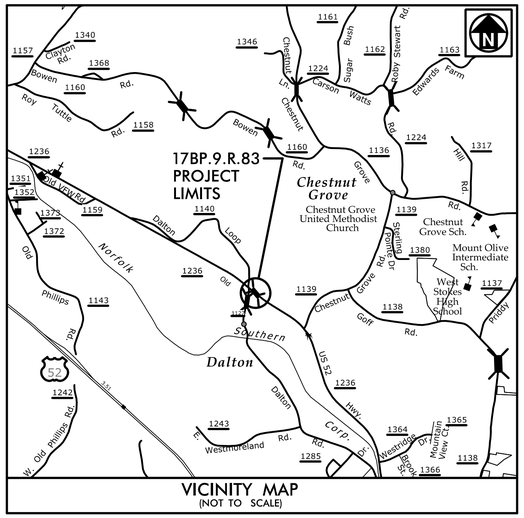
09/08/60

PROJECT: 17BP.9.R.83

CONTRACT: C205059



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STOKES COUNTY

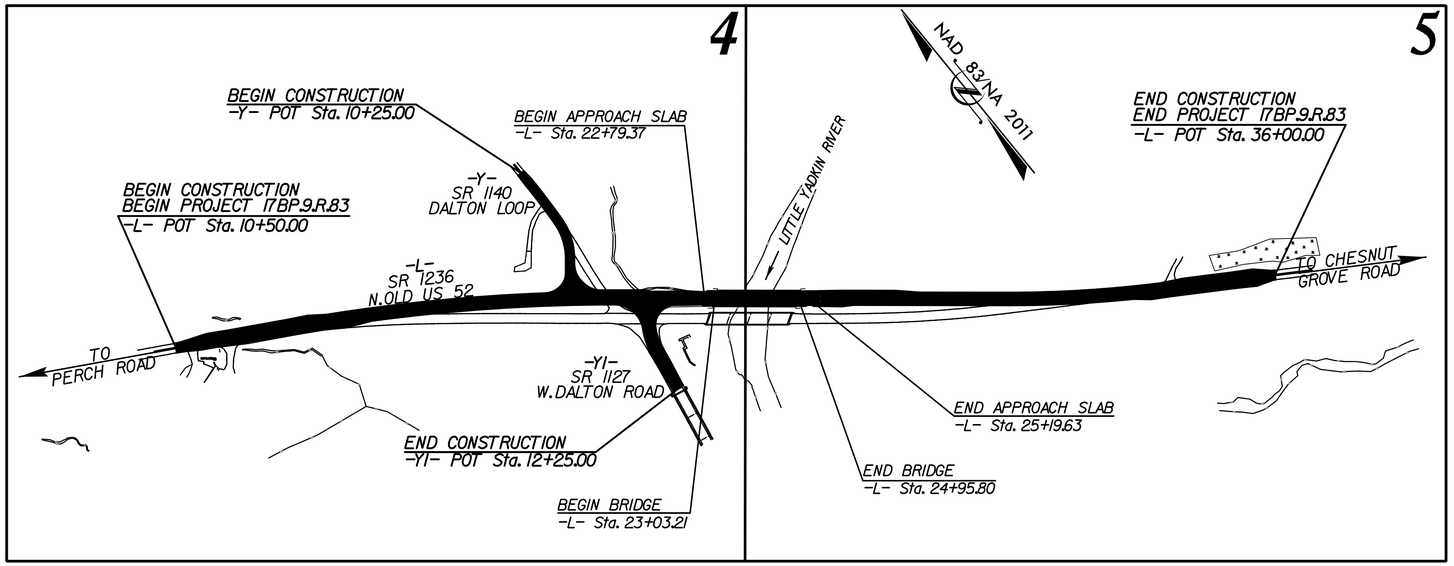
LOCATION: BRIDGE NO. 286 OVER LITTLE YADKIN RIVER ON SR 1236 (NORTH OLD 52)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

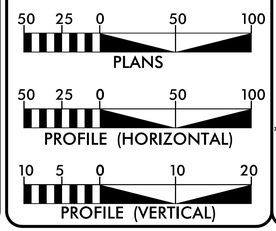
STRUCTURE PLANS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.9.R.83		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.9.PE.83		PE
17BP.9.ROW.83		R/W, UTL
17BP.9.R.83		CONST



GRAPHIC SCALES



DESIGN DATA

ADT (2025)= 3,800
ADT (2040)= 8,400

D = 50%
T = 7%*
V = 55 MPH

* TTST = 3% DUAL = 4%

FUNC CLASS =
MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.447 MILES

LENGTH STRUCTURE PROJECT = 0.036 MILES

TOTAL LENGTH PROJECT = 0.483 MILES

Prepared in the Office of WGI for

DIVISION 9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 1, 2022

LETTING DATE: APRIL 15, 2025

TIM JORDAN, PE
PROJECT ENGINEER

BRANDON BARHAM, PE
HYDRAULIC ENGINEER

NCDOT CONTACT: JEREMY KEATON, PE, PLS
DIVISION BRIDGE PROGRAM MANAGER

ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERCETTE

1/17/2025 | 6:12 AM PST

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:

WGI

5640 Dillard Drive, Suite 200
Cary, NC 27518

LICENSURE NO. C-4434

$$$$SYSTIME$$$$
$$$$EDGN$$$$
$$$$USERNAME$$$$

23+00 24+00 25+00

SPAN A SPAN B SPAN C

BEGIN BRIDGE
FILL FACE @ END BENT 1
STA. 23+03.21 -L-
G.P. EL. 859.30

BEGIN FRONT SLOPE
STA. 22+93.47 -L-
G.P. EL. 859.40

FIX. FIX. FIX.

1'-7" BERM
NORMAL TO CAP (TYP.)

LOW CHORD @
END BENT 1
EL. 855.27

BANK STABILIZATION
(ROADWAY DETAIL
AND PAY ITEM)

APPROXIMATE
NATURAL
GROUND LINE

2'-0" MIN. PILE
EMBED. (TYP.)

FILL

TOP OF DRILLED PIER
EL. 832.34

BASE DISCHARGE
(Q100)
EL. 850.6

N.W.S.
EL. 831.5
5-23-2018

EL. 841 ±
EL. 841 ±
EL. 834 ±
EL. 832 ±
EL. 830 ±
EL. 835 ±
EL. 832 ±
EL. 830 ±

HP 12 X 53 STEEL PILES
(TYP. EA. END BENT)

4'-0" Ø
DRILLED PIER (TYP.)

EXP. FIX. FIX.

TOP OF DRILLED PIER
EL. 840.53

1'-0" MIN. EARTH BERM
NORMAL TO CAP (TYP.)

LOW CHORD @
END BENT 2
EL. 853.23

EL. 837 ±
EL. 843 ±
EL. 842 ±
EL. 830 ±

UNCLASSIFIED
STRUCTURE
EXCAVATION

BANK STABILIZATION
(ROADWAY DETAIL
AND PAY ITEM)

CLASS II
RIP RAP
(TYP.)

SLOPE 1½:1 (TYP.)

END BRIDGE
FILL FACE @ END BENT 2
STA. 24+95.80 -L-
G.P. EL. 857.22

BEGIN FRONT SLOPE
STA. 25+05.53 -L-
G.P. EL. 857.11

FILL

1'-0" MIN.
(TYP.)

EL. 838 ±
EL. 841 ±

END BENT 1 BENT 1 BENT 2 END BENT 2

SECTION ALONG ℄ SURVEY -L-

(SECTIONS AT END BENTS AND BENTS ARE @ RIGHT ANGLES)

(-)7.8991% (-)1.0813%

PVI STA. 20+95.00
EL. = 861.55
VC = 350'

(-)1.0813% (+)0.6041%

PVI STA. 27+10.00
EL. = 854.90
VC = 250'

GRADE DATA -L-

HYDRAULIC DATA:

DESIGN DISCHARGE	= 4400 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 848.7
DRAINAGE AREA	= 37.2 SQ. MI.
BASE DISCHARGE (Q 100)	= 6200 CFS
BASE HIGH WATER ELEVATION	= 850.6

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 21322 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 856.4 **

** OVERTOPPING OCCURS AT ROADWAY SAG
STA. 27+45.40 -L-

TOTAL BRIDGE LENGTH = 192'-7 1/16" (FILL FACE TO FILL FACE)

41'-2¾" (SPAN A) 105'-1 3/16" (SPAN B) 46'-2¾" (SPAN C)

50'-0¾"

NAD 83/NA 2011

CLASS II
RIP RAP
(TYP.)

EARTH BERM
EL. 850.08
(LEVEL)

BANK STABILIZATION
(ROADWAY DETAIL
AND PAY ITEM)

EARTH BERM
EL. 848.03
(LEVEL)

W.P. #1
STA. 23+03.21 -L-
FILL FACE @ END BENT 1

W.P. #4
STA. 24+95.80 -L-
FILL FACE @ END BENT 2

BEGIN APPROACH SLAB
STA. 22+79.37 -L-

TO SR 1127

℄ BRIDGE
STA. 23+99.50 -L-

END APPROACH SLAB
STA. 25+19.63 -L-

℄ SURVEY -L-

TO SR 1139

105°-00'-00"
(TYP.)

BEGIN FRONT SLOPE
STA. 22+93.47 -L-

BEGIN FRONT SLOPE
STA. 25+05.53 -L-

TEMPORARY SHORING
FOR MAINTENANCE
OF TRAFFIC
(SEE NOTES)

W.P. #2
STA. 23+44.44 -L-
BENT 1 CONTROL LINE

TOP OF
TEMPORARY CAUSEWAY
EL. 833.50

W.P. #3
STA. 24+49.57 -L-
BENT 2 CONTROL LINE

TEMPORARY SHORING
FOR MAINTENANCE
OF TRAFFIC
(SEE NOTES)

1'-7" BERM
NORMAL TO CAP
(TYP.)

1'-0" MIN.
EARTH BERM
NORMAL TO CAP
(TYP.)

EXISTING
SUBSTRUCTURE
(TYP.)

LITTLE
YADKIN
RIVER

PLAN

(PILES AND DRILLED PIERS NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 1 OF 2 REPLACES BRIDGE #840286

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1236
(N. OLD US 52)
OVER LITTLE YADKIN RIVER
BETWEEN SR 1127 AND SR 1139

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

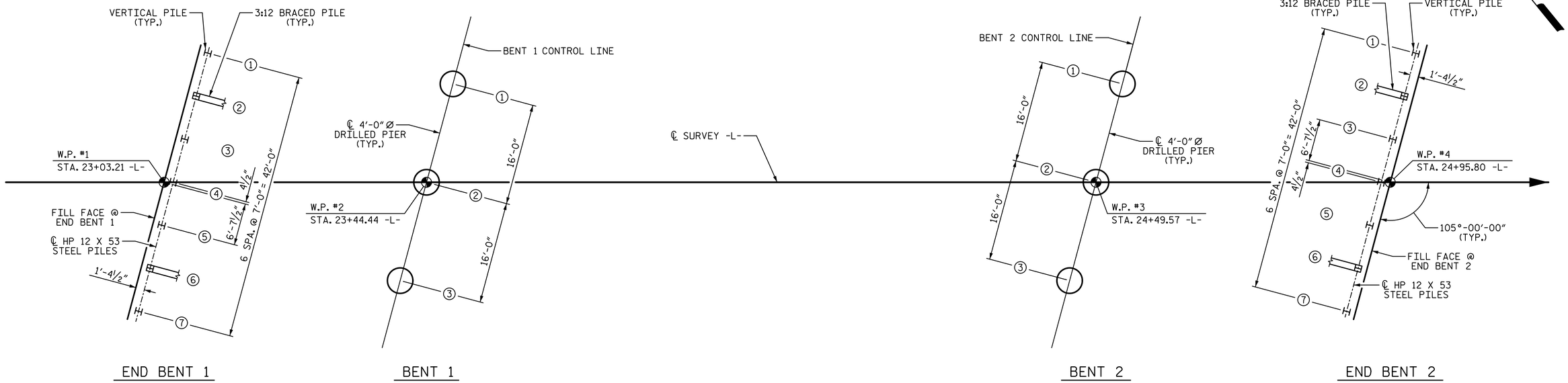
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE CENTERLINE AT BOTTOM OF CAP)

(#) INDICATES PILE NUMBER

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICAITONS.

8/2/2024 10:22:03 AM P:\Raleigh\Projects\2017\Division 9 (SEA)\17BP9R83 (Stokes 286)\Structures\Drawings\Final(Revise Concrete WS)\17BP9R83_SMU_GD_840286.dgn

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 023908 ENGINEER MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1236
(N. OLD US 52)
OVER LITTLE YADKIN RIVER
BETWEEN SR 1127 AND SR 1139

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

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1, Piles 1-7	7	150	See Structure Drawings	30			250							
End Bent No. 2, Piles 1-7	7	162	See Structure Drawings	25			270							
TOTAL QUANTITY:														

$$* \ RDR = \frac{Factored\ Resistance + Factored\ Drag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent No. 1, Piles 1-7	150			0.6		1
End Bent No. 2, Piles 1-7	162			0.6		1

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	Required Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Weathered Rock and Rock per Pier LIN FT	Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier LIN FT
Bent No. 1, Piers 1-3	3	1050	810.5	60	823	15	19.5			YES	825.5	15
Bent No. 2, Piers 1-3	3	1050	809.5	60	822	15	32.5					
TOTAL QUANTITY:							156					45

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "____ Dia. Drilled Piers" or "____ Dia. Drilled Piers Not in Soil" and "____ Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "__Dia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for ____ Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Michael H. Stephens, #028893) on 07-22-2024.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, CSL Testing, SID Inspections and PITs when necessary.

PROJECT NO. 17BP.9.R.83

Stokes COUNTY

STATION: 23+99.50 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

SIGNATURE DATE

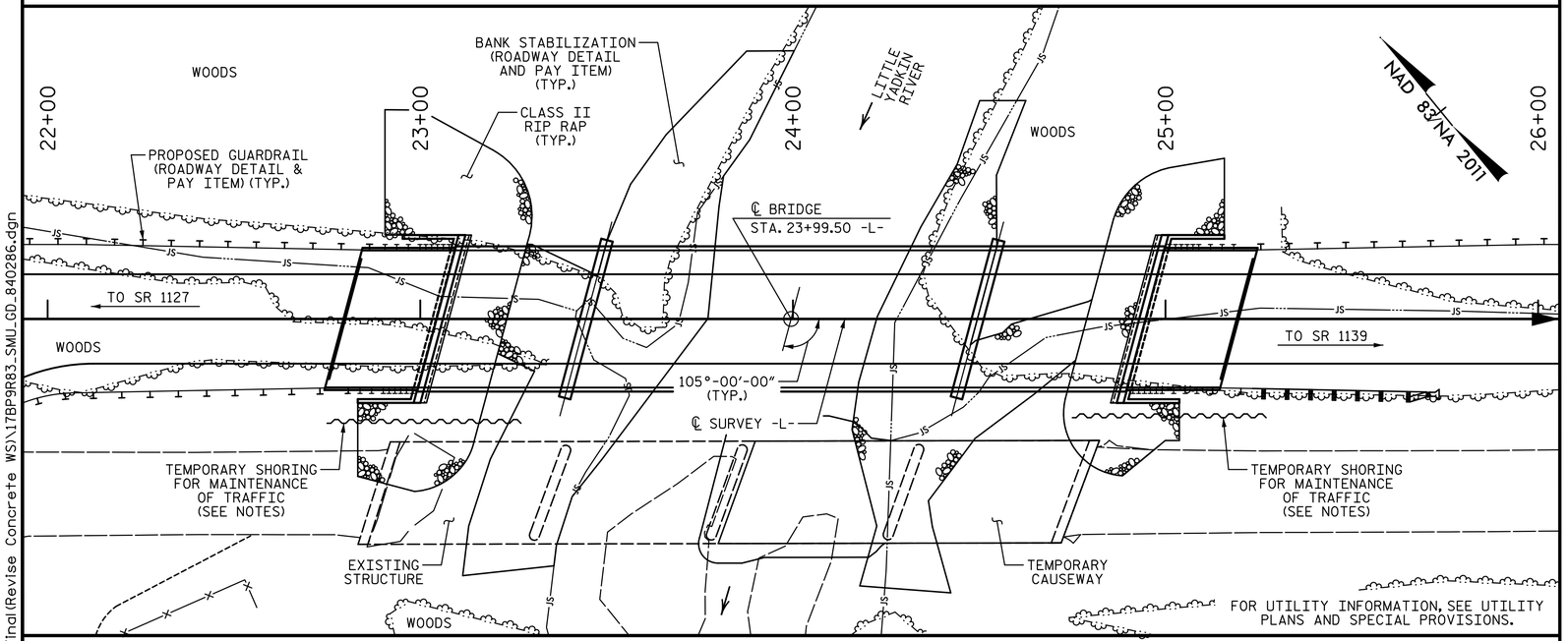
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

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

BM #2 RR SPIKE IN 20"HICKORY, STA. 23+37.00 -L-, 233' RT., EL. 844.92



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 45 FT. LEFT AND 75 FT. RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTS OF 4 SPANS @ 47'-6". THE SUPERSTRUCTURE HAS A CLEAR ROADWAY WIDTH OF 23'-10" AND CONSISTS OF REINFORCED CONCRETE DECK GIRDERS. THE SUBSTRUCTURE CONSISTS OF REINFOCED CONCRETE SPILL THROUGH ABUTMENTS AND REINFORCED CONCRETE POST AND WEB INTERIOR BENTS. AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING BRIDGE WHICH IS LOCATED DOWNSTREAM OF THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

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 23+99.50 -L-.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP. ACCESS AT STA. 23+99.50 -L-	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" DIA. DRILLED PIER	PERMANENT STEEL CASING FOR 4'-0" DIA. DRILLED PIERS	UNCLASSIFIED STRUCTURE EXCAVATION	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LS	LS	LS	LF	LF	LS	SF	SF	CY	LS	LB	LB
SUPERSTRUCTURE							7,008	8,065		LS		
END BENT 1									33.0		5,359	
BENT 1				66.0	21				48.8		12,871	3,151
BENT 2				94.5					38.8		12,897	3,097
END BENT 2						LS			33.0		5,359	
TOTAL	LS	LS	LS	160.5	21	LS	7,008	8,065	153.6	LS	36,486	6,248

TOTAL BILL OF MATERIAL

	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM	
	EA	NO.	LF	LF	TON	SY	LS	LS	NO.	LF
SUPERSTRUCTURE				380.00			LS	LS	39	2,470.00
END BENT 1	7	7	210		350	390				
BENT 1										
BENT 2										
END BENT 2	7	7	175		185	205				
TOTAL	14	14	385	380.00	535	595	LS	LS	39	2,470.00

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1236
(N. OLD US 52)
OVER LITTLE YADKIN RIVER
BETWEEN SR 1127 AND SR 1139

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

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93(Inv)	N/A	**1**	2.75	- -	1.75	0.252	5.56	A	EL	19.224	0.607	**2.75**	A	EL	**7.689**	0.80	0.252	7.15	A	EL	19.224	
		HL-93(Opr)	N/A		3.61	- -	1.35	0.252	7.21	A	EL	19.224	0.607	3.61	A	EL	7.689	N/A	- -	- -	- -		- -	
		HS-20(Inv)	36.000	**2**	3.18	114.5	1.75	0.252	7.01	A	EL	19.224	0.607	**3.18**	A	EL	**7.689**	0.80	0.252	9.00	A	EL	19.224	
		HS-20(Opr)	36.000		4.17	150.1	1.35	0.252	9.08	A	EL	19.224	0.607	4.17	A	EL	7.689	N/A	- -	- -	- -		- -	
LEGAL LOAD	SV	SNSH	13.500		8.30	112.1	1.40	0.252	16.10	A	EL	19.224	0.607	8.30	A	EL	7.689	0.80	0.252	16.54	A	EL	19.224	
		SNGARBS2	20.000		6.28	125.6	1.40	0.252	13.29	A	EL	15.378	0.607	6.28	A	EL	7.689	0.80	0.252	13.68	A	EL	19.224	
		SNAGRIS2	22.000		5.99	131.8	1.40	0.252	13.00	A	EL	15.378	0.607	5.99	A	EL	7.689	0.80	0.252	13.38	A	EL	15.378	
		SNCOTTS3	27.250		4.09	111.5	1.40	0.252	8.05	A	EL	19.224	0.607	4.09	A	EL	7.689	0.80	0.252	8.27	A	EL	19.224	
		SNAGGRS4	34.925		3.65	127.5	1.40	0.252	7.26	A	EL	19.224	0.607	3.65	A	EL	7.689	0.80	0.252	7.46	A	EL	19.224	
		SNS5A	35.550		3.84	136.5	1.40	0.252	7.06	A	EL	19.224	0.607	3.84	A	EL	7.689	0.80	0.252	7.25	A	EL	19.224	
		SNS6A	39.950		3.60	143.8	1.40	0.252	6.72	A	EL	19.224	0.607	3.60	A	EL	7.689	0.80	0.252	6.91	A	EL	19.224	
		SNS7B	42.000		3.70	155.4	1.40	0.252	6.41	A	EL	19.224	0.607	3.70	A	EL	7.689	0.80	0.252	6.59	A	EL	19.224	
	TTST	TNAGRIT3	33.000		4.32	142.6	1.40	0.252	8.28	A	EL	19.224	0.607	4.32	A	EL	7.689	0.80	0.252	8.50	A	EL	19.224	
		TNT4A	33.075		4.03	133.3	1.40	0.252	8.38	A	EL	19.224	0.607	4.03	A	EL	7.689	0.80	0.252	8.61	A	EL	19.224	
		TNT6A	41.600		3.92	163.1	1.40	0.252	7.12	A	EL	19.224	0.607	3.92	A	EL	7.689	0.80	0.252	7.31	A	EL	19.224	
		TNT7A	42.000		3.66	153.7	1.40	0.252	7.30	A	EL	19.224	0.607	3.66	A	EL	7.689	0.80	0.252	7.50	A	EL	19.224	
		TNT7B	42.000		3.51	147.4	1.40	0.252	7.45	A	EL	19.224	0.607	3.51	A	EL	7.689	0.80	0.252	7.65	A	EL	19.224	
		TNAGRIT4	43.000		3.41	146.6	1.40	0.252	7.23	A	EL	19.224	0.607	3.41	A	EL	7.689	0.80	0.252	7.45	A	EL	15.378	
		TNAGT5A	45.000		3.67	165.2	1.40	0.252	6.72	A	EL	19.224	0.607	3.67	A	EL	7.689	0.80	0.252	6.90	A	EL	19.224	
		TNAGT5B	45.000	**3**	3.21	144.5	1.40	0.252	6.53	A	EL	19.224	0.607	**3.21**	A	EL	**7.689**	0.80	0.252	6.71	A	EL	19.224	
EMERGENCY VEHICLE (EV)		EV2	28.750		4.41	126.8	1.30	0.252	9.51	A	EL	15.378	0.607	4.41	A	EL	7.689	0.80	0.252	9.79	A	EL	15.378	
		EV3	43.000	**4**	2.95	126.9	1.30	0.252	6.18	A	EL	19.224	0.607	**2.95**	A	EL	**7.689**	0.80	0.252	6.35	A	EL	19.224	

LOAD FACTORS:

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

NOTES:

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

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

DISTANCE FROM LEFT END OF SPAN IS MEASURED FROM ℄ BEARING.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

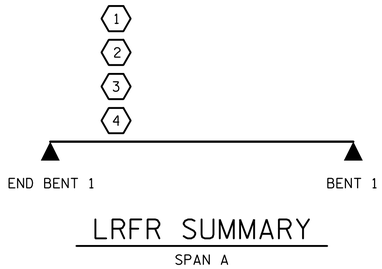
⟨3⟩ LEGAL LOAD RATING **

⟨4⟩ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

SPAN A

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 40' BOX BEAM UNITS 105° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			29

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93(Inv)	N/A	**1**	1.37	- -	1.75	0.202	1.41	B	EL	51.724	0.58	**1.37**	B	EL	**10.345**	0.80	0.202	1.78	B	EL	51.724	
		HL-93(Opr)	N/A		1.82	- -	1.35	0.202	1.83	B	EL	51.724	0.58	1.82	B	EL	10.345	N/A	- -	- -	- -	- -	- -	
		HS-20(Inv)	36.000	**2**	1.90	68.4	1.75	0.202	1.98	B	EL	51.724	0.58	**1.90**	B	EL	**10.345**	0.80	0.202	2.51	B	EL	51.724	
		HS-20(Opr)	36.000		2.51	90.4	1.35	0.202	2.57	B	EL	51.724	0.58	2.51	B	EL	10.345	N/A	- -	- -	- -	- -	- -	
LEGAL LOAD	SV	SNSH	13.500		5.92	79.9	1.40	0.202	5.92	B	EL	51.724	0.58	6.21	B	EL	10.345	0.80	0.202	5.99	B	EL	51.724	
		SNGARBS2	20.000		4.27	85.4	1.40	0.202	4.27	B	EL	51.724	0.58	4.29	B	EL	10.345	0.80	0.202	4.32	B	EL	51.724	
		SNAGRIS2	22.000		3.94	86.7	1.40	0.202	3.99	B	EL	51.724	0.58	3.94	B	EL	10.345	0.80	0.202	4.04	B	EL	51.724	
		SNCOTTS3	27.250		2.94	80.1	1.40	0.202	2.94	B	EL	51.724	0.58	3.00	B	EL	10.345	0.80	0.202	2.98	B	EL	51.724	
		SNAGGRS4	34.925		2.40	83.8	1.40	0.202	2.40	B	EL	51.724	0.58	2.41	B	EL	10.345	0.80	0.202	2.43	B	EL	51.724	
		SNS5A	35.550		2.35	83.5	1.40	0.202	2.35	B	EL	51.724	0.58	2.41	B	EL	10.345	0.80	0.202	2.38	B	EL	51.724	
		SNS6A	39.950		2.14	85.5	1.40	0.202	2.14	B	EL	51.724	0.58	2.18	B	EL	10.345	0.80	0.202	2.16	B	EL	51.724	
		SNS7B	42.000		2.03	85.3	1.40	0.202	2.03	B	EL	51.724	0.58	2.11	B	EL	10.345	0.80	0.202	2.06	B	EL	51.724	
	TTST	TNAGRIT3	33.000		2.60	85.8	1.40	0.202	2.60	B	EL	51.724	0.58	2.64	B	EL	10.345	0.80	0.202	2.63	B	EL	51.724	
		TNT4A	33.075		2.59	85.7	1.40	0.202	2.61	B	EL	51.724	0.58	2.59	B	EL	10.345	0.80	0.202	2.64	B	EL	51.724	
		TNT6A	41.600		2.11	87.8	1.40	0.202	2.11	B	EL	51.724	0.58	2.20	B	EL	10.345	0.80	0.202	2.14	B	EL	51.724	
		TNT7A	42.000		2.11	88.6	1.40	0.202	2.11	B	EL	51.724	0.58	2.16	B	EL	10.345	0.80	0.202	2.14	B	EL	51.724	
		TNT7B	42.000		2.07	86.9	1.40	0.202	2.16	B	EL	51.724	0.58	2.07	B	EL	10.345	0.80	0.202	2.18	B	EL	51.724	
		TNAGRIT4	43.000		2.01	86.4	1.40	0.202	2.07	B	EL	51.724	0.58	2.01	B	EL	10.345	0.80	0.202	2.10	B	EL	51.724	
		TNAGT5A	45.000		1.96	88.2	1.40	0.202	1.96	B	EL	51.724	0.58	1.97	B	EL	10.345	0.80	0.202	1.99	B	EL	51.724	
		TNAGT5B	45.000	**3**	1.91	86.0	1.40	0.202	1.95	B	EL	51.724	0.58	**1.91**	B	EL	**10.345**	0.80	0.202	1.97	B	EL	51.724	
EMERGENCY VEHICLE (EV)		EV2	28.750		3.04	87.4	1.30	0.202	3.23	B	EL	51.724	0.58	3.19	B	EL	10.345	0.80	0.202	3.04	B	EL	51.724	
		EV3	43.000	**4**	2.00	86.0	1.30	0.202	2.13	B	EL	51.724	0.58	2.09	B	EL	10.345	0.80	0.202	**2.00**	B	EL	**51.724**	

LOAD FACTORS:

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

NOTES:

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

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

DISTANCE FROM LEFT END OF SPAN IS MEASURED FROM ℄ BEARING.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

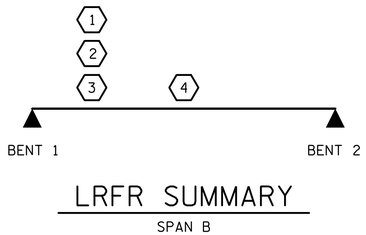
⟨3⟩ LEGAL LOAD RATING **

⟨4⟩ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
SPAN B

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

STATE OF NORTH CAROLINA
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 105' BOX BEAM UNITS 105° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93(Inv)	N/A	**1**	2.55	- -	1.75	0.24	4.72	C	EL	21.724	0.601	**2.55**	C	EL	**8.689**	0.80	0.24	6.00	C	EL	21.724	
		HL-93(Opr)	N/A		3.35	- -	1.35	0.24	6.12	C	EL	21.724	0.601	3.35	C	EL	8.689	N/A	- -	- -	- -		- -	
		HS-20(Inv)	36.000	**2**	2.98	107.3	1.75	0.24	5.79	C	EL	21.724	0.601	**2.98**	C	EL	**8.689**	0.80	0.24	7.36	C	EL	21.724	
		HS-20(Opr)	36.000		3.91	140.8	1.35	0.24	7.51	C	EL	21.724	0.601	3.91	C	EL	8.689	N/A	- -	- -	- -		- -	
LEGAL LOAD	SV	SNSH	13.500		8.10	109.4	1.40	0.24	14.08	C	EL	21.724	0.601	8.10	C	EL	8.689	0.80	0.24	14.31	C	EL	21.724	
		SNGARBS2	20.000		6.03	120.6	1.40	0.24	11.40	C	EL	21.724	0.601	6.03	C	EL	8.689	0.80	0.24	11.58	C	EL	21.724	
		SNAGRIS2	22.000		5.72	125.8	1.40	0.24	11.04	C	EL	17.379	0.601	5.72	C	EL	8.689	0.80	0.24	11.26	C	EL	17.379	
		SNCOTTS3	27.250		4.00	109.0	1.40	0.24	7.03	C	EL	21.724	0.601	4.00	C	EL	8.689	0.80	0.24	7.14	C	EL	21.724	
		SNAGGRS4	34.925		3.52	122.9	1.40	0.24	6.21	C	EL	21.724	0.601	3.52	C	EL	8.689	0.80	0.24	6.32	C	EL	21.724	
		SNS5A	35.550		3.70	131.5	1.40	0.24	6.05	C	EL	21.724	0.601	3.70	C	EL	8.689	0.80	0.24	6.15	C	EL	21.724	
		SNS6A	39.950		3.45	137.8	1.40	0.24	5.71	C	EL	21.724	0.601	3.45	C	EL	8.689	0.80	0.24	5.80	C	EL	21.724	
		SNS7B	42.000		3.50	147.0	1.40	0.24	5.44	C	EL	21.724	0.601	3.50	C	EL	8.689	0.80	0.24	5.53	C	EL	21.724	
	TTST	TNAGRIT3	33.000		4.02	132.7	1.40	0.24	7.01	C	EL	21.724	0.601	4.02	C	EL	8.689	0.80	0.24	7.12	C	EL	21.724	
		TNT4A	33.075		3.81	126.0	1.40	0.24	7.08	C	EL	21.724	0.601	3.81	C	EL	8.689	0.80	0.24	7.20	C	EL	21.724	
		TNT6A	41.600		3.78	157.2	1.40	0.24	5.95	C	EL	21.724	0.601	3.78	C	EL	8.689	0.80	0.24	6.04	C	EL	21.724	
		TNT7A	42.000		3.42	143.6	1.40	0.24	6.07	C	EL	21.724	0.601	3.42	C	EL	8.689	0.80	0.24	6.16	C	EL	21.724	
		TNT7B	42.000		3.35	140.7	1.40	0.24	6.31	C	EL	21.724	0.601	3.35	C	EL	8.689	0.80	0.24	6.42	C	EL	21.724	
		TNAGRIT4	43.000		3.17	136.3	1.40	0.24	6.02	C	EL	21.724	0.601	3.17	C	EL	8.689	0.80	0.24	6.11	C	EL	21.724	
		TNAGT5A	45.000		3.31	149.0	1.40	0.24	5.60	C	EL	21.724	0.601	3.31	C	EL	8.689	0.80	0.24	5.69	C	EL	21.724	
		TNAGT5B	45.000	**3**	3.02	135.9	1.40	0.24	5.46	C	EL	21.724	0.601	**3.02**	C	EL	**8.689**	0.80	0.24	5.55	C	EL	21.724	
EMERGENCY VEHICLE (EV)		EV2	28.750		4.56	131.1	1.30	0.24	8.76	C	EL	17.379	0.601	4.56	C	EL	8.689	0.80	0.24	8.31	C	EL	21.724	
		EV3	43.000	**4**	3.05	131.2	1.30	0.24	5.66	C	EL	21.724	0.601	**3.05**	C	EL	**8.689**	0.80	0.24	5.34	C	EL	21.724	

LOAD FACTORS:

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

NOTES:

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

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

DISTANCE FROM LEFT END OF SPAN IS MEASURED FROM ℄ BEARING.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

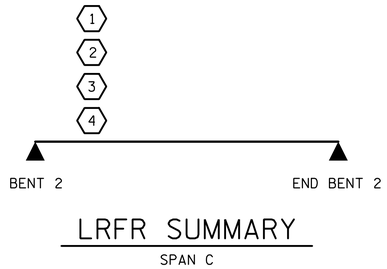
(3) LEGAL LOAD RATING **

(4) EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

SPAN C

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
45' BOX BEAM UNITS
105° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			29

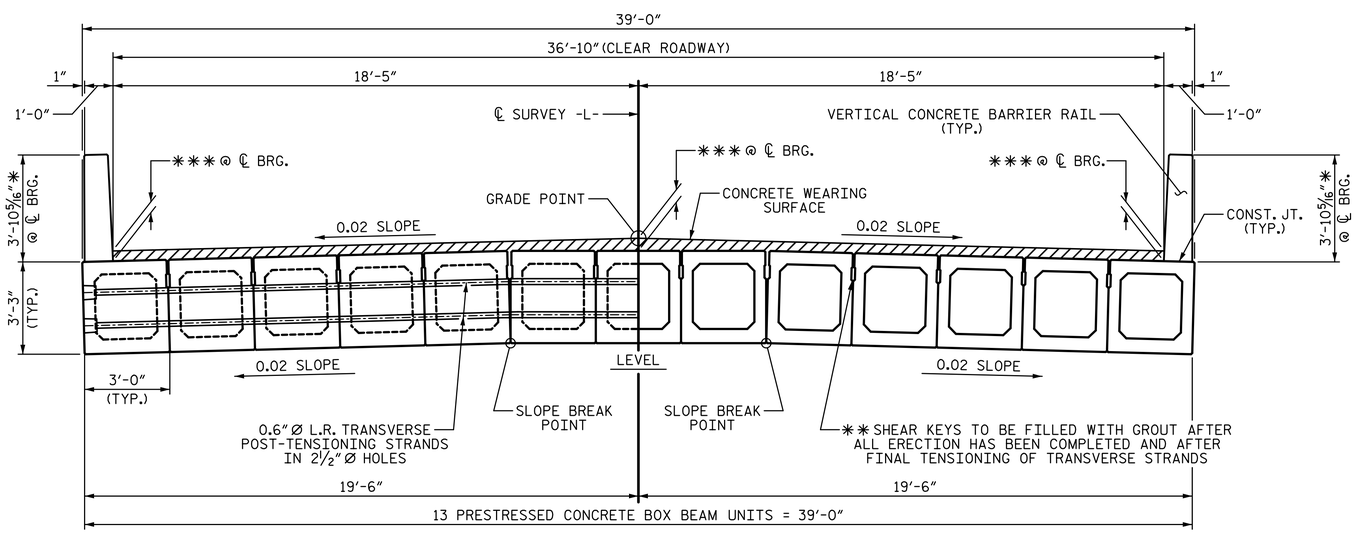
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22



HALF SECTION
(AT INTERMEDIATE DIAPHRAGMS)

HALF SECTION
(THROUGH VOIDS)

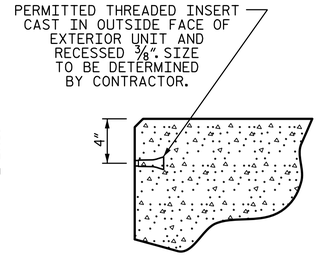
TYPICAL SECTION

✱ - THE MAXIMUM BARRIER RAIL HEIGHTS AND CONCRETE THICKNESS ARE SHOWN. THE HEIGHT OF THE BARRIER RAIL AND CONCRETE THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR BARRIER RAIL HEIGHT DETAILS AND CONCRETE THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

✱✱ GROUT THE SHEAR KEYS BETWEEN THE LEVEL AND SLOPED BOX BEAM UNITS (I.E. SHEAR KEYS AT BREAK POINTS IN THE CAP) PRIOR TO TENSIONING THE TRANSVERSE STANDS.

✱✱✱ SEE CHART FOR CONCRETE THICKNESS @ ℄ BEARING.

CONCRETE THICKNESS AT ℄ BEARING			
	LEFT GUTTER	GRADE POINT	RIGHT GUTTER
END BENT 1	4 3/16"	5 1/4"	4 3/16"
BENT 1 (SPAN A)	4 5/16"	5 1/16"	4 1/4"
BENT 1 (SPAN B)	4 1/16"	5 1/4"	4 1/16"
BENT 2 (SPAN B)	4 5/16"	5 1/16"	4 1/4"
BENT 2 (SPAN C)	4 1/16"	5 1/4"	4 1/16"
END BENT 2	4 3/16"	5 1/4"	4 3/16"



THREADED INSERT DETAIL

NOTES:

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

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

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

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO 1 1/2" ABOVE THE TOP OF DOWELS AND THEN FILLED WITH GROUT.

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A & C AND 5500 PSI FOR SPAN B.

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

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

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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

GROOVED CONTRACTION JOINTS, 1/4" IN DEPTH, SHALL BE TOOLED IN THE TOP OF WEARING SURFACE AT INTERIOR BENTS WITH CONTINUOUS CONCRETE WEARING SURFACE IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 3" AT BENT NO. 2.

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE RAIL. THE COST OF THE REINFORCING STEEL CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

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

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

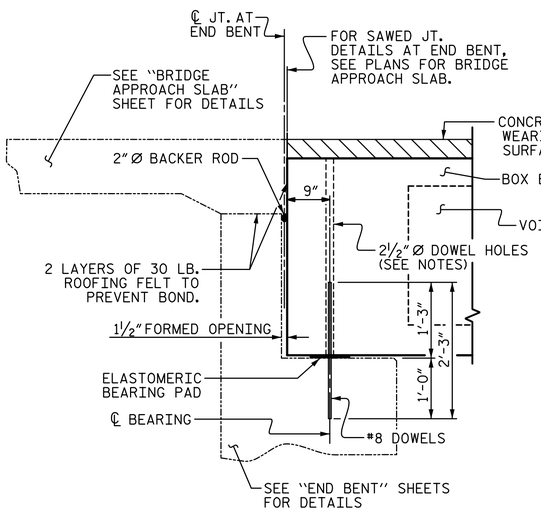
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

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

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

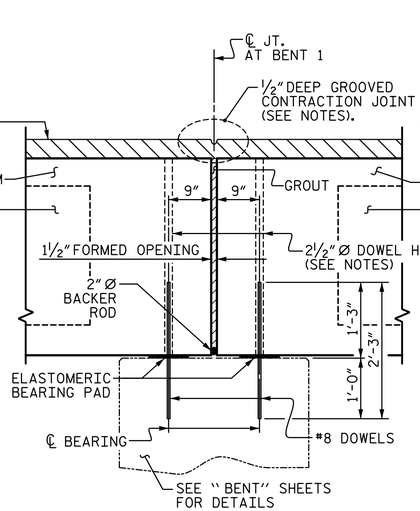
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FIXED END



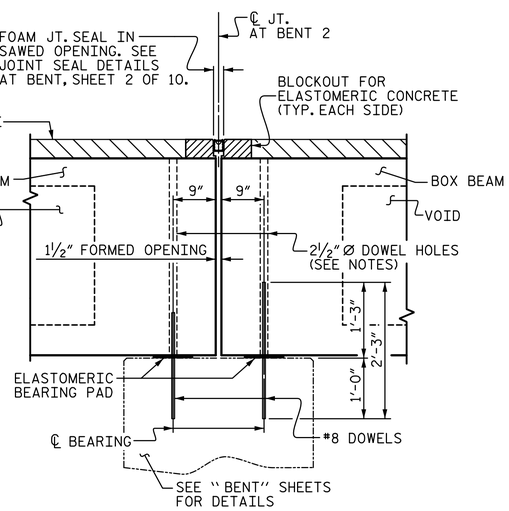
SECTION AT END BENT

FIXED END FIXED END



SECTION AT BENT 1

EXPANSION END FIXED END



SECTION AT BENT 2

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

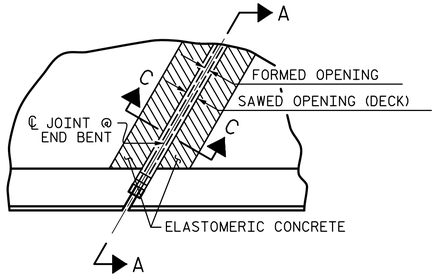
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

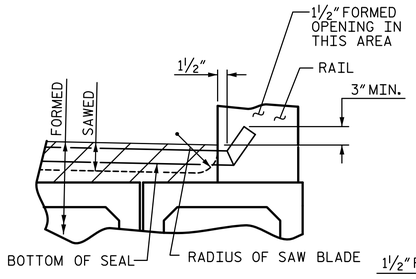
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT
105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			29

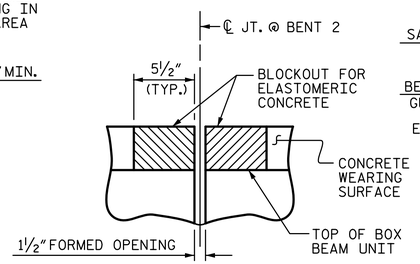
PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-
SHEET 1 OF 10



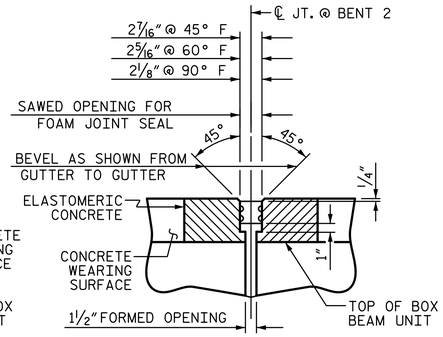
PLAN



SECTION A-A



SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



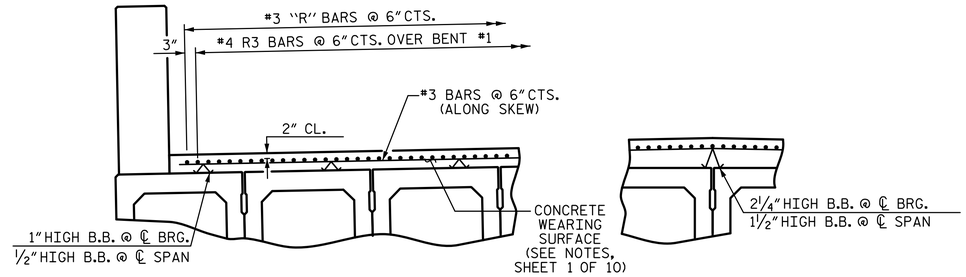
SECTION C-C
FOAM JOINT SEAL

JOINT SEAL DETAILS AT BENT

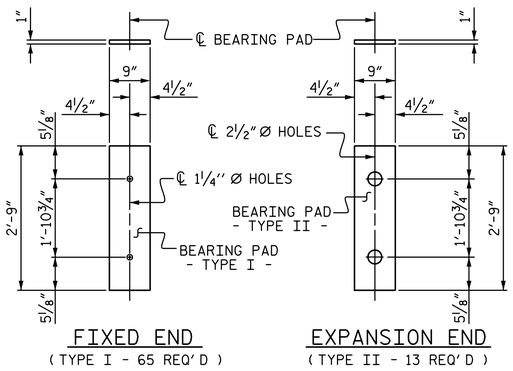
(SHOWING FULL DEPTH BLOCKOUT)

ELASTOMERIC CONCRETE	
BENT NO.	ELASTOMERIC CONCRETE ✳ (CU. FT.)
2	20.6
TOTAL	20.6

✳ BASED ON THE MINIMUM BLOCKOUT SHOWN.



REINFORCING FOR CONCRETE WEARING SURFACE

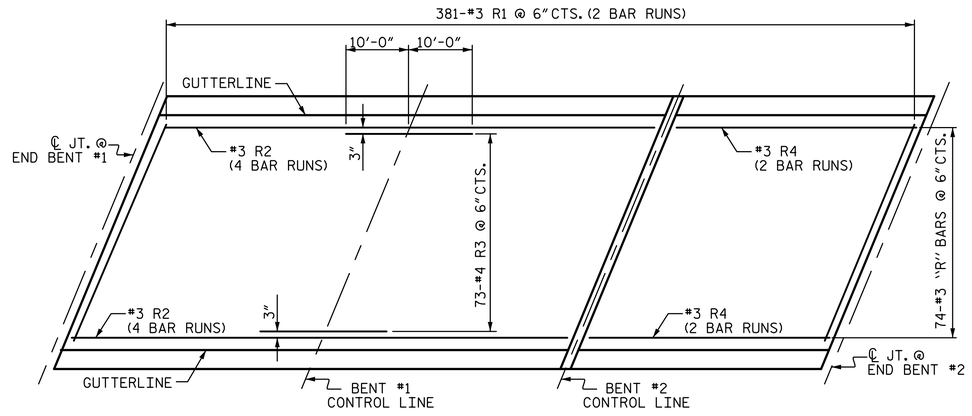


FIXED END
(TYPE I - 65 REQ'D)

EXPANSION END
(TYPE II - 13 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



PLAN SHOWING CONCRETE WEARING SURFACE REINFORCING STEEL

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,670 SQ.FT.
BRIDGE DECK	6,395 SQ.FT.
TOTAL	8,065 SQ.FT.

SPLICE LENGTH CHART	
BAR SIZE	EPOXY COATED
#3	1'-3"
#4	1'-8"

BILL OF MATERIAL FOR CONCRETE WEARING SURFACE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳R1	381	#3	STR	37'-9"	5,393
✳R2	296	#3	STR	37'-2"	4,126
✳R3	73	#4	STR	20'-0"	975
✳R4	148	#3	STR	22'-9"	1,266
✳EPOXY COATED REINFORCING STEEL				LBS.	11,760
CONCRETE WEARING SURFACE				SQ. FT.	7,008

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 2 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT
105° SKEW

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

SHEET NO. S-9
TOTAL SHEETS 29

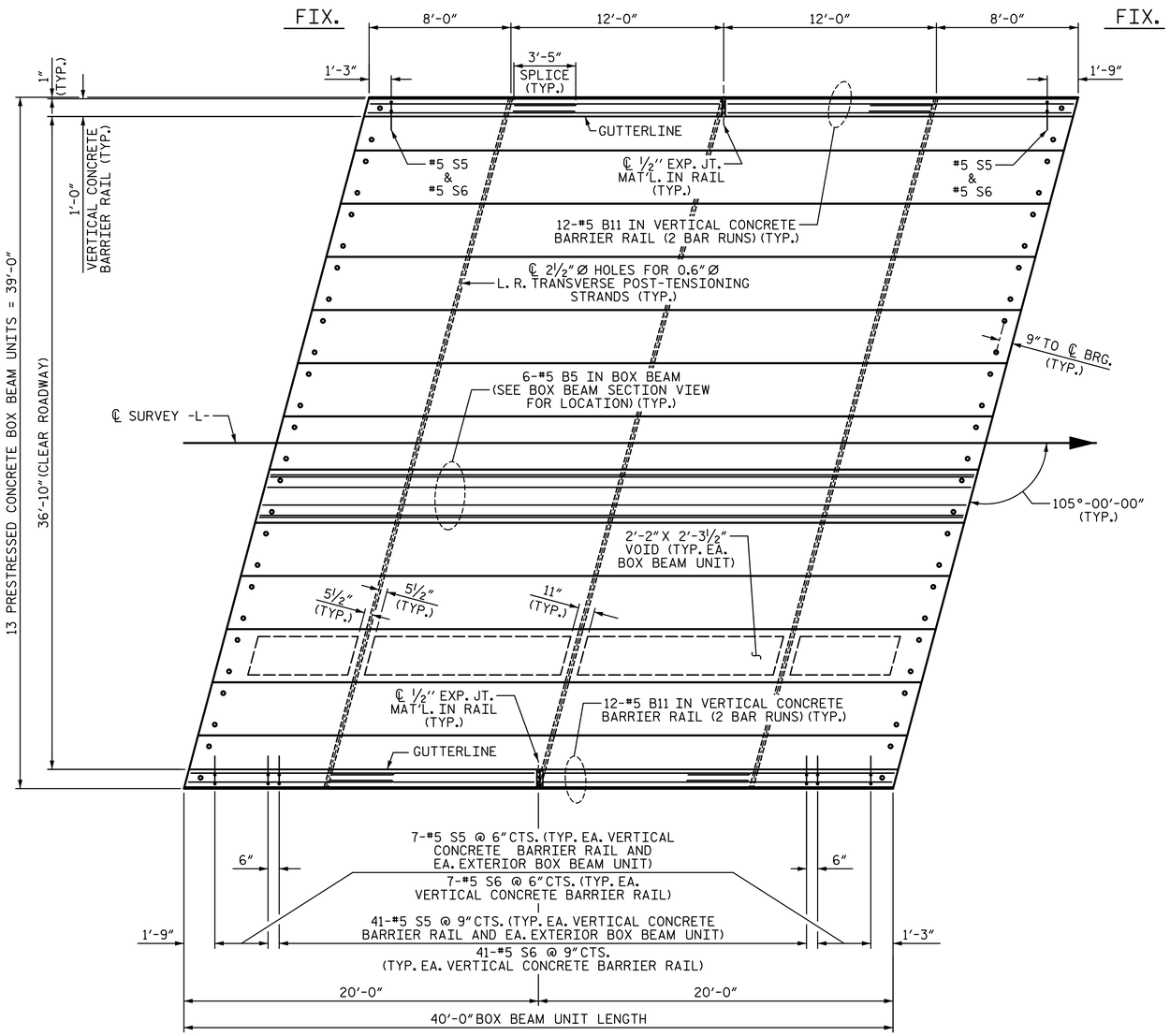
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

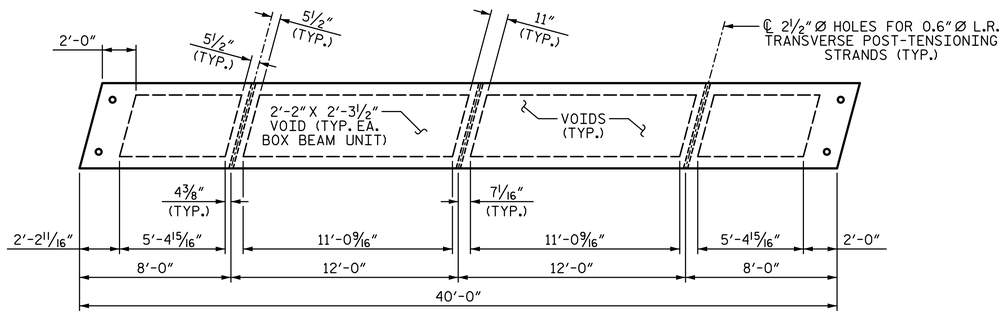
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN OF SPAN A



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A
(40′-0″ UNIT)
36′-10″ CLEAR ROADWAY
105° SKEW

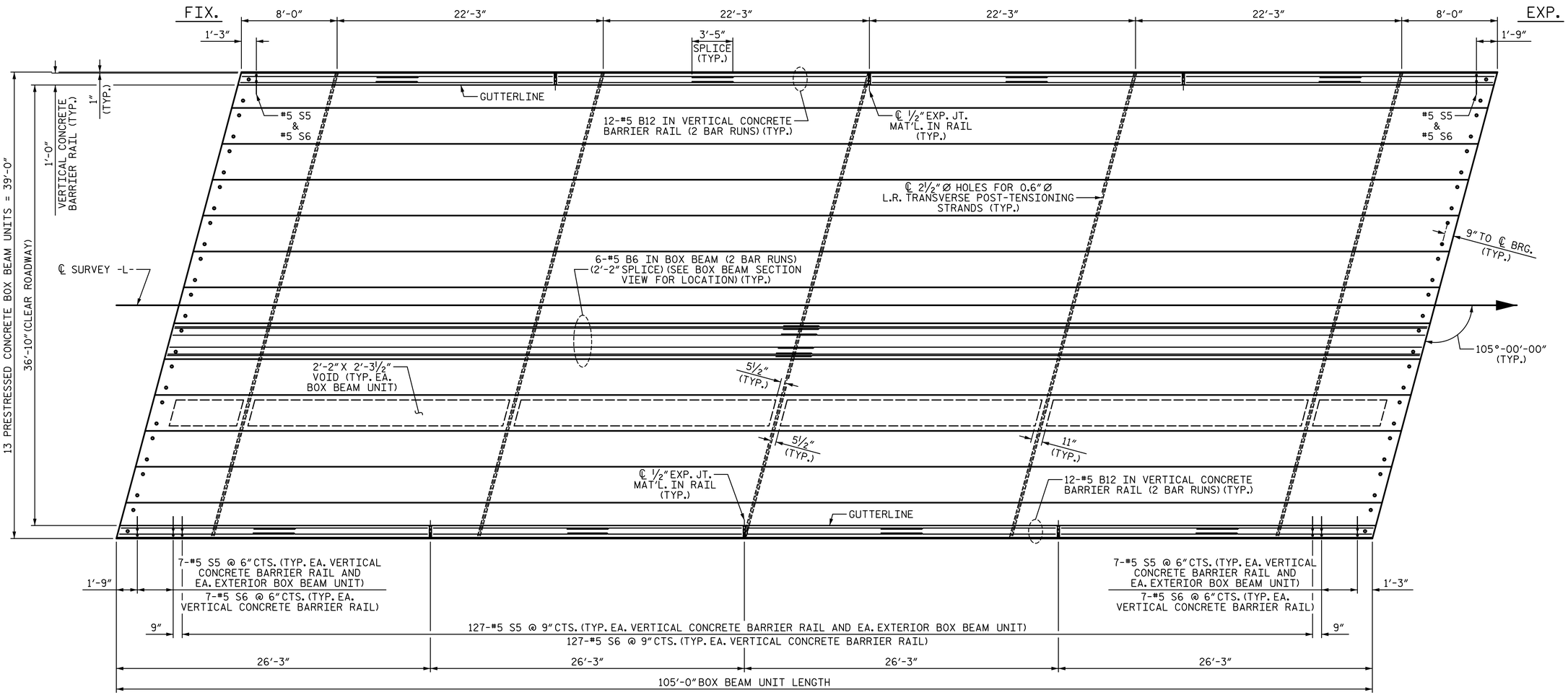
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

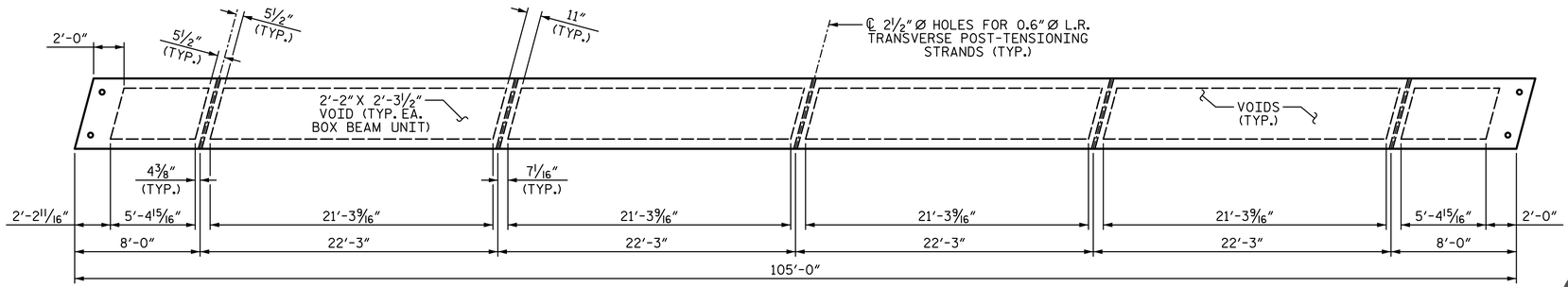
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN OF SPAN B



DIAPHRAGM AND VOID LAYOUT

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

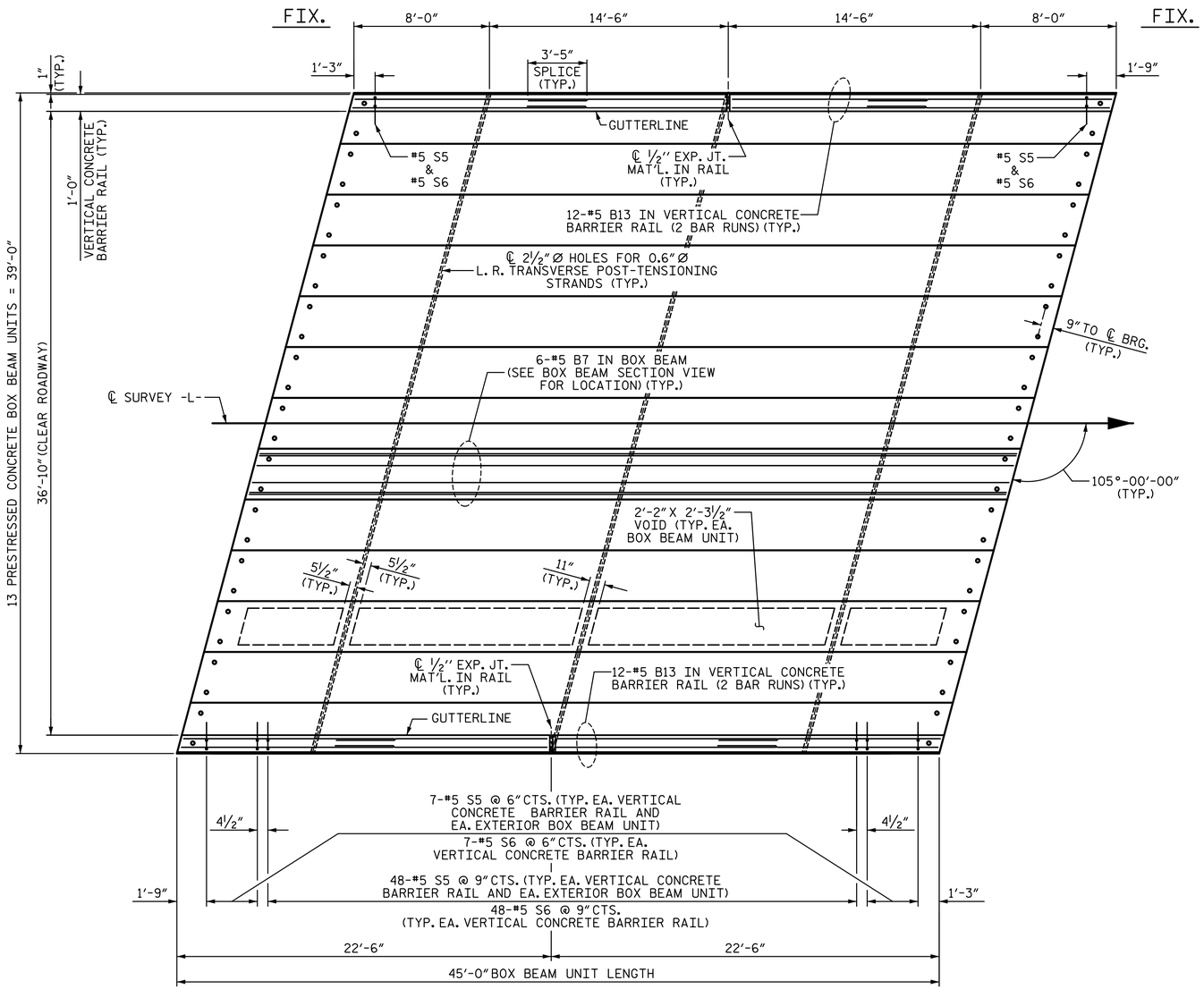
PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 4 OF 10

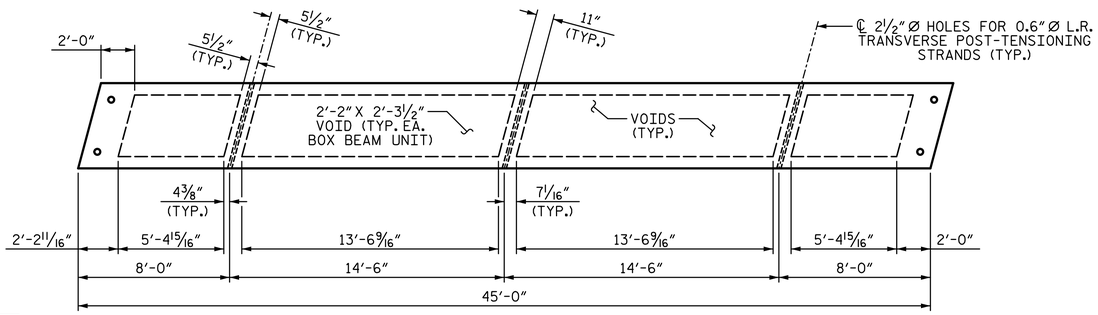
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN B (105'-0" UNIT) 36'-10" CLEAR ROADWAY 105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			29



PLAN OF SPAN C



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 5 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN C (45′-0″ UNIT) 36′-10″ CLEAR ROADWAY 105° SKEW

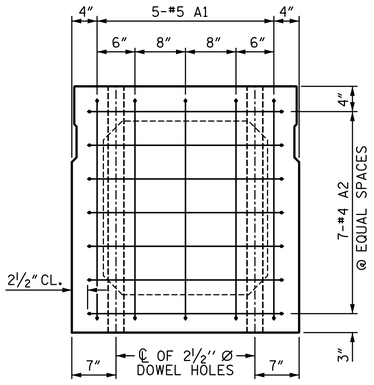
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

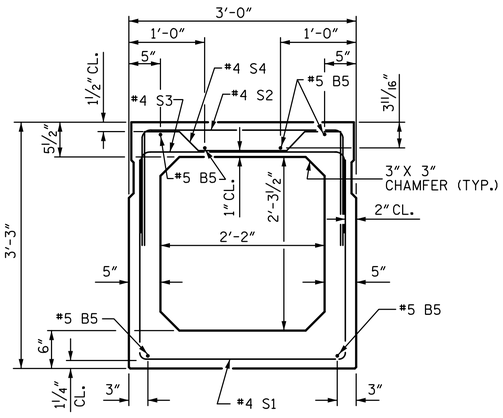
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



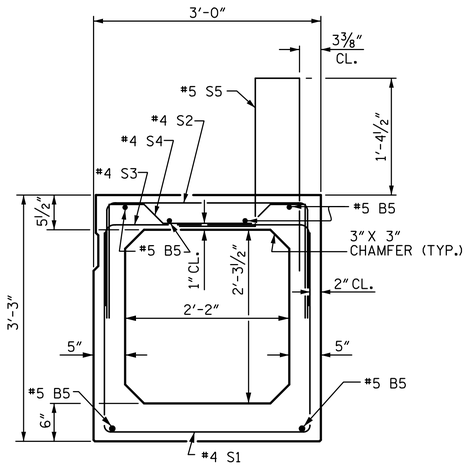
END ELEVATION

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



INTERIOR BOX BEAM SECTION

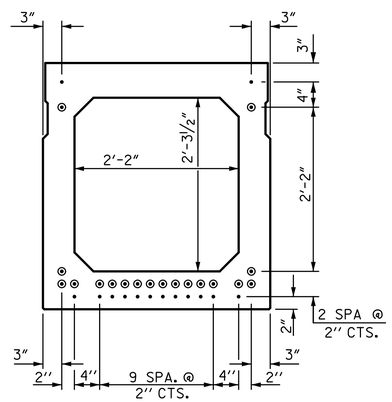
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6″ Ø LOW RELAXATION STRAND LAYOUT



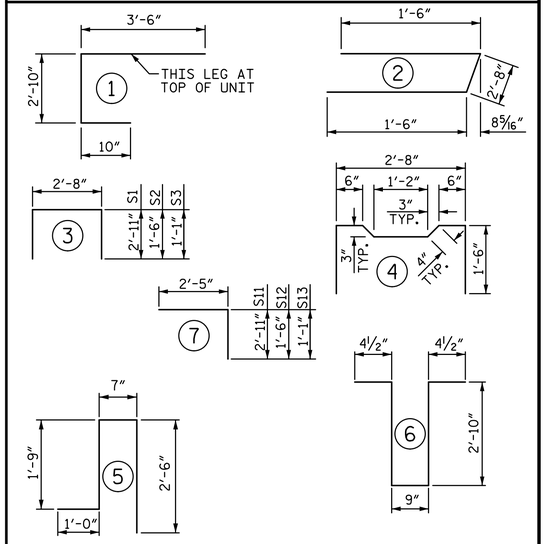
TYPICAL STRAND LOCATION

(14 STRANDS REQUIRED)

DEBONDING LEGEND

- ● FULLY BONDED STRAND
- ⦿ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE BOX BEAM UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST.

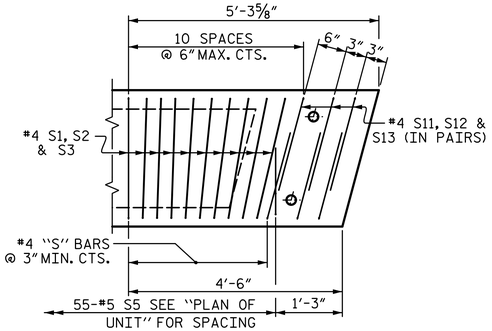
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

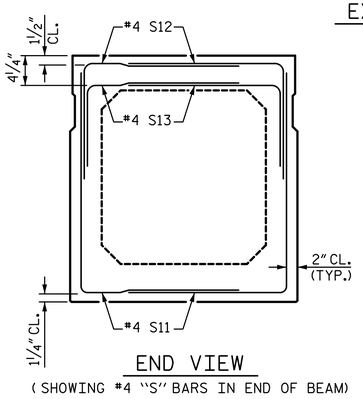
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7′-2″	75	7′-2″	75
A2	32	#4	2	5′-8″	121	5′-8″	121
B5	6	#5	STR	39′-7	248	39′-7″	248
K1	9	#4	6	7′-2″	43	7′-2″	43
K2	6	#4	STR	2′-7″	10	2′-7″	10
S1	40	#4	3	8′-6″	227	8′-6″	227
S2	40	#4	3	5′-8″	151	5′-8″	151
S3	59	#4	3	4′-10″	190	4′-10″	190
S4	19	#4	4	5′-10″	74	5′-10″	74
S11	12	#4	7	5′-4″	43	5′-4″	43
S12	12	#4	7	3′-11″	31	3′-11″	31
S13	12	#4	7	3′-6″	28	3′-6″	28
✳ S5	55	#5	5	5′-10″	335	--	--
REINFORCING STEEL					1241 LBS.		1241 LBS.
✳EPOXY COATED REINF. STEEL					335 LBS.		
5000 P.S.I. CONCRETE					8.5 CU. YDS.		8.4 CU. YDS.
0.6″Ø L.R. STRANDS					No. 14		No. 14



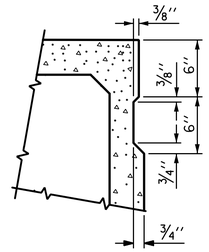
DETAIL "B"

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



END VIEW

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

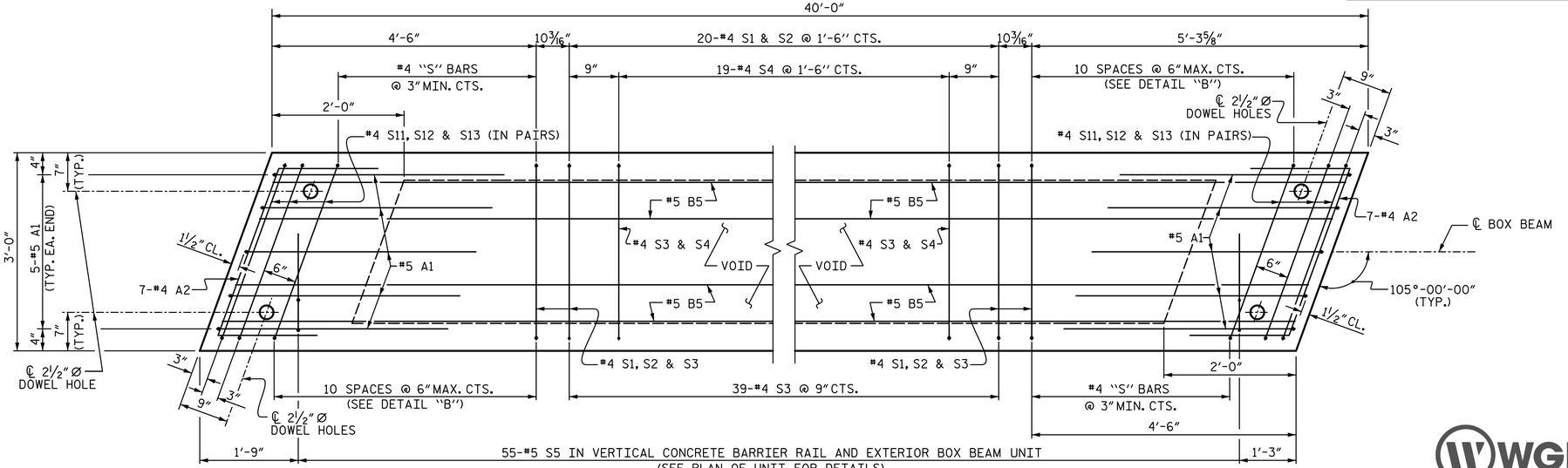


SHEAR KEY DETAIL

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

GRADE 270 STRANDS

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



PLAN OF BOX BEAM

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

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 6 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3′-0″ X 3′-3″ PRESTRESSED CONCRETE BOX BEAM UNIT

SPAN A 105° SKEW

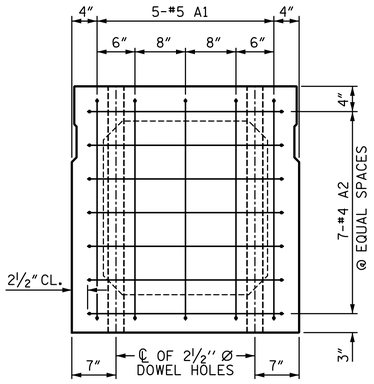
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

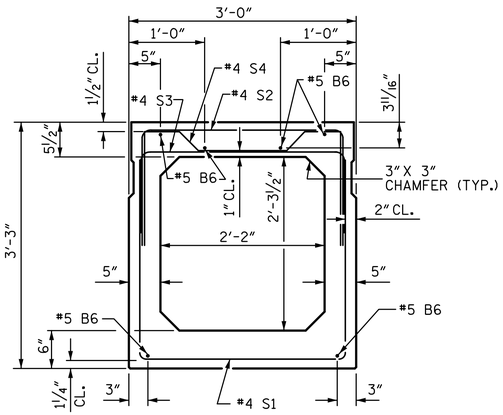
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



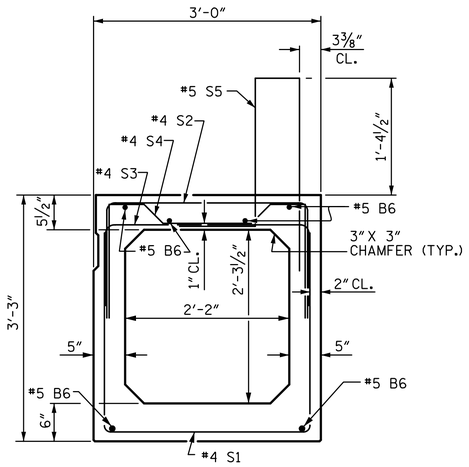
END ELEVATION

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



INTERIOR BOX BEAM SECTION

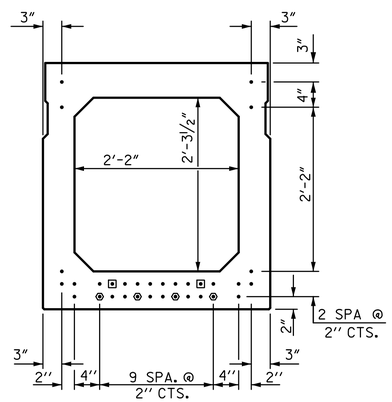
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6″Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(32 STRANDS REQUIRED)

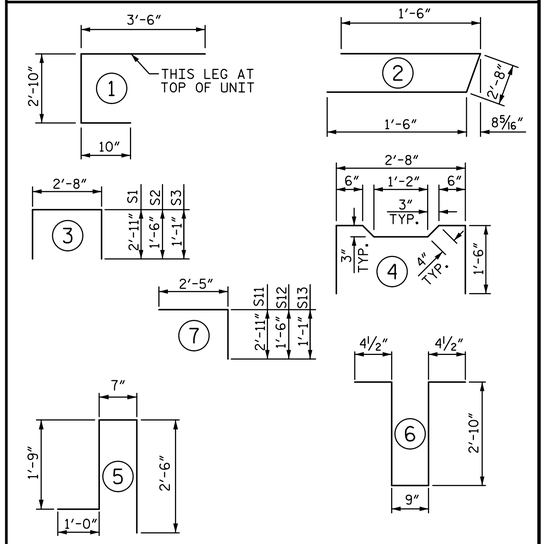
DEBONDING LEGEND

- ● FULLY BONDED STRAND
- ▣ STRAND DEBONDED FOR 4′-0″ FROM END OF GIRDER
- ◉ STRAND DEBONDED FOR 12′-0″ FROM END OF GIRDER

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

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

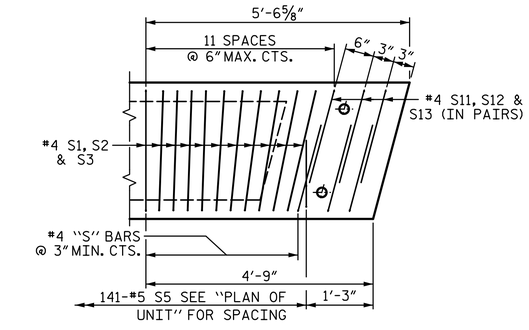
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

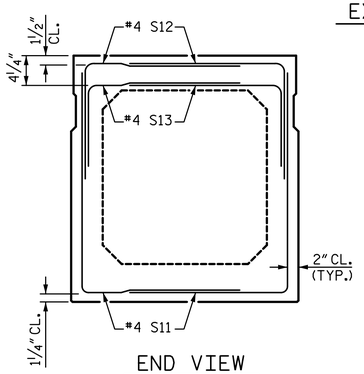
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7′-2″	75	7′-2″	75
A2	44	#4	2	5′-8″	167	5′-8″	167
B6	12	#5	STR	53′-5″	669	53′-5″	669
K1	15	#4	6	7′-2″	72	7′-2″	72
K2	10	#4	STR	2′-7″	17	2′-7″	17
S1	85	#4	3	8′-6″	483	8′-6″	483
S2	85	#4	3	5′-8″	322	5′-8″	322
S3	147	#4	3	4′-10″	475	4′-10″	475
S4	62	#4	4	5′-10″	242	5′-10″	242
S11	12	#4	7	5′-4″	43	5′-4″	43
S12	12	#4	7	3′-11″	31	3′-11″	31
S13	12	#4	7	3′-6″	28	3′-6″	28
✳ S5	141	#5	5	5′-10″	858	--	--
REINFORCING STEEL				2624	LBS.	2624	LBS.
✳ EPOXY COATED REINF. STEEL				858	LBS.		
7500 P.S.I. CONCRETE				20.6	CU. YDS.	20.4	CU. YDS.
0.6″Ø L.R. STRANDS				No. 32		No. 32	



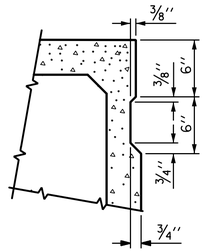
DETAIL "B"

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



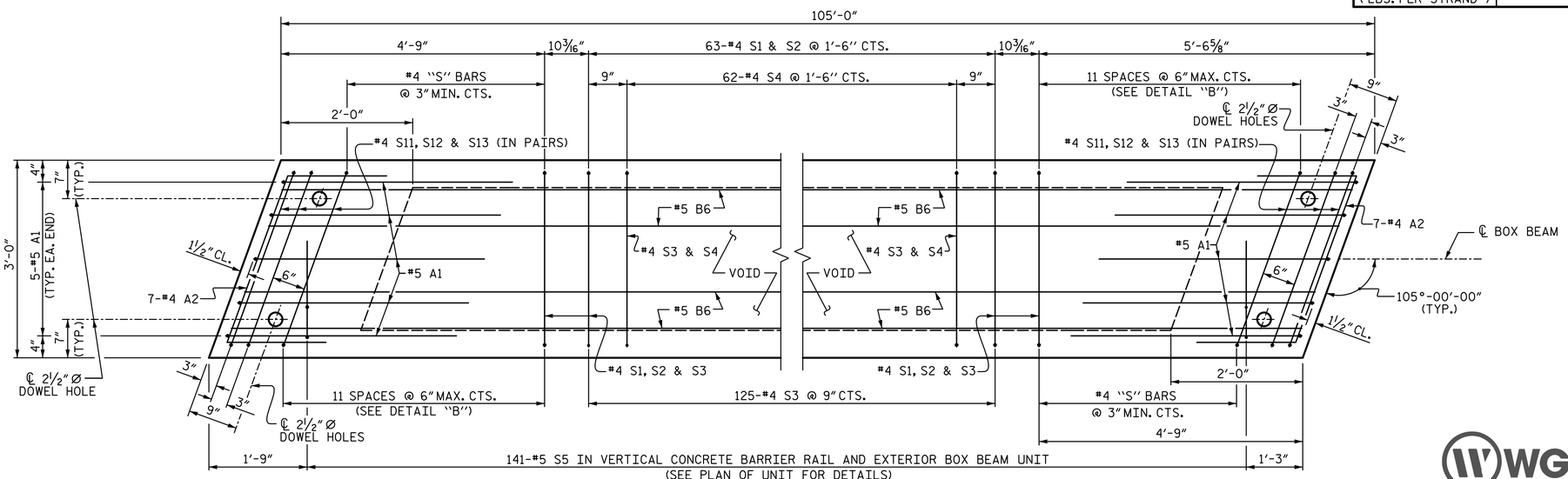
END VIEW

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



SHEAR KEY DETAIL

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



PLAN OF BOX BEAM

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

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

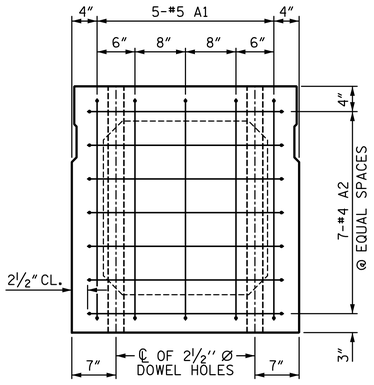
SHEET 7 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

3′-0″ X 3′-3″ PRESTRESSED CONCRETE BOX BEAM UNIT

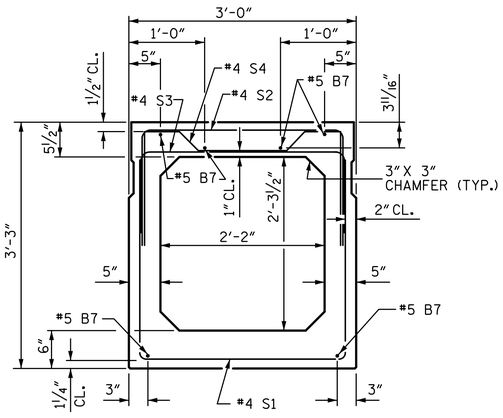
SPAN B 105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			29



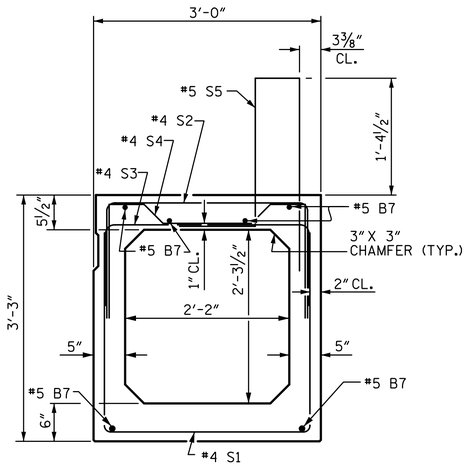
END ELEVATION

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



INTERIOR BOX BEAM SECTION

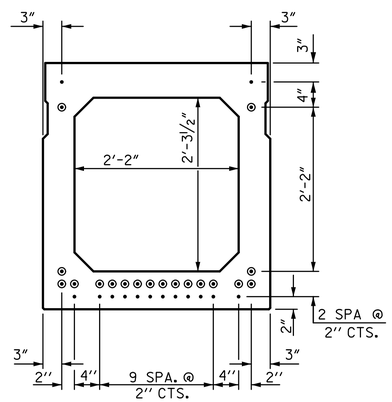
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6″ Ø LOW RELAXATION STRAND LAYOUT



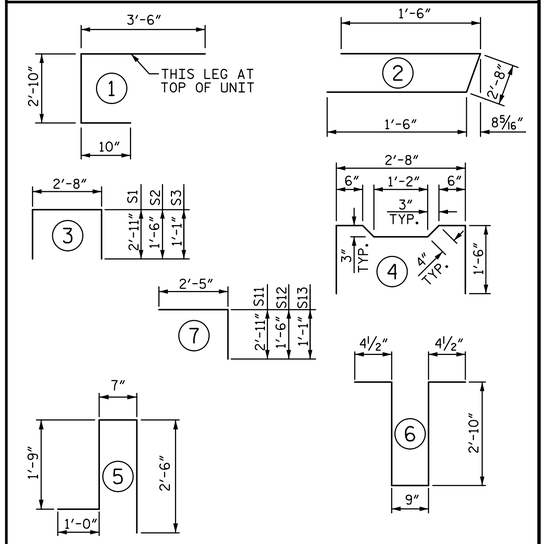
TYPICAL STRAND LOCATION

(14 STRANDS REQUIRED)

DEBONDING LEGEND

- ● FULLY BONDED STRAND
- ⦿ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE BOX BEAM UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST.

BAR TYPES



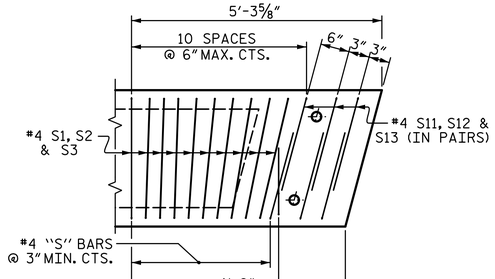
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7′-2″	75	7′-2″	75
A2	32	#4	2	5′-8″	121	5′-8″	121
B7	6	#5	STR	44′-7	279	44′-7″	279
K1	9	#4	6	7′-2″	43	7′-2″	43
K2	6	#4	STR	2′-7″	10	2′-7″	10
S1	43	#4	3	8′-6″	244	8′-6″	244
S2	43	#4	3	5′-8″	163	5′-8″	163
S3	65	#4	3	4′-10″	210	4′-10″	210
S4	22	#4	4	5′-10″	86	5′-10″	86
S11	12	#4	7	5′-4″	43	5′-4″	43
S12	12	#4	7	3′-11″	31	3′-11″	31
S13	12	#4	7	3′-6″	28	3′-6″	28
✱ S5	62	#5	5	5′-10″	377	--	--
REINFORCING STEEL					1333 LBS.		1333 LBS.
✱EPOXY COATED REINF. STEEL					377 LBS.		
5000 P.S.I. CONCRETE					9.4 CU. YDS.		9.3 CU. YDS.
0.6″Ø L.R. STRANDS					No. 14		No. 14

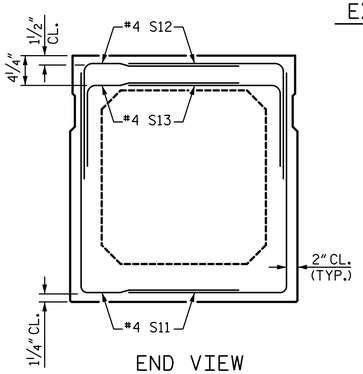
GRADE 270 STRANDS

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



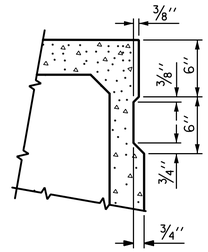
DETAIL "B"

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



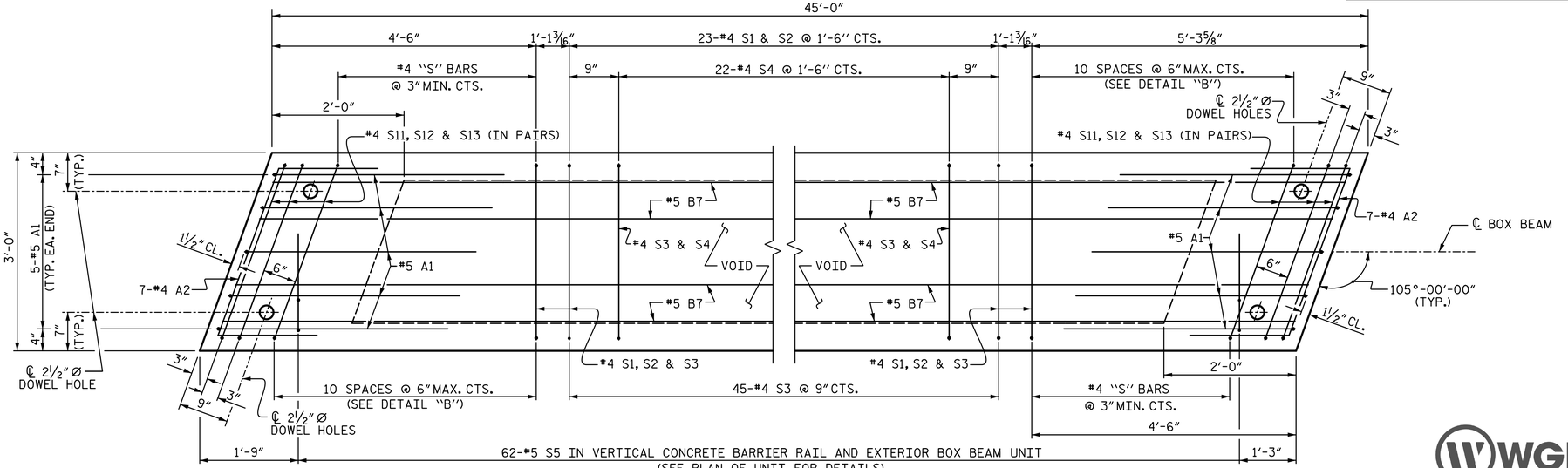
END VIEW

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



SHEAR KEY DETAIL

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



PLAN OF BOX BEAM

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

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 8 OF 10

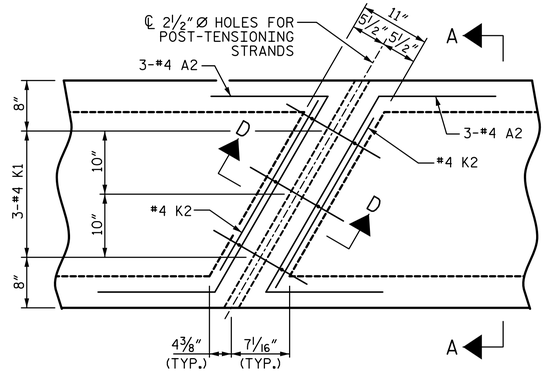
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
3′-0″ X 3′-3″
PRESTRESSED CONCRETE
BOX BEAM UNIT
SPAN C 105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			29

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN

BOX BEAM UNITS REQUIRED

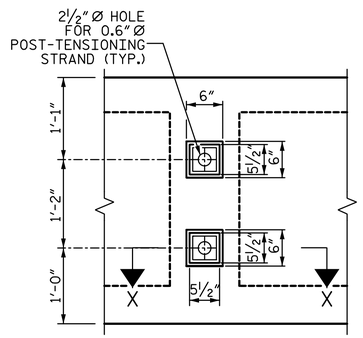
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	40'-0"	80'-0"
INTERIOR B.B.	11	40'-0"	440'-0"
TOTAL	13	———	520'-0"

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	105'-0"	210'-0"
INTERIOR B.B.	11	105'-0"	1155'-0"
TOTAL	13	———	1365'-0"

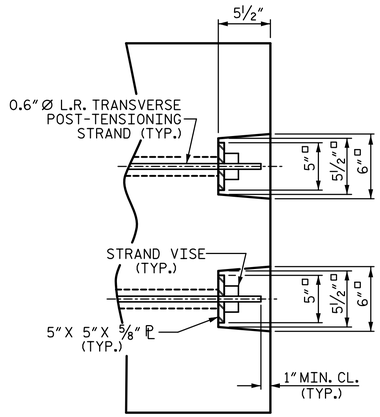
BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	45'-0"	90'-0"
INTERIOR B.B.	11	45'-0"	495'-0"
TOTAL	13	———	585'-0"

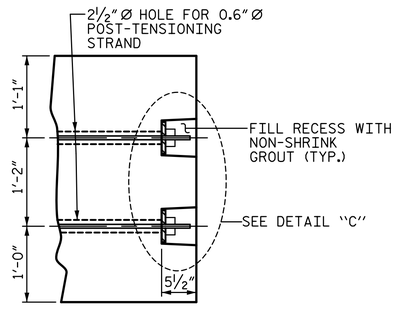


VIEW Y-Y

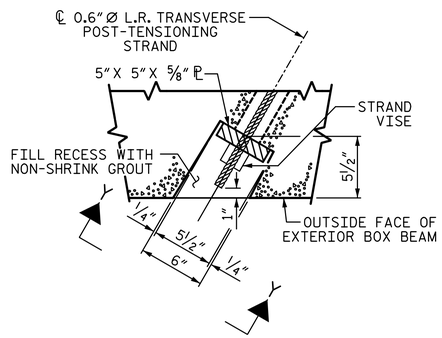
SHOWING ELEVATION VIEW OF GROUTED RECESS



DETAIL "C"



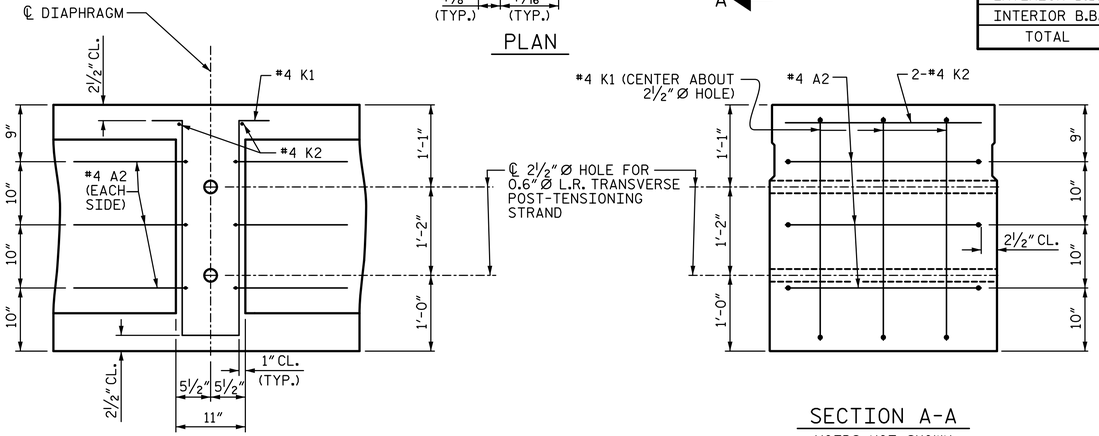
PART SECTION AT RECESS



SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

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



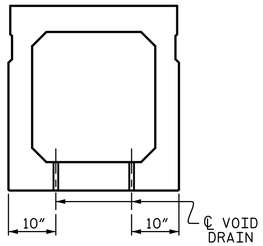
SECTION D-D

SECTION A-A

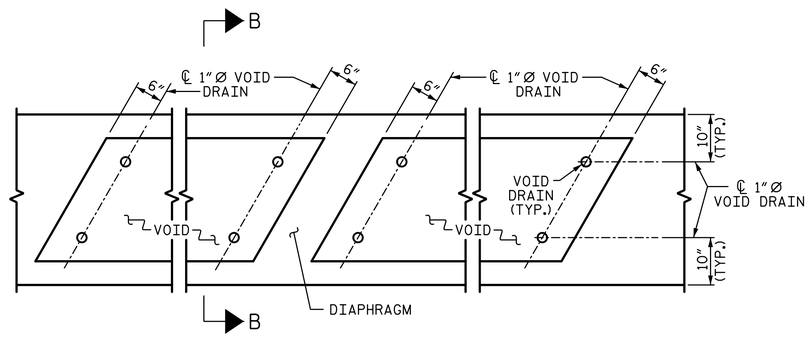
VOIDS NOT SHOWN

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLE.



SECTION B-B



PART PLAN

VOID DRIAN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 3'-3"
40' BOX BEAM UNIT (NC)	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	7/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/16" ↑
FINAL CAMBER	3/8" ↑

** FUTURE WEARING SURFACE NOT INCLUDED

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 3'-3"
105' BOX BEAM UNIT (NC)	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 9/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1 5/16" ↑
FINAL CAMBER	5/8" ↑

** FUTURE WEARING SURFACE NOT INCLUDED

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 3'-3"
45' BOX BEAM UNIT (NC)	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	9/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/16" ↑
FINAL CAMBER	1/2" ↑

** FUTURE WEARING SURFACE NOT INCLUDED

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 9 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

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

105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			29

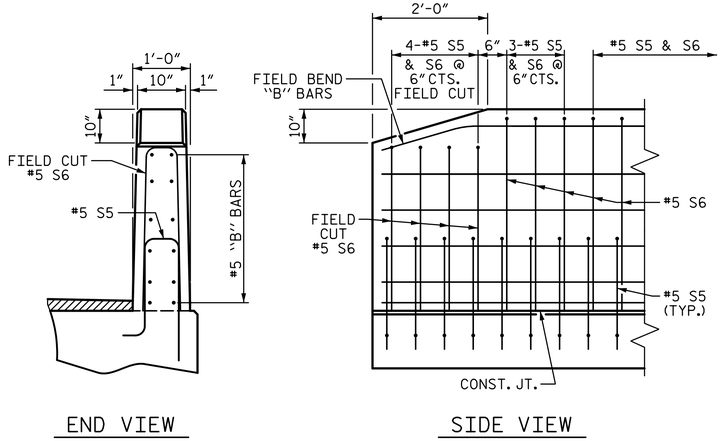
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

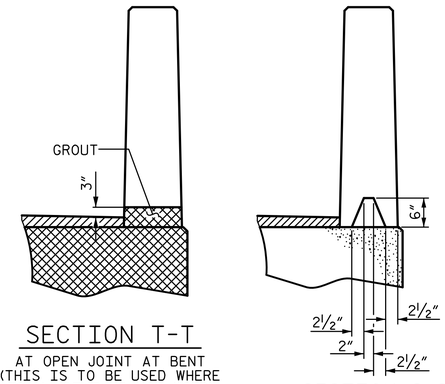
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



END VIEW

SIDE VIEW

END OF RAIL DETAILS

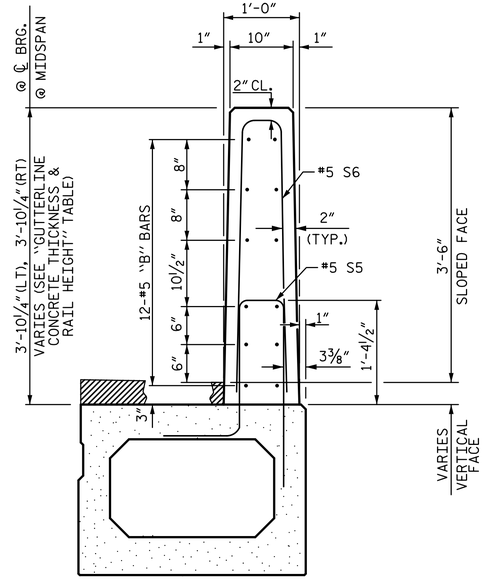


SECTION T-T

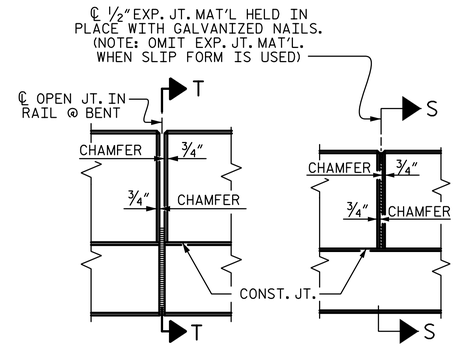
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

SECTION S-S

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

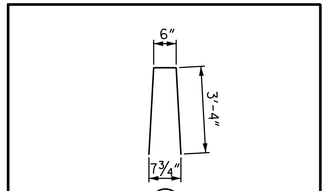


SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	40' UNIT				
✳B11	96	#5	STR	11'-8"	1168
✳S6	110	#5	1	7'-2"	822
✳EPOXY COATED REINFORCING STEEL			LBS.		1990
CLASS AA CONCRETE			CU.YDS.		10.4
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		80.0

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	105' UNIT				
✳B12	192	#5	STR	14'-9"	2954
✳S6	282	#5	1	7'-2"	2108
✳EPOXY COATED REINFORCING STEEL			LBS.		5062
CLASS AA CONCRETE			CU.YDS.		27.2
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		210.0

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	45' UNIT				
✳B13	96	#5	STR	12'-11"	1293
✳S6	124	#5	1	7'-2"	927
✳EPOXY COATED REINFORCING STEEL			LBS.		2220
CLASS AA CONCRETE			CU.YDS.		11.7
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		90.0

GUTTERLINE CONCRETE THICKNESS & RAIL HEIGHT

	CONCRETE OVERLAY THICKNESS @ MID-SPAN		RAIL HEIGHT @ MID-SPAN	
	LEFT	RIGHT	LEFT	RIGHT
SPAN A	3⅞"	3⅞"	3'-9⅞"	3'-9⅞"
SPAN B	3⅝"	3⅝"	3'-9⅝"	3'-9⅝"
SPAN C	3⅝"	3⅝"	3'-9⅝"	3'-9⅝"

NOTE: BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 10 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

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

105° SKEW

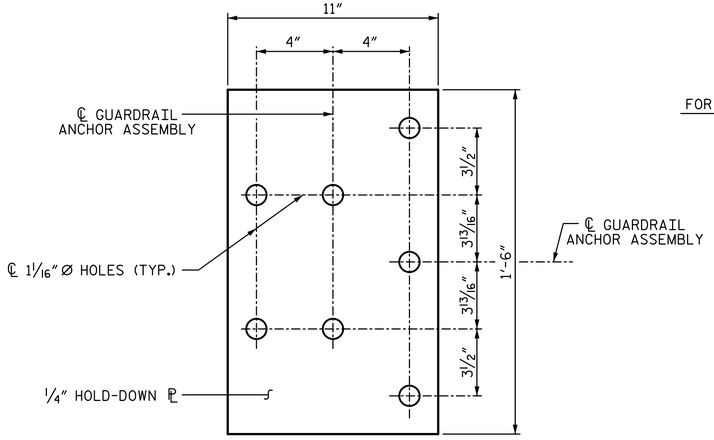
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

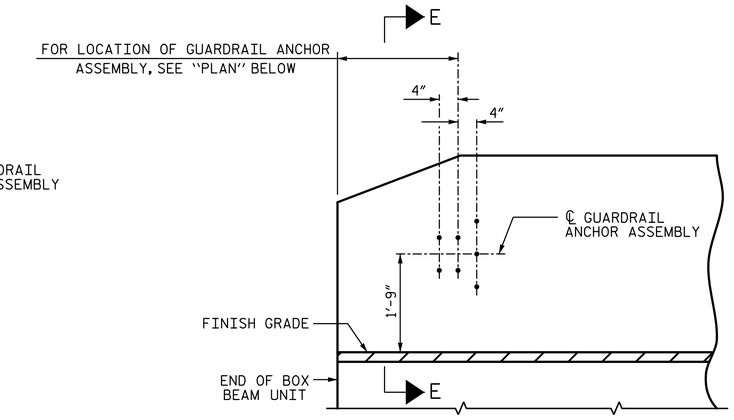
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN



ELEVATION

NOTES:

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

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

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

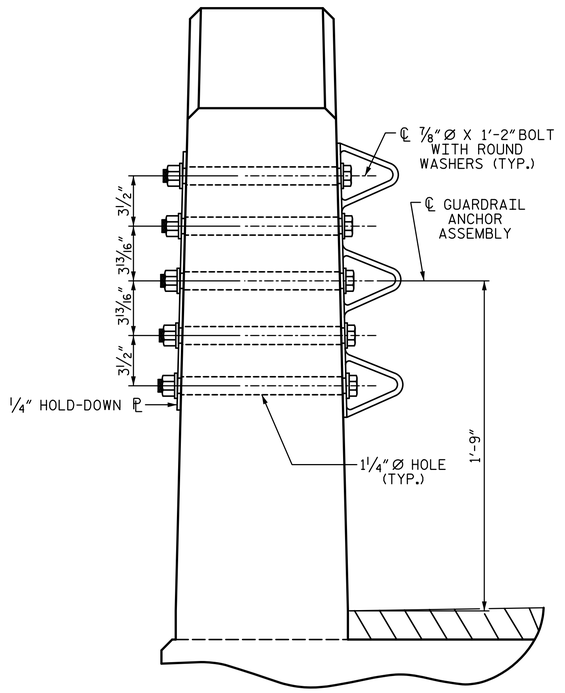
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

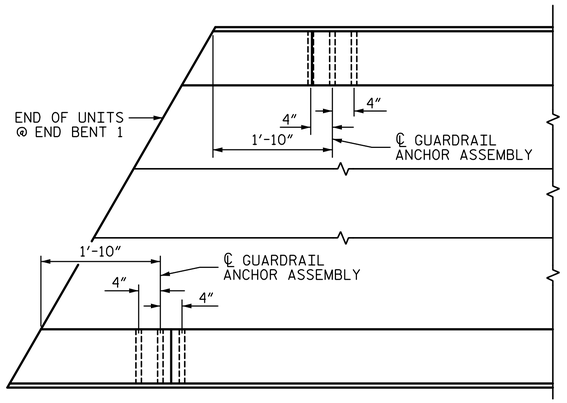
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

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

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



SECTION E-E



PLAN

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

LOCATION OF ANCHORS FOR GUARDRAIL

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

GUARDRAIL ANCHOR ASSEMBLY DETAILS

DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

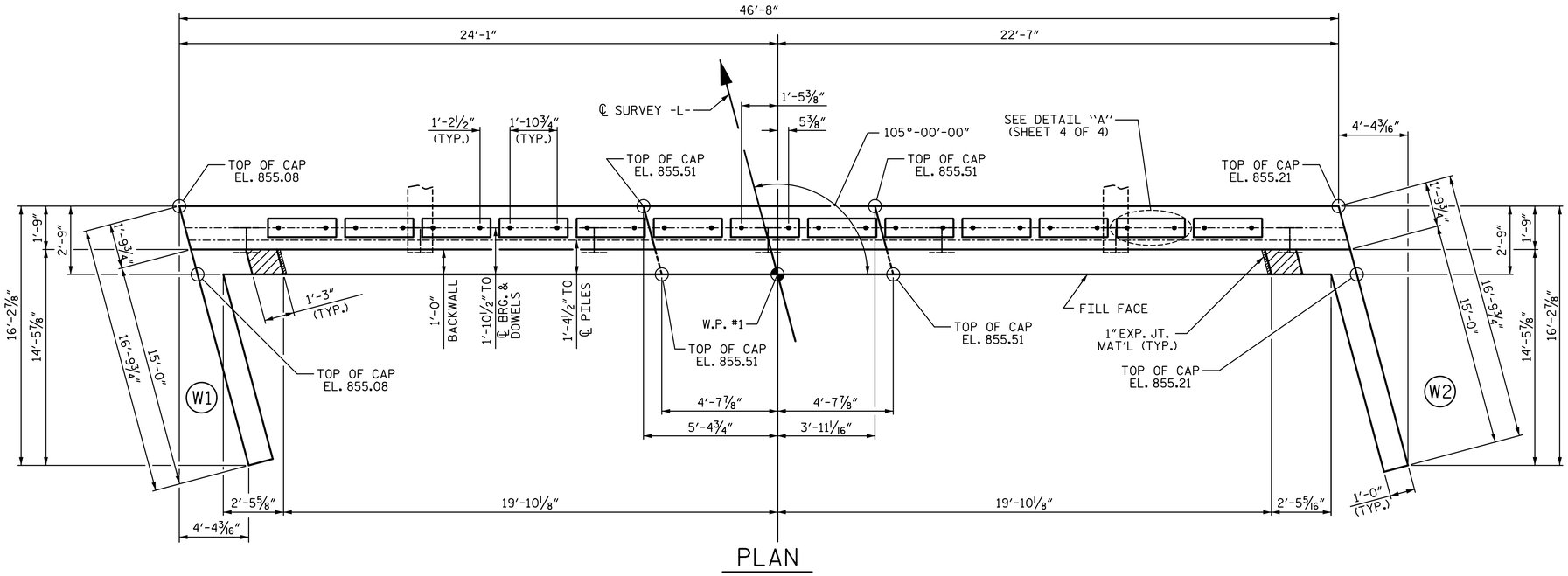
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			29



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

NOTES:

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			29

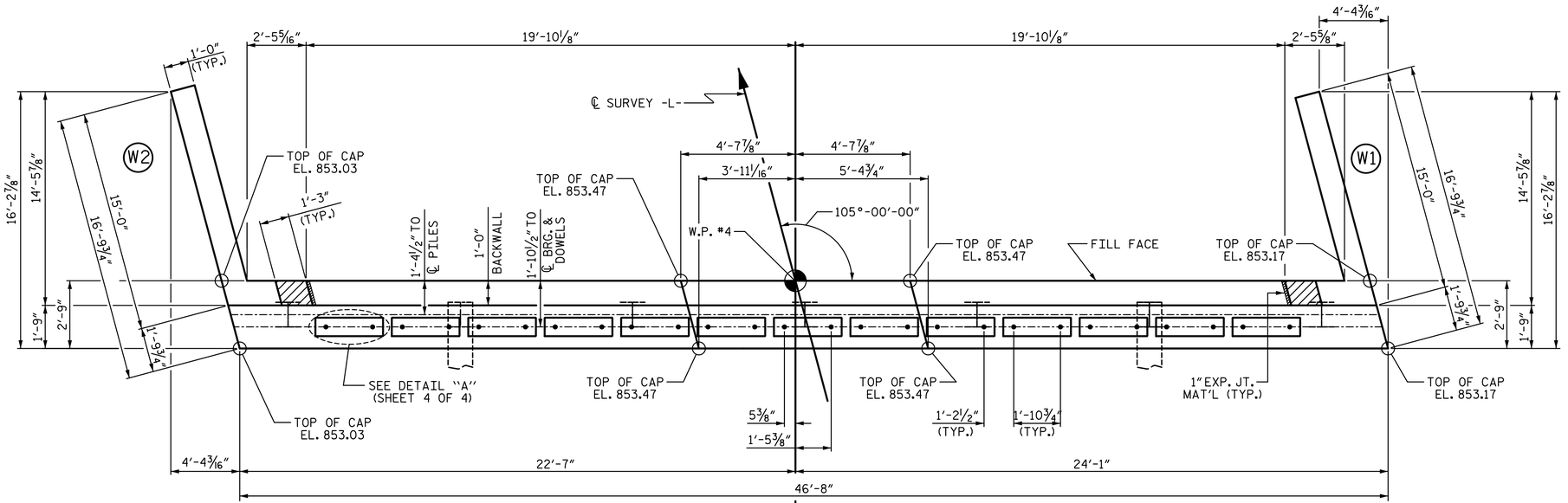
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

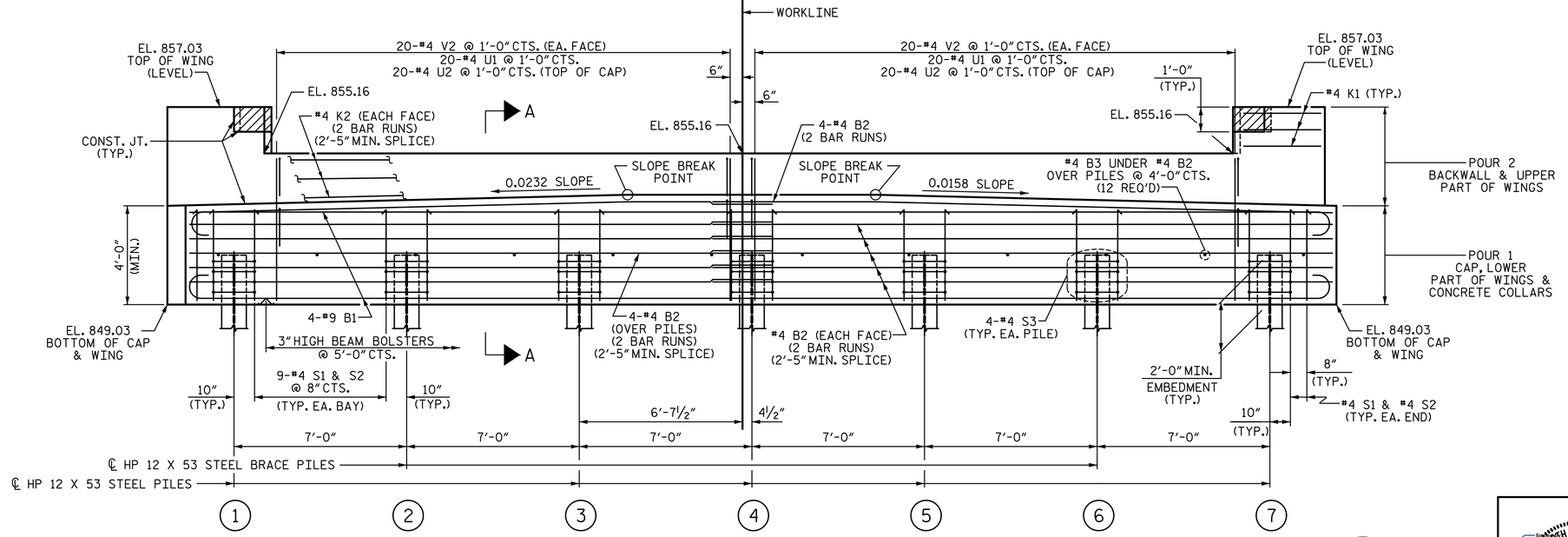
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN



ELEVATION

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

NOTES:

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

PROJECT NO. 17BP.9.R.83
STOKES COUNTY
STATION: 23+99.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 2

DRAWN BY: T. BANKOVICH	DATE: 9-22	
CHECKED BY: D.A. SEALEY	DATE: 9-22	
DESIGN ENGINEER OF RECORD: M.A. AVERETTE	DATE: 9-22	

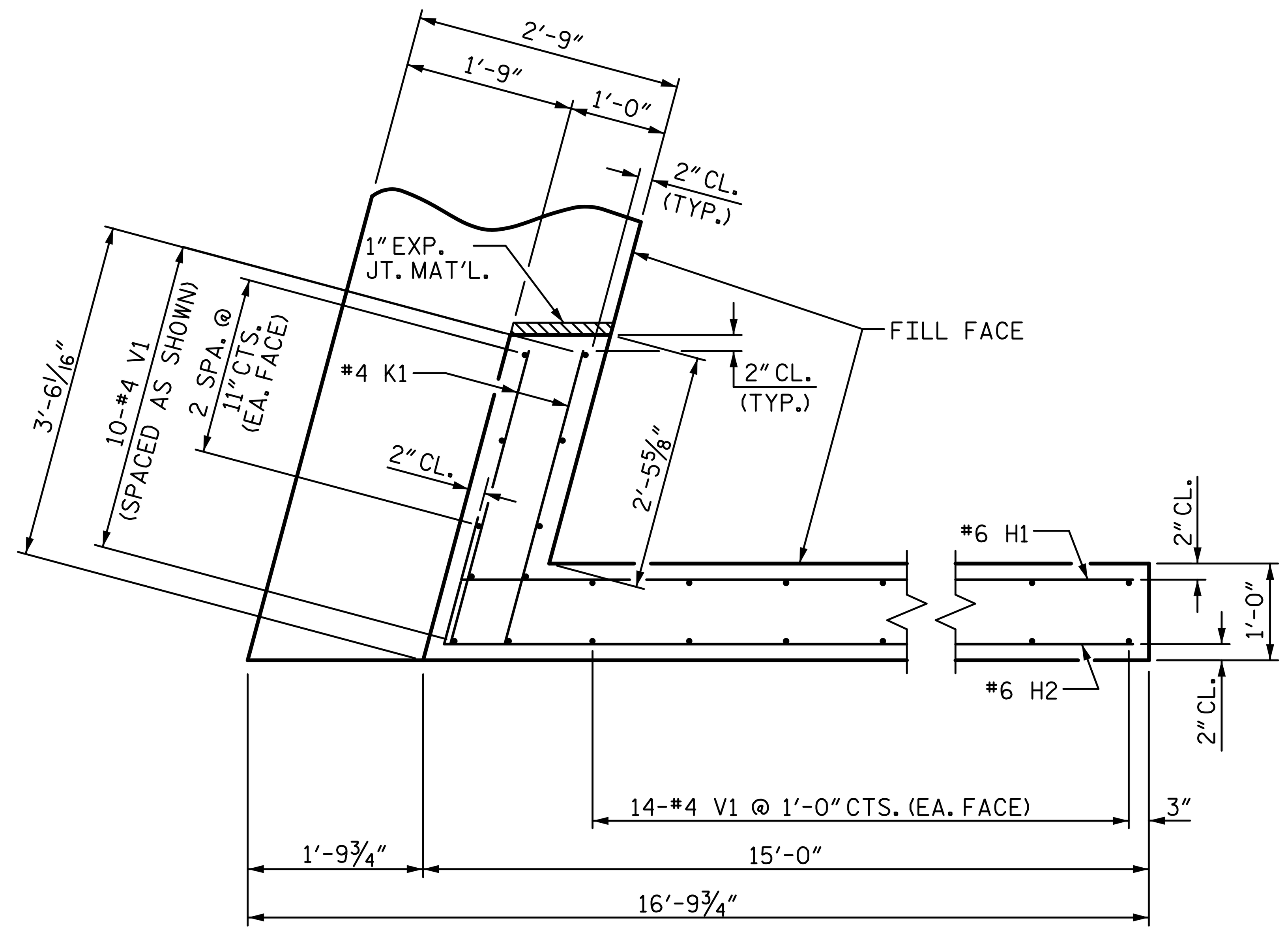
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

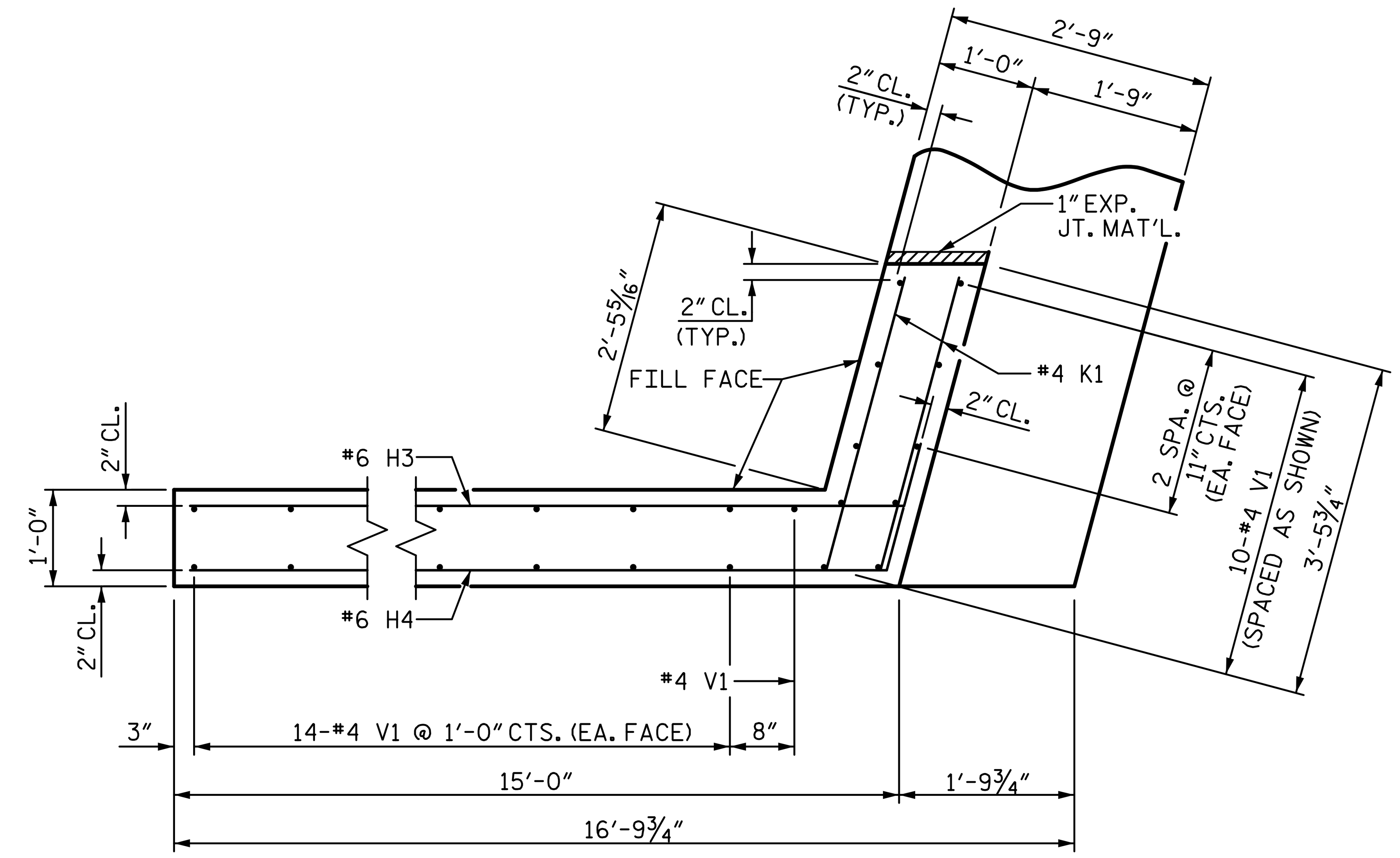
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			29

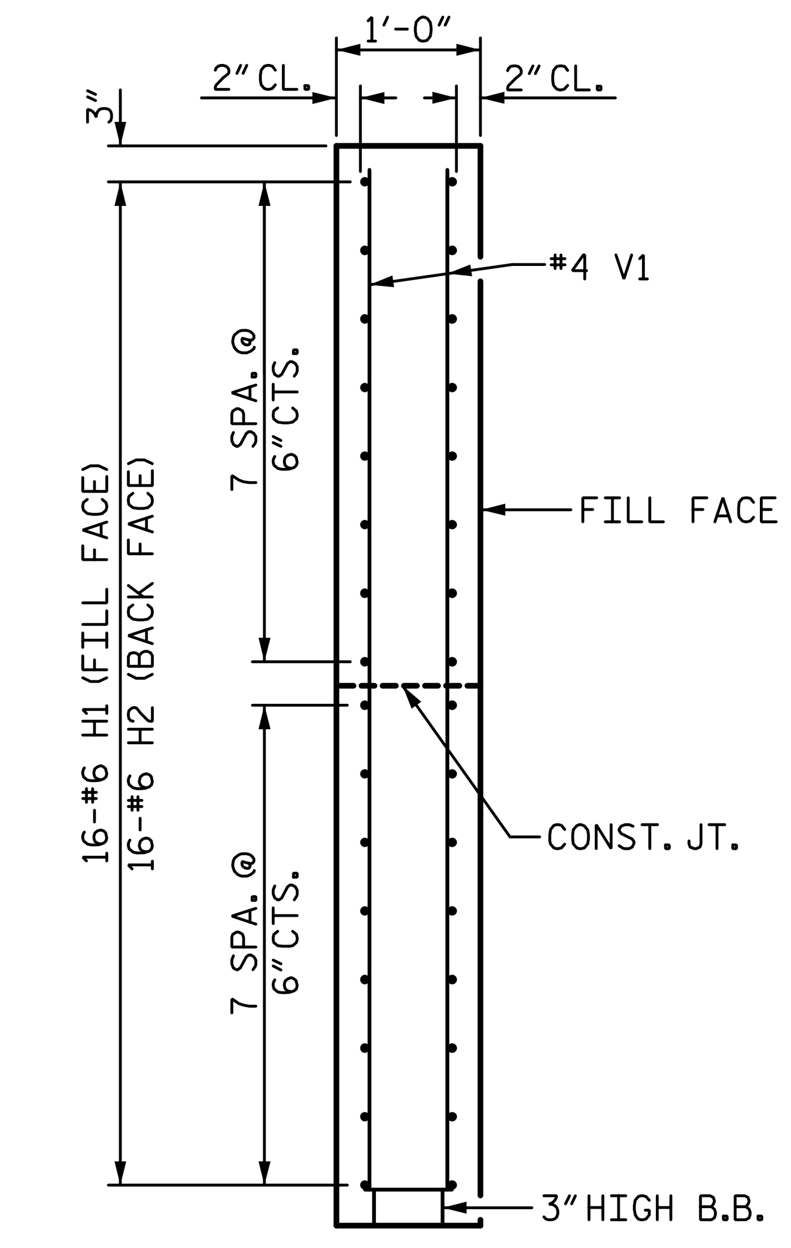
8/2/2024 10:22:14 AM P:\Raleigh\Projects\2017\Division 9 (SEA)\17BP9R83 (Stokes 286)\Structures\Drawings\Final(Revise Concrete WS)\17BP9R83_SMU_E_840286.dgn



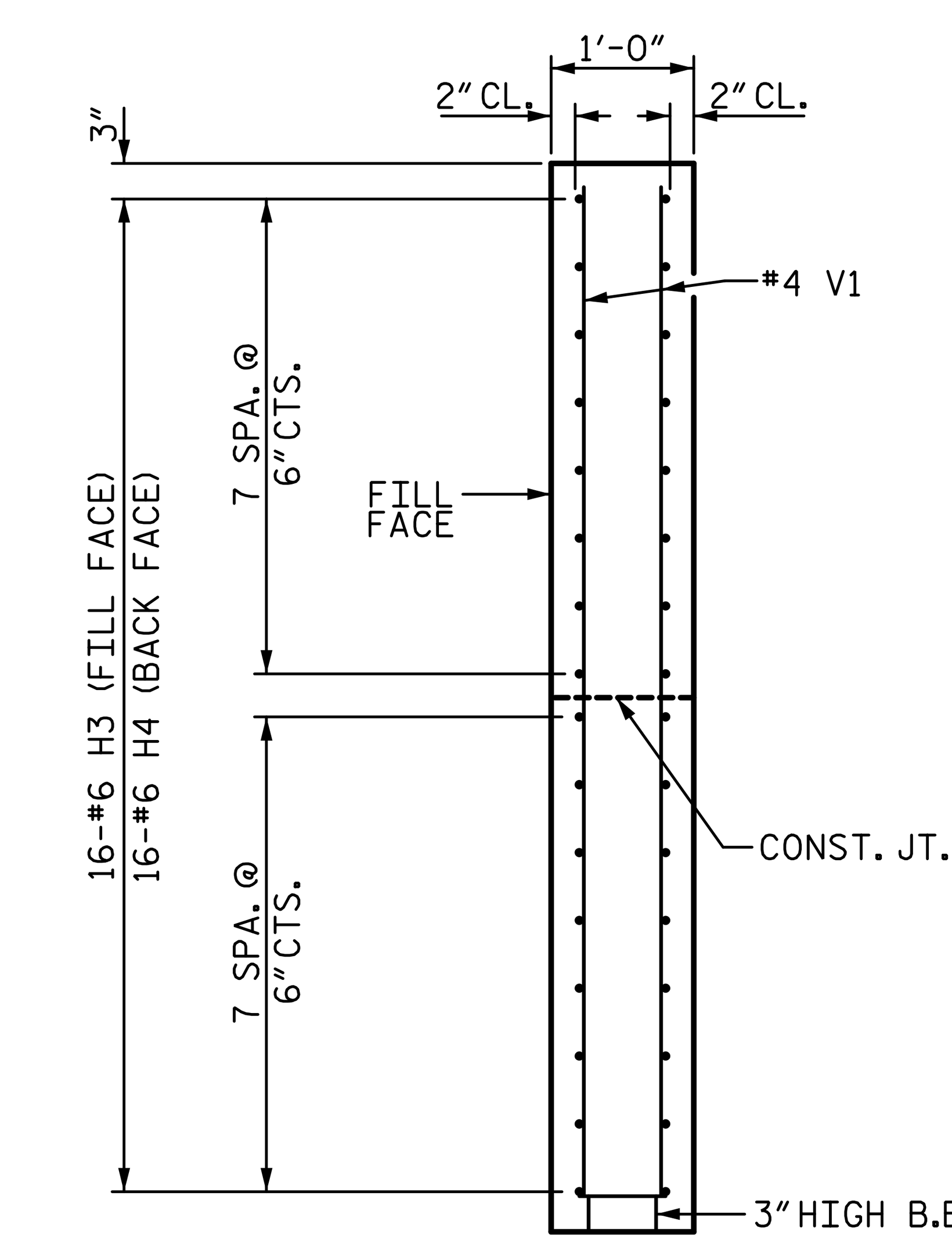
PLAN OF WING (W1)



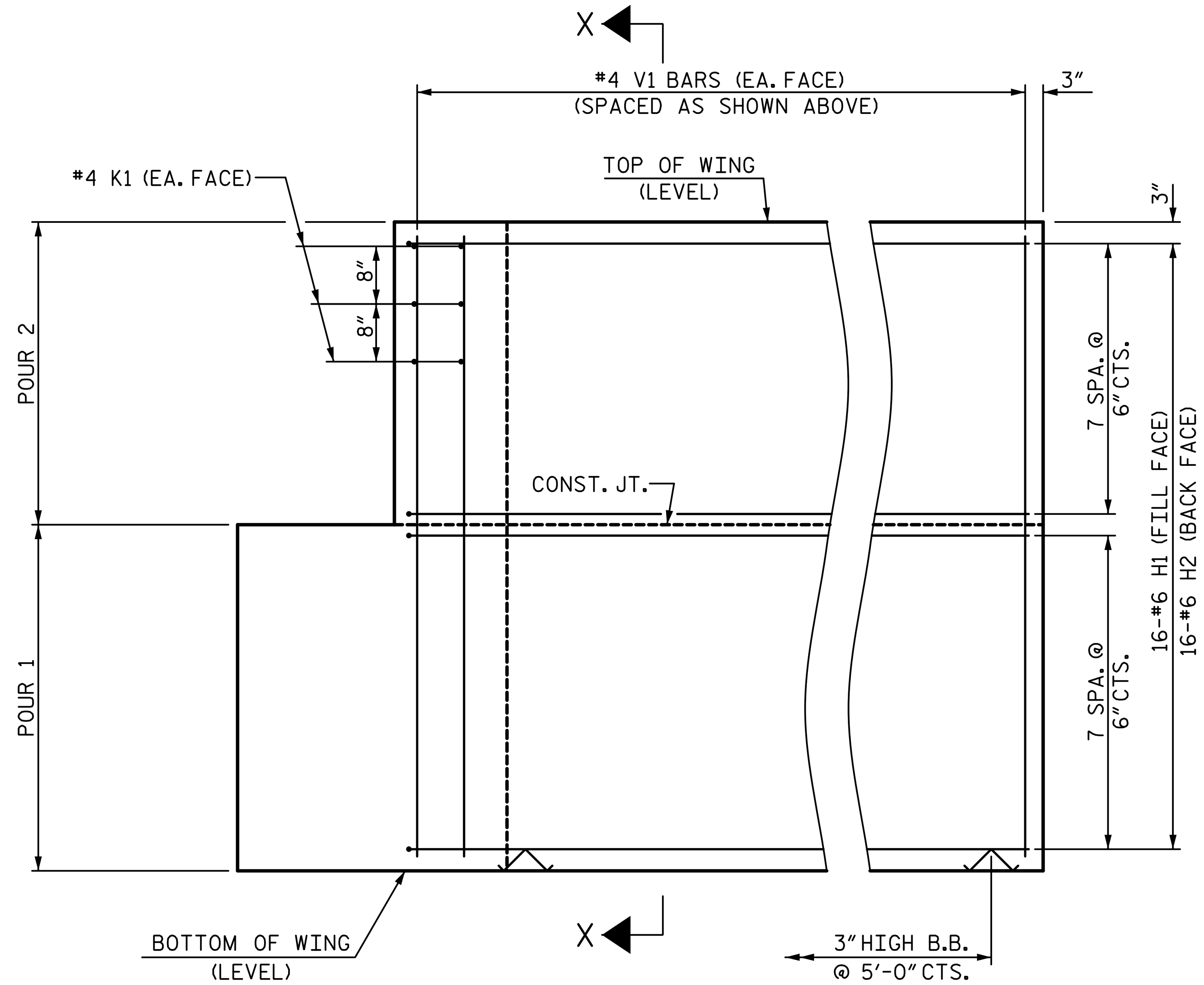
PLAN OF WING (W2)



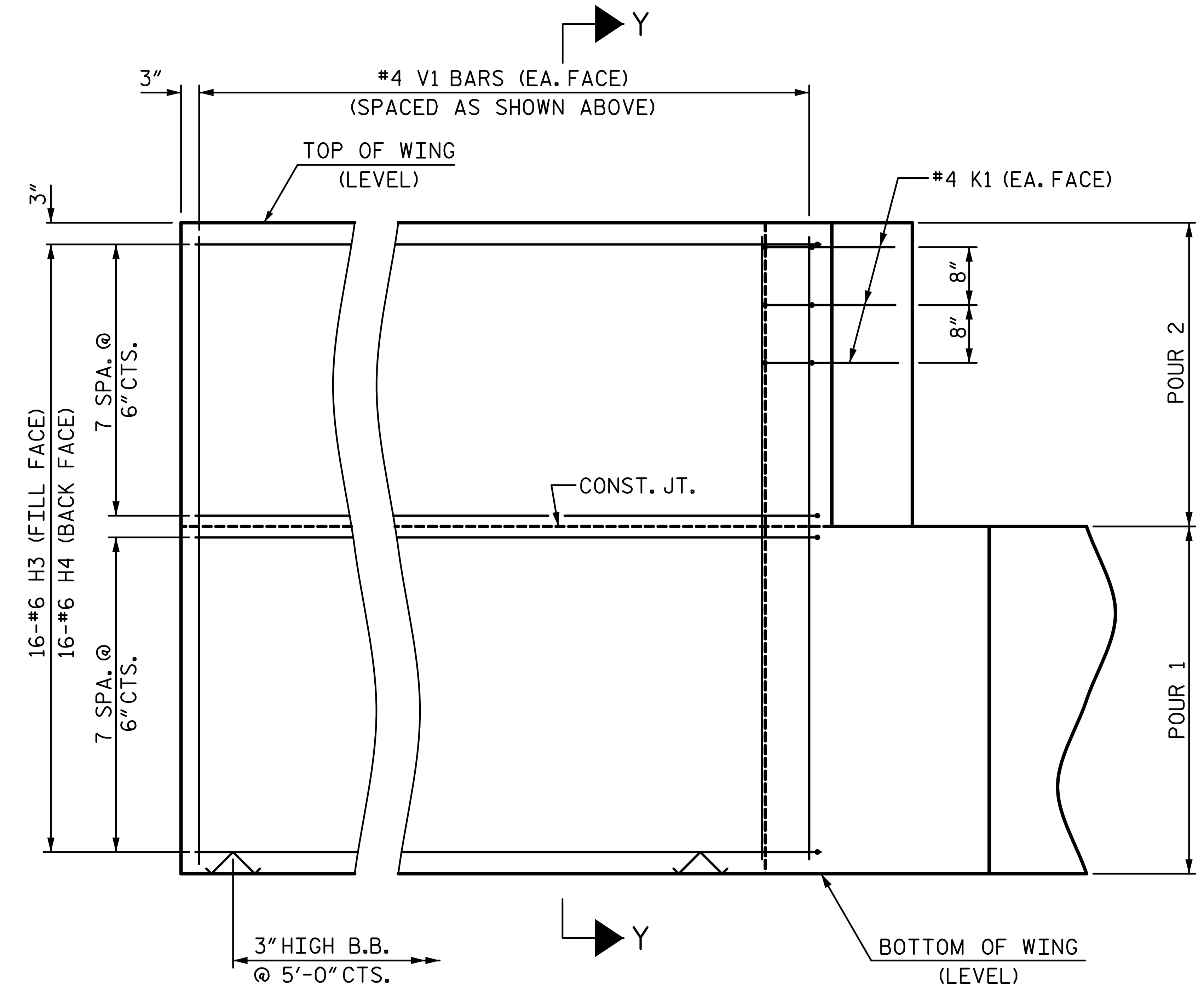
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518

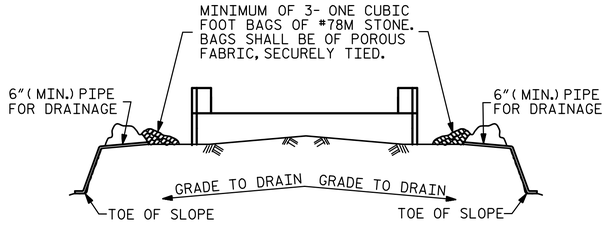
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			29

DRAWN BY:	T. BANKOVICH	DATE:	9-22
CHECKED BY:	D.A. SEALEY	DATE:	9-22
DESIGN ENGINEER OF RECORD:	M.A. AVERETTE	DATE:	9-22

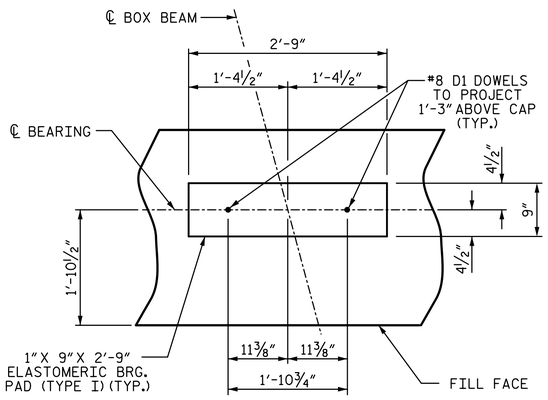


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

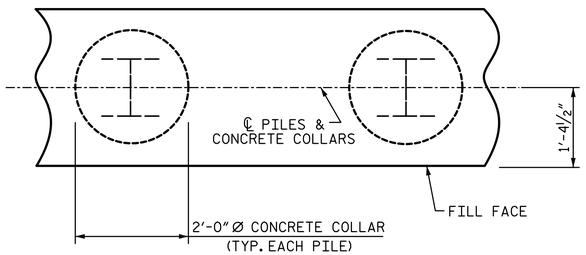
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

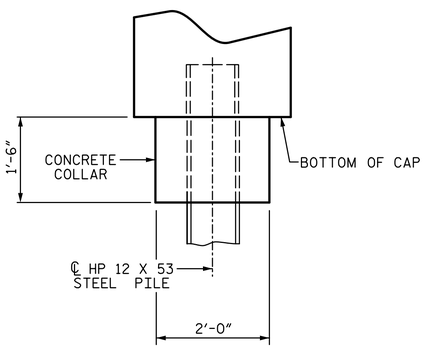


DETAIL "A"

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



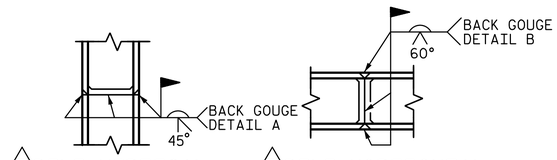
PLAN



ELEVATION

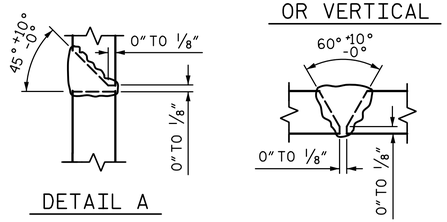
CORROSION PROTECTION FOR STEEL PILES DETAIL

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



△PILE VERTICAL

△PILE HORIZONTAL OR VERTICAL

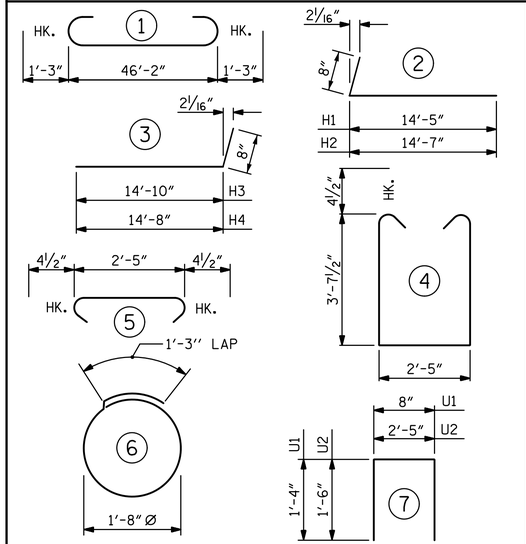


DETAIL A

DETAIL B

△POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	48'-8"	1324
B2	36	#4	STR	24'-5"	587
B3	12	#4	STR	2'-5"	19
D1	26	#8	STR	2'-3"	156
H1	16	#6	2	15'-1"	362
H2	16	#6	2	15'-3"	366
H3	16	#6	3	15'-6"	372
H4	16	#6	3	15'-4"	368
K1	12	#4	STR	3'-1"	25
K2	12	#4	STR	24'-5"	196
S1	58	#4	4	10'-5"	404
S2	58	#4	5	3'-2"	123
S3	28	#4	6	6'-6"	122
U1	40	#4	7	3'-4"	89
U2	40	#4	7	5'-5"	145
V1	77	#4	STR	7'-8"	394
V2	80	#4	STR	5'-9"	307

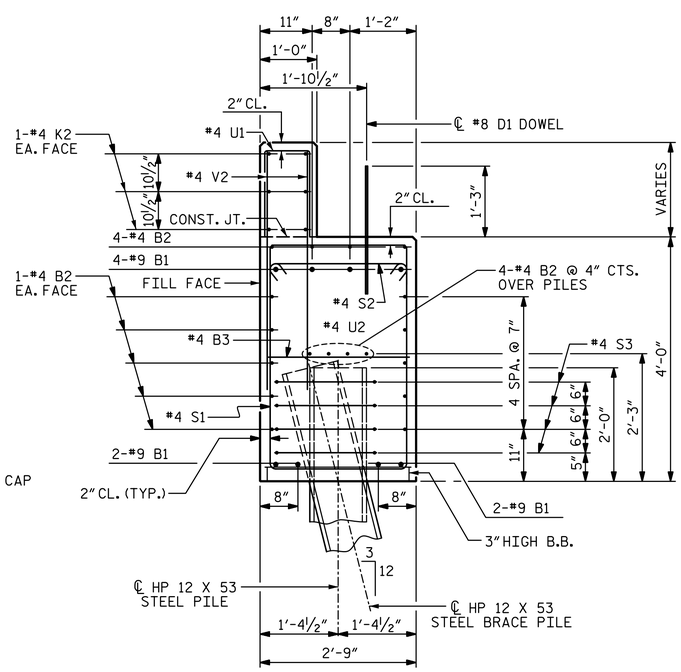
REINFORCING STEEL (FOR ONE END BENT) 5359 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR 1 CAP, LOWER PART OF WINGS & COLLARS 25.4 C.Y.

POUR 2 BACKWALL & UPPER PART OF WINGS 7.6 C.Y.

TOTAL CLASS A CONCRETE 33.0 C.Y.



SECTION A-A

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

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 AND 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			29

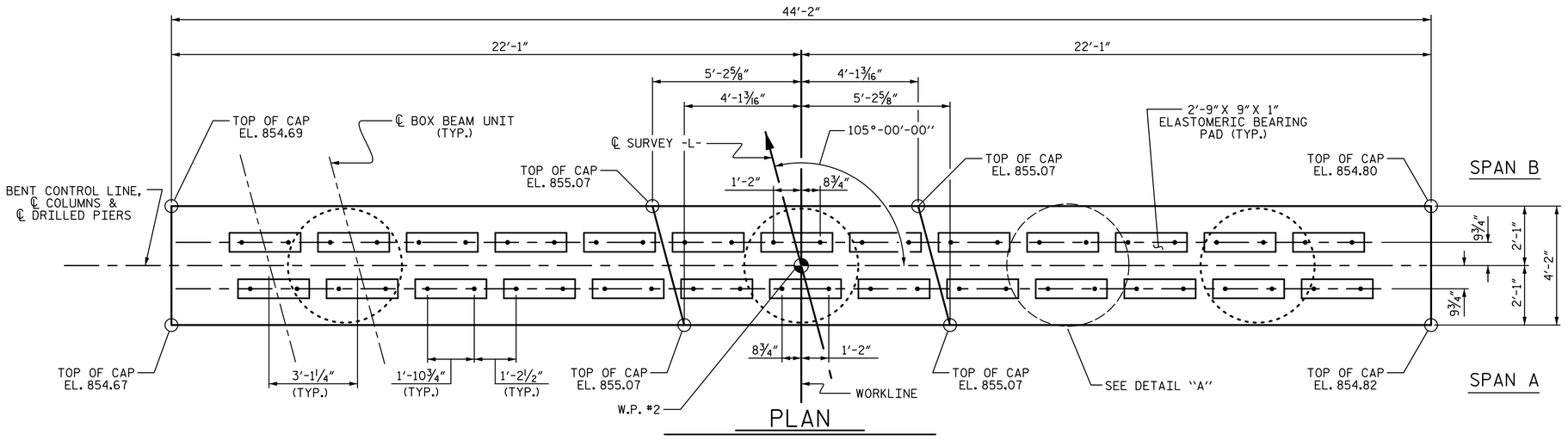
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

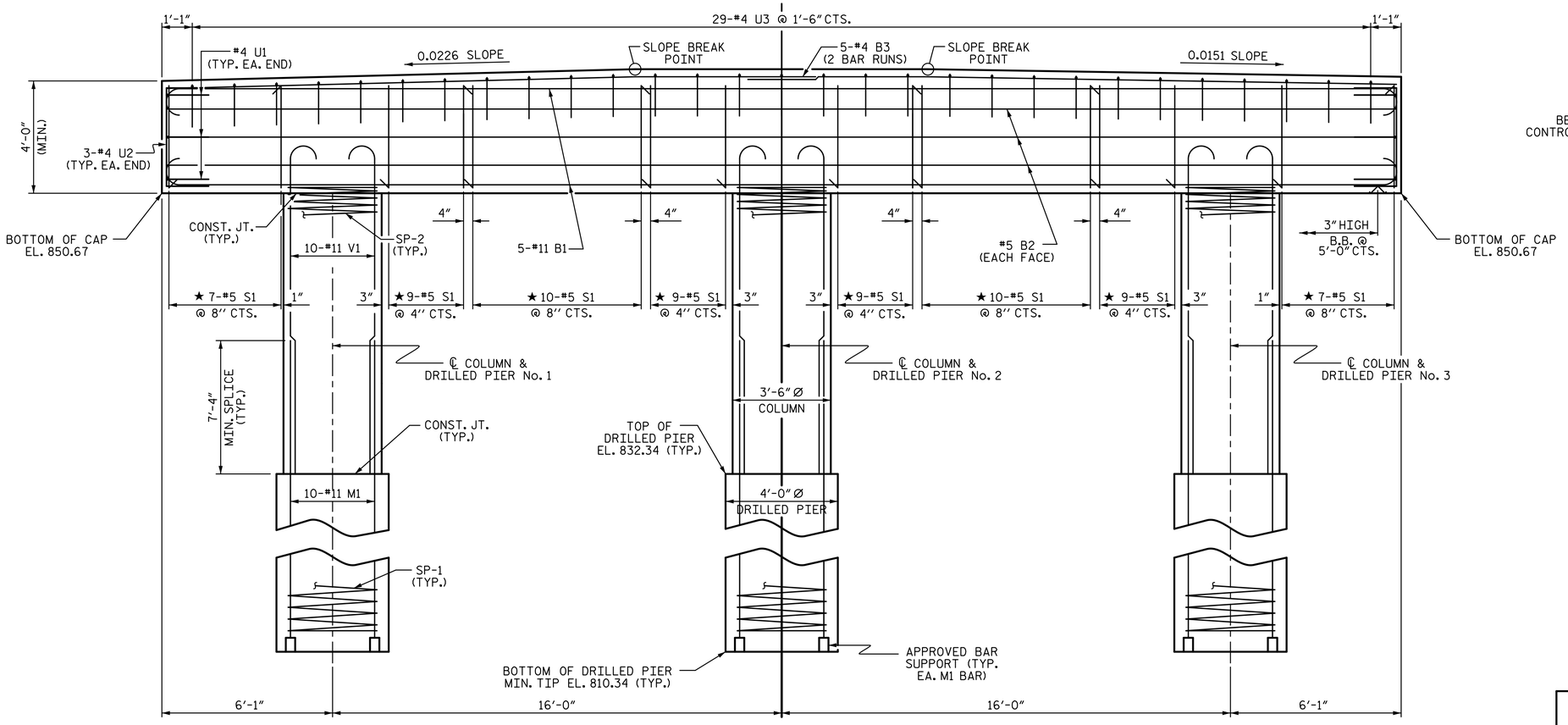
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





ELEVATION

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

NOTES

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

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

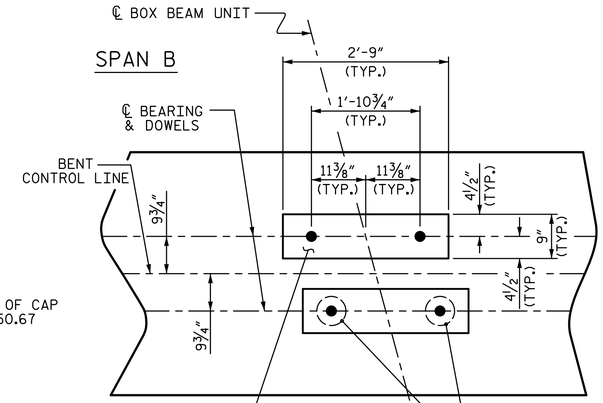
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

DRAWN BY: S.D. COOPER DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

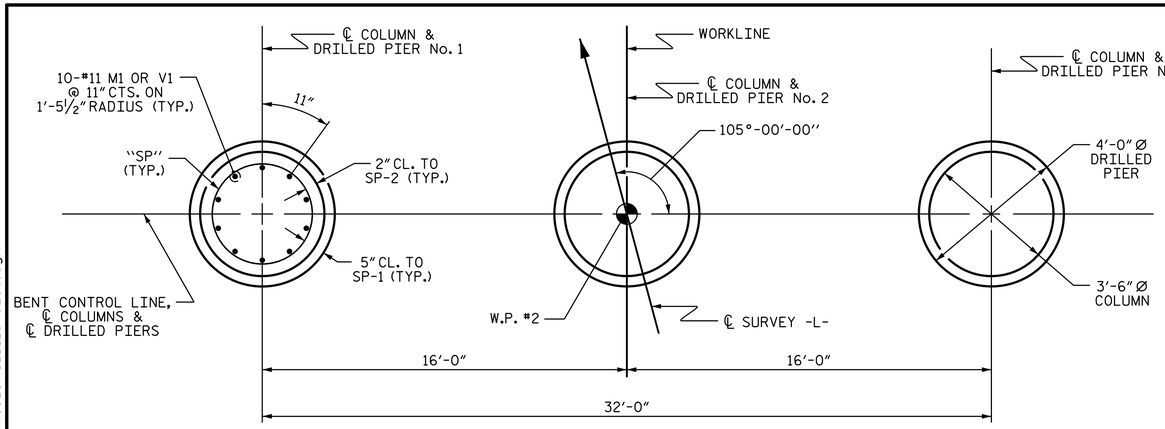
WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

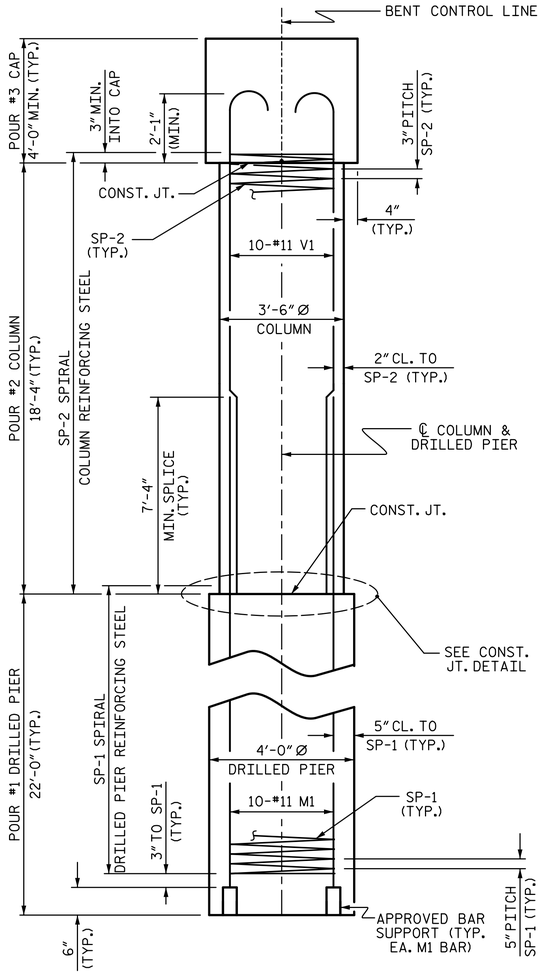
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

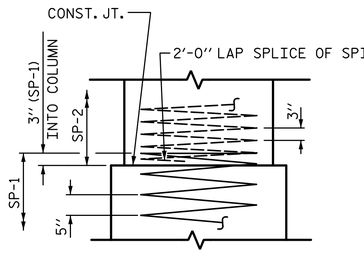
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			29



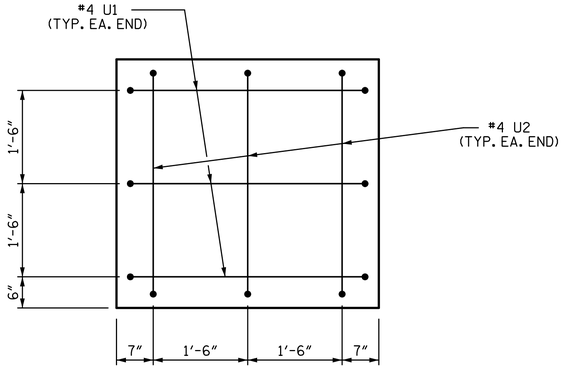
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

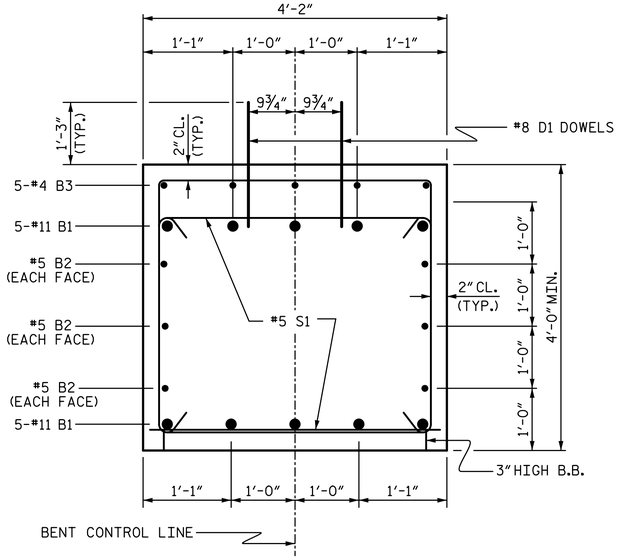


CONSTRUCTION JOINT DETAIL



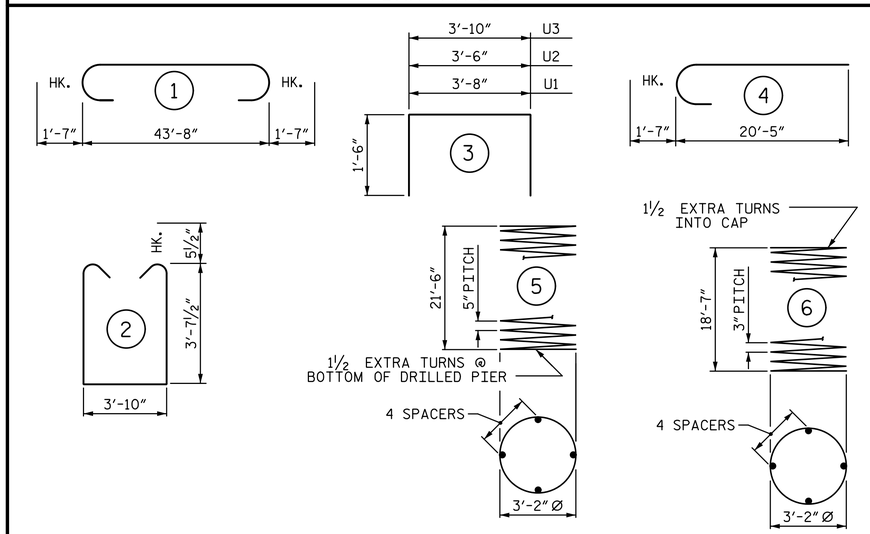
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	46′-10″	2488
B2	6	#5	STR	43′-10″	274
B3	10	#4	STR	23′-2″	155
D1	52	#8	STR	2′-3″	312
M1	30	#11	STR	31′-10″	5074
S1	70	#5	2	12′-0″	876
U1	6	#4	3	6′-8″	27
U2	6	#4	3	6′-6″	26
U3	29	#4	3	6′-10″	132
V1	30	#11	4	22′-0″	3507

REINFORCING STEEL (FOR ONE BENT) 12,871 LBS.

SP-1	3	✳	5	528′-11″	1655
SP-2	3	✳✳	6	746′-5″	1496

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 3151 LBS.

✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

✳✳ THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	19.6 C.Y.
POUR #3 (CAP)	29.2 C.Y.
TOTAL CLASS A CONCRETE	48.8 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	30.7 C.Y.

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENT 1

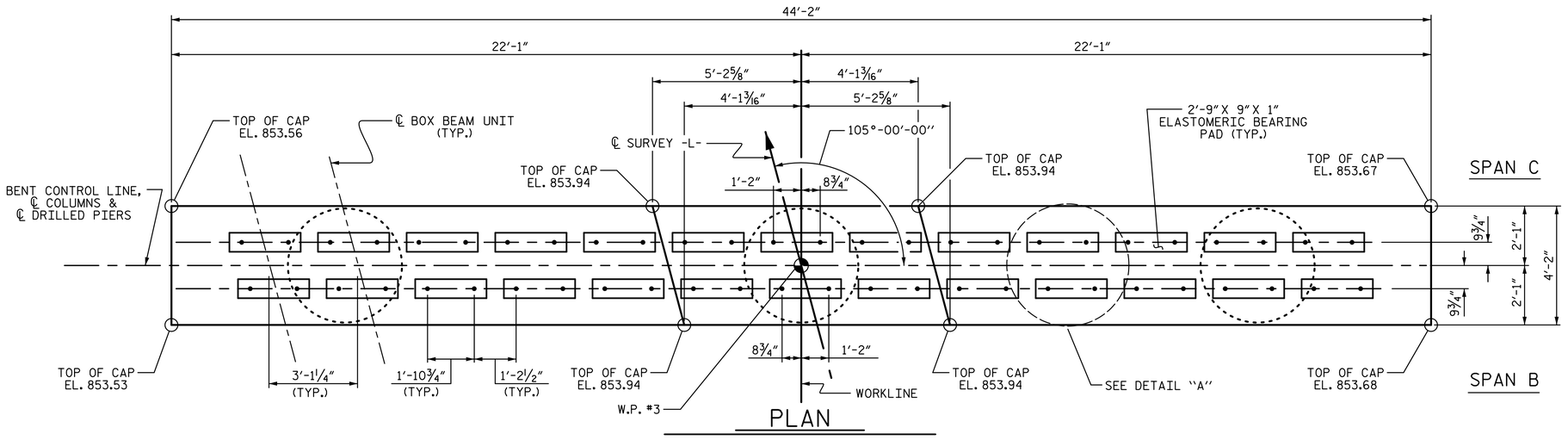
DRAWN BY: S.D. COOPER DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			29



ELEVATION

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

NOTES

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

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

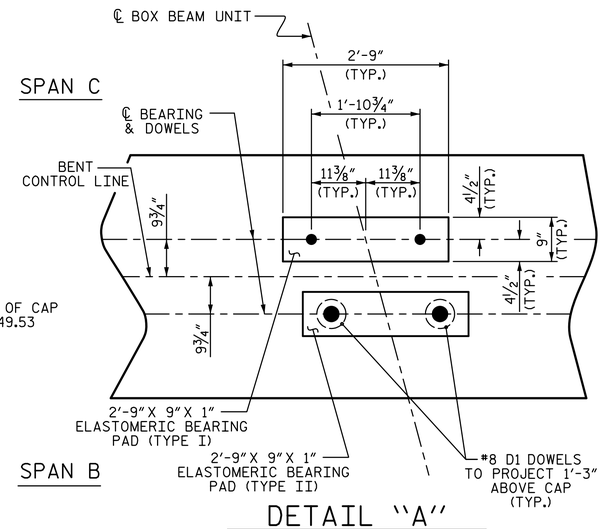
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

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

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



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

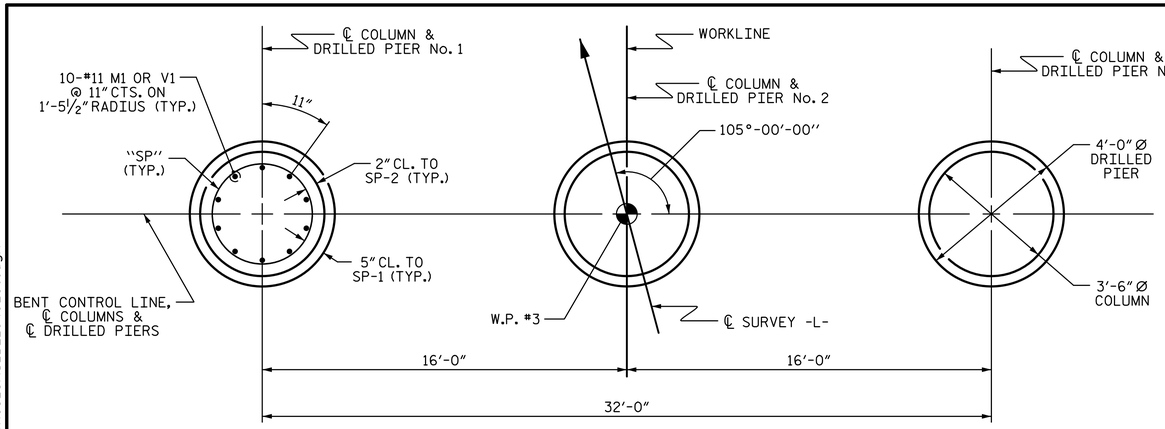
DRAWN BY: S.D. COOPER DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

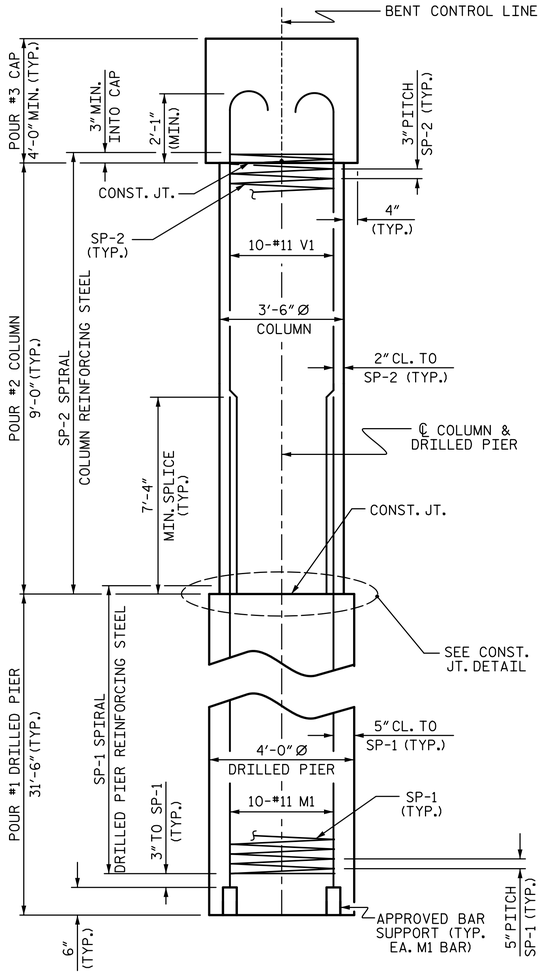
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

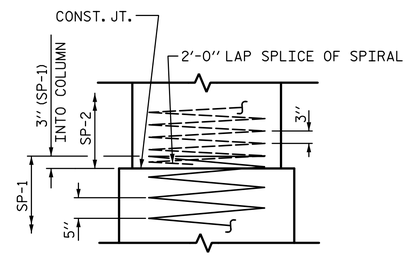
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			29



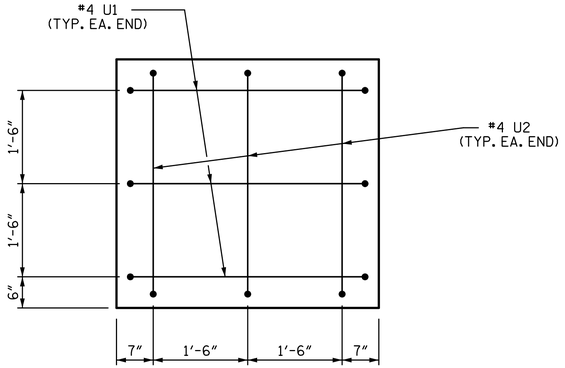
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

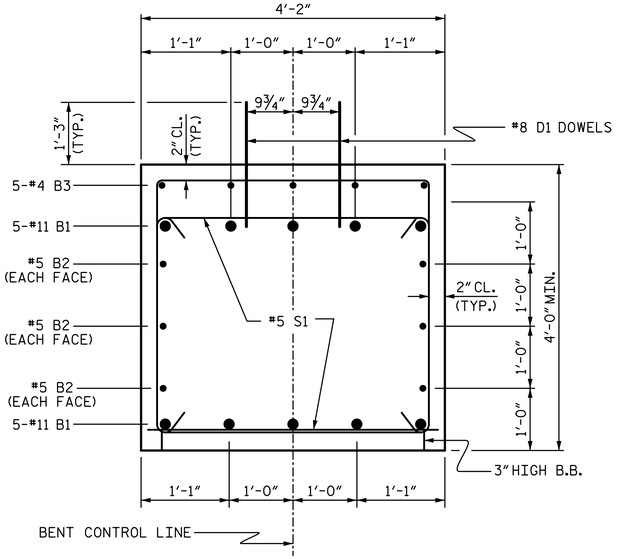


CONSTRUCTION JOINT DETAIL



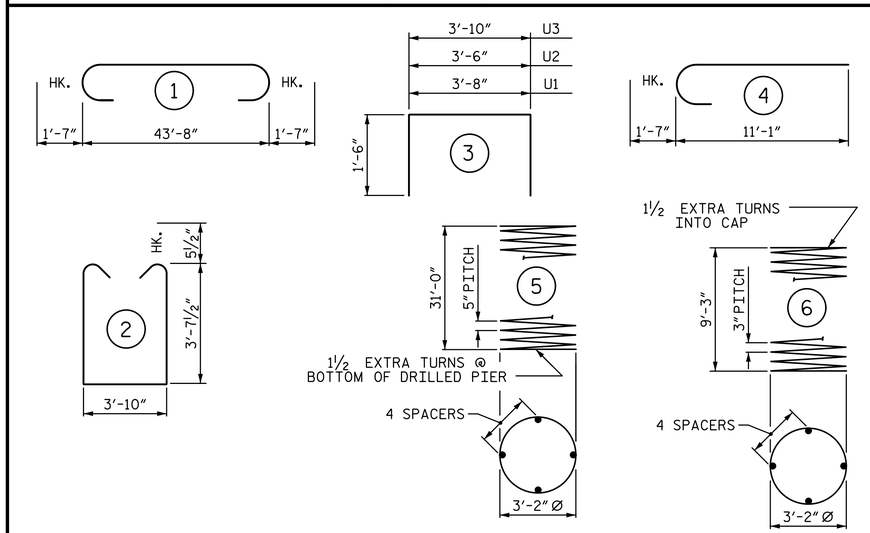
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	46'-10"	2488
B2	6	#5	STR	43'-10"	274
B3	10	#4	STR	23'-2"	155
D1	52	#8	STR	2'-3"	312
M1	30	#11	STR	41'-4"	6588
S1	70	#5	2	12'-0"	876
U1	6	#4	3	6'-8"	27
U2	6	#4	3	6'-6"	26
U3	29	#4	3	6'-10"	132
V1	30	#11	4	12'-8"	2019

REINFORCING STEEL (FOR ONE BENT) 12,897 LBS.

SP-1	3	✳	5	744'-4"	2329
SP-2	3	✳✳	6	383'-1"	768

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 3097 LBS.

✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

✳✳ THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	9.6 C.Y.
POUR #3 (CAP)	29.2 C.Y.
TOTAL CLASS A CONCRETE	38.8 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	44.0 C.Y.

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

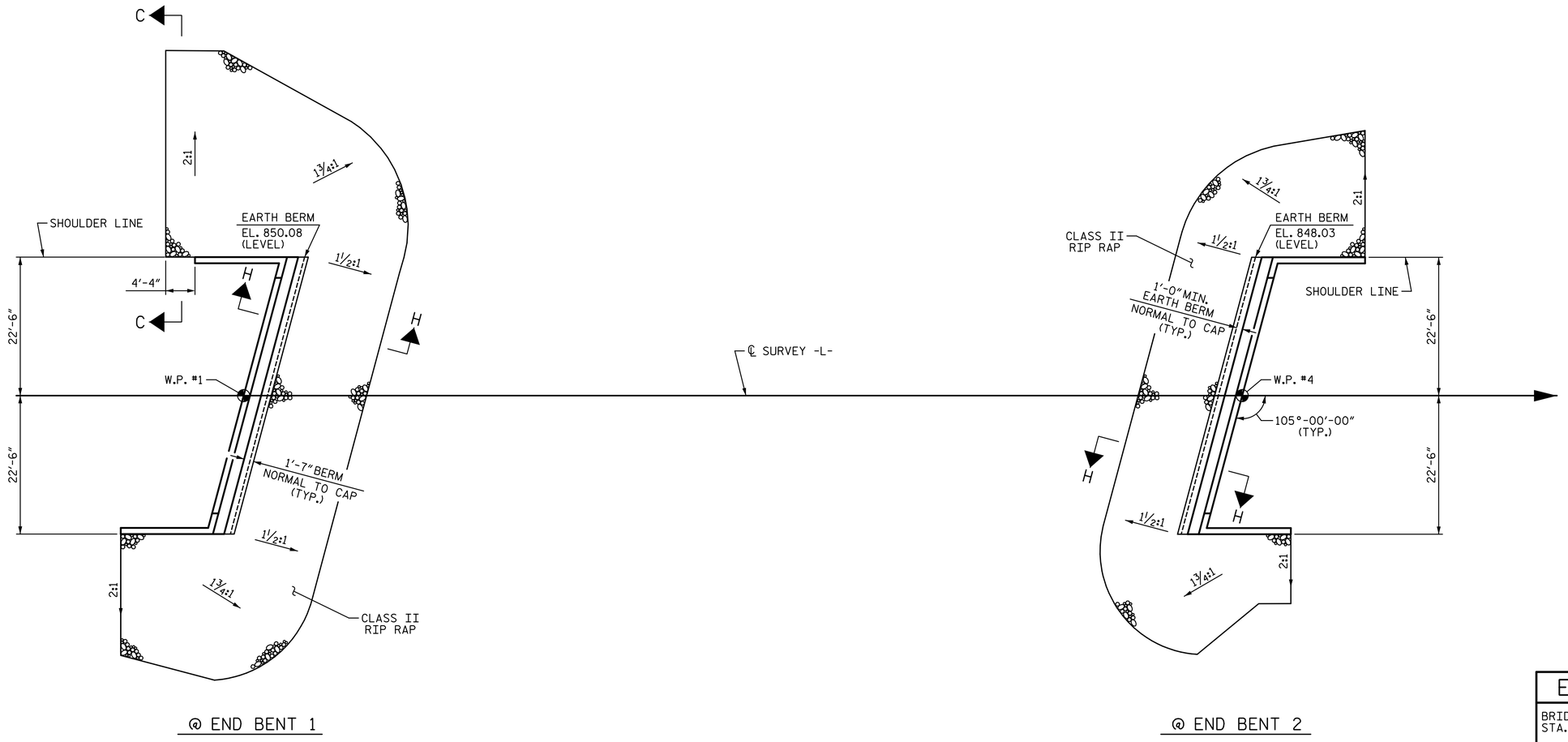
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: S.D. COOPER DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

8/2/2024 | 7:48 AM PDT

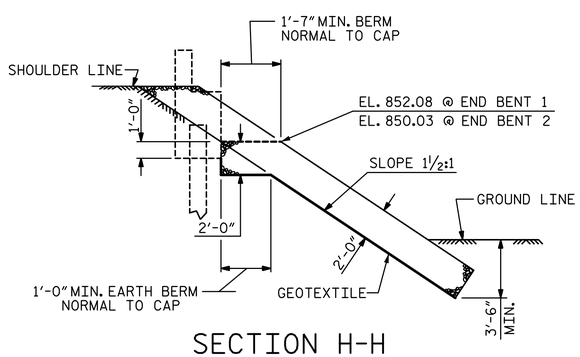
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



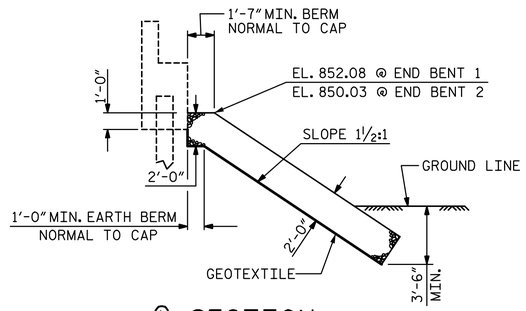
@ END BENT 1

@ END BENT 2

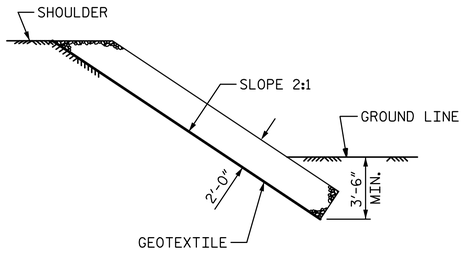
PLAN OF RIP RAP



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

ESTIMATED QUANTITIES

BRIDGE @ STA. 23+99.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	350	390
END BENT 2	185	205

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

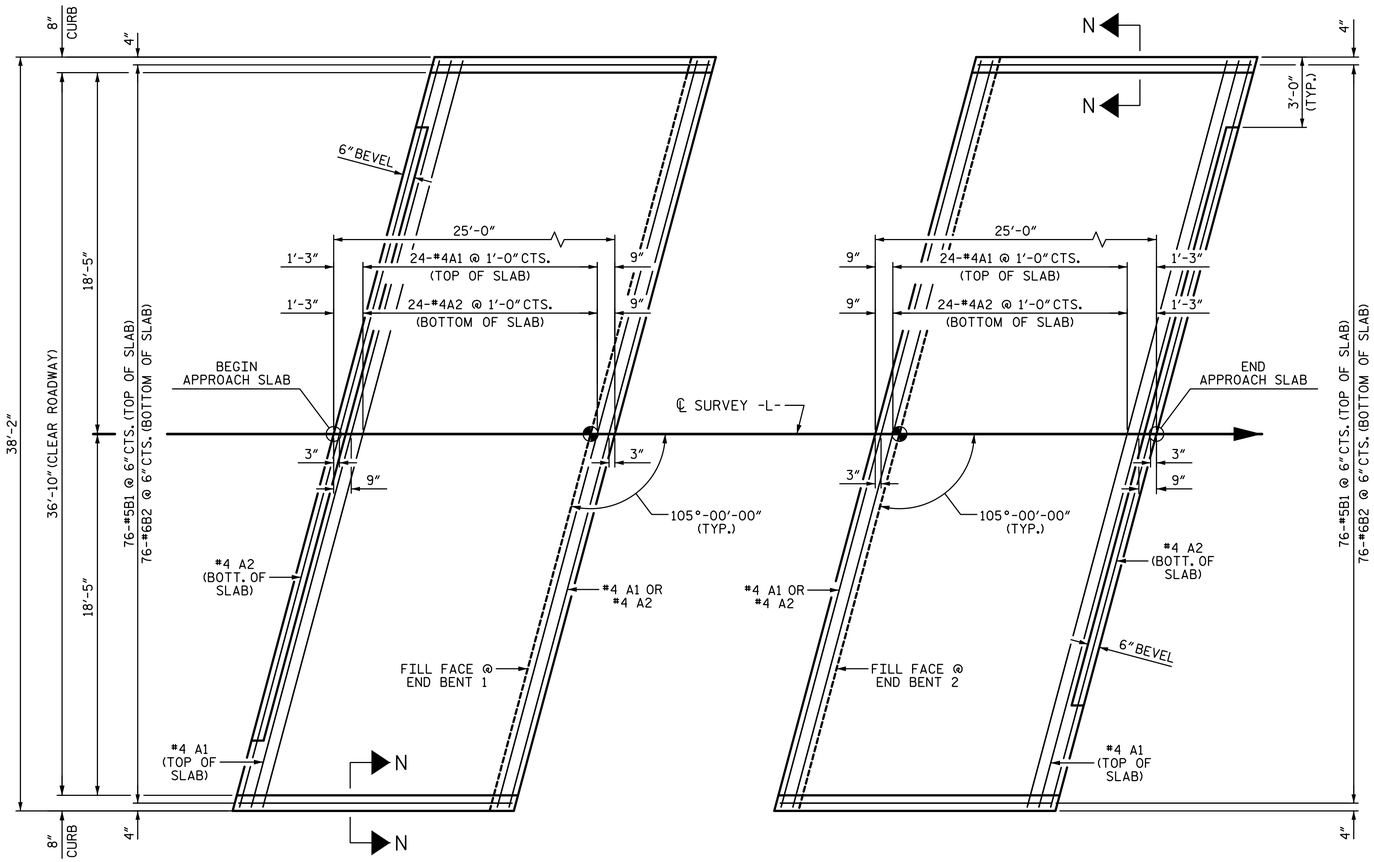
DRAWN BY: T. BANKOVICH DATE: 9-22
CHECKED BY: D.A. SEALEY DATE: 9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			29



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES:

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

APPROACH SLABS SHALL BE POURED AFTER CONCRETE WEARING SURFACE IS POURED.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB 1

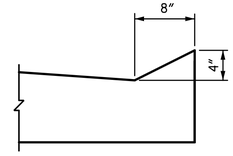
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	26	#4	STR	39'-1"	679
A2	26	#4	STR	39'-1"	679
✳ B1	76	#5	STR	24'-1"	1909
B2	76	#6	STR	24'-7"	2806
REINFORCING STEEL				LBS.	3485
✳ EPOXY COATED REINFORCING STEEL				LBS.	2588
CLASS AA CONCRETE				C. Y.	49.3

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	26	#4	STR	39'-1"	679
A2	26	#4	STR	39'-1"	679
✳ B1	76	#5	STR	24'-1"	1909
B2	76	#6	STR	24'-7"	2806
REINFORCING STEEL				LBS.	3485
✳ EPOXY COATED REINFORCING STEEL				LBS.	2588
CLASS AA CONCRETE				C. Y.	49.3

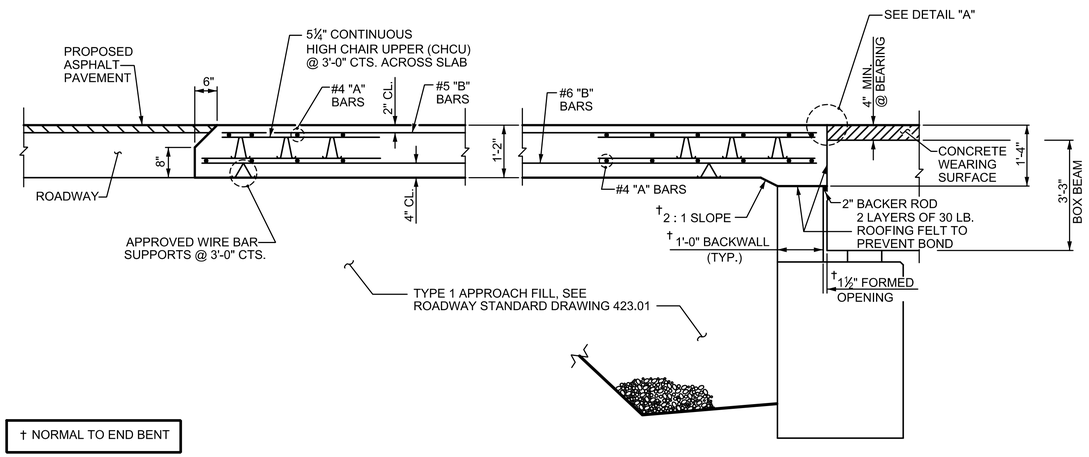
SPLICE CHART

BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



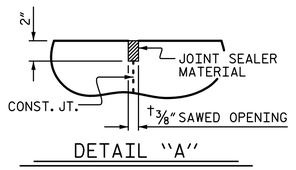
SECTION N-N

CURB DETAILS



† NORMAL TO END BENT

SECTION THRU SLAB



DETAIL "A"

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT

105° SKEW

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

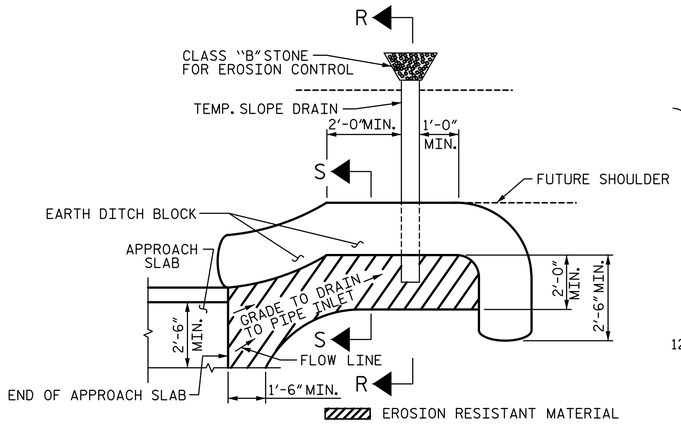
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

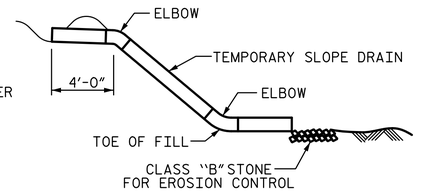
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			29

DRAWN BY:	T. BANKOVICH	DATE:	9-22
CHECKED BY:	D.A. SEALEY	DATE:	9-22
DESIGN ENGINEER OF RECORD:	M.A. AVERETTE	DATE:	9-22

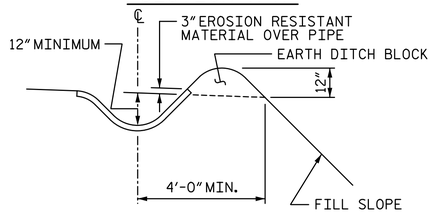


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



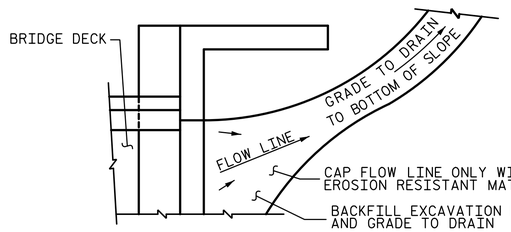
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. 17BP.9.R.83

STOKES COUNTY

STATION: 23+99.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

8/2/2024 | 7:48 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY: T. BANKOVICH	DATE:	9-22
CHECKED BY: D.A. SEALEY	DATE:	9-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE	DATE:	9-22

8/2/2024 10:22:19 AM P:\Raleigh\Projects\2017\Division 9 (SEA)\17BP9R83 (Stokes 286)\Structures\Drawings\Final(Revise Concrete WS)\17BP9R83_SMU_AS_840286.dgn

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 2024 "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.