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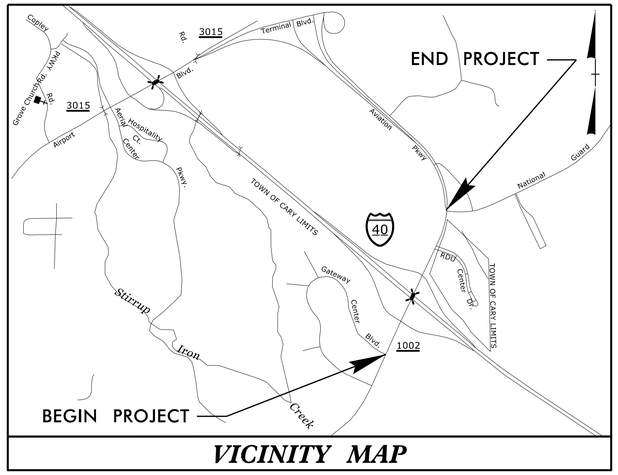
09/08/99

TIP PROJECT: I-5506

CONTRACT: C204069



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

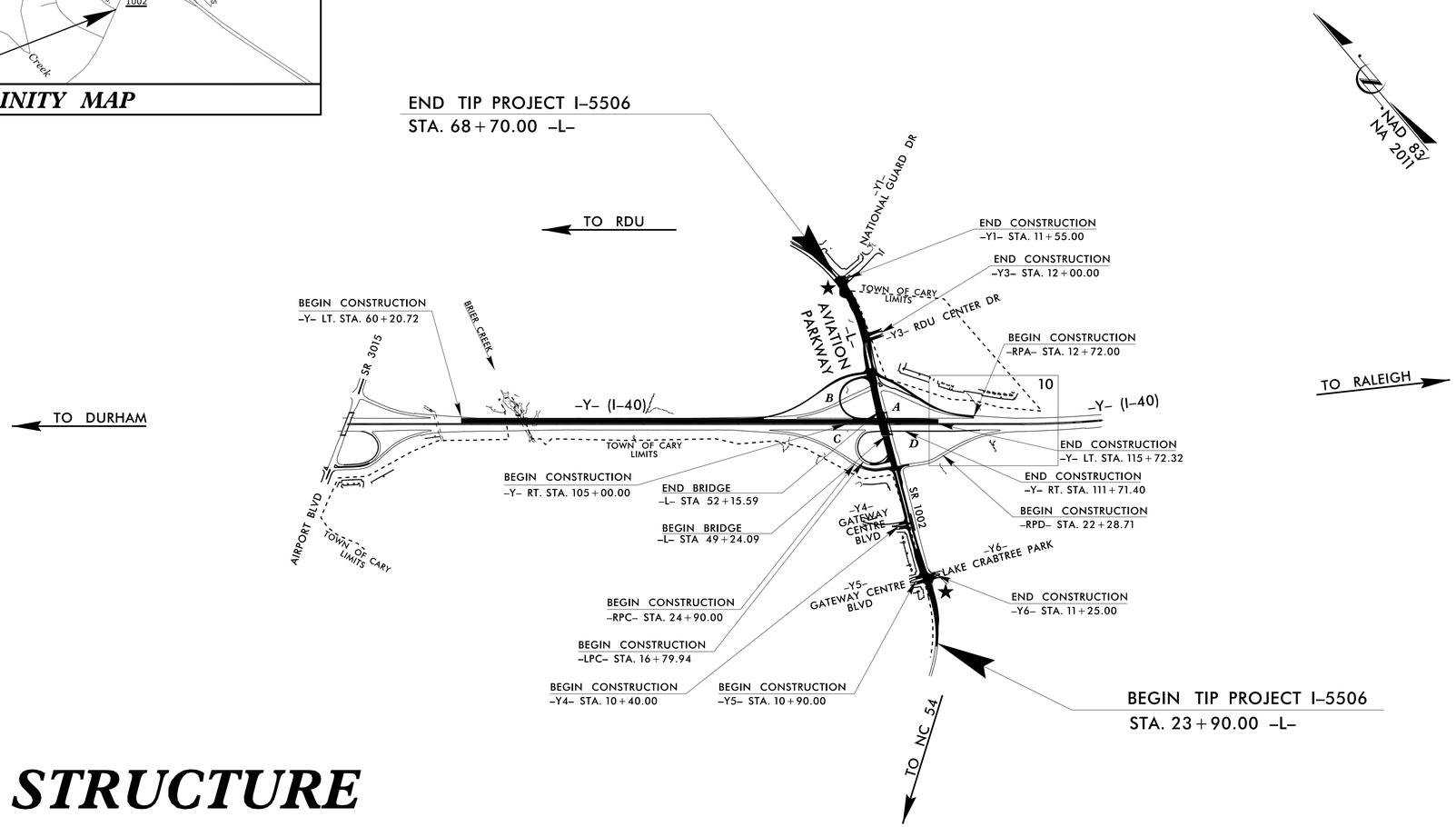
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5506		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
43608.1.1	NHPP-040-7(154)284	PE
43608.2.FS1	NHPP-040-7(154)284	ROW/UTIL.

LOCATION: I-40 AND SR 1002 (AVIATION PARKWAY) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS CULVERTS AND STRUCTURES



STRUCTURE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DESIGN DATA

ADT 2018 = 28,555
ADT 2040 = 37,600
K = 55 %
D = 10 %
T = 9 % *
V = 50 MPH
* TTST=2% DUAL=5%
FUNC CLASS=
"MINOR ARTERIAL"

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT I-5506	=	0.793 MILES
LENGTH STRUCTURE TIP PROJECT I-5506	=	0.055 MILES
TOTAL LENGTH OF TIP PROJECT I-5506	=	0.848 MILES

Prepared for the North Carolina Department of Transportation in the Office of:

WETHERILL ENGINEERING
1223 JONES FRANKLIN ROAD
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

2012 STANDARD SPECIFICATIONS

LETTING DATE:
FEBRUARY 20, 2018

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

G.M. GILLAND, PE
PROJECT DESIGN ENGINEER

8/4/2017
8:30:43 AM
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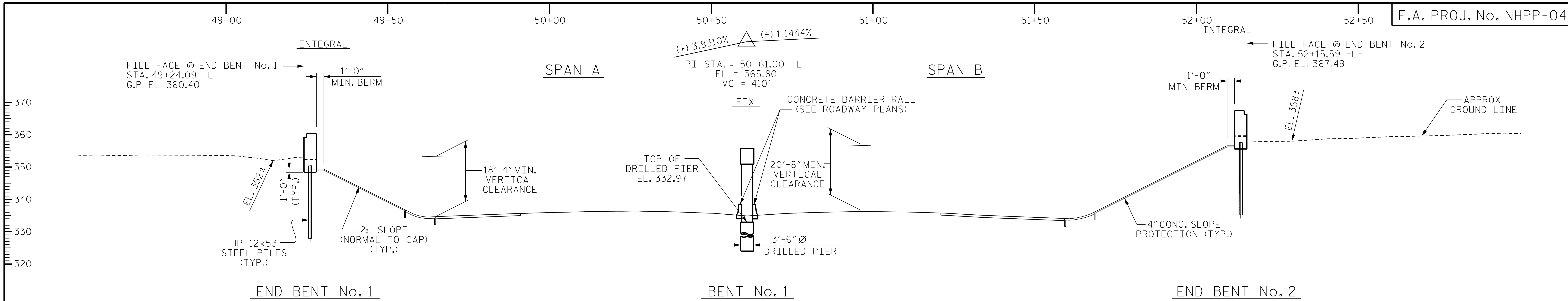
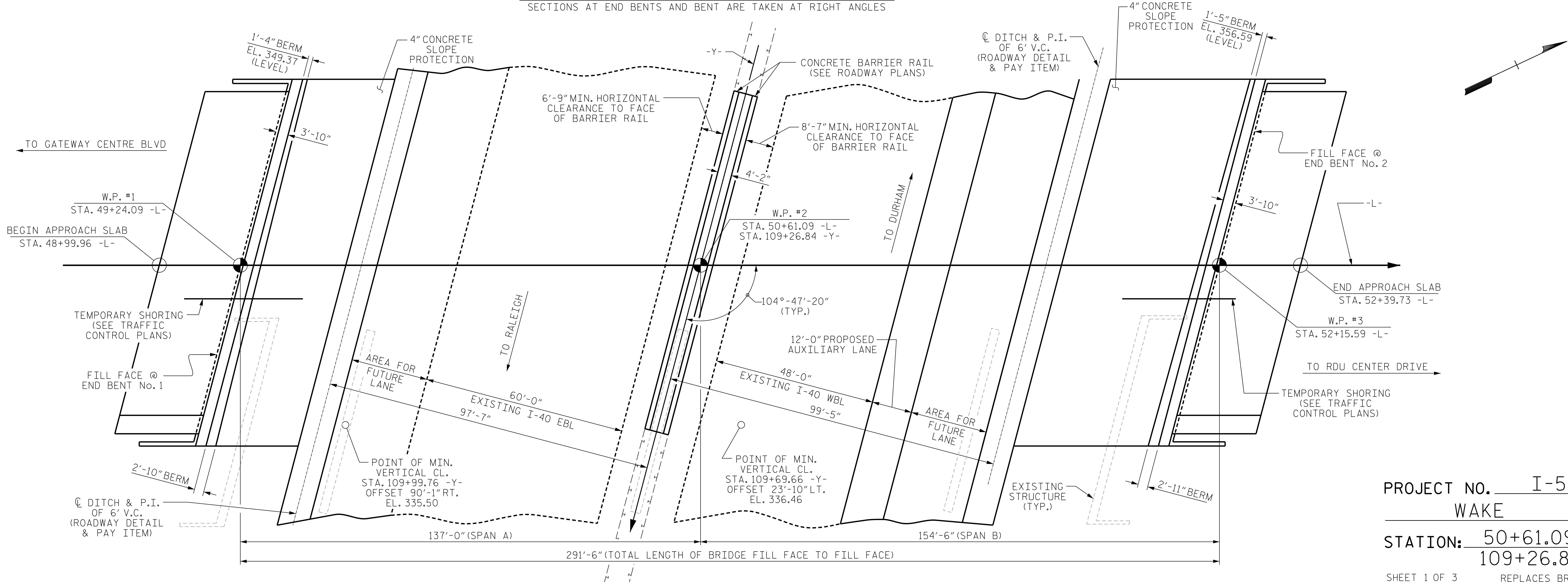
F.A. PROJ. No. NHPP-040-7(154)284



SECTION ALONG -L-

SECTIONS AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES



PLAN

PILES AND DRILLED PIERS NOT SHOWN FOR CLARITY

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-
109+26.84 -Y-

SHEET 1 OF 3 REPLACES BRIDGE No. 073

ENGINEER OF RECORD:

DocuSigned by: Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

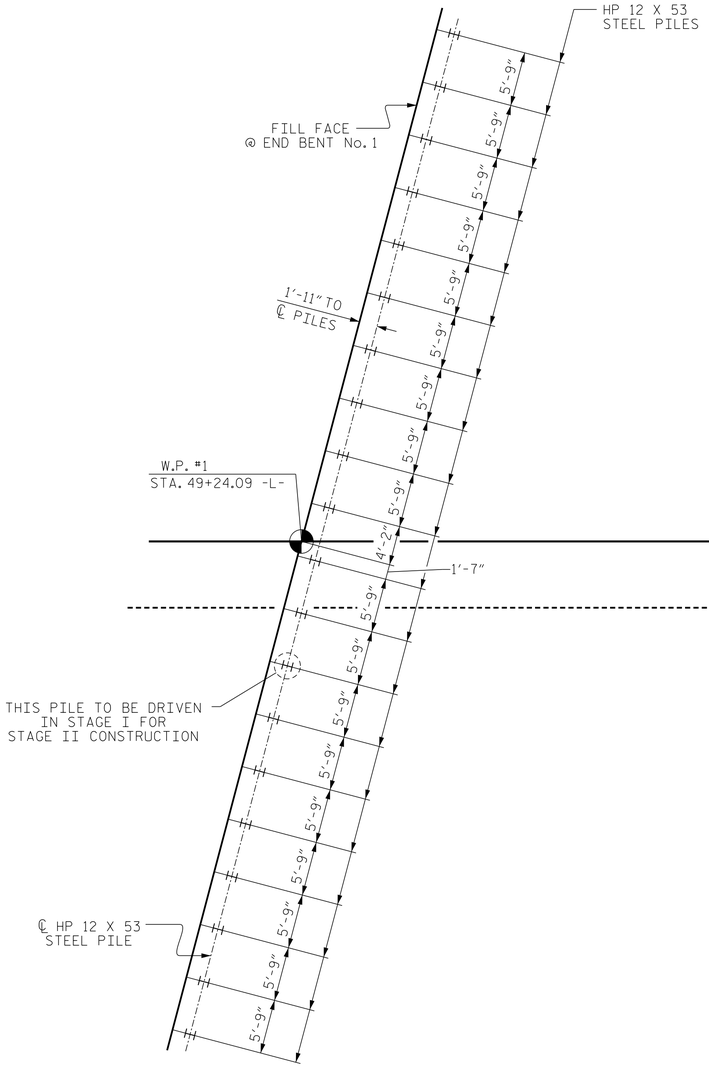
FOR BRIDGE ON AVIATION PARKWAY (SR 1002) OVER I-40 BETWEEN GATEWAY CENTRE BLVD AND RDU CENTER DRIVE

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

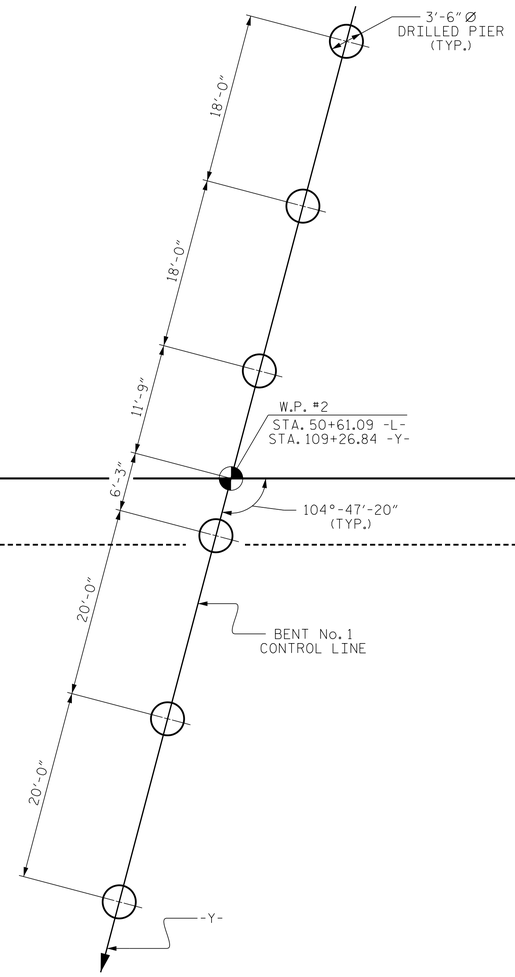
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 11/16

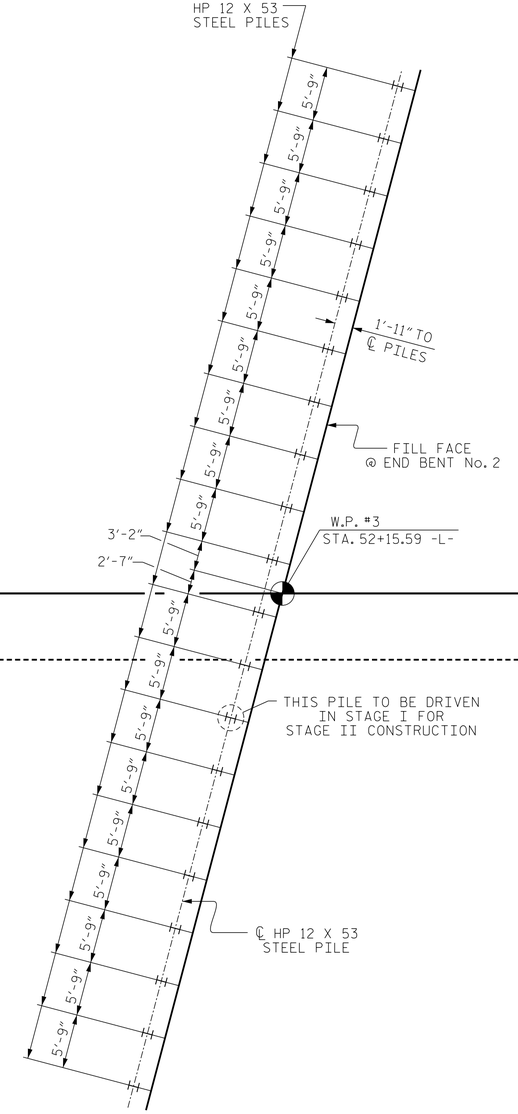
$FILE$ $DATE$ $TIME$



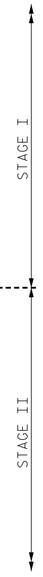
END BENT No. 1



BENT No. 1



END BENT No. 2



FOUNDATION LAYOUT

NOTES:

FOR PILES SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 1 AND END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT END BENT No. 1 AND END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

TESTING THE PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN PILES ARE REQUIRED FOR INTEGRAL END BENT No. 1 AND END BENT No. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 338.4 AT END BENT No. 1 AND 345.6 AT END BENT No. 2. DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE. FILL THE BOTTOM 3 FT. OF HOLES FOR PILE EXCAVATION WITH CONCRETE OR GROUT AND THE REST OF HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1005 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 235 TSF.

INSTALL DRILLED PIERS AT BENT No. 1 TO A TIP ELEVATION NO HIGHER THAN 315.5 WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 7.5 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIER EXCAVATIONS AT BENT No. 1 WILL EXTEND INTO MATERIAL THAT DETERIORATES WHEN EXPOSED TO THE ELEMENTS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER EXCAVATION IS COMPLETED.

DRAWN BY : D. HODGE DATE : 10/16
CHECKED BY : B.C. HUNT DATE : 12/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
12/19/2017

WETHERILL ENGINEERING
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON AVIATION PARKWAY (SR 1002) OVER I-40 BETWEEN GATEWAY CENTRE BLVD AND RDU CENTER DRIVE

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

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 2 OF 3

P:\2016\16132.02 I-5506 Bridge Design\DGN\I-5506_FL_WEI.dgn
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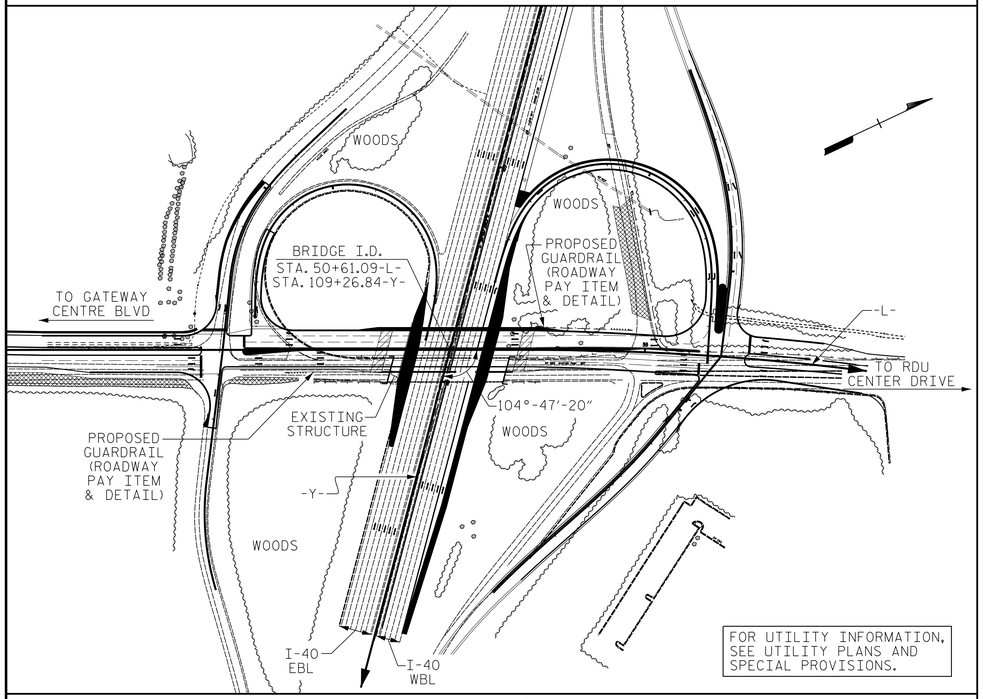
BM.#3 - NAIL WITH TAG IN 15" PINE, 63' RT OF STA. 71+12.38 -L-, ELEV. 384.31



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS 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.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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 OR APPROVED BY THE ENGINEER.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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".

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 65 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.

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.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 4 SPANS (1 @ 45', 2 @ 93' AND 1 @ 31') WITH A REINFORCED CONCRETE DECK ON 7 LINES OR STEEL PLATE GIRDERS AND A CLEAR ROADWAY WIDTH OF 54' ON REINFORCED CONCRETE POST AND BEAM BENTS ON SPREAD FOOTINGS AND REINFORCED CONCRETE END BENTS ON SPREAD FOOTINGS AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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 FT. BELOW THE GROUND LINE.

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

FOR UNCLASSIFIED STRUCTURE EXCAVATION, SEE ROADWAY PLANS.

THE CONTRACTOR SHALL SUBMIT A GIRDER ERECTION SEQUENCE TO THE ENGINEER FOR REVIEW AND APPROVAL.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PDA TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	APPROX 1,197,800 LBS. STRUCTURAL STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 x 53 STEEL PILES		TWO BAR METAL RAIL	1'-2" x 3'-3" CONCRETE PARAPET	4" SLOPE PROTECTION	DISC BEARINGS	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LUMP SUM	EA.	No.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	LUMP SUM							30,049	33,031		LUMP SUM			LUMP SUM				563.94	579.55		LUMP SUM	LUMP SUM	
END BENT 1		80.0	120.0							99.0		13,364			20	20	240			410			
BENT 1				29.82	75.00		1			123.4		28,625	4,610										
END BENT 2		160.0	40.0							94.9		13,212			20	20	290			625			
TOTAL	LUMP SUM	240.0	160.0	29.82	75.00	1	1	30,049	33,031	317.3	LUMP SUM	55,201	4,610	LUMP SUM	40	40	530	563.94	579.55	1035	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 3

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Galland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND
12/19/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON AVIATION PARKWAY (SR 1002) OVER I-40 BETWEEN GATEWAY CENTRE BLVD AND RDU CENTER DRIVE

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

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 12/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE II LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.17	--	1.75	0.887	1.17	B	E	135.02	1.103	1.17	B	I	287.54	1.30	0.887	1.19	B	E	226.53	
		HL-93 (OPERATING)	N/A		1.52	--	1.35	0.887	1.52	B	E	135.02	1.103	1.52	B	I	287.54	1.00	0.887	1.55	B	E	226.53	
		HS-20 (INVENTORY)	36.00	⟨2⟩	1.72	61.92	1.75	0.887	1.87	B	E	226.53	1.103	1.72	B	I	287.54	1.30	0.887	1.81	B	E	226.53	
		HS-20 (OPERATING)	36.00		2.23	80.28	1.35	0.887	2.43	B	E	226.53	1.103	2.23	B	I	287.54	1.00	0.887	2.35	B	E	226.53	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.42	59.67	1.40	0.887	5.72	B	E	226.53	1.103	5.40	B	I	287.54	1.30	0.887	4.42	B	E	226.53	
		SNGARBS2	20.000		3.14	62.80	1.40	0.887	4.06	B	E	226.53	1.103	3.75	B	I	287.54	1.30	0.887	3.14	B	E	226.53	
		SNAGRIS2	22.000		2.19	64.02	1.40	0.887	3.77	B	E	226.53	1.103	3.45	B	I	287.54	1.30	0.887	2.91	B	E	226.53	
		SNCOTTS3	27.250		2.20	59.95	1.40	0.887	2.85	B	E	226.53	1.103	2.69	B	I	287.54	1.30	0.887	2.20	B	E	226.53	
		SNAGGRS4	34.925		1.78	62.17	1.40	0.887	2.30	B	E	226.53	1.103	2.06	B	I	287.54	1.30	0.887	1.78	B	E	226.53	
		SNS5A	35.550		1.75	62.21	1.40	0.887	2.27	B	E	226.53	1.103	2.06	B	I	287.54	1.30	0.887	1.75	B	E	226.53	
		SNS6A	39.950		1.58	63.12	1.40	0.887	2.04	B	E	226.53	1.103	1.86	B	I	287.54	1.30	0.887	1.58	B	E	226.53	
		SNS7B	42.000		1.51	63.42	1.40	0.887	1.95	B	E	226.53	1.103	1.80	B	I	287.54	1.30	0.887	1.51	B	E	226.53	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.93	63.69	1.40	0.887	2.5	B	E	226.53	1.103	2.35	B	I	287.54	1.30	0.887	1.93	B	E	226.53	
		TNT4A	33.075		1.92	63.50	1.40	0.887	2.48	B	E	226.53	1.103	2.20	B	I	287.54	1.30	0.887	1.92	B	E	226.53	
		TNT6A	41.600		1.55	64.48	1.40	0.887	2.01	B	E	226.53	1.103	1.87	B	I	287.54	1.30	0.887	1.55	B	E	226.53	
		TNT7A	42.000		1.55	65.10	1.40	0.887	2.01	B	E	226.53	1.103	1.84	B	I	287.54	1.30	0.887	1.55	B	E	226.53	
		TNT7B	42.000		1.56	65.52	1.40	0.887	2.02	B	E	226.53	1.103	1.77	B	I	287.54	1.30	0.887	1.56	B	E	226.53	
		TNAGRIT4	43.000		1.52	65.36	1.40	0.887	1.96	B	E	226.53	1.103	1.73	B	I	287.54	1.30	0.887	1.52	B	E	226.53	
		TNAGT5A	45.000		1.44	64.80	1.40	0.887	1.87	B	E	226.53	1.103	1.68	B	I	287.54	1.30	0.887	1.44	B	E	226.53	
		TNAGT5B	45.000	⟨3⟩	1.43	64.35	1.40	0.887	1.85	B	E	226.53	1.103	1.64	B	I	287.54	1.30	0.887	1.43	B	E	226.53	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																					

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93) ✱✱

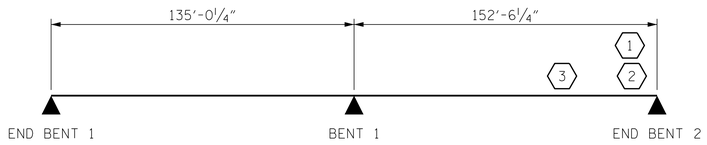
⟨2⟩ DESIGN LOAD RATING (HS-20) ✱✱

⟨3⟩ LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER



LRFR SUMMARY

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

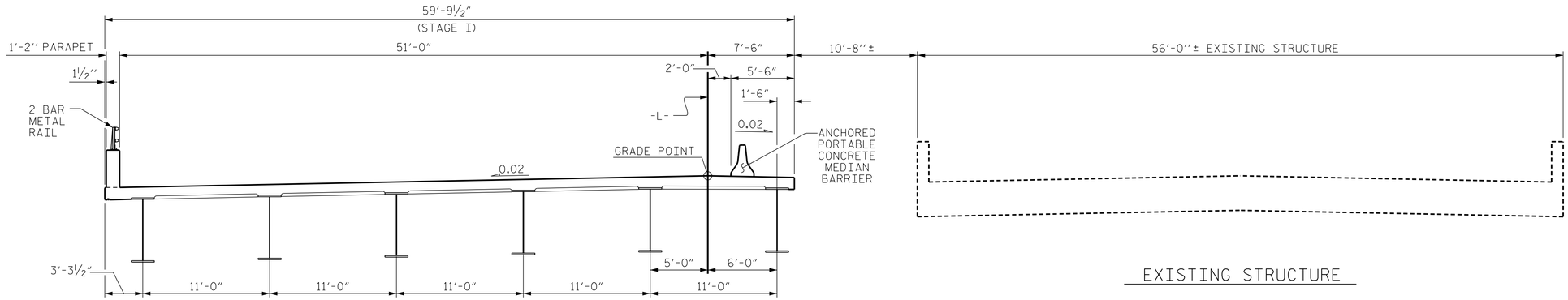
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

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

STD. NO. LRFR3

$TIME$
$FILE$
$DATE$

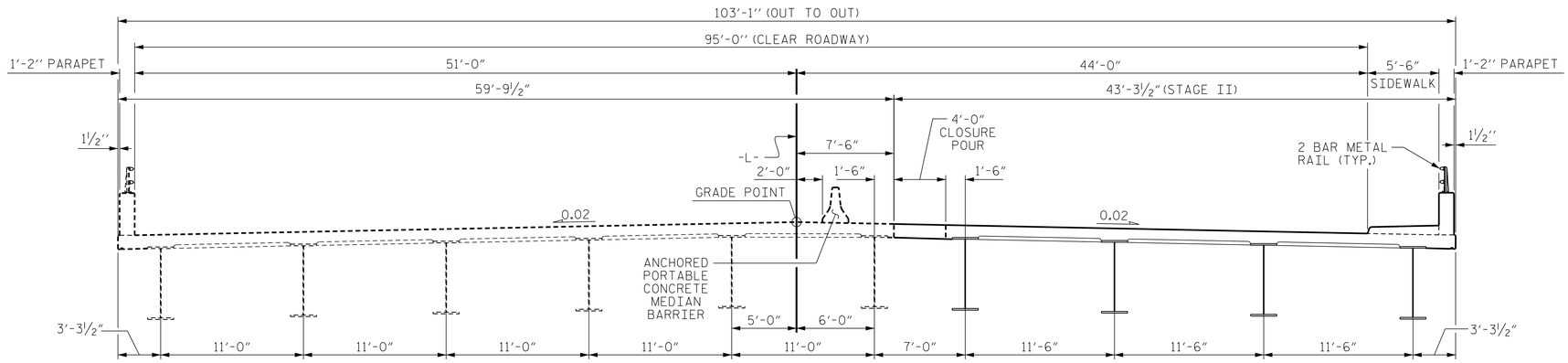
ASSEMBLED BY : D. HODGE DATE : 4/17
CHECKED BY : G.M. GILLAND DATE : 4/17
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM



PROPOSED STAGE I

EXISTING STRUCTURE

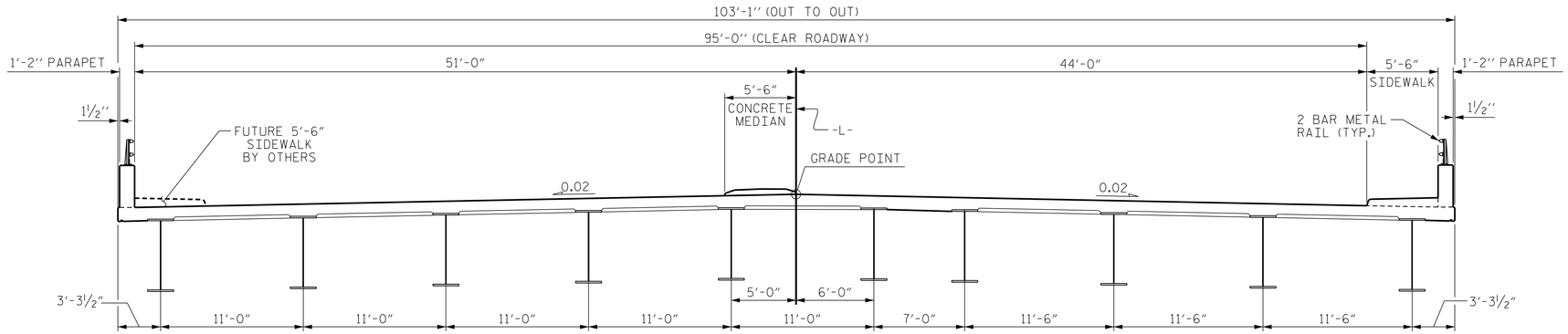
STAGE I



EXISTING STAGE I

PROPOSED STAGE II

STAGE II



FINAL TYPICAL SECTION

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-5
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

$TIME$
$FILE$
$DATE$

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TYPICAL SECTION - STAGE I

(SHOWING INTERMEDIATE AND BENT DIAPHRAGMS)

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.

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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

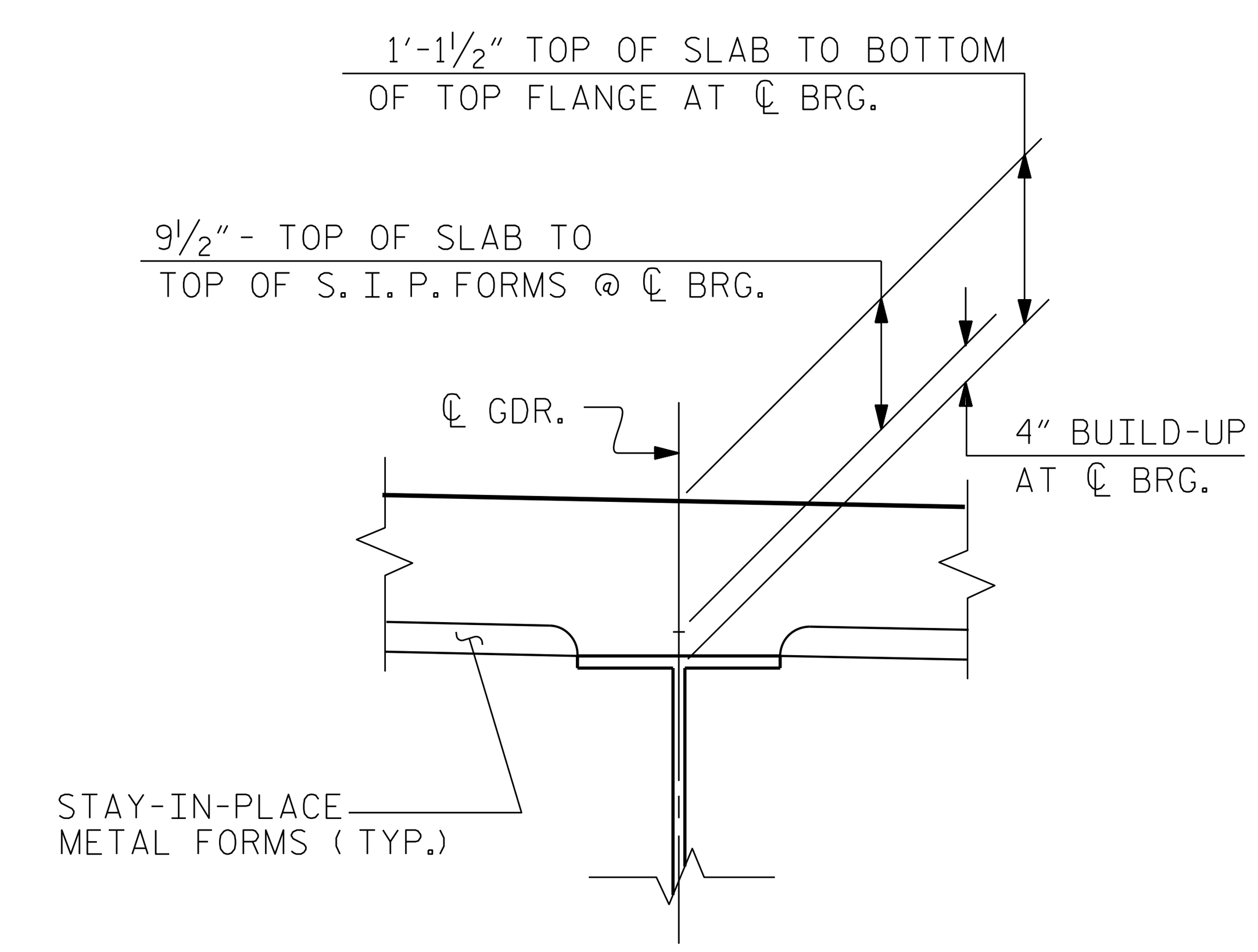
FOR EACH STAGE, PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

FOR EACH STAGE, THE CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

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



DETAIL "A"

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 4

ENGINEER OF RECORD:

SEAL 37400 — NORTH CAROLINA PROFESSIONAL ENGINEER — GREGORY M. GILLAND — 7/31/2017

WETHERILL ENGINEERING

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE I

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

SHEET NO. S01-6

TOTAL SHEETS 46

DRAWN BY : D. HODGE DATE : 6/16
CHECKED BY : B.C. HUNT DATE : 9/16

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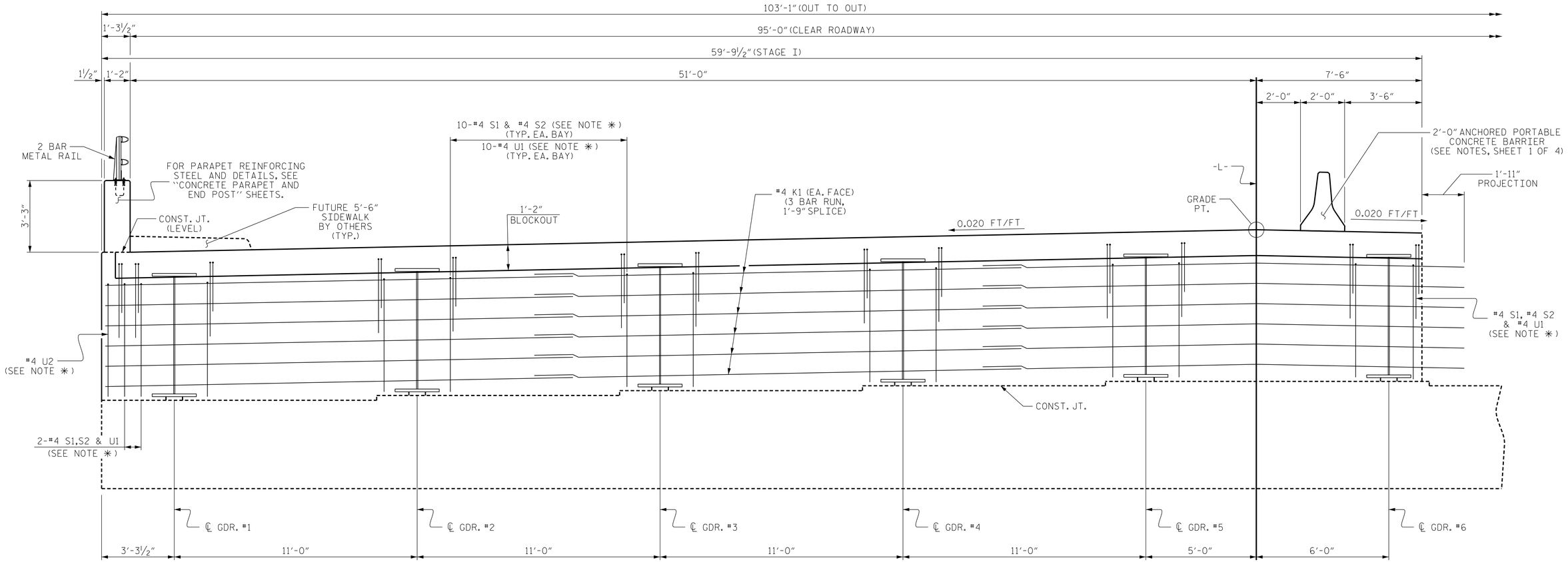
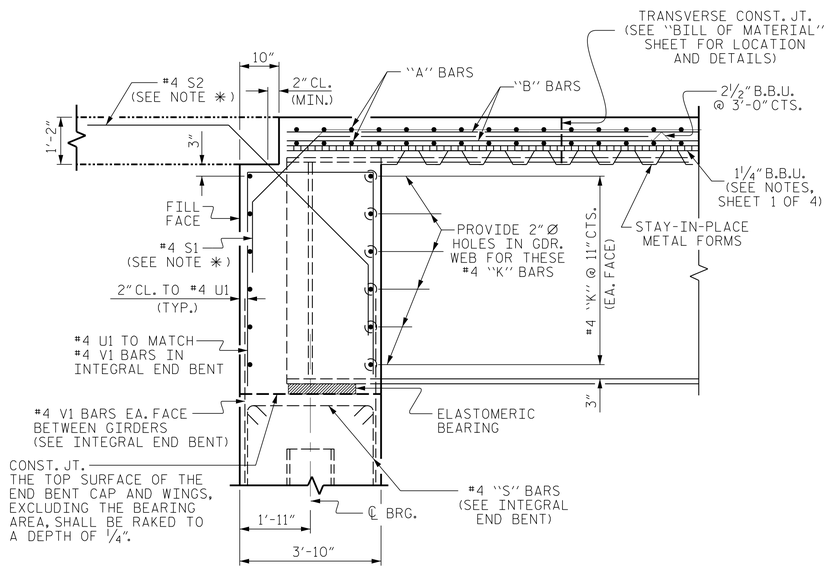


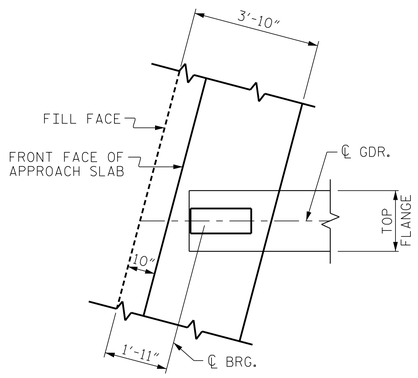
TYPICAL SECTION @ INTEGRAL END BENT - STAGE I

(DECK REINFORCEMENT NOT SHOWN FOR CLARITY)



END OF GIRDER DETAIL AT INTEGRAL END BENT

NOTE ✳
THESE BARS ARE TO MATCH #4 "V" BARS IN END BENT



PLAN OF GIRDER AT INTEGRAL END BENT

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-
SHEET 2 OF 4

ENGINEER OF RECORD:
Docusigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-7
1			3			TOTAL SHEETS
2			4			46

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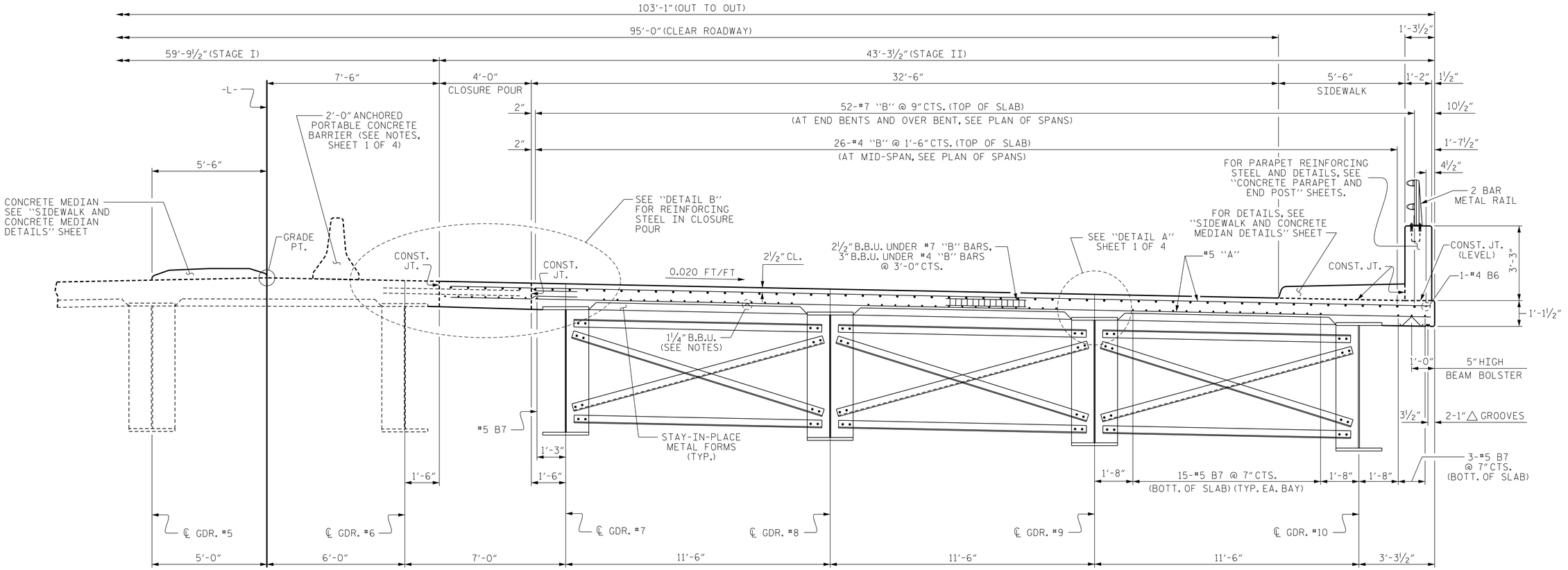
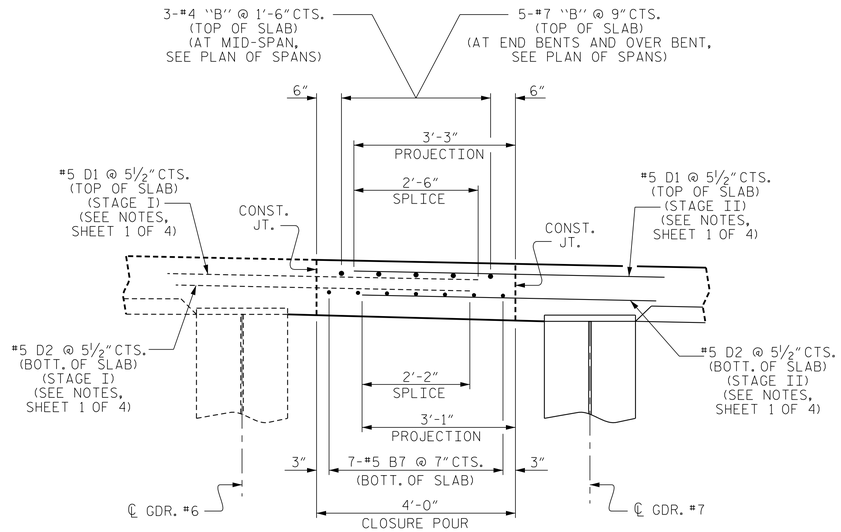
DRAWN BY : D. HODGE DATE : 6/16
CHECKED BY : B.C. HUNT DATE : 9/16

$TIME$
$FILE$
$DATE$



TYPICAL SECTION - STAGE II

(SHOWING INTERMEDIATE AND BENT DIAPHRAGMS)



DETAIL ″B″

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 4

ENGINEER OF RECORD:

Docusigned by: Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND

7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-8
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 6/16
CHECKED BY : B.C. HUNT DATE : 9/16

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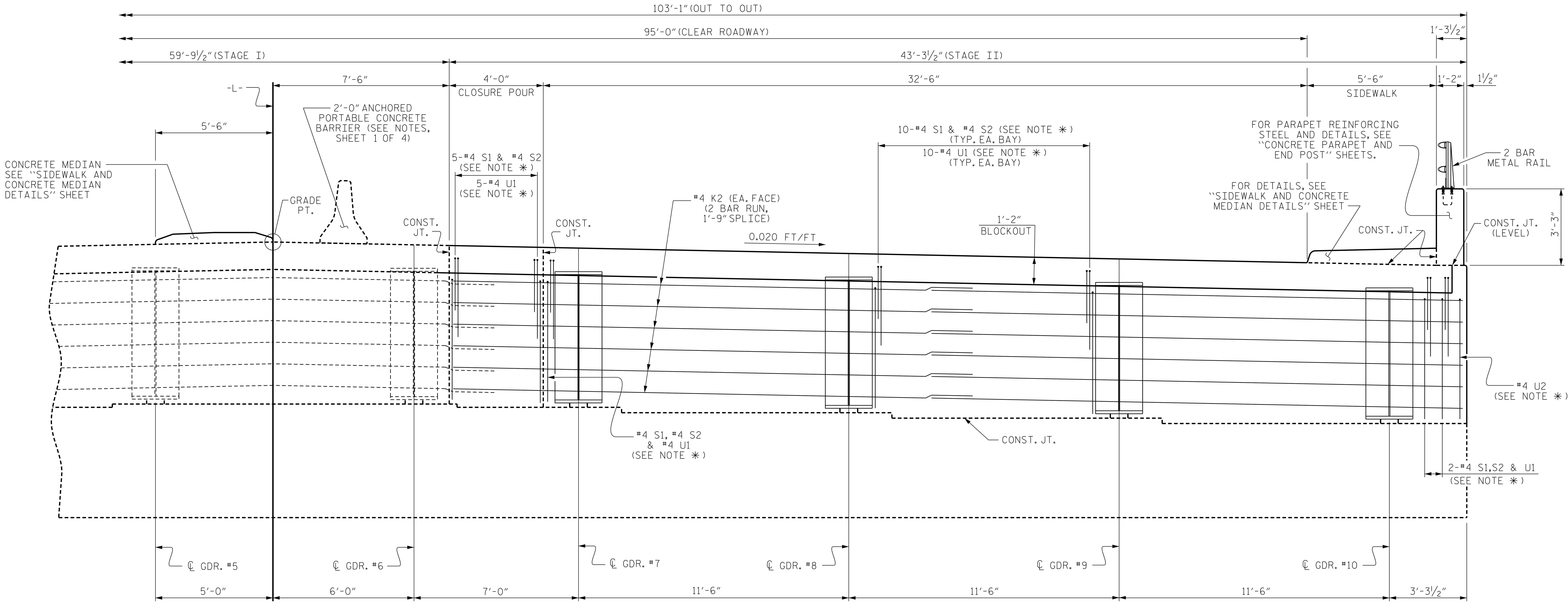
$FILE$
$DATE$
$TIME$



TYPICAL SECTION @ INTEGRAL END BENT - STAGE II

(DECK REINFORCEMENT NOT SHOWN FOR CLARITY)

(FOR END OF GIRDER DETAIL AT INTEGRAL END BENT, SEE SHEET 2 OF 4)

NOTE ✳
THESE BARS ARE TO MATCH #4 "V" BARS IN END BENT

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 4 OF 4

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-9
1			3			TOTAL SHEETS
2			4			46

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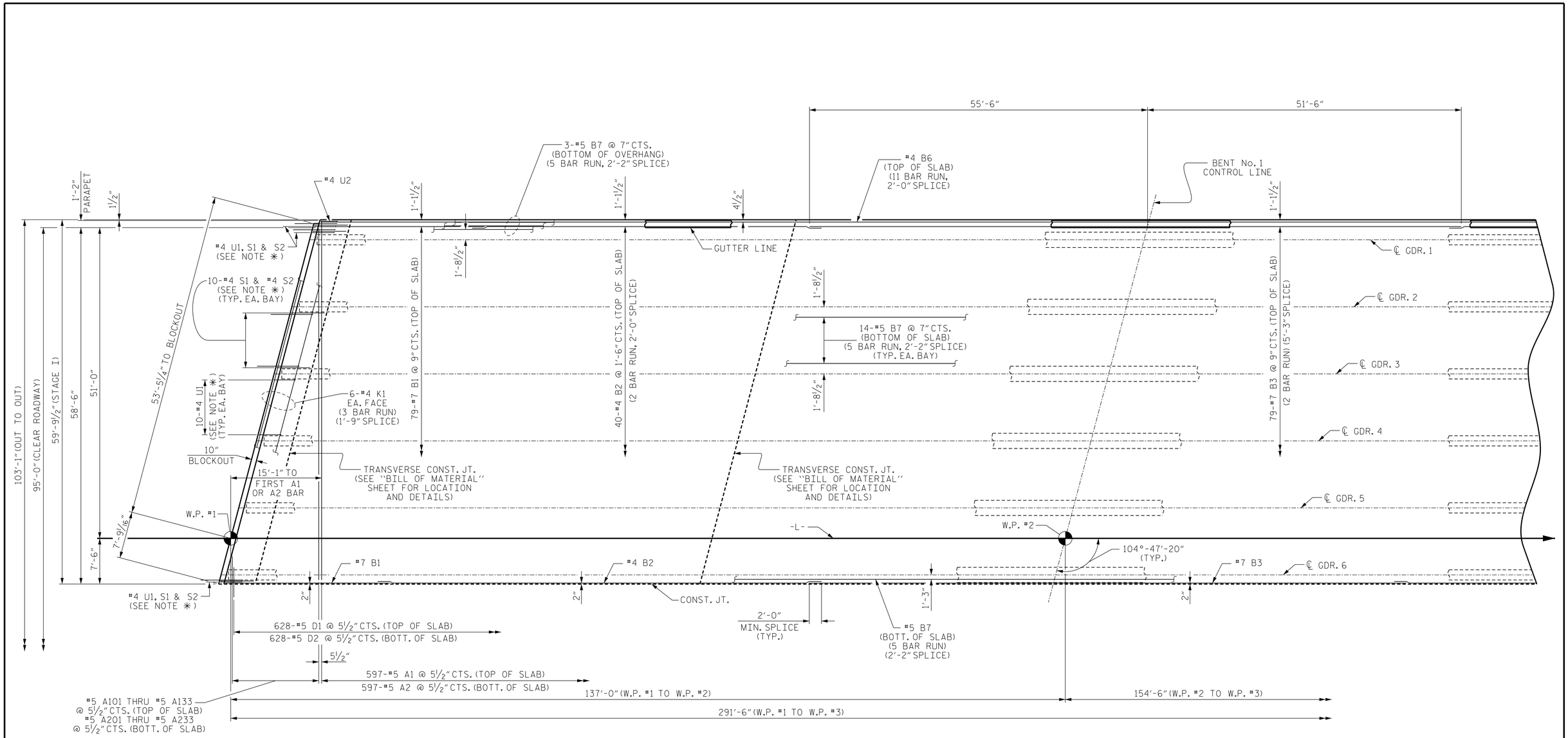

PLAN OF SPAN A - STAGE I

✳ THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 4

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN A
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-10
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 7/16
CHECKED BY : B.C. HUNT DATE : 9/16

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$TIME$
$FILE$
$DATE$

PLAN OF SPAN B - STAGE I

✱ THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 2 OF 4

ENGINEER OF RECORD: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 37400 GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN B
STAGE I

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

SHEET NO. S01-11
TOTAL SHEETS 46

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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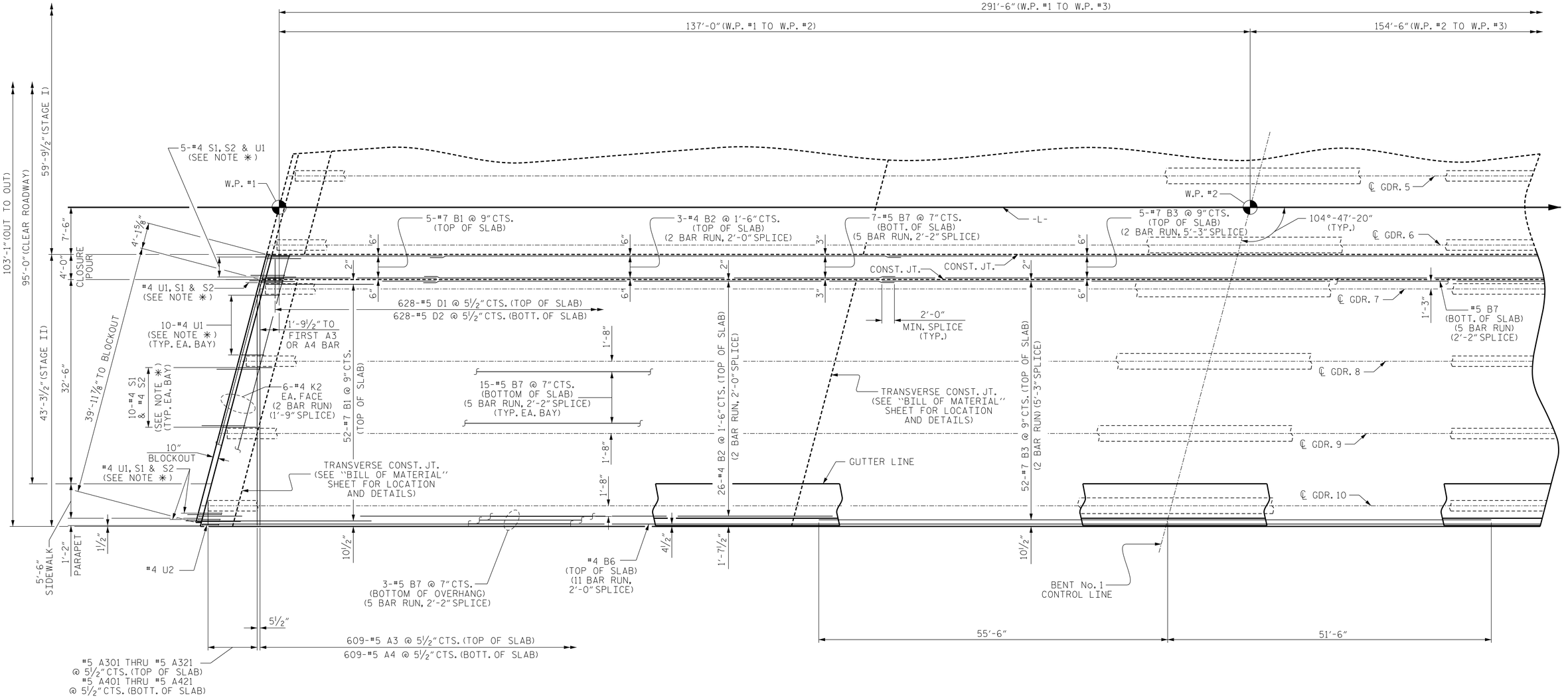
$FILE$ $DATE$ $TIME$



PLAN OF SPAN A - STAGE II

✳ THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 4

ENGINEER OF RECORD:
Docusigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN A
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-12
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 7/16
CHECKED BY : B.C. HUNT DATE : 9/16

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$FILE$ $DATE$ $TIME$

PLAN OF SPAN B - STAGE II

✱ THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 4 OF 4

ENGINEER OF RECORD:

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN B
STAGE II

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

SHEET NO. S01-13
TOTAL SHEETS 46

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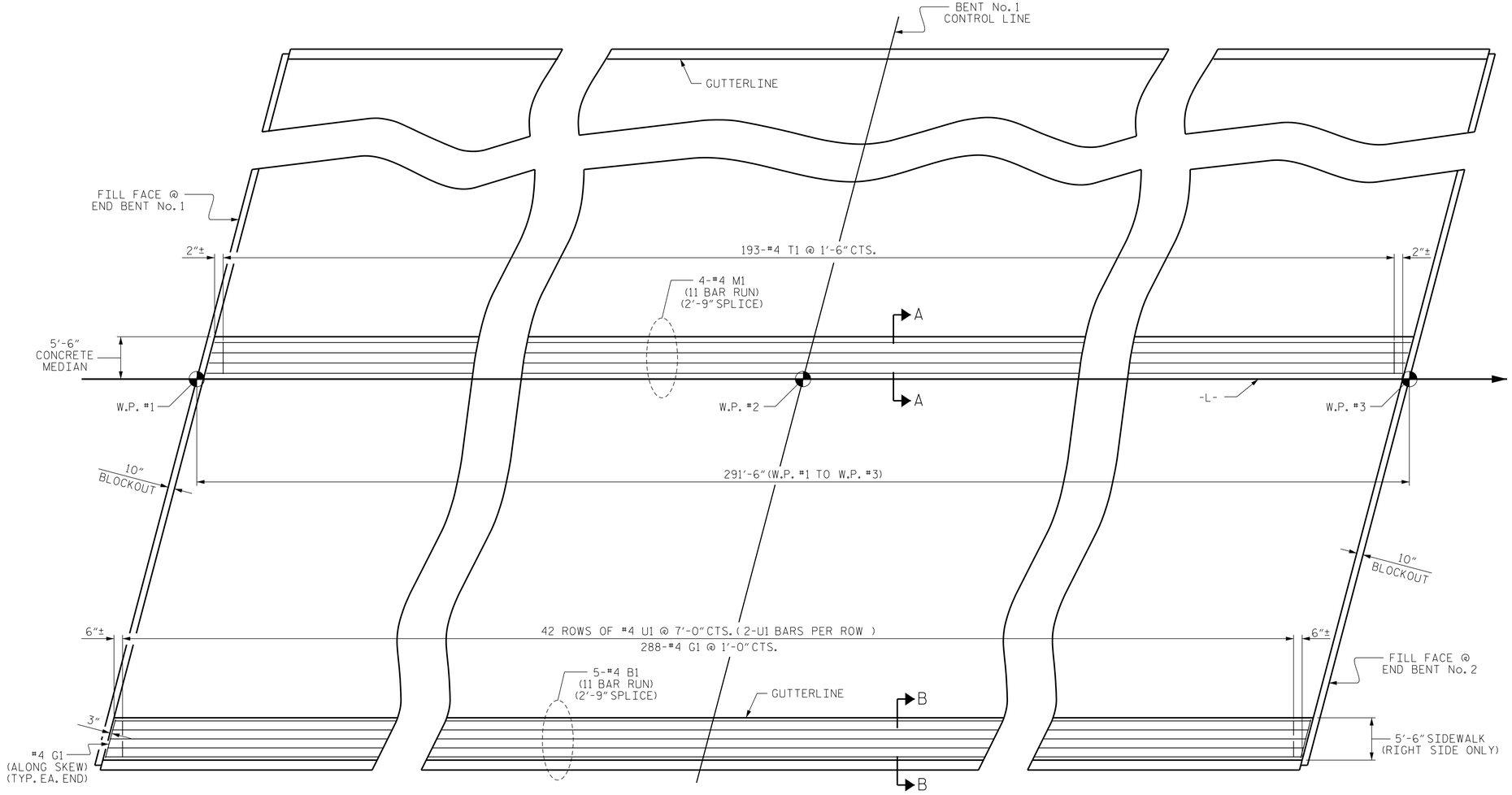
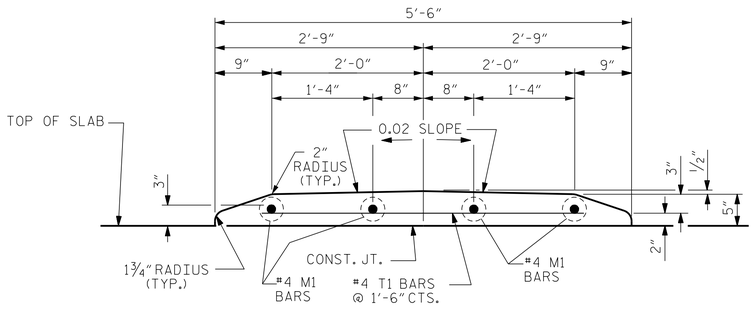
DRAWN BY : D. HODGE DATE : 7/16
CHECKED BY : B.C. HUNT DATE : 9/16

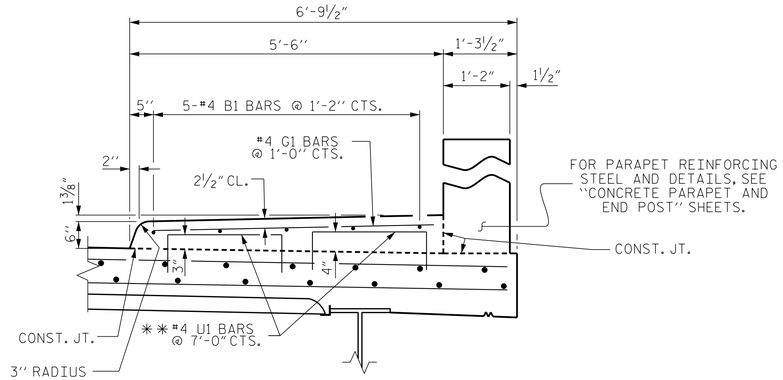
$TIME$ $FILE$ $DATE$



PLAN OF CONCRETE MEDIAN AND SIDEWALK



SECTION A-A



SECTION B-B

** #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF IF NOT SLIP FORMING PARAPET, IF PARAPET IS TO BE SLIP FORMED, #4 U1 BARS SHALL BE DRILLED AND GROUTED.

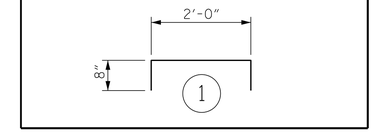
BILL OF MATERIAL FOR CONCRETE MEDIAN

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* M1	44	#4	STR	28'-10"	847
* T1	193	#4	STR	4'-2"	537
* EPOXY COATED REINFORCING STEEL					1,384 LBS.
CLASS "AA" CONCRETE					23.4 C.Y.

BILL OF MATERIAL FOR SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	55	#4	STR	28'-10"	1059
* G1	290	#4	STR	5'-0"	969
* U1	84	#4	1	3'-4"	187
* EPOXY COATED REINFORCING STEEL					2,215 LBS.
CLASS "AA" CONCRETE					35.5 C.Y.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES:

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK AND CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE SIDEWALK OR CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR REINFORCED CONCRETE DECK SLAB.

ALL STEEL IN THE SIDEWALK AND CONCRETE MEDIAN SHALL BE EPOXY COATED.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:
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7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK AND CONCRETE MEDIAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-14
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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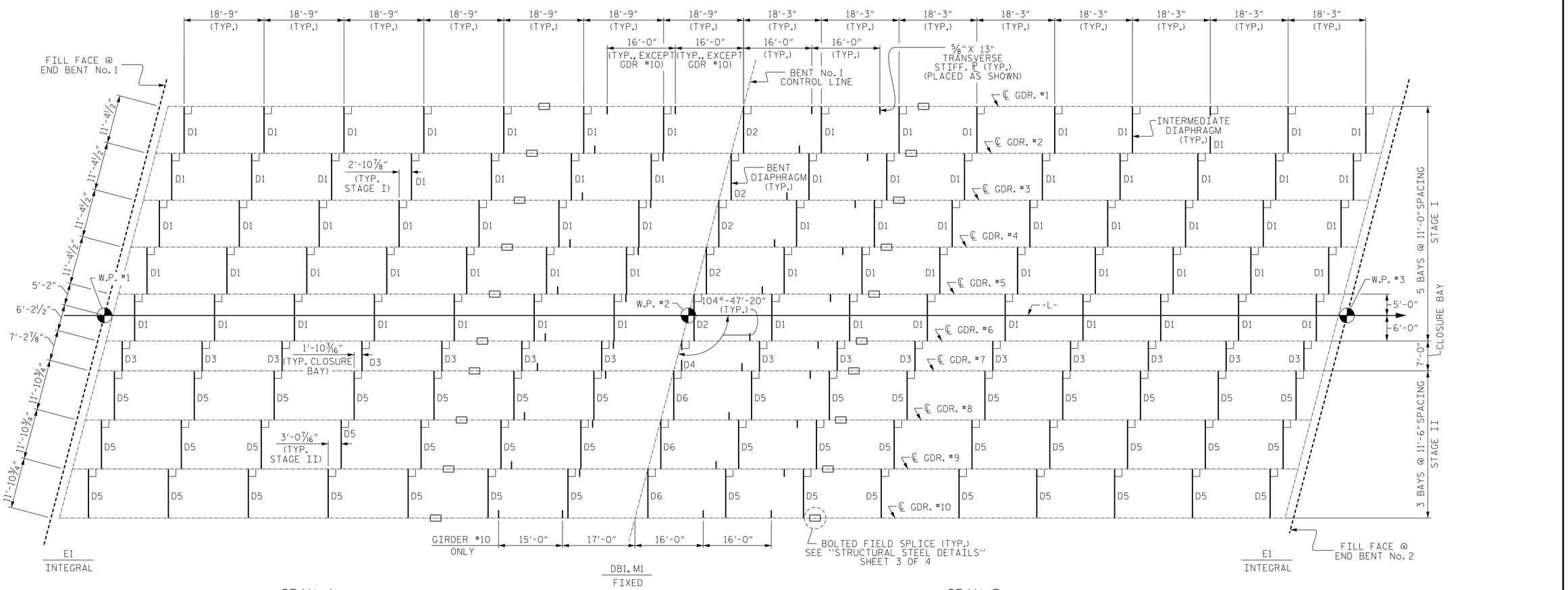

FRAMING PLAN

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:

DocuSigned by: Gregory M. Galland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND

7/31/2017

WETHERILL ENGINEERING

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-15
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16

CHECKED BY : B.C. HUNT DATE : 10/16

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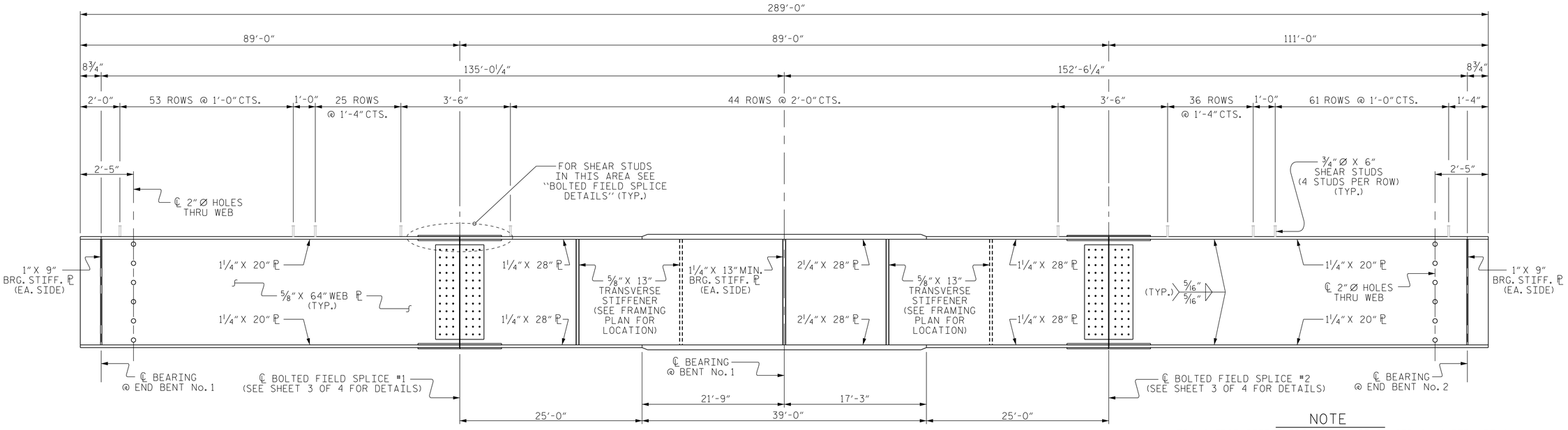
$DATE$

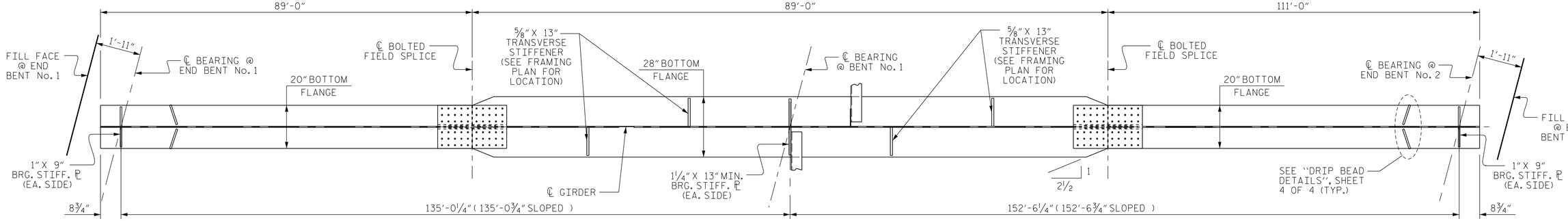


ELEVATION OF GIRDER

(FOR CLARITY, INTERMEDIATE CONNECTOR ℙ's NOT SHOWN, FOR PLACEMENT, SEE "FRAMING PLAN" SHEET.)

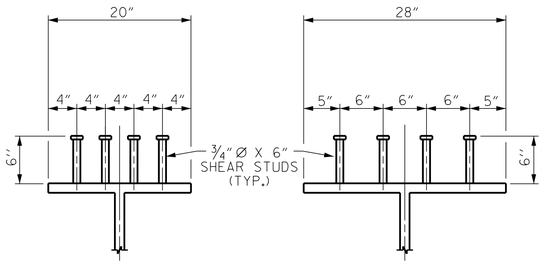
NOTE

TRANSVERSE STIFFENERS ARE TO BE PLACED ON ALTERNATING SIDES OF INTERIOR GIRDERS AND ARE TO BE PLACED ONLY ON INSIDE OF EXTERIOR GIRDERS. (SEE FRAMING PLAN FOR LOCATION)



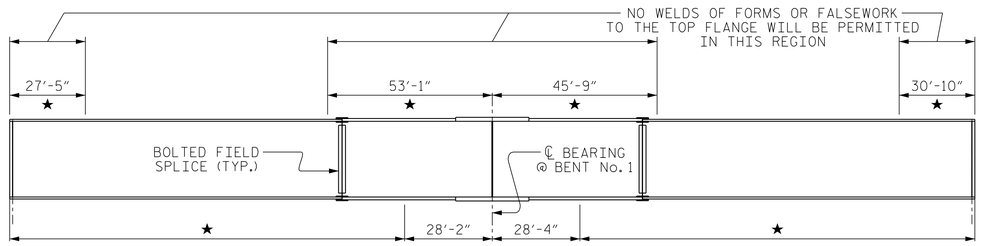
BOTTOM FLANGE DETAIL

(FOR CLARITY, INTERMEDIATE CONNECTOR ℙ's NOT SHOWN, FOR PLACEMENT, SEE "FRAMING PLAN" SHEET.)



SHEAR STUD DETAILS

(TYP. EA. GIRDER)



CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

★ CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS. CHARPY V-NOTCH TEST ARE REQUIRED FOR ALL WEB PLATES AND ALL SPLICE PLATES. IF A PREMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 4

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-16
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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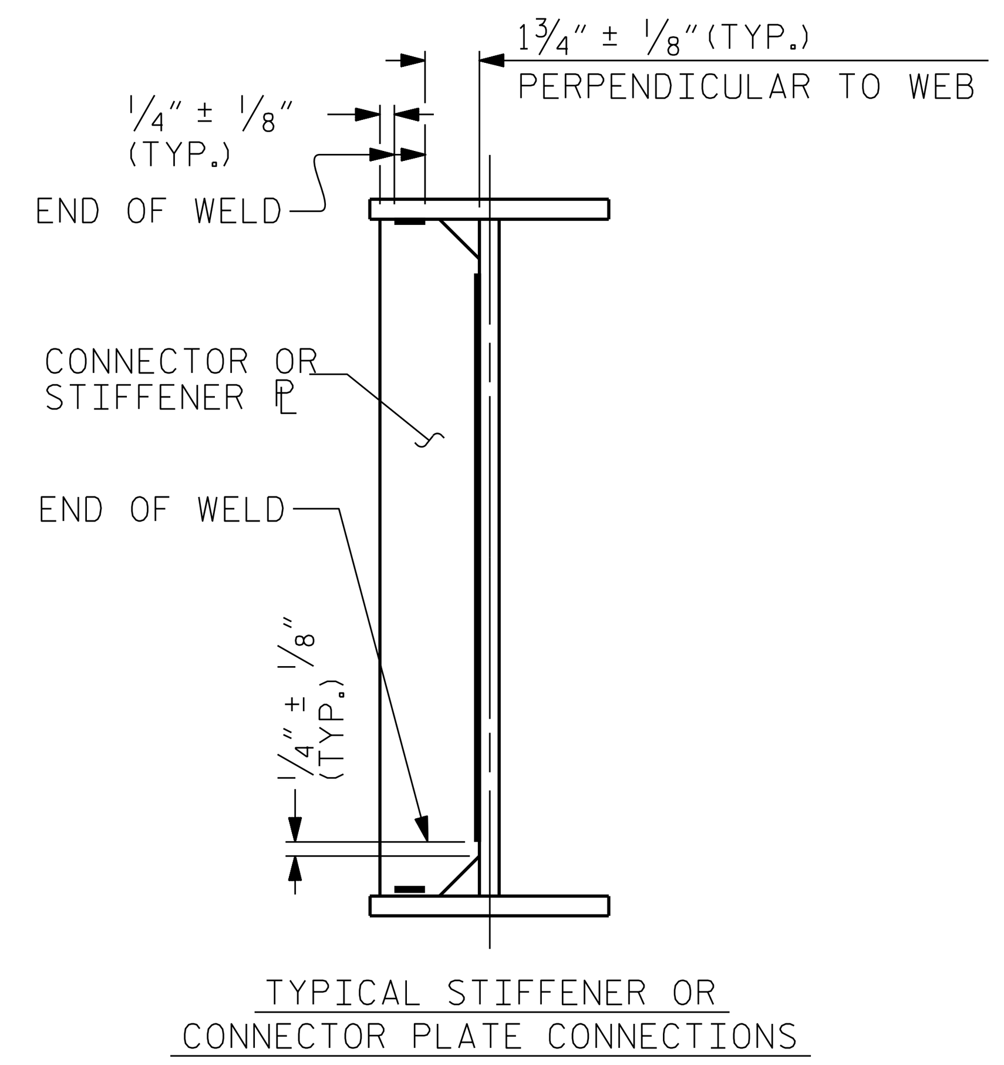
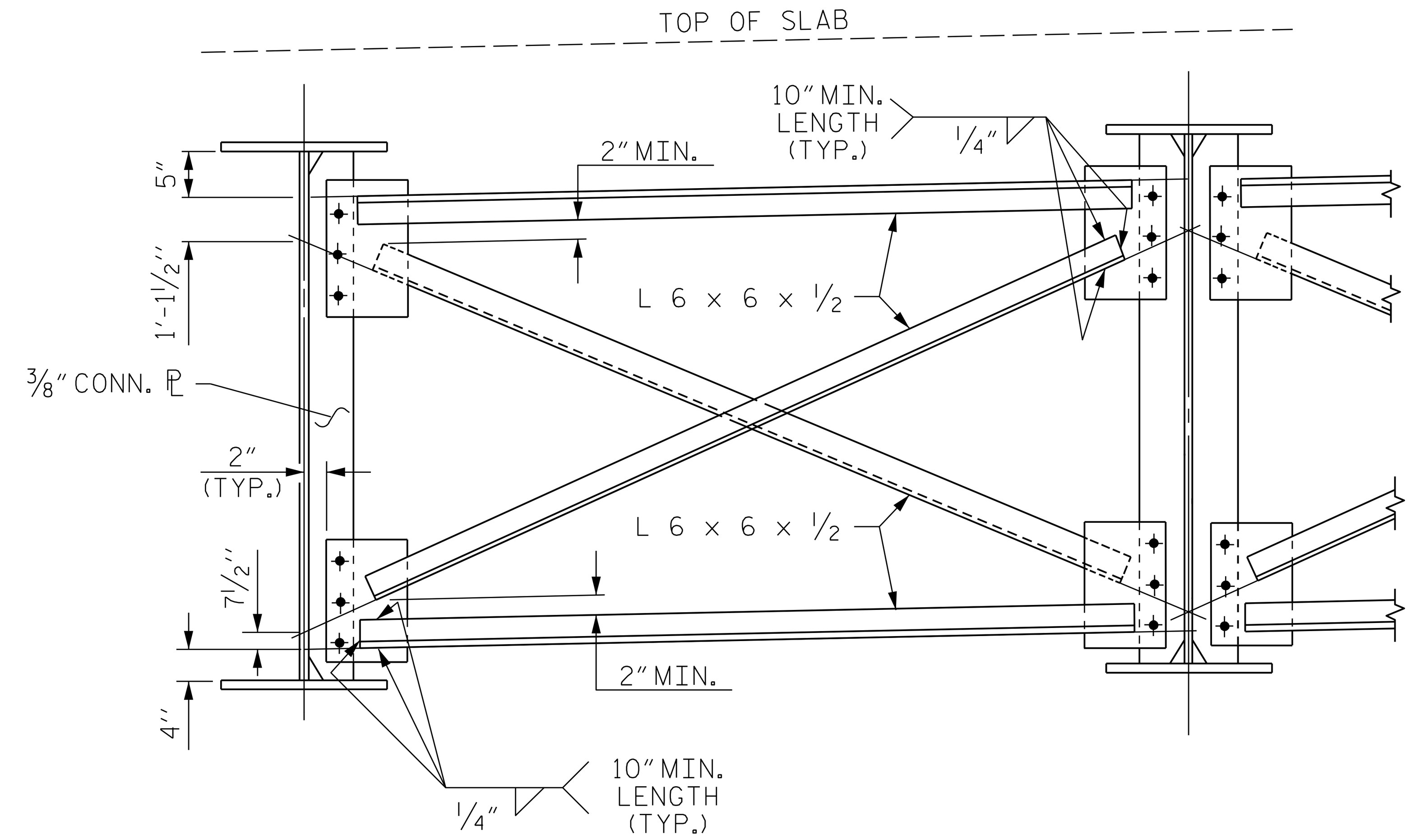
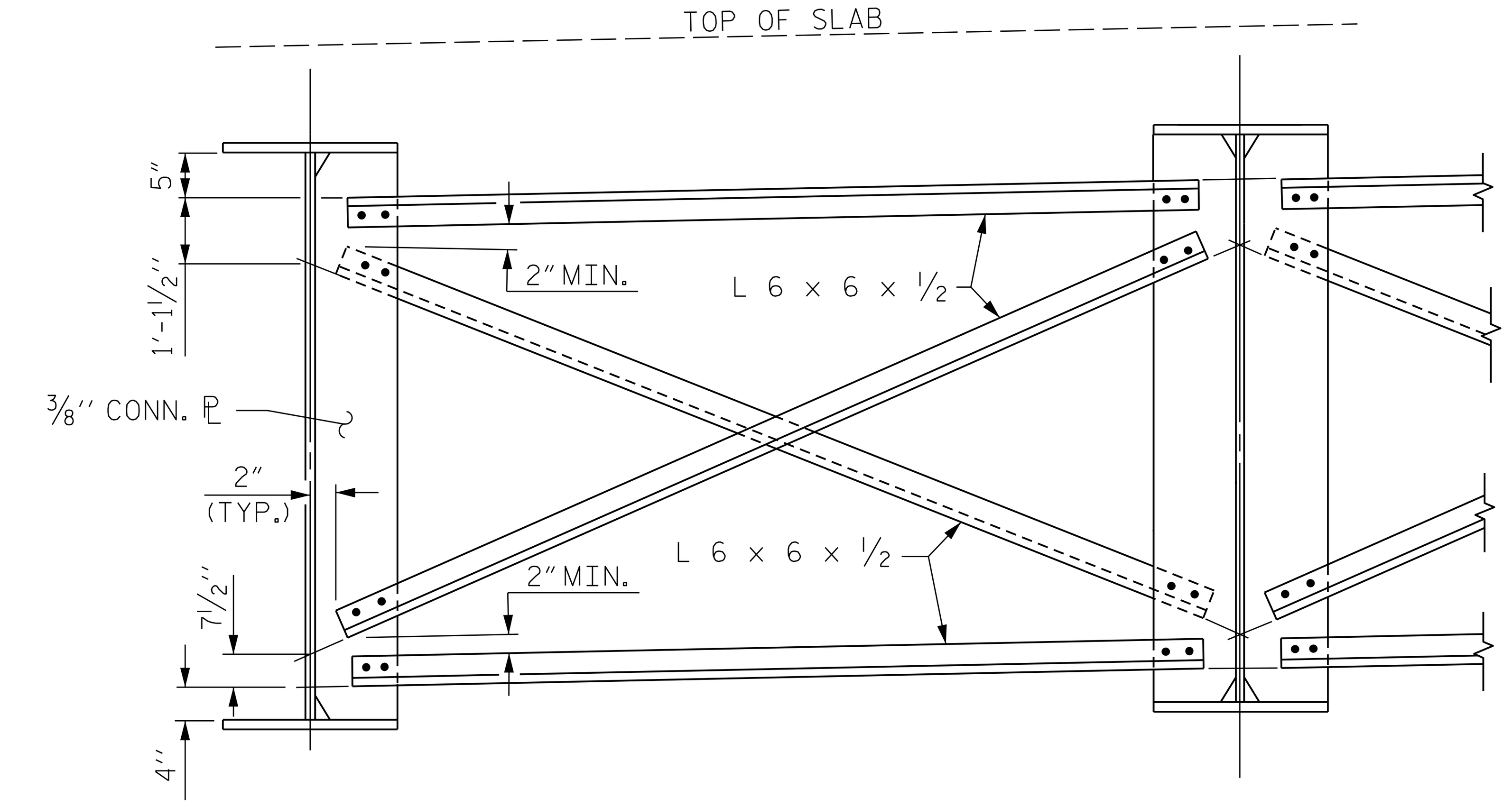


WELD TERMINATION DETAILS

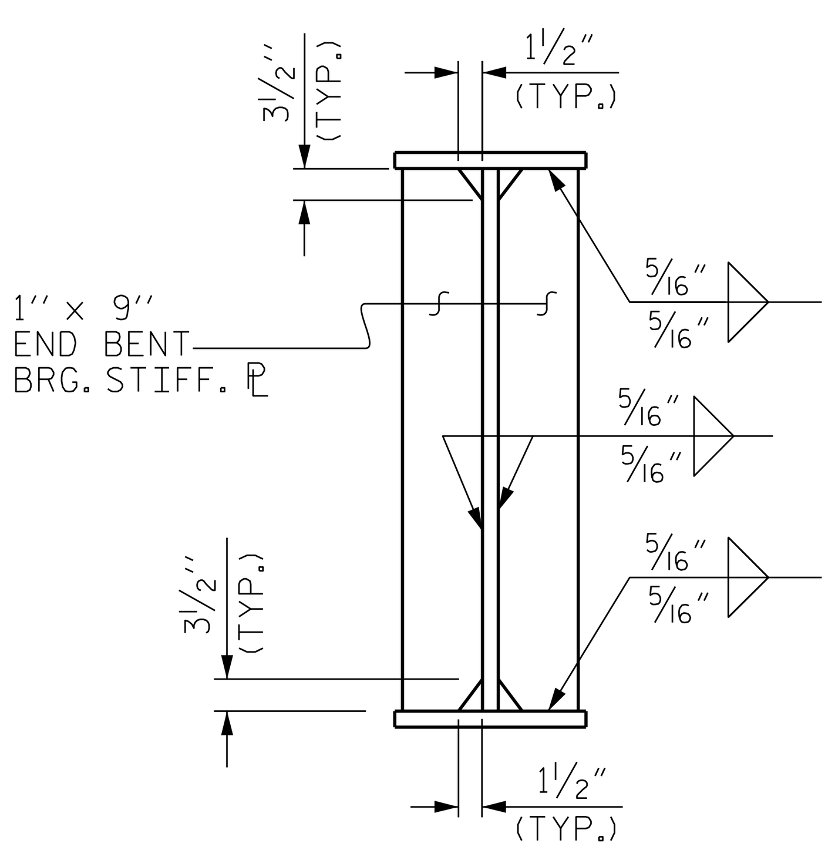


OPTIONAL INTERMEDIATE DIAPHRAGM



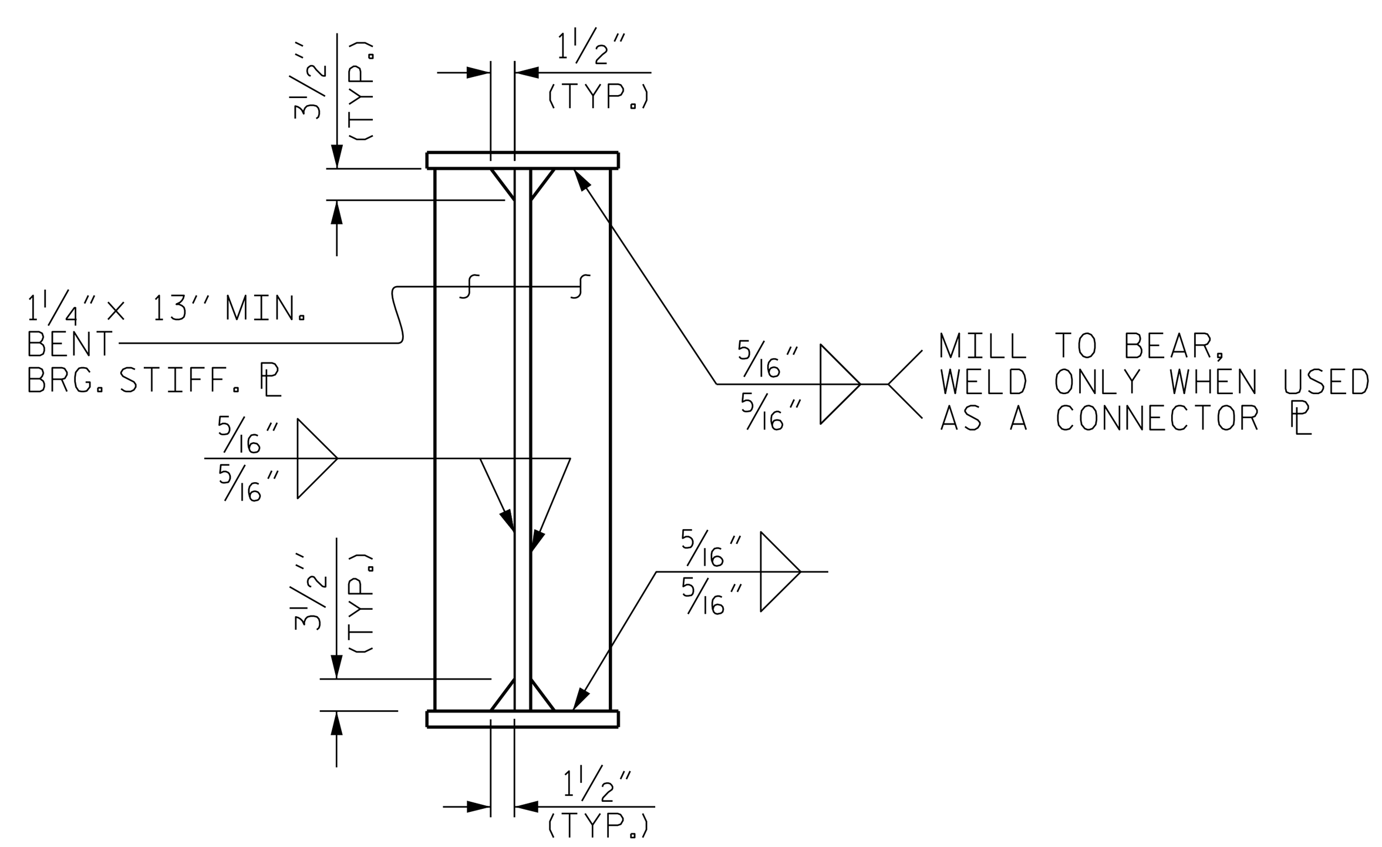
TYPICAL INTERMEDIATE DIAPHRAGM (D1) AND (D5)

(IN BAYS 1-5 & 7-9)



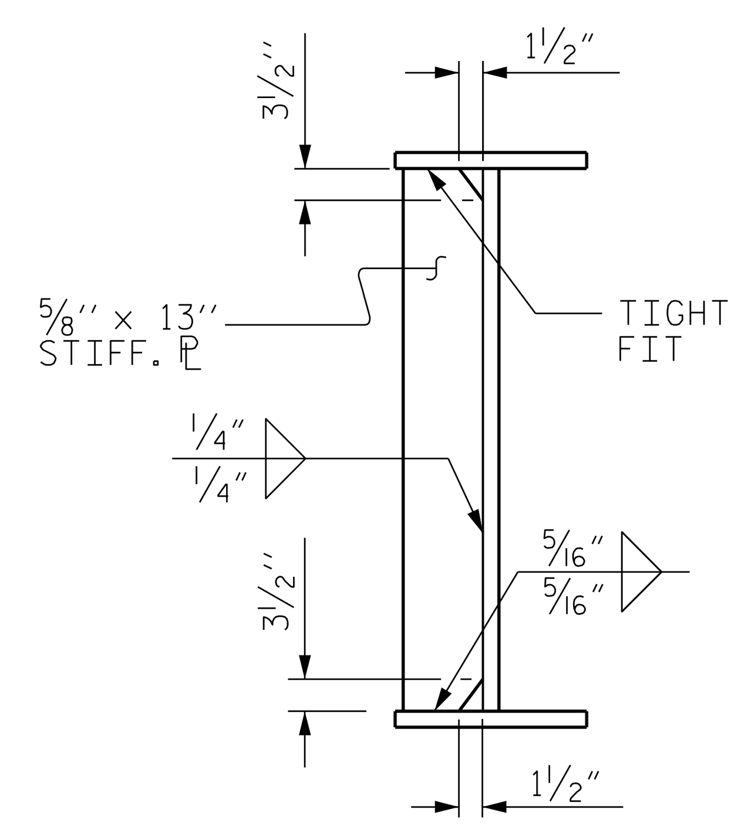
BEARING STIFFENER

(AT END BENTS)

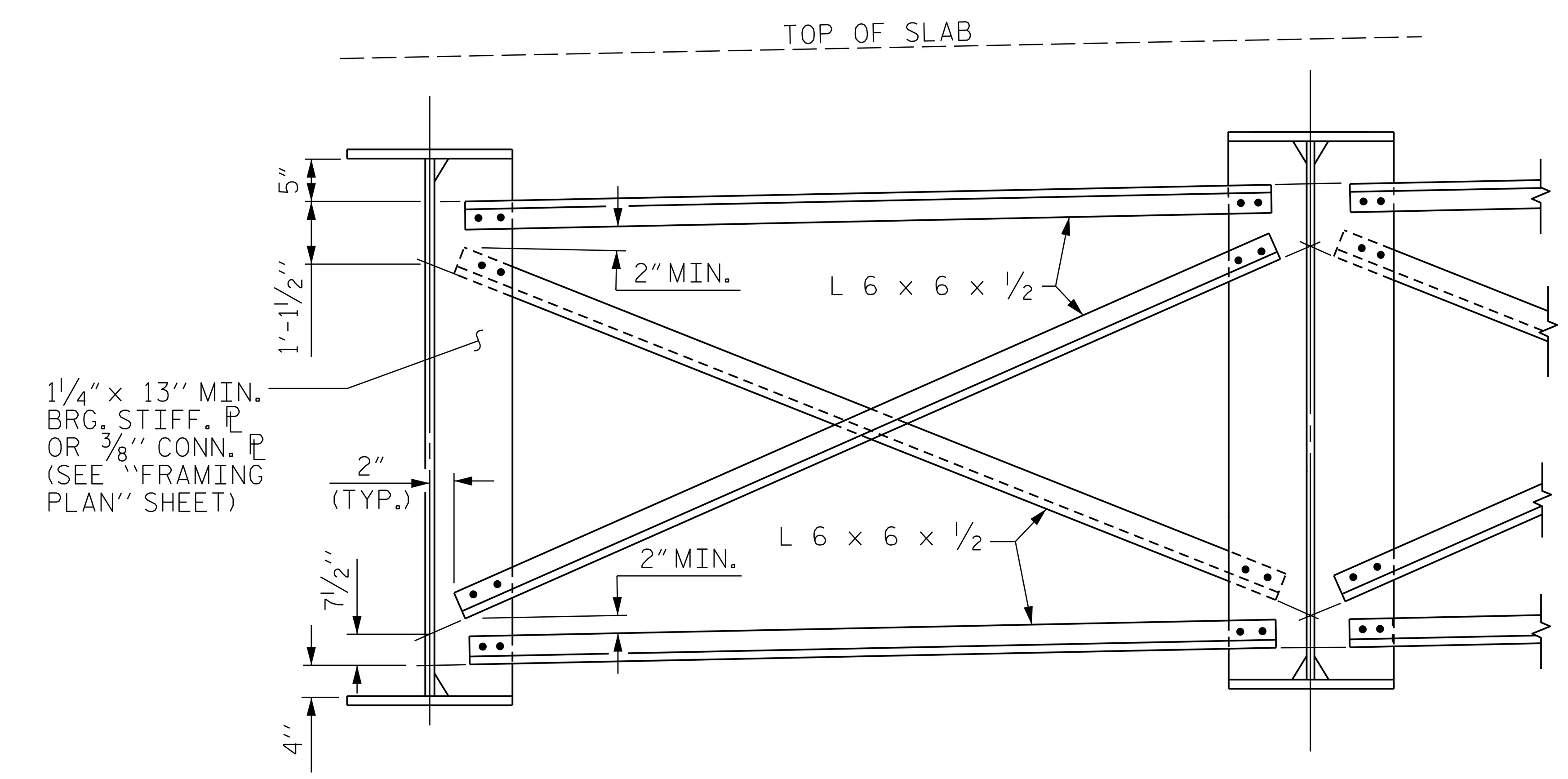


BEARING STIFFENER

(AT INTERIOR BENT)

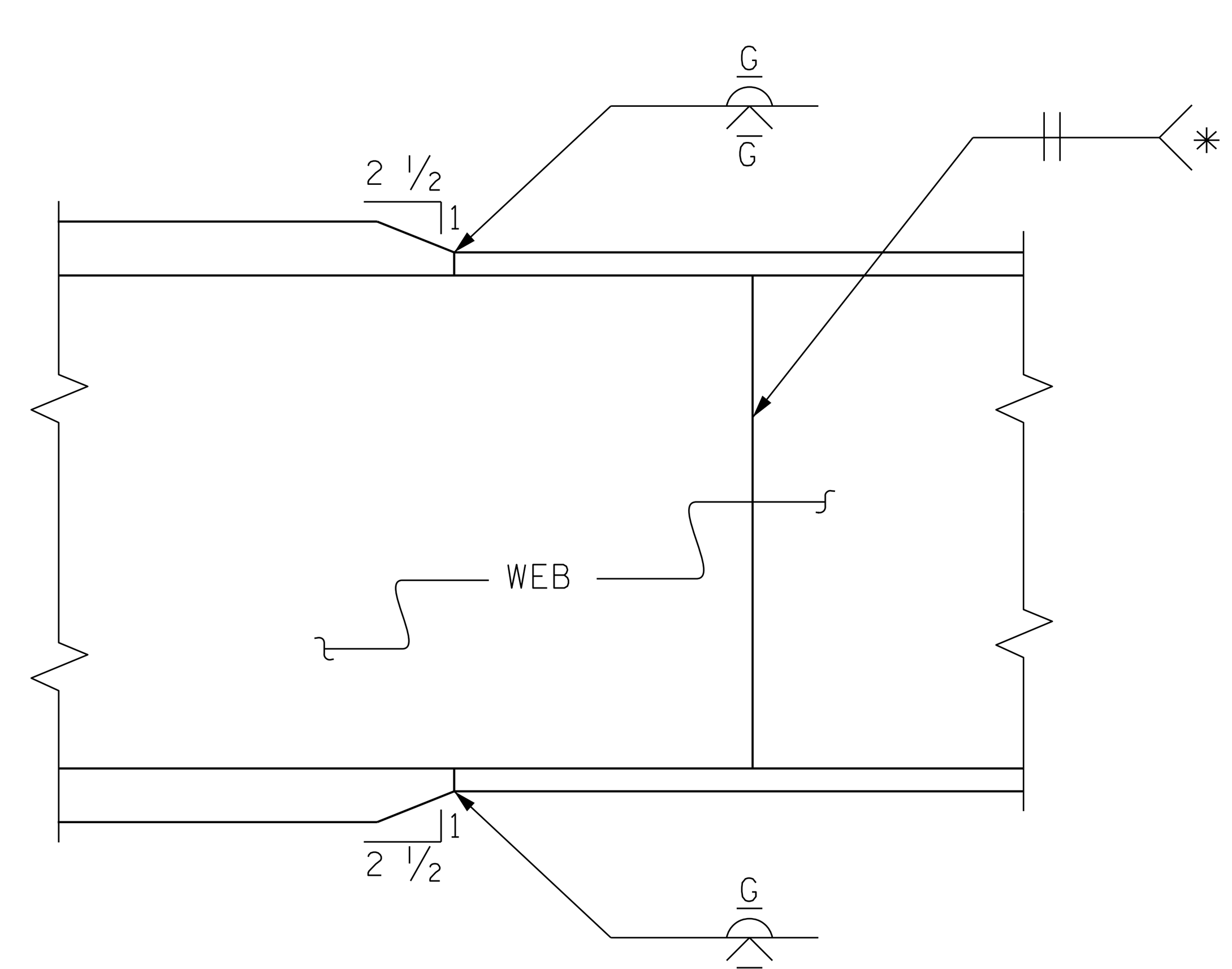


TRANSVERSE STIFFENER



TYPICAL BENT DIAPHRAGM (D2) AND (D6)

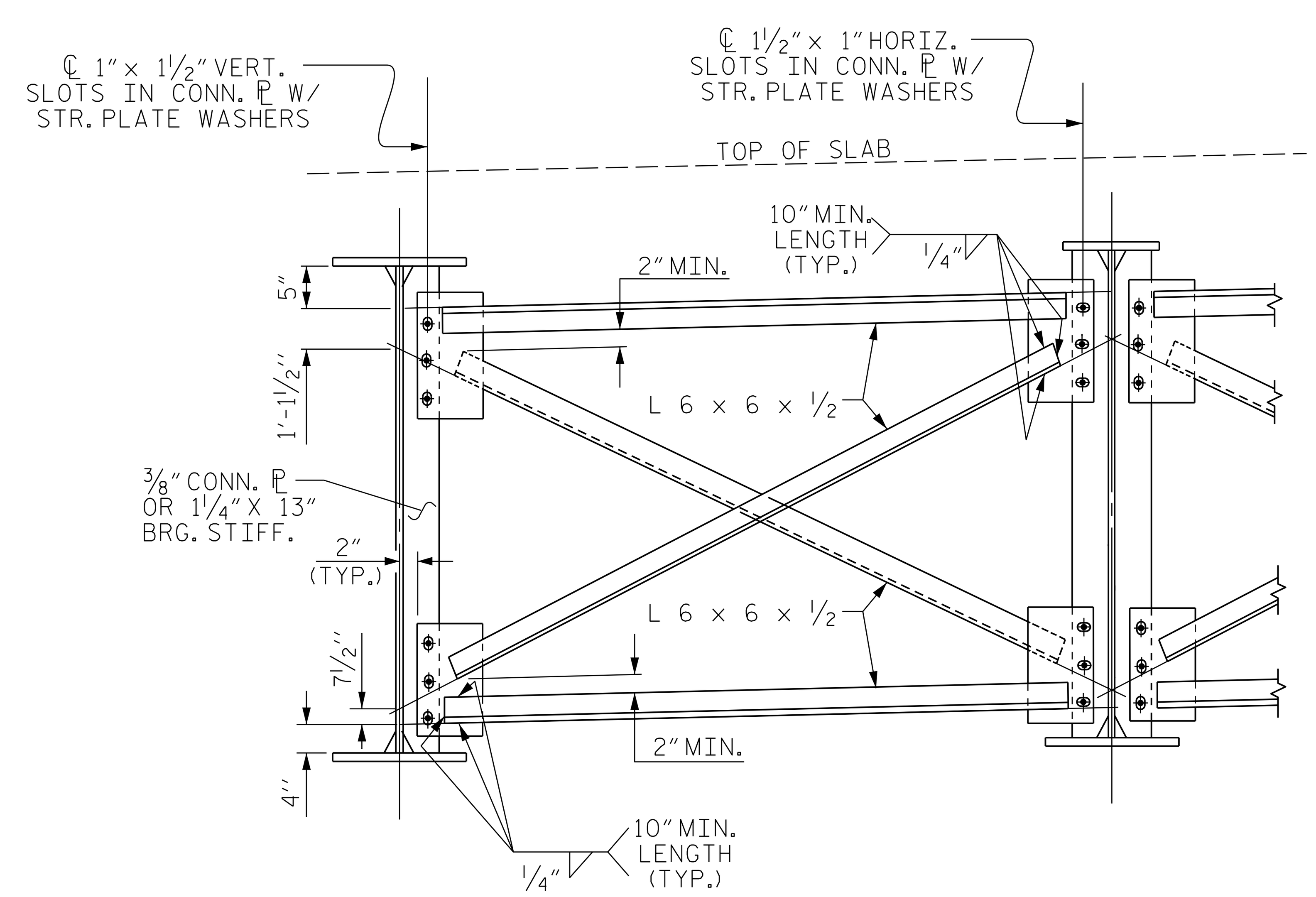
(IN BAYS 1-5 & 7-9)



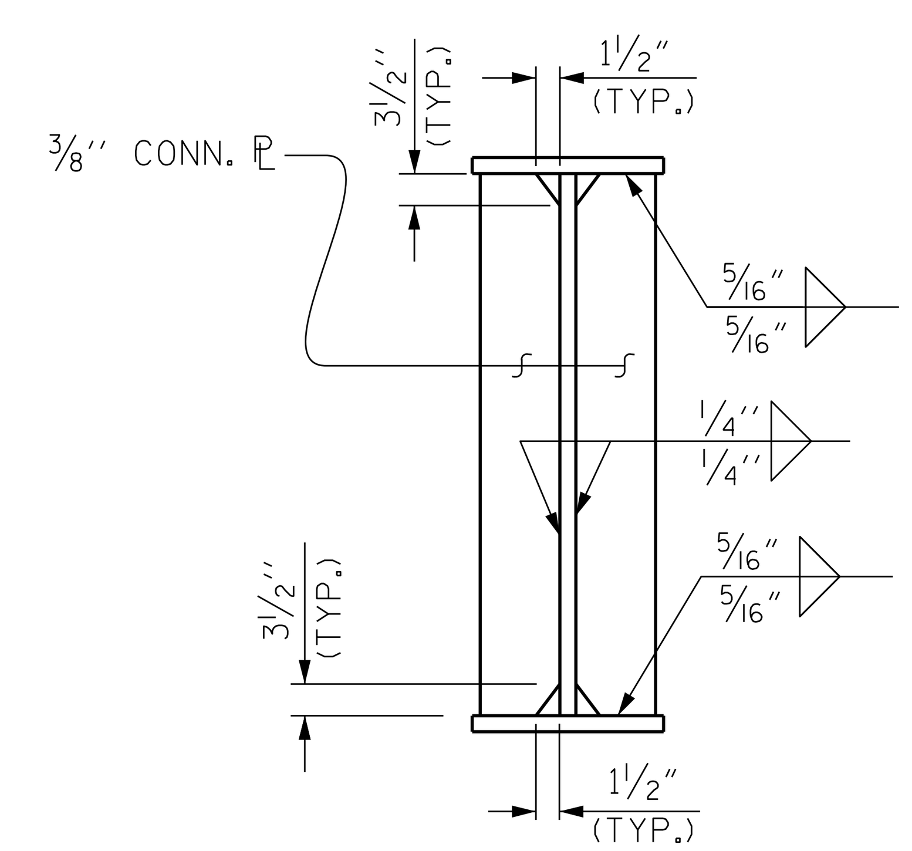
ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



INTERMEDIATE AND BENT DIAPHRAGM IN CLOSURE POUR BAY (D3) AND (D4)



CONNECTOR ℙ

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 4

ENGINEER OF RECORD:

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

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REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S01-17
1			3					TOTAL SHEETS
2			4					46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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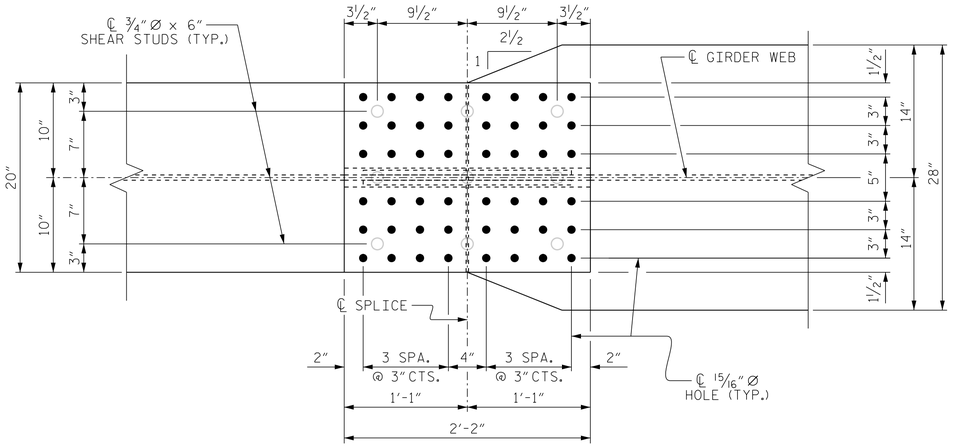
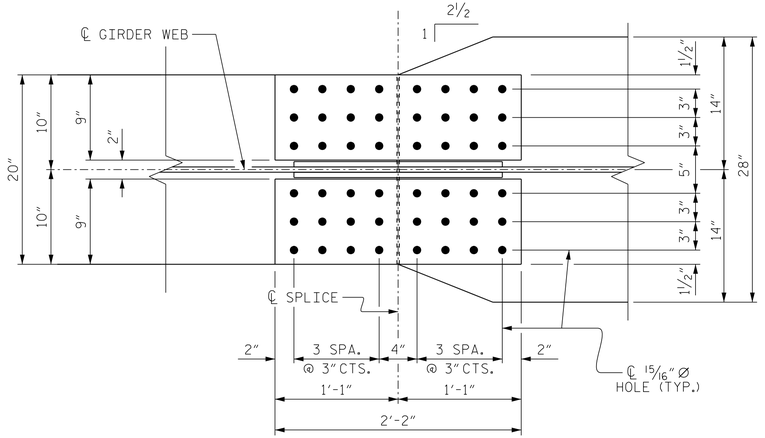
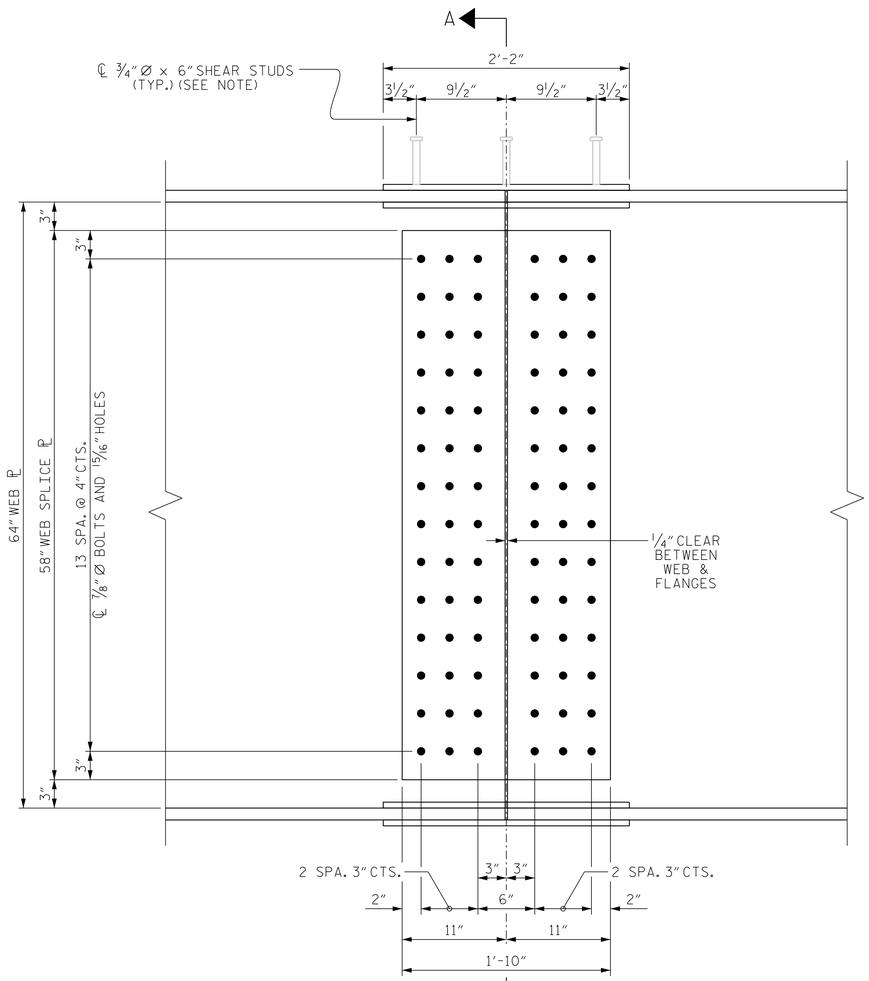


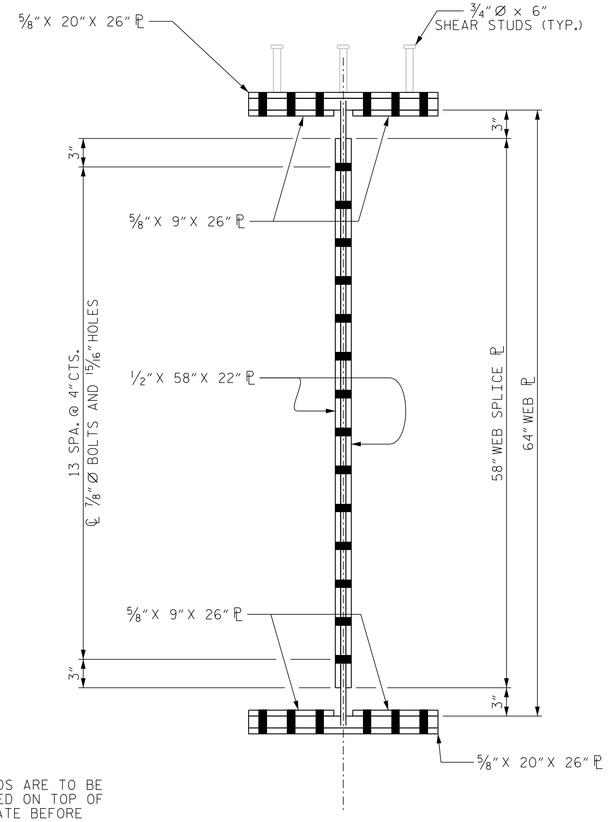
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)

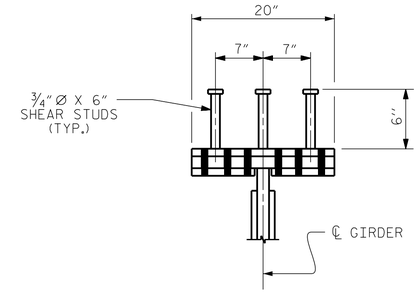


ELEVATION



SECTION A-A

NOTE: SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF SPLICE PLATE BEFORE FIELD ASSEMBLY.



SHEAR STUD DETAIL
FOR TOP FLANGE SPLICE PLATE

BOLTED FIELD SPLICE

(BOLTED FIELD SPLICE #1 SHOWN, BOLTED FIELD SPLICE #2 SIMILAR BY ROTATION)

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 3 OF 4

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-18
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : G. GILLAND/DAH DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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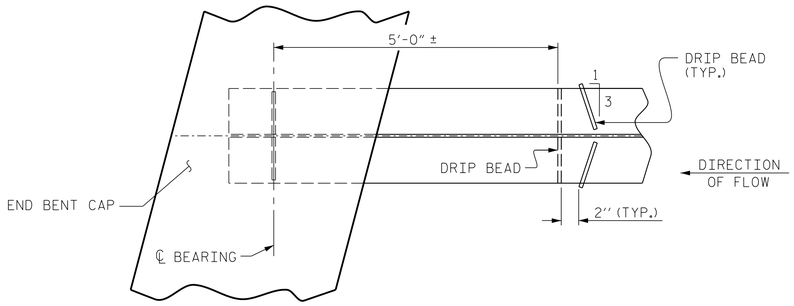
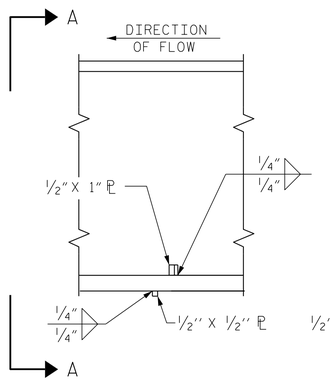
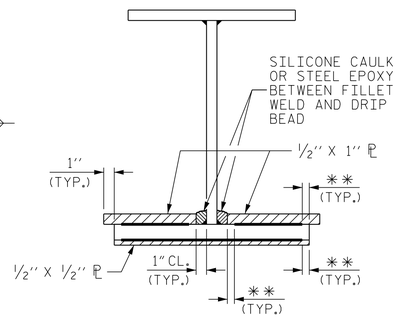


PART PLAN - BOTTOM FLANGE

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR)



SECTION



VIEW A-A

** SEE "WELD TERMINATION DETAILS" SHEET 2 OF 4

DRIP BEAD DETAILS

STRUCTURAL STEEL NOTES :

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

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

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

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

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, THE DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR STEEL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

END OF GIRDERS SHALL BE PLUMB.

WHEN BEARING STIFFENERS ARE USED AS CONNECTOR PLATES THE FABRICATOR MAY ADJUST THE WIDTH AS NECESSARY, 13" MINIMUM, BEARING STIFFENERS MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

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

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 4 OF 4

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

WETHERILL ENGINEERING
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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

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CHECKED BY : B.C. HUNT DATE : 10/16

$FILE$ $DATE$ $TIME$

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A - GIRDERS 1 & 10

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.007	0.014	0.019	0.024	0.028	0.031	0.032	0.032	0.031	0.028	0.025	0.021	0.016	0.012	0.007	0.004	0.001	-0.001	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.022	0.044	0.063	0.078	0.091	0.099	0.102	0.102	0.097	0.089	0.077	0.063	0.048	0.033	0.019	0.008	0.000	-0.005	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ** ↓	0.000	0.003	0.007	0.009	0.012	0.014	0.015	0.016	0.016	0.015	0.014	0.012	0.010	0.008	0.006	0.003	0.002	0.000	-0.001	-0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.032	0.065	0.091	0.114	0.133	0.145	0.150	0.150	0.143	0.131	0.114	0.094	0.072	0.051	0.029	0.014	0.001	-0.007	-0.007	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.028	0.054	0.076	0.096	0.112	0.125	0.136	0.143	0.148	0.149	0.148	0.143	0.136	0.125	0.112	0.096	0.076	0.054	0.028	0.000
REQUIRED CAMBER ↑	0	3/4"	1 7/16"	2"	2 1/2"	2 15/16"	3 1/4"	3 7/16"	3 1/2"	3 1/2"	3 3/8"	3 1/8"	2 7/8"	2 1/2"	2 1/8"	1 11/16"	1 5/16"	15/16"	9/16"	1/4"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
** DEFLECTION DUE TO WEIGHT OF SIDEWALK ON RIGHT SIDE IS NEGLIGIBLE.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A - GIRDERS 2, 3, 8, & 9

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.007	0.014	0.020	0.026	0.030	0.032	0.034	0.034	0.032	0.030	0.026	0.022	0.017	0.012	0.008	0.004	0.001	-0.001	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.022	0.044	0.063	0.078	0.091	0.099	0.102	0.102	0.097	0.089	0.077	0.063	0.048	0.033	0.019	0.008	0.000	-0.005	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ** ↓	0.000	0.002	0.005	0.007	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.004	0.003	0.001	0.000	0.000	-0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.031	0.063	0.090	0.113	0.131	0.142	0.147	0.147	0.140	0.129	0.112	0.093	0.071	0.049	0.030	0.013	0.001	-0.006	-0.007	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.028	0.054	0.076	0.096	0.112	0.125	0.136	0.143	0.148	0.149	0.148	0.143	0.136	0.125	0.112	0.096	0.076	0.054	0.028	0.000
REQUIRED CAMBER ↑	0	3/4"	1 3/8"	2"	2 1/2"	2 7/8"	3 3/16"	3 3/8"	3 1/2"	3 7/16"	3 5/16"	3 1/8"	2 13/16"	2 1/2"	2 1/8"	1 11/16"	1 5/16"	15/16"	9/16"	1/4"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
** DEFLECTION DUE TO WEIGHT OF SIDEWALK ON RIGHT SIDE IS NEGLIGIBLE.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A - GIRDERS 4 THRU 7

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.007	0.014	0.020	0.026	0.030	0.032	0.034	0.034	0.032	0.030	0.026	0.022	0.017	0.012	0.008	0.004	0.001	-0.001	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.022	0.044	0.063	0.078	0.091	0.099	0.102	0.102	0.097	0.089	0.077	0.063	0.048	0.033	0.019	0.008	0.000	-0.005	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ** ↓	0.000	0.000	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.029	0.059	0.084	0.105	0.122	0.133	0.138	0.138	0.131	0.120	0.104	0.086	0.066	0.046	0.027	0.012	0.001	-0.006	-0.006	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.028	0.054	0.076	0.096	0.112	0.125	0.136	0.143	0.148	0.149	0.148	0.143	0.136	0.125	0.112	0.096	0.076	0.054	0.028	0.000
REQUIRED CAMBER ↑	0	1/16"	1 3/8"	1 15/16"	2 7/16"	2 13/16"	3 1/8"	3 5/16"	3 3/8"	3 3/8"	3 1/4"	3"	2 3/4"	2 7/16"	2 1/16"	1 11/16"	1 5/16"	15/16"	9/16"	1/4"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
** DEFLECTION DUE TO WEIGHT OF SIDEWALK ON RIGHT SIDE IS NEGLIGIBLE.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B - GIRDERS 1 & 10

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.008	0.015	0.023	0.032	0.042	0.051	0.059	0.066	0.071	0.074	0.074	0.072	0.068	0.061	0.052	0.041	0.028	0.014	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.013	0.032	0.056	0.086	0.118	0.152	0.184	0.213	0.237	0.255	0.265	0.266	0.259	0.243	0.219	0.186	0.147	0.101	0.052	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ** ↓	0.000	0.002	0.005	0.009	0.013	0.018	0.023	0.028	0.032	0.035	0.038	0.039	0.039	0.038	0.036	0.032	0.027	0.021	0.015	0.008	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.018	0.045	0.080	0.122	0.168	0.217	0.263	0.304	0.338	0.364	0.378	0.379	0.369	0.347	0.312	0.265	0.209	0.144	0.074	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.036	0.069	0.097	0.122	0.143	0.160	0.173	0.183	0.189	0.191	0.189	0.183	0.173	0.160	0.143	0.122	0.097	0.069	0.036	0.000
REQUIRED CAMBER ↑	0	5/8"	1 3/8"	2 1/8"	2 15/16"	3 3/4"	4 1/2"	5 1/4"	5 13/16"	6 5/16"	6 5/8"	6 13/16"	6 3/4"	6 1/2"	6 1/16"	5 7/16"	4 5/8"	3 11/16"	2 9/16"	1 5/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
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PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 1 OF 2

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-20
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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$FILE$ $DATE$ $TIME$

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B - GIRDERS 2, 3, 8, & 9

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.009	0.016	0.024	0.034	0.043	0.053	0.062	0.069	0.074	0.077	0.078	0.076	0.071	0.064	0.054	0.043	0.030	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✳ ↓	0.000	0.013	0.032	0.056	0.086	0.118	0.152	0.184	0.213	0.237	0.255	0.264	0.266	0.259	0.243	0.218	0.186	0.146	0.101	0.052	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ✳✳ ↓	0.000	0.001	0.004	0.006	0.010	0.013	0.017	0.020	0.023	0.026	0.028	0.029	0.029	0.028	0.026	0.023	0.020	0.016	0.011	0.006	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.017	0.045	0.078	0.120	0.165	0.212	0.257	0.298	0.332	0.357	0.370	0.373	0.363	0.340	0.305	0.260	0.205	0.142	0.073	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.036	0.069	0.097	0.122	0.143	0.160	0.173	0.183	0.189	0.191	0.189	0.183	0.173	0.160	0.143	0.122	0.097	0.069	0.036	0.000
REQUIRED CAMBER ↑	0	5/8"	1 3/8"	2 1/8"	2 7/8"	3 11/16"	4 7/16"	5 3/16"	5 3/4"	6 1/4"	6 9/16"	6 11/16"	6 11/16"	6 7/16"	6"	5 3/8"	4 9/16"	3 5/8"	2 1/2"	1 5/16"	0

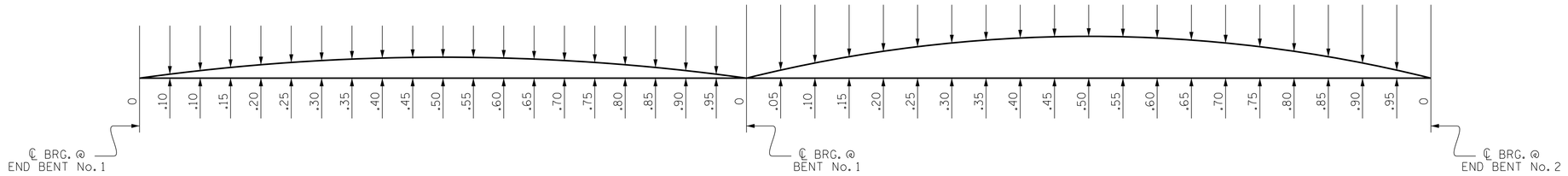
✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).
✳✳ DEFLECTION DUE TO WEIGHT OF SIDEWALK ON RIGHT SIDE IS NEGLIGIBLE.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B - GIRDERS 4 THRU 7

TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.009	0.016	0.024	0.034	0.043	0.053	0.062	0.069	0.074	0.077	0.078	0.076	0.071	0.064	0.054	0.043	0.030	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✳ ↓	0.000	0.013	0.032	0.056	0.086	0.118	0.152	0.184	0.213	0.237	0.254	0.264	0.266	0.259	0.243	0.218	0.186	0.146	0.101	0.052	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ✳✳ ↓	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.016	0.042	0.073	0.111	0.154	0.197	0.240	0.278	0.310	0.332	0.345	0.348	0.339	0.318	0.285	0.243	0.191	0.133	0.068	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.036	0.069	0.097	0.122	0.143	0.160	0.173	0.183	0.189	0.191	0.189	0.183	0.173	0.160	0.143	0.122	0.097	0.069	0.036	0.000
REQUIRED CAMBER ↑	0	5/8"	1 5/16"	2 1/16"	2 13/16"	3 9/16"	4 5/16"	4 15/16"	5 1/2"	6"	6 1/4"	6 7/16"	6 3/8"	6 1/8"	5 3/4"	5 1/8"	4 3/8"	3 7/16"	2 7/16"	1 1/4"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).
✳✳ DEFLECTION DUE TO WEIGHT OF SIDEWALK ON RIGHT SIDE IS NEGLIGIBLE.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

SHEET 2 OF 2

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Galland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-21
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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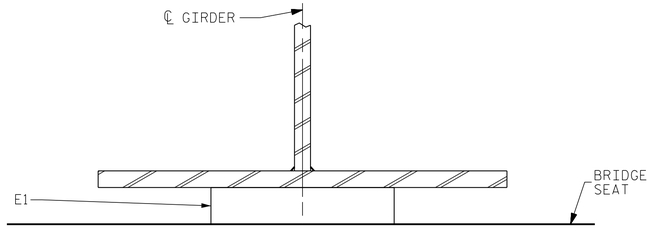
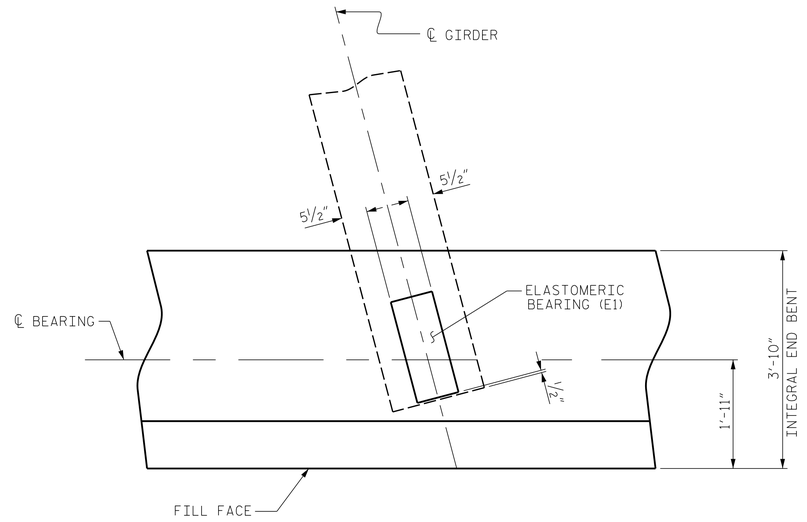
$DATE$



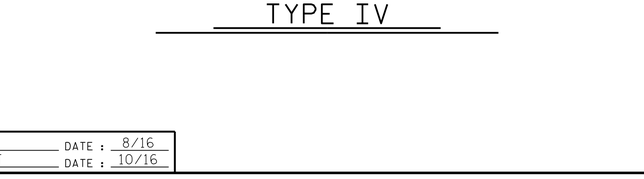
FIXED

END VIEW

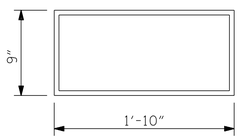


PLAN VIEW AT END BENTS

(SHOWING INTEGRAL END BENT)



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

NOTES

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.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:

Docusigned by: Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND

7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-22
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16

CHECKED BY : B.C. HUNT DATE : 10/16

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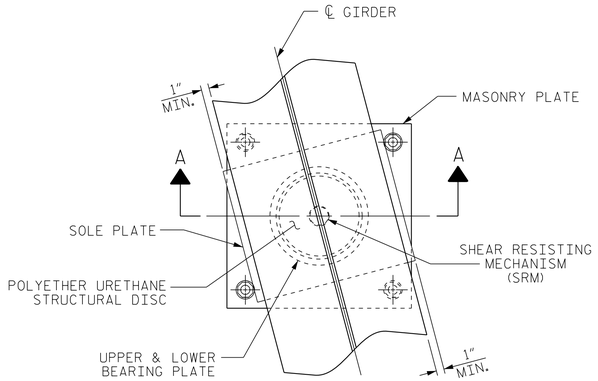
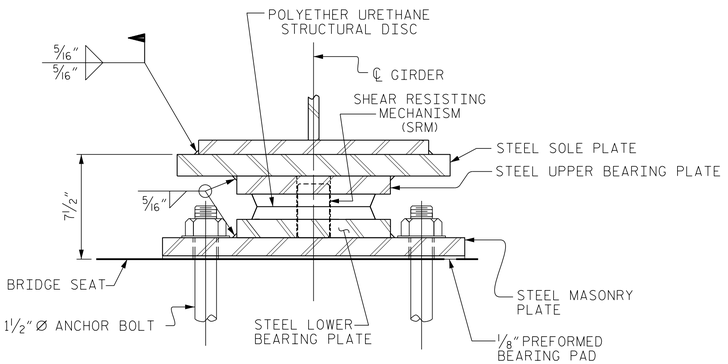
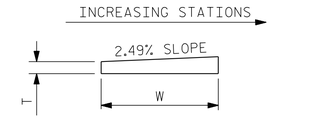


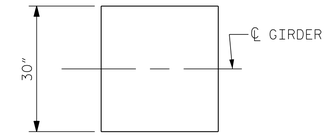
PLAN



SECTION A-A
DB1, FIXED



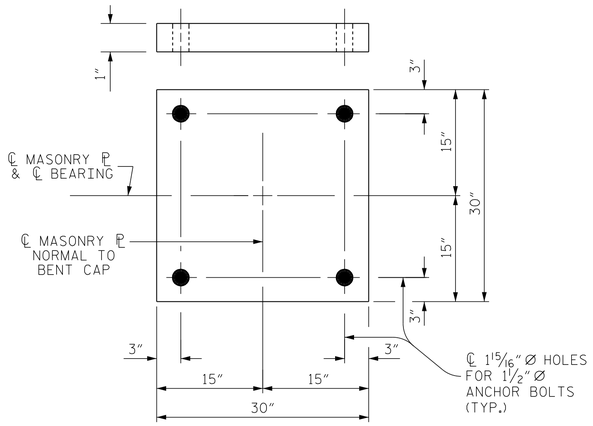
ELEVATION



PLAN

NOTE:
DIMENSIONS "W" AND "T" SHALL BE DETERMINED BY THE BEARING MANUFACTURER.

SOLE PLATE DETAILS



PLAN

MASONRY PLATE DETAILS

NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W OR GRADE 50.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED PLUS AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR URETHANE DISC.

SOLE PLATES SHOULD BE WELDED TO GIRDER FLANGES BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIANS.

LOADS AND MOVEMENT

DESIGNATIONS		LOCATION	NUMBER OF BEARINGS	UNFACTORED VERTICAL LOAD (KIPS)			FACTORED HORIZONTAL LOAD (KIPS)	ONE-WAY MOVEMENT (IN.)
				DEAD		LIVE		
BEARINGS	MASONRY ℙ			DC	DW	LL+IM		
DB1 (FIXED)	M1	BENT 1	10	461	57	323	170	0.0

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-

ENGINEER OF RECORD:
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7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DISC BEARING DETAILS

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

SHEET NO. S01-23
TOTAL SHEETS 46

DRAWN BY : D. HODGE DATE : 8/16
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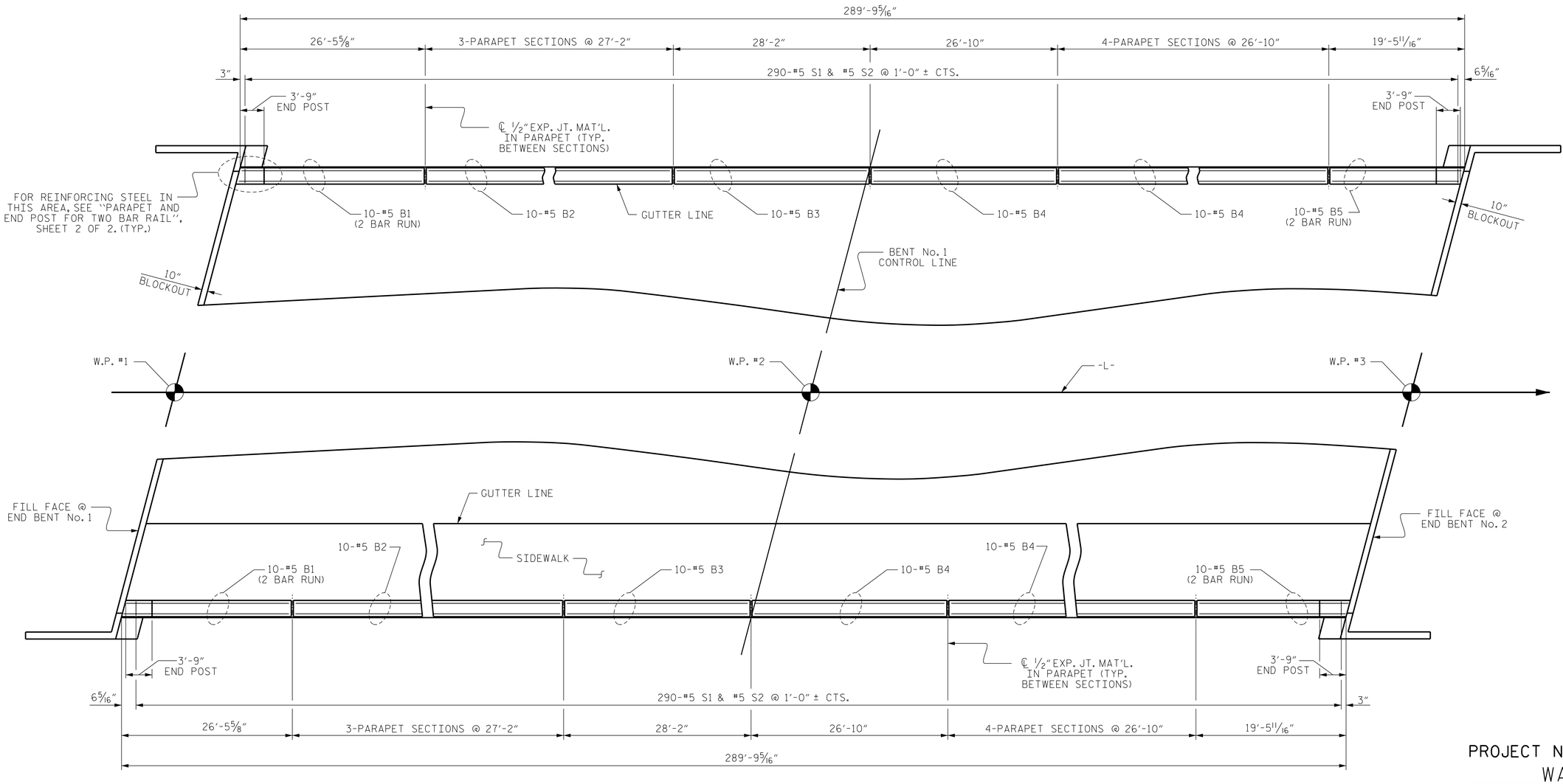

PLAN OF CONCRETE PARAPET

ALL DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET.

#5 S1 BAR MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

FOR REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK AND CONCRETE MEDIAN DETAILS" SHEET.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 2

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Gilland
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7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

1′-2″ x 3′-3″ CONCRETE PARAPET FOR 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-24
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 7/16
CHECKED BY : B.C. HUNT DATE : 10/16

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$DATE$

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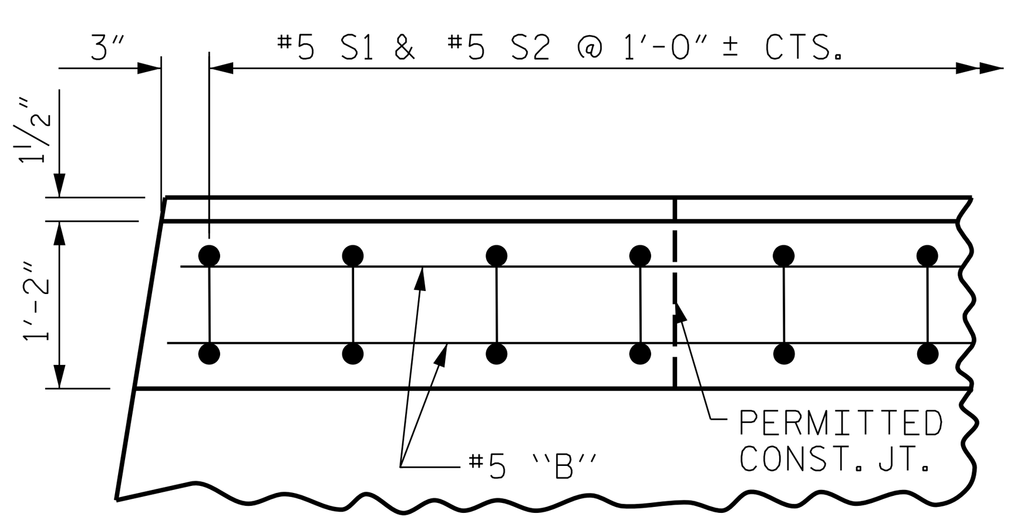
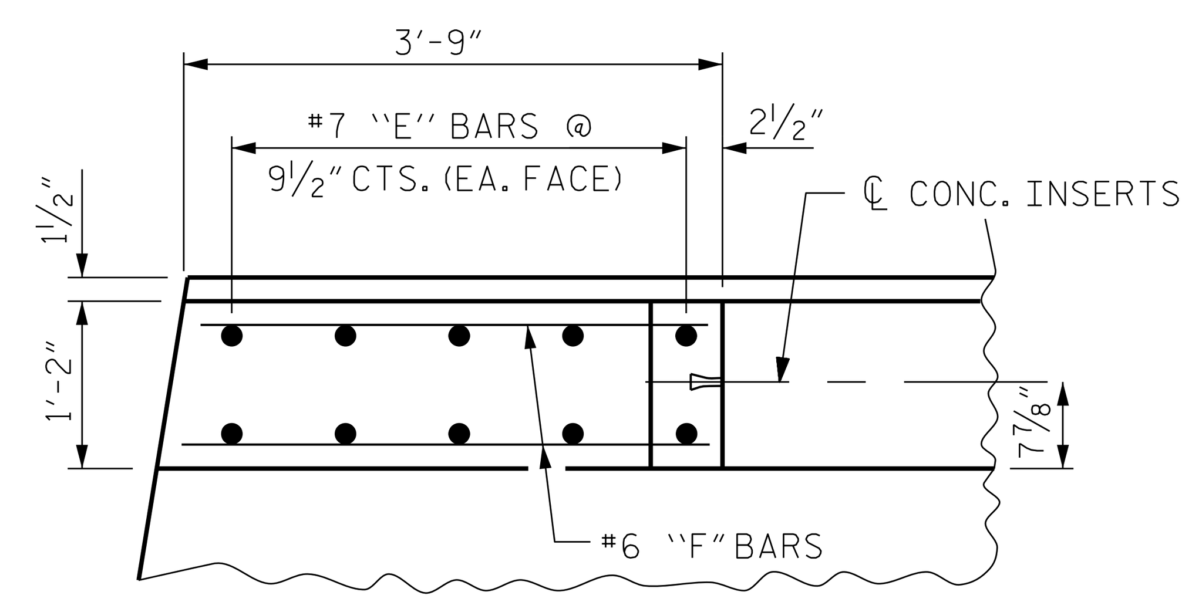
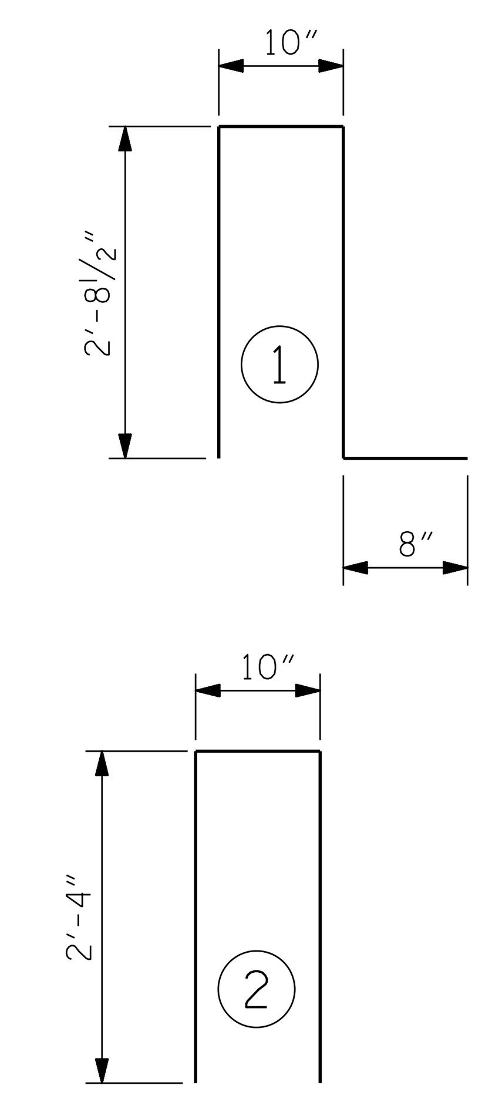


PLAN OF PARAPET



PLAN OF END POST

BAR TYPE



BAR DIMENSIONS
ARE OUT TO OUT.

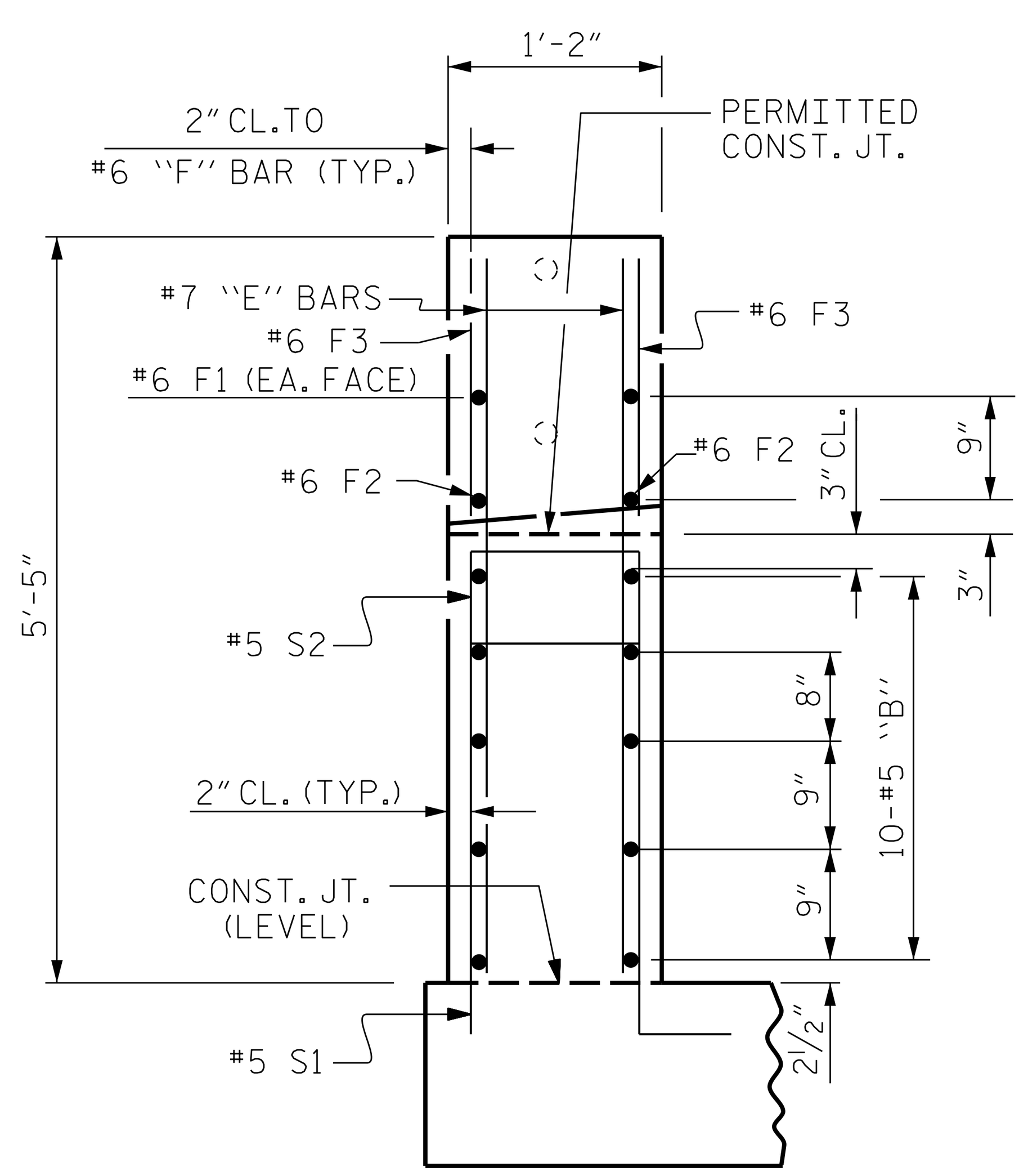
BILL OF MATERIAL FOR PARAPETS AND 4 END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	40	#5	STR	14'-11"	622
* B2	60	#5	STR	26'-9"	1674
* B3	20	#5	STR	27'-9"	579
* B4	100	#5	STR	26'-5"	2755
* B5	40	#5	STR	11'-5"	476
* E1	8	#7	STR	3'-3"	53
* E2	8	#7	STR	3'-9"	61
* E3	8	#7	STR	4'-3"	69
* E4	8	#7	STR	4'-9"	78
* E5	8	#7	STR	5'-1"	83
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-0"	36
* F3	8	#6	STR	3'-4"	40
* S1	580	#5	1	6'-11"	4184
* S2	580	#5	2	5'-6"	3327

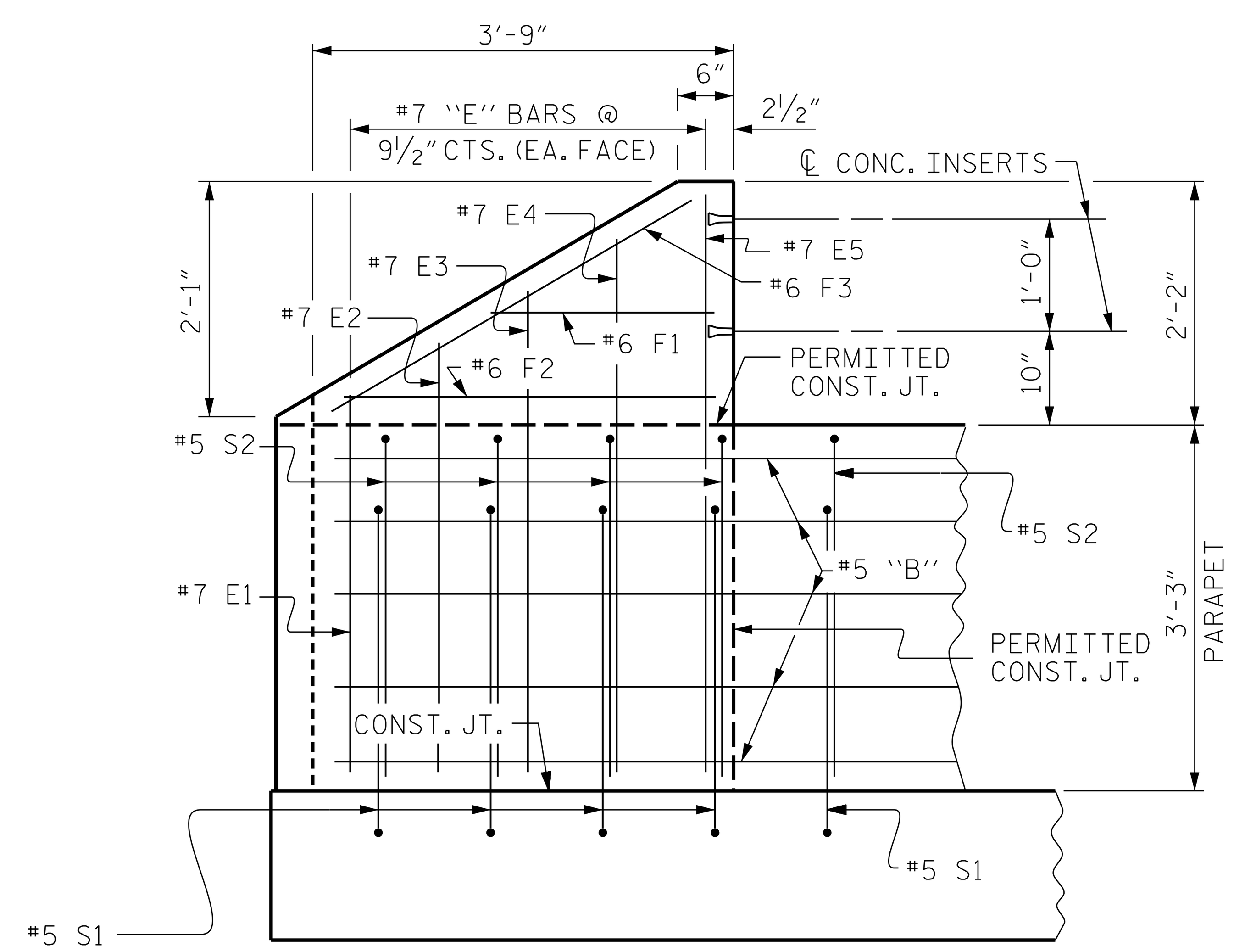
* EPOXY COATED REINFORCING STEEL 14,059 LBS.

CLASS "AA" CONCRETE 82.2 C.Y.

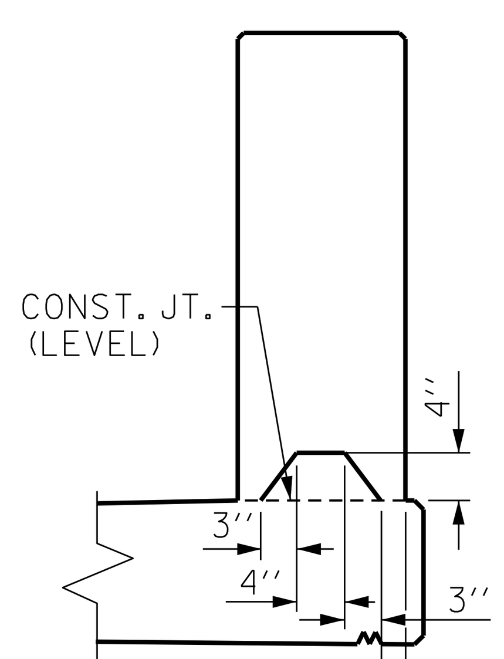
1'-2" × 3'-3" CONCRETE PARAPET 579.55 L.F.



END VIEW

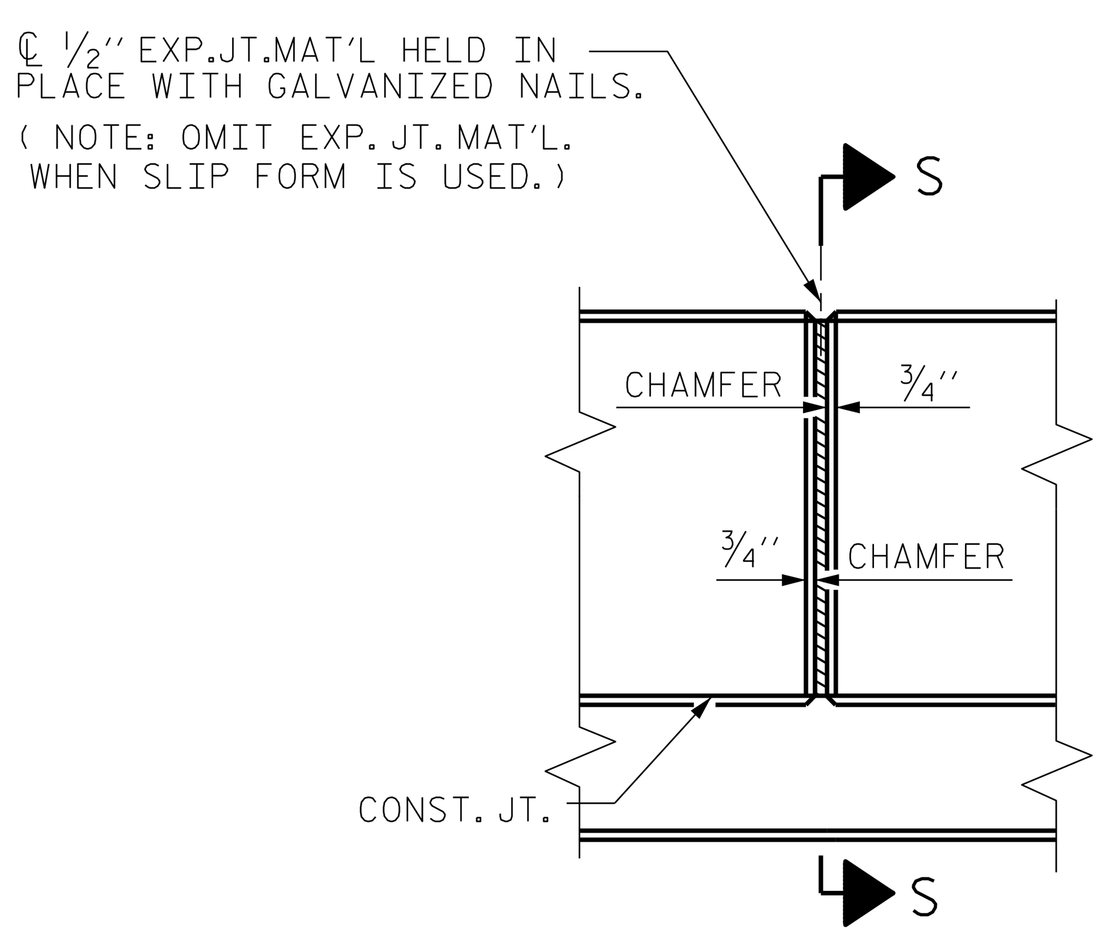


ELEVATION



SECTION S-S

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



ELEVATION AT JOINTS IN PARAPET

PARAPET AND END POST FOR TWO BAR RAIL

FOR GUARDRAIL ANCHORAGE DETAILS AND LOCATION,
SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 2

ENGINEER OF RECORD:

Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

1'-2" × 3'-3"
CONCRETE PARAPET
FOR
2 BAR METAL RAIL

REVISIONS

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

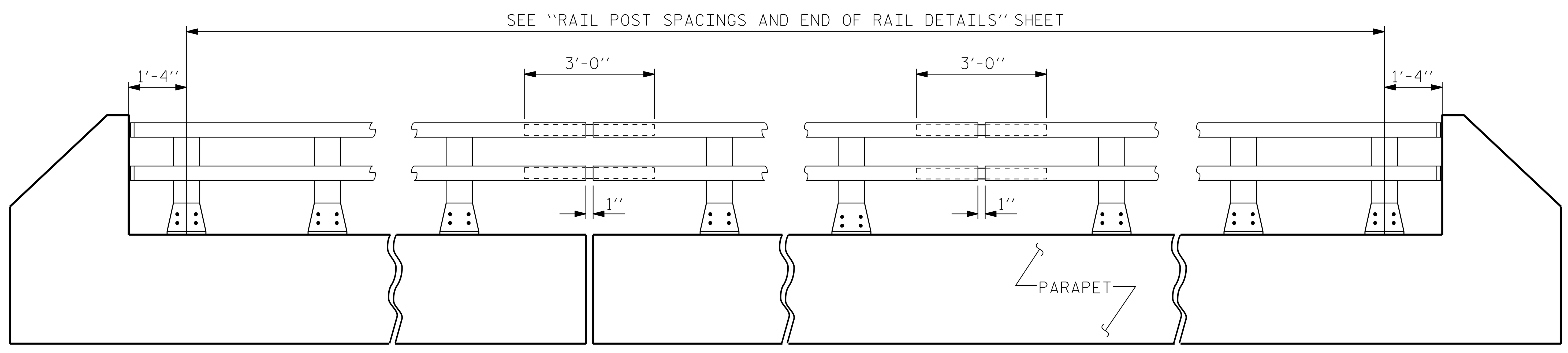
SHEET NO. S01-25

TOTAL SHEETS 46

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

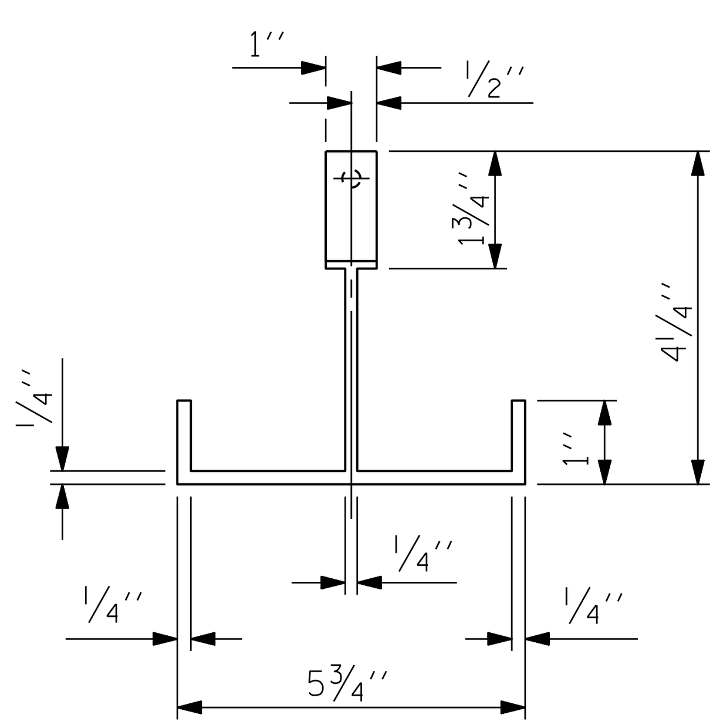
DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

$FILE$ $DATE$ $TIME$

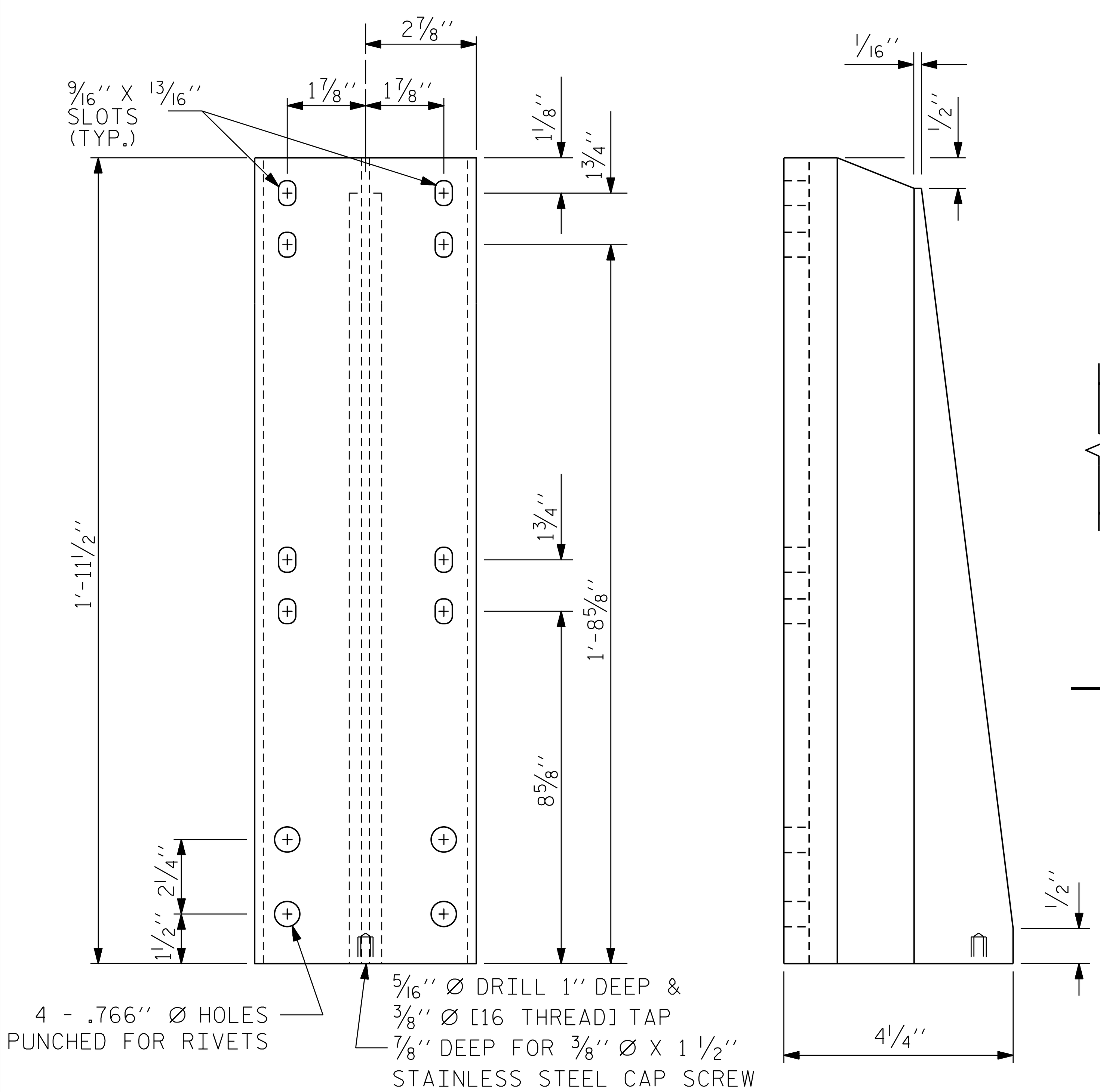


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STD NO. BMR2.

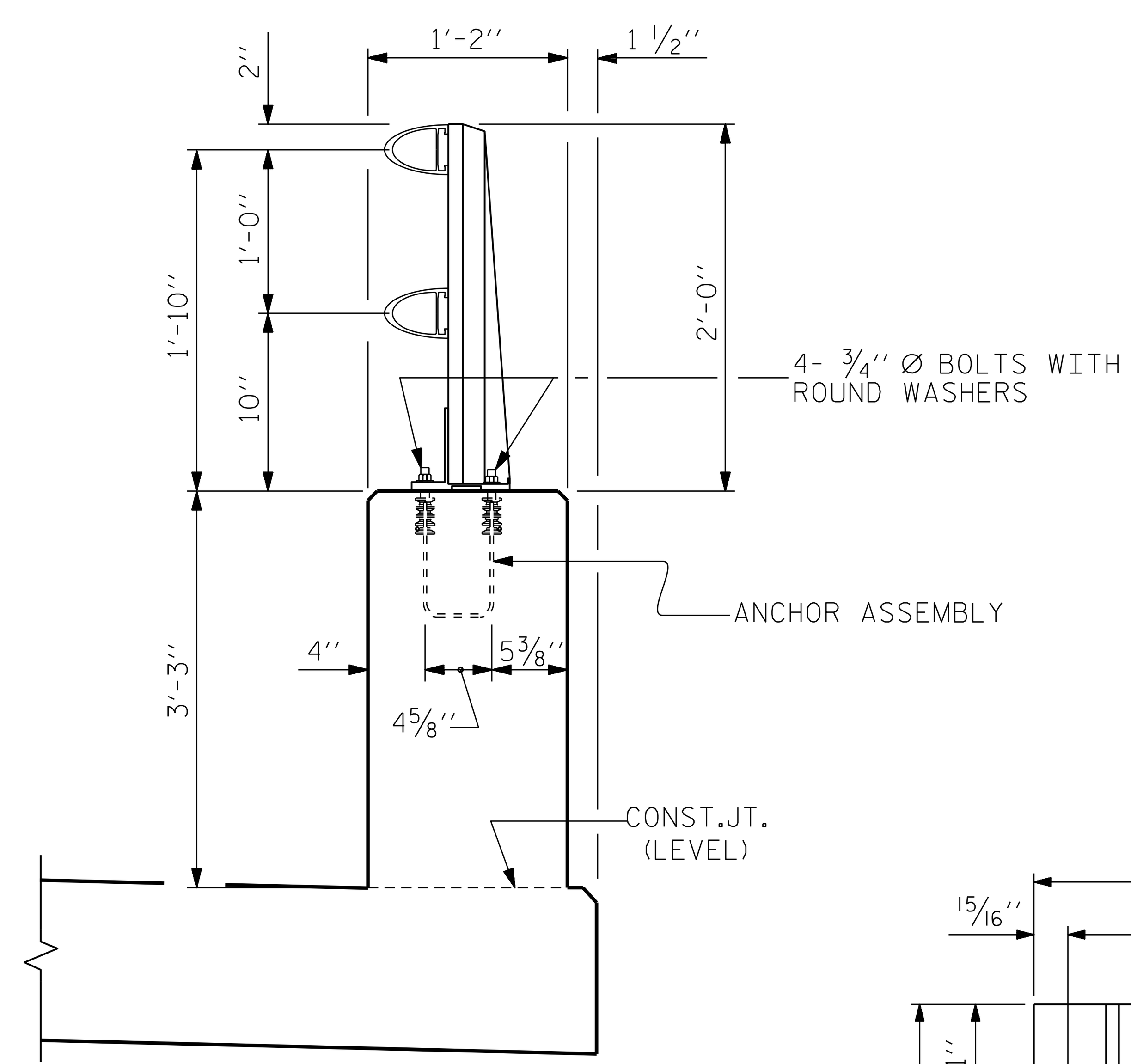


PLAN

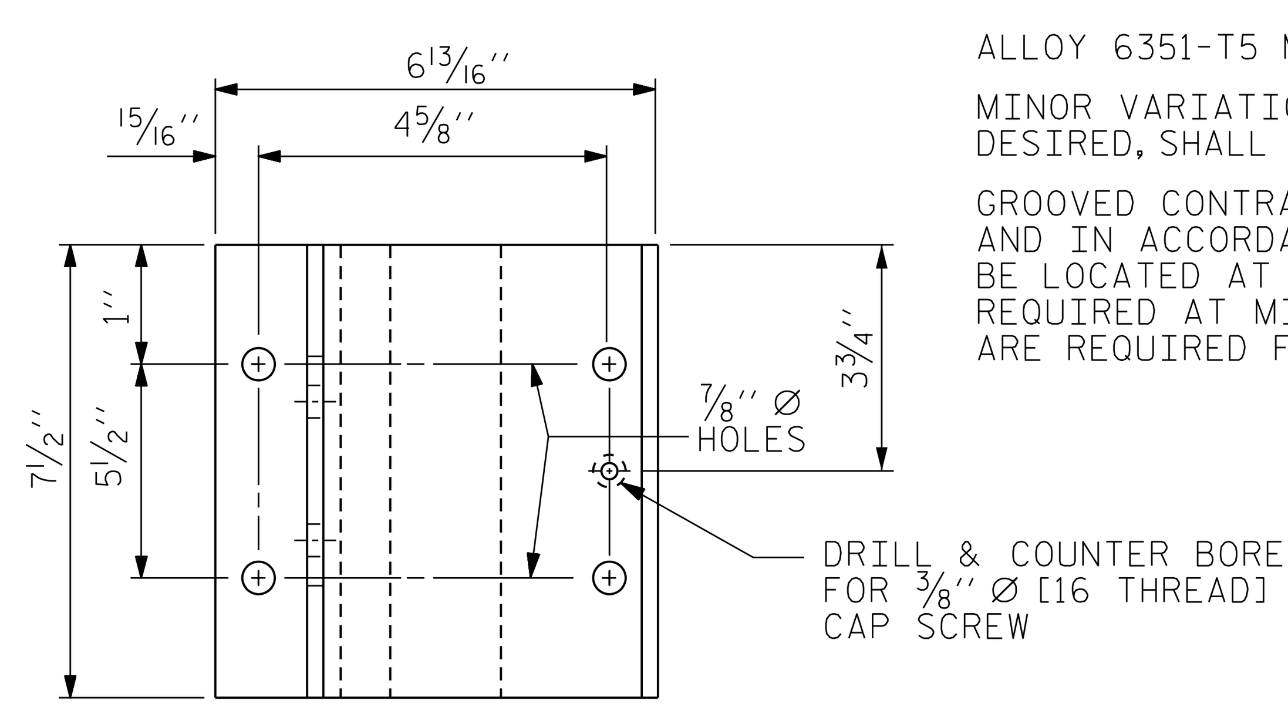


FRONT ELEVATION   SIDE ELEVATION

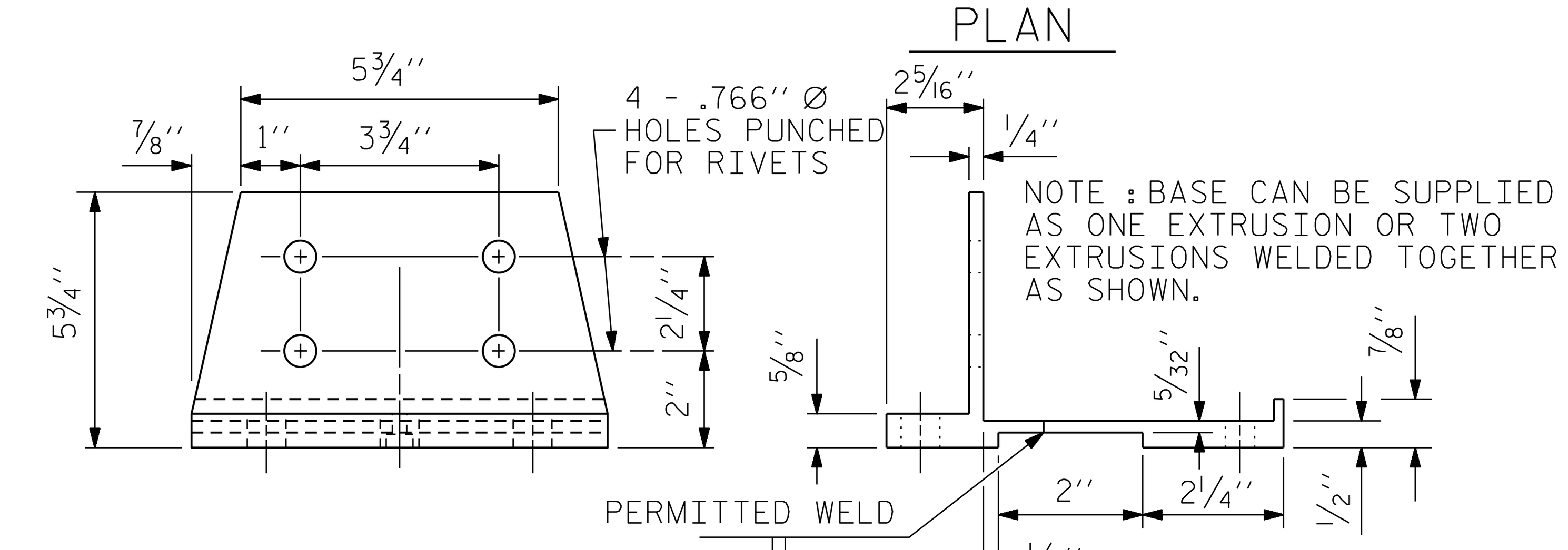
DETAILS OF POST



SECTION THRU PARAPET AND RAIL

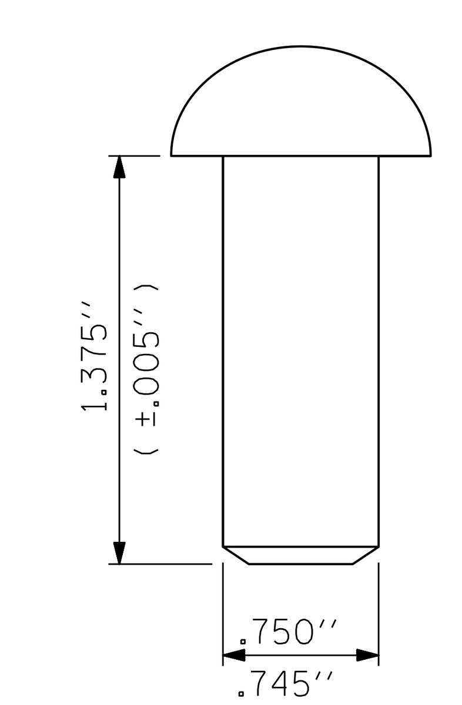


PLAN



FRONT ELEVATION   SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

PAY LENGTH = 563.94 LIN. FT.

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 2

ENGINEER OF RECORD:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 37400 GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : D. HODGE	DATE : 7/16
CHECKED BY : B.C. HUNT	DATE : 10/16

DRAWN BY : EEM 6/94	REV. 5/1/06	TLA/GM
CHECKED BY : RGW 6/94	REV. 10/1/11	MAA/GM
	REV. 6/13	MAA/GM

REVISIONS

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

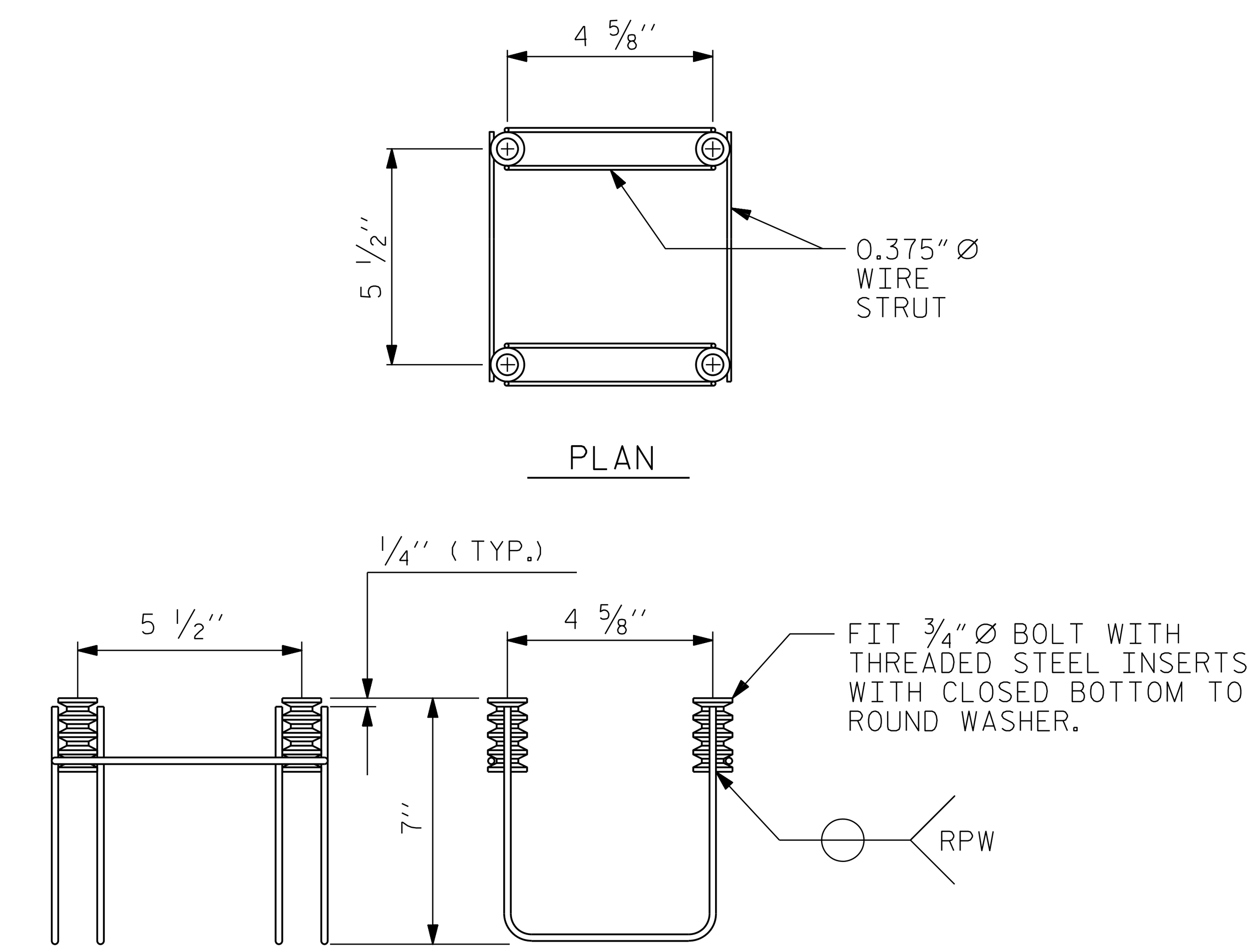
SHEET NO. S01-26

TOTAL SHEETS 46

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

$FILE$ $DATE$ $TIME$

STD. NO. BMR3



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(92 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS 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.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

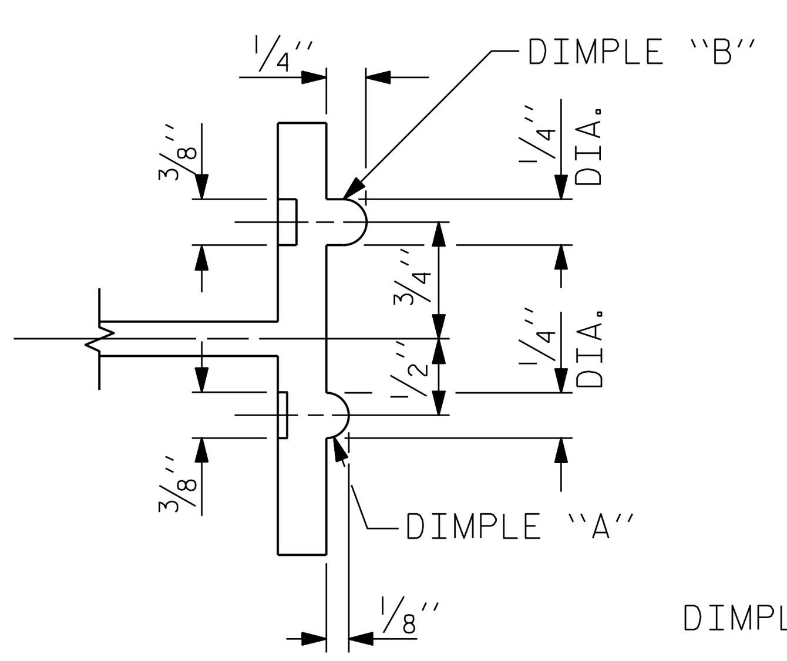
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

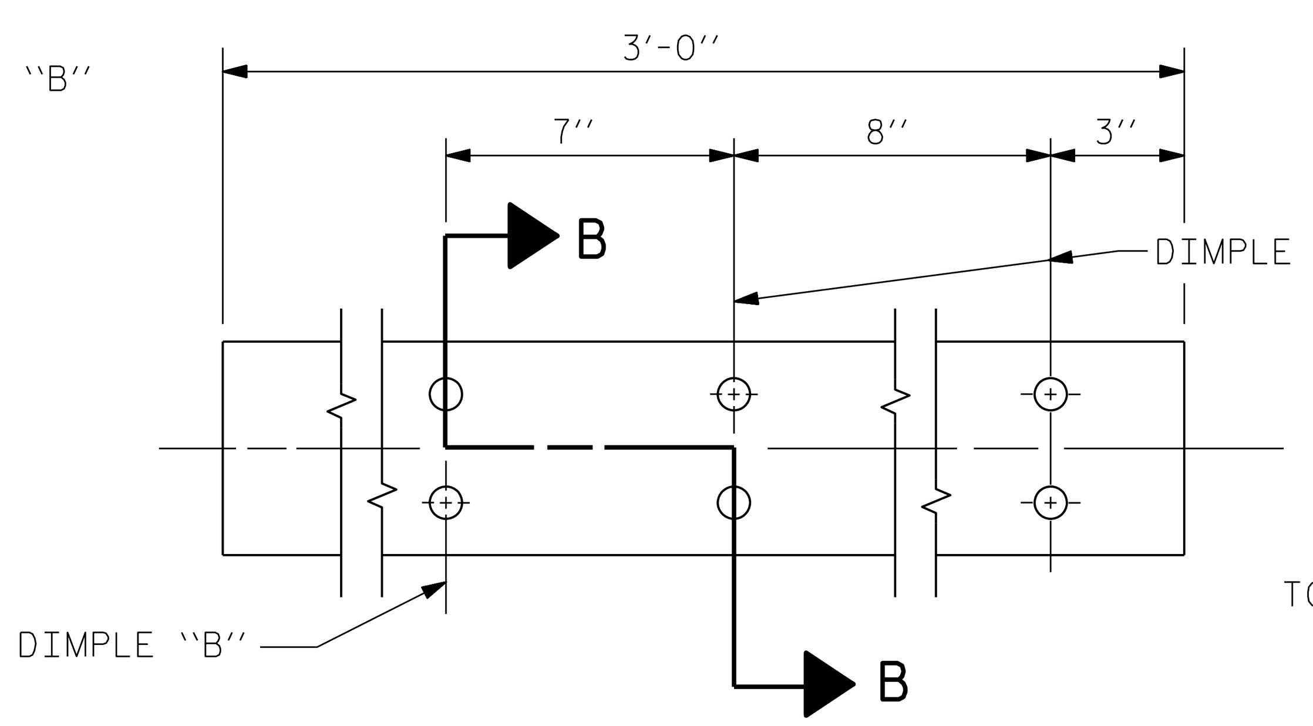
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4'' Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

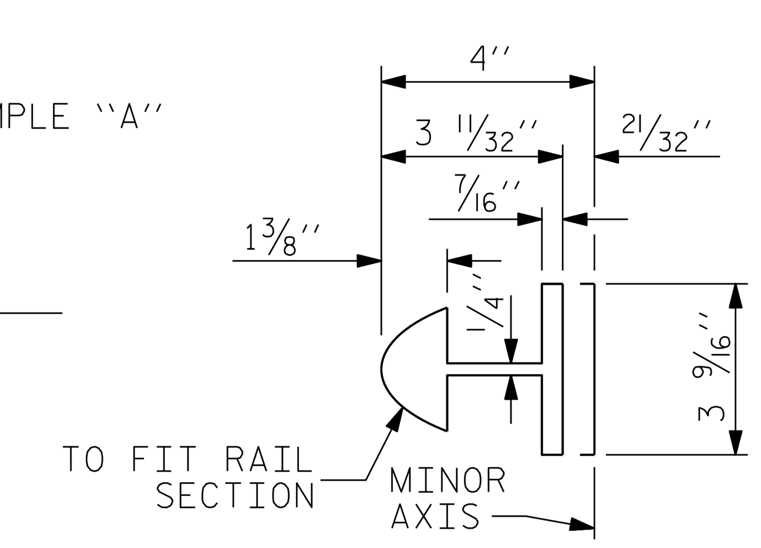
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



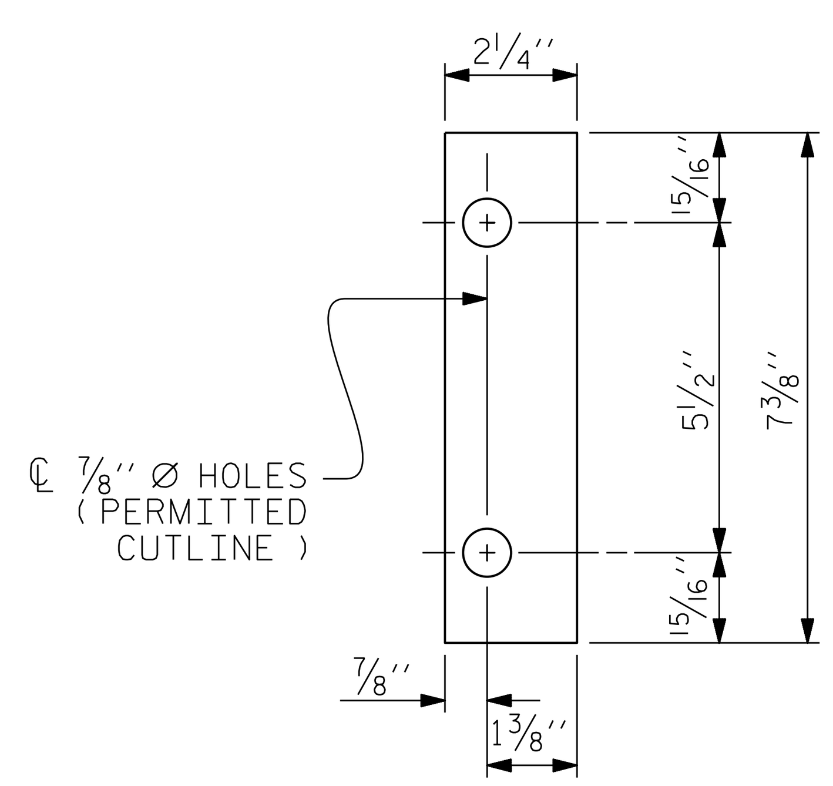
SECTION B - B



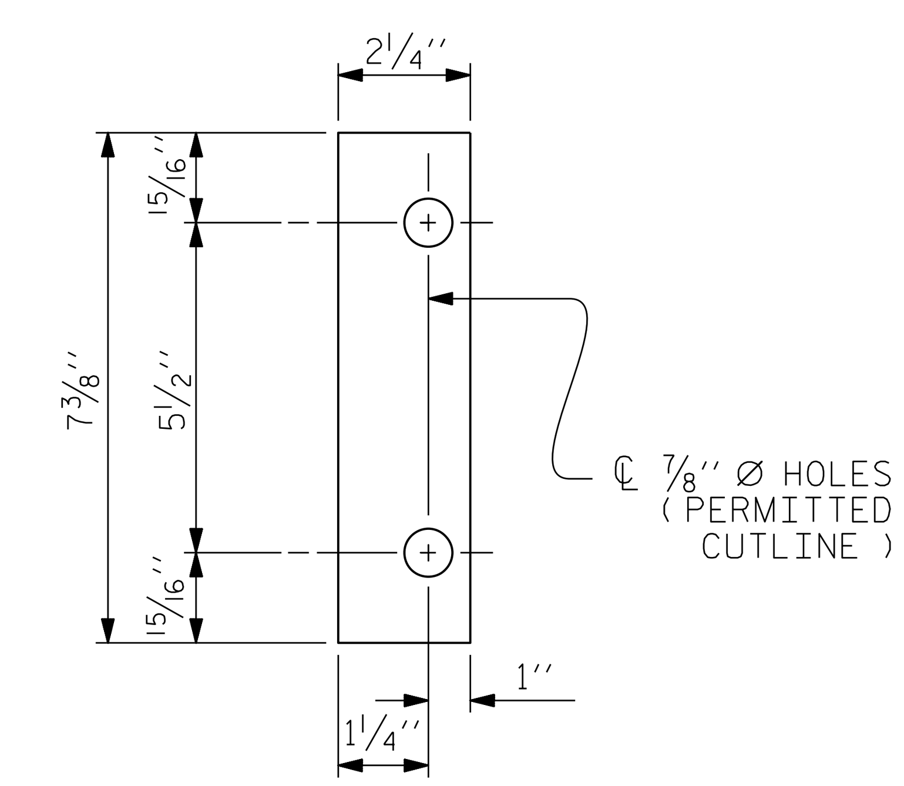
EXPANSION BAR DETAILS



BAR SECTION



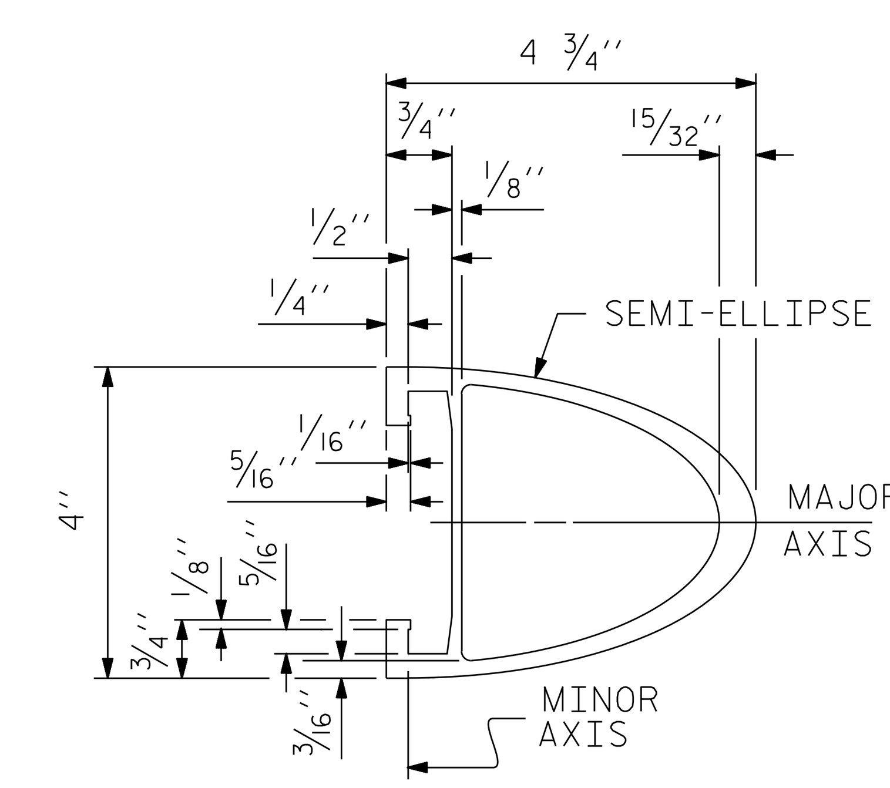
FRONT PLATE



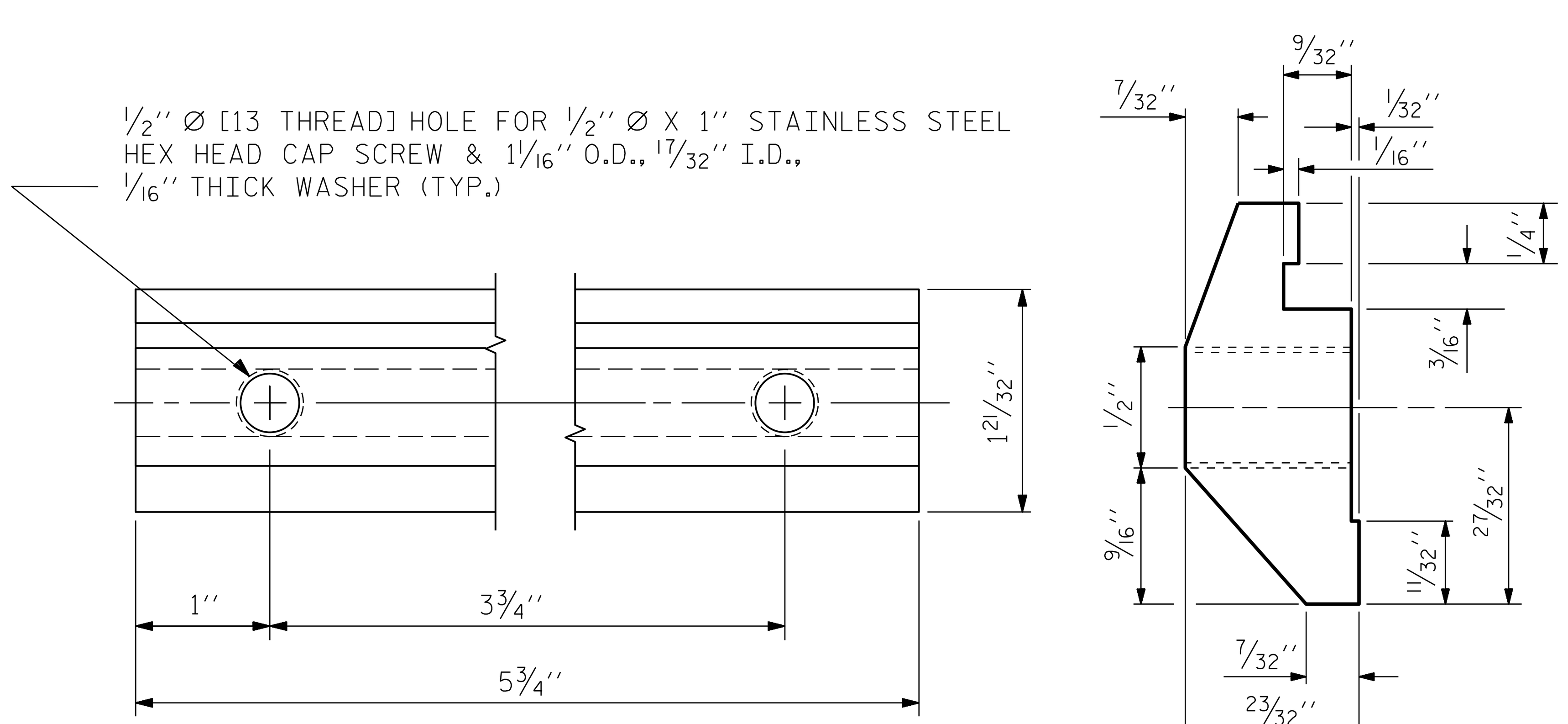
REAR PLATE

SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

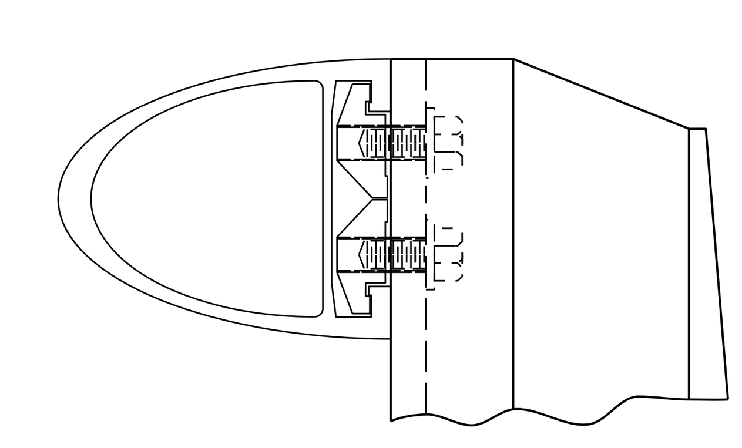


RAIL SECTION

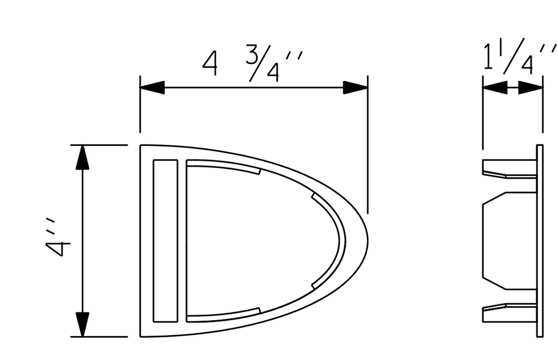


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 2

ENGINEER OF RECORD:

DocuSigned by: Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

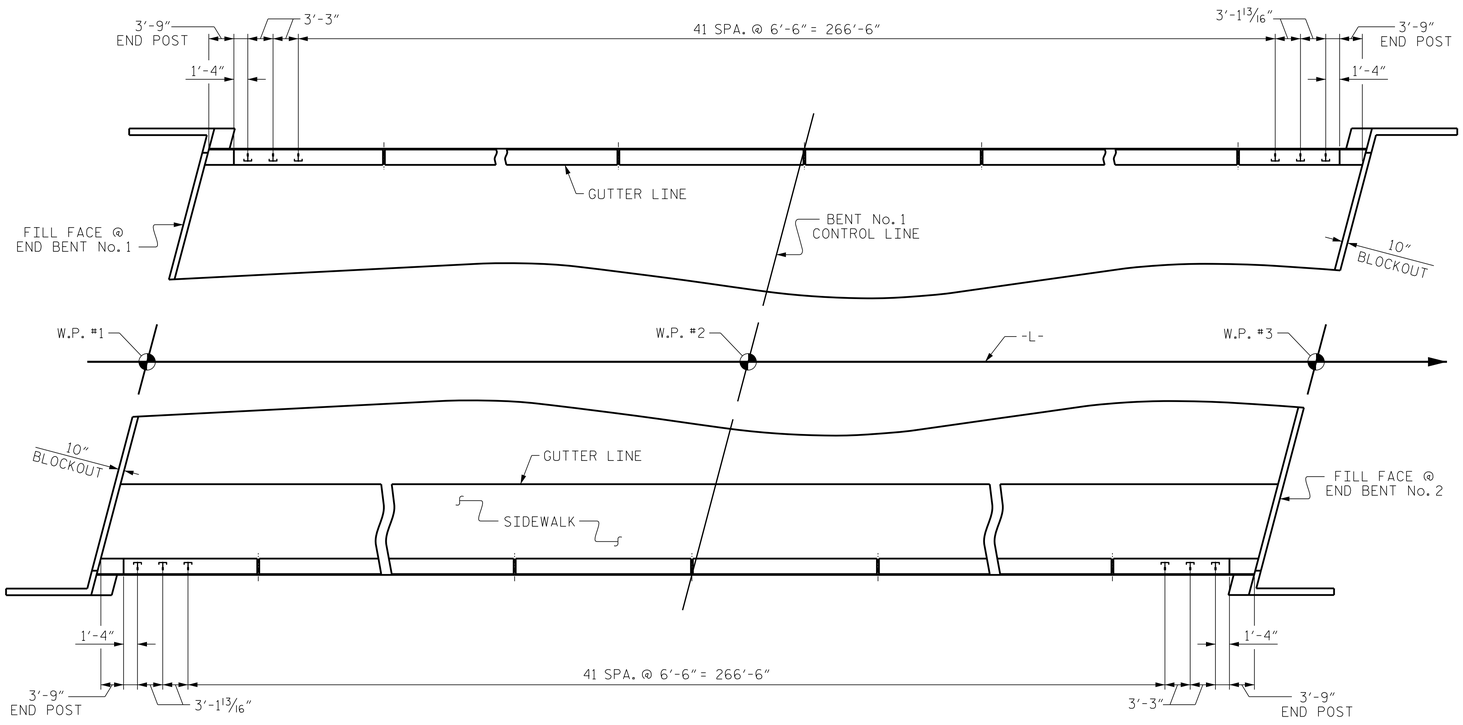
REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S01-27
1			3					TOTAL SHEETS
2			4					46

ASSEMBLED BY : D. HODGE	DATE : 7/16		
CHECKED BY : B.C. HUNT	DATE : 10/16		
DRAWN BY : EEM 6/94	REV. 8/16/99	MAB/LES	
CHECKED BY : RGW 6/94	REV. 5/1/06R	KMM/GM	
	REV. 10/1/11	MAA/GM	

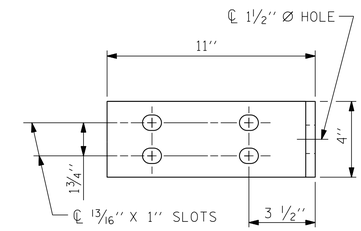
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

$TIME$
$FILE$
$DATE$

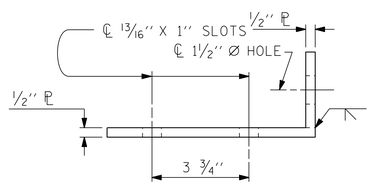
STD. NO. BMR4



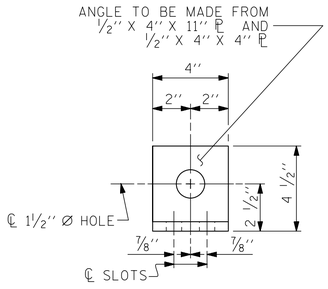
PLAN OF RAIL POST SPACINGS



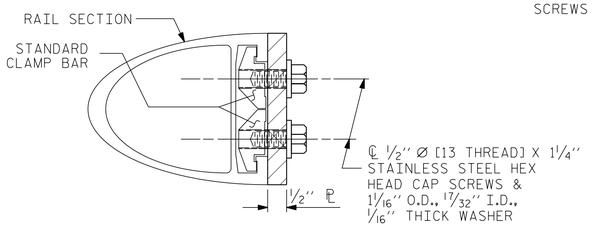
ELEVATION



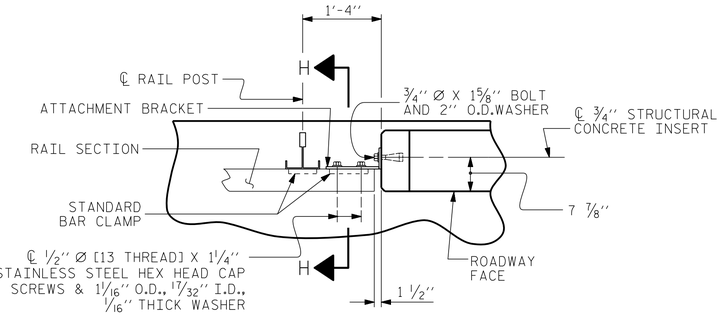
TOP VIEW



END VIEW (FIX AND EXP.)



SECTION H-H (FIX)



PLAN - RAIL AND END POST

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

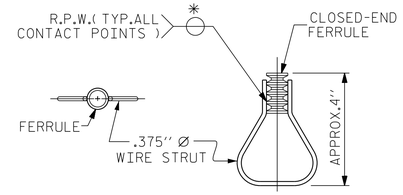
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
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LICENSE NO. F-0377

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

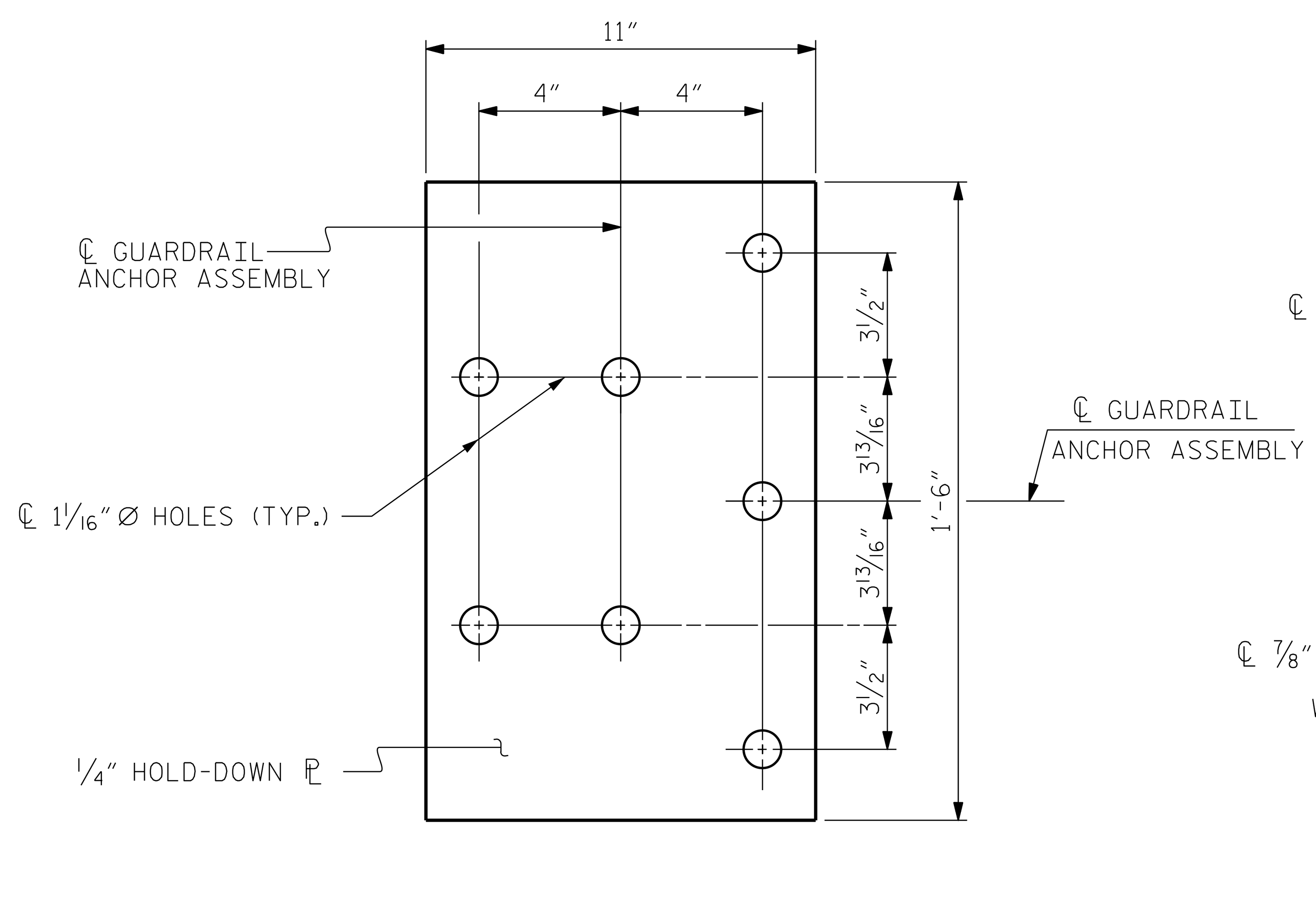
STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-28
1			3			TOTAL SHEETS
2			4			46

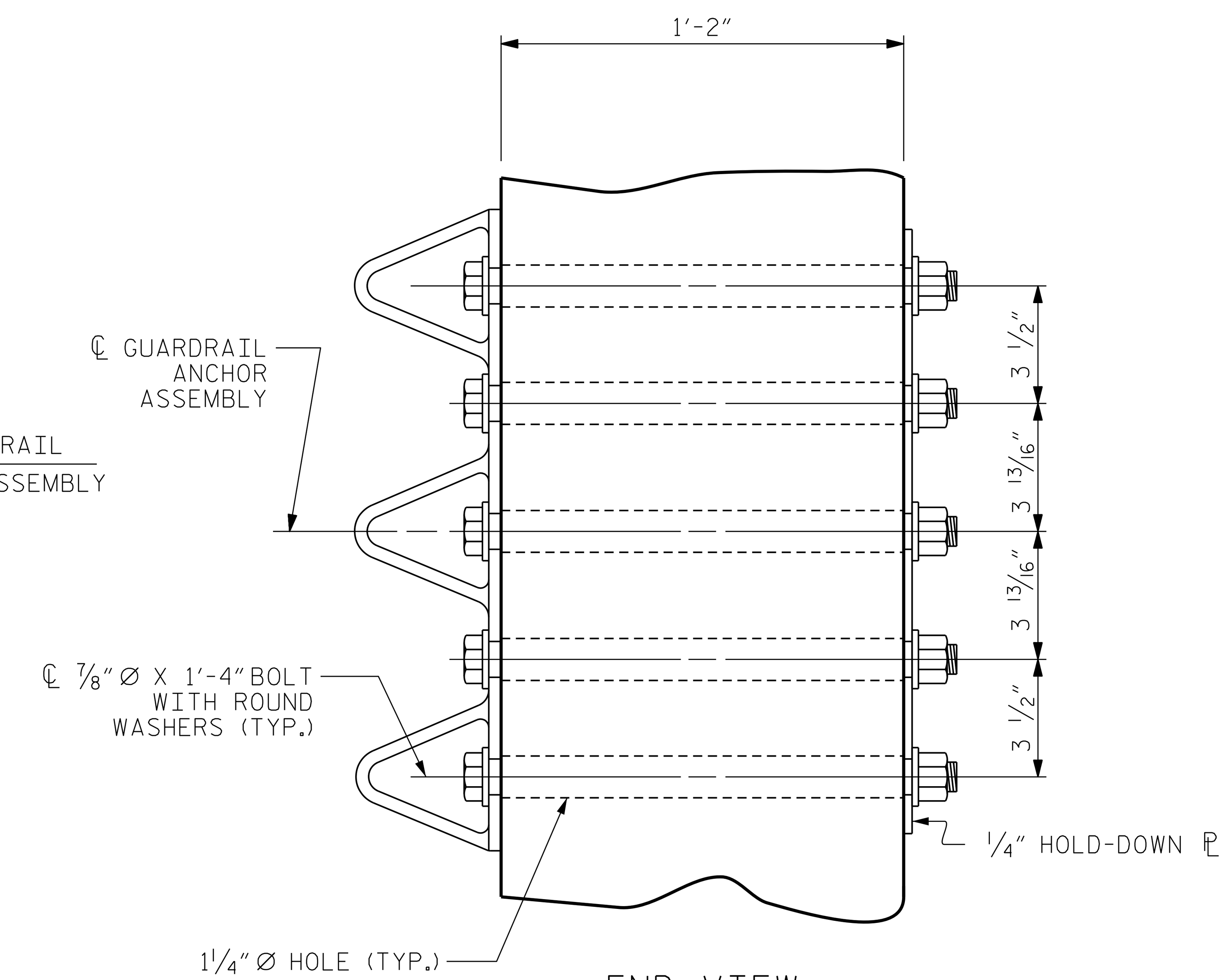
$TIME$
$FILE$
$DATE$

ASSEMBLED BY : D. HODGE		DATE : 7/16	
CHECKED BY : B.C. HUNT		DATE : 10/16	
DRAWN BY : FCJ 1/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : CRK 3/89	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	

STD. NO. BMR2



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 7 - ⅞" Ø BOLTS WITH NUTS AND WASHERS.

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" 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 THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

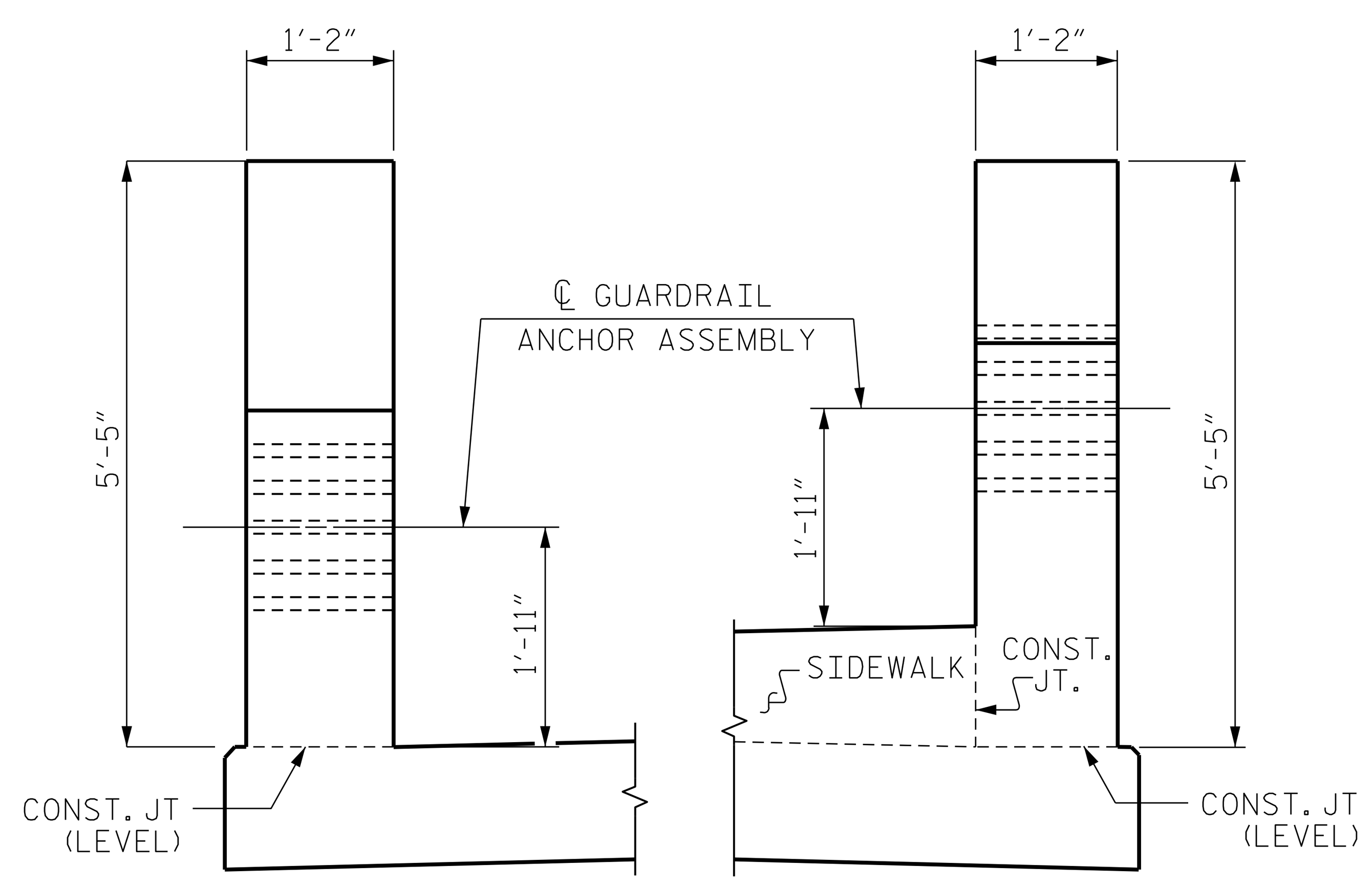
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1¼" 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.

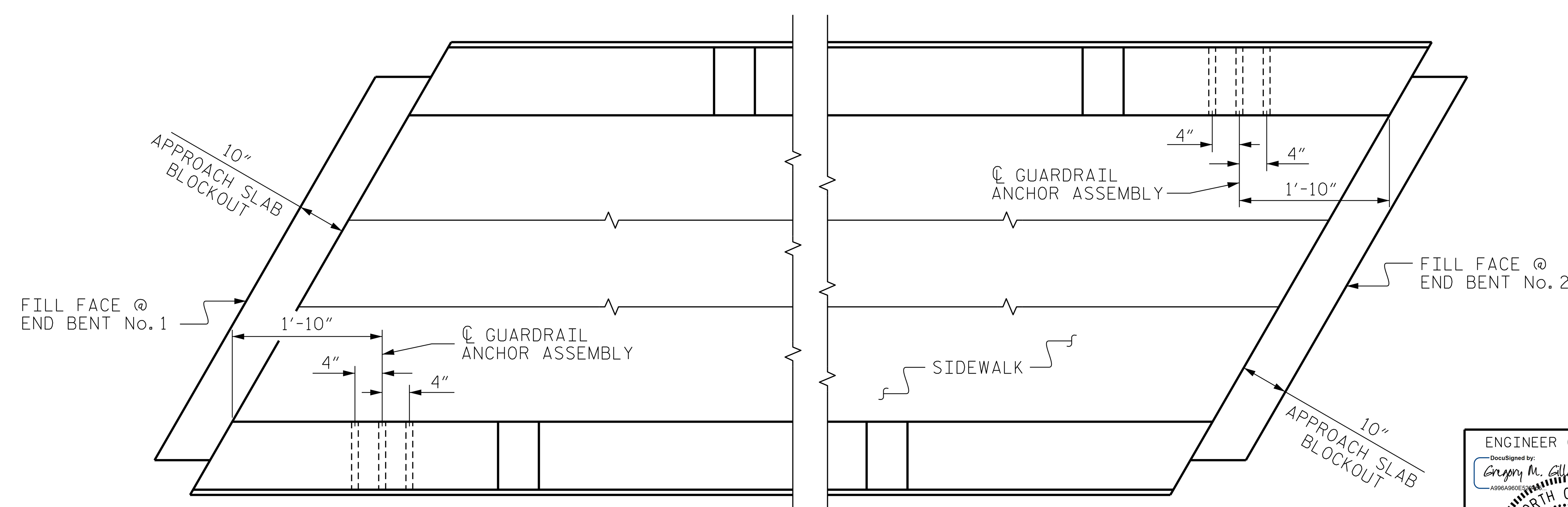
SKETCH SHOWING POINTS OF ATTACHMENT

✳ LOCATION OF GUARDRAIL ATTACHMENT



END VIEW (LEFT SIDE)

END VIEW (RIGHT SIDE)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:

Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

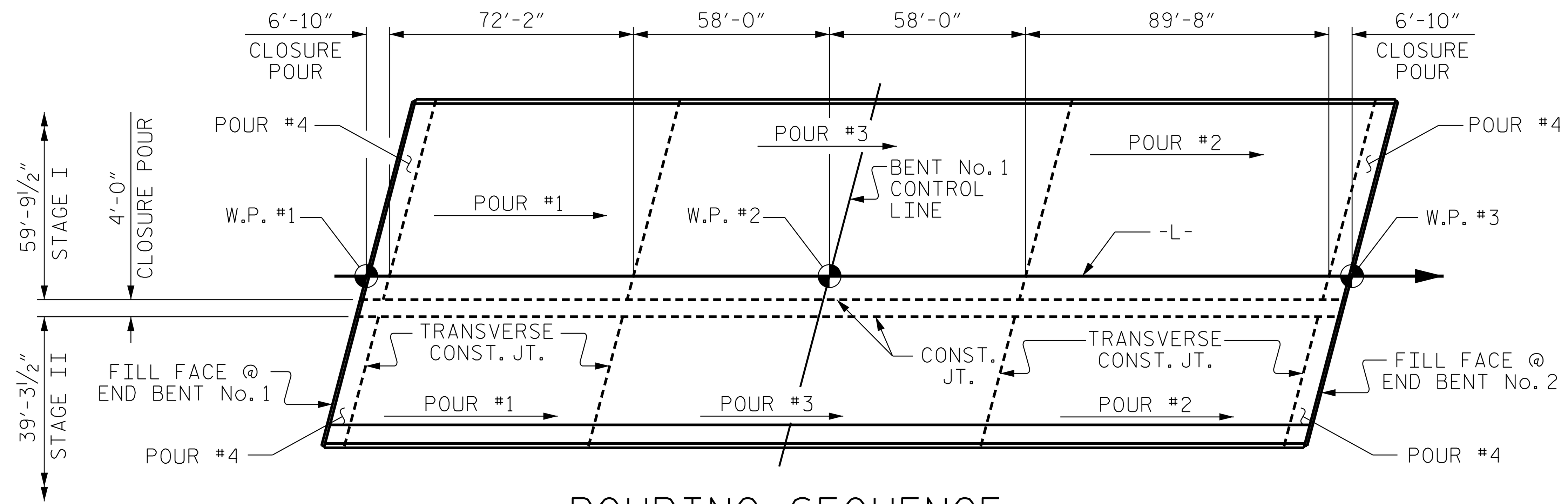
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S01-29
1			3			TOTAL SHEETS	46
2			4				

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

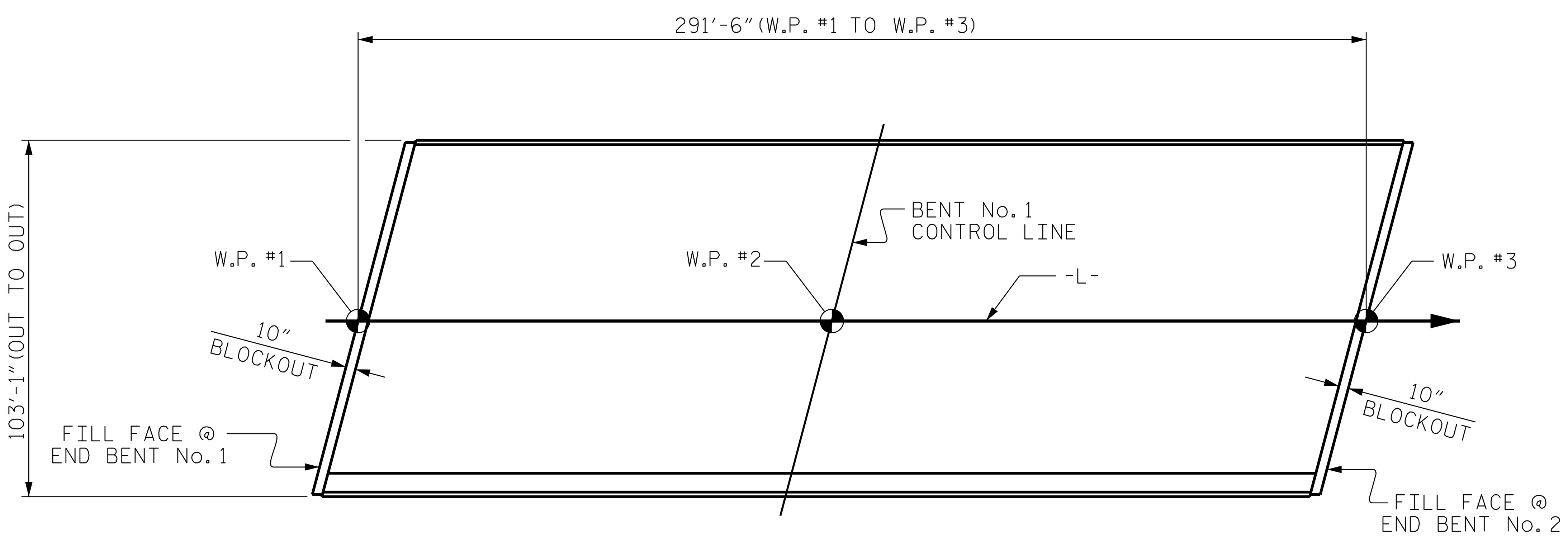
ASSEMBLED BY : D. HODGE		DATE : 8/16	
CHECKED BY : B.C. HUNT		DATE : 10/16	
DRAWN BY : MAA 5/10	REV. 12/5/11		MAA/GM
CHECKED BY : GM 5/10	REV. 6/13		MAA/GM
	REV. 1/15		MAA/TMG

$TIME$
$FILE$
$DATE$

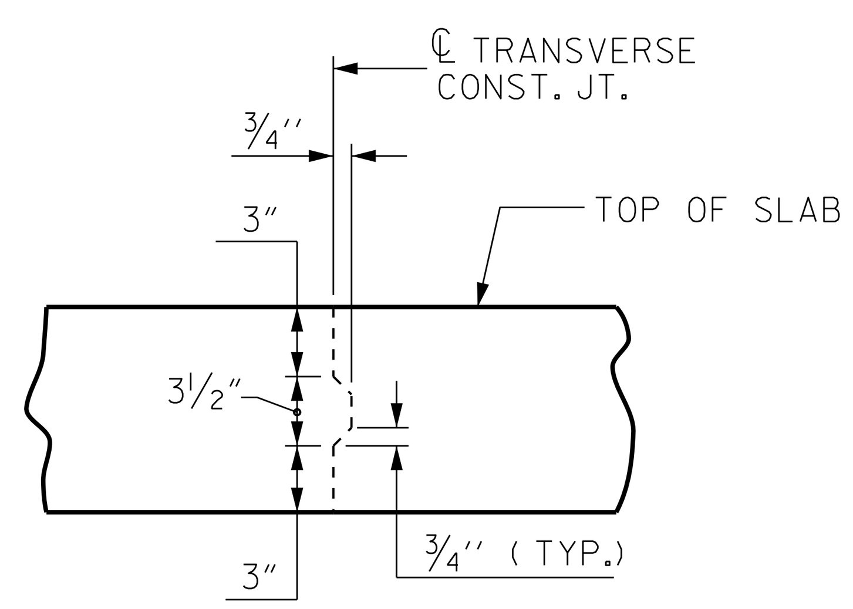
STD. NO. GRA3



POURING SEQUENCE



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 30,049)



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	STAGE I	2,769 SQ.FT.
	STAGE II	1,675 SQ.FT.
BRIDGE DECK	STAGE I	16,517 SQ.FT.
	STAGE II	10,142 SQ.FT.
TOTAL		31,103 SQ.FT.

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	597	#5	STR	59'-5"	36997
A2	597	#5	STR	59'-5"	36997
* A101	2	#5	STR	58'-9"	123
* A102	2	#5	STR	57'-0"	119
* A103	2	#5	STR	55'-3"	115
* A104	2	#5	STR	53'-7"	112
* A105	2	#5	STR	51'-10"	108
* A106	2	#5	STR	50'-1"	104
* A107	2	#5	STR	48'-4"	101
* A108	2	#5	STR	46'-7"	97
* A109	2	#5	STR	44'-10"	94
* A110	2	#5	STR	43'-2"	90
* A111	2	#5	STR	41'-5"	86
* A112	2	#5	STR	39'-8"	83
* A113	2	#5	STR	37'-11"	79
* A114	2	#5	STR	36'-2"	75
* A115	2	#5	STR	34'-5"	72
* A116	2	#5	STR	32'-9"	68
* A117	2	#5	STR	31'-0"	65
* A118	2	#5	STR	29'-3"	61
* A119	2	#5	STR	27'-6"	57
* A120	2	#5	STR	25'-9"	54
* A121	2	#5	STR	24'-0"	50
* A122	2	#5	STR	22'-4"	47
* A123	2	#5	STR	20'-7"	43
* A124	2	#5	STR	18'-10"	39
* A125	2	#5	STR	17'-1"	36
* A126	2	#5	STR	15'-4"	32
* A127	2	#5	STR	13'-7"	28
* A128	2	#5	STR	11'-11"	25
* A129	2	#5	STR	10'-2"	21
* A130	2	#5	STR	8'-5"	18
* A131	2	#5	STR	6'-8"	14
* A132	2	#5	STR	4'-11"	10
* A133	2	#5	STR	3'-2"	7
A201	2	#5	STR	58'-9"	123
A202	2	#5	STR	57'-0"	119
A203	2	#5	STR	55'-3"	115
A204	2	#5	STR	53'-7"	112
A205	2	#5	STR	51'-10"	108
A206	2	#5	STR	50'-1"	104
A207	2	#5	STR	48'-4"	101
A208	2	#5	STR	46'-7"	97
A209	2	#5	STR	44'-10"	94
A210	2	#5	STR	43'-2"	90
A211	2	#5	STR	41'-5"	86
A212	2	#5	STR	39'-8"	83
A213	2	#5	STR	37'-11"	79

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A214	2	#5	STR	36'-2"	75
A215	2	#5	STR	34'-5"	72
A216	2	#5	STR	32'-9"	68
A217	2	#5	STR	31'-0"	65
A218	2	#5	STR	29'-3"	61
A219	2	#5	STR	27'-6"	57
A220	2	#5	STR	25'-9"	54
A221	2	#5	STR	24'-0"	50
A222	2	#5	STR	22'-4"	47
A223	2	#5	STR	20'-7"	43
A224	2	#5	STR	18'-10"	39
A225	2	#5	STR	17'-1"	36
A226	2	#5	STR	15'-4"	32
A227	2	#5	STR	13'-7"	28
A228	2	#5	STR	11'-11"	25
A229	2	#5	STR	10'-2"	21
A230	2	#5	STR	8'-5"	18
A231	2	#5	STR	6'-8"	14
A232	2	#5	STR	4'-11"	10
A233	2	#5	STR	3'-2"	7
* B1	79	#7	STR	27'-0"	4360
* B2	80	#4	STR	29'-9"	1590
* B3	158	#7	STR	56'-2"	18139
* B4	120	#4	STR	26'-6"	2124
* B5	79	#7	STR	30'-6"	4925
* B6	11	#4	STR	28'-2"	207
B7	370	#5	STR	59'-8"	23026
* D1	628	#5	STR	5'-11"	3875
D2	628	#5	STR	5'-5"	3548
K1	72	#4	STR	21'-9"	1046
* S1	106	#4	1	11'-11"	844
* S2	106	#4	1	11'-4"	802
U1	106	#4	2	14'-1"	997
U2	2	#4	2	13'-3"	18

REINFORCING STEEL LBS. 67,765

* EPOXY COATED REINFORCING STEEL LBS. 75,996

* THESE BARS ARE EPOXY COATED.

STAGE II

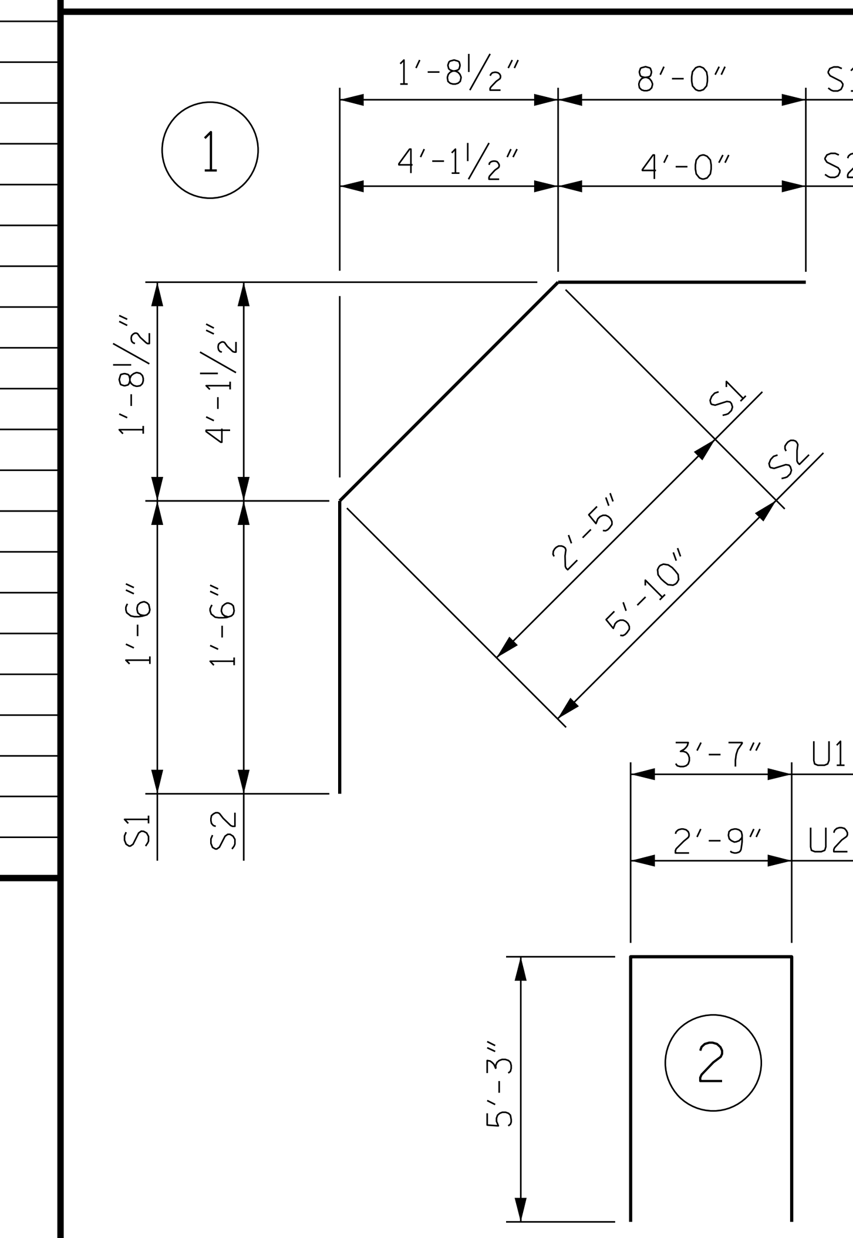
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	609	#5	STR	38'-11"	24719
A4	609	#5	STR	38'-11"	24719
* A301	2	#5	STR	38'-1"	79
* A302	2	#5	STR	36'-4"	76
* A303	2	#5	STR	34'-8"	72
* A304	2	#5	STR	32'-11"	69
* A305	2	#5	STR	31'-2"	65
* A306	2	#5	STR	29'-5"	61
* A307	2	#5	STR	27'-8"	58
* A308	2	#5	STR	25'-11"	54
* A309	2	#5	STR	24'-3"	51
* A310	2	#5	STR	22'-6"	47
* A311	2	#5	STR	20'-9"	43
* A312	2	#5	STR	19'-0"	40
* A313	2	#5	STR	17'-3"	36
* A314	2	#5	STR	15'-6"	32
* A315	2	#5	STR	13'-10"	29
* A316	2	#5	STR	12'-1"	25
* A317	2	#5	STR	10'-4"	22
* A318	2	#5	STR	8'-7"	18
* A319	2	#5	STR	6'-10"	14
* A320	2	#5	STR	5'-1"	11
* A321	2	#5	STR	3'-5"	7
A401	2	#5	STR	38'-1"	79
A402	2	#5	STR	36'-4"	76
A403	2	#5	STR	34'-8"	72
A404	2	#5	STR	32'-11"	69
A405	2	#5	STR	31'-2"	65
A406	2	#5	STR	29'-5"	61
A407	2	#5	STR	27'-8"	58
A408	2	#5	STR	25'-11"	54
A409	2	#5	STR	24'-3"	51
A410	2	#5	STR	22'-6"	47
A411	2	#5	STR	20'-9"	43
A412	2	#5	STR	19'-0"	40
A413	2	#5	STR	17'-3"	36
A414	2	#5	STR	15'-6"	32
A415	2	#5	STR	13'-10"	29
A416	2	#5	STR	12'-1"	25
A417	2	#5	STR	10'-4"	22
A418	2	#5	STR	8'-7"	18
A419	2	#5	STR	6'-10"	14
A420	2	#5	STR	5'-1"	11
A421	2	#5	STR	3'-5"	7

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	57	#7	STR	27'-0"	3146
* B2	58	#4	STR	29'-9"	1153
* B3	114	#7	STR	56'-2"	13088
* B4	87	#4	STR	26'-6"	1540
* B5	57	#7	STR	30'-6"	3553
* B6	11	#4	STR	28'-2"	207
B7	280	#5	STR	59'-8"	17425
* D1	628	#5	STR	5'-11"	3875
D2	628	#5	STR	5'-5"	3548
K2	48	#4	STR	23'-1"	740
* S1	76	#4	1	11'-11"	605
* S2	76	#4	1	11'-4"	575
U1	76	#4	2	14'-1"	715
U2	2	#4	2	13'-3"	18

REINFORCING STEEL LBS. 48,074

* EPOXY COATED REINFORCING STEEL LBS. 53,370

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	* EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
STAGE I	696.2	67,765	75,996
STAGE II	513.3	48,074	53,370
TOTALS**	1,209.5	115,839	129,366

** QUANTITIES FOR PARAPET, CONCRETE MEDIAN AND SIDEWALK ARE NOT INCLUDED

CONCRETE BREAKDOWN

	CLASS AA CONCRETE	
	(CU. YDS.)	
	STAGE I	STAGE II
POUR #1	147.9	97.7
POUR #2	184.4	121.4
POUR #3	238.6	157.1
POUR #4	125.3	82.2
CLOSURE POUR	----	54.9
TOTALS	696.2	513.3

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

ENGINEER OF RECORD:

DocuSigned by: Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-30
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 9/16

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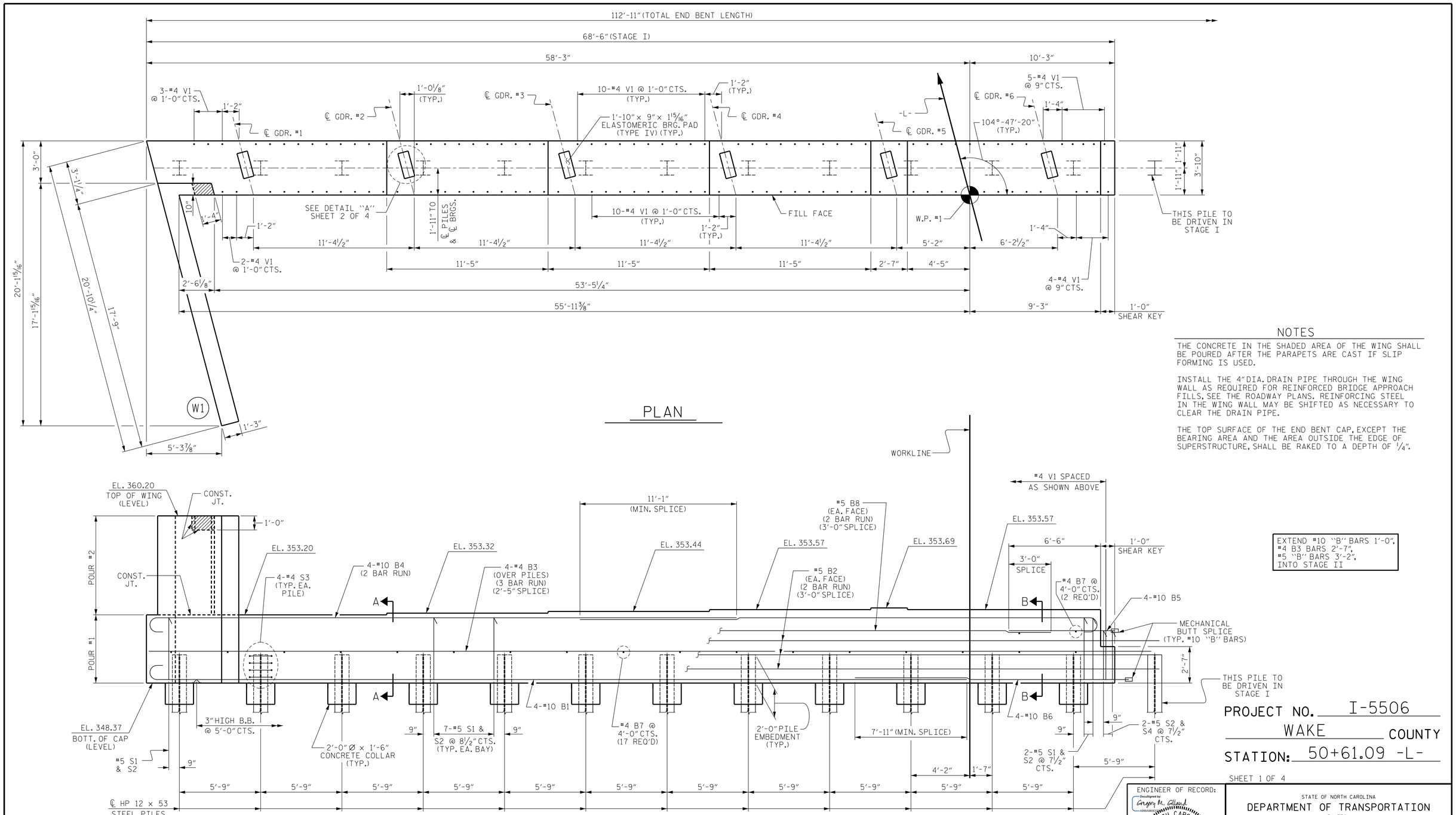

PLAN

NOTES

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPETS ARE CAST IF SLIP FORMING IS USED.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".

ELEVATION

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 4

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1
STAGE I

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

SHEET NO. S01-31
TOTAL SHEETS 46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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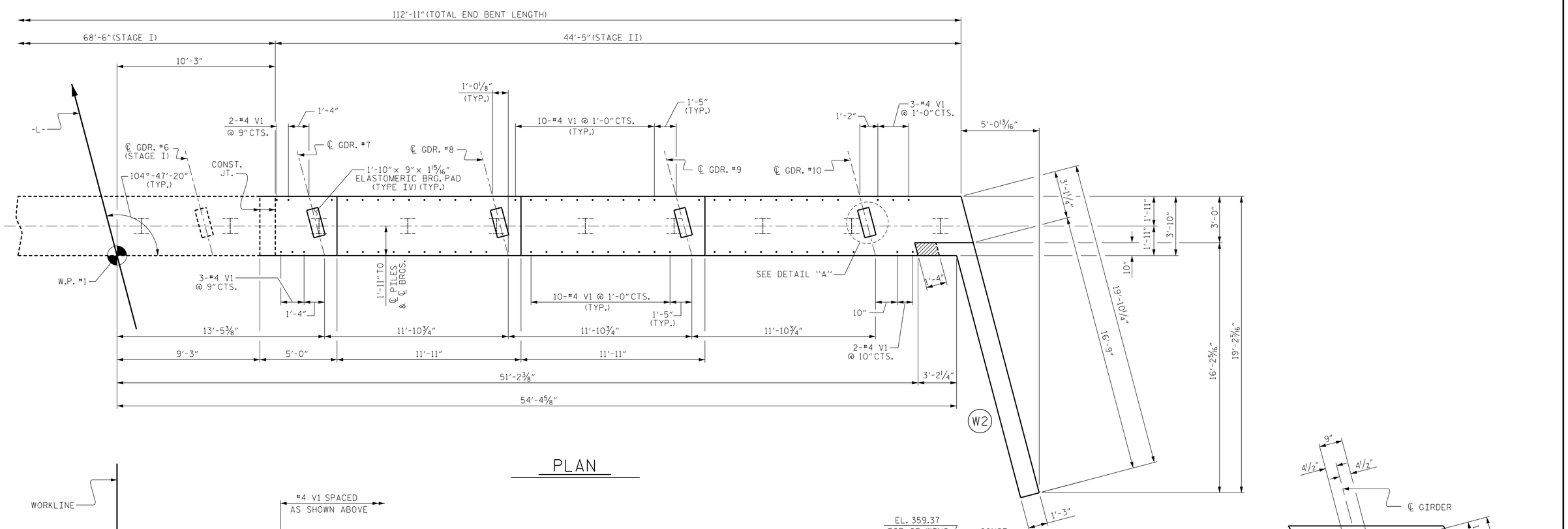
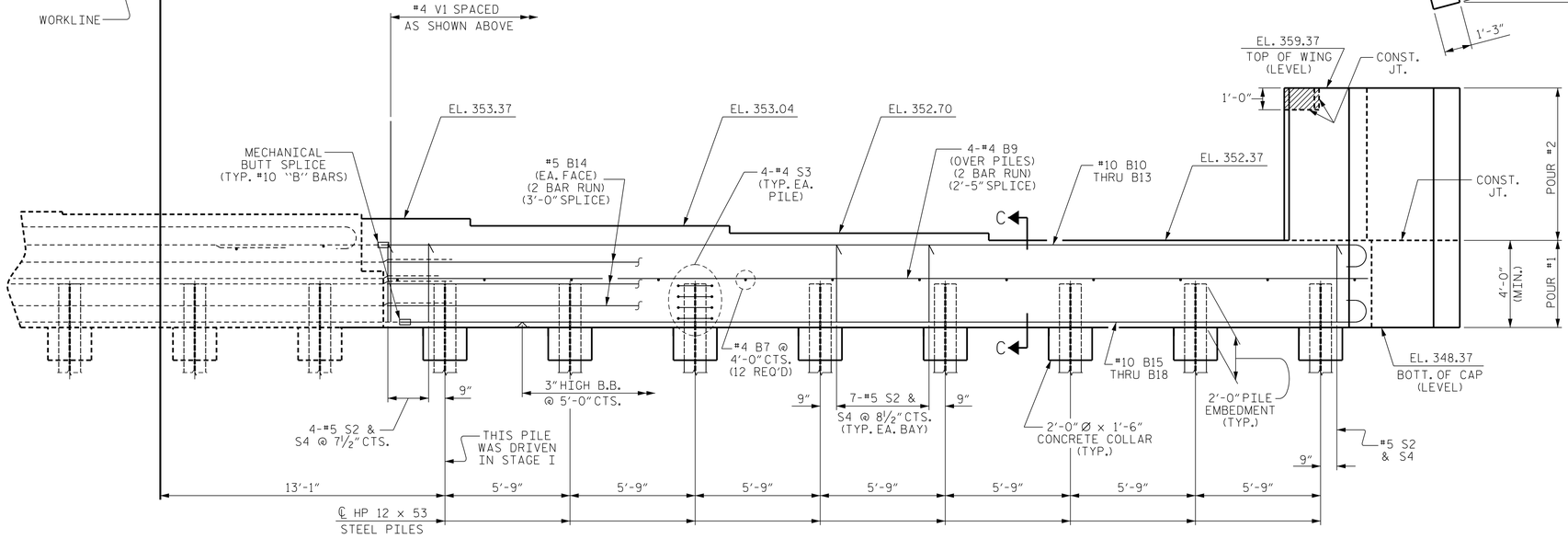
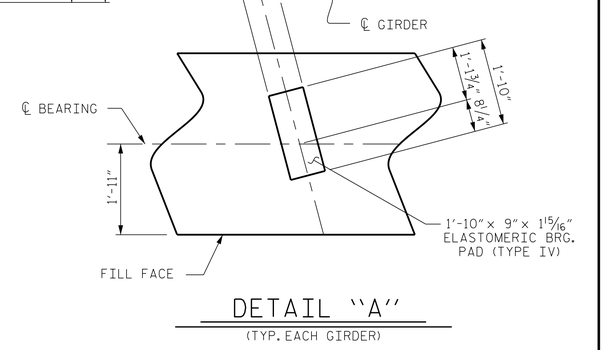
$TIME$
$FILE$
$DATE$



PLAN



ELEVATION



DETAIL "A"

(TYP. EACH GIRDER)

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 4

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-32
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 8/16
CHECKED BY : B.C. HUNT DATE : 10/16

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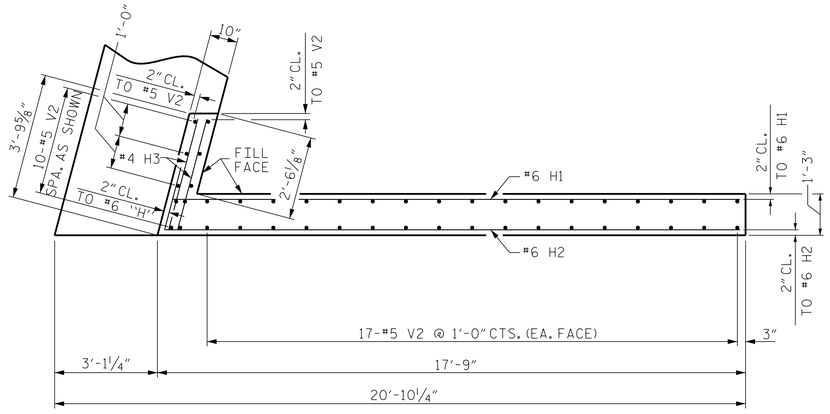
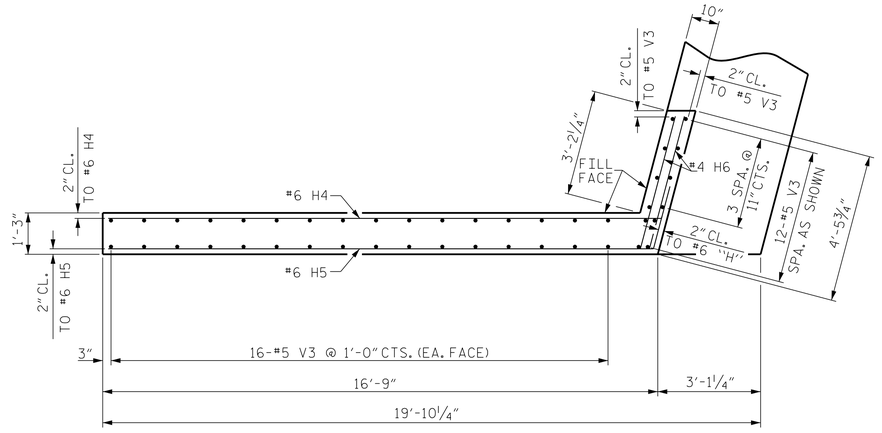
$FILE$ $DATE$ $TIME$

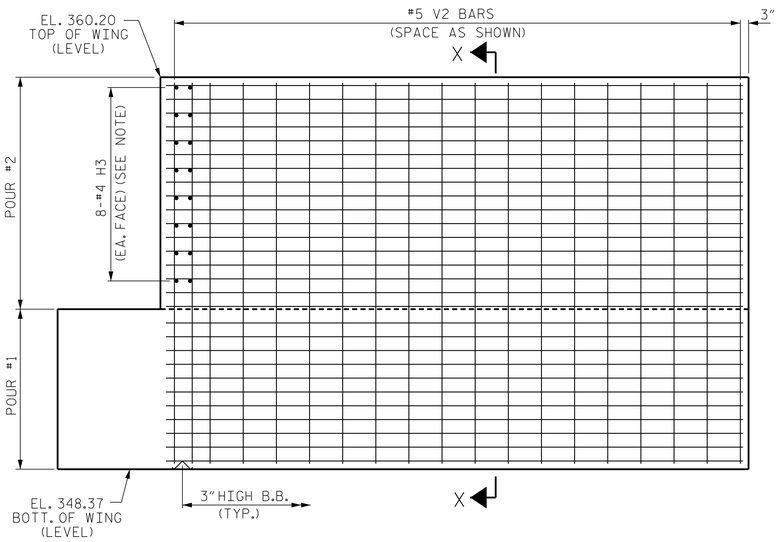


PLAN OF WING - W1

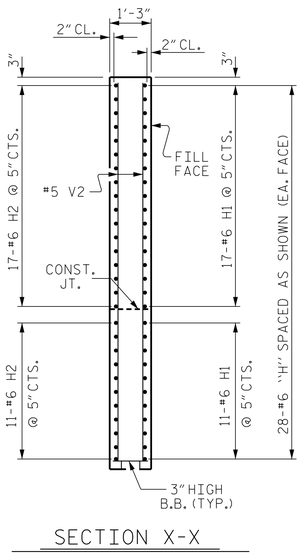
NOTE: #4 H3 & H6 TO BE PLACED TO MATCH EVERY OTHER #6 "H" BAR



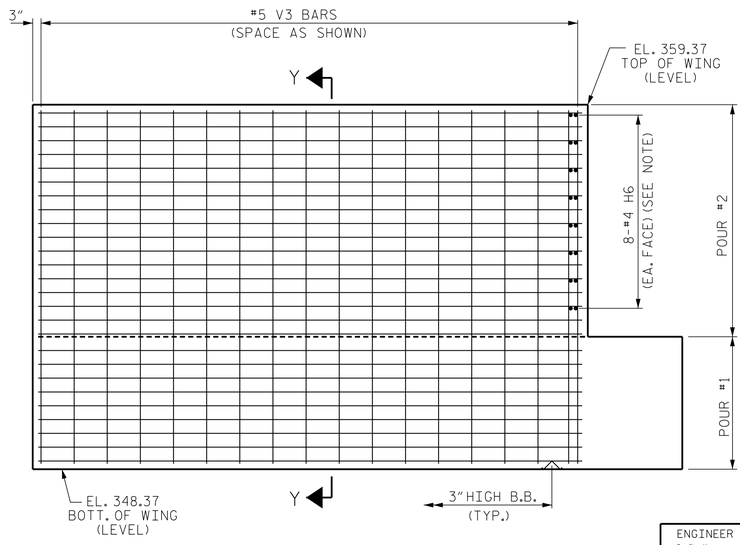
PLAN OF WING - W2



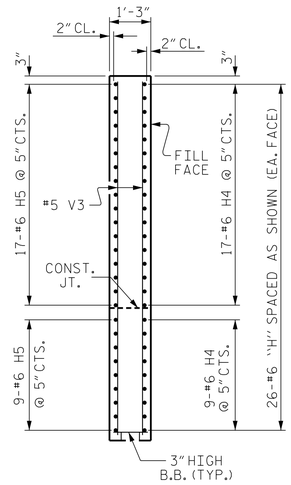
ELEVATION OF WING - W1



SECTION X-X



ELEVATION OF WING - W2



SECTION Y-Y

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 4

ENGINEER OF RECORD:

Docusigned by: Gregory M. Galland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND 7/31/2017

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

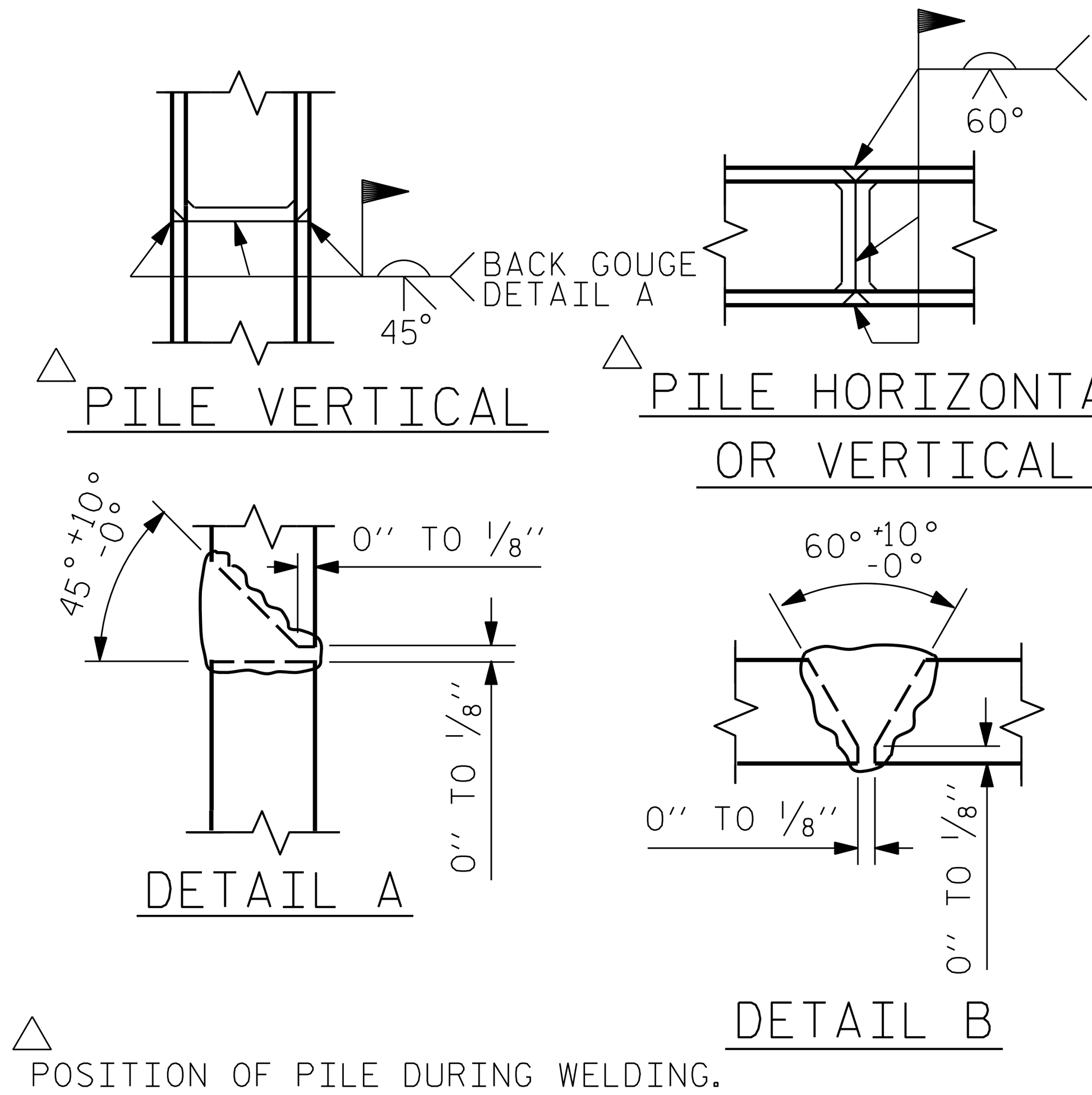
SUBSTRUCTURE
END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-33
1			3			TOTAL SHEETS
2			4			46

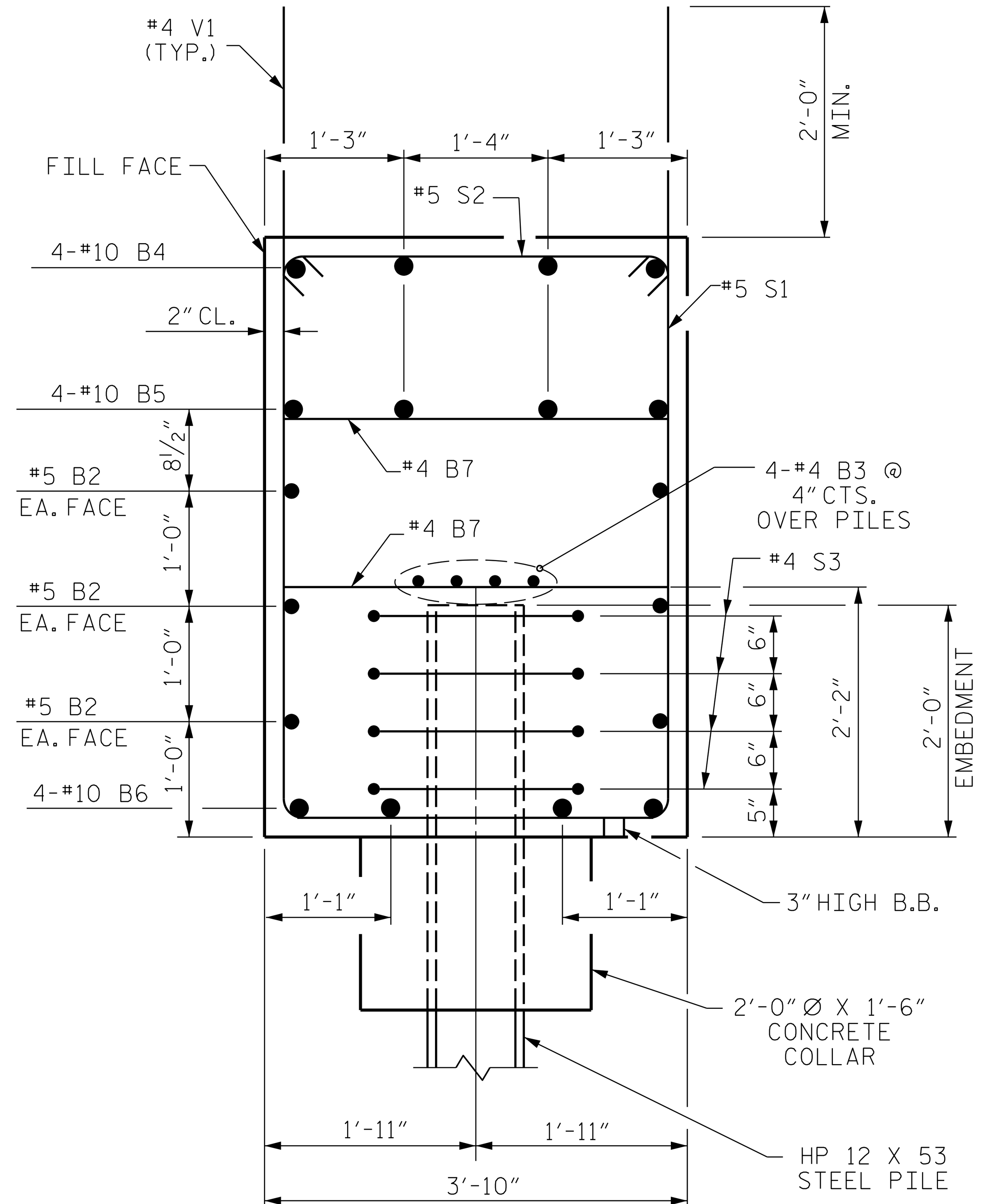
DRAWN BY : D. HODGE DATE : 9/16
CHECKED BY : B.C. HUNT DATE : 10/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

$FILE$ $DATE$ $TIME$

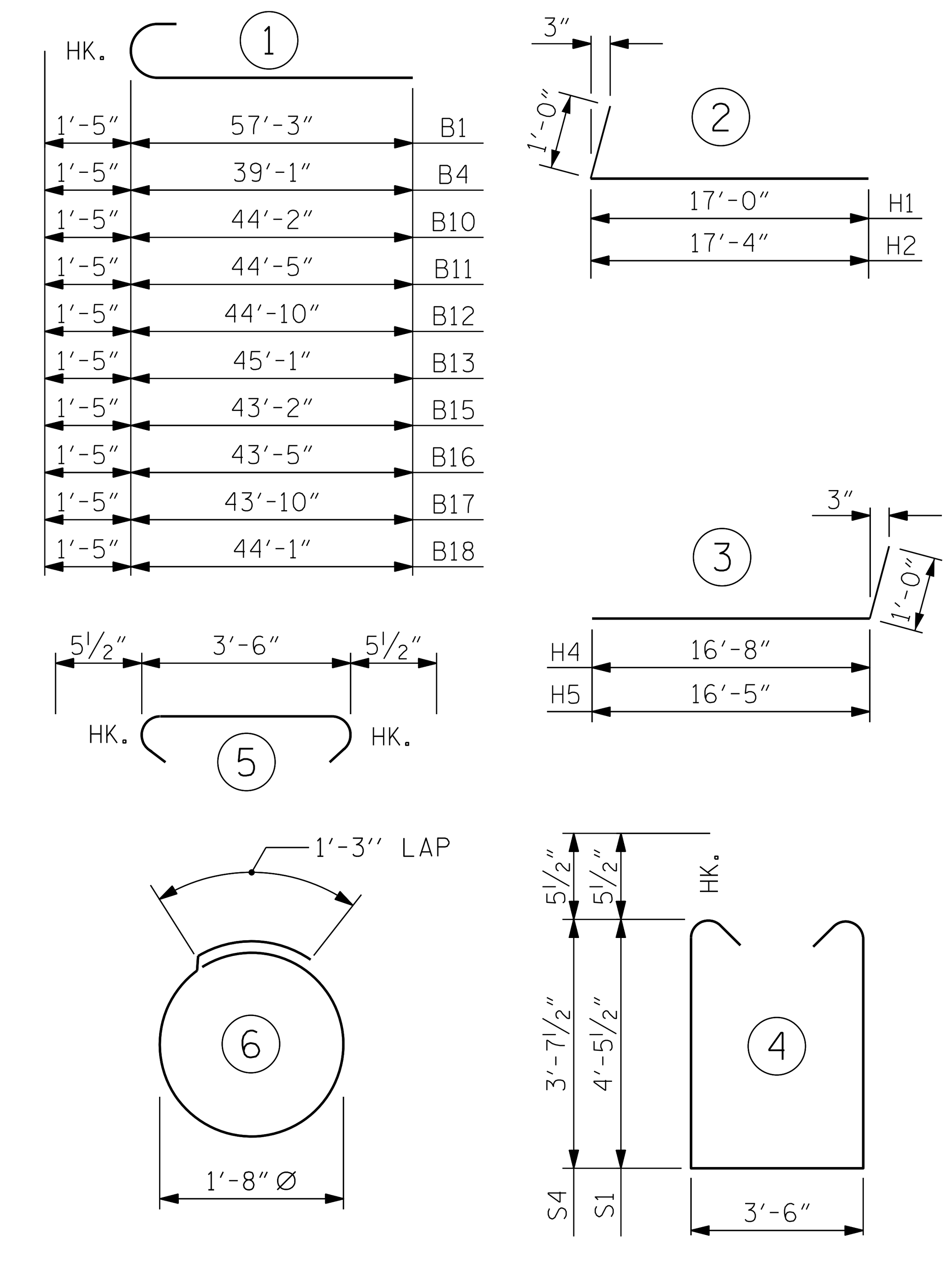


PILE SPLICE DETAILS



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

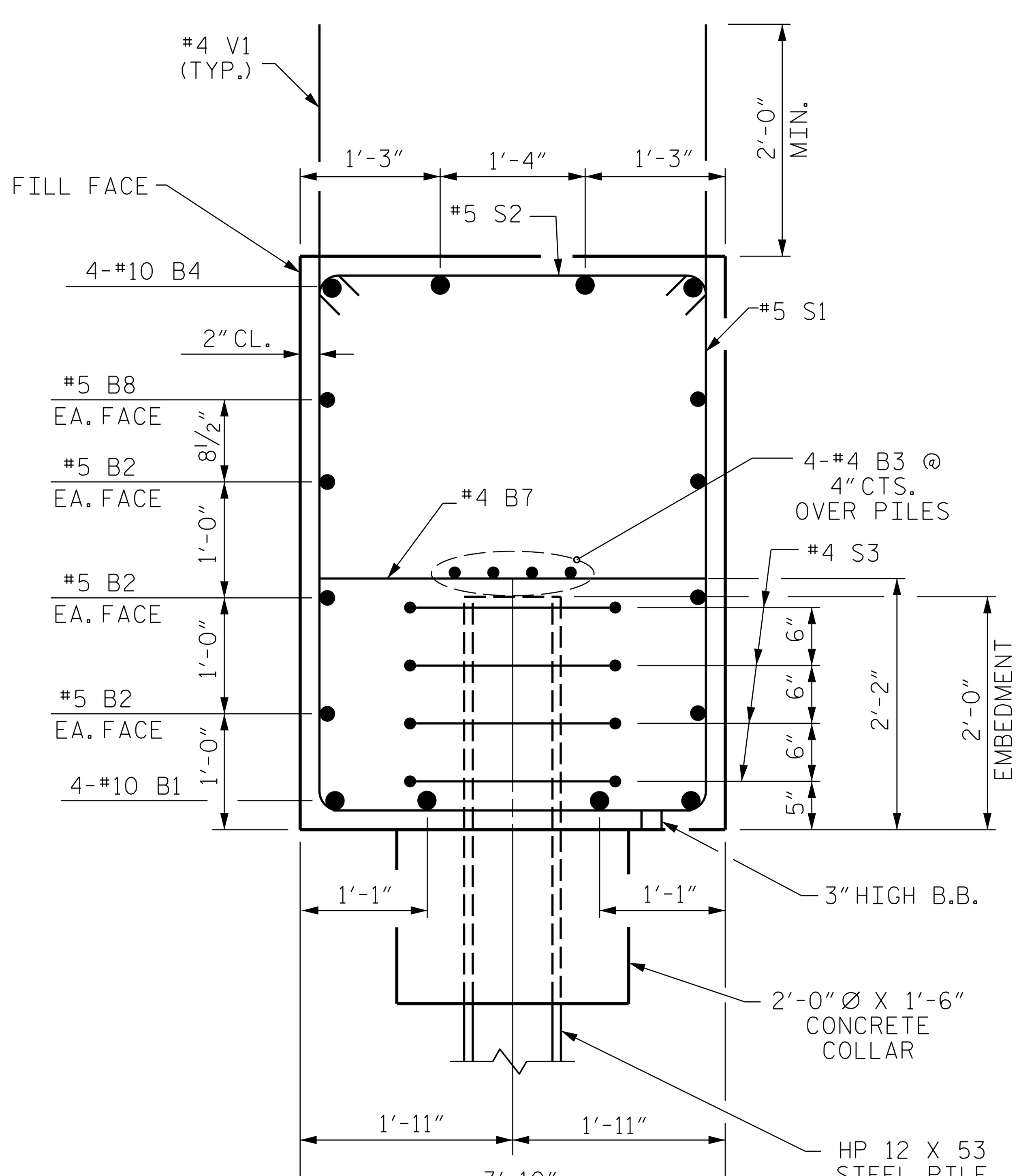
END BENT No. 1

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	58'-8"	1010	B7	12	#4	STR	3'-6"	28
B2	12	#5	STR	37'-3"	466	B9	8	#4	STR	23'-8"	126
B3	12	#4	STR	25'-3"	202	B10	1	#10	1	45'-7"	196
B4	8	#10	1	40'-6"	1394	B11	1	#10	1	45'-10"	197
B5	4	#10	STR	7'-6"	129	B12	1	#10	1	46'-3"	199
B6	4	#10	STR	19'-10"	341	B13	1	#10	1	46'-6"	200
B7	19	#4	STR	3'-6"	44	B14	12	#5	STR	24'-0"	300
B8	4	#5	STR	33'-5"	139	B15	1	#10	1	44'-7"	192
						B16	1	#10	1	44'-10"	193
H1	28	#6	2	18'-0"	757	B17	1	#10	1	45'-3"	195
H2	28	#6	2	18'-4"	771	B18	1	#10	1	45'-6"	196
H3	16	#4	STR	3'-5"	37						
						H4	26	#6	3	17'-8"	690
S1	80	#5	4	13'-4"	1113	H5	26	#6	3	17'-5"	680
S2	82	#5	5	4'-5"	378	H6	16	#4	STR	4'-1"	44
S3	48	#4	6	6'-6"	208						
S4	2	#5	4	11'-8"	24	S2	54	#5	5	4'-5"	249
						S3	32	#4	6	6'-6"	139
V1	114	#4	STR	7'-0"	533	S4	54	#5	4	11'-8"	657
V2	44	#5	STR	11'-5"	524						
						V1	70	#4	STR	7'-0"	327
						V3	44	#5	STR	10'-7"	486
REINFORCING STEEL					8,070 LBS.	REINFORCING STEEL					5,294 LBS.

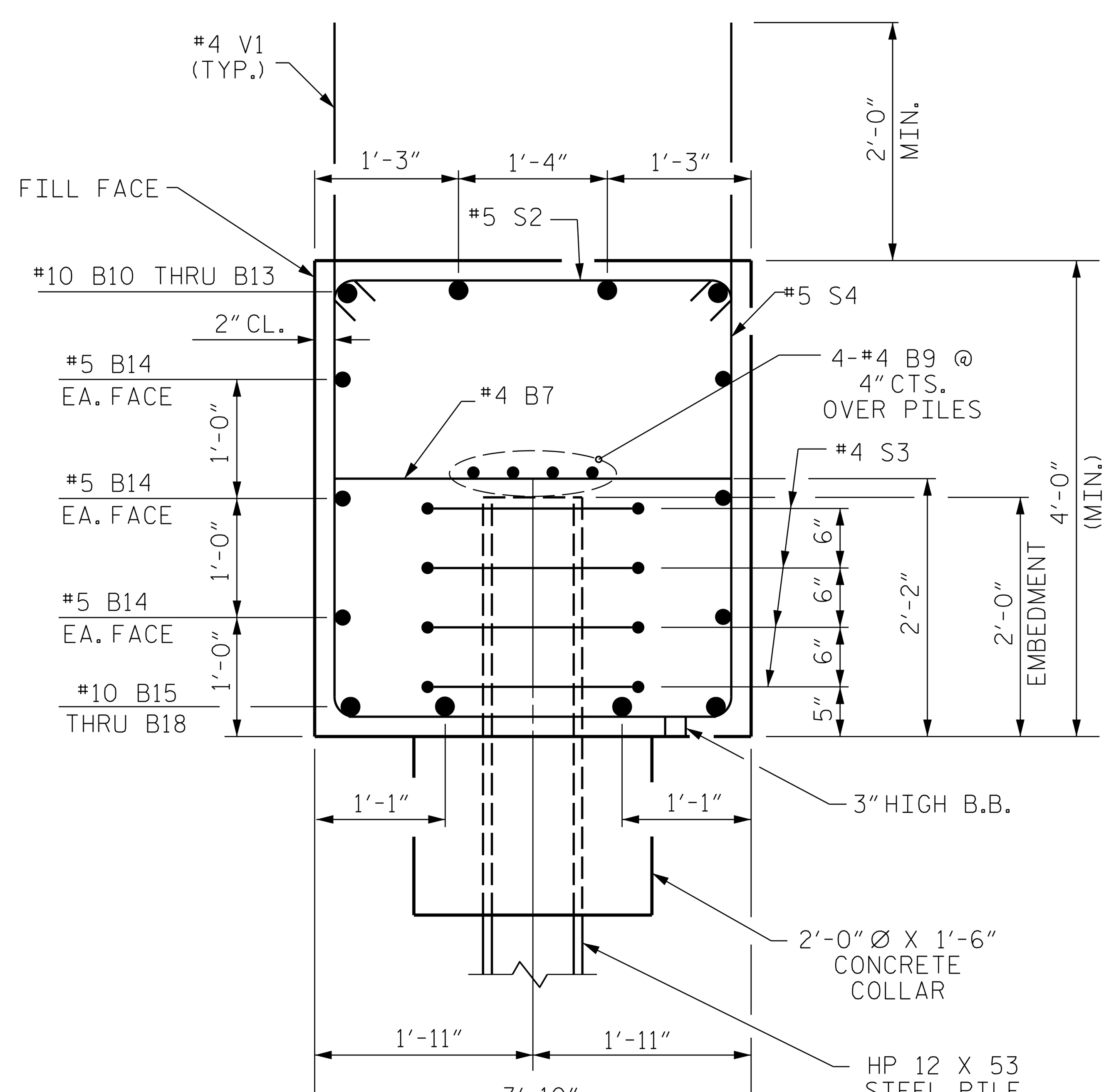
STAGE I		STAGE II	
CLASS A CONCRETE BREAKDOWN		CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP, CONC. COLLARS & LOWER PART OF WINGS	53.5 C.Y.	POUR #1 CAP, CONC. COLLARS & LOWER PART OF WINGS	33.2 C.Y.
POUR #2 UPPER PART OF WINGS	6.2 C.Y.	POUR #2 UPPER PART OF WINGS	6.1 C.Y.
TOTAL CLASS A CONCRETE	59.7 C.Y.	TOTAL CLASS A CONCRETE	39.3 C.Y.
HP 12 X 53 STEEL PILES NO: 13	156.0 L.F.	HP 12 X 53 STEEL PILES NO: 7	84.0 L.F.
PILE EXCAVATION IN SOIL	52.0 L.F.	PILE EXCAVATION IN SOIL	28.0 L.F.
PILE EXCAVATION NOT IN SOIL	78.0 L.F.	PILE EXCAVATION NOT IN SOIL	42.0 L.F.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	13 EA.	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	7 EA.

TOTAL QUANTITIES

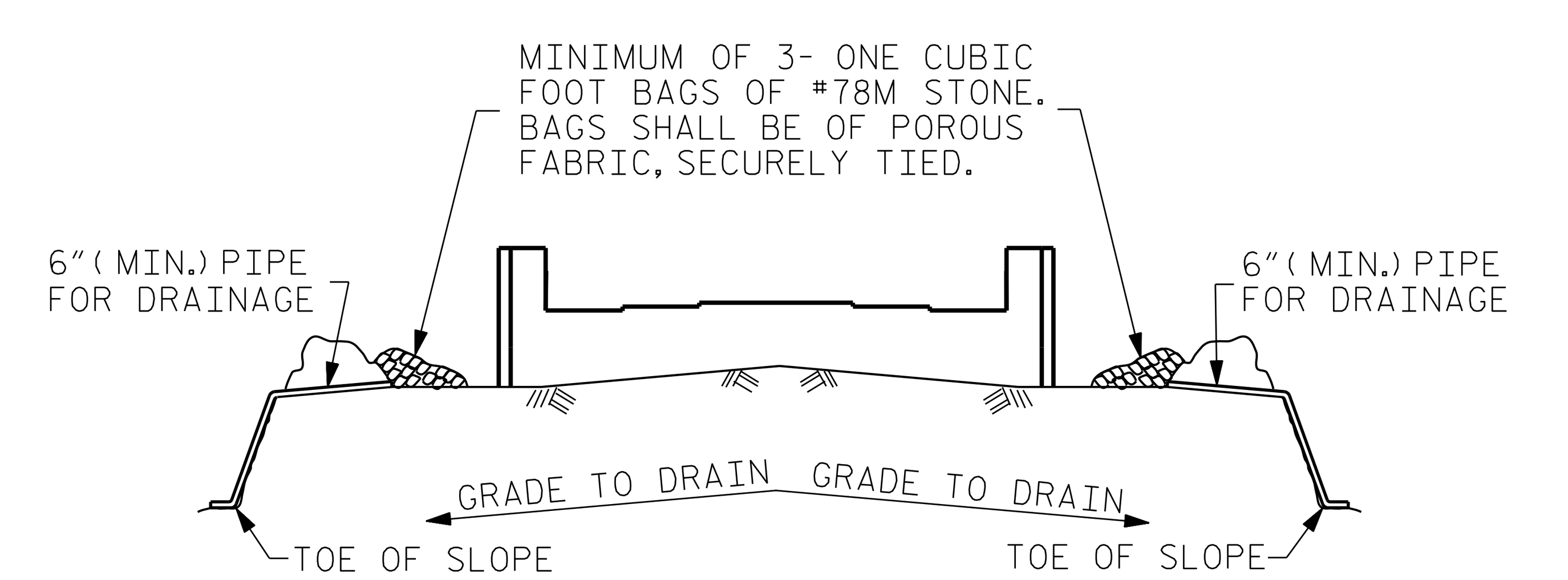
REINFORCING STEEL	13,364 LBS.
CLASS "A" CONCRETE TOTAL	99.0 C.Y.
HP 12 X 53 STEEL PILES NO: 20	240.0 L.F.
PILE EXCAVATION IN SOIL	80.0 L.F.
PILE EXCAVATION NOT IN SOIL	120.0 L.F.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	20 EA.



SECTION A-A



SECTION C-C



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

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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 4 OF 4

ENGINEER OF RECORD:

Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 37400 GREGORY M. GILLAND 7/31/2017

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S01-34
1				3				TOTAL SHEETS
2				4				46

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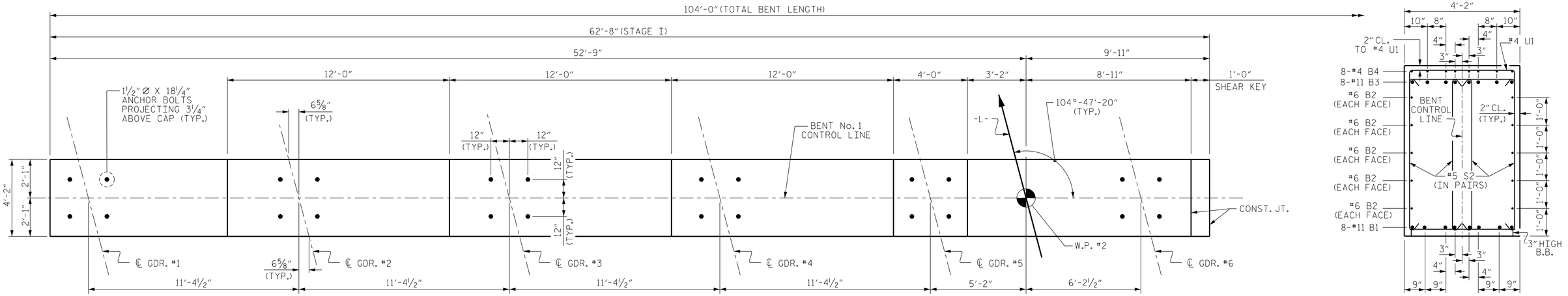
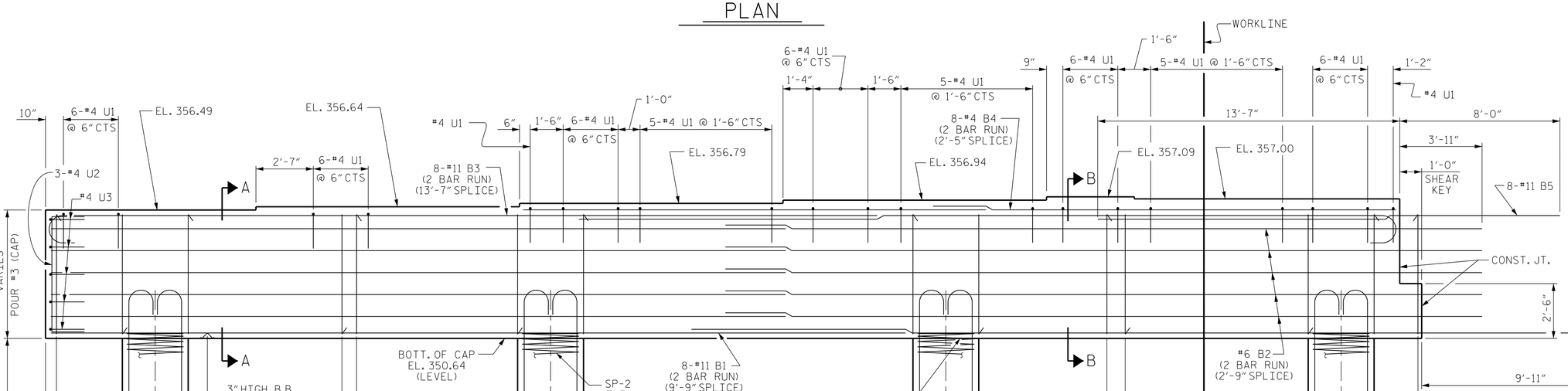
DRAWN BY :	D. HODGE	DATE :	9/16
CHECKED BY :	B.C. HUNT	DATE :	12/16

$TIME$ $FILE$ $DATE$



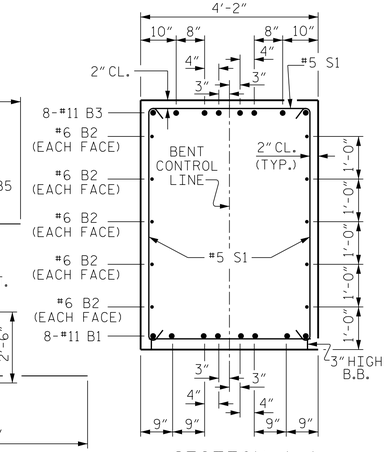
PLAN



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER.

SECTION B-B



SECTION A-A

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 3

ENGINEER OF RECORD:
DocuSigned by: Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-35
1			3			TOTAL SHEETS
2			4			46

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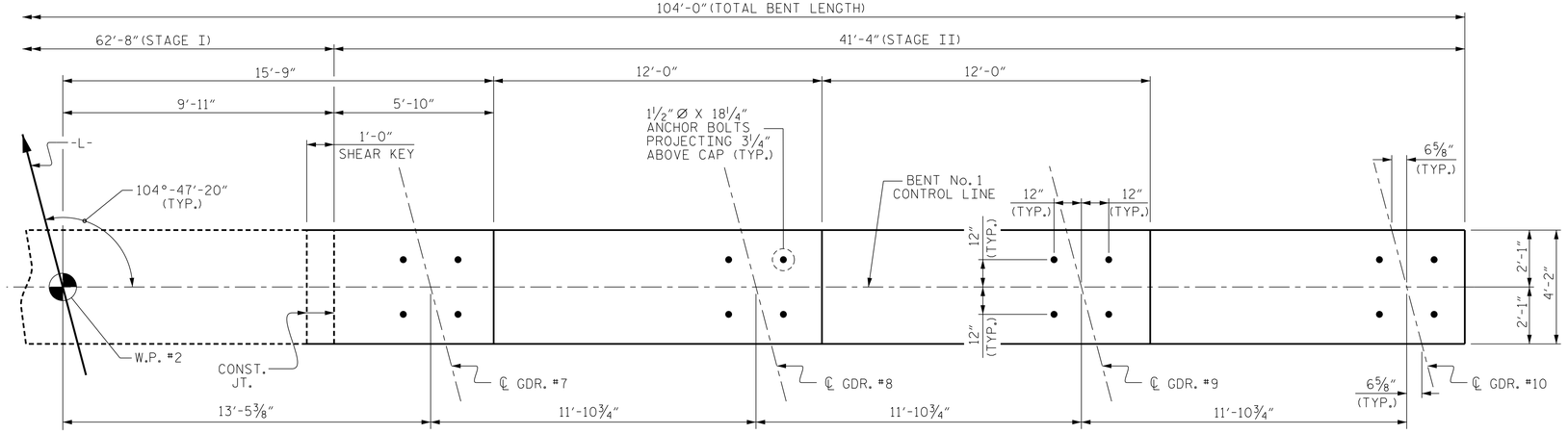
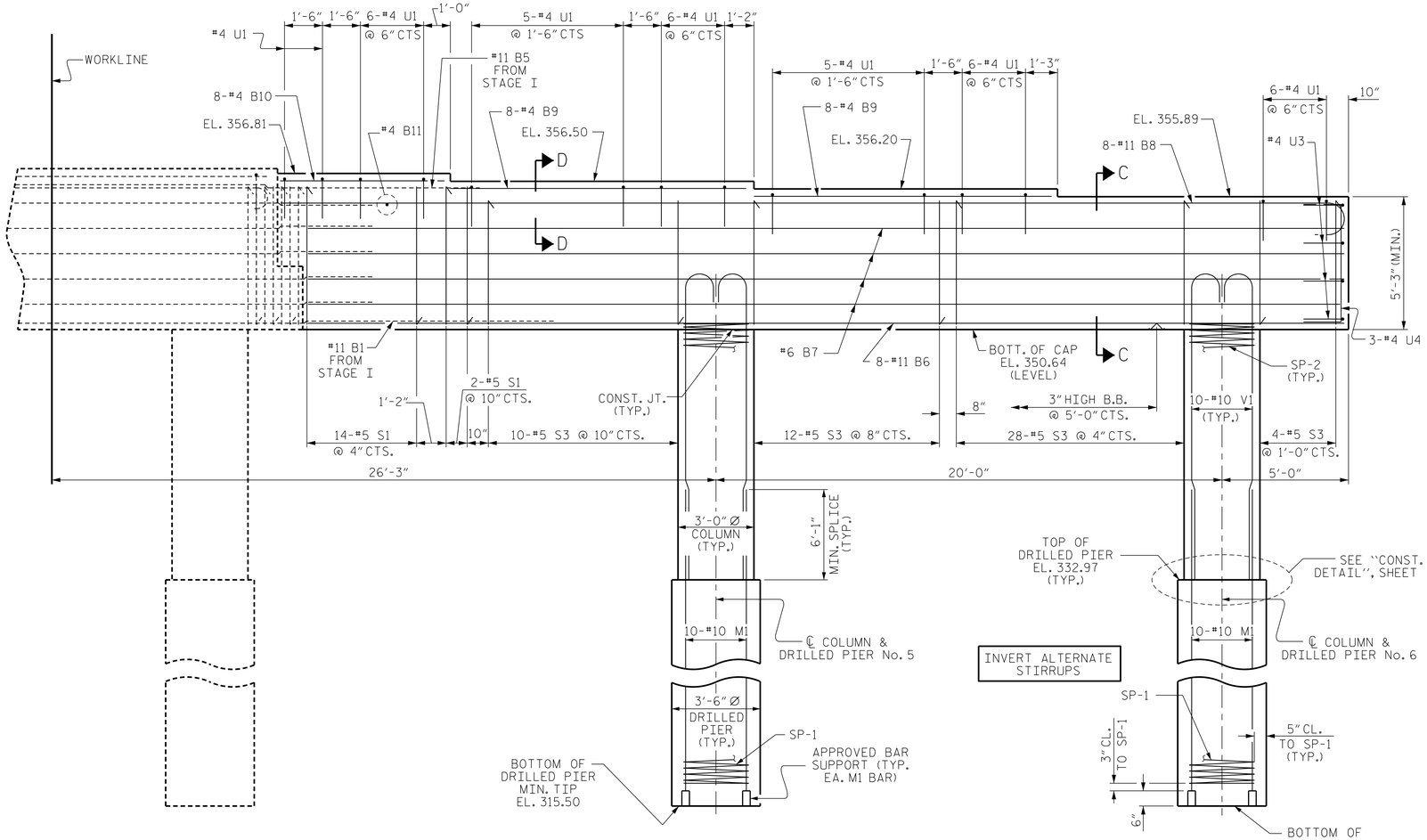
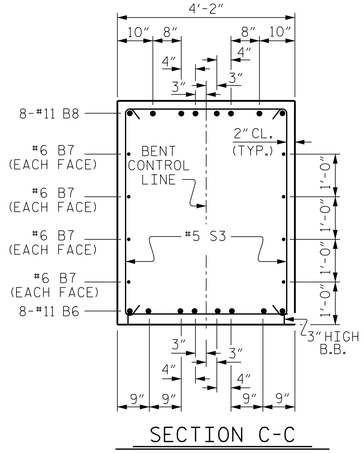


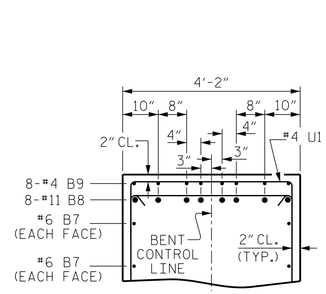


ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER.



SECTION C-C



SECTION D-D

NOTES

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

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

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "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 LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

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

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 3

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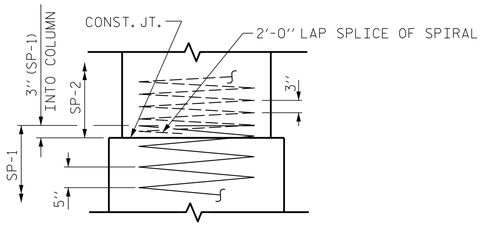
RALEIGH

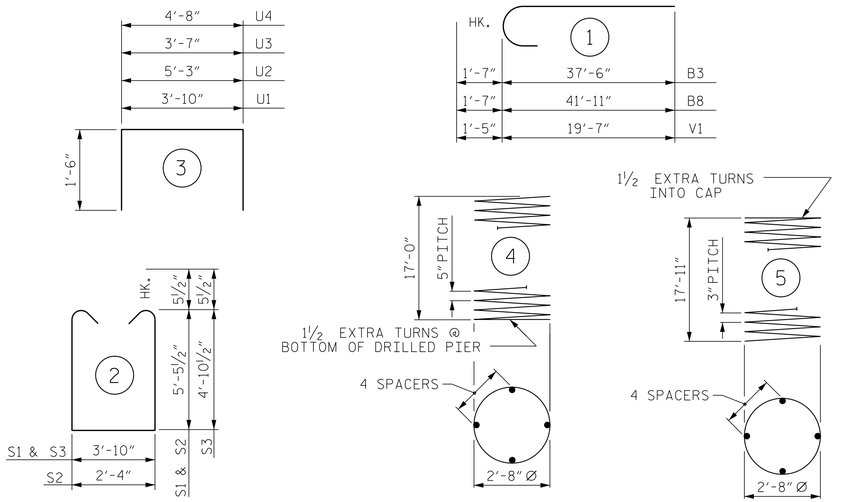
SUBSTRUCTURE
BENT No. 1
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-36
1			3			TOTAL SHEETS
2			4			46



CONSTRUCTION JOINT DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT No. 1

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#11	STR	41'-1"	3492
B2	20	#6	STR	34'-7"	1039
B3	16	#11	1	39'-1"	3322
B4	16	#4	STR	21'-1"	225
B5	8	#11	STR	21'-7"	917
M1	40	#10	STR	26'-1"	4489
S1	75	#5	2	15'-8"	1226
S2	30	#5	2	14'-2"	443
U1	53	#4	3	6'-10"	242
U2	3	#4	3	8'-3"	17
U3	5	#4	3	6'-7"	22
V1	40	#10	1	21'-0"	3615
REINFORCING STEEL					19,049 LBS.
SP-1	4	✱	4	349'-7"	1458
SP-2	4	✱✱	5	604'-5"	1615
SPIRAL COLUMN REINFORCING STEEL					3,073 LBS.

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

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

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	18.5 C.Y.
POUR #3 (CAP)	59.0 C.Y.
TOTAL CLASS A CONCRETE	77.5 C.Y.

DRILLED PIERS:

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	37.3 C.Y.
3'-6" Ø DRILLED PIER IN SOIL	29.82 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL	75.00 LIN. FT.
CSL TUBES	456.00 LIN. FT.
CSL TESTING	1 EA.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	8	#11	STR	41'-0"	1743
B7	8	#6	STR	41'-0"	493
B8	8	#11	1	43'-6"	1849
B9	16	#4	STR	11'-10"	126
B10	8	#4	STR	6'-6"	35
B11	1	#4	STR	3'-10"	3
M1	20	#10	STR	26'-1"	2245
S1	16	#5	2	15'-8"	261
S3	54	#5	2	14'-6"	817
U1	36	#4	3	6'-10"	164
U3	4	#4	3	6'-7"	18
U4	3	#4	3	7'-8"	15
V1	20	#10	1	21'-0"	1807
REINFORCING STEEL					9,576 LBS.
SP-1	2	✱	4	349'-7"	729
SP-2	2	✱✱	5	604'-5"	808
SPIRAL COLUMN REINFORCING STEEL					1,537 LBS.

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

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

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	9.3 C.Y.
POUR #3 (CAP)	36.6 C.Y.
TOTAL CLASS A CONCRETE	45.9 C.Y.

DRILLED PIERS:

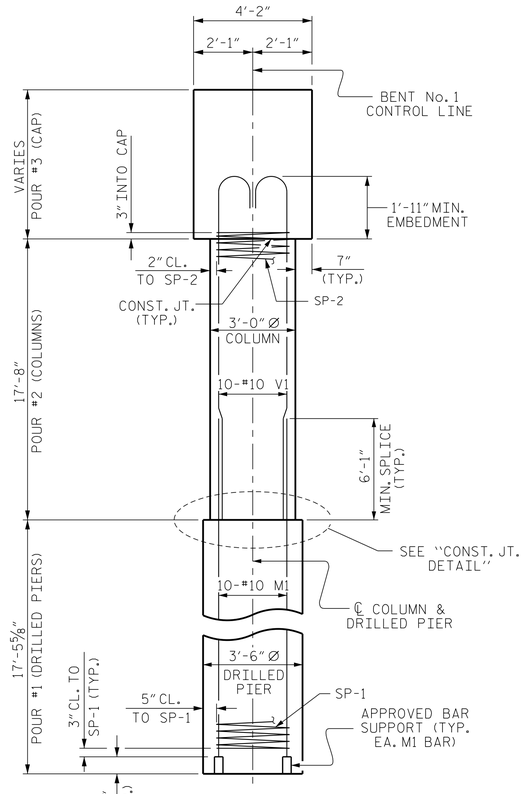
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	12.4 C.Y.
3'-6" Ø DRILLED PIER IN SOIL	9.94 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL	25.00 LIN. FT.
CSL TUBES	152 LIN. FT.

TOTAL QUANTITIES

REINFORCING STEEL	28,625 LBS.
SPIRAL COLUMN REINFORCING STEEL	4,610 LBS.
CLASS "A" CONCRETE TOTAL	123.4 C.Y.

DRILLED PIERS:

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	37.3 C.Y.
3'-6" Ø DRILLED PIER IN SOIL	29.82 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL	75.00 LIN. FT.
CSL TUBES	456.00 LIN. FT.
CSL TESTING	1 EA.



END ELEVATION

END OF CAP VIEW
(LEFT END OF STAGE I CAP)

END OF CAP VIEW
(RIGHT END OF STAGE II CAP)

PLAN OF DRILLED PIERS AND COLUMNS
(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN & DRILLED PIER)

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 3

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7/31/2017

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RALEIGH

SUBSTRUCTURE
BENT No. 1

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2			4			46

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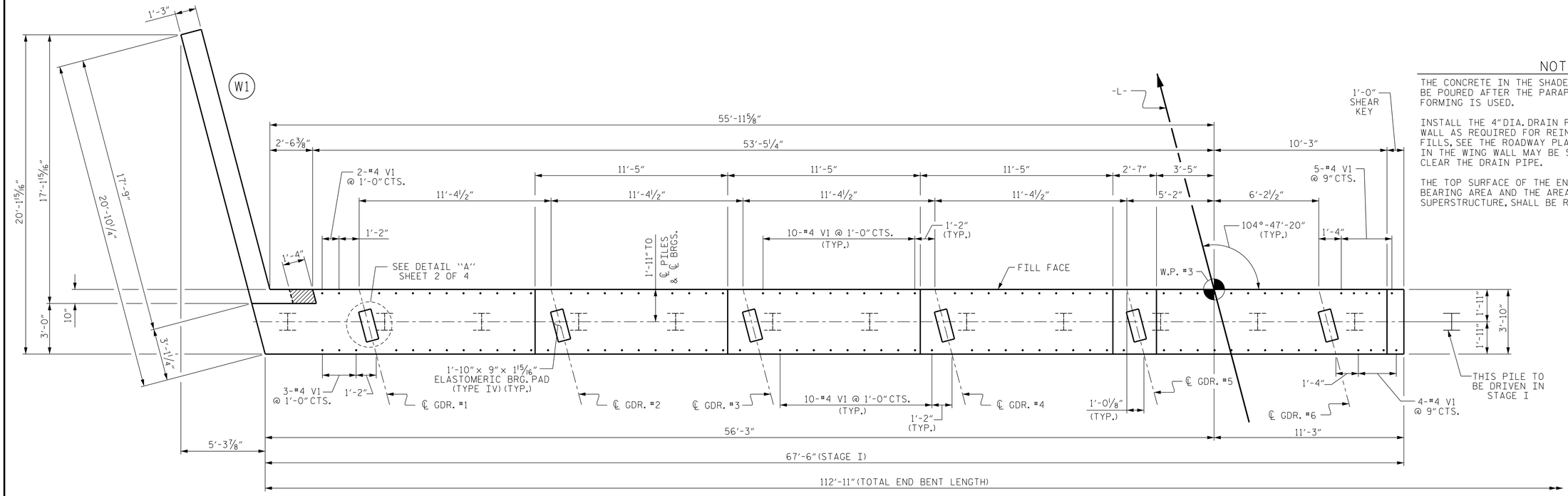
$FILE$
$DATE$

PLAN



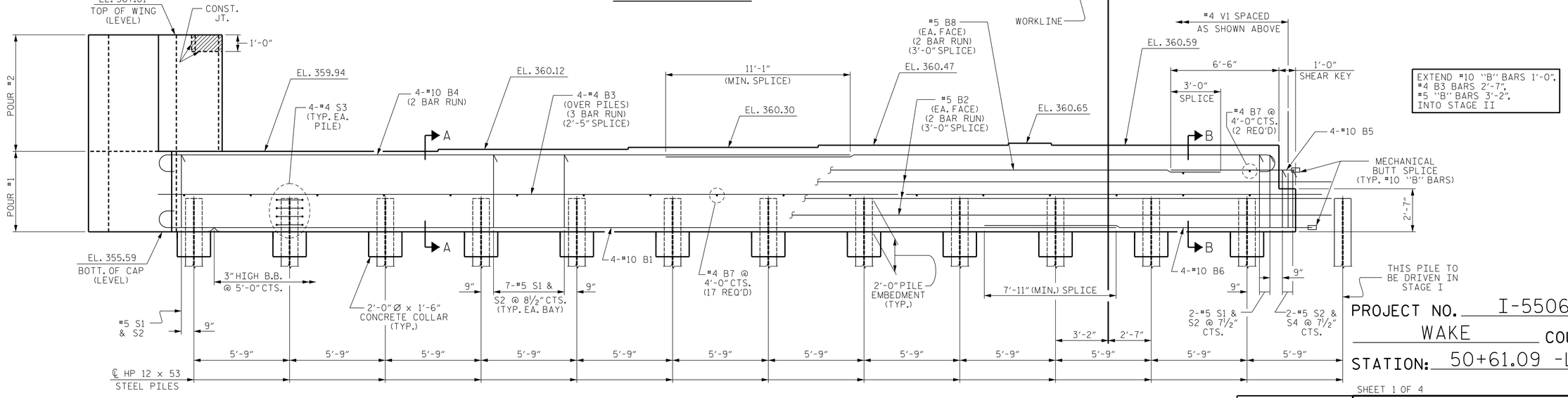
NOTES

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPETS ARE CAST IF SLIP FORMING IS USED.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".

ELEVATION



PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 4

ENGINEER OF RECORD:

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-38
1			3			TOTAL SHEETS
2			4			46

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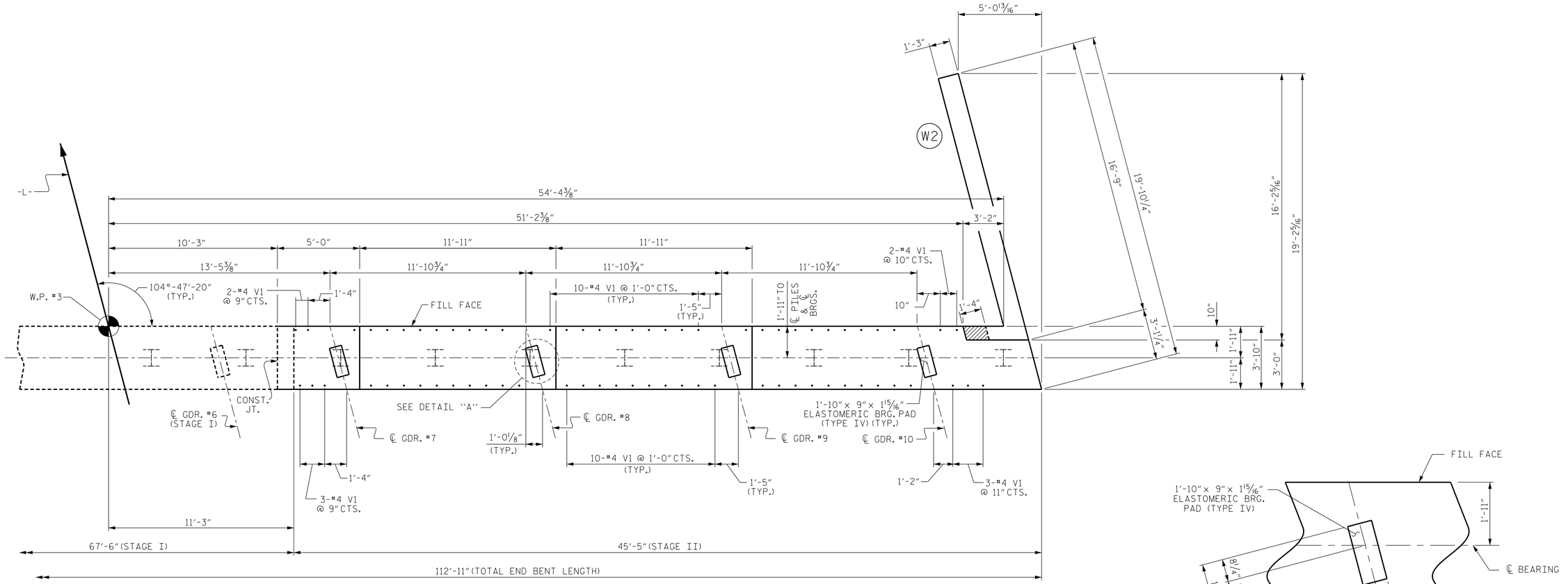
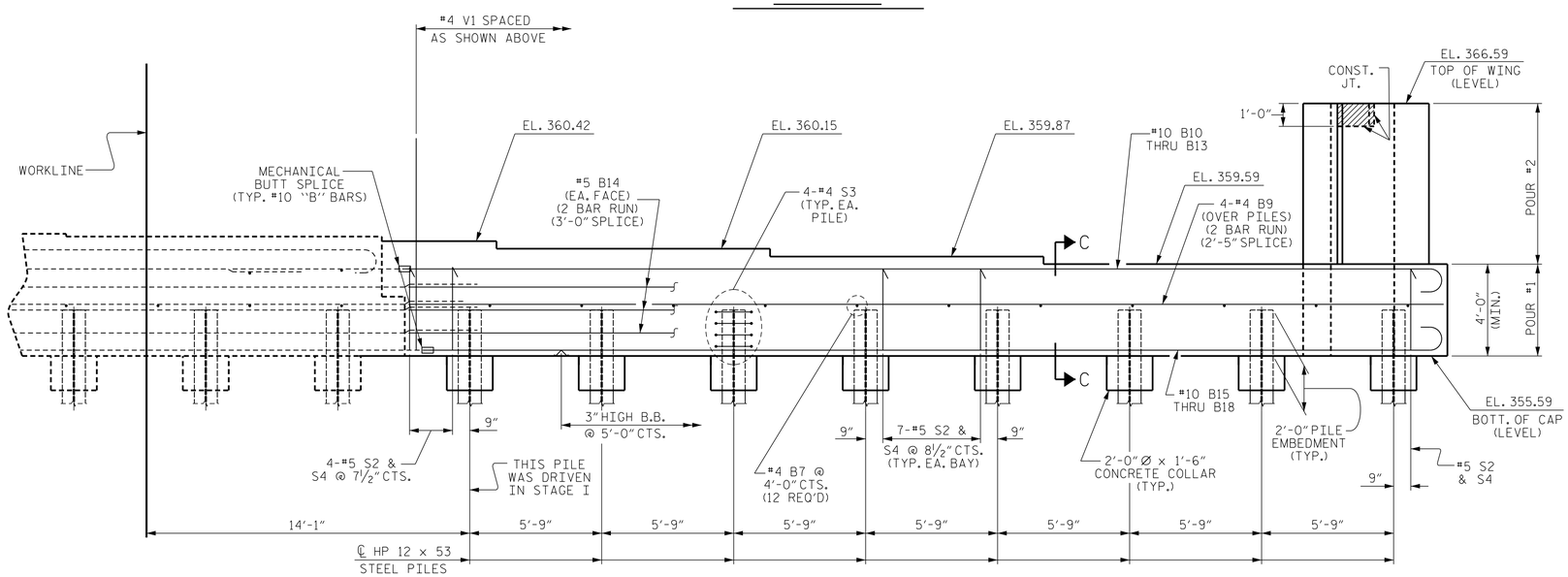
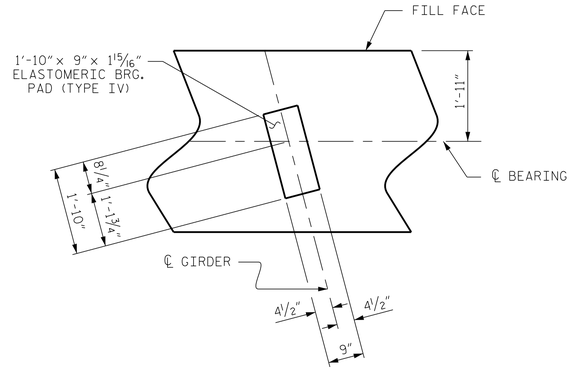
$FILE$ $DATE$ $TIME$



PLAN



ELEVATION



DETAIL "A"

(TYP. EACH GIRDER)

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 4

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 2
STAGE II

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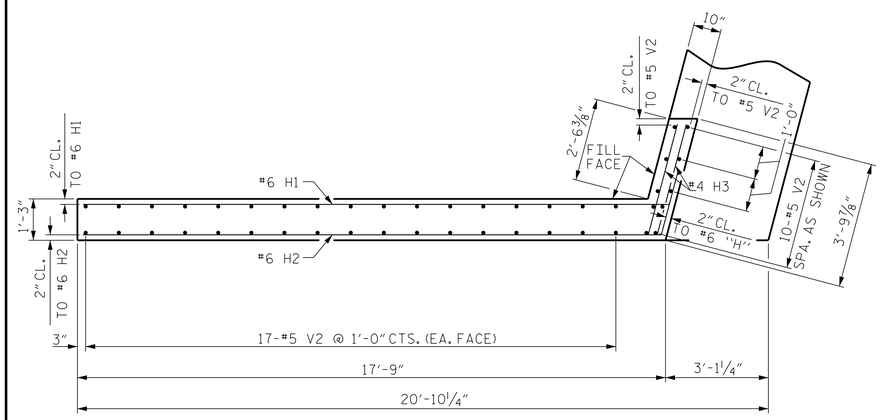
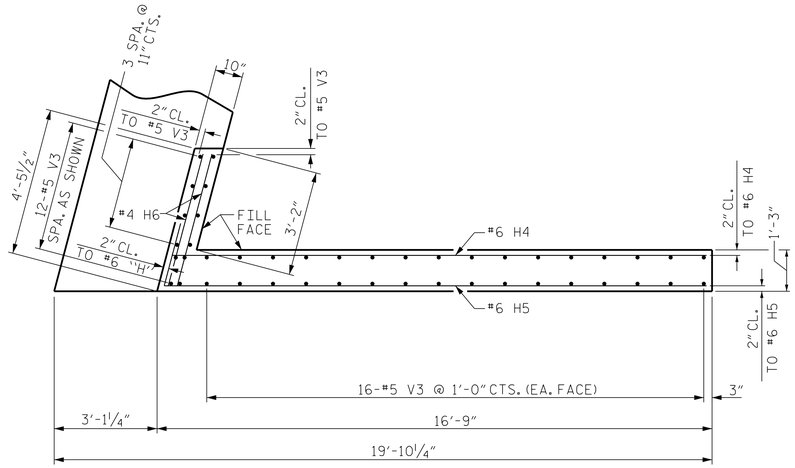
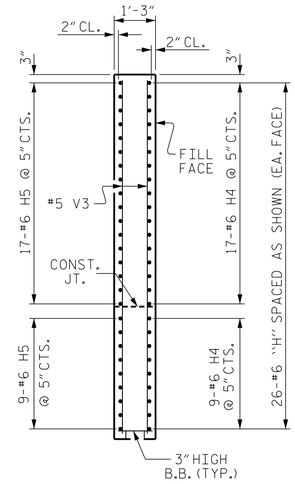


PLAN OF WING - (W1)

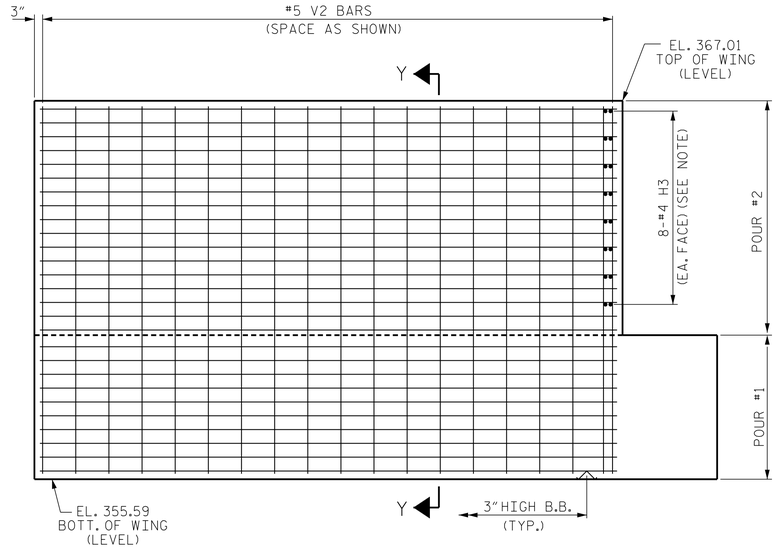
NOTE: #4 H3 & H6 TO BE PLACED TO MATCH EVERY OTHER #6 "H" BAR



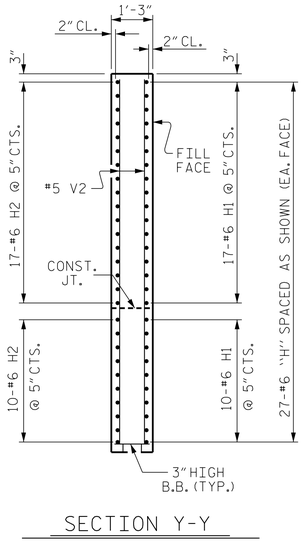
PLAN OF WING - (W2)



SECTION X-X



ELEVATION OF WING - (W1)



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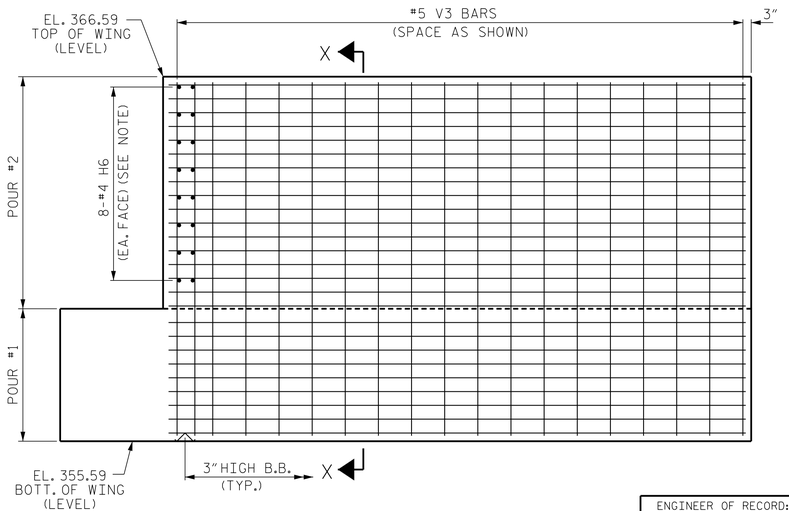

ELEVATION OF WING - (W2)

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 4

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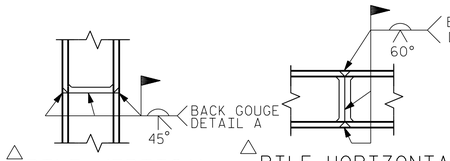
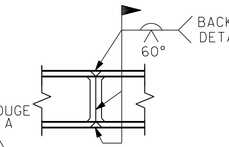
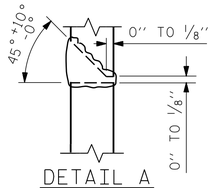


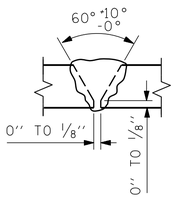
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



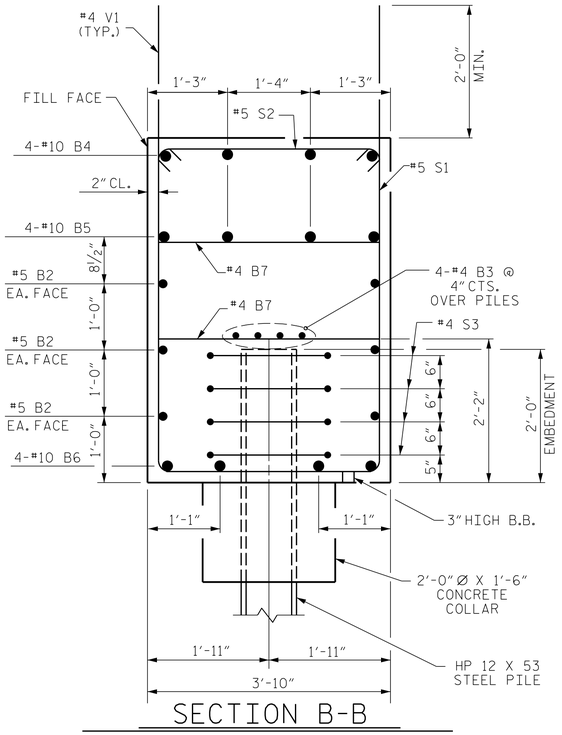
DETAIL A



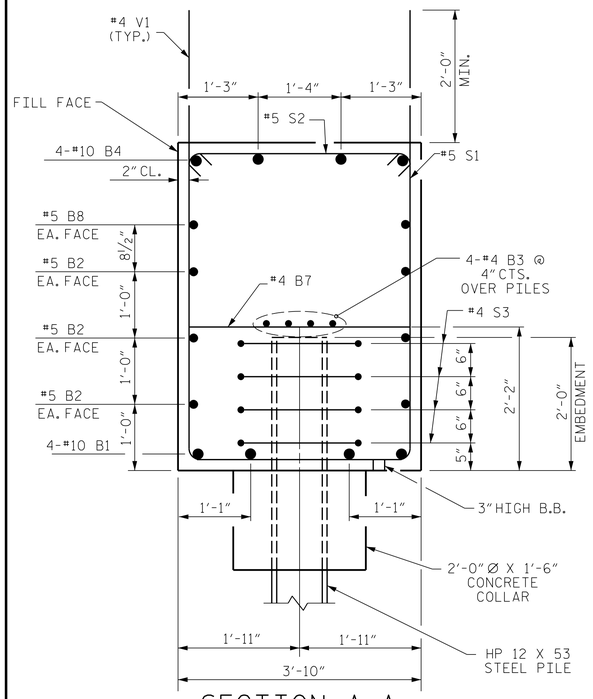
DETAIL B

△ POSITION OF PILE DURING WELDING.

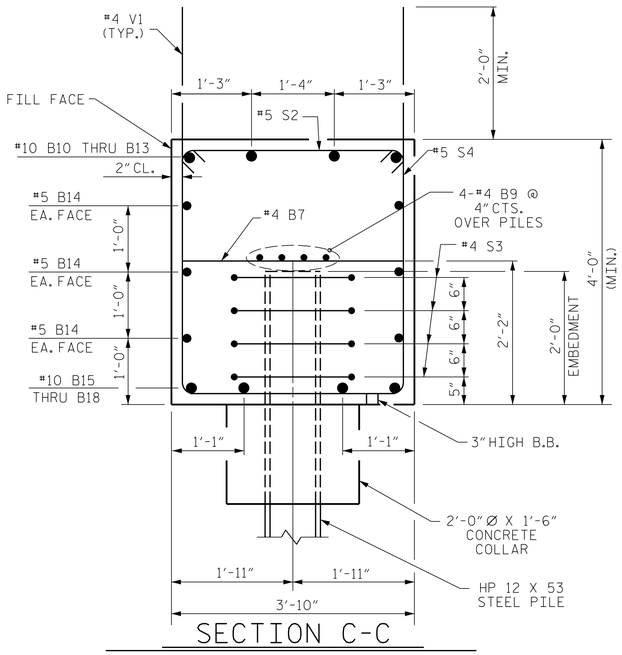
PILE SPLICE DETAILS



SECTION B-B

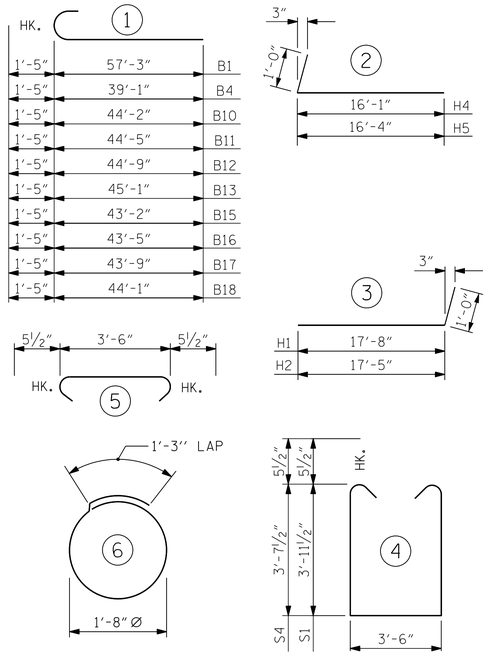


SECTION A-A



SECTION C-C

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL QUANTITIES

REINFORCING STEEL	13,212 LBS.
CLASS "A" CONCRETE TOTAL	94.9 C.Y.
HP 12 X 53 STEEL PILES NO: 20	290.0 L.F.
PILE EXCAVATION IN SOIL	160.0 L.F.
PILE EXCAVATION NOT IN SOIL	40.0 L.F.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	20 EA.

BILL OF MATERIAL

END BENT No. 2

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	58'-8"	1010
B2	12	#5	STR	37'-3"	466
B3	12	#4	STR	25'-3"	202
B4	8	#10	1	40'-6"	1394
B5	4	#10	STR	7'-6"	129
B6	4	#10	STR	19'-11"	343
B7	19	#4	STR	3'-6"	44
B8	4	#5	STR	33'-5"	139
H1	27	#6	3	18'-8"	757
H2	27	#6	3	18'-5"	747
H3	16	#4	STR	3'-5"	37
S1	80	#5	4	12'-4"	1029
S2	82	#5	5	4'-5"	378
S3	48	#4	6	6'-6"	208
S4	2	#5	4	11'-8"	24
V1	114	#4	STR	7'-0"	533
V2	44	#5	STR	11'-0"	505

REINFORCING STEEL 7,945 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, CONC. COLLARS & LOWER PART OF WINGS 49.8 C.Y.

POUR #2 UPPER PART OF WINGS 6.4 C.Y.

TOTAL CLASS A CONCRETE 56.2 C.Y.

HP 12 X 53 STEEL PILES NO: 13 206.0 L.F.

PILE EXCAVATION IN SOIL 104.0 L.F.

PILE EXCAVATION NOT IN SOIL 26.0 L.F.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES 13 EA.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B7	12	#4	STR	3'-6"	28
B9	8	#4	STR	23'-8"	126
B10	1	#10	1	45'-7"	196
B11	1	#10	1	45'-10"	197
B12	1	#10	1	46'-2"	199
B13	1	#10	1	46'-6"	200
B14	12	#5	STR	24'-0"	300
B15	1	#10	1	44'-7"	192
B16	1	#10	1	44'-10"	193
B17	1	#10	1	45'-2"	194
B18	1	#10	1	45'-6"	196
H4	26	#6	2	17'-1"	667
H5	26	#6	2	17'-4"	677
H6	16	#4	STR	4'-1"	44
S2	54	#5	5	4'-5"	249
S3	32	#4	6	6'-6"	139
S4	54	#5	4	11'-8"	657
V1	70	#4	STR	7'-0"	327
V3	44	#5	STR	10'-7"	486

REINFORCING STEEL 5,267 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, CONC. COLLARS & LOWER PART OF WINGS 32.7 C.Y.

POUR #2 UPPER PART OF WINGS 6.0 C.Y.

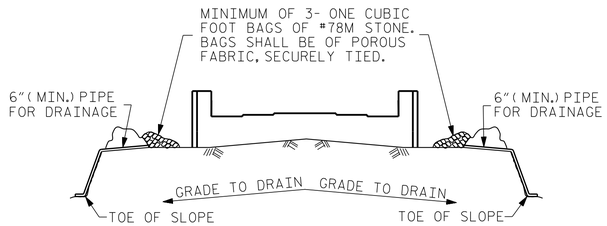
TOTAL CLASS A CONCRETE 38.7 C.Y.

HP 12 X 53 STEEL PILES NO: 7 84.0 L.F.

PILE EXCAVATION IN SOIL 56.0 L.F.

PILE EXCAVATION NOT IN SOIL 14.0 L.F.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES 7 EA.



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

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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 4 OF 4

ENGINEER OF RECORD:
Gregory M. Galland
NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-41
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 9/16
CHECKED BY : B.C. HUNT DATE : 12/16

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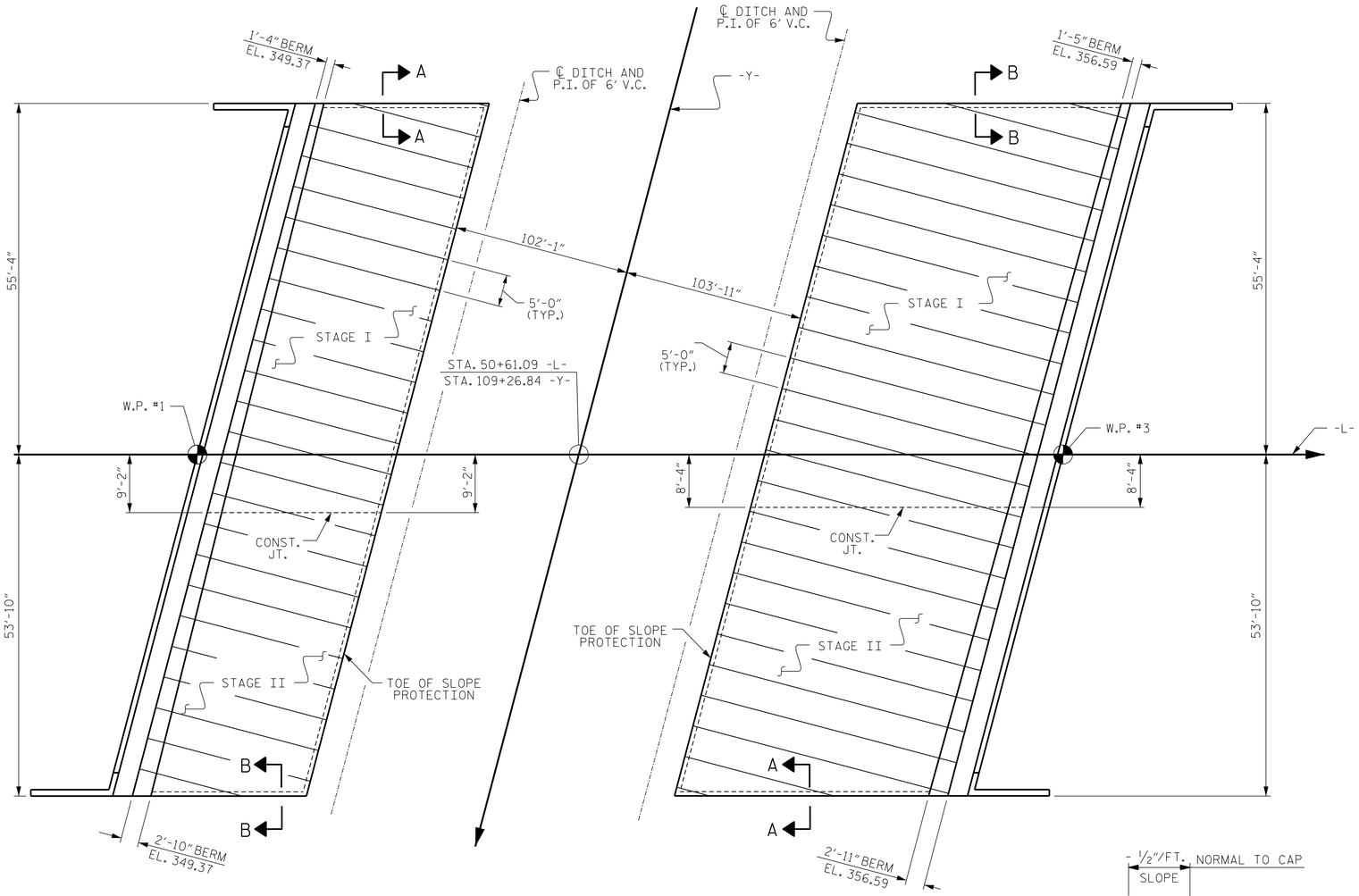


PLAN - CONCRETE PLACEMENT

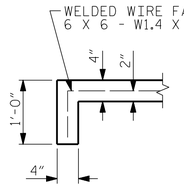
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

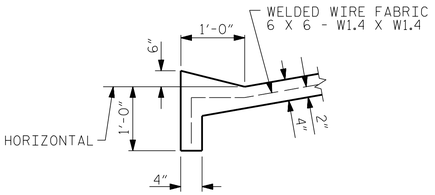
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE ''POURING DETAIL'' WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE ''OPTIONAL POURING DETAIL'' WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6''. THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 50+61.09 -L-		4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
		SQUARE YARDS	APPROX. L.F.
END BENT No. 1	STAGE I	240	420
	STAGE II	170	300
TOTAL		410	720
END BENT No. 2	STAGE I	365	640
	STAGE II	260	455
TOTAL		625	1095

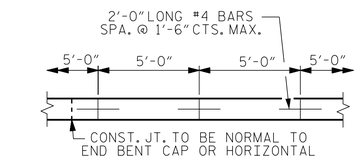
✳ QUANTITY SHOWN IS BASED ON 5' POURS.



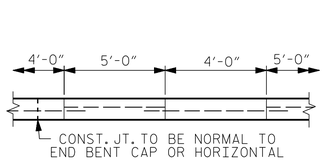
SECTION A-A



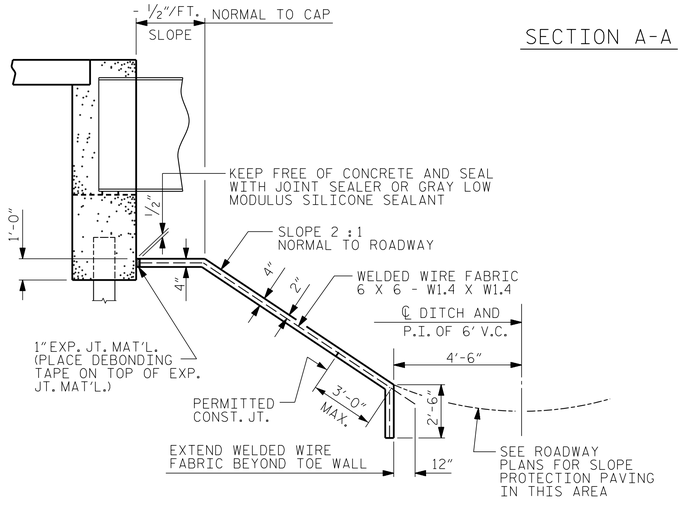
SECTION B-B



POURING DETAIL



OPTIONAL POURING DETAIL



SECTION ALONG ℄ ROADWAY WHEN FILL CATCHES IN DITCH

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 2

ENGINEER OF RECORD:

Docusigned by: Gregory M. Galland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND

7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-42
1			3			TOTAL SHEETS
2			4			46

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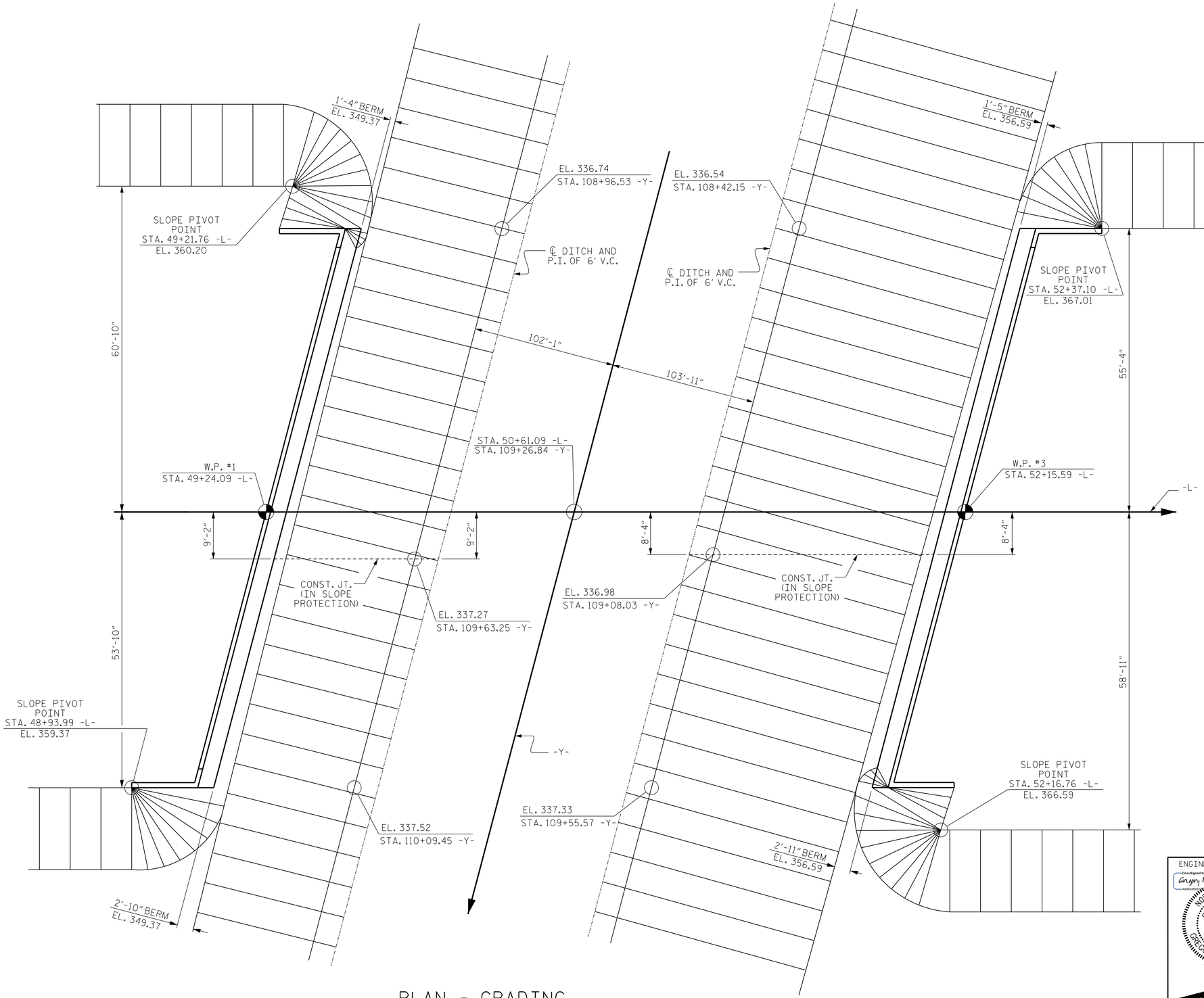

PLAN - GRADING

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 2 OF 2

ENGINEER OF RECORD:

DocuSigned by: Gregory M. Galland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GALLAND
7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-43
1			3			TOTAL SHEETS
2			4			46

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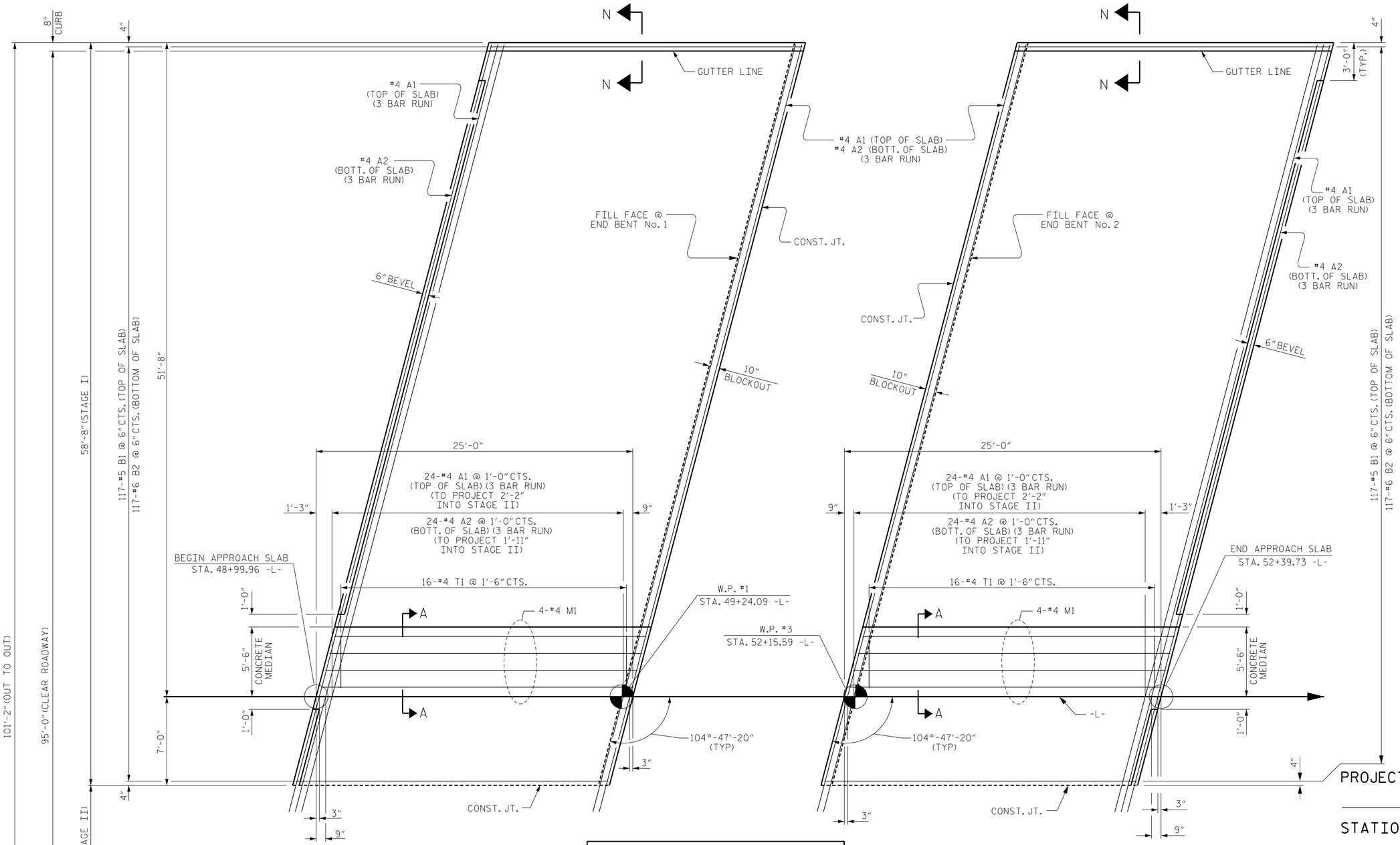


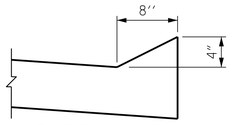
PLAN @ END BENT No. 1

CONCRETE MEDIAN IS SHOWN ON STAGE I, BUT SHALL NOT BE CONSTRUCTED UNTIL STAGE II APPROACH SLAB IS BUILT

PLAN @ END BENT No. 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

FOR SECTION A-A, SEE SHEET 2 OR 3



SECTION N-N

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 1 OF 3

ENGINEER OF RECORD:

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NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND 7/31/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (STAGE I)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-44
1			3			TOTAL SHEETS
2			4			46

DRAWN BY : D. HODGE DATE : 10/16

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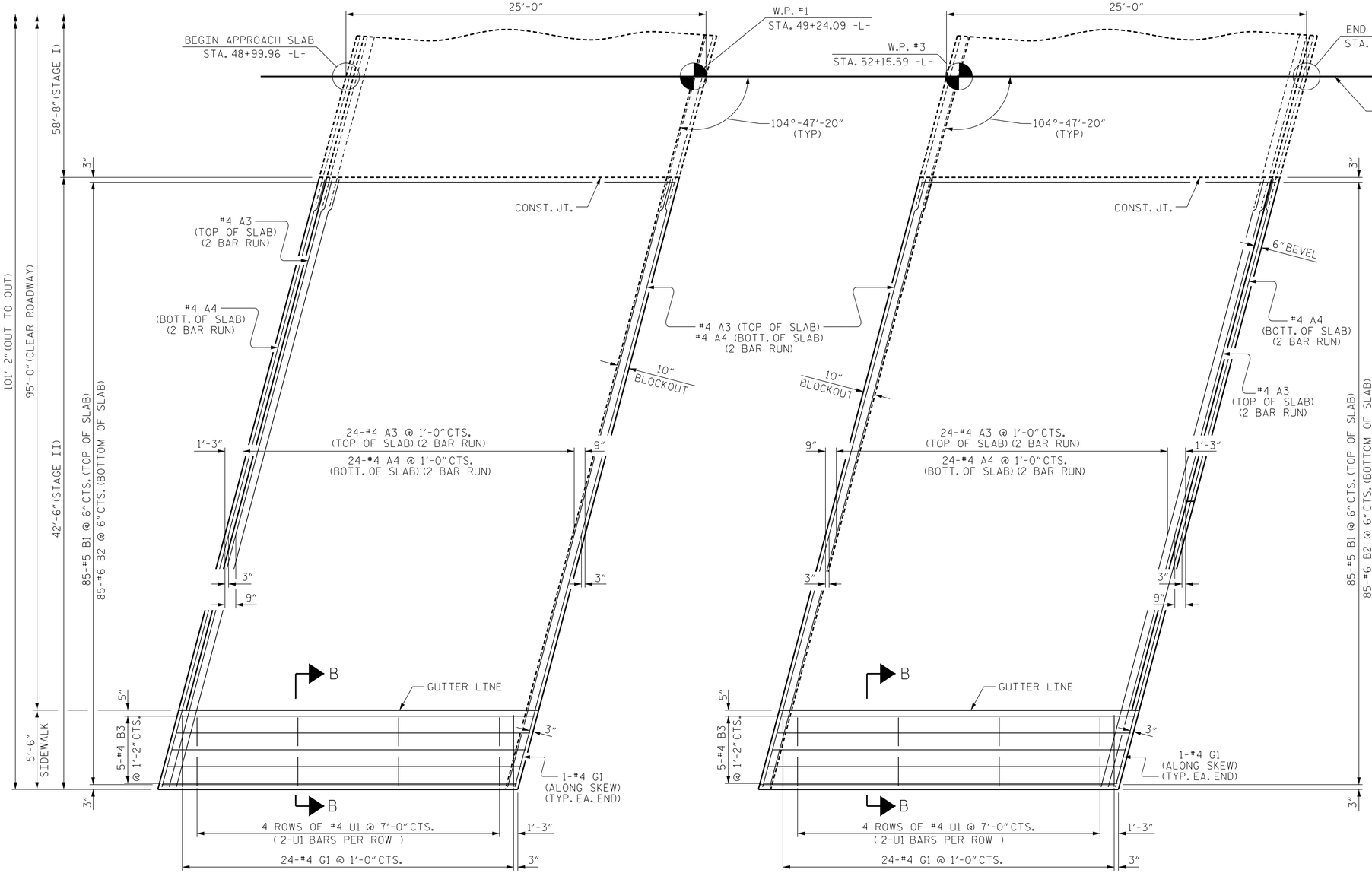
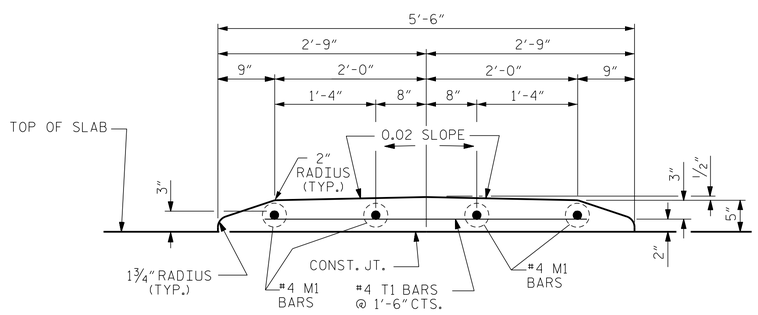
$FILE$ $DATE$ $TIME$



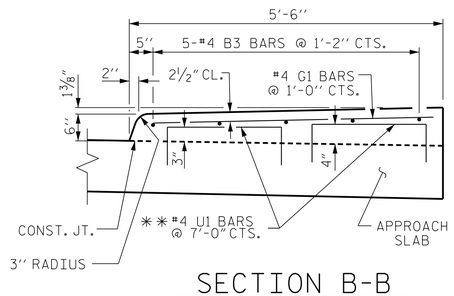
PLAN @ END BENT No. 1

PLAN @ END BENT No. 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION A-A



SECTION B-B

** #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER APPROACH SLAB HAS BEEN POURED.

NOTES

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

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6"Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE 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.

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.

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

2'-0" SPLICE FOR A3
1'-9" SPLICE FOR A4

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ENGINEER OF RECORD:
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NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND
12/19/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (STAGE II)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-45
1			3			TOTAL SHEETS
2			4			46

PROJECT NO. I-5506
WAKE COUNTY
STATION: 50+61.09 -L-
SHEET 2 OF 3

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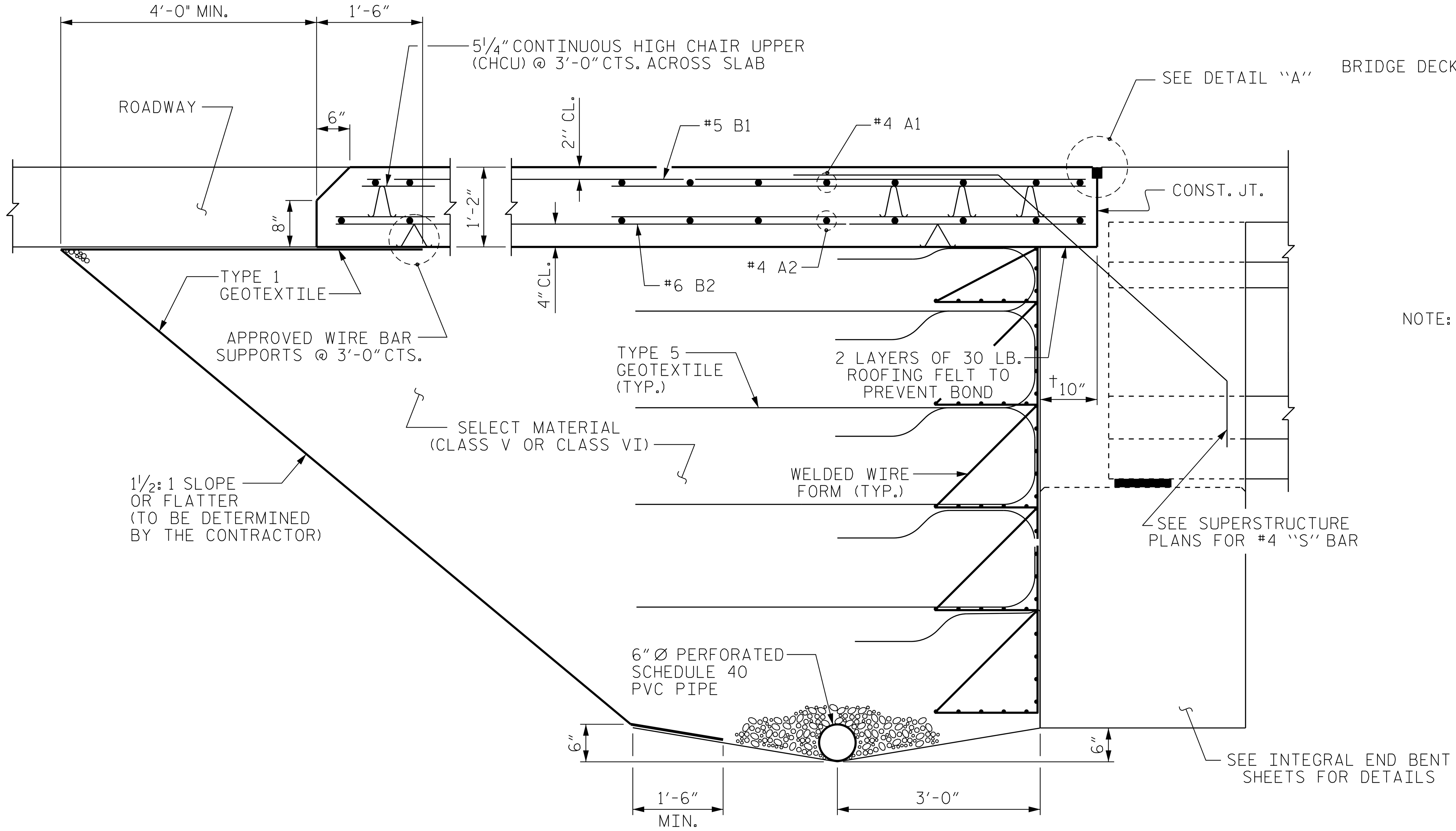
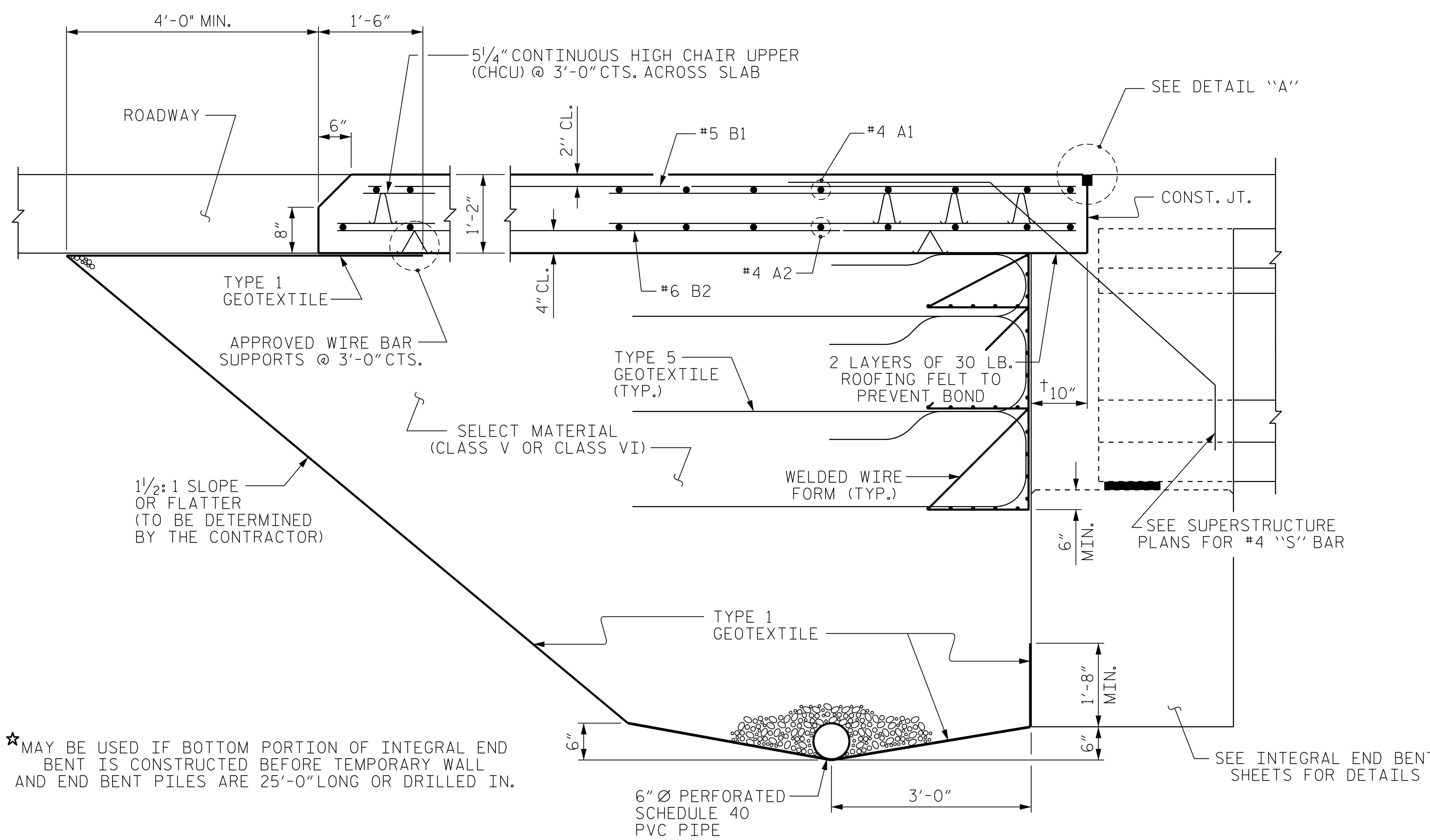


SECTION THRU SLAB

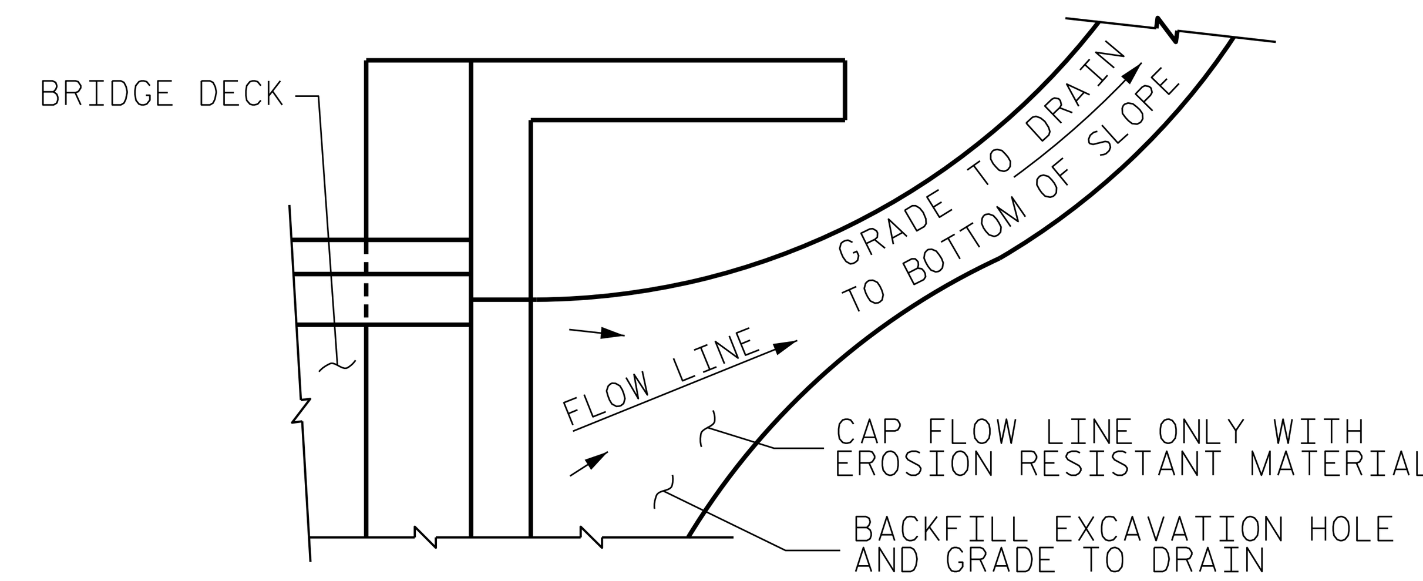
(TYPE A - ALTERNATE APPROACH FILL)



☆MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

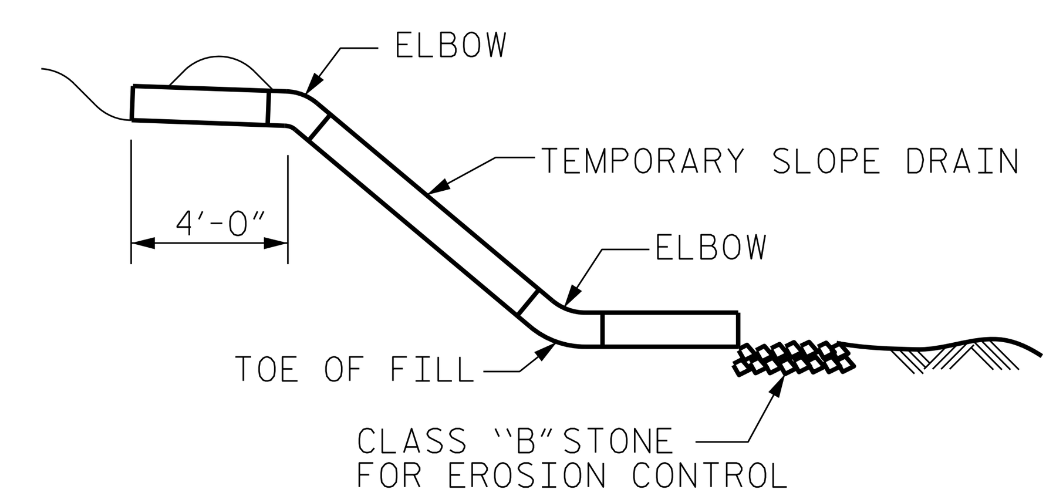
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)

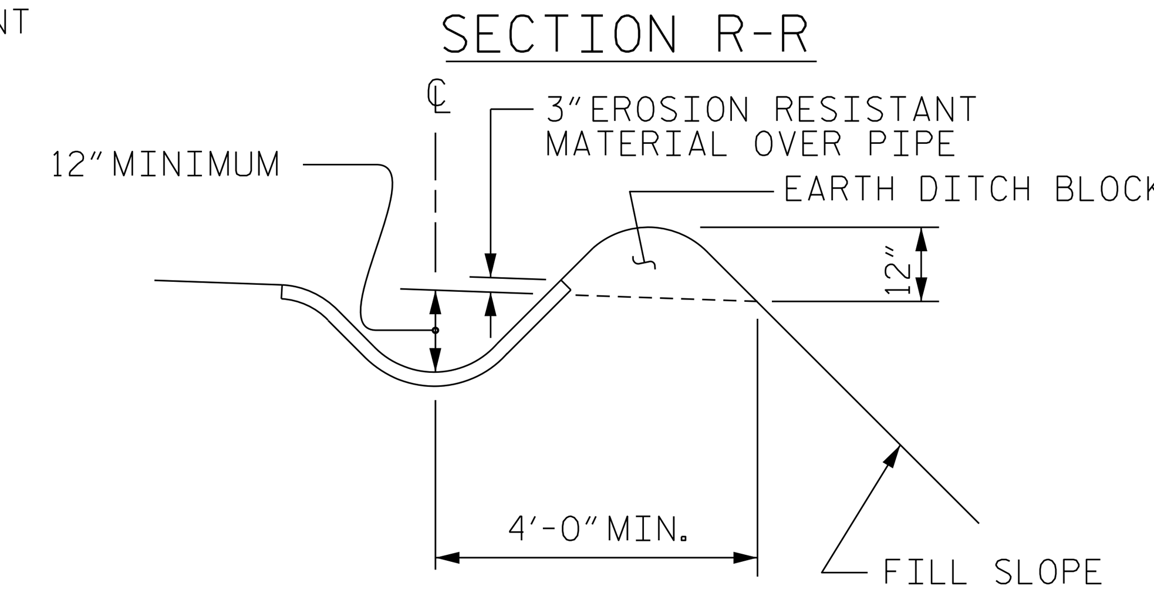


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

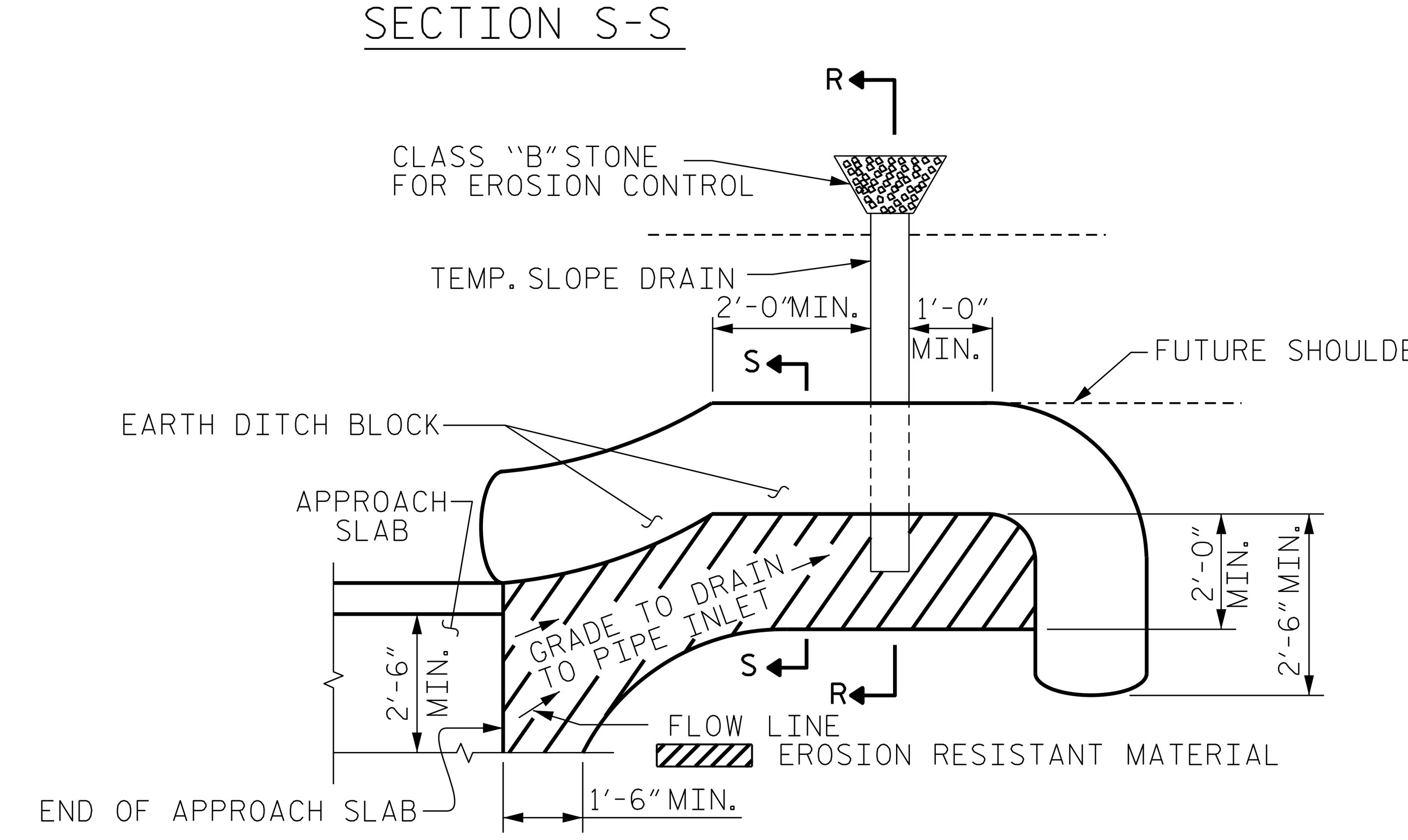
TEMPORARY DRAINAGE DETAIL



SECTION R-R



SECTION S-S



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL FOR ONE APPROACH SLAB (2 REQ'D)

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	78	#4	STR	22'-3"	1159	✳ A3	52	#4	STR	22'-10"	793
A2	78	#4	STR	22'-0"	1146	A4	52	#4	STR	22'-9"	790
✳ B1	117	#5	STR	24'-1"	2939	✳ B1	85	#5	STR	24'-1"	2135
B2	117	#6	STR	24'-7"	4320	B2	85	#6	STR	24'-7"	3139
REINFORCING STEEL				LBS.	5,466	REINFORCING STEEL				LBS.	3,929
✳ EPOXY COATED REINFORCING STEEL				LBS.	4,098	✳ EPOXY COATED REINFORCING STEEL				LBS.	2,928
CLASS AA CONCRETE				C. Y.	63.2	CLASS AA CONCRETE				C. Y.	44.2

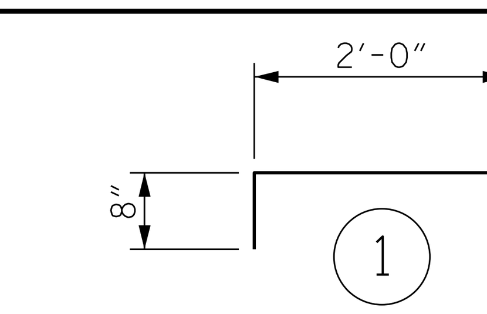
BILL OF MATERIAL FOR ONE CONCRETE MEDIAN (2 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ M1	4	#4	STR	24'-8"	66
✳ T1	16	#4	STR	4'-2"	45
✳ EPOXY COATED REINFORCING STEEL					111 LBS.
CLASS "AA" CONCRETE					2.0 C.Y.

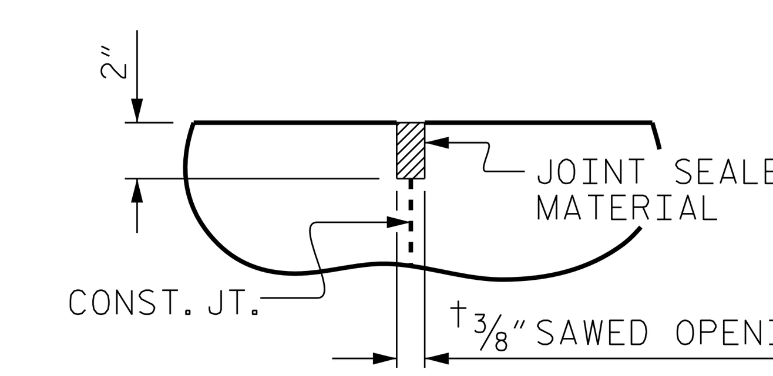
BILL OF MATERIAL FOR SIDEWALK (2 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B3	5	#4	STR	24'-7"	82
✳ G1	26	#4	STR	5'-0"	87
✳ U1	8	#4	1	3'-4"	18
✳ EPOXY COATED REINFORCING STEEL					187 LBS.
CLASS "AA" CONCRETE					3.1 C.Y.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



DETAIL "A"

PROJECT NO. I-5506

WAKE COUNTY

STATION: 50+61.09 -L-

SHEET 3 OF 3

ENGINEER OF RECORD:

Gregory M. Gilland

NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND

12/19/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

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

SHEET NO. S01-46

TOTAL SHEETS 46

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DRAWN BY :	D. HODGE	DATE :	10/16
CHECKED BY :	B.C. HUNT	DATE :	10/16

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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

ENGLISH

JANUARY, 1990

STD. NO. SN