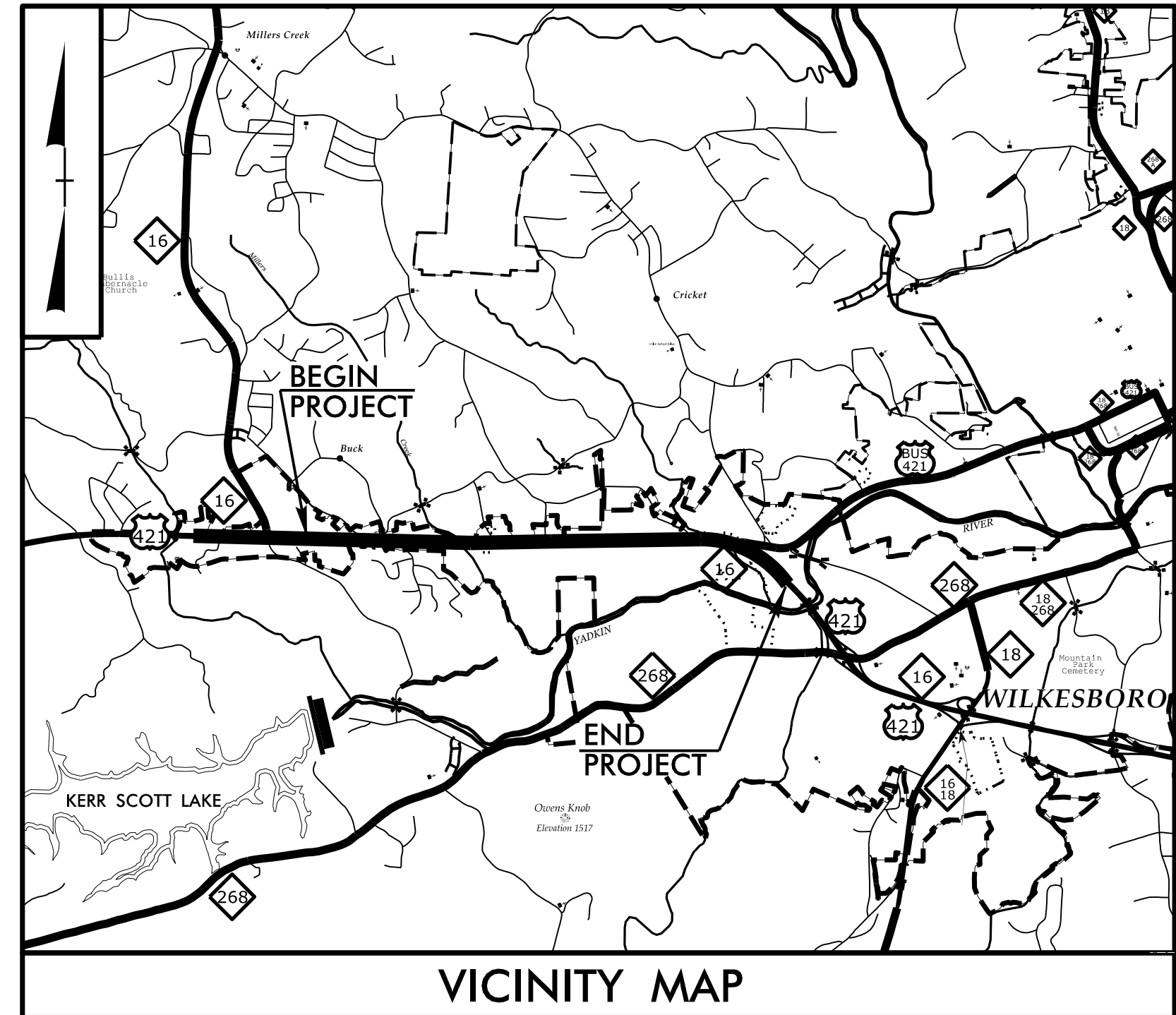


09_08/199

TIP PROJECT: U-5312



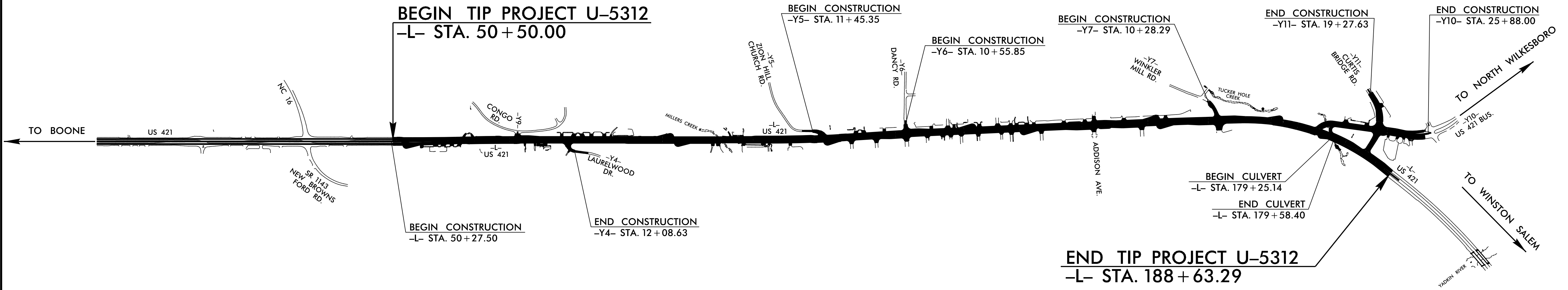
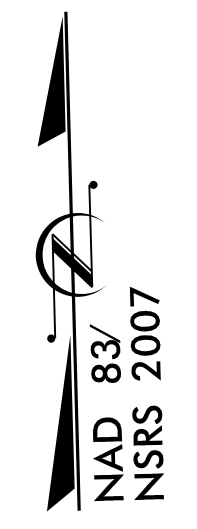
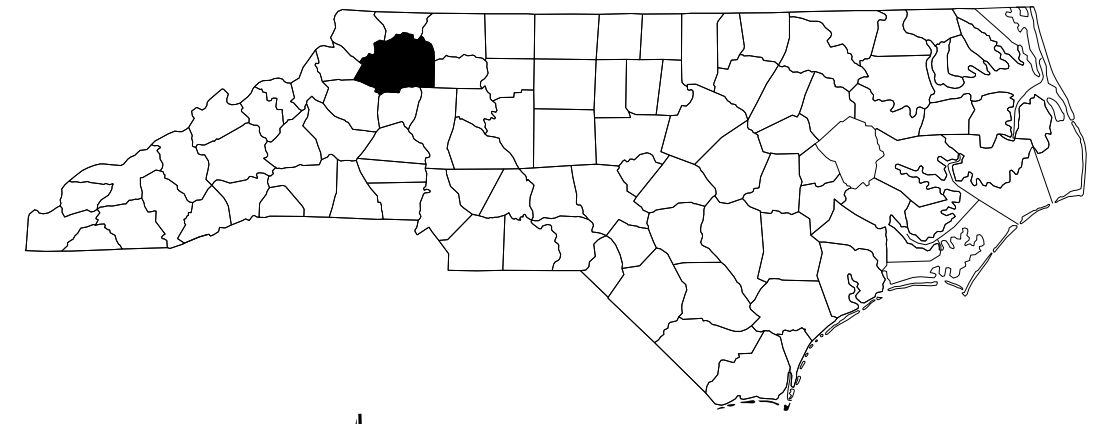
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

LOCATION: US 421 FROM EAST OF NC 16 TO US 421 BUSINESS IN WILKESBORO

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNING, SIGNALS, AND ITS

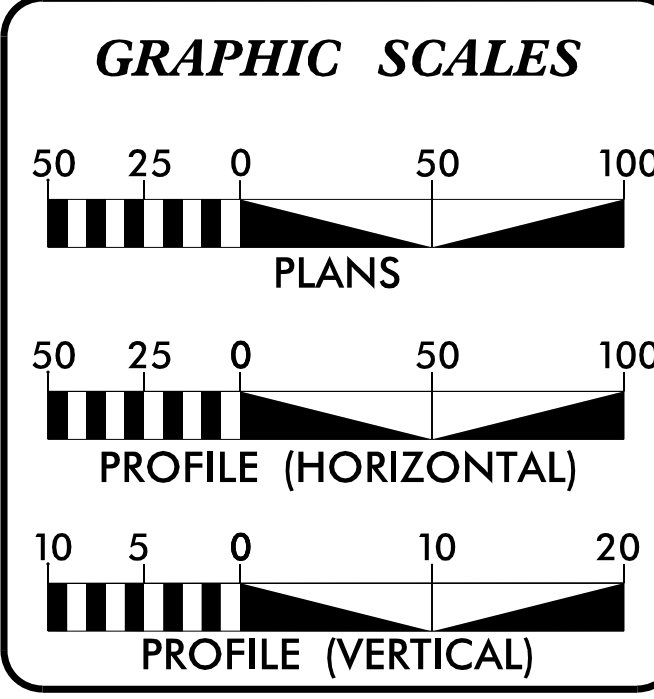
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	U-5312	1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45446.1.1	NHS-0421(072)	PE
45446.2.1	NHS-0421(072)	R/W
45446.2.U1	NHS-0421(072)	UTILITY
45446.3.1	NHS-0421(072)	CONST.



STRUCTURES

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CONTRACT: C204841



DESIGN DATA

ADT 2020 =	37,000
ADT 2040 =	41,900
K =	8 %
D =	55 %
T =	5 % *
V =	50 MPH
* TTST =	2% DUAL 3%
FUNC CLASS =	ARTERIAL
STATEWIDE TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-5312 =	2.610 MILES
LENGTH OF STRUCTURE TIP PROJECT U-5312 =	0.006 MILES
TOTAL LENGTH OF TIP PROJECT U-5312 =	2.616 MILES

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

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 861-6606
FIRM PE NUMBER: P-0671

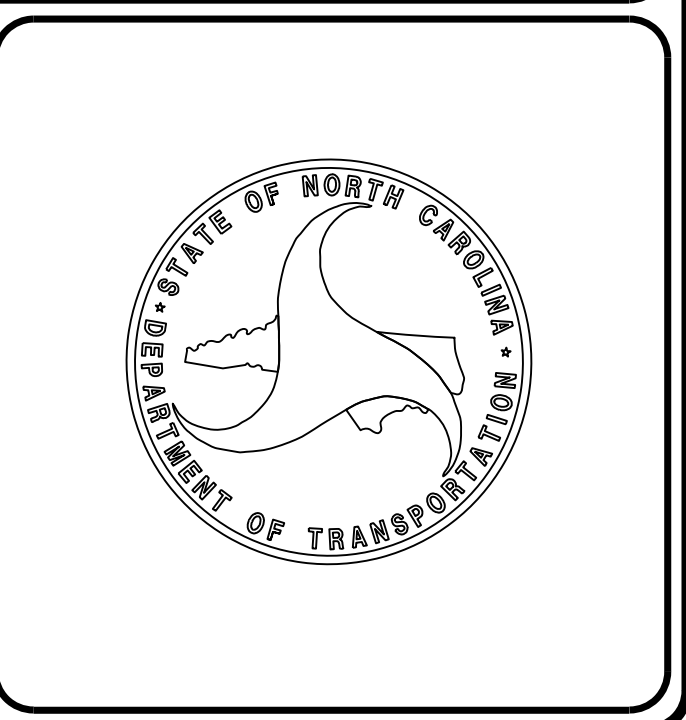
2012 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
FEBRUARY 26, 2018

LETTING DATE:
SEPTEMBER 19, 2023

MORRIS ISRAELNAIM, PE
PROJECT ENGINEER

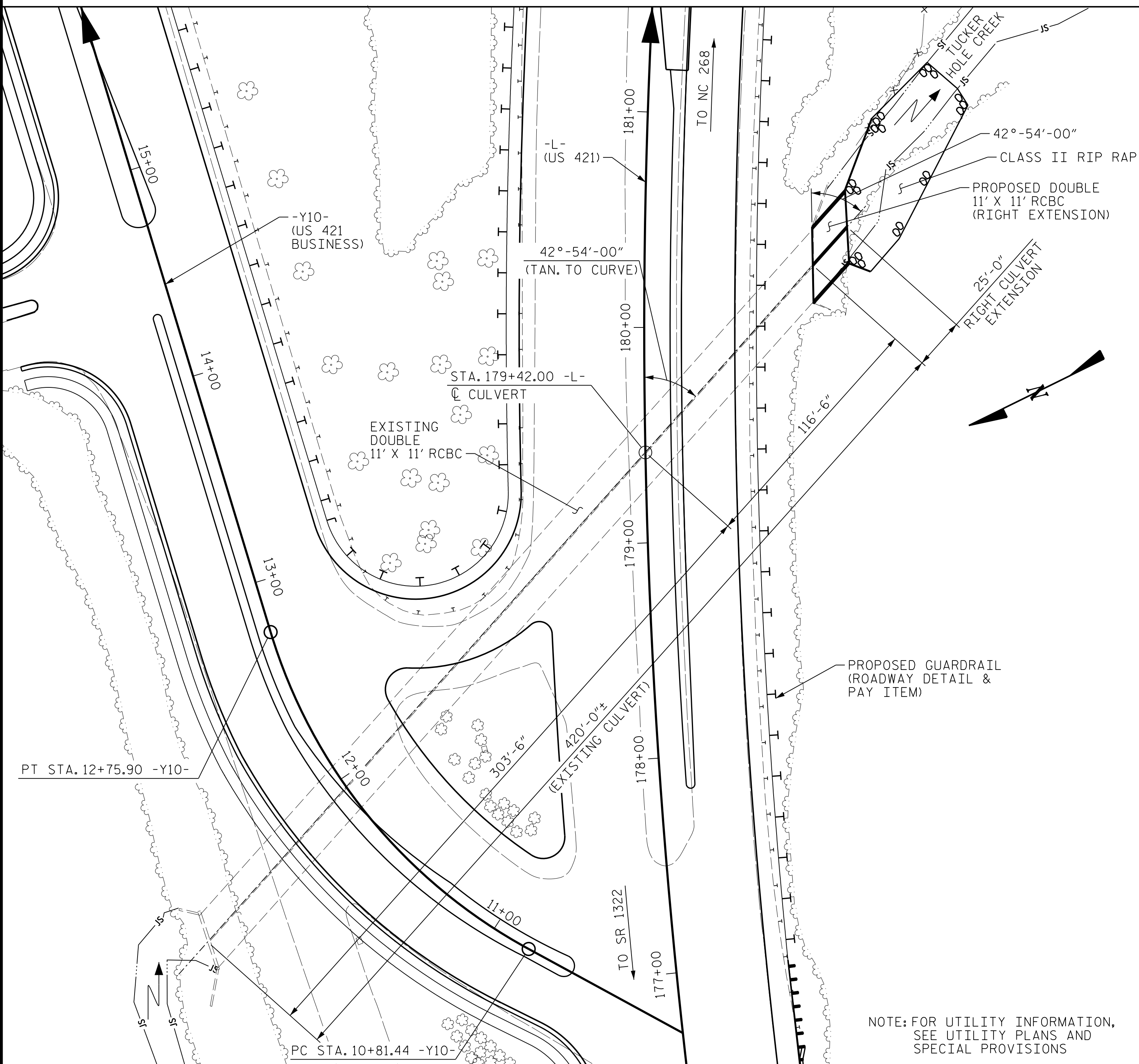
JILLA I. BREWER, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT: RAMIE SHAW, PE
Division Project Development Engineer



7/17/2023 12:21:36 PM
User: jlsr@dnm
Filename: N:\NC Bridges\MI7004-VHB-U-5312\Culverts & Walls\U-5312\Structures\499_001_U5312_SMU_TSH.dgn

BM #1: MAG NAIL IN BRIDGE WING WALL, 300.00' RT. OF STA. 27+60.00 -Y10-, EL. 981.65



ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 DESIGN FILL----- 7.9 FT.
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

THE EXISTING STRUCTURE CONSISTING OF A REINFORCED CONCRETE CULVERT 2 AT 11' (W) X 11' (H) SIZE, 420'-0"± LONG AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE RETAINED.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

ONE PERMITTED CONSTRUCTION JOINT WILL BE ALLOWED IN THE END OF THE CURTAIN WALL.

HYDRAULIC DATA

DESIGN DISCHARGE = 1,800 CFS
 FREQUENCY OF DESIGN FLOOD = 50 YRS.
 DESIGN HIGH WATER ELEVATION = 979.1
 DRAINAGE AREA = 2.05 SQ. MI.
 BASE DISCHARGE (Q100) = 2,000 CFS
 BASE HIGH WATER ELEVATION = 979.9

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 7,075 CFS
 FREQUENCY OF OVERTOPPING FLOOD = 500+ YRS.
 OVERTOPPING FLOOD ELEVATION = 1001.3

-L- PROFILE DATA

PVI STA. 177+66.00 -L-
 PVI EL. = 994.65
 VC = 900.00
 g1 = -4.5511%
 g2 = +0.1973%

NOTES

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

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.

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.

EXCAVATE FOUNDATION A MINIMUM OF 12" BELOW CULVERT BEARING ELEVATION. PLACE 12" OF CLASS VI FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

FOR AREAS WITH NEW FILL BELOW CULVERT BEARING ELEVATION, PLACE A MINIMUM OF 12" OF CLASS VI FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE ADDITIONAL CLASS VI FOUNDATION CONDITIONING MATERIAL FOR FILL BENEATH FOUNDATION CONDITIONING MATERIAL.

OVEREXCAVATE ADDITIONAL LOOSE/SOFT OR ORGANIC MATERIAL IF PRESENT TO SUITABLE BEARING MATERIALS AND REPLACE WITH ADDITIONAL CLASS VI FOUNDATION CONDITIONING MATERIAL.

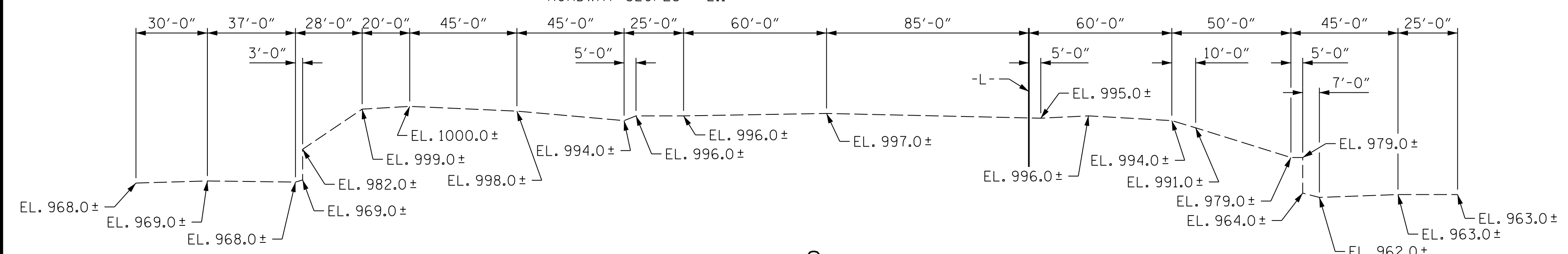
SAMPLE BAR REPLACEMENT SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 2.61	CY/FT	65.3 C.Y.
WING ETC.		46.9 C.Y.
TOTAL		112.2 C.Y.
REINFORCING STEEL		
BARREL		11,582 LBS.
WINGS ETC.		5,052 LBS.
TOTAL		16,634 LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL		50 TONS

LOCATION SKETCH

GRADE POINT ELEVATION @ 179+42.00 -L- = 997.53
 BED ELEVATION @ 179+42.00 -L- = 965.11
 ROADWAY SLOPES = 2:1



PROFILE ALONG CULVERT

PROJECT NO. U-5312
WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 1 OF 8 EXTENDS CULVERT NO. 960062



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**RIGHT EXTENSION
 DOUBLE 11 FT. X 11 FT.
 CONCRETE BOX CULVERT
 42°-54'-00" SKEW**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-1
1			3			TOTAL SHEETS 8
2			4			

DRAWN BY: B.E. LANNING DATE: 04/2022
 CHECKED BY: J.I. BREWER DATE: 05/2022
 DESIGN ENGINEER OF RECORD: J.I. BREWER DATE: 09/2022

6/21/2023 12:35:44 PM
 User: jlsr@ncdm
 File: \\s:\nc\bridges\m17004\yhb_u-5312\Culverts & Walls\U-5312\Structure\es\10_001_U5312_SMJ_CUL_960062.dgn

**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (LL)	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.23	--	1.75	1.49	2	TOP SLAB	5.50	1.23	1	BOTTOM SLAB	11.00		
	HL-93 (OPERATING)	N/A		1.60	--	1.35	1.93	2	TOP SLAB	5.50	1.60	1	BOTTOM SLAB	11.00		
	HS-20 (INVENTORY)	36.000	2	1.23	44.28	1.75	1.49	2	TOP SLAB	5.50	1.23	1	BOTTOM SLAB	11.00		
	HS-20 (OPERATING)	36.000		1.60	57.60	1.35	1.93	2	TOP SLAB	5.50	1.60	1	BOTTOM SLAB	11.00		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.97	26.60	1.40	1.97	1	EXTERIOR WALL	5.50	3.48	1	TOP SLAB	11.00	
		SNGARBS2	20.000		1.97	39.40	1.40	1.97	1	EXTERIOR WALL	5.50	2.95	1	BOTTOM SLAB	11.00	
		SNAGRIS2	22.000		1.97	43.34	1.40	1.97	1	EXTERIOR WALL	5.50	2.71	1	BOTTOM SLAB	11.00	
		SNCOTTS3	27.250		1.55	42.24	1.40	1.55	2	TOP SLAB	5.50	1.71	1	TOP SLAB	11.00	
		SNAGGRS4	34.925		1.66	57.98	1.40	1.66	2	TOP SLAB	5.50	1.81	1	BOTTOM SLAB	11.00	
		SNS5A	35.550		1.62	57.59	1.40	1.62	1	TOP SLAB	5.50	1.71	1	TOP SLAB	11.00	
		SNS6A	39.950		1.61	64.32	1.40	1.61	2	TOP SLAB	5.50	1.68	1	TOP SLAB	11.00	
		SNS7B	42.000		1.61	67.62	1.40	1.61	2	TOP SLAB	5.50	1.66	1	TOP SLAB	11.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.96	64.68	1.40	1.96	1	EXTERIOR WALL	5.50	2.09	1	BOTTOM SLAB	11.00	
		TNT4A	33.075		1.85	61.19	1.40	1.85	2	TOP SLAB	5.50	1.97	1	TOP SLAB	11.00	
		TNT6A	41.600		1.71	71.14	1.40	1.71	1	TOP SLAB	5.50	1.81	1	BOTTOM SLAB	11.00	
		TNT7A	42.000		1.76	73.92	1.40	1.78	2	TOP SLAB	5.50	1.76	1	BOTTOM SLAB	11.00	
		TNT7B	42.000		1.68	70.56	1.40	1.68	2	TOP SLAB	5.50	1.82	1	TOP SLAB	11.00	
		TNAGRIT4	43.000		1.72	73.96	1.40	1.85	2	TOP SLAB	5.50	1.72	1	BOTTOM SLAB	11.00	
	TNAGT5A	45.000		1.76	79.20	1.40	1.85	2	TOP SLAB	5.50	1.76	1	BOTTOM SLAB	11.00		
	TNAGT5B	45.000	3	1.52	68.40	1.40	1.85	2	TOP SLAB	5.50	1.52	1	BOTTOM SLAB	11.00		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

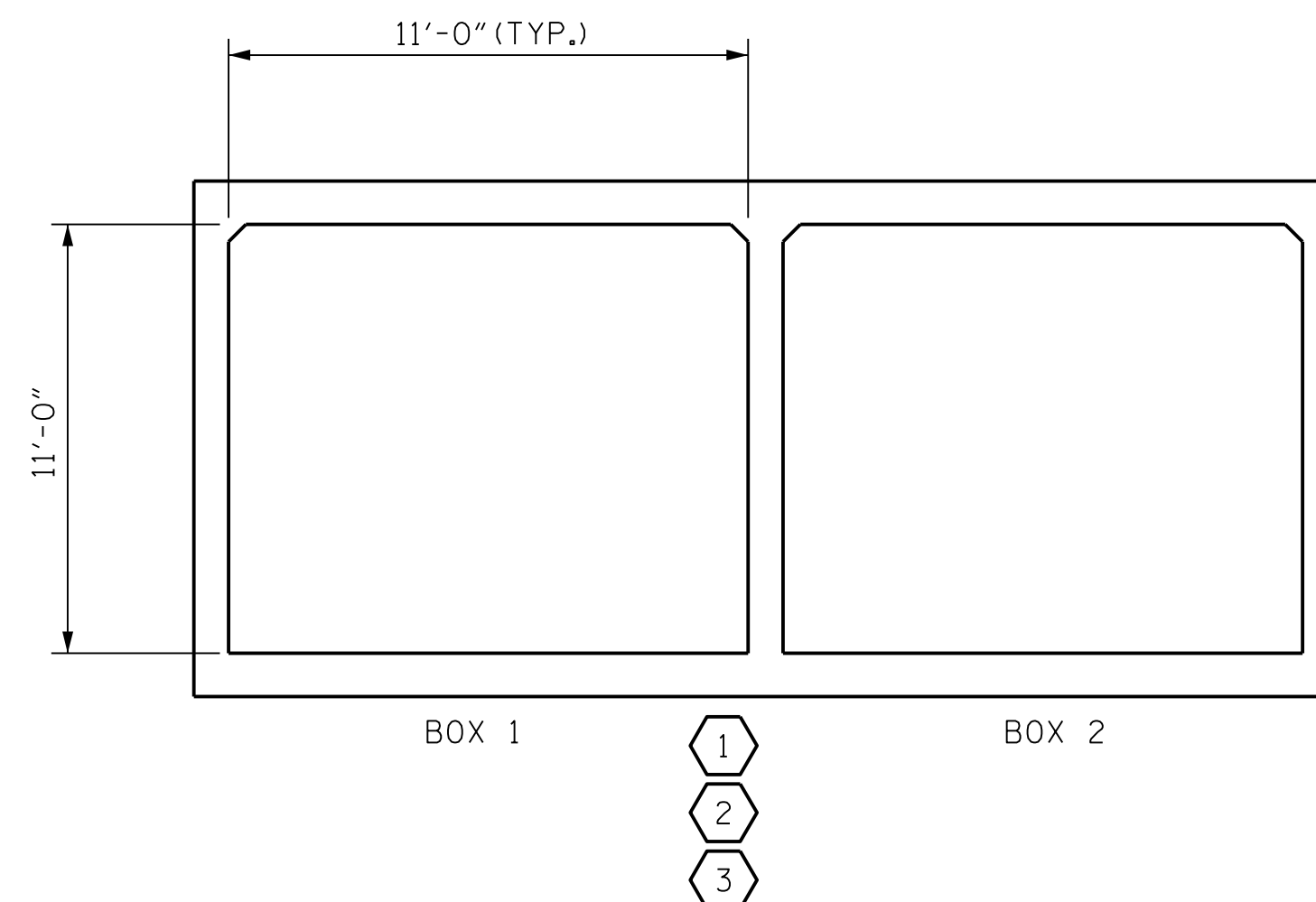
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

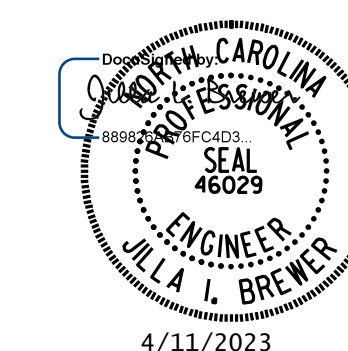
-
-
-
-

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



PROJECT NO. U-5312
WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 2 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

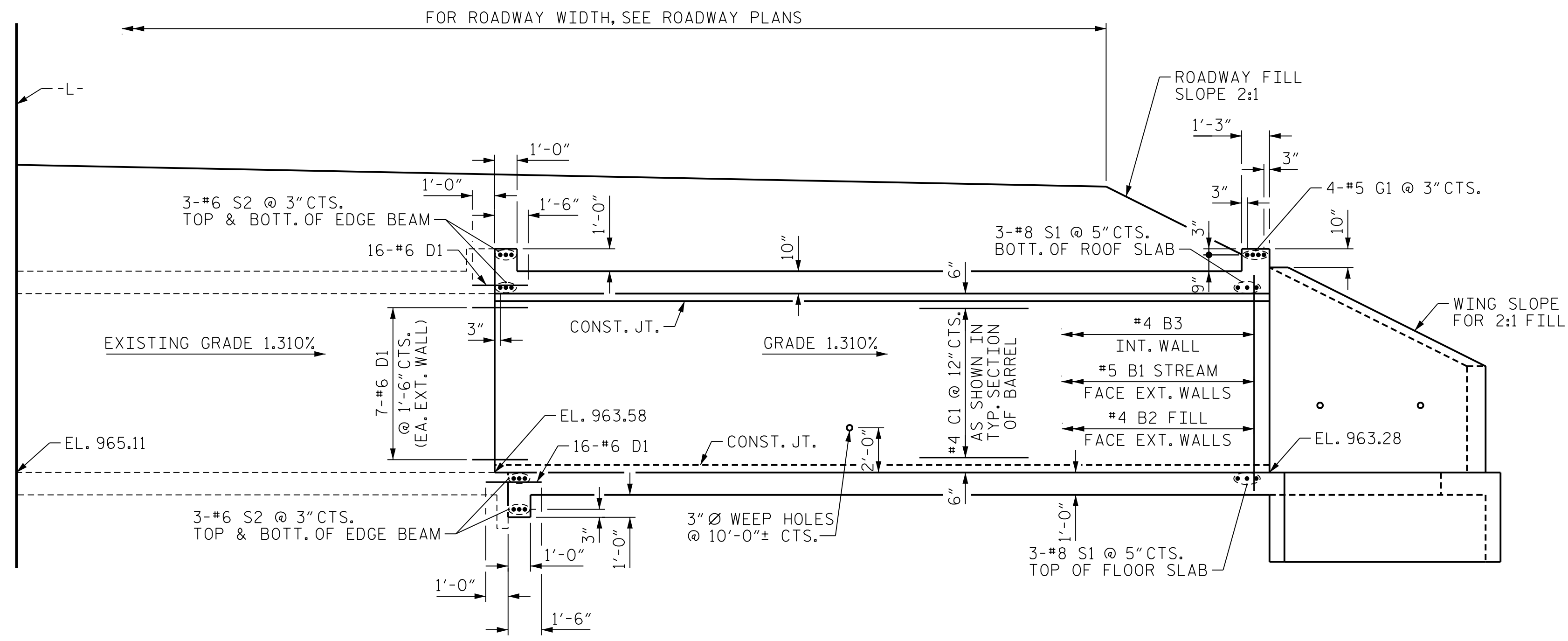
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C1-2
2			4			TOTAL SHEETS 8

LRFR SUMMARY
(LOOKING DOWNSTREAM)

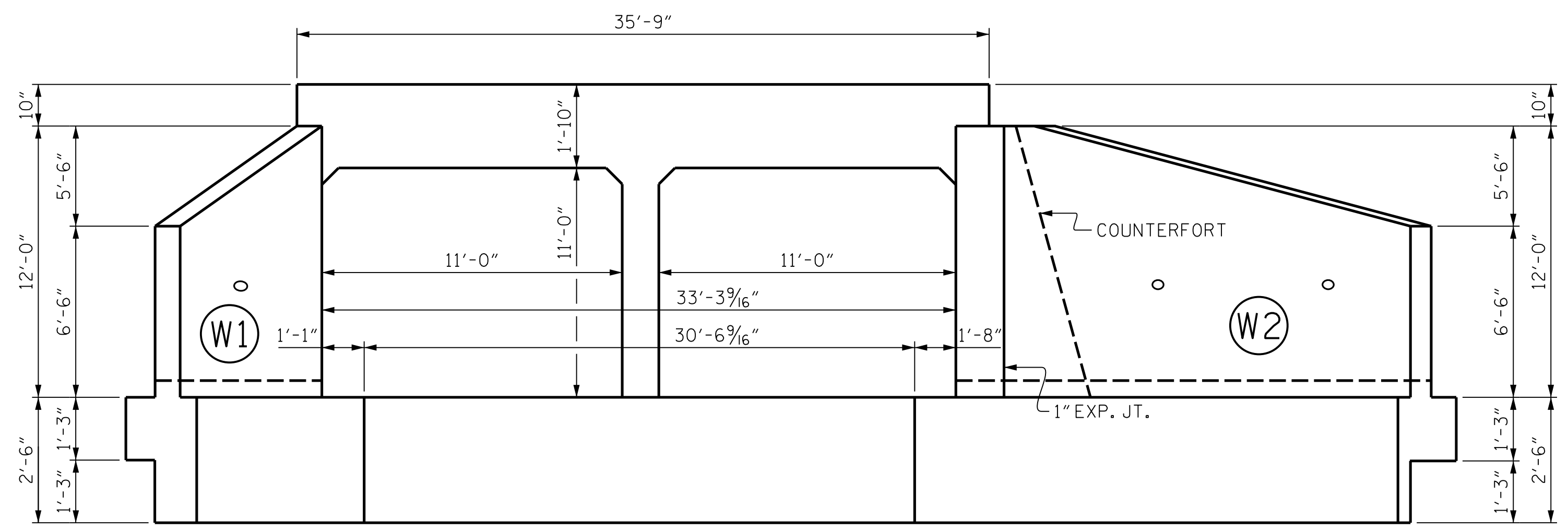
ASSEMBLED BY: B.E. LANNING	DATE: 04/2022
CHECKED BY: J.I. BREWER	DATE: 09/2022
DESIGN ENGINEER OF RECORD: J.I. BREWER	DATE: 09/2022
DRAWN BY: WMC 7/II	REV. 10/1/II MAA/GM
CHECKED BY: GM 7/II	REV. 12/17 MAA/THC

STD. NO. LRFR5

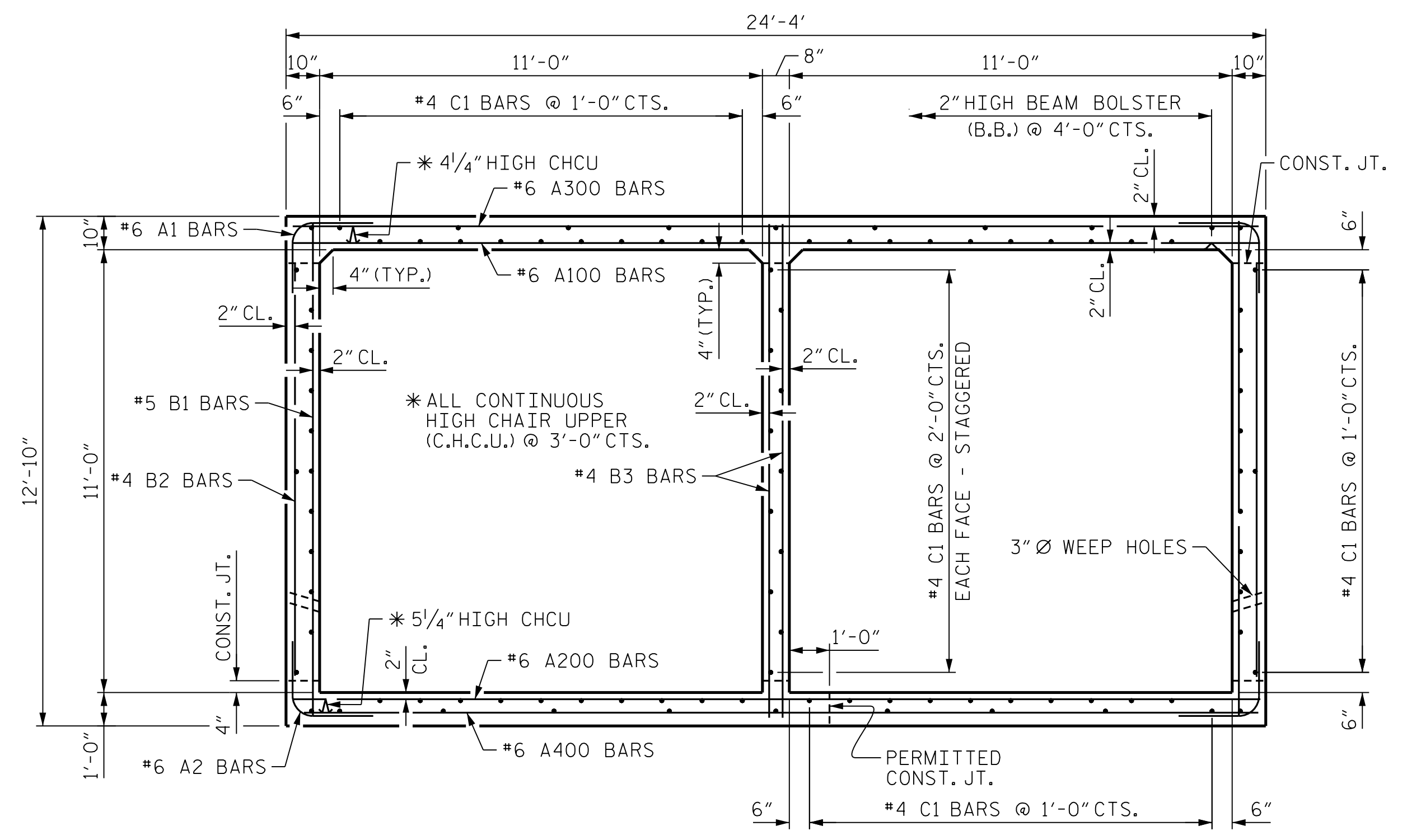
4/11/2023 1:11:37 PM User: blanning
 Filename: N:\NC Bridges\MI7004_VHB_U-5312\Culverts & Walls\U-5312\Structures\410.005.U5312.SMU.CU3.960062.dgn



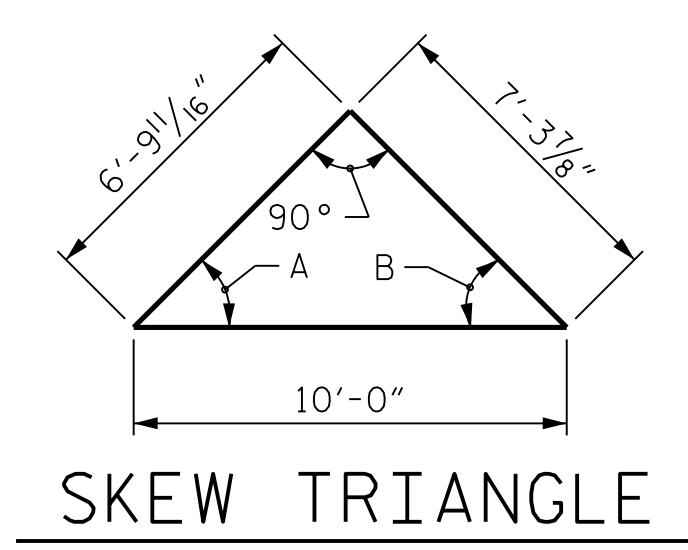
EXISTING CULVERT PROPOSED EXTENSION
 CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION
 (OUTLET END)



RIGHT ANGLE SECTION OF BARREL
 THERE ARE 97 #6 BARS IN SECTION OF BARREL.

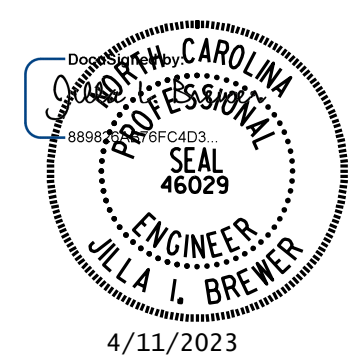


A 47°-06'-00"
 B 42°-54'-00"

SKEW TRIANGLE

PROJECT NO. U-5312
 WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 3 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 RIGHT EXTENSION
 DOUBLE 11 FT. X 11 FT.
 CONCRETE BOX CULVERT
 42°-54'-00" SKEW

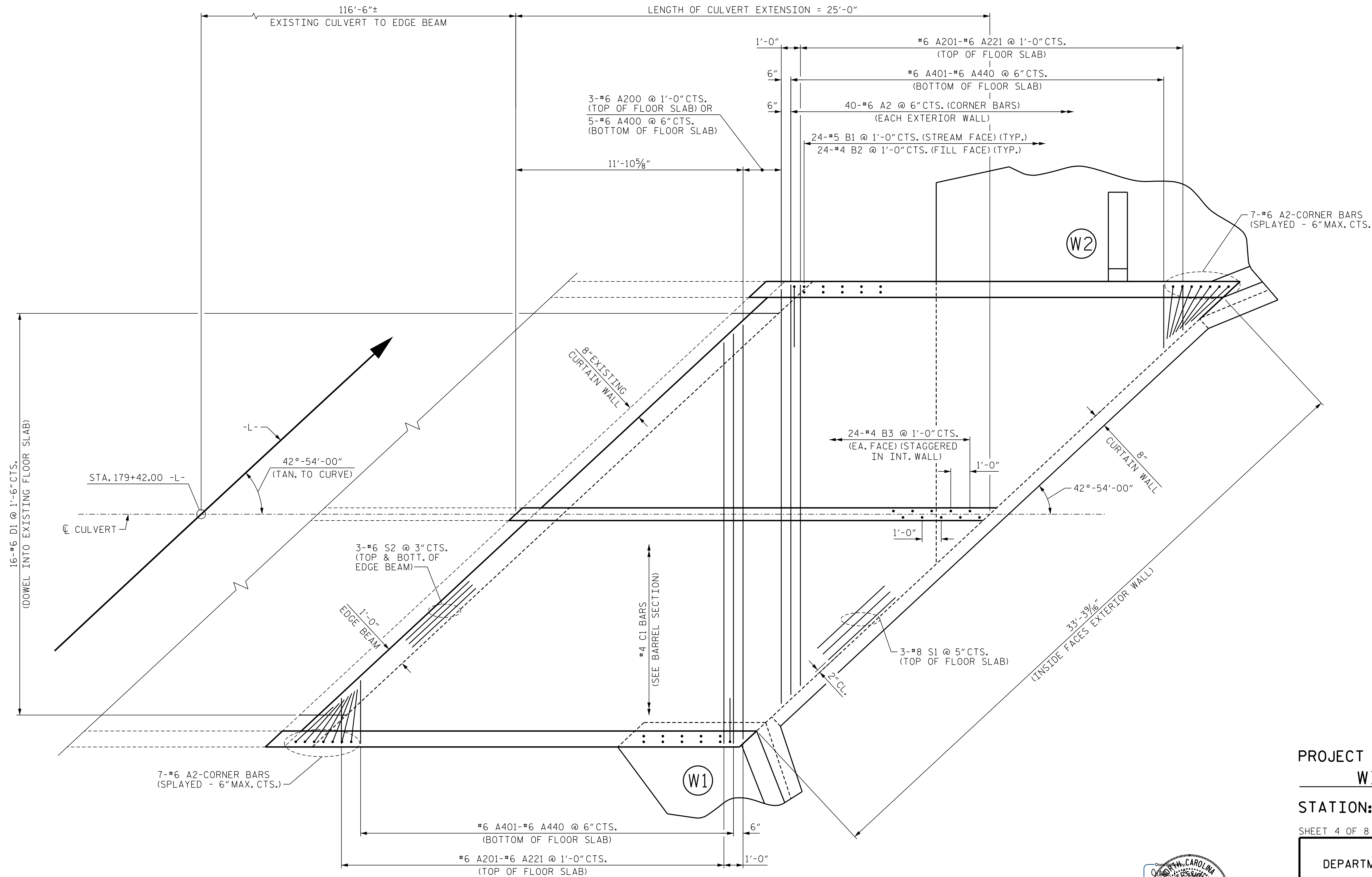
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-3
1			3			TOTAL SHEETS
2			4			8

DRAWN BY : B.E. LANNING	DATE : 04/2022
CHECKED BY : J.I. BREWER	DATE : 05/2022
DESIGN ENGINEER OF RECORD : J.I. BREWER	DATE : 09/2022

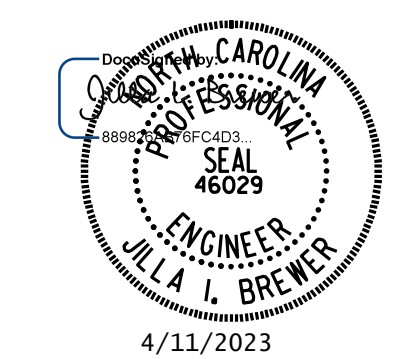
4/11/2023
11:13:38 PM
User: blanning
Filename: N:\NC Bridges\MI7004_VHB_U-5312\Culverts & Walls\U-5312\Structures\10.007.U5312.SMU.CU4.960062.dgn



PLAN - FLOOR SLAB

PROJECT NO. U-5312
WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 4 OF 8



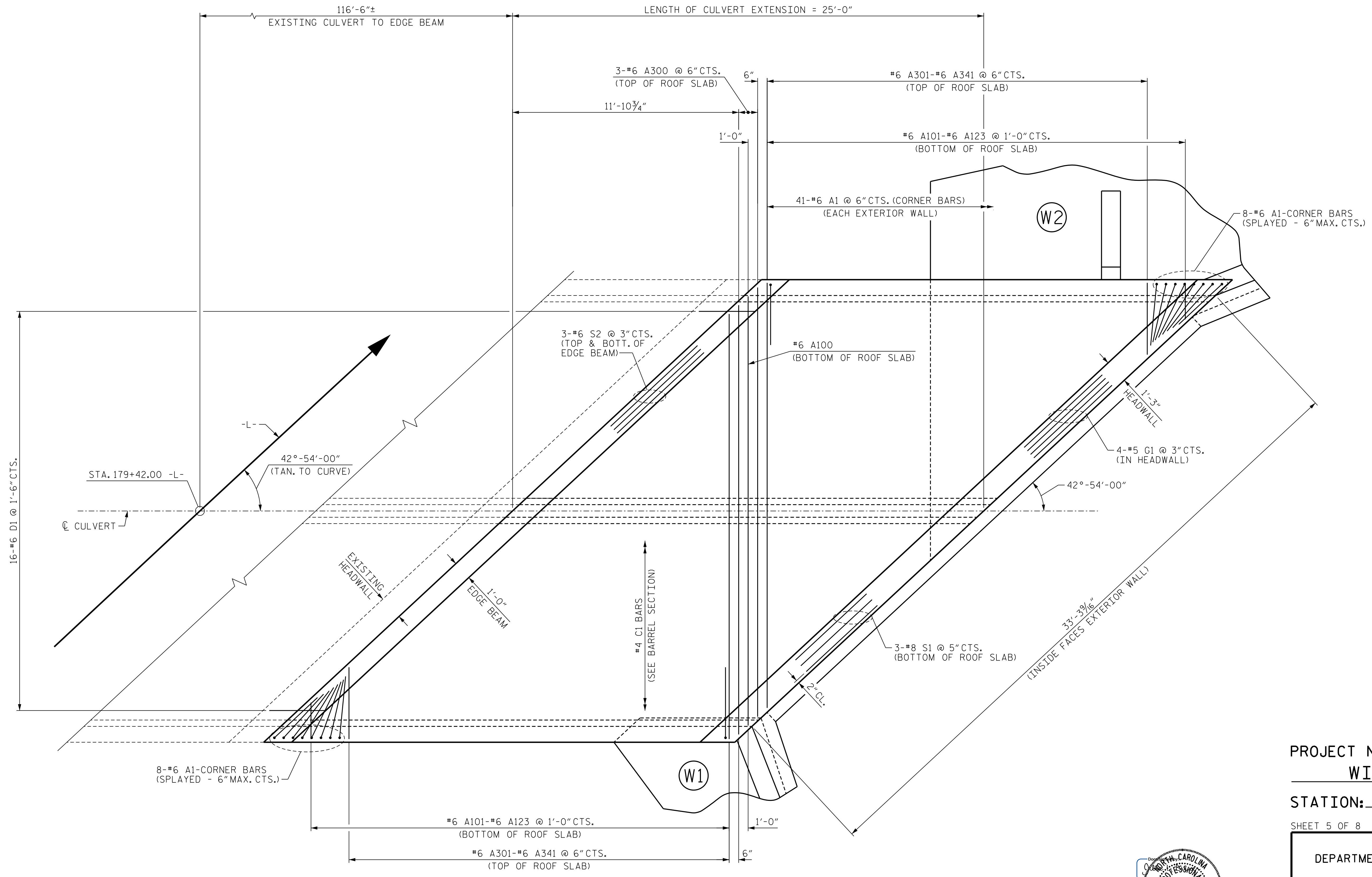
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
RIGHT EXTENSION DOUBLE 11 FT. X 11 FT. CONCRETE BOX CULVERT 42°-54'-00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C1-4					TOTAL SHEETS 8

DRAWN BY : B.E. LANNING	DATE : 04/2022
CHECKED BY : J.I. BREWER	DATE : 05/2022
DESIGN ENGINEER OF RECORD : J.I. BREWER	DATE : 09/2022

4/11/2023 1:11:39 PM User: blanning
 Filename: N:\NC Bridges\MI7004_VHB_U-5312\Culverts & Walls\U-5312\Structures\10.009.U5312.SMU.CU5.960062.dgn

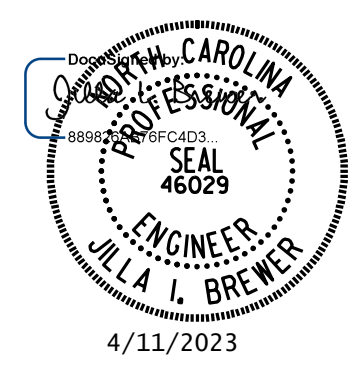


PLAN - ROOF SLAB

PROJECT NO. U-5312
WILKES COUNTY
 STATION: 179+42.00 -L-
 SHEET 5 OF 8

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

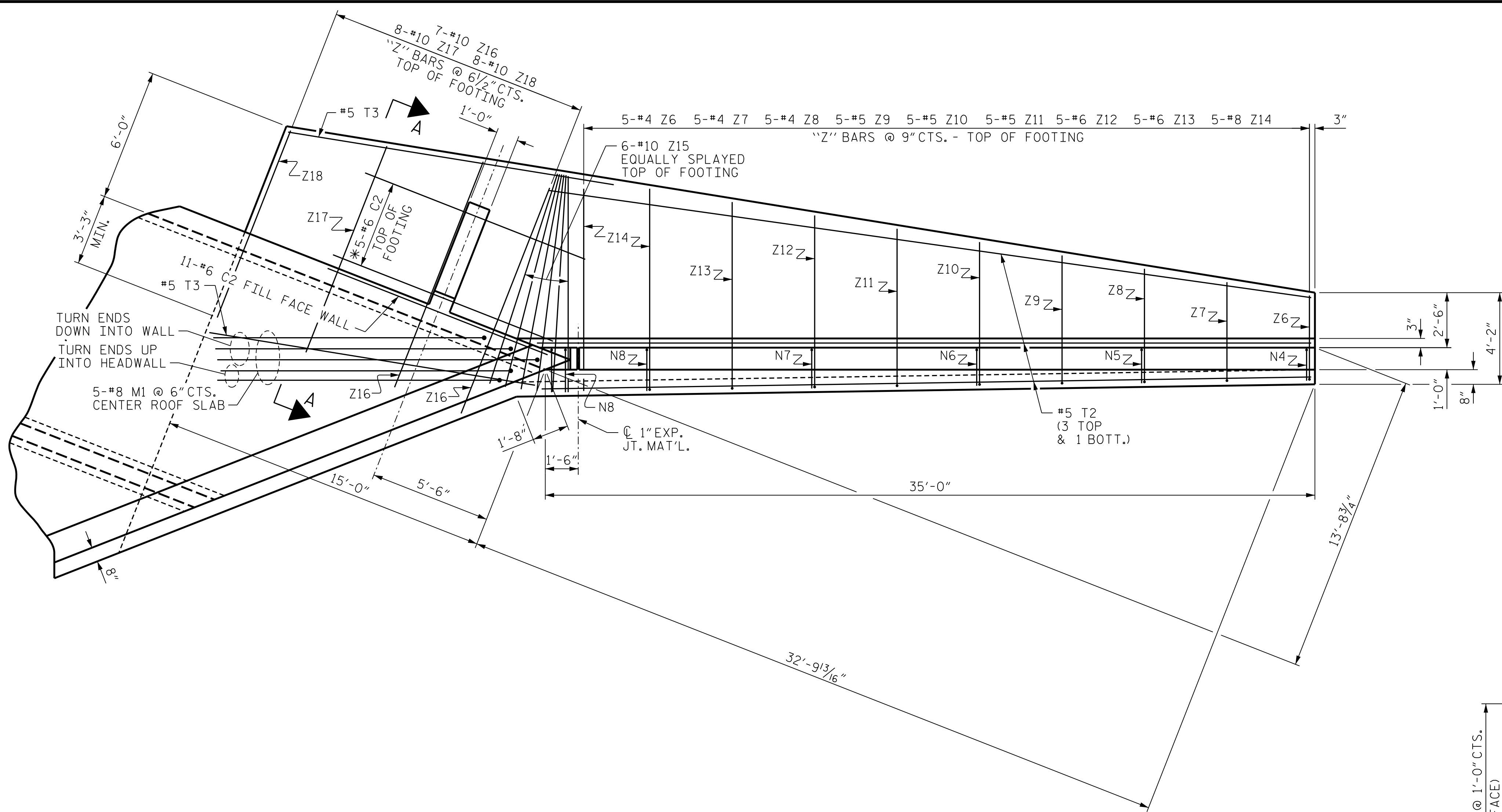
RIGHT EXTENSION
 DOUBLE 11 FT. X 11 FT.
 CONCRETE BOX CULVERT
 42°-54'-00" SKEW



**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

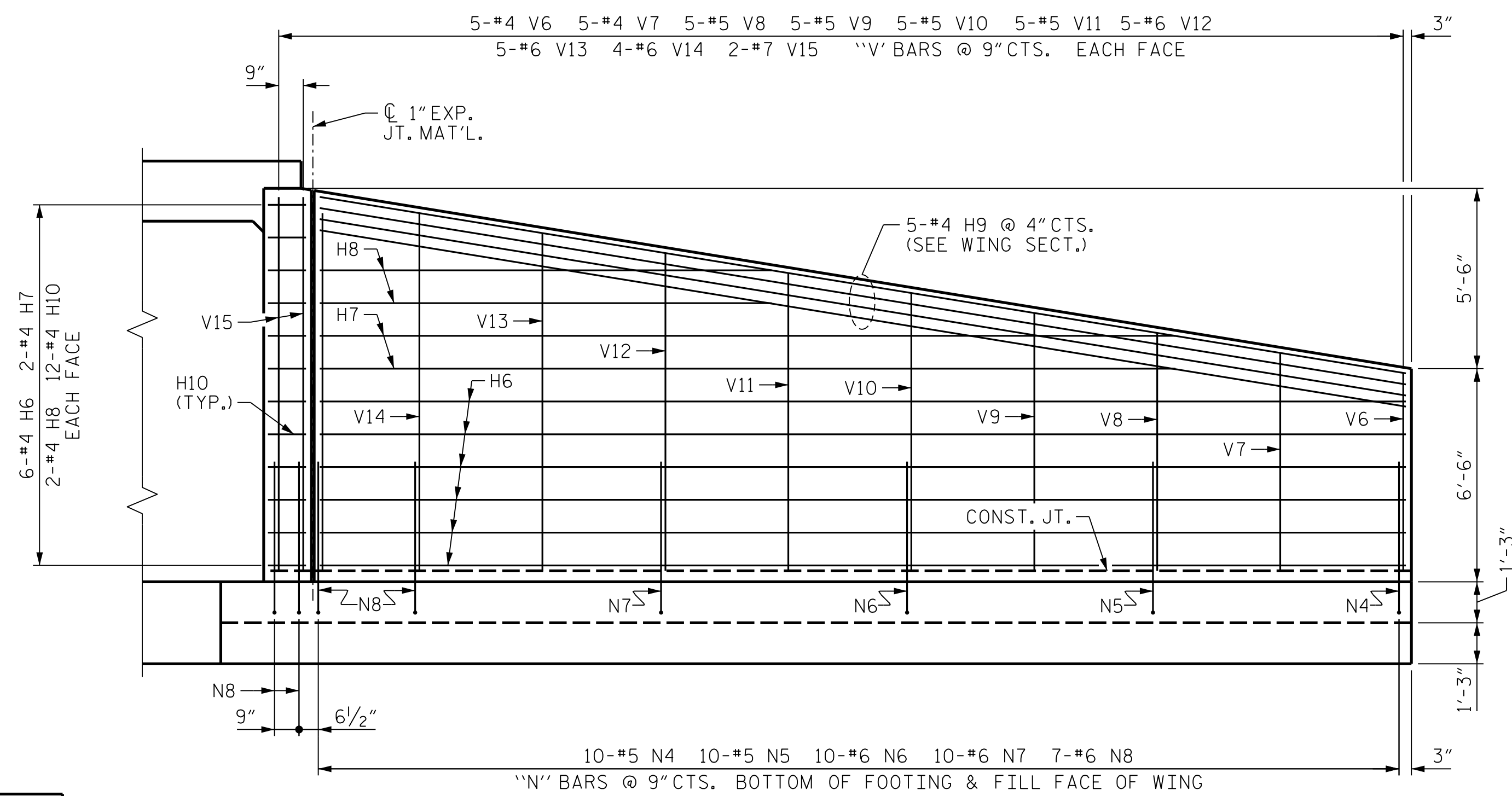
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-5
1			3			TOTAL SHEETS
2			4			8

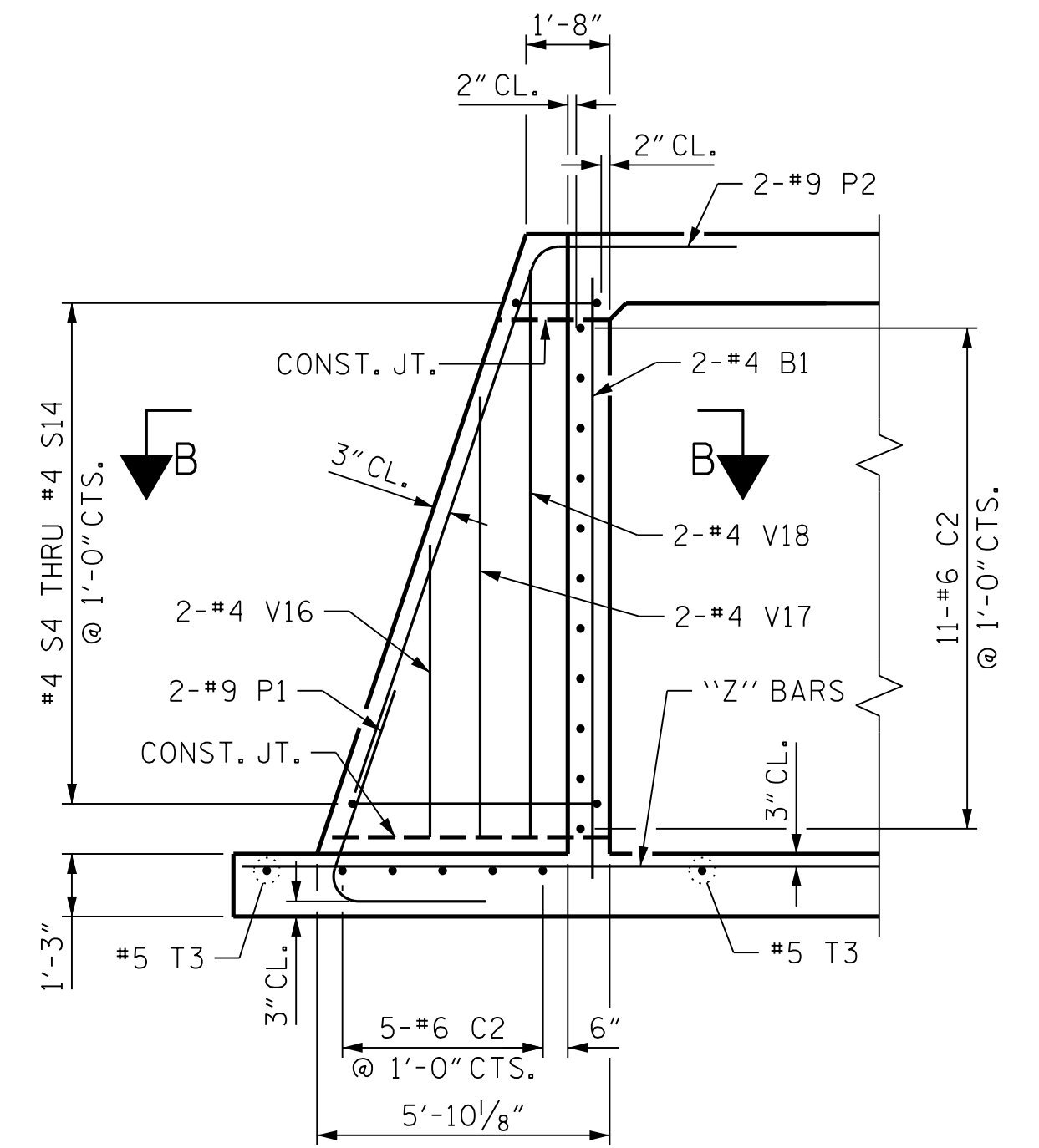


PLAN W2

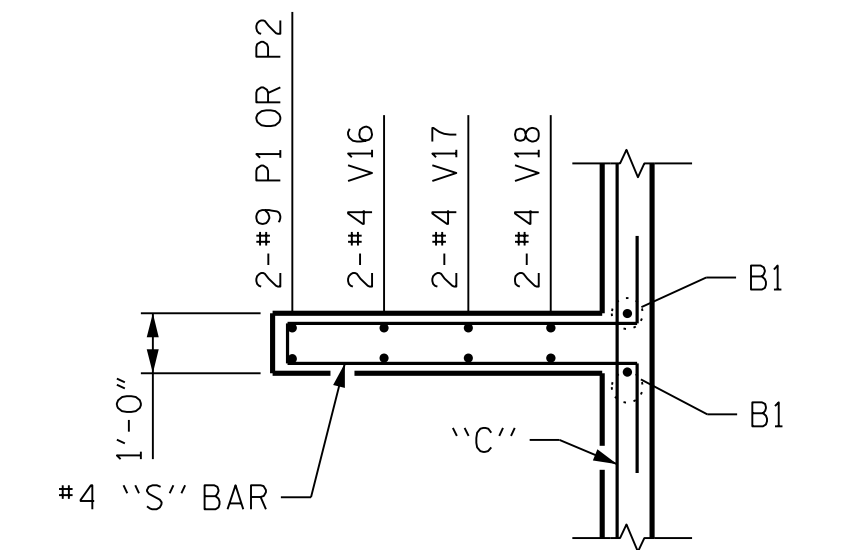
* CENTER ALL #6 C2 BARS ON ϕ COUNTERFORT



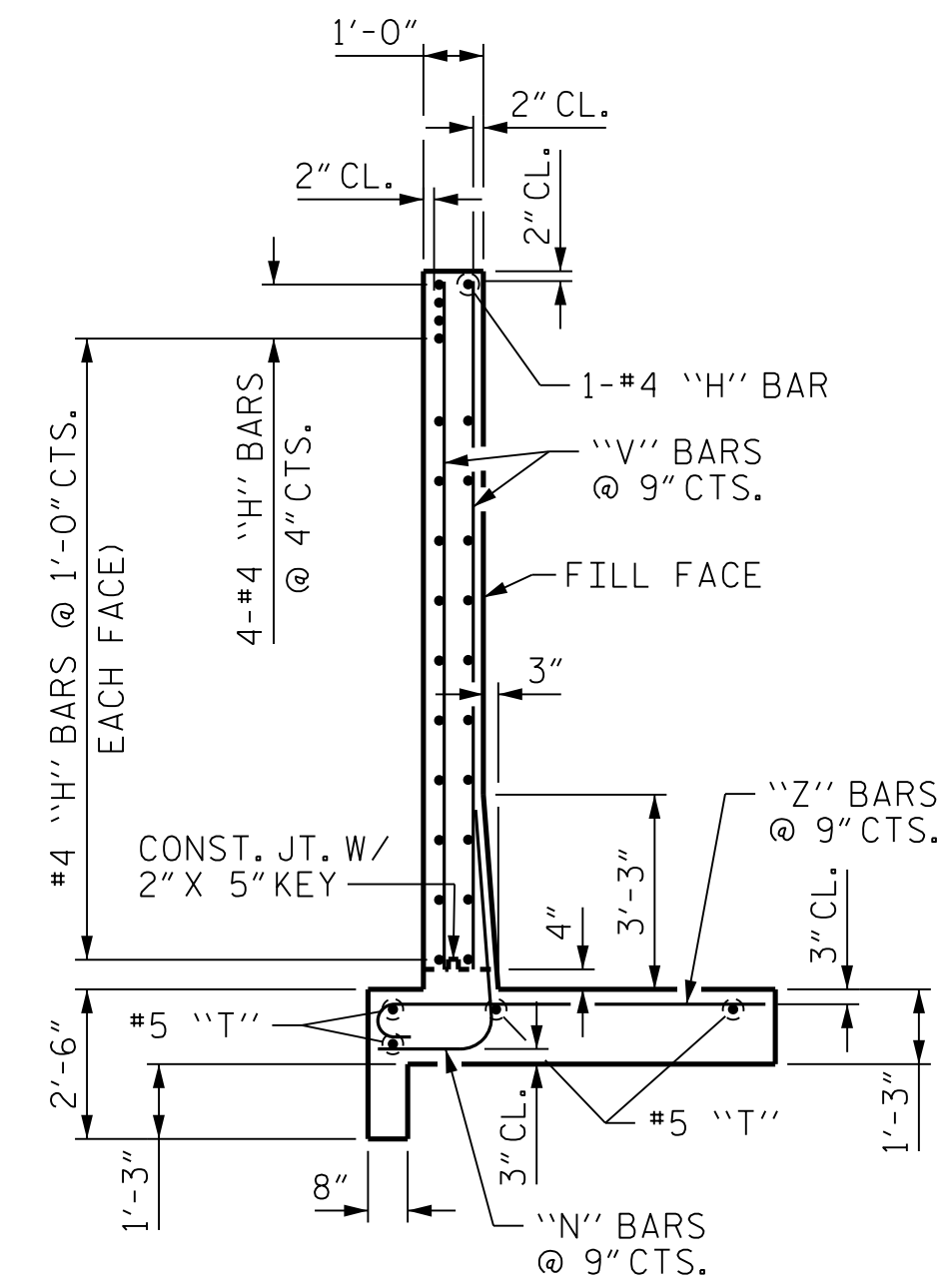
ELEVATION W2



SECTION A-A



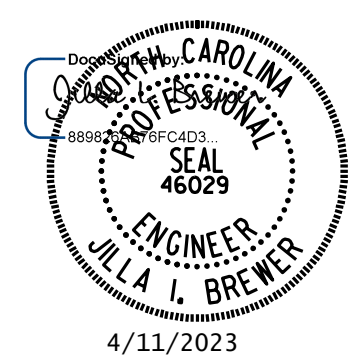
SECTION B-B



TYPICAL WING SECTION

PROJECT NO. U-5312
WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 7 OF 8

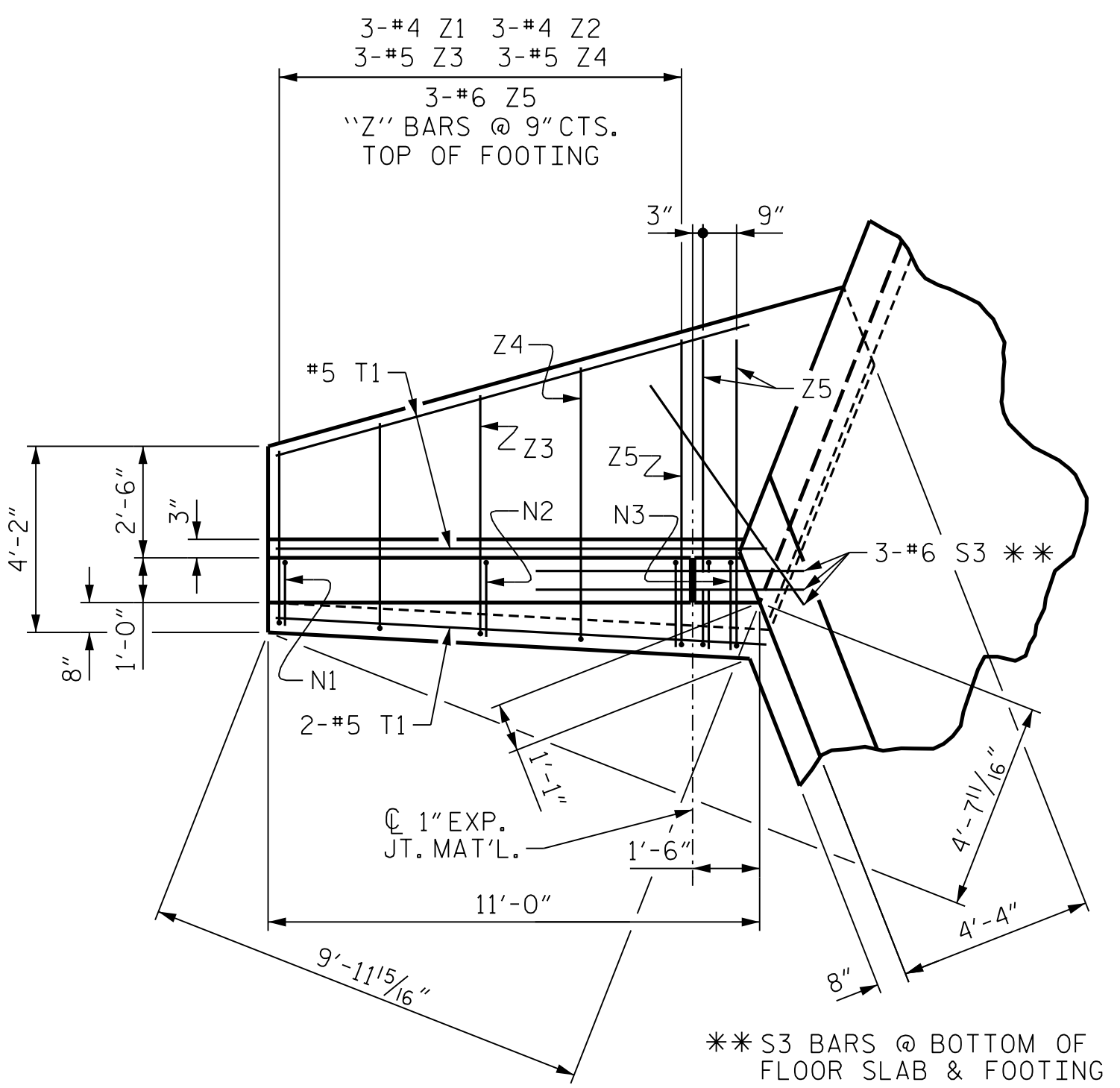


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**WINGS DETAILS FOR
 CONCRETE BOX
 CULVERT EXTENSION**

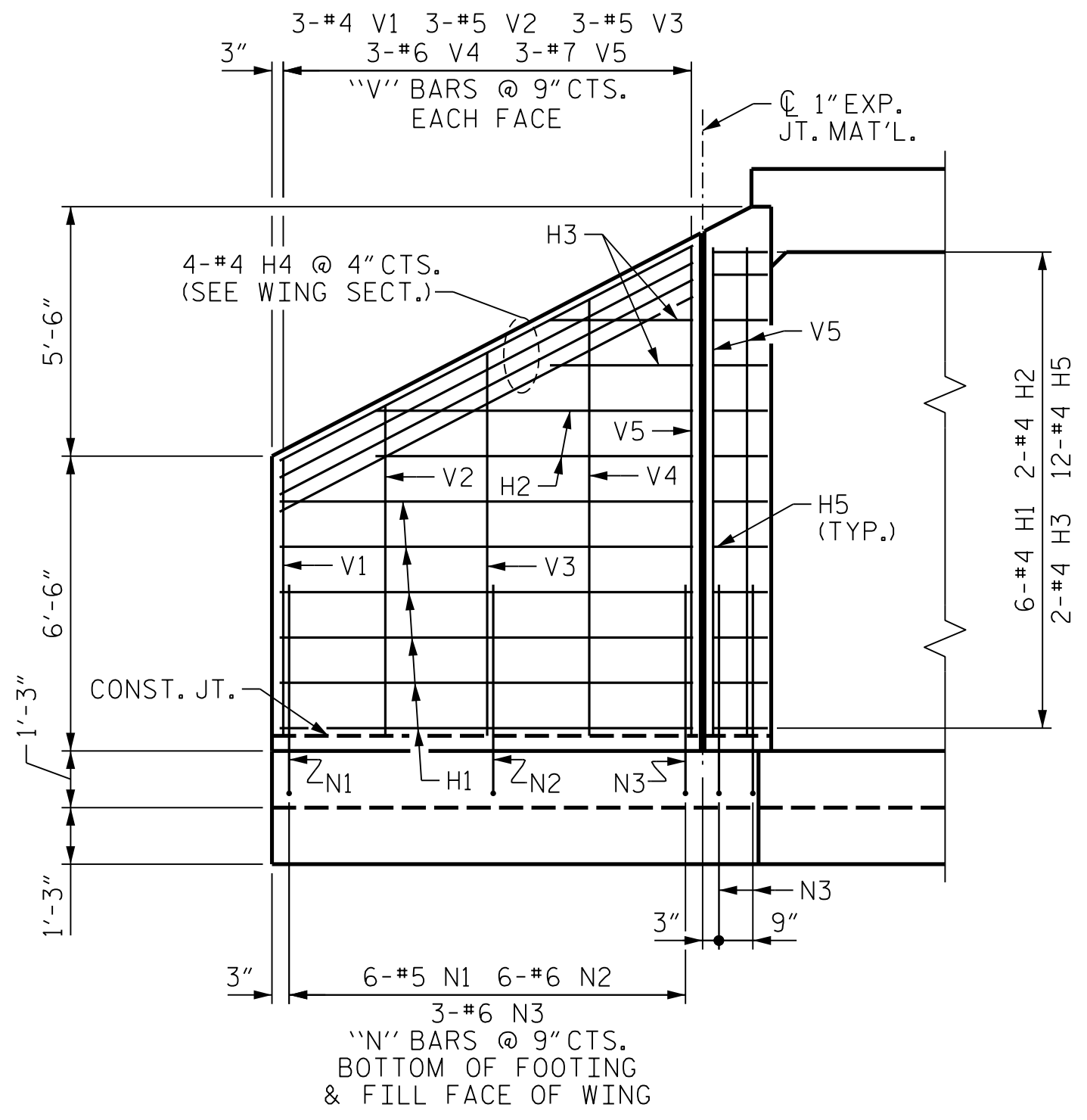
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671		REVISIONS		SHEET NO. C1-7
NO.	BY:	DATE:	NO.	BY:	DATE:					TOTAL SHEETS 8
1			3							
2			4							

4/11/2023 1:11:42 PM User: blanning
 Filenamer: N:\NC Bridges\MI7004_VHB_U-5312_Culverts & Walls\U-5312\Structures\410_013_U5312_SML_CUT_960062.dgn

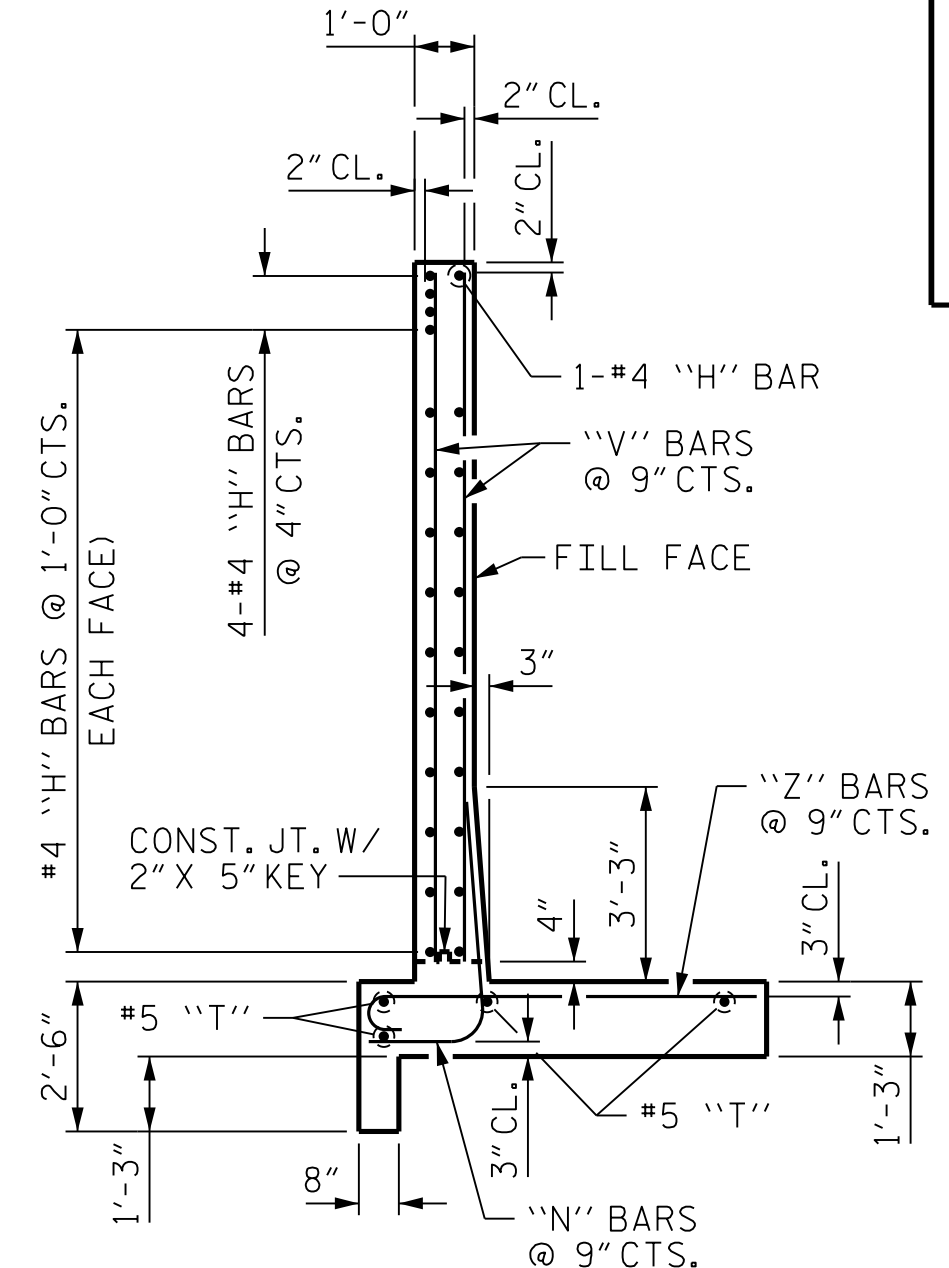
DRAWN BY: <u>B.E. LANNING</u>	DATE: <u>06/2022</u>
CHECKED BY: <u>J.I. BREWER</u>	DATE: <u>09/2022</u>
DESIGN ENGINEER OF RECORD: <u>J.I. BREWER</u>	DATE: <u>09/2022</u>



PLAN W1

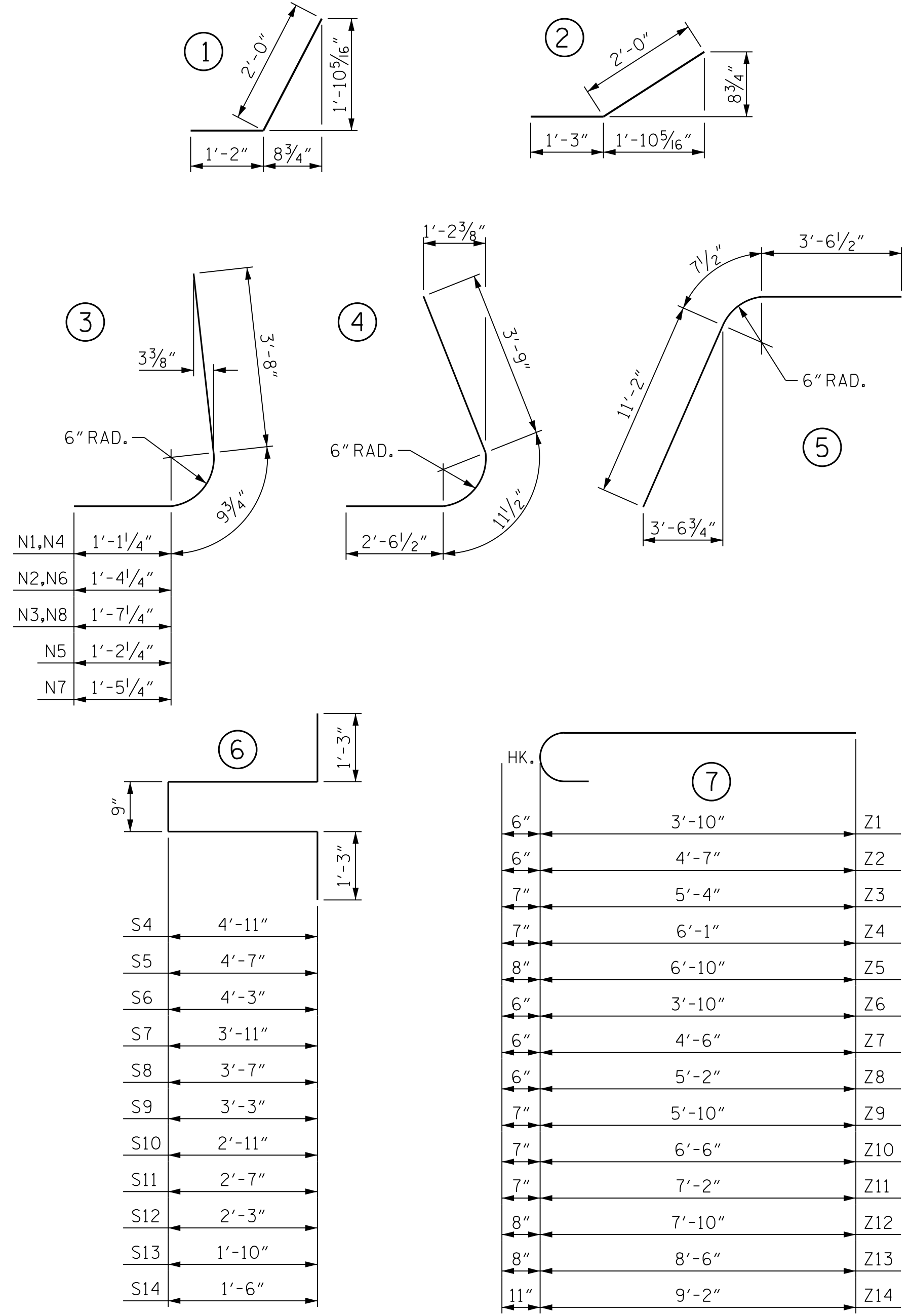


ELEVATION W1



TYPICAL WING SECTION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

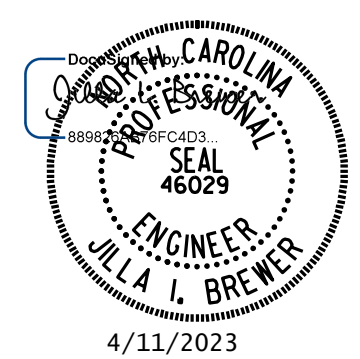
BILL OF MATERIAL

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#4	STR	12'-0"	16	T1	4	#5	STR	11'-0"	46
						T2	4	#5	STR	35'-0"	146
C2	16	#6	STR	10'-9"	258	T3	2	#5	STR	15'-0"	31
H1	12	#4	STR	9'-1"	73	V1	6	#4	STR	6'-1"	24
H2	4	#4	STR	7'-0"	19	V2	6	#5	STR	7'-3"	45
H3	4	#4	STR	3'-1"	8	V3	6	#5	STR	8'-5"	53
H4	5	#4	STR	10'-3"	34	V4	6	#6	STR	9'-7"	86
H5	24	#4	1	3'-2"	51	V5	6	#7	STR	10'-9"	132
H6	12	#4	STR	33'-1"	265	V6	10	#4	STR	6'-0"	40
H7	4	#4	STR	26'-0"	69	V7	10	#4	STR	6'-7"	44
H8	4	#4	STR	13'-9"	37	V8	10	#5	STR	7'-3"	76
H9	5	#4	STR	33'-6"	112	V9	10	#5	STR	7'-10"	82
H10	24	#4	2	3'-3"	52	V10	10	#5	STR	8'-5"	88
						V11	10	#5	STR	9'-1"	95
N1	6	#5	3	5'-7"	35	V12	10	#6	STR	9'-8"	145
N2	6	#6	3	5'-10"	53	V13	10	#6	STR	10'-3"	154
N3	3	#6	3	6'-1"	27	V14	8	#6	STR	10'-10"	130
N4	10	#5	3	5'-7"	58	V15	4	#7	STR	11'-4"	93
N5	10	#5	3	5'-8"	59	V16	2	#4	STR	5'-10"	8
N6	10	#6	3	5'-10"	88	V17	2	#4	STR	8'-9"	12
N7	10	#6	3	5'-11"	89	V18	2	#4	STR	11'-4"	15
N8	7	#6	3	6'-1"	64						
						Z1	3	#4	7	4'-4"	9
P1	2	#9	4	7'-3"	49	Z2	3	#4	7	5'-1"	10
P2	2	#9	5	15'-4"	104	Z3	3	#5	7	5'-11"	19
						Z4	3	#5	7	6'-8"	21
S3	6	#6	6	6'-0"	54	Z5	3	#6	7	7'-6"	34
S4	1	#4	6	13'-1"	9	Z6	5	#4	7	4'-4"	14
S5	1	#4	6	12'-5"	8	Z7	5	#4	7	5'-0"	17
S6	1	#4	6	11'-9"	8	Z8	5	#4	7	5'-8"	19
S7	1	#4	6	11'-1"	7	Z9	5	#5	7	6'-5"	33
S8	1	#4	6	10'-5"	7	Z10	5	#5	7	7'-1"	37
S9	1	#4	6	9'-9"	7	Z11	5	#5	7	7'-9"	40
S10	1	#4	6	9'-1"	6	Z12	5	#6	7	8'-6"	64
S11	1	#4	6	8'-5"	6	Z13	5	#6	7	9'-2"	69
S12	1	#4	6	7'-9"	5	Z14	5	#8	7	10'-1"	135
S13	1	#4	6	6'-11"	5	Z15	6	#10	STR	9'-9"	252
S14	1	#4	6	6'-3"	4	Z16	7	#10	STR	11'-0"	331
						Z17	8	#10	STR	10'-0"	344
						Z18	8	#10	STR	9'-1"	313

REINFORCING STEEL FOR 2 WINGS	5,052 LBS
CLASS A CONCRETE	
2 WINGS	40.6 CY
1 HEADWALL	1.7 CY
1 END CURTAIN WALL	1.9 CY
TOTAL	44.2 CY

PROJECT NO. U-5312
 WILKES COUNTY
 STATION: 179+42.00 -L-

SHEET 8 OF 8



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
 1011 SCHAUH DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-8
1			3			TOTAL SHEETS 8
2			4			

4/11/2023 1:11:43 PM User: blanning
 Filenamer: N:\NC Bridges\MI7004_VHB_U-5312_Culverts & Wallis\U-5312\Structures\410.015.U5312_SML\CUB_960062.dgn

DRAWN BY: B.E. LANNING DATE: 06/2022
 CHECKED BY: J.I. BREWER DATE: 09/2022
 DESIGN ENGINEER OF RECORD: J.I. BREWER DATE: 09/2022

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990