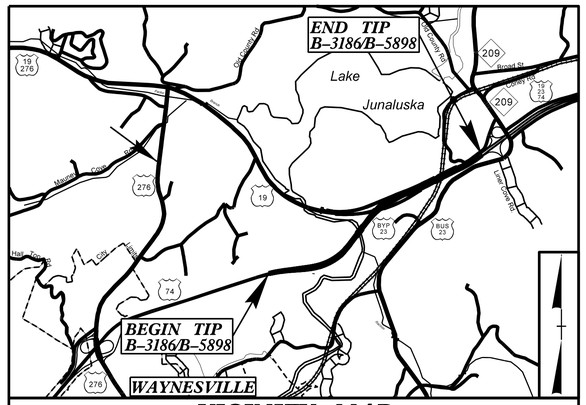
09/08/99

TIP PROJECT: B–3186 /B–5898

CONTRACT: C204684



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

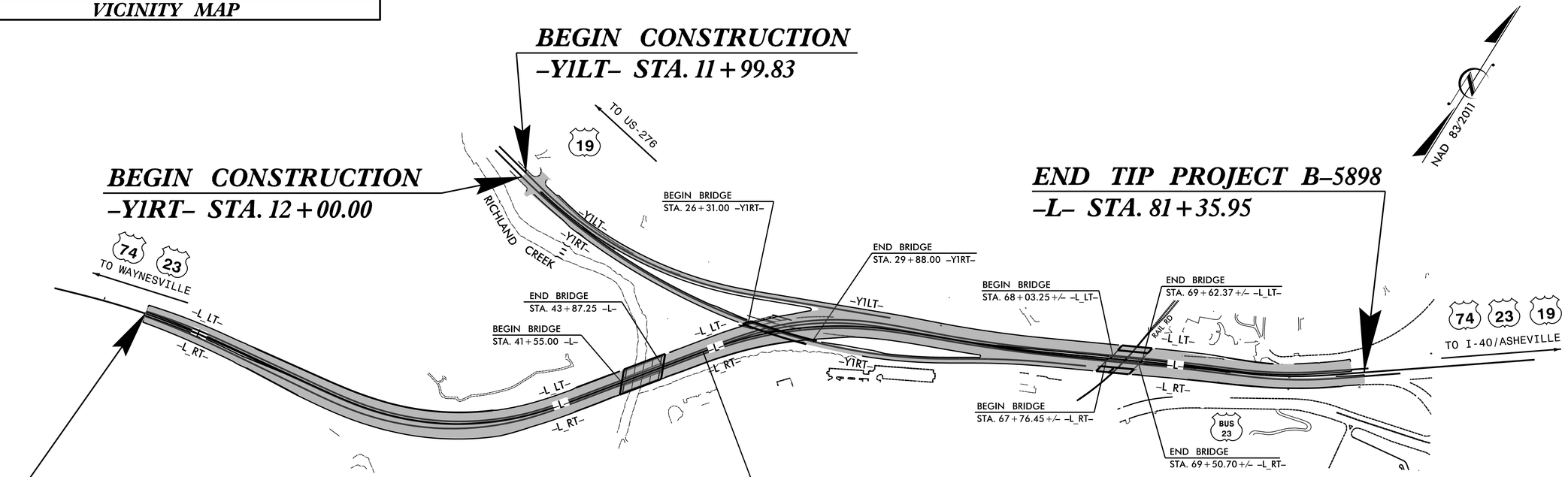
HAYWOOD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–3186 /B–5898	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38332.1.FS.1	BRNHP–0023(32)	P.E.
48030.1.FS.1	BRSTP–0019(49)	P.E.
38332.2.1	N/A	RW/UTILITY
48030.2.1	N/A	RW/UTILITY

LOCATION: US 23/US 74/US 19 (GREAT SMOKEY MOUNTAIN HWY) FROM WEST OF NC 209(CRABTREE RD.) TO EAST OF RUSS AVE.

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES AND UTILITIES.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2022 = 47,300
ADT 2042 = 59,400
K = 8 %
D = 55 %
T = 5 % *
V = 65 MPH
* TTST = 2% DUAL 3%

FUNC CLASS = FREEWAY
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–3186 = 0.545 miles
TOTAL STRUCTURES TIP PROJECT B–3186 = 0.044 miles
TOTAL LENGTH TIP PROJECT B–3186 = 0.589 miles

LENGTH ROADWAY TIP PROJECT B–5898 = 0.636 miles
TOTAL STRUCTURES TIP PROJECT B–5898 = 0.033 miles
TOTAL LENGTH TIP PROJECT B–5898 = 0.669 miles

(LENGTHS BASED ON L_RT ALIGNMENT)

Prepared in the Office of:
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 8, 2021

LETTING DATE:
MARCH 15, 2022

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

HENRY W. BARE
PROJECT DESIGN ENGINEER

GARRETT HIGDON, PE
NCDOT CONTACT

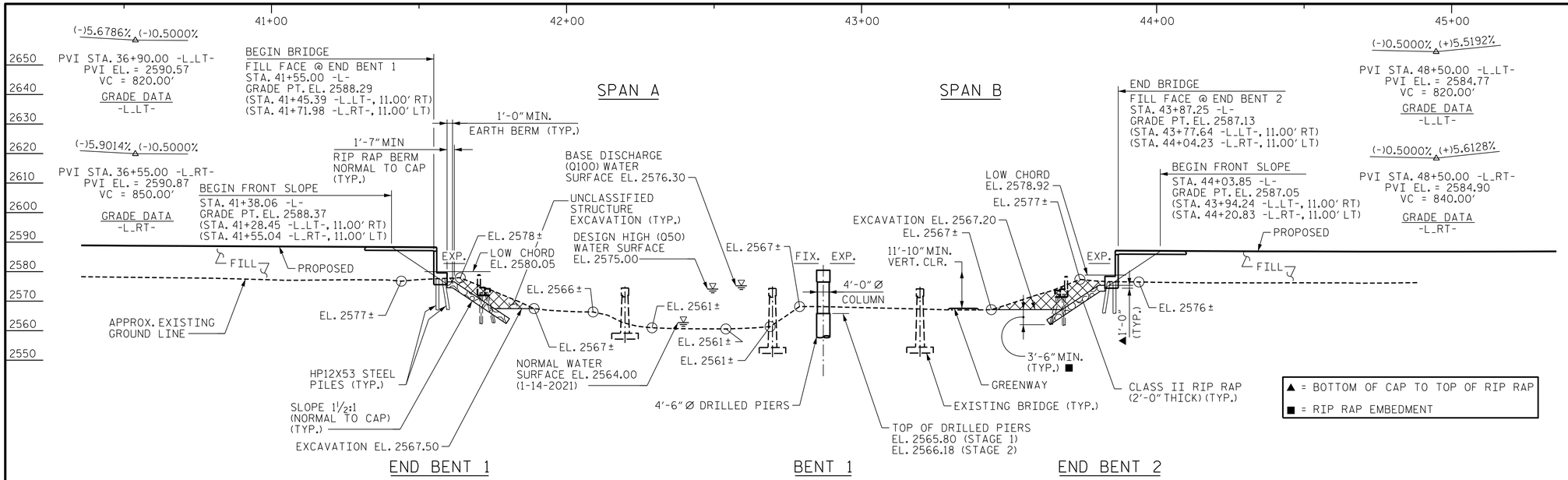
ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

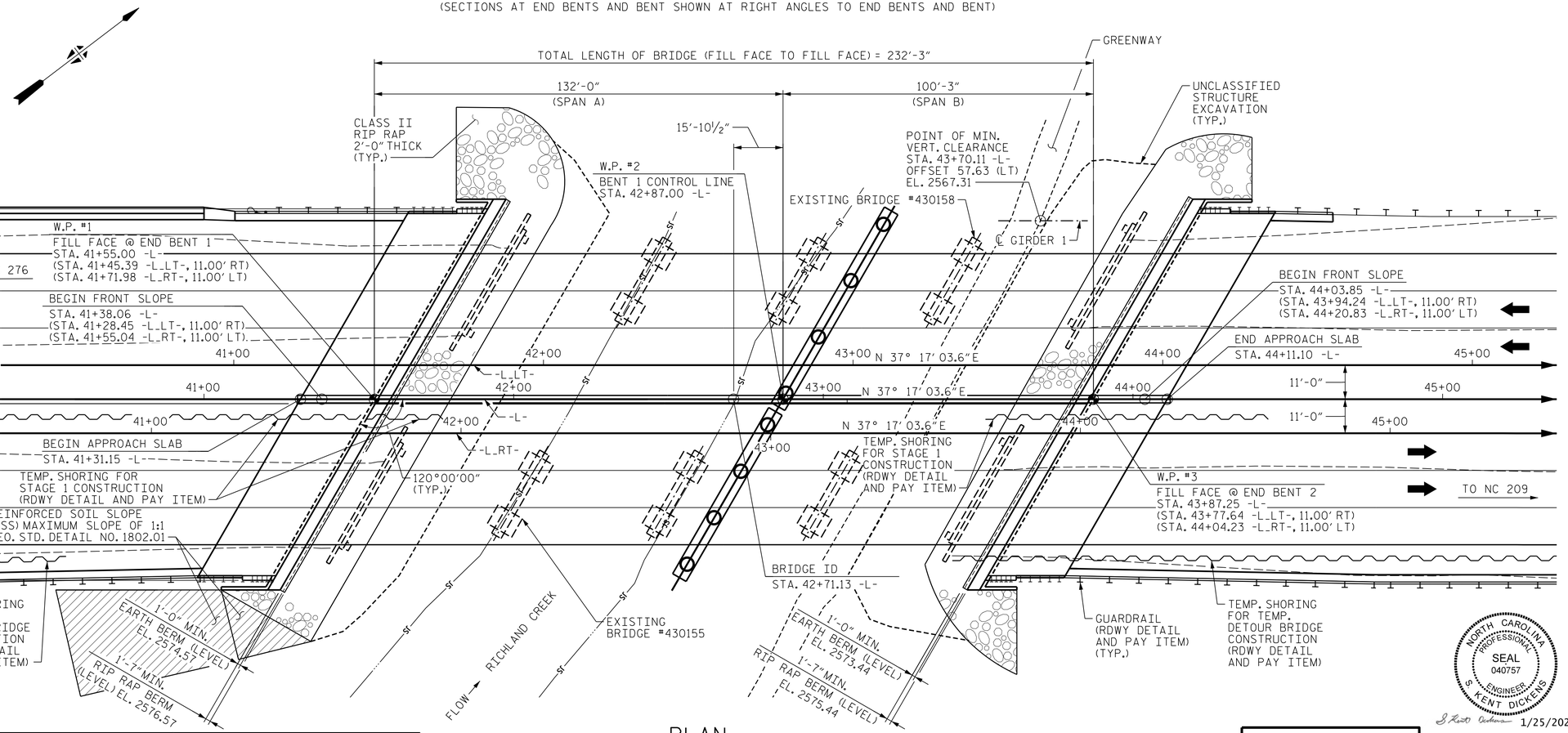
PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.pltPENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 12/10/2021 TIME: 2:26:54 PM
FILE: NCDOT\NCDOT-B3186_T02.c…\6.0_CAD_BIM\6.2_Work_In_Progress\B-3186-B-5898\Structures\CAD\Common Files\0001

F.A. PROJECT NOS. BRNHP-0023(32) & BRSTP-0019(49)



SECTION ALONG -L-

(SECTIONS AT END BENTS AND BENT SHOWN AT RIGHT ANGLES TO END BENTS AND BENT)



PLAN

(PILES NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

BRIDGE #430468 REPLACES
BRIDGE #430155 & #430158

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON -L- (US 74/US 23)
OVER RICHLAND CREEK
BETWEEN US 276 AND NC 209

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

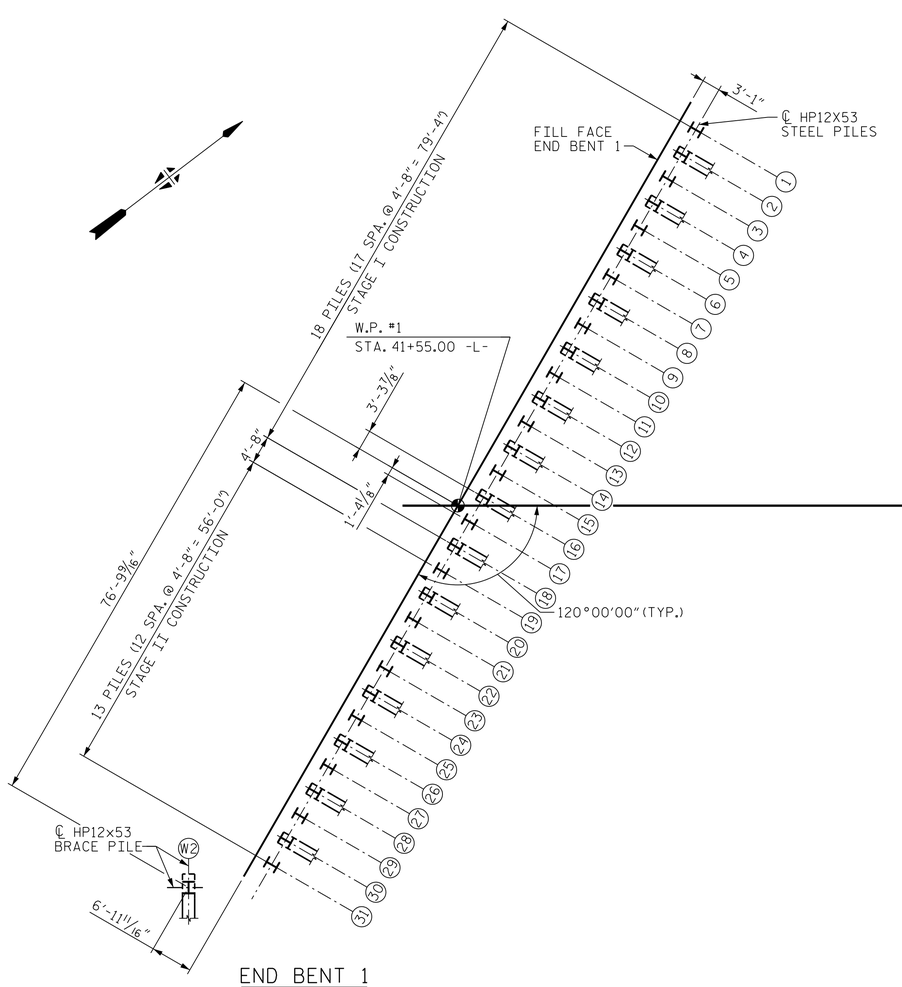
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-01
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY: K. DICKENS	DATE: 03/21	DWG BY: D. CARTER	DATE: 03/21
DES CHK: B. ROGERS	DATE: 03/21	CHK BY: H. ABU NIMEH	DATE: 07/21

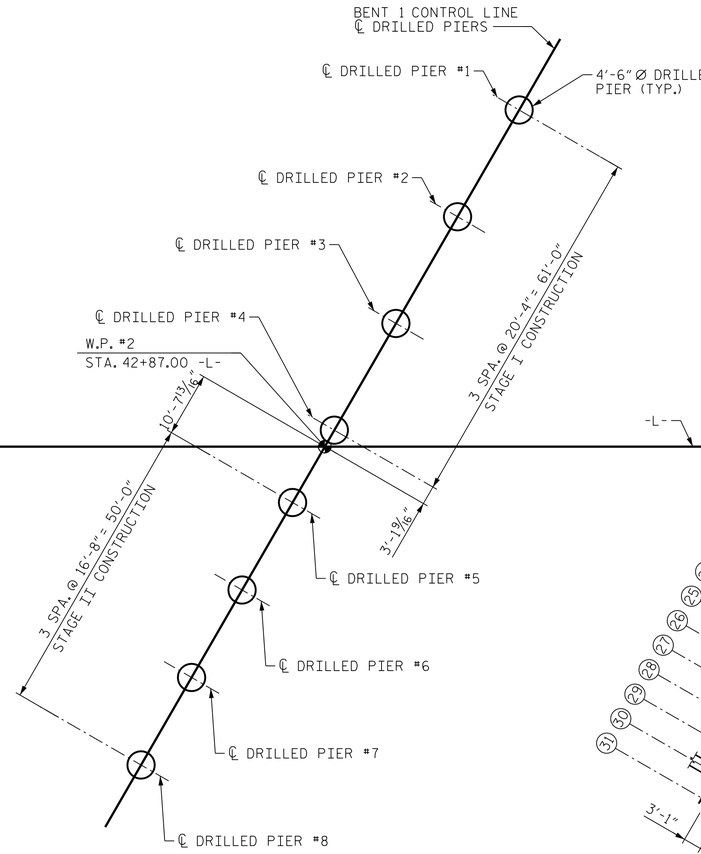
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

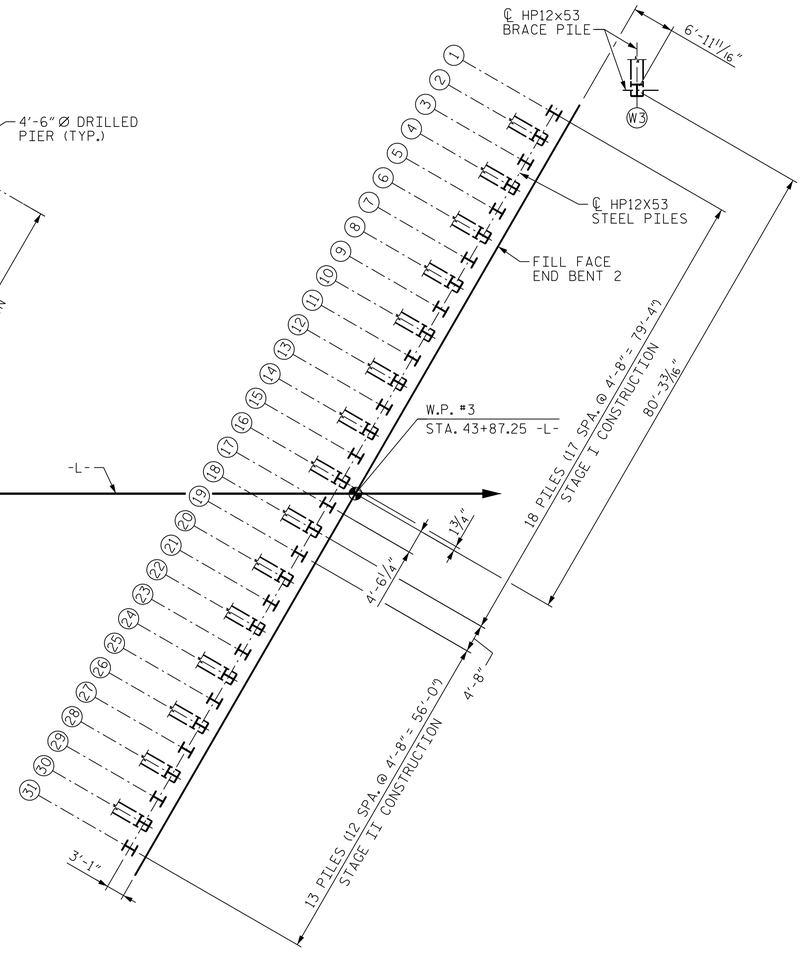
PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:24:06 AM
FILE: ...\401.B5898B3186_SMU_GD_001_430168.dgn



END BENT 1



BENT 1



END BENT 2

FOUNDATION LAYOUT

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS NO. 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENTS NO. 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

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

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

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS (AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION).

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

DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 725 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 100 TSF.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. DO NOT EXTEND PERMANENT CASING AT BENT NO. 1 BELOW ELEVATION 2557 FT FOR STAGE 1 LT AND STAGE 2 RT AND ELEVATION 2547 FOR STAGE 1 RT AND STAGE 2 LT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 2548 FEET FOR STAGE 1 LT, 2528 FEET FOR STAGE 1 RT AND STAGE 2 LT, AND 2542 FEET FOR STAGE 2 RT, RESPECTIVELY, AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 9 FT INTO WEATHERED ROCK/ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS 2557 FT FOR STAGE 1 LT, 2542 FT FOR STAGE 1 RT AND STAGE 2 LT, AND 2550 FT FOR STAGE 2 RT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

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

CSL TUBES AND TESTING ARE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

LEGEND

H	HP12X53 VERTICAL PILE
H-->	HP12X53 BRACE PILE (BATTER 3H:12V)
(#)	PILE NUMBER

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOUNDATION LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

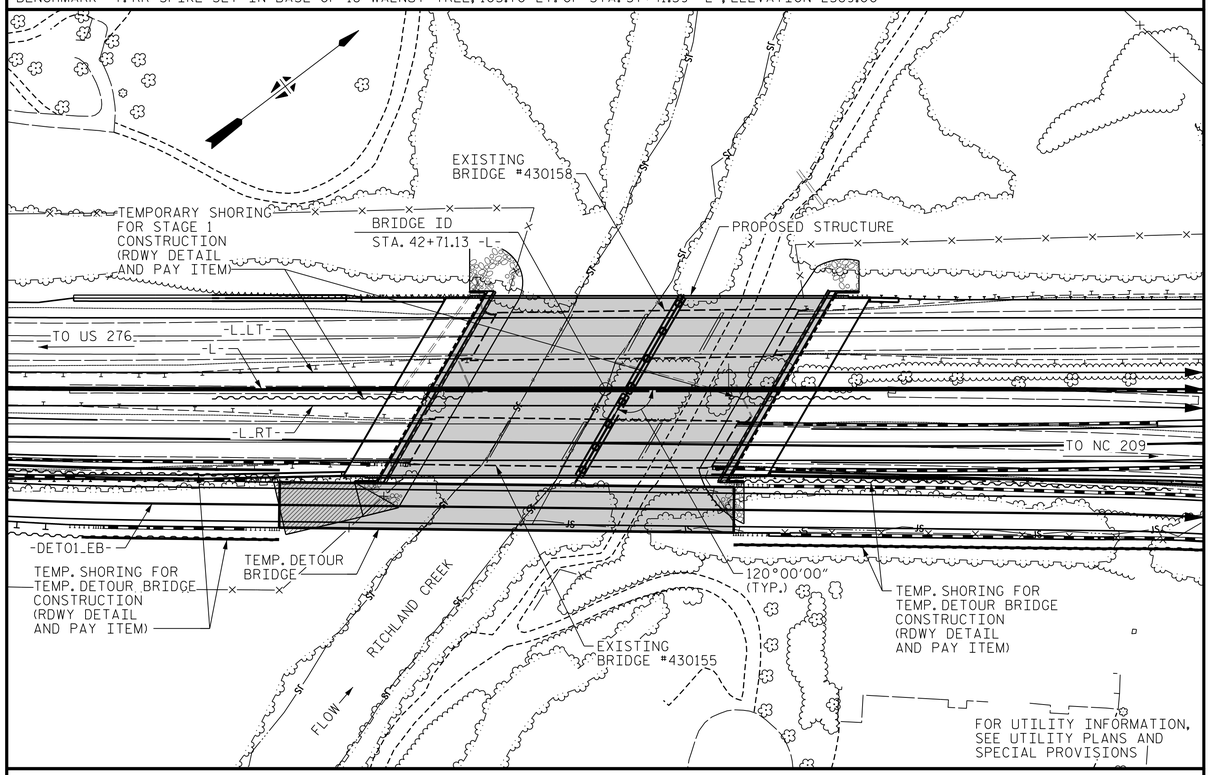
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-02
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY: K. DICKENS	DATE: 06/21	DWG BY: B. PETERSON	DATE: 06/21
DES CHK: L. GUALTERI	DATE: 06/21	CHK BY: K. DICKENS	DATE: 07/21



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE ..... = 8,700 CFS
FREQUENCY OF DESIGN FLOOD ..... = 50 YR.
DESIGN HIGH WATER ELEVATION ..... = 2575.0
DRAINAGE AREA ..... = 56.9 SQ. MI.
BASE DISCHARGE (0100) ..... = 10,300 CFS
BASE HIGH WATER ELEVATION ..... = 2576.3

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ..... = 47,500 CFS
FREQUENCY OF OVERTOPPING FLOOD ..... = + 500 YR.
OVERTOPPING FLOOD ELEVATION ..... = 2590.9

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINT OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS APPROVED BY THE ENGINEER.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 42+71.13 -L-."

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

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 80 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

TEMPORARY SHORING SHALL BE REQUIRED IN THE AREA INDICATED IN THE PLAN.

FOR TEMPORARY SHORING, 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.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 42+55.00 -DET01_EB- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGES INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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 DIFFERENCE BETWEEN THE EXISTING BRIDGES SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.

EXISTING BRIDGES #430155 AND #430158, EACH CONSISTING OF FOUR (4) 50 FOOT STEEL SPANS WITH A CLEAR ROADWAY WIDTH OF 28 FEET ON A CAST IN PLACE CONCRETE DECK ON END BENTS WITH PILE FOUNDATIONS AND INTERIOR BENTS ON SPREAD FOOTINGS, AND EACH LOCATED ± 18'-0" UPSTREAM OR ± 18'-0" DOWNSTREAM (RESPECTIVELY) FROM PROPOSED STRUCTURE, SHALL BE REMOVED WHEN INDICATED BY THE CONSTRUCTION SEQUENCE. THE EXISTING BRIDGES ARE PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGES 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.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP. STRUCTURE @ STA. 42+71.13 -L-	REMOVAL OF EXISTING STRUCTURES @ STA. 42+71.13 -L-	ASBESTOS ASSESMENT	4'-6" DIA. DRILLED PIERS IN SOIL	4'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-6" DIA. DRILLED PIERS	PDA TESTING	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 42+71.13 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS @ STA. 42+71.13 -L-
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM
SUPERSTRUCTURE											27,636	30,119		LUMP SUM
END BENT NO. 1													164.4	
BENT NO. 1				164	72	112			1				155.4	
END BENT NO. 2													165.1	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	164	72	112	1	1	1	LUMP SUM	27,636	30,119	484.9	LUMP SUM

TOTAL BILL OF MATERIAL

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	72" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	HP12X53 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	ELECTRICAL CONDIUT SYSTEM FOR SIGNALS @ STA. 42+71.13 -L-
	LB.	LB.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			26	2950.8					499.6	282.0			LUMP SUM	LUMP SUM	LUMP SUM
END BENT NO. 1	21,997				32	32	960	32			425	470			
BENT NO. 1	46,647	9,020													
END BENT NO. 2	22,004				32	32	1120	32			420	435			
TOTAL	90,648	9,020	26	2950.8	64	64	2080	64	499.6	282.0	845	905	LUMP SUM	LUMP SUM	LUMP SUM

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

PROJECT NO. B-3186/B-5898
HAYWOOD COUNTY
STATION: 42+71.13 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING LOCATION SKETCH AND NOTES

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER J. KENT DICKENS

J. Kent Dickens 1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-03
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

DES BY: K. DICKENS DATE: 03/21
DES CHK: B. ROGERS DATE: 03/21
DWG BY: D. CARTER DATE: 03/21
CHK BY: H. ABU NIMEH DATE: 07/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 10:03:20 AM
FILE: ...\401.010.B5898B3186_SMU.GD.003.430168.dgn

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 × 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⟩	1.09	--	1.75	0.87	1.39	A	E	63.97	0.94	1.25	A	E	25.17	0.80	0.87	1.09	A	E	63.97	
		HL-93 (OPERATING)	N/A		1.72	--	1.35	0.87	1.81	A	E	63.97	1.01	1.72	A	I	102.78	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.62	58.32	1.75	0.87	1.95	B	E	48.10	1.01	1.83	A	I	102.78	0.80	0.87	1.62	A	E	63.97	
		HS-20 (OPERATING)	36.000		2.43	87.48	1.35	0.87	2.53	B	E	48.10	1.01	2.43	A	I	102.78	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.94	53.19	1.40	0.87	5.76	B	E	48.10	1.01	6.06	A	I	102.78	0.80	0.87	3.94	A	E	63.97	
		SNGARBS2	20.000		2.81	56.20	1.40	0.87	4.18	B	E	48.10	1.01	4.17	A	I	102.78	0.80	0.87	2.81	A	E	63.97	
		SNAGRIS2	22.000		2.61	57.42	1.40	0.87	3.91	B	E	48.10	1.01	3.82	A	I	102.78	0.80	0.87	2.61	A	E	63.97	
		SNCOTTS3	27.250		1.96	53.41	1.40	0.87	2.86	B	E	48.10	1.01	2.93	A	I	102.78	0.80	0.87	1.96	A	E	63.97	
		SNAGGRS4	34.925		1.59	55.53	1.40	0.87	2.35	B	E	48.10	1.01	2.34	A	I	102.78	0.80	0.87	1.59	A	E	63.97	
		SNS5A	35.550		1.55	55.10	1.40	0.87	2.30	B	E	48.10	1.01	2.34	A	I	102.78	0.80	0.87	1.55	A	E	63.97	
		SNS6A	39.950		1.41	56.33	1.40	0.87	2.09	B	E	48.10	1.01	2.10	A	I	102.78	0.80	0.87	1.41	A	E	63.97	
		SNS7B	42.000		1.34	56.28	1.40	0.87	1.99	B	E	48.10	1.01	2.03	A	I	102.78	0.80	0.87	1.34	A	E	63.97	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.71	56.43	1.40	0.87	2.55	B	E	48.10	1.01	2.55	A	I	102.78	0.80	0.87	1.71	A	E	63.97	
		TNT4A	33.075		1.71	56.56	1.40	0.87	2.55	B	E	48.10	1.01	2.50	A	I	102.78	0.80	0.87	1.71	A	E	63.97	
		TNT6A	41.600		1.38	57.41	1.40	0.87	2.07	B	E	48.10	1.01	2.12	A	I	102.78	0.80	0.87	1.38	A	E	63.97	
		TNT7A	42.000		1.38	57.96	1.40	0.87	2.07	B	E	48.10	1.01	2.09	A	I	102.78	0.80	0.87	1.38	A	E	63.97	
		TNT7B	42.000		1.40	58.80	1.40	0.87	2.12	B	E	48.10	1.01	2.00	A	I	102.78	0.80	0.87	1.40	A	E	63.97	
		TNAGRIT4	43.000		1.35	58.05	1.40	0.87	2.04	B	E	48.10	1.01	1.94	A	I	102.78	0.80	0.87	1.35	A	E	63.97	
		TNAGT5A	45.000		1.28	57.60	1.40	0.87	1.93	B	E	48.10	1.01	1.89	A	I	102.78	0.80	0.87	1.28	A	E	63.97	
		TNAGT5B	45.000	⟨3⟩	1.27	57.15	1.40	0.87	1.91	B	E	48.10	1.01	1.83	A	I	102.78	0.80	0.87	1.27	A	E	63.97	

LOAD FACTORS

	LIMIT STATE	γ_{DC}	γ_{DW}
DESIGN LOAD RATING FACTORS	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.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

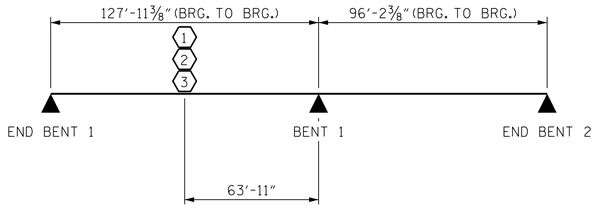
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER



SPAN A SPAN B

LRFR SUMMARY

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-04
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

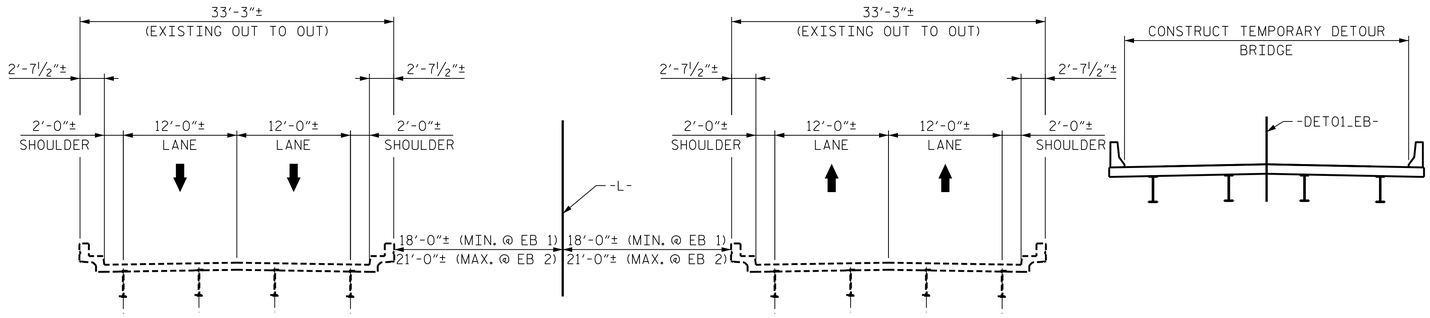
1/25/2022

DES BY: K. DICKENS DATE : 03/21
DES CHK: B. ROGERS DATE : 03/21

DWG BY: D. CARTER DATE : 03/21
CHK BY: K. DICKENS DATE : 06/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

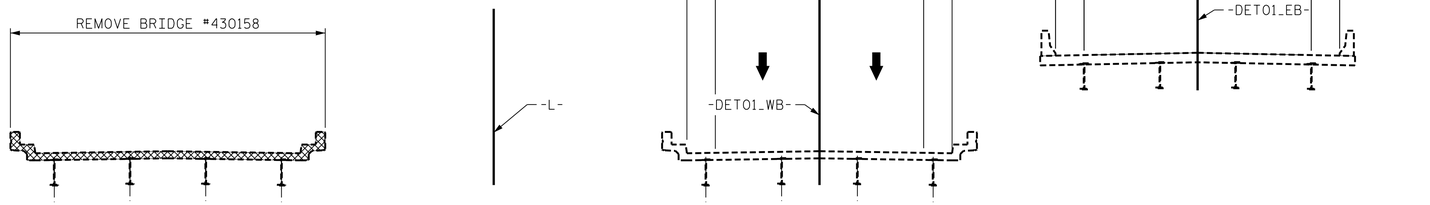


BRIDGE #430158

BRIDGE #430155

PHASE 1 TRAFFIC

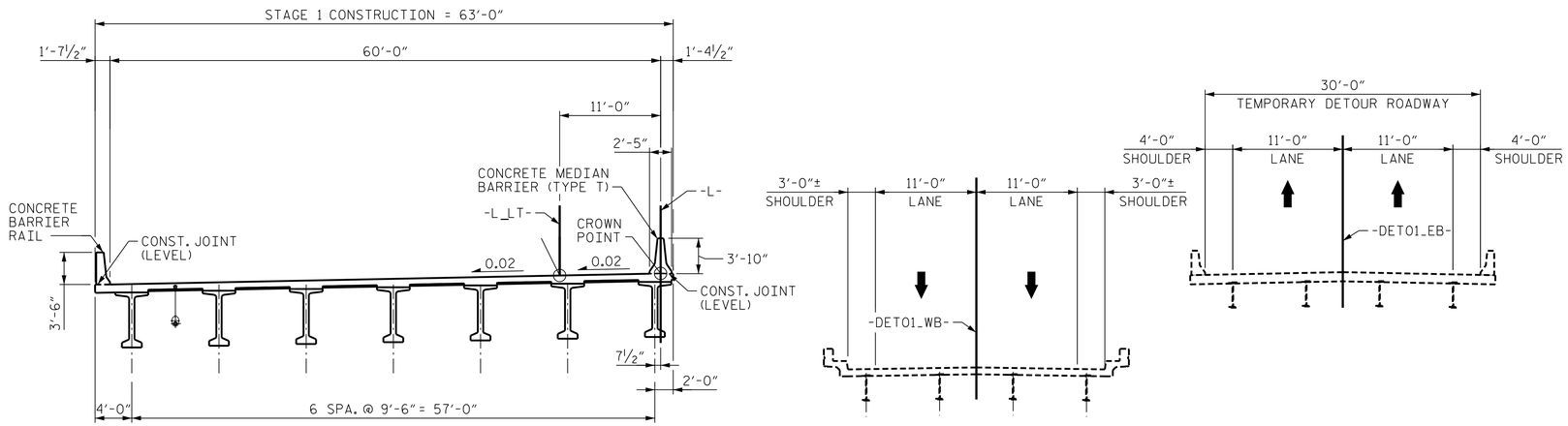
CONSTRUCT -DET01_EB- AND TEMPORARY DETOUR BRIDGE



BRIDGE #430155

PHASE 2 TRAFFIC

(WB TRAFFIC SHIFTED TO BRIDGE #155, EB TRAFFIC SHIFTED TO TEMPORARY DETOUR BRIDGE. REMOVE BRIDGE #158)



BRIDGE #430155

PHASE 2 TRAFFIC

(STAGE 1 CONSTRUCTION: CONSTRUCT SUBSTRUCTURE, ERECT GIRDERS, PLACE DECK, AND PLACE BARRIERS.)

NOTES

FOR MAINTENANCE OF TRAFFIC, SEE TRANSPORTATION MANGEMENT PLAN (TMP).

FOR DIMENSIONS AND CALLOUTS NOT SHOWN, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE SEE SPECIAL PROVISIONS.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE CONSTRUCTION SEQUENCE

REVISIONS						SHEET NO. S01-05
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 59
2			4			

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

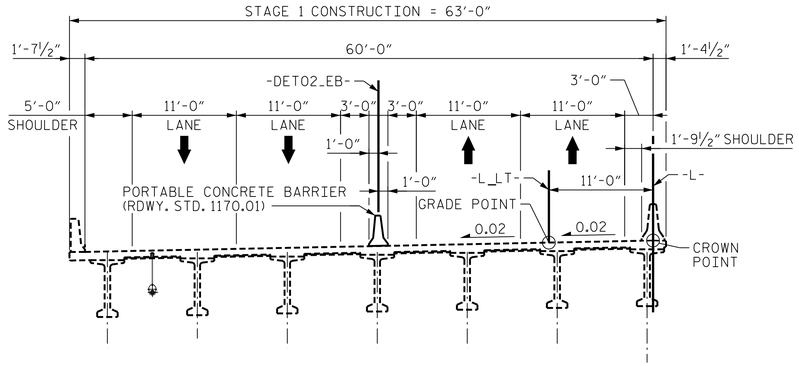
DES BY: H. ABU NIMEH DATE: 05/21
DES CHK: K. DICKENS DATE: 06/21
DWG BY: D. CARTER DATE: 03/21
CHK BY: K. DICKENS DATE: 06/21

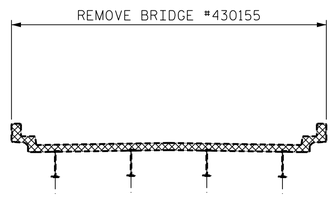
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

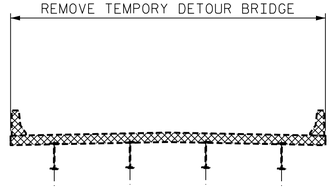
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER

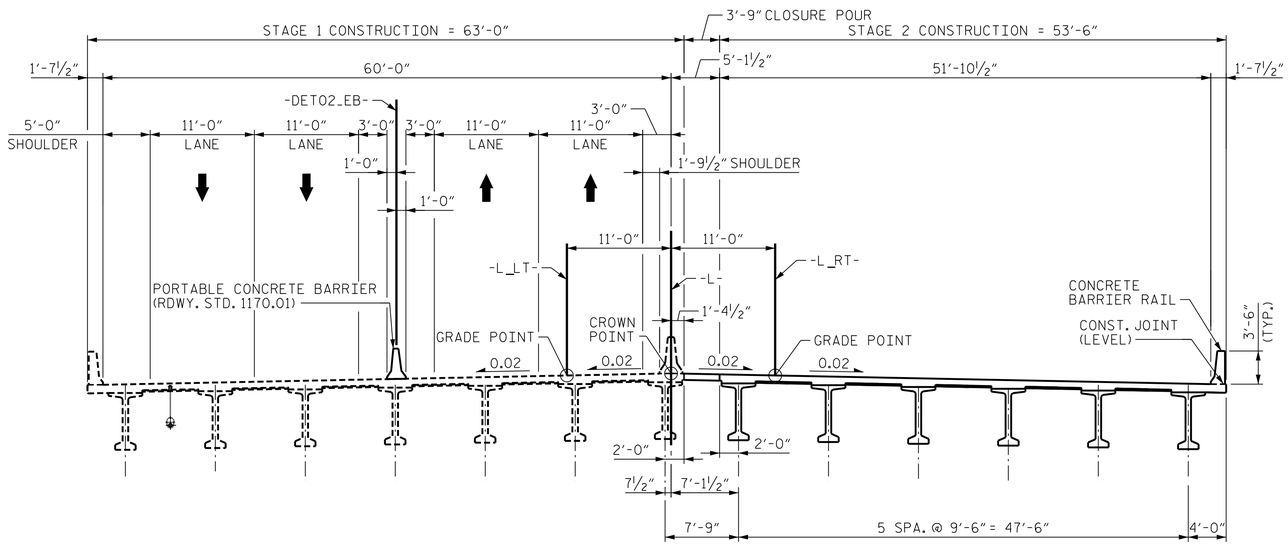






PHASE 3 TRAFFIC

(PLACE TEMPORARY BARRIER. WB AND EB TRAFFIC SHIFTED TO STAGE 1 CONSTRUCTION. REMOVE BRIDGE #155 AND TEMPORARY DETOUR BRIDGE.)



PHASE 3 TRAFFIC

(STAGE 2 CONSTRUCTION: CONSTRUCT SUBSTRUCTURE, ERECT GIRDERS, PLACE DECK, PLACE CLOSURE, AND PLACE BARRIERS.)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

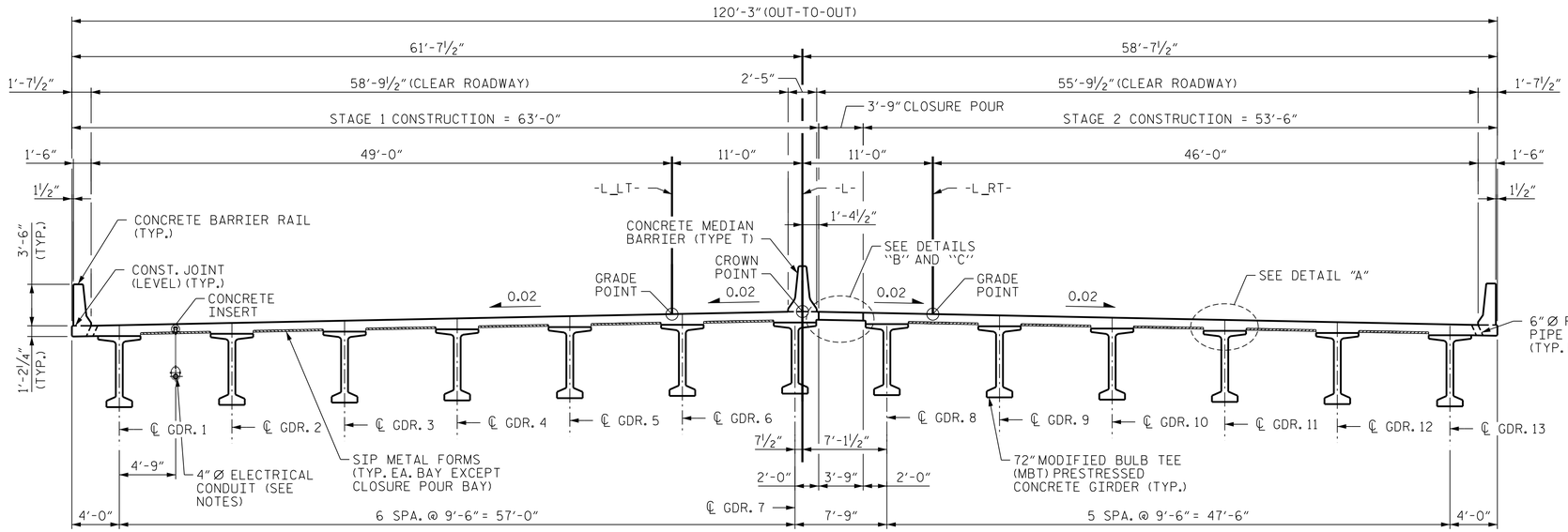
REVISIONS						SHEET NO. S01-06
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1			3			
2			4			

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	06/21
DWG BY:	D. CARTER	DATE :	03/21
CHK BY:	K. DICKENS	DATE :	06/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.pltPENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:25:22 AM
FILE: ...\401.025_B5898B3186_SMU_PC_006.430168.dgn



TYPICAL SECTION

(SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEETS 2, 3 AND 4 FOR ADDITIONAL DETAILS NOT SHOWN HERE)

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.

THE INTERMEDIATE STEEL DIAPHRAGMS IN THE CLOSURE POUR BAYS SHALL BE INSTALLED AFTER THE TWO ADJACENT DECK SECTIONS ARE PLACED, AND BEFORE THE CLOSURE POUR IS PLACED.

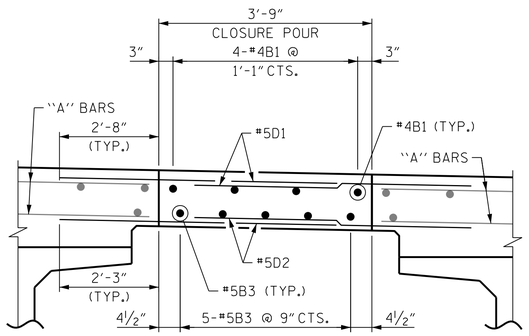
FOR LOCATIONS OF 6" Ø PVC PLASTIC PIPE DECK DRAINS, SEE "SUPERSTRUCTURE PLAN OF SPANS" SHEET 9 OF 9.

FOR ELECTRICAL CONDUIT DETAILS, SEE "ELECTRICAL CONDUIT SYSTEM FOR SIGNALS" SHEET.

DETAIL "A"

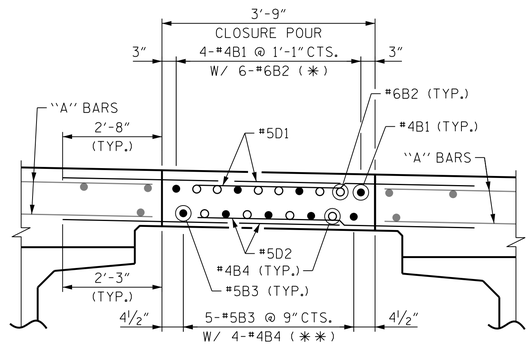
GIRDER BUILDUP				
	SPAN A		SPAN B	
	℄ BRG	MIDSPAN ▲	℄ BRG	MIDSPAN ▲
GIRDERS 1 & 13	5¾"	4 11/16"	5¾"	4 11/16"
GIRDERS 2-6 & 9-12	5¾"	4½"	5¾"	4 11/16"
GIRDER 7	5¾"	4 3/16"	5¾"	4½"
GIRDER 8	5¾"	3 13/16"	5¾"	4½"

▲ = MAXIMUM BUILDUP BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.



DETAIL "B"

(END BENT DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY)



DETAIL "C"

(SHOWN AT BENT 1)

✳ SPACE #6B2 PAIRS EQUALLY AS SHOWN BETWEEN #4B1 BARS
✳✳ SPACE #4B4 EQUALLY AS SHOWN BETWEEN #5B3 BARS

DES BY:	H. ABU NIMEH	DATE :	04/21
DES CHK:	K. DICKENS	DATE :	04/21
DWG BY:	B. PETERSON	DATE :	04/21
CHK BY:	K. DICKENS	DATE :	06/21

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE TYPICAL SECTION

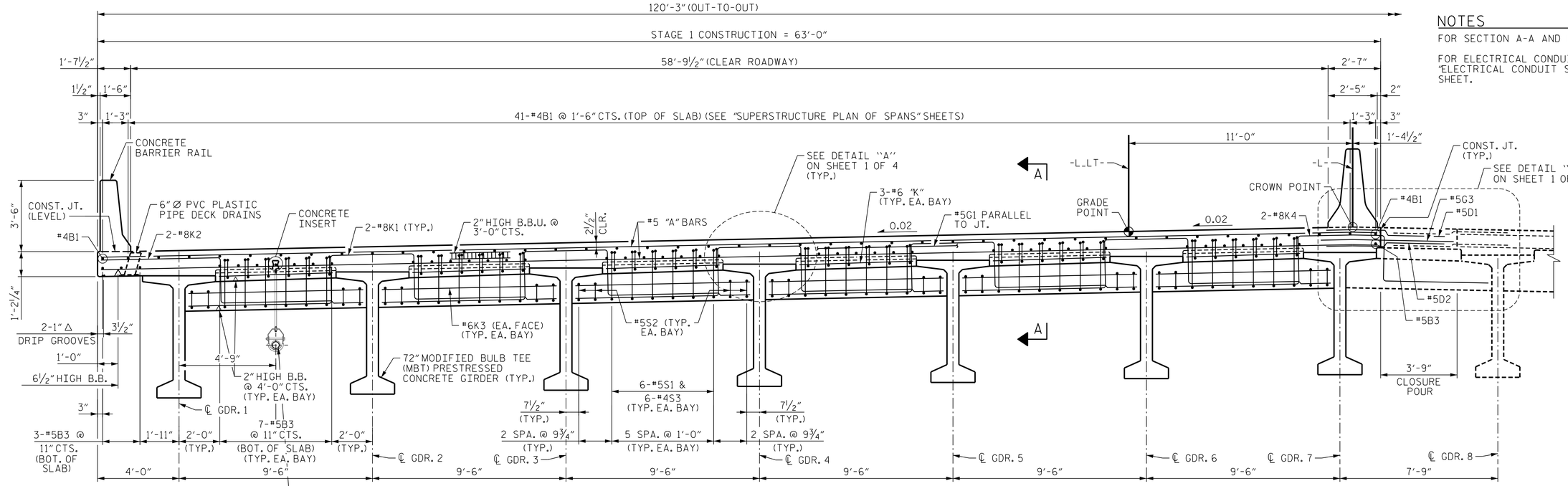
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

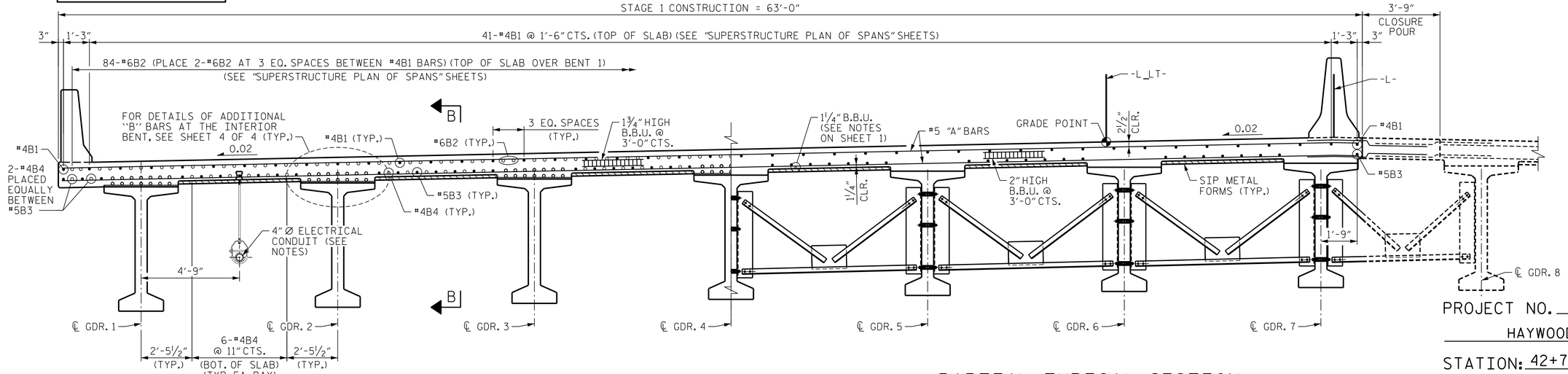
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-07
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59



TYPICAL SECTION
SHOWING END BENT DIAPHRAGMS

NOTES
FOR SECTION A-A AND B-B, SEE SHEET 4 OF 4.

FOR ELECTRICAL CONDUIT DETAILS, SEE "ELECTRICAL CONDUIT SYSTEM FOR SIGNALS" SHEET.



PARTIAL TYPICAL SECTION
AT BENT 1

PARTIAL TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

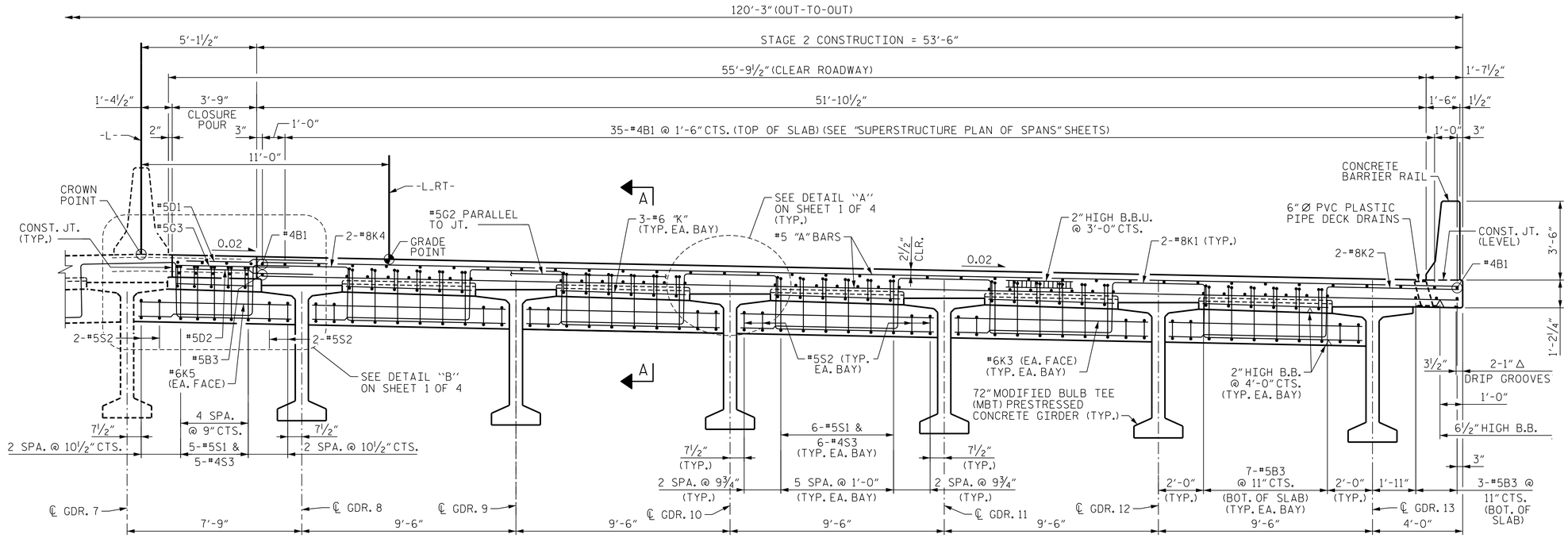
1/25/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-08
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

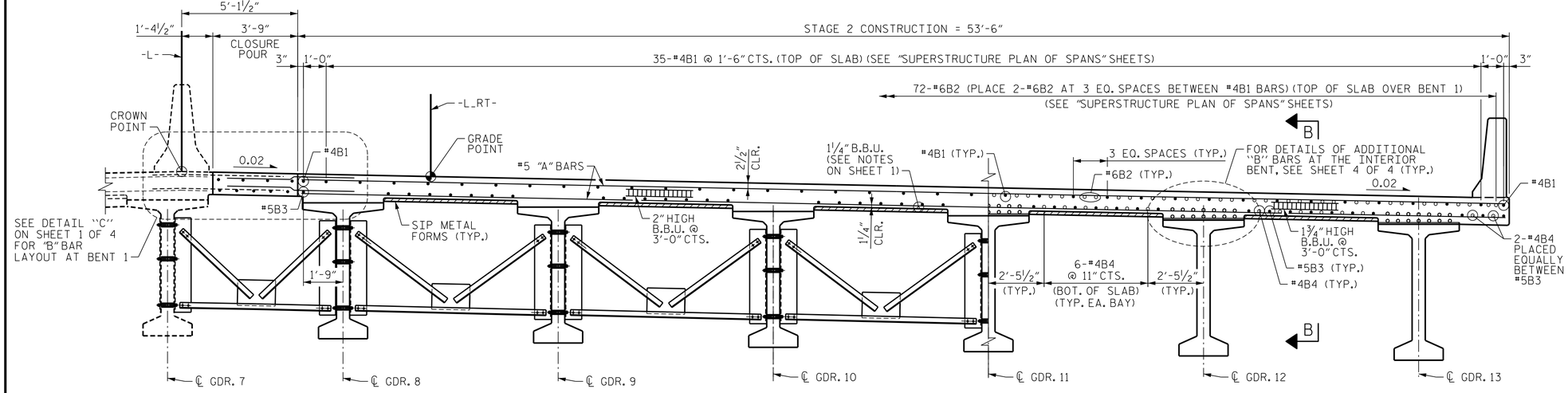
DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	K. DICKENS	DATE :	06/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



TYPICAL SECTION
SHOWING END BENT DIAPHRAGMS



PARTIAL TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS

PARTIAL TYPICAL SECTION
AT BENT 1

NOTES
FOR SECTION A-A AND B-B, SEE SHEET 4 OF 4.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-09
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

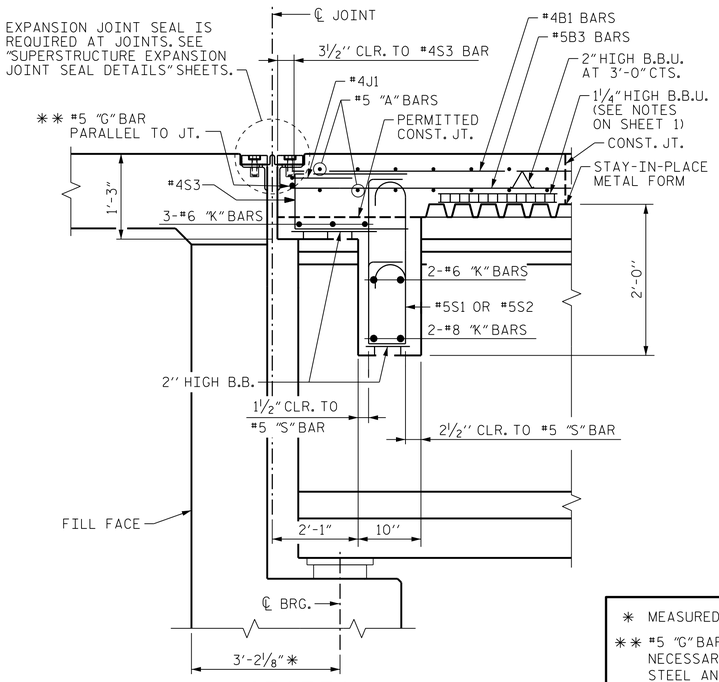
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

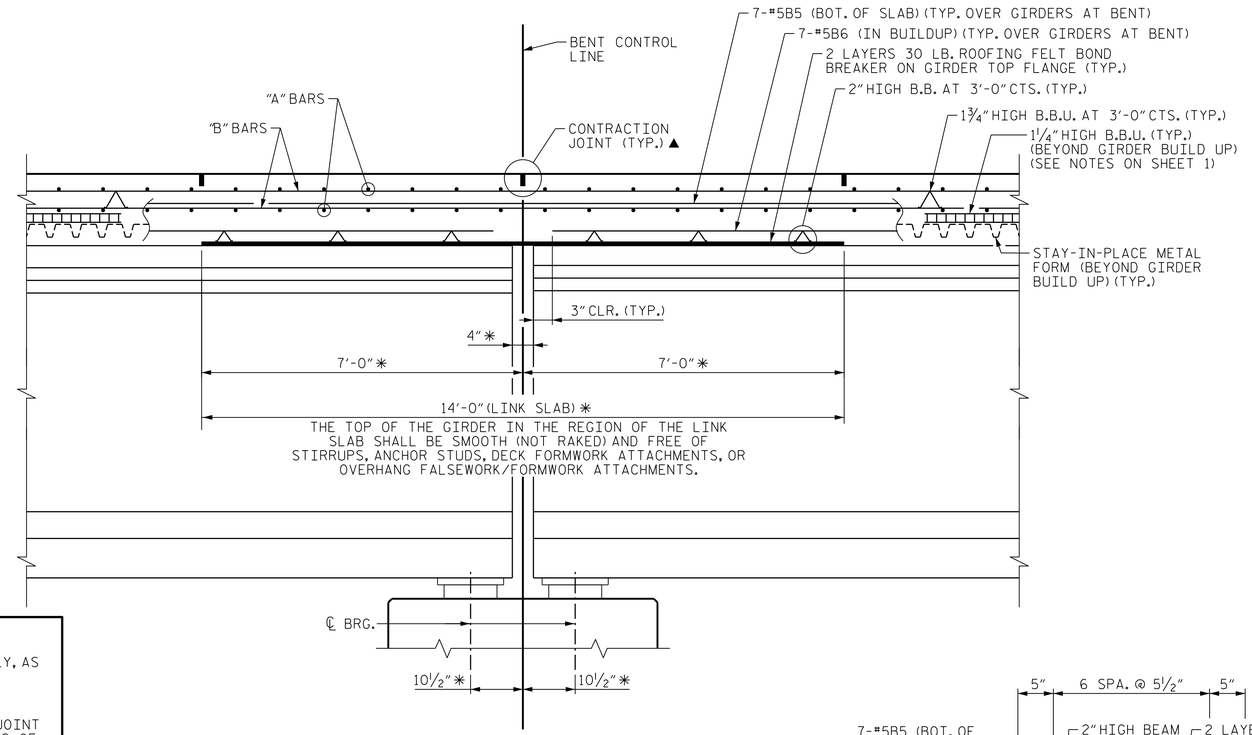
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE : 05/21	DWG BY:	B. PETERSON	DATE : 05/21
DES CHK:	K. DICKENS	DATE : 05/21	CHK BY:	K. DICKENS	DATE : 06/21



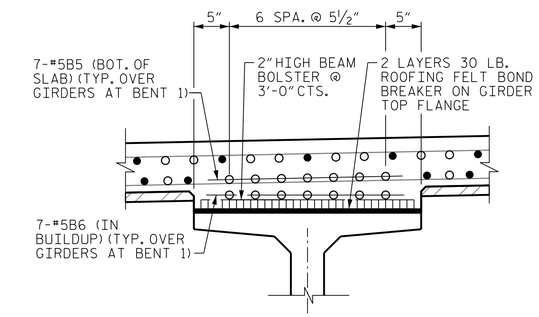
SECTION A-A

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION B-B

(LINK SLAB AT INTERIOR BENT)

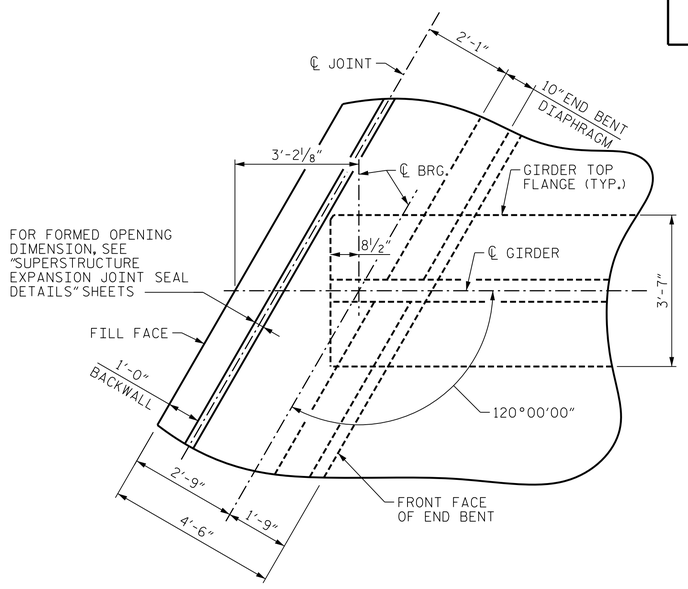


SECTION C-C

* MEASURED ALONG ℄ OF GIRDER

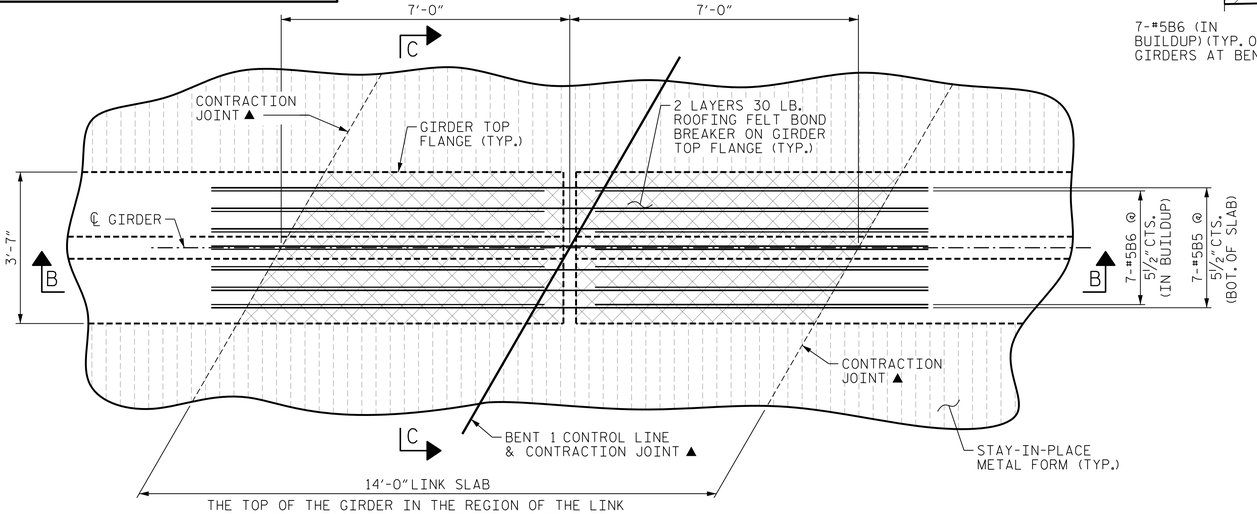
** #5 "G" BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

▲ A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT BENT CONTROL LINE AND AT ENDS OF LINK SLAB SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.



PLAN OF GIRDER AT END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



PLAN OF GIRDERS AT BENT

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-10
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

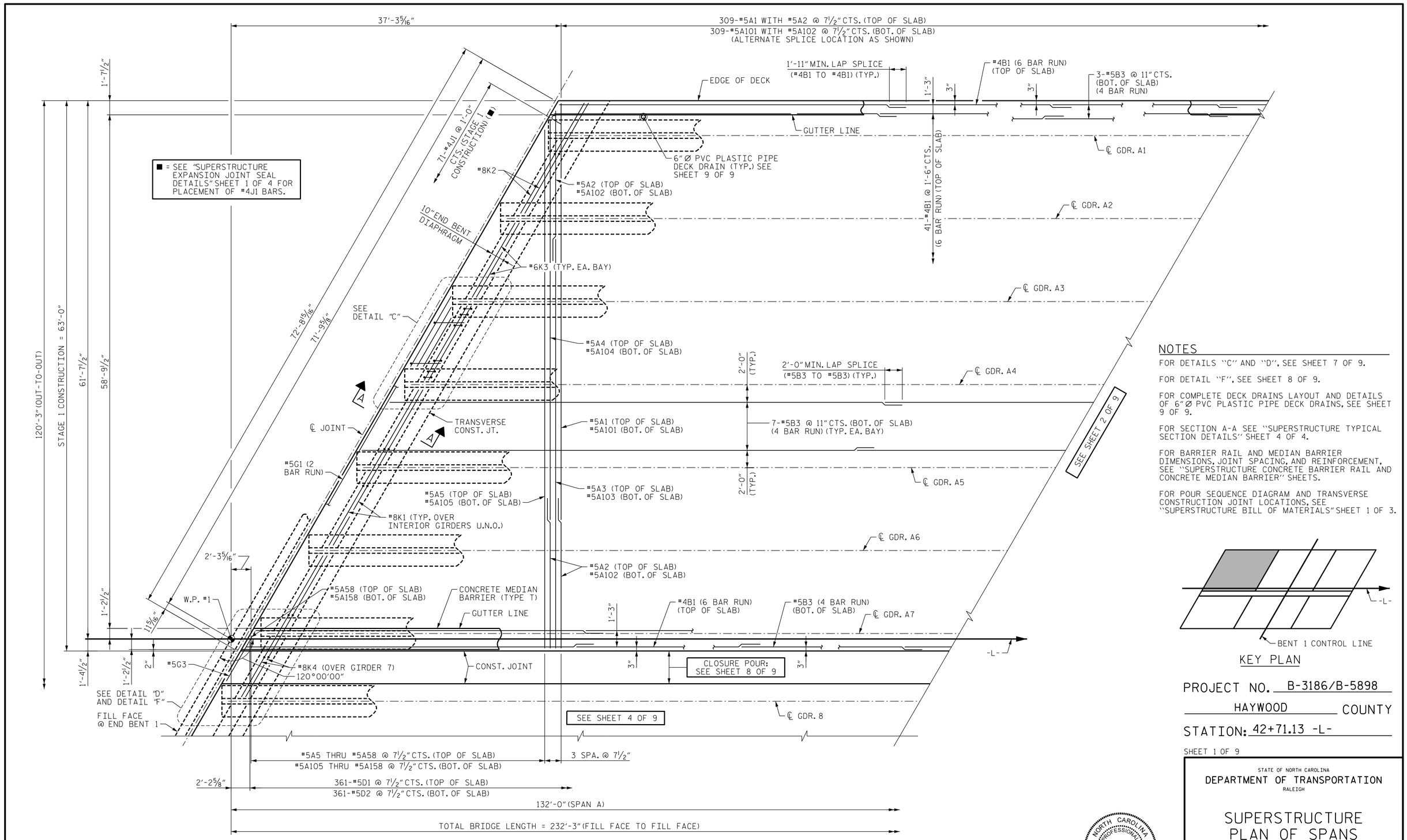
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	K. DICKENS	DATE :	06/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:26:41 AM
FILE: ...\401.045_B5898B3186_SMU_TS_010.430168.dgn



SPAN A

PARTIAL PLAN OF SPANS

NOTES

FOR DETAILS "C" AND "D", SEE SHEET 7 OF 9.

FOR DETAIL "F", SEE SHEET 8 OF 9.

FOR COMPLETE DECK DRAINS LAYOUT AND DETAILS OF 6" Ø PVC PLASTIC PIPE DECK DRAINS, SEE SHEET 9 OF 9.

FOR SECTION A-A SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 4 OF 4.

FOR BARRIER RAIL AND MEDIAN BARRIER DIMENSIONS, JOINT SPACING, AND REINFORCEMENT, SEE "SUPERSTRUCTURE CONCRETE BARRIER RAIL AND CONCRETE MEDIAN BARRIER" SHEETS.

FOR POUR SEQUENCE DIAGRAM AND TRANSVERSE CONSTRUCTION JOINT LOCATIONS, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET 1 OF 3.

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-11
1			3			TOTAL SHEETS
2			4			59

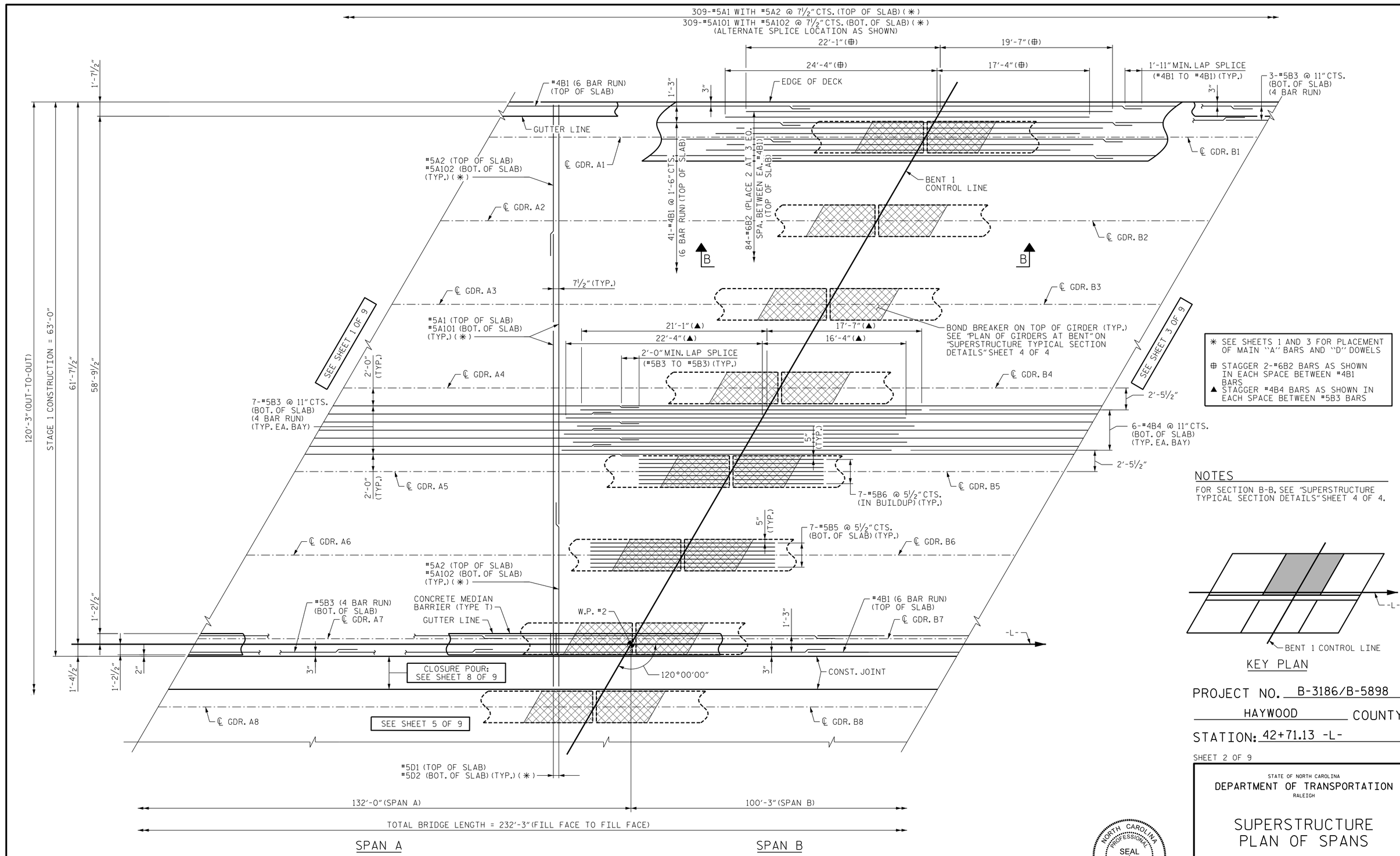
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	K. DICKENS	DATE :	07/21



PARTIAL PLAN OF SPANS

✱ SEE SHEETS 1 AND 3 FOR PLACEMENT OF MAIN "A" BARS AND "D" DOWELS

⊕ STAGGER 2-#6B2 BARS AS SHOWN IN EACH SPACE BETWEEN #4B1 BARS

▲ STAGGER #4B4 BARS AS SHOWN IN EACH SPACE BETWEEN #5B3 BARS

NOTES

FOR SECTION B-B, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 4 OF 4.

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

DES BY: H. ABU NIMEH	DATE: 05/21	DWG BY: B. PETERSON	DATE: 05/21
DES CHK: K. DICKENS	DATE: 07/21	CHK BY: K. DICKENS	DATE: 07/21

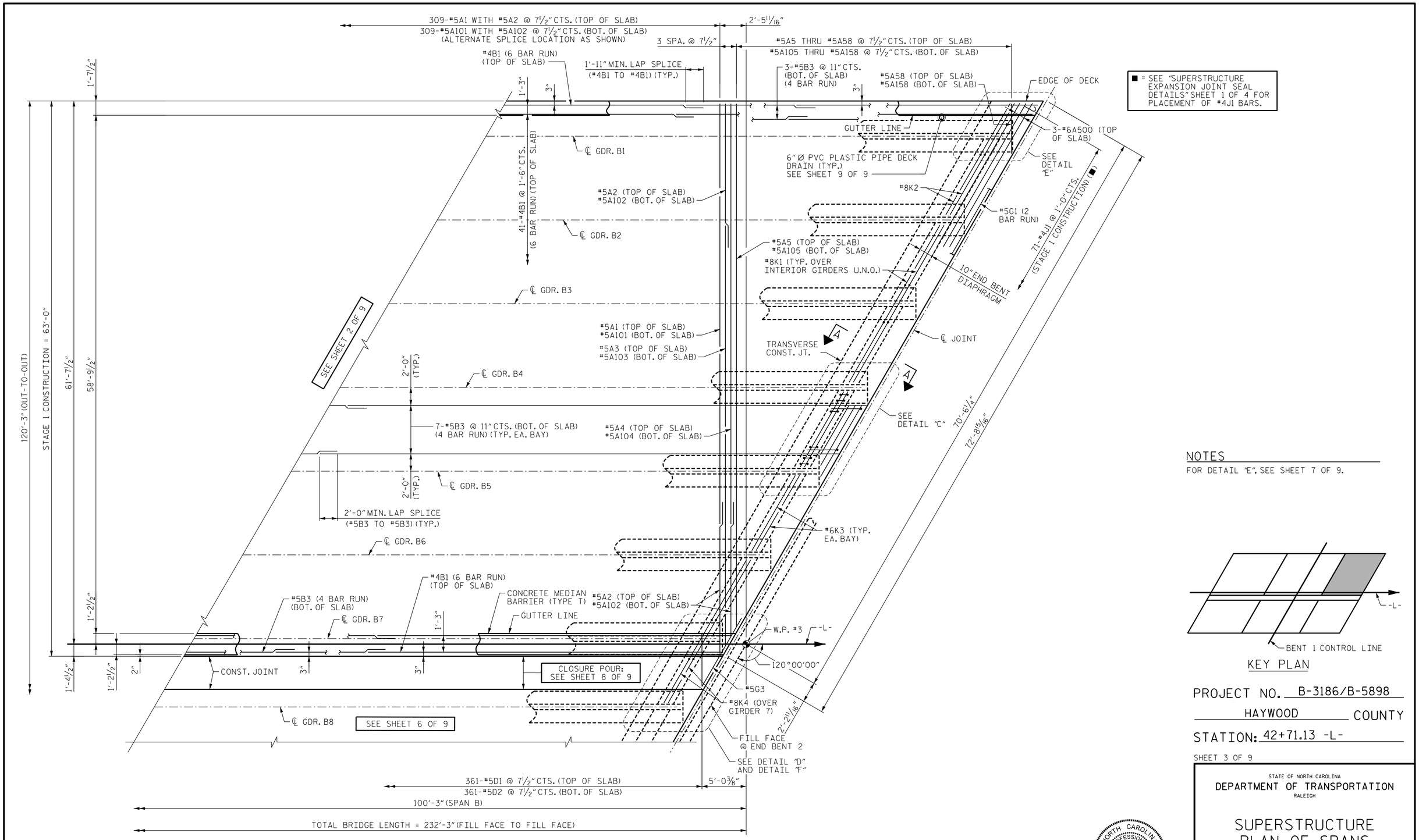
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-12
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 59
2			4			



SPAN B

PARTIAL PLAN OF SPANS

NOTES

FOR DETAIL "E", SEE SHEET 7 OF 9.

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

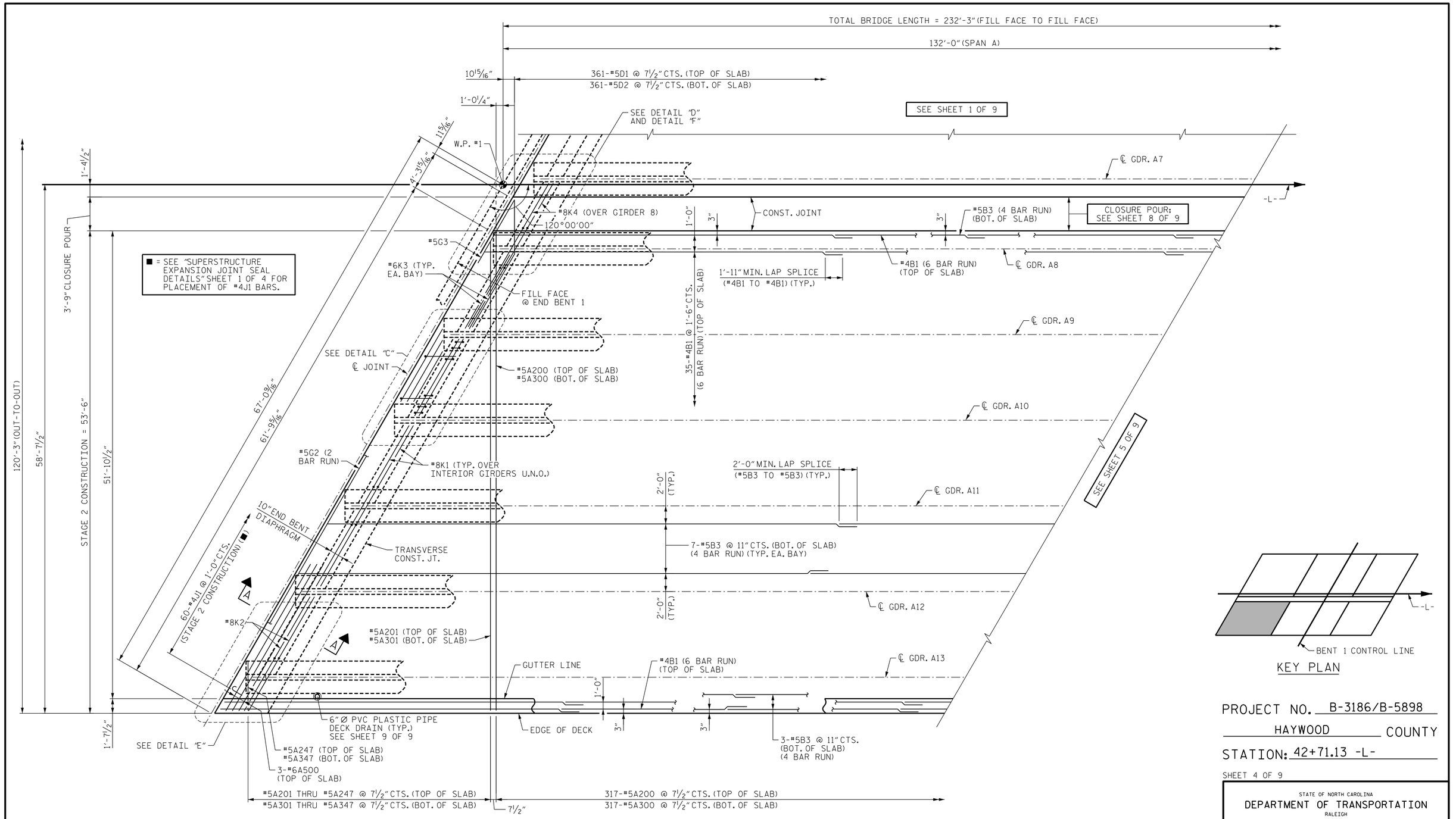
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-13
1			3			TOTAL SHEETS
2			4			59

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	K. DICKENS	DATE :	07/21



SPAN A

PARTIAL PLAN OF SPANS

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

REVISIONS						SHEET NO. S01-14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

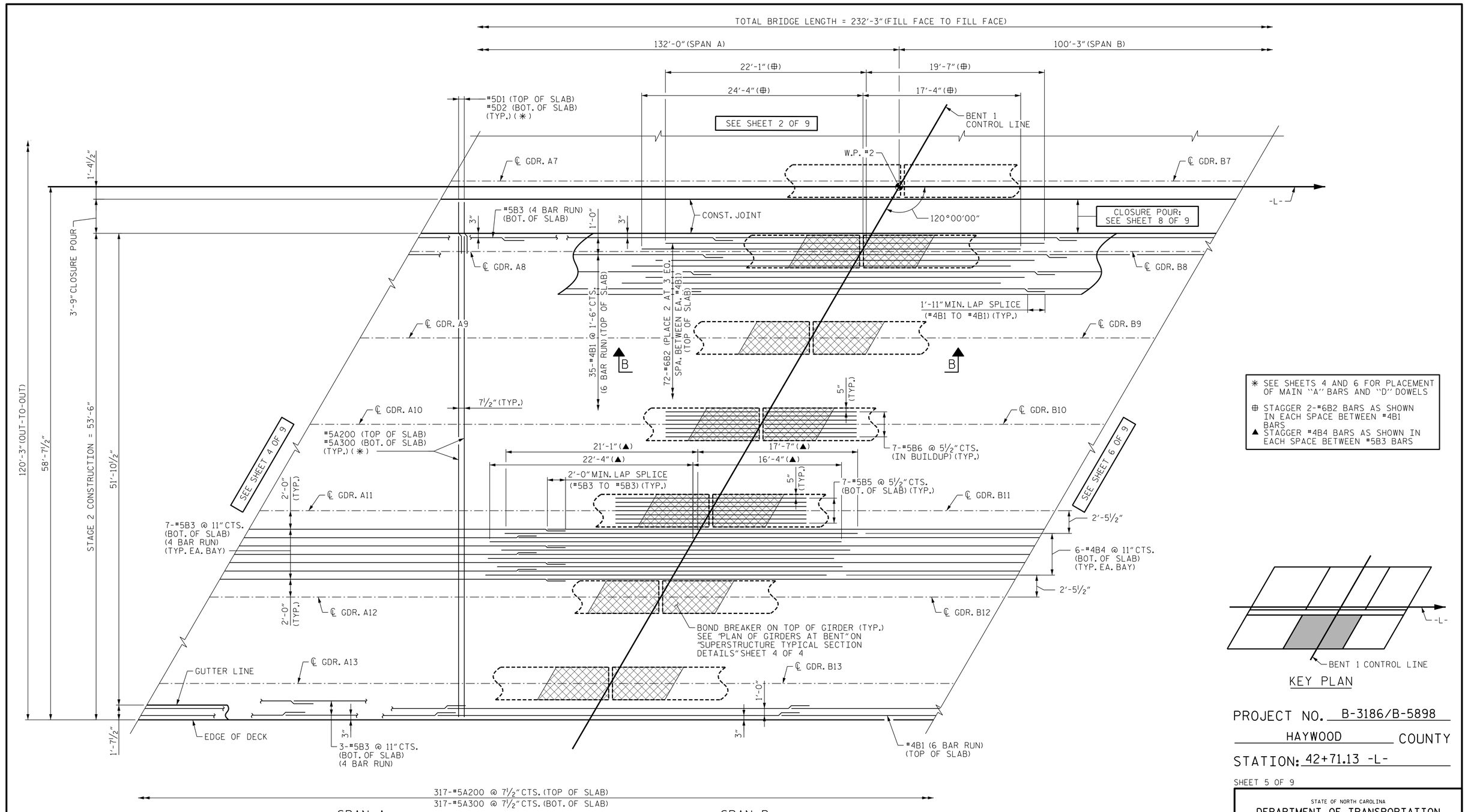
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE:	05/21
DES CHK:	K. DICKENS	DATE:	07/21
DWG BY:	B. PETERSON	DATE:	05/21
CHK BY:	K. DICKENS	DATE:	07/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.pltPENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:27:36 AM
FILE: ...\401.065.B5898B3186.SMU_S1.014.430168.dgn



PARTIAL PLAN OF SPANS

✳ SEE SHEETS 4 AND 6 FOR PLACEMENT OF MAIN "A" BARS AND "D" DOWELS

⊞ STAGGER 2-#6B2 BARS AS SHOWN IN EACH SPACE BETWEEN #4B1 BARS

▲ STAGGER #4B4 BARS AS SHOWN IN EACH SPACE BETWEEN #5B3 BARS

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-15
1			3			TOTAL SHEETS
2			4			59

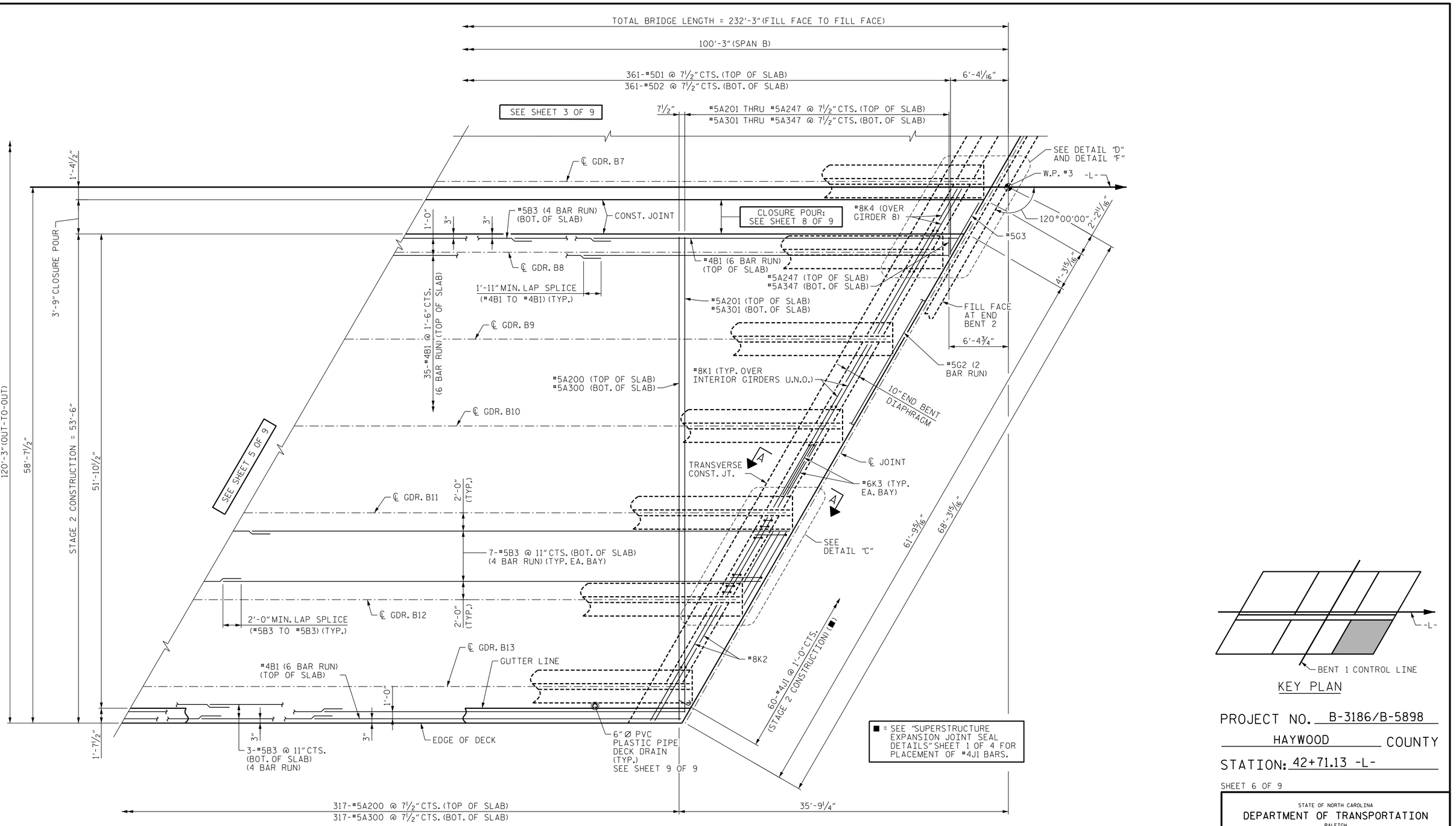
DES BY: H. ABU NIMEH	DATE: 05/21	DWG BY: B. PETERSON	DATE: 05/21
DES CHK: K. DICKENS	DATE: 07/21	CHK BY: K. DICKENS	DATE: 07/21

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SPAN B

PARTIAL PLAN OF SPANS

KEY PLAN

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-16
1			3			TOTAL SHEETS
2			4			59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

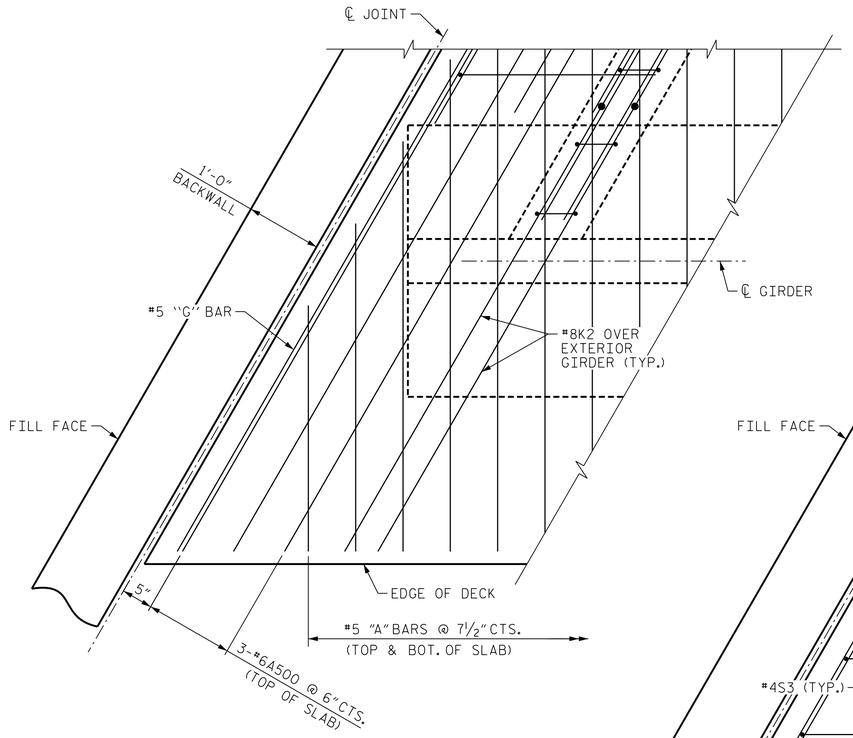
1/25/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

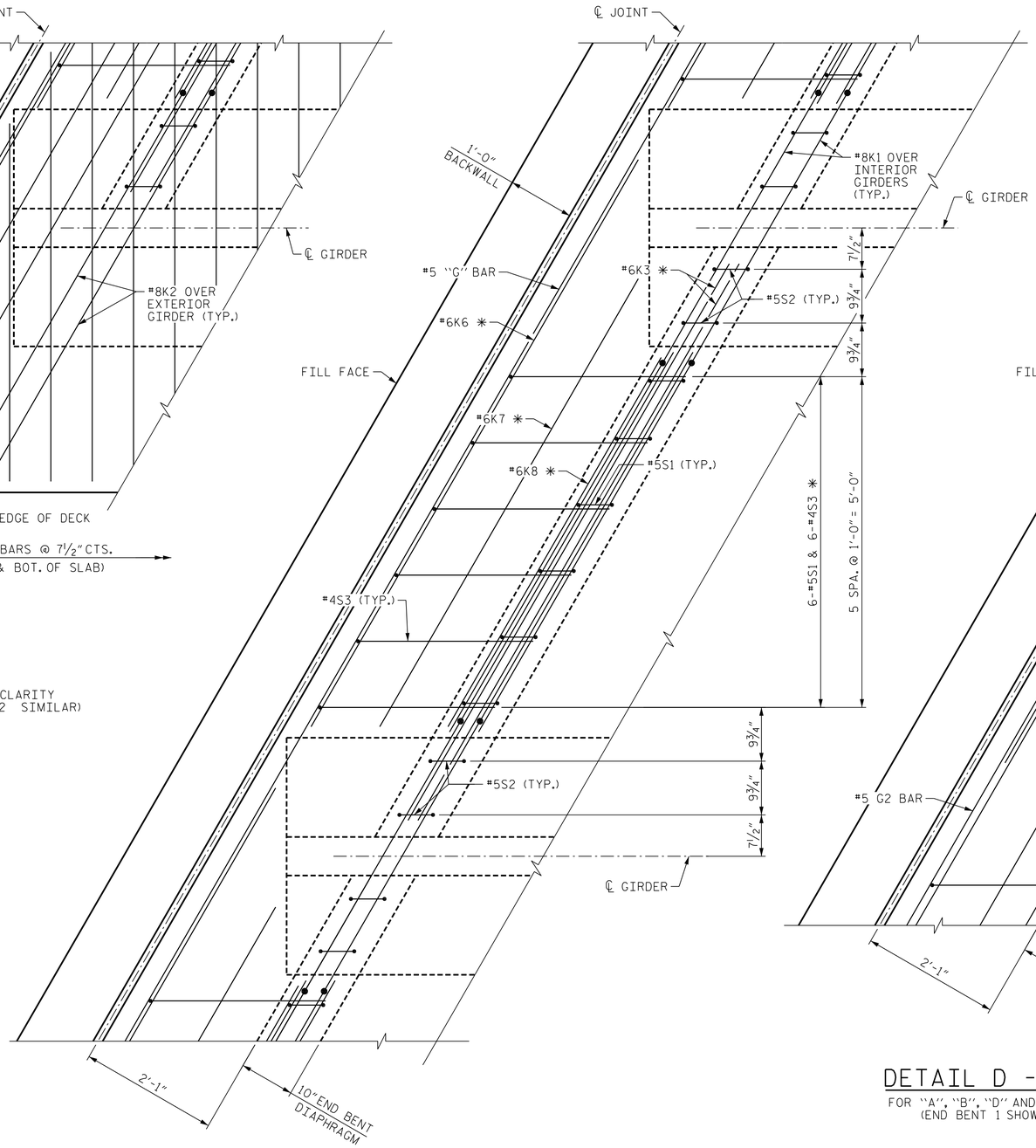
DES BY:	H. ABU NIMEH	DATE:	05/21	DWG BY:	B. PETERSON
DES CHK:	K. DICKENS	DATE:	07/21	CHK BY:	K. DICKENS

DATE: 05/21
DATE: 07/21



DETAIL E

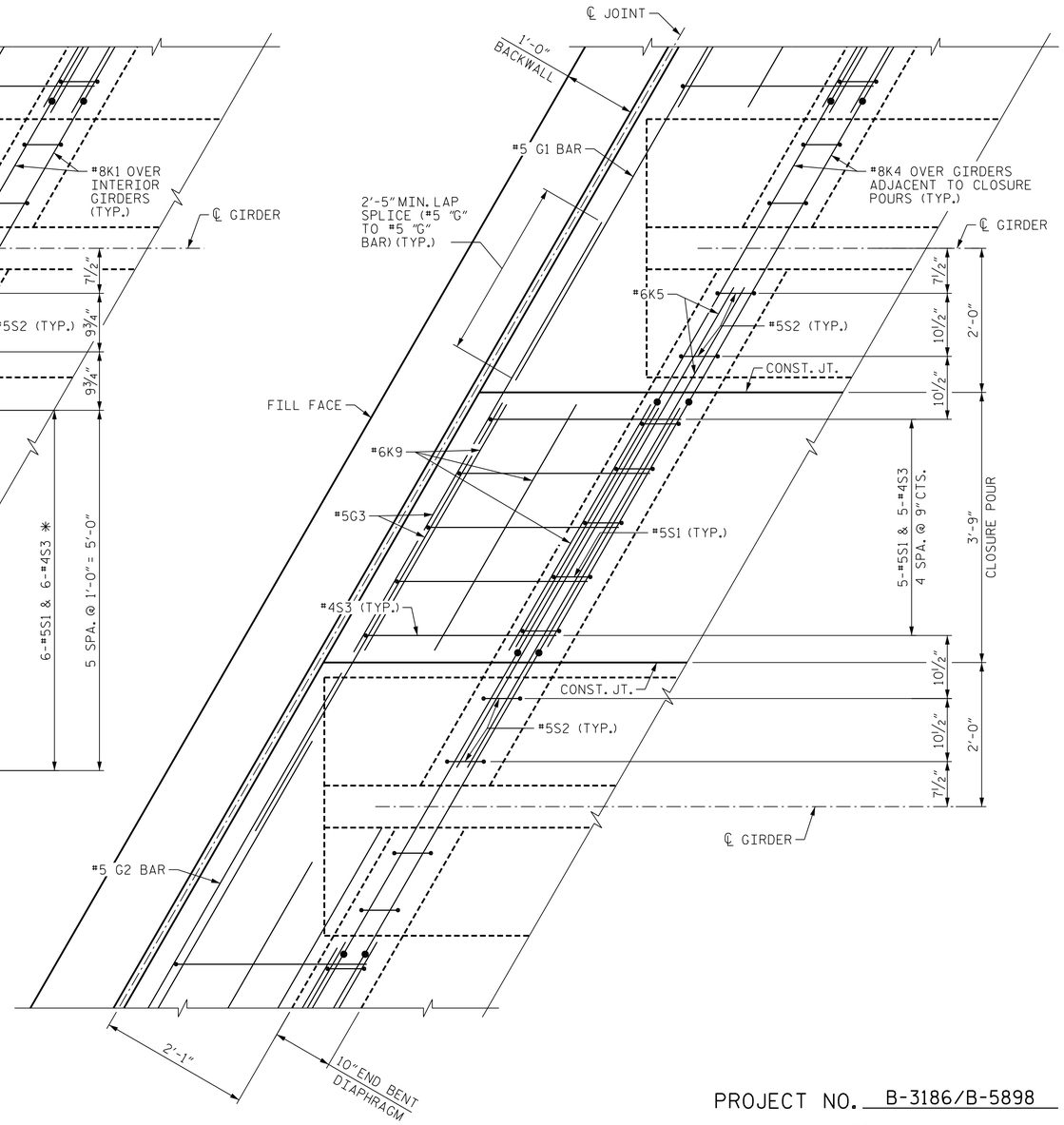
"B" BARS NOT SHOWN FOR CLARITY
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



DETAIL C

"A", "B", AND "J" BARS NOT SHOWN FOR CLARITY
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

✳ TYPICAL EACH BAY EXCEPT CLOSURE POUR BAY.



DETAIL D - CLOSURE POUR

FOR "A", "B", "D" AND "J" BARS, SEE SHEET 8 OF 9
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-17
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

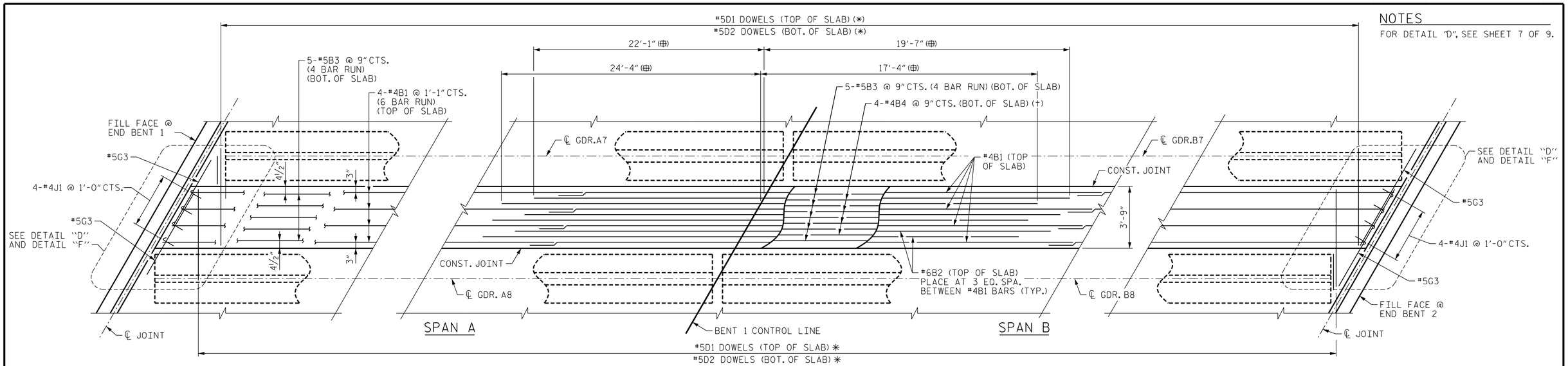
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

S Kent Dickens 1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE:	05/21	DWG BY:	B. PETERSON	DATE:	05/21
DES CHK:	K. DICKENS	DATE:	05/21	CHK BY:	K. DICKENS	DATE:	07/21



PLAN OF CLOSURE POUR

("A" BARS AND END BENT DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY)

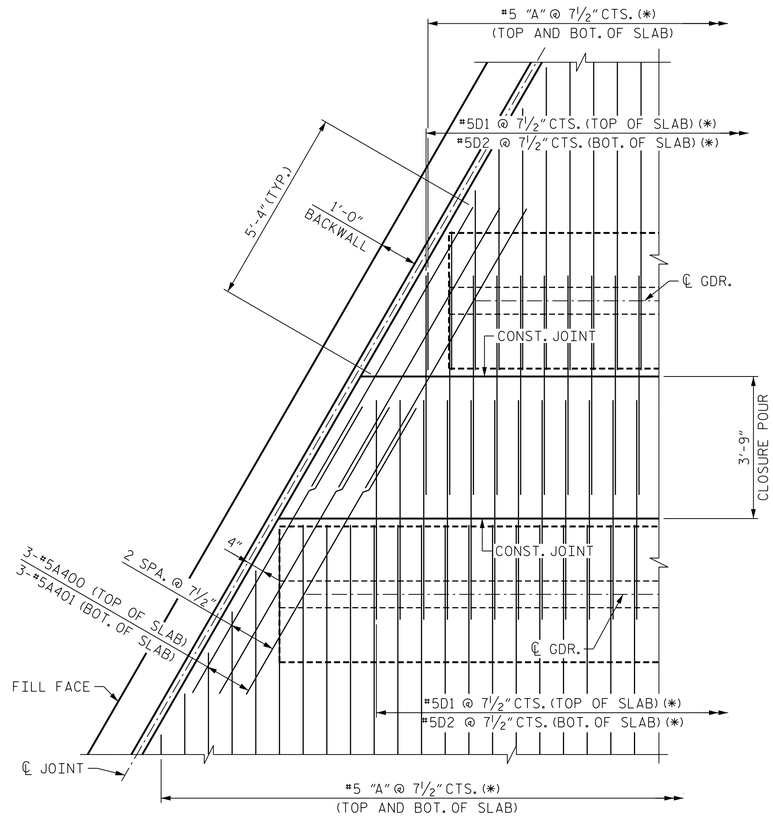
NOTES

FOR DETAIL "D", SEE SHEET 7 OF 9.

* SEE SHEETS 1-6 OF 9 FOR PLACEMENT

⊞ STAGGER 2-#6B2 BARS AS SHOWN IN EACH SPACE BETWEEN #4B1 BARS IN TOP OF SLAB

† SEE "SUPERSTRUCTURE PLAN OF SPANS" SHEETS 2 AND 5 OF 9 FOR LIMITS OF #4B4 BARS IN BOTTOM OF SLAB



DETAIL "F"

(END BENT 1 SHOWN, END BENT 2 SIMILAR)
("B" BARS AND END BENT DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY)

DES BY: H. ABU NIMEH	DATE : 05/21	DWG BY: H. ABU NIMEH	DATE : 05/21
DES CHK: K. DICKENS	DATE : 05/21	CHK BY: K. DICKENS	DATE : 07/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS
1/25/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 8 OF 9

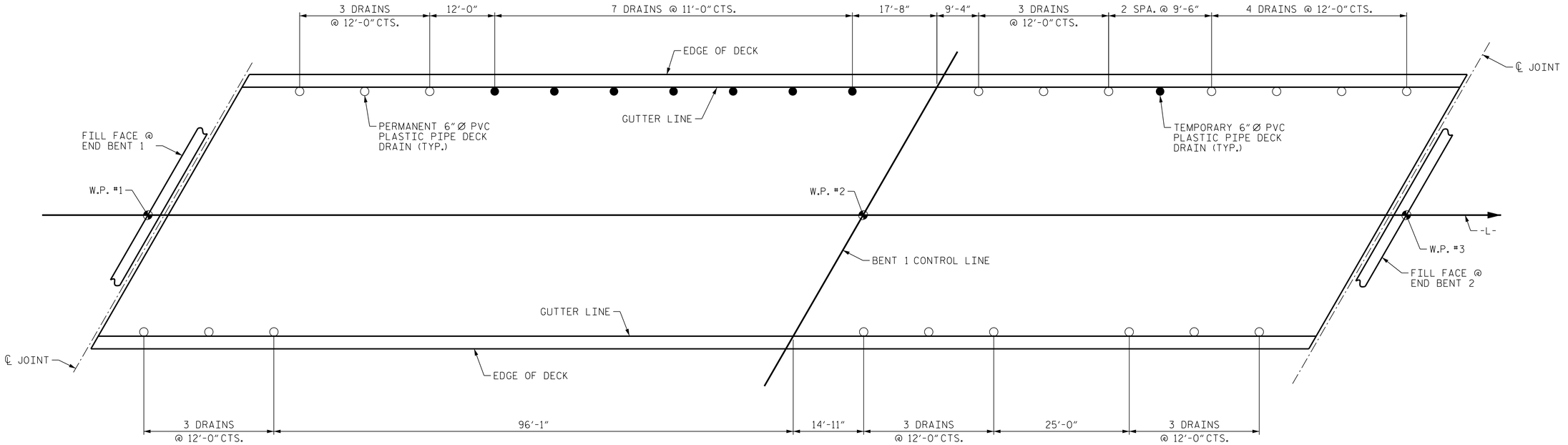
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS DETAILS

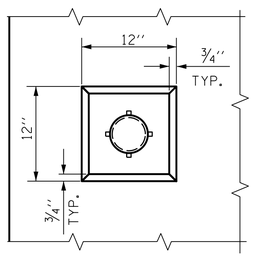
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-18
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

NOTE

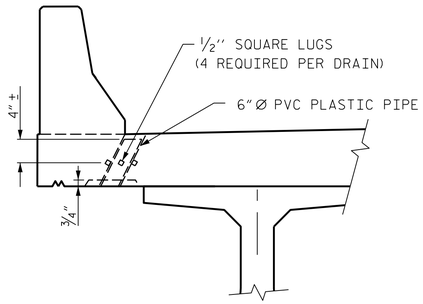
DECK DRAINS MAY BE SHIFTED UP TO 3" IN THE LONGITUDINAL DIRECTION TO AVOID CONFLICTS WITH TRANSVERSE REINFORCING OR TRANSVERSE CONSTRUCTION JOINTS IN THE DECK.



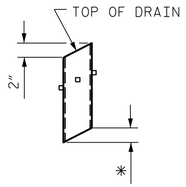
PLAN OF DECK DRAINS



PLAN OF RECESS

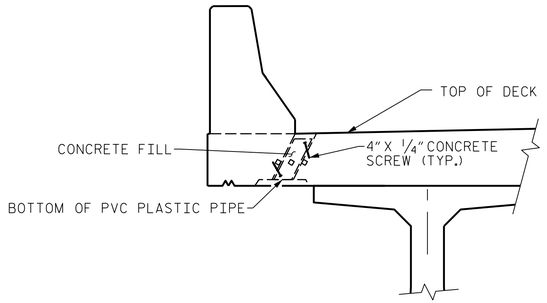


ELEVATION



PIPE DETAIL
(27 REQUIRED)

* = TO BE SET TO MATCH SLOPE OF OVERHANG.



TEMPORARY DECK DRAIN PLUG DETAIL

TEMPORARY DECK DRAIN PLUG NOTES

DECK DRAINS MARKED AS "TEMPORARY" IN THE PLAN OF DECK DRAINS SHALL BE PLUGGED AT THE END OF CONSTRUCTION AFTER TRAFFIC IS MOVED TO ITS FINAL CONFIGURATION.

PROVIDE 3 CONCRETE SCREWS NEAR BOTH THE TOP AND BOTTOM OF THE DECK DRAIN, SPACED AT LEAST 1" ON CENTER AROUND INSIDE PERIMETER OF THE DECK DRAIN. EMBED EACH CONCRETE SCREW 2" ± ¼"

FILL THE TEMPORARY DRAIN WITH CLASS AA CONCRETE THROUGH THE FULL DEPTH OF THE OVERHANG. THE RESULTING CONCRETE PLUG SHALL BE FLUSH WITH TOP OF DECK AND BOTTOM OF PVC PLASTIC PIPE.

DECK DRAIN NOTES

TOP OF FLOOR DRAINS TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS DETAILS

REVISIONS						SHEET NO. S01-19
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

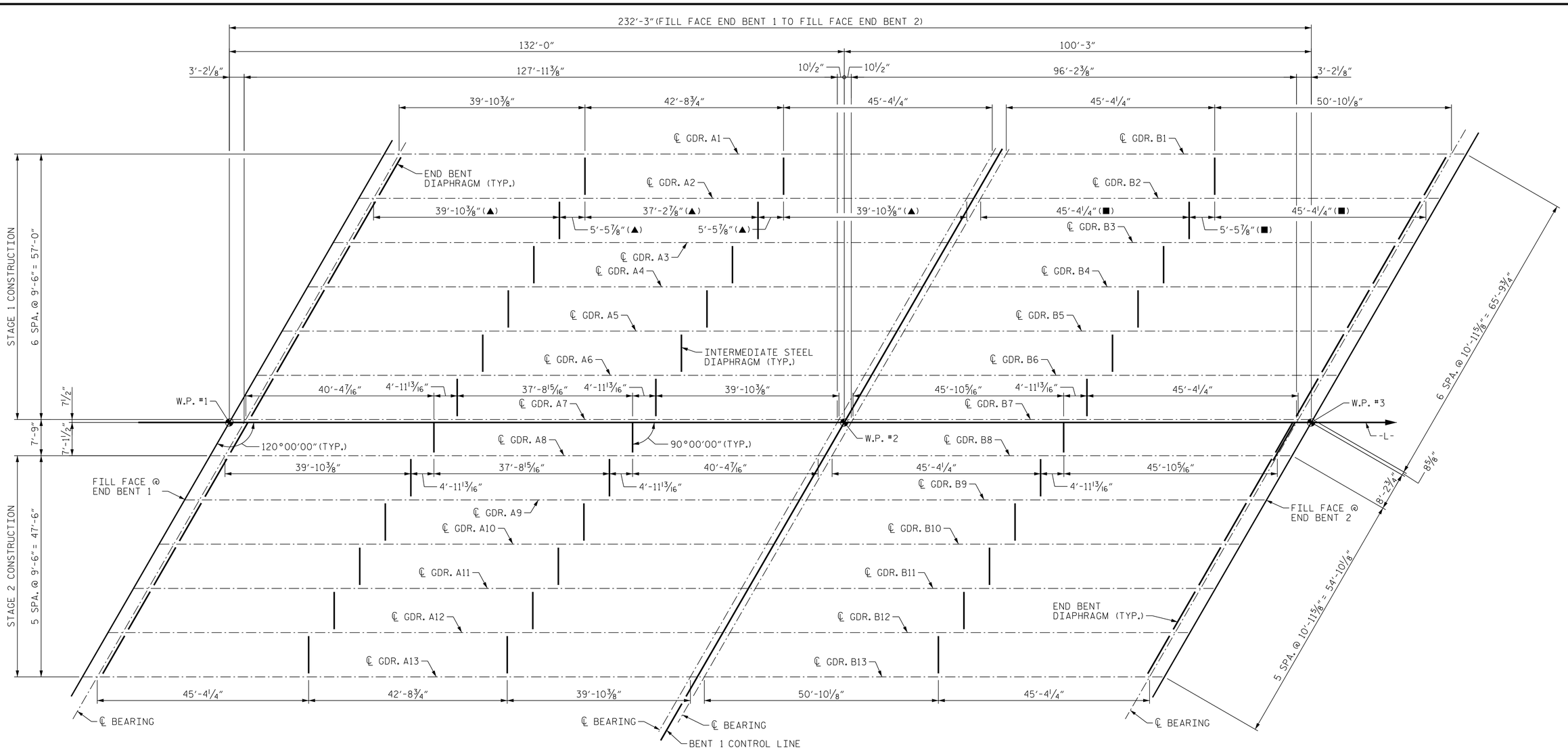
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE:	04/21	DWG BY:	B. PETERSON	DATE:	04/21
DES CHK:	K. DICKENS	DATE:	04/21	CHK BY:	K. DICKENS	DATE:	07/21



SPAN A

SPAN B

FRAMING PLAN

▲ = TYPICAL AT GDRS. A2 THRU A6 AND A9 THRU A12

■ = TYPICAL AT GDRS. B2 THRU B6 AND B9 THRU B12

NOTES

FOR ELASTOMERIC BEARING AND SOLE PLATE DETAILS, SEE "SUPERSTRUCTURE ELASTOMERIC BEARING DETAILS" SHEET.

FOR DIAPHRAGM DETAILS, SEE "SUPERSTRUCTURE INTERMEDIATE STEEL DIAPHRAGMS" SHEET.

FOR END BENT DIAPHRAGM DETAILS, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEETS.

THE INTERMEDIATE STEEL DIAPHRAGMS IN THE CLOSURE POUR BAY, BETWEEN GIRDERS 7 AND 8, SHALL BE INSTALLED AFTER THE TWO ADJACENT DECK SECTIONS ARE PLACED, AND BEFORE THE CLOSURE POUR IS PLACED.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

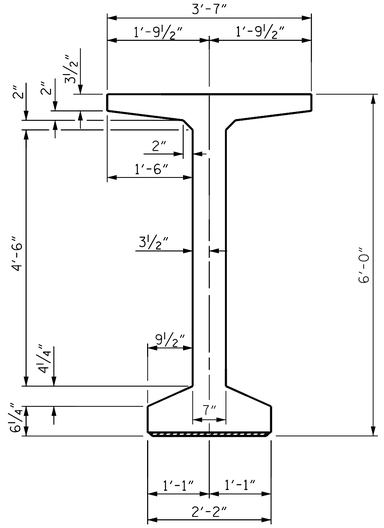
1/25/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-20
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

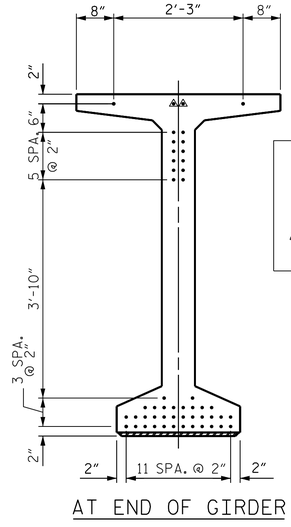
DES BY:	B. ROGERS	DATE :	04/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	B. PETERSON	DATE :	02/21
CHK BY:	K. DICKENS	DATE :	05/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



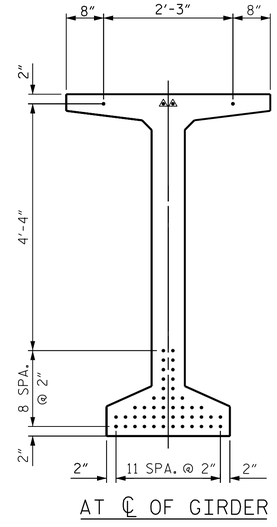
GIRDER OUTSIDE DIMENSIONS



AT END OF GIRDER

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⚠ OPTIONAL SLACK STRANDS TO BE TENSIONED TO 4500 LBS. (MAX.)



AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

NOTES

FOR LOCATION OF 1½"Ø FORMED HOLES, SEE "SUPERSTRUCTURE PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS" SHEET 4 OF 4.

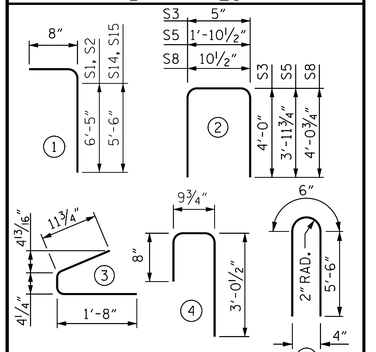
FOR SECTIONS A-A, B-B, C-C & D-D, SEE SHEET 3 OF 4.

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

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	200	#4	1	7'-1"	947
	S2	18	#6	1	7'-1"	192
	S3	14	#4	2	8'-5"	79
	S4	88	#4	3	3'-0"	177
	S5	2	#5	2	9'-10"	21
	S6	218	#5	4	4'-7"	1043
	S8	2	#5	2	9'-0"	19
	S9	72	#5	STR	3'-3"	245
EXTERIOR GDR.	S11	8	#5	5	11'-6"	96
INTERIOR GDR.	S11	16	#5	5	11'-6"	192
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	13'-6"	145
	S14	18	#4	1	6'-2"	75
	S15	18	#6	1	6'-2"	167

BAR TYPES



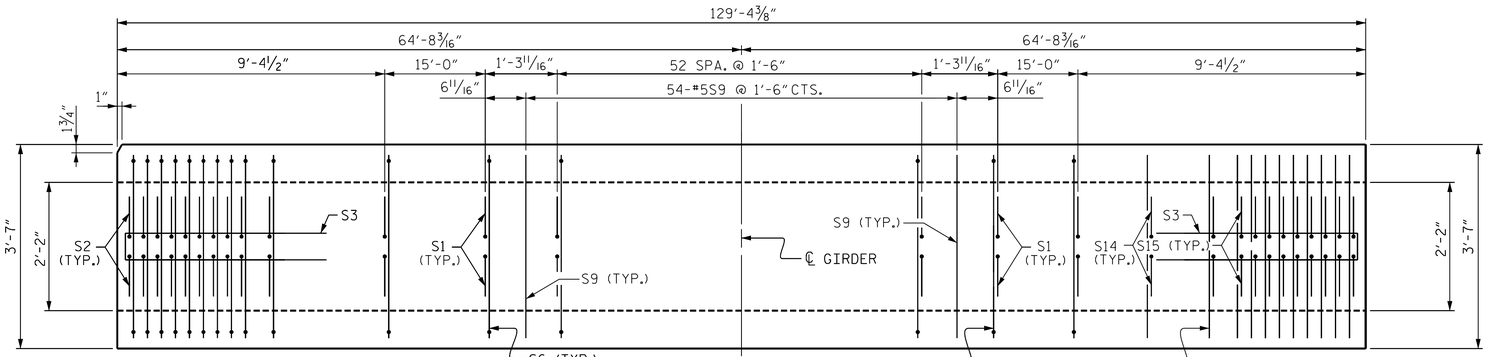
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

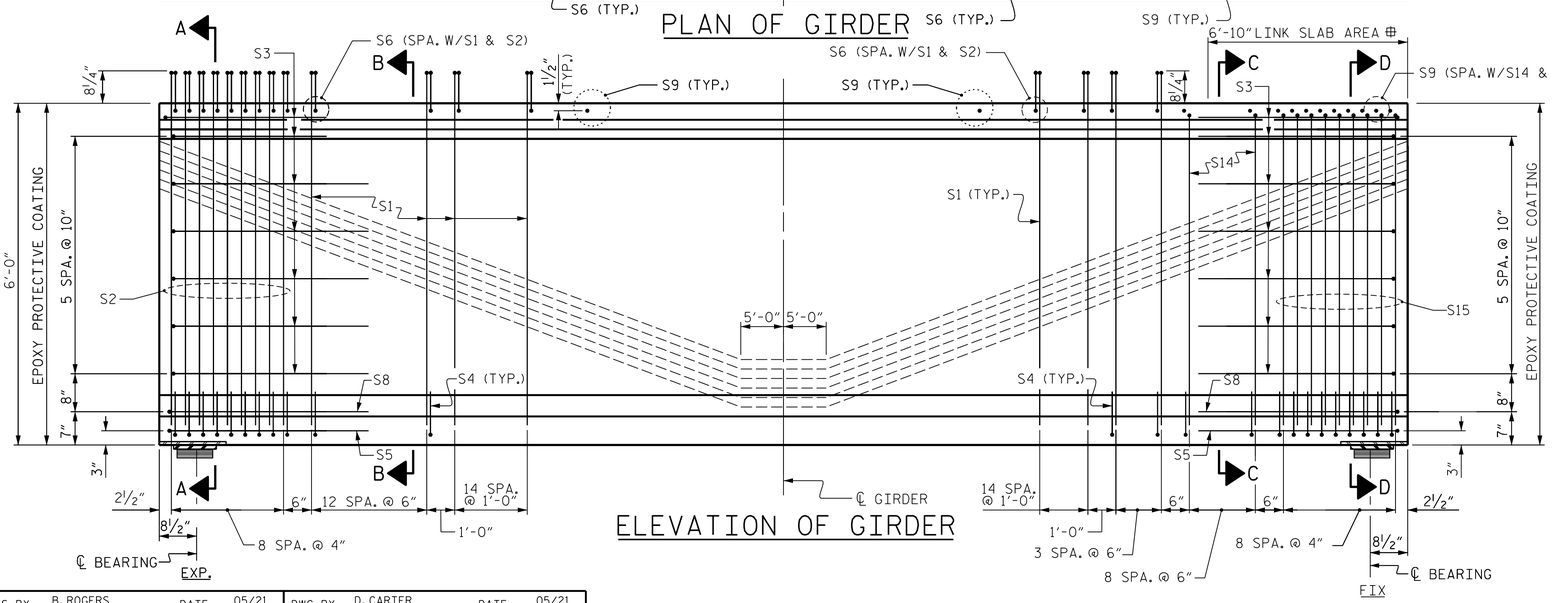
	REINFORCING STEEL	8500 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	3147	27.7	48
INTERIOR GIRDER	3302	27.7	48

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
13	129'-4⅜"	1681'-8⅞"



PLAN OF GIRDER



ELEVATION OF GIRDER

⊕ DO NOT ROUGHEN TOP OF GIRDER IN THIS AREA

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

72" PRESTRESSED CONCRETE MODIFIED BULB TEE FOR LINK SLAB SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

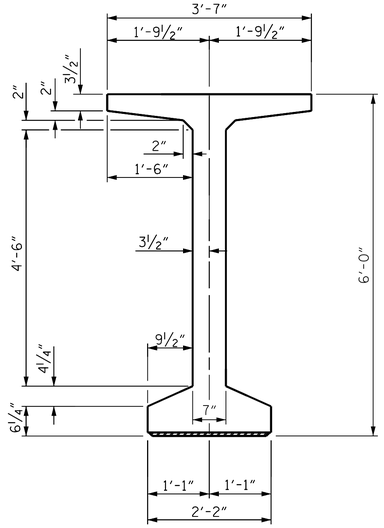
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

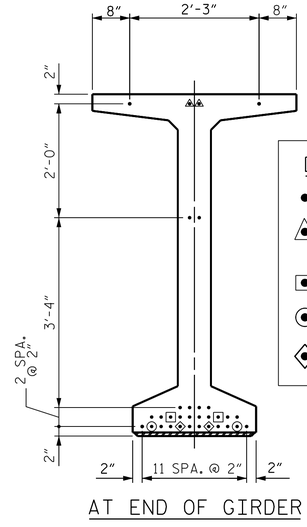
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

DES BY:	B. ROGERS	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	D. CARTER	DATE :	05/21
CHK BY:	B. ROGERS	DATE :	07/21



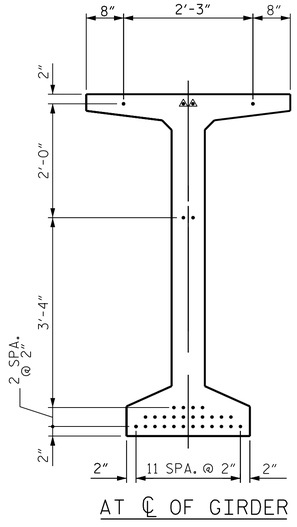
GIRDER OUTSIDE DIMENSIONS



AT END OF GIRDER

DEBONDING LEGEND

- FULLY BONDED STRANDS
- OPTIONAL SLACK STRANDS TO BE TENSIONED TO 4500 LBS. (MAX.)
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER



AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTES

FOR LOCATION OF 1½" Ø FORMED HOLES, SEE "SUPERSTRUCTURE PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS" SHEET 4 OF 4.

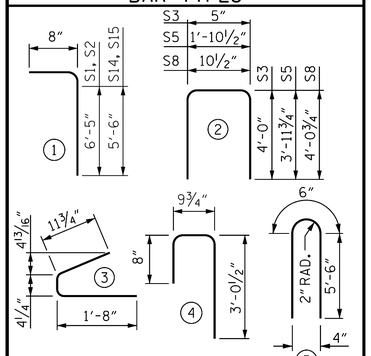
FOR SECTIONS A-A, B-B, C-C & D-D, SEE SHEET 3 OF 4.

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

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	144	#4	1	7'-1"	682
	S2	18	#6	1	7'-1"	192
	S3	14	#4	2	8'-5"	79
	S4	88	#4	3	3'-0"	177
	S5	2	#5	2	9'-10"	21
	S6	162	#5	4	4'-7"	775
	S8	2	#5	2	9'-0"	19
	S9	64	#5	STR	3'-3"	217
EXTERIOR GDR.	S11	4	#5	5	11'-6"	48
INTERIOR GDR.	S11	8	#5	5	11'-6"	96
EXTERIOR GDR.	S12	8	#4	STR	8'-0"	43
INTERIOR GDR.	S13	8	#4	STR	13'-6"	73
	S14	18	#4	1	6'-2"	75
	S15	18	#6	1	6'-2"	167

BAR TYPES



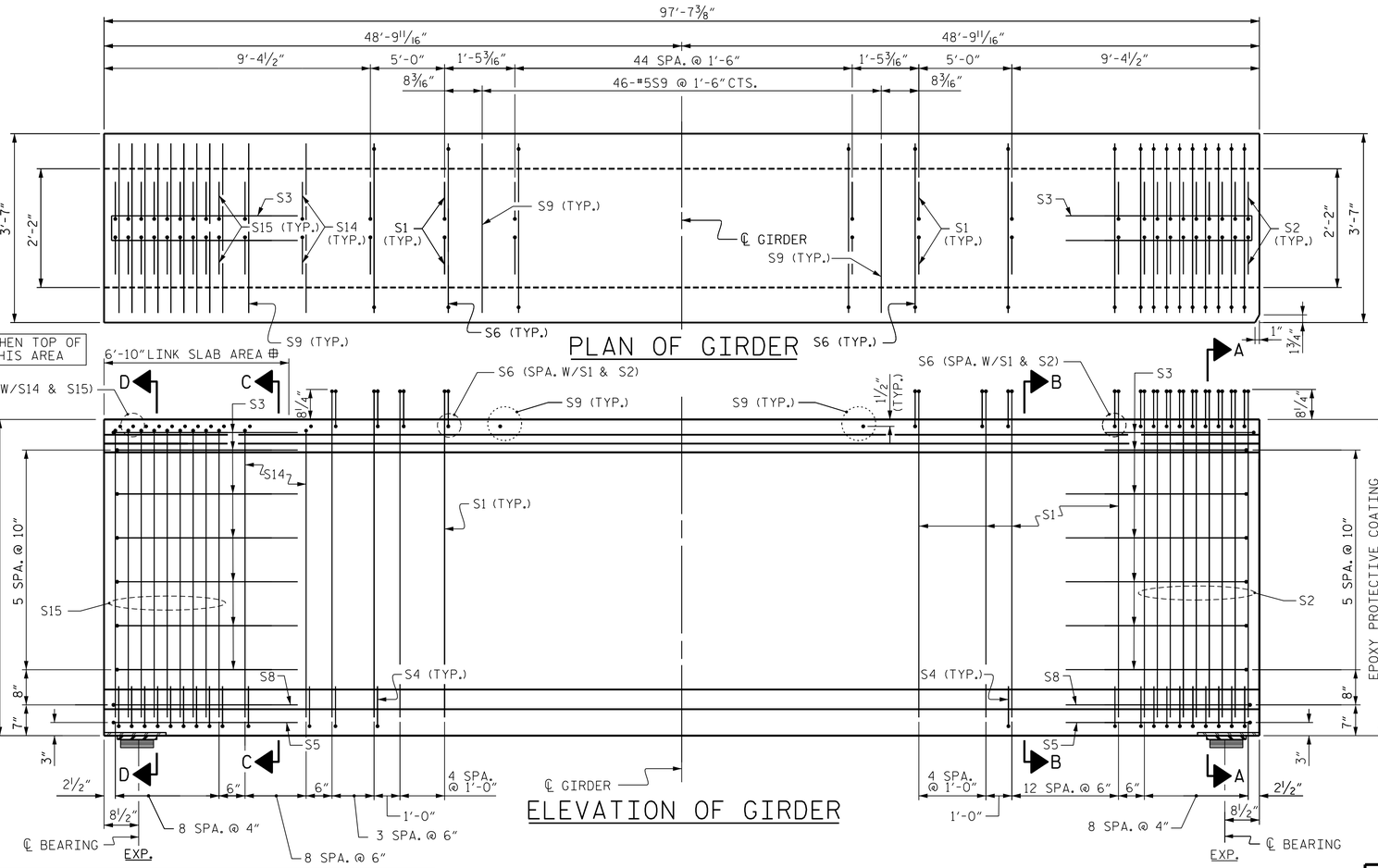
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2495	20.9	30
INTERIOR GIRDER	2573	20.9	30

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
13	97'-7⅜"	1268'-11⅞"



PLAN OF GIRDER

DO NOT ROUGHEN TOP OF GIRDER IN THIS AREA

ELEVATION OF GIRDER

FOR LOCATION OF 1½" Ø FORMED HOLES, SEE "SUPERSTRUCTURE PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS" SHEET

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

72" PRESTRESSED CONCRETE MODIFIED BULB TEE FOR LINK SLAB SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

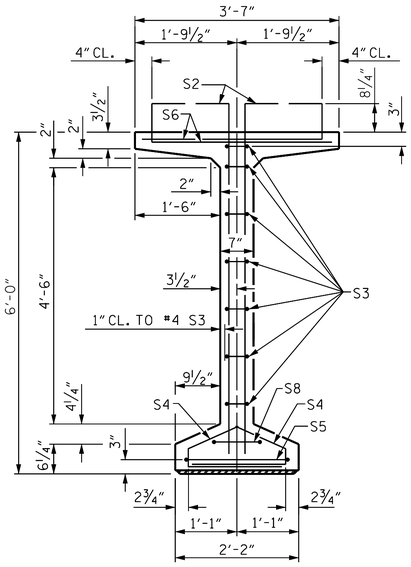
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

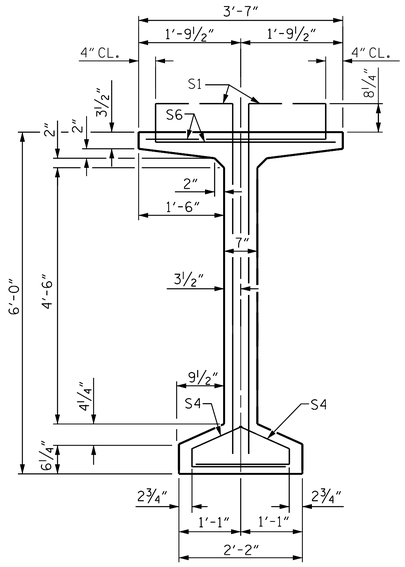
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-22
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

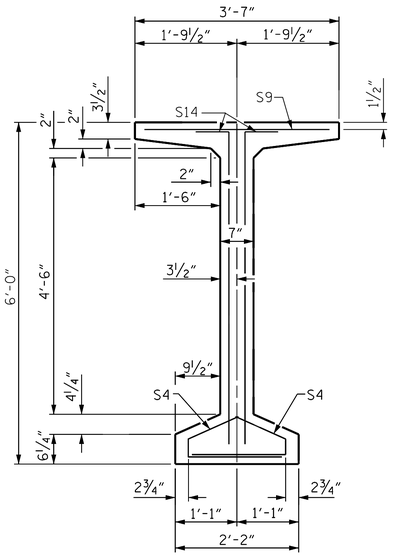
DES BY:	B. ROGERS	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	D. CARTER	DATE :	05/21
CHK BY:	B. ROGERS	DATE :	07/21



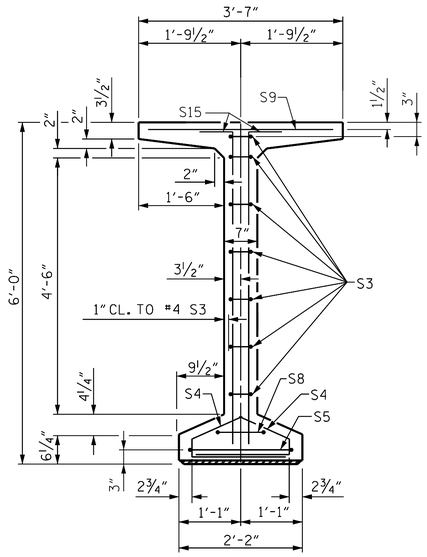
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

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 SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW ON SHEETS 1 OF 4 AND 2 OF 4.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2"BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,800 PSI FOR SPAN A AND 4,800 PSI FOR SPAN B.

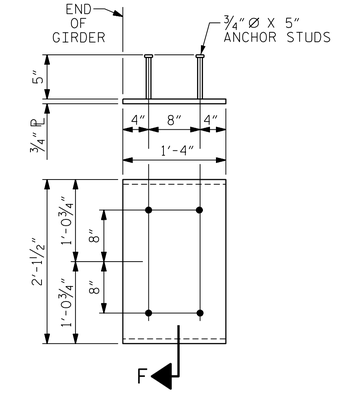
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

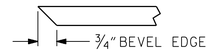
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4" AND WITHIN THE LINK SLAB, SHALL BE RAKED TO A DEPTH OF ¼".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6"OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN ½"OF THE THEORETICAL LOCATION SHOWN.

A 2"x 2"CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.





SECTION "F"
(SEE NOTES)

EMBEDDED PLATE "B-1" DETAILS
(2 REQ'D PER GIRDER)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

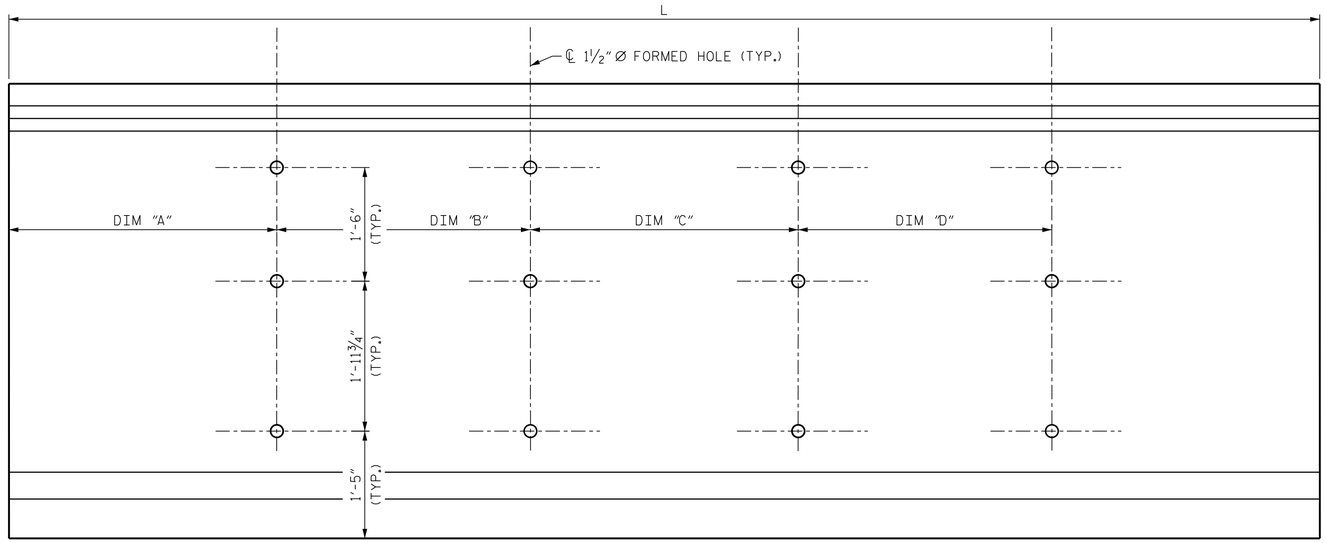
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

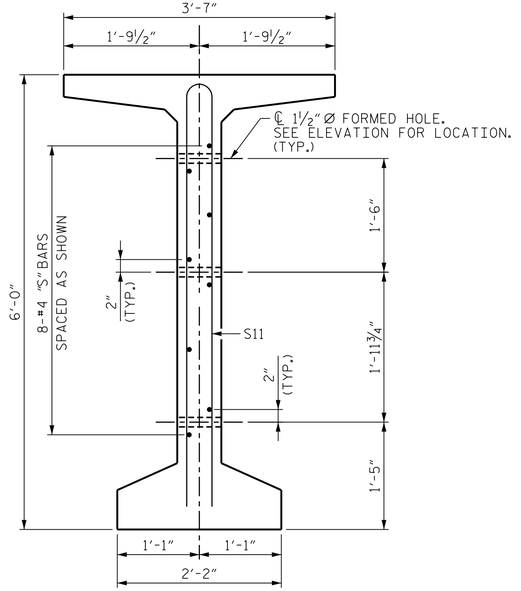
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-23
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	B. ROGERS	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	B. ROGERS	DATE :	07/21



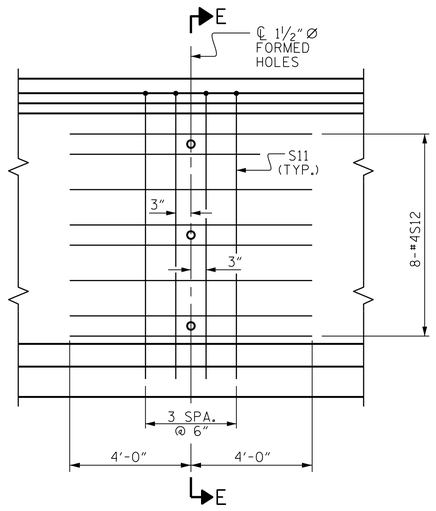
DIRECTION OF INCREASING STATIONS

LOCATION OF 1½" Ø FORMED HOLE



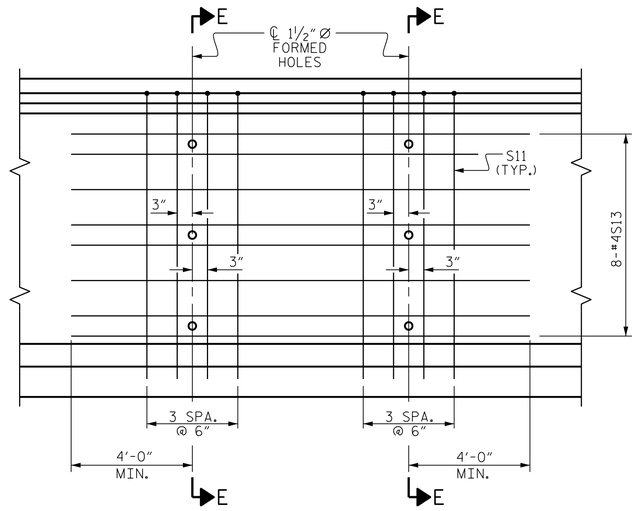
SECTION E-E

(MAIN GIRDER REINFORCING NOT SHOWN FOR CLARITY)



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR EXTERIOR GIRDERS



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR EXTERIOR GIRDERS

TABLE OF 1½" Ø FORMED HOLE DIMENSIONS					
GIRDER	L	DIM "A"	DIM "B"	DIM "C"	DIM "D"
A1	129'-4⅜"	40'-6⅞"	42'-8¾"	-	-
A2 THRU A6 & A9 THRU A12	129'-4⅜"	40'-6⅞"	5'-5⅞"	37'-2⅞"	5'-5⅞"
A7	129'-4⅜"	41'-0 15/16"	4'-11 13/16"	37'-8 15/16"	4'-11 13/16"
A8	129'-4⅜"	40'-6⅞"	4'-11 13/16"	37'-8 15/16"	4'-11 13/16"
A13	129'-4⅜"	46'-0¾"	42'-8¾"	-	-
B1	97'-7⅜"	46'-0¾"	-	-	-
B2 THRU B6 & B9 THRU B12	97'-7⅜"	46'-0¾"	5'-5⅞"	-	-
B7	97'-7⅜"	46'-6 13/16"	4'-11 13/16"	-	-
B8	97'-7⅜"	46'-0¾"	4'-11 13/16"	-	-
B13	97'-7⅜"	51'-6⅝"	-	-	-

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS

REVISIONS						SHEET NO. S01-24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

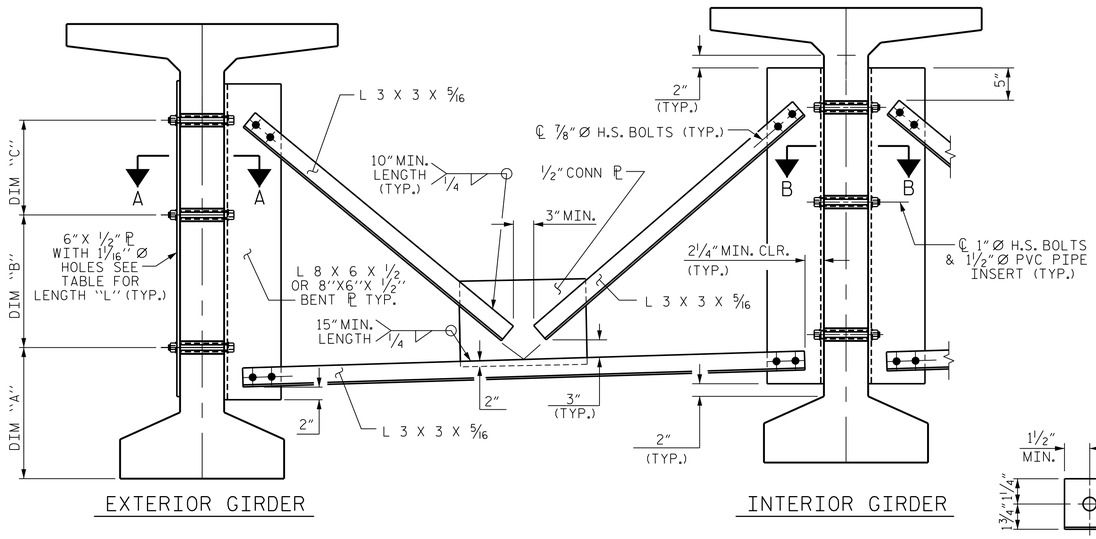
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

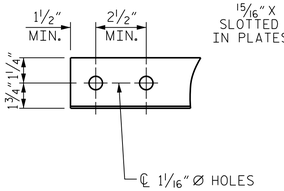
DES BY:	K. DICKENS	DATE: 06/21	DWG BY:	B. PETERSON	DATE: 06/21
DES CHK:	B. ROGERS	DATE: 06/21	CHK BY:	B. ROGERS	DATE: 07/21



EXTERIOR GIRDER

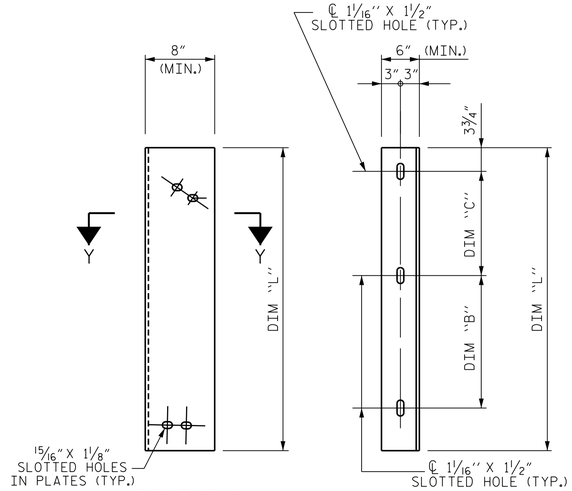
INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



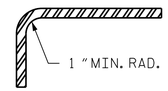
ANGLE END

(L 3 X 3 X 5/16)



DIAPHRAGM FACE

WEB FACE



SECTION Y-Y

CONNECTION PLATE DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

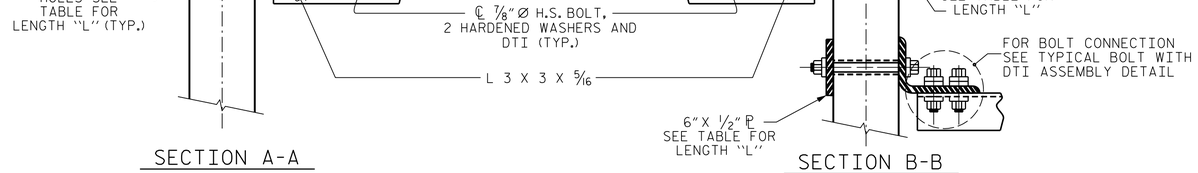
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

FOR INTERMEDIATE DIAPHRAGMS IN CLOSURE BAYS, THE NUTS AND BOLTS FOR CONNECTING THE DIAPHRAGM TO CONNECTOR PLATE SHALL BE LEFT LOOSE FOR PURPOSE OF ADJUSTMENT UNTIL BOTH SIDES OF SLAB HAVE BEEN POURED.

TABLE

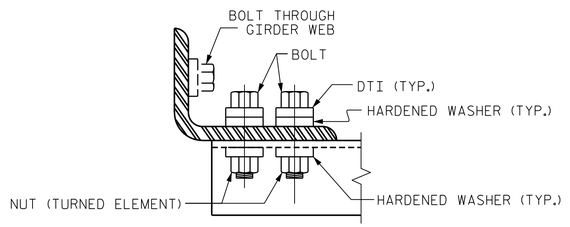
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-5"	1'-11 3/4"	1'-6"	4'-2"



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE INTERMEDIATE STEEL DIAPHRAGMS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

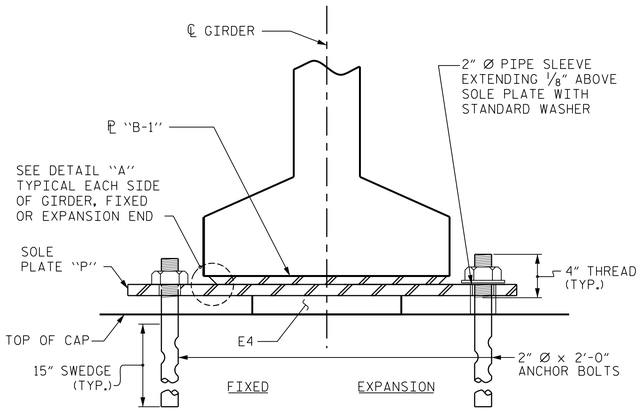
S. Kent Dickens 1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

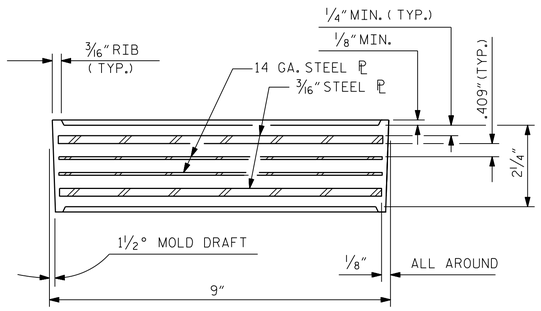
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-25
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

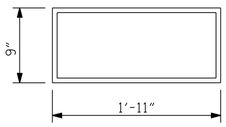
DES BY: K. DICKENS	DATE : 06/21	DWG BY: B. PETERSON	DATE : 06/21
DES CHK: B. ROGERS	DATE : 06/21	CHK BY: K. DICKENS	DATE : 06/21



SECTION E-E



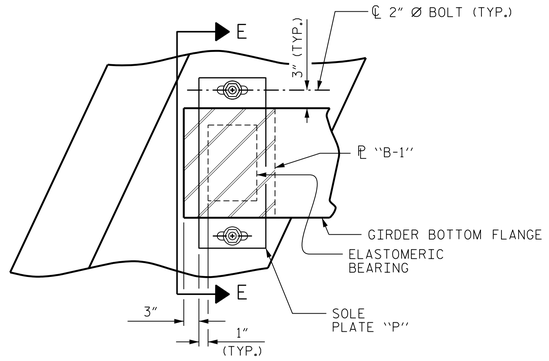
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (52 REQ'D)

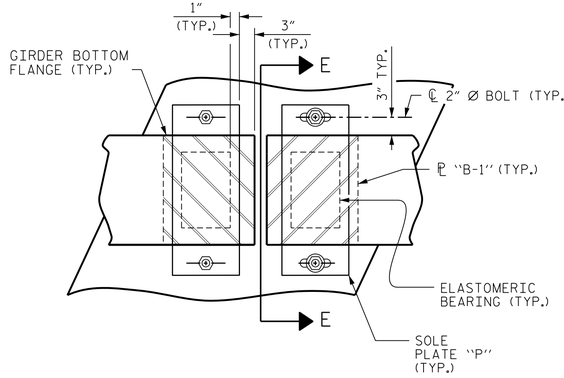
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



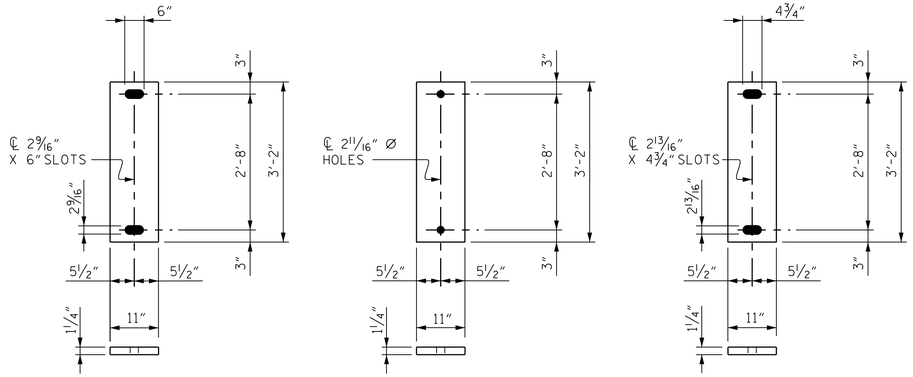
TYPICAL PLAN AT END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



TYPICAL PLAN AT BENT

DIRECTION OF INCREASING STATIONS →



P1 (EXPANSION) (26 REQ'D)

P2 (FIXED) (13 REQ'D)

P3 (EXPANSION) (13 REQ'D)

SOLE PLATE DETAILS ("P")

DIRECTION OF INCREASING STATIONS →

NOTES

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

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

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

SOLE PLATE "P" BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

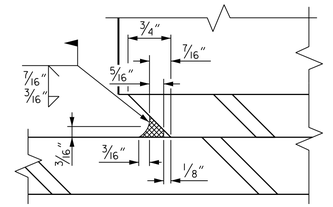
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



DETAIL "A"

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L. + L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE ELASTOMERIC BEARING DETAILS

DES BY: K. DICKENS	DATE : 05/21	DWG BY: B. PETERSON	DATE : 02/21
DES CHK: H. ABU NIMEH	DATE : 06/21	CHK BY: H. ABU NIMEH	DATE : 06/21

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-26
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

DEAD LOAD DEFLECTION TABLE FOR GIRDERS, SPAN A

GIRDERS 1 AND 13

40TH POINTS	0.00	0.025	0.050	0.075	0.10	0.125	0.150	0.175	0.20	0.225	0.250	0.275	0.30	0.325	0.350	0.375	0.40	0.425	0.450	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.084	0.111	0.137	0.163	0.187	0.209	0.232	0.252	0.271	0.288	0.303	0.317	0.328	0.337	0.345	0.350	0.353	0.354
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.021	0.042	0.063	0.083	0.103	0.122	0.140	0.156	0.173	0.189	0.202	0.215	0.226	0.237	0.245	0.252	0.257	0.261	0.264	0.265
FINAL CAMBER ↑	0″	1/16″	3/16″	1/4″	5/16″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	13/16″	7/8″	15/16″	15/16″	1″	1″	1 1/16″	1 1/16″	1 1/16″	1 1/16″

GIRDERS 1 AND 13

40TH POINTS	0.50	0.525	0.550	0.575	0.60	0.625	0.650	0.675	0.70	0.725	0.750	0.775	0.80	0.825	0.850	0.875	0.90	0.925	0.950	0.975	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.354	0.353	0.350	0.343	0.337	0.328	0.317	0.303	0.288	0.271	0.252	0.232	0.210	0.187	0.163	0.137	0.111	0.084	0.056	0.028	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.265	0.264	0.261	0.257	0.252	0.245	0.237	0.226	0.215	0.202	0.189	0.173	0.157	0.140	0.122	0.103	0.083	0.063	0.042	0.021	0.000
FINAL CAMBER ↑	1 1/16″	1 1/16″	1 1/16″	1 1/16″	1″	1″	15/16″	15/16″	7/8″	13/16″	3/4″	11/16″	5/8″	9/16″	1/2″	7/16″	5/16″	1/4″	3/16″	1/16″	0″

GIRDER 7

40TH POINTS	0.00	0.025	0.050	0.075	0.10	0.125	0.150	0.175	0.20	0.225	0.250	0.275	0.30	0.325	0.350	0.375	0.40	0.425	0.450	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.084	0.111	0.137	0.163	0.187	0.209	0.232	0.252	0.271	0.288	0.303	0.317	0.328	0.337	0.345	0.350	0.353	0.354
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.018	0.035	0.052	0.070	0.086	0.102	0.117	0.131	0.145	0.158	0.169	0.180	0.190	0.198	0.205	0.211	0.216	0.219	0.221	0.222
FINAL CAMBER ↑	0″	1/8″	1/4″	3/8″	1/2″	5/8″	3/4″	13/16″	15/16″	1 1/16″	1 1/8″	1 3/16″	1 5/16″	1 3/8″	1 7/16″	1 1/2″	1 1/2″	1 9/16″	1 9/16″	1 9/16″	1 9/16″

GIRDER 7

40TH POINTS	0.50	0.525	0.550	0.575	0.60	0.625	0.650	0.675	0.70	0.725	0.750	0.775	0.80	0.825	0.850	0.875	0.90	0.925	0.950	0.975	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.354	0.353	0.350	0.343	0.337	0.328	0.317	0.303	0.288	0.271	0.252	0.232	0.210	0.187	0.163	0.137	0.111	0.084	0.056	0.028	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.222	0.221	0.219	0.215	0.211	0.205	0.198	0.190	0.180	0.169	0.158	0.145	0.132	0.117	0.102	0.086	0.070	0.052	0.035	0.018	0.000
FINAL CAMBER ↑	1 9/16″	1 9/16″	1 9/16″	1 9/16″	1 1/2″	1 1/2″	1 7/16″	1 3/8″	1 5/16″	1 3/16″	1 1/8″	1 1/16″	15/16″	13/16″	3/4″	5/8″	1/2″	3/8″	1/4″	1/8″	0″

GIRDER 8

40TH POINTS	0.00	0.025	0.050	0.075	0.10	0.125	0.150	0.175	0.20	0.225	0.250	0.275	0.30	0.325	0.350	0.375	0.40	0.425	0.450	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.084	0.111	0.137	0.163	0.187	0.209	0.232	0.252	0.271	0.288	0.303	0.317	0.328	0.337	0.345	0.350	0.353	0.354
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.016	0.031	0.046	0.061	0.076	0.090	0.103	0.115	0.128	0.139	0.149	0.158	0.167	0.174	0.180	0.186	0.190	0.193	0.194	0.195
FINAL CAMBER ↑	0″	1/8″	5/16″	7/16″	5/8″	3/4″	7/8″	1″	1 1/8″	1 1/4″	1 3/8″	1 7/16″	1 9/16″	1 5/8″	1 11/16″	1 3/4″	1 13/16″	1 7/8″	1 7/8″	1 7/8″	1 15/16″

GIRDER 8

40TH POINTS	0.50	0.525	0.550	0.575	0.60	0.625	0.650	0.675	0.70	0.725	0.750	0.775	0.80	0.825	0.850	0.875	0.90	0.925	0.950	0.975	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.354	0.353	0.350	0.343	0.337	0.328	0.317	0.303	0.288	0.271	0.252	0.232	0.210	0.187	0.163	0.137	0.111	0.084	0.056	0.028	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.195	0.194	0.193	0.189	0.186	0.180	0.174	0.167	0.158	0.149	0.139	0.128	0.116	0.103	0.090	0.076	0.061	0.046	0.031	0.016	0.000
FINAL CAMBER ↑	1 15/16″	1 7/8″	1 7/8″	1 7/8″	1 13/16″	1 3/4″	1 11/16″	1 5/8″	1 9/16″	1 7/16″	1 3/8″	1 1/4″	1 1/8″	1″	7/8″	3/4″	5/8″	7/16″	5/16″	1/8″	0″

GIRDERS 2, 3, 4, 5, 6, 9, 10, 11, AND 12

40TH POINTS	0.00	0.025	0.050	0.075	0.10	0.125	0.150	0.175	0.20	0.225	0.250	0.275	0.30	0.325	0.350	0.375	0.40	0.425	0.450	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.084	0.111	0.137	0.163	0.187	0.209	0.232	0.252	0.271	0.288	0.303	0.317	0.328	0.337	0.345	0.350	0.353	0.354
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.020	0.040	0.059	0.078	0.097	0.115	0.132	0.147	0.163	0.178	0.191	0.203	0.214	0.223	0.231	0.238	0.243	0.247	0.249	0.250
FINAL CAMBER ↑	0″	1/8″	3/16″	5/16″	3/8″	1/2″	9/16″	11/16″	3/4″	13/16″	7/8″	15/16″	1″	1 1/16″	1 1/8″	1 3/16″	1 3/16″	1 1/4″	1 1/4″	1 1/4″	1 1/4″

GIRDERS 2, 3, 4, 5, 6, 9, 10, 11, AND 12

40TH POINTS	0.50	0.525	0.550	0.575	0.60	0.625	0.650	0.675	0.70	0.725	0.750	0.775	0.80	0.825	0.850	0.875	0.90	0.925	0.950	0.975	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.354	0.353	0.350	0.345	0.337	0.328	0.317	0.303	0.288	0.271	0.252	0.232	0.210	0.187	0.163	0.137	0.111	0.084	0.056	0.028	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.250	0.249	0.247	0.243	0.238	0.231	0.223	0.214	0.203	0.191	0.178	0.163	0.148	0.132	0.115	0.097	0.078	0.059	0.040	0.020	0.000
FINAL CAMBER ↑	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 3/16″	1 3/16″	1 1/8″	1 1/16″	1″	15/16″	7/8″	13/16″	3/4″	11/16″	9/16″	1/2″	3/8″	5/16″	3/16″	1/8″	0″

DEAD LOAD DEFLECTION TABLE FOR GIRDERS, SPAN B

GIRDERS 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, AND 13

TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.029	0.057	0.083	0.107	0.129	0.147	0.162	0.172	0.178	0.181	0.178	0.172	0.162	0.147	0.129	0.107	0.083	0.057	0.029	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.015	0.030	0.043	0.056	0.067	0.077	0.084	0.090	0.093	0.094	0.093	0.090	0.084	0.077	0.067	0.056	0.043	0.030	0.015	0.000
FINAL CAMBER ↑	0″	3/16″	5/16″	1/2″	5/8″	3/4″	13/16″	15/16″	1″	1″	1 1/16″	1″	1″	15/16″	13/16″	3/4″	5/8″	1/2″	5/16″	3/16″	0″

GIRDERS 7 AND 8

TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.029	0.057	0.083	0.107	0.129	0.147	0.162	0.172	0.178	0.181	0.178	0.172	0.162	0.147	0.129	0.107	0.083	0.057	0.029	0.000
DEFLECTION DUE TO SDL ✳ ↓	0.000	0.012	0.025	0.036	0.046	0.056	0.064	0.070	0.075	0.078	0.079	0.078	0.075	0.070	0.064	0.056	0.047	0.036	0.025	0.012	0.000
FINAL CAMBER ↑	0″	3/16″	3/8″	9/16″	3/4″	7/8″	1″	1 1/8″	1 3/16″	1 3/16″	1 1/4″	1 3/16″	1 3/16″	1 1/8″	1″	7/8″	3/4″	9/16″	3/8″	3/16″	0″

↑ = UPWARD CAMBER

↓ = DOWNWARD DEFLECTION

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES (FRACTION FORM).

SDL = SUPERIMPOSED DEAD LOAD

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE DEAD LOAD DEFLECTIONS AND CAMBER ORDINATES

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

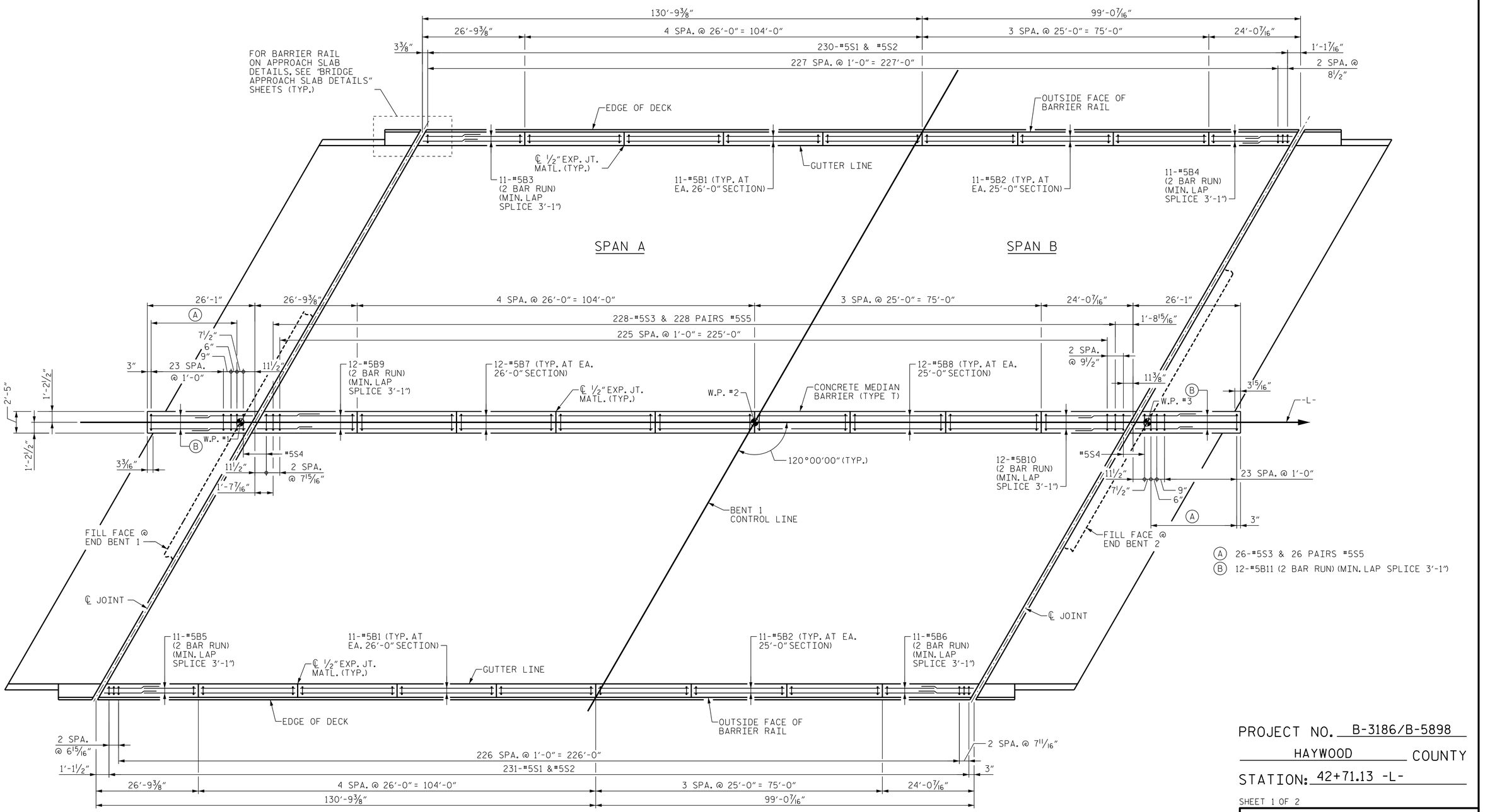
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-27
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY: B. ROGERS	DATE: 03/21	DWG BY: D. CARTER	DATE: 03/21
DES CHK: K. DICKENS	DATE: 03/21	CHK BY: K. DICKENS	DATE: 06/21



PLAN OF BARRIER RAILS AND MEDIAN BARRIER

ALL DIMENSIONS FOR BARRIER RAIL ARE MEASURED ALONG THE OUTSIDE FACE OF THE BARRIER RAIL.
ALL DIMENSIONS FOR MEDIAN BARRIER ARE MEASURED ALONG THE ℄ OF THE MEDIAN BARRIER.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE CONCRETE BARRIER RAIL AND CONCRETE MEDIAN BARRIER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-28
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

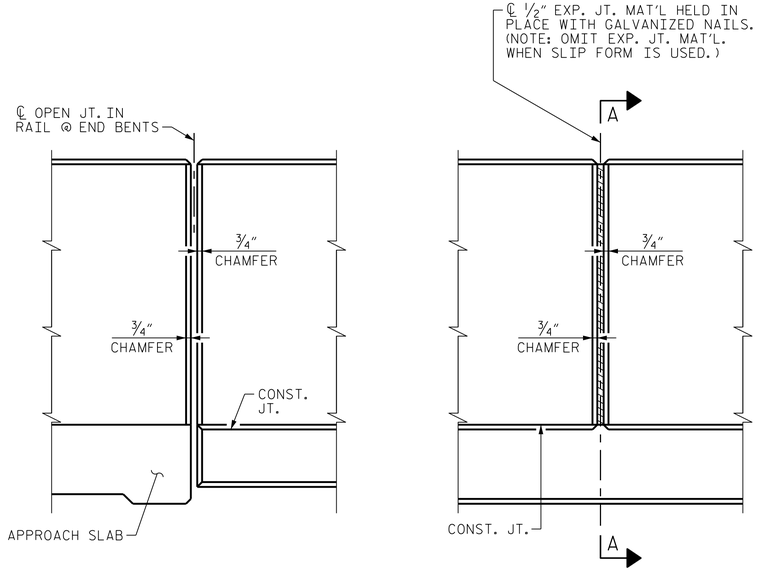
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

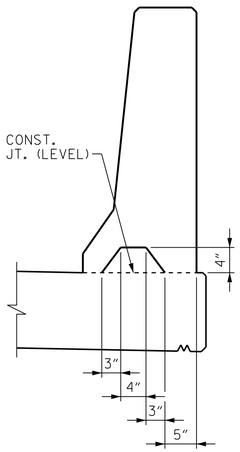
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	L. GUALTIERI	DATE :	06/21

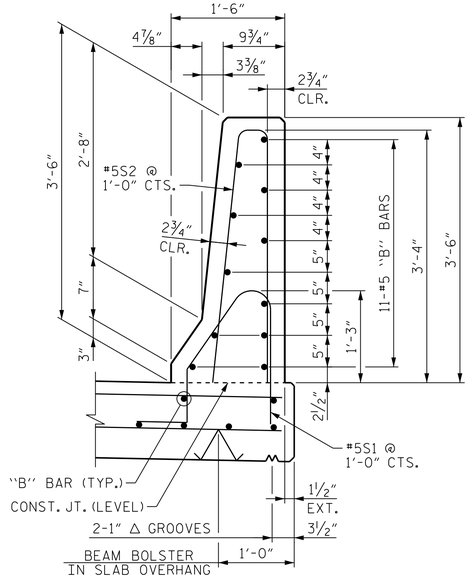
PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:30:10 AM
FILE: ...\401.135_B5898B3186_SMU_BR_028_430168.dgn



ELEVATION AT EXPANSION JOINTS

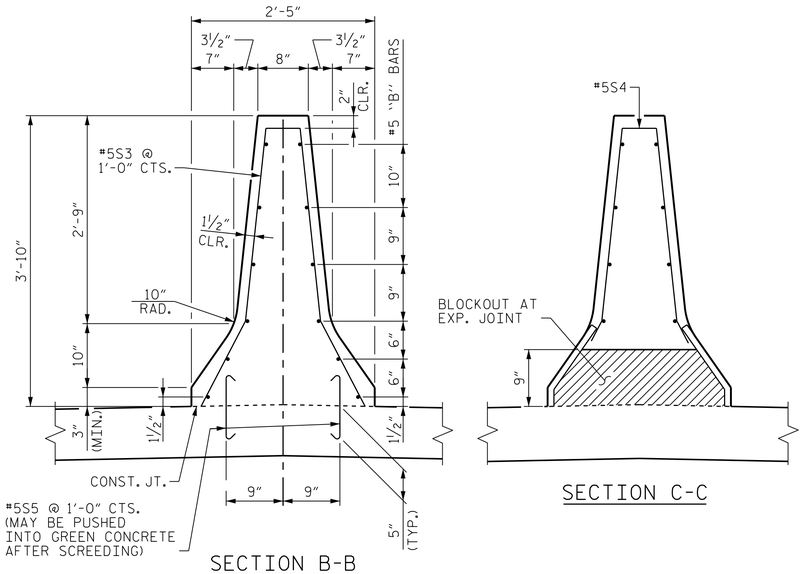


SECTION A-A
(AT DAM IN OPEN JOINT)
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



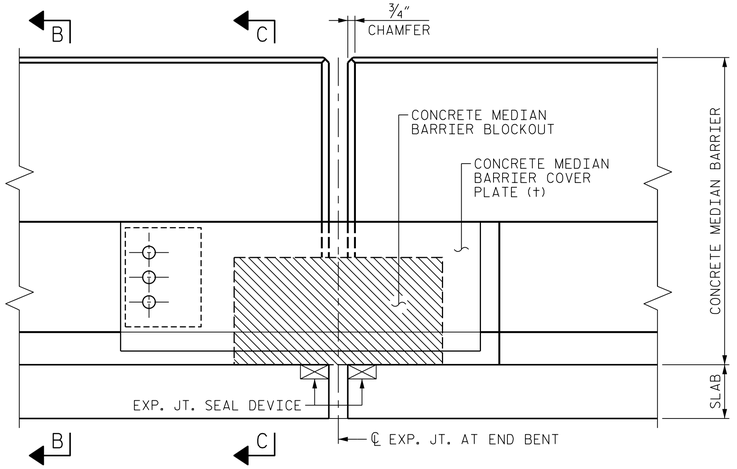
SECTION THROUGH RAIL

BARRIER RAIL DETAILS



SECTION B-B

SECTION C-C



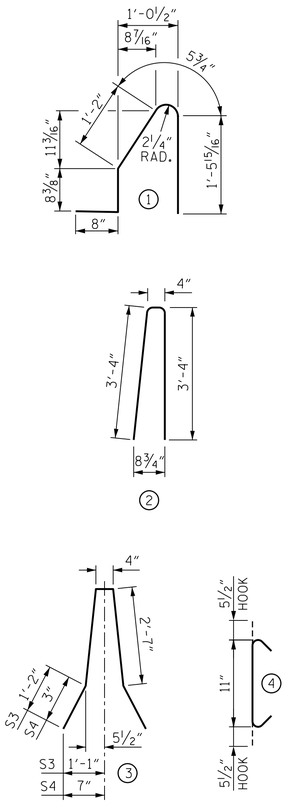
ELEVATION AT EXPANSION JOINT SEALS

(†) SEE "SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS FOR MEDIAN BARRIER" SHEET 3 OF 4 FOR COVER PLATE DETAILS

MEDIAN BARRIER DETAILS

(TYPE T)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

■ FOR STAGE I CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	44	#5	STR	25'-7"	1175
✳ B2	33	#5	STR	24'-7"	847
✳ B3	22	#5	STR	15'-2"	349
✳ B4	22	#5	STR	13'-5"	308
✳ S1	230	#5	1	4'-6"	1080
✳ S2	230	#5	2	7'-0"	1680

✳ EPOXY COATED REINFORCING STEEL	5439 LBS.
CLASS AA CONCRETE	31.3 CU. YDS.
CONCRETE BARRIER RAIL	229.8 LIN. FT.

BILL OF MATERIAL

■ FOR STAGE II CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	44	#5	STR	25'-7"	1175
✳ B2	33	#5	STR	24'-7"	847
✳ B5	22	#5	STR	14'-9"	339
✳ B6	22	#5	STR	13'-10"	318
✳ S1	231	#5	1	4'-6"	1085
✳ S2	231	#5	2	7'-0"	1687

✳ EPOXY COATED REINFORCING STEEL	5451 LBS.
CLASS AA CONCRETE	31.3 CU. YDS.
CONCRETE BARRIER RAIL	229.8 LIN. FT.

BILL OF MATERIAL

▲ FOR CONCRETE MEDIAN BARRIER ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B7	48	#5	STR	25'-7"	1281
✳ B8	36	#5	STR	24'-7"	924
✳ B9	24	#5	STR	15'-1"	378
✳ B10	24	#5	STR	13'-9"	345
✳ B11	48	#5	STR	14'-9"	739
✳ S3	280	#5	3	7'-10"	2288
✳ S4	4	#5	3	6'-0"	26
✳ S5	560	#5	4	1'-10"	1071

✳ EPOXY COATED REINFORCING STEEL	7052 LBS.
CLASS AA CONCRETE	49.8 CU. YDS.
CONCRETE MEDIAN BARRIER	282.0 LIN. FT.

■ QUANTITY FOR BARRIER RAILS ON APPROACH SLAB NOT INCLUDED. SEE APPROACH SLAB DETAILS.

▲ INCLUDES QUANTITIES FOR MEDIAN BARRIER ON APPROACH SLAB.

NOTES

THE BARRIER RAIL AND CONCRETE MEDIAN BARRIER IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN THE BARRIER RAILS AND CONCRETE MEDIAN BARRIER RAIL SHALL BE EPOXY COATED.

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

THE #5 "S" BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN THE BARRIER RAIL AND CONCRETE MEDIAN BARRIER.

THE #5 "S" BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE EXPANSION JOINT COVER PLATE ASSEMBLY IN THE CONCRETE MEDIAN BARRIER AT THE END BENTS.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE CONCRETE BARRIER RAIL AND CONCRETE MEDIAN BARRIER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-29
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

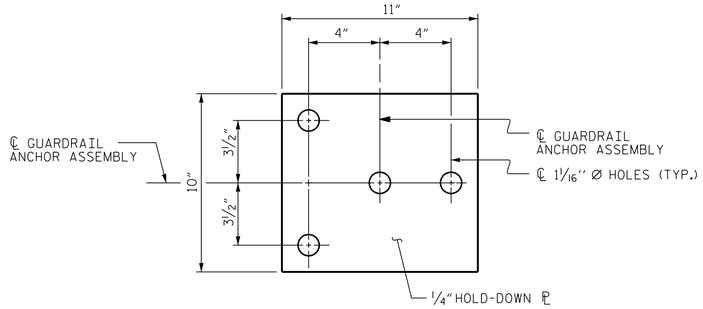
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

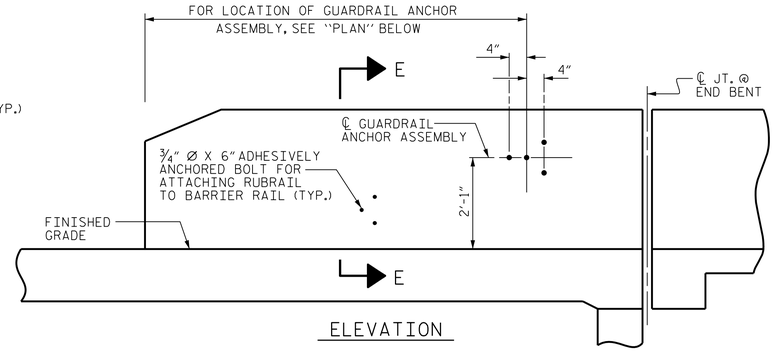
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DWG BY:	B. PETERSON
DES CHK:	L. GUALTIERI	CHK BY:	L. GUALTIERI
DATE :	05/21	DATE :	05/21
DATE :	06/21	DATE :	06/21



PLAN



ELEVATION

NOTES

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

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.)

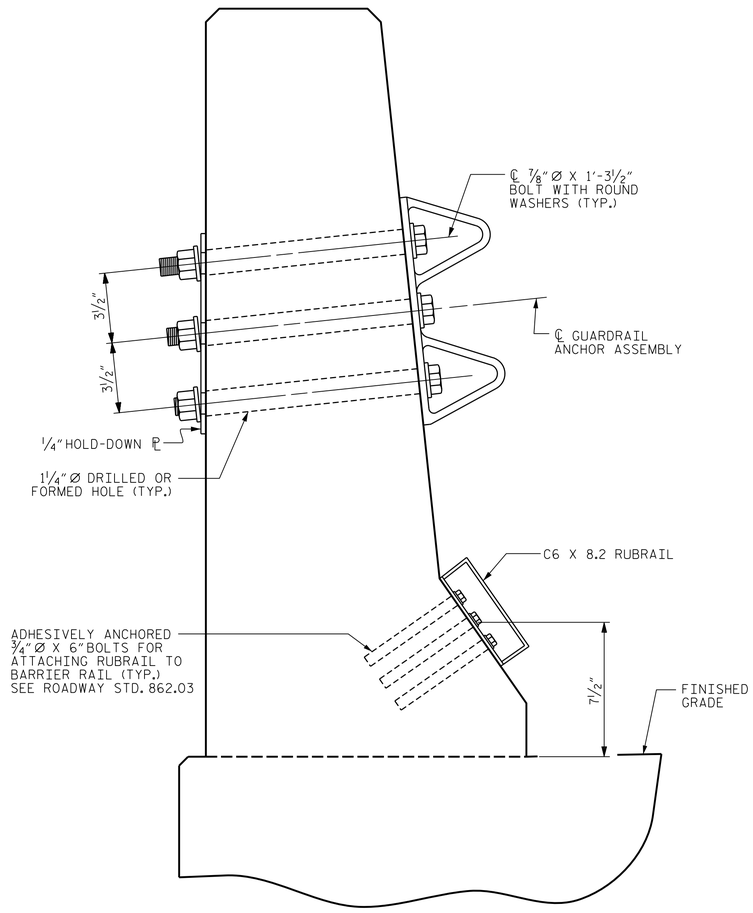
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

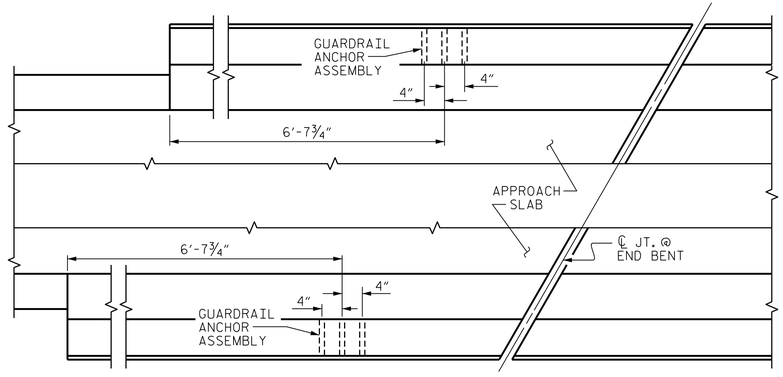
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SECTION E-E

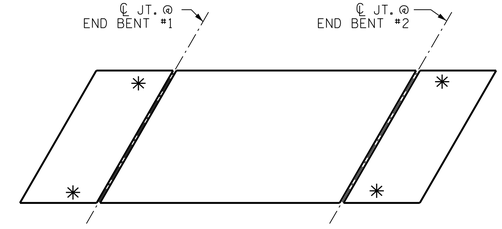
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE GUARDRAIL ANCHORAGE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-30
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

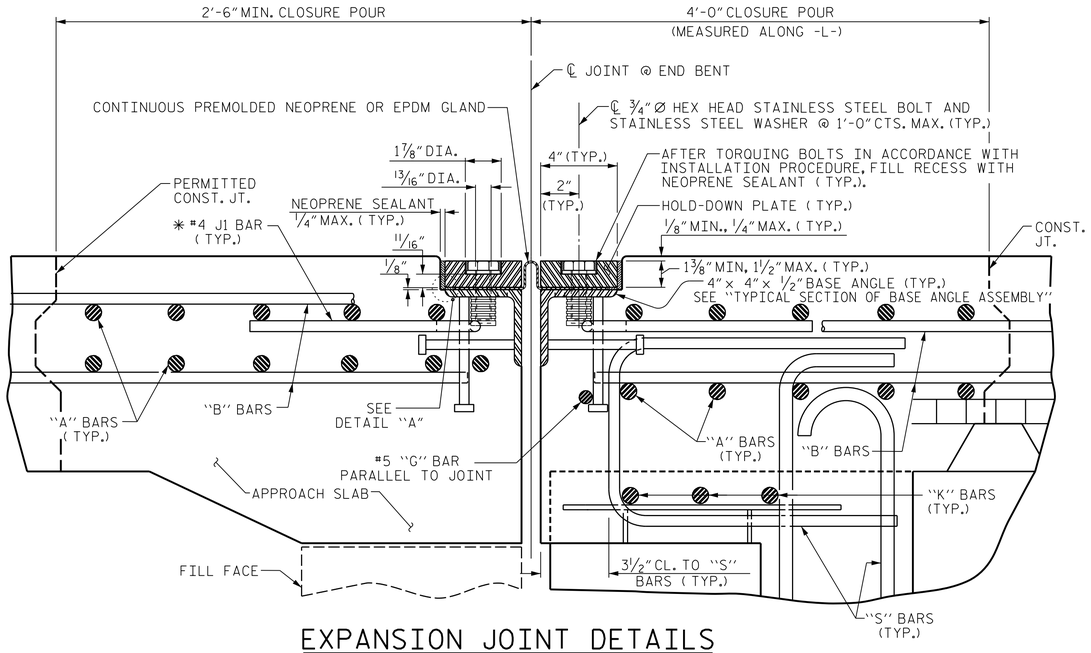
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

S Kent Dickens 1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE:	05/21	DWG BY:	H. ABU NIMEH	DATE:	05/21
DES CHK:	K. DICKENS	DATE:	05/21	CHK BY:	L. GUALTIERI	DATE:	07/21



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

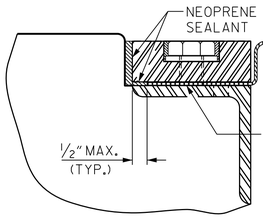
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

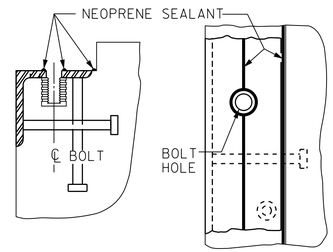
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE ¾" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X ½" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅞" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE ½" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE ¾" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.
13. A TEMPORARY GLAND IS REQUIRED FOR STAGE 1. NO SEPARATE PAYMENT WILL BE MADE FOR THE TEMPORARY GLAND.



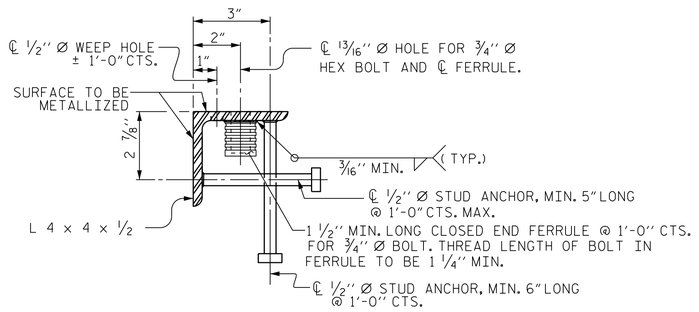
DETAIL "A"



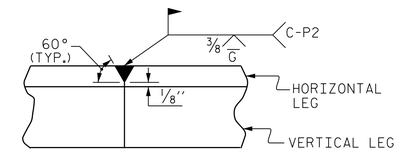
CROSS SECTION PLAN VIEW

INSTALLATION SKETCH

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
#1	120°00'00"	13/16"	1½"	1⅜"	1⅛"
#2	120°00'00"	⅝"	1⅜"	1¼"	1 1/16"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-31
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

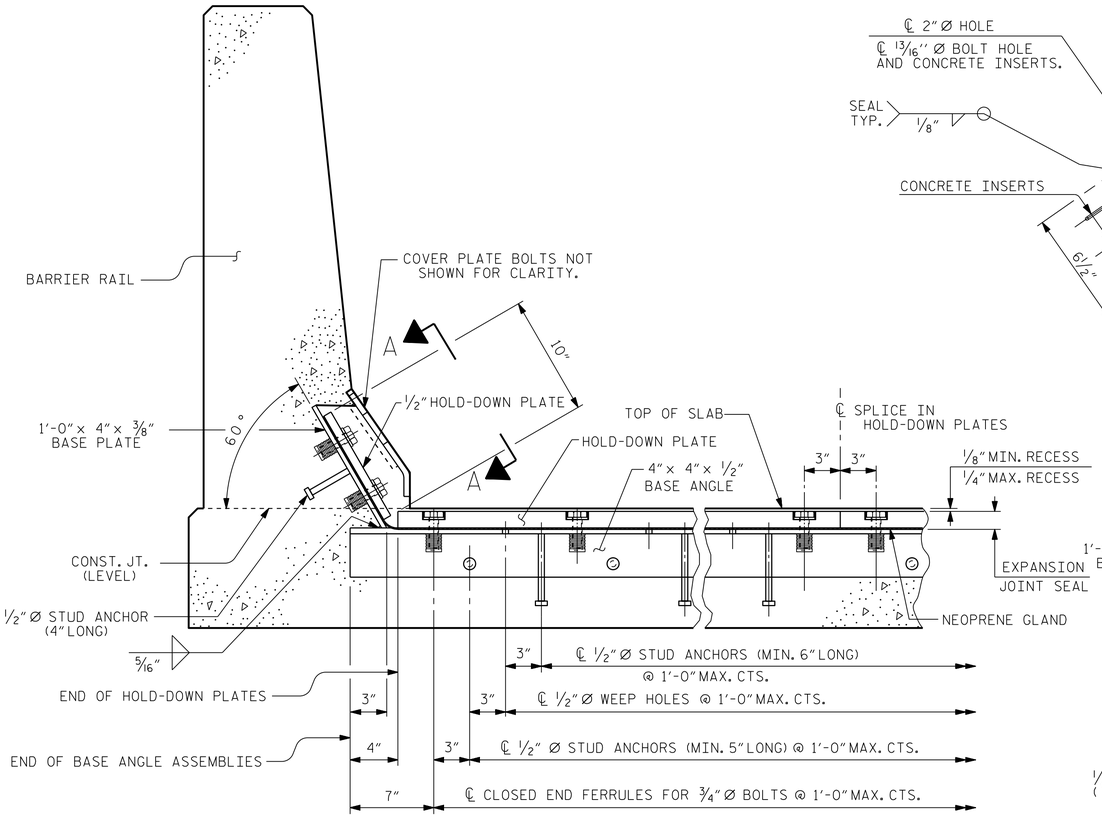
1/25/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

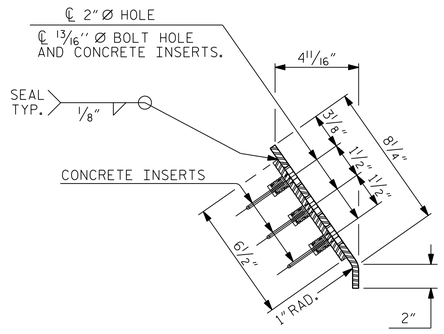
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DES BY:	H. ABU NIMEH	DATE :	04/21	DWG BY:	B. PETERSON	DATE :	04/21
DES CHK:	K. DICKENS	DATE :	04/21	CHK BY:	L. GUALTIERI	DATE :	07/21

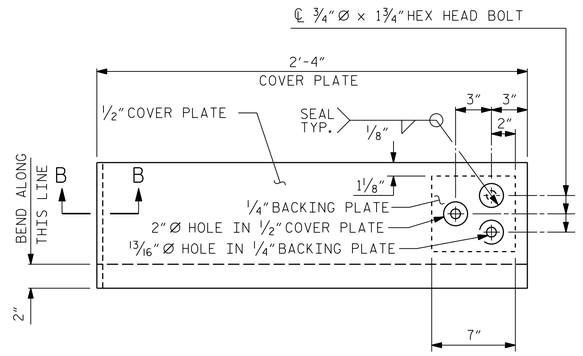
PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:30:47 AM
FILE: ...\401.150.B5898B3186_SMU_JS_031.430168.dgn



SECTION THRU RAIL NORMAL TO JOINT



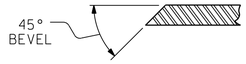
END VIEW



TYPE II - ELEVATION VIEW

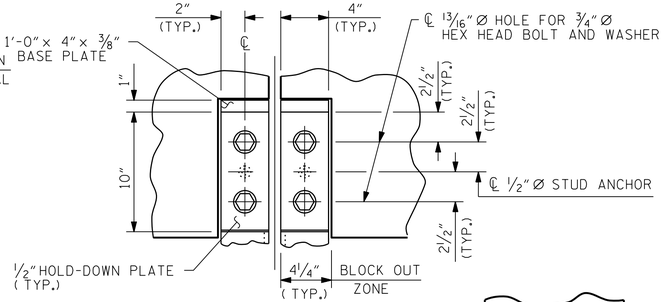
NOTE

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATES. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR EXPANSION JOINT SEALS.



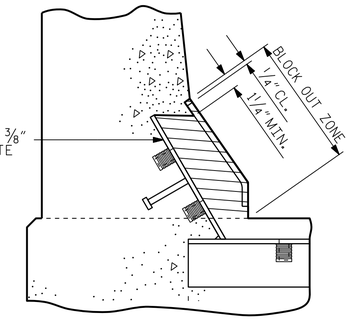
SECTION B-B

COVER PLATE DETAILS



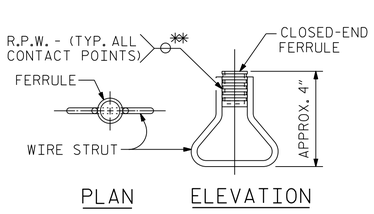
SECTION A-A

SEE SHEET 4 OF 4 FOR PAVEMENT MARKING ALIGNMENT



BLOCK OUT DETAIL

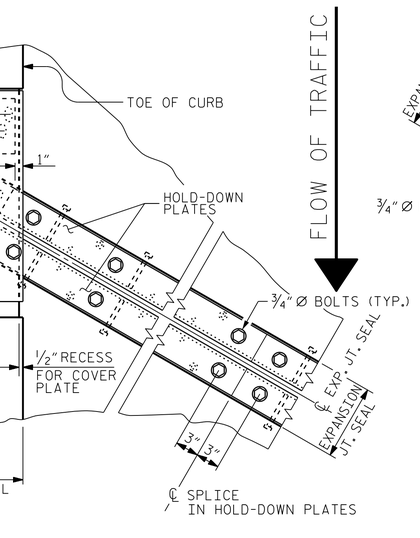
SEE "SECTION A - A" FOR OTHER DETAILS.

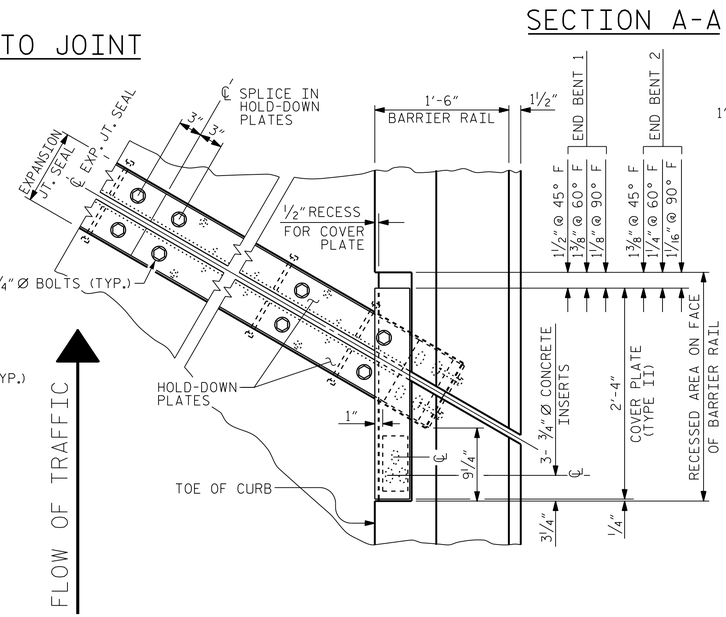


PLAN ELEVATION

CONCRETE INSERT

**EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.





PLAN OF EXPANSION JOINT SEAL

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-32
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

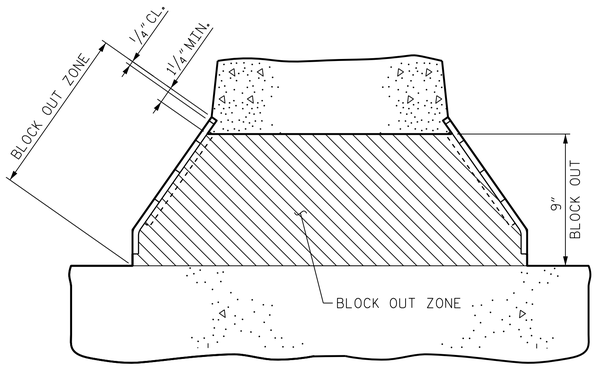
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER J. KENT DICKENS

J. Kent Dickens 1/25/2022

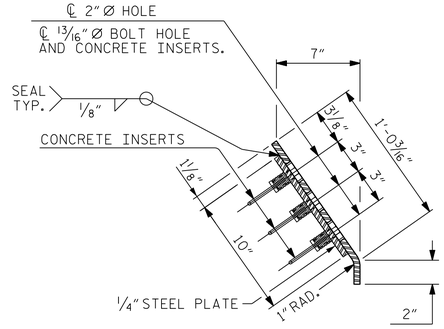
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

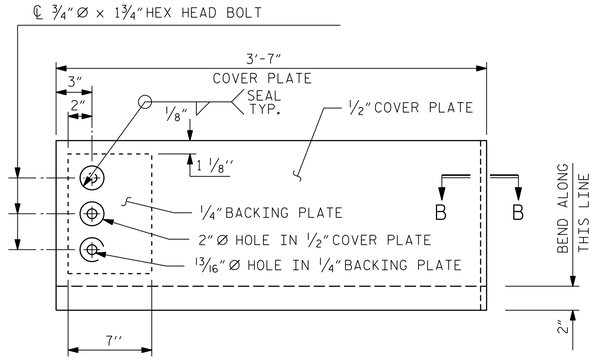
DES BY:	H. ABU NIMEH	DATE:	04/21	DWG BY:	B. PETERSON	DATE:	04/21
DES CHK:	K. DICKENS	DATE:	04/21	CHK BY:	L. GUALTIERI	DATE:	07/21



BLOCK OUT DETAIL

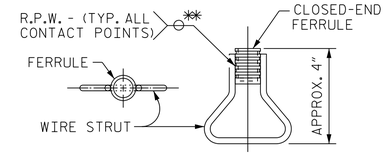


END VIEW



TYPE I - ELEVATION VIEW

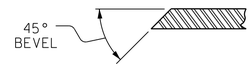
COVER PLATE DETAILS



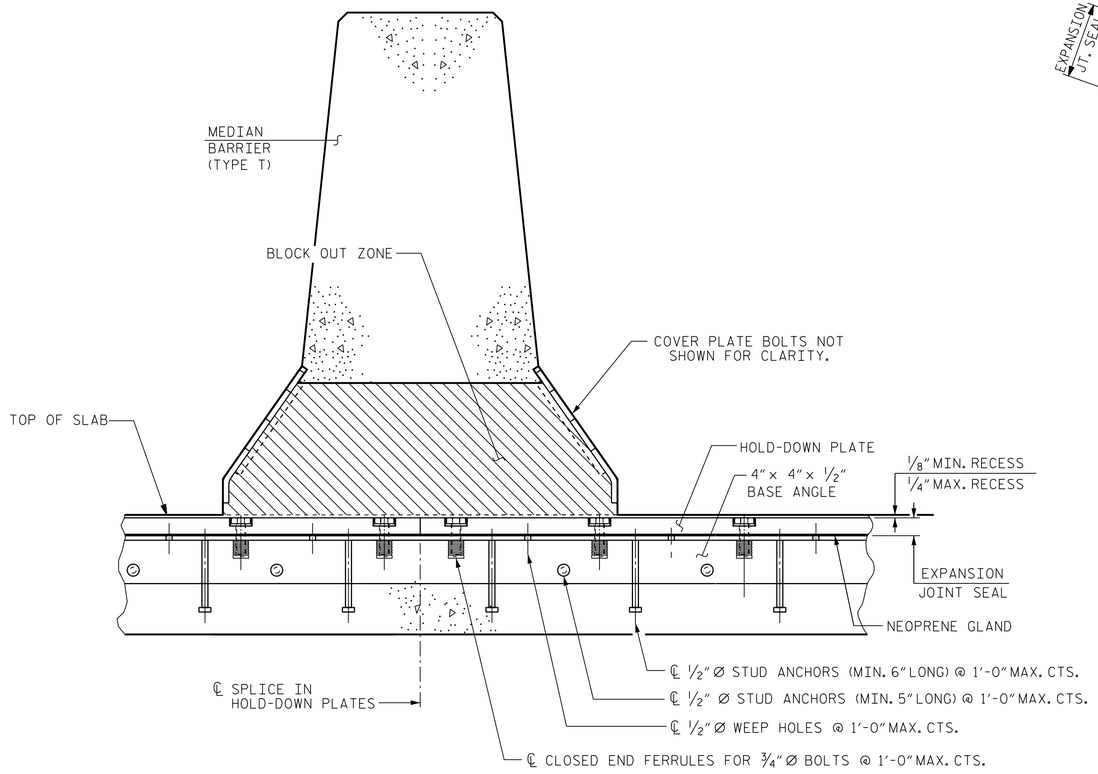
PLAN ELEVATION

CONCRETE INSERT

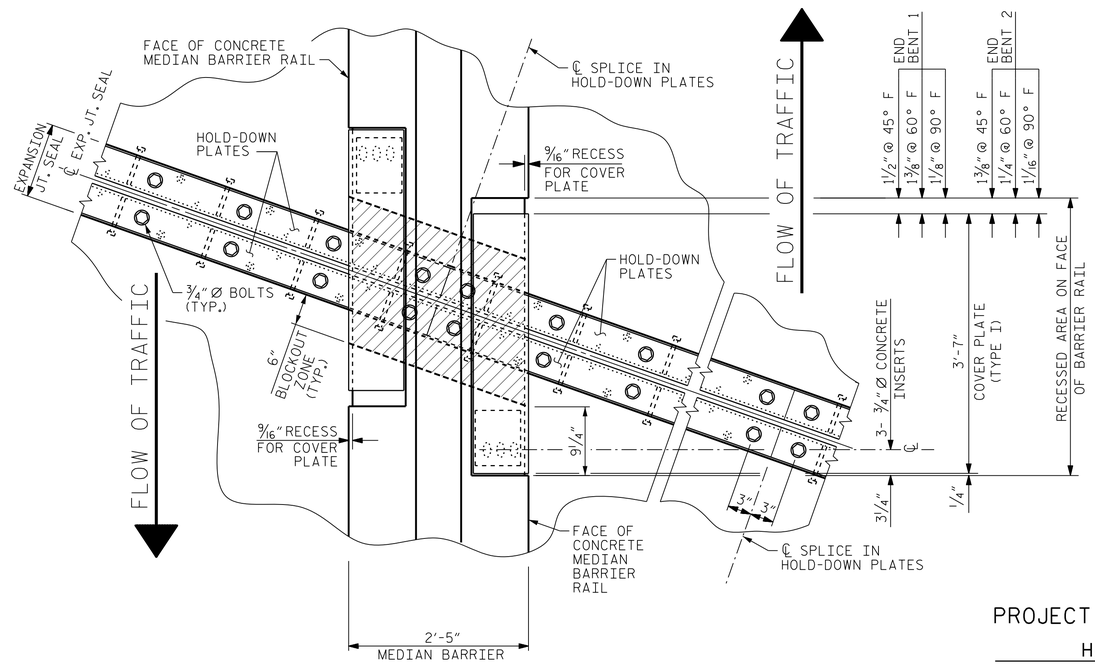
** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



SECTION B-B



SECTION THRU MEDIAN BARRIER



PLAN OF EXPANSION JOINT SEAL

(DETAILS TYPICAL BOTH SIDES)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS FOR MEDIAN BARRIER

REVISIONS						SHEET NO. S01-33
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

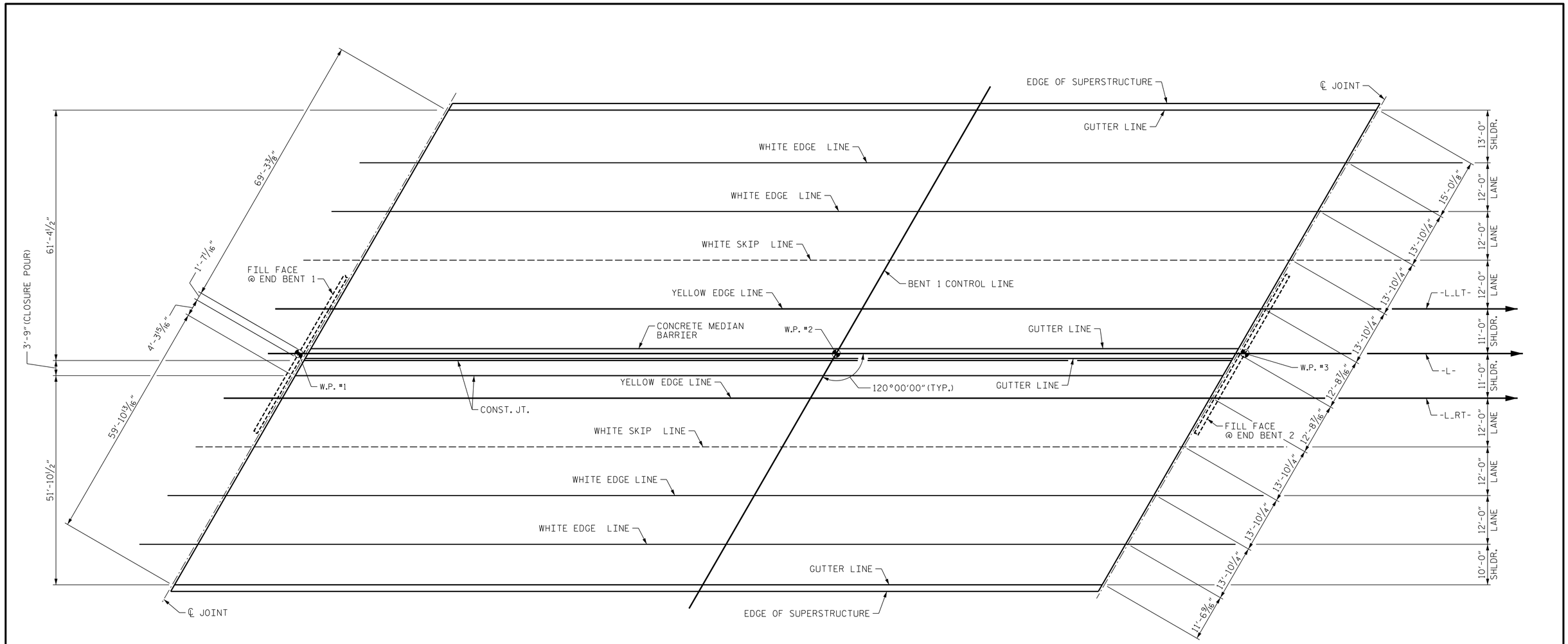
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE:	04/21	DWG BY:	B. PETERSON	DATE:	04/21
DES CHK:	K. DICKENS	DATE:	04/21	CHK BY:	L. GUALTIERI	DATE:	07/21



END BENT 1 BENT 1 END BENT 2

PAVEMENT MARKING ALIGNMENT

NOTES

ALL DIMENSIONS MEASURED ALONG ℄ JOINT.

DIMENSIONS ARE TYPICAL AT EACH END BENT.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-34
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

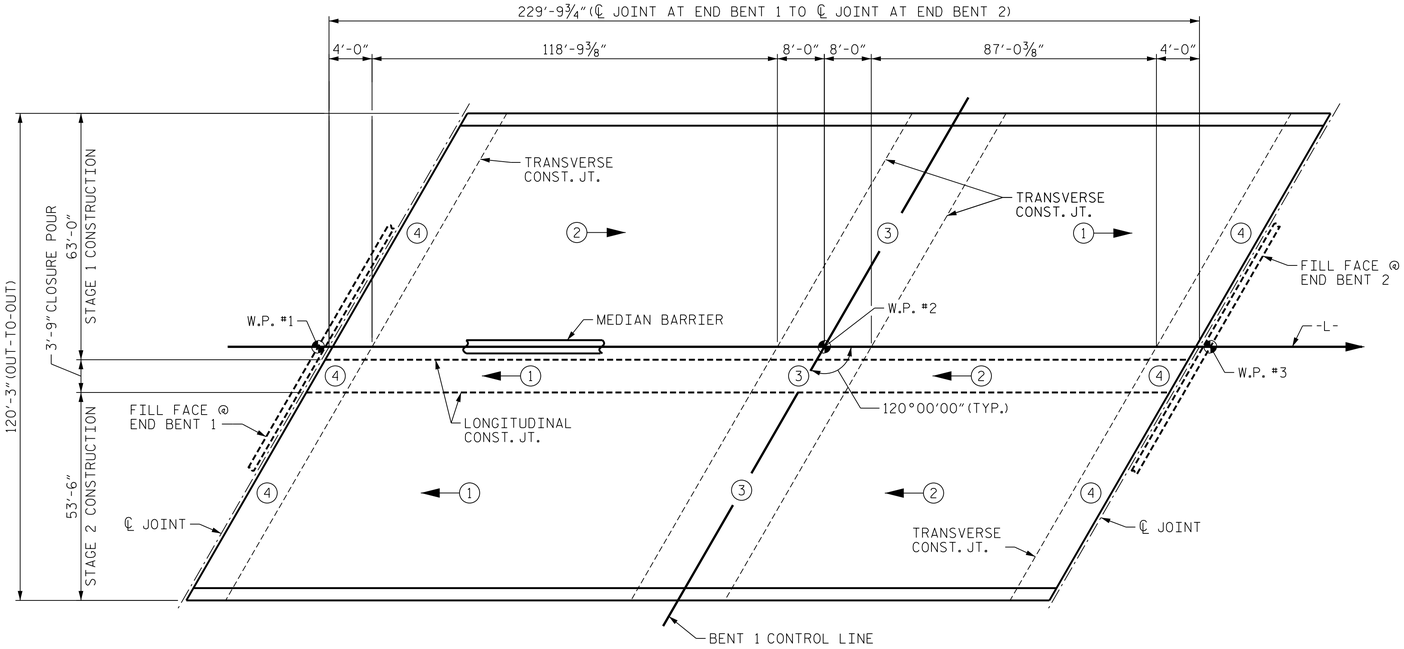
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

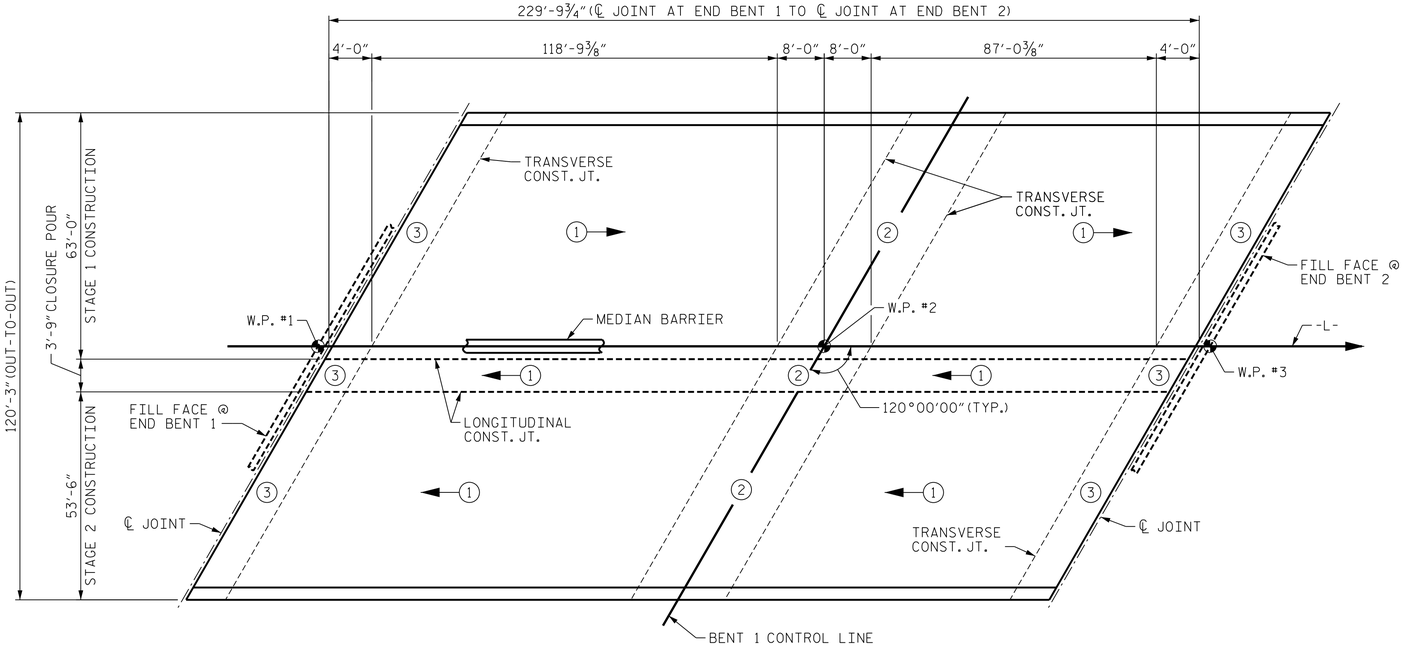
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY: H. ABU NIMEH	DATE: 04/21	DWG BY: B. PETERSON	DATE: 04/21
DES CHK: K. DICKENS	DATE: 04/21	CHK BY: L. GUALTIERI	DATE: 07/21



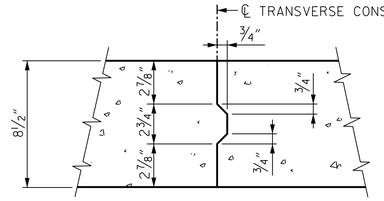
POURING SEQUENCE

◄—(#) INDICATES POUR NUMBER AND DIRECTION OF POUR



OPTIMAL POURING SEQUENCE

POURS (2) & (3) OF THE OPTIONAL POUR SEQUENCE MAY NOT BE STARTED UNTIL BOTH ADJACENT POURS (1) HAVE REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.



TRANSVERSE CONSTRUCTION JOINT

(REINFORCING STEEL IN SLAB NOT SHOWN)
(LONGITUDINAL AND TRANSVERSE REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-35
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	B. PETERSON	DATE :	05/21
CHK BY:	K. DICKENS	DATE :	07/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BILL OF MATERIAL

STAGE 1 CONSTRUCTION

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	309	#5	STR.	43'-10''	14127	A120	2	#5	STR.	43'-2''	90
✳ A2	313	#5	STR.	21'-5''	6992	A121	2	#5	STR.	42'-1''	88
✳ A3	2	#5	STR.	42'-9''	89	A122	2	#5	STR.	41'-0''	86
✳ A4	2	#5	STR.	41'-8''	87	A123	2	#5	STR.	39'-11''	83
✳ A5	2	#5	STR.	59'-5''	124	A124	2	#5	STR.	38'-10''	81
✳ A6	2	#5	STR.	58'-4''	122	A125	2	#5	STR.	37'-9''	79
✳ A7	2	#5	STR.	57'-3''	119	A126	2	#5	STR.	36'-8''	76
✳ A8	2	#5	STR.	56'-2''	117	A127	2	#5	STR.	35'-7''	74
✳ A9	2	#5	STR.	55'-1''	115	A128	2	#5	STR.	34'-6''	72
✳ A10	2	#5	STR.	54'-0''	113	A129	2	#5	STR.	33'-5''	70
✳ A11	2	#5	STR.	52'-11''	110	A130	2	#5	STR.	32'-4''	67
✳ A12	2	#5	STR.	51'-10''	108	A131	2	#5	STR.	31'-3''	65
✳ A13	2	#5	STR.	50'-9''	106	A132	2	#5	STR.	30'-2''	63
✳ A14	2	#5	STR.	49'-8''	104	A133	2	#5	STR.	29'-1''	61
✳ A15	2	#5	STR.	48'-7''	101	A134	2	#5	STR.	28'-0''	58
✳ A16	2	#5	STR.	47'-6''	99	A135	2	#5	STR.	26'-11''	56
✳ A17	2	#5	STR.	46'-5''	97	A136	2	#5	STR.	25'-10''	54
✳ A18	2	#5	STR.	45'-4''	95	A137	2	#5	STR.	24'-9''	52
✳ A19	2	#5	STR.	44'-3''	92	A138	2	#5	STR.	23'-8''	49
✳ A20	2	#5	STR.	43'-2''	90	A139	2	#5	STR.	22'-7''	47
✳ A21	2	#5	STR.	42'-1''	88	A140	2	#5	STR.	21'-6''	45
✳ A22	2	#5	STR.	41'-0''	86	A141	2	#5	STR.	20'-5''	43
✳ A23	2	#5	STR.	39'-11''	83	A142	2	#5	STR.	19'-4''	40
✳ A24	2	#5	STR.	38'-10''	81	A143	2	#5	STR.	18'-3''	38
✳ A25	2	#5	STR.	37'-9''	79	A144	2	#5	STR.	17'-2''	36
✳ A26	2	#5	STR.	36'-8''	76	A145	2	#5	STR.	16'-1''	34
✳ A27	2	#5	STR.	35'-7''	74	A146	2	#5	STR.	15'-0''	31
✳ A28	2	#5	STR.	34'-6''	72	A147	2	#5	STR.	13'-11''	29
✳ A29	2	#5	STR.	33'-5''	70	A148	2	#5	STR.	12'-10''	27
✳ A30	2	#5	STR.	32'-4''	67	A149	2	#5	STR.	11'-9''	25
✳ A31	2	#5	STR.	31'-3''	65	A150	2	#5	STR.	10'-8''	22
✳ A32	2	#5	STR.	30'-2''	63	A151	2	#5	STR.	9'-7''	20
✳ A33	2	#5	STR.	29'-1''	61	A152	2	#5	STR.	8'-6''	18
✳ A34	2	#5	STR.	28'-0''	58	A153	2	#5	STR.	7'-5''	15
✳ A35	2	#5	STR.	26'-11''	56	A154	2	#5	STR.	6'-4''	13
✳ A36	2	#5	STR.	25'-10''	54	A155	2	#5	STR.	5'-3''	11
✳ A37	2	#5	STR.	24'-9''	52	A156	2	#5	STR.	4'-2''	9
✳ A38	2	#5	STR.	23'-8''	49	A157	2	#5	STR.	3'-1''	6
✳ A39	2	#5	STR.	22'-7''	47	A158	2	#5	STR.	2'-0''	4
✳ A40	2	#5	STR.	21'-6''	45						
✳ A41	2	#5	STR.	20'-5''	43	✳ A400	6	#5	STR.	9'-5''	59
✳ A42	2	#5	STR.	19'-4''	40	A401	6	#5	STR.	9'-5''	59
✳ A43	2	#5	STR.	18'-3''	38	✳ A500	3	#6	STR.	18'-5''	83
✳ A44	2	#5	STR.	17'-2''	36						
✳ A45	2	#5	STR.	16'-1''	34	✳ B1	258	#4	STR.	39'-10''	6865
✳ A46	2	#5	STR.	15'-0''	31	✳ B2	84	#6	STR.	41'-8''	5257
✳ A47	2	#5	STR.	13'-11''	29	B3	184	#5	STR.	58'-10''	11291
✳ A48	2	#5	STR.	12'-10''	27	B4	38	#4	STR.	38'-8''	982
✳ A49	2	#5	STR.	11'-9''	25	B5	49	#5	STR.	20'-9''	1060
✳ A50	2	#5	STR.	10'-8''	22	B6	98	#5	STR.	10'-0''	1022
✳ A51	2	#5	STR.	9'-7''	20						
✳ A52	2	#5	STR.	8'-6''	18	✳ D1	361	#5	STR.	6'-0''	2259
✳ A53	2	#5	STR.	7'-5''	15	D2	361	#5	STR.	5'-6''	2071
✳ A54	2	#5	STR.	6'-4''	13						
✳ A55	2	#5	STR.	5'-3''	11	✳ G1	4	#5	STR.	37'-5''	156
✳ A56	2	#5	STR.	4'-2''	9	✳ G3	2	#5	STR.	6'-6''	14
✳ A57	2	#5	STR.	3'-1''	6						
✳ A58	2	#5	STR.	2'-0''	4	✳ J1	142	#4	1	1'-5''	135
A101	309	#5	STR.	43'-10''	14127	✳ K1	20	#8	2	24'-11''	1331
A102	313	#5	STR.	21'-0''	6856	✳ K2	4	#8	3	16'-6''	176
A103	2	#5	STR.	42'-9''	89	✳ K3	24	#6	STR.	9'-10''	354
A104	2	#5	STR.	41'-8''	87	✳ K4	4	#8	4	22'-9''	243
A105	2	#5	STR.	59'-5''	124	✳ K6	12	#6	STR.	10'-0''	180
A106	2	#5	STR.	58'-4''	122	✳ K7	12	#6	STR.	7'-8''	138
A107	2	#5	STR.	57'-3''	119	✳ K8	12	#6	STR.	6'-4''	114
A108	2	#5	STR.	56'-2''	117						
A109	2	#5	STR.	55'-1''	115	✳ S1	72	#5	5	5'-10''	438
A110	2	#5	STR.	54'-0''	113	✳ S2	48	#5	5	3'-2''	159
A111	2	#5	STR.	52'-11''	110	✳ S3	72	#4	6	6'-1''	293
A112	2	#5	STR.	51'-10''	108						
A113	2	#5	STR.	50'-9''	106						
A114	2	#5	STR.	49'-8''	104						
A115	2	#5	STR.	48'-7''	101						
A116	2	#5	STR.	47'-6''	99						
A117	2	#5	STR.	46'-5''	97						
A118	2	#5	STR.	45'-4''	95						
A119	2	#5	STR.	44'-3''	92						

✳ EPOXY COATED REINFORCING STEEL 43,008 LBS.
REINFORCING STEEL 41,103 LBS.
✳ DENOTES EPOXY COATED REINFORCING STEEL

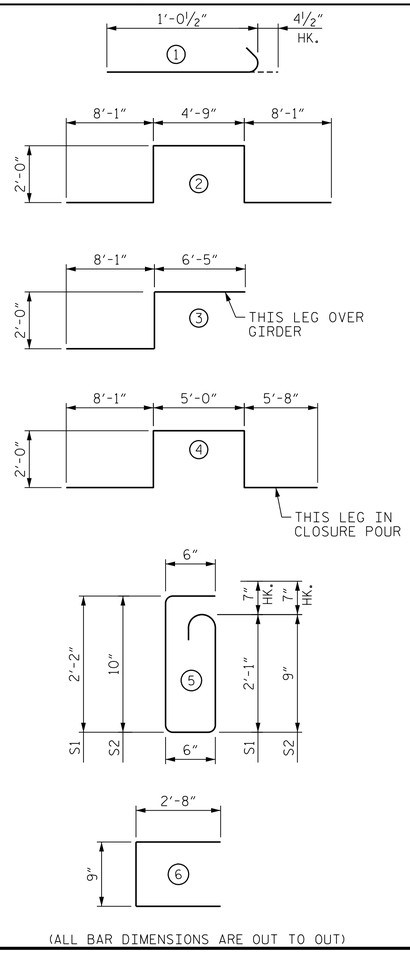
STAGE 2 CONSTRUCTION

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A200	317	#5	STR.	53'-2''	17579	A329	2	#5	STR.	22'-2''	46
✳ A201	2	#5	STR.	52'-6''	110	A330	2	#5	STR.	21'-1''	44
✳ A202	2	#5	STR.	51'-5''	107	A331	2	#5	STR.	20'-0''	42
✳ A203	2	#5	STR.	50'-4''	105	A332	2	#5	STR.	18'-11''	39
✳ A204	2	#5	STR.	49'-3''	103	A333	2	#5	STR.	17'-10''	37
✳ A205	2	#5	STR.	48'-2''	100	A334	2	#5	STR.	16'-9''	35
✳ A206	2	#5	STR.	47'-1''	98	A335	2	#5	STR.	15'-8''	33
✳ A207	2	#5	STR.	46'-0''	96	A336	2	#5	STR.	14'-7''	30
✳ A208	2	#5	STR.	44'-11''	94	A337	2	#5	STR.	13'-6''	28
✳ A209	2	#5	STR.	43'-10''	91	A338	2	#5	STR.	12'-5''	26
✳ A210	2	#5	STR.	42'-9''	89	A339	2	#5	STR.	11'-4''	24
✳ A211	2	#5	STR.	41'-8''	87	A340	2	#5	STR.	10'-3''	21
✳ A212	2	#5	STR.	40'-7''	85	A341	2	#5	STR.	9'-2''	19
✳ A213	2	#5	STR.	39'-6''	82	A342	2	#5	STR.	8'-1''	17
✳ A214	2	#5	STR.	38'-5''	80	A343	2	#5	STR.	7'-0''	15
✳ A215	2	#5	STR.	37'-4''	78	A344	2	#5	STR.	5'-11''	12
✳ A216	2	#5	STR.	36'-3''	76	A345	2	#5	STR.	4'-10''	10
✳ A217	2	#5	STR.	35'-2''	73	A346	2	#5	STR.	3'-9''	8
✳ A218	2	#5	STR.	34'-1''	71	A347	2	#5	STR.	2'-8''	6
✳ A219	2	#5	STR.	33'-0''	69						
✳ A220	2	#5	STR.	31'-11''	67	✳ A400	6	#5	STR.	9'-5''	59
✳ A221	2	#5	STR.	30'-10''	64	A401	6	#5	STR.	9'-5''	59
✳ A222	2	#5	STR.	29'-9''	62	✳ A500	3	#6	STR.	18'-5''	83
✳ A223	2	#5	STR.	28'-8''	60						
✳ A224	2	#5	STR.	27'-7''	58	✳ B1	222	#4	STR.	39'-10''	5907
✳ A225	2	#5	STR.	26'-6''	55	✳ B2	72	#6	STR.	41'-8''	4506
✳ A226	2	#5	STR.	25'-5''	53	B3	156	#5	STR.	58'-10''	9573
✳ A227	2	#5	STR.	24'-4''	51	B4	32	#4	STR.	38'-8''	827
✳ A228	2	#5	STR.	23'-3''	48	B5	42	#5	STR.	20'-9''	909
✳ A229	2	#5	STR.	22'-2''	46	B6	84	#5	STR.	10'-0''	876
✳ A230	2	#5	STR.	21'-1''	44						
✳ A231	2	#5	STR.	20'-0''	42	✳ D1	361	#5	STR.	6'-0''	2259
✳ A232	2	#5	STR.	18'-11''	39	D2	361	#5	STR.	5'-6''	2071
✳ A233	2	#5	STR.	17'-10''	37						
✳ A234	2	#5	STR.	16'-9''	35	✳ G2	4	#5	STR.	31'-11''	133
✳ A235	2	#5	STR.	15'-8''	33	✳ G3	2	#5	STR.	6'-6''	14
✳ A236	2	#5	STR.	14'-7''	30						
✳ A237	2	#5	STR.	13'-6''	28	✳ J1	120	#4	1	1'-5''	114
✳ A238	2	#5	STR.	12'-5''	26						
✳ A239	2	#5	STR.	11'-4''	24	✳ K1	16	#8	2	24'-11''	1064
✳ A240	2	#5	STR.	10'-3''	21	✳ K2	4	#8	3	16'-6''	176
✳ A241	2	#5	STR.	9'-2''	19	✳ K3	20	#6	STR.	9'-10''	295
✳ A242	2	#5	STR.	8'-1''	17	✳ K4	4	#8	4	22'-9''	243
✳ A243	2	#5	STR.	7'-0''	15	✳ K6	10	#6	STR.	10'-0''	150
✳ A244	2	#5	STR.	5'-11''	12	✳ K7	10	#6	STR.	7'-8''	115
✳ A245	2	#5	STR.	4'-10''	10	✳ K8	10	#6	STR.	6'-4''	95
✳ A246	2	#5	STR.	3'-9''	8						
✳ A247	2	#5	STR.	2'-8''	6	✳ S1	60	#5	5	5'-10''	365
						✳ S2	40	#5	5	3'-2''	132
A300	317	#5	STR.	53'-2''	17579	✳ S3	60	#4	6	6'-1''	244
A301	2	#5	STR.	52'-6''	110						
A302	2	#5	STR.	51'-5''	107						
A303	2	#5	STR.	50'-4''	105						
A304	2	#5	STR.	49'-3''	103						
A305	2	#5	STR.	48'-2''	100						
A306	2	#5	STR.	47'-1''	98						
A307	2	#5	STR.	46'-0''	96						
A308	2	#5	STR.	44'-11''	94						
A309	2	#5	STR.	43'-10''	91						
A310	2	#5	STR.	42'-9''	89						
A311	2	#5	STR.	41'-8''	87						
A312	2	#5	STR.	40'-7''	85						
A313	2	#5	STR.	39'-6''	82						
A314	2	#5	STR.	38'-5''	80						
A315	2	#5	STR.	37'-4''	78						
A316	2	#5	STR.	36'-3''	76						
A317	2	#5	STR.	35'-2''	73						
A318	2	#5	STR.	34'-1''	71						
A319	2	#5	STR.	33'-0''	69						
A320	2	#5	STR.	31'-11''	67						
A321	2	#5	STR.	30'-10''	64						
A322	2	#5	STR.	29'-9''	62						
A323	2	#5	STR.	28'-8''	60						
A324	2	#5	STR.	27'-7''	58						
A325	2	#5	STR.	26'-6''	55						
A326	2	#5	STR.	25'-5''	53						
A327	2	#5	STR.	24'-4''	51						
A328	2	#5	STR.	23'-3''	48						

✳ EPOXY COATED REINFORCING STEEL 36,237 LBS.
REINFORCING STEEL 34,598 LBS.
✳ DENOTES EPOXY COATED REINFORCING STEEL

DES BY: H. ABU NIMEH DATE : 05/21
DES CHK: K. DICKENS DATE : 05/21
DWG BY: B. PETERSON DATE : 05/21
CHK BY: L. GUALTIERI DATE : 07/21

BAR TYPES



(ALL BAR DIMENSIONS ARE OUT TO OUT)

NOTES

SEE SHEET 3 OF 3 FOR REINFORCING STEEL IN CLOSURE POUR.

SEE SHEET 3 OF 3 FOR REINFORCING STEEL MINIMUM SPLICE LENGTHS.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S01-36
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

BILL OF MATERIAL

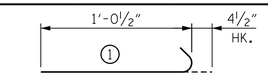
CLOSURE POUR

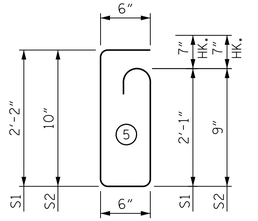
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	24	#4	STR.	39′-10″	639
✳ B2	6	#6	STR.	41′-8″	376
B3	20	#5	STR.	58′-10″	1227
B4	4	#4	STR.	38′-8″	103
✳ J1	8	#4	1	1′-5″	8
✳ K5	4	#6	STR.	7′-9″	47
✳ K9	6	#6	STR.	3′-11″	35
✳ S1	10	#5	5	5′-10″	61
✳ S2	8	#5	5	3′-2″	26
✳ S3	10	#4	6	6′-1″	41

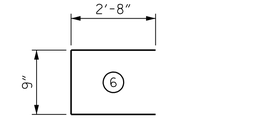
✳ EPOXY COATED REINFORCING STEEL	1,233 LBS.
REINFORCING STEEL	1,330 LBS.

✳ DENOTES EPOXY COATED REINFORCING STEEL

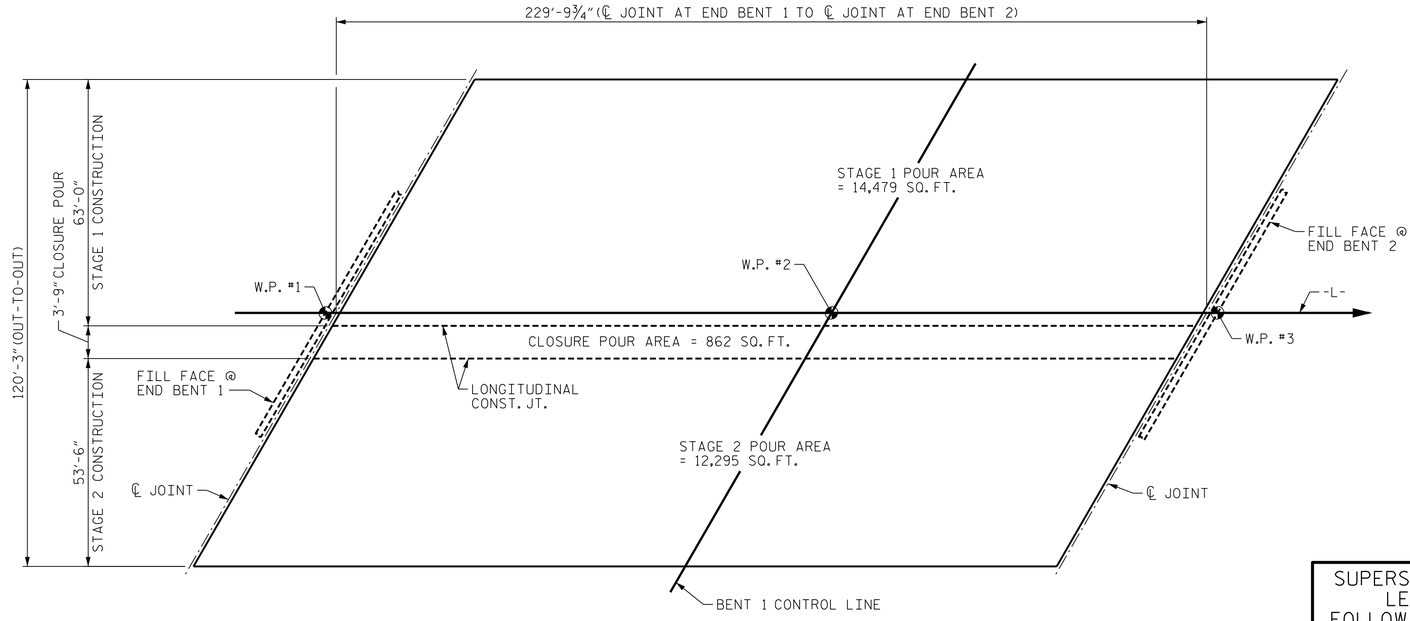
BAR TYPES







(ALL BAR DIMENSIONS ARE OUT TO OUT)



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 27,636)

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	EPOXY COATED
#4	1′-11″	1′-7″	1′-11″	1′-7″	2′-6″
#5	2′-5″	2′-0″	2′-5″	2′-0″	3′-1″
#6	2′-10″	2′-5″	3′-7″	2′-5″	3′-8″
#7	4′-2″	2′-9″			
#8	4′-9″	3′-2″			

SUPERSTRUCTURE BILL OF MATERIAL FOR POUR VOLUMES AND GROOVING AREAS

	CLASS AA CONCRETE (CU. YDS.)					GROOVING BRIDGE FLOORS (SQ. FT.)		
	POUR #1	POUR #2	POUR #3	POUR #4	TOTAL	REINFORCED CONCRETE DECK SLAB	BRIDGE APPROACH SLABS	TOTAL
STAGE 1 CONSTRUCTION	195.6	266.9	36.0	30.5	529.0	12,750	2,726	15,476
STAGE 2 CONSTRUCTION	227.6	166.8	30.7	25.8	250.9	12,065	2,578	14,643
CLOSURE POUR	11.7	8.6	1.6	2.6	24.5	-	-	-
TOTAL ✳✳	-	-	-	-	804.4	-	-	30,119

✳✳ QUANTITIES FOR CONCRETE BARRIER RAIL AND MEDIAN BARRIER NOT INCLUDED

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

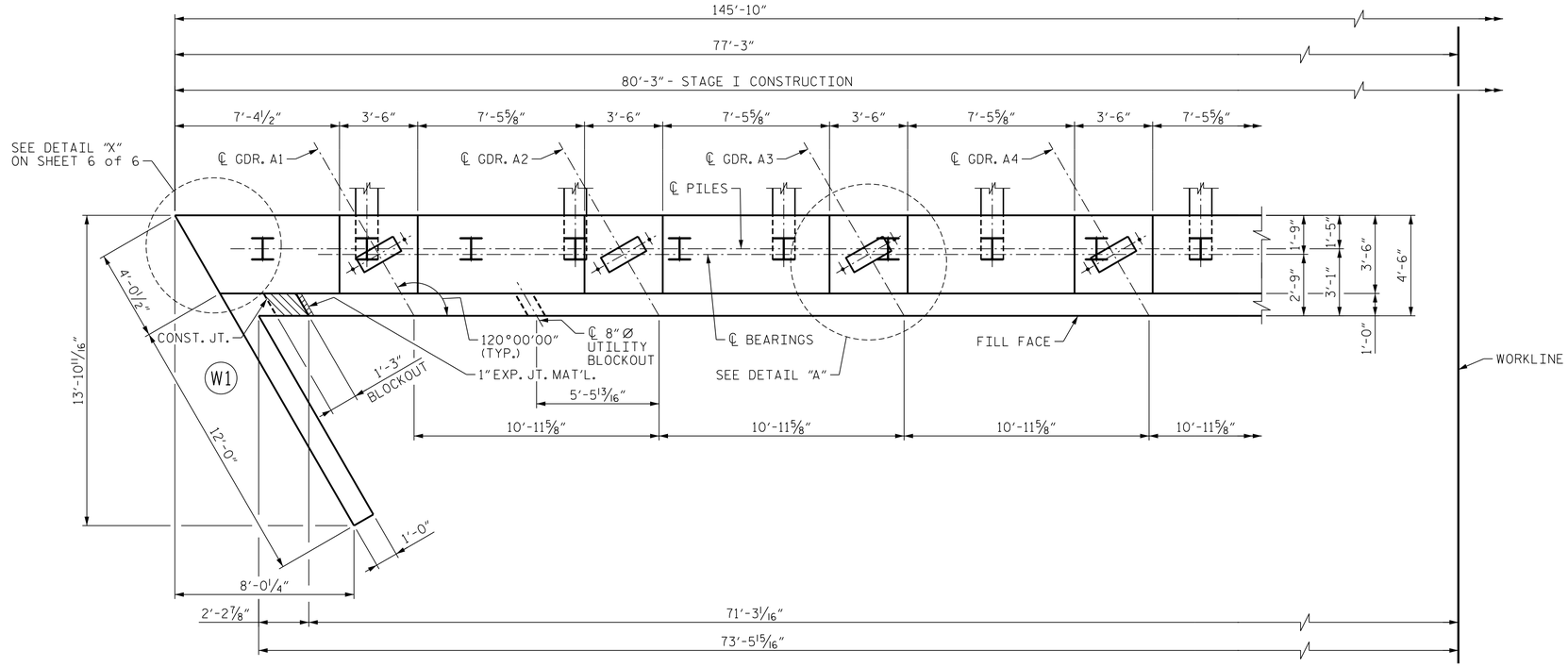
1/25/2022

REVISIONS						SHEET NO. S01-37
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

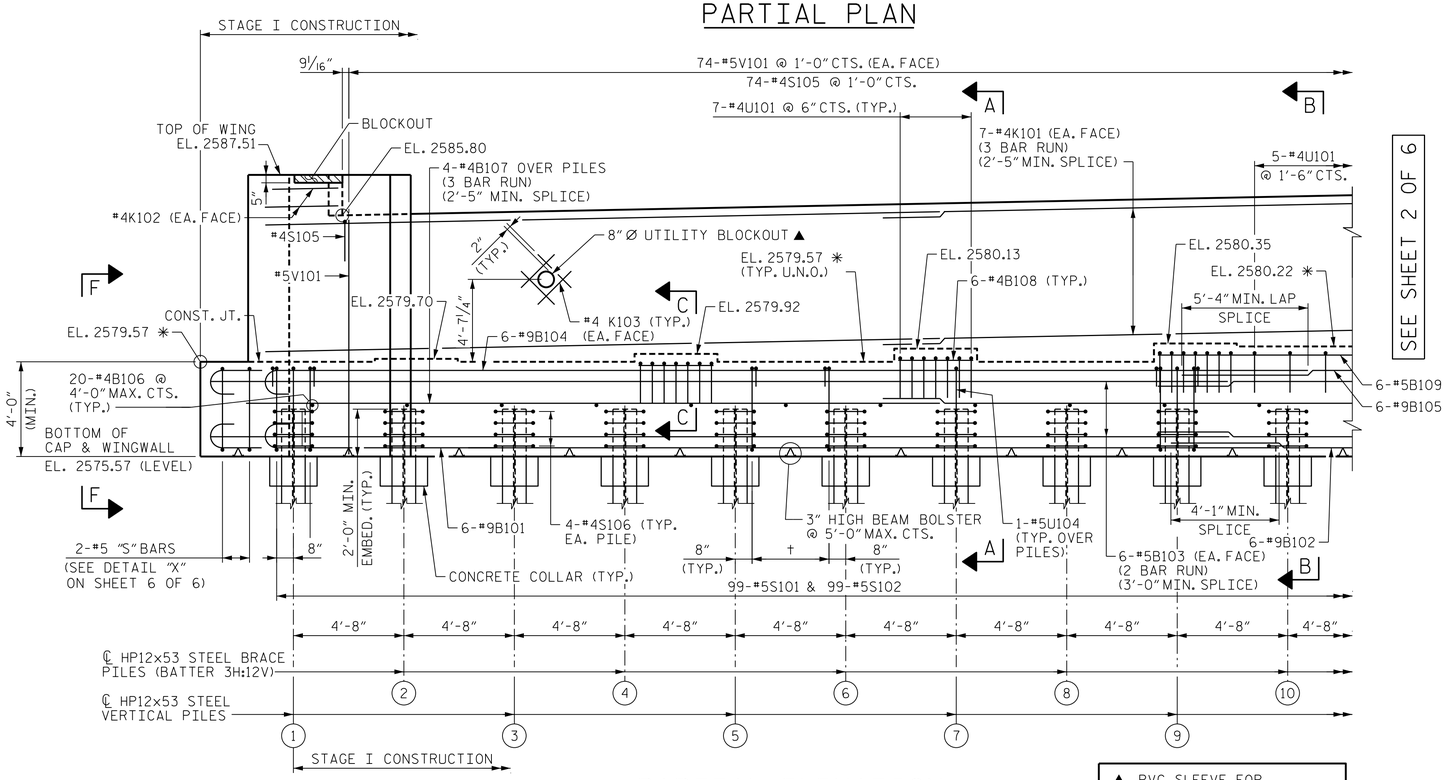
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	K. DICKENS	DATE :	05/21
DWG BY:	H. ABU NIMEH	DATE :	05/21
CHK BY:	L. GUALTIERI	DATE :	07/21



PARTIAL PLAN



PARTIAL ELEVATION

✳ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS" SHEET 5 OF 6.

† = 6-#5 "S" BARS @ 8" CTS. (TYP. BTWN. PILES)

▲ PVC SLEEVE FOR ELECTRICAL CONDUIT, SEE "ELECTRICAL CONDUIT SYSTEM FOR SIGNALS" SHEET FOR DETAILS.

NOTES

FOR SECTIONS A-A, B-B, C-C AND VIEW F-F, SEE "SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS" SHEET 5 OF 6.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

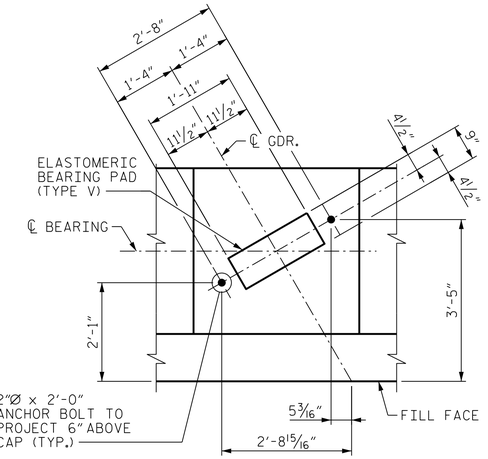
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

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

FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE AT END BENT DETAIL, SEE "SUPERSTRUCTURE END BENT 1 BILL OF MATERIALS" SHEET 6 OF 6.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE BARRIER RAIL (PARAPET AND END POST) ARE CAST IF SLIP FORMING IS USED.

REINFORCING STEEL IN THE BACKWALL MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR THE UTILITY BLOCKOUT



DETAIL "A"

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 PLAN AND ELEVATION STAGE 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-38
1			3			TOTAL SHEETS
2			4			59

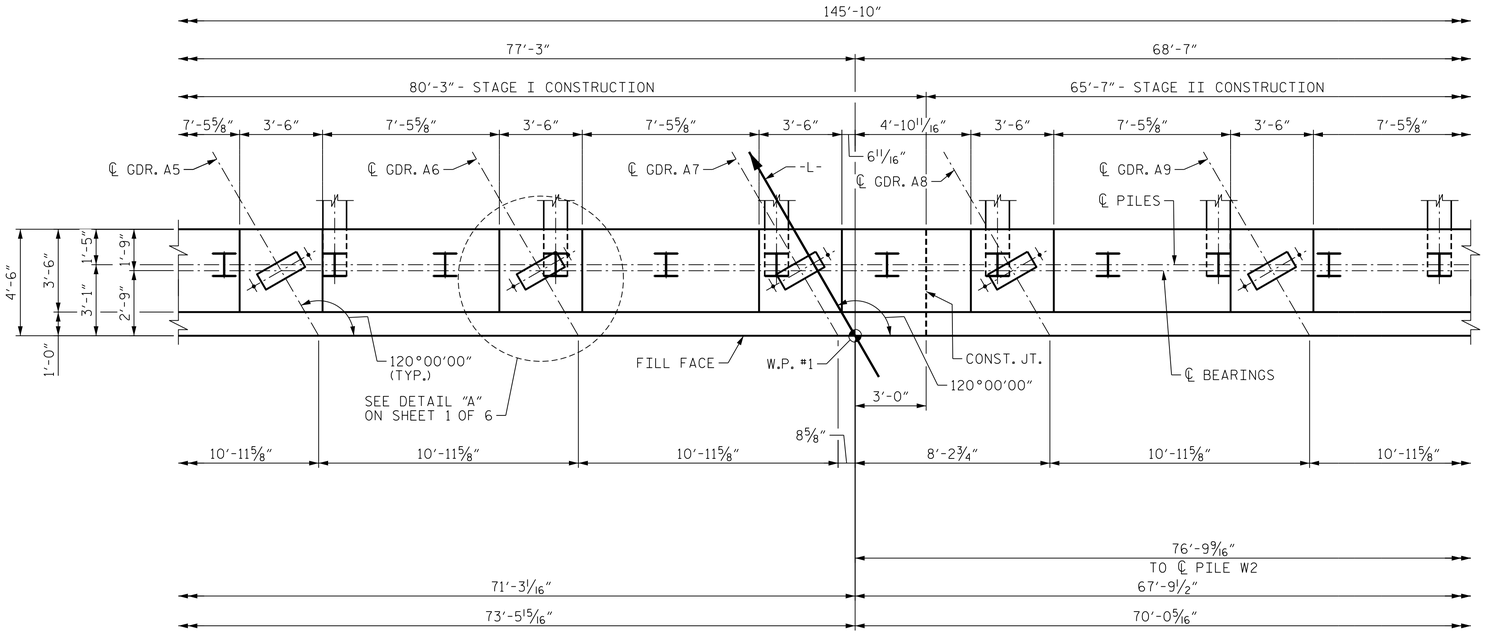
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

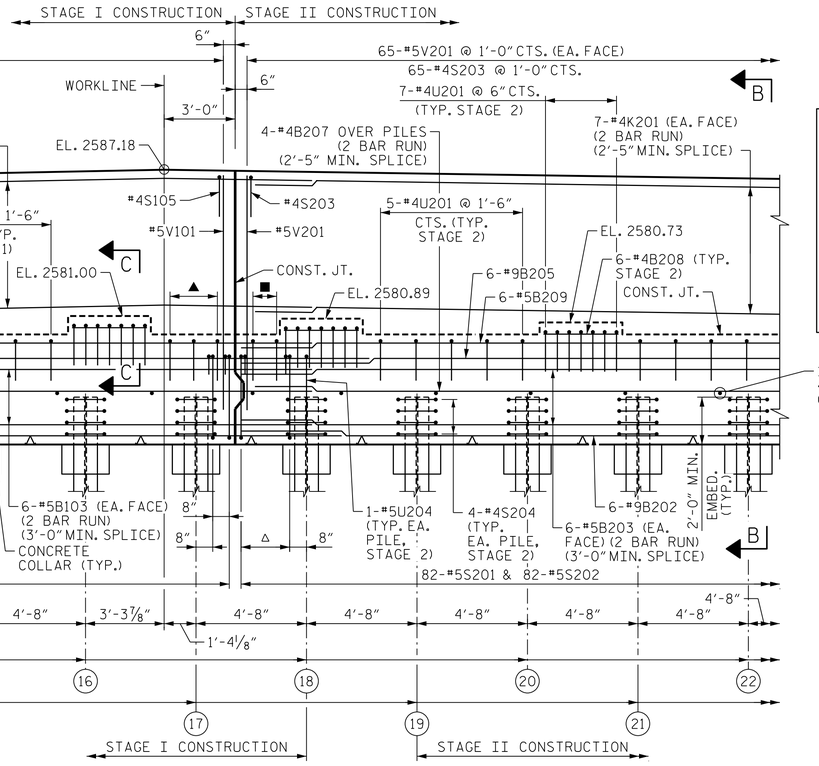
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



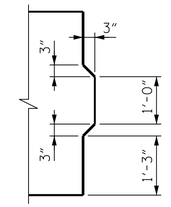
PARTIAL PLAN



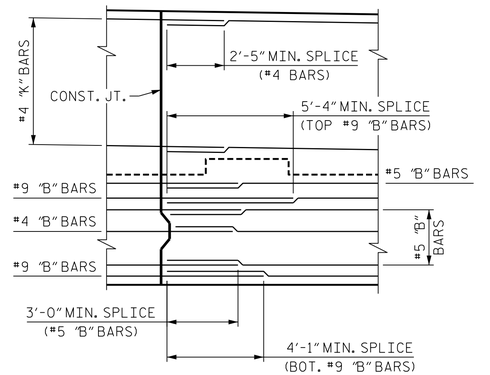
PARTIAL ELEVATION

*FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS" SHEET 5 OF 6.

† = 6-#5 "S" BARS @ 8" CTS. (TYP. BTWN. PILES)
⊕ = 1-#5U104 (TYP. OVER PILES, STAGE 1)
△ = 4-#5 "S" BARS @ 8" CTS.
▲ = 3-#4U101 @ 1'-6" CTS.
■ = 2-#4U201 @ 1'-6" CTS.



SHEAR KEY DETAIL



SPLICE DETAIL

PROJECT NO. B-3186/B-5898
HAYWOOD COUNTY
STATION: 42+71.13 -L-
SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 PLAN AND ELEVATION STAGES 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-39
1			3			TOTAL SHEETS
2			4			59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

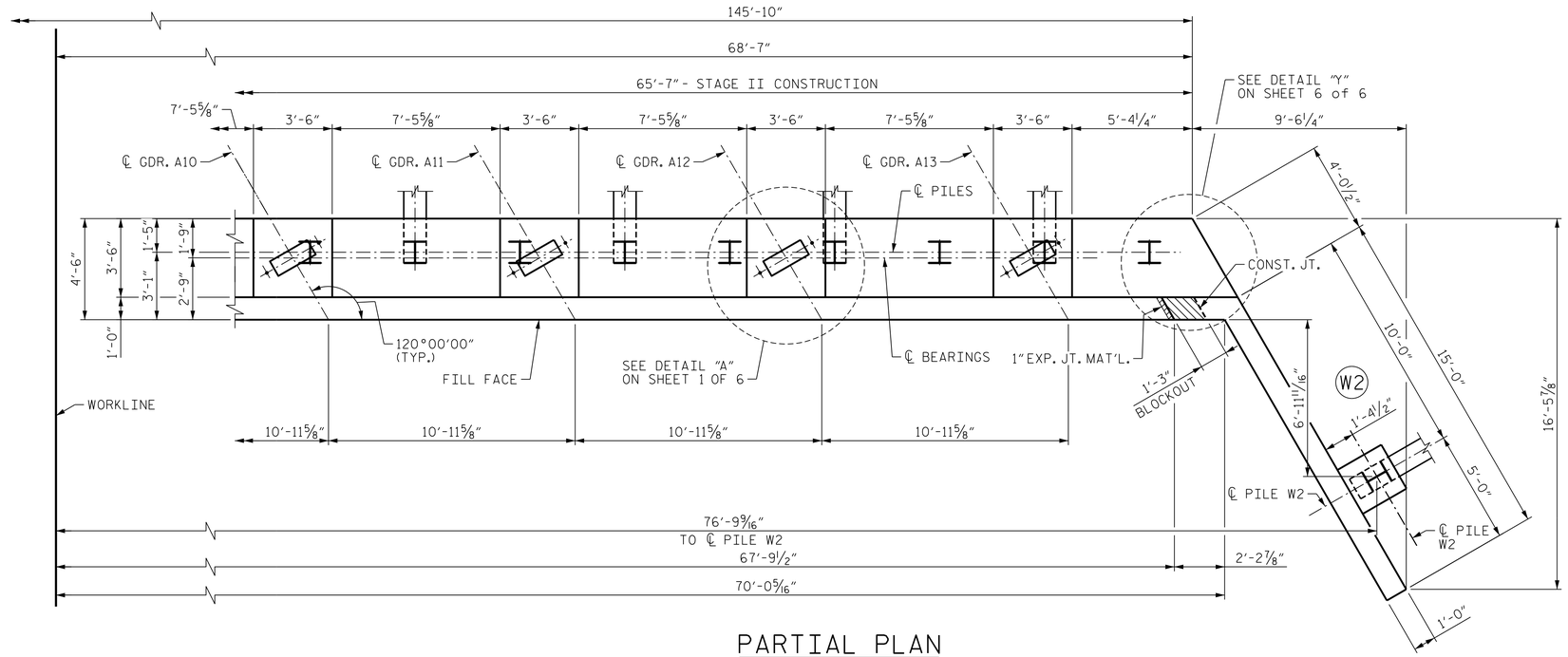
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY: K. DICKENS DATE: 06/21
DES CHK: L. GUALTIERI DATE: 06/21
DWG BY: B. PETERSON DATE: 06/21
CHK BY: K. DICKENS DATE: 07/21

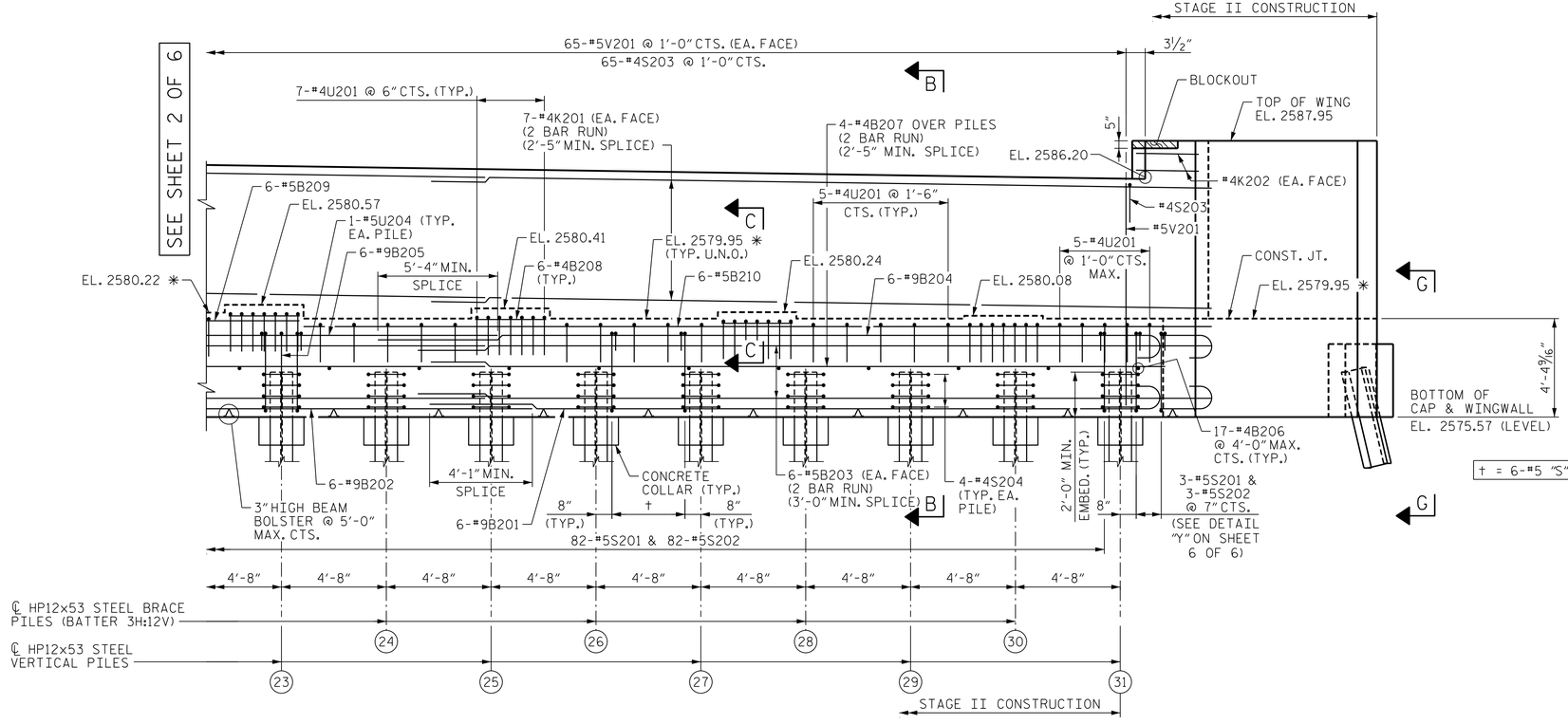
PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:32:01 AM
FILE: ...\401.190.B589B3186.SMU.E1.039.430168.dgn

NOTES

FOR VIEW G-G, SEE "SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS" SHEET 5 OF 6



PARTIAL PLAN



PARTIAL ELEVATION

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS" SHEET 5 OF 6.

† = 6-#5 "S" BARS @ 8" CTS. (TYP. BTWN. PILES)

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 PLAN AND ELEVATION STAGE 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-40
1			3			TOTAL SHEETS
2			4			59

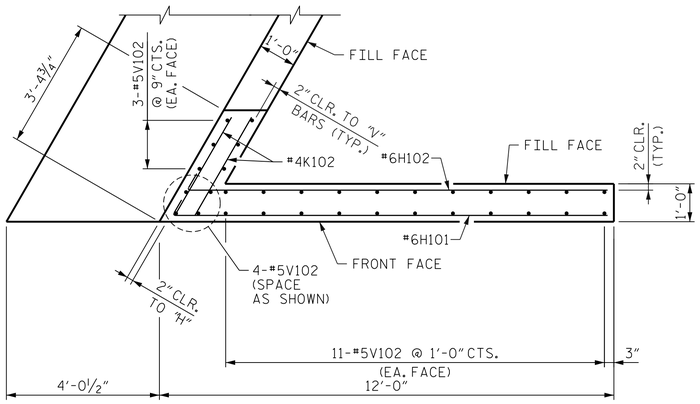
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

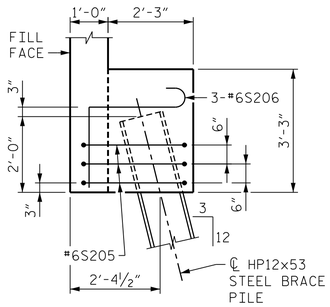
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

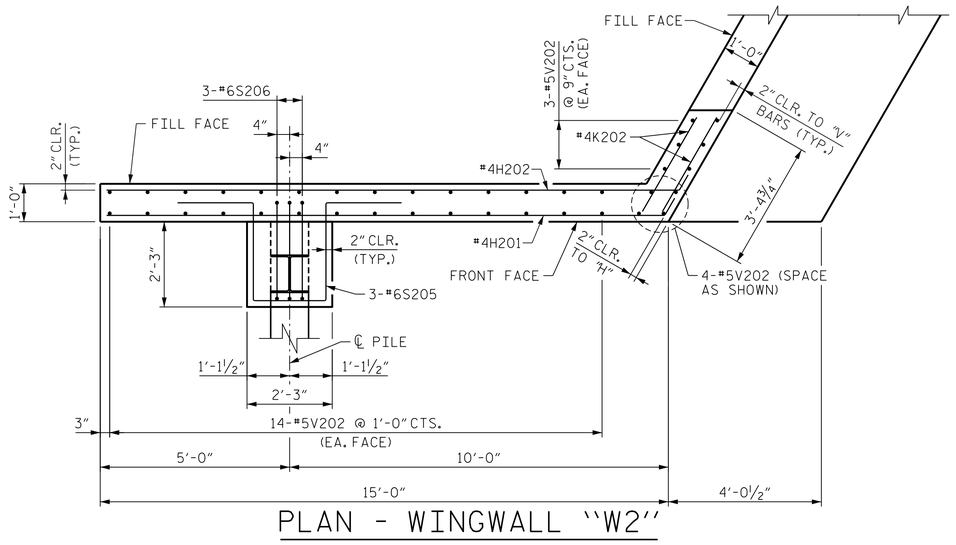
DES BY:	K. DICKENS	DATE:	06/21
DES CHK:	L. GUALTIERI	DATE:	06/21
DWG BY:	B. PETERSON	DATE:	06/21
CHK BY:	K. DICKENS	DATE:	07/21



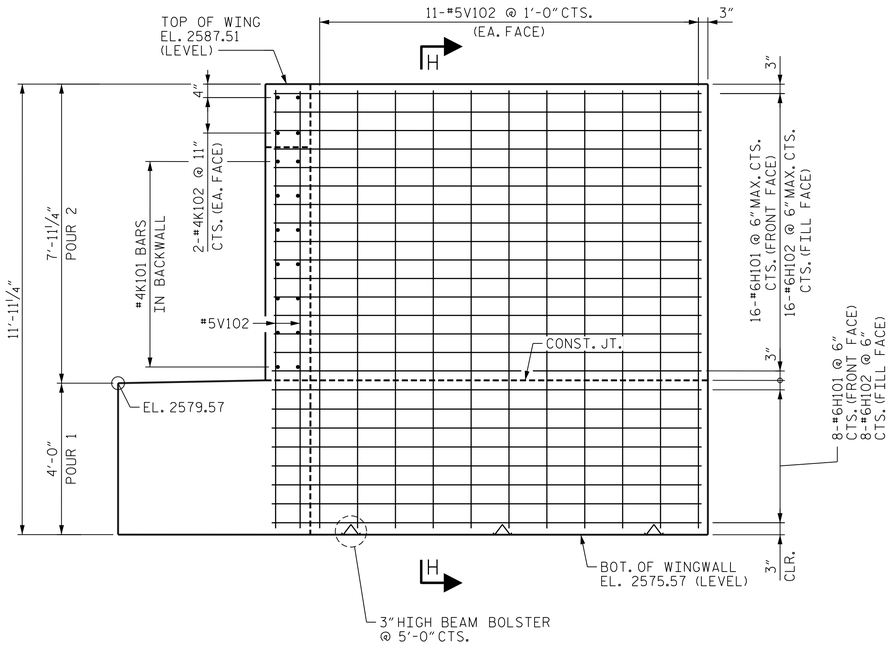
PLAN - WINGWALL "W1"



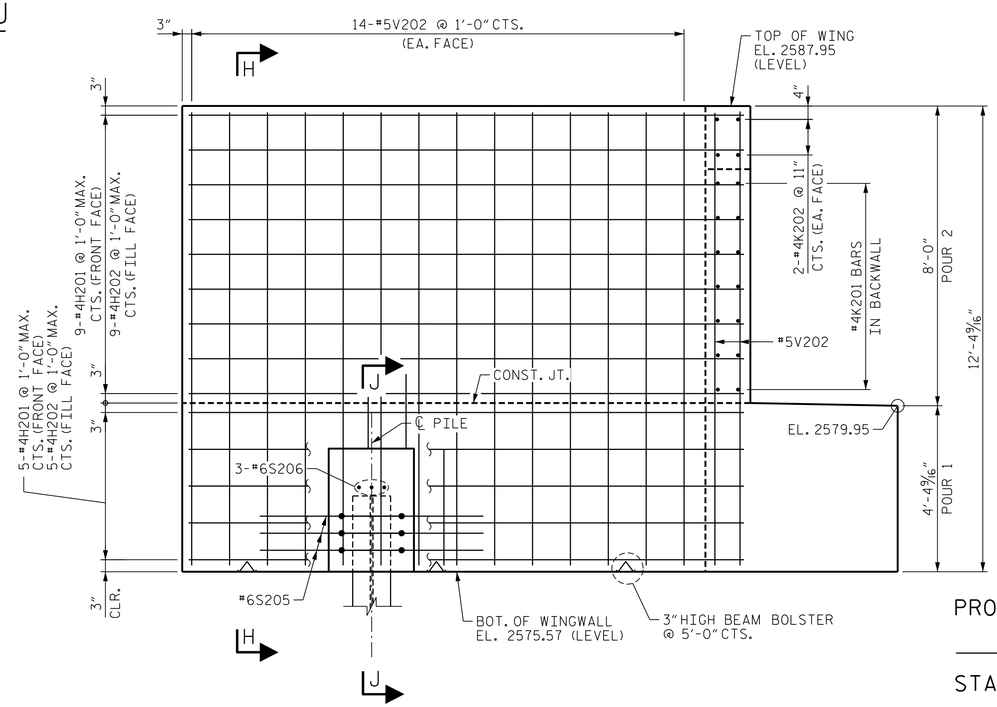
SECTION J-J



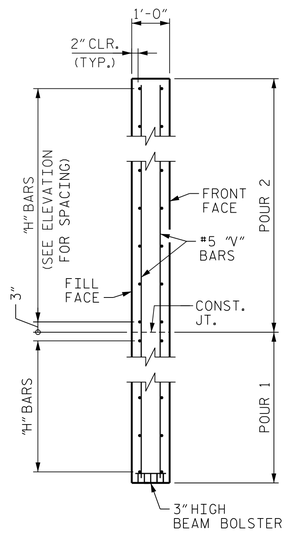
PLAN - WINGWALL "W2"



ELEVATION - WINGWALL "W1"



ELEVATION - WINGWALL "W2"



SECTION H-H

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 WINGWALLS

REVISIONS						SHEET NO. S01-41
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

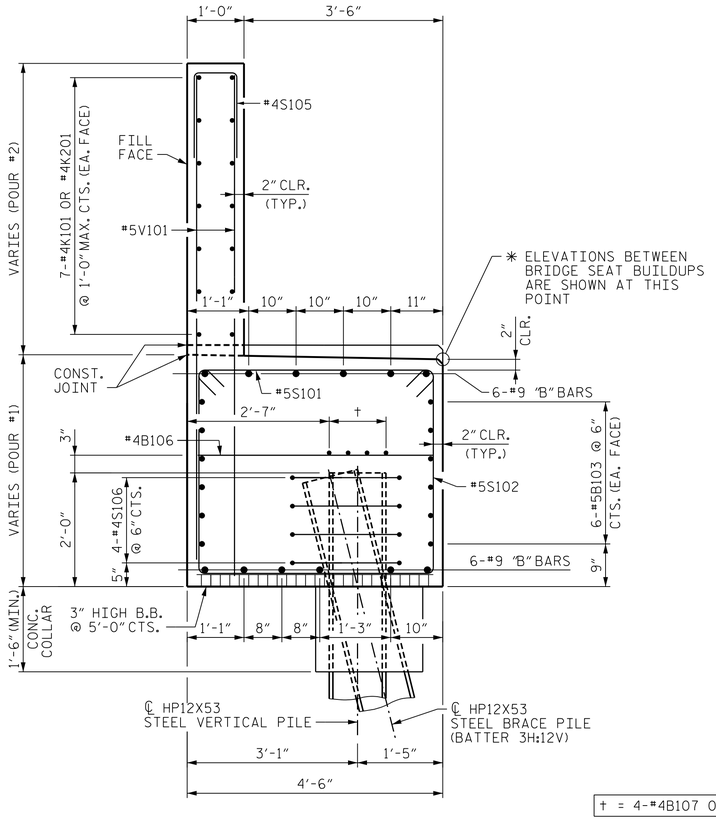
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

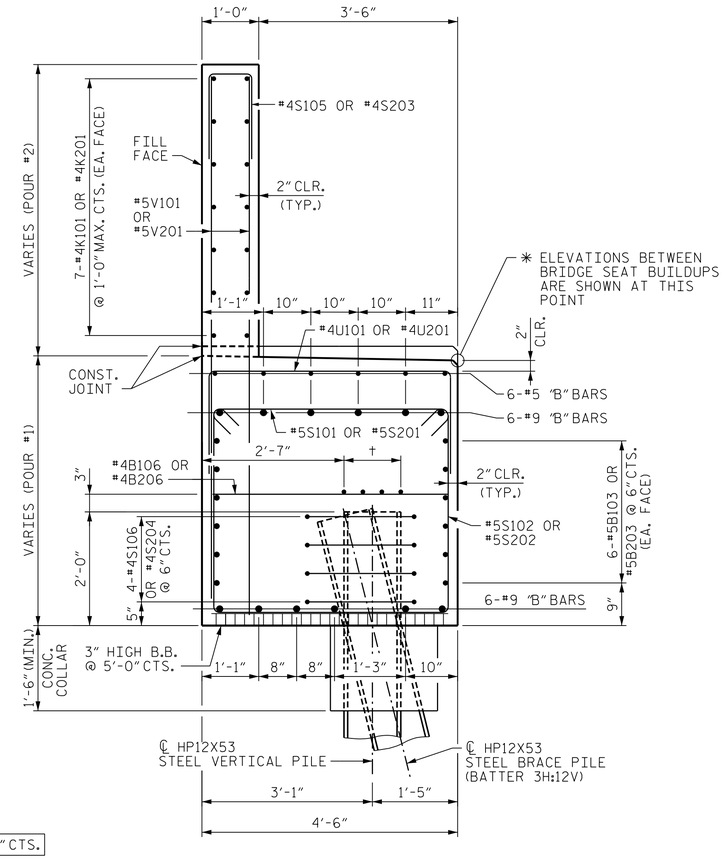
DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:32:19 AM
FILE: ...\401_200_B5898B3186_SMU_E1_041_430168.dgn

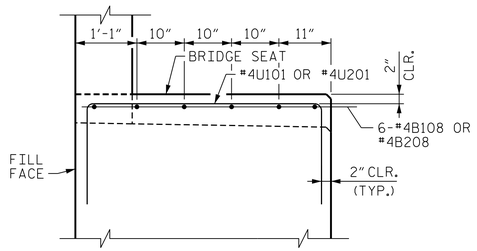


SECTION A-A

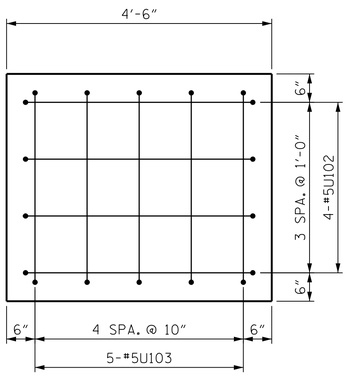
† = 4-#4B107 OR #4B207 @ 4" CTS.



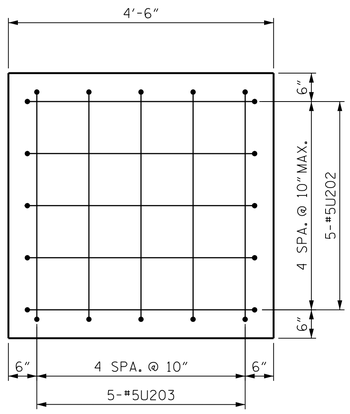
SECTION B-B



SECTION C-C



VIEW F-F



VIEW G-G

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-42
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

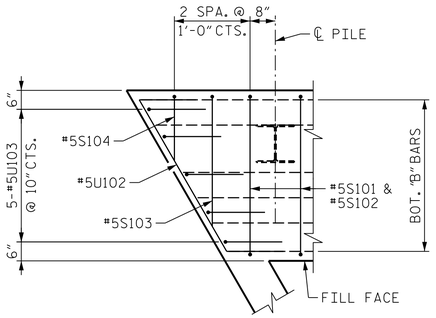
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

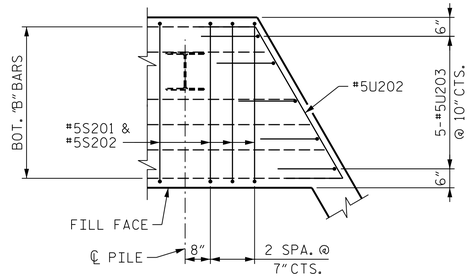
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



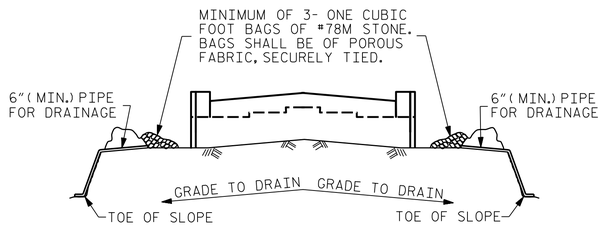
DETAIL "X"

("K" BARS NOT SHOWN FOR CLARITY)



DETAIL "Y"

("K" BARS NOT SHOWN FOR CLARITY)



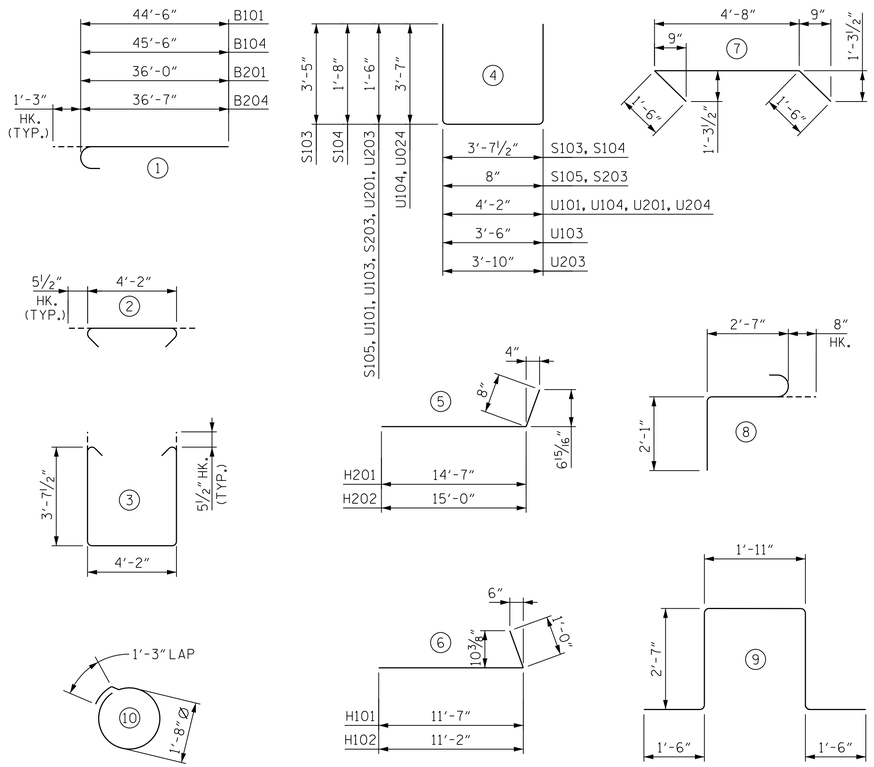
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 INCLUEDED IN THE UNIT CONTRACT PRCE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



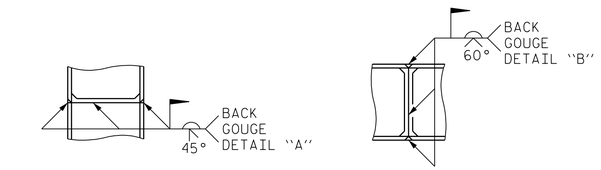
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL - END BENT 1

STAGE 1						STAGE 2					
BAR	QTY	SIZE	TYPE	LENGTH	WEIGHT	BAR	QTY	SIZE	TYPE	LENGTH	WEIGHT
B101	6	#9	1	45'-9"	934	B201	6	#9	1	37'-3"	760
B102	6	#9	STR	44'-6"	908	B202	6	#9	STR	36'-0"	735
B103	24	#5	STR	43'-3"	1083	B203	24	#5	STR	35'-5"	887
B104	6	#9	1	46'-9"	954	B204	6	#9	1	37'-10"	772
B105	6	#9	STR	45'-6"	929	B205	6	#9	STR	36'-7"	747
B106	20	#4	STR	4'-2"	56	B206	17	#4	STR	4'-2"	48
B107	12	#4	STR	29'-3"	235	B207	8	#4	STR	35'-2"	188
B108	30	#4	STR	3'-2"	64	B208	30	#4	STR	3'-2"	64
B109	6	#5	STR	41'-9"	308	B209	6	#5	STR	26'-11"	169
						B210	6	#5	STR	40'-8"	255
H101	24	#6	6	12'-7"	454						
H102	24	#6	6	12'-2"	439	H201	14	#4	5	15'-3"	143
						H202	14	#4	5	15'-8"	147
K101	42	#4	STR	29'-3"	821						
K102	4	#4	STR	3'-0"	9	K201	28	#4	STR	35'-2"	658
K103	8	#4	STR	2'-0"	11	K202	4	#4	STR	3'-0"	9
S101	99	#5	2	5'-1"	525	S201	85	#5	2	5'-1"	451
S102	99	#5	3	12'-4"	1274	S202	85	#5	3	12'-4"	1094
S103	1	#5	4	10'-6"	11	S203	65	#4	4	3'-8"	160
S104	1	#5	4	7'-0"	8	S204	56	#4	10	6'-6"	244
S105	74	#4	4	3'-8"	182	S205	3	#6	9	10'-1"	46
S106	68	#4	10	6'-6"	296	S206	3	#6	8	5'-4"	25
U101	60	#4	4	7'-2"	288	U201	74	#4	4	7'-2"	355
U102	4	#5	7	7'-8"	32	U202	5	#5	7	7'-8"	40
U103	5	#5	4	6'-6"	34	U203	5	#5	4	6'-10"	36
U104	17	#5	4	11'-4"	201	U204	14	#5	4	11'-4"	166
V101	148	#5	STR	9'-9"	1506	V201	130	#5	STR	10'-2"	1379
V102	32	#5	STR	11'-6"	384	V202	38	#5	STR	11'-11"	473

REINFORCING STEEL	LBS.	11,946	
CLASS A CONCRETE			
POUR #1 (COLLARS, CAP, LOWER PART OF WINGS)	CU. YDS.	63.5	
POUR #2 (BACKWALL & UPPER PART OF WINGS)	CU. YDS.	23.2	
TOTAL	CU. YDS.	86.7	
HP12x53 STEEL PILES	NO.18 LIN. FT.	540	
PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES	EA.	18	
STEEL PILE POINTS	EA.	18	

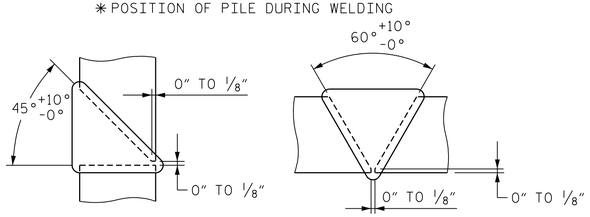
REINFORCING STEEL	LBS.	10,051
CLASS A CONCRETE		
POUR #1 (COLLARS, CAP, LOWER PART OF WINGS)	CU. YDS.	56.5
POUR #2 (BACKWALL & UPPER PART OF WINGS)	CU. YDS.	21.2
TOTAL	CU. YDS.	77.7
HP12x53 STEEL PILES	NO.14 LIN. FT.	420
PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES	EA.	14
STEEL PILE POINTS	EA.	14



✱ PILE VERTICAL

✱ PILE HORIZONTAL OR VERTICAL

✱ POSITION OF PILE DURING WELDING



DETAIL "A" DETAIL "B"

PILE SPLICE DETAILS

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 1 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-43
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

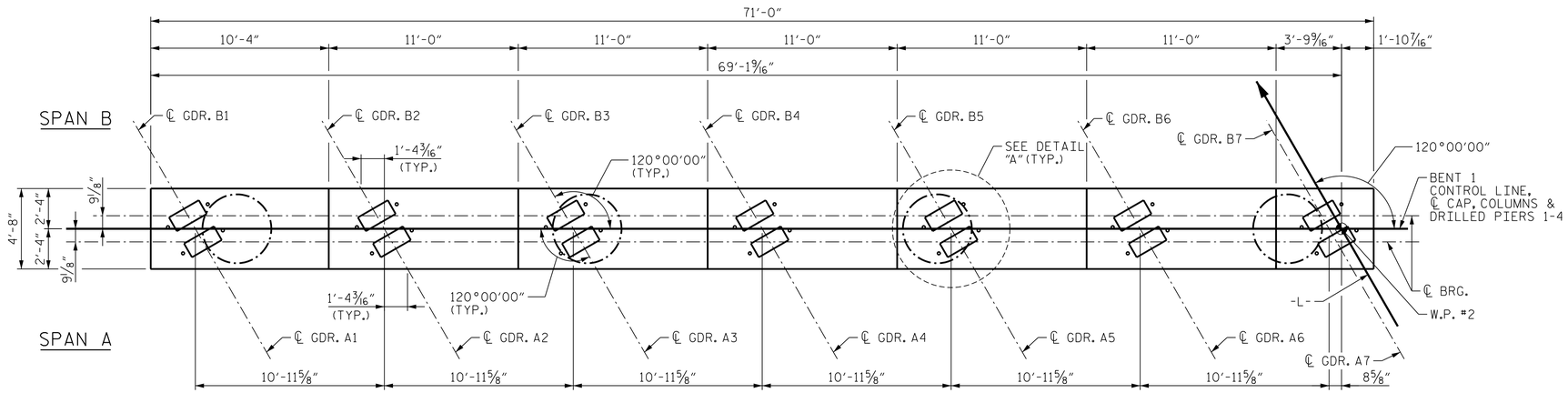
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

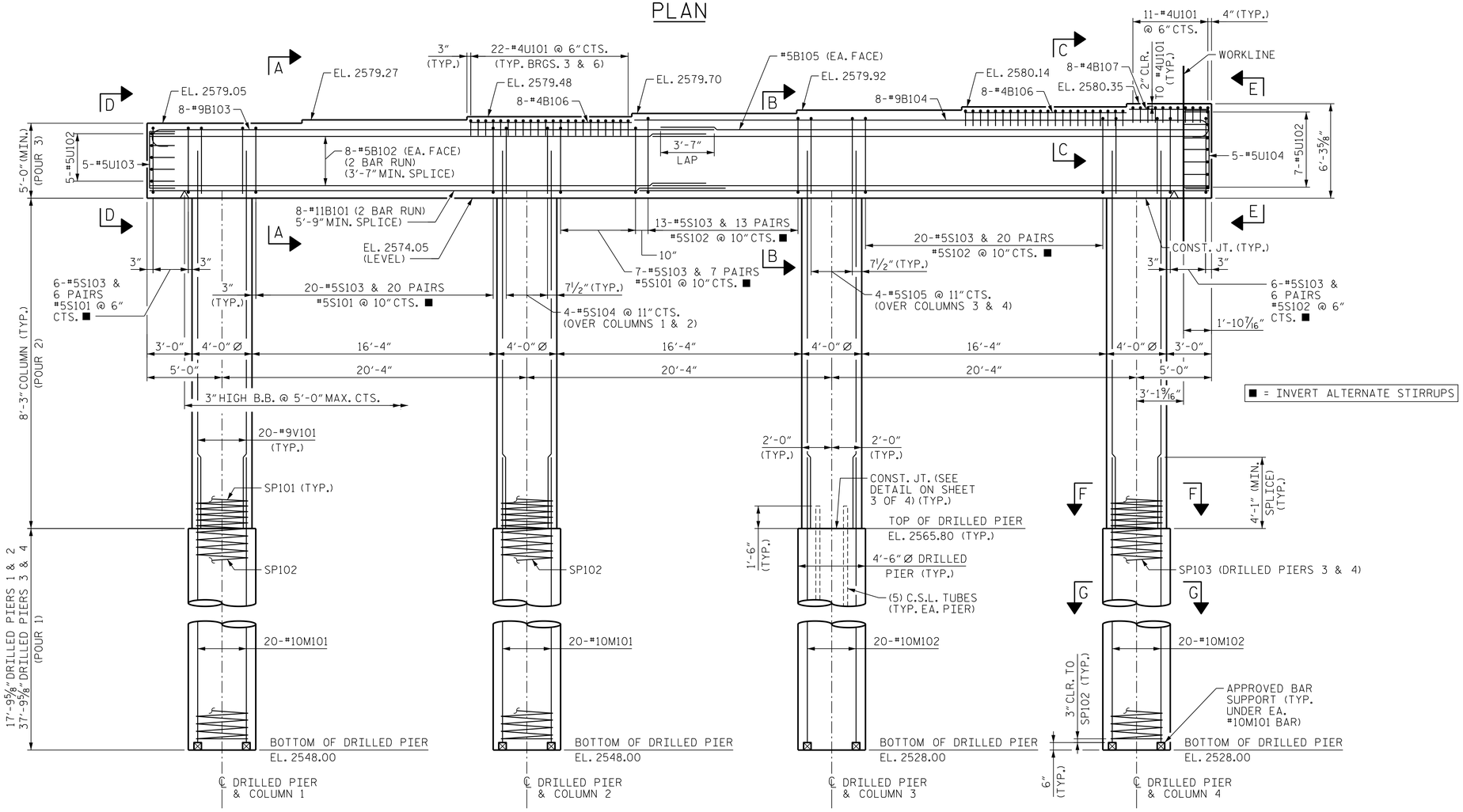
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



PLAN



ELEVATION

NOTES

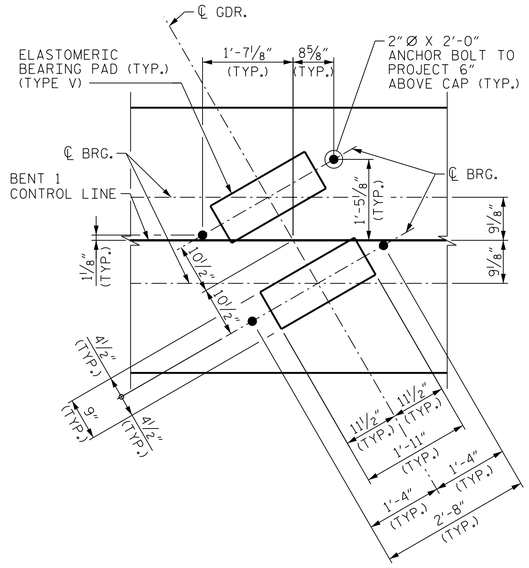
FOR END ELEVATION AND SECTION VIEWS SEE SHEET 3 OF 4.

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

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

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 ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



DETAIL "A"

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 PLAN AND ELEVATION STAGE 1

REVISIONS						SHEET NO. S01-44
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

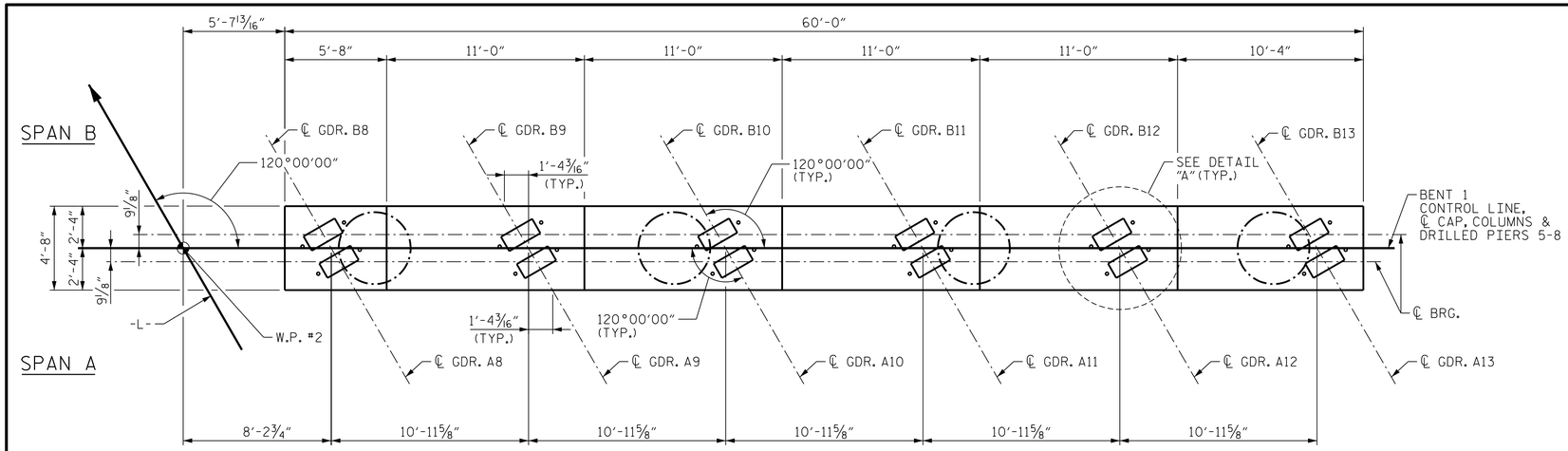
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

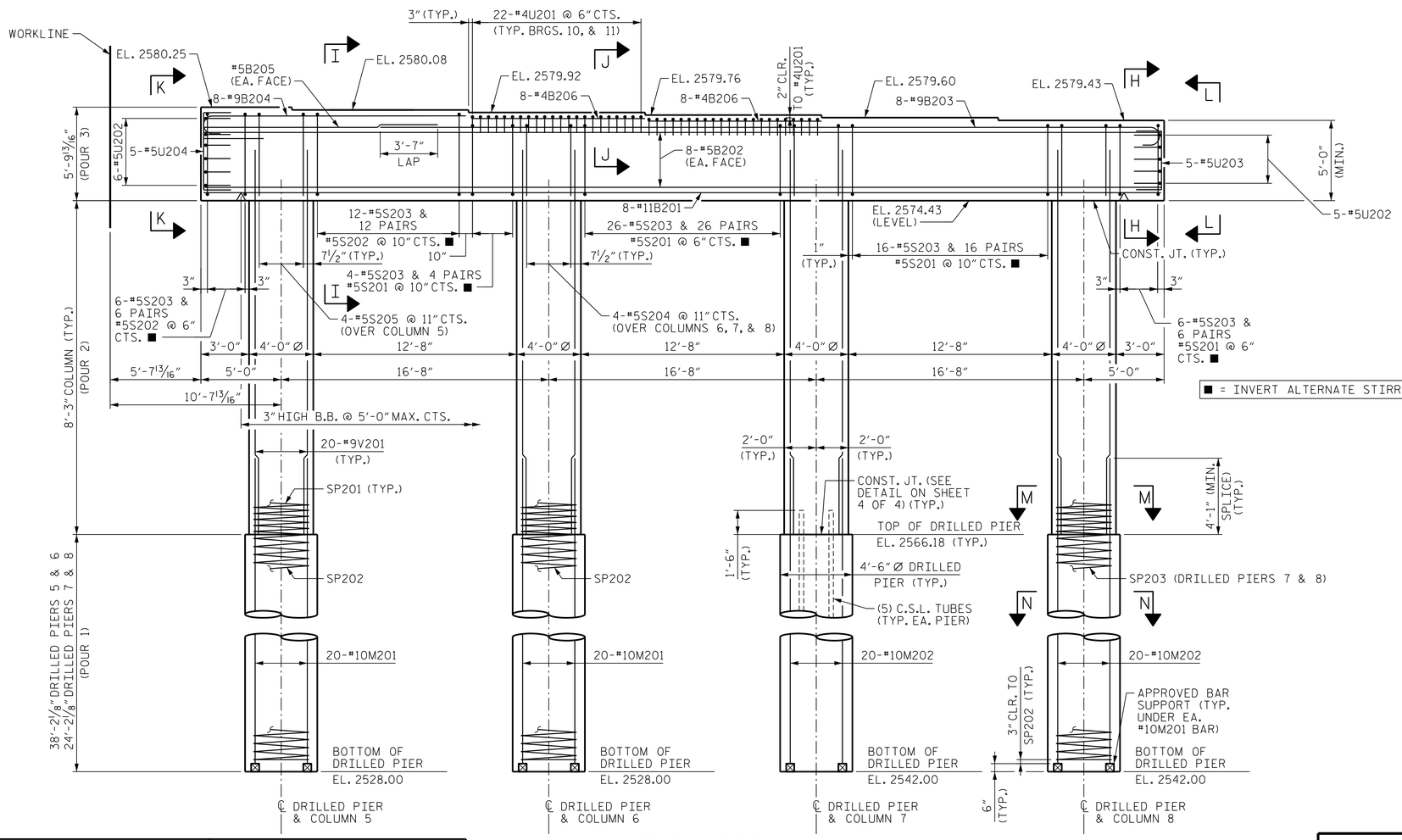
DES BY:	L. GUALTIERI	DATE :	06/21
DES CHK:	K. DICKENS	DATE :	06/21
DWG BY:	D. CARTER	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21

NOTES

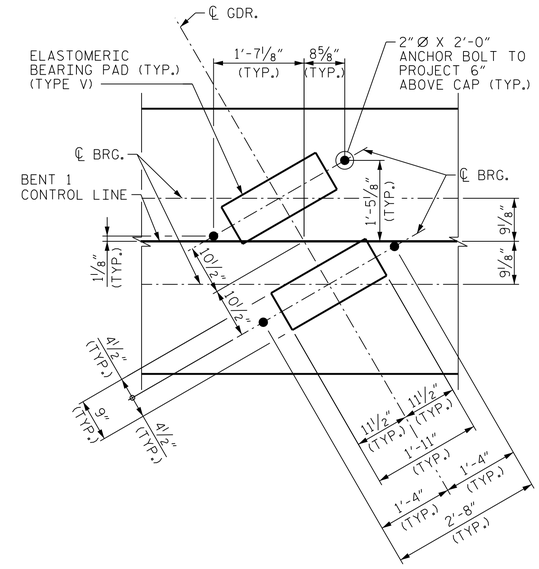
FOR END ELEVATIONS AND SECTION VIEWS SEE SHEET 4 OF 4.



PLAN



ELEVATION



DETAIL "A"

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 PLAN AND ELEVATION STAGE 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-45
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

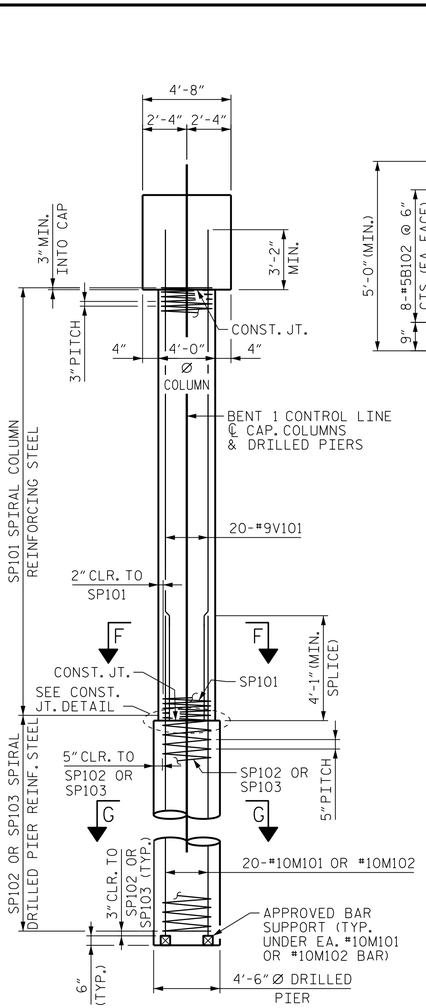
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

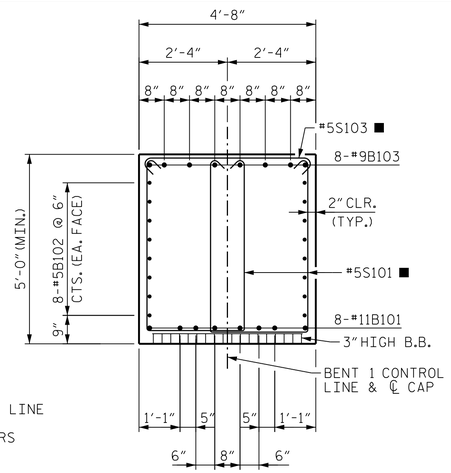
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

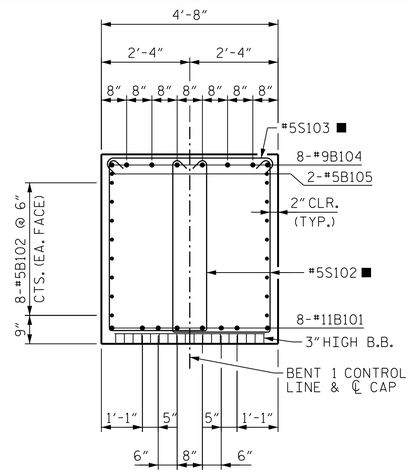
DES BY:	L. GUALTIERI	DATE :	06/21
DES CHK:	K. DICKENS	DATE :	06/21
DWG BY:	D. CARTER	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



END ELEVATION

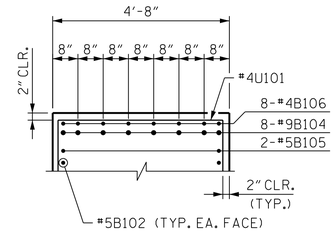


SECTION A-A



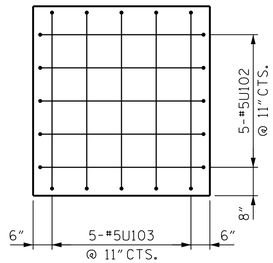
SECTION B-B

■ = INVERT ALTERNATE STIRRUPS

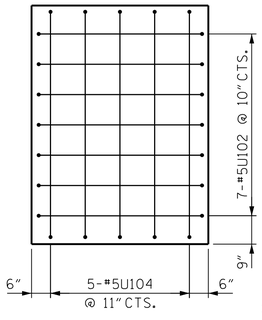


SECTION C-C

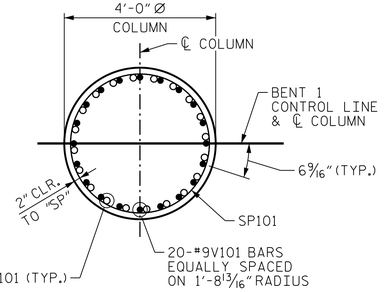
REINFORCING SHOWN AT BEARING 6, SIMILAR FOR BEARINGS 3 AND 7. STIRRUPS NOT SHOWN FOR CLARITY SEE SECTIONS A-A AND B-B FOR MAIN CAP STEEL



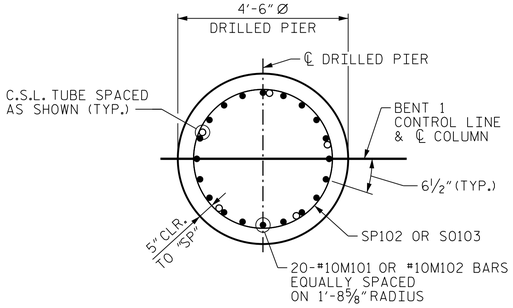
VIEW D-D



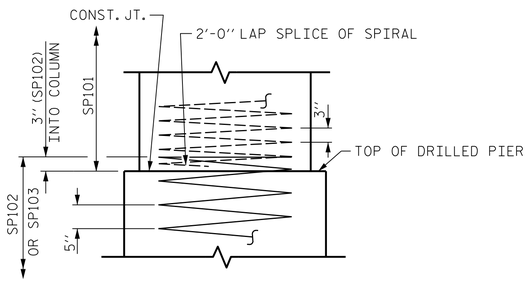
VIEW E-E



SECTION F-F

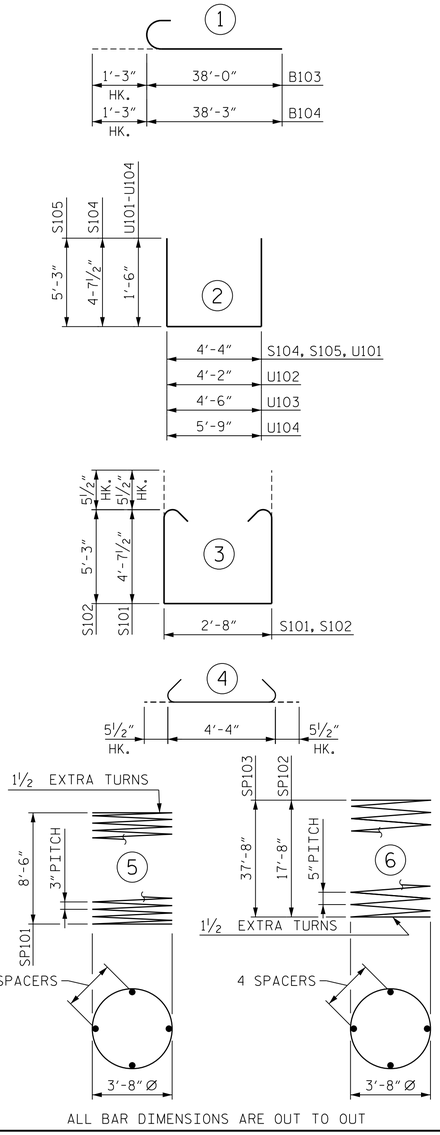


SECTION G-G



CONSTRUCTION JOINT DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1 - STAGE 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B101	16	#11	STR	38'-3"	3252
B102	32	#5	STR	37'-2"	1241
B103	8	#9	1	39'-3"	1068
B104	8	#9	1	39'-6"	1075
B105	2	#5	STR	36'-6"	77
B106	16	#4	STR	10'-10"	116
B107	8	#4	STR	5'-4"	29
M101	40	#10	STR	24'-9"	4260
M102	40	#10	STR	44'-9"	7703
S101	66	#5	3	12'-10"	884
S102	78	#5	3	14'-1"	1146
S103	72	#5	4	5'-3"	395
S104	8	#5	2	13'-7"	114
S105	8	#5	2	14'-10"	124
U101	55	#4	2	7'-4"	270
U102	12	#5	2	7'-2"	90
U103	5	#5	2	7'-6"	40
U104	5	#5	2	8'-9"	46
V101	80	#9	STR	11'-9"	3196

REINFORCING STEEL LBS. 23,528

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP101	4	*	5	410'-1"	1096
SP102	2	**	6	500'-0"	1043
SP103	2	**	6	1045'-5"	1281

SPIRAL REINF. STEEL LBS. 4,320

CLASS A CONCRETE	
POUR 2 (COLUMNS)	CU. YDS. 15.4
POUR 3 (CAP)	CU. YDS. 68.8
TOTAL CLASS A CONCRETE	CU. YDS. 84.2
DRILLED PIER CONCRETE	
POUR 1 (DRILLED PIERS)	CU. YDS. 65.5
CSL TUBES	LIN. FT. 590.0
DRILLED PIERS IN SOIL	LIN. FT. 76
DRILLED PIERS NOT IN SOIL	LIN. FT. 36
PERMANENT STEEL CASING	LIN. FT. 56

* THE SP101 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

** THE SP102 & SP103 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 SECTIONS AND DETAILS AND BILL OF MATERIALS STAGE 1

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

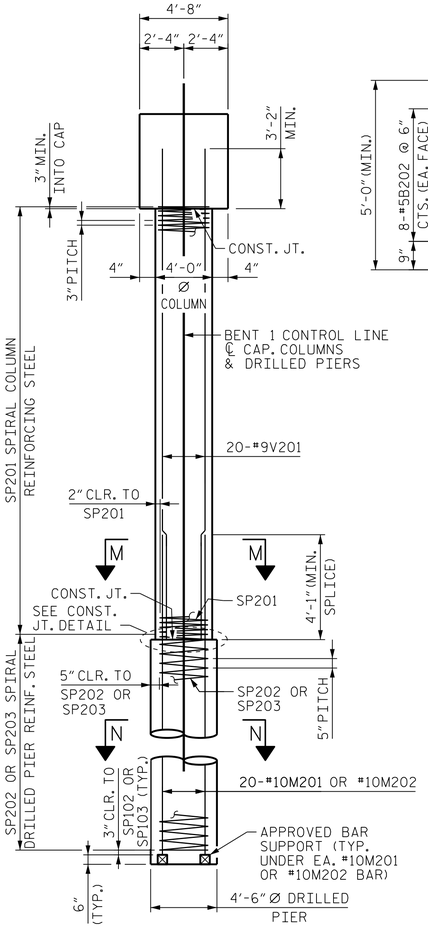
1/25/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-46
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

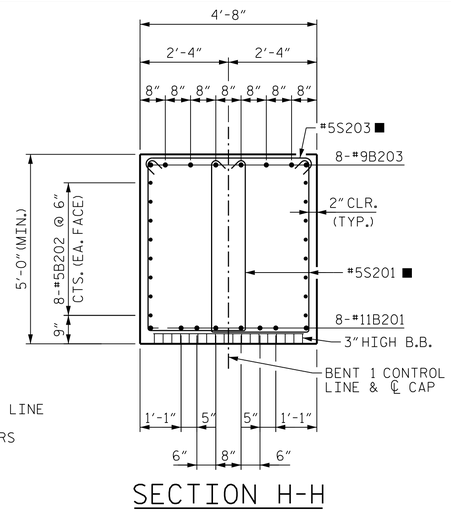
DES BY: L. GUALTIERI DATE: 06/21
DES CHK: K. DICKENS DATE: 06/21
DWG BY: D. CARTER DATE: 06/21
CHK BY: K. DICKENS DATE: 07/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

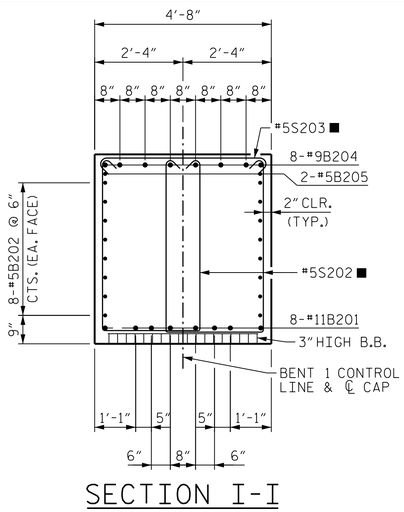
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



END ELEVATION

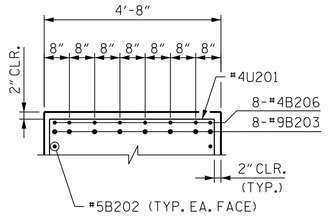


SECTION H-H

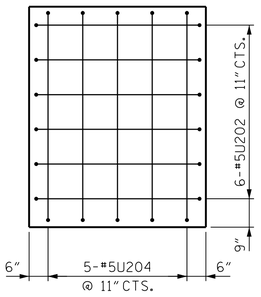


SECTION I-I

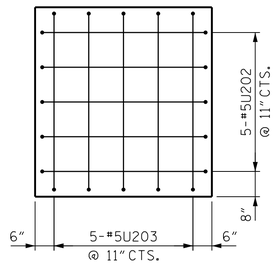
■ = INVERT ALTERNATE STIRRUPS



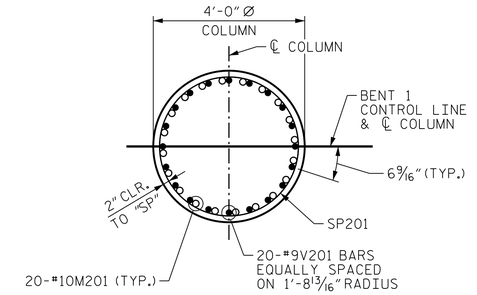
SECTION J-J



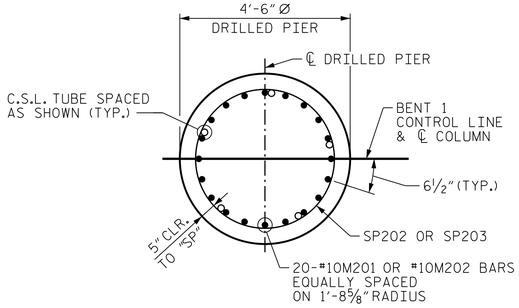
VIEW K-K



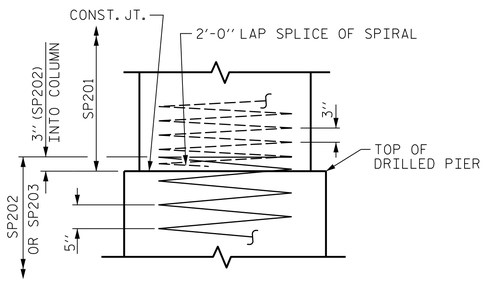
VIEW L-L



SECTION M-M

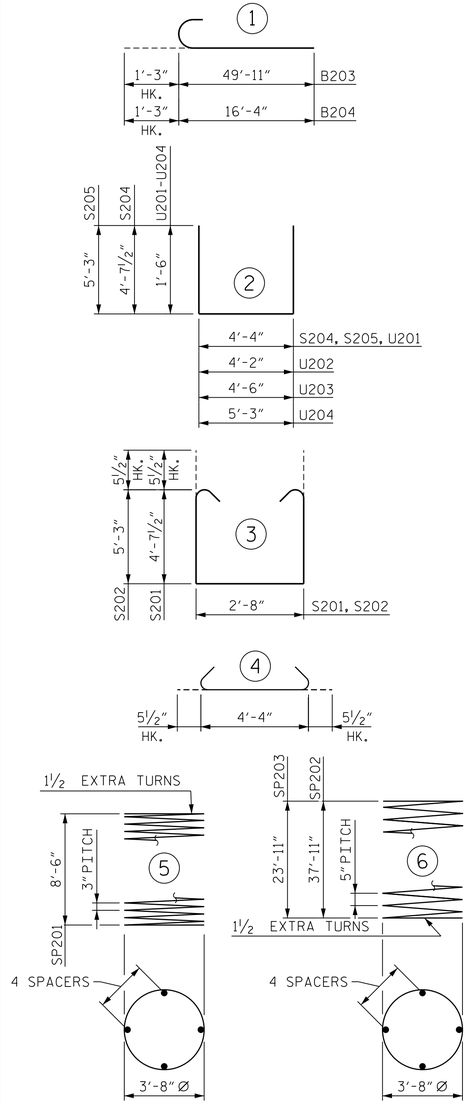


SECTION N-N



CONSTRUCTION JOINT DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1 - STAGE 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B201	8	#11	STR	59'-8"	2537
B202	16	#5	STR	59'-8"	996
B203	8	#9	1	49'-11"	1358
B204	8	#9	1	17'-7"	479
B205	2	#5	STR	14'-7"	31
B206	16	#4	STR	10'-10"	116
M201	40	#10	STR	45'-0"	7746
M202	40	#10	STR	31'-0"	5336
S201	104	#5	3	12'-10"	1393
S202	36	#5	3	14'-1"	529
S203	70	#5	4	5'-3"	384
S204	12	#5	2	13'-7"	171
S205	4	#5	2	14'-10"	62
U201	44	#4	2	7'-4"	216
U202	11	#5	2	7'-2"	83
U203	5	#5	2	7'-6"	40
U204	5	#5	2	8'-3"	44
V201	80	#9	STR	11'-9"	3196
REINFORCING STEEL				LBS.	23,119

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP201	4	*	5	410'-1"	1096
SP202	2	**	6	1056'-10"	2205
SP203	2	**	6	670'-6"	1399
SPIRAL REINF. STEEL				LBS.	4,700

CLASS A CONCRETE	
POUR 2 (COLUMNS)	CU. YDS. 15.4
POUR 3 (CAP)	CU. YDS. 55.8
TOTAL CLASS A CONCRETE	CU. YDS. 71.2
DRILLED PIER CONCRETE	
POUR 1 (DRILLED PIERS)	CU. YDS. 73.5
CSL TUBES	LIN. FT. 655.0
DRILLED PIERS IN SOIL	LIN. FT. 88
DRILLED PIERS NOT IN SOIL	LIN. FT. 36
PERMANENT STEEL CASING	LIN. FT. 56

* THE SP201 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

** THE SP202 & SP203 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 SECTIONS AND DETAILS AND BILL OF MATERIALS STAGE 2

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

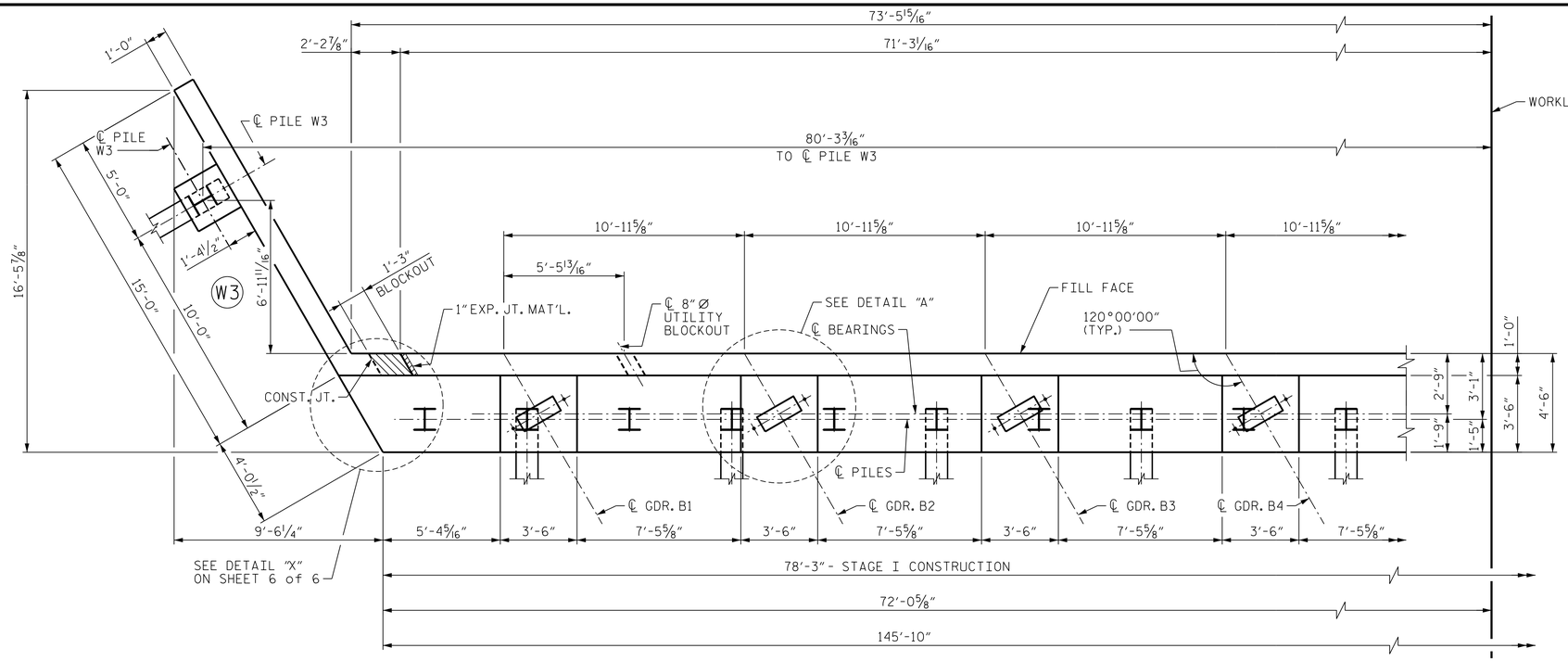
1/25/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-47
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

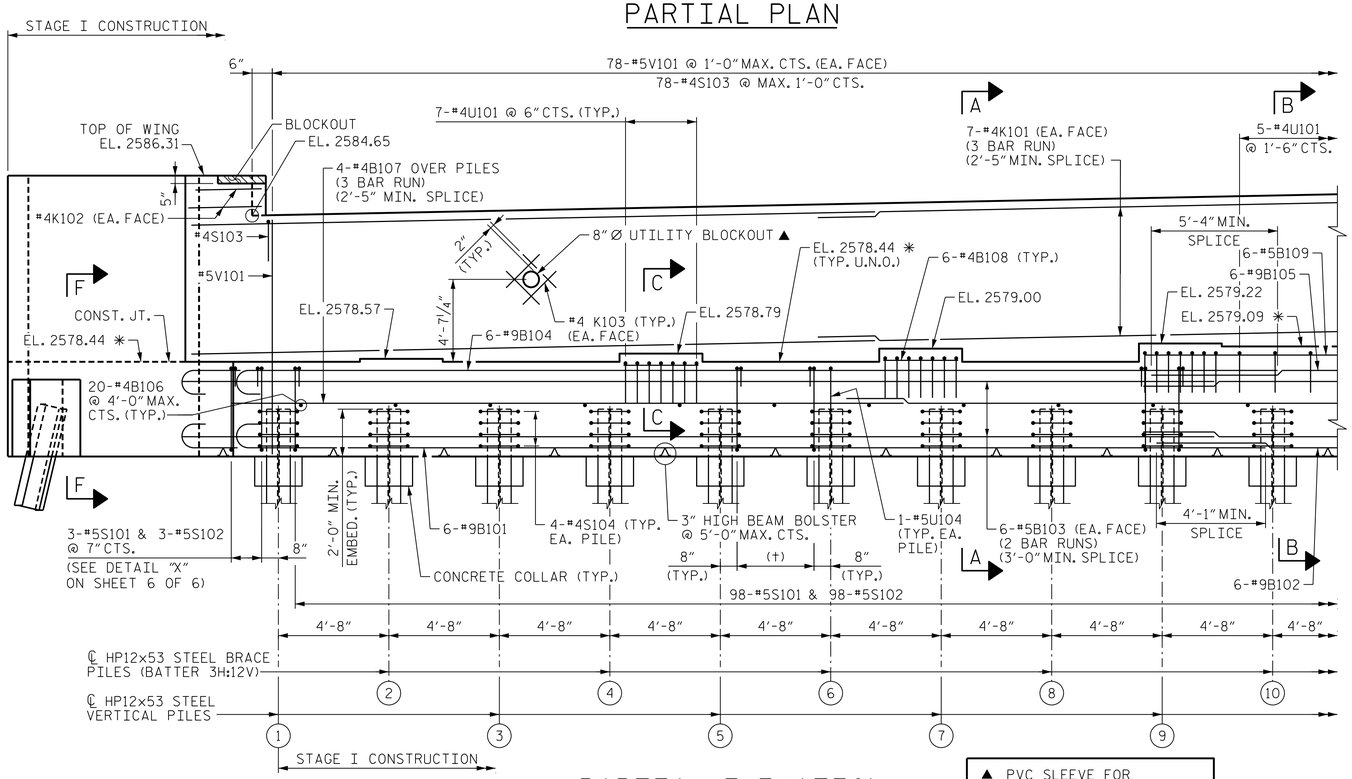
DES BY:	L. GUALTIERI	DATE :	06/21
DES CHK:	K. DICKENS	DATE :	06/21
DWG BY:	D. CARTER	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PARTIAL PLAN



PARTIAL ELEVATION

✳FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 2 SECTIONS AND DETAILS" SHEET 5 OF 6.

▲ PVC SLEEVE FOR ELECTRICAL CONDUIT, SEE "ELECTRICAL CONDUIT SYSTEM FOR SIGNALS" SHEET FOR DETAILS.

† = 6-#5 "S" BARS @ 8" CTS. (TYP. BTWN. PILES)

NOTES

FOR SECTIONS A-A, B-B, C-C AND VIEW F-F, SEE "SUBSTRUCTURE END BENT 2 SECTIONS AND DETAILS" SHEET 5 OF 6.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

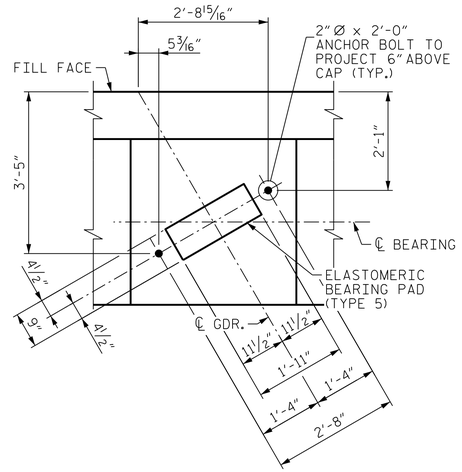
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

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

FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE AT END BENT DETAIL, SEE "SUPERSTRUCTURE END BENT 2 BILL OF MATERIALS" SHEET 6 OF 6.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL (PARAPET AND END POST) ARE CAST IF SLIP FORMING IS USED.

REINFORCING STEEL IN THE BACKWALL MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR THE UTILITY BLOCKOUT



DETAIL "A"

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 PLAN AND ELEVATION STAGE 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-48
1			3			TOTAL SHEETS
2			4			59

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

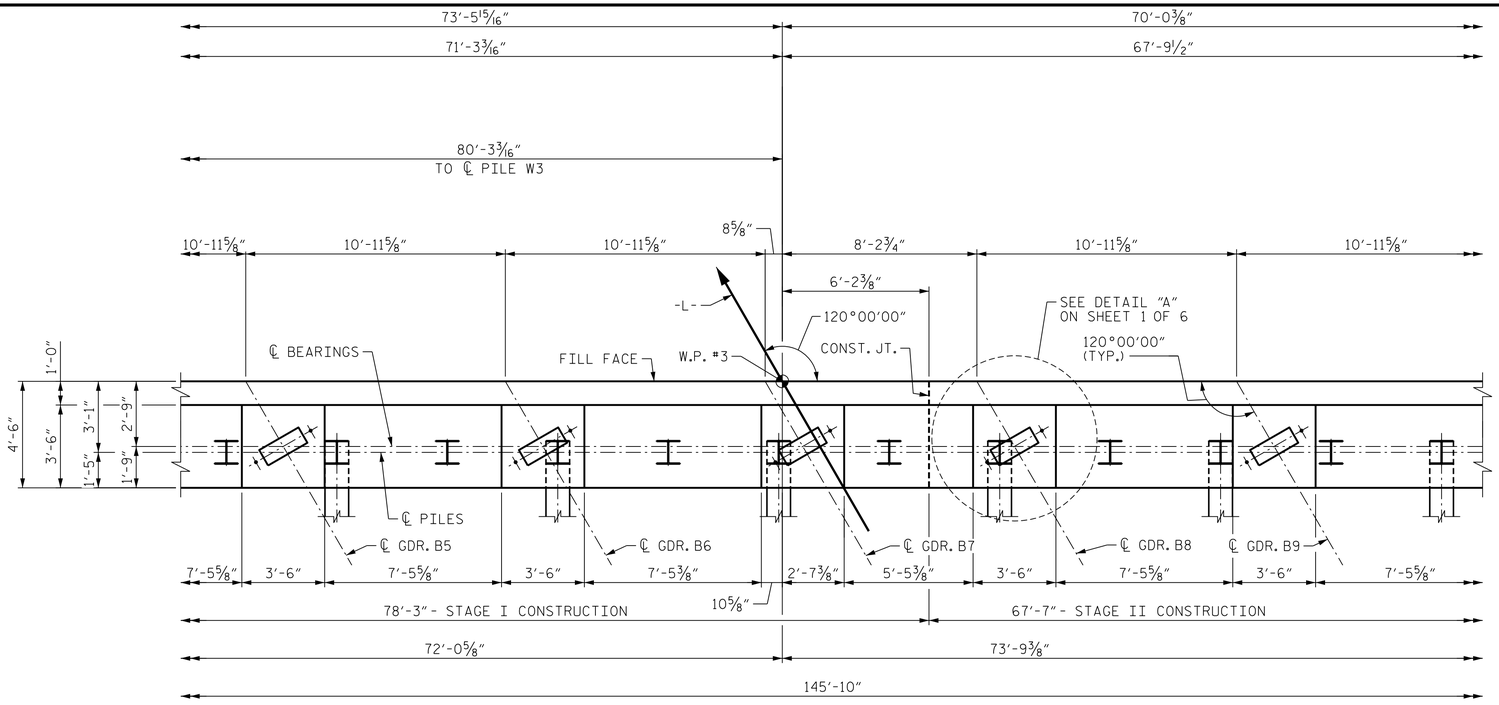
1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

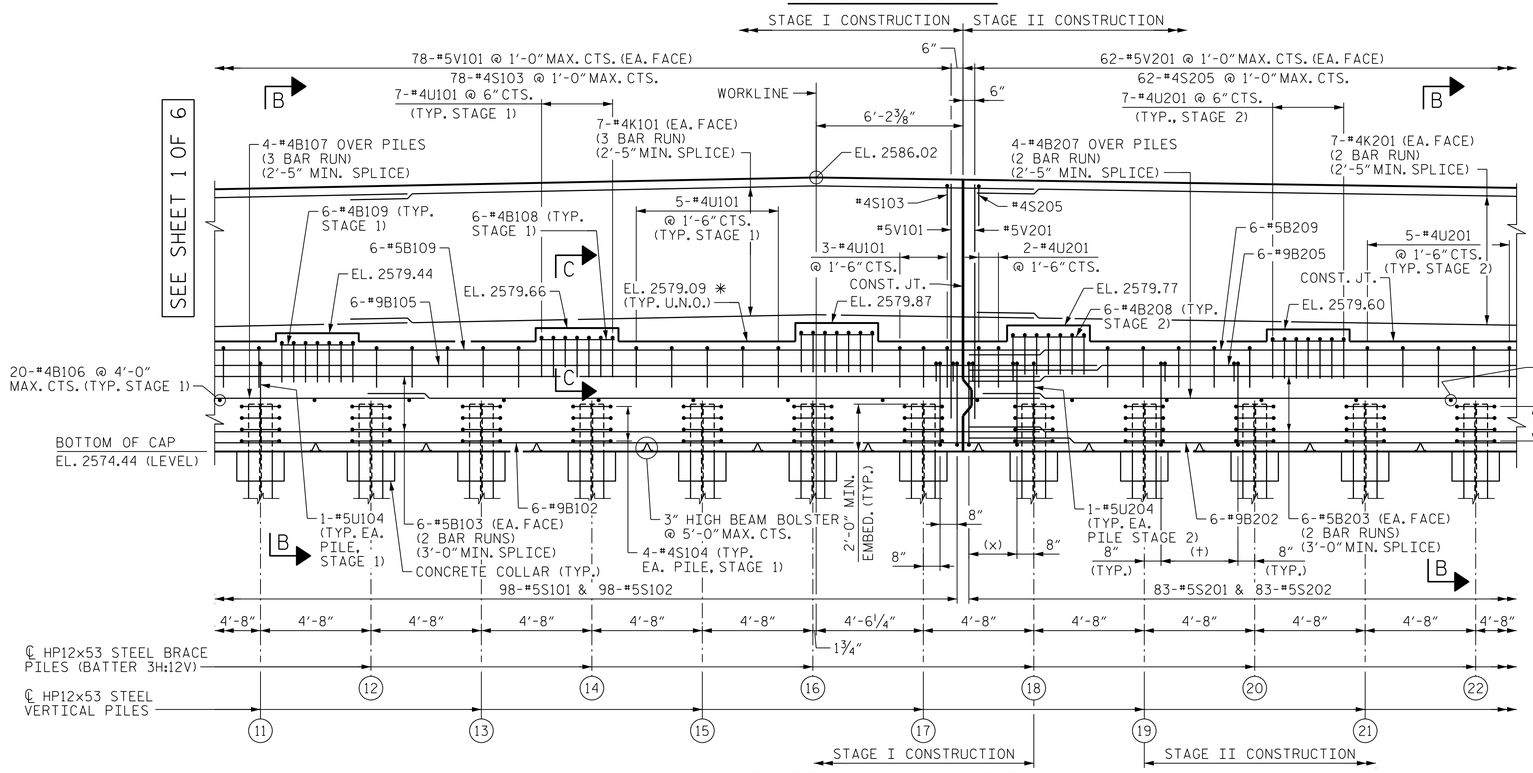
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:33:45 AM
FILE: ...\401.235_B5898B3186.SMU.E2.048.430168.dgn



PARTIAL PLAN

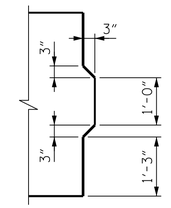


PARTIAL ELEVATION

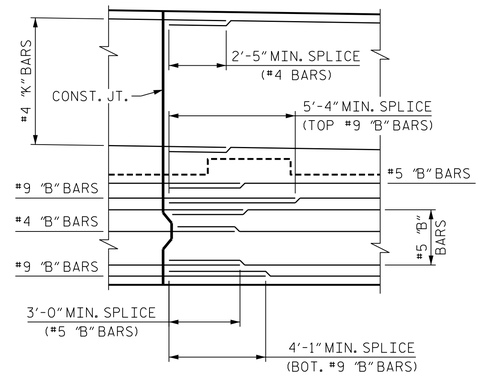
* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 2 SECTIONS AND DETAILS" SHEET 5 OF 6.

† = 6-#5 "S" BARS @ 8″CTS. (TYP. BTWN. PILES)

x = 4-#5 "S" BARS @ 8″CTS.



SHEAR KEY DETAIL



SPLICE DETAIL

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 PLAN AND ELEVATION STAGES 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-49
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

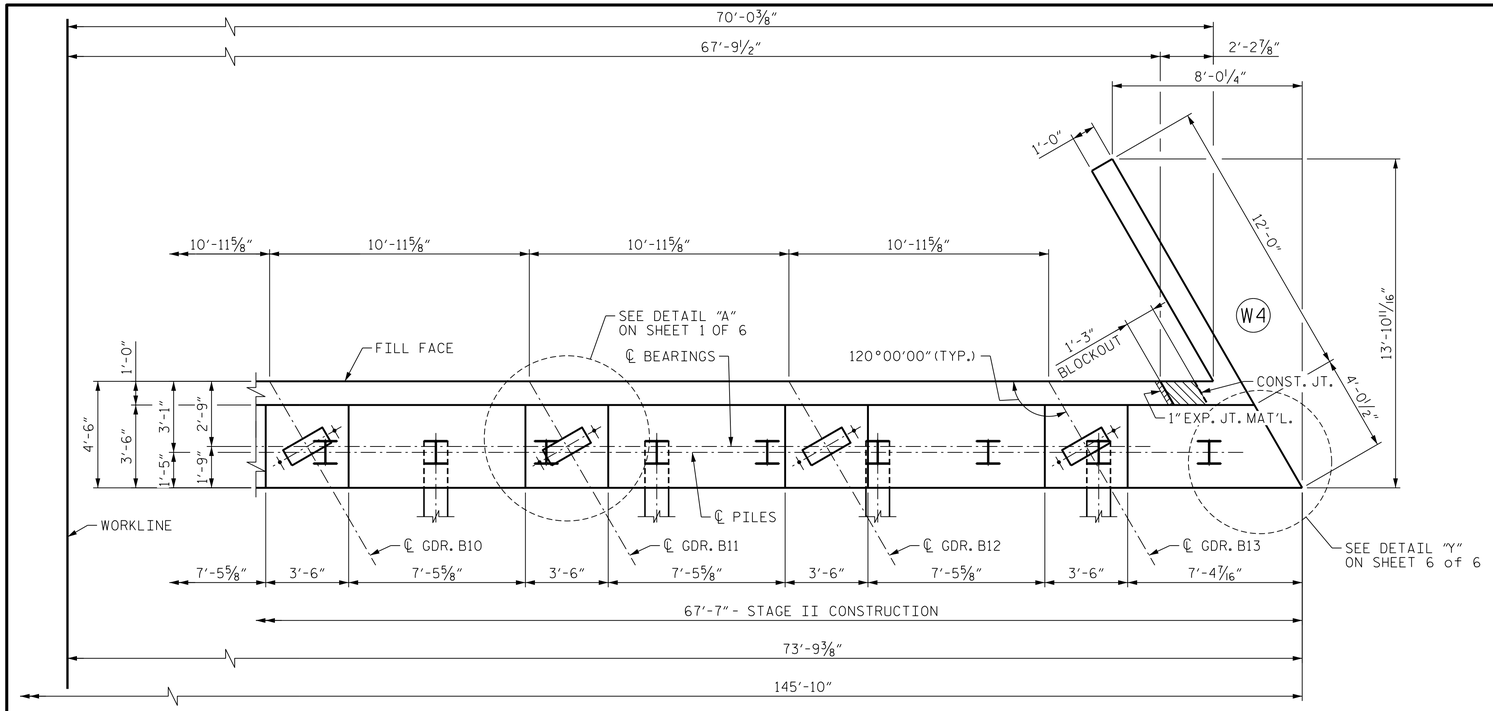
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

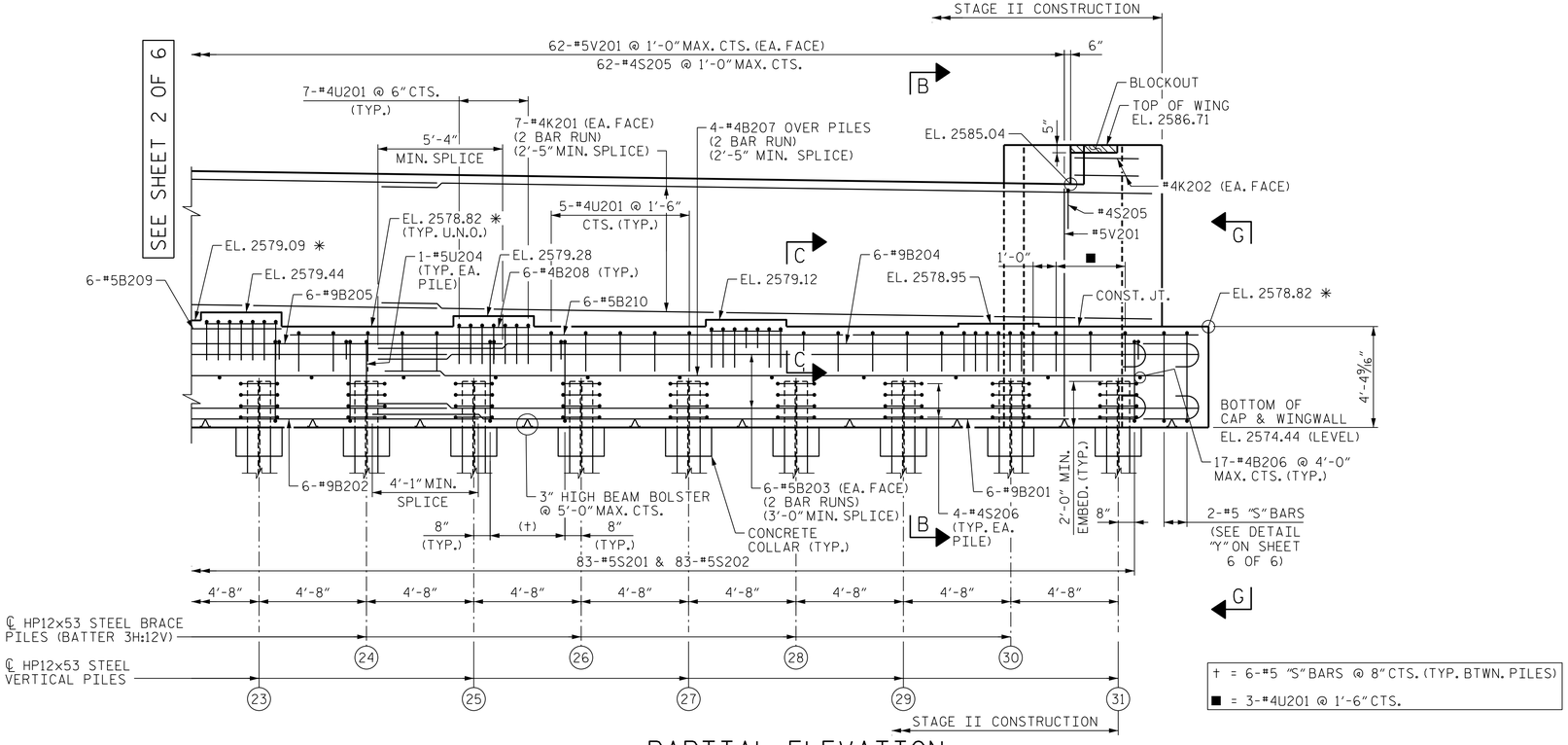
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



PARTIAL PLAN



PARTIAL ELEVATION

✳ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUP, SEE "SUBSTRUCTURE END BENT 2 SECTIONS AND DETAILS" SHEET 5 OF 6.

† = 6-#5 "S" BARS @ 8" CTS. (TYP. BTWN. PILES)

■ = 3-#4U201 @ 1'-6" CTS.

NOTES

FOR VIEW G-G, SEE "SUBSTRUCTURE END BENT 2 SECTIONS AND DETAILS" SHEET 5 OF 6

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 PLAN AND ELEVATION STAGE 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-50
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

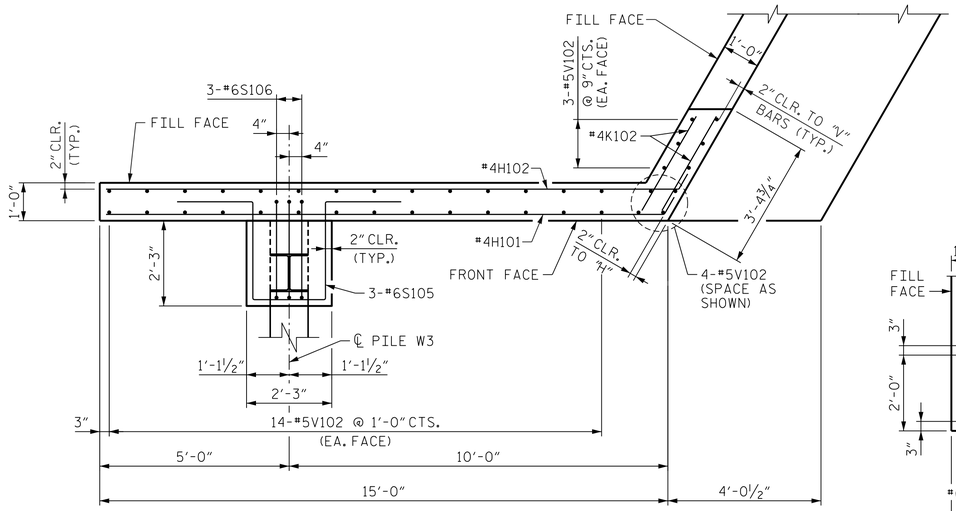
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

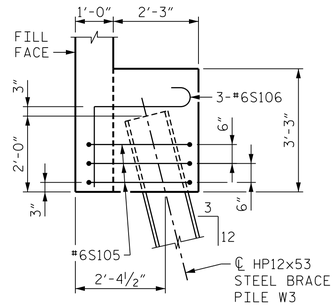
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

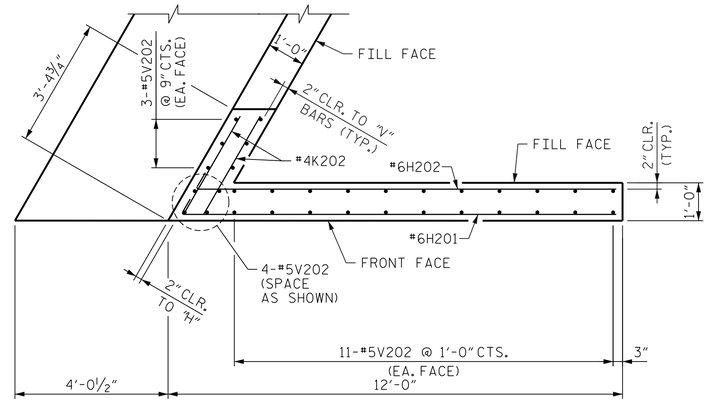
DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



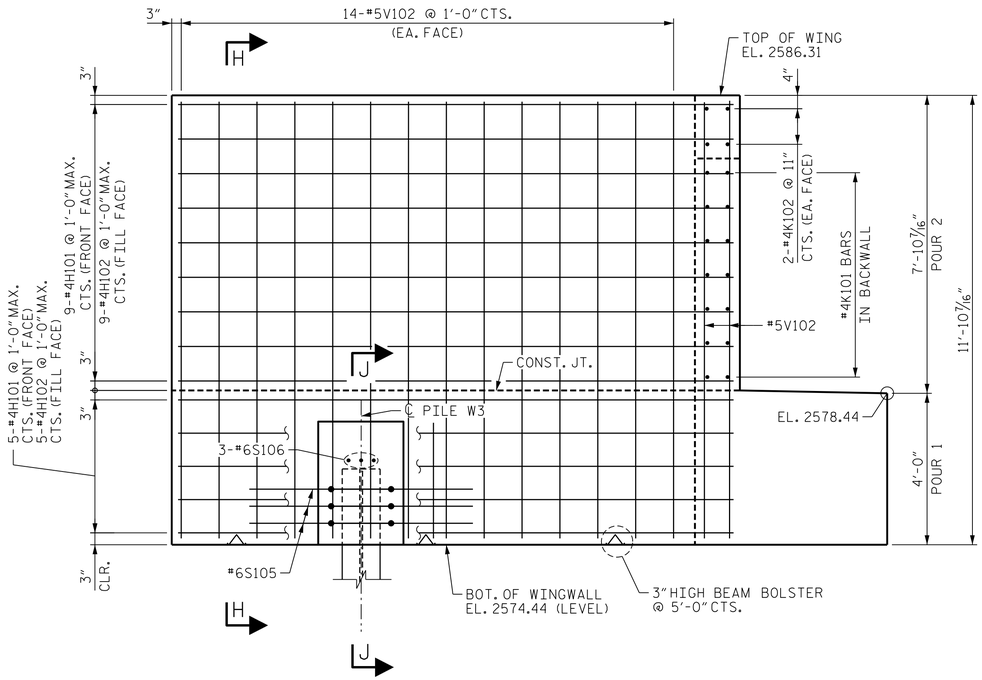
PLAN - WINGWALL "W3"



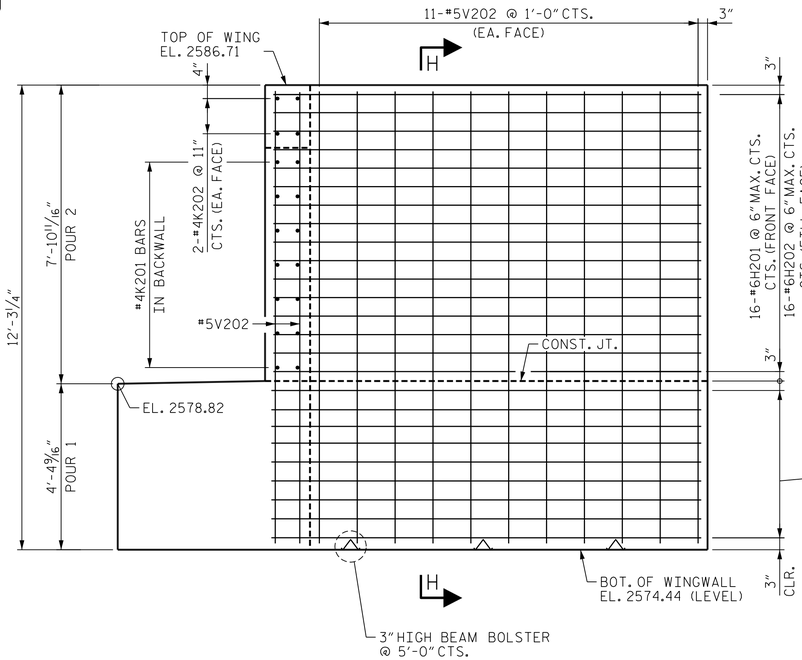
SECTION J-J



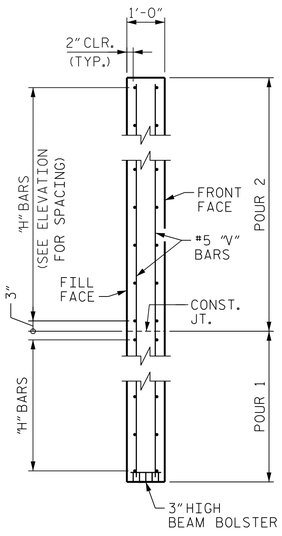
PLAN - WINGWALL "W4"



ELEVATION - WINGWALL "W3"



ELEVATION - WINGWALL "W4"



SECTION H-H

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 WINGWALLS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

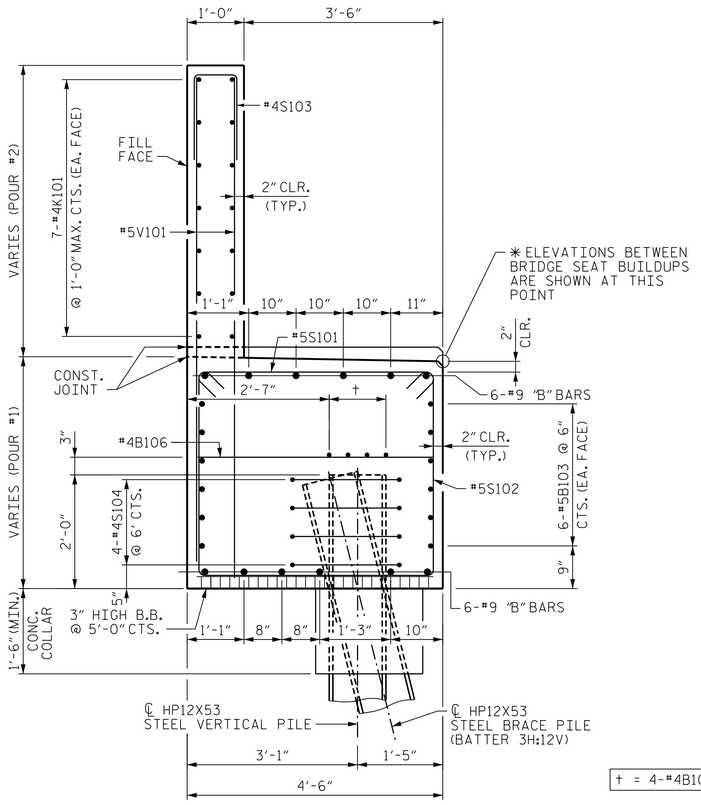
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-51
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

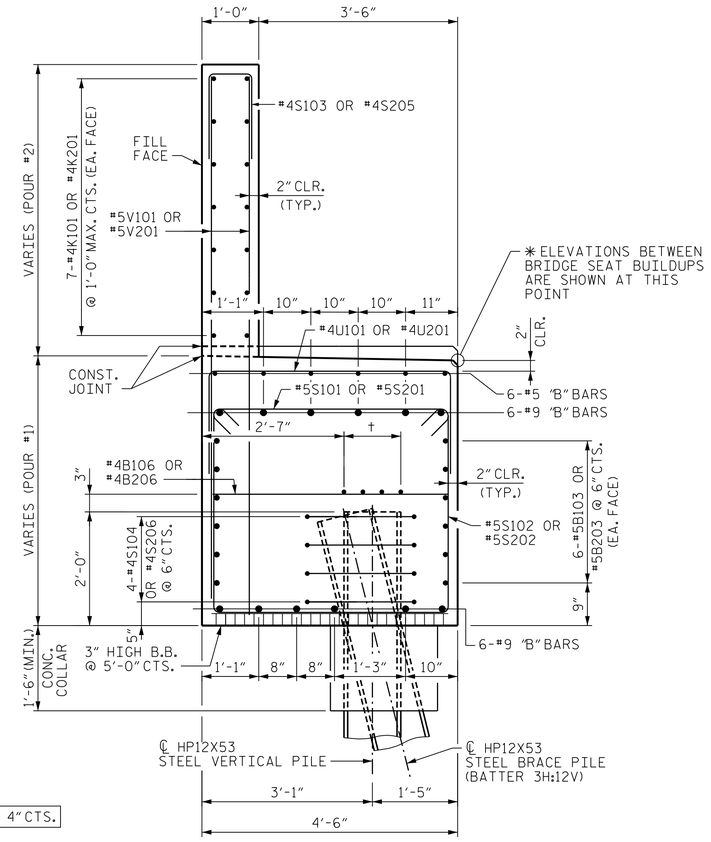
DES BY: K. DICKENS	DATE: 06/21	DWG BY: B. PETERSON	DATE: 06/21
DES CHK: L. GUALTIERI	DATE: 06/21	CHK BY: K. DICKENS	DATE: 07/21

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.plt PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
USER: PPETERSO DATE: 1/25/2022 TIME: 8:34:12 AM
FILE: ...\401_250_B5898B3186_SMU_E2_051_430168.dgn

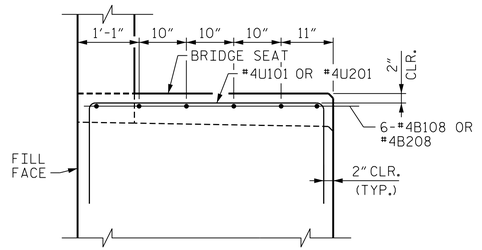


SECTION A-A

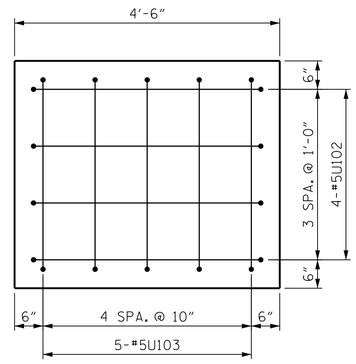
† = 4-#4B107 OR #4B207 @ 4" CTS.



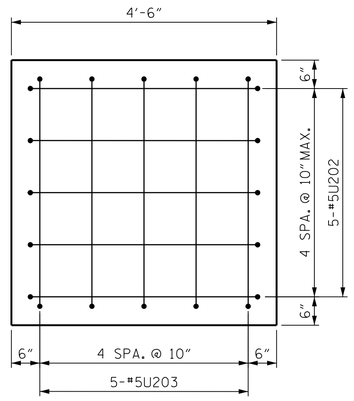
SECTION B-B



SECTION C-C



VIEW F-F



VIEW G-G

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-52
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

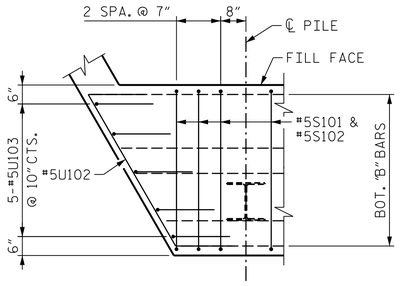
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

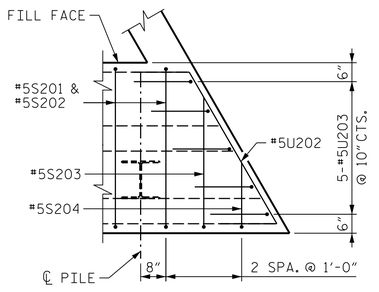
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	K. DICKENS	DATE :	06/21
DES CHK:	L. GUALTIERI	DATE :	06/21
DWG BY:	B. PETERSON	DATE :	06/21
CHK BY:	K. DICKENS	DATE :	07/21



DETAIL "X"

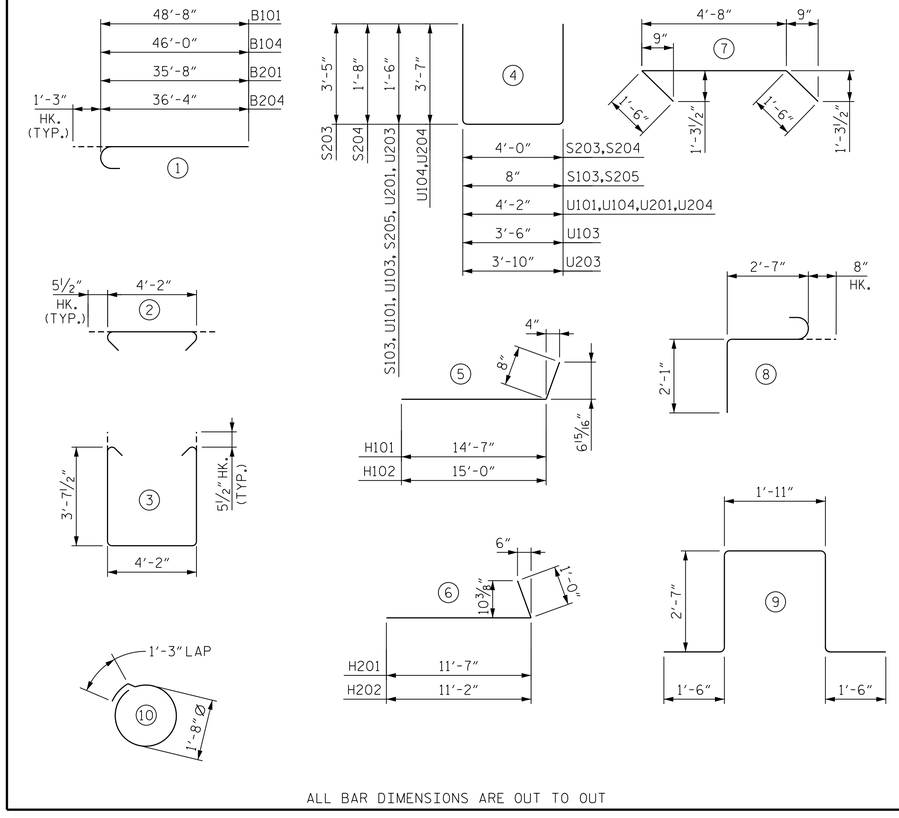
("K" BARS NOT SHOWN FOR CLARITY)



DETAIL "Y"

("K" BARS NOT SHOWN FOR CLARITY)

BAR TYPES



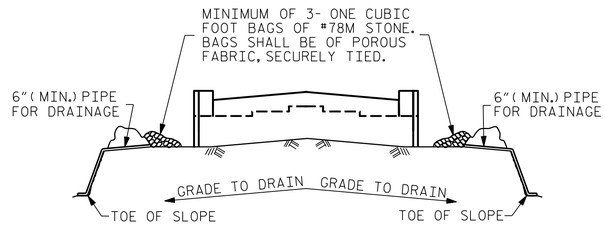
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL - END BENT 2

STAGE 1						STAGE 2					
BAR	QTY	SIZE	TYPE	LENGTH	WEIGHT	BAR	QTY	SIZE	TYPE	LENGTH	WEIGHT
B101	6	#9	1	45'-11"	937	B201	6	#9	1	36'-11"	754
B102	6	#9	STR	44'-8"	912	B202	6	#9	STR	35'-8"	728
B103	24	#5	STR	43'-7"	1091	B203	24	#5	STR	35'-2"	881
B104	6	#9	1	47'-3"	964	B204	6	#9	1	37'-7"	767
B105	6	#9	STR	46'-0"	939	B205	6	#9	STR	36'-4"	742
B106	20	#4	STR	4'-2"	57	B206	17	#4	STR	4'-2"	48
B107	12	#4	STR	29'-6"	237	B207	8	#4	STR	34'-10"	187
B108	30	#4	STR	3'-2"	64	B208	30	#4	STR	3'-2"	64
B109	6	#5	STR	43'-1"	270	B209	6	#5	STR	26'-11"	169
						B210	6	#5	STR	40'-2"	252
H101	14	#4	5	15'-3"	143						
H102	14	#4	5	15'-8"	147	H201	25	#6	6	12'-7"	473
						H202	25	#6	6	12'-2"	457
K101	42	#4	STR	29'-6"	828						
K102	4	#4	STR	3'-0"	9	K201	28	#4	STR	34'-10"	652
K103	8	#4	STR	2'-0"	11	K202	4	#4	STR	3'-0"	9
S101	101	#5	2	5'-1"	536	S201	83	#5	2	5'-1"	441
S102	101	#5	3	12'-4"	1300	S202	83	#5	3	12'-4"	1068
S103	78	#4	4	3'-8"	192	S203	1	#5	4	10'-10"	12
S104	68	#4	10	6'-6"	296	S204	1	#5	4	7'-4"	8
S105	3	#6	9	10'-1"	46	S205	62	#4	4	3'-8"	152
S106	3	#6	8	5'-4"	25	S206	56	#4	10	6'-6"	244
U101	60	#4	4	7'-2"	288	U201	72	#4	4	7'-2"	345
U102	4	#5	7	7'-8"	32	U202	5	#5	7	7'-8"	40
U103	5	#5	4	6'-6"	34	U203	5	#5	4	6'-10"	36
U104	17	#5	4	11'-4"	201	U204	14	#5	4	11'-4"	166
V101	156	#5	STR	9'-9"	1587	V201	124	#5	STR	10'-2"	1315
V102	38	#5	STR	11'-5"	453	V202	32	#5	STR	11'-10"	395

REINFORCING STEEL	LBS.	11,599	
CLASS A CONCRETE			
POUR #1 (COLLARS, CAP, LOWER PART OF WINGS)	CU. YDS.	65.6	
POUR #2 (BACKWALL & UPPER PART OF WINGS)	CU. YDS.	24.8	
TOTAL	CU. YDS.	90.4	
HP12X53 STEEL PILES NO.19	LIN. FT.	665	
PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	EA.	19	
STEEL PILE POINTS	EA.	19	

REINFORCING STEEL	LBS.	10,405
CLASS A CONCRETE		
POUR #1 (COLLARS, CAP, LOWER PART OF WINGS)	CU. YDS.	55.3
POUR #2 (BACKWALL & UPPER PART OF WINGS)	CU. YDS.	19.4
TOTAL	CU. YDS.	74.7
HP12X53 STEEL PILES NO.13	LIN. FT.	455
PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	EA.	13
STEEL PILE POINTS	EA.	13

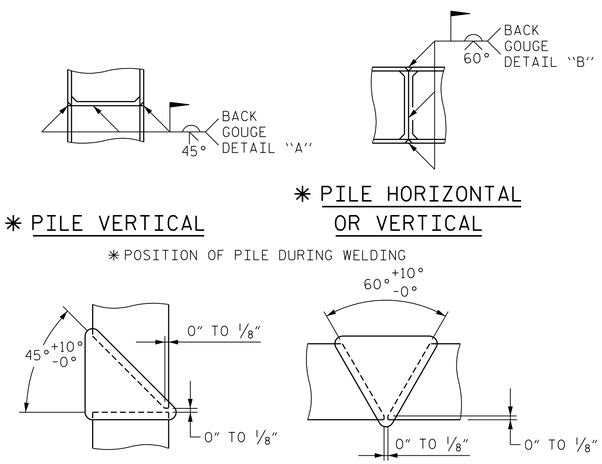


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 INCLUEDED IN THE UNIT CONTRACT PRCE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT 2 BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

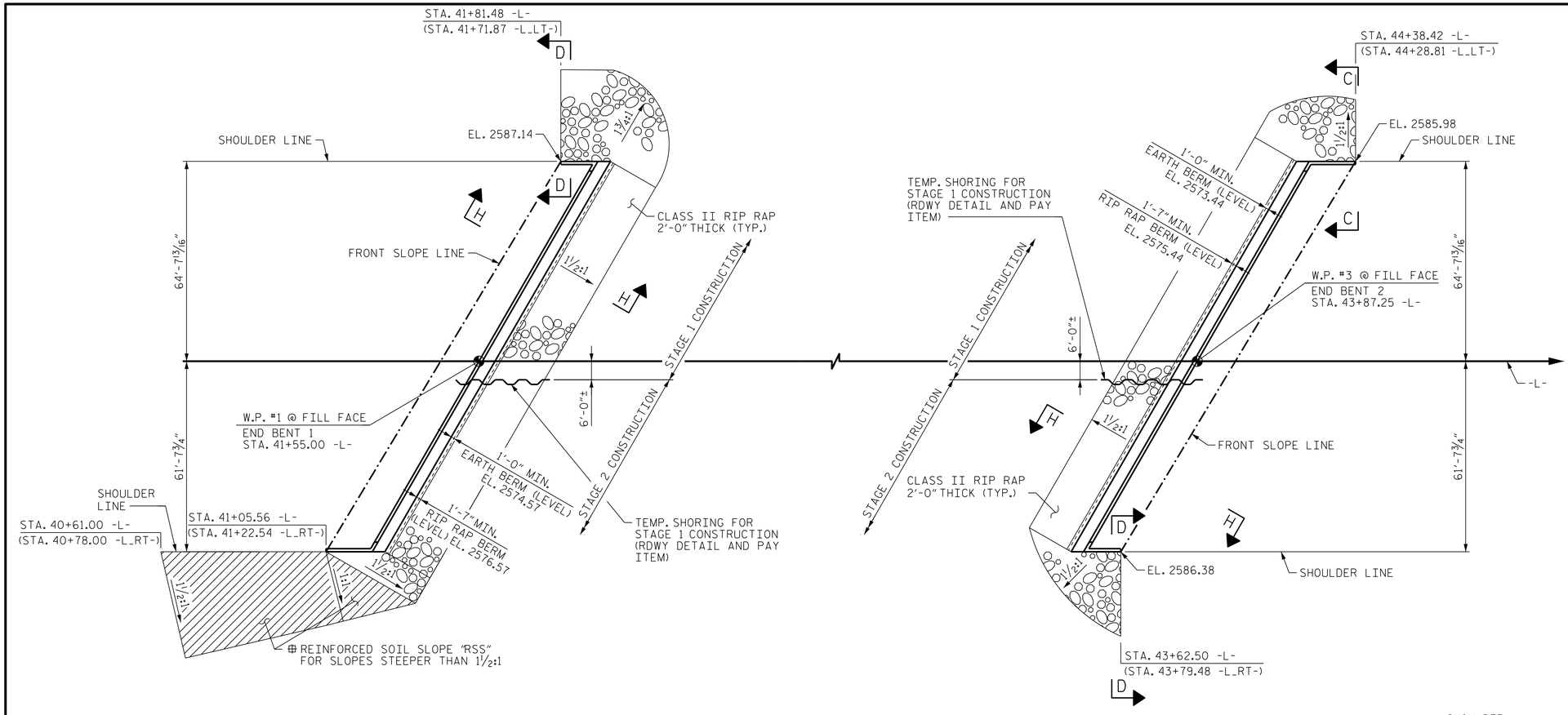
S Kent Dickens 1/25/2022

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-53
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

DES BY: K. DICKENS	DATE: 06/21	DWG BY: B. PETERSON	DATE: 06/21
DES CHK: L. GUALTIERI	DATE: 06/21	CHK BY: K. DICKENS	DATE: 07/21

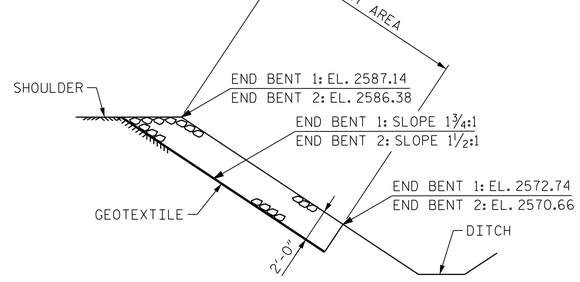


⊕ SEE GEOTECHNICAL DRAWINGS FOR REINFORCED SOIL SLOPE "RSS" DETAILS. (GEOTECHNICAL DETAIL AND PAY ITEM)

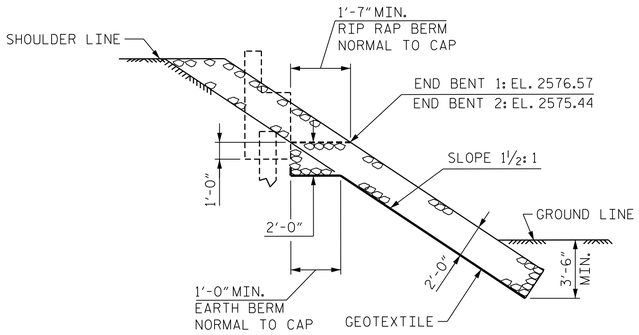
RIP RAP AT END BENT #1

ESTIMATED QUANTITIES				
BRIDGE @ STA. 42+71.13	RIP RAP CLASS II (2'-0" THICK) (TONS)		GEOTEXTILE FOR DRAINAGE (SQUARE YARDS)	
	STAGE 1	STAGE 2	STAGE 1	STAGE 2
END BENT 1	265	160	295	175
END BENT 2	255	165	250	185

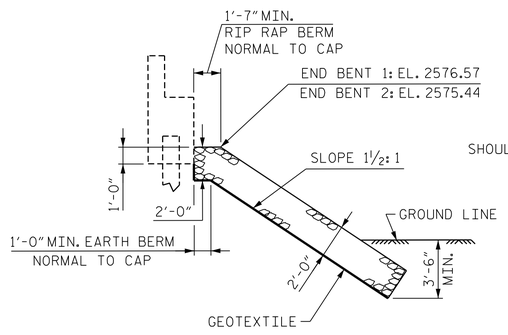
RIP RAP AT END BENT #2



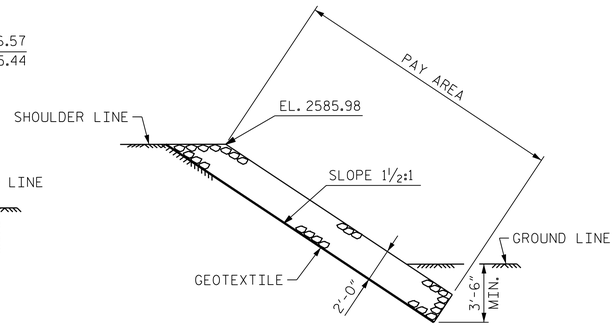
SECTION D-D



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

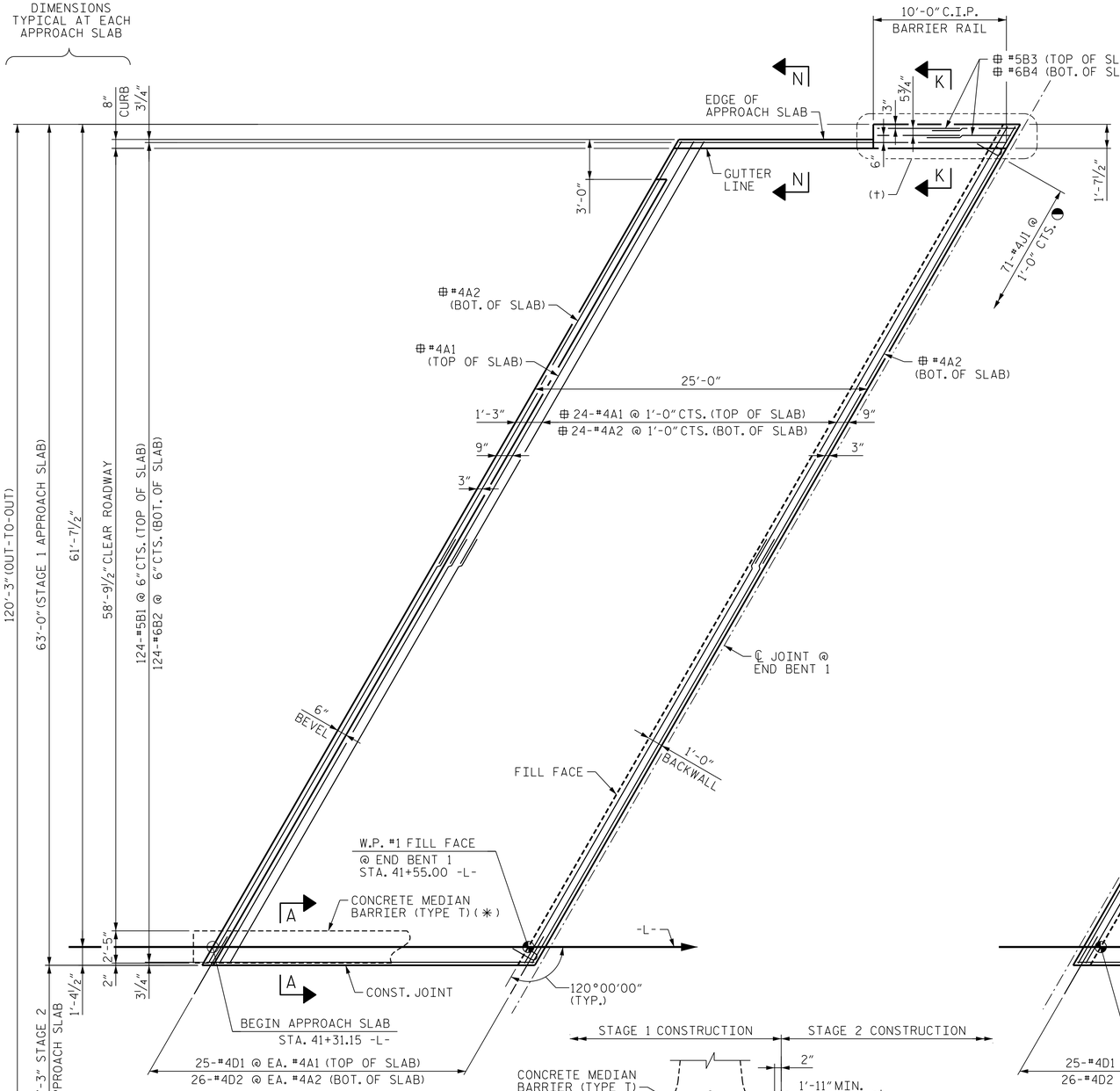
1/25/2022

REVISIONS						SHEET NO. S01-54
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

DES BY: H. ABU NIMEH DATE: 06/21
DES CHK: K. DICKENS DATE: 07/21
DWG BY: D. CARTER DATE: 06/21
CHK BY: K. DICKENS DATE: 07/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

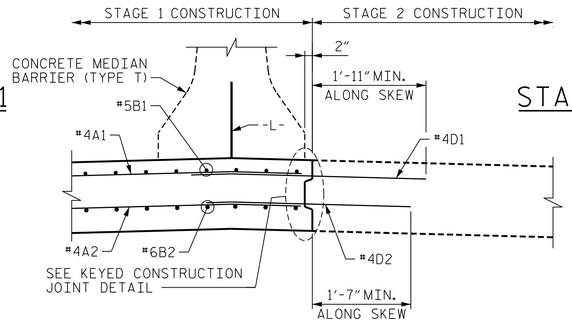
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



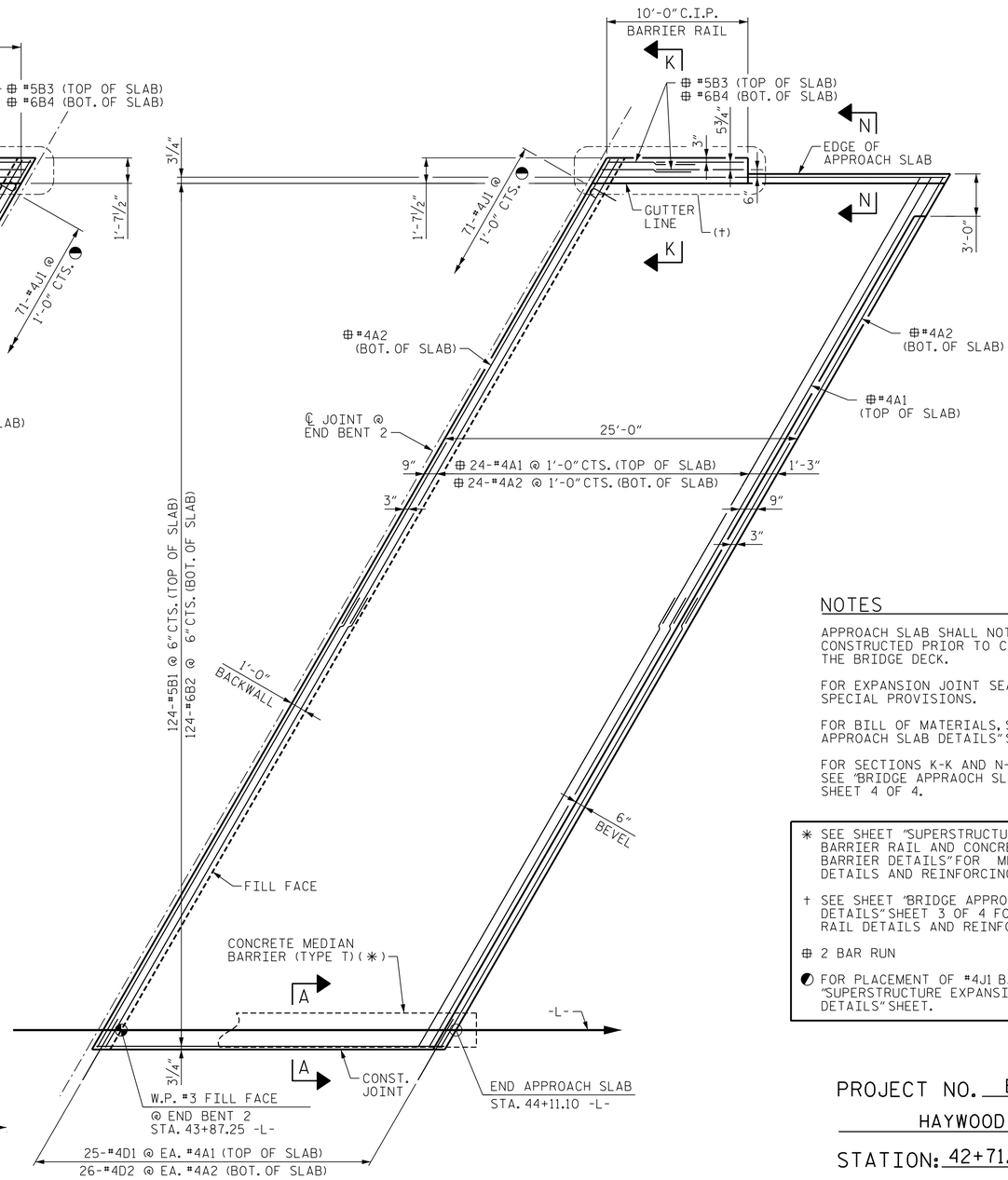
STAGE 1 - PLAN AT END BENT 1

KEYED CONSTRUCTION JOINT

(REINFORCING STEEL IN SLAB NOT SHOWN)



SECTION A-A



STAGE 1 - PLAN AT END BENT 2

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR BILL OF MATERIALS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 4 OF 4.

FOR SECTIONS K-K AND N-N, SEE "BRIDGE APPRAOCH SLAB DETAILS" SHEET 4 OF 4.

✳ SEE SHEET "SUPERSTRUCTURE CONCRETE BARRIER RAIL AND CONCRETE MEDIAN BARRIER DETAILS" FOR MEDIAN BARRIER DETAILS AND REINFORCING.

† SEE SHEET "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 4 FOR BARRIER RAIL DETAILS AND REINFORCING.

⊕ 2 BAR RUN

◐ FOR PLACEMENT OF #4J1 BARS SEE "SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS" SHEET.

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

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB PLAN AND SECTION STAGE 1

REVISIONS						SHEET NO. S01-55
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

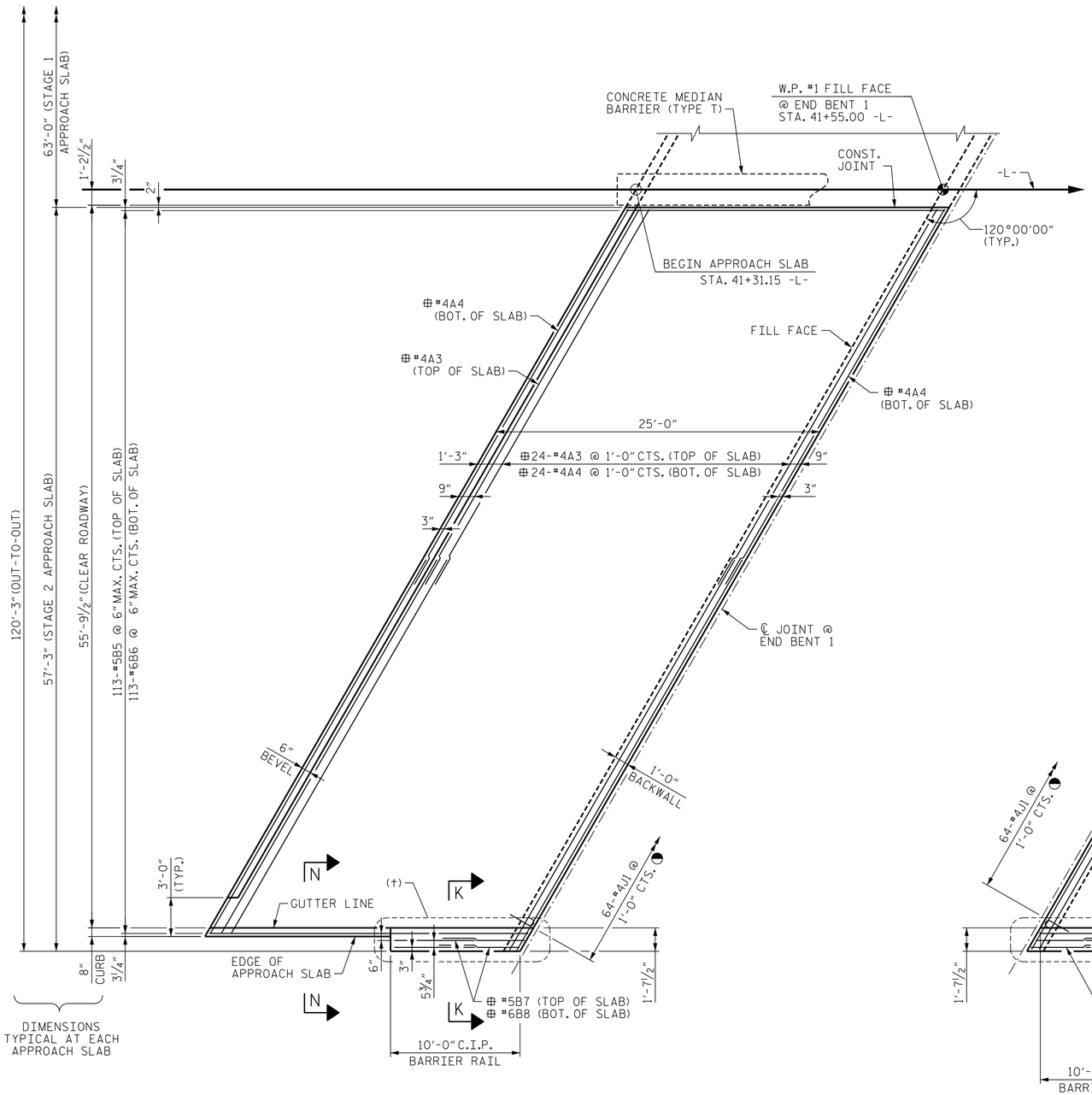
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER KENT DICKENS

1/25/2022

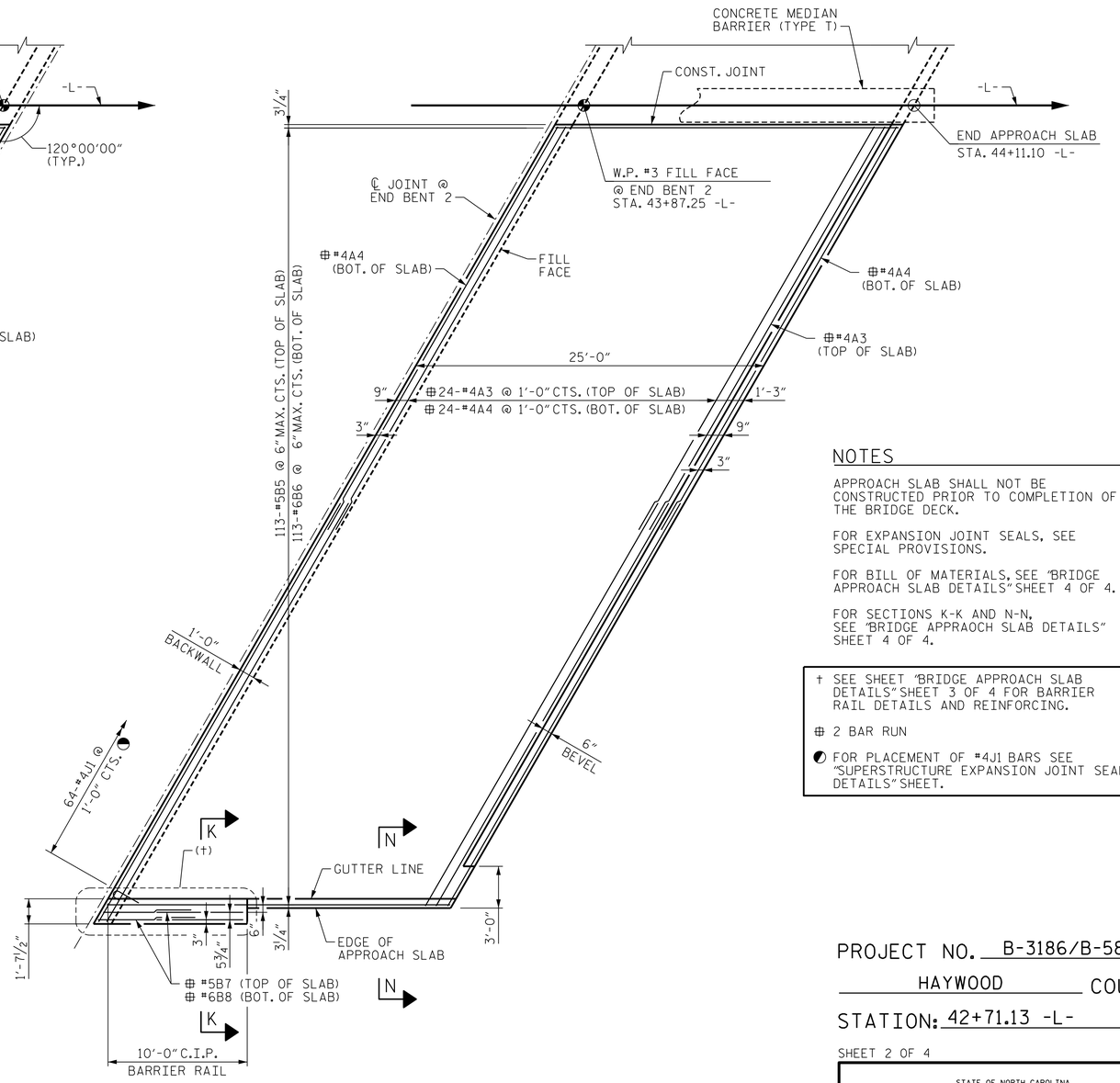
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	L. GUALTIERI	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	02/21
CHK BY:	L. GUALTIERI	DATE :	07/21



STAGE 2 - PLAN AT END BENT 1



STAGE 2 - PLAN AT END BENT 2

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR BILL OF MATERIALS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 4 OF 4.

FOR SECTIONS K-K AND N-N, SEE "BRIDGE APPRAOCH SLAB DETAILS" SHEET 4 OF 4.

† SEE SHEET "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 4 FOR BARRIER RAIL DETAILS AND REINFORCING.

⊕ 2 BAR RUN

◐ FOR PLACEMENT OF #4J1 BARS SEE "SUPERSTRUCTURE EXPANSION JOINT SEAL DETAILS" SHEET.

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

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB PLAN AND SECTION STAGE 2

REVISIONS						SHEET NO. S01-56
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 59
2	--	--	4	--	--	

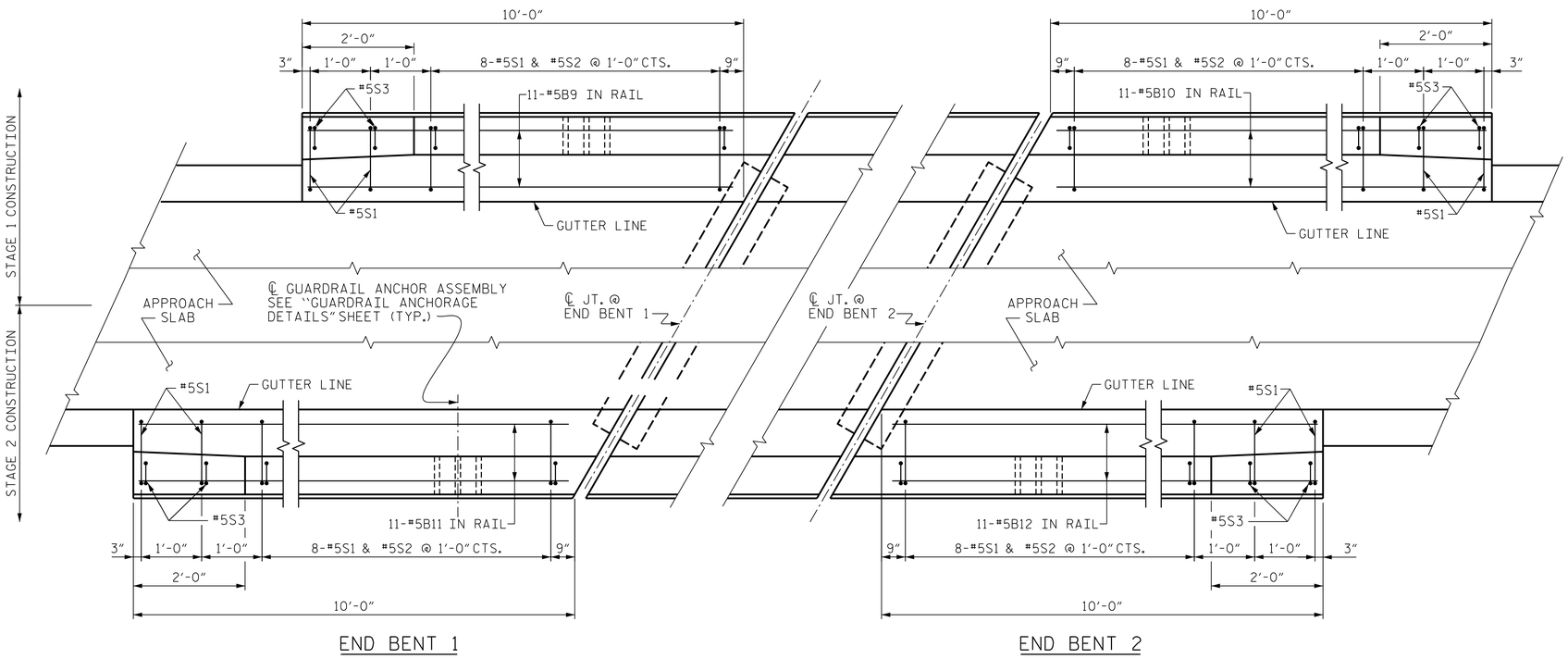
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

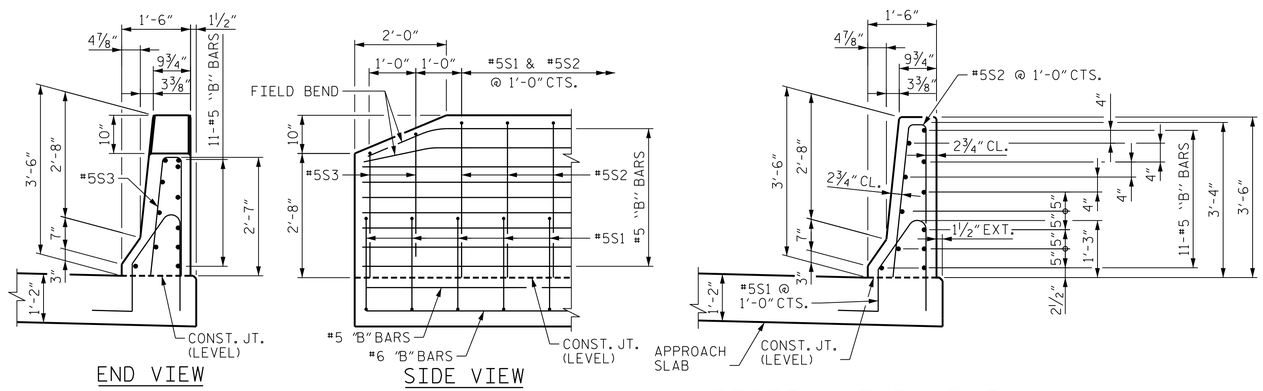
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	L. GUALTIERI	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	02/21
CHK BY:	L. GUALTIERI	DATE :	07/21



PLAN OF BARRIER RAIL



END OF RAIL DETAILS

BILL OF MATERIAL

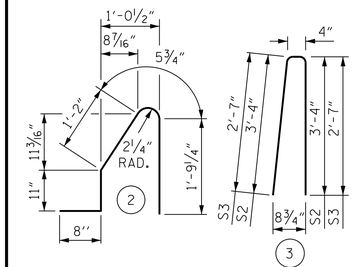
STAGE 1 (LEFT BARRIER RAIL ONLY)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B9	11	#5	STR	9'-7"	110
✳B10	11	#5	STR	9'-7"	110
✳S1	20	#5	2	5'-0"	105
✳S2	16	#5	3	7'-0"	117
✳S3	4	#5	3	5'-6"	23
✳EPOXY COATED REINFORCING STEEL				LBS.	465
CLASS "AA" CONCRETE				CU. YDS.	2.8
CONCRETE BARRIER RAIL				LIN. FT.	20.0

STAGE 2 (RIGHT BARRIER RAIL ONLY)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B11	11	#5	STR	9'-7"	110
✳B12	11	#5	STR	9'-7"	110
✳S1	20	#5	2	5'-0"	105
✳S2	16	#5	3	7'-0"	117
✳S3	4	#5	3	5'-6"	23
EPOXY COATED REINFORCING STEEL				LBS.	465
CLASS "AA" CONCRETE				CU. YDS.	2.8
CONCRETE BARRIER RAIL				LIN. FT.	20.0

BAR TYPES



NOTES

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPXOY COATED

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-57
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59

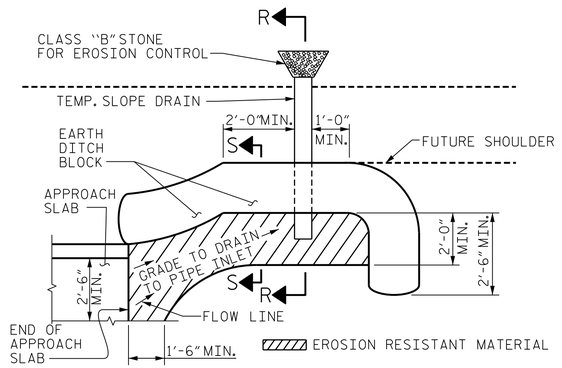
NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

1/25/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

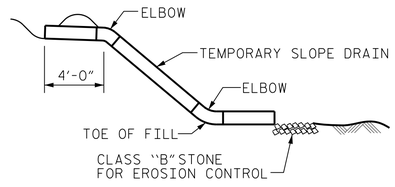
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	L. GUALTIERI	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	02/21
CHK BY:	L. GUALTIERI	DATE :	07/21

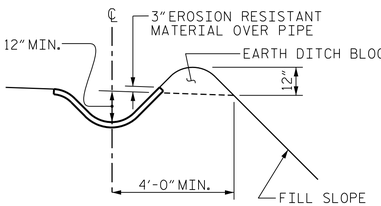


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



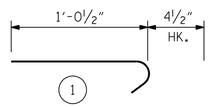
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE 1 APP. SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	37'-2"	1242
A2	52	#4	STR	37'-0"	1286
✳ B1	124	#5	STR	24'-1"	3115
B2	124	#6	STR	24'-7"	4579
✳ B3	4	#5	STR	6'-6"	28
B4	4	#6	STR	6'-6"	40
✳ D1	25	#4	STR	4'-1"	69
D2	26	#4	STR	3'-5"	60
✳ J1	71	#4	1	1'-5"	68

✳ EPOXY COATED REINF. STEEL LBS. 4,522
REINF. STEEL LBS. 5,965
✳ DENOTES EPOXY COATED REINF. STEEL
CLASS "AA" CONCRETE CU. YDS. 78.4

STAGE 1 APP. SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	37'-2"	1242
A2	52	#4	STR	37'-0"	1286
✳ B1	124	#5	STR	24'-1"	3115
B2	124	#6	STR	24'-7"	4579
✳ B3	4	#5	STR	6'-6"	28
B4	4	#6	STR	6'-6"	40
✳ D1	25	#4	STR	4'-1"	69
D2	26	#4	STR	3'-5"	60
✳ J1	71	#4	1	1'-5"	68

✳ EPOXY COATED REINF. STEEL LBS. 4,522
REINF. STEEL LBS. 5,965
✳ DENOTES EPOXY COATED REINF. STEEL
CLASS "AA" CONCRETE CU. YDS. 78.4

STAGE 2 APP. SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	50	#4	STR	33'-10"	1131
A4	52	#4	STR	33'-8"	1170
✳ B5	113	#5	STR	24'-1"	2839
B6	113	#6	STR	24'-7"	4173
✳ B7	4	#5	STR	6'-6"	28
B8	4	#6	STR	6'-6"	40
✳ J1	64	#4	1	1'-5"	61

✳ EPOXY COATED REINF. STEEL LBS. 4,059
REINF. STEEL LBS. 5,383
✳ DENOTES EPOXY COATED REINF. STEEL
CLASS "AA" CONCRETE CU. YDS. 71.2

STAGE 2 APP. SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	50	#4	STR	33'-10"	1131
A4	52	#4	STR	33'-8"	1170
✳ B5	113	#5	STR	24'-1"	2839
B6	113	#6	STR	24'-7"	4173
✳ B7	4	#5	STR	6'-6"	28
B8	4	#6	STR	6'-6"	40
✳ J1	64	#4	1	1'-5"	61

✳ EPOXY COATED REINF. STEEL LBS. 4,059
REINF. STEEL LBS. 5,383
✳ DENOTES EPOXY COATED REINF. STEEL
CLASS "AA" CONCRETE CU. YDS. 71.2

✳✳ QUANTITIES FOR BARRIER RAIL OR END POST ARE NOT INCLUDED. SEE SHEET 3 OF 4.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT HE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

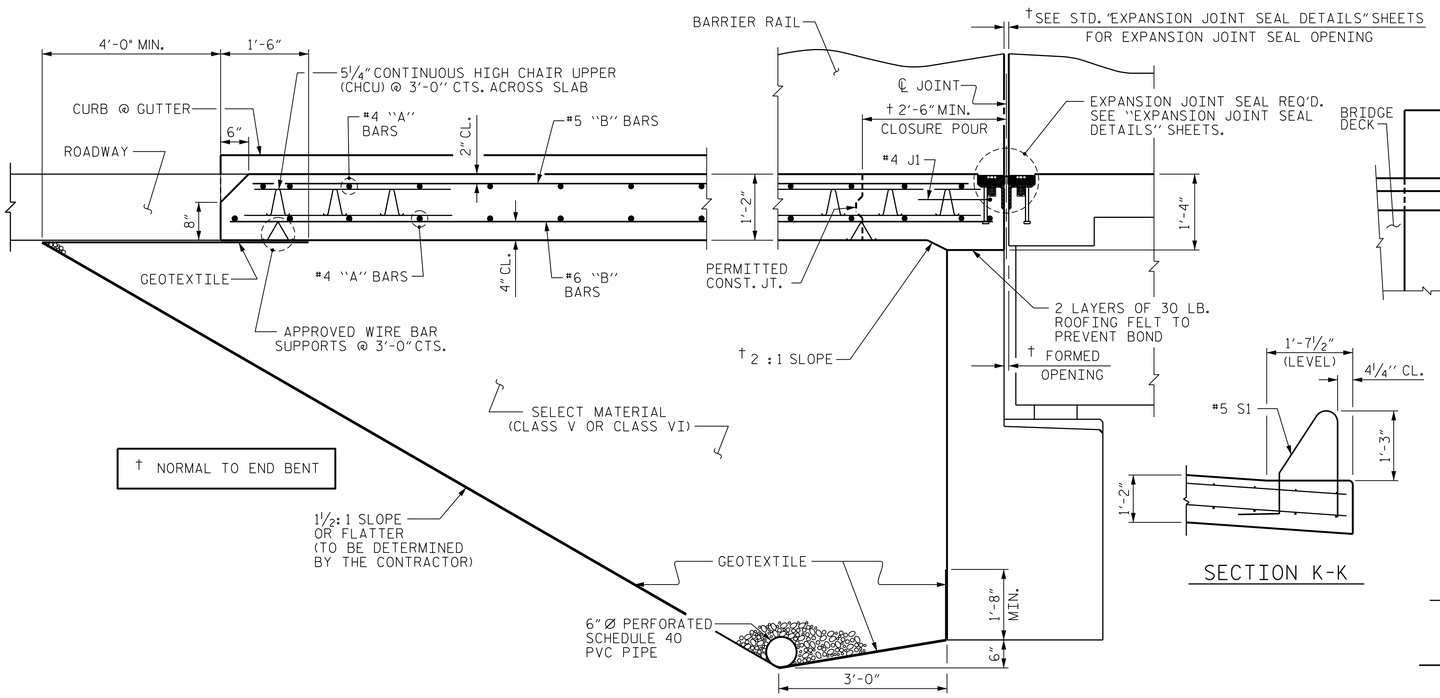
SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

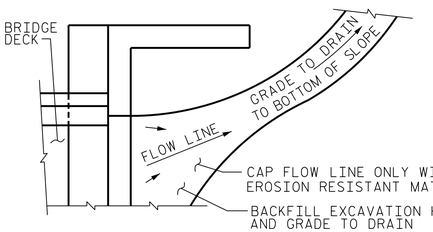
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



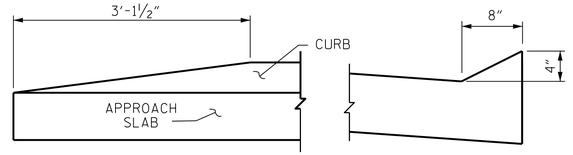
SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)

SECTION K-K



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



END OF CURB WITHOUT SHOULDER BERM GUTTER

SECTION N-N

CURB DETAILS

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

PROJECT NO. B-3186/B-5898
HAYWOOD COUNTY
STATION: 42+71.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

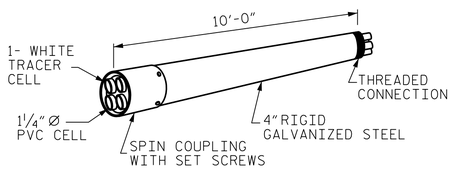
REVISIONS						SHEET NO. S01-58
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 59
1	--	--	3	--	--	
2	--	--	4	--	--	

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
1/25/2022

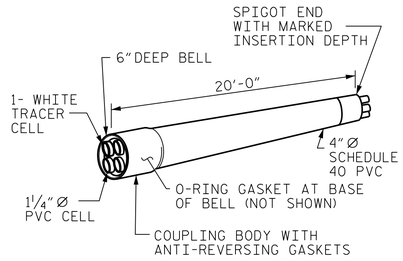
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

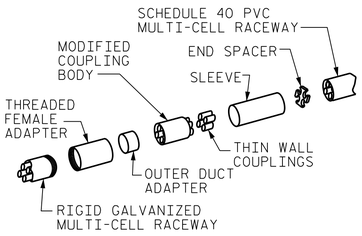
DES BY:	H. ABU NIMEH	DATE :	05/21
DES CHK:	L. GUALTIERI	DATE :	07/21
DWG BY:	B. PETERSON	DATE :	02/21
CHK BY:	L. GUALTIERI	DATE :	07/21



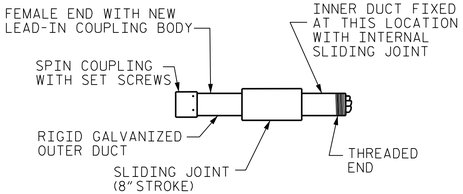
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



SCHEDULE 40 PVC
MULTI-CELL RACEWAY



TRANSITION ADAPTER



EXPANSION JOINT FITTING

DETAIL "D"

4" MULTI-CELL COMPONENTS

NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

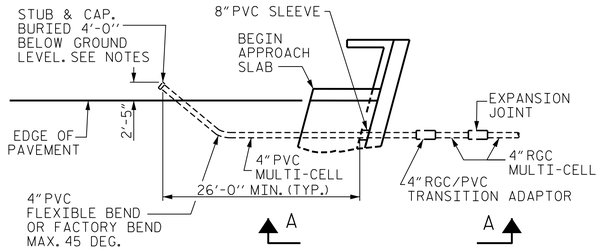
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

PROVIDE TRANSITION ADAPTOR (AND EXPANSION JOINT) FOR CONDUIT AT END BENT 1 AND END BENT 2.

INSTALL STABILIZER'S MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

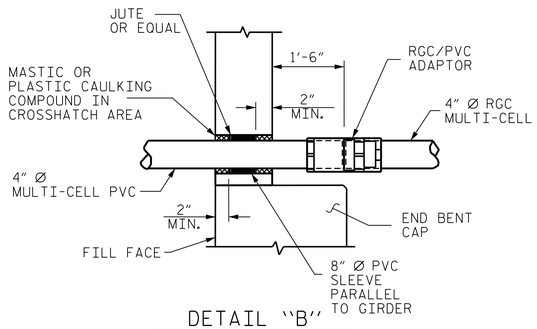
THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF ⅝" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



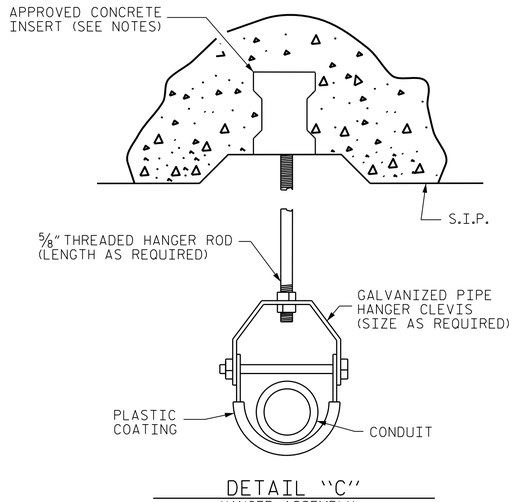
DETAIL "A"

TERMINATION OF CONDUIT AT WING WALL AT END BENT 1
(END BENT 2 SIMILAR)



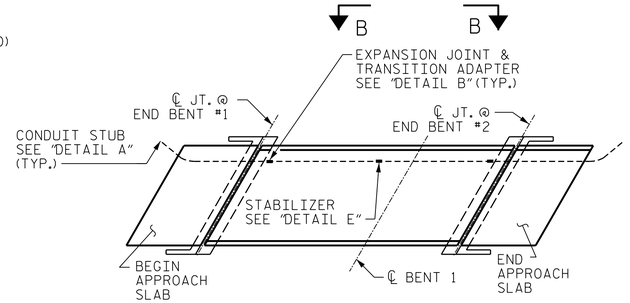
DETAIL "B"

PVC SLEEVE INSTALLATION & RGC/PVC
ADAPTOR AT BACKWALL.

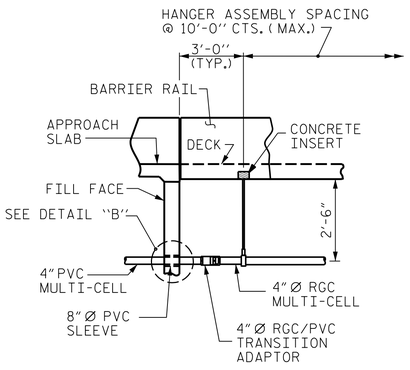


DETAIL "C"

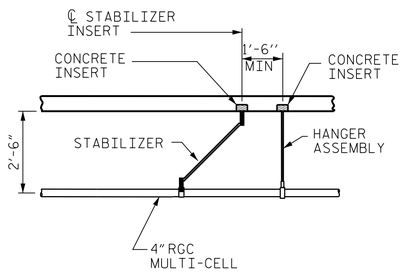
HANGER ASSEMBLY



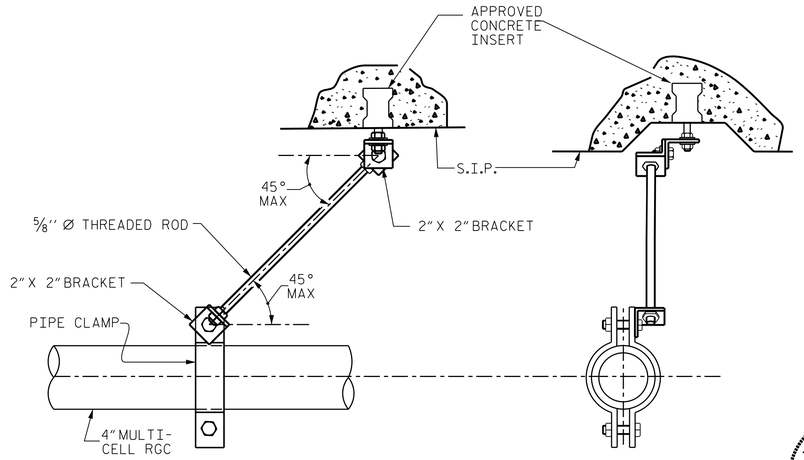
CONDUIT LAYOUT



VIEW A-A



VIEW B-B



DETAIL "E"

STABILIZER

PROJECT NO. B-3186/B-5898

HAYWOOD COUNTY

STATION: 42+71.13 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELECTRIC CONDUIT DETAILS

ELECTRICAL CONDUIT SYSTEM FOR SIGNALS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

S. Kent Dickens 1/25/2022

DES BY:	K. DICKENS	DATE :	10/21
DES CHK:	H. ABU NIMEH	DATE :	10/21
DWG BY:	D. CARTER	DATE :	10/21
CHK BY:	K. DICKENS	DATE :	10/21

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-59
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	59