

TIP PROJECT: U-3462

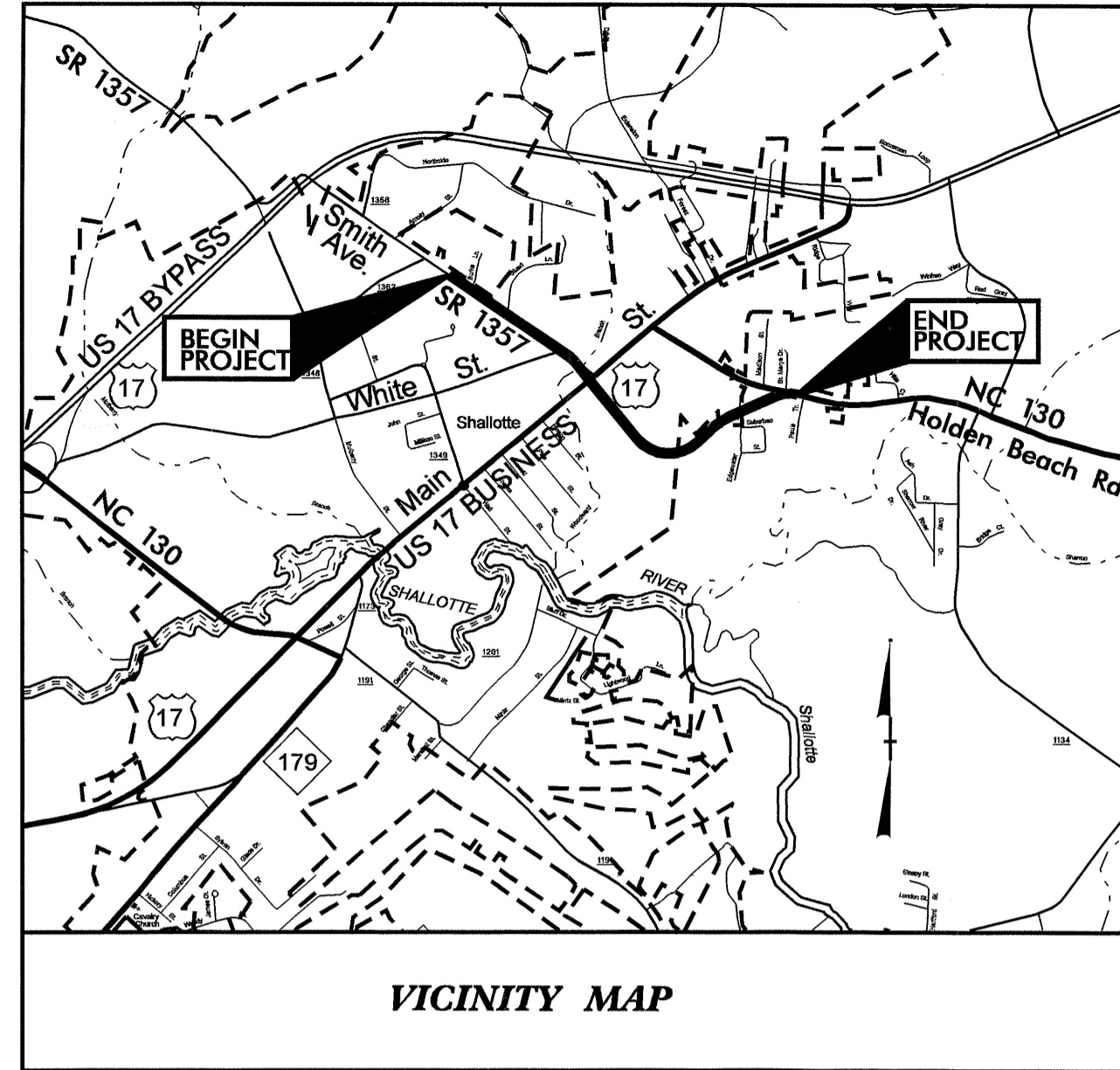
CONTRACT: C202027

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

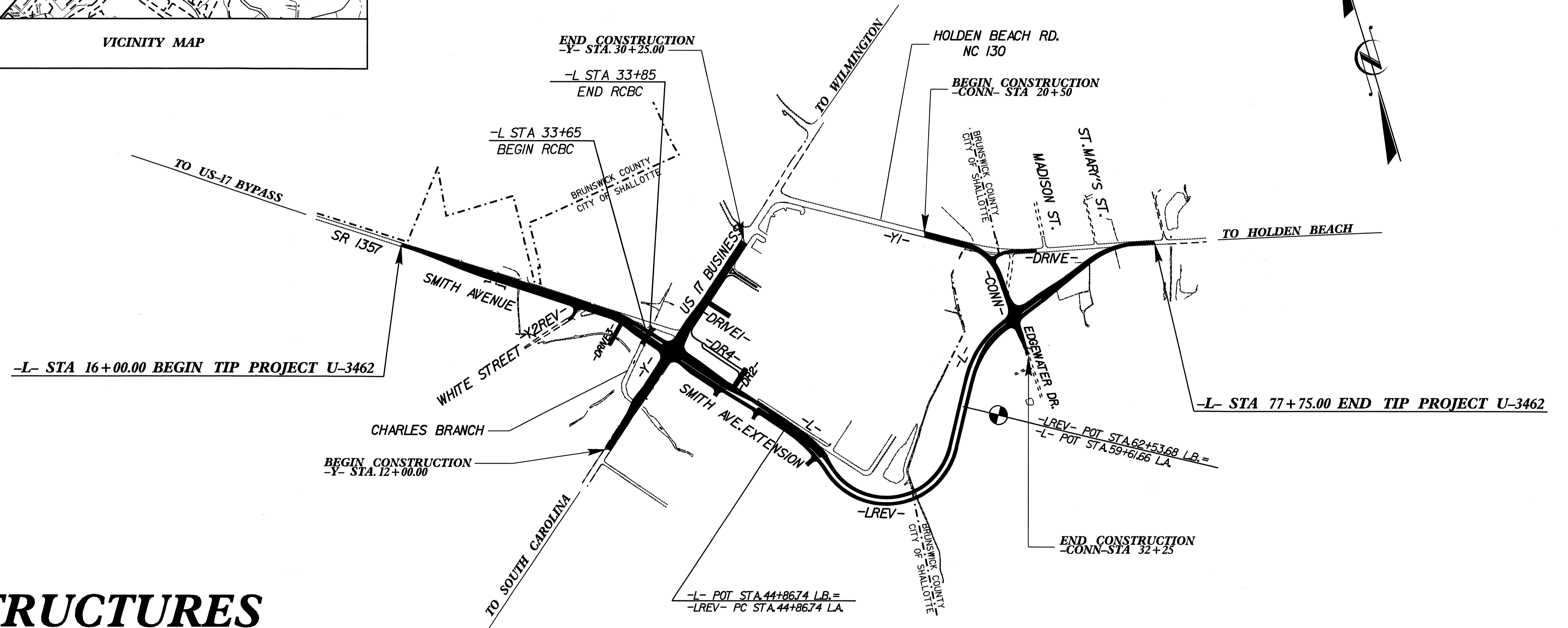
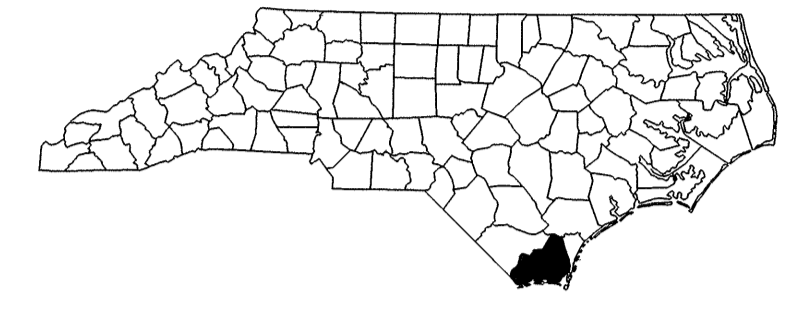
# BRUNSWICK COUNTY

**LOCATION: EXTENSION OF SR 1357 FROM WEST OF  
US 17 BUSINESS TO NC 130 IN SHALLOTTE**

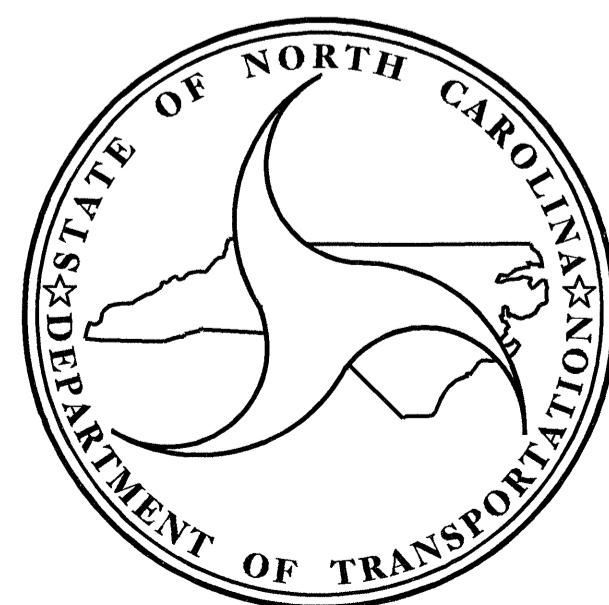
**TYPE OF WORK: GRADING DRAINAGE, PAVING, CULVERTS,  
SIGNING AND TRAFFIC SIGNALS**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3462		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34953.1.1	STP-1357(2)	PE	
34953.2.2	STP-1357(2)	RW & UTIL	
34953.3.2.ST1	STP-1357(4)	CONST.	



## STRUCTURES



DESIGN DATA	
ADT 2007=	6300 - 18,800
ADT 2035 =	16100 - 42,200
DHV =	10 %
D =	55 %
T =	3 % *
V =	40 MPH
* TTST 1%	DUAL 2%
FUNCTIONAL CLASSIFICATION MAJOR COLLECTOR	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT U-3462 =	1.221 MILES
LENGTH STRUCTURE TIP PROJECT U-3462 =	0.004 MILES
TOTAL LENGTH OF TIP PROJECT U-3462 =	1.225 MILES

Prepared In the Office of: DIVISION OF HIGHWAYS	
2006 STANDARD SPECIFICATIONS	
LETTING DATE: March 17, 2009	OMAR R. AZIZI, PE PROJECT ENGINEER
	TIMOTHY L. COGGINS, PE PROJECT DESIGN ENGINEER

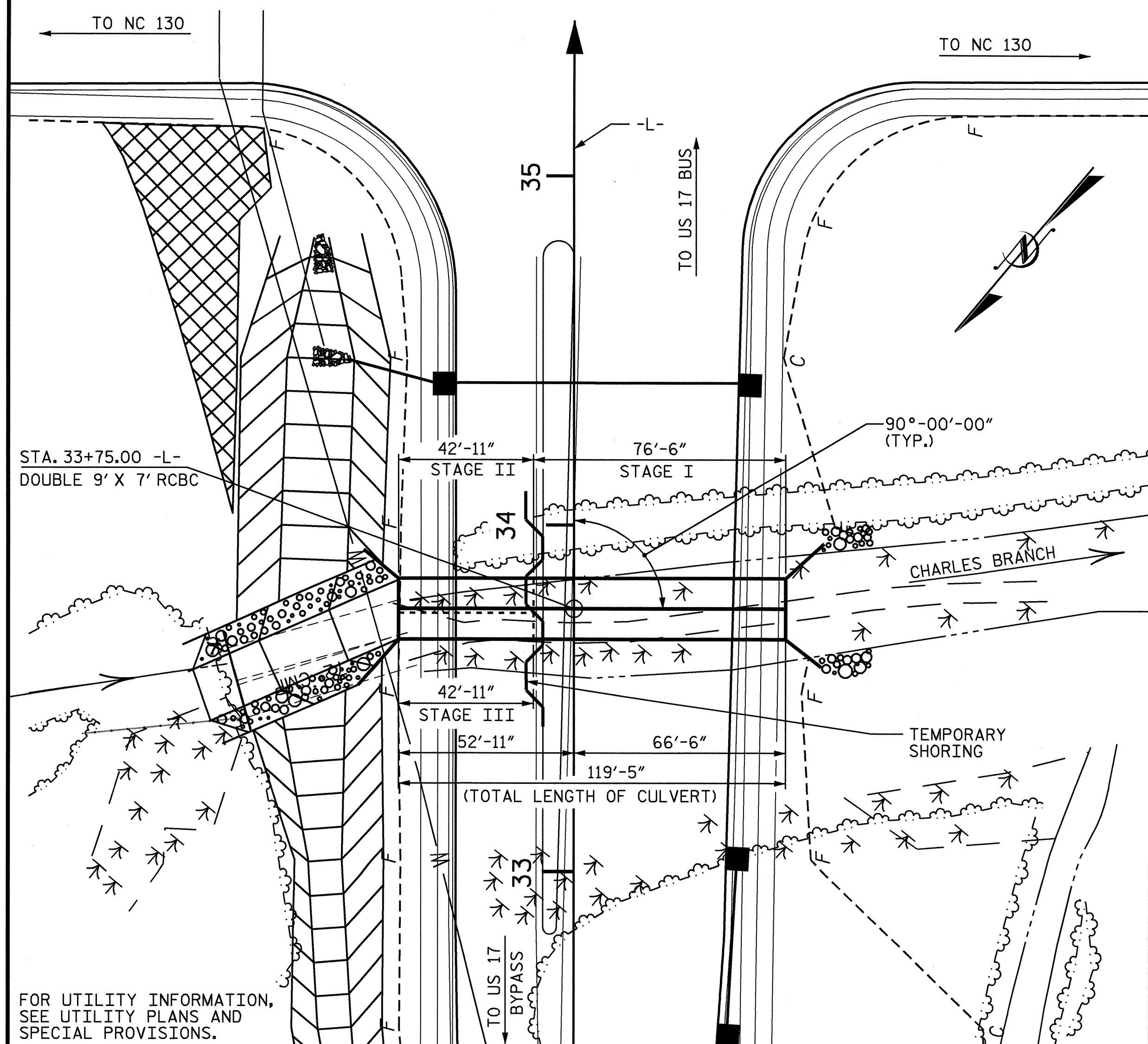
STRUCTURE DESIGN UNIT	
1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610	

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA	
STATE HIGHWAY DESIGN ENGINEER	

28-OCT-2008 16:00  
\$\$\$\$\$DCN\$\$\$\$\$  
toggins

BM: SQUARE CUT SET IN CONCRETE 116' RT. OF BL STA. 25+07, ELEV. 11.23', NAVD 88.

F. A. PROJECT NO. STP-1357(4)



LOCATION SKETCH

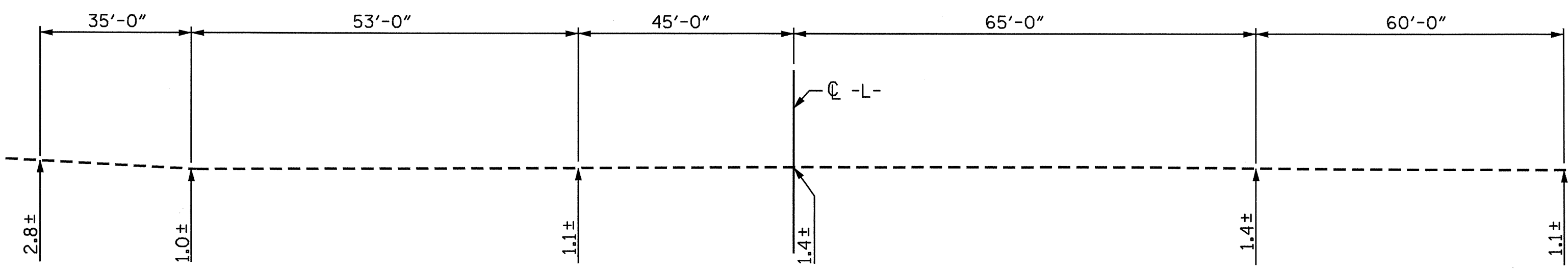
GRADE DATA	
GRADE POINT ELEVATION @ STA. 33+75.00 -L-	10.257 FT.
BED ELEVATION @ STA. 33+75.00 -L-	0.0 FT.
ROADWAY SLOPES	3 : 1

HYDRAULIC DATA	
DESIGN DISCHARGE	= 390 c.f.s.
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 7.2 FT.
DRAINAGE AREA	= 1.46 MI <sup>2</sup>
BASIC DISCHARGE (Q100)	= 710 c.f.s.
BASIC HIGH WATER ELEVATION	= 8.8 FT.

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 950 c.f.s.
FREQUENCY OF OVERTOPPING FLOOD	= 100 YR.+
OVERTOPPING FLOOD ELEVATION	= 9.6 FT.



PROFILE ALONG CULVERT

STRUCTURE QUANTITIES STAGE I		
CLASS A CONCRETE		
BARREL @ 1.79 CY/FT	137.0	C.Y.
WINGS ETC.	14.8	C.Y.
TOTAL	151.8	C.Y.
EPOXY COATED REINFORCING STEEL		
BARREL	26901	LBS.
WINGS ETC.	828	LBS.
TOTAL	27729	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	108	TONS

STRUCTURE QUANTITIES STAGE II		
CLASS A CONCRETE		
BARREL @ 1.07 CY/FT	45.9	C.Y.
WING ETC.	7.5	C.Y.
TOTAL	53.4	C.Y.
EPOXY COATED REINFORCING STEEL		
BARREL	10946	LBS.
WING ETC.	414	LBS.
TOTAL	11360	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	34	TONS

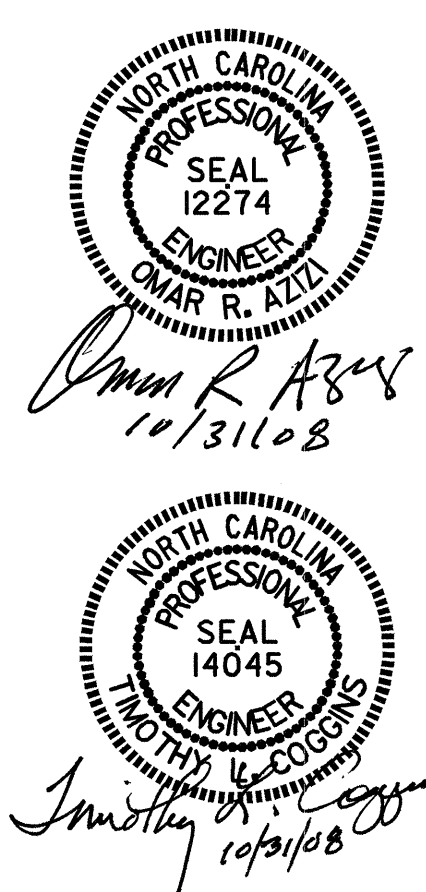
STRUCTURE QUANTITIES STAGE III		
CLASS A CONCRETE		
BARREL @ 0.72 CY/FT	30.9	C.Y.
WING ETC.	7.3	C.Y.
TOTAL	38.2	C.Y.
EPOXY COATED REINFORCING STEEL		
BARREL	6417	LBS.
WING ETC.	414	LBS.
TOTAL	6831	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	26	TONS

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL @ 1.79 CY/FT	213.8	C.Y.
WINGS ETC.	29.6	C.Y.
TOTAL	243.4	C.Y.
EPOXY COATED REINFORCING STEEL		
BARREL	44264	LBS.
WINGS ETC.	1656	LBS.
TOTAL	45920	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	168	TONS

NOTES

ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.  
 DESIGN FILL----- MAX. 3.28' ----- MIN. 2.18'  
 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:  
**STAGE I CONSTRUCTION**  
 1. STAGE I WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.  
 2. THE REMAINING PORTIONS OF THE STAGE I WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.  
**STAGE II CONSTRUCTION**  
 1. STAGE II WING FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.  
 2. THE REMAINING PORTIONS OF THE STAGE II WALLS AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.  
**STAGE III CONSTRUCTION**  
 1. STAGE III WING FOOTING AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALL.  
 2. THE REMAINING PORTION OF THE STAGE III WALL AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.  
 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.  
 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.  
 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.  
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.  
 ALL BAR SUPPORTS USED IN THE CULVERT AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.  
 FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.  
 FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING, SEE ROADWAY PLANS.



PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 33+75.00 -L-

SHEET 1 OF 5

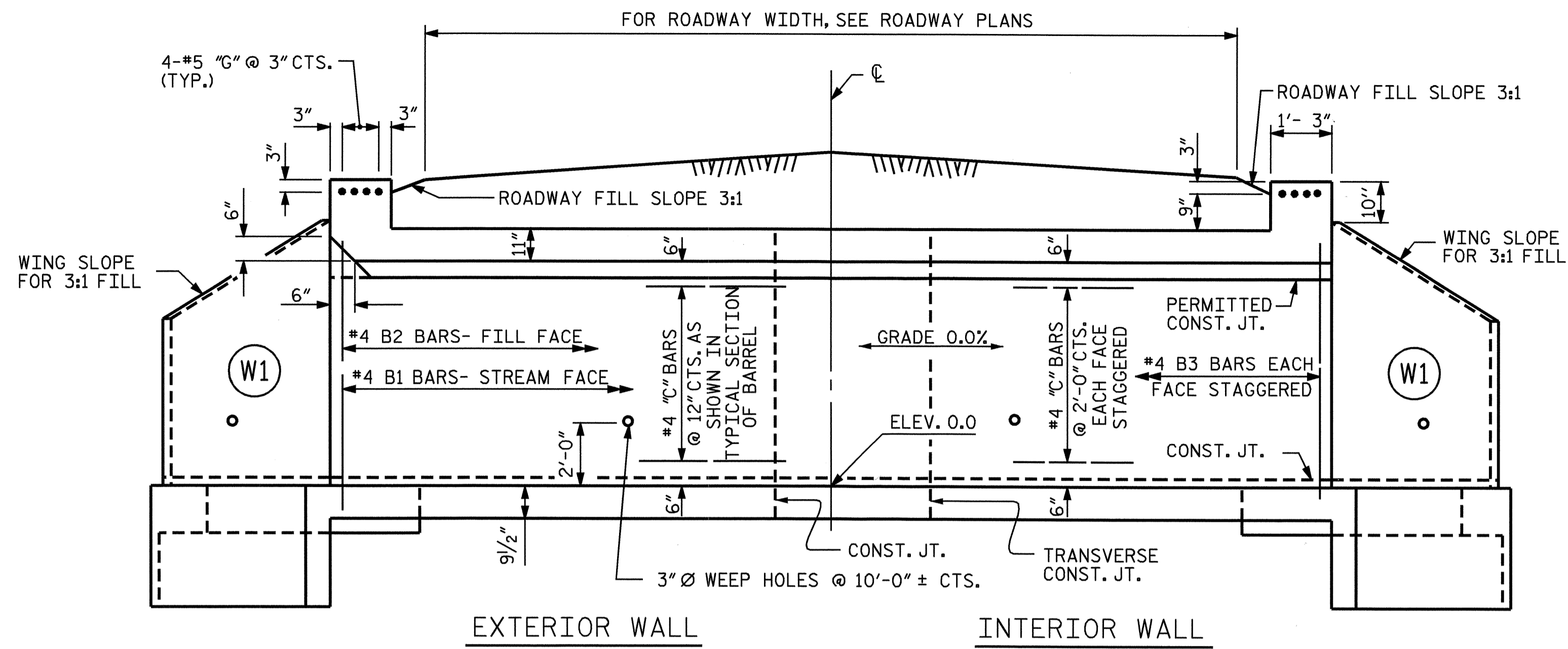
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 9 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 90° SKEW

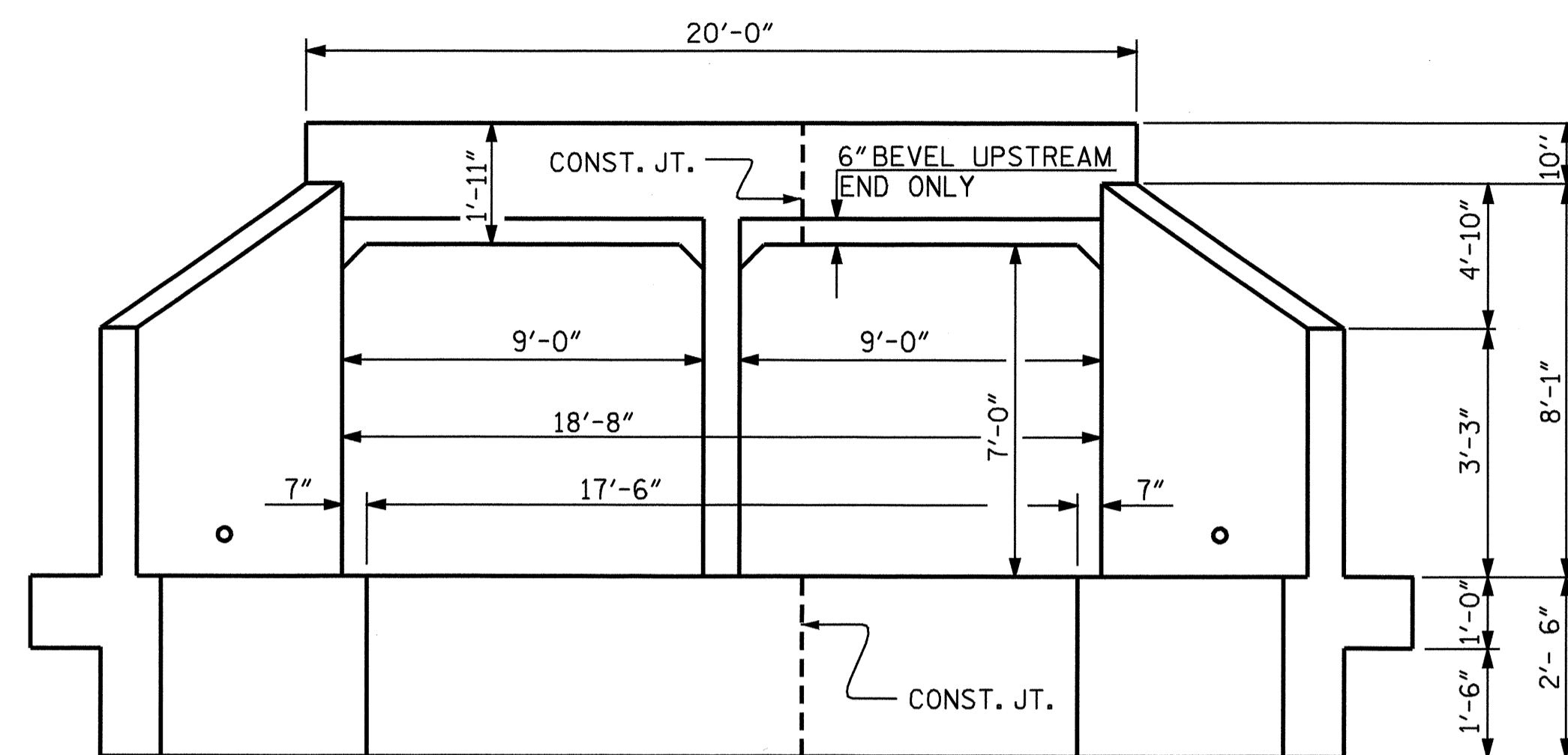
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-1	
1			3			TOTAL SHEETS	
2			4			10	

DRAWN BY: PEGGY ADKINS DATE: 6-05  
 CHECKED BY: B.N. BARODAWALA DATE: 10-08

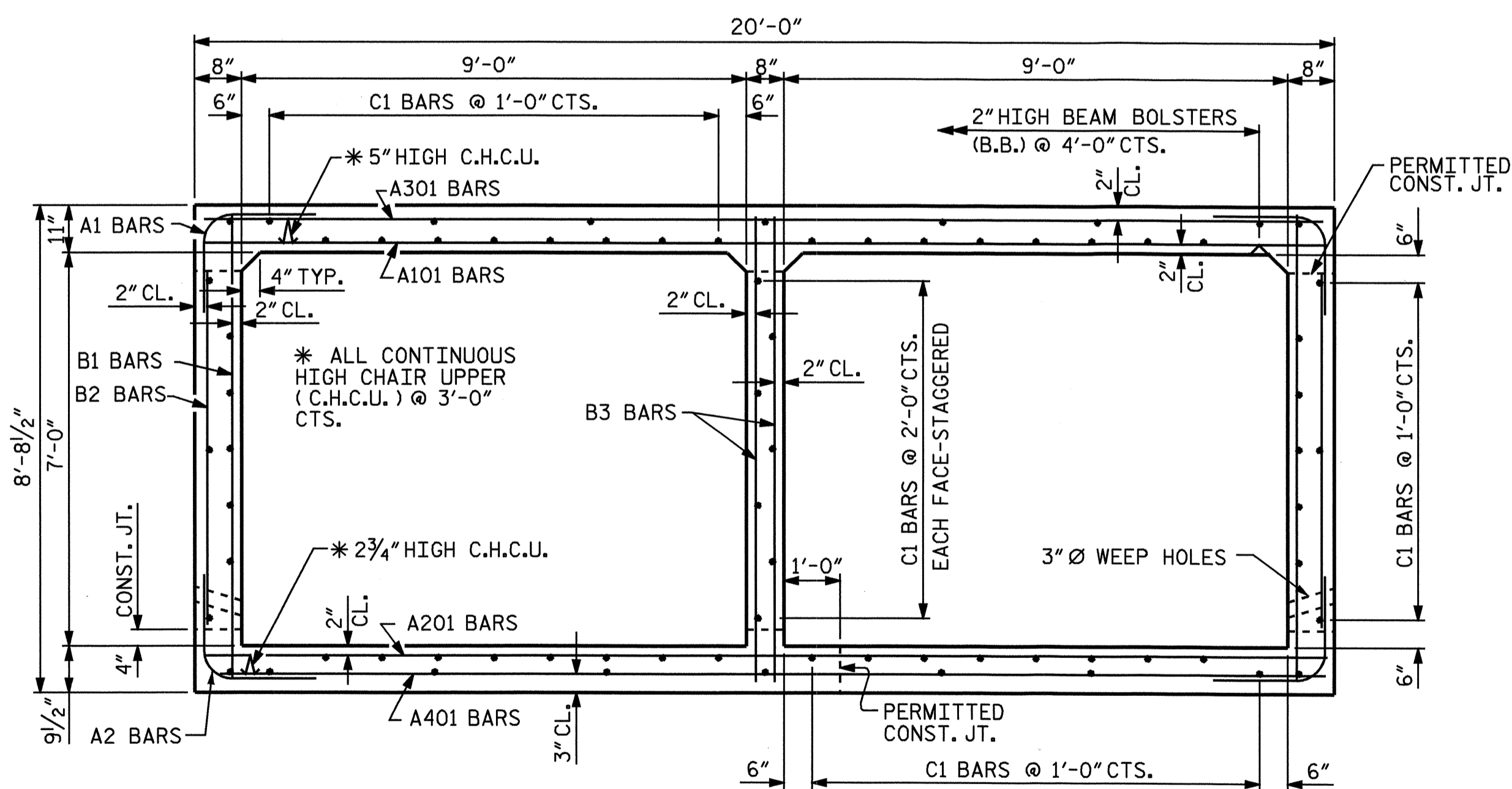
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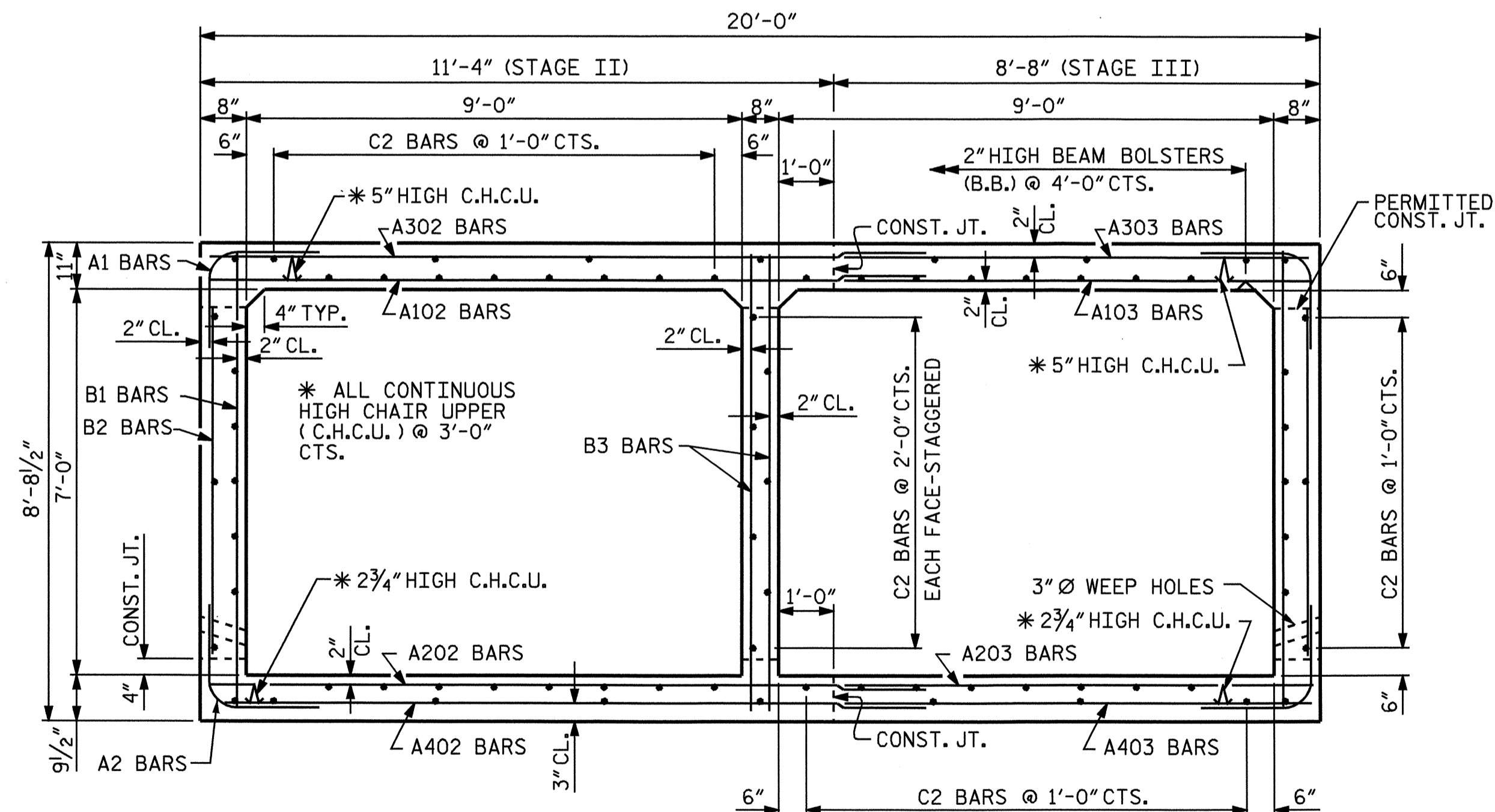
EXTERIOR WALL INTERIOR WALL  
**CULVERT SECTION NORMAL TO ROADWAY**



**END ELEVATION**



**RIGHT ANGLE SECTION OF BARREL -- STAGE I**  
 THERE ARE 73 "C" BARS IN SECTION OF BARREL.



**RIGHT ANGLE SECTION OF BARREL -- STAGE II & III**  
 THERE ARE 73 "C" BARS IN SECTION OF BARREL.  
 (THIS VIEW IS LOOKING DOWNSTREAM)

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 33+75.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**DOUBLE 9 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 90° SKEW**

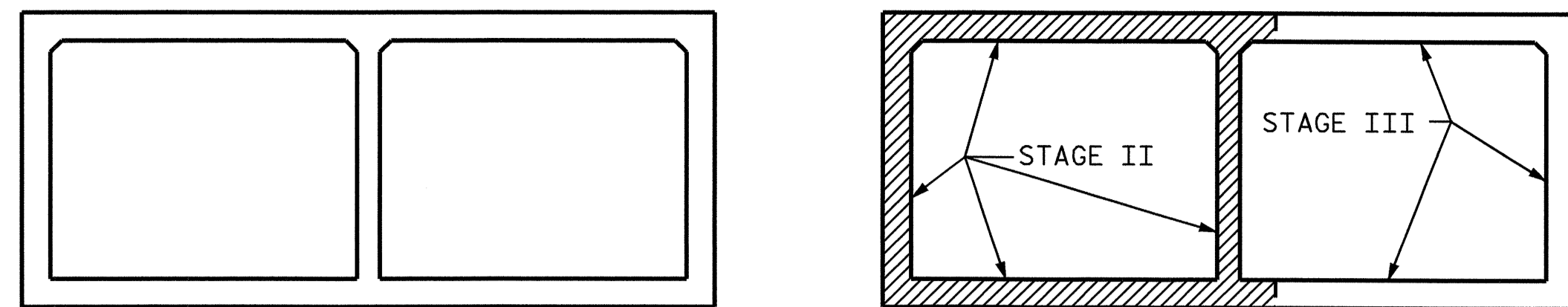
*Professional Engineer Seal*  
 NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14045  
 J. M. COOKS  
 10/21/08

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.  
 REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

ASSEMBLED BY : PEGGY ADKINS	DATE : 6-05	<b>SPECIAL</b>
CHECKED BY : B.N. BARODAWALA	DATE : 10-08	
DRAWN BY : RALPH D. UNDERWOOD	DATE : MAY 1971	<b>STANDARD</b>
CHECKED BY : JOEL A. JOHNSON	DATE : JULY 1971	

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
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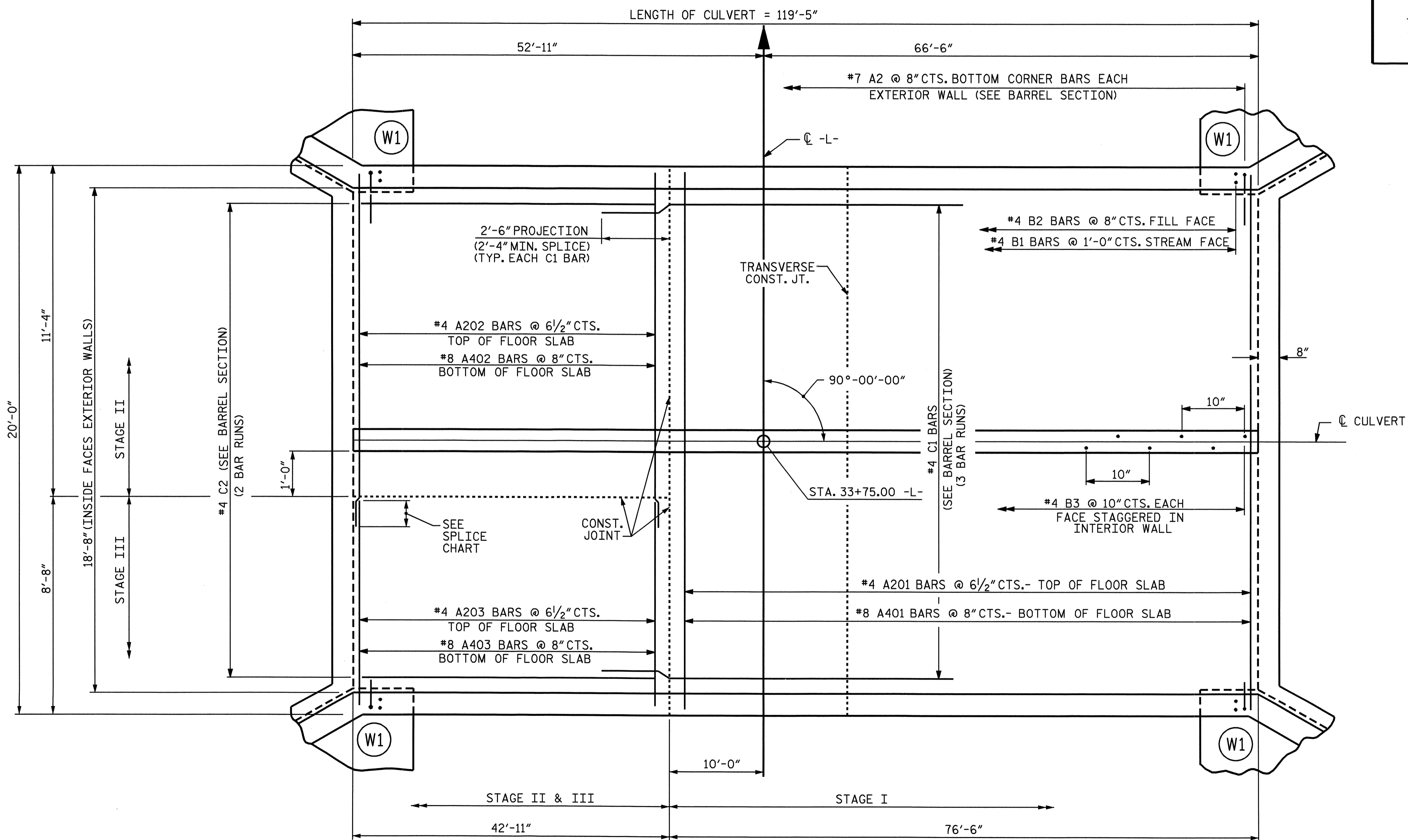
TOTAL SHEETS 10



STAGE I

STAGE II AND III  
(LOOKING DOWN STREAM)

CONSTRUCTION SEQUENCE



PLAN OF FLOOR SLAB

**BAR TYPE**

BAR DIMENSIONS ARE OUT TO OUT

BAR	SIZE	SPLICE LENGTH
* A"100"	6	4'-3"
* A"200"	4	2'-0"
* A"300"	7	4'-9"
* A"400"	8	6'-2"
* B1	4	2'-0"
* B3	4	2'-0"
* C1	4	2'-4"

**REINFORCING STEEL BAR SCHEDULE**

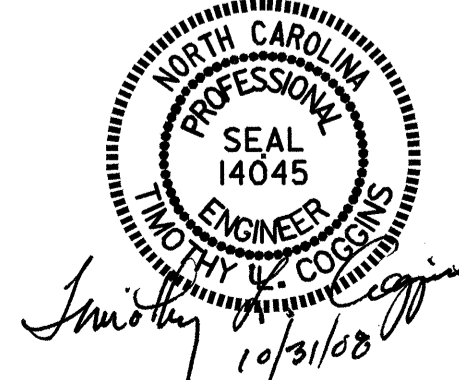
STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	230	5	6	4'-8"	1119
* A2	230	7	6	6'-9"	3173
* A101	108	6	STR	19'-7"	3177
* A201	141	4	STR	19'-7"	1845
* A301	115	7	STR	19'-7"	4603
* A401	115	8	STR	19'-7"	6013
* B1	154	4	STR	8'-2"	840
* B2	230	4	STR	6'-4"	973
* B3	184	4	STR	8'-2"	1004
* C1	219	4	STR	27'-10"	4072
* G1	4	5	STR	19'-8"	82
* EPOXY COATED REINFORCING STEEL 26901 LBS.					
STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	65	5	6	4'-8"	316
* A2	65	7	6	6'-9"	897
* A102	61	6	STR	15'-7"	1428
* A202	79	4	STR	13'-4"	704
* A302	65	7	STR	16'-1"	2137
* A402	65	8	STR	17'-6"	3037
* B1	43	4	STR	8'-2"	235
* B2	65	4	STR	6'-4"	275
* B3	103	4	STR	8'-2"	562
* C2	86	4	STR	22'-6"	1293
* G2	4	5	STR	14'-10"	62
* EPOXY COATED REINFORCING STEEL 10946 LBS.					
STAGE III					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	65	5	6	4'-8"	316
* A2	65	7	6	6'-9"	897
* A103	61	6	STR	8'-4"	764
* A203	79	4	STR	8'-4"	440
* A303	65	7	STR	8'-4"	1107
* A403	65	8	STR	8'-4"	1446
* B1	43	4	STR	8'-2"	235
* B2	65	4	STR	6'-4"	275
* C2	60	4	STR	22'-6"	902
* G3	4	5	STR	8'-4"	35
* EPOXY COATED REINFORCING STEEL 6417 LBS.					

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 33+75.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 9 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 90° SKEW



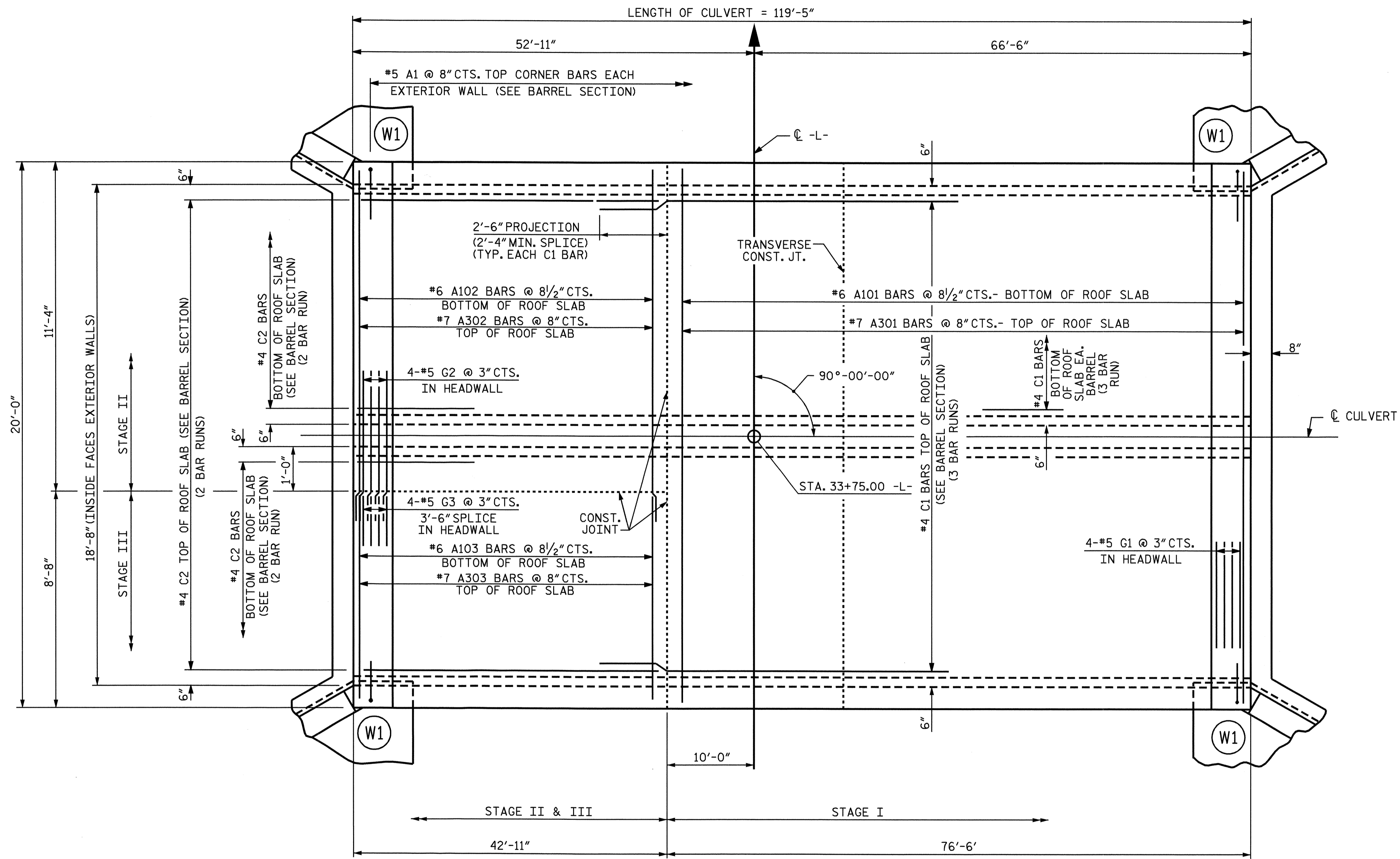
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NO.	BY:	DATE:	NO.	DATE:	C-3
1			3		TOTAL SHEETS 10
2			4		

ADDED NOV. 1, 1990

ASSEMBLED BY: PEGGY ADKINS DATE: 6-05  
 CHECKED BY: B.N. BARODAWALA DATE: 10-08

31-OCT-2008 12:25

STD. NO. CR12A STD. #1



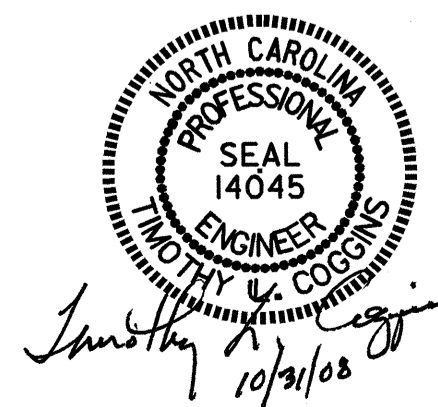
PLAN OF ROOF SLAB

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 33+75.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

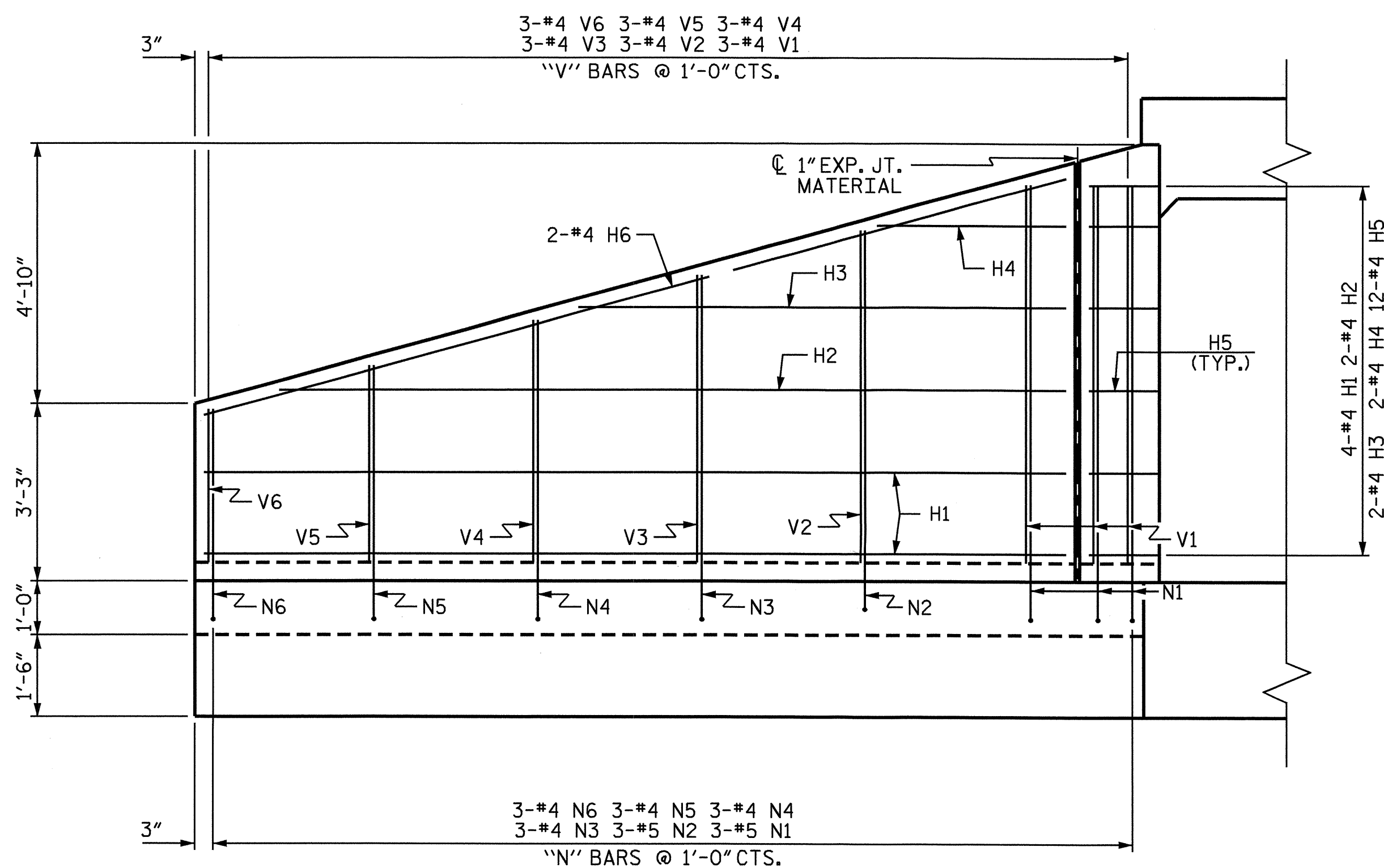
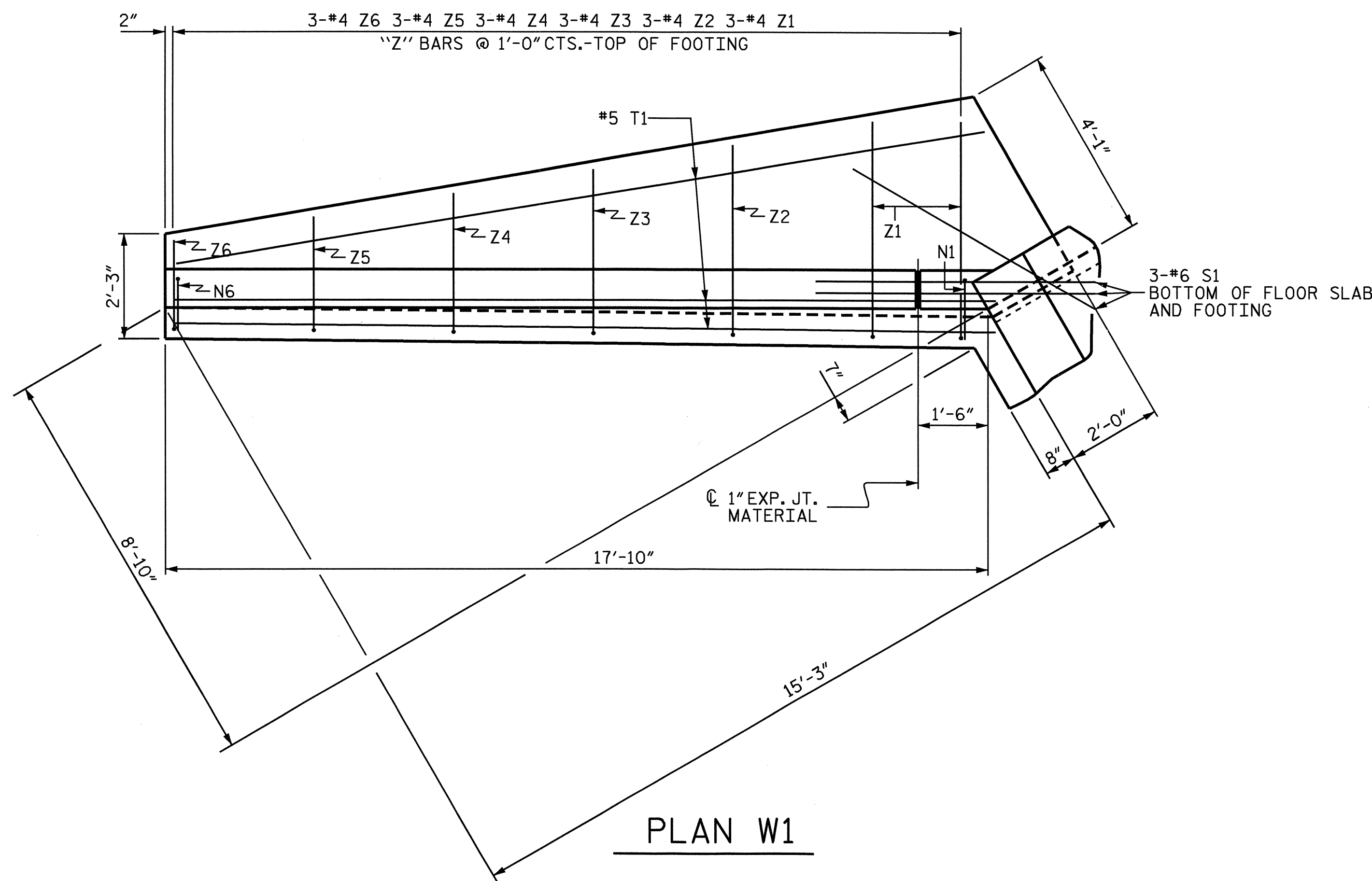
DOUBLE 9 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 90° SKEW



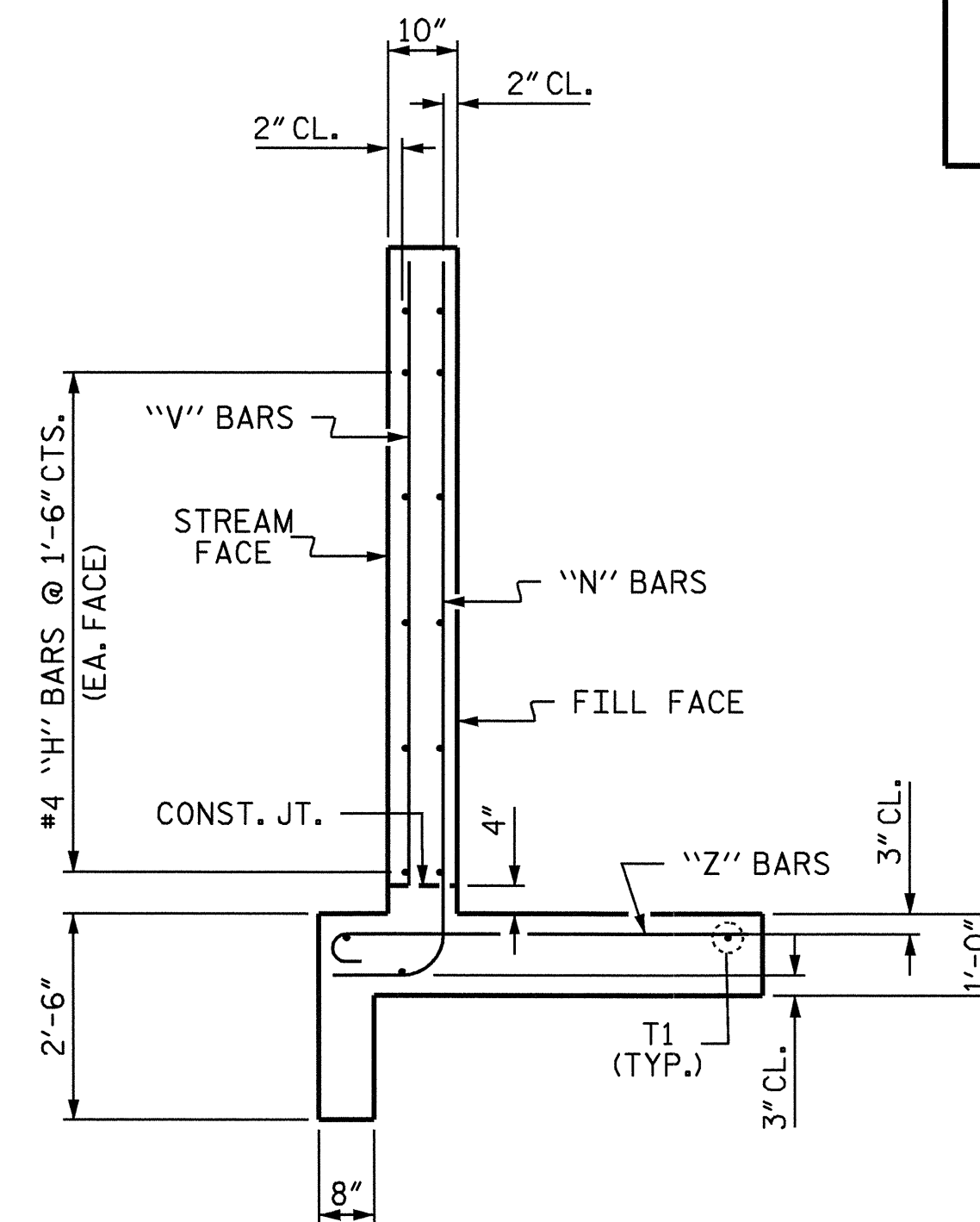
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
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2			4			10

ADDED NOV. 1, 1990

ASSEMBLED BY: PEGGY ADKINS DATE: 6-05  
 CHECKED BY: B.N. BARODAWALA DATE: 10-08

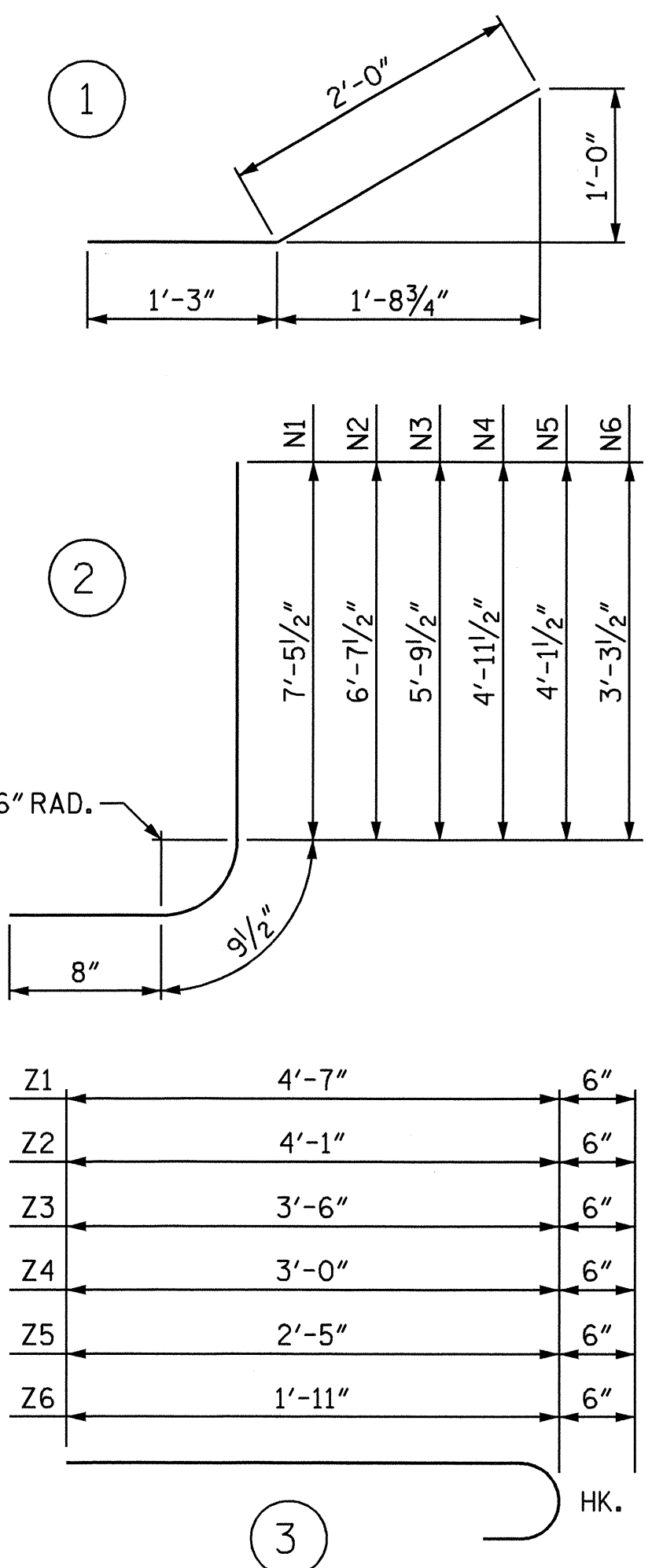


ELEVATION W1



TYPICAL WING SECTION

BAR TYPES  
ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL  
FOR ONE WING

* BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
* H1	#4	STR	15'-9"	42
* H2	#4	STR	14'-5"	19
* H3	#4	STR	8'-11"	12
* H4	#4	STR	3'-5"	5
* H5	#4	1	3'-3"	26
* H6	#4	STR	16'-4"	22
* N1	#5	2	8'-11"	28
* N2	#5	2	8'-1"	25
* N3	#4	2	7'-3"	15
* N4	#4	2	6'-5"	13
* N5	#4	2	5'-7"	11
* N6	#4	2	4'-9"	10
* S1	#6	STR	6'-0"	27
* T1	#5	STR	17'-7"	55
* V1	#4	STR	6'-11"	14
* V2	#4	STR	6'-1"	12
* V3	#4	STR	5'-3"	11
* V4	#4	STR	4'-5"	9
* V5	#4	STR	3'-7"	7
* V6	#4	STR	2'-9"	6
* Z1	#4	3	5'-1"	10
* Z2	#4	3	4'-7"	9
* Z3	#4	3	4'-0"	8
* Z4	#4	3	3'-6"	7
* Z5	#4	3	2'-11"	6
* Z6	#4	3	2'-5"	5

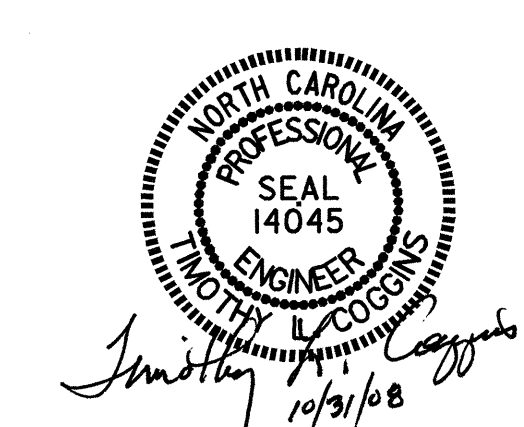
\* TOTAL EPOXY COATED REINFORCING STEEL FOR 1 WING 414 LBS

\* EPOXY COATED REINFORCING STEEL  
STAGE I (2 WINGS) 828  
STAGE II (1 WING) 414  
STAGE III (1 WING) 414  
TOTAL REINFORCING STEEL 1656 LBS

CLASS A CONCRETE  
STAGE I  
1 WING 12.8 CY  
1 HEADWALL 0.9 CY  
1 CURTAIN WALL 1.1 CY  
TOTAL 14.8 CY  
STAGE II  
1 WING 6.4 CY  
1 HEADWALL 0.5 CY  
1 CURTAIN WALL 0.6 CY  
TOTAL 7.5 CY  
STAGE III  
1 WING 6.4 CY  
1 HEADWALL 0.4 CY  
1 CURTAIN WALL 0.5 CY  
TOTAL 7.3 CY  
TOTAL CLASS A CONCRETE 29.6 CY

PROJECT NO. U-3462  
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SHEET 5 OF 5

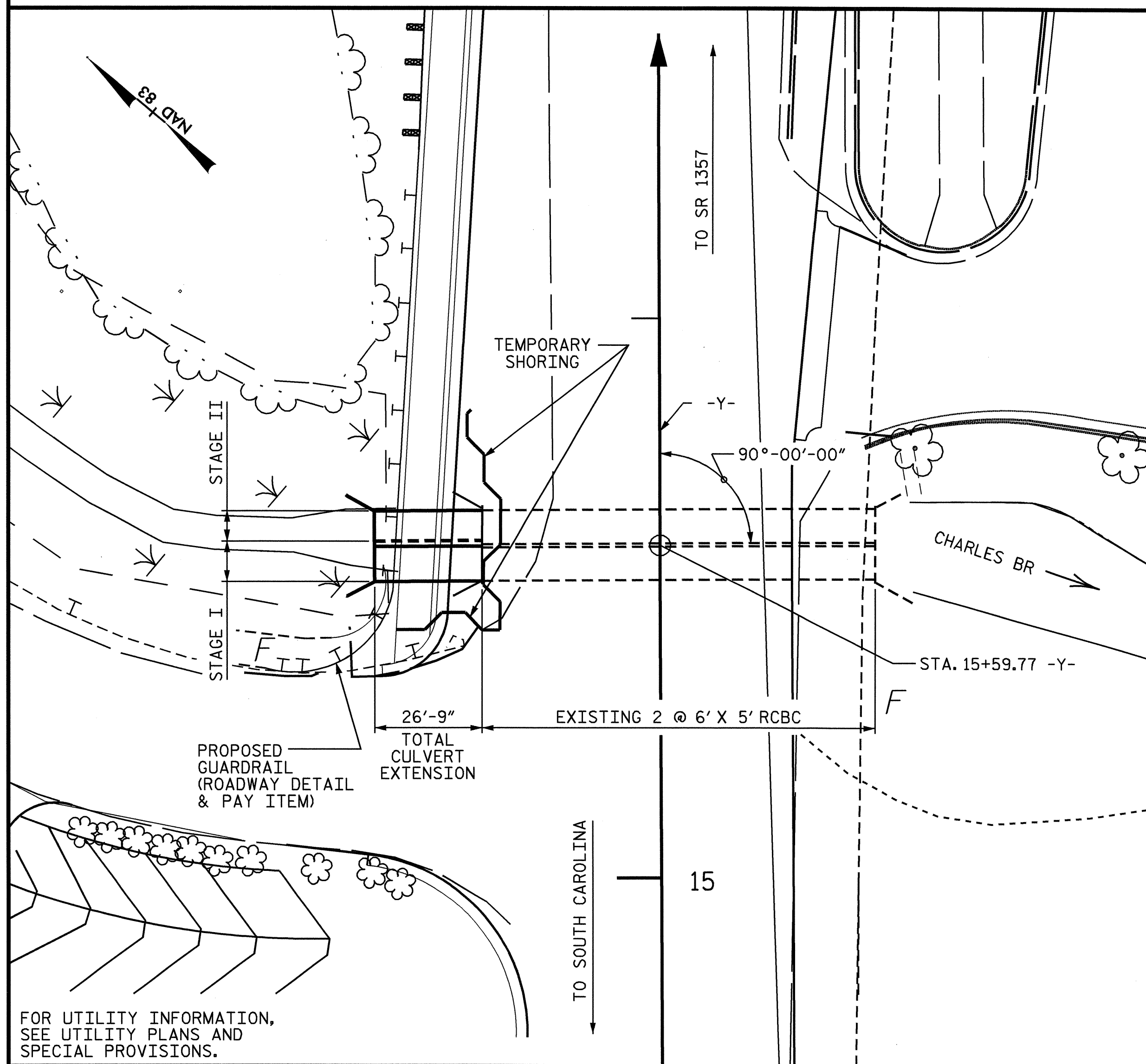
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
WINGS FOR  
CONCRETE BOX CULVERT  
H = 7'-0" SLOPE = 3:1  
90° SKEW



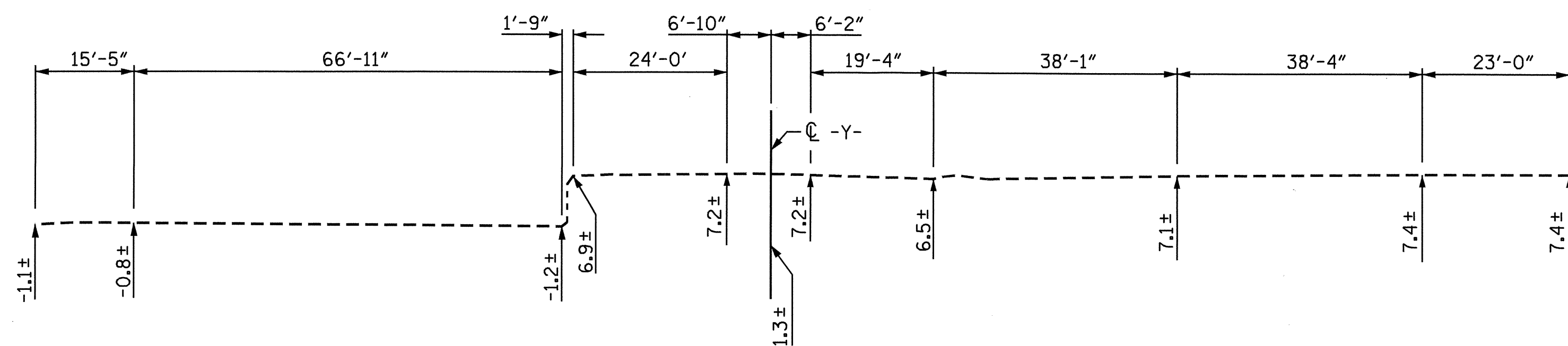
ASSEMBLED BY : PEGGY ADKINS DATE : 6-05  
CHECKED BY : B.N. BARODAWALA DATE : 10-08  
DRAWN BY : CCJ 10/99  
CHECKED BY : RWW 03/00

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

BM: SQUARE CUT SET IN CONCRETE 116' RT. OF BL STA. 25+07, ELEV. 11.23', NAVD 88.



LOCATION SKETCH



PROFILE ALONG CULVERT

DRAWN BY: PEGGY ADKINS DATE: 5-07  
 CHECKED BY: B.N. BARODAWALA DATE: 10-08

31-OCT-2008 12:33  
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STRUCTURE QUANTITIES STAGE I	
CLASS A CONCRETE	
BARREL @ 0.729 CY/FT	19.5 C.Y.
WINGS ETC.	4.9 C.Y.
TOTAL	24.4 C.Y.
EPOXY COATED REINFORCING STEEL	
BARREL	3490 LBS.
WINGS ETC.	261 LBS.
TOTAL	3751 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L.	16 TONS
STRUCTURE QUANTITIES STAGE II	
CLASS A CONCRETE	
BARREL @ 0.449 CY/FT	12.0 C.Y.
WINGS ETC.	4.7 C.Y.
TOTAL	16.7 C.Y.
EPOXY COATED REINFORCING STEEL	
BARREL	1955 LBS.
WINGS ETC.	261 LBS.
TOTAL	2216 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L.	11 TONS
TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 1.178 CY/FT	31.5 C.Y.
WINGS ETC.	9.6 C.Y.
TOTAL	41.1 C.Y.
EPOXY COATED REINFORCING STEEL	
BARREL	5445 LBS.
WINGS ETC.	522 LBS.
TOTAL	5967 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L.	27 TONS

NOTES

F. A. PROJECT NO. STP-1357(2)

- ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.  
 DESIGN FILL-----2.58 MIN.-----3.32 MAX.  
 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:  
**STAGE I CONSTRUCTION**  
 1. WING FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.  
 2. THE REMAINING PORTIONS OF THE WALLS AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.  
**STAGE II CONSTRUCTION**  
 1. WING FOOTING AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALL.  
 2. THE REMAINING PORTION OF THE WALL AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.  
 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.  
 DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.  
 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 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.  
 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.  
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 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.  
 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.  
 ALL BAR SUPPORTS USED IN THE CULVERT AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.  
 FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.  
 FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING, SEE ROADWAY PLANS.

GRADE DATA

GRADE POINT ELEVATION @ STA. 15+59.77-Y-	7.535 FT.
BED ELEVATION @ STA. 15+59.77 -Y-	-0.651± FT.
ROADWAY SLOPES	3 : 1

HYDRAULIC DATA

DESIGN DISCHARGE	= 450 c.f.s.
FREQUENCY OF DESIGN FLOOD	= 25 YR.**
DESIGN HIGH WATER ELEVATION	= 6.7 FT.**
DRAINAGE AREA	= 1.63 MI <sup>2</sup>
BASIC DISCHARGE (Q100)	= 810 c.f.s.
BASIC HIGH WATER ELEVATION	= 7.8 FT.

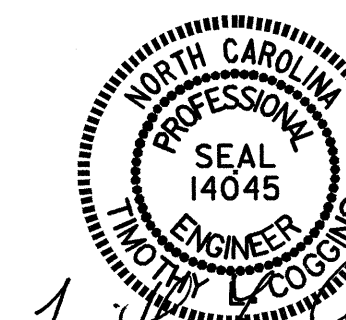
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 550 c.f.s.
FREQUENCY OF OVERTOPPING FLOOD	= 25 YR.+
OVERTOPPING FLOOD ELEVATION	= 7.2 FT.

\*\* THE DESIGN MAINTAINS THE EXISTING LEVEL OF SERVICE, BUT DOES NOT ACHIEVE THE DESIRED (50 YR) LEVEL OF SERVICE. TO DO SO, THE GRADE WOULD NEED TO BE RAISED AND THE CULVERT REPLACED.



Omar R. Aziz  
 10-31-08



Timothy R. Collins  
 10/31/08

PROJECT NO. U-3462  
 BRUNSWICK COUNTY  
 STATION: 15+59.77 -Y-

SHEET 1 OF 5

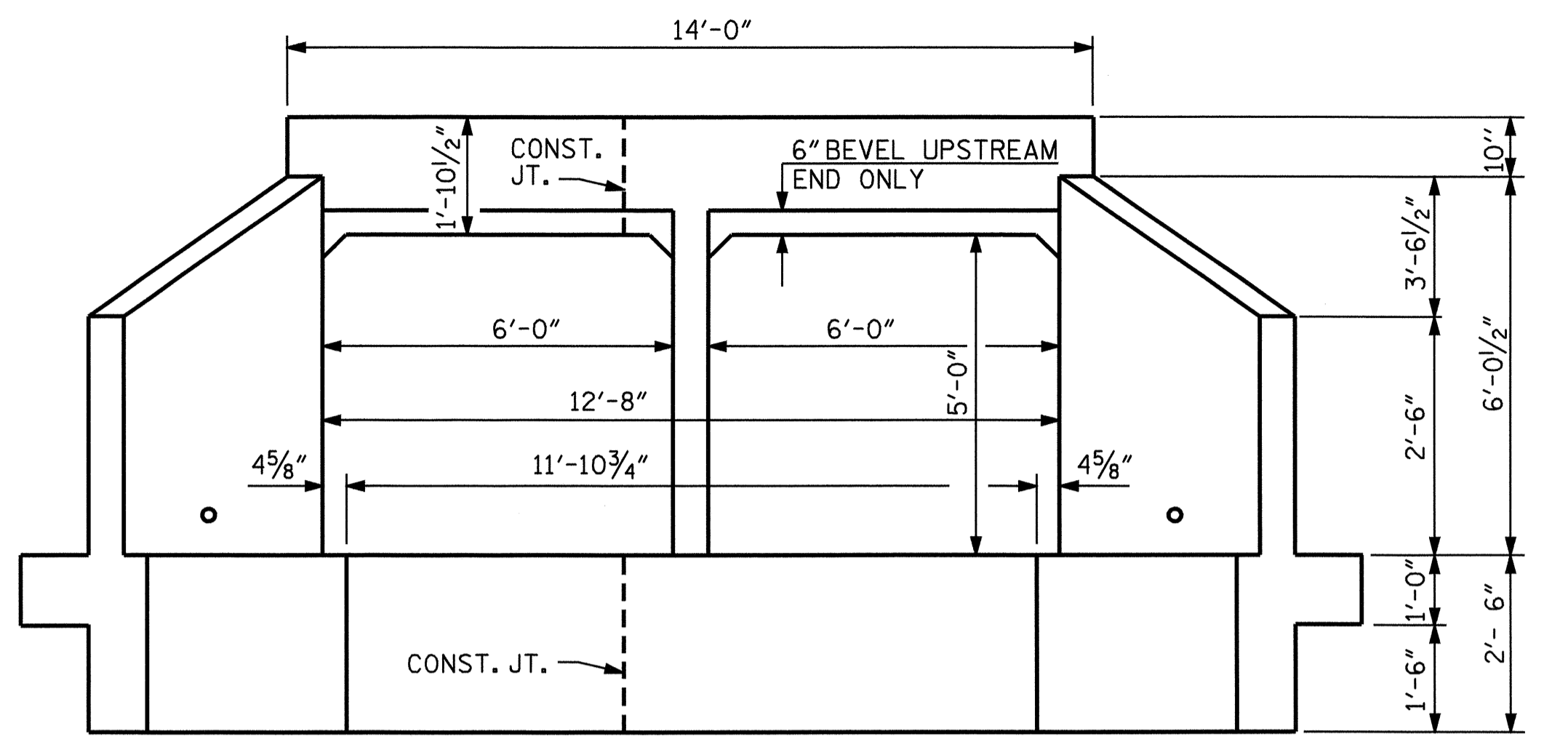
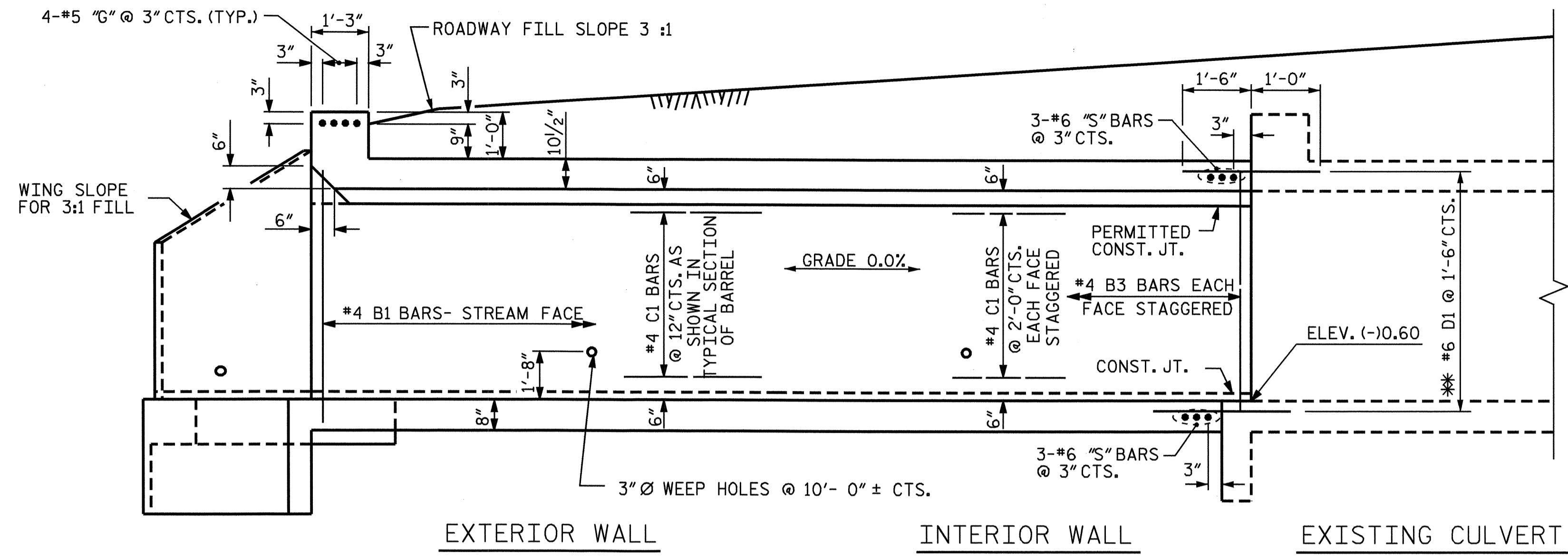
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 6 FT. X 5 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION  
 90° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6	
1			3			TOTAL SHEETS	
2			4			10	

STD. NO. CB12A

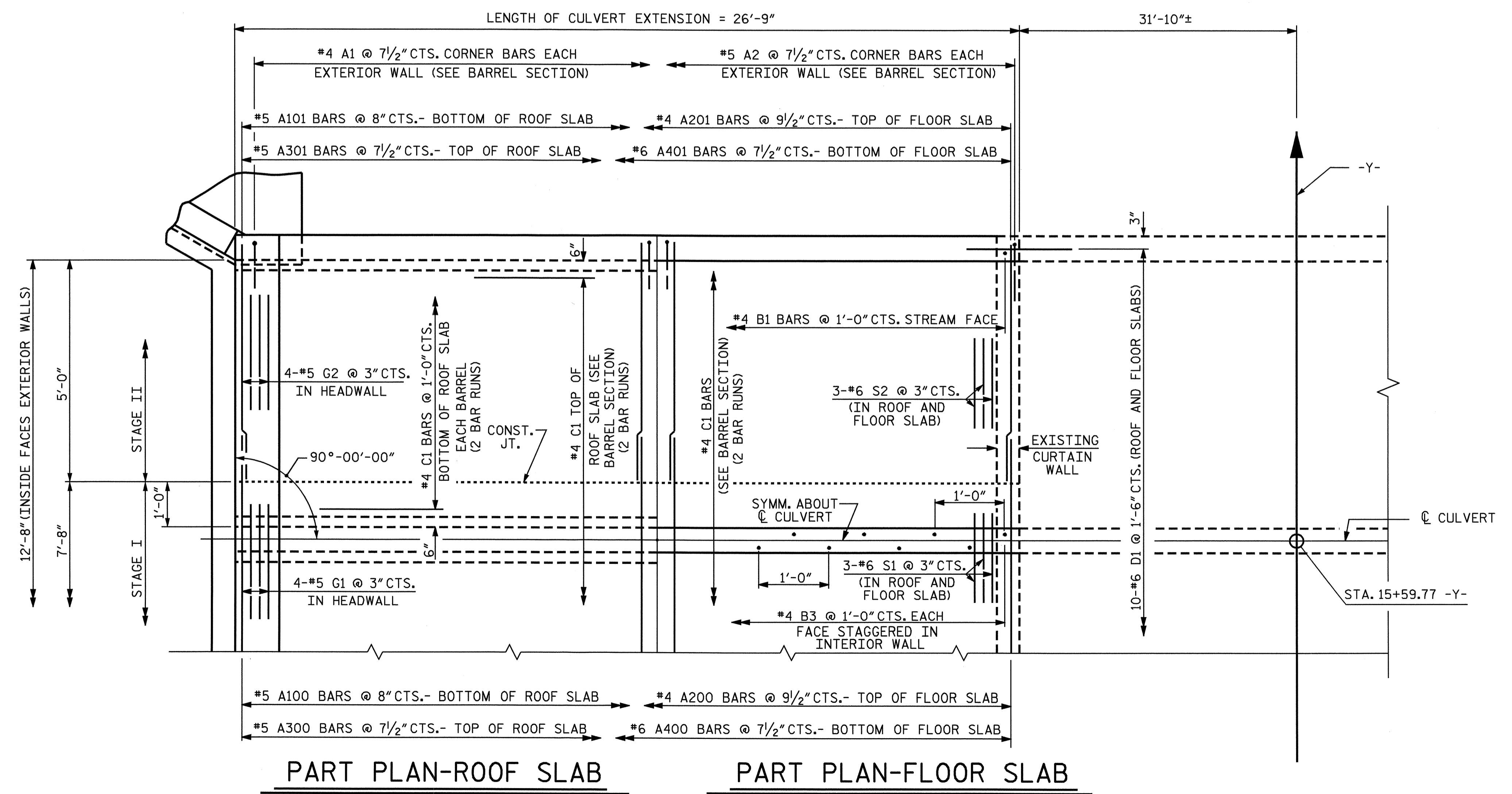
STR. #2



**CULVERT SECTION NORMAL TO ROADWAY**

**END ELEVATION**

\* #6 D1 DOWELS SHALL BE PLACED @ 1'-6" CTS. IN THE ROOF SLAB, FLOOR SLAB AND EXTERIOR WALLS TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT.

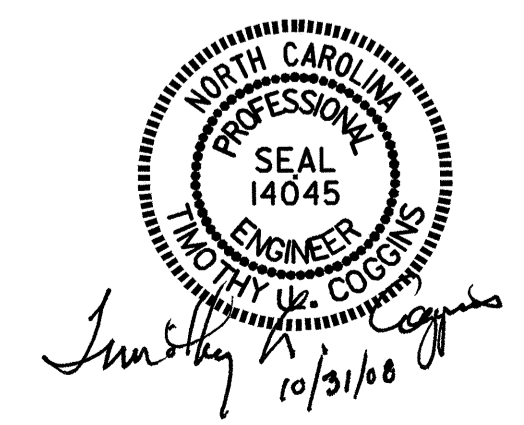


**PART PLAN-ROOF SLAB**

**PART PLAN-FLOOR SLAB**

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 15+59.77 -Y-  
 SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**DOUBLE 6 FT. X 5 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION  
 90° SKEW**

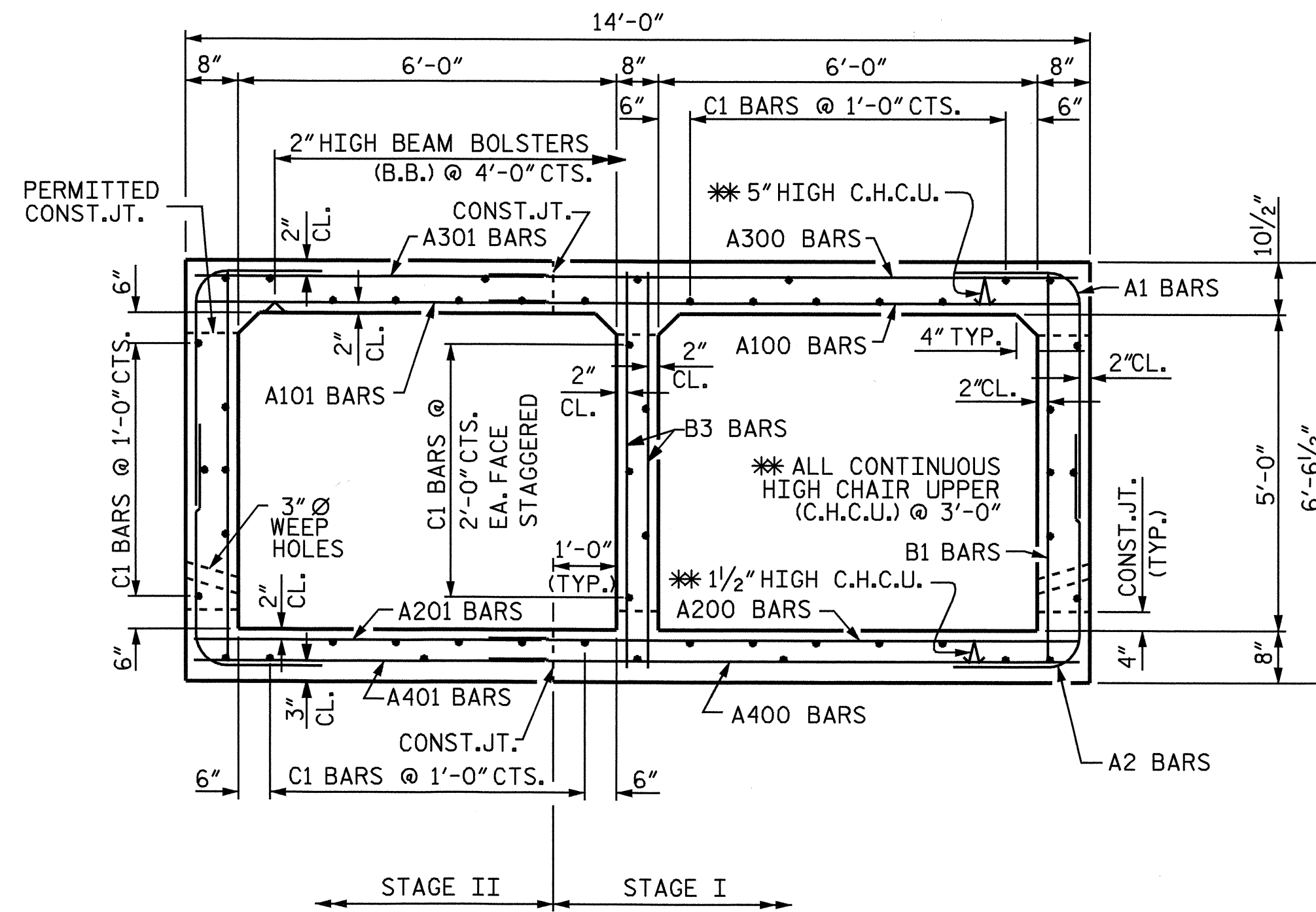


REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.  
 REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

ASSEMBLED BY: PEGGY ADKINS	DATE: 5-07	<b>SPECIAL</b>
CHECKED BY: B.N. BARODAWALA	DATE: 10-08	
DRAWN BY: RALPH D. UNDERWOOD	DATE: MAY 1971	<b>STANDARD</b>
CHECKED BY: JOEL A. JOHNSON	DATE: JULY 1971	

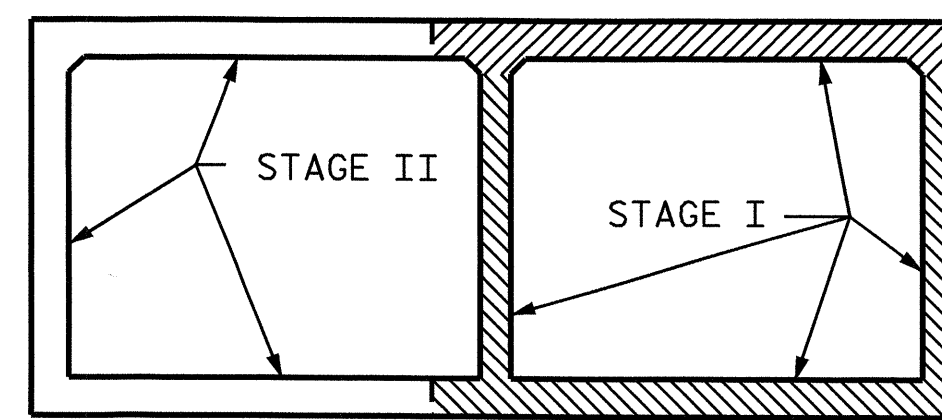
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			10





**RIGHT ANGLE SECTION OF BARREL**

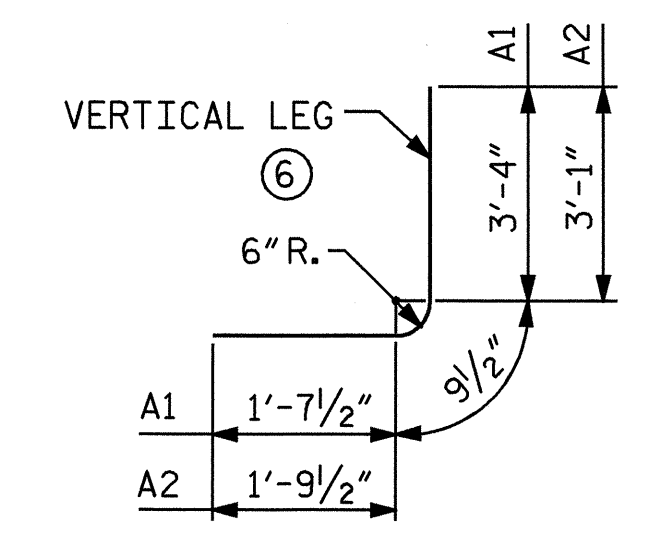
THERE ARE 51 "C" BARS IN SECTION OF BARREL.  
(LOOKING DOWNSTREAM)



STAGE I AND II

**CONSTRUCTION SEQUENCE**

BAR TYPE			REINFORCING STEEL BAR SCHEDULE				
STAGE I							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
* A1	43	4	6	5'-9"	165		
* A2	43	5	6	5'-8"	254		
* A100	41	5	STR	10'-11"	467		
* A200	34	4	STR	10'-4"	235		
* A300	43	5	STR	10'-6"	471		
* A400	43	6	STR	11'-9"	759		
* B1	27	4	STR	6'-0"	108		
* B3	54	4	STR	6'-0"	216		
* C1	62	4	STR	14'-5"	597		
* D1	15	6	STR	2'-6"	56		
* G1	4	5	STR	11'-10"	49		
* S1	6	6	STR	12'-7"	113		
* TOTAL EPOXY COATED REINFORCING STEEL					3490 LBS		
STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
* A1	43	4	6	5'-9"	165		
* A2	43	5	6	5'-8"	254		
* A101	41	5	STR	5'-4"	228		
* A201	34	4	STR	5'-4"	121		
* A301	43	5	STR	5'-4"	239		
* A401	43	6	STR	5'-4"	344		
* B1	27	4	STR	6'-0"	108		
* C1	40	4	STR	14'-5"	385		
* D1	11	6	STR	2'-6"	41		
* G2	4	5	STR	5'-4"	22		
* S2	6	6	STR	5'-4"	48		
* TOTAL EPOXY COATED REINFORCING STEEL					1955 LBS		



BAR DIMENSIONS ARE OUT TO OUT

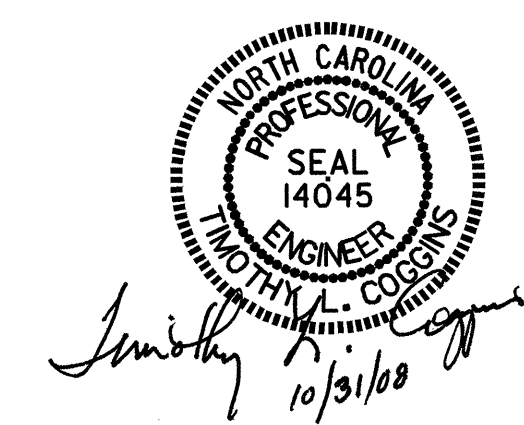
BAR TYPE		
BAR	SIZE	SPLICE LENGTH
A"100"	5	2'-7"
A"200"	4	2'-0"
A"300"	5	2'-2"
A"400"	6	3'-5"
B1	4	2'-0"
B3	4	2'-0"
C1	4	2'-4"
G1	5	3'-6"
S1	6	4'-3"

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
 STATION: 15+59.77 -Y-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**DOUBLE 6 FT. X 5 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION  
 90° SKEW**



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

TOTAL SHEETS: 10

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.  
 REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

ASSEMBLED BY: PEGGY ADKINS DATE: 5-07	SPECIAL
CHECKED BY: B.N. BARODAWALA DATE: 10-08	
DRAWN BY: RALPH D. UNDERWOOD DATE: MAY 1971	STANDARD
CHECKED BY: JOEL A. JOHNSON DATE: JULY 1971	

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 7/16" 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.

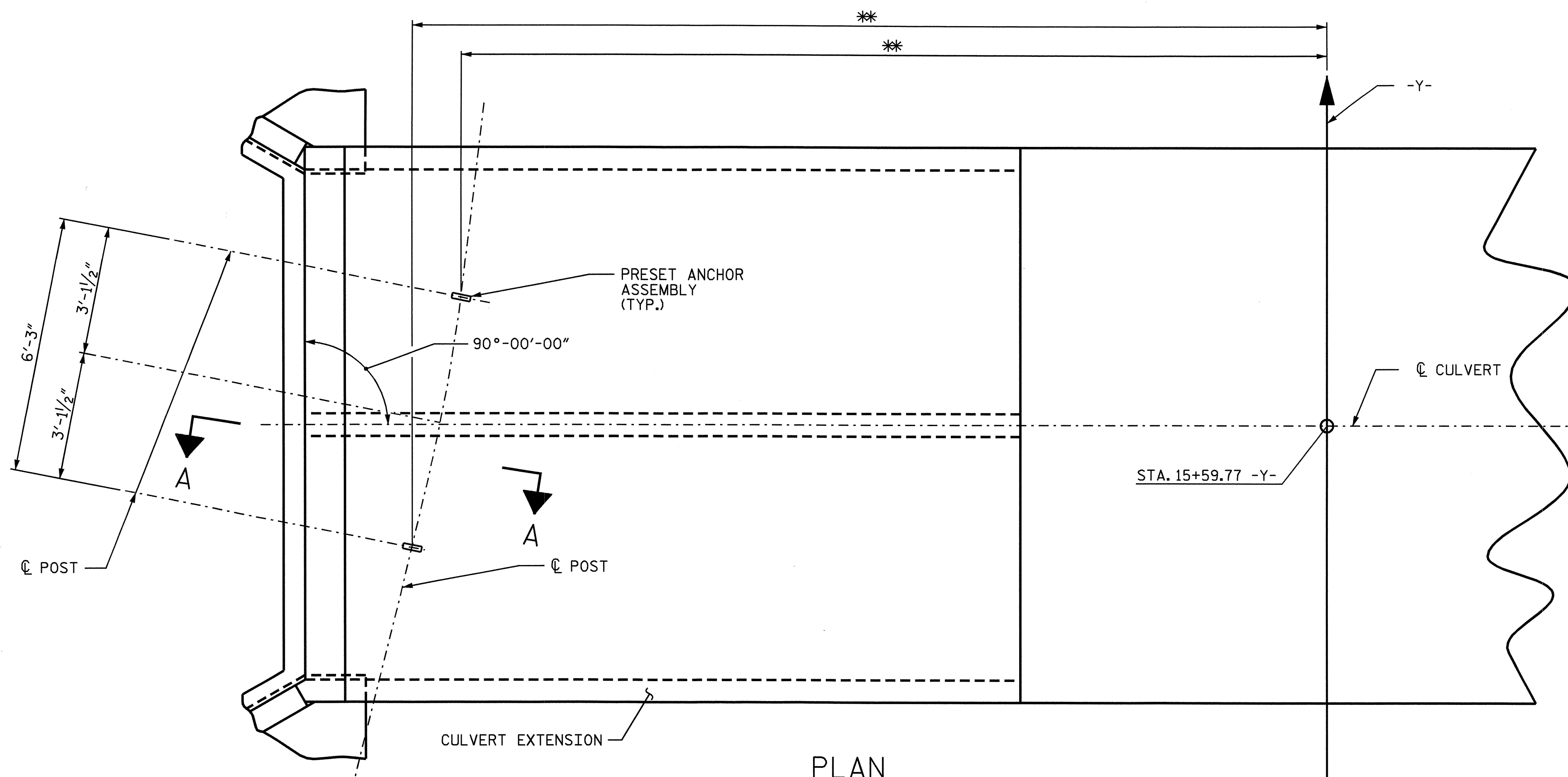
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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.

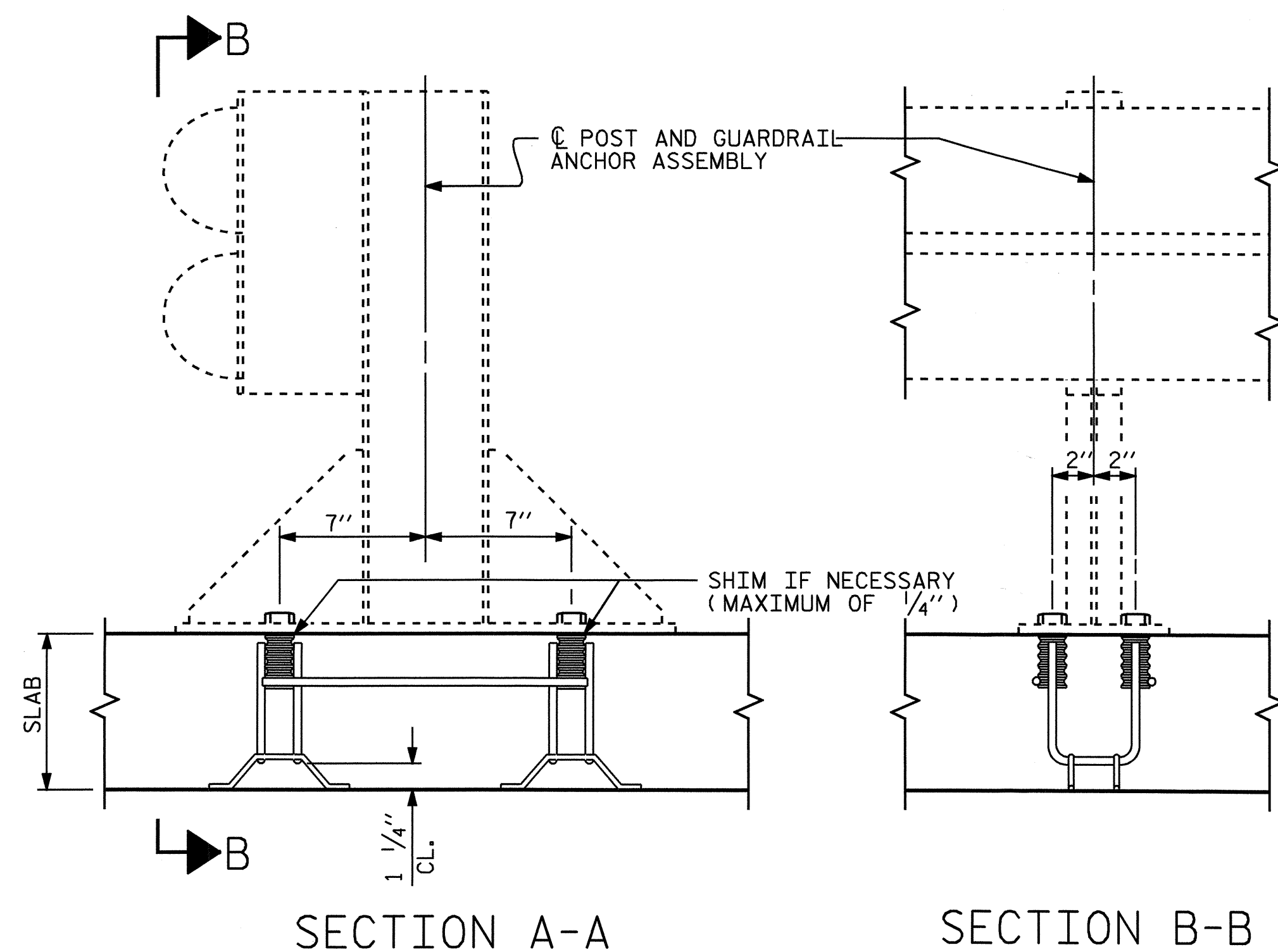
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.



PLAN

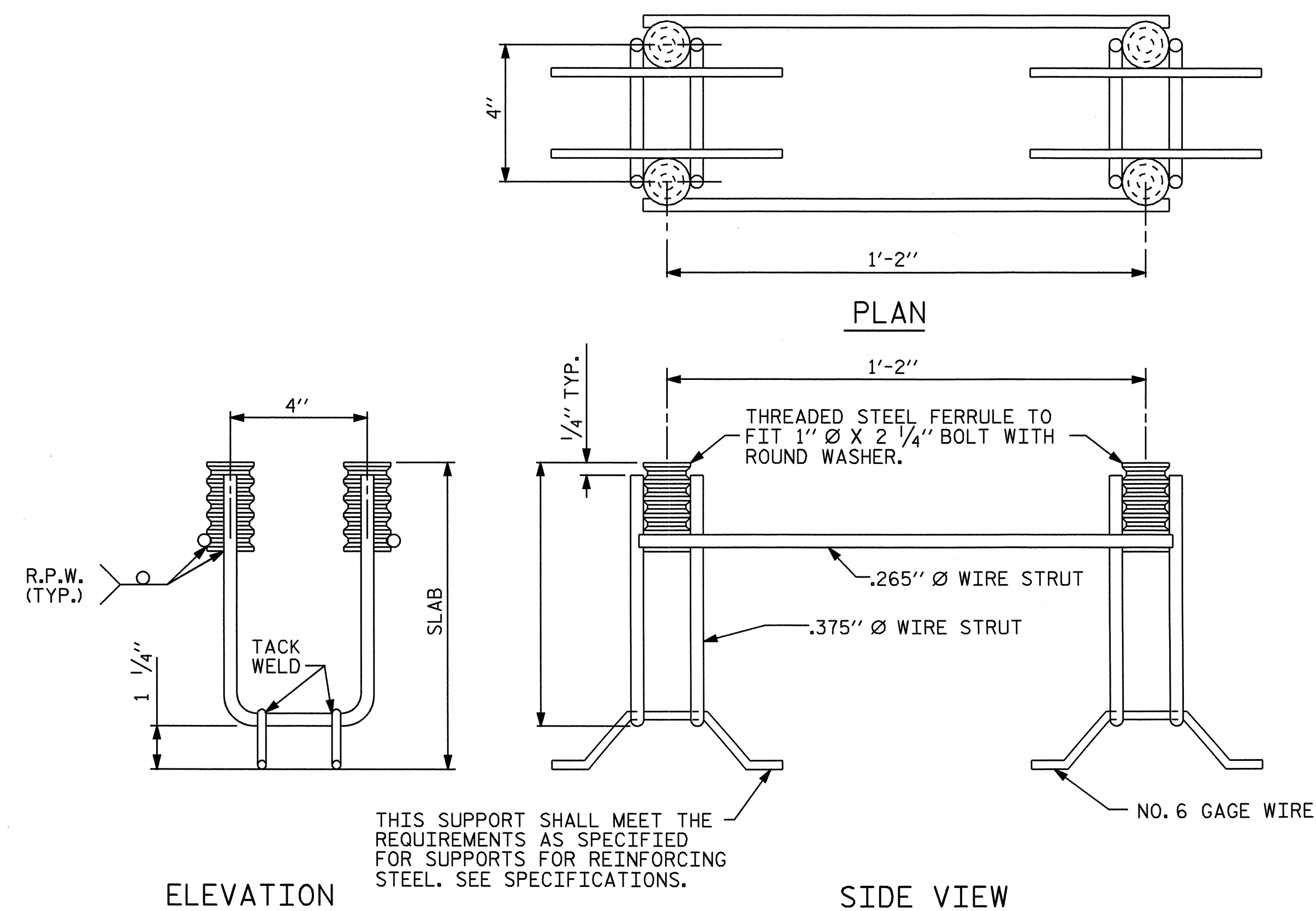
SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

\*\* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.



SECTION A-A

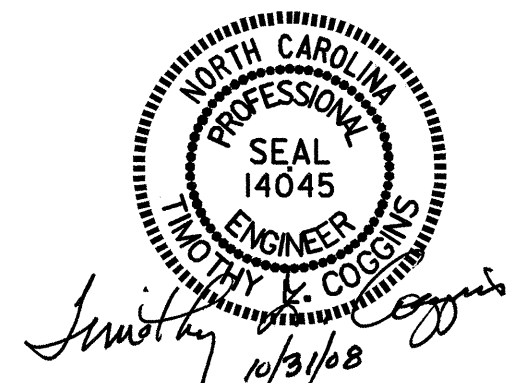
SECTION B-B



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



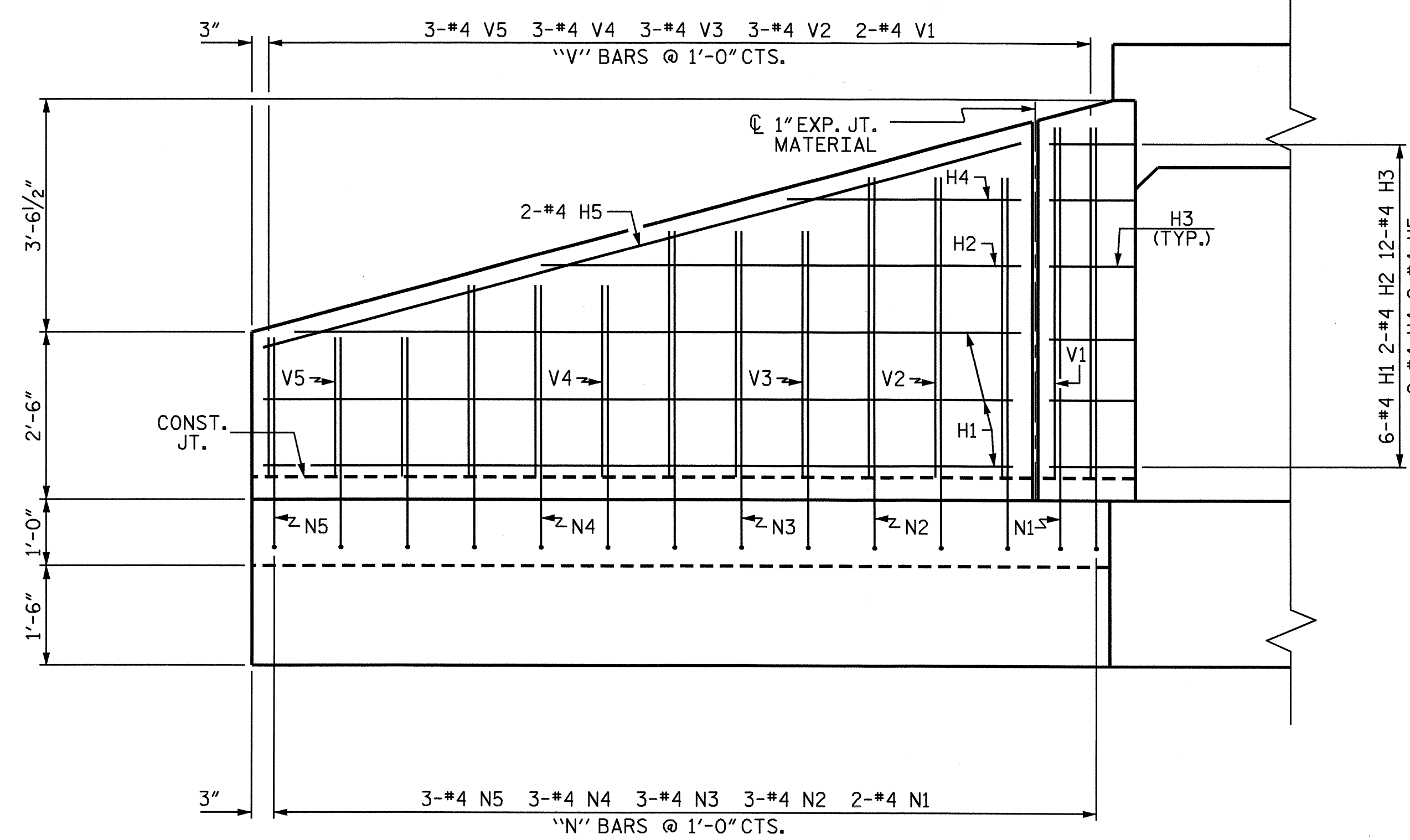
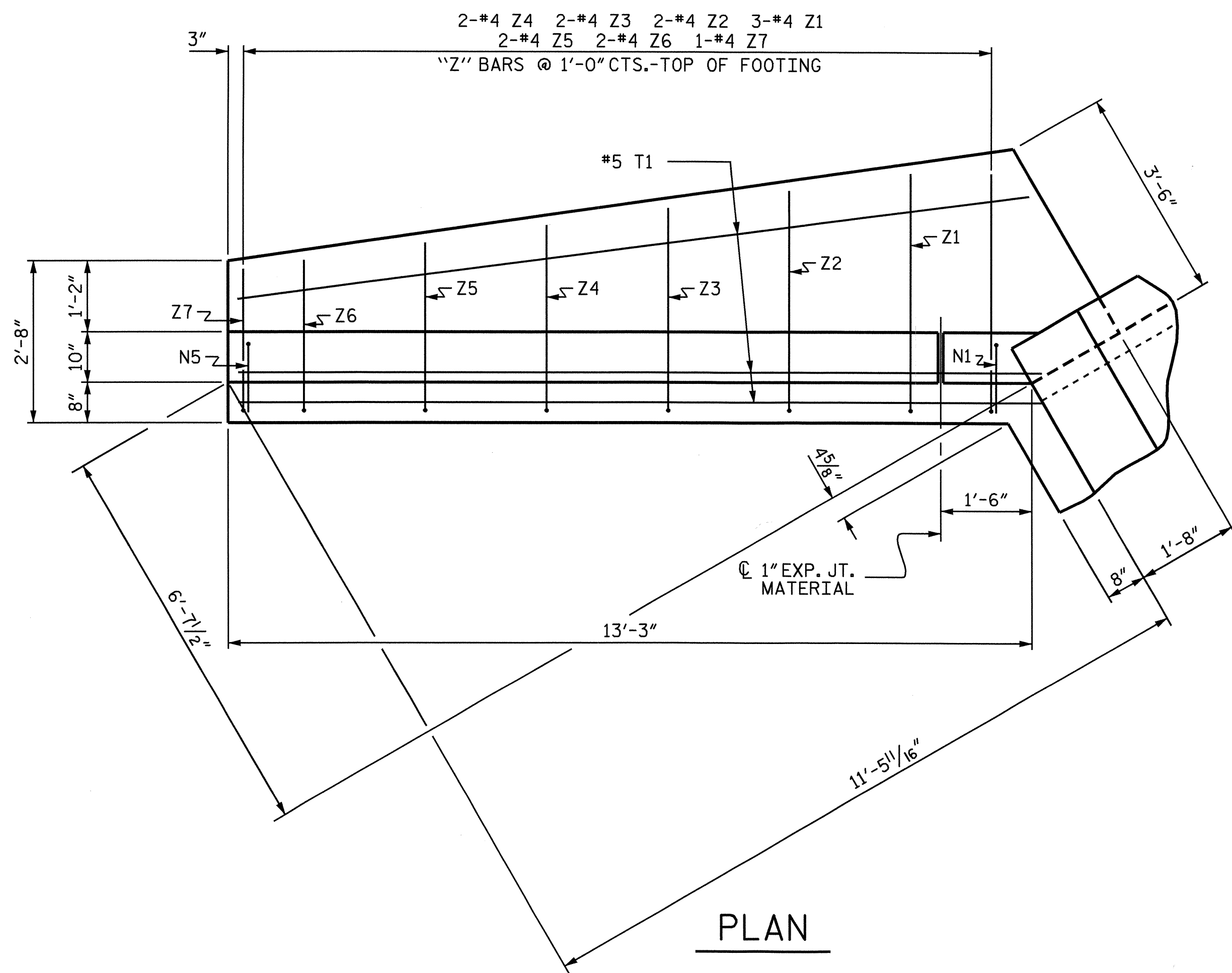
PROJECT NO. U-3462  
 BRUNSWICK COUNTY  
 STATION: 15+59.77 -Y-

SHEET 4 OF 5

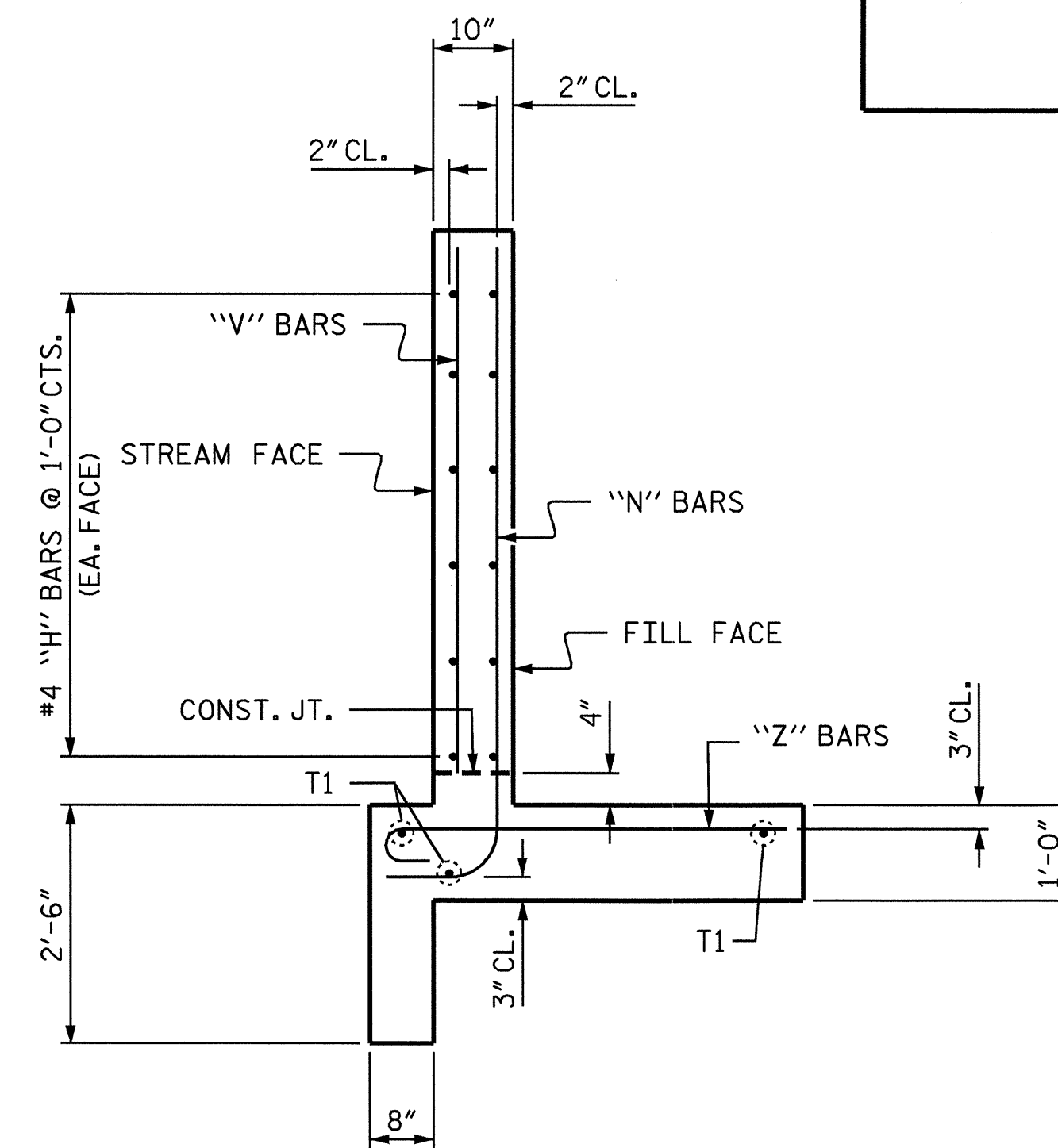
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 ANCHORAGE DETAILS FOR  
 GUARDRAIL ANCHOR ASSEMBLY  
 FOR CULVERTS

ASSEMBLED BY : PEGGY ADKINS	DATE : 6-05
CHECKED BY : B.N. BARODAWALA	DATE : 10-08
DRAWN BY : FCJ	6/88
CHECKED BY : ARB	6/88
REV. 7/10/01	LES/RDR
REV. 5/7/03	RWW/JTE
REV. 5/1/06R	KMM/GM

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9	
1			3			TOTAL SHEETS	
2			4			10	



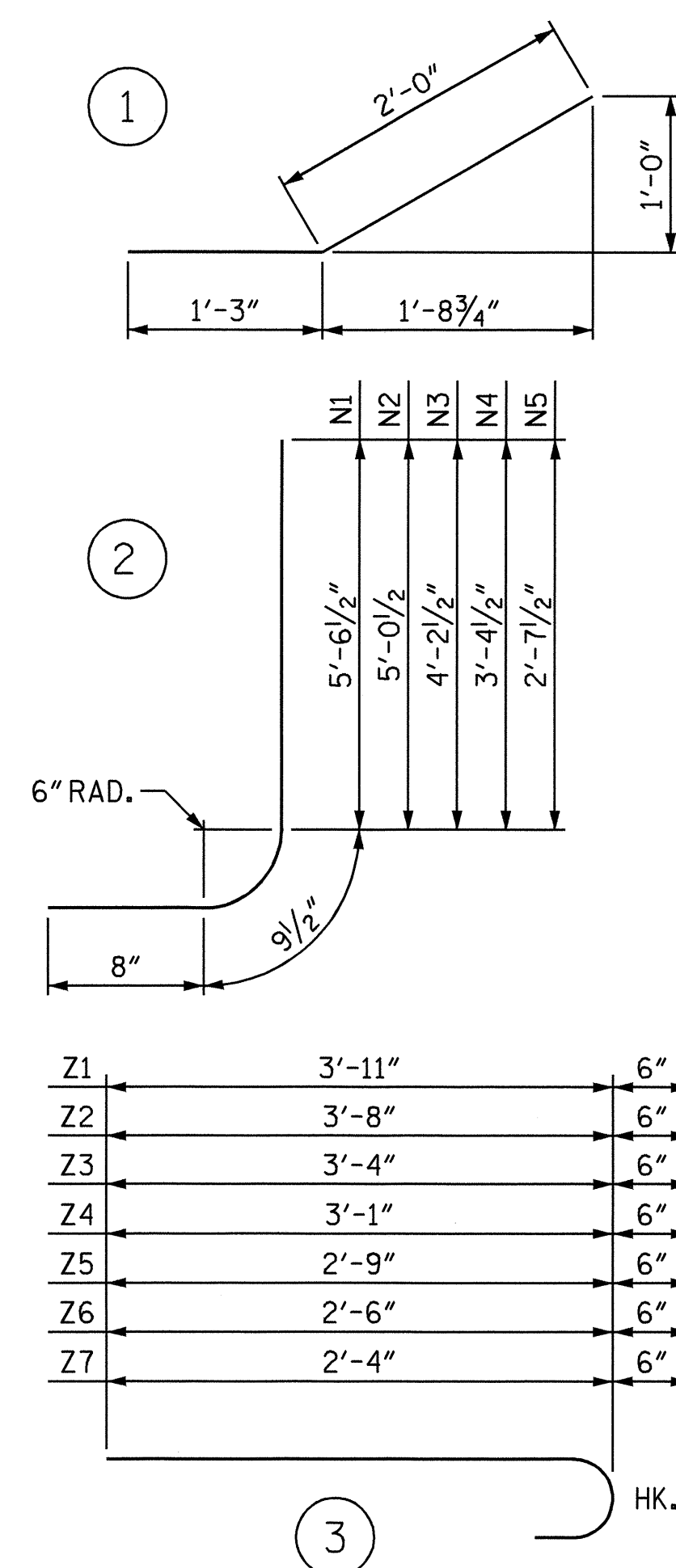
ELEVATION



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

FOR ONE WING

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* H1	6	#4	STR	11'-3"	45
* H2	2	#4	STR	7'-2"	10
* H3	12	#4	1	3'-3"	26
* H4	2	#4	STR	3'-6"	5
* H5	2	#4	STR	11'-9"	16
* N1	2	#4	2	7'-0"	9
* N2	3	#4	2	6'-5"	13
* N3	3	#4	2	5'-8"	11
* N4	3	#4	2	4'-8"	9
* N5	3	#4	2	4'-1"	8
* T1	3	#5	STR	13'-1"	41
* V1	2	#4	STR	5'-0"	7
* V2	3	#4	STR	4'-6"	9
* V3	3	#4	STR	3'-8"	7
* V4	3	#4	STR	2'-10"	6
* V5	3	#4	STR	2'-1"	4
* Z1	3	#4	3	4'-5"	9
* Z2	2	#4	3	4'-2"	6
* Z3	2	#4	3	3'-10"	5
* Z4	2	#4	3	3'-7"	5
* Z5	2	#4	3	3'-3"	4
* Z6	2	#4	3	3'-0"	4
* Z7	1	#4	3	2'-10"	2

\* EPOXY COATED REINFORCING STEEL FOR 1 WING 261 LBS

STAGE I

CLASS A CONCRETE		
1 WING	4.1	CY
1 HEADWALL	0.4	CY
END CURTAIN WALL	0.4	CY
TOTAL	4.9	CY

STAGE II

CLASS A CONCRETE		
1 WING	4.1	CY
1 HEADWALL	0.3	CY
END CURTAIN WALL	0.3	CY
TOTAL	4.7	CY

PROJECT NO. U-3462  
BRUNSWICK COUNTY  
STATION: 15+59.77 -Y-

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

WINGS FOR  
CONCRETE BOX CULVERT

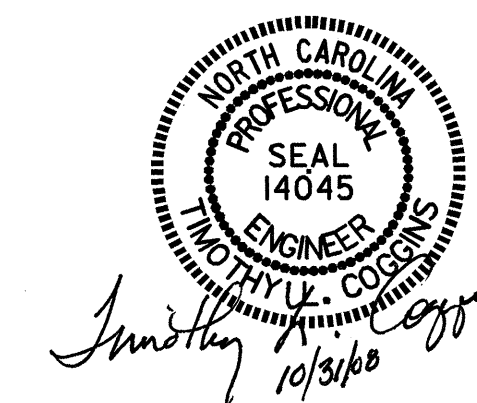
H = 5'-0" SLOPE = 3:1  
90° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10	
1			3			TOTAL	10
2			4			SHEETS	10

STD. NO. CW9005 STR. #2

ASSEMBLED BY: PEGGY PARISI DATE: 10-08  
CHECKED BY: B.N. BARODAWALADATE: 10-08  
DRAWN BY: CCJ 10/99  
CHECKED BY: RWW 03/00

3I-OCT-2008 12:32  
p:\structures\final plans\STR. #2\U3462\_SD.CU.02.dgn  
tcoadins



NOTES ON PLANS

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

BEFORE BEGINNING WALL DESIGN FOR RETAINING WALL NO. 1, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVEL PAD ELEVATION).

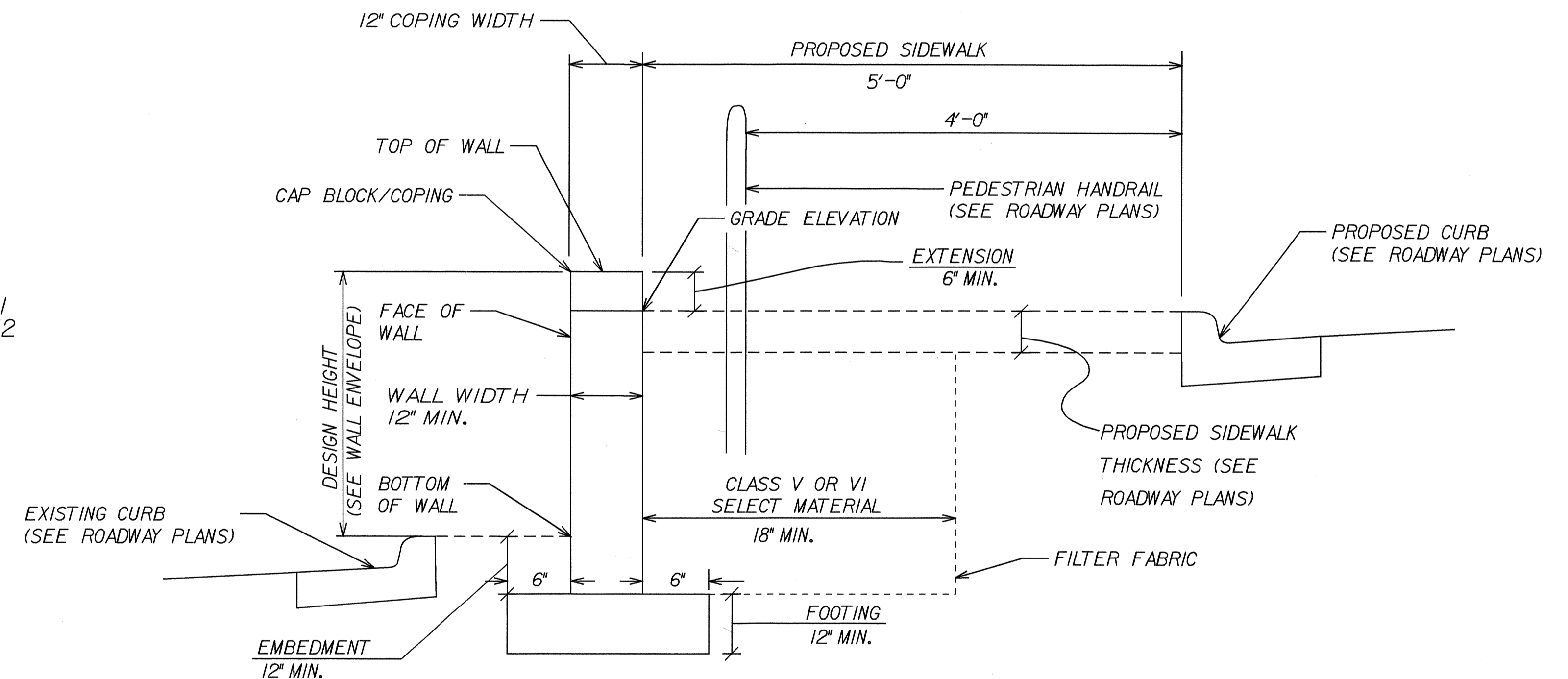
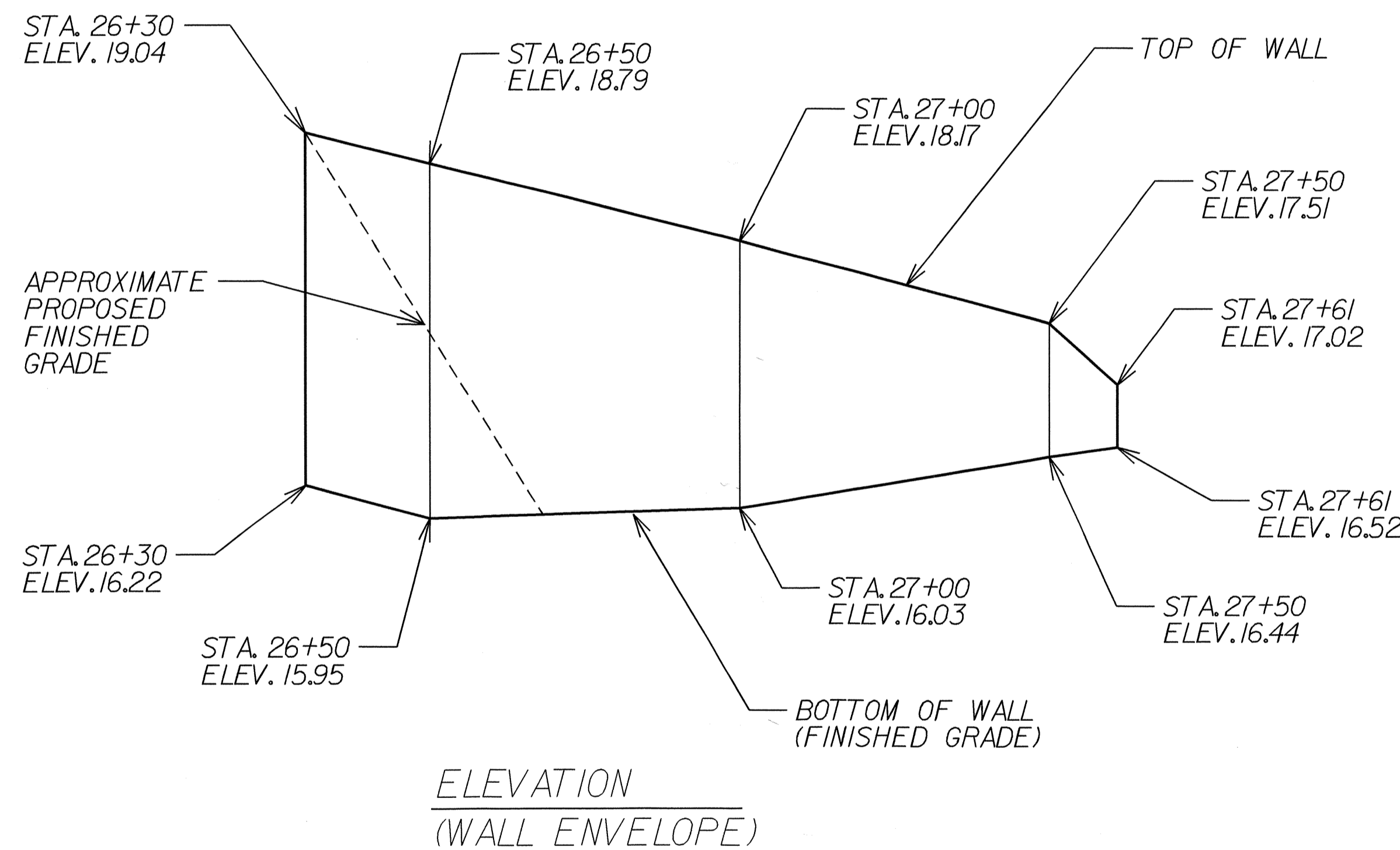
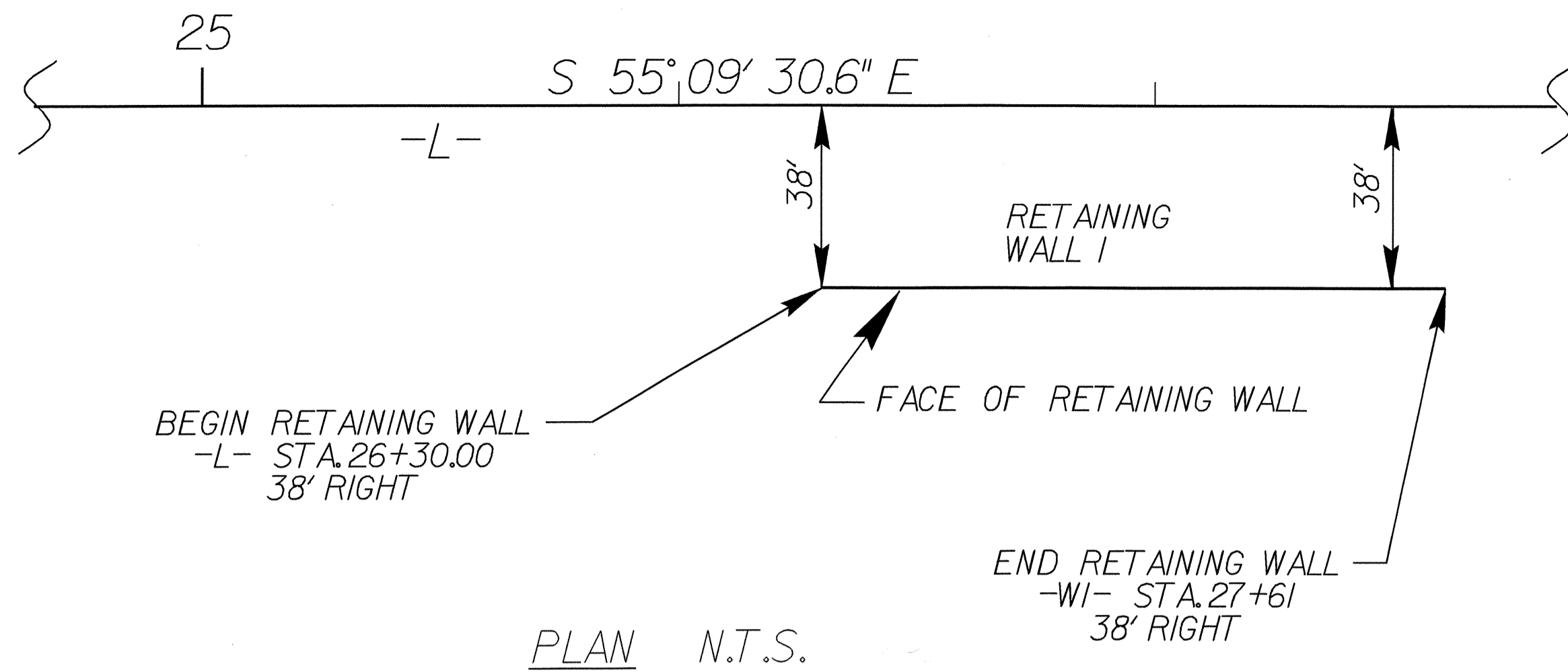
DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:

- 1) MINIMUM SERVICE LIFE = 75 YEARS
- 2) ALLOWABLE BEARING CAPACITY = 3,000 PSF
- 3) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
BACKFILL	100	38	0
FOUNDATION	120	32	0

DESIGN WALL NO. 1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

HANDRAIL POST FOUNDATION AND RETAINING WALL BLOCKS SHOULD BE COORDINATED DURING WALL DESIGN.



STATION -L-	OFFSET	GRADE ELEVATION	TOP OF WALL ELEV.	BOTTOM OF WALL ELEV.
26+30.000	38.00 ft RT	18.54 ft	19.04 ft	16.22 ft
26+50.000	38.00 ft RT	18.29 ft	18.79 ft	15.99 ft
27+00.000	38.00 ft RT	17.67 ft	18.17 ft	16.03 ft
27+50.000	38.00 ft RT	17.01 ft	17.51 ft	16.44 ft
27+61.000	38.00 ft RT	16.52 ft	17.02 ft	16.52 ft

TOTAL WALL AREA: 300 SQUARE FEET

PROJECT NO.: 34953.1.1  
BRUNSWICK COUNTY  
STATION: 27+61 TO 26+30 -L-  
SHEET 1 OF 1

**GEOTECHNICAL ENGINEERING UNIT**

- EASTERN REGIONAL OFFICE
- WESTERN REGIONAL OFFICE
- CONTRACT OFFICE

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SEGMENTAL GRAVITY RETAINING WALL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-1
1			3			TOTAL SHEETS 1
2			4			

## 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 2006 "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.

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