVATION NOT IN SOIL				150 LIN. FT.	



ALL BAR DIMENSIONS ARE OUT TO OUT.



SECTION A-A



SECTION B-B

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

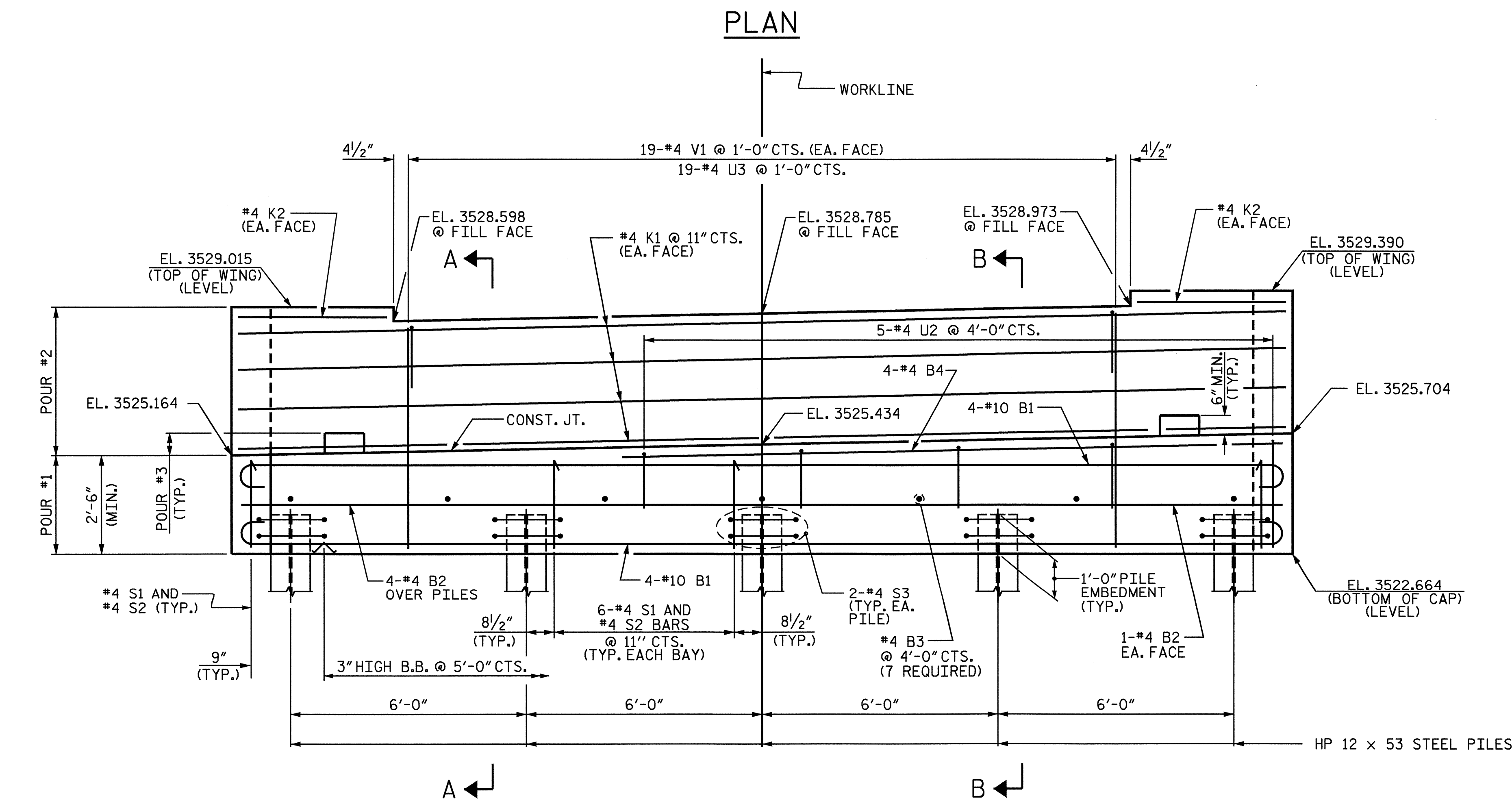
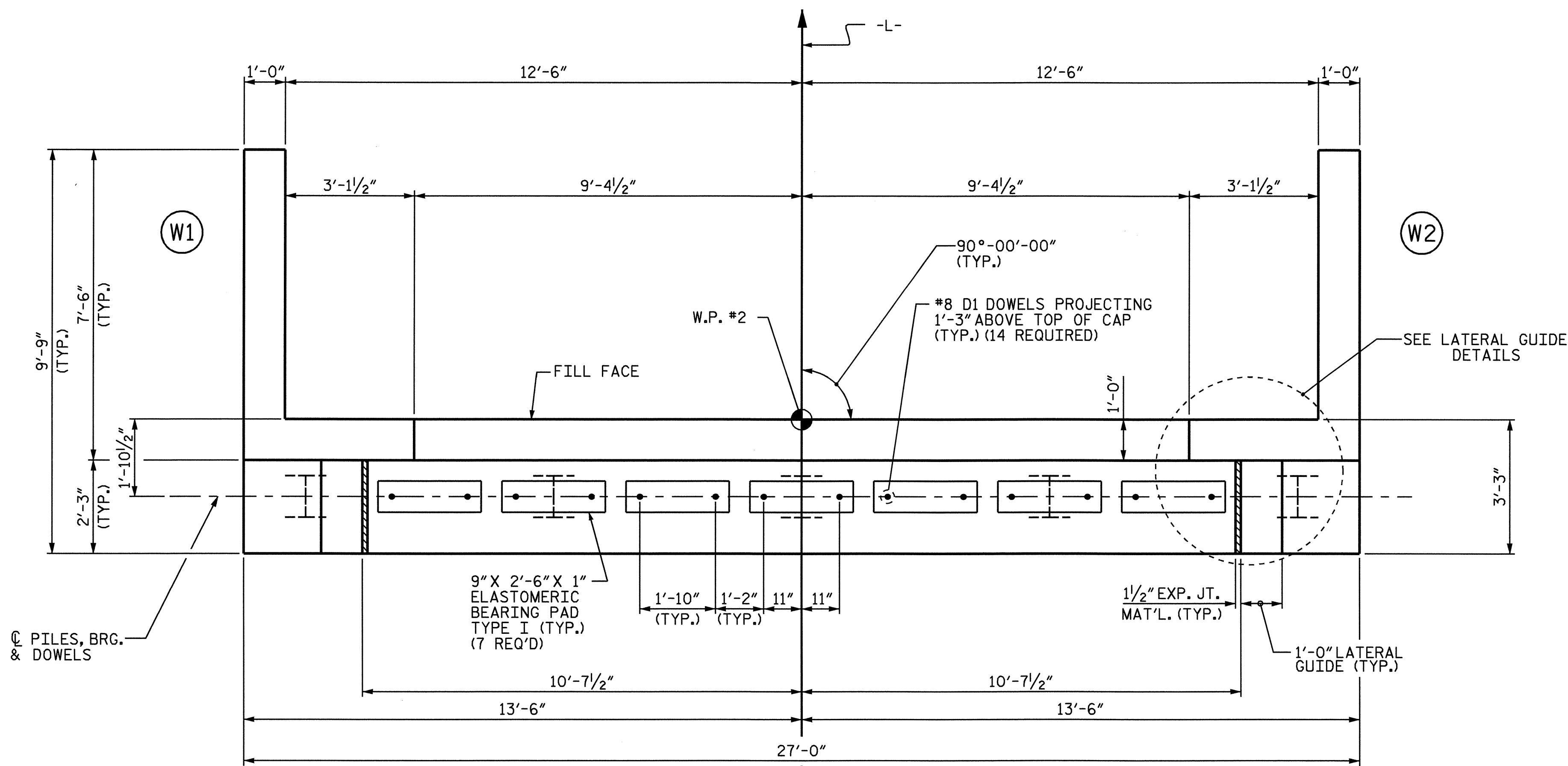
SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1

REVISIONS						SHEET NO. S-12
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			16

DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 7-08



NOTES

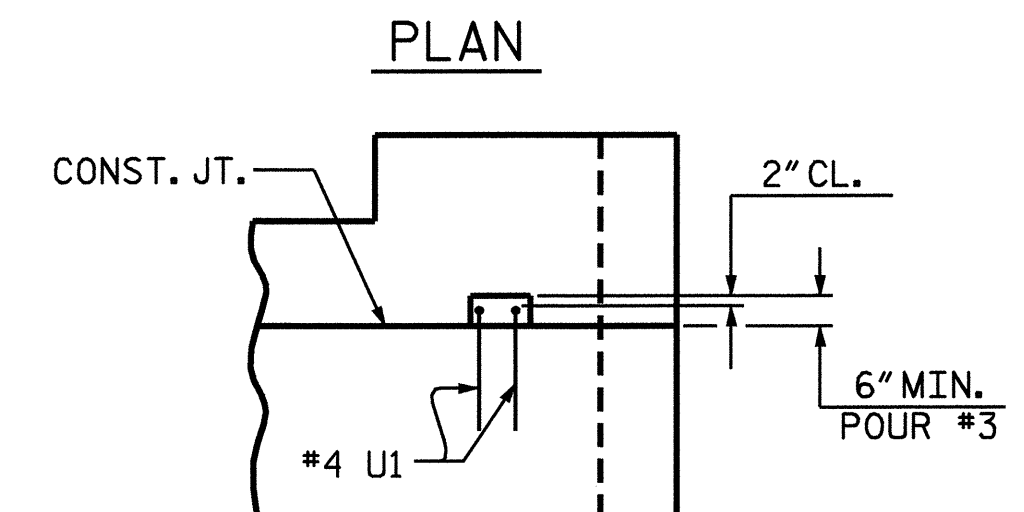
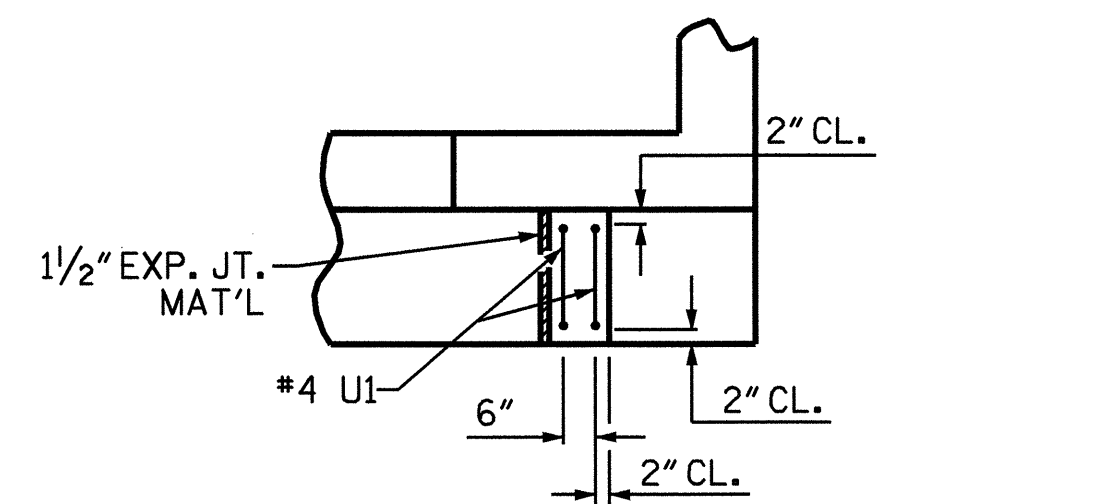
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FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE DETAIL, SEE SHEET 3 OF 3.

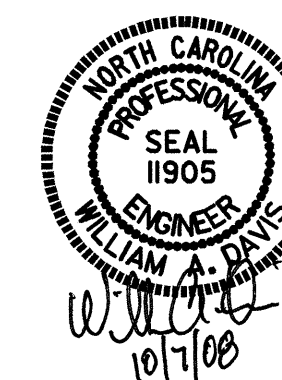
FOR REINFORCING STEEL IN WINGS, SEE SHEET 2 OF 3.



LATERAL GUIDE DETAILS
(EACH END SIMILAR)

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

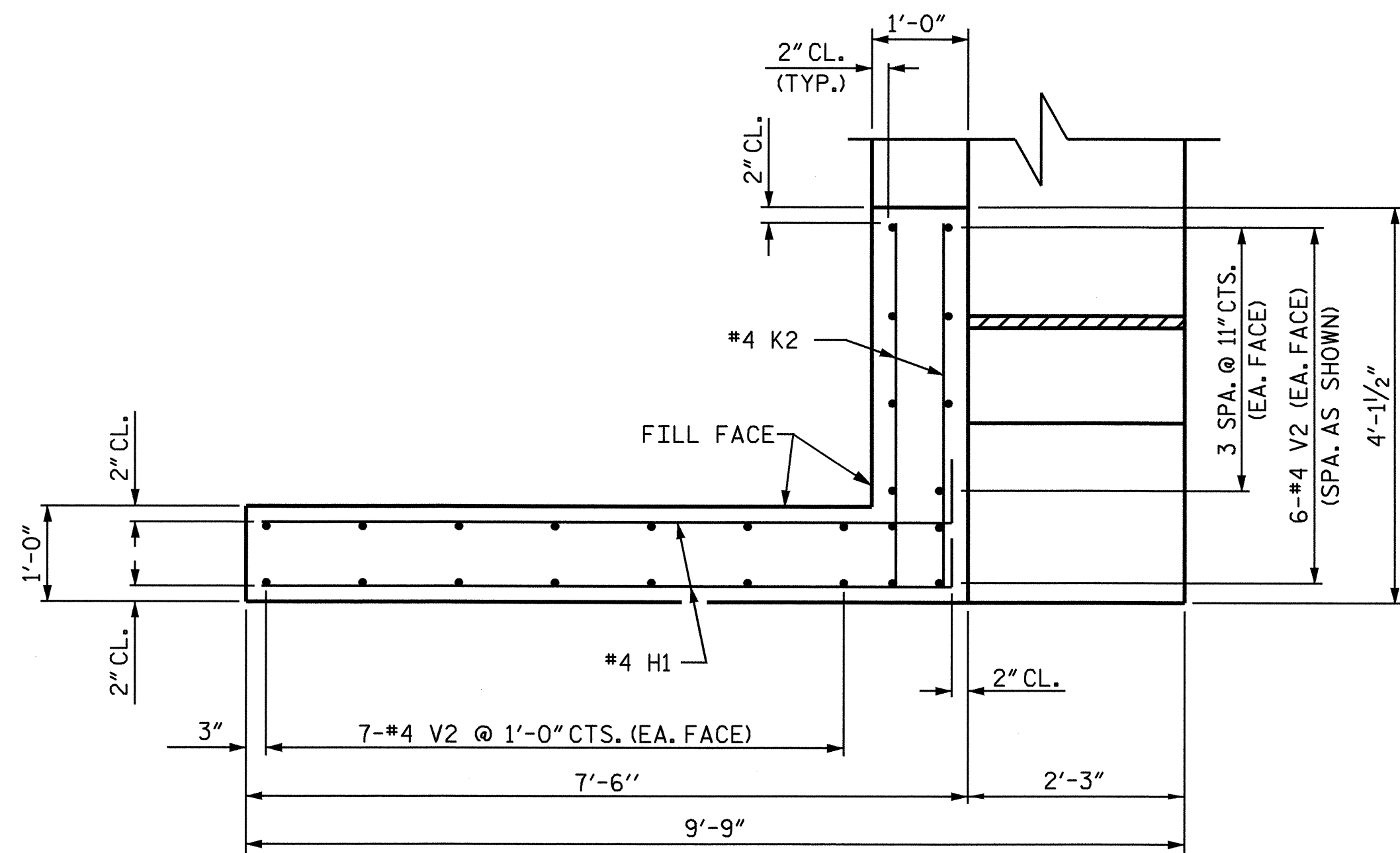
SHEET 1 OF 3



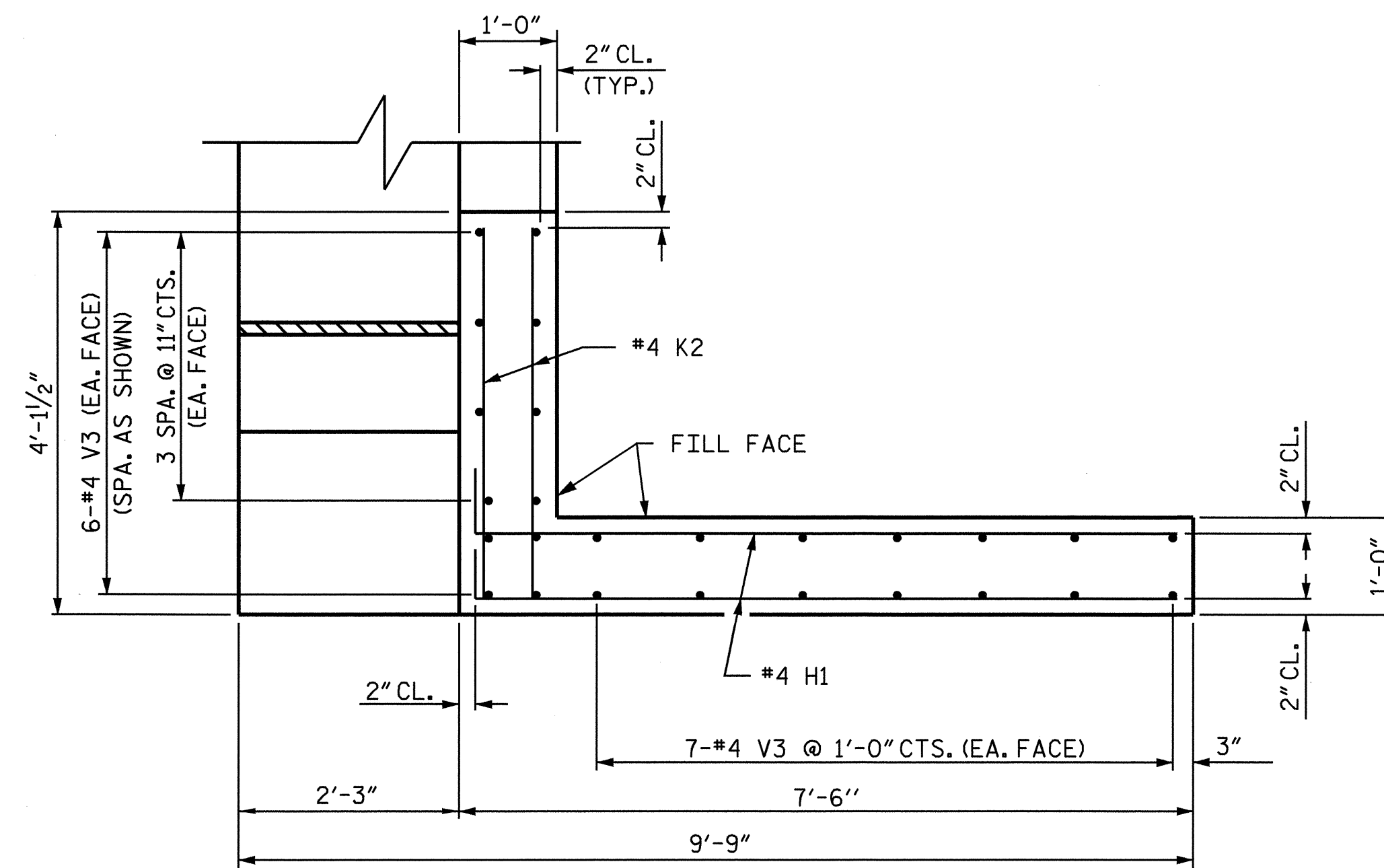
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2

REVISIONS						SHEET NO. S-13
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2			4			16

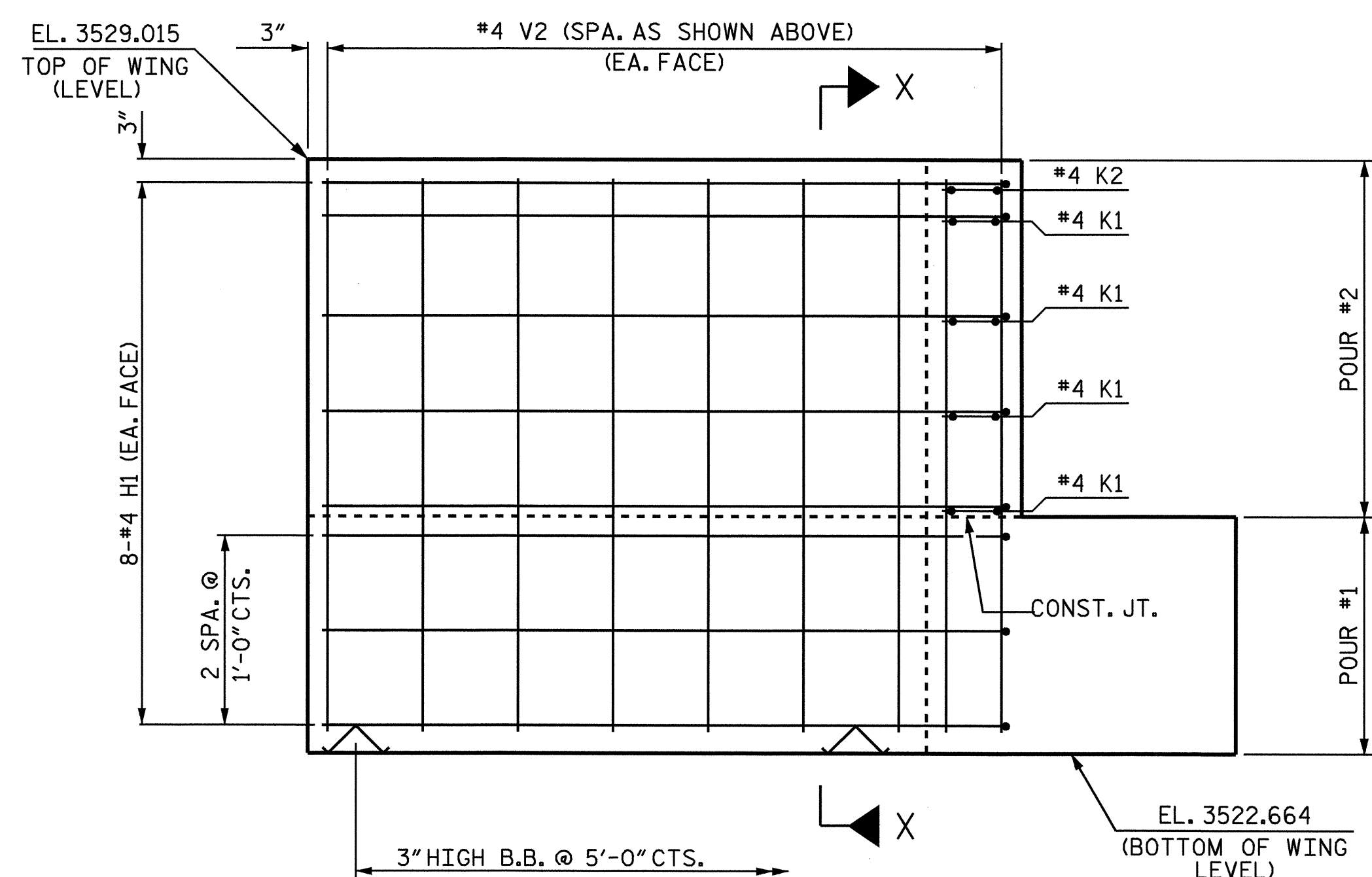
DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 7-08



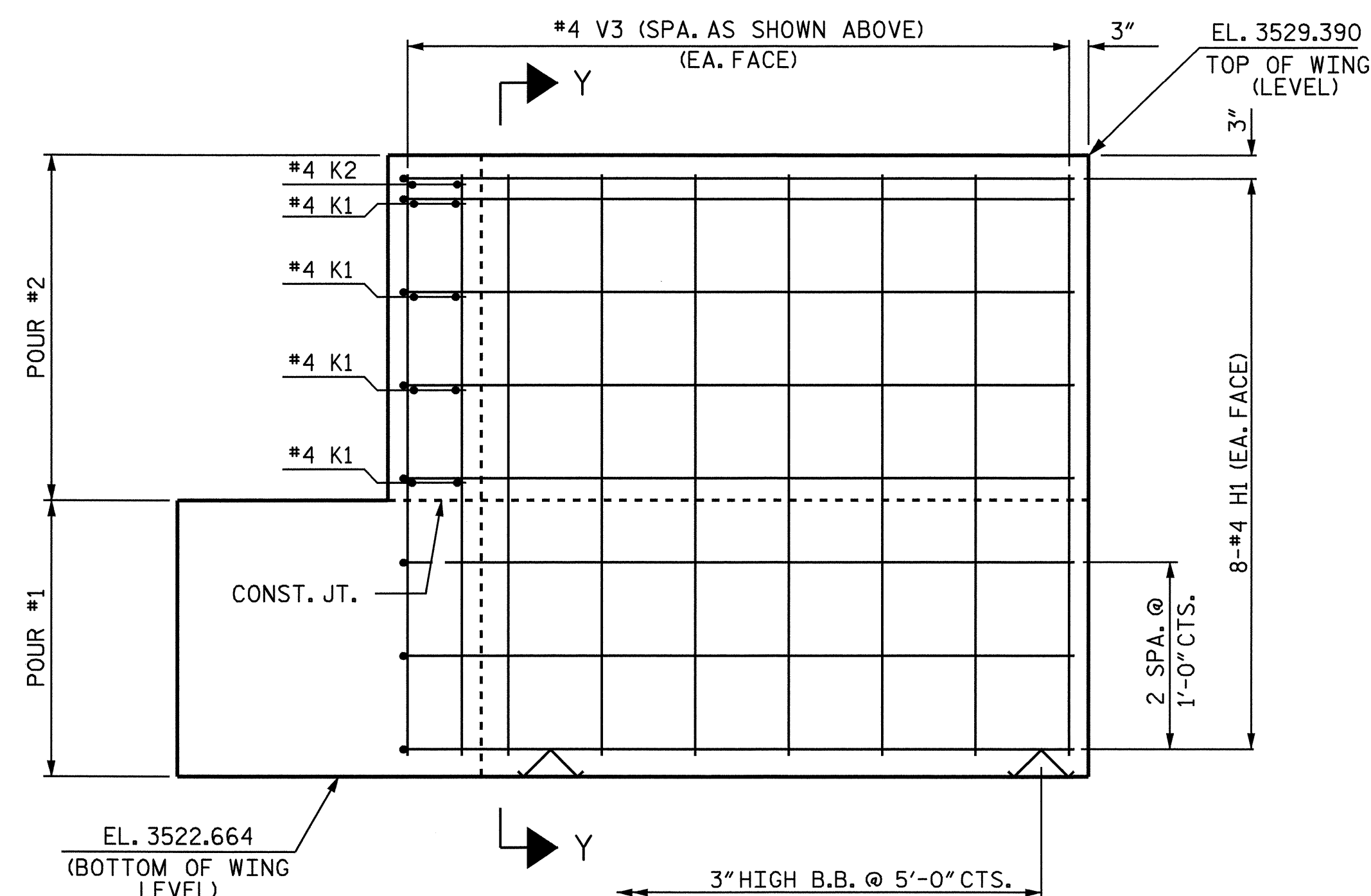
PLAN OF WING W1



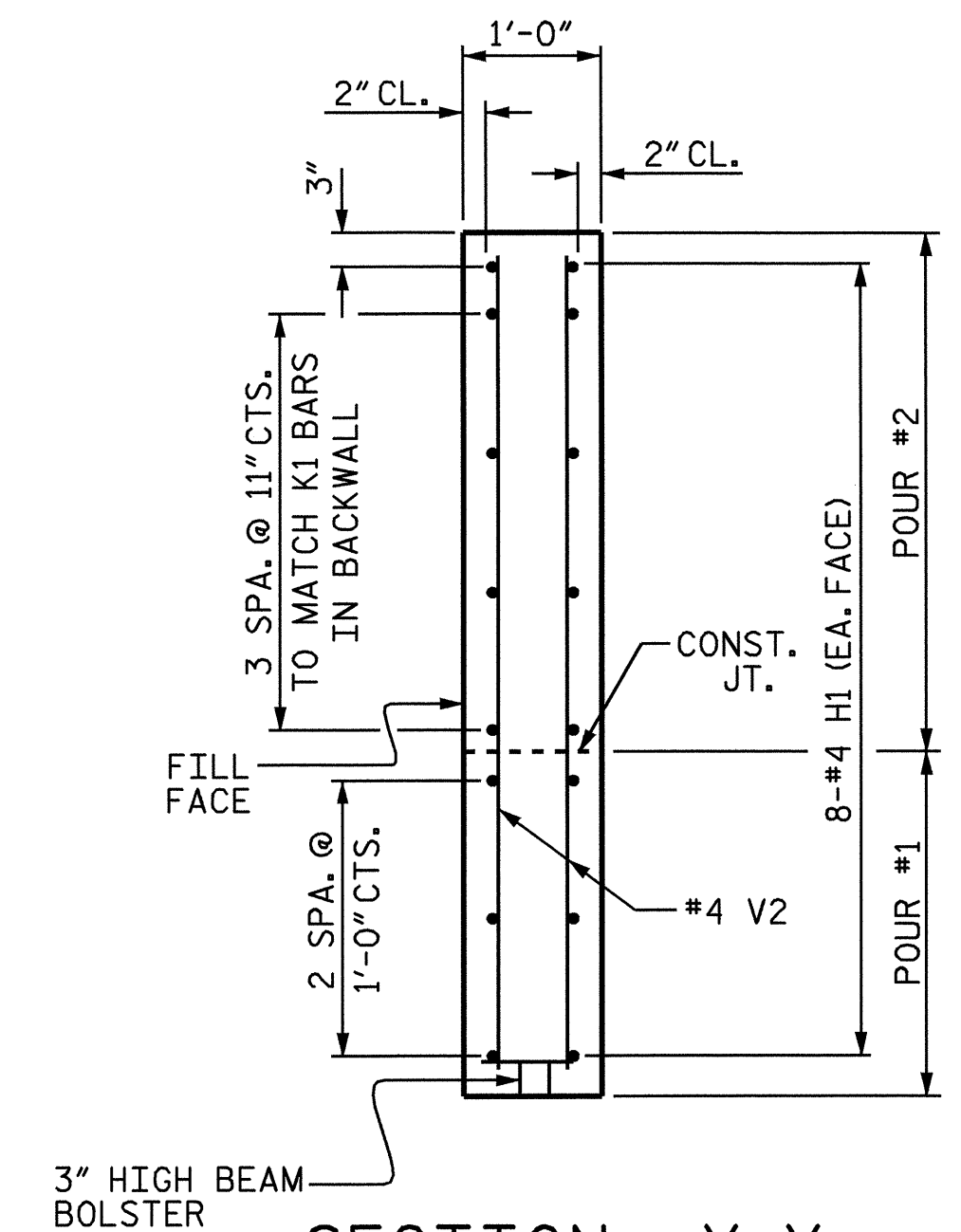
PLAN OF WING W2



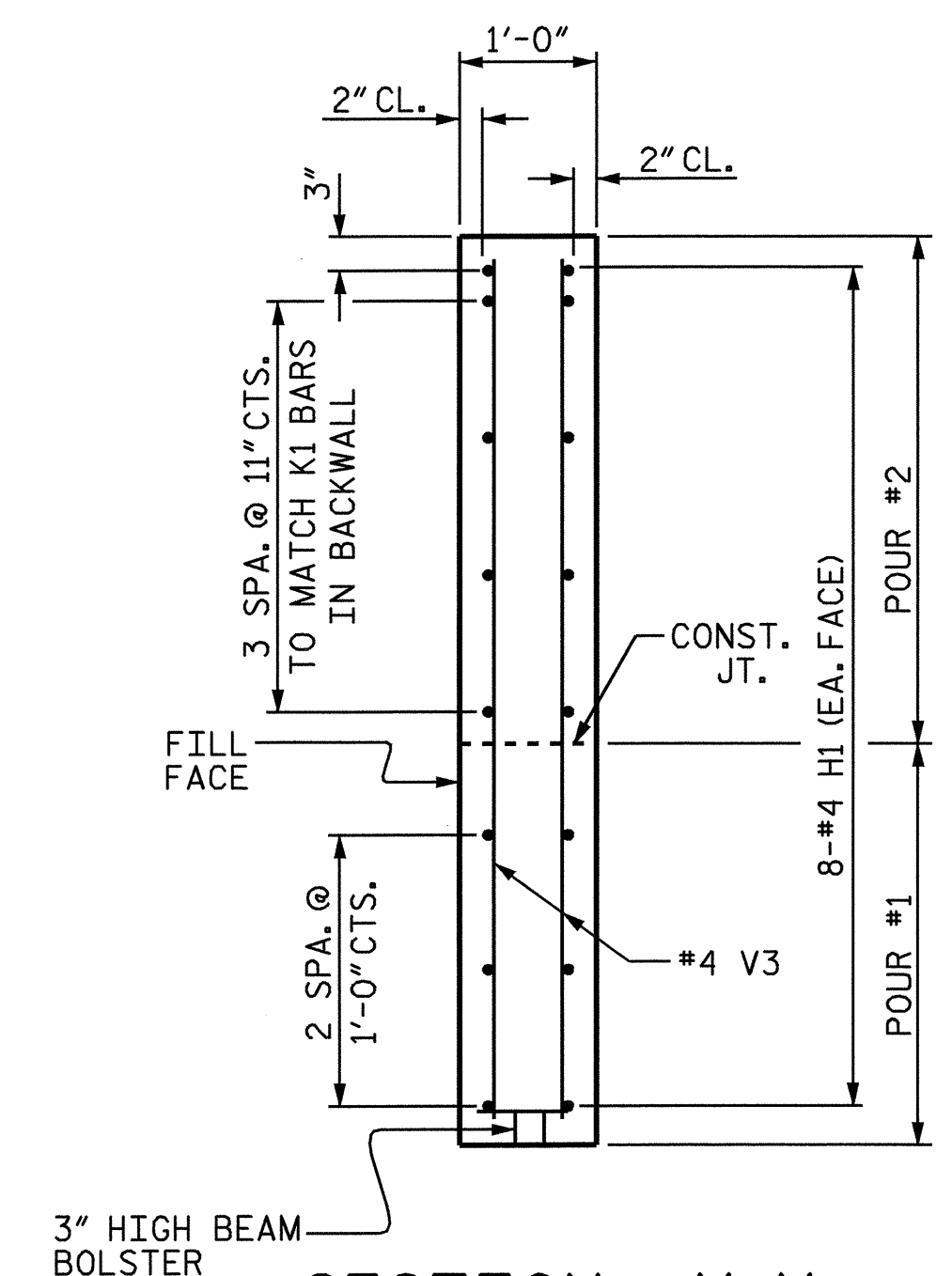
ELEVATION OF WING W1



ELEVATION OF WING W2



SECTION X-X



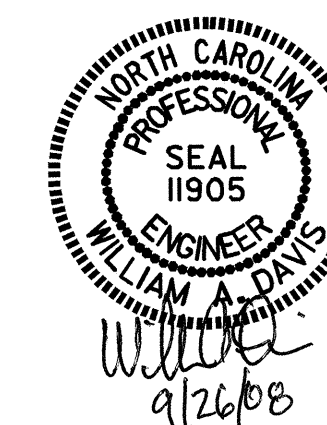
SECTION Y-Y

PROJECT NO. B-4318
 WATAUGA COUNTY
 STATION: 16+48.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

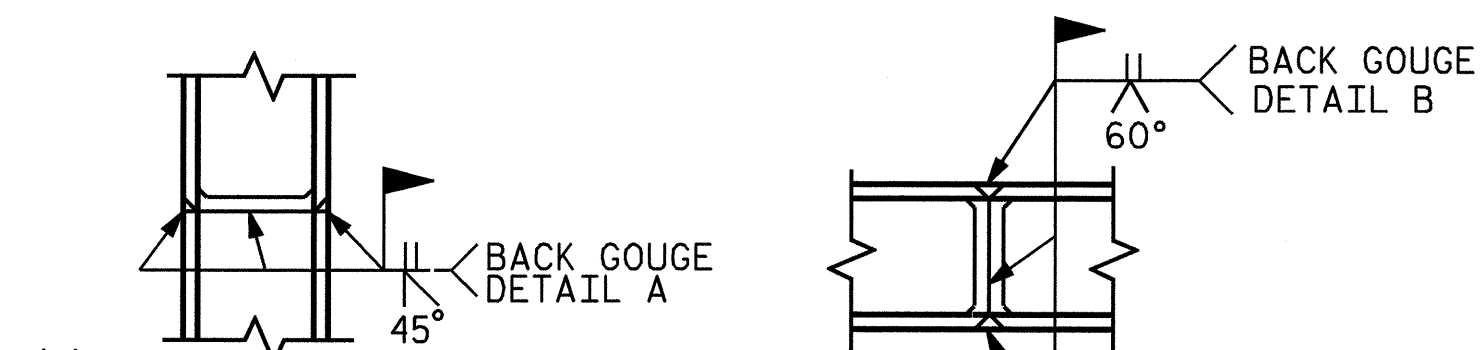
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DRAWN BY: M.A. ALLEN DATE: 7-08
 CHECKED BY: A.R. CHESSON DATE: 7-08

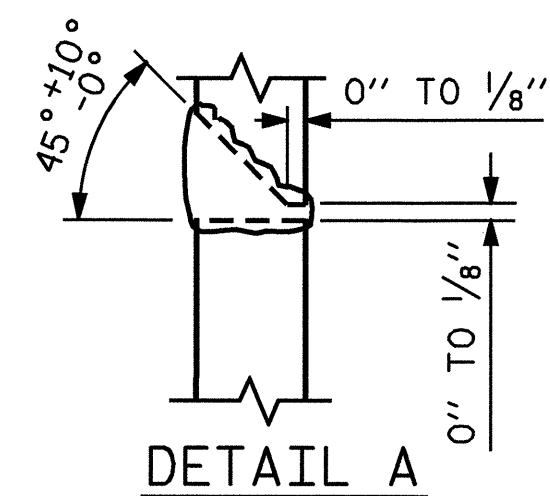
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REVISIONS						SHEET NO.	
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2			4			16	

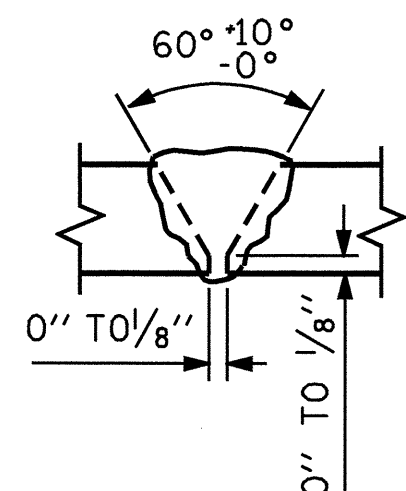


** PILE VERTICAL

** PILE HORIZONTAL OR VERTICAL



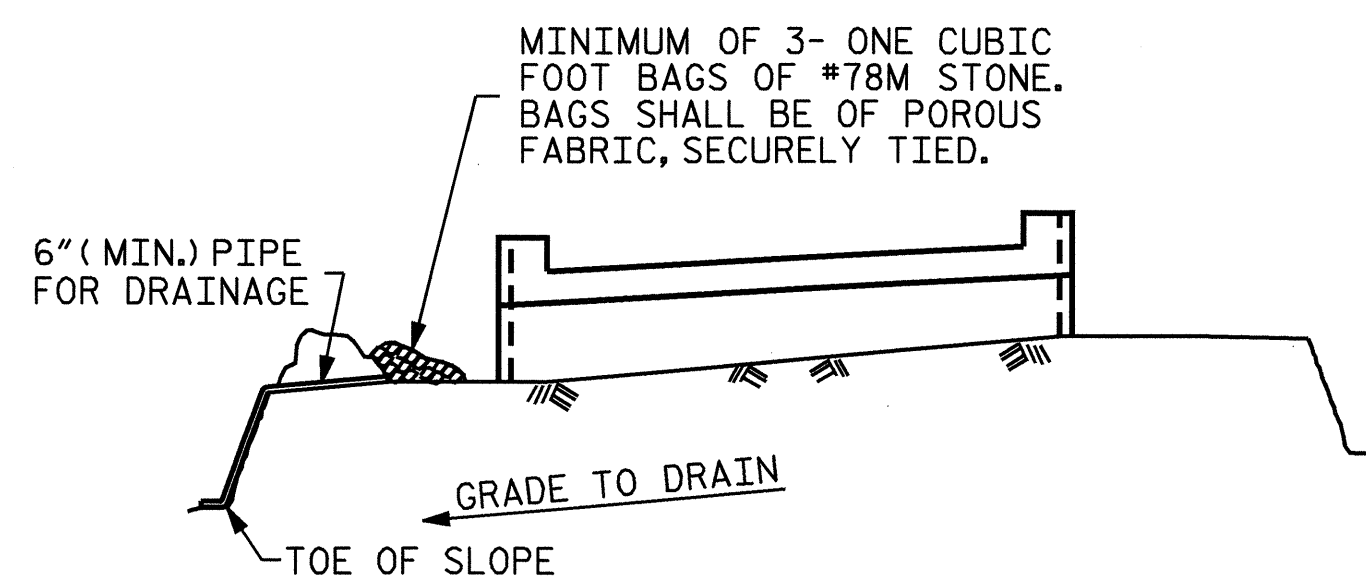
DETAIL A



DETAIL B

** POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

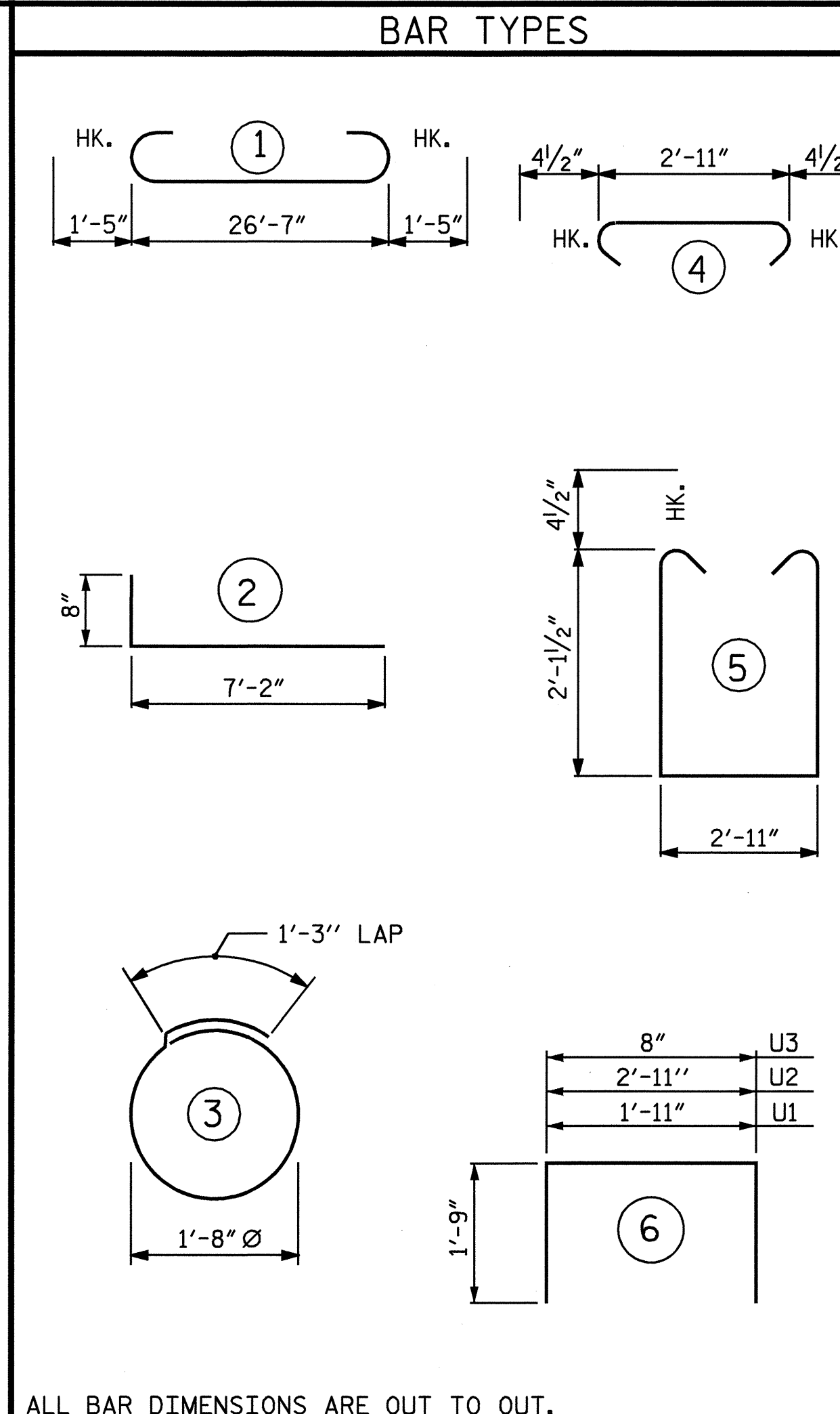


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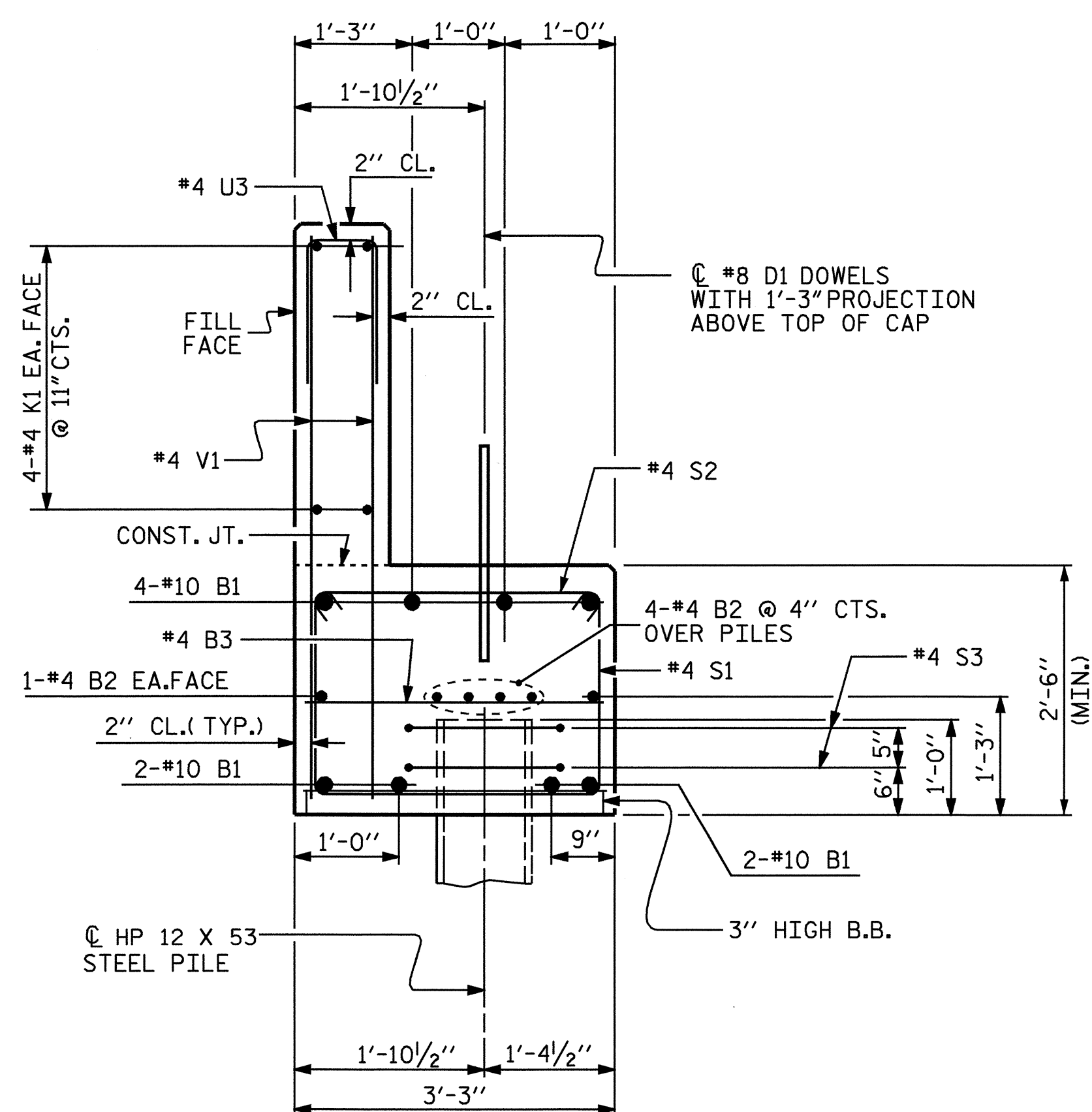
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TEMPORARY DRAINAGE AT END BENT

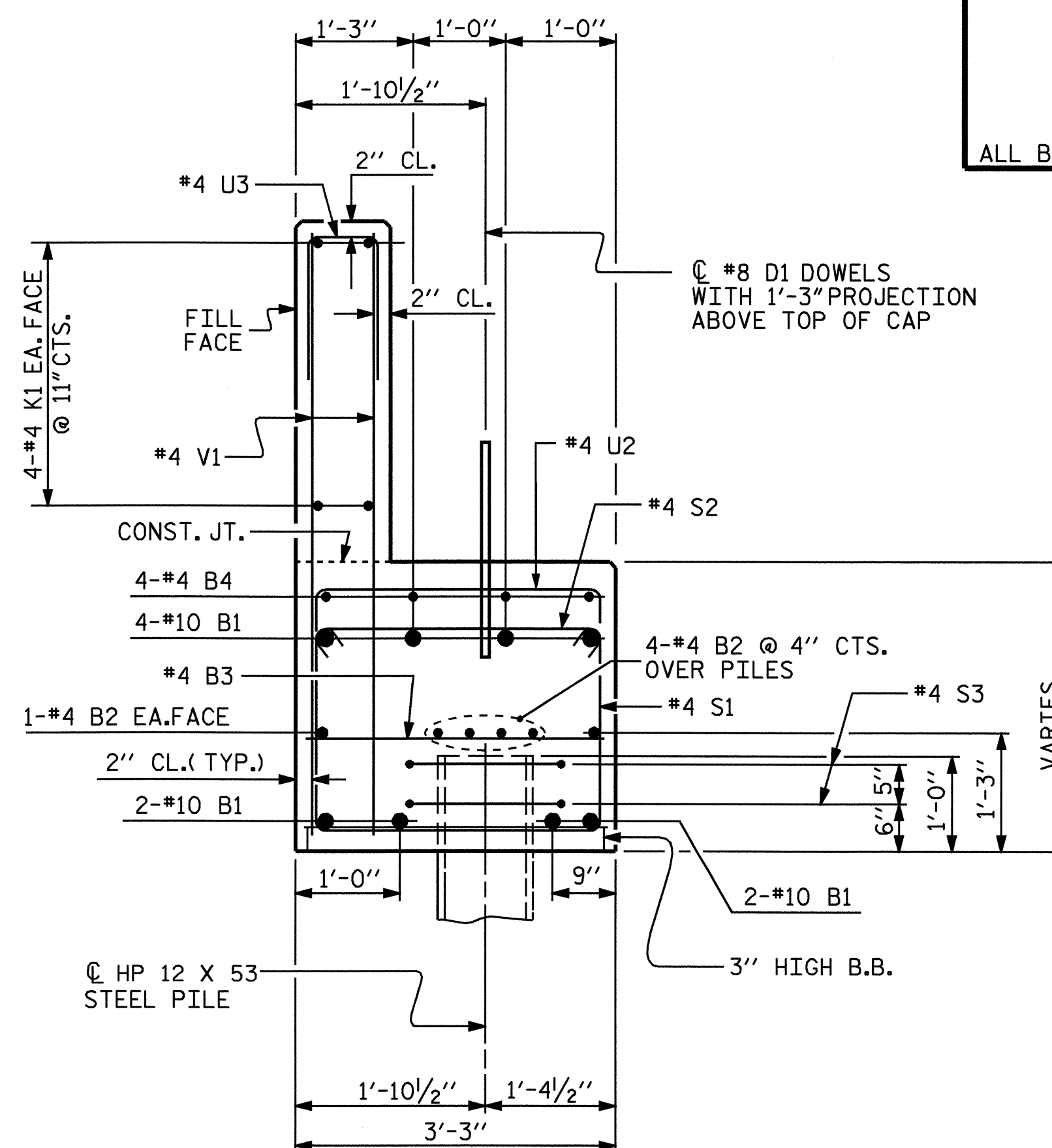


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	29'-5"	1013
B2	6	#4	STR	26'-8"	107
B3	7	#4	STR	2'-11"	14
B4	4	#4	STR	17'-0"	45
D1	14	#8	STR	2'-3"	84
H1	32	#4	2	7'-10"	167
K1	8	#4	STR	26'-8"	143
K2	4	#4	STR	3'-9"	10
S1	26	#4	5	7'-11"	137
S2	26	#4	4	3'-8"	64
S3	10	#4	3	6'-6"	43
U1	4	#4	6	5'-5"	14
U2	5	#4	6	6'-5"	21
U3	19	#4	6	4'-2"	53
V1	38	#4	STR	5'-6"	140
V2	26	#4	STR	6'-0"	104
V3	26	#4	STR	6'-4"	110
REINFORCING STEEL				LBS.	2269
CLASS A CONC. BREAKDOWN					
POUR #1 (CAP & LOWER WINGS) 10.3 CU. YD.					
POUR #2 (BACKWALL & UPPER WINGS) 5.3 CU. YD.					
POUR #3 (LATERAL GUIDES) 0.1 CU. YD.					
TOTAL 15.7 CU. YD.					
HP 12X53 STEEL PILES					
NUMBER = 5 175 LIN. FT.					
PILE EXCAVATION IN SOIL 50 LIN. FT.					
PILE EXCAVATION NOT IN SOIL 125 LIN. FT.					



SECTION A-A



SECTION B-B

DRAWN BY : M.A. ALLEN DATE : 7-08
 CHECKED BY : A.R. CHESSON DATE : 7-08

07-OCT-2008 10:06
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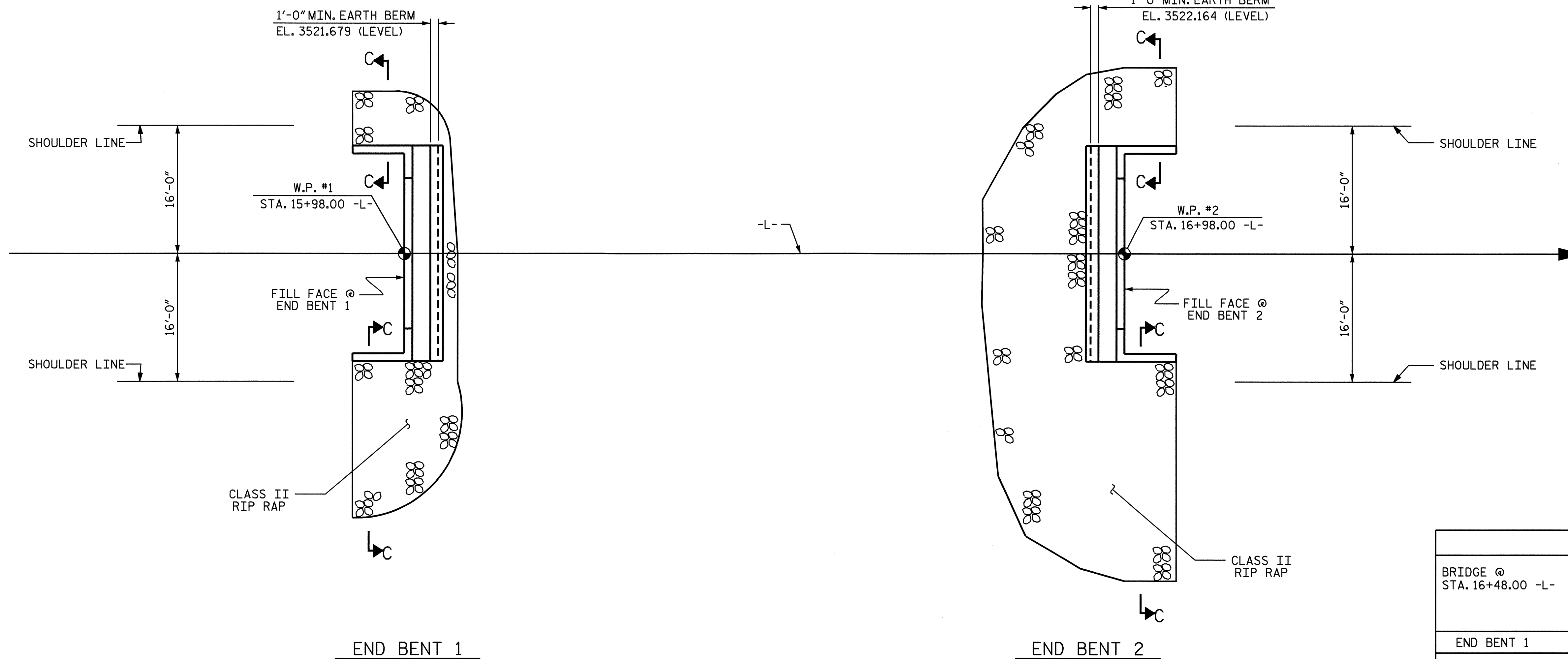


PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-

SHEET 3 OF 3

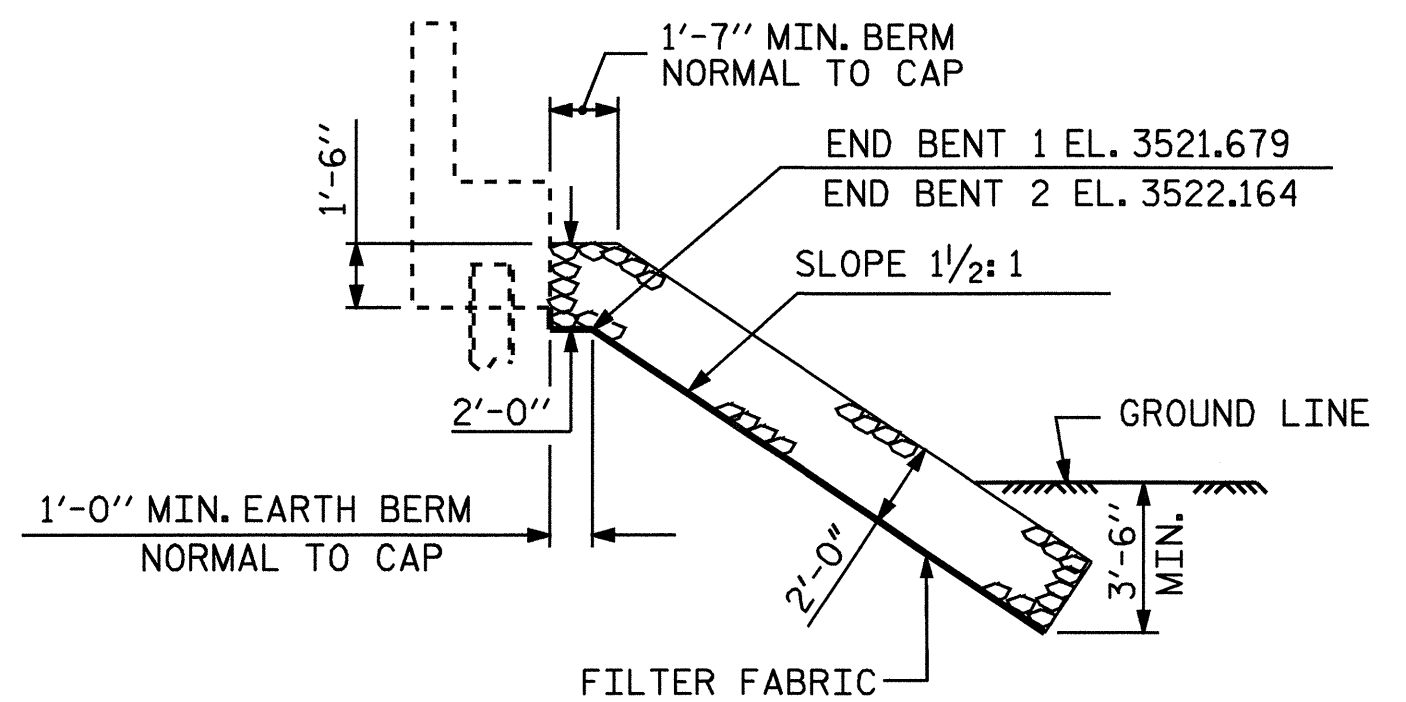
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-15
 TOTAL SHEETS 16

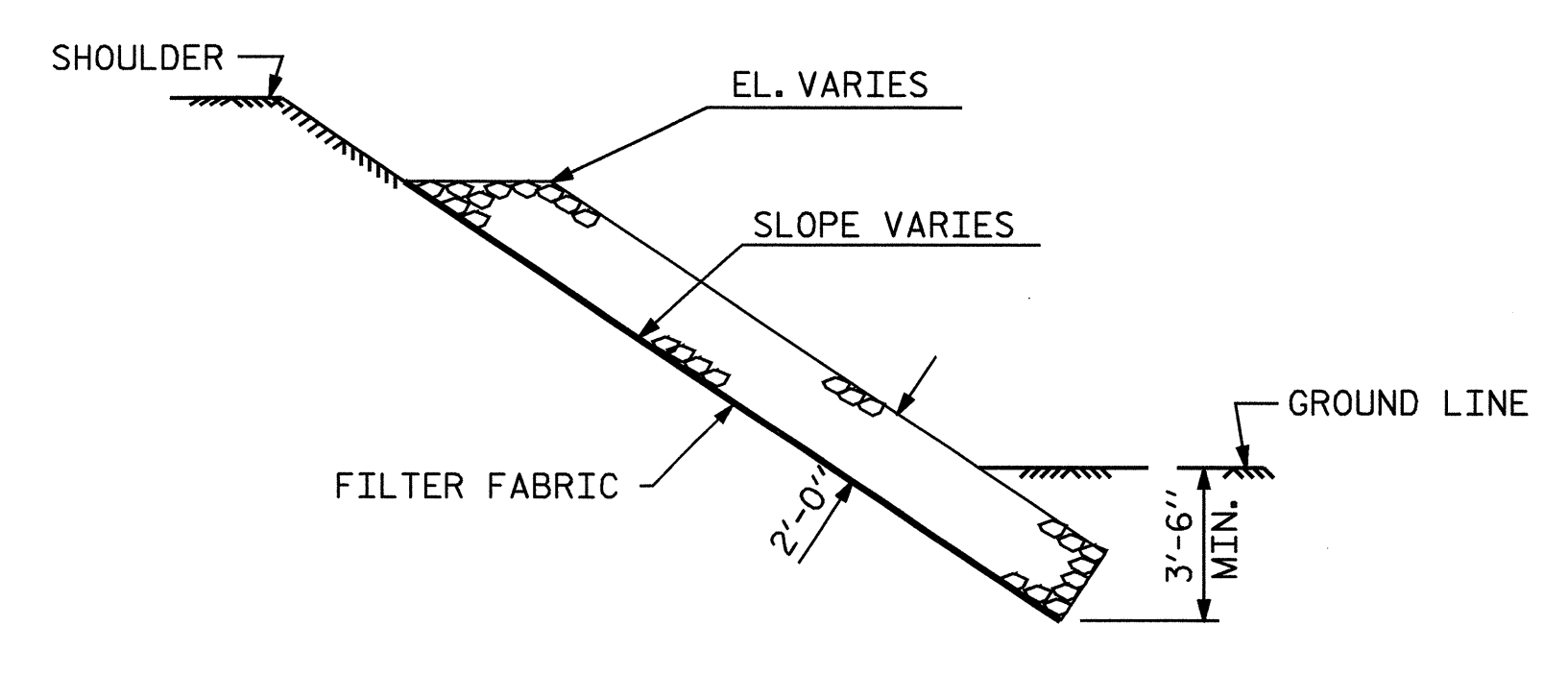


ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+48.00 -L-	PLAIN RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	136	151
END BENT 2	414	459

PLAN



SECTION BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-4318
WATAUGA COUNTY
 STATION: 16+48.00 -L-



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

ASSEMBLED BY : M.A. ALLEN	DATE : 7-08
CHECKED BY : A.R. CHESSON	DATE : 8-08
DRAWN BY : FCJ 2/88	REV. 8/16/99 RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/GM

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

07-OCT-2008 10:06
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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2002 STANDARD SPECIFICATIONS "FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

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

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

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

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED WITH THE EXCEPTION OF #2 BARS WHICH MAY BE FABRICATED FROM COLD DRAWN STEEL WIRE. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991.

THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

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