

NOTES

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 1.11' MIN. FILL AND 2.89' MAX. FILL.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTES SHEET.
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN EACH STAGE TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- 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 SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

- FOR TRAFFIC PHASING, SEE TRAFFIC CONTROL PLANS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

DOWELS SHALL BE USED TO CONNECT THE STAGE II TO STAGE I. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

FOR BOX CULVERT EXCAVATION, SEE SECTION 414 OF THE STANDARD SPECIFICATIONS.

THE REINFORCED CONCRETE BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FOOT BLANKET OF FOUNDATION CONDITIONING MATERIAL.

UNDERCUT SOFT/VERY LOOSE SOILS IF ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL, BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL. IF MORE THAN 1 FT UNDERCUT IS REQUIRED, CONTACT THE OPERATIONS ENGINEER FOR APPROVAL.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE STANDARD SPECIFICATIONS ARTICLE 410-9.

ROADWAY DATA

GRADE POINT ELEV. @ STA. 12+93.03 -L- = 1070.77'
 BED ELEV. @ STA. 12+93.03 -L- = 1060.0'
 ROADWAY SLOPES = VARIES

HYDRAULIC DATA

DESIGN DISCHARGE = 320 CFS
 FREQUENCY OF DESIGN FLOOD = 50 YRS
 DESIGN HIGH WATER ELEVATION = 1068.5'
 DRAINAGE AREA = 0.33 SQ. MI.
 BASIC DISCHARGE (Q100) = 350 CFS
 BASIC HIGH WATER ELEVATION = 1068.9'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = N/A
 FREQUENCY OF OVERTOPPING FLOOD = >500+ YRS
 OVERTOPPING FLOOD ELEVATION = 1069.9 *

* NATURAL GROUND @ STA. 12+19 -L- RT.

TOTAL STRUCTURE QUANTITIES

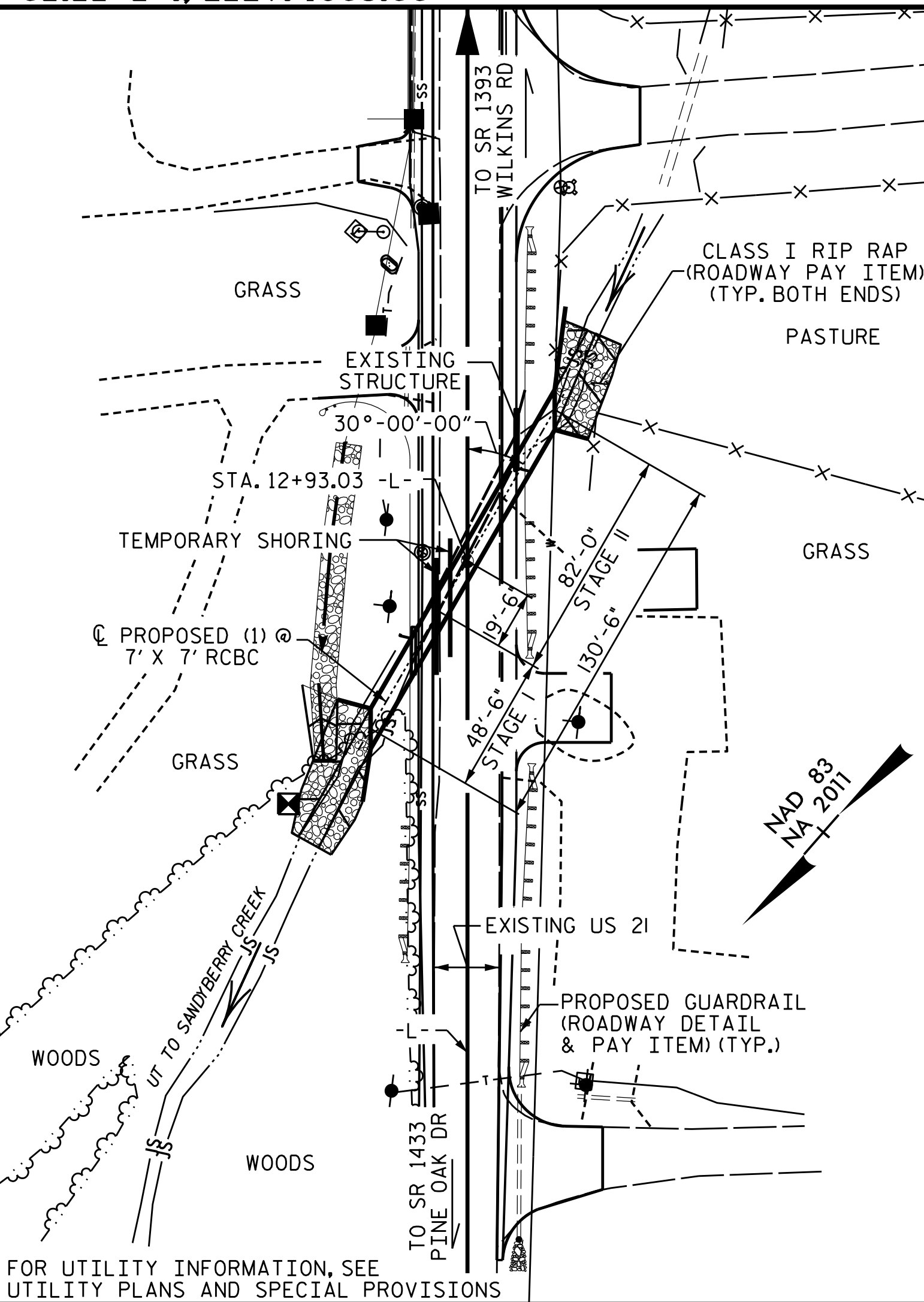
CLASS A CONCRETE		REINFORCING STEEL		FOUNDATION COND. MAT'L.	
STAGE I	67.1 C.Y.	STAGE I	7,353 LBS.	STAGE I	42 TONS
STAGE II	95.4 C.Y.	STAGE II	10,150 LBS.	STAGE II	71 TONS
TOTAL	162.5 C.Y.	TOTAL	17,503 LBS.	TOTAL	113 TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	CULVERT EXCAVATION	LUMP SUM		

SAMPLE BAR REPLACEMENT

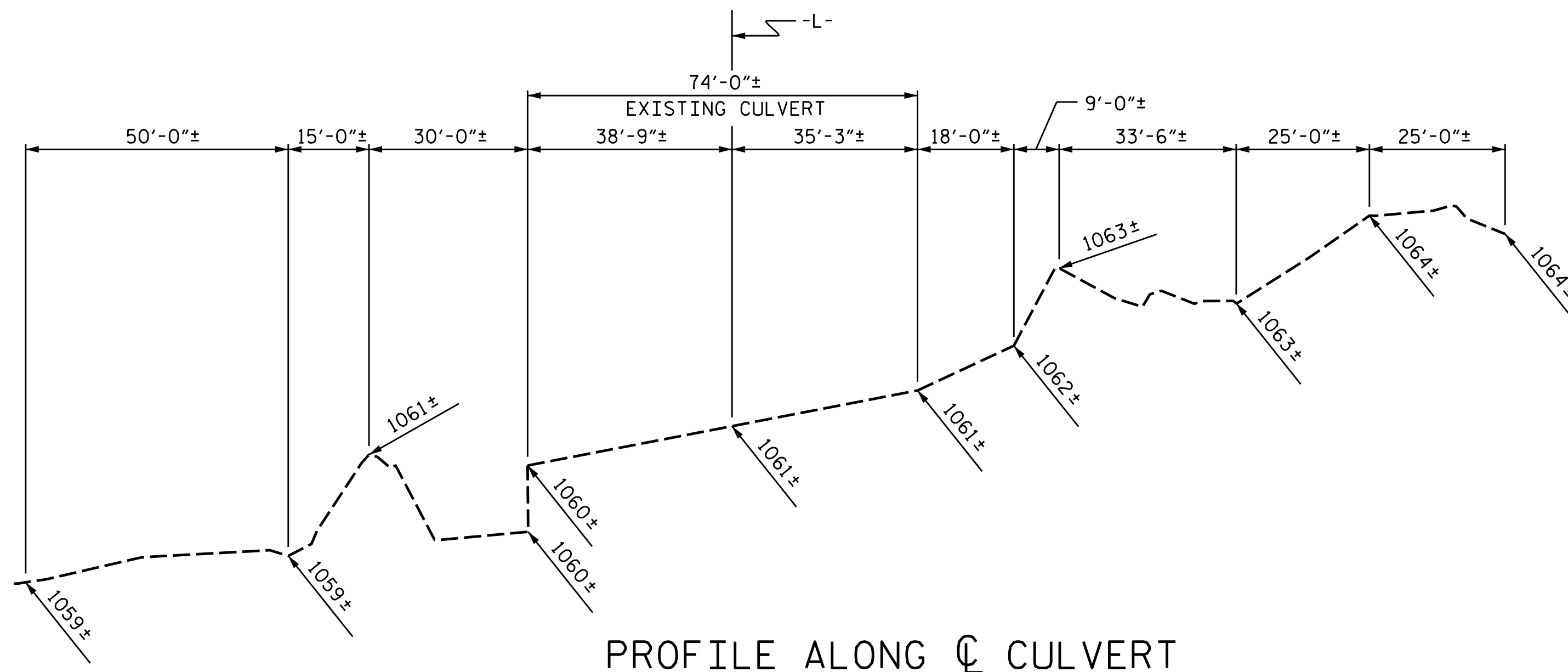
SIZE	LENGTH	SIZE	LENGTH
#3	6'-2"	#8	12'-0"
#4	7'-4"	#9	13'-2"
#5	8'-6"	#10	14'-6"
#6	9'-8"	#11	15'-10"
#7	10'-10"		

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

BENCH MARK #1:
 RR SPIKE SET IN 15" LOCUST; STA. 12+08.58 -L-;
 62.22' LT.; ELEV. 1063.66



LOCATION SKETCH



PROFILE ALONG CULVERT

DRAWN BY: ZCS DATE: 10/21
 CHECKED BY: MGC DATE: 3/22
 DESIGN ENGINEER OF RECORD: ZCS DATE: 3/22

PROJECT NO. B-5833
 YADKIN COUNTY
 STATION: 12+93.03 -L-

SHEET 1 OF 9 REPLACES CULVERT #982099

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
 706 HILLSBOROUGH STREET
 SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 7 FT. X 7 FT.
 CONCRETE BOX CULVERT
 30°-00'-00" SKEW

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (γ _L)	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	1.42	--	1.75	1.66	1	BOTT. SLAB	4.17	1.42	1	TOP SLAB	1.00		
	HL-93 (OPERATING)	N/A		1.84	--	1.35	2.15	1	BOTT. SLAB	4.17	1.84	1	TOP SLAB	1.00		
	HS-20 (INVENTORY)	36.000	2	1.31	47.16	1.75	1.64	1	TOP SLAB	4.17	1.31	1	TOP SLAB	1.00		
	HS-20 (OPERATING)	36.000		1.70	61.20	1.35	2.12	1	TOP SLAB	4.17	1.70	1	TOP SLAB	1.00		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		3.05	41.18	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00		
		SNGARBS2	20.000		2.77	55.40	1.40	2.98	1	TOP SLAB	4.17	2.77	1	TOP SLAB	1.00	
		SNAGRIS2	22.000		3.05	67.10	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00	
		SNCOTTS3	27.250	3	1.79	48.78	1.40	2.07	1	BOTT. SLAB	4.17	1.79	1	BOTT. SLAB	1.00	
		SNAGGRS4	34.925		2.52	88.01	1.40	2.73	1	BOTT. SLAB	4.17	2.52	1	BOTT. SLAB	1.00	
		SNS5A	35.550		2.23	79.28	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		SNS6A	39.950		2.23	89.09	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
	SNS7B	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.05	100.65	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00	
		TNT4A	33.075		2.23	73.76	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT6A	41.600		2.23	92.77	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT7A	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT7B	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNAGRIT4	43.000		2.23	95.89	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
TNAGT5A		45.000		2.23	100.35	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00		
TNAGT5B	45.000		2.23	100.35	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00			
EMERGENCY VEHICLE (EV)	EV2	28.750		1.83	52.61	1.30	2.25	1	TOP SLAB	4.17	1.83	1	TOP SLAB	1.00		
	EV3	43.000	4	1.48	63.64	1.30	1.80	1	BOTT. SLAB	4.17	1.48	1	BOTT. SLAB	1.00		

LOAD FACTORS

DESIGN LOAD RATING FACTORS

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

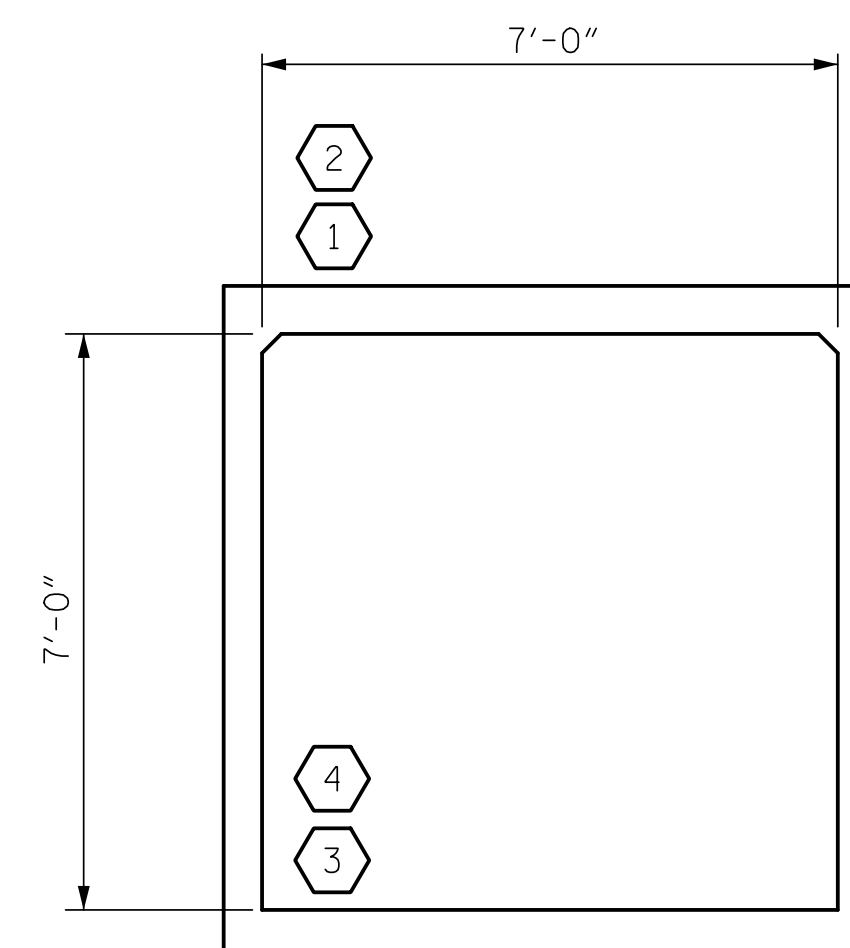
NOTE

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS

- 1.
- 2.
- 3.
- 4.

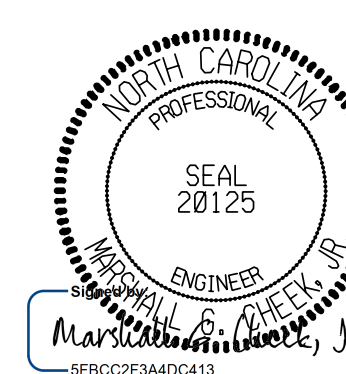
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY

PROJECT NO. B-5833
YADKIN COUNTY
 STATION: 12+93.03 -L-

SHEET 2 OF 9



11/20/2025

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

ASSEMBLED BY : ZCS	DATE : 7/23
CHECKED BY : MGC	DATE : 7/23
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/1/11	MAA/THC
REV. 04/23	BRB/AAI

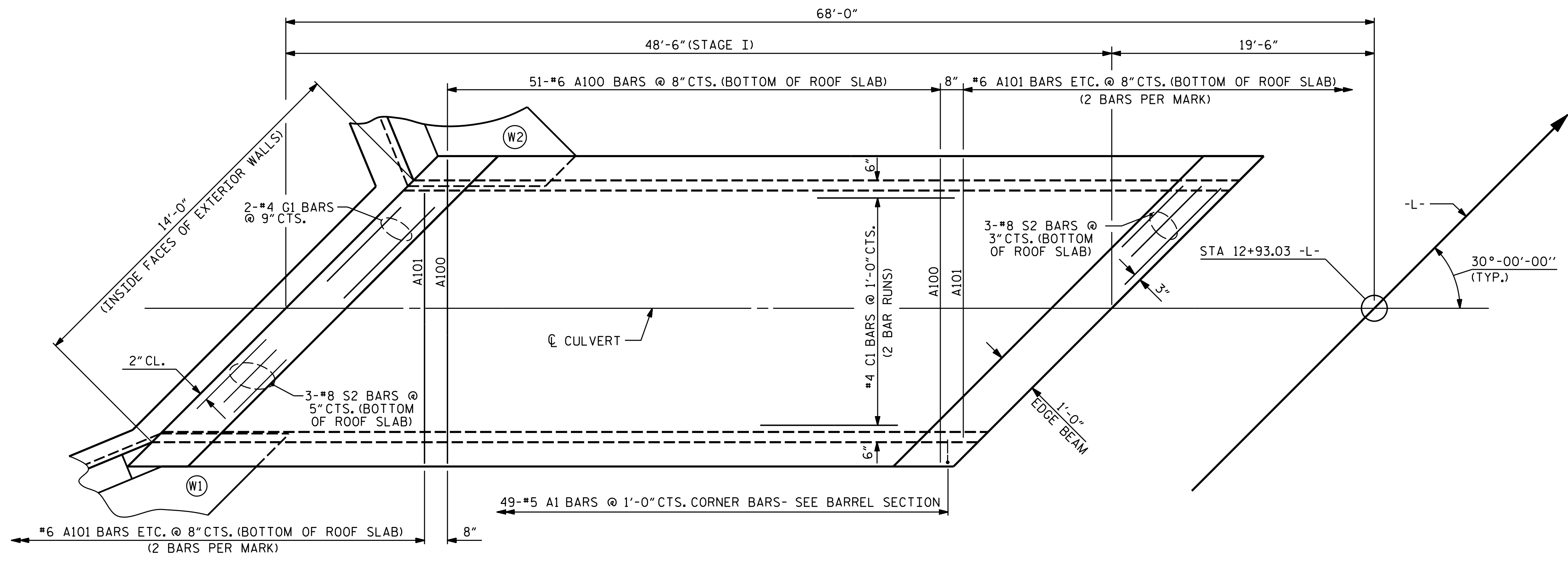
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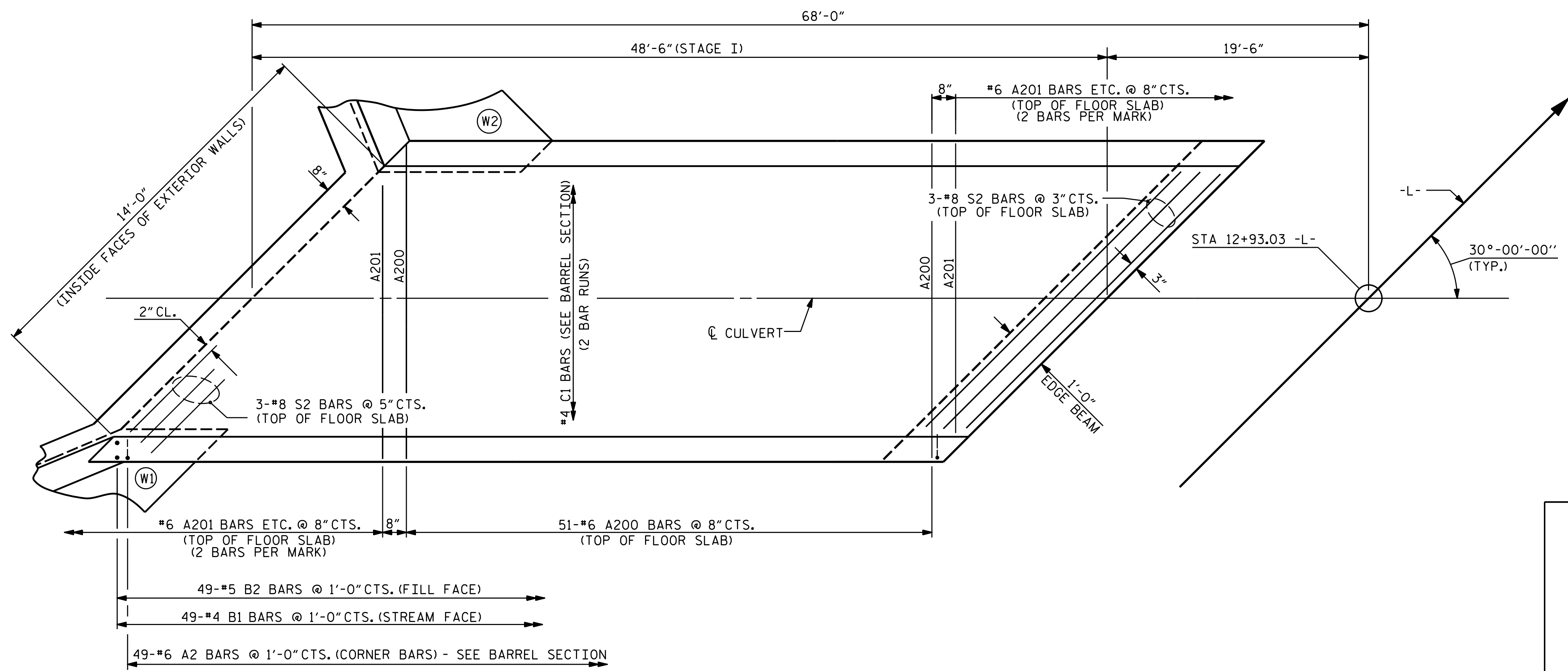
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STD. NO. LRFR5



PLAN - ROOF SLAB

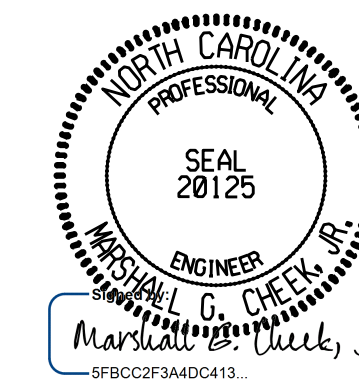


PLAN - FLOOR SLAB

FOR S1 BARS IN FLOOR SLAB & WING FOOTING, SEE WING SHEETS.

PROJECT NO. B-5833
YADKIN COUNTY
 STATION: 12+93.03 -L-

SHEET 3 OF 9



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 7 FT. X 7 FT.
 CONCRETE BOX CULVERT
 30° SKEW
 STAGE I

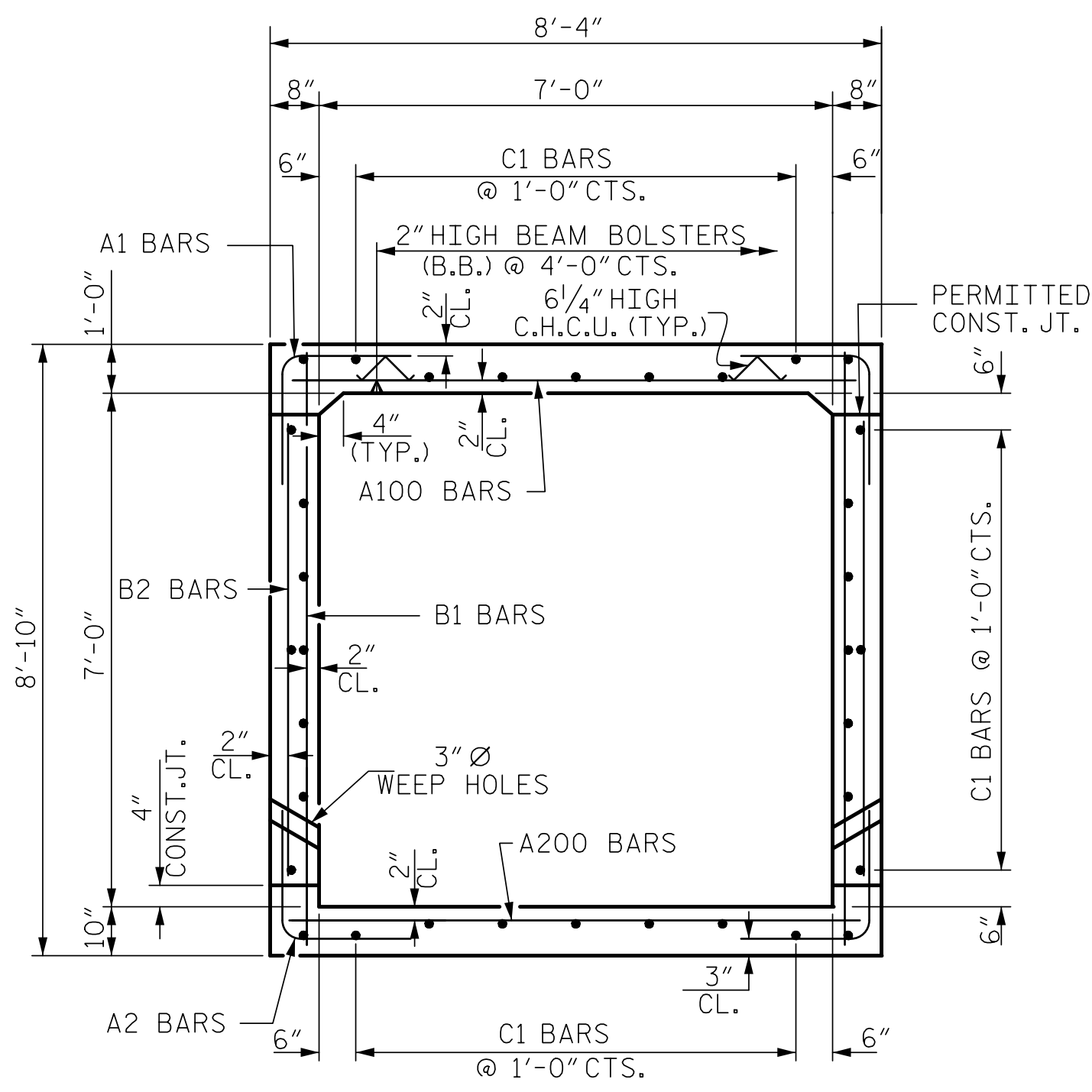
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ASSEMBLED BY : ZCS DATE : 11/21
 CHECKED BY : MGC DATE : 3/22

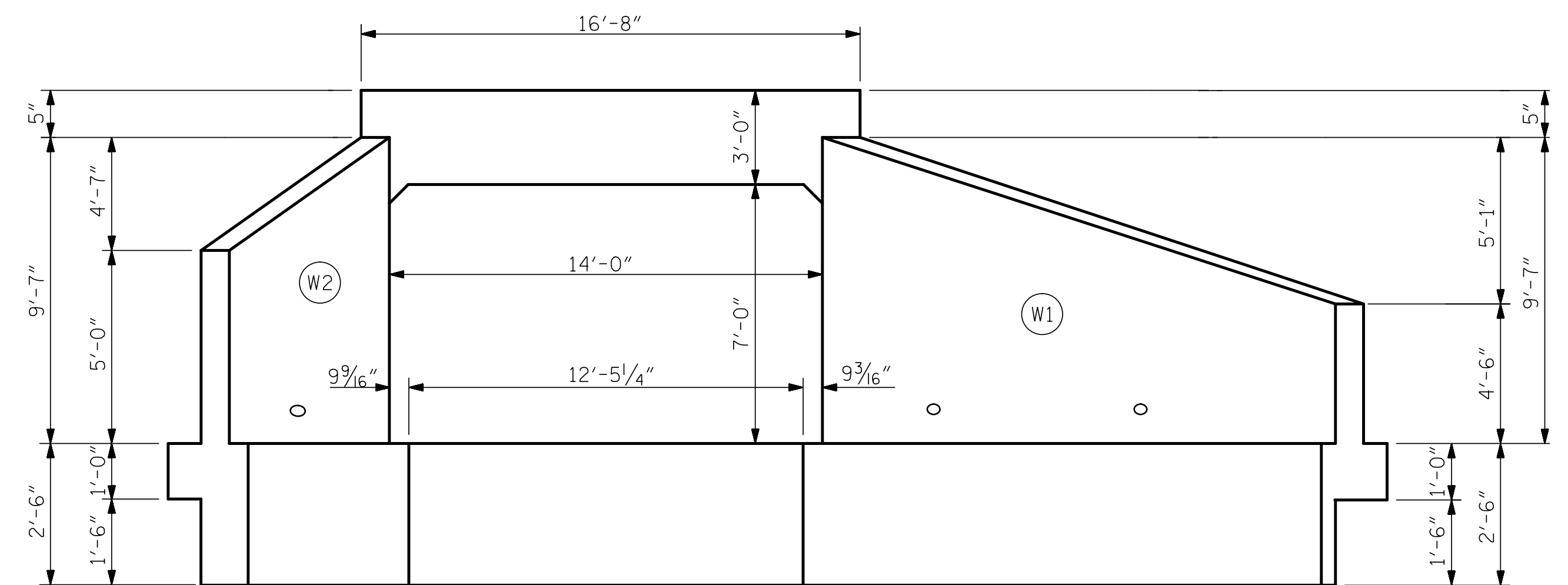
11/17/2025
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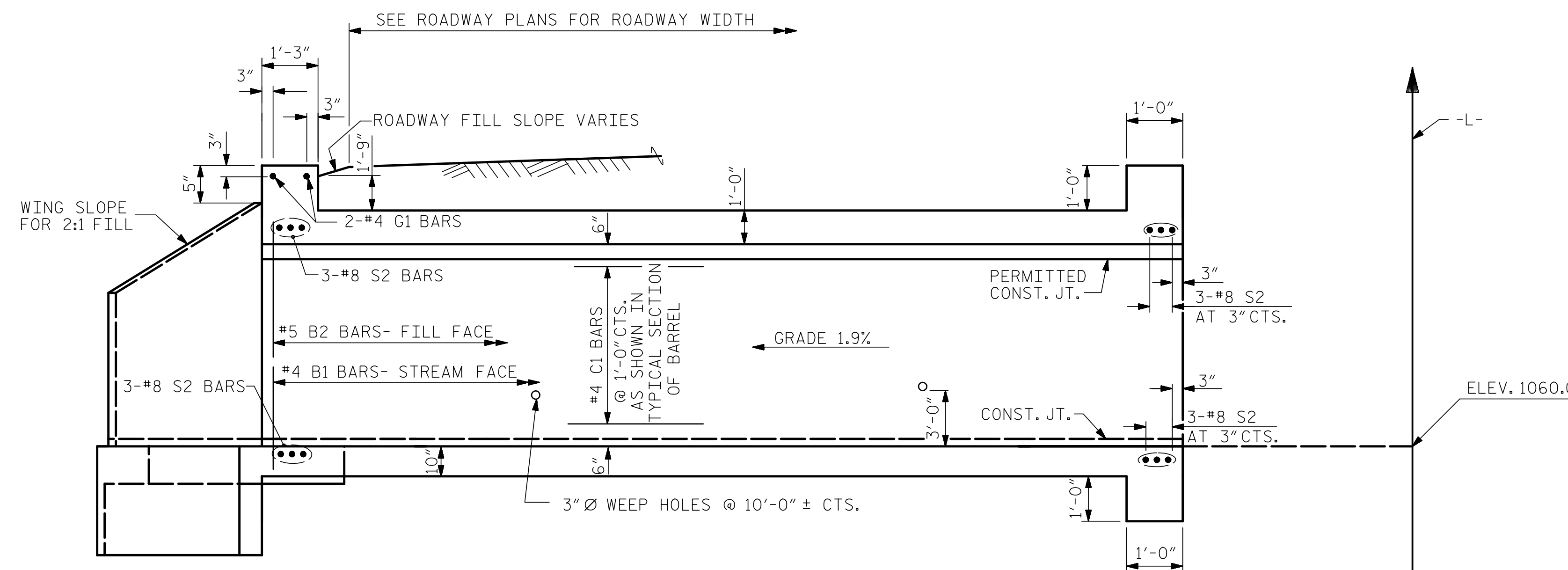
RIGHT ANGLE SECTION OF BARREL
THERE ARE 34 "C" BARS IN SECTION OF BARREL

STAGE I QUANTITIES			
CLASS A CONCRETE			
BARREL @	0.92	CY/FT	44.6 C.Y.
WINGS, ETC.			20.8 C.Y.
EDGE BEAMS			1.2 C.Y.
SILLS			0.5 C.Y.
TOTAL			67.1 C.Y.
REINFORCING STEEL			
BARREL & SILLS			6,152 LBS.
WINGS, ETC.			1,201 LBS.
TOTAL			7,353 LBS.
CULVERT EXCAVATION		LUMP SUM	
FOUNDATION COND. MAT'L.		42 TONS	

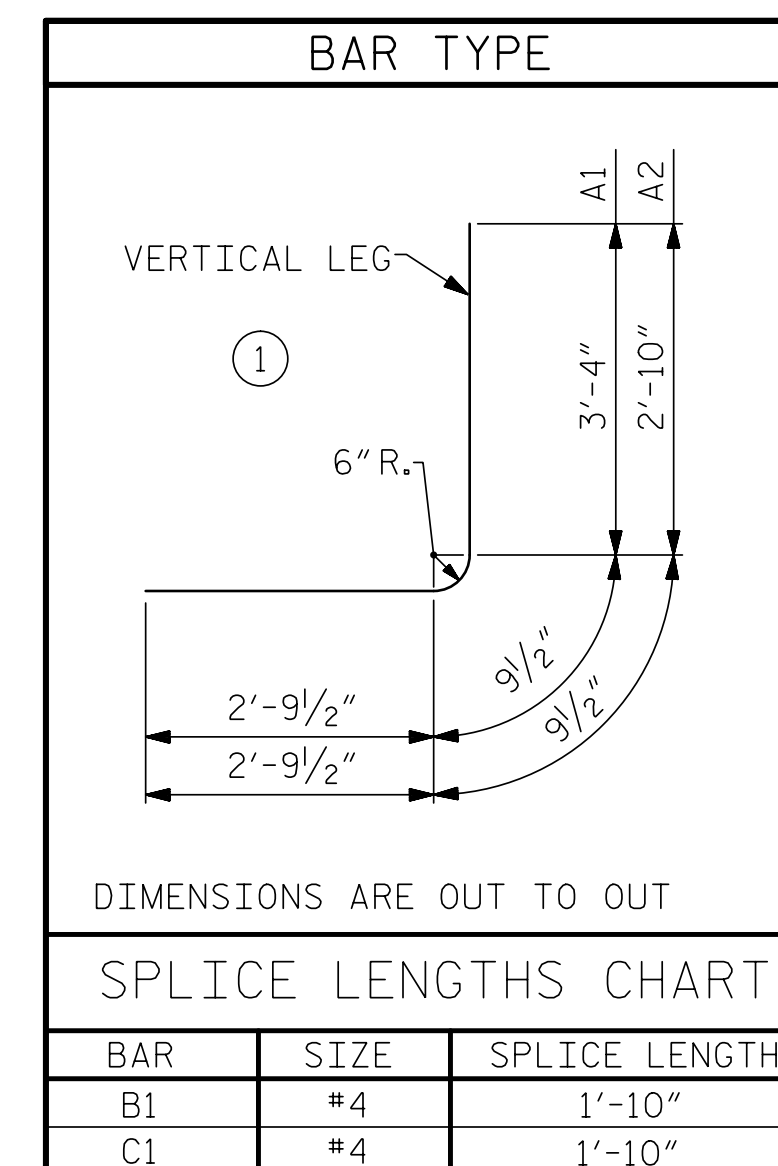
STAGE I BAR SCHEDULE											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	51	#6	STR	7'-11"	606	A1	98	#5	1	6'-11"	707
A101	4	#6	STR	7'-4"	44	A2	98	#6	1	6'-5"	945
A102	4	#6	STR	6'-6"	39						
A103	4	#6	STR	5'-9"	35	B1	98	#4	STR	8'-4"	546
A104	4	#6	STR	5'-0"	30	B2	98	#5	STR	6'-4"	647
A105	4	#6	STR	4'-3"	26						
A106	4	#6	STR	3'-5"	21	C1	68	#4	STR	25'-0"	1136
A107	4	#6	STR	2'-8"	16						
A200	51	#6	STR	7'-11"	606	S2	12	#8	STR	15'-10"	507
A201	4	#6	STR	7'-4"	44	G1	2	#4	STR	15'-10"	21
A202	4	#6	STR	6'-6"	39						
A203	4	#6	STR	5'-9"	35	D2	4	#6	STR	1'-5"	9
A204	4	#6	STR	5'-0"	30						
A205	4	#6	STR	4'-3"	26						
A206	4	#6	STR	3'-5"	21						
A207	4	#6	STR	2'-8"	16						
										REINFORCING STEEL	6,152 LBS



OUTLET END ELEVATION NORMAL TO SKEW



CULVERT SECTION NORMAL TO ROADWAY



PROJECT NO. B-5833
YADKIN COUNTY
 STATION: 12+93.03 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 7 FT. X 7 FT. CONCRETE BOX CULVERT 30° SKEW STAGE I

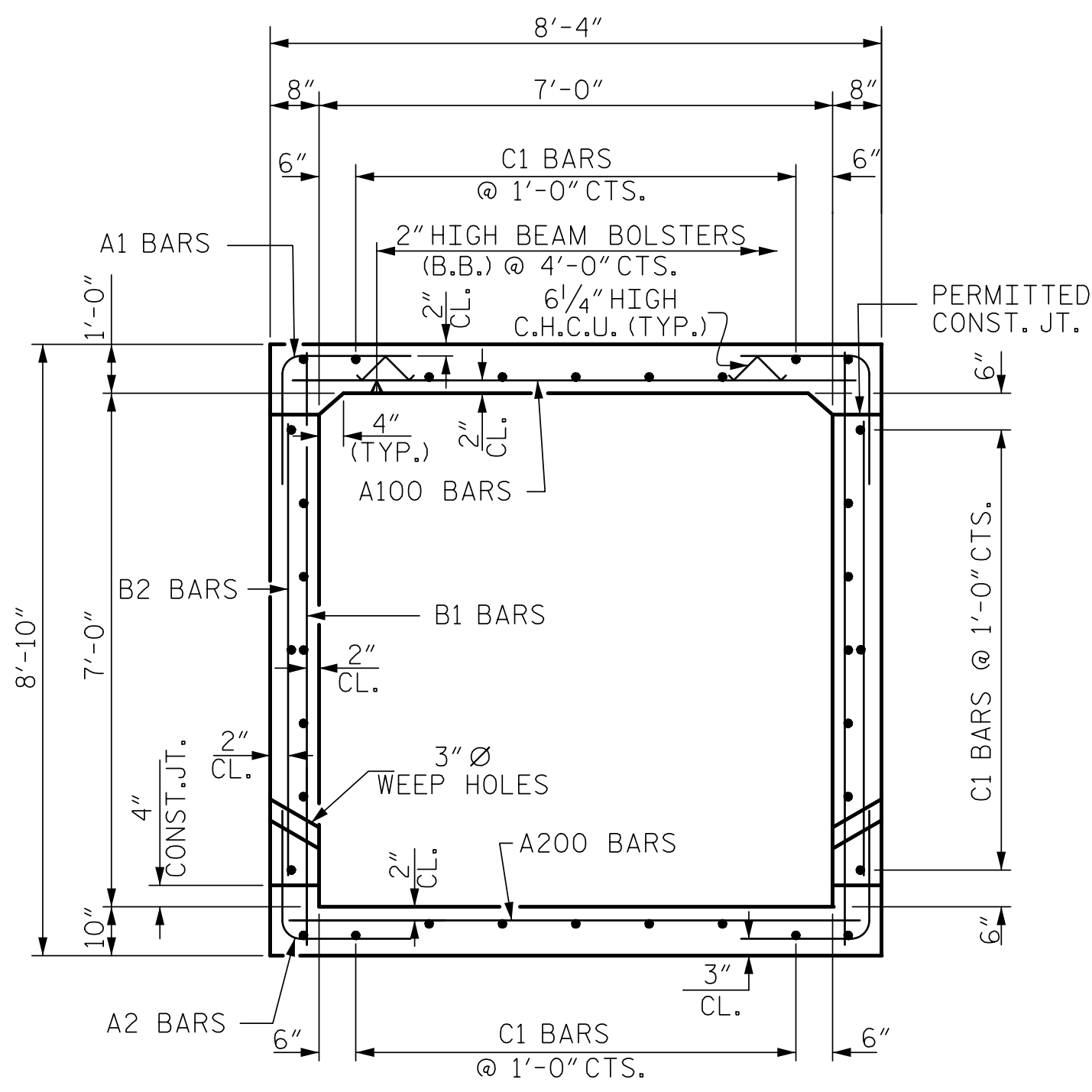
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2			4			9

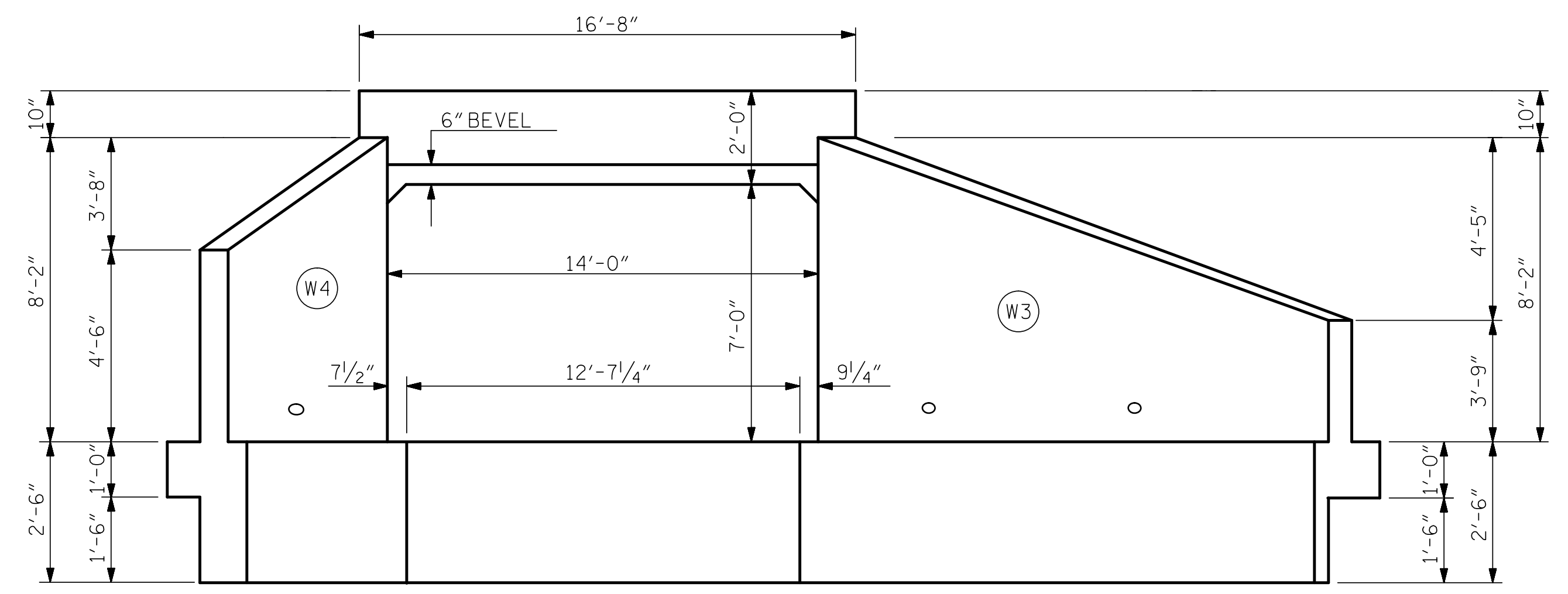
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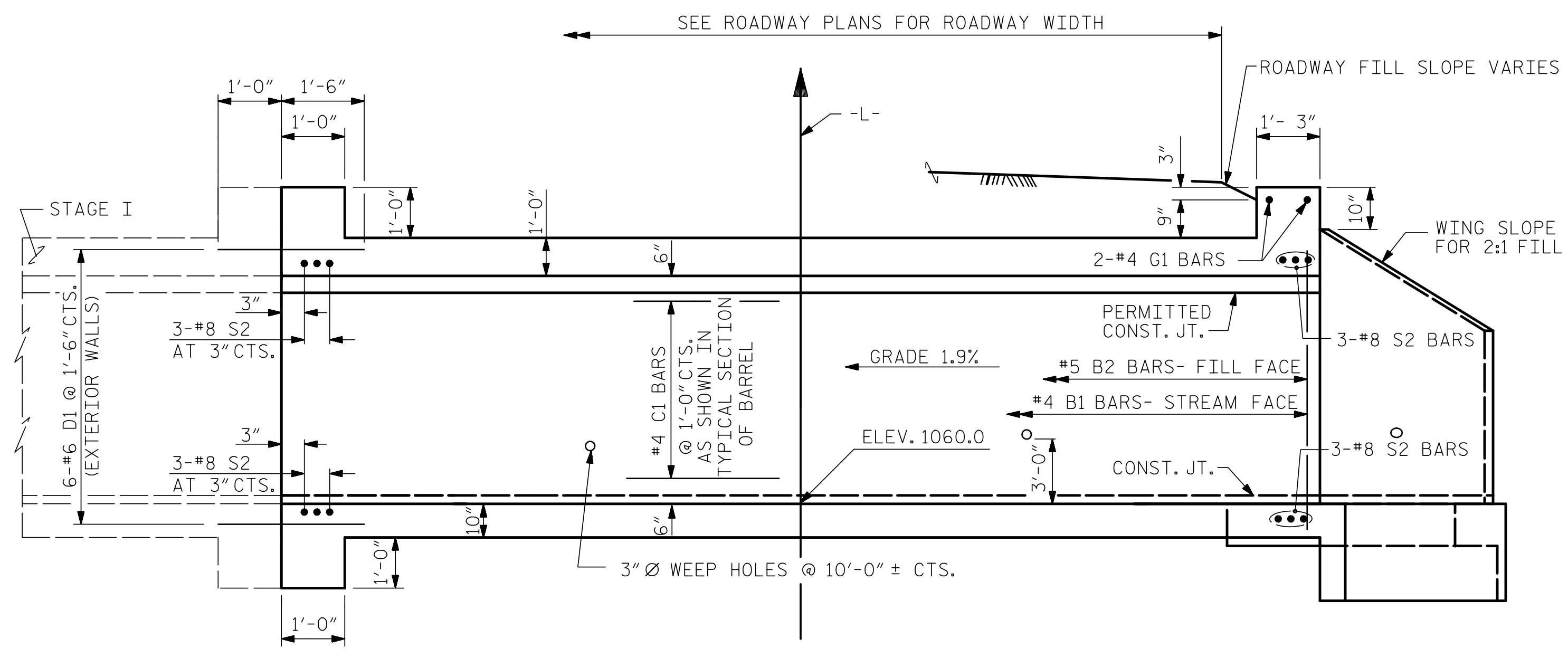
RIGHT ANGLE SECTION OF BARREL
THERE ARE 34 "C" BARS IN SECTION OF BARREL

STAGE II QUANTITIES			
CLASS A CONCRETE			
BARREL @	0.92	CY/FT	75.4 C.Y.
WINGS, ETC.			17.8 C.Y.
EDGE BEAMS			1.2 C.Y.
SILLS			1.0 C.Y.
TOTAL			95.4 C.Y.
REINFORCING STEEL			
BARREL & SILLS			10,158 LBS.
WINGS, ETC.			992 LBS.
TOTAL			11,150 LBS.
CULVERT EXCAVATION		LUMP SUM	
FOUNDATION COND. MAT'L.		71 TONS	

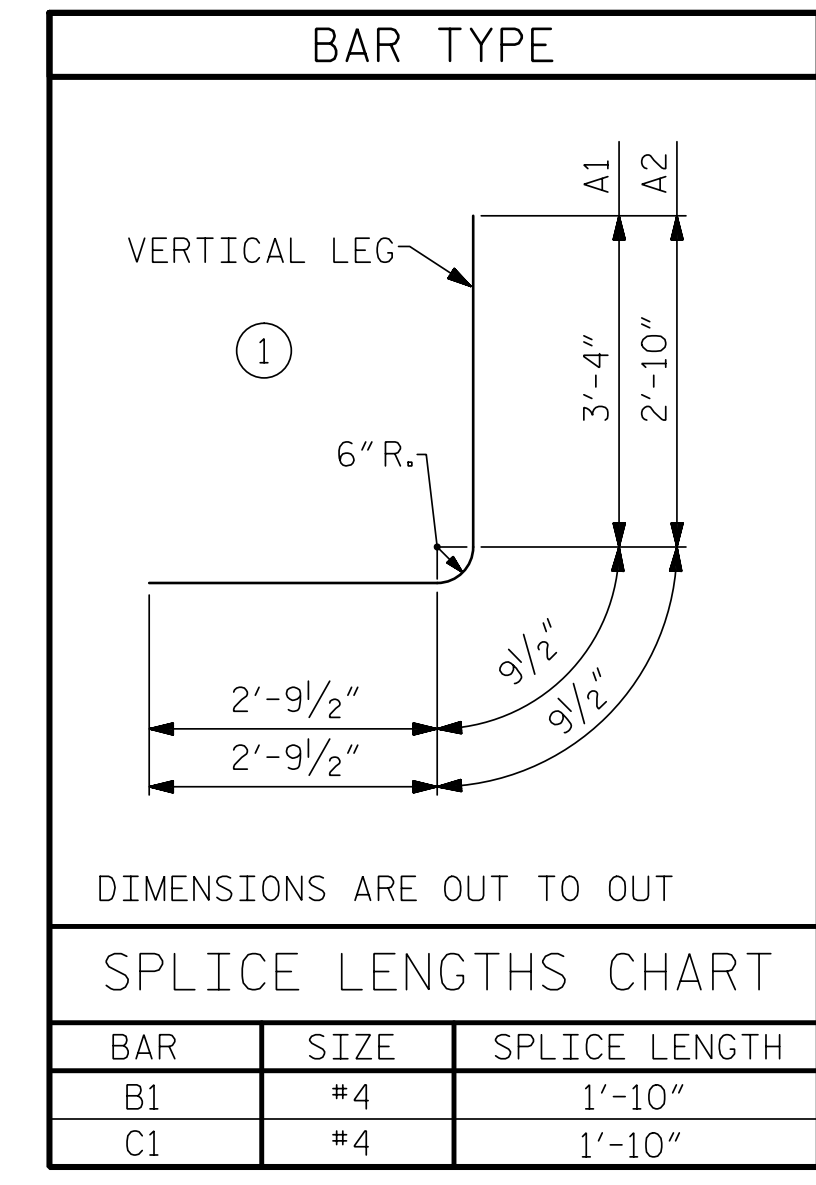
STAGE II BAR SCHEDULE											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	101	#6	STR	7'-11"	1201	A1	164	#5	1	6'-11"	1183
A101	4	#6	STR	7'-2"	43	A2	164	#6	1	6'-5"	1581
A102	4	#6	STR	6'-5"	39						
A103	4	#6	STR	5'-7"	34	B1	164	#4	STR	8'-4"	913
A104	4	#6	STR	4'-10"	29	B2	164	#5	STR	6'-4"	1083
A105	4	#6	STR	4'-1"	25						
A106	4	#6	STR	3'-4"	20	C1	102	#4	STR	28'-6"	1942
A107	4	#6	STR	2'-6"	15						
A200	101	#6	STR	7'-11"	1201	S2	12	#8	STR	15'-10"	507
A201	4	#6	STR	7'-2"	43	G1	2	#4	STR	15'-10"	21
A202	4	#6	STR	6'-5"	39						
A203	4	#6	STR	5'-7"	34	D1	24	#6	STR	2'-6"	90
A204	4	#6	STR	4'-10"	29	D2	12	#6	STR	1'-5"	26
A205	4	#6	STR	4'-1"	25						
A206	4	#6	STR	3'-4"	20						
A207	4	#6	STR	2'-6"	15						
										REINFORCING STEEL	10,158 LBS



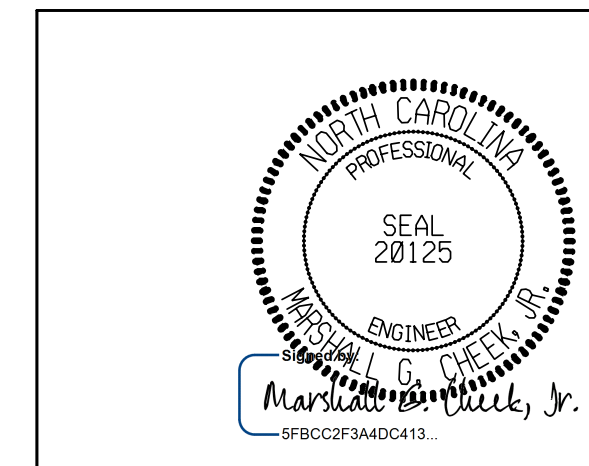
INLET END ELEVATION NORMAL TO SKEW



CULVERT SECTION NORMAL TO ROADWAY



PROJECT NO. B-5833
YADKIN COUNTY
 STATION: 12+93.03 -L-
 SHEET 6 OF 9



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 7 FT. X 7 FT.
 CONCRETE BOX CULVERT
 30° SKEW
 STAGE II

11/20/2025
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2			4			

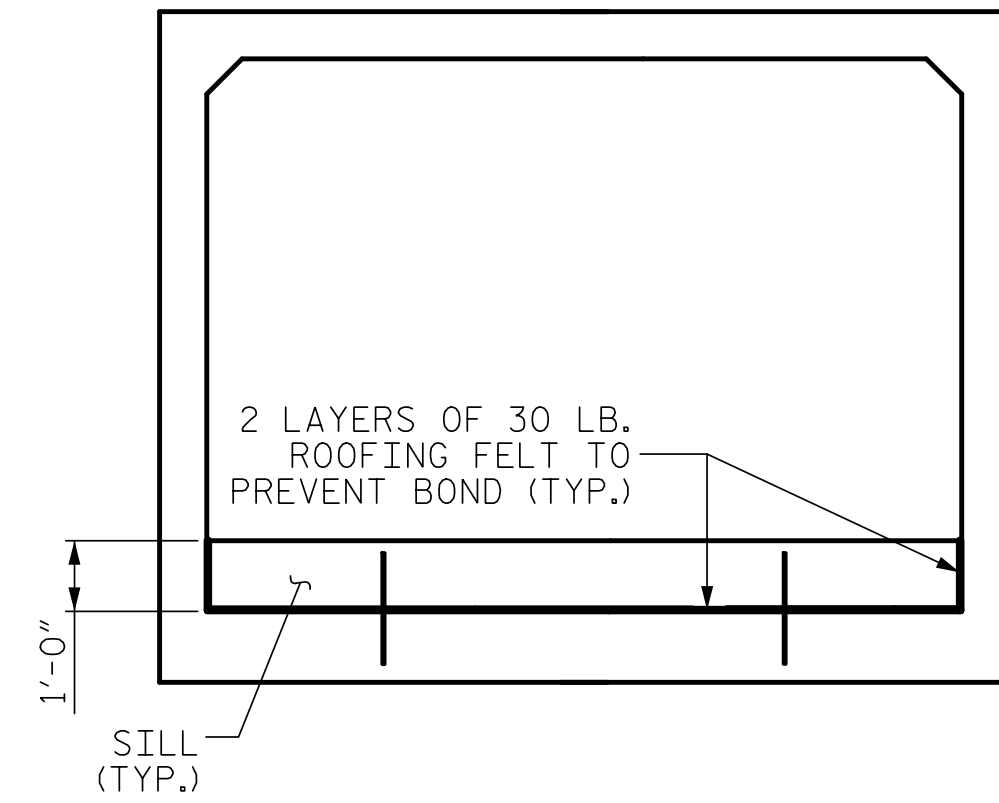
ASSEMBLED BY: ZCS DATE: 11/21
 CHECKED BY: MGC DATE: 3/22

NOTES

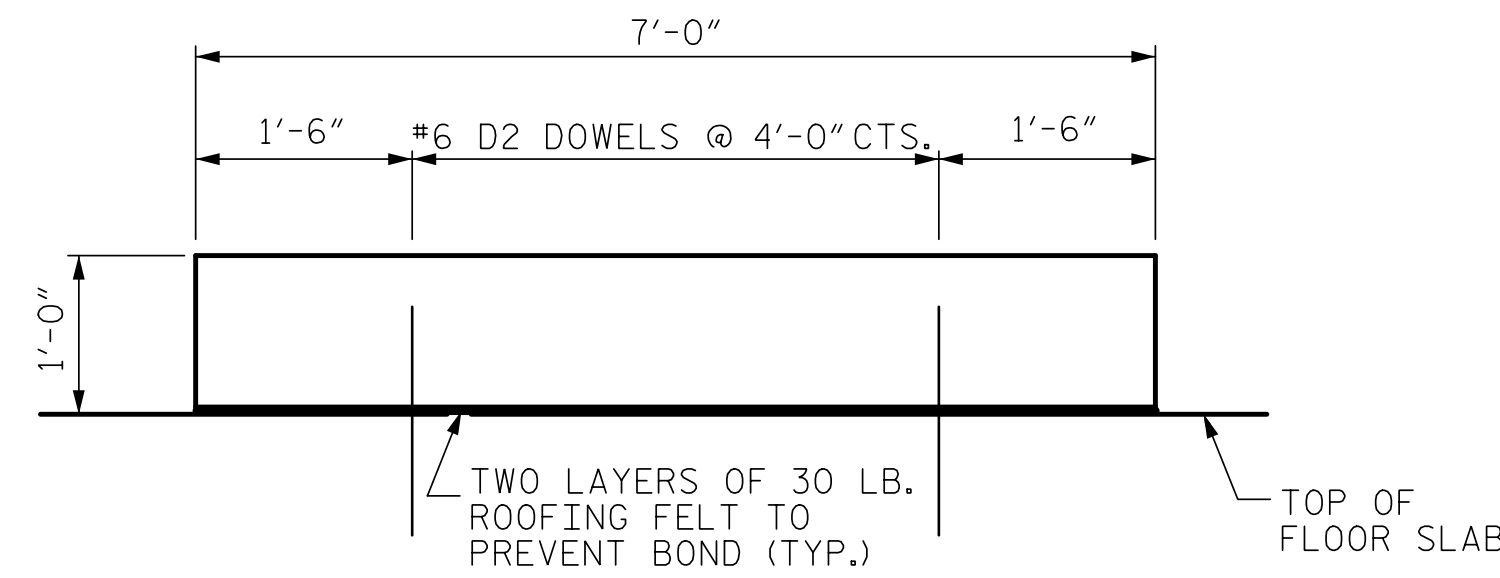
NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE CULVERT BARREL.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

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

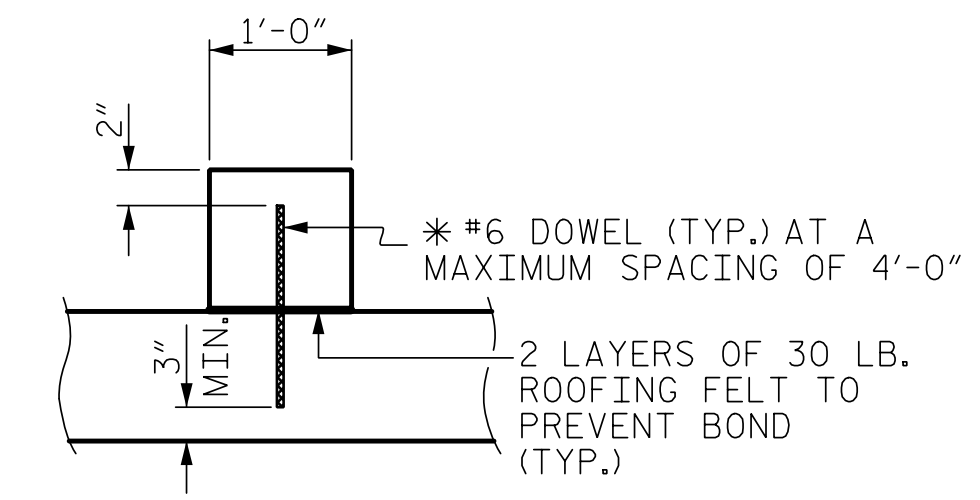
THE ENTIRE COST OF WORK REQUIRED TO CONSTRUCT THE SILLS SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.



INLET ELEVATION



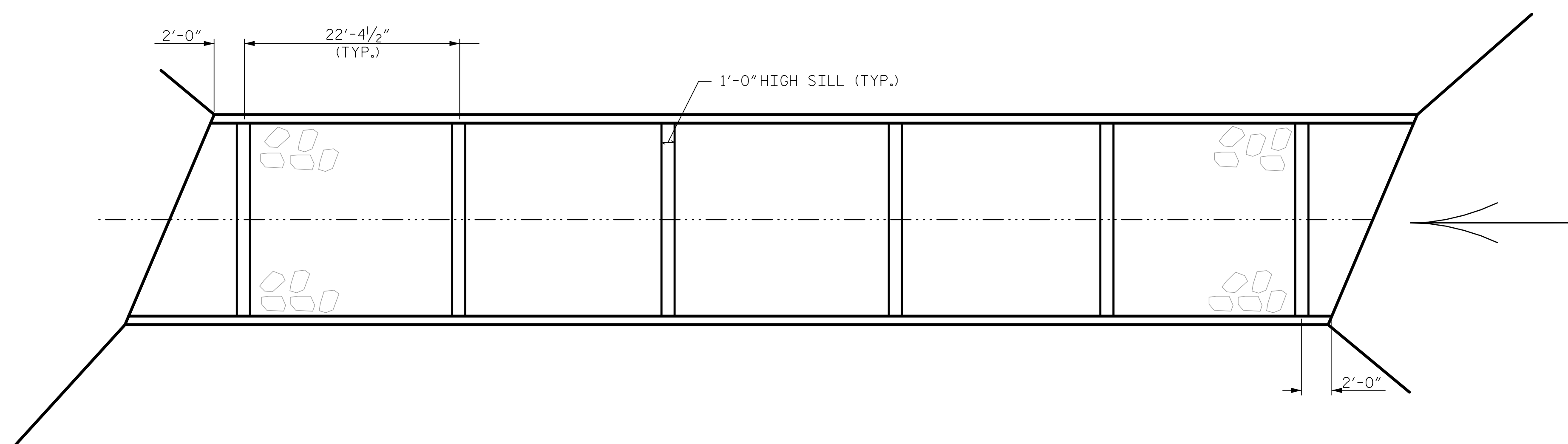
ELEVATION



SECTION THROUGH SILL

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

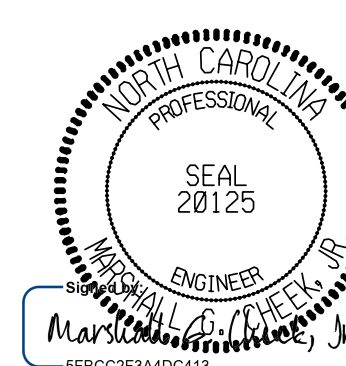
SILL DETAILS



PLAN OF FLOOR SILL LAYOUT

PROJECT NO. B-5833
YADKIN COUNTY
 STATION: 12+93.03 -L-

SHEET 7 OF 9



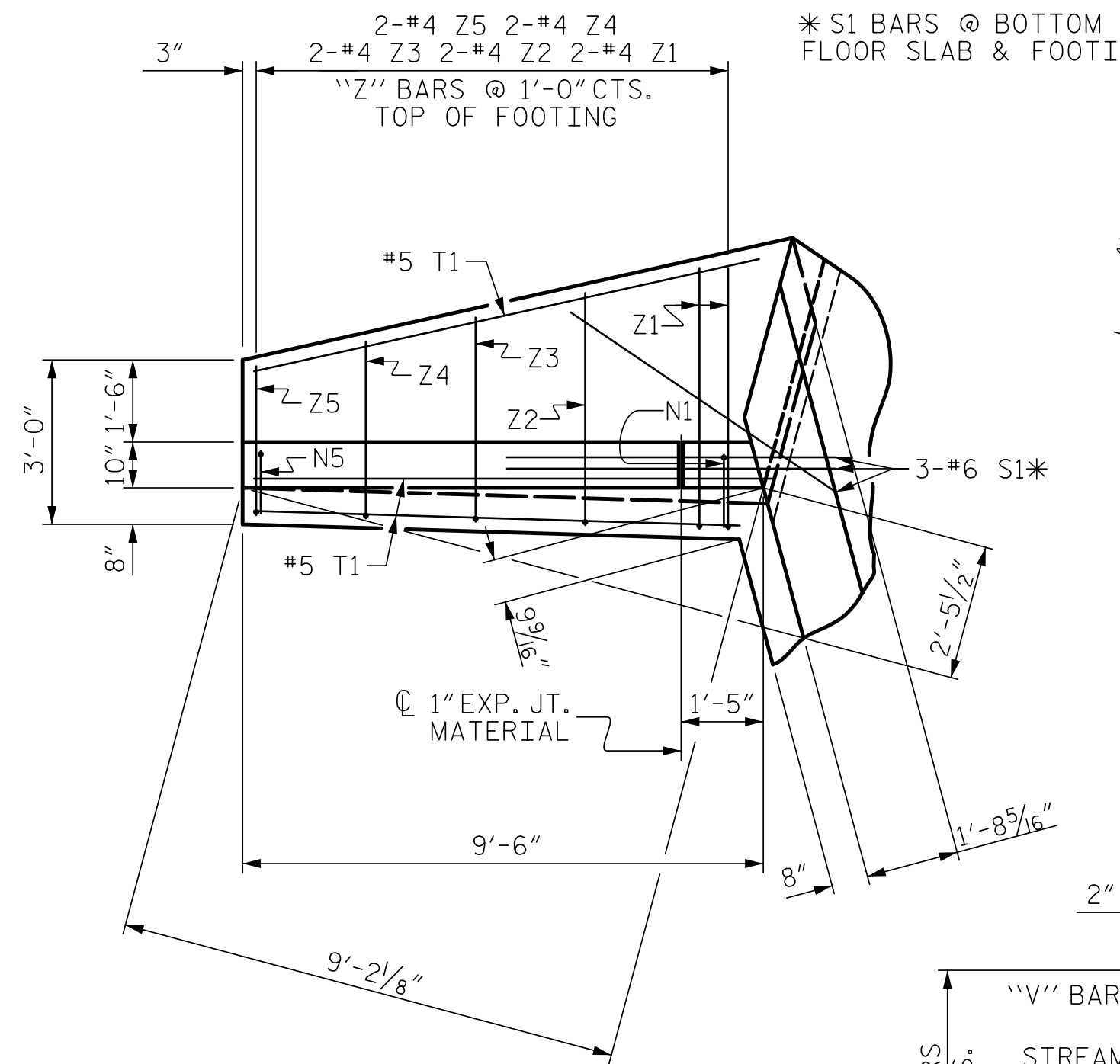
11/20/2025

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 7 FT. X 7 FT.
 CONCRETE BOX CULVERT
 30° SKEW

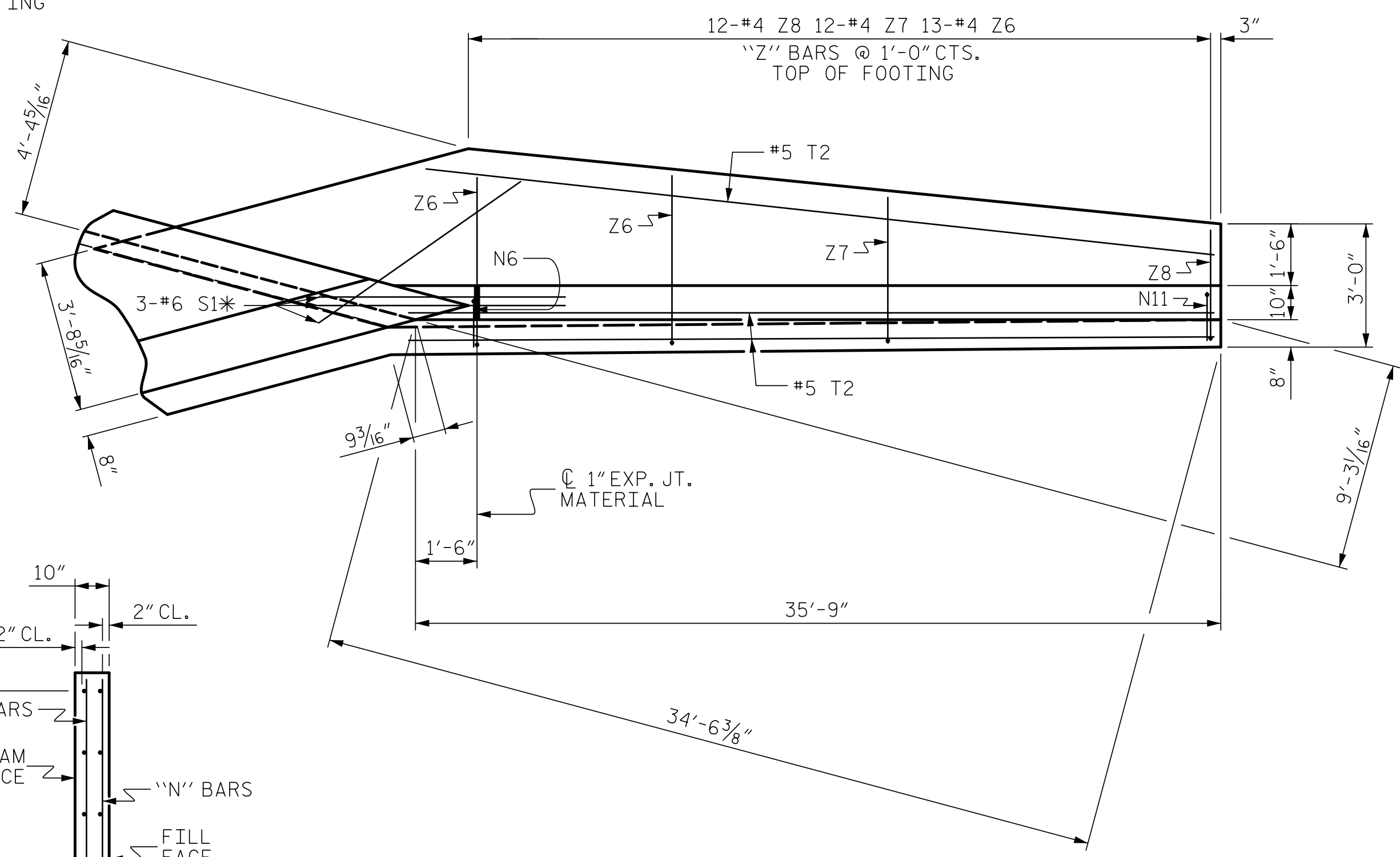
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 706 HILLSBOROUGH STREET
 SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

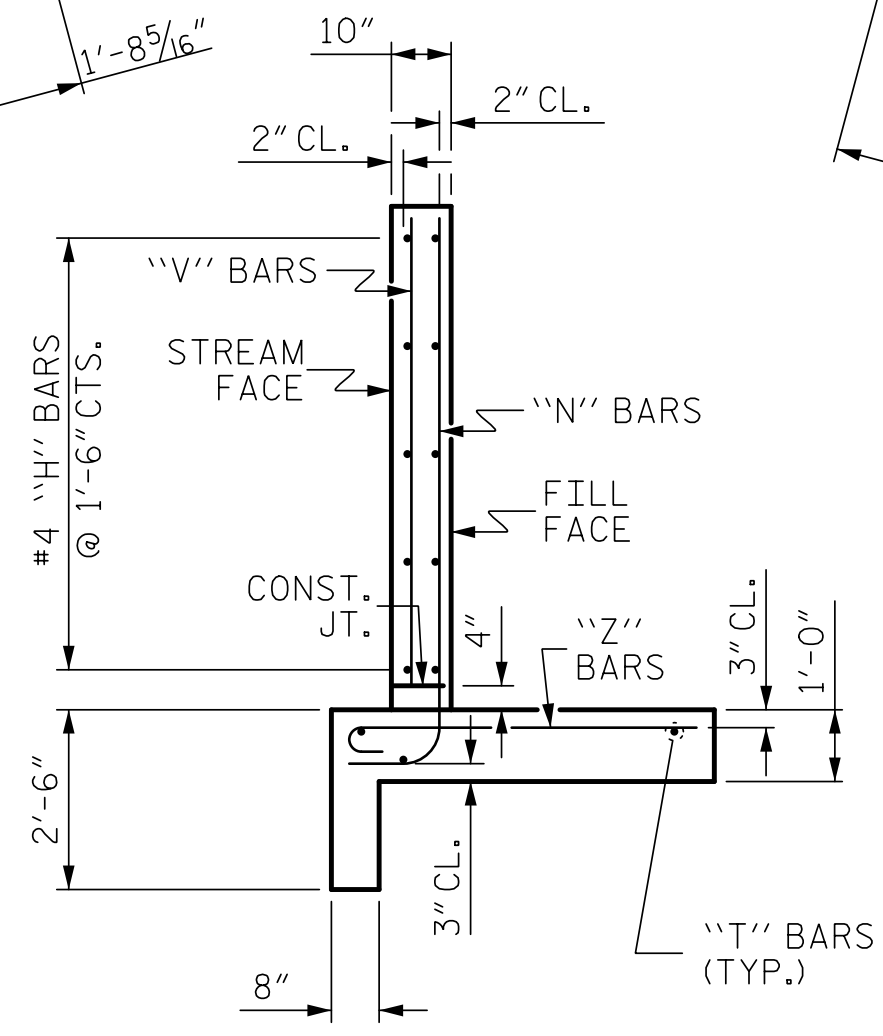
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C-7
2			4			TOTAL SHEETS 9



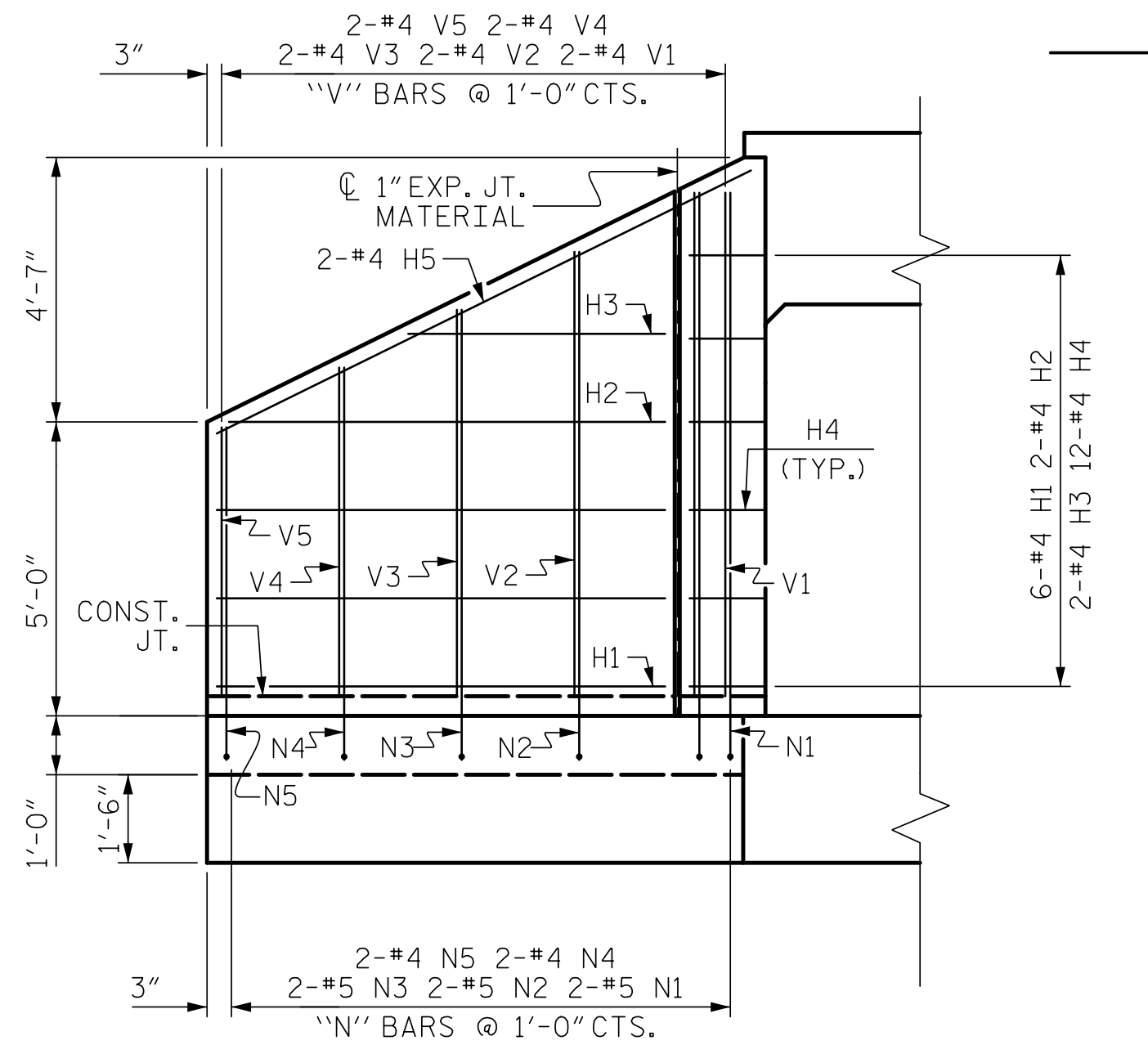
PLAN W2



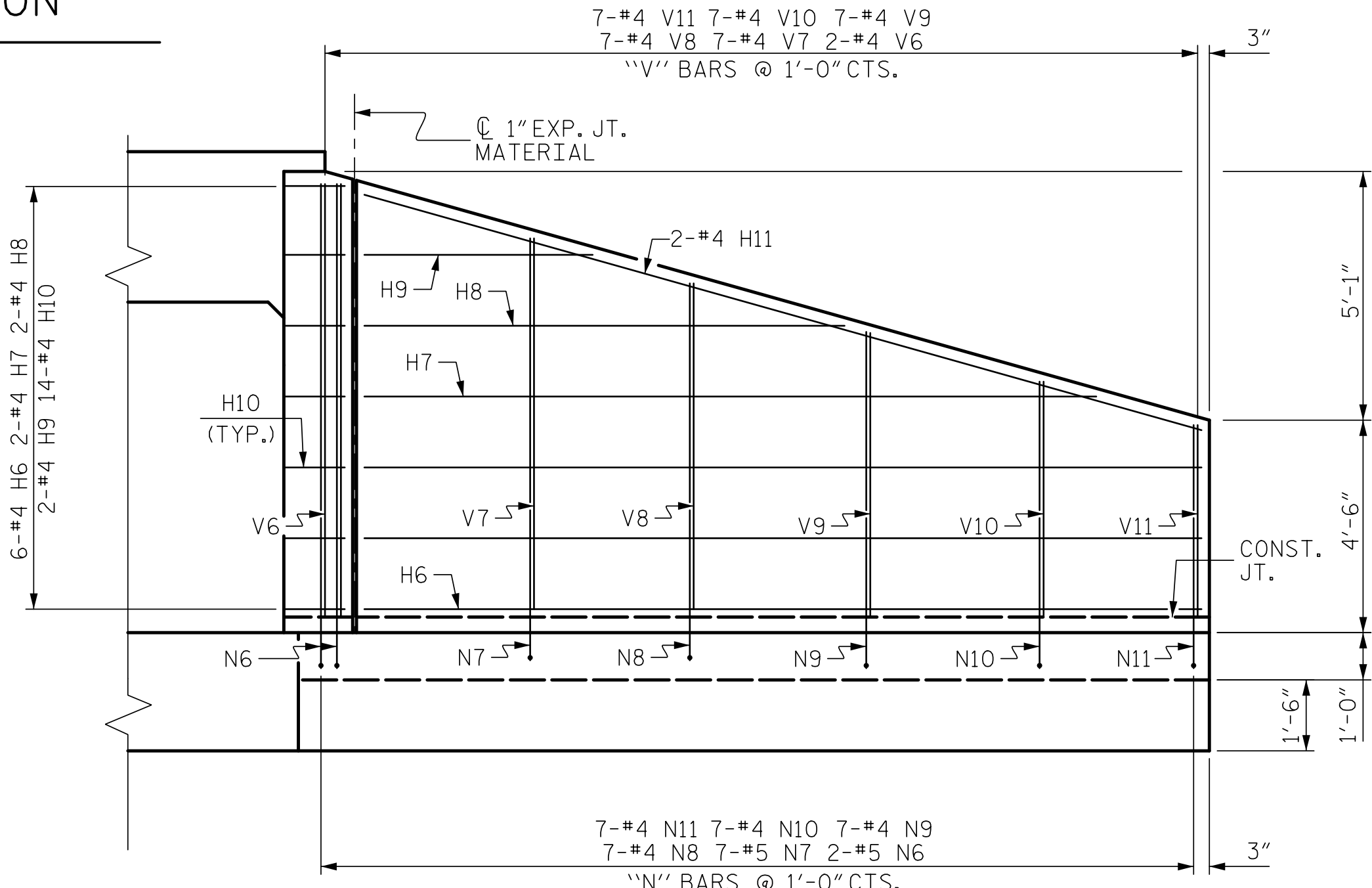
PLAN W1



TYPICAL WING SECTION

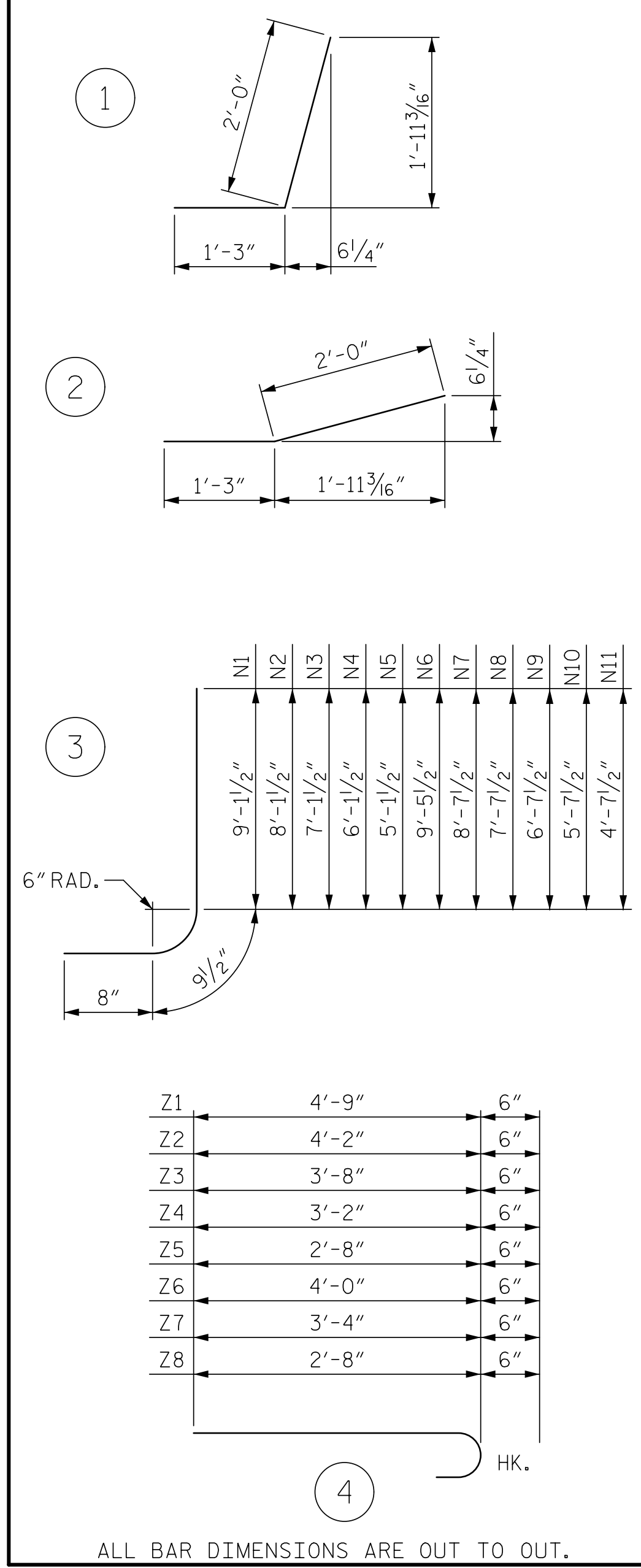


ELEVATION W2



ELEVATION W1

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL WINGS W1 & W2

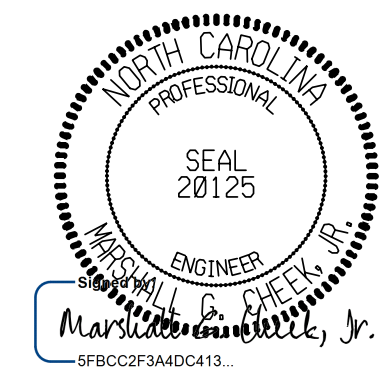
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	7'-7"	30
H2	2	#4	STR	7'-5"	10
H3	2	#4	STR	4'-4"	6
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	8'-0"	11
H6	6	#4	STR	33'-10"	136
H7	2	#4	STR	29'-4"	39
H8	2	#4	STR	18'-11"	25
H9	2	#4	STR	8'-5"	11
H10	14	#4	2	3'-3"	30
H11	2	#4	STR	34'-2"	46
N1	2	#5	3	10'-7"	22
N2	2	#5	3	9'-7"	20
N3	2	#5	3	8'-7"	18
N4	2	#4	3	7'-7"	10
N5	2	#4	3	6'-7"	9
N6	2	#5	3	10'-11"	23
N7	7	#5	3	10'-1"	74
N8	7	#4	3	9'-1"	42
N9	7	#4	3	8'-1"	38
N10	7	#4	3	7'-1"	33
N11	7	#4	3	6'-1"	28
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	9'-6"	30
T2	3	#5	STR	35'-9"	112
V1	2	#4	STR	8'-4"	11
V2	2	#4	STR	7'-4"	10
V3	2	#4	STR	6'-5"	9
V4	2	#4	STR	5'-7"	7
V5	2	#4	STR	4'-7"	6
V6	2	#4	STR	9'-0"	12
V7	7	#4	STR	8'-0"	37
V8	7	#4	STR	7'-0"	33
V9	7	#4	STR	6'-0"	28
V10	7	#4	STR	5'-0"	23
V11	7	#4	STR	4'-0"	19
Z1	2	#4	4	5'-3"	7
Z2	2	#4	4	4'-8"	6
Z3	2	#4	4	4'-2"	6
Z4	2	#4	4	3'-8"	5
Z5	2	#4	4	3'-2"	4
Z6	13	#4	4	4'-6"	39
Z7	12	#4	4	3'-10"	31
Z8	12	#4	4	3'-2"	25
REINFORCING STEEL FOR 2 WINGS					1,201 LBS
CLASS A CONCRETE					
2 WINGS					19.2 CY
1 HEADWALL					0.8 CY
1 END CURTAIN WALL					0.8 CY
TOTAL					20.8 CY

NOTES

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.
G1 BARS IN HEADWALL ARE INCLUDED WITH THE BARREL REINFORCING STEEL.

PROJECT NO. B-5833
YADKIN COUNTY
STATION: 12+93.03 -L-

SHEET 8 OF 9

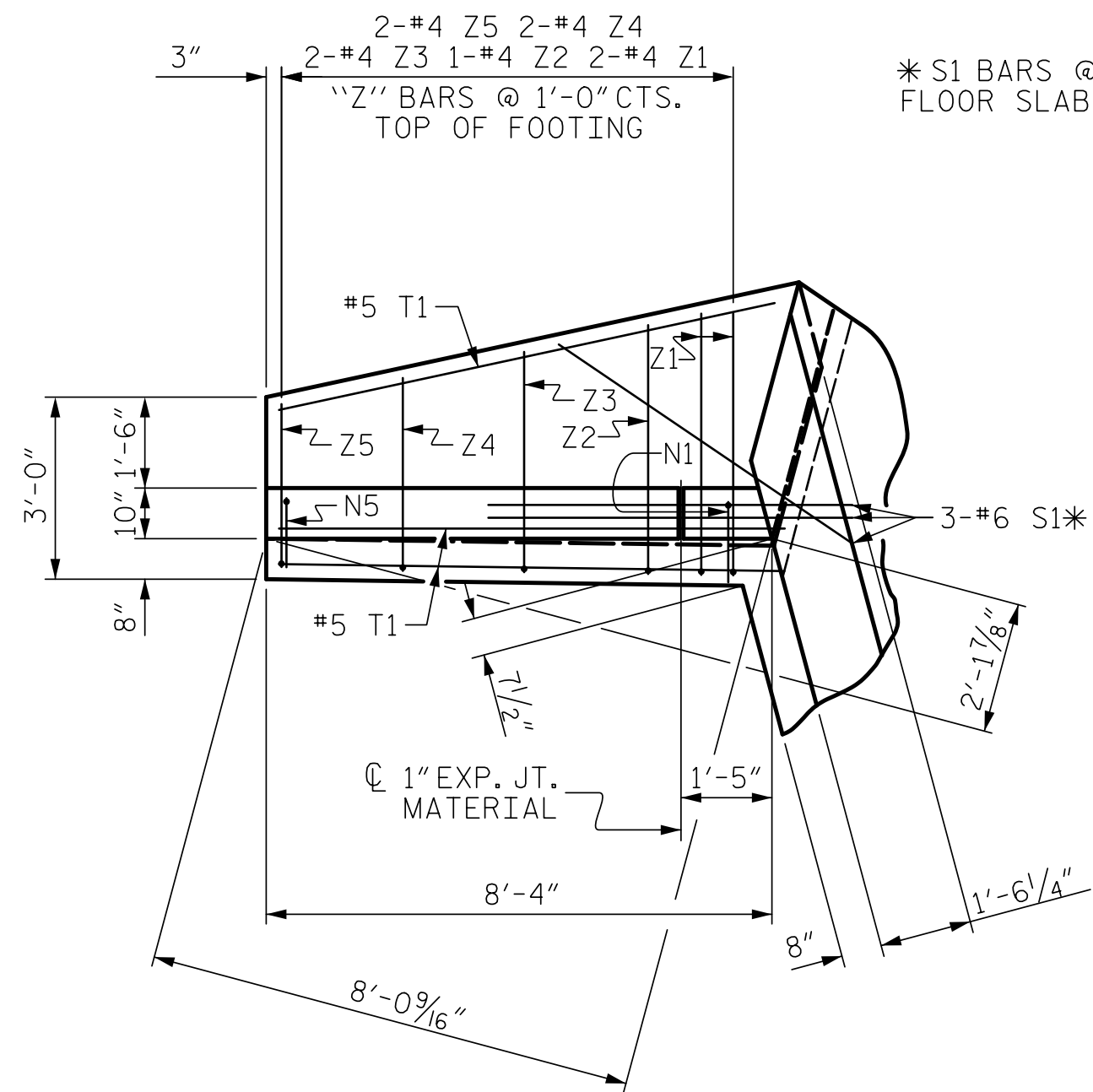


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
WINGS FOR CONCRETE BOX CULVERT
STAGE I
30° SKEW

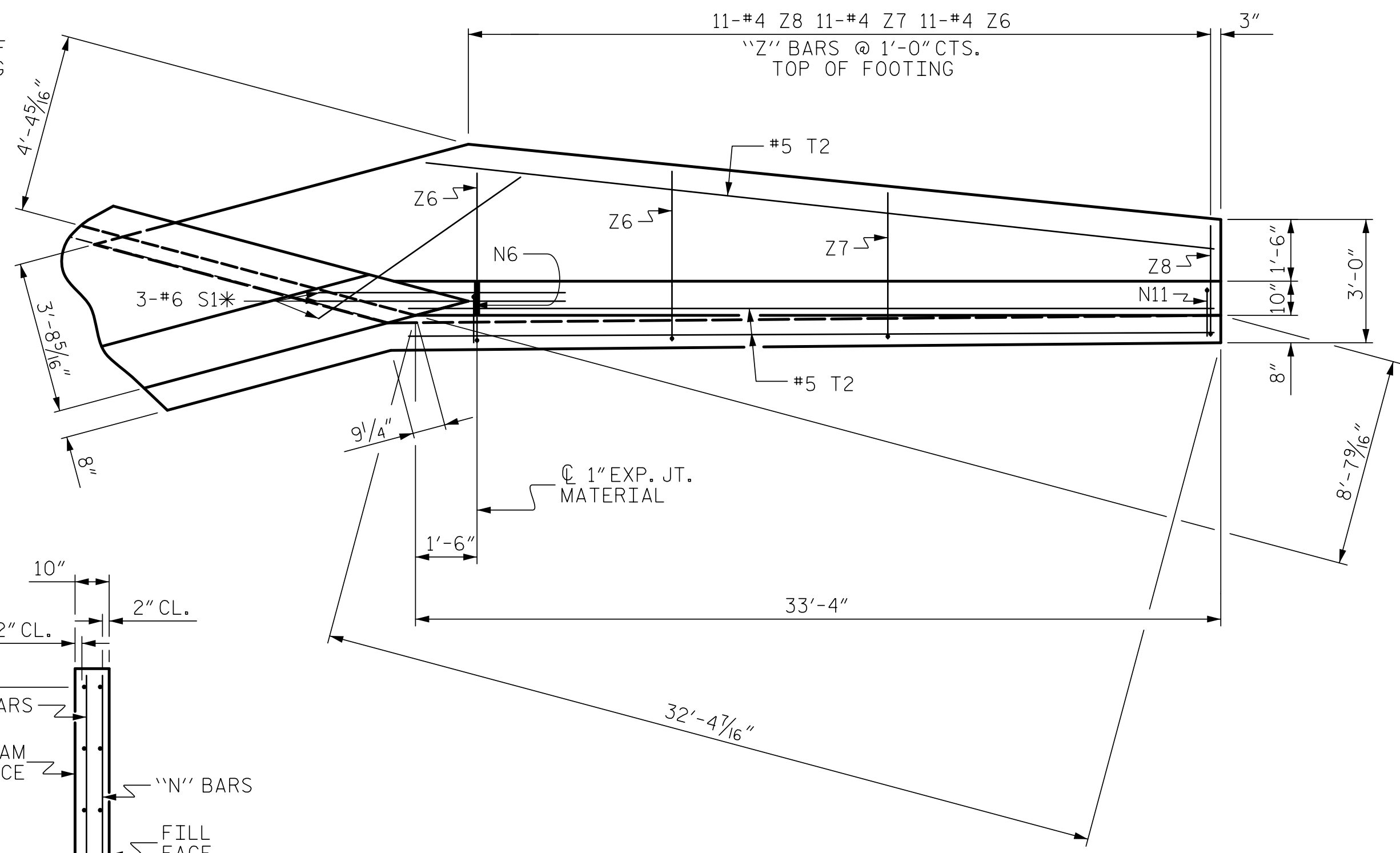
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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

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2			4			9

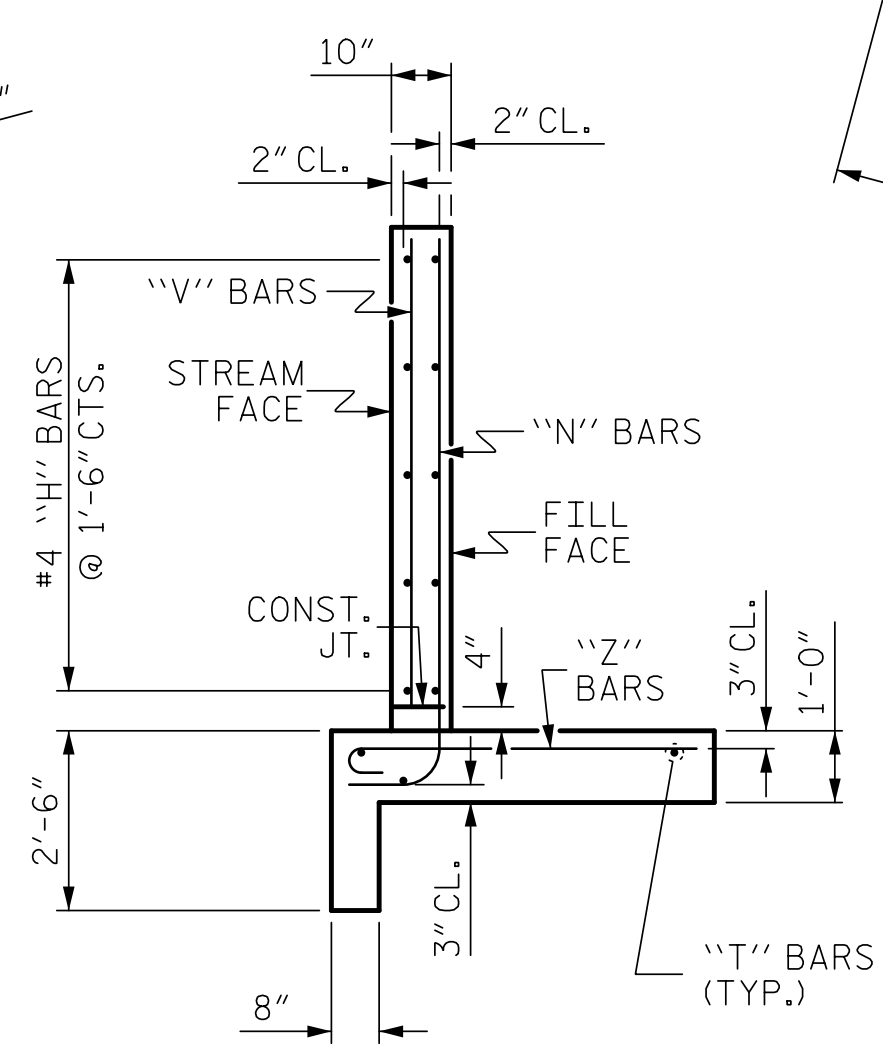
DRAWN BY: ZCS DATE: 3/22
CHECKED BY: MGC DATE: 3/22
DESIGN ENGINEER OF RECORD: ZCS DATE: 3/22



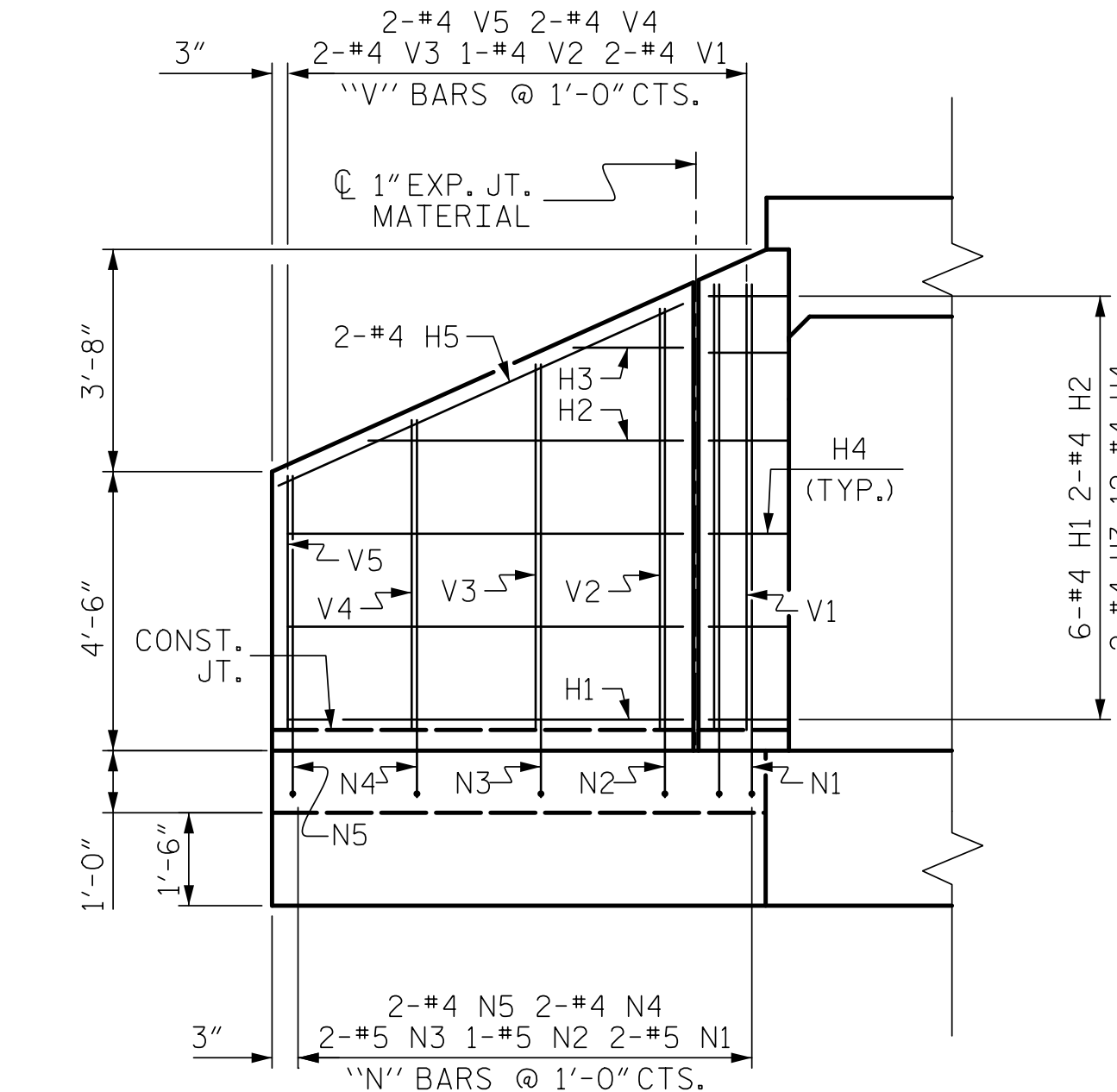
PLAN W4



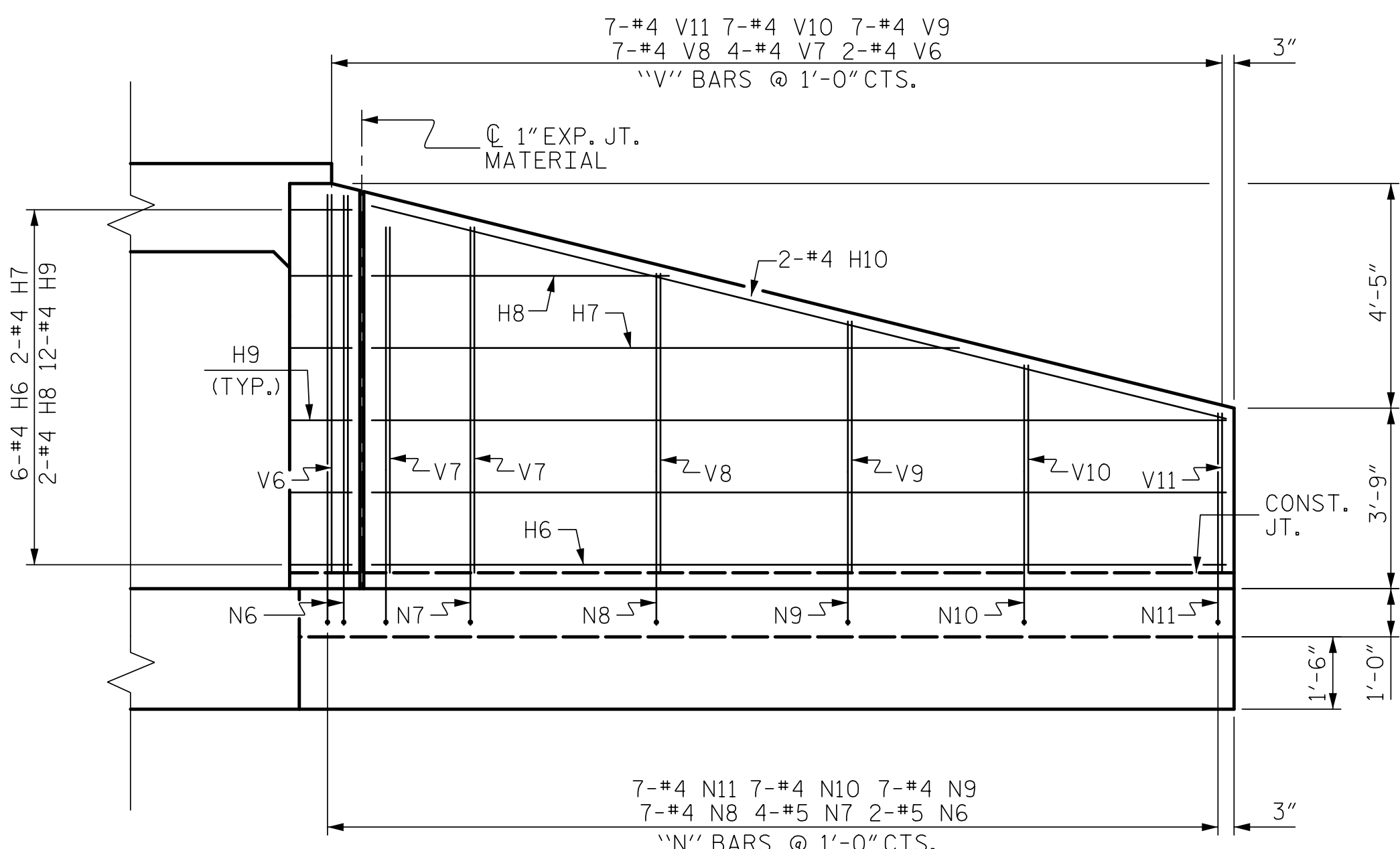
PLAN W3



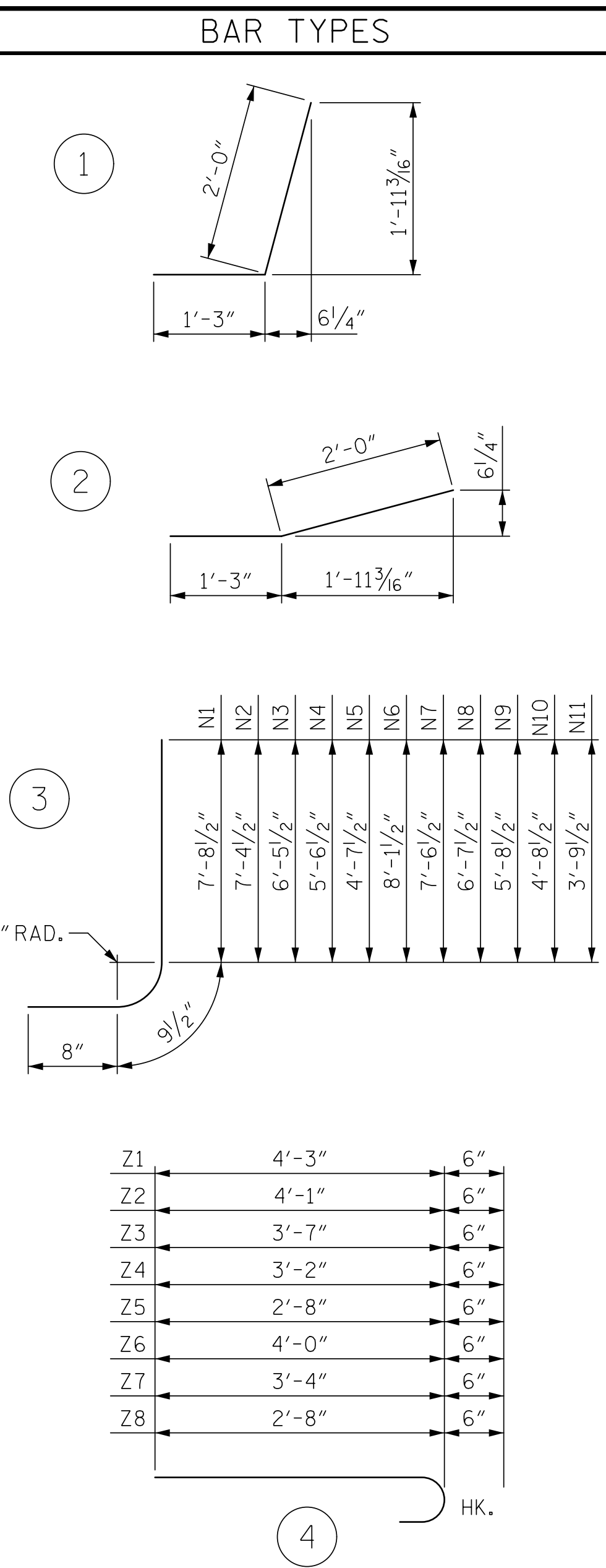
TYPICAL WING SECTION



ELEVATION W4



ELEVATION W3



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL WINGS W3 & W4					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	6'-5"	26
H2	2	#4	STR	5'-1"	7
H3	2	#4	STR	1'-9"	2
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	7'-0"	9
H6	6	#4	STR	31'-5"	126
H7	2	#4	STR	21'-0"	28
H8	2	#4	STR	9'-9"	13
H9	12	#4	2	3'-3"	26
H10	2	#4	STR	31'-8"	42
N1	2	#5	3	9'-2"	19
N2	1	#5	3	8'-10"	9
N3	2	#5	3	7'-11"	17
N4	2	#4	3	7'-0"	9
N5	2	#4	3	6'-1"	8
N6	2	#5	3	9'-7"	20
N7	4	#5	3	9'-0"	38
N8	7	#4	3	8'-1"	38
N9	7	#4	3	7'-2"	34
N10	7	#4	3	6'-2"	29
N11	7	#4	3	5'-3"	25
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	8'-4"	26
T2	3	#5	STR	33'-4"	104
V1	2	#4	STR	7'-0"	9
V2	1	#4	STR	6'-7"	4
V3	2	#4	STR	5'-10"	8
V4	2	#4	STR	4'-10"	6
V5	2	#4	STR	4'-1"	5
V6	2	#4	STR	7'-6"	10
V7	4	#4	STR	7'-0"	19
V8	7	#4	STR	6'-1"	28
V9	7	#4	STR	5'-1"	24
V10	7	#4	STR	4'-2"	19
V11	7	#4	STR	3'-3"	15
Z1	2	#4	4	4'-9"	6
Z2	1	#4	4	4'-7"	3
Z3	2	#4	4	4'-1"	5
Z4	2	#4	4	3'-8"	5
Z5	2	#4	4	3'-2"	4
Z6	12	#4	4	4'-6"	36
Z7	11	#4	4	3'-10"	28
Z8	11	#4	4	3'-2"	23

REINFORCING STEEL	992 LBS
FOR 2 WINGS	
CLASS A CONCRETE	
2 WINGS	16.2 CY
1 HEADWALL	0.8 CY
1 END CURTAIN WALL	0.8 CY
TOTAL	17.8 CY

NOTES
 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.
 G1 BARS IN HEADWALL ARE INCLUDED WITH THE BARREL REINFORCING STEEL.

PROJECT NO. B-5833
 YADKIN COUNTY
 STATION: 12+93.03 -L-
 SHEET 9 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
WINGS FOR CONCRETE BOX CULVERT STAGE II 30° SKEW
 11/20/2025
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TGS ENGINEERS
 706 HILLSBOROUGH STREET SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
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2			4			9

DRAWN BY: ZCS DATE: 3/22
 CHECKED BY: MGC DATE: 3/22
 DESIGN ENGINEER OF RECORD: ZCS DATE: 3/22

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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