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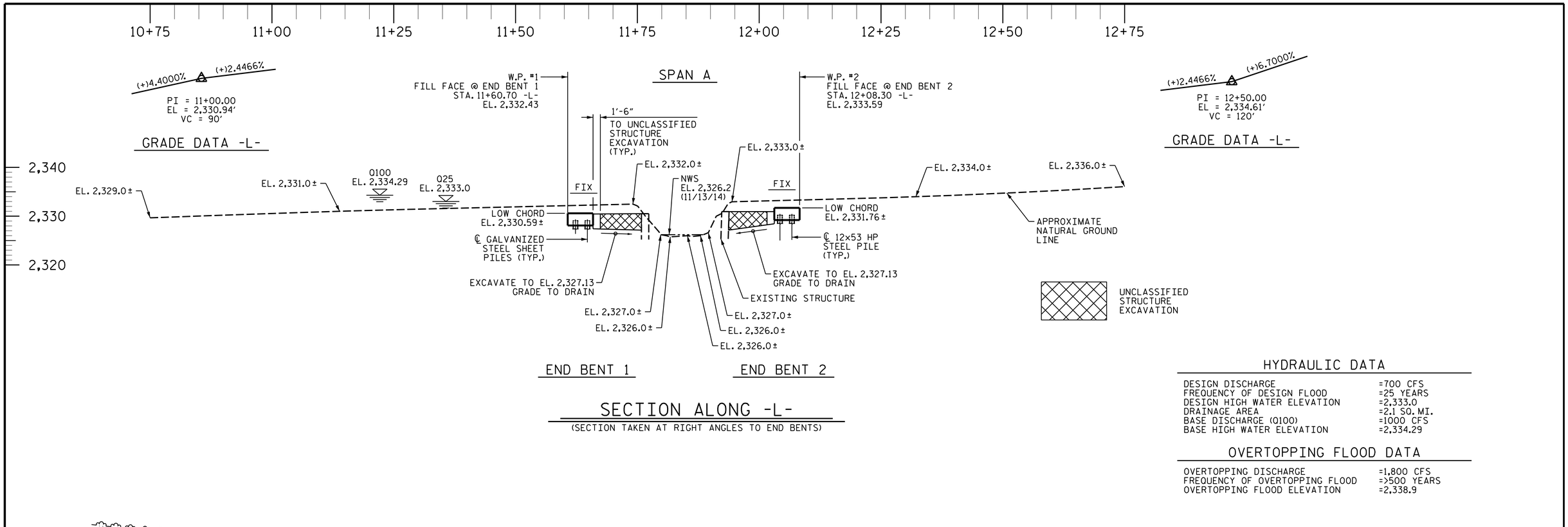


SECTION ALONG -L-

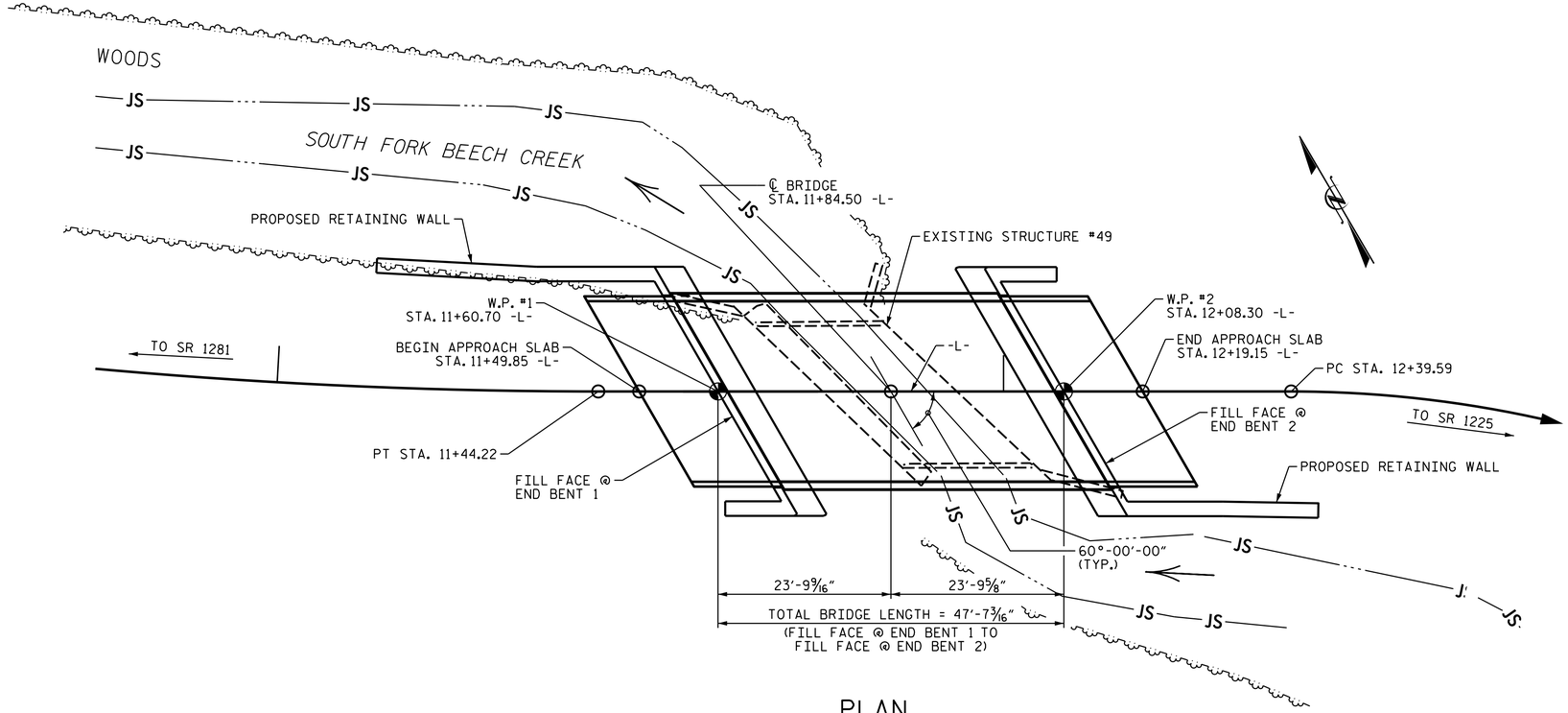
(SECTION TAKEN AT RIGHT ANGLES TO END BENTS)

HYDRAULIC DATA

DESIGN DISCHARGE	=700 CFS
FREQUENCY OF DESIGN FLOOD	=25 YEARS
DESIGN HIGH WATER ELEVATION	=2,333.0
DRAINAGE AREA	=2.1 SQ. MI.
BASE DISCHARGE (Q100)	=1000 CFS
BASE HIGH WATER ELEVATION	=2,334.29

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=1,800 CFS
FREQUENCY OF OVERTOPPING FLOOD	=>500 YEARS
OVERTOPPING FLOOD ELEVATION	=2,338.9



PLAN

(FOR CLARITY, PILES AND SHEET PILES ARE NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE #49

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
Docusigned by: Nicholas Pierce
03F097FA047D438...
DATE: 2/3/2016

WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
SOUTH FORK BEECH CREEK ON
BEECH CREEK RD. (SR 1223)
BETWEEN SR 1281 AND SR 1225

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

DRAWN BY : M.J.O./M.A.H. DATE : 10/2014
CHECKED BY : N. PIERCE DATE : 10/2014

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1/6/2016
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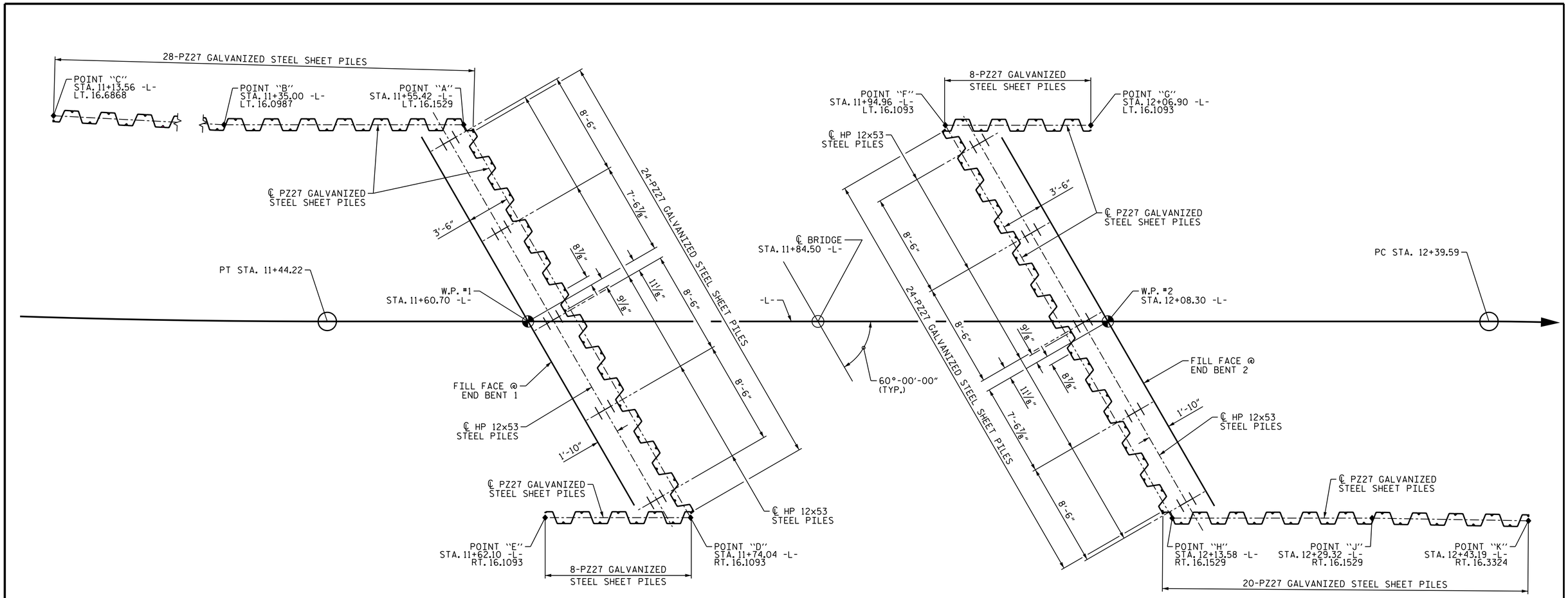
usmo04281



END BENT 1

END BENT 2

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP)

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 & 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.

DRIVE PILES AT END BENTS 1 & 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 & 2. FOR STEEL PILE POINTS SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PZ27 SHEET PILES ARE TO BE DRIVEN IN FRONT (STREAM SIDE) OF HP 12X53 PILES AT END BENTS 1 & 2 AND ALONG WING WALLS AS SHOWN ON PLANS.

INSTALL PILES AT END BENT 1 AND END BENT 2 TO A TIP ELEVATION NO HIGHER THAN 2305 FT.

STEEL SHEET PILES SHOULD BE DRIVEN TO ELEVATION 2315 AT END BENTS 1 & 2.

STEEL SHEET PILES SHOULD BE DRIVEN TO ELEVATION 2310 ALONG WING WALLS.

EXCAVATION TO REMOVE OBSTRUCTIONS MAY BE REQUIRED PRIOR TO DRIVING H-PILES AND SHEET PILES AT END BENTS 1 & 2 AND ALONG WING WALLS. IF REQUIRED, DO NOT EXCAVATE BELOW ELEVATION 2320FT AND BACKFILL WITH SELECT MATERIAL CLASS III, IF WATER IS PRESENT. THE ENGINEER WILL DETERMINE THE NEED FOR EXCAVATION.

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
Docusigned by: Nicholas Pierce 03F097FA047D438...
DATE: 2/3/2016

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www.wspgroup.com
LICENSE NO. F-0891

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N. PIERCE DATE : 07/2014

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PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER SOUTH FORK BEECH CREEK ON BEECH CREEK RD. (SR 1223) BETWEEN SR 1281 AND SR 1225

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

1/6/2016
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TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 11+84.50 -L-	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	ELASTOMERIC BEARINGS	3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLABS		GALVANIZED 18" STEEL SHEET PILES	
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	EACH	LIN. FT.	LUMP SUM	No.	LIN. FT.	No.	SQ. FT.
SUPERSTRUCTURE				LUMP SUM					90.00	LUMP SUM	9	405.00		
END BENT 1		LUMP SUM	20.7		4,171	5	300	5					62	1,788
END BENT 2		LUMP SUM	19.8		4,057	5	300	5					54	1,635
TOTAL	LUMP SUM	LUMP SUM	40.5	LUMP SUM	8,228	10	600	10	90.00	LUMP SUM	9	405.00	116	3,423

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF A SINGLE SPAN 18'-6", WITH A CLEAR ROADWAY WIDTH OF 19'-0"; TIMBER DECK WITH ASPHALT WEARING SURFACE ON TIMBER JOIST WITH TIMBER CAPS AND PILES, CONCRETE ENCASED, TIMBER BULKHEADS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT (LEFT) AND 20 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 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".

ASPHALT WEARING SURFACE IS INCLUDED IN THE ROADWAY QUANTITY ON ROADWAY PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

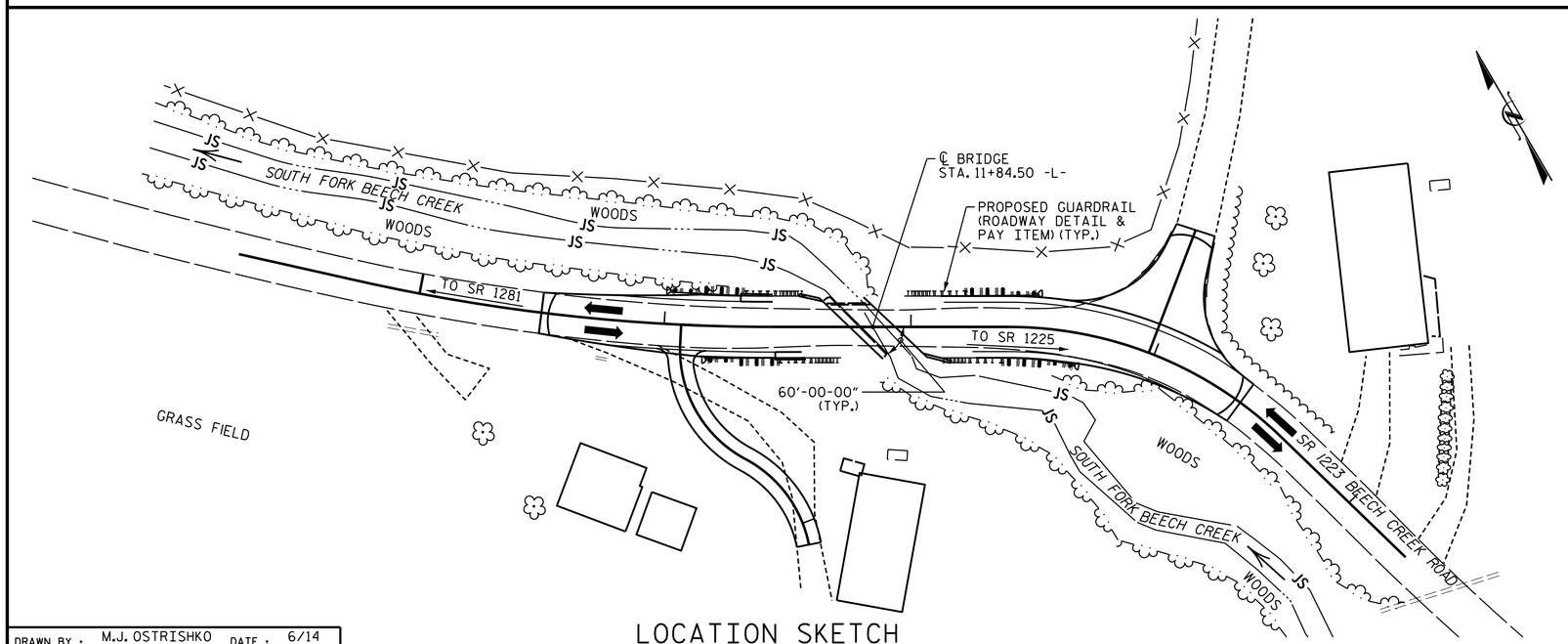
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR GALVANIZED 18" STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

STEEL SHEET PILES SHALL BE GALVANIZED.

BM#2: 8 INCH SPIKE SET IN BASE OF 24 INCH MAPLE TREE 20.43' LEFT OF STA. 11+81.10 -L- EL.=2330.50



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

DRAWN BY : M.J. OSTRISHKO DATE : 6/14
CHECKED BY : N. PIERCE DATE : 6/14

1/6/2016
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usmo04281

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD: Nicholas Pierce
03F097FA047D438...
DATE: 2/3/2016

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PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
SOUTH FORK BEECH CREEK ON
BEECH CREEK RD. (SR 1223)
BETWEEN SR 1281 AND SR 1225

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) 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						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.28	--	1.75	0.245	1.44	A	E	22.0	0.728	1.28	A	I	13.0	0.80	0.245	1.44	A	E	22.0	
		HL-93 (OPERATING)	N/A		1.80	--	1.35	0.245	1.86	A	E	22.0	0.728	1.80	A	I	8.5	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.59	57	1.75	0.245	1.76	A	E	22.0	0.728	1.59	A	I	8.5	0.80	0.245	1.76	A	E	22.0	
		HS-20 (OPERATING)	36.000		2.12	76	1.35	0.245	2.28	A	E	22.0	0.728	2.12	A	I	8.5	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.45	47	1.40	0.245	4.31	A	E	22.0	0.728	4.54	A	I	8.5	0.80	0.245	3.45	A	E	22.0	
		SNGARBS2	20.000		2.78	56	1.40	0.245	3.48	A	E	22.0	0.728	3.34	A	I	8.5	0.80	0.245	2.78	A	E	22.0	
		SNAGRIS2	22.000		2.74	60	1.40	0.245	3.42	A	E	19.5	0.728	3.16	A	I	8.5	0.80	0.245	2.74	A	E	22.0	
		SNCOTTS3	27.250		1.72	47	1.40	0.245	2.15	A	E	22.0	0.728	2.18	A	I	8.5	0.80	0.245	1.72	A	E	22.0	
		SNAGGRS4	34.925		1.52	53	1.40	0.245	1.90	A	E	22.0	0.728	1.90	A	I	8.5	0.80	0.245	1.52	A	E	22.0	
		SNS5A	35.550		1.48	53	1.40	0.245	1.85	A	E	22.0	0.728	2.00	A	I	8.5	0.80	0.245	1.48	A	E	22.0	
		SNS6A	39.950		1.39	56	1.40	0.245	1.74	A	E	22.0	0.728	1.86	A	I	8.5	0.80	0.245	1.39	A	E	22.0	
		SNS7B	42.000	3	1.33	56	1.40	0.245	1.66	A	E	22.0	0.728	1.91	A	I	8.5	0.80	0.245	1.33	A	E	22.0	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.71	56	1.40	0.245	2.14	A	E	22.0	0.728	2.19	A	I	8.5	0.80	0.245	1.71	A	E	22.0	
		TNT4A	33.075		1.73	57	1.40	0.245	2.16	A	E	22.0	0.728	2.09	A	I	8.5	0.80	0.245	1.73	A	E	22.0	
		TNT6A	41.600		1.45	60	1.40	0.245	1.81	A	E	22.0	0.728	2.05	A	I	8.5	0.80	0.245	1.45	A	E	22.0	
		TNT7A	42.000		1.48	62	1.40	0.245	1.85	A	E	22.0	0.728	1.87	A	I	8.5	0.80	0.245	1.48	A	E	22.0	
		TNT7B	42.000		1.54	65	1.40	0.245	1.92	A	E	22.0	0.728	1.80	A	I	8.5	0.80	0.245	1.54	A	E	22.0	
		TNAGRIT4	43.000		1.47	63	1.40	0.245	1.83	A	E	22.0	0.728	1.72	A	I	8.5	0.80	0.245	1.47	A	E	22.0	
		TNAGT5A	45.000		1.36	61	1.40	0.245	1.70	A	E	22.0	0.728	1.78	A	I	8.5	0.80	0.245	1.36	A	E	22.0	
		TNAGT5B	45.000		1.33	60	1.40	0.245	1.66	A	E	22.0	0.728	1.61	A	I	8.5	0.80	0.245	1.33	A	E	22.0	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

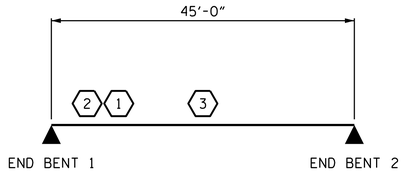
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD: Nicholas Pierce (03F097FA047D438...)

DATE: 2/3/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)

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

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ASSEMBLED BY :	N. PIERCE	DATE :	07/2014
CHECKED BY :	M.T. MILLS	DATE :	07/2014
DRAWN BY :	MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY :	GM/DI 2/08	REV. 10/1/11	MAA/GM

1/6/2016
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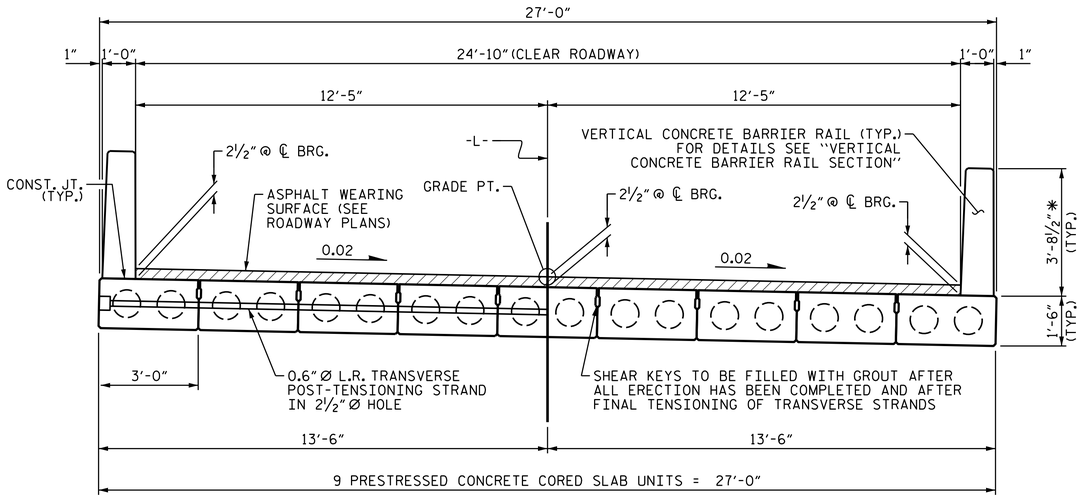
usmo04281



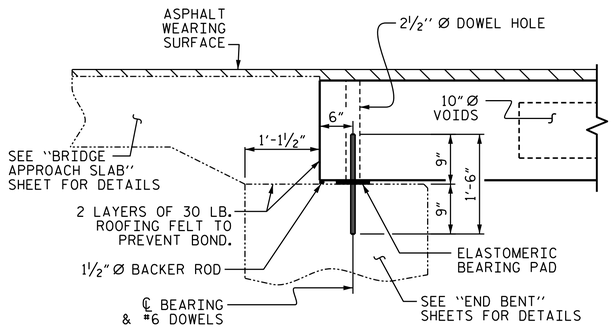
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

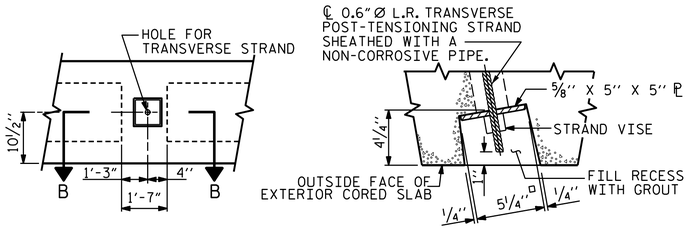
TYPICAL SECTION

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

FIXED END



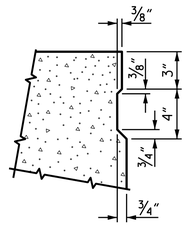
SECTION AT END BENT



ELEVATION VIEW

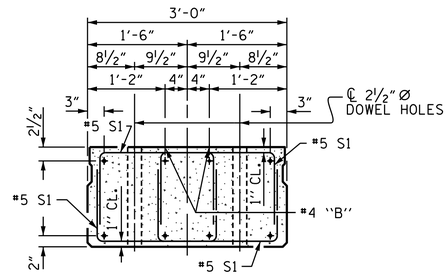
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



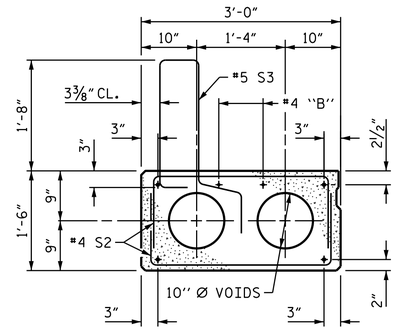
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



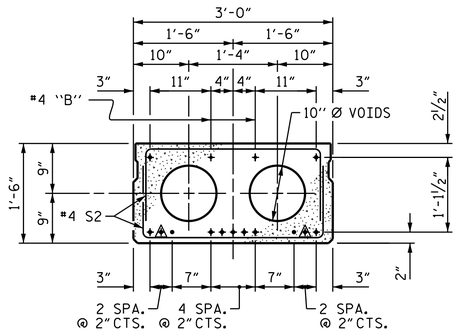
END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



EXT. SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION

(13 STRANDS REQUIRED)

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

0.6" Ø LOW RELAXATION STRAND LAYOUT

PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
Docusigned by: Nicholas Pierce 03F097FA0470438...
DATE: 2/3/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY M.J. OSTRISHKO	DATE : 07/2014	
CHECKED BY : N.A. PIERCE	DATE : 07/2014	
DRAWN BY : DGE 5/09	REV. 12/11	MAA/AAC
CHECKED BY : BCH 6/09		

1/6/2016
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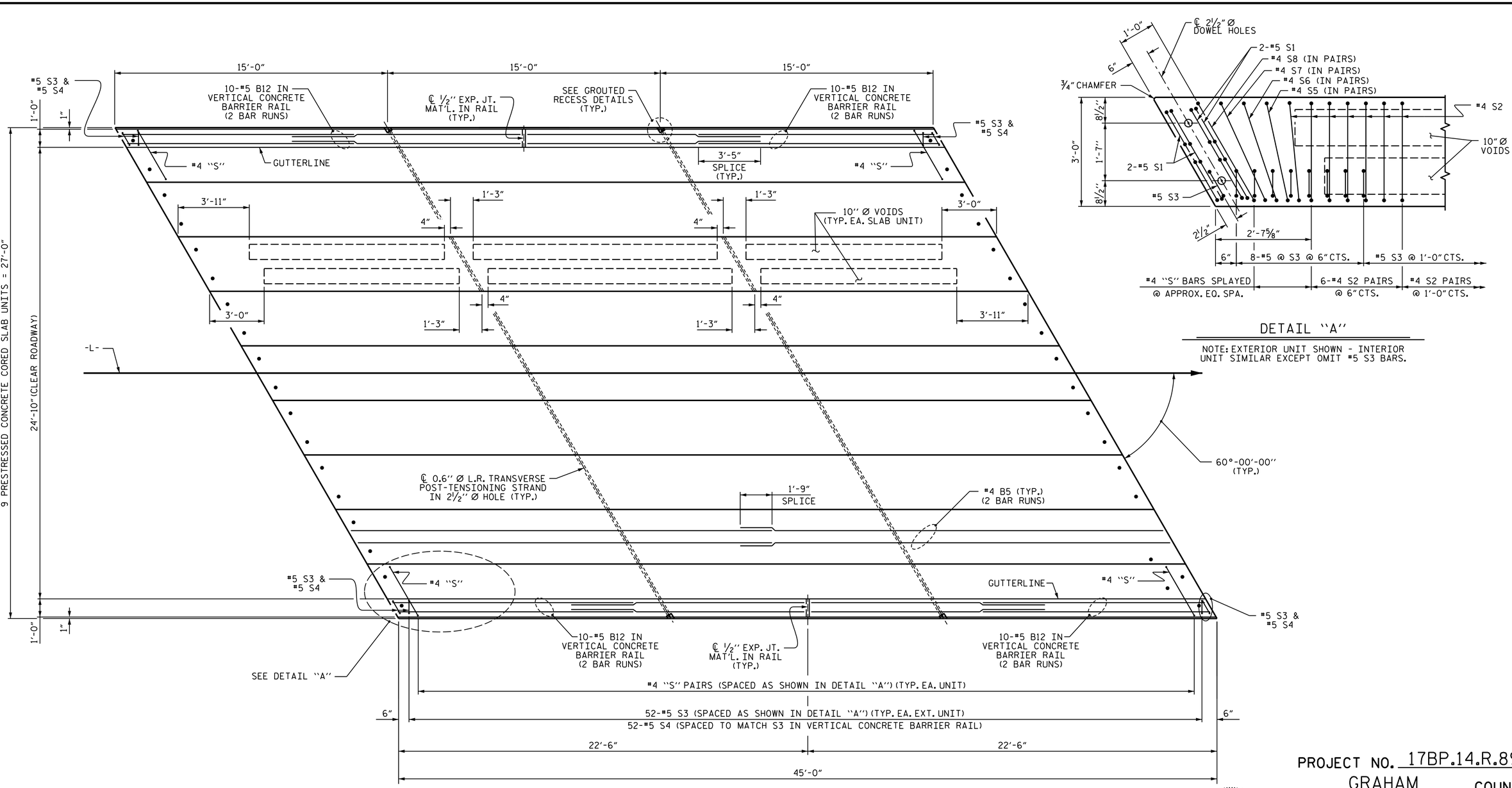

DETAIL "A"

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF UNIT

ASSEMBLED BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014
DRAWN BY : DGE 5/09
CHECKED BY : BCH 6/09
REV. 12/5/11 MAA/AAC

2/3/2016
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usnp04353

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce 03F097FA047D438...
DATE: 2/3/2016

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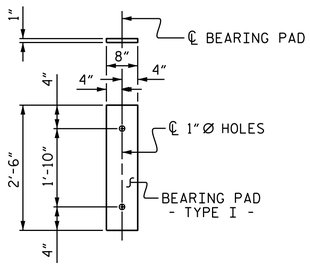
PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 45' UNIT 24'-10" CLEAR ROADWAY 60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			15



FIXED END
(TYPE I - 18 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

CORED SLABS REQUIRED

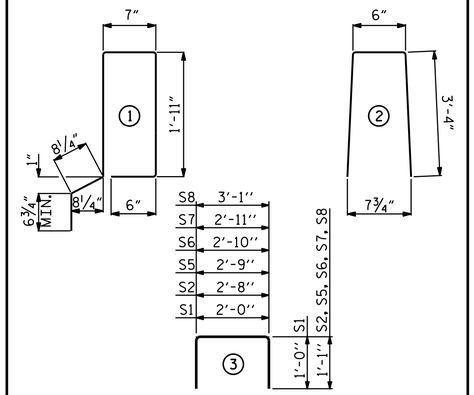
	NUMBER	LENGTH	TOTAL LENGTH
45'UNIT			
EXTERIOR C.S.	2	45'-0"	90'-0"
INTERIOR C.S.	7	45'-0"	315'-0"
TOTAL	9		405'-0"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-6"
45' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	15/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↓
FINAL CAMBER	11/16" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	45' UNIT					
✳B12	80	80	#5	STR	13'-0"	1085
✳ S4	108	108	#5	2	7'-2"	807
✳EPOXY COATED REINFORCING STEEL				LBS.		1892
CLASS AA CONCRETE				CU.YDS.		11.8
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		90.00

BILL OF MATERIAL FOR ONE 45' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B5	4	#4	STR	23'-3"	62	23'-3"	62
S1	16	#5	3	4'-0"	67	4'-0"	67
S2	92	#4	3	4'-10"	297	4'-10"	297
✳ S3	54	#5	1	6'-2"	347		
S5	4	#4	3	4'-11"	13	4'-11"	13
S6	4	#4	3	5'-0"	13	5'-0"	13
S7	4	#4	3	5'-1"	14	5'-1"	14
S8	4	#4	3	5'-3"	14	5'-3"	14
REINFORCING STEEL			LBS.		480		480
✳EPOXY COATED REINFORCING STEEL			LBS.		347		
6500 P.S.I. CONCRETE			CU. YDS.		6.0		6.0
0.6" Ø L.R. STRANDS			No.		13		13

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 CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

THE 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

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

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

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

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

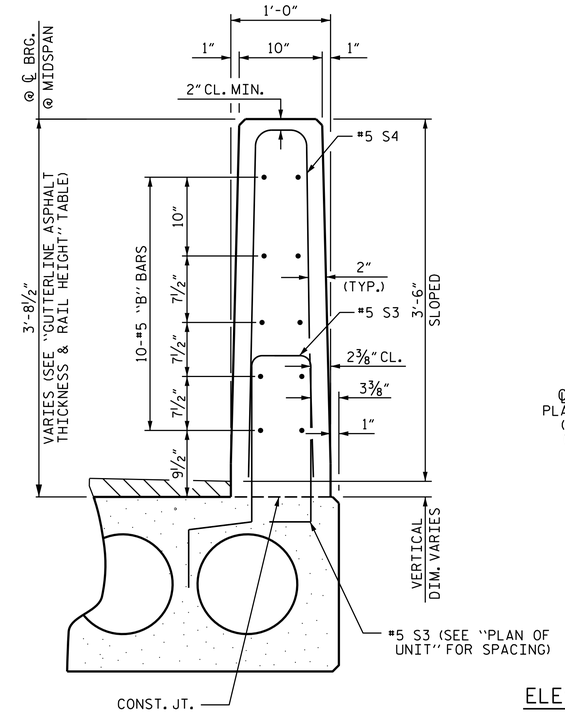
24'-10" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
	RIGHT SUPER	
45' UNITS	1 13/16"	3'-7 11/16"

CONCRETE RELEASE STRENGTH

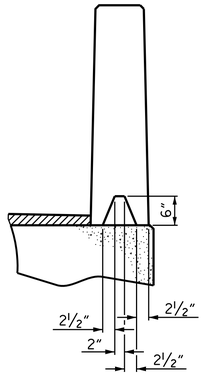
UNIT	PSI
45' UNITS	4000

GRADE 270 STRANDS

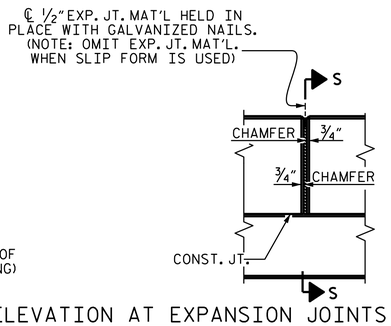
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



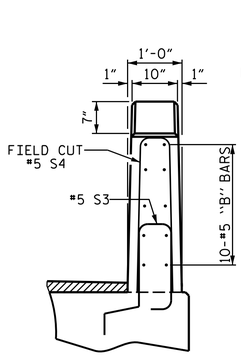
VERTICAL CONCRETE BARRIER RAIL SECTION



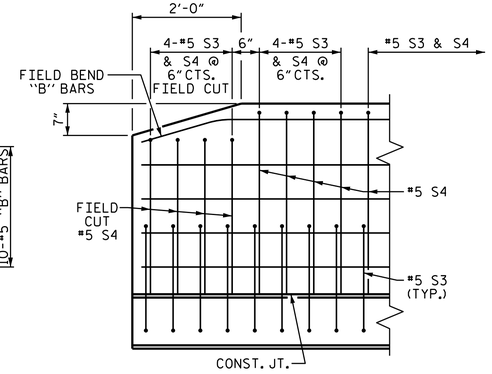
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce
03F097FA047D438...
DATE: 2/3/2016

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GRAHAM COUNTY
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SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014
DRAWN BY : DGE 5/09
CHECKED BY : BCH 6/09
REV. 12/11 MAA/AAC

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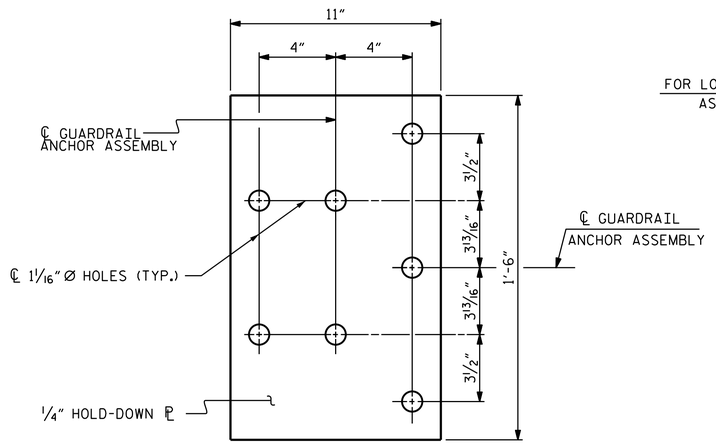
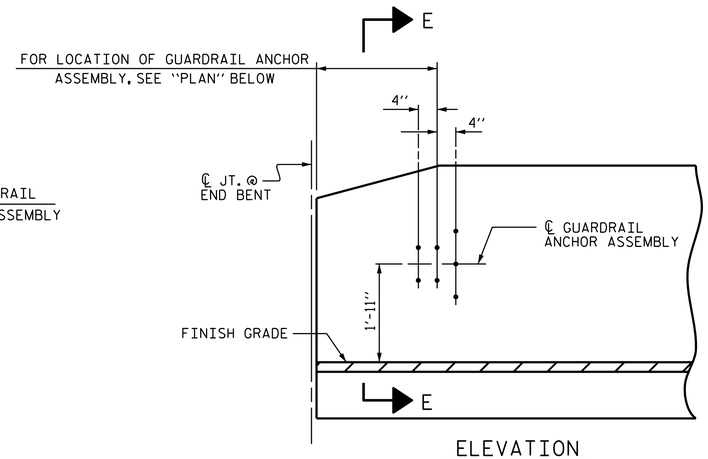


PLAN



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.)

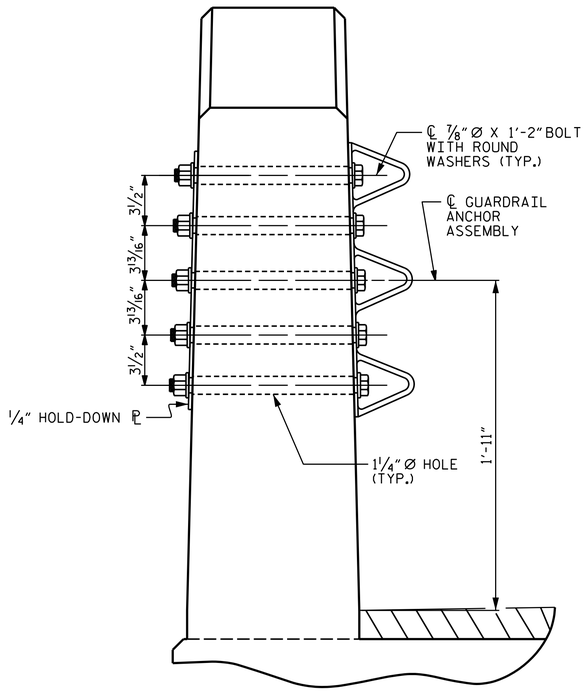
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

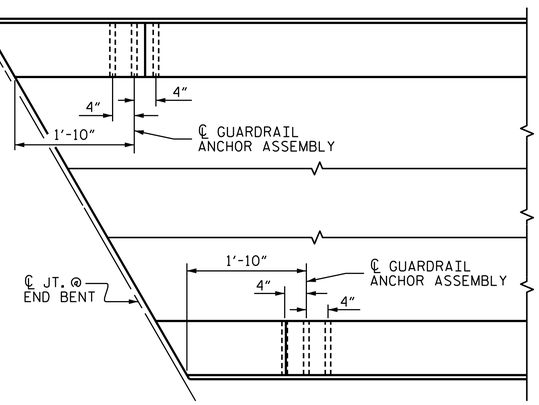
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

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

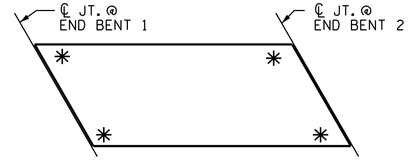


PLAN

GUARDRAIL ANCHOR ASSEMBLY DETAILS

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:

DocuSigned by: Nicholas Pierce 03F097FA047D438...

DATE: 2/3/2016

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Cary, NC 27513 - 919.678.0035
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : M.J. OSTRISHKO	DATE : 07/2014	
CHECKED BY : N.A. PIERCE	DATE : 07/2014	
DRAWN BY : MAA 5/10	REV. 10/1/11	MAA/GM
CHECKED BY : GM 5/10	REV. 12/5/11	MAA/GM
	REV. 6/13	MAA/GM

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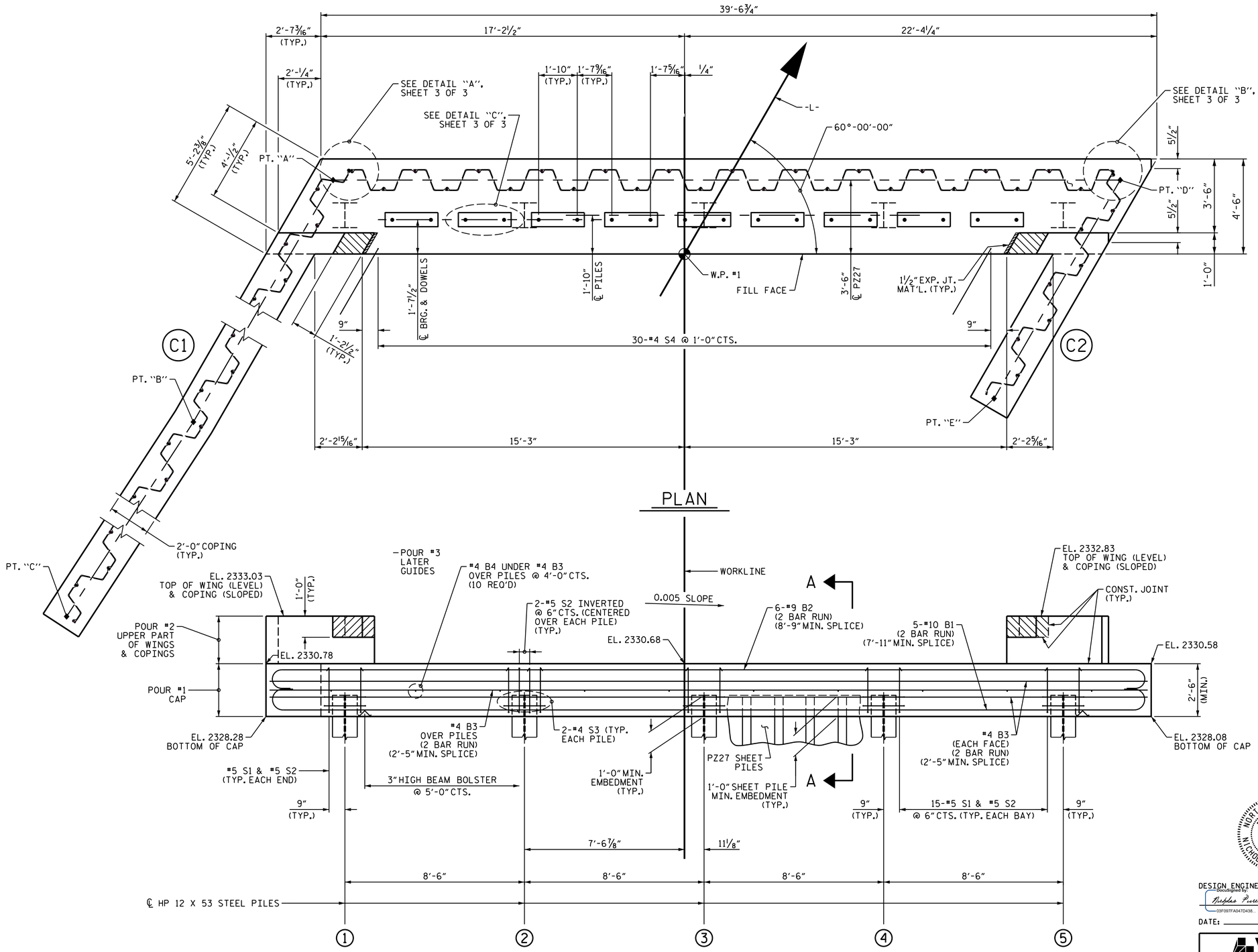
STD. NO. GRA3



FOR SECTION A-A, SEE SHEET 3 OF 3.
COPING & PZ27 SHEET PILES OMITED FOR CLARITY.
NOT ALL PZ27 SHEET PILES ARE SHOWN FOR CLARITY.
FOR EMBEDMENT DEPTH INTO WING AND COPING, SEE SHEET 2 OF 3.

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.

INSTALL THE 4" DRAIN PIPE THROUGH THE PZ27 GALVANIZED STEEL SHEET PILES AS REQUIRED FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) APPROACH FILLS, SEE THE ROADWAY PLANS.

ALL 2" Ø MAX. HOLES IN THE PZ27 GALVANIZED STEEL SHEET PILES TO BE DRILLED NOT BURNED.

FOR GALVANIZATION OF THE PZ27 STEEL SHEET PILES SEE SPECIAL PROVISIONS.

THE POINTS "F THRU K" CAN BE FOUND ON THE "FOUNDATION LAYOUT" OF THE GENERAL DARWINGS SHEET S-2.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING AND COPING DETAILS, SEE SHEET 2 OF 3.

TOP OF PILE ELEVATIONS	
①	2329.27
②	2329.23
③	2329.18
④	2329.14
⑤	2329.09

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce 03F097FA047D438...
DATE: 2/3/2016

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DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

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1			3			TOTAL SHEETS
2			4			15

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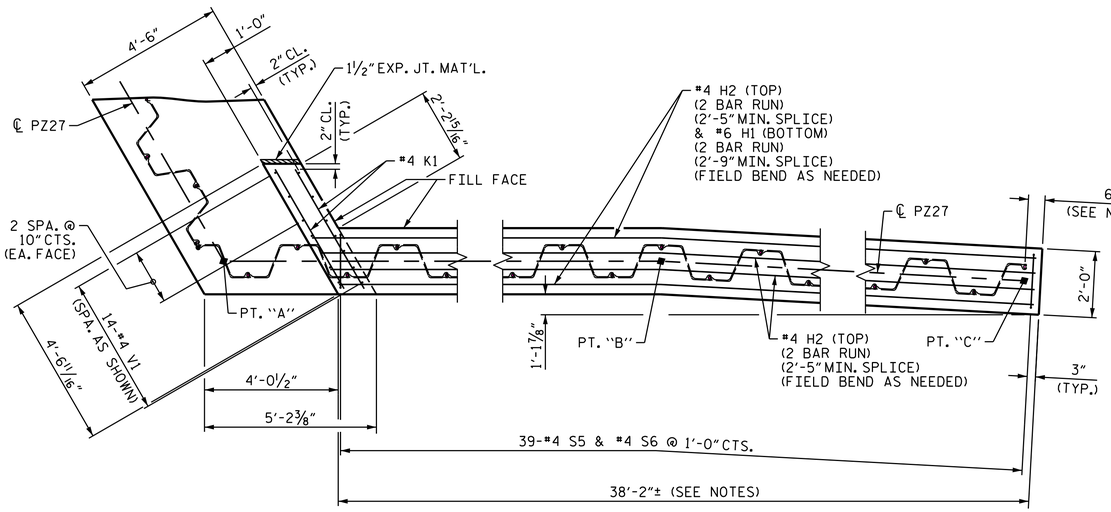
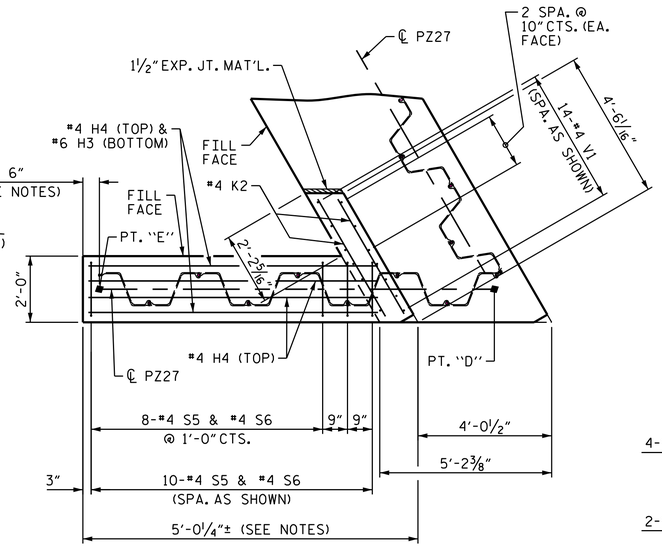


PLAN OF COPING C1

DRILL 2"Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.



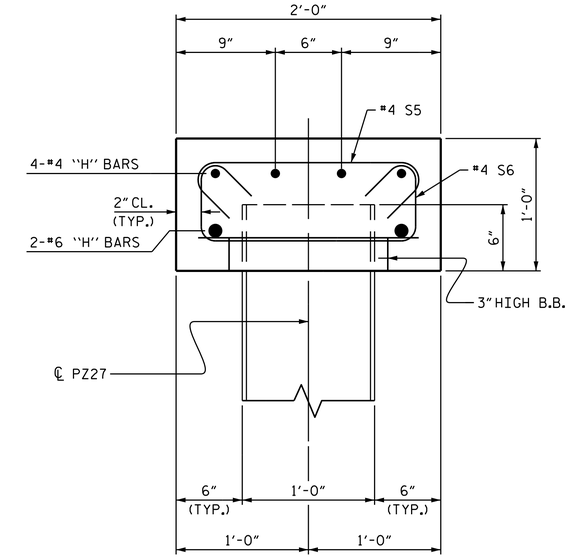
PLAN OF COPING C2

DRILL 2"Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.

NOTES

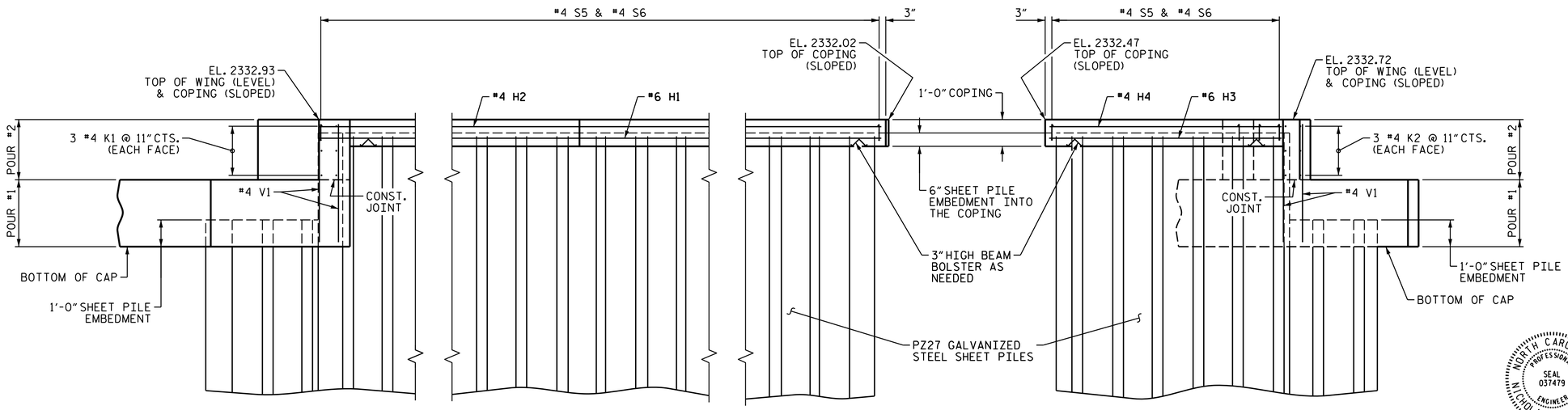
THE POINTS "A THRU E" CAN BE FOUND ON THE "FOUNDATION LAYOUT" OF THE GENERAL DARWINGS SHEET S-2.

THE LENGTH OF THE COPING IS BASED ON THE LAST SHEET PILE PLUS 6" ACCORDING TO THE FOUNDATION LAYOUT.



SECTION THRU COPING

DRILL 2"Ø HOLES IN SHEET PILES FOR #4 S6 BAR



ELEVATION OF COPING C1

DRILL 2"Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.
V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES.

ELEVATION OF COPING C2

DRILL 2"Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.
V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES.

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce 05F097FA047D438...
DATE: 2/3/2016

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GRAHAM COUNTY
STATION: 11+84.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

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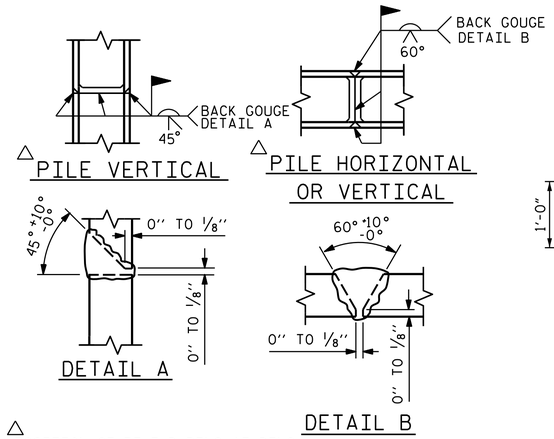
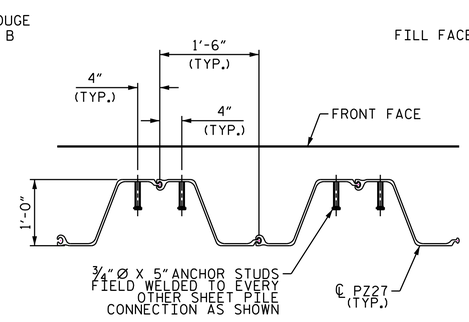
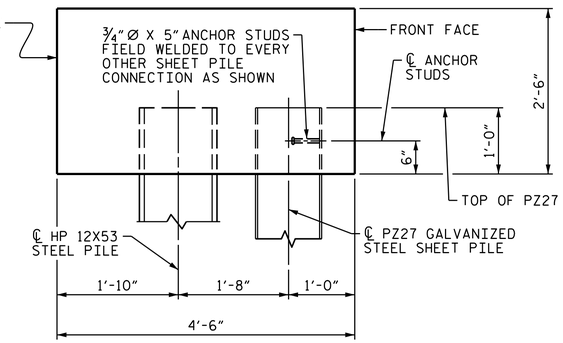
usnp04353

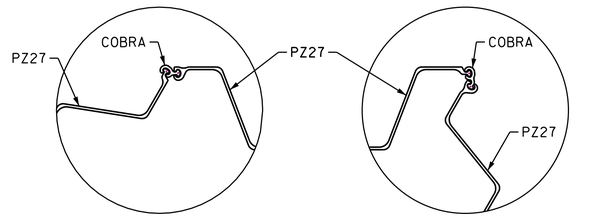


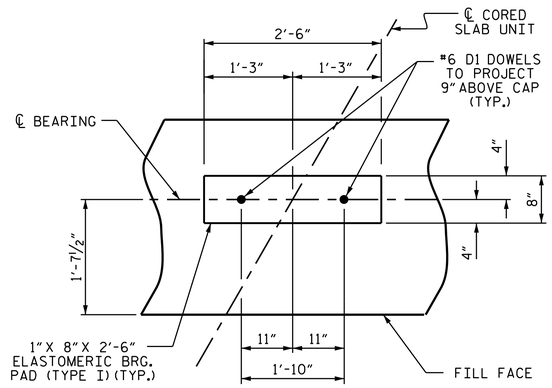
PILE SPLICE DETAILS

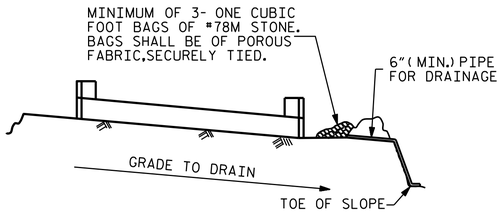




SHEET PILE ANCHOR STUD DETAIL





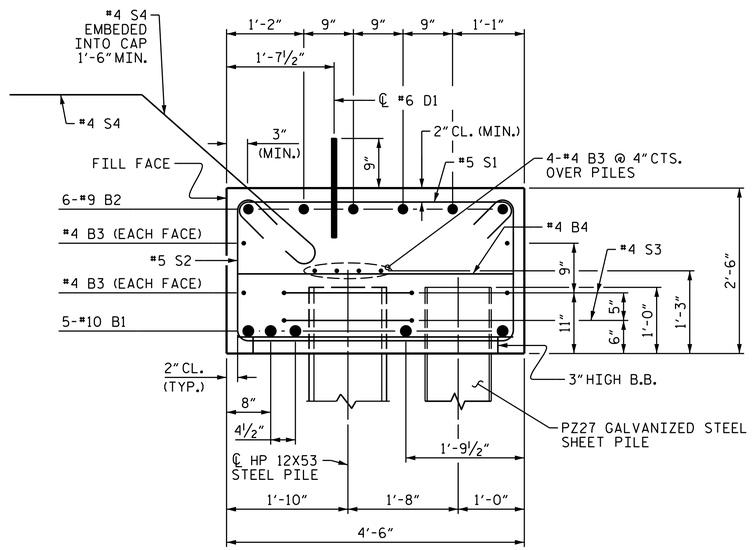


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

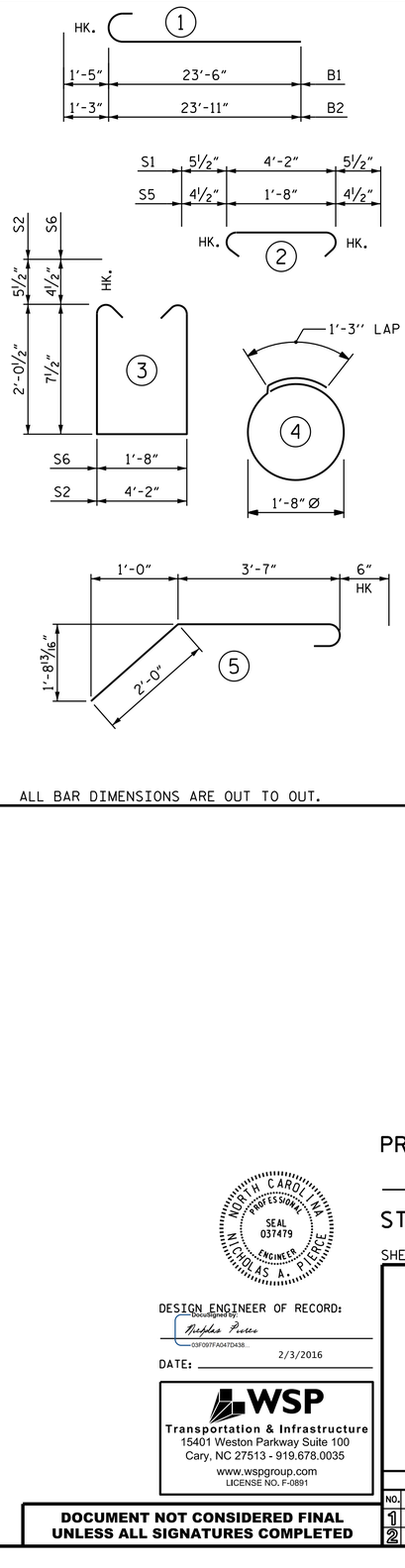
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	24'-11"	1072
B2	12	#9	1	25'-2"	1027
B3	16	#4	STR	20'-9"	222
B4	10	#4	STR	4'-2"	28
D1	18	#6	STR	1'-6"	41
H1	4	#6	STR	20'-10"	125
H2	8	#4	STR	20'-8"	110
H3	2	#6	STR	8'-9"	26
H4	4	#4	STR	8'-9"	23
K1	6	#4	STR	4'-2"	17
K2	6	#4	STR	4'-0"	16
S1	62	#5	2	5'-1"	329
S2	72	#5	3	9'-2"	688
S3	10	#4	4	6'-6"	43
S4	30	#4	5	6'-1"	122
S5	49	#4	2	2'-5"	79
S6	49	#4	3	3'-8"	120
V1	28	#4	STR	4'-5"	83

REINFORCING STEEL 4171 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP 16.5 C.Y.

POUR #2 UPPER PART OF WINGS & COPINGS 4.2 C.Y.

TOTAL CLASS A CONCRETE 20.7 C.Y.

HP 12 X 53 STEEL PILES
NO. 5 300 LIN. FT.

GALVANIZED 18" STEEL SHEET PILES
NO. PZ27 = 60 1788 SQ. FT.
NO. COBRA = 2 EA.
TOTAL NO. = 62 1788 SQ. FT.

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD: Nicholas Pierce
03F097FA047D438...
DATE: 2/3/2016

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Cary, NC 27513 - 919.678.0035
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LICENSE NO. F-0891

PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

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2/3/2016
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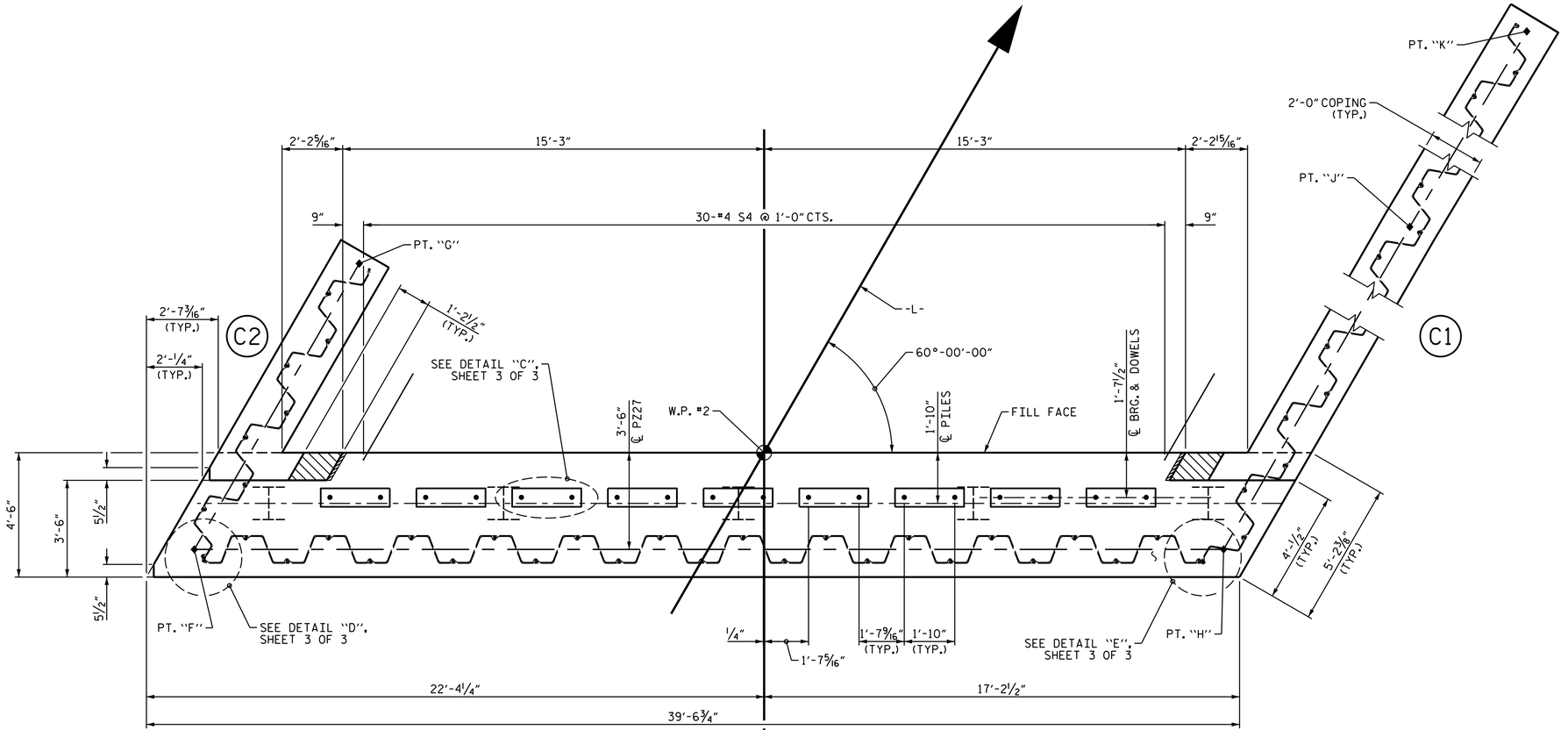
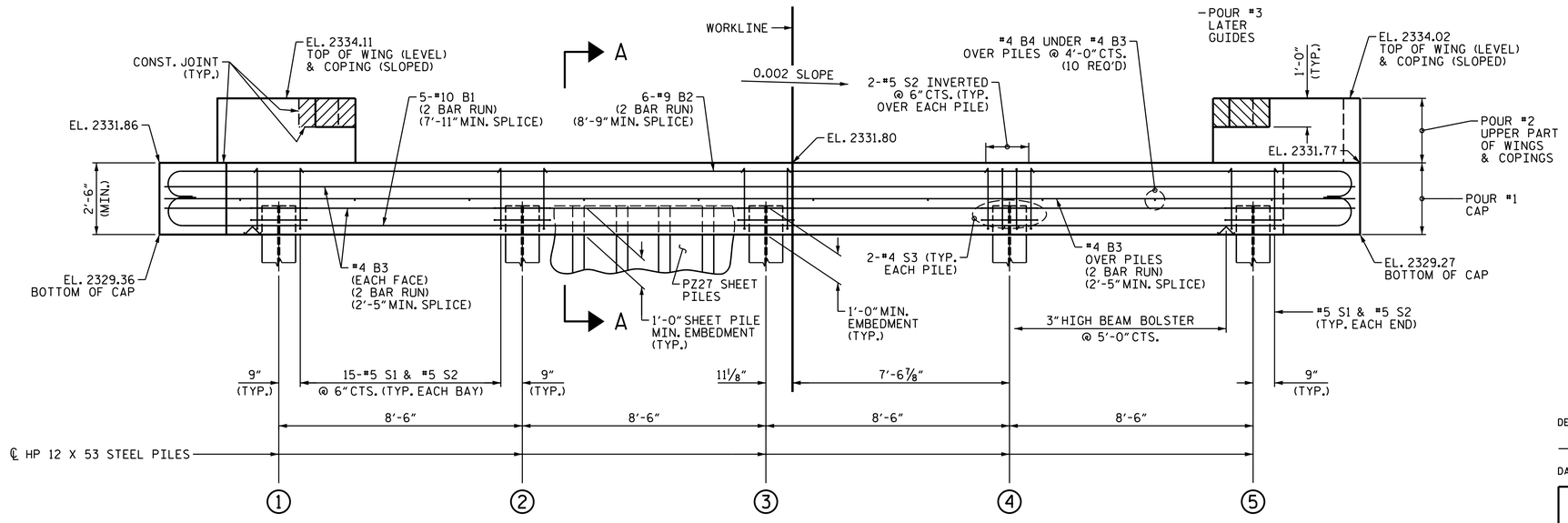


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 3 OF 3.
COPING & PZ27 SHEET PILES OMITED FOR CLARITY.
NOT ALL PZ27 SHEET PILES ARE SHOWN FOR CLARITY.
FOR EMBEDMENT DEPTH INTO WING AND COPING, SEE SHEET 2 OF 3.

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.

INSTALL THE 4" DRAIN PIPE THROUGH THE PZ27 GALVANIZED STEEL SHEET PILES AS REQUIRED FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) APPROACH FILLS, SEE THE ROADWAY PLANS.

ALL 2" Ø MAX. HOLES IN THE PZ27 GALVANIZED STEEL SHEET PILES TO BE DRILLED NOT BURNED.

FOR GALVANIZATION OF THE PZ27 STEEL SHEET PILES SEE SPECIAL PROVISIONS.

THE POINTS "F THRU K" CAN BE FOUND ON THE "FOUNDATION LAYOUT" OF THE GENERAL DARWINGS SHEET S-2.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING AND COPING DETAILS, SEE SHEET 2 OF 3.

TOP OF PILE ELEVATIONS	
①	2330.35
②	2330.33
③	2330.31
④	2330.30
⑤	2330.28

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
Docusigned by: Nicholas Pierce 03F097FA047D438...
DATE: 2/3/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

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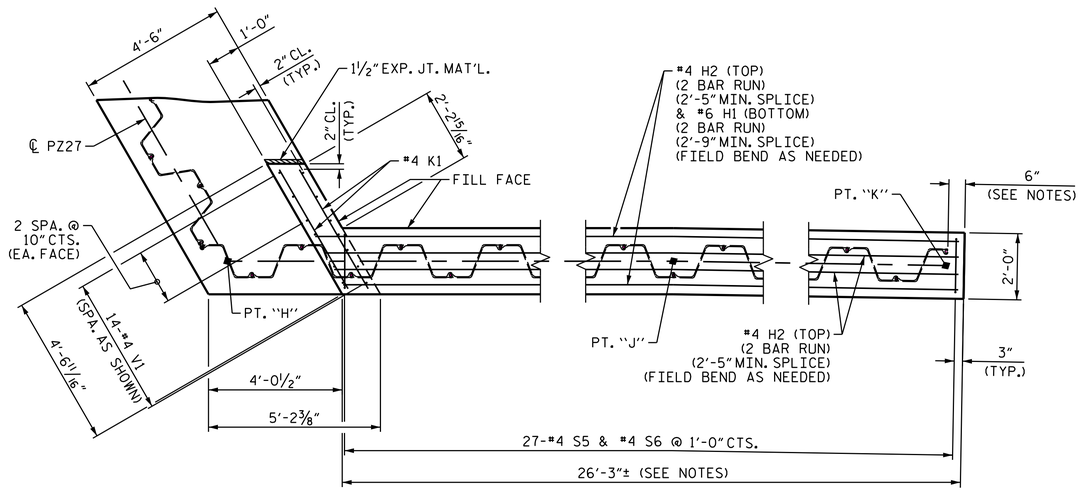
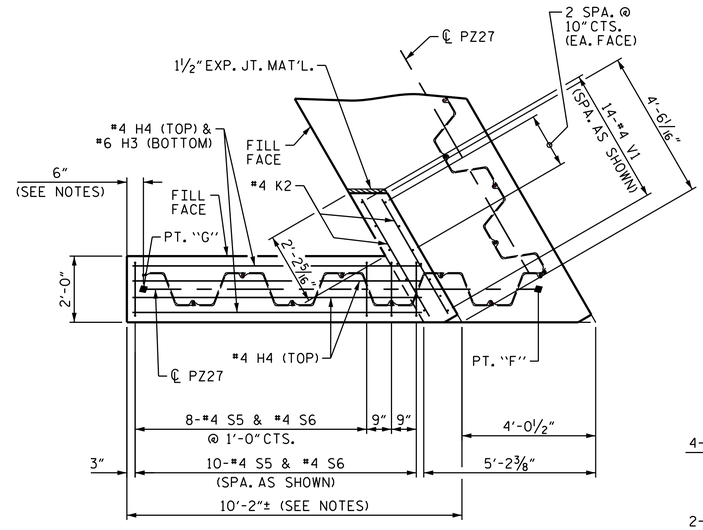


PLAN OF COPING C1

DRILL 2" Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.



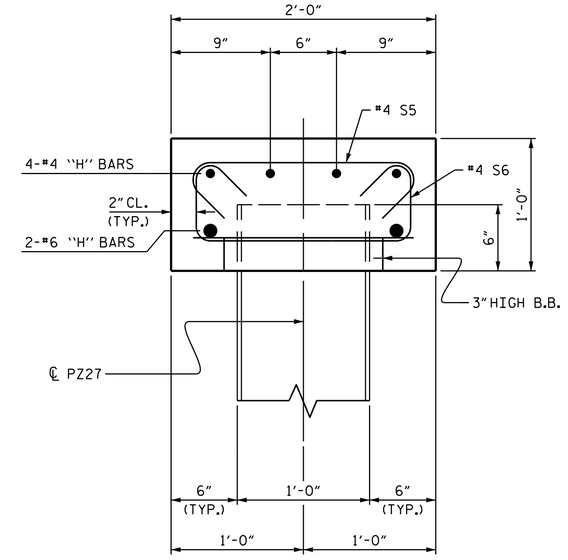
PLAN OF COPING C2

DRILL 2" Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.

NOTES

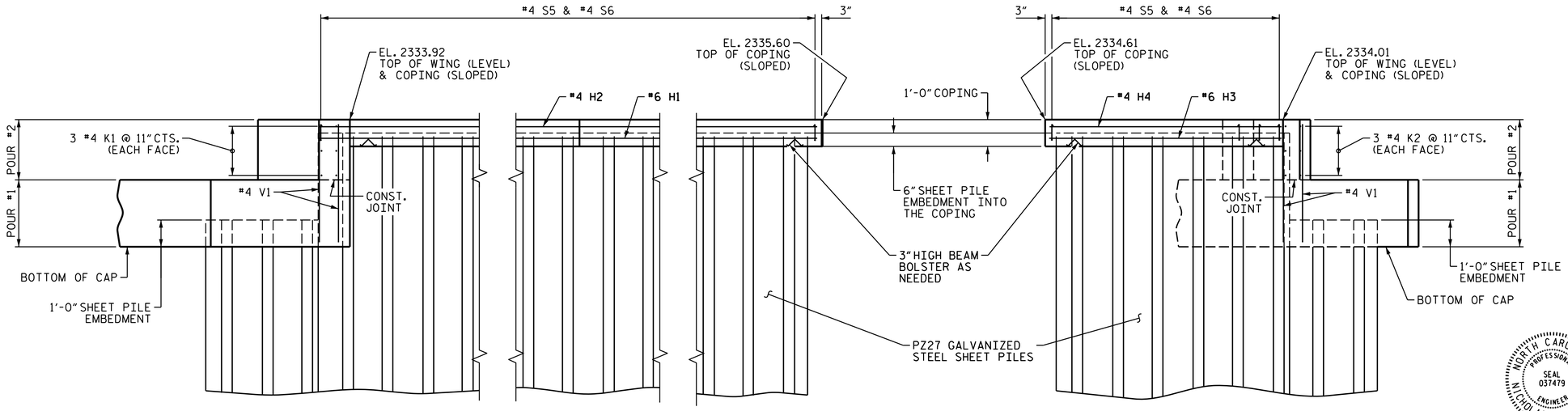
THE POINTS "F THRU K" CAN BE FOUND ON THE "FOUNDATION LAYOUT" OF THE GENERAL DARWINGS SHEET S-2.

THE LENGTH OF THE COPING IS BASED ON THE LAST SHEET PILE PLUS 6" ACCORDING TO THE FOUNDATION LAYOUT.



SECTION THRU COPING

DRILL 2" Ø HOLES IN SHEET PILES FOR #4 S6 BAR



ELEVATION OF COPING C1

DRILL 2" Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.
V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES.

ELEVATION OF COPING C2

DRILL 2" Ø HOLES IN SHEET PILES FOR #10 B1, #9 B2, #4 B3, #4 K1, AND #4 S6 BARS.
V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES.

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce
03F05FFA047D438...
DATE: 2/3/2016

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GRAHAM COUNTY
STATION: 11+84.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

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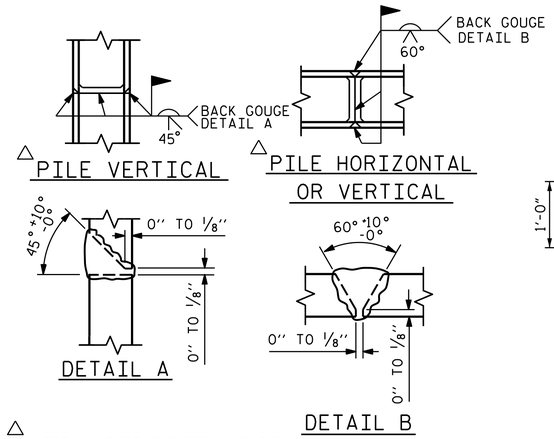
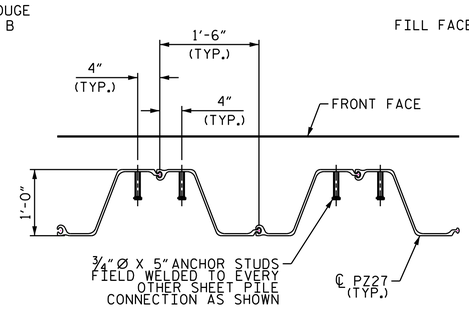
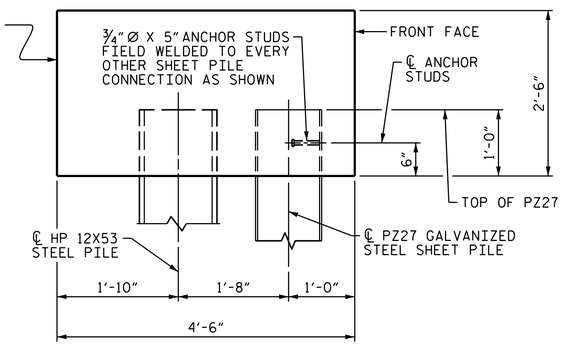
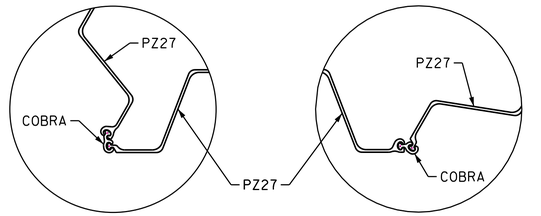


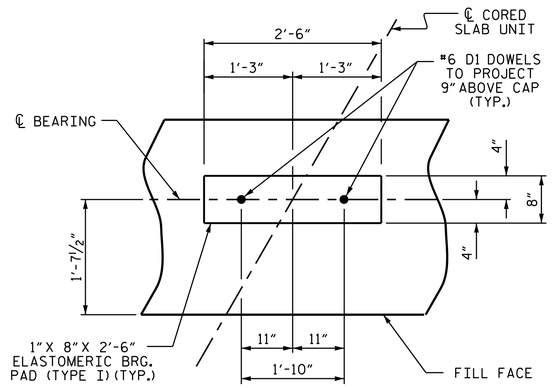
PILE SPLICE DETAILS

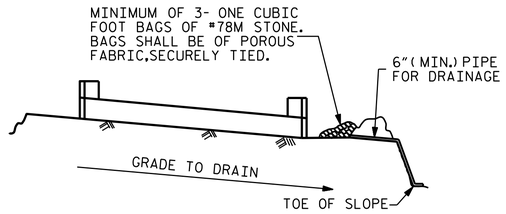




SHEET PILE ANCHOR STUD DETAIL







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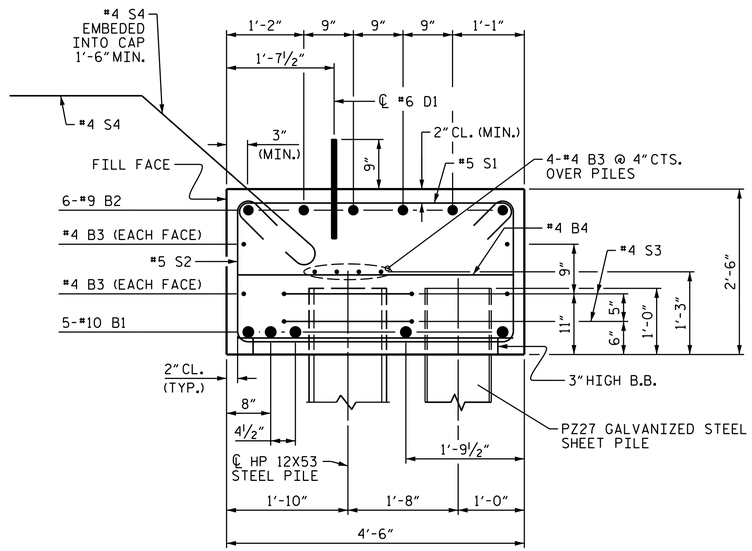
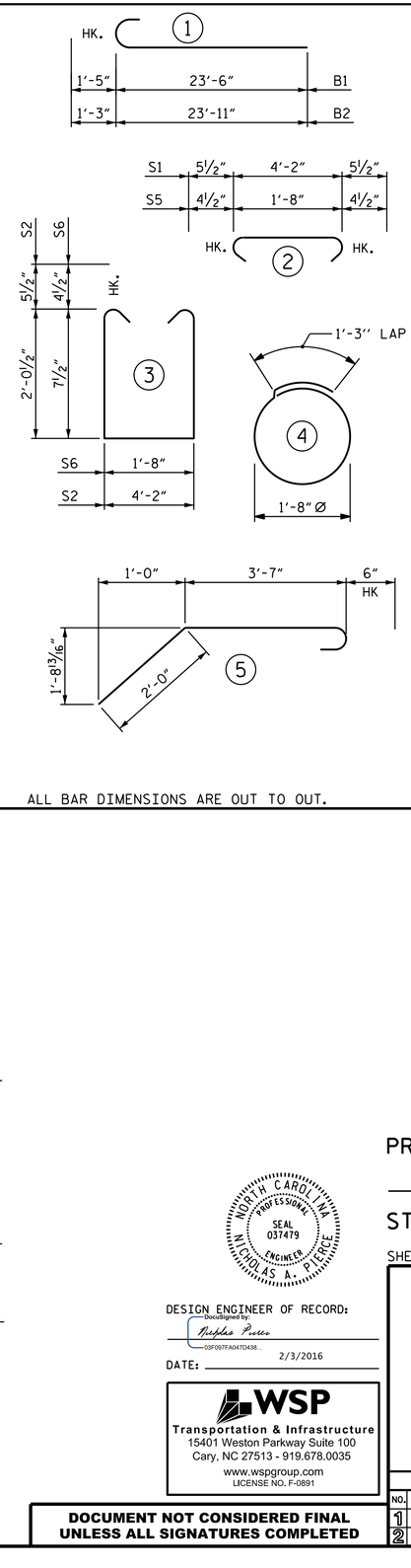
TEMPORARY DRAINAGE AT END BENT



BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	24'-11"	1072
B2	12	#9	1	25'-2"	1027
B3	16	#4	STR	20'-9"	222
B4	10	#4	STR	4'-2"	28
D1	18	#6	STR	1'-6"	41
H1	4	#6	STR	14'-11"	90
H2	8	#4	STR	14'-9"	79
H3	2	#6	STR	8'-9"	26
H4	4	#4	STR	8'-9"	23
K1	6	#4	STR	4'-2"	17
K2	6	#4	STR	4'-0"	16
S1	62	#5	2	5'-1"	329
S2	72	#5	3	9'-2"	688
S3	10	#4	4	6'-6"	43
S4	30	#4	5	6'-1"	122
S5	37	#4	2	2'-5"	60
S6	37	#4	3	3'-8"	91
V1	28	#4	STR	4'-5"	83

REINFORCING STEEL 4057 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP 16.5 C.Y.

POUR #2 UPPER PART OF WINGS & COPINGS 3.3 C.Y.

TOTAL CLASS A CONCRETE 19.8 C.Y.

HP 12 X 53 STEEL PILES
NO. 5 300 LIN. FT.

GALVANIZED 18" STEEL SHEET PILES
NO. PZ27 = 52 1635 SQ. FT.
NO. COBRA = 2 EA.
TOTAL NO. = 54 1635 SQ. FT.

DRAWN BY : M.J. OSTRISHKO DATE : 07/2014
CHECKED BY : N.A. PIERCE DATE : 07/2014

2/3/2016
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usnp04353

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD:
DocuSigned by: Nicholas Pierce
03F097FA047D438...
DATE: 2/3/2016

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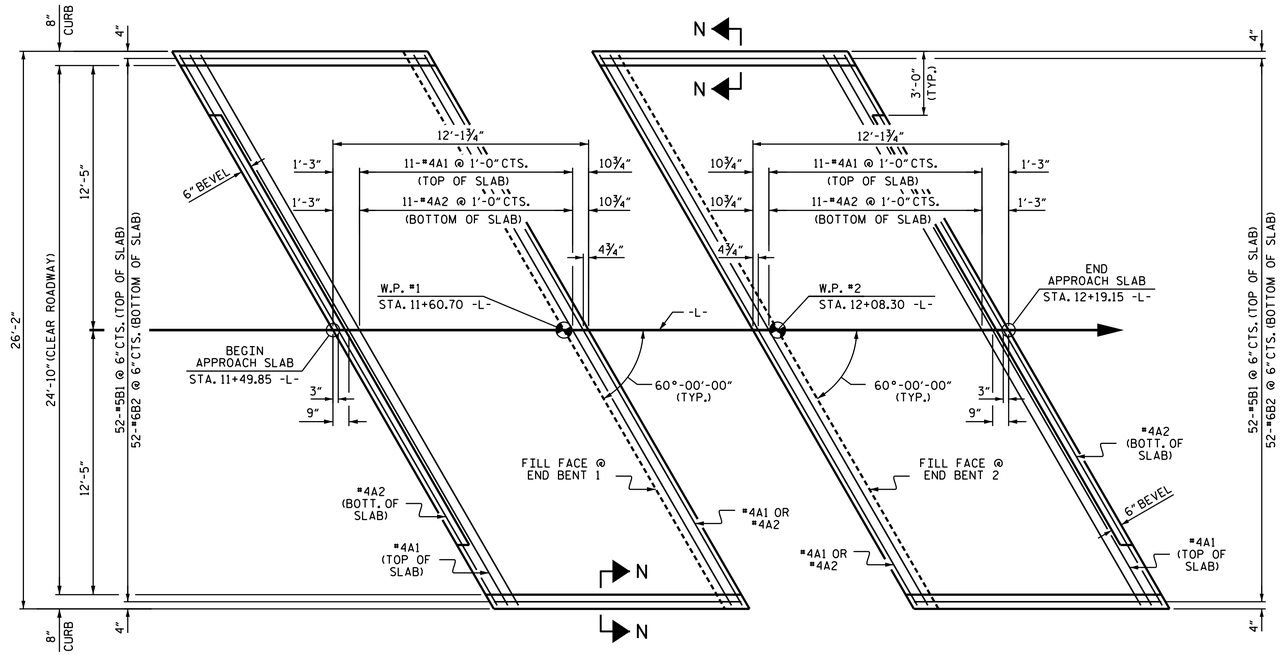
PROJECT NO. 17BP.14.R.89
GRAHAM COUNTY
STATION: 11+84.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			15



PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

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

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

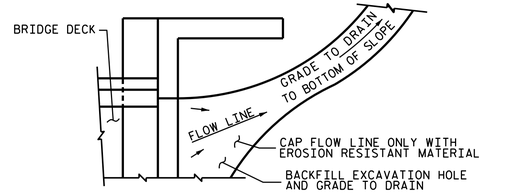
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.



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

TEMPORARY DRAINAGE DETAIL

BILL OF MATERIAL

APPROACH SLAB AT EB 1

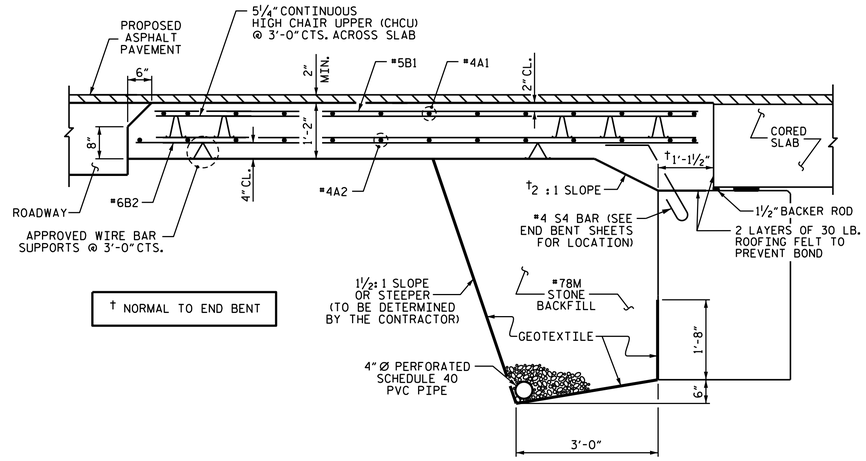
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	29'-9"	258
A2	13	#4	STR	29'-9"	258
* B1	52	#5	STR	11'-1"	601
B2	52	#6	STR	11'-7"	905
REINFORCING STEEL				LBS.	1163
* EPOXY COATED REINFORCING STEEL				LBS.	859
CLASS AA CONCRETE				C. Y.	14.8

APPROACH SLAB AT EB 2

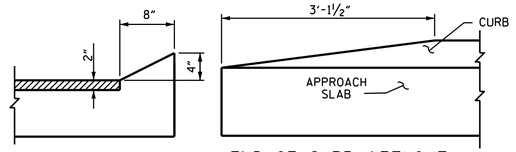
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	29'-9"	258
A2	13	#4	STR	29'-9"	258
* B1	52	#5	STR	11'-1"	601
B2	52	#6	STR	11'-7"	905
REINFORCING STEEL				LBS.	1163
* EPOXY COATED REINFORCING STEEL				LBS.	869
CLASS AA CONCRETE				C. Y.	14.8

SPLICE LENGTHS

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



SECTION THRU SLAB



SECTION N-N END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. 17BP.14.R.89

GRAHAM COUNTY

STATION: 11+84.50 -L-

NORTH CAROLINA PROFESSIONAL SEAL 037479 ENGINEER NICHOLAS A. PIERCE

DESIGN ENGINEER OF RECORD: DocuSigned by: Nicholas Pierce 03F097FA047D438...

DATE: 2/3/2016

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Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 60° SKEW

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M.J. OSTRISHKO	DATE : 07/2014
CHECKED BY : N.A. PIERCE	DATE : 07/2014
DRAWN BY : SHS/MAA 5-09	REV. 12-11 MAA/AAC
CHECKED BY : BCH 5-09	

2/3/2016
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STD. NO. BAS_27_60S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

REV. 6-16-95 EEM (-) RGW REV. 5-7-03 RWW (-) JTE REV. 10-1-11 MAA (-) GM
REV. 8-16-99 RWW (-) LES REV. 5-1-06 TLA (-) GM

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