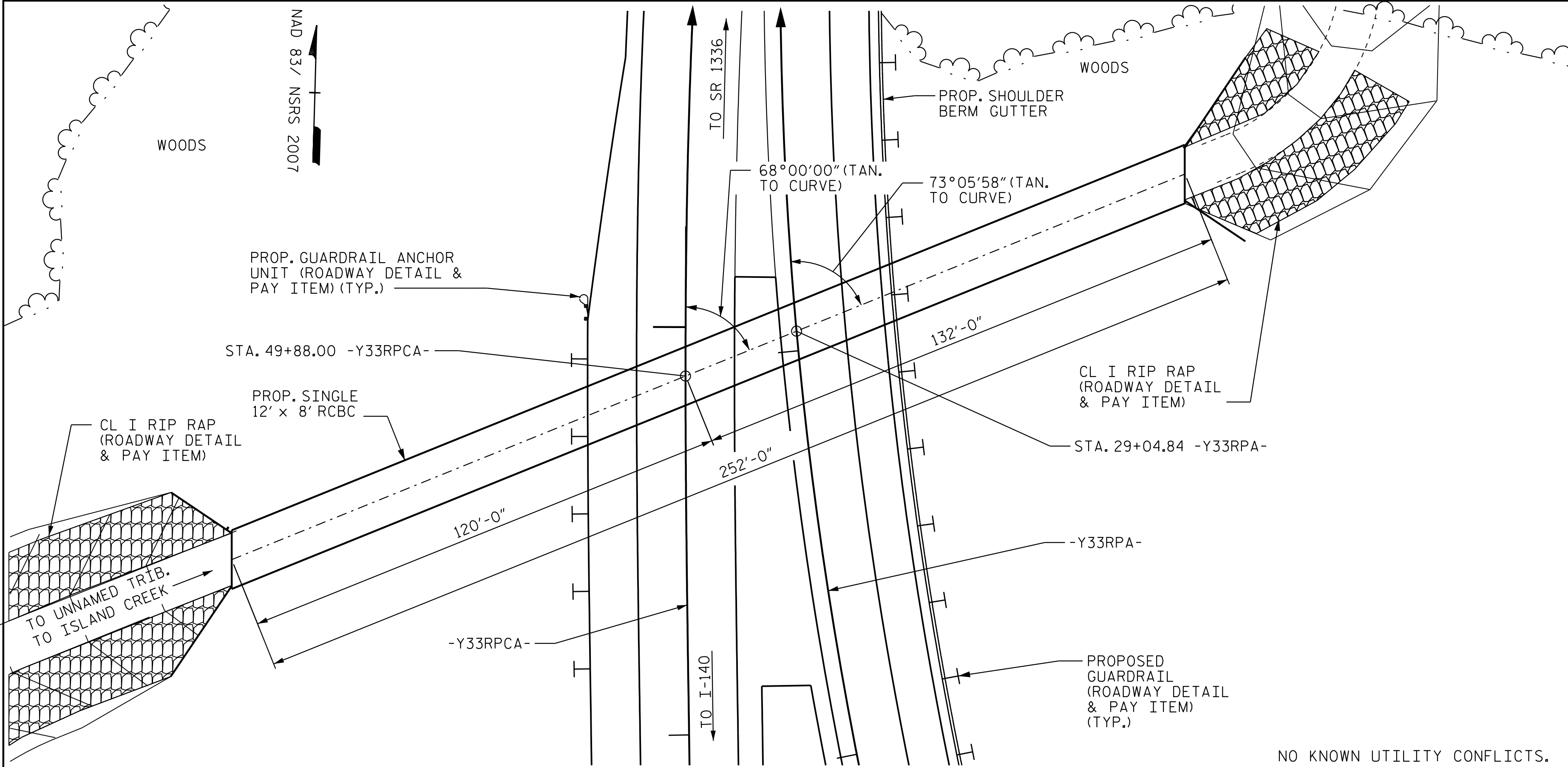
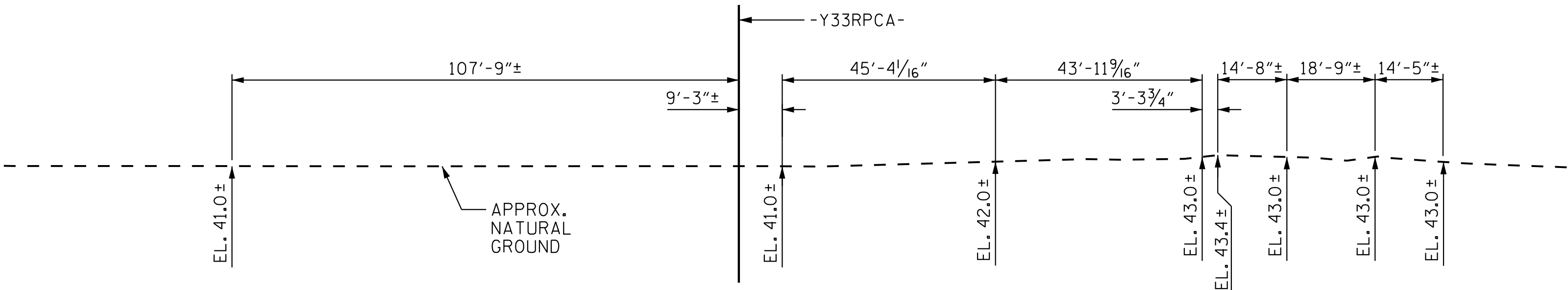


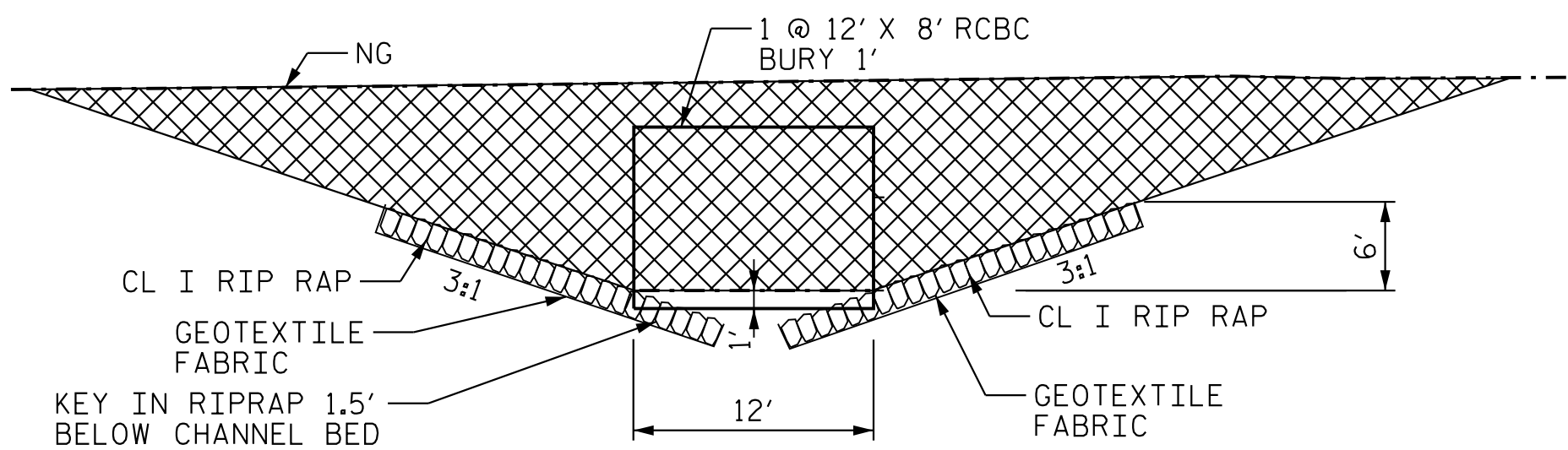
BM #1: R.R. SPIKE IN 8" PINE TREE, 633' LT. OF STA. 243+30 -L-, 633' LT.. EL. 43.48



LOCATION SKETCH



PROFILE ALONG CULVERT



INLET & OUTLET CHANNEL DETAIL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)

NOTES

ASSUMED LIVE LOAD = HL-93.

DESIGN FILL= 29.79 FT.(MAXIMUM) 25.94 FT.(MINIMUM)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4"OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT, LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	367 TONS
FOUNDATION COND. GEOTEXTILE	448 S.Y.

CLASS A CONCRETE			
BARREL @	2.045	CY/FT	515.4 C.Y.
WINGS ETC.			42.5 C.Y.
TOTAL			557.9 C.Y.

REINFORCING STEEL	
BARREL	116,068 LBS.
WINGS ETC.	3,118 LBS.
TOTAL	119,186 LBS.

ROADWAY DATA

GRADE POINT EL. @ STATION 49+88 -Y33RPCA-	=	66.90
BED ELEV. @ STATION 49+88.00 -Y33RPCA-	=	30.0
ROADWAY SLOPES	=	3:1 (LT.) 3:1 (RT.)

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	1200 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	500+ YRS.
OVERTOPPING FLOOD ELEVATION	48.2
OVERTOPS ROADWAY AT STATION 43+76.1 -Y8RPDB- SAG RT. SHLD.	

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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

BACKFILL CULVERT BARREL WITH 1' OF NATIVE MATERIAL.

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE SYSTEM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APROVALBY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

FOUNDATION NOTES

EXCAVATE FOUNDATION A MINIMM OF 1.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 1.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL ENCAPSULATED IN TYPE 2 GEOTEXTILE IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS. FOR FOUNDATION CONDITIONING TEXTILE, SEE SPECIAL PROVISIONS.

CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT -Y33RPCA- STA. 49+88 WITH 3"OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

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

DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS BOX CULVERT SHALL BE SUBMITTED. SEE SHEET SN (SHEET SNSM).

HYDRAULIC DATA

DESIGN DISCHARGE	=	410 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	37.2
DRAINAGE AREA	=	0.56 SQ. MI.
BASIC DISCHARGE (Q100)	=	470 C.F.S.
BASIC HIGH WATER ELEVATION	=	37.8

PROJECT NO. R-3300A

NEW HANOVER COUNTY

STATION: 49+88.00 -Y33RPCA-

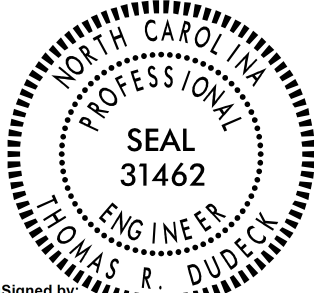
SHEET 1 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

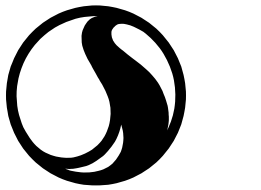
SINGLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

68°00'00" SKEW

REVISIONS						SHEET NO. C01-01
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			



DocuSigned by
Tommy Dudeck
41025220BCA2464E8
4/30/2025
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 08/26/20
CHECKED BY : T. N. ENNIS DATE : 11/23/20

DESIGN
ENGINEER
OF RECORD: T. R. DUDECK DATE : 04/22/25

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

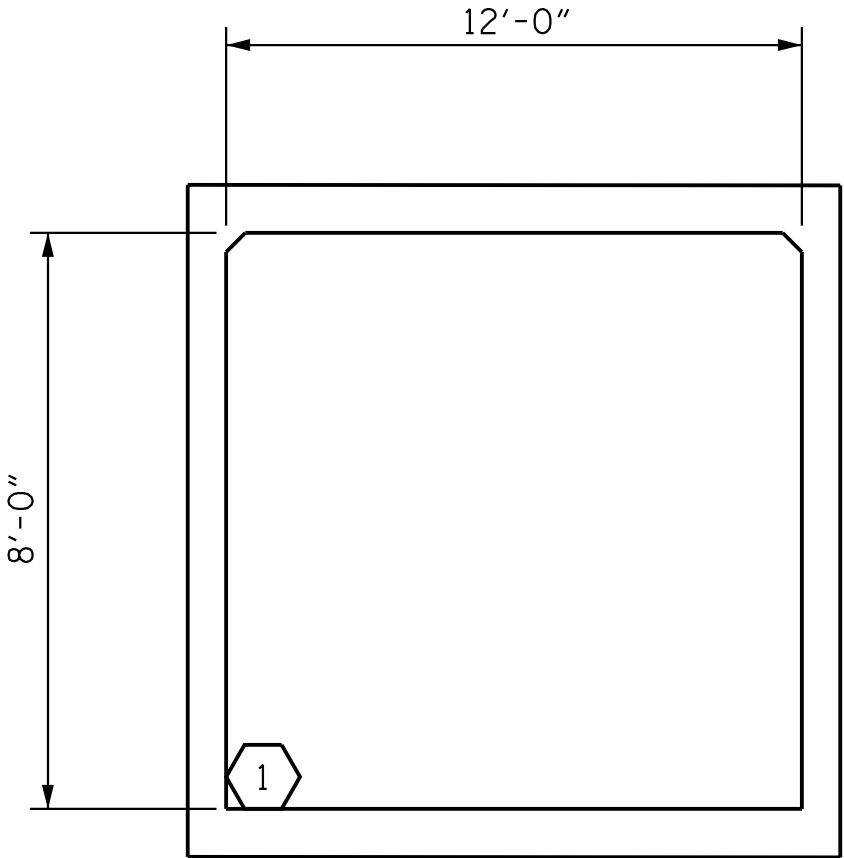
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

LOAD RATING FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS										
	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	STRENGTH I LIMIT STATE							
			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)
PERMANENT LOAD RATING	1	1.13	1.26	1	EXT. WALL - BOTTOM	0.00	1.13	1	LEFT END - BOTT. SLAB	0.00



BOX 1

LRFR SUMMARY

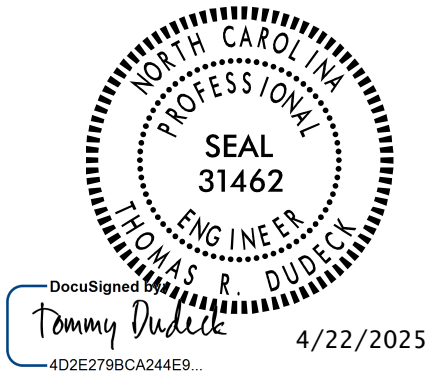
(LOOKING DOWNSTREAM)

PROJECT NO. R-3300A

NEW HANOVER COUNTY

STATION: 49+88.00 -Y33RPCA-

SHEET 2 OF 7



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)						REVISIONS			SHEET NO. C01-02
NO.	BY:	DATE:	NO.	BY:	DATE:				TOTAL SHEETS 07
1			3						
2			4						

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STD. NO. LRFR5

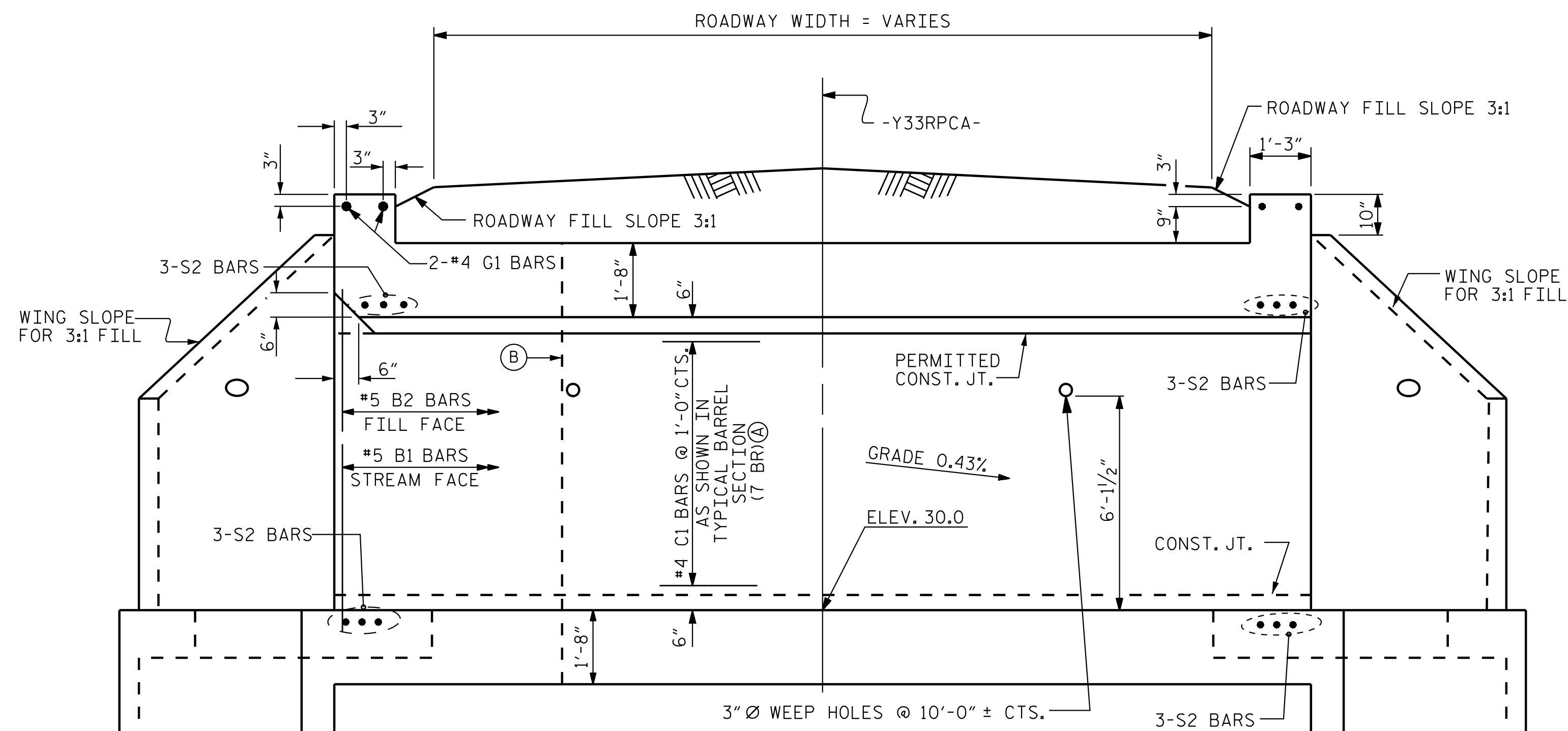


Stantec Consulting Services Inc
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

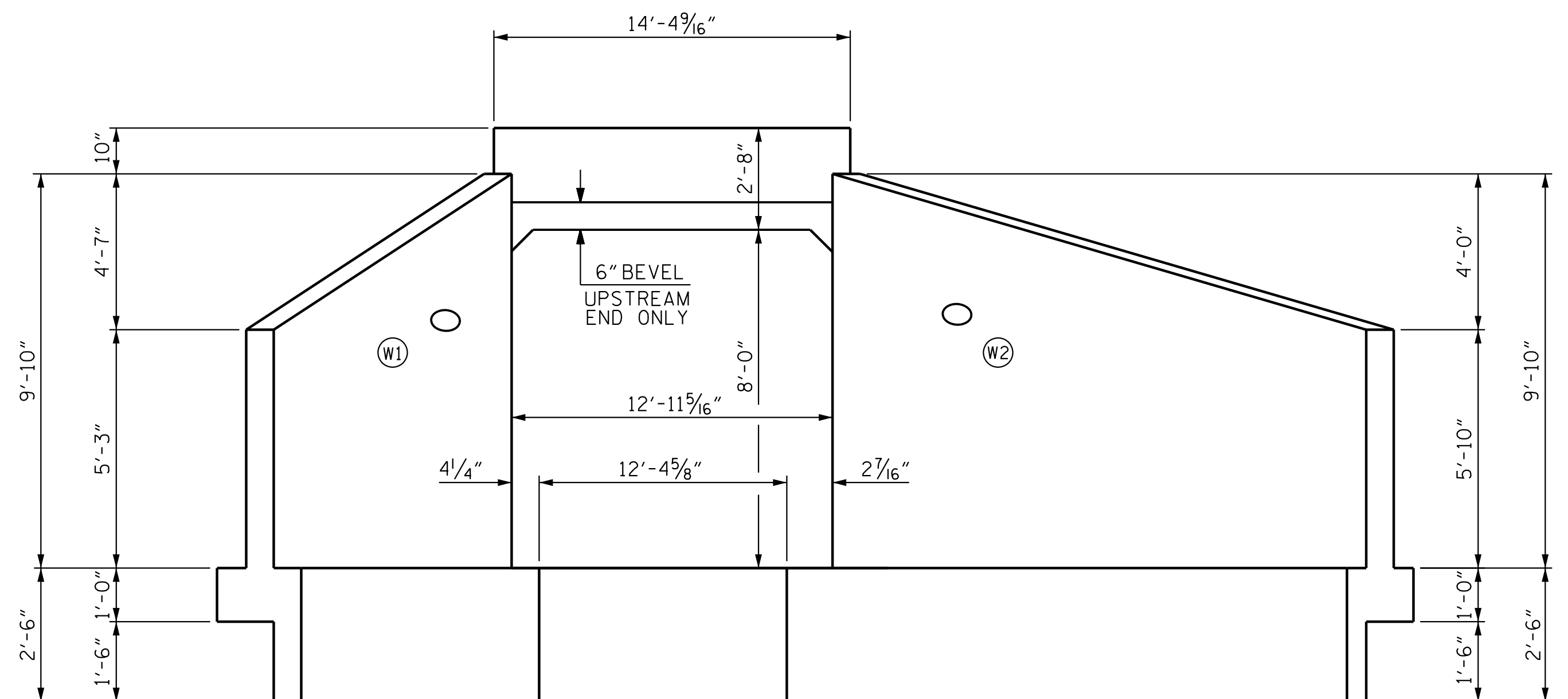
ASSEMBLED BY : J. HAGENBUSH DATE : 11/11/20
CHECKED BY : T. N. ENNIS DATE : 11/23/20

DRAWN BY : WMC 7/II REV. 10/1/II MAA/GM
CHECKED BY : GM 7/II REV. 12/17 MAA/THC

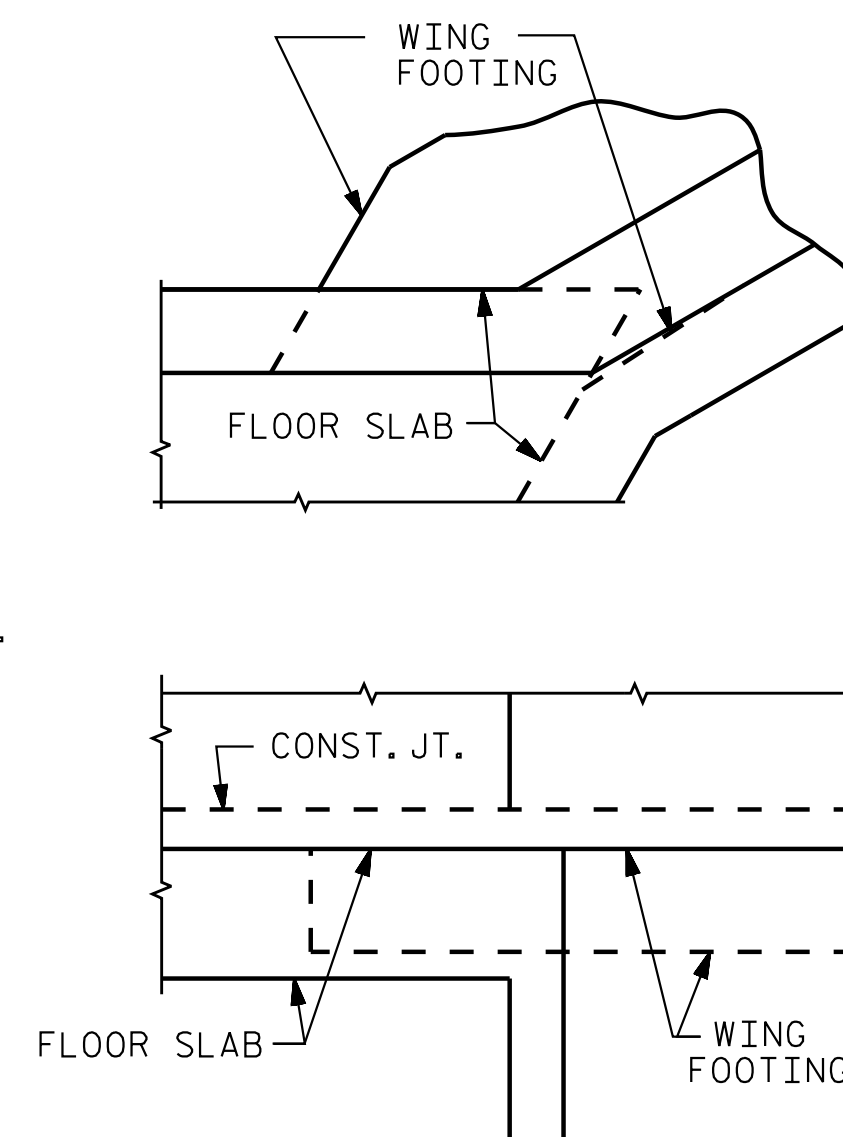
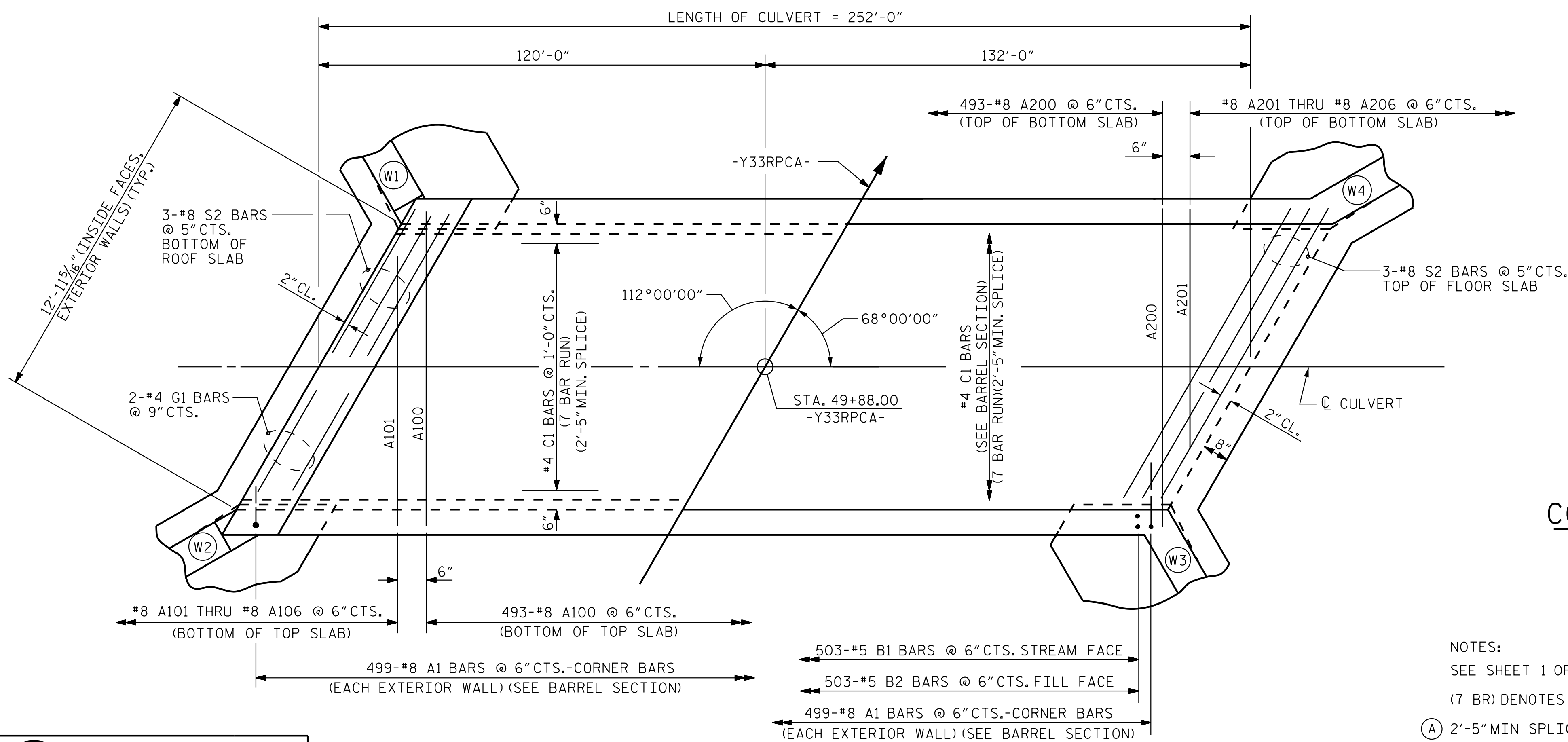
DESIGN ENGINEER
OF RECORD: T. R. DUDECK DATE : 04/22/25



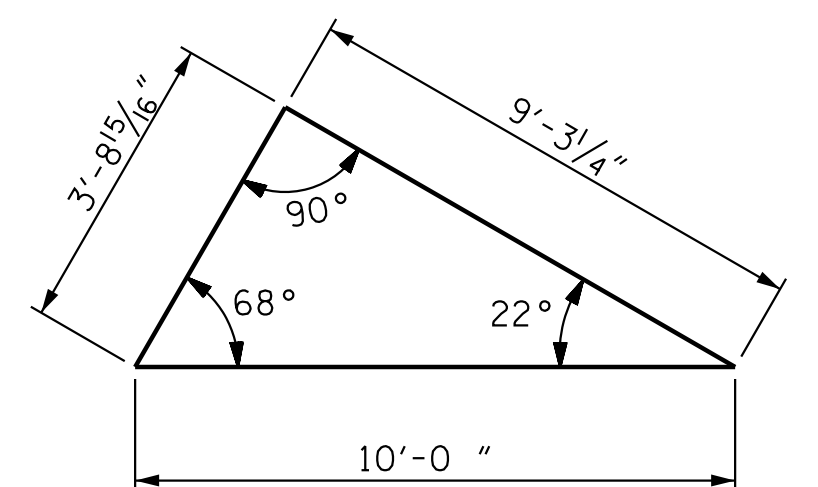
CULVERT SECTION NORMAL TO ROADWAY
(LOOKING UPSTATION)



END ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM)



CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING



SKEW TRIANGLE

PROJECT NO. R-3300A
NEW HANOVER COUNTY
 STATION: 49+88.00 -Y33RPCA-

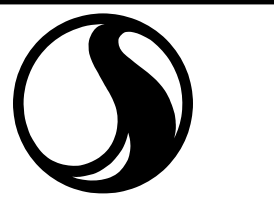
SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

68°00'00" SKEW

REVISIONS						SHEET NO. C01-03
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 11/18/20
CHECKED BY : T. N. ENNIS DATE : 11/23/20

DESIGN
ENGINEER
OF RECORD: T. R. DUDECK DATE : 04/22/25

PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

NOTES:

SEE SHEET 1 OF 7 FOR ADITONAL INFORMATION

(7 BR) DENOTES 7 BAR RUN

(A) 2'-5" MIN SPLICE

(B) TRANSVERSE CONSTRUCTION JOINTS
(3 REQ'D.) (SEE NOTES SHT.1 OF 6)



DocuSigned by
Tommy Duda
4D2E2709CA244E6

4/22/2025

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



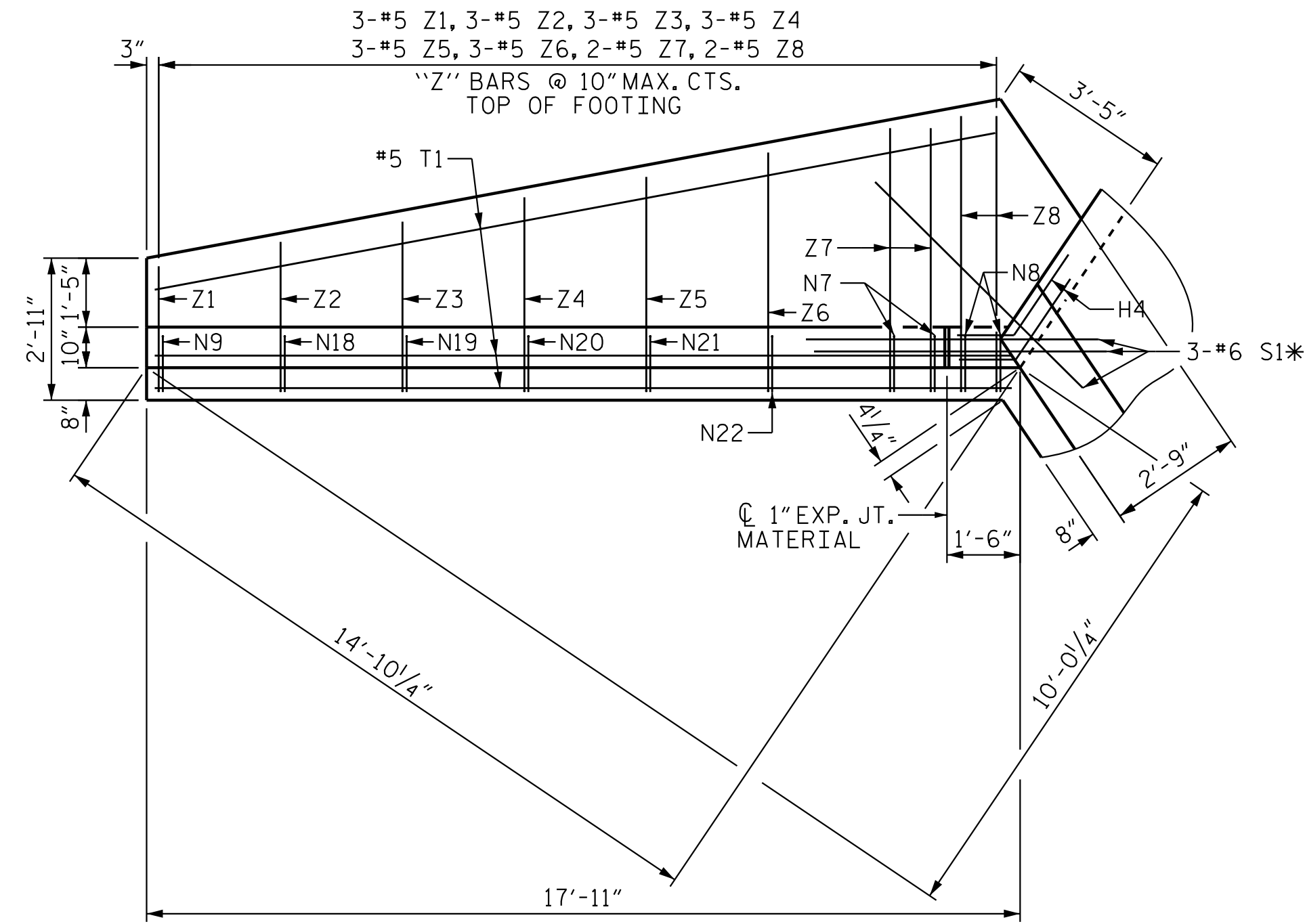
WEEP HOLES NOT SHOWN FOR CLARITY.

DESIGN
ENGINEER
OF RECORD: T. R. DUDECK DATE : 04/22/25

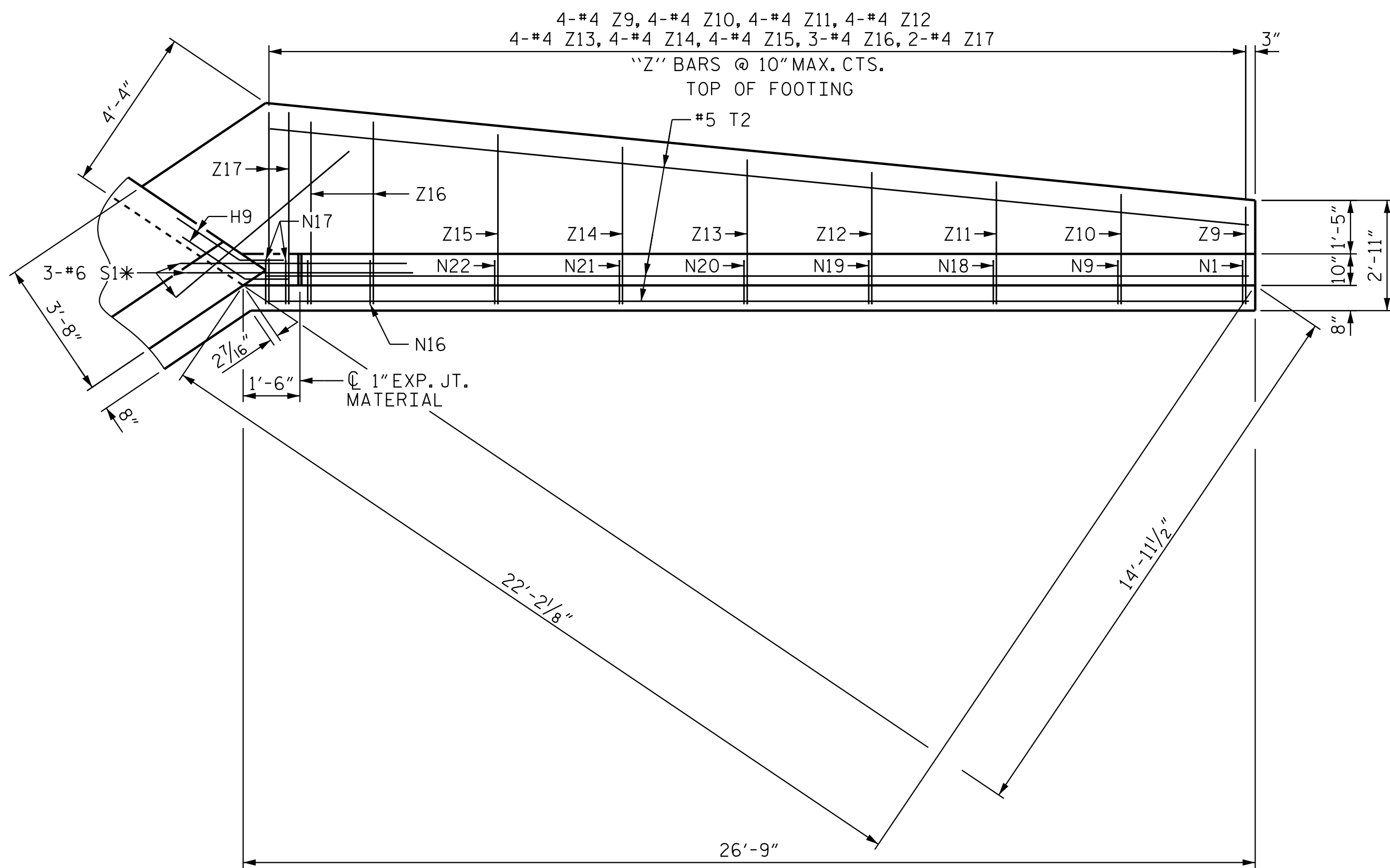


REVISIONS						SHEET NO. C01-05
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			

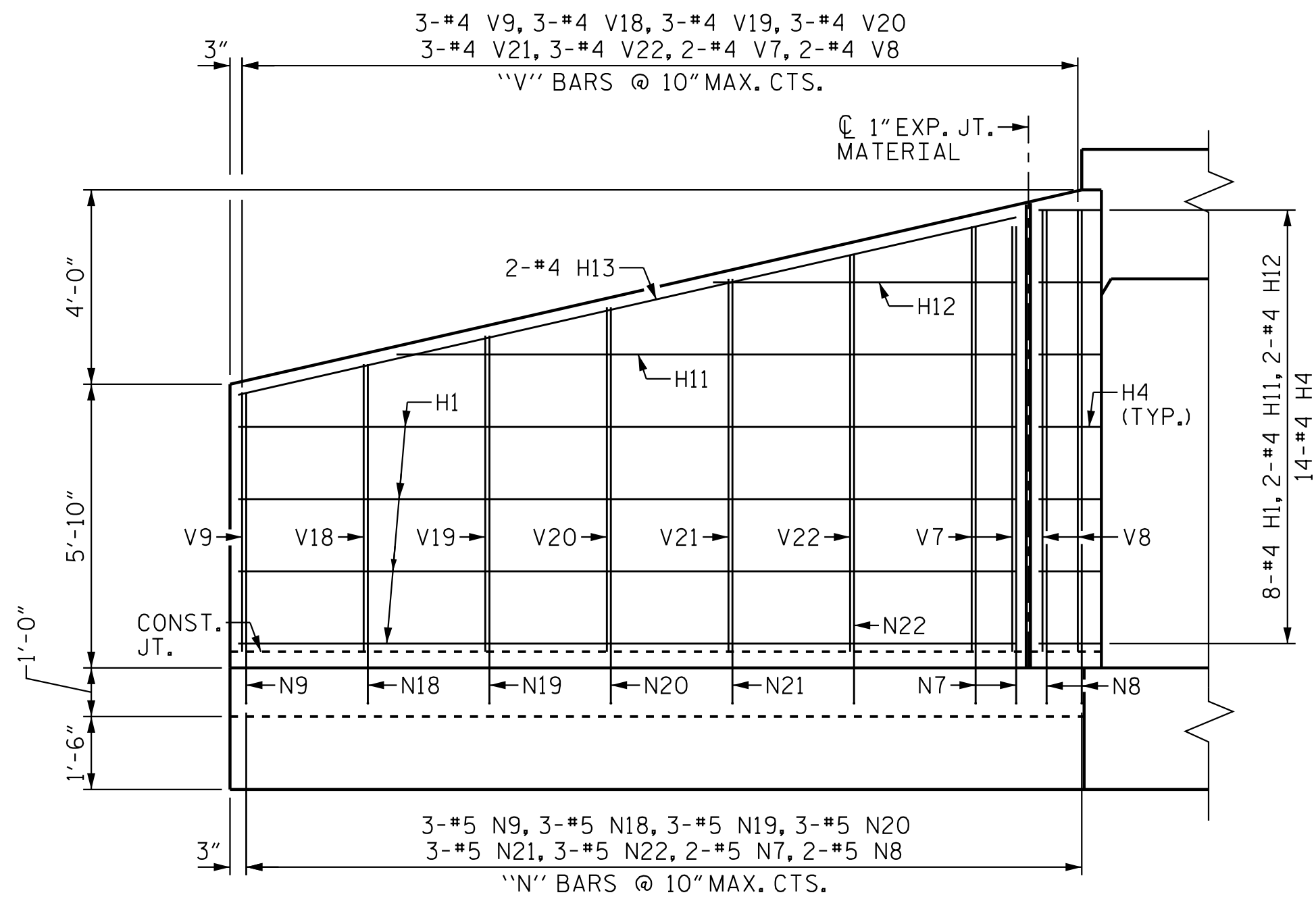
4/22/2025 10:53:34 AM jgeile
U:\Structures\CAD\working\Final\R3300A_SML_CU_06_640001.dgn



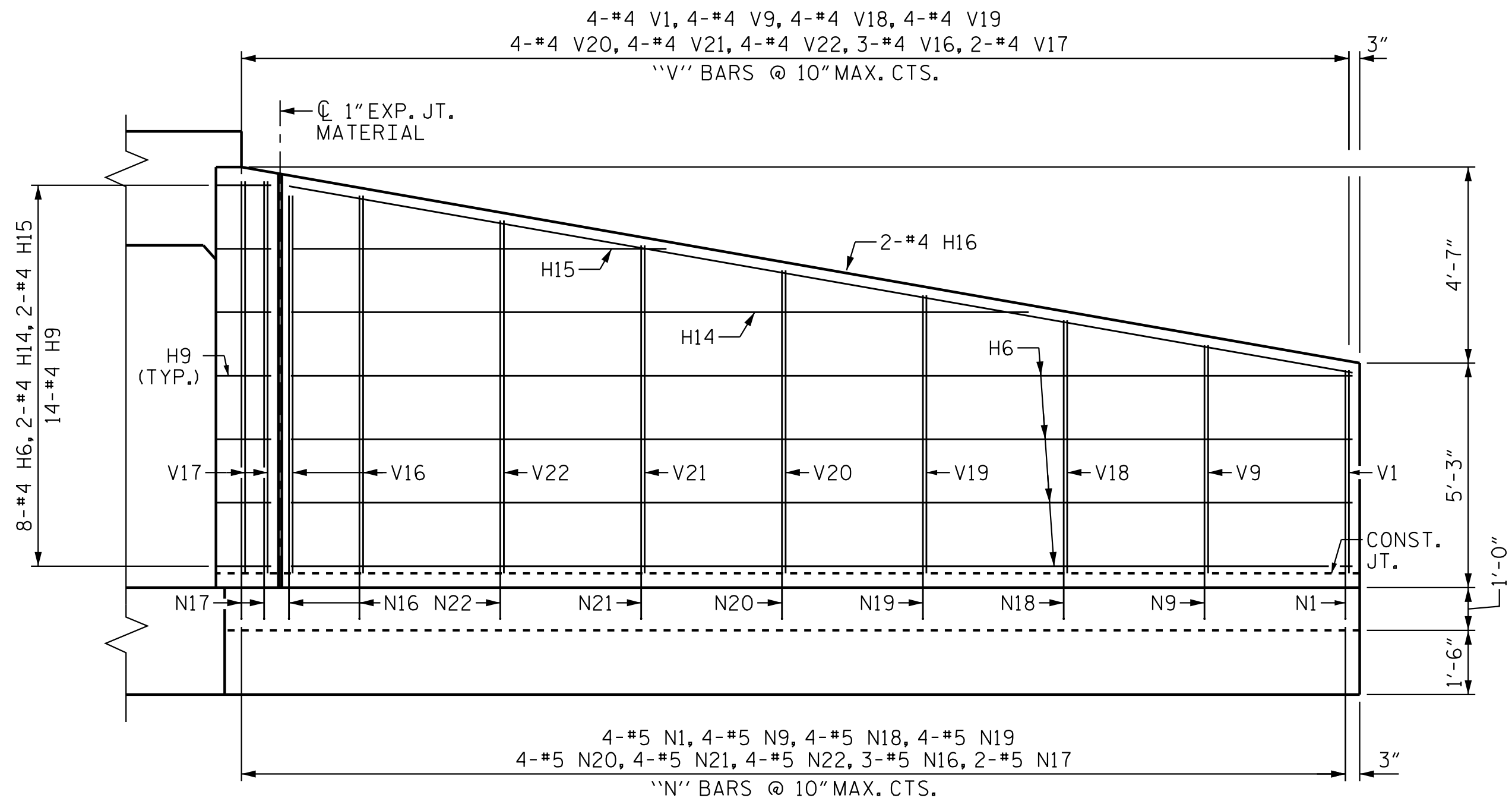
PLAN W3



PLAN W4



ELEVATION W3



ELEVATION W4

NOTES:
FOR "TYPICAL WING SECTION" AND REINFORCING
SCHEDULE, SEE SHEET 7 OF 7.
WEEP HOLES NOT SHOWN FOR CLARITY.

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 49+88.00 -Y33RPCA-

SHEET 8 OF 7



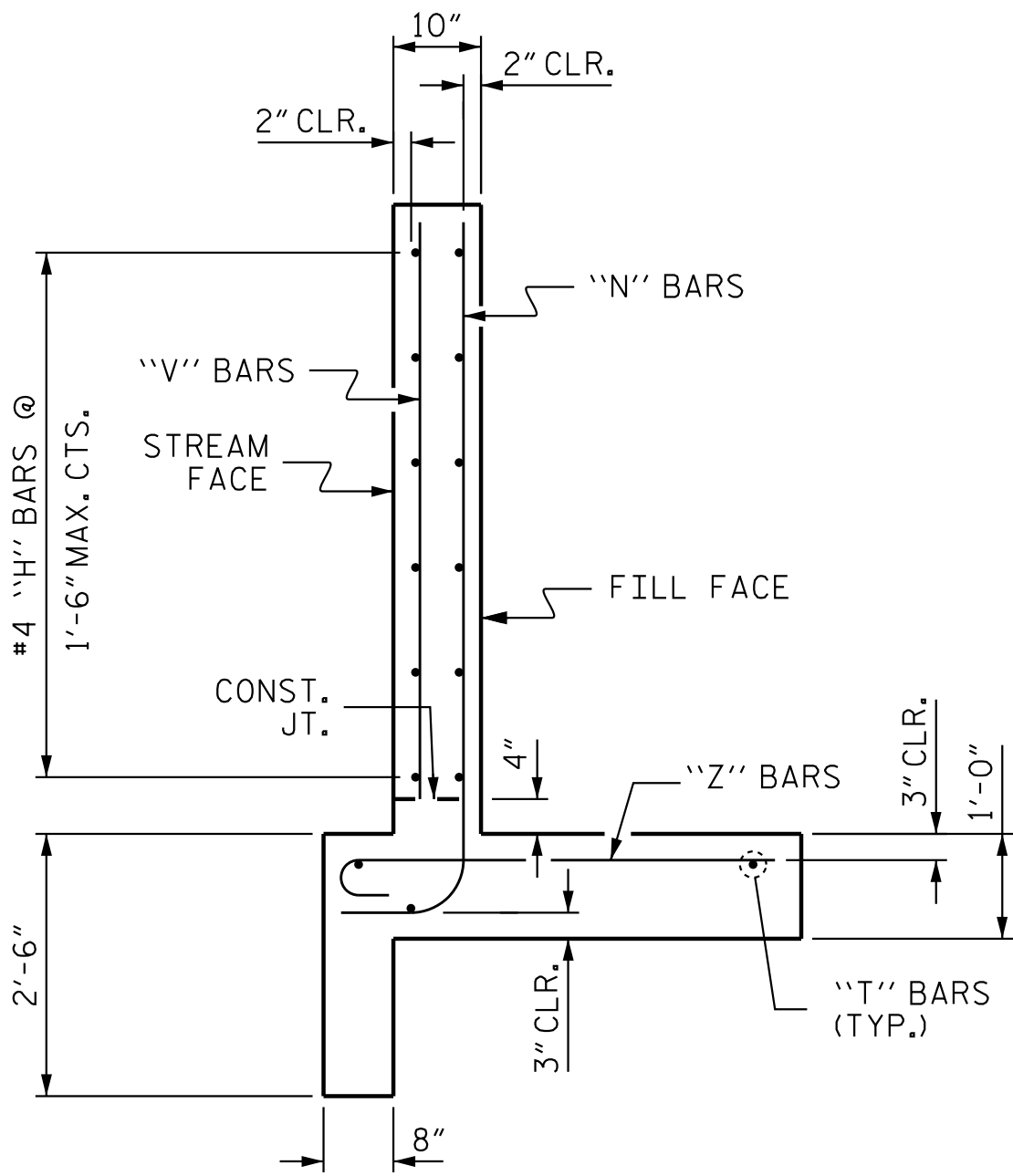
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 11/18/20
CHECKED BY : T. N. ENNIS DATE : 11/23/20
DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/22/25

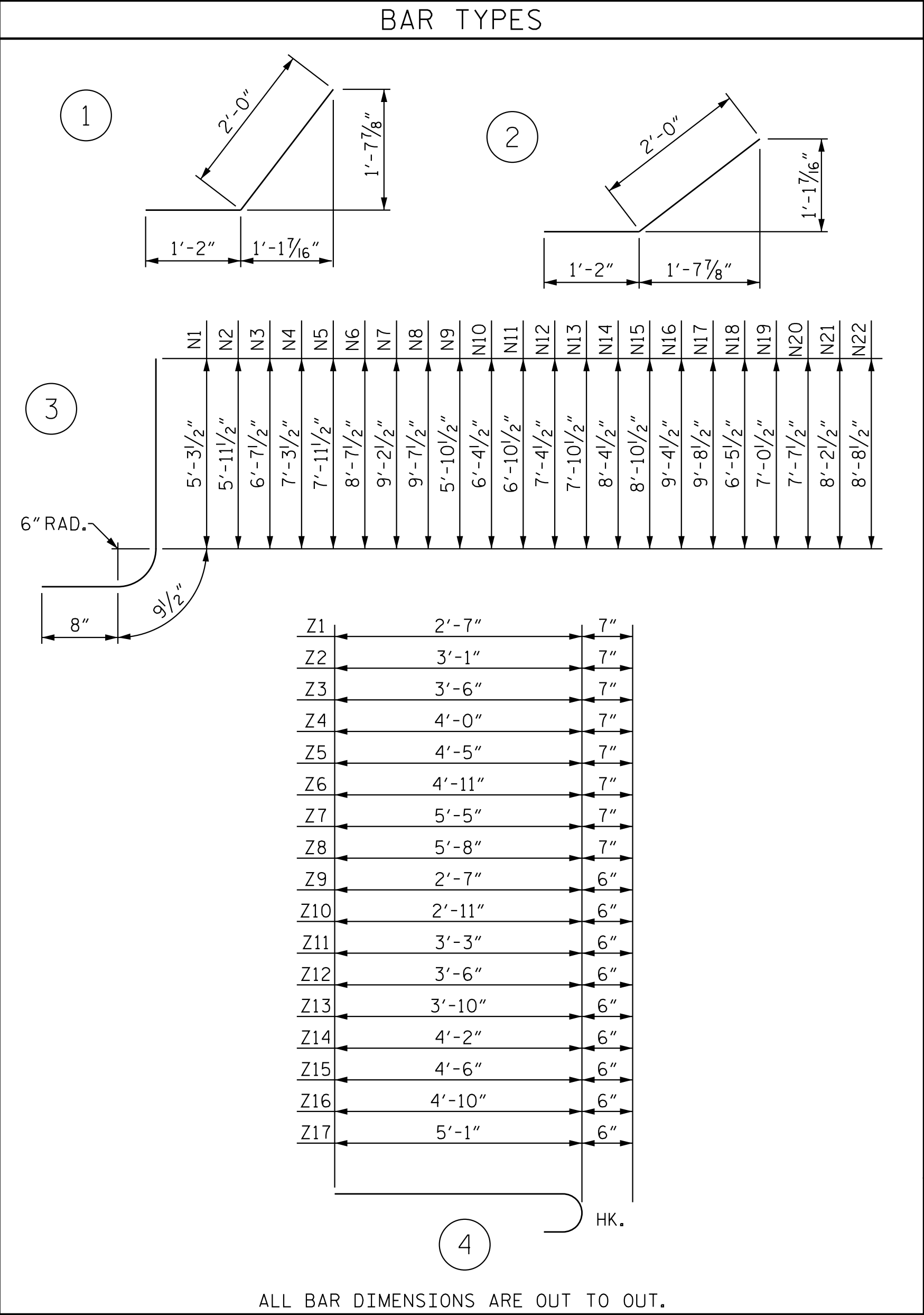


DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. C01-06		
WINGS FOR CONCRETE BOX CULVERT H= 8'-0" SLOPE= 3:1						TOTAL SHEETS 07		
68°00'00" SKEW								
REVISIONS								
NO.	BY:	DATE:	NO.	BY:	DATE:			
1			3					
2			4					



TYPICAL WING SECTION

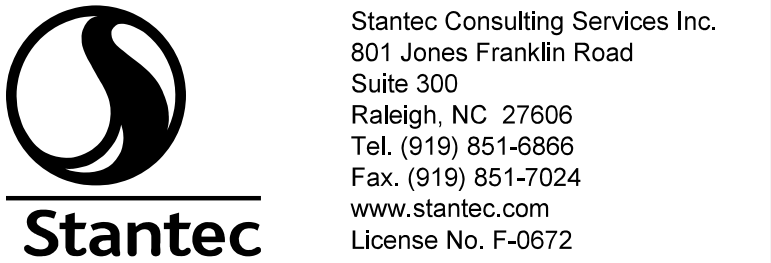


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL						BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	16'-0"	171	V1	7	#4	STR	4'-9"	22
H2	2	#4	STR	10'-11"	15	V2	3	#4	STR	5'-5"	11
H3	2	#4	STR	5'-3"	7	V3	3	#4	STR	6'-1"	12
H4	28	#4	1	3'-2"	59	V4	3	#4	STR	6'-9"	14
H5	2	#4	STR	16'-7"	22	V5	3	#4	STR	7'-5"	15
H6	16	#4	STR	24'-10"	265	V6	3	#4	STR	8'-1"	16
H7	2	#4	STR	19'-11"	27	V7	4	#4	STR	8'-8"	23
H8	2	#4	STR	10'-2"	14	V8	4	#4	STR	9'-1"	24
H9	28	#4	2	3'-2"	59	V9	11	#4	STR	5'-4"	39
H10	2	#4	STR	25'-2"	34	V10	4	#4	STR	5'-10"	16
H11	2	#4	STR	12'-9"	17	V11	4	#4	STR	6'-4"	17
H12	2	#4	STR	6'-3"	8	V12	4	#4	STR	6'-10"	18
H13	2	#4	STR	16'-5"	22	V13	4	#4	STR	7'-4"	20
H14	2	#4	STR	17'-3"	23	V14	4	#4	STR	7'-10"	21
H15	2	#4	STR	8'-9"	12	V15	4	#4	STR	8'-4"	22
H16	2	#4	STR	25'-3"	34	V16	6	#4	STR	8'-10"	35
						V17	4	#4	STR	9'-2"	24
N1	7	#5	3	6'-9"	49	V18	7	#4	STR	5'-11"	28
N2	3	#5	3	7'-5"	23	V19	7	#4	STR	6'-6"	30
N3	3	#5	3	8'-1"	25	V20	7	#4	STR	7'-1"	33
N4	3	#5	3	8'-9"	27	V21	7	#4	STR	7'-8"	36
N5	3	#5	3	9'-5"	29	V22	7	#4	STR	8'-2"	38
N6	3	#5	3	10'-1"	32						
N7	4	#5	3	10'-8"	45	Z1	6	#5	4	3'-2"	20
N8	4	#5	3	11'-1"	46	Z2	6	#5	4	3'-8"	23
N9	11	#5	3	7'-4"	84	Z3	5	#5	4	4'-1"	26
N10	4	#5	3	7'-10"	33	Z4	5	#5	4	4'-7"	29
N11	4	#5	3	8'-4"	35	Z5	5	#5	4	5'-0"	31
N12	4	#5	3	8'-10"	37	Z6	5	#5	4	5'-6"	34
N13	4	#5	3	9'-4"	39	Z7	5	#5	4	6'-0"	25
N14	4	#5	3	9'-10"	41	Z8	5	#5	4	6'-3"	26
N15	4	#5	3	10'-4"	43	Z9	8	#4	4	3'-1"	16
N16	6	#5	3	10'-10"	68	Z10	8	#4	4	3'-5"	18
N17	4	#5	3	11'-2"	47	Z11	8	#4	4	3'-9"	20
N18	7	#5	3	7'-11"	58	Z12	8	#4	4	4'-0"	21
N19	7	#5	3	8'-6"	62	Z13	8	#4	4	4'-4"	23
N20	7	#5	3	9'-1"	66	Z14	8	#4	4	4'-8"	25
N21	7	#5	3	9'-8"	71	Z15	8	#4	4	5'-0"	27
N22	7	#5	3	10'-2"	74	Z16	6	#4	4	5'-4"	21
						Z17	4	#4	4	5'-7"	15
S1	12	#6	STR	6'-0"	108	REINFORCING STEEL FOR 4 WINGS					3,118 LBS
T1	6	#5	STR	17'-7"	110	CLASS A CONCRETE					
T2	6	#5	STR	26'-0"	163						
						4 WINGS		39.6	CY		
						2 HEADWALLS		1.3	CY		
						2 END CURTAIN WALLS		1.6	CY		
						TOTAL		42.5	CY		

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 49+88.00 -Y33RPCA-

SHEET 7 OF 7



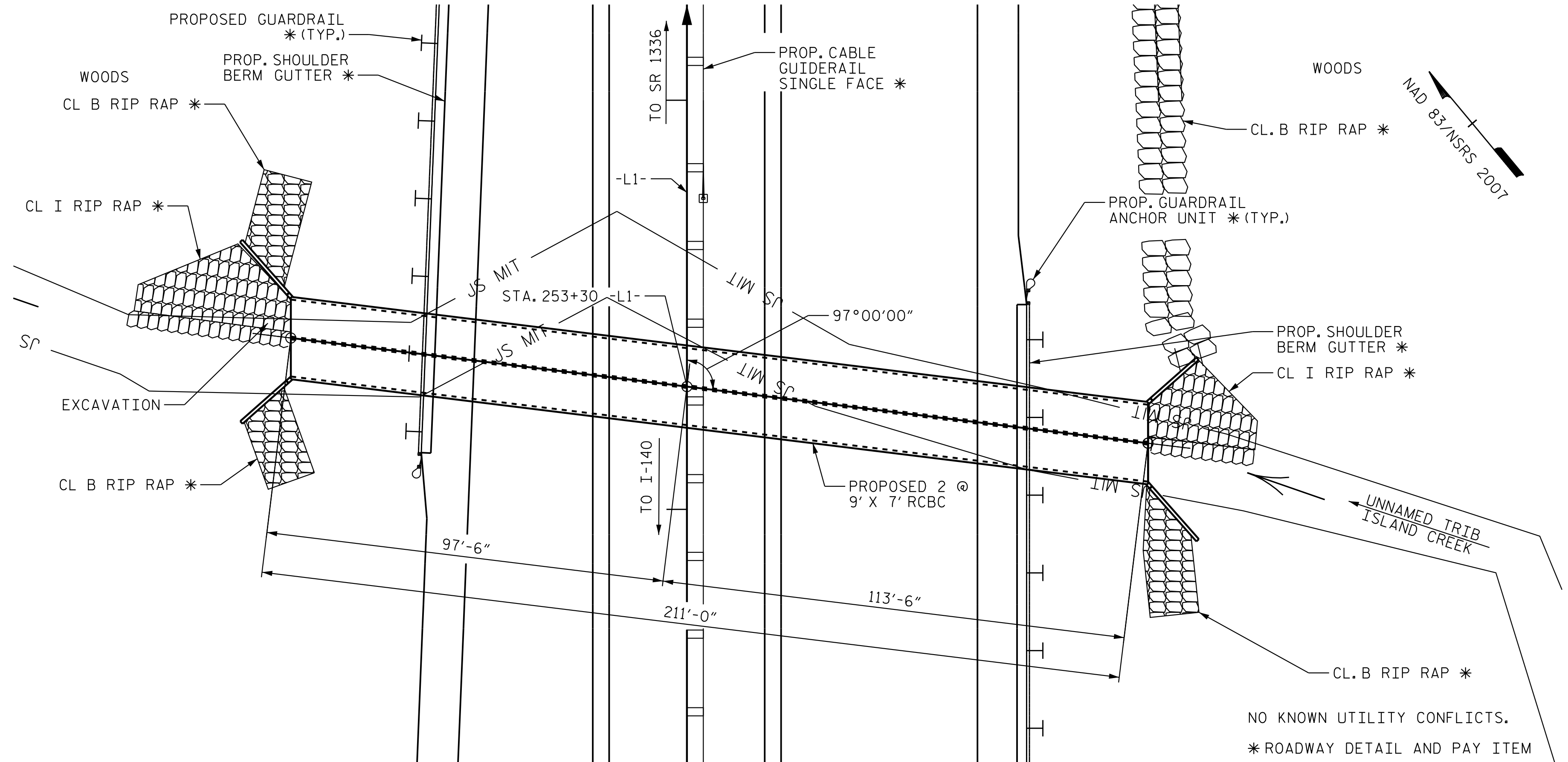
DRAWN BY : J. B. GEILE DATE : 11/18/20
CHECKED BY : T. N. ENNIS DATE : 11/23/20
DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/22/25



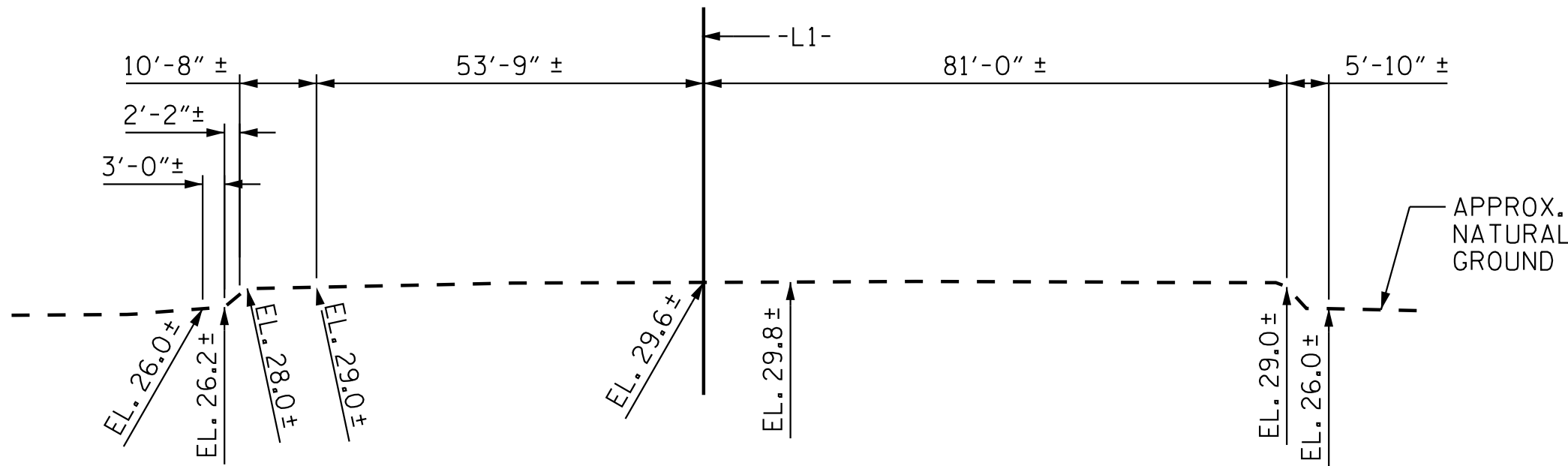
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WINGS FOR CONCRETE BOX CULVERT H= 8'-0" SLOPE= 3:1					
68°00'00" SKEW					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					07

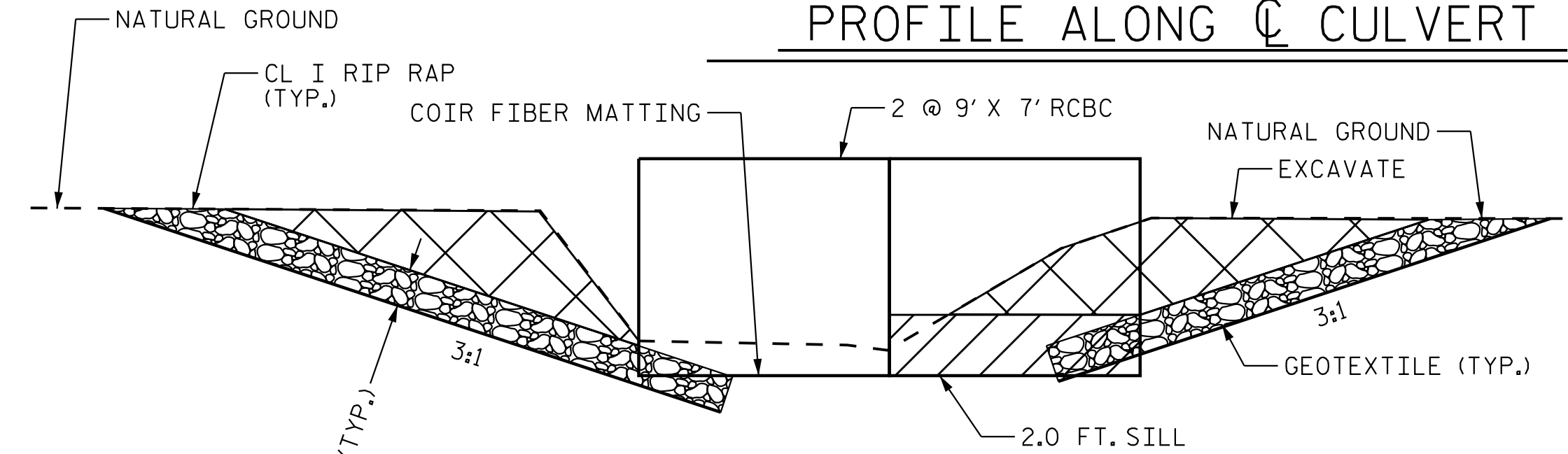
BM #2: RR SPIKE IN 6" HICKORY. N209066 E2355159, STA. 254+01.22 -L1-, 379.33' LT. EL. 31.51



LOCATION SKETCH

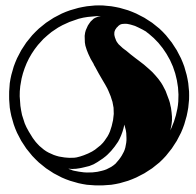


PROFILE ALONG CULVERT



INLET & OUTLET CHANNEL DETAIL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 11/16/20
CHECKED BY : T. N. ENNIS DATE : 11/18/20

DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/16/25

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	893 TONS
FOUNDATION COND. GEOTEXTILE	563 S.Y.

CLASS A CONCRETE

BARREL @ 2.132 CY/FT	449.8 C.Y.
WINGS ETC.	33.0 C.Y.
TOTAL	482.8 C.Y.

REINFORCING STEEL

BARREL	78,828 LBS.
WINGS ETC.	2,060 LBS.
TOTAL	80,888 LBS.

HYDRAULIC DATA

DESIGN DISCHARGE	=	750 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	31.50
DRAINAGE AREA	=	1.22 SQ. MI.
BASIC DISCHARGE (Q100)	=	840 C.F.S.
BASIC HIGH WATER ELEVATION	=	32.20

ROADWAY DATA

GRADE POINT EL. @ STATION 253+30 -L1-	=	43.01
BED ELEV. @ STATION 253+30 -L1-	=	24.1
ROADWAY SLOPES	=	3:1 (LT.) 3:1 (RT.)

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	880 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	100+ YRS.
OVERTOPPING FLOOD ELEVATION	=	32.50
OVERTOPS ROADWAY AT STATION 255+65.0 -L1- RT.		

NOTES

ASSUMED LIVE LOAD = HL-93.

DESIGN FILL= 12.06 FT. (MAXIMUM) 9.10 FT. (MINIMUM)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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.

PLACE 1' NATIVE MATERIAL IN LOW FLOW BARREL AND 2' IN HIGH FLOW BARREL FOR FLOODPLAIN BENCH.

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

FOUNDATION NOTES

1. EXCAVATE FOUNDATION A MINIMM OF 3.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 3.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL ENCAPSULATED IN TYPE 2 GEOTEXTILE IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS. FOR FOUNDATION CONDITIONING TEXTILE, SEE SPECIAL PROVISIONS.
2. CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT -L1- STATION 253+30.00 WITH 3" OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

PROJECT NO. R-3300A

NEW HANOVER COUNTY

STATION: 253+30.00 -L1-

SHEET 1 OF 6 BRIDGE NO. 640238

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 9 FT. X 7 FT.
CONCRETE BOX CULVERT

97°00'00" SKEW

REVISIONS						SHEET NO. C02-01
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

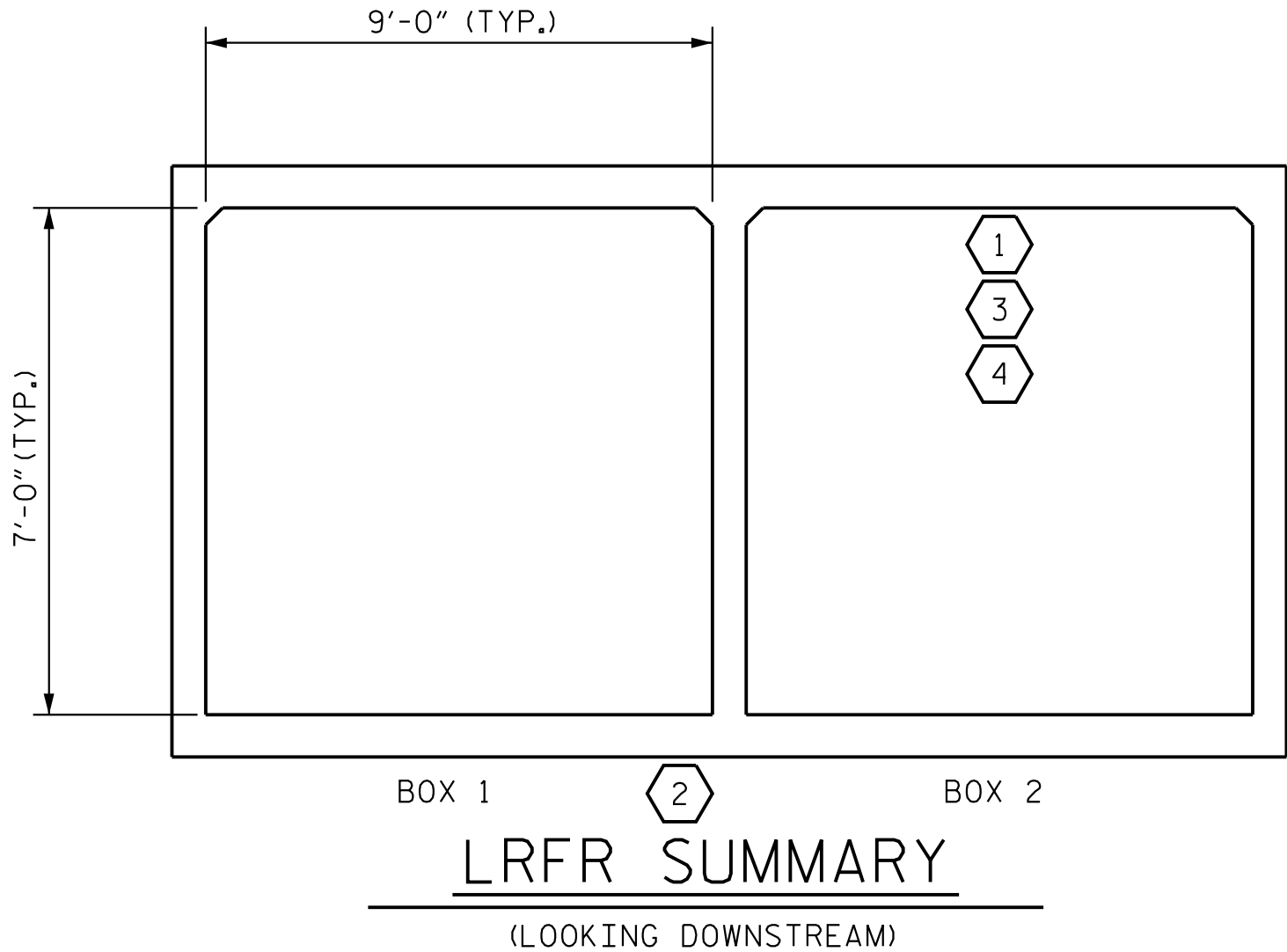


DocuSigned by
Tommy Dudeck
402E2798CA24E9...

4/30/2025

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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 × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
						LIVE-LOAD FACTORS (γ _{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	2.14	--	1.75	2.14	2	MIDDLE (TOP SLAB) - INSIDE	4.50	3.25	2	LEFT END - BOTT SLAB	0.00	1
	HL-93 (OPERATING)	N/A		2.77	--	1.35	2.77	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.21	2	LEFT END - BOTT SLAB	0.00	1
	HS-20 (INVENTORY)	36.000	⬡2	3.48	125.280	1.75	3.88	2	MIDDLE (TOP SLAB) - INSIDE	4.50	3.48	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
	HS-20 (OPERATING)	36.000		4.51	162.360	1.35	5.04	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.51	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		8.48	114.480	1.40	8.48	2	MIDDLE (TOP SLAB) - INSIDE	4.50	10.05	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		SNGARBS2		7.87	157.400	1.40	7.94	2	MIDDLE (TOP SLAB) - INSIDE	4.50	7.87	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		SNAGRIS2		7.61	167.420	1.40	8.48	2	MIDDLE (TOP SLAB) - INSIDE	4.50	7.61	2	LEFT END - BOTT SLAB	0.00	1
		SNCOTTS3		3.74	101.915	1.40	3.74	1	MIDDLE (TOP SLAB) - INSIDE	4.50	4.72	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		SNAGGRS4		3.70	129.223	1.40	3.70	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.27	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		SNS5A		3.55	126.203	1.40	3.55	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.18	2	LEFT END - BOTT SLAB	0.00	1
		SNS6A		3.52	140.624	1.40	3.52	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.00	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		SNS7B	⬡3	3.50	147.000	1.40	3.50	2	MIDDLE (TOP SLAB) - INSIDE	4.50	3.66	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3		5.02	165.660	1.40	5.02	2	MIDDLE (TOP SLAB) - INSIDE	4.50	5.15	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		TNT4A		4.44	146.853	1.40	4.44	2	MIDDLE (TOP SLAB) - INSIDE	4.50	5.04	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		TNT6A		3.91	162.656	1.40	3.91	1&2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.38	2	LEFT END - BOTT SLAB	0.00	1
		TNT7A		4.19	175.980	1.40	4.19	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.41	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		TNT7B		3.78	158.760	1.40	3.78	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.45	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		TNAGRIT4		4.22	181.460	1.40	4.39	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.22	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1
		TNAGT5A		4.16	187.200	1.40	4.38	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.16	2	LEFT END - BOTT SLAB	0.00	1
		TNAGT5B		3.79	170.550	1.40	4.41	2	MIDDLE (TOP SLAB) - INSIDE	4.50	3.79	2	LEFT END - BOTT SLAB	0.00	1
	EV2		6.00	172.500	1.30	6.00	1&2	MIDDLE (TOP SLAB) - INSIDE	4.50	6.16	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1	
	EV3	⬡4	3.25	139.750	1.30	3.25	2	MIDDLE (TOP SLAB) - INSIDE	4.50	4.11	1	RIGHT END (BOTT SLAB) - OUTSIDE	9.00	1	





Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ASSEMBLED BY : J. B. CEILE DATE : 11/17/20
CHECKED BY : T. N. ENNIS DATE : 11/18/20

DRAWN BY : WMC 7/11 REV. 10/11/11 MAA/GM
CHECKED BY : CM 7/11 REV. 12/17 MAA/THC
REV. 04/23 BNB/AAI

DESIGN
ENGINEER
OF RECORD: T. R. DUDECK DATE : 04/16/25

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:

LOAD RATINGS FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

⬡ CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

⬡3 LEGAL LOAD RATING **

⬡4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 567+53.70 -L1-

SHEET 2 OF 6



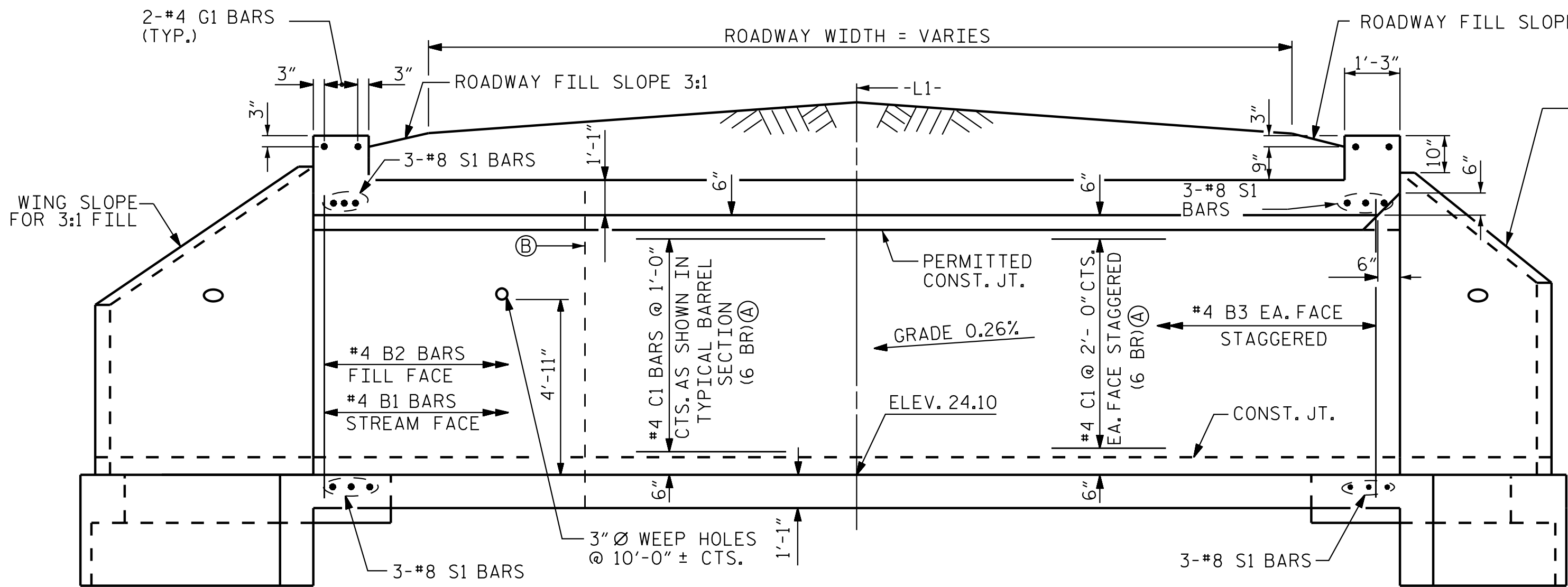
Tommy Dudeck / 2025
402E278CA246E9

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

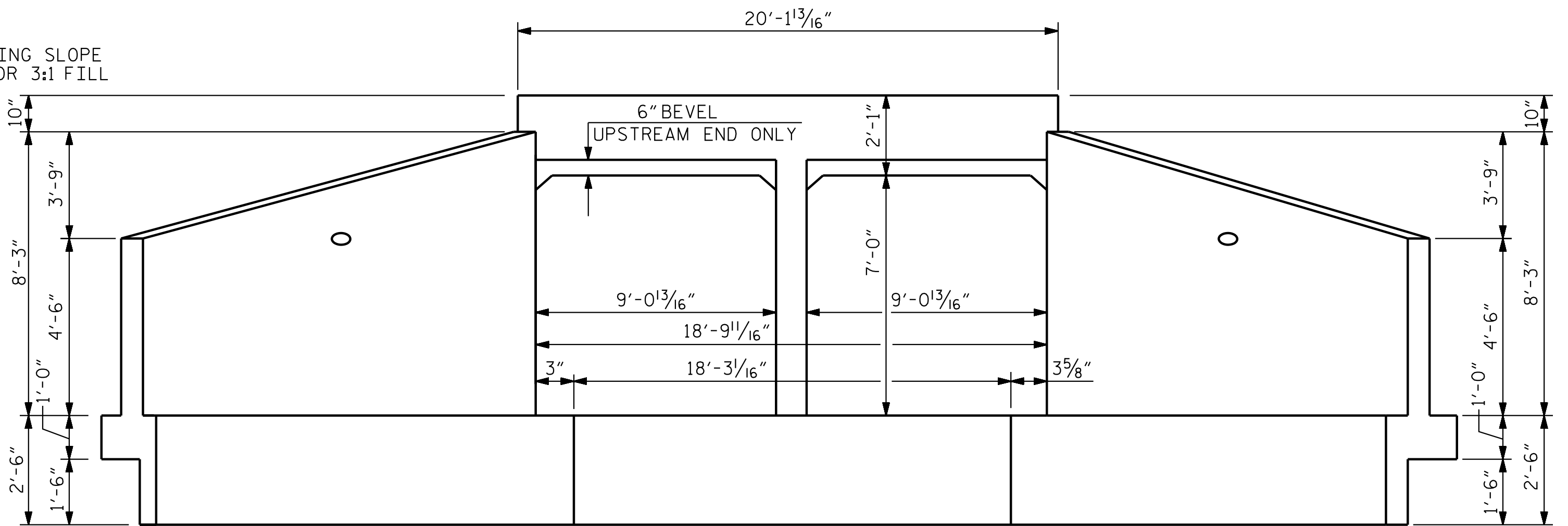
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

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

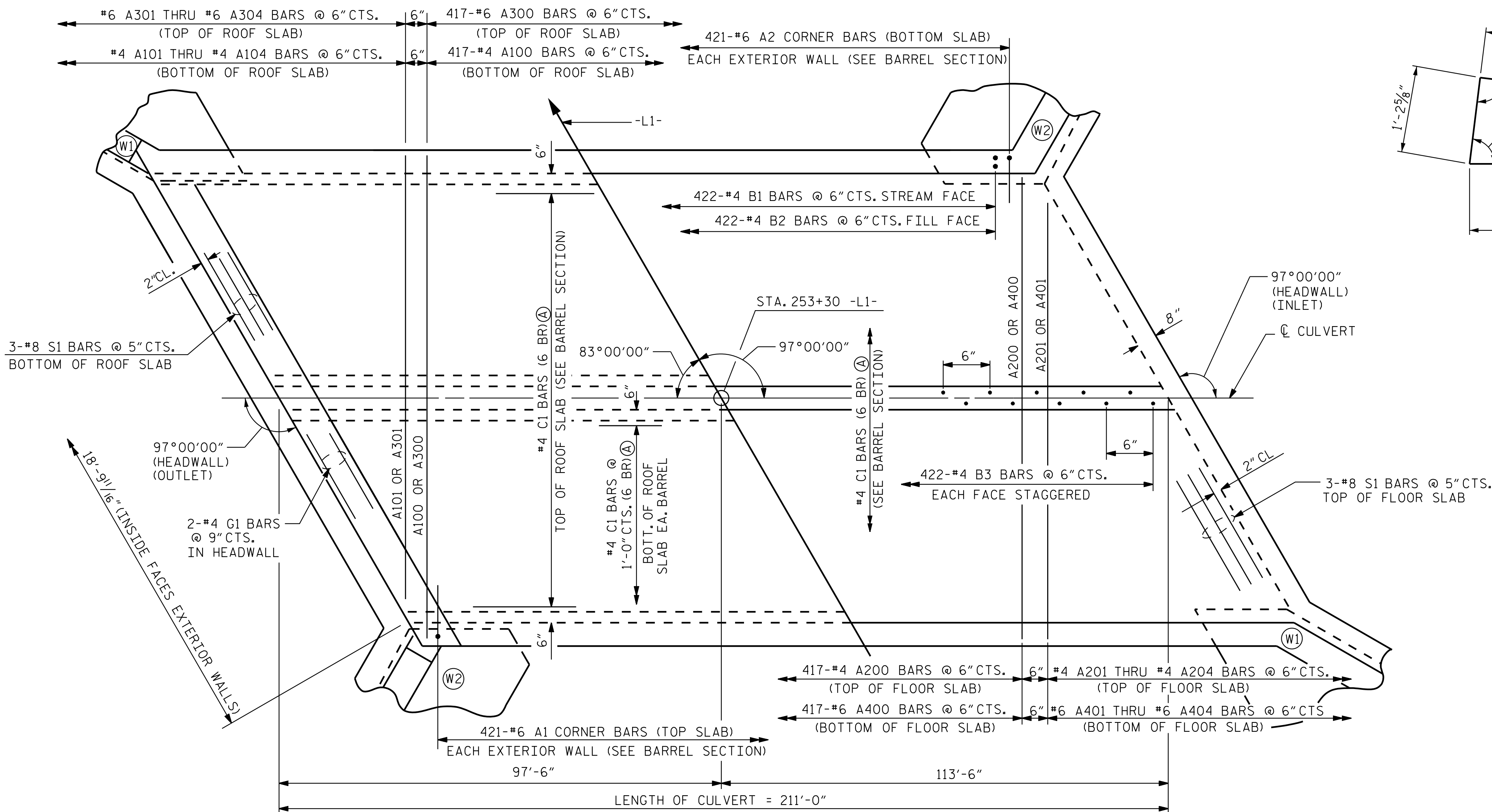
SHEET NO. C02-02
TOTAL SHEETS 06



CULVERT SECTION NORMAL TO ROADWAY
(LOOKING UPSTATION)

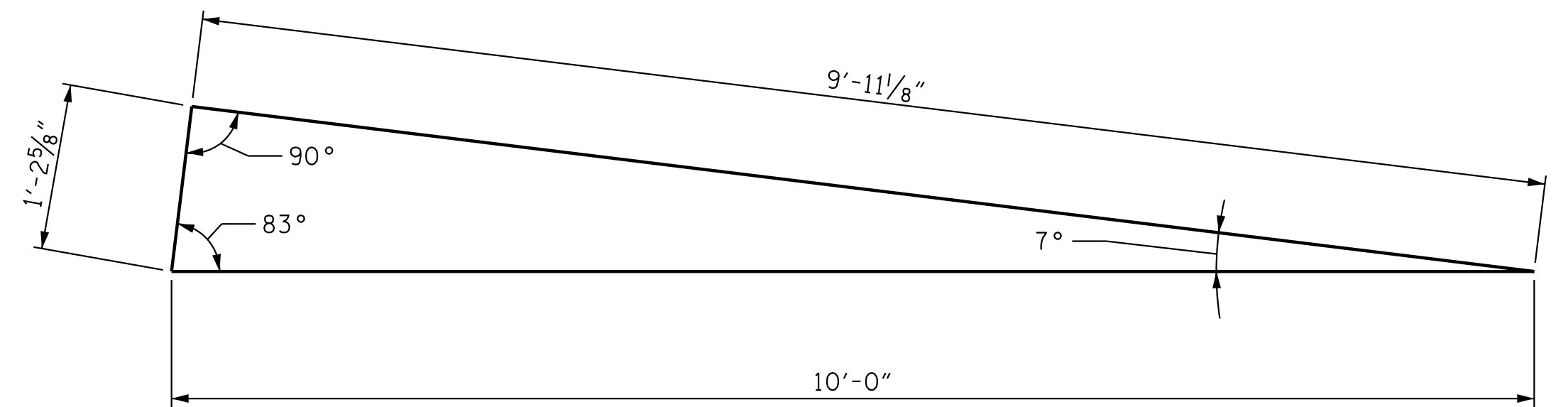


END ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM)



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



SKEW TRIANGLE
(CULVERT & HEADWALL)

NOTES

SEE SHEET 1 OF 6 FOR ADDITIONAL INFORMATION.

(6 BR) DENOTES 6 BAR RUN.

(A) 2'-5" MIN. SPLICE

(B) TRANSVERSE CONSTRUCTION JOINTS (3 REQ'D) (SEE NOTES SHT. 1 OF 6)

* 2 BARS PER MARK

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 253+30.00 -L1-

SHEET 3 OF 6



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
DOUBLE 9 FT. X 7 FT. CONCRETE BOX CULVERT					
97°00'00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C02-03					TOTAL SHEETS 06

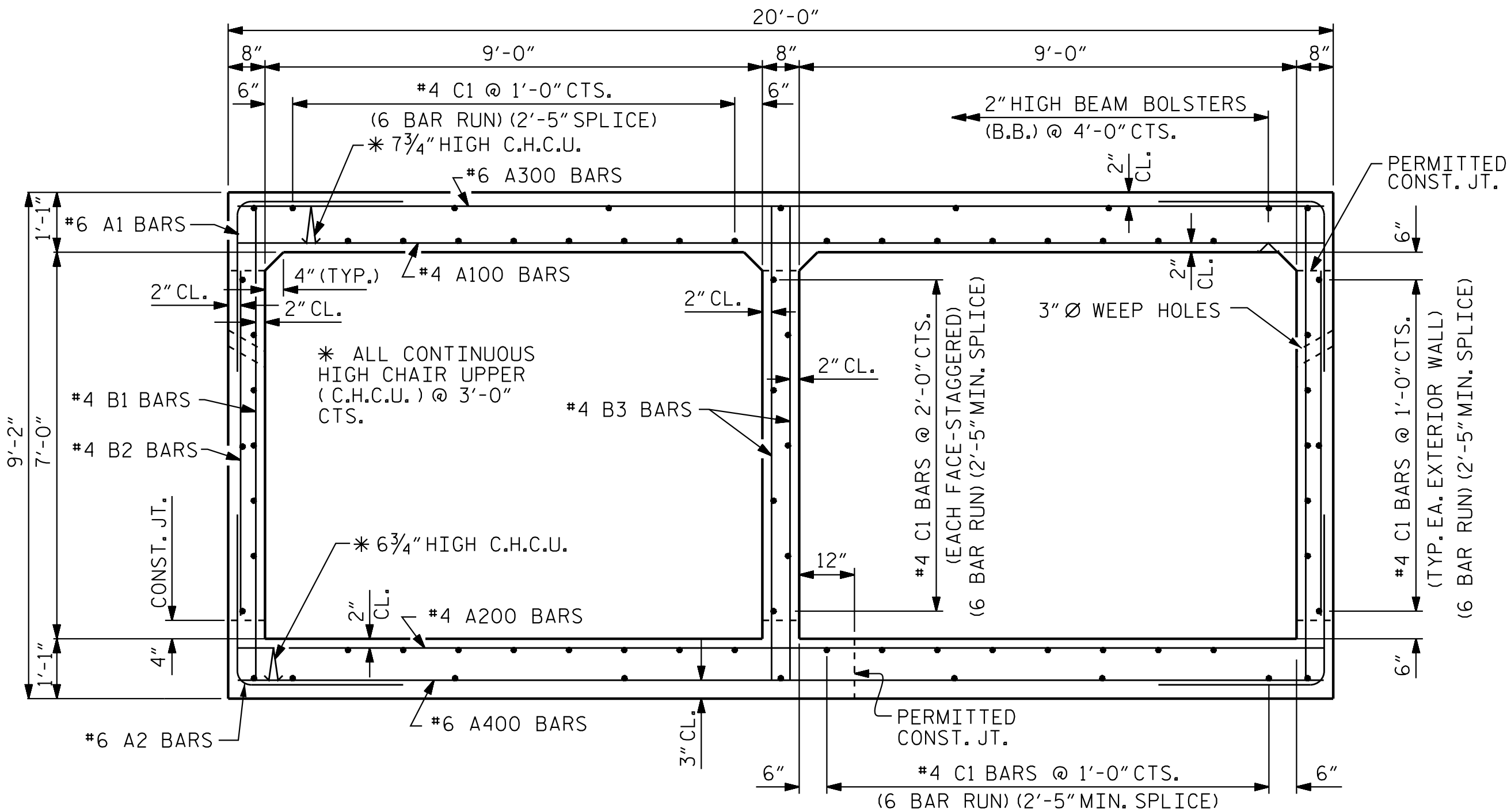
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

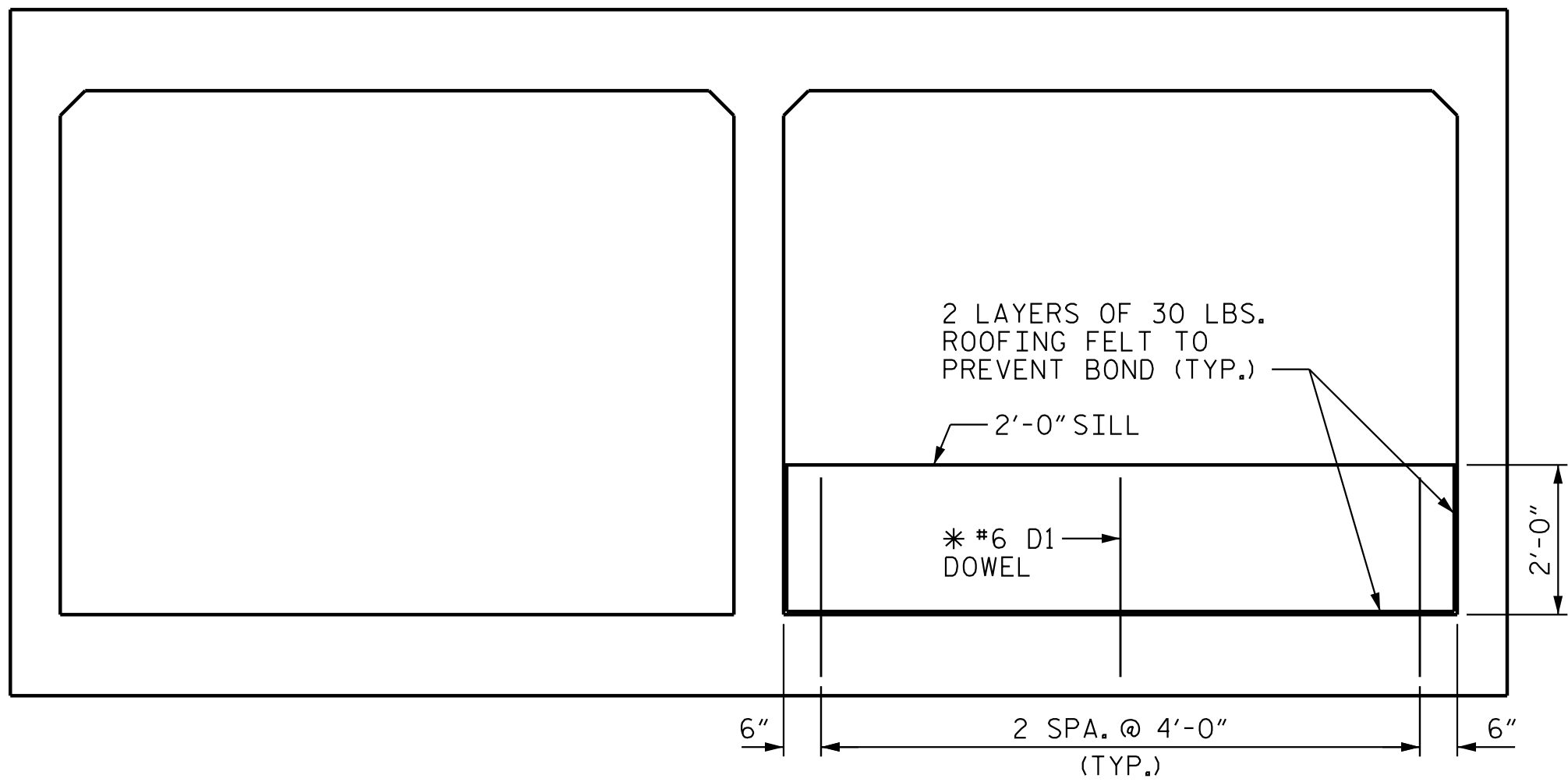
DRAWN BY: J. B. GEILE DATE: 08/26/20
CHECKED BY: T. N. ENNIS DATE: 11/18/20

DESIGN
ENGINEER
OF RECORD: T. R. DUDECK DATE: 04/16/25



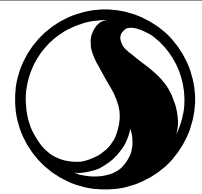
RIGHT ANGLE SECTION OF BARREL

THERE ARE 73 "C" BARS IN SECTION OF BARREL.



ELEVATION

(LOOKING DOWNSTREAM)

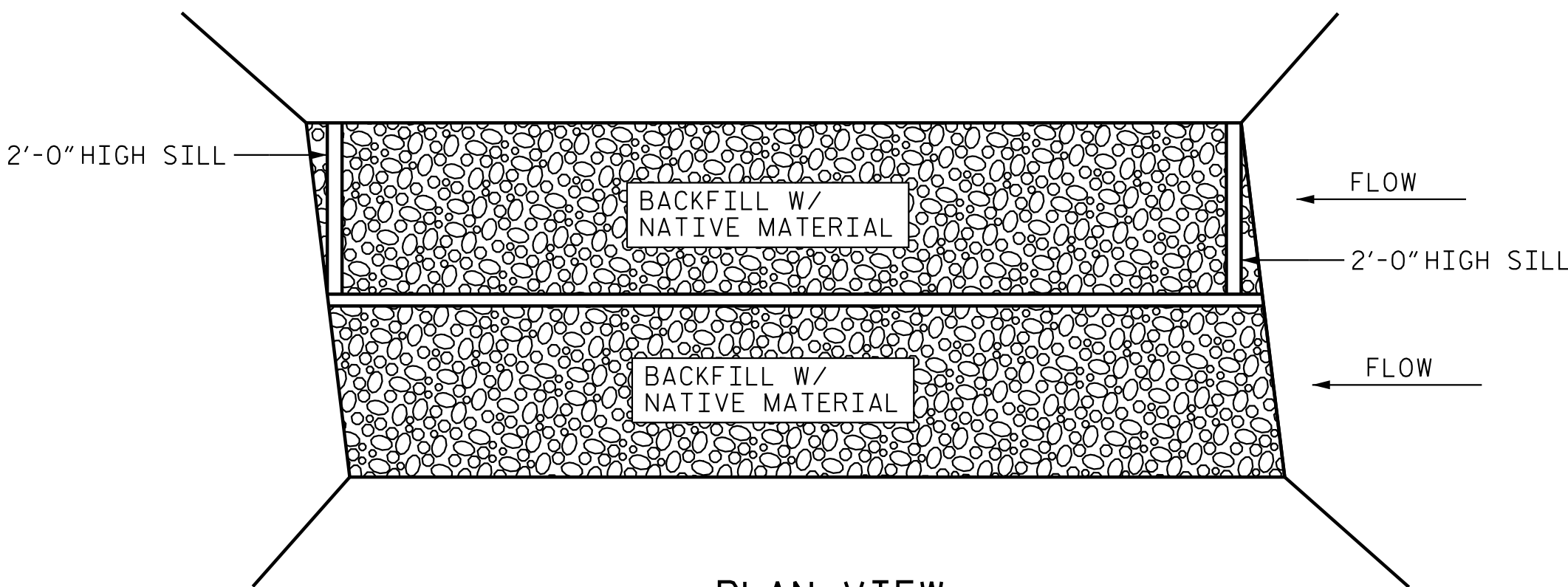


Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 11/13/20
CHECKED BY : T. N. ENNIS DATE : 11/18/20

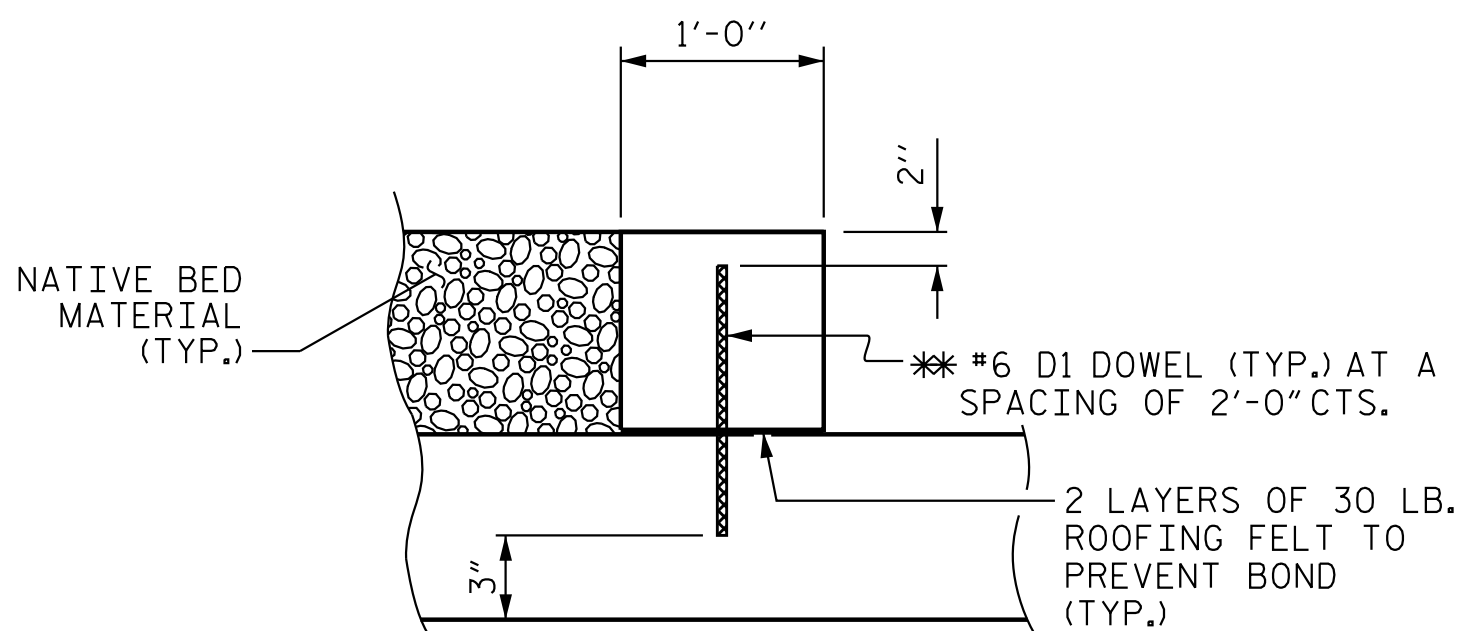
DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/16/25

NAD 83/NSRS 2007



PLAN VIEW

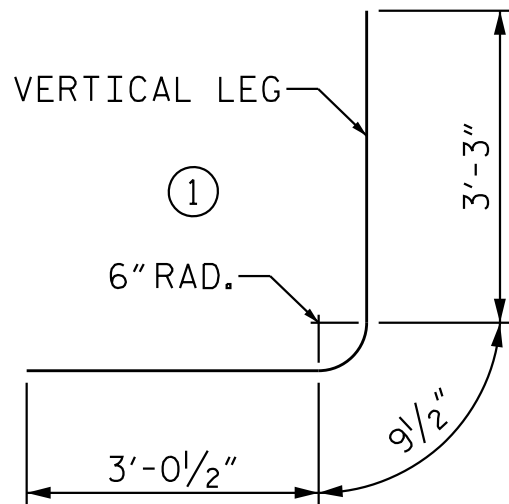
(SEE NOTES SHEET 1 OF 6 FOR BACKFILL INSTRUCTIONS.)



SECTION THROUGH SILL

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

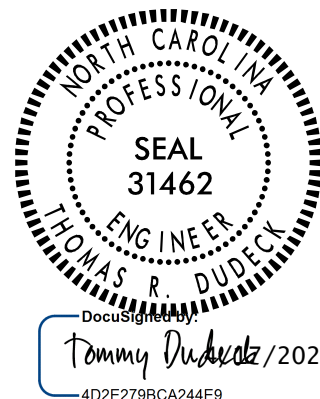
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	842	#6	1	7'-1"	8958	A400	417	#6	STR	19'-8"	12318
A2	842	#6	1	7'-1"	8958	A401	2	#6	STR	16'-0"	48
						A402	2	#6	STR	12'-0"	36
A100	417	#4	STR	19'-8"	5478	A403	2	#6	STR	8'-0"	24
A101	2	#4	STR	16'-0"	21	A404	2	#6	STR	4'-0"	12
A102	2	#4	STR	12'-0"	16						
A103	2	#4	STR	8'-0"	11	B1	844	#4	STR	8'-9"	4933
A104	2	#4	STR	4'-0"	5	B2	844	#4	STR	6'-3"	3524
						B3	844	#4	STR	8'-9"	4933
A200	417	#4	STR	19'-8"	5478						
A201	2	#4	STR	16'-0"	21	C1	438	#4	STR	37'-2"	10874
A202	2	#4	STR	12'-0"	16						
A203	2	#4	STR	8'-0"	11	D1	6	#6	STR	2'-8"	24
A204	2	#4	STR	4'-0"	5						
						G1	4	#4	STR	19'-9"	53
A300	417	#6	STR	19'-8"	12318						
A301	2	#6	STR	16'-0"	48	S1	12	#8	STR	19'-9"	633
A302	2	#6	STR	12'-0"	36						
A303	2	#6	STR	8'-0"	24						
A304	2	#6	STR	4'-0"	12						
REINFORCING STEEL										78,828 LBS	

SPLICE CHART

BAR	SIZE	SPLICE LENGTH
C1	#4	2'-5"

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 253+30.00 -L1-

SHEET 4 OF 6



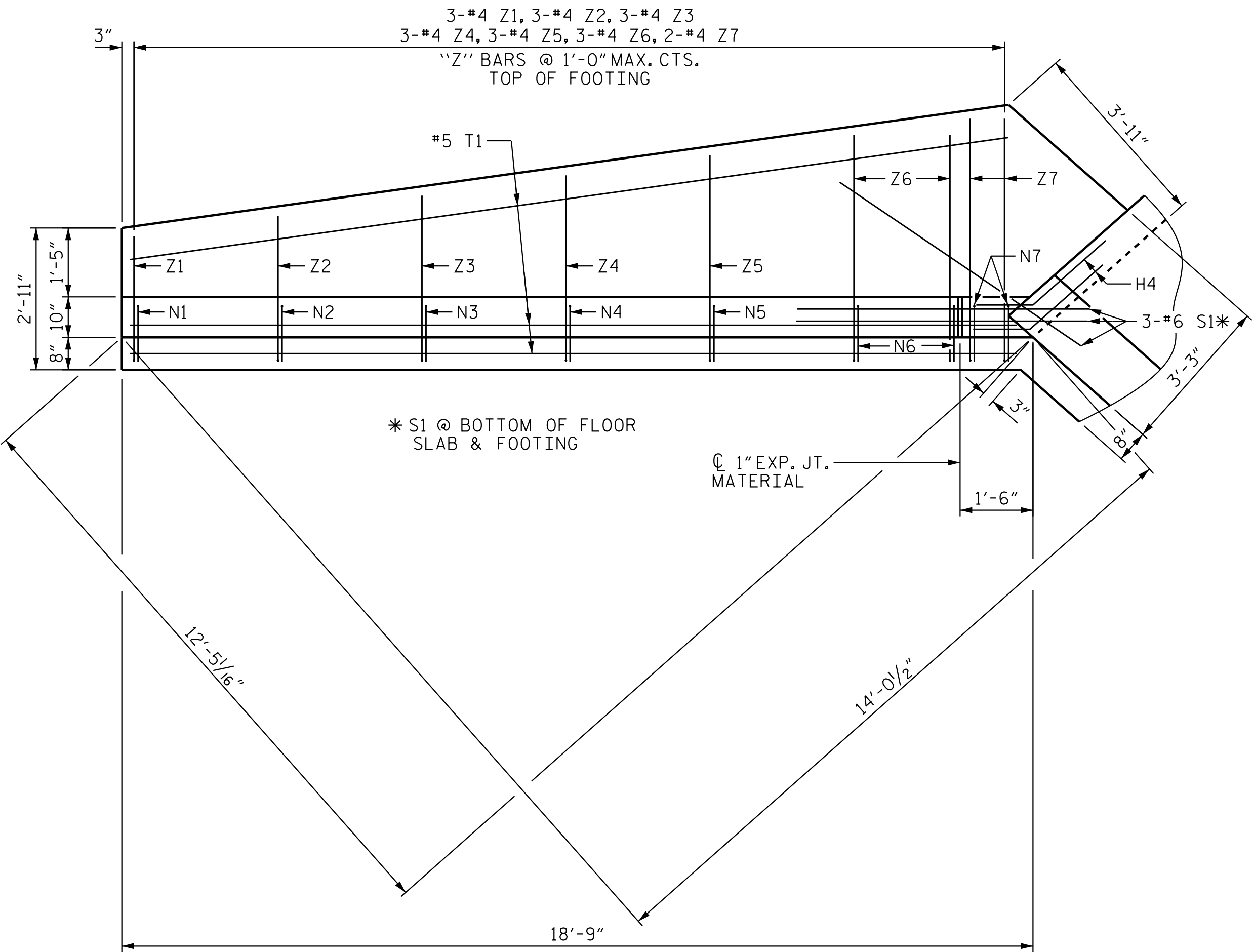
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

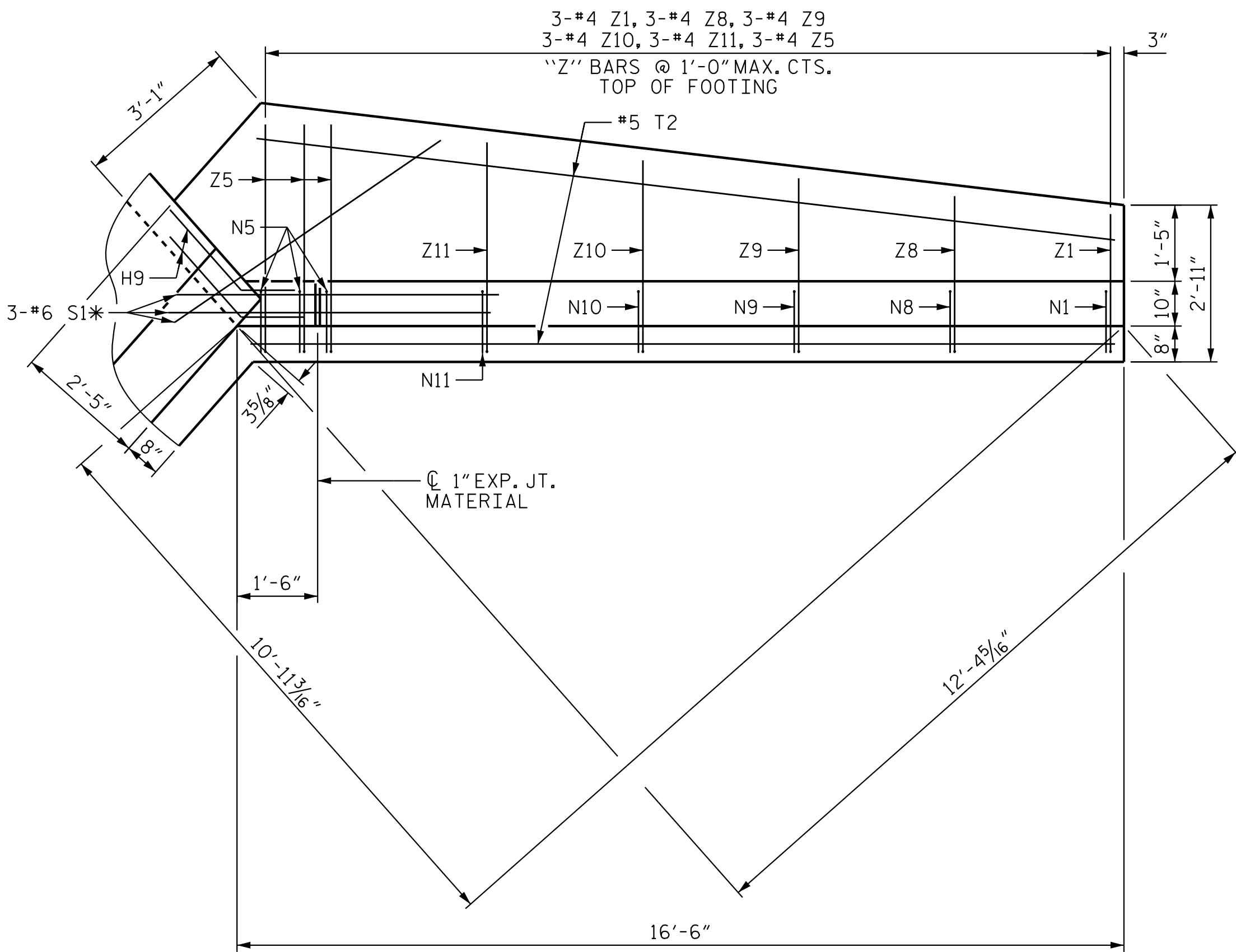
DOUBLE 9 FT. X 7 FT.
CONCRETE BOX CULVERT

97°00'00" SKEW

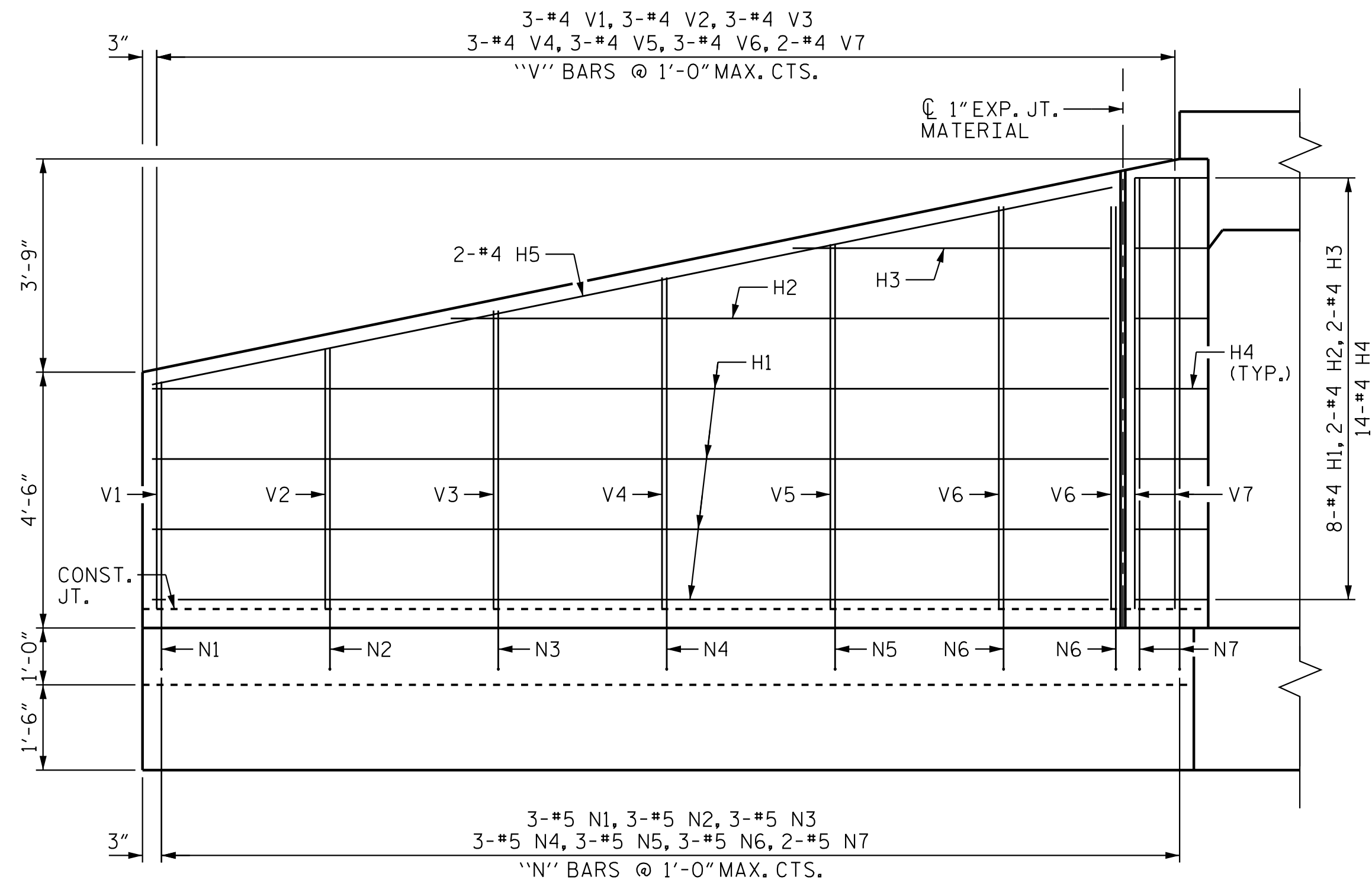
REVISIONS						SHEET NO. C02-04
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			



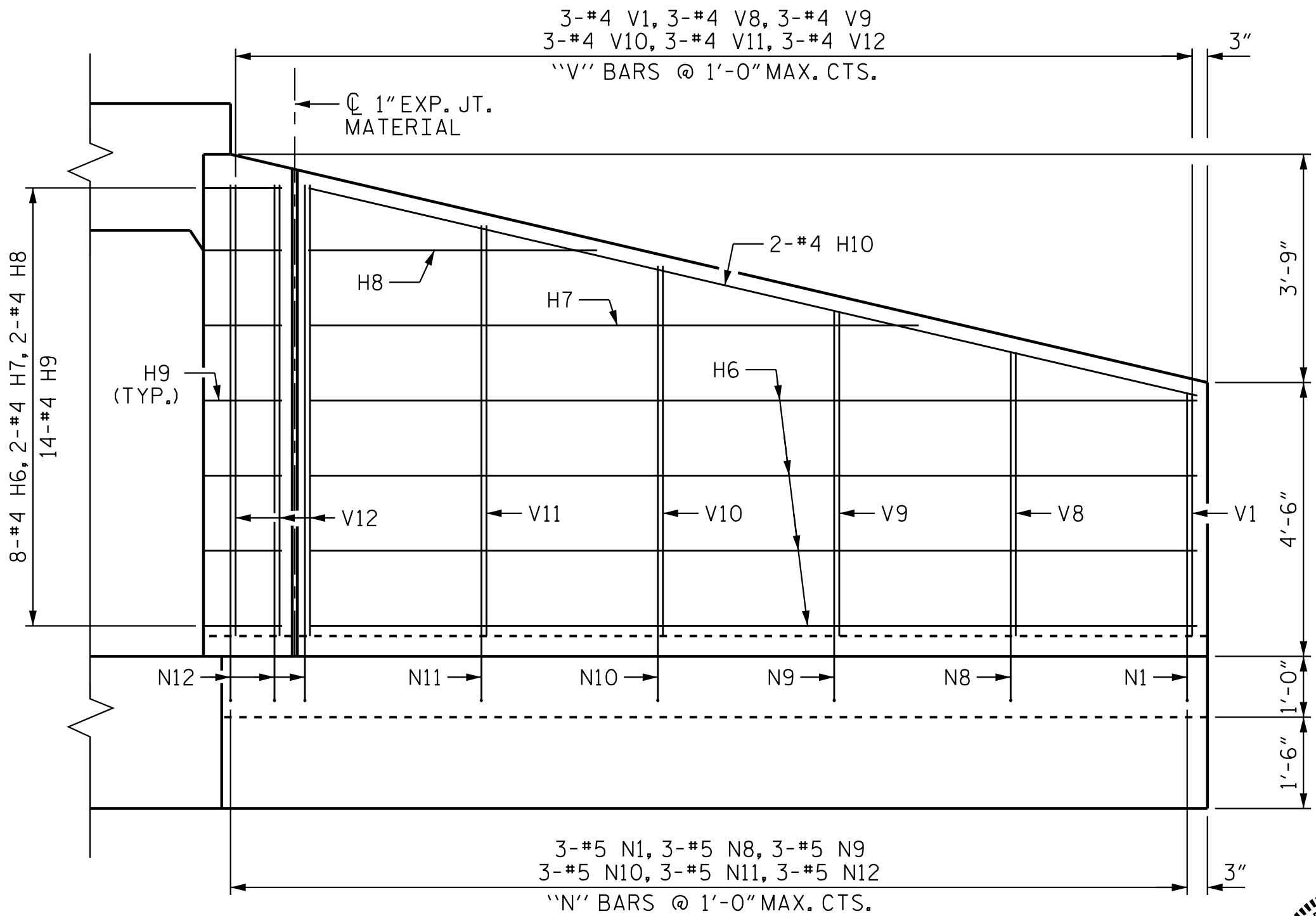
PLAN W1



PLAN W2



ELEVATION W1



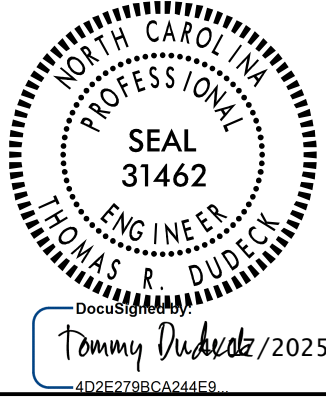
ELEVATION W2



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 11/16/20
CHECKED BY : T. N. ENNIS DATE : 11/18/20

DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/16/25

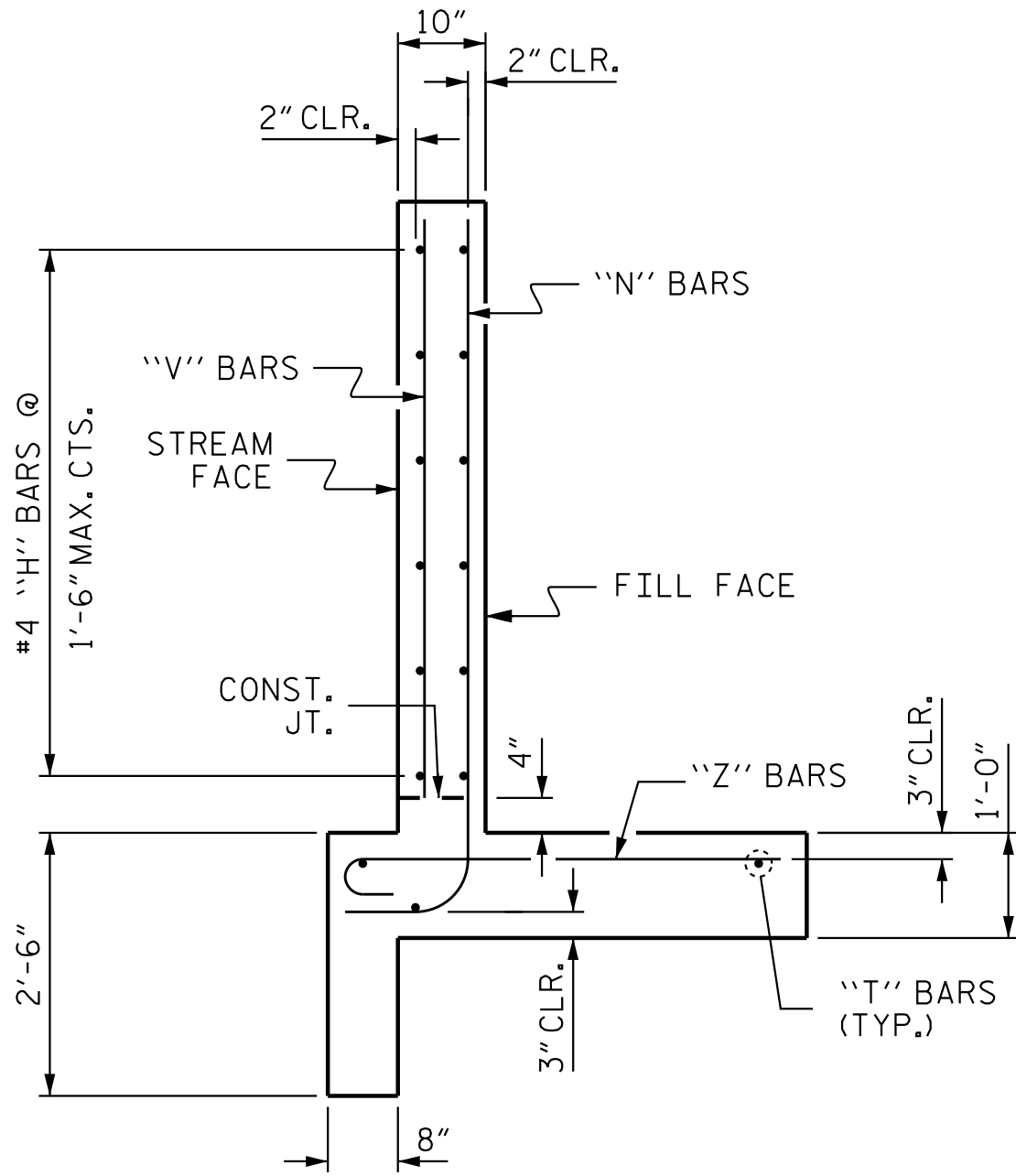


DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 253+30.00 -L1-

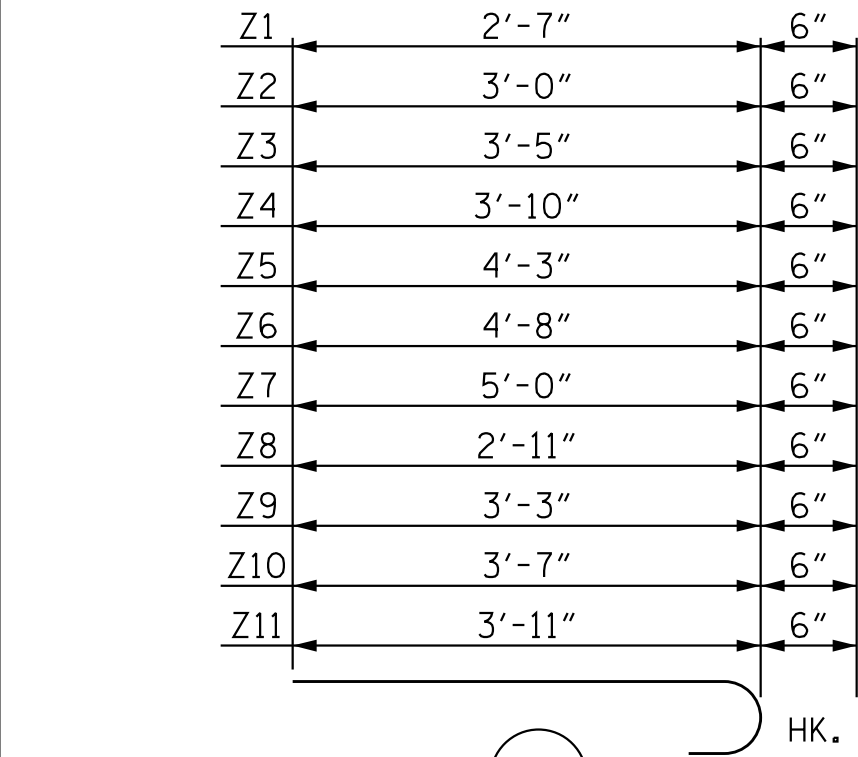
SHEET 5 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. C02-05	
WINGS FOR CONCRETE BOX CULVERT						TOTAL SHEETS 06	
H = 7'-0" SLOPE = 3:1 97°00'00" SKEW							
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				



TYPICAL WING SECTION

BAR TYPES						BILL OF MATERIAL						BILL OF MATERIAL (CONT.)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	16'-10"	180	V1	12	#4	STR	4'-0"	32	V1	12	#4	STR	4'-0"	32
H2	4	#4	STR	11'-7"	31	V2	6	#4	STR	4'-7"	18	H2	4	#4	STR	4'-7"	18
H3	4	#4	STR	5'-7"	15	V3	6	#4	STR	5'-3"	21	H3	4	#4	STR	5'-3"	21
H4	28	#4	1	3'-2"	59	V4	6	#4	STR	5'-10"	23	H4	28	#4	1	3'-2"	59
H5	4	#4	STR	17'-3"	46	V5	6	#4	STR	6'-5"	26	H5	4	#4	STR	17'-3"	46
H6	16	#4	STR	14'-7"	156	V6	6	#4	STR	7'-1"	28	H6	16	#4	STR	14'-7"	156
H7	4	#4	STR	10'-0"	27	V7	4	#4	STR	7'-7"	20	H7	4	#4	STR	10'-0"	27
H8	4	#4	STR	4'-9"	13	V8	6	#4	STR	4'-8"	19	H8	4	#4	STR	4'-9"	13
H9	28	#4	2	3'-2"	59	V9	6	#4	STR	5'-4"	21	H9	28	#4	2	3'-2"	59
H10	4	#4	STR	15'-0"	40	V10	6	#4	STR	6'-1"	24	H10	4	#4	STR	15'-0"	40
						V11	6	#4	STR	6'-9"	27						
						V12	6	#4	STR	7'-5"	30						
N1	12	#5	3	6'-0"	75							N1	12	#5	3	6'-0"	75
N2	6	#5	3	6'-7"	41							N2	6	#5	3	6'-7"	41
N3	6	#5	3	7'-3"	45	Z1	12	#4	4	3'-1"	25	N3	6	#5	3	7'-3"	45
N4	6	#5	3	7'-10"	49	Z2	6	#4	4	3'-6"	14	N4	6	#5	3	7'-10"	49
N5	6	#5	3	8'-5"	53	Z3	6	#4	4	3'-11"	16	N5	6	#5	3	8'-5"	53
N6	6	#5	3	9'-1"	57	Z4	6	#4	4	4'-4"	17	N6	6	#5	3	9'-1"	57
N7	4	#5	3	9'-7"	40	Z5	12	#4	4	4'-9"	38	N7	4	#5	3	9'-7"	40
N8	6	#5	3	6'-8"	42	Z6	6	#4	4	5'-2"	21	N8	6	#5	3	6'-8"	42
N9	6	#5	3	7'-4"	46	Z7	4	#4	4	5'-6"	15	N9	6	#5	3	7'-4"	46
N10	6	#5	3	8'-1"	51	Z8	6	#4	4	3'-5"	14	N10	6	#5	3	8'-1"	51
N11	6	#5	3	8'-9"	55	Z9	6	#4	4	3'-9"	15	N11	6	#5	3	8'-9"	55
N12	6	#5	3	9'-5"	59	Z10	6	#4	4	4'-1"	16	N12	6	#5	3	9'-5"	59
						Z11	6	#4	4	4'-5"	18						
S1	12	#6	STR	6'-0"	108							S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	18'-3"	114							REINFORCING STEEL					
T2	6	#5	STR	16'-1"	101							FOR 4 WINGS					
												CLASS A CONCRETE					
												4 WINGS		27.49	CY		
												2 HEADWALLS		1.87	CY		
												2 END CURTAIN WALLS		2.29	CY		
												2 SILLS		1.33	CY		
														TOTAL	32.98	CY	



PROJECT NO. _____ R-3300A
NEW HANOVER COUNTY
STATION: _____ 253+30.00 -L1-

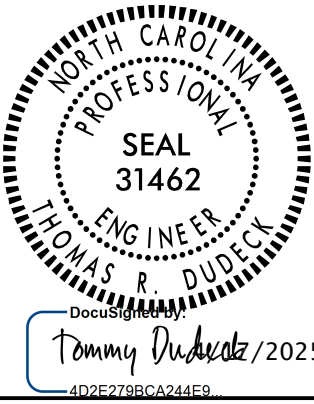
SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR
CONCRETE BOX CULVERT

H = 7'-0" SLOPE = 3:1
97°00'00" SKEW

REVISIONS						SHEET NO. C02-06
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

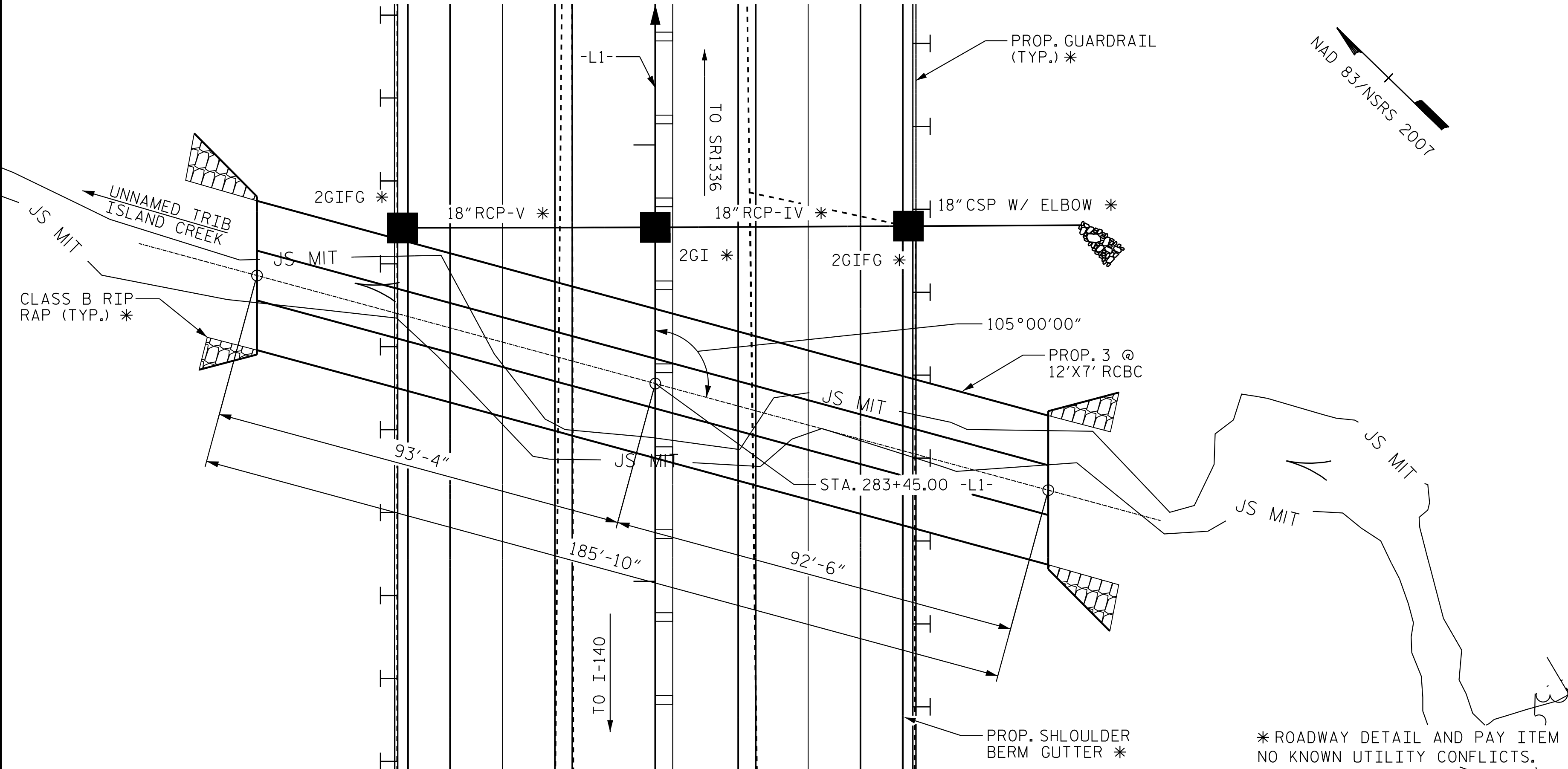


DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

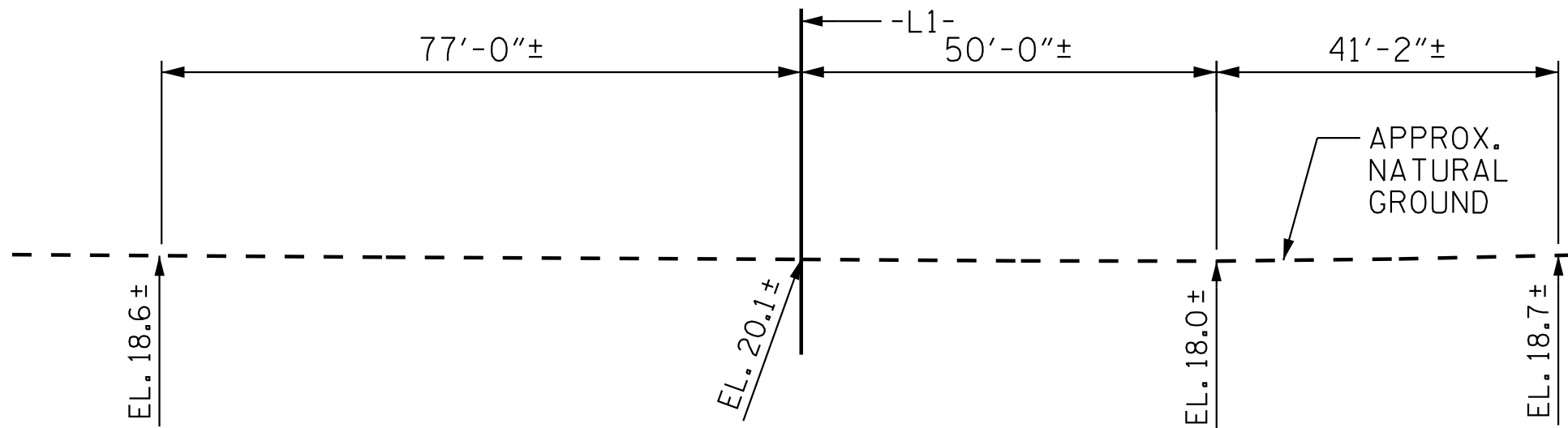
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 11/12/20
CHECKED BY : T. N. ENNIS DATE : 11/18/20
DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 04/16/25

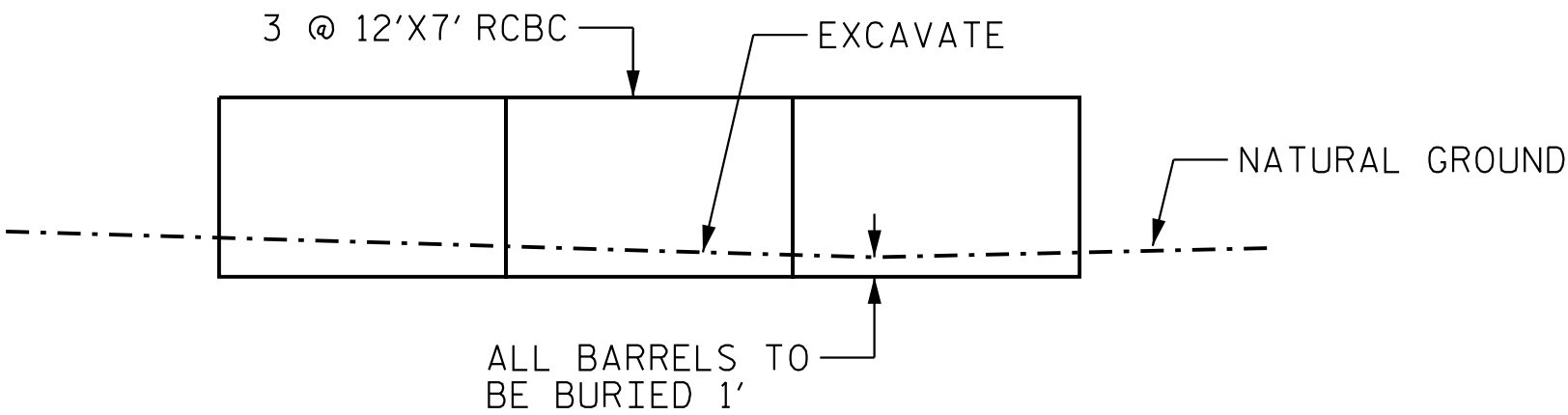
BM #4: RR SPIKE IN 8" PINE. N211254 E2357236, STA. 283+82.46 -L1-, 337.22' LT. EL. 25.16



LOCATION SKETCH

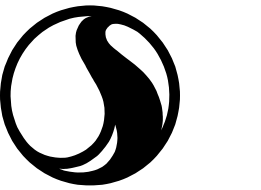


PROFILE ALONG CULVERT



INLET & OUTLET CHANNEL DETAIL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : W. G. KUHN DATE : 01/24/24
CHECKED BY : K. A. WOYAHN DATE : 01/29/24

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/11/25

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	1,678 TONS
FOUNDATION COND. GEOTEXTILE	881 S.Y.
CLASS A CONCRETE	
BARREL @ 4.761 CY/FT	884.8 C.Y.
WINGS ETC.	39.5 C.Y.
TOTAL	924.3 C.Y.
REINFORCING STEEL	
BARREL	104,916 LBS.
WINGS ETC.	2,443 LBS.
TOTAL	107,359 LBS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 1130 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 24.0
DRAINAGE AREA	= 2.4 SQ. MI.
BASIC DISCHARGE (Q100)	= 1270 C.F.S.
BASIC HIGH WATER ELEVATION	= 24.4

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 4200 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 36.60
OVERTOPS ROADWAY AT STATION 283+81.00 -L1-	

ROADWAY DATA

GRADE POINT EL. @ STATION 283+45.00 -L1-	= 36.6
BED ELEV. @ STATION 283+45.00 -L1-	= 17.8
ROADWAY SLOPES	= 3:1 (L.T.) 3:1 (RT.)

NOTES

ASSUMED LIVE LOAD = HL-93.

DESIGN FILL= 12.00 FT. (MAXIMUM) 11.41 FT. (MINIMUM)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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.

BACKFILL ALL BARRELS WITH 1' NATIVE MATERIAL.

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN ALL CULVERT BARRELS. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

FOUNDATION NOTES

1. EXCAVATE FOUNDATION A MINIMUM OF 3.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 3.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL ENCAPSULATED IN TYPE 2 GEOTEXTILE IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS. FOR FOUNDATION CONDITIONING TEXTILE, SEE SPECIAL PROVISIONS.
2. CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT -L1- STATION 283+45.00 WITH 2" OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.
3. OVEREXCAVATE ADDITIONAL LOOSE/SOFT OR ORGANIC MATERIAL IF PRESENT TO SUITABLE BEARING MATERIALS AND REPLACE WITH ADDITIONAL CLASS VI FOUNDATION CONDITIONING MATERIAL.

PROJECT NO. R-3300A

NEW HANOVER COUNTY

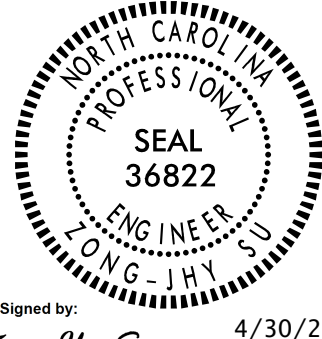
STATION: 283+45.00 -L1-

SHEET 1 OF 6 BRIDGE NO. 640239

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 7 FT.
CONCRETE BOX CULVERT

105°00'00" SKEW



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO. C03-01
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

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:

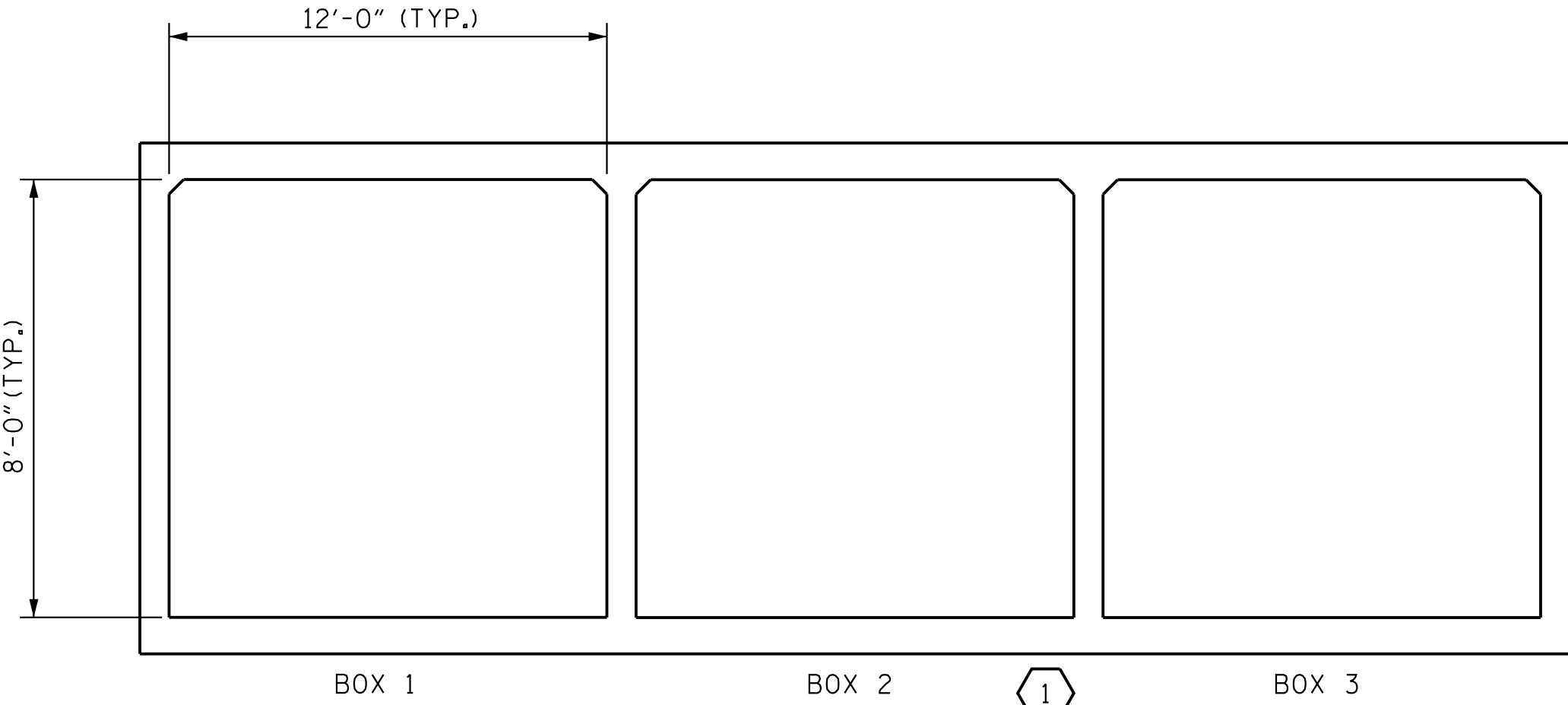
1. RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. LOAD RATINGS FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

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

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 × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER	
						γ_{LL} LIVE-LOAD FACTORS	RATING FACTOR	BOX NO.	ELEMENT TYPE	ft DISTANCE FROM LEFT END OF ELEMENT	RATING FACTOR	BOX NO.	ELEMENT TYPE	ft DISTANCE FROM LEFT END OF ELEMENT		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	2.19	--	1.75	2.19	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	3.70	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1	
	HL-93 (OPERATING)	N/A		2.84	--	1.35	2.84	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	4.79	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1	
	HS-20 (INVENTORY)	36.000	2	2.46	88.56	1.75	2.46	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	5.05	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1	
	HS-20 (OPERATING)	36.000		3.20	115.20	1.35	3.20	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.55	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13.500		8.84	119.34	1.40	8.84	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	12.88	1	TOP (EXTERIOR WALL)	0.00	1
		SNGARBS2	20.000		6.31	126.20	1.40	6.31	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	12.80	1	TOP (EXTERIOR WALL)	0.00	1
		SNAGRIS2	22.000		5.86	128.92	1.40	5.86	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	12.00	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1
		SNCOTTS3	27.250		4.40	119.90	1.40	4.40	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.56	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		SNAGGRS4	34.925		3.64	127.12	1.40	3.64	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.33	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		SNS5A	35.550		3.60	127.98	1.40	3.60	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.15	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		SNS6A	39.950		3.24	129.43	1.40	3.24	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	5.88	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		SNS7B	42.000		3.09	129.78	1.40	3.09	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	5.69	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.98	131.34	1.40	3.98	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	8.03	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1
		TNT4A	33.075		3.82	126.34	1.40	3.82	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	7.41	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		TNT6A	41.600		3.33	138.52	1.40	3.33	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.64	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		TNT7A	42.000		3.24	136.08	1.40	3.24	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.57	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1
		TNT7B	42.000		3.15	132.30	1.40	3.15	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.34	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1
		TNAGRIT4	43.000		3.02	129.86	1.40	3.02	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.16	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1
TNAGT5A		45.000		2.98	134.10	1.40	2.98	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	6.03	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1	
TNAGT5B		45.000	3	2.93	131.85	1.40	2.93	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	5.94	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	1	
EMERGENCY VEHICLE (EV)	EV2	28.750		4.72	135.70	1.30	4.72	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	9.80	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1	
	EV3	43.000	4	3.10	133.30	1.30	3.10	2	RIGHT END (BOTTOM SLAB) - OUTSIDE	12.00	5.57	1	RIGHT END (TOP SLAB) - OUTSIDE	12.00	1	



PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 283+45.00 -L1-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NO. BY: DATE: NO. BY: DATE:

1 2 3 4

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
36822
ENGINEER
FONG-HY SU

Signed by:
Fong-Hy Su
04/11/2025

REVISIONS

NO. BY: DATE: NO. BY: DATE:

1 2 3 4

SHEET NO.
C03-02

TOTAL
SHEETS
06

Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6868
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ASSEMBLED BY : W. G. KUHN
CHECKED BY : K. A. WOYAHN

DATE :01/24/24
DATE :01/26/24

DRAWN BY : WMC
CHECKED BY : GM

7/II
7/II

REV. 10/1/II
REV. 12/17
REV. 04/23

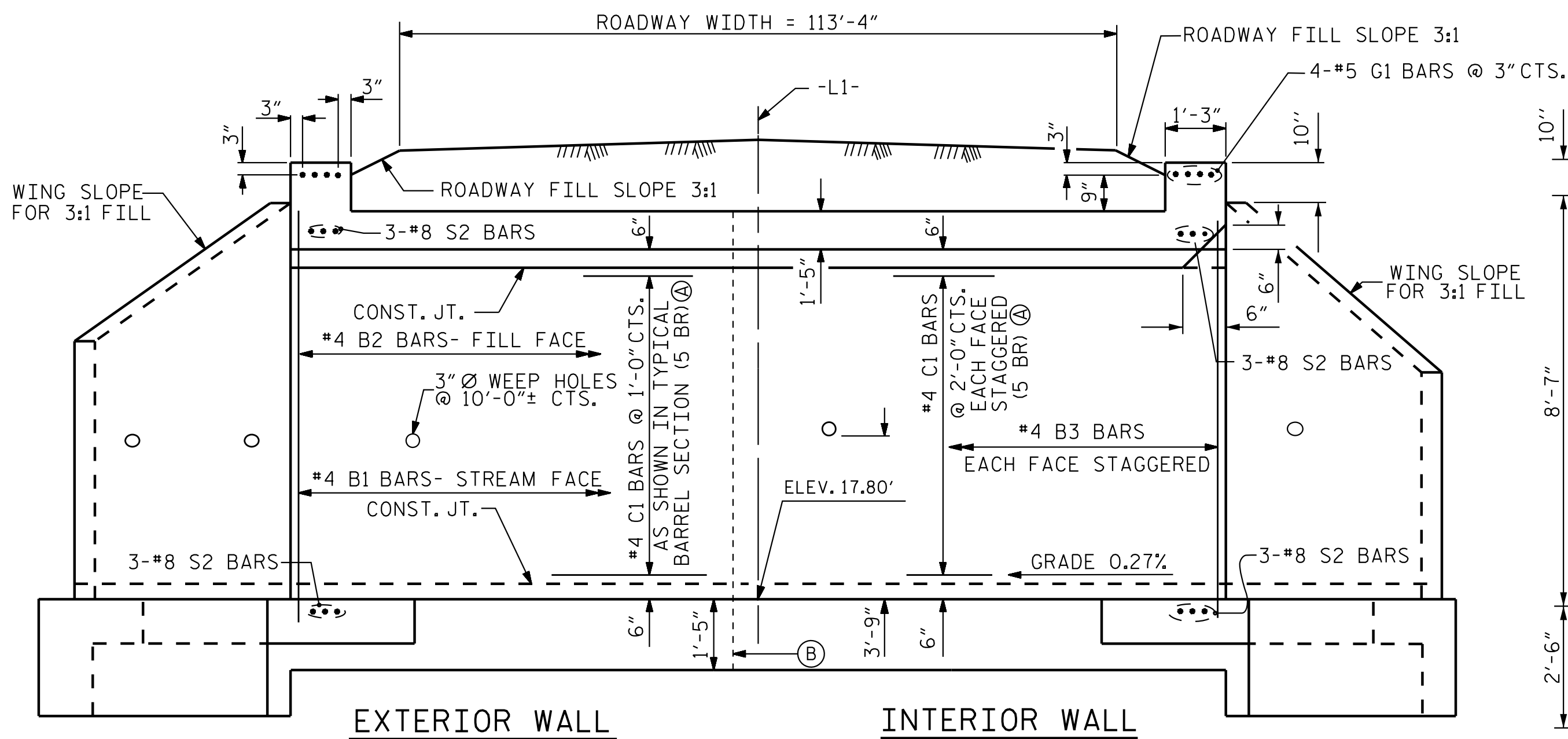
MAA/GM
MAA/THC
BNB/AAI

DESIGN
ENGINEER
OF RECORD:

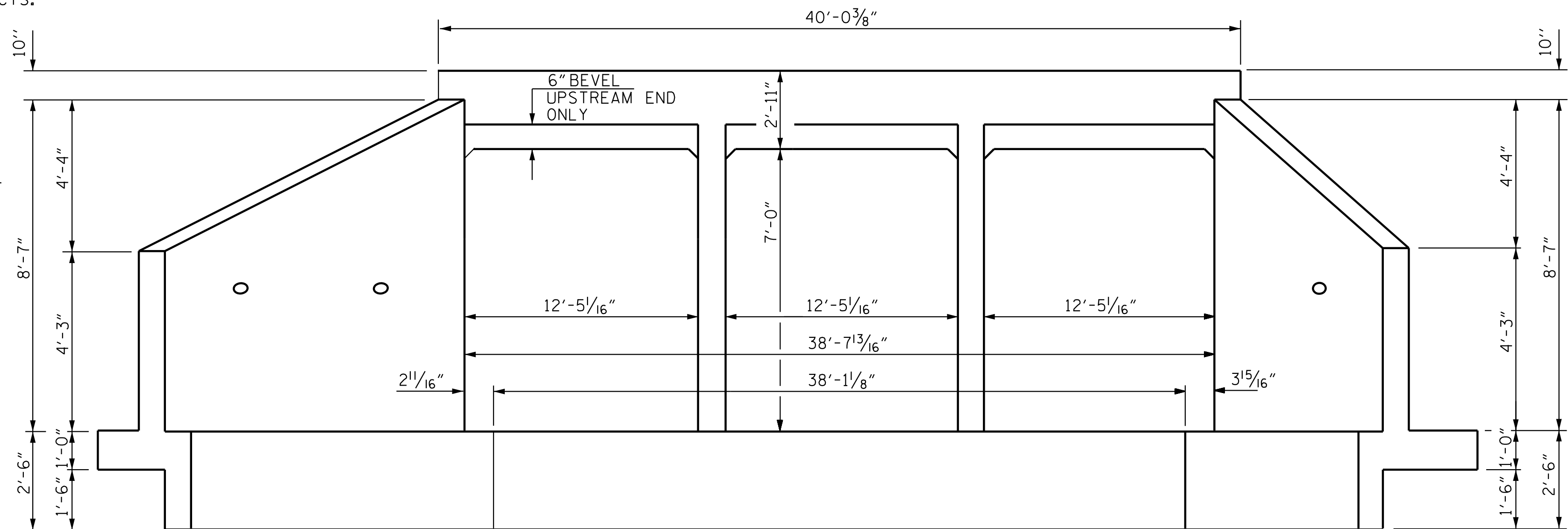
Z.-J. SU

DATE : 04/11/25

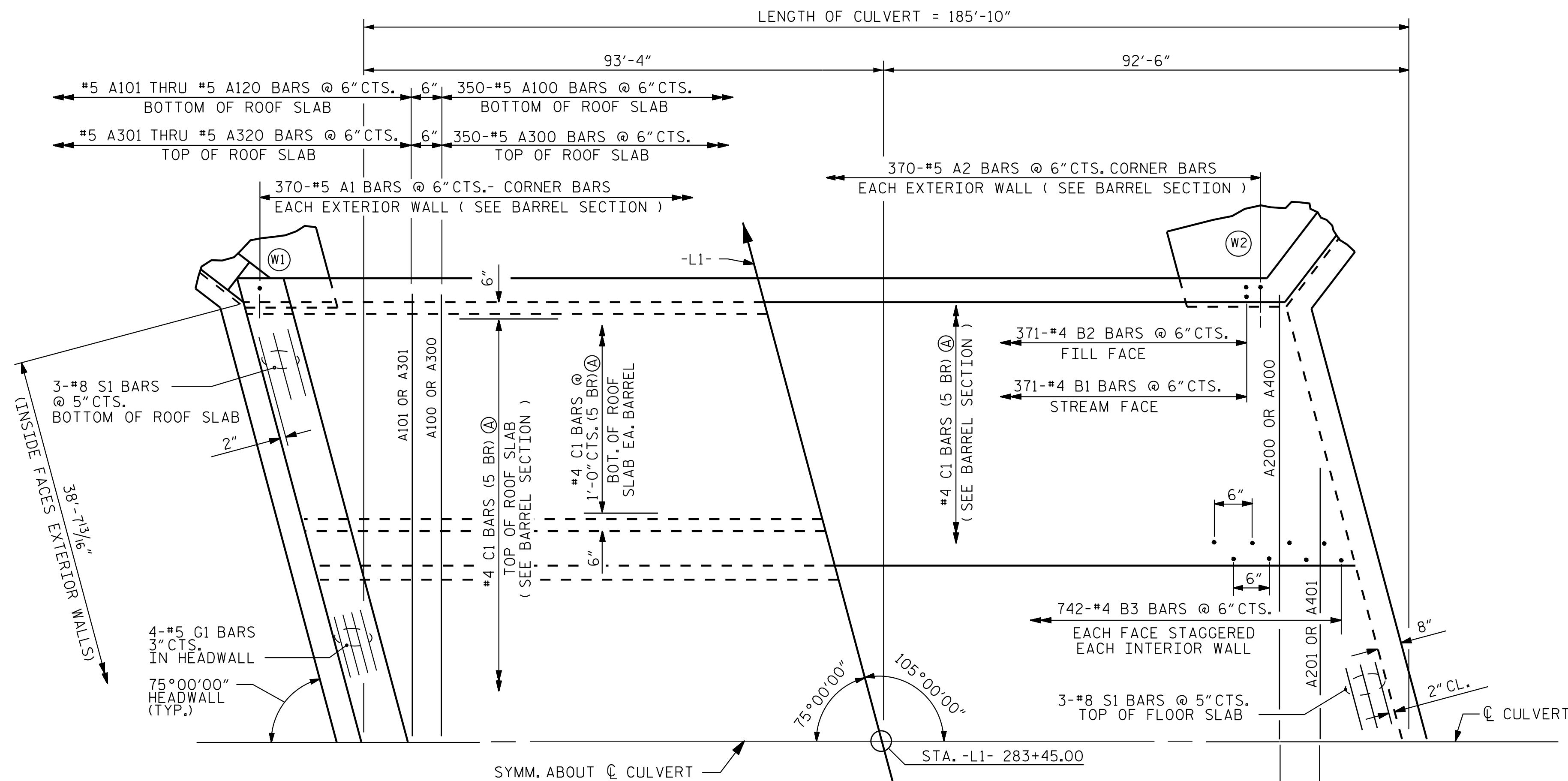
LRFR SUMMARY
(LOOKING DOWNSTREAM)



CULVERT SECTION NORMAL TO ROADWAY

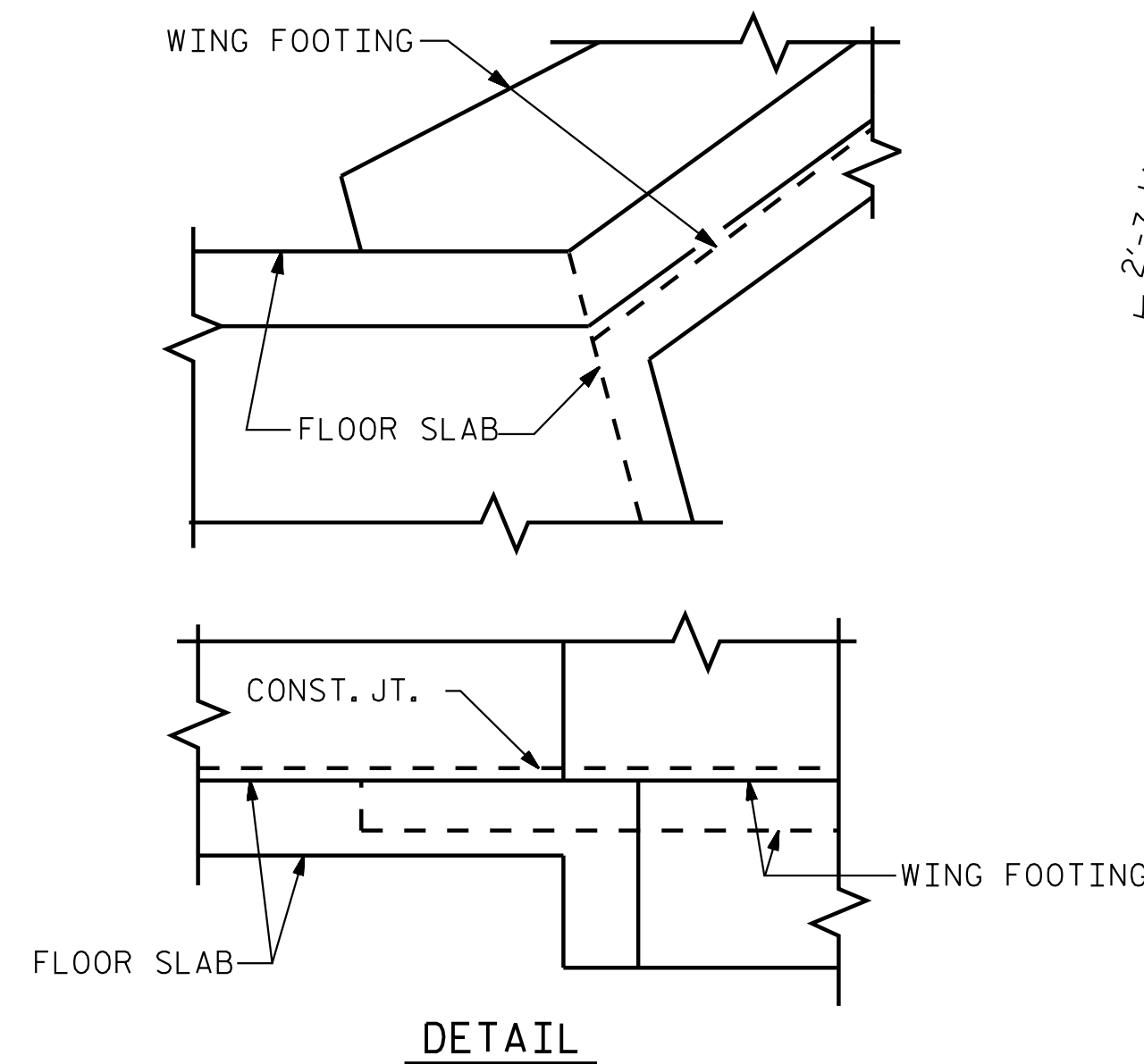


END ELEVATION NORMAL TO SKEW

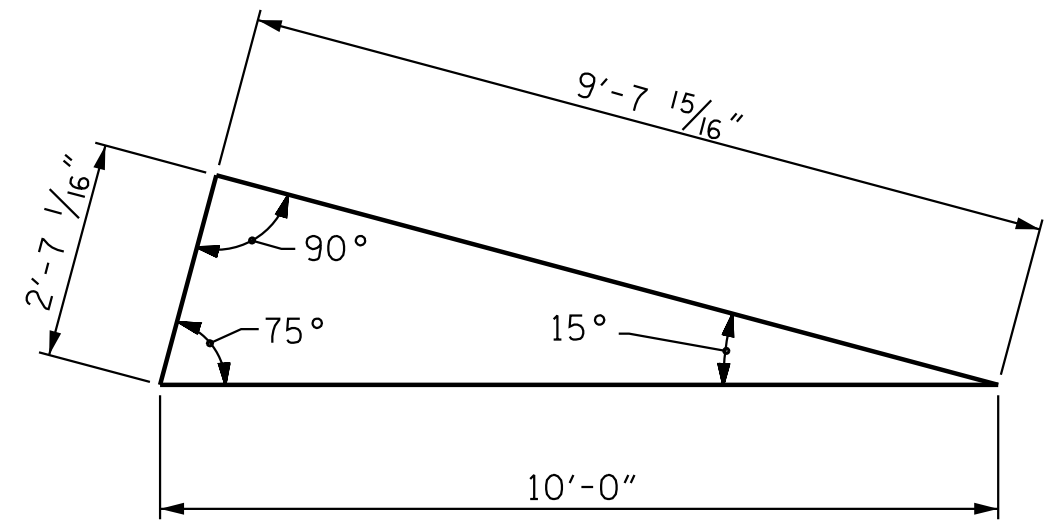


PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



DETAIL
CONNECTION OF WING FOOTING
AND FLOOR SLAB WHEN SLAB
IS THICKER THAN FOOTING



SKEW TRIANGLE
(@ ROADWAY & HEADWALL)

NOTES:

- ① 2'-5" MIN. SPLICE
- ② TRANSVERSE CONSTRUCTION JT. (2 REQ'D.) (SEE NOTES SHT. 1 OF 6)



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 283+45.00 -L1-

SHEET 3 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
TRIPLE 12 FT. X 7 FT. CONCRETE BOX CULVERT					
105°00'00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C03-03					TOTAL SHEETS 06



DRAWN BY : W. G. KUHN DATE : 01/24/24
CHECKED BY : K. A. WOYAHN DATE : 01/29/24
DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/11/25



REINFORCING STEEL	104.916 LBS.
-------------------	--------------



SEE NOTES SHEET 1 OF 6 FOR BACKFILL INSTRUCTIONS.



DRAWN BY : W. G. KUHN DATE : 01/24/24
CHECKED BY : K. A. WOYAHN DATE : 01/29/24

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/11/25

Signed by:
Zong-Jhy. Su 4/11/2021

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SHEET 4 OF 6

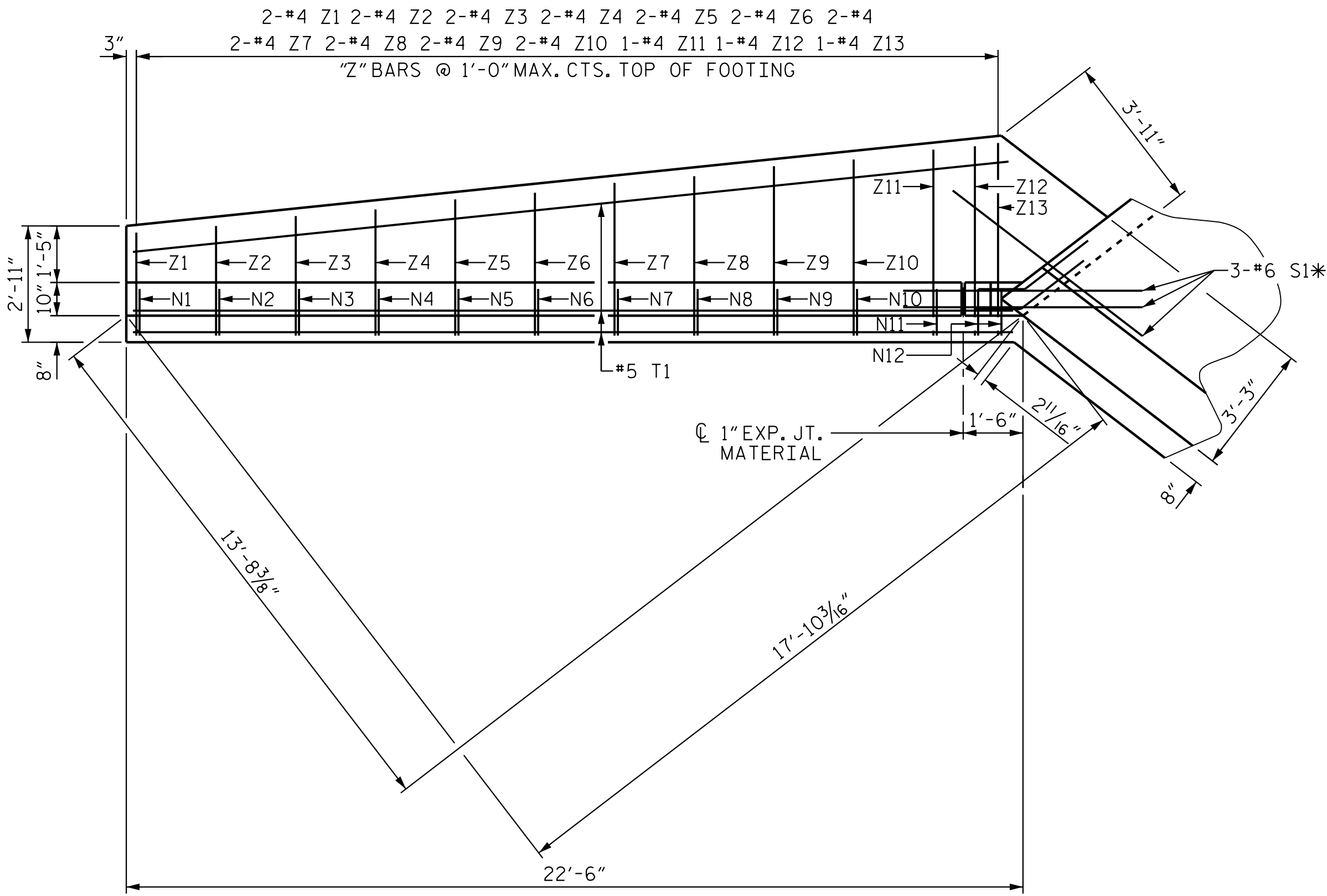
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 7 FT.
CONCRETE BOX CULVERT

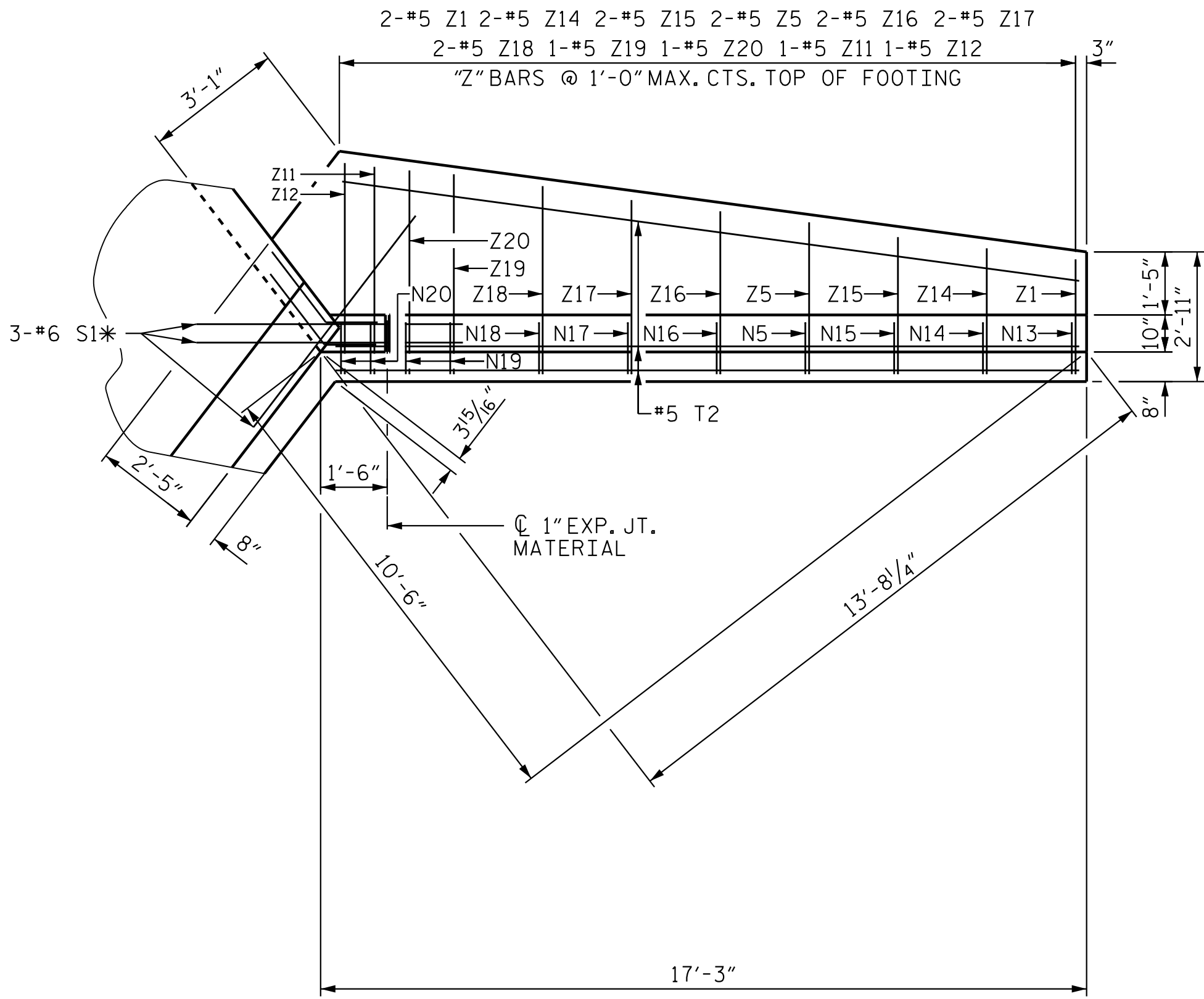
105°00'00" SKEW

REVISIONS						SHEET NO. C03-04
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

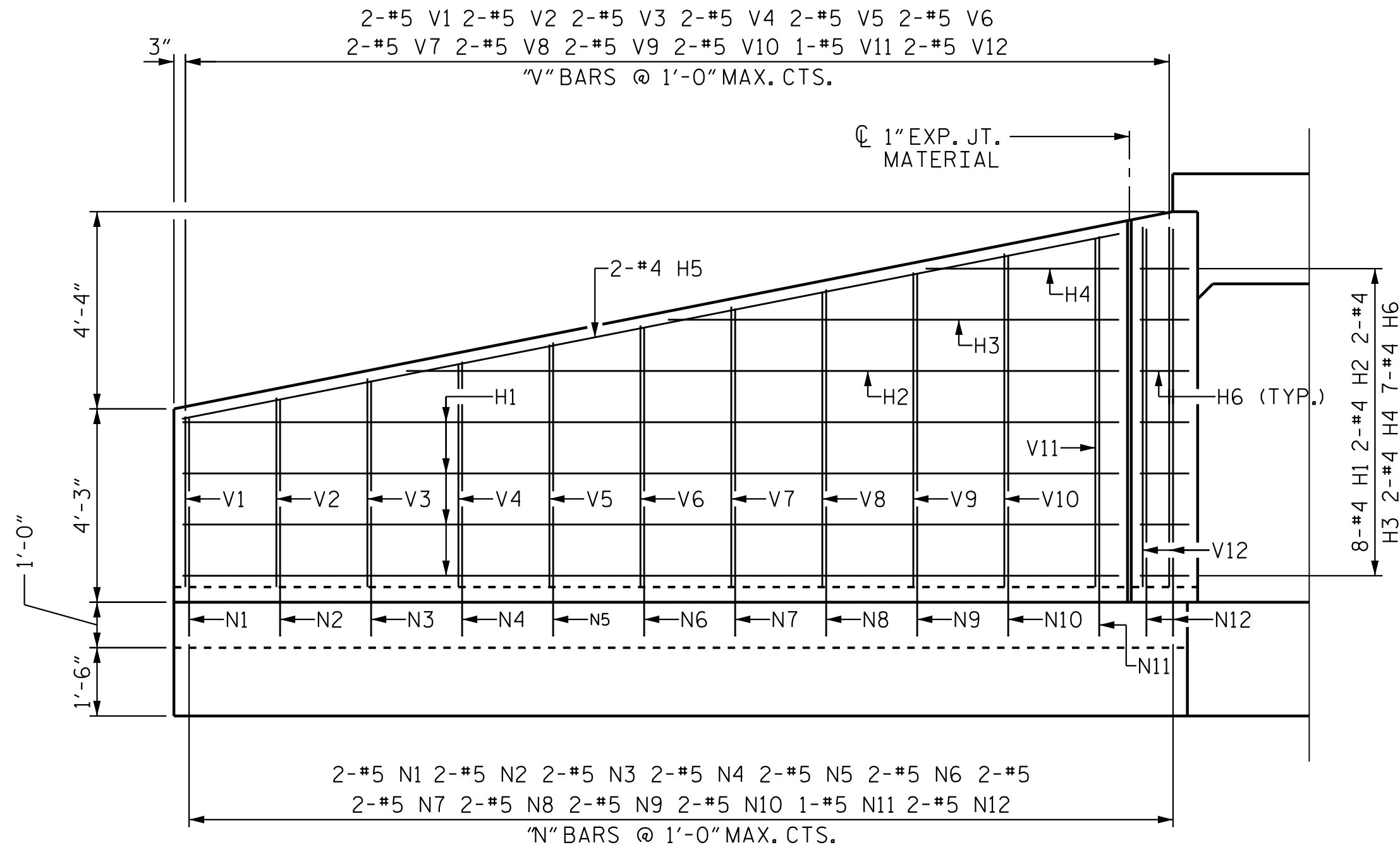
ksu 10/17/23 AM 4/11/2025 U:\Structures\CS\Drafting\Final\VR3300A_SML_CU_05_640003.dgn



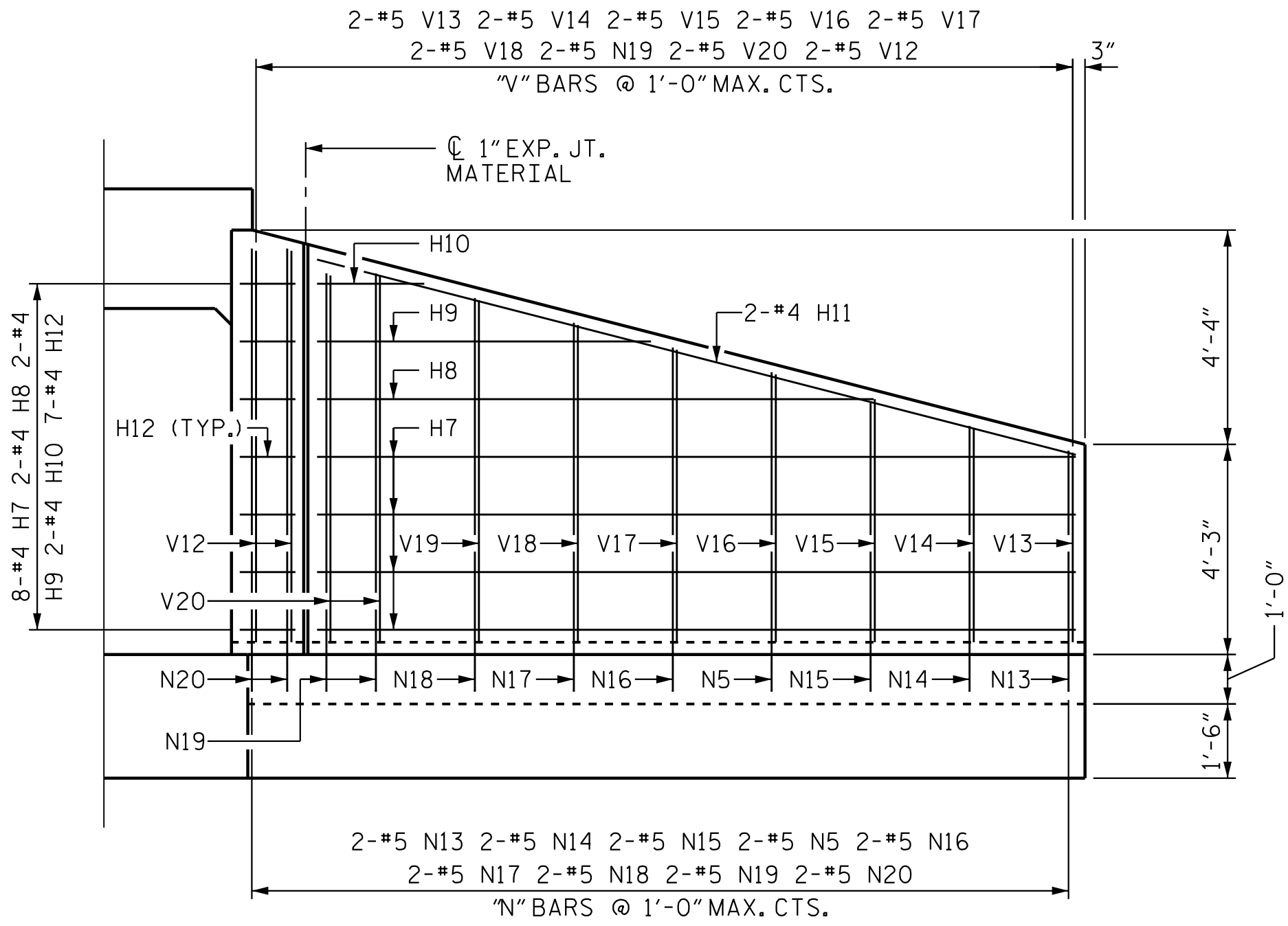
PLAN W1



PLAN W2



ELEVATION W1



ELEVATION W2

NOTES:

FOR TYPICAL "WING SECTION" AND REINFORCING SCHEDULE, SEE SHEET 6 OF 6.

WEEP HOLES NOT SHOWN FOR CLARITY.

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 283+45.00 -L1-

SHEET 5 OF 6



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : W. G. KUHN DATE : 02/13/25
CHECKED BY : Z.-J. SU DATE : 02/20/25

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/11/25



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

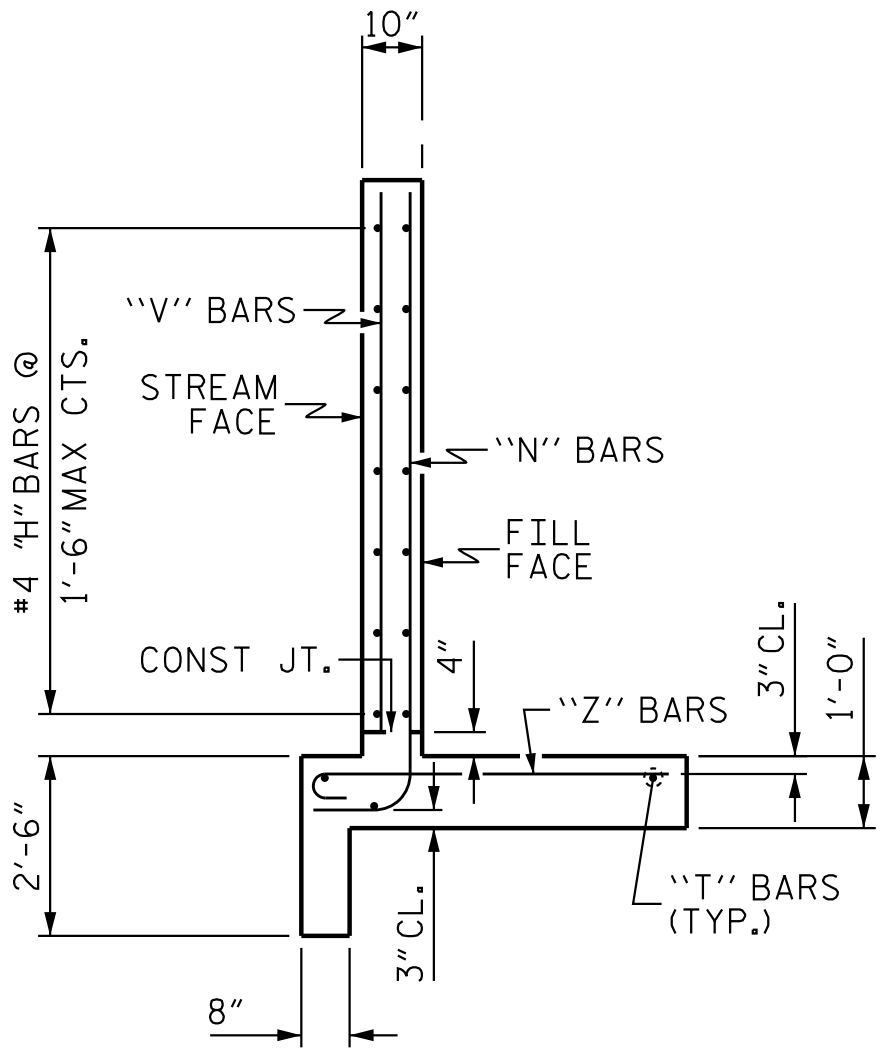
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE
BOX CULVERT

H = 7'-0" SLOPE = 3:1
105°00'00" SKEW

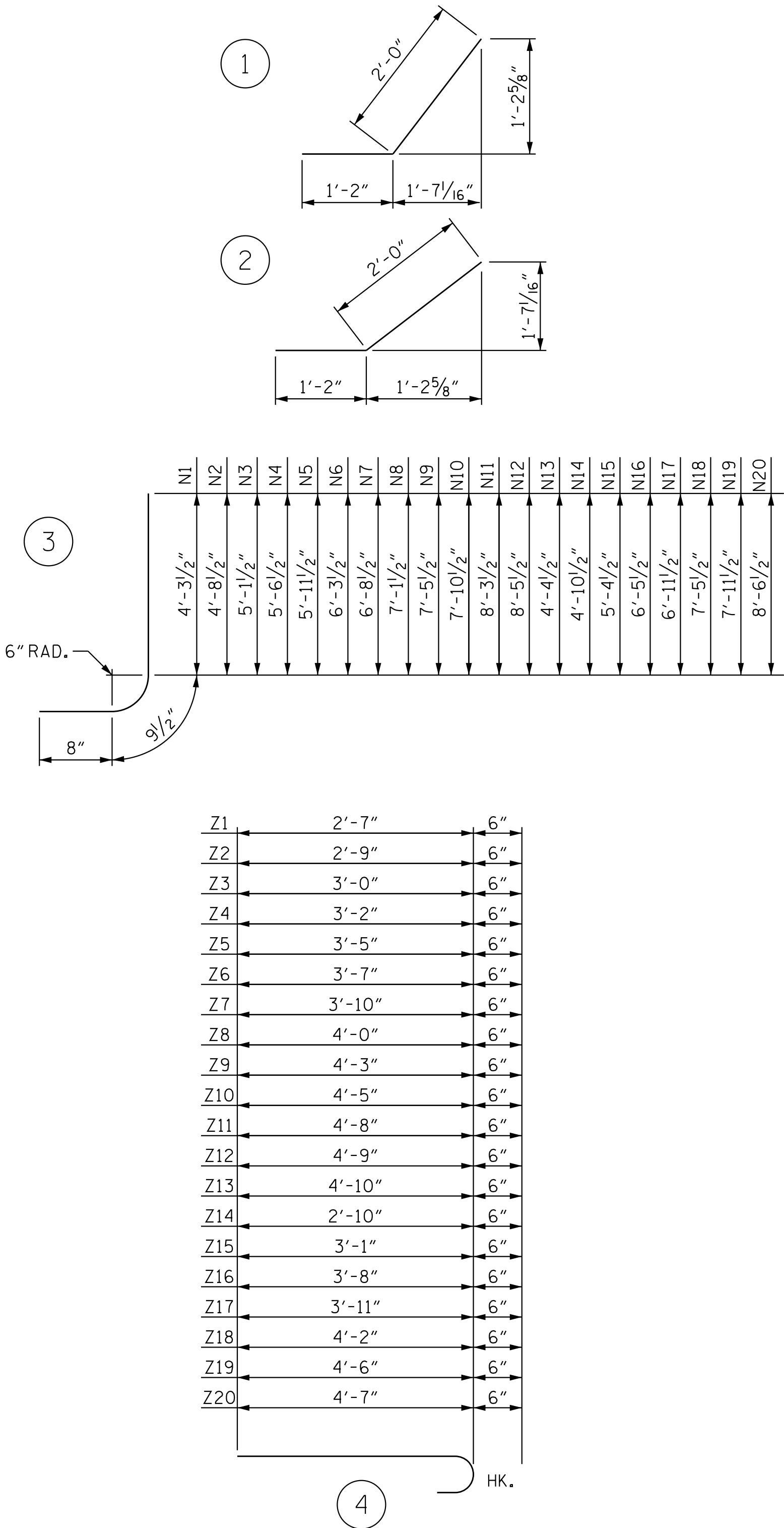
REVISIONS						SHEET NO. C03-05
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

4/11/2025 10:17:38 AM ksu
U:\Structures\CS\Dr-drawing\Final\VR3300A_SMU_CU_06_640003.dgn



TYPICAL WING SECTION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL						BILL OF MATERIAL (CONT.)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	20'-7"	220	V1	4	#5	STR	3'-9"	16
H2	4	#4	STR	15'-8"	42	V2	4	#5	STR	4'-2"	17
H3	4	#4	STR	9'-11"	26	V3	4	#5	STR	4'-7"	19
H4	4	#4	STR	4'-3"	11	V4	4	#5	STR	4'-11"	21
H5	2	#4	STR	21'-0"	28	V5	4	#5	STR	5'-4"	22
H6	28	#4	1	3'-2"	59	V6	4	#5	STR	5'-9"	24
H7	16	#4	STR	15'-4"	164	V7	4	#5	STR	6'-2"	26
H8	4	#4	STR	11'-3"	30	V8	4	#5	STR	6'-6"	27
H9	4	#4	STR	6'-9"	18	V9	4	#5	STR	6'-11"	29
H10	4	#4	STR	2'-2"	6	V10	4	#5	STR	7'-4"	31
H11	2	#4	STR	15'-10"	21	V11	2	#5	STR	7'-8"	32
H12	28	#4	2	3'-2"	59	V12	8	#5	STR	7'-11"	66
						V13	4	#5	STR	3'-10"	16
N1	4	#5	3	5'-9"	24	V14	4	#5	STR	4'-4"	18
N2	4	#5	3	6'-2"	26	V15	4	#5	STR	4'-11"	21
N3	4	#5	3	6'-7"	27	V16	4	#5	STR	5'-5"	23
N4	4	#5	3	7'-0"	29	V17	4	#5	STR	5'-11"	25
N5	8	#5	3	7'-5"	62	V18	4	#5	STR	6'-5"	27
N6	4	#5	3	7'-9"	32	V19	4	#5	STR	6'-11"	29
N7	4	#5	3	8'-2"	34	V20	4	#5	STR	7'-5"	31
N8	4	#5	3	8'-7"	36						
N9	4	#5	3	8'-11"	37	Z1	8	#4	4	3'-1"	16
N10	4	#5	3	9'-4"	39	Z2	4	#4	4	3'-3"	9
N11	2	#5	3	9'-9"	20	Z3	4	#4	4	3'-6"	9
N12	4	#5	3	9'-11"	41	Z4	4	#4	4	3'-8"	10
N13	4	#5	3	5'-10"	24	Z5	8	#4	4	3'-11"	21
N14	4	#5	3	6'-4"	26	Z6	4	#4	4	4'-1"	11
N15	4	#5	3	6'-10"	29	Z7	4	#4	4	4'-4"	12
N16	4	#5	3	7'-11"	33	Z8	4	#4	4	4'-6"	12
N17	4	#5	3	8'-5"	35	Z9	4	#4	4	4'-9"	13
N18	4	#5	3	8'-11"	37	Z10	4	#4	4	4'-11"	13
N19	2	#5	3	9'-5"	20	Z11	4	#4	4	5'-2"	14
N20	4	#5	3	10'-0"	42	Z12	4	#4	4	5'-3"	14
						Z13	2	#4	4	5'-4"	7
S1	12	#6	STR	6'-0"	108	Z14	4	#4	4	3'-4"	9
						Z15	4	#4	4	3'-7"	10
T1	6	#5	STR	22'-1"	138	Z16	4	#4	4	4'-2"	11
T2	6	#5	STR	16'-9"	105	Z17	4	#4	4	4'-5"	12

REINFORCING STEEL		2,443 LBS
FOR 4 WINGS		
CLASS A CONCRETE		
4 WINGS	31.1	CY
2 HEADWALLS	3.7	CY
2 END CURTAIN WALLS	4.7	CY
TOTAL	39.5	CY

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 283+45.00 -L1-

SHEET 6 OF 6



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

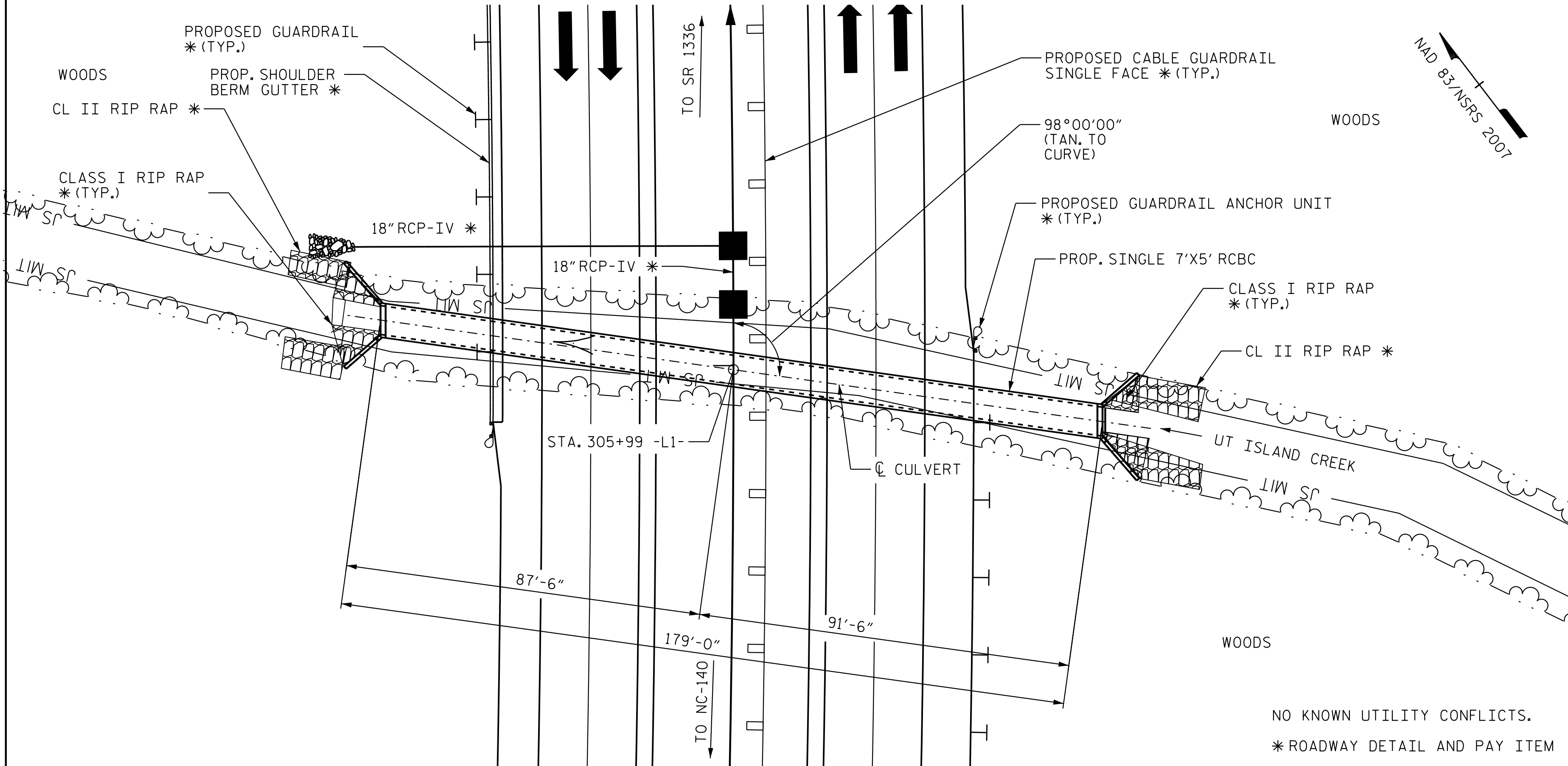
DRAWN BY : W. G. KUHN DATE : 02/13/25
CHECKED BY : Z.-J. SU DATE : 02/20/25
DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/11/25



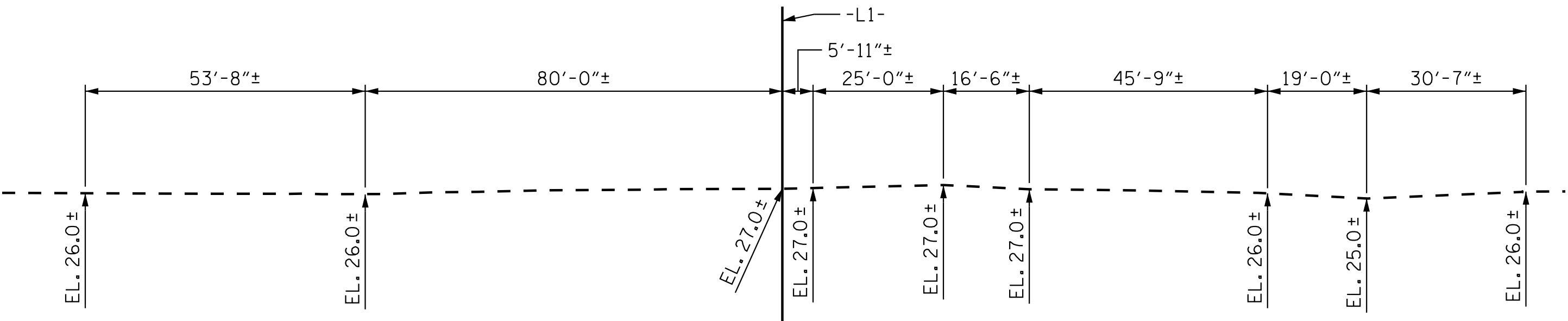
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WINGS FOR CONCRETE BOX CULVERT					
H = 7'-0" SLOPE = 3:1 105°00'00" SKEW					
REVISIONS					SHEET NO. C03-06
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					06

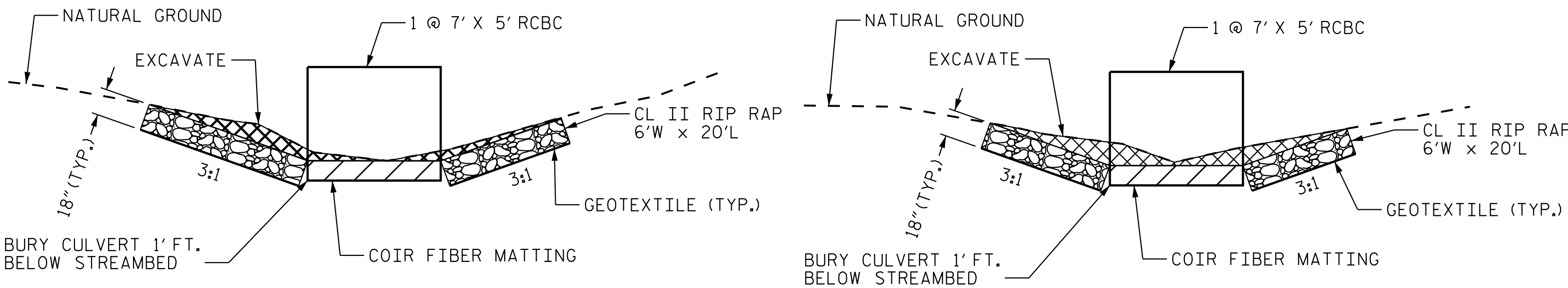
BM #5: RR SPIKE IN 10" PINE N212813 E2358657, STA. 305+47.13 -L1-, 421.14' LT. EL. 33.10



LOCATION SKETCH



PROFILE ALONG CULVERT



INLET CHANNEL DETAIL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)

OUTLET CHANNEL DETAIL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)

NOTES

ASSUMED LIVE LOAD = HL-93.

DESIGN FILL= 10.96 FT. (MAXIMUM) 7.04 FT. (MINIMUM)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

FOUNDATION NOTES

1. EXCAVATE FOUNDATION A MINIMUM OF 3.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 3.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL ENCAPSULATED IN TYPE 2 GEOTEXTILE IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS. FOR FOUNDATION CONDITIONING TEXTILE, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	316 TONS
FOUNDATION COND. GEOTEXTILE	246 S.Y.

CLASS A CONCRETE
BARREL @ 0.714 CY/FT 127.8 C.Y.
WINGS ETC. 17.9 C.Y.
TOTAL 145.7 C.Y.

REINFORCING STEEL
BARREL 23,978 LBS.
WINGS ETC. 1,022 LBS.
TOTAL 25,000 LBS.

HYDRAULIC DATA

DESIGN DISCHARGE	=	210 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	31.6
DRAINAGE AREA	=	0.15 SQ. MI.
BASIC DISCHARGE (Q100)	=	240 C.F.S.
BASIC HIGH WATER ELEVATION	=	32.5

ROADWAY DATA

GRADE POINT EL. @ STATION 305+99.00 -L1-	=	40.00
BED ELEV. @ STATION 305+99.00 -L1-	=	24.90
ROADWAY SLOPES	=	3:1 (LT.) 3:1 (RT.)

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	435 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	500+ YRS.
OVERTOPPING FLOOD ELEVATION	=	40.0
OVERTOPS ROADWAY AT STATION 306+29.00 -L1-		

PROJECT NO. R-3300A

NEW HANOVER COUNTY

STATION: 305+99.00 -L1-

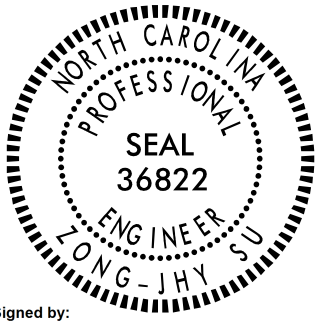
SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 7 FT. X 5 FT.
CONCRETE BOX CULVERT

98°00'00" SKEW

REVISIONS						SHEET NO. C04-01
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			



Signed by: *Gong-Hy Sun* 4/30/2025
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 08/07/20
CHECKED BY : T. N. ENNIS DATE : 10/07/20

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

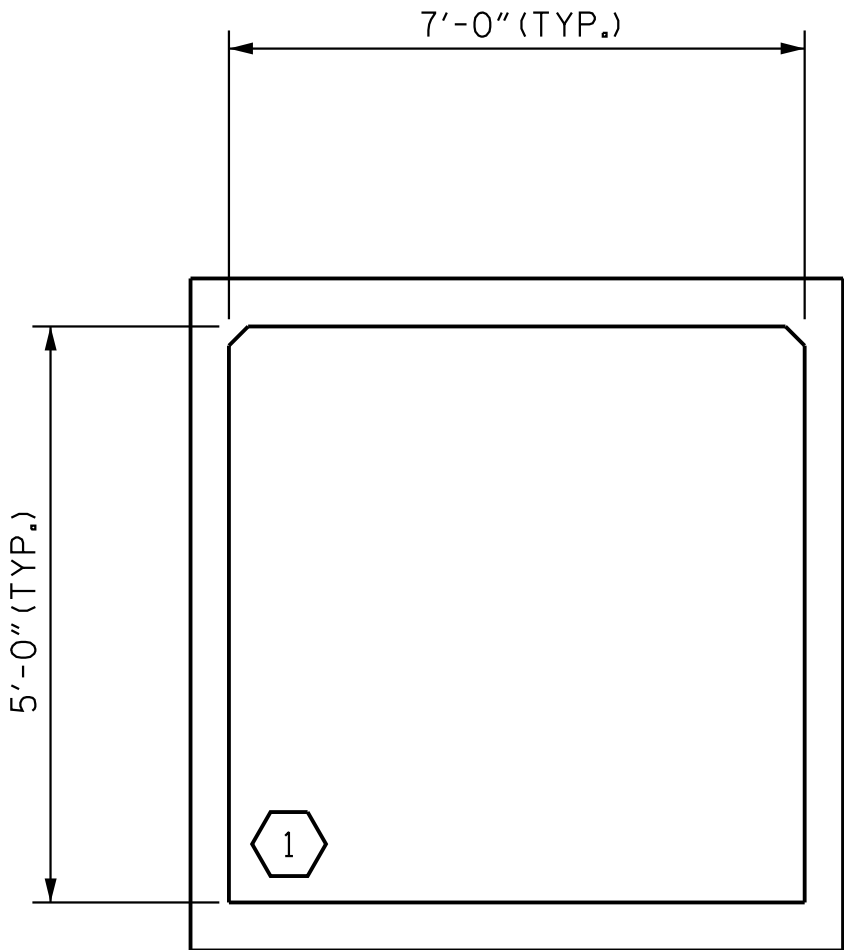
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

LOAD RATING FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS										
	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	STRENGTH I LIMIT STATE							
			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)
PERMANENT LOAD RATING	1	1.31	1.50	1	BOTT. SLAB (MID) - INSIDE	4.17	1.31	1	LEFT END - BOTT. SLAB	0.00



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 305+99.00 -L1-

SHEET 2 OF 6



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)						SHEET NO. C04-02		
REVISIONS						TOTAL SHEETS 06		
NO.	BY:	DATE:	NO.	BY:	DATE:			
1			3					
2			4					

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STD. NO. LRFR7

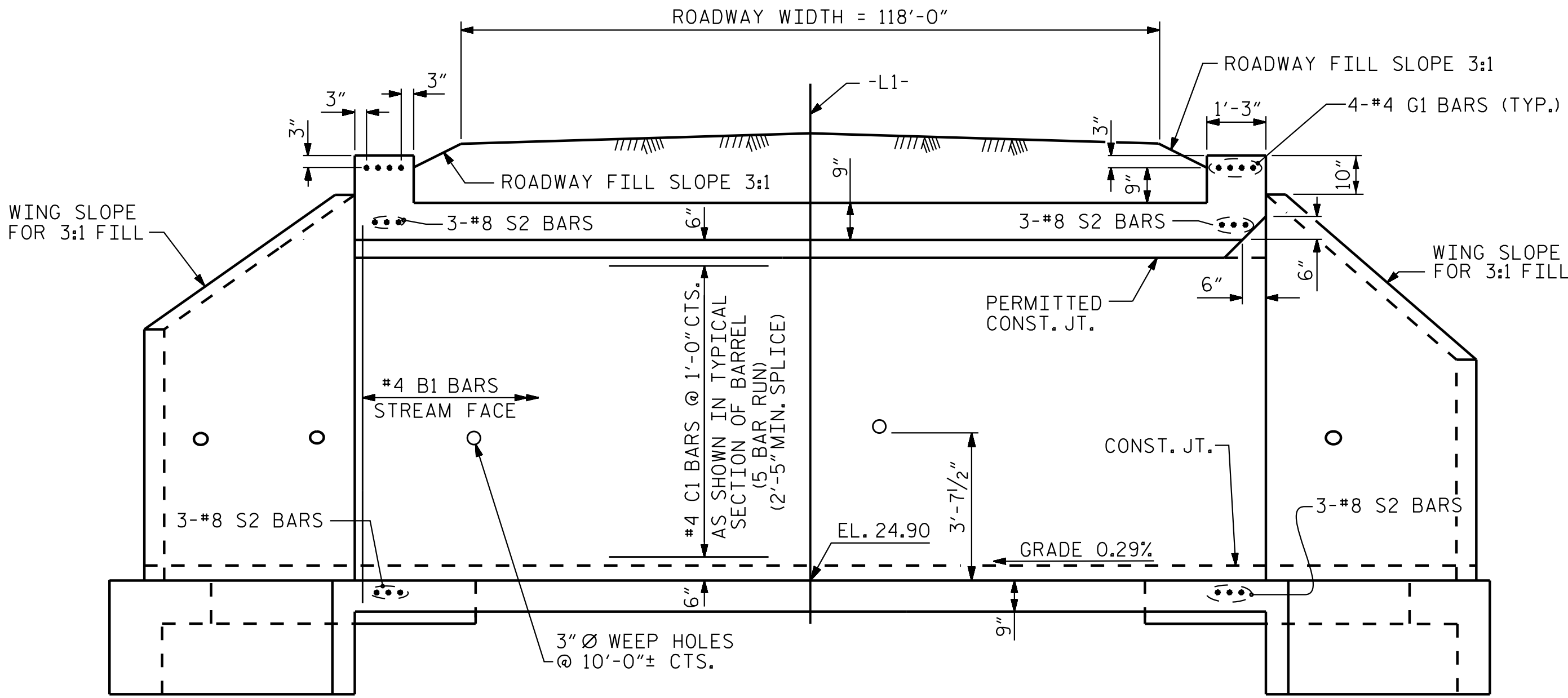


Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

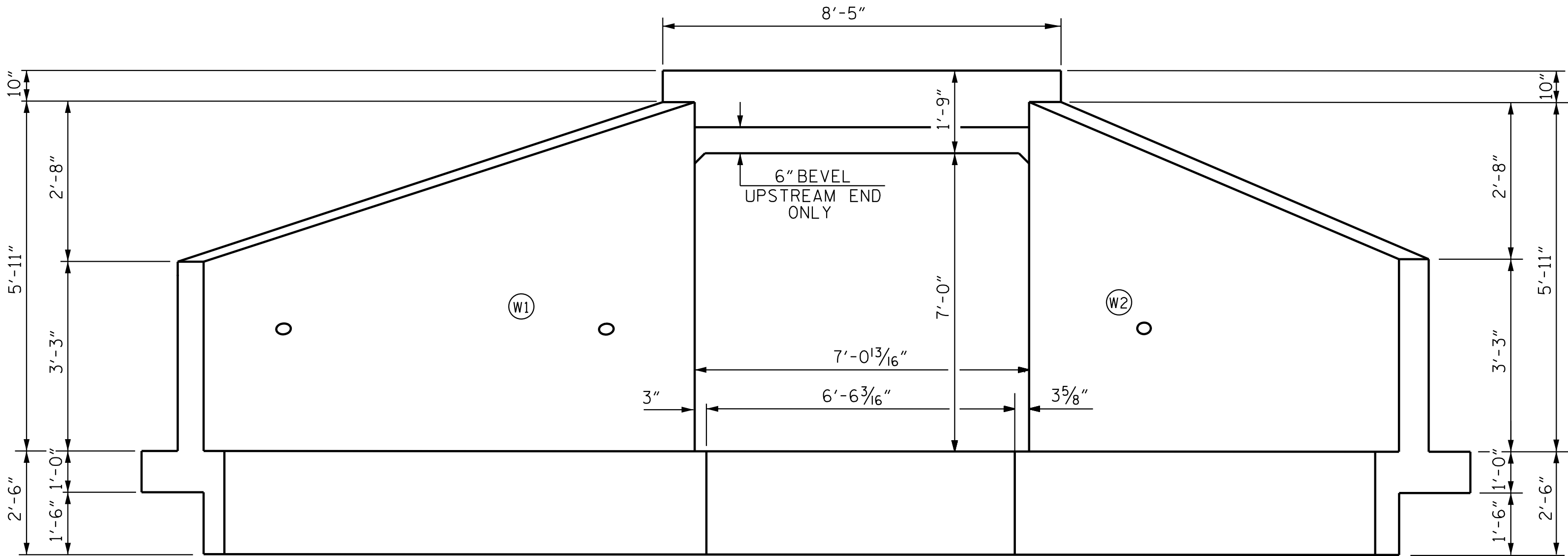
ASSEMBLED BY : J. HAGENBUSH DATE :09/22/20
CHECKED BY : T. N. ENNIS DATE :10/07/20

DRAWN BY : BNB 6/19
CHECKED BY : THC 6/19

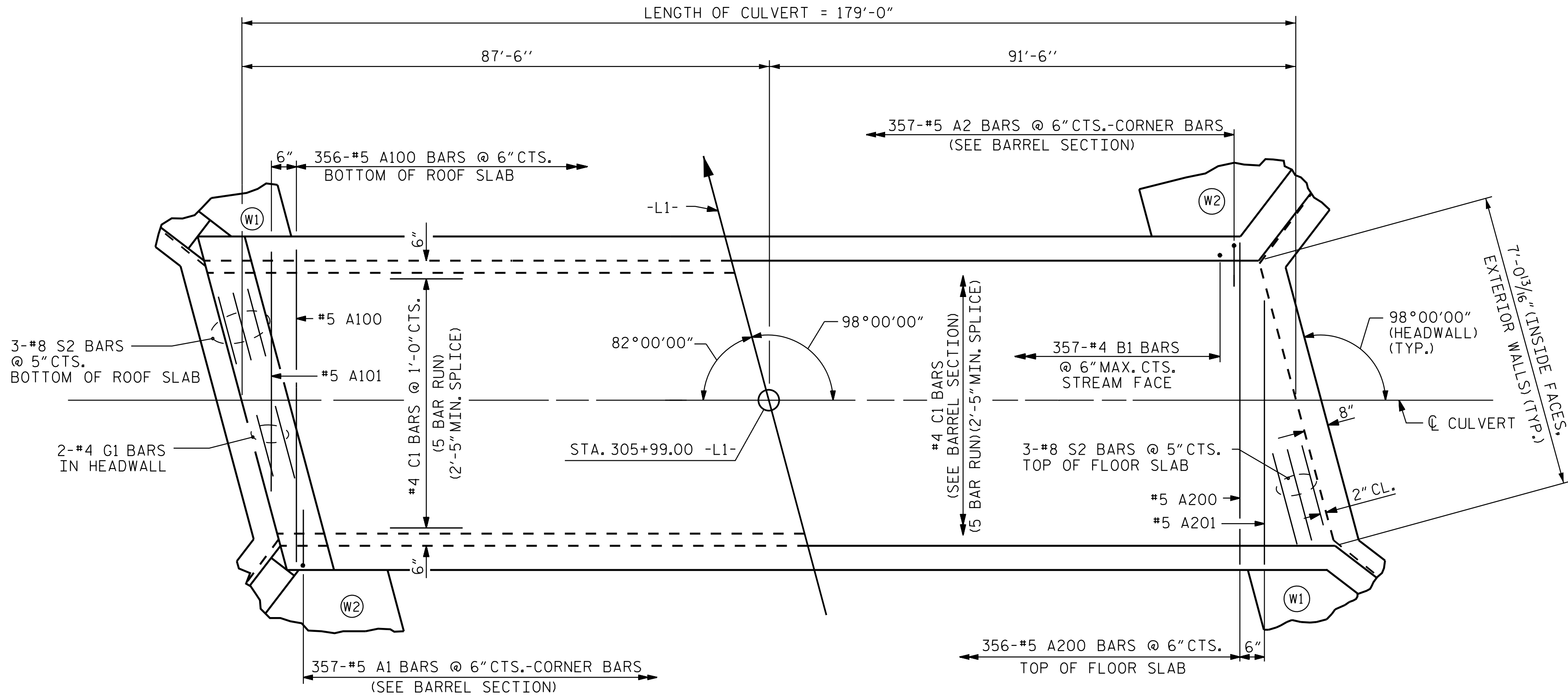
DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



CULVERT SECTION NORMAL TO ROADWAY
(LOOKING UPSTATION)



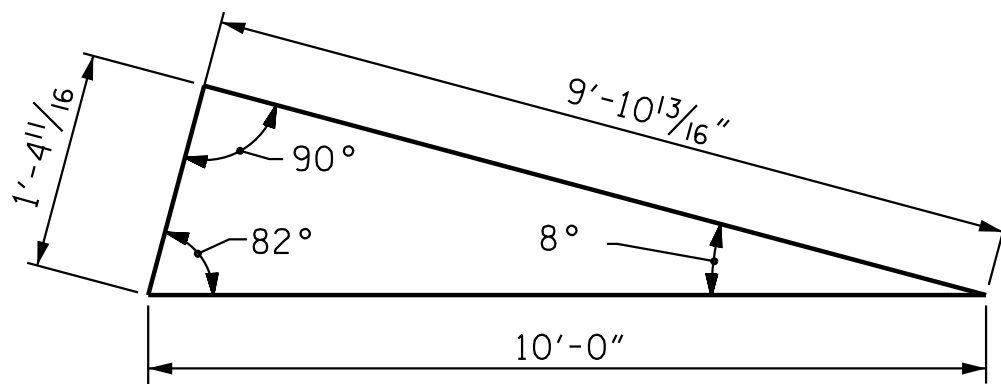
END ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM)



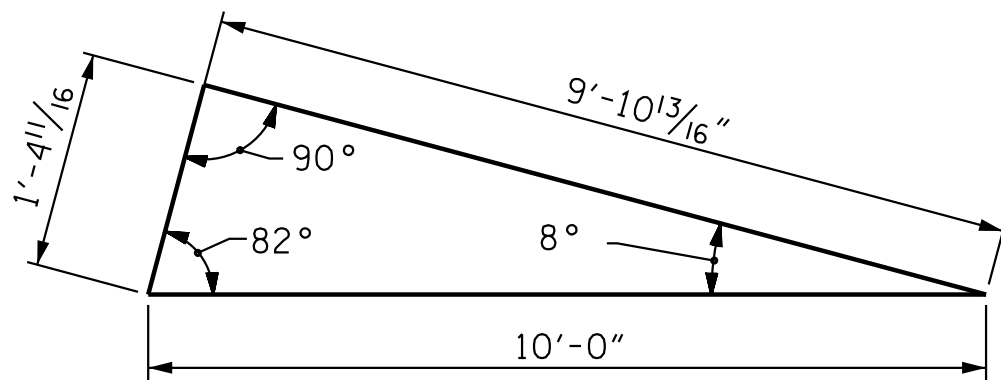
PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

TRANSVERSE CONST. JTS. NOT SHOWN FOR CLARITY.
SEE SHEET 1 OF 6 FOR ADDITIONAL INFORMATION.



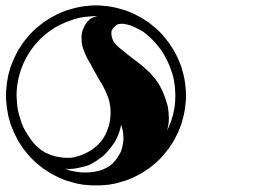
SKEW TRIANGLE
(CL ROADWAY)



SKEW TRIANGLE
(HEADWALL)

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 305+99.00 -L1-

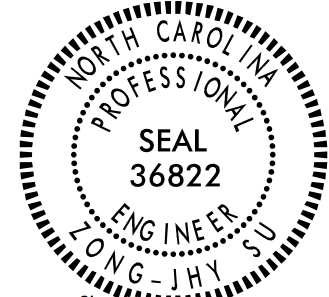
SHEET 3 OF 6



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

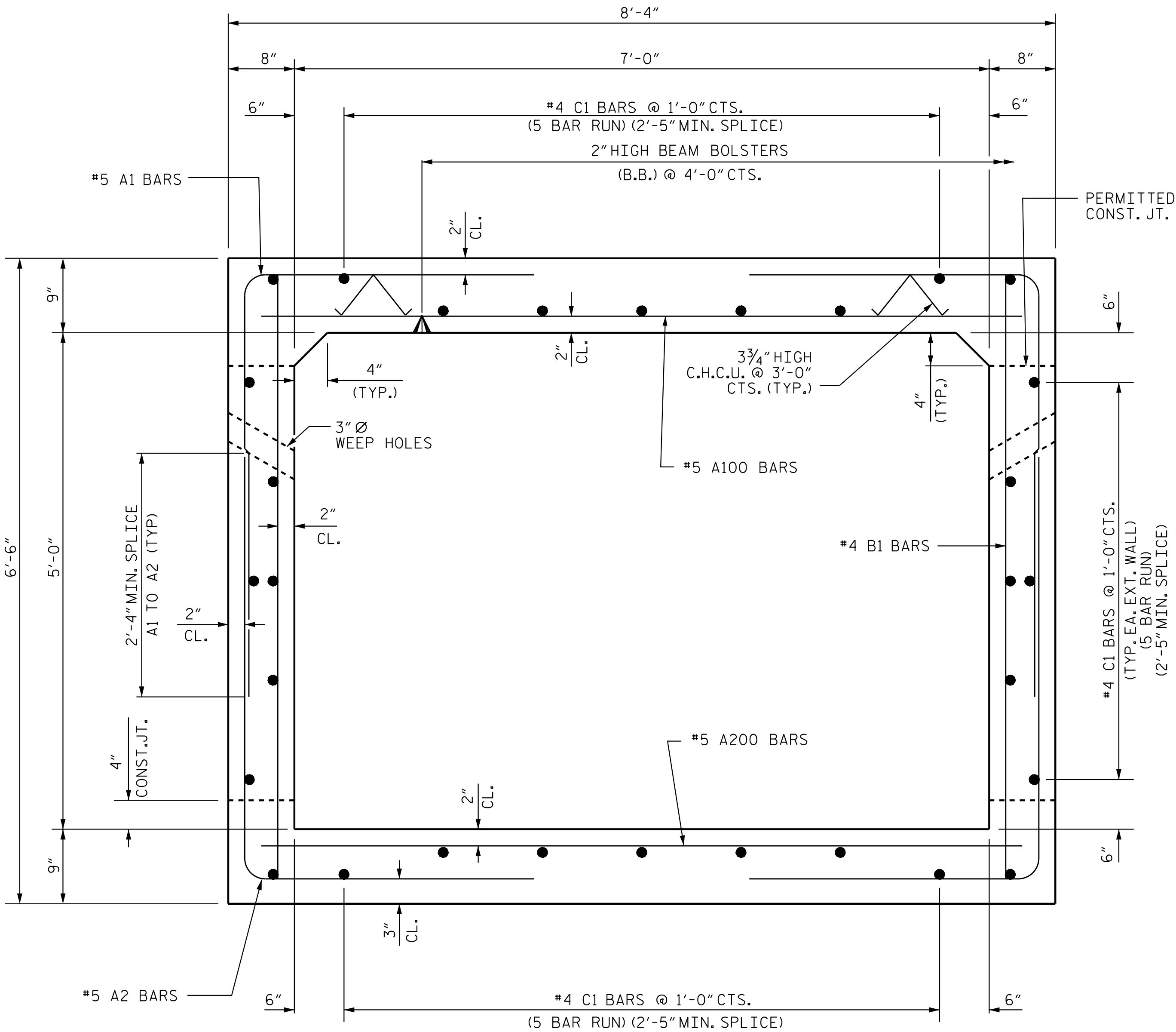
DRAWN BY : J. HAGENBUSH DATE : 09/22/20
CHECKED BY : T. N. ENNIS DATE : 10/07/20

DESIGNED BY : Z.-J. SU DATE : 04/15/25
ENGINEER OF RECORD



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SINGLE 7 FT. X 5 FT. CONCRETE BOX CULVERT					
98°00'00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C04-03					TOTAL SHEETS 06



RIGHT ANGLE SECTION OF BARREL

THERE ARE 30 "C" BARS IN SECTION OF BARREL

BAR TYPE		BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A1	714	#5	1	7'-5"	5523		
A2	714	#5	1	7'-5"	5523		
A100	356	#5	STR	8'-0"	2790		
A101	2	#5	STR	4'-5"	9		
A200	356	#5	STR	8'-0"	2790		
A201	2	#5	STR	4'-5"	9		
B1	714	#4	STR	6'-1"	2901		
C1	150	#4	STR	37'-8"	3774		
G1	8	#4	STR	8'-0"	43		
S2	12	#8	STR	8'-0"	256		
		REINFORCING STEEL				23,978 LBS.	

SPlice CHART		
BAR	SIZE	SPlice LENGTH
A1, A2	#5	2'-4"
C1	#4	2'-5"

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 305+99.00 -L1-

SHEET 4 OF 6



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

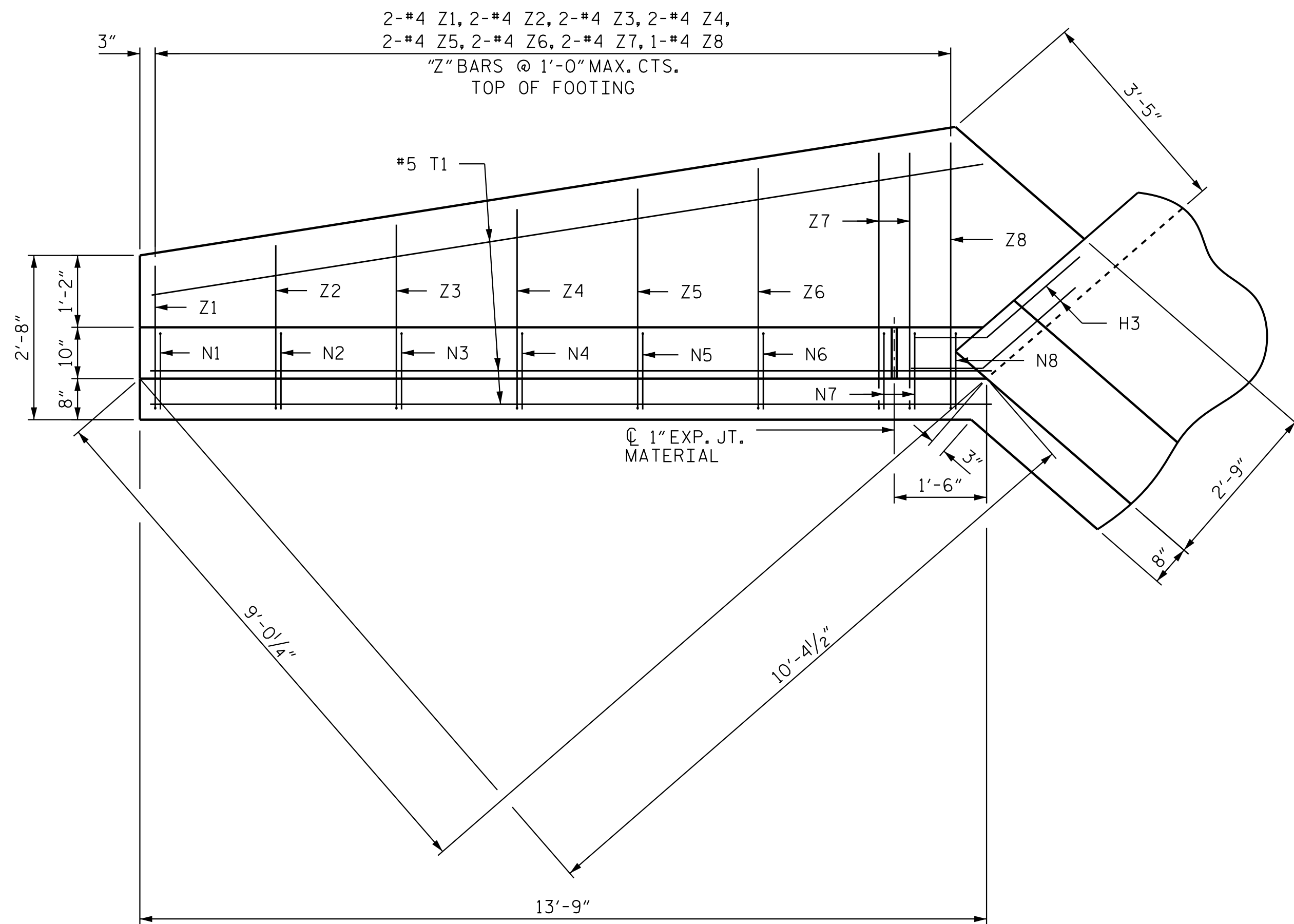
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SINGLE 7 FT. X 5 FT. CONCRETE BOX CULVERT					
98°00'00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. C04-04
					TOTAL SHEETS 06



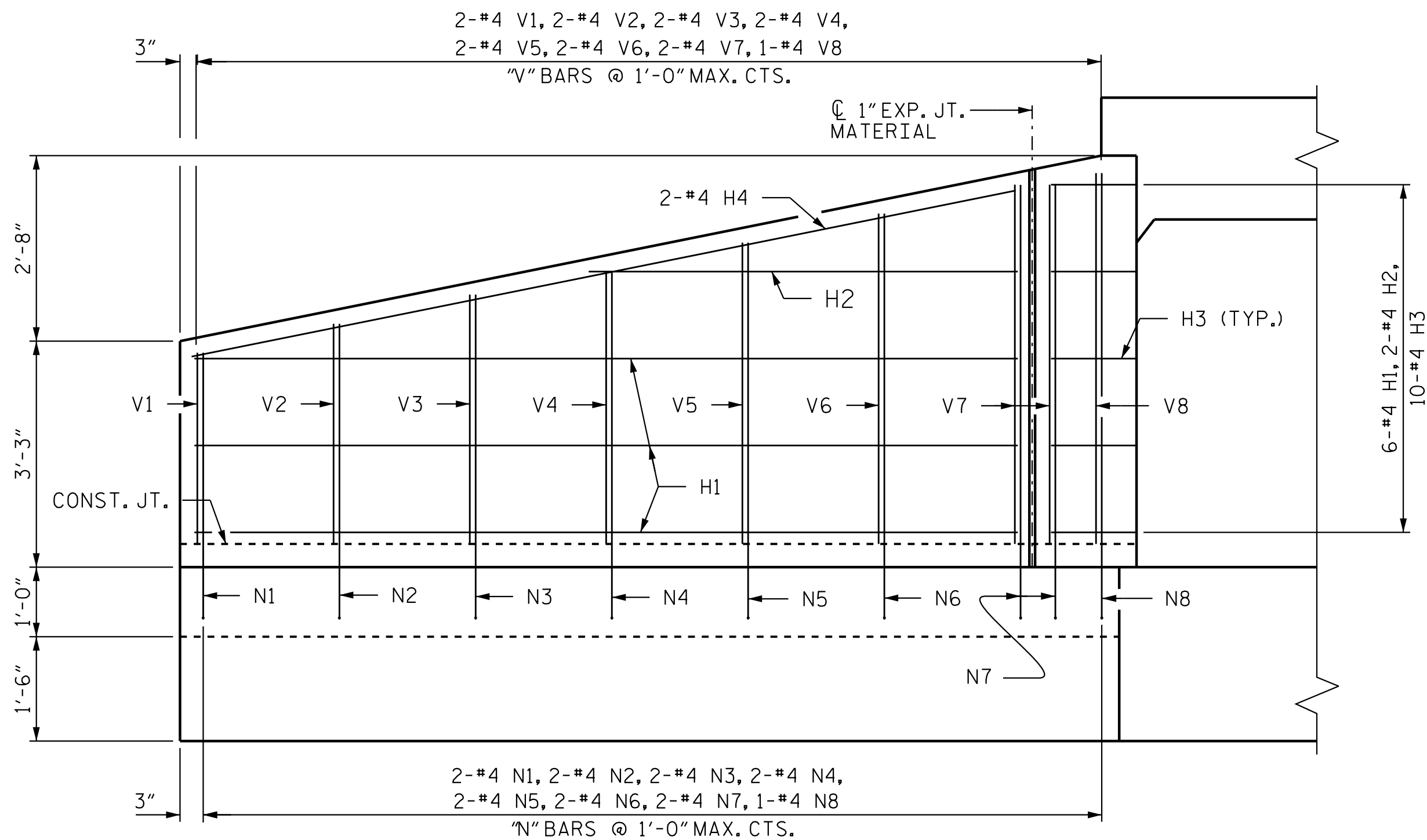
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J.HAGENBUSH DATE : 09/24/20
CHECKED BY : T. N. ENNIS DATE : 10/07/20

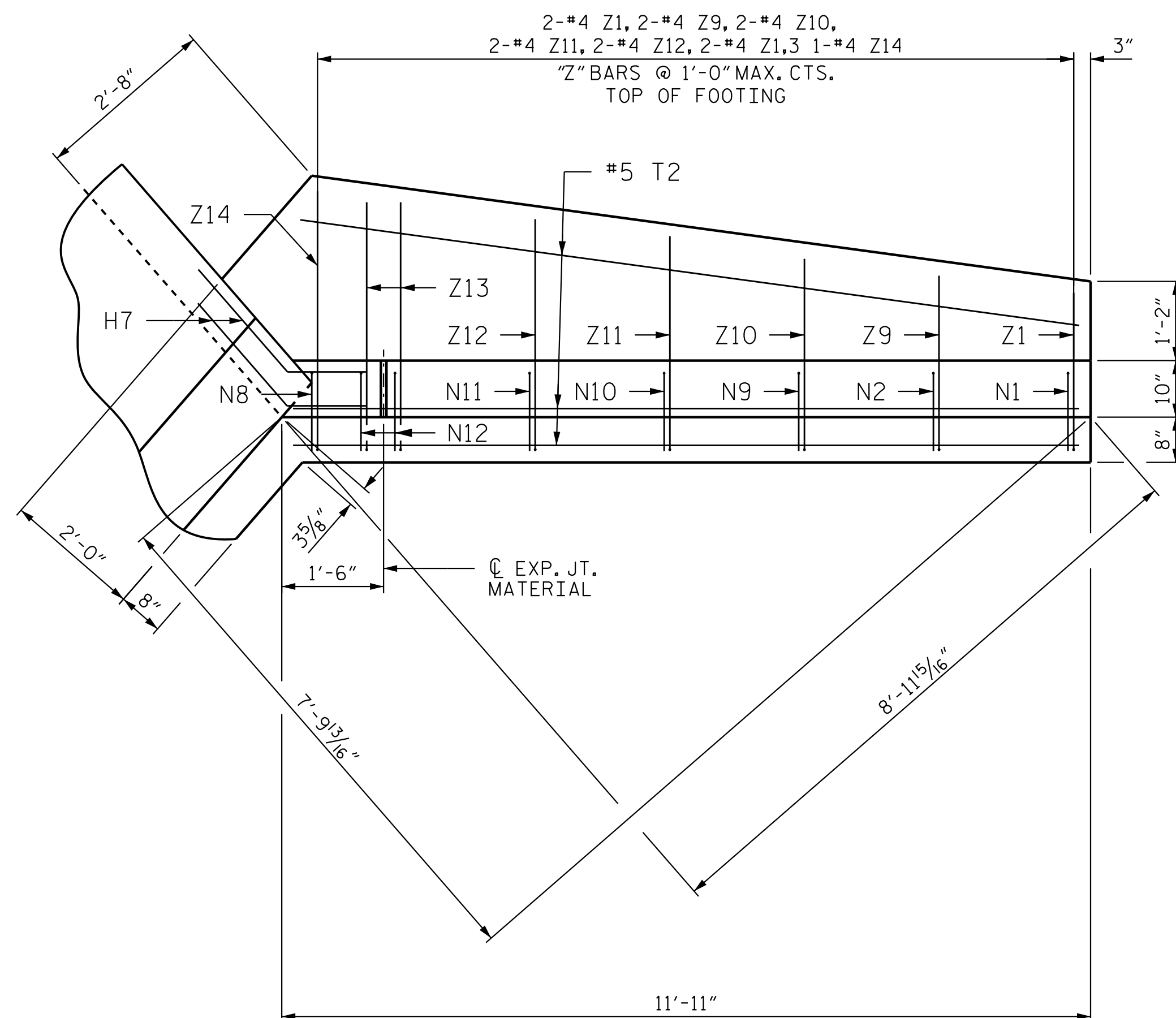
DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



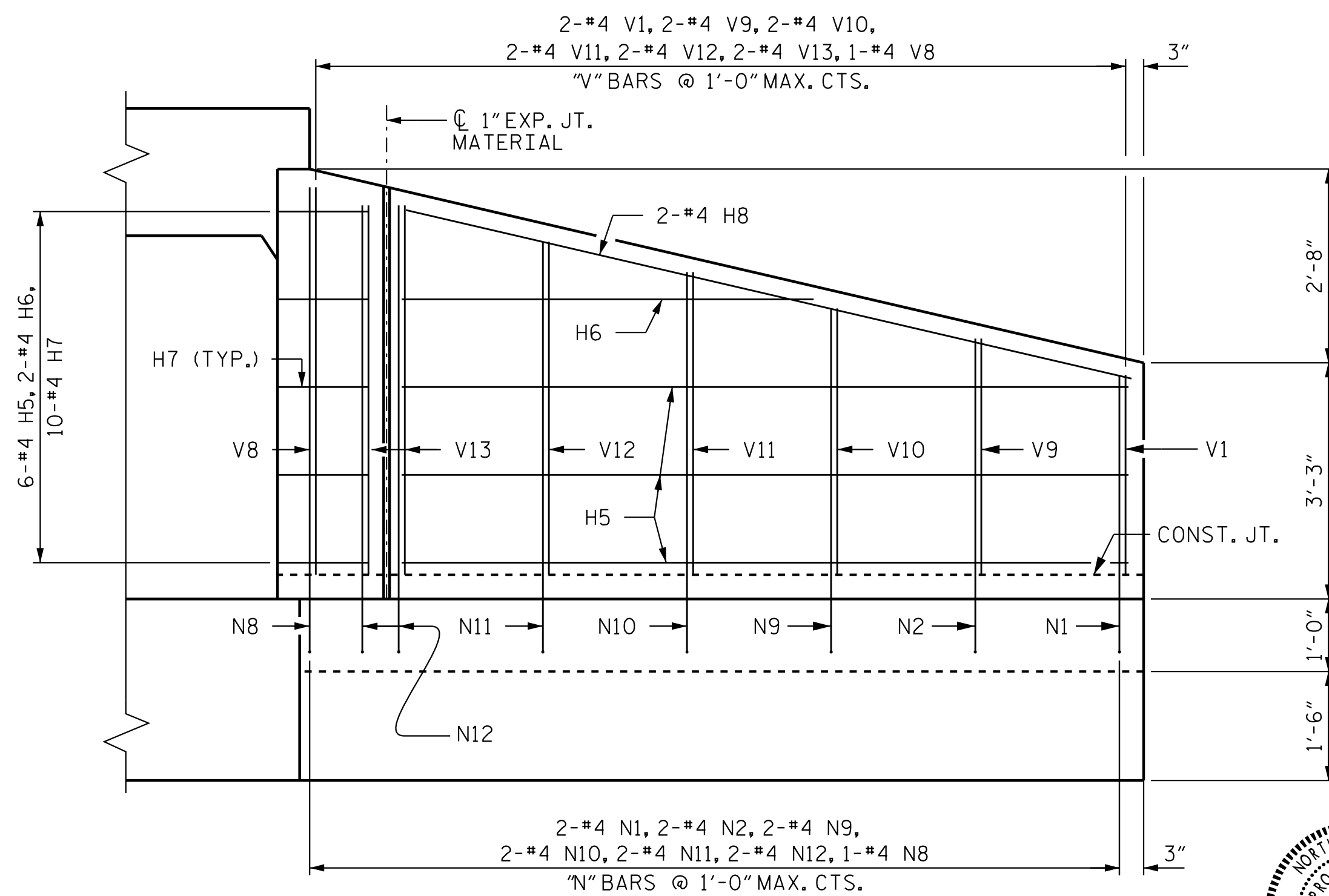
PLAN W1



ELEVATION W1



PLAN W2



ELEVATION W2

NOTES

FOR "TYPICAL WING SECTION" DETAIL,
SEE SHEET 6 OF 6.

FOR REINFORCING SCHEDULE,
SEE SHEET 6 OF 6.

PROJECT NO. R-3300A
NEW HANOVER COUNTY
 STATION: 305+99.00 -L1-

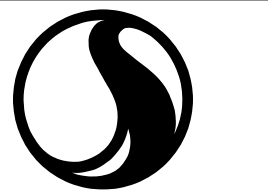
SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT

H = 5'-0"	SLOPE = 3:1
98°00'00" SKEW	

REVISIONS						SHEET NO. C04-05
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			



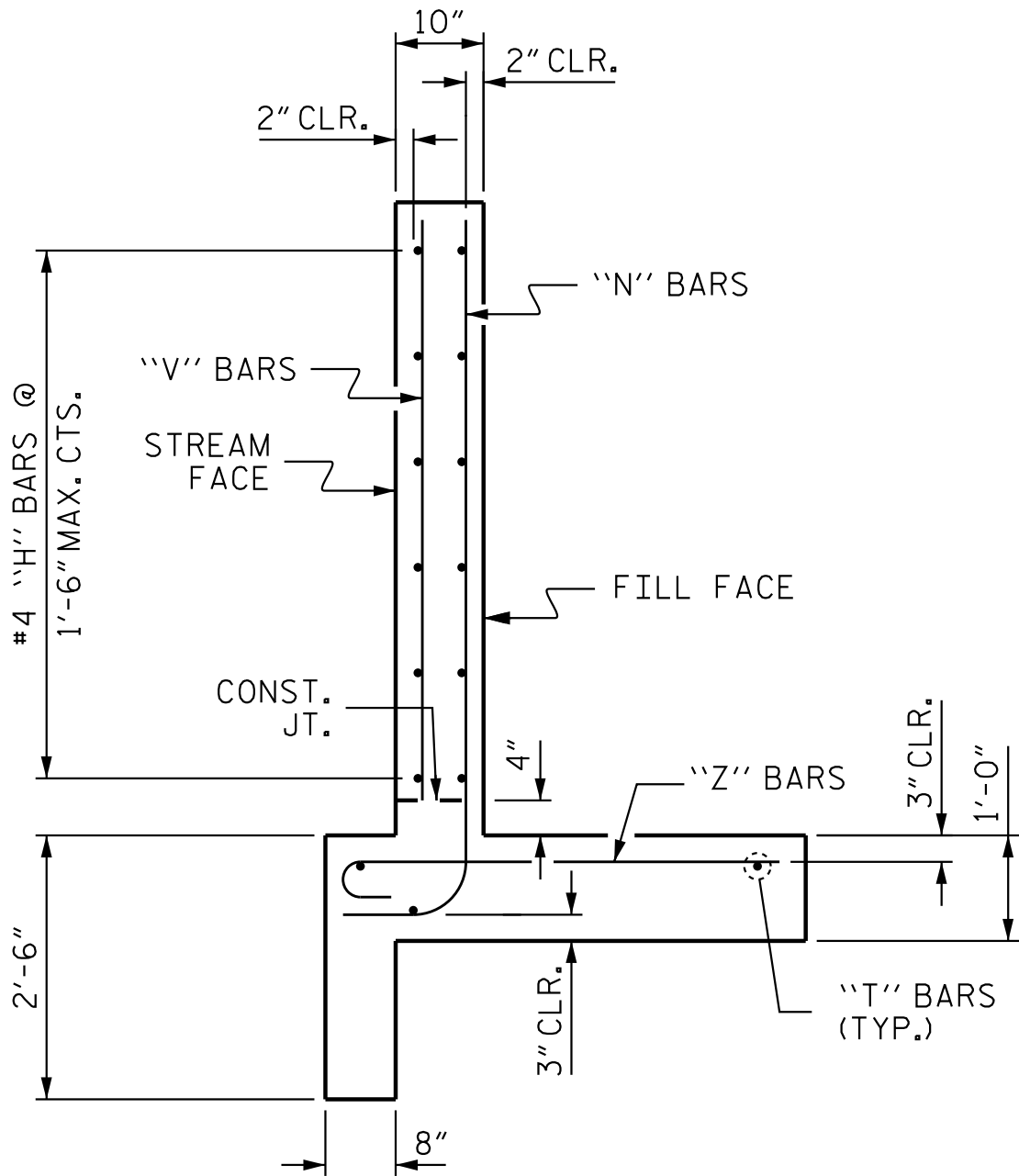
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 09/22/20
CHECKED BY : T. N. ENNIS DATE : 10/07/20

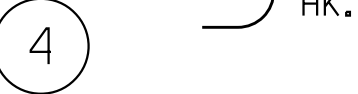
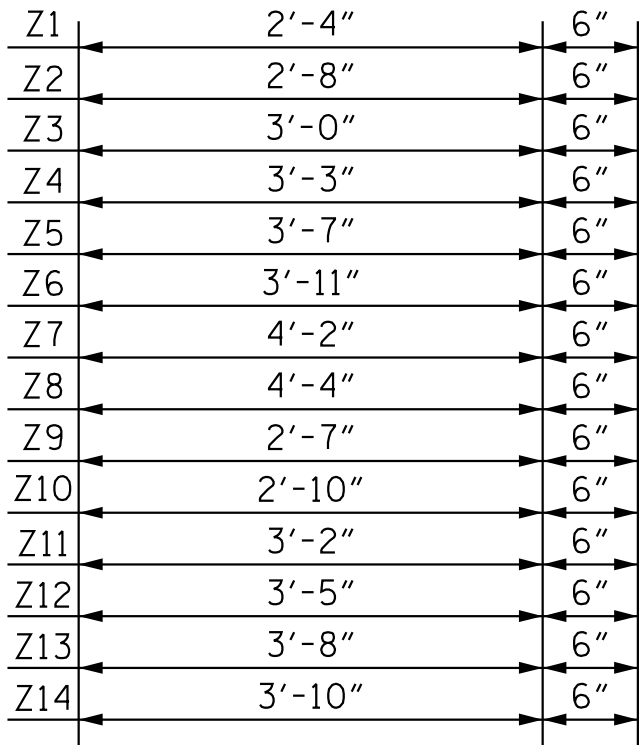
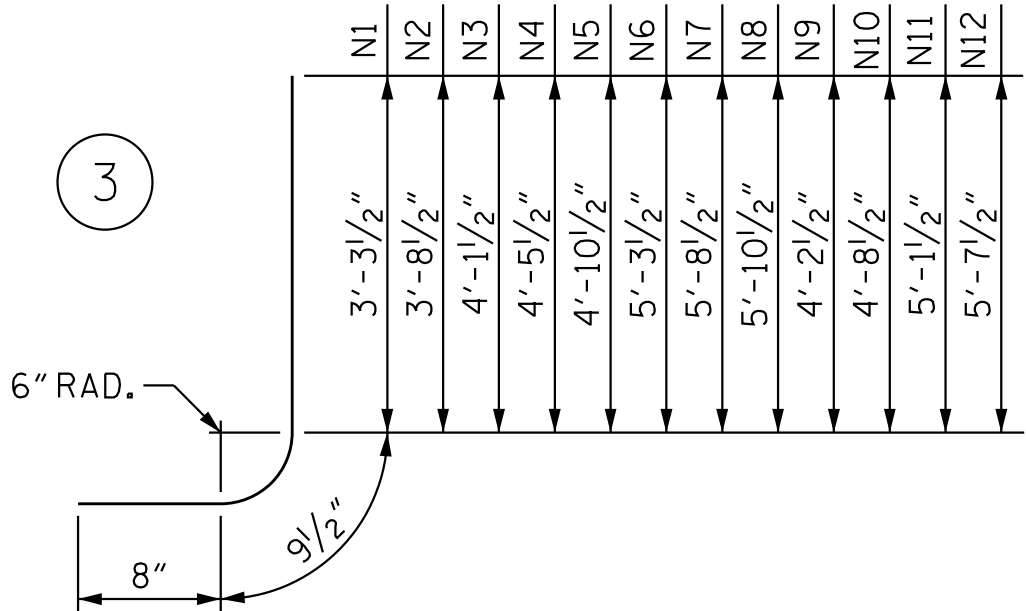
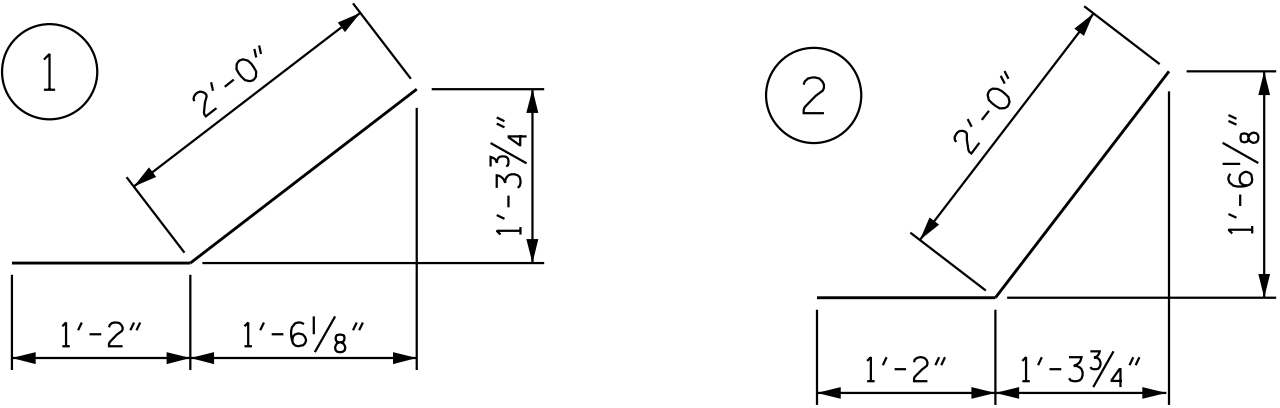
DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



TYPICAL WING SECTION



ALL BAR DIMENSIONS ARE OUT TO OUT.

CLASS A CONCRETE		
4 WINGS	16.3	CY
2 HEADWALLS	0.8	CY
2 END CURTAIN WALLS	0.8	CY
TOTAL	17.9	CY

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	11'-10"	95
H2	4	#4	STR	6'-2"	16
H3	20	#4	1	3'-2"	42
H4	4	#4	STR	12'-1"	32
H5	12	#4	STR	10'-0"	80
H6	4	#4	STR	5'-8"	15
H7	20	#4	2	3'-2"	42
H8	4	#4	STR	10'-3"	27
N1	8	#4	3	4'-10"	26
N2	8	#4	3	5'-3"	28
N3	4	#4	3	5'-7"	15
N4	4	#4	3	6'-0"	16
N5	4	#4	3	6'-5"	17
N6	4	#4	3	6'-9"	18
N7	4	#4	3	7'-2"	19
N8	4	#4	3	7'-5"	20
N9	4	#4	3	5'-9"	15
N10	4	#4	3	6'-2"	16
N11	4	#4	3	6-8"	18
N12	4	#4	3	7'-1"	19
T1	6	#5	STR	13'-8"	86
T2	6	#5	STR	11'-7"	72
V1	8	#4	STR	2'-9"	15
V2	4	#4	STR	3'-2"	8
V3	4	#4	STR	3'-7"	10
V4	4	#4	STR	3'-11"	10
V5	4	#4	STR	4'-4"	12
V6	4	#4	STR	4'-9"	13
V7	4	#4	STR	5'-2"	14
V8	4	#4	STR	5'-4"	14
V9	4	#4	STR	3'-3"	9
V10	4	#4	STR	3'-8"	10
V11	4	#4	STR	4'-2"	11
V12	4	#4	STR	4'-7"	12
V13	4	#4	STR	5'-1"	14
Z1	8	#4	4	2'-10"	15
Z2	4	#4	4	3'-2"	8
Z3	4	#4	4	3'-6"	9
Z4	4	#4	4	3'-9"	10
Z5	4	#4	4	4'-1"	11
Z6	4	#4	4	4'-5"	12
Z7	4	#4	4	4'-8"	12
Z8	2	#4	4	4'-10"	6
Z9	4	#4	4	3'-1"	8
Z10	4	#4	4	3'-4"	9
Z11	4	#4	4	3'-8"	10
Z12	4	#4	4	3'-11"	10
Z13	4	#4	4	4'-2"	11
Z14	2	#4	4	4'-4"	6
REINF. STEEL FOR 4 WINGS				1,022	LBS

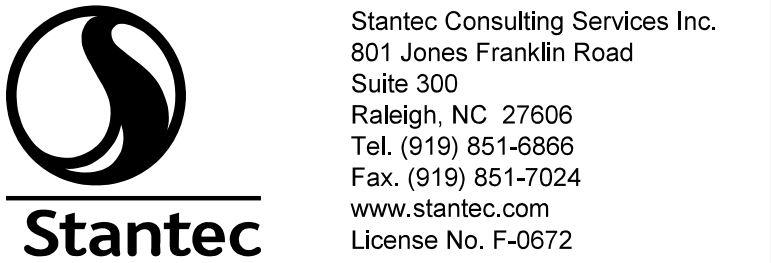
PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 305+99.00 -L1-

SHEET 6 OF 6



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WINGS FOR CULVERT BOX CULVERT					
H = 5'-0"				SLOPE = 3:1	
98°00'00" SKEW					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					06
					C04-05



DRAWN BY : J. B. GEILE DATE : 09/24/20
CHECKED BY : T. N. ENNIS DATE : 10/07/20
DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25

PROPOSED CABLE GUIDERAIL SINGLE FACE * (TYP.)
 STA. 443+00.50 -L1-
 PROPOSED 2 @ 6'x7' RCBC
 WOODS
 UT TO ISLAND CREEK TRIBUTARY
 CL. I RIP RAP * (TYP.)
 WOODS
 103'-6"
 194'-0"
 TO SR 1336 (STIDBURY RD.)
 18" RCP-IV *
 TO SR 1573 (HARRISON CR. RD.)
 65° 00'00" (TAN TO CURVE)
 JS MIT
 2GI
 18" RCP-IV *
 PROPOSED GUARDRAIL * (TYP.)
 WOODS
 CL. I RIP RAP * (TYP.)
 TOE PROTECTION *
 PROP. SHOULDER BERM GUTTER *
 NAD 83/NSRS 2007
 NO KNOWN UTILITY CONFLICTS.
 * ROADWAY DETAIL AND PAY ITEM

ROADWAY DATA		
GRADE POINT EL. @ STATION 443+00.50 -L1-	=	33.50
BED ELEV. @ STATION 443+00.50 -L1-	=	16.66
ROADWAY SLOPES	=	3:1 (L.T.)
		3:1 (RT.)



NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	246 TONS
FOUNDATION COND. GEOTEXTILE	388 S.Y.
CLASS A CONCRETE	
BARREL @ 1.391 CY/FT	269.8 C.Y.
WINGS ETC.	34.5 C.Y.
TOTAL	304.3 C.Y.
REINFORCING STEEL	
BARREL	32,344 LBS.
WINGS ETC.	2,069 LBS.
TOTAL	34,413 LBS.

DESIGN DISCHARGE	=	300 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	23.6
DRAINAGE AREA	=	0.30 SQ. MI.
BASIC DISCHARGE (Q100)	=	340 C.F.S.
BASIC HIGH WATER ELEVATION	=	24.0

OVERTOPPING DISCHARGE	=	1030 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	500+ YRS.
OVERTOPPING FLOOD ELEVATION	=	33.2
OVERTOPS ROADWAY AT STATION 444+16.20 -L1- SAG POINT		

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C05-01
1			3			TOTAL SHEETS
2			4			06



DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



(LOOKING DOWNSTREAM)
(NOT TO SCALE)



Signed by:  5/1/2025

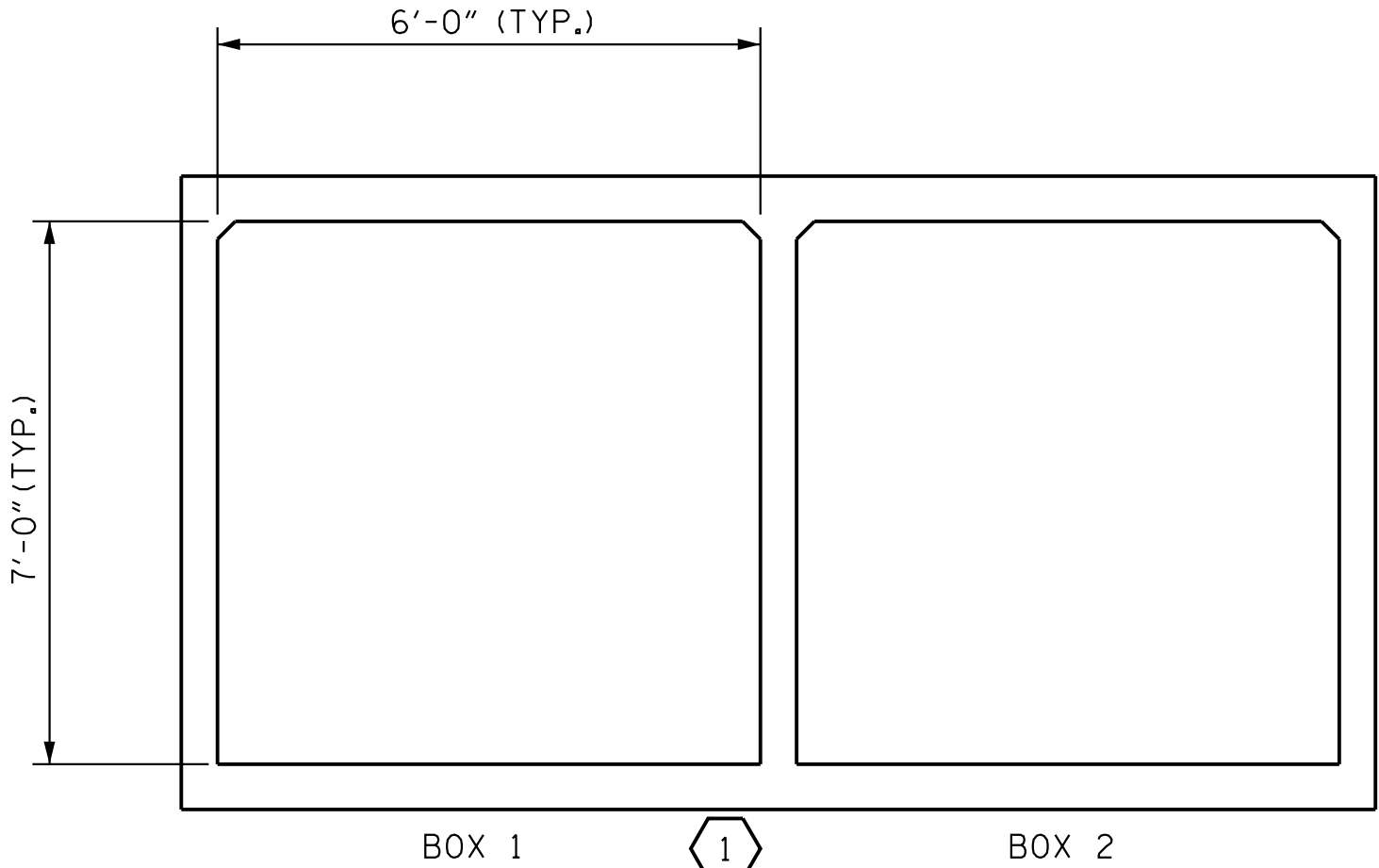
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ksu

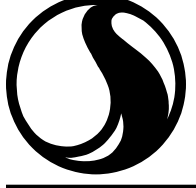
4/16/2025

U:\Structures\C5\Drafting\Final\VR3300A_SML_CU.02_700005.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 × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER	
						LIVE-LOAD FACTORS (γ _{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	1.84	--	1.75	1.84	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	2.50	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	
	HL-93 (OPERATING)	N/A		2.38	--	1.35	2.38	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	3.25	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	
	HS-20 (INVENTORY)	36.000	⬡2	3.00	108.00	1.75	3.00	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.05	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	
	HS-20 (OPERATING)	36.000		3.89	140.04	1.35	3.89	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	5.25	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.96	53.46	1.40	3.96	1	MIDDLE (EXTERIOR WALL) - INSIDE	0.00	8.87	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNGARBS2	20.000		3.96	79.20	1.40	3.96	1	MIDDLE (EXTERIOR WALL) - INSIDE	0.00	8.31	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNAGRIS2	22.000		3.96	87.12	1.40	3.96	1	MIDDLE (EXTERIOR WALL) - INSIDE	0.00	8.87	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNCOTTS3	27.250		3.23	88.01	1.40	3.23	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.43	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNAGGRS4	34.925		3.20	111.76	1.40	3.20	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.33	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNS5A	35.550		3.19	113.40	1.40	3.19	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.18	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNS6A	39.950		3.04	121.44	1.40	3.04	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	3.94	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		SNS7B	42.000	⬡3	2.93	123.06	1.40	2.93	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	3.76	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.96	130.68	1.40	3.96	1	MIDDLE (EXTERIOR WALL) - INSIDE	0.00	5.17	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNT4A	33.075		3.56	117.74	1.40	3.56	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.83	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNT6A	41.600		3.44	143.10	1.40	3.44	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.43	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNT7A	42.000		3.60	151.20	1.40	3.60	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.58	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNT7B	42.000		3.16	132.72	1.40	3.16	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.27	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNAGRIT4	43.000		3.31	142.33	1.40	3.31	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.44	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNAGT5A	45.000		3.42	153.90	1.40	3.42	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.36	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
		TNAGT5B	45.000		3.22	144.90	1.40	3.22	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.29	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1
EMERGENCY VEHICLE (EV)	EV2	28.750		4.26	122.47	1.30	4.26	1	MIDDLE (EXTERIOR WALL) - INSIDE	0.00	6.75	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	
	EV3	43.000	⬡4	3.08	132.44	1.30	3.08	1	RIGHT END (BOTT SLAB) - OUTSIDE	6.00	4.23	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	6.00	1	



LRFR SUMMARY
(LOOKING DOWNSTREAM)



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ASSEMBLED BY : J. HAGENBUSH DATE :09/24/20
CHECKED BY : T. N. ENNIS DATE :10/08/20

DRAWN BY : WMC 7/II REV. 10/1/II MAA/GM
CHECKED BY : GM 7/II REV. 12/1/II MAA/THC
REV. 04/23 BNB/AAI

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25

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:

1. RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. LOAD RATINGS FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

⬡# CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

⬡3 LEGAL LOAD RATING **

⬡4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

PROJECT NO. R-3300A
NEW HANOVER COUNTY
STATION: 443+00.50 -L1-

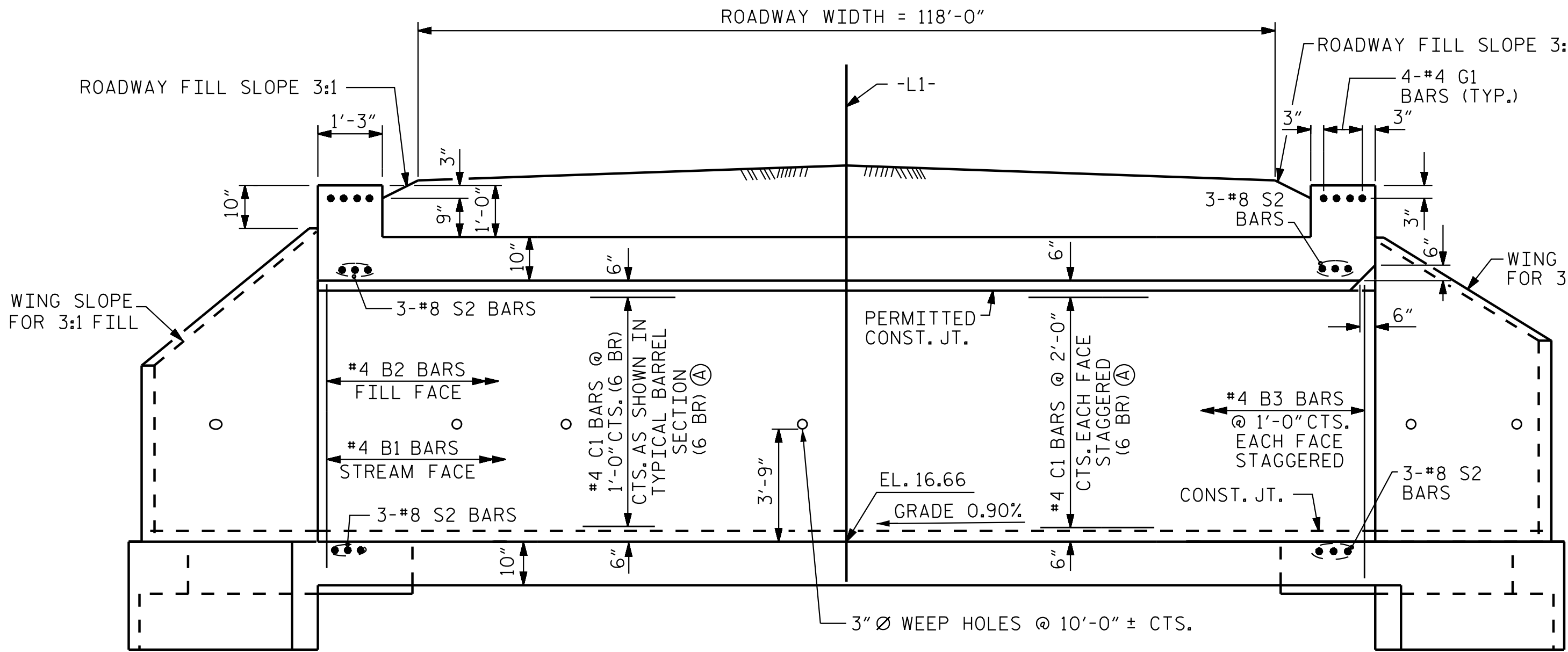
SHEET 2 OF 6



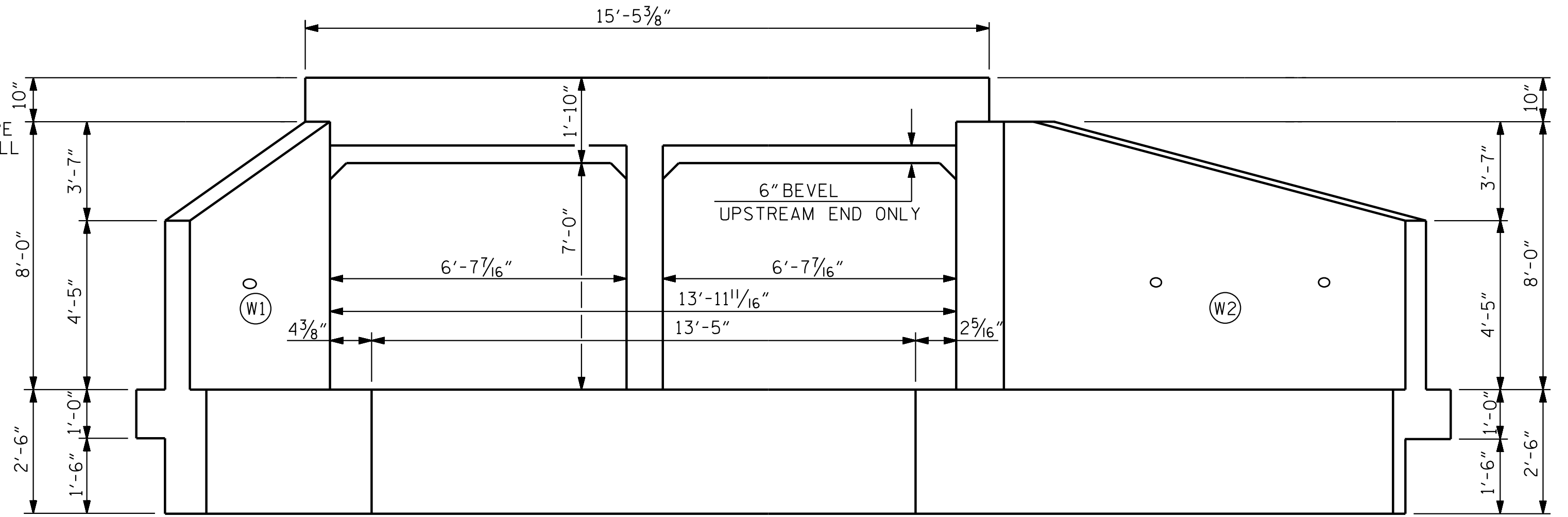
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO. C05-02
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

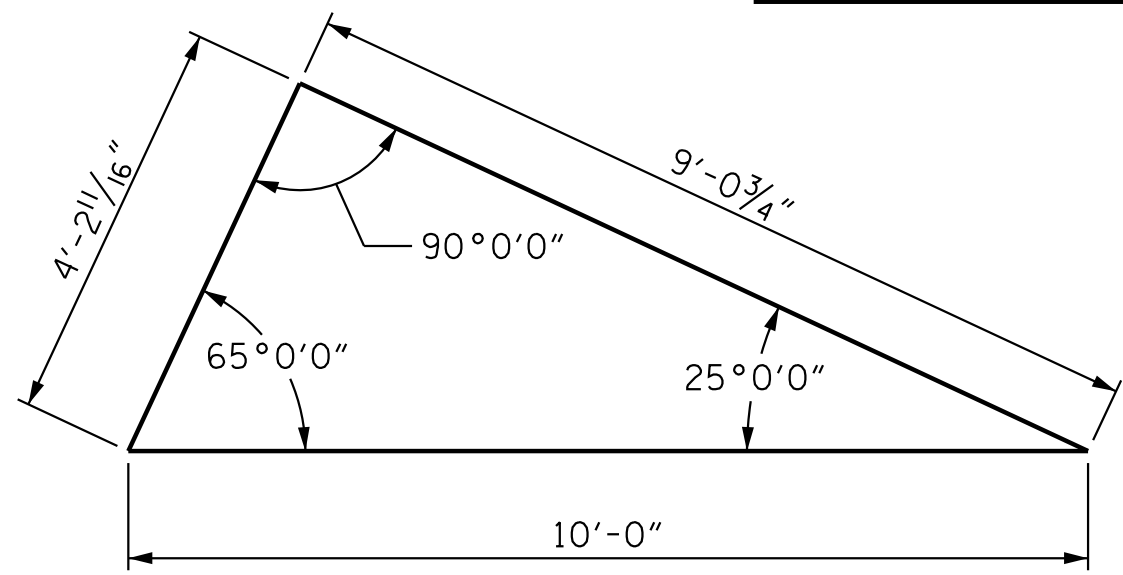
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



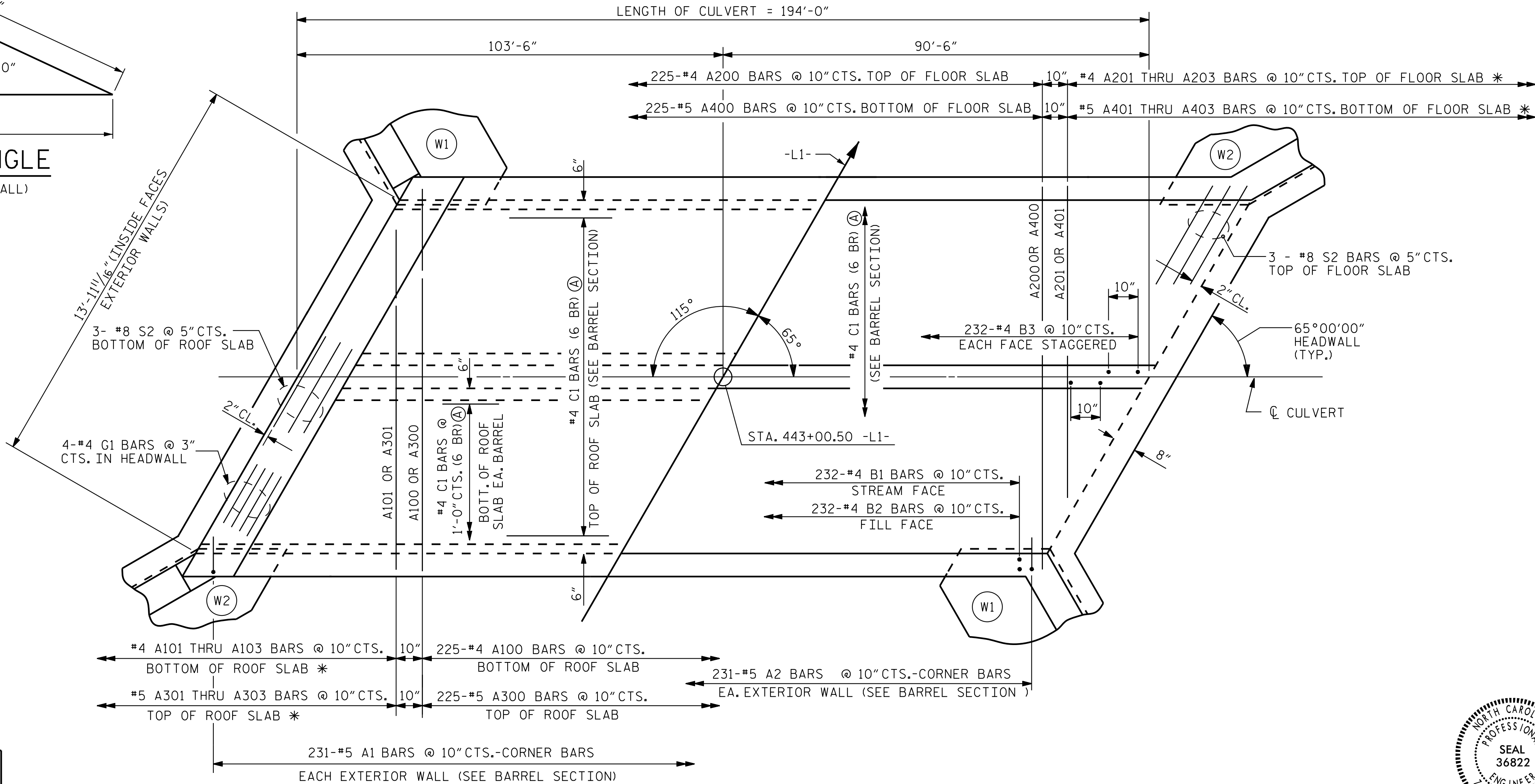
EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY
(LOOKING UPSTATION)



END ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM)



SKEW TRIANGLE
(CL ROADWAY & HEADWALL)



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

NOTES

TRANSVERSE CONSTRUCTION JOINTS
NOT SHOWN FOR CLARITY.

SEE SHEET 1 OF 6 FOR ADDITIONAL
INFORMATION.

(6 BR) DENOTES 6 BAR RUN.

Ⓐ 2'-5" MIN. SPLICE

* 2 BARS PER MARK

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 443+00.50 -L1-

SHEET 3 OF 6



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 09/28/20
CHECKED BY : T. N. ENNIS DATE : 10/08/20

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

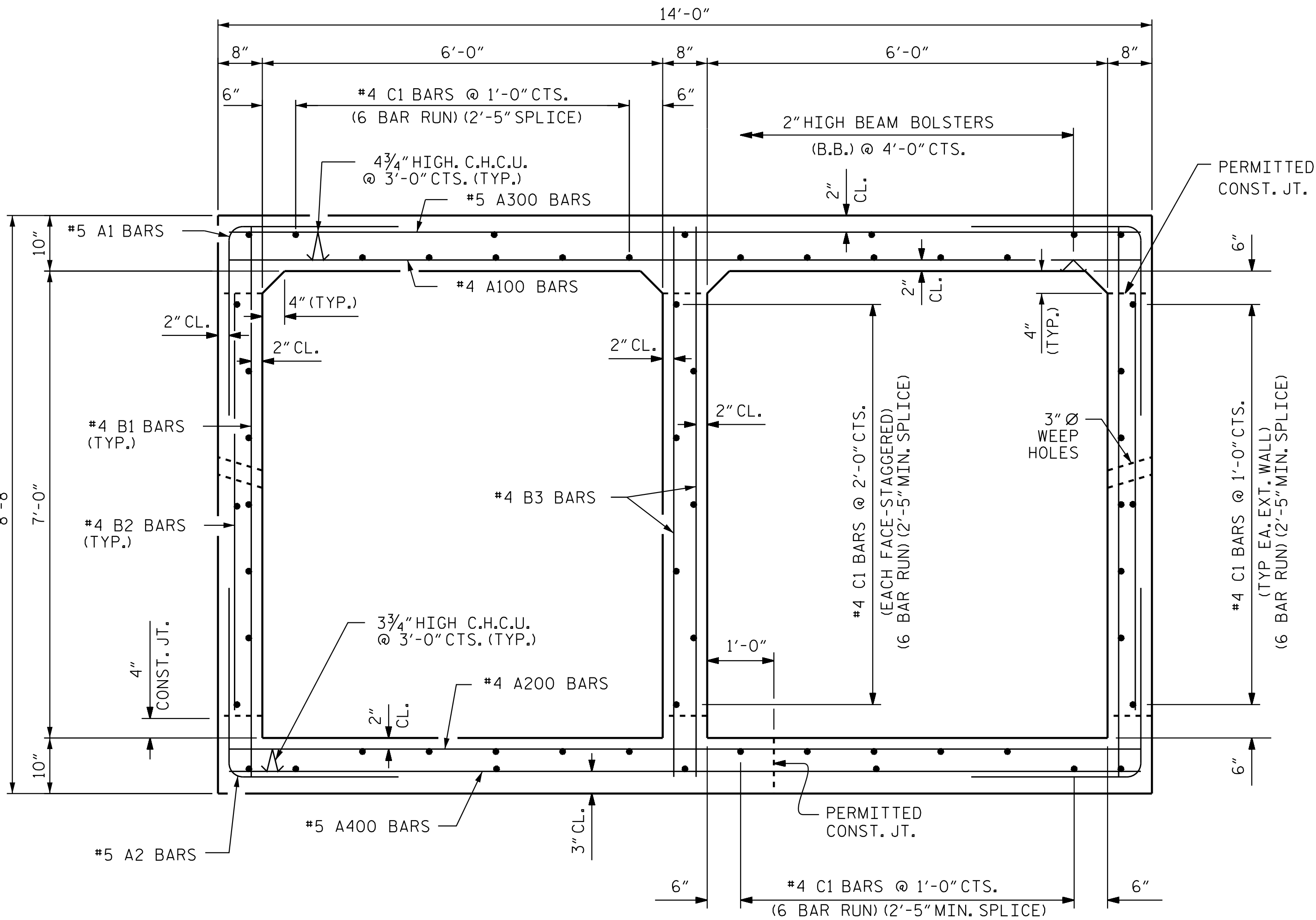
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 6 FT. X 7 FT.
CONCRETE BOX CULVERT

65°00'00" SKEW

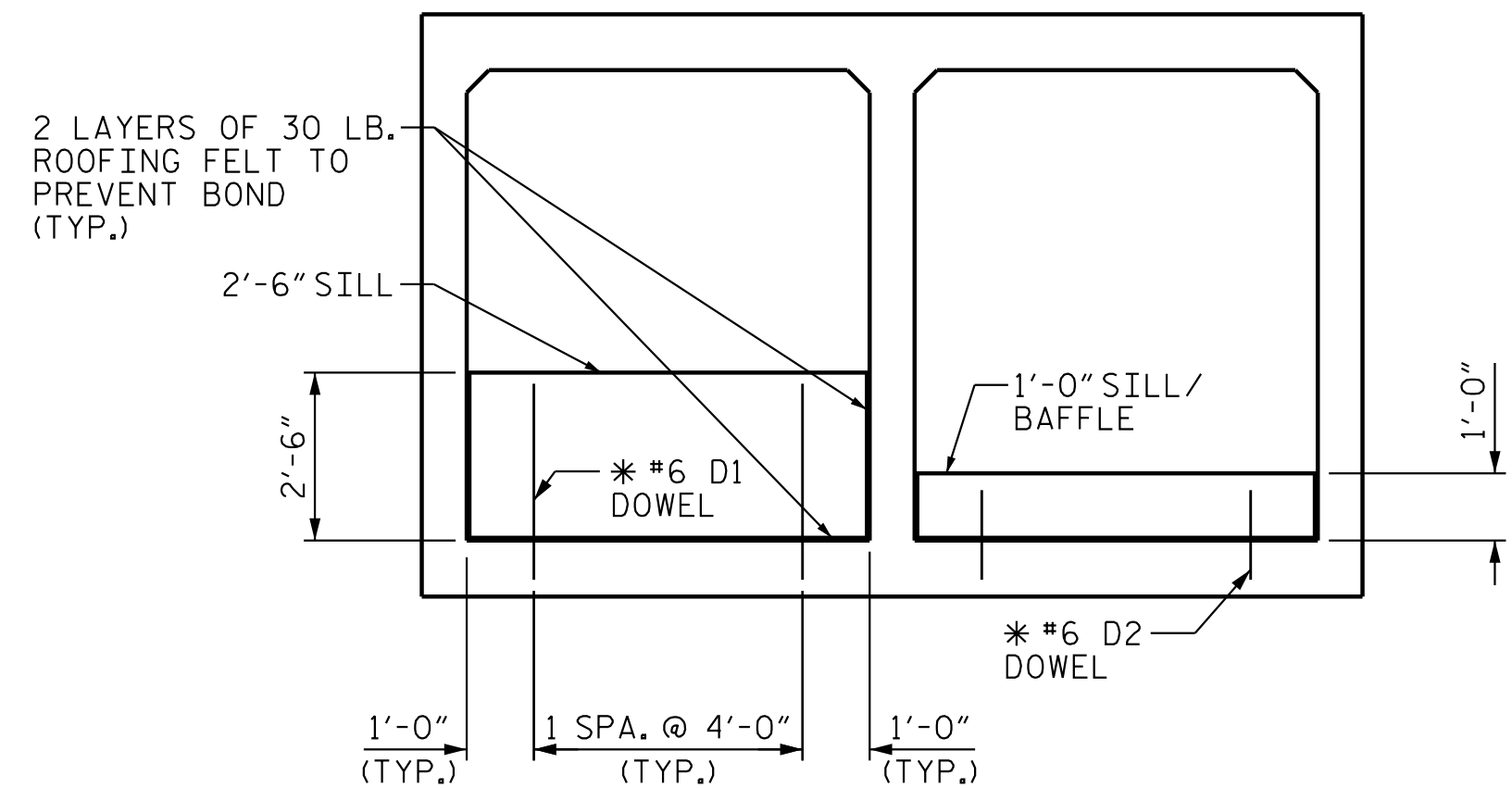
REVISIONS						SHEET NO. C05-03
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			

4/6/2025 3:04:42 PM ksu
U:\Structures\CS\Dr-offing\Final\R3300A_SMJ.CL_04_700005.dgn



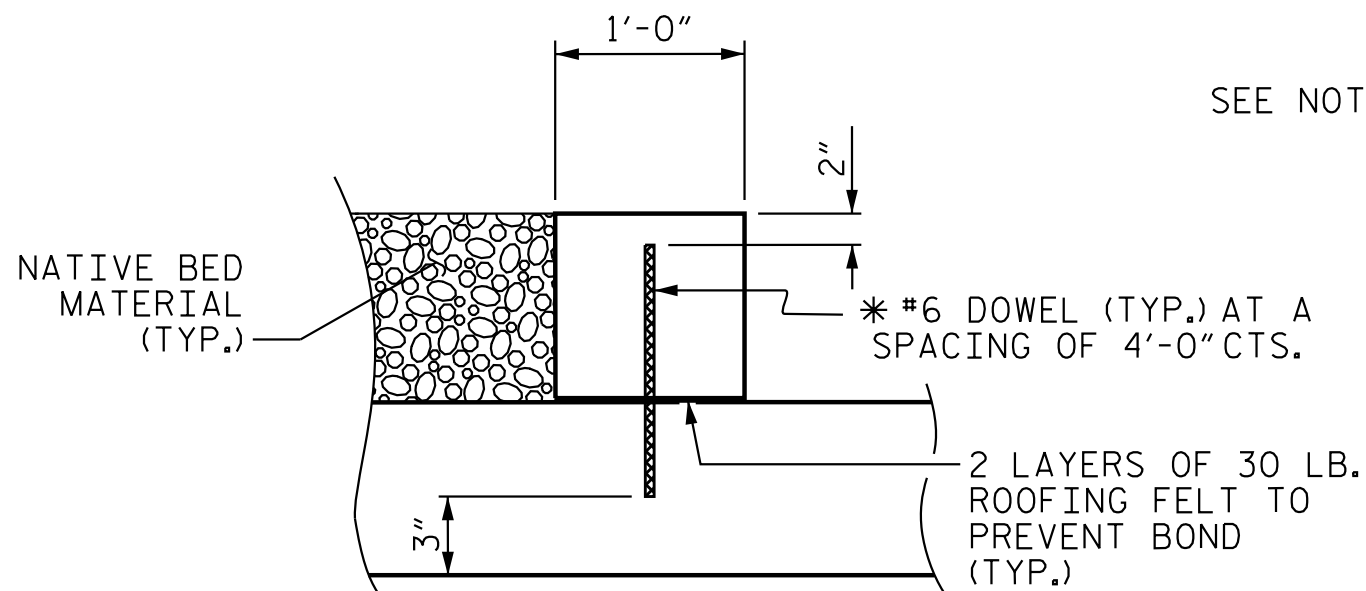
RIGHT ANGLE SECTION OF BARREL

THERE ARE 57 "C" BARS IN SECTION OF BARREL.



ELEVATION

(LOOKING DOWNSTREAM)



SECTION THROUGH SILL/BAFFLE

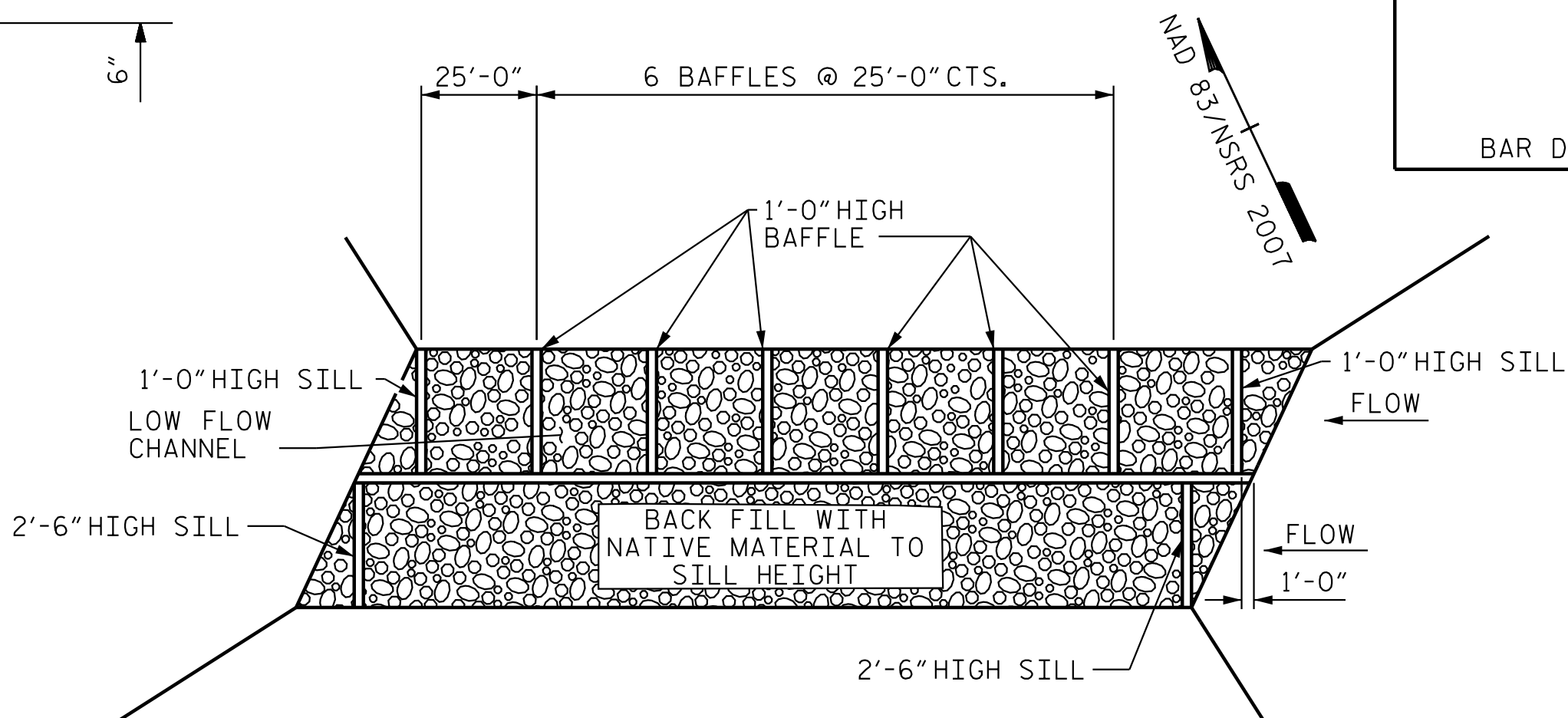
(SECTION THROUGH 2'-6" SILL SIMILAR)

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS

SEE PLAN VIEW FOR LOCATION OF SILLS

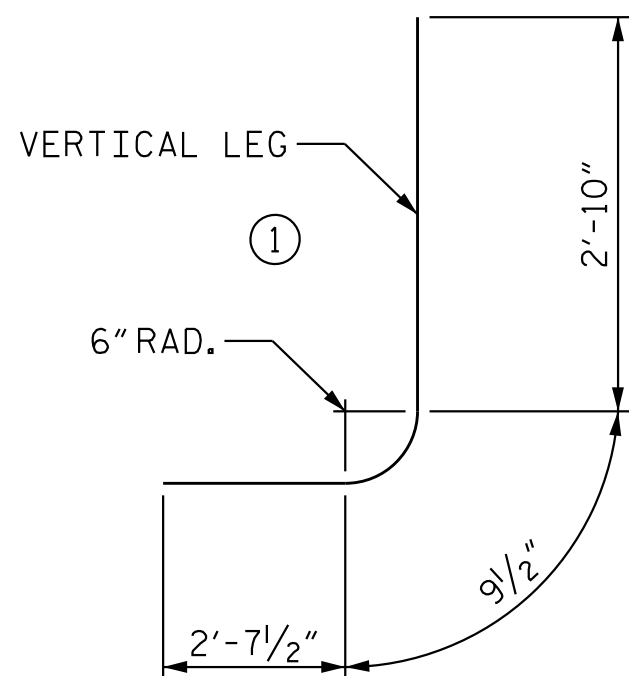
SEE SHEET 1 OF 6 FOR NOTES REGARDING ADDITIONAL SILL/BACKFILL INFORMATION



PLAN VIEW

SEE NOTES SHEET 1 OF 6 FOR BACKFILL INSTRUCTIONS.

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	462	#5	1	6'-3"	3012
A2	462	#5	1	6'-3"	3012
A100	225	#4	STR	13'-8"	2054
A101	4	#4	STR	10'-8"	29
A102	4	#4	STR	7'-0"	19
A103	4	#4	STR	3'-6"	9
A200	225	#4	STR	13'-8"	2054
A201	4	#4	STR	10'-8"	29
A202	4	#4	STR	7'-0"	19
A203	4	#4	STR	3'-6"	9
A300	225	#5	STR	13'-8"	3207
A301	4	#5	STR	10'-8"	45
A302	4	#5	STR	7'-0"	29
A303	4	#5	STR	3'-6"	15
A400	225	#5	STR	13'-8"	3207
A401	4	#5	STR	10'-8"	45
A402	4	#5	STR	7'-0"	29
A403	4	#5	STR	3'-6"	15
B1	464	#4	STR	8'-3"	2557
B2	464	#4	STR	6'-3"	1937
B3	464	#4	STR	8'-3"	2557
C1	342	#4	STR	34'-4"	7844
D1	4	#6	STR	2'-11"	18
D2	16	#6	STR	1'-4"	32
G1	8	#4	STR	15'-0"	80
S2	12	#8	STR	15'-0"	481
REINFORCING STEEL				32,344 LBS.	

SPLICE CHART

BAR	SIZE	SPLICE LENGTH
C1	#4	2'-5"

PROJECT NO. R-3300A

PENDER COUNTY

STATION: 443+00.50 -L1-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 6 FT. X 7 FT.
CONCRETE BOX CULVERT

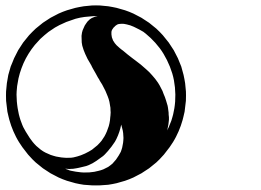
65°00'00" SKEW

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			C05-04
2			4			TOTAL SHEETS 06



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

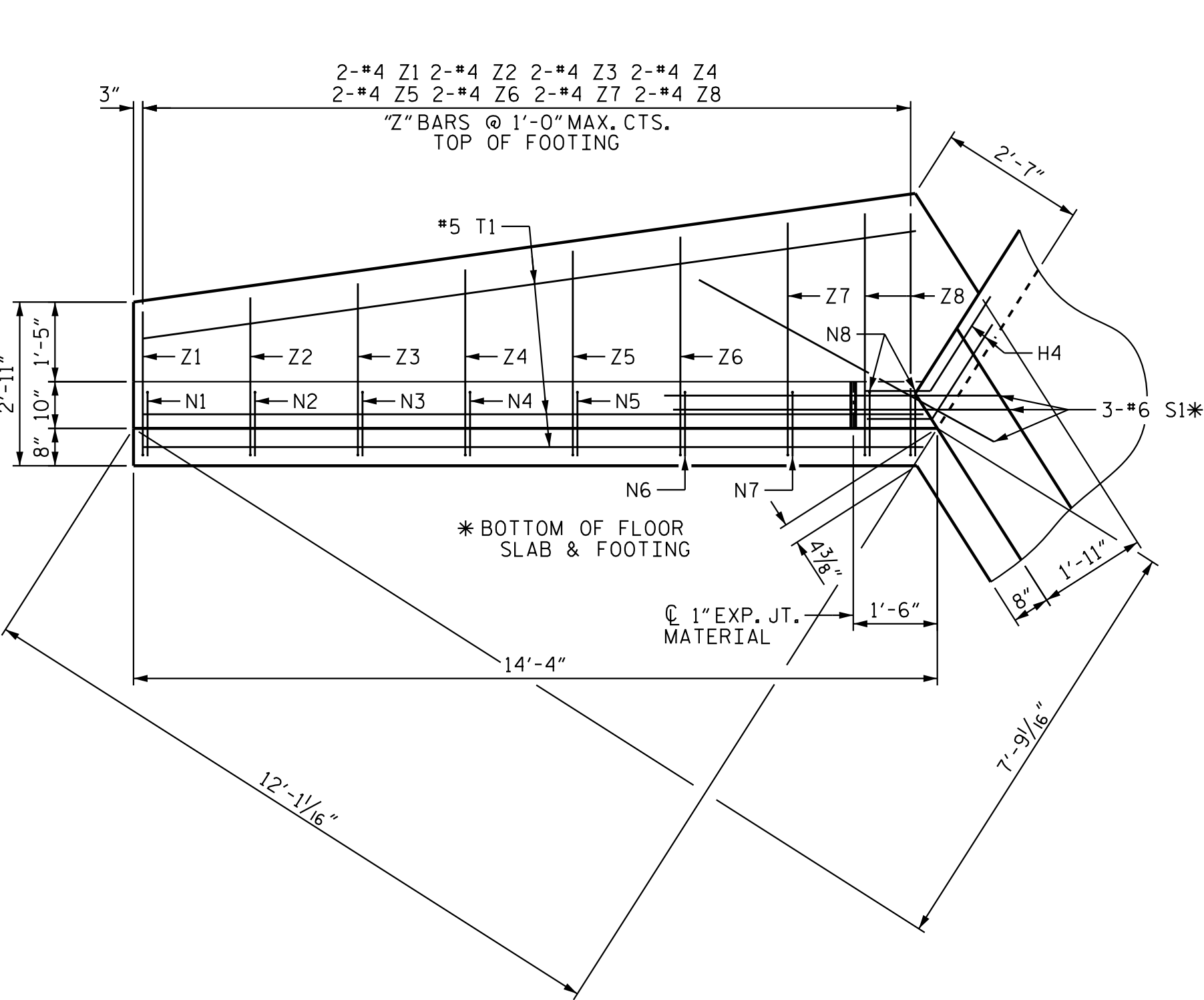


Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

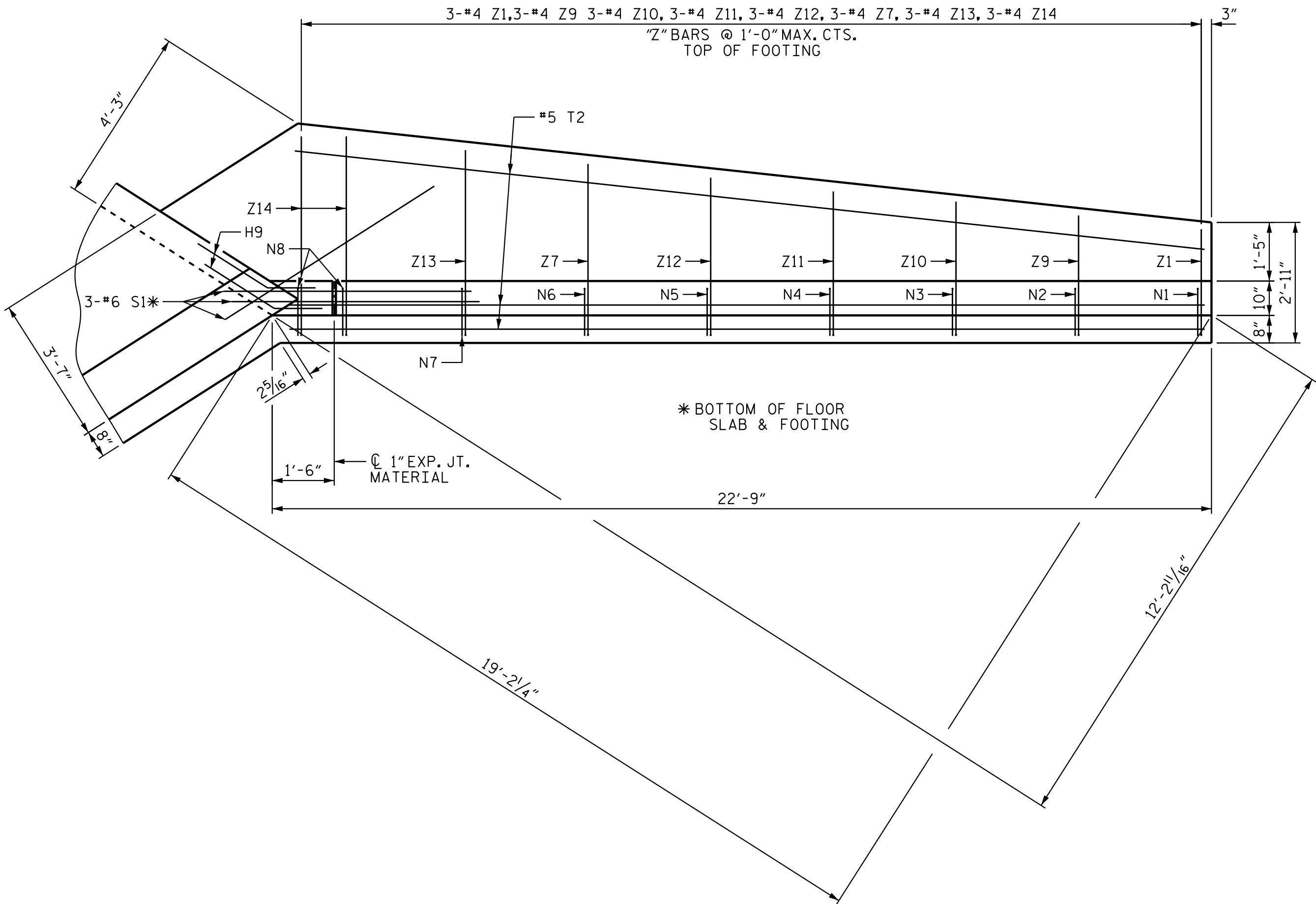
DRAWN BY : J. HAGENBUSH DATE : 09/29/20
CHECKED BY : T. N. ENNIS DATE : 10/08/20

DESIGNED BY : Z.-J. SU DATE : 04/15/25
ENGINEER OF RECORD:

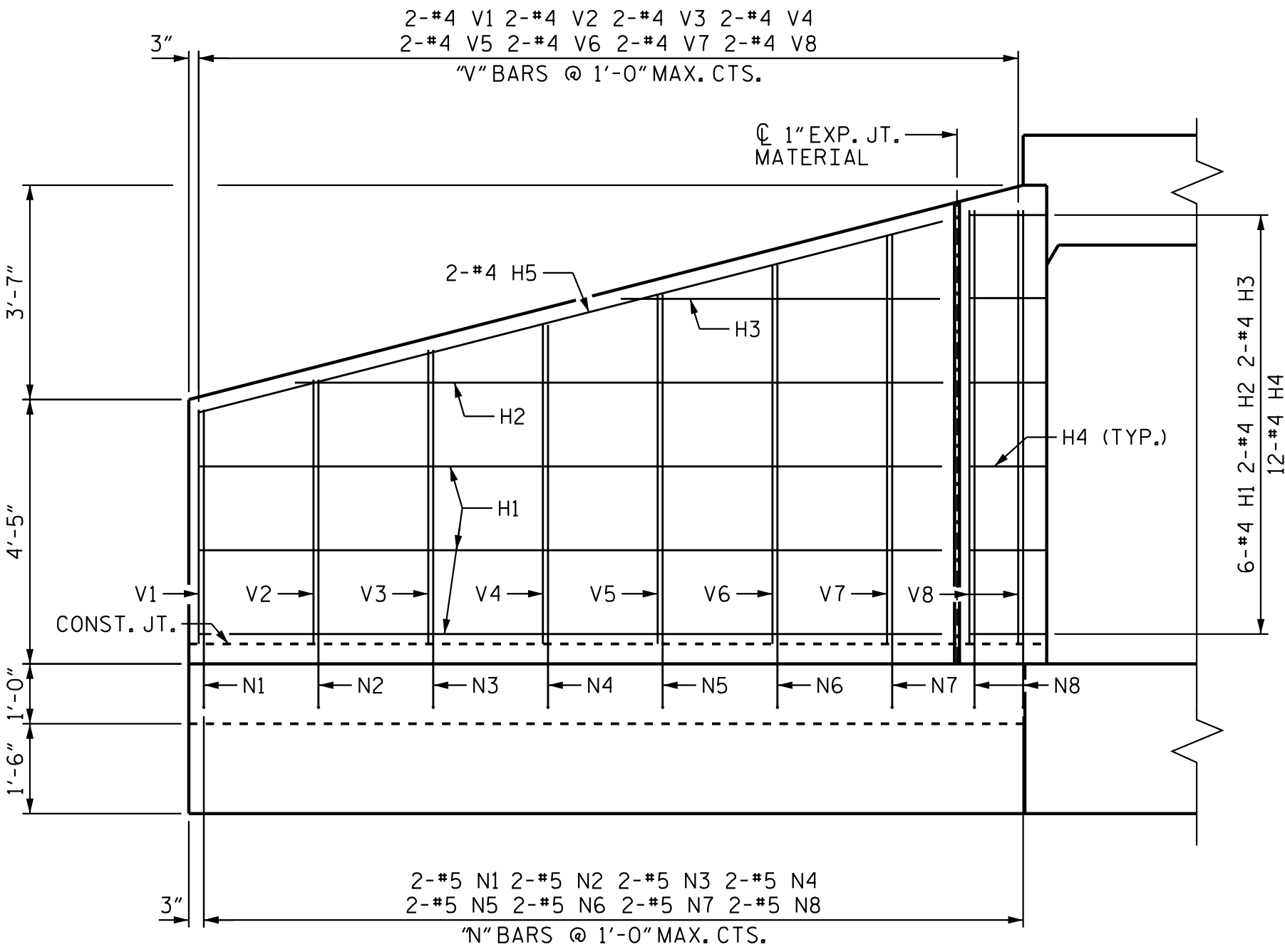
NOTES:
FOR "TYPICAL WING SECTION" AND REINFORCING
SCHEDULE, SEE SHEET 6 OF 6.
WEEP HOLES NOT SHOWN FOR CLARITY.



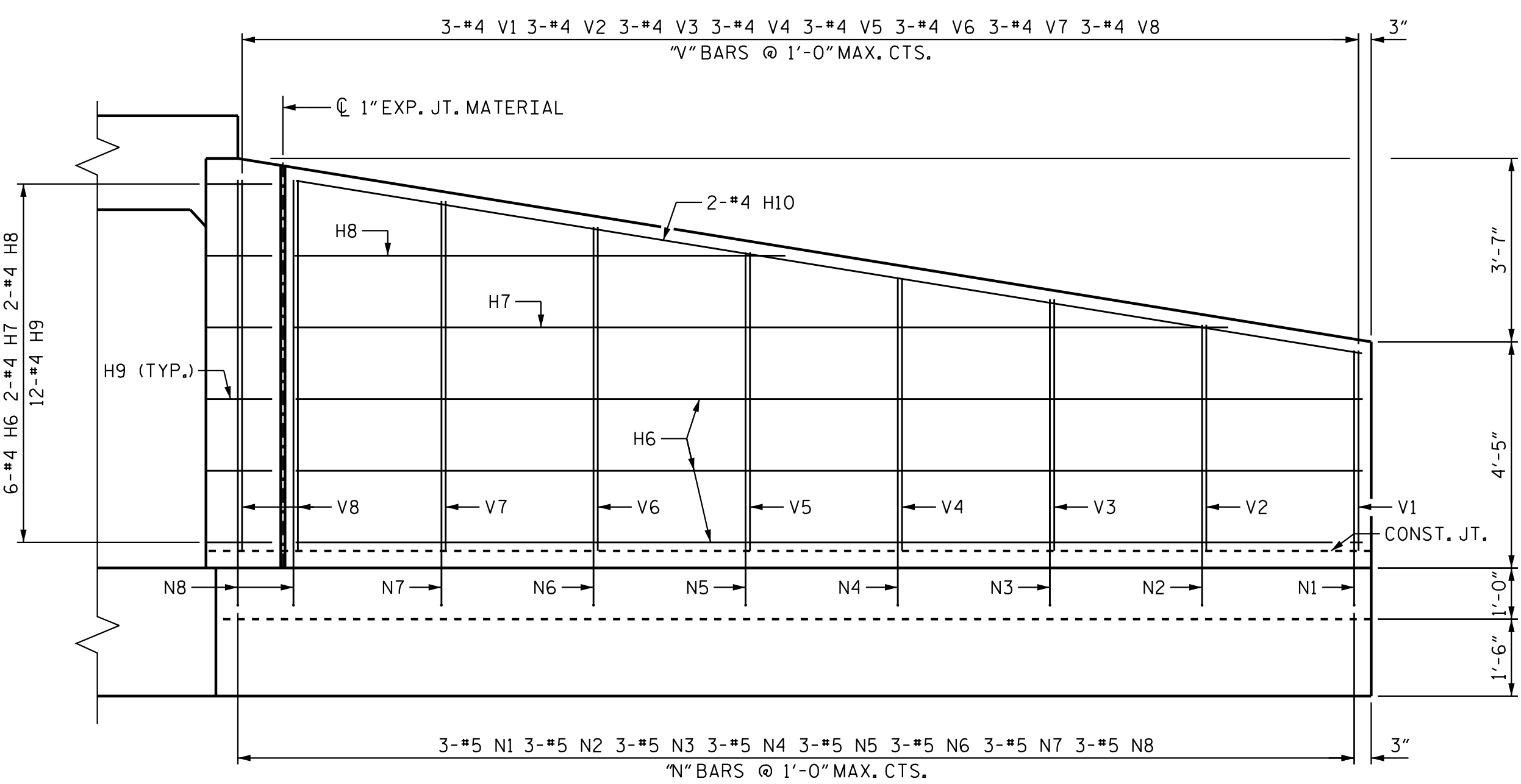
PLAN W1



PLAN W2



ELEVATION W1



ELEVATION W2

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 443+00.50 -L1-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

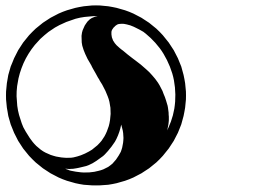
WINGS FOR
CONCRETE BOX CULVERT

H = 7'-0" SLOPE = 3:1
65°00'00" SKEW



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

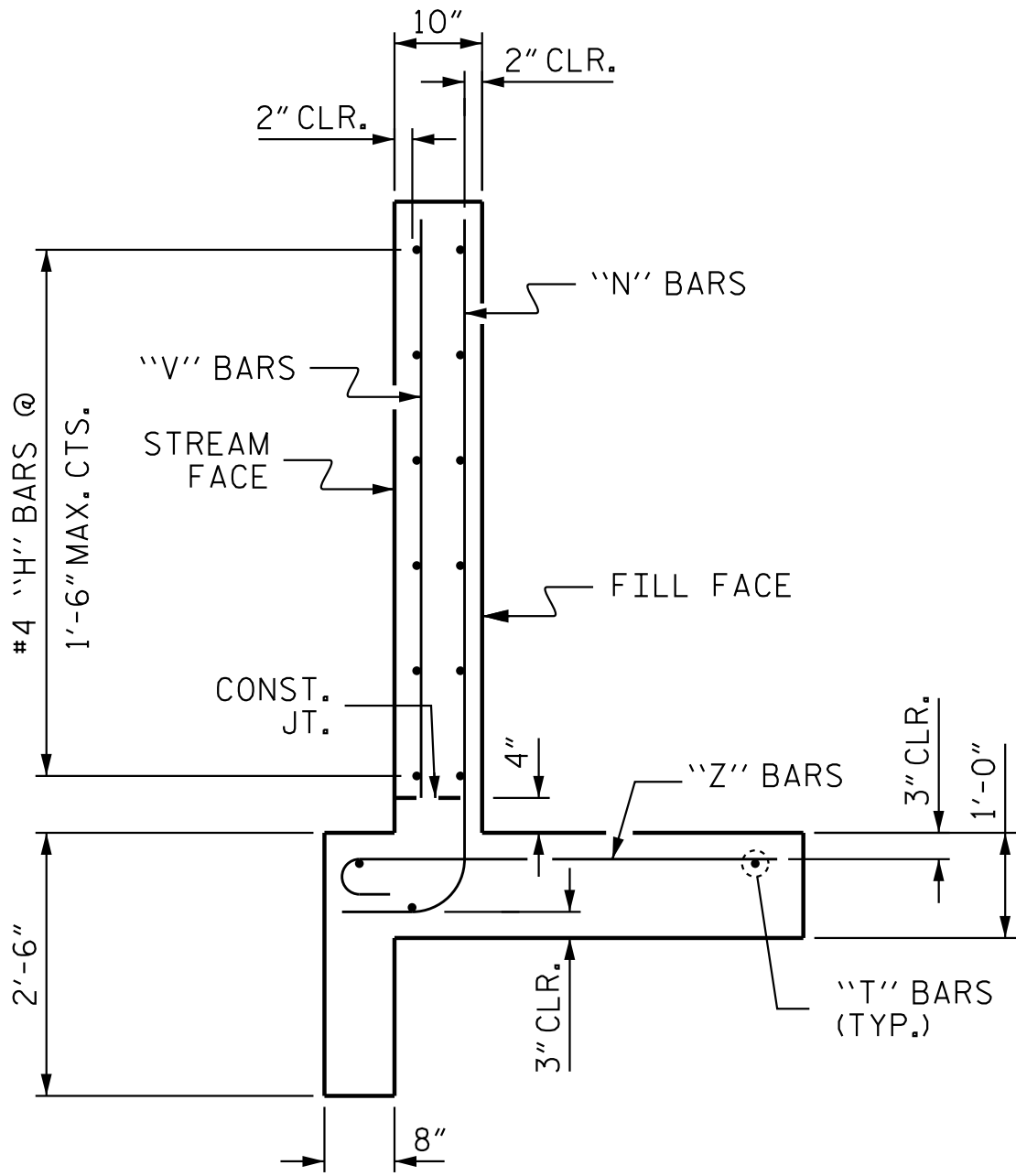
REVISIONS						SHEET NO. C05-05
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			



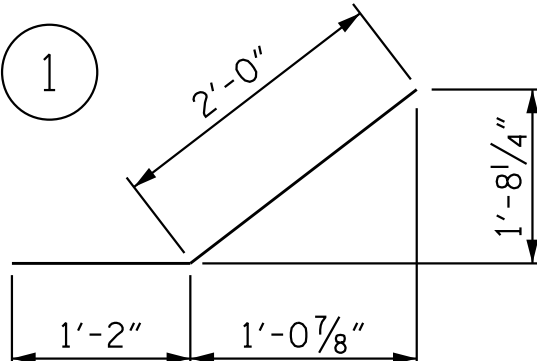
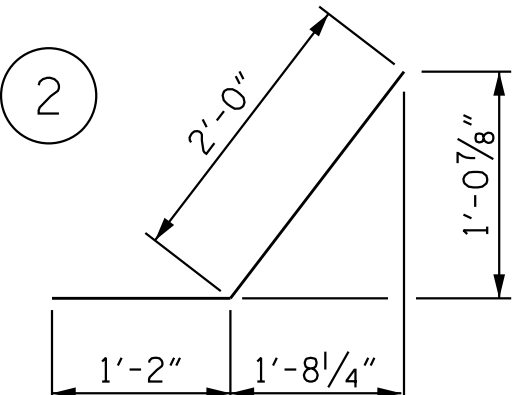
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 09/28/20
CHECKED BY : T. N. ENNIS DATE : 10/08/20

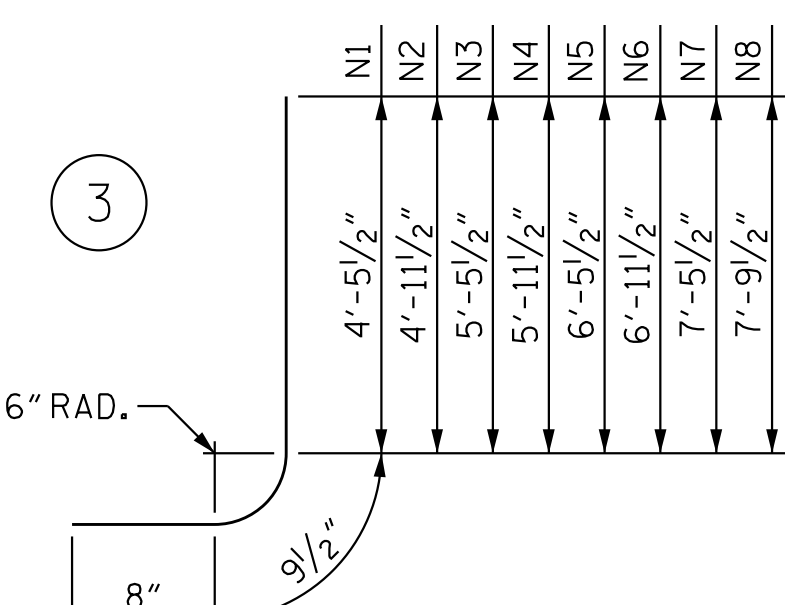
DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



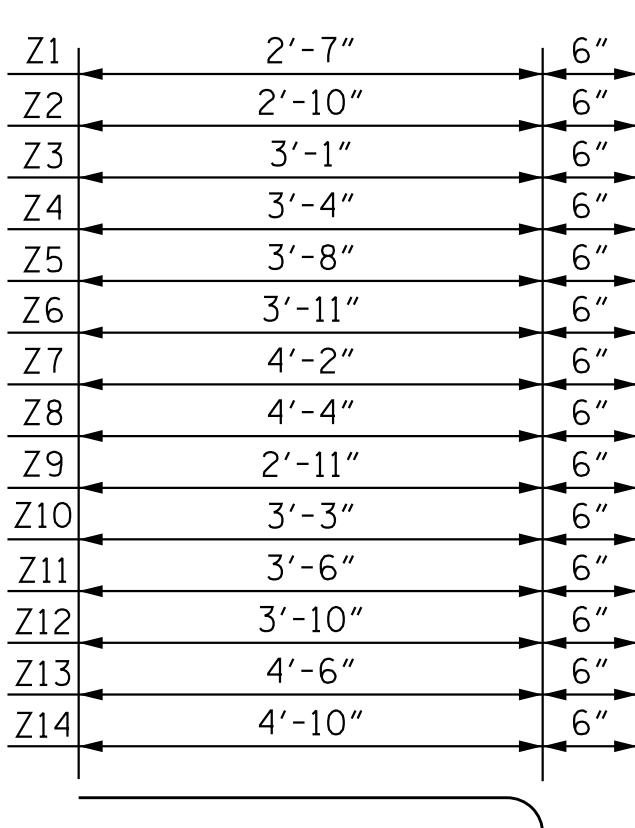
TYPICAL WING SECTION

BAR TYPES				BILL OF MATERIAL					
1  2 				BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
				H1	12	#4	STR	12'-5"	100
				H2	4	#4	STR	10'-10"	29
				H3	4	#4	STR	5'-4"	14
				H4	24	#4	1	3'-2"	51
				H5	4	#4	STR	12'-10	34
				H6	12	#4	STR	20'-10"	167
				H7	4	#4	STR	18'-3"	49
				H8	4	#4	STR	9'-7"	26
				H9	24	#4	2	3'-2"	51
				H10	4	#4	STR	21'-1"	56
				N1	10	#5	3	5'-11"	62
				N2	10	#5	3	6'-5"	67
				N3	10	#5	3	6'-11"	72
				N4	10	#5	3	7'-5"	77
				N5	10	#5	3	7'-11"	83
				N6	10	#5	3	8'-5"	88
				N7	10	#5	3	8'-11"	93
				N8	10	#5	3	9'-3"	96
				S1	12	#6	STR	6'-0"	108
				T1	6	#5	STR	13'-11"	87
				T2	6	#5	STR	22'-2"	139
				V1	10	#4	STR	3'-11"	26
				V2	10	#4	STR	4'-5"	30
				V3	10	#4	STR	4'-11"	33
				V4	10	#4	STR	5'-4"	36
				V5	10	#4	STR	5'-10"	39
				V6	10	#4	STR	6'-4"	42
				V7	10	#4	STR	6'-10"	46
				V8	10	#4	STR	7'-3"	48
				Z1	10	#4	4	3'-1"	21
				Z2	4	#4	4	3'-4"	9
				Z3	4	#4	4	3'-7"	10
				Z4	4	#4	4	3'-10"	10
				Z5	4	#4	4	4'-2"	11
				Z6	4	#4	4	4'-5"	12
				Z7	10	#4	4	4'-8"	31
				Z8	4	#4	4	4'-10"	13
				Z9	6	#4	4	3'-5"	14
				Z10	6	#4	4	3'-9"	15
				Z11	6	#4	4	4'-0"	16
				Z12	6	#4	4	4'-4"	17
				Z13	6	#4	4	5'-0"	20
				Z14	6	#4	4	5'-4"	21
				REINF. STEEL FOR 4 WINGS				2,069 LBS	

3



4



CLASS A CONCRETE

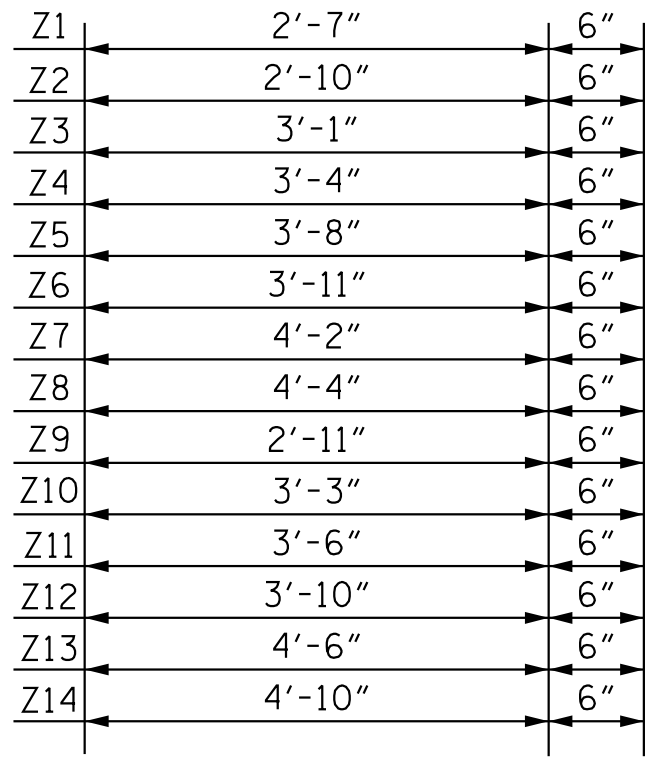
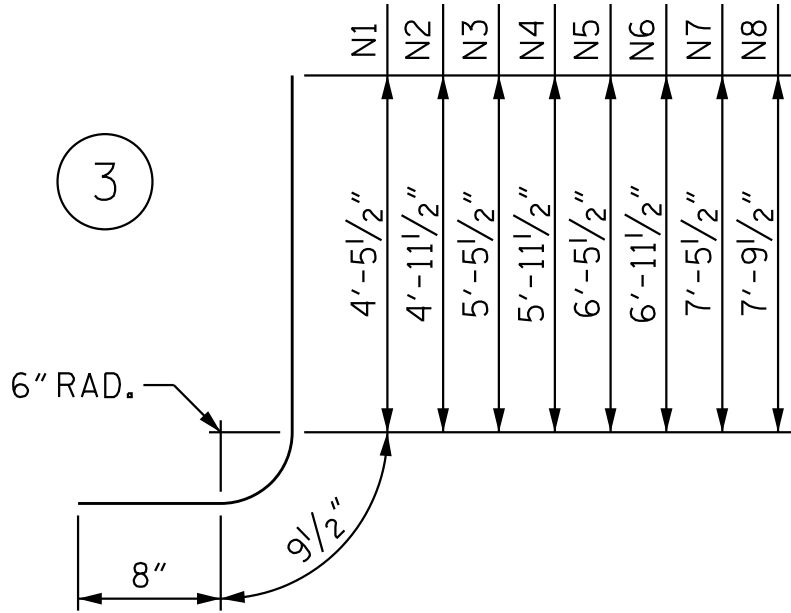
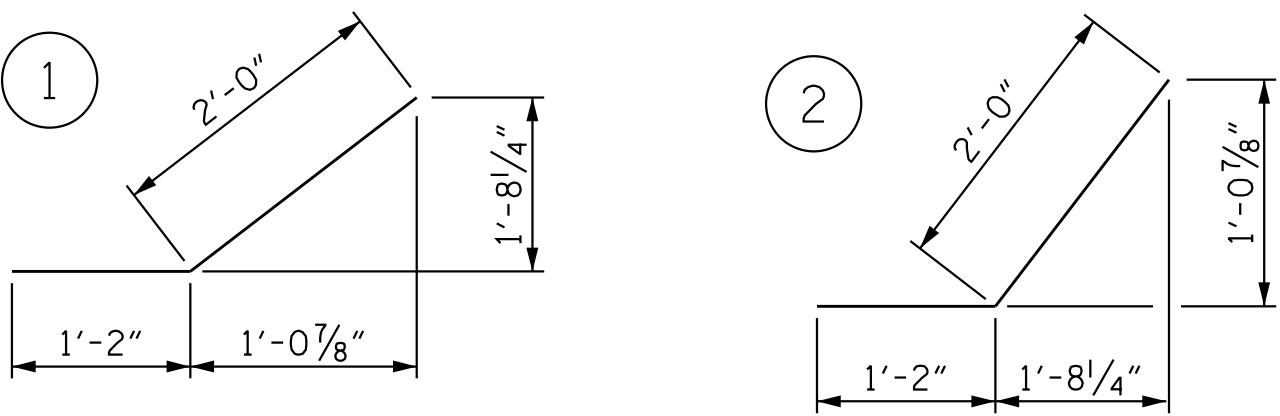
4 WINGS28.5 CY

2 HEADWALLS1.4 CY

2 END CURTAIN WALLS1.7 CY

4 SILLS & 6 BAFFLES2.9 CY

TOTAL34.5 CY



CLASS A CONCRETE			
4 WINGS	28.5	CY	
2 HEADWALLS	1.4	CY	
2 END CURTAIN WALLS	1.7	CY	
4 SILLS & 6 BAFFLES	2.9	CY	
TOTAL	34.5	CY	

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 443+00.50 -L1-

SHEET 6 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WINGS FOR CONCRETE BOX CULVERT					
H = 7'-0"			SLOPE = 3:1		
65°00'00" SKEW					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					C05-06
					TOTAL SHEETS 06

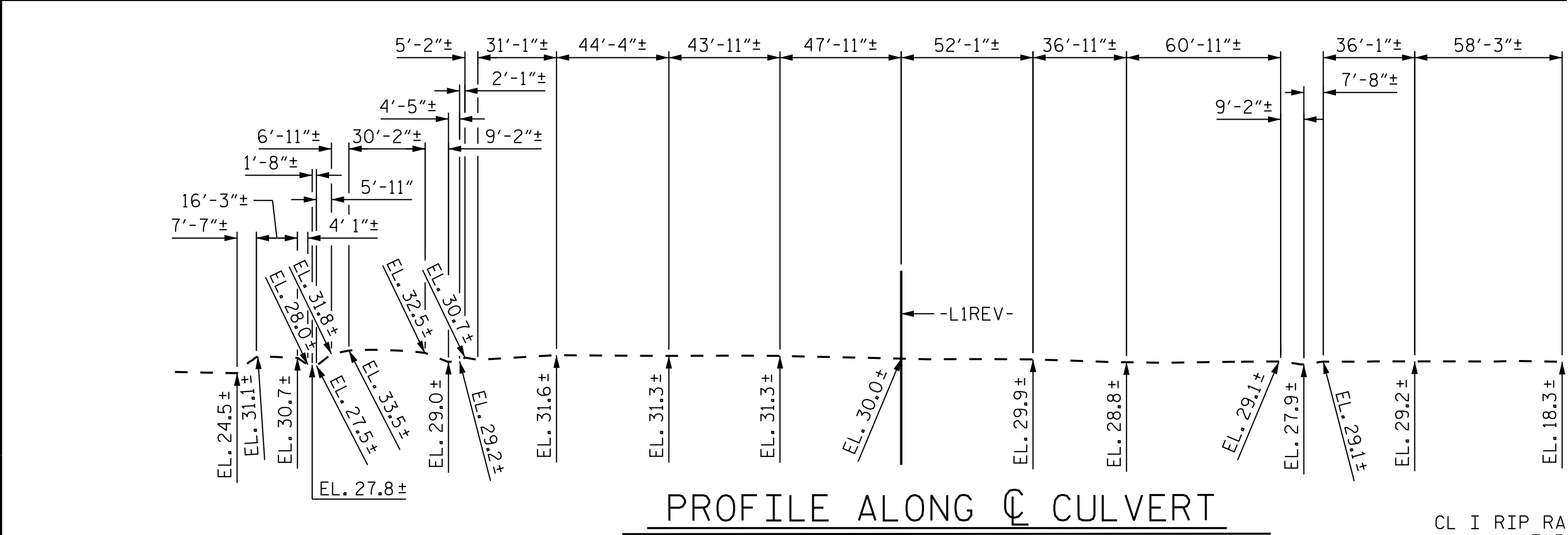
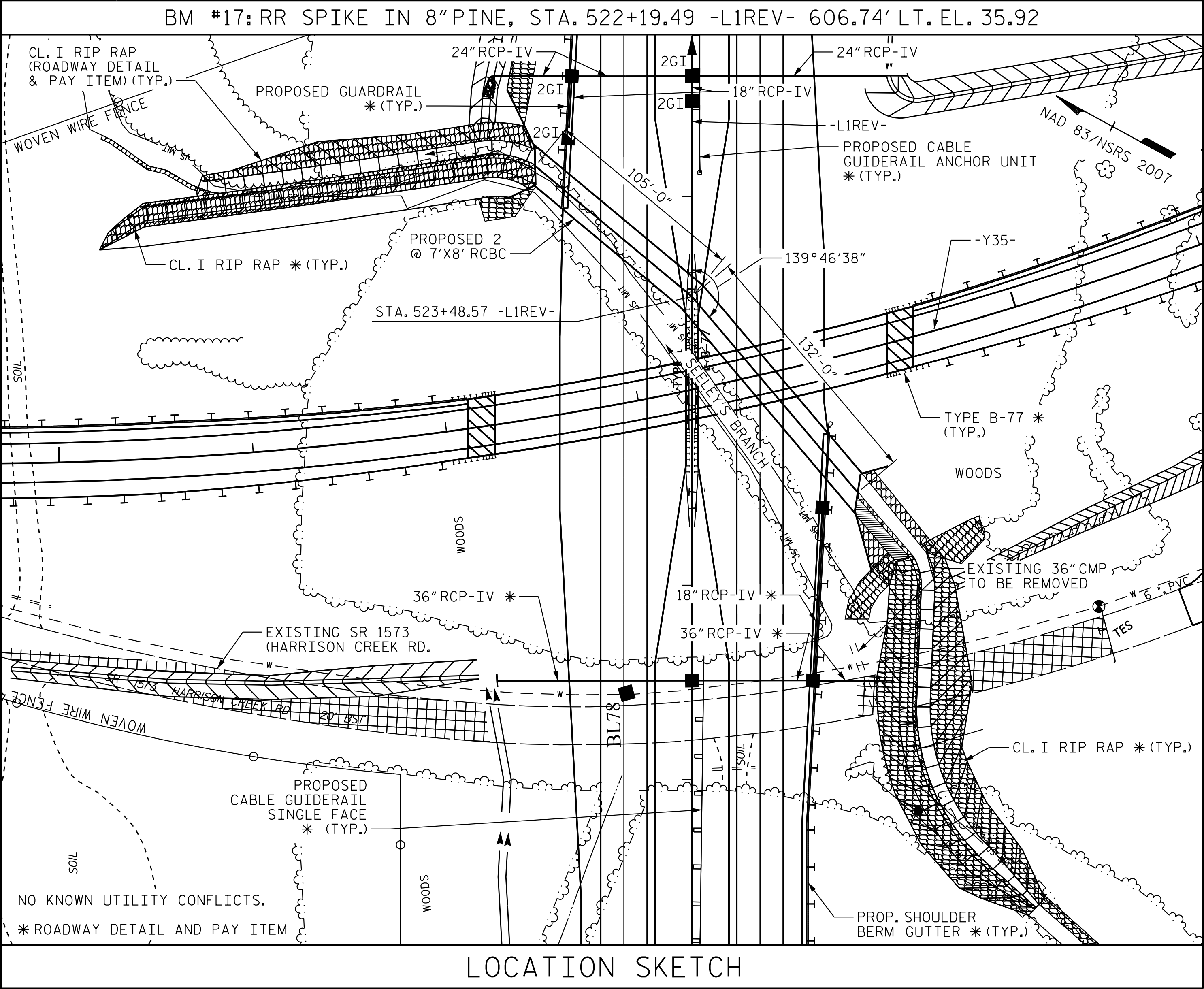


DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 09/28/20
CHECKED BY : T. N. ENNIS DATE : 10/08/20
DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25





Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 08/27/20
CHECKED BY : T. N. ENNIS DATE : 10/13/20

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25

NOTES

ASSUMED LIVE LOAD = HL-93.

DESIGN FILL= 5.51 FT. (MAXIMUM) 4.17 FT. (MINIMUM)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP-RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP-RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

REALIGN UPSTREAM CHANNEL TO FLOW THROUGH EAST BARREL.

BACKFILL LOW FLOW BARREL WITH 1' NATIVE MATERIAL. BACKFILL HIGH FLOW BARREL WITH NATIVE MATERIAL TO SILL HEIGHT.

FOUNDATION NOTES

1. EXCAVATE FOUNDATION A MINIMM OF 3.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 3.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL ENCAPSULATED IN TYPE 2 GEOTEXTILE IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS. FOR FOUNDATION CONDITIONING TEXTILE, SEE SPECIAL PROVISIONS.
2. CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT -L1REV- STATION 523+48.57 WITH 3" OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	1,003 TONS
FOUNDATION COND. GEOTEXTILE	527 S.Y.

CLASS A CONCRETE			
BARREL @	1.490	CY/FT	353.1 C.Y.
WINGS ETC.			54.9 C.Y.
TOTAL			408.0 C.Y.

REINFORCING STEEL			
BARREL			65,996 LBS.
WINGS ETC.			5,268 LBS.
TOTAL			71,264 LBS.

HYDRAULIC DATA

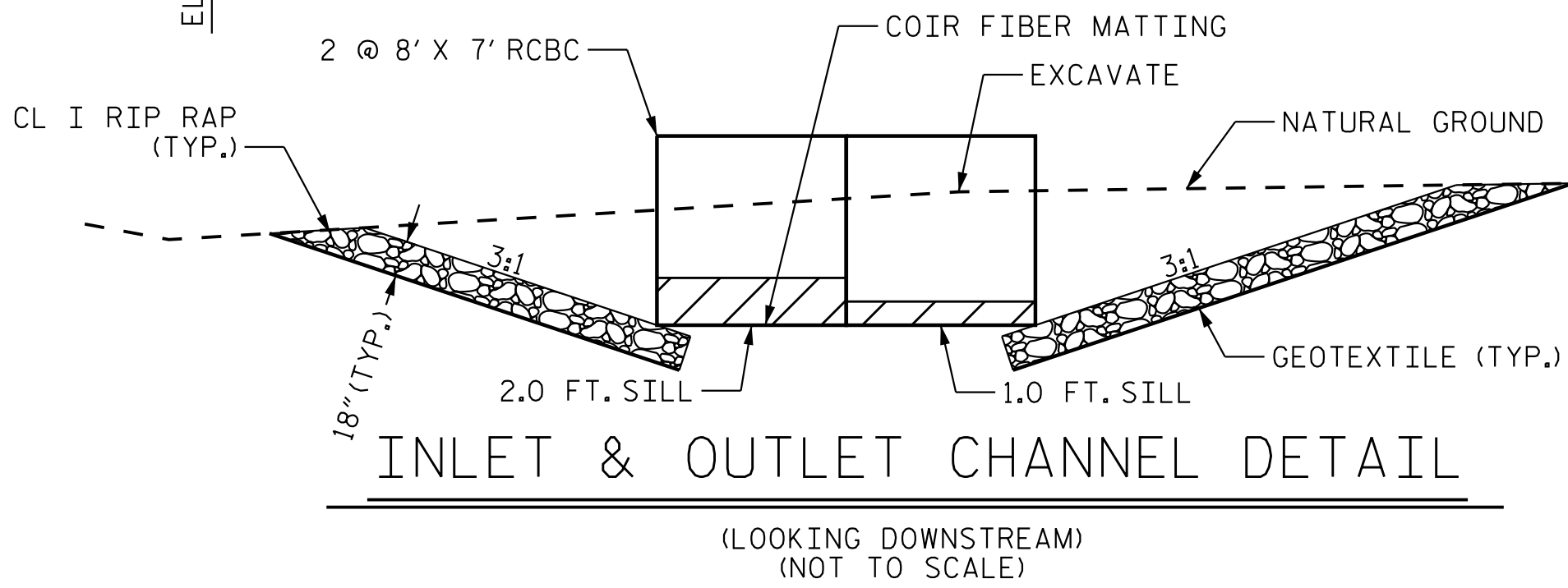
DESIGN DISCHARGE	=	360 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	33.2
DRAINAGE AREA	=	0.41 SQ. MI.
BASIC DISCHARGE (Q100)	=	410 C.F.S.
BASIC HIGH WATER ELEVATION	=	33.6

ROADWAY DATA

GRADE POINT EL. @ STATION 523+48.57 -L1REV-	=	37.37
BED ELEV. @ STATION 523+48.57 -L1REV-	=	26.12
ROADWAY SLOPES	=	3:1 (LT.) 3:1 (RT.)

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	1100 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	500+ YRS.
OVERTOPPING FLOOD ELEVATION	=	38.6
OVERTOPS ROADWAY AT STATION 524+35.73 SHLD. PT. RT.		



PROJECT NO. R-3300A

PENDER COUNTY

STATION: 523+48.57 -L1REV-

SHEET 1 OF 7 BRIDGE NO. 700276

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 7 FT. X 8 FT.
CONCRETE BOX CULVERT

139°46'38" SKEW



Signed by Yong-Hy Su 4/30/2025

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO. C06-01
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			

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:

1. RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. LOAD RATINGS FOR MAXIMUM AND MINIMUM FILL CONDITIONS HAVE BEEN EVALUATED. MAXIMUM FILL CONDITIONS CONTROL LOAD RATINGS AND ARE PRESENTED IN THE ADJACENT TABLE AS THE MOST CRITICAL LOAD RATING.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

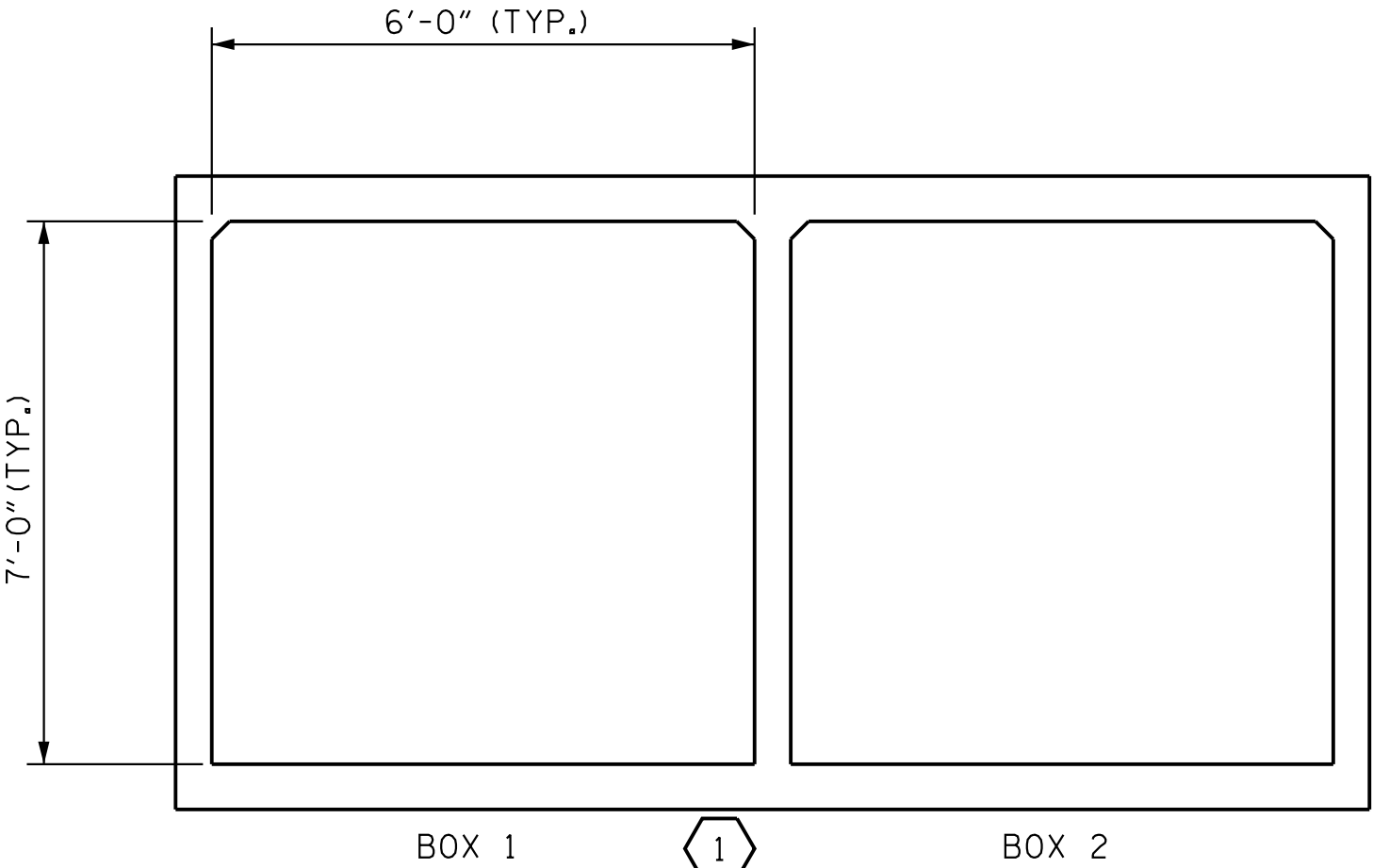
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS																
LEVEL	VEHICLE	WEIGHT (W) (TONS)	#	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER	
						LIVE-LOAD FACTORS (γ _{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	1.53	--	1.75	1.83	1	MIDDLE (TOP SLAB) - INSIDE	3.50	1.53	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
	HL-93 (OPERATING)	N/A		1.99	--	1.35	2.37	1	MIDDLE (TOP SLAB) - INSIDE	3.50	1.99	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
	HS-20 (INVENTORY)	36.000	2	2.24	80.64	1.75	2.84	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.24	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
	HS-20 (OPERATING)	36.000		2.91	104.76	1.35	3.68	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.91	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		5.68	76.68	1.40	6.19	2	MIDDLE (TOP SLAB) - INSIDE	3.50	5.68	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
		SNGARBS2	20.000		4.95	99.00	1.40	5.79	2	MIDDLE (TOP SLAB) - INSIDE	3.50	4.95	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNAGRIS2	22.000		4.96	109.12	1.40	6.19	2	MIDDLE (TOP SLAB) - INSIDE	3.50	4.96	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNCOTTS3	27.250		2.70	73.57	1.40	3.02	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.70	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNAGGRS4	34.925		2.56	89.40	1.40	3.71	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.56	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNS5A	35.550		2.50	88.87	1.40	3.44	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.50	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNS6A	39.950		2.32	92.68	1.40	3.43	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.32	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		SNS7B	42.000		2.32	97.44	1.40	3.44	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.32	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.35	110.55	1.40	5.11	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	3.35	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNT4A	33.075		2.95	97.57	1.40	3.59	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.95	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNT6A	41.600		2.73	113.56	1.40	3.48	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.73	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNT7A	42.000		2.84	119.28	1.40	3.53	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.84	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNT7B	42.000		2.52	105.84	1.40	3.52	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.52	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNAGRIT4	43.000		2.69	115.67	1.40	3.59	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.69	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNAGT5A	45.000		2.69	121.05	1.40	3.60	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.69	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
		TNAGT5B	45.000	3	2.37	106.65	1.40	3.59	2	MIDDLE (TOP SLAB) - INSIDE	3.50	2.37	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1
EMERGENCY VEHICLE (EV)	EV2	28.750		4.01	115.28	1.30	4.38	2	MIDDLE (TOP SLAB) - INSIDE	3.50	4.01	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	
	EV3	43.000	4	2.36	101.48	1.30	2.63	1	MIDDLE (TOP SLAB) - INSIDE	3.50	2.36	1	RIGHT END (BOTTOM SLAB) - OUTSIDE	7.00	1	



LRFR SUMMARY

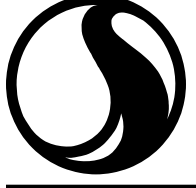
(LOOKING DOWNSTREAM)

PROJECT NO. R-3300A

PENDER COUNTY

STATION: 523+48.57 -L1REV-

SHEET 2 OF 7



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ASSEMBLED BY : J. B. GEILE
CHECKED BY : T. N. ENNIS
DATE : 10/09/20
DATE : 10/13/20

DRAWN BY : WMC
CHECKED BY : GM
7/II
7/II

REV. 10/1/II
REV. 12/1/II
REV. 04/23

MAA/GM
MAA/THC
BNB/AAI

DESIGN
ENGINEER
OF RECORD: Z.-J. SU
DATE : 04/15/25



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

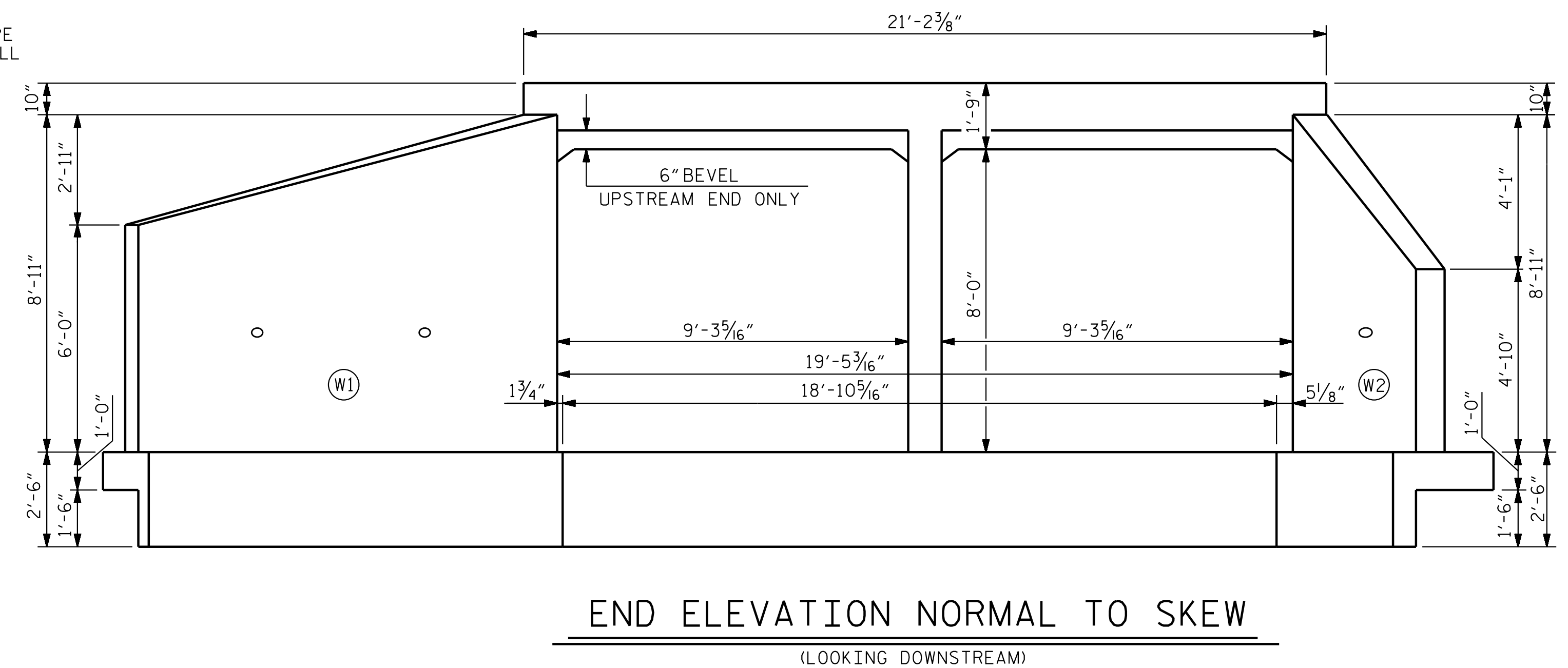
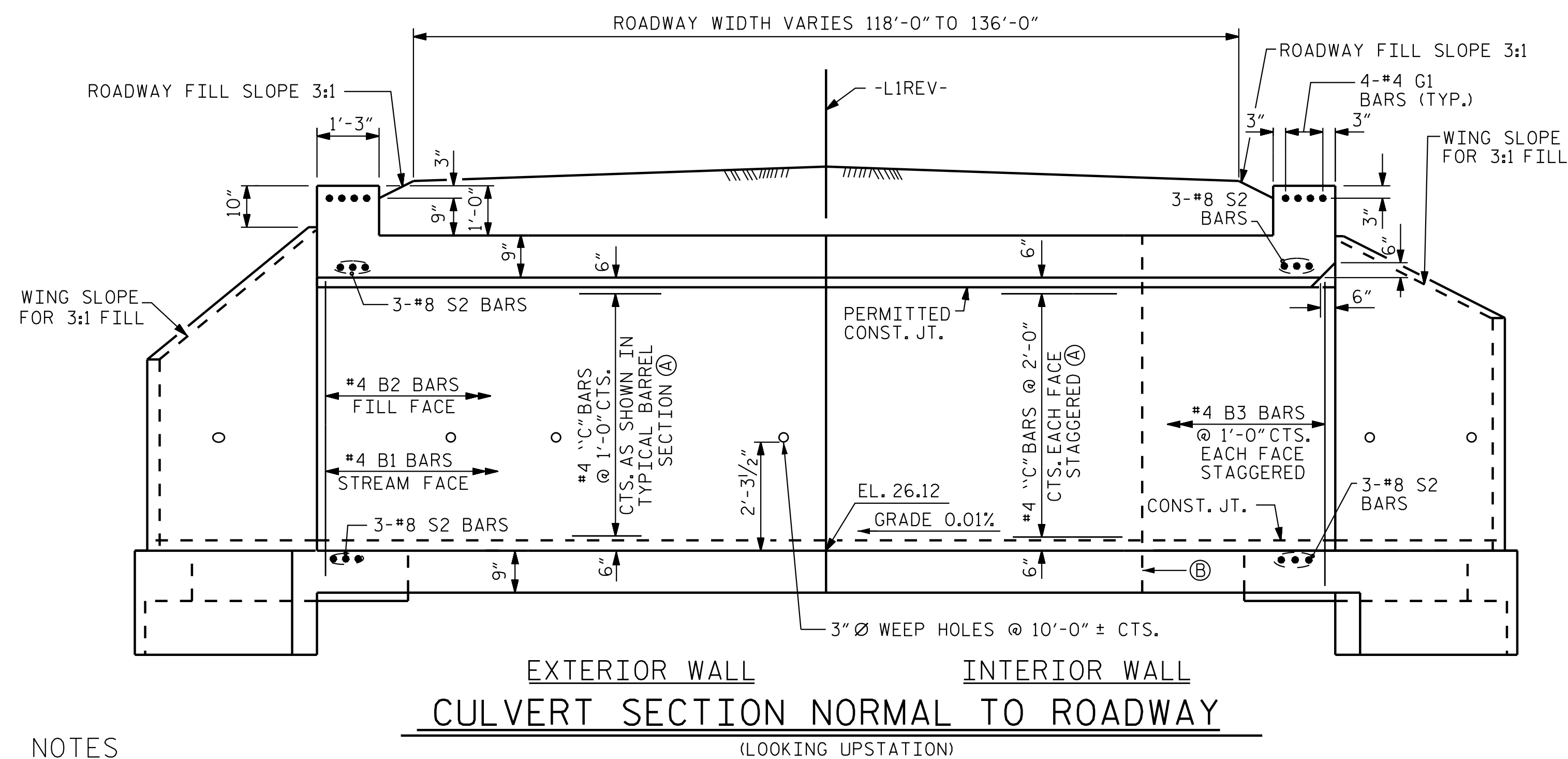
REVISIONS

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

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SHEET NO.
C06-02
TOTAL
SHEETS
07

STD. NO. LRFR5



NOTES

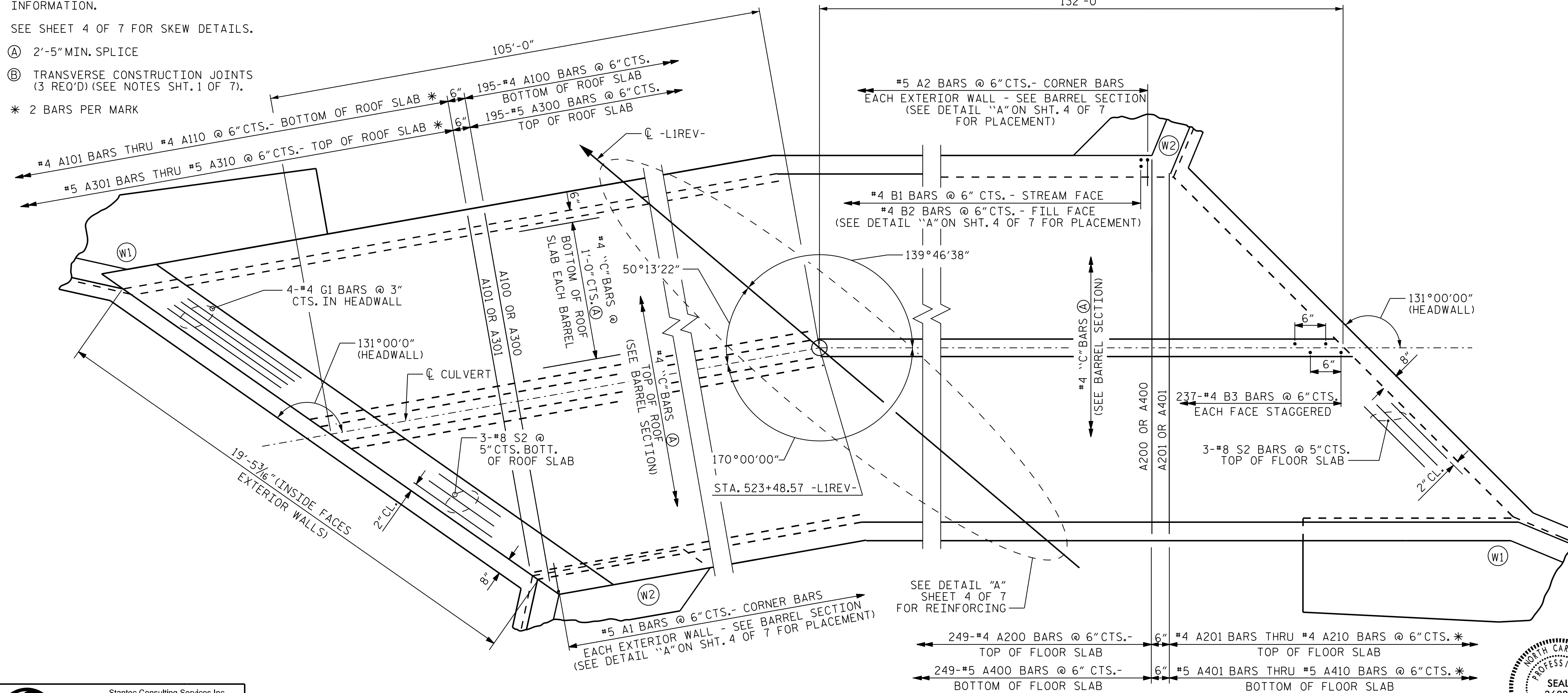
SEE SHEET 1 OF 7 FOR ADDITIONAL
INFORMATION.

SEE SHEET 4 OF 7 FOR SKEW DETAILS.

④ 2'-5" MIN. SPLICE

⑧ TRANSVERSE CONSTRUCTION JOINTS
(3 REQ'D) (SEE NOTES SHT.1 OF 7).

* 2 BARS PER MARK



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 10/12/20
CHECKED BY : T. N. ENNIS DATE : 10/13/20

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. R-3300A
 PENDER COUNTY
 STATION: 523+48.57 -L1REV-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 7 FT. X 8 FT.
CONCRETE BOX CULVERT

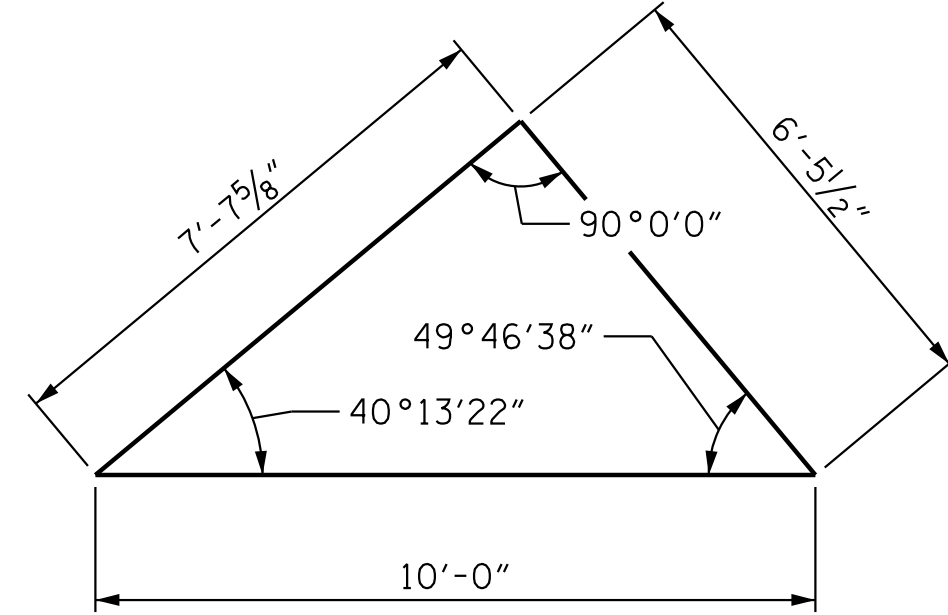
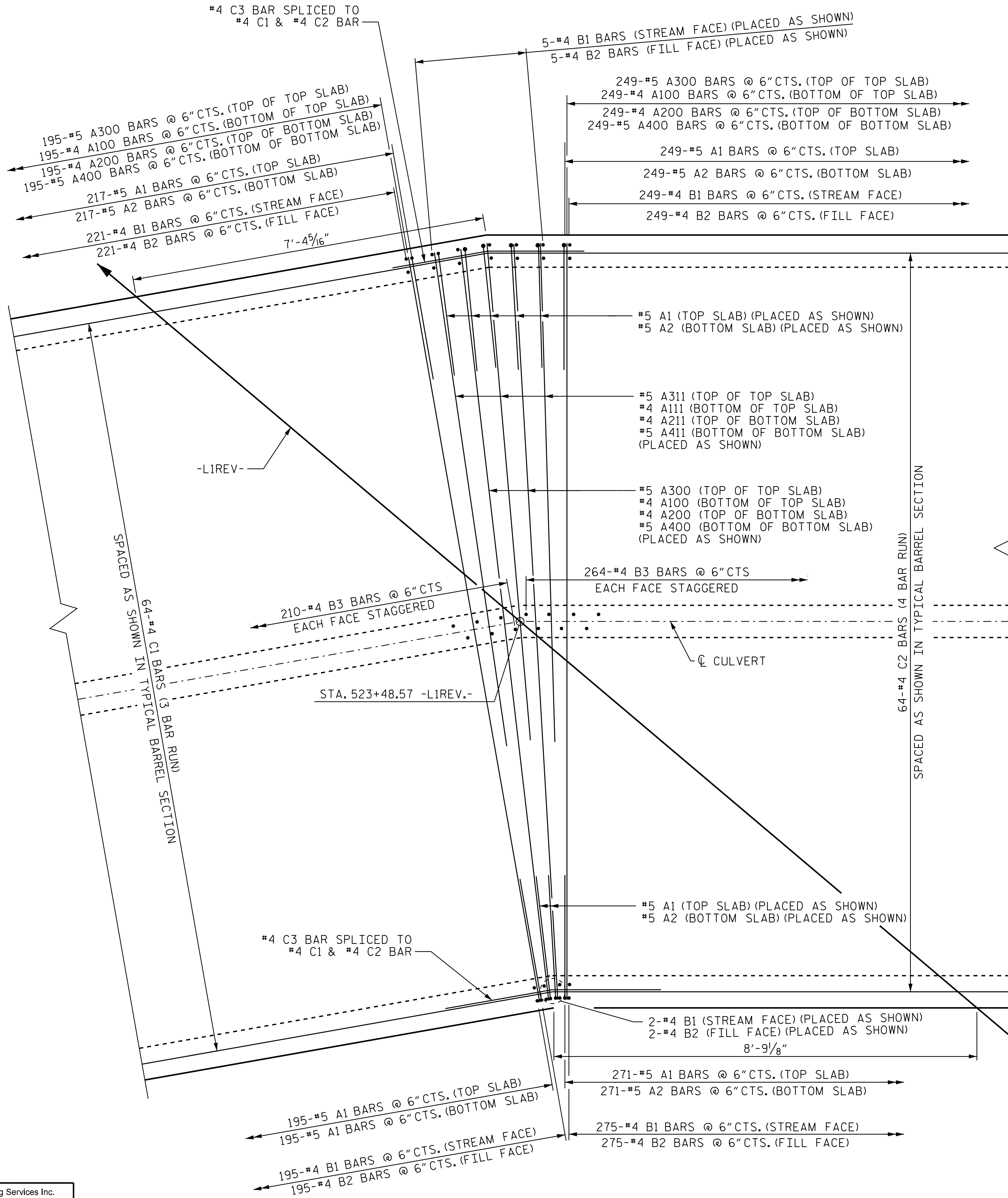
139°46'38" SKEW

REVISIONS						SHEET NO. C06-03
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			

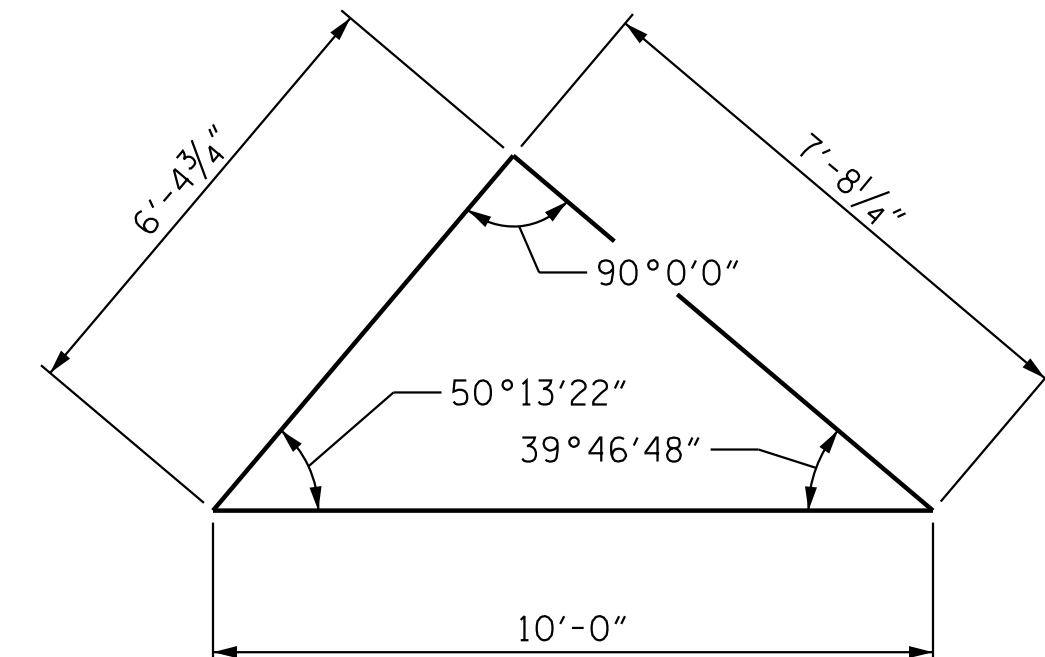
SHEET NO.
C06-03

TOTAL SHEETS	07
-----------------	----

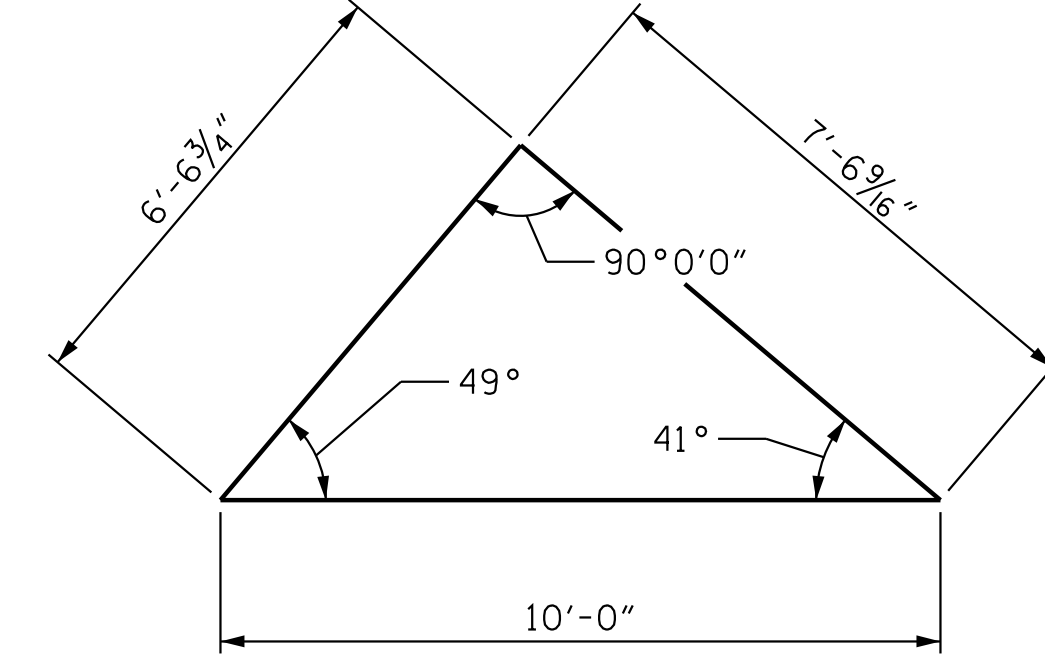
NAD 83/NSRS 2007



SKIEW TRIANGLE
(☐ ROADWAY TO SOUTH SEGMENT)



SKIEW TRIANGLE
(☐ ROADWAY TO NORTH SEGMENT)

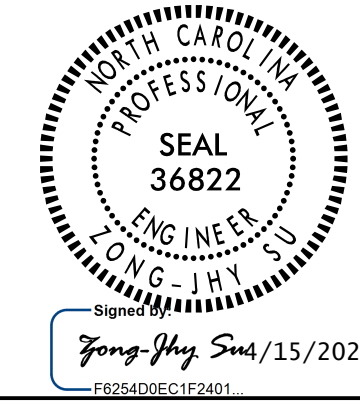


SKIEW TRIANGLE
(HEADWALL)

DETAIL "A"

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 523+48.57 -L1REV-

SHEET 4 OF 7



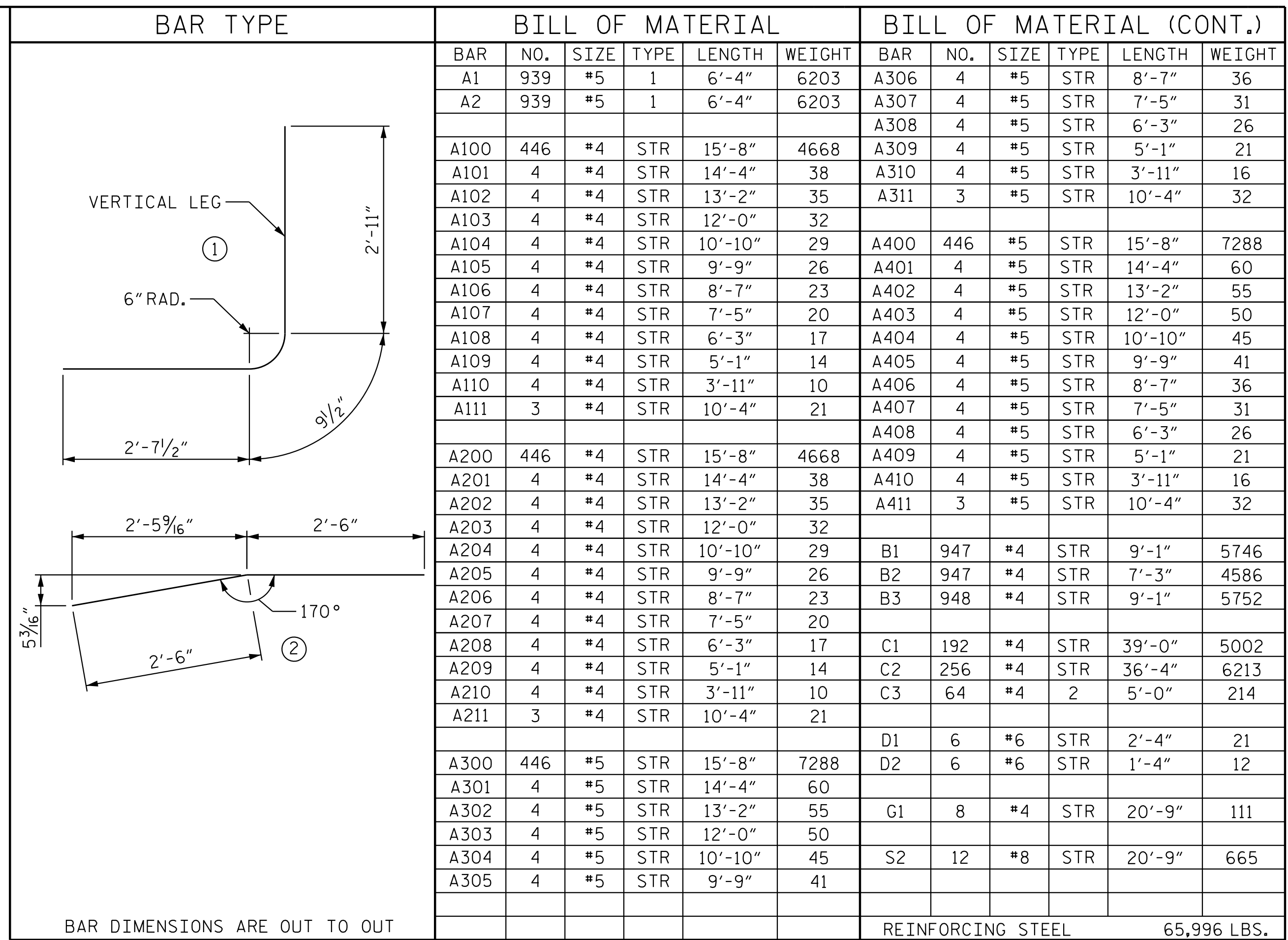
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO. C06-04
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			

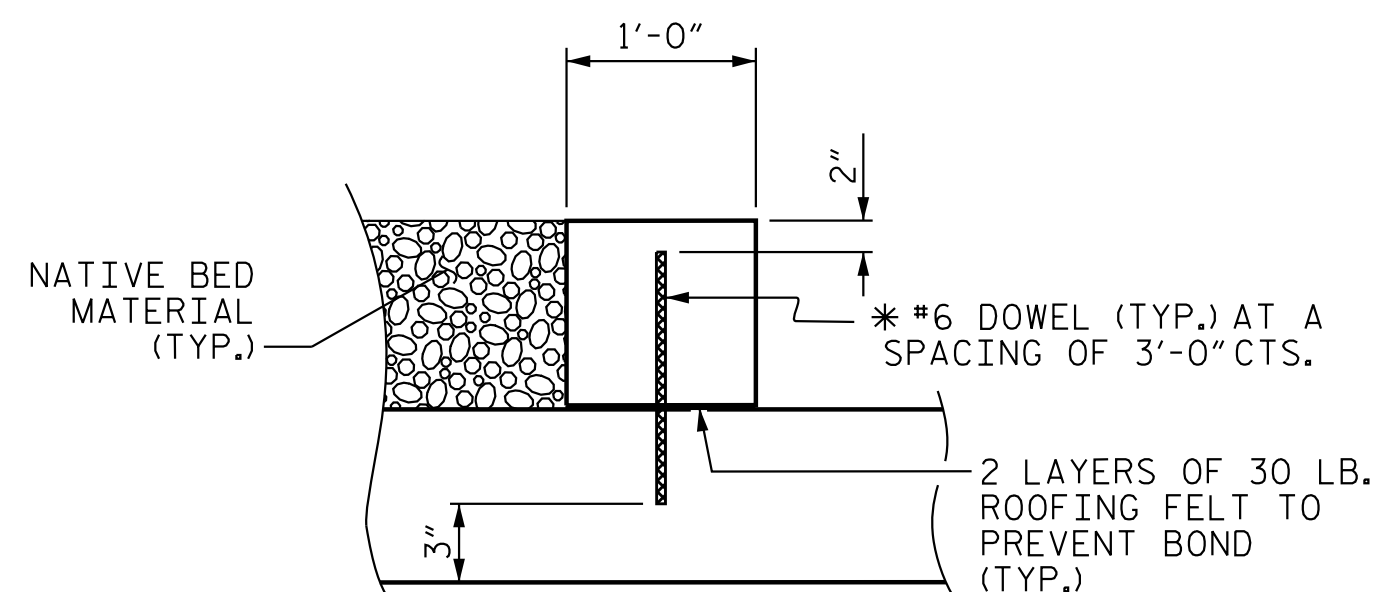


Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 10/12/20
CHECKED BY : T. N. ENNIS DATE : 10/13/20
ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25



THERE ARE 64 "C" BARS IN SECTION OF BARREL.



* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

SEE PLAN VIEW FOR LOCATION OF SILLS

SEE SHEET 1 OF 7 FOR NOTES REGARDING
ADDITIONAL SILL/BACKFILL INFORMATION)



SEE NOTES SHEET 1 OF 7 FOR BACKFILL INSTRUCTIONS.

SPLICE CHART		
BAR	SIZE	SPLICE LENGTH
C1,C2,C3	#4	2'-5"

PROJECT NO. R-3300A
 PENDER COUNTY
 STATION: 523+48.57 -L1REV-

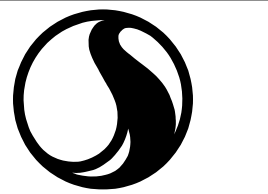
SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 7 FT. X 8 FT.
CONCRETE BOX CULVERT

139°46'38" SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C06-05
1			3			TOTAL SHEETS 07
2			4			

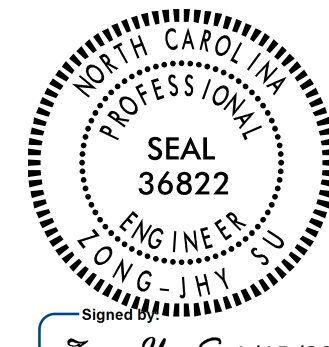


Stantec

Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

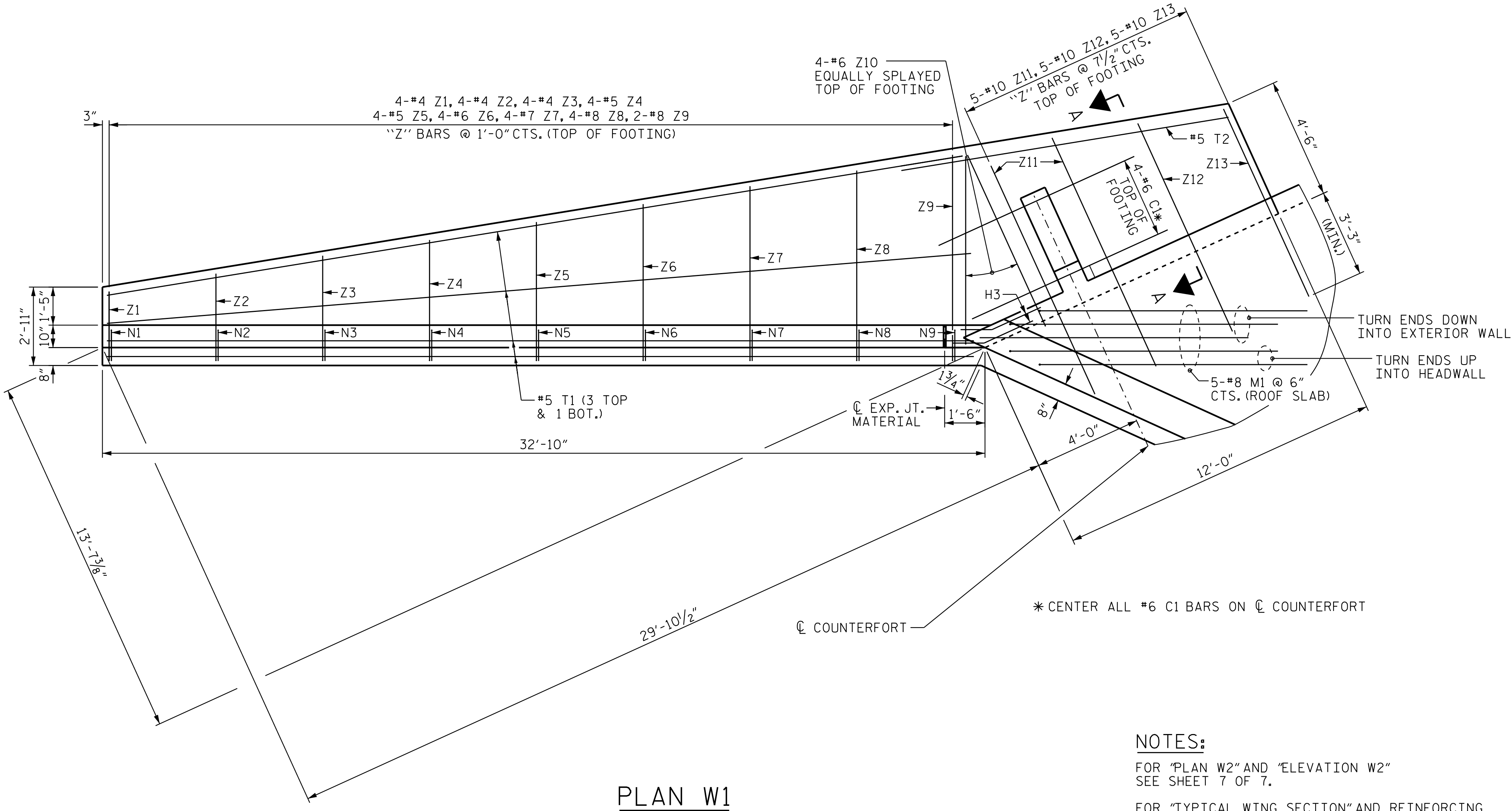
DRAWN BY : J. B. GEILE DATE : 10/13/20
CHECKED BY : T. N. ENNIS DATE : 10/13/20

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

U:\Structures\06\Dr-drafting\Final\VR3300A_SML CU.06_700006.dgn 4/5/2025 3:39:08 PM ksu



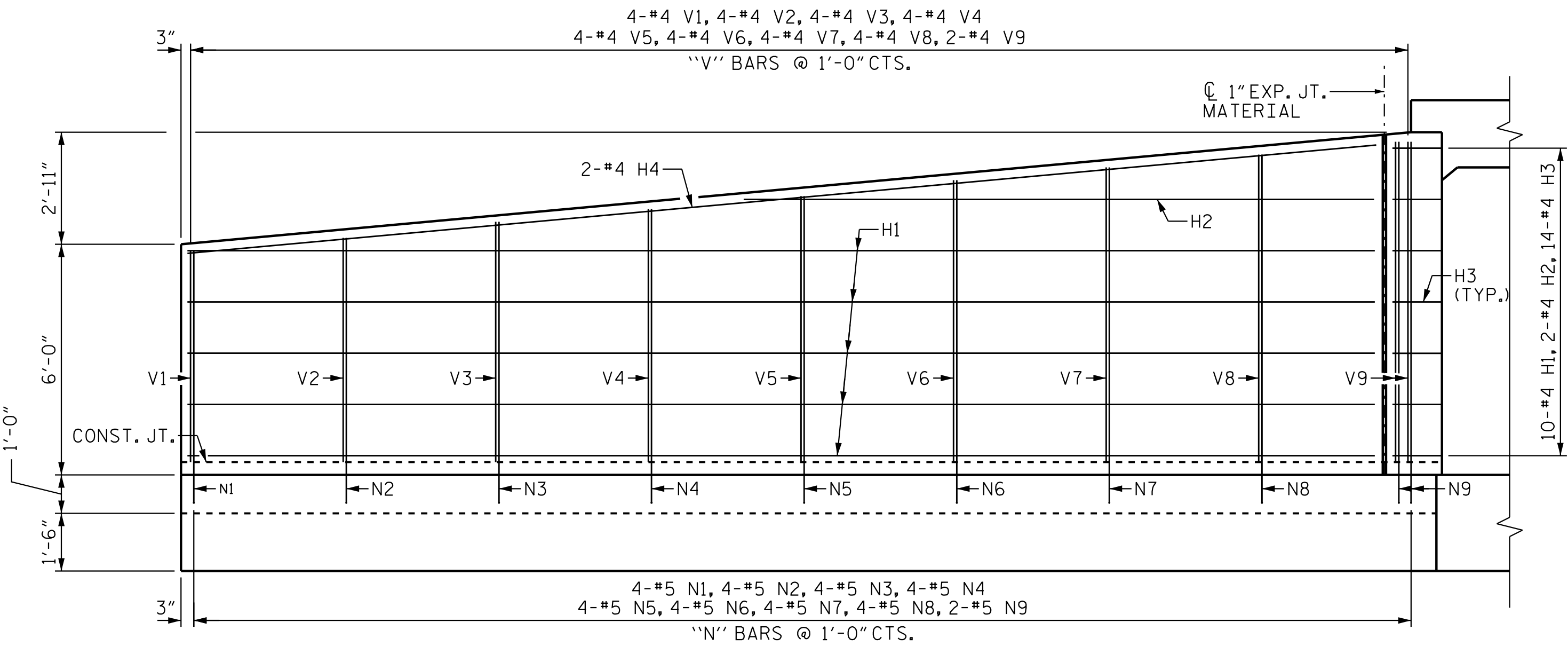
PLAN W1

NOTES:

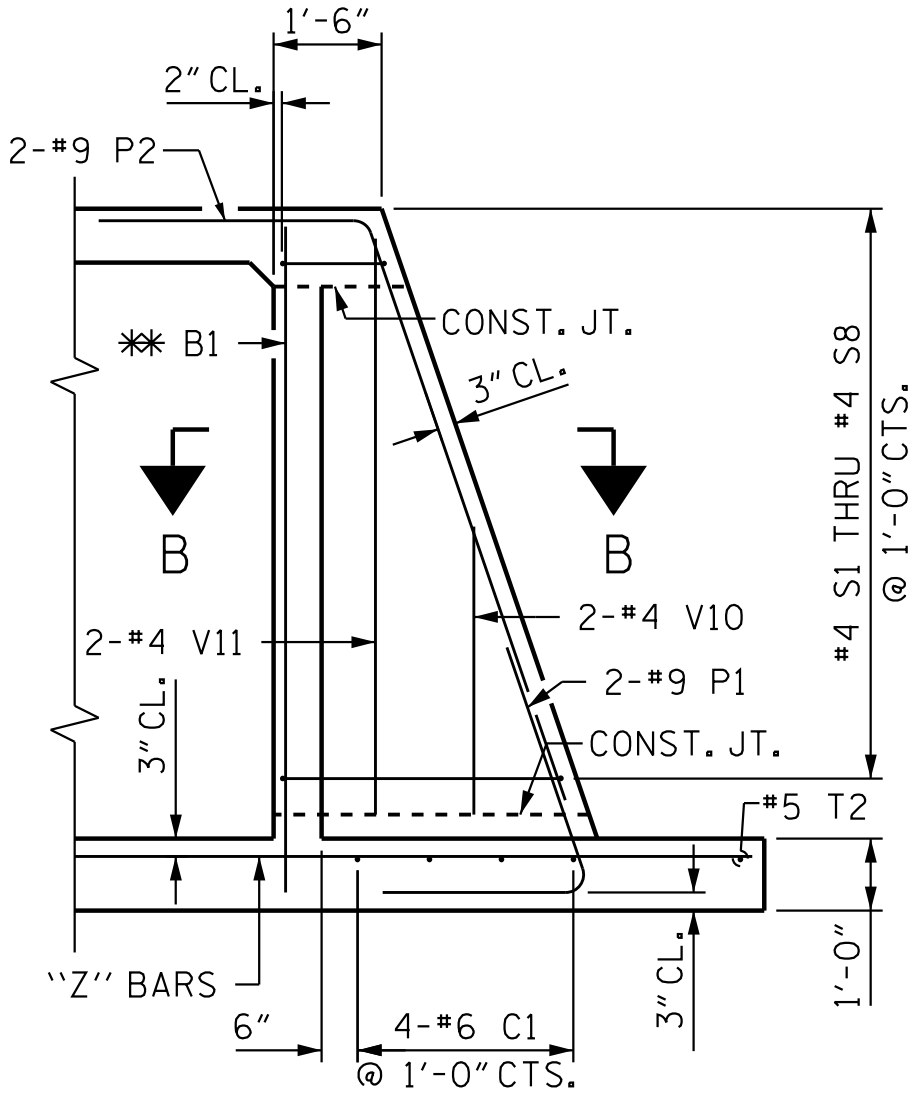
FOR "PLAN W2" AND "ELEVATION W2"
SEE SHEET 7 OF 7.

FOR "TYPICAL WING SECTION" AND REINFORCING
SCHEDULE, SEE SHEET 7 OF 7.

WEEP HOLES NOT SHOWN FOR CLARITY.

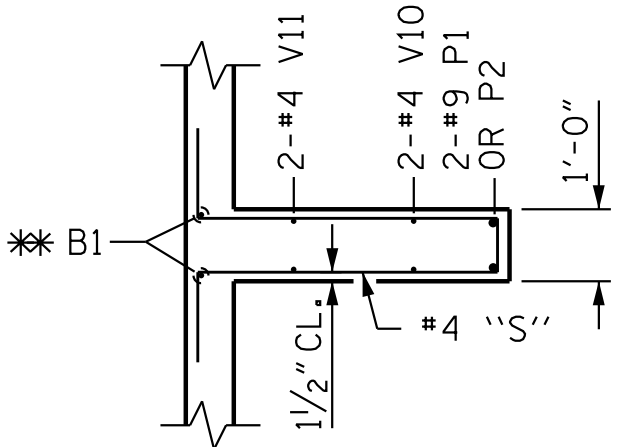


ELEVATION W1



SECTION A-A

** B1 BARS ACCOUNTED FOR IN CULVERT
BARREL BILL OF MATERIAL.



SECTION B-B

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 523+48.57 -L1REV-

SHEET 6 OF 7



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 10/13/20
CHECKED BY : T. N. ENNIS DATE : 10/13/20

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

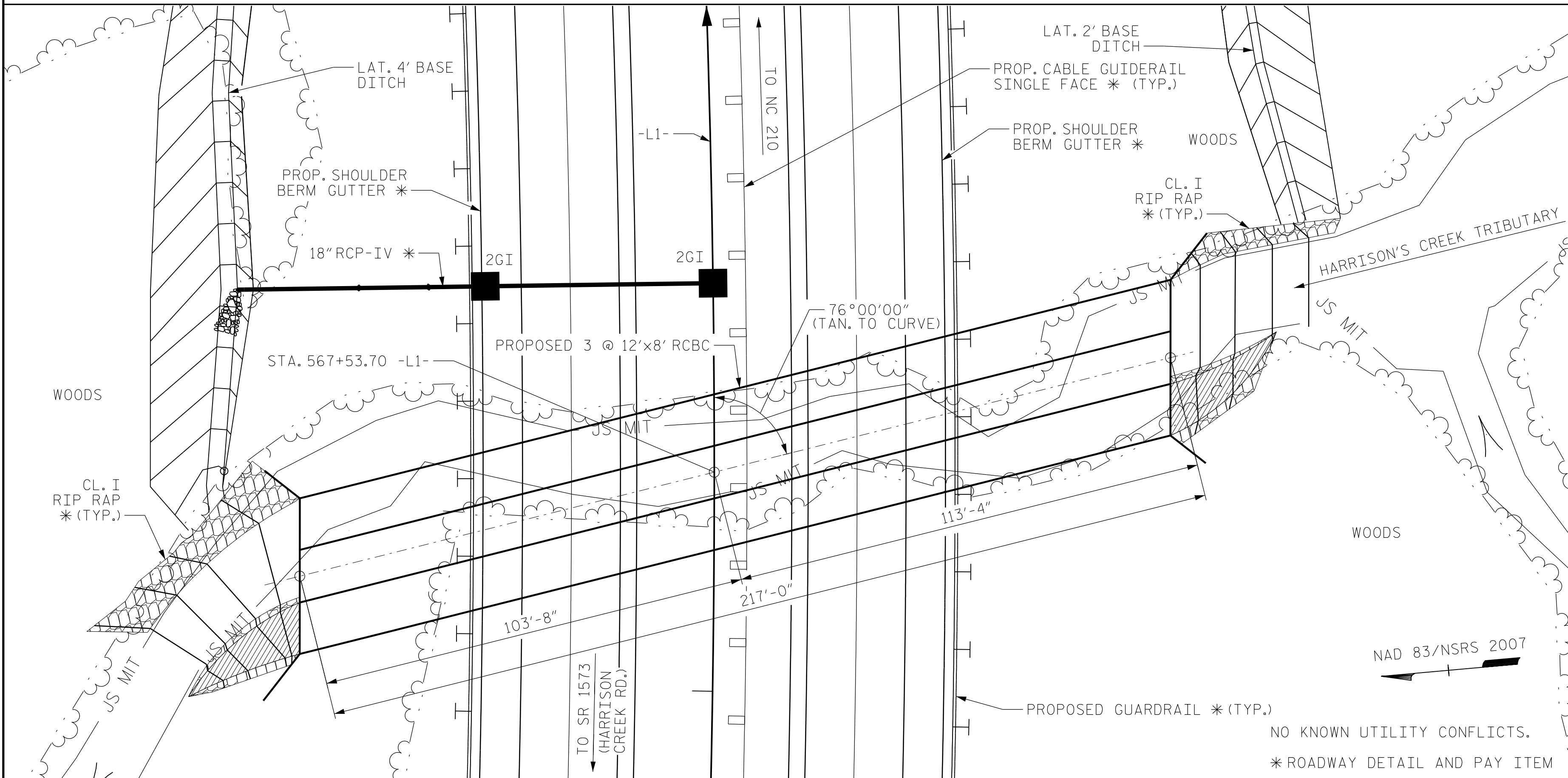
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR
CONCRETE BOX CULVERT

H= 8'-0" SLOPE= 3:1
139°46'38" SKEW

REVISIONS						SHEET NO. C06-06
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 07
2			4			

BM #19: RR SPIKE IN 19" POPLAR, STA. 569+38.88 -L1-, 391.00' LT. EL. 35.42



NOTES

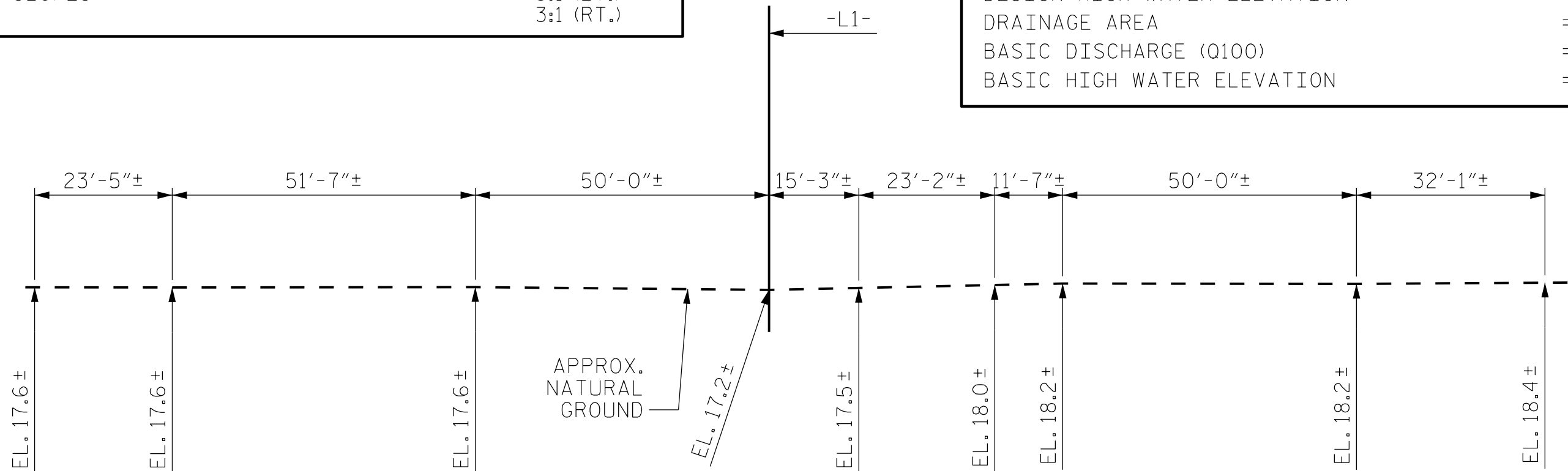
- ASSUMED LIVE LOAD = HL-93.
- DESIGN FILL= 17.03 FT. (MAXIMUM) 11.32 FT. (MINIMUM)
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:
1. WING FOOTINGS, CURTAIN WALLS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE 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.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- 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.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP-RAP MAY BE USED TO SUPPLEMENT THE NATIVE BED MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP-RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
- THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

ROADWAY DATA

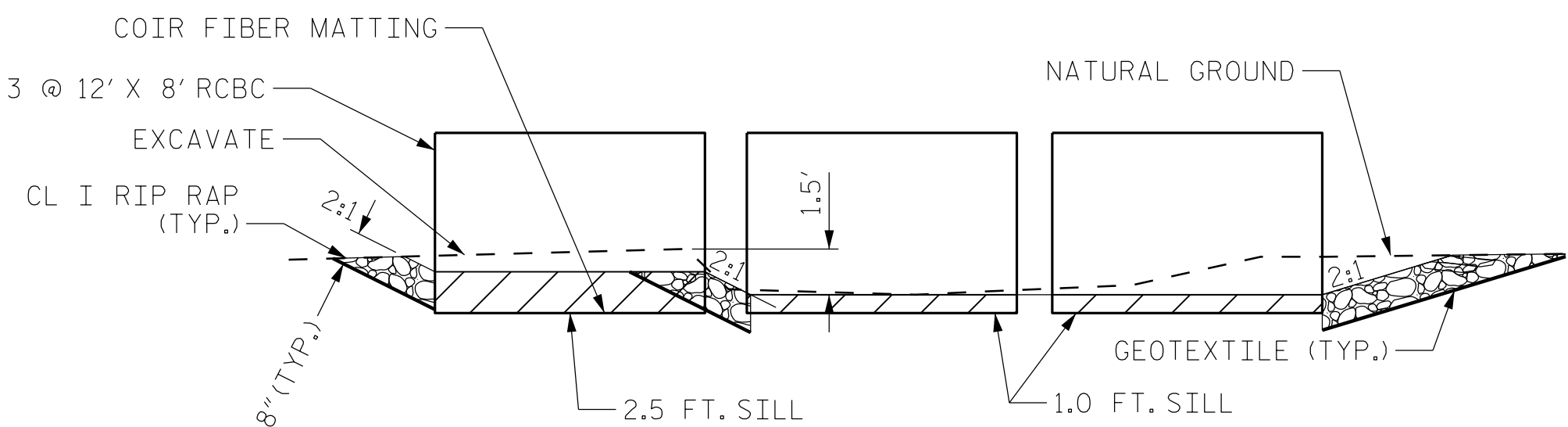
GRADE POINT EL. @ STATION 567+53.70 -L1- = 41.19
BED ELEV. @ STATION 567+53.70 -L1- = 16.84
ROADWAY SLOPES = 3:1 (LT.)
3:1 (RT.)

HYDRAULIC DATA

DESIGN DISCHARGE = 1120 C.F.S.
FREQUENCY OF DESIGN FLOOD = 50 YR.
DESIGN HIGH WATER ELEVATION = 23.9
DRAINAGE AREA = 2.55 SQ. MI.
BASIC DISCHARGE (Q100) = 1280 C.F.S.
BASIC HIGH WATER ELEVATION = 24.3



PROFILE ALONG CULVERT



OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 5100 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD = 500+ YRS.
OVERTOPPING FLOOD ELEVATION = 40.3
OVERTOPS ROADWAY AT STATION 565+73.22 -L1- SAG POINT

TOTAL STRUCTURE QUANTITIES

CULVERT EXCAVATION LUMP SUM
FOUNDATION COND. MATERIAL 1,306 TONS
FOUNDATION COND. GEOTEXTILE 1,029 S.Y.

CLASS A CONCRETE
BARREL @ 5.576 CY/FT 1,210.0 C.Y.
WINGS ETC. 50.3 C.Y.
TOTAL 1,260.3 C.Y.

REINFORCING STEEL
BARREL 213,755 LBS.
WINGS ETC. 2,916 LBS.
TOTAL 216,671 LBS.



Signed by: **Yong-Hy Su** 4/30/2025
F06540DEC1F2401
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-3300A

PENDER COUNTY

STATION: 567+53.70 -L1-

SHEET 1 OF 6 BRIDGE NO. 700277

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

76°00'00" SKEW

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



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 08/27/20
CHECKED BY : T. N. ENNIS DATE : 10/12/20

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25

(LOOKING DOWNSTREAM)
(NOT TO SCALE)

Diagram illustrating the layout of three boxes (BOX 1, BOX 2, BOX 3) with dimensions and labels:

- Overall width: 12'-0" (TYP.)
- Overall height: 8'-0" (TYP.)
- BOX 1 contains four labels: 1, 2, 3, and 4.
- BOX 2 and BOX 3 are empty.

(LOOKING DOWNSTREAM)

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25

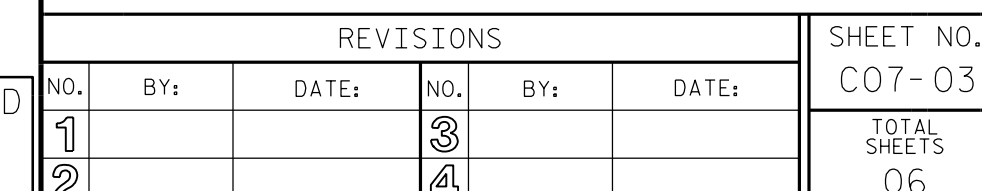
CONTROLLING LOAD RATING

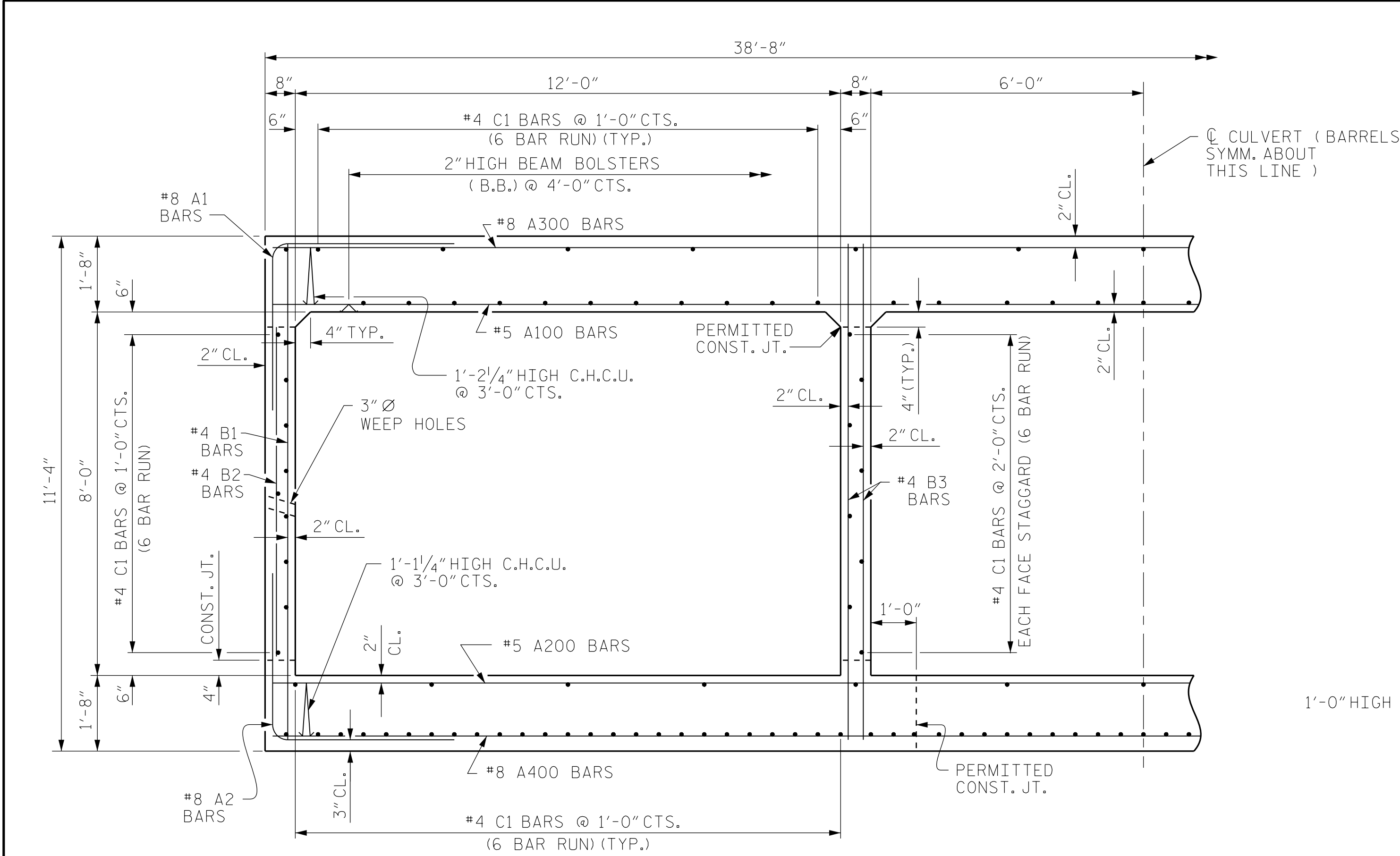
- 1 DESIGN LOAD RATING (HL-93)
- 2 DESIGN LOAD RATING (HS-20)
- 3 LEGAL LOAD RATING **
- 4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

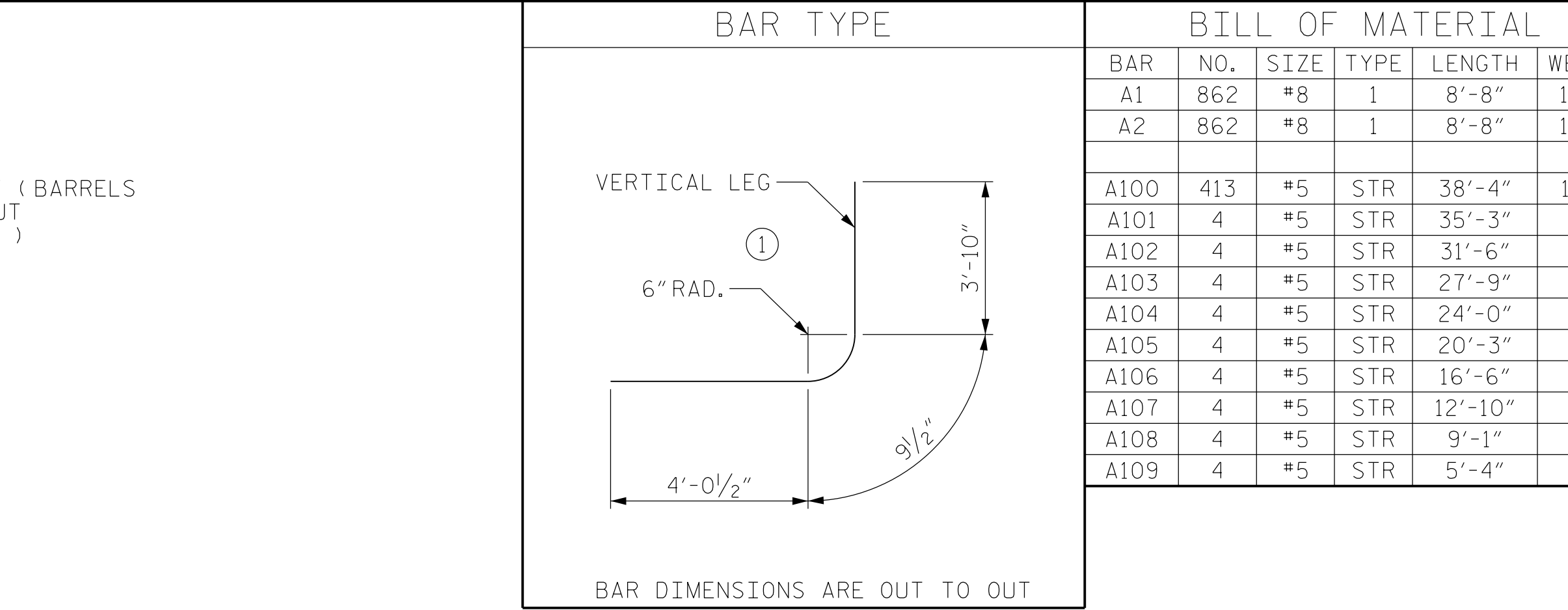
STD. NO. LRFR5





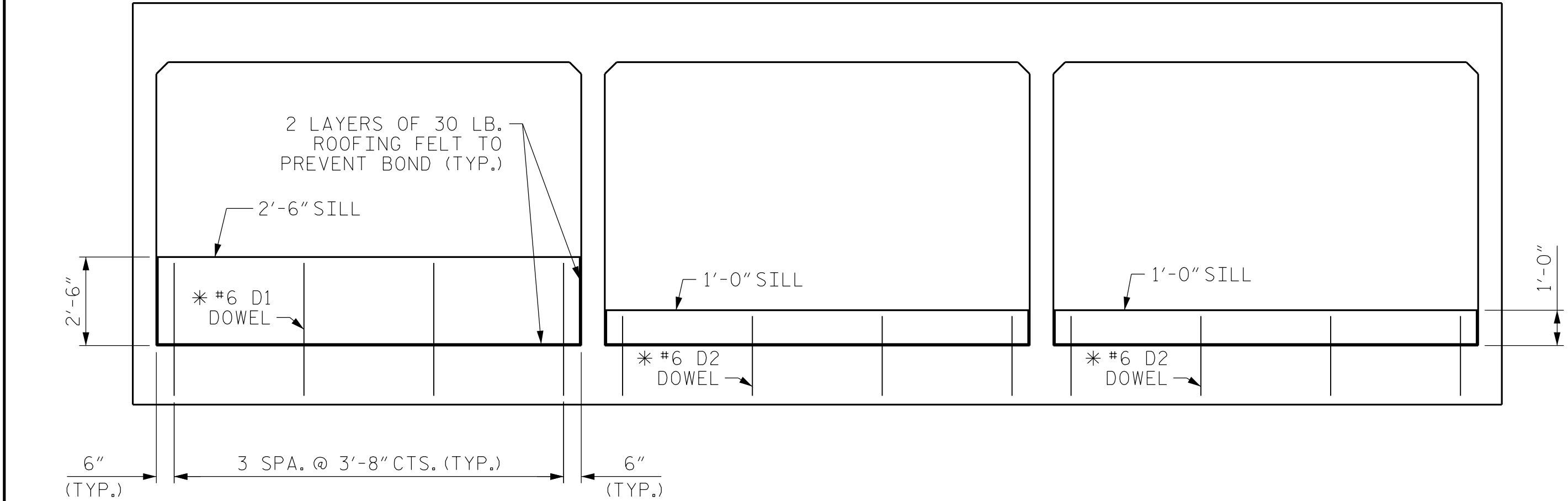
RIGHT ANGLE SECTION OF BARREL

THERE ARE 171 "C" BARS IN SECTION OF BARREL.
(BARS PLACED AS SHOWN)



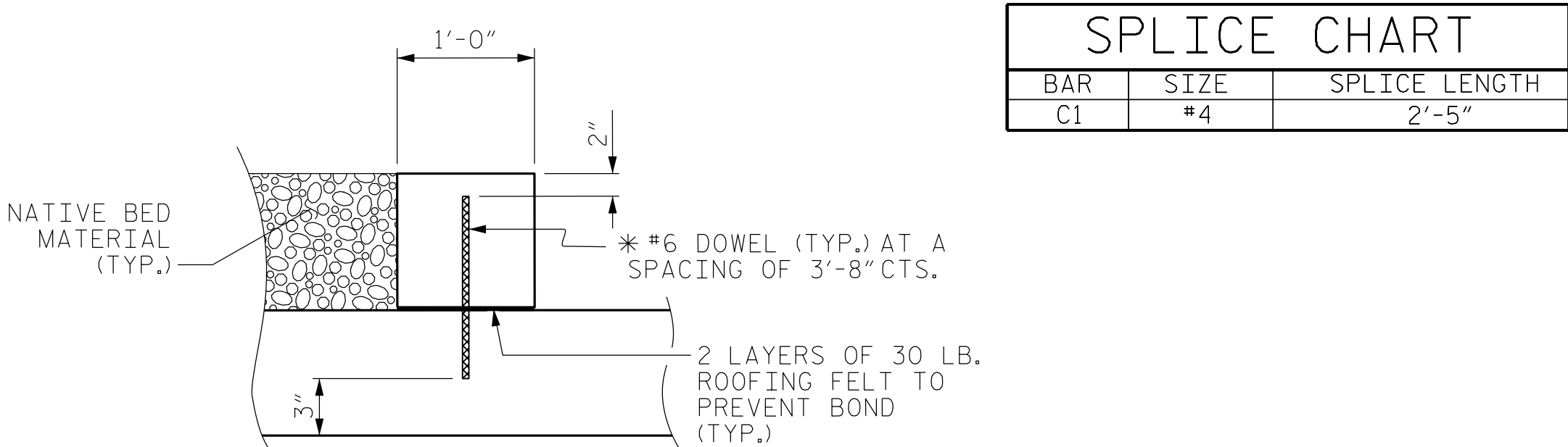
PLAN VIEW

SEE NOTES SHEET 1 OF 6 FOR BACKFILL INSTRUCTIONS.



ELEVATION

(LOOKING DOWNSTREAM)



SECTION THROUGH SILL

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE
AFTER SLAB HAS BEEN FLOAT FINISHED.

SPLICE CHART		
BAR	SIZE	SPLICE LENGTH
C1	#4	2'-5"

BILL OF MATERIAL						BILL OF MATERIAL (CONT.)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	862	#8	1	8'-8"	19947	A200	413	#5	STR	38'-4"	16512
A2	862	#8	1	8'-8"	19947	A201	4	#5	STR	35'-3"	147
						A202	4	#5	STR	31'-6"	131
A100	413	#5	STR	38'-4"	16512	A203	4	#5	STR	27'-9"	116
A101	4	#5	STR	35'-3"	147	A204	4	#5	STR	24'-0"	100
A102	4	#5	STR	31'-6"	131	A205	4	#5	STR	20'-3"	84
A103	4	#5	STR	27'-9"	116	A206	4	#5	STR	16'-6"	69
A104	4	#5	STR	24'-0"	100	A207	4	#5	STR	12'-10"	54
A105	4	#5	STR	20'-3"	84	A208	4	#5	STR	9'-1"	38
A106	4	#5	STR	16'-6"	69	A209	4	#5	STR	5'-4"	22
A107	4	#5	STR	12'-10"	54						
A108	4	#5	STR	9'-1"	38	A300	413	#8	STR	38'-4"	42271
A109	4	#5	STR	5'-4"	22	A301	4	#8	STR	35'-3"	376
						A302	4	#8	STR	31'-6"	336
						A303	4	#8	STR	27'-9"	296
						A304	4	#8	STR	24'-0"	256
						A305	4	#8	STR	20'-3"	216
						A306	4	#8	STR	16'-6"	176
						A307	4	#8	STR	12'-10"	137
						A308	4	#8	STR	9'-1"	97
						A309	4	#8	STR	5'-4"	57
						A400	413	#8	STR	38'-4"	42271
						A401	4	#8	STR	35'-3"	376
						A402	4	#8	STR	31'-6"	336
						A403	4	#8	STR	27'-9"	296
						A404	4	#8	STR	24'-0"	256
						A405	4	#8	STR	20'-3"	216
						A406	4	#8	STR	16'-6"	176
						A407	4	#8	STR	12'-10"	137
						A408	4	#8	STR	9'-1"	97
						A409	4	#8	STR	5'-4"	57
						B1	866	#4	STR	10'-11"	6315
						B2	866	#4	STR	7'-3"	4194
						B3	1732	#4	STR	10'-11"	12630
						C1	1026	#4	STR	38'-2"	26158
						D1	8	#6	STR	3'-9"	45
						D2	16	#6	STR	2'-3"	54
						G1	8	#4	STR	39'-8"	212
						S2	12	#8	STR	39'-8"	1271
						REINFORCING STEEL					213,755 LBS.

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 567+53.70 -L1-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

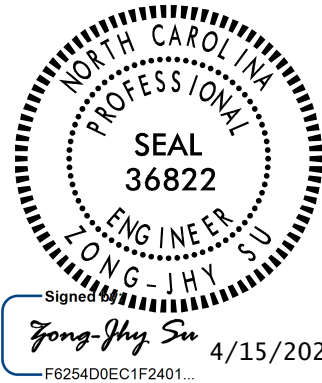
TRIPLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

76°00'00" SKEW

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			C07-04
2			4			TOTAL SHEETS 06

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 10/09/20
CHECKED BY : T. N. ENNIS DATE : 10/12/20

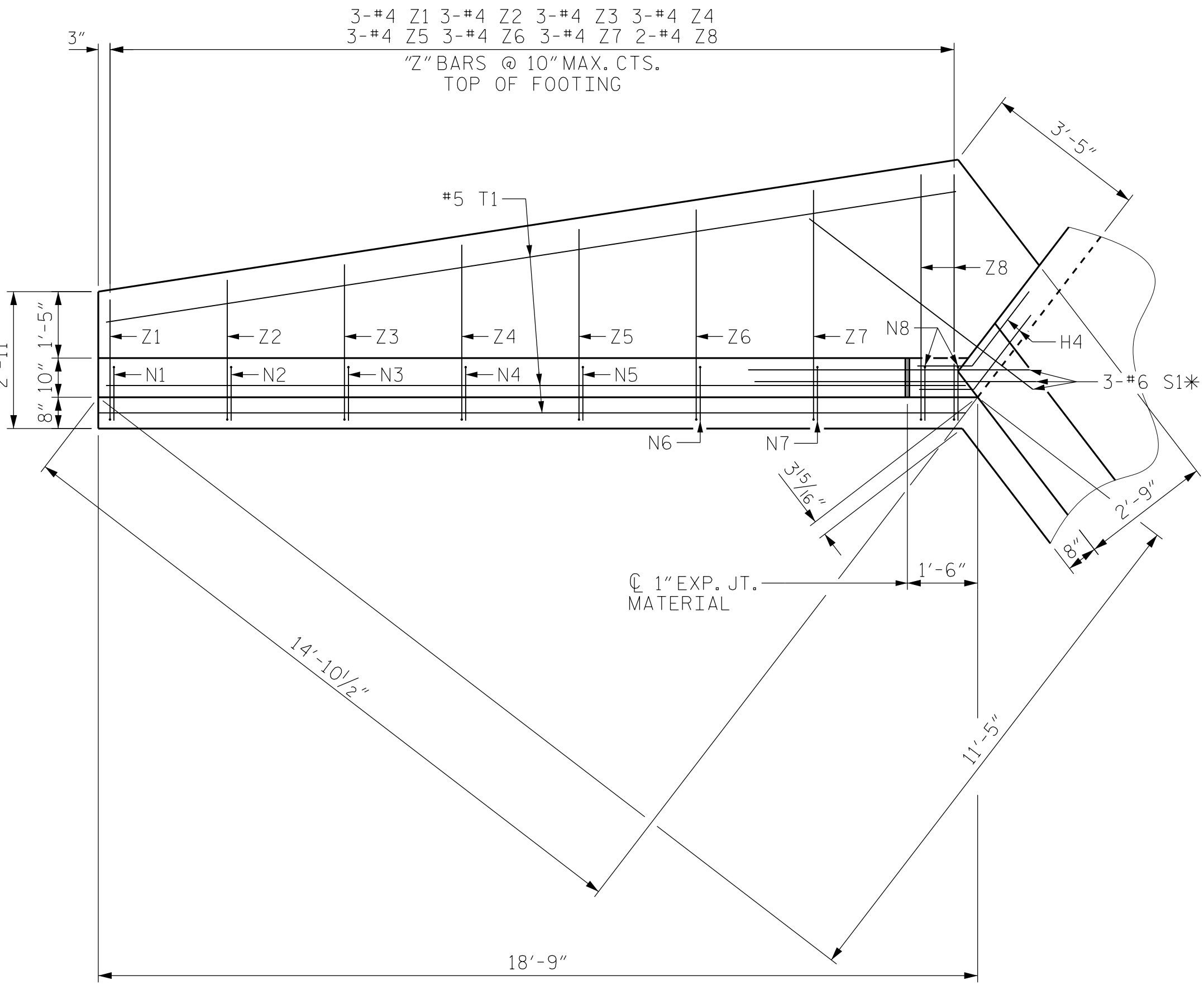
DESIGNED BY : Z.-J. SU DATE : 04/15/25
OF RECORD:

CULVERT SILL DETAILS

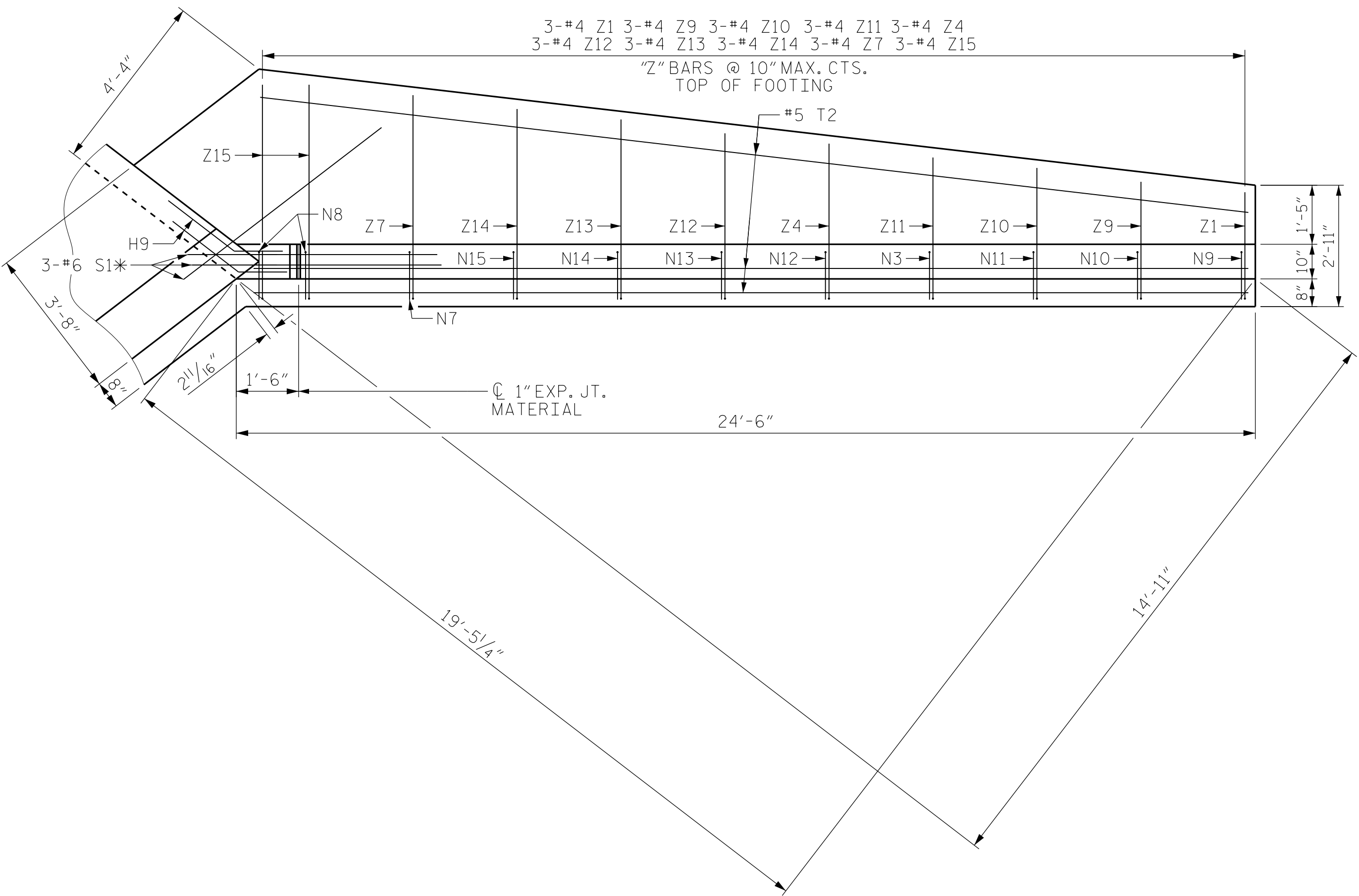
SEE PLAN VIEW FOR LOCATION OF SILLS

SEE SHEET 1 OF 6 FOR NOTES REGARDING
ADDITIONAL SILL/BACKFILL INFORMATION)

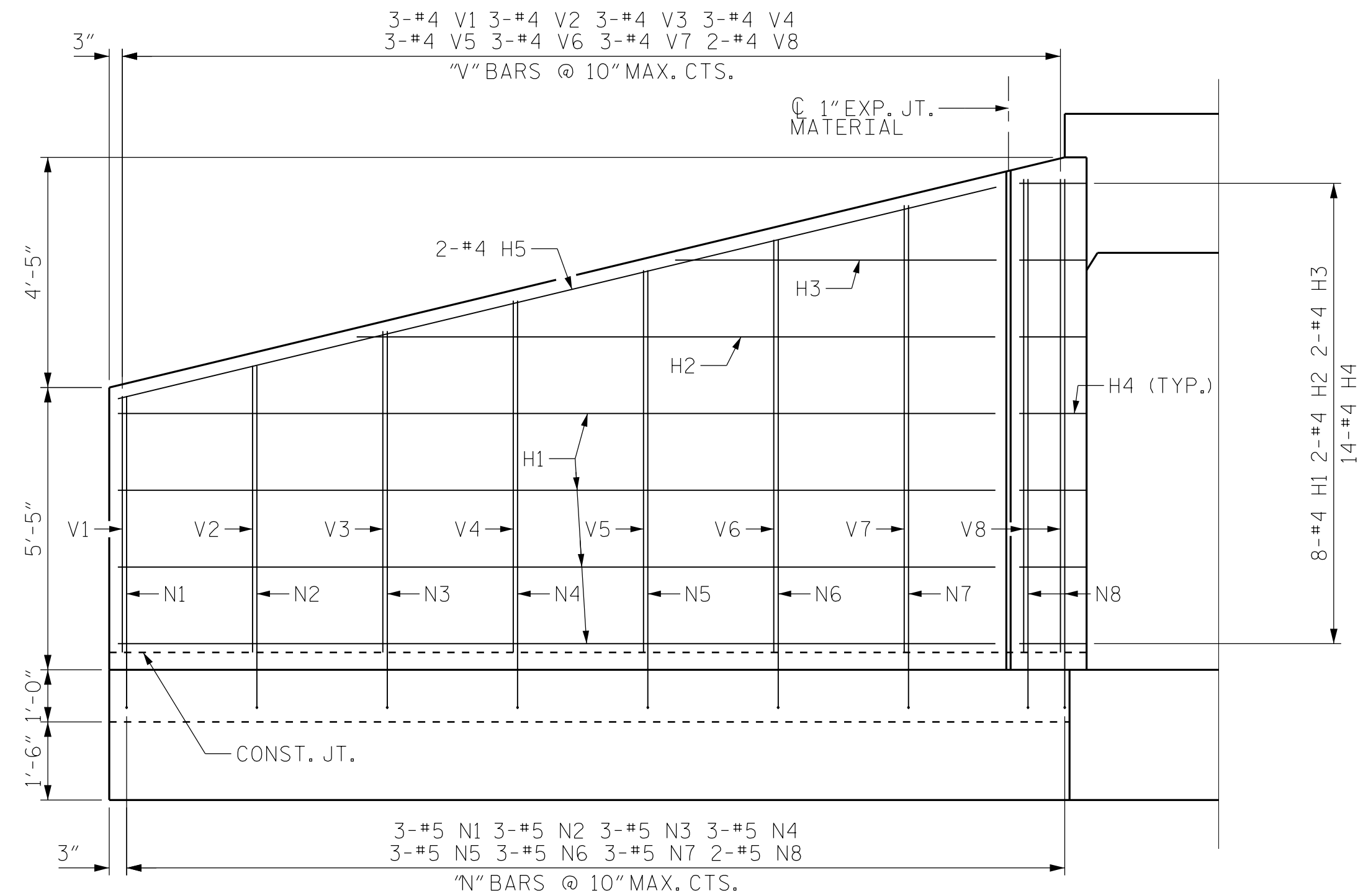
4/5/2025 3:44:35 PM ksu
U:\Structures\CT\Drafting\Final\VR3300A_SML\CU.05_700007.dgn



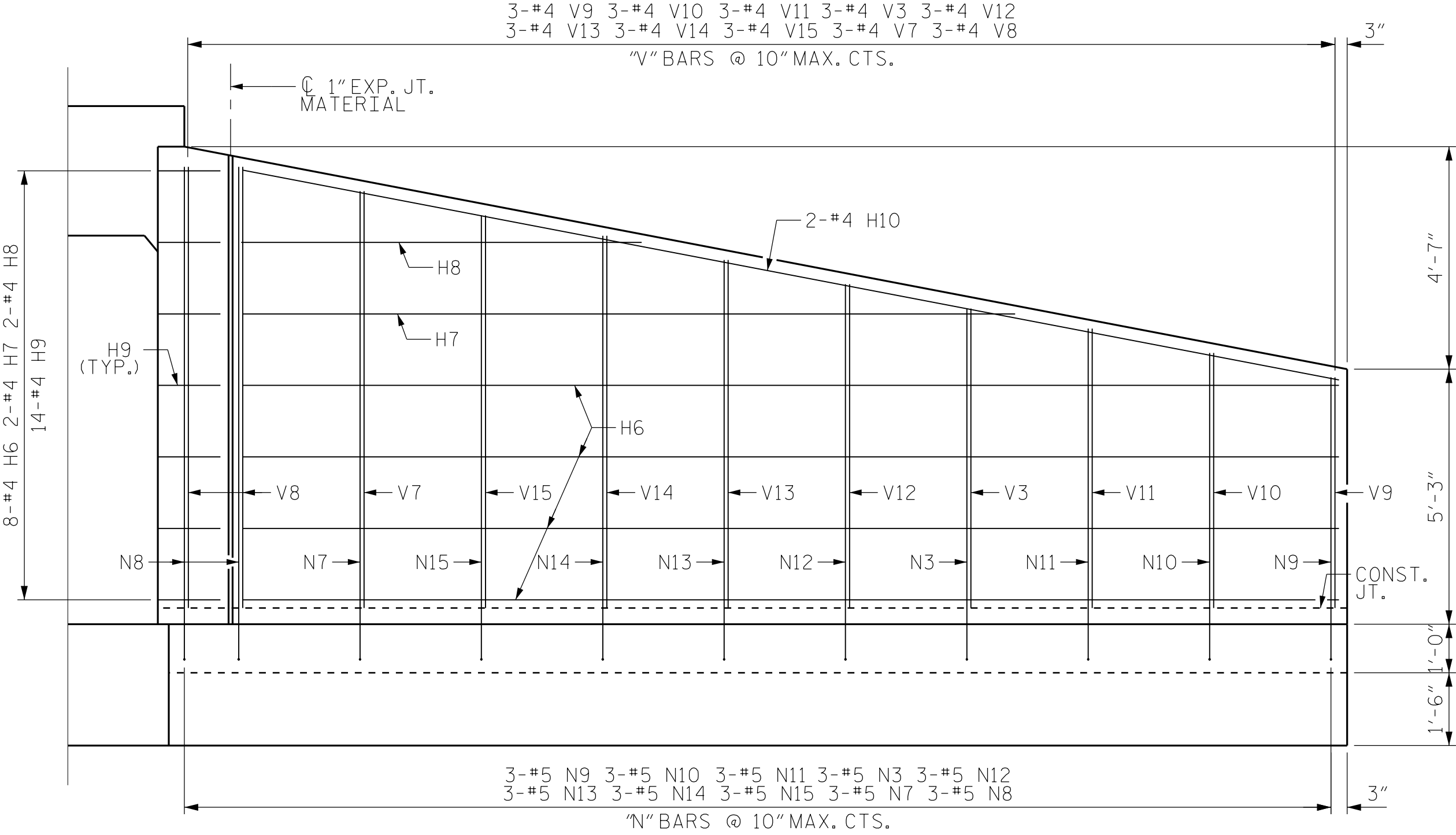
PLAN W1



PLAN W2



ELEVATION W1



ELEVATION W2

NOTES:
FOR "TYPICAL WING SECTION" AND REINFORCING
SCHEDULE, SEE SHEET 6 OF 6.
WEEP HOLES NOT SHOWN FOR CLARITY.

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 567+53.70 -L1-

SHEET 5 OF 6



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

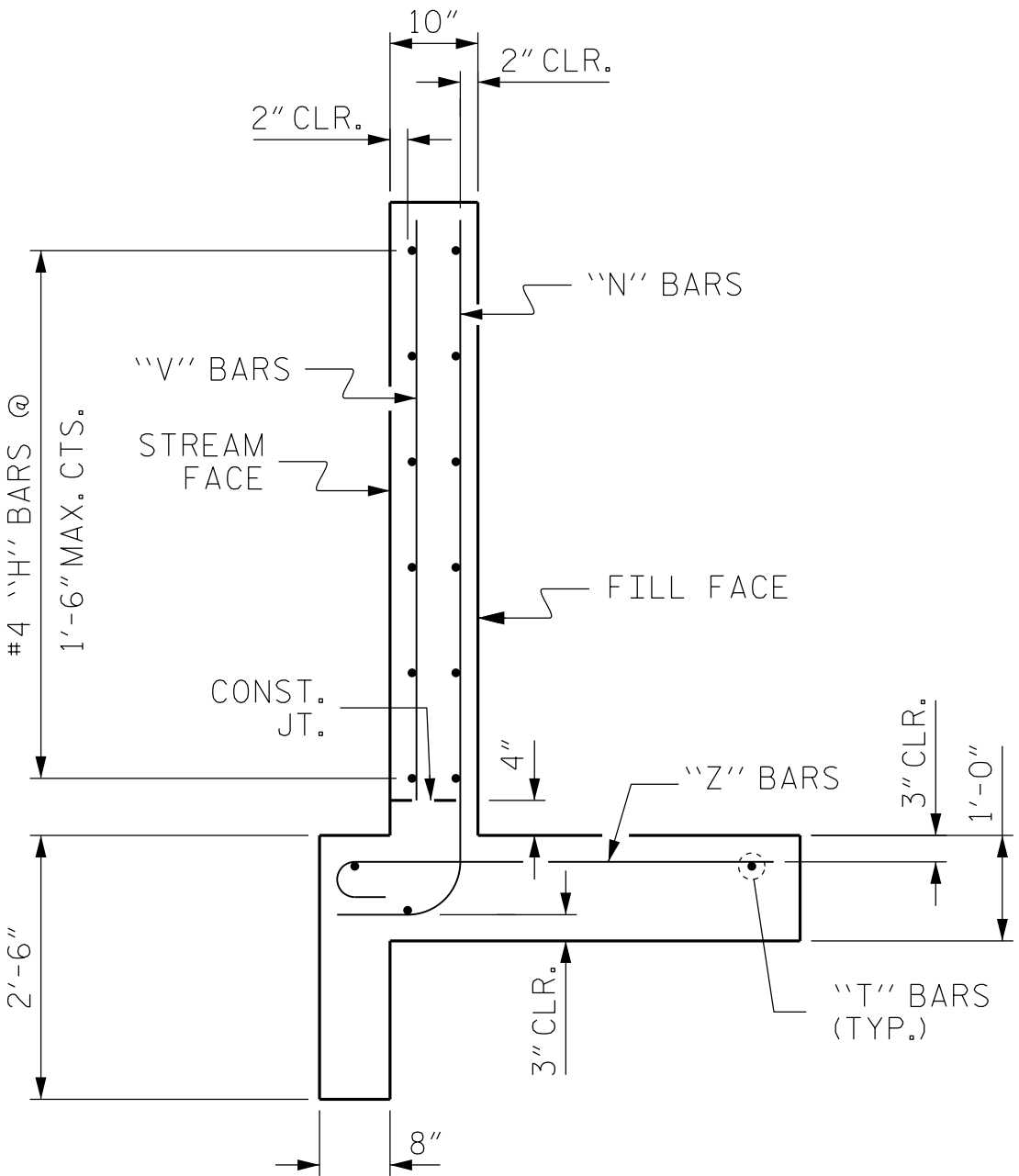
DRAWN BY : J. HAGENBUSH DATE : 10/09/20
CHECKED BY : T. N. ENNIS DATE : 10/12/20

DESIGN
ENGINEER
OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WINGS FOR CONCRETE BOX CULVERT					
H = 8'-0" SLOPE = 3:1 76°00'00" SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C07-05					TOTAL SHEETS 06



TYPICAL WING SECTION

BAR TYPES

1

2

3

4

ALL BAR DIMENSIONS ARE OUT TO OUT.

CLASS A CONCRETE

4 WINGS37.9 CY

2 HEADWALLS3.7 CY

2 END CURTAIN WALLS4.7 CY

6 SILLS4.0 CY

TOTAL50.3 CY

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	16'-10"	180
H2	4	#4	STR	12'-3"	33
H3	4	#4	STR	6'-2"	16
H4	28	#4	1	3'-2"	59
H5	4	#4	STR	17'-4"	46
H6	16	#4	STR	22'-7"	241
H7	4	#4	STR	15'-11"	43
H8	4	#4	STR	8'-3"	22
H9	28	#4	2	3'-2"	59
H10	4	#4	STR	23'-0"	61

BILL OF MATERIAL (CONT.)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
N1	6	#5	3	6'-11"	43
N2	6	#5	3	7'-6"	47
N3	12	#5	3	8'-2"	102
N4	6	#5	3	8'-9"	55
N5	6	#5	3	9'-4"	58
N6	6	#5	3	9'-11"	62
N7	12	#5	3	10'-7"	132
N8	10	#5	3	11'-1"	116
N9	6	#5	3	6'-9"	42
N10	6	#5	3	7'-3"	45
N11	6	#5	3	7'-9"	48
N12	6	#5	3	8'-8"	54
N13	6	#5	3	9'-2"	57
N14	6	#5	3	9'-8"	60
N15	6	#5	3	10'-1"	63

S1

12

#6

STR

6'-0"

108

T1

6

#5

STR

18'-4"

115

T2

6

#5

STR

23'-11"

150

V1

6

#4

STR

4'-11"

20

V2

6

#4

STR

5'-6"

22

V3

12

#4

STR

6'-2"

49

V4

6

#4

STR

6'-9"

27

V5

6

#4

STR

7'-4"

29

V6

6

#4

STR

7'-11"

32

V7

12

#4

STR

8'-7"

69

V8

10

#4

STR

9'-1"

61

V9

6

#4

STR

4'-9"

19

V10

6

#4

STR

5'-3"

21

V11

6

#4

STR

5'-9"

23

V12

6

#4

STR

6'-8"

27

V13

6

#4

STR

7'-2"

29

V14

6

#4

STR

7'-8"

31

V15

6

#4

STR

8'-1"

32

Z1

12

#4

4

3'-1"

25

Z2

6

#4

4

3'-6"

14

Z3

6

#4

4

3'-10"

15

Z4

12

#4

4

4'-3"

34

Z5

6

#4

4

4'-7"

18

Z6

6

#4

4

5'-0"

20

Z7

12

#4

4

5'-5"

43

Z8

4

#4

4

5'-9"

15

Z9

6

#4

4

3'-4"

13

Z10

6

#4

4

3'-8"

15

Z11

6

#4

4

3'-11"

16

Z12

6

#4

4

4'-6"

18

Z13

6

#4

4

4'-10"

19

Z14

6

#4

4

5'-1"

20

Z15

6

#4

4

5'-8"

23

REINF. STEEL FOR 4 WINGS2,916 LBS.

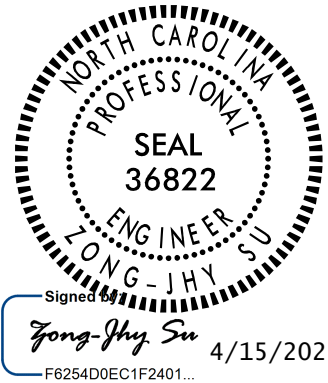
4/5/2025 3:44:43 PM ksu U:\Structures\CT\Drafting\Final\N33004_SML_CU_06_700007.dgn



Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-8866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. HAGENBUSH DATE : 10/09/20
CHECKED BY : T. N. ENNIS DATE : 10/12/20

DESIGN ENGINEER OF RECORD: Z.-J. SU DATE : 04/15/25



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. R-3300A
PENDER COUNTY
STATION: 567+53.70 -L1-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR
CONCRETE BOX CULVERT

H = 8'-0" SLOPE = 3:1
76°00'00" SKEW

REVISIONS						SHEET NO. C07-06
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 06
2			4			