

09_08/2019


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NASH COUNTY

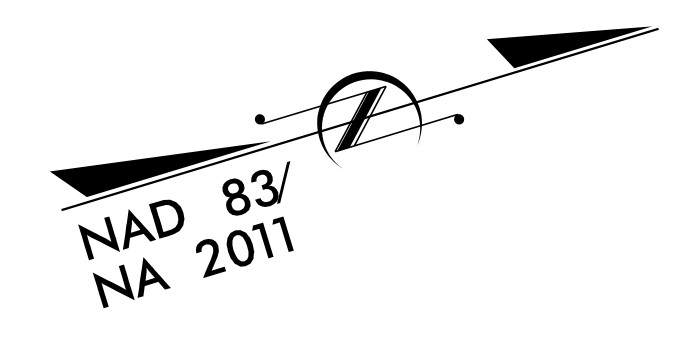
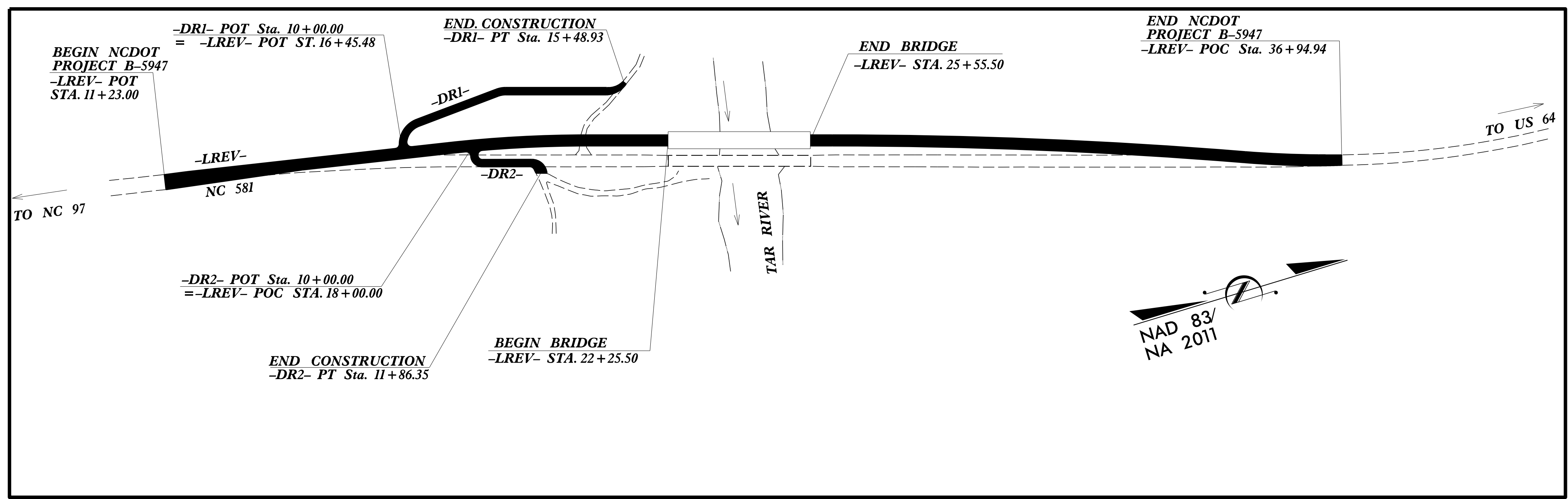
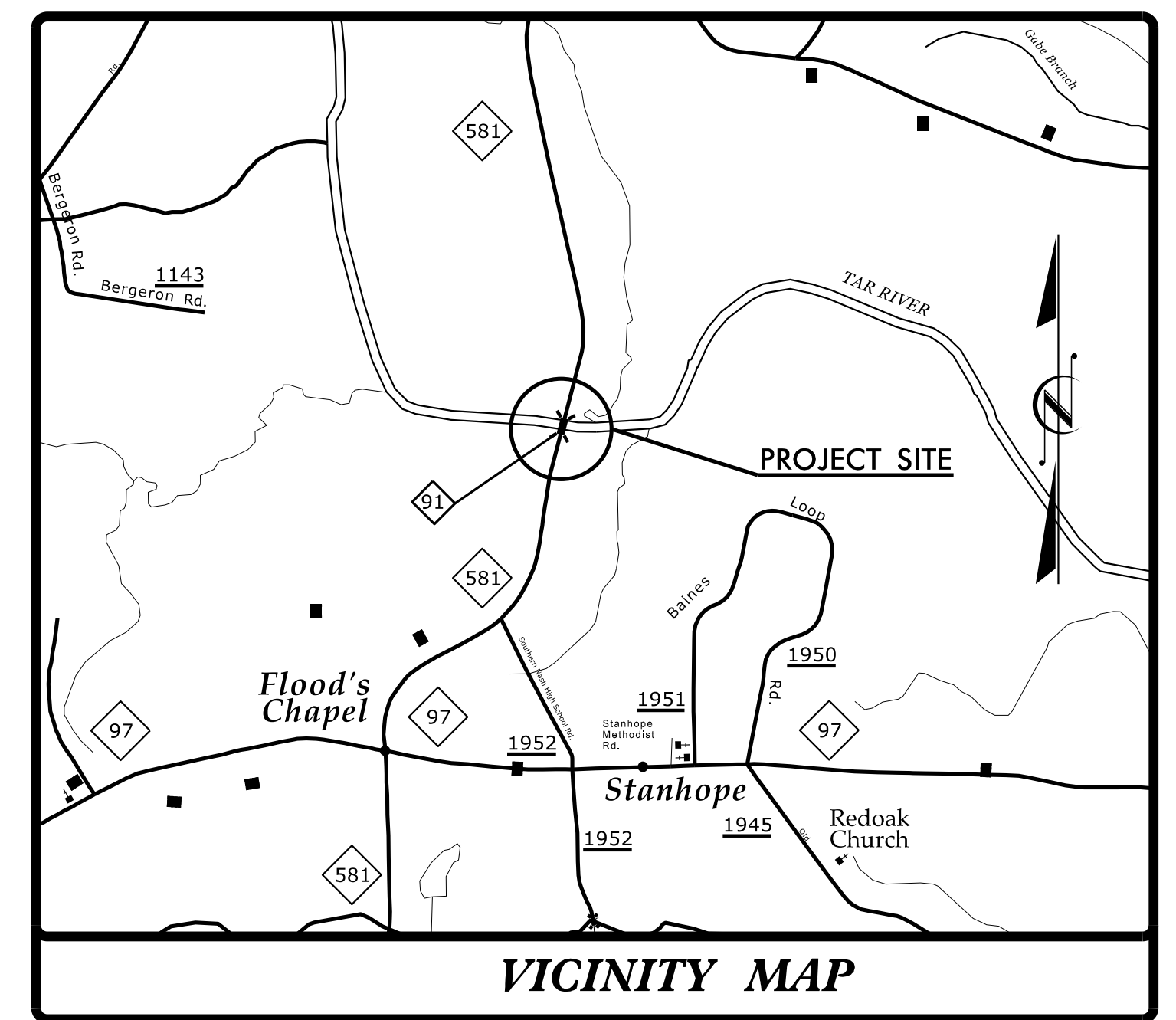
**LOCATION: BRIDGE NO. 630091 OVER TAR RIVER
ON NC 581**

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STRUCTURE PLANS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5947		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45983.1.1		PE	
45983.2.1	0581032	ROW	
45983.2.2		UTILITIES	
45983.3.1	0581032	CONST.	
			
1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107			
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION			

BRIDGE #630091



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT: B-5947

CONTRACT: C204725

DESIGN DATA

ADT 2021 =	5,350
ADT 2040 =	6,300
K =	10 %
D =	55 %
T =	5 % *
V =	60 MPH

* (TTST = 1% +
DUAL = 4%)
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT B-5947 =	0.424 MILES
LENGTH STRUCTURE PROJECT B-5947 =	0.063 MILES
TOTAL LENGTH PROJECT B-5947 =	0.487 MILES

NCDOT CONTACT: KRISTY ALFORD, PE
PROJECT ENGINEER - PEP/PROGRAM MGT.

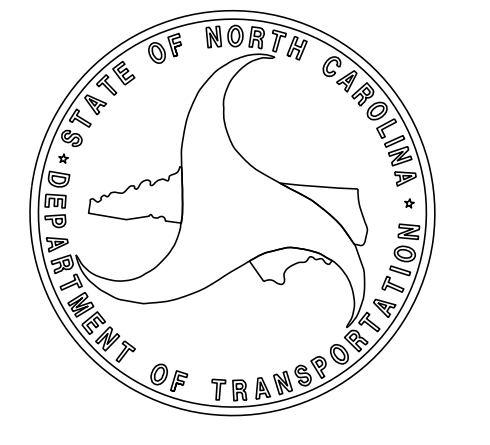
Prepared for:
**DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT**
1000 BIRCH RIDGE DRIVE RALEIGH NC, 27610

2018 STANDARD SPECIFICATIONS

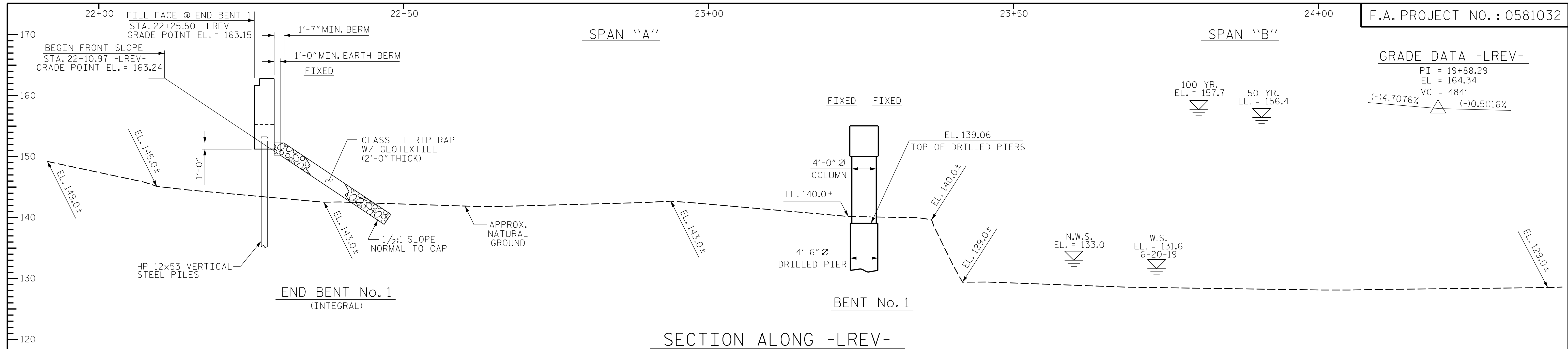
LETTING DATE:
JULY 18, 2023

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

GREGORY M. GILLAND, PE
PROJECT DESIGN ENGINEER



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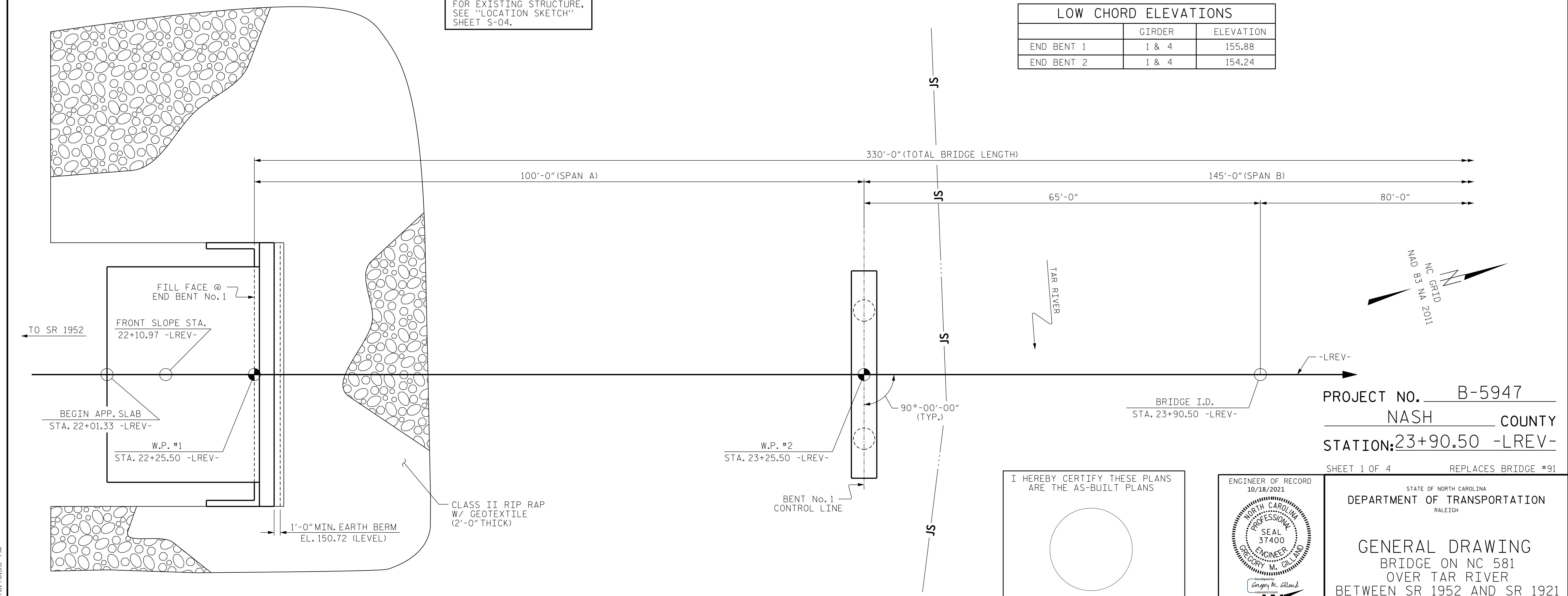
GRADE DATA -LREV-

PI = 19+88.29	EL = 164.34
VC = 484'	
(-)4.7076%	(-)0.5016%

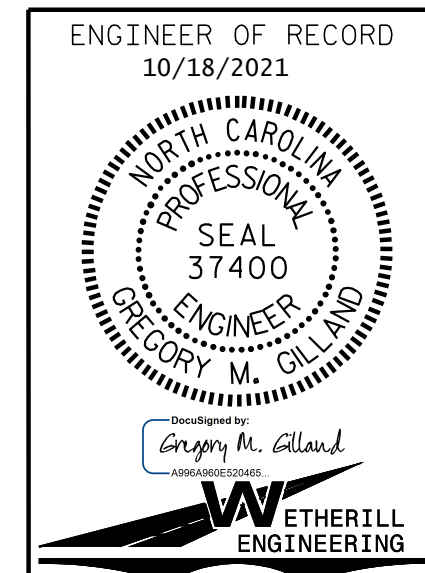
LOW CHORD ELEVATIONS

	GIRDER	ELEVATION
END BENT 1	1 & 4	155.88
END BENT 2	1 & 4	154.24

FOR EXISTING STRUCTURE, SEE "LOCATION SKETCH" SHEET S-04.



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 4 REPLACES BRIDGE #91

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 BRIDGE ON NC 581
 OVER TAR RIVER
 BETWEEN SR 1952 AND SR 1921

REVISIONS

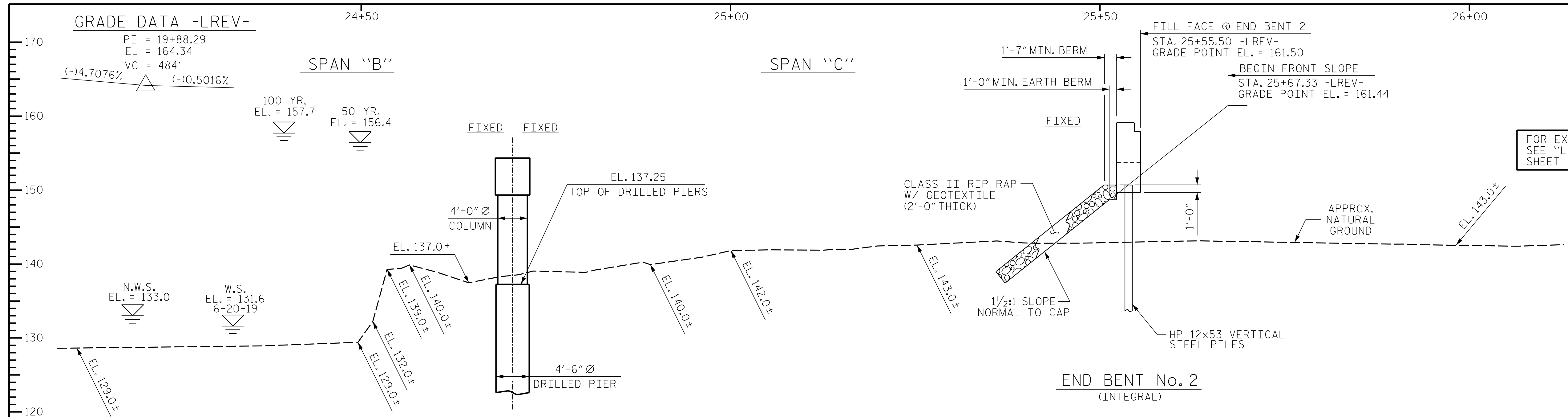
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-01
 TOTAL SHEETS 39

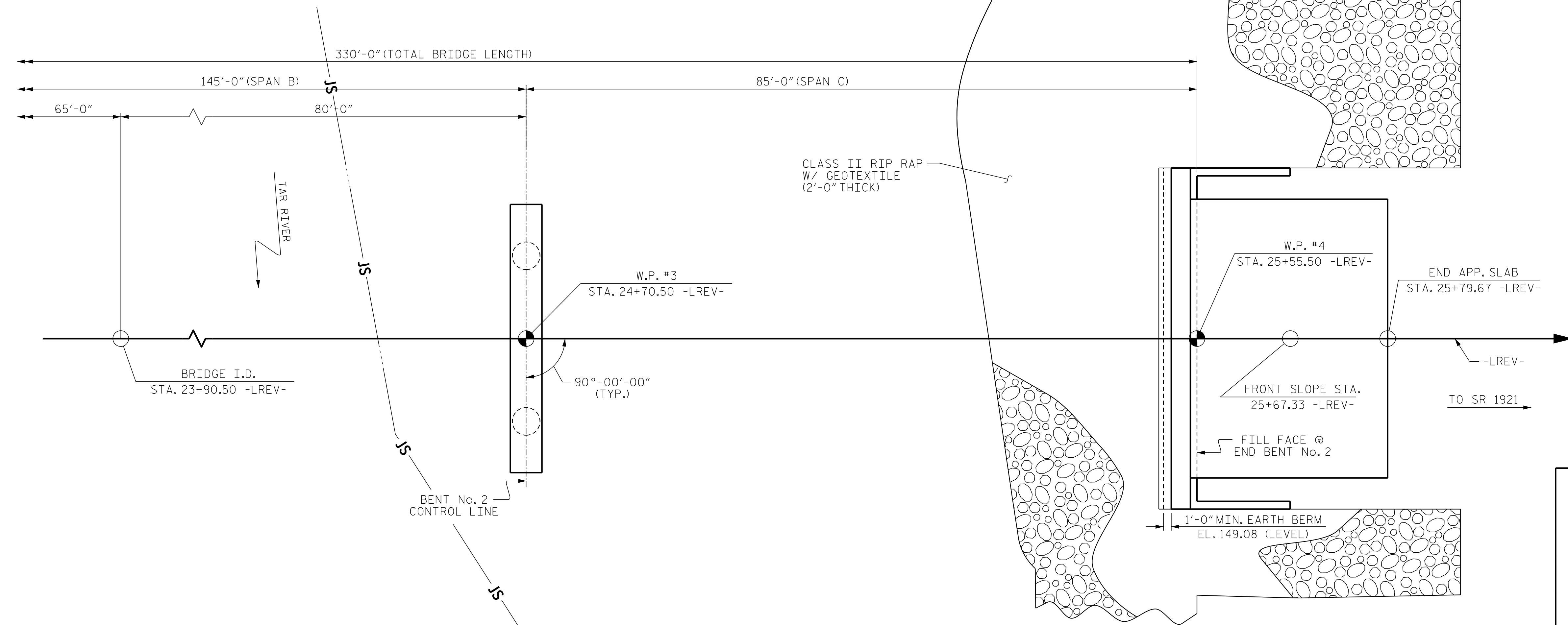
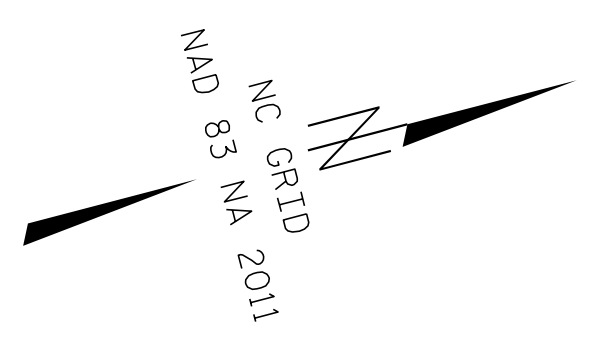
DRAWN BY : D. HODGE DATE : 8/20
 CHECKED BY : G. GILLAND DATE : 8/20

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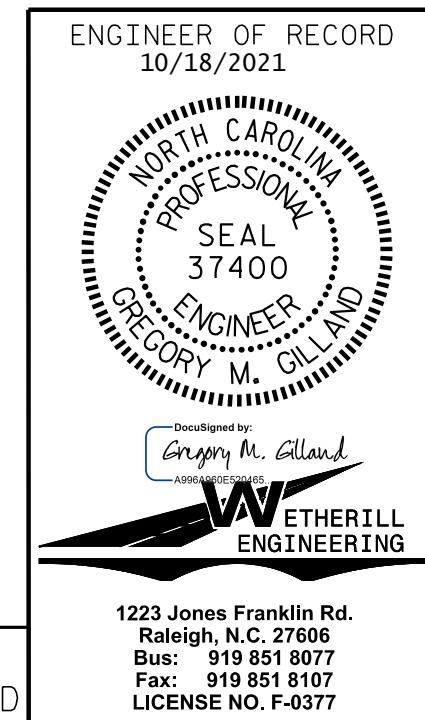


SECTION ALONG -LREV-



PLAN
 (PILES NOT SHOWN FOR CLARITY)

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 4



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING BRIDGE ON NC 581 OVER TAR RIVER BETWEEN SR 1952 AND SR 1921					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-02
					TOTAL SHEETS 39

DRAWN BY: D. HODGE DATE: 8/20
 CHECKED BY: G. GILLAND DATE: 8/20

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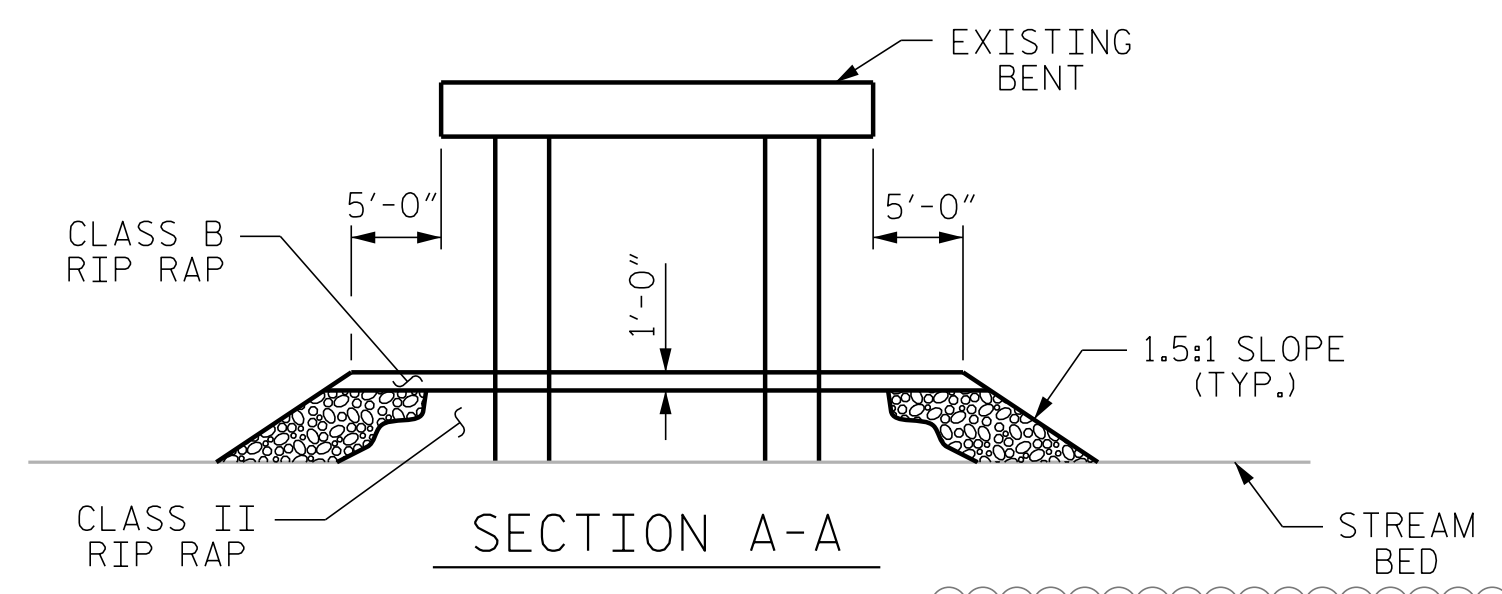
NOTES

FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STATION 23+90.50 -LREV-, SEE SPECIAL PROVISIONS.

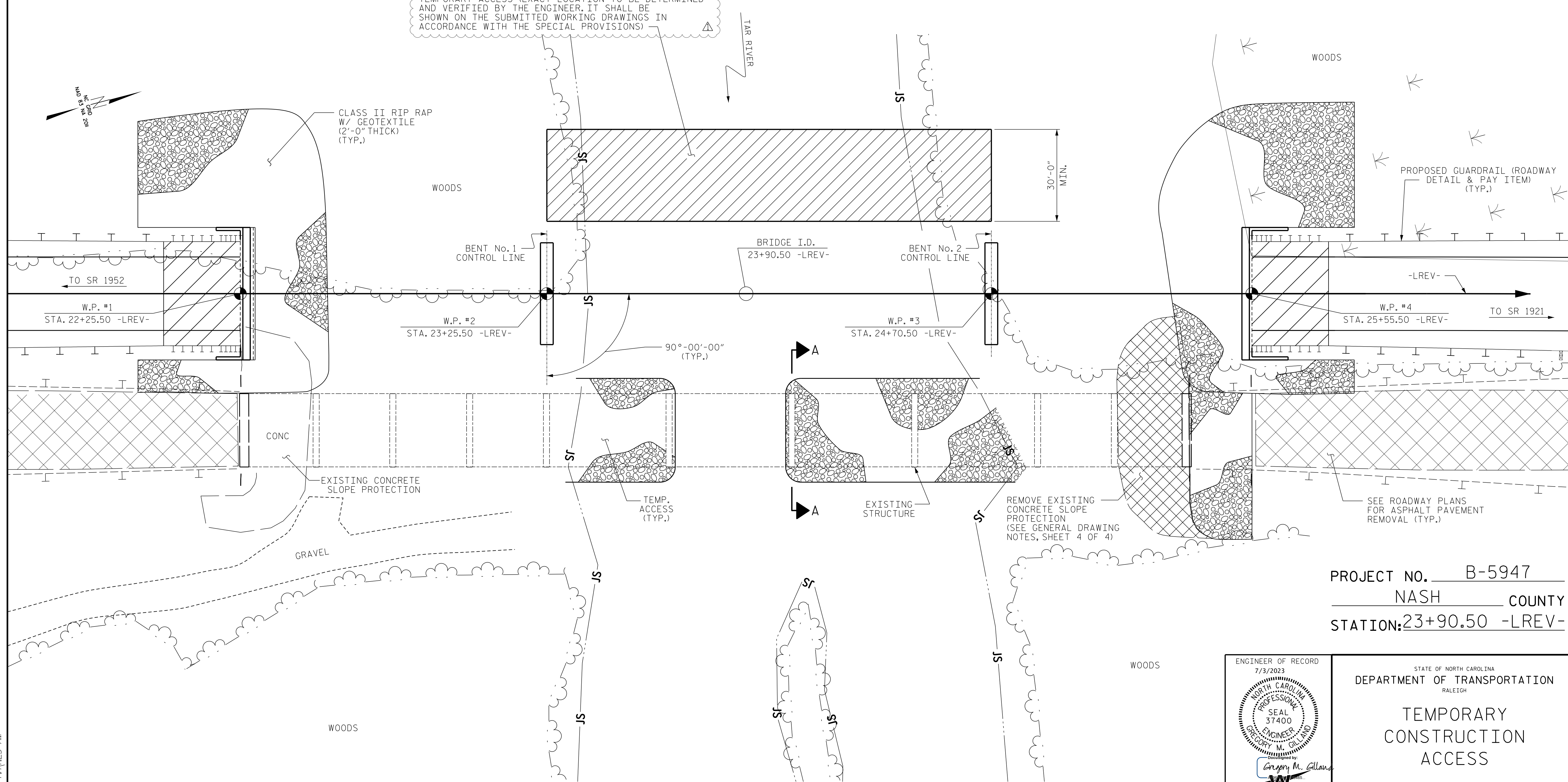
AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 23+90.50 -LREV-.

IF A TEMPORARY WORK BRIDGE IS UTILIZED THEN IT SHALL BE ILLUMINATED AT NIGHT WITH BLINKING YELLOW LIGHTS AS WELL AS REFLECTIVE SIGNAGE POSTED ON THE UPSTREAM/DOWNSTREAM/LEFT /RIGHT CHANNEL OPENING FOR PUBLIC NAVAGATION SAFETY.

AT NO TIME IS THE TEMPORARY ACCESS PERMITTED TO OBSTRUCT MORE THAN 50% OF STREAM FLOW.



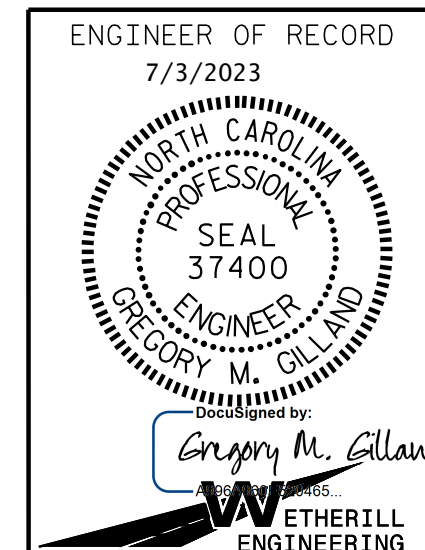
TEMPORARY ACCESS (EXACT LOCATION TO BE DETERMINED AND VERIFIED BY THE ENGINEER. IT SHALL BE SHOWN ON THE SUBMITTED WORKING DRAWINGS IN ACCORDANCE WITH THE SPECIAL PROVISIONS)



PLAN

(PILES FOR END BENTS AND COLUMNS FOR BENTS NOT SHOWN FOR CLARITY)

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**TEMPORARY
 CONSTRUCTION
 ACCESS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-05
1	JTD	7-3-23	3			TOTAL SHEETS
2			4			39

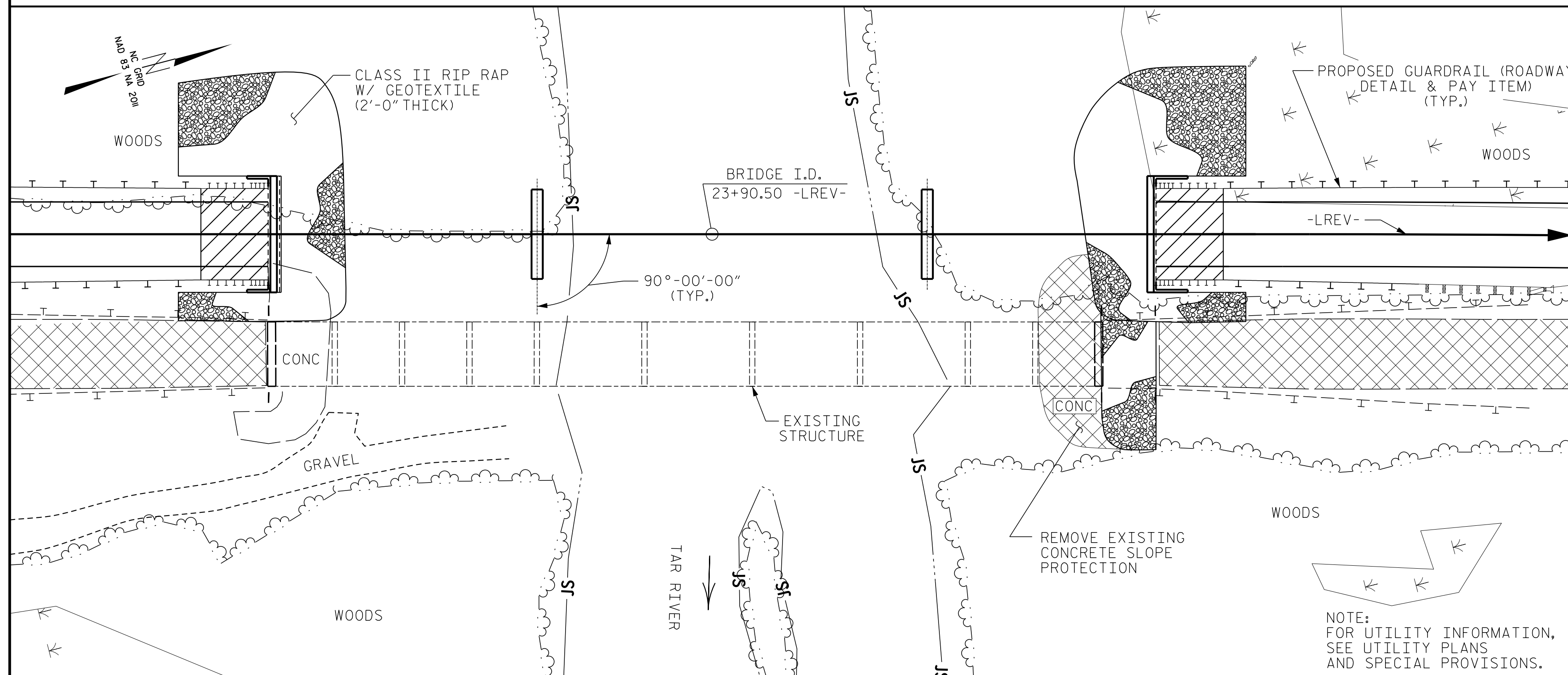
DRAWN BY: D. HODGE DATE: 6/20
 CHECKED BY: G. GILLAND DATE: 6/20

△ REVISED TEMPORARY ACCESS/WORK BRIDGE NOTES

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BM-1 (NAIL SET IN 16" HARDWOOD) 108.9' LT OF -LREV- STA. 21+89.99 EL. 146.10; N 777073 E 2269535



LOCATION SKETCH

SAMPLE BAR REPLACEMENT

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

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

HYDRAULIC DATA

DESIGN DISCHARGE = 26000 C.F.S.
 FREQUENCY OF DESIGN FLOOD = 50 YRS.
 DESIGN HIGH WATER ELEVATION... = 156.4
 DRAINAGE AREA = 680 SQ. MI.
 BASE DISCHARGE (0100) = 29,300 C.F.S.
 BASE HIGH WATER ELEVATION... = 157.7

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 29300+ C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD = 100+ YRS.
 OVERTOPPING FLOOD ELEVATION... = 159.2
 * OT OCCURS @ SAG -LREV- STA. 31+29.6 ±,
 ELEV = 159.2

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-6" Ø DRILLED PIERS IN SOIL	4'-6" Ø DRILLED PIERS NOT IN SOIL	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	72" PRESTRESSED FLORIDA I-BEAM	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 x 53 STEEL PILES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS		
	LUMP SUM	LUMP SUM	LUMP SUM	LN.FT.	LN.FT.	EACH	EACH	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	No.	LN.FT.	EA.	NO.	LN.FT.	LN.FT.	LN.FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	LUMP SUM	LUMP SUM	LUMP SUM					12,072	11,687					12	1,306.02								LUMP SUM
END BENT 1										36.0		7,147			7	7	189				440	488	
BENT 1				20.17	38.00	2				39.3		11,726	2,373										
BENT 2				45.50	38.00	2				40.3		13,480	3,162										
END BENT 2										36.0		7,147			7	7	244				535	595	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	65.67	76.00	4	1	12,072	11,687	151.6	LUMP SUM	39,500	5,535	12	1,306.02	14	14	433	641.67	656.67	975	1,083	LUMP SUM

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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.

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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA OF THE EXISTING STRUCTURE AT END BENT No. 2 ON THE TEMPORARY CONSTRUCTION ACCESS SHEET SHALL BE EXCAVATED AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR REMOVAL OF EXISTING STRUCTURE.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING 10 SPAN STRUCTURE CONSISTING OF 2 SPANS @ 25' CONT., 2 SPANS @ 25' CONT., 1 SPAN @ 40', 2 SPANS @ 40'-1", 1 SPAN @ 40' AND 2 SPANS @ 25' CONT. WITH REINFORCED CONCRETE DECK ON STEEL I-BEAMS AND A CLEAR ROADWAY WIDTH OF 24' ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE CAPS ON TIMBER PILES AND REINFORCED CONCRETE POST AND BEAM BENTS AND LOCATED 45' DOWNSTREAM FROM PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT 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.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

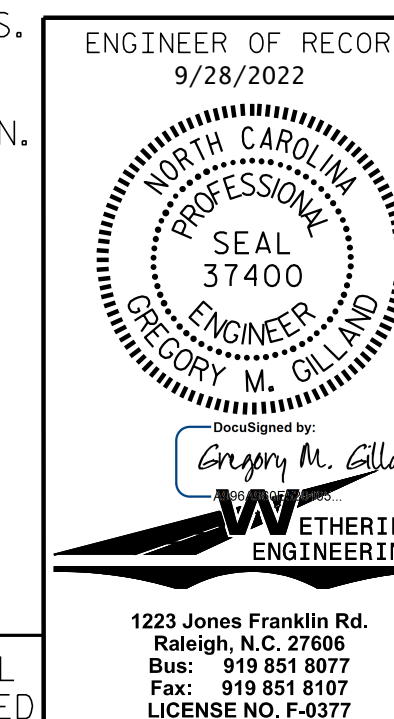
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

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

THERE IS AN OPERABLE USGS STREAM GAUGE LOCATED AT THE SOUTHEASTERN CORNER OF EXISTING BRIDGE WHICH SHALL REMAIN UNDISTURBED UNTIL BRIDGE DEMOLITION. NOTIFY THE ENGINEER TWO WEEKS PRIOR TO DEMOLITION OF BRIDGE TO ALLOW USGS TO REMOVE ITS EQUIPMENT.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 BRIDGE ON NC 581
 OVER TAR RIVER
 BETWEEN SR 1952 AND SR 1921

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : G. GILLAND/DAH DATE : 8/21
 CHECKED BY : T. KOCH DATE : 8/21

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.08	--	1.75	0.960	1.080	A	ER	48.630	0.960	1.230	A	ER	68.360	0.80	0.960	1.130	B	ER	71.380	1	
	HL-93 (OPERATING)	N/A		1.40	--	1.35	0.960	1.400	A	ER	48.630	0.960	1.710	B	ER	114.630	N/A	--	--	--	--	--	--	1
	HS-20 (INVENTORY)	36.000	②	1.50	54,000	1.75	0.960	1.500	A	ER	48.630	0.960	1.890	B	ER	114.630	0.80	0.960	1.640	A	ER	48.630	1	
	HS-20 (OPERATING)	36.000		1.94	69,840	1.35	0.960	1.940	A	ER	48.630	0.960	2.510	B	ER	114.630	N/A	--	--	--	--	--	--	1
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.87	52,245	1.40	0.960	4.440	A	ER	48.630	0.960	6.430	B	ER	114.630	0.80	0.960	3.870	A	ER	48.630	1
		SNGARBS2	20.000		2.81	56,200	1.40	0.960	3.220	A	ER	48.630	0.960	4.390	B	ER	114.630	0.80	0.960	2.810	A	ER	48.630	1
		SNAGRIS2	22.000		2.63	57,860	1.40	0.960	3.010	A	ER	48.630	0.960	4.010	B	ER	114.630	0.80	0.960	2.630	A	ER	48.630	1
		SNCOTTS3	27.250		1.92	52,320	1.40	0.960	2.210	A	ER	48.630	0.960	3.070	B	ER	114.630	0.80	0.960	1.920	A	ER	48.630	1
		SNAGGRS4	34.925		1.58	55,182	1.40	0.960	1.810	A	ER	48.630	0.960	2.430	B	ER	114.630	0.80	0.960	1.580	A	ER	48.630	1
		SNS5A	35.550		1.55	55,103	1.40	0.960	1.770	A	ER	48.630	0.960	2.430	B	ER	114.630	0.80	0.960	1.550	A	ER	48.630	1
		SNS6A	39.950		1.41	56,330	1.40	0.960	1.610	A	ER	48.630	0.960	2.170	B	ER	114.630	0.80	0.960	1.410	A	ER	48.630	1
	SNS7B	42.000		1.34	56,280	1.40	0.960	1.530	A	ER	48.630	0.960	2.090	B	ER	114.630	0.80	0.960	1.340	A	ER	48.630	1	
	TRUCK TRACTOR SEMI-TRAILER (TTS)	TNAGRIT3	33.000		1.71	56,430	1.40	0.960	1.960	A	ER	48.630	0.960	2.650	B	ER	114.630	0.80	0.960	1.710	A	ER	48.630	1
		TNT4A	33.075		1.71	56,558	1.40	0.960	1.970	A	ER	48.630	0.960	2.610	B	ER	114.630	0.80	0.960	1.710	A	ER	48.630	1
		TNT6A	41.600		1.39	57,824	1.40	0.960	1.590	A	ER	48.630	0.960	2.180	B	ER	114.630	0.80	0.960	1.390	A	ER	48.630	1
		TNT7A	42.000		1.39	58,380	1.40	0.960	1.590	A	ER	48.630	0.960	2.140	B	ER	114.630	0.80	0.960	1.390	A	ER	48.630	1
		TNT7B	42.000		1.42	59,640	1.40	0.960	1.630	A	ER	48.630	0.960	2.060	B	ER	114.630	0.80	0.960	1.420	A	ER	48.630	1
		TNAGRIT4	43.000		1.37	58,910	1.40	0.960	1.570	A	ER	48.630	0.960	2.000	B	ER	114.630	0.80	0.960	1.370	A	ER	48.630	1
TNAGT5A		45.000		1.29	58,050	1.40	0.960	1.480	A	ER	48.630	0.960	1.940	B	ER	114.630	0.80	0.960	1.290	A	ER	48.630	1	
TNAGT5B	45.000		③	1.28	57,600	1.40	0.960	1.470	A	ER	48.630	0.960	1.890	B	ER	114.630	0.80	0.960	1.280	A	ER	48.630	1	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1. BOTH EXTERIOR GIRDERS ARE THE SAME.
- 2.
- 3.
- 4.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

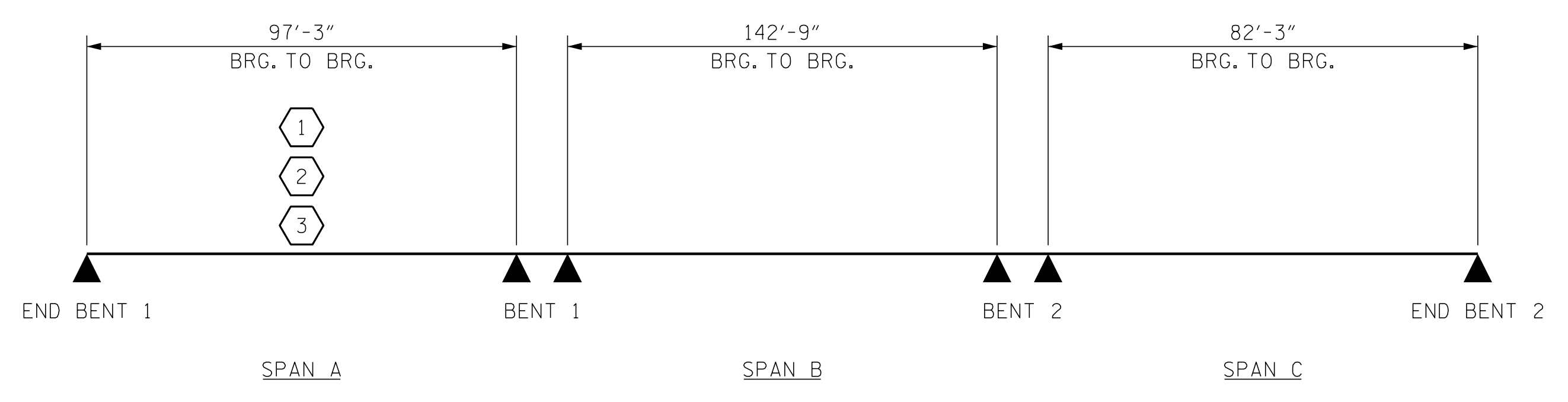
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING ***

*** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

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ASSEMBLED BY : G.M. GILLAND	DATE : 6/20
CHECKED BY : J. DILWORTH	DATE : 6/20
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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ENGINEER OF RECORD
10/18/2021

NORTH CAROLINA
PROFESSIONAL
SEAL
37400
ENGINEER
GREGORY M. GILLAND

Gregory M. Gilland
ETHERILL
ENGINEERING

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-06
1			3			TOTAL SHEETS
2			4			39

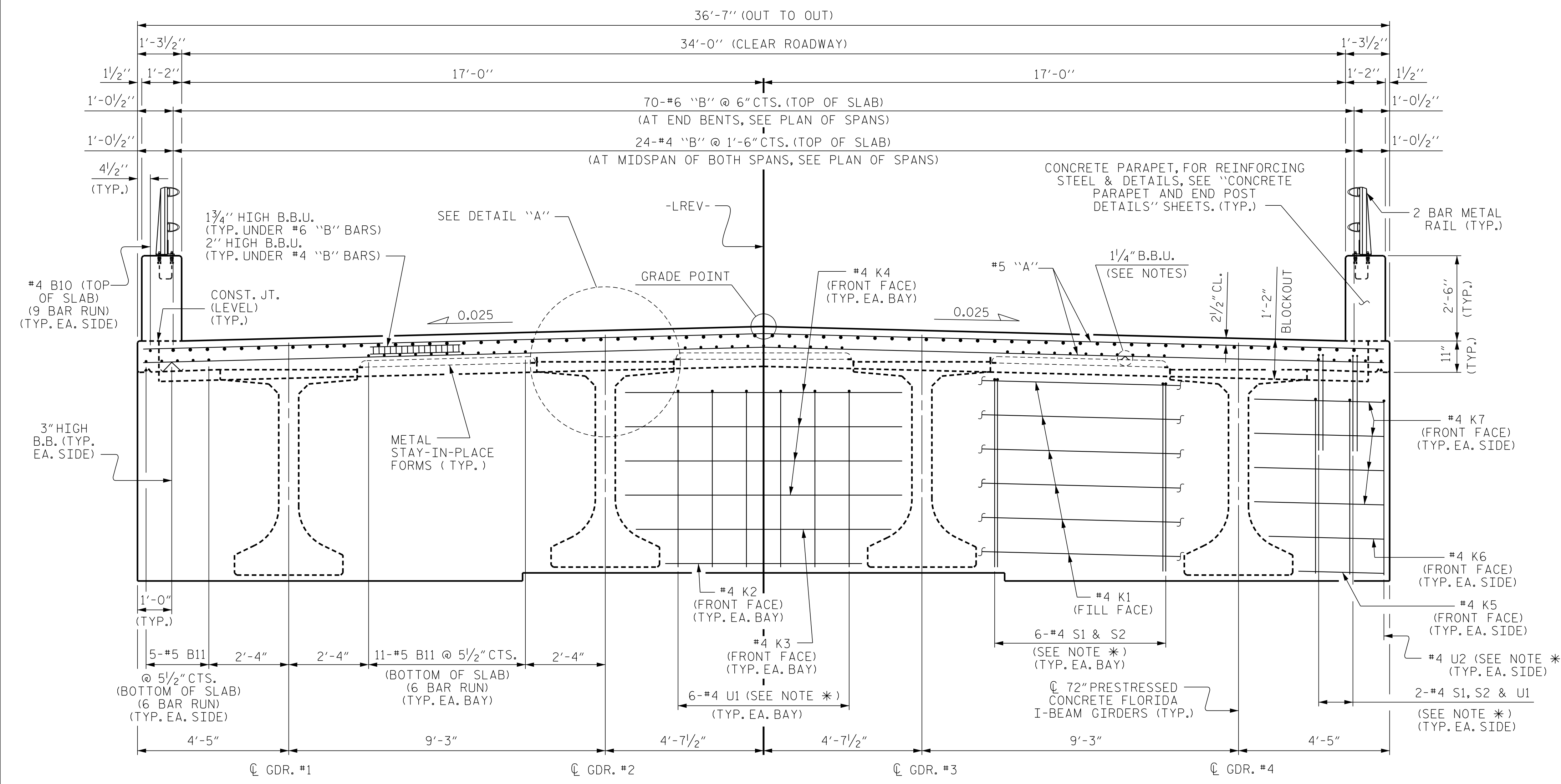
NOTES:

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

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

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.

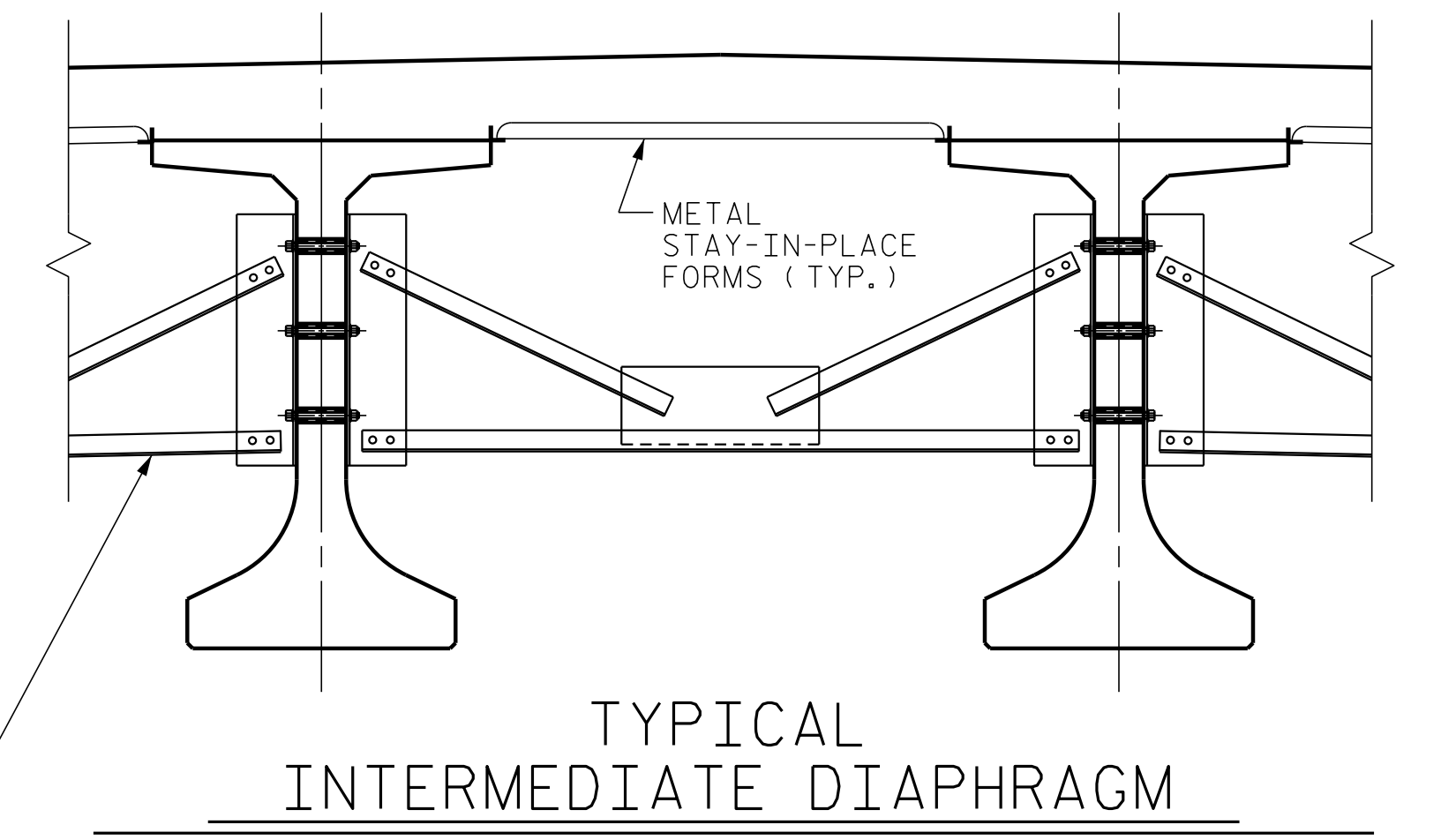
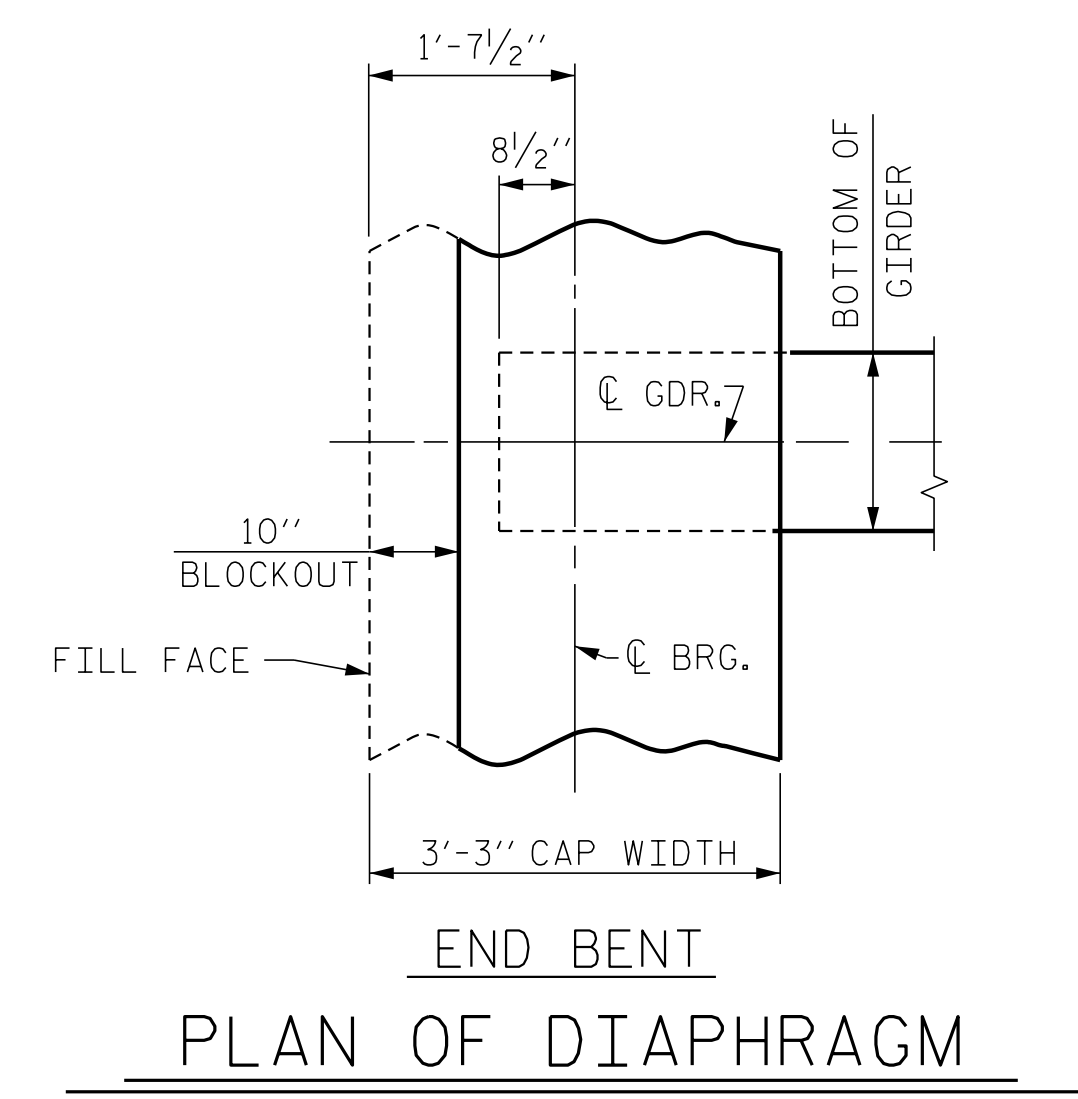
CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.



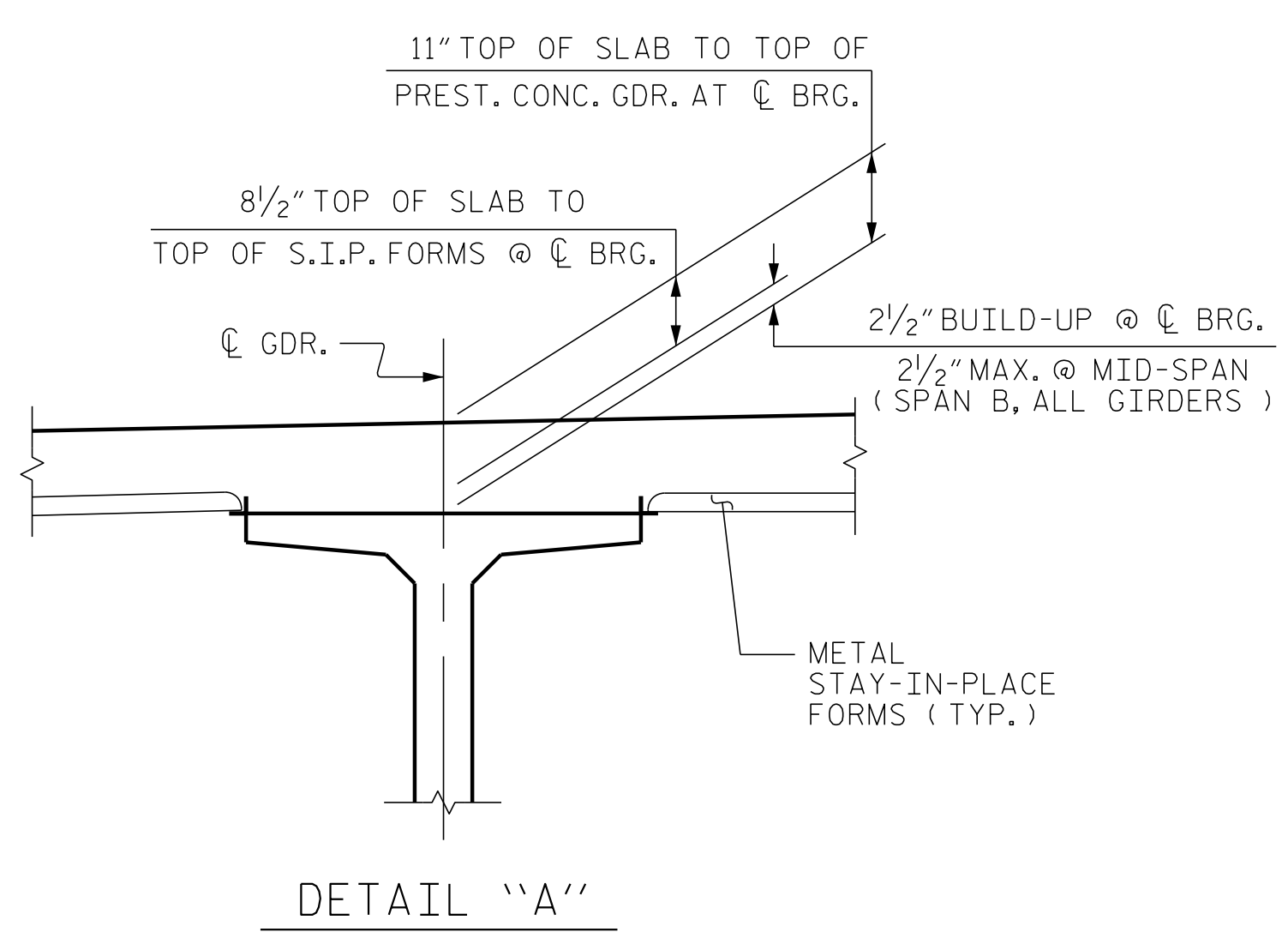
TYPICAL SECTION

END BENT No. 1 DIAPHRAGM SHOWN, END BENT No. 2 SIMILAR

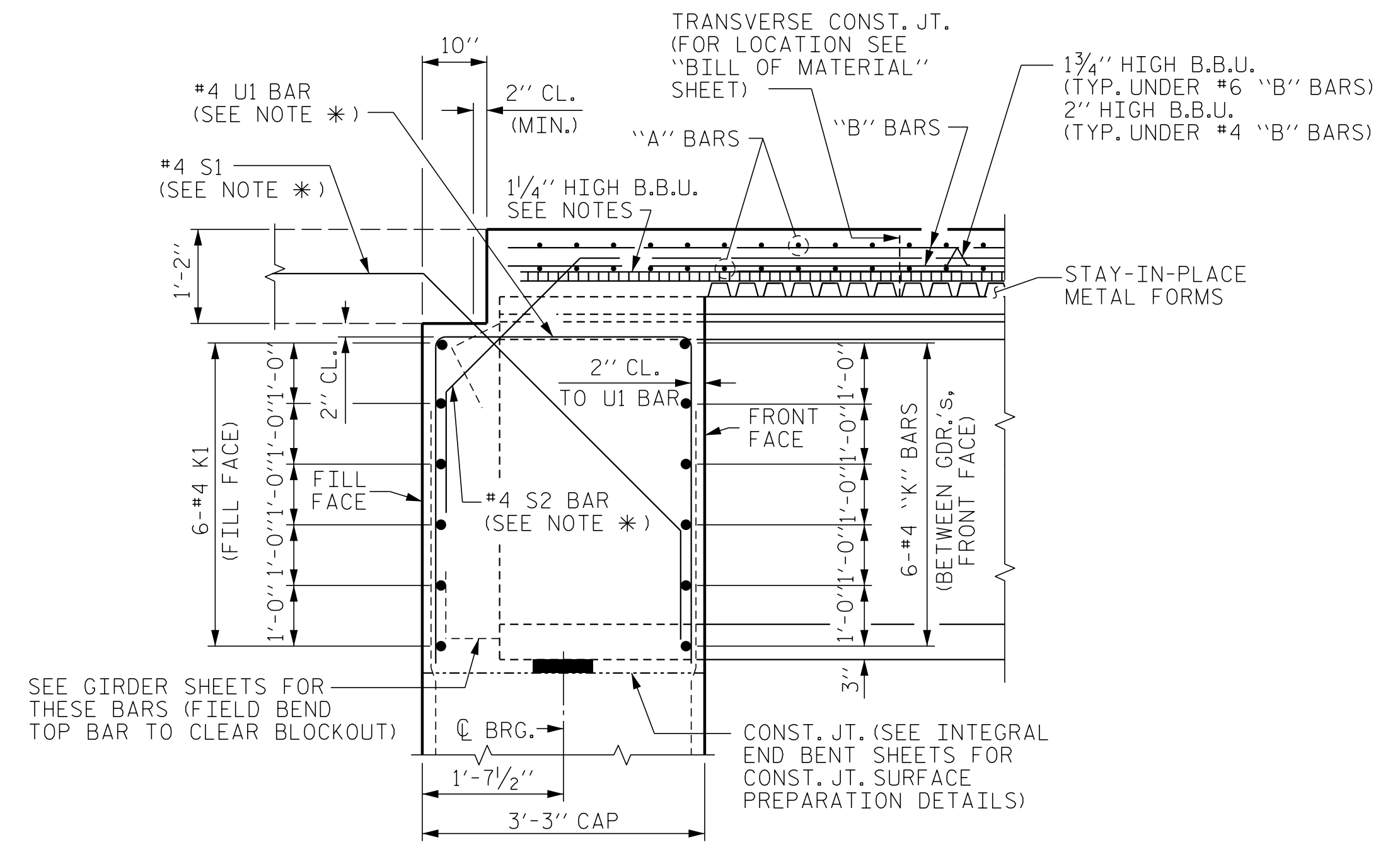
NOTE *
THESE BARS ARE TO MATCH #4 'V' BARS IN END BENT



PROJECT NO. B-5947
 NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 2

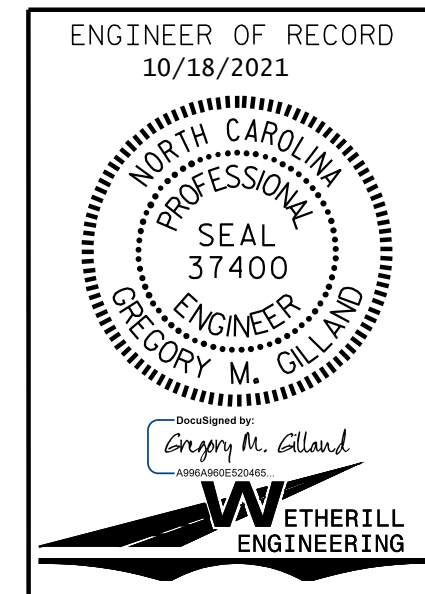


DETAIL 'A'



SECTION THRU INTEGRAL END BENT

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE 'INTERMEDIATE STEEL DIAPHRAGMS FOR 72" PRESTRESSED FLORIDA I BEAM' (TYP.)



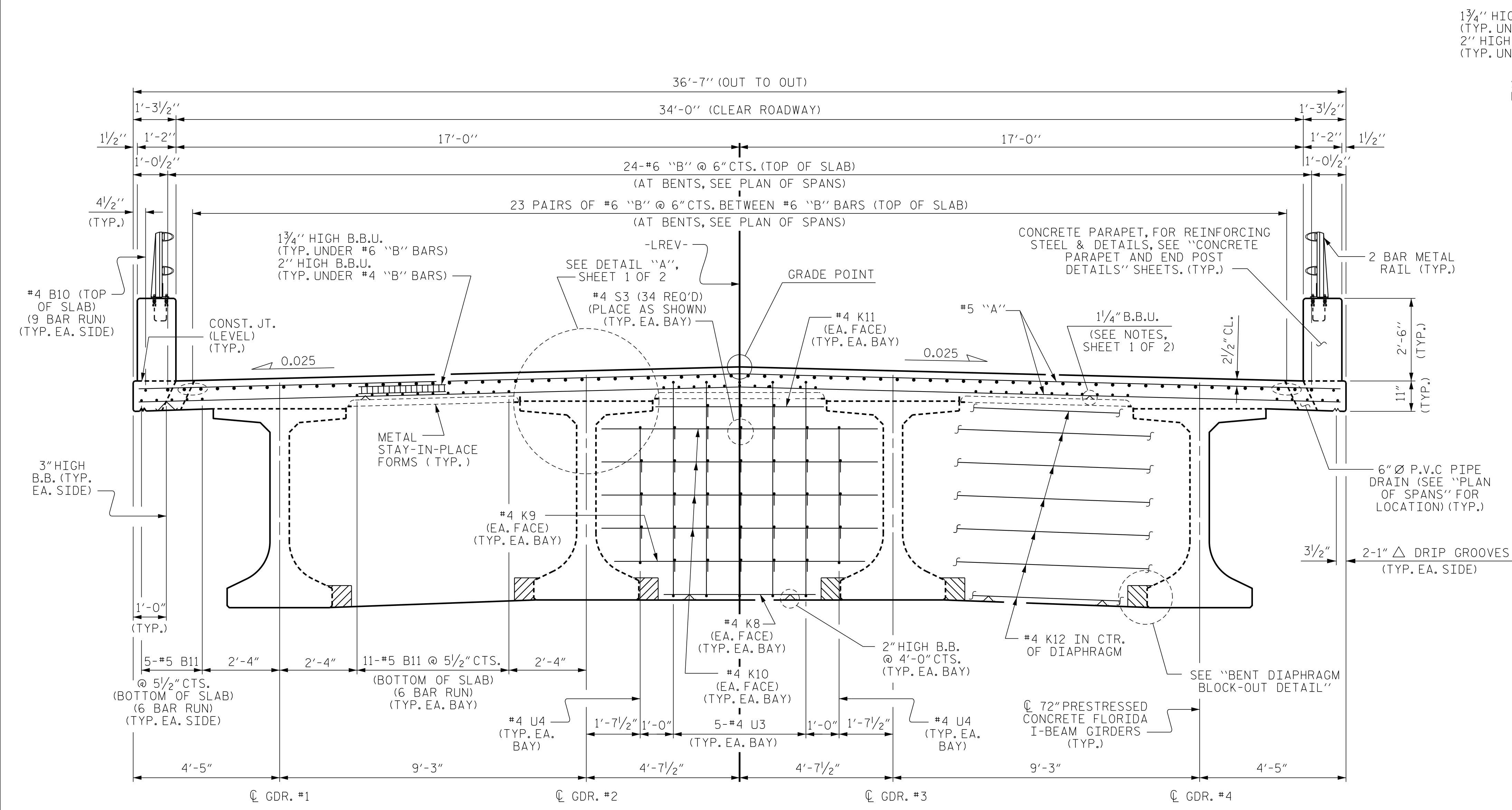
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SUPERSTRUCTURE					
TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-07
TOTAL SHEETS					39

DRAWN BY: D. HODGE DATE: 3/20
 CHECKED BY: G. GILLAND DATE: 5/20

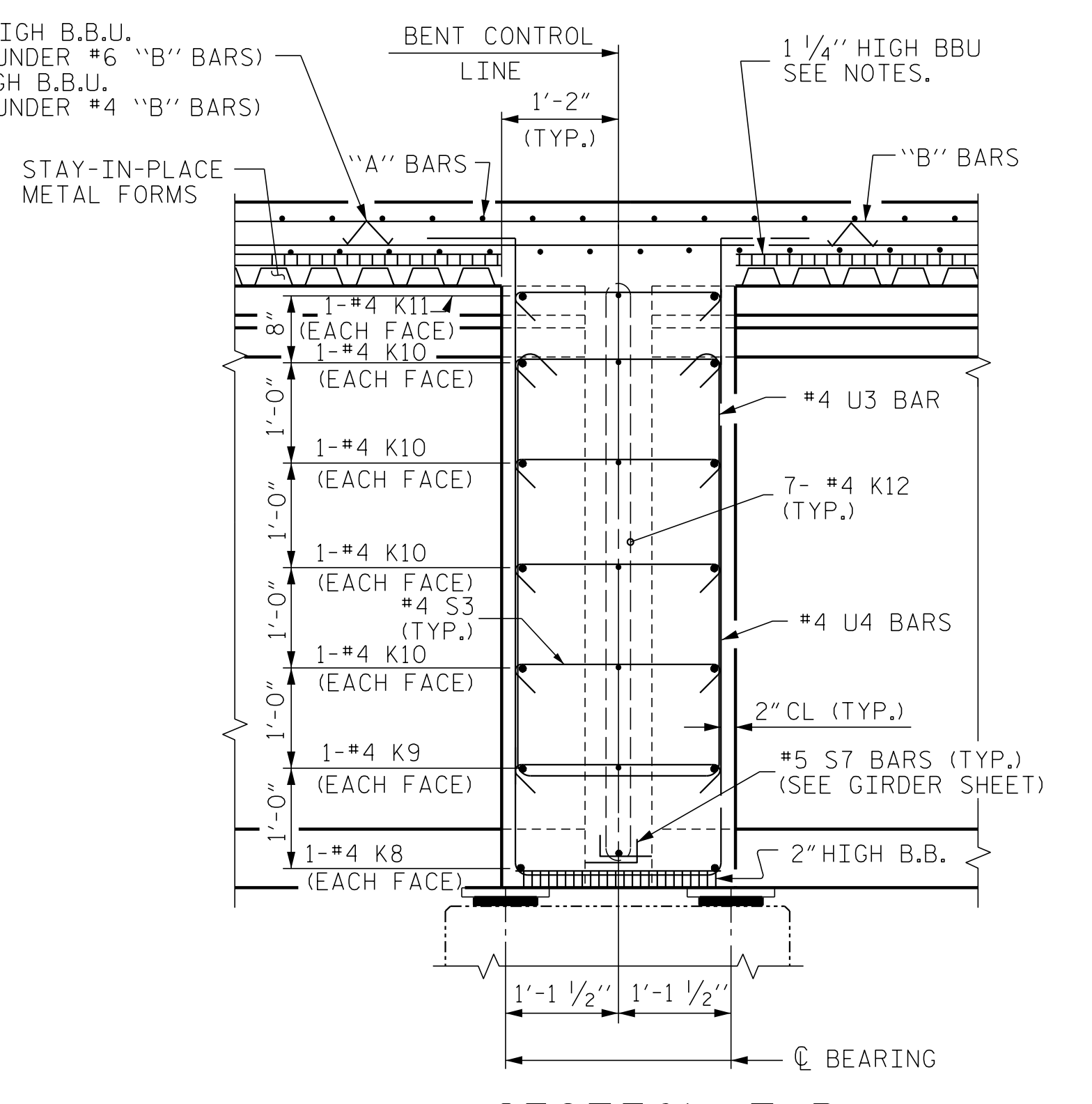
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1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

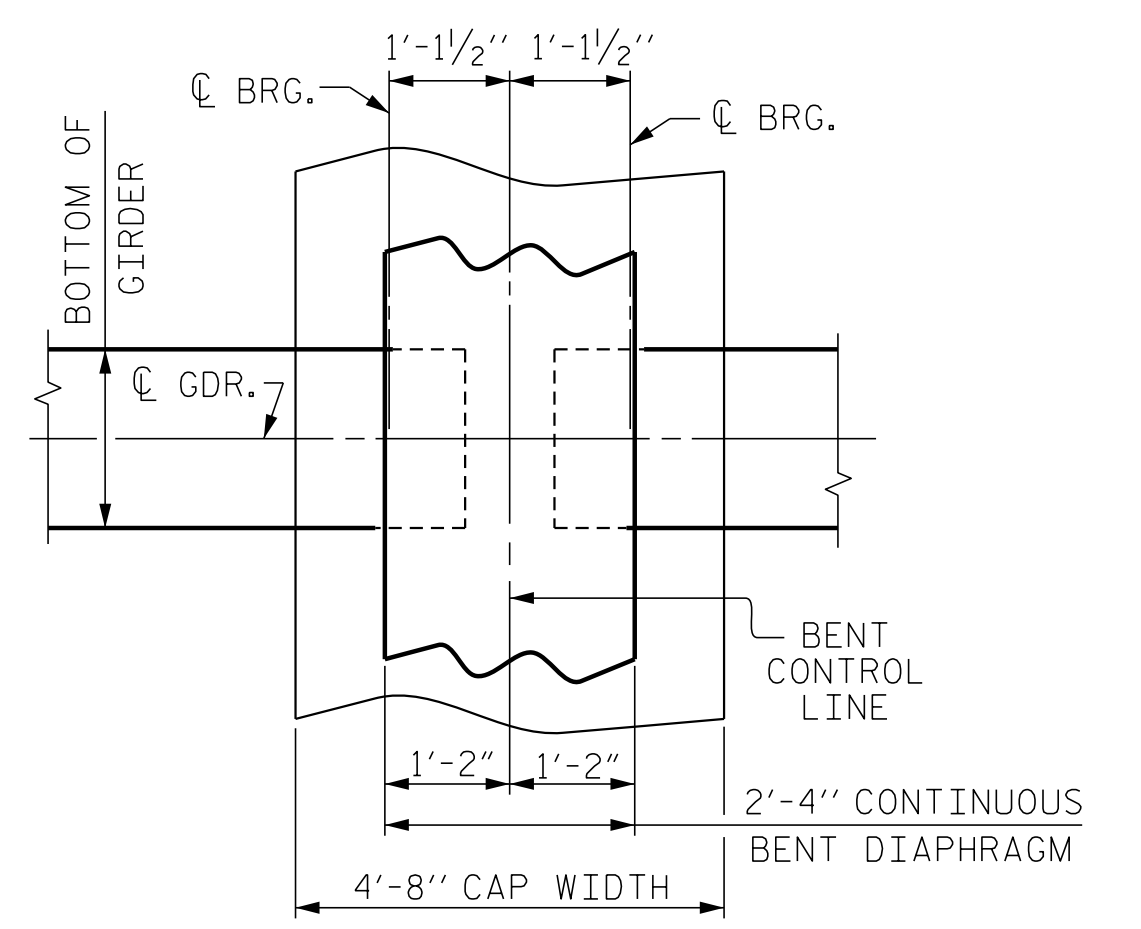
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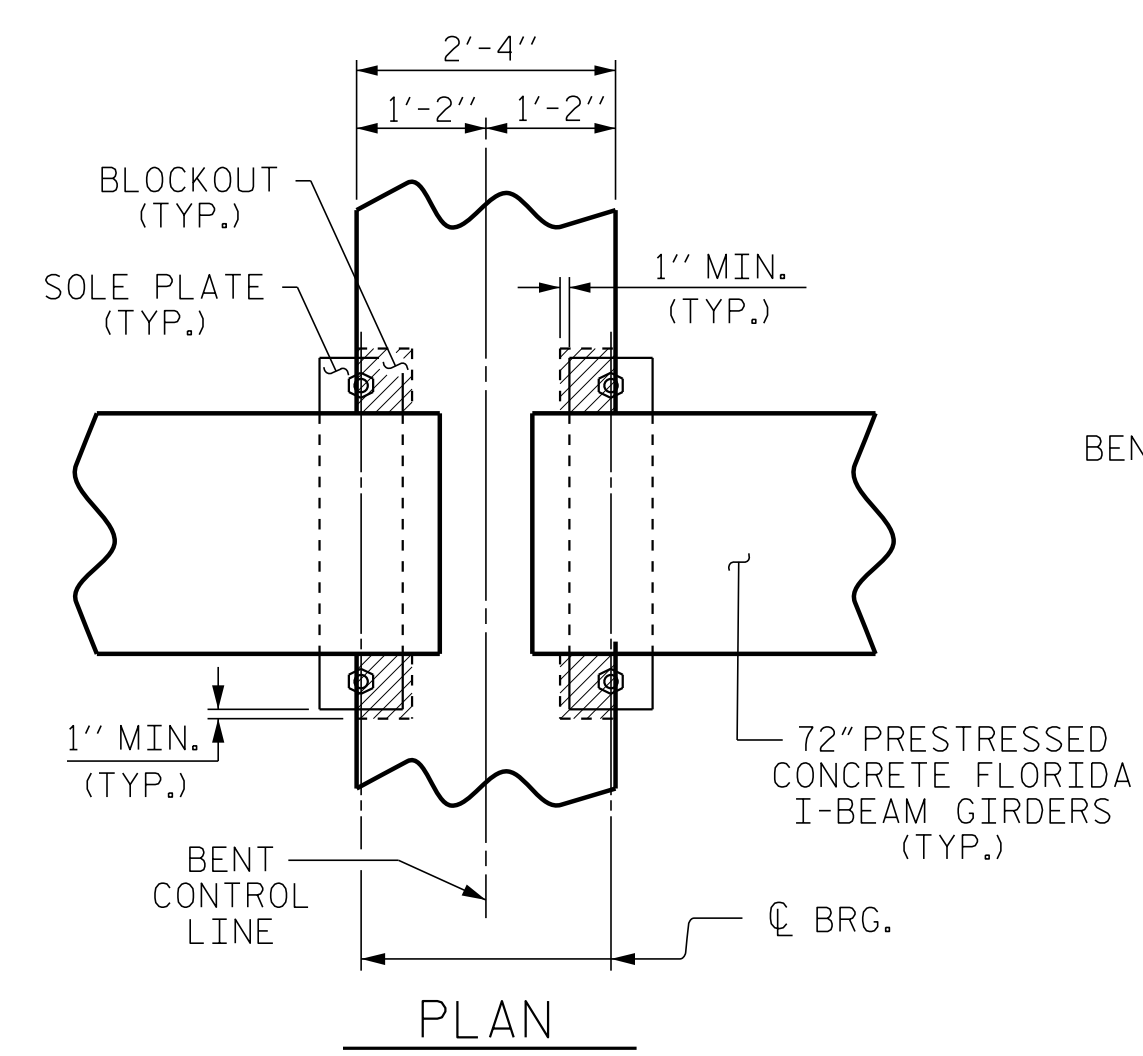
TYPICAL SECTION
BENT DIAPHRAGM



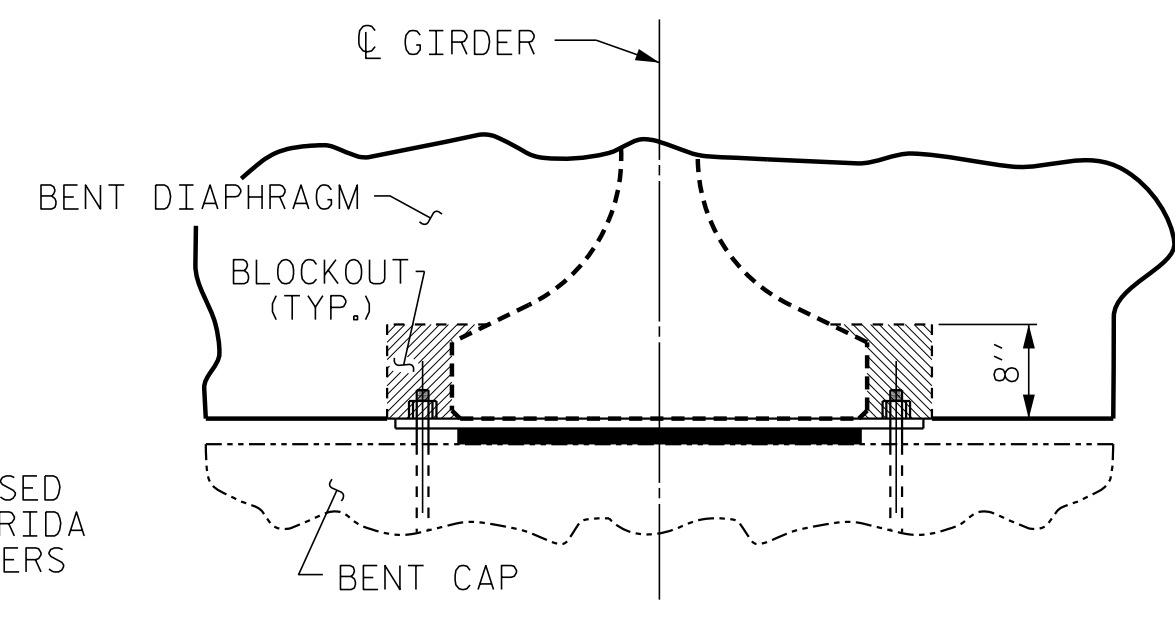
SECTION THRU
CONTINUOUS BENT DIAPHRAGM



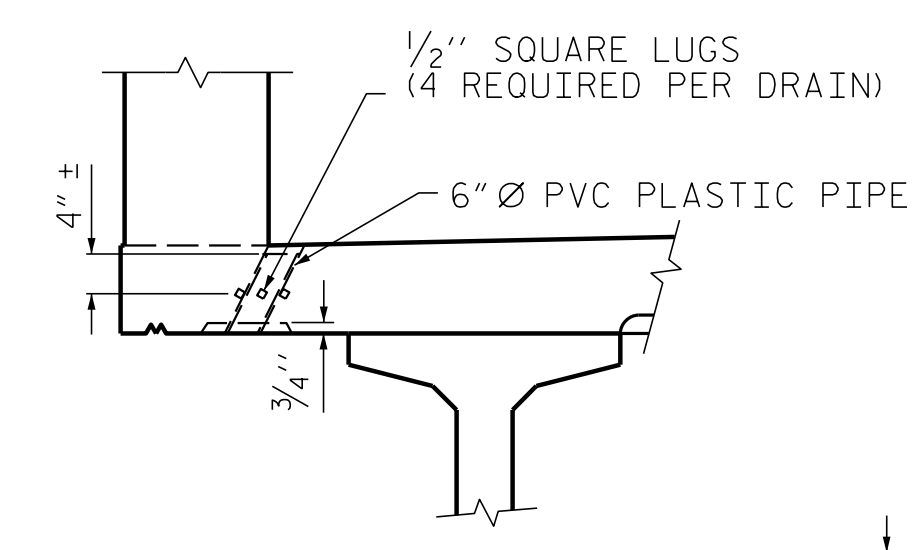
BENT
PLAN OF DIAPHRAGM



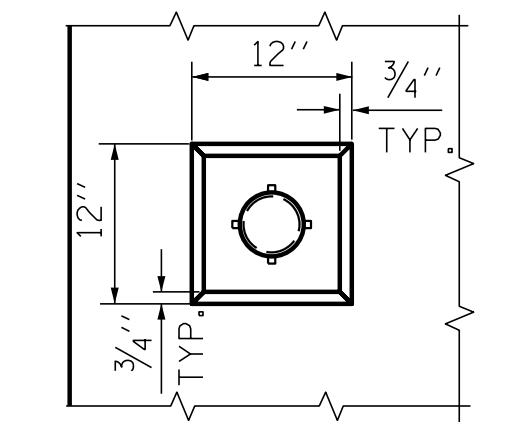
BENT DIAPHRAGM BLOCK-OUT DETAIL



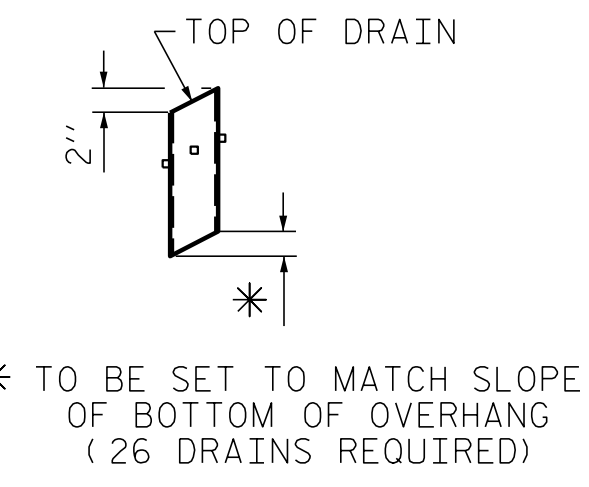
SECTION



ELEVATION



PLAN OF RECESS



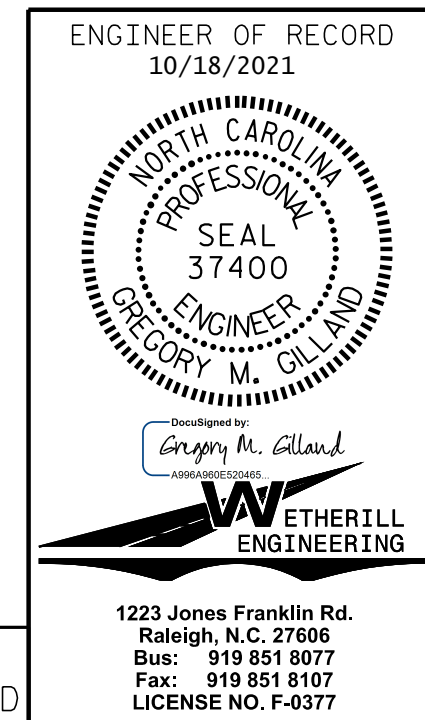
PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.
4 - 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

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

DRAIN DETAILS

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-
SHEET 2 OF 2

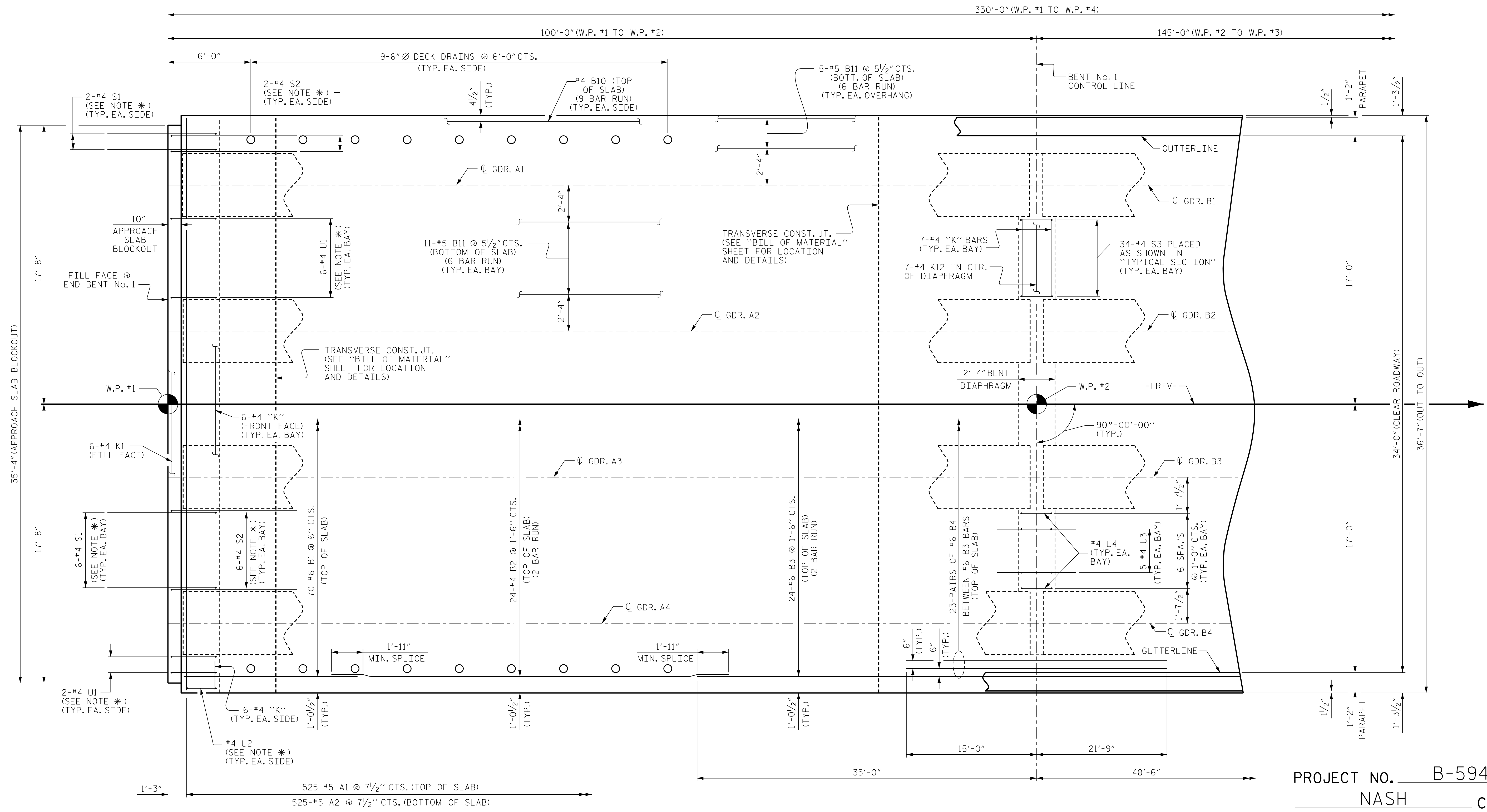


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUPERSTRUCTURE TYPICAL SECTION	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-08
2			TOTAL SHEETS 39

DRAWN BY: D. HODGE DATE: 3/20
CHECKED BY: G. GILLAND DATE: 5/20

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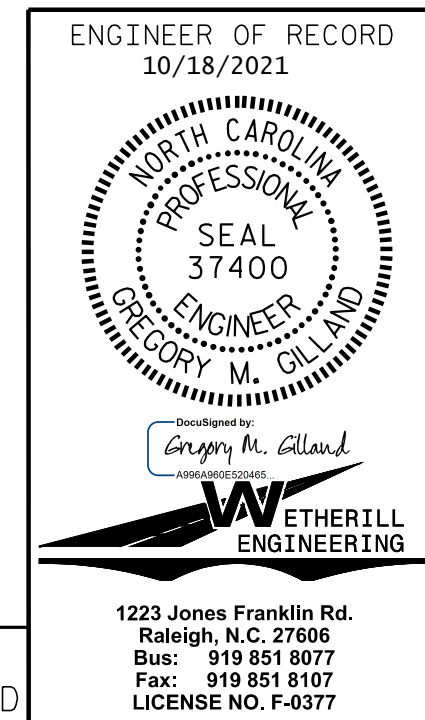


PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

SPAN "A"
 SPAN "B"

PARTIAL PLAN OF SPAN

NOTES:
 FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET" SHEETS.
 * THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.



ENGINEER OF RECORD
 10/18/2021
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 37400
 GREGORY M. GILLAND
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 LICENSE NO. F-0377

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS

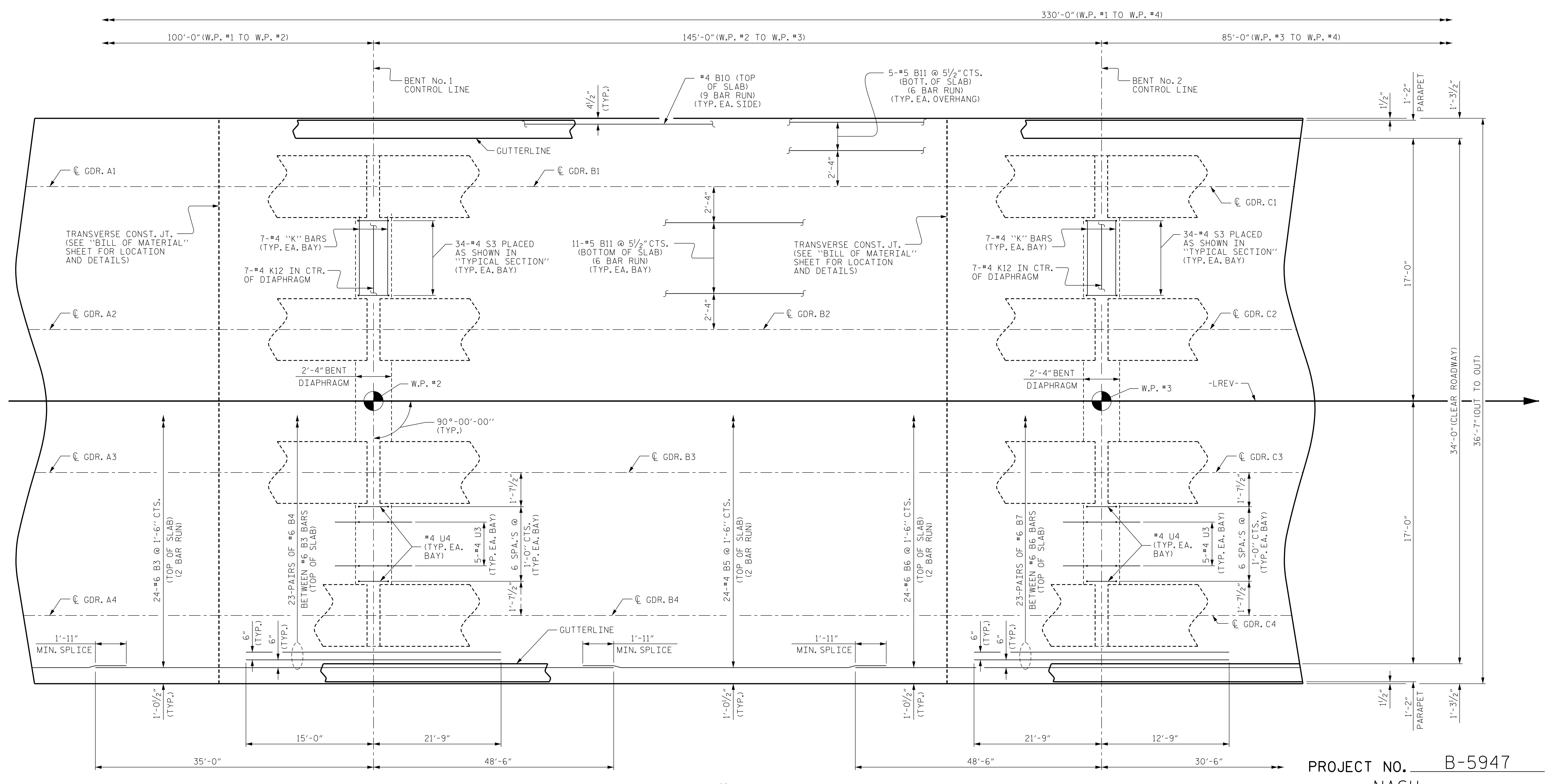
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2			4		

SHEET NO. S-09
 TOTAL SHEETS 39

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DRAWN BY: D. HODGE DATE: 3/20
 CHECKED BY: G. GILLAND DATE: 5/20

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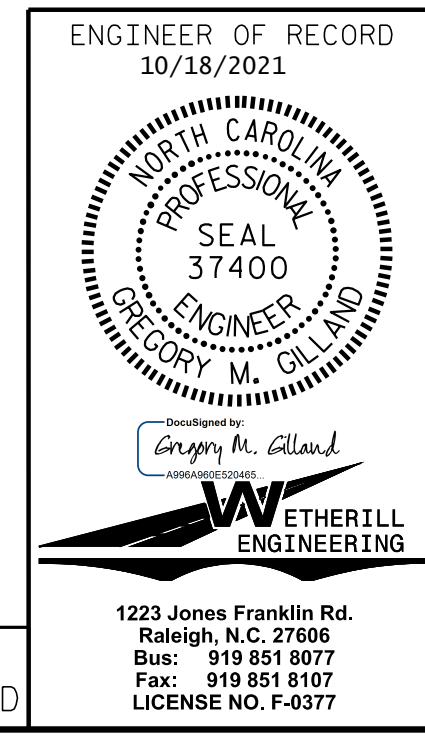


PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

SHEET 2 OF 3

PARTIAL PLAN OF SPAN

NOTES :
 FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET" SHEETS.
 * THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

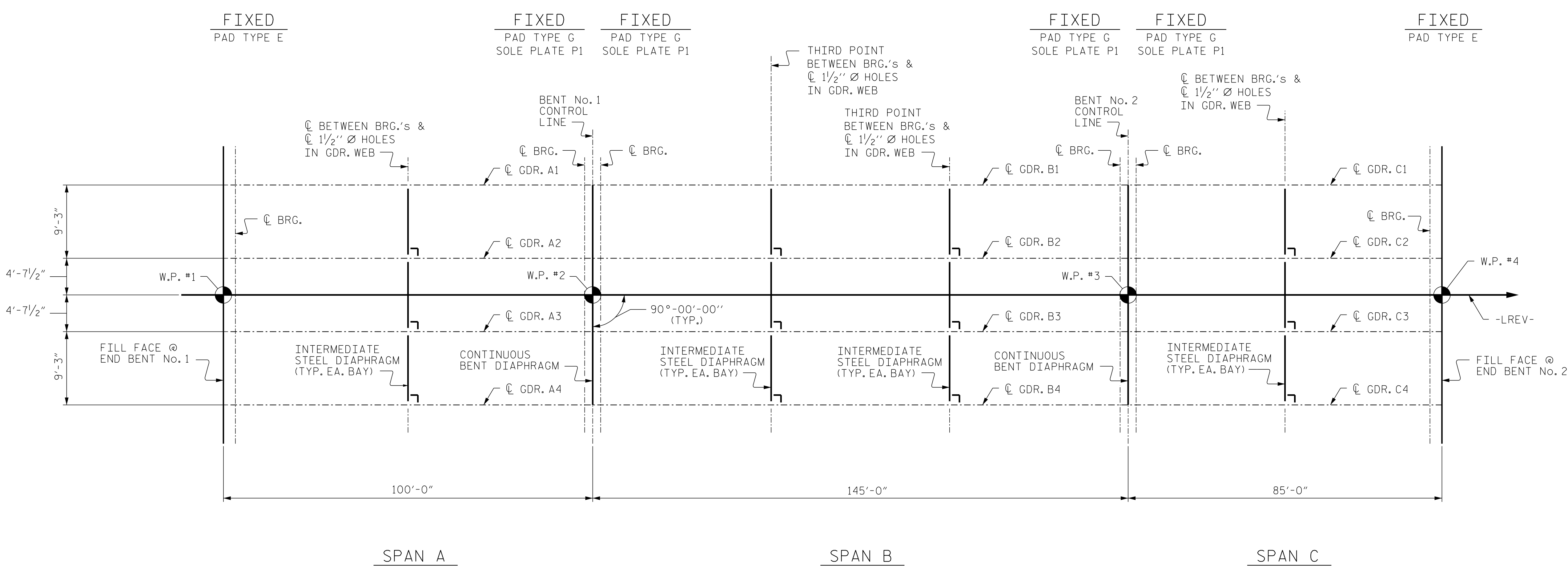


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPANS					
SHEET NO. S-10					
TOTAL SHEETS 39					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY: D. HODGE DATE: 3/20
 CHECKED BY: G. GILLILAND DATE: 5/20

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GIRDER LAYOUT

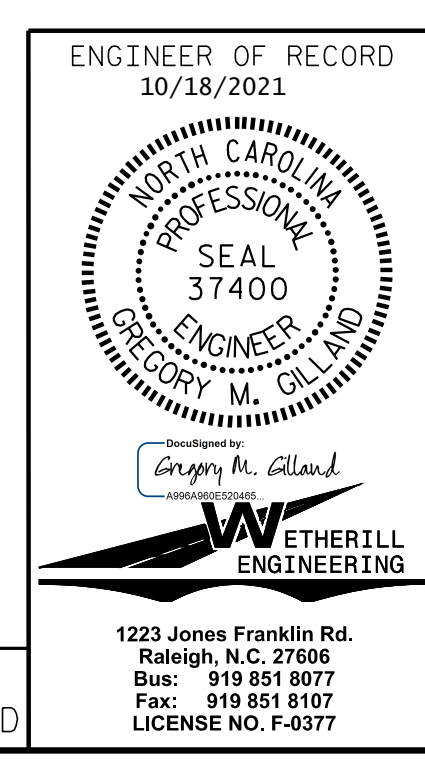
SEE "BEARING PADS AND SOLE PLATES FOR PRESTRESSED FLORIDA I-BEAMS" SHEET FOR DETAILS AND PLACING.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

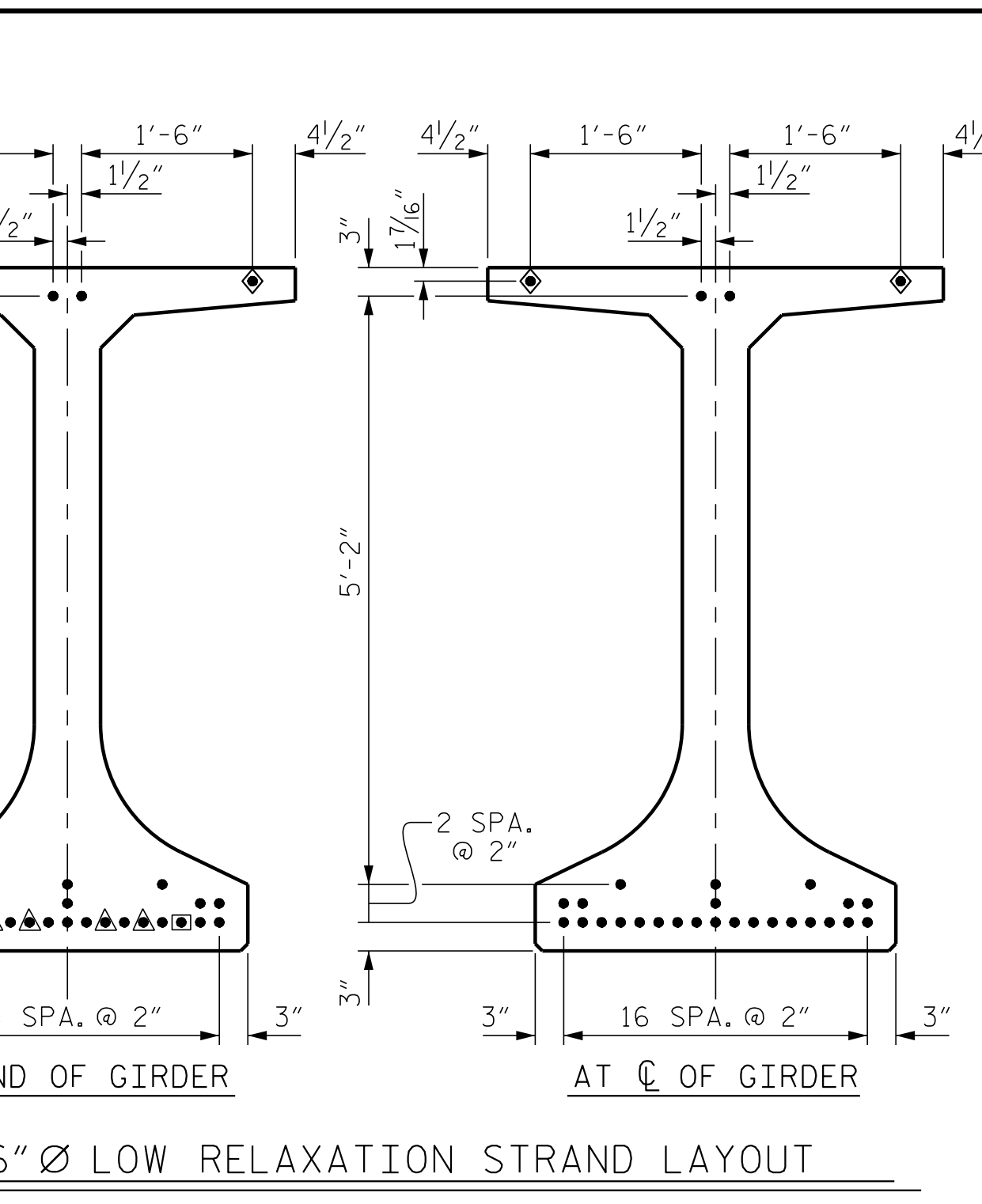
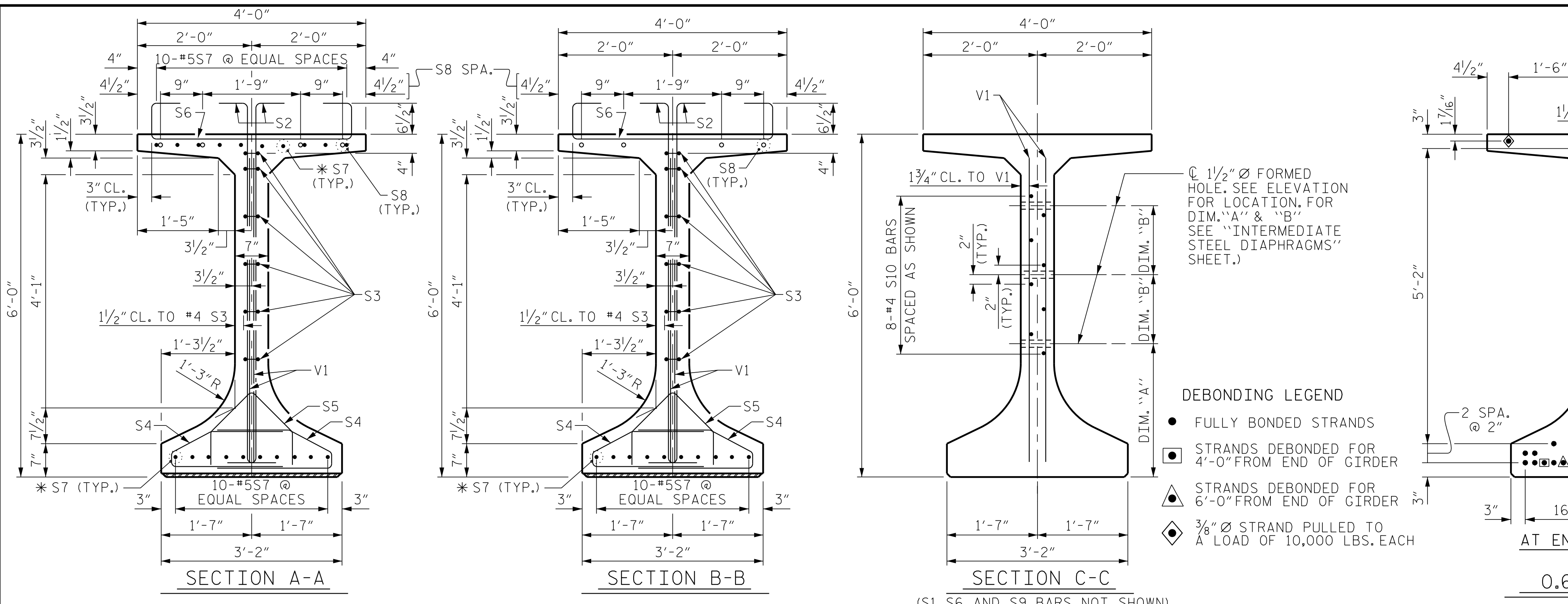
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DRAWN BY : D. HODGE DATE : 5/20
 CHECKED BY : G. GILLAND DATE : 5/20

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ENGINEER OF RECORD 10/18/2021 NORTH CAROLINA PROFESSIONAL SEAL 37400 ENGINEER GREGORY M. GILLAND Gregory M. Gilland 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 GIRDER LAYOUT					
REVISIONS						SHEET NO.					
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12					
1			3			TOTAL SHEETS					
2			4			39					

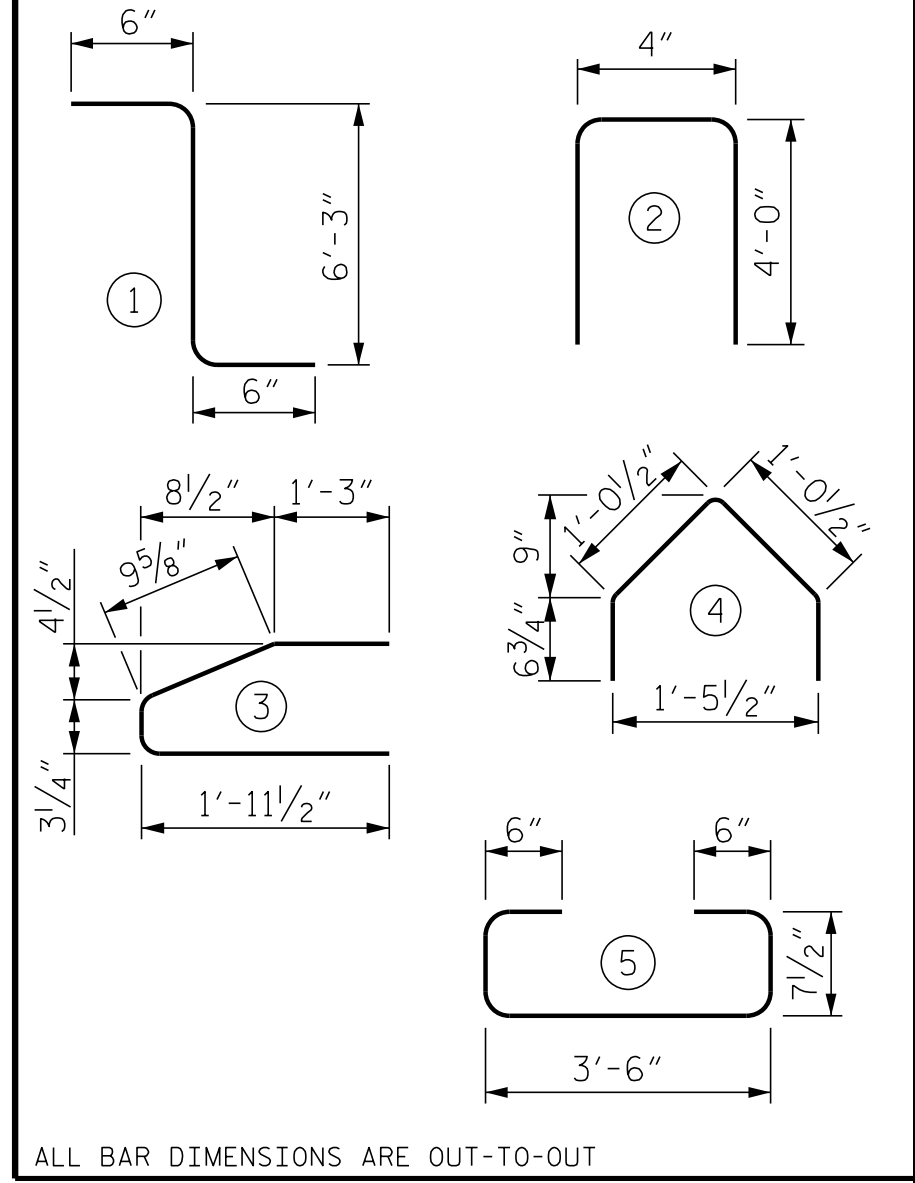


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	220	#4	1	7'-3"	1065
S2	24	#5	1	7'-3"	181
S3	12	#4	2	8'-4"	67
S4	244	#3	3	4'-4"	398
S5	54	#3	4	3'-3"	66
S6	86	#5	5	5'-9"	516
*S7	30	#5	STR	3'-8"	115
S8	8	#6	STR	26'-0"	312
S9	2	#3	STR	2'-10"	2
S10	8	#4	STR	8'-0"	43
V1	20	#5	STR	5'-4"	111

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

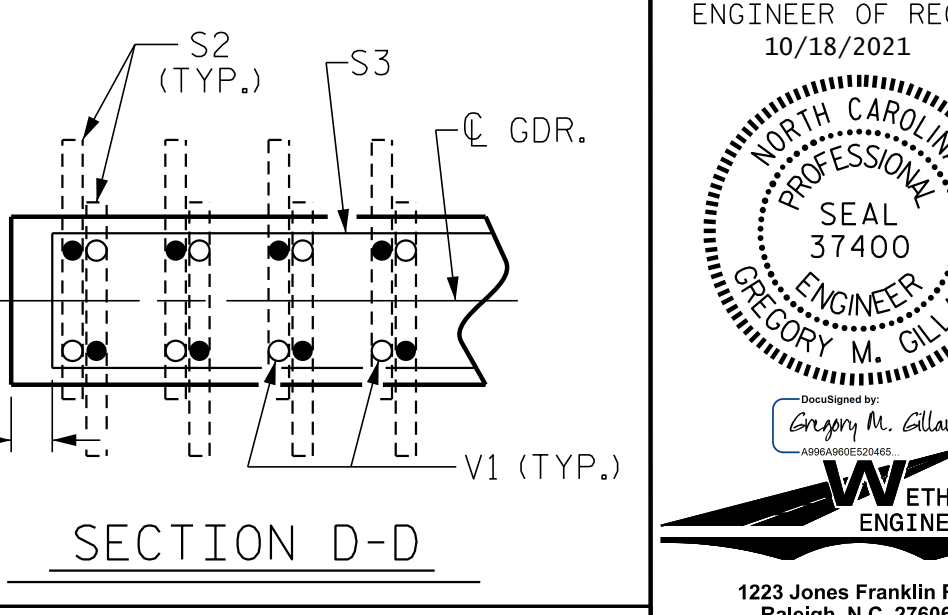
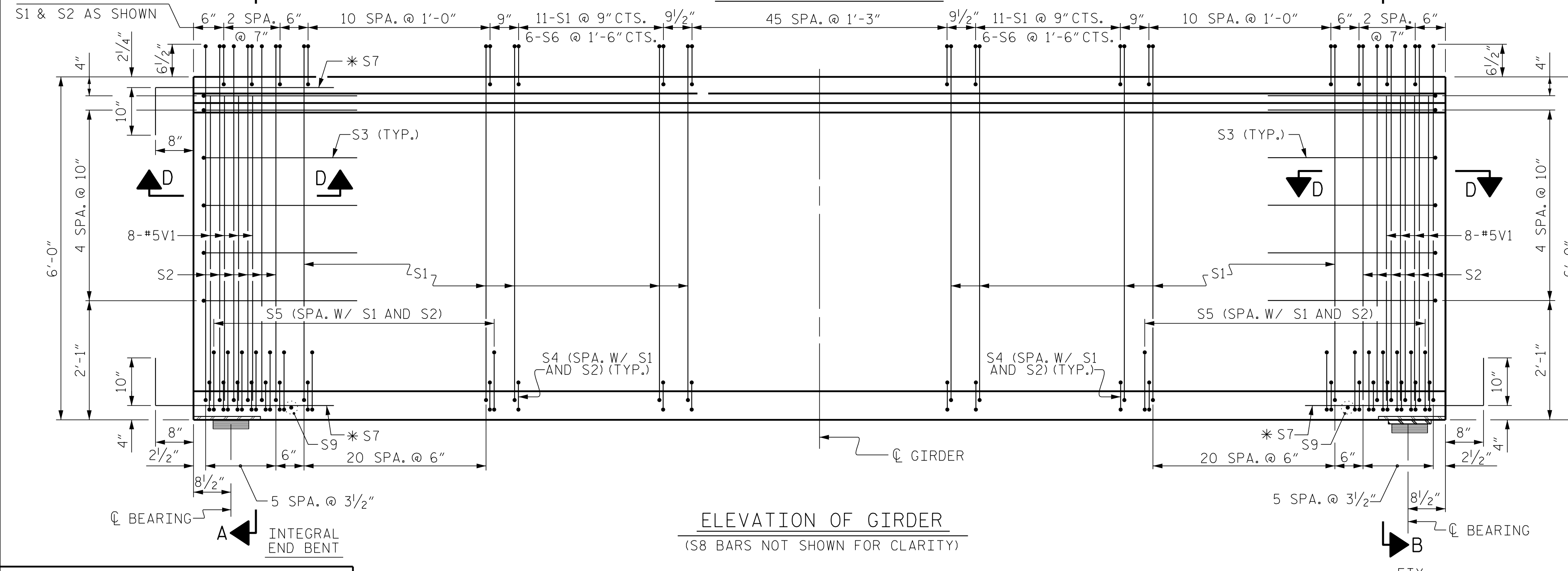
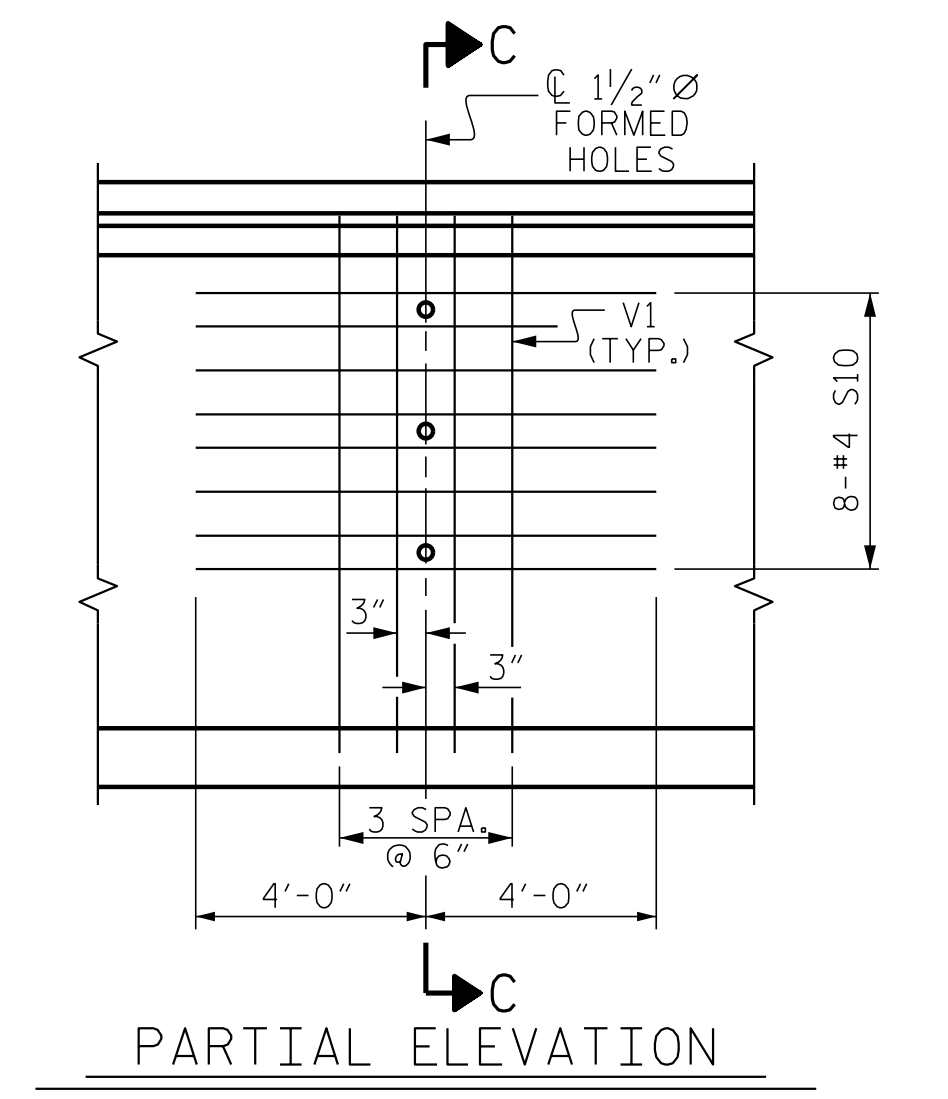
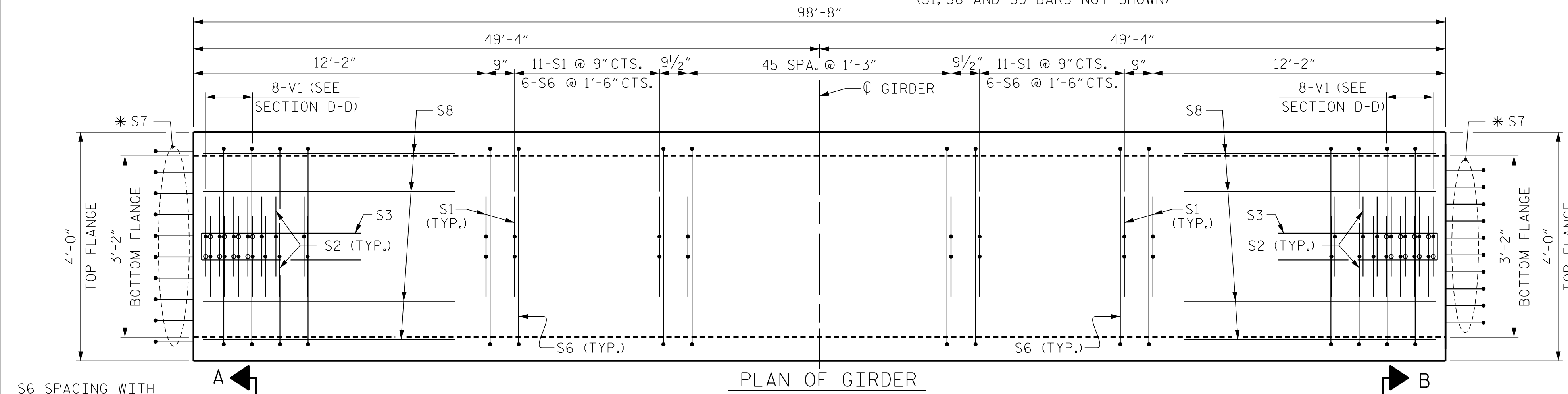
BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	6,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2,876	26.9	27

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	98.67'	394.67'



PROJECT NO. B-5947
 NASH COUNTY
 STATION: 23+90.50 -LREV-

ENGINEER OF RECORD
 10/18/2021

 Gregory M. Gilland
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
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 Fax: 919 851 8107
 LICENSE NO. F-0377

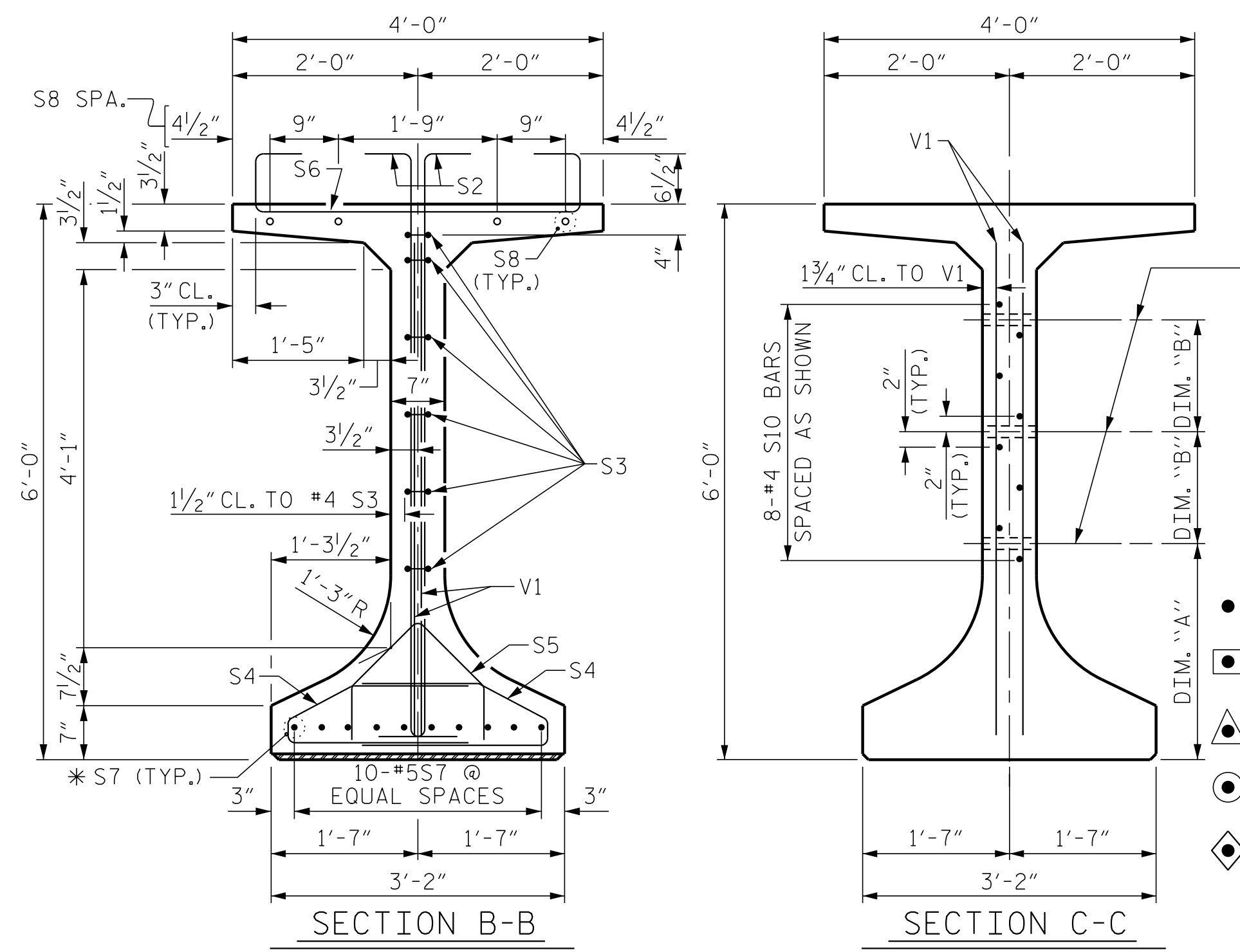
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NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO.	
S-13	TOTAL SHEETS
39	

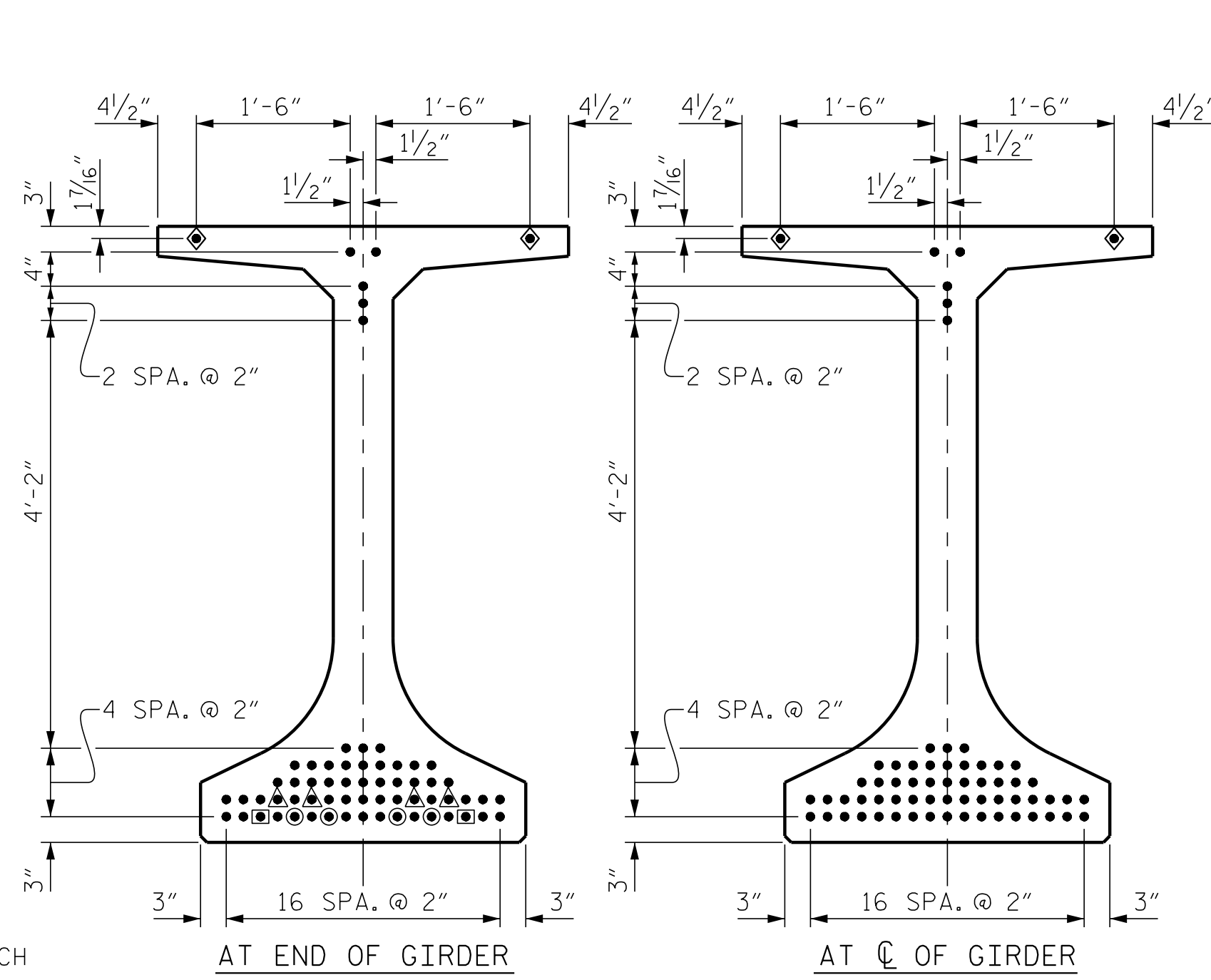
DRAWN BY: G. GILLAND DATE: 4-20-21
 CHECKED BY: JAD / TKK DATE: 8-23-21

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- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ◆ 3/8" Ø STRAND PULLED TO A LOAD OF 10,000 LBS. EACH

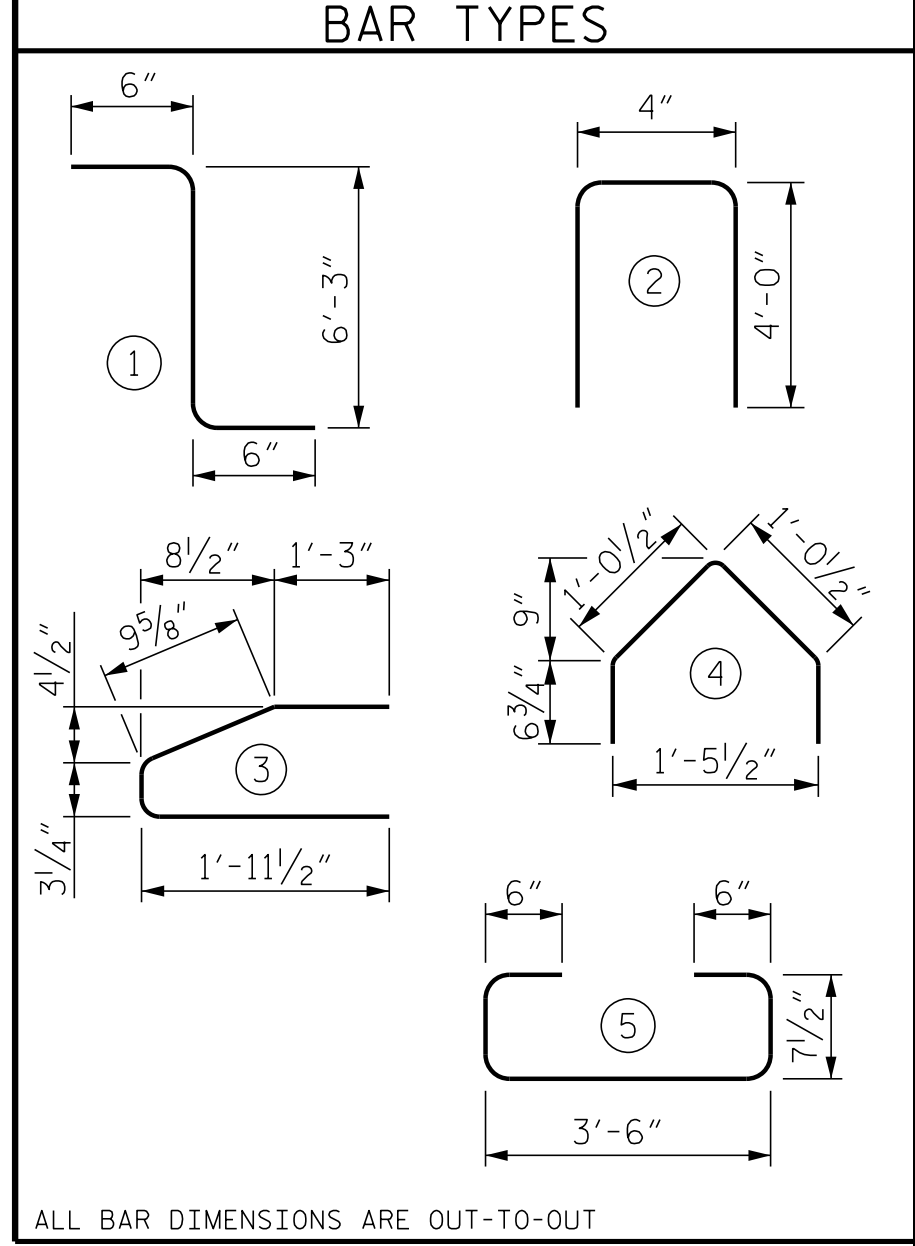


0.6" Ø LOW RELAXATION STRAND LAYOUT

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

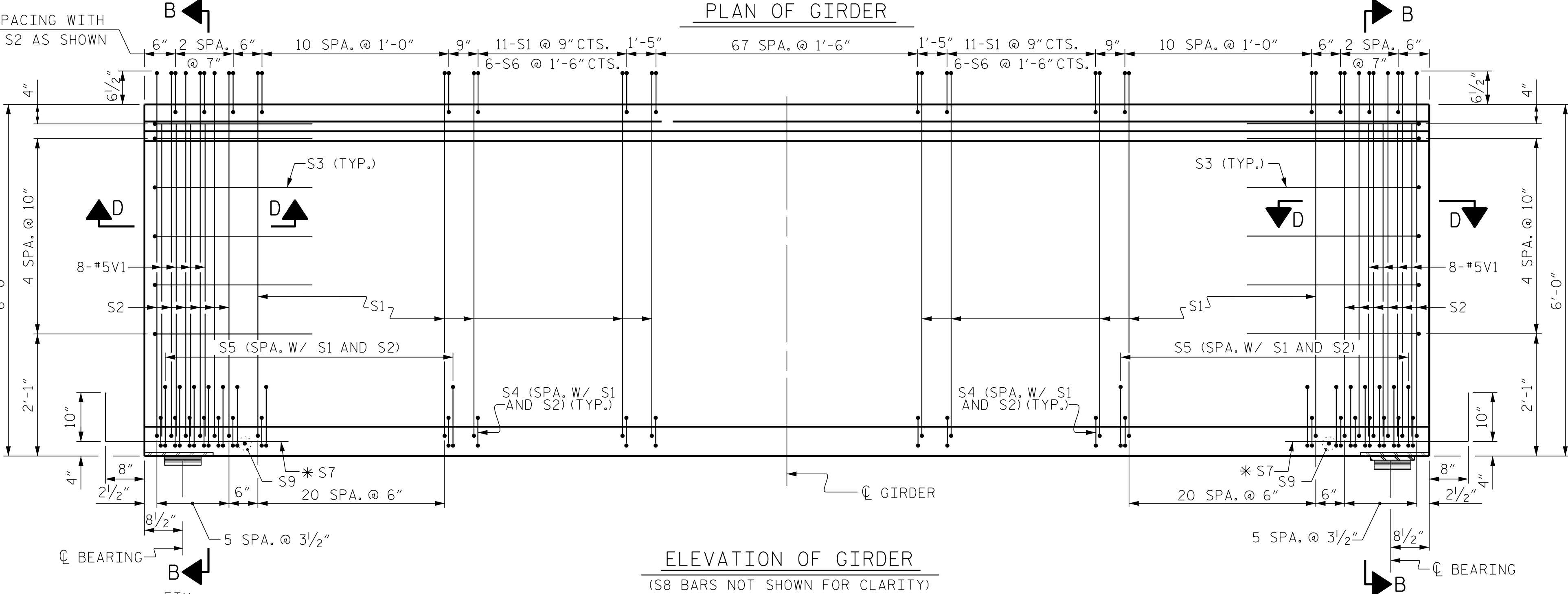
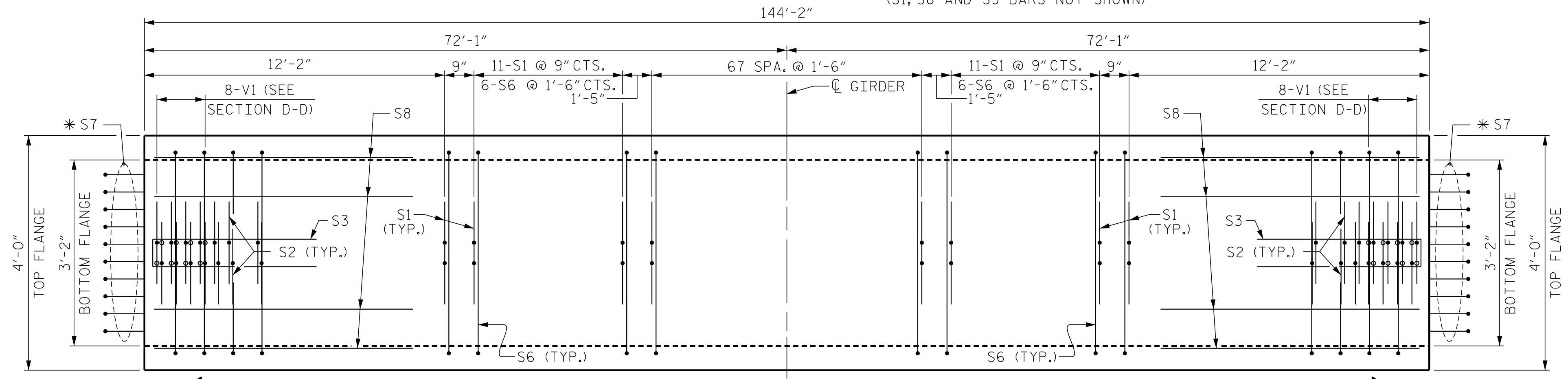
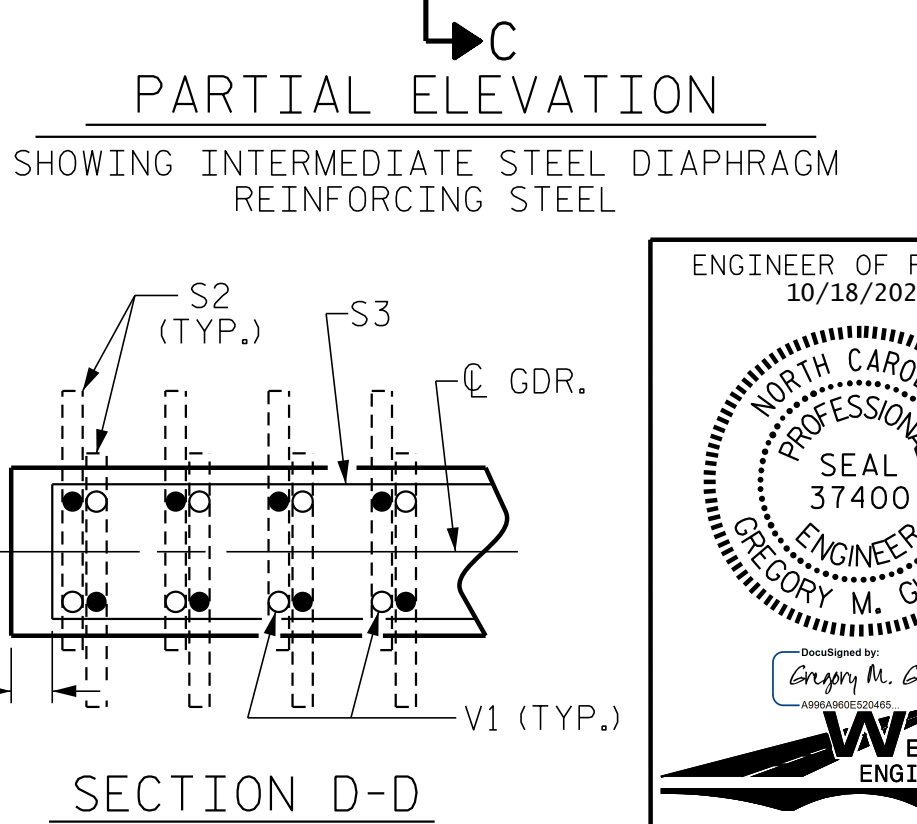
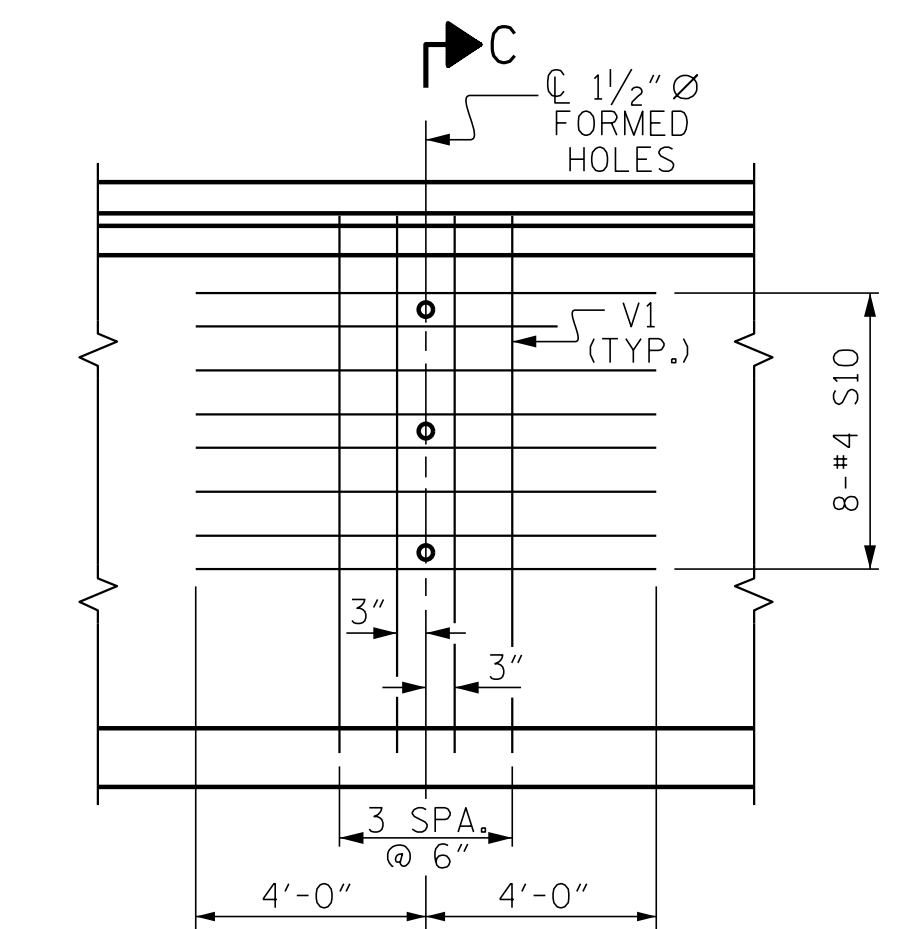
REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	264	#4	1	7'-3"	1279
S2	24	#5	1	7'-3"	181
S3	12	#4	2	8'-4"	67
S4	288	#3	3	4'-4"	469
S5	54	#3	4	3'-3"	66
S6	108	#5	5	5'-9"	648
*S7	20	#5	STR	3'-8"	76
S8	8	#6	STR	26'-0"	312
S9	2	#3	STR	2'-10"	2
S10	16	#4	STR	8'-0"	86
V1	24	#5	STR	5'-4"	134

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

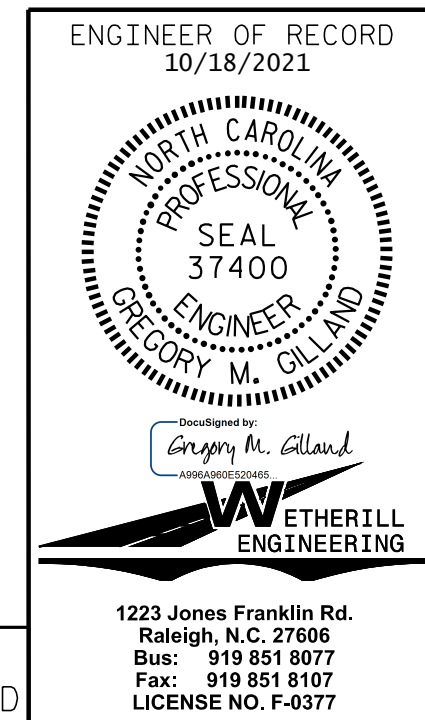


QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	9,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
3,320	39.2	62

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	144.17'	576.67'



PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-



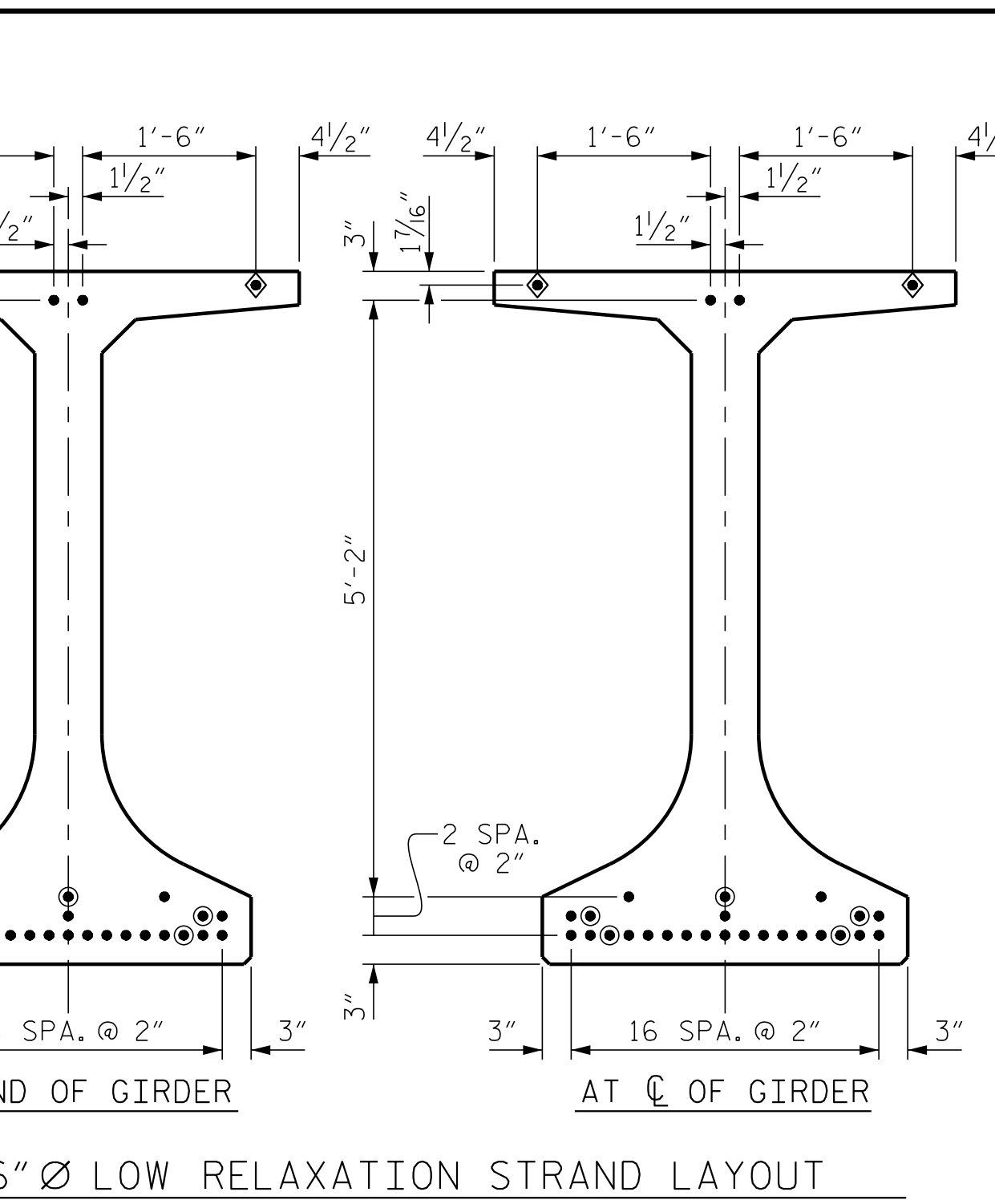
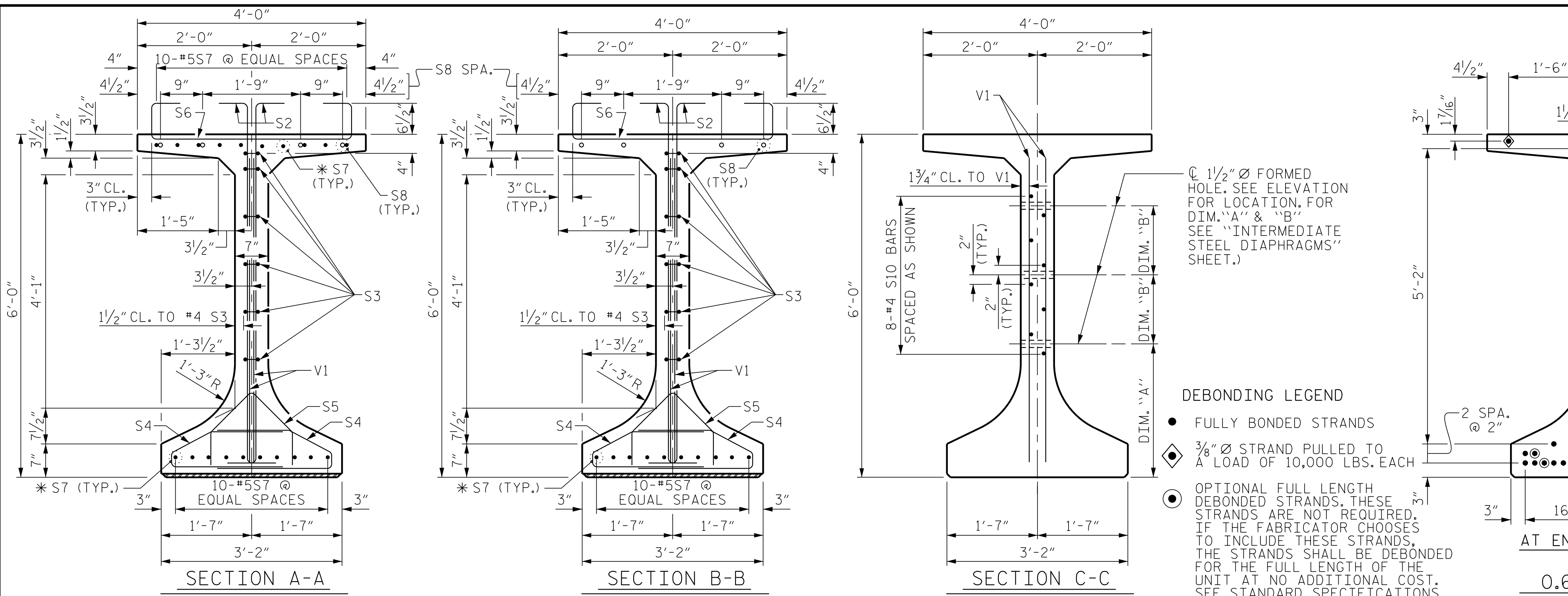
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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DRAWN BY: G. GILLAND DATE: 4-21-21
 CHECKED BY: JAD / TKK DATE: 8-23-21

SHEET NO. S-14
 TOTAL SHEETS 39

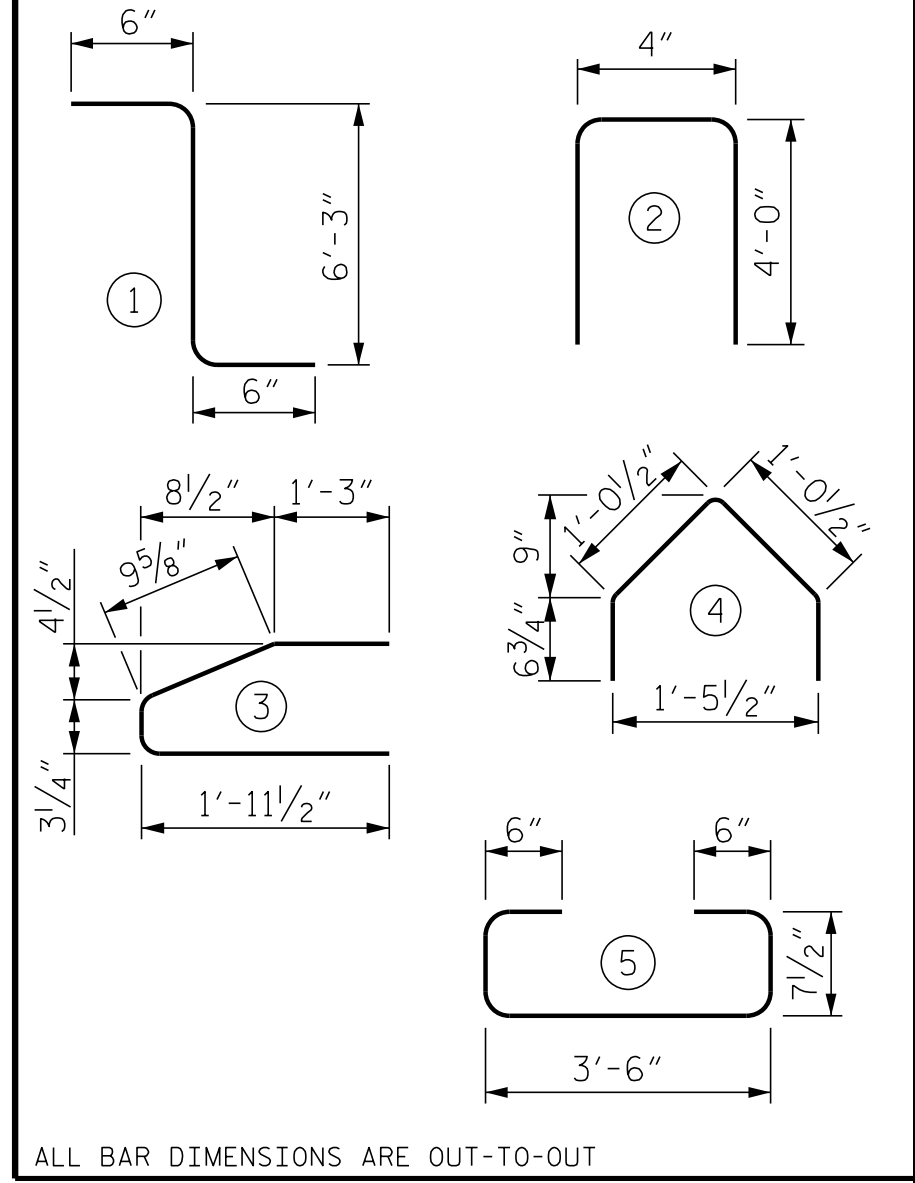


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

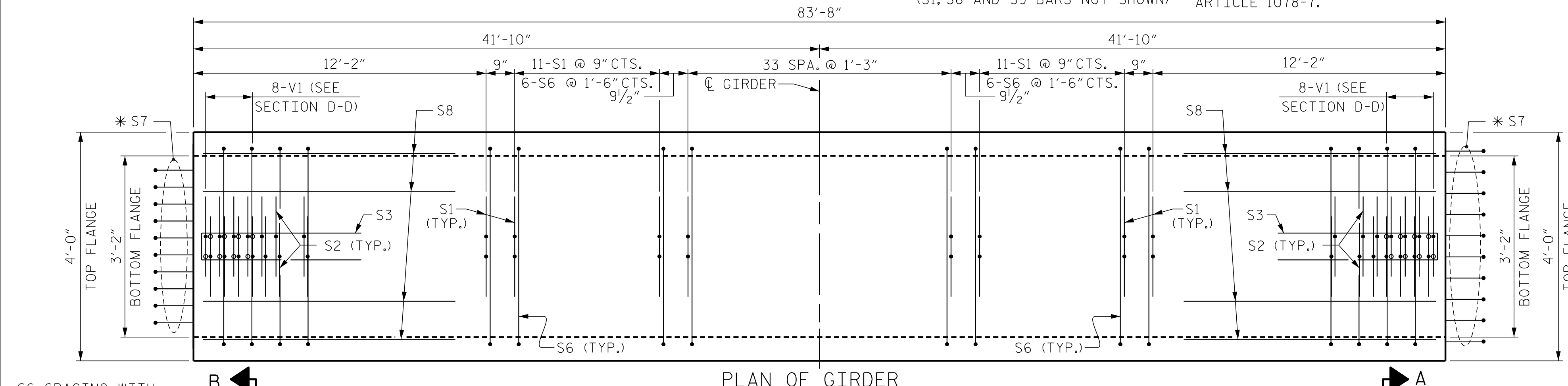
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	196	#4	1	7'-3"	949
S2	24	#5	1	7'-3"	181
S3	12	#4	2	8'-4"	67
S4	220	#3	3	4'-4"	358
S5	54	#3	4	3'-3"	66
S6	74	#5	5	5'-9"	444
*S7	30	#5	STR	3'-8"	115
S8	8	#6	STR	26'-0"	312
S9	2	#3	STR	2'-10"	2
S10	8	#4	STR	8'-0"	43
V1	20	#5	STR	5'-4"	111

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

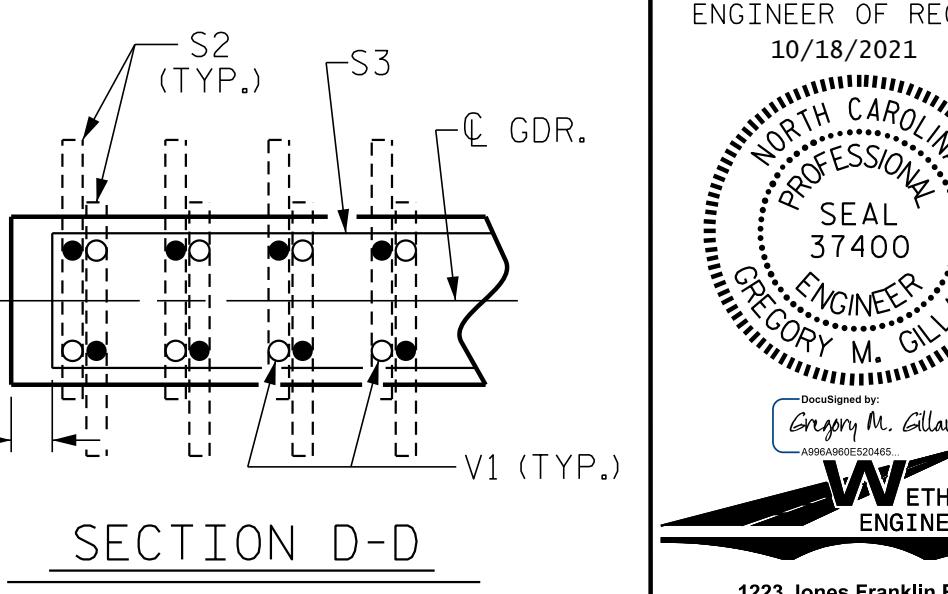
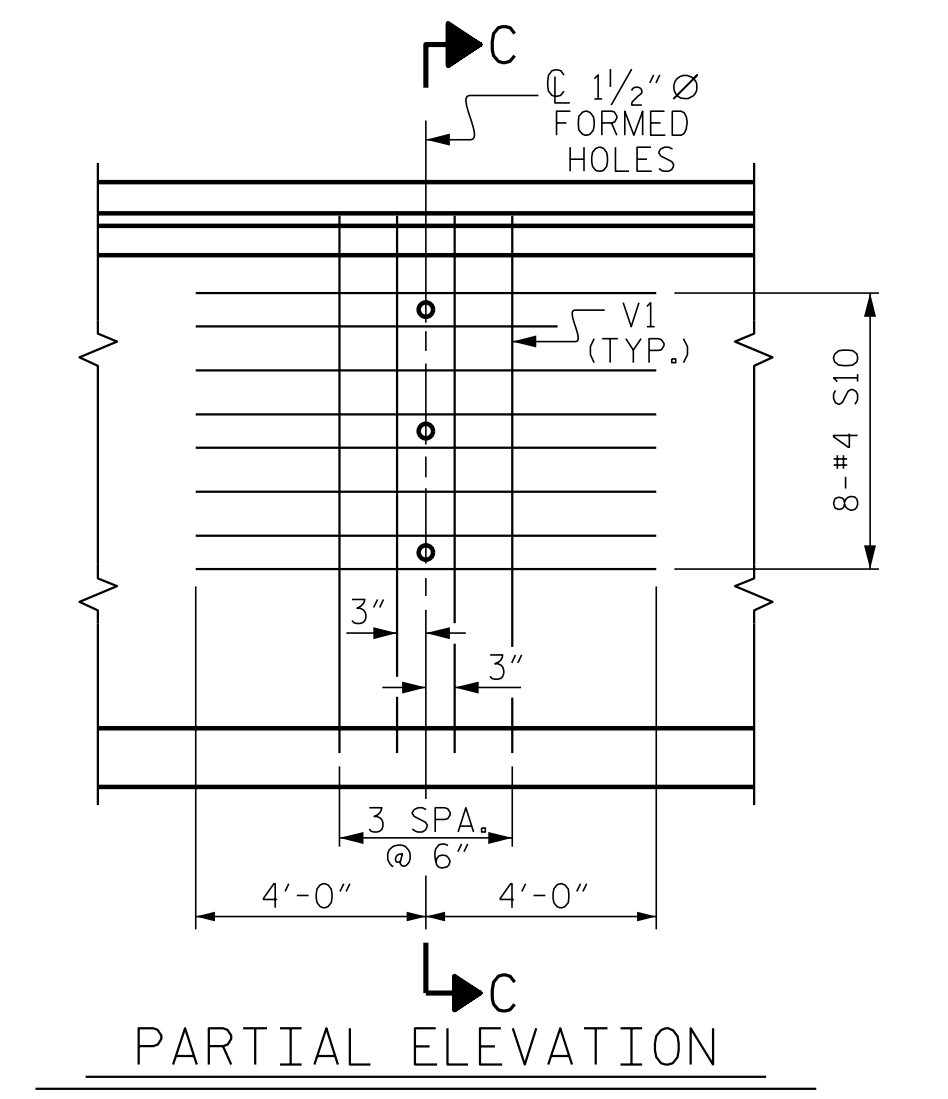
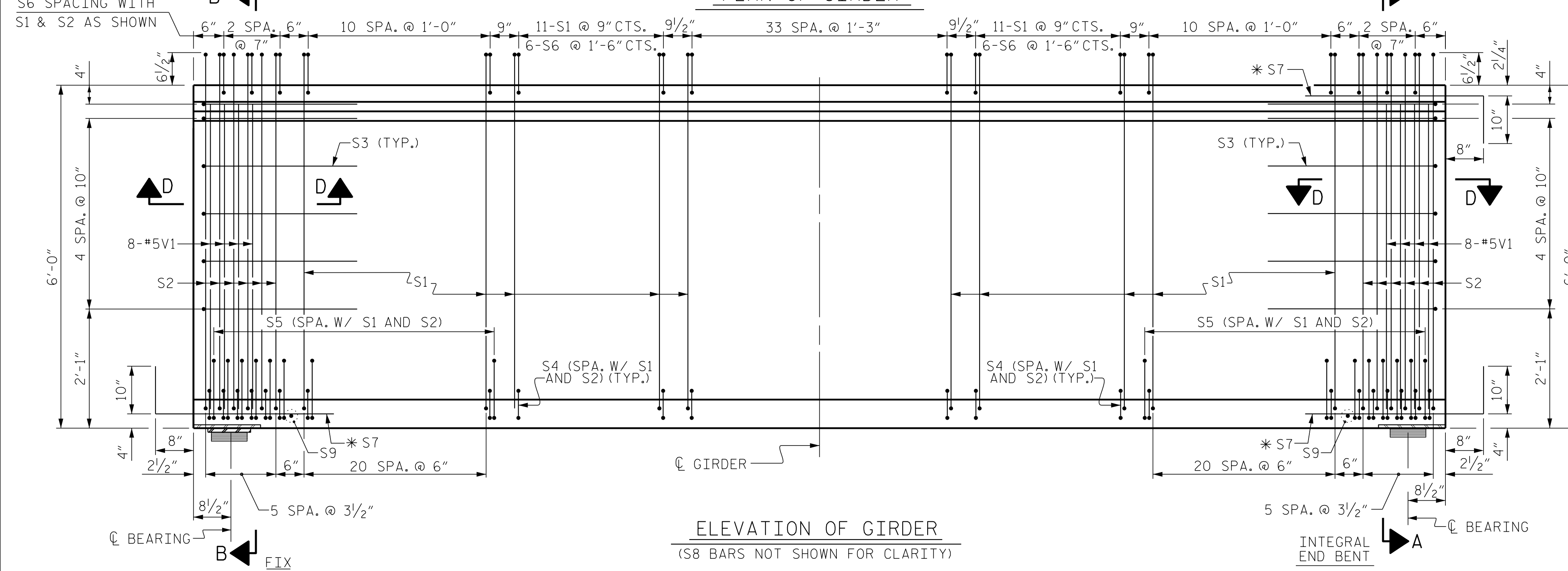


ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	6,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2,648	22.8	22

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	83.67'	334.68'



PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

ENGINEER OF RECORD
 10/18/2021

 Gregory M. Gilland
 ETHERILL ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
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 Fax: 919 851 8107
 LICENSE NO. F-0377

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

SHEET NO.	
S-15	TOTAL SHEETS
	39

DRAWN BY: G. GILLAND DATE: 4-21-21
 CHECKED BY: JAD / TKK DATE: 8-23-21

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NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

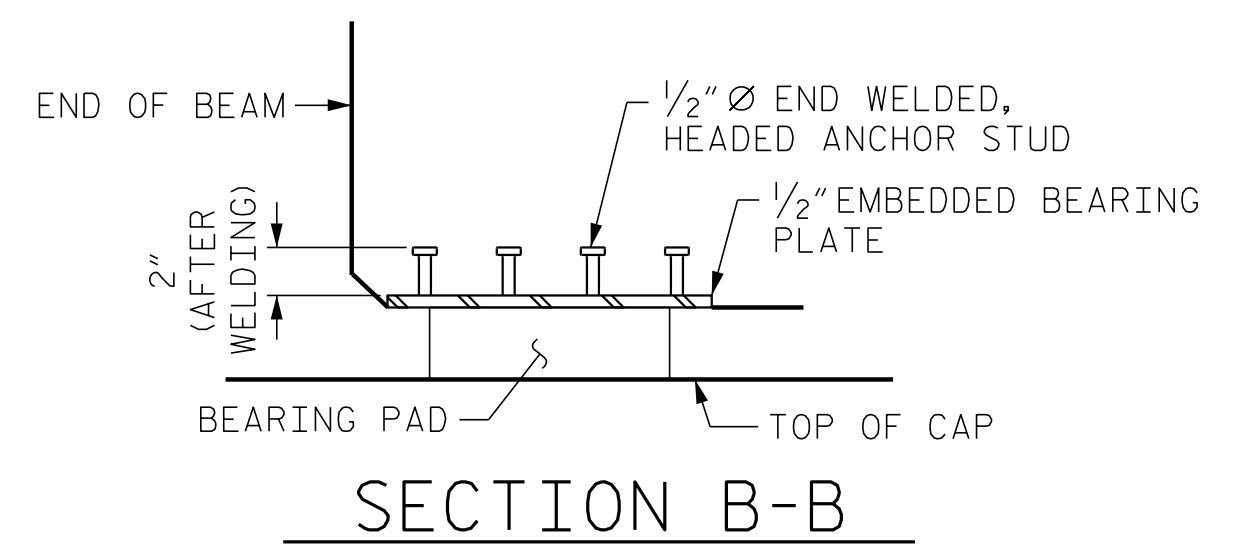
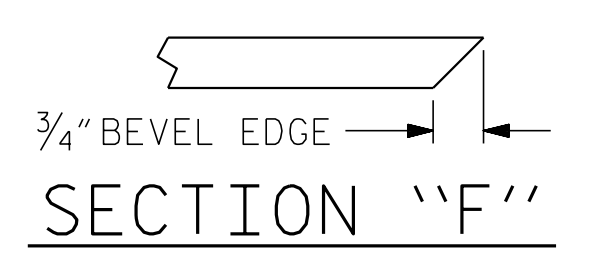
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5200 PSI. FOR SPANS A AND C AND 7000 PSI FOR SPAN B

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

THE #5 S6 BARS SHALL BE TIED TO THE 3/8" STRAND AFTER TENSIONING.

THE #5 V1 BARS SHALL BE PLACED SO IT IS EQUAL DISTANCE FROM TOP & BOTTOM FLANGE.



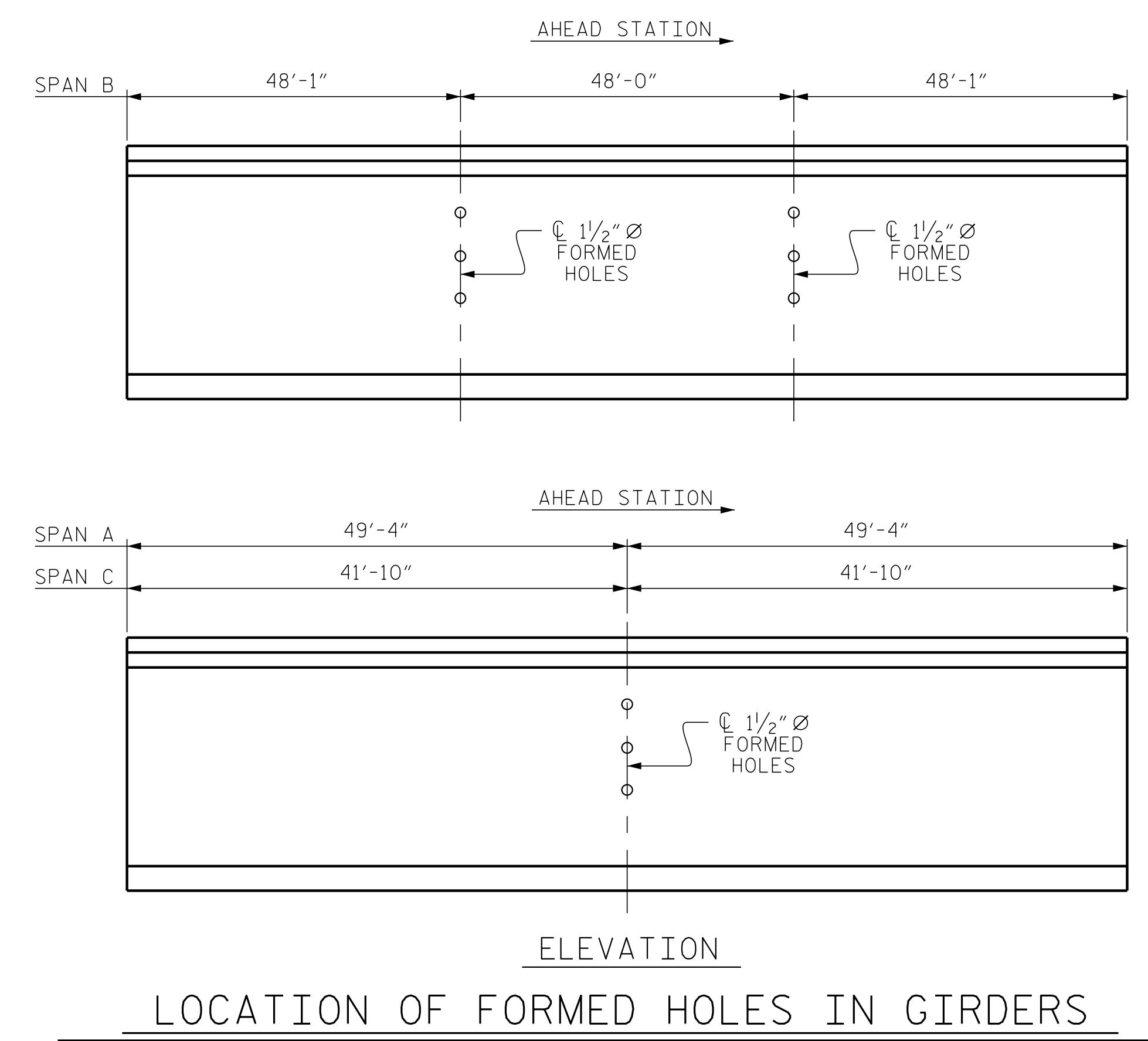
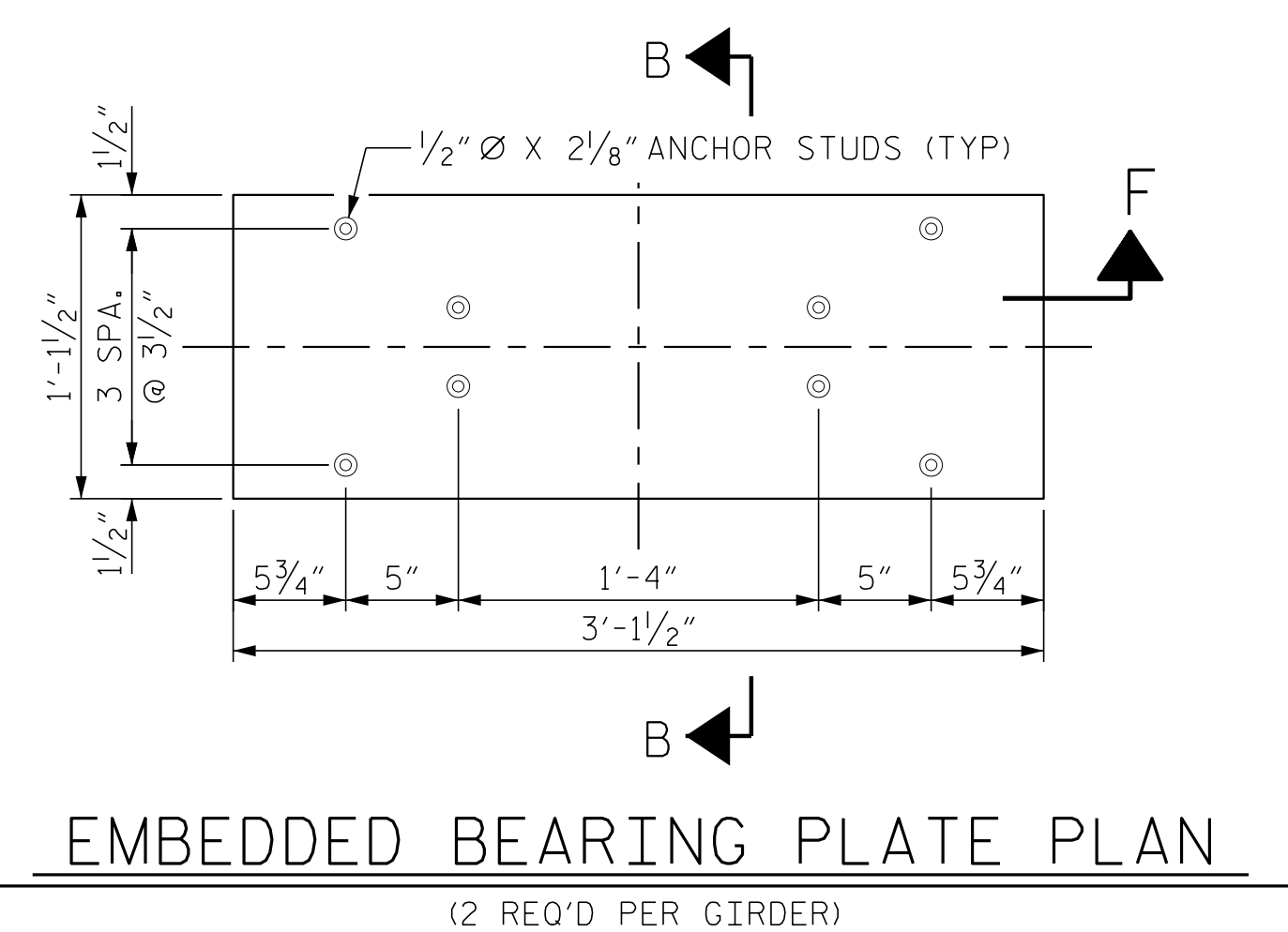
EMBEDDED PLATE NOTES

EMBEDDED PLATE SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

ALL SURFACES OF EMBEDDED BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36 OR 50.



DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN "A"																				
	GIRDERS 1 THRU 4																				
	TWENTIETH POINTS																				
CAMBER (GIRDER ALONE IN PLACE)	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.013	0.025	0.037	0.048	0.057	0.065	0.071	0.076	0.079	0.080	0.079	0.076	0.071	0.065	0.057	0.048	0.037	0.025	0.013	0
FINAL CAMBER	0"	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0"

* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN "B"																																										
	GIRDERS 1 THRU 4																																										
	FORTIETH POINTS																																										
CAMBER (GIRDER ALONE IN PLACE)	0	.025	.050	.075	.100	.125	.150	.175	.200	.225	.250	.275	.300	.325	.350	.375	.400	.425	.450	.475	.500	.525	.550	.575	.600	.625	.650	.675	.700	.725	.750	.775	.800	.825	.850	.875	.900	.925	.950	.975	0		
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.022	0.043	0.064	0.085	0.105	0.124	0.143	0.159	0.177	0.192	0.206	0.219	0.231	0.241	0.250	0.257	0.263	0.267	0.269	0.270	0.269	0.267	0.263	0.257	0.250	0.241	0.231	0.219	0.206	0.192	0.177	0.159	0.143	0.124	0.105	0.085	0.064	0.043	0.022	0		
FINAL CAMBER	0	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	0

* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN "C"																				
	GIRDERS 1 THRU 4																				
	TWENTIETH POINTS																				
CAMBER (GIRDER ALONE IN PLACE)	0	0.008	0.017	0.024	0.032	0.038	0.044	0.047	0.051	0.052	0.054	0.052	0.051	0.047	0.044	0.038	0.032	0.024	0.017	0.008	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.005	0.010	0.015	0.019	0.023	0.027	0.029	0.031	0.032	0.033	0.032	0.031	0.029	0.027	0.023	0.019	0.015	0.010	0.005	0
FINAL CAMBER	0"	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0"

* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

ENGINEER OF RECORD
10/18/2021

Gregory M. Gilliam
ENGINEER

ETHERILL ENGINEERING

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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

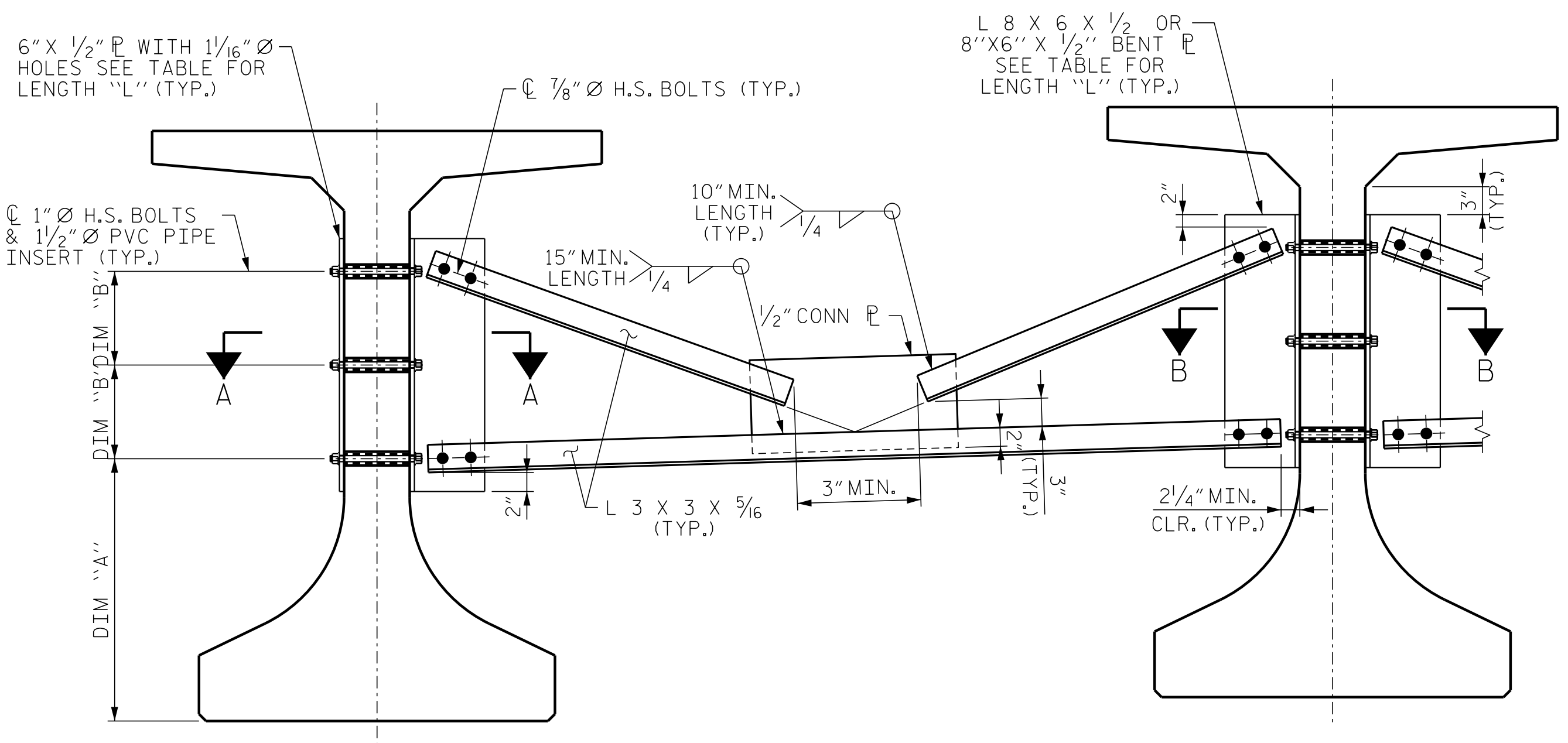
SUPERSTRUCTURE
 FIB DETAILS &
 DEAD LOAD
 DEFLECTIONS

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

DRAWN BY: D. HODGE DATE: 5/20
 CHECKED BY: J. DILWORTH/GMG DATE: 8/21

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

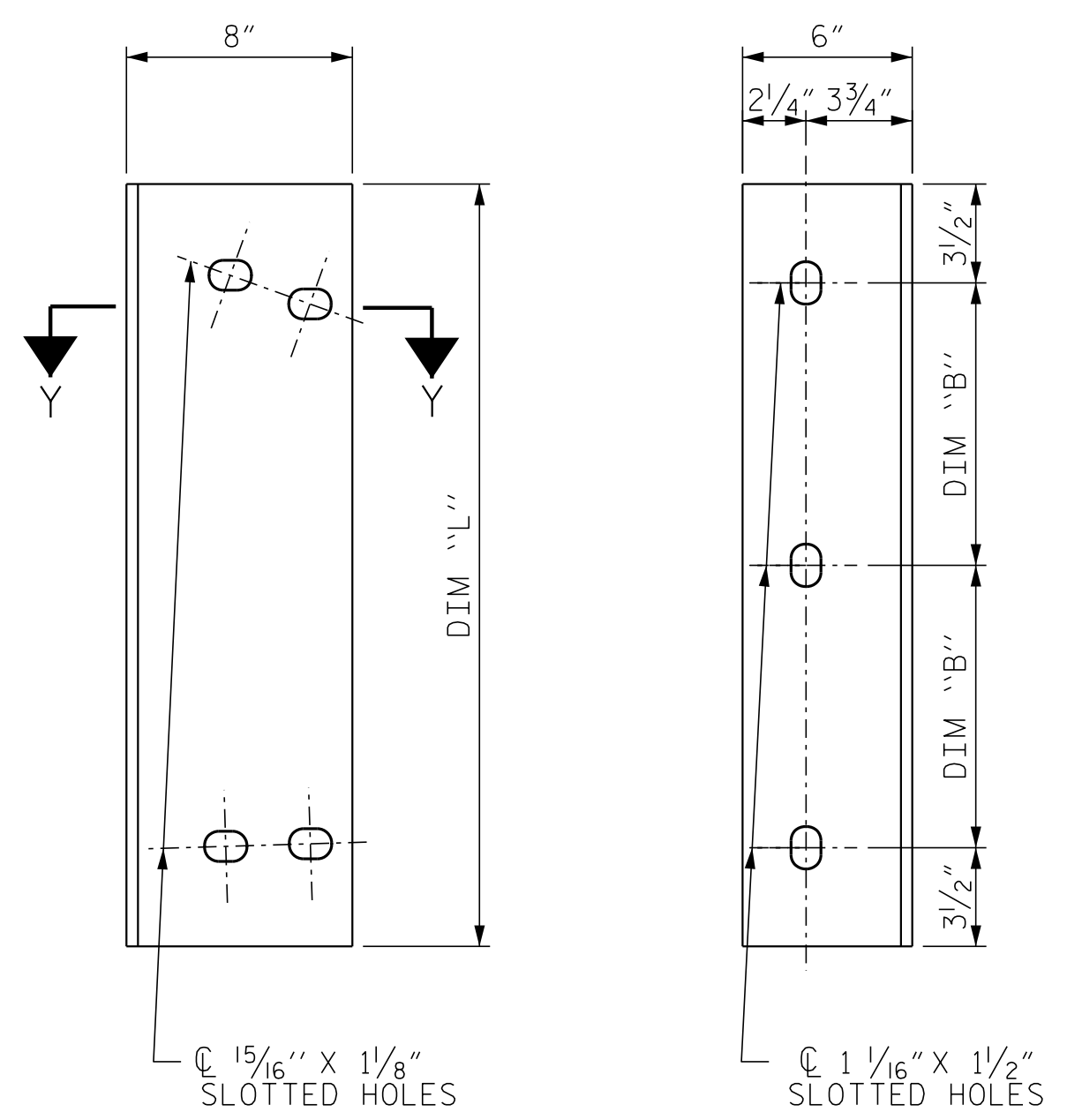
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EXTERIOR GIRDERS

INTERIOR GIRDERS

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

STRUCTURAL STEEL NOTES

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

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

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

THE PLATES, BENT PLATES, AND CHANNELS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

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

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

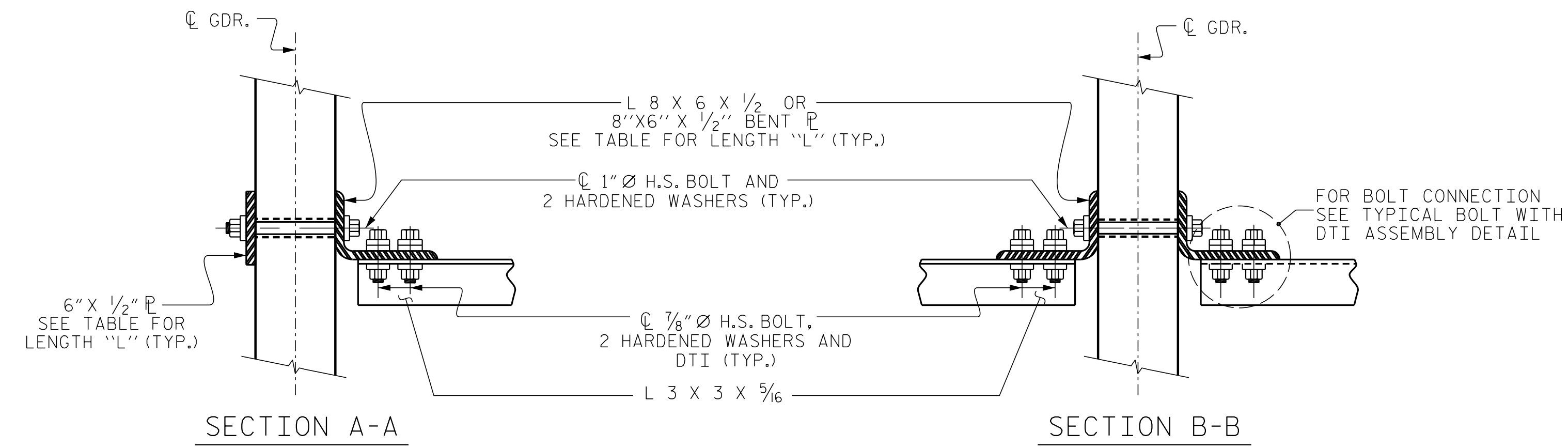
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

TABLE

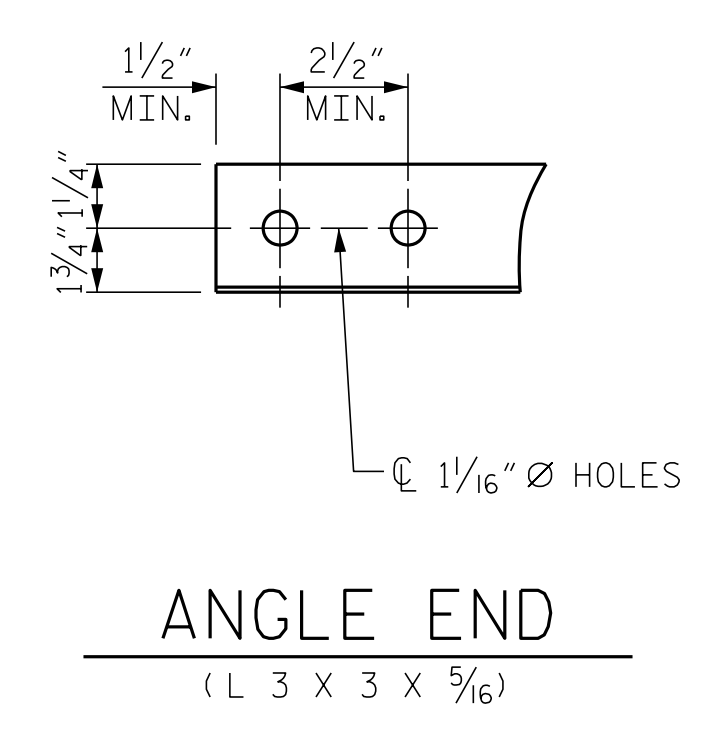
GIRDER TYPE	DIM "A"	DIM "B"	DIM "L"
FIB 72	2'-4"	1'-2 1/2"	3'-0"



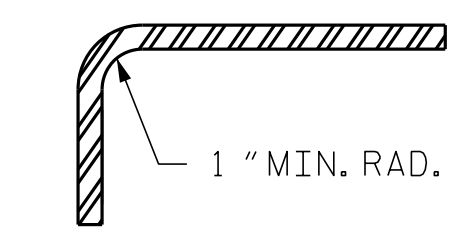
SECTION A-A

SECTION B-B

CONNECTION DETAILS



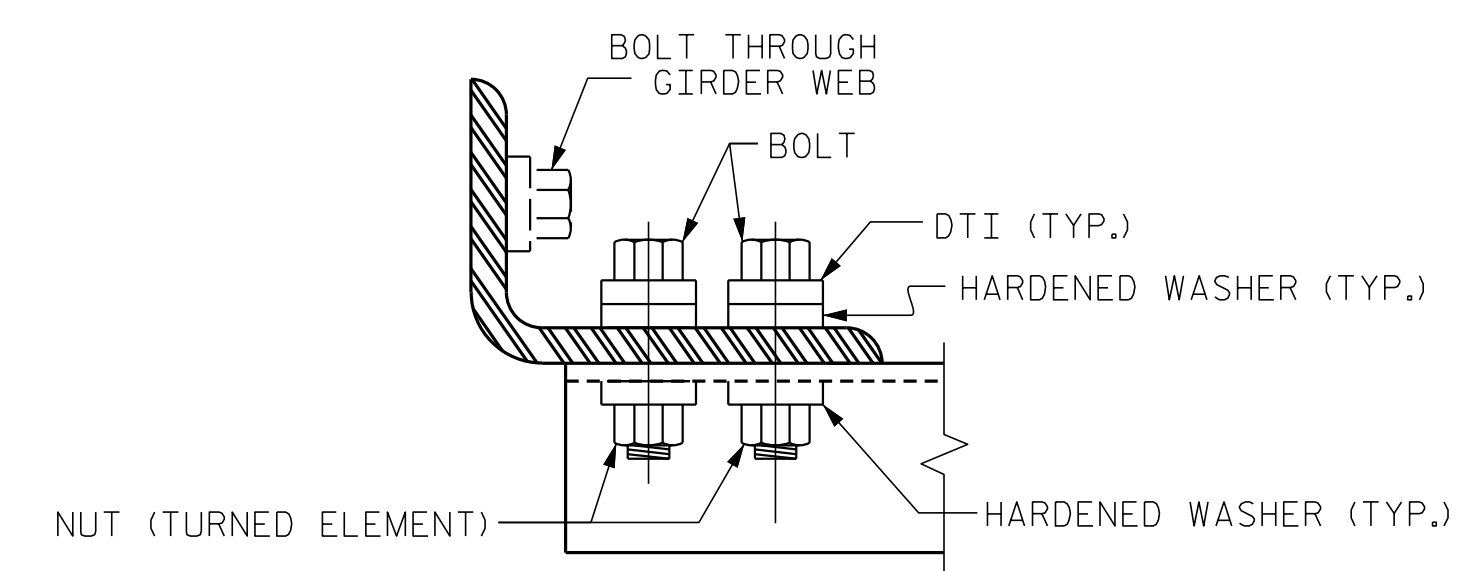
ANGLE END
(L 3 X 3 X 5/16)



SECTION Y-Y

CONNECTOR PLATE DETAIL

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-



BOLT WITH DTI ASSEMBLY DETAIL

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DRAWN BY: D. HODGE DATE: 5/20
 CHECKED BY: J. DILWORTH DATE: 5/20

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ENGINEER OF RECORD
 10/18/2021

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 INTERMEDIATE
 STEEL DIAPHRAGMS
 FIB 72 PRESTRESSED
 FLORIDA-I BEAM

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

NOTES

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

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

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

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

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

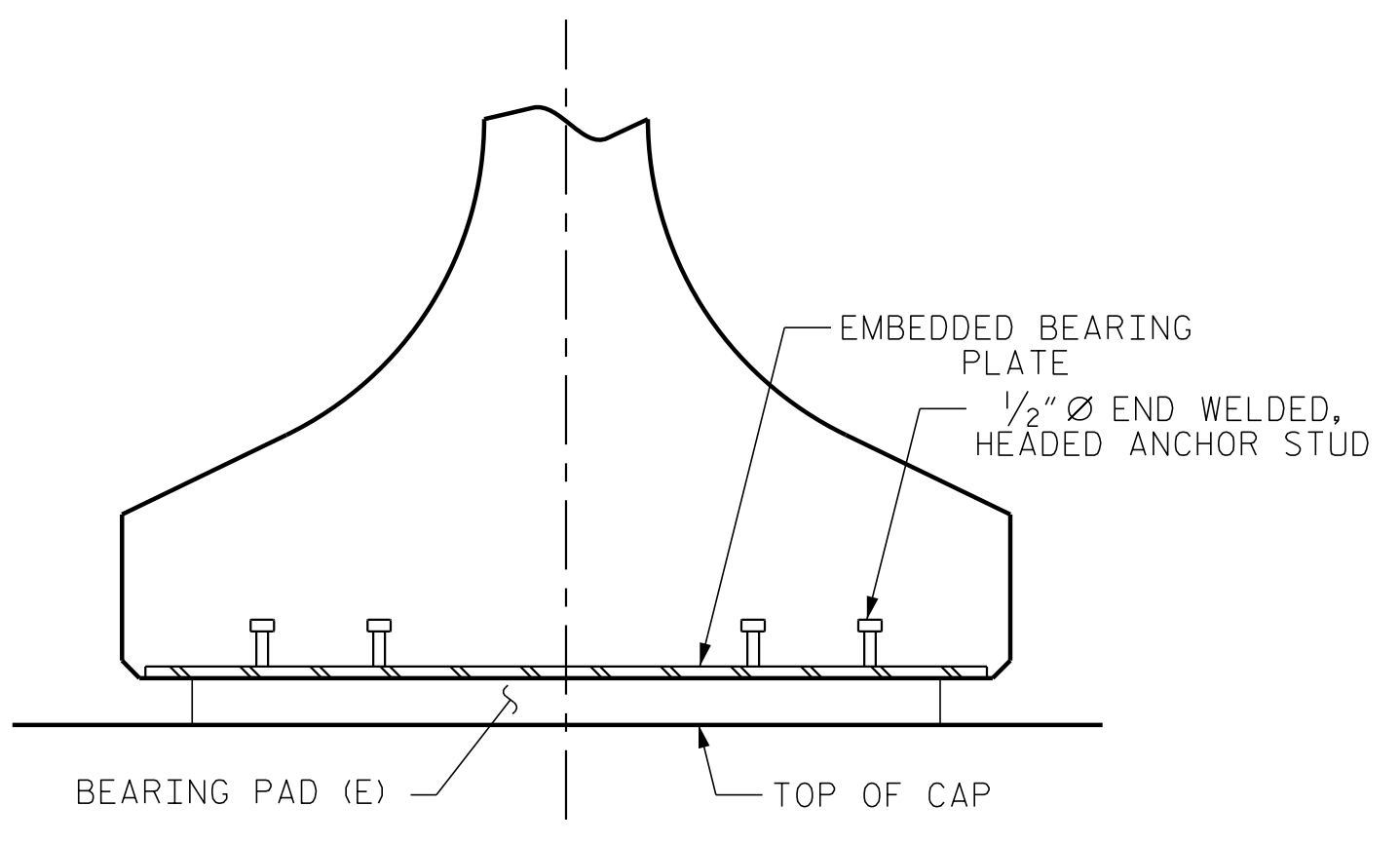
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

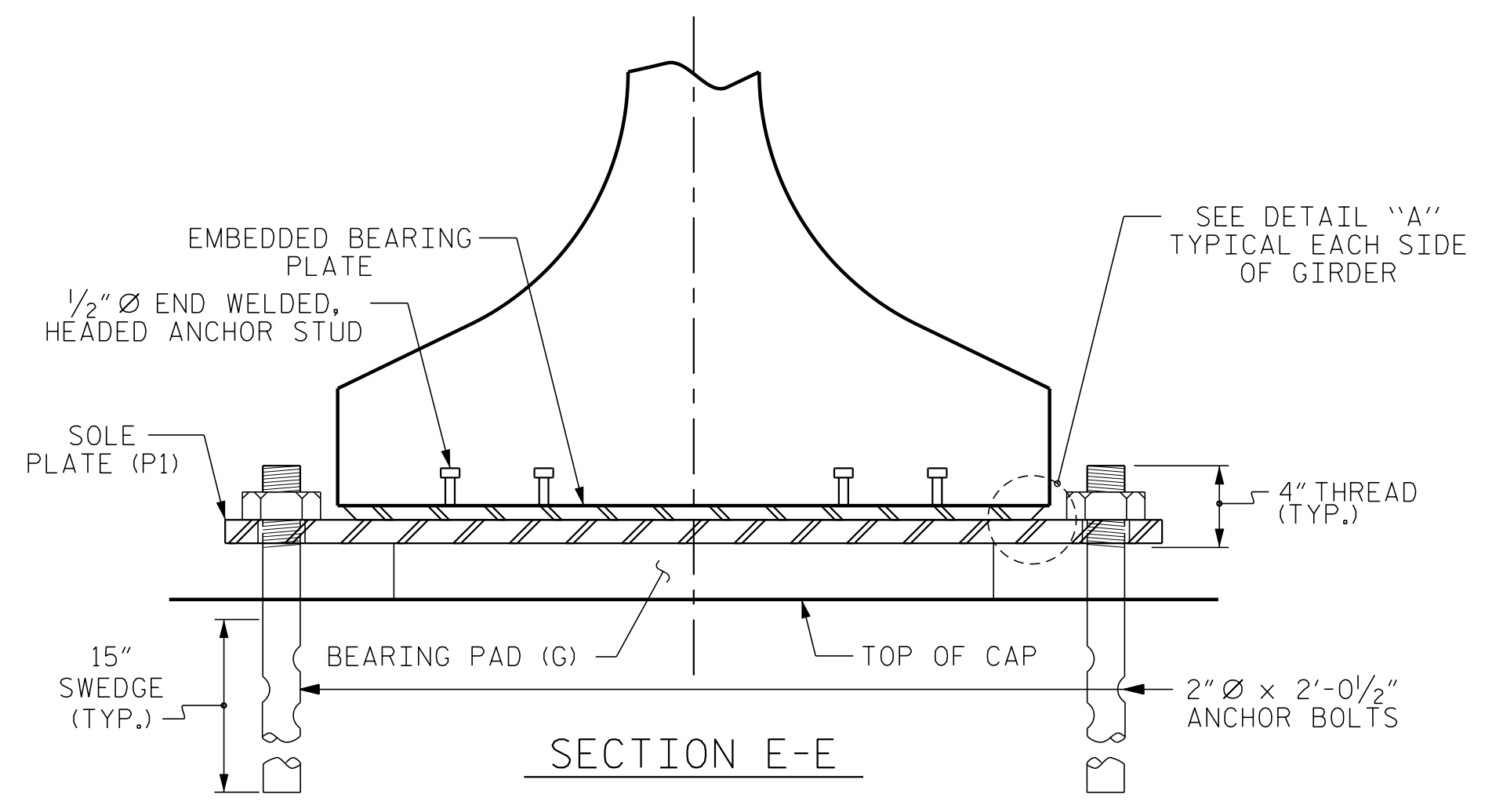
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.110 KSI FOR THE TYPE E PAD AND 0.150 KSI FOR THE TYPE G PAD, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

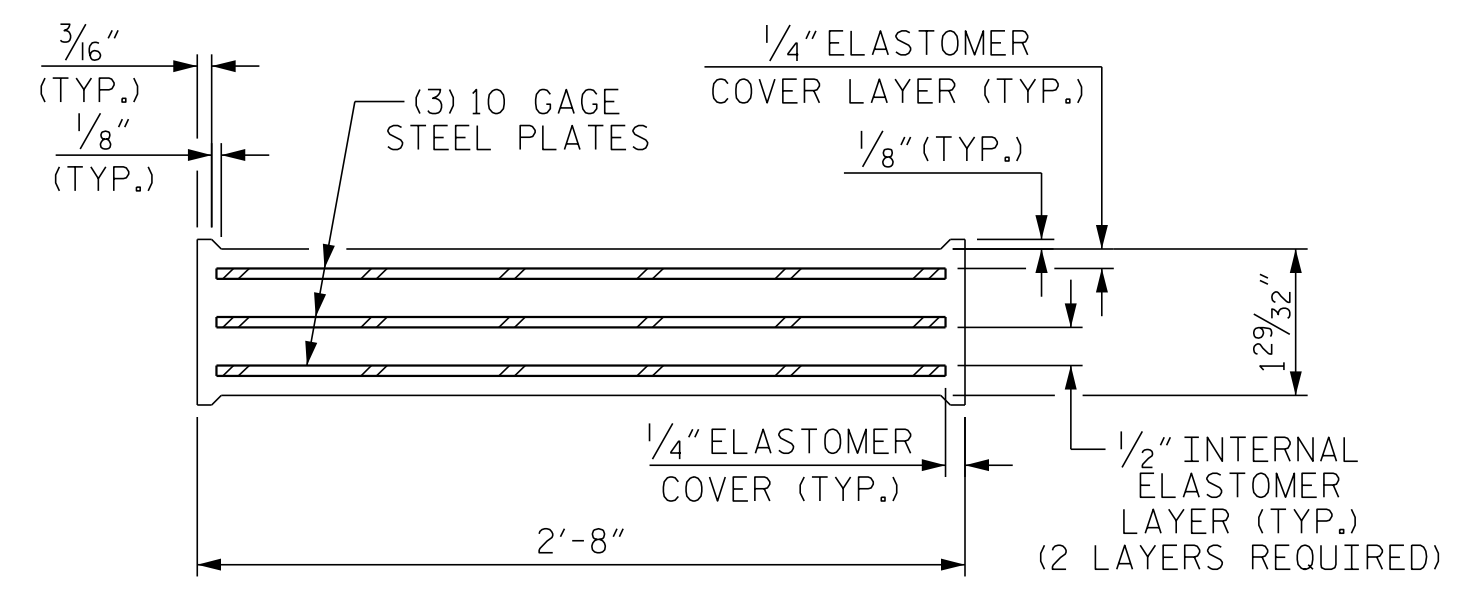
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



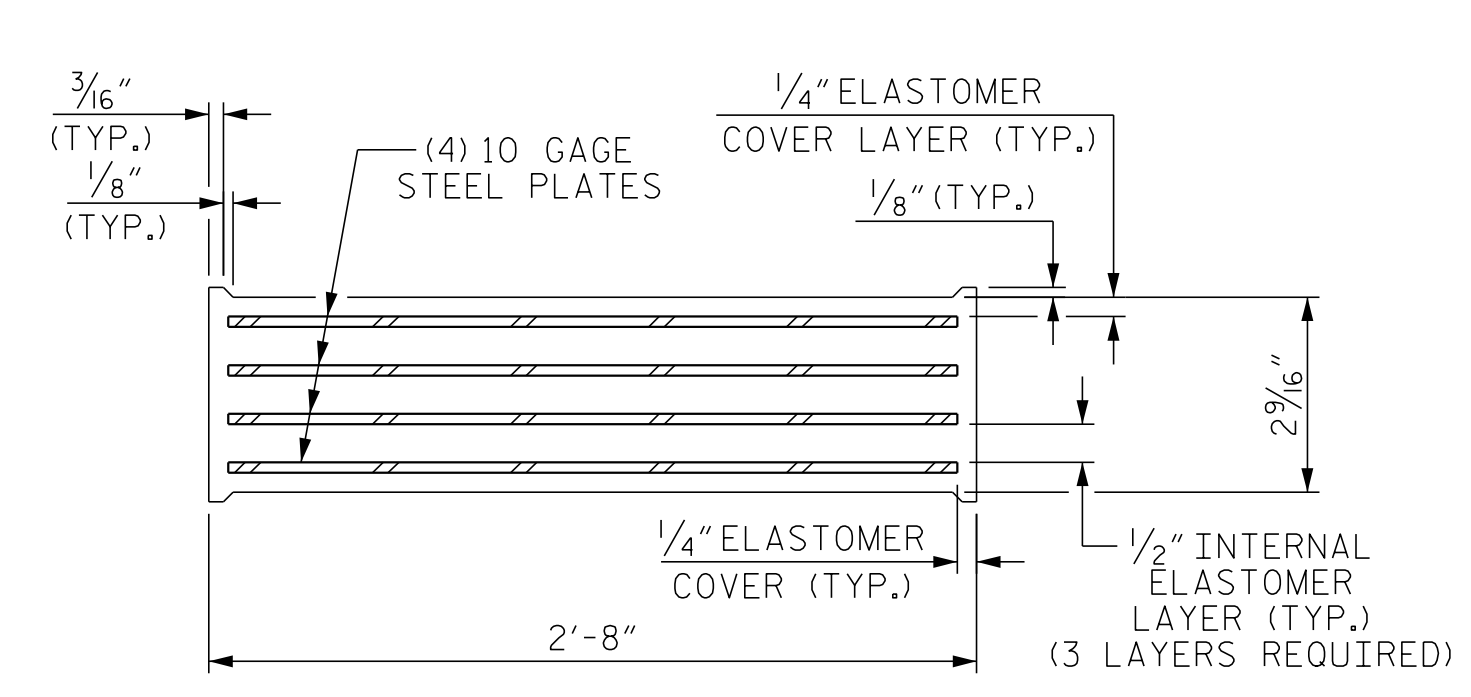
SECTION D-D



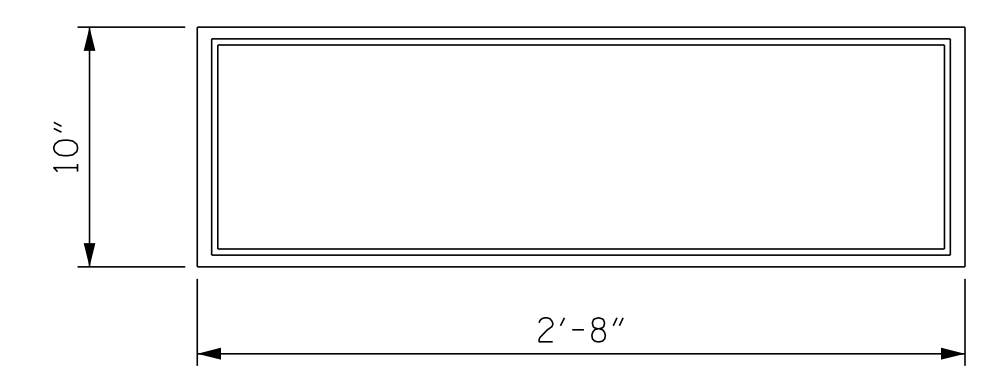
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARING

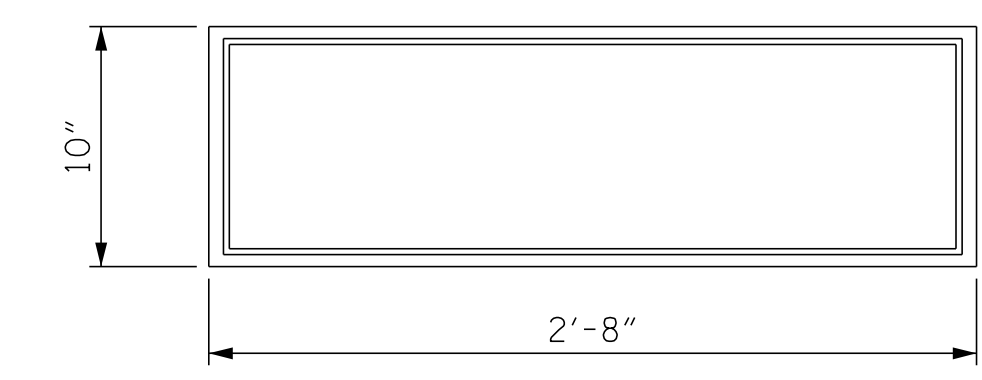


TYPICAL SECTION OF ELASTOMERIC BEARING



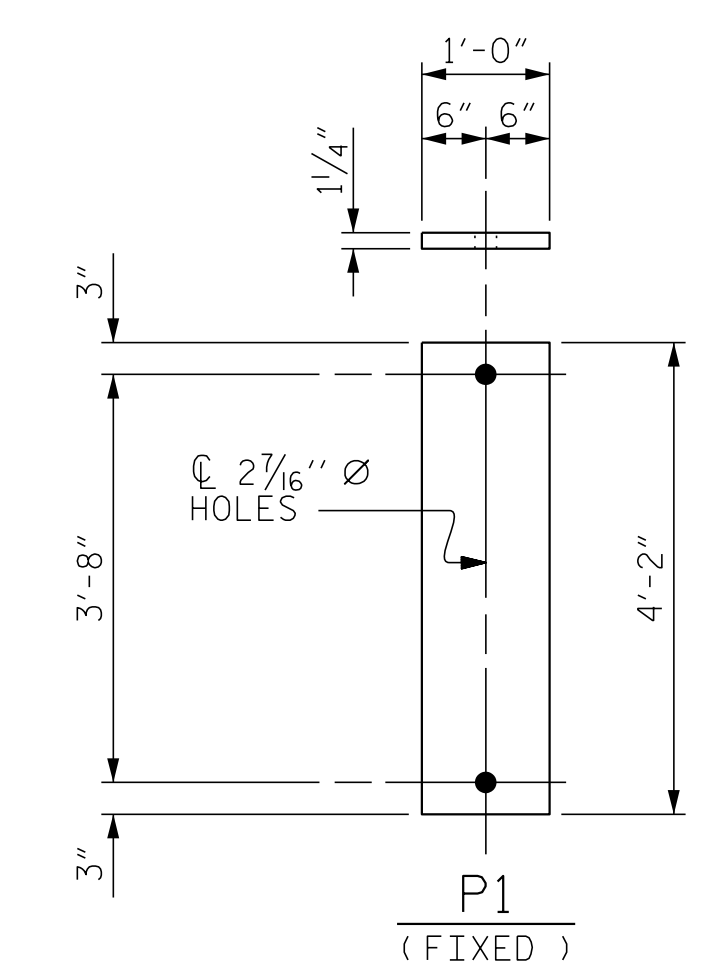
PLAN VIEW OF ELASTOMERIC BEARING
TYPE E PAD

8 REQUIRED



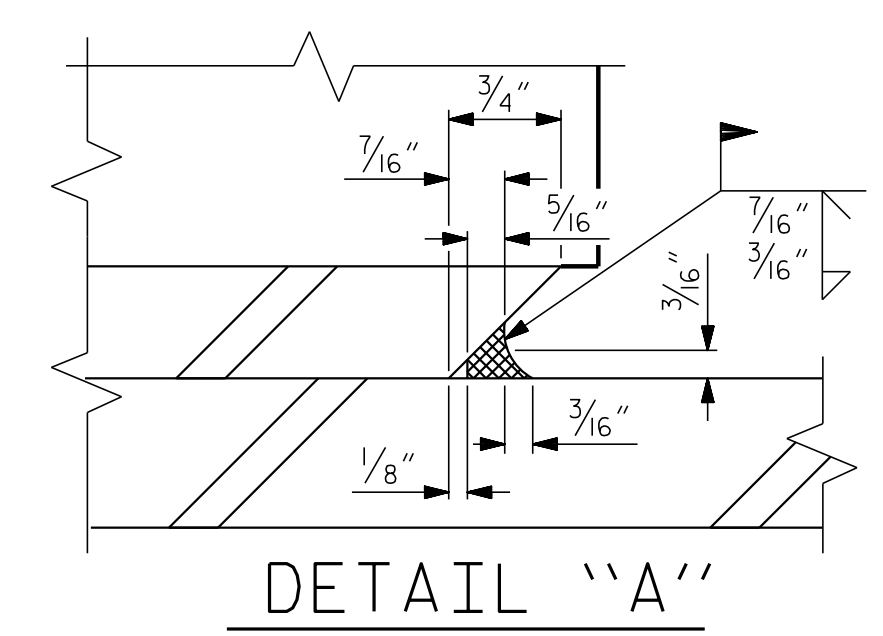
PLAN VIEW OF ELASTOMERIC BEARING
TYPE G PAD

16 REQUIRED



SOLE PLATE DETAILS

16 REQUIRED

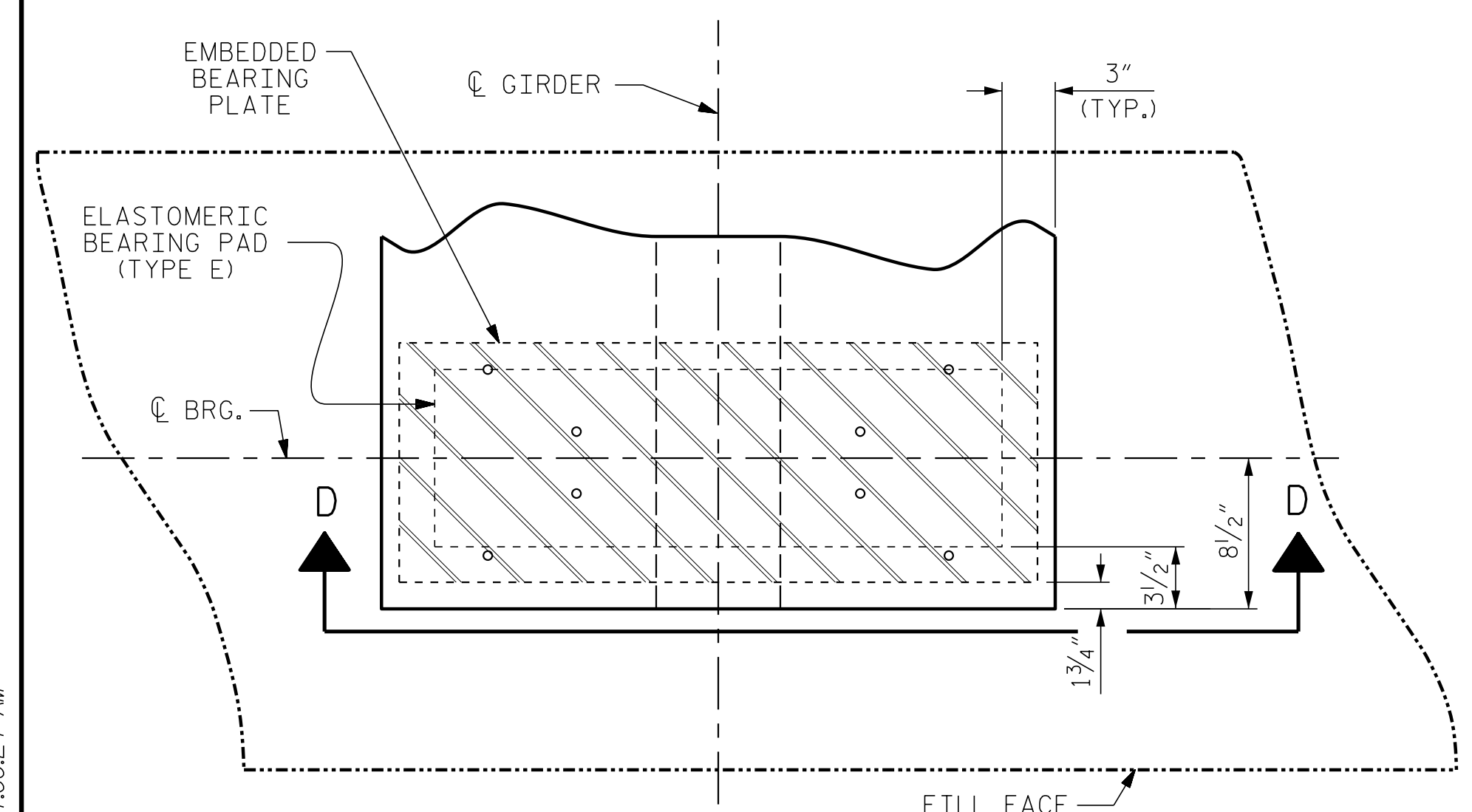


DETAIL "A"

**MAX. SERVICE LOADS
D.L.+L.L. (NO IMPACT)**

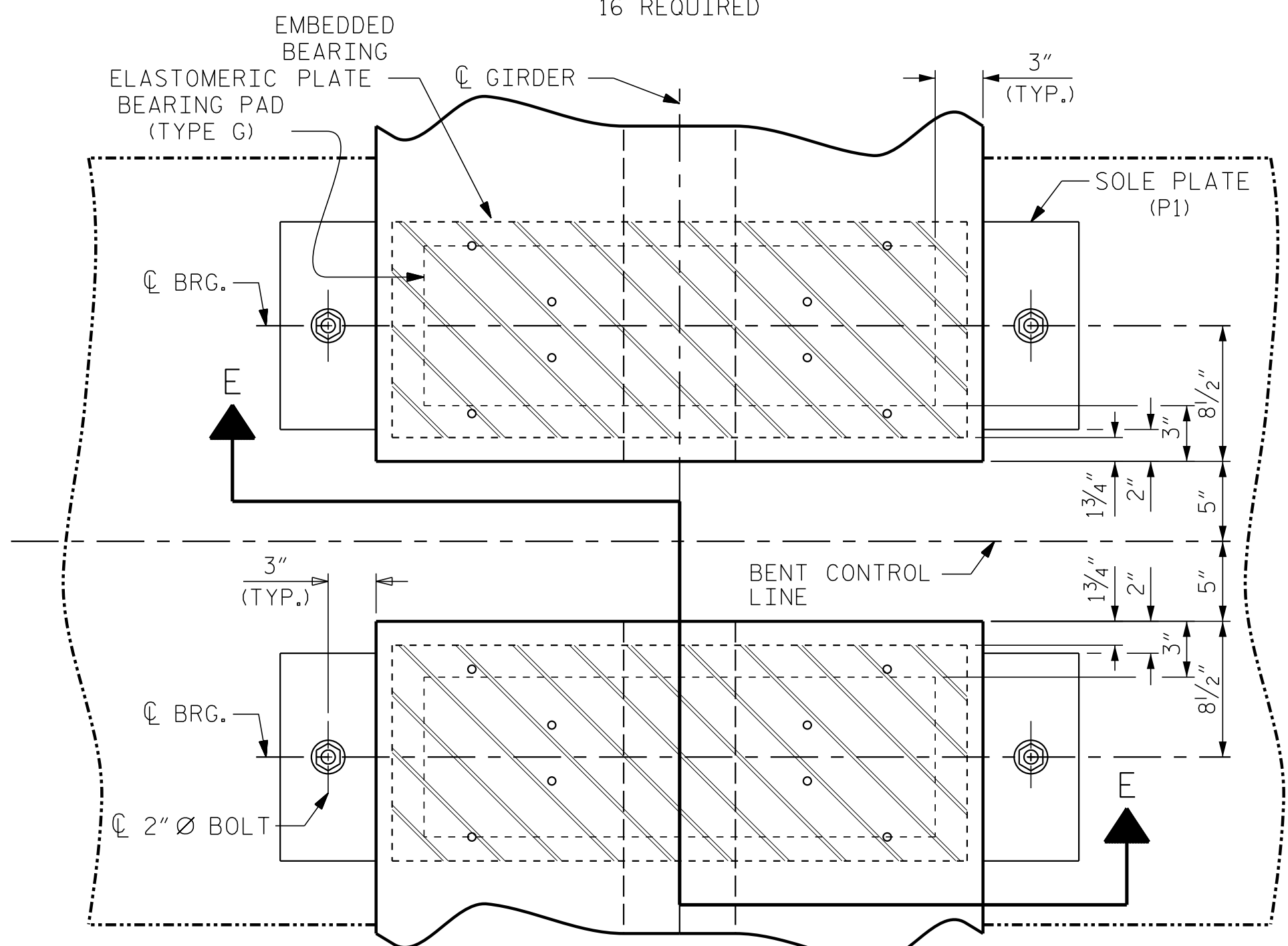
TYPE E	138 k
TYPE G	328 k

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-



TYPICAL PLAN

(SHOWING INTEGRAL END BENT)



TYPICAL PLAN

(SHOWING CONTINUOUS BENT)

DRAWN BY: G. GILLAND DATE: 6/20
 CHECKED BY: J. DILWORTH DATE: 6/20

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ENGINEER OF RECORD
 10/18/2021

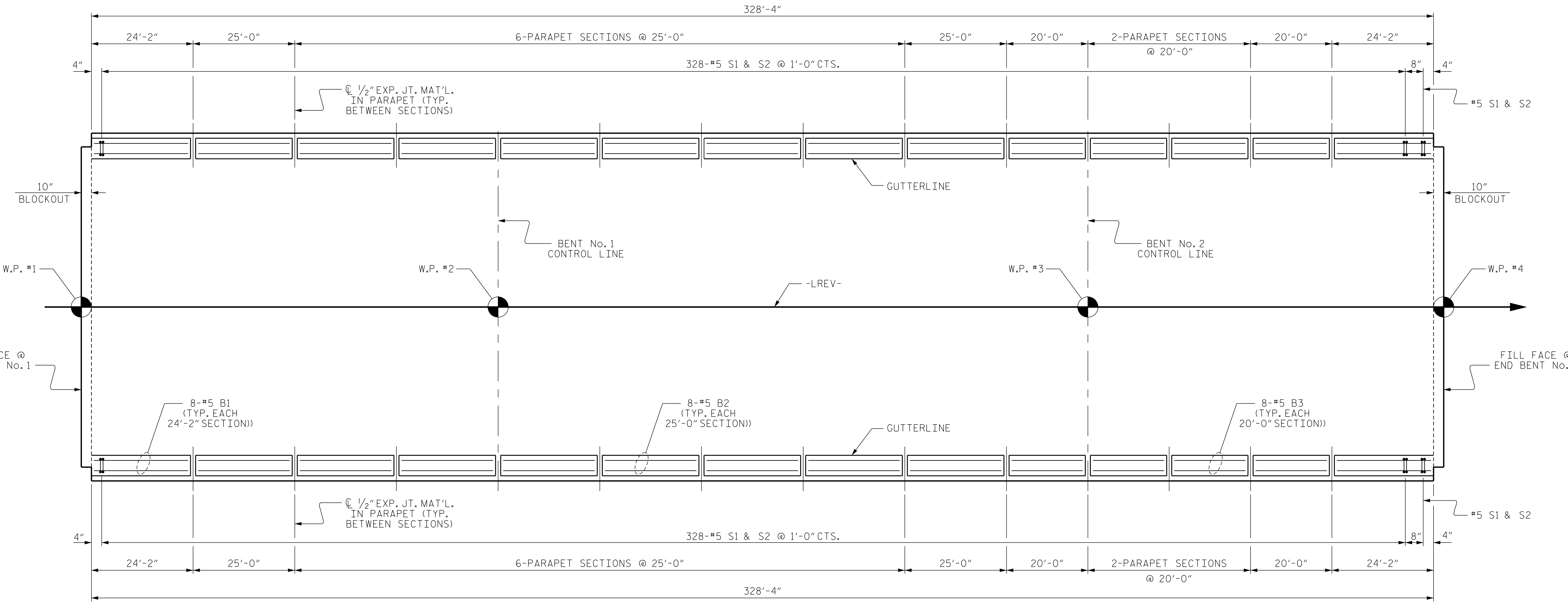
 GREGORY M. GILLAND
 GREGORY M. GILLAND
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 BEARING PADS
 AND SOLE PLATES
 PRESTRESSED FLORIDA-I BEAM

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

SHEET NO. S-18
 TOTAL SHEETS 39

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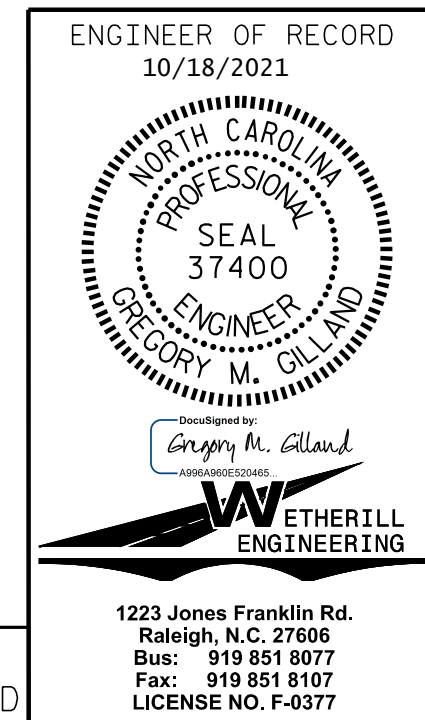
PLAN OF CONCRETE PARAPET

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

NOTES

- THE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.
- GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE 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.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

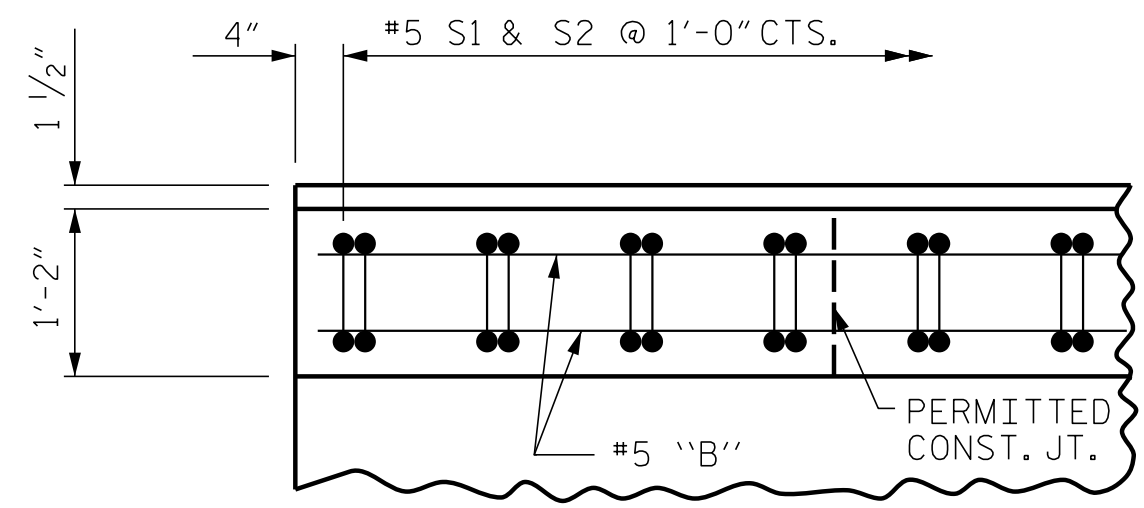
1'-2" x 2'-6"
 CONCRETE PARAPET FOR
 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			39

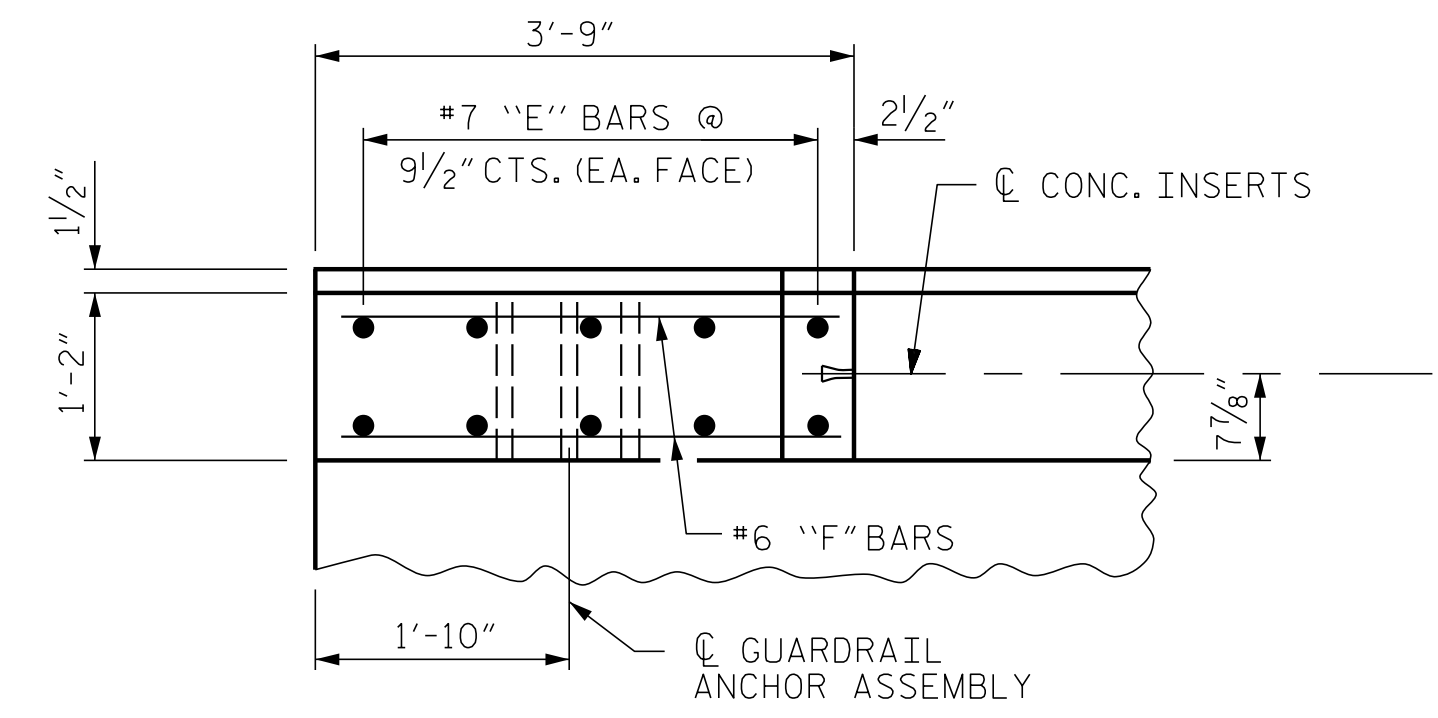
DRAWN BY : D. HODGE DATE : 4/20
 CHECKED BY : J. DILWORTH DATE : 5/20

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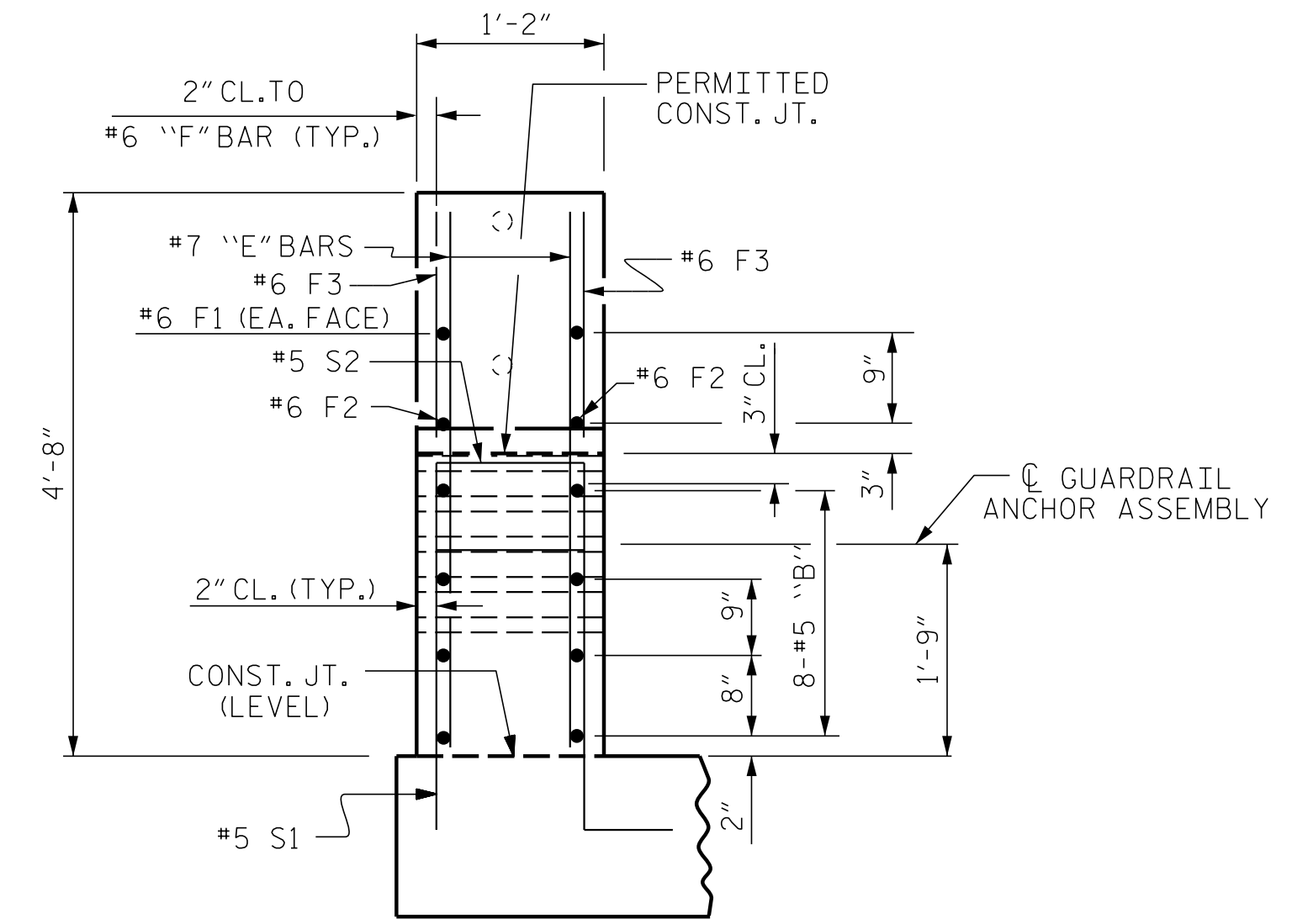
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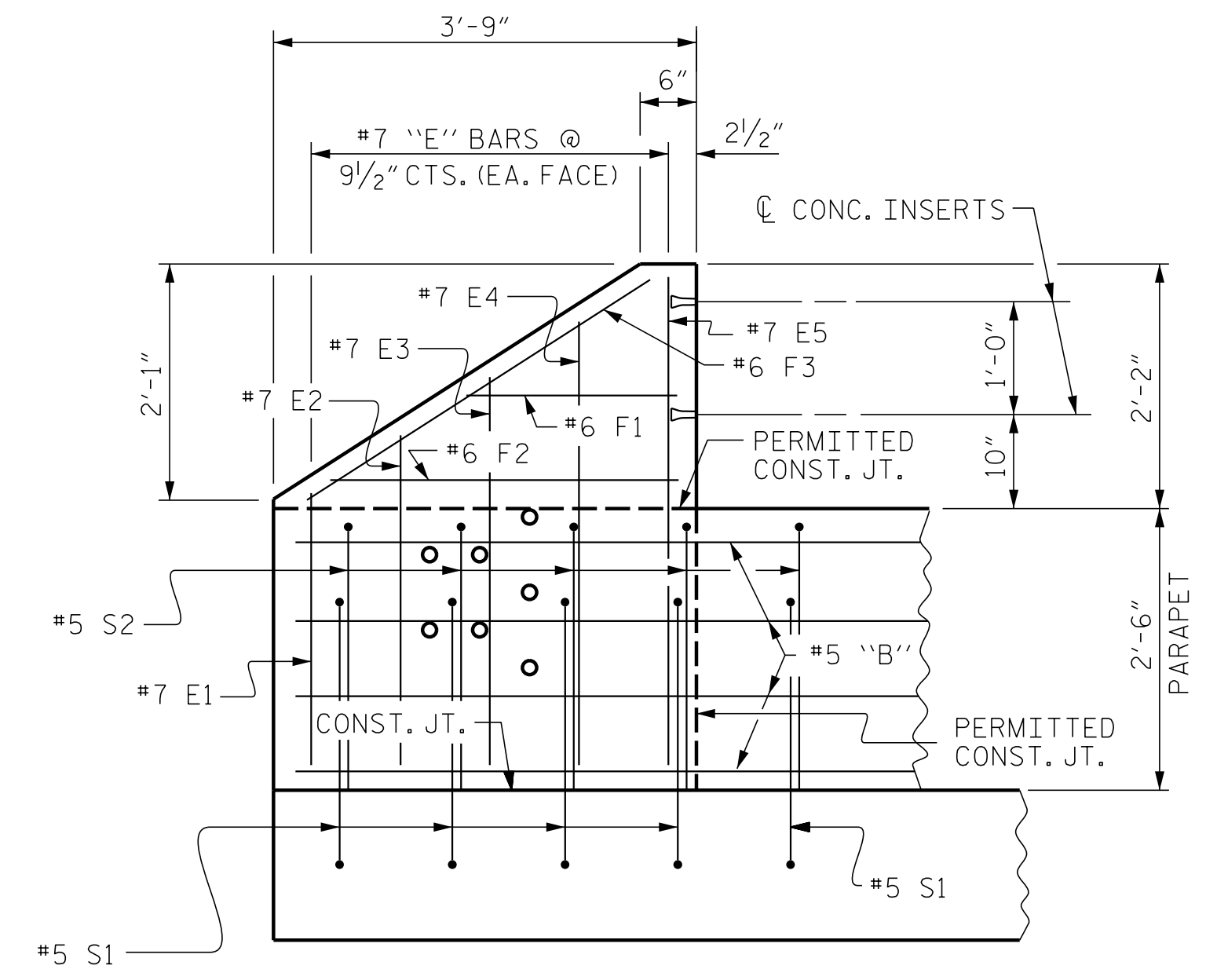
PLAN OF PARAPET



PLAN OF END POST

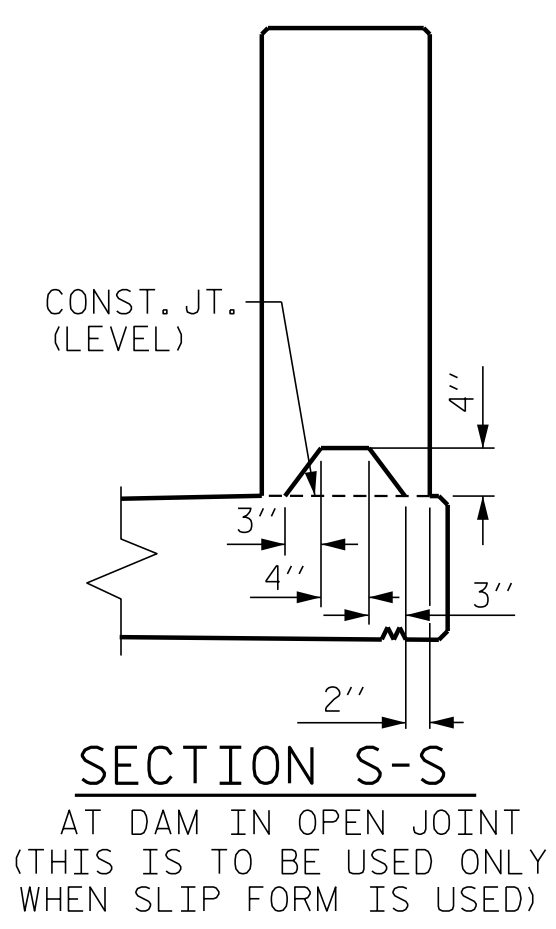


END VIEW

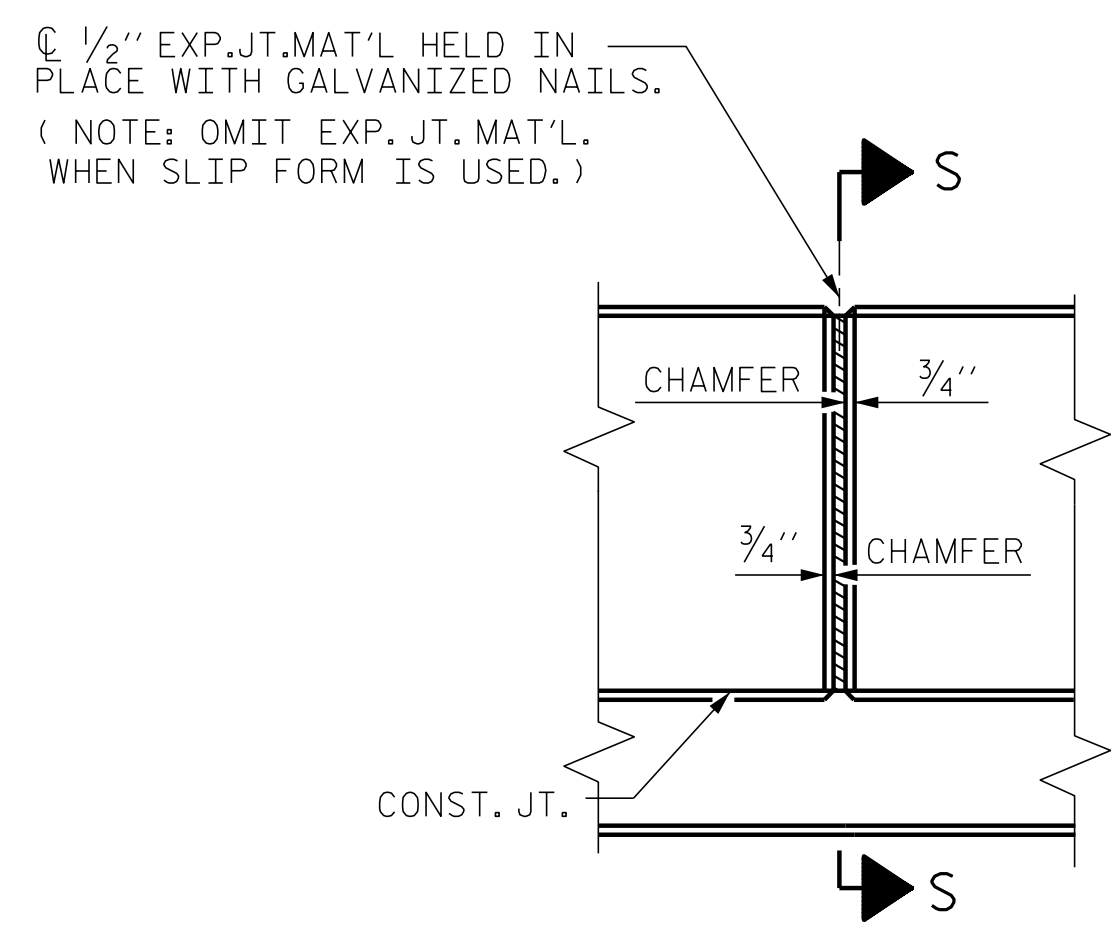


ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

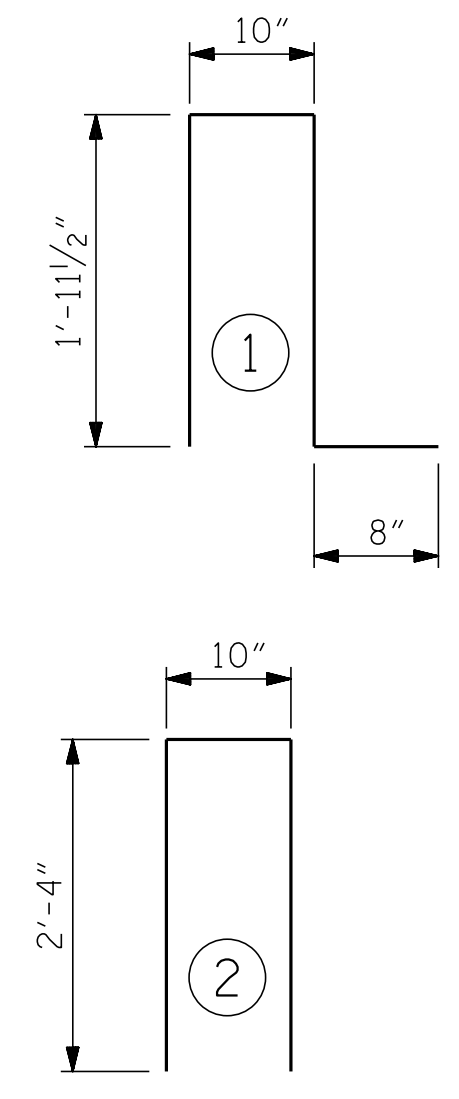


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



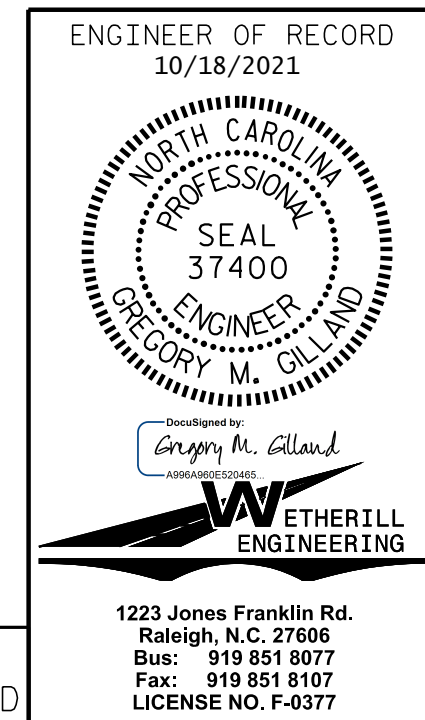
ELEVATION AT JOINTS IN PARAPET

BAR TYPE		BILL OF MATERIAL FOR PARAPETS AND 4 END POSTS					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
* B1	32	#5	STR	23'-9"	793		
* B2	128	#5	STR	24'-7"	3282		
* B3	64	#5	STR	19'-7"	1307		
* E1	8	#7	STR	2'-6"	41		
* E2	8	#7	STR	3'-0"	49		
* E3	8	#7	STR	3'-6"	57		
* E4	8	#7	STR	4'-0"	65		
* E5	8	#7	STR	4'-4"	71		
* F1	8	#6	STR	1'-10"	22		
* F2	8	#6	STR	3'-0"	36		
* F3	8	#6	STR	3'-4"	40		
* S1	658	#5	1	5'-5"	3717		
* S2	658	#5	2	5'-6"	3775		
					* EPOXY COATED REINFORCING STEEL	13,255 LBS.	
					CLASS "AA" CONCRETE	71.8 C.Y.	
					1'-2" x 2'-6" CONCRETE PARAPET	656.67 L.F.	



BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 2

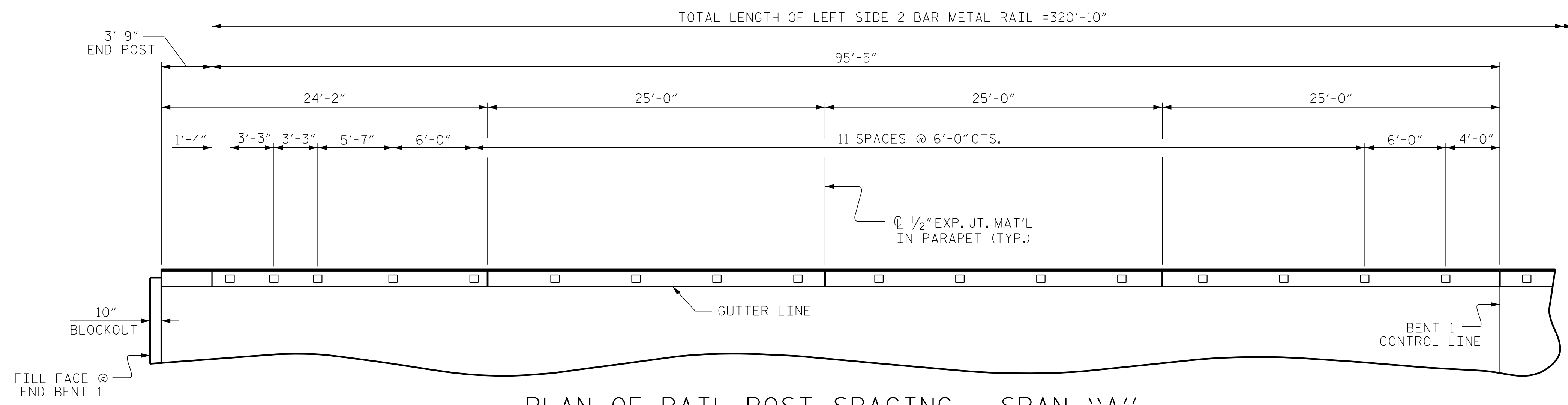


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			39

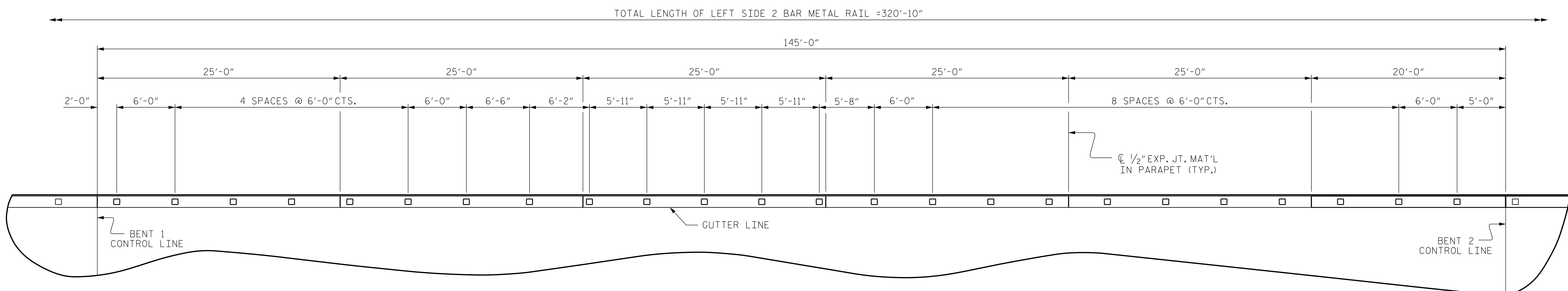
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UNLESS ALL SIGNATURES COMPLETED

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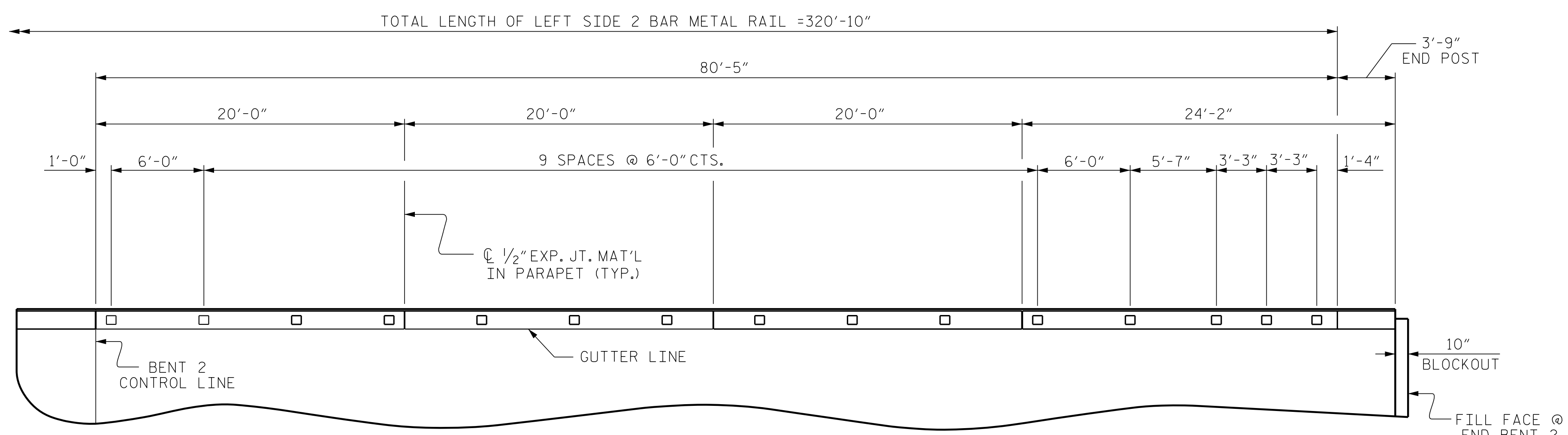
DRAWN BY: D. HODGE DATE: 5/20
 CHECKED BY: J. DILWORTH DATE: 5/20



PLAN OF RAIL POST SPACING - SPAN "A"
(LEFT SIDE PARAPET SHOWN, RIGHT SIDE SIMILAR)

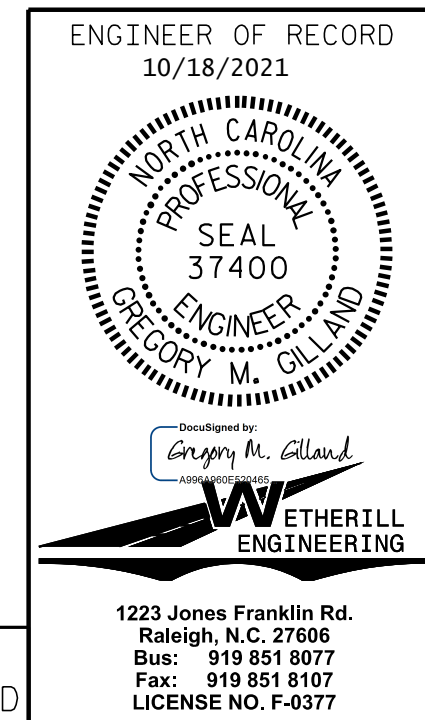


PLAN OF RAIL POST SPACING - SPAN "B"
(LEFT SIDE PARAPET SHOWN, RIGHT SIDE SIMILAR)



PLAN OF RAIL POST SPACING - SPAN "C"
(LEFT SIDE PARAPET SHOWN, RIGHT SIDE SIMILAR)

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 4

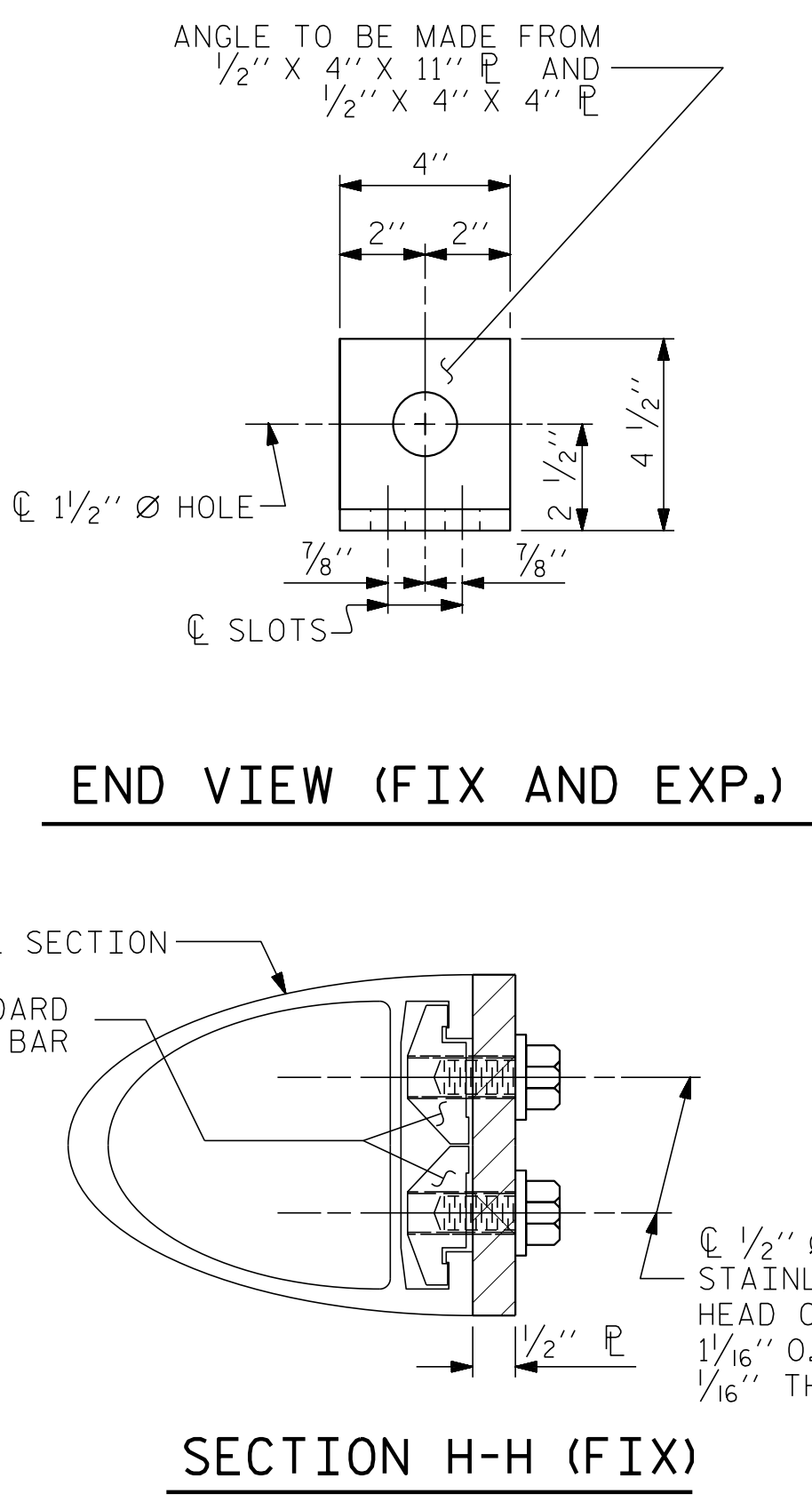
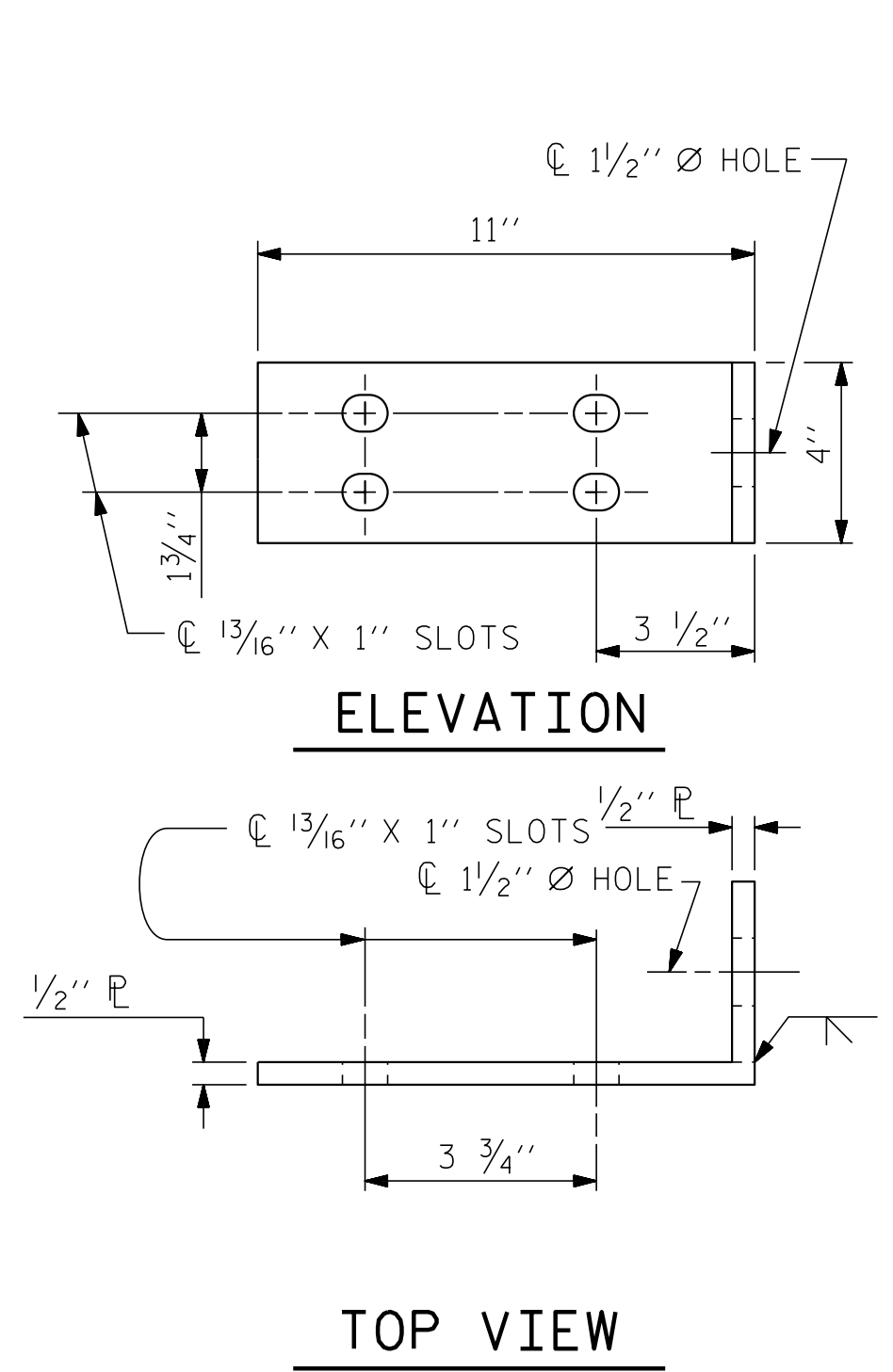
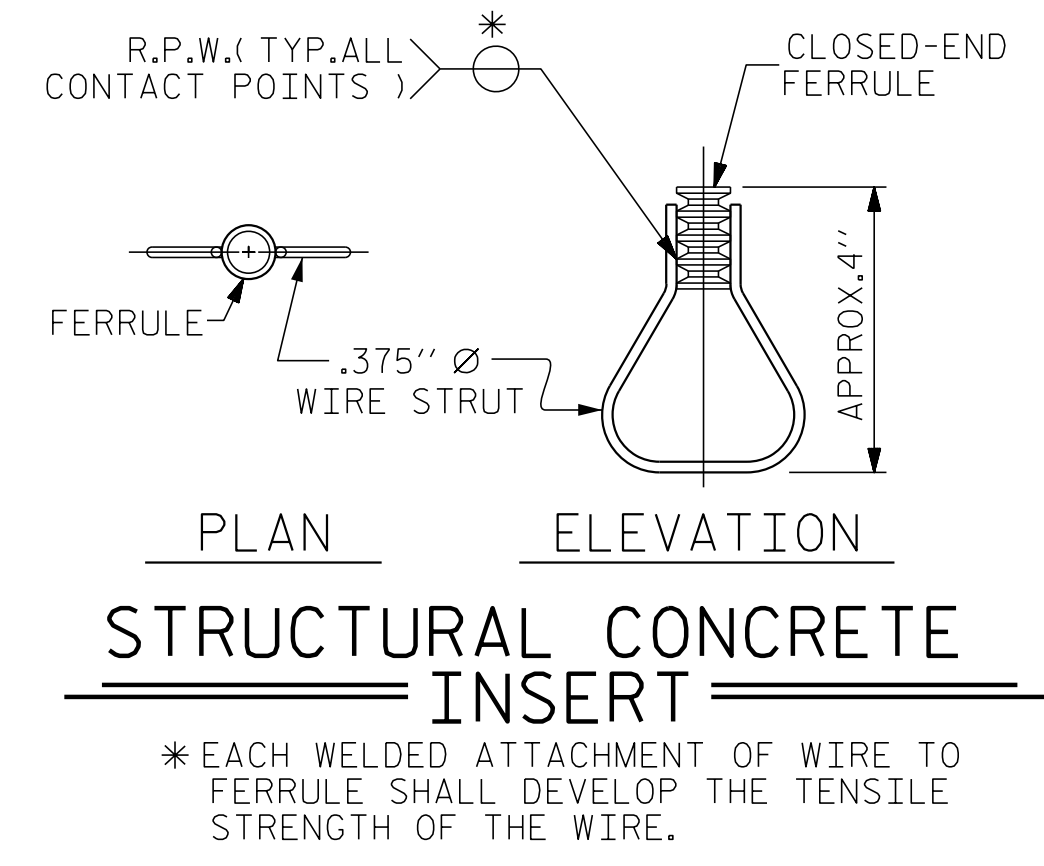
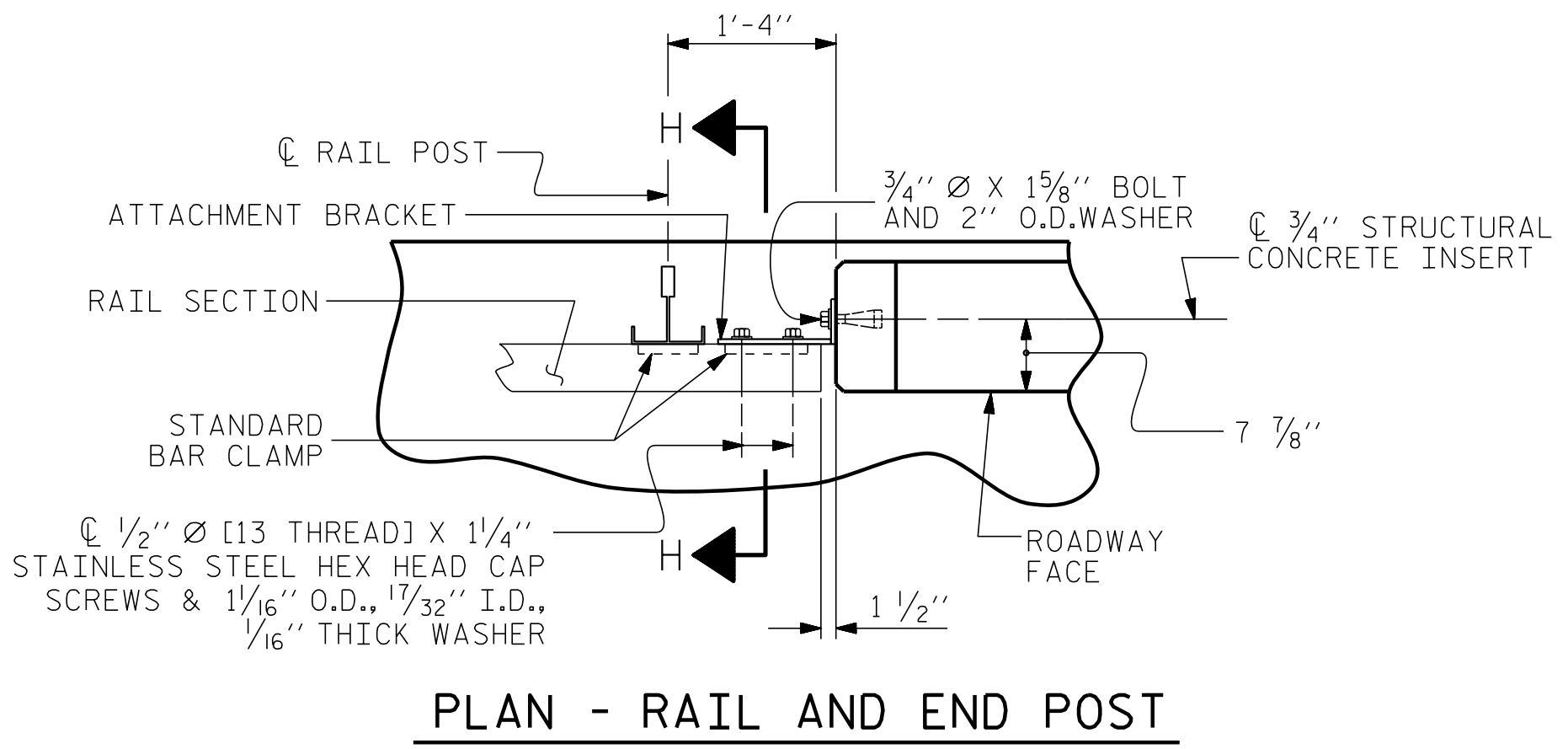


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
2 BAR METAL RAIL POST SPACING					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-21
TOTAL SHEETS					39

DRAWN BY: D. HODGE DATE: 5/20
 CHECKED BY: G. GILLILAND DATE: 6/20

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DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES
STRUCTURAL CONCRETE INSERT

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

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
- 1 - 3/4" Ø X 1 5/8" 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 3/4" Ø X 1 5/8" 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.)
- 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 1/16" 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:

- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
- 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.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

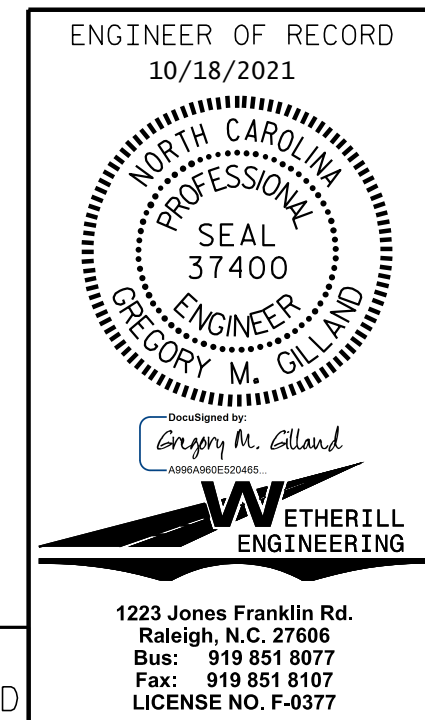
THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" 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 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 4



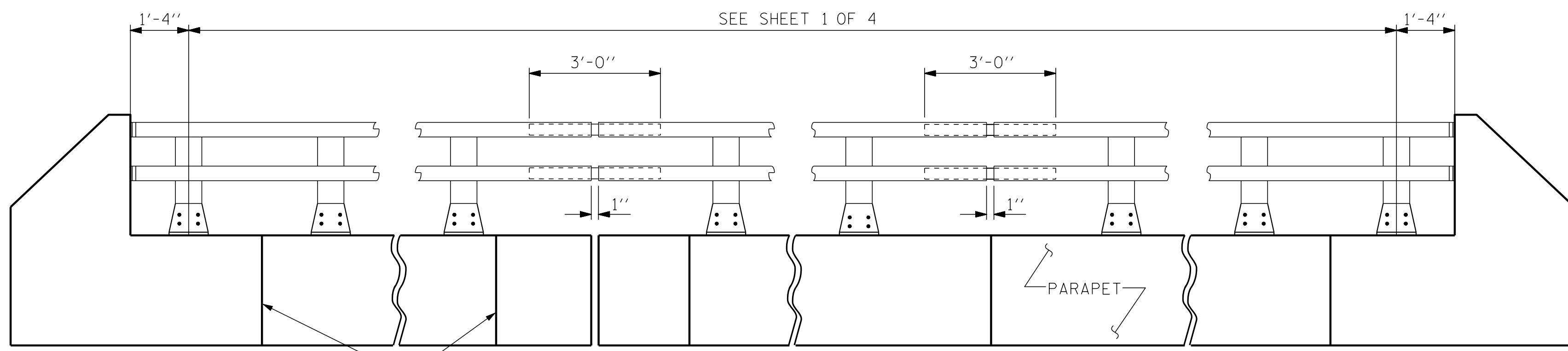
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD RAIL POST SPACINGS AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-22
					TOTAL SHEETS 39

ASSEMBLED BY : D. HODGE	DATE : 5/20
CHECKED BY : J. DILWORTH	DATE : 5/20
DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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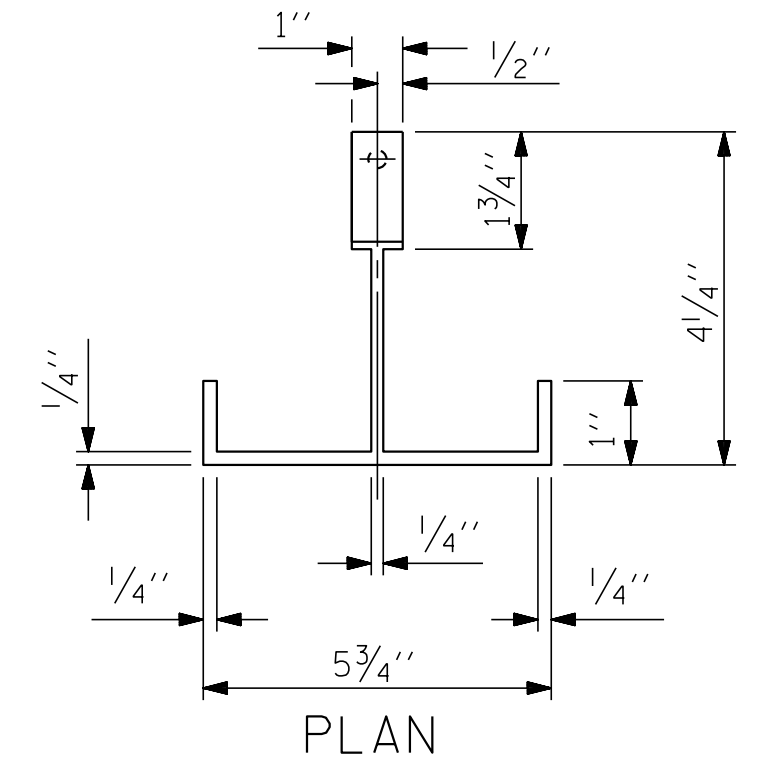
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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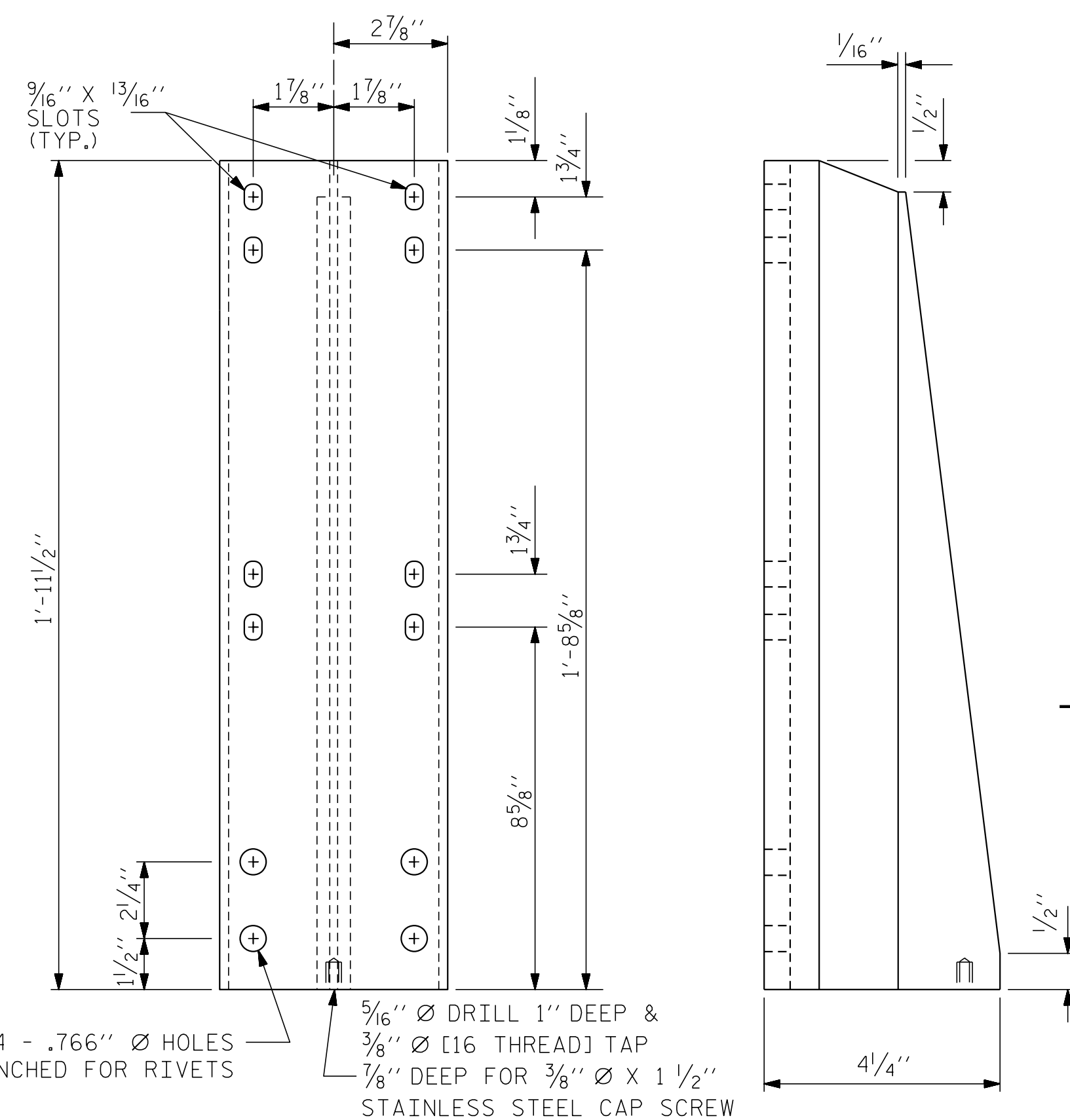


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 2 OF 4.



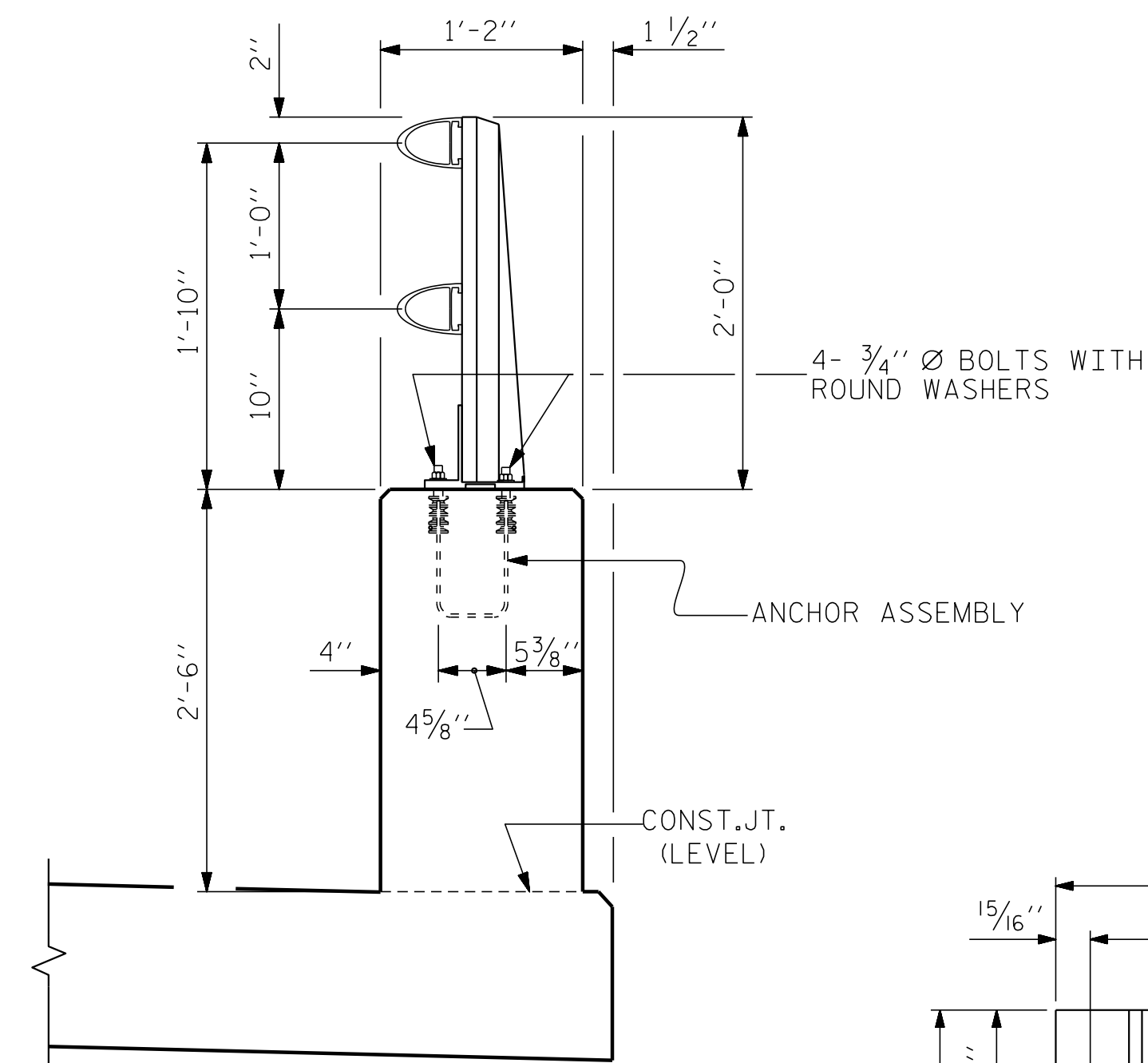
PLAN



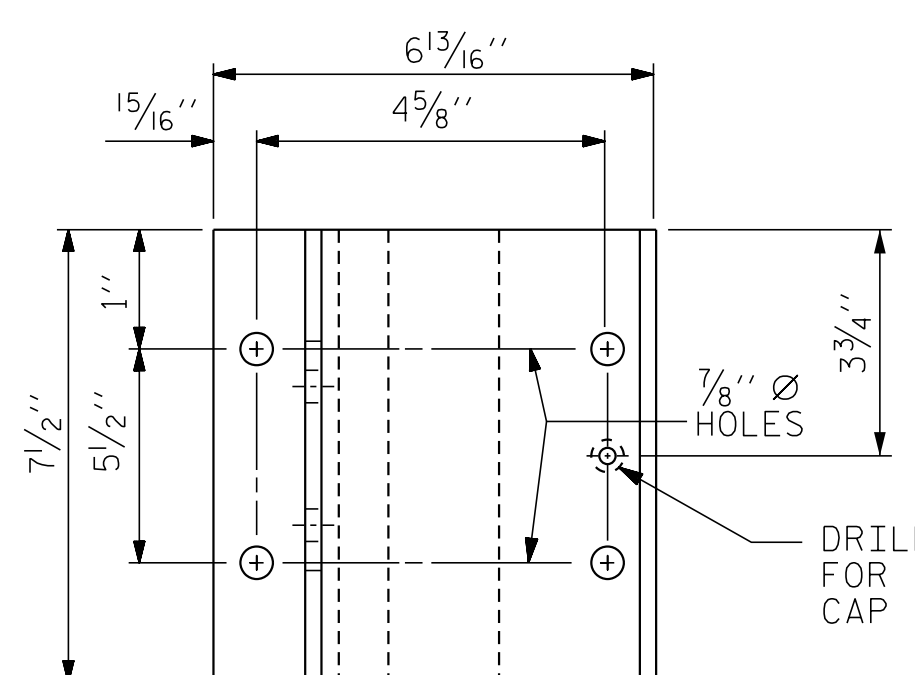
FRONT ELEVATION

SIDE ELEVATION

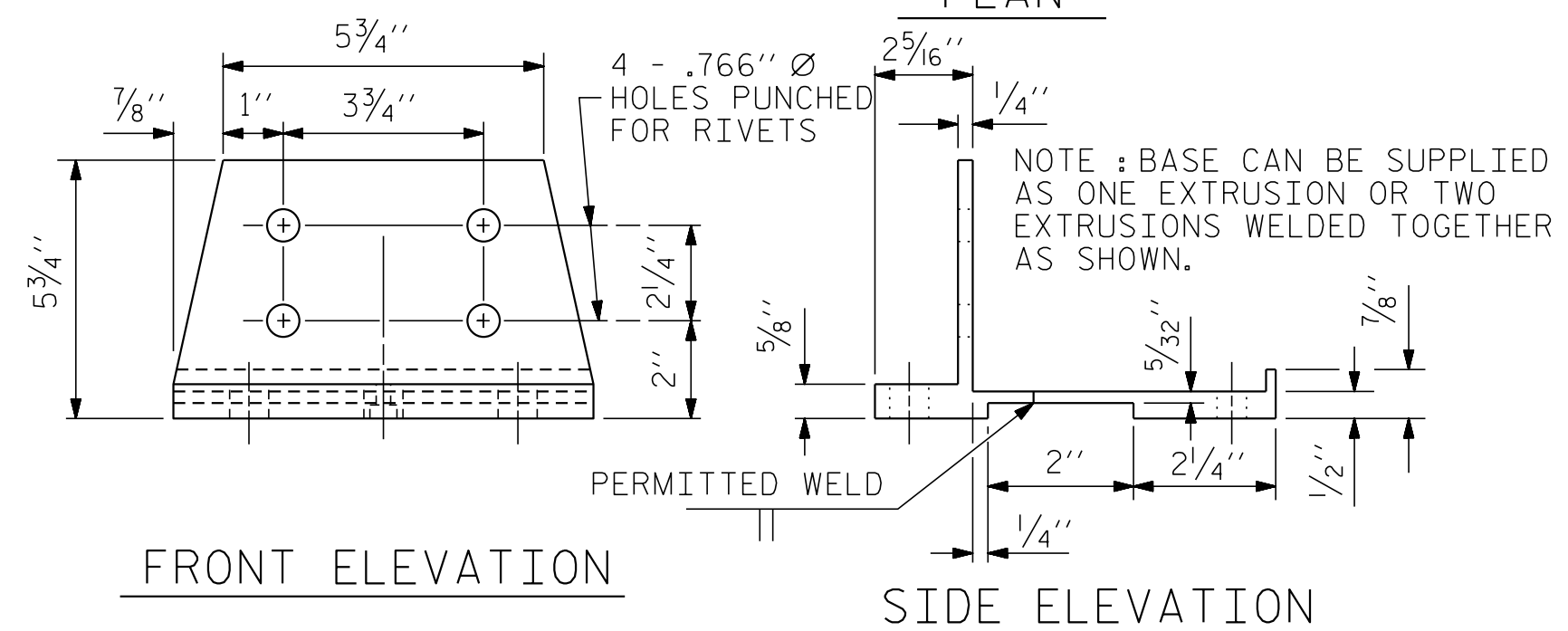
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



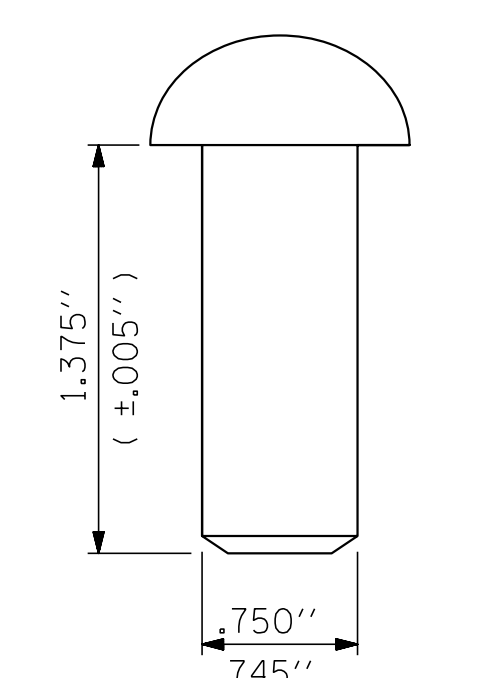
PLAN



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 LRFDBRIDGE 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.

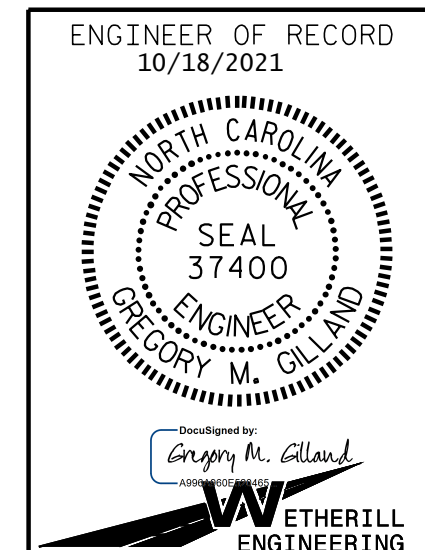
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" 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 = 641.67 LIN. FT.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

SHEET 3 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 2 BAR METAL RAIL

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

SHEET NO. S-23
 TOTAL SHEETS 39

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NOTES

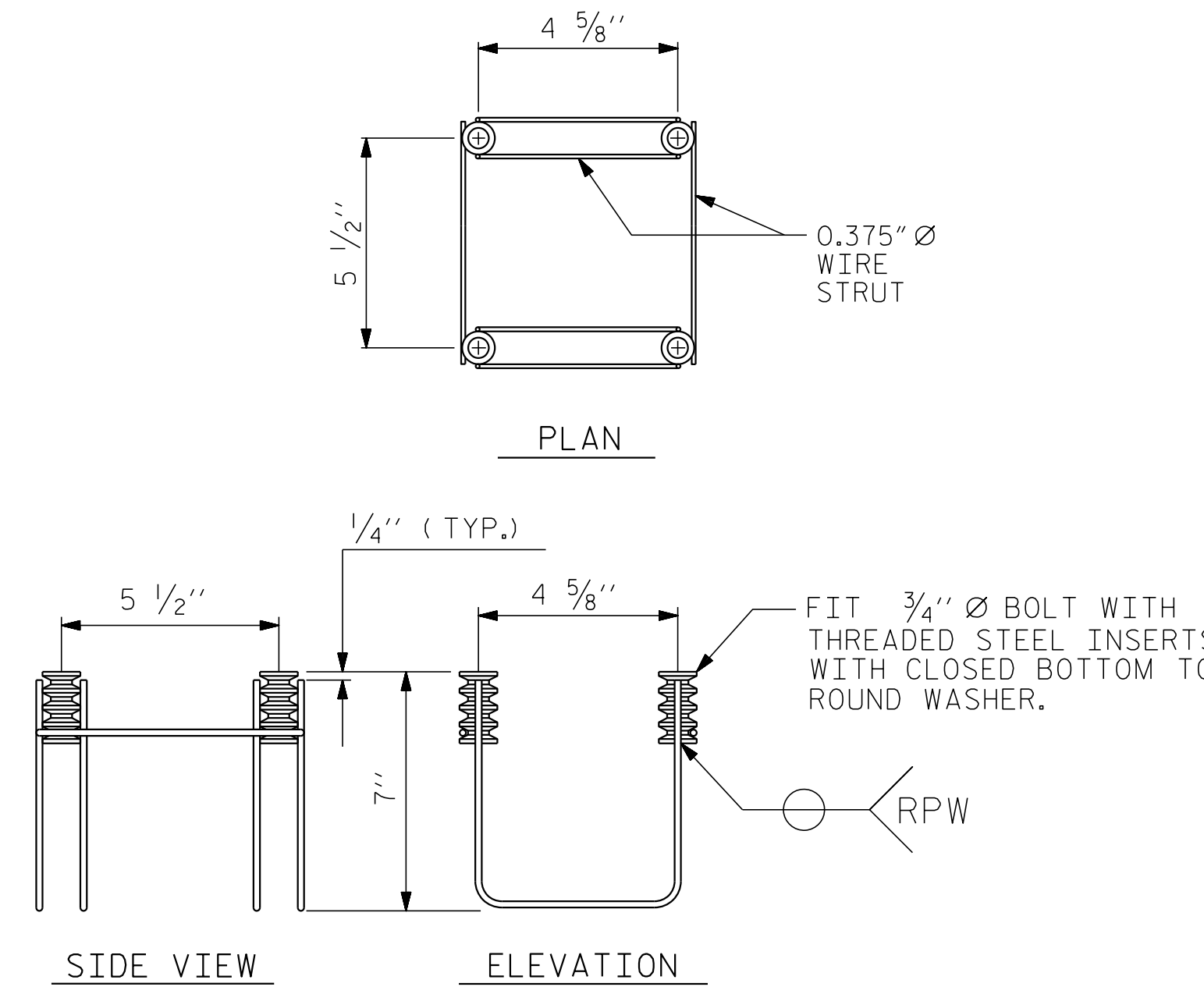
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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.

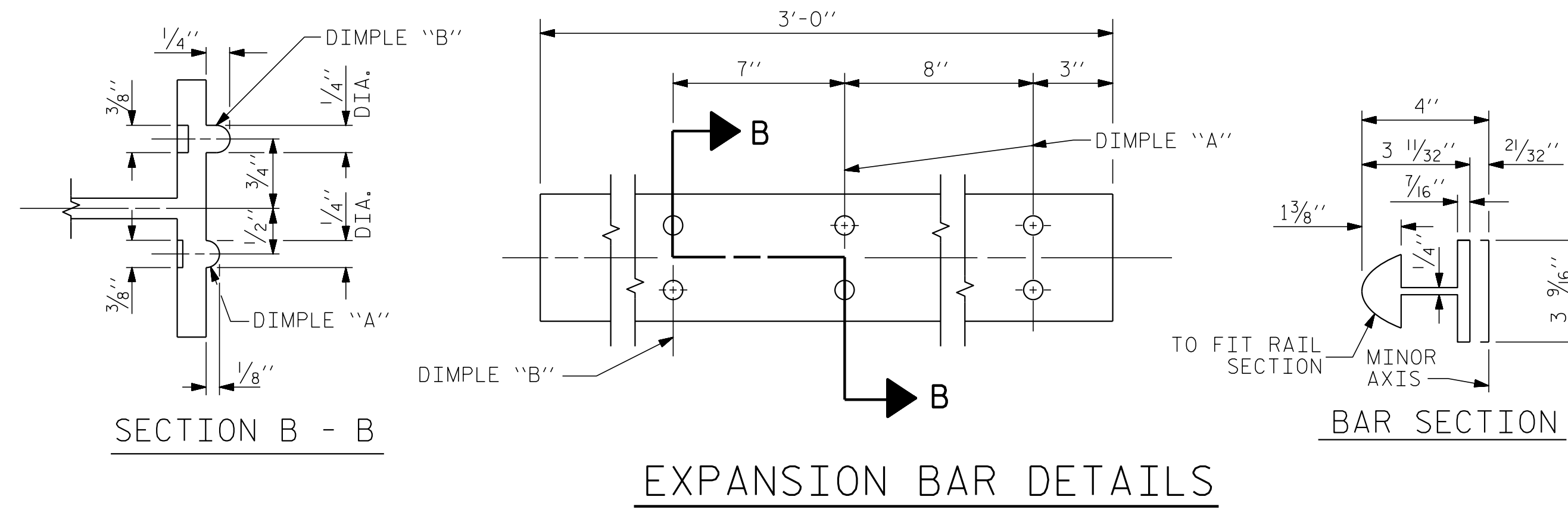
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.

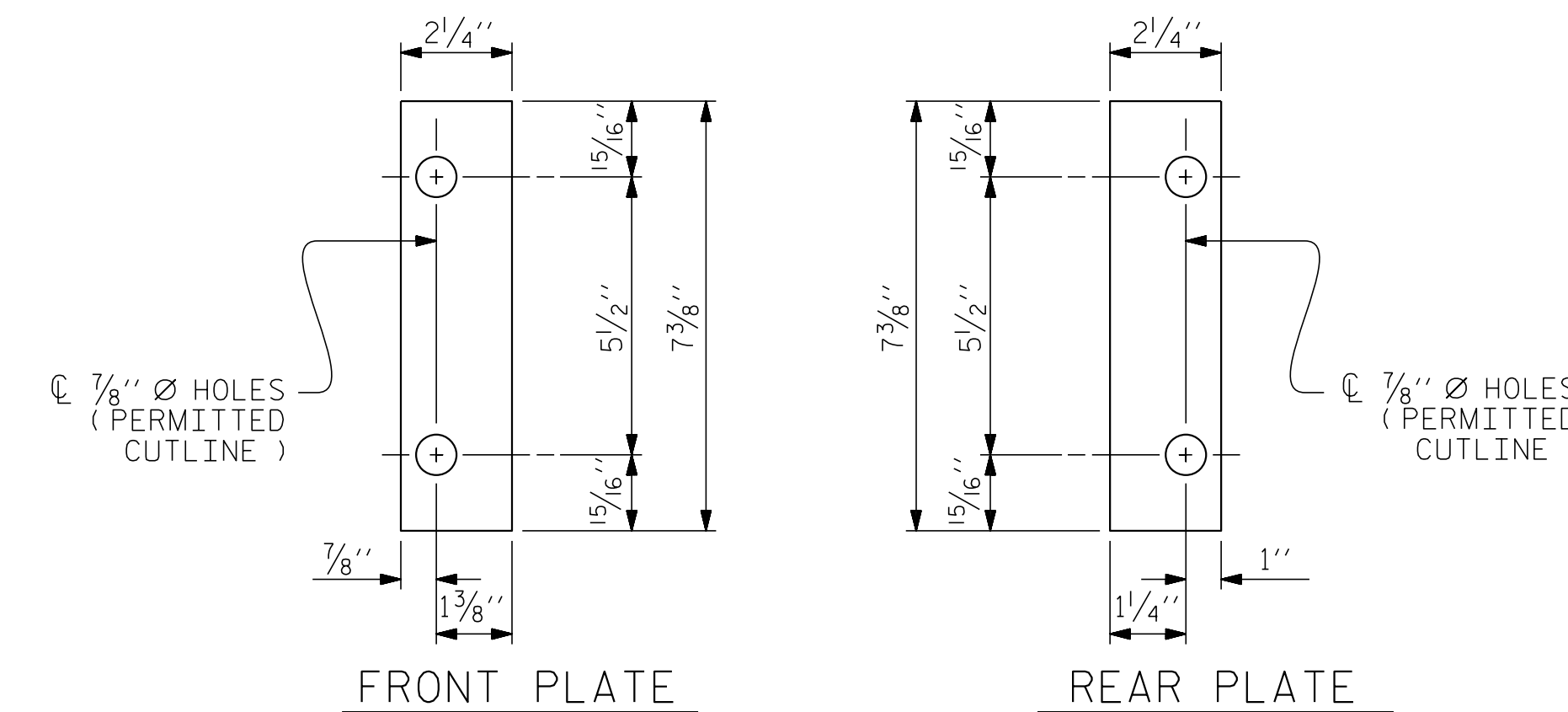


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(112 ASSEMBLIES REQUIRED)

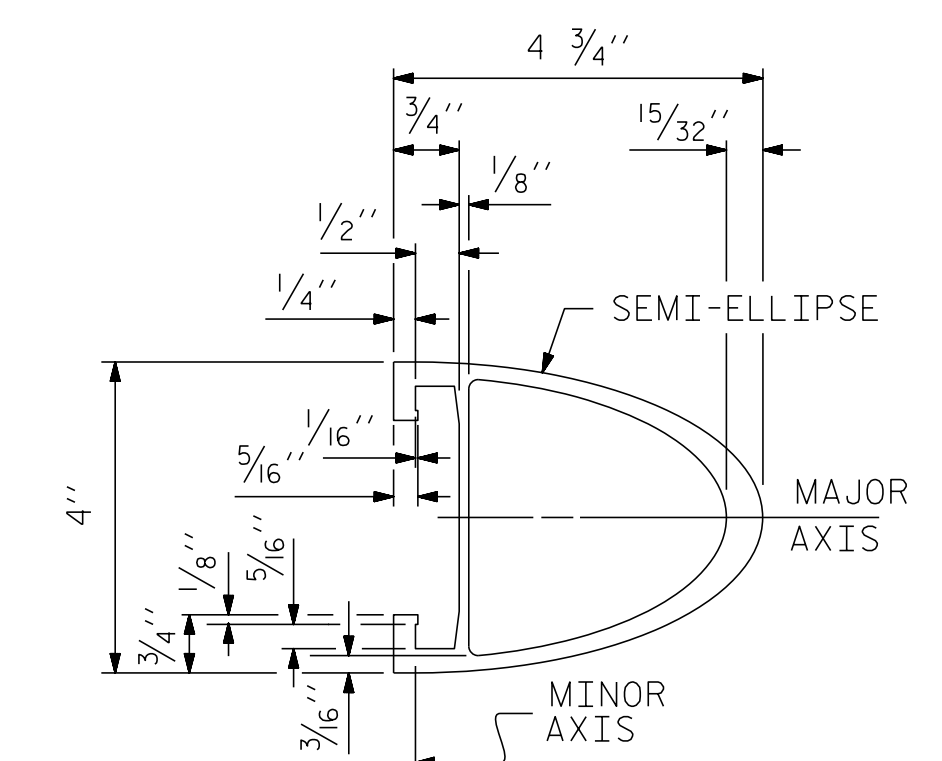


EXPANSION BAR DETAILS

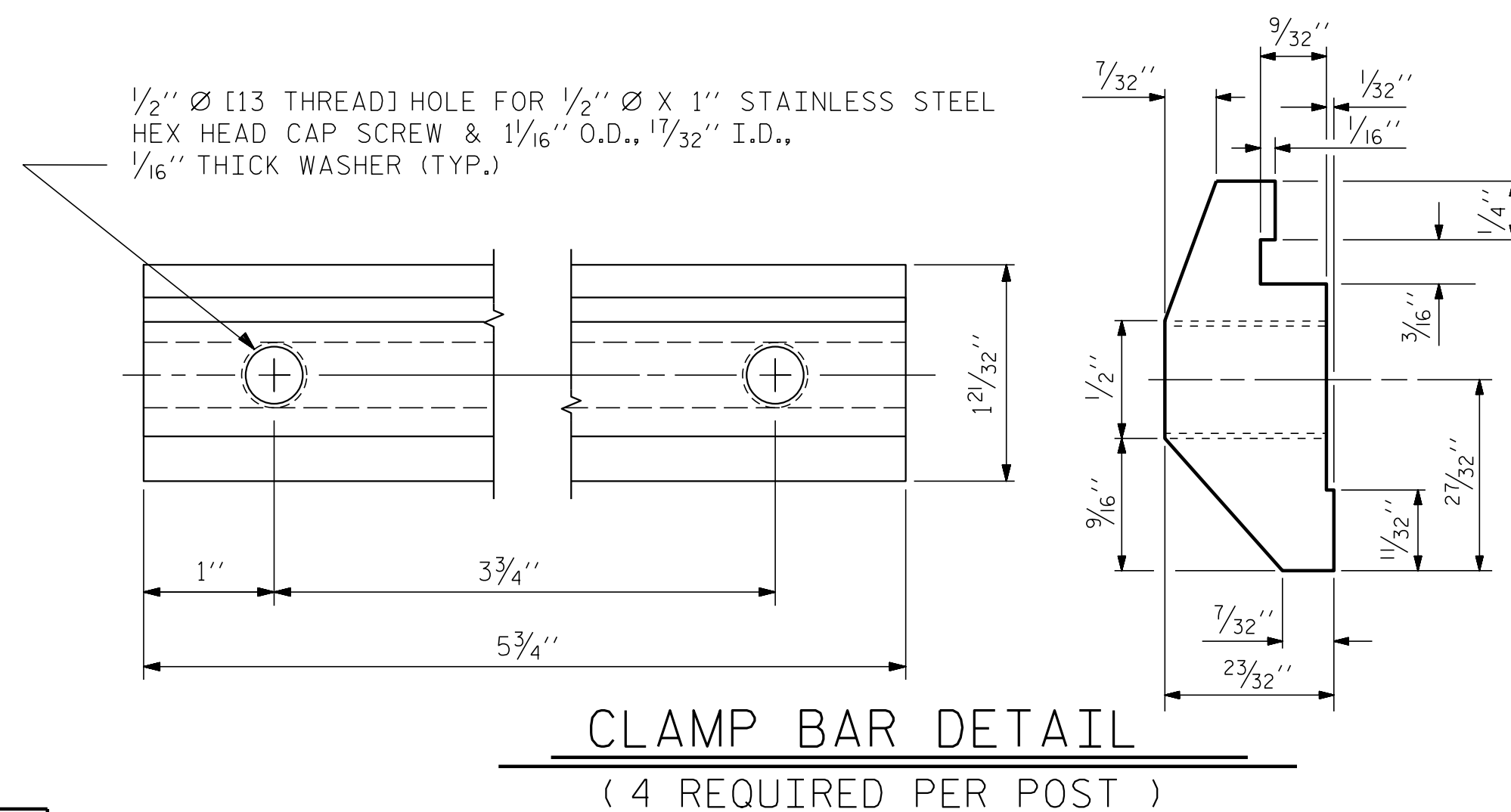


SHIM DETAILS

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

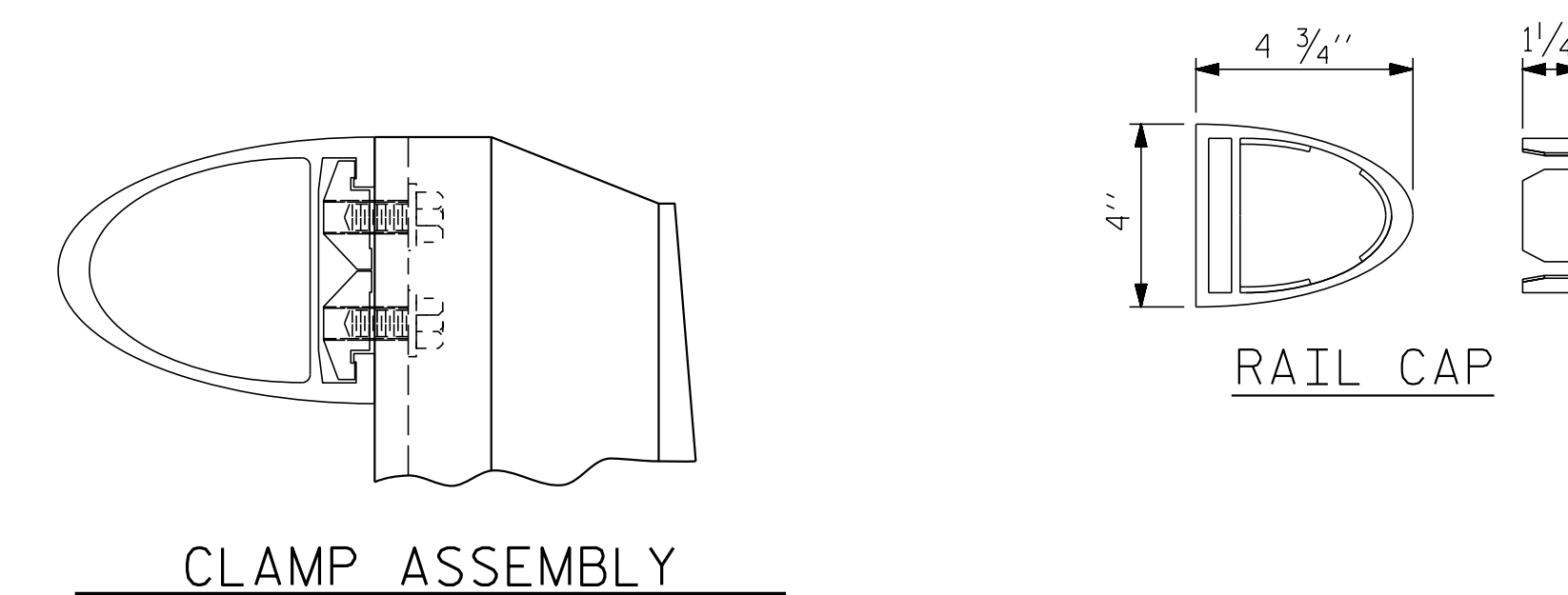


RAIL SECTION



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

RAIL CAP

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-

SHEET 4 OF 4

ENGINEER OF RECORD
10/18/2021
NORTH CAROLINA PROFESSIONAL SEAL 37400
ENGINEER
GREGORY M. GILLAND
GREGORY M. GILLAND
ETHERILL 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

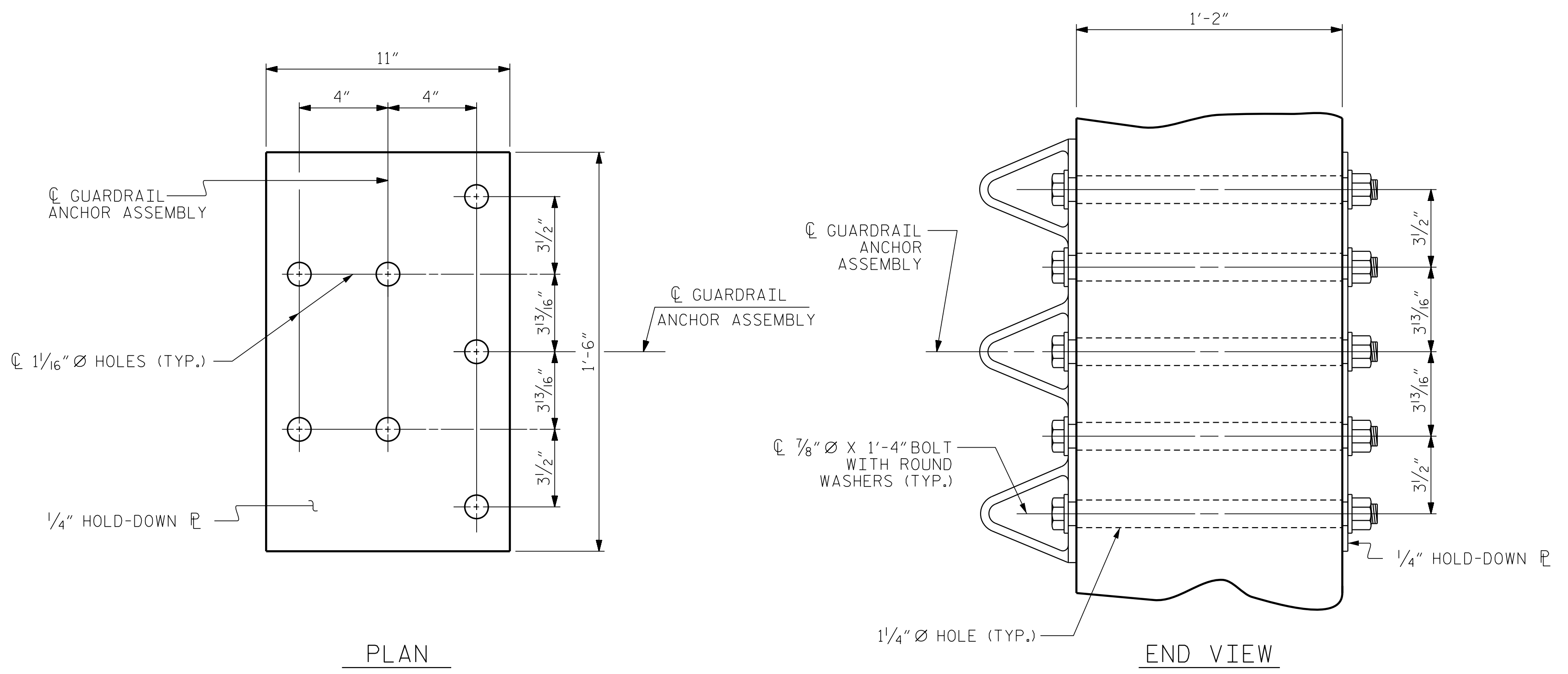
STANDARD
2 BAR METAL RAIL

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			39

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ASSEMBLED BY : D. HODGE	DATE : 5/20
CHECKED BY : J. DILWORTH	DATE : 5/20
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

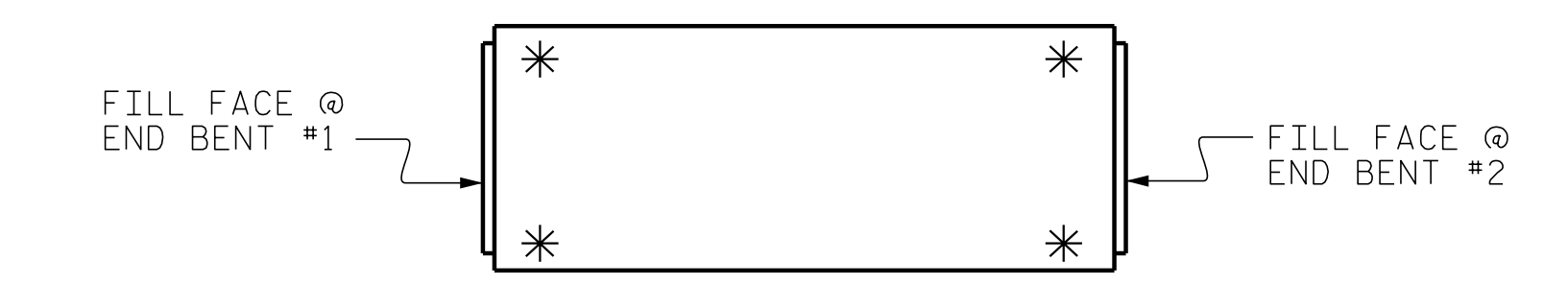
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

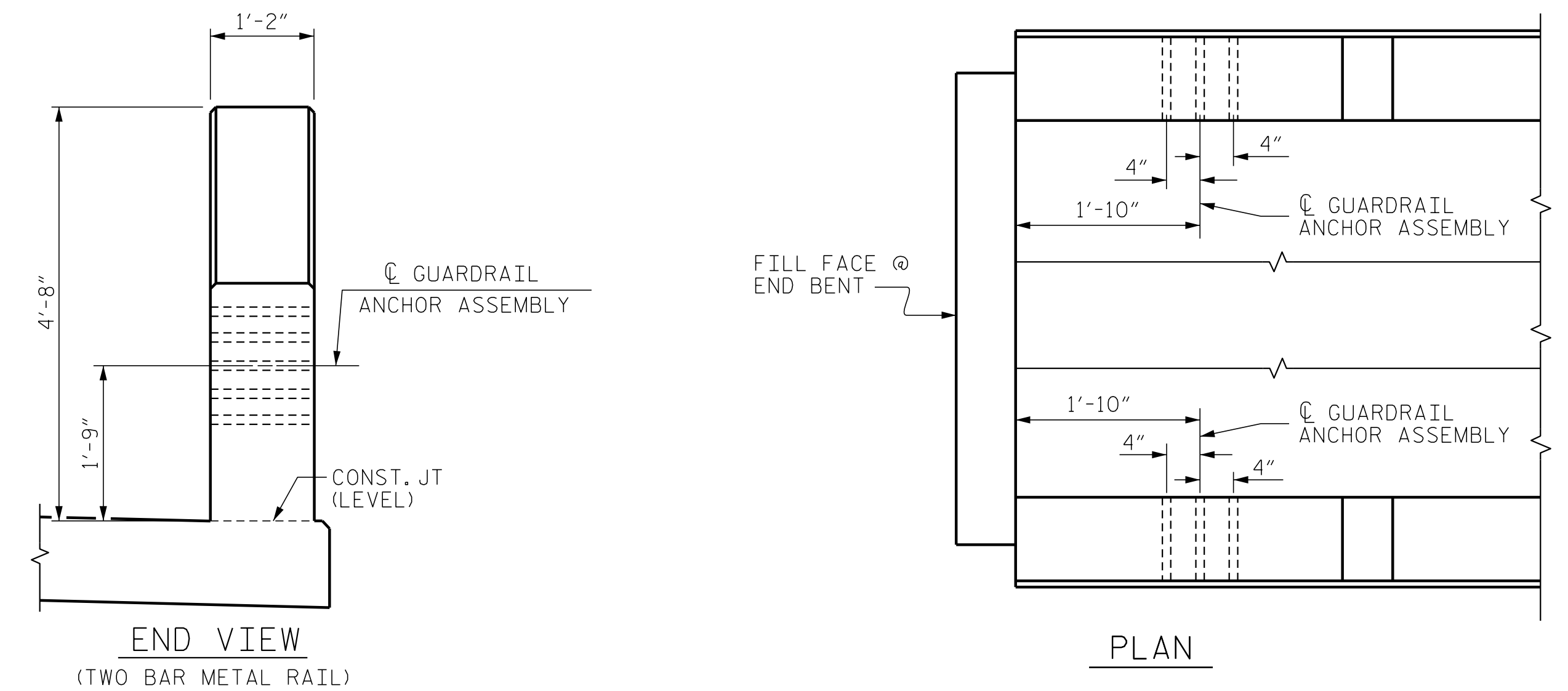
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-

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ASSEMBLED BY : D. HODGE	DATE : 5/20
CHECKED BY : J. DILWORTH	DATE : 5/20
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

ENGINEER OF RECORD
 10/18/2021

Gregory M. Gilland
 WETHERILL ENGINEERING

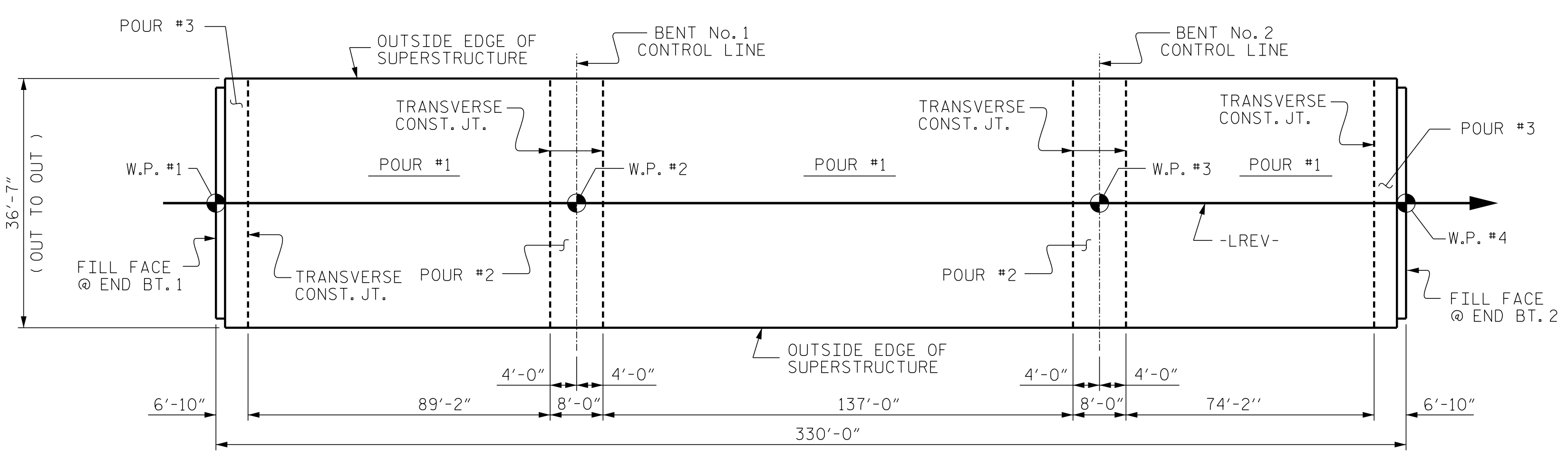
1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-25
TOTAL SHEETS					39

DOCUMENT NOT CONSIDERED FINAL
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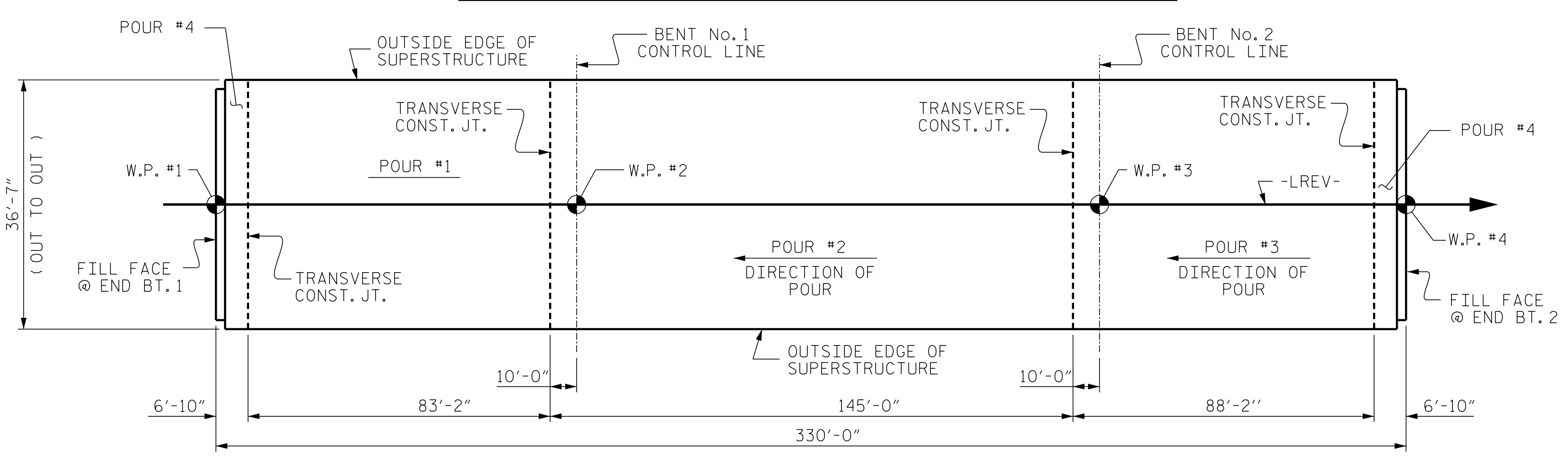
GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,509 SQ.FT.
BRIDGE DECK	10,178 SQ.FT.
TOTAL	11,687 SQ.FT.

CLASS AA CONCRETE BREAKDOWN	
POUR #1	97.4 CY
POUR #2	183.3 CY
POUR #3	116.8 CY
POUR #4	62.9 CY
CLASS AA CONCRETE BREAKDOWN TOTAL	460.4 CY



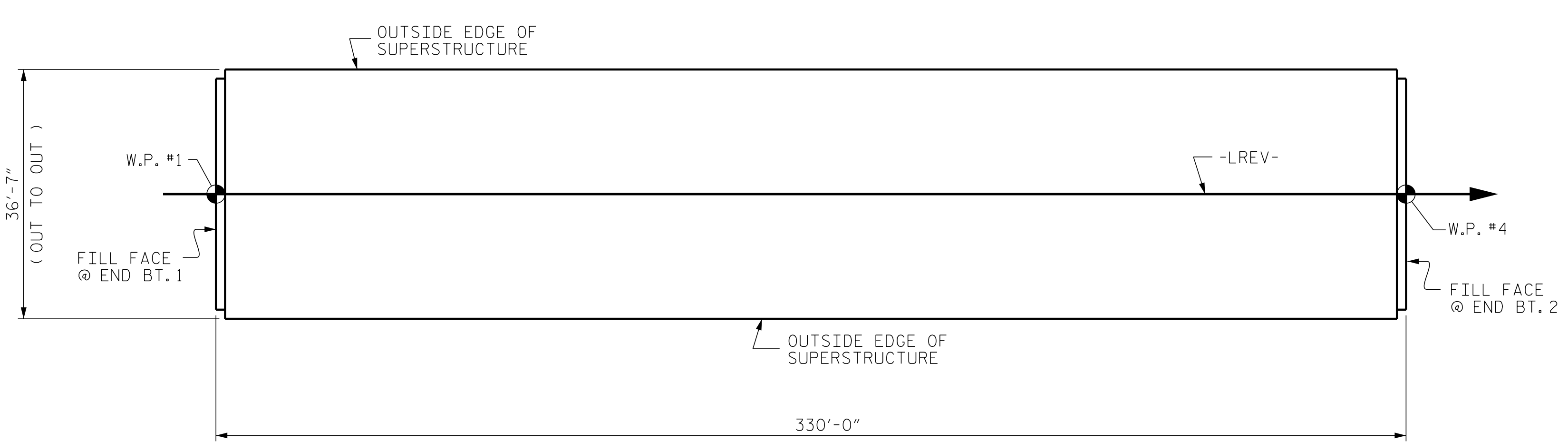
OPTIONAL POUR SEQUENCE SKETCH

NOTE : POUR #3 INCLUDES UPPER PART OF THE INTEGRAL END BENT.



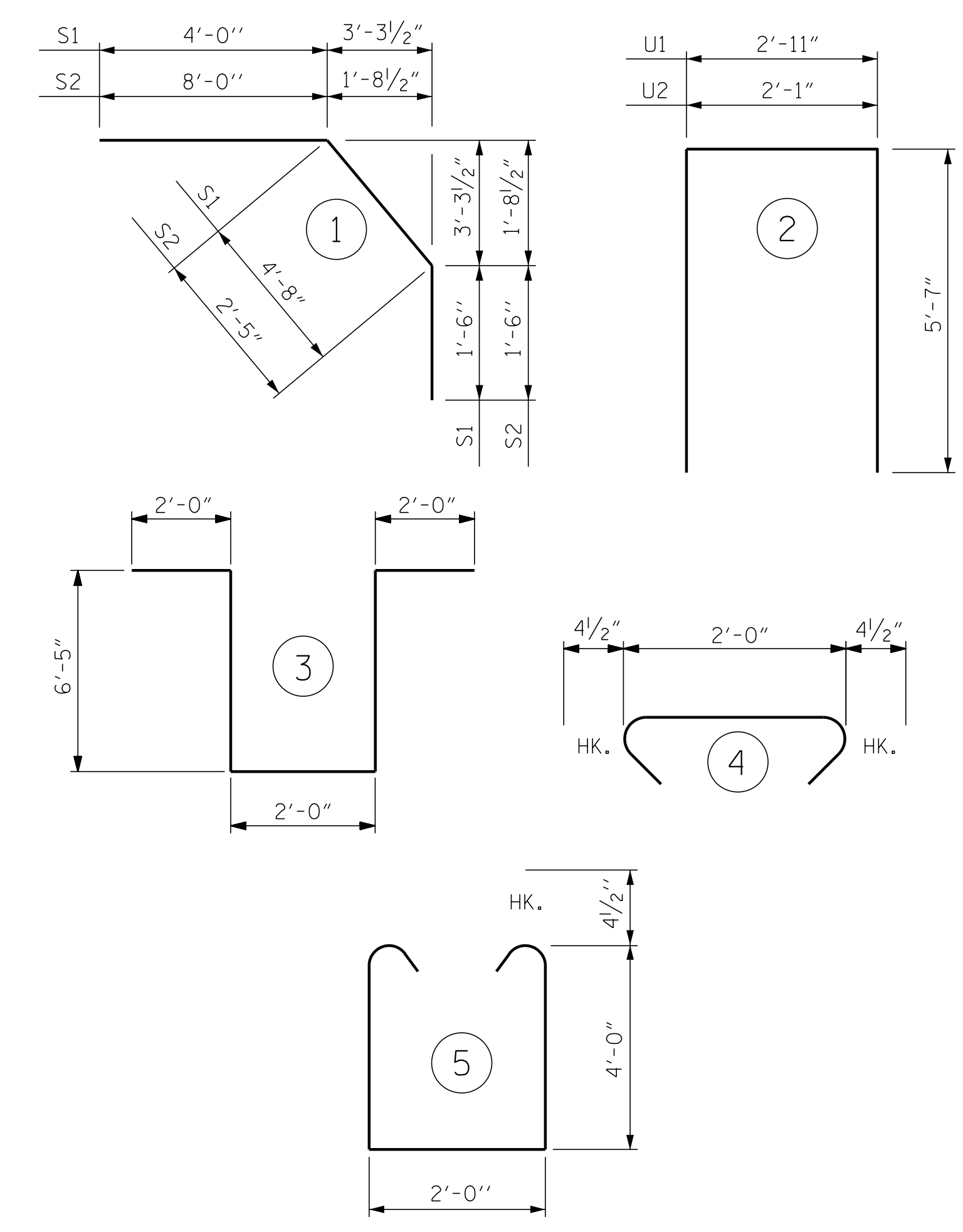
POUR SEQUENCE SKETCH

NOTE : POUR #4 INCLUDES UPPER PART OF THE INTEGRAL END BENT.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 12,072)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
TOTALS **	460.4	37,486	38,174

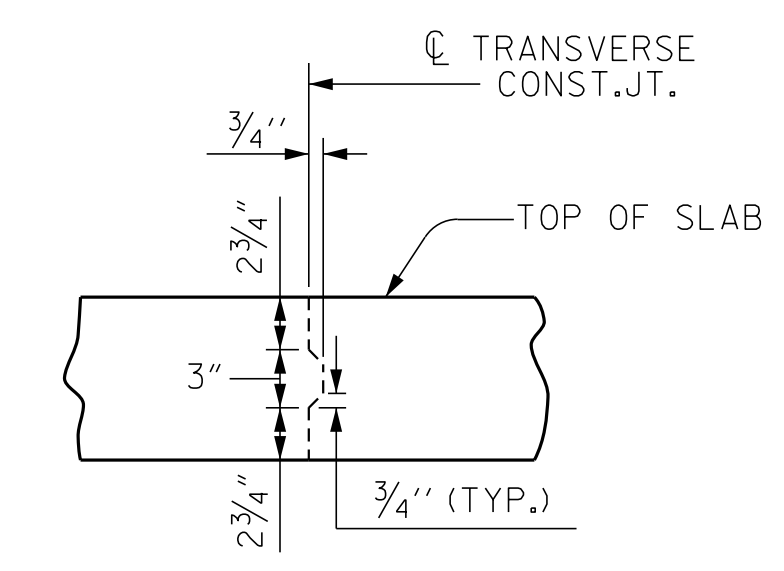
** QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	525	#5	STR	36'-3"	19,850
A2	525	#5	STR	36'-3"	19,850
* B1	70	#6	STR	20'-0"	2,103
* B2	48	#4	STR	24'-11"	799
* B3	48	#6	STR	43'-2"	3,112
* B4	46	#6	STR	36'-9"	2,539
* B5	48	#4	STR	26'-11"	863
* B6	48	#6	STR	40'-11"	2,950
* B7	46	#6	STR	34'-6"	2,384
* B8	48	#4	STR	21'-2"	679
* B9	70	#6	STR	17'-0"	1,787
* B10	18	#4	STR	38'-2"	459
B11	258	#5	STR	56'-4"	15,159
K1	12	#4	STR	35'-0"	281
K2	6	#4	STR	5'-9"	23
K3	6	#4	STR	7'-9"	31
K4	24	#4	STR	8'-4"	134
K5	4	#4	STR	2'-6"	7
K6	4	#4	STR	3'-6"	9
K7	16	#4	STR	3'-9"	40
K8	12	#4	STR	4'-7"	37
K9	12	#4	STR	7'-6"	60
K10	48	#4	STR	8'-4"	267
K11	12	#4	STR	4'-11"	39
K12	14	#4	STR	28'-0"	262
* S1	44	#4	1	10'-2"	299
* S2	44	#4	1	11'-11"	350
S3	204	#4	4	2'-9"	375
U1	44	#4	2	14'-1"	414
U2	4	#4	2	13'-3"	35
U3	30	#4	3	18'-10"	377
U4	12	#4	5	10'-9"	86

REINFORCING STEEL LBS. 37,486
* EPOXY COATED REINFORCING STEEL LBS. 38,174

* THESE BARS ARE EPOXY COATED.



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: SLAB REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	EPOXY COATED
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

ENGINEER OF RECORD
10/18/2021
NORTH CAROLINA PROFESSIONAL SEAL 37400
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Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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

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

TOTAL SHEETS 39

DRAWN BY: D. HODGE DATE: 5/20
CHECKED BY: G. GILLAND DATE: 5/20

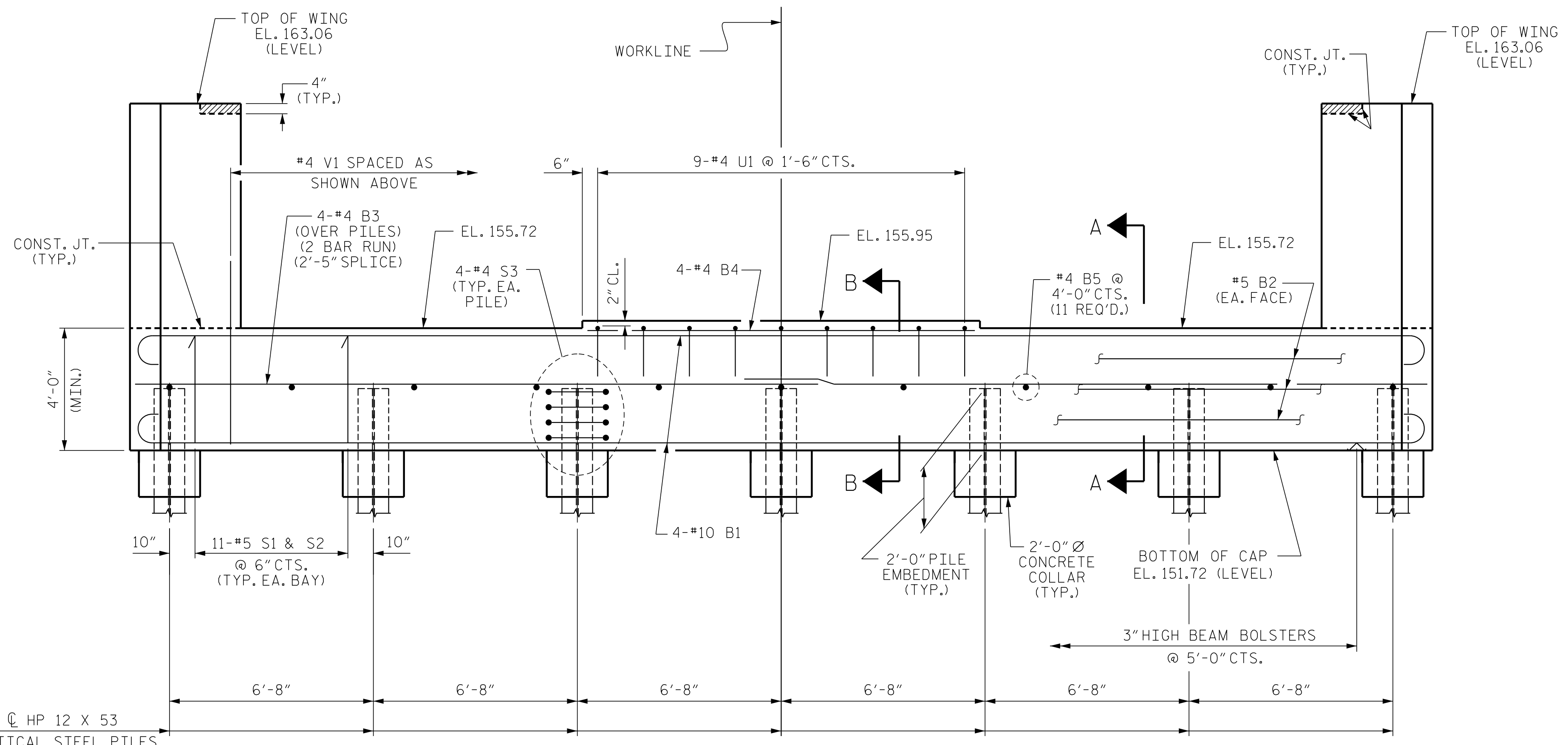
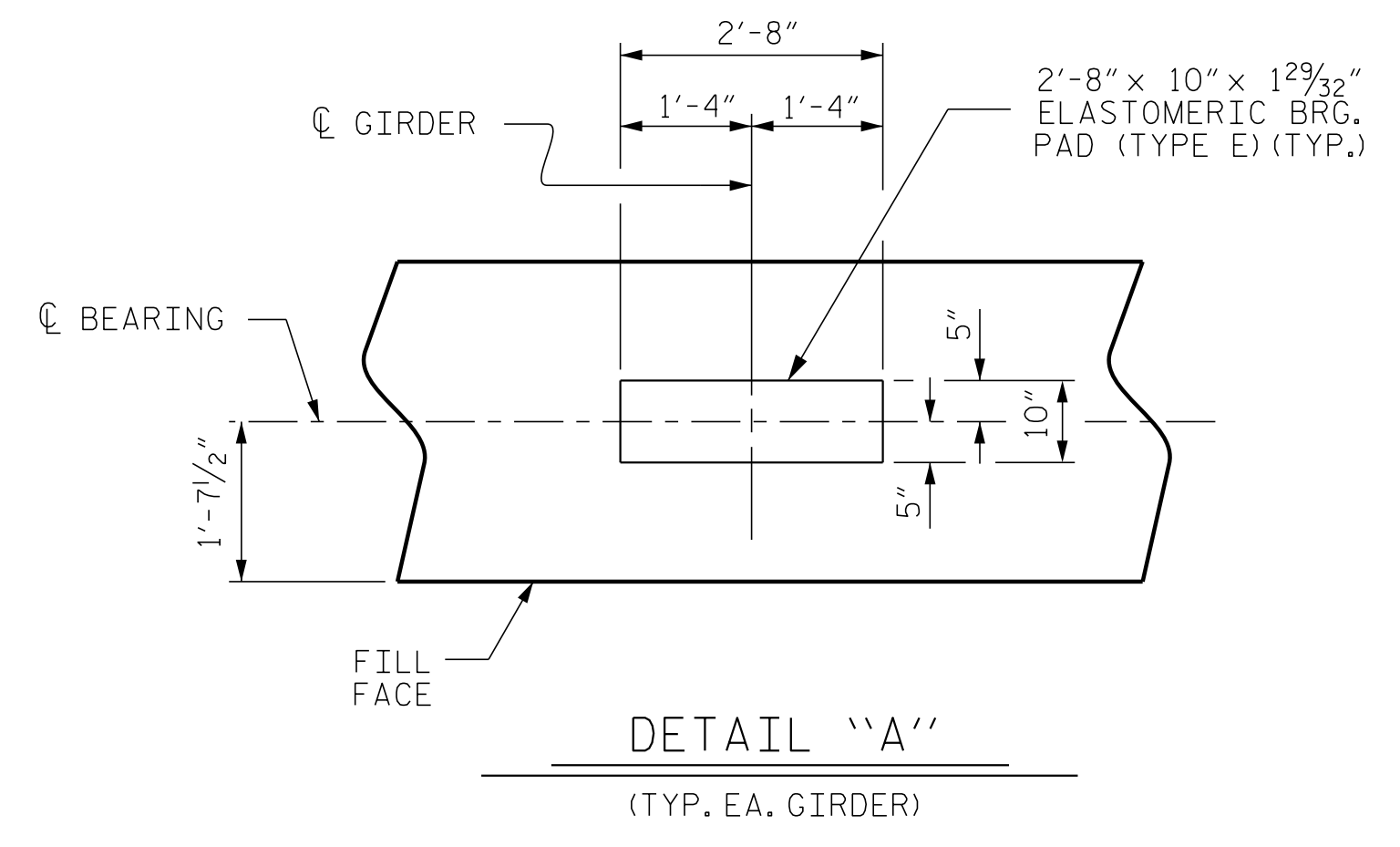
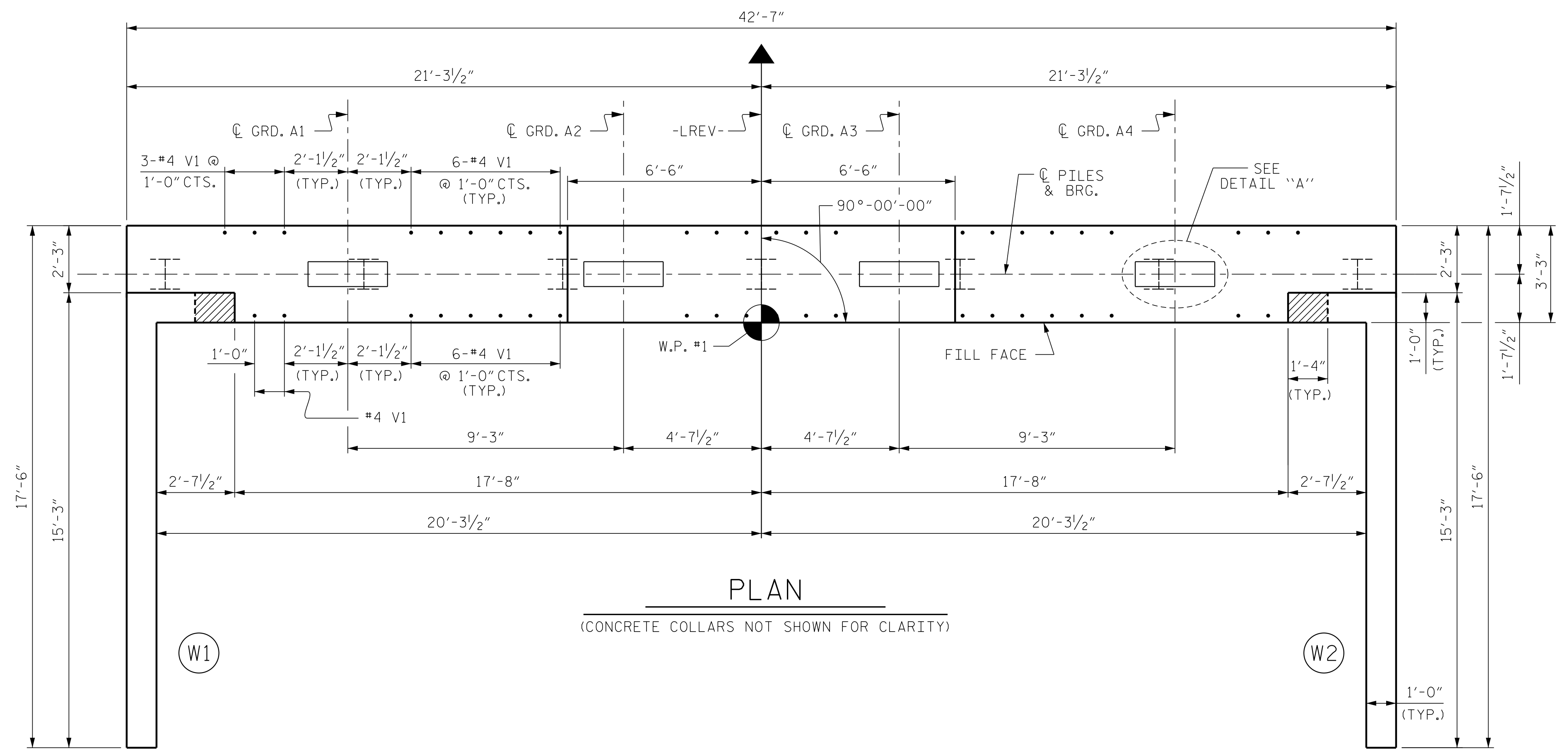
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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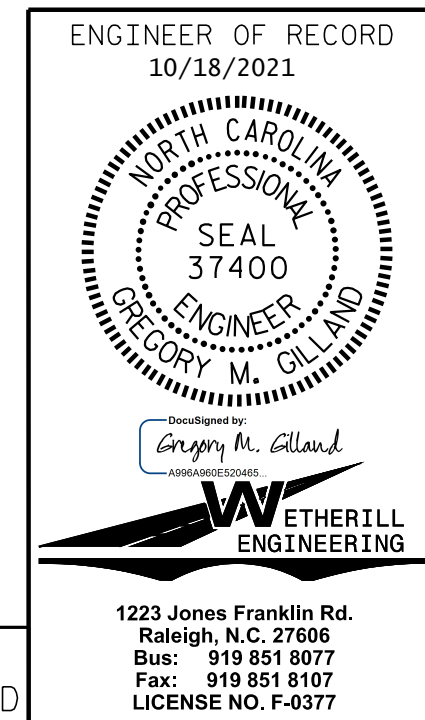
NOTES

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

THE TOP SURFACE OF THE END BENT CAP WITHIN THE LIMITS OF THE INTEGRAL ABUTMENT, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 3



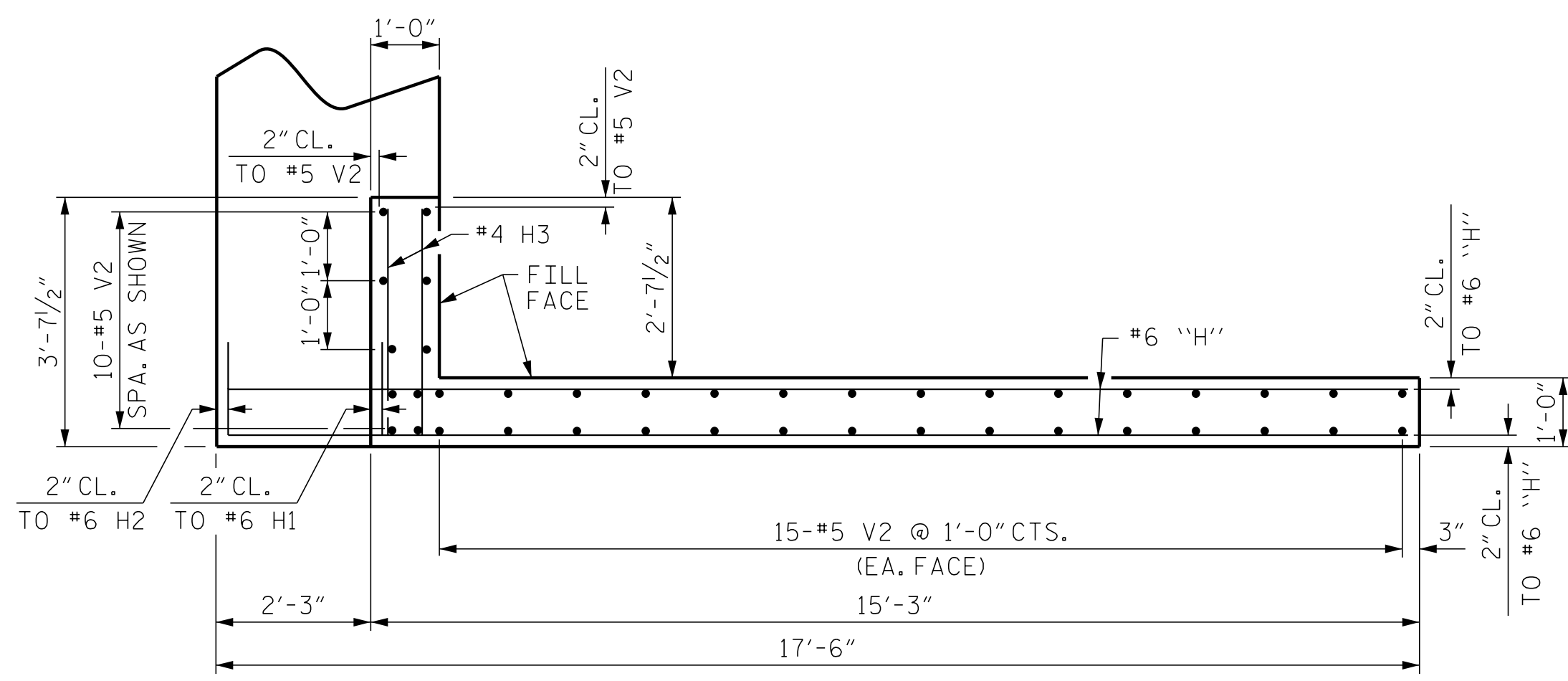
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT No. 1	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-27
2			TOTAL SHEETS 39

DRAWN BY: G. GILLAND DATE: 6/20
 CHECKED BY: J. PENDERGRAFT DATE: 10/20

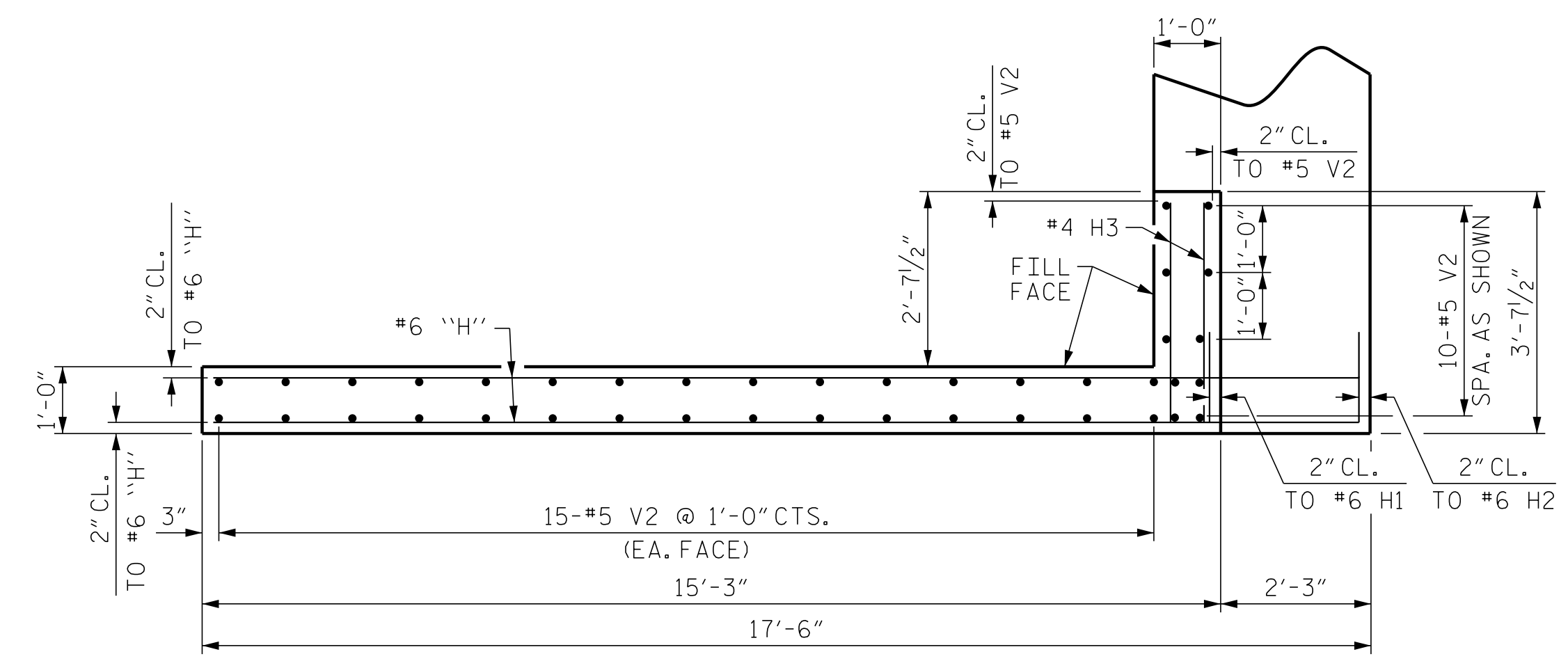
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ELEVATION
 FOR SECTION A-A & B-B, SEE SHEET 3 OF 3.

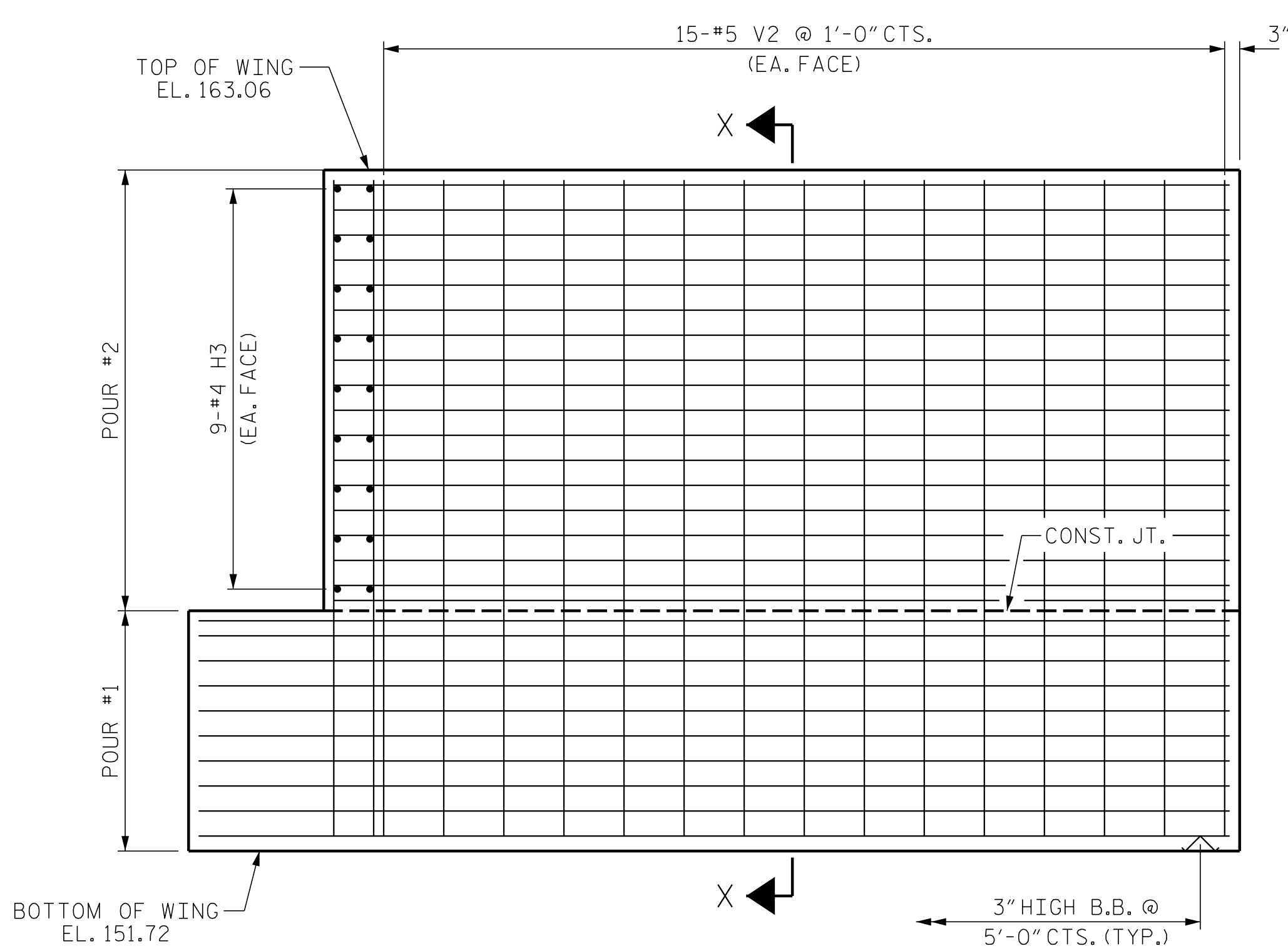
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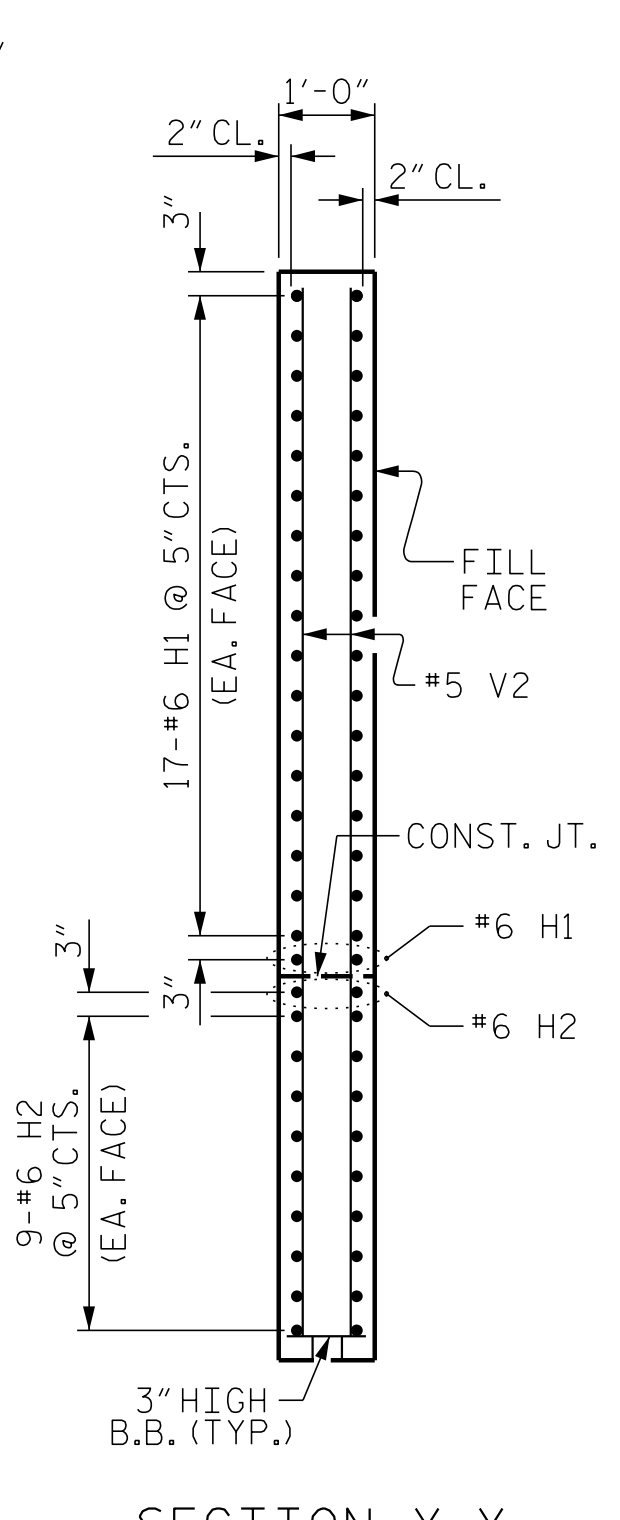
PLAN OF WING - W1



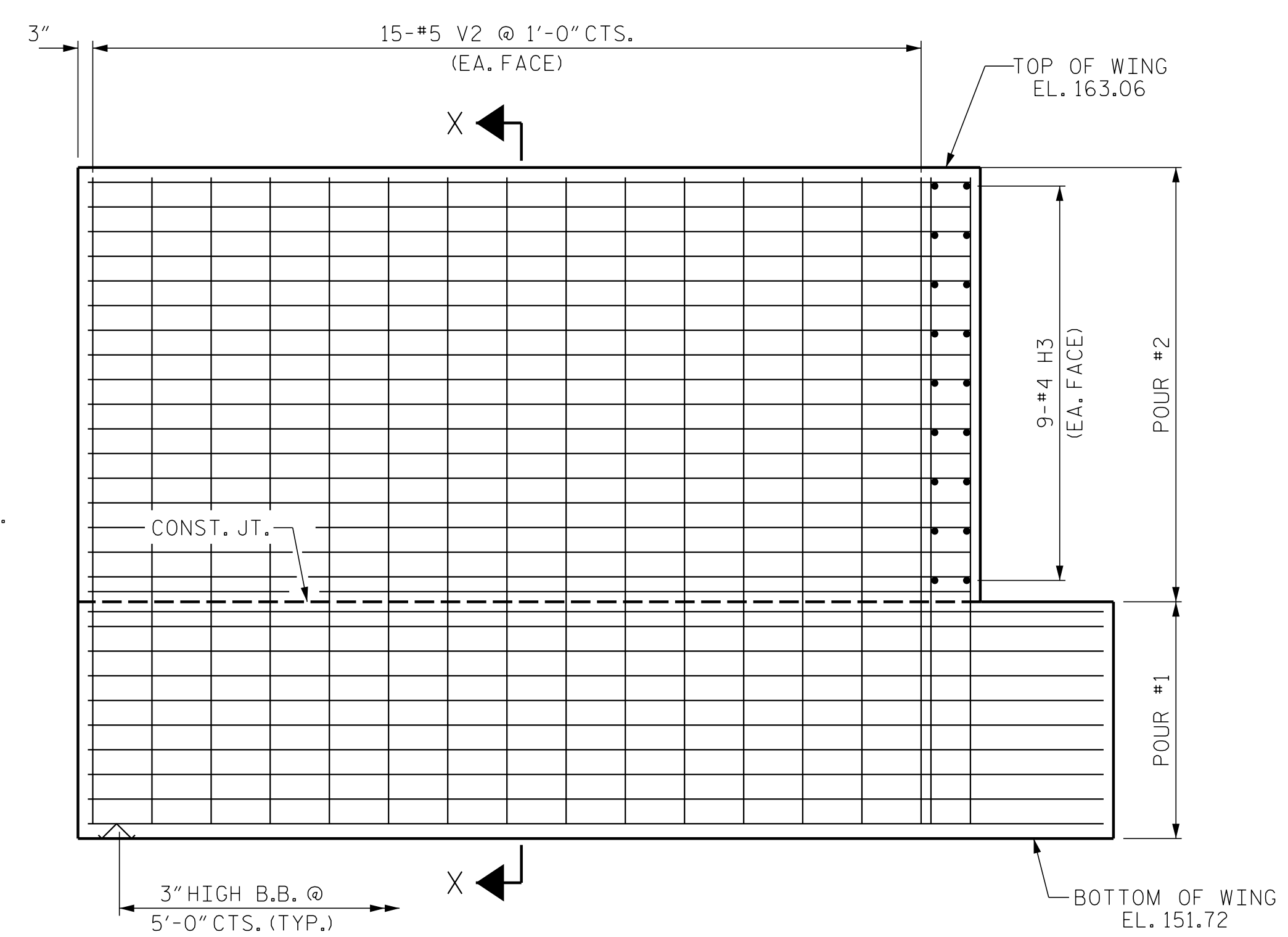
PLAN OF WING - W2



ELEVATION OF WING - W1



SECTION X-X



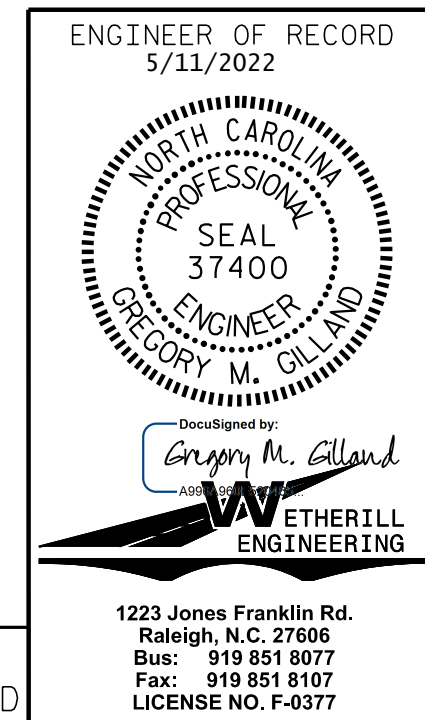
ELEVATION OF WING - W2

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 3

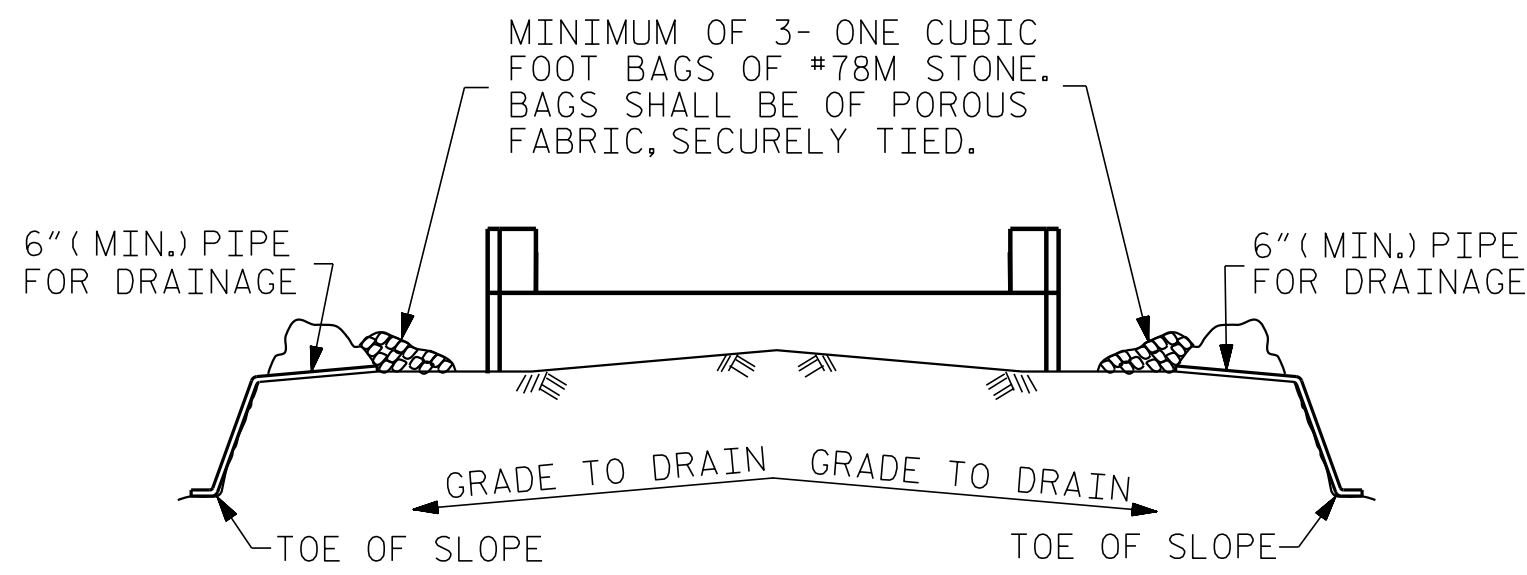
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 CHECKED BY: J. PENDERGRAFT DATE: 10/20

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SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-28
					TOTAL SHEETS 39

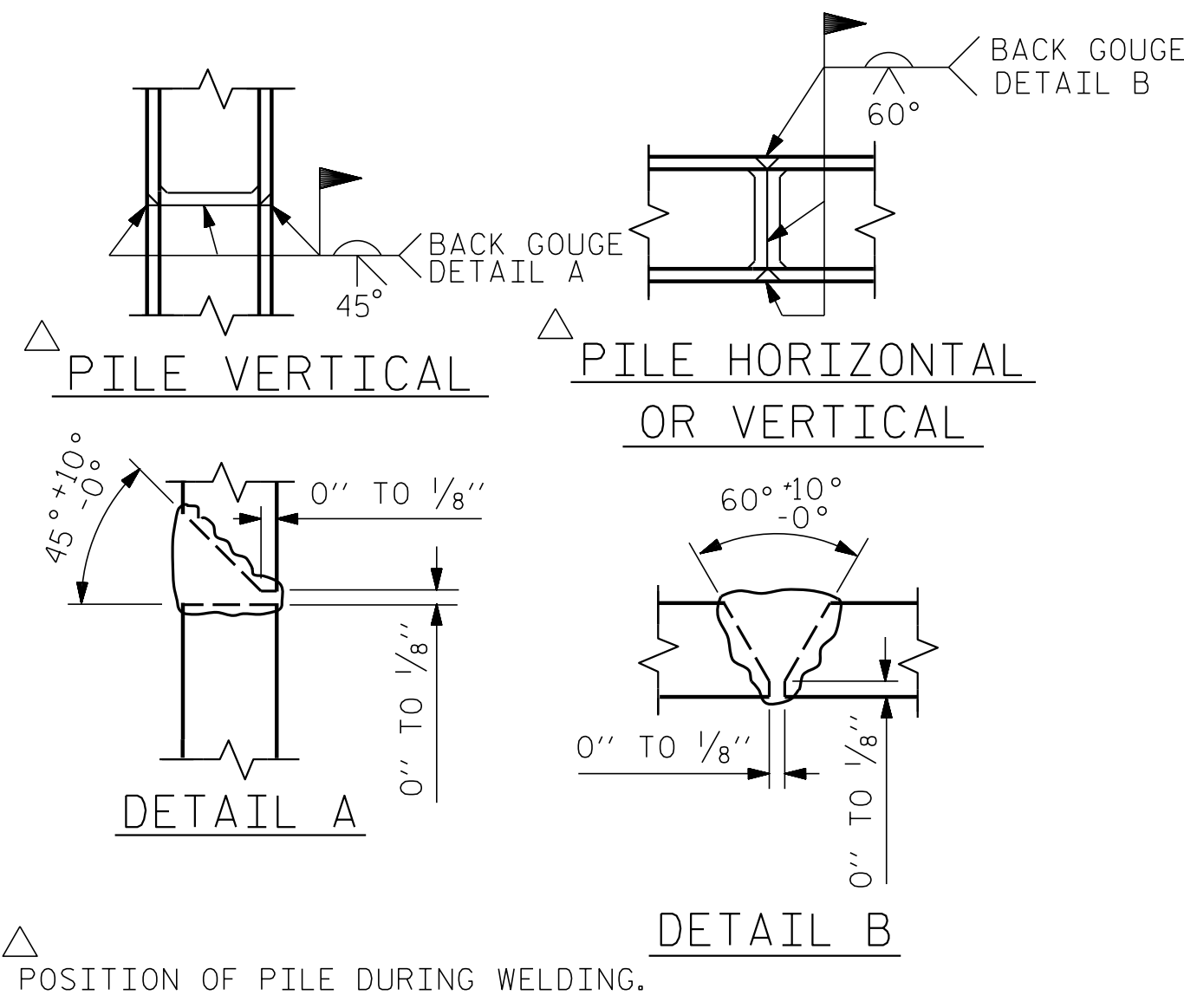


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

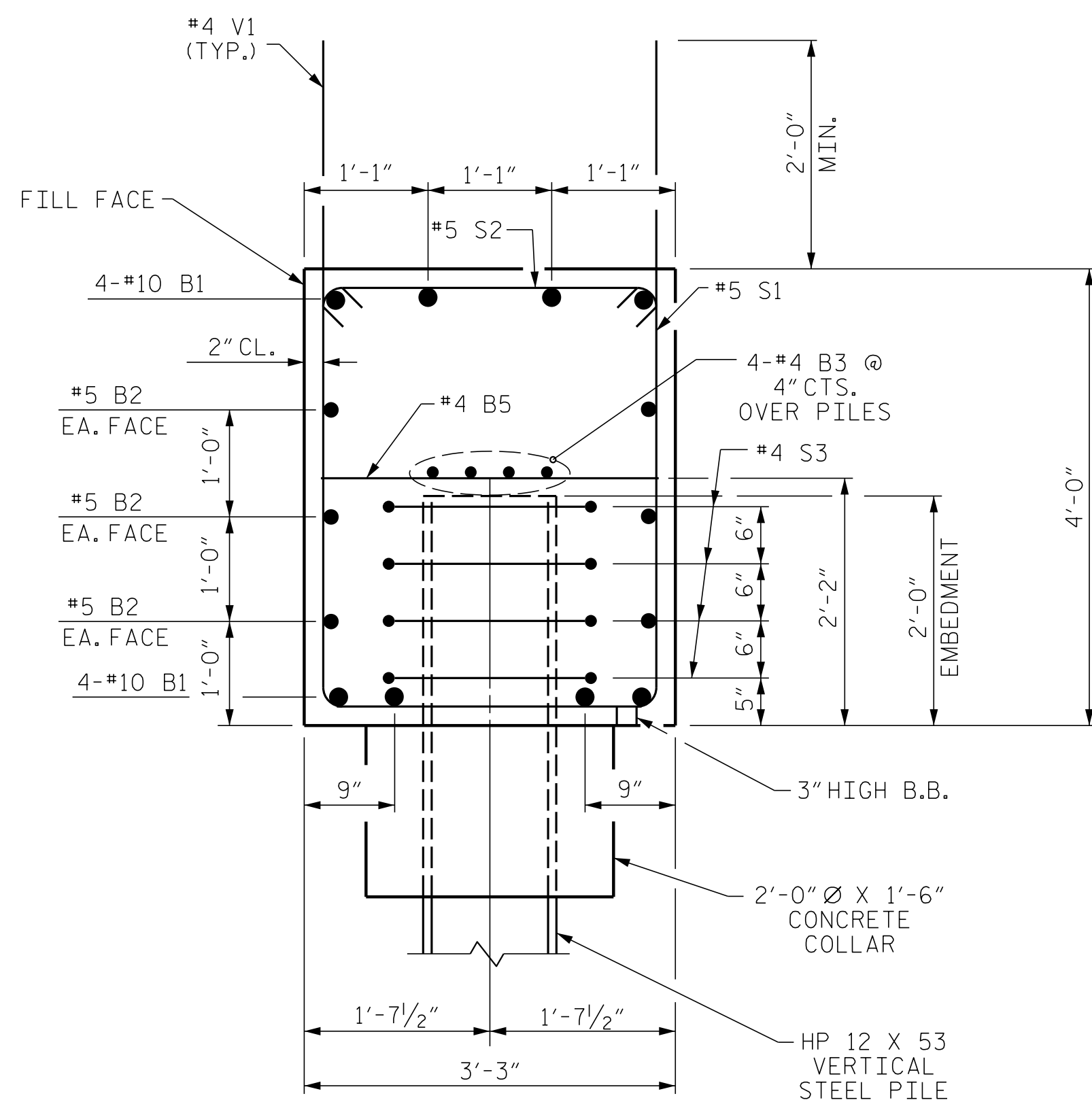


PILE SPLICE DETAILS

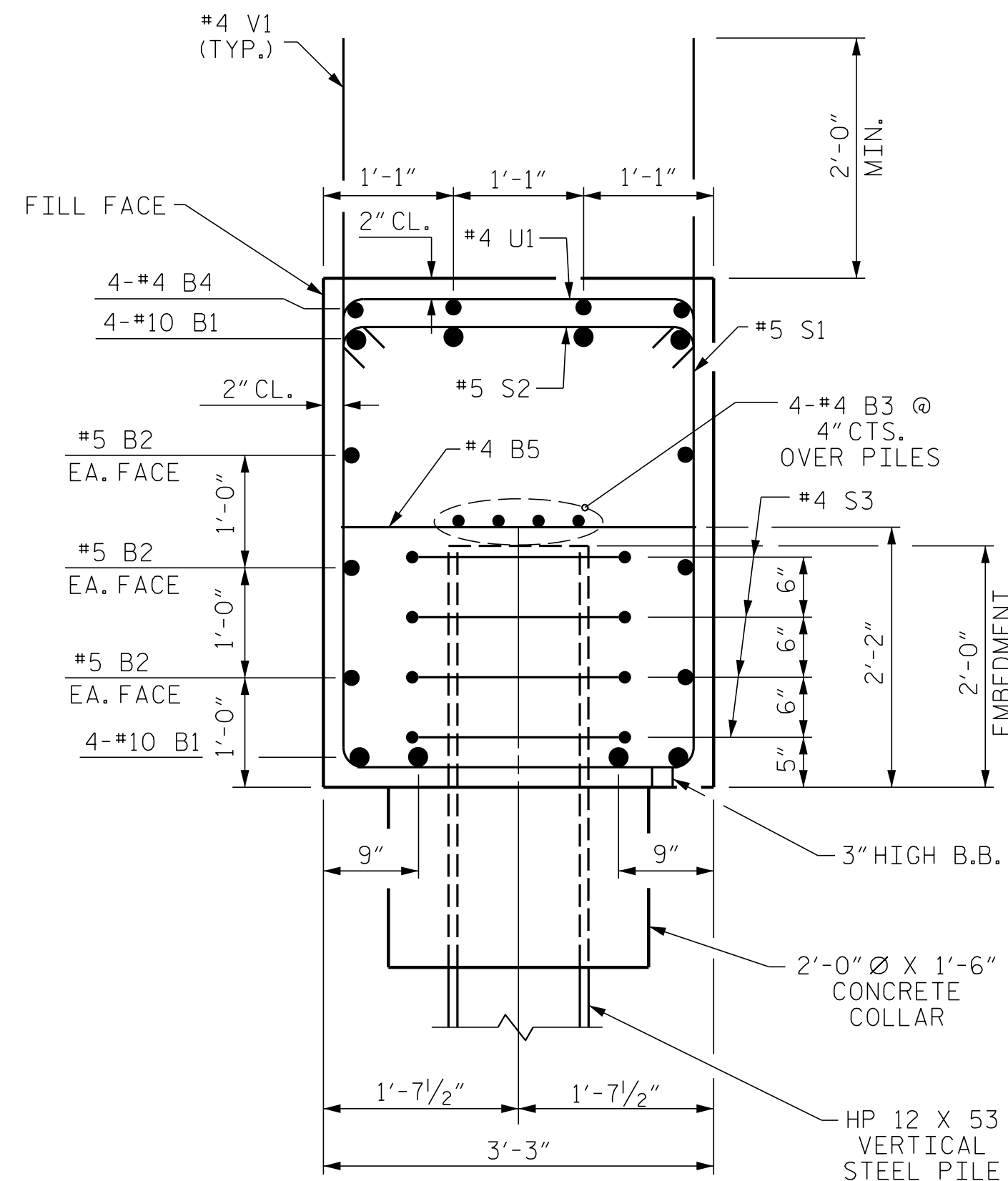
BAR TYPES					BILL OF MATERIAL				
					END BENT No. 1				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT				
B1	8	#10		44'-11"	1546				
B2	6	#5	STR	42'-3"	264				
B3	8	#4	STR	22'-4"	119				
B4	4	#4	STR	12'-8"	34				
B5	11	#4	STR	2'-11"	21				
H1	72	#6	2	15'-11"	1721				
H2	40	#6	2	18'-2"	1091				
H3	36	#4	STR	3'-3"	78				
S1	66	#5	3	11'-1"	763				
S2	66	#5	4	3'-10"	264				
S3	28	#4	5	6'-6"	122				
U1	9	#4	6	5'-11"	36				
V1	46	#4	STR	6'-0"	184				
V2	80	#5	STR	10'-10"	904				
REINFORCING STEEL					7,147 LBS.				
CLASS A CONCRETE BREAKDOWN									
POUR #1	CAP, CONC, COLLARS & LOWER PART OF WINGS			26.3 C.Y.					
POUR #2	UPPER PART OF WINGS			9.7 C.Y.					
TOTAL CLASS A CONCRETE				36.0 C.Y.					

ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12 X 53 VERTICAL STEEL PILES	
NO: 7	LIN. FT. = 189
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 VERTICAL STEEL PILES	
	7 EA.



SECTION A-A



SECTION B-B

PROJECT NO. B-5947

NASH COUNTY

STATION: 23+90.50 -LREV-

SHEET 3 OF 3

ENGINEER OF RECORD
5/11/2022

NORTH CAROLINA PROFESSIONAL SEAL 37400

ENGINEER
GREGORY M. GILLAND

Gregory M. Gilland
WETHERILL ENGINEERING

1223 Jones Franklin Rd.
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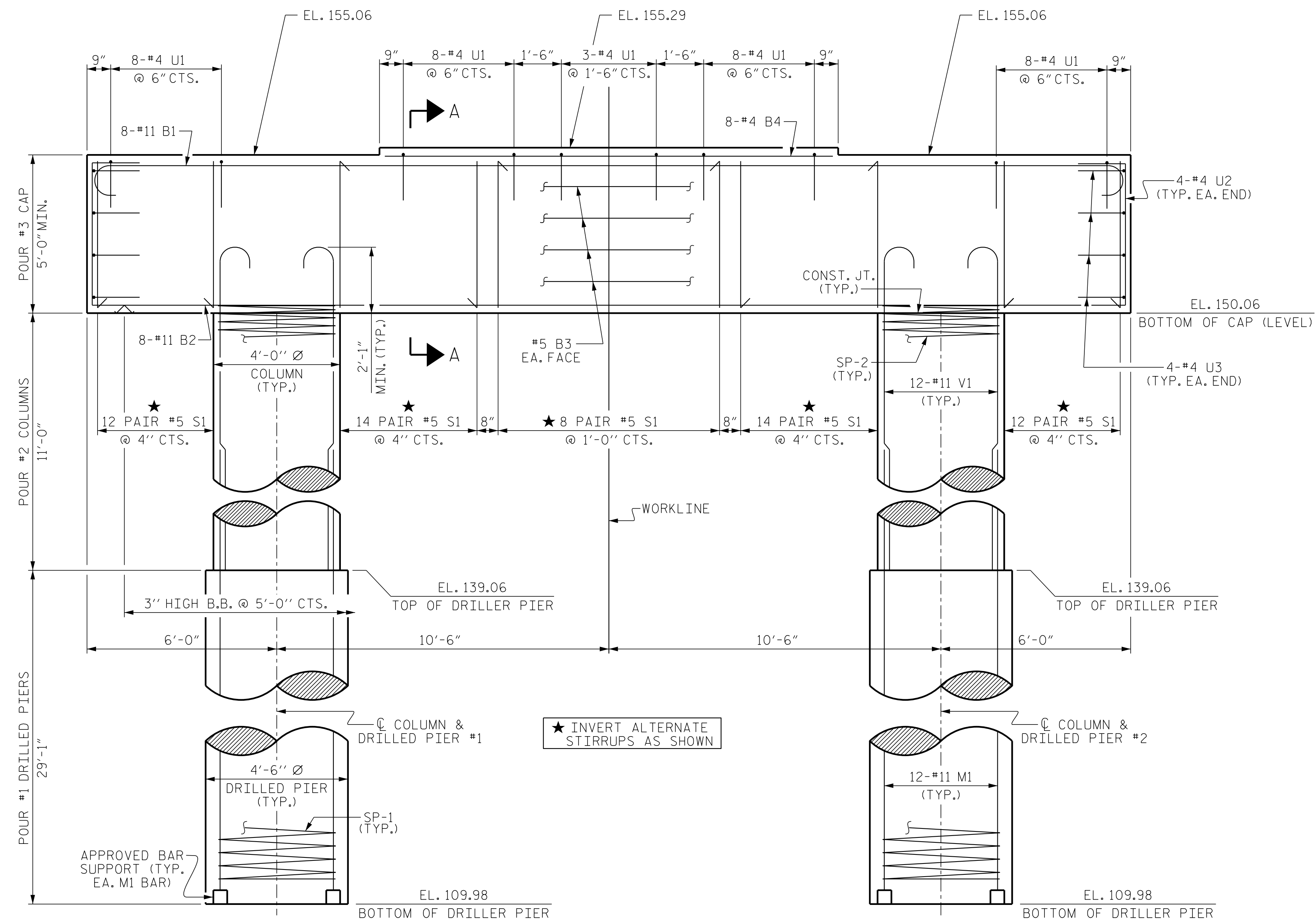
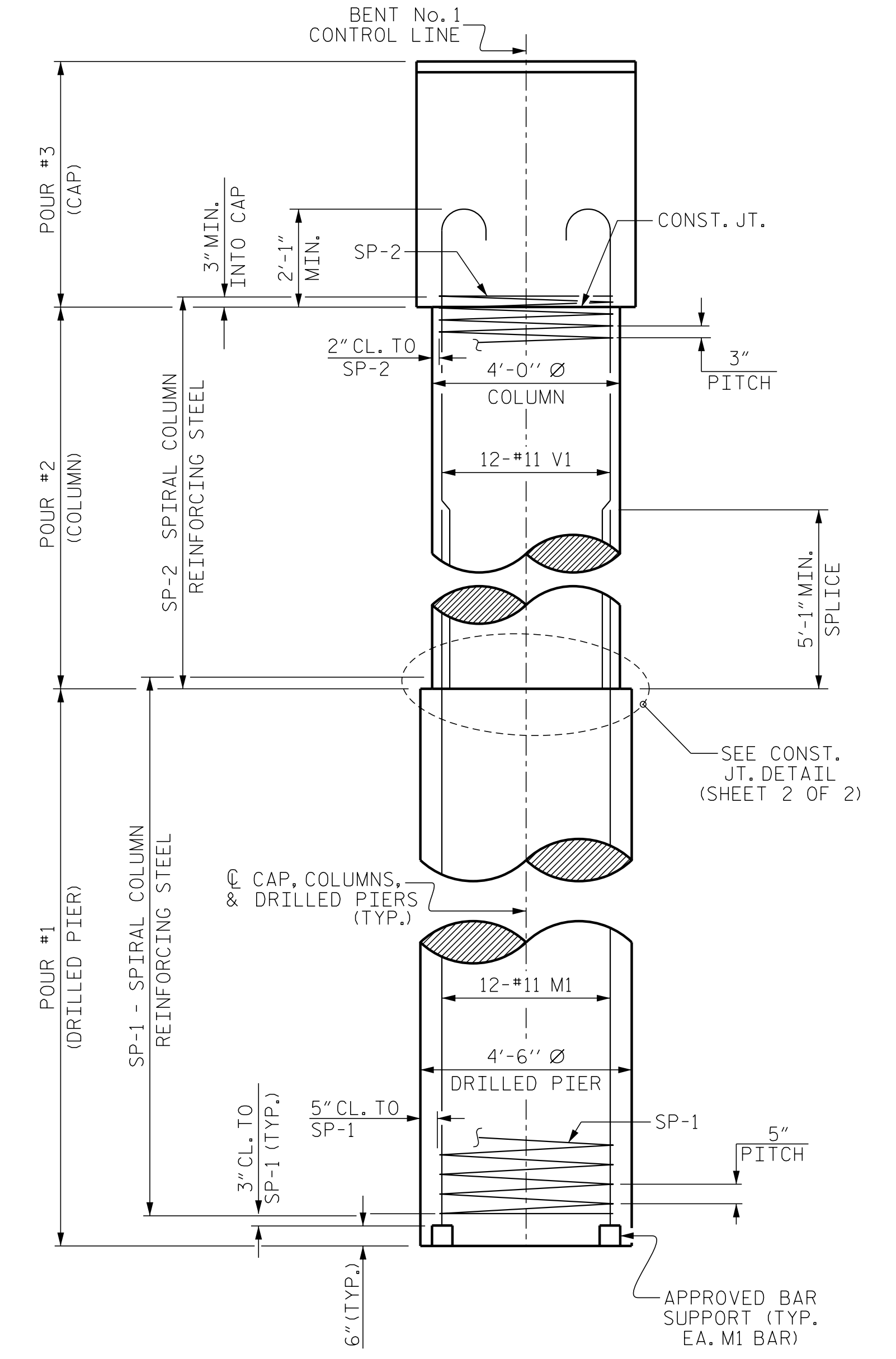
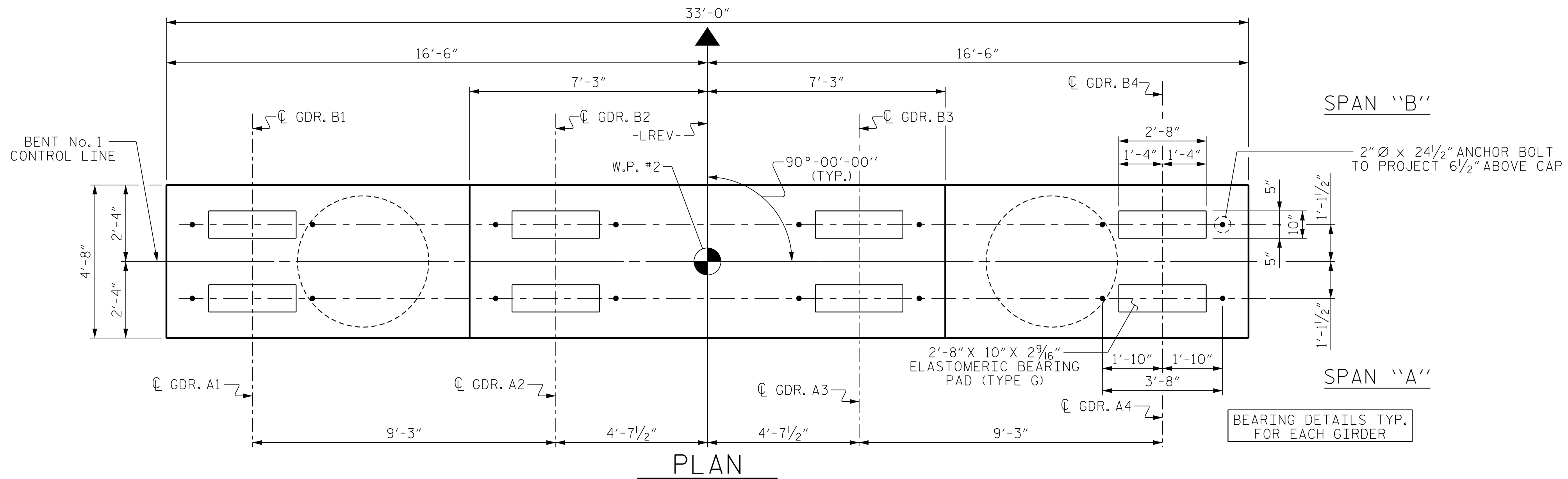
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE END BENT No. 1

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			39

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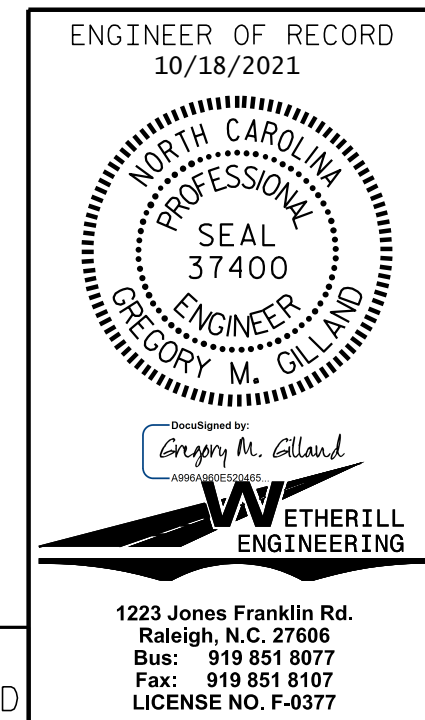


ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2.
(DIMENSION AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER EXCEPT AS NOTED)

END ELEVATION

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-
SHEET 1 OF 2

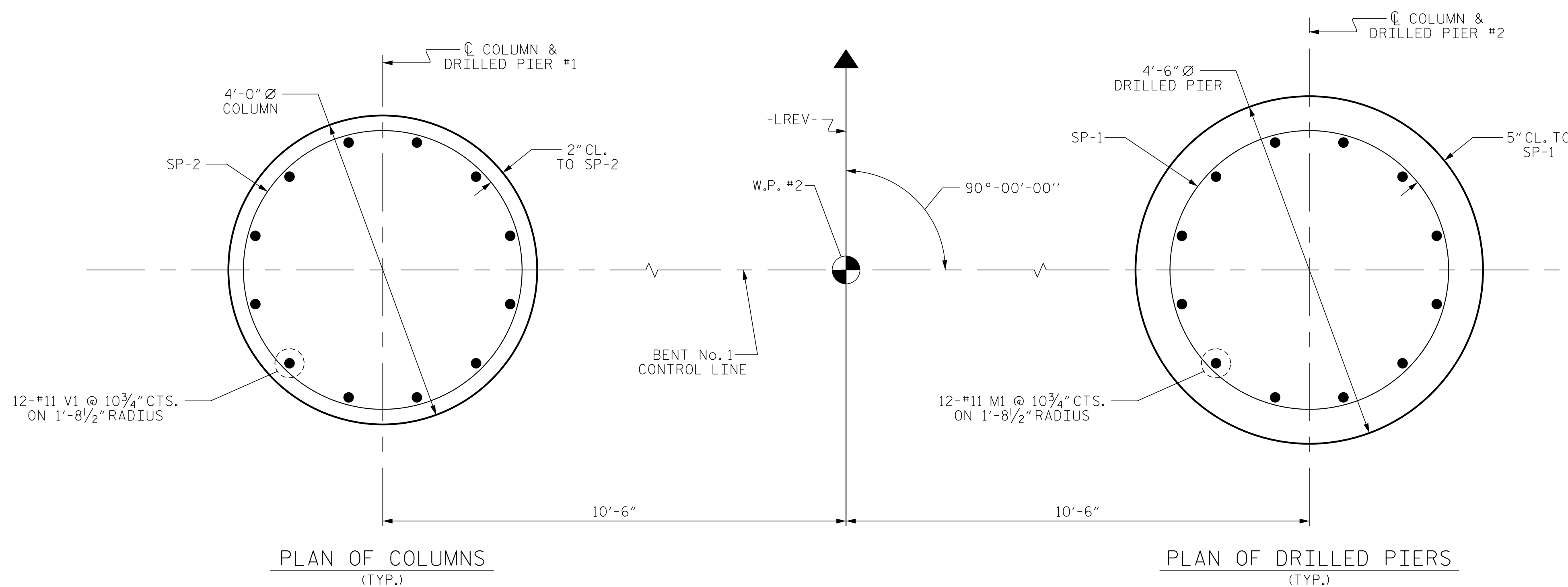


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE BENT No. 1			
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		
SHEET NO.			S-30		
TOTAL SHEETS			39		

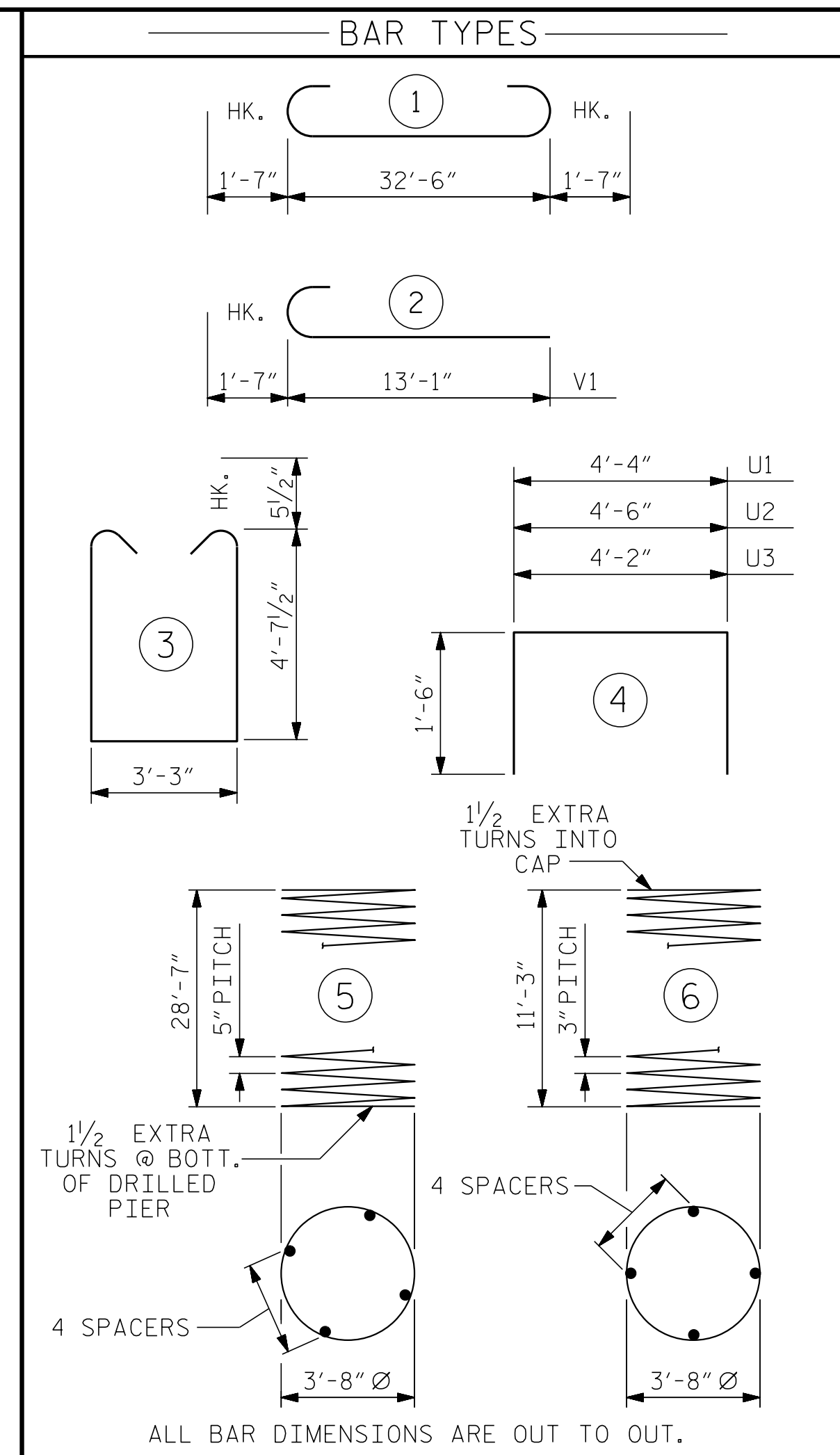
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CHECKED BY : D. HODGE DATE : 8-21

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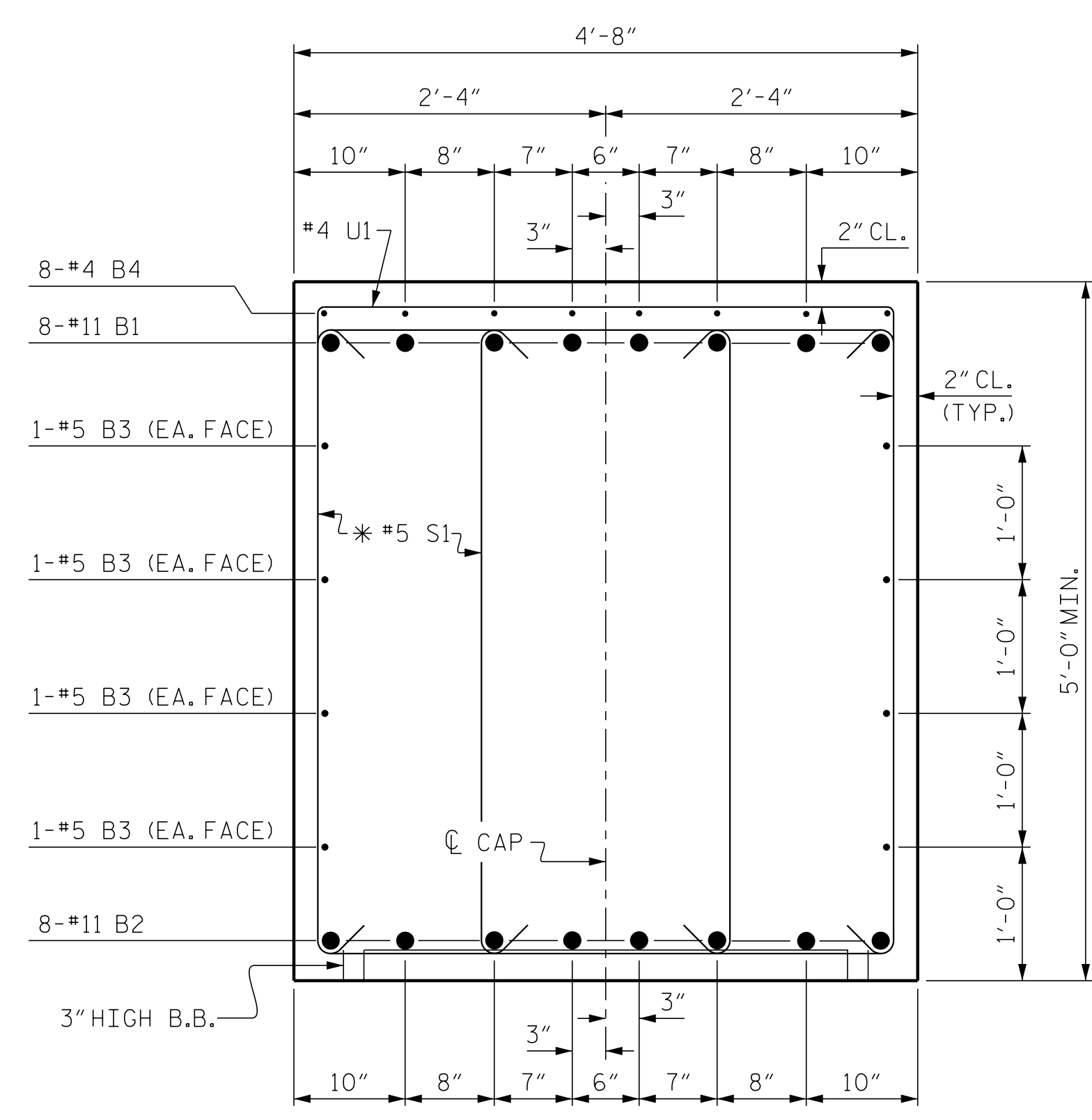
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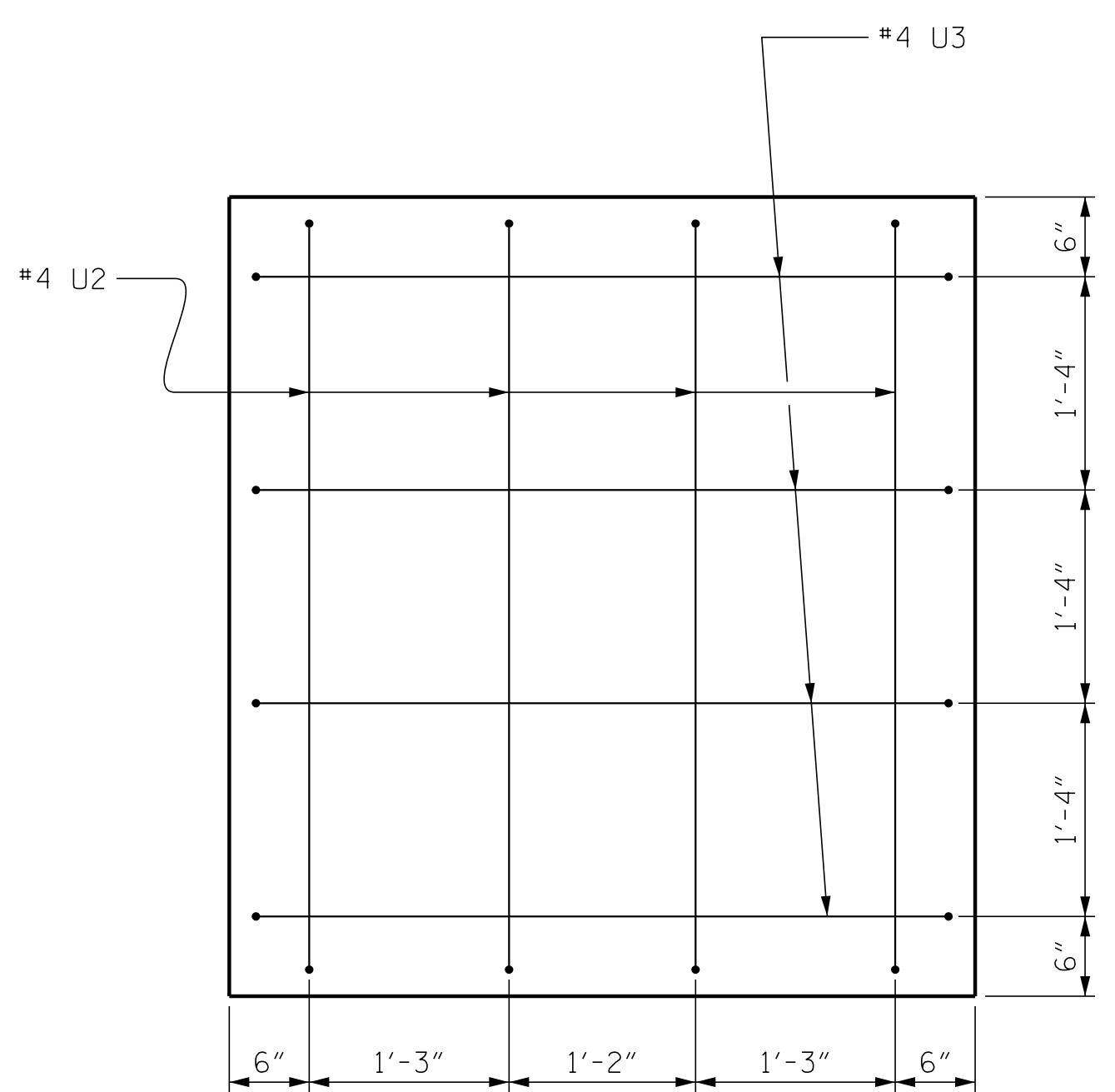
PLAN OF COLUMNS AND DRILLED PIERS



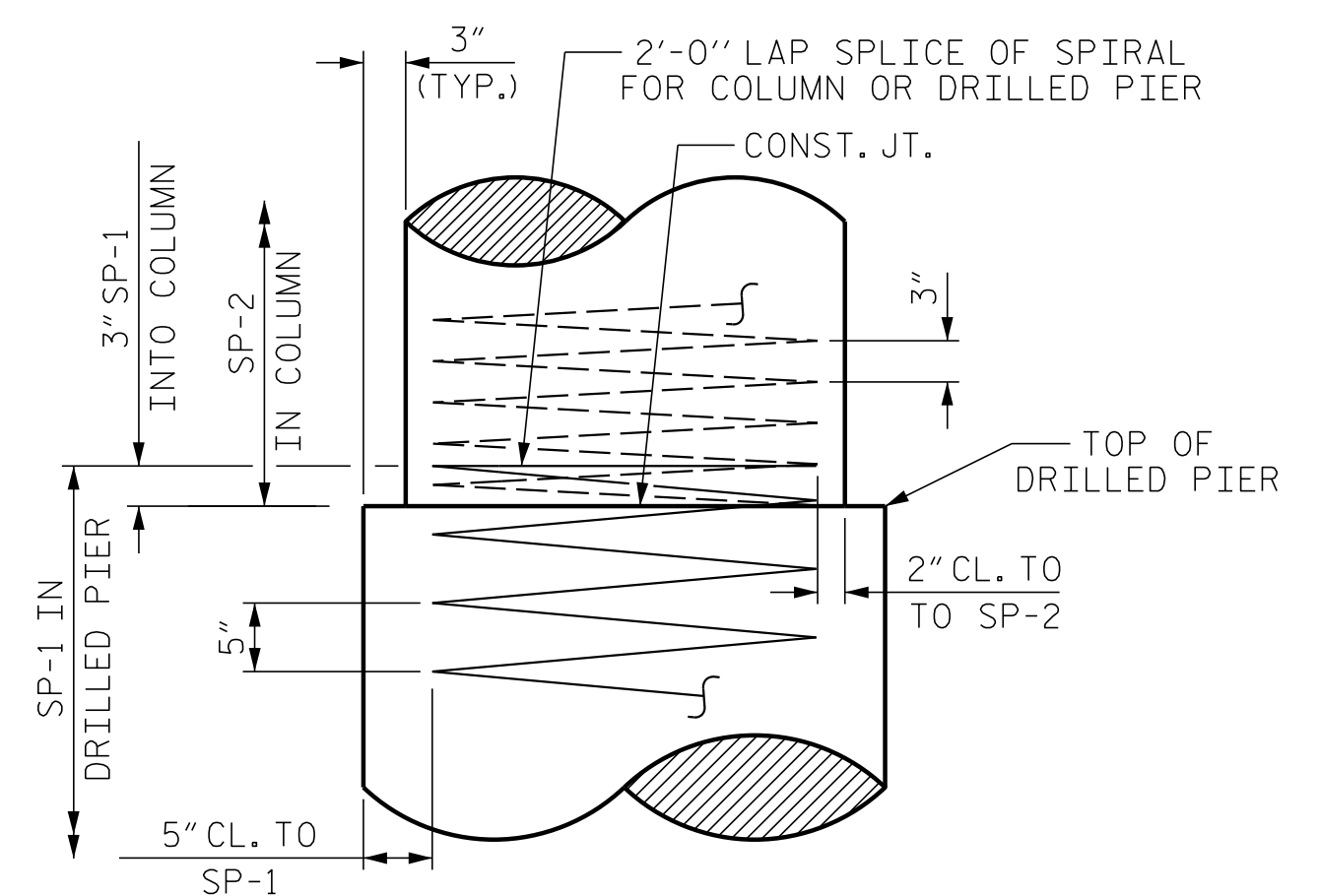
BILL OF MATERIAL					
BENT #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	35'-8"	1516
B2	8	#11	STR	32'-8"	1388
B3	8	#5	STR	32'-8"	273
B4	8	#4	STR	14'-2"	76
M1	24	#11	STR	36'-8"	4675
S1	120	#5	3	13'-5"	1679
U1	35	#4	4	7'-4"	171
U2	8	#4	4	7'-6"	40
U3	8	#4	4	7'-2"	38
V1	24	#11	2	14'-8"	1870
TOTAL REINFORCING STEEL LBS.					11,726
SP-1	2	*	5	798'-4"	1,665
SP-2	2	**	6	529'-9"	708
SPIRAL COLUMN REINFORCING STEEL LBS.					2,373
* THIS "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
** THIS "SP" 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)					10.2 C.Y.
POUR #3 (BENT CAP)					29.1 C.Y.
TOTAL					39.3 C.Y.
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					34.3 C.Y.
4'-6" DIA. DRILLED PIERS IN SOIL					20.17 LIN. FT.
4'-6" DIA. DRILLED PIERS NOT IN SOIL					38 LIN. FT.
CSL TUBES					244.67 LIN. FT.



SECTION A-A
* INVERT ALTERNATE STIRRUPS



END OF CAP VIEW
(TYP. EA. END)

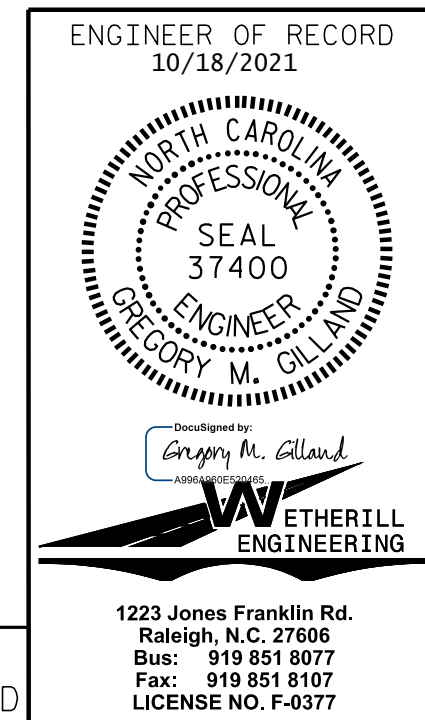


CONSTRUCTION JOINT DETAIL
(TYP. EA. DRILLED PIER)

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 ARE BASED ON AN APPROXIMATE GROUND ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. 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. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 2



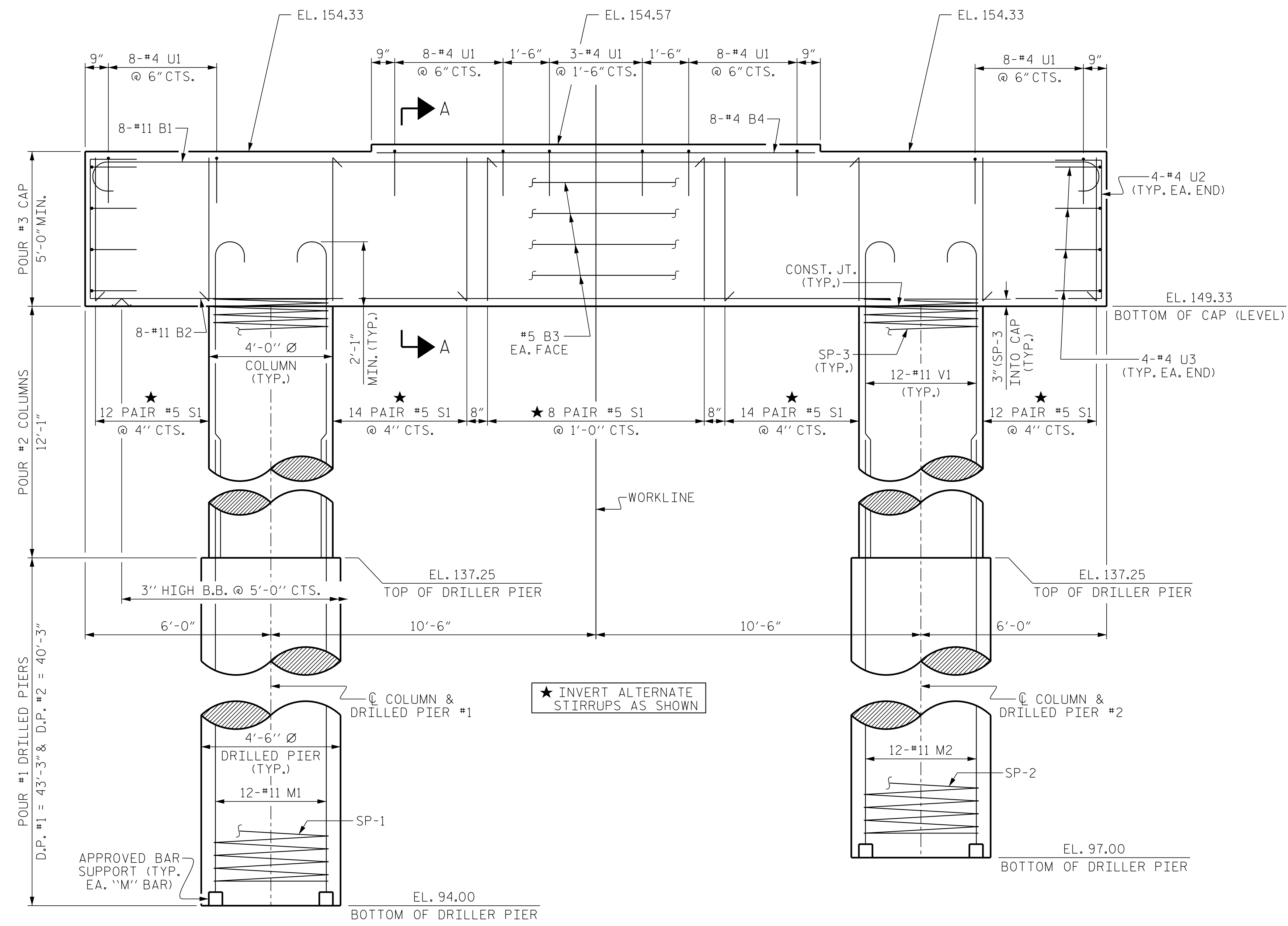
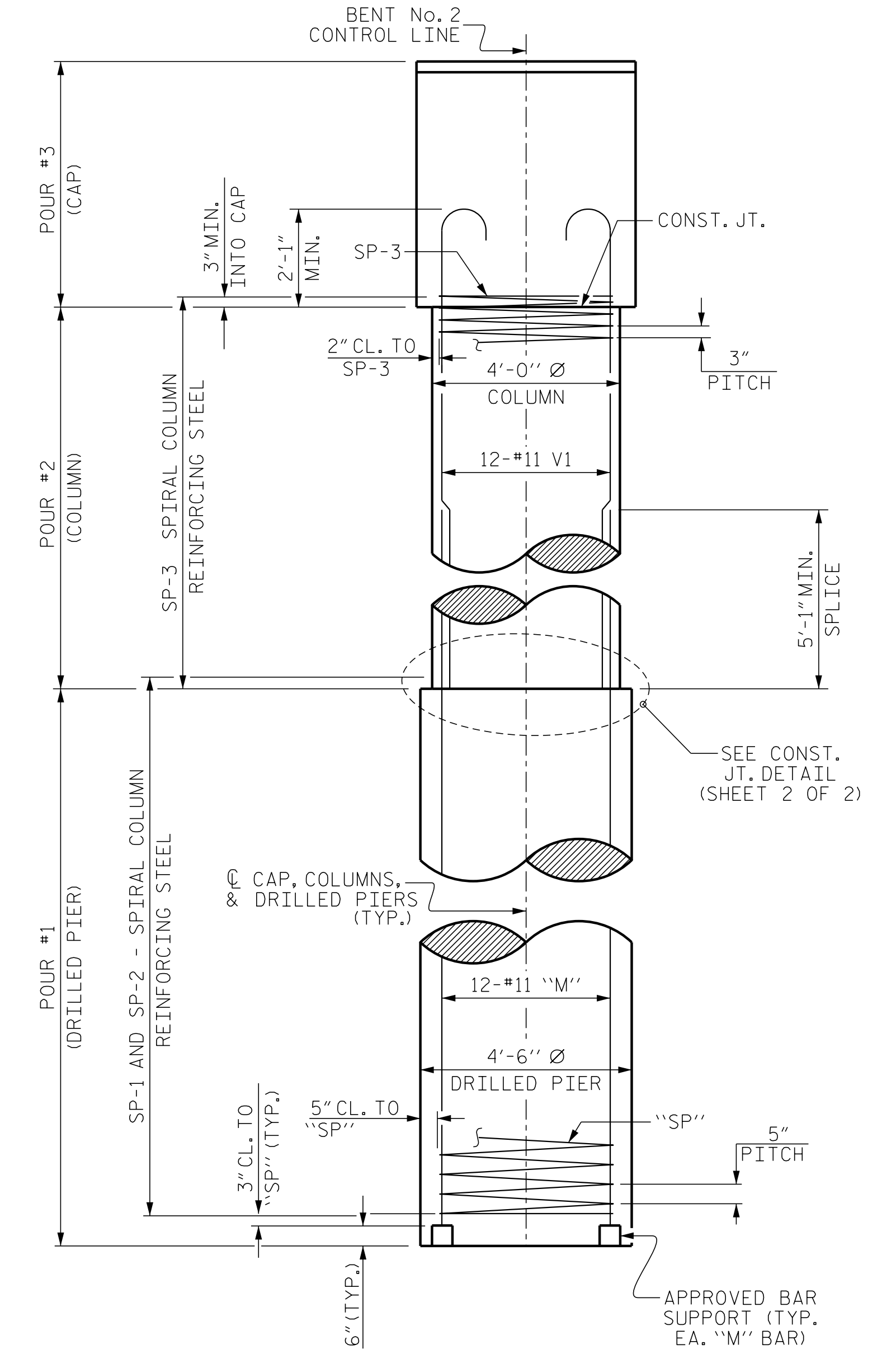
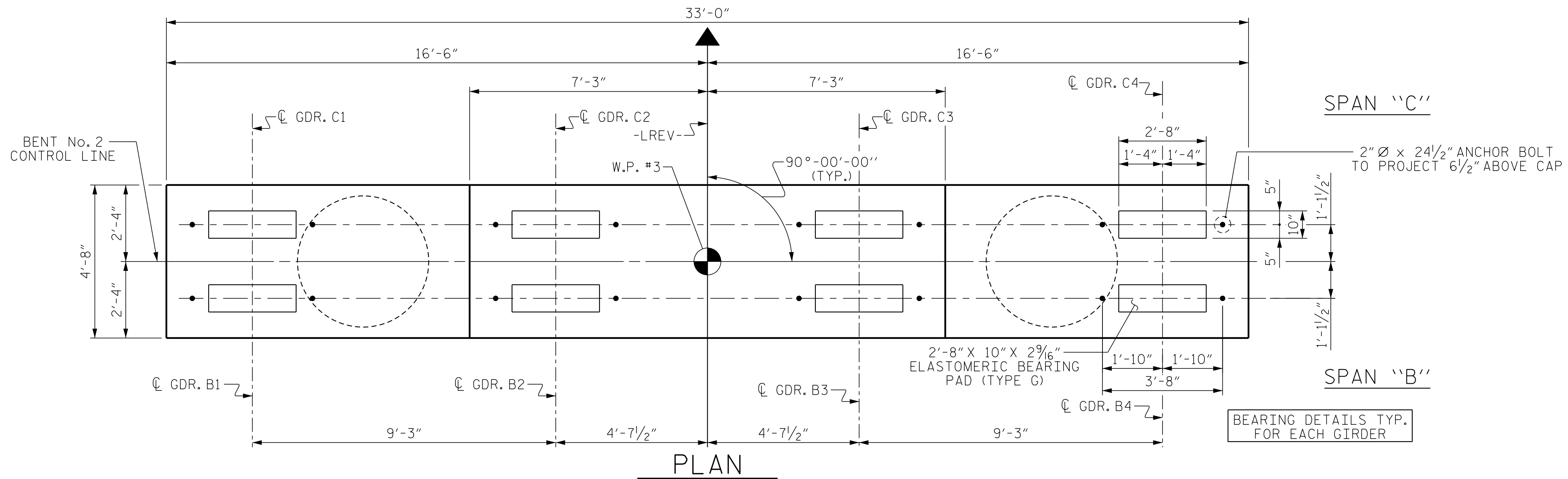
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SUBSTRUCTURE BENT No. 1					
REVISIONS					
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1			3		
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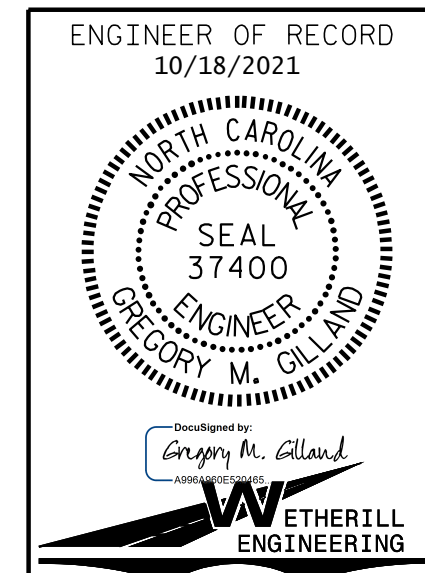
SHEET NO.
S-31
TOTAL SHEETS
39



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2.
(DIMENSION AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER EXCEPT AS NOTED)

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-
SHEET 1 OF 2



STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE
BENT No. 2

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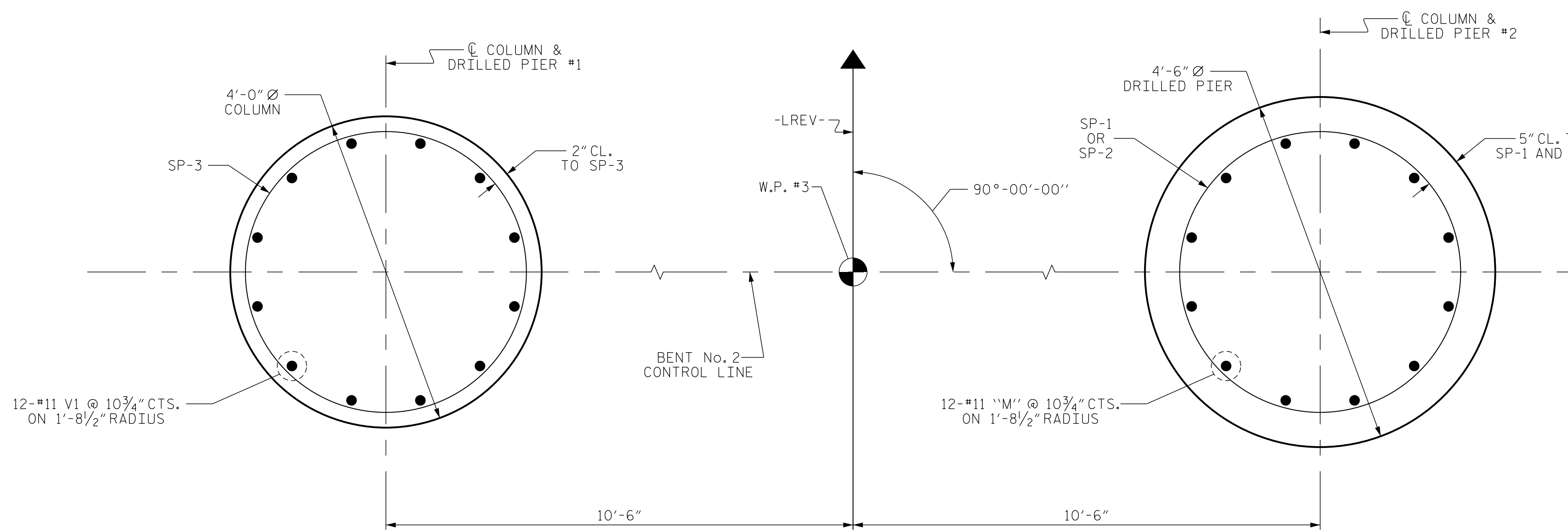
SHEET NO. S-32
TOTAL SHEETS 39

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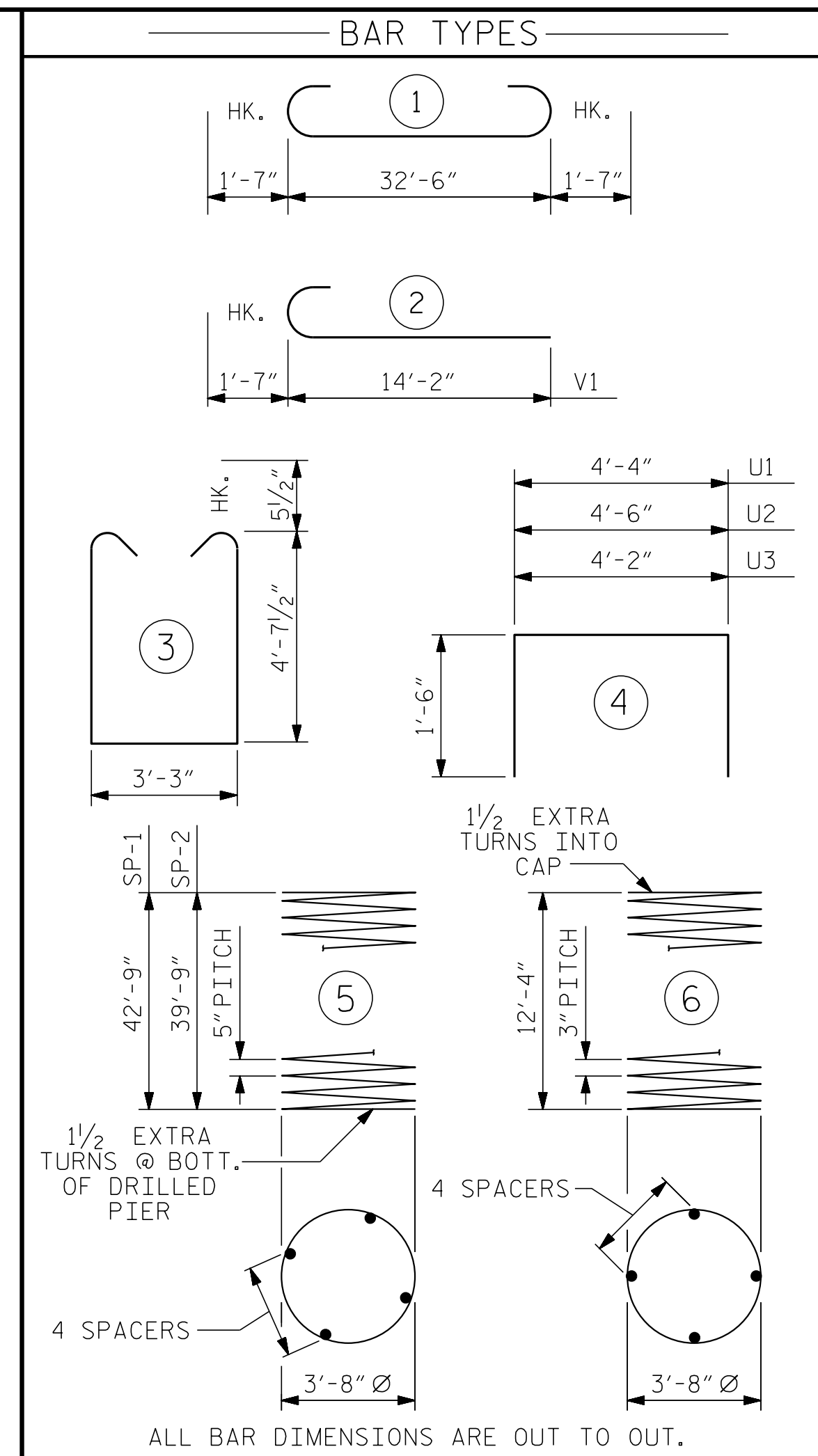
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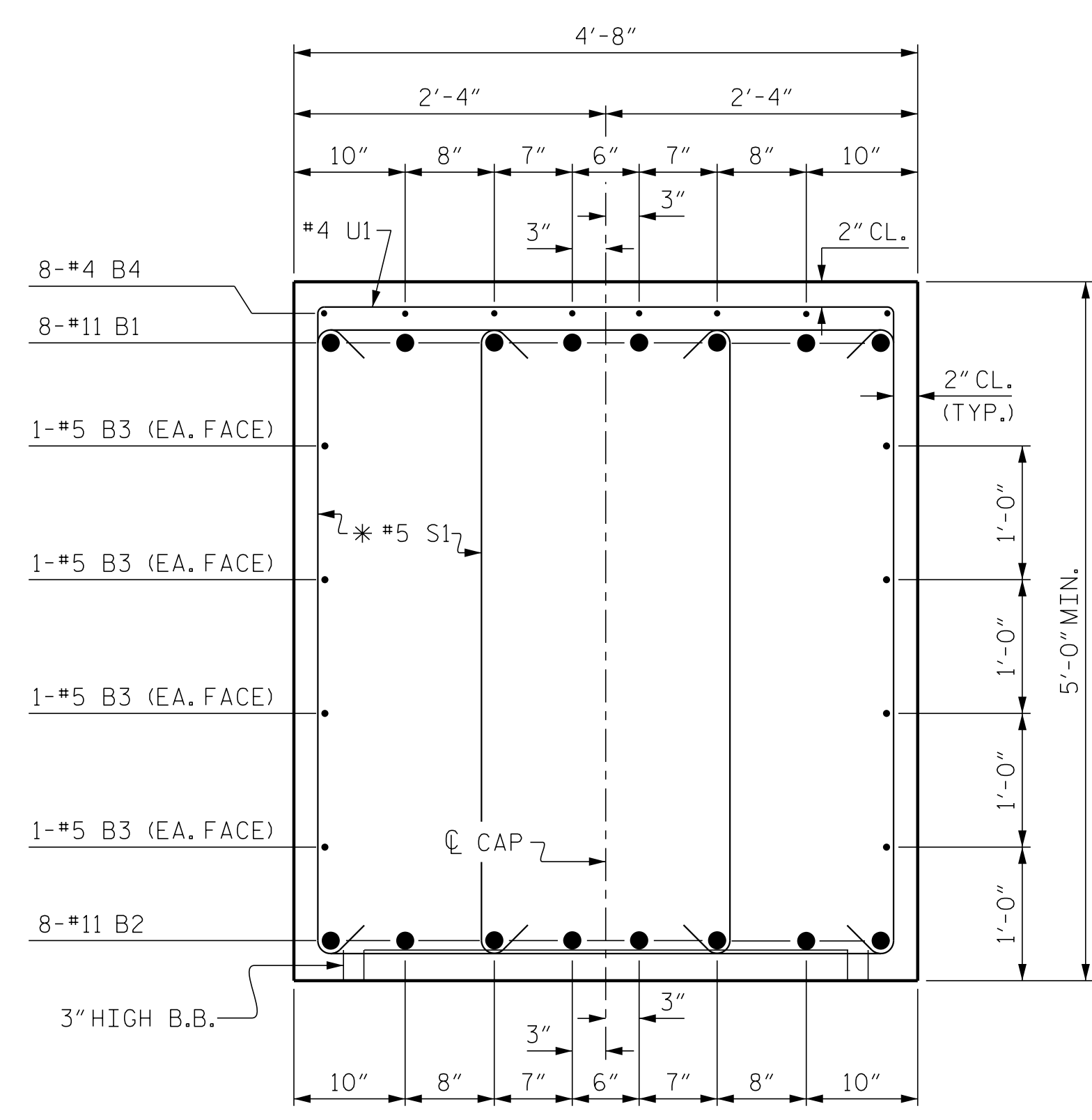
PLAN OF COLUMNS (TYP.) PLAN OF DRILLED PIERS (TYP.)

PLAN OF COLUMNS AND DRILLED PIERS



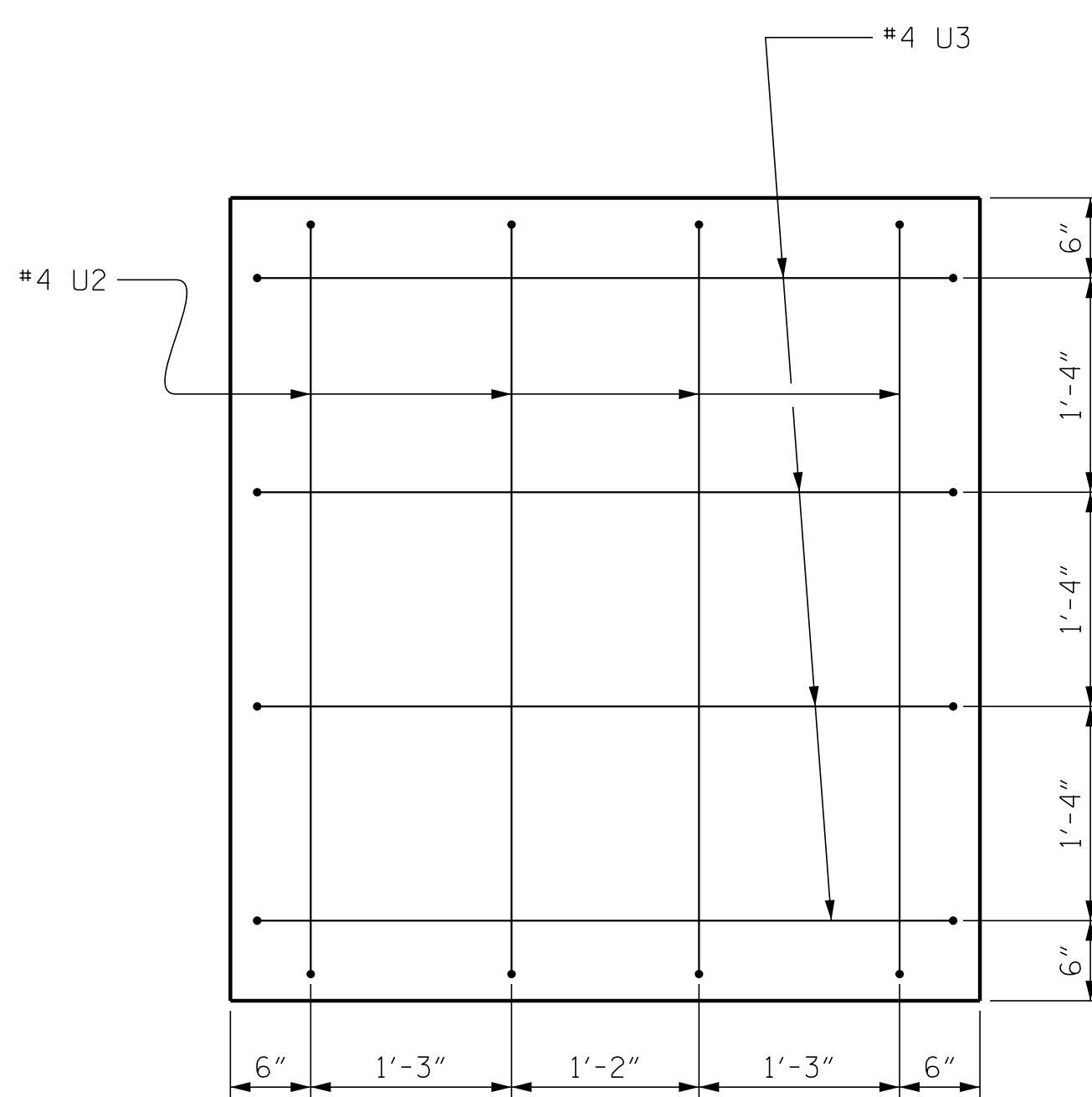
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BENT #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	35'-8"	1516
B2	8	#11	STR	32'-8"	1388
B3	8	#5	STR	32'-8"	273
B4	8	#4	STR	14'-2"	76
M1	12	#11	STR	50'-10"	3241
M2	12	#11	STR	47'-10"	3050
S1	120	#5	3	13'-5"	1679
U1	35	#4	4	7'-4"	171
U2	8	#4	4	7'-6"	40
U3	8	#4	4	7'-2"	38
V1	24	#11	2	15'-9"	2008
TOTAL REINFORCING STEEL LBS.					13,480
SP-1	1	*	5	1184'-8"	1236
SP-2	1	*	5	1102'-3"	1150
SP-3	2	**	6	581'-0"	776
SPIRAL COLUMN REINFORCING STEEL LBS.					3,162
* THIS "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
** THIS "SP" 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)					11.2 C.Y.
POUR #3 (BENT CAP)					29.1 C.Y.
TOTAL					40.3 C.Y.
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					49.2 C.Y.
4'-6" DIA. DRILLED PIERS IN SOIL					45.50 LIN. FT.
4'-6" DIA. DRILLED PIERS NOT IN SOIL					38.00 LIN. FT.
CSL TUBES					346.00 LIN. FT.



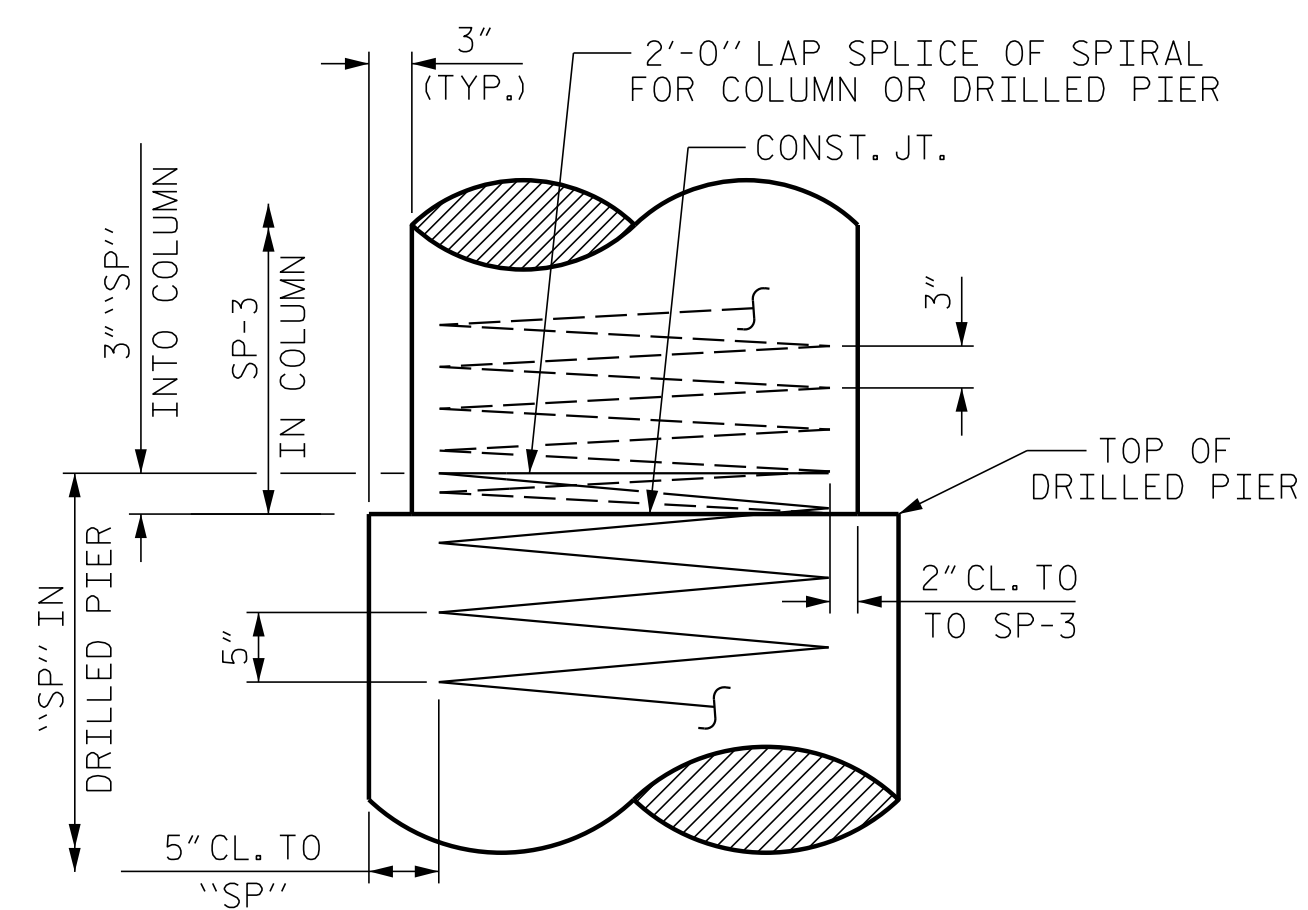
SECTION A-A

* INVERT ALTERNATE STIRRUPS



END OF CAP VIEW

(TYP. EA. END)



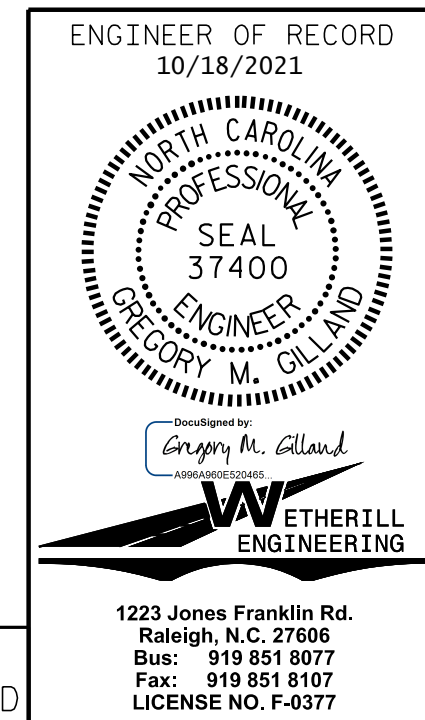
CONSTRUCTION JOINT DETAIL

(TYP. EA. DRILLED PIER)

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 ARE BASED ON AN APPROXIMATE GROUND ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. 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. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 2



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

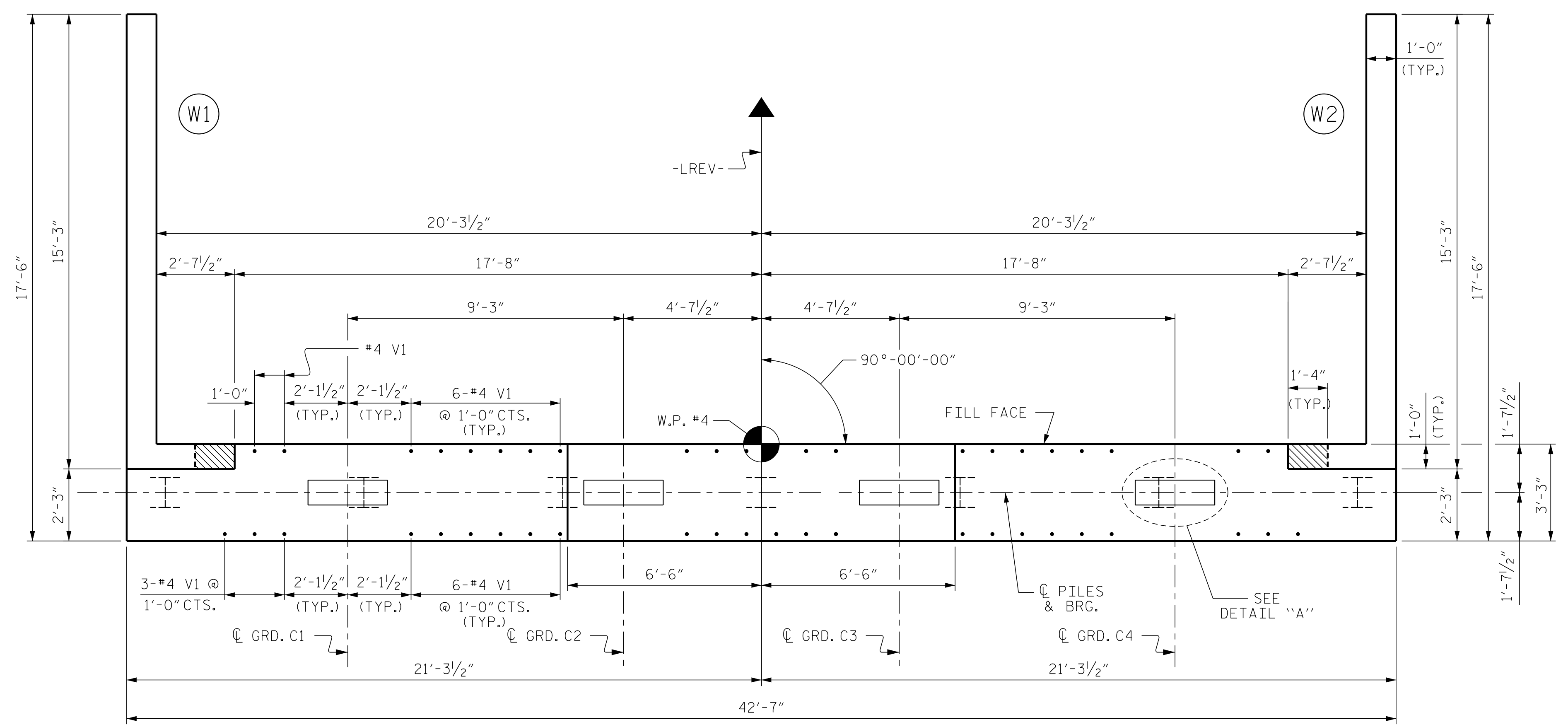
SHEET NO.
S-33
TOTAL SHEETS
39

DRAWN BY: G. GILLAND DATE: 4-21
 CHECKED BY: D. HODGE DATE: 8-21

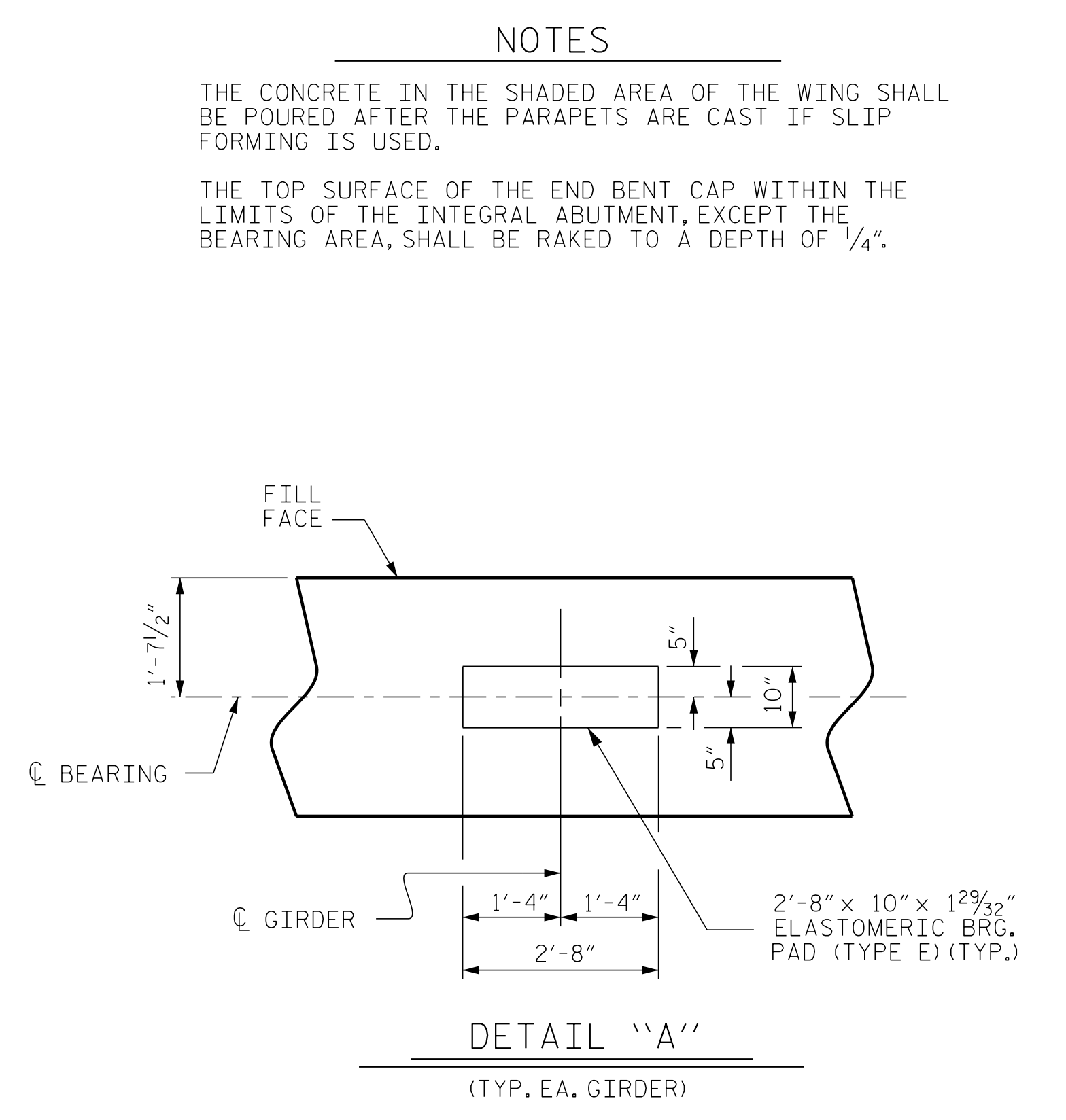
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PLAN
(CONCRETE COLLARS NOT SHOWN FOR CLARITY)

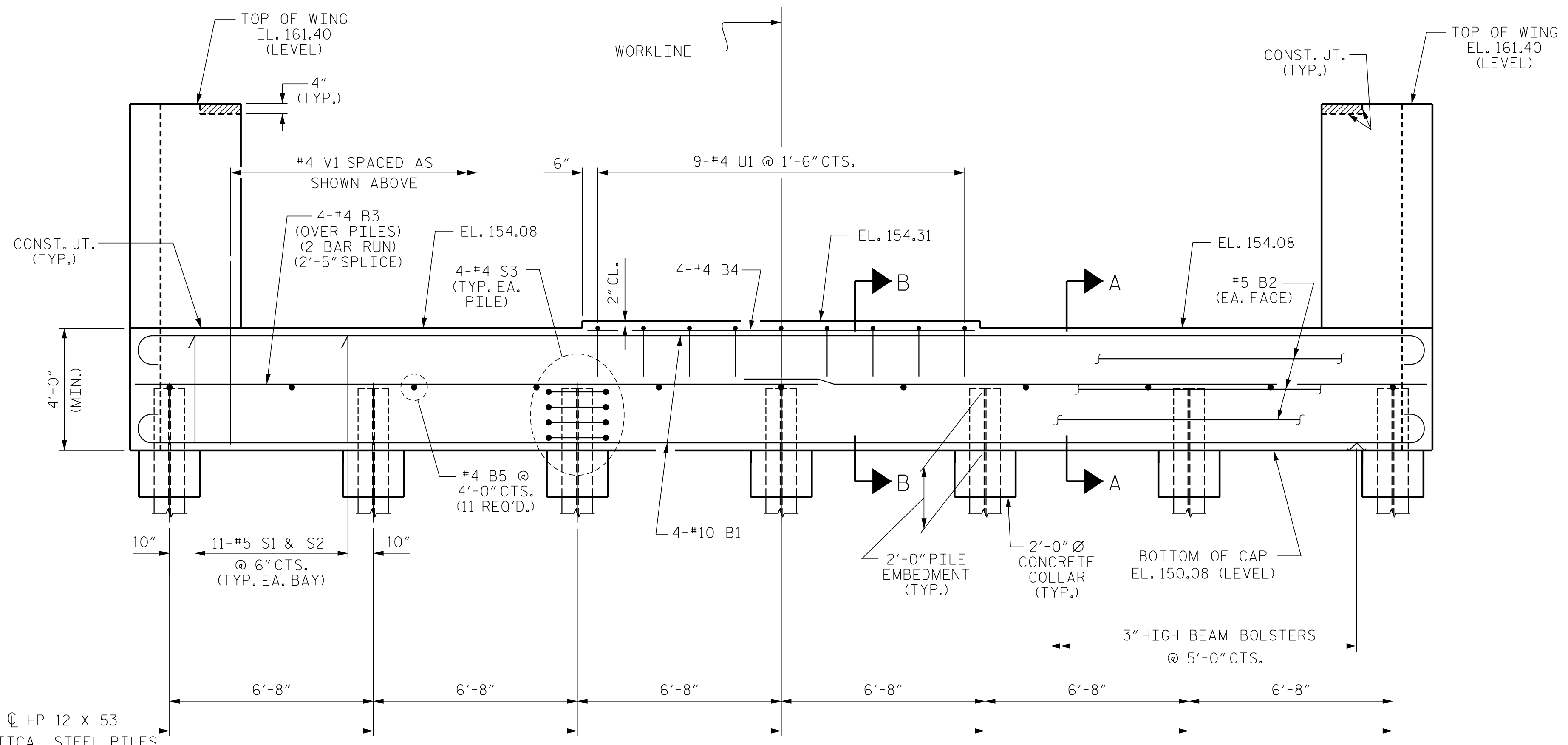


DETAIL "A"
(TYP. EA. GIRDER)

NOTES

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

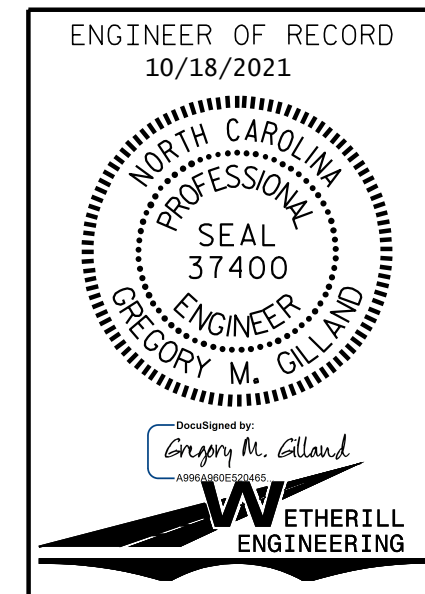
THE TOP SURFACE OF THE END BENT CAP WITHIN THE LIMITS OF THE INTEGRAL ABUTMENT, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



ELEVATION

FOR SECTION A-A & B-B, SEE SHEET 3 OF 3.

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT No. 2**

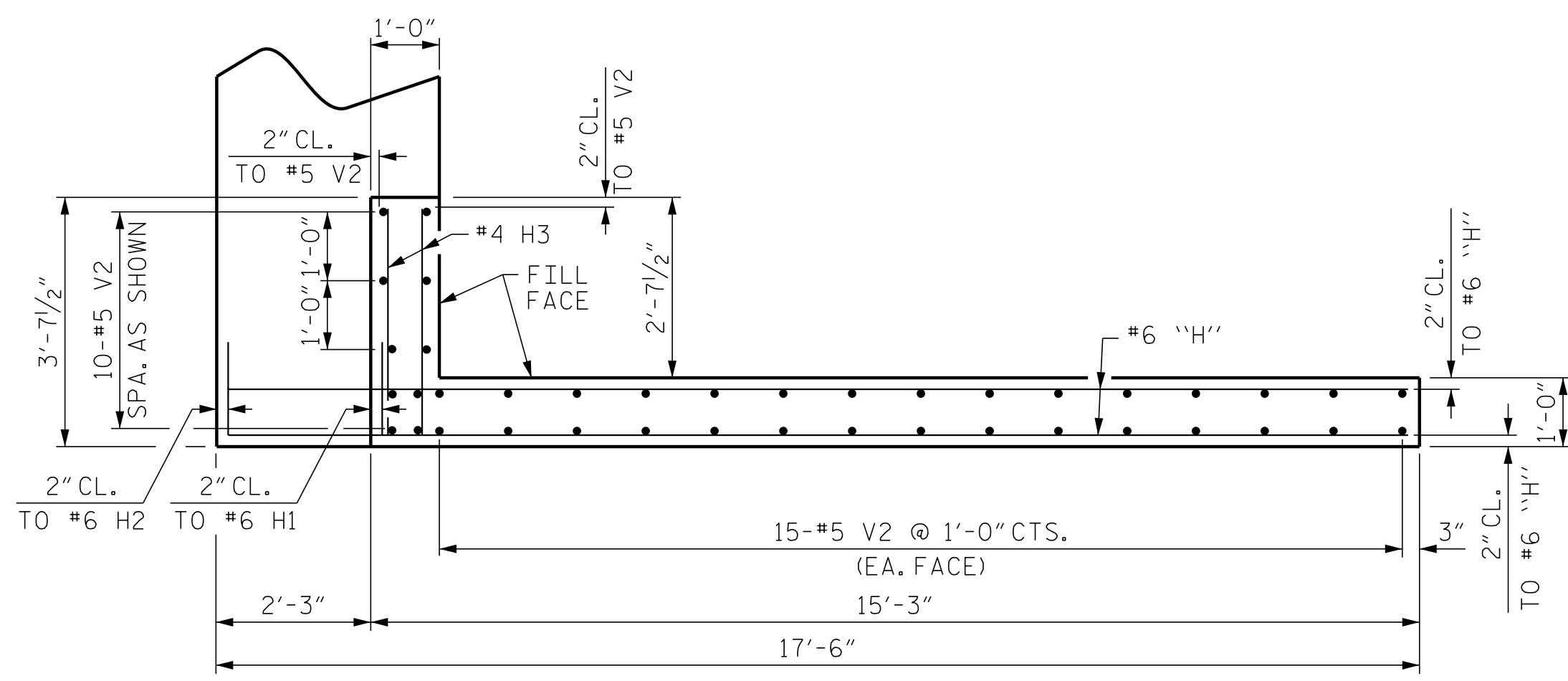
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			39

DRAWN BY: G. GILLAND DATE: 7/20
 CHECKED BY: J. PENDERGRAFT DATE: 10/20

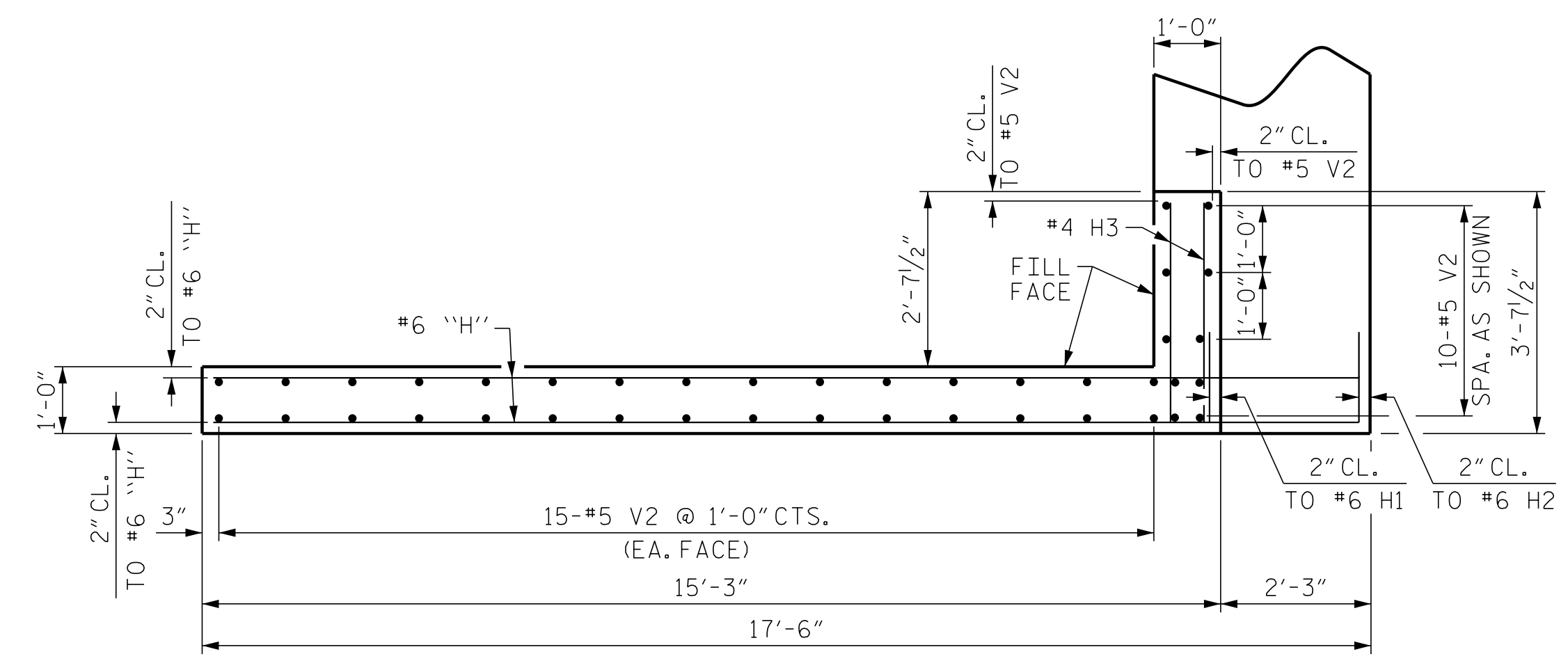
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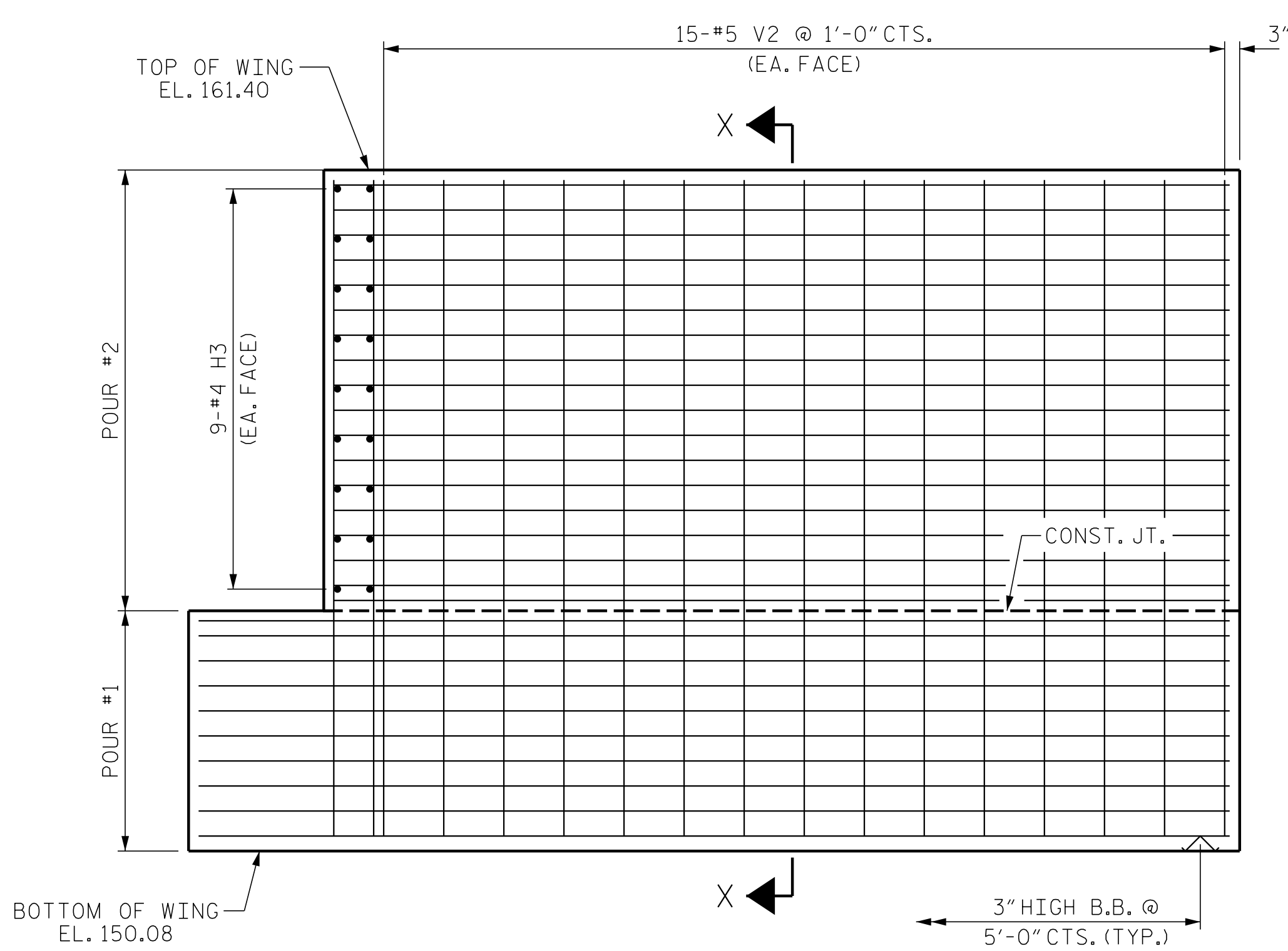
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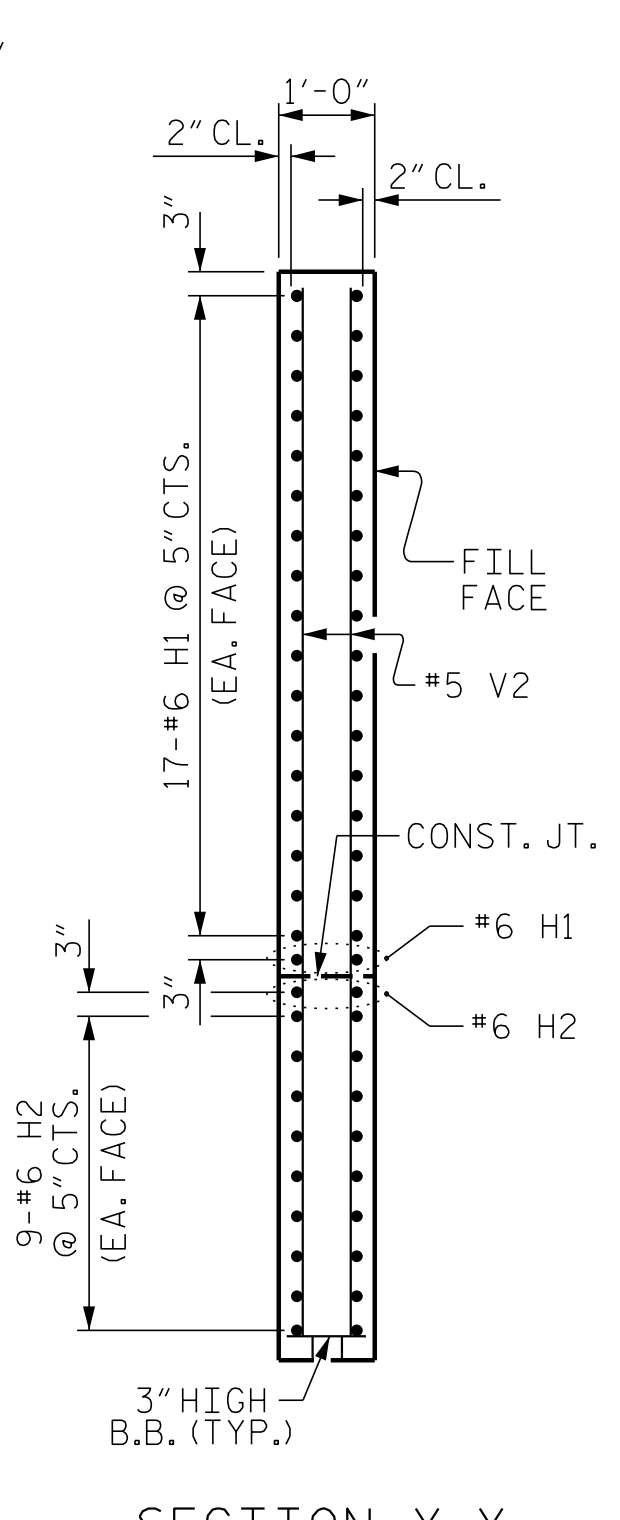
PLAN OF WING - W2



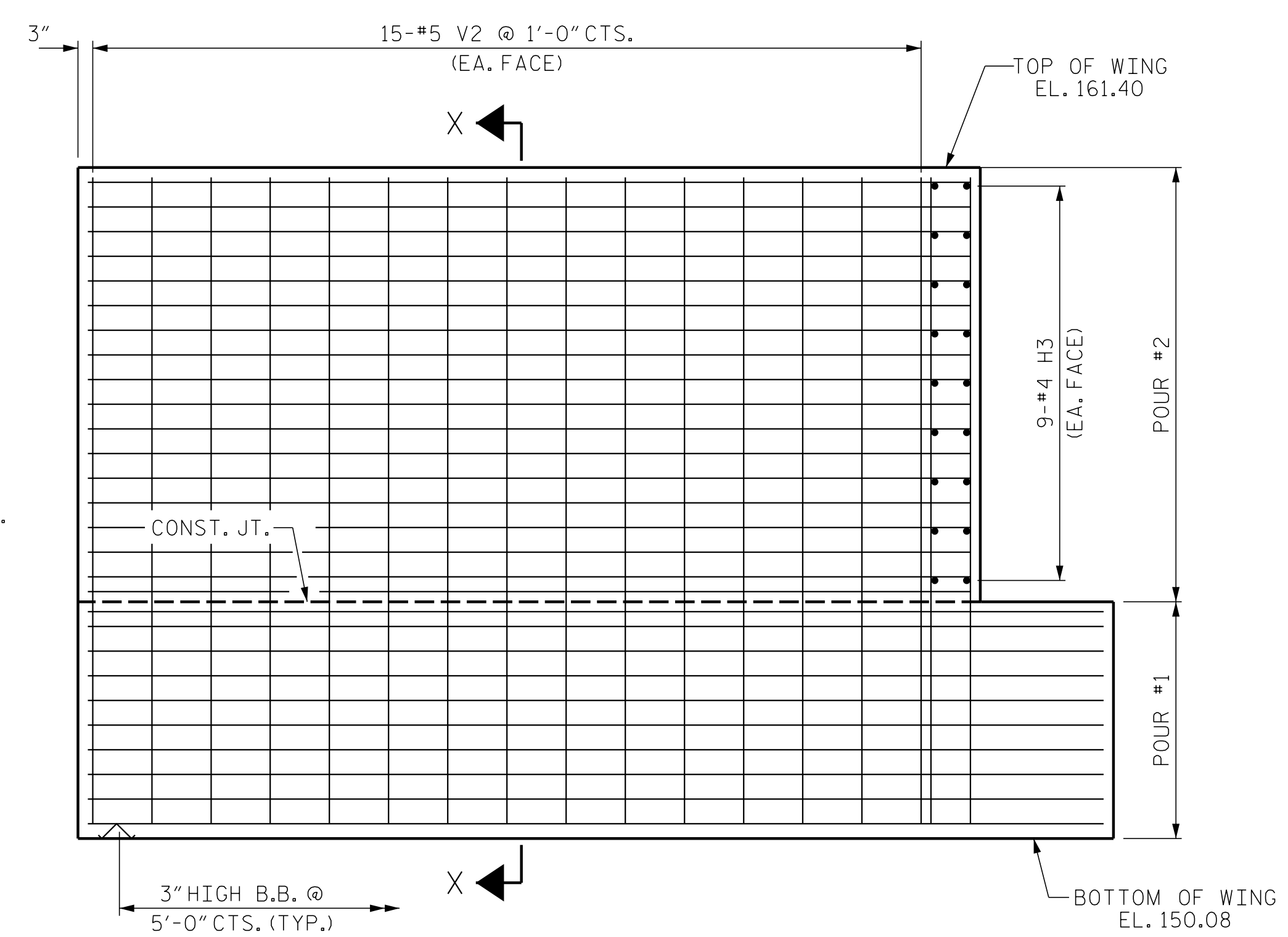
PLAN OF WING - W1



ELEVATION OF WING - W2

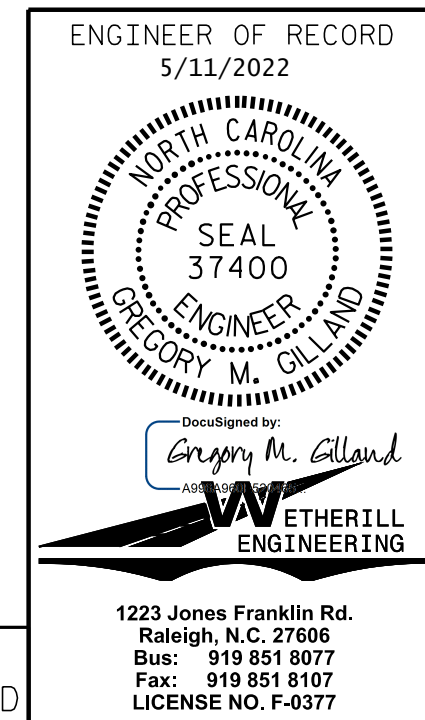


SECTION X-X



ELEVATION OF WING - W1

PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 2 OF 3

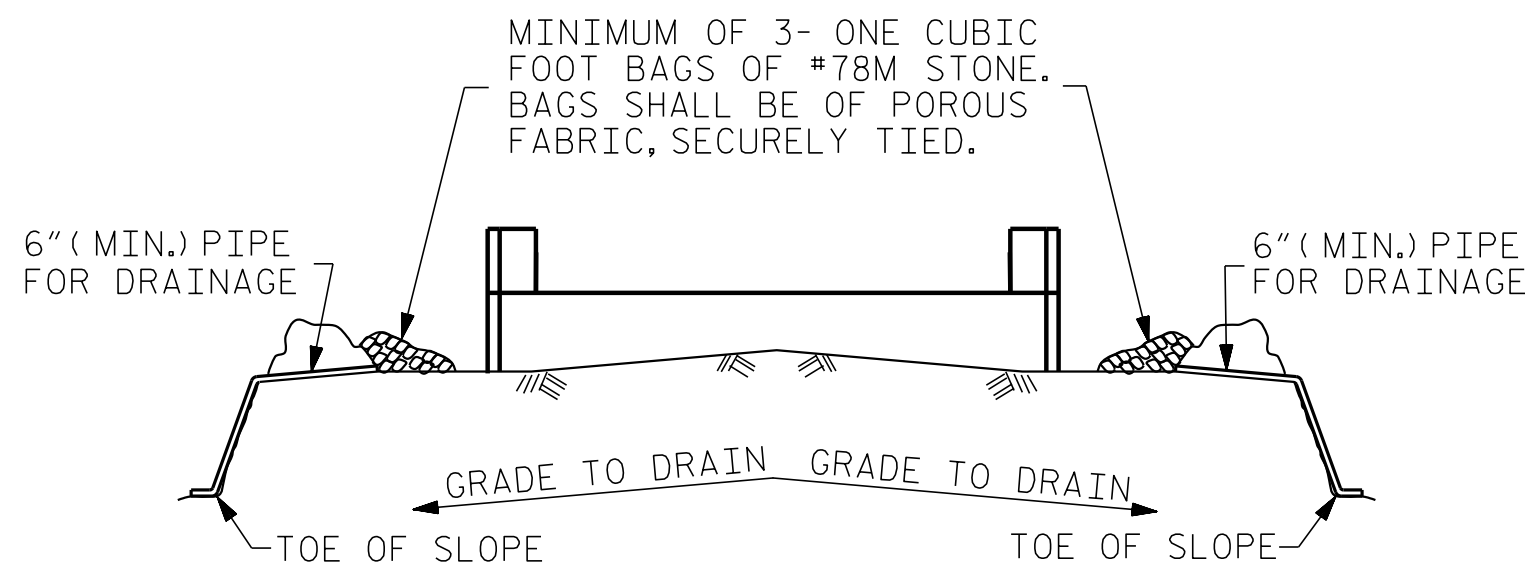


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SUBSTRUCTURE END BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-35
TOTAL SHEETS					39

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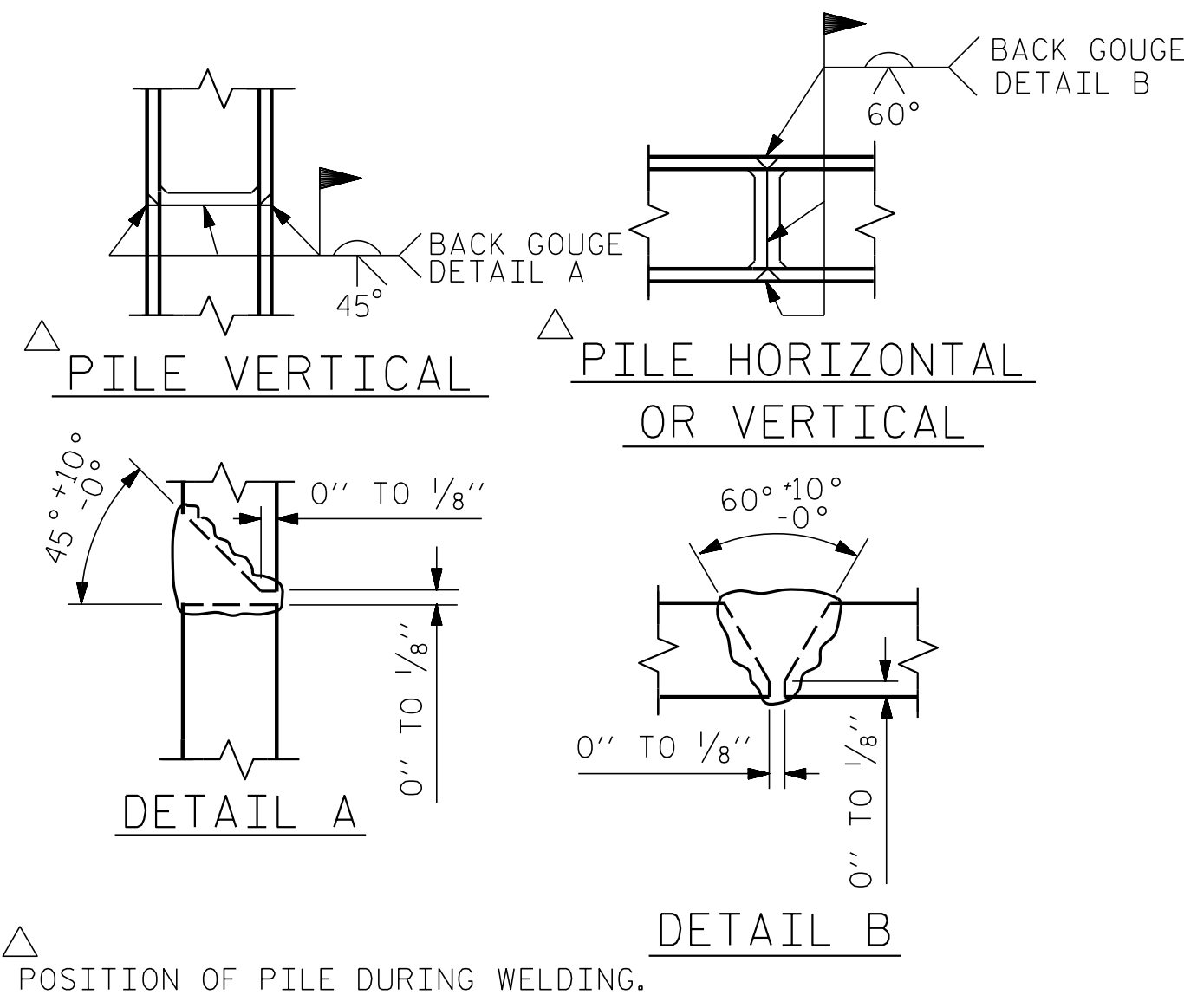


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



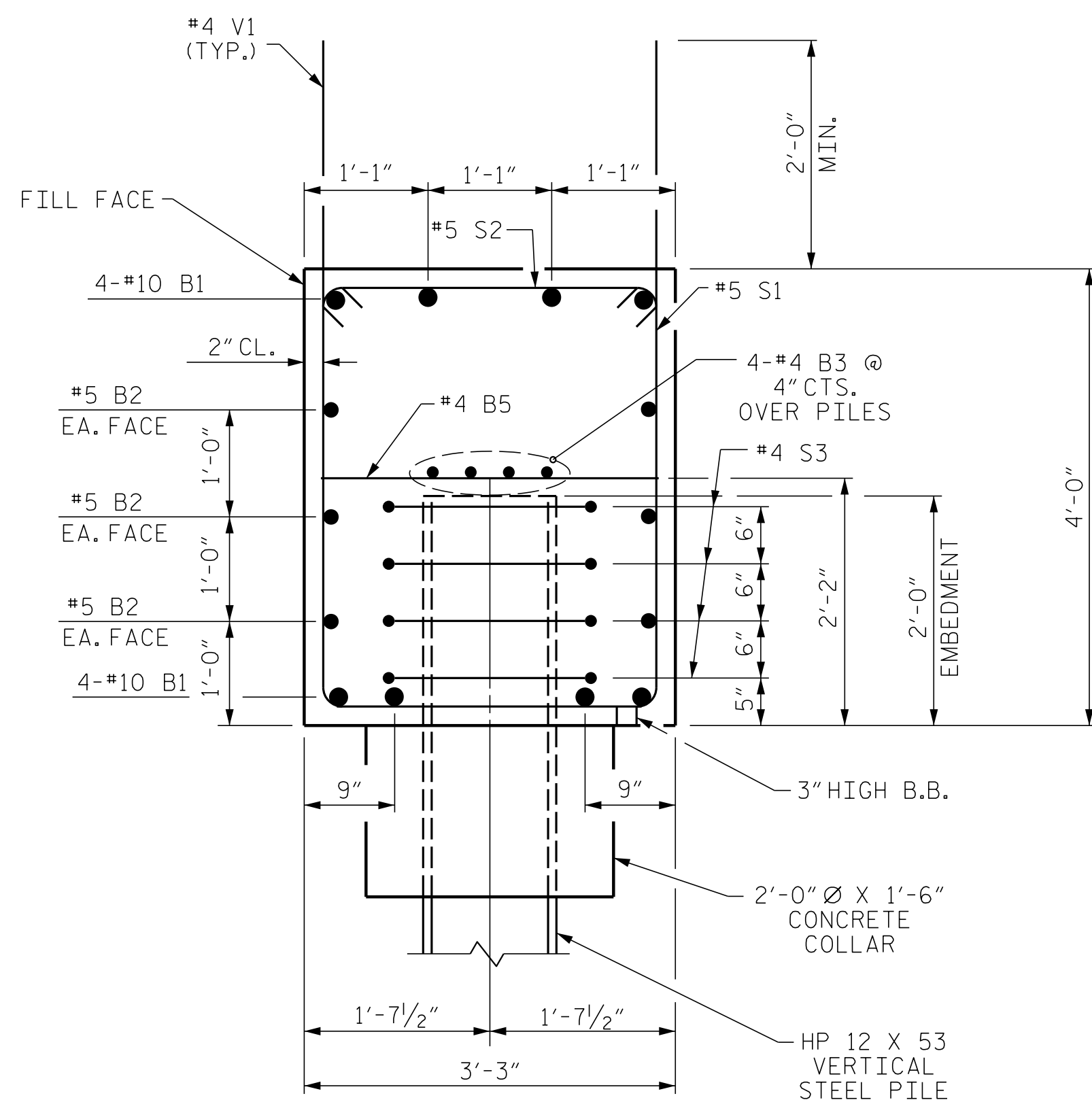
PILE SPLICE DETAILS

BILL OF MATERIAL					
END BENT No. 2					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10		44'-11"	1546
B2	6	#5	STR	42'-3"	264
B3	8	#4	STR	22'-4"	119
B4	4	#4	STR	12'-8"	34
B5	11	#4	STR	2'-11"	21
H1	72	#6	2	15'-11"	1721
H2	40	#6	2	18'-2"	1091
H3	36	#4	STR	3'-3"	78
S1	66	#5	3	11'-1"	763
S2	66	#5	4	3'-10"	264
S3	28	#4	5	6'-6"	122
U1	9	#4	6	5'-11"	36
V1	46	#4	STR	6'-0"	184
V2	80	#5	STR	10'-10"	904
REINFORCING STEEL					7,147 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1	CAP, CONC. COLLARS & LOWER PART OF WINGS				26.3 C.Y.
POUR #2	UPPER PART OF WINGS				9.7 C.Y.
TOTAL CLASS A CONCRETE					36.0 C.Y.

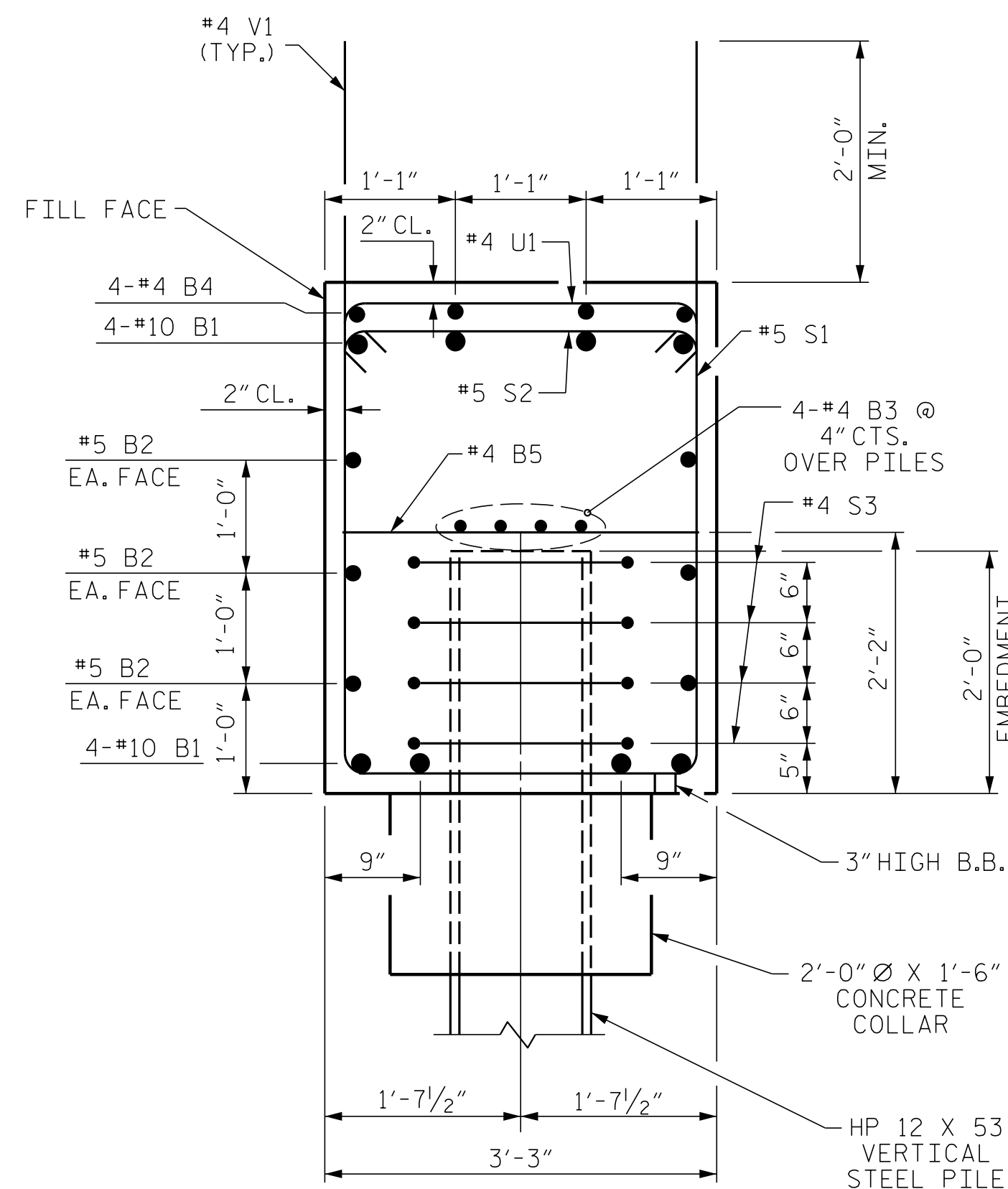
BAR TYPES					
①		②		③	
④		⑤		⑥	

ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12 X 53 VERTICAL STEEL PILES	
NO: 7	LIN. FT.= 244
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 VERTICAL STEEL PILES	
	7 EA.

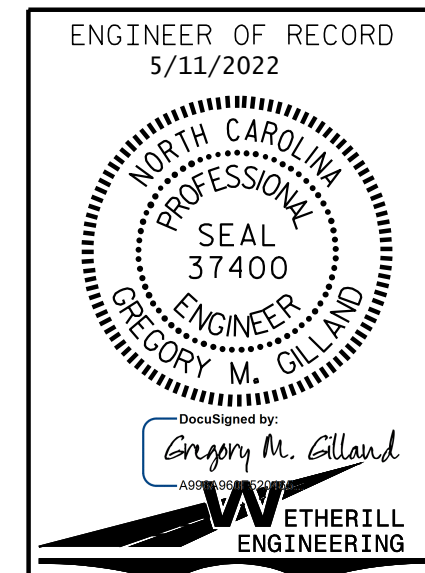


SECTION A-A



SECTION B-B

PROJECT NO. B-5947
 NASH COUNTY
 STATION: 23+90.50 -LREV-
 SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2

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SHEET NO.	S-36
TOTAL SHEETS	39

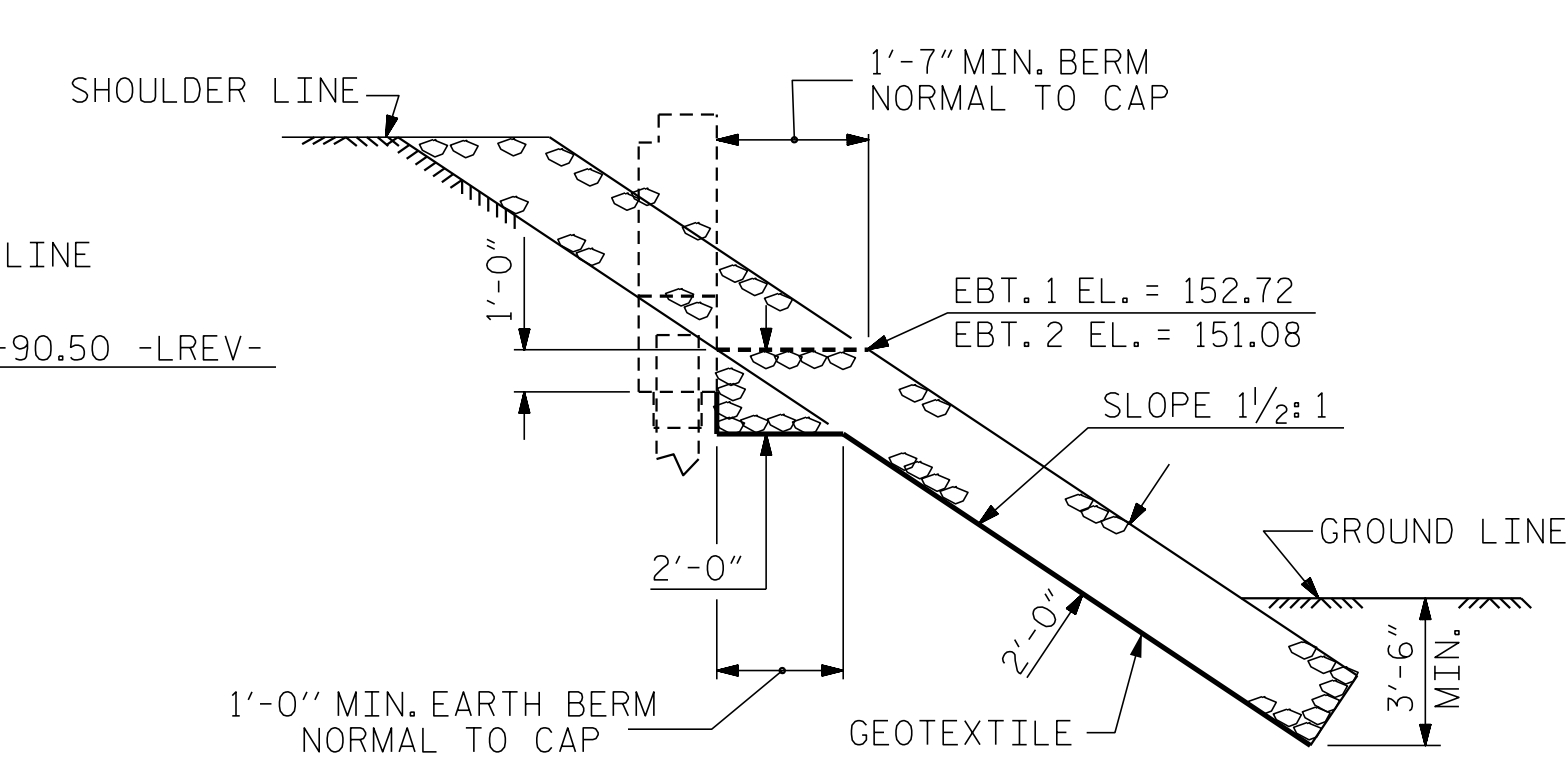
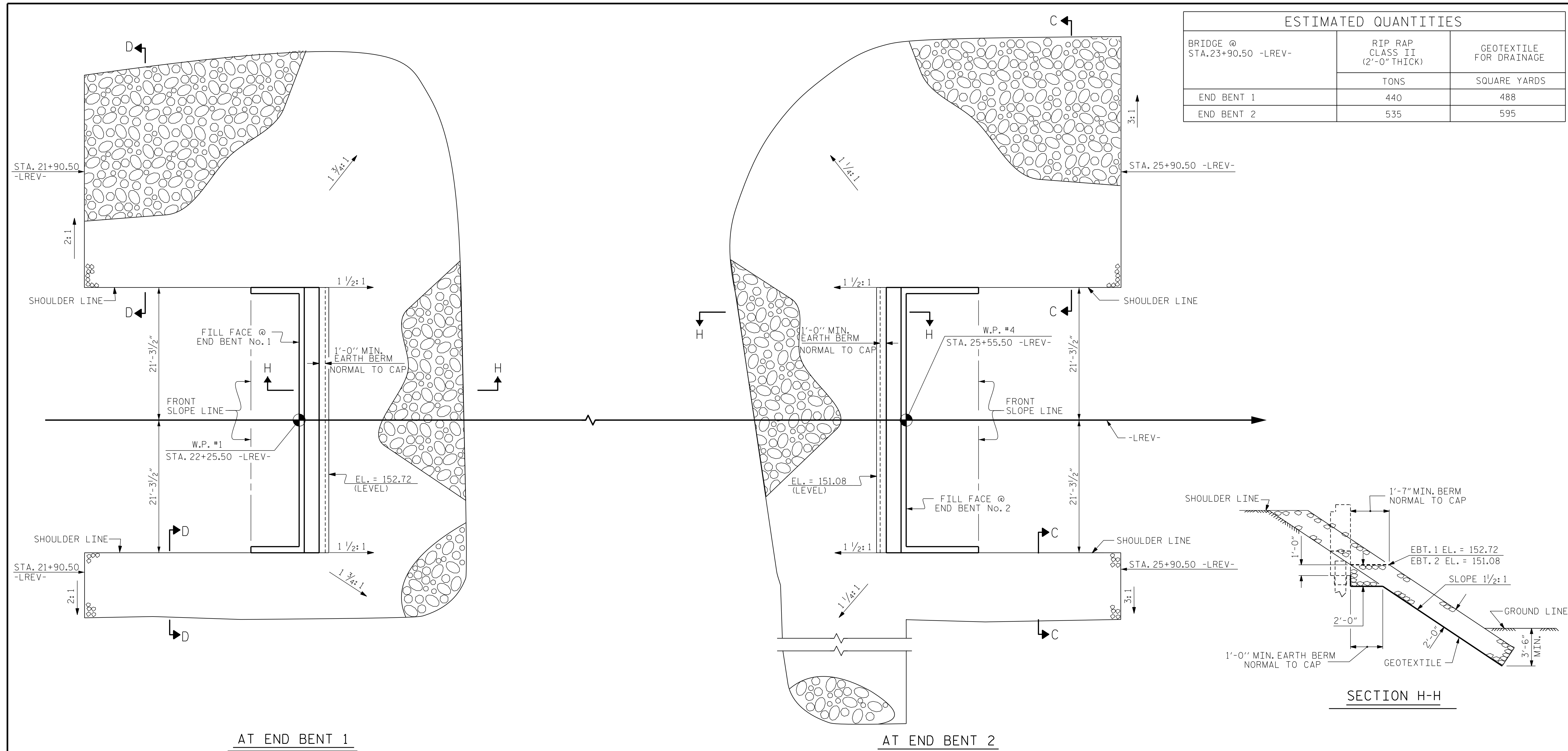
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ESTIMATED QUANTITIES		
BRIDGE @ STA. 23+90.50 -LREV-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	440	488
END BENT 2	535	595



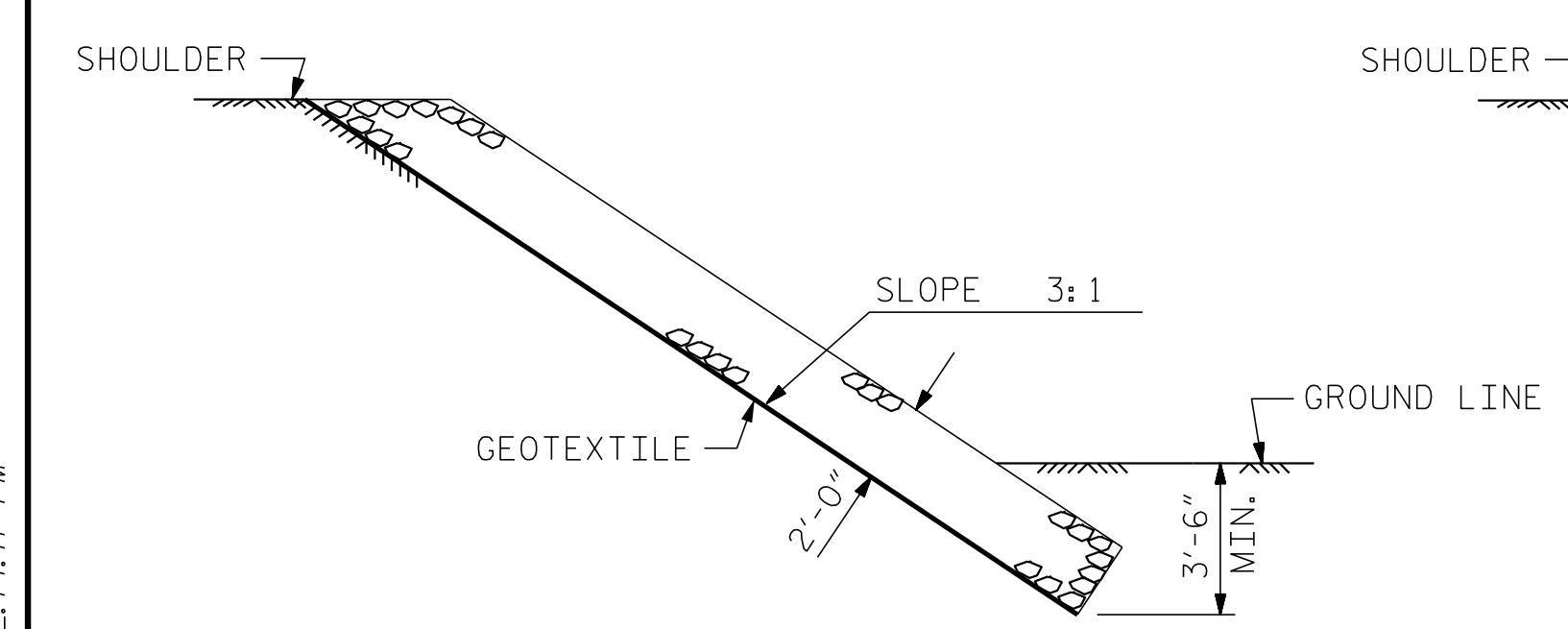
SECTION H-H

AT END BENT 1

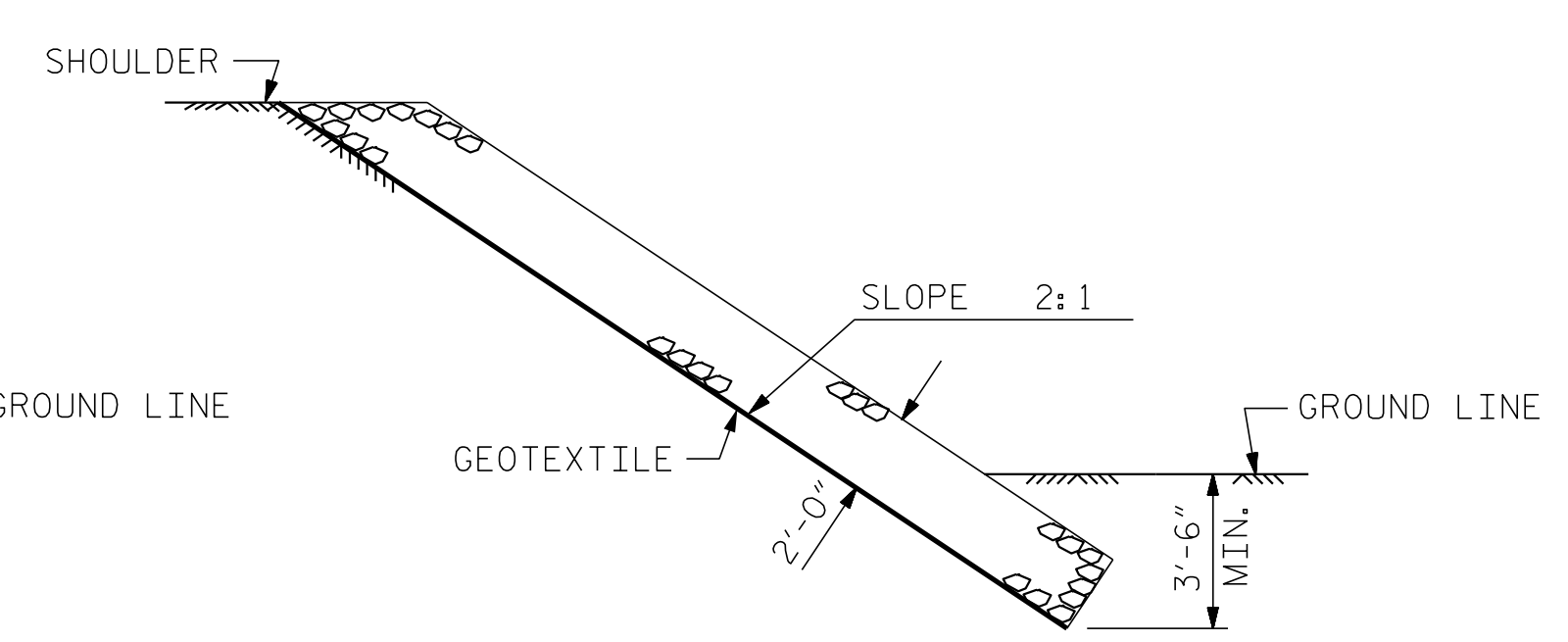
AT END BENT 2

PLAN OF RIP RAP

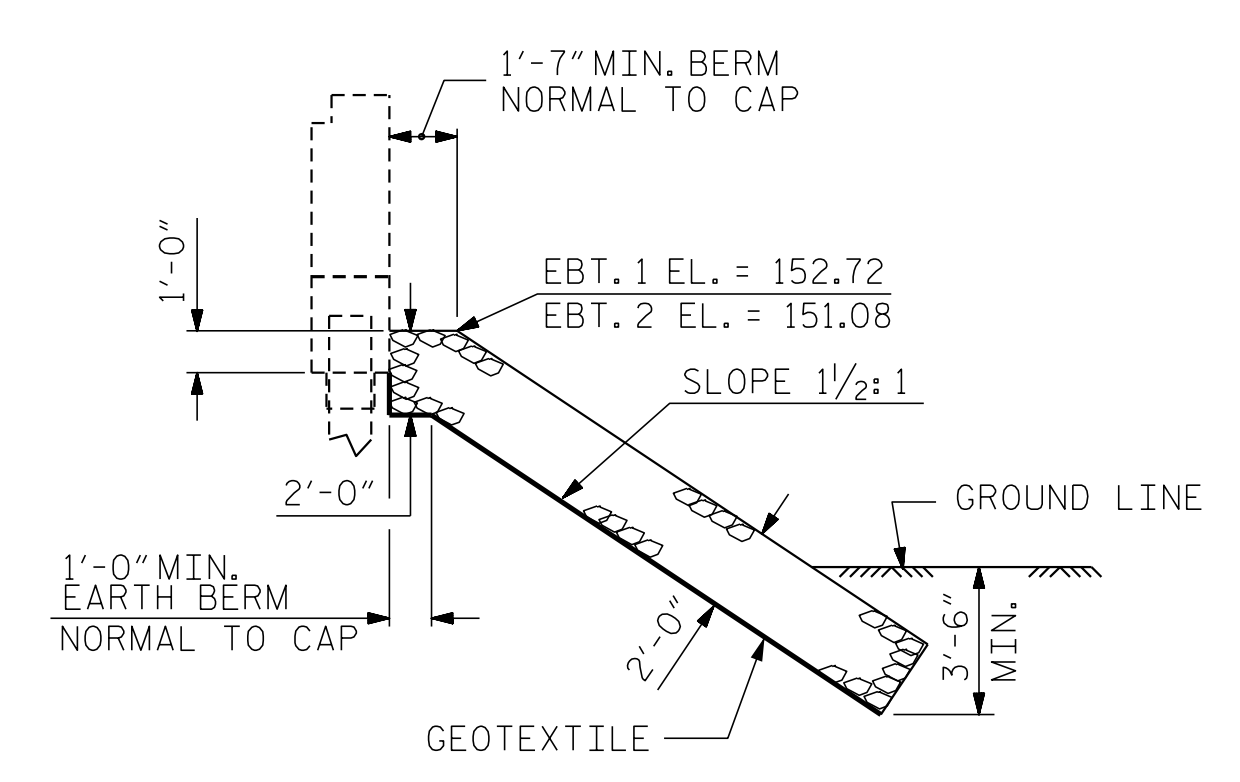
PROJECT NO. B-5947
NASH COUNTY
 STATION: 23+90.50 -LREV-



SECTION C-C



SECTION D-D



SECTION C-C SECTION
 BERM RIP RAPPED

ENGINEER OF RECORD
 10/18/2021

Gregory M. Gilland
 WETHERILL ENGINEERING

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STATE OF NORTH CAROLINA
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 RALEIGH

STANDARD
 RIP RAP DETAILS

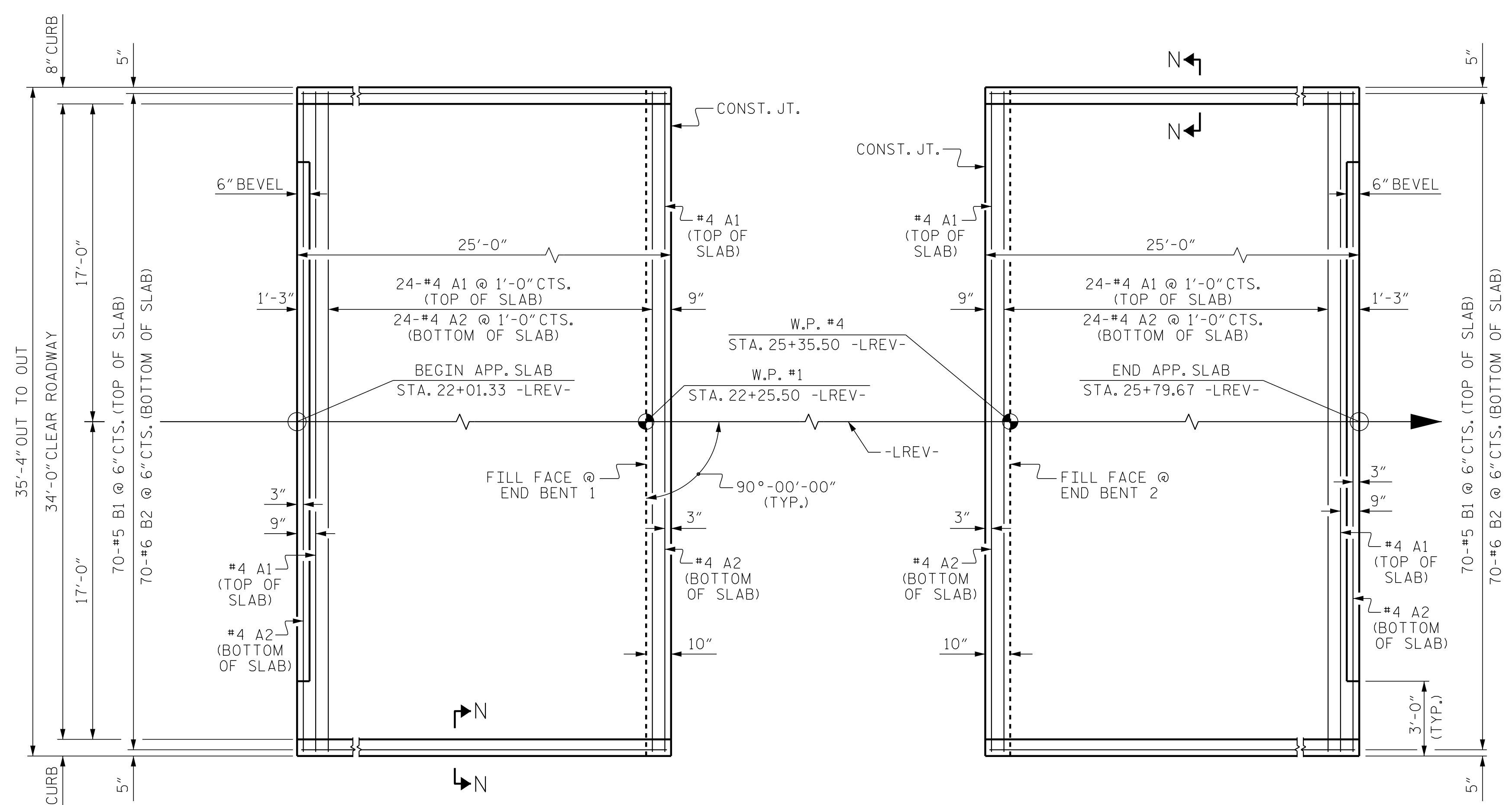
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NO.	BY:	DATE:	NO.	BY:	DATE:
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SHEET NO. S-37
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NOTES

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

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

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

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

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

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.

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

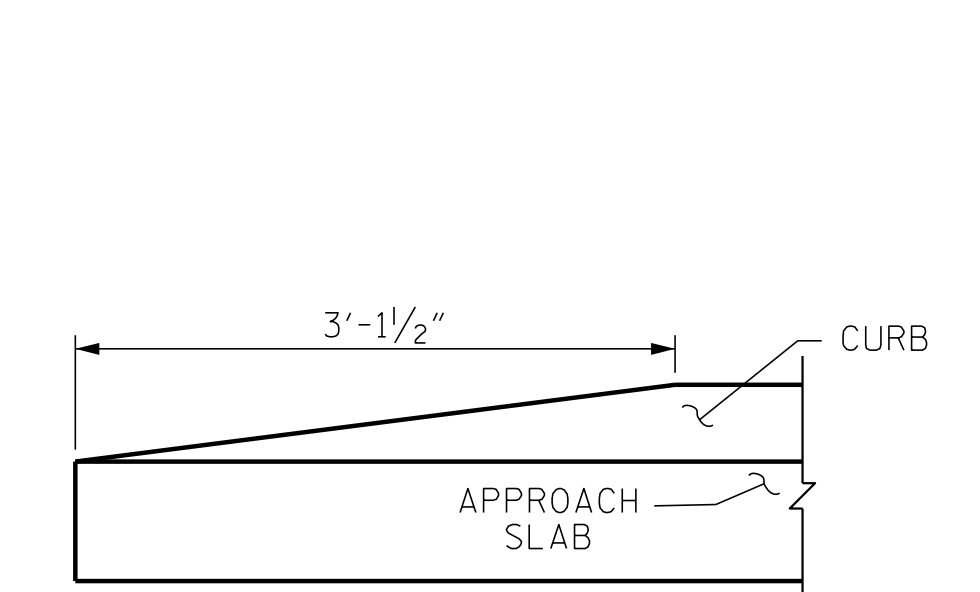
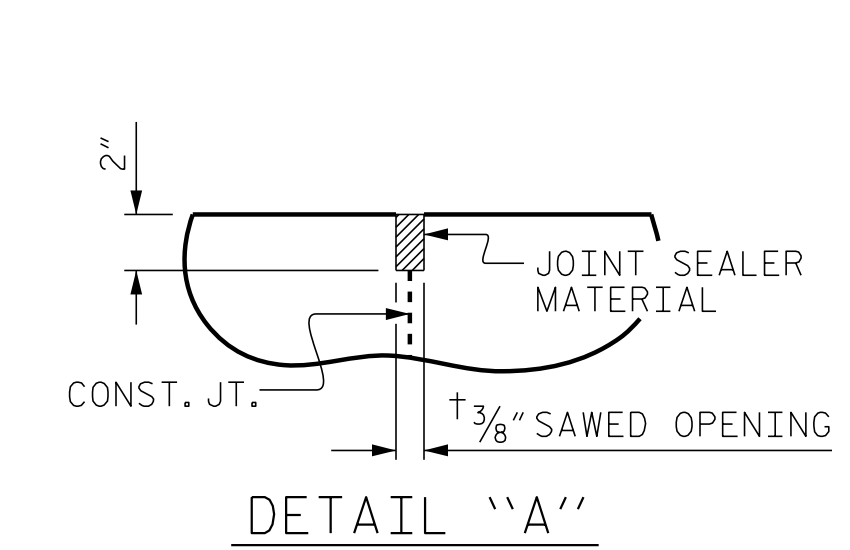
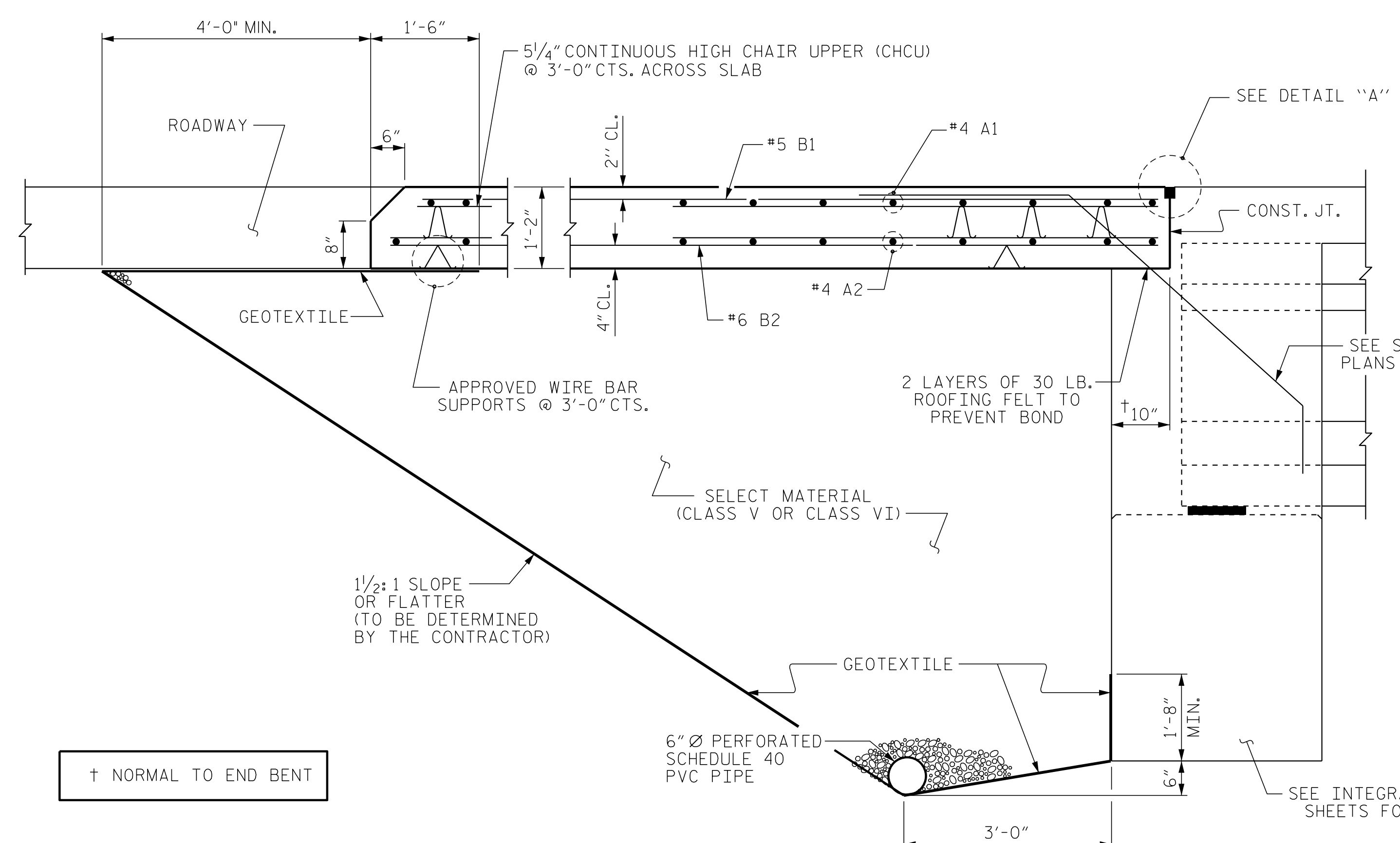
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

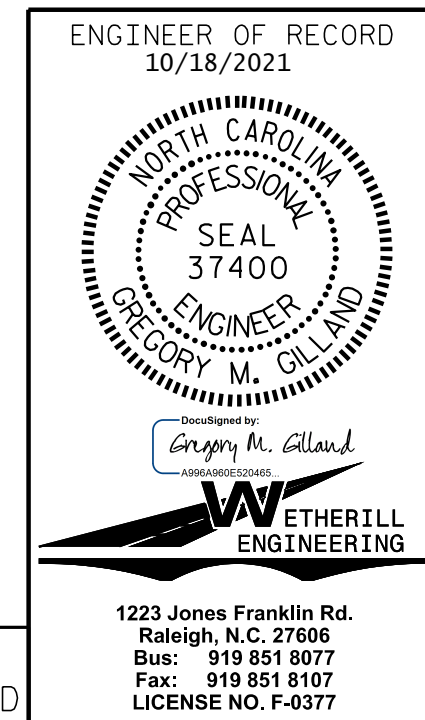
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	35'-0"	608
A2	26	#4	STR	35'-0"	608
* B1	70	#5	STR	24'-2"	1764
B2	70	#6	STR	24'-8"	2593
REINFORCING STEEL				LBS.	3201
* EPOXY COATED REINFORCING STEEL				LBS.	2372
CLASS AA CONCRETE				C. Y.	38.2

SPLICE LENGTHS

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



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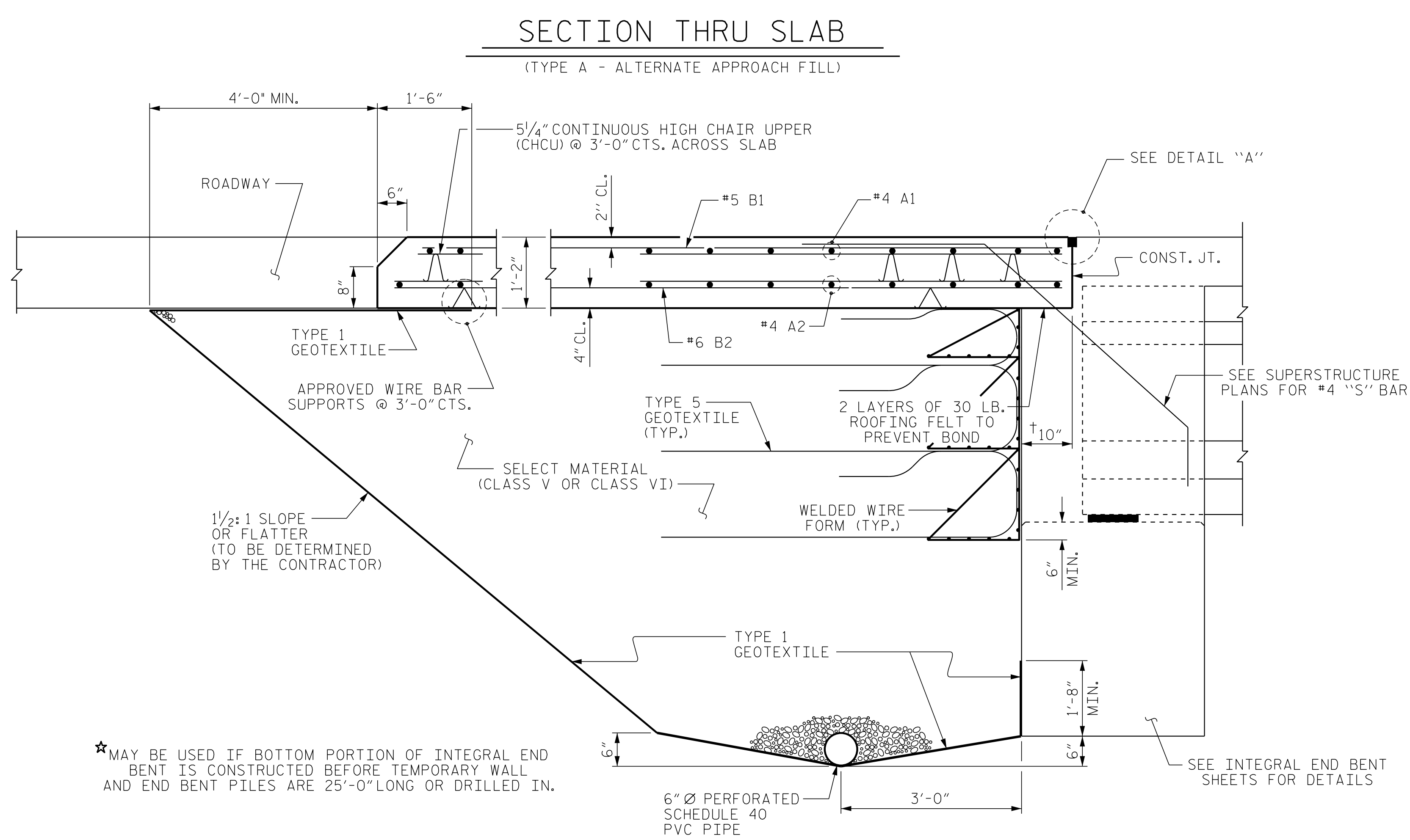
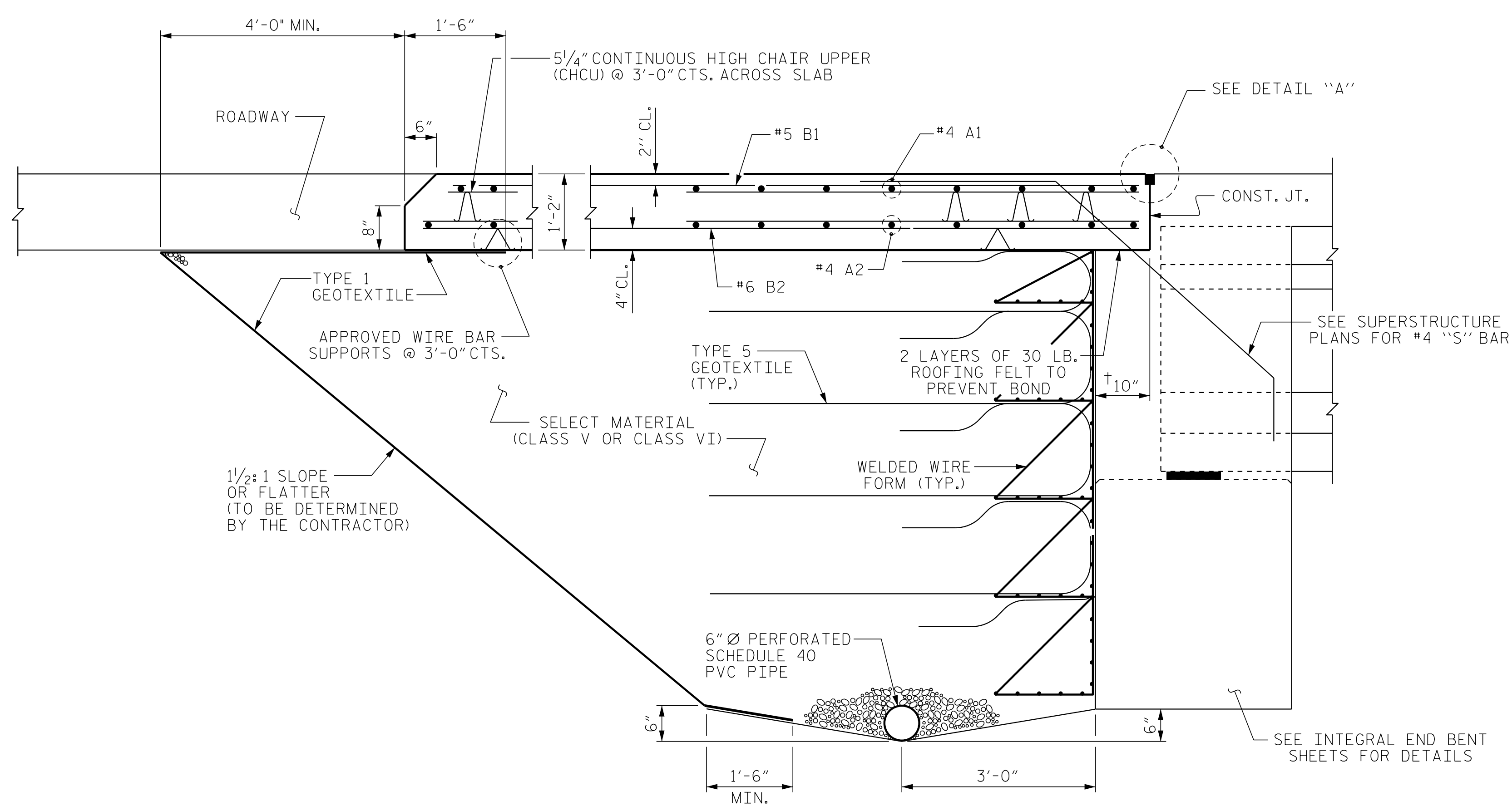
STANDARD
 BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			39

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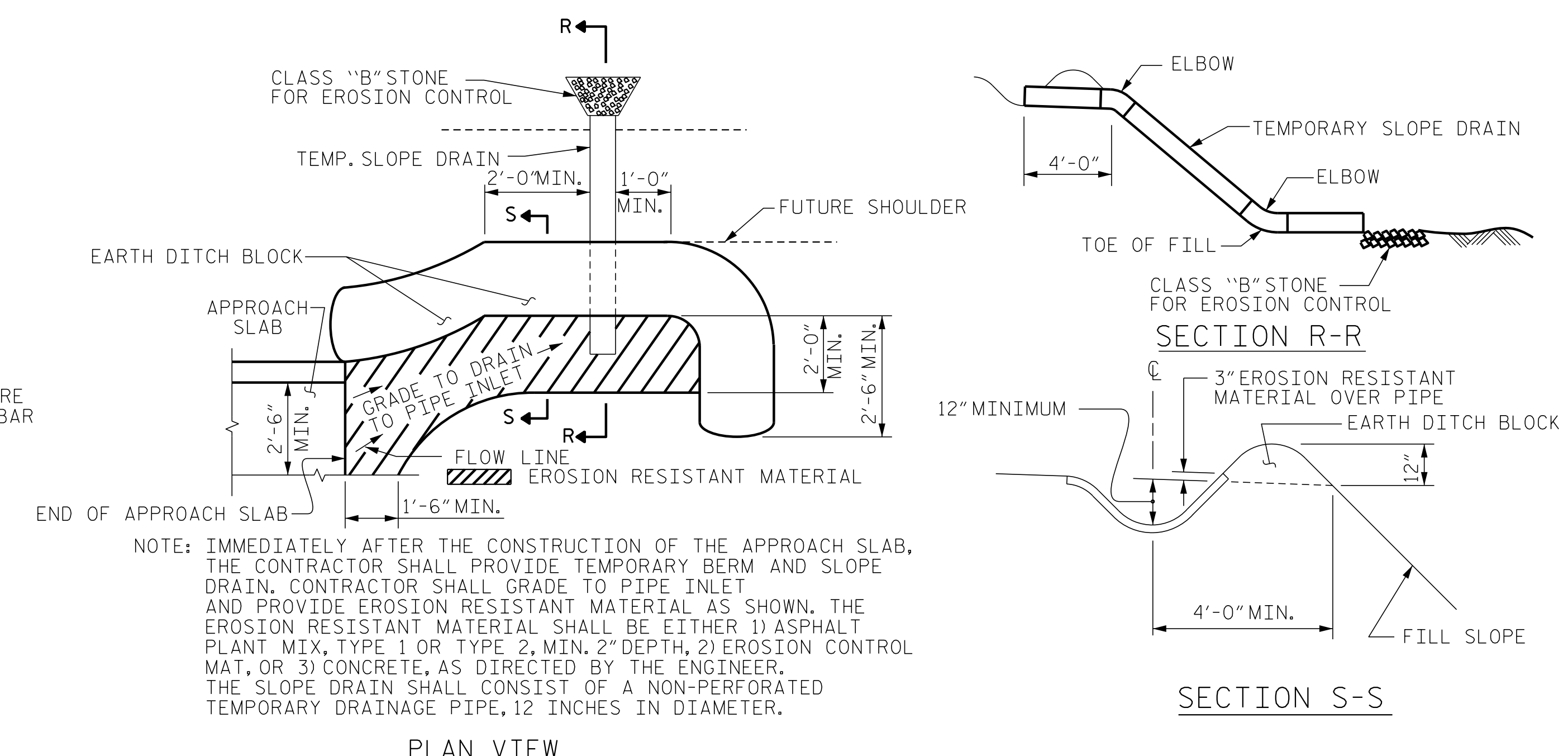
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ASSEMBLED BY : G. GILLAND	DATE : 1/20
CHECKED BY : D. HODGE	DATE : 1/20
DRAWN BY : TLA 10/05	REV. 6/13 MAA/GM
CHECKED BY : GM 5/06	REV. 12/17 MAA/THC
	REV. 06/19 BNB/THC

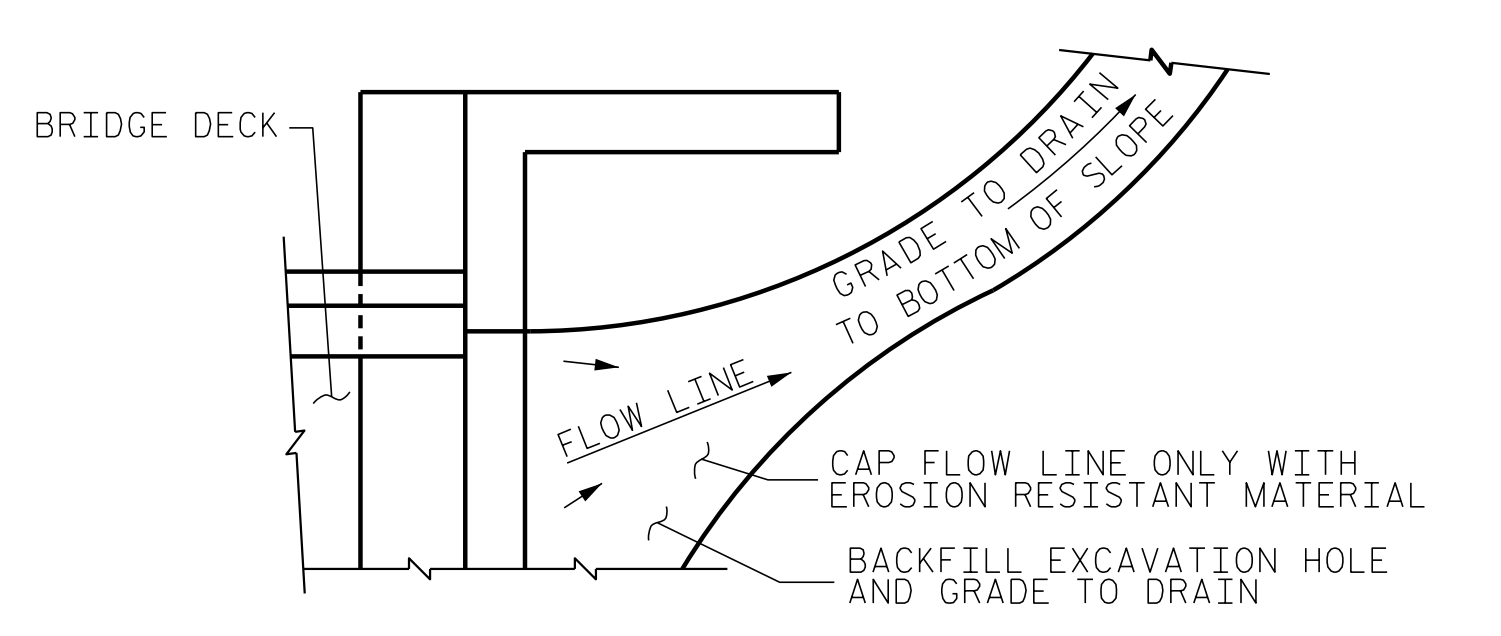


ASSEMBLED BY : G. GILLAND	DATE : 1/20
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DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

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/DECK 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.

PROJECT NO. B-5947
NASH COUNTY
STATION: 23+90.50 -LREV-
SHEET 2 OF 2

ENGINEER OF RECORD
10/18/2021

NORTH CAROLINA PROFESSIONAL SEAL 37400

ENGINEER
GREGORY M. GILLAND

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ETHERILL ENGINEERING

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LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-39
TOTAL SHEETS					39

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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