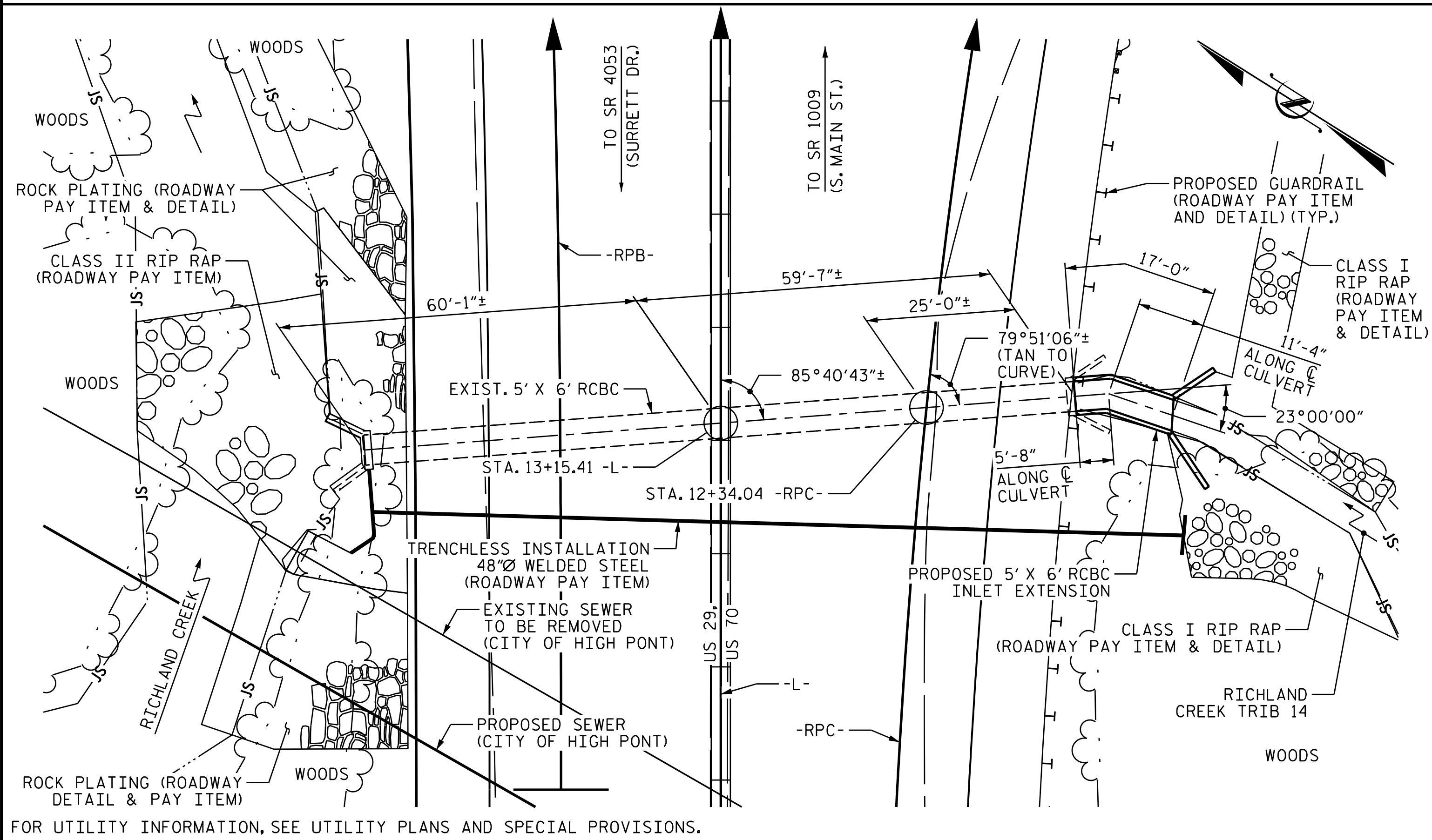


BM #1: R/R SPIKE IN 20" POPLAR, 80' LT. OF STA. 10+04 -L-, ELEV. = 806.10'



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL = 7'-9" MAX. AND 6'-4" MIN.
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- 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.
- IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.
- DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL COORDINATE PLACEMENT OF THE CULVERT WINGWALL AND HEADWALL OF THE 48" Ø WELDED STEEL PIPE PRIOR TO CONSTRUCTION OF THE CULVERT WINGWALL.

HYDRAULIC DATA:

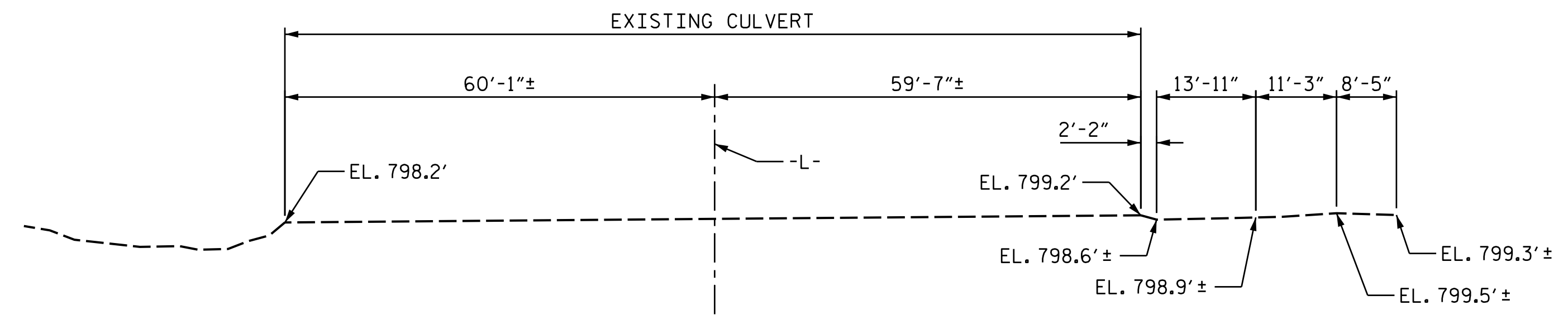
DESIGN DISCHARGE	= 500 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEAR
DESIGN HIGH WATER ELEVATION	= 807.8
DRAINAGE AREA	= 0.23 SQ. MI.
BASE DISCHARGE (Q 100)	= 550 CFS
BASE HIGH WATER ELEVATION	= 808.5

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 845 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 814.1 *
* ROAD OVERTOPS AT APPROX. STATION 10+72 -L-	

GRADE DATA:

GRADE POINT ELEV. @ STA. 13+15.41 -L-	= 815.98'
BED ELEV. @ STA. 13+15.41 -L-	= 798.7' ±
ROADWAY SLOPES	= 2 : 1



PROFILE ALONG CULVERT

TOTAL STRUCTURE QUANTITIES

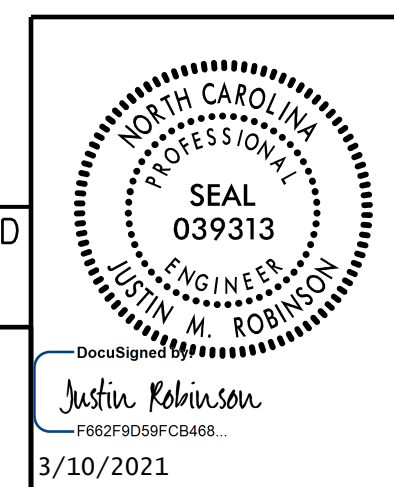
CLASS A CONCRETE	
BARREL @ 0.613 CY/FT	10.4 C.Y.
WINGS ETC.	8.1 C.Y.
TOTAL	18.5 C.Y.
REINFORCING STEEL	
BARREL	1,513 LBS.
WINGS ETC.	466 LBS.
TOTAL	1,979 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MATERIAL	12 TONS

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. U-5896
GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 1 OF 6 EXTEND CULVERT #401286

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SINGLE 5 FT. X 6 FT. CONCRETE BOX CULVERT
85°40'43" ± SKEW
 (INLET EXTENSION ONLY)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
M MOTT MACDONALD
 PO Box 700 Fuquay-Varina, NC 27526
 (919) 552-2253
 www.mottmac.com
 LICENSE NO. F-0669

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
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DRAWN BY: J. T. WILLIAMS DATE: 8-2020
 CHECKED BY: J. M. ROBINSON DATE: 8-2020
 DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 10-2020

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (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	1.95	--	1.75	1.95	1	BOTTOM SLAB	2.83	3.80	1	BOTTOM SLAB	0.81		
	HL-93 (OPERATING)	N/A		2.53	--	1.35	2.53	1	BOTTOM SLAB	2.83	4.93	1	BOTTOM SLAB	0.81		
	HS-20 (INVENTORY)	36.000	②	2.29	82.440	1.75	2.29	1	BOTTOM SLAB	2.83	4.47	1	BOTTOM SLAB	0.81		
	HS-20 (OPERATING)	36.000		2.97	106.920	1.35	2.97	1	BOTTOM SLAB	2.83	5.80	1	BOTTOM SLAB	0.81		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		4.22	56.970	1.40	4.22	1	BOTTOM SLAB	2.83	8.24	1	BOTTOM SLAB	0.81		
		SNGARBS2	20.000		3.95	79.000	1.40	3.95	1	BOTTOM SLAB	2.83	7.71	1	BOTTOM SLAB	0.81	
		SNAGRIS2	22.000		4.22	92.840	1.40	4.22	1	BOTTOM SLAB	2.83	8.24	1	BOTTOM SLAB	0.81	
		SNCOTTS3	27.250		2.75	74.938	1.40	2.75	1	BOTTOM SLAB	2.83	5.37	1	BOTTOM SLAB	0.81	
		SNAGGRS4	34.925	③	2.43	84.868	1.40	2.43	1	BOTTOM SLAB	2.83	4.76	1	BOTTOM SLAB	4.85	
		SNS5A	35.550		2.58	91.719	1.40	2.58	1	BOTTOM SLAB	2.83	5.15	1	BOTTOM SLAB	0.81	
		SNS6A	39.950		2.49	99.476	1.40	2.49	1	BOTTOM SLAB	2.83	4.86	1	BOTTOM SLAB	0.81	
		SNS7B	42.000		2.49	104.580	1.40	2.49	1	BOTTOM SLAB	2.83	4.86	1	BOTTOM SLAB	0.81	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		4.18	137.940	1.40	4.18	1	BOTTOM SLAB	2.83	8.24	1	BOTTOM SLAB	0.81	
		TNT4A	33.075		3.28	108.486	1.40	3.28	1	BOTTOM SLAB	2.83	6.39	1	BOTTOM SLAB	0.81	
		TNT6A	41.600		2.56	106.496	1.40	2.56	1	BOTTOM SLAB	2.83	5.02	1	BOTTOM SLAB	0.81	
		TNT7A	42.000		2.73	114.660	1.40	2.73	1	BOTTOM SLAB	2.83	5.34	1	BOTTOM SLAB	0.81	
		TNT7B	42.000		2.50	105.000	1.40	2.50	1	BOTTOM SLAB	2.83	4.88	1	BOTTOM SLAB	0.81	
		TNAGRIT4	43.000		3.28	141.040	1.40	3.28	1	BOTTOM SLAB	2.83	6.39	1	BOTTOM SLAB	0.81	
TNAGT5A	45.000		3.28	147.600	1.40	3.28	1	BOTTOM SLAB	2.83	6.39	1	BOTTOM SLAB	0.81			
TNAGT5B	45.000		3.16	142.200	1.40	3.16	1	BOTTOM SLAB	2.83	6.39	1	BOTTOM SLAB	0.81			

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.

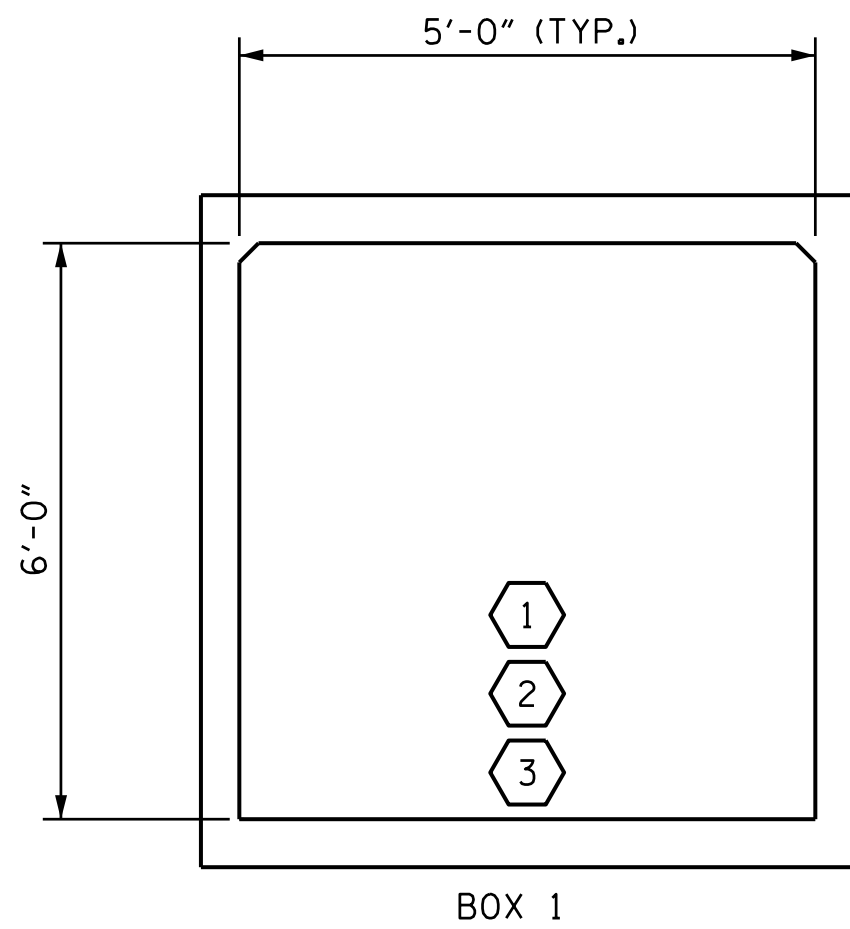
CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY
(LOOKING DOWNSTREAM)

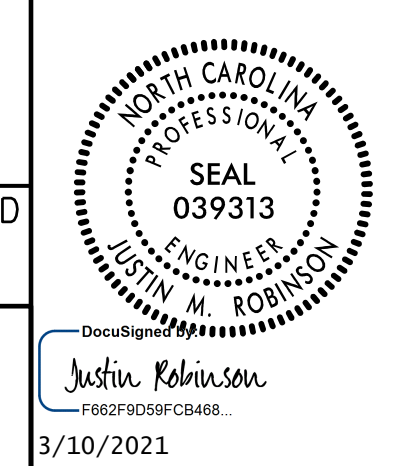
PROJECT NO. U-5896
GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS**

(NON-INTERSTATE TRAFFIC)



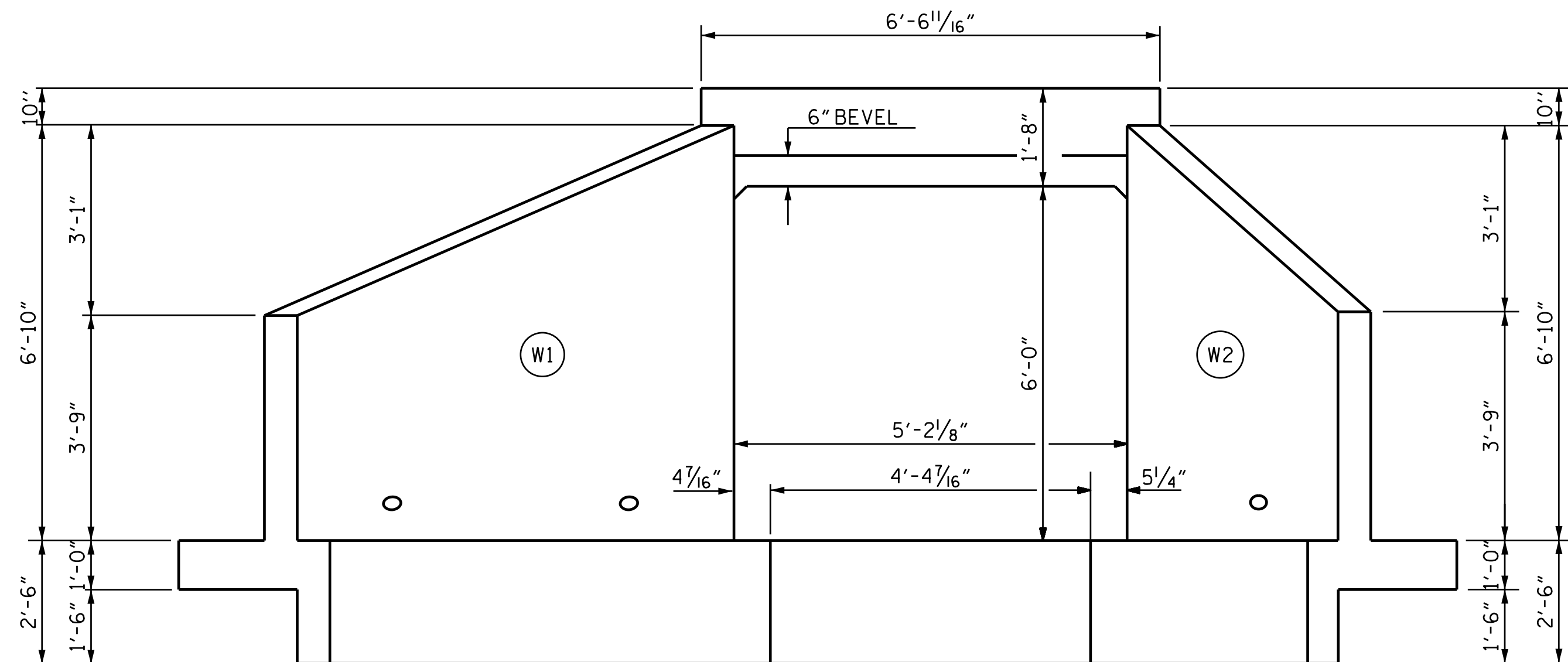
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 LICENSE NO. F-0669

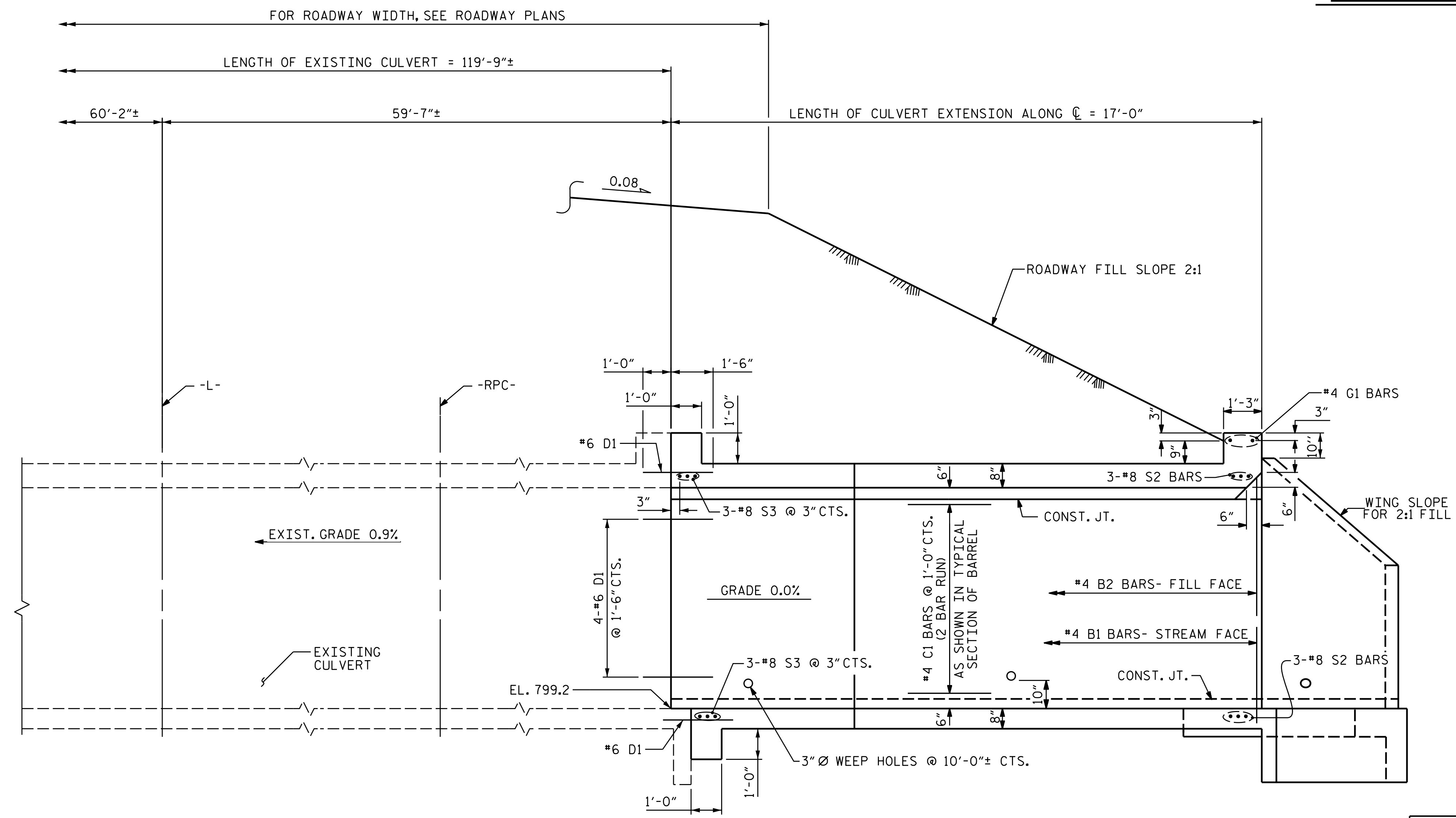
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2			4			6

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 CHECKED BY: J. M. ROBINSON DATE: 9-2020
 DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 10-2020



END ELEVATION NORMAL TO SKEW

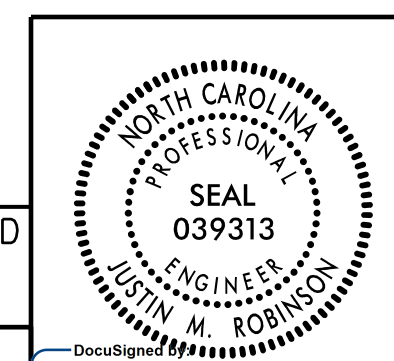


CULVERT SECTION NORMAL TO ROADWAY

PROJECT NO. U-5896
GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 5 FT. X 6 FT.
 CONCRETE BOX CULVERT
 85°40'43"± SKEW
 (INLET EXTENSION ONLY)



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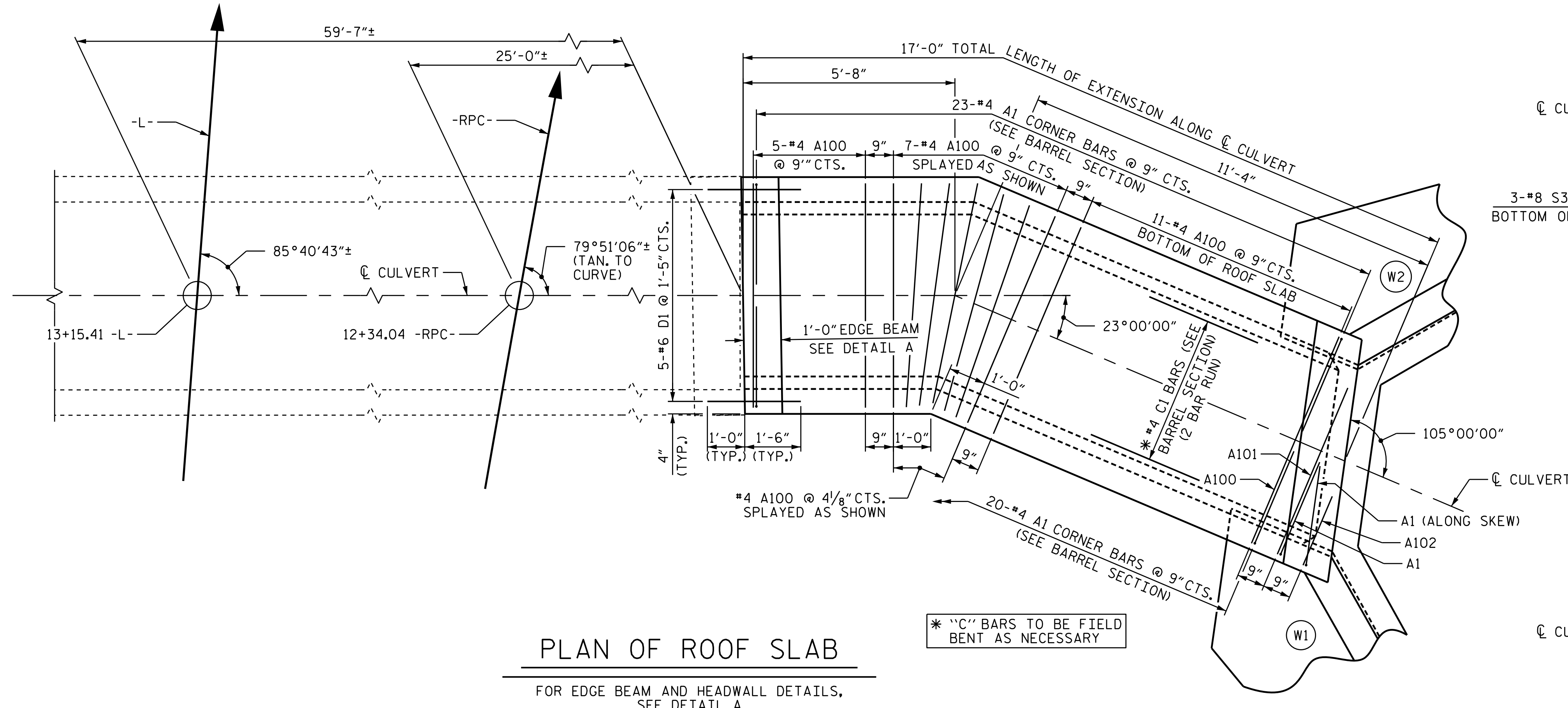
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 LICENSE NO. F-0669

Justin Robinson
 3/10/2021

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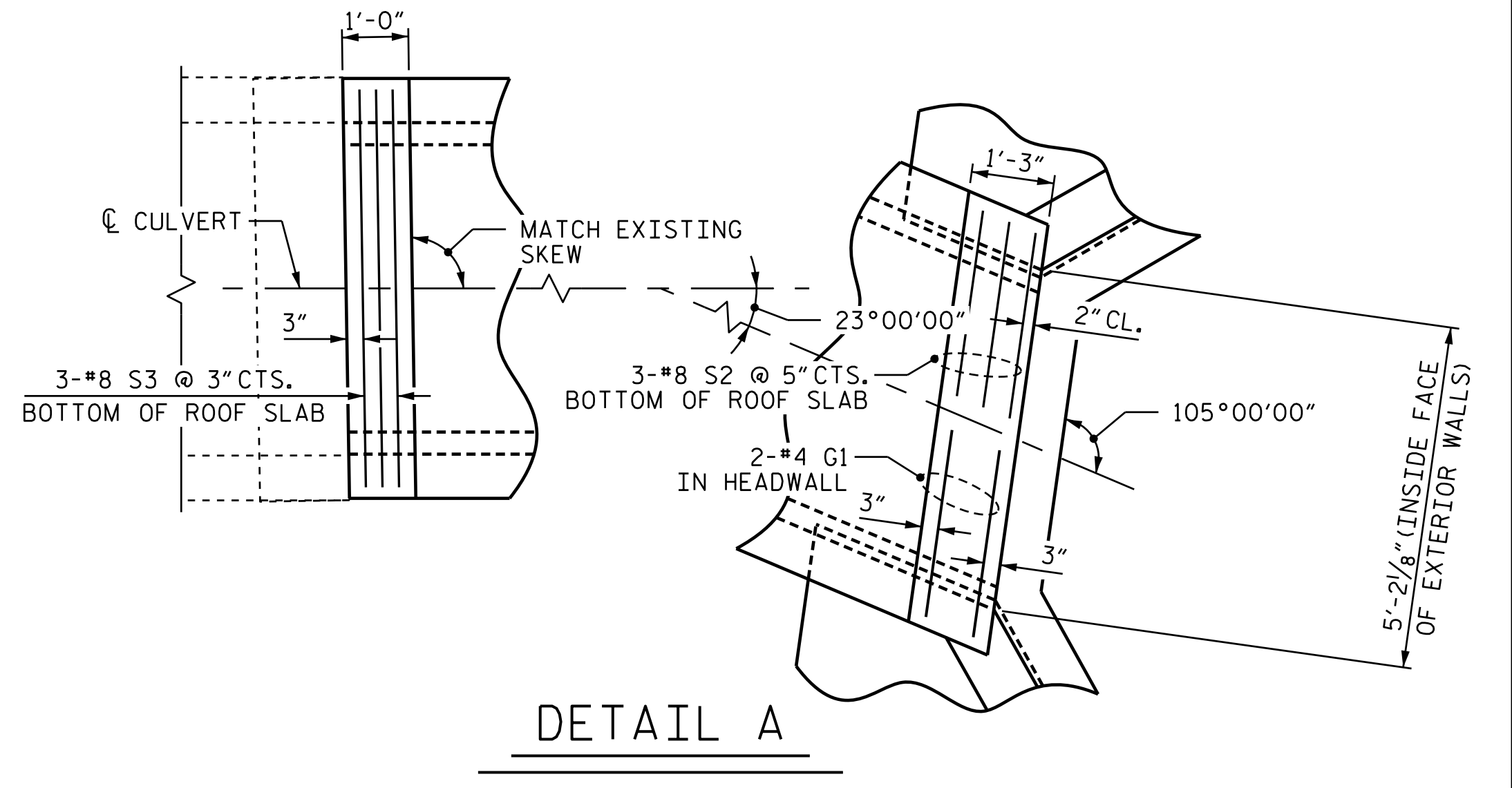
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 CHECKED BY: J. M. ROBINSON DATE: 8-2020
 DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 10-2020

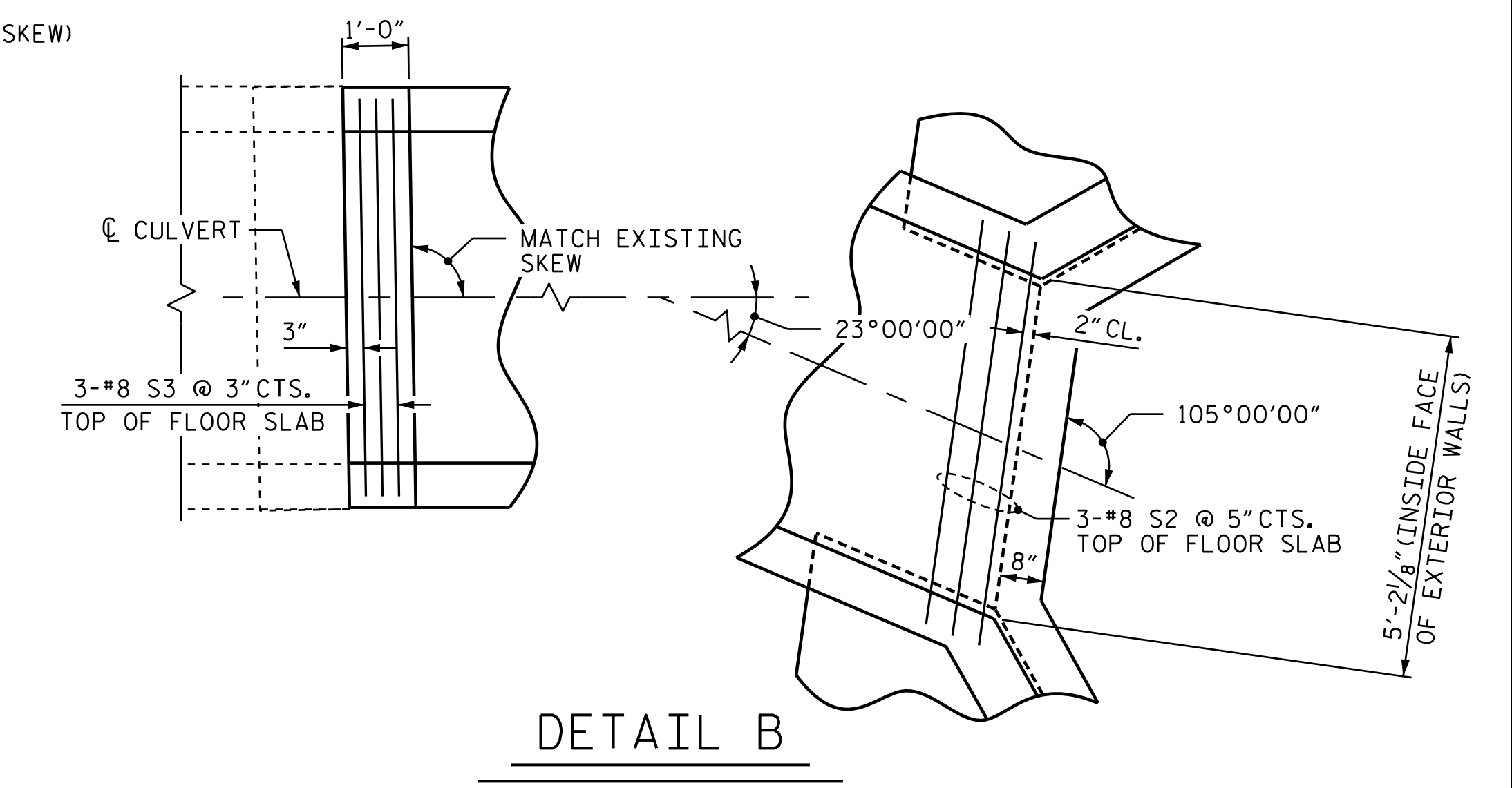


PLAN OF ROOF SLAB

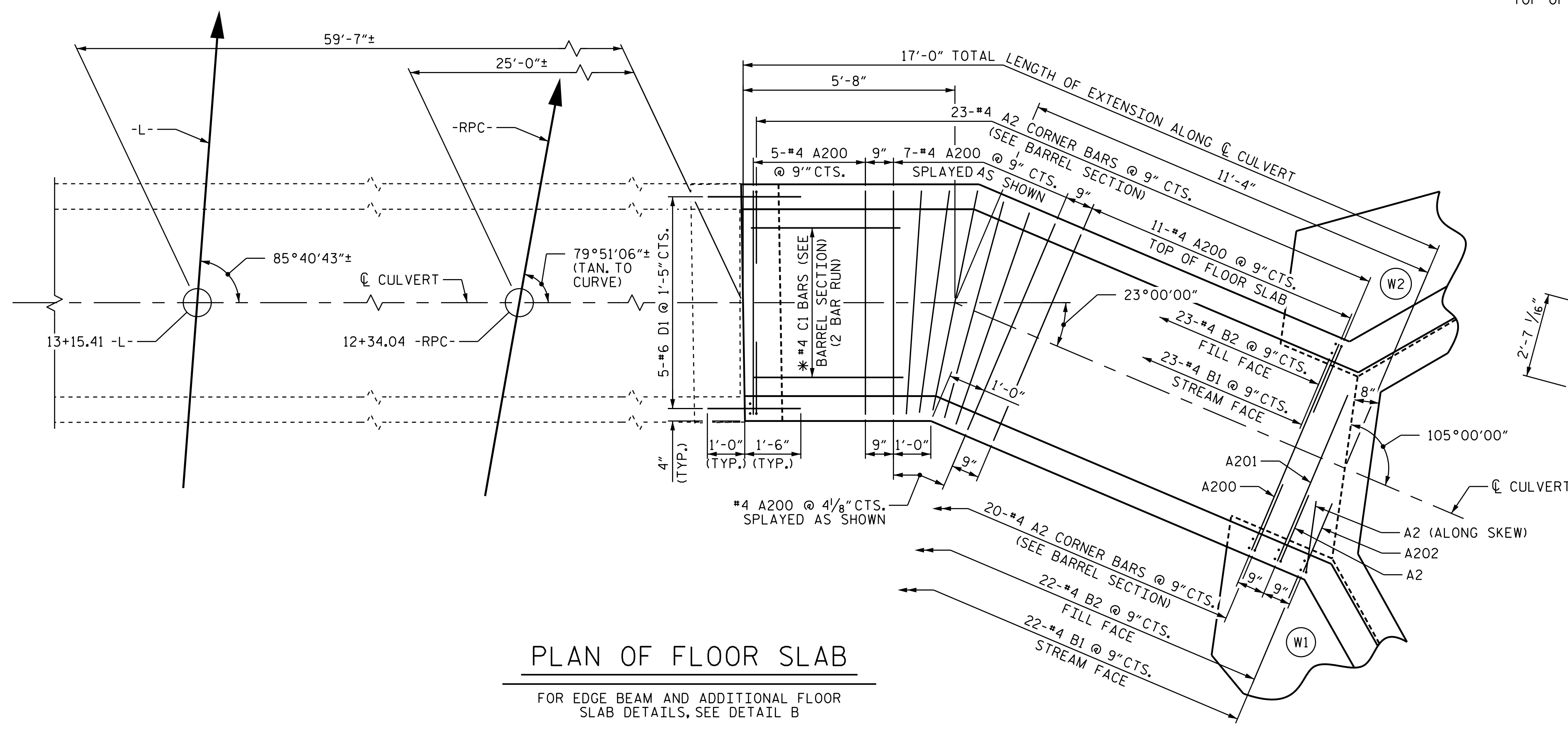
FOR EDGE BEAM AND HEADWALL DETAILS, SEE DETAIL A



DETAIL A

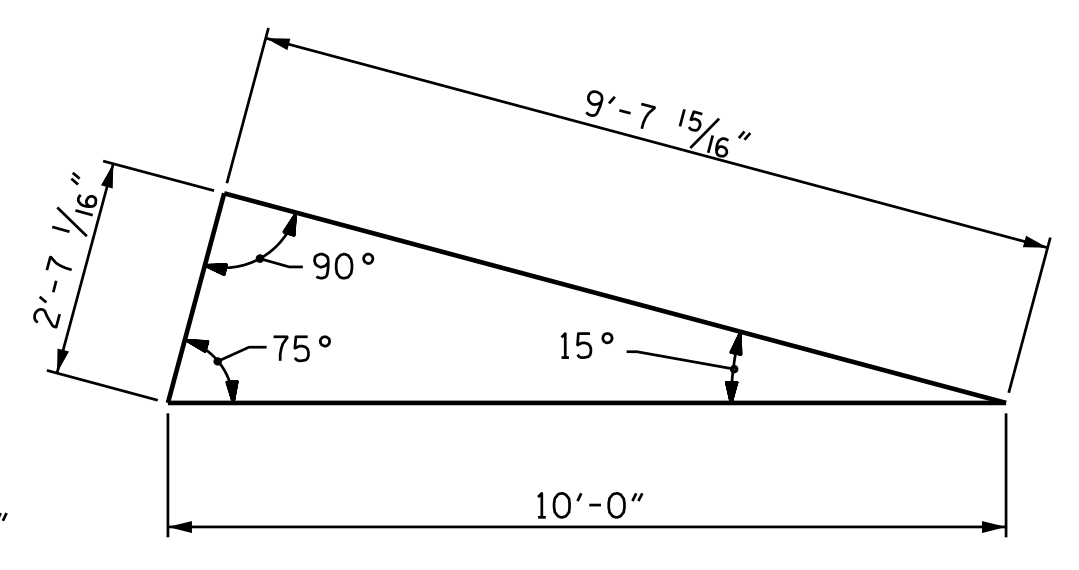


DETAIL B



PLAN OF FLOOR SLAB

FOR EDGE BEAM AND ADDITIONAL FLOOR SLAB DETAILS, SEE DETAIL B



SKEW TRIANGLE

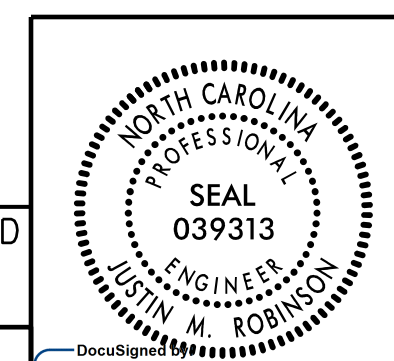
PROJECT NO. U-5896
GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE 5 FT. X 6 FT.
 CONCRETE BOX CULVERT
 85°40'43"± SKEW**

(INLET EXTENSION ONLY)



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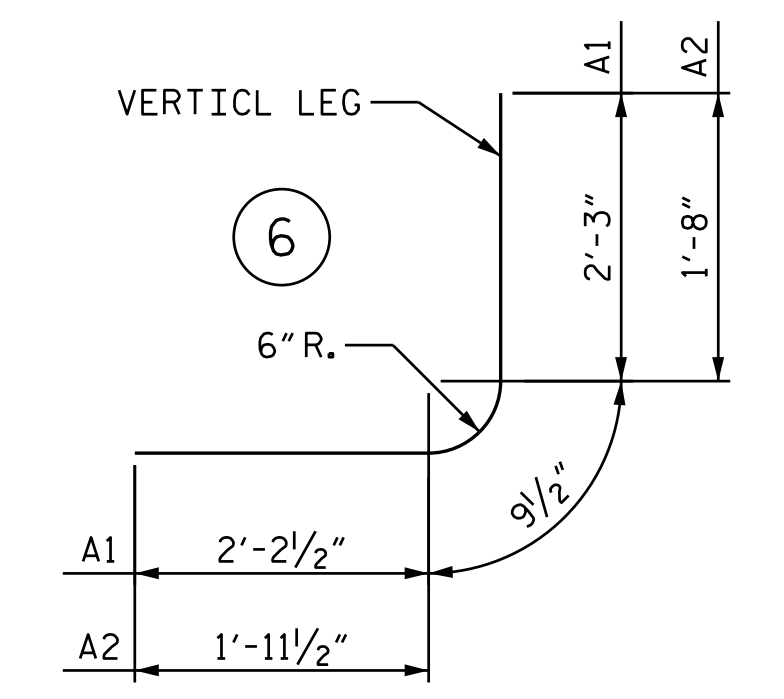
Justin Robinson
 3/10/2021

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 DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 10-2020

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

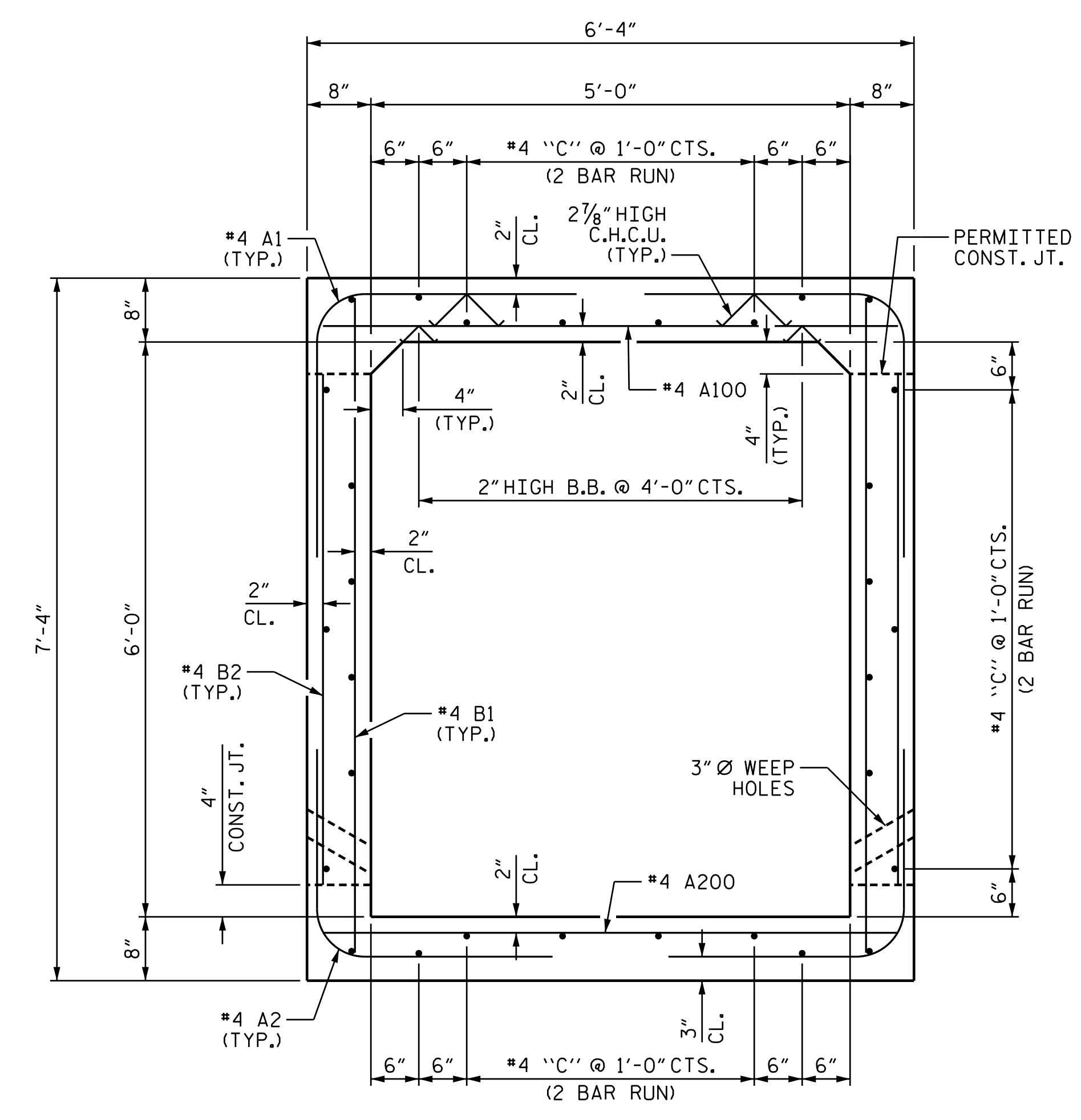
REINFORCING STEEL BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	45	#4	6	5'-3"	158
A2	45	#4	6	4'-5"	133
A100	23	#4	STR	6'-0"	92
A101	1	#4	STR	4'-10"	3
A102	1	#4	STR	2'-0"	1
A200	23	#4	STR	6'-0"	92
A201	1	#4	STR	4'-10"	3
A202	1	#4	STR	2'-0"	1
B1	45	#4	STR	6'-10"	205
B2	45	#4	STR	5'-4"	160
C1	60	#4	STR	9'-10"	394
D1	18	#6	STR	2'-6"	68
G1	2	#4	STR	6'-2"	8
S2	6	#8	STR	6'-2"	99
S3	6	#8	STR	6'-0"	96

REINFORCING STEEL LBS. 1,513

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
B1	#4	1'-10"
C1	#4	2'-5"



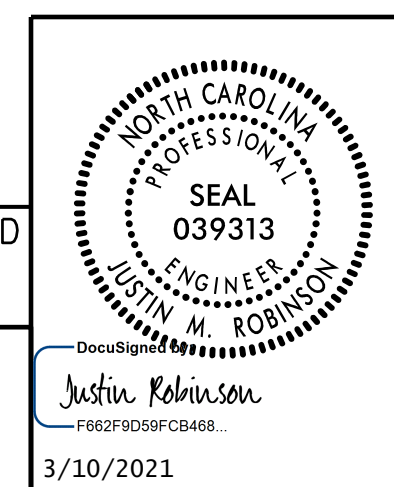
RIGHT ANGLE SECTION OF BARREL

THERE ARE 30 "C" BARS IN SECTION OF BARREL

PROJECT NO. U-5896
 GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 5 FT. X 6 FT.
 CONCRETE BOX CULVERT
 85°40'43"± SKEW
 (INLET EXTENSION ONLY)



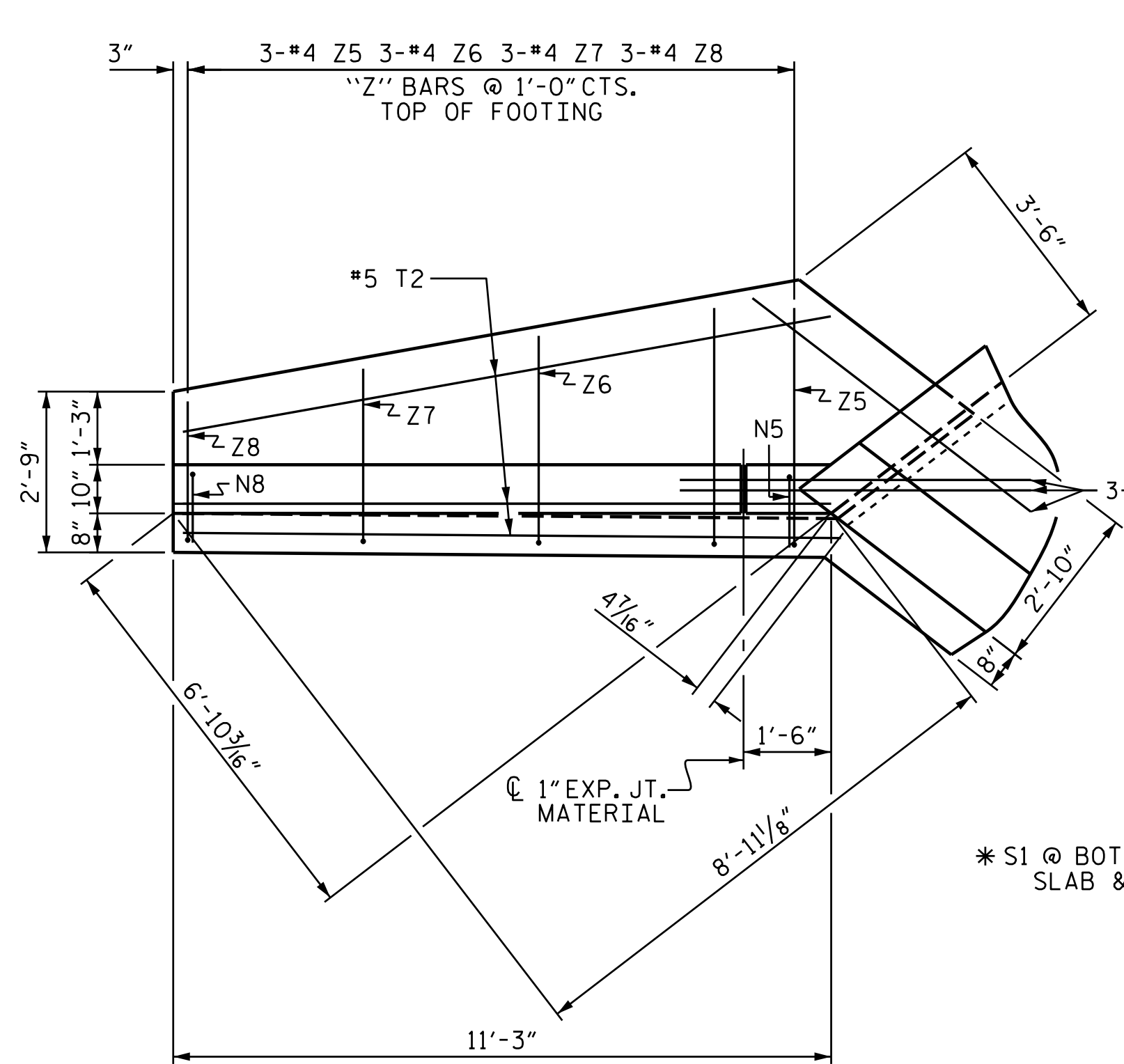
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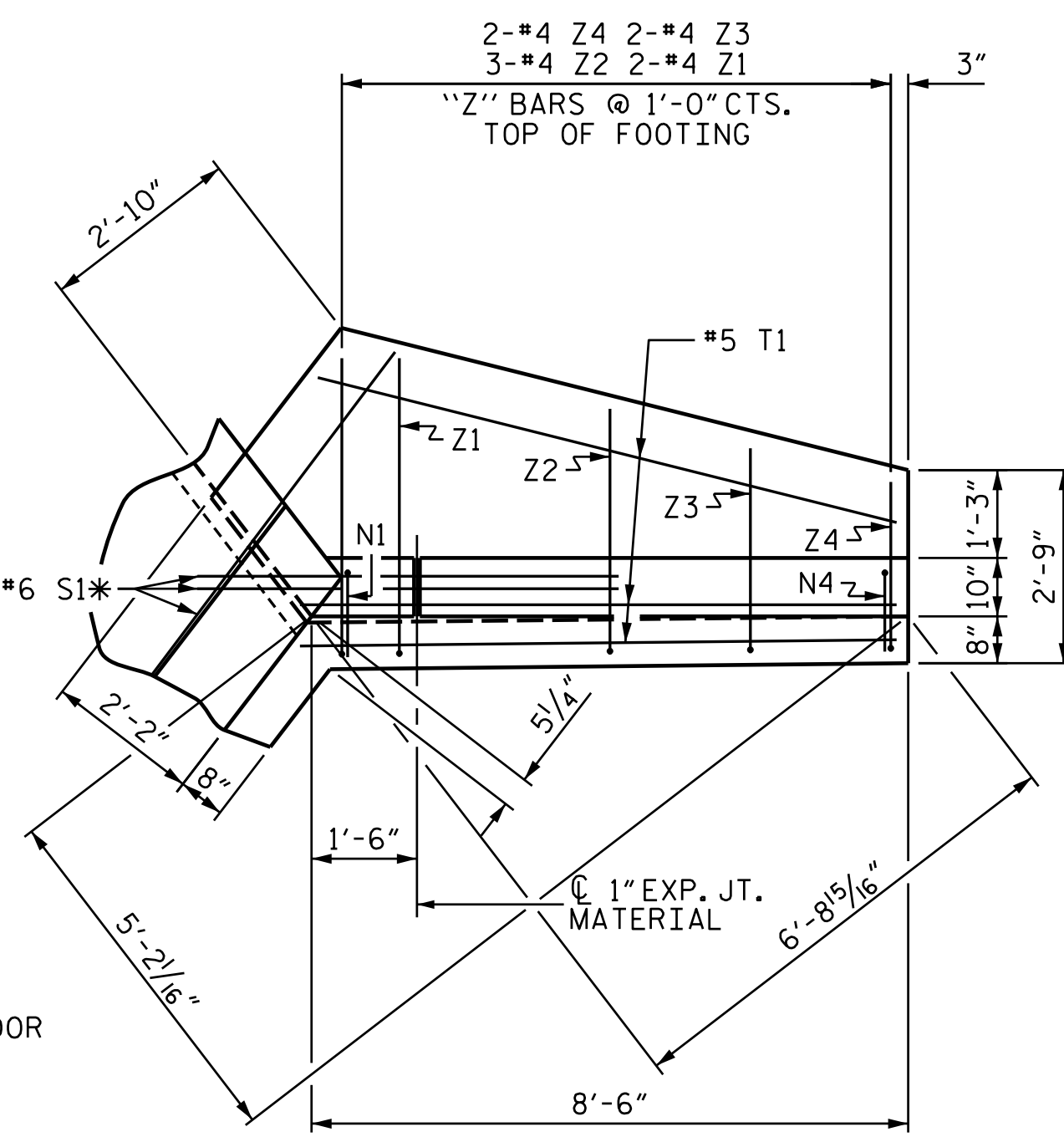
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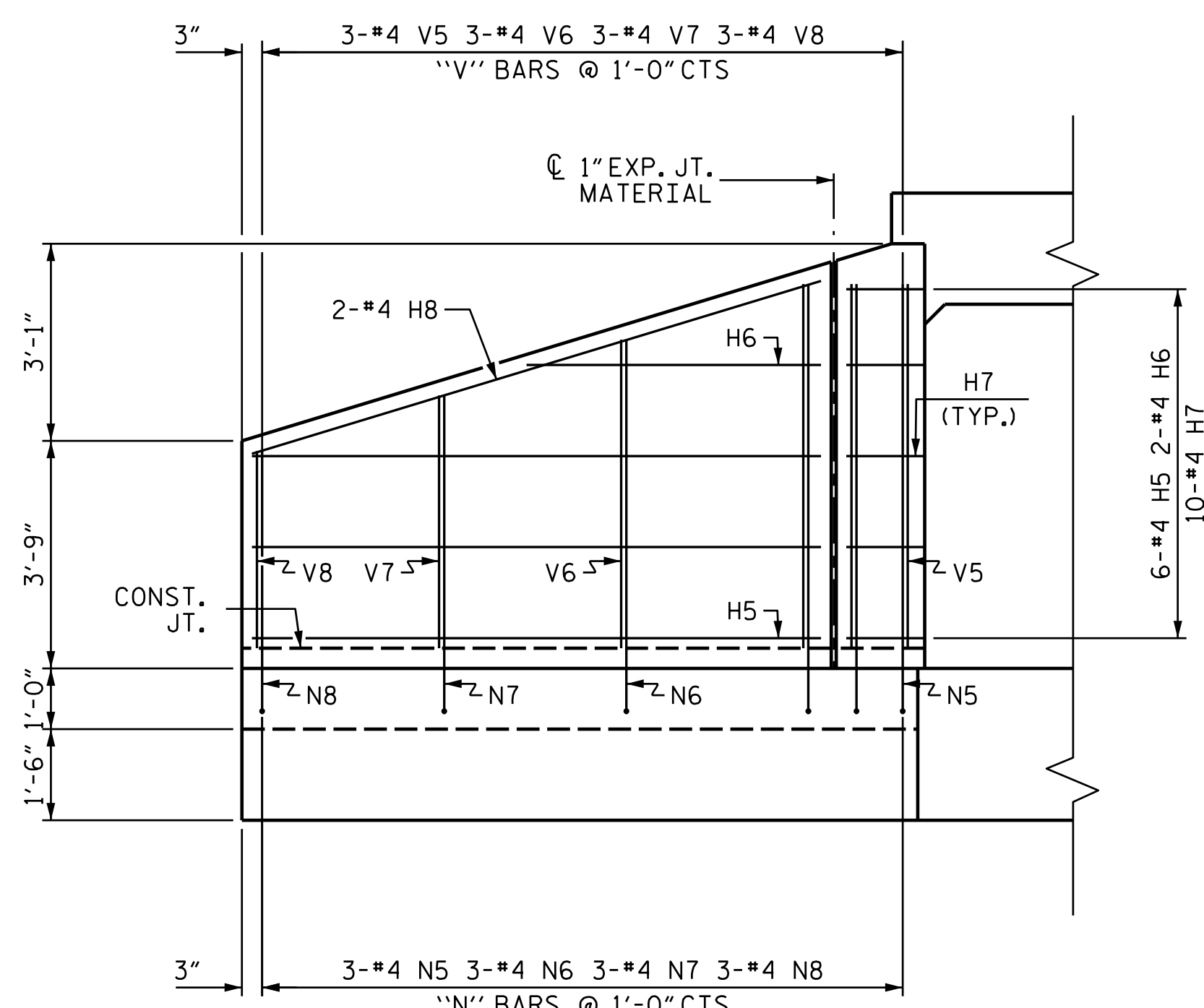
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 CHECKED BY: J. M. ROBINSON DATE: 8-2020
 DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 10-2020



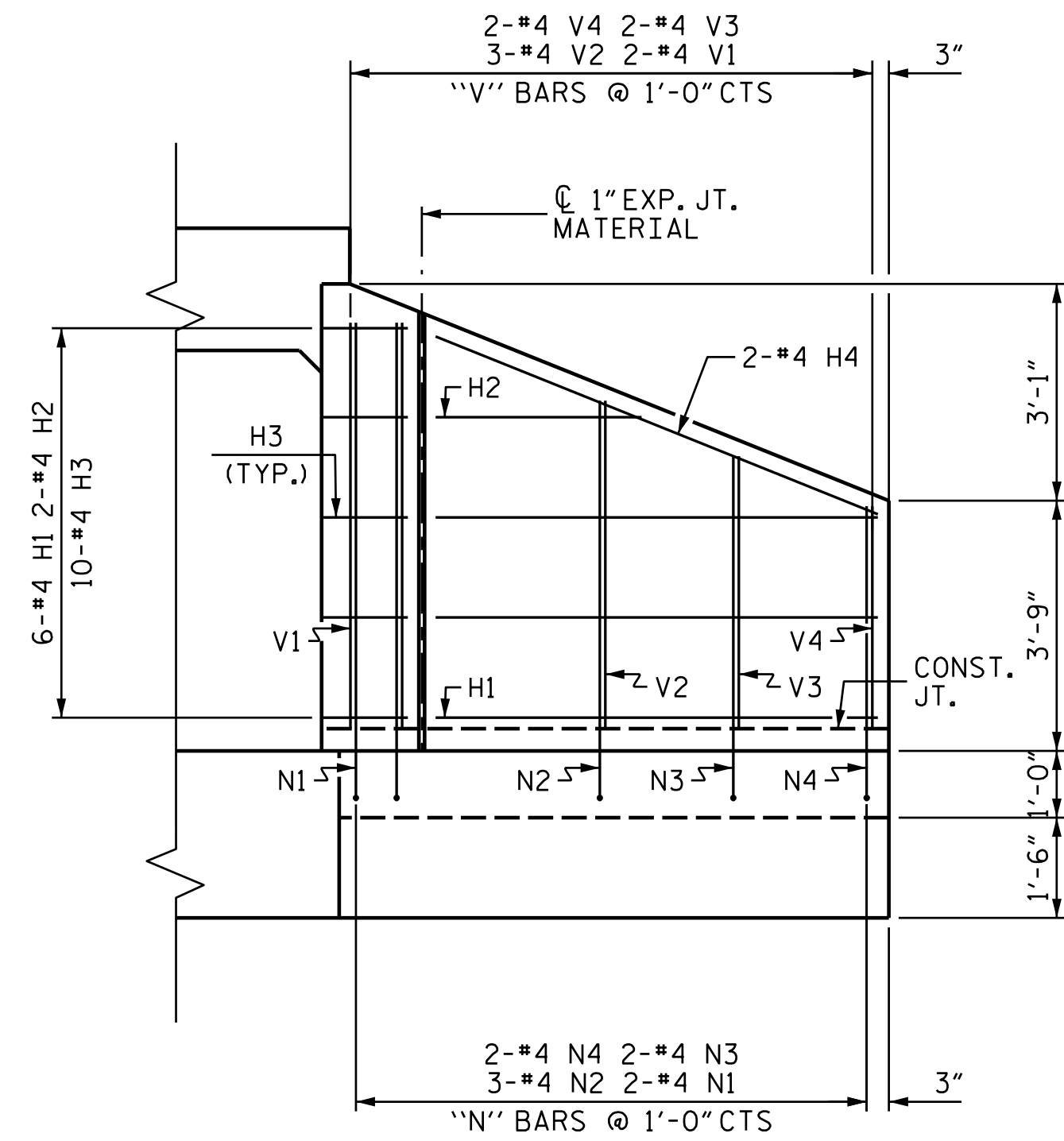
PLAN W1



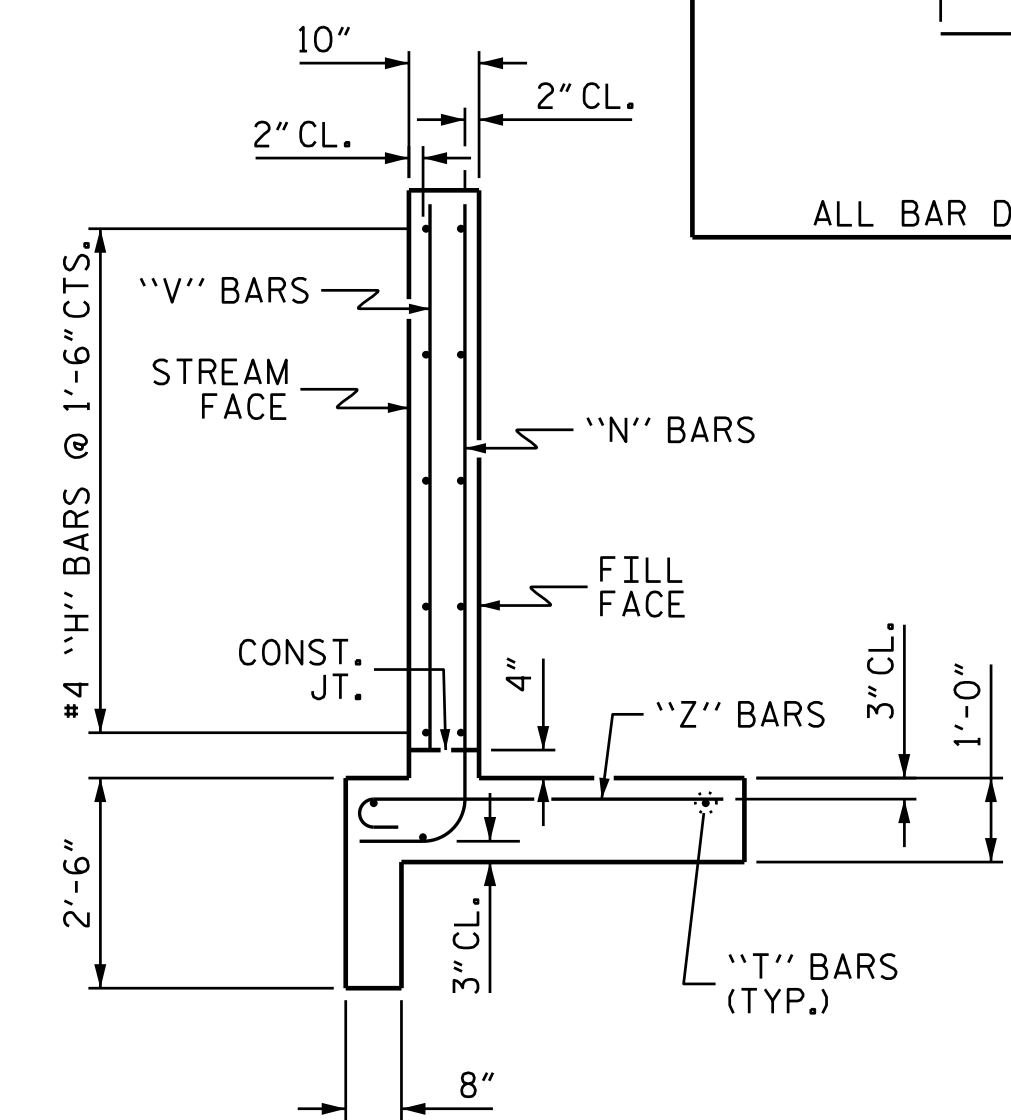
PLAN W2



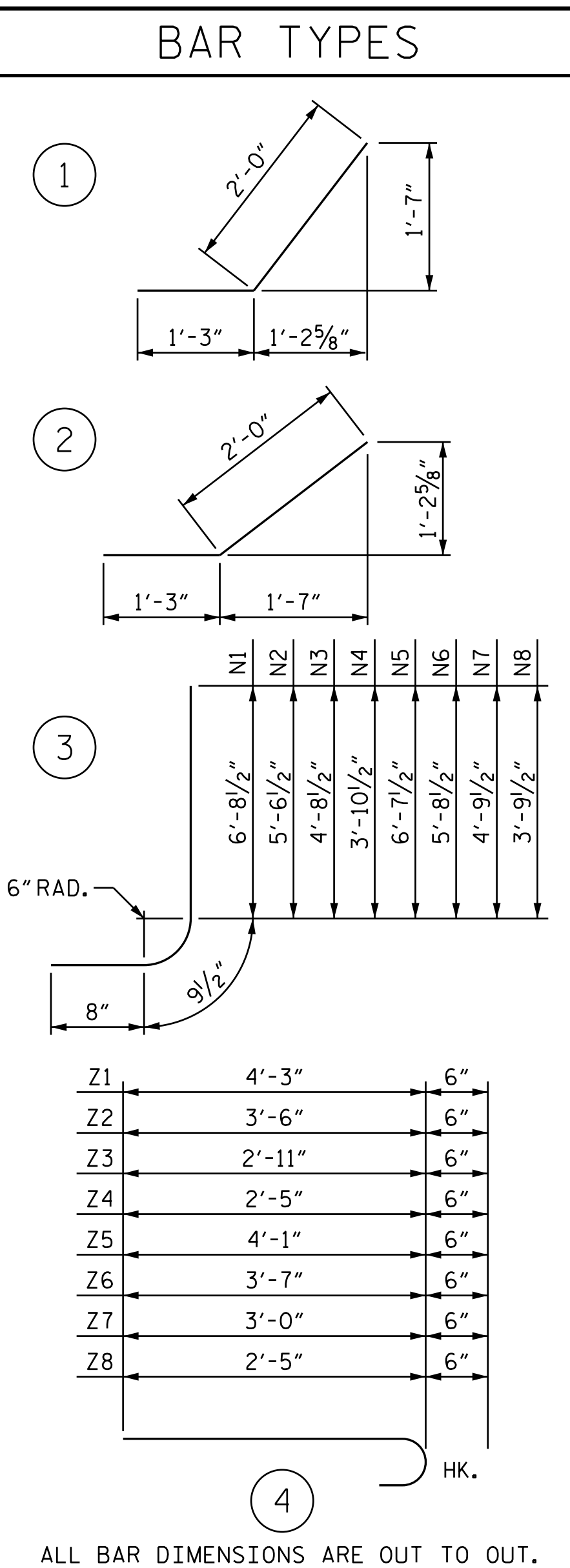
ELEVATION W1



ELEVATION W2



TYPICAL WING SECTION

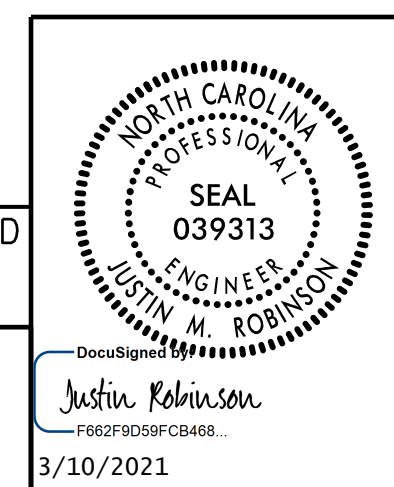


BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	6'-7"	26
H2	2	#4	STR	3'-1"	4
H3	10	#4	1	3'-3"	22
H4	2	#4	STR	7'-1"	9
H5	6	#4	STR	9'-4"	37
H6	2	#4	STR	4'-10"	6
H7	10	#4	2	3'-3"	22
H8	2	#4	STR	9'-9"	13
N1	2	#4	3	8'-2"	11
N2	3	#4	3	7'-0"	14
N3	2	#4	3	6'-2"	8
N4	2	#4	3	5'-4"	7
N5	3	#4	3	8'-1"	16
N6	3	#4	3	7'-2"	14
N7	3	#4	3	6'-3"	13
N8	3	#4	3	5'-3"	11
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	8'-6"	27
T2	3	#5	STR	11'-3"	35
V1	2	#4	STR	6'-1"	8
V2	3	#4	STR	4'-11"	10
V3	2	#4	STR	4'-1"	5
V4	2	#4	STR	3'-4"	4
V5	3	#4	STR	6'-0"	12
V6	3	#4	STR	5'-1"	10
V7	3	#4	STR	4'-2"	8
V8	3	#4	STR	3'-3"	7
Z1	2	#4	4	4'-9"	6
Z2	3	#4	4	4'-0"	8
Z3	2	#4	4	3'-5"	5
Z4	2	#4	4	2'-11"	4
Z5	3	#4	4	4'-7"	9
Z6	3	#4	4	4'-1"	8
Z7	3	#4	4	3'-6"	7
Z8	3	#4	4	2'-11"	6
REINFORCING STEEL FOR 2 WINGS					466 LBS
CLASS A CONCRETE					
2 WINGS					7.0 CY
1 HEADWALL					0.3 CY
1 END CURTAIN WALL					0.3 CY
2 EDGE BEAMS					0.5 CY
TOTAL					8.1 CY

PROJECT NO. U-5896
 GUILFORD COUNTY
 STATION: 13+15.41 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 2:1
 105° SKEW



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