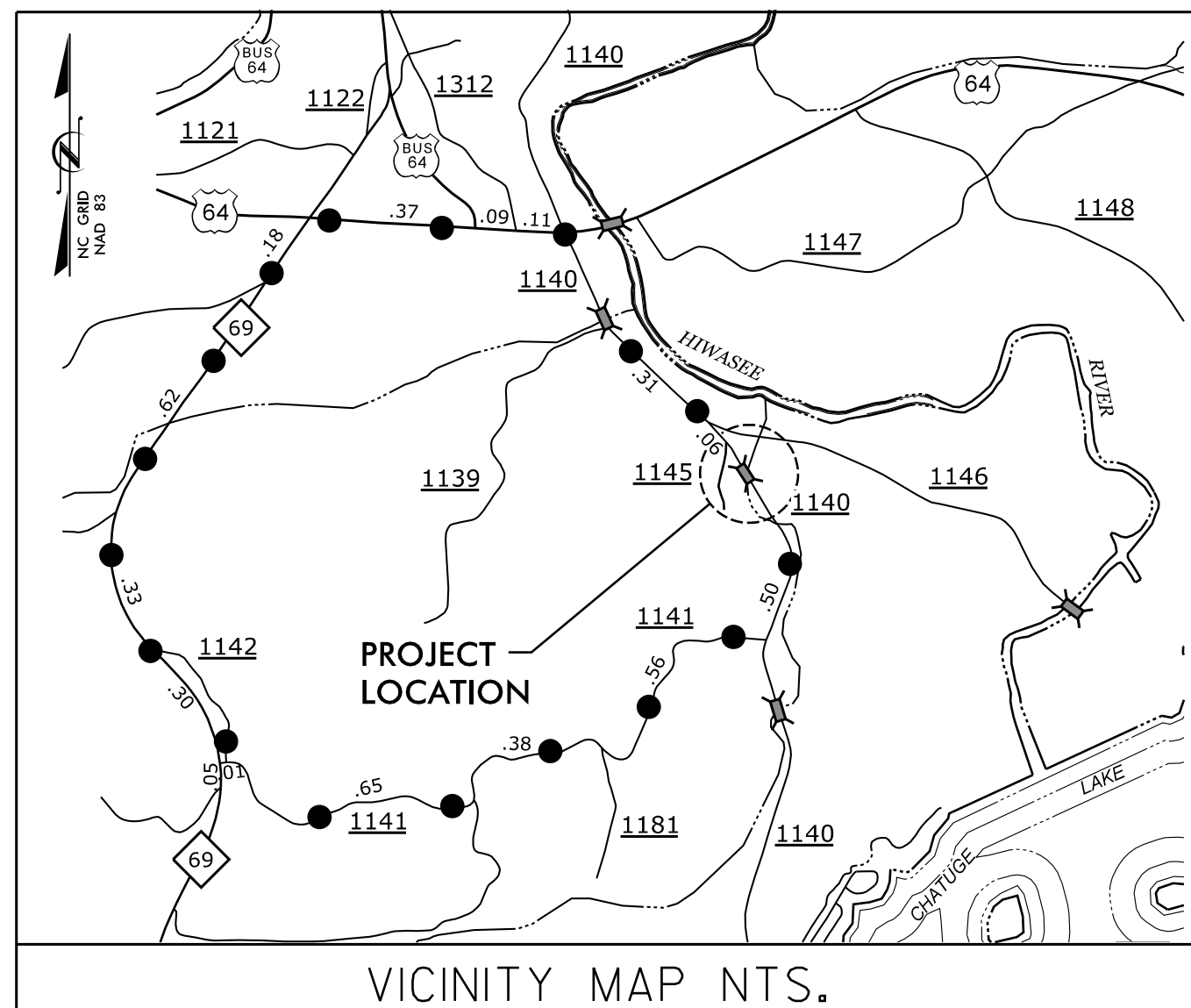


**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

CONTRACT: DN00124 TIP NO: 14SP.20221.1/.2



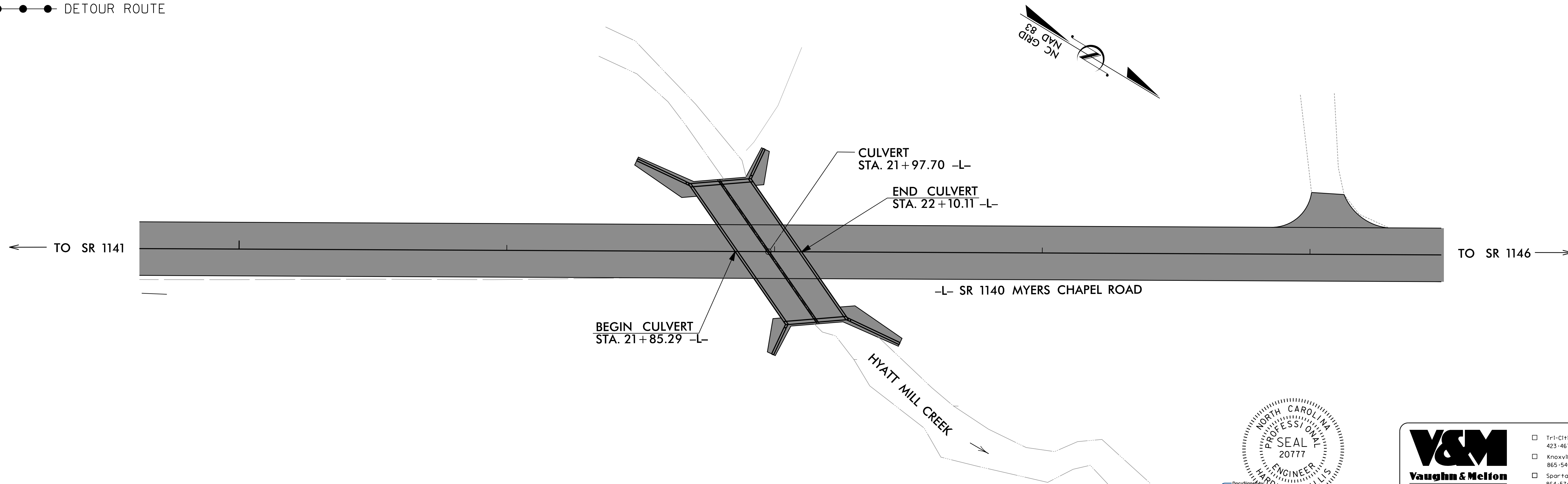
VICINITY MAP NTS.

---●--- DETOUR ROUTE

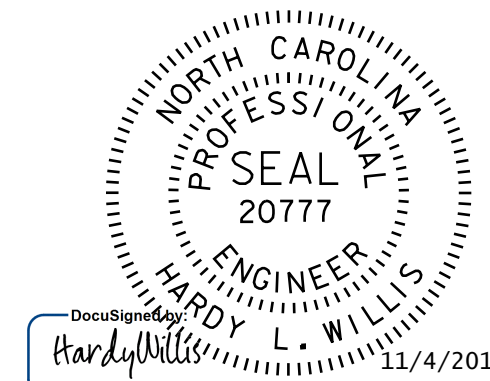
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CLAY COUNTY

**REPLACES BRIDGE 86 OVER HYATT MILL CREEK
ON SR 1140 BETWEEN SR 1141 AND SR 1146**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	14SP.20221.1/.2		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
14SP.20221.1/.2	N/A	P.E.	
14SP.20221.1/.2	N/A	RW & UTIL.	
14SP.20221.1/.2	N/A	CONST.	



CULVERT



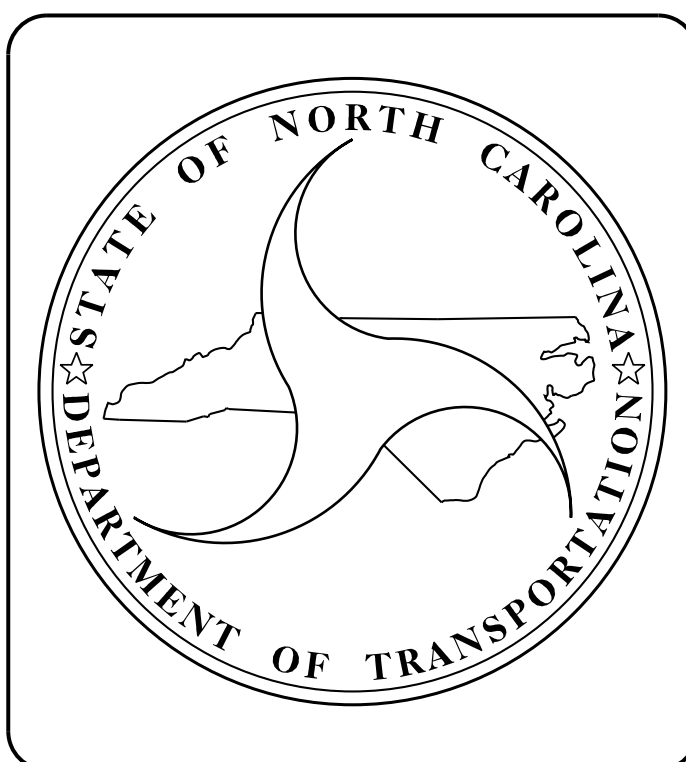
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, NC
828-253-2796

- Tri-Cities, TN 423-467-8401
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middlesboro, KY 606-248-6600
- Atlanta, GA 770-627-3509
- Charlotte, NC 704-357-0488
- Boone, NC 828-355-9933

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved



DESIGN DATA

ADT 2010 = 690
ADT 2025 = 1100

T = 6 %
V = 50 MPH

FUNC CLASS =
MINOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY PROJECT
14SP.20221.1/.2 = 0.213 MI.

LENGTH STRUCTURE PROJECT
14SP.20221.1 = 0.005 MI.

TOTAL LENGTH PROJECT
14SP.20221.1/.2 = 0.218 MI.

Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE, NC, 28806

FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

LETTING DATE :

HARDY L. WILLIS, PE
PROJECT ENGINEER

CHARLES J. RICE, EI
PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

JOSH DEYTON P.E.
STATE DESIGN ENGINEER

**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

APPROVED _____
DIVISION ADMINISTRATOR DATE

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER	
						LIVE-LOAD FACTORS (LL)	MOMENT				SHEAR				
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.13	--	1.75	1.13	1	BOT. OF SLAB	9.83	1.31	1	TOP OF SLAB	9.57	
	HL-93 (OPERATING)	N/A		1.47	--	1.35	1.47				1.70				
	HS-20 (INVENTORY)	36.000	②	1.13	40.7	1.75	1.13				1.34				
	HS-20 (OPERATING)	36.000		1.47	52.9	1.35	1.47		BOT. OF SLAB	9.83	1.74				
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.84	24.8	1.40	1.84		EXT. WALLS	0.00	2.47			
		SNGARBS2	20.000		1.77	35.4	1.40	1.77		EXT. WALLS	0.00	2.29			
		SNAGRIS2	22.000		1.84	40.5	1.40	1.84		EXT. WALLS	0.00	2.44		TOP OF SLAB	9.57
		SNCOTTS3	27.250		1.77	48.2	1.40	1.77		BOT. OF SLAB	9.83	2.72		BOT. OF SLAB	9.51
		SNAGGRS4	34.925		1.51	52.7	1.40	1.51	1			2.32	1		
		SNS5A	35.550		1.74	61.9	1.40	1.74				2.68			
		SNS6A	39.950		1.78	71.1	1.40	1.78				2.74			
	SNS7B	42.000		1.91	80.2	1.40	1.91		BOT. OF SLAB		2.95		BOT. OF SLAB	9.51	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.71	56.4	1.40	1.71		TOP OF SLAB		2.24		TOP OF SLAB	9.57
		TNT4A	33.075		1.94	64.2	1.40	1.94		BOT. OF SLAB		2.99		BOT. OF SLAB	9.51
		TNT6A	41.600		1.99	82.8	1.40	1.99				3.06			
		TNT7A	42.000		2.19	92.0	1.40	2.19				3.37			
		TNT7B	42.000		2.19	92.0	1.40	2.19				3.37			
		TNAGRIT4	43.000	③	1.49	64.1	1.40	1.49				2.30			
TNAGT5A		45.000		1.63	73.4	1.40	1.63				2.51				
TNAGT5B	45.000		1.63	73.4	1.40	1.63	1	BOT. OF SLAB	9.83	2.51	1	BOT. OF SLAB	9.51		

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	--

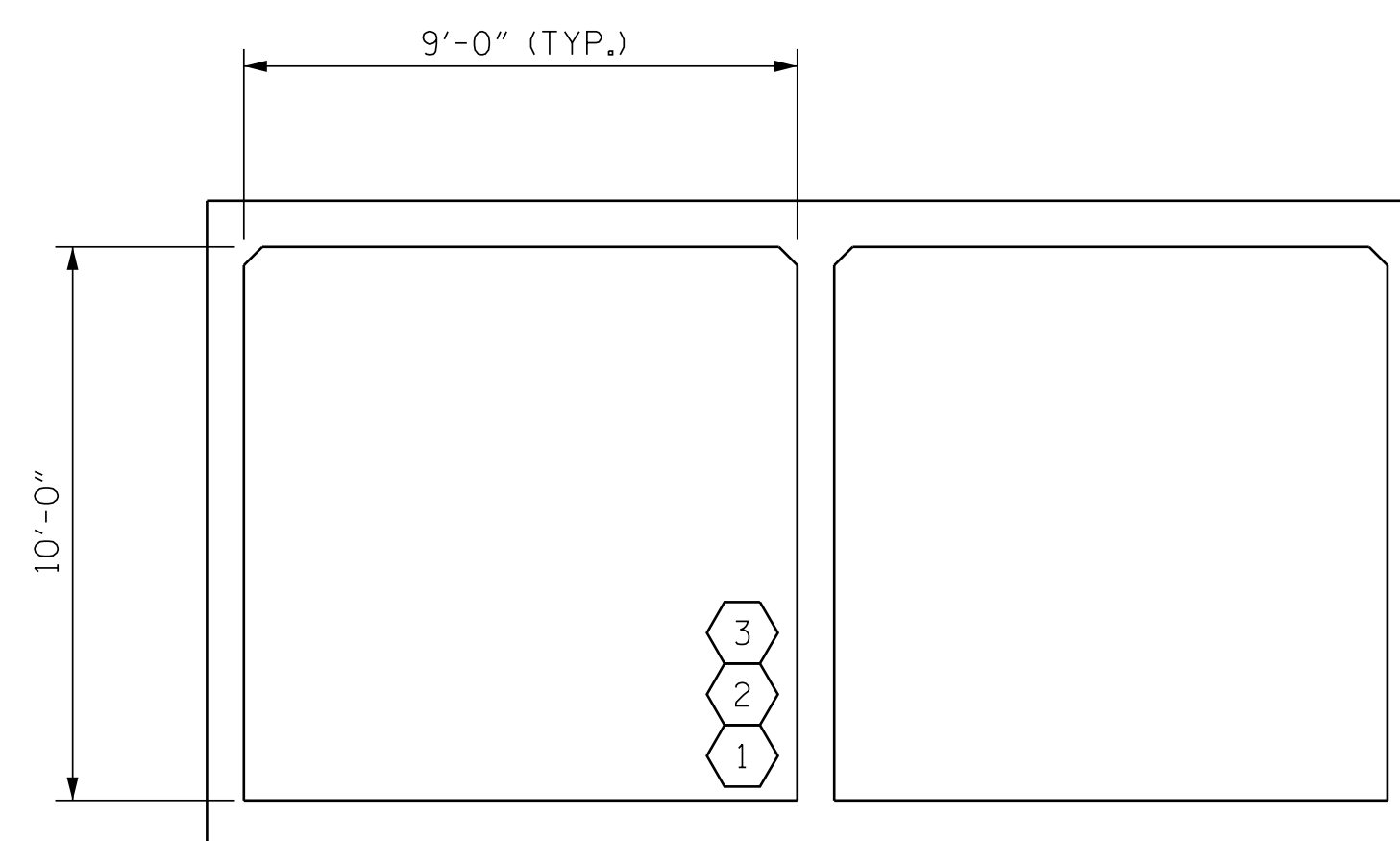
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

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

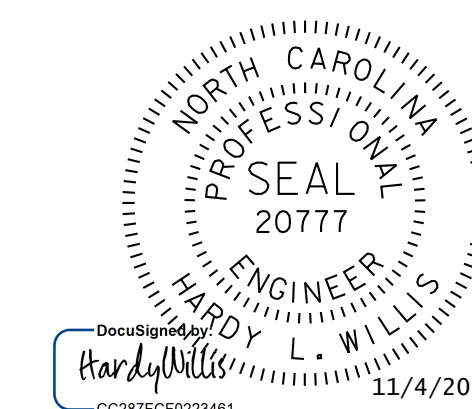
#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



BOX 1 BOX 2
LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. 14SP.20221.1/.2
CLAY COUNTY
STATION: 21+97.70 -L-

SHEET 9 OF 9



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

STD. NO. LRFR5

ASSEMBLED BY : MAF	DATE : 6/14
CHECKED BY : HLW	DATE : 6/14
DRAWN BY : WMC 7/11	REV. 10/1/11
CHECKED BY : GM 7/11	MAA/GM

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2 1/2".
- B. 4 - 1" Ø X 2 1/4" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

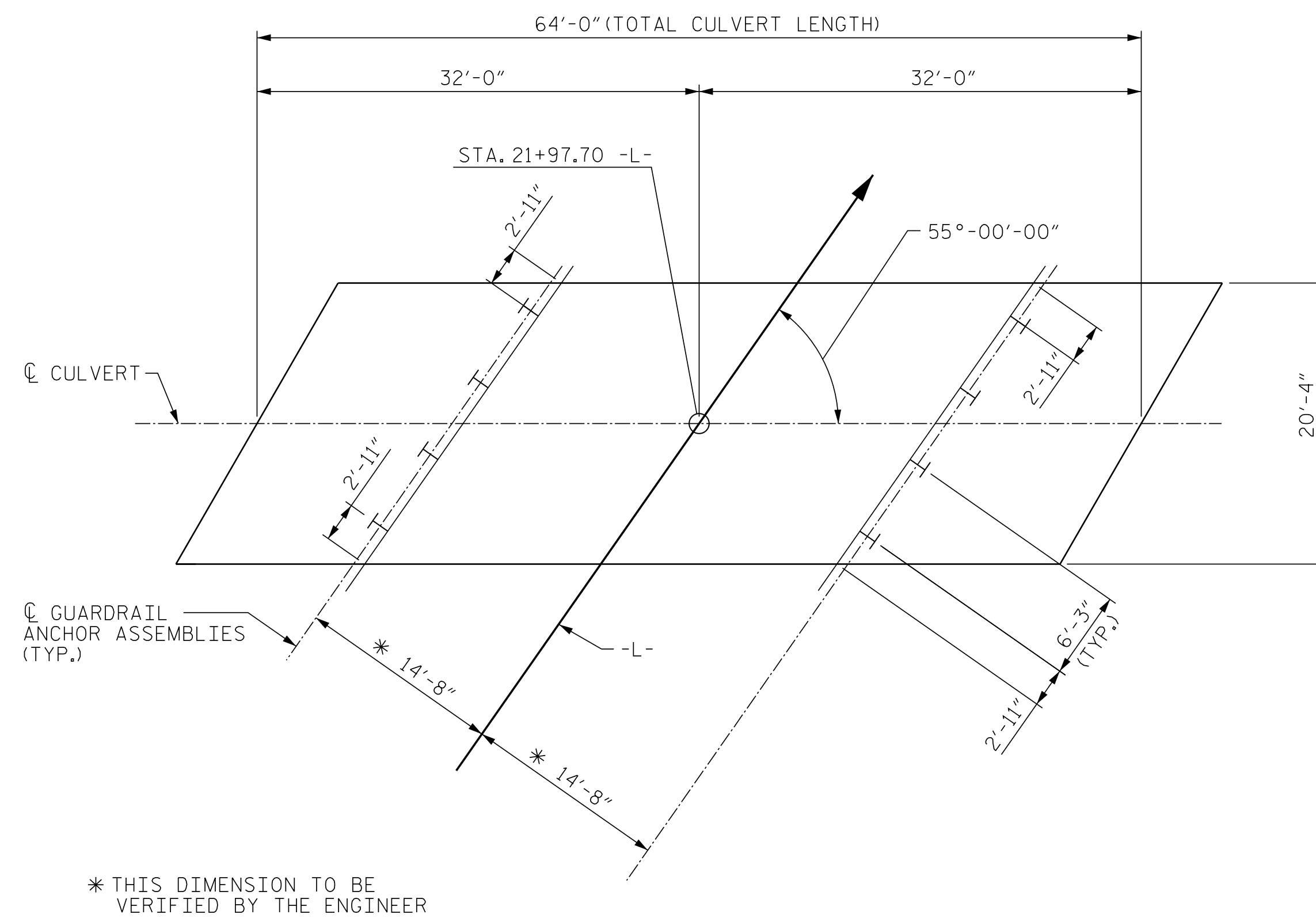
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

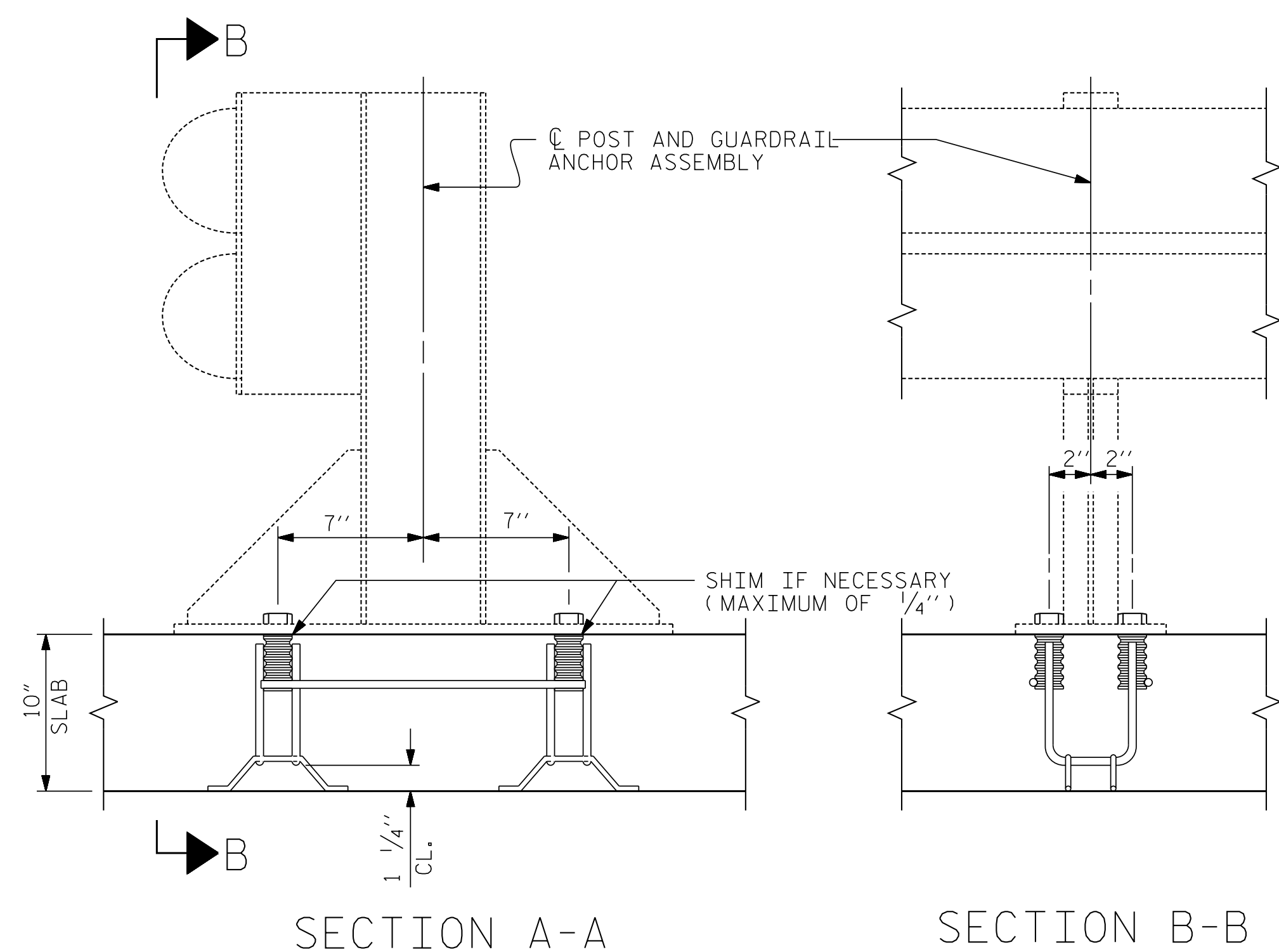
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



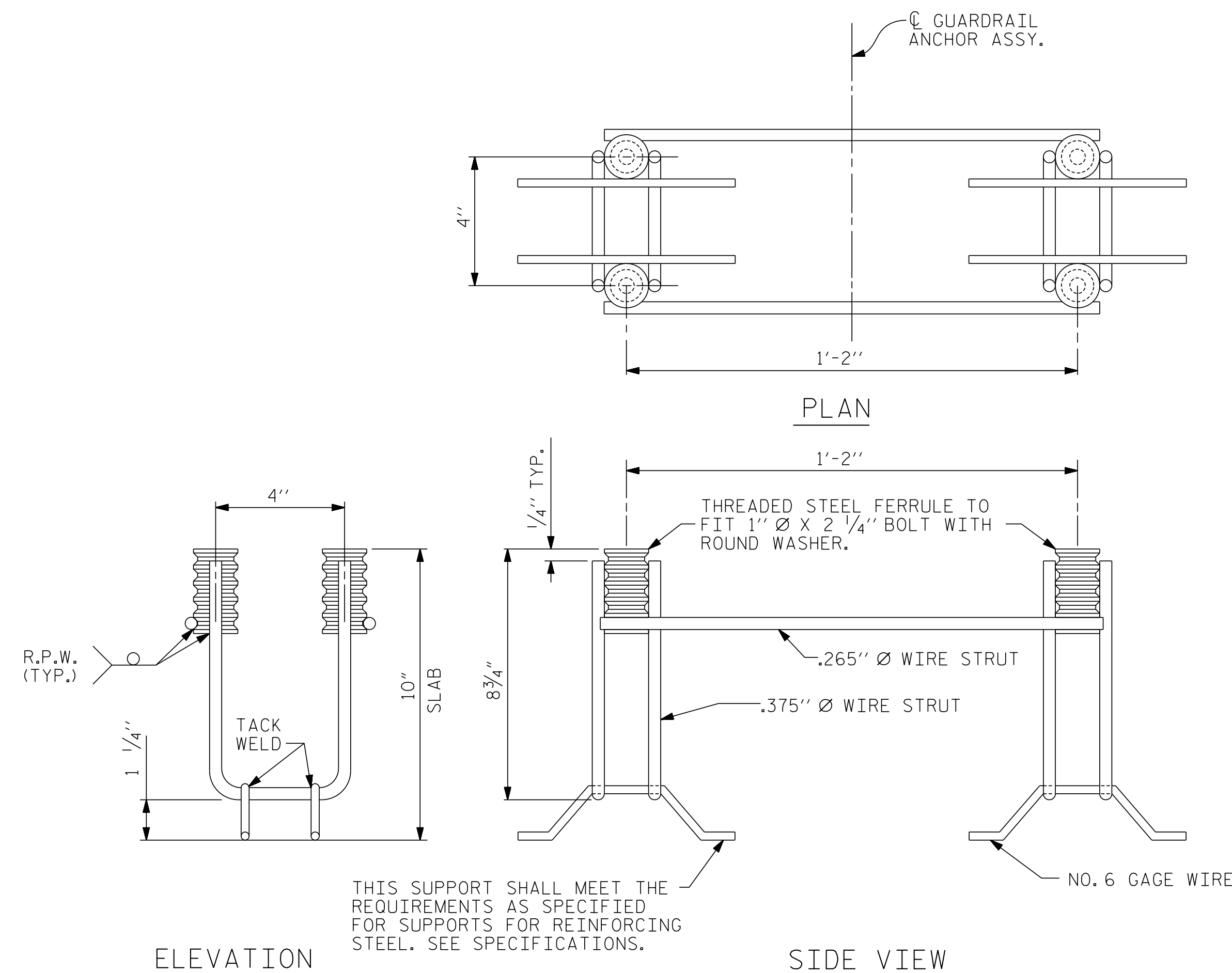
PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.



SECTION A-A

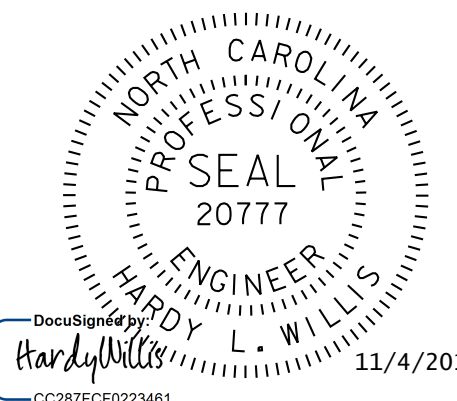
SECTION B-B



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 21+97.70 -L-

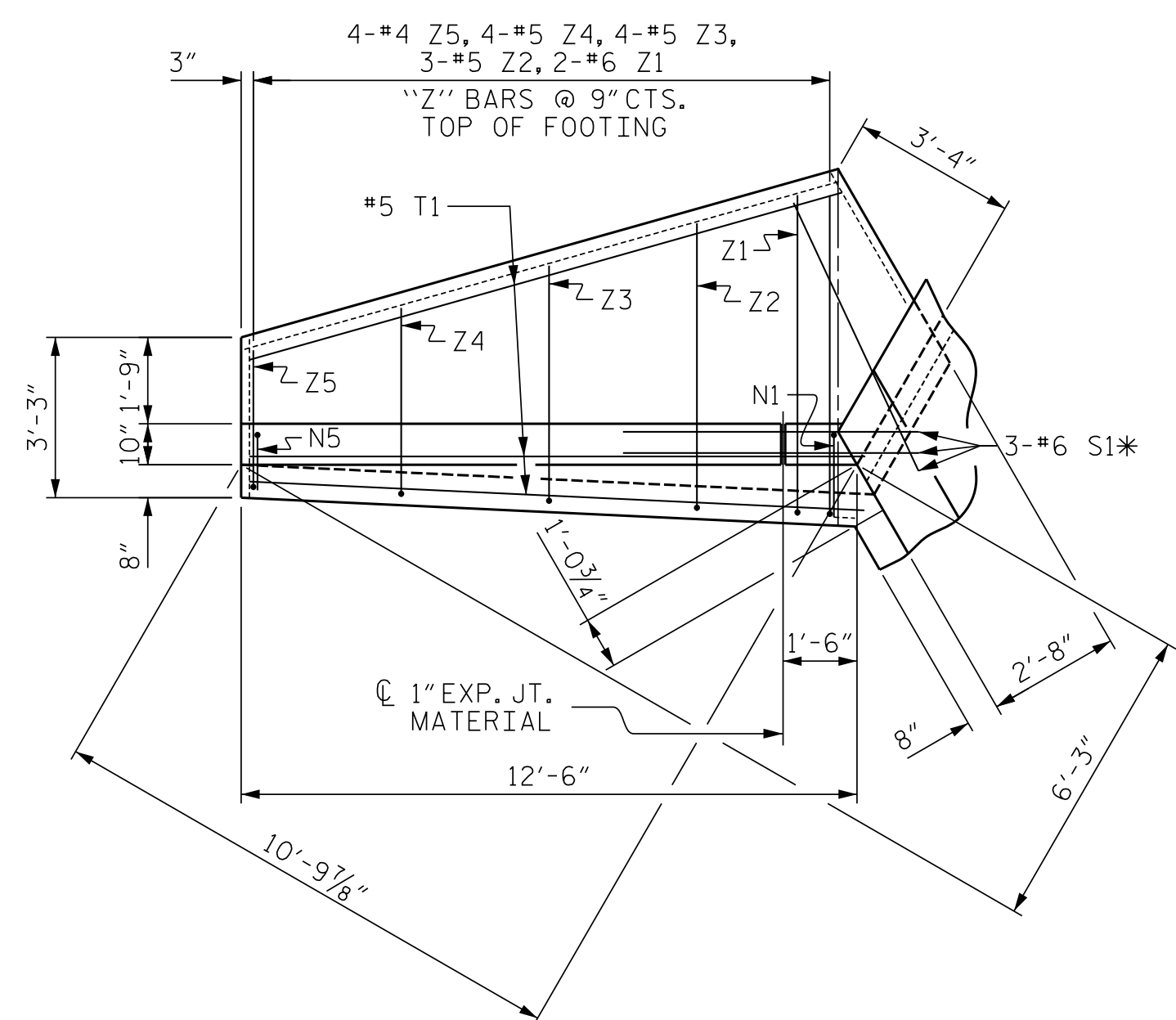
SHEET 8 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ANCHORAGE DETAILS FOR
 GUARDRAIL ANCHOR ASSEMBLY
 FOR CULVERTS

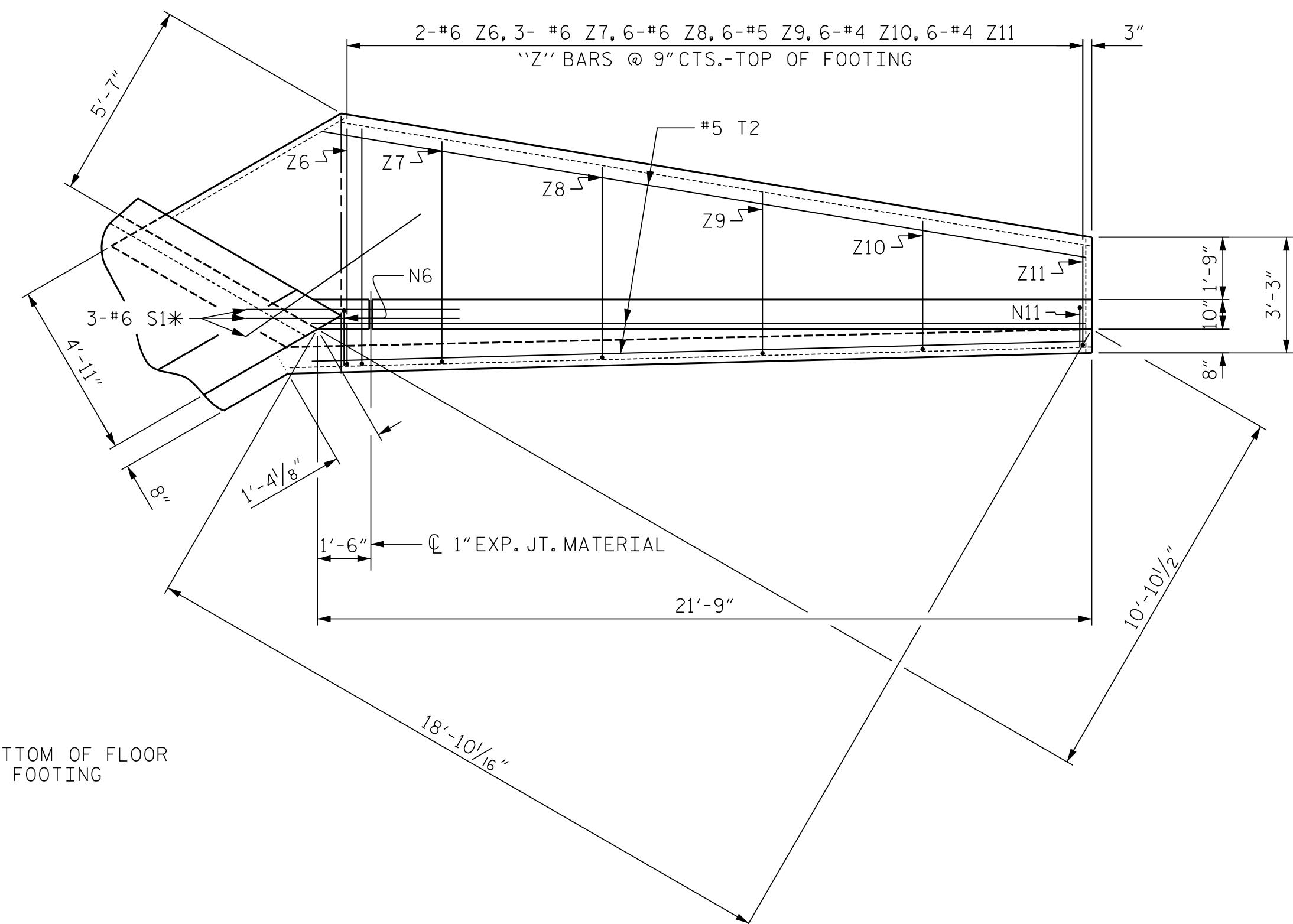
ASSEMBLED BY : MAF	DATE : 6/14
CHECKED BY : HLW	DATE : 6/14
DRAWN BY : FCJ 6/88	REV. 7/10/01 LES/RDR
CHECKED BY : ARB 6/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R KMM/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-18
1			3			TOTAL SHEETS
2			4			19

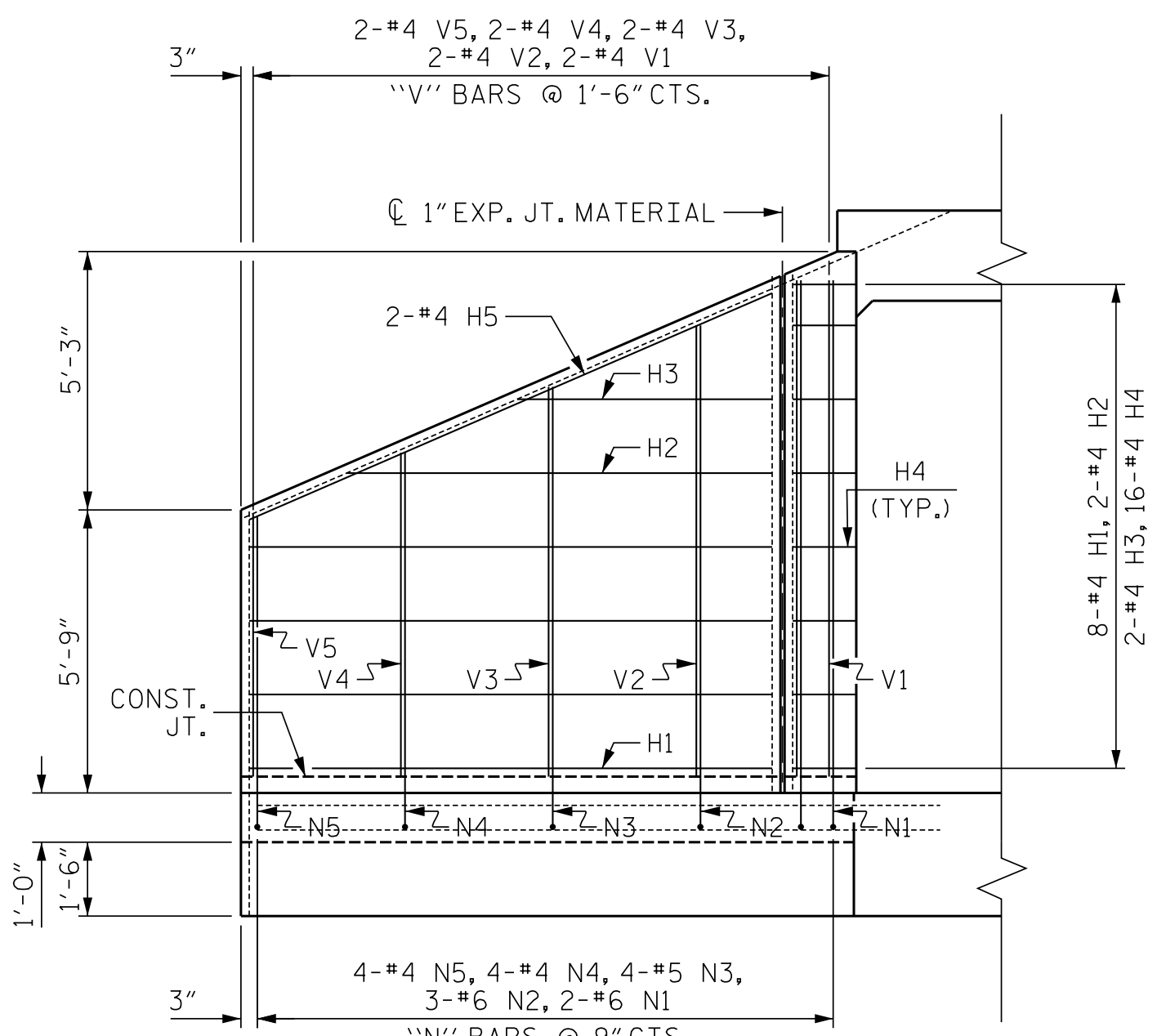
STD. NO. GRA1



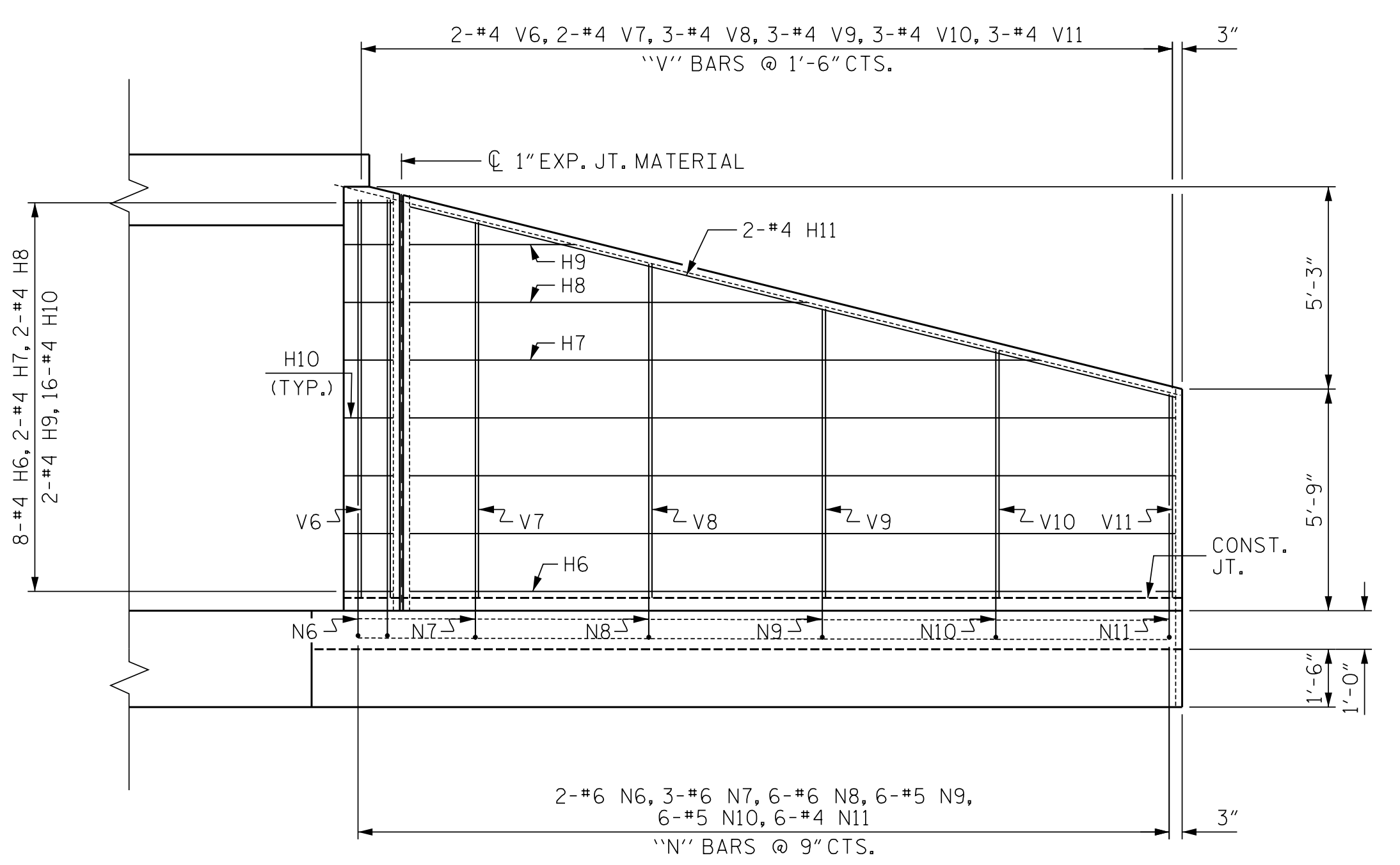
PLAN W2



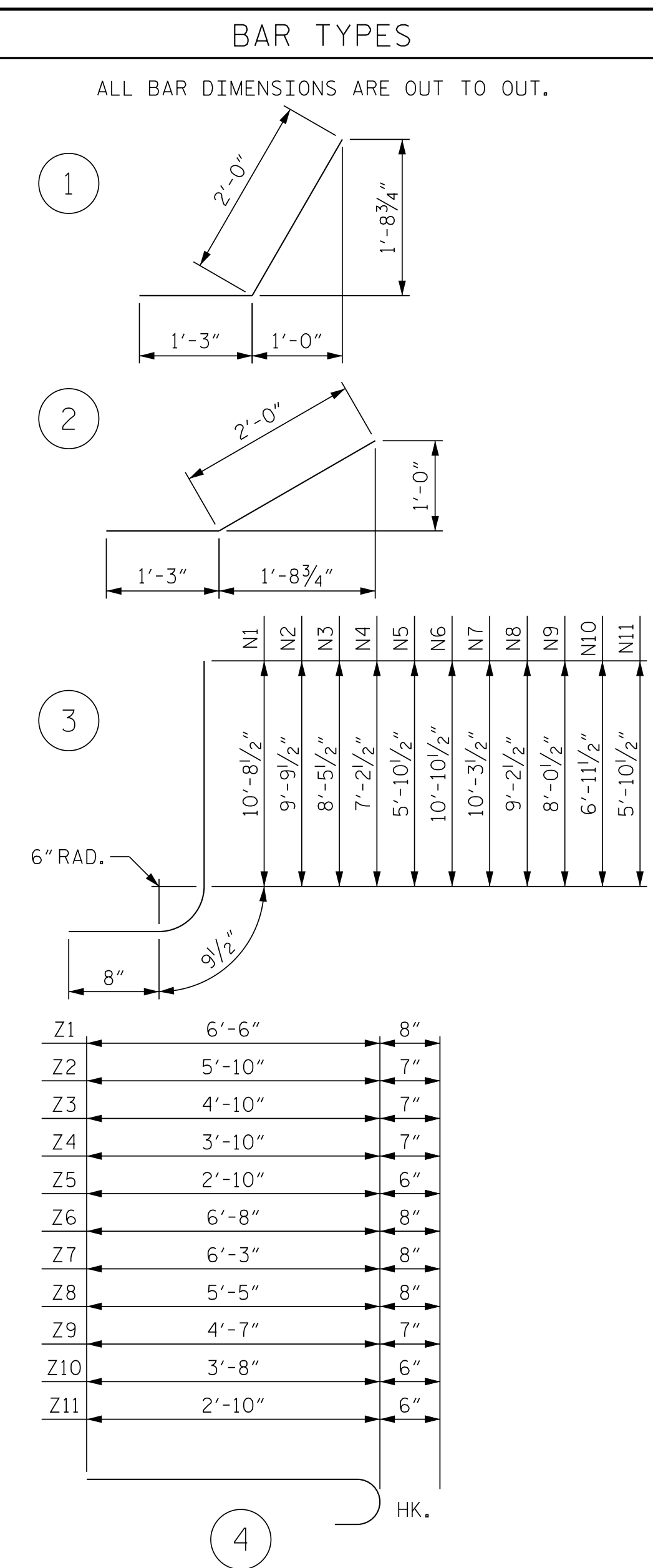
PLAN W1



ELEVATION W2

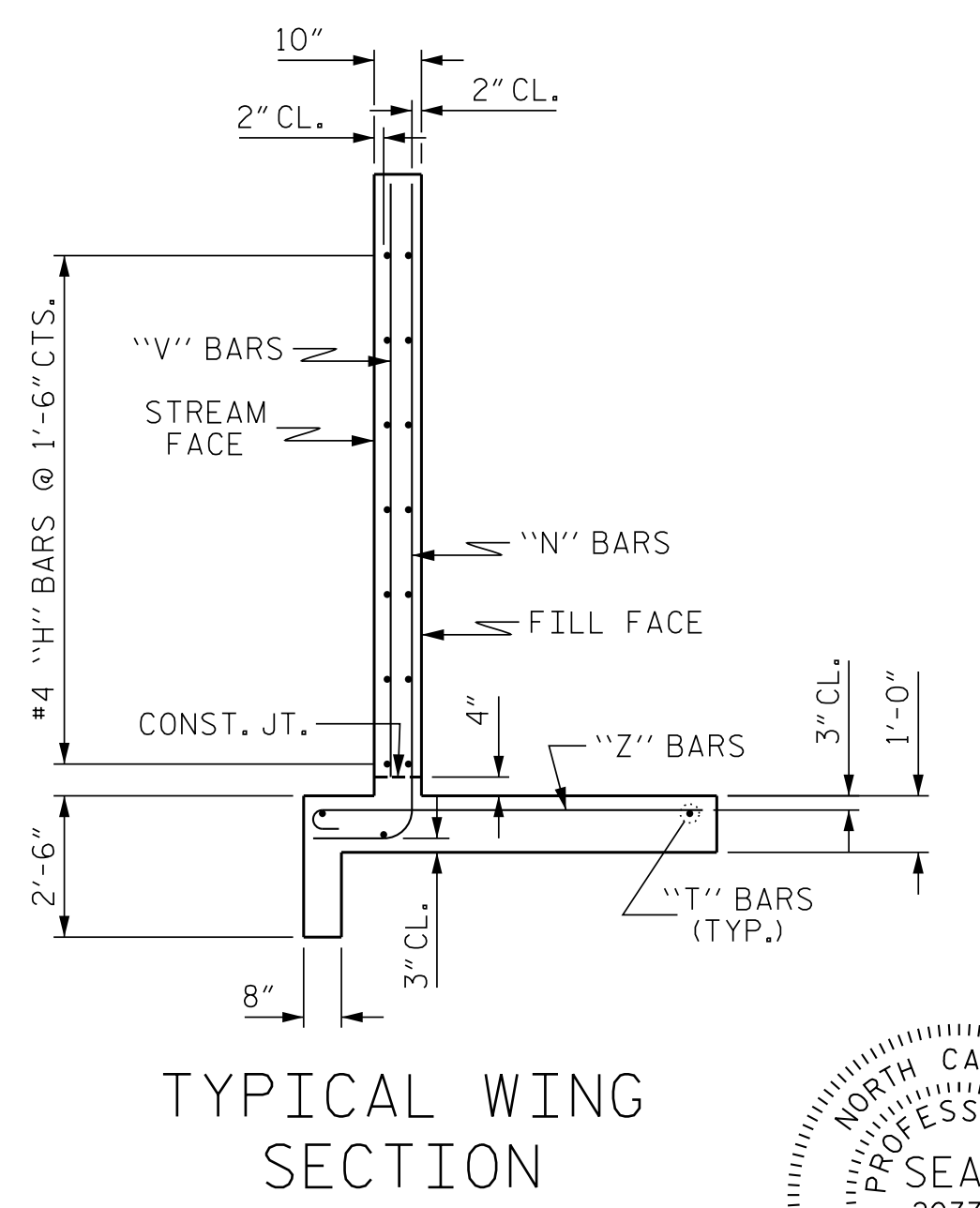


ELEVATION W1



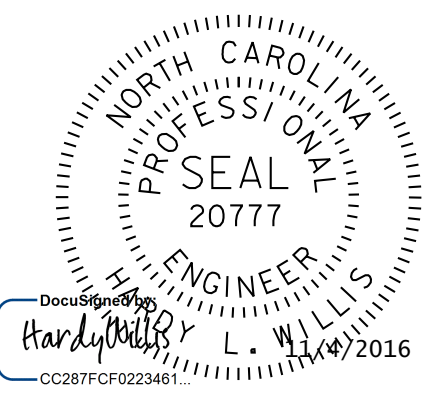
BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	16	#4	STR	10'-7"	113
H2	4	#4	STR	8'-7"	23
H3	4	#4	STR	5'-2"	14
H4	32	#4	1	3'-3"	69
H5	4	#4	STR	11'-7"	31
H6	16	#4	STR	19'-10"	212
H7	4	#4	STR	16'-4"	44
H8	4	#4	STR	10'-3"	27
H9	4	#4	STR	4'-3"	11
H10	32	#4	2	3'-3"	69
H11	4	#4	STR	20'-5"	55
N1	4	#6	3	12'-2"	73
N2	6	#6	3	11'-3"	101
N3	8	#5	3	9'-11"	83
N4	8	#4	3	8'-8"	46
N5	8	#4	3	7'-4"	39
N6	4	#6	3	12'-4"	74
N7	6	#6	3	11'-9"	106
N8	12	#6	3	10'-8"	192
N9	12	#5	3	9'-6"	119
N10	12	#5	3	8'-5"	105
N11	12	#4	3	7'-4"	59
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	12'-6"	78
T2	6	#5	STR	21'-9"	136
V1	4	#4	STR	10'-1"	27
V2	4	#4	STR	9'-2"	24
V3	4	#4	STR	7'-11"	21
V4	4	#4	STR	6'-7"	18
V5	4	#4	STR	5'-4"	14
V6	4	#4	STR	10'-4"	28
V7	4	#4	STR	9'-9"	26
V8	6	#4	STR	8'-8"	35
V9	6	#4	STR	7'-6"	30
V10	6	#4	STR	6'-5"	26
V11	6	#4	STR	5'-3"	21
Z1	4	#6	4	7'-2"	43
Z2	6	#5	4	6'-5"	40
Z3	8	#5	4	5'-5"	45
Z4	8	#5	4	4'-5"	37
Z5	8	#4	4	3'-4"	18
Z6	4	#6	4	7'-4"	44
Z7	6	#6	4	6'-11"	62
Z8	12	#6	4	6'-1"	110
Z9	12	#5	4	5'-2"	65
Z10	12	#4	4	4'-2"	33
Z11	12	#4	4	3'-4"	27

REINFORCING STEEL FOR 4 WINGS	2781 LBS
CLASS A CONCRETE	
4 WINGS	36.0 CY
2 HEADWALLS	2.2 CY
2 END CURTAIN WALLS	2.4 CY
TOTAL	40.6 CY



TYPICAL WING SECTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. 14SP.20221.1/2
 CLAY COUNTY
 STATION: 21+97.70 -L-
 SHEET 7 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 60° OR 120° SKEW

ASSEMBLED BY : MAF	DATE : 6/14
CHECKED BY : HLW	DATE : 6/14
DRAWN BY : CCJ 12/99	
CHECKED BY : RWW 03/00	

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
				C-17	
				TOTAL SHEETS	19

BILL OF MATERIAL

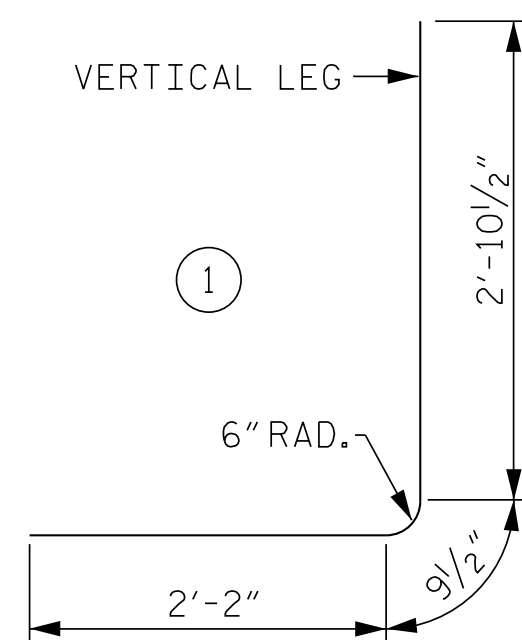
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	344	4	①	5'-10"	1340						
A100	70	5	STR.	20'-0"	1460	B1	128	4	STR.	11'-4"	969
A101	2	5	STR.	18'-11"	39	B2	128	4	STR.	9'-2"	784
A102	2	5	STR.	17'-8"	37	B3	128	4	STR.	11'-4"	969
A103	2	5	STR.	16'-4"	34						
A104	2	5	STR.	15'-1"	31	C1	285	4	STR.	22'-5"	4268
A105	2	5	STR.	13'-9"	29						
A106	2	5	STR.	12'-5"	26	D1	6	6	STR.	2'-6"	23
A107	2	5	STR.	11'-2"	23						
A108	2	5	STR.	9'-10"	21	G1	8	5	STR.	23'-1"	193
A109	2	5	STR.	8'-7"	18						
A110	2	5	STR.	7'-3"	15	S2	12	8	STR.	23'-1"	740
A111	2	5	STR.	5'-11"	12						
A112	2	5	STR.	4'-8"	10						
A113	2	5	STR.	3'-4"	7						
A114	2	5	STR.	2'-1"	4						
A200	70	5	STR.	20'-0"	1460						
A201	2	5	STR.	18'-11"	39						
A202	2	5	STR.	17'-8"	37						
A203	2	5	STR.	16'-4"	34						
A204	2	5	STR.	15'-1"	31						
A205	2	5	STR.	13'-9"	29						
A206	2	5	STR.	12'-5"	26						
A207	2	5	STR.	11'-2"	23						
A208	2	5	STR.	9'-10"	21						
A209	2	5	STR.	8'-7"	18						
A210	2	5	STR.	7'-3"	15						
A211	2	5	STR.	5'-11"	12						
A212	2	5	STR.	4'-8"	10						
A213	2	5	STR.	3'-4"	7						
A214	2	5	STR.	2'-1"	4						
A300	70	5	STR.	20'-0"	1460						
A301	2	5	STR.	18'-11"	39						
A302	2	5	STR.	17'-8"	37						
A303	2	5	STR.	16'-4"	34						
A304	2	5	STR.	15'-1"	31						
A305	2	5	STR.	13'-9"	29						
A306	2	5	STR.	12'-5"	26						
A307	2	5	STR.	11'-2"	23						
A308	2	5	STR.	9'-10"	21						
A309	2	5	STR.	8'-7"	18						
A310	2	5	STR.	7'-3"	15						
A311	2	5	STR.	5'-11"	12						
A312	2	5	STR.	4'-8"	10						
A313	2	5	STR.	3'-4"	7						
A314	2	5	STR.	2'-1"	4						
A400	70	5	STR.	20'-0"	1460						
A401	2	5	STR.	18'-11"	39						
A402	2	5	STR.	17'-8"	37						
A403	2	5	STR.	16'-4"	34						
A404	2	5	STR.	15'-1"	31						
A405	2	5	STR.	13'-9"	29						
A406	2	5	STR.	12'-5"	26						
A407	2	5	STR.	11'-2"	23						
A408	2	5	STR.	9'-10"	21						
A409	2	5	STR.	8'-7"	18						
A410	2	5	STR.	7'-3"	15						
A411	2	5	STR.	5'-11"	12						
A412	2	5	STR.	4'-8"	10						
A413	2	5	STR.	3'-4"	7						
A414	2	5	STR.	2'-1"	4						

BARREL REINFORCING STEEL: 16,350 LB.
 BARREL AND SILLS
 CLASS A CONCRETE 141.7 CY

SPLICE LENGTH CHART

BAR SIZE	SPLICE LENGTH
#4	1'-9"
#5	2'-2"
#6	2'-9"

BAR TYPES



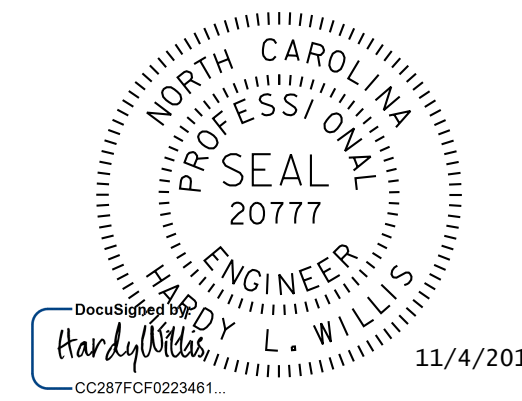
BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 21+97.70 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 9' X 10' RCBC
 55° SKEW
 HYATT MILL CREEK



V&M
 Vaughn & Melton
 Consulting Engineers
 Asheville, North Carolina
 828-253-2796

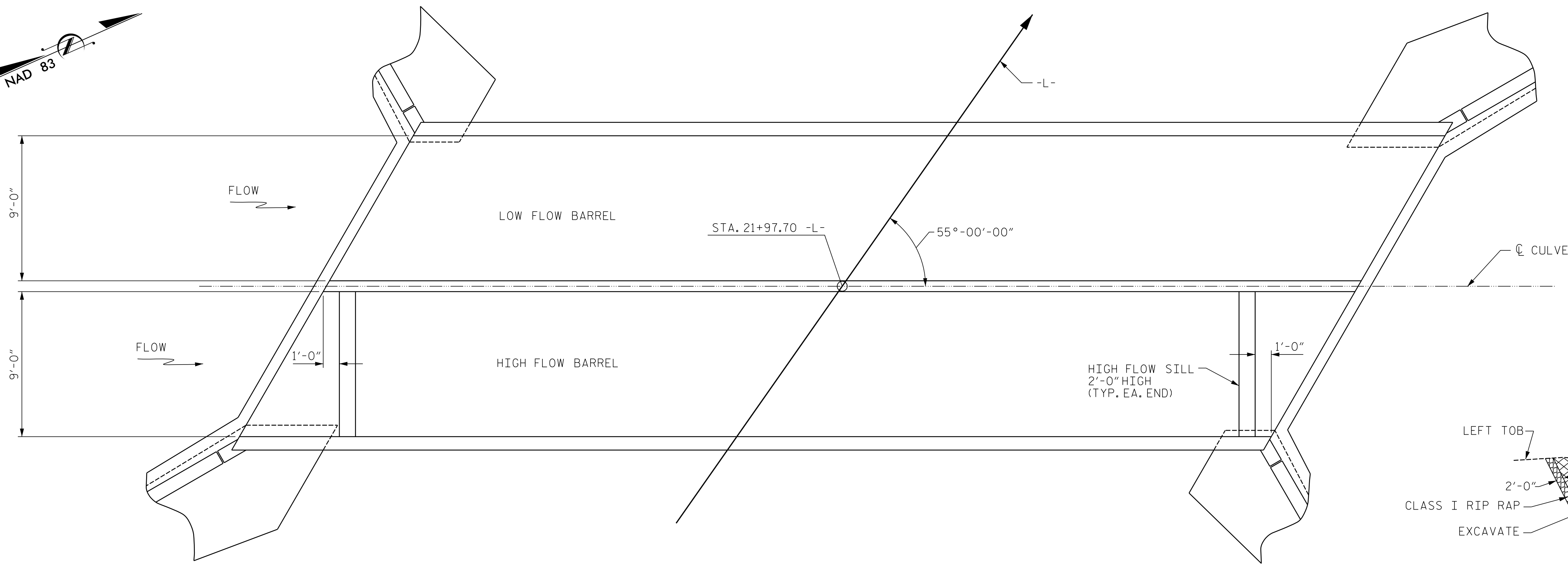
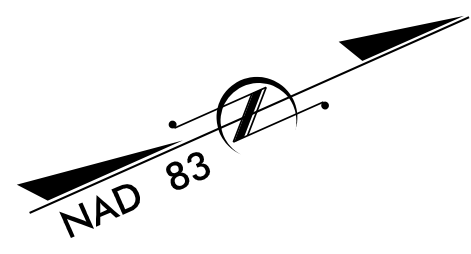
- Tri-Cities, TN 423-467-9400
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middleburg, KY 606-248-6600
- Atlanta, GA 770-627-3509
- Charlotte, NC 704-357-0488
- Boone, NC 828-355-9933

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

DWN. BY: MAF DATE: 7/14
 CHKD. BY: HLW DATE: 7/14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-16
1			3			TOTAL SHEETS
2			4			19



CULVERT SILL LAYOUT

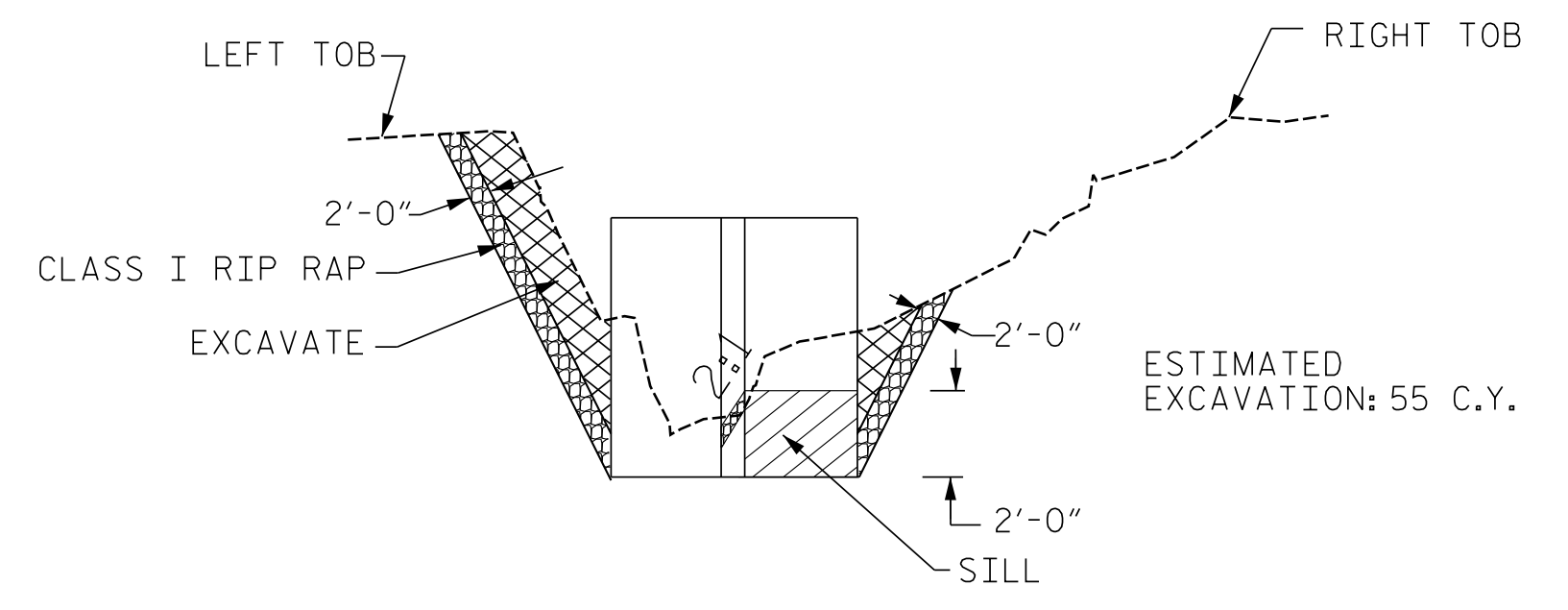
NOTES

SEE SHEET C-11 FOR SILL CONCRETE QUANTITY

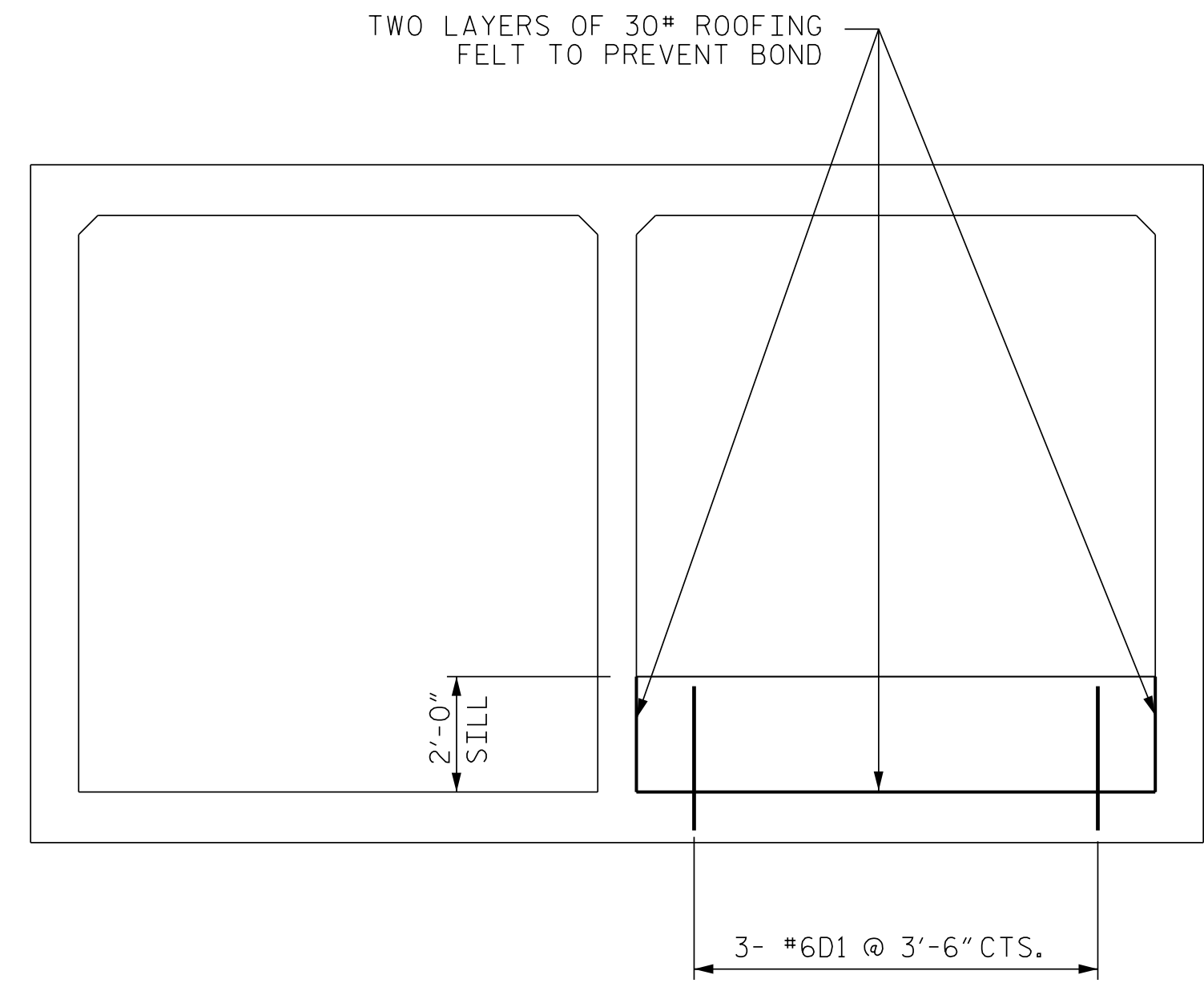
SEE SHEET C-16 BAR SCHEDULE FOR DOWELS

BED MATERIAL SHALL BE EXCAVATED AND STOCKPILED DURING INSTALLATION OF THE CULVERT AND SILLS. THE NATURAL BED MATERIALS SHALL THEN BE PLACED IN THE CULVERT TO A DEPTH OF ONE FOOT.

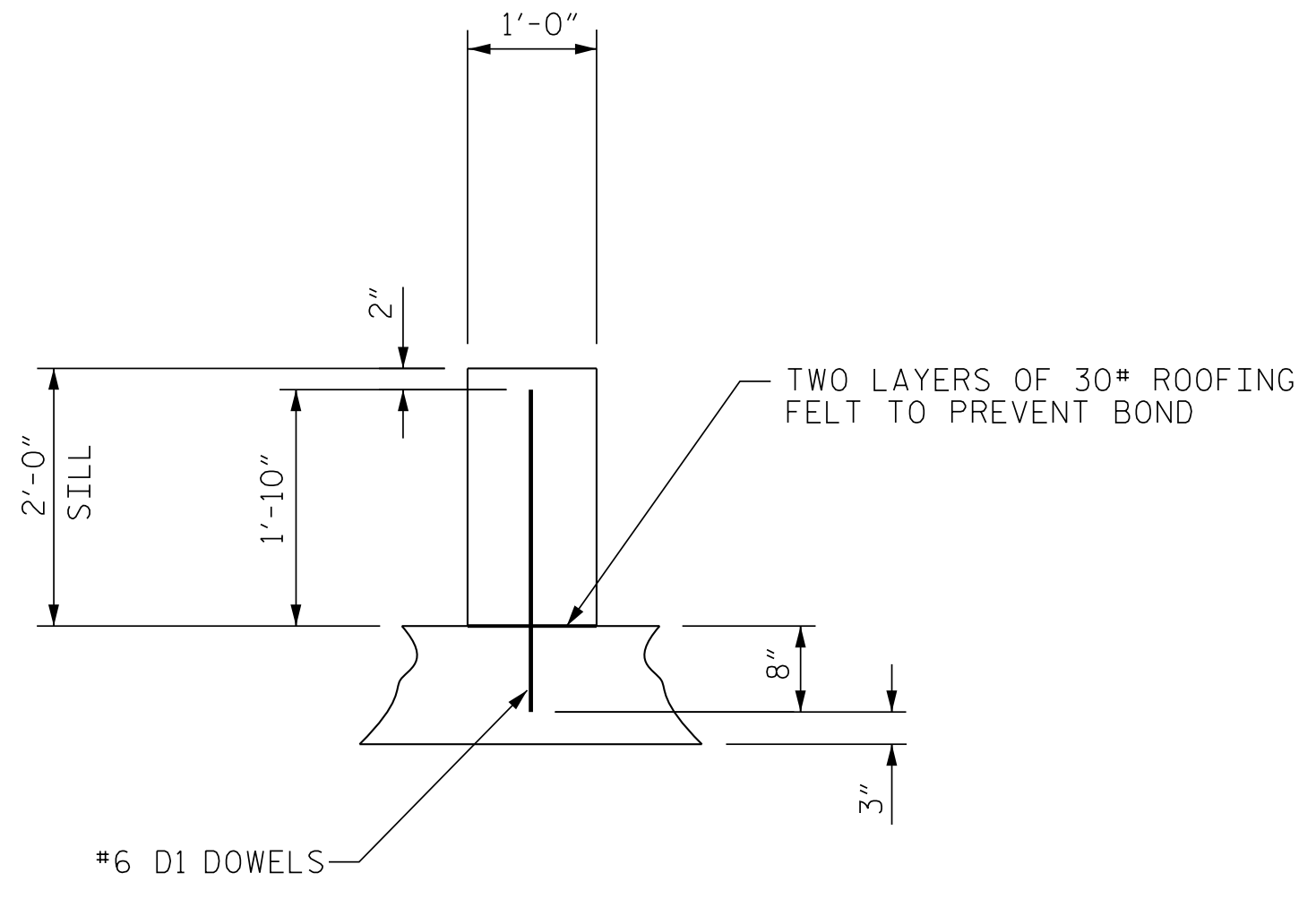
CHANNEL SUBSTRATE MATERIAL MAY BE USED TO SUPPLEMENT BED MATERIAL.



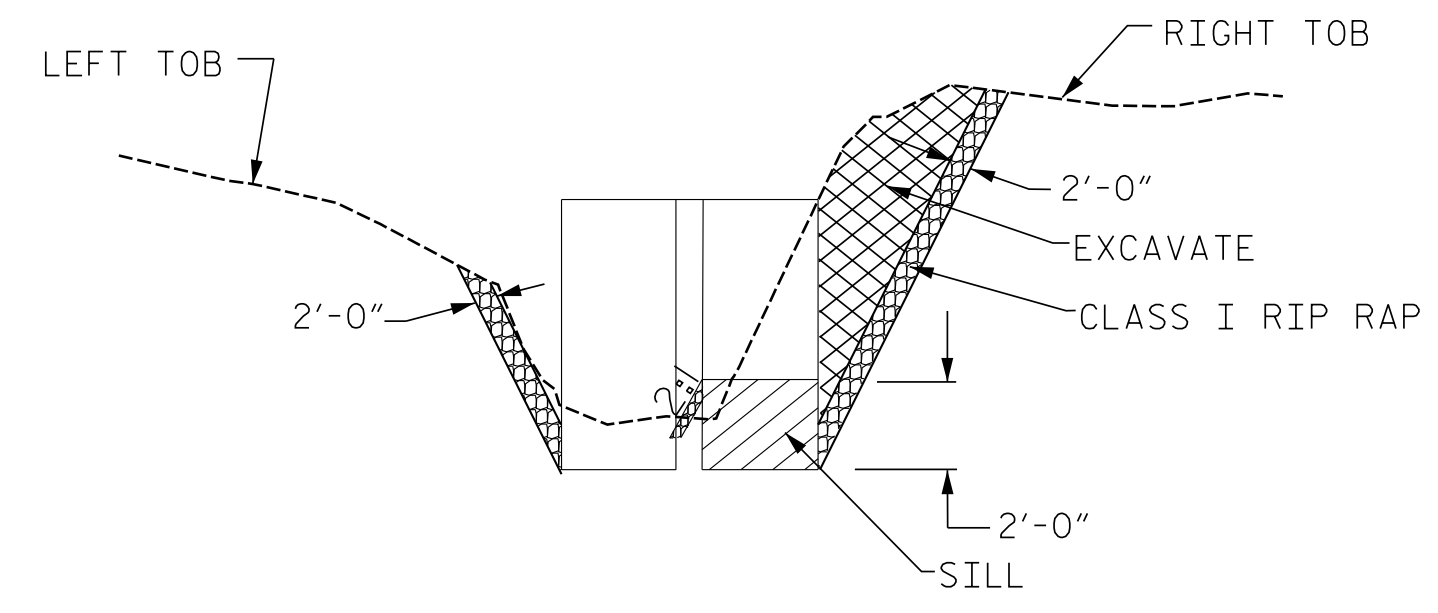
INLET BENCH
(FACING DOWNSTREAM)



END ELEVATION
LOOKING DOWNSTREAM



SECTION THROUGH SILL
DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOATED.



OUTLET BENCH
(FACING DOWNSTREAM)

PROJECT NO. 14SP.20221.1/2
CLAY COUNTY
STATION: 21+97.70 -L-

SHEET 5 OF 9



V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
828-253-2796

- Tri-Cities, TN 423-467-8400
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middleboro, KY 606-248-6600
- Charlotte, NC 704-357-0488
- Boone, NC 828-355-9933
- Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

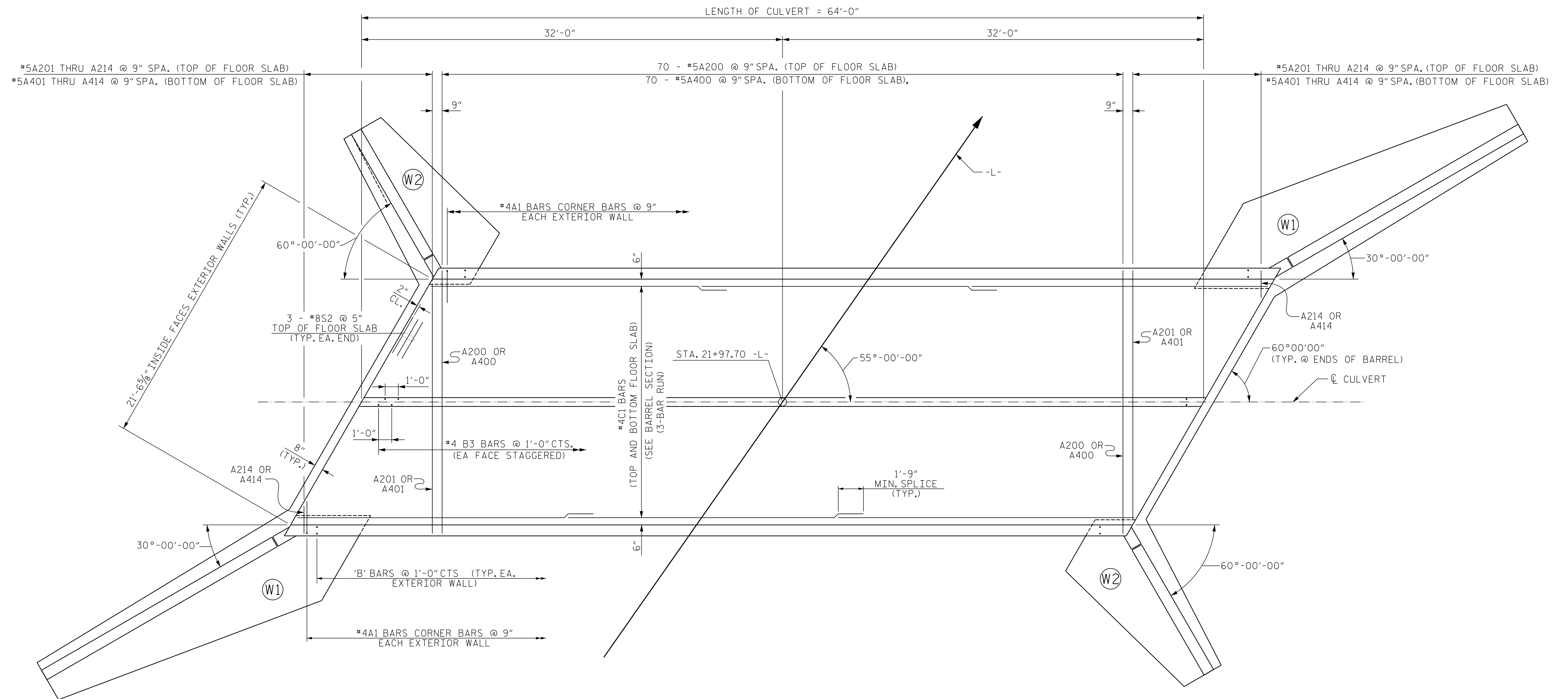
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL
9' X 10' RCBC
55° SKEW
HYATT MILL CREEK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DWN. BY: MAF DATE: 7/14
CHKD. BY: HLW DATE: 7/14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-15
1			3			TOTAL SHEETS
2			4			19



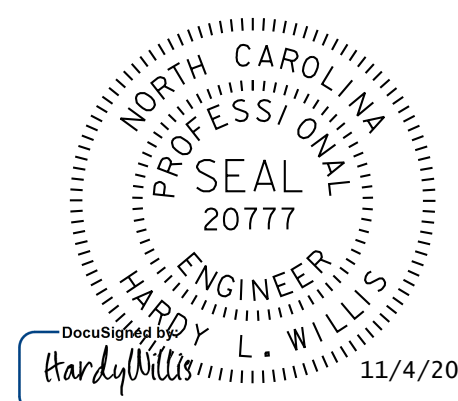
FLOOR SLAB PLAN

PROJECT NO. 14SP.20221.1/2
 CLAY COUNTY
 STATION: 21+97.70 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 9' X 10' RCBC
 55° SKEW
 HYATT MILL CREEK



V&M
 Vaughn & Melton
 Consulting Engineers

Asheville, North Carolina
 828-253-2796

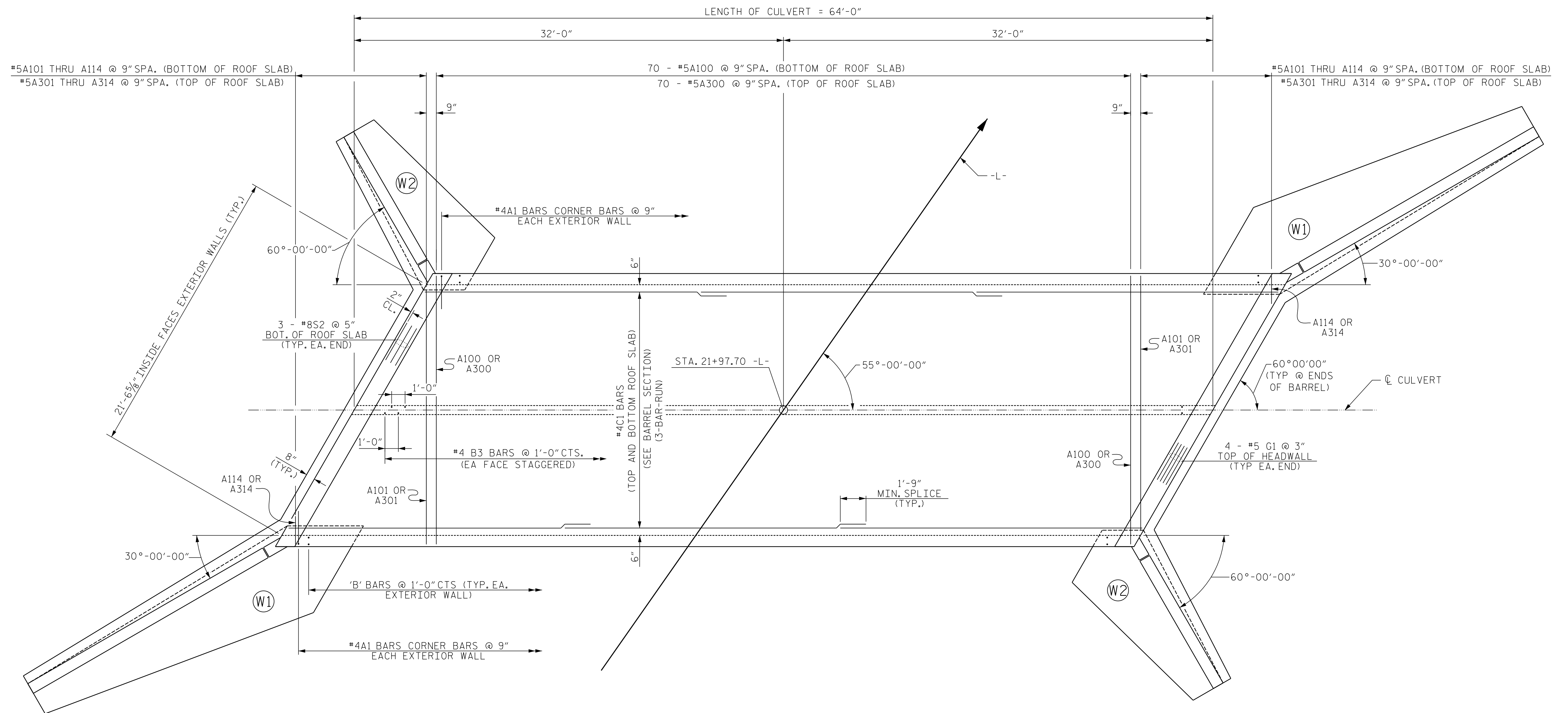
Tri-Cities, TN 423-467-8401
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
 Middleburg, KY 606-248-6600
 Atlanta, GA 770-627-3509
 Charlotte, NC 704-357-0488
 Boone, NC 828-355-9933

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DWN. BY: MAF DATE: 7/14
 CHKD. BY: HLW DATE: 7/14

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14	
1			3			TOTAL SHEETS	19
2			4				



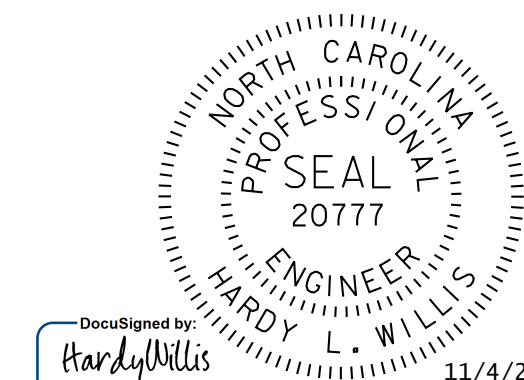
ROOF SLAB PLAN

PROJECT NO. 14SP.20221.1/2
 CLAY COUNTY
 STATION: 21+97.70 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 9' X 10' RCBC
 55° SKEW
 HYATT MILL CREEK



V&M
 Vaughn & Melton
 Consulting Engineers

Asheville, North Carolina
 828-253-2796

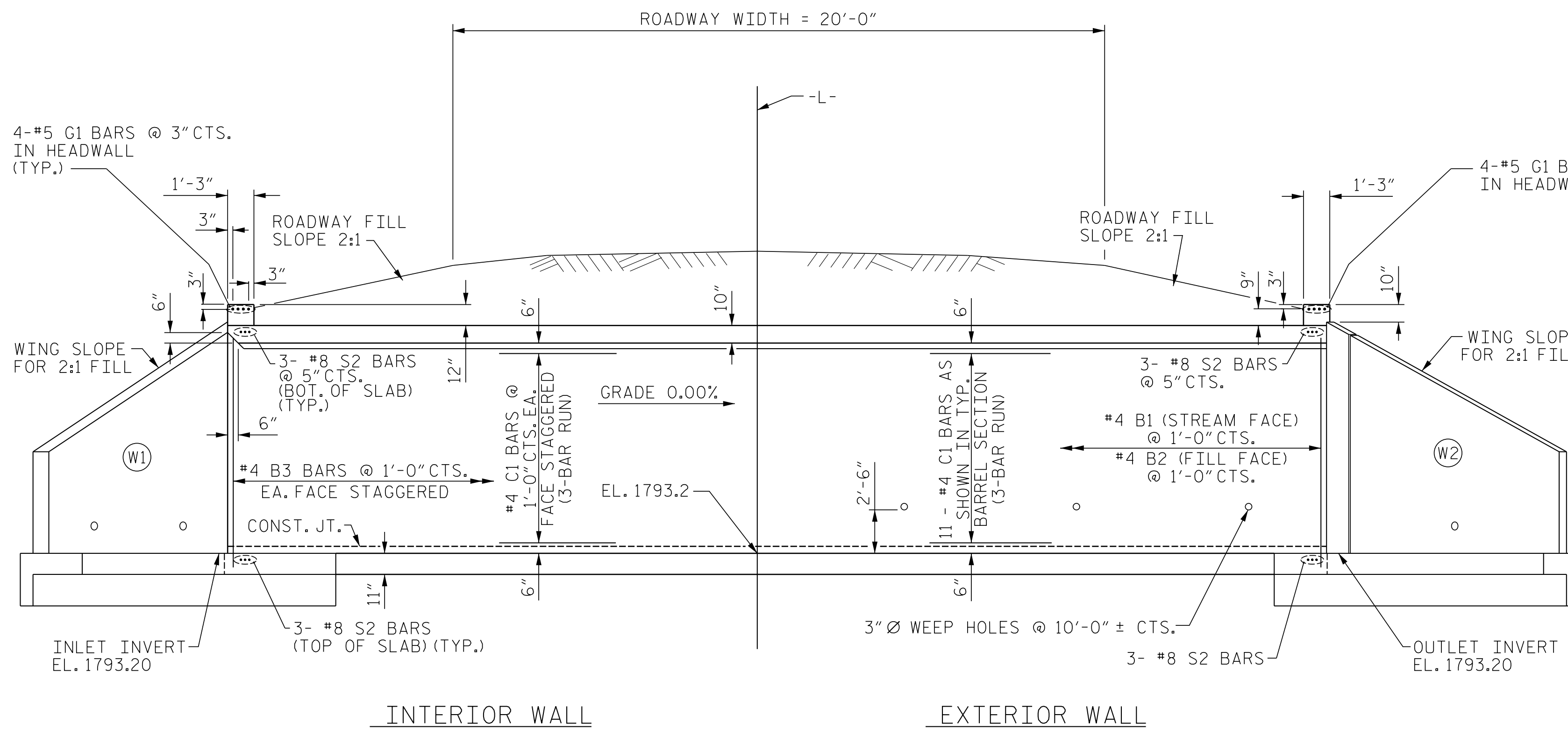
Charlotte, NC
 Knoxville, TN
 Spartanburg, SC
 Charleston, SC
 Middlesboro, KY
 Atlanta, GA
 Boone, NC
 828-355-9933
 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

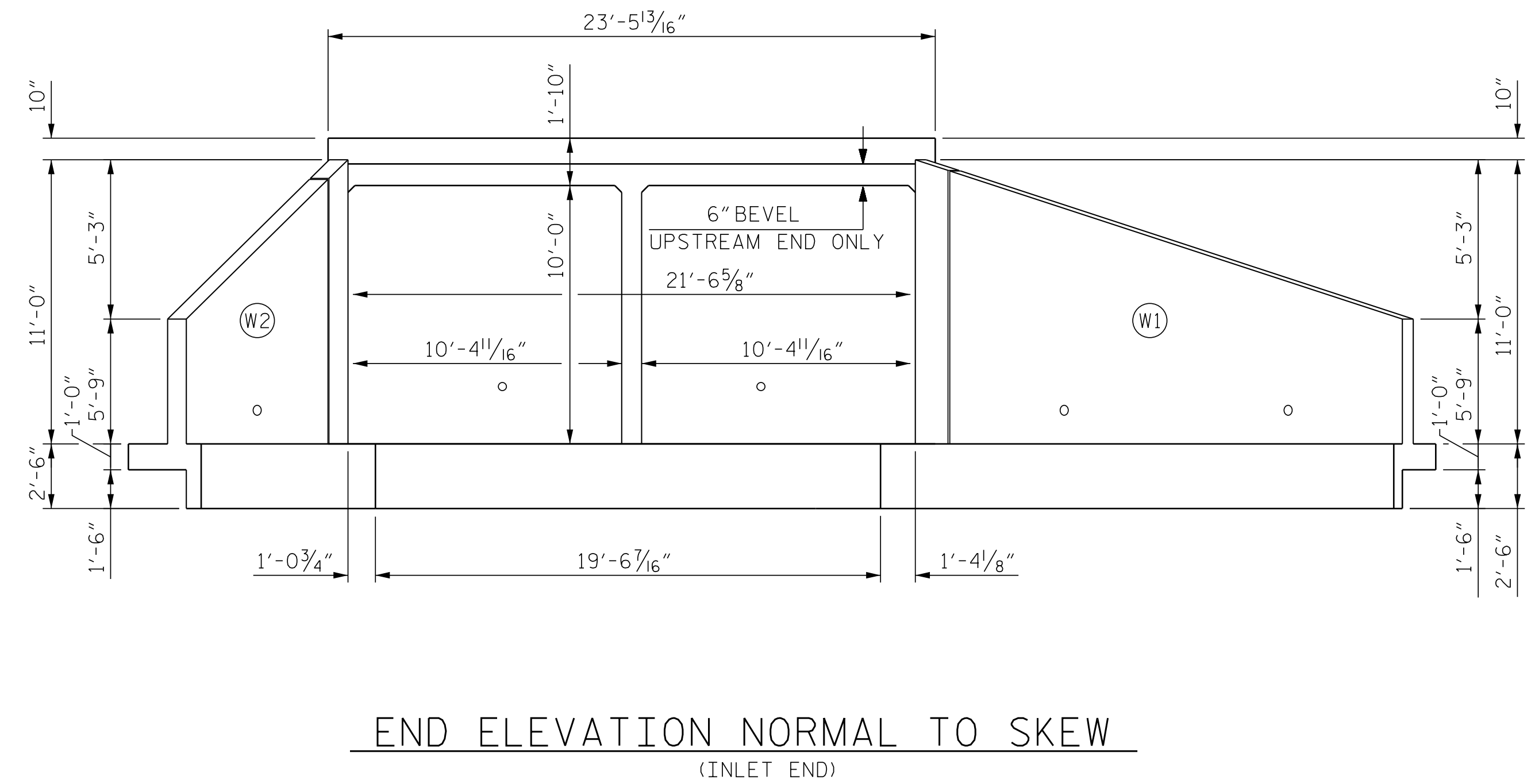
DocuSigned by:
 Hardy L. Willis
 11/4/2016
 DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

DWN. BY: MAF DATE: 7/14
 CHKD. BY: HLW DATE: 7/14

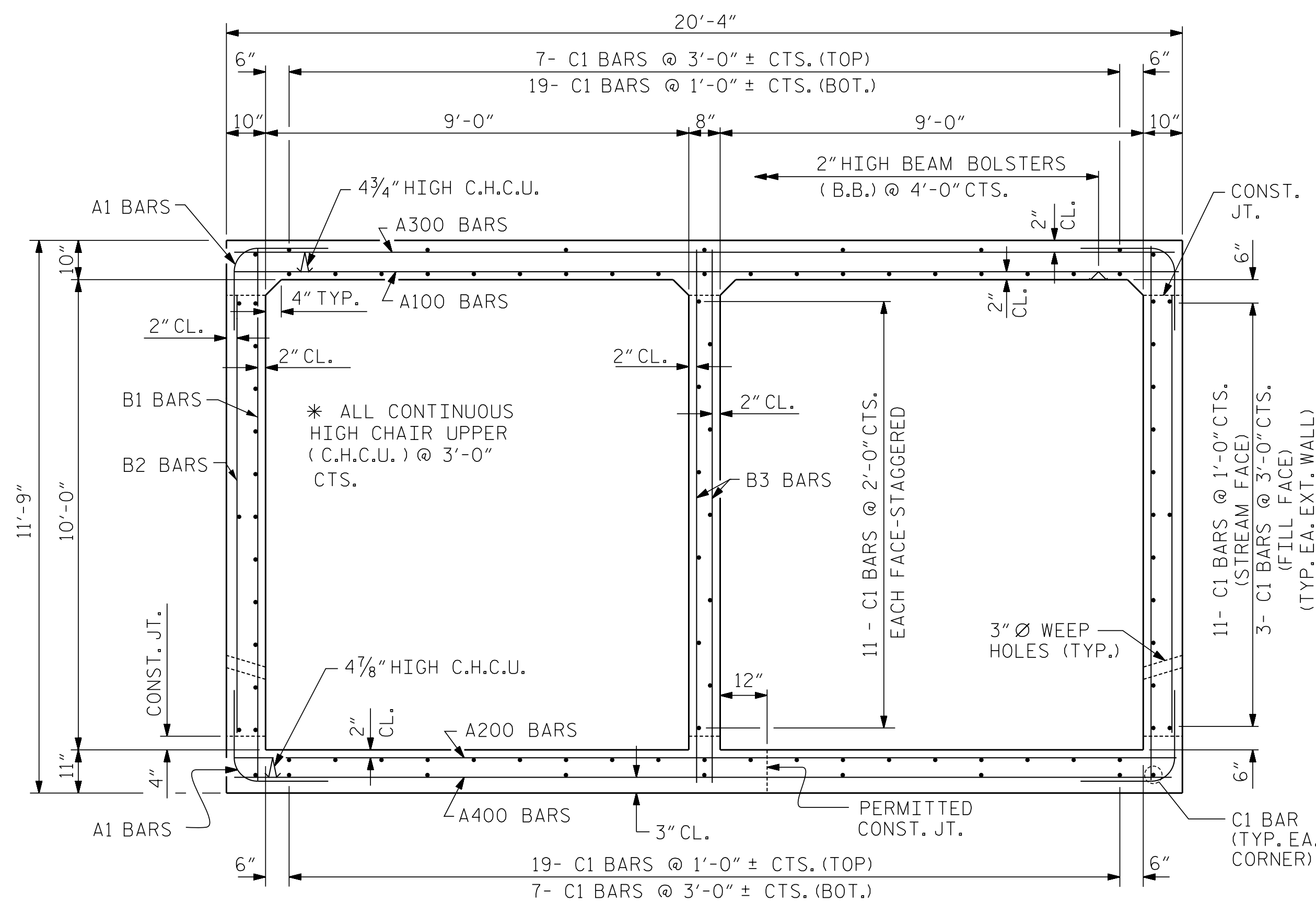
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13	
1			3			TOTAL SHEETS	
2			4			19	



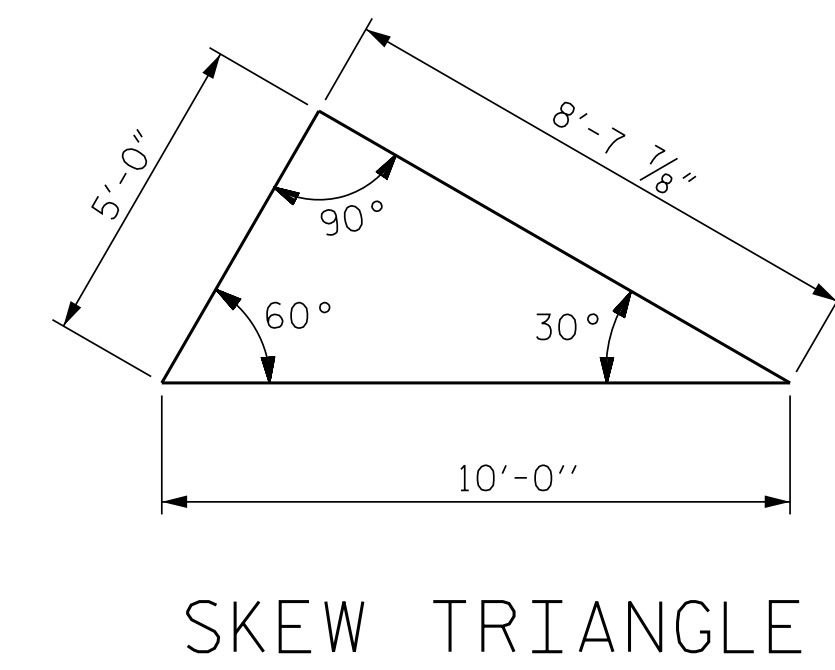
INTERIOR WALL
EXTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION NORMAL TO SKEW
(INLET END)



RIGHT ANGLE SECTION OF BARREL
THERE ARE 95 "C" BARS IN SECTION OF BARREL.



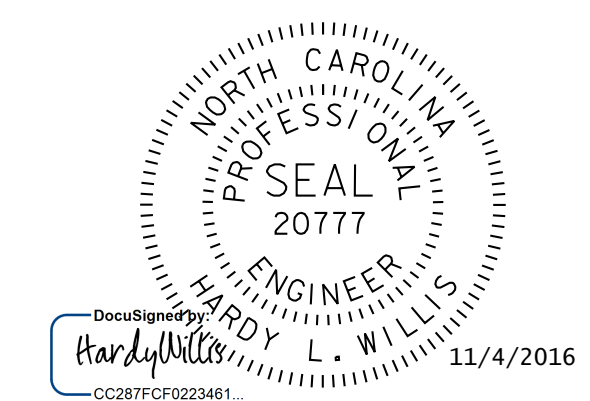
SKEW TRIANGLE

PROJECT NO. 14SP.20221.1/2
CLAY COUNTY
STATION: 21+97.70 -L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL
9' X 10' RCBC
55° SKEW
HYATT MILL CREEK



V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
828-253-2796

- Tri-Cities, TN 423-467-8400
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middlesboro, KY 606-248-6600
- Atlanta, GA 770-627-3509
- Charlotte, NC 704-357-0488
- Boone, NC 828-355-9933

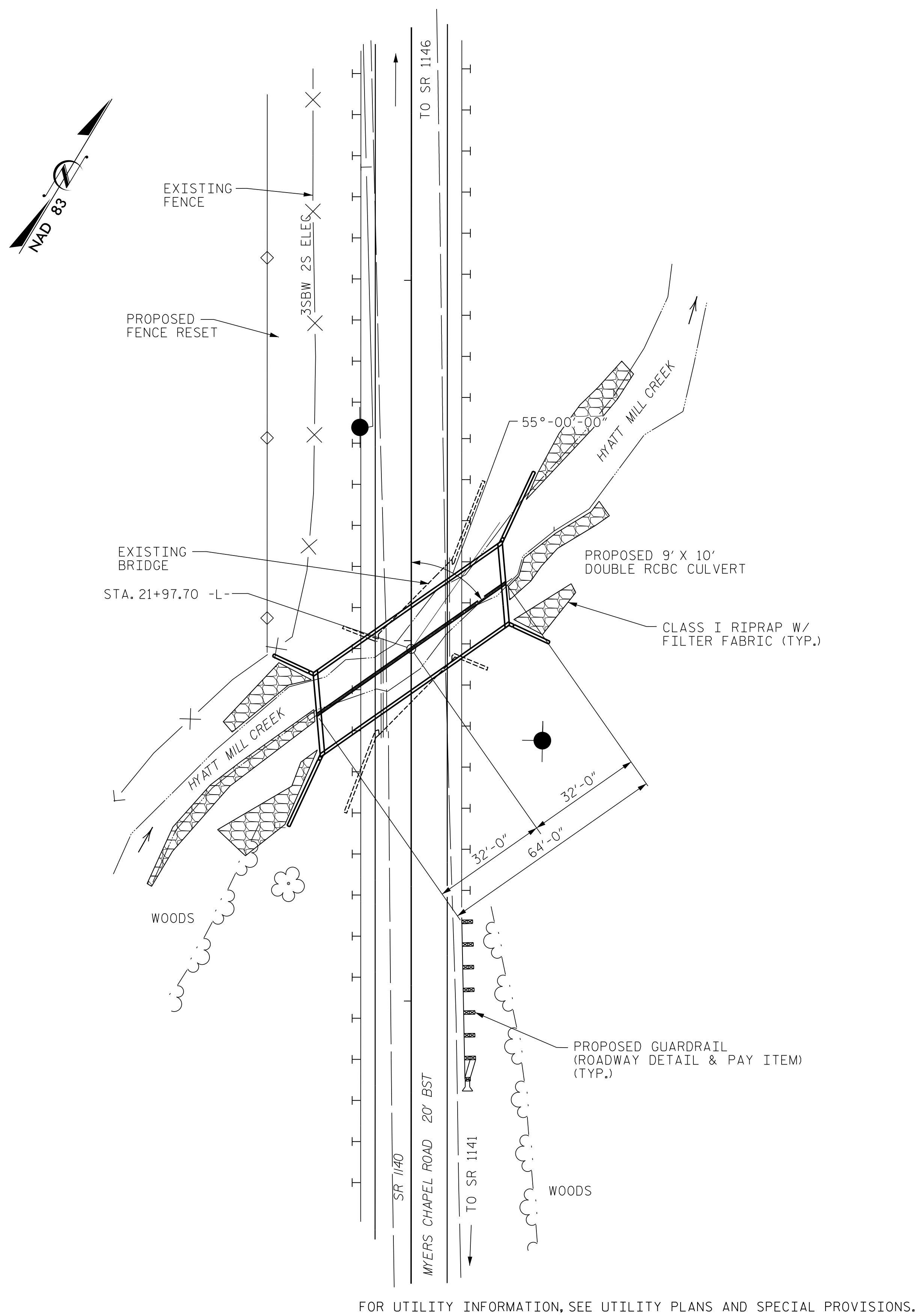
Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

DWN. BY: MAF DATE: 7/14
CHKD. BY: HLW DATE: 7/14

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12	
1			3			TOTAL SHEETS	
2			4			19	

BM #2: 8" SPIKE IN ROOT OF 18" PINE 20.5' LT OF -L- STA. 24+81.21
 N 499757, E 562582 EL. 1817.66'



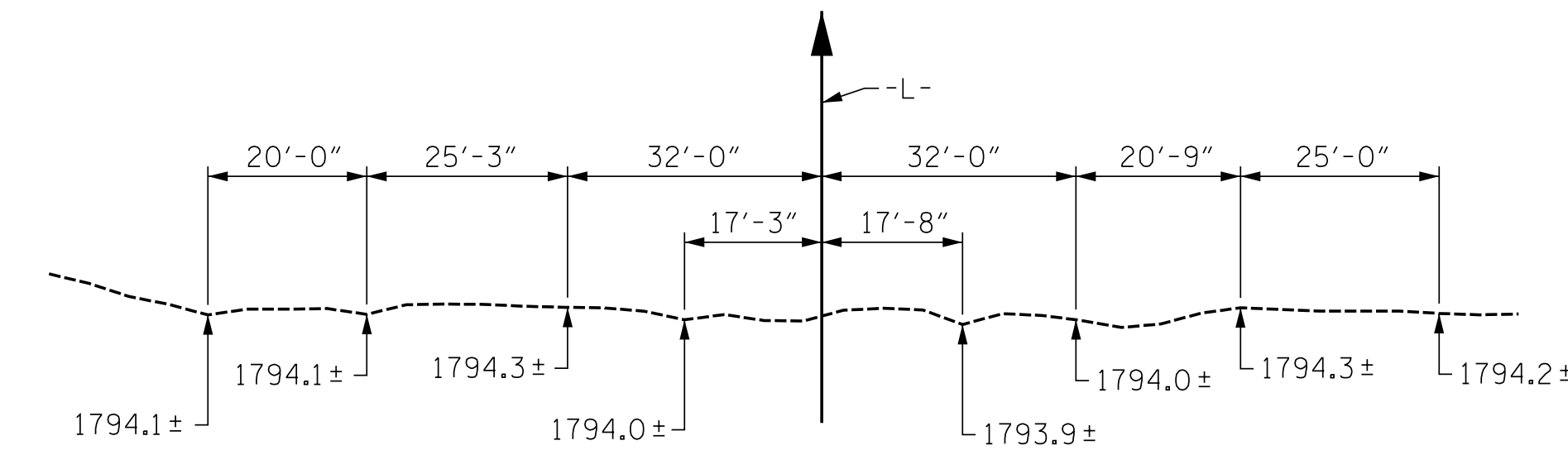
FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

— LOCATION SKETCH —

NOTES

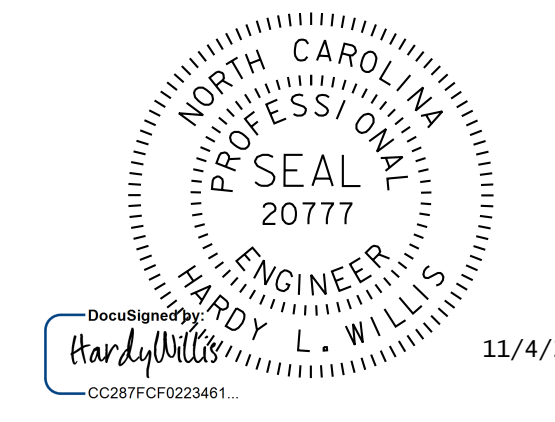
ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 DESIGN FILL-----MAX. = 4.44' MIN. = 3.96'
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND 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.
 STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 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.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION ACTIVITIES, SEE SPECIAL PROVISIONS
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS
 THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 28'-2", WITH A CLEAR ROADWAY WIDTH OF 17'-2", WITH REINFORCED CONCRETE DECK ON CONCRETE GIRDERS AND ABUTMENTS, AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED.
 THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 EXCAVATE 1'-0" MIN. BENEATH CULVERT FOOTING AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414 OF THE STANDARD SPECIFICATIONS.
 GRADE DATA
 GRADE POINT ELEV. @ STA. 21+97.70 -L- = 1808.4
 BED ELEV. @ STA. 21+97.70 -L- = 1793.2 ±
 ROADWAY SLOPES 2:1



PROFILE ALONG C CULVERT

HYDRAULIC DATA		
DESIGN DISCHARGE	= 1000	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1803.0	FT
DRAINAGE AREA	= 3.5	SQ. MI.
BASE DISCHARGE	= 1626	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1806.53	FT
OVERTOPPING DISCHARGE	= 1830	CFS
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING ELEVATION	= 1804.4	FT
W.S. ELEVATION AT DATE OF SURVEY	= 1795.00	FT
	5-16-2011	



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
 Vaughn & Melton
 Consulting Engineers
 Asheville, North Carolina
 828-253-2796
 Charlotte, NC 828-357-0488 Boone, NC 828-355-9933
 Tri-Cities, TN 423-467-8400 Knoxville, TN 865-546-5800 Spartanburg, SC 864-574-4775 Charleston, SC 843-574-5650 Asheville, NC 828-253-2796 Middleboro, KY 606-248-6600 Atlanta, GA 770-627-3509
 Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL @ 2.19 C.Y./FT.	140.2	C.Y.
SILLS	1.5	C.Y.
WINGS, ETC.	40.6	C.Y.
TOTAL	182.3	C.Y.
REINFORCING STEEL		
BARREL	16,350	LBS.
WINGS	2,781	LBS.
TOTAL	19,131	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	151	TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	
RIP RAP CLASS 1	114	TONS
GEOTEXTILE MATERIAL UNDER RIP RAP	113.8	S.Y.
ASBESTOS ASSESSMENT	LUMP SUM	
CHANNEL SUBSTRATE MATERIAL	78	TONS

PROJECT NO. 14SP.20221.1/2
 CLAY COUNTY
 STATION: 21+97.70 -L-

SHEET 1 OF 9 REPLACES BRIDGE NO. 86

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE BARREL
 9' X 10' RCBC
 55° SKEW
 HYATT MILL CREEK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			19

DWN. BY: MAF DATE: 7/14
 CHKD. BY: HLW DATE: 7/14

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 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 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø 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 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 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. 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.

ENGLISH

JANUARY, 1990