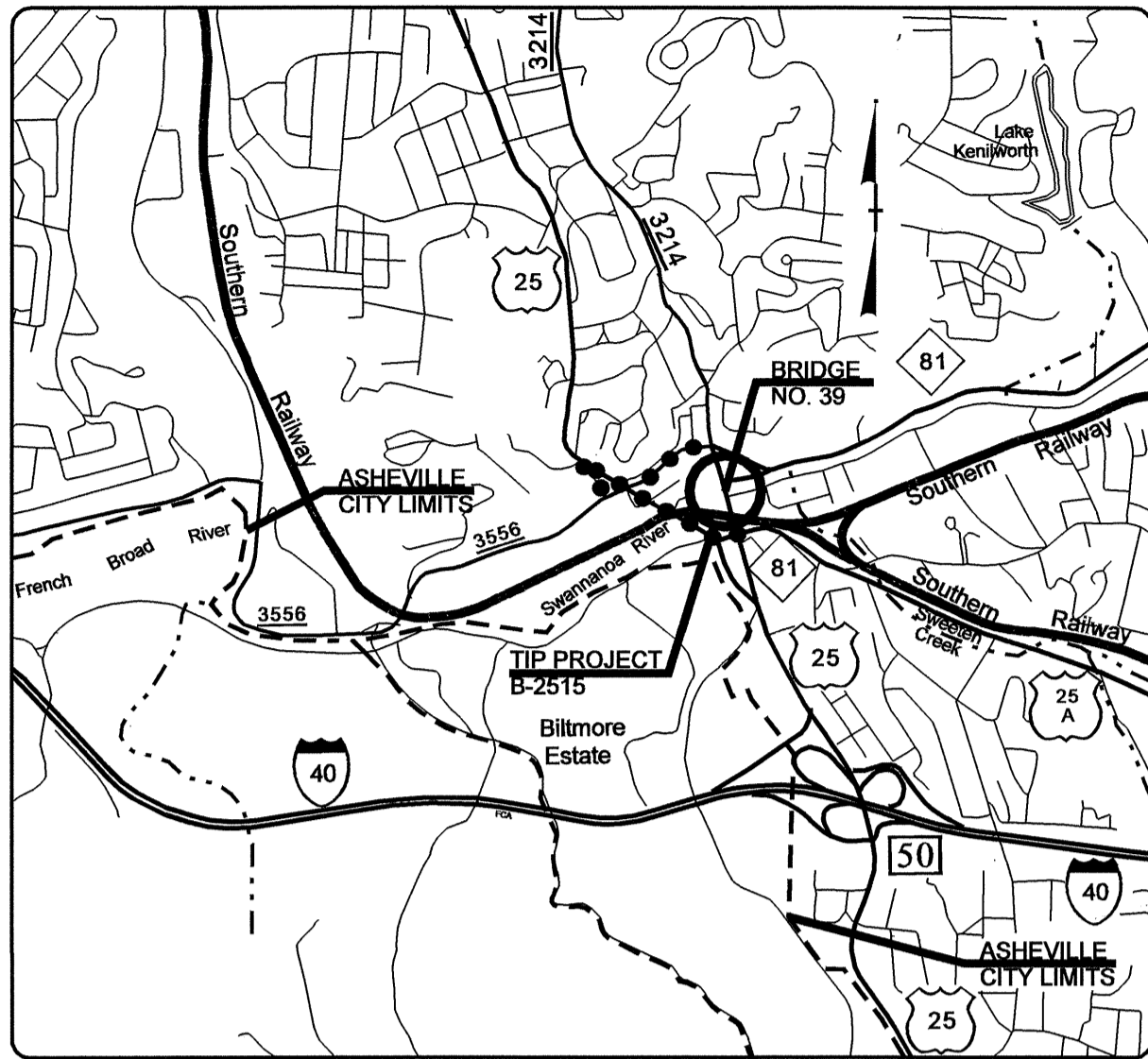


09/08/09

TIP PROJECT: B-2515

CONTRACT: C202024

STRUCTURE



VICINITY MAP OF B-2515

OFFSITE DETOUR ●●●●●●

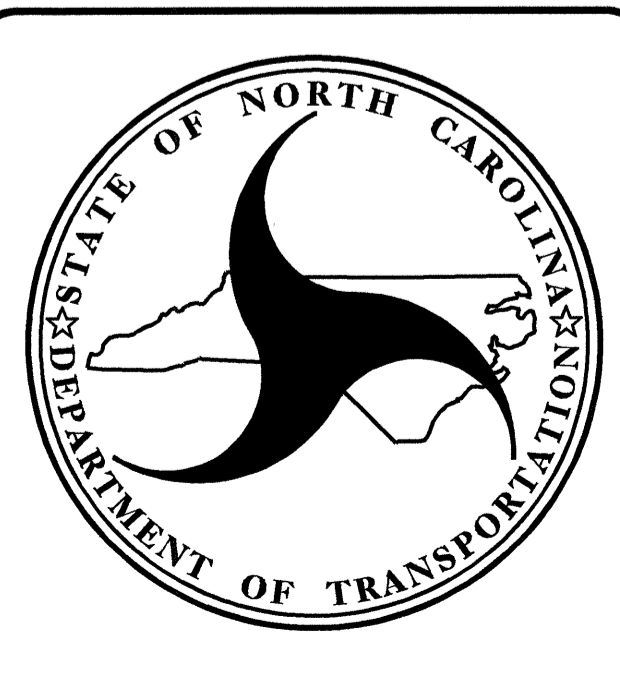
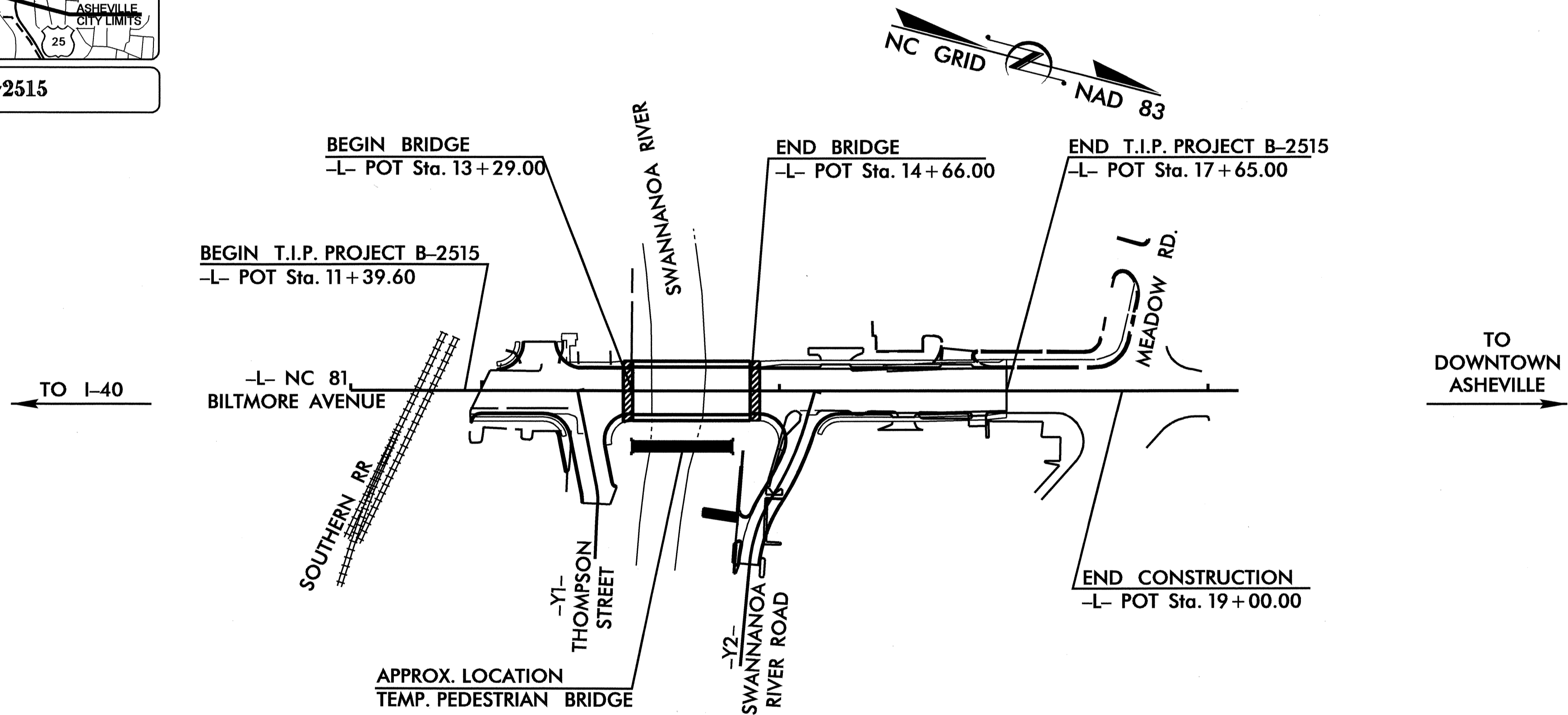
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BUNCOMBE COUNTY**

**LOCATION: BRIDGE NO. 39 OVER SWANNANOA RIVER  
ON NC 81 (BILTMORE AVENUE)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING,  
STRUCTURE, AND SIGNALS**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-2515		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32643.1.1	BRSTP-0081(1)	P.E.	
32643.2.2	BRSTP-0081(32)	R/W, UTIL	
32643.3.2	BRSTP-0081(1)	CONST.	



**DESIGN DATA**

ADT 2009 =	34,890
ADT 2029 =	52,640
DHV =	10 %
D =	60 %
T =	6 % *
V =	40 MPH
* TTST 2% DUAL 4%	
FUNC. CLASS. =	URBAN MINOR ARTERIAL

**PROJECT LENGTH**

LENGTH ROADWAY T.I.P. PROJECT B-2515	=	0.092 MILES
LENGTH STRUCTURES T.I.P. PROJECT B-2515	=	0.026 MILES
TOTAL LENGTH OF T.I.P. PROJECT B-2515	=	0.118 MILES

PREPARED IN THE OFFICE OF :

DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:  
JUNE 16, 2009

BRIAN C. HANKS, P.E.  
PROJECT ENGINEER

E. E. MURRAY, P.E.  
PROJECT DESIGN ENGINEER

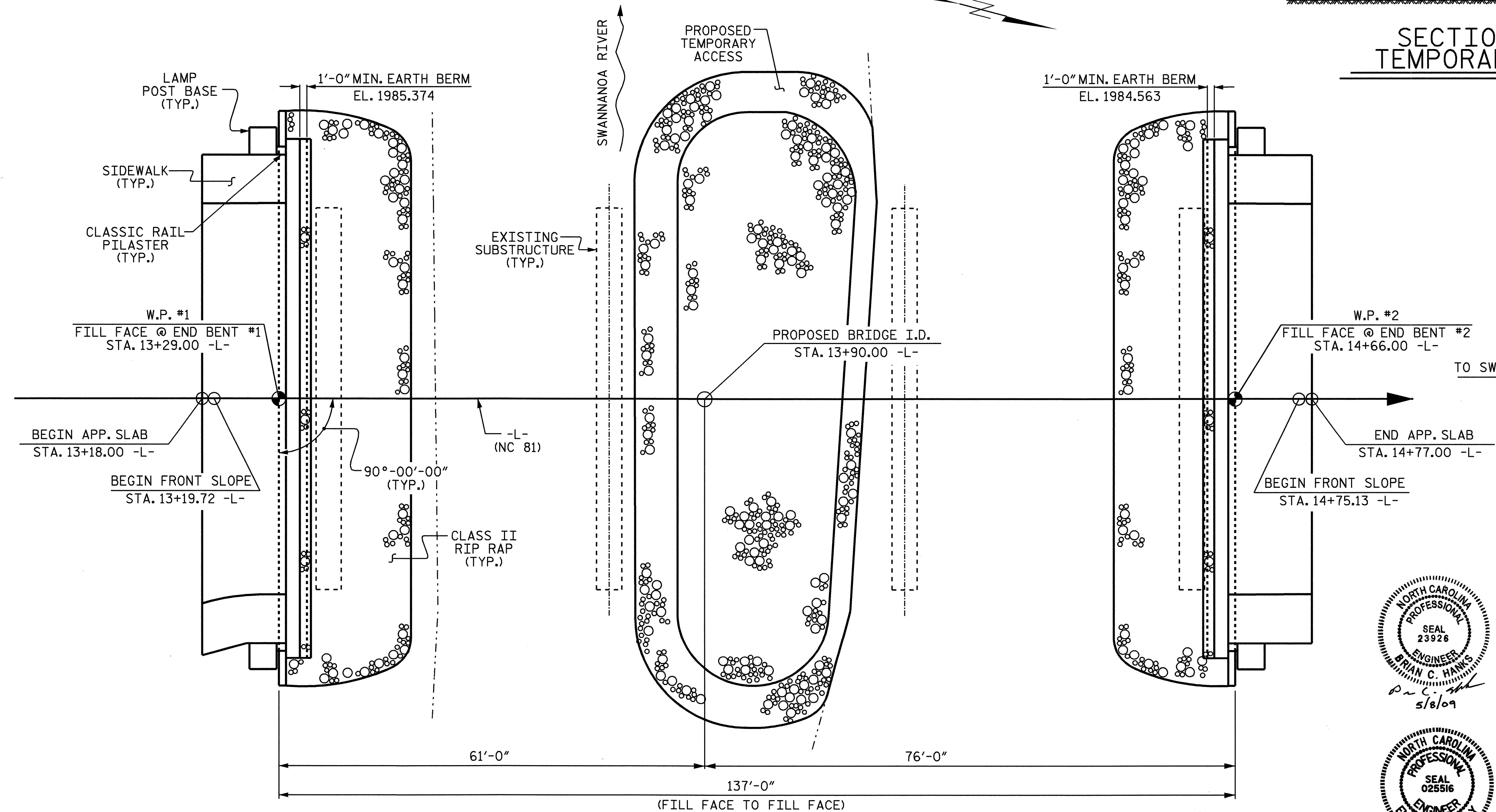
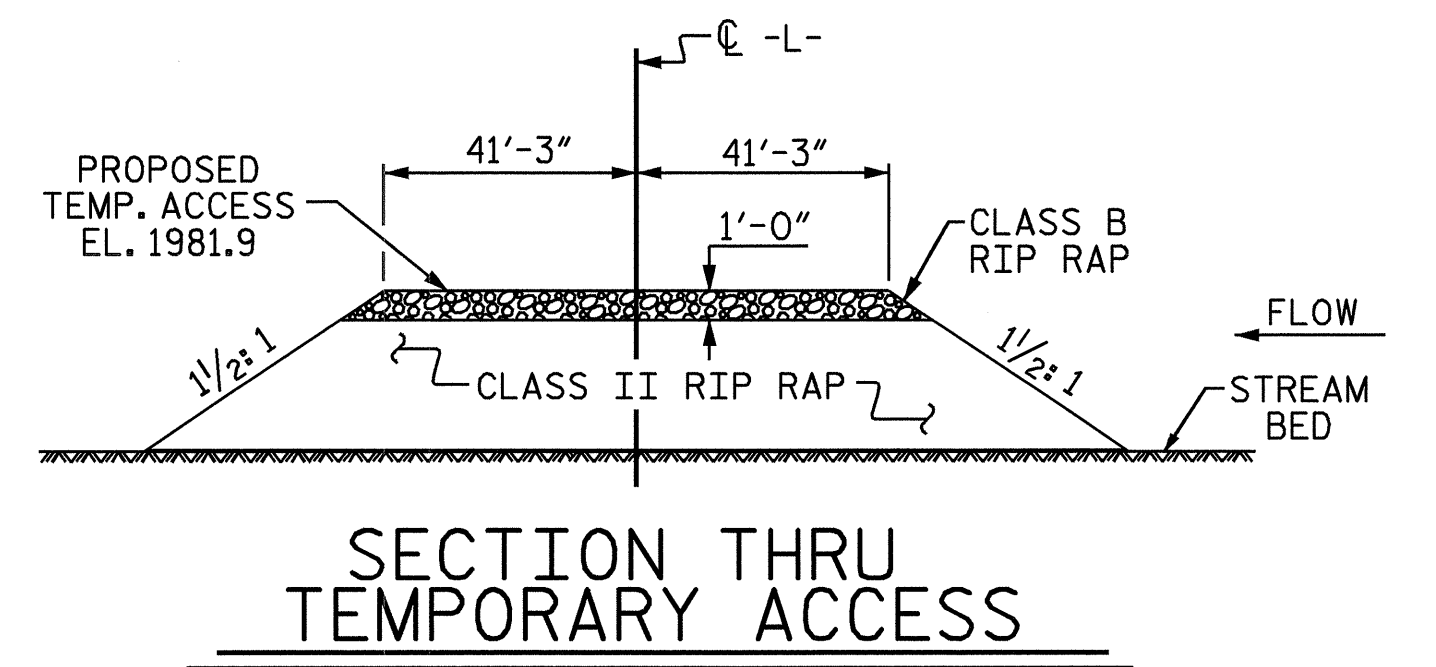
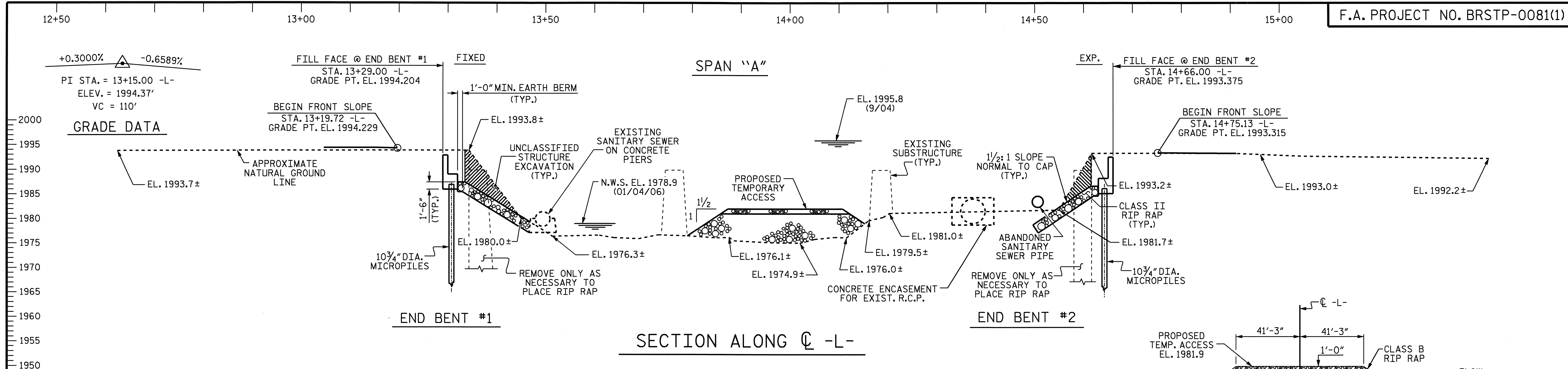
STRUCTURE DESIGN UNIT

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

SIGNATURE: \_\_\_\_\_ P.E.  
DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
DIVISION ADMINISTRATOR

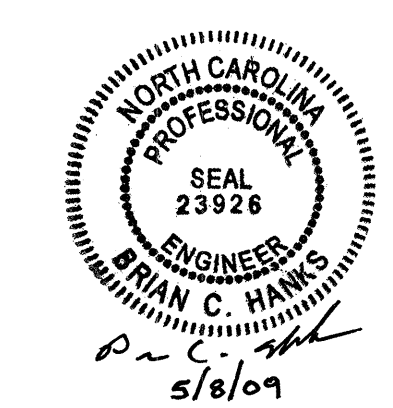
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PLAN

DRAWN BY : T.L. AVERETTE DATE : 3-09  
 CHECKED BY : PEGGY PARISI DATE : 3-09

07-MAY-2009 15:21  
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 taverette



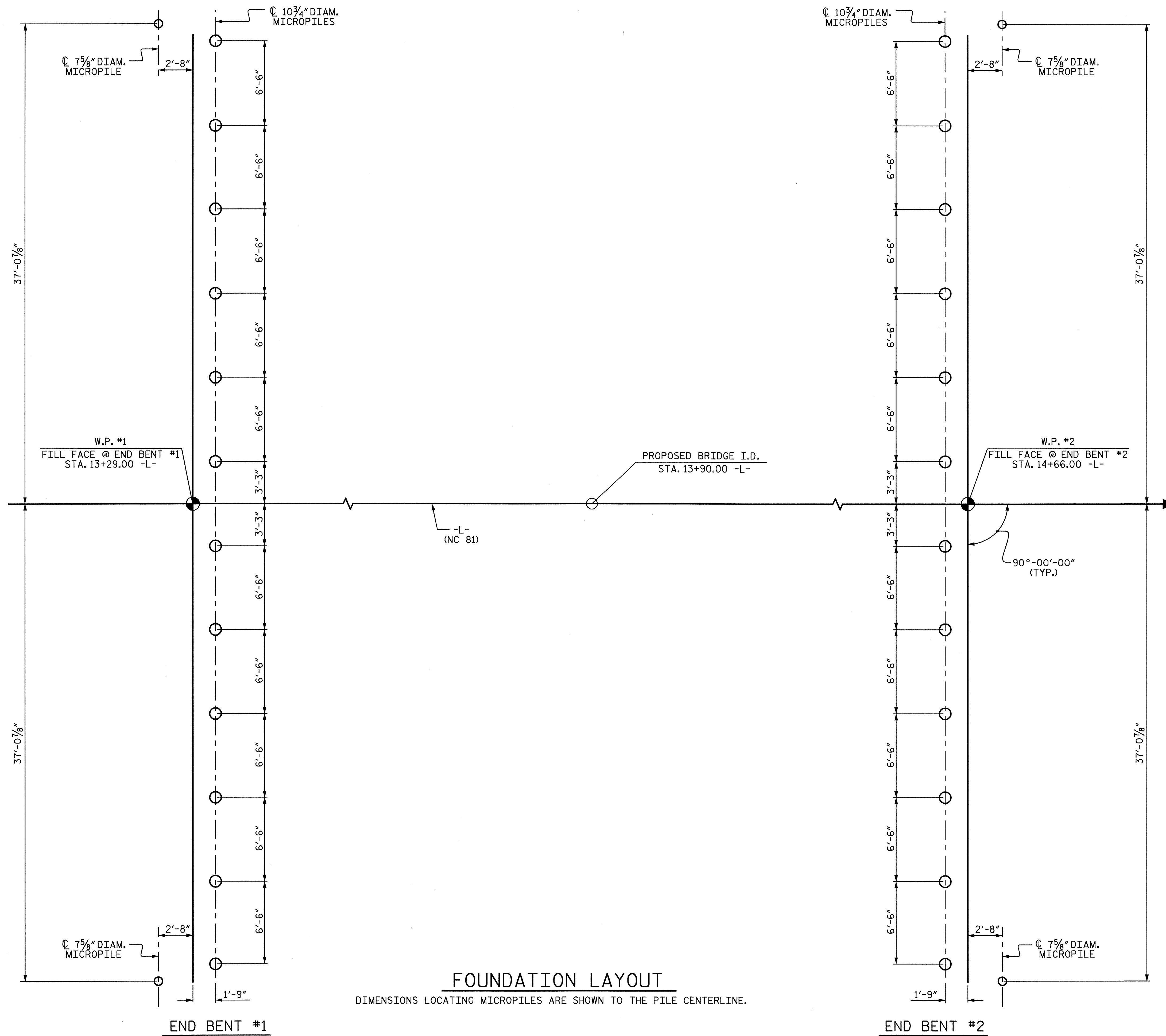
PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 39

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 SWANNAHOA RIVER ON NC 81  
 BETWEEN THOMPSON STREET  
 AND SWANNAHOA RIVER ROAD

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

S-1  
TOTAL SHEETS 28



**FOUNDATION LAYOUT**

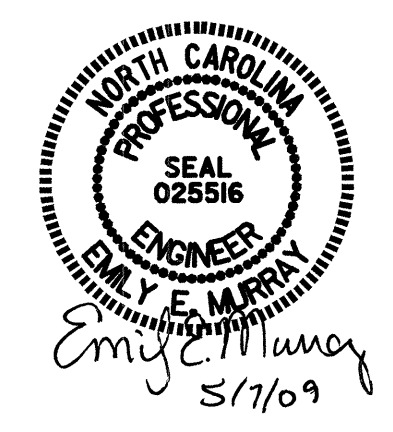
DIMENSIONS LOCATING MICROPILES ARE SHOWN TO THE PILE CENTERLINE.

**FOUNDATION NOTES**

- FOR MICROPILES, SEE MICROPILES SPECIAL PROVISION.
- DESIGN BOND LENGTH FOR MICROPILES AT END BENT NO.1 FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.
- USE REINFORCING CASINGS WITH MINIMUM YIELD STRENGTH OF 80 KSI FOR MICROPILES AT END BENT NO.1.
- INSTALL REINFORCING CASINGS FOR MICROPILES AT END BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 1970.0 FEET (LT.) AND 1967.0 FEET (RT.) AND WITH A MINIMUM PENETRATION OF 5 FEET INTO ROCK.
- DESIGN BOND LENGTH FOR MICROPILES AT END BENT NO.2 FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.
- USE REINFORCING CASINGS WITH MINIMUM YIELD STRENGTH OF 80 KSI FOR MICROPILES AT END BENT NO.2.
- INSTALL REINFORCING CASINGS FOR MICROPILES AT END BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 1960.5 FEET (LT.) AND 1961.0 FEET (RT.) AND WITH A MINIMUM PENETRATION OF 5 FEET INTO ROCK.
- DESIGN BOND LENGTH FOR MICROPILES AT LAMP POST BASE AT END BENT NO.1 FOR A FACTORED RESISTANCE OF 20 TONS PER PILE.
- USE REINFORCING CASINGS WITH MINIMUM YIELD STRENGTH OF 80 KSI FOR MICROPILES AT LAMP POST BASE AT END BENT NO.1.
- INSTALL REINFORCING CASINGS FOR MICROPILES AT LAMP POST BASE AT END BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 1970.0 FEET (LT.) AND 1967.0 FEET (RT.) AND WITH A MINIMUM PENETRATION OF 5 FEET INTO ROCK.
- DESIGN BOND LENGTH FOR MICROPILES AT LAMP POST BASE AT END BENT NO.2 FOR A FACTORED RESISTANCE OF 20 TONS PER PILE.
- USE REINFORCING CASINGS WITH MINIMUM YIELD STRENGTH OF 80 KSI FOR MICROPILES AT LAMP POST BASE AT END BENT NO.2.
- INSTALL REINFORCING CASINGS FOR MICROPILES AT LAMP POST BASE AT END BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 1960.5 FEET (LT.) AND 1961.0 FEET (RT.) AND WITH A MINIMUM PENETRATION OF 5 FEET INTO ROCK.
- DEMONSTRATION MICROPILES ARE REQUIRED. DEMONSTRATION PILE TO BE DRIVEN ON THE SOUTHWEST CORNER OF BRIDGE. LOCATION TO BE DETERMINED BY THE ENGINEER. SEE MICROPILES SPECIAL PROVISION.
- THE CONTRACTOR/DESIGNER SHALL DEMONSTRATE, IN THEIR CALCULATIONS, THAT THE FOUNDATION DESIGN IS CAPABLE OF RESISTING ANY LATERAL LOADS THAT ARE APPLIED TO THE END BENT CAPS. THESE LOADS TYPICALLY RESULT FROM THE BACKFILL MATERIALS ( GAMMA = 120 pc/f, PHI = 30 DEGREES, C = 0 psf ) ALONG WITH A TRAFFIC SURCHARGE OF 240 psf.

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 2 OF 3



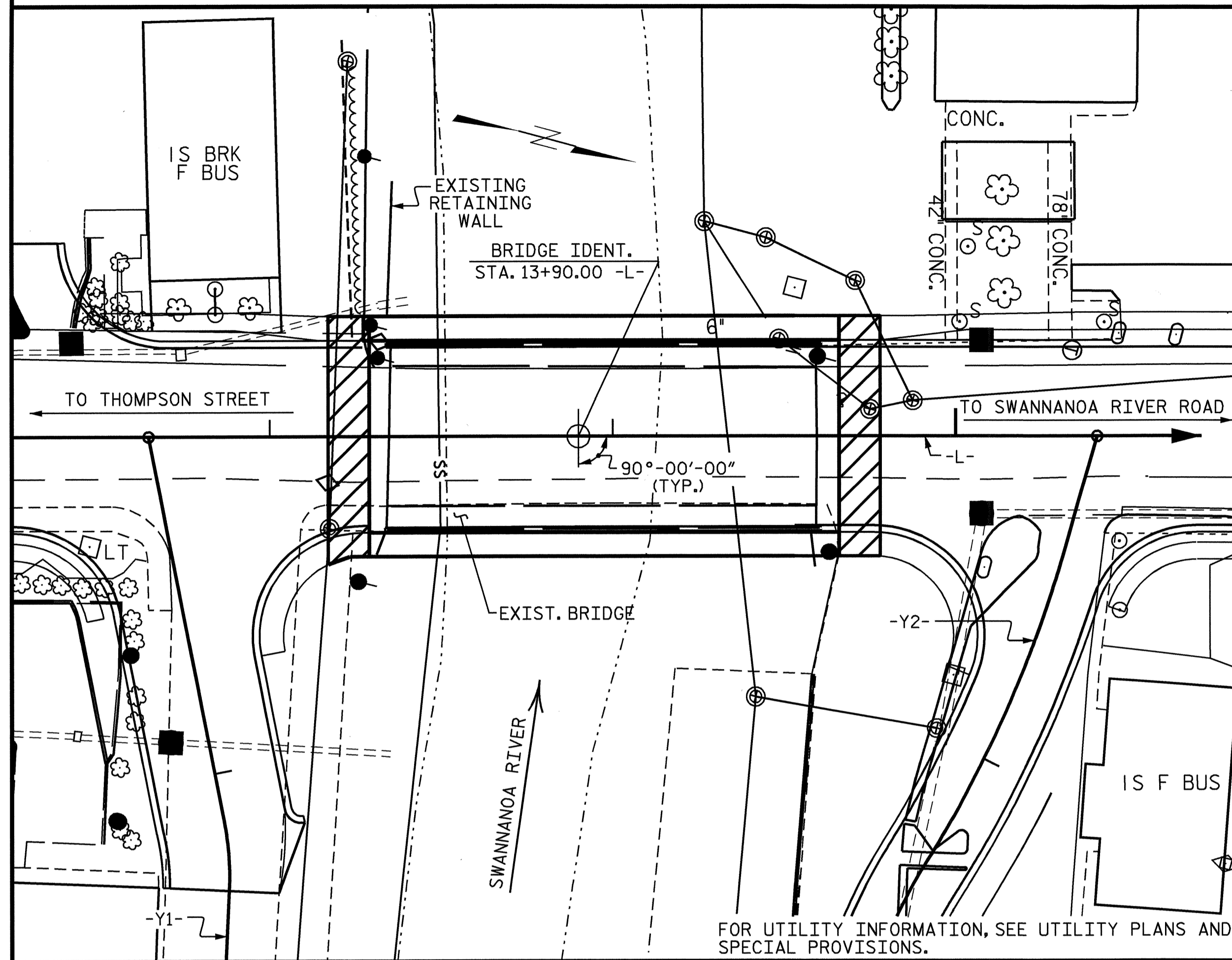
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 SWANNAHOA RIVER ON NC 81  
 BETWEEN THOMPSON STREET  
 AND SWANNAHOA RIVER ROAD

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

S-2  
TOTAL SHEETS 28

DRAWN BY : T.L. AVERETTE DATE : 3-09  
 CHECKED BY : PEGGY PARISI DATE : 3-09

BENCHMARK: "BRYSON1" NCGS MONUMENT -L- STA 18+38.32, 38.17' RT., EL. 1994.97.



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE ..... 17100 CFS  
 FREQUENCY OF DESIGN FLOOD ..... 100 YEARS  
 DESIGN HIGH WATER ELEVATION ..... 1997.4'  
 DRAINAGE AREA ..... 130 SQ. MI.  
 BASIC DISCHARGE (Q100) ..... 17100 CFS  
 BASIC HIGH WATER ELEVATION ..... 1997.4'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ..... 7320 CFS  
 FREQUENCY OF OVERTOPPING FLOOD ..... 10+ YRS.  
 OVERTOPPING FLOOD ELEVATION ..... 1992.3'

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STRUCTURAL STEEL	RIP RAP CLASS II (2'-0" THICK)
	LUMP SUM	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	TONS
SUPERSTRUCTURE				9781	8316			LUMP SUM			420600	
END BENT NO. 1							36.6		5553			204
END BENT NO. 2							36.6		5553			146
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	9781	8316	10.4	73.2	LUMP SUM	11,106	992	420600	350
	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	ELECTRICAL CONDUIT SYSTEM	CLASSIC CONCRETE BRIDGE RAIL AND SIDEWALK	7 7/8" DIA. MICROPILES	10 3/4" DIA. MICROPILES	DEMONSTRATION MICROPILES	ARCHITECTURAL TREATMENT FOR LAMP POST BASE	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY PEDESTRIAN BRIDGE	BRIDGE DECK GRINDING	TELEPHONE CONDUIT STRUCTURE ATTACHMENT
	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	EACH	EACH	EACH	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		LUMP SUM	LUMP SUM	LUMP SUM	269.83					LUMP SUM	LUMP SUM	
END BENT NO. 1	227								12			
END BENT NO. 2	162								12			
TOTAL	389	LUMP SUM	LUMP SUM	LUMP SUM	269.83	4	24	1	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

DRAWN BY : T.L. AVERETTE DATE : 3-09  
 CHECKED BY : E.E. MURRAY DATE : 4-09

07-MAY-2009 16:00  
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 taverette

NOTES

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

THE EXISTING STRUCTURE IS 123 FEET LONG AND CONSISTS OF THREE SPANS OF 41 FEET EACH AND A CLEAR ROADWAY WIDTH OF 40 FEET. IT HAS REINFORCED CONCRETE GIRDERS WITH A REINFORCED CONCRETE DECK ON REINFORCED CONCRETE VERTICAL ABUTMENTS AND PIERS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT. SEE SPECIAL PROVISION FOR REMOVAL OF EXISTING STRUCTURE @ 13+90.00 -L-.

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 CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY PEDESTRIAN BRIDGE AT STATION 13+90.00 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY PEDESTRIAN BRIDGE, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 41.5 FEET 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. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

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

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.

FOR BRIDGE DECK GRINDING, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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 AT STATION 13+90.00 -L-.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ARCHITECTURAL TREATMENT FOR LAMP POST BASE, SEE SPECIAL PROVISIONS.

FOR ELECTRICAL CONDUIT SYSTEM @ STA. 13+90.00 -L-, SEE SPECIAL PROVISIONS.

FOR INSTALLATION OF DUCT BANK, SEE STRUCTURE UTILITIES PLANS AND SPECIAL PROVISION.

DUCT BANK SHALL NOT BE ATTACHED TO STRUCTURE UNTIL CLOSURE POURS HAVE REACHED FULL COMPRESSIVE STRENGTH.

PROJECT NO. B-2515  
 BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE OVER  
 SWANNANOA RIVER ON NC 81  
 BETWEEN THOMPSON STREET  
 AND SWANNANOA RIVER ROAD



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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.32	--	1.75	0.502	1.32	A	EXT.	66.5	0.680	1.62	A	INT.	133	1.30	0.502	1.57	A	EXT.	66.5		
	HL-93 (OPERATING)	N/A		1.71	--	1.35	0.502	1.71	A	EXT.	66.5	0.680	2.10	A	INT.	133	1.00	0.502	2.03	A	EXT.	66.5		
	HS-20 (INVENTORY)	36.00	②	1.93	69.48	1.80	0.502	1.93	A	EXT.	66.5	0.680	2.33	A	INT.	133	1.30	0.502	3.88	A	EXT.	66.5		
	HS-20 (OPERATING)	36.00		2.57	92.52	1.35	0.502	2.57	A	EXT.	66.5	0.680	3.10	A	INT.	133	1.00	0.502	5.05	A	EXT.	66.5		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		5.15	69.53	1.65	0.502	5.15	A	EXT.	66.5	0.680	6.43	A	INT.	133	1.30	0.502	9.52	A	EXT.	66.5		
		NGARBS2	20.00		3.66	73.20	1.65	0.502	3.66	A	EXT.	66.5	0.680	4.45	A	INT.	133	1.30	0.502	6.75	A	EXT.	66.5	
		NAGRIS2	22.00		3.39	74.58	1.65	0.502	3.39	A	EXT.	66.5	0.680	4.09	A	INT.	133	1.30	0.502	6.27	A	EXT.	66.5	
		NCOTTS3	27.25		2.56	69.76	1.65	0.502	2.56	A	EXT.	66.5	0.680	3.20	A	INT.	133	1.30	0.502	4.72	A	EXT.	66.5	
		NAGGRS4	34.93		2.07	72.31	1.65	0.502	2.07	A	EXT.	66.5	0.680	2.57	A	INT.	133	1.30	0.502	3.82	A	EXT.	66.5	
		NS5A	35.55		2.02	71.81	1.65	0.502	2.02	A	EXT.	66.5	0.680	2.56	A	INT.	133	1.30	0.502	3.74	A	EXT.	66.5	
		NS6A	39.95		1.83	73.11	1.65	0.502	1.83	A	EXT.	66.5	0.680	2.30	A	INT.	133	1.30	0.502	3.39	A	EXT.	66.5	
	NS7B	42.00		1.74	73.08	1.65	0.502	1.74	A	EXT.	66.5	0.680	2.22	A	INT.	133	1.30	0.502	3.22	A	EXT.	66.5		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	NAGRIT3	33.00		2.22	73.26	1.65	0.502	2.22	A	EXT.	66.5	0.680	2.77	A	INT.	133	1.30	0.502	4.11	A	EXT.	66.5	
		NT4A	33.08		2.23	73.77	1.65	0.502	2.23	A	EXT.	66.5	0.680	2.73	A	INT.	133	1.30	0.502	4.11	A	EXT.	66.5	
		NT6A	41.60		1.79	74.46	1.65	0.502	1.79	A	EXT.	66.5	0.680	2.30	A	INT.	133	1.30	0.502	3.31	A	EXT.	66.5	
		NT7A	42.00		1.79	75.18	1.65	0.502	1.79	A	EXT.	66.5	0.680	2.27	A	INT.	133	1.30	0.502	3.31	A	EXT.	66.5	
		NT7B	42.00		1.82	76.44	1.65	0.502	1.82	A	EXT.	66.5	0.680	2.20	A	INT.	133	1.30	0.502	3.36	A	EXT.	66.5	
NAGRIT4		43.00		1.76	75.68	1.65	0.502	1.76	A	EXT.	66.5	0.680	2.14	A	INT.	133	1.30	0.502	3.25	A	EXT.	66.5		
NAGRIT5A	45.00		1.67	75.15	1.65	0.502	1.67	A	EXT.	66.5	0.680	2.08	A	INT.	133	1.30	0.502	3.08	A	EXT.	66.5			
NAGRIT5B	45.00		③	1.66	74.70	1.65	0.502	1.66	A	EXT.	66.5	0.680	2.04	A	INT.	133	1.30	0.502	3.06	A	EXT.	66.5		
FATIGUE	HL-93 (INVENTORY)	γ <sub>LL</sub> =0.75	--	--																				

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

LEGAL LOAD RATING FACTORS	YEAR	ADTT	γ <sub>L</sub>
	2009	1256	N/A
	2029	1895	1.65

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) \*\*

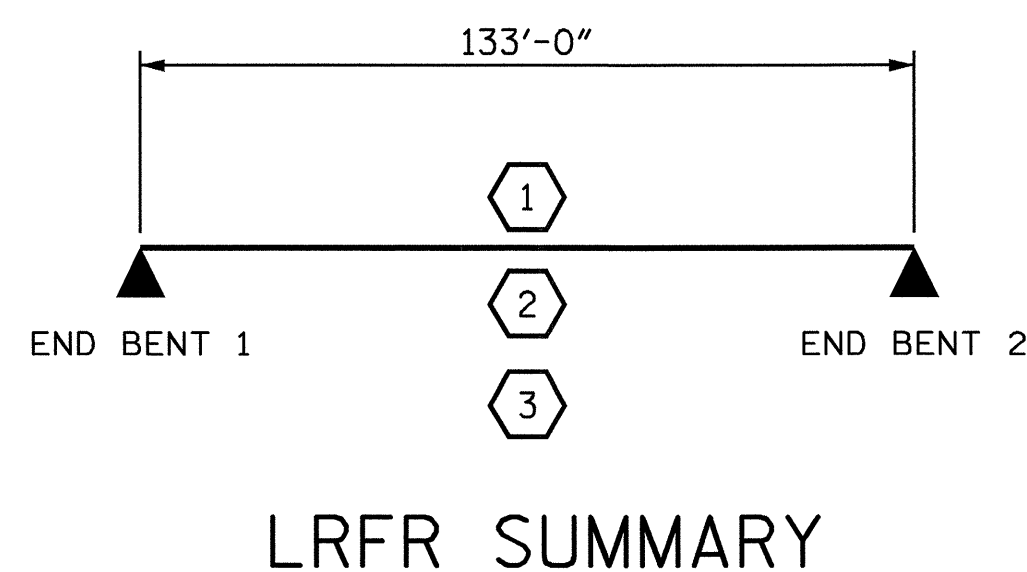
② DESIGN LOAD RATING (HS-20) \*\*

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

INT. - INTERIOR GIRDER  
EXT. - EXTERIOR GIRDER



PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD

LRFR SUMMARY FOR  
 STEEL GIRDERS  
 (NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY : T.L. AVERETTE      DATE : 04/09  
 CHECKED BY : M. RORIE              DATE : 05/09  
 DRAWN BY : MAA      1/08      REV. 11/2/08R      MAA/GM  
 CHECKED BY : GM/DI 2/08

NOTES

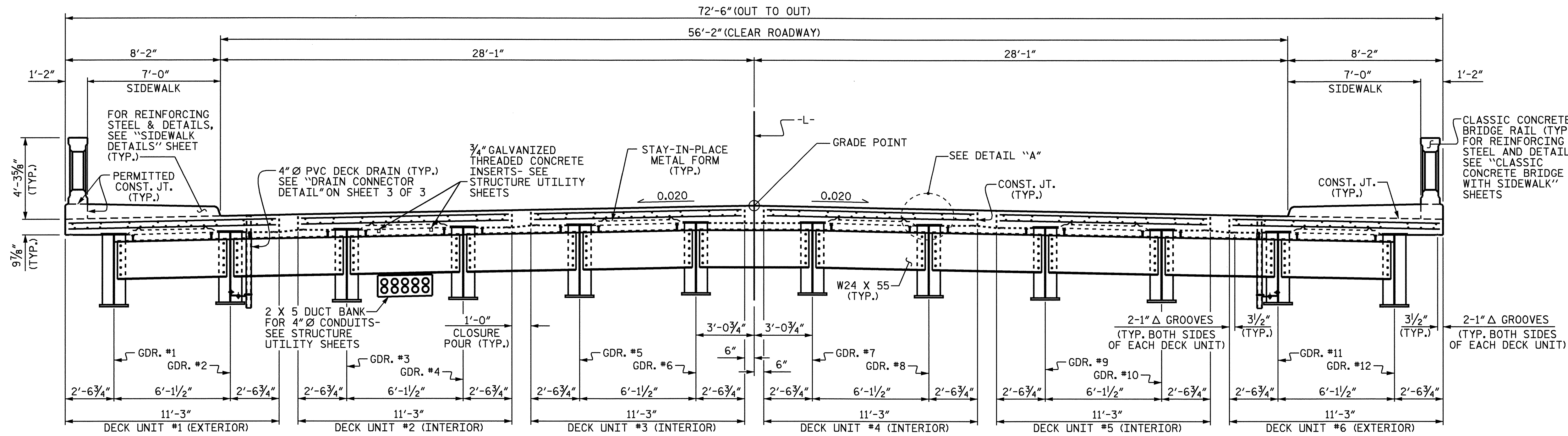
PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

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

BRIDGE SEAT ELEVATIONS ARE TO BE VERIFIED BY THE ENGINEER BEFORE PLACEMENT OF DECK UNITS.

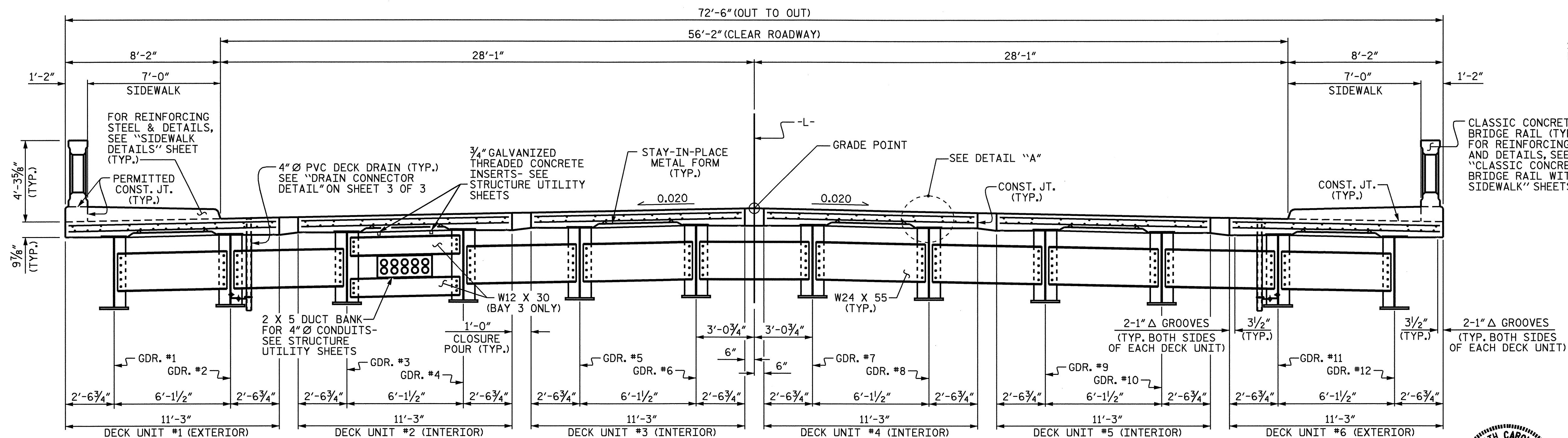
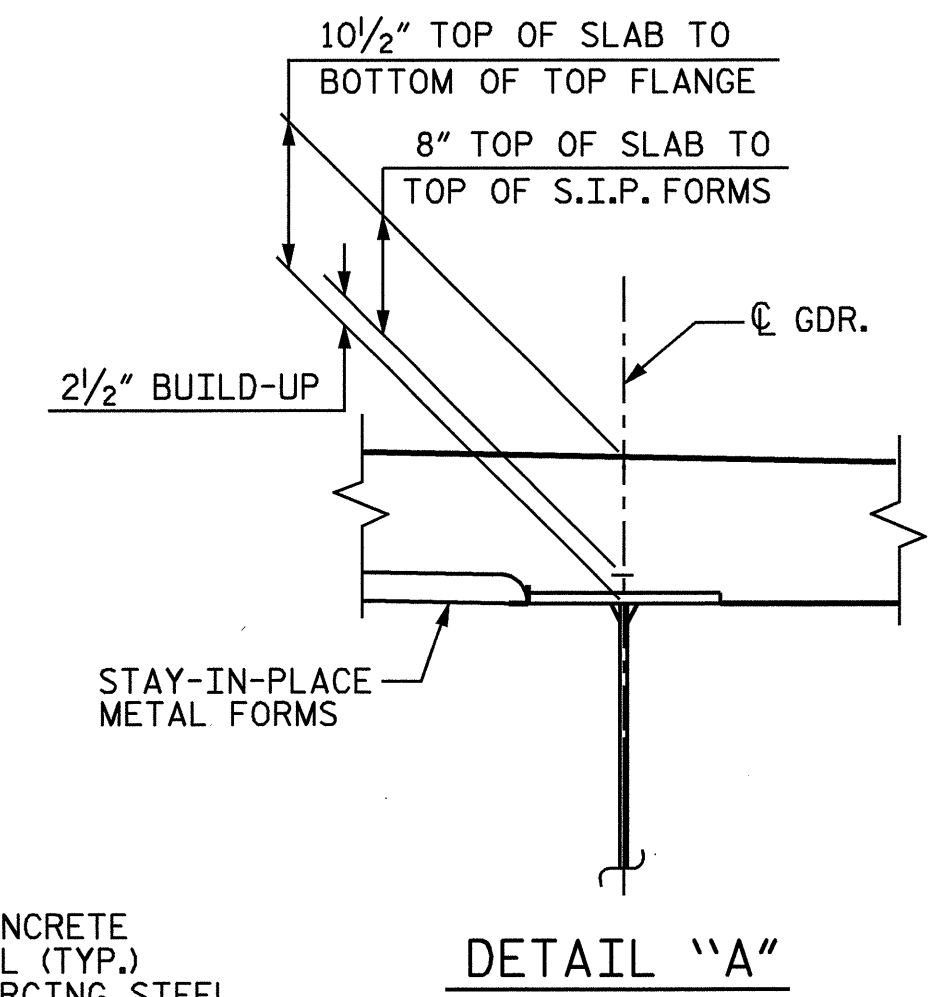
FOR DECK UNIT CONSTRUCTION SEQUENCE, SEE TYPICAL SECTION SHEET 2 OF 3.

DECK UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE SECTIONS OF THE STANDARD SPECIFICATIONS.



TYPICAL SECTION

SHOWING END BENT DIAPHRAGMS  
FOR DECK UNIT AND CLOSURE POUR REINFORCING STEEL AND DETAILS, SEE SHEET 2 OF 3.



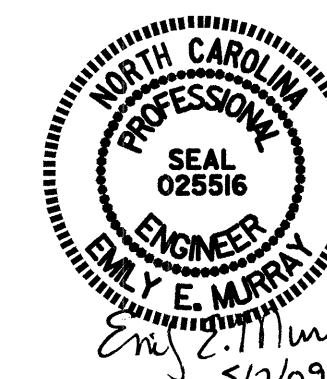
TYPICAL SECTION

SHOWING INTERMEDIATE DIAPHRAGMS  
FOR DECK UNIT AND CLOSURE POUR REINFORCING STEEL AND DETAILS, SEE SHEET 3 OF 3.

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
TYPICAL SECTION



DRAWN BY: T.L. AVERETTE DATE: 1-09  
CHECKED BY: PEGGY PARISI DATE: 3-09

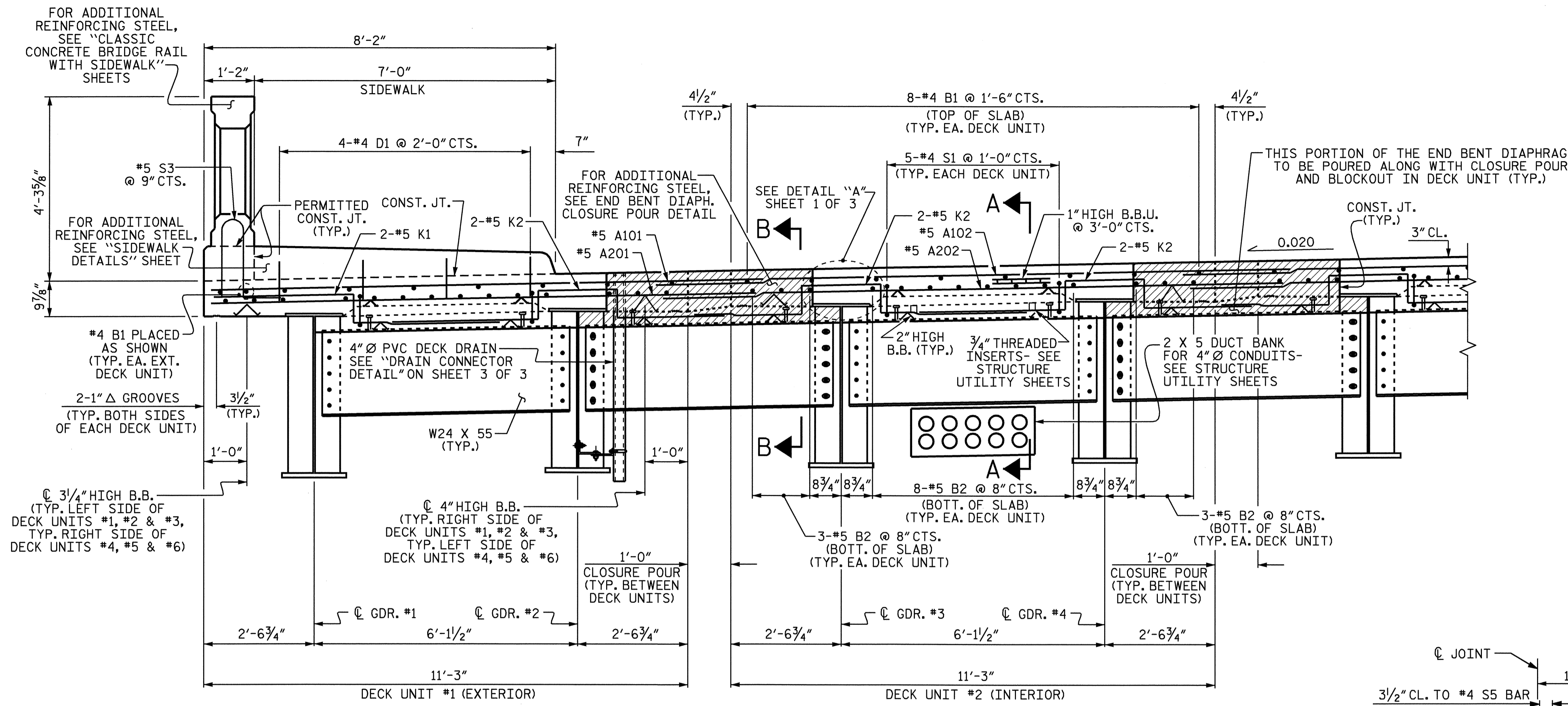
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REVISIONS				SHEET NO.	
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1			3		
2			4		

TOTAL SHEETS: 28

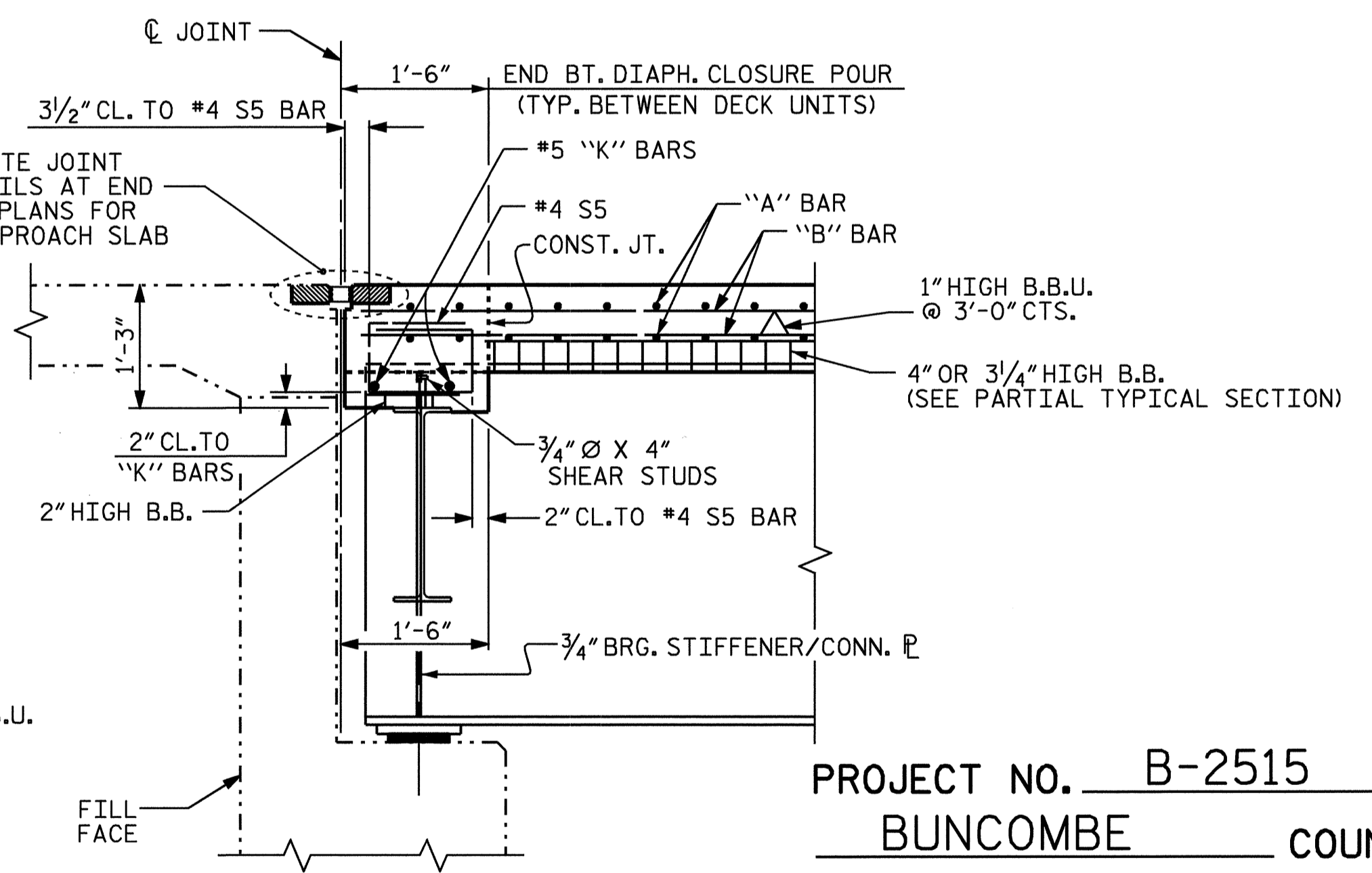
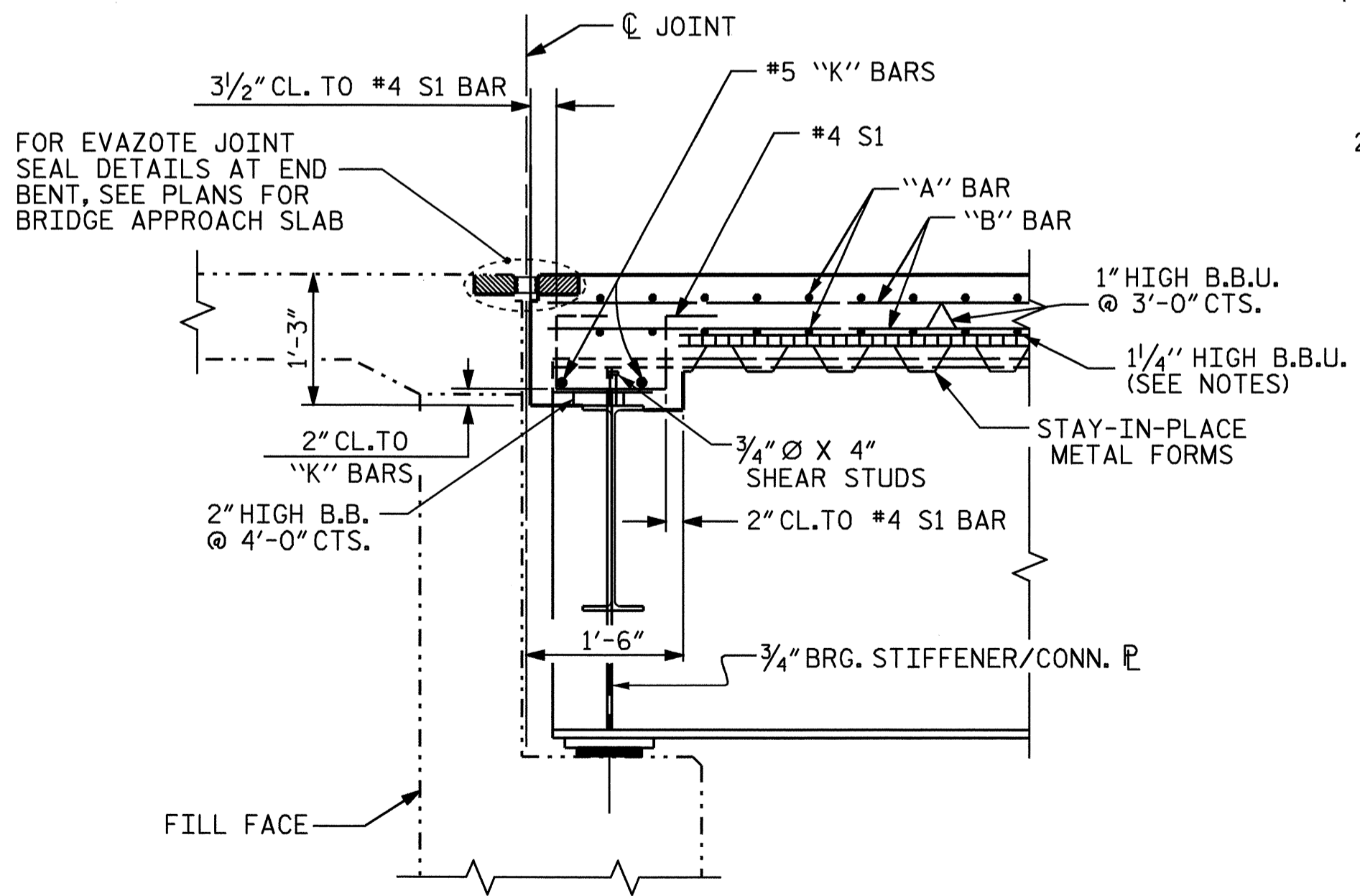
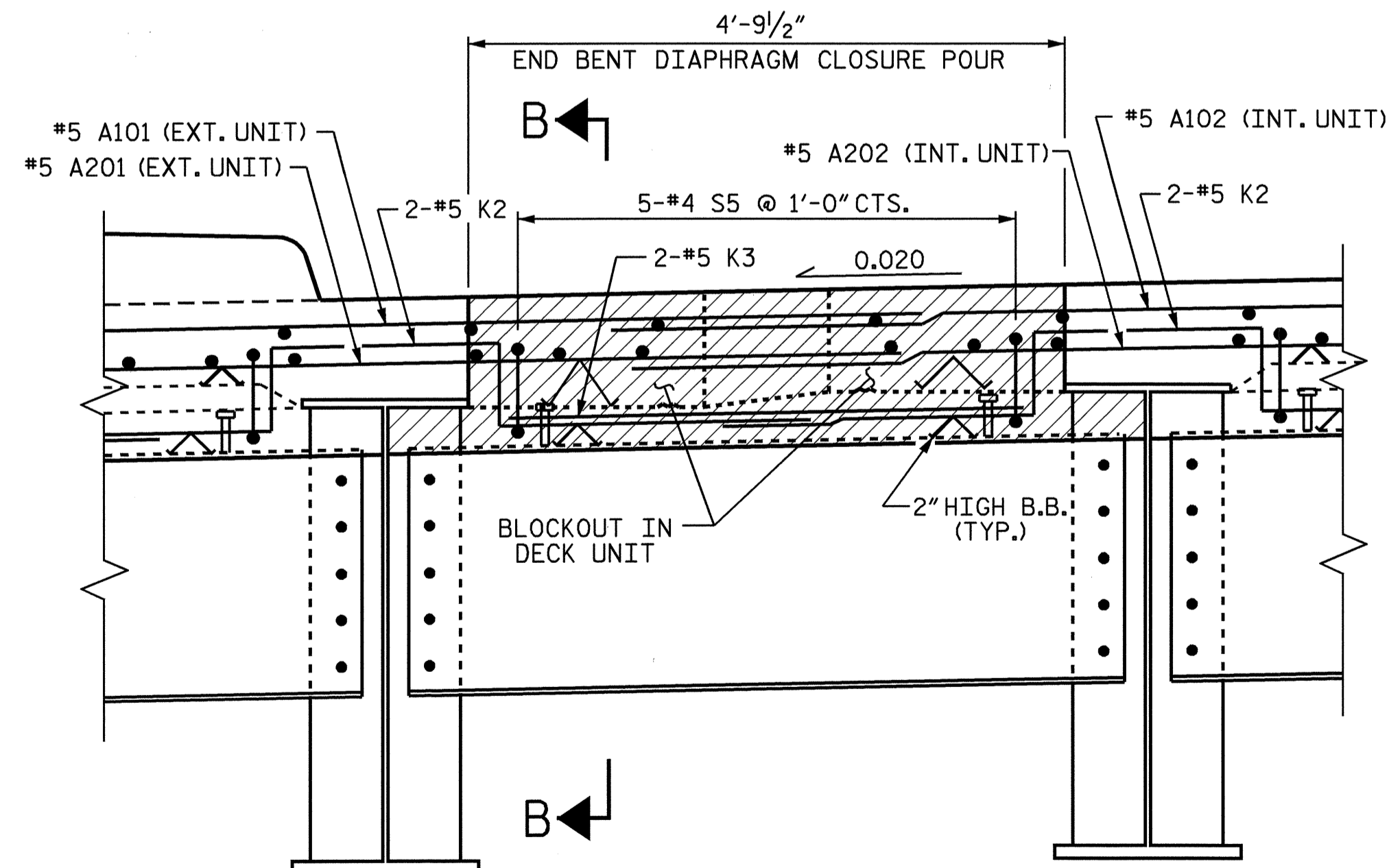
**DECK UNIT CONSTRUCTION SEQUENCE**

1. AT THE OFF-SITE ASSEMBLY LOCATION, SUPPORT GIRDERS AT BEARING LOCATIONS. ALLOW EACH GIRDER TO DEFLECT UNDER SELFWEIGHT, THEN INSTALL AND FULLY TIGHTEN INTERMEDIATE DIAPHRAGMS.
2. VERIFY THAT THE OFF-SITE BEARING SUPPORT SETUP AND FALSEWORK FOR EACH DECK UNIT IS CORRECT FOR THE REQUIRED SUPERELEVATION AND SKEW.
3. DECK SHALL BE CAST WITH GIRDERS IN SHORED POSITION TO PREVENT DEFLECTION OF GIRDERS DURING DECK POUR. USE THE SAME SHORING SYSTEM FOR EACH DECK UNIT TO PREVENT DIFFERENTIAL DEFLECTION.
4. OBTAIN ENGINEER'S APPROVAL OF THE GIRDER SHORING SYSTEM BEFORE POURING THE CONCRETE SLAB OF DECK UNITS.
5. THE CONCRETE IN EACH DECK UNIT SHALL REACH FULL COMPRESSIVE STRENGTH BEFORE REMOVING SHORING OR TRANSPORTING THE UNITS. AT THE CONTRACTOR'S OPTION, THE SIDEWALK MAY BE CAST OFF-SITE AS A SEPARATE POUR ON THE EXTERIOR UNITS. IN THIS CASE, SHORE GIRDERS DURING THE SLAB POUR TO PREVENT DEFLECTION THEN SUPPORT GIRDERS ONLY AT BEARING LOCATIONS DURING THE SIDEWALK POUR.
6. VERIFY BRIDGE SEAT ELEVATIONS AT END BENTS.
7. POSITION BEARINGS AND SOLE PLATES ON CAP.
8. PLACE AND PROPERLY ALIGN ALL DECK UNITS THEN INSTALL AND FULLY TIGHTEN DIAPHRAGMS IN CLOSURE POUR BAYS.
9. FIELD WELD GIRDERS TO SOLE PLATES.
10. AFTER RAIL AND SIDEWALK ARE COMPLETE, POUR CLOSURE POURS. CONTRACTOR HAS THE OPTION TO POUR CLOSURE POURS BETWEEN DECK UNITS #2 THRU #5 BEFORE RAIL AND SIDEWALK ARE COMPLETE. CLOSURE POURS BETWEEN DECK UNITS #1 & #2 AND #5 & #6 SHALL NOT BE POURED UNTIL RAIL AND SIDEWALK ARE CAST.
11. AFTER ALL CLOSURE POURS AND ELASTOMERIC CONCRETE AT JOINTS HAVE REACHED COMPRESSIVE STRENGTH, GRIND DECK AND APPROACH SLAB AS NEEDED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR BRIDGE DECK GRINDING.
12. GROOVE BRIDGE FLOORS.



**END BENT DIAPHRAGM**

EXTERIOR DECK UNITS #1 AND #6 AND INTERIOR DECK UNITS #2 THRU #5 ARE SIMILAR, EXCEPT FOR #5 S2 PLACEMENT IN CLOSURE POUR. SEE PARTIAL PLAN OF SPANS. ALSO, NOTE THAT THREADED INSERTS FOR UTILITIES ARE ONLY IN DECK UNIT #2.



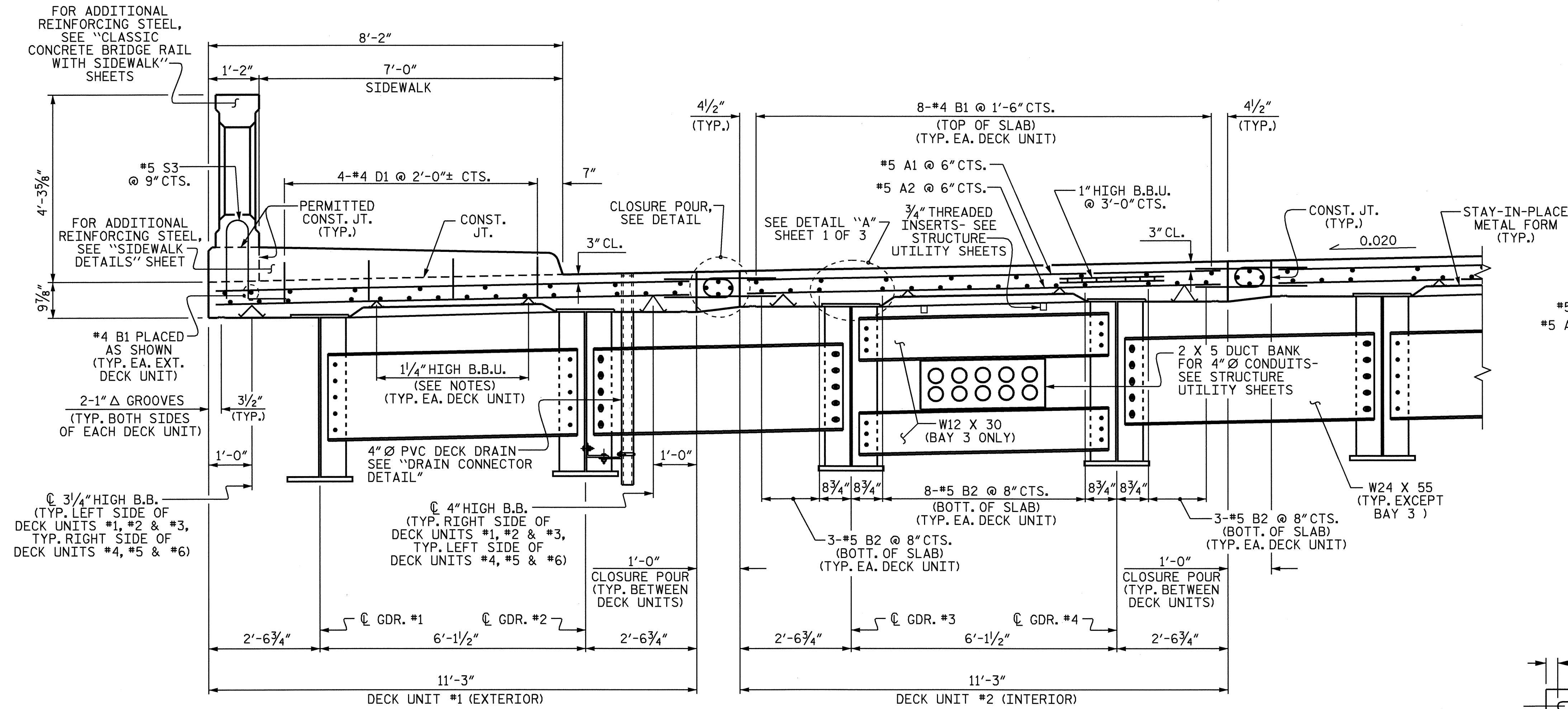
PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 2 OF 3

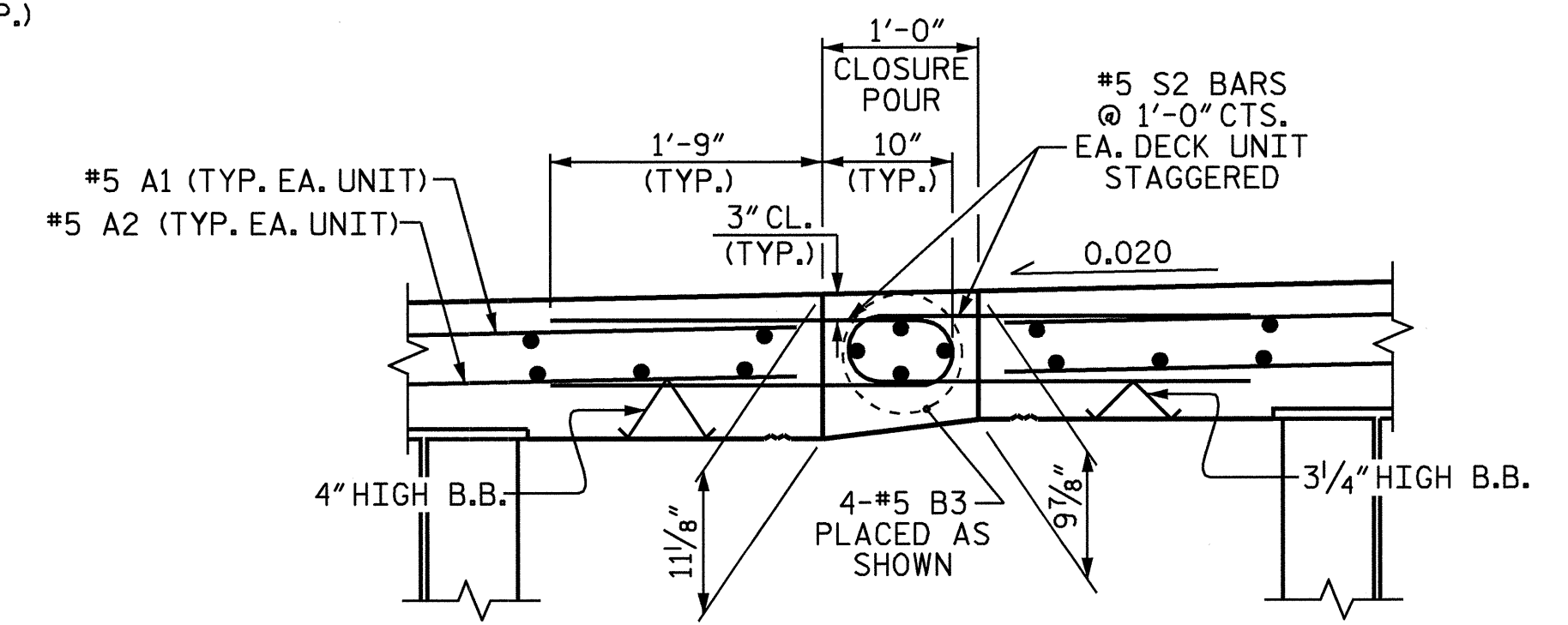
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			28



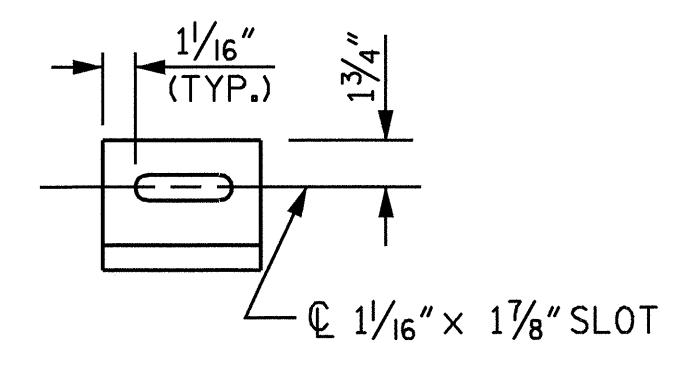
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 CHECKED BY: PEGGY PARISI DATE: 3-09



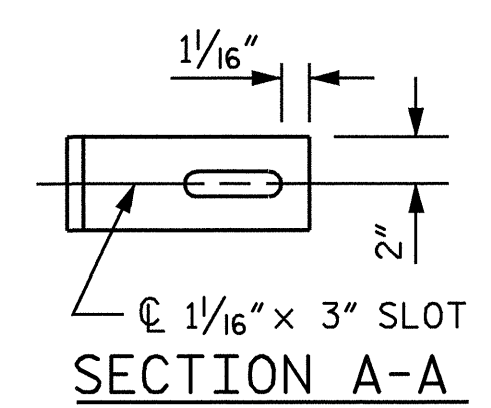
**PARTIAL TYPICAL SECTION**  
@ INTERMEDIATE DIAPHRAGM



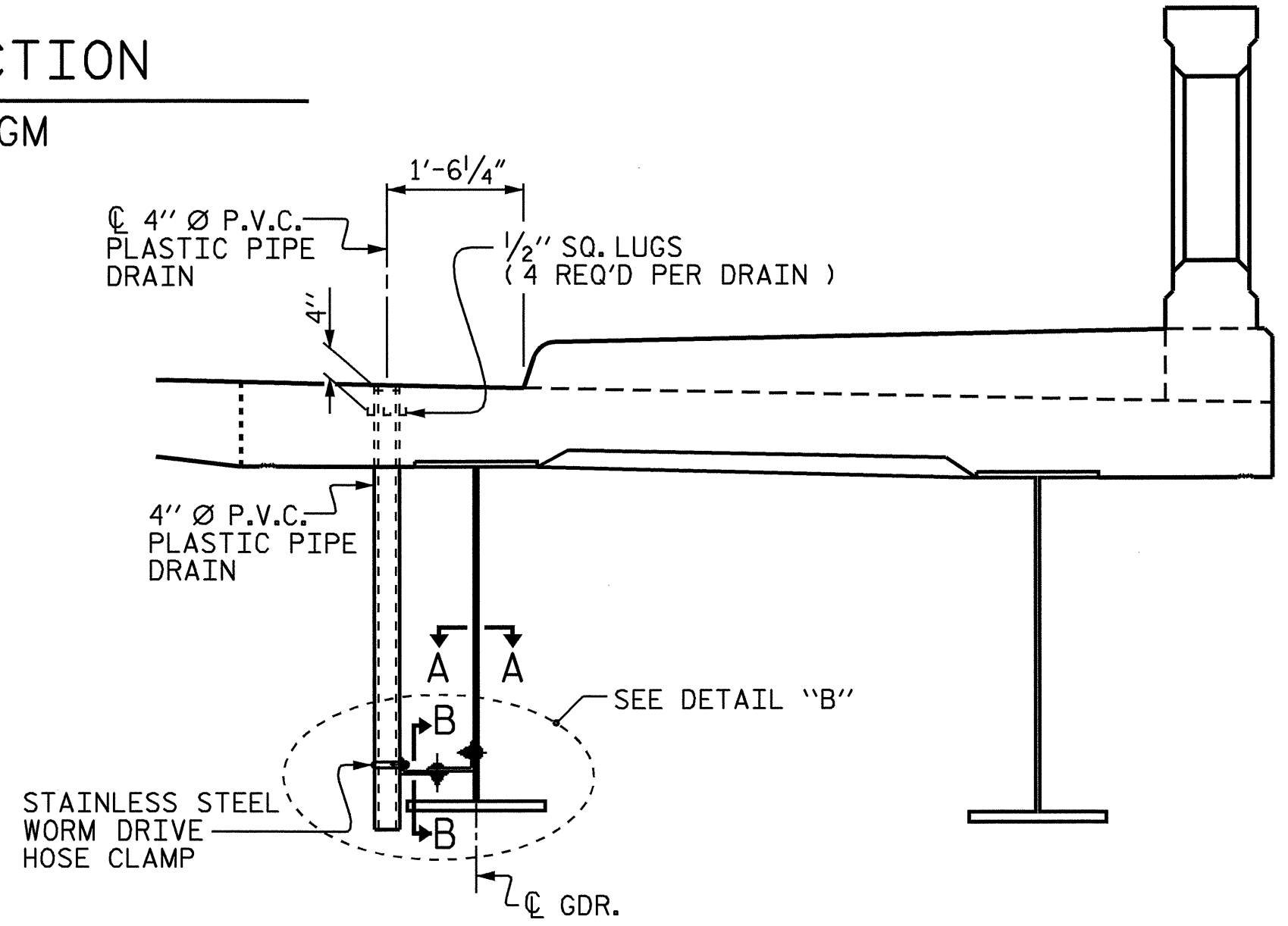
**CLOSURE POUR DETAIL**



**SECTION B-B**



**SECTION A-A**

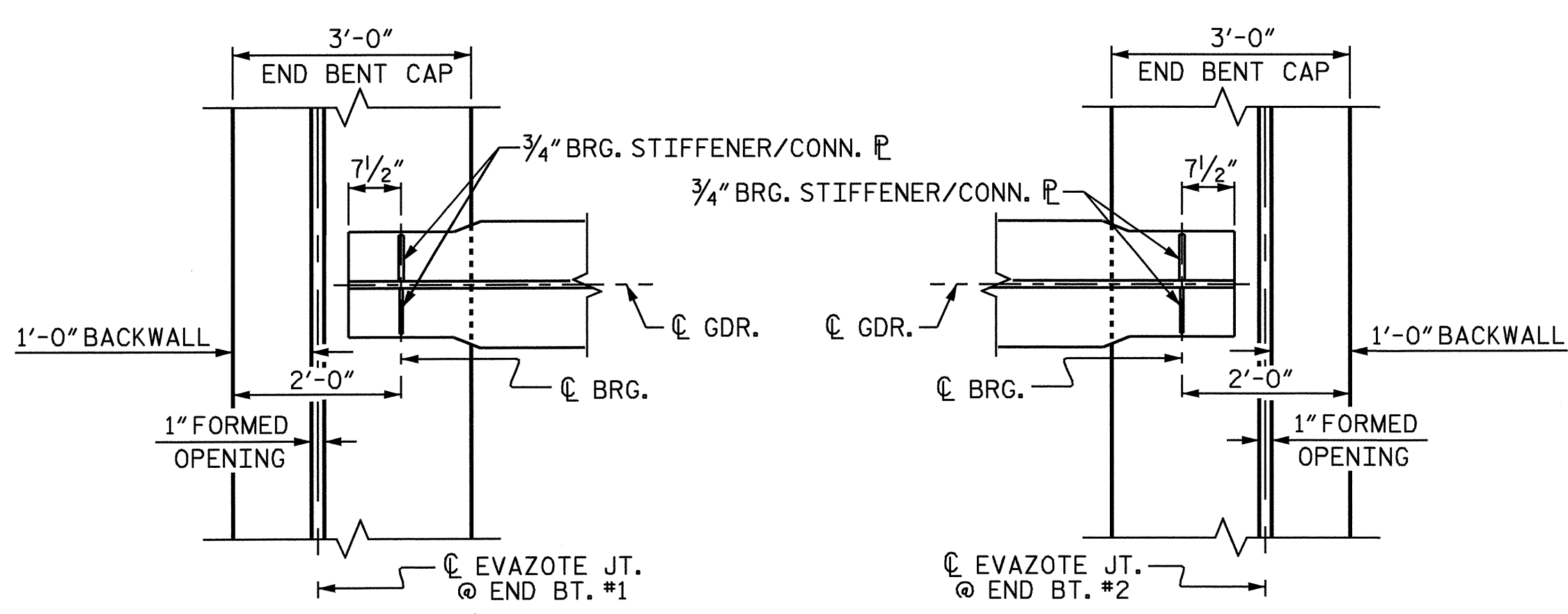


**DRAIN CONNECTOR DETAIL**

PROVIDE SLOTS AS NECESSARY TO ALLOW ADJUSTMENTS Laterally AND LONGITUDINALLY.

**DETAIL "B"**

COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY THE ENGINEER.  
TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.  
4 - 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.  
BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM DRIVE HOSE CLAMP SHALL BE COMMERCIAL QUALITY.  
THE 4" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



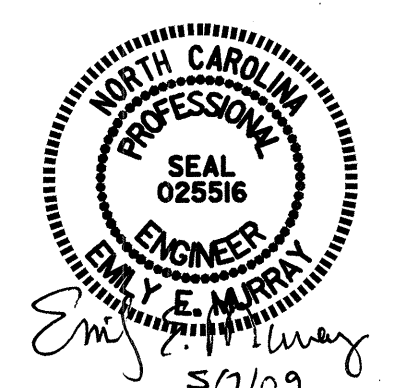
**PLAN @ END BENT #1**

**PLAN @ END BENT #2**

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-

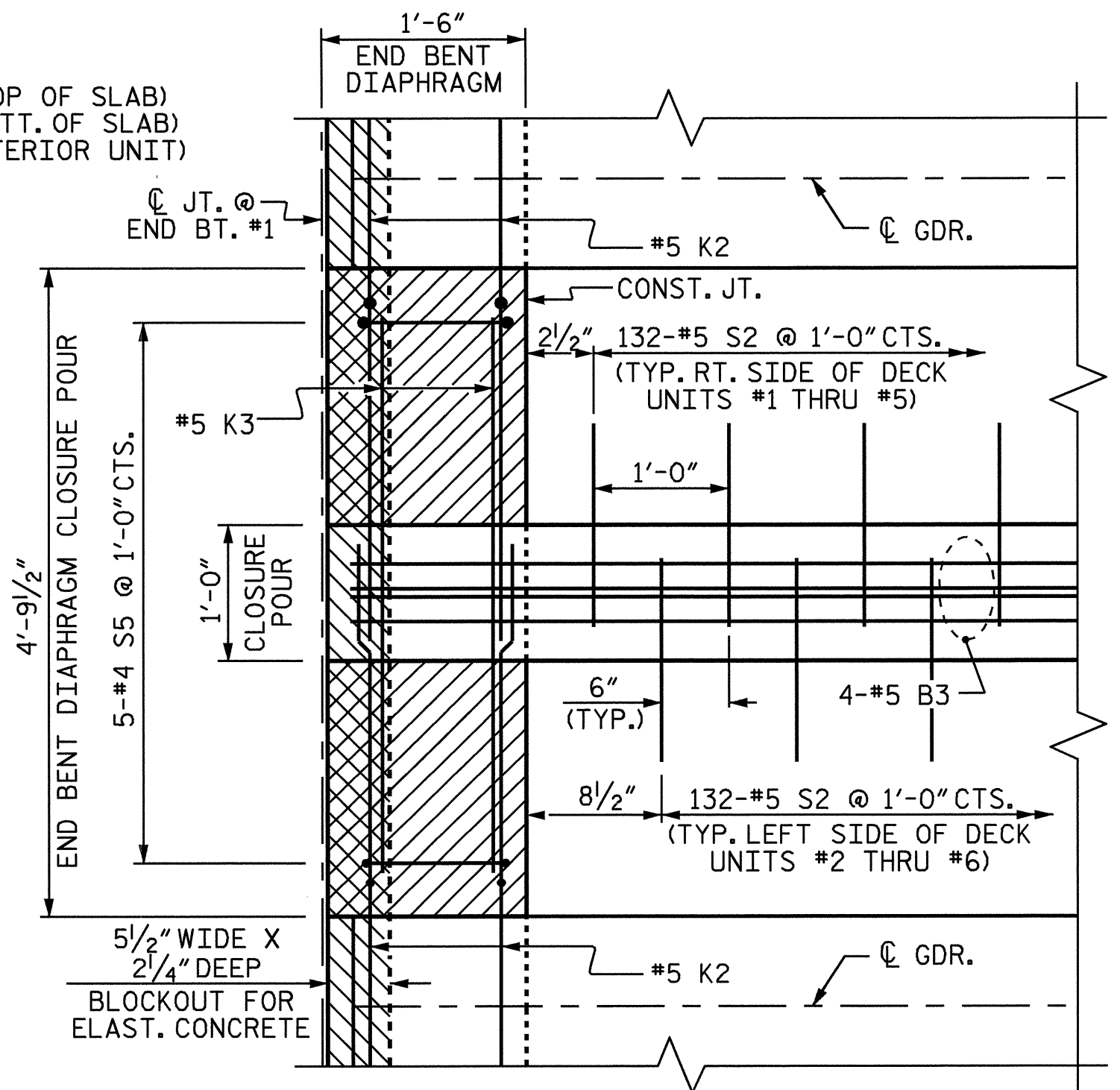
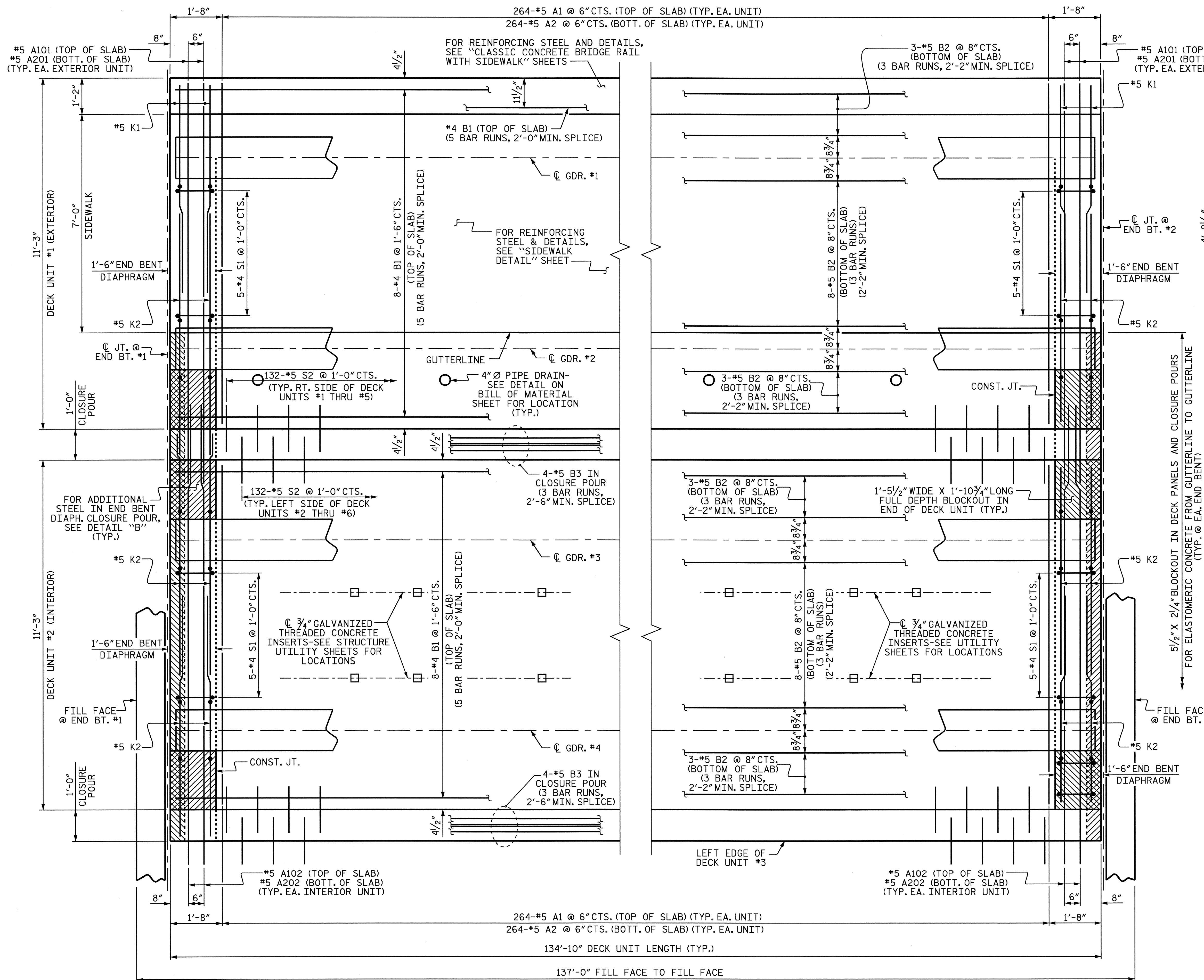
SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 28



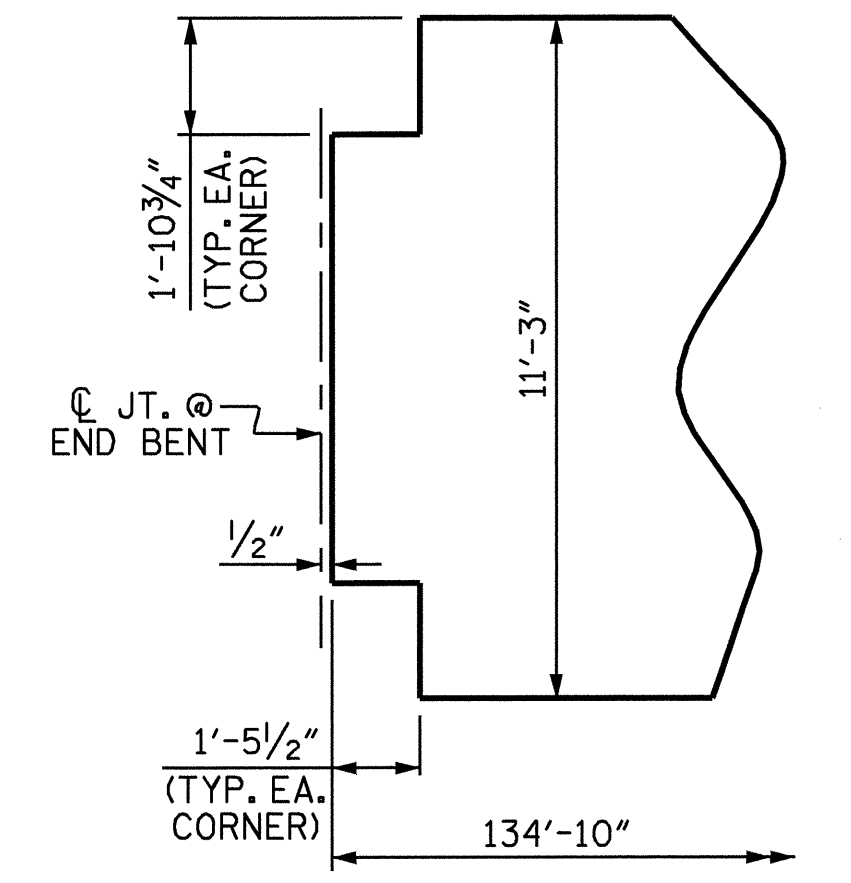
DRAWN BY : T.L. AVERETTE DATE : 2-09  
CHECKED BY : PEGGY PARISI DATE : 3-09





**DETAIL "B"**

SHOWING CLOSURE POUR @ END BENT DIAPHRAGM ("A" AND "B" BARS IN DECK UNITS NOT SHOWN)



**BLOCK OUT DETAIL**

INTERIOR DECK UNIT SHOWN, EXTERIOR DECK UNIT SIMILAR EXCEPT EXTERIOR OF UNIT DOES NOT HAVE BLOCK OUT.

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PARTIAL  
 PLAN OF SPAN**

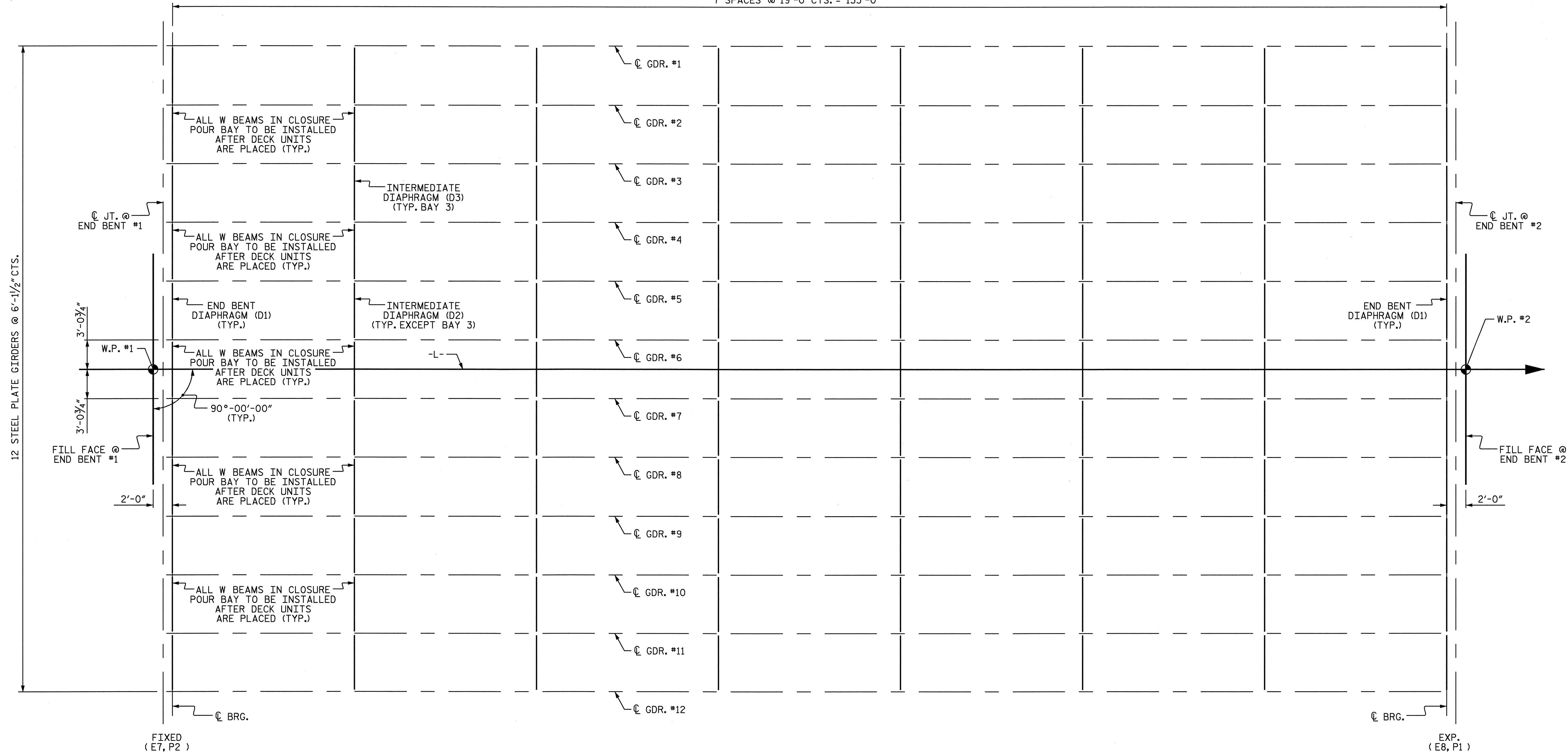
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			28



DRAWN BY: T.L. AVERETTE DATE: 2-09  
 CHECKED BY: PEGGY PARISI DATE: 3-09

FOR LOCATION OF #5 S3 BARS IN EXTERIOR DECK UNIT & CLASSIC CONCRETE BRIDGE RAIL, SEE "CLASSIC CONCRETE BRIDGE RAIL WITH SIDEWALK" SHEETS.  
 FOR LOCATION OF #4 D1 BARS IN INTERIOR DECK UNIT & SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.

7 SPACES @ 19'-0" CTS. = 133'-0"



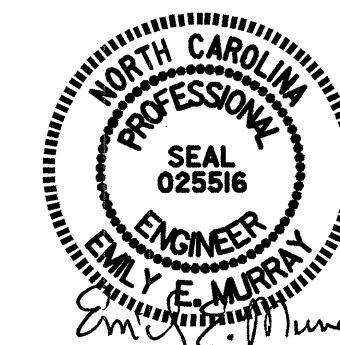
### FRAMING PLAN

(FOR DIAPHRAGMS D1, D2 AND D3, SEE "STRUCTURAL STEEL DETAILS," SHEET 2 OF 2.  
FOR BEARINGS AND SOLE PLATES, SEE "ELASTOMERIC BEARING DETAILS" SHEET.)

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
FRAMING PLAN



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : T.L. AVERETTE DATE : 2-09  
CHECKED BY : PEGGY PARISI DATE : 3-09



**NOTES**

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

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

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

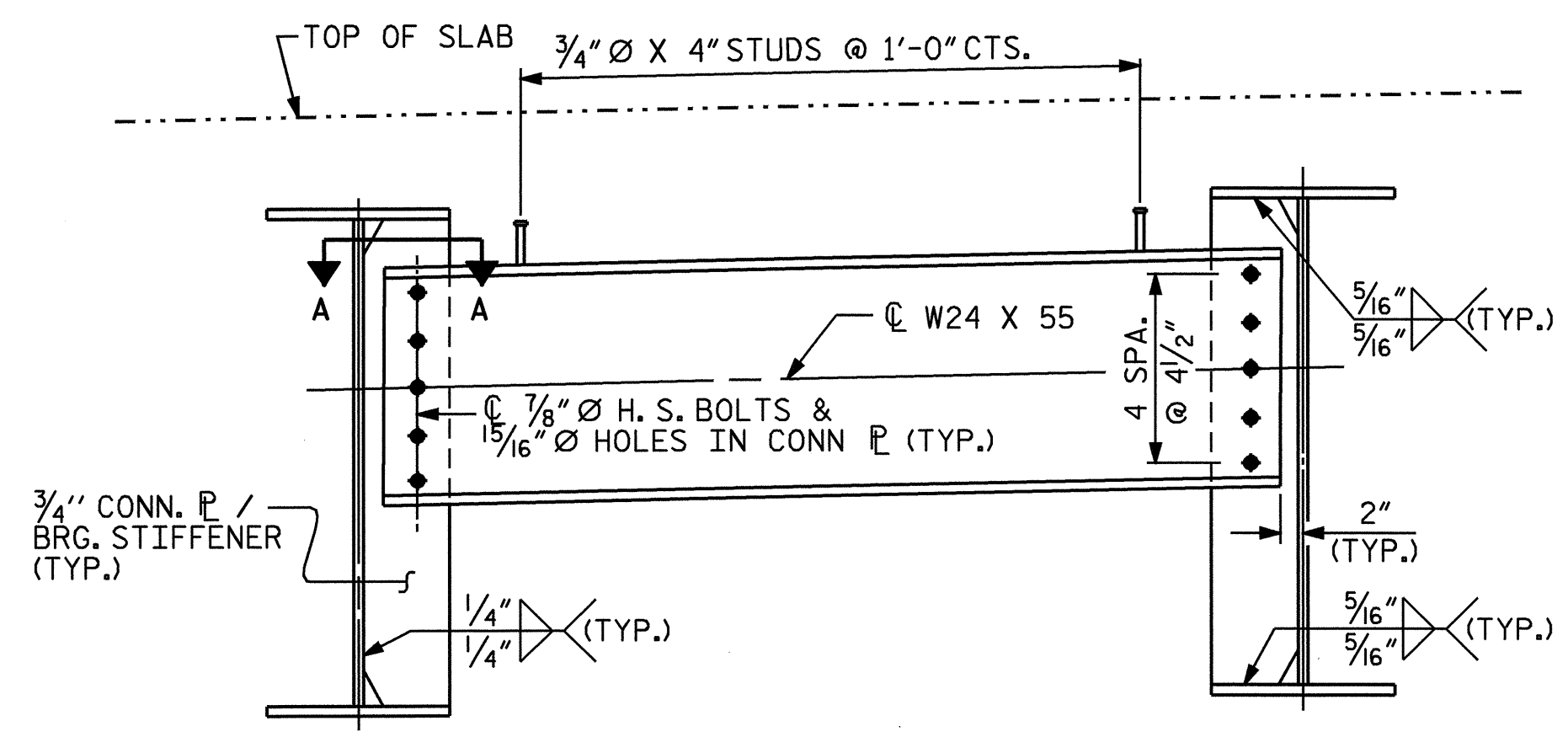
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

END OF GIRDERS SHALL BE PLUMB.

USE A MINIMUM 7/16" THICK PLATE WASHER WITH STANDARD HOLES UNDER EACH BOLT HEAD AND NUT IN DIAPHRAGMS LOCATED IN CLOSURE BAYS. THE PLATE WASHERS SHALL HAVE SUFFICIENT SIZE TO COVER THE HOLES AFTER INSTALLATION. DIRECT TENSION INDICATORS ARE TO BE USED IN CONJUNCTION WITH THE PLATE WASHERS.

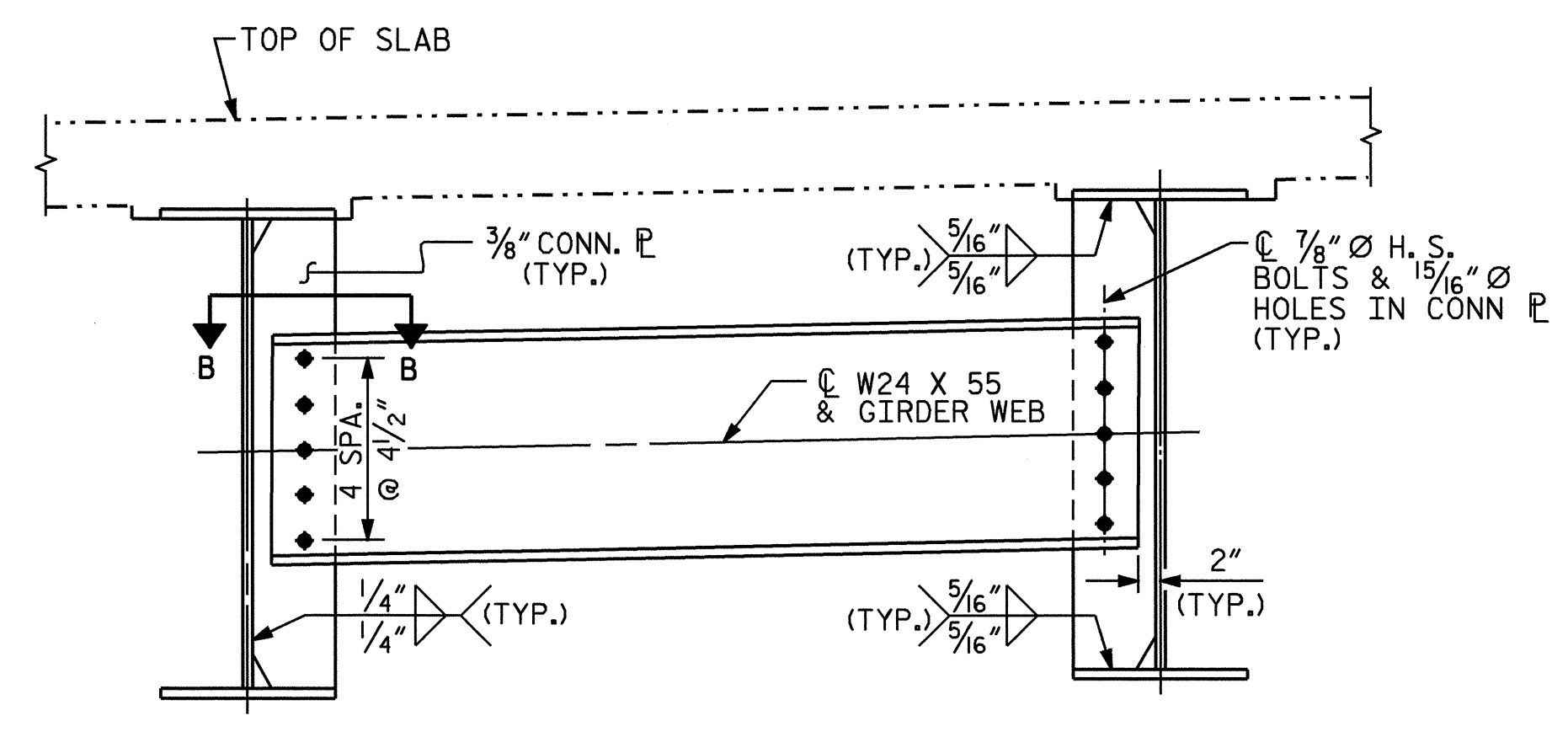
PROVIDE SUFFICIENT LENGTH OF ALL BOLTS TO ACCOMMODATE WASHERS, DIRECT TENSION INDICATORS, THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.



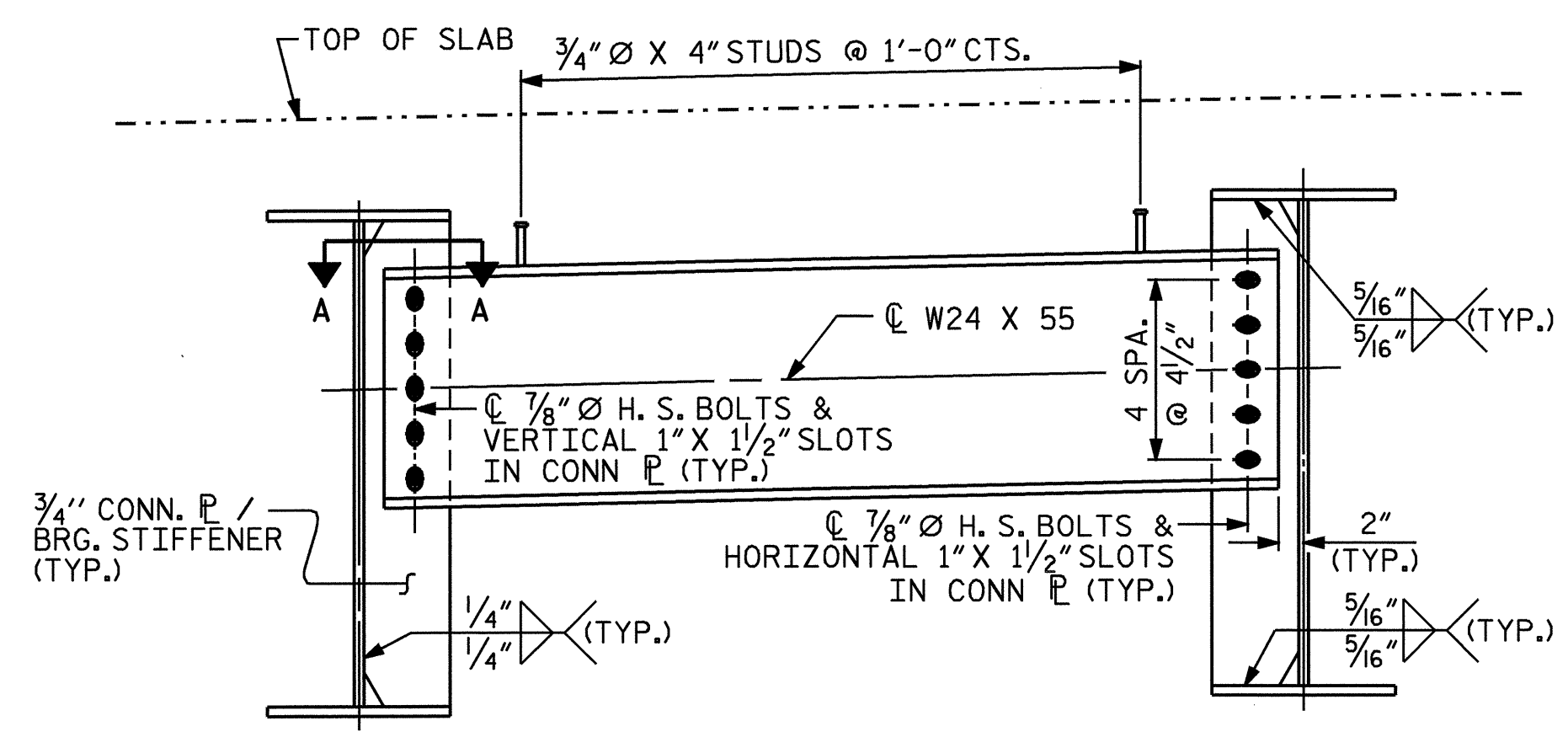
**TYPICAL END BENT DIAPHRAGM (D1)**

(SHOWING END BENT DIAPHRAGM IN BAYS 1, 3, 5, 7, 9 AND 11)



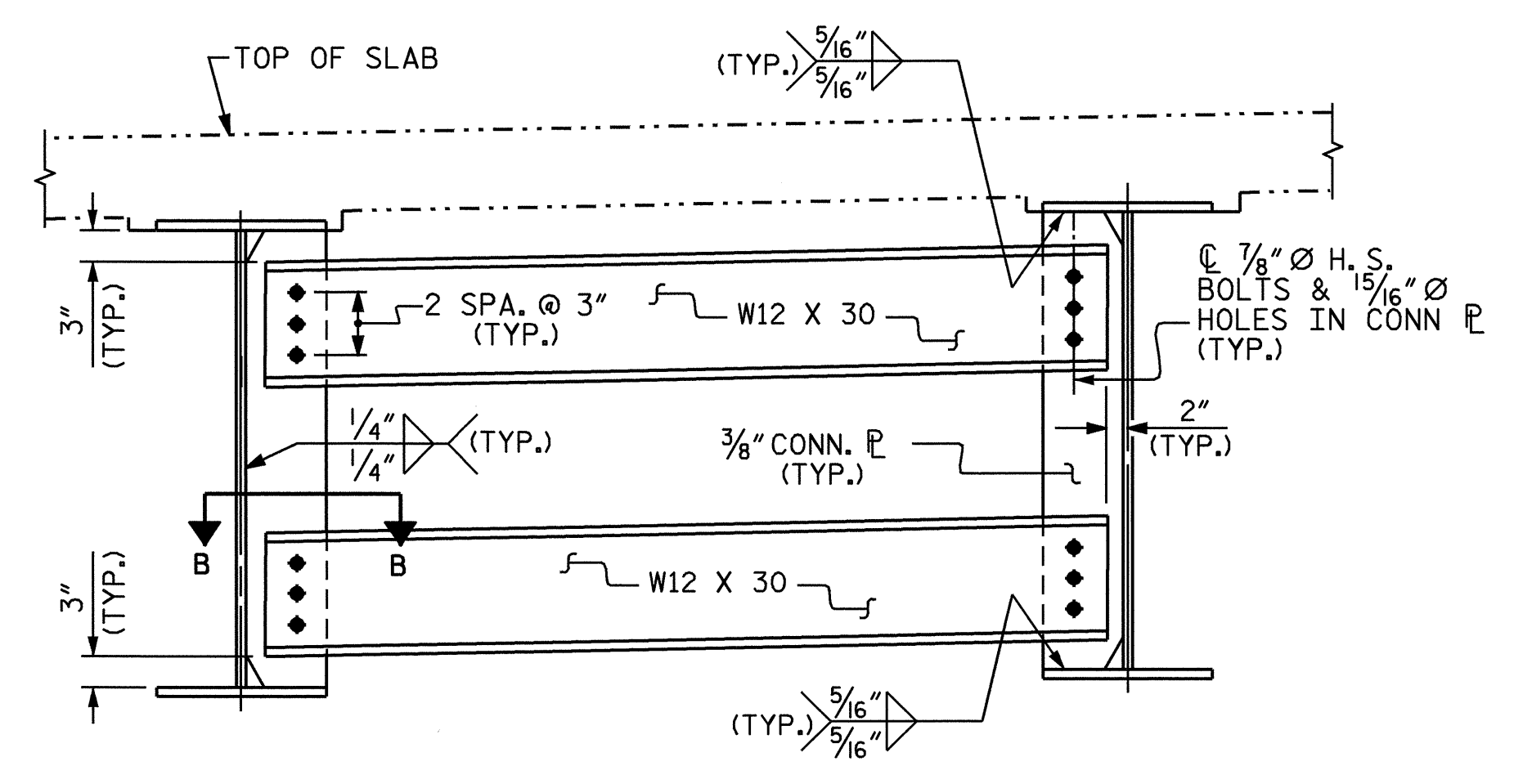
**TYPICAL INTERMEDIATE DIAPHRAGM (D2)**

(SHOWING INTERMEDIATE DIAPHRAGM IN BAYS 1, 5, 7, 9 AND 11)



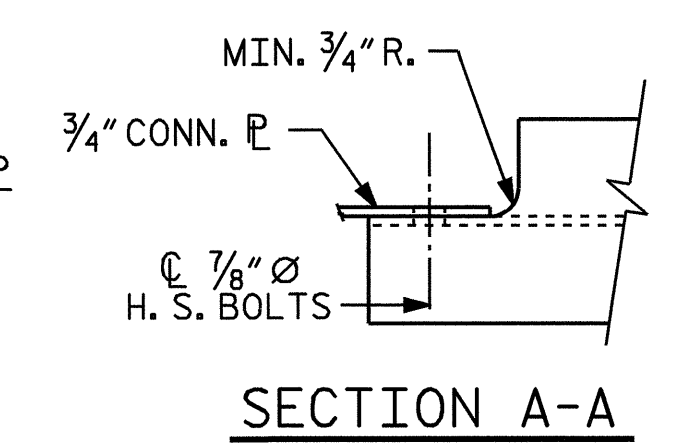
**TYPICAL END BENT DIAPHRAGM (D1)**

(SHOWING END BENT DIAPHRAGM IN CLOSURE POUR BAYS 2, 4, 6, 8 AND 10)

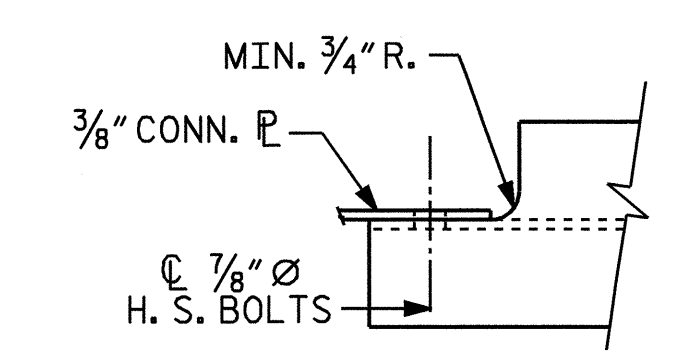


**TYPICAL INTERMEDIATE DIAPHRAGM (D3)**

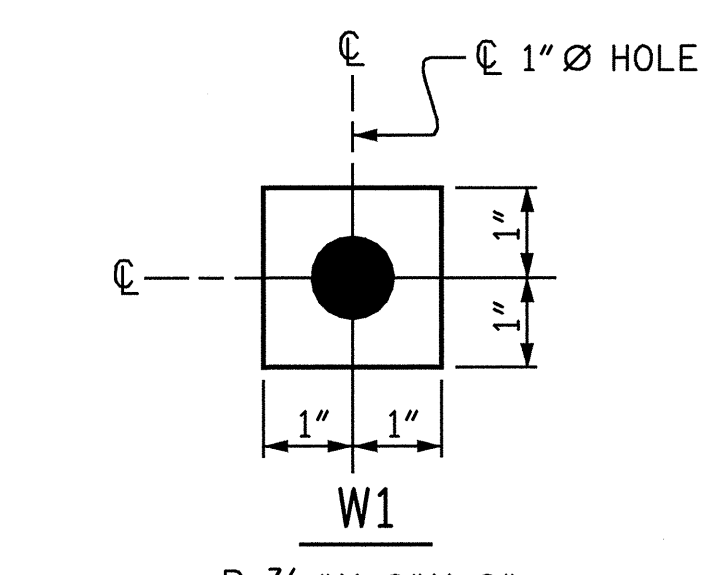
(SHOWING INTERMEDIATE DIAPHRAGM IN BAY 3)



**SECTION A-A**

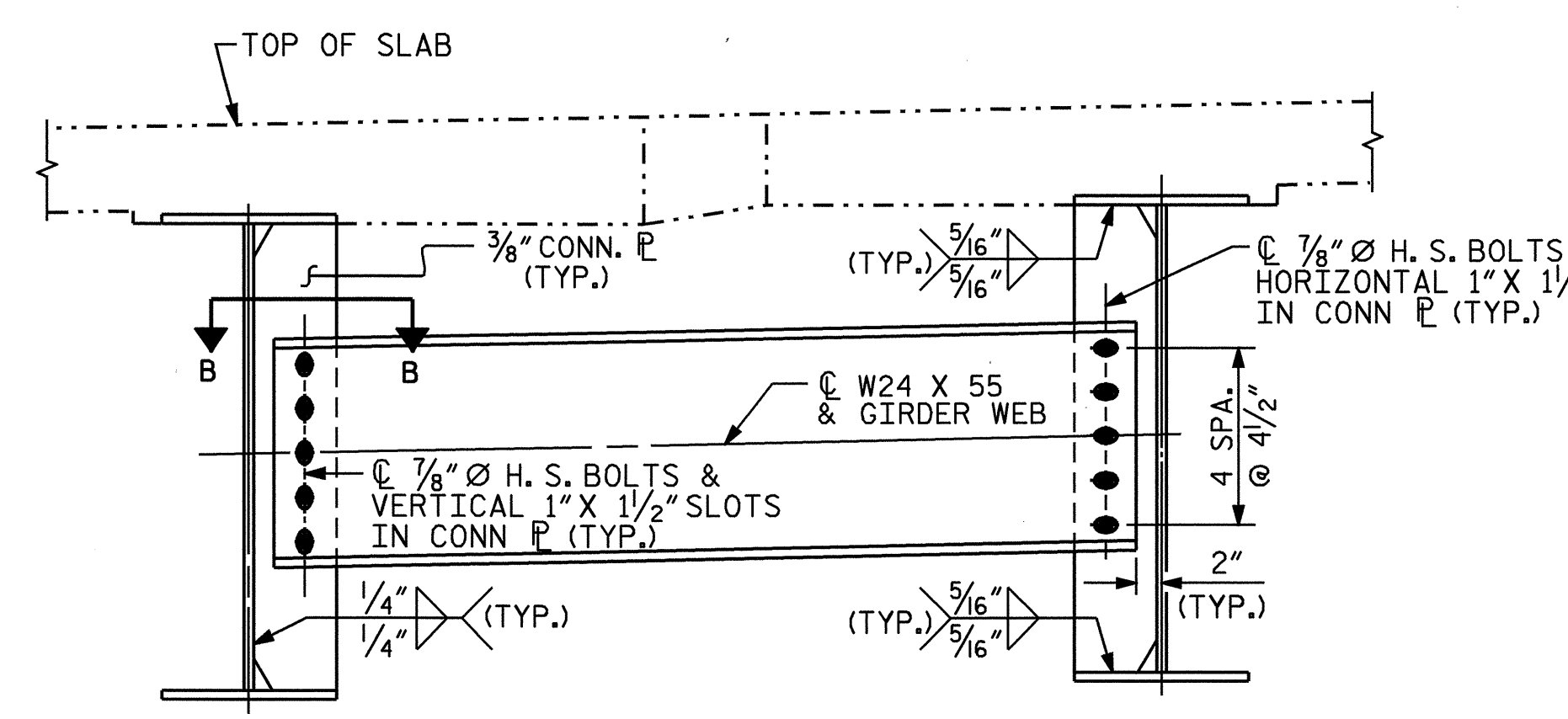


**SECTION B-B**



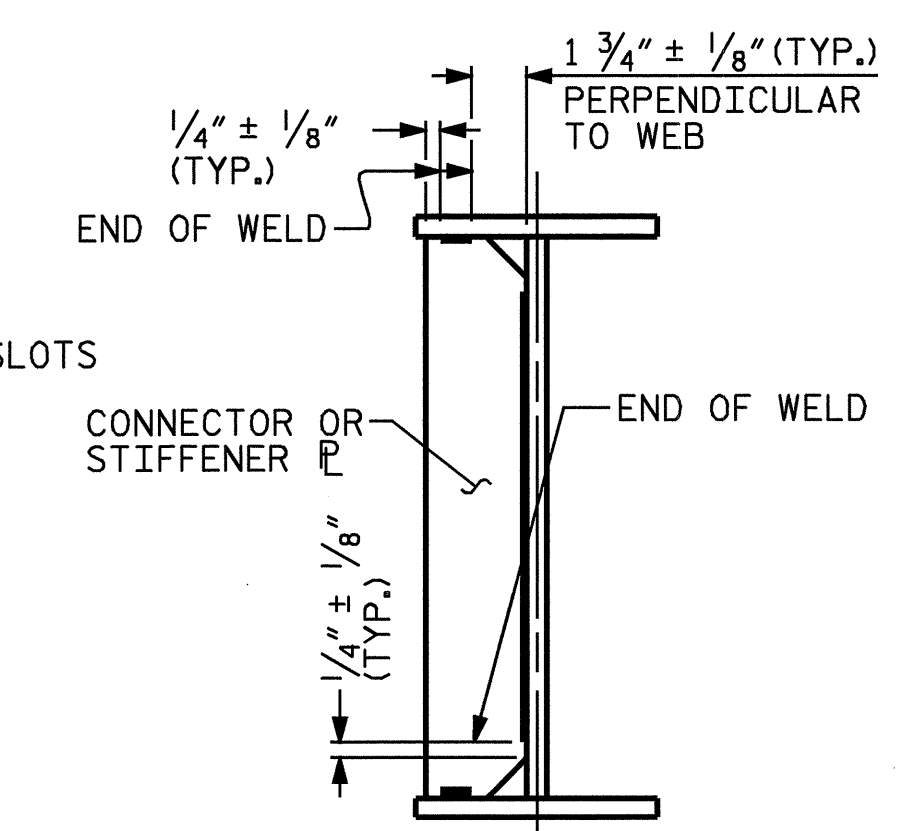
**WASHER DETAILS**

USE WITH 7/8" Ø H.V.Y. HEX NUTS & DIRECT TENSION INDICATOR WASHERS AT DIAPHRAGM W BEAM TO CONNECTOR PLATE CONNECTIONS

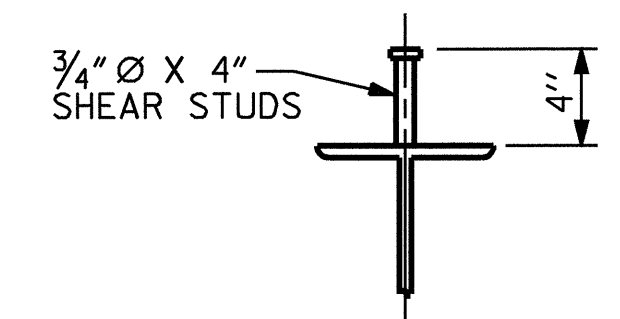


**TYPICAL INTERMEDIATE DIAPHRAGM (D2)**

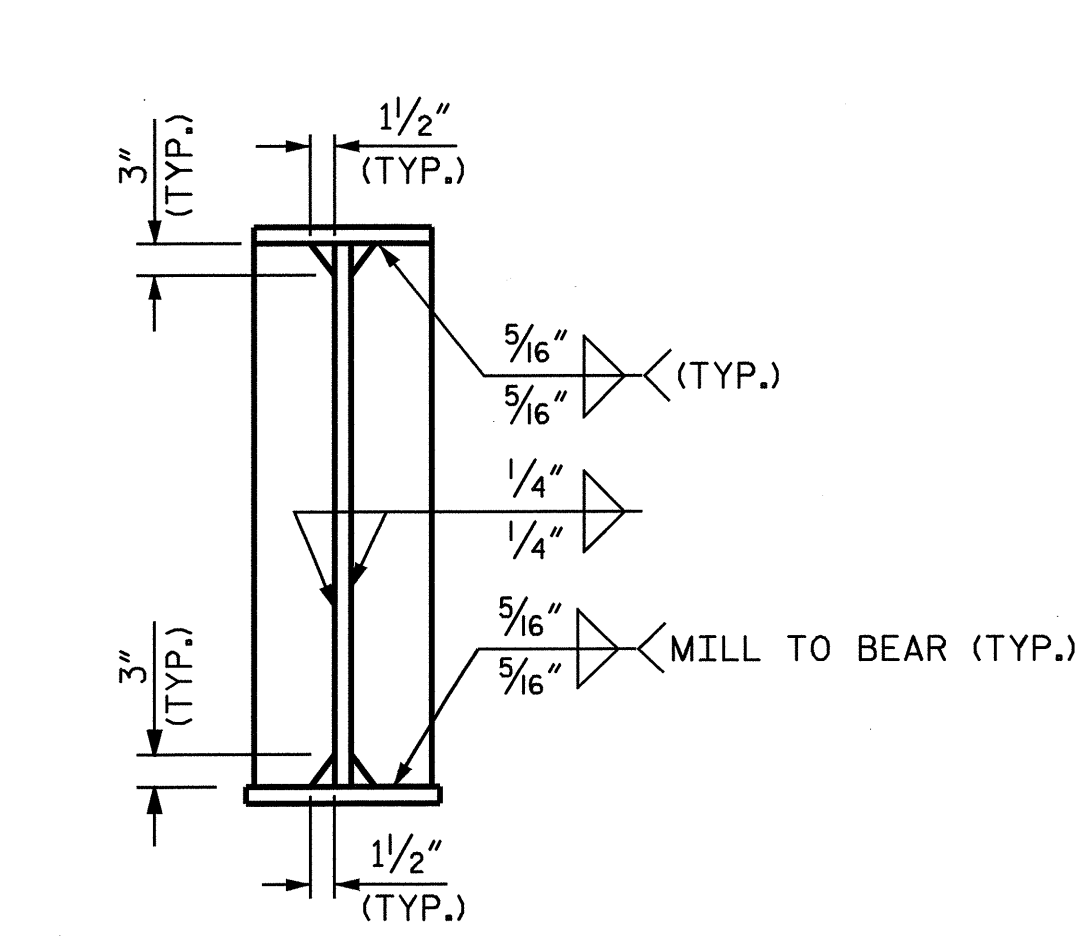
(SHOWING INTERMEDIATE DIAPHRAGM IN CLOSURE POUR BAYS 2, 4, 6, 8 AND 10)



**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS WELD TERMINATION DETAILS**

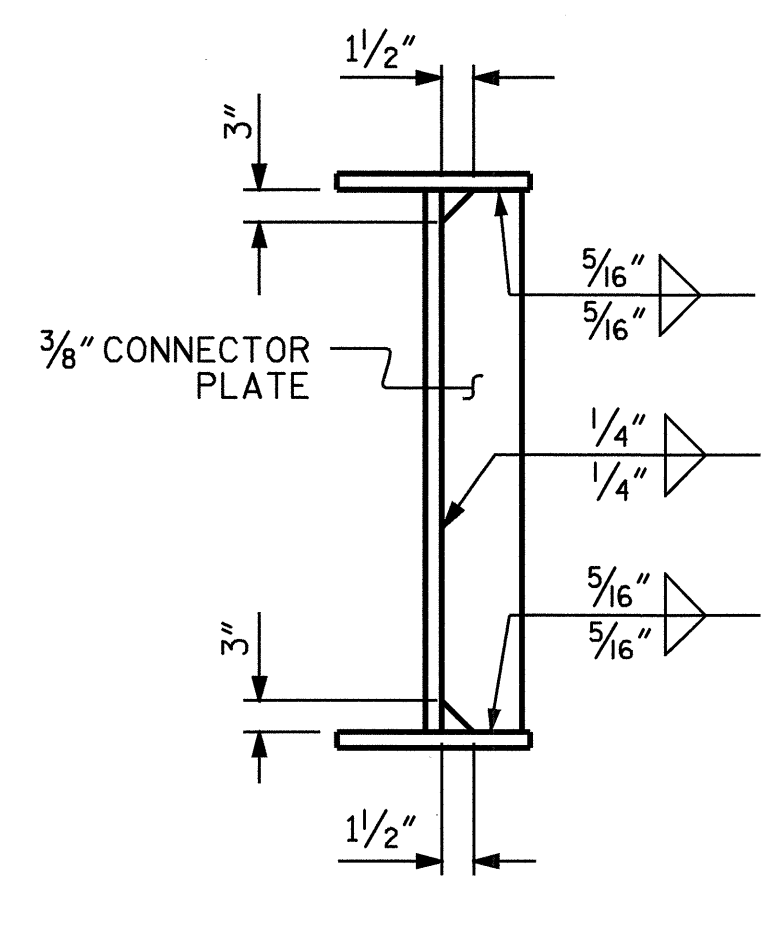


**SHEAR STUD DETAILS**  
(@ END BENT DIAPHRAGM)



**CONNECTOR PLATE/ BEARING STIFFENER (FOR D1)**

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.



**CONNECTOR PLATE (FOR D2 & D3)**

(OMIT ON OUTER FACE OF EXTERIOR GIRDER)



PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-

SHEET 2 OF 2

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			28

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

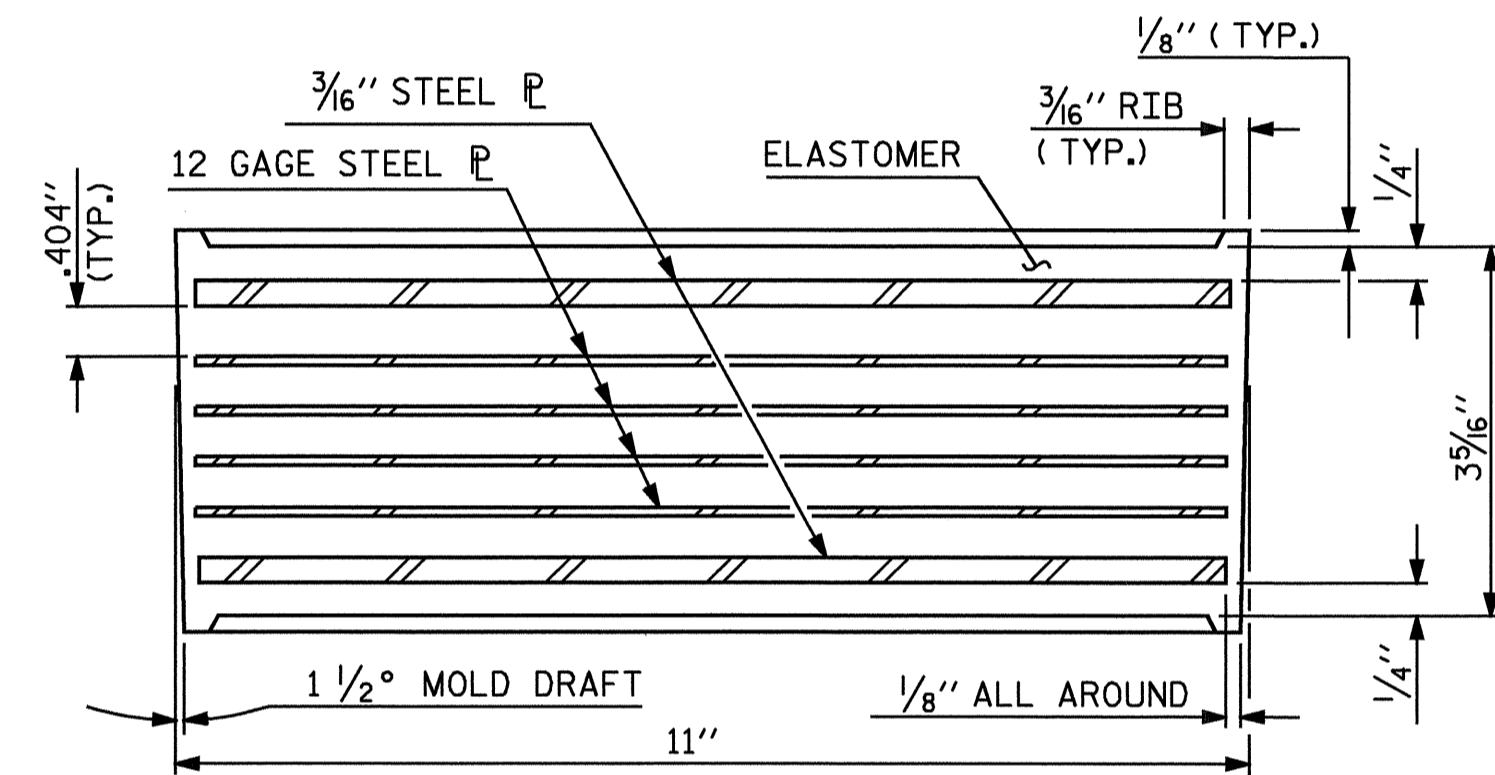
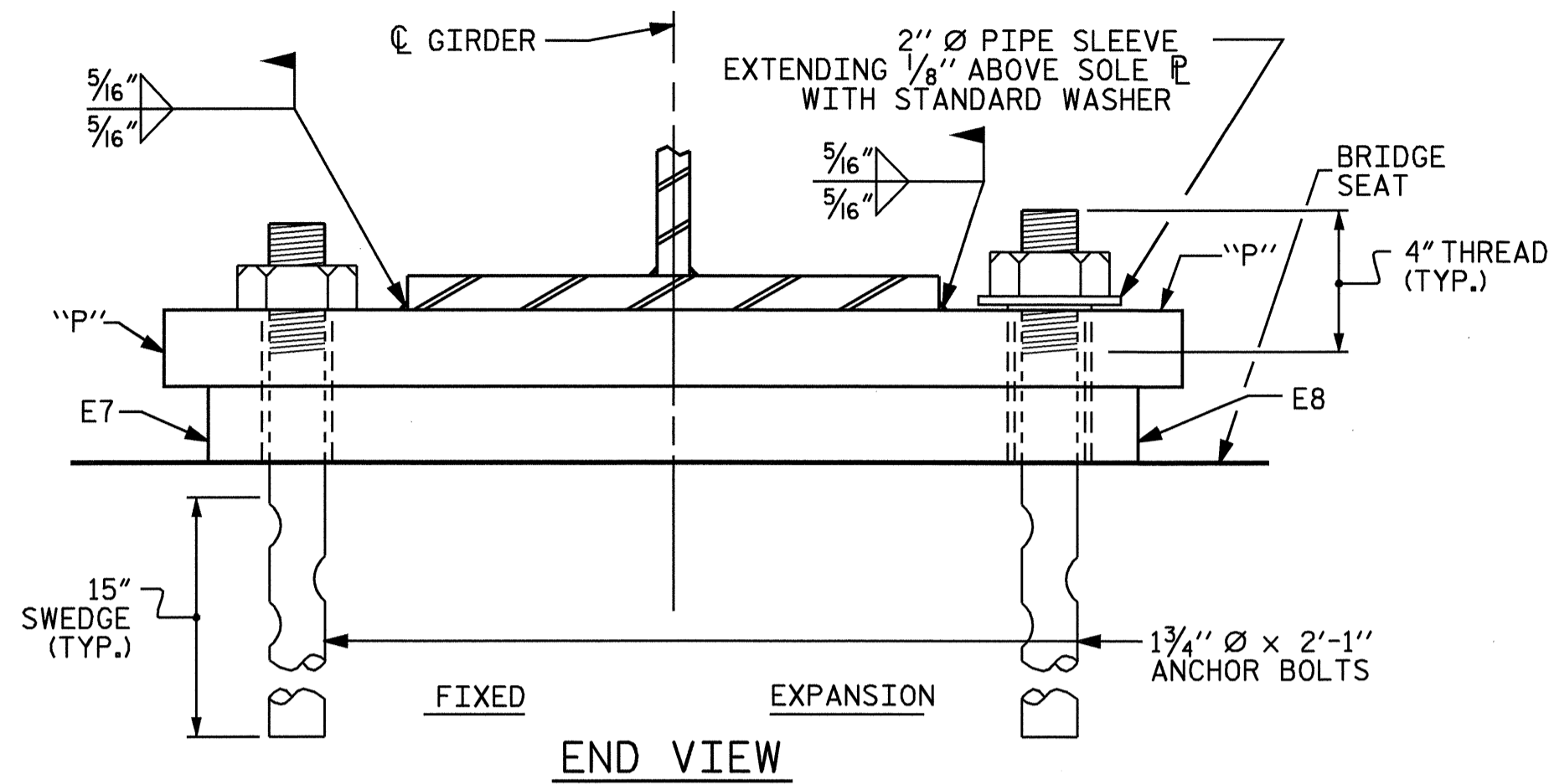
SOLE PLATE SHALL NOT BE WELDED TO THE GIRDER FLANGE UNTIL THE CONTRACTOR HAS FIELD VERIFIED THAT THE DECK UNITS ARE PROPERLY ALIGNED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

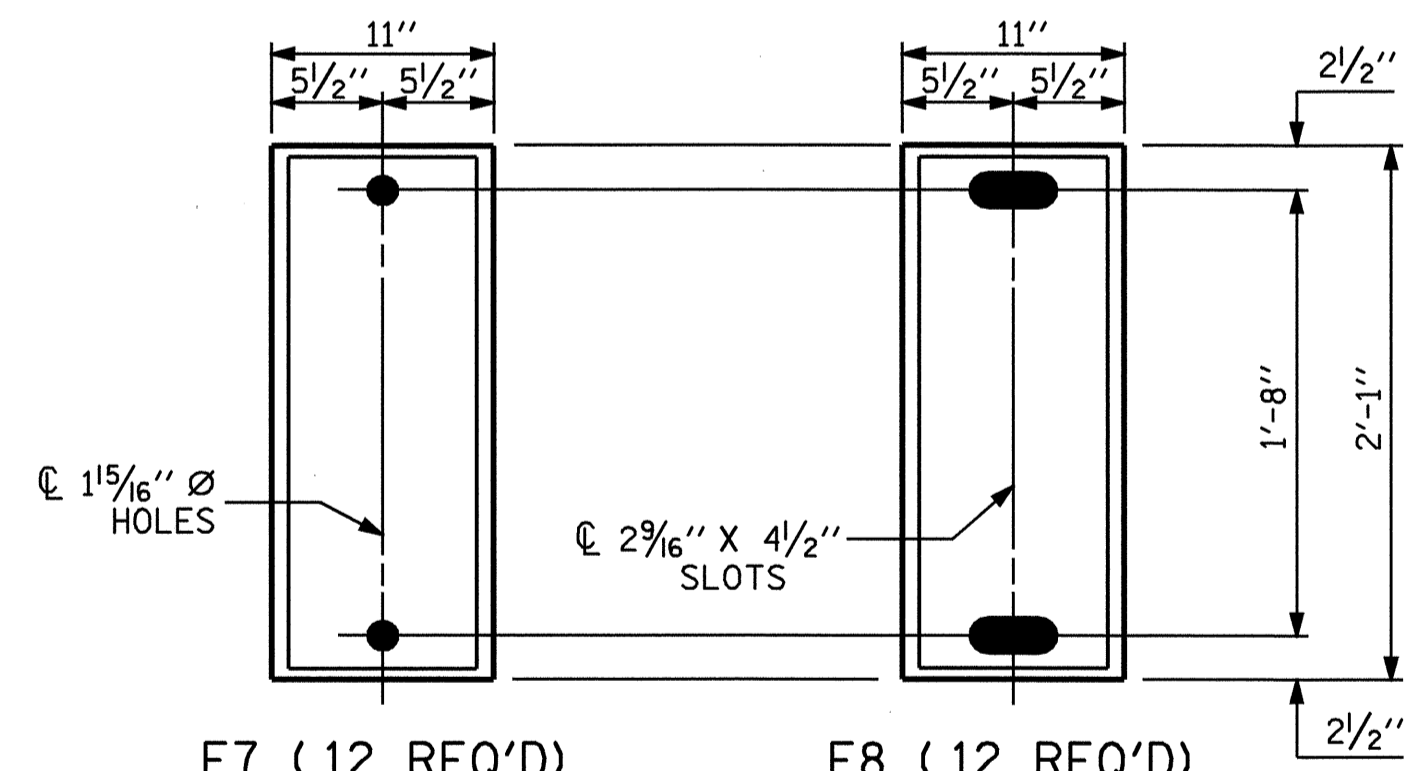
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE ALL CLOSURE POURS HAVE CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

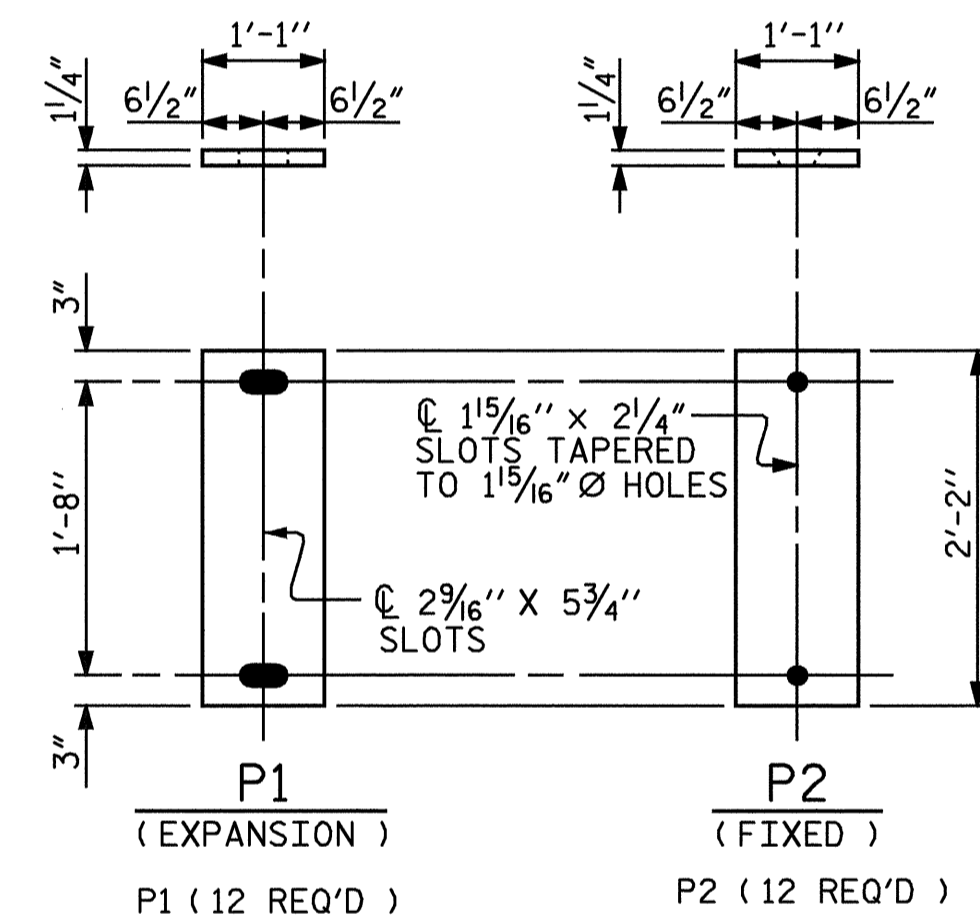
THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.



TYPICAL SECTION OF ELASTOMERIC BEARING



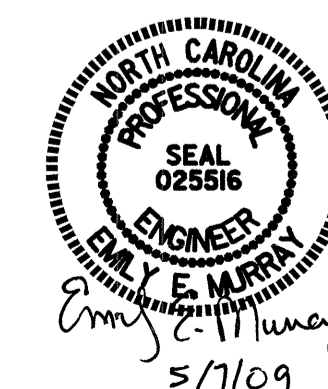
E7 (12 REQ'D) E8 (12 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE IV



SOLE PLATE DETAILS ("P")

-LOAD RATINGS-	
	MAX.D.L.+ L.L.
TYPE IV	184 K

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD ELASTOMERIC BEARING DETAILS (STEEL SUPERSTRUCTURE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-12
					TOTAL SHEETS 28

ASSEMBLED BY : T.L. AVERETTE	DATE : 2-09
CHECKED BY : PEGGY PARISI	DATE : 3-09
DRAWN BY : EEM 10/95	REV. 10/17/00 RWW/LES
CHECKED BY : PEK 10/95	REV. 7/10/01 LES/RDR
	REV. 5/1/06 TLA/GM

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN "A"																					
	GIRDERS A1 & A12																				
@ TWENTIETH POINTS BETWEEN @ BEARINGS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.030	0.059	0.086	0.110	0.130	0.147	0.160	0.170	0.176	0.178	0.176	0.170	0.160	0.147	0.130	0.110	0.086	0.059	0.030	0.000
DEFLECTION DUE TO WEIGHT OF SLAB, RAIL & SIDEWALK*	0.000	0.084	0.164	0.239	0.305	0.363	0.411	0.450	0.478	0.495	0.501	0.495	0.478	0.450	0.411	0.363	0.305	0.239	0.164	0.084	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.114	0.223	0.325	0.415	0.493	0.558	0.610	0.648	0.671	0.679	0.671	0.648	0.610	0.558	0.493	0.415	0.325	0.223	0.114	0.000
VERTICAL CURVE ORDINATE	0.000	0.017	0.031	0.041	0.046	0.048	0.046	0.043	0.040	0.037	0.033	0.030	0.027	0.023	0.020	0.017	0.013	0.010	0.007	0.003	0.000
REQUIRED CAMBER	0	1 <sup>9</sup> / <sub>16</sub> "	3 <sup>1</sup> / <sub>16</sub> "	4 <sup>3</sup> / <sub>8</sub> "	5 <sup>9</sup> / <sub>16</sub> "	6 <sup>1</sup> / <sub>2</sub> "	7 <sup>1</sup> / <sub>4</sub> "	7 <sup>13</sup> / <sub>16</sub> "	8 <sup>1</sup> / <sub>4</sub> "	8 <sup>1</sup> / <sub>2</sub> "	8 <sup>9</sup> / <sub>16</sub> "	8 <sup>7</sup> / <sub>16</sub> "	8 <sup>1</sup> / <sub>8</sub> "	7 <sup>5</sup> / <sub>8</sub> "	6 <sup>15</sup> / <sub>16</sub> "	6 <sup>1</sup> / <sub>8</sub> "	5 <sup>1</sup> / <sub>8</sub> "	4"	2 <sup>3</sup> / <sub>4</sub> "	1 <sup>3</sup> / <sub>8</sub> "	0

\* INCLUDES SLAB, RAIL, SIDEWALK, BUILDUPS & STAY-IN-PLACE FORMS.  
ALL VALUES ARE SHOWN IN FEET EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

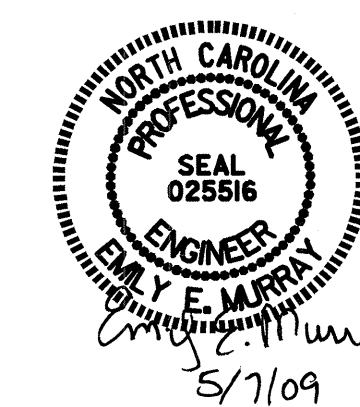
DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN "A"																					
	GIRDERS A2 & A11																				
@ TWENTIETH POINTS BETWEEN @ BEARINGS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.030	0.059	0.086	0.110	0.130	0.147	0.160	0.170	0.176	0.178	0.176	0.170	0.160	0.147	0.130	0.110	0.086	0.059	0.030	0.000
DEFLECTION DUE TO WEIGHT OF SLAB, RAIL & SIDEWALK*	0.000	0.064	0.126	0.183	0.234	0.278	0.314	0.344	0.366	0.379	0.383	0.379	0.366	0.344	0.314	0.278	0.234	0.183	0.126	0.064	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.094	0.185	0.269	0.344	0.408	0.461	0.504	0.536	0.555	0.561	0.555	0.536	0.504	0.461	0.408	0.344	0.269	0.185	0.094	0.000
VERTICAL CURVE ORDINATE	0.000	0.017	0.031	0.041	0.046	0.048	0.046	0.043	0.040	0.037	0.033	0.030	0.027	0.023	0.020	0.017	0.013	0.010	0.007	0.003	0.000
REQUIRED CAMBER	0	1 <sup>5</sup> / <sub>16</sub> "	2 <sup>9</sup> / <sub>16</sub> "	3 <sup>3</sup> / <sub>4</sub> "	4 <sup>11</sup> / <sub>16</sub> "	5 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>16</sub> "	6 <sup>9</sup> / <sub>16</sub> "	6 <sup>15</sup> / <sub>16</sub> "	7 <sup>1</sup> / <sub>8</sub> "	7 <sup>1</sup> / <sub>8</sub> "	7"	6 <sup>3</sup> / <sub>4</sub> "	6 <sup>5</sup> / <sub>16</sub> "	5 <sup>3</sup> / <sub>4</sub> "	5 <sup>1</sup> / <sub>8</sub> "	4 <sup>5</sup> / <sub>16</sub> "	3 <sup>3</sup> / <sub>8</sub> "	2 <sup>5</sup> / <sub>16</sub> "	1 <sup>3</sup> / <sub>16</sub> "	0

\* INCLUDES SLAB, RAIL, SIDEWALK, BUILDUPS & STAY-IN-PLACE FORMS.  
ALL VALUES ARE SHOWN IN FEET EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN "A"																					
	GIRDERS A3 THRU A10																				
@ TWENTIETH POINTS BETWEEN @ BEARINGS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.030	0.059	0.086	0.110	0.130	0.147	0.160	0.170	0.176	0.178	0.176	0.170	0.160	0.147	0.130	0.110	0.086	0.059	0.030	0.000
DEFLECTION DUE TO WEIGHT OF SLAB **	0.000	0.052	0.102	0.148	0.189	0.225	0.254	0.279	0.296	0.307	0.310	0.307	0.296	0.279	0.254	0.225	0.189	0.148	0.102	0.052	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.082	0.161	0.234	0.299	0.355	0.401	0.439	0.466	0.483	0.488	0.483	0.466	0.439	0.401	0.355	0.299	0.234	0.161	0.082	0.000
VERTICAL CURVE ORDINATE	0.000	0.017	0.031	0.041	0.046	0.048	0.046	0.043	0.040	0.037	0.033	0.030	0.027	0.023	0.020	0.017	0.013	0.010	0.007	0.003	0.000
REQUIRED CAMBER	0	1 <sup>3</sup> / <sub>16</sub> "	2 <sup>5</sup> / <sub>16</sub> "	3 <sup>5</sup> / <sub>16</sub> "	4 <sup>1</sup> / <sub>8</sub> "	4 <sup>13</sup> / <sub>16</sub> "	5 <sup>3</sup> / <sub>8</sub> "	5 <sup>13</sup> / <sub>16</sub> "	6 <sup>1</sup> / <sub>16</sub> "	6 <sup>1</sup> / <sub>4</sub> "	6 <sup>1</sup> / <sub>4</sub> "	6 <sup>1</sup> / <sub>8</sub> "	5 <sup>15</sup> / <sub>16</sub> "	5 <sup>9</sup> / <sub>16</sub> "	5 <sup>1</sup> / <sub>16</sub> "	4 <sup>7</sup> / <sub>16</sub> "	3 <sup>3</sup> / <sub>4</sub> "	2 <sup>15</sup> / <sub>16</sub> "	2"	1"	0

\*\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.  
ALL VALUES ARE SHOWN IN FEET EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
STATION: 13+90.00 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
DEAD LOAD  
DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 28
2			4			

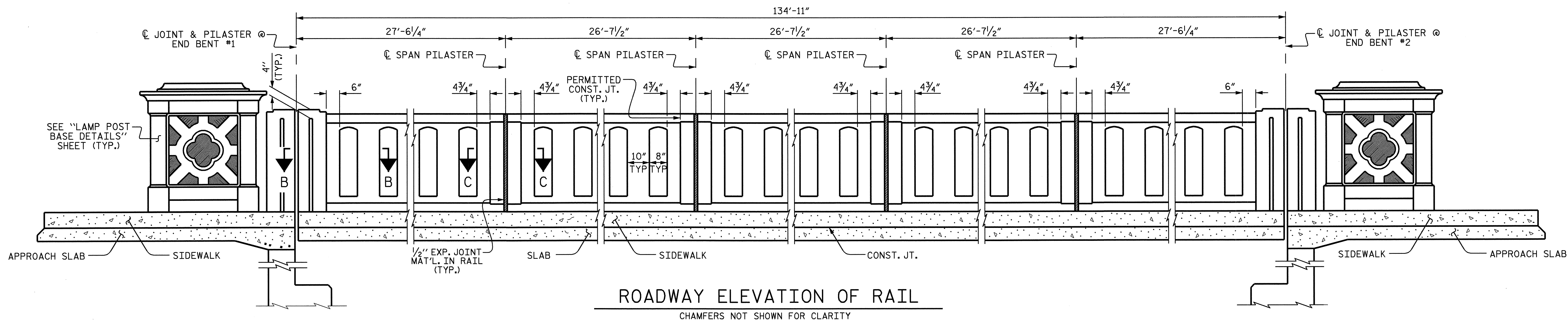
DRAWN BY : I.L. AVERETTE DATE : 3-09  
CHECKED BY : PEGGY PARISI DATE : 3-09

NOTES

ALL REINFORCING STEEL IN THE CLASSIC CONCRETE BRIDGE RAIL SHALL BE EPOXY COATED.

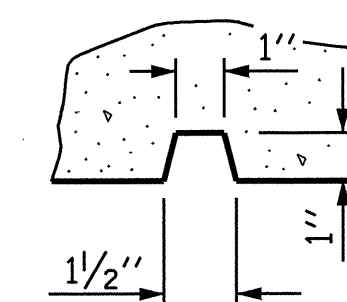
FOR CLASSIC CONCRETE BRIDGE RAIL, SEE SPECIAL PROVISIONS.

FOR SAND LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS.

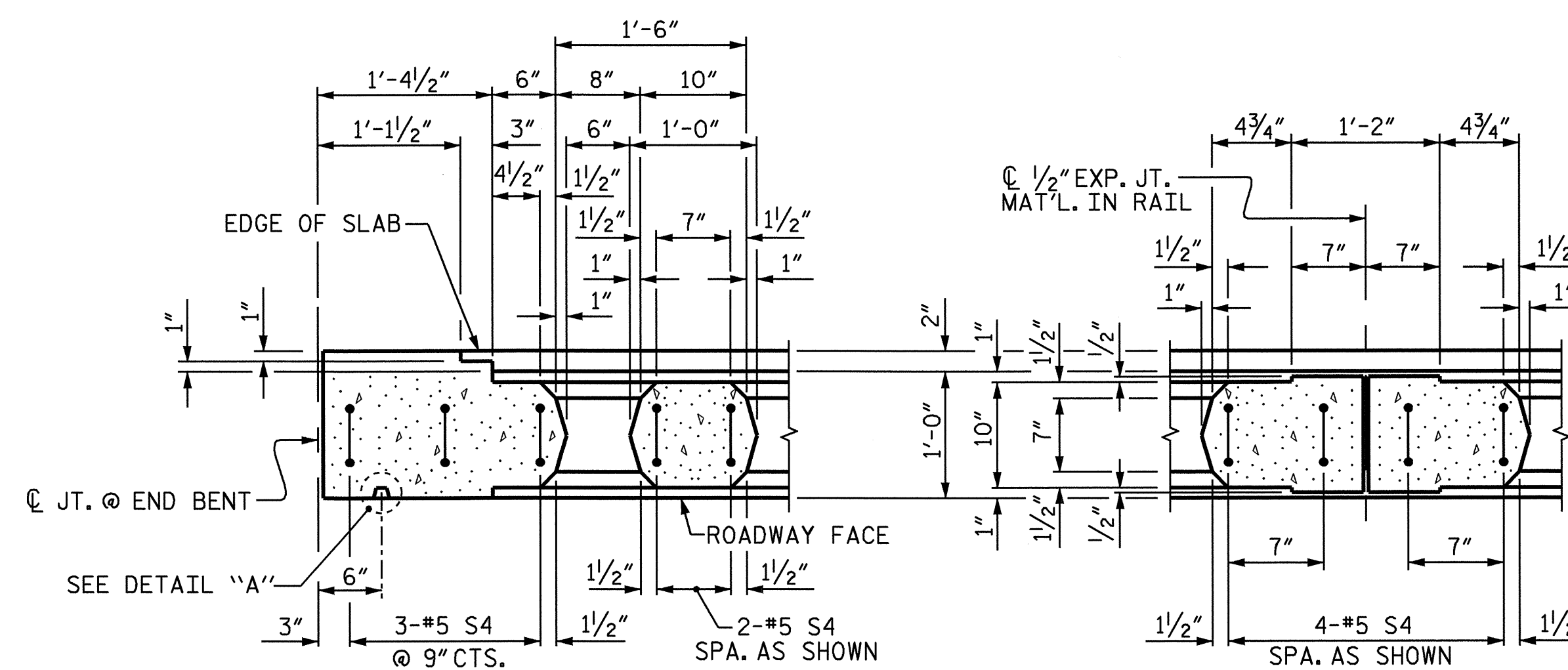


ROADWAY ELEVATION OF RAIL

CHAMFERS NOT SHOWN FOR CLARITY



DETAIL "A"



SECTION B-B

SHOWING END BENT PILASTER

SECTION C-C

SHOWING SPAN PILASTER

PARTIAL PLAN

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

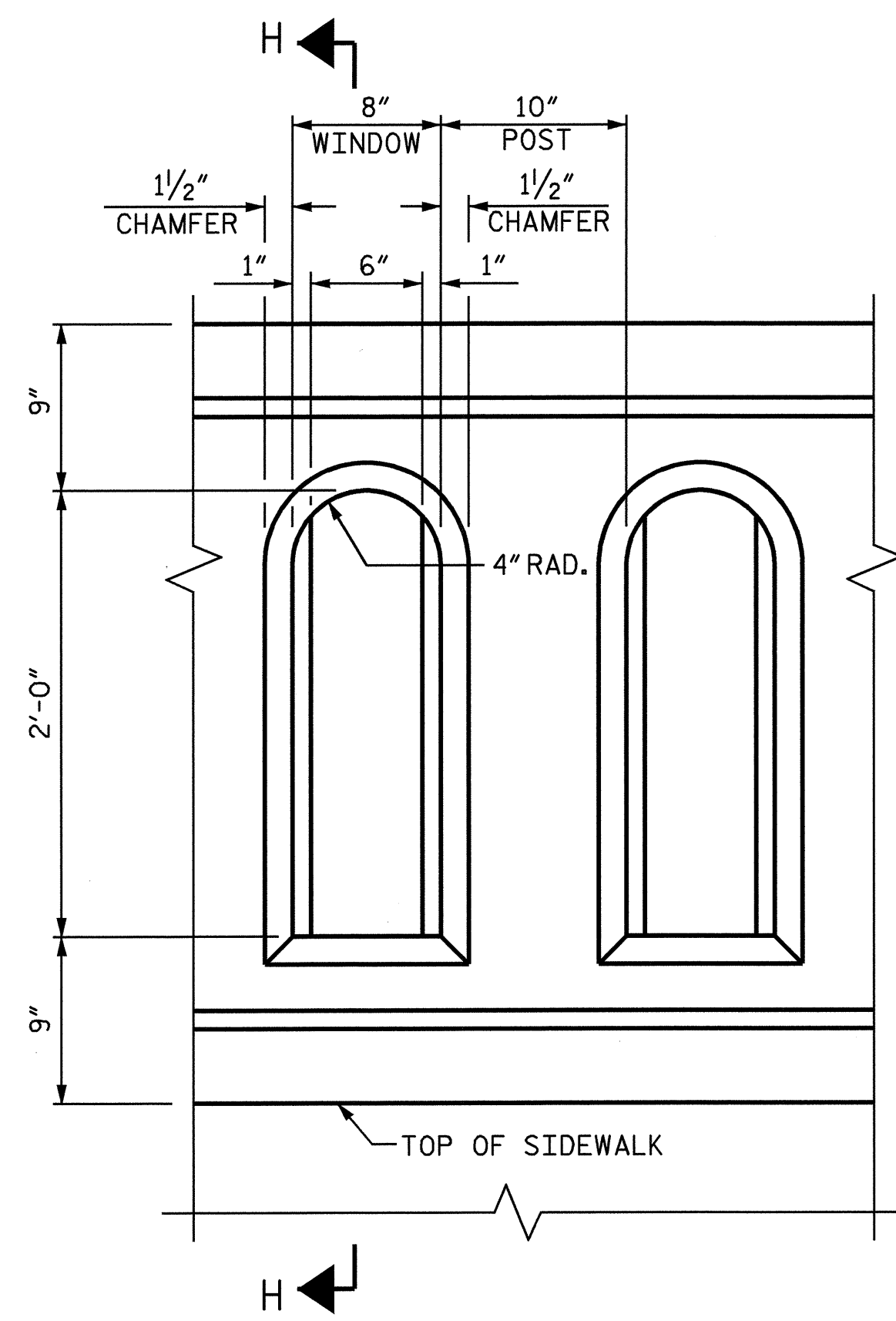
CLASSIC CONCRETE  
 BRIDGE RAIL WITH  
 SIDEWALK



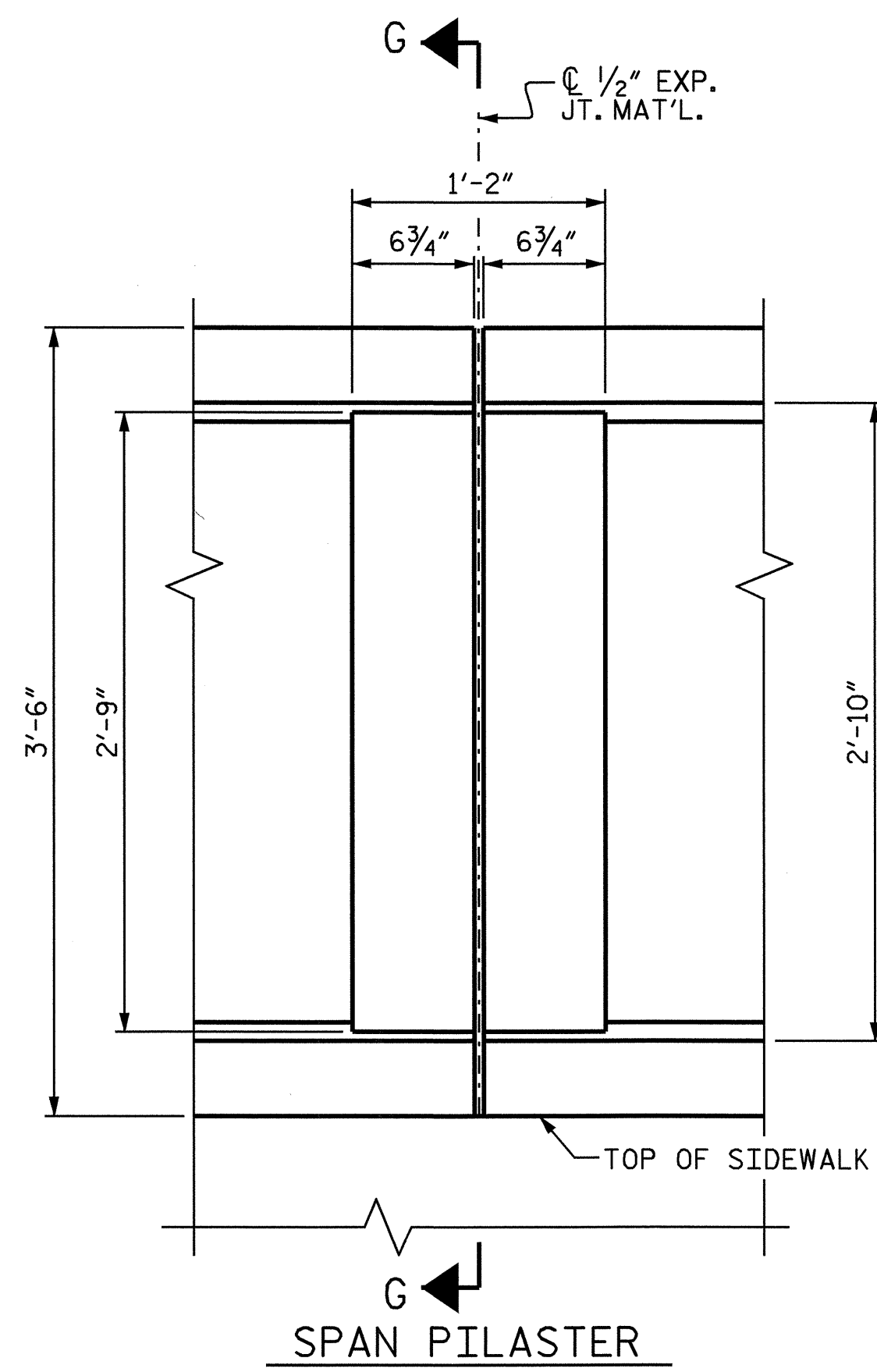
DRAWN BY: I.L. AVERETTE DATE: 2-09  
 CHECKED BY: PEGGY PARISI DATE: 3-09

07-MAY-2009 14:35  
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 I.Averette

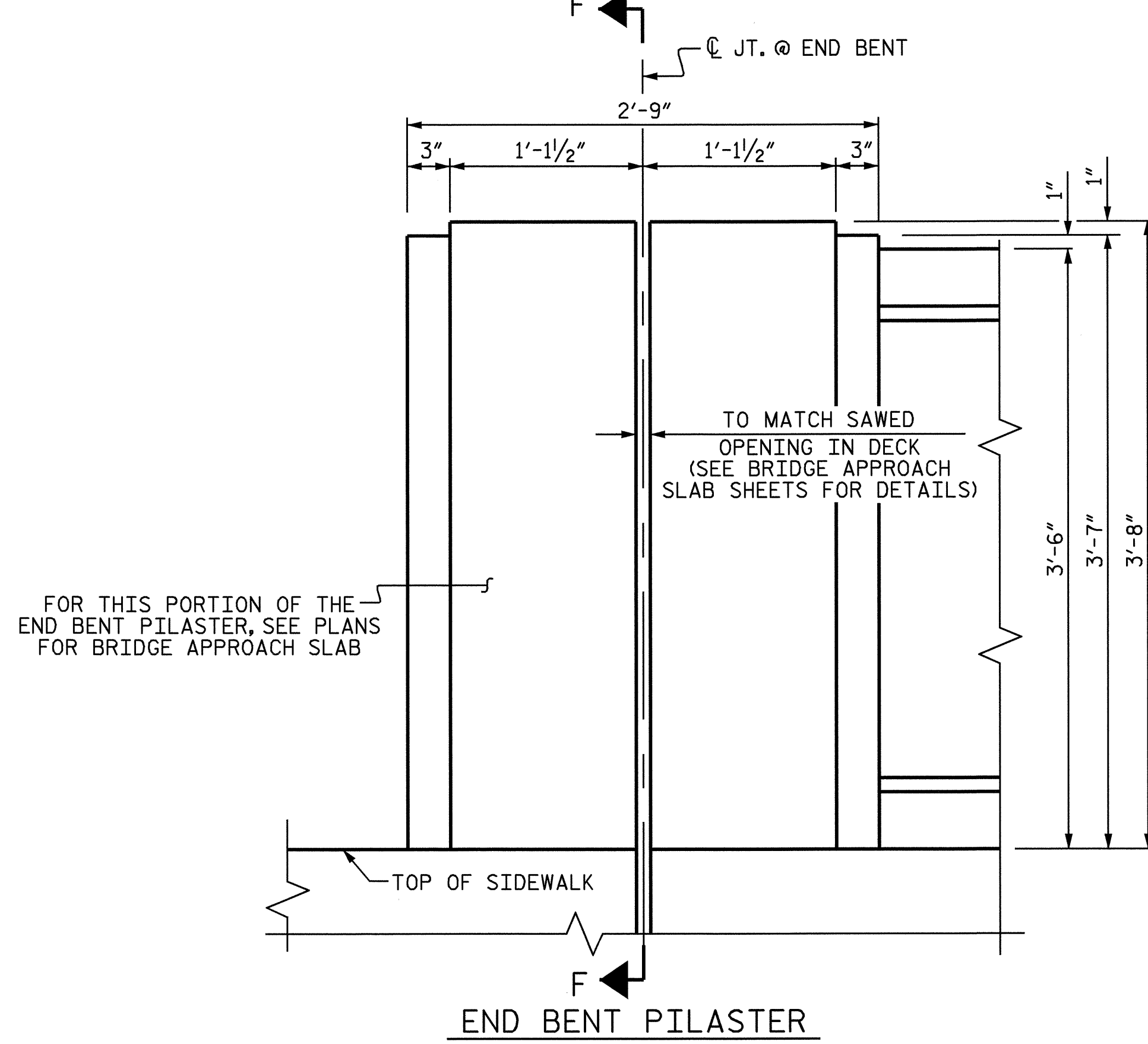
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	28
2			4				



WINDOW DETAIL



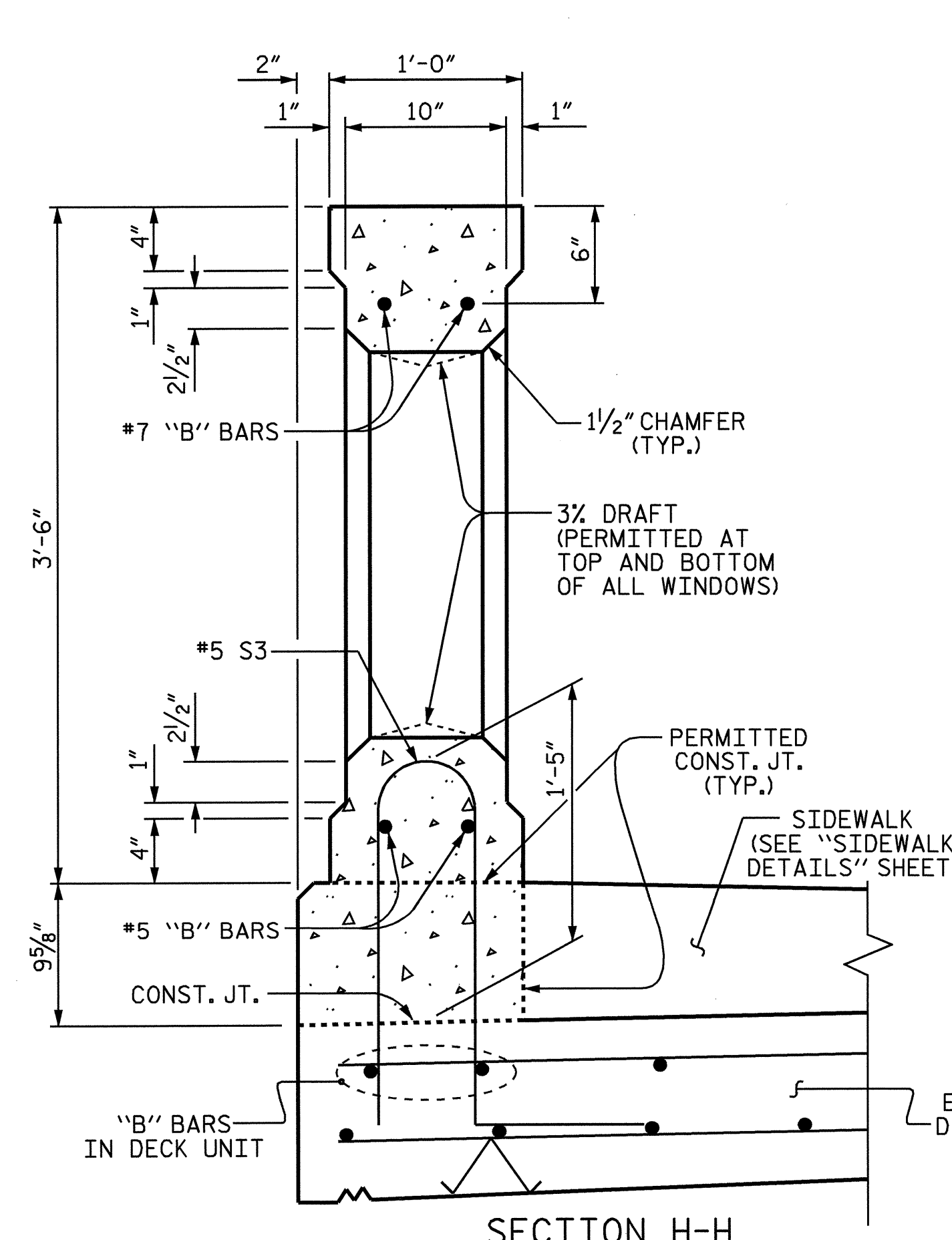
SPAN PILASTER



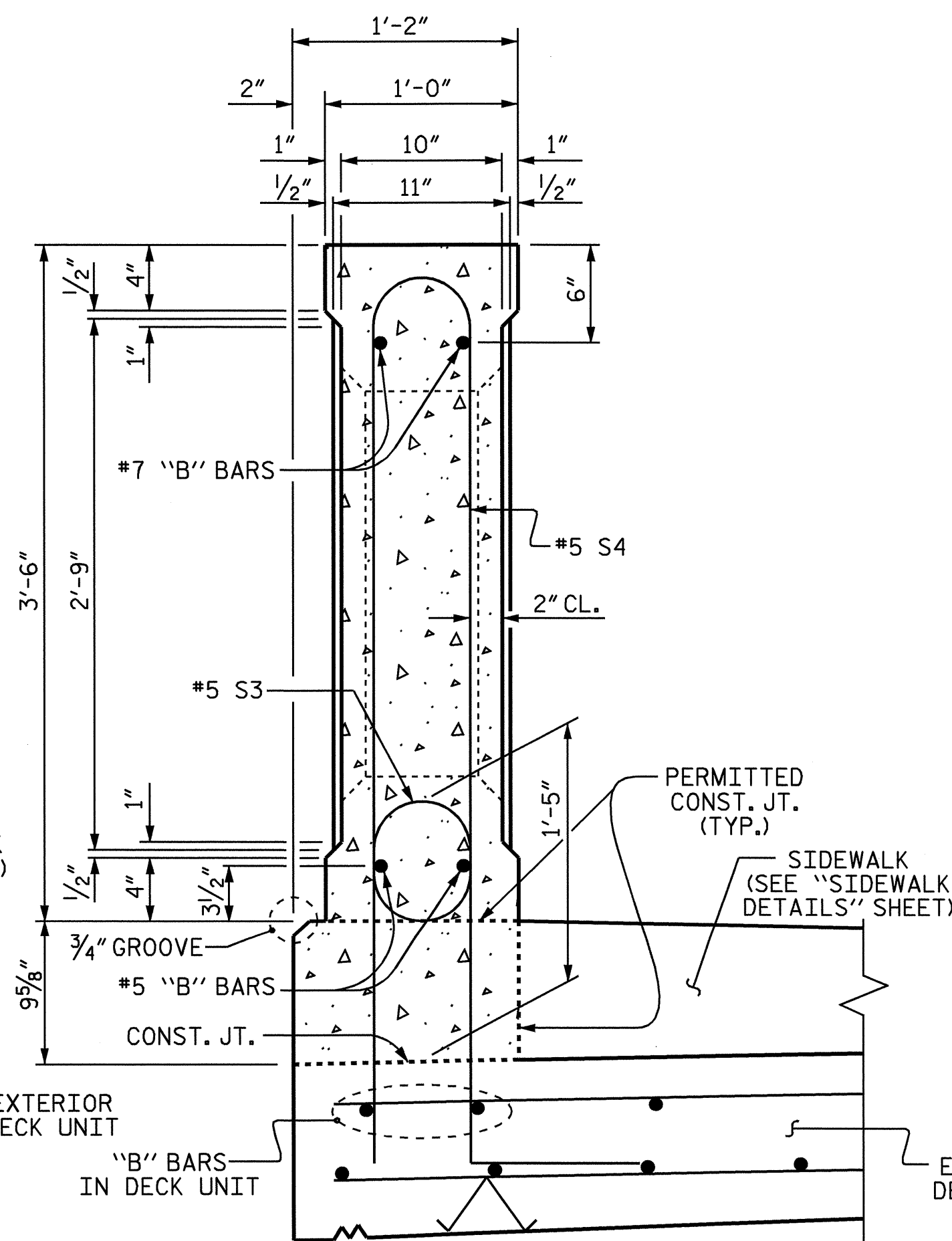
END BENT PILASTER

FOR THIS PORTION OF THE END BENT PILASTER, SEE PLANS FOR BRIDGE APPROACH SLAB

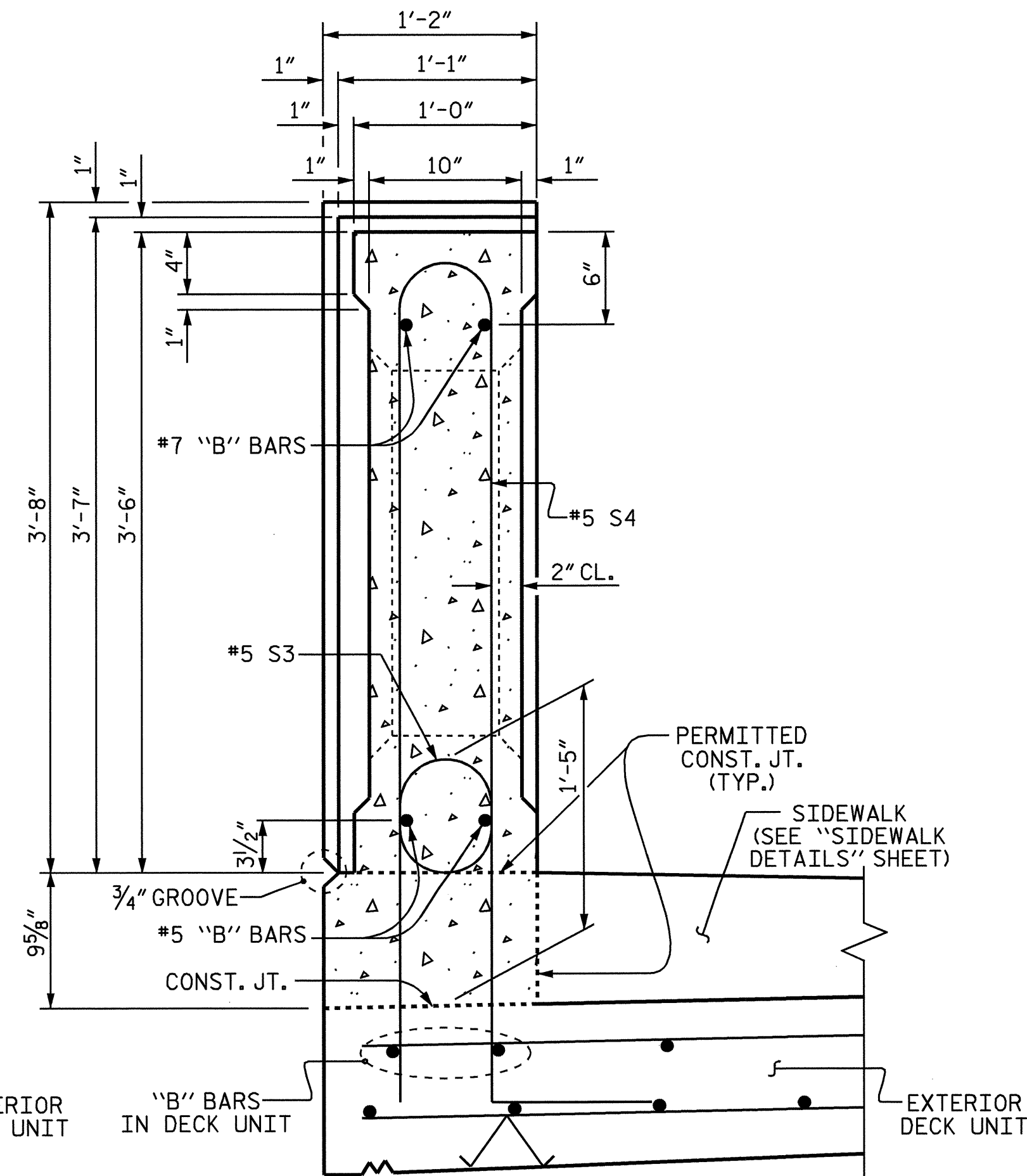
EXTERIOR PILASTER ELEVATIONS



SECTION H-H (SHOWING WINDOW OF RAIL)



SECTION G-G (SHOWING SPAN PILASTER)



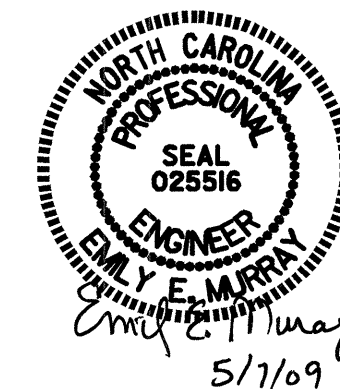
SECTION F-F (SHOWING END BENT PILASTER)

DRAWN BY : T.L. AVERETTE DATE : 2-09  
 CHECKED BY : PEGGY PARISI DATE : 3-09

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 taverette

PROJECT NO. B-2515  
 BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-  
 SHEET 2 OF 3

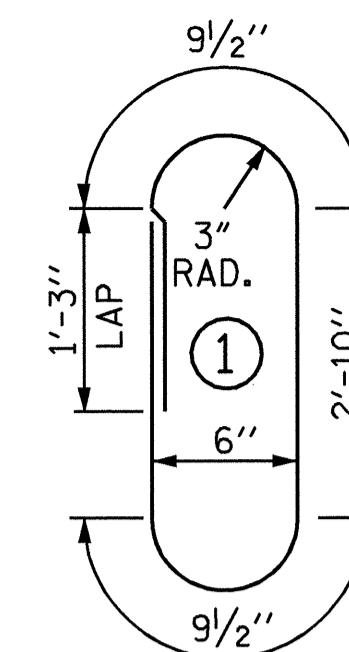
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 CLASSIC CONCRETE  
 BRIDGE RAIL WITH  
 SIDEWALK



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15	
1			3			TOTAL SHEETS 28	
2			4				



BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CLASSIC BRIDGE RAILING ONLY

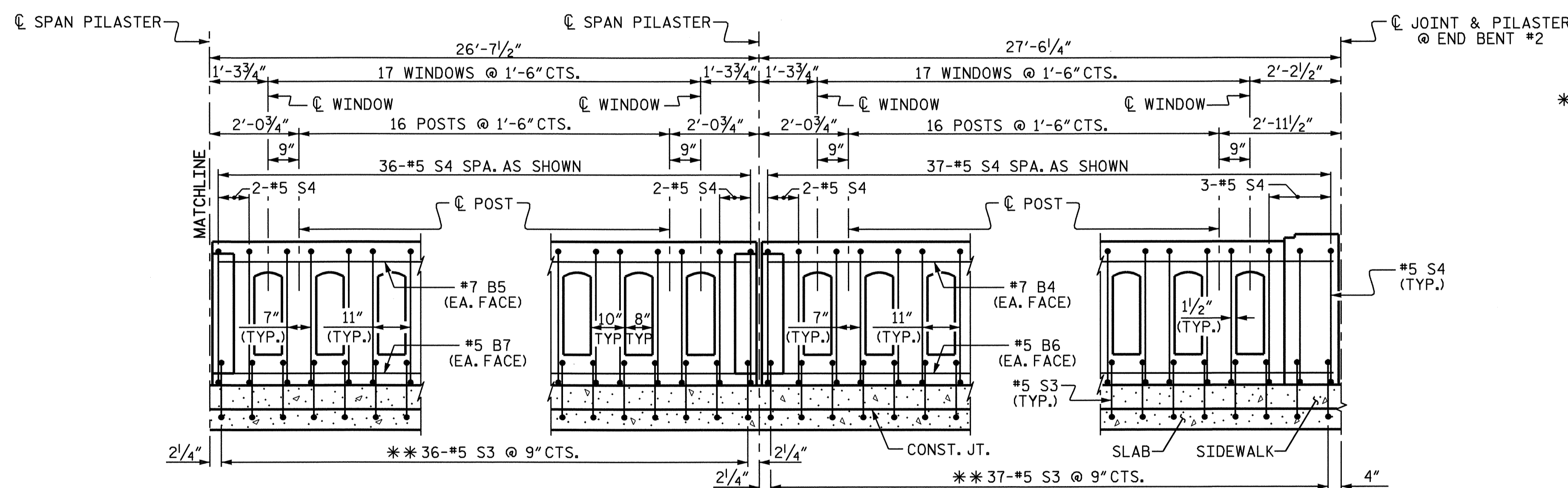
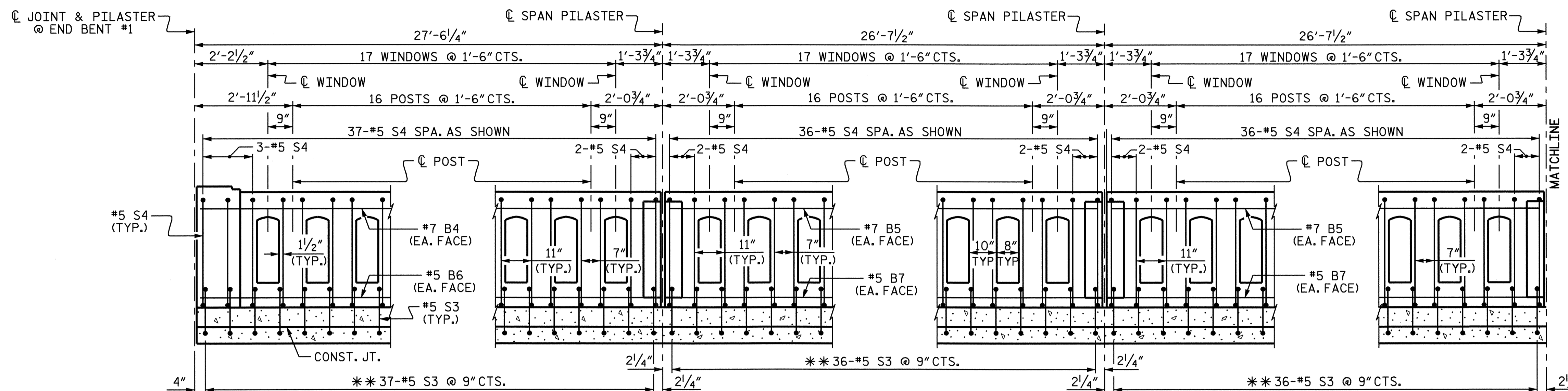
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B4	8	#7	STR	27'-1"	443
* B5	12	#7	STR	26'-3"	644
* B6	8	#5	STR	27'-1"	226
* B7	12	#5	STR	26'-3"	329
* S4	364	#5	1	8'-6"	3227

\* EPOXY COATED REINFORCING STEEL 4869 LBS.

SAND LIGHTWEIGHT CONCRETE 33.1 CU. YDS.

CLASSIC CONCRETE BRIDGE RAIL AND SIDEWALK 269.83 LIN. FT.

\*\* THE #5 S3 BARS ARE CAST IN EXTERIOR DECK UNITS AND ARE INCLUDED IN THE BILL OF MATERIAL FOR EXTERIOR DECK UNIT.



REINFORCING PLACEMENT- SPAN "A"

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

CLASSIC CONCRETE  
 BRIDGE RAIL WITH  
 SIDEWALK

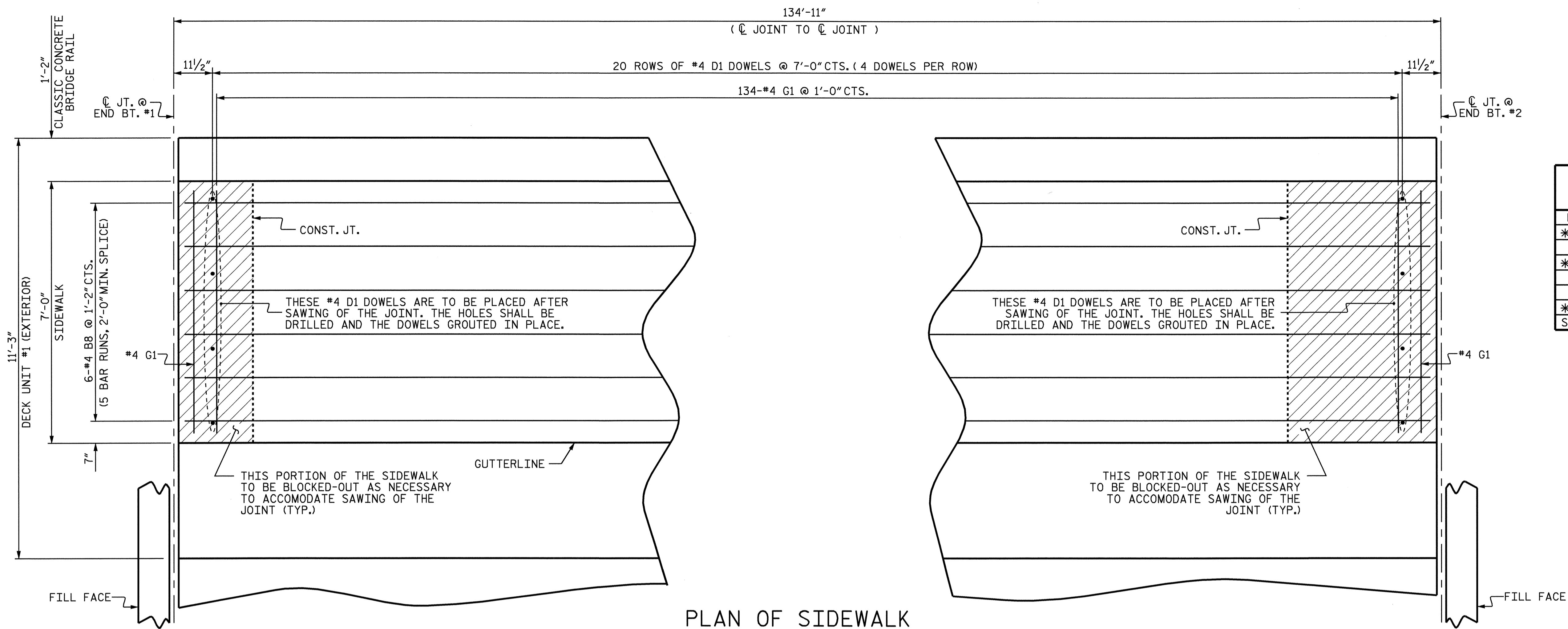


Emily E. Murray  
 5/7/09

DRAWN BY : T.L. AVERETTE DATE : 2-09  
 CHECKED BY : PEGGY PARISI DATE : 3-09

07-MAY-2009 14:35  
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 taverette

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS 28
2			4			

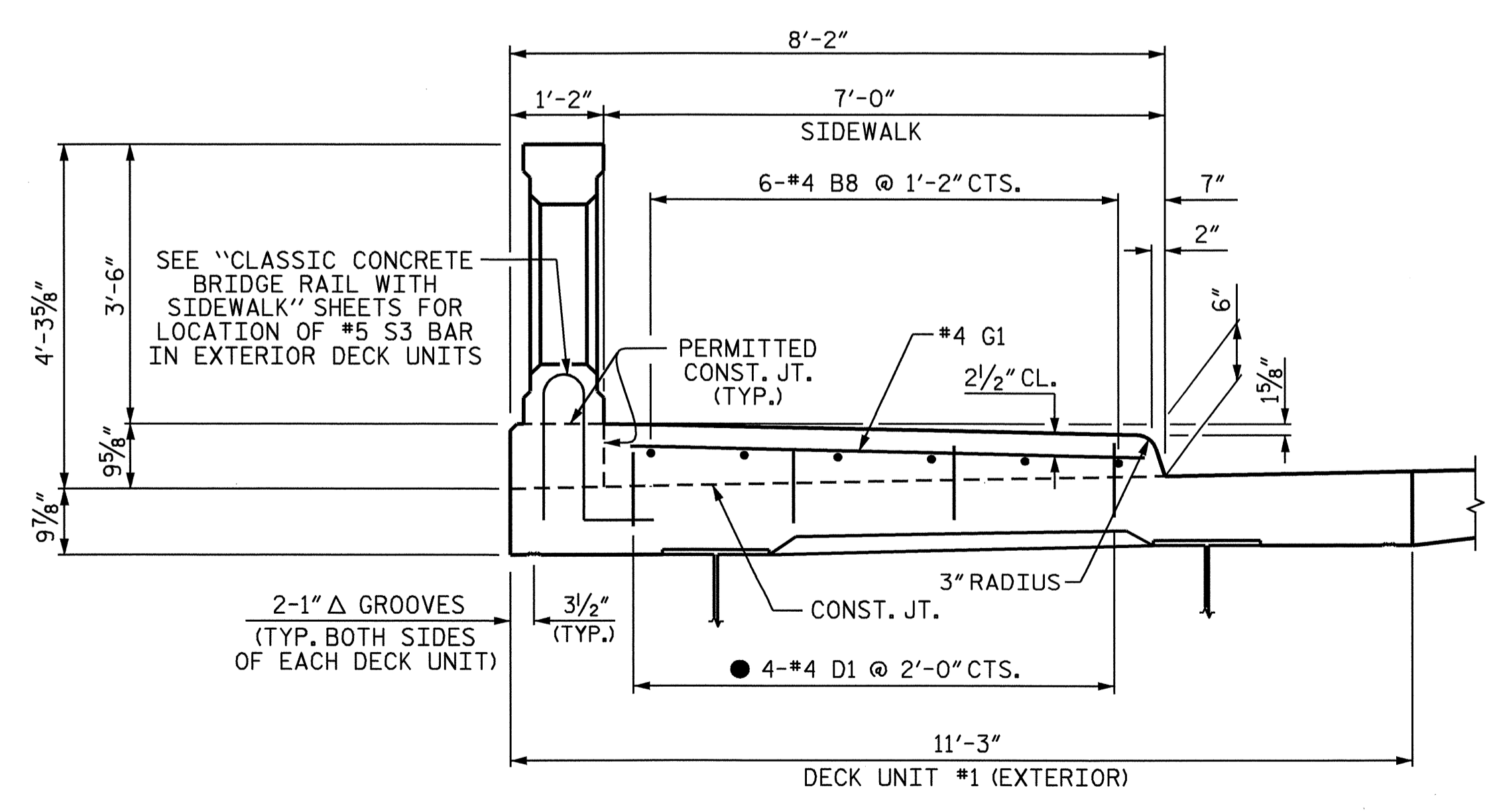


PLAN OF SIDEWALK  
SIDEWALK FOR DECK UNIT #1 SHOWN; SIDEWALK FOR DECK UNIT #6 SIMILAR

BILL OF MATERIAL FOR SIDEWALK					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B8	60	#4	STR	28'-6"	1142
* G1	272	#4	STR	6'-6"	1181
* EPOXY COATED REINF. STEEL				2323	LBS.
SAND LIGHTWEIGHT CONCRETE				44.2	CU. YDS.

NOTES

ALL REINFORCING STEEL IN SIDEWALKS SHALL BE EPOXY COATED.  
 GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.  
 PAYMENT FOR SIDEWALK SHALL BE INCLUDED IN PAY ITEM FOR "CLASSIC CONCRETE BRIDGE RAIL AND SIDEWALK,"  
 FOR SAND LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS.  
 THE #4 D1 DOWELS ARE CAST IN EXTERIOR DECK UNITS AND ARE INCLUDED IN THE BILL OF MATERIAL FOR EXTERIOR DECK UNIT.



SECTION THRU SIDEWALK

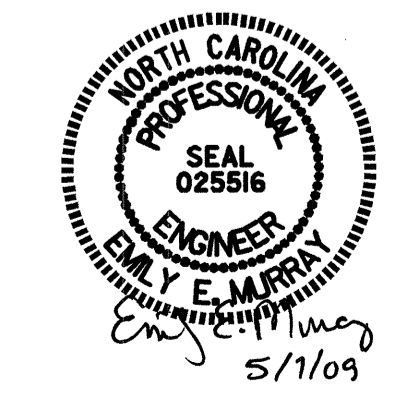
● DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER DECK UNIT HAS BEEN FINISHED.

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 SIDEWALK DETAILS

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

TOTAL SHEETS: 28



DRAWN BY : T.L. AVERETTE DATE : 2-09  
 CHECKED BY : PEGGY PARISI DATE : 3-09

**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

**BILL OF MATERIAL FOR ONE EXTERIOR DECK UNIT**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	264	#5	STR	10'-11"	3006
A2	264	#5	STR	10'-11"	3006
* A101	4	#5	STR	12'-10"	54
A201	4	#5	STR	12'-8"	53
* B1	45	#4	STR	28'-6"	857
B2	42	#5	STR	46'-4"	2030
* D1	80	#4	STR	1'-0"	53
* K1	4	#5	1	7'-4"	31
* K2	4	#5	2	9'-1"	38
* S1	10	#4	3	3'-4"	22
* S2	132	#5	4	5'-5"	746
* S3	182	#5	6	4'-10"	917
REINFORCING STEEL					5089 LBS.
* EPOXY COATED REINF. STEEL					5724 LBS.
CLASS AA CONCRETE					45.5 CU. YDS.

**BILL OF MATERIAL FOR ONE INTERIOR DECK UNIT**

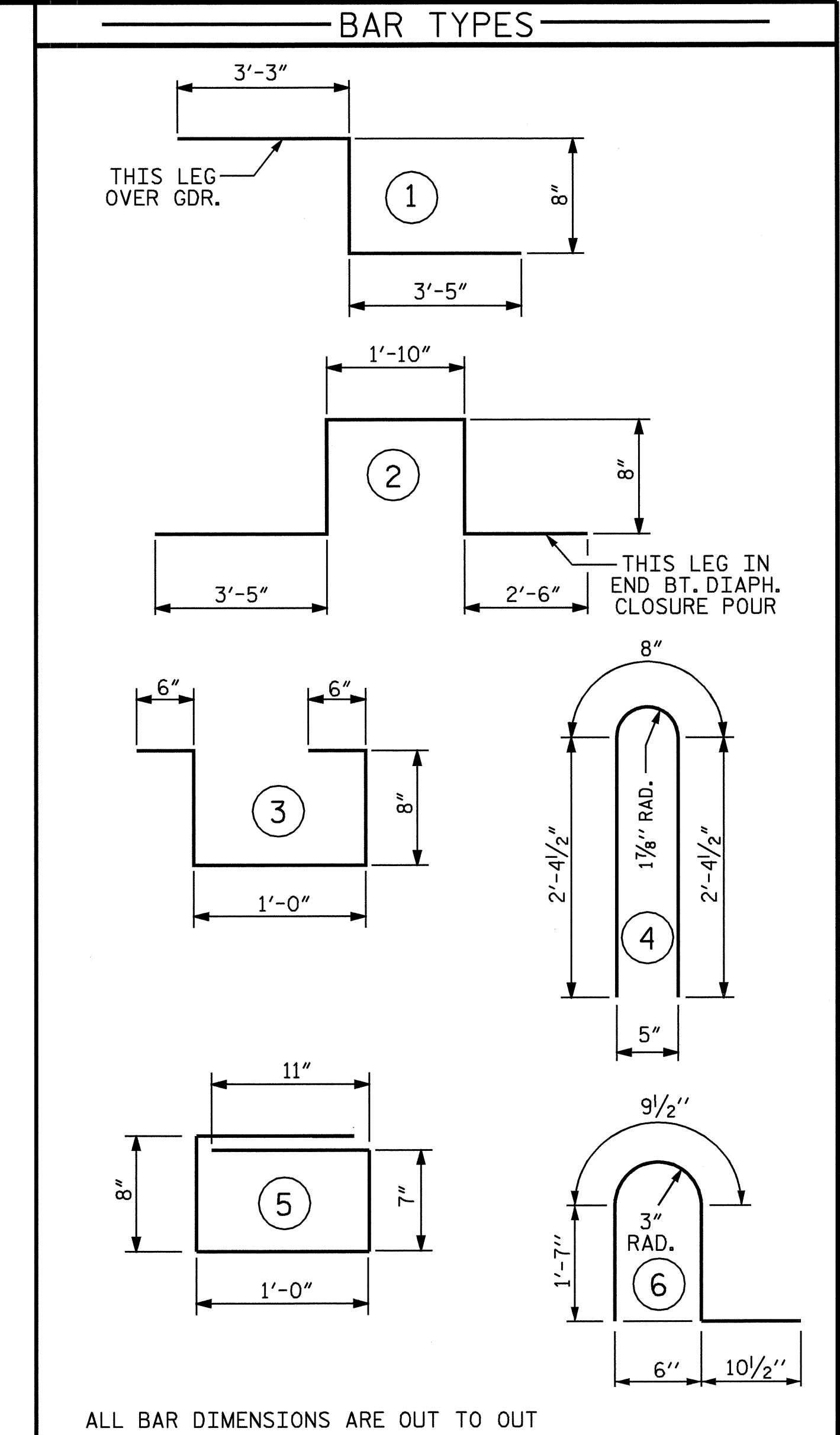
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	264	#5	STR	10'-11"	3006
A2	264	#5	STR	10'-11"	3006
* A102	4	#5	STR	14'-9"	62
A202	4	#5	STR	14'-5"	60
* B1	40	#4	STR	28'-6"	762
B2	42	#5	STR	46'-4"	2030
* K2	8	#5	2	9'-1"	76
* S1	10	#4	3	3'-4"	22
* S2	264	#5	4	5'-5"	1491
REINFORCING STEEL					5096 LBS.
* EPOXY COATED REINF. STEEL					5419 LBS.
CLASS AA CONCRETE					45.3 CU. YDS.

**BILL OF MATERIAL FOR ONE CLOSURE POUR**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B3	12	#5	STR	46'-6"	582
* K3	4	#5	STR	4'-4"	18
* S5	10	#4	5	4'-1"	27
* EPOXY COATED REINF. STEEL					627 LBS.
CLASS AA CONCRETE					5.1 CU. YDS.

**GROOVING BRIDGE FLOORS**

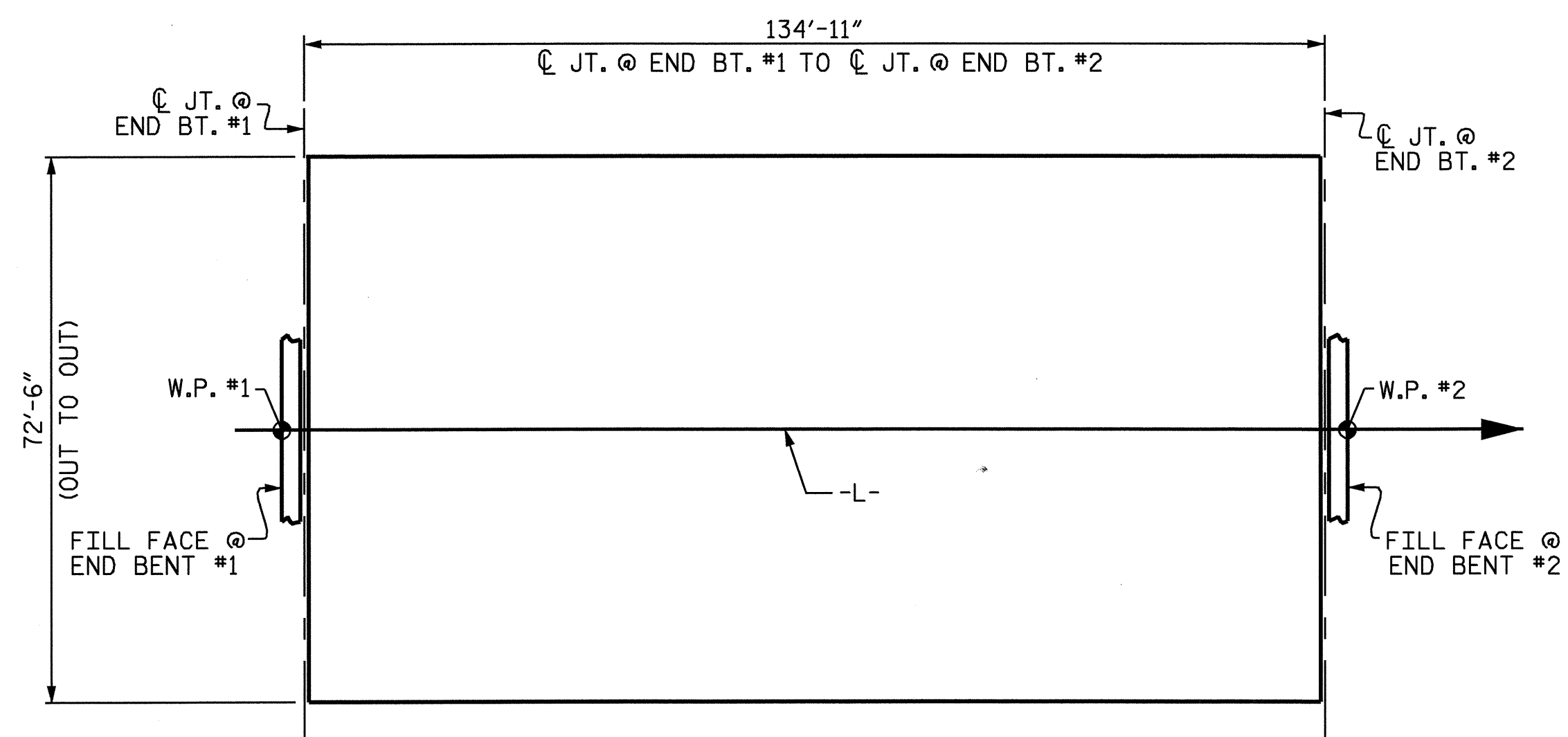
APPROACH SLABS	1214 SQ.FT.
BRIDGE DECK	7102 SQ.FT.
TOTAL	8316 SQ.FT.



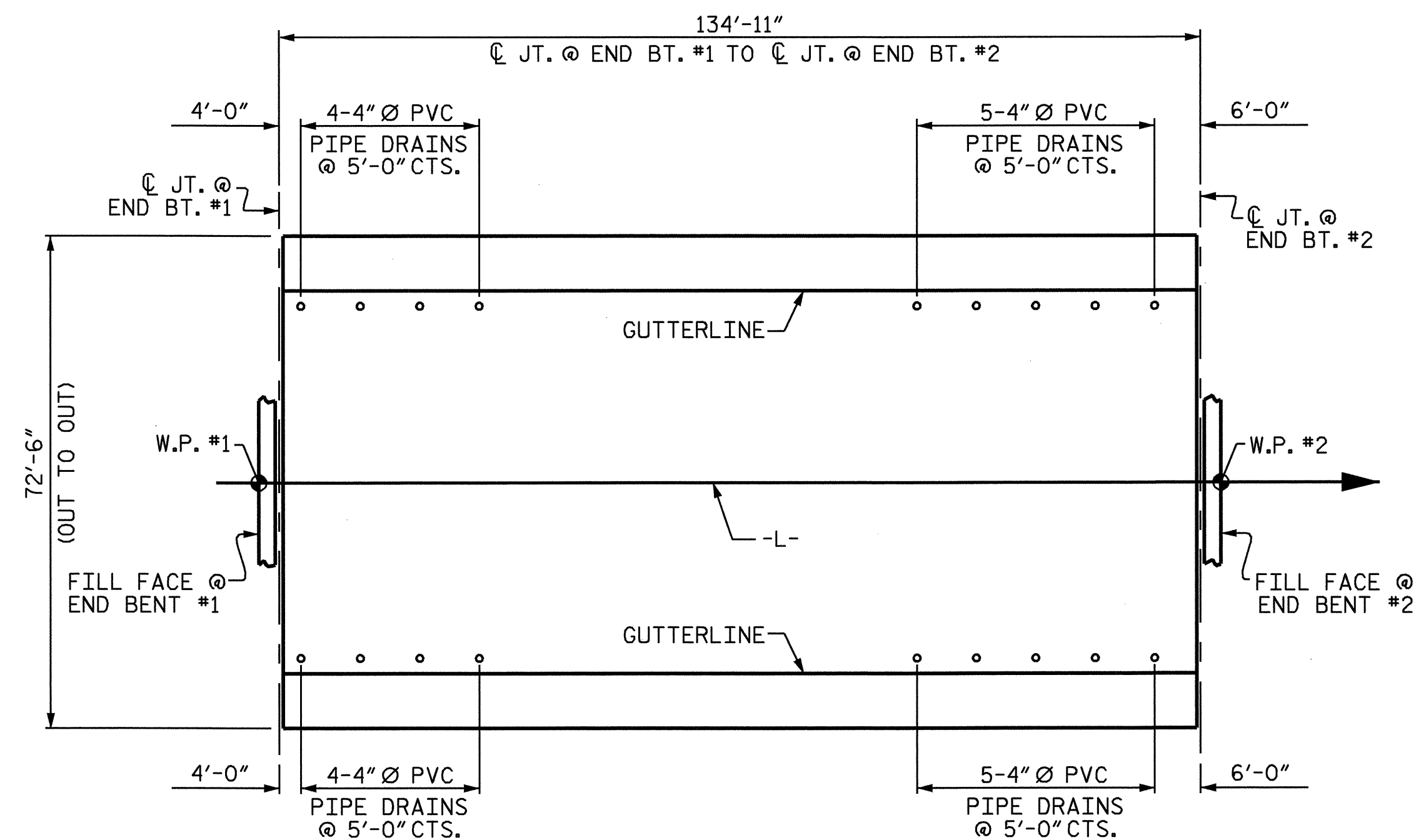
**SUPERSTRUCTURE BILL OF MATERIAL**

	TOTAL NUMBER REQ'D.	TOTAL CONCRETE CLASS AA (CU. YDS.)	TOTAL REINFORCING STEEL (LBS.)	TOTAL EPOXY COATED REINFORCING STEEL (LBS.)
EXTERIOR DECK UNIT	2	91.0	10,178	11,448
INTERIOR DECK UNIT	4	181.2	20,384	21,676
CLOSURE POUR	5	25.5	-	3,135
<b>** TOTALS</b>		297.7	30,562	36,259

\*\* QUANTITIES FOR CLASSIC CONCRETE BRIDGE RAIL AND SIDEWALK ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9781)



**PIPE DRAIN LOCATIONS**

SEE TYPICAL SECTION SHEET 3 OF 3 FOR DRAIN CONNECTOR DETAIL (18 DRAINS REQUIRED)

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

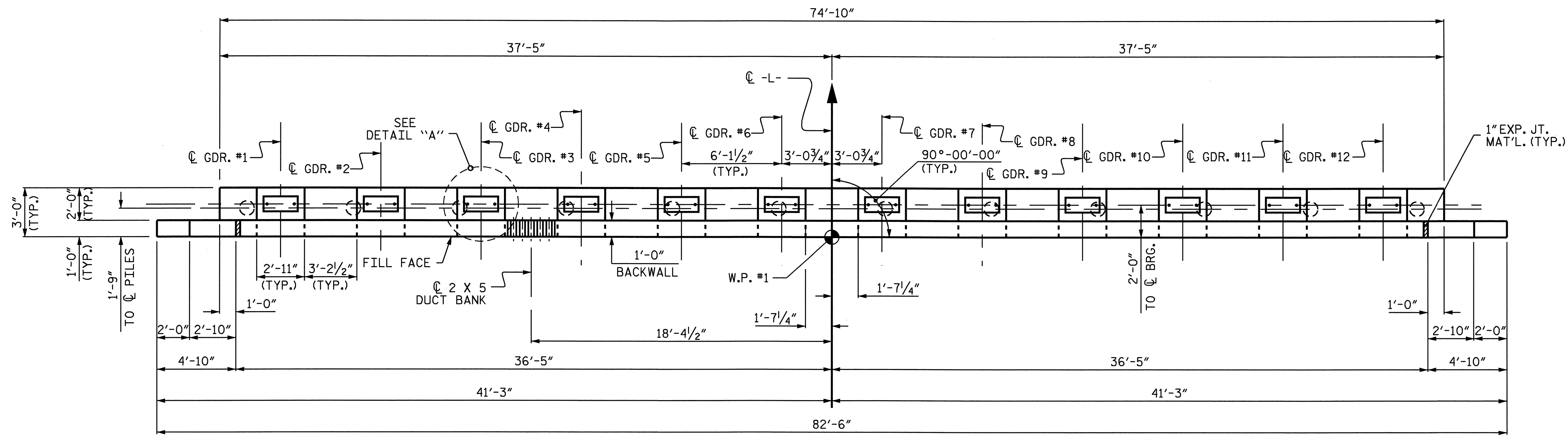
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BILL OF MATERIAL



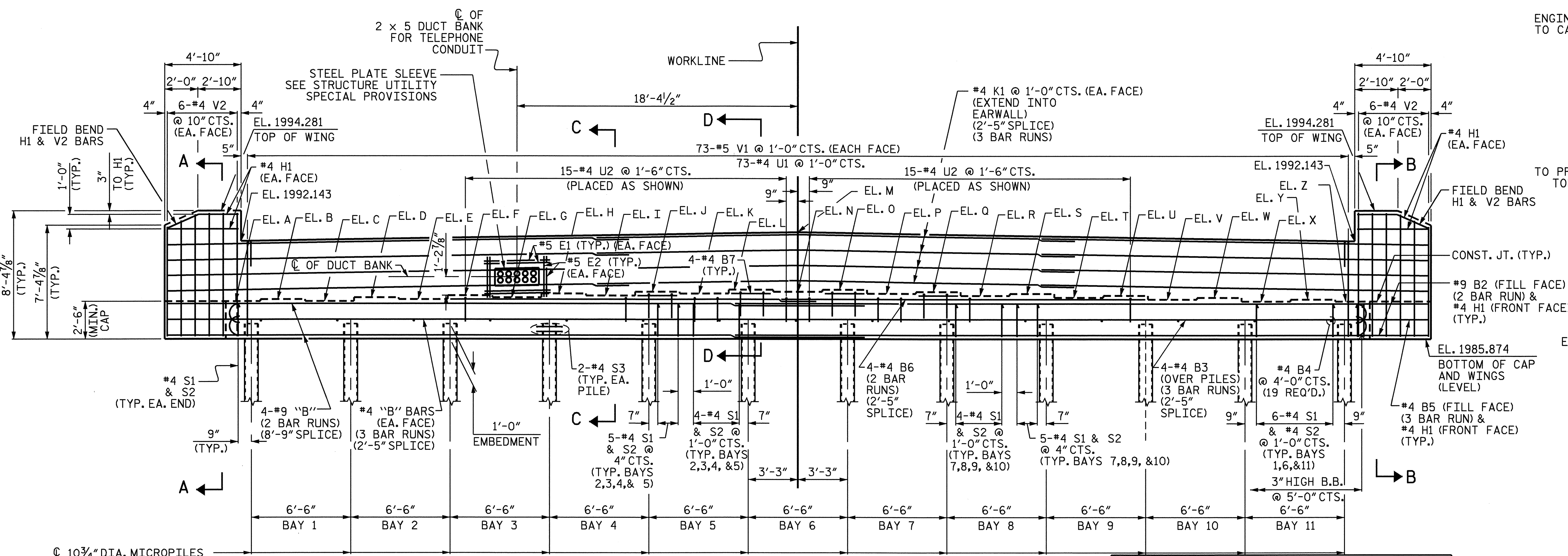
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 28

DRAWN BY: T.L. AVERETTE DATE: 2-09  
 CHECKED BY: PEGGY PARISI DATE: 3-09



PLAN

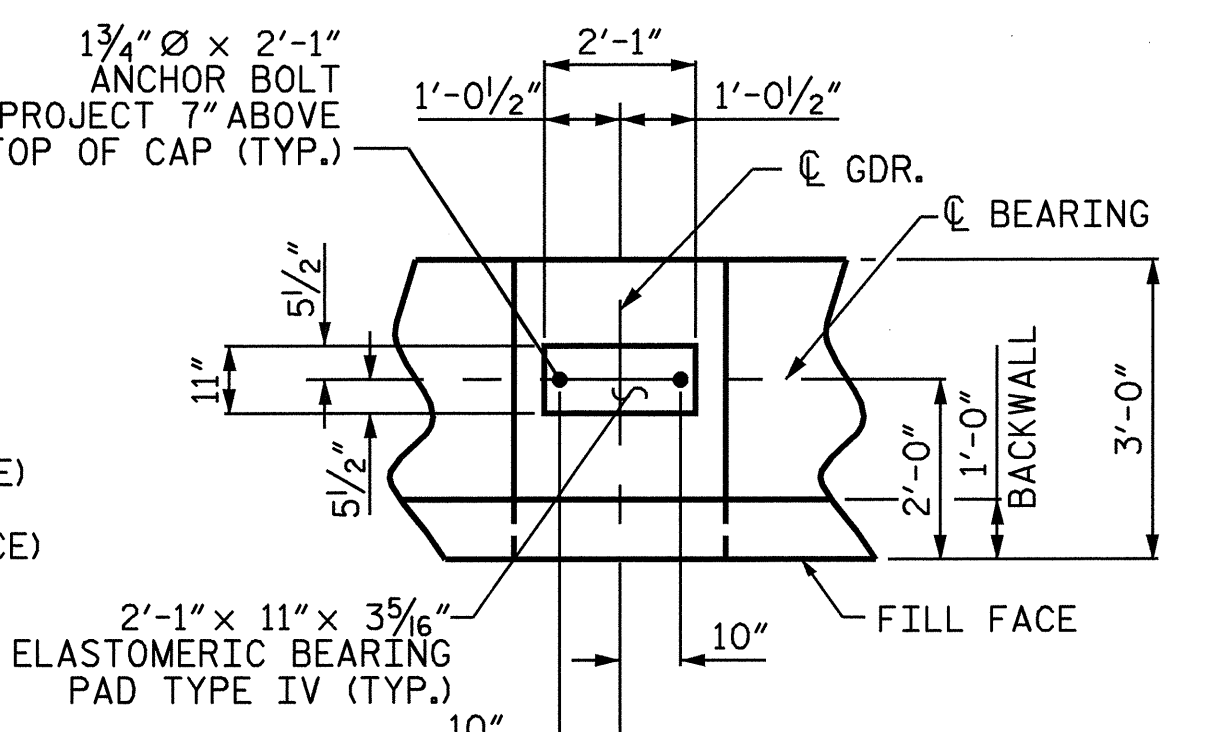


ELEVATION

EL.	ELEVATION	EL.	ELEVATION
EL. A	1988.374	EL. N	1988.986
EL. B	1988.499	EL. O	1989.111
EL. C	1988.374	EL. P	1988.864
EL. D	1988.621	EL. Q	1988.989
EL. E	1988.496	EL. R	1988.741
EL. F	1988.744	EL. S	1988.866
EL. G	1988.619	EL. T	1988.619
EL. H	1988.866	EL. U	1988.744
EL. I	1988.741	EL. V	1988.496
EL. J	1988.989	EL. W	1988.621
EL. K	1988.864	EL. X	1988.374
EL. L	1989.111	EL. Y	1988.499
EL. M	1992.871	EL. Z	1988.374

NOTES

- STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- CENTER DUCT BANK IN BLOCKOUT AND FILL ANNULAR SPACE WITH JOINT FILLER IN ACCORDANCE WITH STRUCTURE UTILITY PLANS & SPECIAL PROVISIONS.
- THE DIMENSIONS AND DETAILS SHOWN FOR THE STEEL PLATE SLEEVE ARE FOR THE CONTRACTOR'S BENEFIT IN PLACING THE SLEEVE AND SHOULD NOT BE CONSTRUED TO BE AN APPROVAL FOR THE ATTACHMENT OF THE UTILITY TO THE STRUCTURE.
- FOR RESPONSIBILITIES FOR FURNISHING AND PLACING STEEL PLATE SLEEVE, SEE STRUCTURE UTILITY SPECIAL PROVISIONS.
- THE STEEL PLATE SLEEVE IS TO BE FLUSH WITH BOTH SIDES OF BACKWALL. SLEEVE IS TO BE PLACED SO THAT OPENING IS PARALLEL TO GIRDERS.
- THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE DUCT BANK IN THE BACKWALL. REINFORCING STEEL IN THE BACKWALL MAY BE SHIFTED OR CUT AS NECESSARY TO PROVIDE FOR THE DUCT BANK. SEE STRUCTURE UTILITY PLANS AND SPECIAL PROVISIONS FOR DETAILS.
- FOR MICROPILES, SEE SPECIAL PROVISIONS.
- ENGINEER SHALL VERIFY BRIDGE SEAT ELEVATIONS PRIOR TO CASTING END BENTS.



DETAIL "A"

PROJECT NO. B-2515  
 BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #1

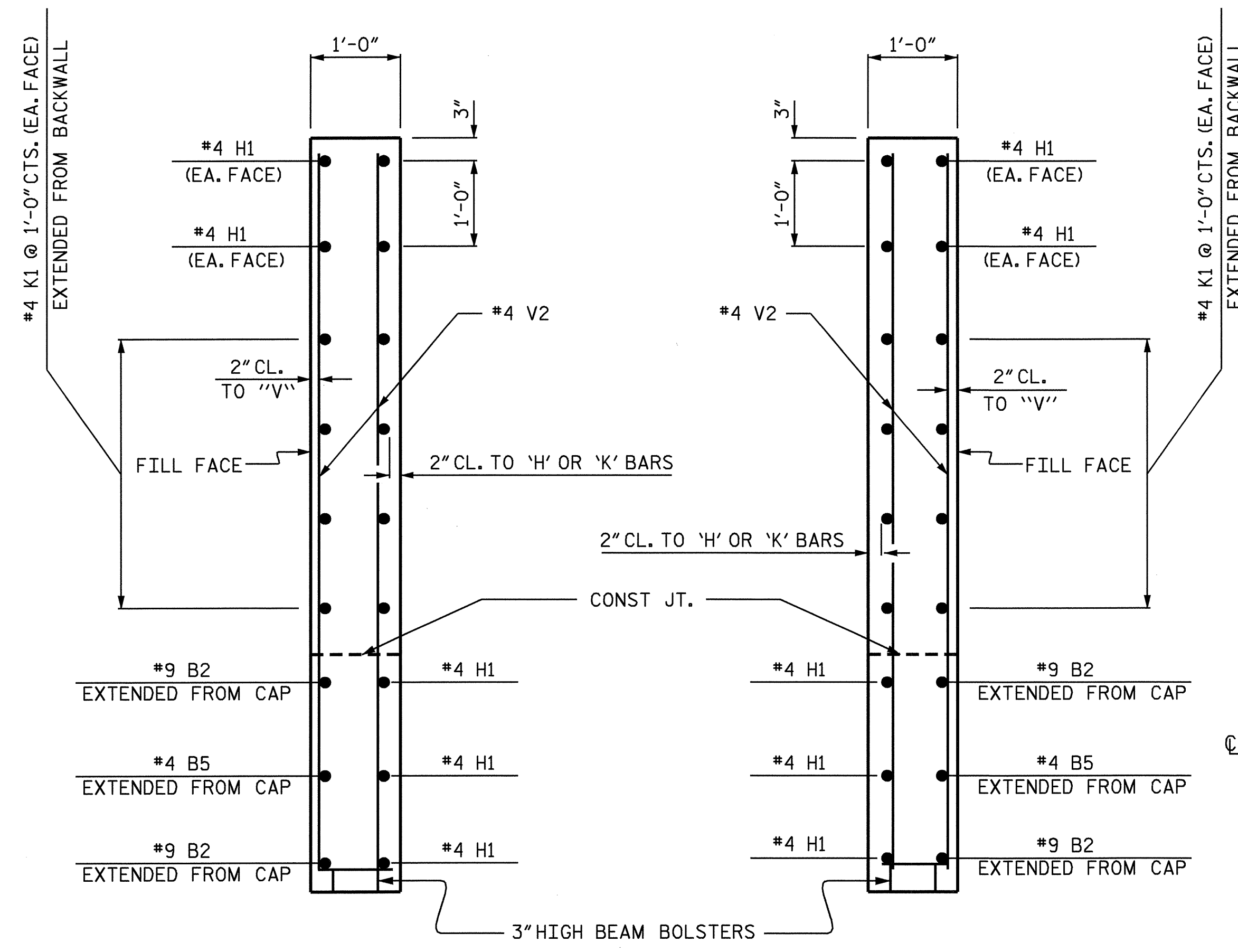
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-19  
 TOTAL SHEETS 28



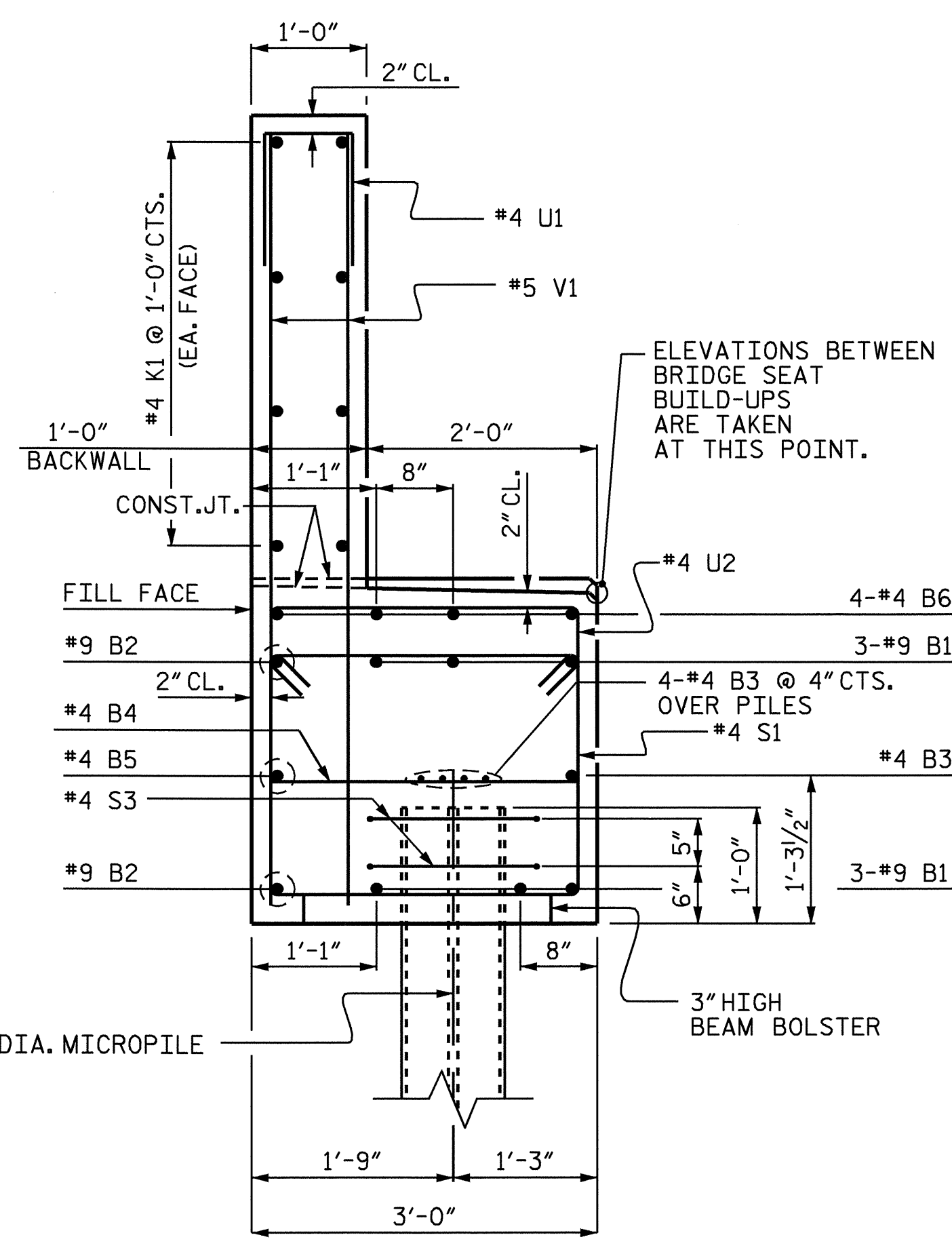
DRAWN BY: J.B. WILSON DATE: 3/10/09  
 CHECKED BY: B.N. BARODWALA DATE: 3/19/09

07-MAY-2009 14:33  
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 favorette

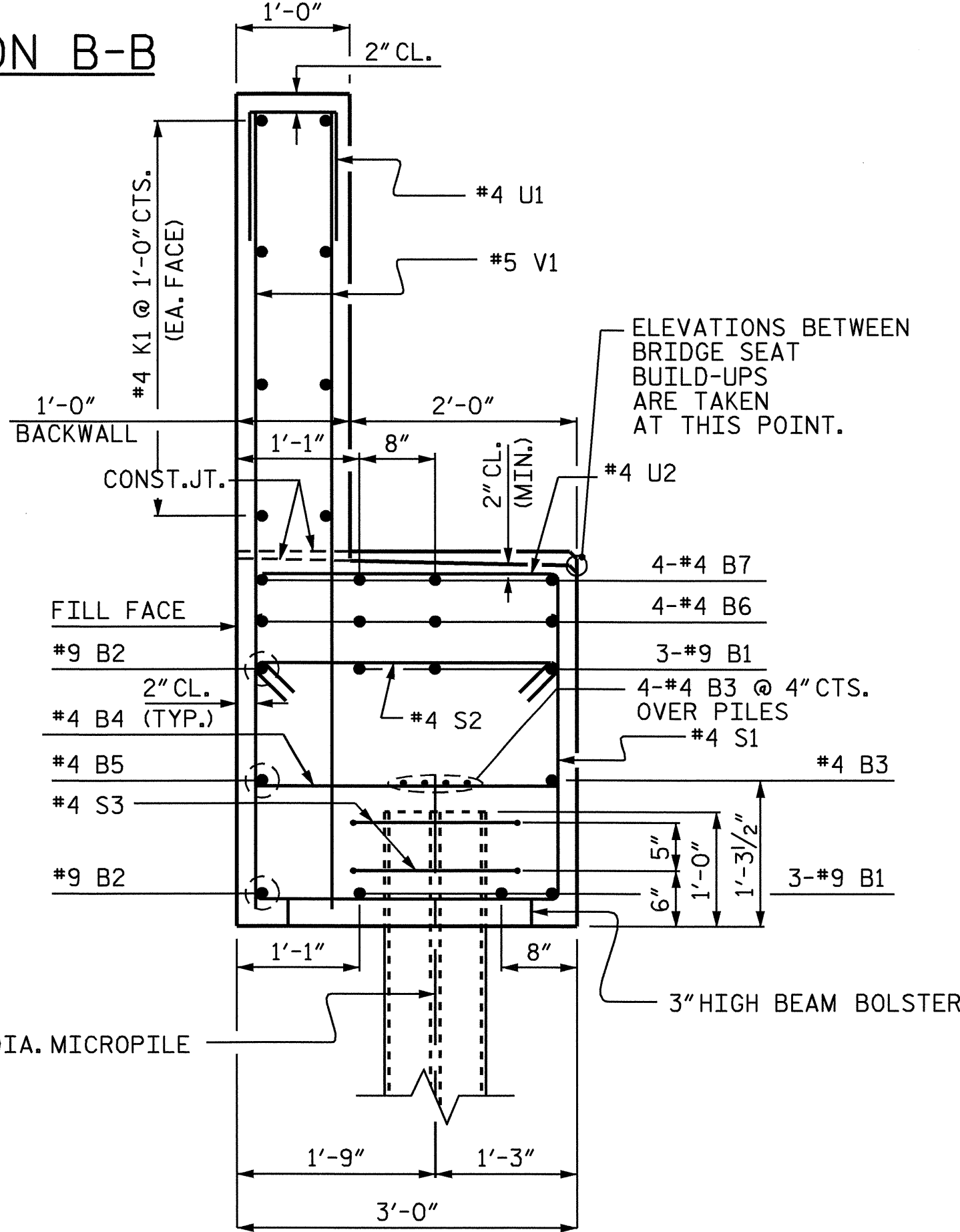


SECTION A-A

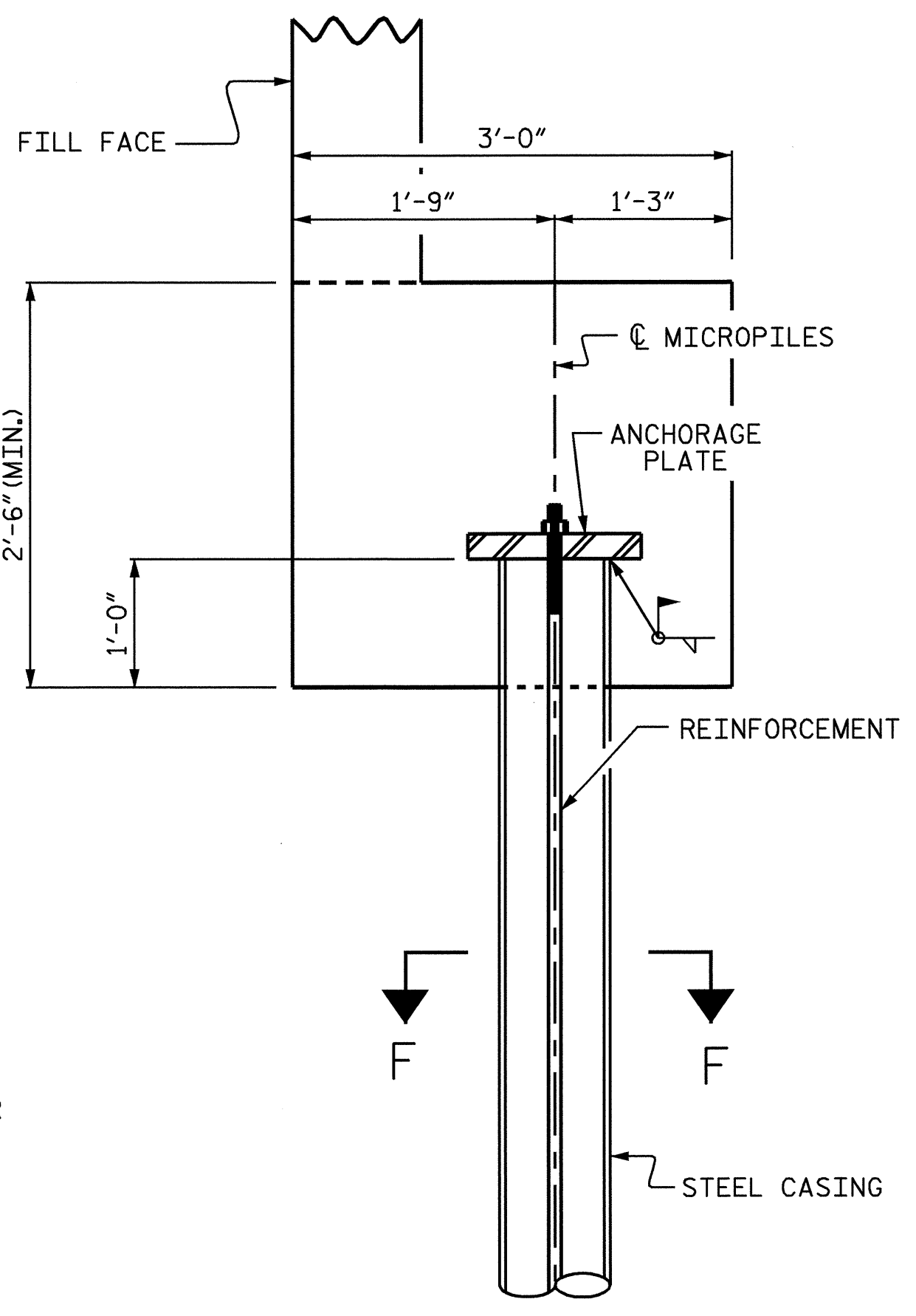
SECTION B-B



SECTION C-C

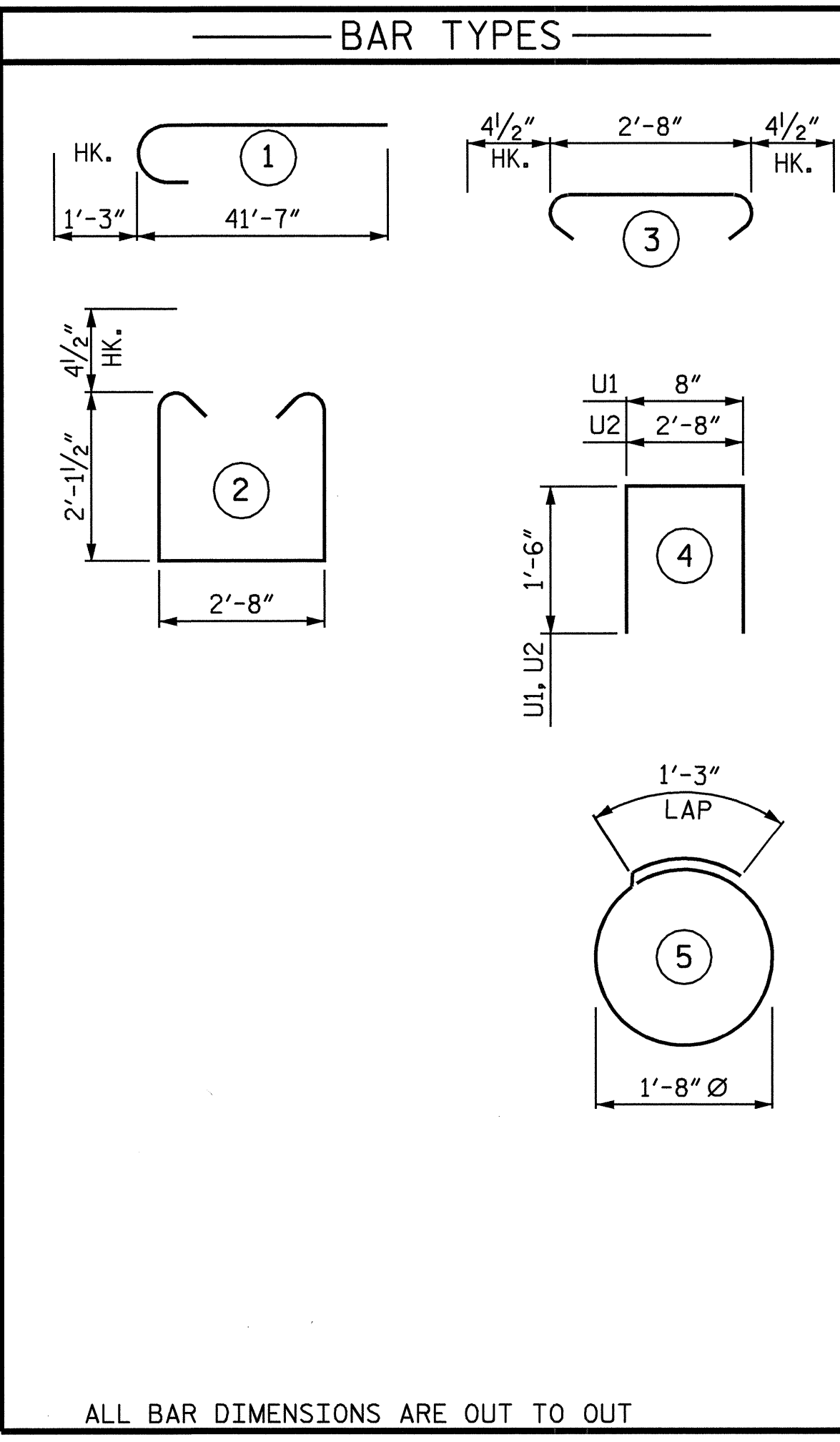


SECTION D-D



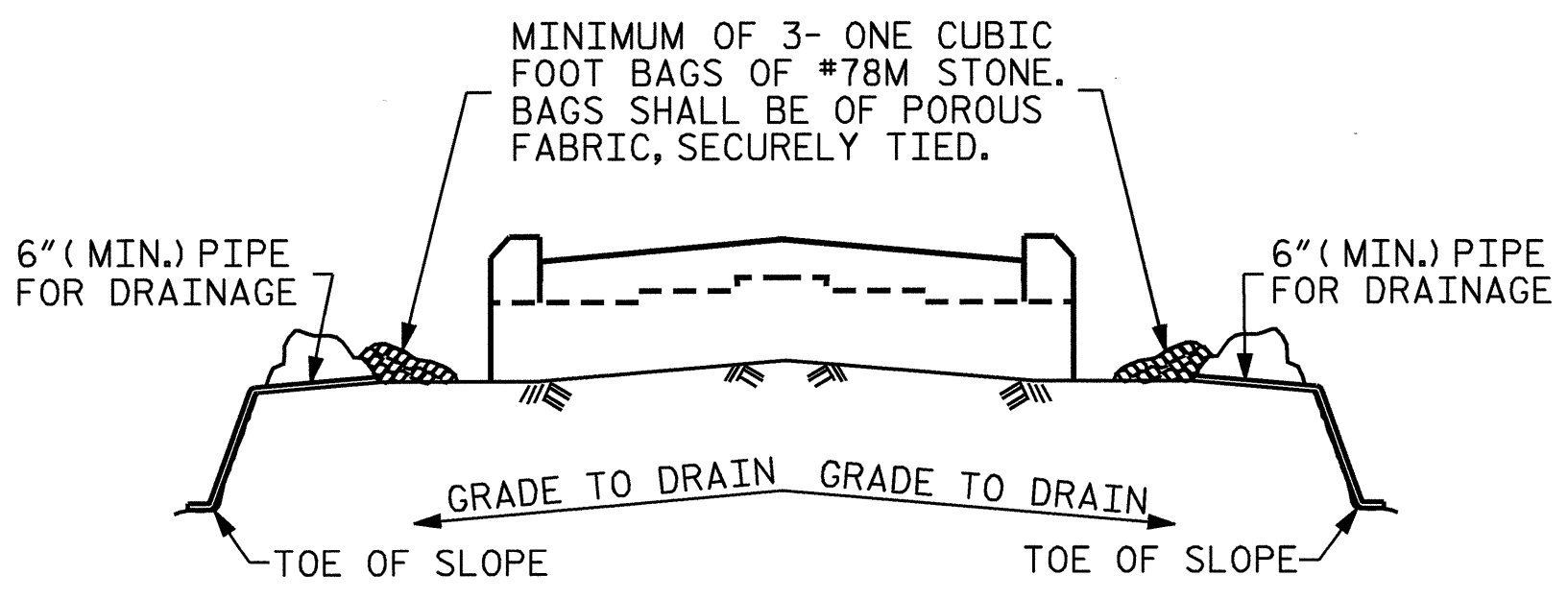
MICROPILE DETAIL

(TYP. EACH MICROPILE)



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL						
END BENT #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	12	#9		42'-10"	1748	
B2	4	#9	STR	45'-6"	619	
B3	15	#4	STR	26'-6"	266	
B4	19	#4	STR	2'-8"	34	
B5	3	#4	STR	29'-0"	58	
B6	8	#4	STR	24'-0"	128	
B7	16	#4	STR	2'-7"	28	
E1	8	#5	STR	4'-4"	36	
E2	8	#5	STR	2'-8"	22	
H1	14	#4	STR	4'-6"	42	
K1	24	#4	STR	29'-0"	465	
S1	92	#4	2	7'-8"	471	
S2	92	#4	3	3'-5"	210	
S3	24	#4	5	6'-6"	104	
U1	73	#4	4	3'-8"	179	
U2	30	#4	4	5'-8"	114	
V1	146	#5	STR	5'-11"	901	
V2	24	#4	STR	8'-0"	128	
REINFORCING STEEL					=	5553 LBS
CLASS 'A' CONCRETE BREAKDOWN						
POUR #1 CAP & LOWER PART OF WINGS						
24.3 C.Y.						
POUR #2 UPPER WINGS & BACKWALL						
12.3 C.Y.						
CLASS 'A' CONCRETE TOTAL					=	36.6 C.Y.
10 3/4" DIA. MICROPILES					=	EACH 12



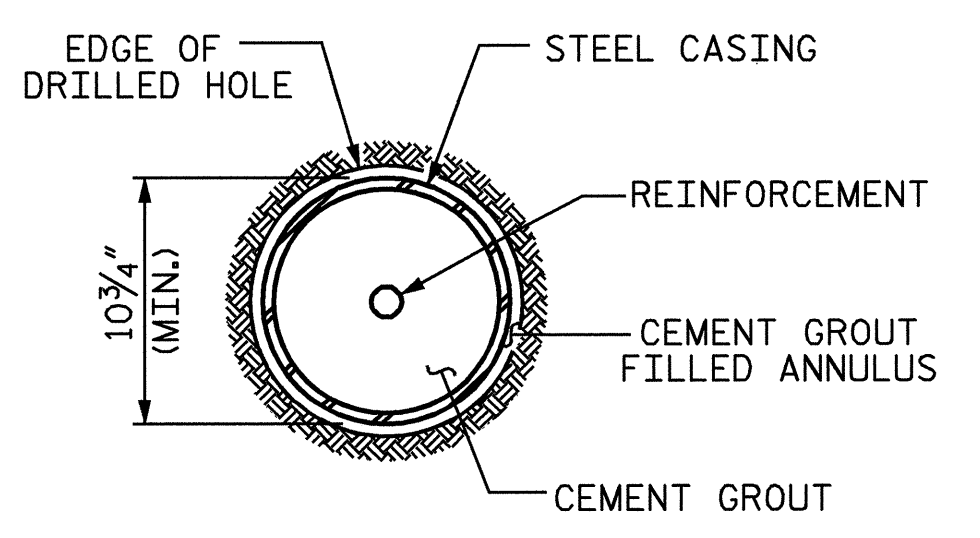
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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

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

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

TEMPORARY DRAINAGE AT END BENT



SECTION F-F

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				
SUBSTRUCTURE END BENT #1				
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				S-20
				TOTAL SHEETS 28



DRAWN BY : J.B. WILSON DATE : 3/10/09  
 CHECKED BY : B.N. BARODAWALA DATE : 3/19/09

**NOTES**

STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

CENTER DUCT BANK IN BLOCKOUT AND FILL ANNULAR SPACE WITH JOINT FILLER IN ACCORDANCE WITH STRUCTURE UTILITY PLANS & SPECIAL PROVISIONS.

THE DIMENSIONS AND DETAILS SHOWN FOR THE STEEL PLATE SLEEVE ARE FOR THE CONTRACTOR'S BENEFIT IN PLACING THE SLEEVE AND SHOULD NOT BE CONSTRUED TO BE AN APPROVAL FOR THE ATTACHMENT OF THE UTILITY TO THE STRUCTURE.

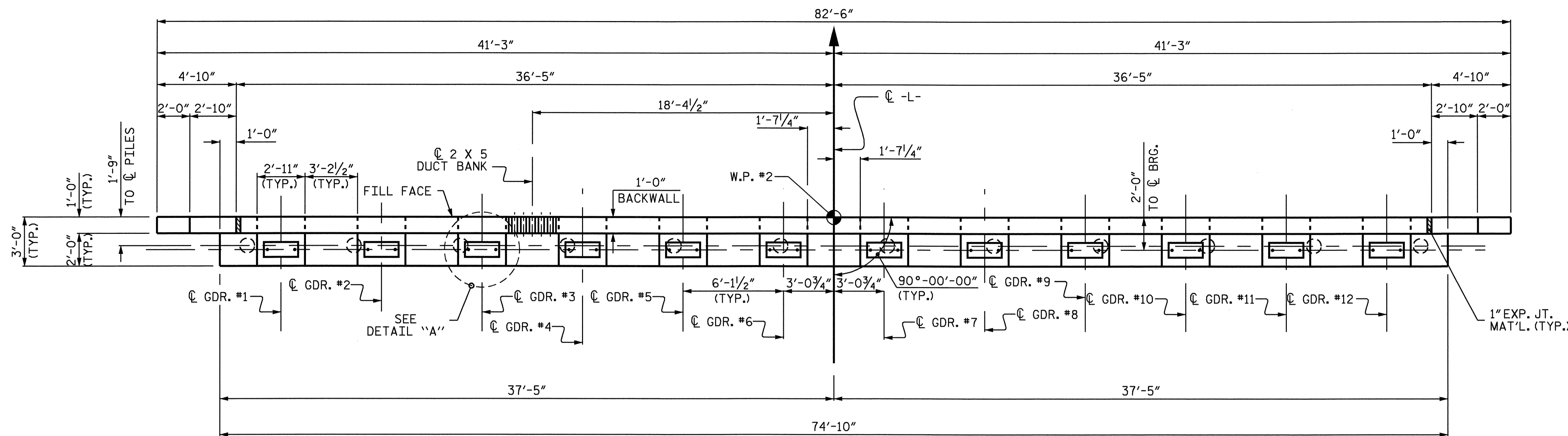
FOR RESPONSIBILITIES FOR FURNISHING AND PLACING STEEL PLATE SLEEVE, SEE STRUCTURE UTILITY SPECIAL PROVISIONS.

THE STEEL PLATE SLEEVE IS TO BE FLUSH WITH BOTH SIDES OF BACKWALL. SLEEVE IS TO BE PLACED SO THAT OPENING IS PARALLEL TO GIRDERS.

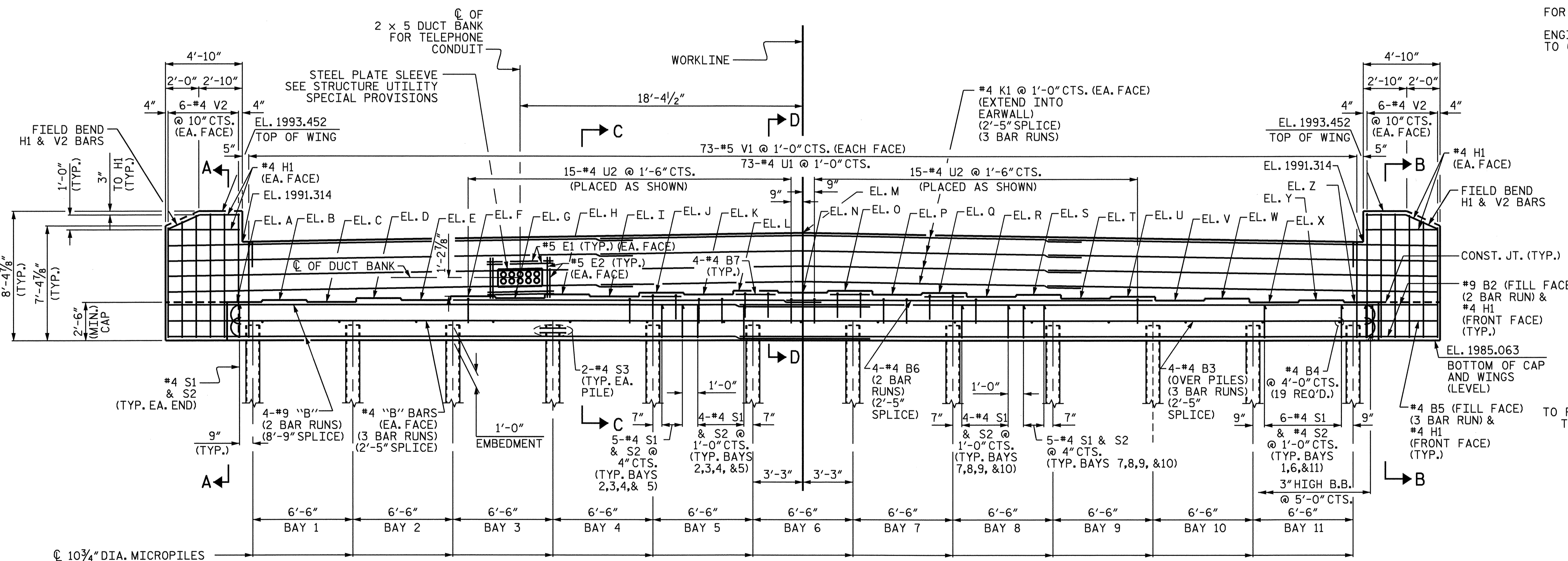
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE DUCT BANK IN THE BACKWALL. REINFORCING STEEL IN THE BACKWALL MAY BE SHIFTED OR CUT AS NECESSARY TO PROVIDE FOR THE DUCT BANK. SEE STRUCTURE UTILITY PLANS AND SPECIAL PROVISIONS FOR DETAILS.

FOR MICROPILES, SEE SPECIAL PROVISIONS.

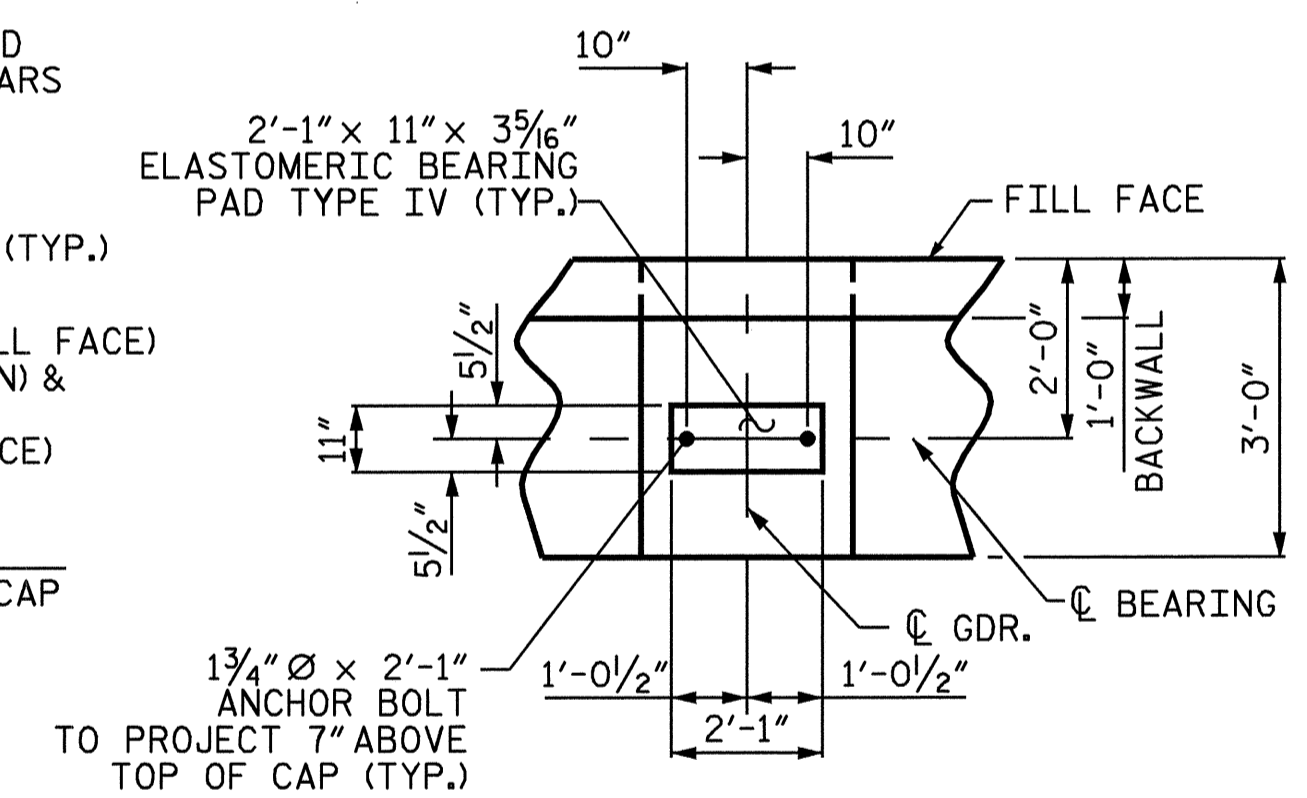
ENGINEER SHALL VERIFY BRIDGE SEAT ELEVATIONS PRIOR TO CASTING END BENTS.



**PLAN**



**ELEVATION**

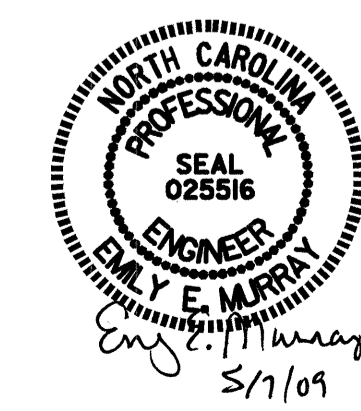


**DETAIL "A"**

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 1 OF 2

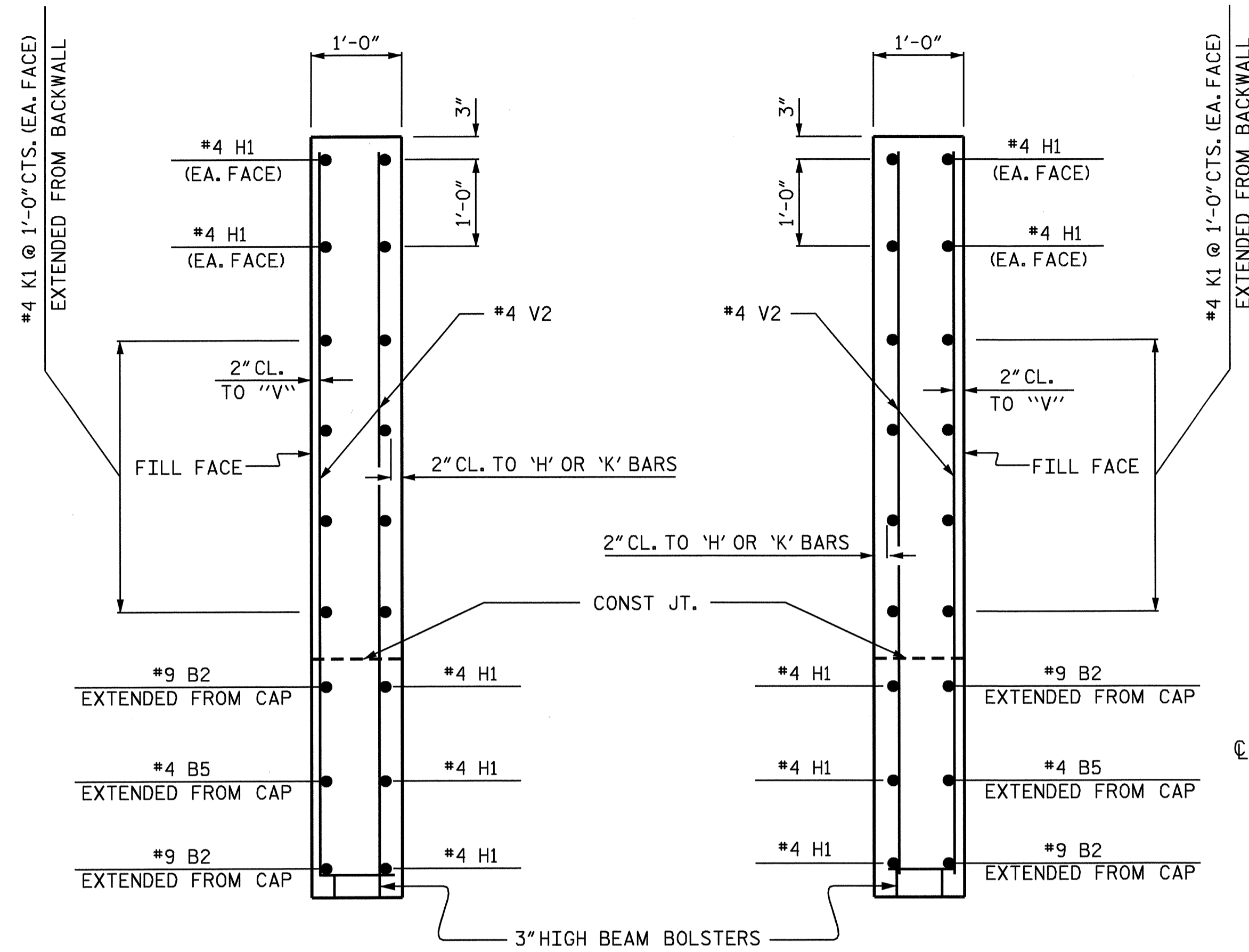
ELEVATION TABLE			
EL. A	1987.563	EL. N	1988.176
EL. B	1987.688	EL. O	1988.301
EL. C	1987.563	EL. P	1988.053
EL. D	1987.811	EL. Q	1988.178
EL. E	1987.686	EL. R	1987.931
EL. F	1987.933	EL. S	1988.056
EL. G	1987.808	EL. T	1987.808
EL. H	1988.056	EL. U	1987.933
EL. I	1987.931	EL. V	1987.686
EL. J	1988.178	EL. W	1987.811
EL. K	1988.053	EL. X	1987.563
EL. L	1988.301	EL. Y	1987.688
EL. M	1992.042	EL. Z	1987.563



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

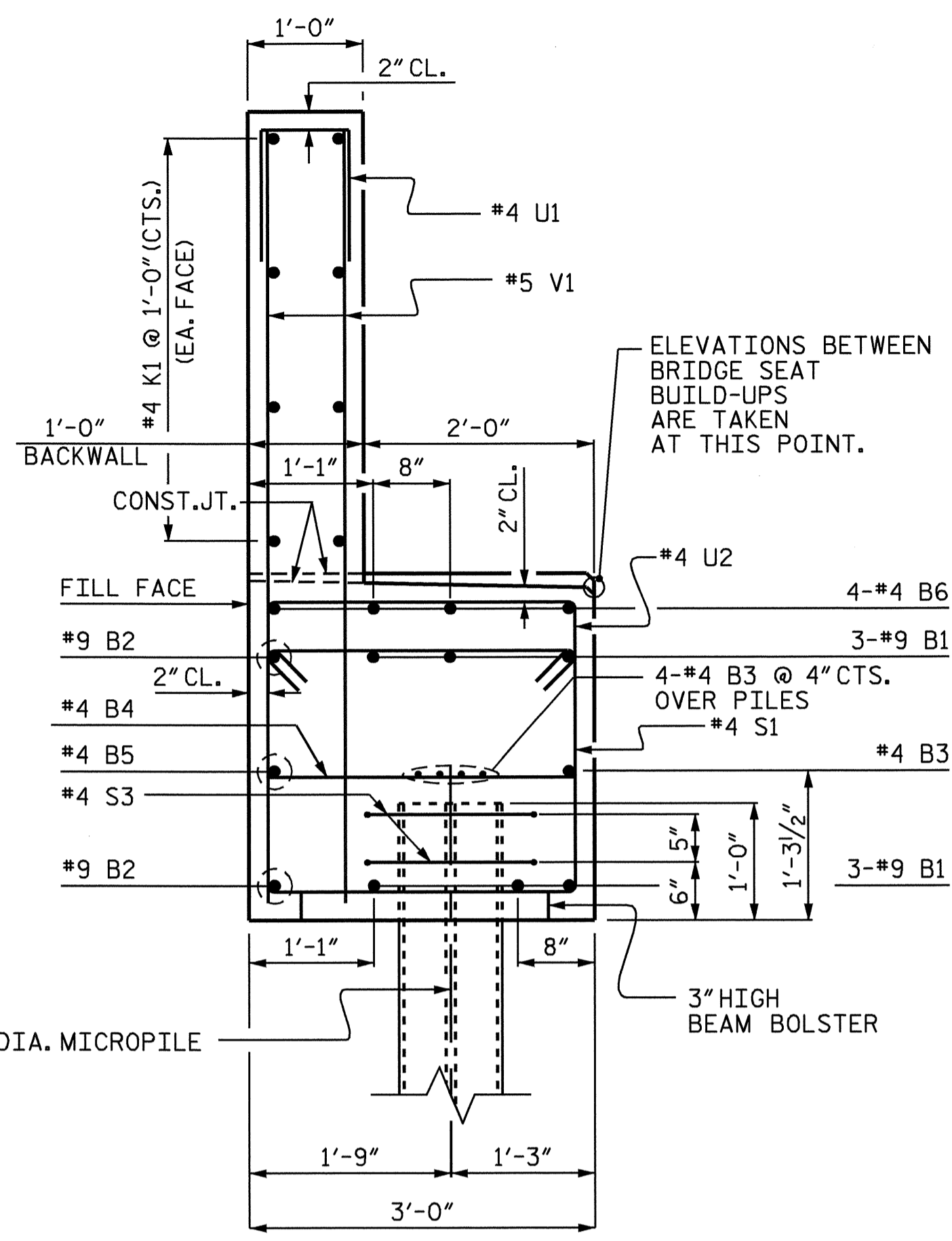
DRAWN BY: J.B. WILSON DATE: 3/10/09  
 CHECKED BY: B.N. BARODWALA DATE: 3/19/09

SHEET NO.  
S-21  
 TOTAL SHEETS  
28

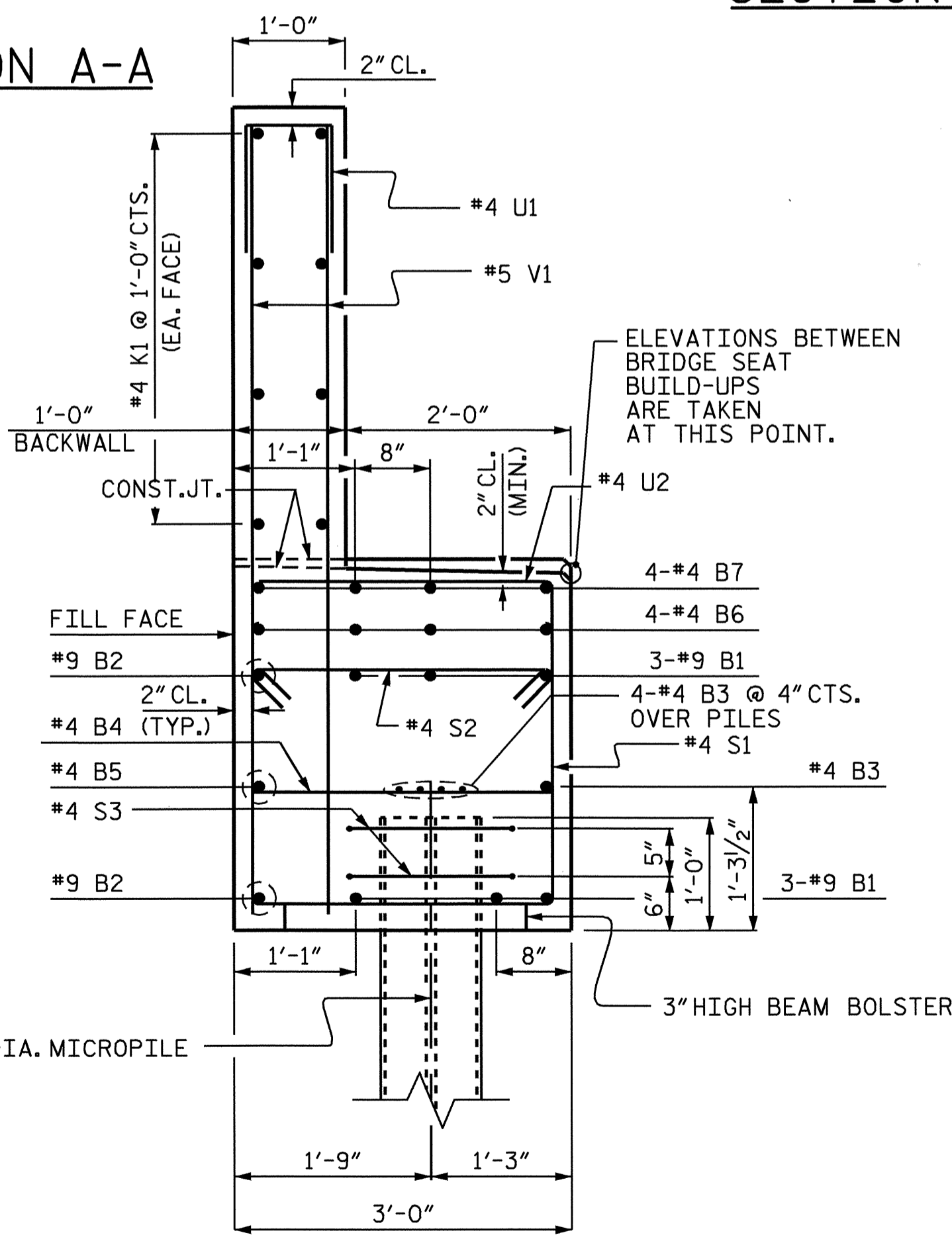


SECTION B-B

SECTION A-A



SECTION C-C



SECTION D-D

BAR TYPES

END BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	42'-10"	1748
B2	4	#9	STR	45'-6"	619
B3	15	#4	STR	26'-6"	266
B4	19	#4	STR	2'-8"	34
B5	3	#4	STR	29'-0"	58
B6	8	#4	STR	24'-0"	128
B7	16	#4	STR	2'-7"	28
E1	8	#5	STR	4'-4"	36
E2	8	#5	STR	2'-8"	22
H1	14	#4	STR	4'-6"	42
K1	24	#4	STR	29'-0"	465
S1	92	#4	2	7'-8"	471
S2	92	#4	3	3'-5"	210
S3	24	#4	5	6'-6"	104
U1	73	#4	4	3'-8"	179
U2	30	#4	4	5'-8"	114
V1	146	#5	STR	5'-11"	901
V2	24	#4	STR	8'-0"	128

REINFORCING STEEL = 5553 LBS

CLASS 'A' CONCRETE BREAKDOWN

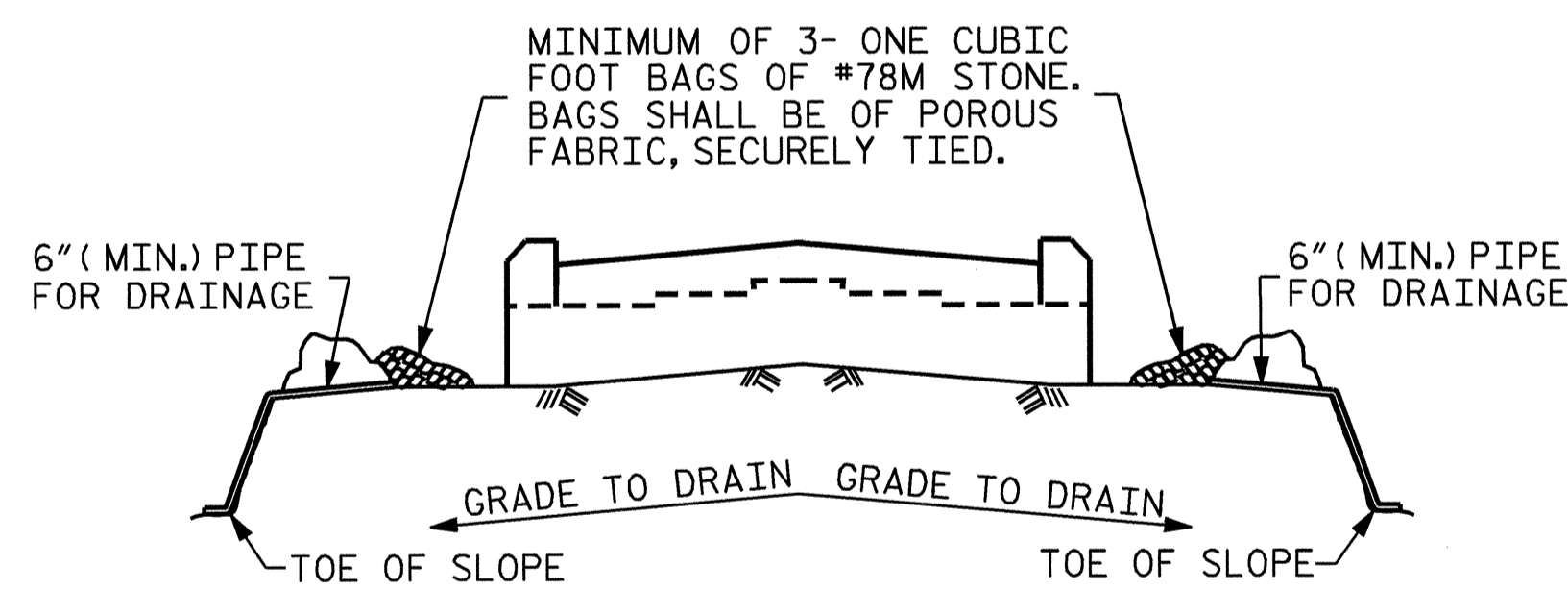
POUR #1 CAP & LOWER PART OF WINGS 24.3 C.Y.

POUR #2 UPPER WINGS & BACKWALL 12.3 C.Y.

CLASS 'A' CONCRETE TOTAL 36.6 C.Y.

10 3/4" DIA. MICROPILES EACH 12

ALL BAR DIMENSIONS ARE OUT TO OUT

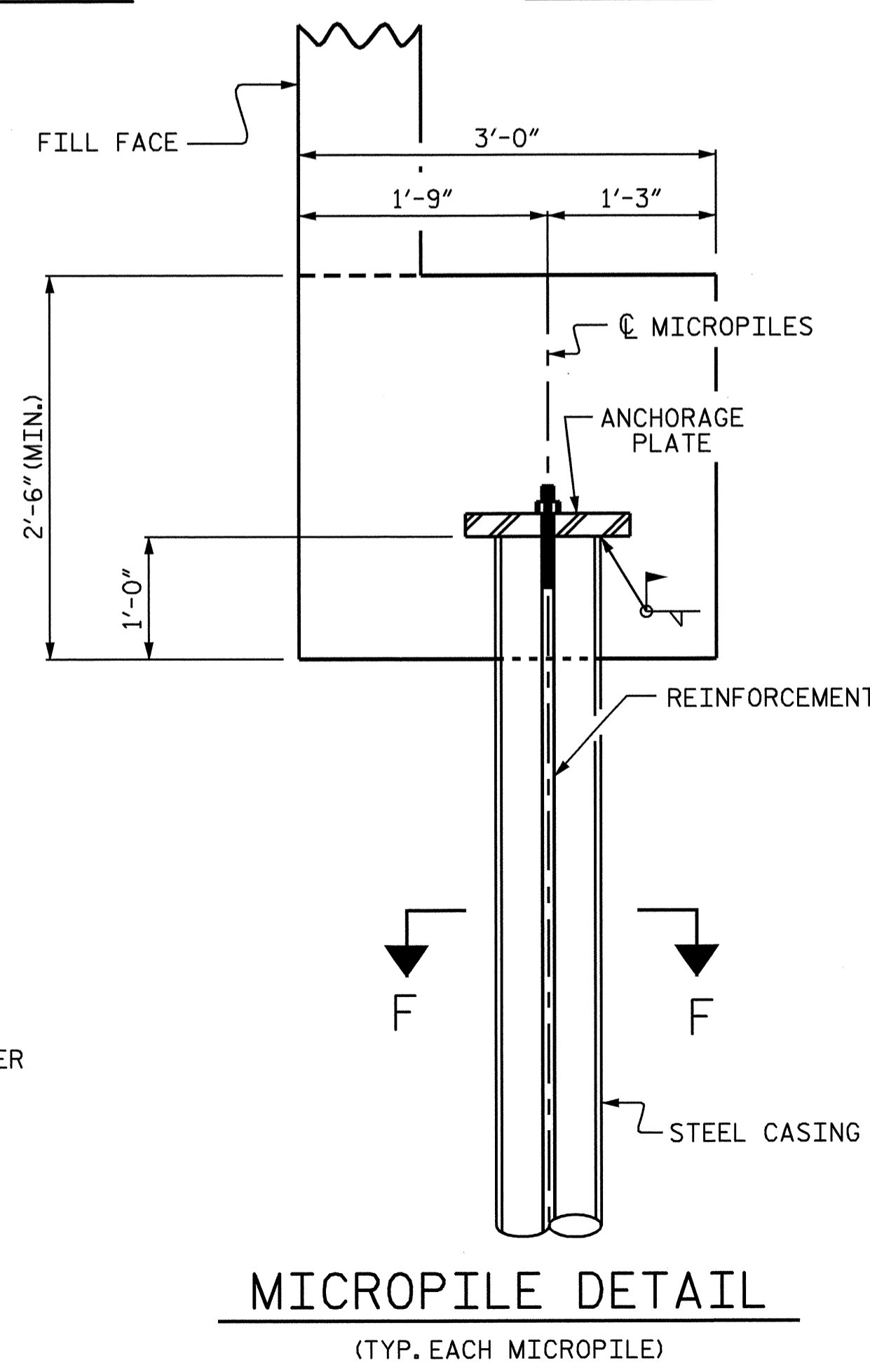


TEMPORARY DRAINAGE AT END BENT

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.

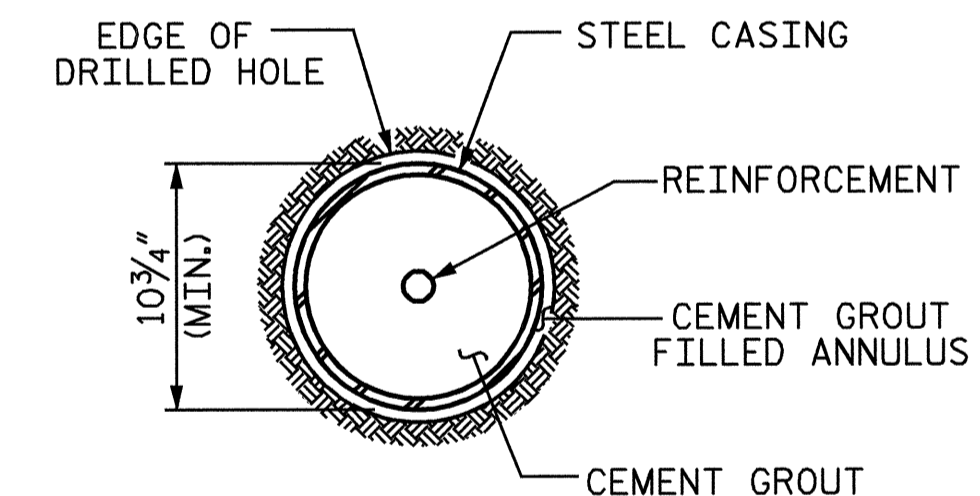
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



MICROPILE DETAIL

(TYP. EACH MICROPILE)



SECTION F-F

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 2 OF 2

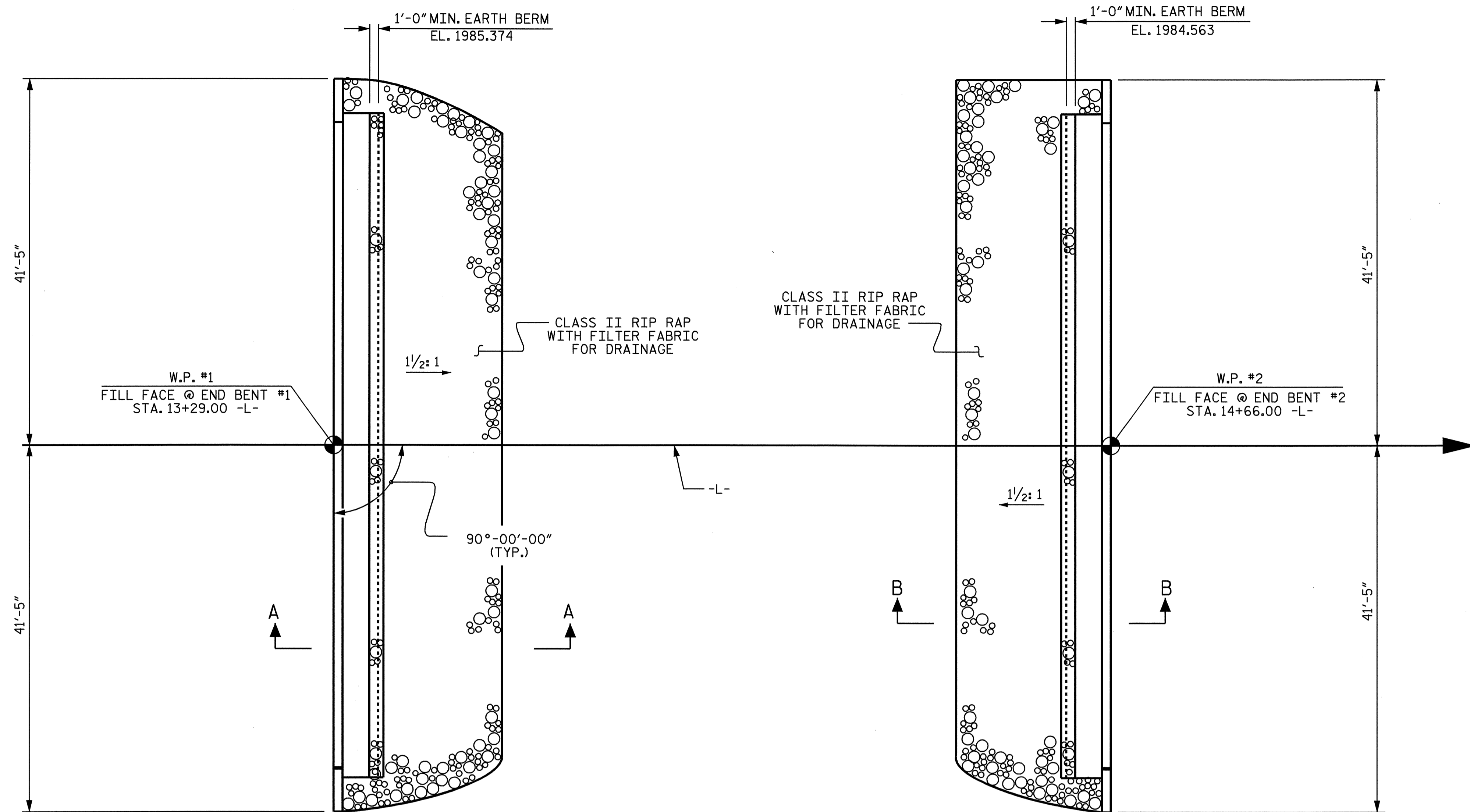
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #2

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22	
1			3			TOTAL SHEETS	28
2			4				

Professional Engineer Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025516, E. MURPHY, dated 5/19/09.

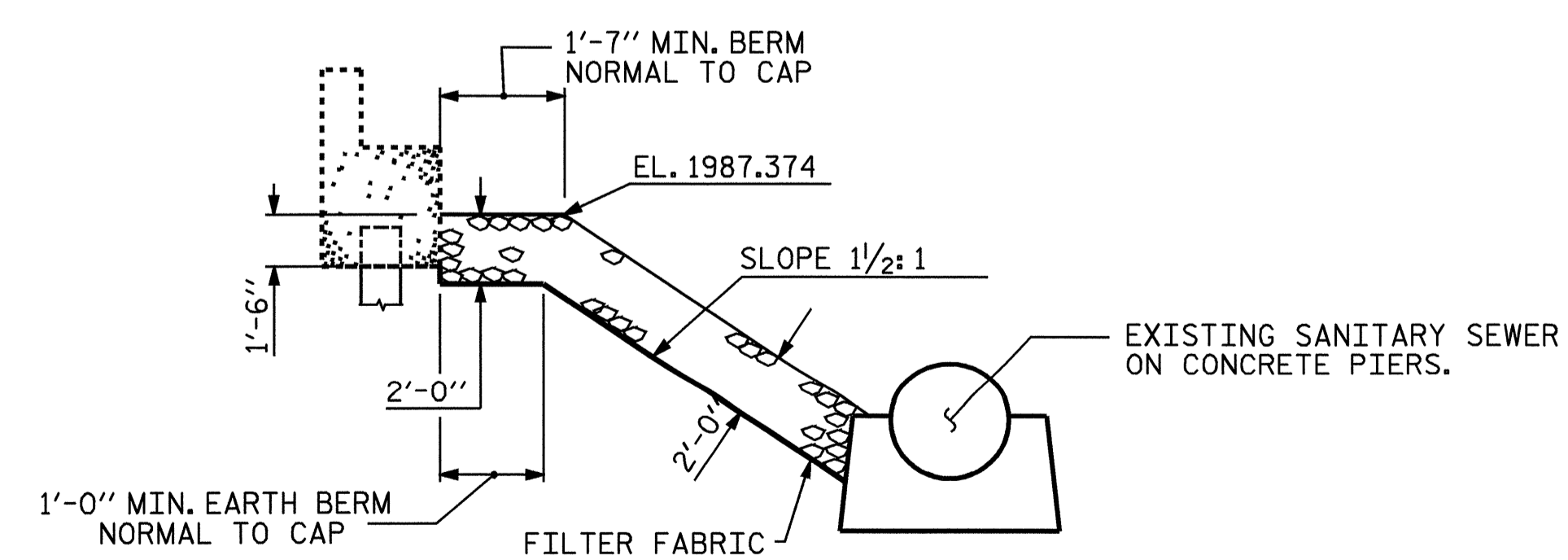
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 CHECKED BY: B.N. BARODAWALA DATE: 3/19/09



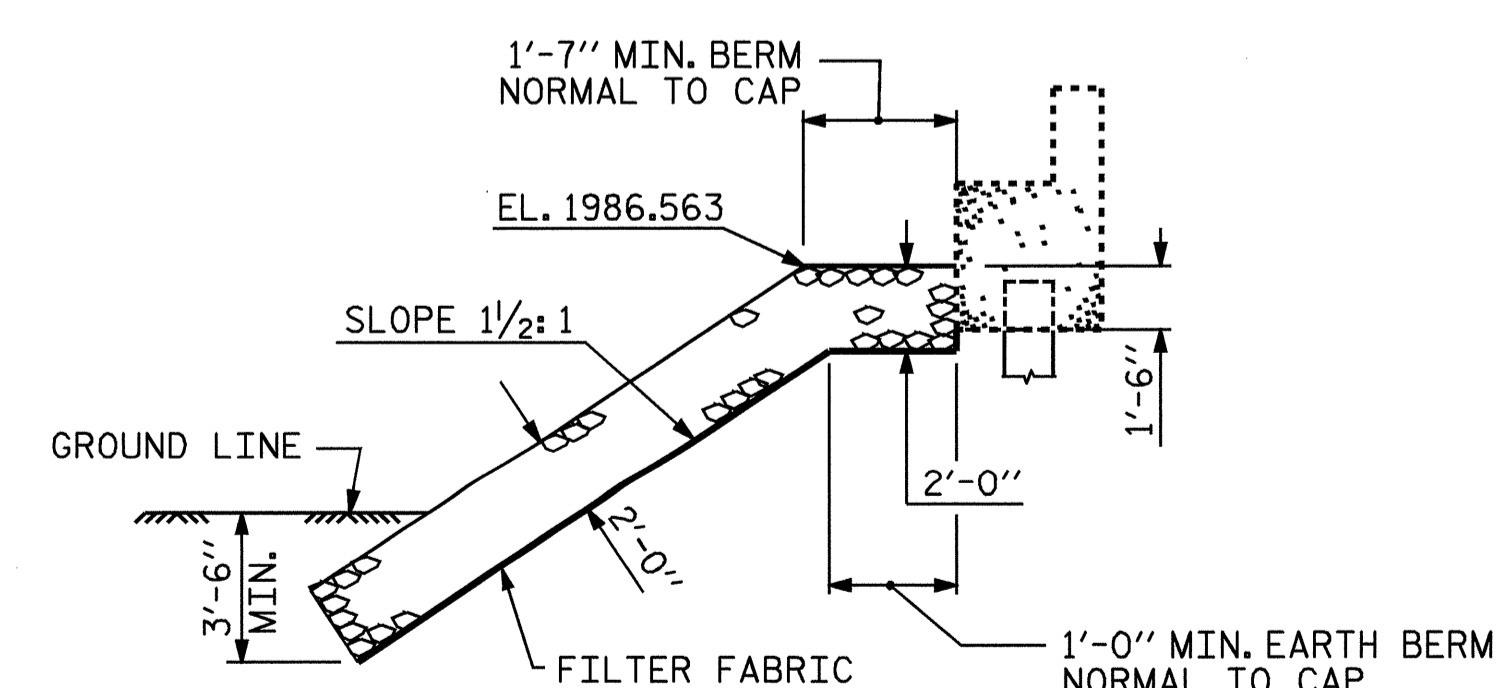
END BENT #1

END BENT #2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+90.00 -L-	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT #1	204	227
END BENT #2	146	162
TOTAL	350	389



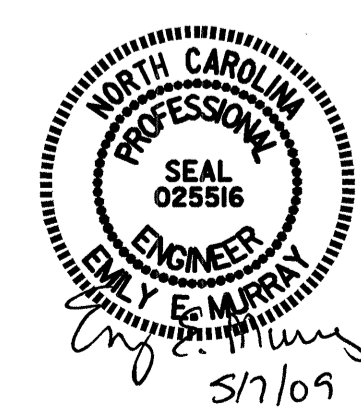
SECTION A-A



SECTION B-B

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

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



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS 28
2			4			

DRAWN BY : M. GUDLAUGSSON DATE : 01/2009  
 CHECKED BY : B.N. BARODAWALA DATE : 3/05/09



NOTES

THE COST OF THE CLASSIC CONCRETE RAIL PILASTER ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR BRIDGE APPROACH SLABS.

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

FABRIC SHALL BE TYPE 1 ENGINEERING FABRIC 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 BEHIND THE WINGWALL AND BESIDE APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

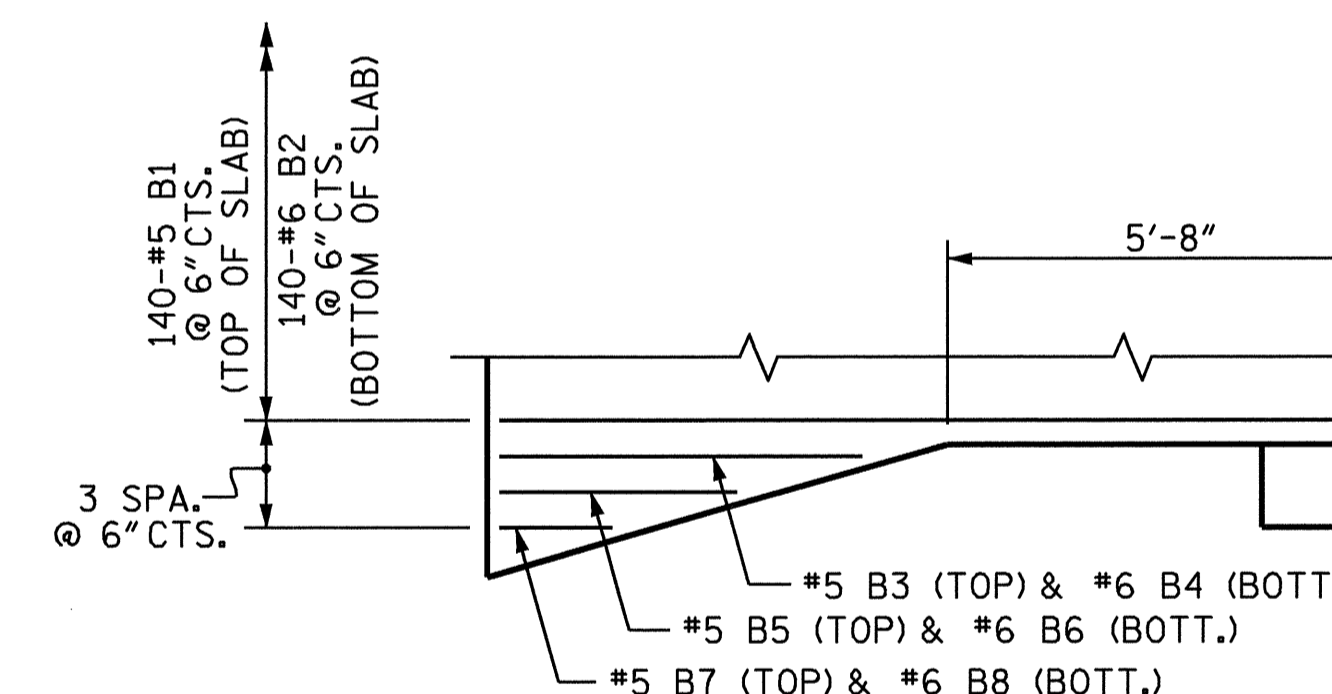
THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

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

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.



DETAIL "C"  
(LAMP POST BASE NOT SHOWN)

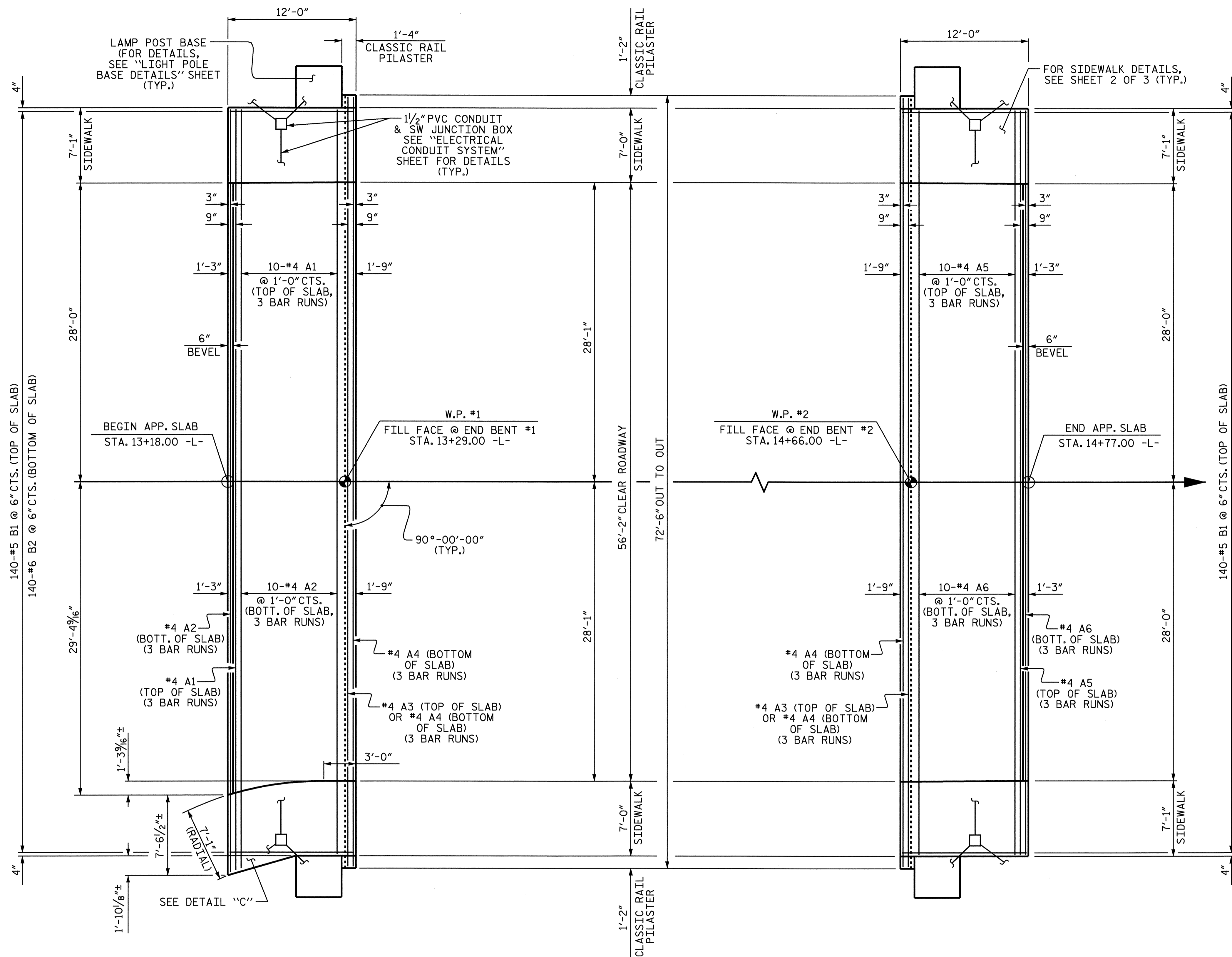
PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB  
 FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			28

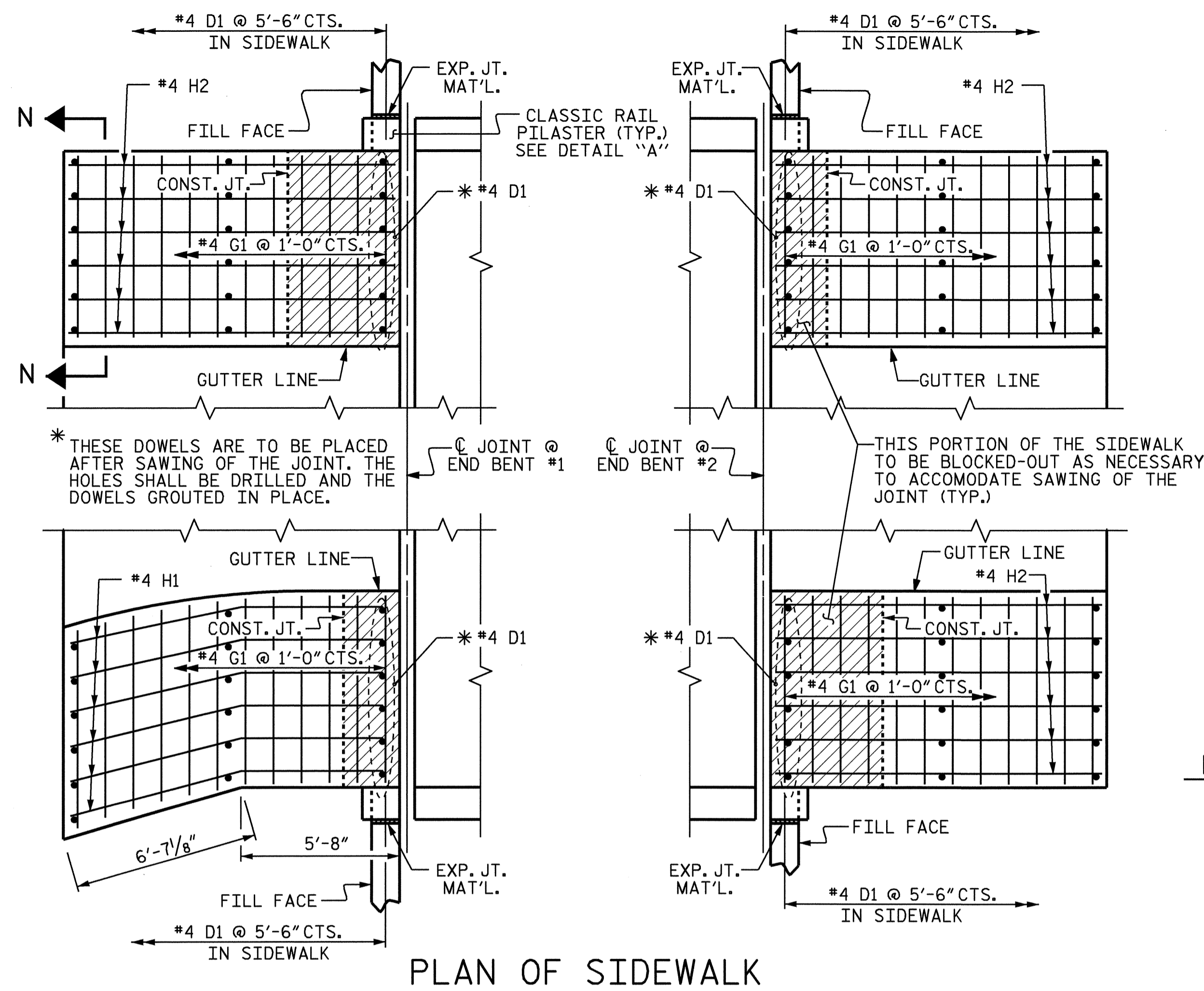


PLAN @ END BENT #1

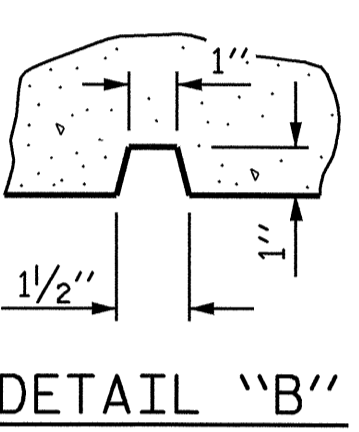
PLAN @ END BENT #2

DRAWN BY: T.L. AVERETTE DATE: 3-09  
 CHECKED BY: PEGGY PARISI DATE: 3-09

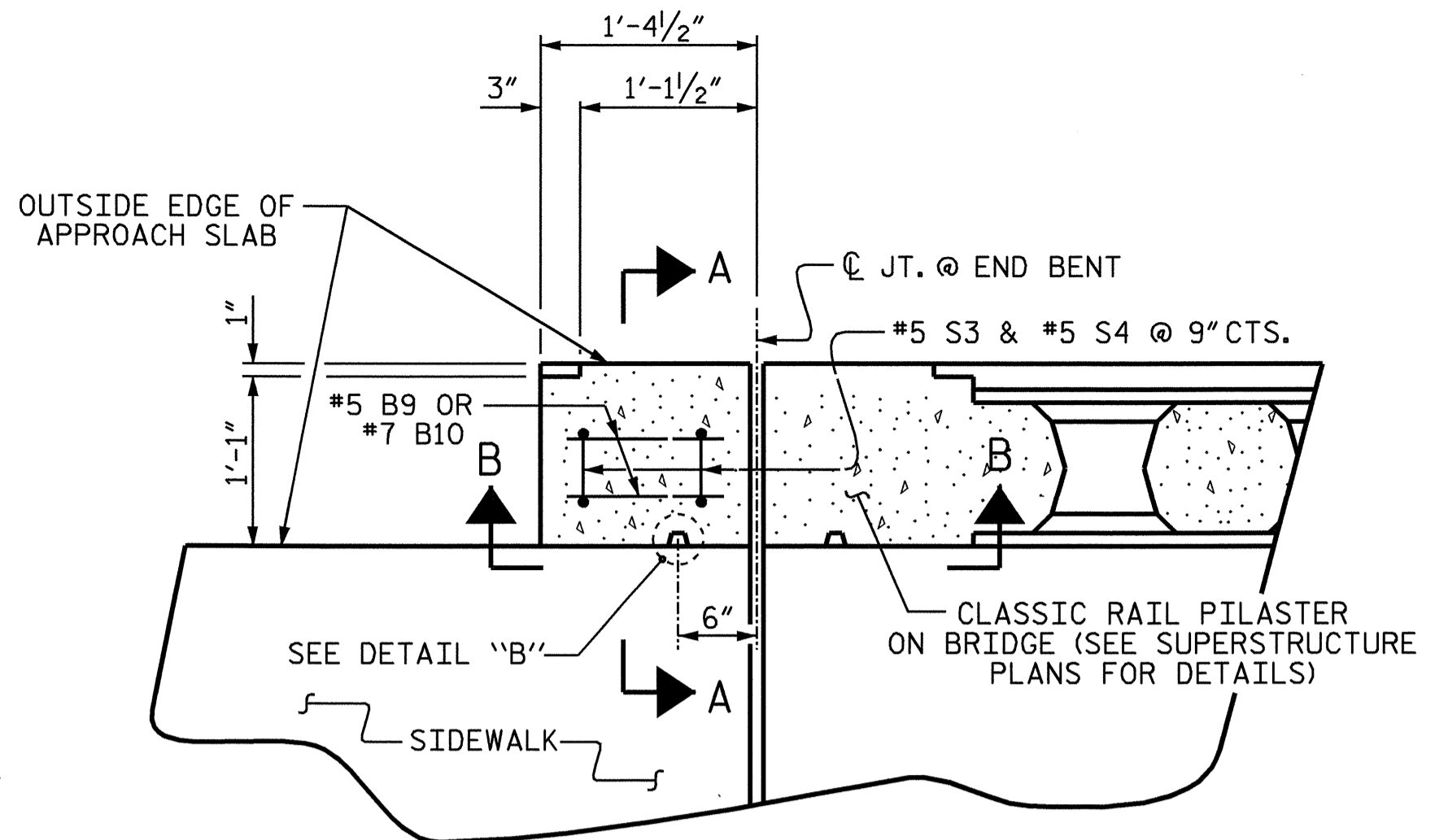
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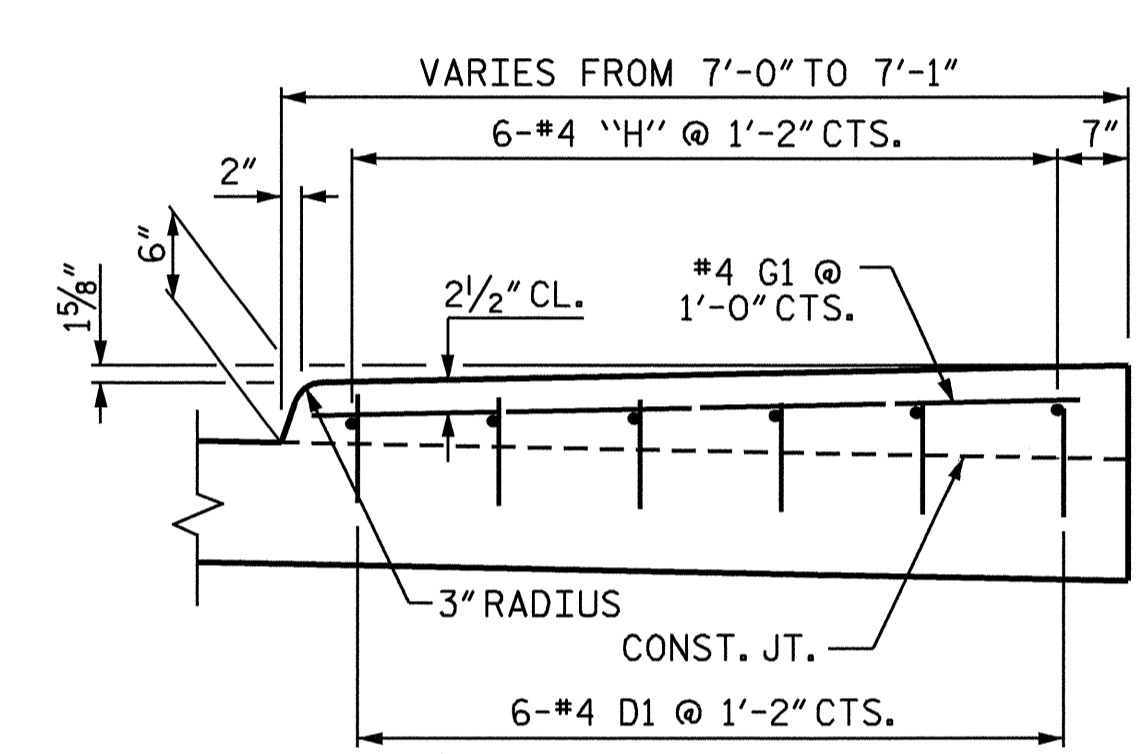
PLAN OF SIDEWALK



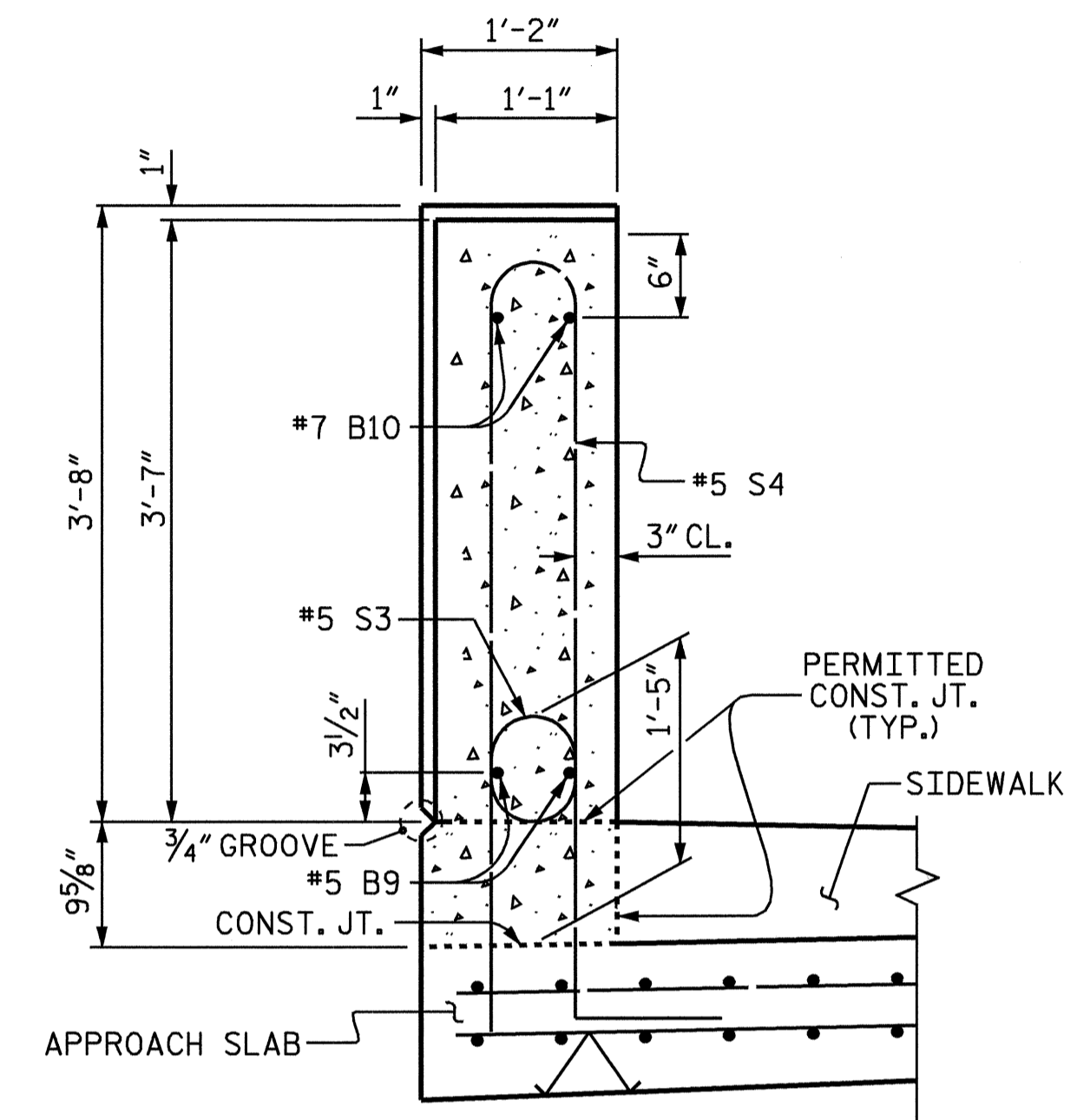
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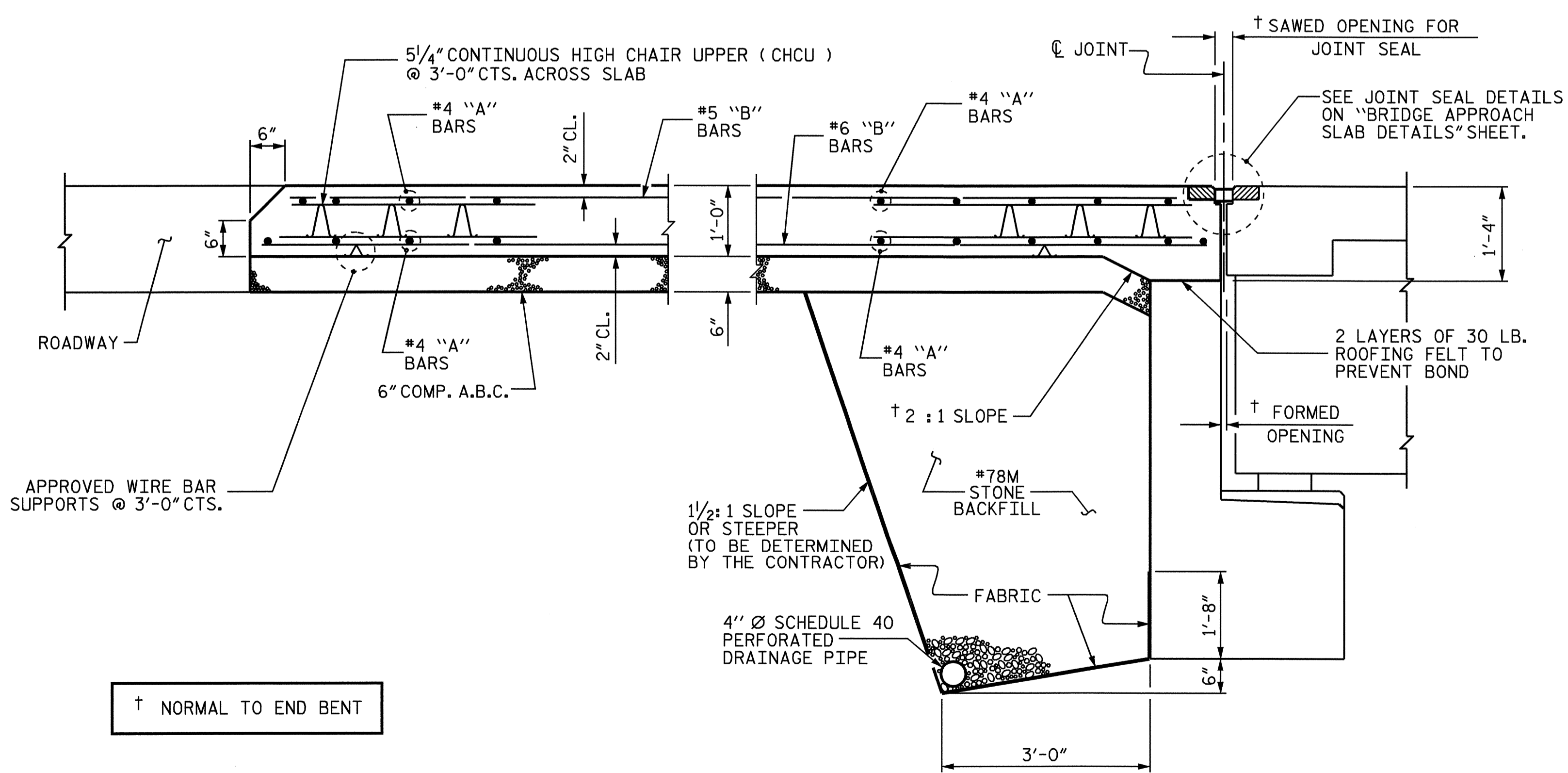
DETAIL "A"  
SHOWING PLAN OF CLASSIC RAIL PILASTER ON APPROACH SLAB



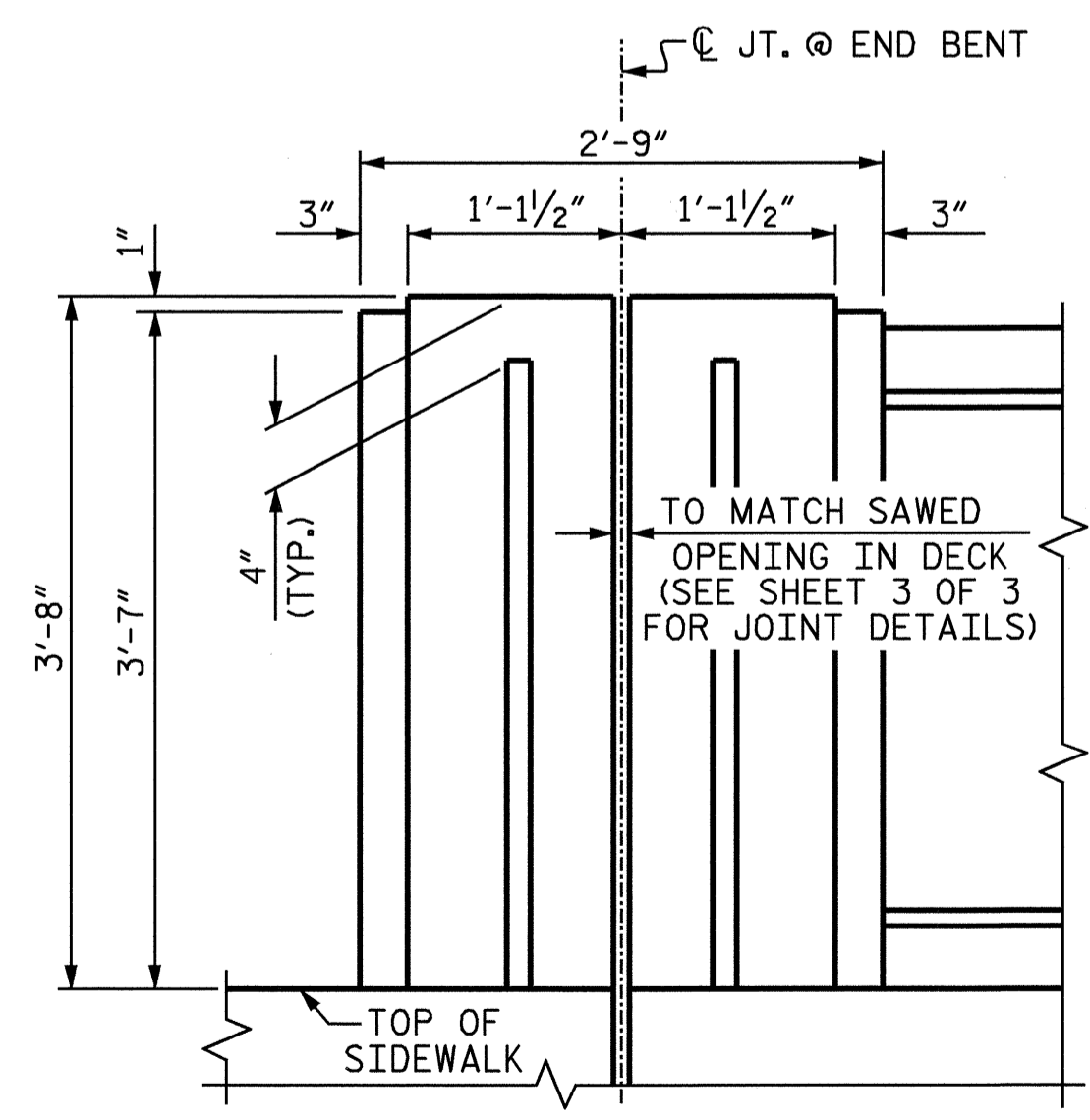
SECTION N-N  
SHOWING SIDEWALK ON APPROACH SLAB



SECTION A-A  
(SHOWING CLASSIC RAIL PILASTER)



SECTION THRU SLAB

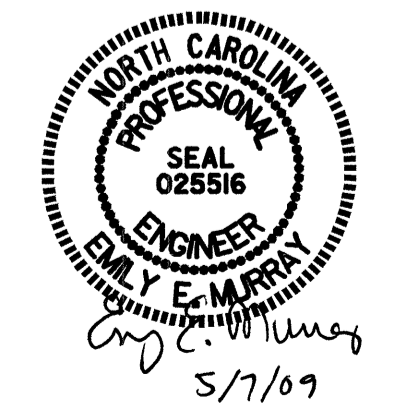


SECTION B-B  
(CLASSIC RAIL PILASTER ELEVATION)

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-  
 SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB  
 FOR FLEXIBLE PAVEMENT



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS 28
2			4			

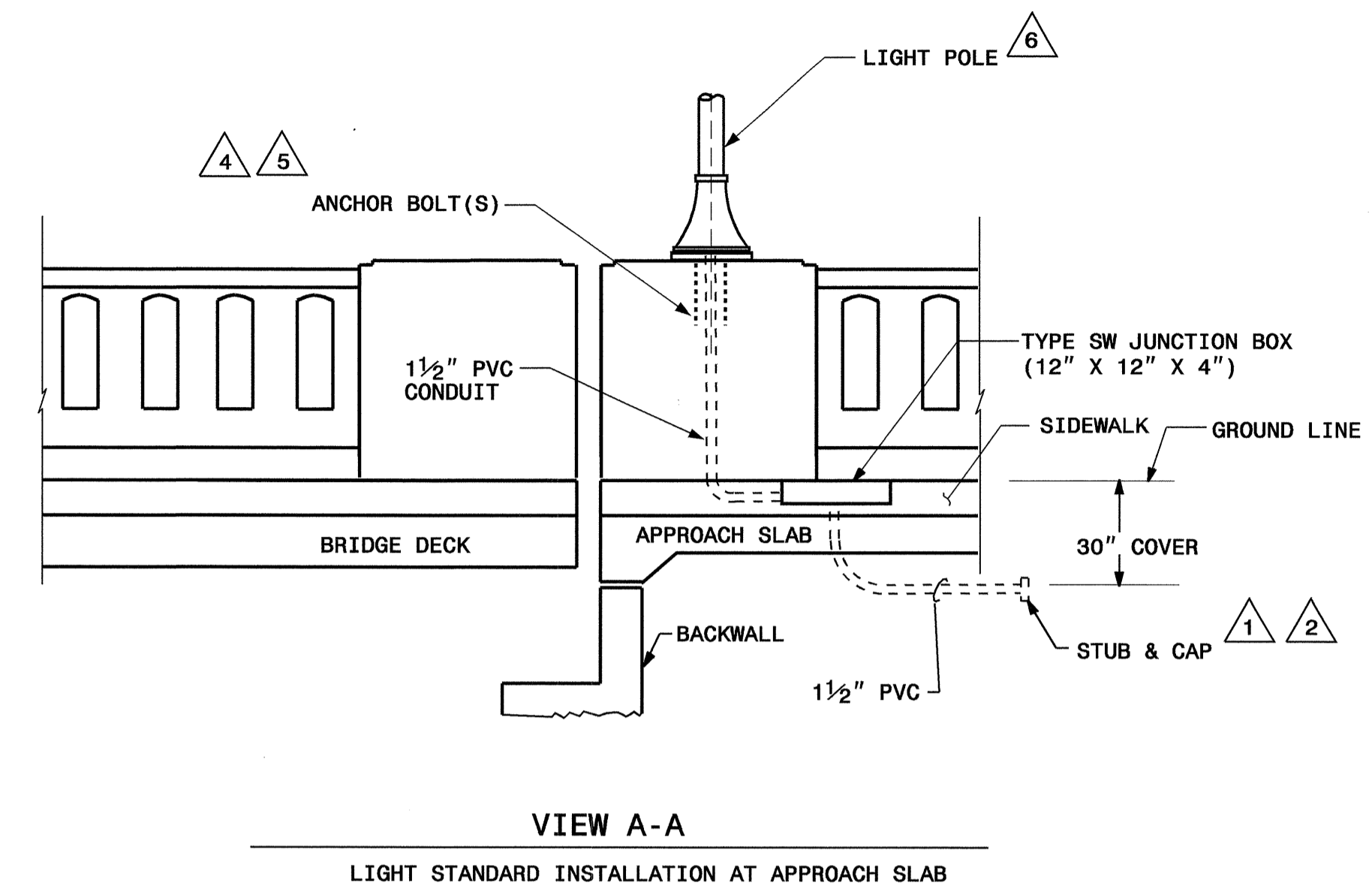
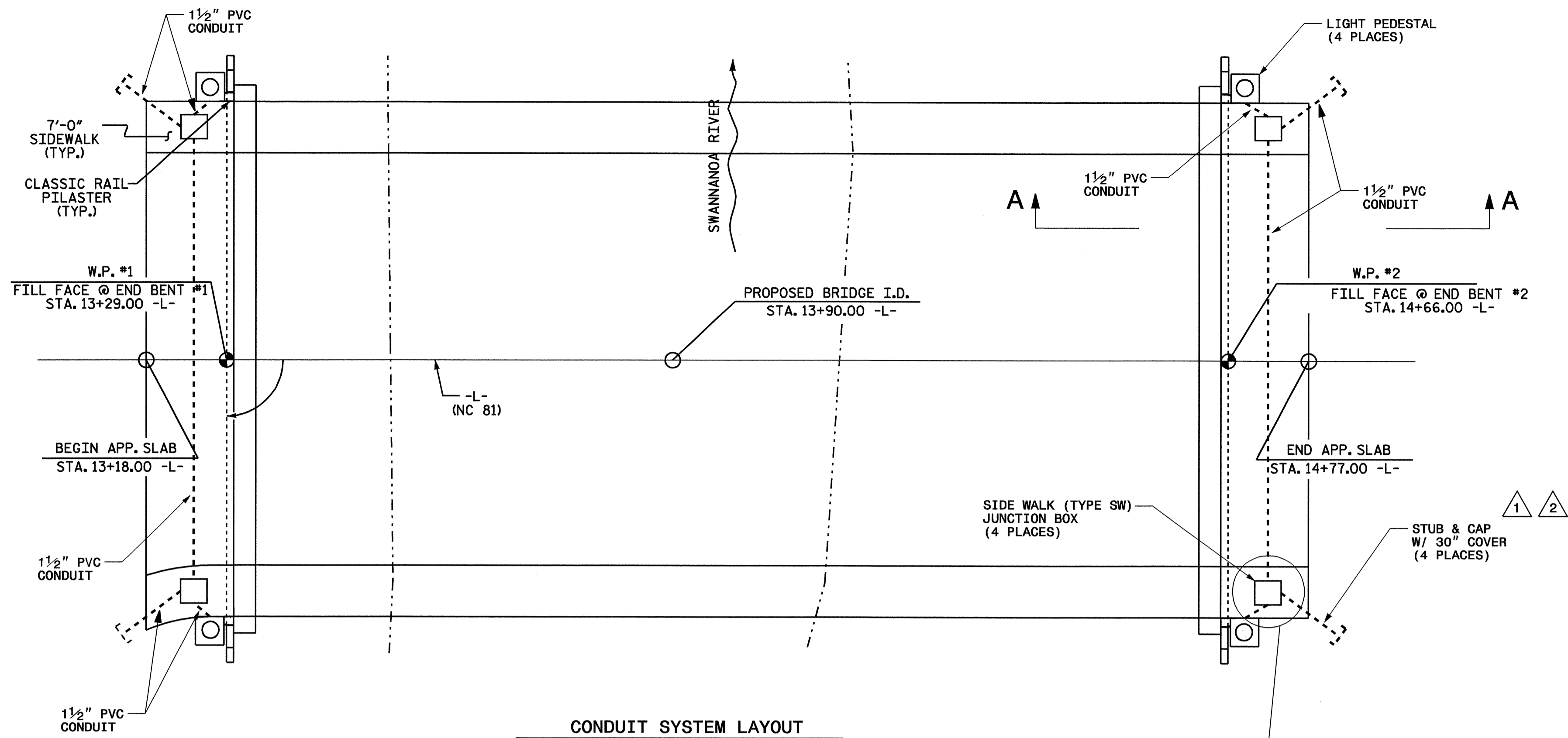
DRAWN BY: T.L. AVERETTE DATE: 3-09  
 CHECKED BY: PEGGY PARISI DATE: 3-09

07-MAY-2009 14:30  
 g:\tppr\projects-b\2515\structures\2515\final\plane\2515.sd.dgn  
 taverette

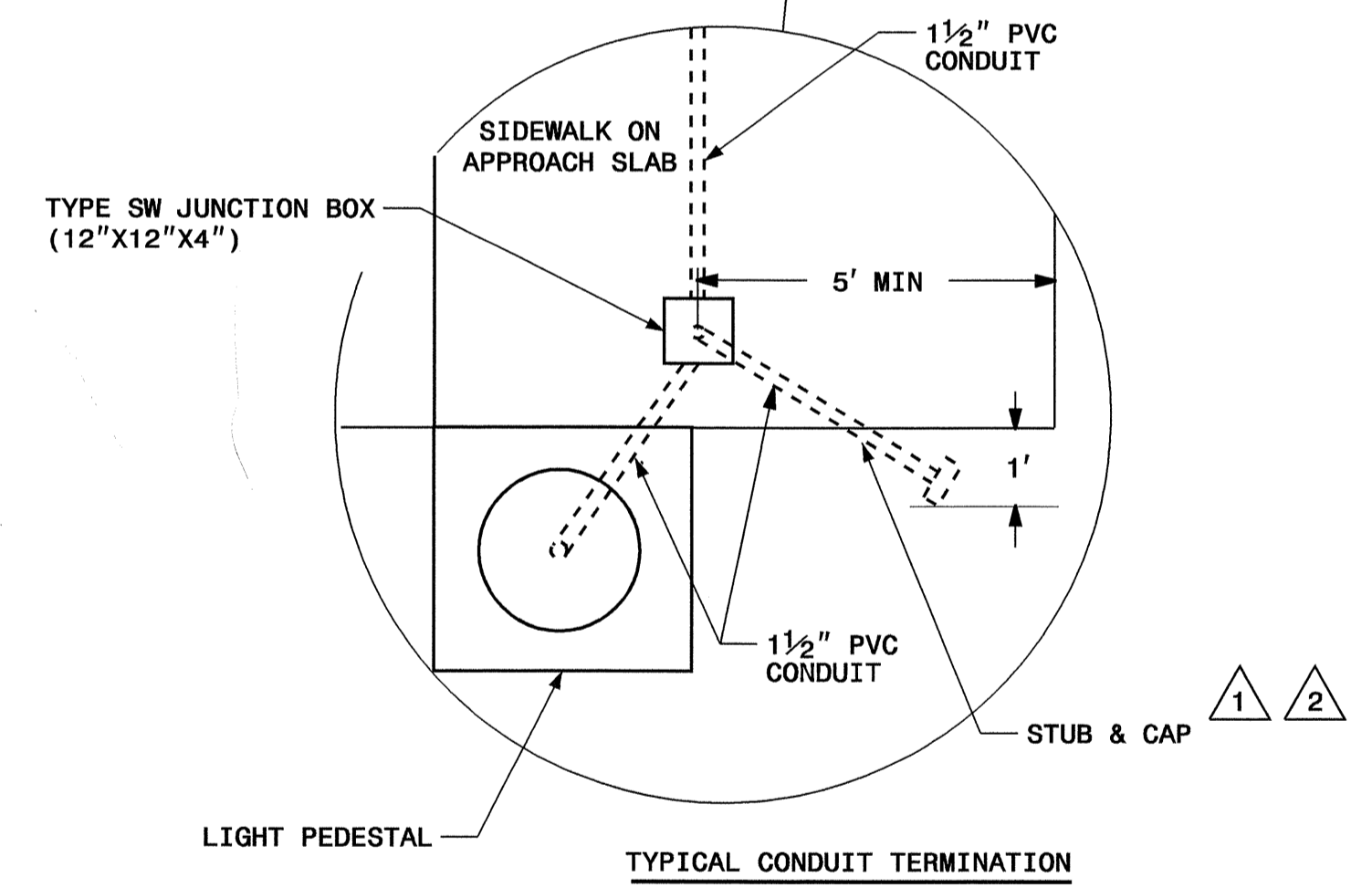
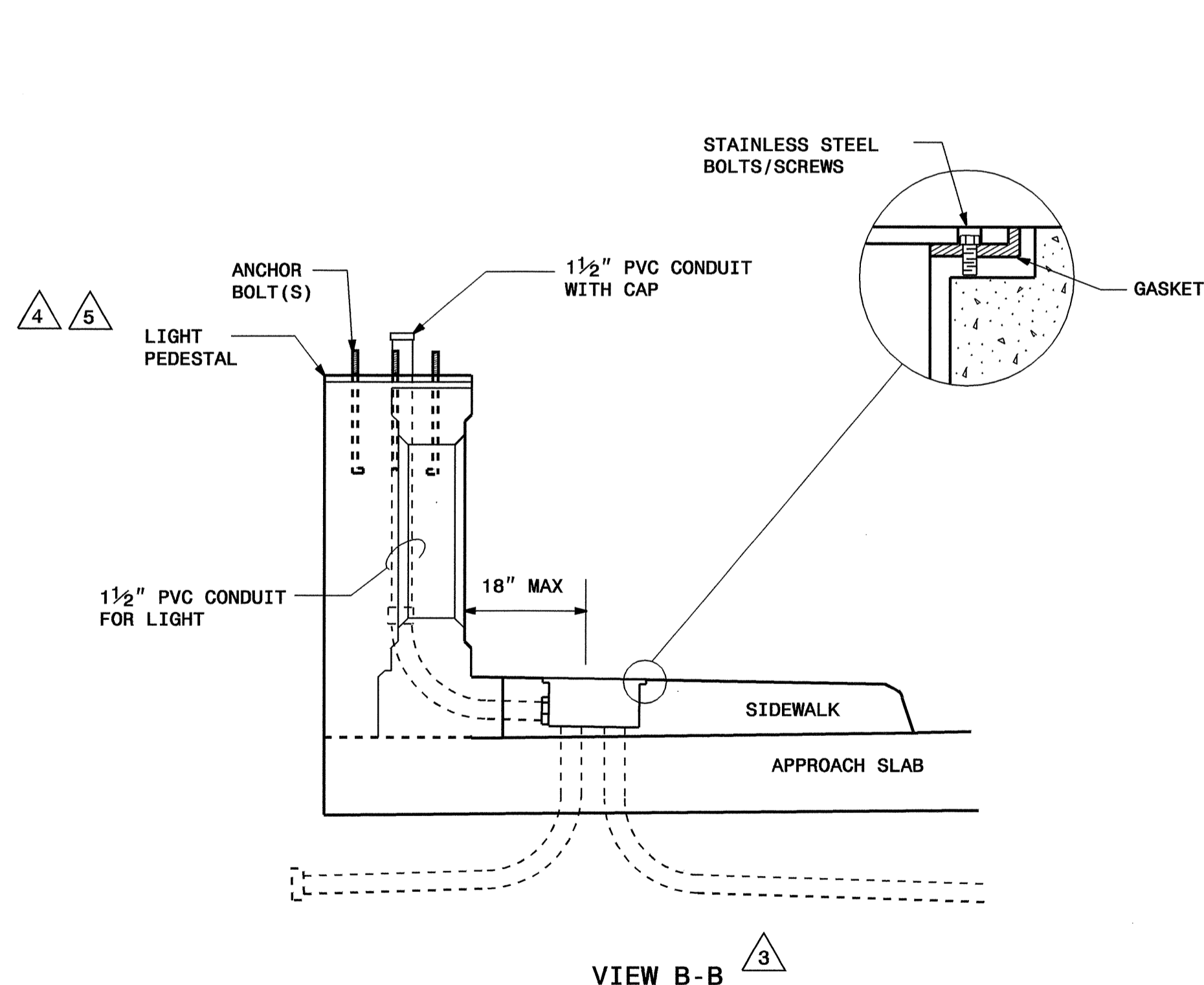




USE FOR LIGHTING CONSTRUCTION ONLY



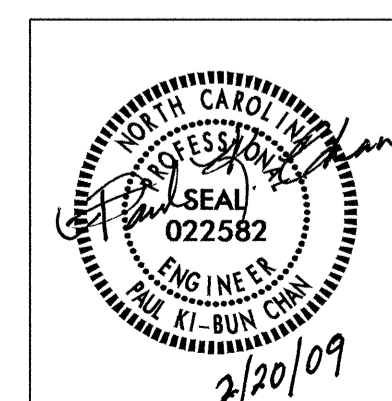
UNIT	ITEMS	QTY
EA	SW JUNCTION BOX (12"X12"X4")	4
FT	1 1/2" PVC CONDUIT	150
FT	POLYETHYLENE PULL LINE	180



NOTES

- 1 POWER SERVICE FROM EACH END OF BRIDGE, TIE TO LIGHTING CIRCUIT IN AREA.
- 2 COORDINATE CONNECTION OF CONDUIT WITH OTHERS. ENSURE THAT CONDUIT IS NOT IN CONFLICT WITH GUARD RAIL POSTS.
- 3 SEE STRUCTURE PLANS FOR LOCATION AND DETAILS FOR LIGHT PEDESTALS.
- 4 INSTALL ANCHOR BOLTS ACCORDING TO MANUFACTURER'S RECOMMENDATION.
- 5 COORDINATE WITH THE CITY OF ASHEVILLE TO INSTALL ANCHOR BOLTS ACCORDING TO POLE MANUFACTURER SPECIFICATIONS.
- 6 POLES AND LUMINAIRES PROVIDED AND INSTALLED BY OTHERS.

PROJECT NO. B-2515  
BUNCOMBE COUNTY  
 STATION: 13+90.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 ROADWAY DESIGN LIGHTING & ELECTRICAL  
**ELECTRICAL CONDUIT SYSTEM**  
 BRIDGE OVER SWANNAHOA RIVER ON  
 NC 81 BETWEEN NORFOLK SOUTHERN RR  
 AND BRYSON STREET

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

20-FEB-2009 12:04  
 DRAWN BY: P. K. CHAN DATE: 2/19/09  
 CHECKED BY: [Signature] DATE: 2-20-09

SEE PROJECT SPECIAL PROVISIONS TITLED  
 "ELECTRICAL CONDUIT SYSTEM" FOR MATERIALS  
 CONSTRUCTION METHODS AND PAYMENT.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-2515	SU-1	11

STATE OF NORTH CAROLINA

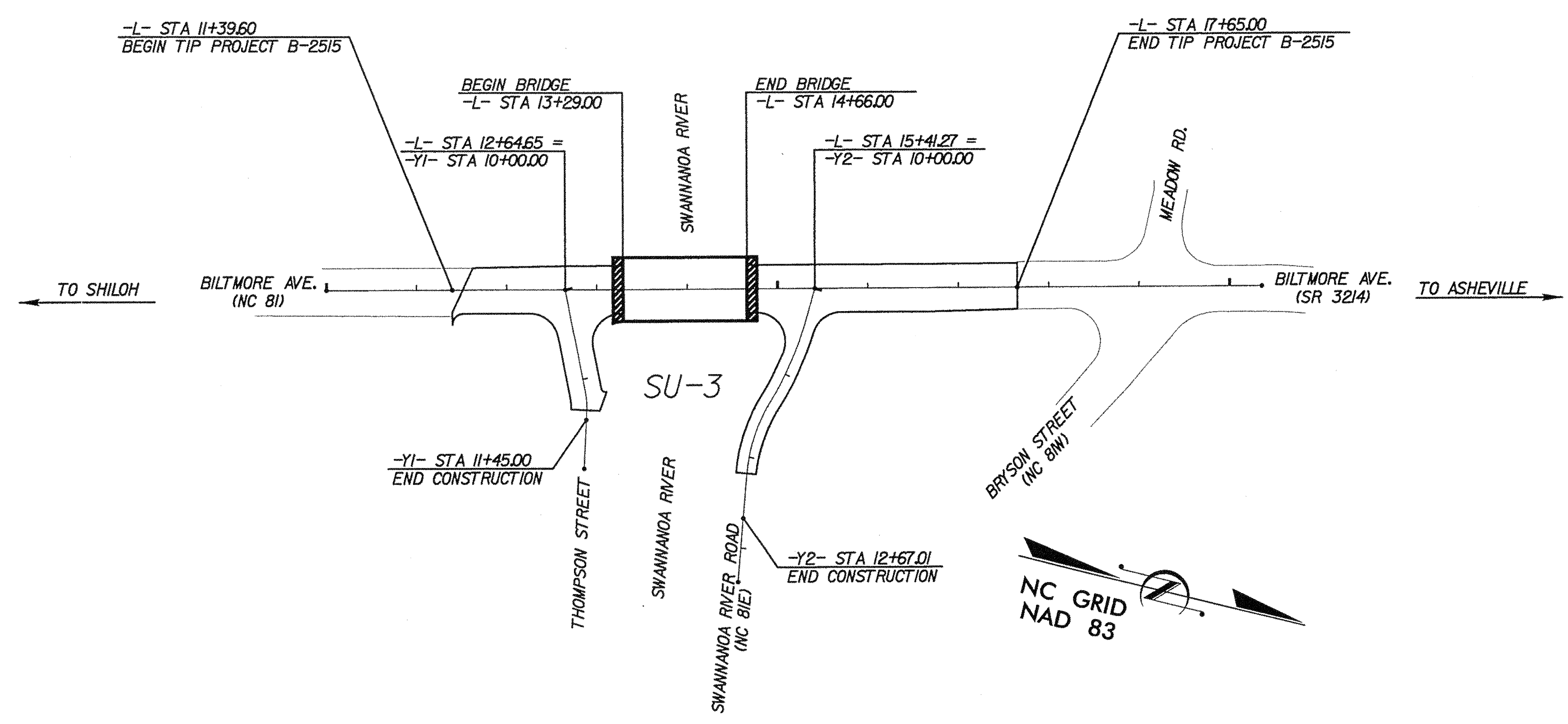
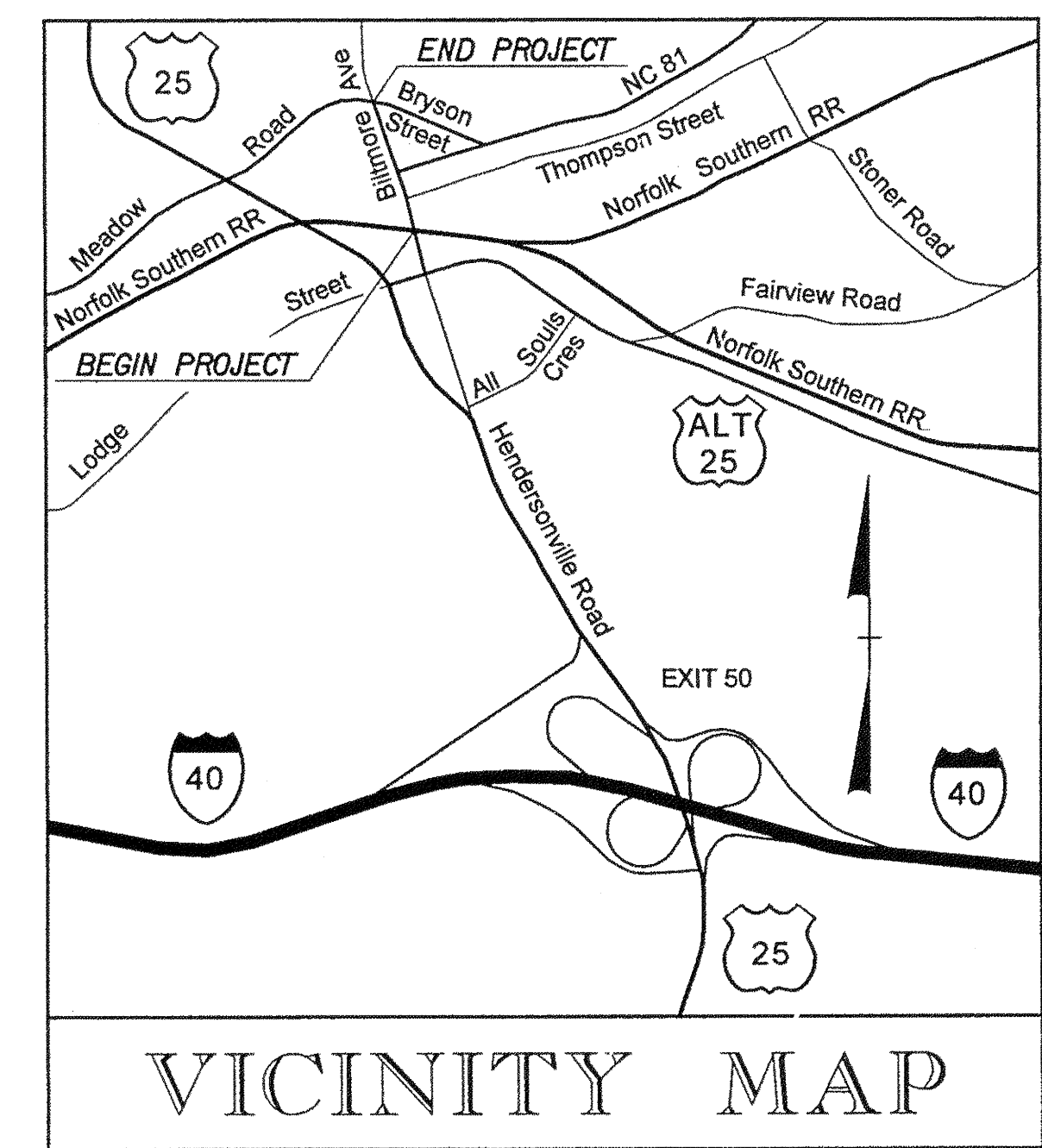
DIVISION OF HIGHWAYS

**BUNCOMBE COUNTY**

**LOCATION: NC 81 (BILTMORE AVENUE) BETWEEN NORFOLK SOUTHERN RR AND NC 81 WEST (BRYSON STREET)**

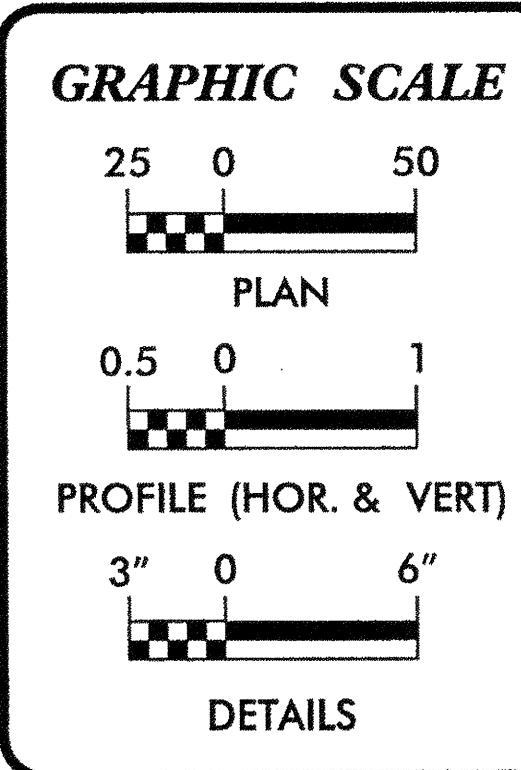
**TYPE OF WORK: UTILITIES CONSTRUCTION - FIBER OPTIC CONDUITS**

SEE THIS SHEET FOR INDEX OF SHEETS  
SEE SHEET SU-2 FOR CONVENTIONAL PLAN SHEET SYMBOLS



TIP PROJECT: B-2515

CONTRACT:



INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
SU-1	TITLE SHEET
SU-2	SYMBOLS SHEET
SU-3	PLAN SHEET
SU-4	LOCATION PLAN AND DETAILS FOR THREADED ANCHOR INSERTS
SU-5	PROFILES - VERTICAL TRANSITION OF DUCT BANK
SU-6	DETAILS - DUCT BANK SECTION THROUGH BACK WALL
SU-7	HANGER DETAILS
SU-7A	HANGER DETAILS
SU-8	HANGER DETAILS
SU-9	HANGER DETAILS
SU-10	HANGER DETAILS
SU-11	DETAILS - BELOW GRADE DUCT BANK

**UTILITY OWNERS ON THIS PROJECT:**  
 TELEPHONE - AT&T  
 FIBER OPTIC - AT&T  
 WATER - CITY OF ASHEVILLE  
 SANITARY SEWER - METROPOLITAN SEWERAGE DISTRICT

**NCDOT CONTACTS FOR THIS PROJECT:**  
 STRUCTURES: EMILY MURRAY  
 UTILITIES: BO HEMPHILL  
 CARL BARCLAY

UTILITY DESIGN BY:  
**MA Engineering CONSULTANTS, INC.**  
 598 East Chatham Street Suite 137 Cary, NC 27511  
 Phone: 919.297.0220 Fax: 919.297.0221

PLANS PREPARED FOR:  
 AT&T  
 24 O'HENRY AVENUE  
 ROOM 400  
 ASHEVILLE, NC 28801

AT&T REPRESENTATIVE:  
 SCOTT ADDINGTON

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Property Corner	----- X
Property Monument	□ EGM
Parcel/Sequence Number	⑫③
Existing Fence Line	----- X X X
Proposed Woven Wire Fence	----- ○
Proposed Chain Link Fence	----- □
Proposed Barbed Wire Fence	----- ◇
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⊗
Foundation	□
Area Outline	□
Cemetery	□ †
Building	□
School	□
Church	□
Dam	□

### HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	----- JS
Buffer Zone 1	----- BZ 1
Buffer Zone 2	----- BZ 2
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	----- FLOW
False Sump	-----

### RAILROADS:

Standard Gauge	----- CSX TRANSPORTATION
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

### RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	----- (R/W)
Proposed Right of Way Line with Iron Pin and Cap Marker	----- (R/W) ▲
Proposed Right of Way Line with Concrete or Granite Marker	----- (R/W) ●
Existing Control of Access	○ CA
Proposed Control of Access	○ CA
Existing Easement Line	----- E
Proposed Temporary Construction Easement	----- E
Proposed Temporary Drainage Easement	----- TDE
Proposed Permanent Drainage Easement	----- PDE
Proposed Permanent Utility Easement	----- PUE

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	----- C
Proposed Slope Stakes Fill	----- F
Proposed Wheel Chair Ramp	----- (WCR)
Proposed Wheel Chair Ramp Curb Cut	----- (WCC)
Curb Cut for Future Wheel Chair Ramp	----- (CCFR)
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	⊗

### VEGETATION:

Single Tree	○
Single Shrub	○
Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	----- Vineyard

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	----- CONC
Bridge Wing Wall, Head Wall and End Wall	----- CONC WW
MINOR:	
Head and End Wall	----- CONC HW
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	○ S
Storm Sewer	----- S

### UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○ P
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	□ PH
H-Frame Pole	●
Recorded U/G Power Line	----- P
Designated U/G Power Line (S.U.E.*)	----- P

### TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○ T
Telephone Booth	□ T
Telephone Pedestal	□ T
Telephone Cell Tower	⊗
U/G Telephone Cable Hand Hole	□ PH
Recorded U/G Telephone Cable	----- T
Designated U/G Telephone Cable (S.U.E.*)	----- T
Recorded U/G Telephone Conduit	----- TC
Designated U/G Telephone Conduit (S.U.E.*)	----- TC
Recorded U/G Fiber Optics Cable	----- T FO
Designated U/G Fiber Optics Cable (S.U.E.*)	----- T FO

### WATER:

Water Manhole	○ W
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	----- A/G Water

### TV:

TV Satellite Dish	⊗
TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	□ PH
Recorded U/G TV Cable	----- TV
Designated U/G TV Cable (S.U.E.*)	----- TV
Recorded U/G Fiber Optic Cable	----- TV FO
Designated U/G Fiber Optic Cable (S.U.E.*)	----- TV FO

### GAS:

Gas Valve	◇
Gas Meter	⊕
Recorded U/G Gas Line	----- G
Designated U/G Gas Line (S.U.E.*)	----- G
Above Ground Gas Line	----- A/G Gas

### SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS
Designated SS Forced Main Line (S.U.E.*)	----- FSS

### MISCELLANEOUS:

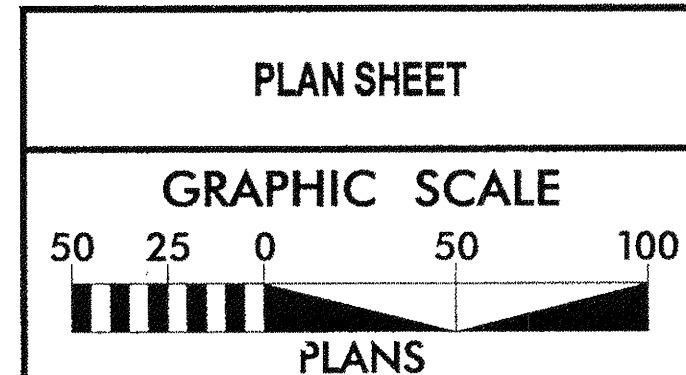
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line	----- ZUTL
U/G Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

**PLAN NOTES LEGEND**

- (A) MH G31 - 12"x12"x7' (LxWxH) INSTALLED BY OTHERS
- (B) 4" PVC TYPE C CONDUIT DUCT BANK INSTALLED BY OTHERS
- (C) MH G30 - 12"x6"x7' (LxWxH) INSTALLED BY OTHERS
- (1) STA. 13+14, LT 18.375' TO STA. 13+29, LT 18.375' BELOW GRADE 2x5 DUCT BANK (10) 4" PVC TYPE C CONDUITS
- (2) STA. 13+29, LT 18.375' TO STA. 14+66, LT 18.375' EXPOSED 2x5 DUCT BANK ATTACHED TO CONDUIT (10) 4" PVC TYPE D CONDUIT
- (3) STA. 14+66, LT 18.375' TO STA. 14+81, LT 18.375' BELOW GRADE 2x5 DUCT BANK (10) 4" PVC TYPE C CONDUIT

- UTILITY OWNERS OF UTILITIES SHOWN ON THIS SHEET:
- FIBER OPTIC CONDUIT / TELEPHONE - AT&T  
CONTACT PERSON: SCOTT ADDINGTON  
PHONE: 828-258-7138
  - WATER - CITY OF ASHEVILLE  
CONTACT PERSON: CHAD PIERCE  
PHONE: 828-259-5420
  - SANITARY SEWER - MSD (METROPOLITAN SEWERAGE DISTRICT)  
CONTACT PERSON: STAN BOYD  
PHONE: 828-225-8286
  - GAS - PSNC ENERGY  
CONTACT PERSON: BRANDON AYCOCK  
PHONE: 704-810-3183

SEE SHEET SU-4 FOR THREADED ANCHOR INSERT PLAN AND DETAILS  
 SEE SHEET SU-5 FOR DUCT BANK TRANSITION PROFILES ON THE BRIDGE.  
 SEE SHEET SU-6 FOR DUCT BANK SECTION THROUGH BACK WALL DETAILS.  
 SEE SHEETS SU-7 TO SU-10 FOR HANGER DETAILS.  
 SEE SHEET SU-11 FOR BELOW GRADE DETAILS OF DUCT BANK.



LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
DESIGNED BY:	COUNTY: BUNCOMBE
CHECKED BY:	DATE: MARCH 3, 2009

BEGIN T.J.P. PROJECT B-2515  
 -L- POT 11+39.60

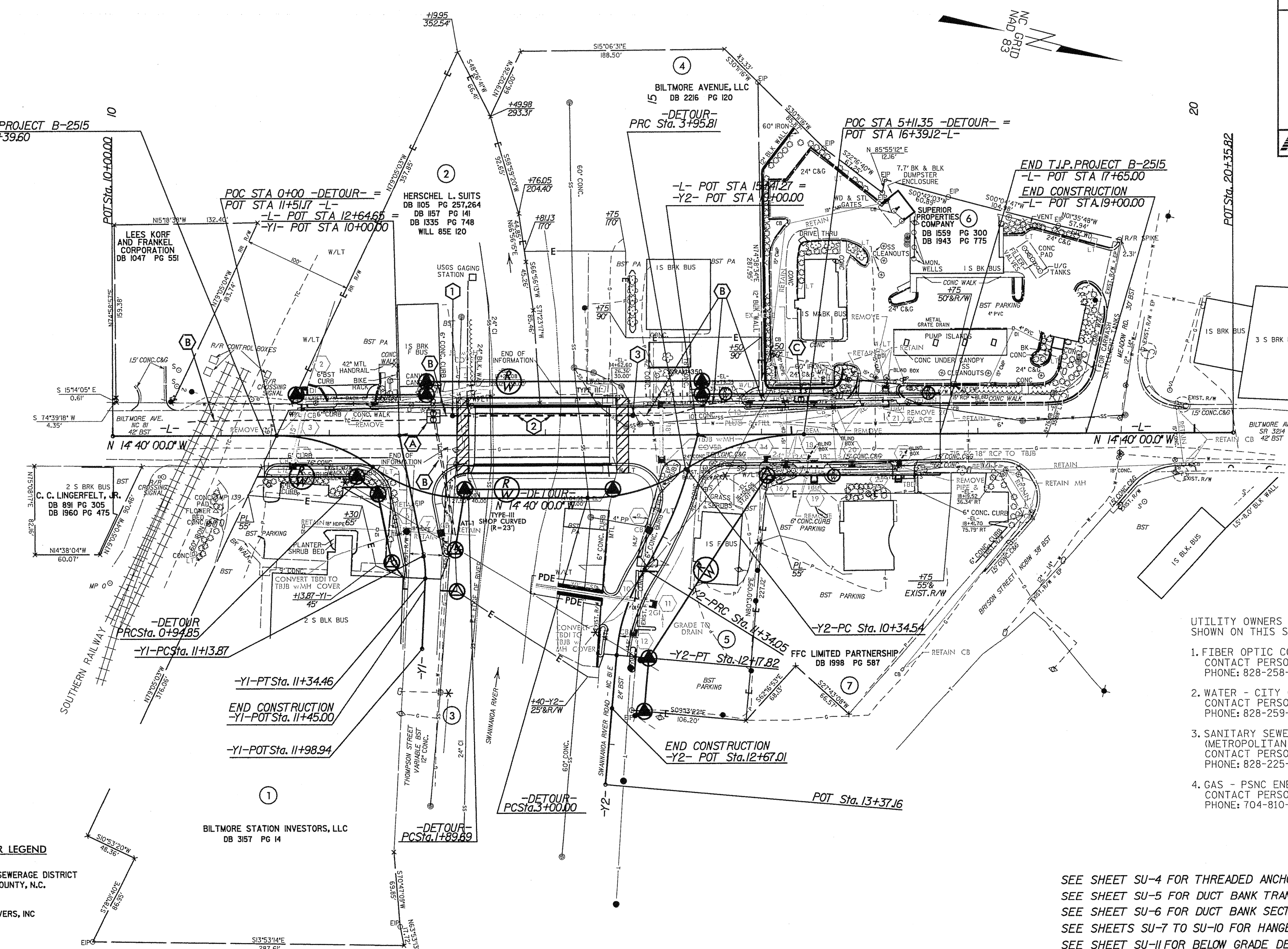
END T.J.P. PROJECT B-2515  
 -L- POT STA 17+65.00  
 END CONSTRUCTION  
 -L- POT STA 19+00.00

- PARCEL IDENTIFIER LEGEND**
- (3) METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, N.C.  
DB 982 PG 1
  - (5) LONG JOHN SILVERS, INC  
DB 2210 PG 190

- NOTES:**
- CONTRACTOR SHALL NOTIFY NC ONE-CALL PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY SUCH THAT EXISTING UTILITIES CAN BE MARKED. FURTHERMORE, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CONTACT ANY UTILITY OWNERS THAT ARE NOT MEMBERS OF NC ONE-CALL AND HAVE THEIR UTILITIES MARKED.
  - BEGIN FIBER OPTIC CONDUIT WORK AT STA. 13+14, LEFT 18.375' AND END AT STA. 14+81, LEFT 18.375'.
  - THE SUSPENDED PORTION OF THE 2x5 DUCT BANK IS FROM STA. 13+30.00 TO STA. 14+65.00, A DISTANCE OF 135'-0". THE DUCT BANK SHALL BE CENTERED IN BAY 3, BETWEEN GIRDERS 3 AND 4, AT A DISTANCE OF 18'-4 1/2" (18.375') LEFT OF THE -L- C.
  - THE DUCT BANK SHALL TRANSITION VERTICAL LOCATION ON THE BRIDGE BETWEEN THE END BENT DIAPHRAGM AND THE FIRST INTERMEDIATE DIAPHRAGM AT EACH END OF THE BRIDGE. REFER TO SHEET SU-5.
  - AT&T REPRESENTATIVE SHALL DIRECT CONTRACTOR AS TO REQUIRED DEPTH LOCATION AT THE WORK LIMITS FOR THE DUCT BANK CONSTRUCTION. ALL CONDUIT ENDS SHALL BE PLUGGED WITH SOLID RUBBER CONDUIT PLUGS AT THE PROJECT LIMITS OF CONDUIT WORK NOTED ON THIS PLAN.

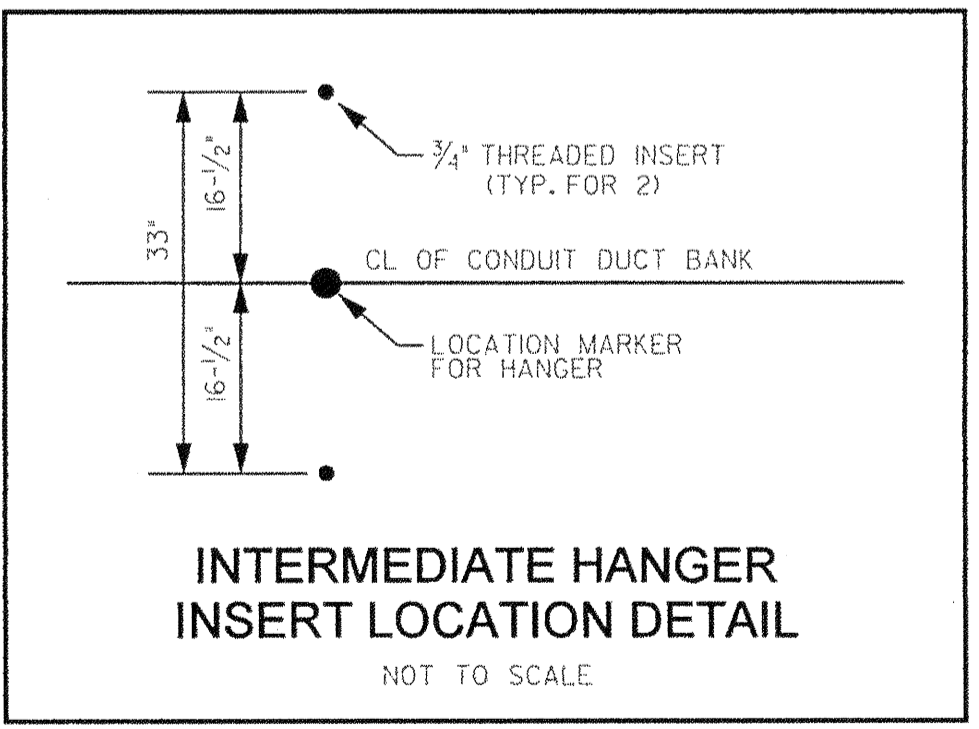
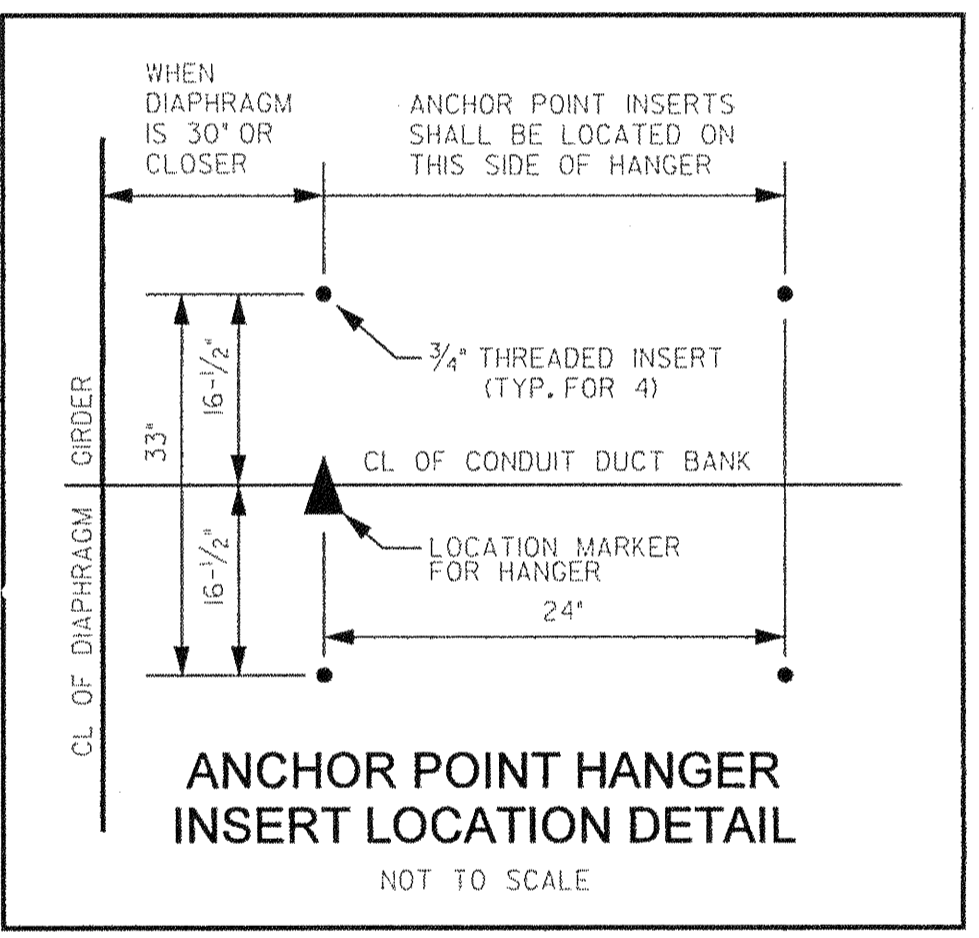
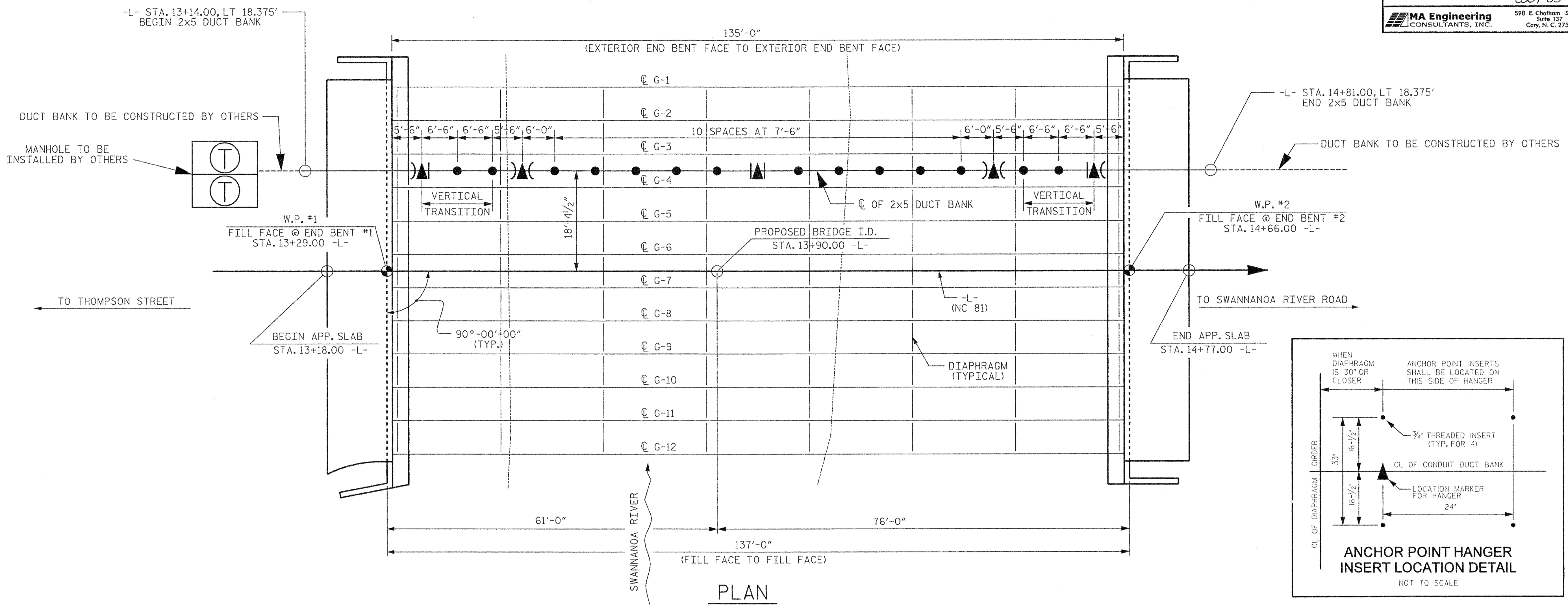
- MARKER BALLS SHALL BE SET ABOVE THE ENDS OF THE CONDUITS AS PER DETAIL ON SHEET SU-11.
- CONTRACTOR SHALL INSTALL ALL BELOW GRADE CONDUIT AS CONCRETE ENCASED DUCT BANK AS DESCRIBED IN THE SPECIAL PROVISIONS FOR THIS PROJECT, OR AS DIRECTED BY THE AT&T REPRESENTATIVE.
- BACKFILL AND COMPACT TRENCHES AS PER THE SPECIAL PROVISIONS FOR THIS PROJECT.
- BELOW GRADE CONDUITS SHALL BE 4" TYPE C PLASTIC AT-8546 SCHEDULE 40 PVC CONDUIT.
- BRIDGE (EXPOSED) CONDUIT SHALL BE 4" TYPE D PLASTIC AT-8546 SCHEDULE 40 PVC CONDUIT.
- ALL JOINTS SHALL BE SOLVENT WELDED.
- CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION CONCURRENTLY TO NCDOT RESIDENT ENGINEER AND AT&T THAT THE DUCT INSTALLATION HAS BEEN COMPLETED.
- CONTRACTOR SHALL PROVIDE DOCUMENTATION TO AT&T THAT CONDUIT MANDREL TESTING WAS PERFORMED AND HAS BEEN SUCCESSFULLY COMPLETED. AN AT&T REPRESENTATIVE SHALL BE PRESENT AND WITNESS THE MANDREL TESTING.
- THE CONTRACTOR IS NOT RESPONSIBLE FOR INSTALLATION OF FIBER OPTIC CABLE.

REVISIONS  
 2009-05-05 - KCZ - REVISE NOTES AND SHEET REFERENCE.  
 FILE: SFILES DATE: 05/05/09



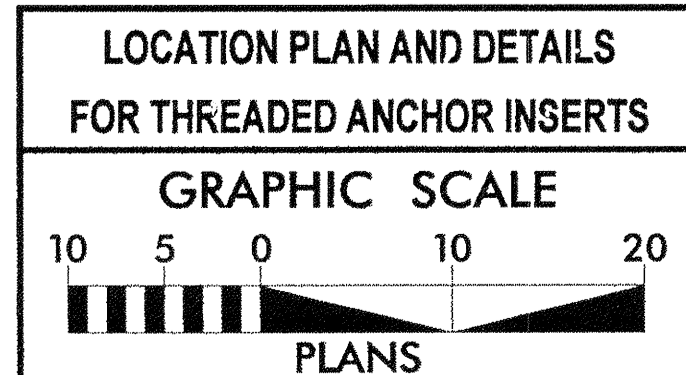


REVISIONS  
 2009-05-04 - KCZ - REVISE ANCHOR POINT HANGER EXPANSION COUPLING AND RESTRAINT POINT LOCATIONS.  
 2009-03-26 - KCZ - REVISE SHEET NUMBER AND REMOVE END BENT DIMENSIONS AS PER NCDOT.  
 2009-03-06 - KCZ - REVISE HANGER SPACING TO ACCOMMODATE FOR USE OF PREFORMED BENDS IN TRANSITION OF CONDUITS.  
 2009-01-30 - KCZ - REVISE HANGER SPACING AND ANCHOR INSERT DETAILS DUE TO NCDOT DIAPHRAGM SPACING.



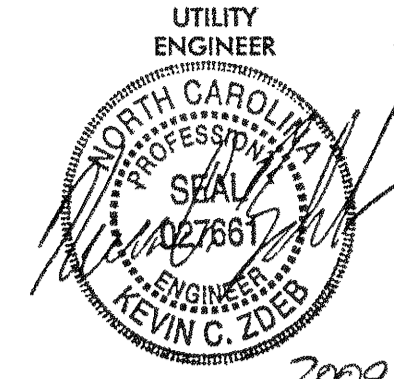
LEGEND	
	RESTRAINT POINT
(	EXPANSION COUPLING
▲	ANCHOR POINT HANGER
●	INTERMEDIATE HANGER
•	THREADED INSERT

- NOTES:**
1. THE SUSPENDED PORTION OF THE 2x5 DUCT BANK IS FROM STA. 13+30.00 TO STA. 14+65.00, A DISTANCE OF 135'-0".
  2. A TOTAL OF 5 ANCHOR POINT HANGERS AND 14 INTERMEDIATE HANGERS ARE REQUIRED.
  3. EACH ANCHOR POINT HANGER REQUIRES 4 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
  4. EACH INTERMEDIATE HANGER REQUIRES 2 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
  5. ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL ACCOMMODATE A 3/4" DIAMETER ANCHOR BOLT; BE CONSTRUCTED OF MALLEABLE IRON OR STEEL OR STAINLESS STEEL; HAVE A MINIMUM 3-INCH CONCRETE EMBEDMENT; AND HAVE A LOAD CAPACITY OF 3,000 LBS. MINIMUM.
  6. ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL BE INSTALLED IN THE BOTTOM (THICKEST) PART OF THE STAY-IN-PLACE METAL FORMS.
  7. THE DUCT BANK SHALL BE CENTERED IN BAY 3, BETWEEN GIRDERS 3 AND 4, AT A DISTANCE OF 18'-4 1/2" LEFT OF THE -L- C.
  8. THE DUCT BANK SHALL TRANSITION VERTICAL LOCATION ON THE BRIDGE BETWEEN THE END BENT DIAPHRAGM AND THE FIRST INTERMEDIATE DIAPHRAGM AT EACH END OF THE BRIDGE. REFER TO SHEET SU-5 FOR DETAILS.
  9. THE BELOW GRADE DUCT BANK SHALL BE CONCRETE ENCASED IN THE FOLLOWING LOCATIONS:  
 A. STA. 13+16.00 TO STA. 13+28.96  
 B. STA. 14+66.04 TO STA. 14+79.00
  10. REFER TO SHEET SU-6 FOR SECTION DETAILS THROUGH BACK WALL.

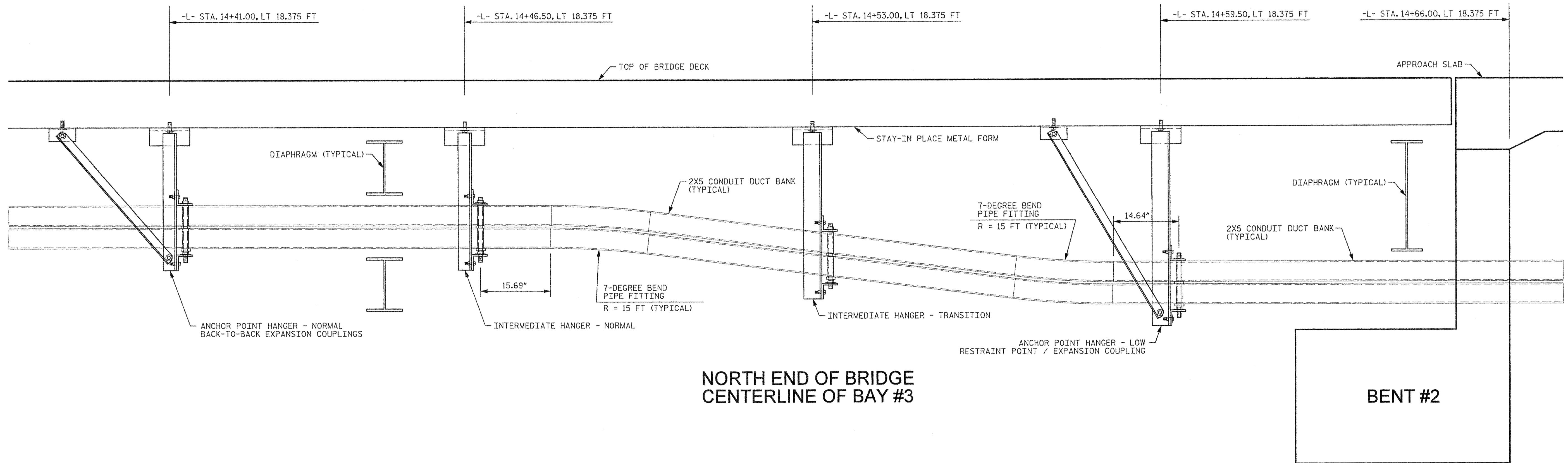


LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
COUNTY:	BUNCOMBE
DESIGNED BY:	
CHECKED BY:	
DATE:	JANUARY 15, 2009

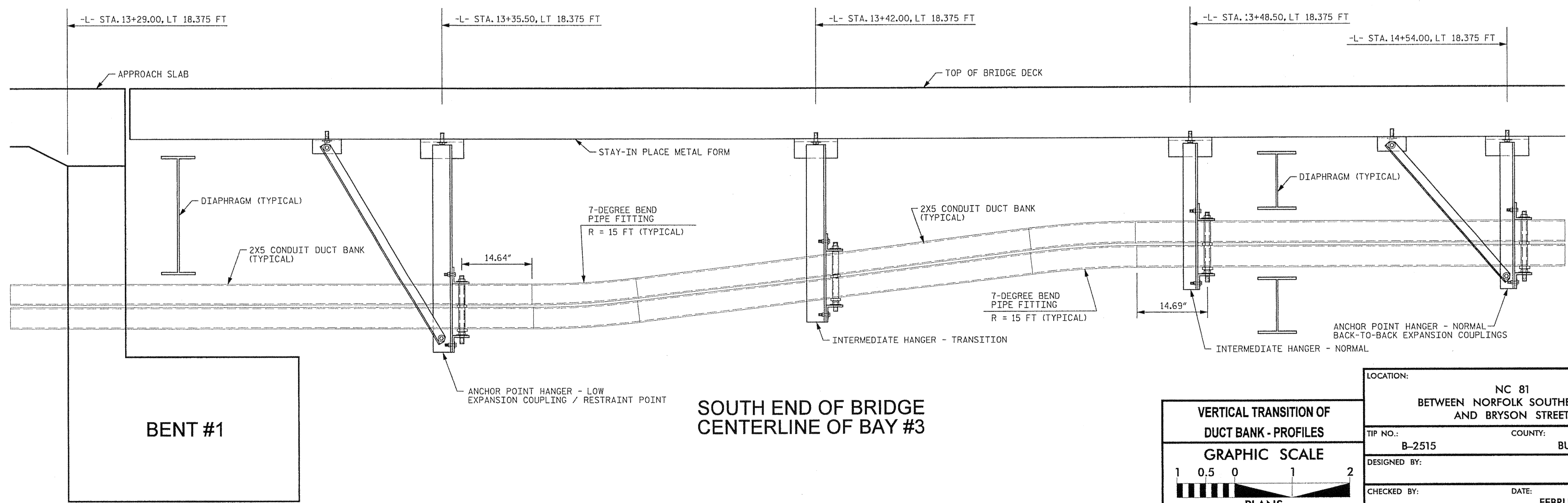
7/2/99

PROJECT REFERENCE NO. B-2515	SHEET NO. SU-5
UTILITY ENGINEER  2009-05-05 <b>MA Engineering</b> CONSULTANTS, INC.	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	

- NOTES:
- REFER TO SHEET SU-4 FOR ANCHOR INSERT LAYOUT AND DETAILS.
  - EACH ANCHOR POINT HANGER REQUIRES 4 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
  - EACH INTERMEDIATE HANGER REQUIRES 2 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
  - ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL ACCOMMODATE A 3/4" DIAMETER ANCHOR BOLT.
  - THE DUCT BANK SHALL BE CENTERED IN BAY 3, BETWEEN GIRDERS 3 AND 4, AT A DISTANCE OF 18'-4 1/2" LEFT OF THE -L- C.
  - THE DUCT BANK SHALL TRANSITION VERTICAL LOCATION ON THE BRIDGE BETWEEN THE END BENT DIAPHRAGM AND THE FIRST INTERMEDIATE DIAPHRAGM AT EACH END OF THE BRIDGE, AS SHOWN.
  - ALL BRIDGE CONDUIT UTILIZED AT VERTICAL TRANSITION POINTS SHALL BE CONSTRUCTED WITH PREFORMED 7-DEGREE BEND PIPE FITTINGS WITH A RADIUS OF 15 FEET.
  - ALL CONDUIT INSTALLED ON THE BRIDGE SHALL BE TYPE D PLASTIC CONDUIT.
  - NO PIPE JOINTS SHALL BE LOCATED WITHIN ONE (1) FOOT OF ANY HANGER.
  - REFER TO SHEET SU-6 FOR SECTION DETAILS THROUGH BENT BACK WALL.




NORTH END OF BRIDGE CENTERLINE OF BAY #3



SOUTH END OF BRIDGE CENTERLINE OF BAY #3

VERTICAL TRANSITION OF DUCT BANK - PROFILES

GRAPHIC SCALE



PLANS

LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET	
TIP NO.:	B-2515	COUNTY: BUNCOMBE
DESIGNED BY:		
CHECKED BY:	DATE: FEBRUARY 10, 2009	

REVISIONS  
2009-05-05 - KCZ - REVISE ANCHOR POINT HANGER, EXPANSION COUPLING, AND RESTRAINT POINT LOCATIONS.

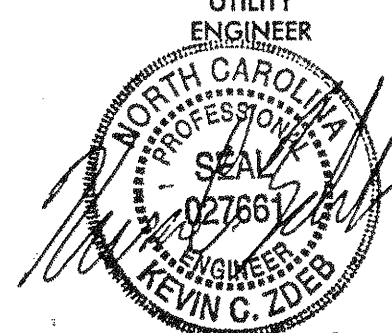

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DATE: 02/10/09

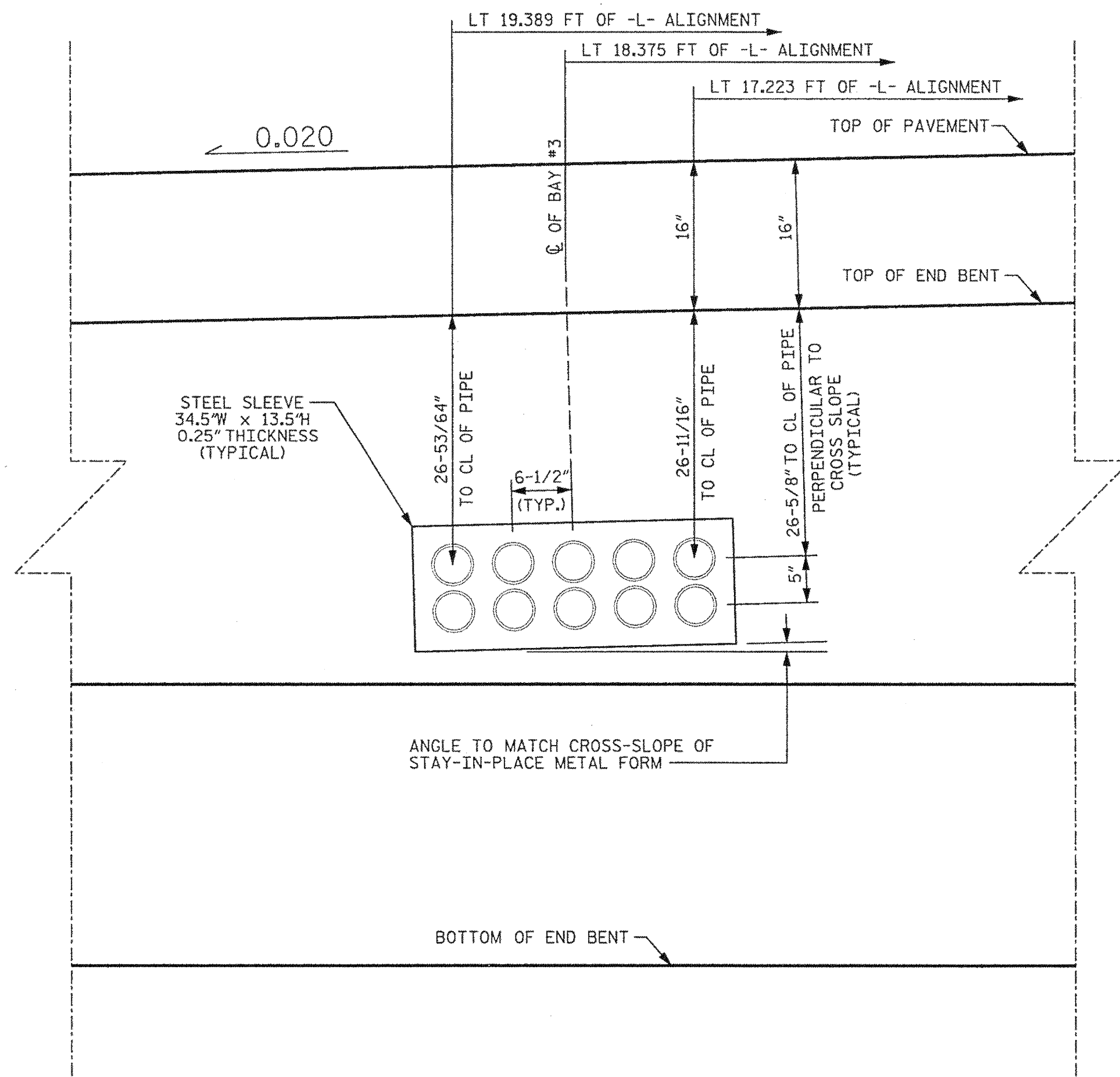
7/2/99

REVISIONS

2009-05-05 - KCZ - REVISE END BENT DETAILS AS PER MODOT REQUEST.

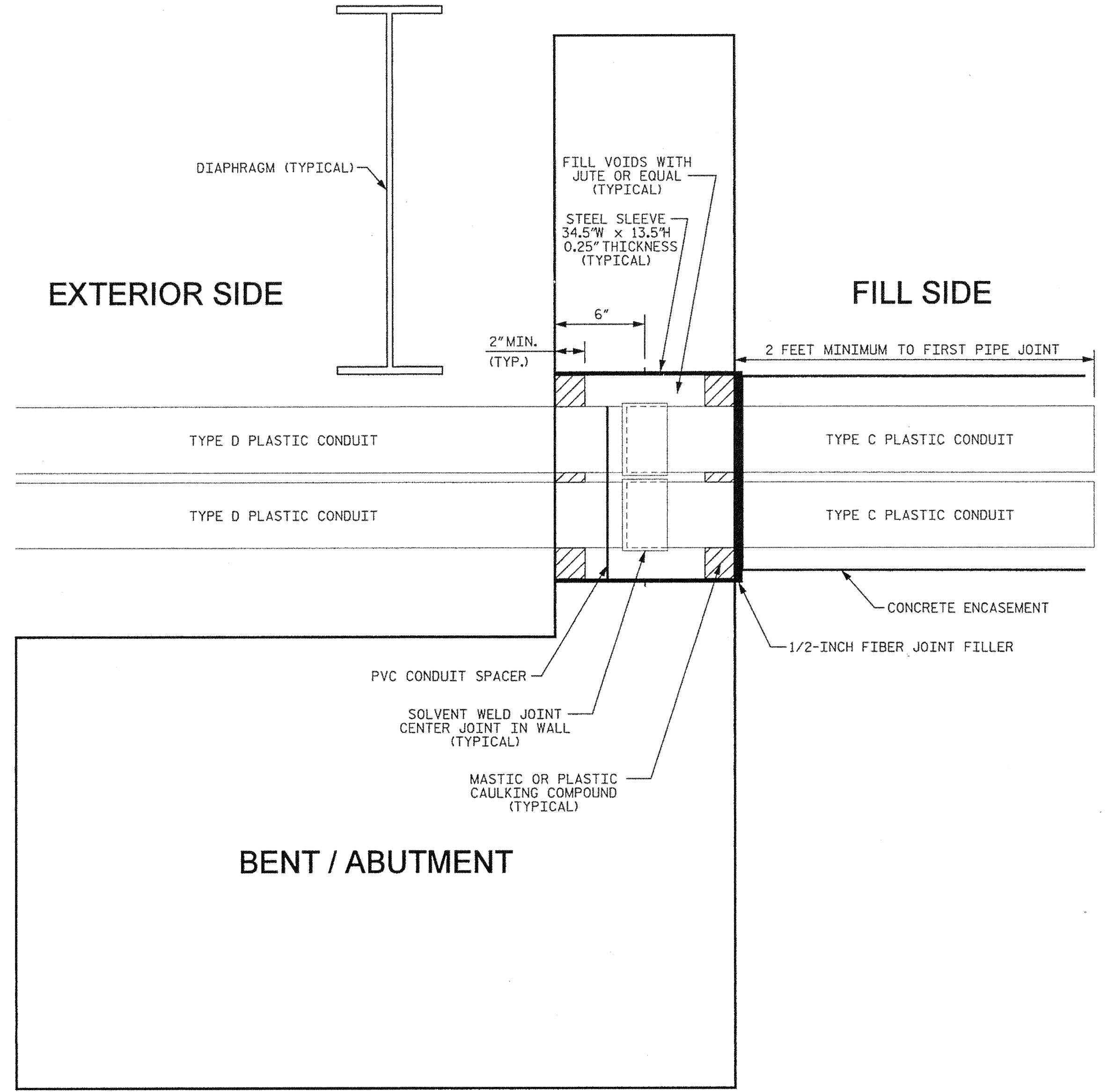
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DATE: 02/10/09

PROJECT REFERENCE NO. B-2515	SHEET NO. SU-6
UTILITY ENGINEER  2009-05-05	
 MA Engineering CONSULTANTS, INC.	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	



**SECTION VIEW FACING:  
FILL SIDE OF BENT #1  
EXTERIOR SIDE OF BENT #2**

SCALE: 1" = 1 FT



**BENT / ABUTMENT**

**DUCT BANK SECTION THROUGH BACK WALL**

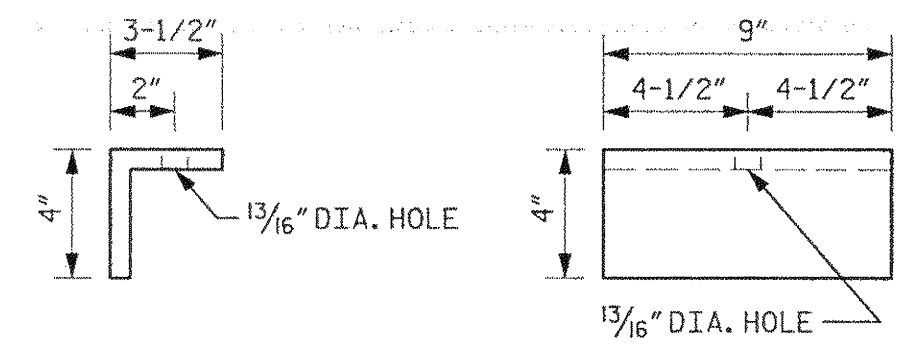
SCALE: 1" = 6"

- NOTES:  
 1. STEEL SLEEVE SHALL BE CAST-IN-PLACE IN THE BACK WALL OF EACH ABUTMENT.  
 2. CONTRACTOR SHALL INSTALL PVC CONDUIT SPACER IN SLEEVE TO INSURE THE 1 INCH SPACING IS MAINTAINED BETWEEN CONDUITS IN THE BACK WALL.

**DETAILS - DUCT BANK SECTION  
THROUGH BACK WALL  
GRAPHIC SCALE  
SCALE AS NOTED**

LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
DESIGNED BY:	COUNTY: BUNCOMBE
CHECKED BY:	DATE: FEBRUARY 10, 2009

7/2/99

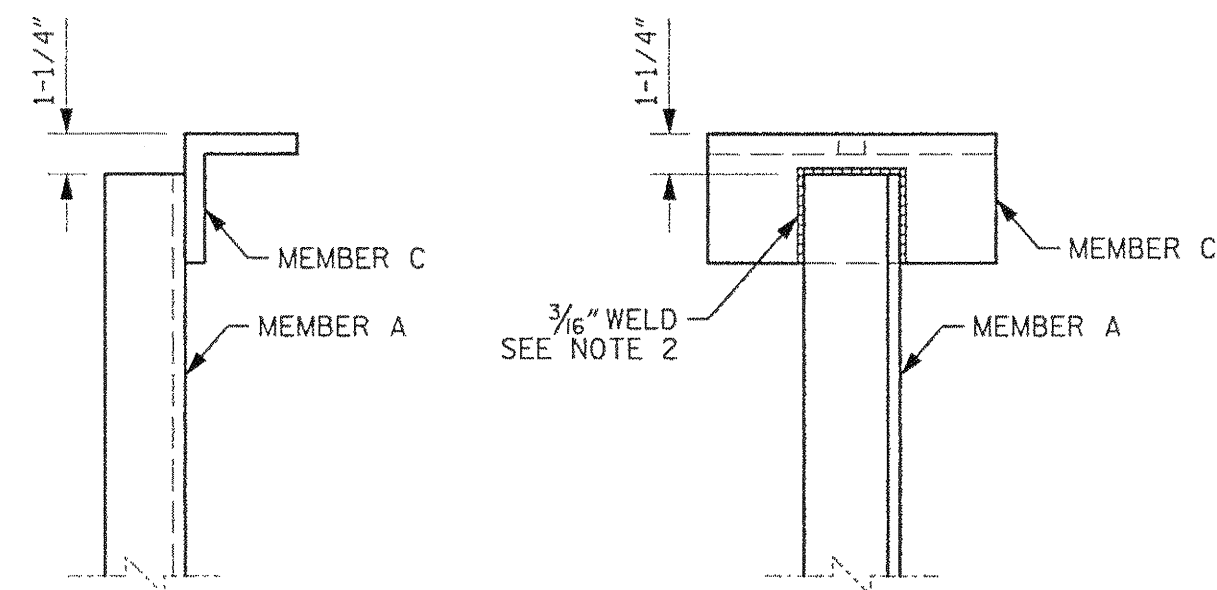


FRONT VIEW SIDE VIEW

**MEMBER C**

NOTES:

1. MEMBER SIZE IS: L 3.5 x 4 x 5/8
2. 3.5" LEG IS ALWAYS BOLTED TO THE BRIDGE.
3. HOLE IS 13/16" DIAMETER.

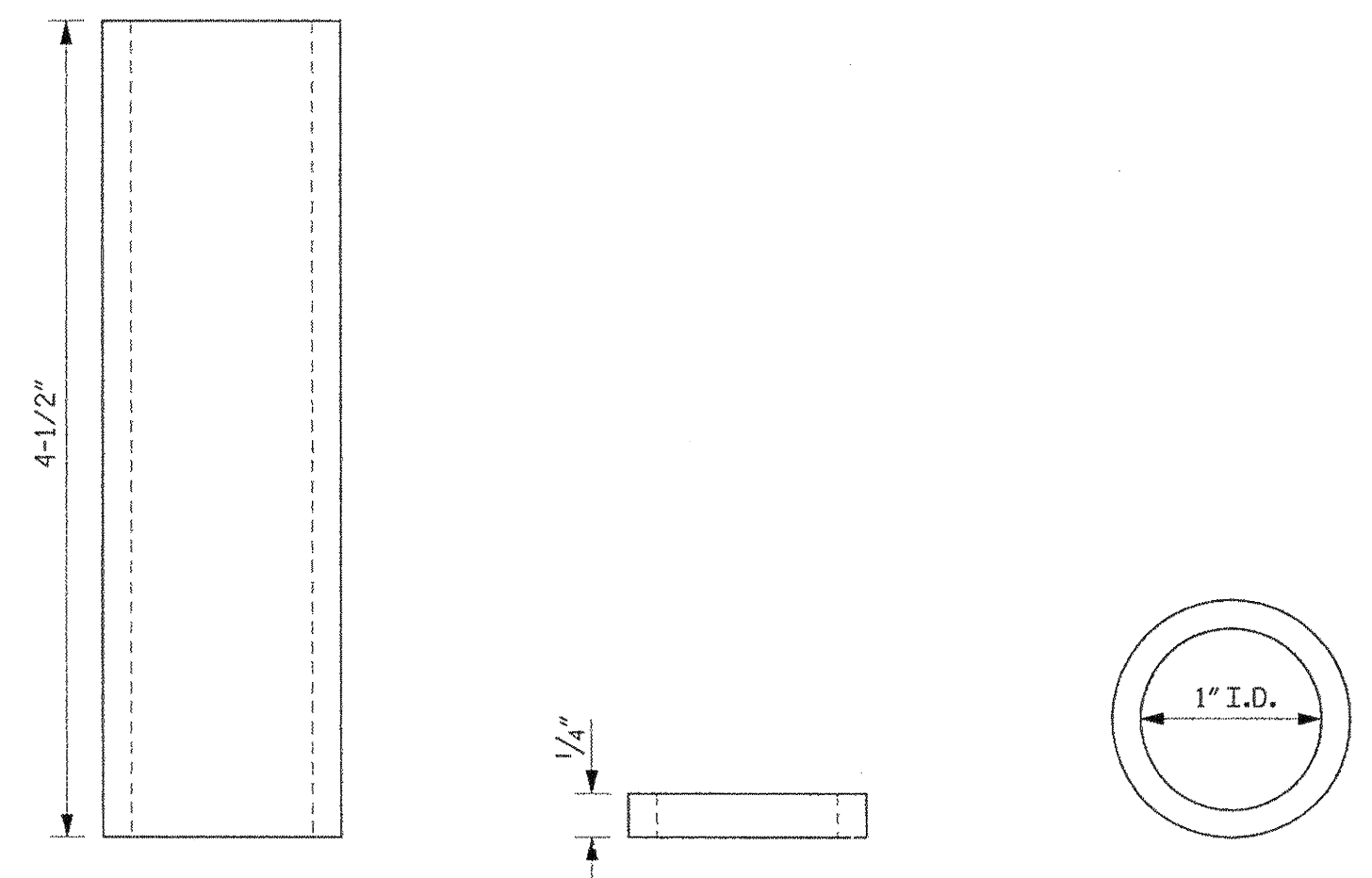


FRONT VIEW SIDE VIEW

**CONNECTION DETAIL OF MEMBER A TO MEMBER C**

NOTES:

1. MEMBER A CAN BE EITHER MEMBER A-1, A-2, OR A-3.
2. WELD IS ON VERTICAL LEG.
3. HOLE IS 13/16" DIAMETER.



FRONT VIEW MEMBER F

FRONT VIEW MEMBER G

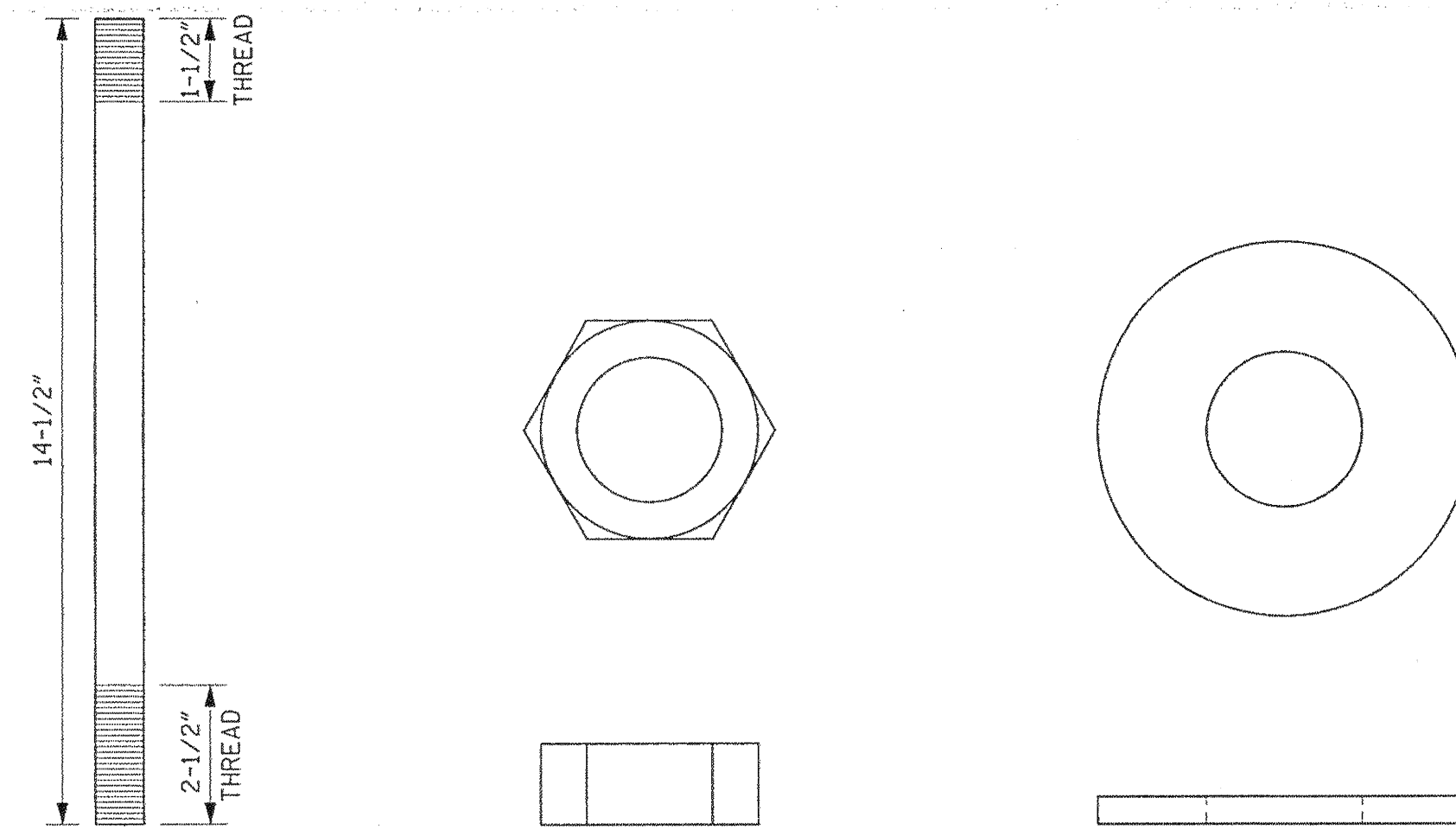
TOP VIEW

**MEMBERS F & G**

SCALE: 1" = 1"

NOTES:

1. MEMBERS ARE MADE FROM ULTRAVIOLET PROTECTED SCH 40 PVC PIPE, OR EQUIVALENT WALL THICKNESS THAT IS COMMERCIALY AVAILABLE.



7/8" DIA. ROD

SCALE: 1" = 3"

7/8" DIA. NYLOCK JAM NUT

SCALE: 1" = 1"

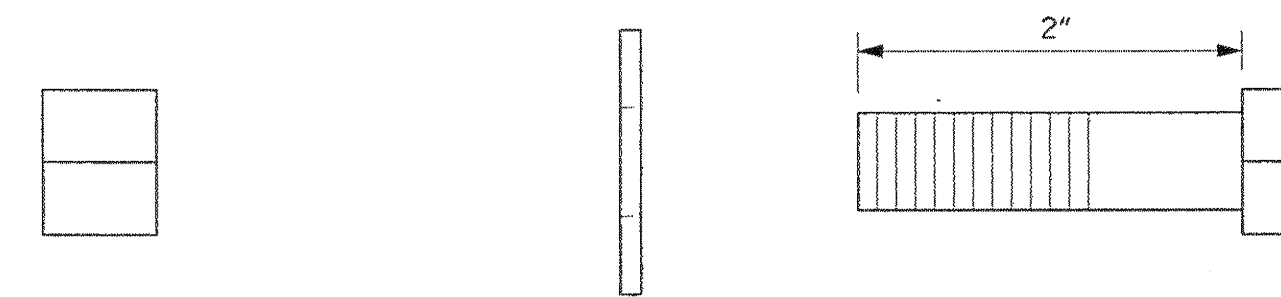
7/8" DIA. FLAT WASHER

SCALE: 1" = 1"

**MEMBER D**

NOTES:

1. ROD IS MADE FROM TYPE 316 STAINLESS STEEL.
2. NYLOCK JAM NUT AND FLAT WASHER SHALL BE GRADE 18.8 STAINLESS STEEL.
3. NYLOCK JAM NUT AND FLAT WASHER ARE USED TO HOLD MEMBER IN PLACE AT EACH END OF ROD.



1/2" DIA. NYLOCK NUT

SCALE: 1" = 1"

1/2" DIA. FLAT WASHER

SCALE: 1" = 1"

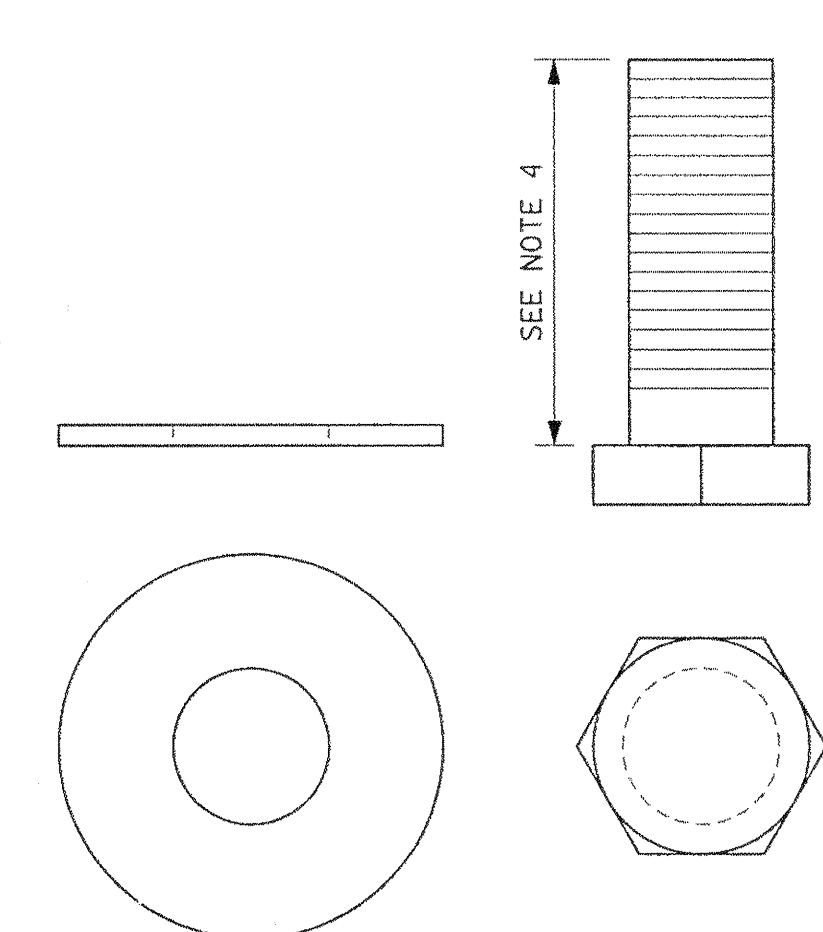
1/2" DIA. BOLT

SCALE: 1" = 1"

**MEMBER J**

NOTES:

1. BOLT SHALL BE HEXAGONAL HEAD.
2. BOLT, NYLOCK NUT, AND FLAT WASHER SHALL BE GRADE 18.8 STAINLESS STEEL.
3. NYLOCK NUT AND WASHER USED WITH EACH BOLT TO FASTEN MEMBERS TOGETHER.



3/4" DIA. FLAT WASHER

SCALE: 1" = 1"

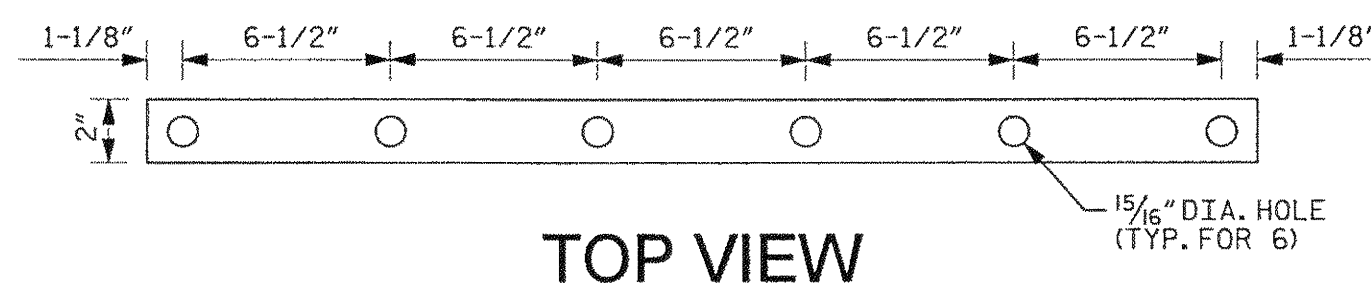
3/4" DIA. BOLT

SCALE: 1" = 1"

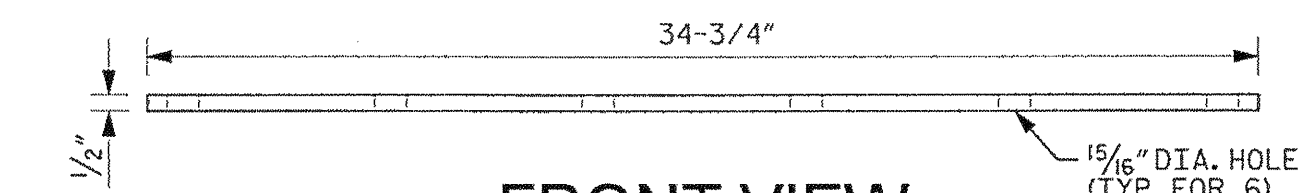
**MEMBER K**

NOTES:

1. BOLT SHALL BE HEXAGONAL HEAD.
2. BOLT AND FLAT WASHER SHALL BE GRADE 18.8 STAINLESS STEEL.
3. MEMBER K IS USED TO FASTEN MEMBER C TO BRIDGE DECK.
4. CONTRACTOR SHALL COORDINATE WITH THE NCDOT TO DETERMINE THE EXACT MODEL OF ANCHOR INSERT INSTALLED IN THE PRE-CAST BRIDGE DECK PANEL IN ORDER TO DETERMINE THE APPROPRIATE LENGTH OF BOLT TO ORDER.

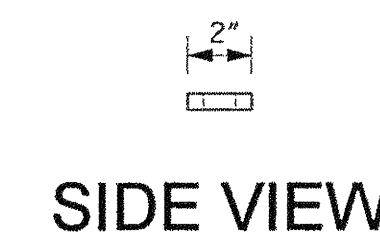


TOP VIEW



FRONT VIEW

**MEMBER H**



SIDE VIEW

NOTES:

1. MEMBER IS MADE FROM ULTRAVIOLET PROTECTED 1/2" THICK PVC BAR, OR EQUIVALENT.

PROJECT REFERENCE NO. B-2515	SHEET NO. SU-7
UTILITY ENGINEER	
2009-03-26	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	

<b>HANGER DETAILS - STANDARD MEMBERS FOR ALL HANGERS</b>  <b>GRAPHIC SCALE</b> 	LOCATION: NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
	TIP NO.: B-2515 COUNTY: BUNCOMBE
	DESIGNED BY:
	CHECKED BY: DATE: FEBRUARY 20, 2009

REVISIONS

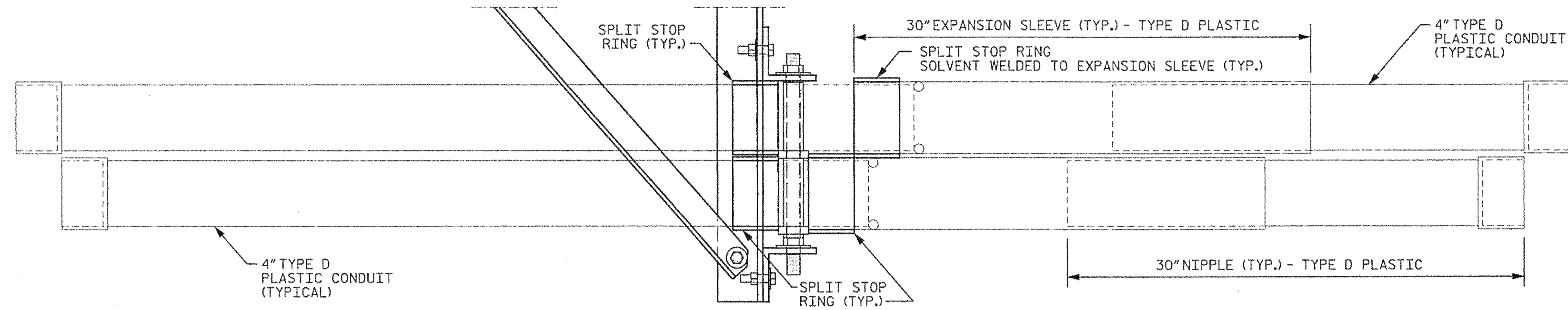
FILE: FILES DATE: 04/05/09 STW/MS

7/12/99

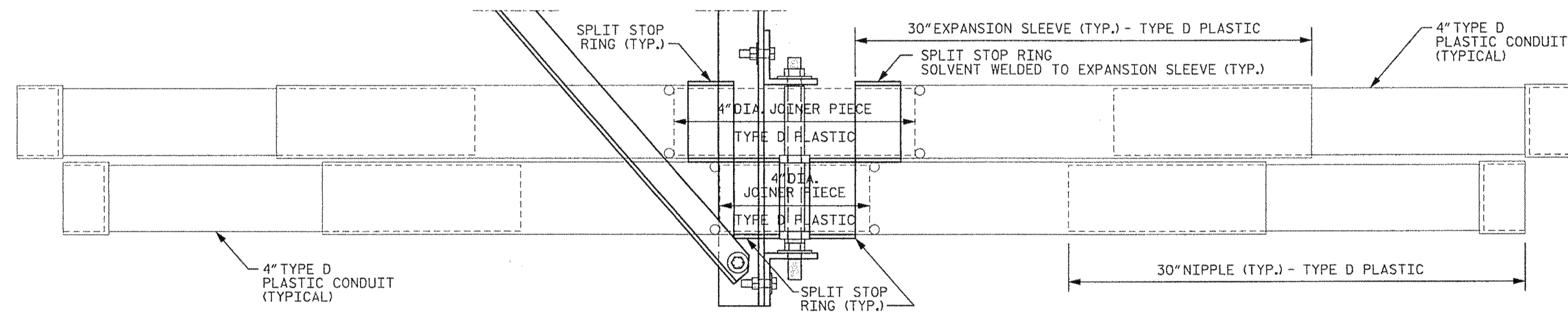
REVISIONS

2009-05-05 - KCZ - ADD SHEET TO SET.

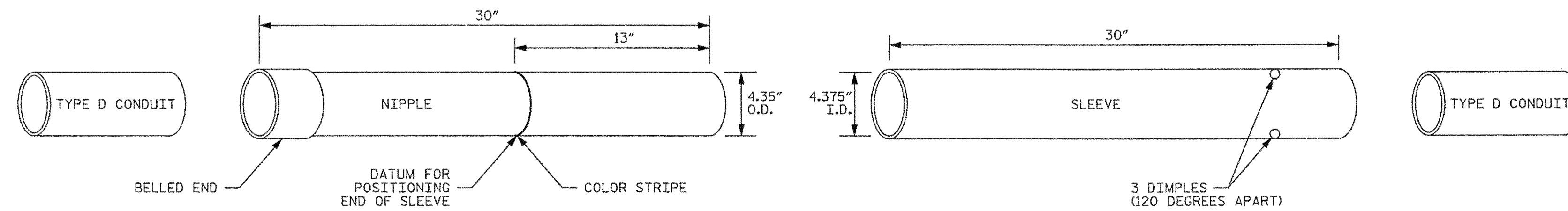
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DATE: \$DATES  
\$TIMES



**ANCHOR POINT HANGER  
WITH RESTRAINT POINT  
AND EXPANSION COUPLING**



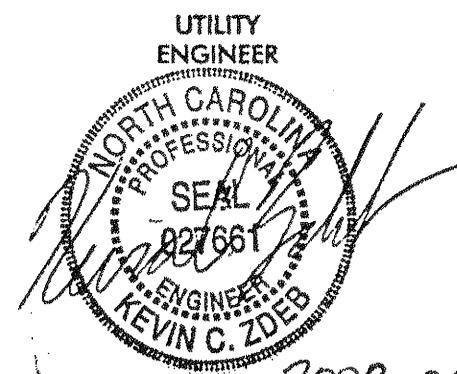
**ANCHOR POINT HANGER  
WITH BACK-TO-BACK  
EXPANSION COUPLING**



- NOTES:  
 1. NIPPLE AND SLEEVE SHALL BE MADE FROM TYPE D PLASTIC CONDUIT.  
 2. TYPE D CONDUIT SHALL BE SOLVENT WELDED TO BELL OF NIPPLE.  
 3. TYPE D CONDUIT SHALL BE SOLVENT WELDED TO THE DIMPLE END OF SLEEVE.

**EXPANSION COUPLING DETAIL**

SCALE: 1" = 6"

PROJECT REFERENCE NO. B-2515	SHEET NO. SU-7A
UTILITY ENGINEER  2009-05-05 <b>MA Engineering</b> CONSULTANTS, INC.	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	

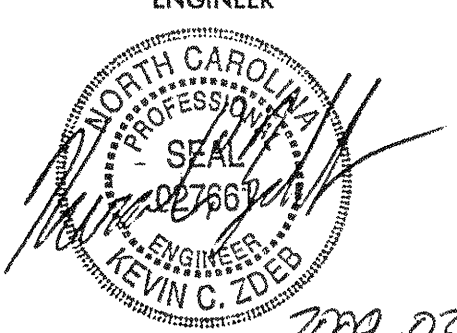

**HANGER DETAILS - RESTRAINT POINT  
AND EXPANSION COUPLING**

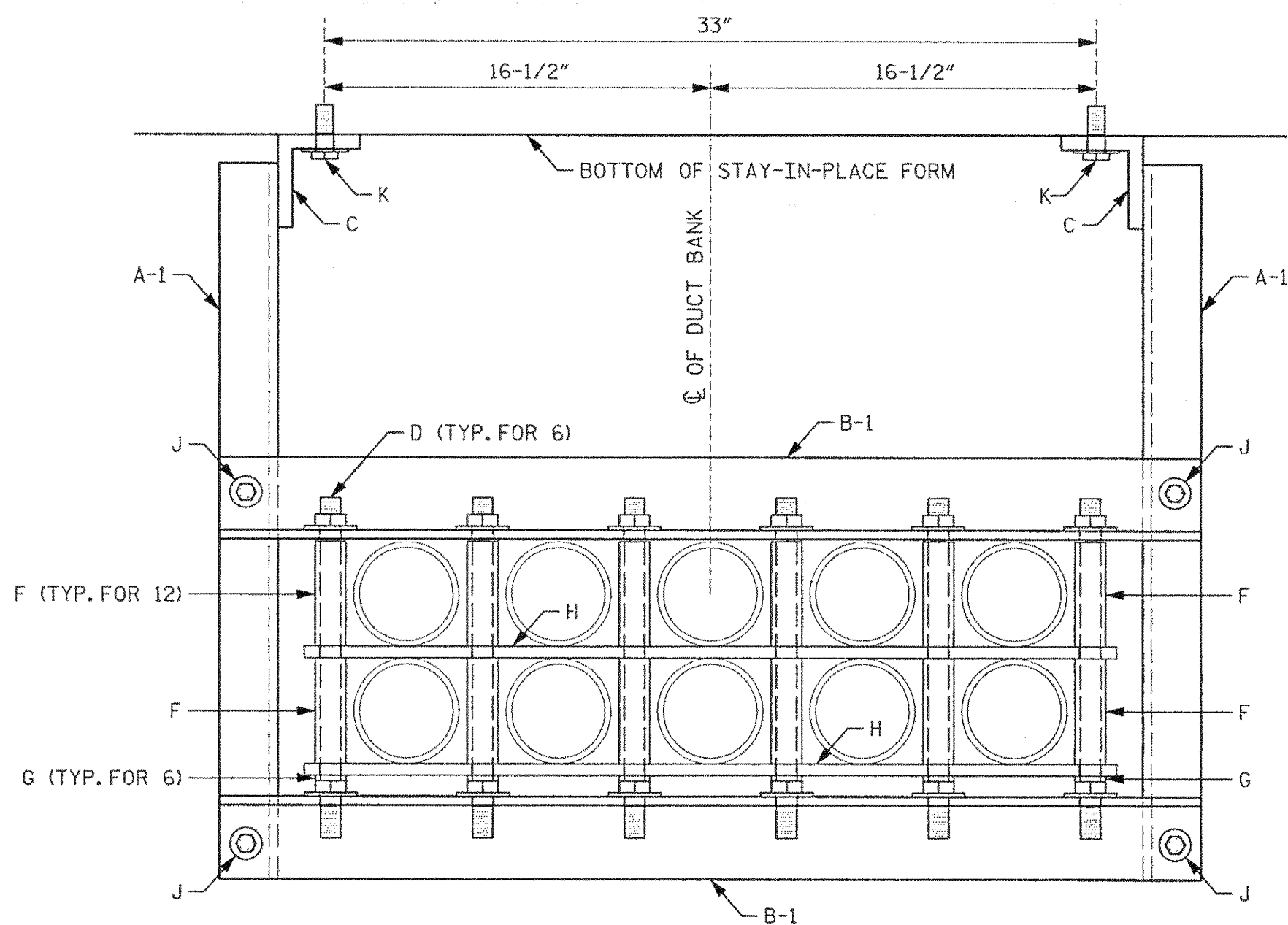
**GRAPHIC SCALE**

**SCALE AS NOTED**

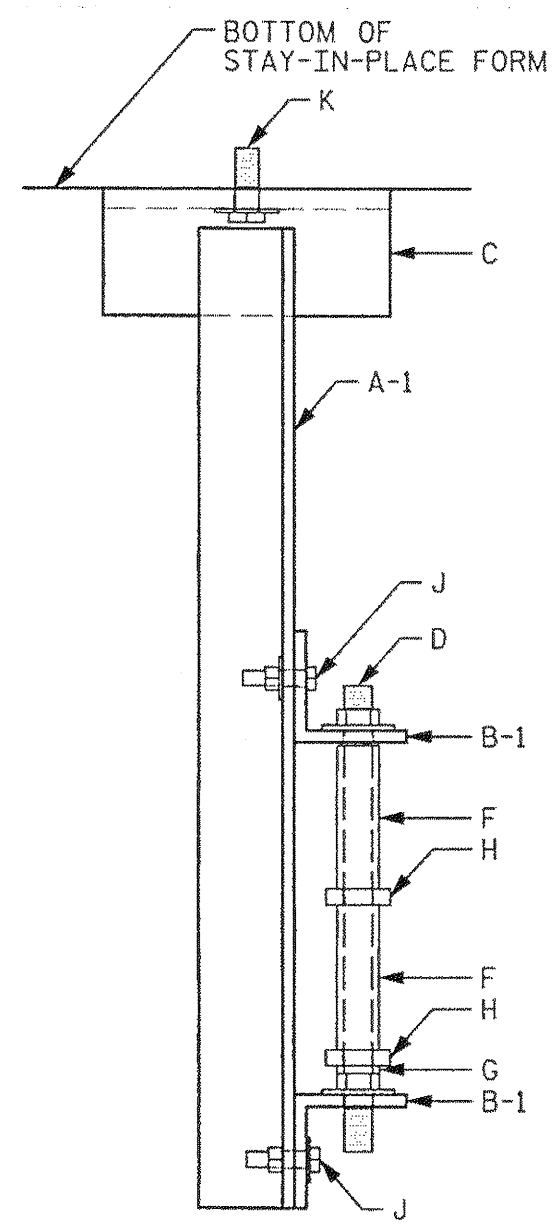
LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
DESIGNED BY:	
CHECKED BY:	
COUNTY:	BUNCOMBE
DATE:	MAY 5, 2009

7/2/99

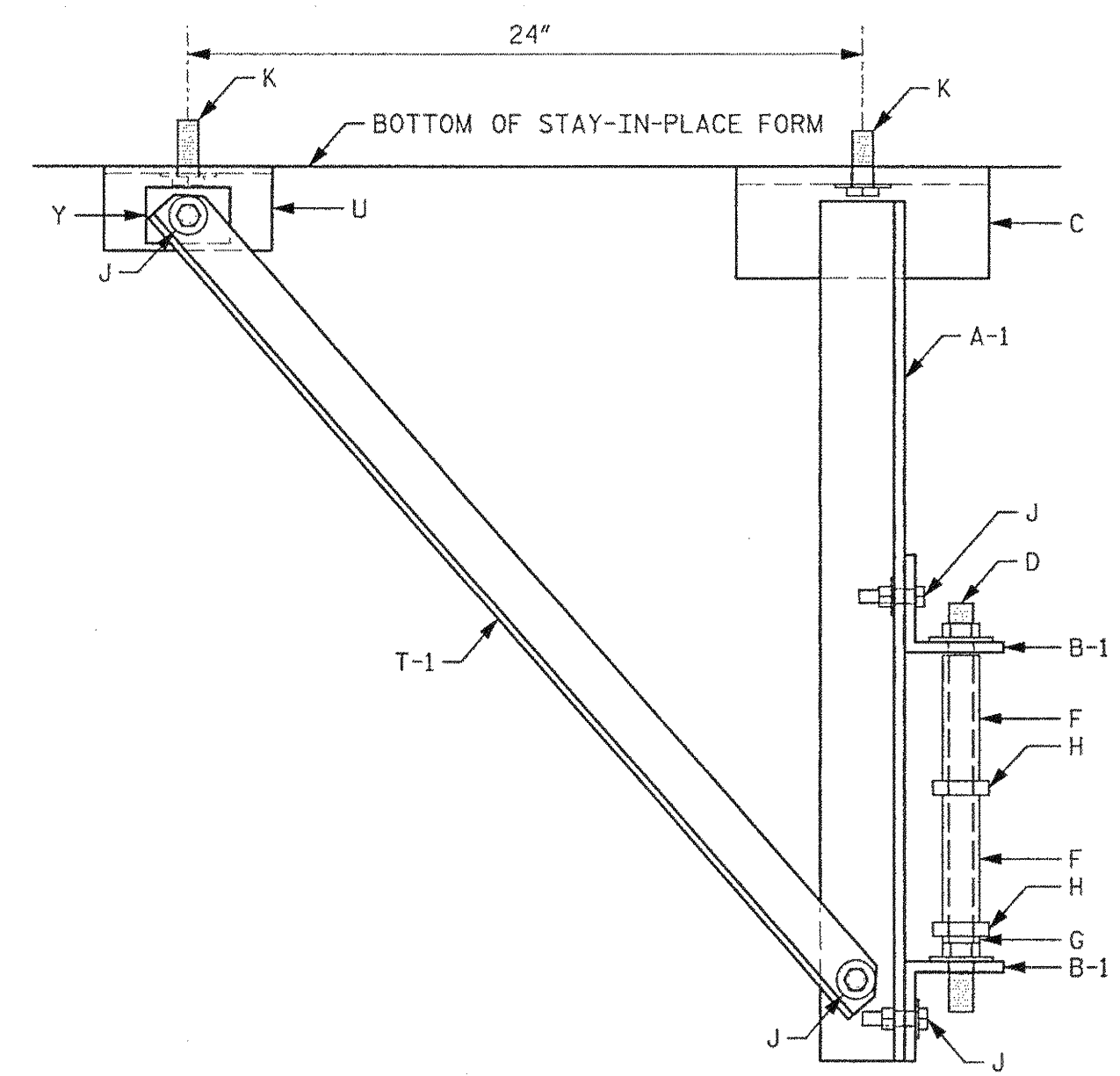
PROJECT REFERENCE NO. B-2515	SHEET NO. SU-8
UTILITY ENGINEER	
	
2009-03-26	
	
598 E. Chatham Street, Suite 137 Cary, N.C. 27511	



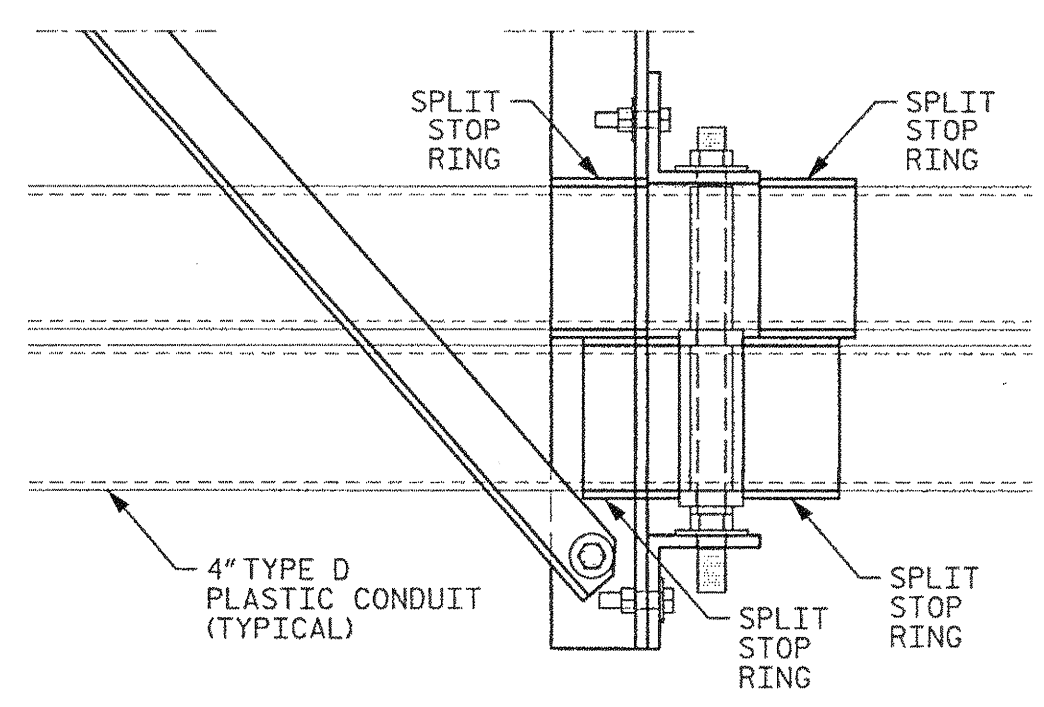
**INTERMEDIATE / ANCHOR POINT HANGER  
NORMAL POSITION  
FRONT VIEW**



**INTERMEDIATE HANGER  
NORMAL POSITION  
SIDE VIEW**

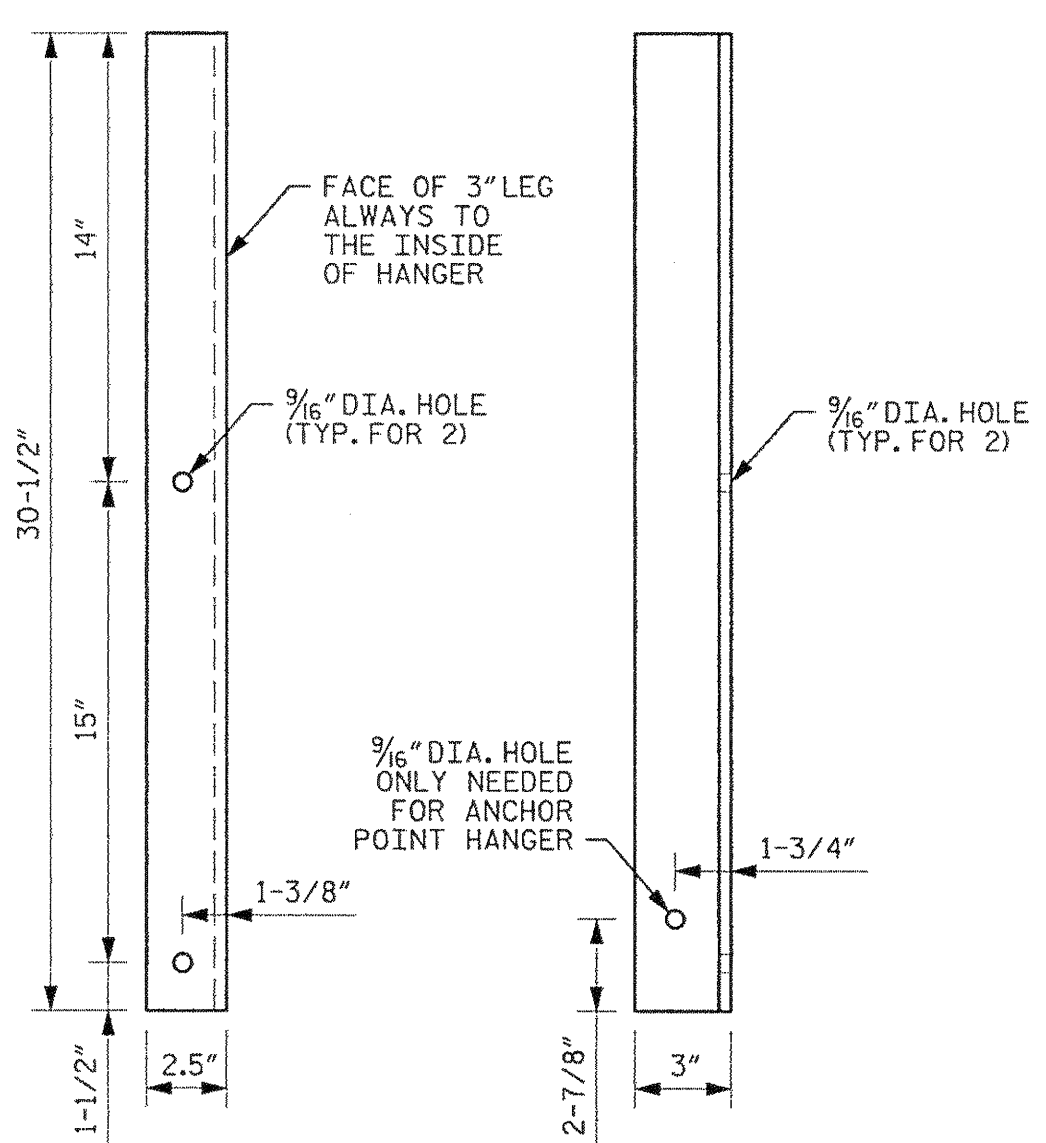


**ANCHOR POINT HANGER  
NORMAL POSITION  
SIDE VIEW**



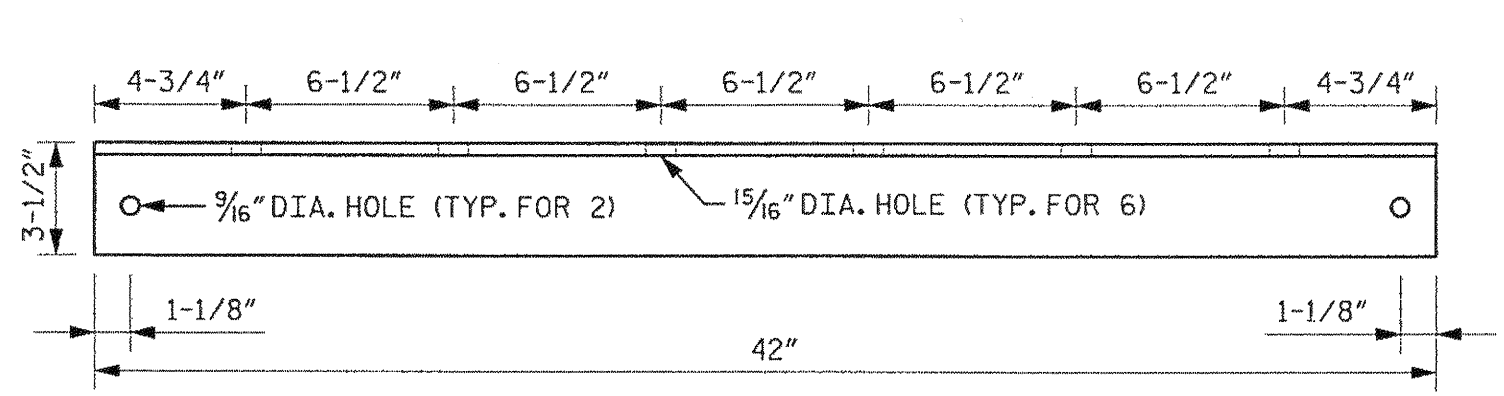
**ANCHOR POINT HANGER  
RESTRAINT POINT**

REVISIONS



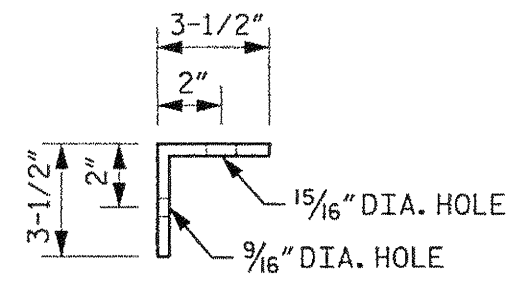
**FRONT VIEW    SIDE VIEW  
MEMBER A-1**

- NOTES:
- MEMBER SIZE IS: L 2.5 x 3 x 3/8
  - 2.5" LEG ATTACHES TO MEMBER B.
  - 3" LEG ATTACHES TO MEMBER T-1, WHEN ANCHOR POINT BRACING IS CALLED FOR.
  - ALL HOLES ARE 3/16" DIAMETER.

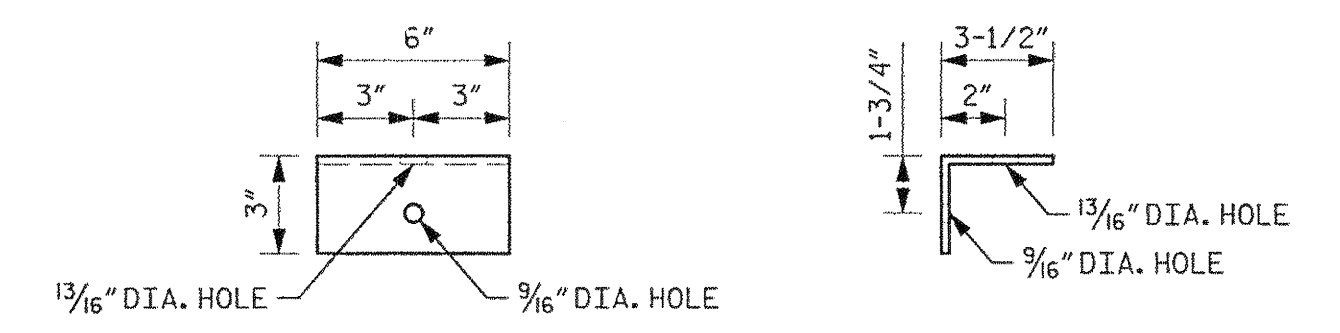


**FRONT VIEW  
MEMBER B-1**

- NOTES:
- MEMBER SIZE IS: L 3.5 x 3.5 x 3/8
  - LEG WITH 3/16" DIAMETER HOLES ATTACHES TO MEMBER A-1.



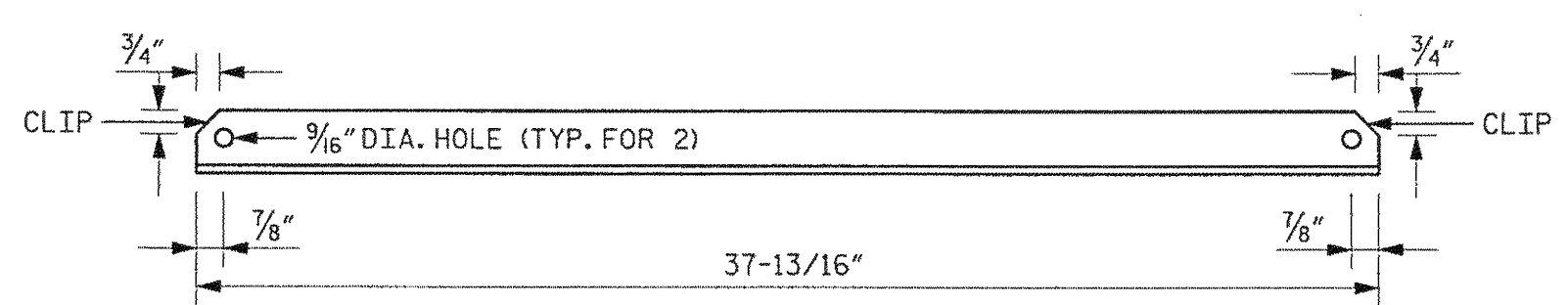
**SIDE VIEW**



**SIDE VIEW    FRONT VIEW**

**MEMBER U**

- NOTES:
- MEMBER SIZE IS: L 3.5 x 3 x 1/4
  - 3.5" LEG IS ALWAYS BOLTED TO THE BRIDGE.



**SIDE VIEW    FRONT VIEW**

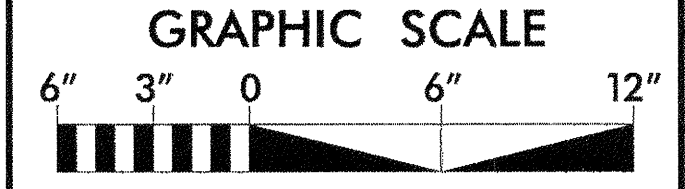
**MEMBER T-1**

- NOTES:
- MEMBER SIZE IS: L 2 x 2 x 1/4
  - MEMBER T-1 IS BOLTED TO MEMBER A-1 AND MEMBER U.

**GENERAL NOTES:**

- REFER TO SHEET SU-7 FOR DETAILS OF MEMBERS: C, D, F, G, H, J, AND K.
- ANCHOR POINT HANGER LOCATIONS: STA. 13+48.50 AND STA. 14+46.50.
- ANCHOR POINT HANGER WITH RESTRAINT POINT LOCATION: STA. 13+97.50.
- REFER TO SHEET SU-4 FOR THREADED ANCHOR INSERT LAYOUT AND DETAILS.
- EACH ANCHOR POINT HANGER REQUIRES 4 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
- EACH INTERMEDIATE HANGER REQUIRES 2 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
- ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL ACCOMMODATE A 3/4" DIAMETER ANCHOR BOLT.
- ALL CONDUIT INSTALLED ON THE BRIDGE SHALL BE TYPE D PLASTIC CONDUIT.
- NO PIPE JOINTS SHALL BE LOCATED WITHIN ONE (1) FOOT OF ANY HANGER.

**HANGER DETAILS - NORMAL  
INTERMEDIATE HANGER  
ANCHOR POINT HANGER**

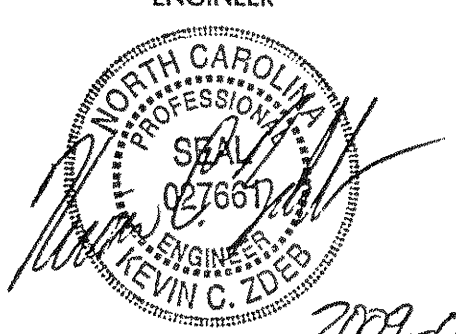



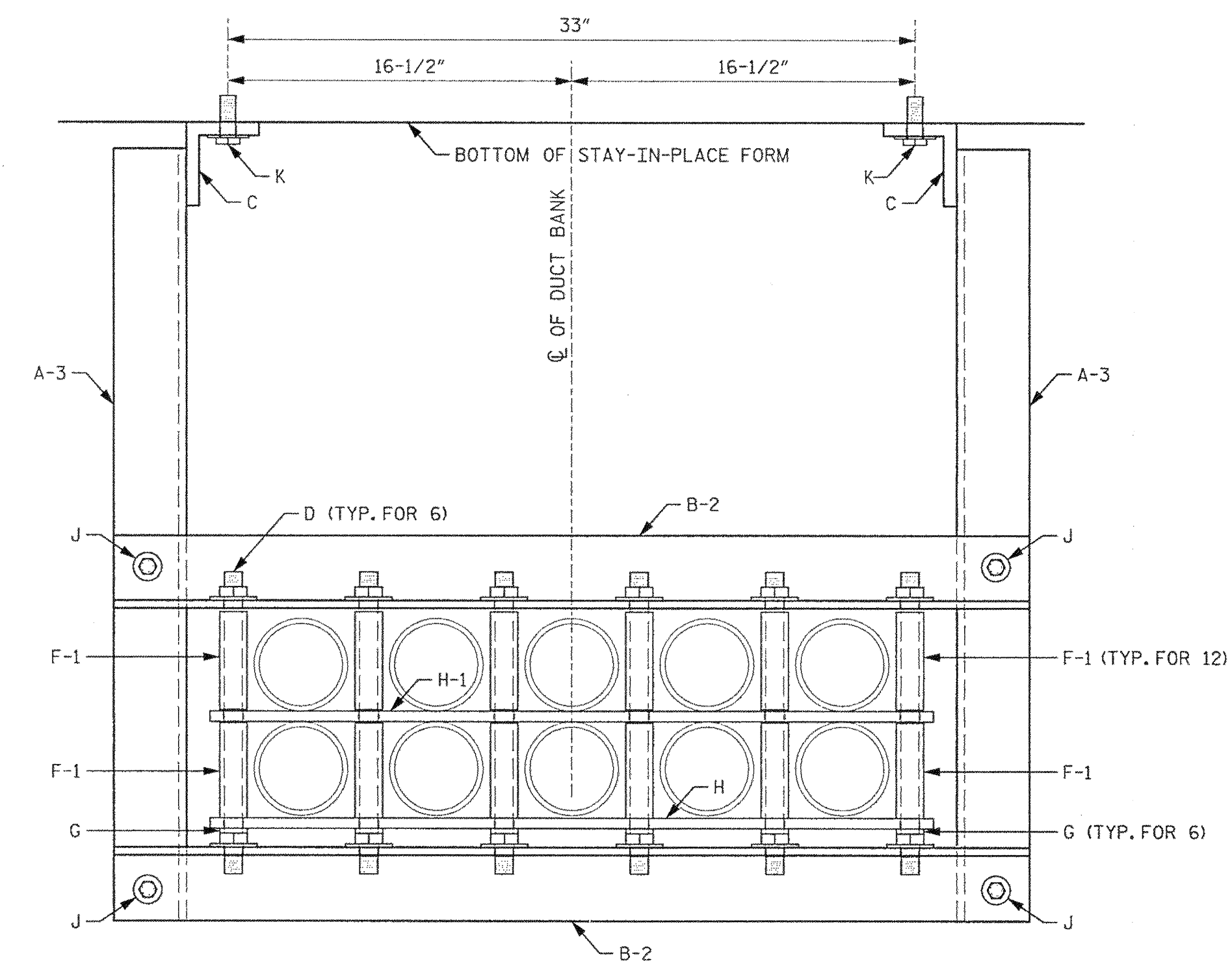
LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
COUNTY:	BUNCOMBE
DESIGNED BY:	
CHECKED BY:	
DATE:	FEBRUARY 17, 2009

FILE: SERIES STAGES

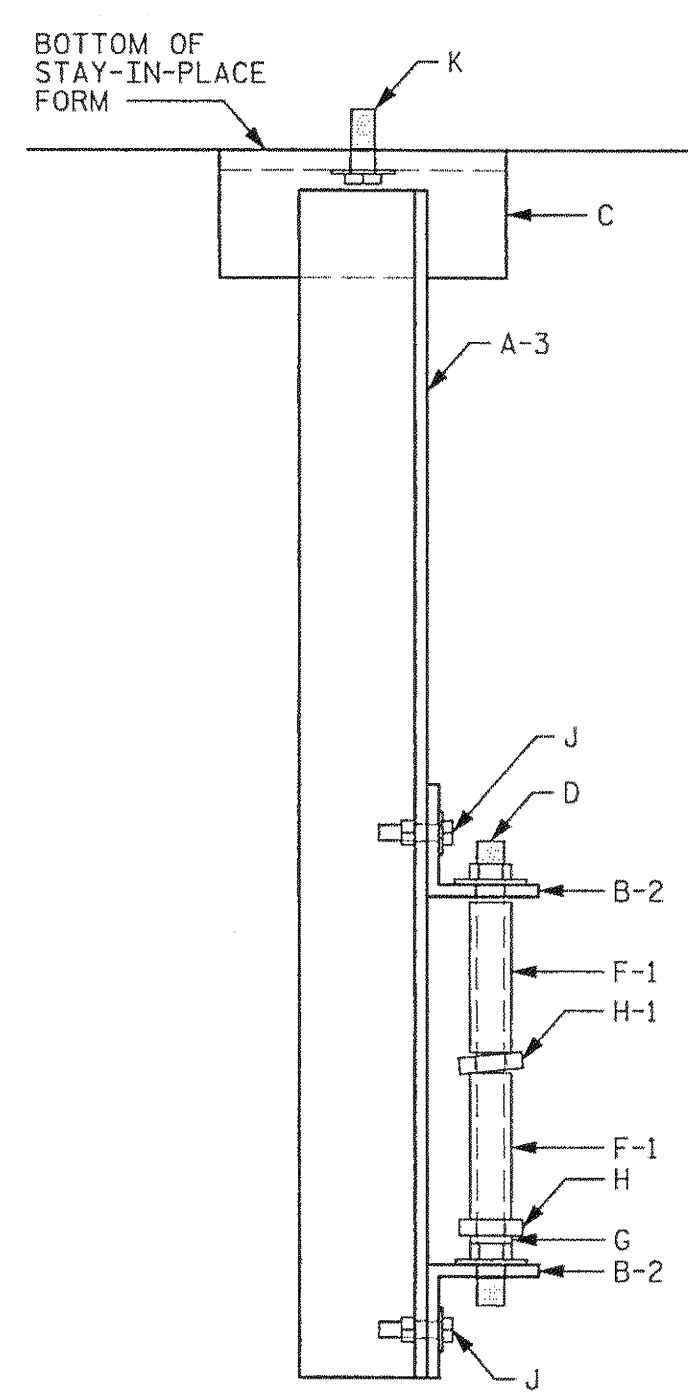
7/2/99

REVISIONS

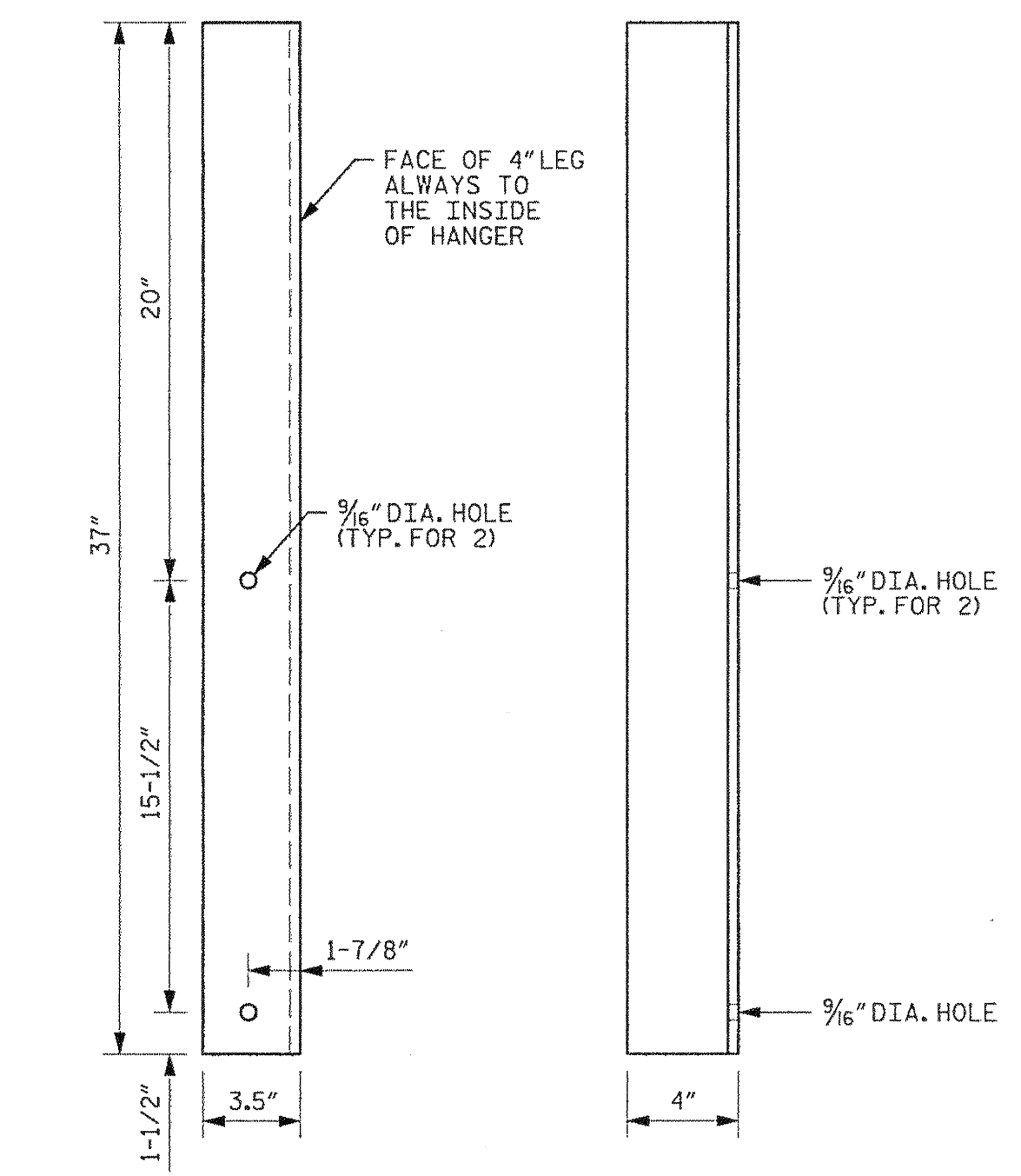
PROJECT REFERENCE NO. B-2515	SHEET NO. SU-9
UTILITY ENGINEER	
	
2009-03-26	
	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	



**INTERMEDIATE HANGER  
TRANSITION POSITION  
FRONT VIEW**



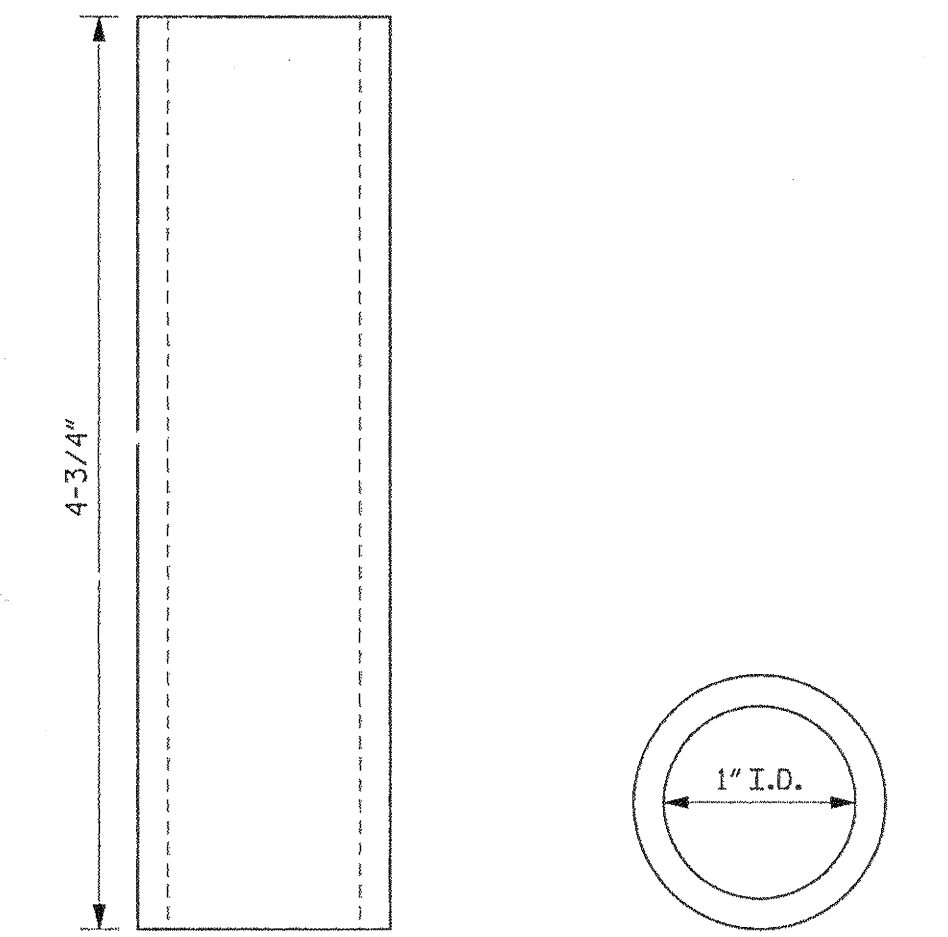
**INTERMEDIATE HANGER  
TRANSITION POSITION  
SIDE VIEW**



**FRONT VIEW      SIDE VIEW**

**MEMBER A-3**

- NOTES:
1. MEMBER SIZE IS: L 3.5 x 4 x 3/8
  2. 3.5\"/>

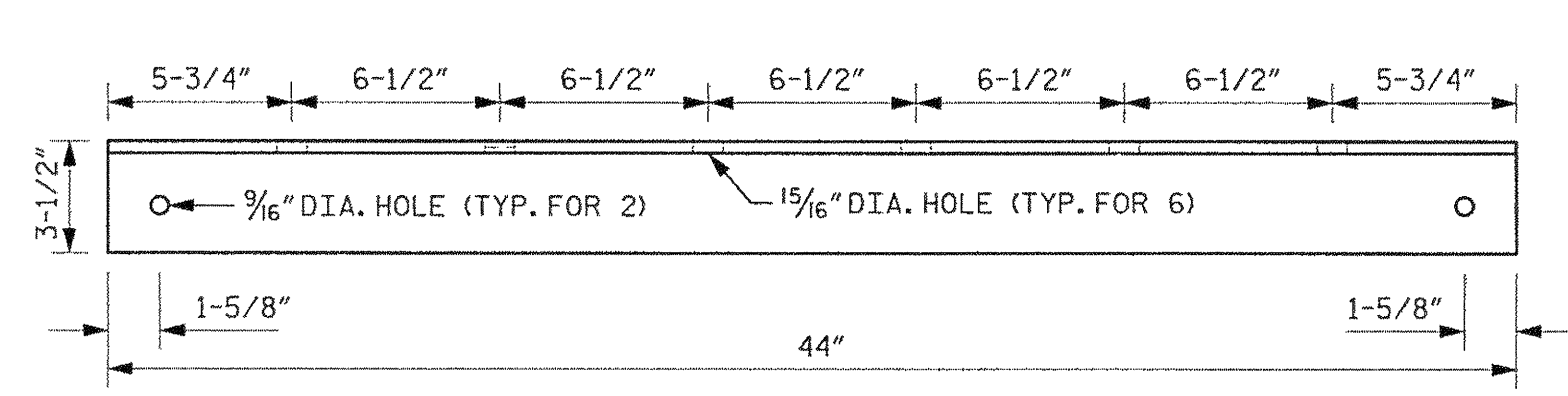


**FRONT VIEW      TOP VIEW**

**MEMBER F-1**

SCALE: 1" = 1"

- NOTES:
1. MEMBER IS MADE FROM ULTRAVIOLET PROTECTED SCH 40 PVC PIPE, OR EQUIVALENT WALL THICKNESS THAT IS COMMERCIALY AVAILABLE.
  2. MEMBER F-1 IS ONLY USED ON THE TRANSITION HANGER.

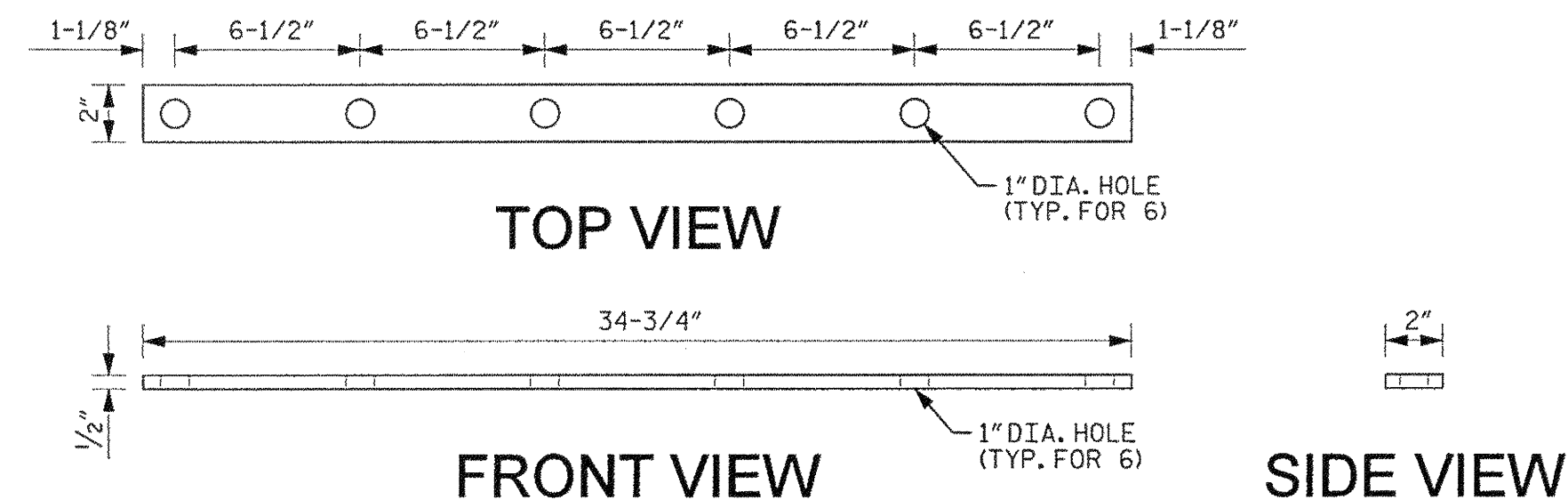


**FRONT VIEW**

**SIDE VIEW**

**MEMBER B-2**

- NOTES:
1. MEMBER SIZE IS: L 3.5 x 3.5 x 3/8
  2. LEG WITH 3/16\"/>



**TOP VIEW**

**FRONT VIEW**

**SIDE VIEW**

**MEMBER H-1**


- NOTES:
1. MEMBER IS MADE FROM ULTRAVIOLET PROTECTED 1/2\"/>

**GENERAL NOTES:**

1. REFER TO SHEET SU-7 FOR DETAILS OF MEMBERS: C, D, F, G, H, J, AND K.
2. TRANSITION INTERMEDIATE HANGER LOCATIONS: STA. 13+42 AND STA. 14+53.
3. REFER TO SHEET SU-4 FOR THREADED ANCHOR INSERT LAYOUT AND DETAILS.
4. EACH INTERMEDIATE HANGER REQUIRES 2 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.
5. ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL ACCOMMODATE A 3/4\"/>

**HANGER DETAILS - TRANSITION  
INTERMEDIATE HANGER**

**GRAPHIC SCALE**

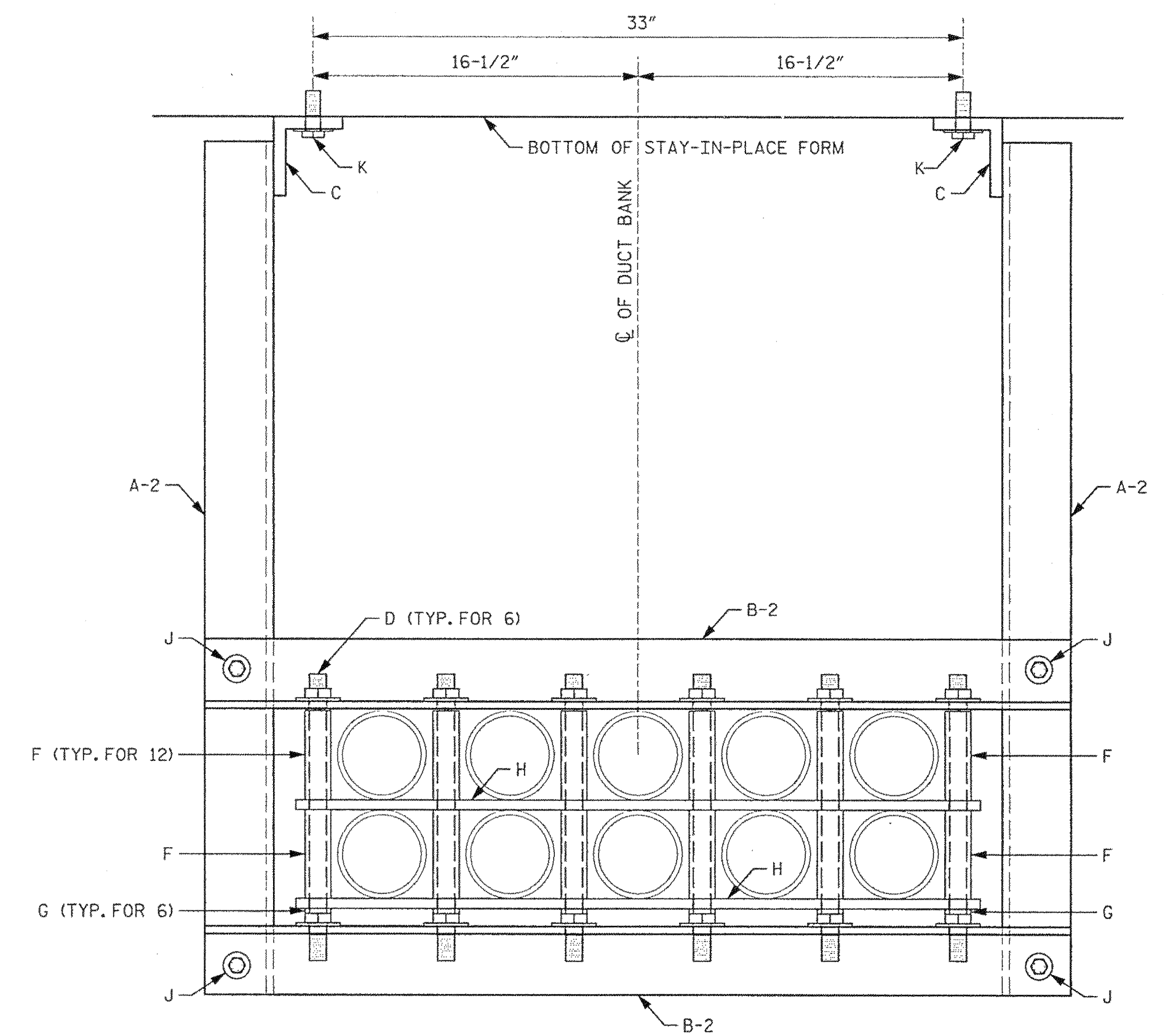


LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
COUNTY:	BUNCOMBE
DESIGNED BY:	
CHECKED BY:	
DATE:	FEBRUARY 19, 2009

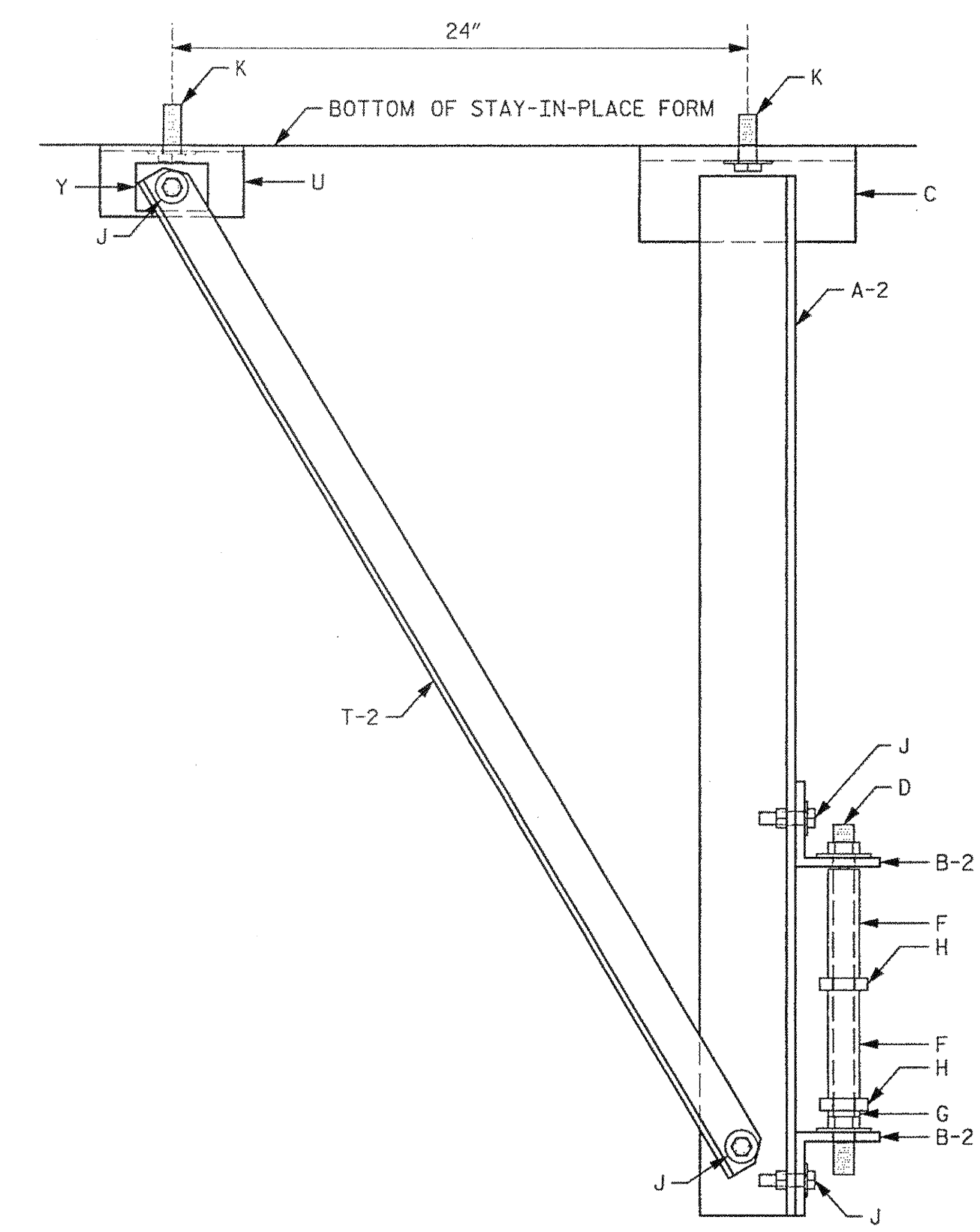
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DATE: EDATES  
STAGES

7/2/99

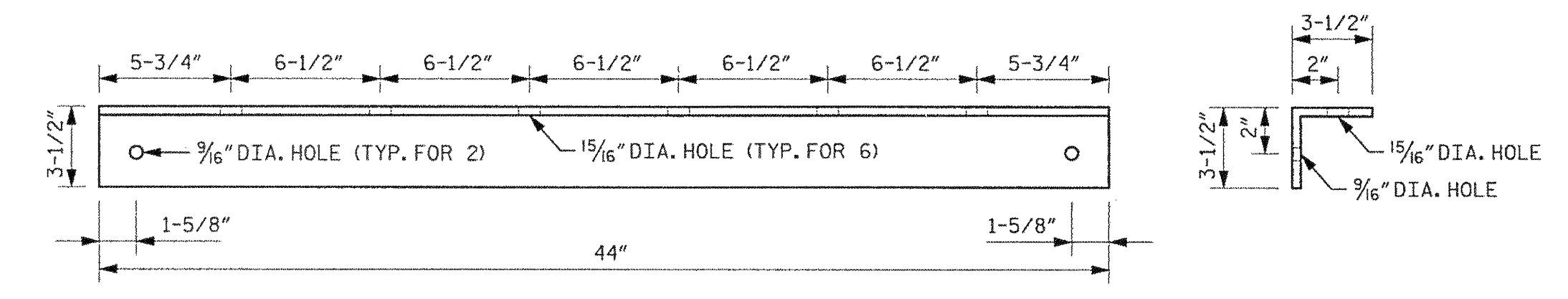
REVISIONS



**ANCHOR POINT HANGER  
LOW POSITION  
FRONT VIEW**

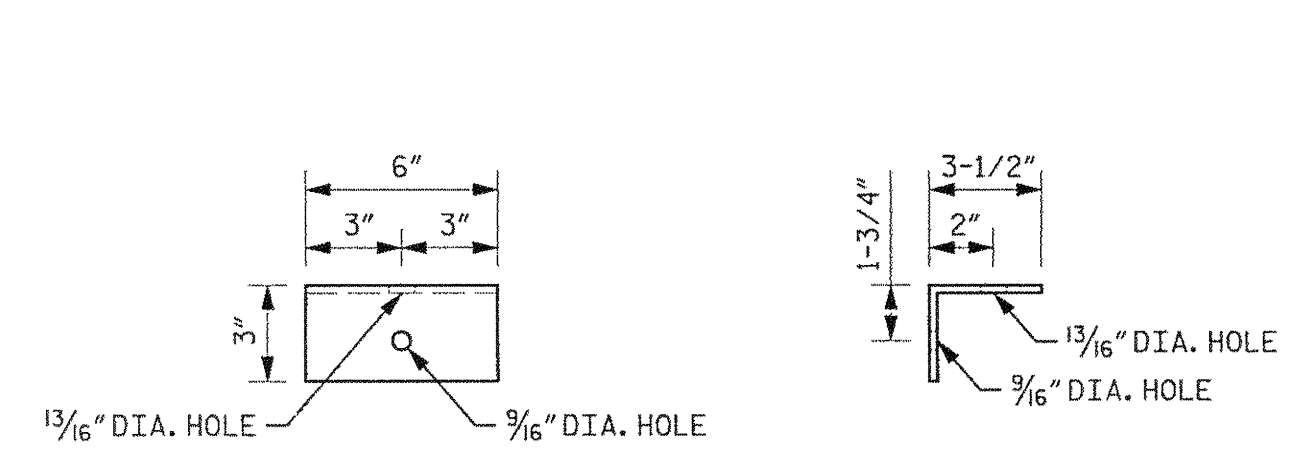


**ANCHOR POINT HANGER  
LOW POSITION  
SIDE VIEW**



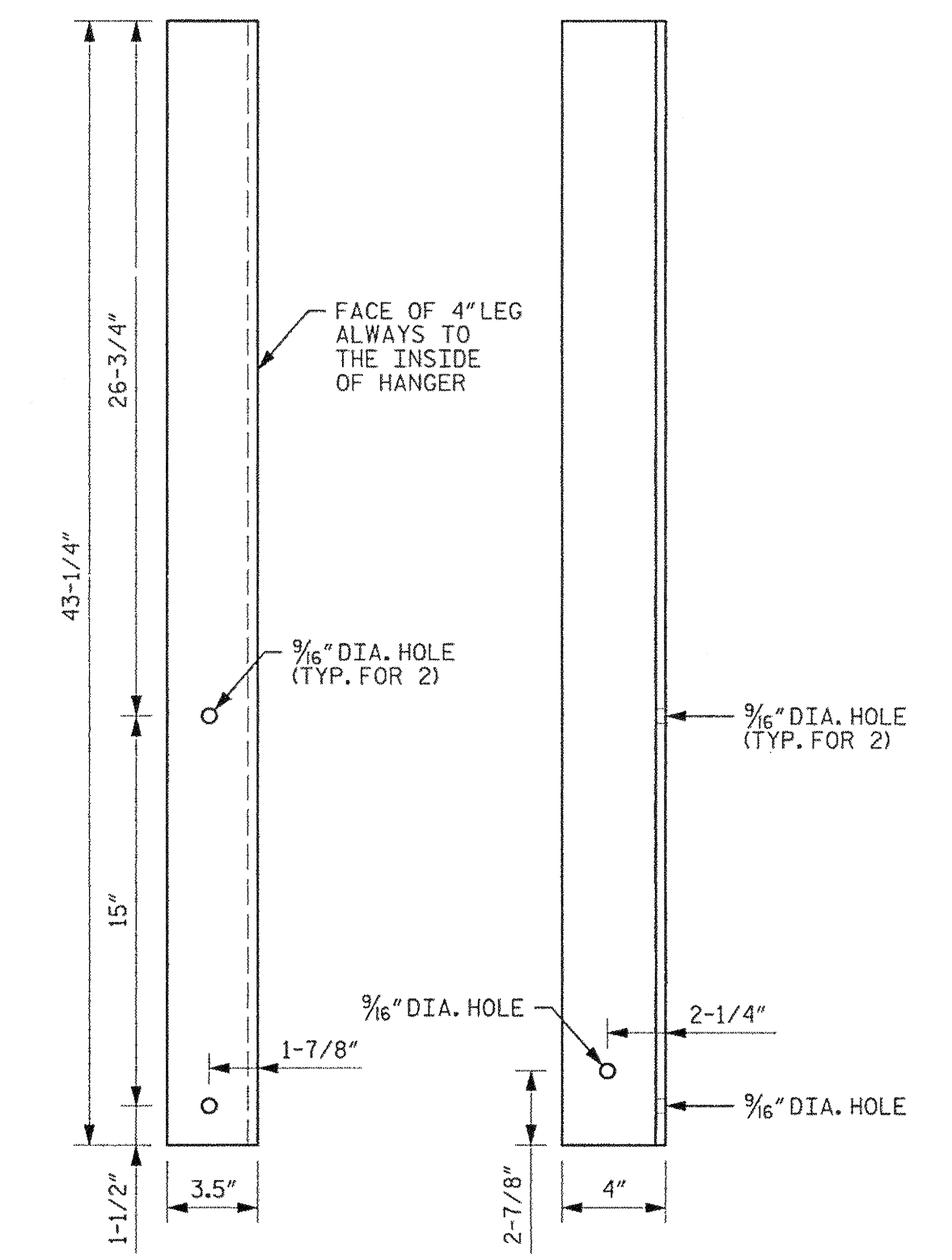
**FRONT VIEW                      SIDE VIEW**  
**MEMBER B-2**

NOTES:  
1. MEMBER SIZE IS: L 3.5 x 3.5 x 3/8  
2. LEG WITH 9/16\" DIA. HOLES ATTACHES TO MEMBER A-2.



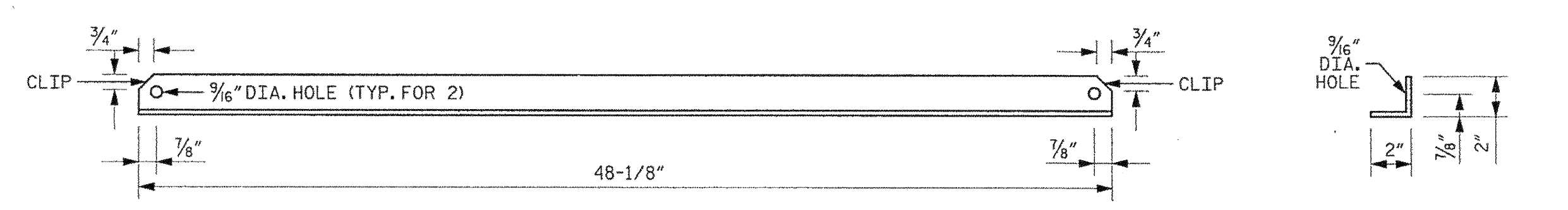
**SIDE VIEW                      FRONT VIEW**  
**MEMBER U**

NOTES:  
1. MEMBER SIZE IS: L 3.5 x 3 x 1/4  
2. 3.5\" LEG IS ALWAYS BOLTED TO THE BRIDGE.



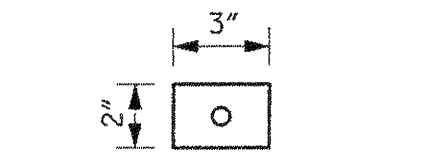
**FRONT VIEW                      SIDE VIEW**  
**MEMBER A-2**

NOTES:  
1. MEMBER SIZE IS: L 3.5 x 4 x 3/8  
2. 3.5\" LEG ATTACHES TO MEMBER B-2.  
3. 4\" LEG ATTACHES TO MEMBER T-2.  
4. ALL HOLES ARE 9/16\" DIAMETER.



**SIDE VIEW                      FRONT VIEW**  
**MEMBER T-2**

NOTES:  
1. MEMBER SIZE IS: L 2 x 2 x 1/4  
2. MEMBER T-2 IS BOLTED TO MEMBER A-2 AND MEMBER U.



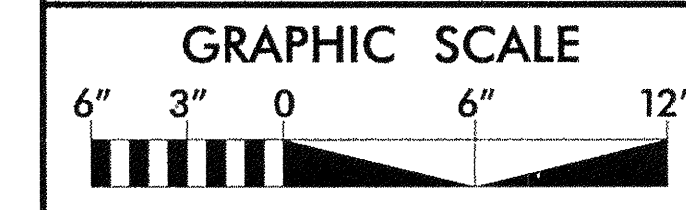
**MEMBER Y**

NOTES:  
1. SPACER IS MADE FROM 1/4\" THICK PLATE STOCK.  
2. 9/16\" DIA. HOLE IS CENTERED IN THE SPACER.  
3. SPACER IS INSTALLED BETWEEN MEMBER T-2 AND MEMBER U.

PROJECT REFERENCE NO. B-2515	SHEET NO. SU-10
UTILITY ENGINEER NORTH CAROLINA PROFESSIONAL SEAL SEAN J. ZEB 007586 2009-03-26 KEVIN C. ZDEB	
<b>MA Engineering</b> CONSULTANTS, INC.	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	

GENERAL NOTES:  
1. REFER TO SHEET SU-7 FOR DETAILS OF MEMBERS: C, D, F, G, H, J, AND K.  
2. LOW ANCHOR POINT HANGER LOCATIONS: STA. 13+35.50 AND STA. 14+59.50.  
3. REFER TO SHEET SU-4 FOR THREADED ANCHOR INSERT LAYOUT AND DETAILS.  
4. EACH ANCHOR POINT HANGER REQUIRES 4 THREADED ANCHOR INSERTS CAST IN PLACE IN THE BRIDGE DECK BOTTOM.  
5. ALL CAST IN PLACE THREADED ANCHOR INSERTS SHALL ACCOMMODATE A 3/4\" DIAMETER ANCHOR BOLT.  
6. ALL CONDUIT INSTALLED ON THE BRIDGE SHALL BE TYPE D PLASTIC CONDUIT.  
7. NO PIPE JOINTS SHALL BE LOCATED WITHIN ONE (1) FOOT OF ANY HANGER.

**HANGER DETAILS - LOW  
ANCHOR POINT HANGER**



LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET
TIP NO.:	B-2515
DESIGNED BY:	COUNTY: BUNCOMBE
CHECKED BY:	DATE: FEBRUARY 19, 2009

FILE: EFILES  
DATE: 3/2/09

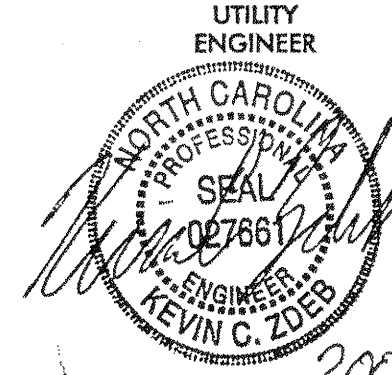


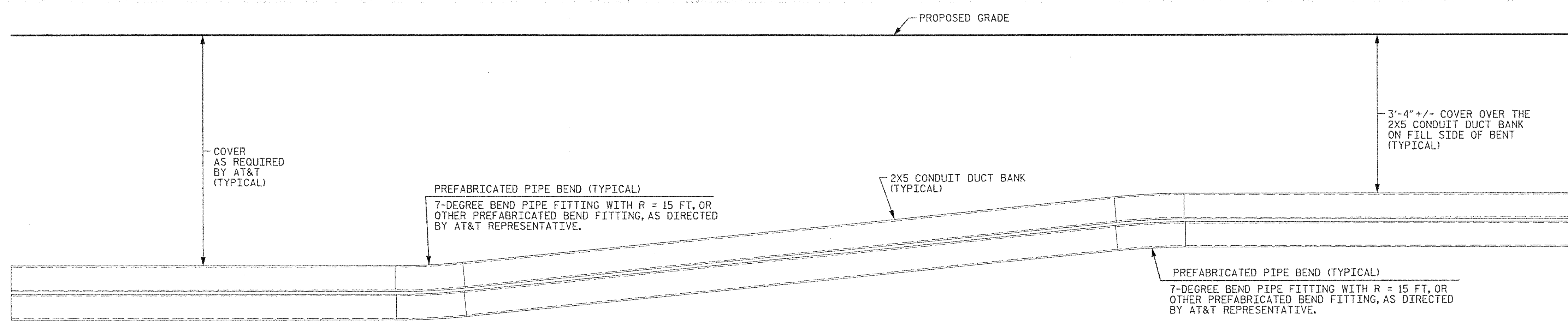
7/2/99

2009-05-05 - KCZ - REMOVE BUNDLED CONDUIT DETAIL REVISE CONCRETE ENCASEMENT AND END OF CONDUIT DETAILS.

REVISIONS

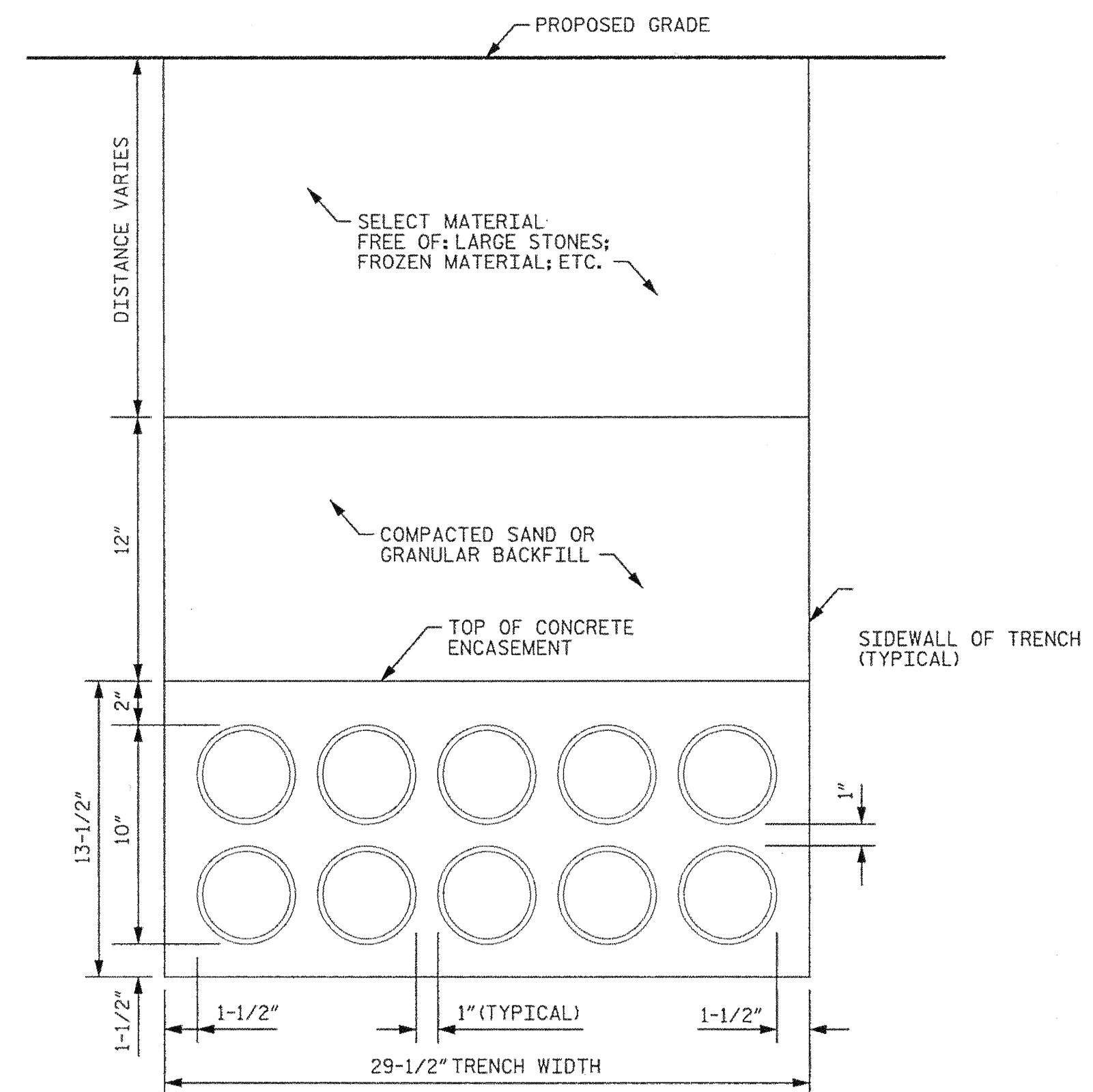
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PROJECT REFERENCE NO. B-2515	SHEET NO. SU-11
UTILITY ENGINEER	
 2009-05-05	
<b>MA Engineering</b> CONSULTANTS, INC.	
598 E. Chatham Street, Suite 137 Cary, N. C. 27511	



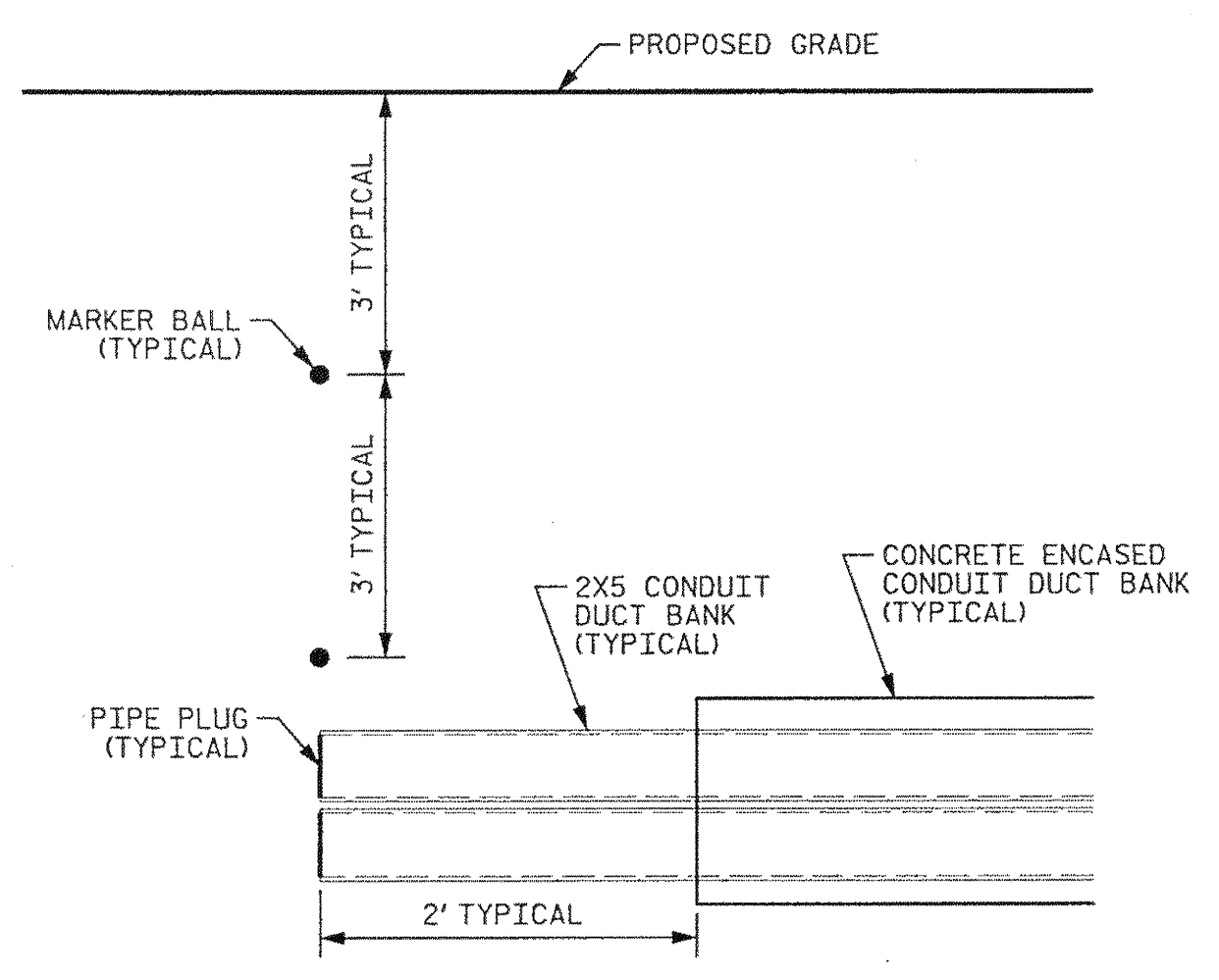
### VERTICAL GRADE TRANSITION OF CONDUIT DUCT BANK

- NOTES:
1. ALL BELOW GRADE CONDUIT SHALL BE TYPE C PLASTIC.
  2. 2x5 CONDUIT DUCT BANK SHALL BE CONSTRUCTED TO A DISTANCE OF 15 FEET BEYOND THE FILL FACE OF THE BENTS.
  3. THE OUTSIDE FACE OF THE PROPOSED MANHOLE, TO BE INSTALLED BY OTHERS, IS TO BE LOCATED APPROXIMATELY 23 FEET FROM THE FILL FACE OF BENT #1.
  4. AT&T REPRESENTATIVE SHALL DIRECT CONTRACTOR AS TO THE REQUIRED DEPTH OF CONDUIT AT CONSTRUCTION LIMITS OF THIS WORK.
  5. AT&T REPRESENTATIVE SHALL DIRECT CONTRACTOR AS TO WHETHER A VERTICAL GRADE CHANGE IS NECESSARY AND, IF SO, WHERE TO BEGIN GRADE CHANGE.



### CONCRETE ENCASEMENT OF TYPE C PLASTIC PVC CONDUIT 1-INCH VERTICAL AND HORIZONTAL SEPARATION

- NOTES:
1. OVERALL CONCRETE ENCASEMENT DIMENSIONS FOR 5 DUCTS WIDE BY 2 DUCTS HIGH SHALL BE 29-1/2 INCHES WIDE BY 13-1/2 INCHES HIGH.
  2. ENCASEMENT WIDTH DIMENSION INCLUDES 1-1/2 INCHES FROM EACH SIDE OF THE DUCT FORMATION TO THE TRENCH WALLS AND 1 INCH BETWEEN CONDUITS.
  3. ENCASEMENT HEIGHT DIMENSION INCLUDES 1-1/2 INCHES BELOW THE BOTTOM OF THE DUCT FORMATION AND 2 INCHES ABOVE THE TOP OF THE DUCT FORMATION.
  4. CONTRACTOR SHALL USE PVC CONDUIT SPACERS TO INSURE 1 INCH SPACING IS MAINTAINED BETWEEN CONDUITS THROUGHOUT THE ENCASEMENT. DISTANCE BETWEEN THE SPACERS SHALL BE AS PER MANUFACTURER RECOMMENDATION.
  5. CONDUIT DUCT BANK SHALL BE CONCRETE ENCASED AS PER THIS DETAIL WHEN:
    - A. THE CONDUIT HAS A HORIZONTAL RADIUS OF 80 FEET OR LESS.
    - B. THE CONDUIT HAS A VERTICAL GRADE CHANGE OF 20% (11.3 DEGREES), OR MORE.
    - C. AS NOTED ON THE PLANS.
    - D. AS DIRECTED BY AT&T REPRESENTATIVE.
  6. LIGHTWEIGHT TAMPERS SHOULD BE USED TO COMPACT THE TOP SURFACE OF THE SELECT MATERIAL BACKFILL.



### END OF CONDUIT DUCT BANK

- NOTES:
1. CONTRACTOR SHALL INSTALL PLUGS AT THE ENDS OF ALL CONDUITS.
  2. CONTRACTOR SHALL INSTALL MARKER BALLS AT EVERY 3 FEET OF DEPTH FROM GRADE ABOVE CONDUIT ENDS.
  3. AT&T SHALL SUPPLY THE MARKER BALLS TO THE CONTRACTOR.
  4. THE LAST 2 FEET OF THE CONDUIT DUCT BANK SHALL BE BACKFILLED WITH SAND AROUND THE 1 INCH SPACES BETWEEN THE CONDUITS TO FILL ALL VOIDS, TO A DEPTH OF 1-1/2 INCHES BELOW THE DUCT BANK, AND TO A HEIGHT OF 12 INCHES ABOVE THE DUCT BANK.
  5. CONTRACTOR SHALL INSTALL PVC CONDUIT SPACER AT END OF CONDUITS TO INSURE 1 INCH SPACING IS MAINTAINED BETWEEN THE CONDUITS.
  6. LIGHTWEIGHT TAMPERS SHOULD BE USED TO COMPACT THE TOP SURFACE OF THE SELECT MATERIAL BACKFILL.

**DETAILS -**  
**BELOW GRADE DUCT BANK**  
**GRAPHIC SCALE**  
**(NOT TO SCALE)**

LOCATION:	NC 81 BETWEEN NORFOLK SOUTHERN RR AND BRYSON STREET	
TIP NO.:	B-2515	COUNTY: BUNCOMBE
DESIGNED BY:		
CHECKED BY:	DATE: FEBRUARY 25, 2009	

## 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 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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