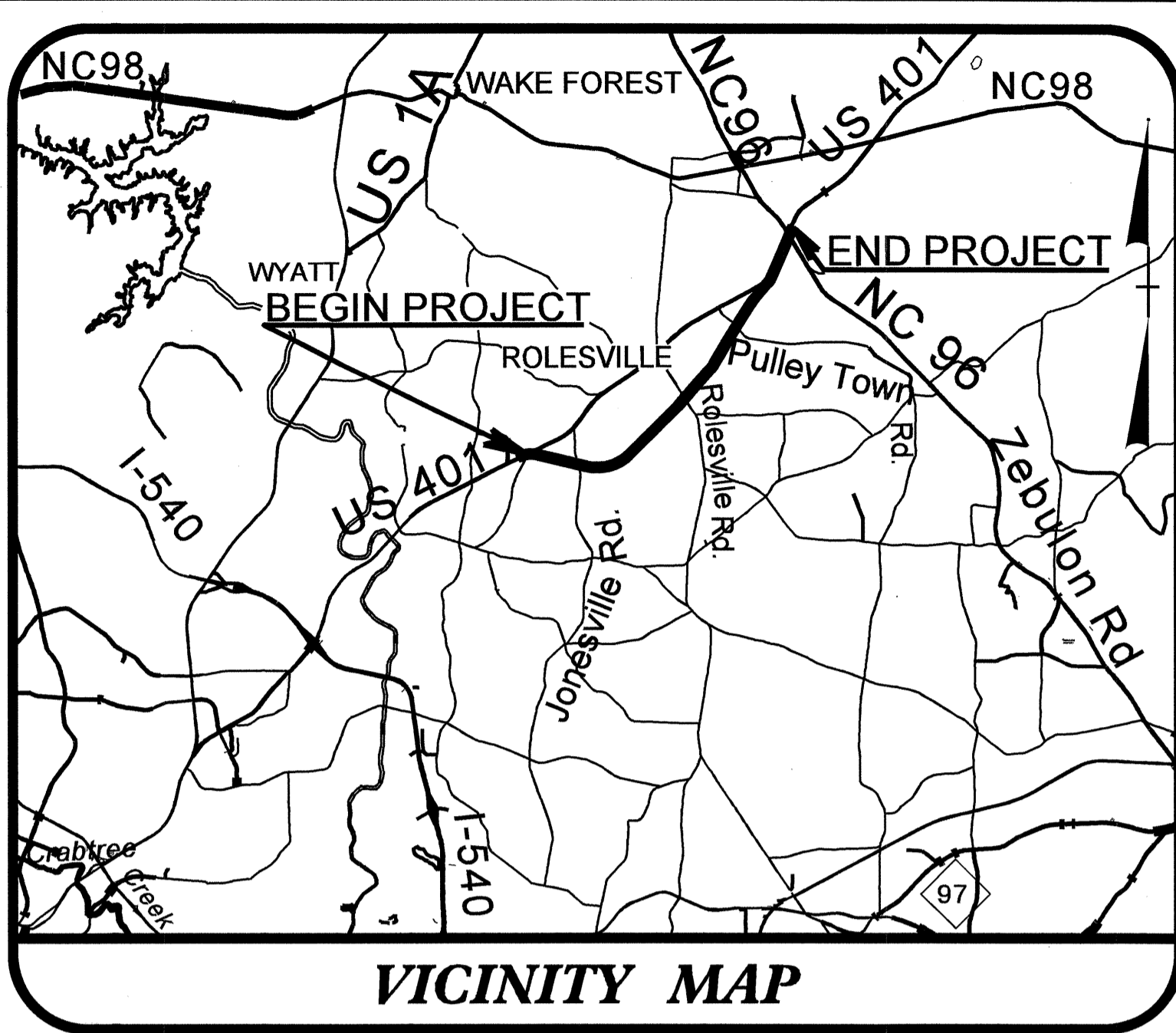


CONTRACT: C202583
TIP PROJECT: R-2814 B

CULVERTS



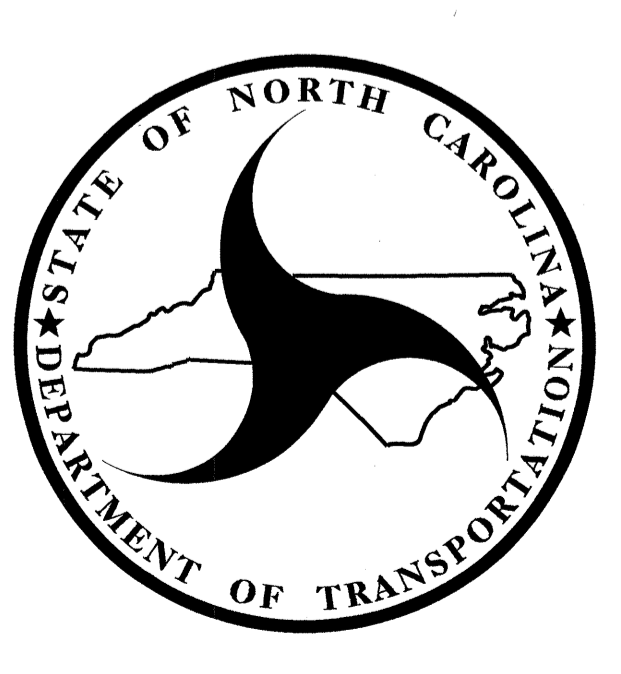
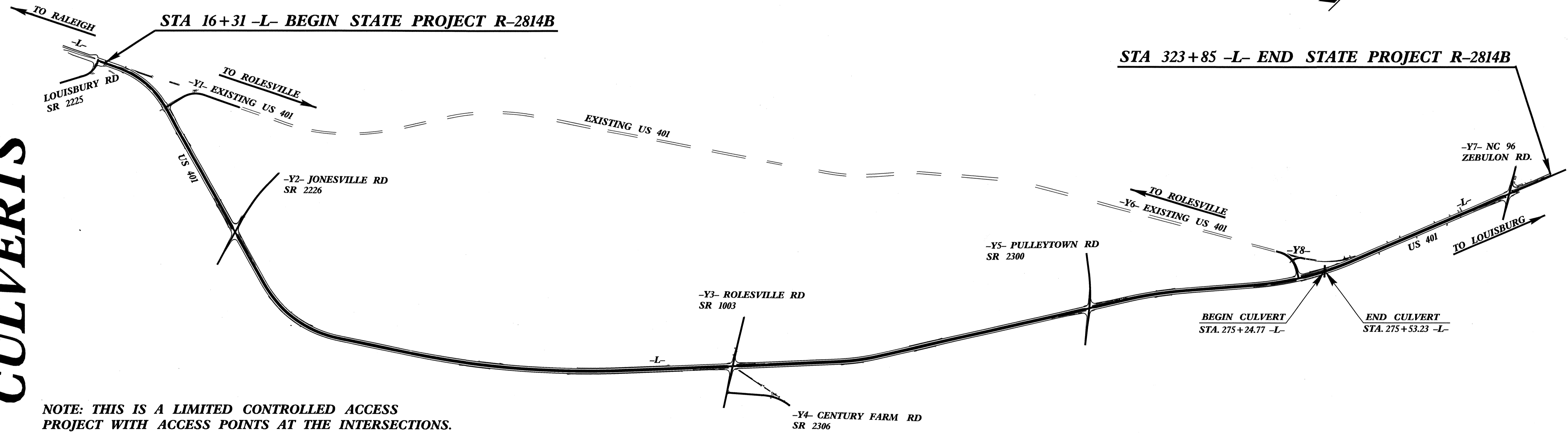
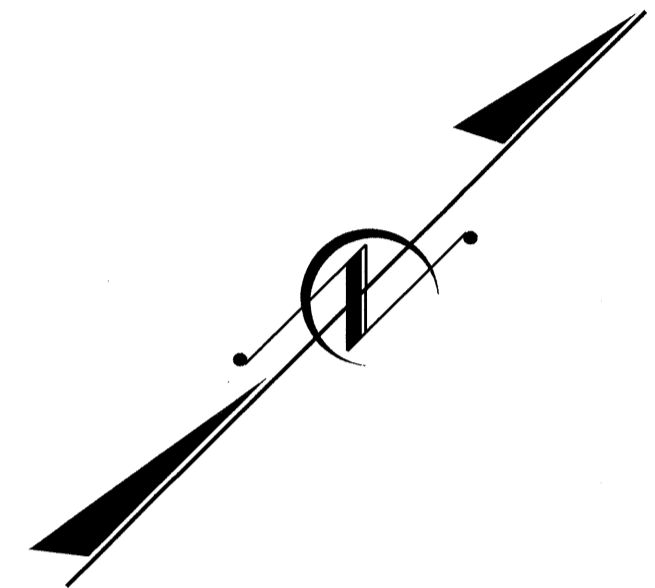
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

**LOCATION: US 401 ROLESVILLE BYPASS FROM SR 2225,
 LOUISBURY ROAD TO NC 96, ZEBULON ROAD**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB AND GUTTER,
 CULVERTS AND SIGNALS**

STATE	STATE PROJECT REFERENCE NO.	
N.C.	R-2814B	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34506.1.1	STP-401(4)	P.E.
34506.2.GV1	STP-0401(199)	ROW & UTIL.
34506.3.GV3	STP-0401(214)	CONST.



DESIGN DATA

ADT 2005 =	16,100
ADT 2030 =	24,600
DHV =	55 %
D =	13 %
T =	7 % *
V =	60 MPH
* TTST 2% + DUAL 5%	

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-2814B	=	5.691 MILES
LENGTH STRUCTURE T.I.P. PROJECT R-2814B	=	0.005 MILES
TOTAL LENGTH OF T.I.P. PROJECT R-2814B	=	5.696 MILES

2006 STANDARDS SPECIFICATION

LETTING DATE:
 APRIL 19, 2011

Prepared in the Office of:
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
 1000 Birch Ridge Drive Raleigh, N.C. 27610

B. S. COX, P. E.
 PROJECT ENGINEER

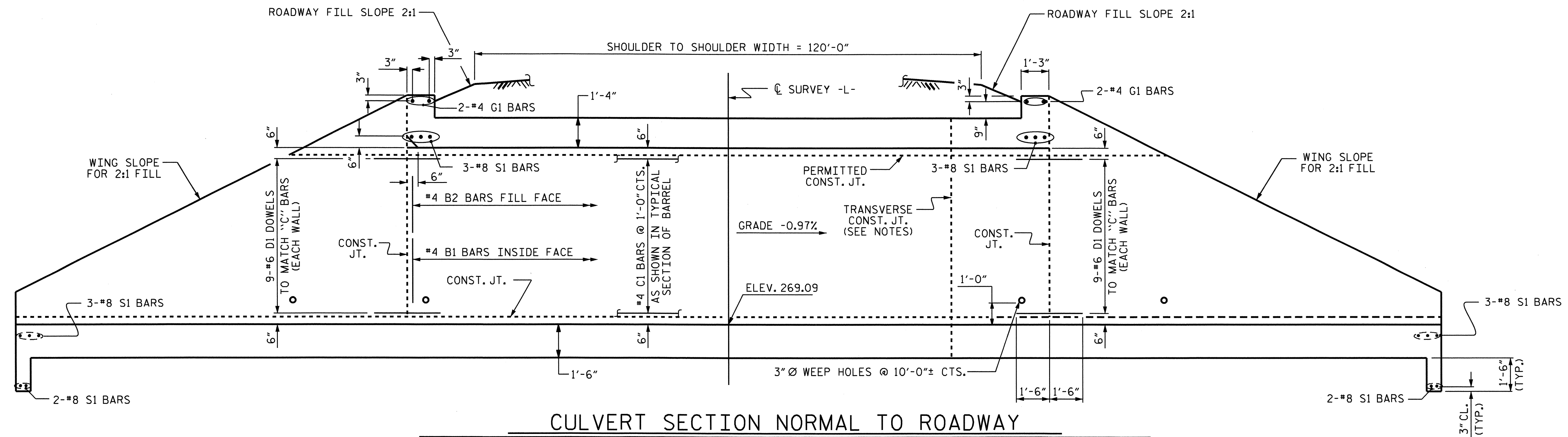
T.J. BEACH, P. E.
 PROJECT DESIGN ENGINEER

APPROVED FOR
 DIVISION ADMINISTRATOR

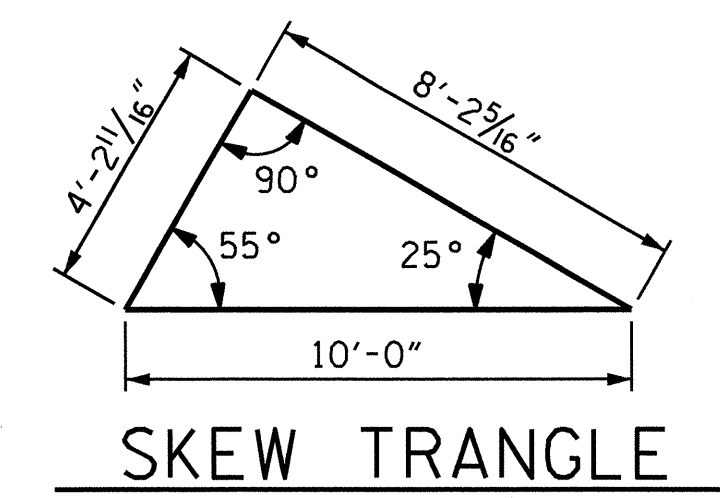
DATE

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

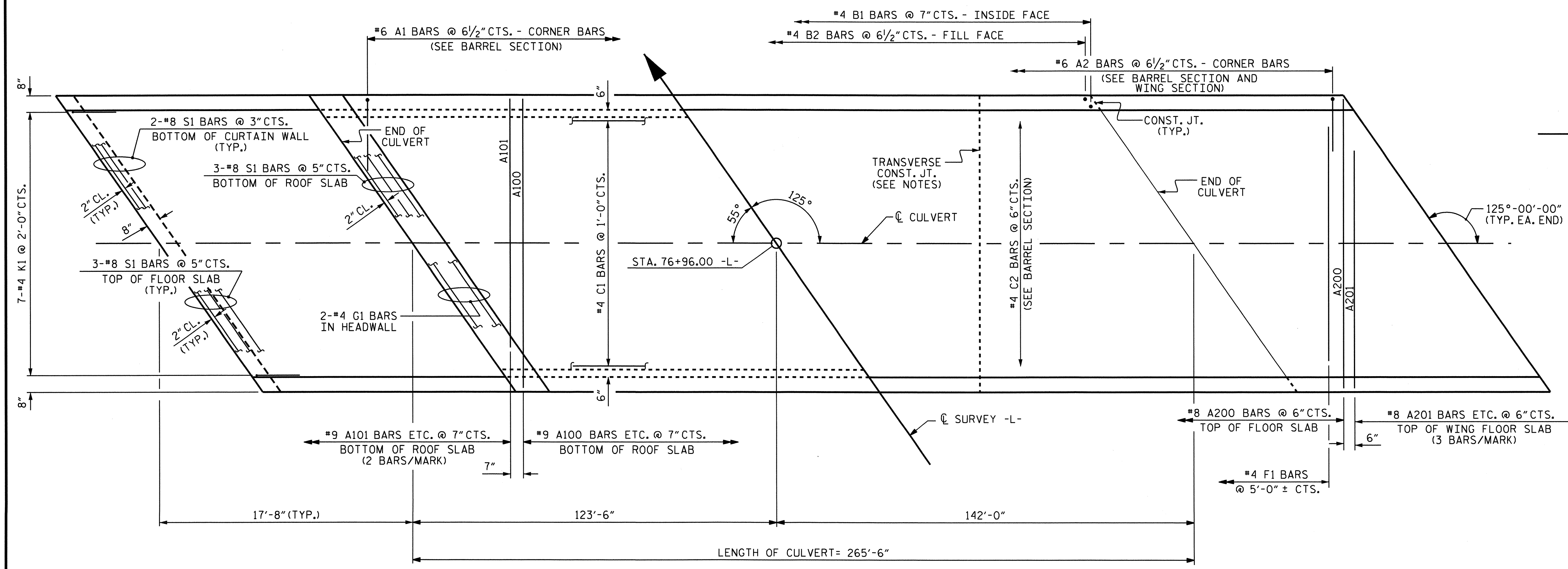
STATE HIGHWAY ENGINEER - DESIGN
DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



CULVERT SECTION NORMAL TO ROADWAY



SKEW TRIANGLE



PART PLAN - ROOF SLAB

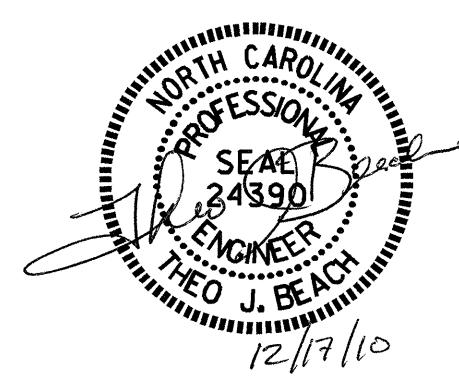
PART PLAN - FLOOR SLAB

C1 BARS ARE 10 BAR RUNS
C2 BARS ARE 11 BAR RUNS

PROJECT NO. R-2814B
WAKE COUNTY
STATION: 76+96.00 -L-

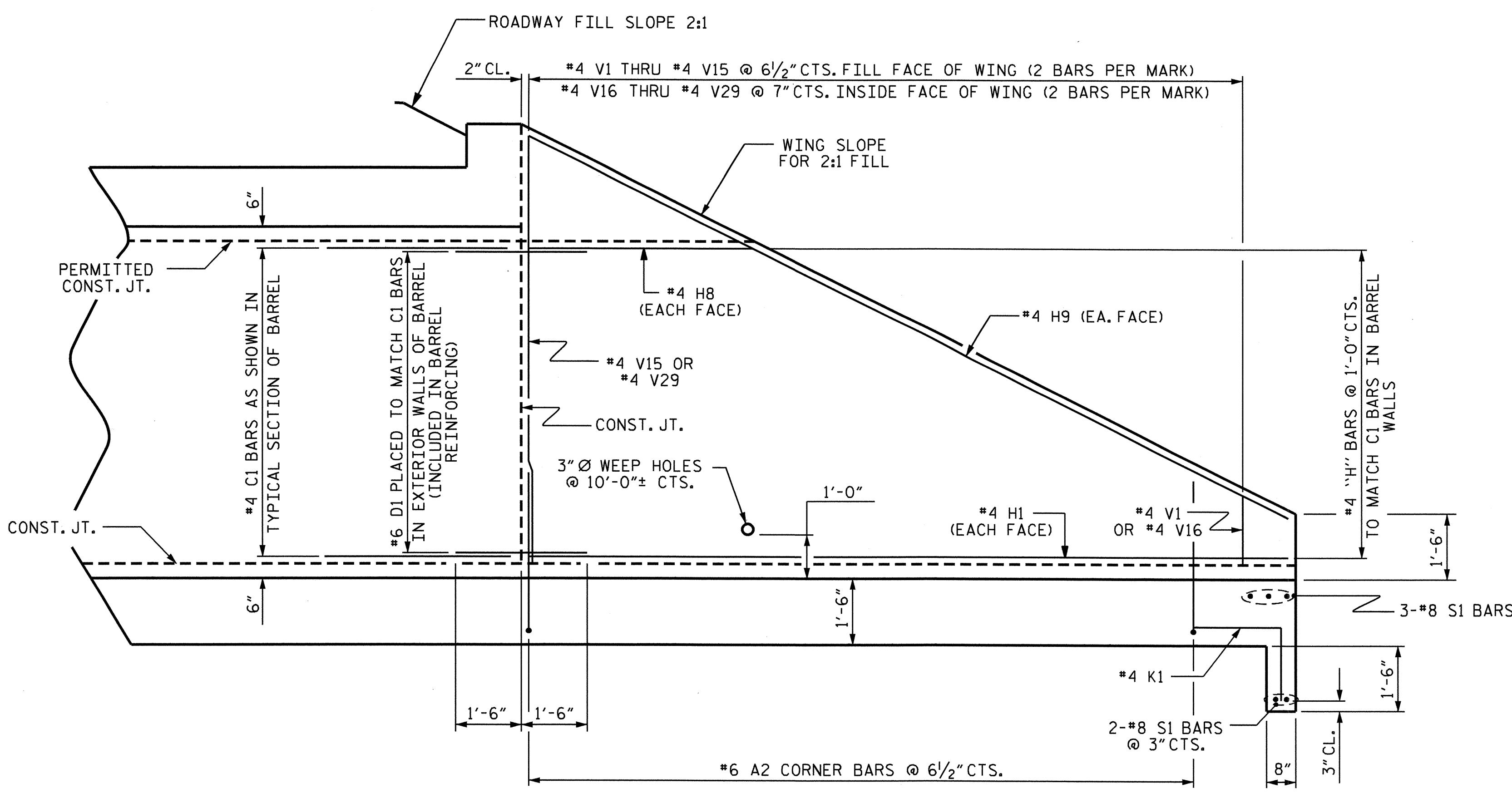
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
SINGLE 12 FT. X 8 FT.
PEDESTRIAN
CONCRETE BOX CULVERT
125° SKEW

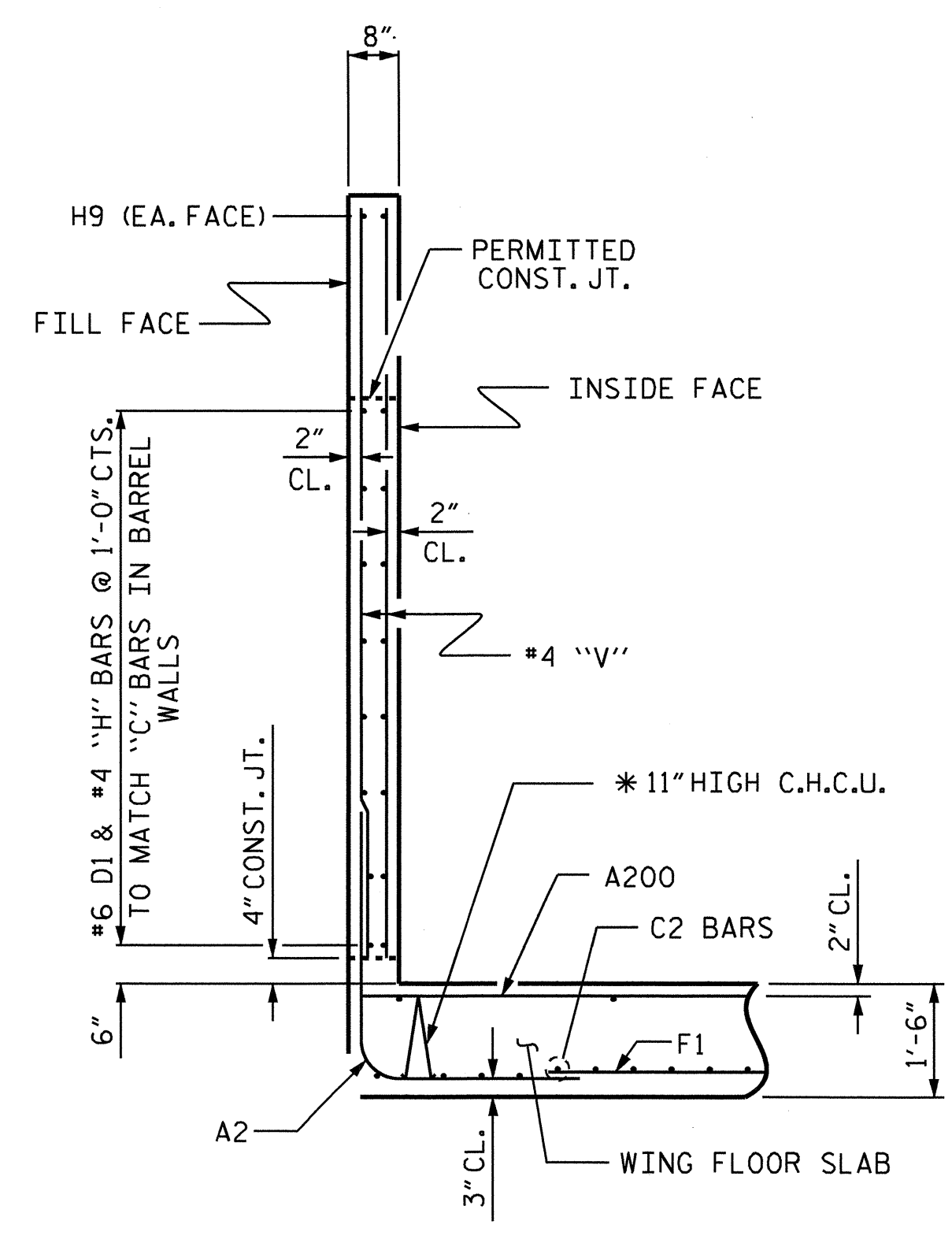


DRAWN BY: M. L. BROWN DATE: 3/10
CHECKED BY: I. BANKOVICH DATE: 5/10

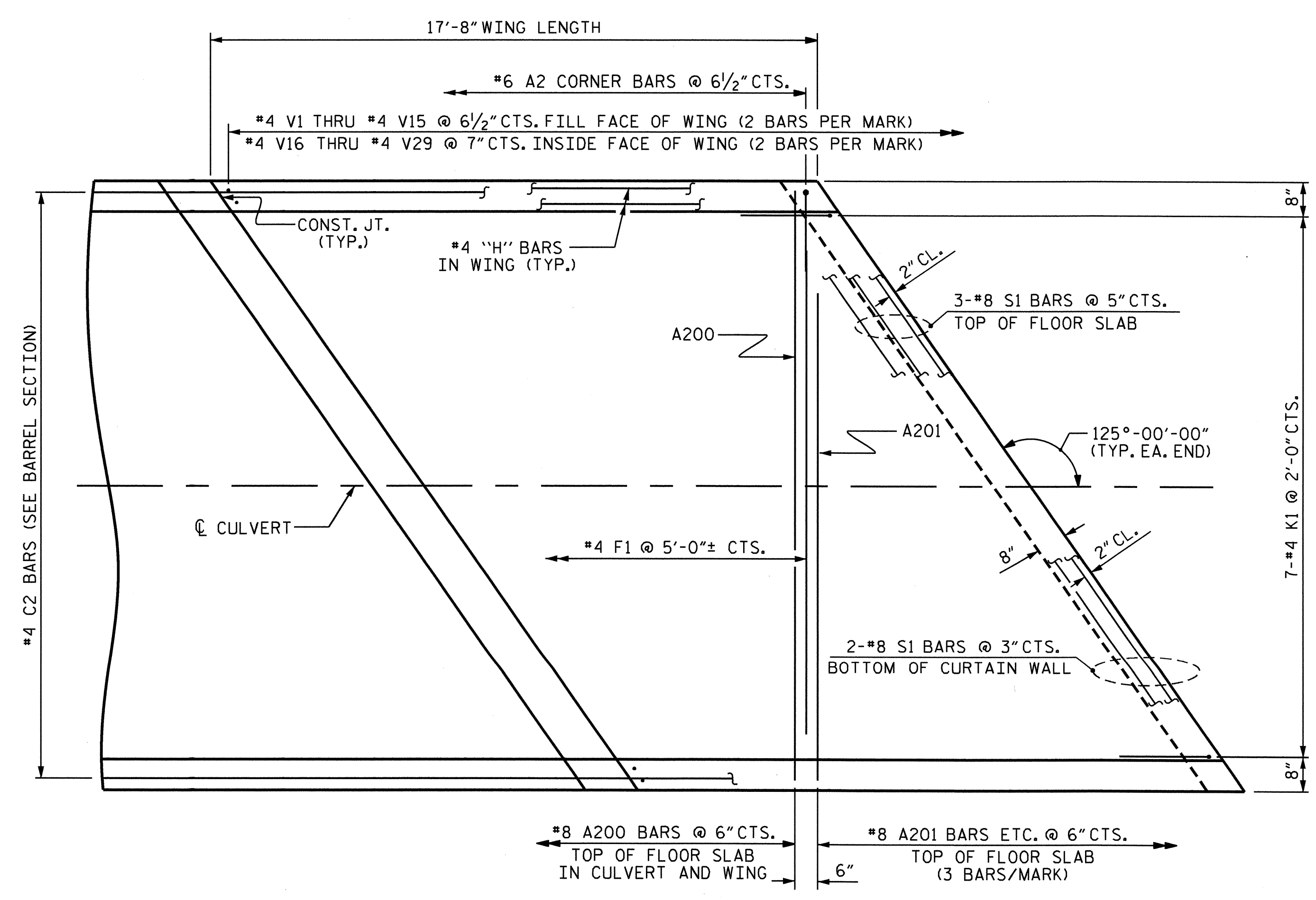
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2	
1			3			TOTAL SHEETS	29
2			4				



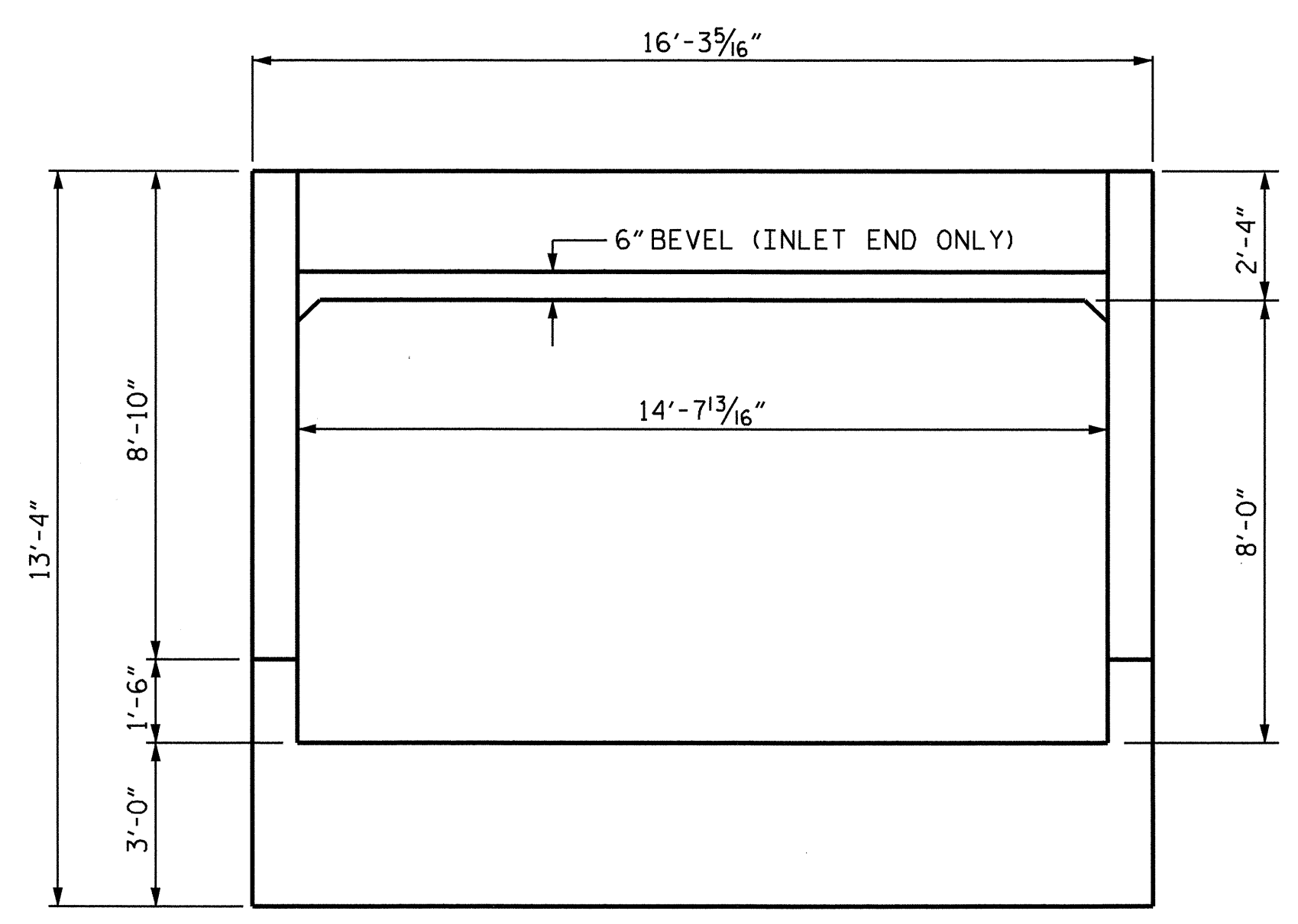
WING SECTION NORMAL TO ROADWAY
(TYPICAL EACH WING)



TYPICAL WING SECTION
* CONTINUOUS HIGH CHAIR UPPER (C.H.C.U.) @ 3'-0" CTS.



PLAN



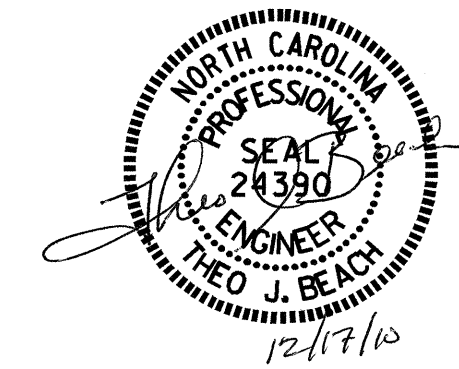
END ELEVATION NORMAL TO SKEW
INLET END SHOWN, OUTLET END SIMILAR

BILL OF MATERIAL					
WINGS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	17'-4"	93
H2	8	#4	STR	17'-1"	91
H3	8	#4	STR	15'-1"	81
H4	8	#4	STR	13'-1"	70
H5	8	#4	STR	11'-1"	59
H6	8	#4	STR	9'-1"	49
H7	8	#4	STR	7'-1"	38
H8	8	#4	STR	5'-1"	27
H9	8	#4	STR	19'-4"	103
V1	8	#4	STR	1'-10"	10
V2	8	#4	STR	2'-5"	13
V3	8	#4	STR	2'-11"	16
V4	8	#4	STR	3'-6"	19
V5	8	#4	STR	4'-0"	21
V6	8	#4	STR	4'-7"	24
V7	8	#4	STR	5'-1"	27
V8	8	#4	STR	5'-8"	30
V9	8	#4	STR	6'-2"	33
V10	8	#4	STR	6'-9"	36
V11	8	#4	STR	7'-3"	39
V12	8	#4	STR	7'-10"	42
V13	8	#4	STR	8'-4"	45
V14	8	#4	STR	8'-11"	48
V15	8	#4	STR	9'-6"	51
V16	8	#4	STR	1'-10"	10
V17	8	#4	STR	2'-5"	13
V18	8	#4	STR	3'-0"	16
V19	8	#4	STR	3'-7"	19
V20	8	#4	STR	4'-2"	22
V21	8	#4	STR	4'-9"	25
V22	8	#4	STR	5'-4"	29
V23	8	#4	STR	5'-11"	32
V24	8	#4	STR	6'-6"	35
V25	8	#4	STR	7'-1"	38
V26	8	#4	STR	7'-8"	41
V27	8	#4	STR	8'-3"	44
V28	8	#4	STR	8'-10"	47
V29	8	#4	STR	9'-5"	50
REINFORCING STEEL FOR 4 WINGS					1486 LBS.
CLASS A CONCRETE					
4 WINGS					9.7 C.Y.
2 HEADWALLS					1.5 C.Y.
2 END CURTAIN WALLS AND WING FLOOR SLABS					28.0 C.Y.
TOTAL					39.2 C.Y.

NOTE:
QUANTITIES FOR "A", "C", "D", "F", "K" AND "S" BARS INCLUDED IN BARREL REINFORCING STEEL.

PROJECT NO. R-2814B
WAKE COUNTY
STATION: 76+96.00 -L-

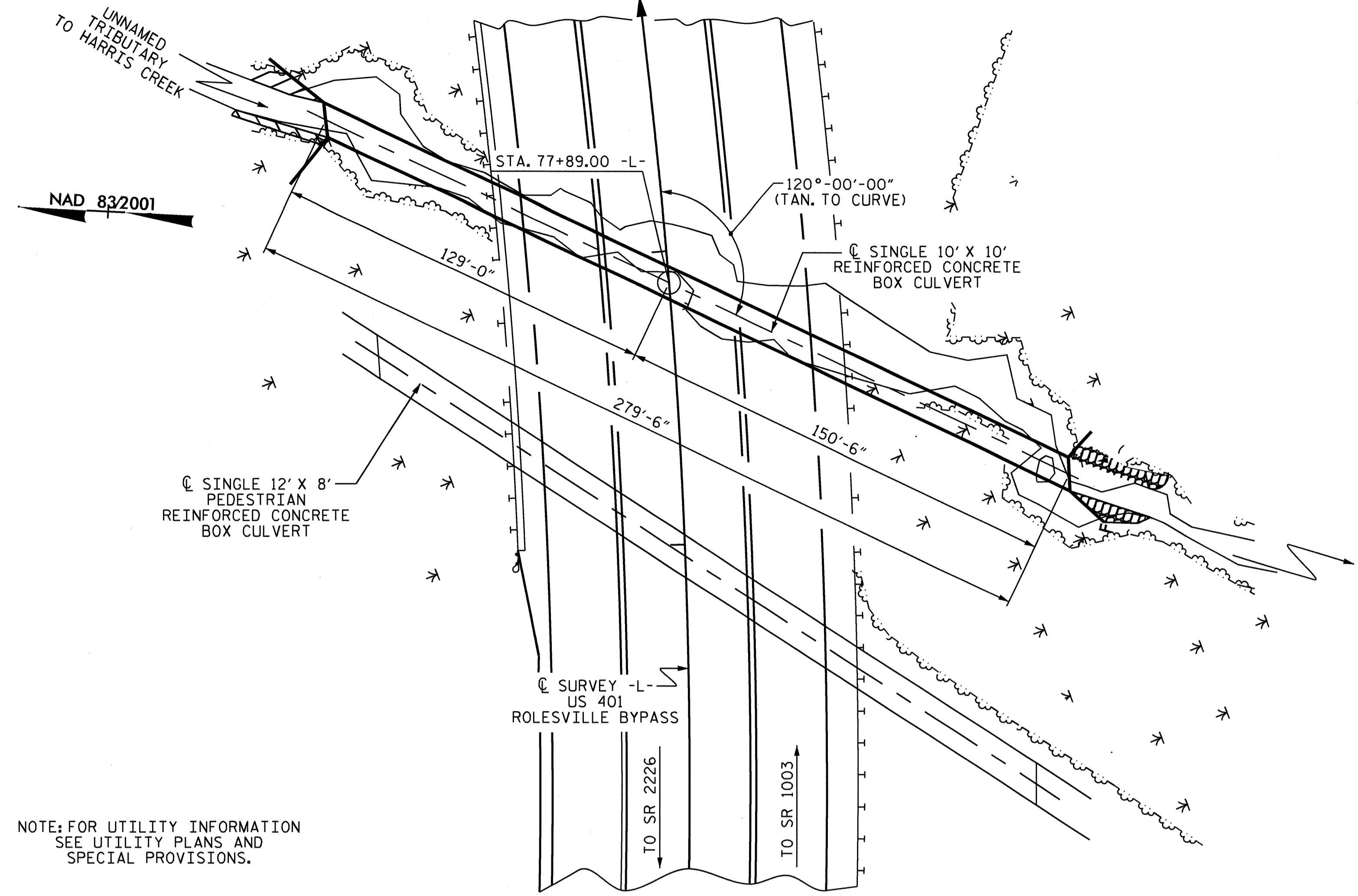
SHEET 3 OF 3
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
WINGS FOR PEDESTRIAN
CONCRETE BOX CULVERT
H = 8'-0" SLOPE = 2:1
125° SKEW



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS 29
2			4			

DRAWN BY: M. L. BROWN DATE: 3/10
CHECKED BY: T. BANKOVICH DATE: 5/10

BM #5, R.R. SPIKE IN 14" GUM 144' LEFT OF STA. 80+02 -L- EL. 277.80 FT. NAVD 88



NOTE: FOR UTILITY INFORMATION SEE UTILITY PLANS AND SPECIAL PROVISIONS.

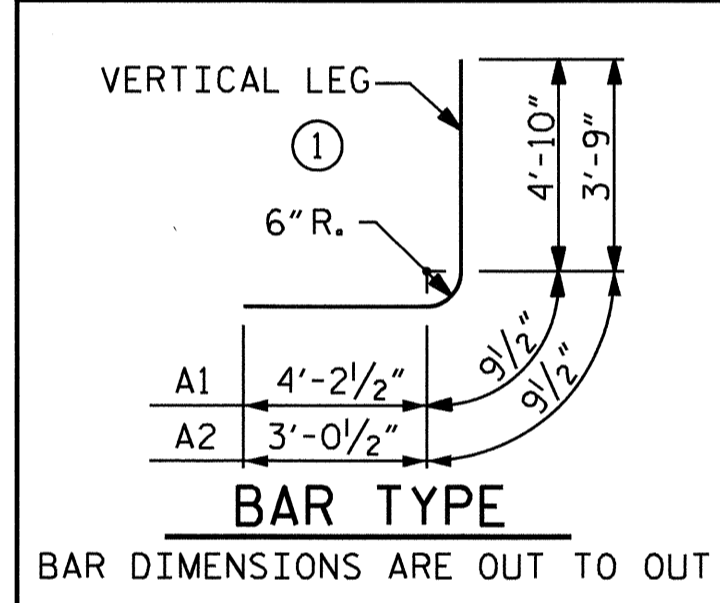
LOCATION SKETCH

REINFORCING STEEL BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	504	#8	STR	11'-1"	14915
A101	4	#8	STR	9'-0"	96
A102	4	#8	STR	7'-2"	77
A103	4	#8	STR	5'-3"	56
A104	4	#8	STR	3'-5"	36
A200	504	#8	STR	11'-1"	14915
A201	4	#8	STR	9'-0"	96
A202	4	#8	STR	7'-2"	77
A203	4	#8	STR	5'-3"	56
A204	4	#8	STR	3'-5"	36
A1	960	#7	1	9'-10"	19295
A2	960	#7	1	7'-7"	14880
B1	746	#4	STR	12'-3"	6105
B2	960	#4	STR	9'-4"	5985
C1	590	#4	STR	29'-10"	11758
D1	28	#6	STR	2'-1"	88
D2	42	#6	STR	1'-7"	100
G1	4	#4	STR	12'-10"	34
S2	12	#8	STR	12'-10"	411
F1	56	#4	STR	6'-1"	228
REINFORCING STEEL				LBS.	89244

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
B1	#4	1'-9"
C1	#4	1'-11"



NOTES:

- ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.
- DESIGN FILL----- 35.40'
- 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, BAFFLES AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- 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.
- 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.
- NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.749 CY/FT.	488.8 C.Y.
BAFFLES	3.6 C.Y.
WINGS ETC.	38.3 C.Y.
TOTAL	530.7 C.Y.
REINFORCING STEEL	
BARREL & BAFFLES	89244 LBS.
WINGS ETC.	2781 LBS.
TOTAL	92025 LBS.
FOUNDATION CONDITIONING MAT'L. 227 TONS	
CULVERT EXCAVATION LUMP SUM	
CLASS B RIP RAP 103 TONS	

GRADE DATA

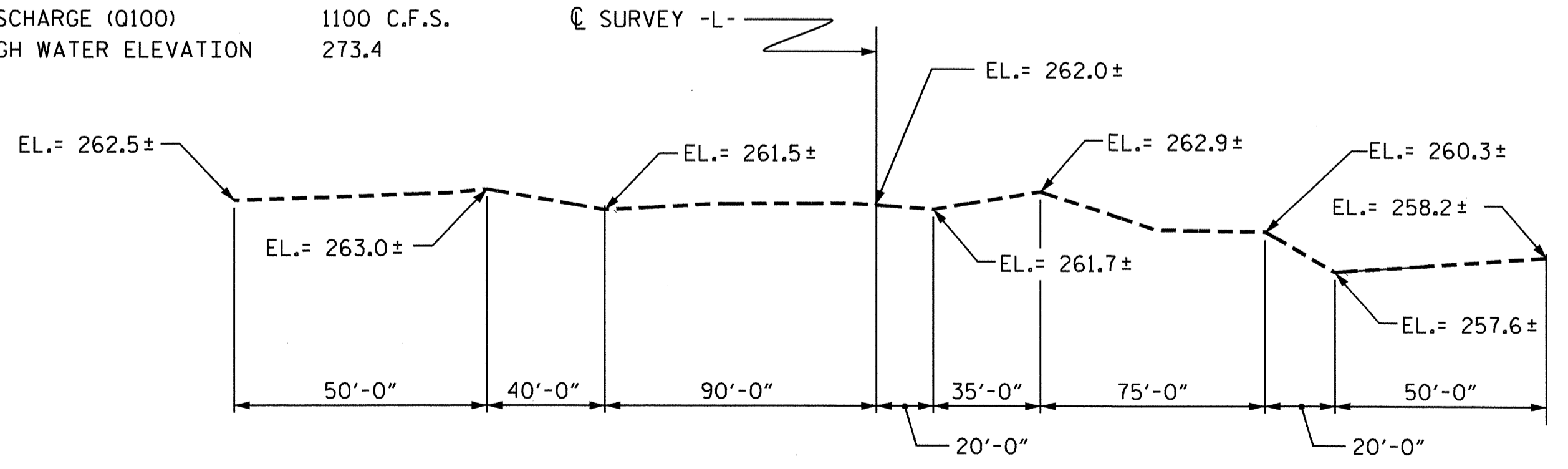
GRADE POINT ELEV. @ STA. 77+89.00 -L- = 302.06
 BED ELEV. @ STA. 77+89.00 -L- = 260.01
 ROADWAY SLOPE = 2:1

OVERTOPPING DATA

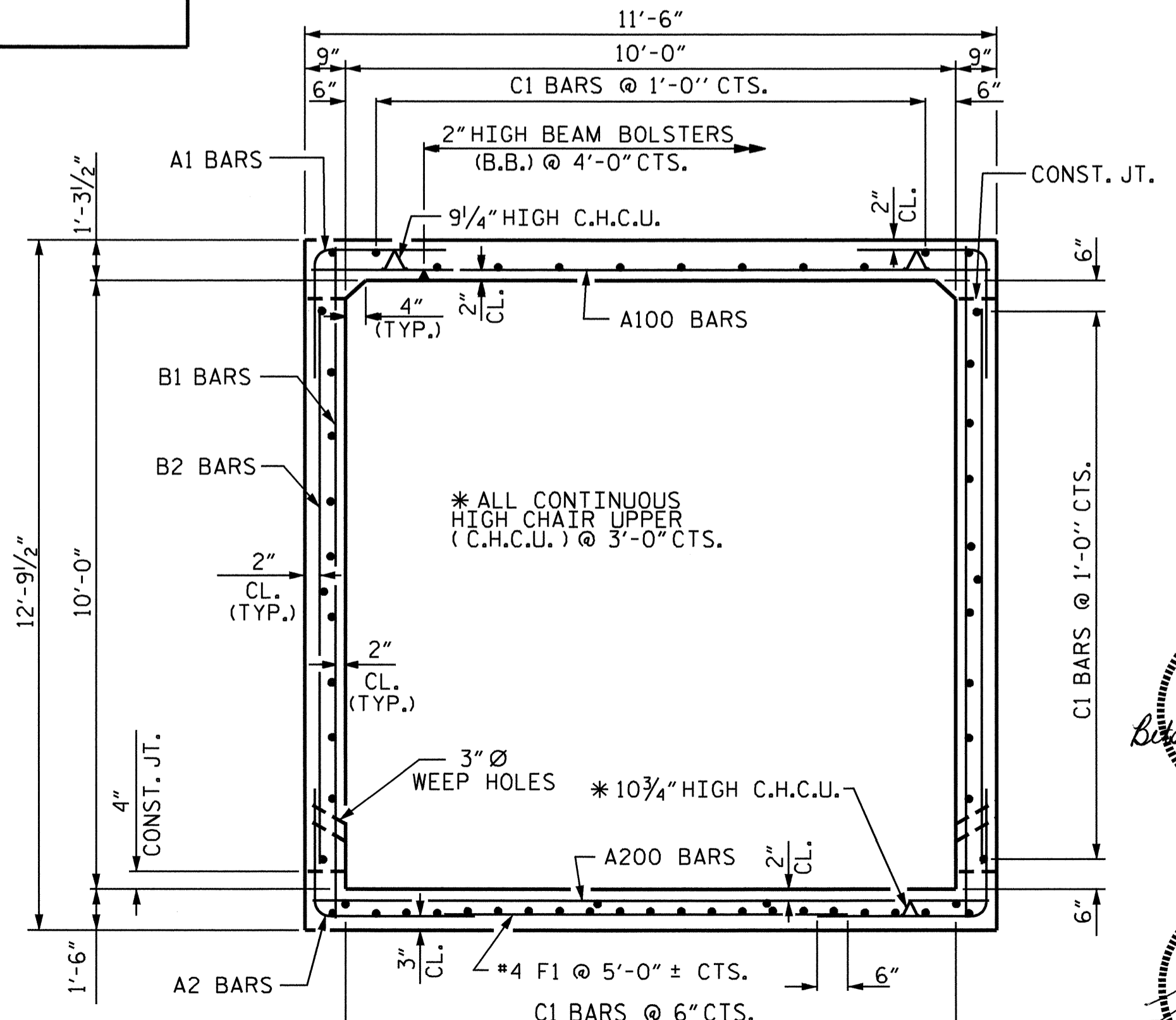
DESIGN DISCHARGE 5557 C.F.S.
 FREQUENCY OF DESIGN FLOOD 500+ YR.
 OVERTOPPING FLOOD ELEVATION 303.4 FT.

HYDRAULIC DATA

DESIGN DISCHARGE 1000 C.F.S.
 FREQUENCY OF DESIGN FLOOD 50 YRS.
 DESIGN HIGH WATER ELEVATION 272.9
 DRAINAGE AREA 505 AC.
 BASIC DISCHARGE (Q100) 1100 C.F.S.
 BASIC HIGH WATER ELEVATION 273.4



PROFILE ALONG CULVERT

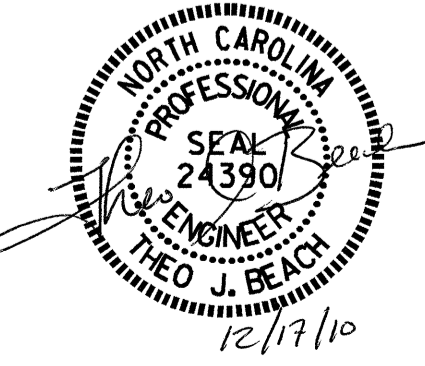
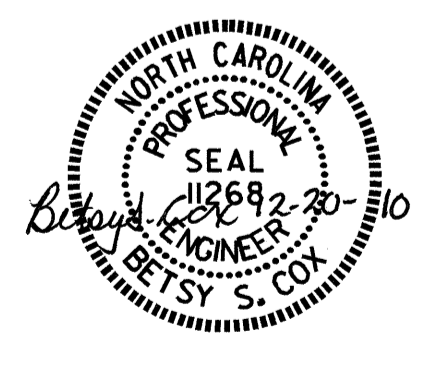


RIGHT ANGLE SECTION OF BARREL

THERE ARE 59 C1 BARS IN SECTION OF BARREL

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 77+89.00 -L-

SHEET 1 OF 4



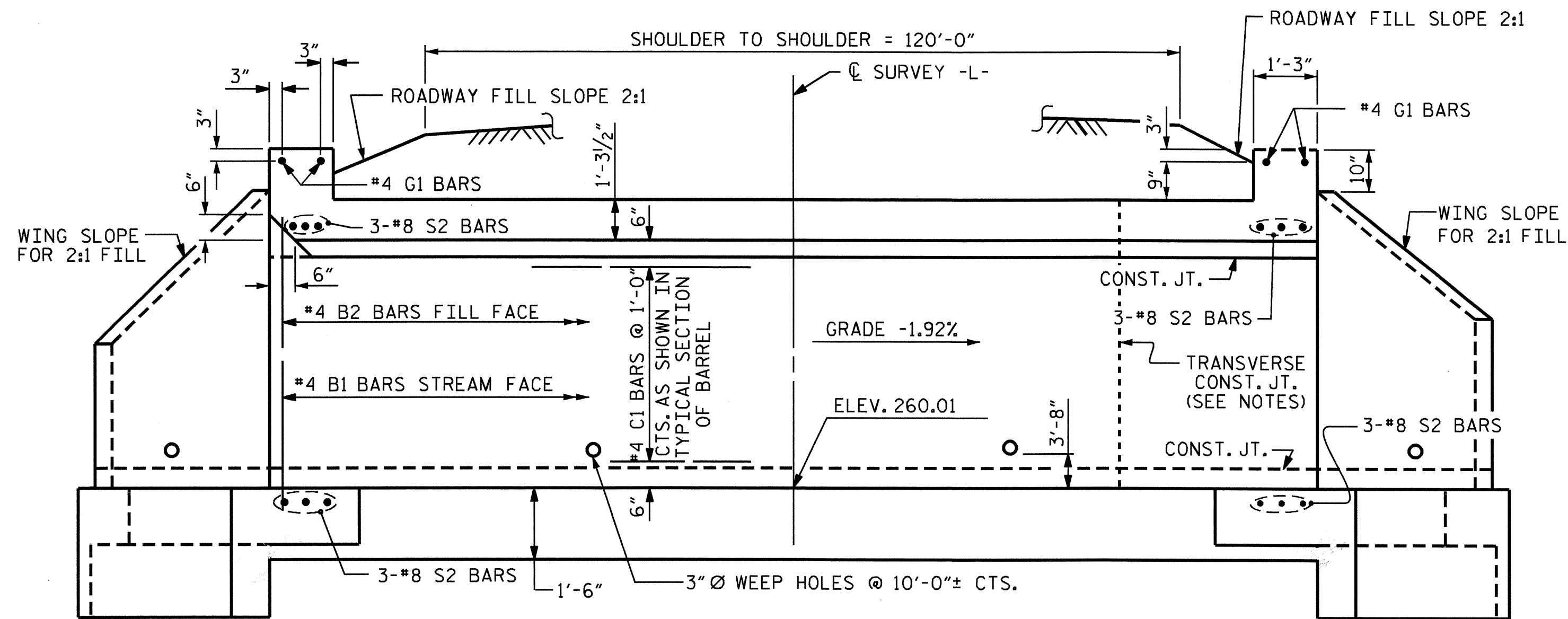
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 10 FT. X 10 FT.
 CONCRETE BOX CULVERT
 120° SKEW

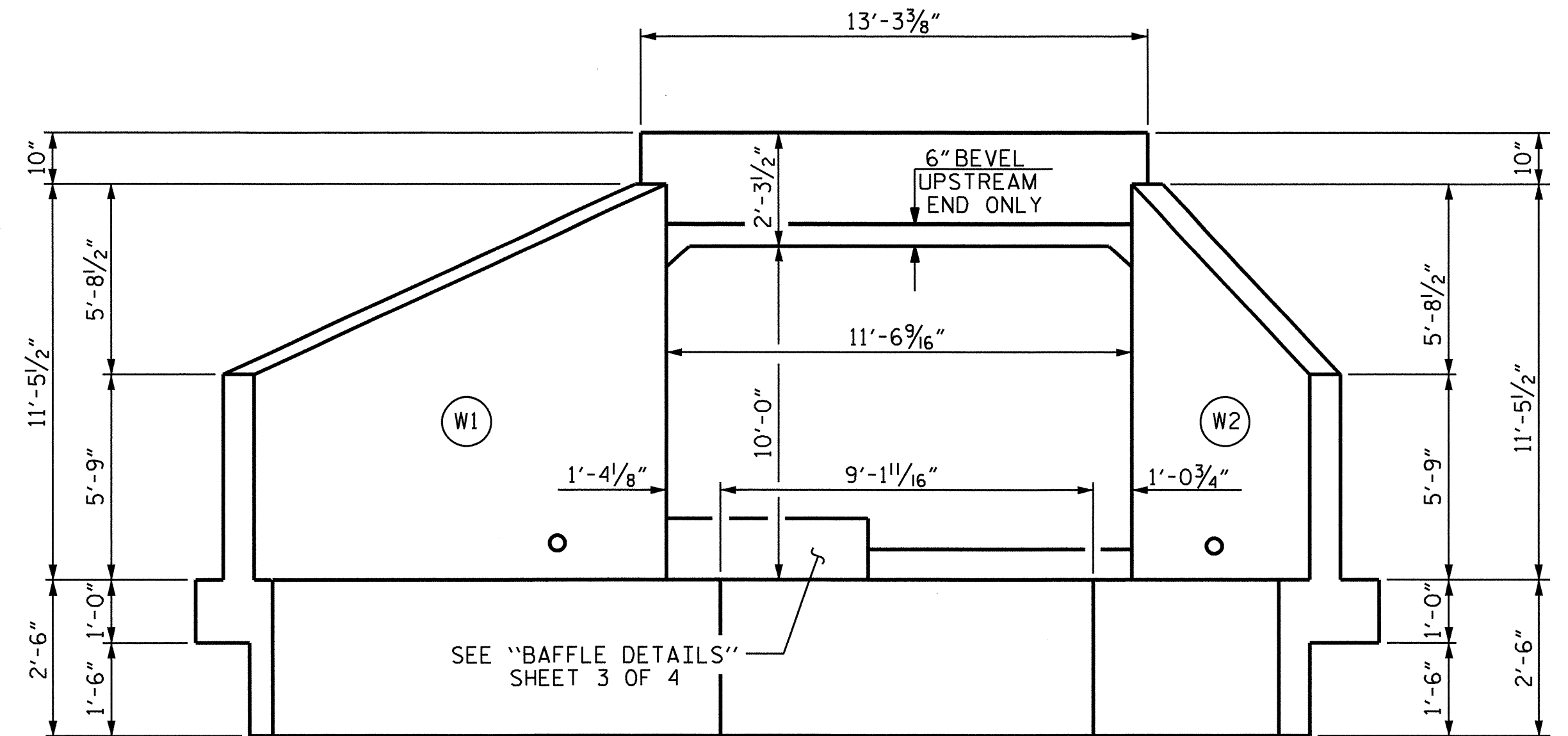
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS 29
2			4			

REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
 ADDED 8-22-89

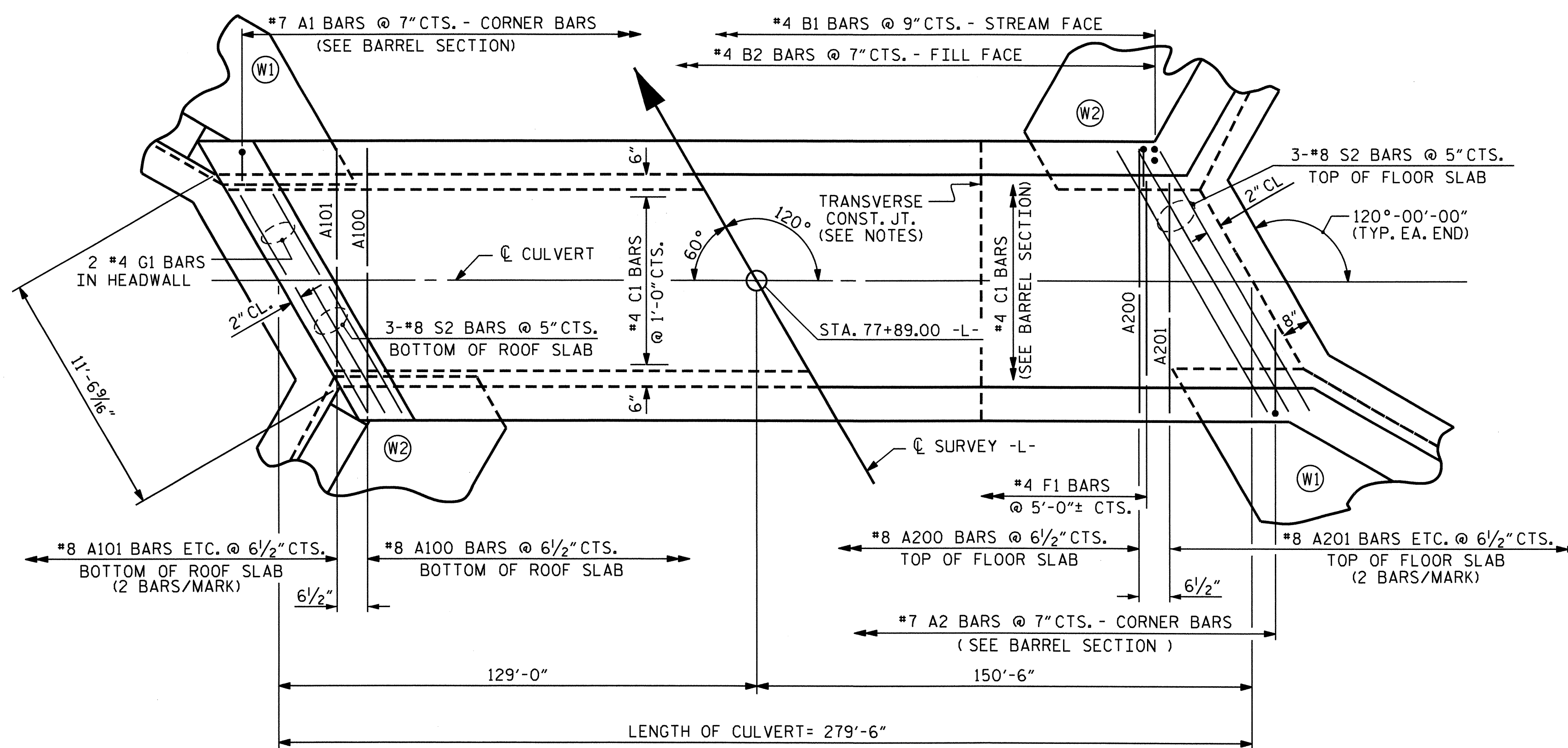
ASSEMBLED BY: M.L. BROWN	DATE: 10/09	SPECIAL
CHECKED BY: S.B. WILLIAMS	DATE: 12/09	
DRAWN BY: B.M. MEYERS	DATE: AUG. 1989	STANDARD
CHECKED BY: A.R. BISSETTE	DATE: AUG. 1989	



CULVERT SECTION NORMAL TO ROADWAY

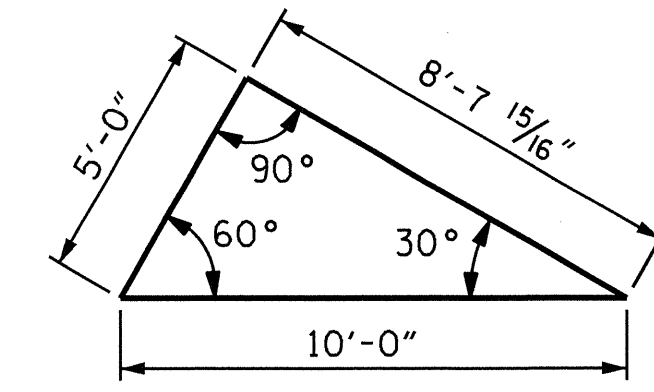


END ELEVATION NORMAL TO SKEW

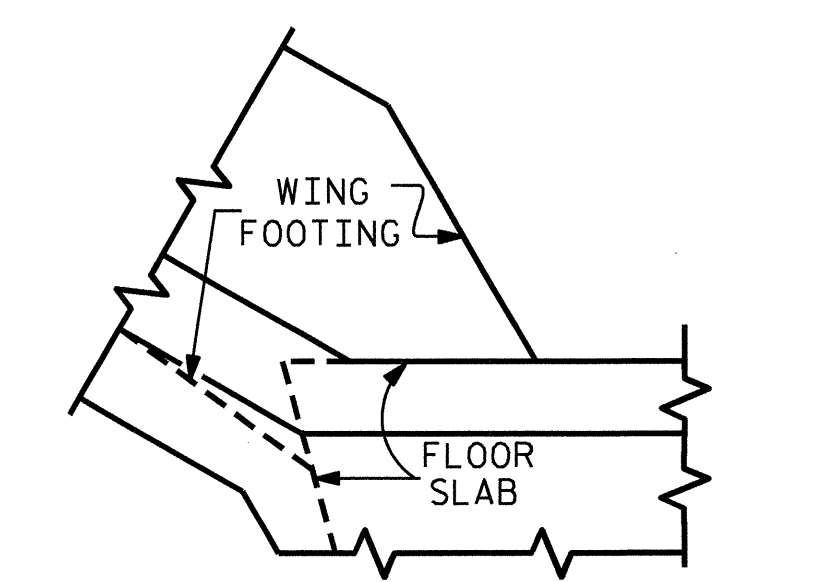


PART PLAN - ROOF SLAB PART PLAN - FLOOR SLAB

NOTE: C1 BARS ARE 10 BAR RUNS.

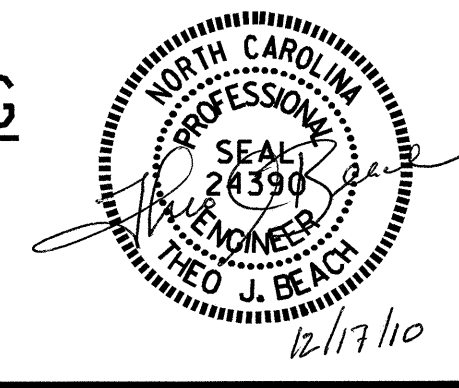


SKEW TRIANGLE



DETAIL

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



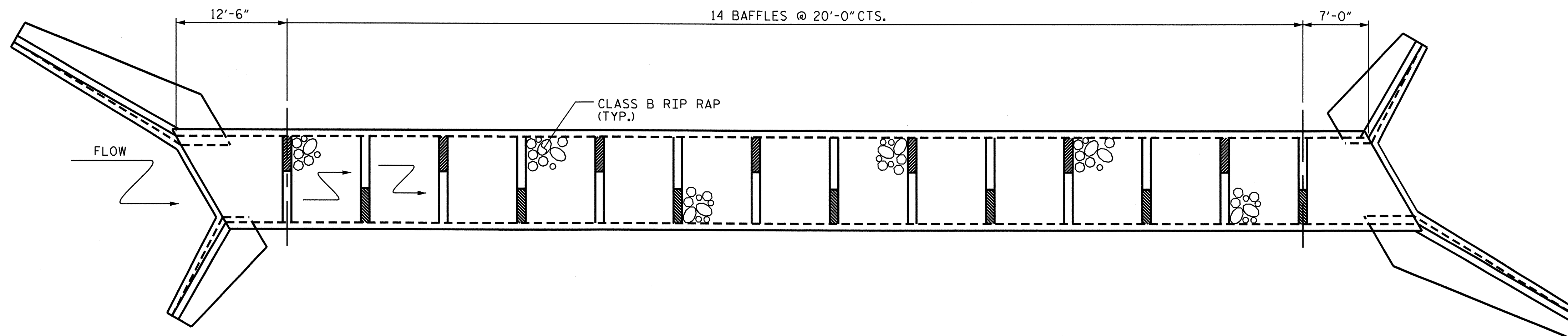
PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 77+89.00 -L-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
BARREL STANDARD
SINGLE 10 FT. X 10 FT.
CONCRETE BOX CULVERT
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			29

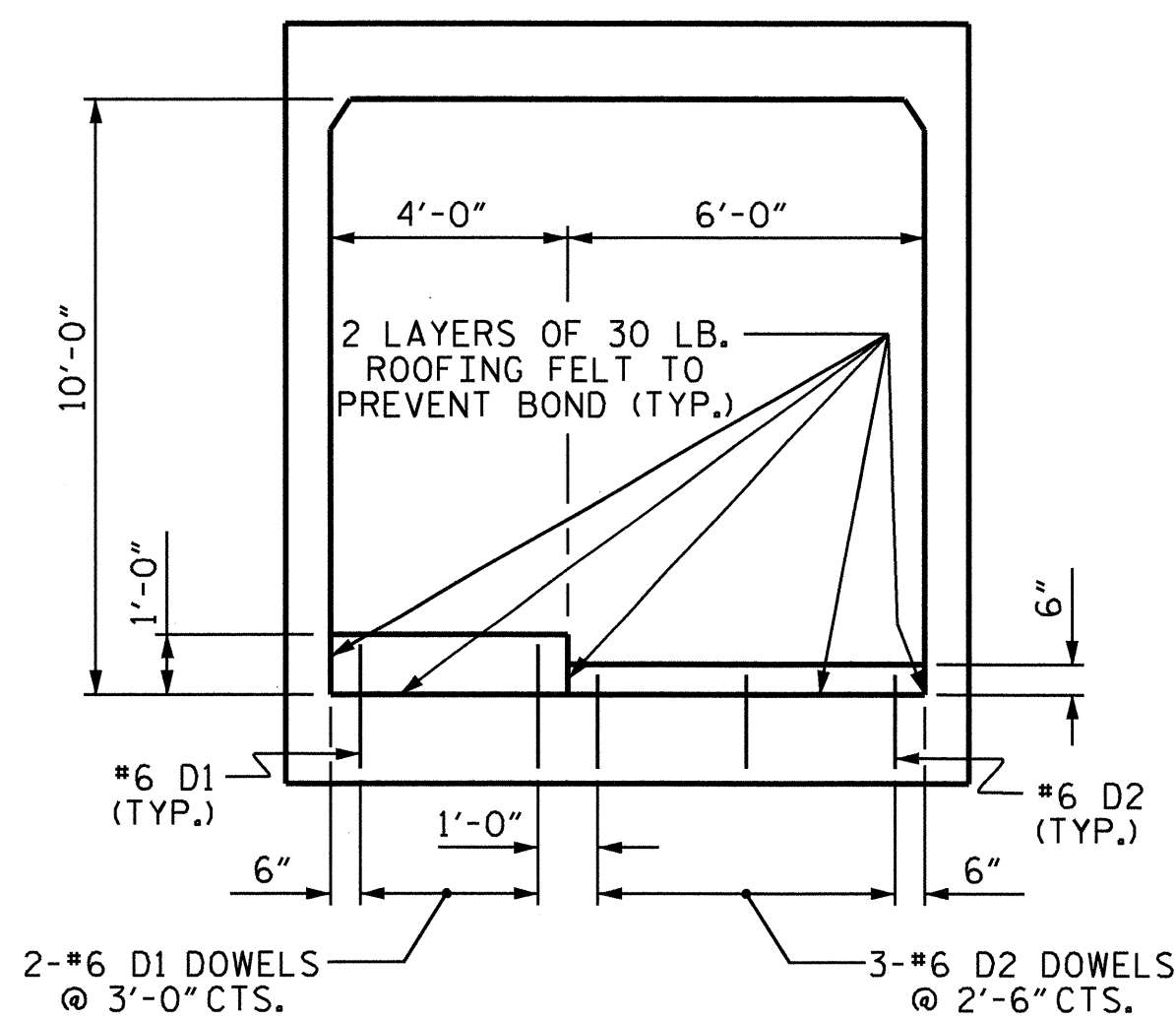
REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
 REDRAWN 8-22-89
 REVISED 11-19-99 BY M.M. CHECKED BY R.W.M.

ASSEMBLED BY: <u>M.L. BROWN</u> DATE: <u>10/09</u>	SPECIAL
CHECKED BY: <u>S.B. WILLIAMS</u> DATE: <u>12/09</u>	
DRAWN BY: <u>J.W. ROUSE</u> DATE: <u>SEPT. 1989</u>	STANDARD
CHECKED BY: <u>A.R. BISSETTE</u> DATE: <u>AUG. 1989</u>	



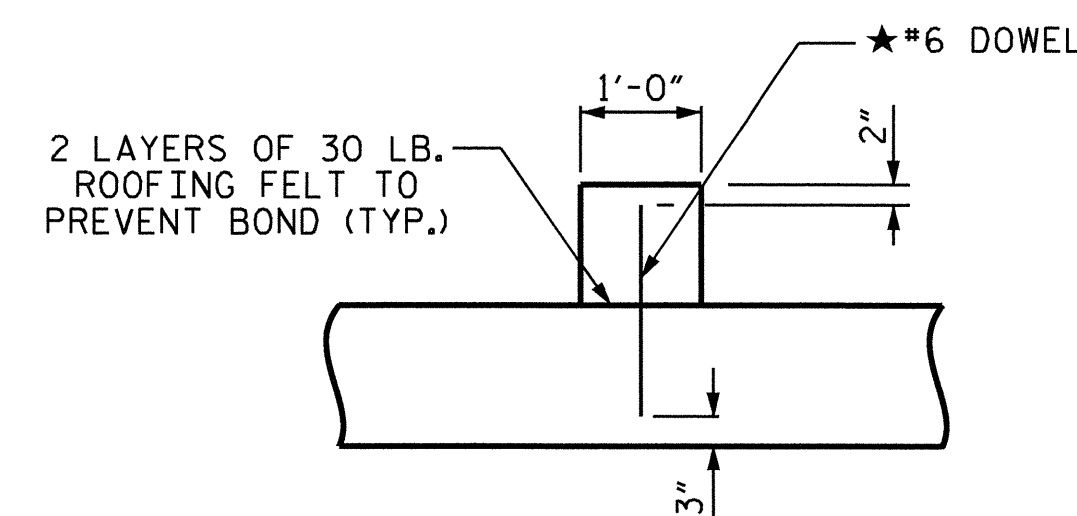
BAFFLE DETAIL - TOP VIEW

BED MATERIAL PLACED BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER BAFFLES. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER THAN 6 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER. PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION.



CULVERT BAFFLE DETAILS

ALTERNATE HIGH AND LOW SIDE OF BAFFLE TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT



SECTION THRU BAFFLE

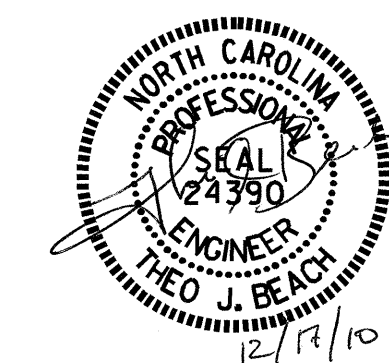
★ DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 77+89.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

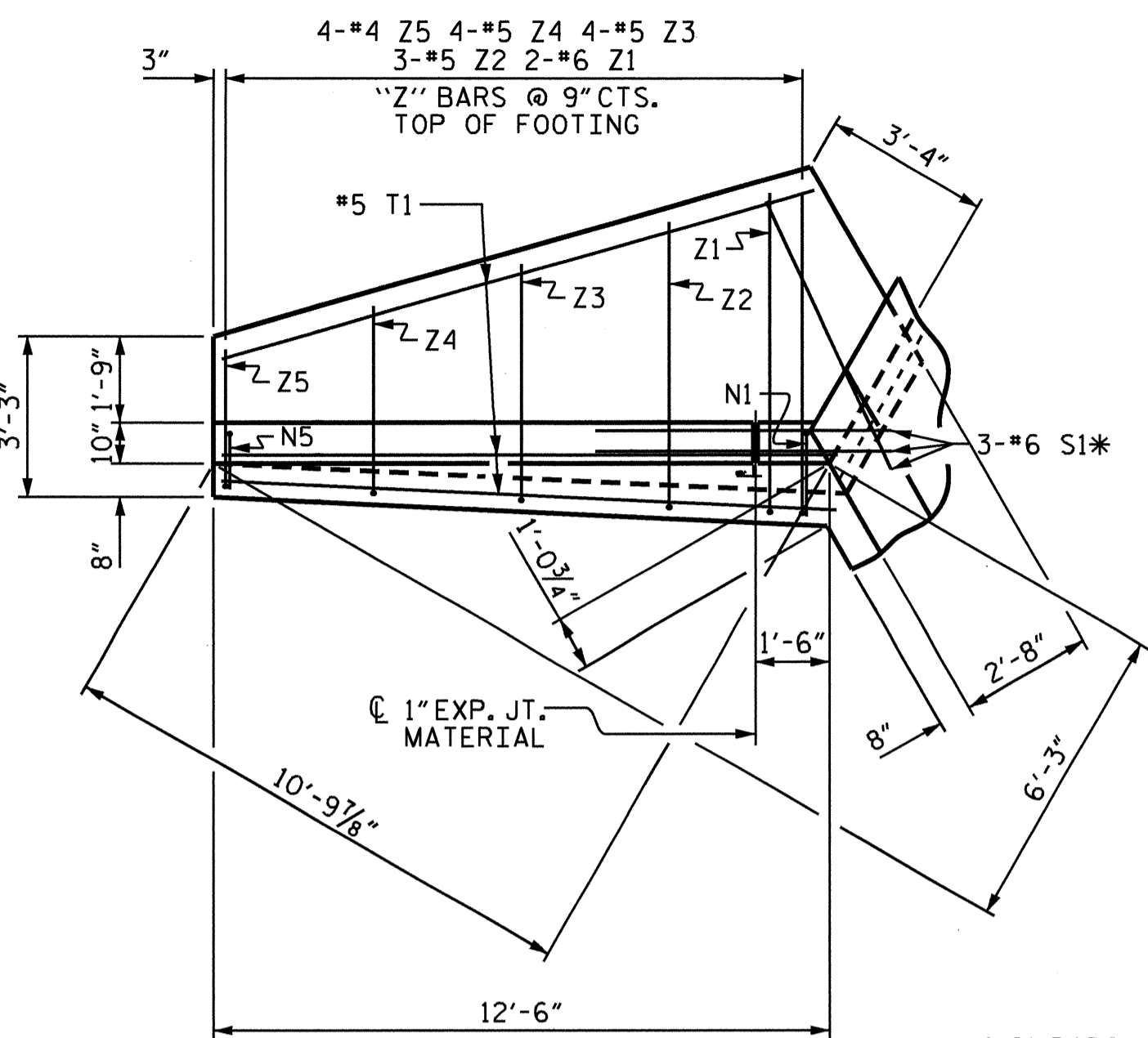
BAFFLE DETAILS



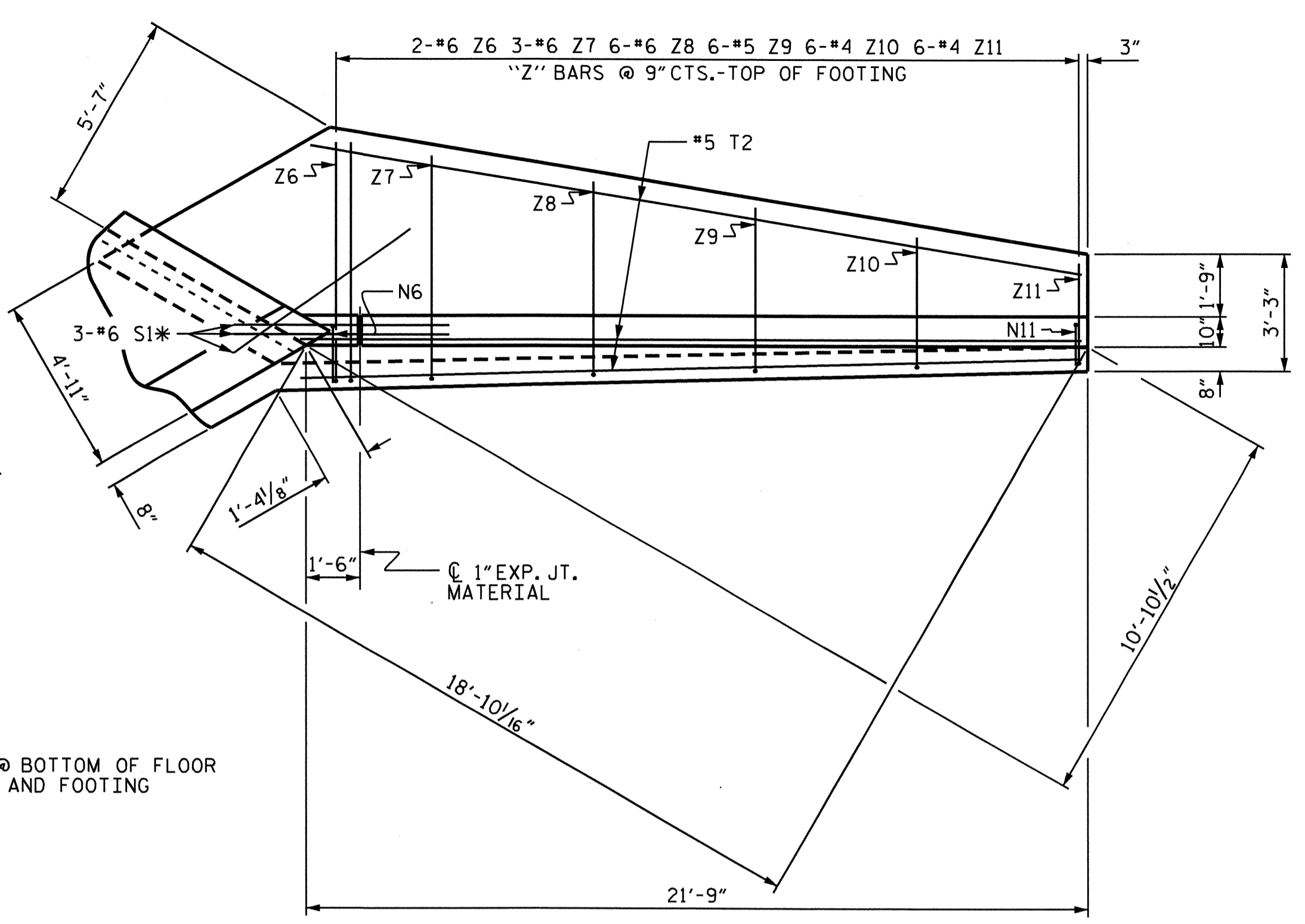
DRAWN BY : M.L. BROWN DATE : 10/09
 CHECKED BY : S.B. WILLIAMS DATE : 12/09

20-DEC-2010 11:28
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 tbeach

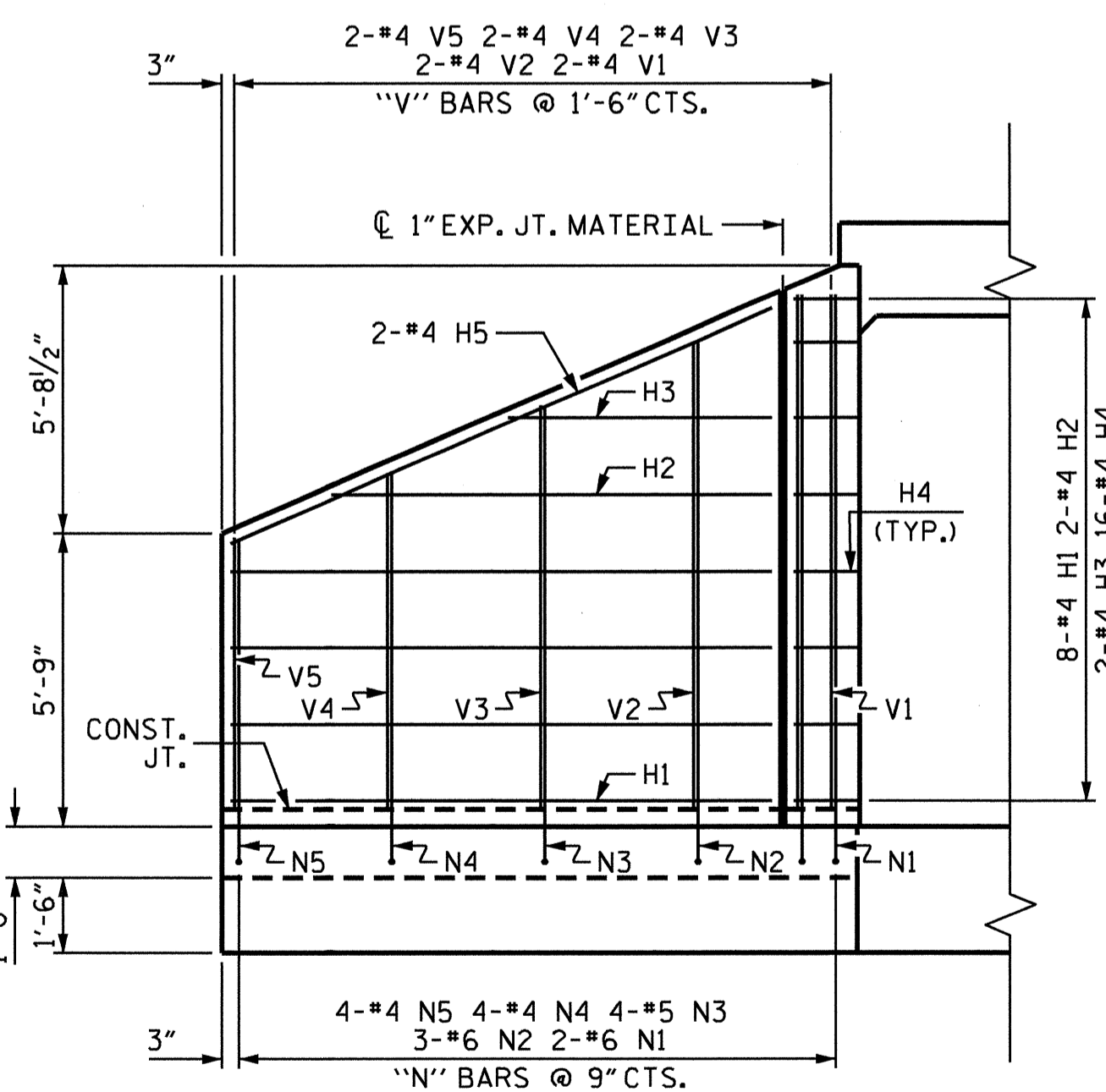
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS 29
2			4			



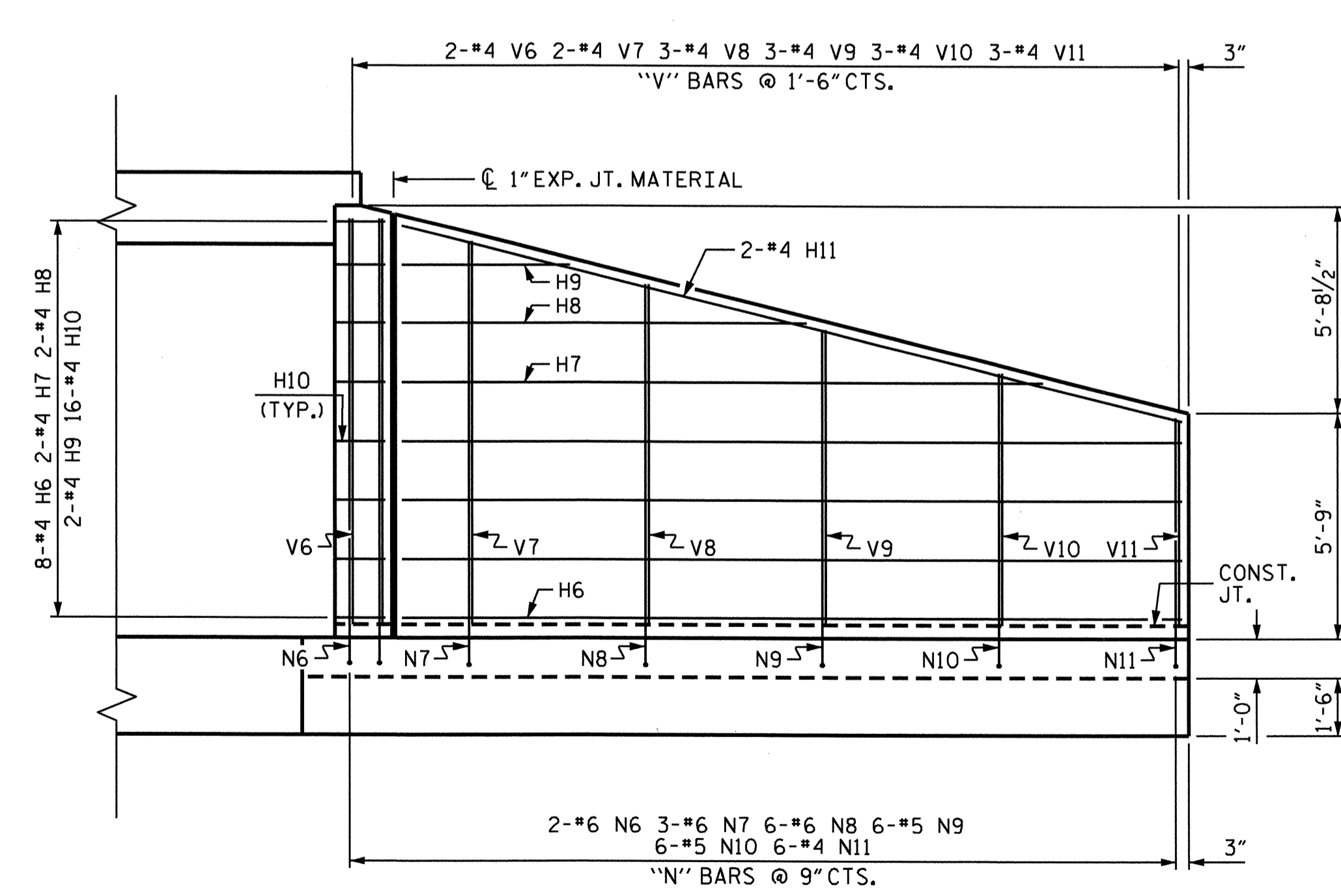
PLAN W2



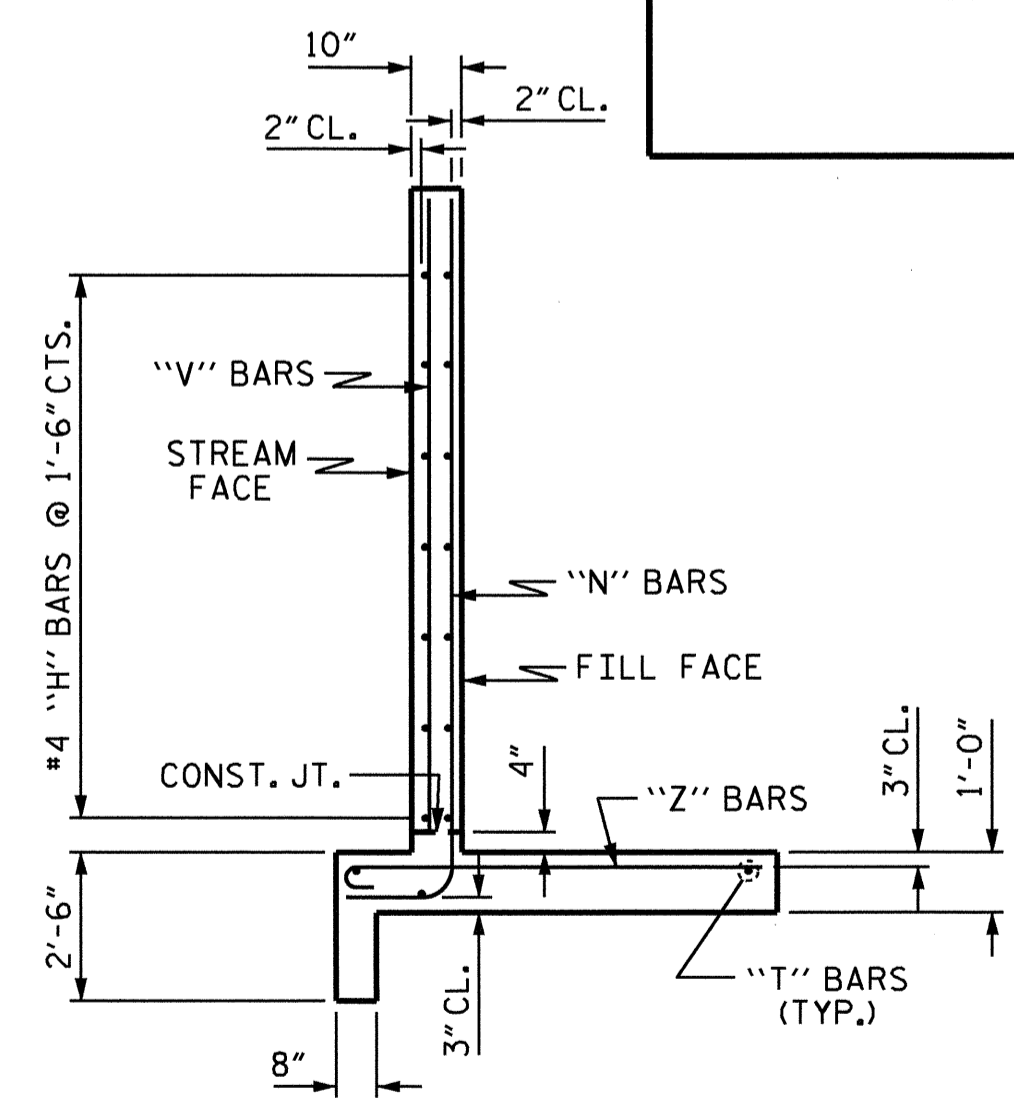
PLAN W1



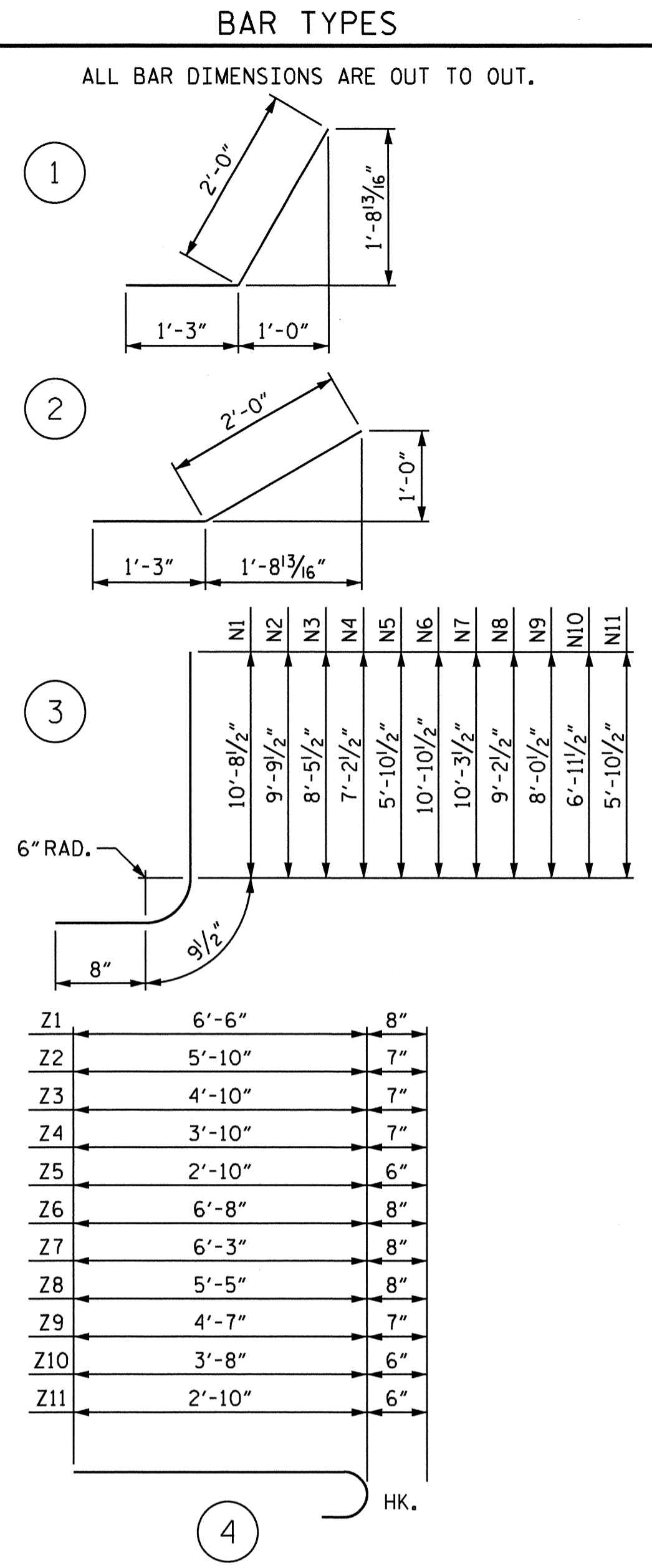
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

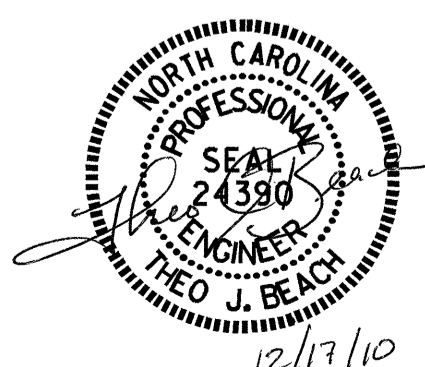


BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	10'-7"	113
H2	4	#4	STR	8'-7"	23
H3	4	#4	STR	5'-2"	14
H4	32	#4	1	3'-3"	69
H5	4	#4	STR	11'-7"	31
H6	16	#4	STR	19'-10"	212
H7	4	#4	STR	16'-4"	44
H8	4	#4	STR	10'-3"	27
H9	4	#4	STR	4'-3"	11
H10	32	#4	2	3'-3"	69
H11	4	#4	STR	20'-5"	55
N1	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 2781 LBS FOR 4 WINGS
 CLASS A CONCRETE
 4 WINGS 36.0 CY
 2 HEADWALLS 1.2 CY
 2 END CURTAIN WALLS 1.1 CY
 TOTAL 38.3 CY

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 77+89.00 -L-

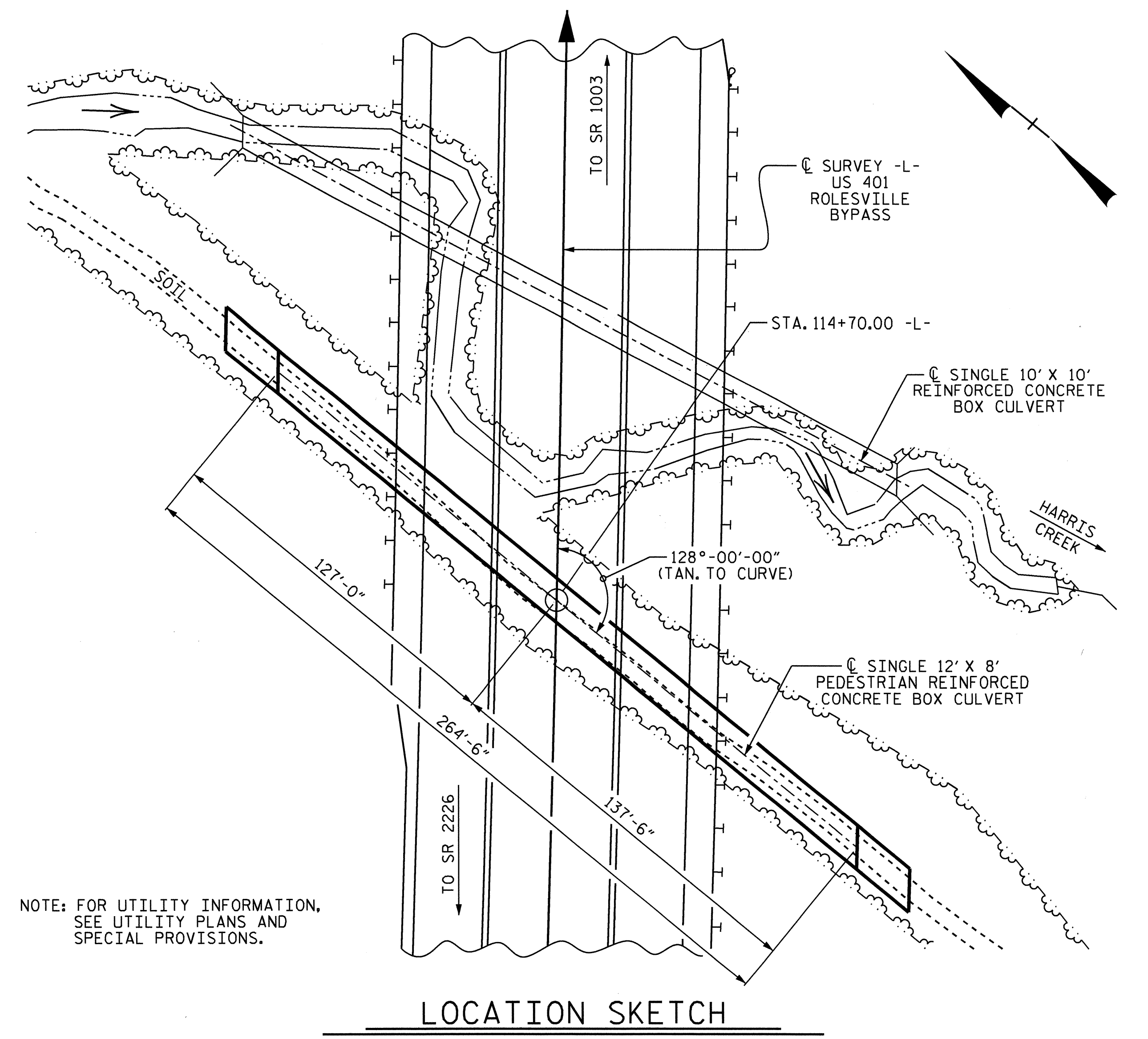
SHEET 4 OF 4
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS FOR CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 120° SKEW



ASSEMBLED BY: M. L. BROWN DATE: 10/09
 CHECKED BY: S. B. WILLIAMS DATE: 12/09
 DRAWN BY: CCJ 12/99
 CHECKED BY: RWW 03/00

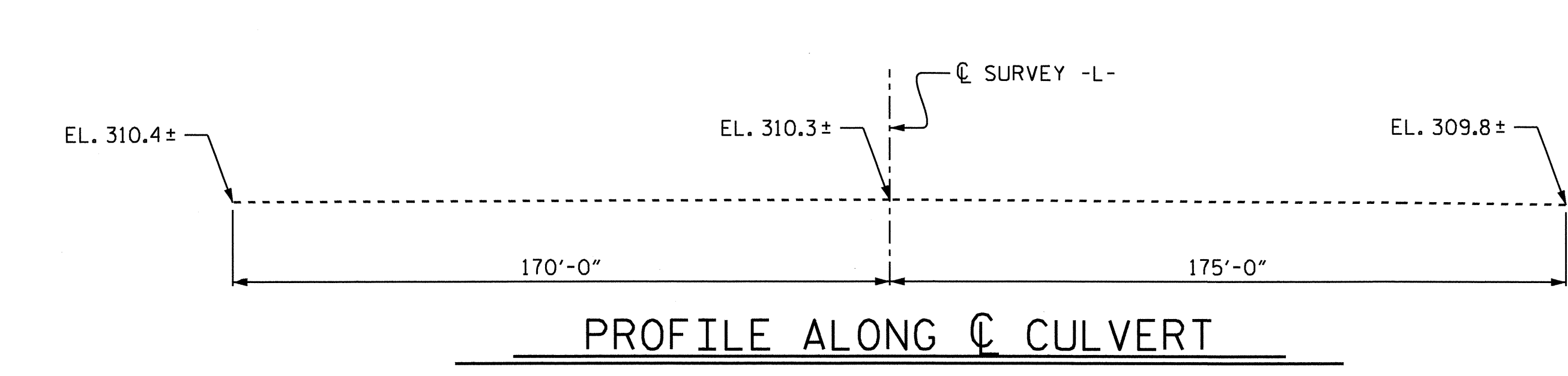
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

C-7
 TOTAL SHEETS 29



NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH



PROFILE ALONG CULVERT

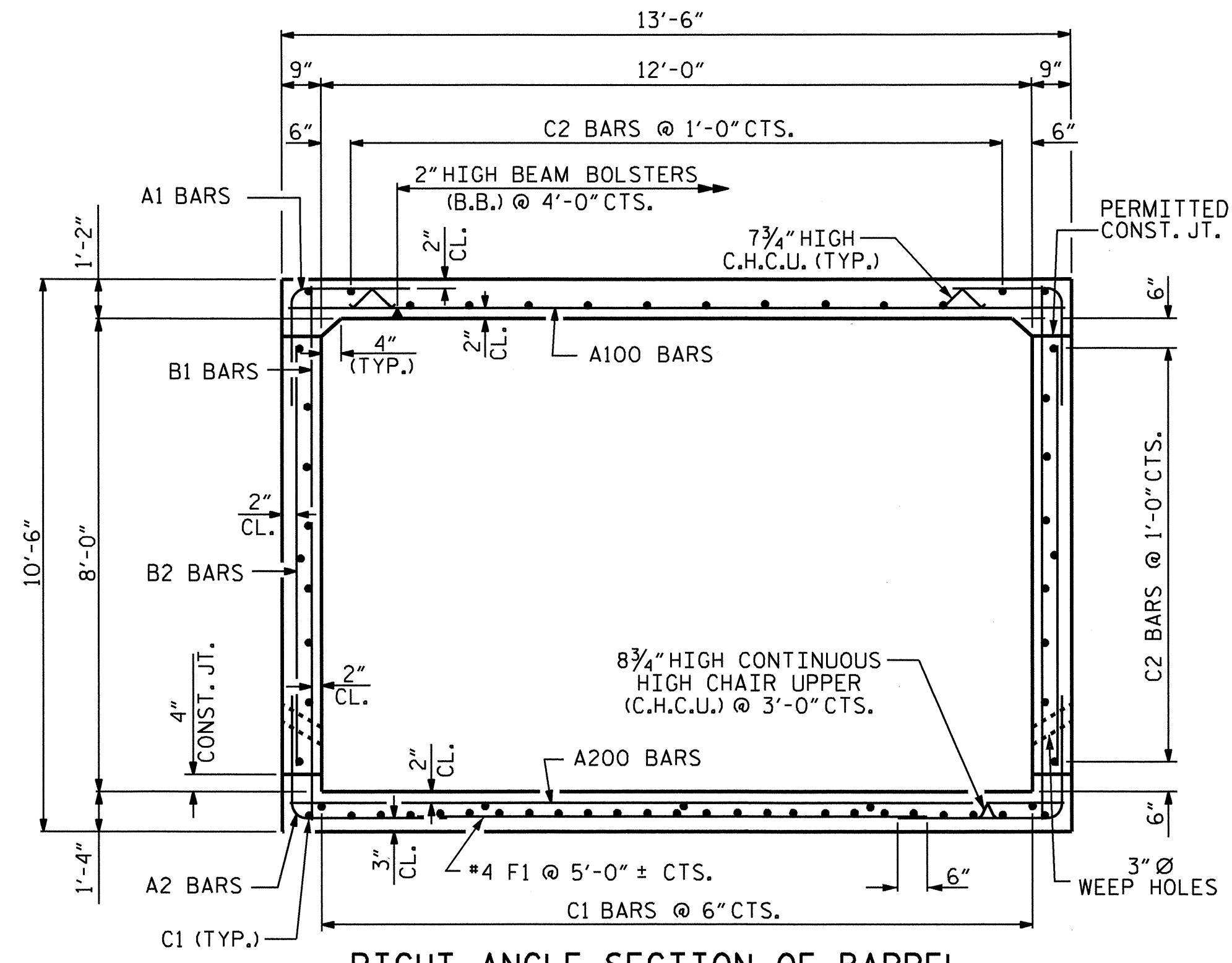
GRADE DATA

GRADE POINT ELEV. @ STA. 114+70.00 -L- = 341.60
 BED ELEV. @ STA. 114+70.00 -L- = 310.33
 ROADWAY SLOPE = 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.699 CY/FT	449.4 C.Y.
WINGS ETC.	25.0 C.Y.
TOTAL	474.4 C.Y.
REINFORCING STEEL	
BARREL	79,348 LBS.
WINGS ETC.	939 LBS.
TOTAL	80,287 LBS.
FOUNDATION CONDITIONING MAT'L	272 TONS
CULVERT EXCAVATION	LUMP SUM

ASSEMBLED BY: T. BANKOVICH	DATE: 10-2009	SPECIAL
CHECKED BY: S.B. WILLIAMS	DATE: 3-2010	
DRAWN BY: B.M. MEYERS	DATE: AUG. 1989	STANDARD
CHECKED BY: A.R. BISSETTE	DATE: AUG. 1989	



RIGHT ANGLE SECTION OF BARREL

THERE ARE 62 "C" BARS IN SECTION OF BARREL (30 C1 BARS @ 11 BAR RUNS AND 32 C2 BARS @ 10 BAR RUNS)

BAR TYPE	BILL OF MATERIAL				
	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
	A1	#7	1	7'-4"	11212
	A2	#6	1	6'-3"	7585
	A100	#8	STR	13'-1"	16558
	A101	#8	STR	11'-2"	119
	A102	#8	STR	9'-3"	99
	A103	#8	STR	7'-5"	79
A104	#8	STR	5'-6"	59	
A105	#8	STR	3'-8"	39	
A106	#8	STR	1'-9"	19	
A200	#9	STR	13'-1"	19795	
A201	#9	STR	11'-1"	151	
A202	#9	STR	8'-11"	121	
A203	#9	STR	6'-9"	92	
A204	#9	STR	4'-8"	63	
A205	#9	STR	2'-6"	34	
B1	#4	STR	10'-0"	4248	
B2	#5	STR	7'-4"	5721	
C1	#4	STR	27'-8"	6099	
C2	#4	STR	28'-2"	6021	
D1	#6	STR	3'-0"	162	
F1	#4	STR	9'-3"	346	
G1	#4	STR	15'-3"	41	
K1	#4	2	3'-8"	34	
S1	#8	STR	15'-3"	651	
TOTAL REINFORCING STEEL (LBS)					79,348

SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
B1	#4	1'-9"
"C"	#4	1'-11"

NOTES:
 ASSUMED LIVE LOAD -----HS20 OR ALTERNATE LOADING.
 DESIGN FILL-----23.96'
 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. CULVERT AND WINGS FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
 THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
 TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 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.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
 AT THE CONTRACTORS OPTION, THE VERTICAL CONSTRUCTION JOINT BETWEEN THE WINGS AND THE BARREL MAY BE ELIMINATED AND THE "C" BARS IN THE BARREL MAY BE EXTENDED TO REPLACE THE "D" AND "H" BARS IN THE WINGS.

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 114+70.00 -L-

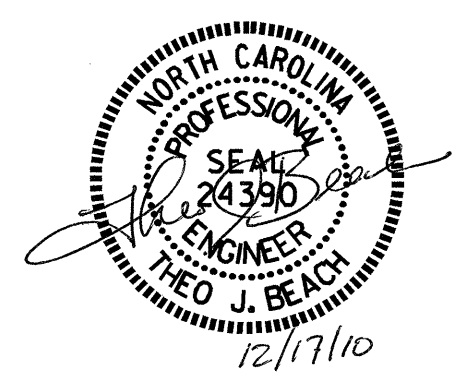
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

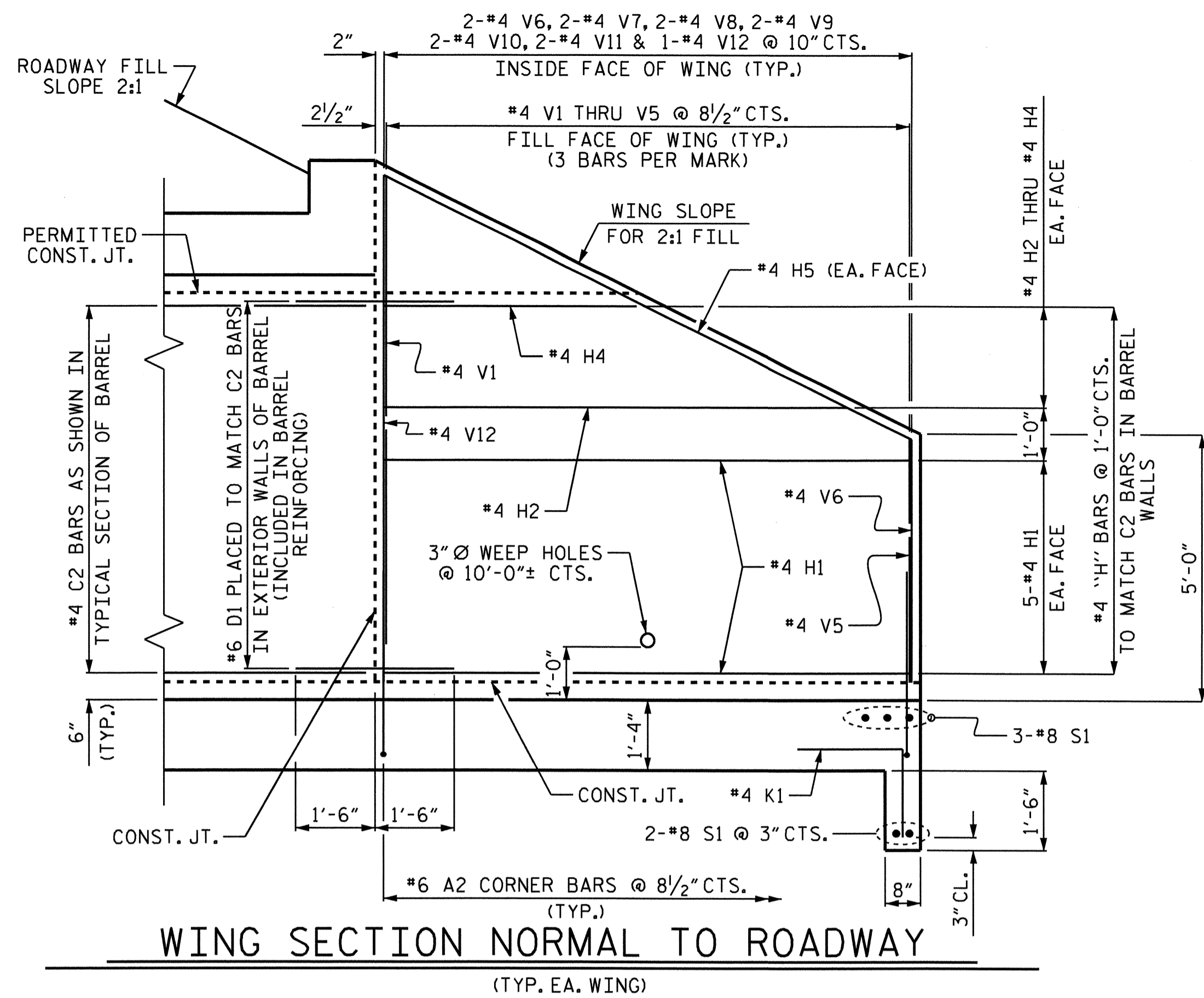
**BARREL STANDARD
 SINGLE 12 FT. X 8 FT.
 PEDESTRIAN CONCRETE
 BOX CULVERT
 128° SKEW**

AUGUST 1989

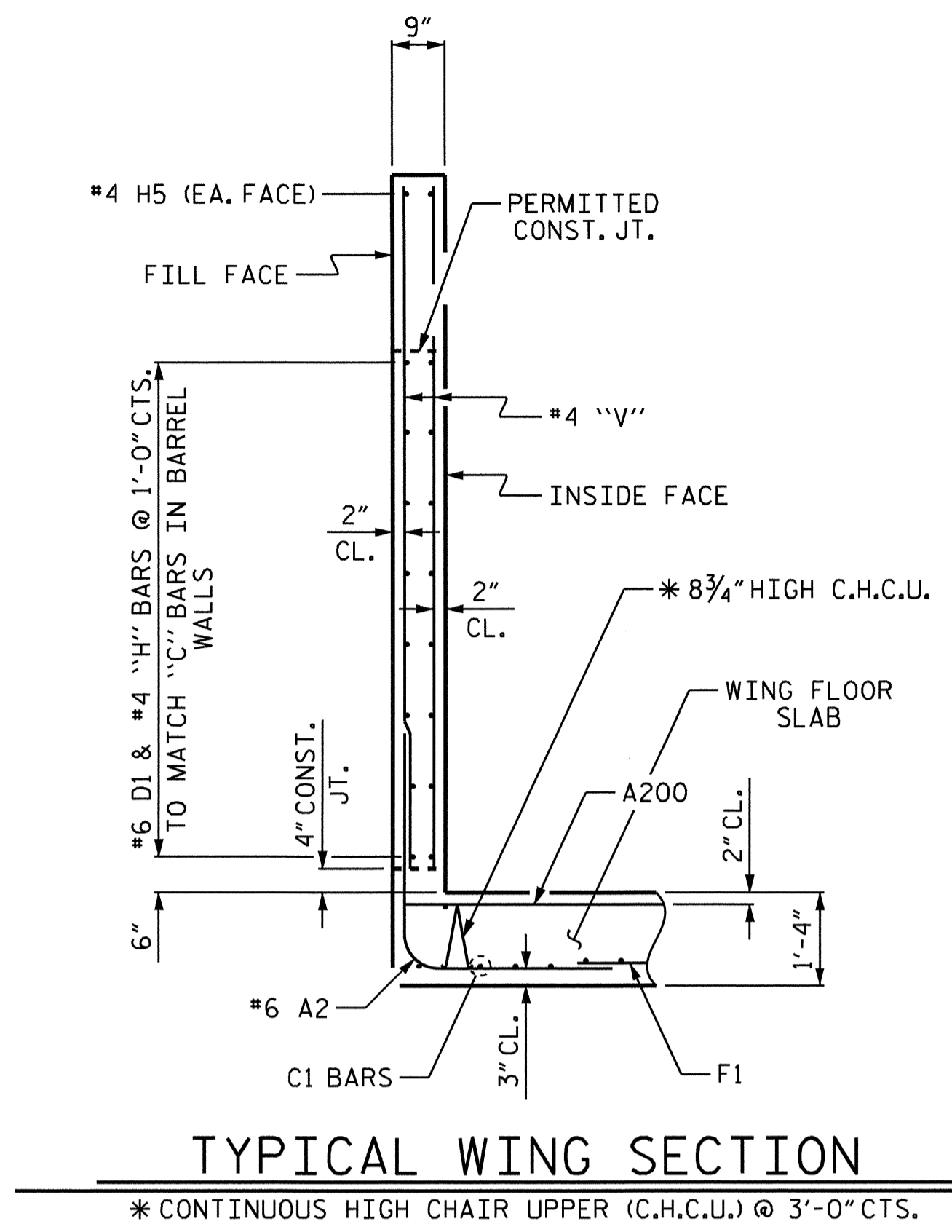
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			29



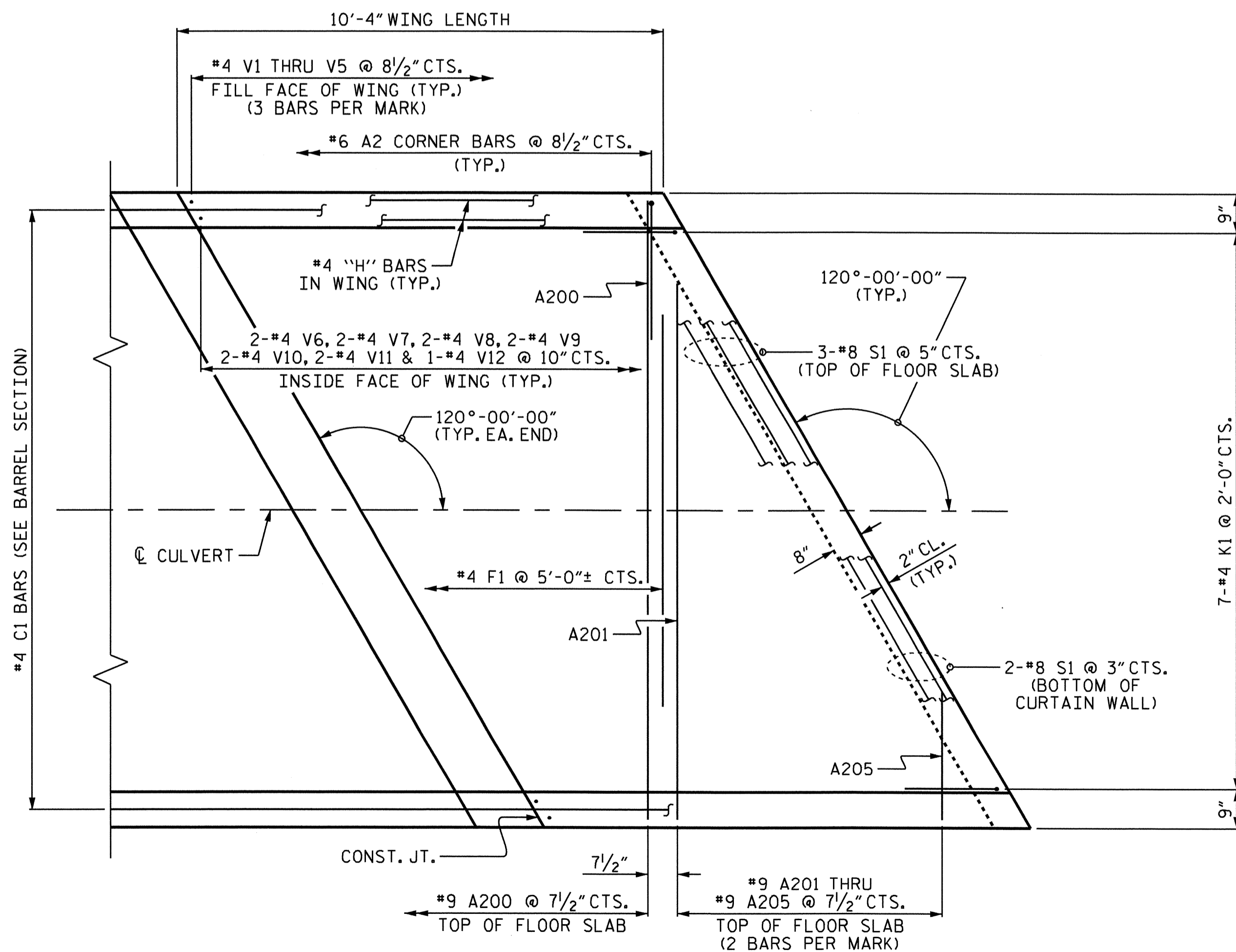
REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
 ADDED 8-22-89



WING SECTION NORMAL TO ROADWAY
(TYP. EA. WING)



TYPICAL WING SECTION
* CONTINUOUS HIGH CHAIR UPPER (C.H.C.U.) @ 3'-0" CTS.



PLAN
OUTLET WINGS SHOWN, INLET WINGS SIMILAR

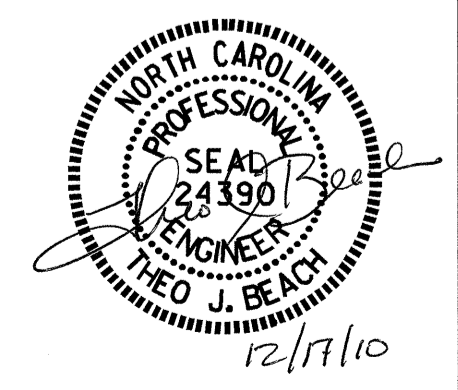
BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	40	#4	STR	10'-0"	267
H2	8	#4	STR	8'-9"	47
H3	8	#4	STR	6'-9"	36
H4	8	#4	STR	4'-9"	25
H5	8	#4	STR	11'-2"	60
V1	12	#4	STR	8'-10"	71
V2	12	#4	STR	7'-9"	62
V3	12	#4	STR	6'-8"	53
V4	12	#4	STR	5'-7"	45
V5	12	#4	STR	4'-7"	37
V6	8	#4	STR	4'-6"	24
V7	8	#4	STR	5'-4"	29
V8	8	#4	STR	6'-2"	33
V9	8	#4	STR	7'-0"	37
V10	8	#4	STR	7'-10"	42
V11	8	#4	STR	8'-8"	46
V12	4	#4	STR	9'-6"	25
REINFORCING STEEL FOR 4 WINGS					939 LBS.
CLASS A CONCRETE					
4 WINGS					8.3 C.Y.
2 HEADWALLS					1.4 C.Y.
2 END CURTAIN WALLS AND WING FLOOR SLABS					15.3 C.Y.
TOTAL					25.0 C.Y.

NOTE:
QUANTITIES FOR "A", "C", "D", "F", "K" AND "S" BARS INCLUDED IN BARREL REINFORCING STEEL.

PROJECT NO. R-2814B
WAKE COUNTY
STATION: 114+70.00 -L-

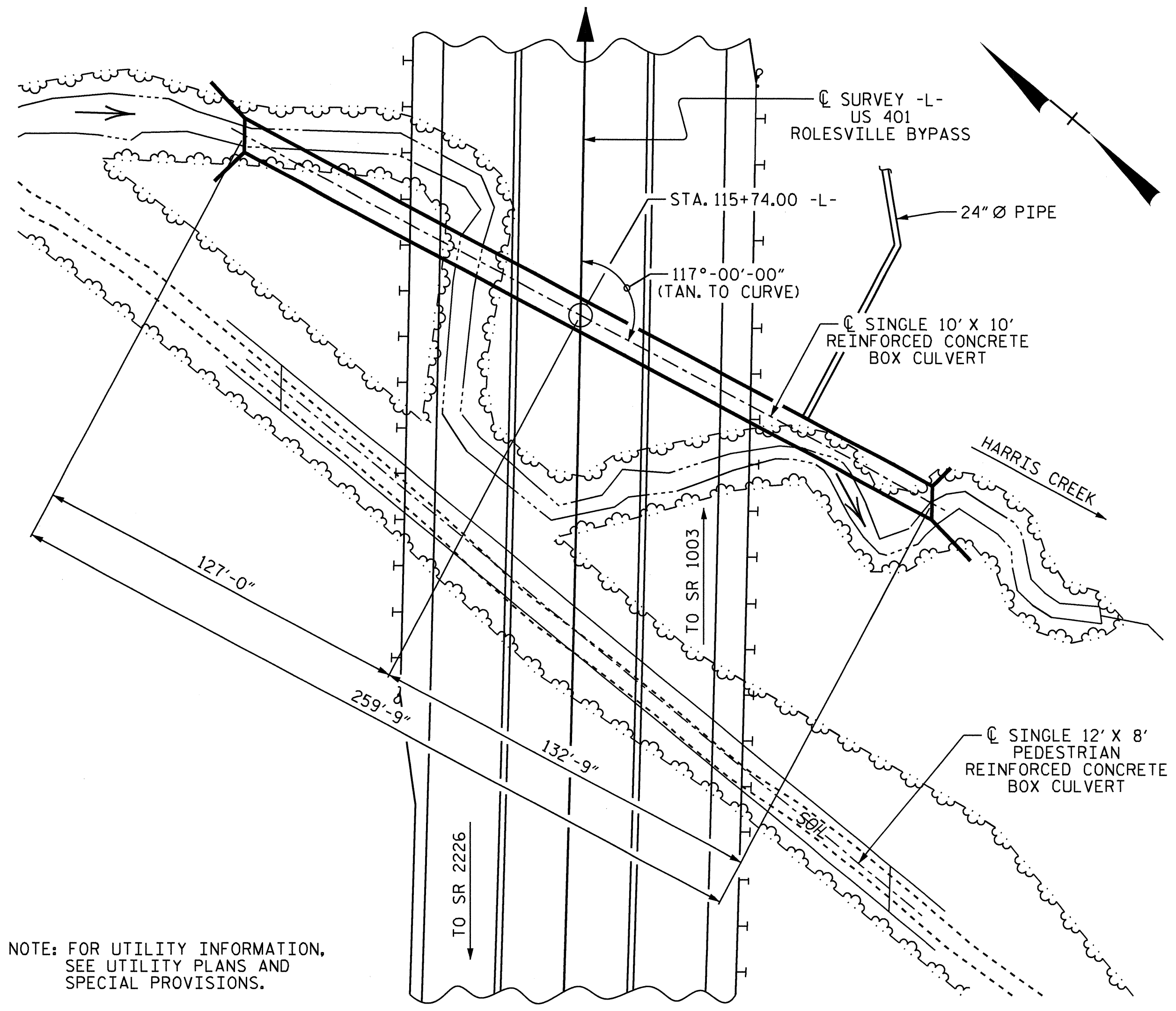
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
WINGS FOR PEDESTRAIN CONCRETE BOX CULVERT
H = 8'-0" SLOPE = 2:1
120° SKEW



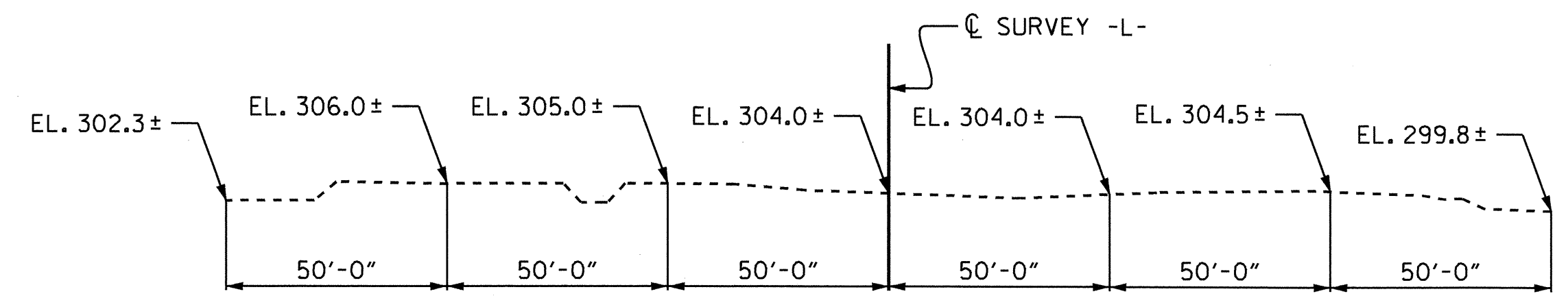
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			29

DRAWN BY: T. BANKOVICH DATE: 2-2010
CHECKED BY: S.B. WILLIAMS DATE: 3-2010



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

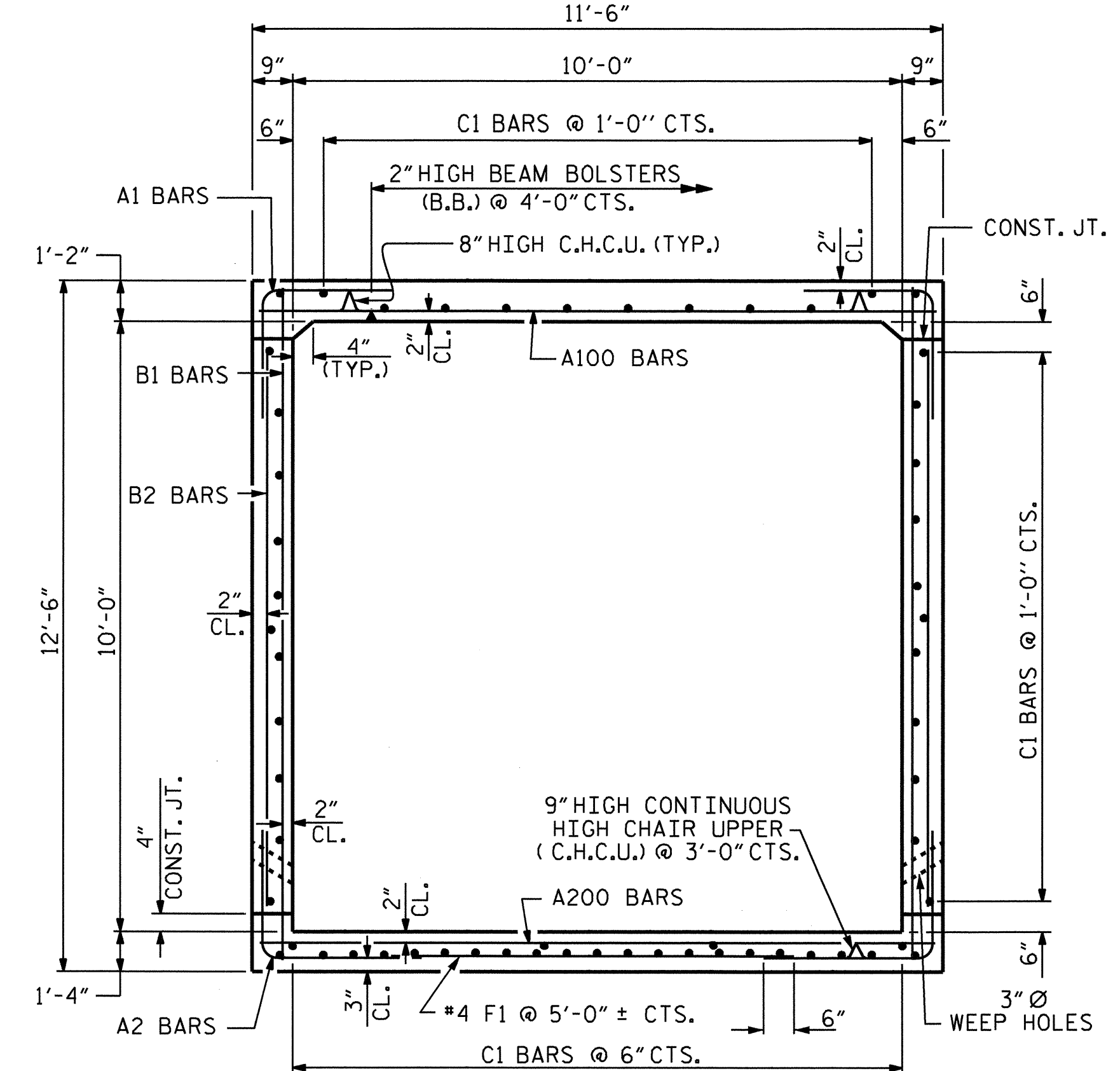


PROFILE ALONG CULVERT

HYDROGRAPHIC DATA	
DESIGN DISCHARGE	950 CFS
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	312.4
DRAINAGE AREA	454 AC
BASIC DISCHARGE (Q100)	1000 CFS
BASIC HIGH WATER ELEVATION	312.7

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	5169 CFS
FREQUENCY OVERTOPPING FLOOD	500+ YR.
OVERTOPPING FLOOD ELEVATION	339.9

GRADE DATA	
GRADE POINT ELEV. @ STA. 115+74.00 -L-	= 340.314
BED ELEV. @ STA. 115+74.00	= 300.670
ROADWAY SLOPE	= 2:1



RIGHT ANGLE SECTION OF BARREL
THERE ARE 59 C1 BARS IN SECTION OF BARREL

BAR TYPE	BILL OF MATERIAL					
	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	A1	1040	#6	1	6'-2"	9633
	A2	1040	#6	1	6'-3"	9763
A100	A100	434	#8	STR	11'-1"	12843
	A101	4	#8	STR	8'-10"	94
	A102	4	#8	STR	6'-10"	73
	A103	4	#8	STR	4'-9"	51
A104	4	#8	STR	2'-9"	29	
A200	A200	434	#8	STR	11'-1"	12843
	A201	4	#8	STR	8'-10"	94
	A202	4	#8	STR	6'-10"	73
	A203	4	#8	STR	4'-9"	51
A204	4	#8	STR	2'-9"	29	
B1	B1	624	#4	STR	12'-0"	5002
	B2	1040	#4	STR	9'-4"	6484
C1	C1	590	#4	STR	27'-10"	10970
	D1	26	#6	STR	1'-11"	75
D2	39	#6	STR	1'-5"	83	
F1	F1	52	#4	STR	7'-4"	255
	G1	4	#4	STR	12'-10"	34
S2	S2	12	#8	STR	12'-10"	411
	T1	16	#6	STR	3'-3"	78
TOTAL REINFORCING STEEL (LBS)						68,968

SPlice LENGTHS CHART		
BAR	SIZE	SPlice LENGTH
B1	#4	1'-9"
C1	#4	1'-11"

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 1.624 CY/FT	421.8 C.Y.
BAFFLES	3.4 C.Y.
WINGS ETC.	38.3 C.Y.
TOTAL	463.5 C.Y.
REINFORCING STEEL	
BARREL & BAFFLES	68,968 LBS.
WINGS ETC.	2,781 LBS.
TOTAL	71,749 LBS.
FOUNDATION CONDITIONING MAT'L	211 TONS
CULVERT EXCAVATION	LUMP SUM
CLASS B RIP RAP	89 TONS

NOTES:

ASSUMED LIVE LOAD -----HS20 OR ALTERNATE LOADING.
 DESIGN FILL-----30.02'
 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, BAFFLES AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
 THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
 TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 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.
 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 CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 THE 24" Ø PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE AS DIRECTED BY THE ENGINEER.

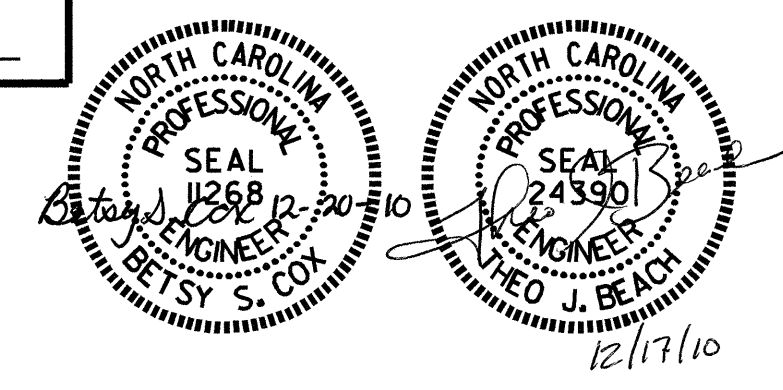
PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 115+74.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

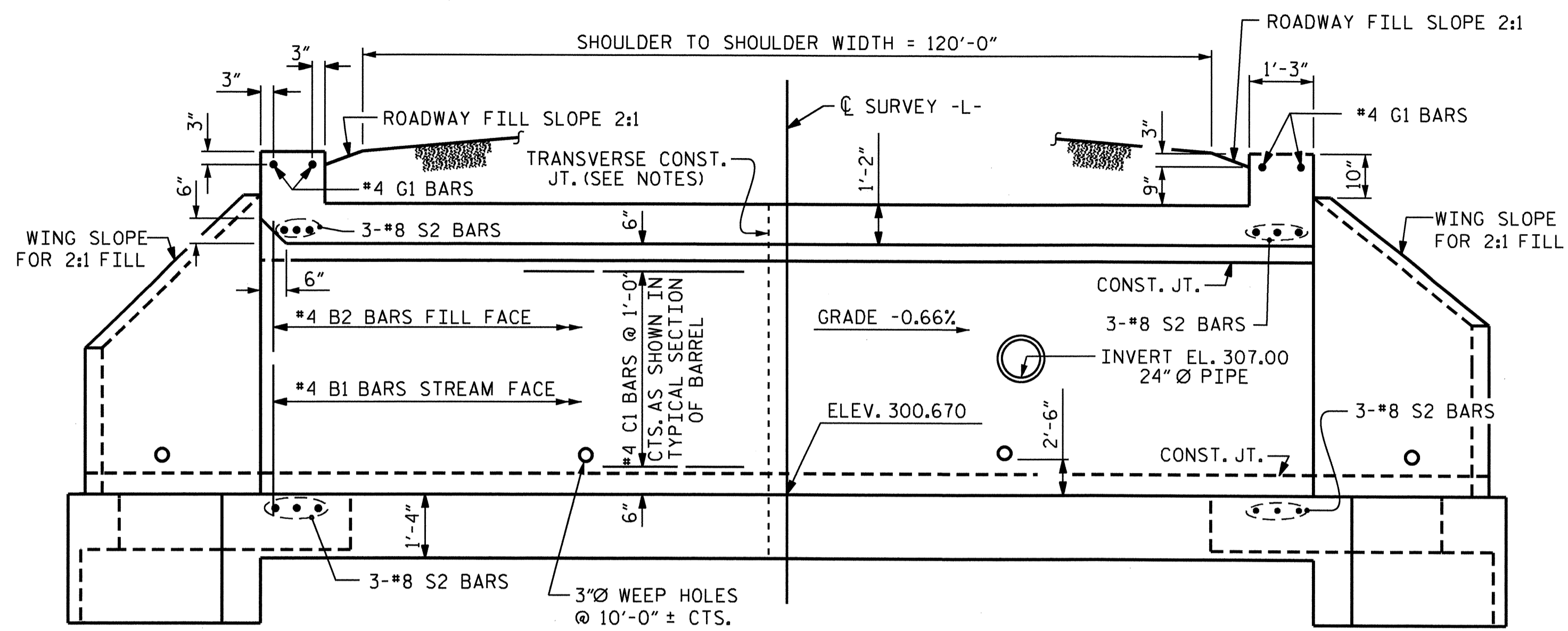
**BARREL STANDARD
 SINGLE 10 FT. X 10 FT.
 CONCRETE BOX CULVERT
 117° SKEW**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			29

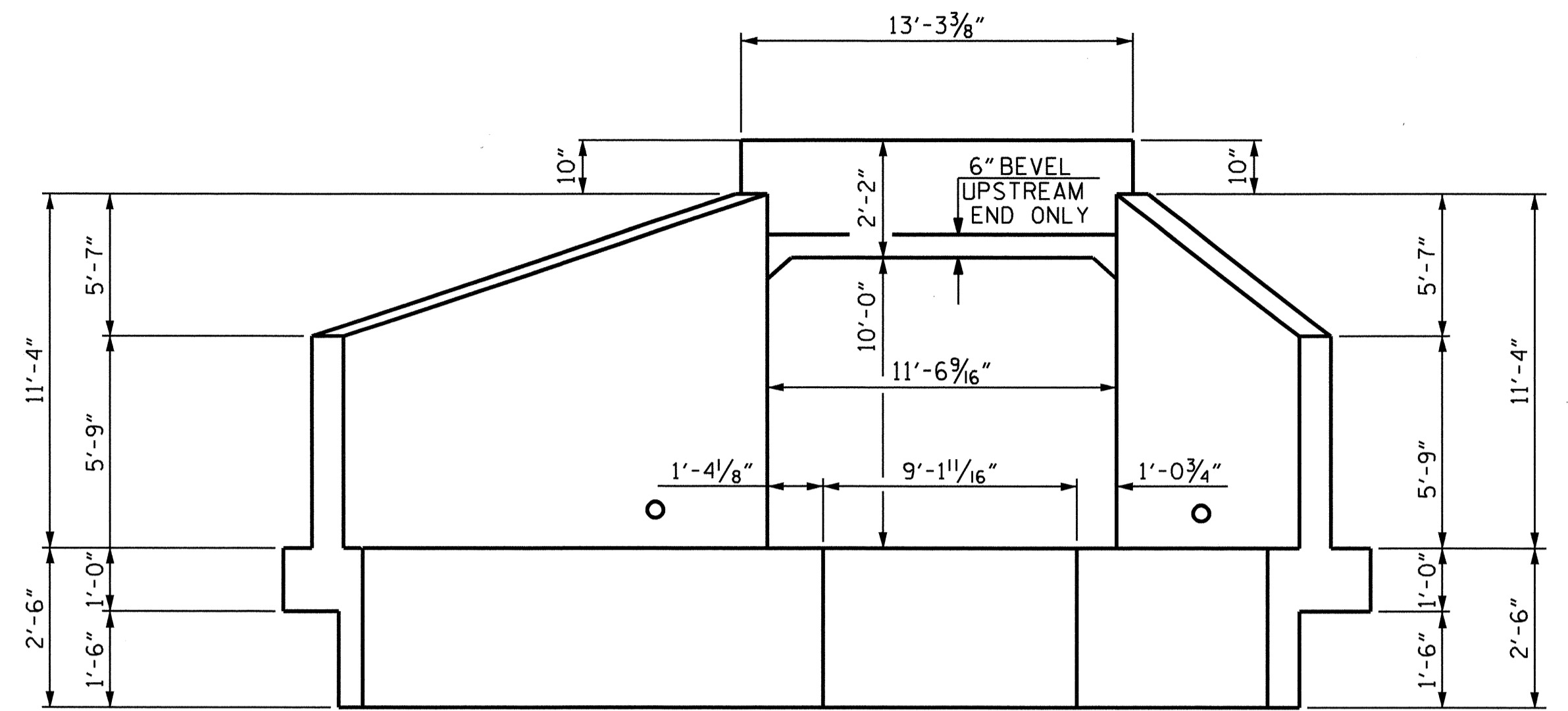


REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
 ADDED 8-22-89

ASSEMBLED BY: T. BANKOVICH	DATE: 10-2009	SPECIAL
CHECKED BY: S.B. WILLIAMS	DATE: 3-2010	
DRAWN BY: B.M. MEYERS	DATE: AUG. 1989	STANDARD
CHECKED BY: A.R. BISSETTE	DATE: AUG. 1989	

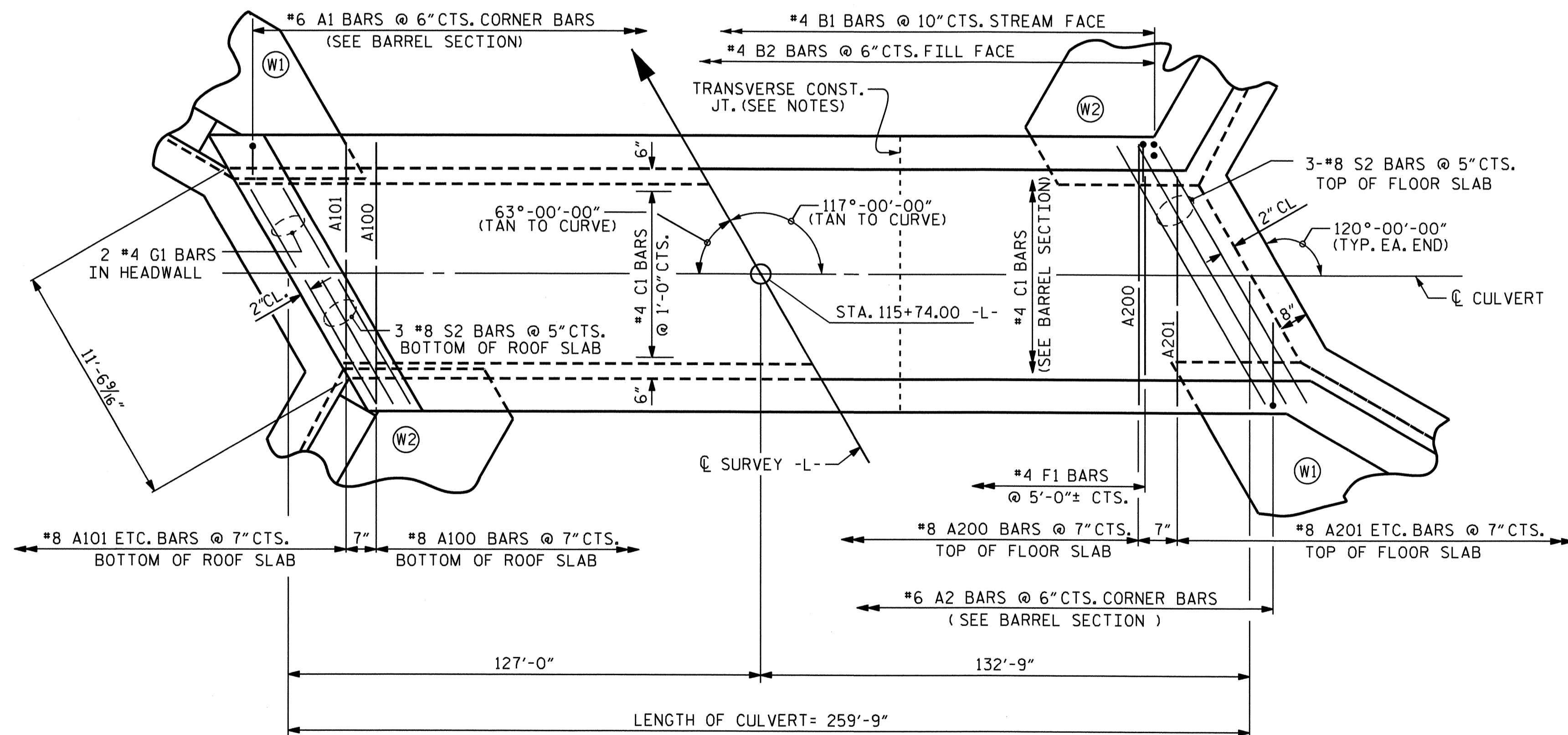


CULVERT SECTION NORMAL TO ROADWAY



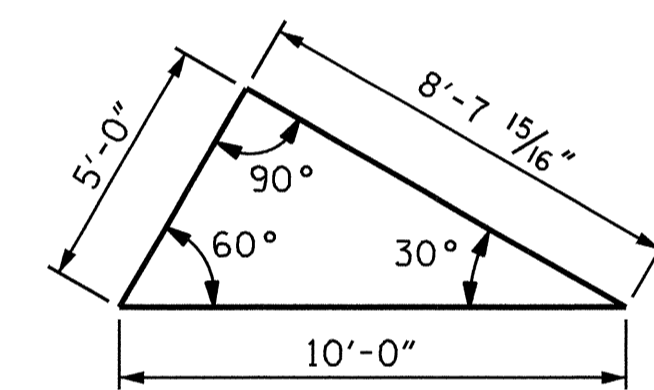
END ELEVATION NORMAL TO SKEW

BAFFLE NOT SHOWN FOR CLARITY.
FOR BAFFLE DETAIL SEE SHEET 3 OF 4.

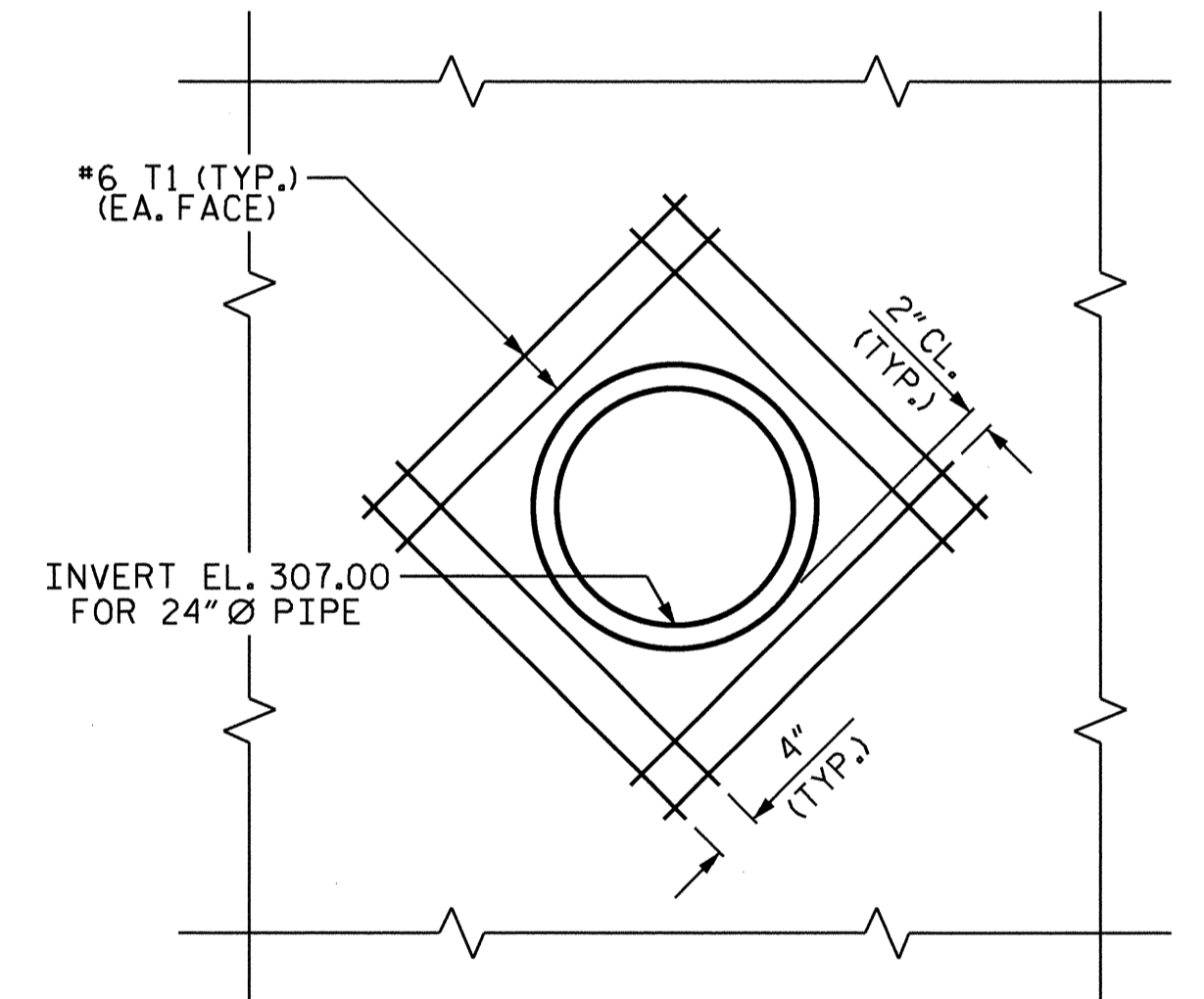


PART PLAN - ROOF SLAB PART PLAN - FLOOR SLAB

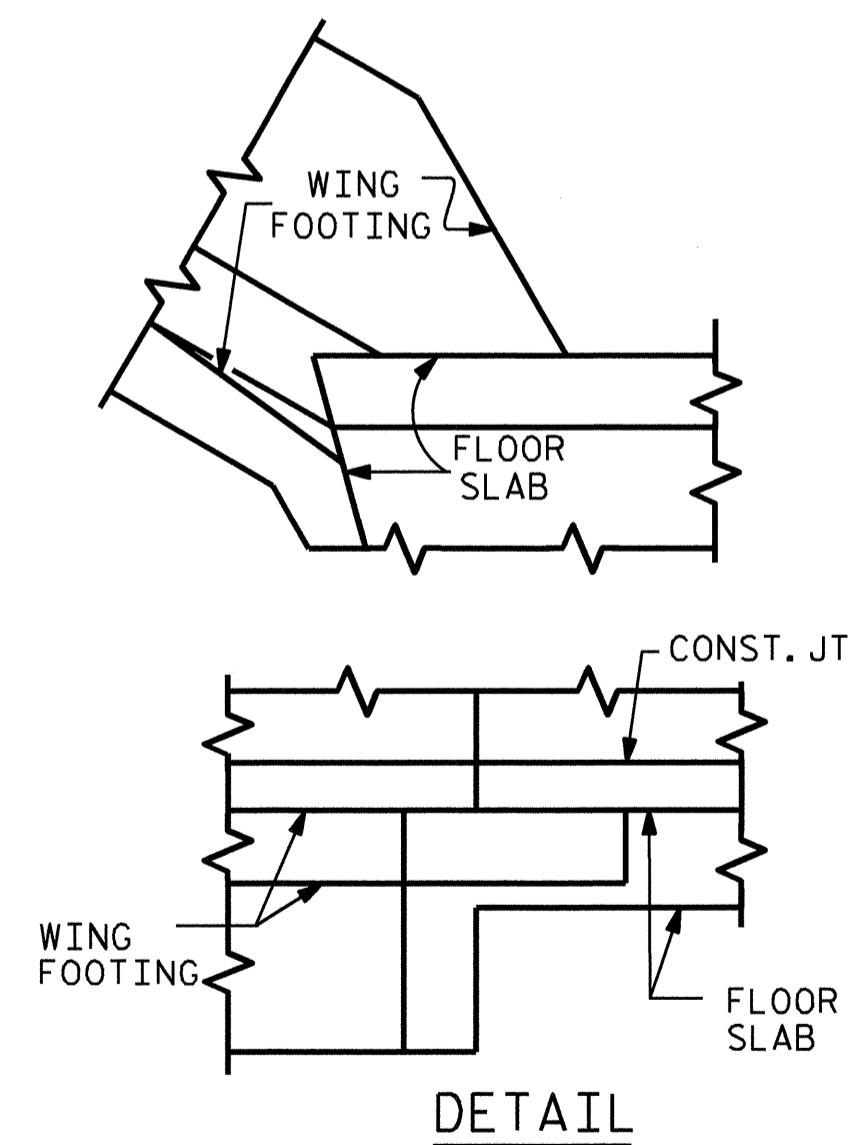
NOTE: C1 BARS ARE 10 BAR RUNS.



SKEW TRIANGLE



24" Ø PIPE DETAILS



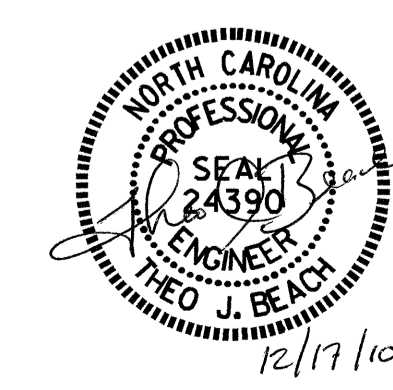
DETAIL

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

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 115+74.00 -L-

SHEET 2 OF 4

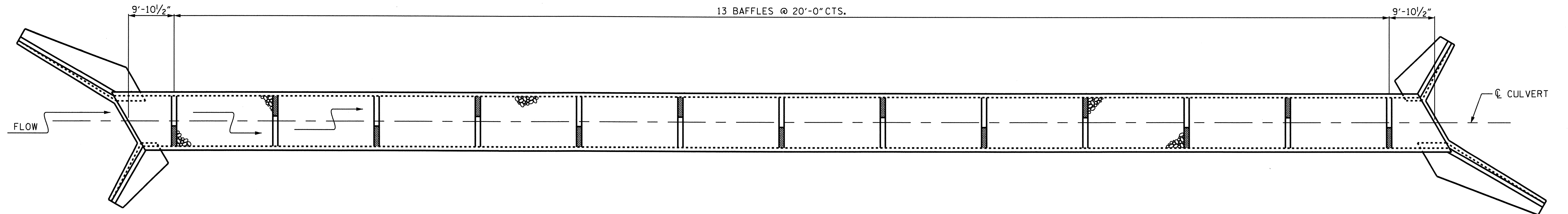
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
BARREL STANDARD
 SINGLE 10 FT. X 10 FT.
 CONCRETE BOX CULVERT
 117° SKEW



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12
1			3			TOTAL SHEETS 29
2			4			

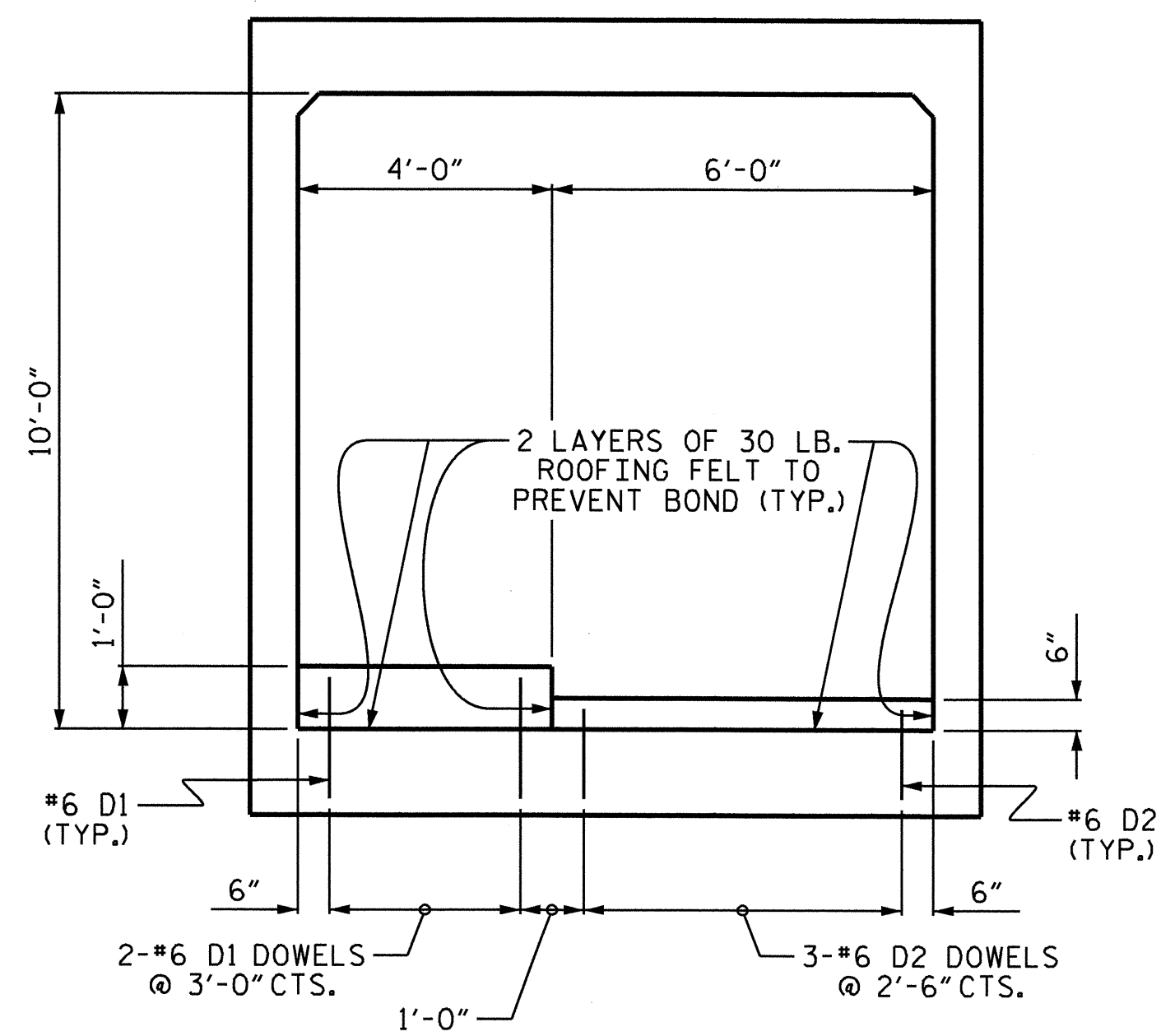
STD. NO. CB331 STR. #4

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
 REDRAWN 8-22-89
 REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 ASSEMBLED BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: S.B. WILLIAMS DATE: 3-2010
 DRAWN BY: J.W. ROUSE DATE: SEPT. 1989
 CHECKED BY: A.R. BISSETTE DATE: AUG. 1989



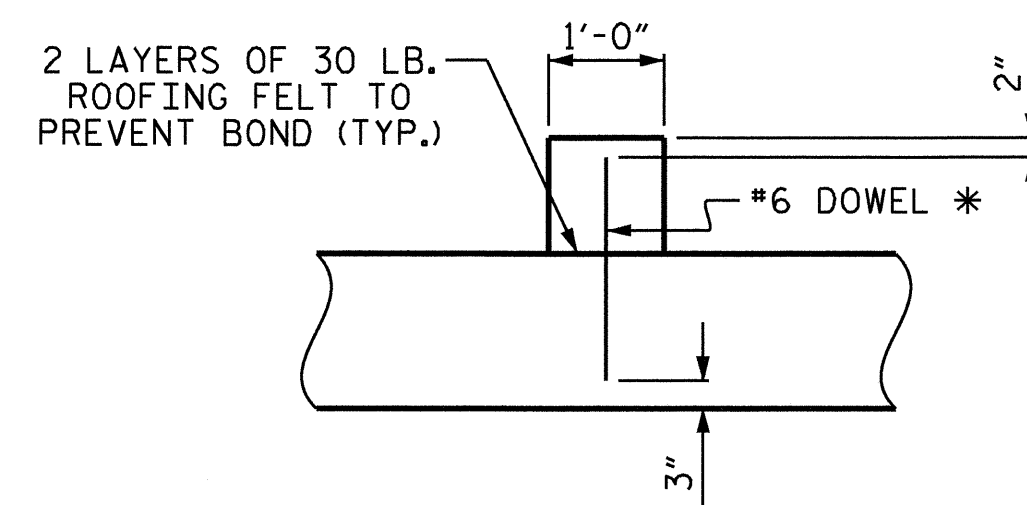
BAFFLE DETAIL - TOP VIEW

BED MATERIAL PLACED BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER BAFFLES, THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER THAN 6 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER. PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION.



CULVERT BAFFLE DETAILS

ALTERNATE HIGH AND LOW SIDE OF BAFFLE TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT



SECTION THRU BAFFLE

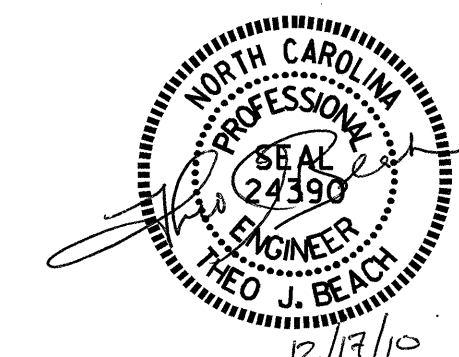
* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 115+74.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

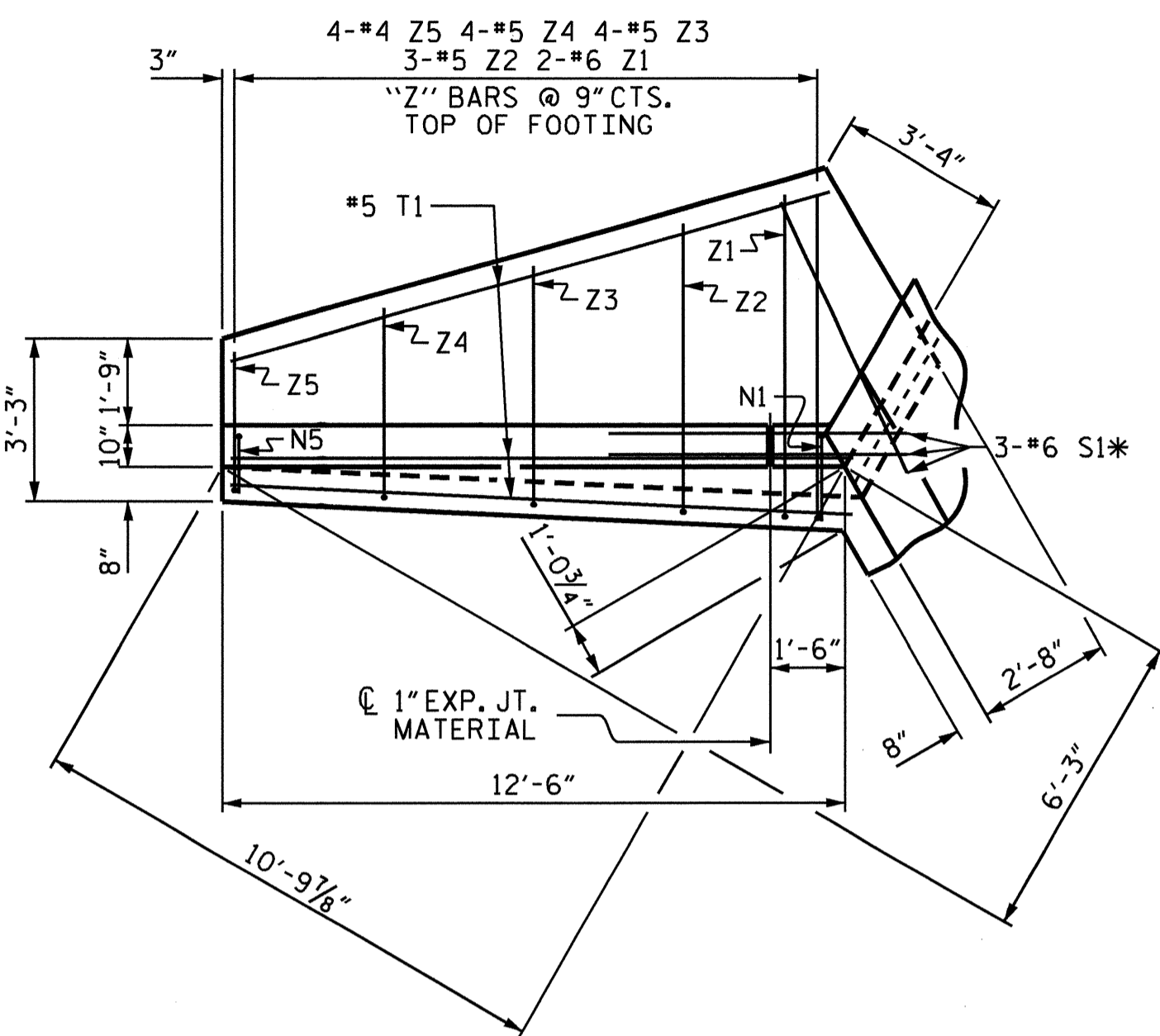
BAFFLE DETAILS



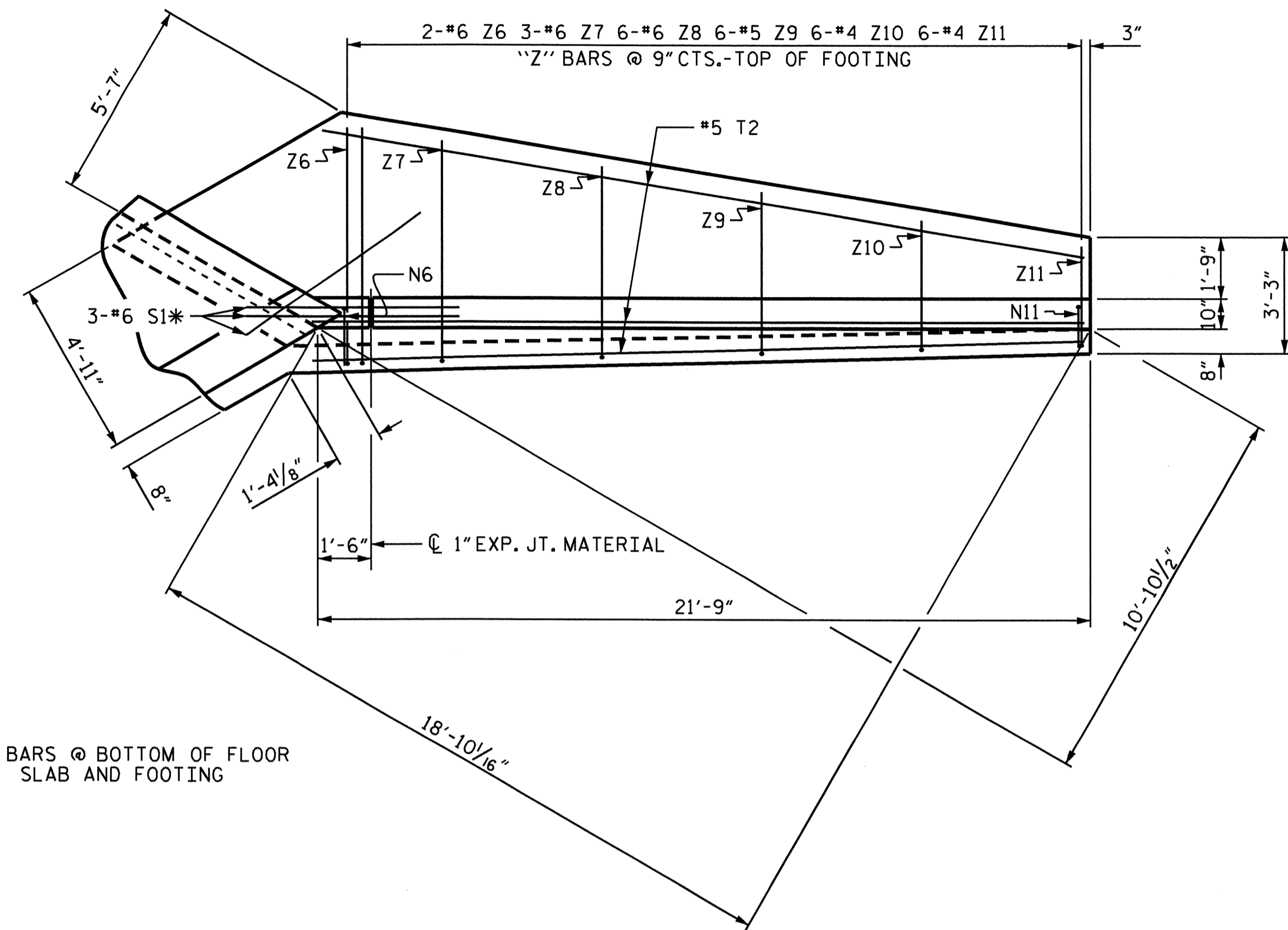
DRAWN BY : T. BANKOVICH DATE : 10-2009
 CHECKED BY : S.B. WILLIAMS DATE : 3-2010

20-DEC-2010 11:30
 R:\Structures\structures3&4\StreamCulvert\Drawings\R-2814B.str4.CU.dgn
 tbeach

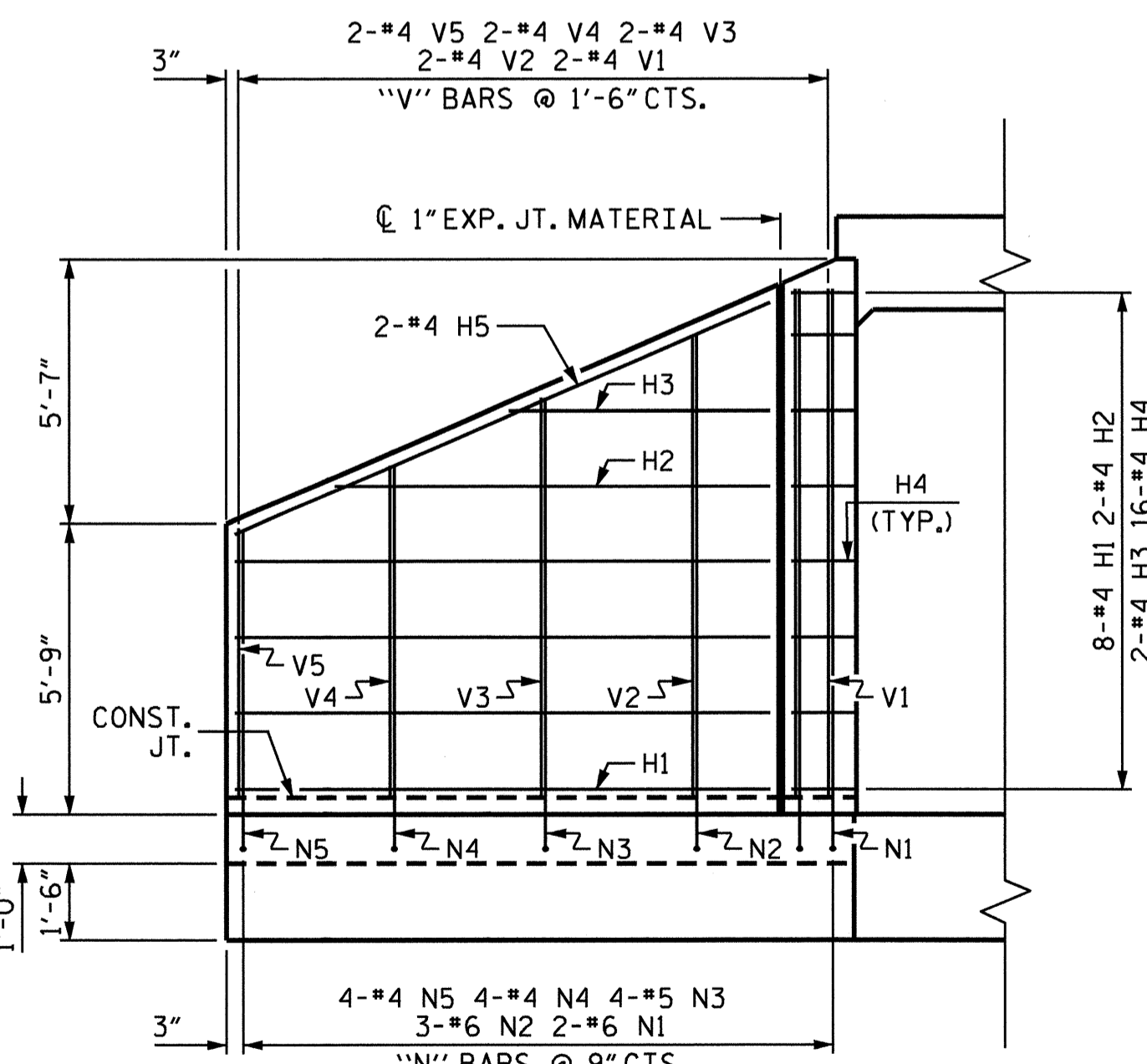
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13
1			3			TOTAL SHEETS
2			4			29



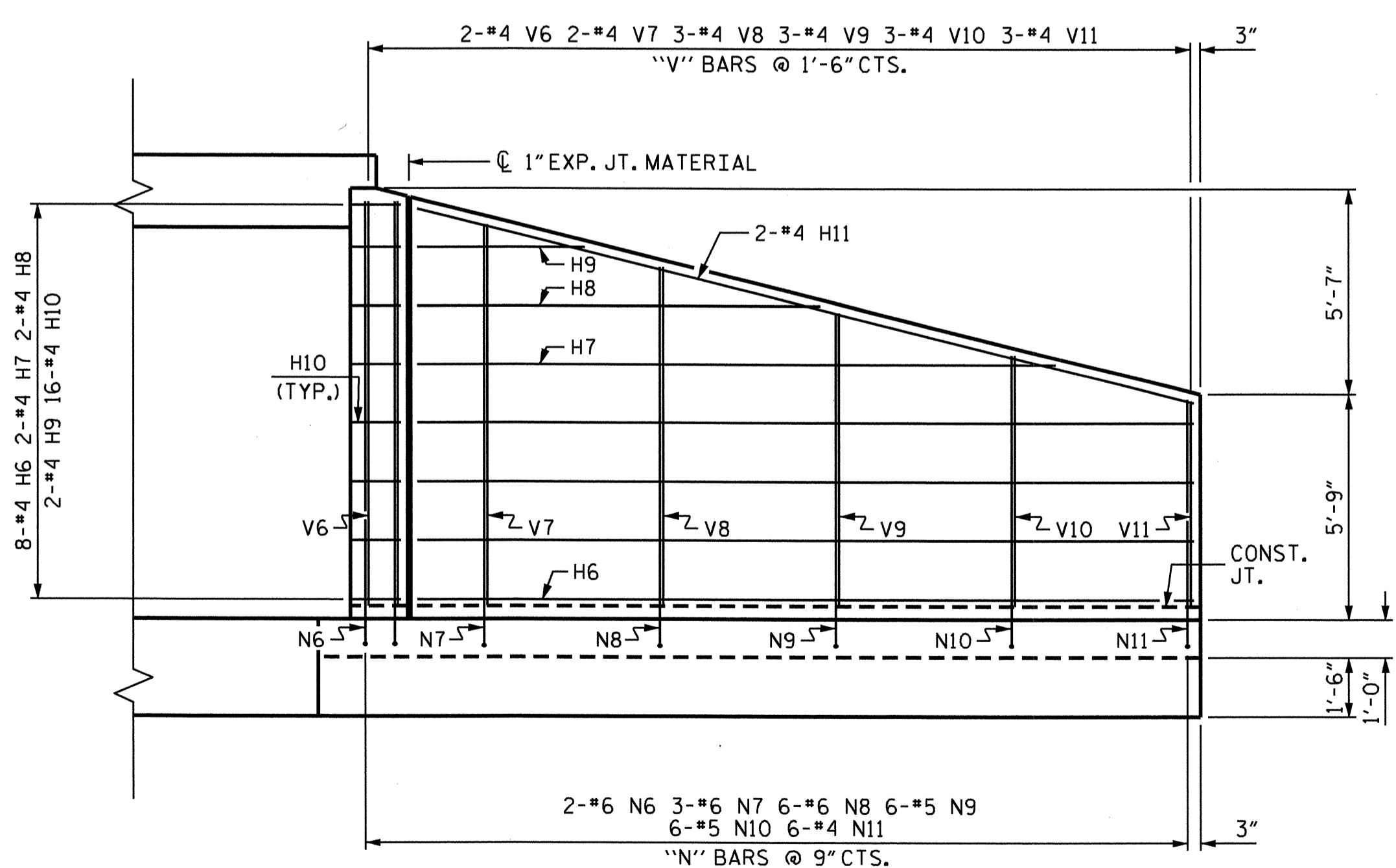
PLAN W2



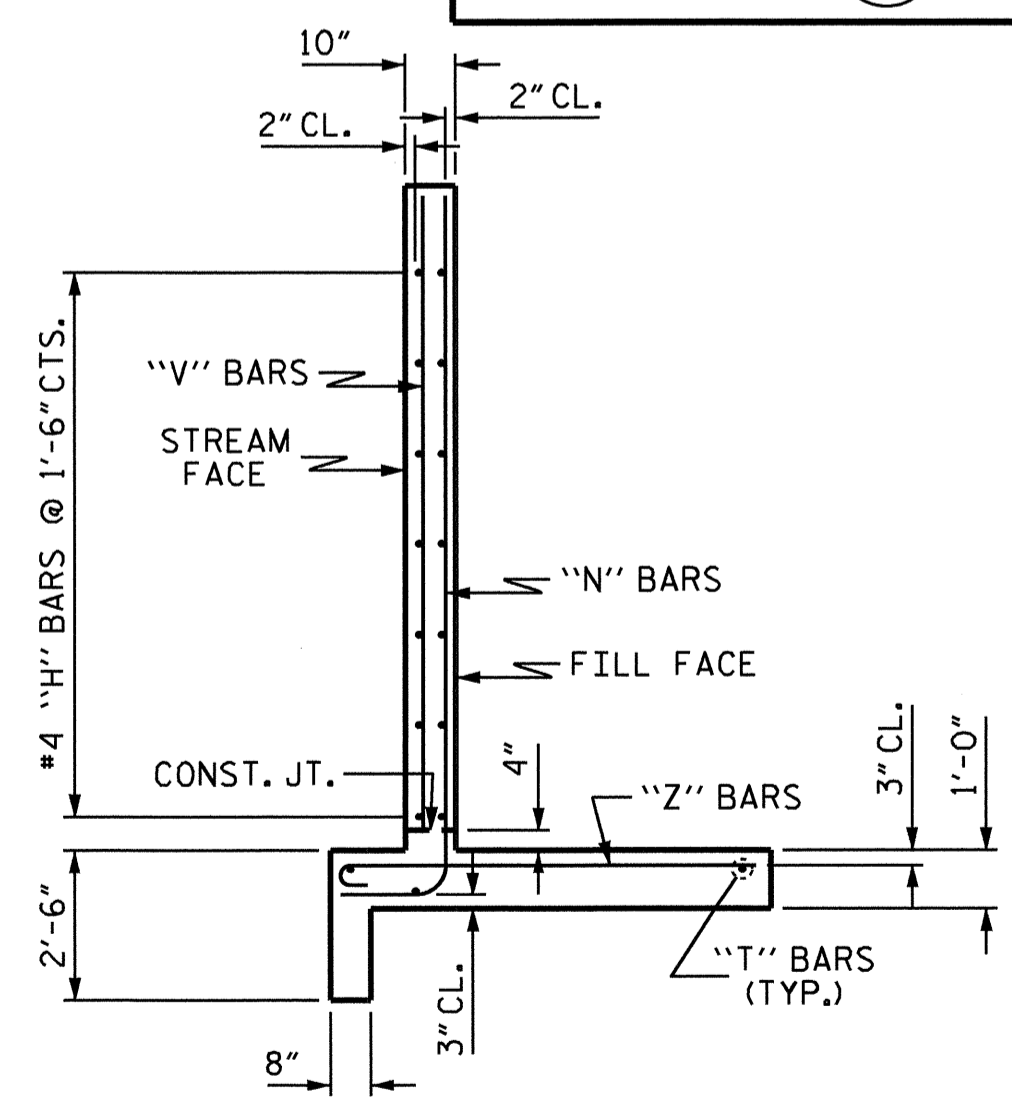
PLAN W1



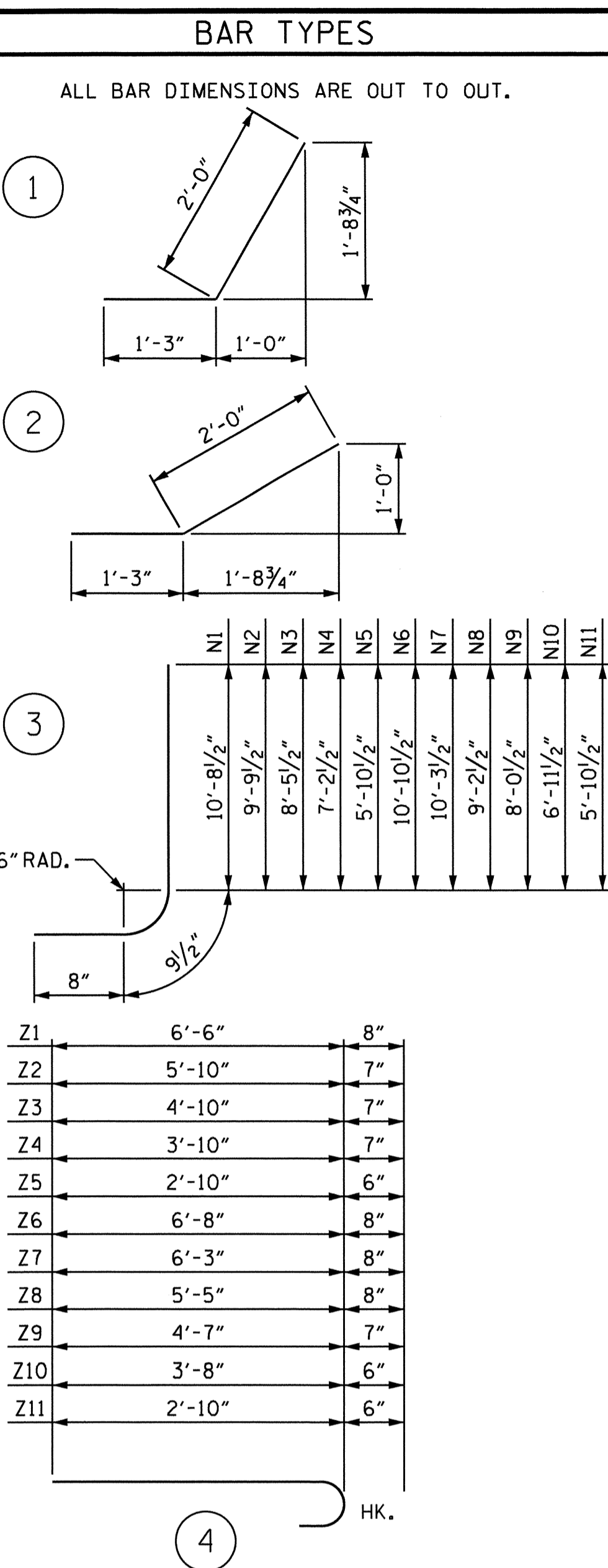
ELEVATION W2



ELEVATION W1



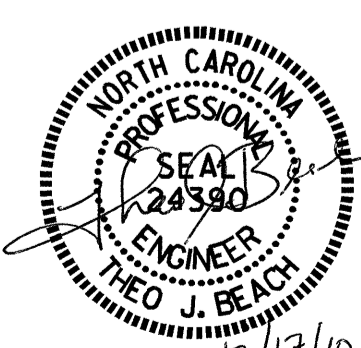
TYPICAL WING SECTION



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	11'-7"	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					2781 LBS
FOR 4 WINGS					
CLASS A CONCRETE					
4 WINGS					36.0 CY
2 HEADWALLS					1.2 CY
2 END CURTAIN WALLS					1.1 CY
TOTAL					38.3 CY

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 115+74.00 -L-

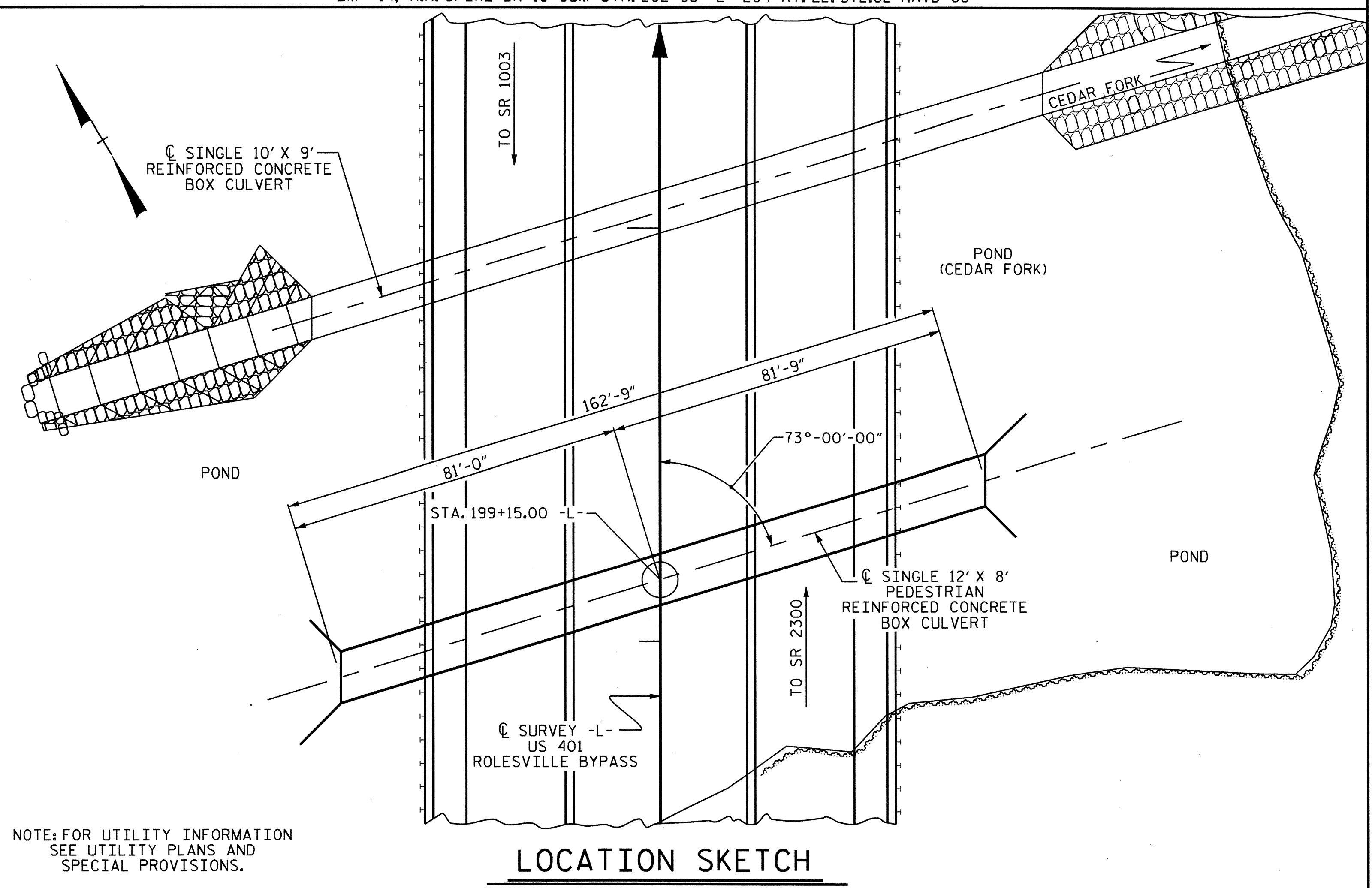
SHEET 4 OF 4
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 120° SKEW



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14
1			3			TOTAL SHEETS 29
2			4			

ASSEMBLED BY : T. BANKOVICH DATE : 10-2009
 CHECKED BY : S.B. WILLIAMS DATE : 3-2010
 DRAWN BY : CCJ 12/99
 CHECKED BY : RWW 03/00

BM #14; R.R. SPIKE IN 18" GUM STA. 202+93 -L- 204' RT. EL. 372.82 NAVD 88

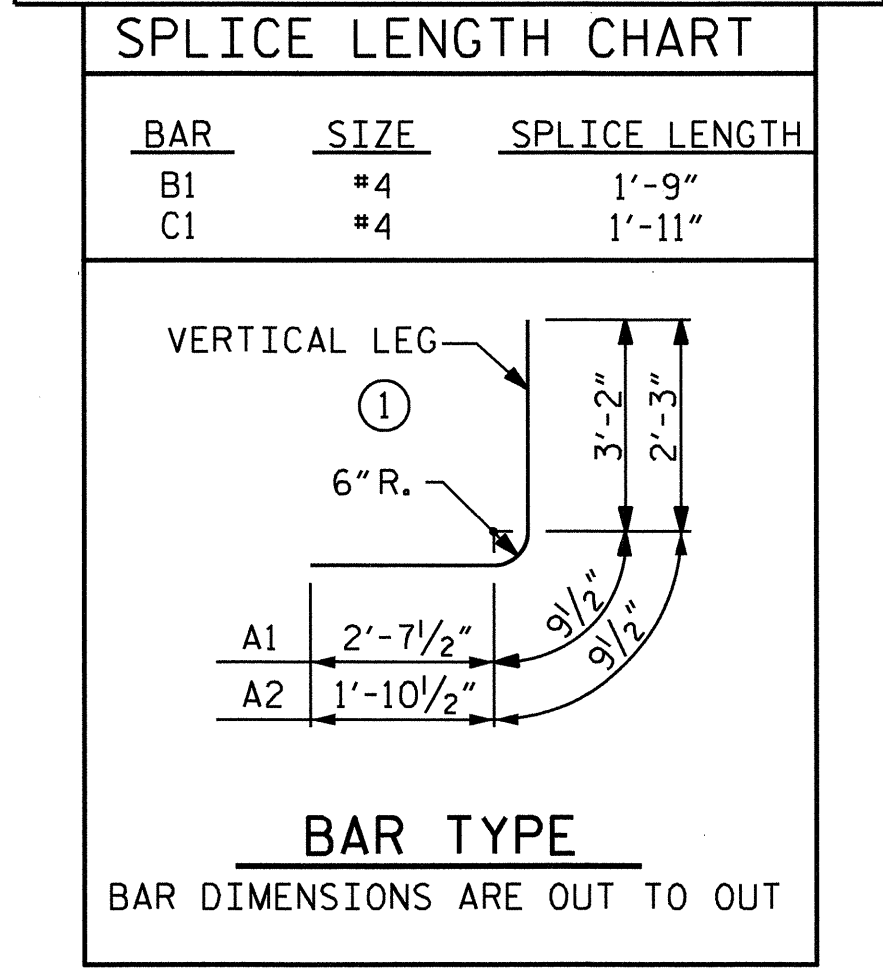


NOTE: FOR UTILITY INFORMATION
 SEE UTILITY PLANS AND
 SPECIAL PROVISIONS.

LOCATION SKETCH

REINFORCING STEEL BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	294	#6	STR	13'-1"	5777
A101	4	#6	STR	8'-7"	52
A102	4	#6	STR	4'-6"	27
A200	273	#7	STR	13'-1"	7301
A201	4	#7	STR	8'-3"	67
A202	4	#7	STR	3'-11"	32
A1	522	#5	1	6'-7"	3584
A2	522	#5	1	4'-11"	2677
B1	392	#4	STR	9'-11"	2597
B2	522	#4	STR	7'-4"	2557
C1	276	#4	STR	28'-10"	5316
G1	4	#4	STR	13'-7"	36
S2	12	#8	STR	13'-7"	435
REINFORCING STEEL				LBS.	30458



NOTES:

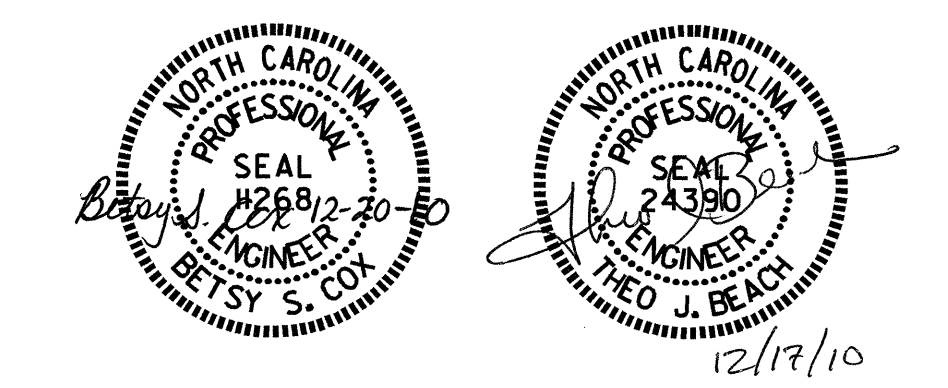
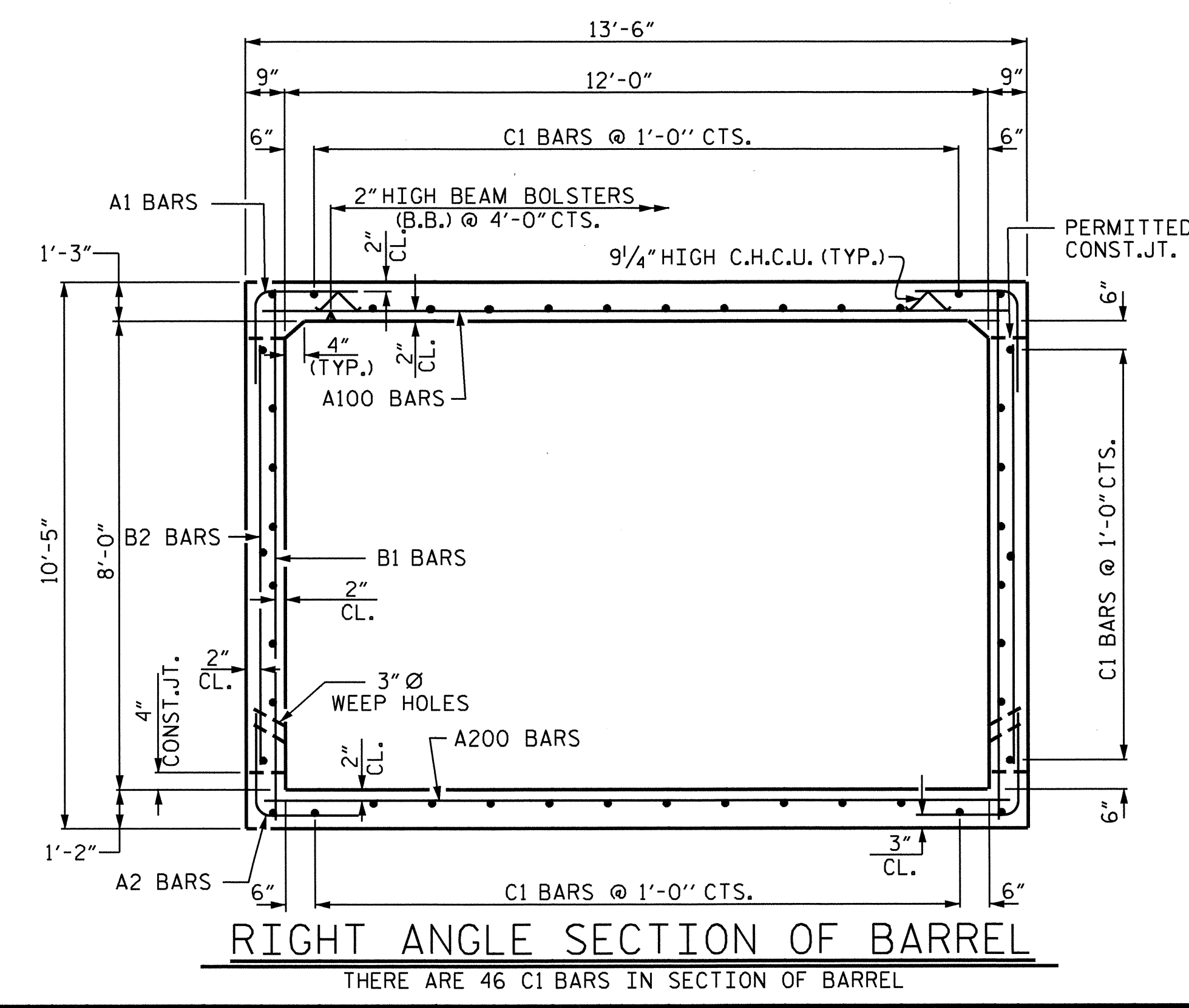
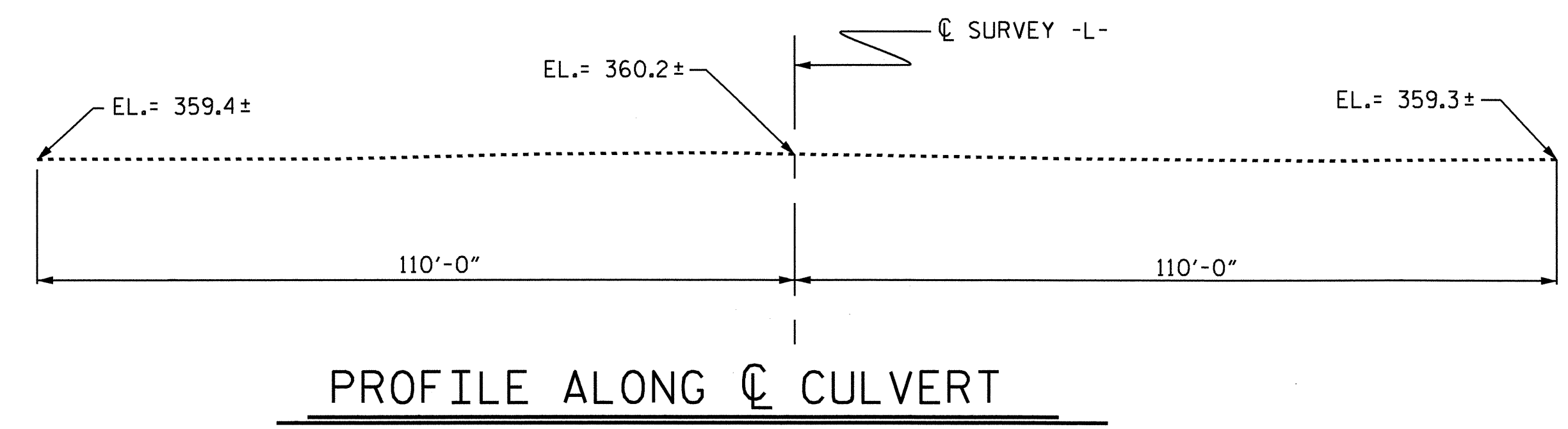
- ASSUMED LIVE LOAD -----HS20 OR ALTERNATE LOADING.
- DESIGN FILL----- 11.19'
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB 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.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- 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.
- 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.
- NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

GRADE DATA

GRADE POINT ELEV. @ STA. 199+15.00 -L- =	379.14
BED ELEV. @ STA. 199+15.00 -L- =	360.09
ROADWAY SLOPE =	2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.657 CY/FT.	269.7 C.Y.
WINGS ETC.	25.2 C.Y.
TOTAL	294.9 C.Y.
REINFORCING STEEL	
BARREL	30458 LBS.
WINGS ETC.	1547 LBS.
TOTAL	32,005 LBS.
FOUNDATION CONDITIONING MAT'L.	155 TONS
CULVERT EXCAVATION	LUMP SUM



PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 199+15.00 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

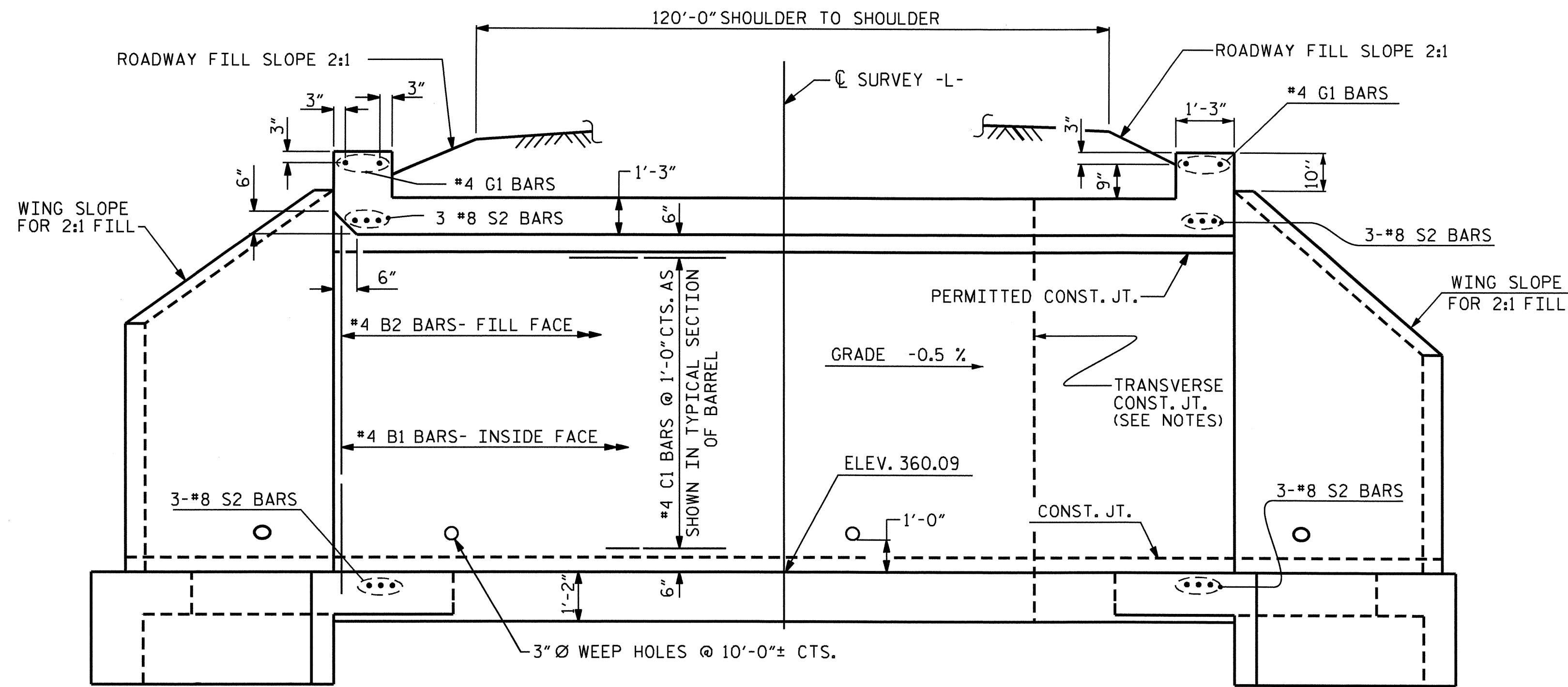
SINGLE 12 FT. X 8 FT. PEDESTRIAN CONCRETE BOX CULVERT 73° SKEW

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

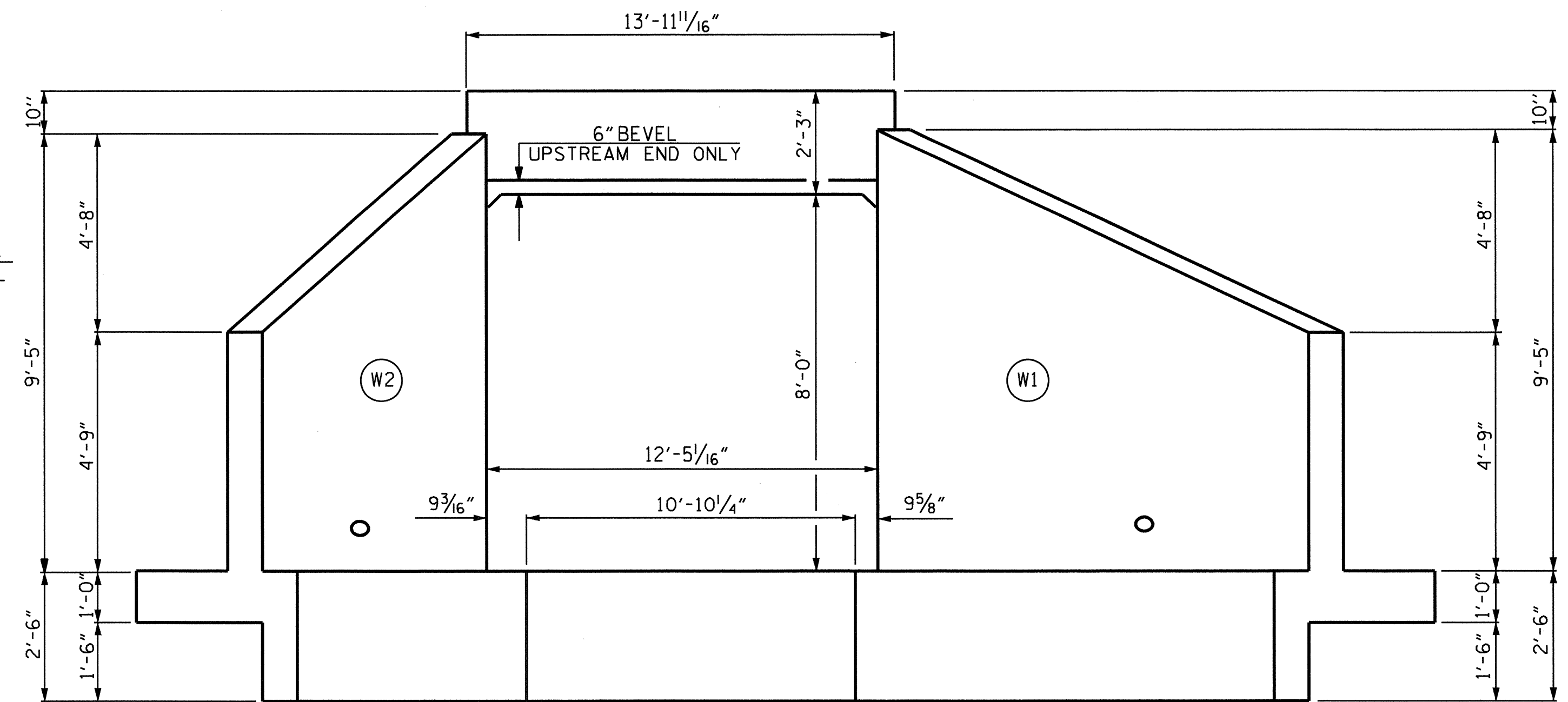
C-15			
TOTAL SHEETS 29			

REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
 ADDED 8-22-89

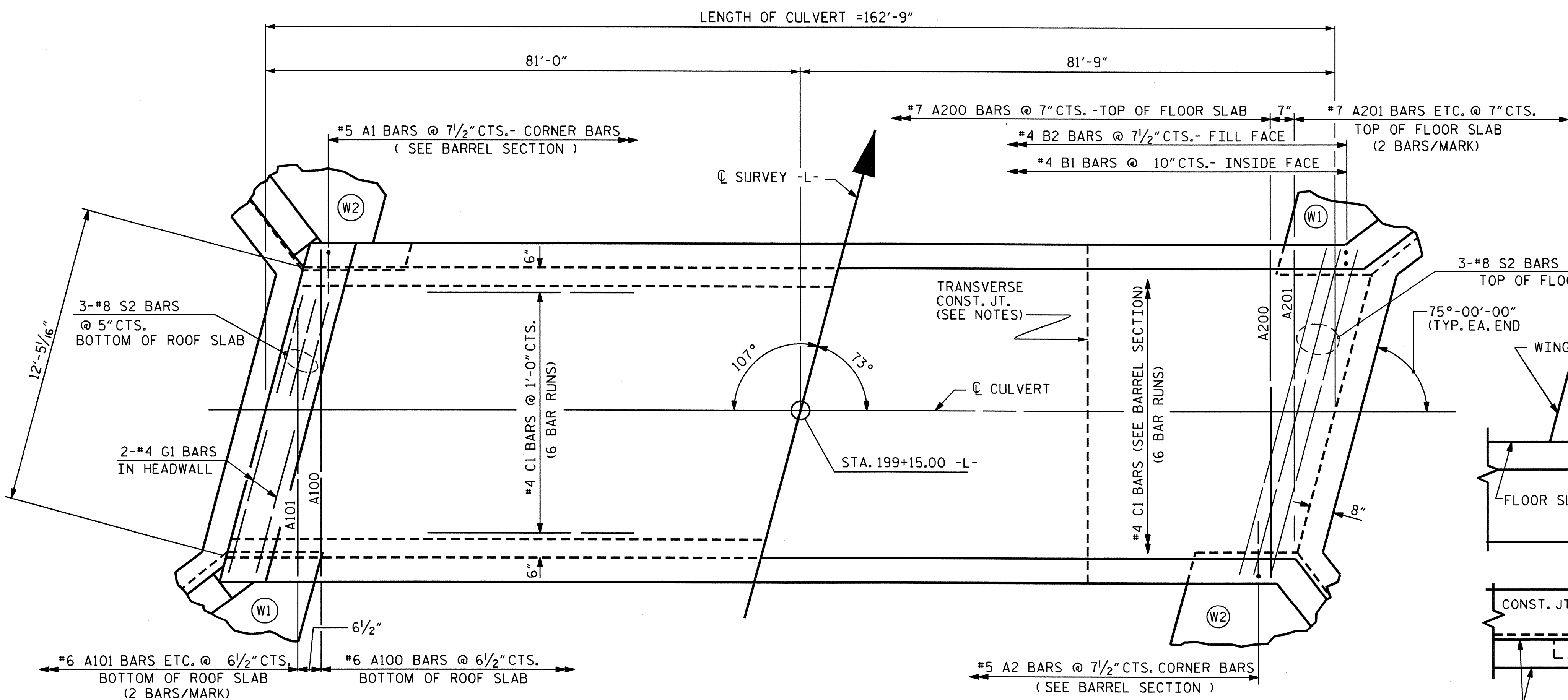
ASSEMBLED BY : S.B. WILLIAMS	DATE : 9-09	SPECIAL
CHECKED BY : T. BANKOVICH	DATE : 10-09	
DRAWN BY : R.W. WRIGHT	DATE : AUG. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	



CULVERT SECTION NORMAL TO ROADWAY

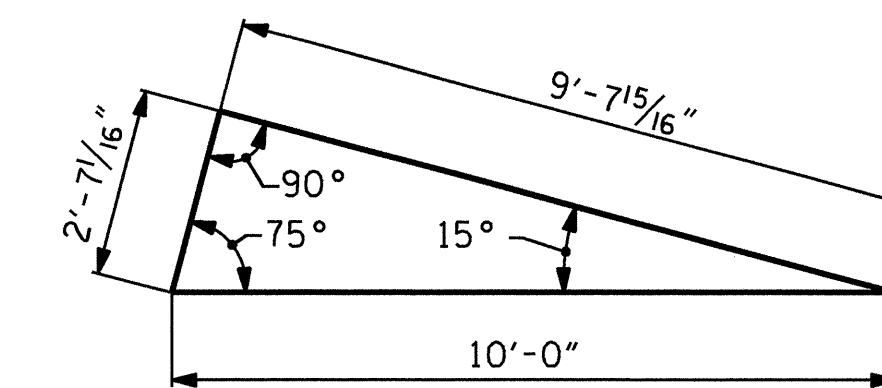


END ELEVATION NORMAL TO SKEW

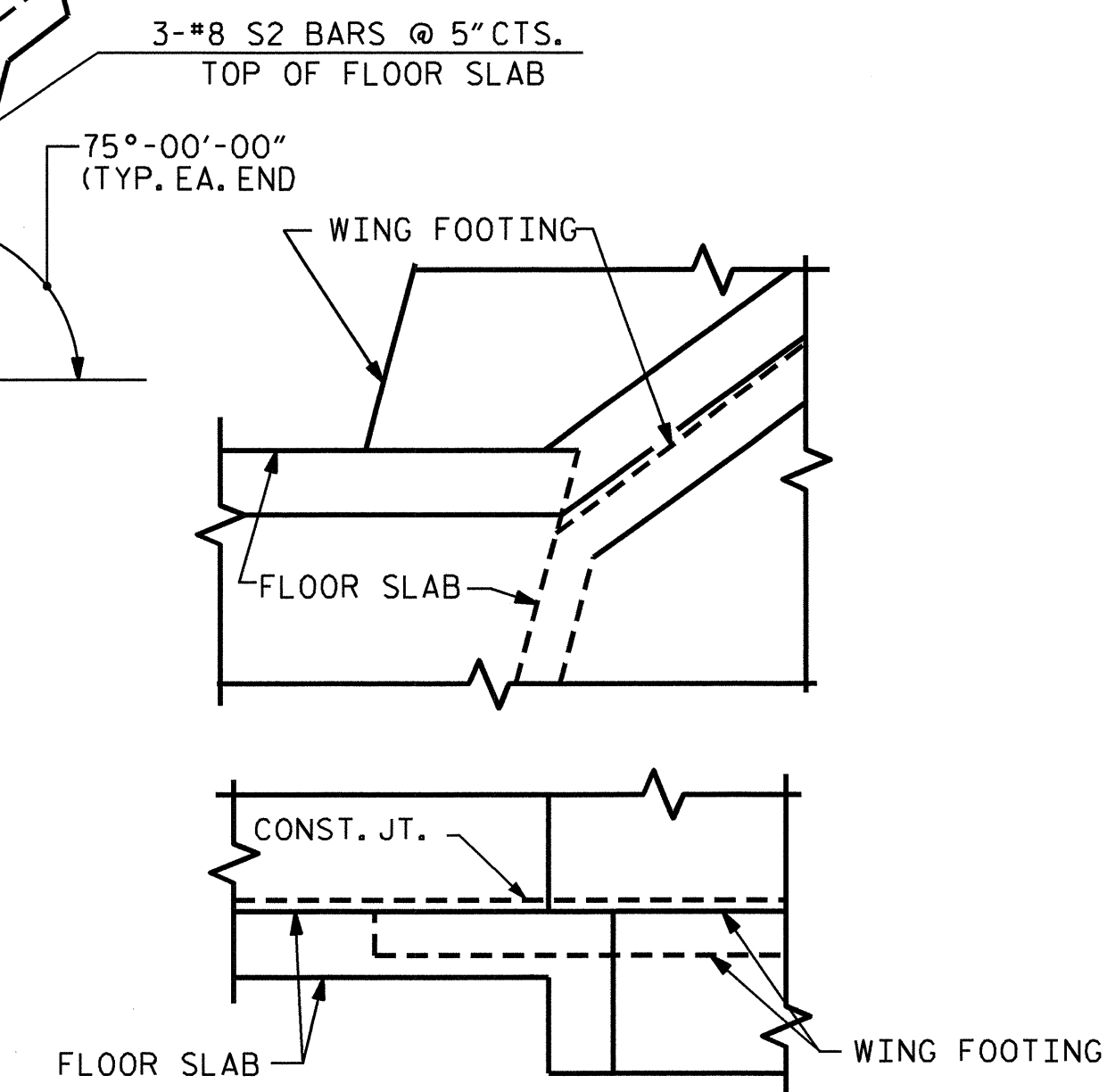


PART PLAN - ROOF SLAB

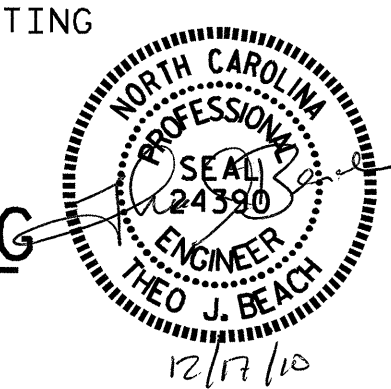
PART PLAN - FLOOR SLAB



SKEW TRIANGLE



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

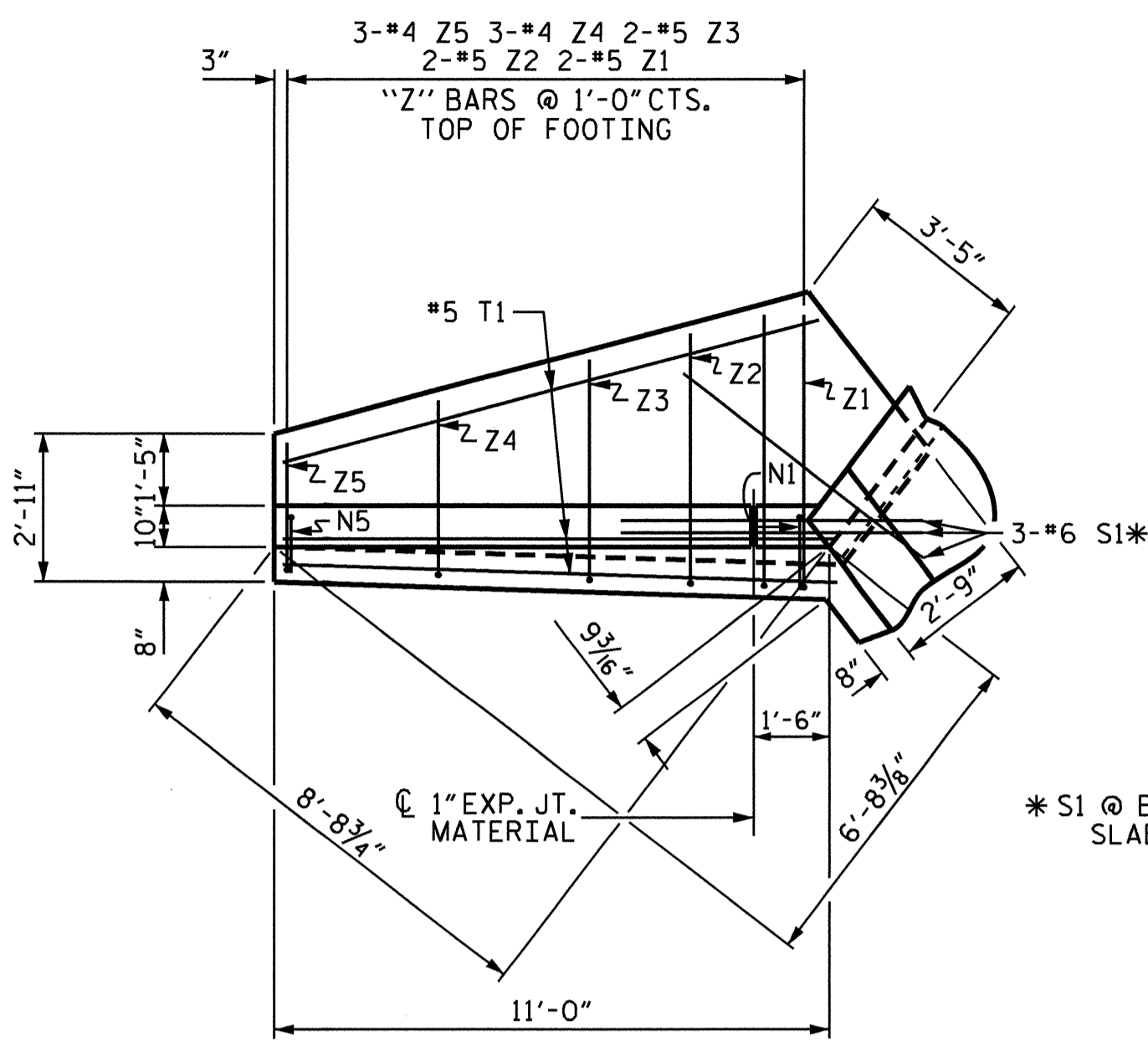


PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 199+15.00 -L-
 SHEET 2 OF 3

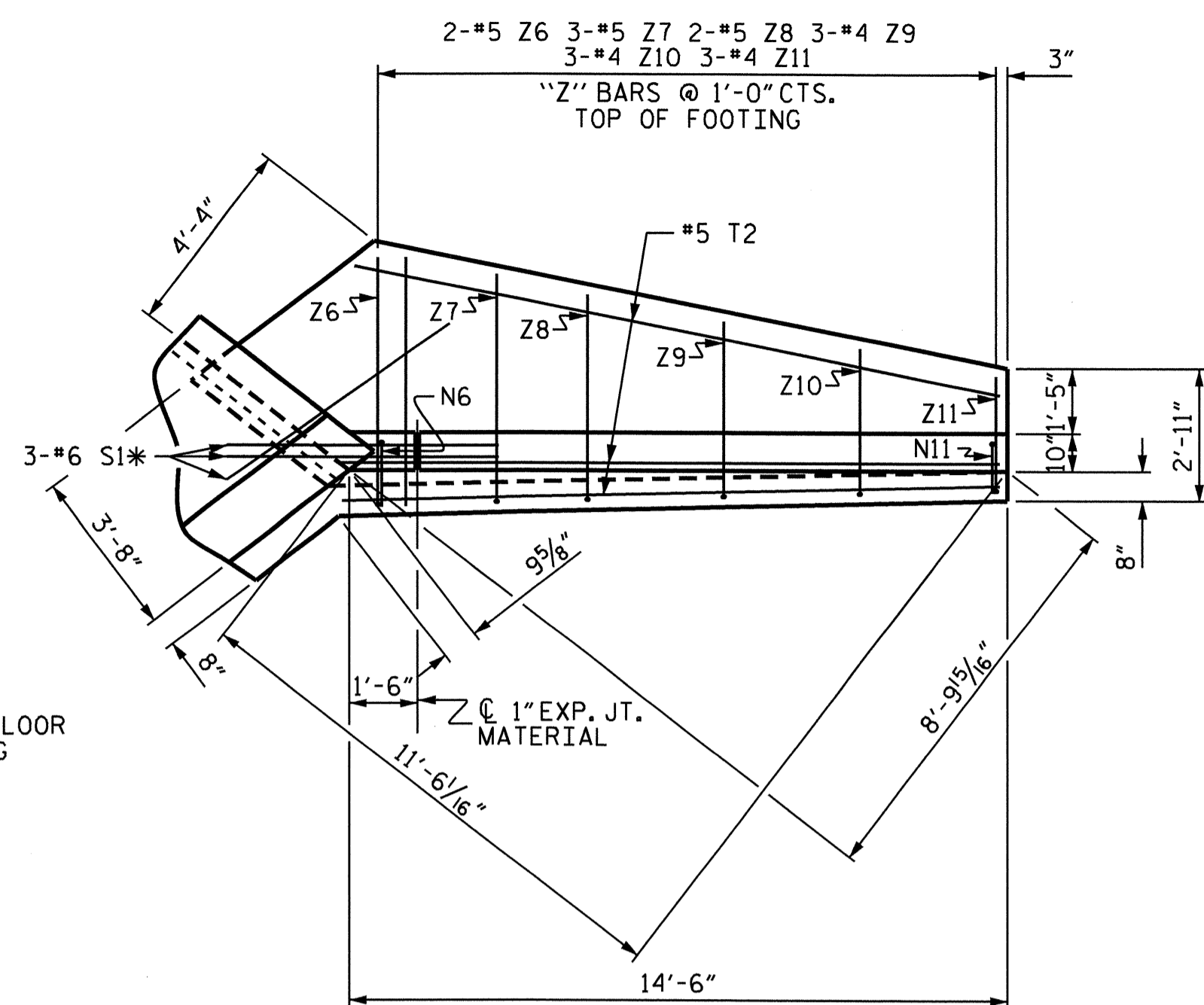
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SINGLE 12 FT. X 8 FT. PEDESTRIAN CONCRETE BOX CULVERT 73° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. C-16
					TOTAL SHEETS 29

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
 REDRAWN 8-22-89
 REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.

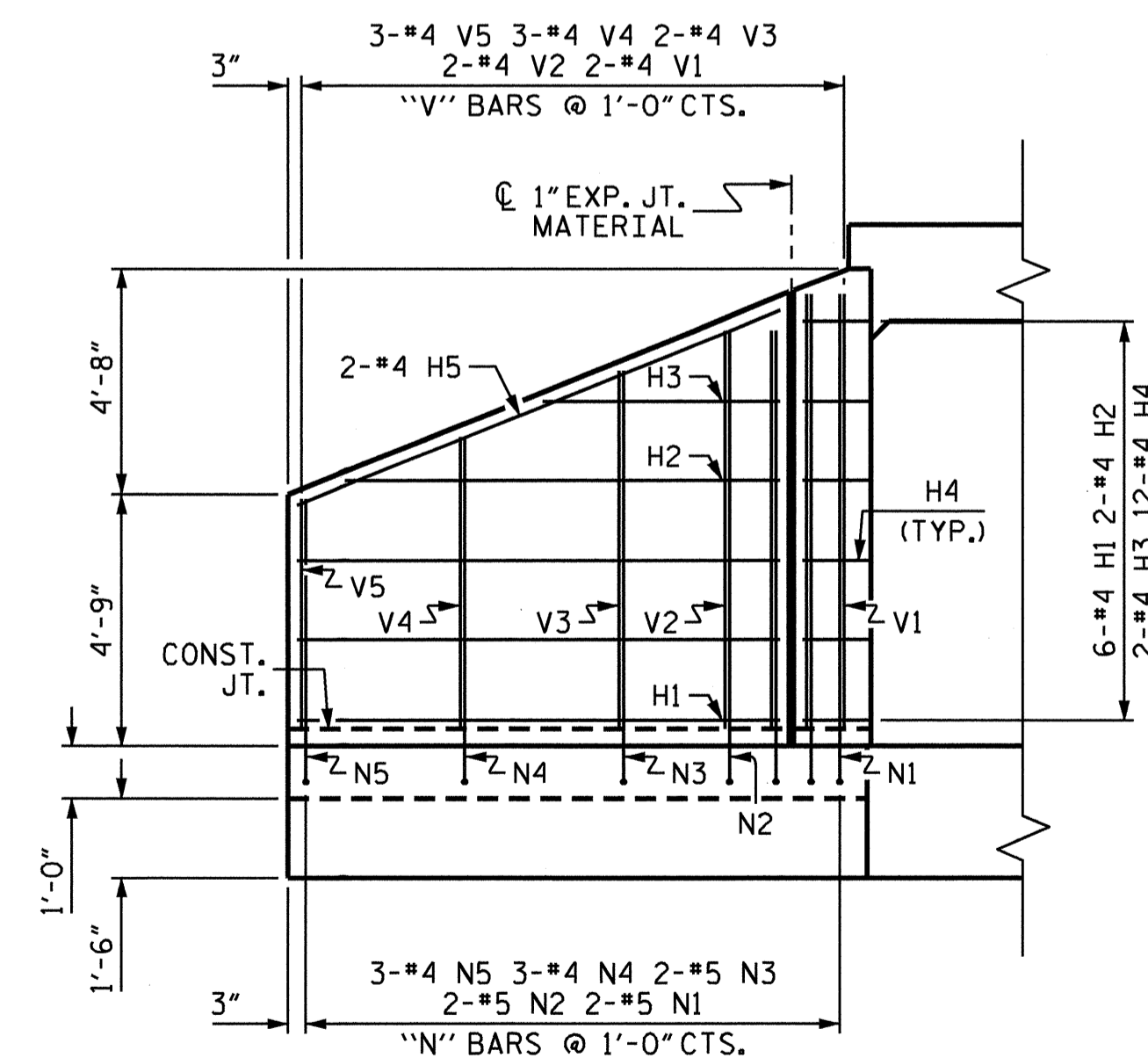
ASSEMBLED BY : S.B. WILLIAMS	DATE : 9-09	SPECIAL
CHECKED BY : T. BANKOVICH	DATE : 9-09	
DRAWN BY : S.A. TEDDER	DATE : AUG. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	



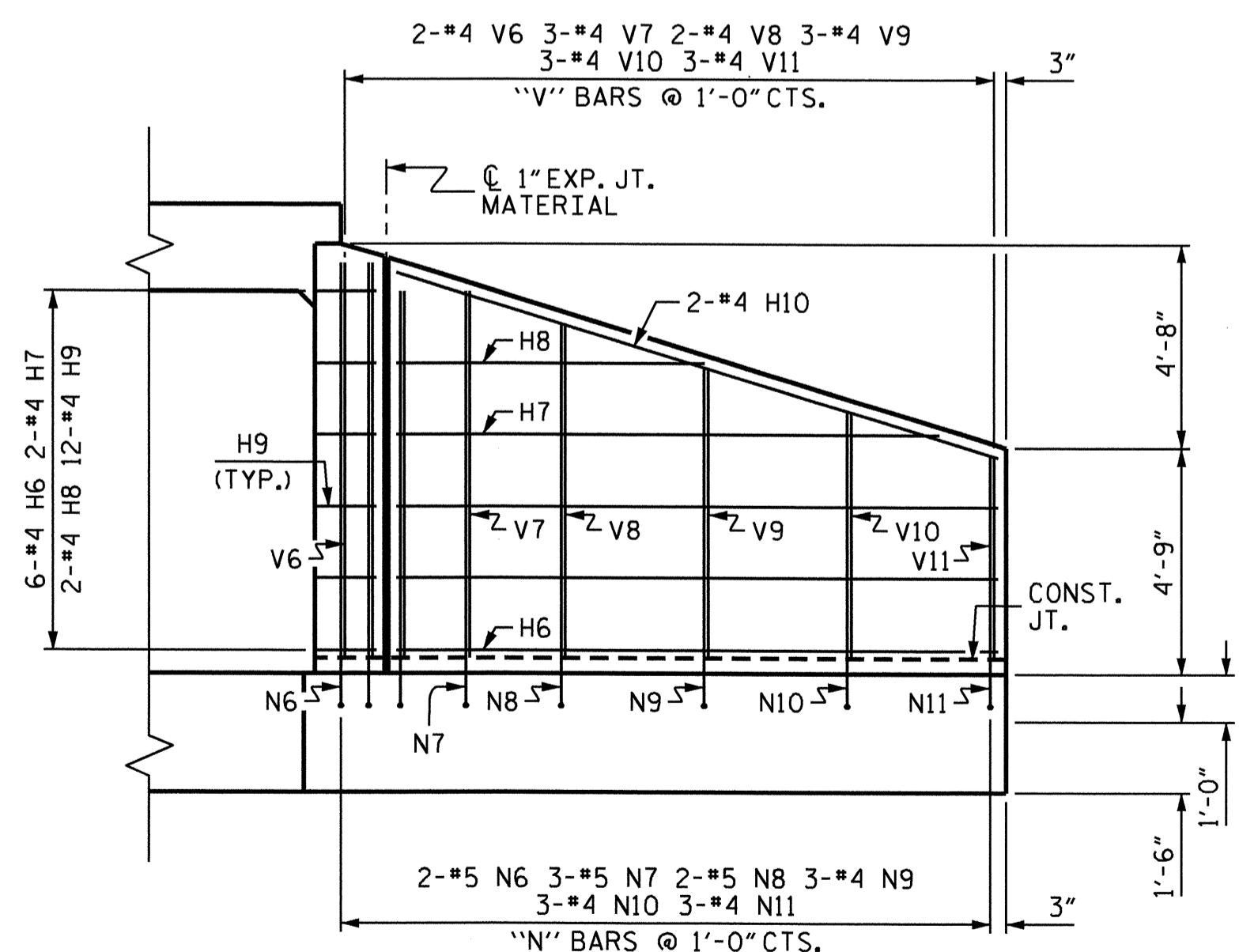
PLAN W2



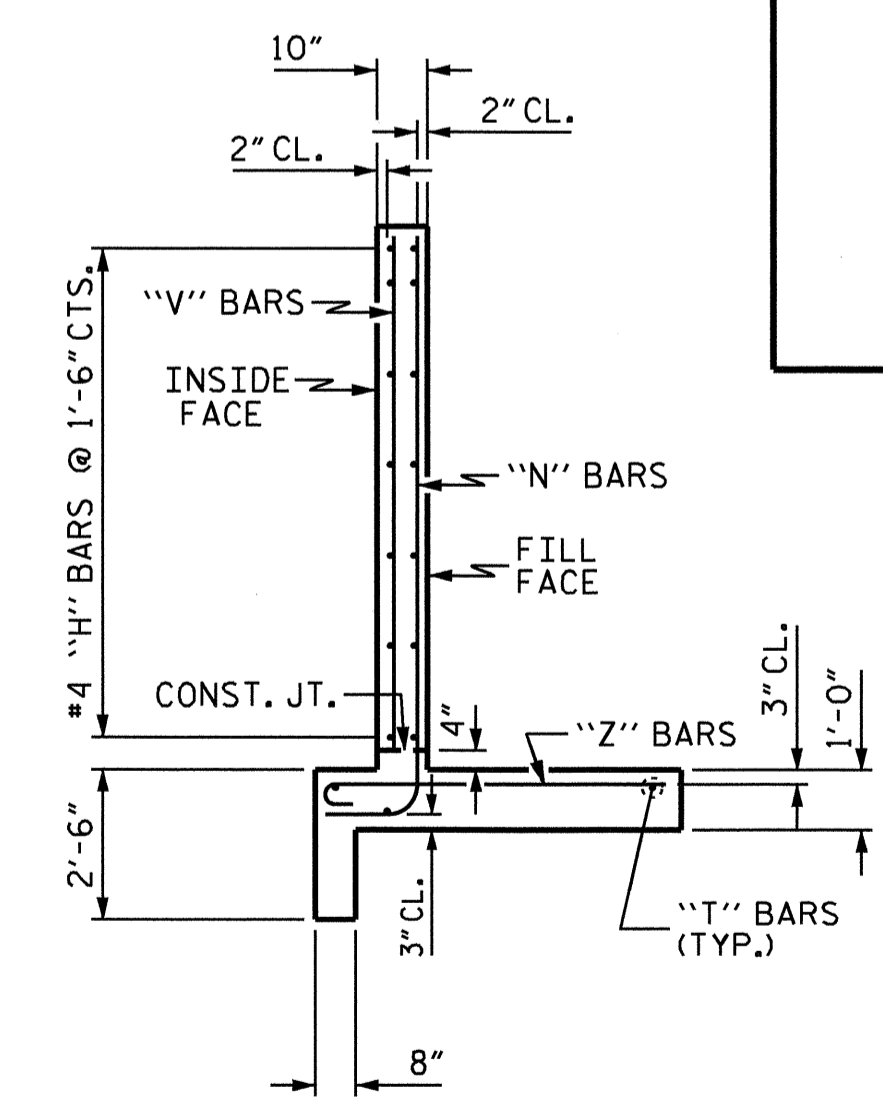
PLAN W1



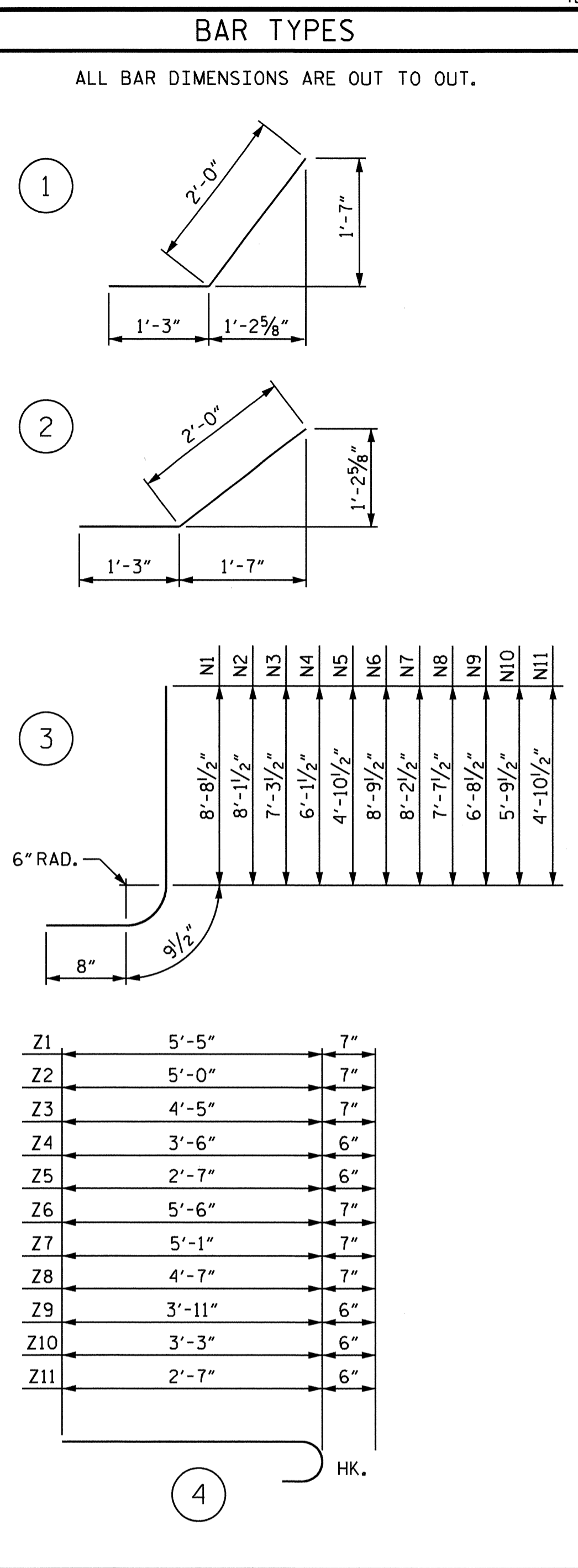
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

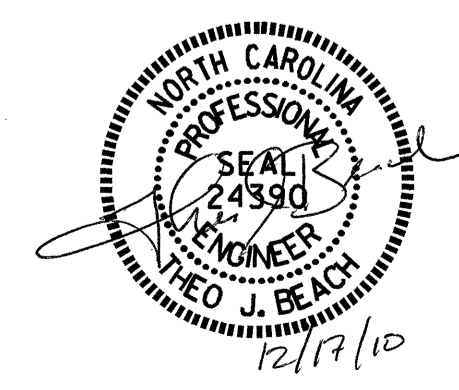


BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	12	#4	STR	9'-1"	73
H2	4	#4	STR	8'-2"	22
H3	4	#4	STR	4'-5"	12
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	9'-10"	26
H6	12	#4	STR	12'-7"	101
H7	4	#4	STR	11'-4"	30
H8	4	#4	STR	6'-5"	17
H9	24	#4	2	3'-3"	52
H10	4	#4	STR	13'-2"	35
N1	4	#5	3	10'-2"	42
N2	4	#5	3	9'-7"	40
N3	4	#5	3	8'-9"	37
N4	6	#4	3	7'-7"	30
N5	6	#4	3	6'-4"	25
N6	4	#5	3	10'-3"	43
N7	6	#5	3	9'-8"	60
N8	4	#5	3	9'-1"	38
N9	6	#4	3	8'-2"	33
N10	6	#4	3	7'-3"	29
N11	6	#4	3	6'-4"	25
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	11'-0"	69
T2	6	#5	STR	14'-6"	91
V1	4	#4	STR	8'-2"	22
V2	4	#4	STR	7'-6"	20
V3	4	#4	STR	6'-9"	18
V4	6	#4	STR	5'-6"	22
V5	6	#4	STR	4'-4"	17
V6	4	#4	STR	8'-3"	22
V7	6	#4	STR	7'-8"	31
V8	4	#4	STR	7'-0"	19
V9	6	#4	STR	6'-1"	24
V10	6	#4	STR	5'-2"	21
V11	6	#4	STR	4'-3"	17
Z1	4	#5	4	6'-0"	25
Z2	4	#5	4	5'-7"	23
Z3	4	#5	4	5'-0"	21
Z4	6	#4	4	4'-0"	16
Z5	6	#4	4	3'-1"	12
Z6	4	#5	4	6'-1"	25
Z7	6	#5	4	5'-8"	35
Z8	4	#5	4	5'-2"	22
Z9	6	#4	4	4'-5"	18
Z10	6	#4	4	3'-9"	15
Z11	6	#4	4	3'-1"	12
REINFORCING STEEL FOR 4 WINGS				1547 LBS	
CLASS A CONCRETE				22.6 CY	
4 WINGS				22.6 CY	
2 HEADWALLS				1.3 CY	
2 END CURTAIN WALLS				1.3 CY	
TOTAL				25.2 CY	

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 199+15.00 -L-

SHEET 3 OF 3

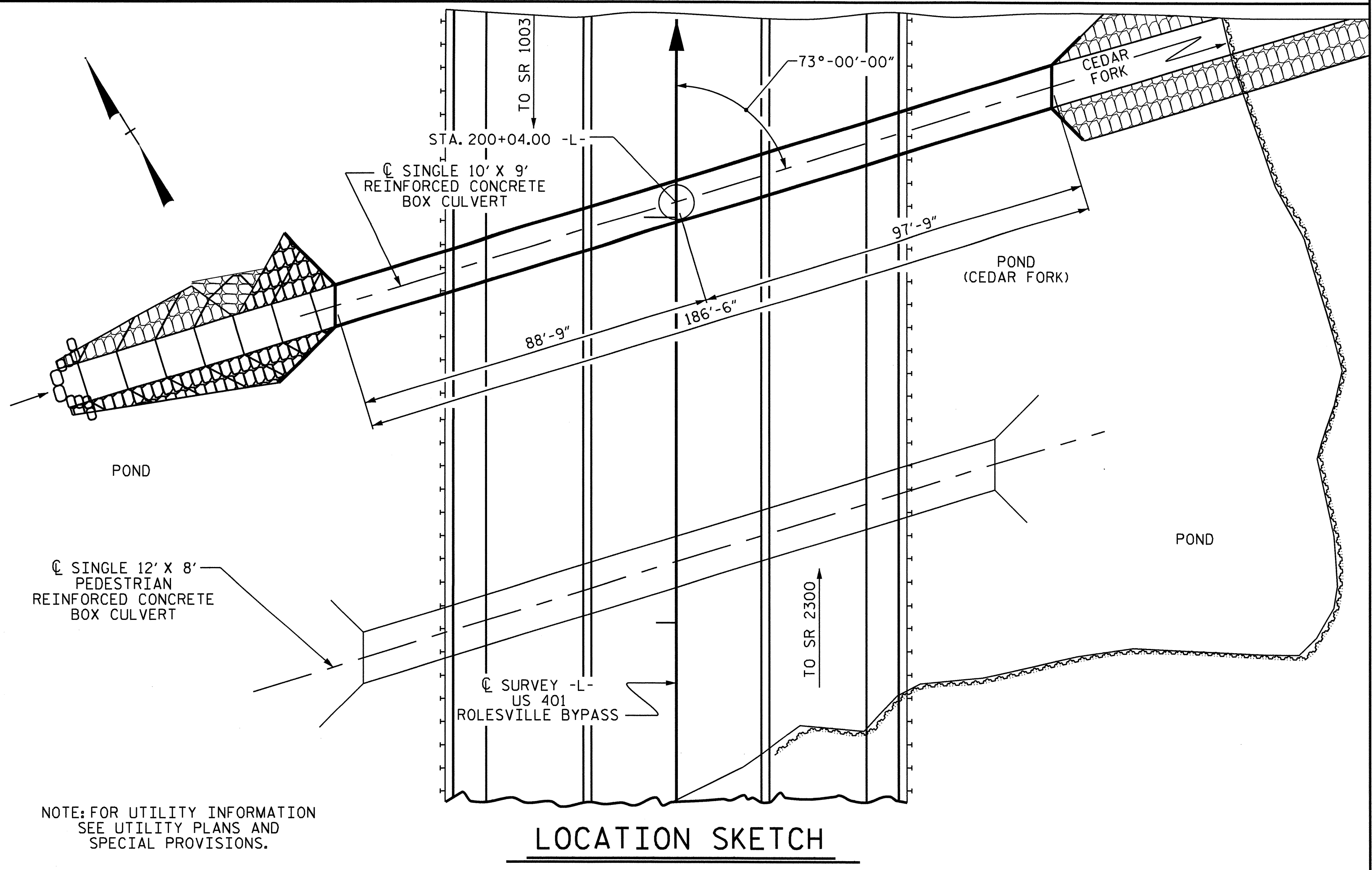
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS FOR CONCRETE BOX CULVERT
 H = 8'-0" SLOPE = 2:1
 75° SKEW



ASSEMBLED BY: S.B. WILLIAMS DATE: 9-09
 CHECKED BY: T. BANKOVICH DATE: 9-09
 DRAWN BY: CCJ 01/00
 CHECKED BY: RWW 03/00

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-17
1			3			TOTAL SHEETS
2			4			29

BM #14; R. R. SPIKE IN 18" GUM STA. 202+93 -L- 204' RT. EL. 372.82 NAVD 88



NOTE: FOR UTILITY INFORMATION SEE UTILITY PLANS AND SPECIAL PROVISIONS.

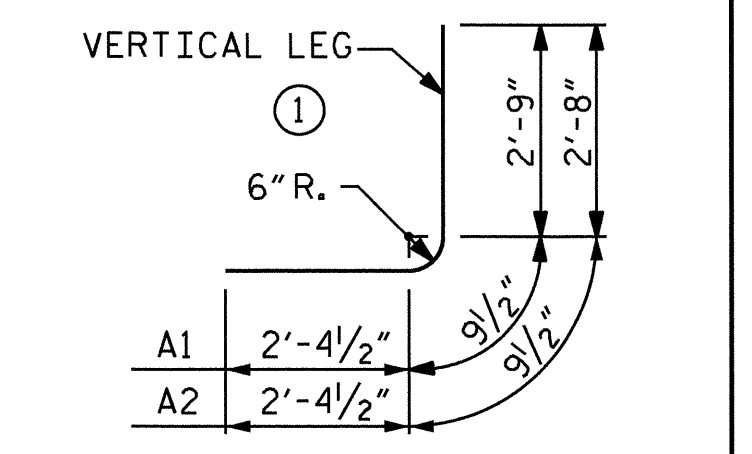
LOCATION SKETCH

REINFORCING STEEL BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	315	#7	STR	10'-11"	7029
A101	4	#7	STR	6'-1"	50
A200	339	#7	STR	10'-11"	7564
A201	4	#7	STR	6'-5"	52
A202	4	#7	STR	2'-4"	19
A1	560	#6	1	5'-11"	4977
A2	560	#6	1	5'-10"	4907
B1	640	#4	STR	10'-6"	4489
B2	560	#5	STR	8'-4"	4867
C1	399	#4	STR	28'-5"	7574
D1	20	#6	STR	1'-7"	48
D2	30	#6	STR	1'-1"	49
G1	4	#4	STR	11'-4"	30
S2	12	#8	STR	11'-4"	363
F1	38	#4	STR	7'-3"	184
REINFORCING STEEL				LBS.	42202

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
B1	#4	1'-9"
C1	#4	1'-11"



BAR TYPE
BAR DIMENSIONS ARE OUT TO OUT

NOTES:

- ASSUMED LIVE LOAD -----HS20 ALTERNATE LOADING.
- DESIGN FILL----- 17.01'
- 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, BAFFLES AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTHCHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- 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.
- 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.
- NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 900 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 364.1
DRAINAGE AREA	= 430 ACRES
BASIC DISCHARGE (Q100)	= 1000 CFS
BASIC HIGH WATER ELEVATION	= 364.6

OVERTOPPING FLOOD DATA

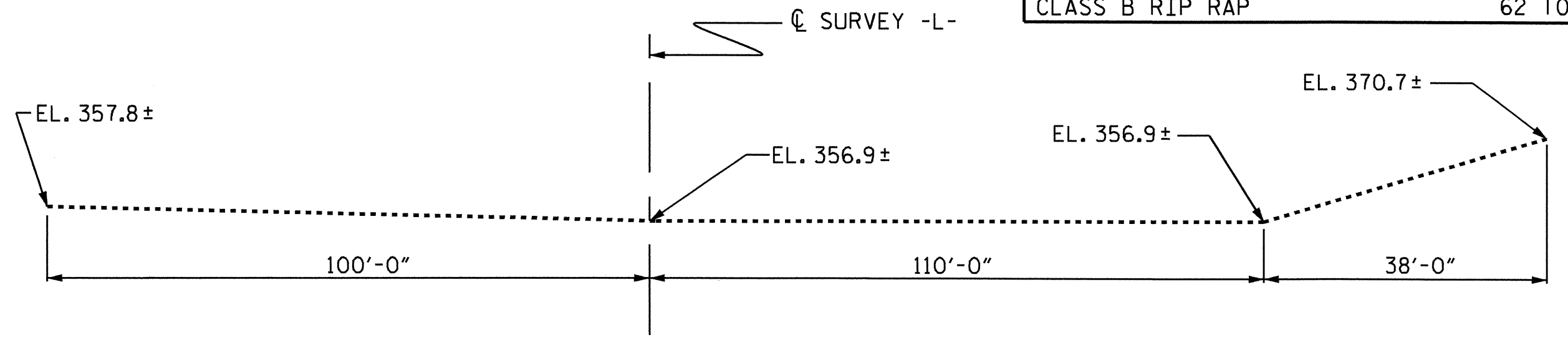
OVERTOPPING DISCHARGE	= 3,611 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500 YRS.±
OVERTOPPING FLOOD ELEVATION	= 378.7

GRADE DATA

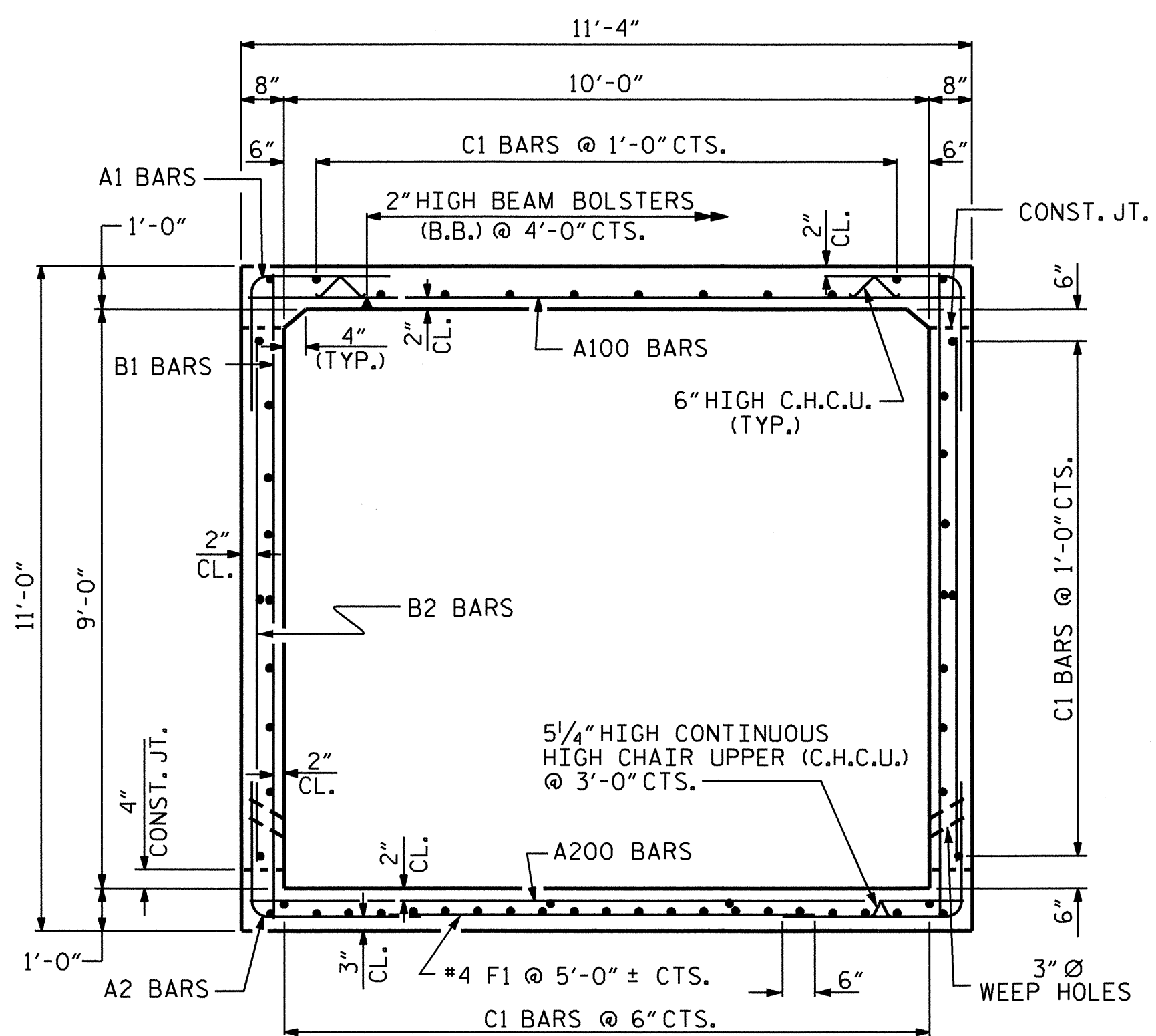
GRADE POINT ELEV. @ STA. 200+04.00 -L- = 378.61
BED ELEV. @ STA. 200+04.00 -L- = 353.23
ROADWAY SLOPE = 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.288 CY/FT	240.2 C.Y.
BAFFLES	2.4 C.Y.
WING ETC.	29.8 C.Y.
TOTAL	272.4 C.Y.
REINFORCING STEEL	
BARREL & BAFFLES	42,202 LBS.
WINGS ETC.	1,957 LBS.
TOTAL	44,159 LBS.
FOUNDATION CONDITIONING MAT'L.	149 TONS
CULVERT EXCAVATION	LUMP SUM
CLASS B RIP RAP	62 TONS

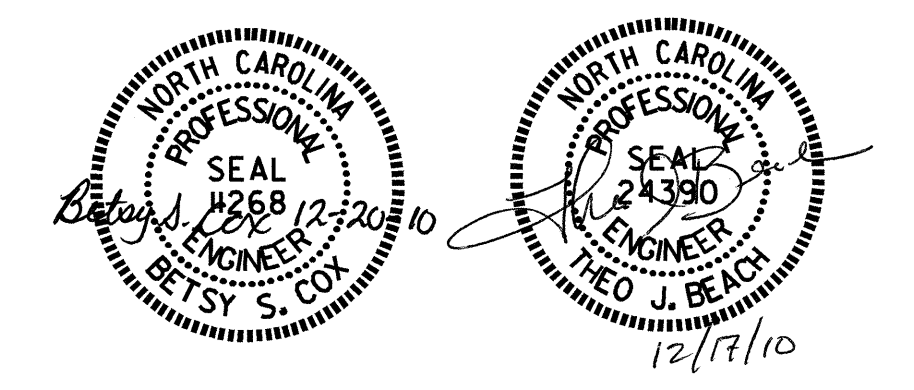


PROFILE ALONG CULVERT



RIGHT ANGLE SECTION OF BARREL

THERE ARE 57 "C" BARS IN SECTION OF BARREL



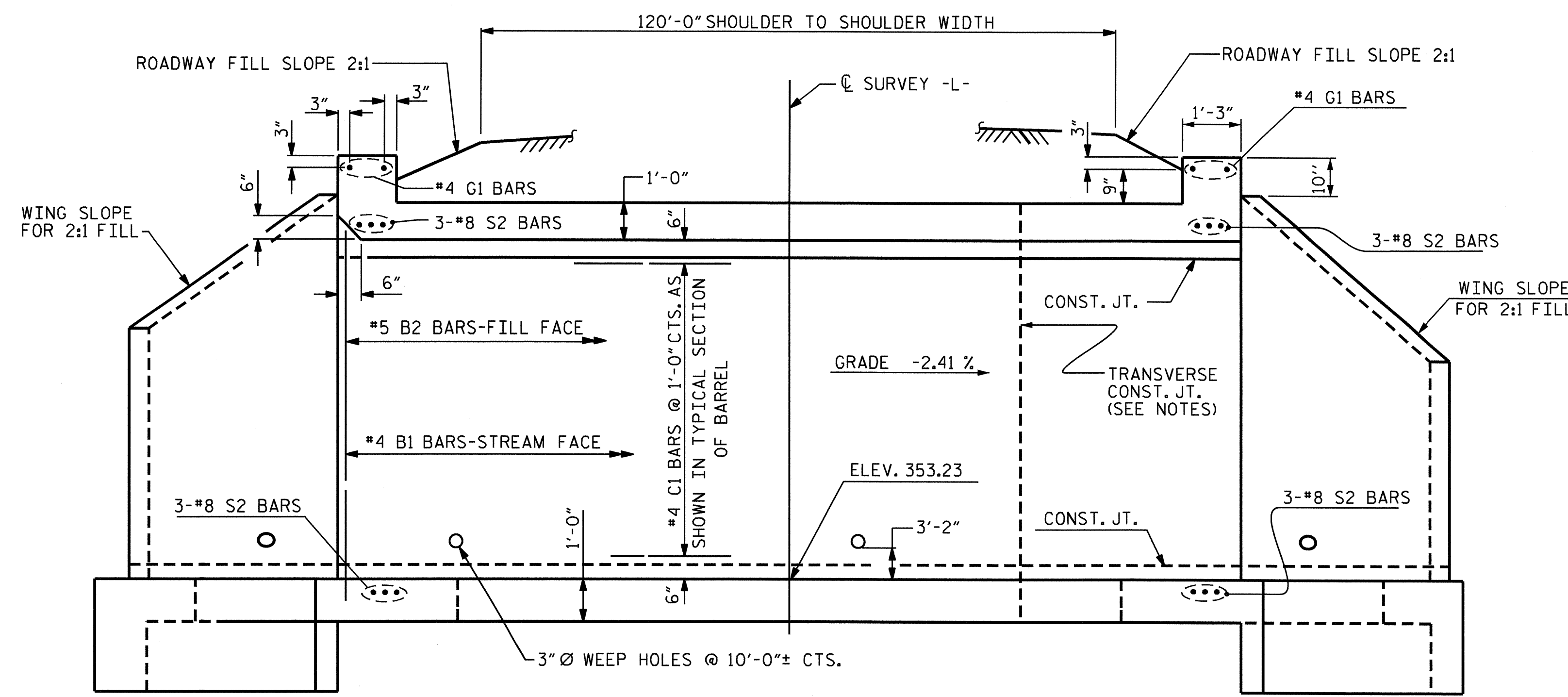
PROJECT NO. R-2814B
WAKE COUNTY
STATION: 200+04.00 -L-

SHEET 1 OF 4

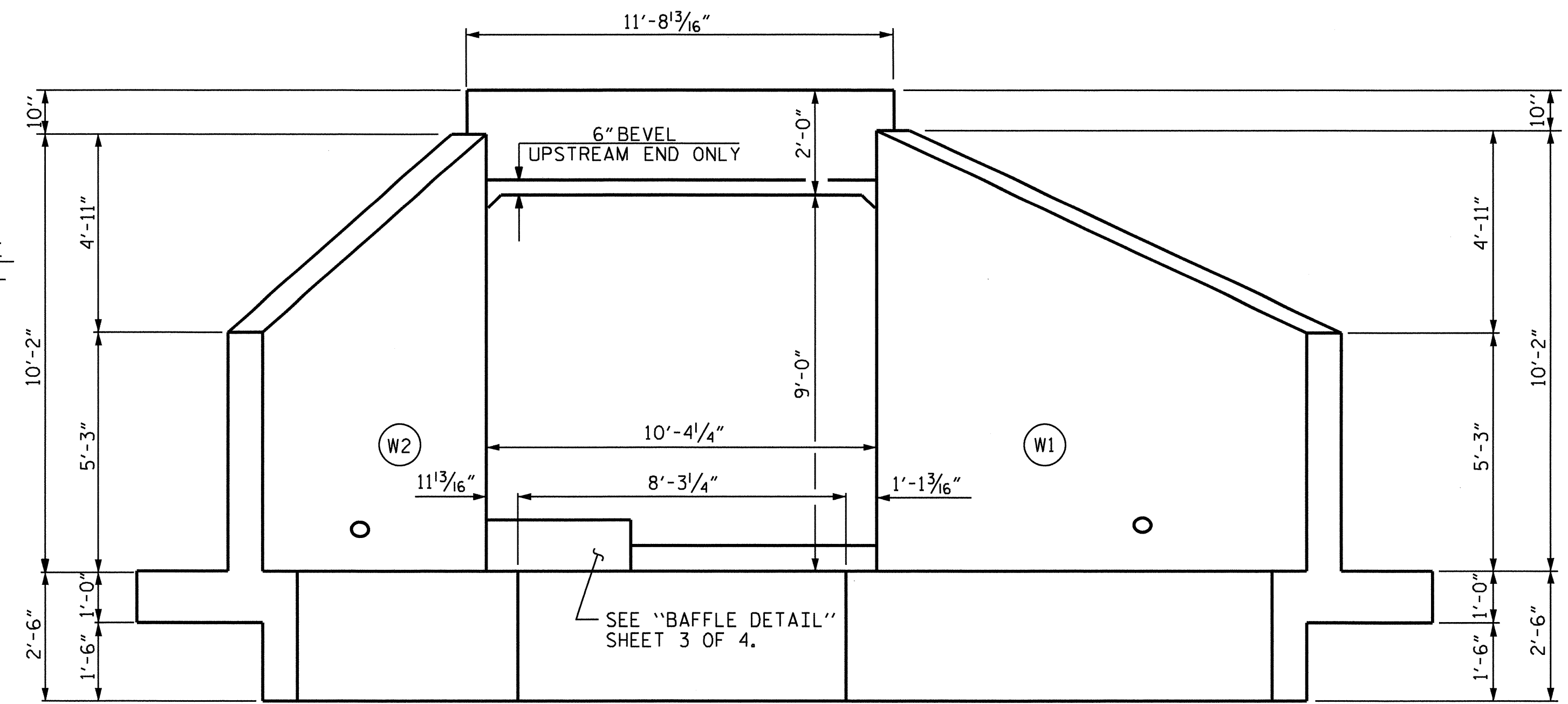
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BARREL STANDARD SINGLE 10 FT. X 9 FT. CONCRETE BOX CULVERT 73° SKEW					
AUGUST 1989					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
ADDED 8-22-89

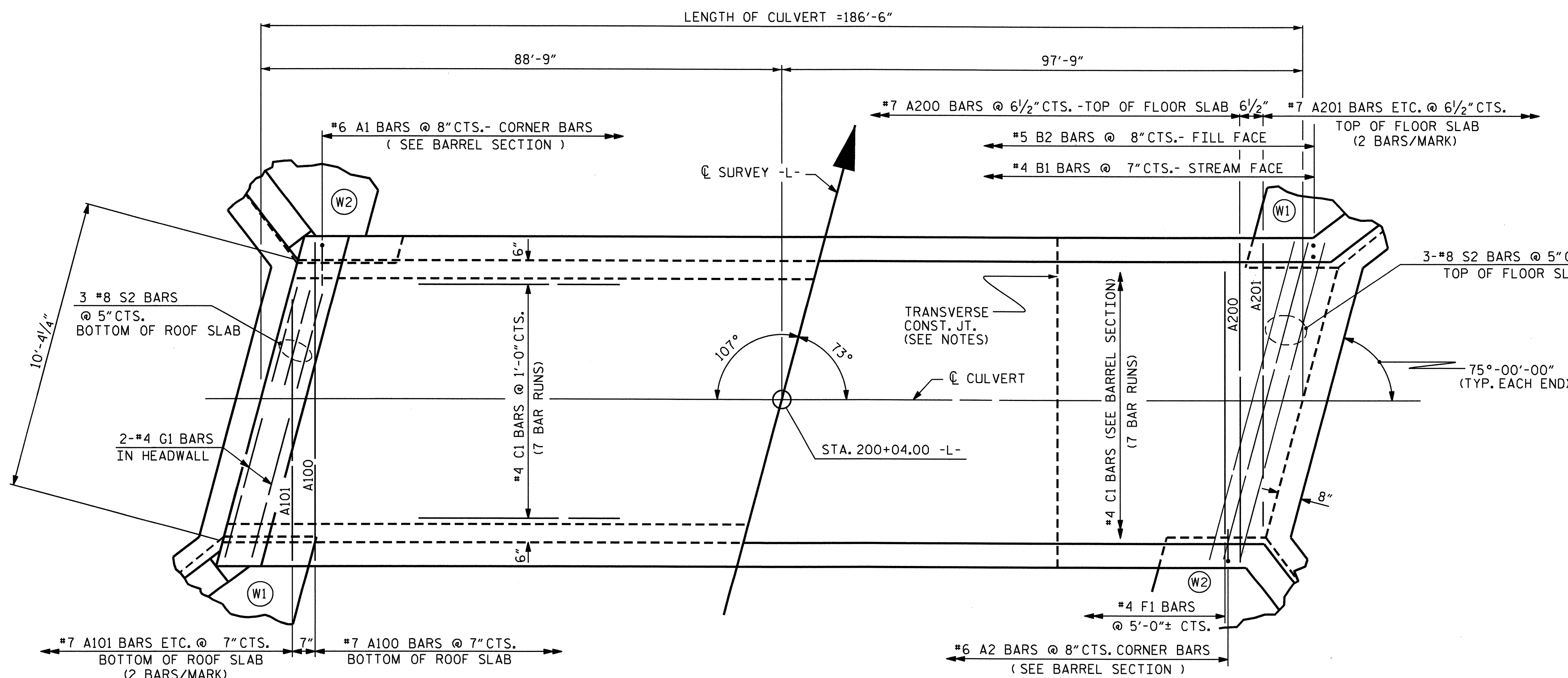
ASSEMBLED BY: S.B. WILLIAMS	DATE: 9-09	SPECIAL
CHECKED BY: T. BANKOVICH	DATE: 9-09	
DRAWN BY: R.W. WRIGHT	DATE: AUG. 1989	STANDARD
CHECKED BY: A.R. BISSETTE	DATE: AUG. 1989	



CULVERT SECTION NORMAL TO ROADWAY

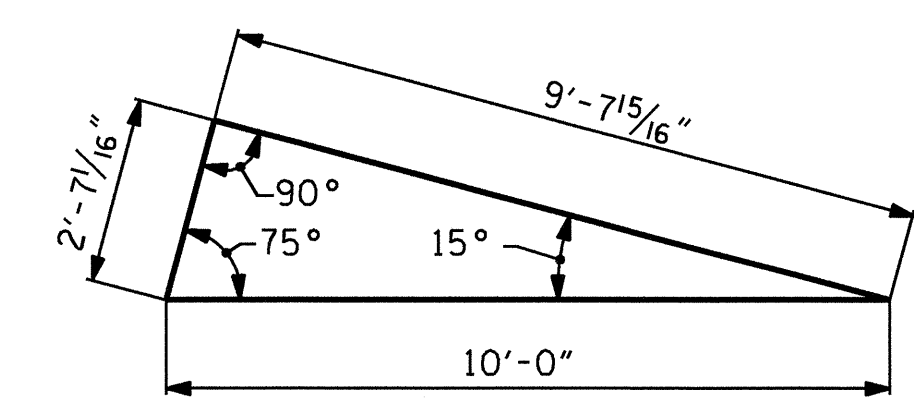


END ELEVATION NORMAL TO SKEW



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

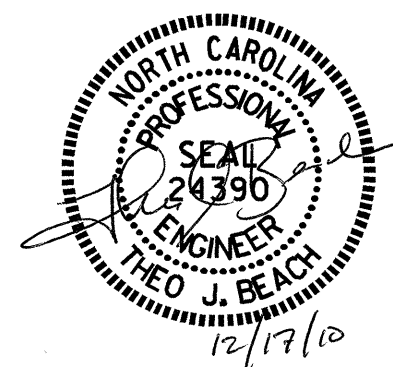


SKEW TRIANGLE

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 200+04.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**BARREL STANDARD
 SINGLE 10 FT. X 9 FT.
 CONCRETE BOX CULVERT
 73° SKEW**

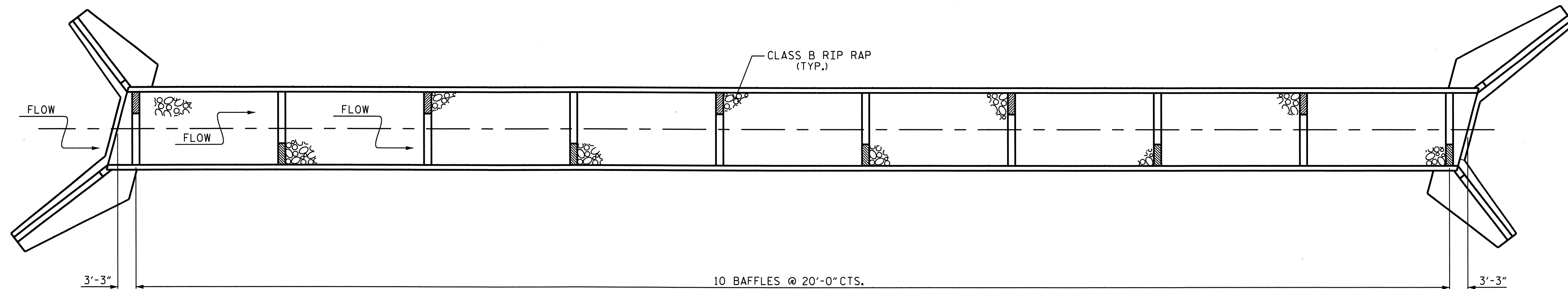


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-19
1			3			TOTAL SHEETS 29
2			4			

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
 REDRAWN 8-22-89
 REVISED 11-9-99 BY M.M. CHECKED BY R.W.W.

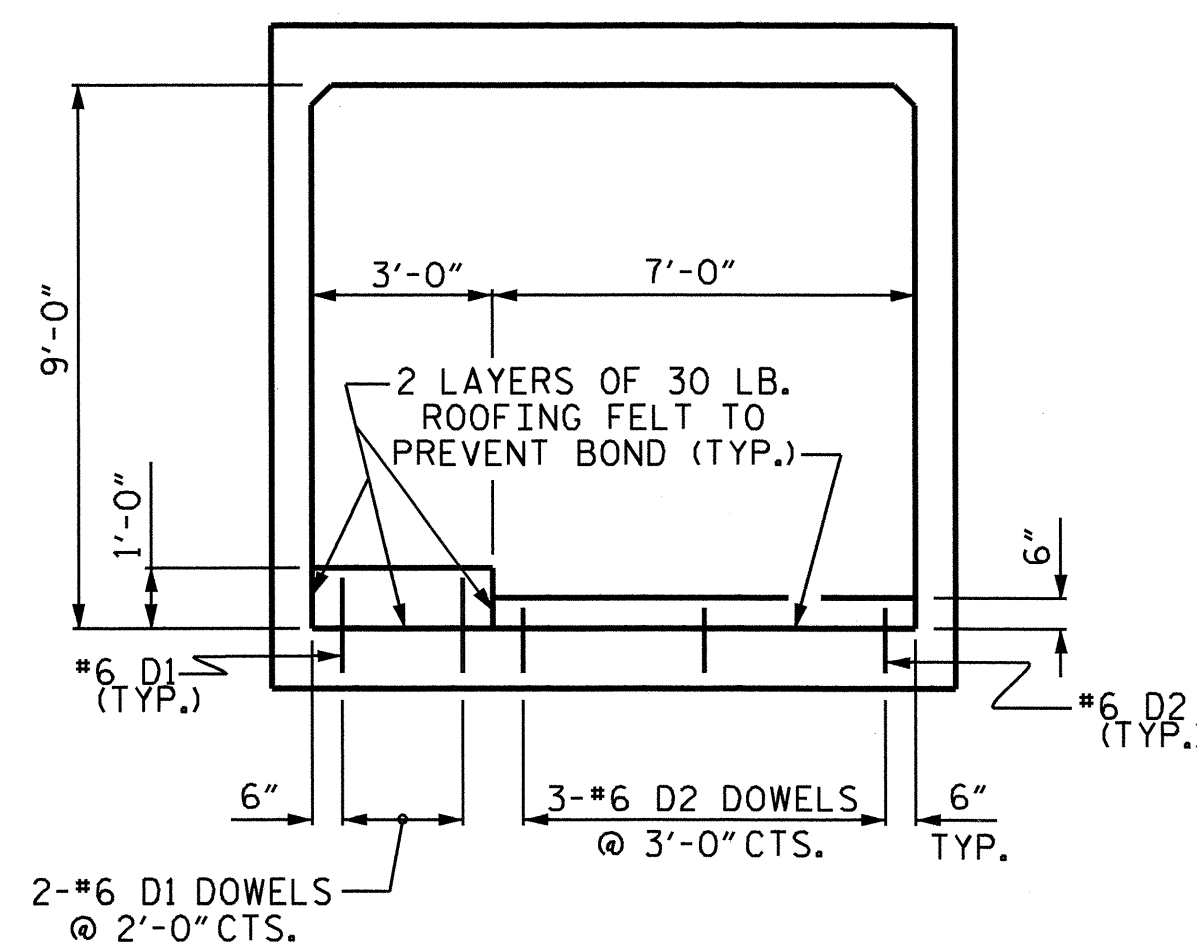
ASSEMBLED BY: S.B. WILLIAMS DATE: 9-09
 CHECKED BY: T. BANKOVICH DATE: 10-09
 DRAWN BY: S. A. TEDDER DATE: AUG. 1989
 CHECKED BY: A.R. BISSETTE DATE: AUG. 1989

SPECIAL
STANDARD



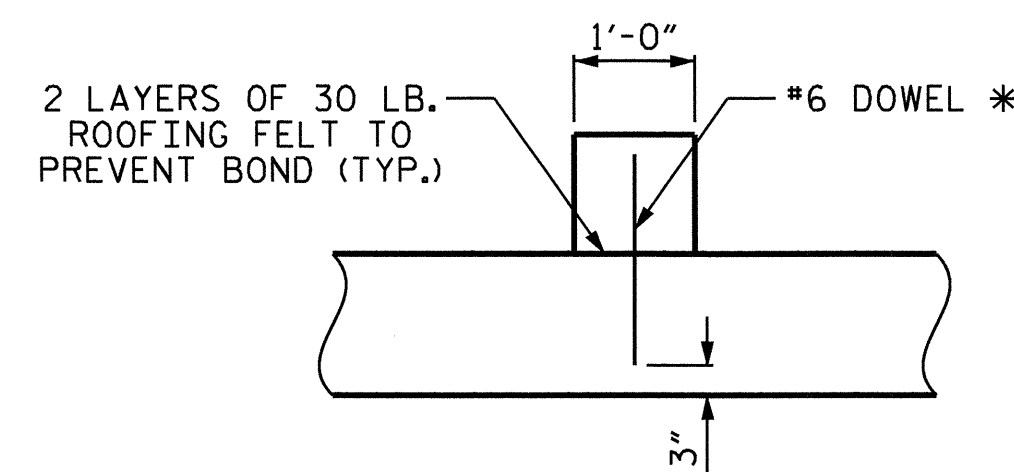
BAFFLE DETAIL - TOP VIEW

BED MATERIAL PLACED BETWEEN SILLS IN CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER THAN 6 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY ENGINEER. PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION.



CULVERT BAFFLE DETAILS

ALTERNATE HIGH AND LOW SIDE OF BAFFLE TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT



SECTION THRU BAFFLE

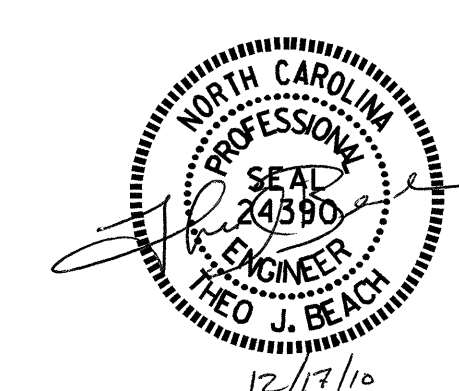
*DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 200+04.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

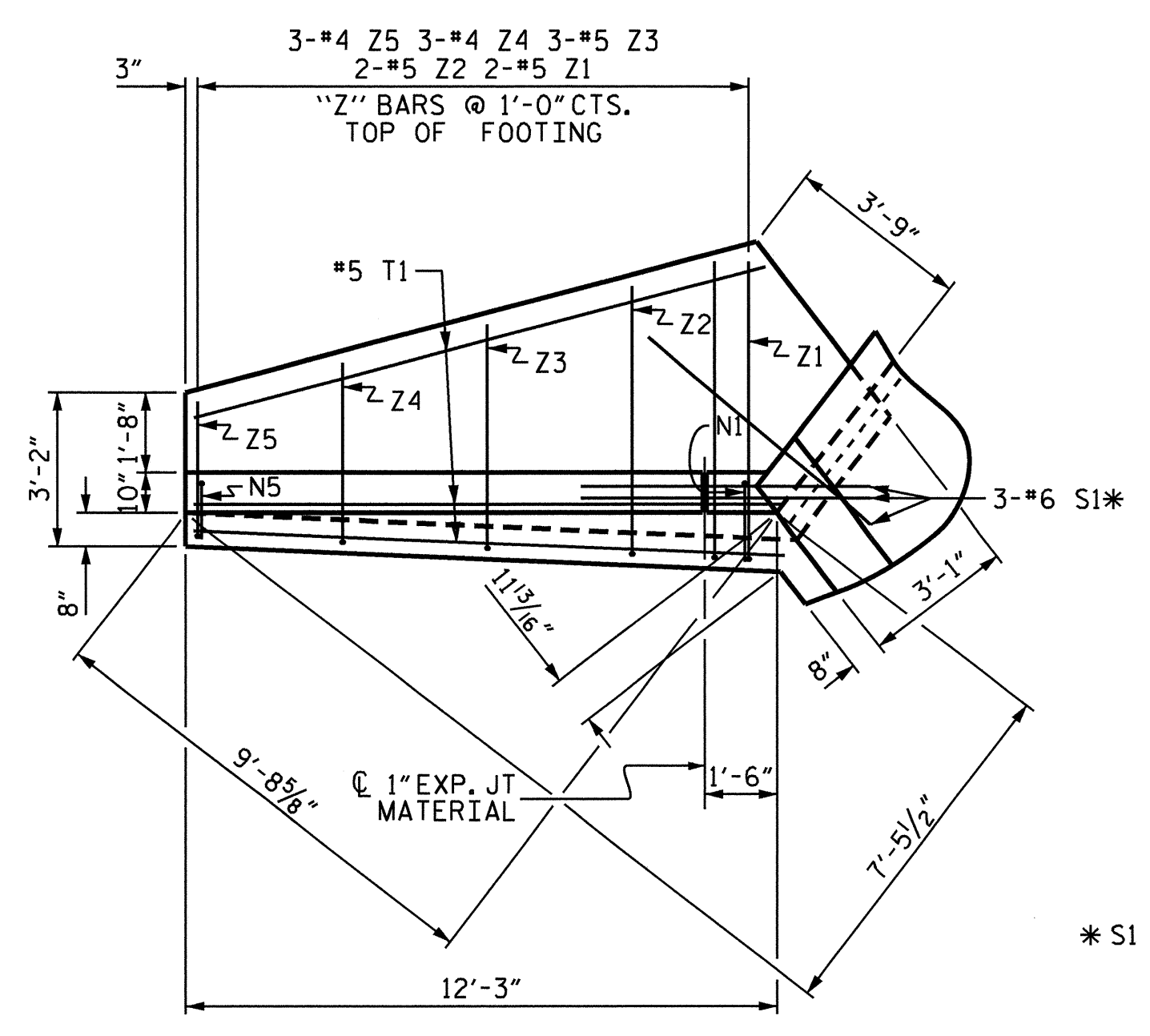
BAFFLE DETAILS



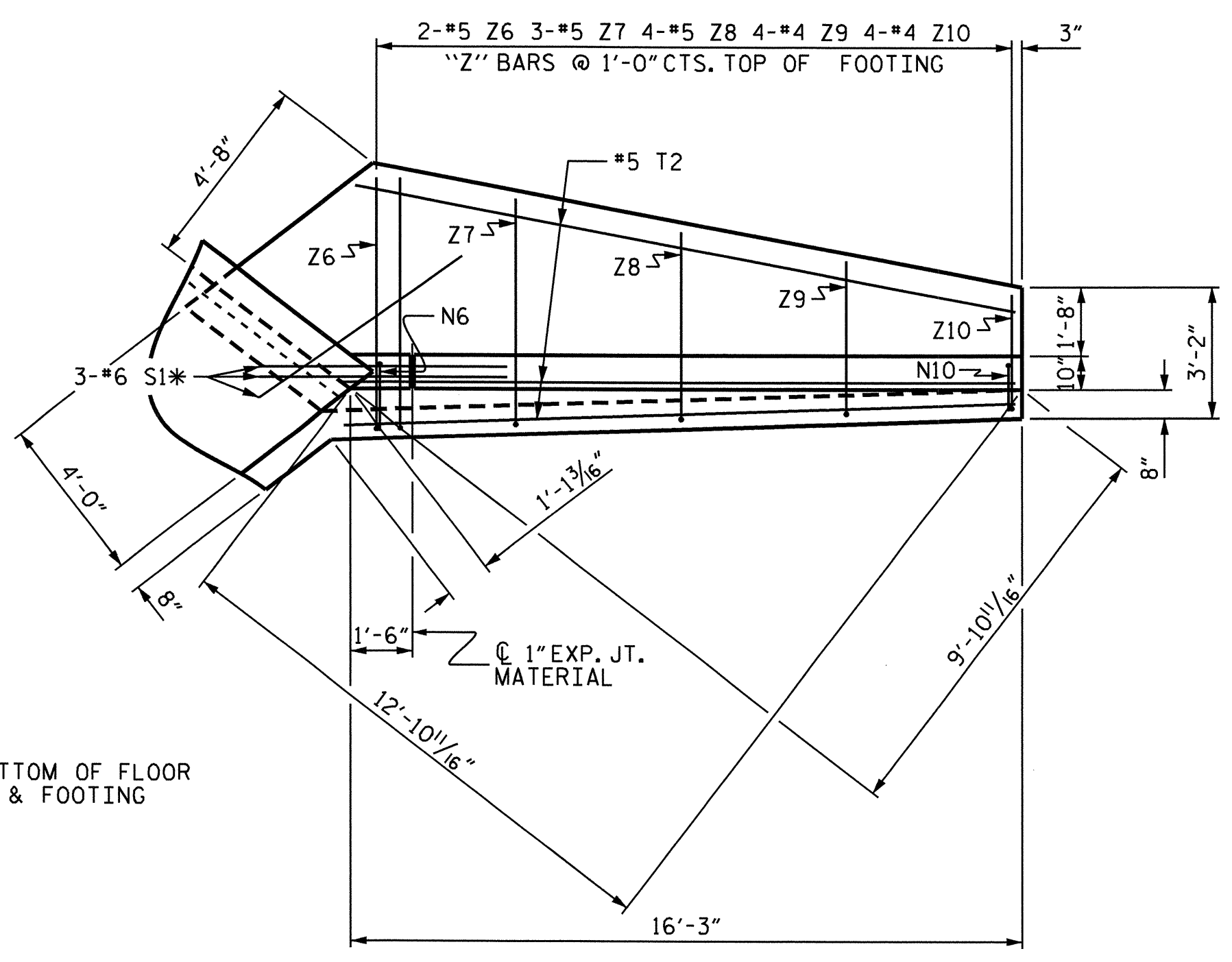
DRAWN BY : S.B. WILLIAMS DATE : 10-2009
 CHECKED BY : T. BANKOVICH DATE : 10-2009

20-DEC-2010 11:31
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 tbeach

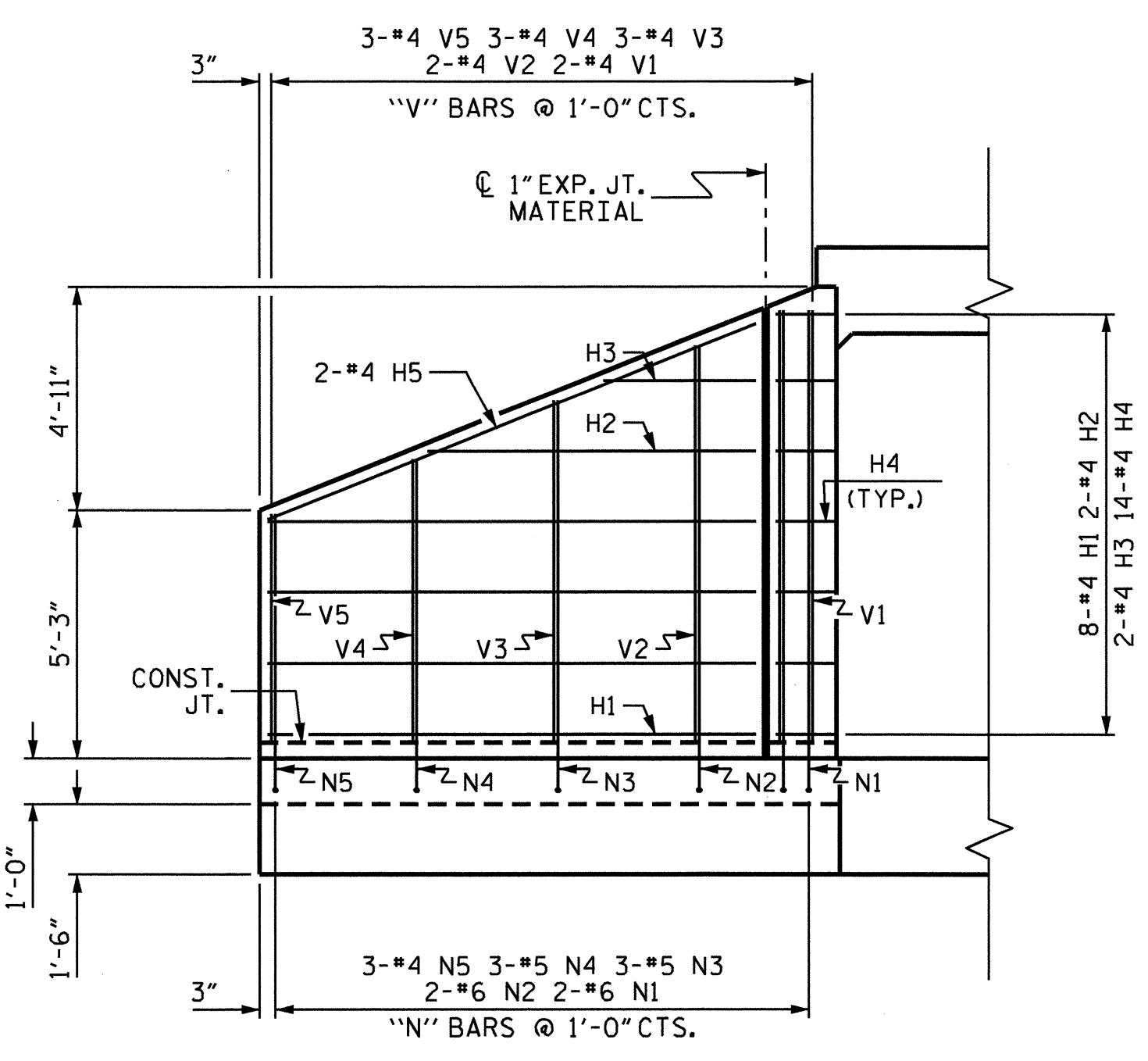
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-20	
1			3			TOTAL SHEETS	29
2			4				



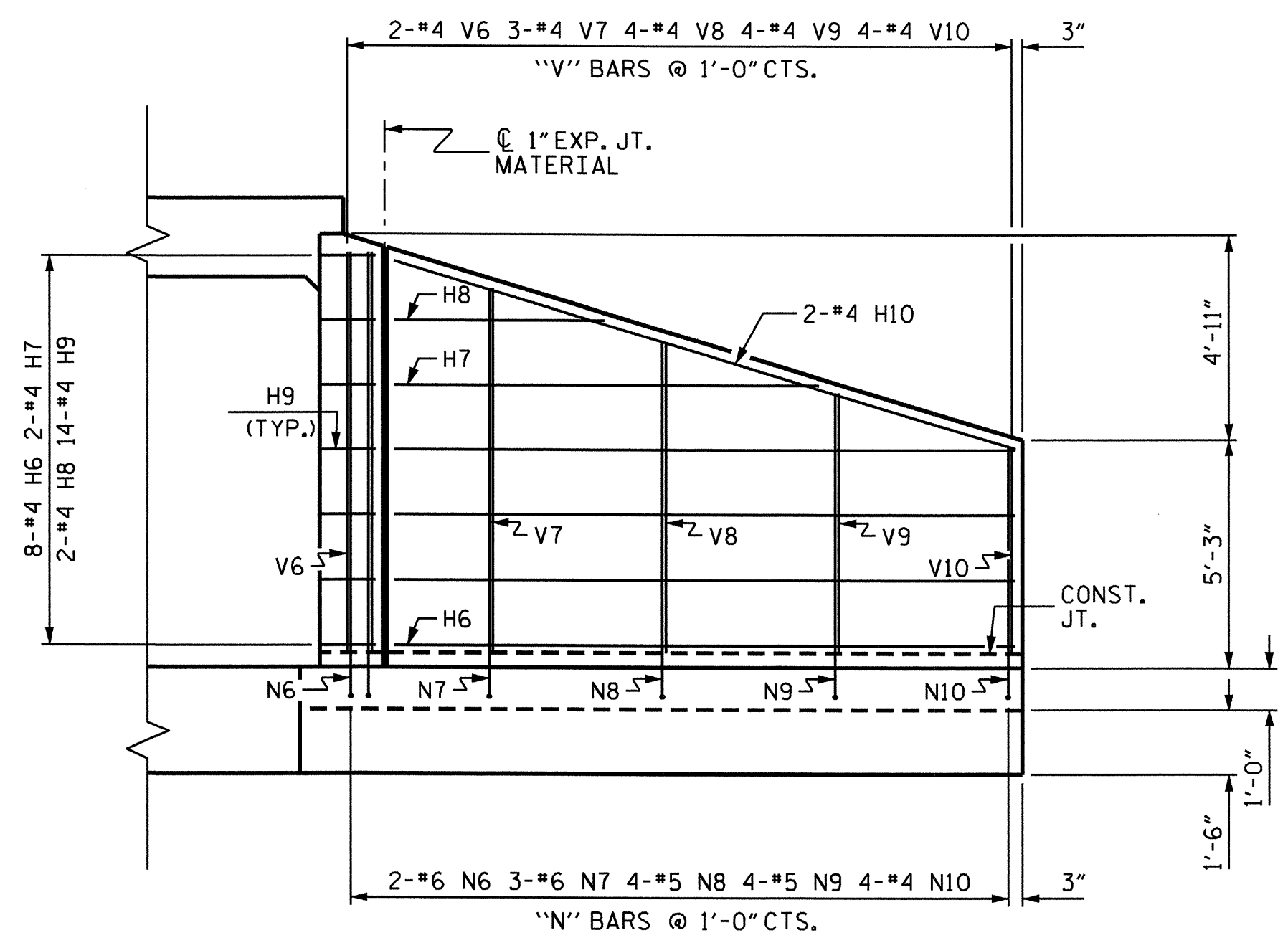
PLAN W2



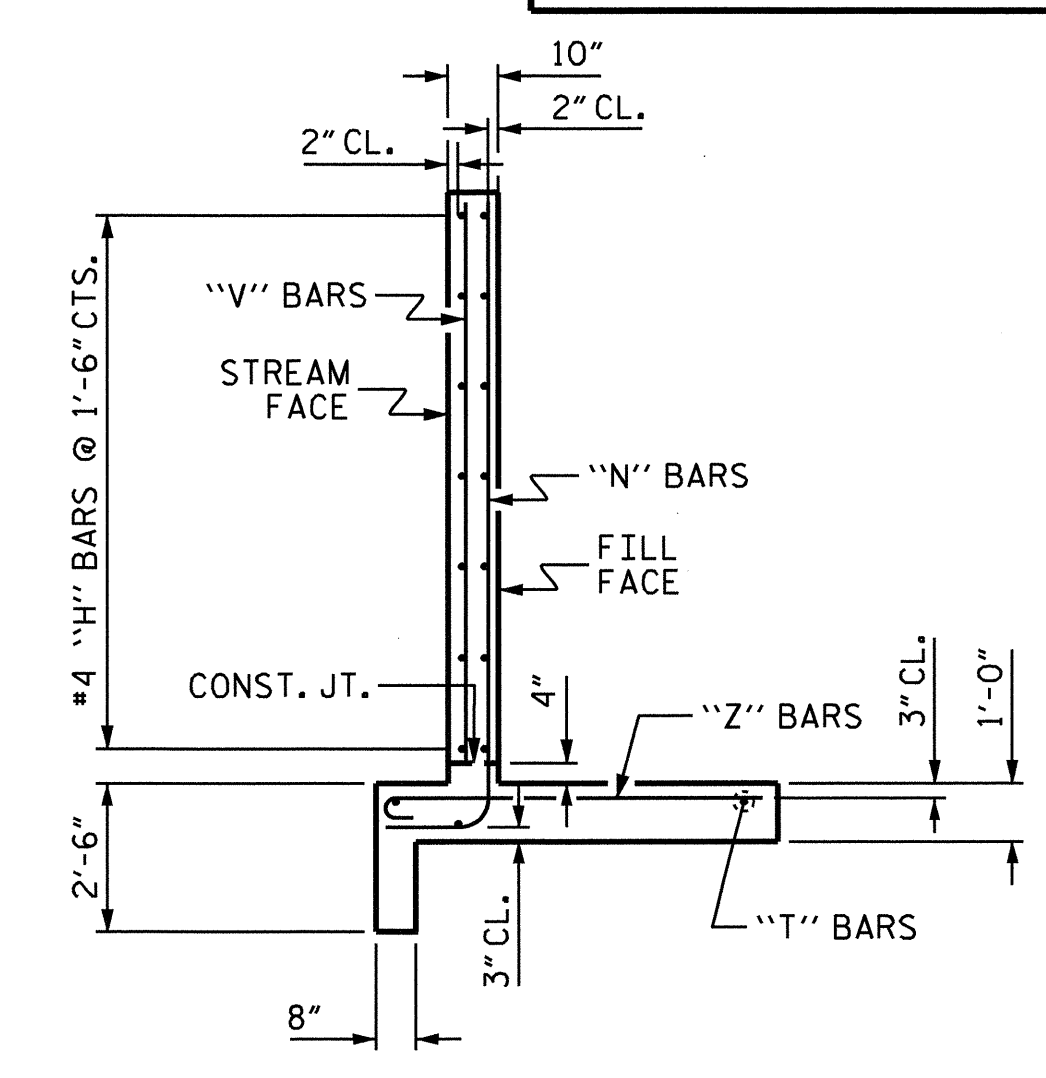
PLAN W1



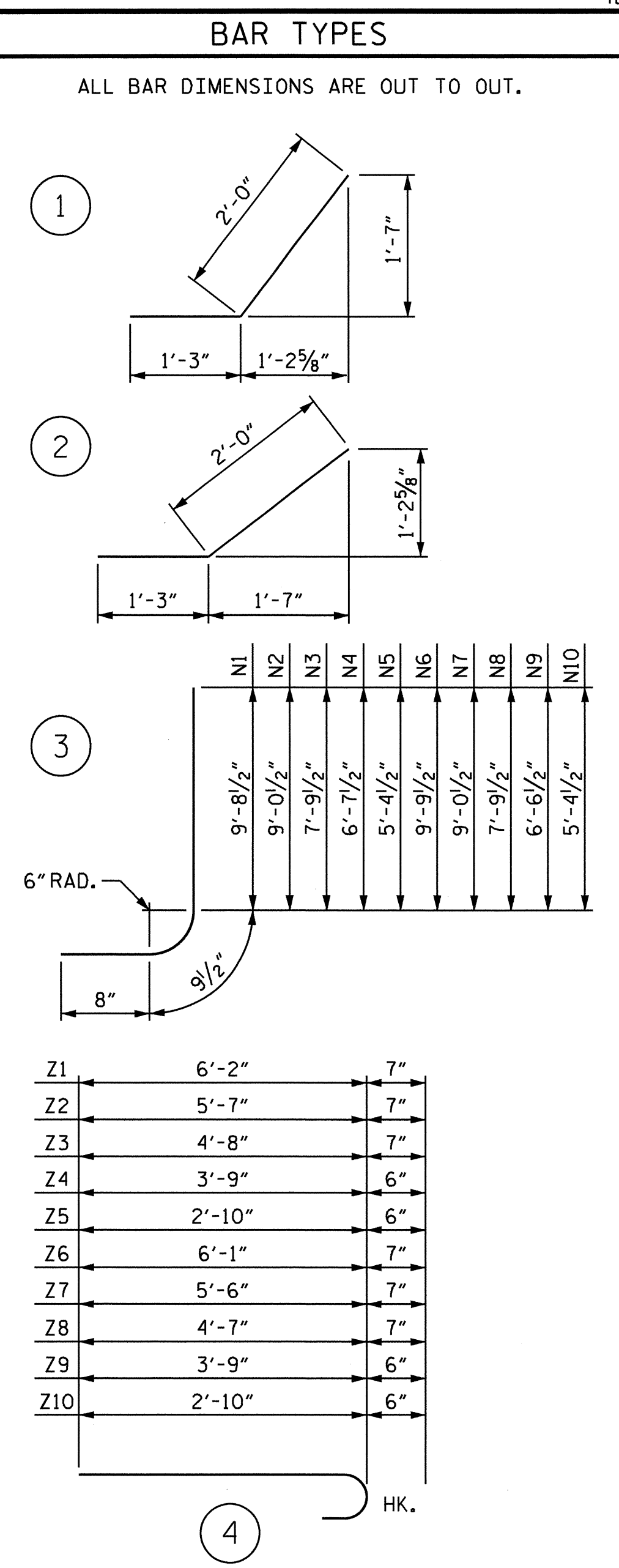
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

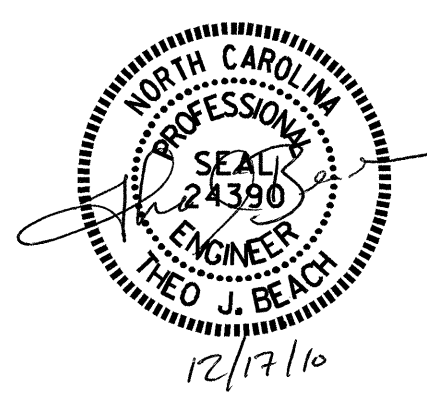


Z1	6'-2"	7"
Z2	5'-7"	7"
Z3	4'-8"	7"
Z4	3'-9"	6"
Z5	2'-10"	6"
Z6	6'-1"	7"
Z7	5'-6"	7"
Z8	4'-7"	7"
Z9	3'-9"	6"
Z10	2'-10"	6"

BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	10'-4"	110
H2	4	#4	STR	6'-11"	18
H3	4	#4	STR	3'-3"	9
H4	28	#4	1	3'-3"	61
H5	4	#4	STR	11'-2"	30
H6	16	#4	STR	14'-4"	153
H7	4	#4	STR	9'-10"	26
H8	4	#4	STR	4'-10"	13
H9	28	#4	2	3'-3"	61
H10	4	#4	STR	15'-0"	40
N1	4	#6	3	11'-2"	67
N2	4	#6	3	10'-6"	63
N3	6	#5	3	9'-3"	58
N4	6	#5	3	8'-1"	51
N5	6	#4	3	6'-10"	27
N6	4	#6	3	11'-3"	68
N7	6	#6	3	10'-6"	95
N8	8	#5	3	9'-3"	77
N9	8	#5	3	8'-0"	67
N10	8	#4	3	6'-10"	37
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	12'-3"	77
T2	6	#5	STR	16'-3"	102
V1	4	#4	STR	9'-2"	24
V2	4	#4	STR	8'-5"	22
V3	6	#4	STR	7'-3"	29
V4	6	#4	STR	6'-0"	24
V5	6	#4	STR	4'-10"	19
V6	4	#4	STR	9'-3"	25
V7	6	#4	STR	8'-5"	34
V8	8	#4	STR	7'-2"	38
V9	8	#4	STR	6'-0"	32
V10	8	#4	STR	4'-9"	25
Z1	4	#5	4	6'-9"	28
Z2	4	#5	4	6'-2"	26
Z3	6	#5	4	5'-3"	33
Z4	6	#4	4	4'-3"	17
Z5	6	#4	4	3'-4"	13
Z6	4	#5	4	6'-8"	28
Z7	6	#5	4	6'-1"	38
Z8	8	#5	4	5'-2"	43
Z9	8	#4	4	4'-3"	23
Z10	8	#4	4	3'-4"	18
REINFORCING STEEL FOR 4 WINGS					1957 LBS
CLASS A CONCRETE					
4 WINGS					27.7 CY
2 HEADWALLS					1.1 CY
2 END CURTAIN WALLS					1.0 CY
TOTAL					29.8 CY

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 200+04.00-L-
 SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 9'-0" SLOPE = 2:1
 75° SKEW



ASSEMBLED BY : S.B. WILLIAMS DATE : 9/09
 CHECKED BY : T. BANKOVICH DATE : 10/09
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00

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

TOTAL SHEETS: 29

NOTES:

ASSUMED LIVE LOAD-----HS20 OR ALTERNATE LOADING.

DESIGN FILL-----3.09'

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.

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.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

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.

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 CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

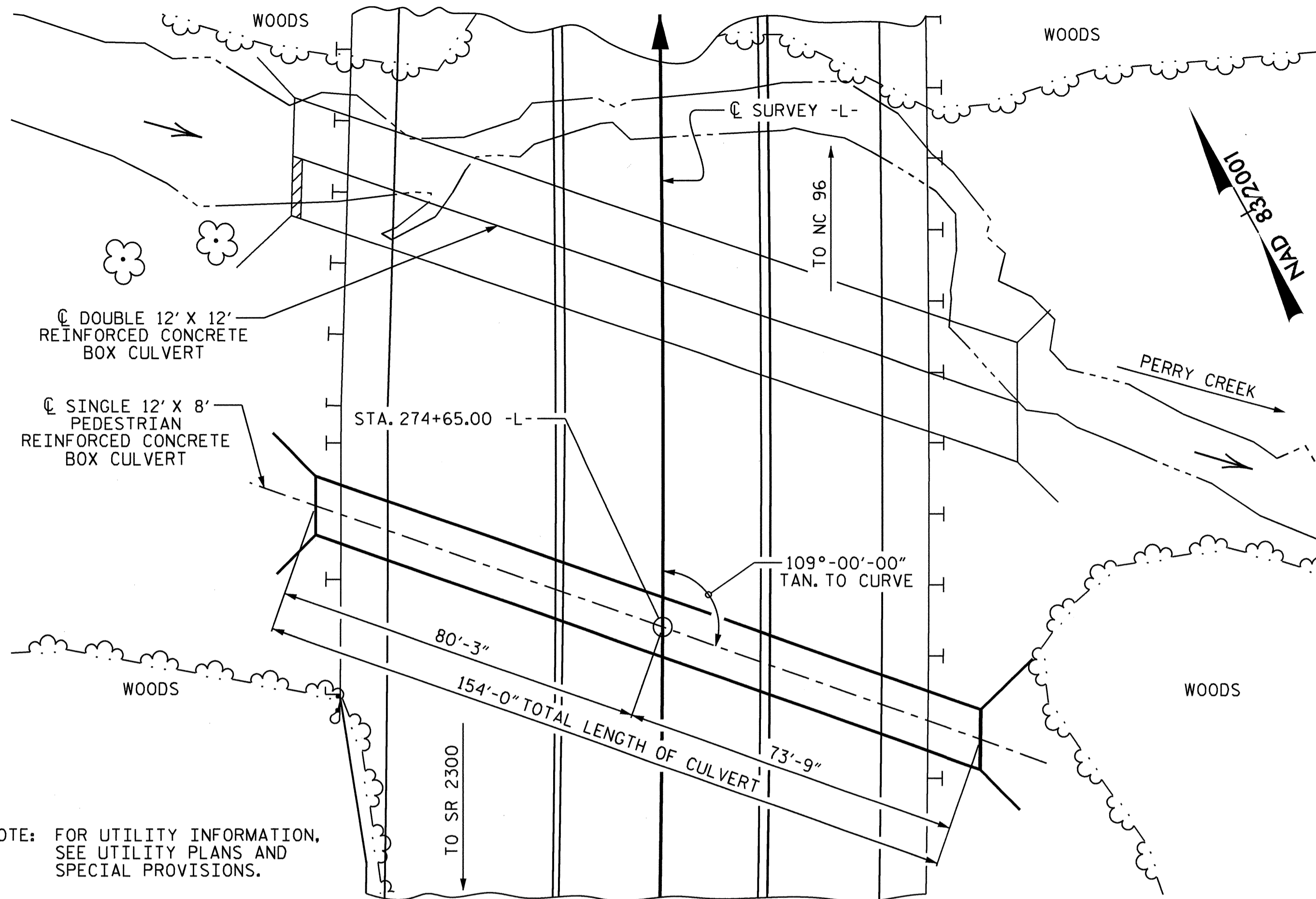
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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



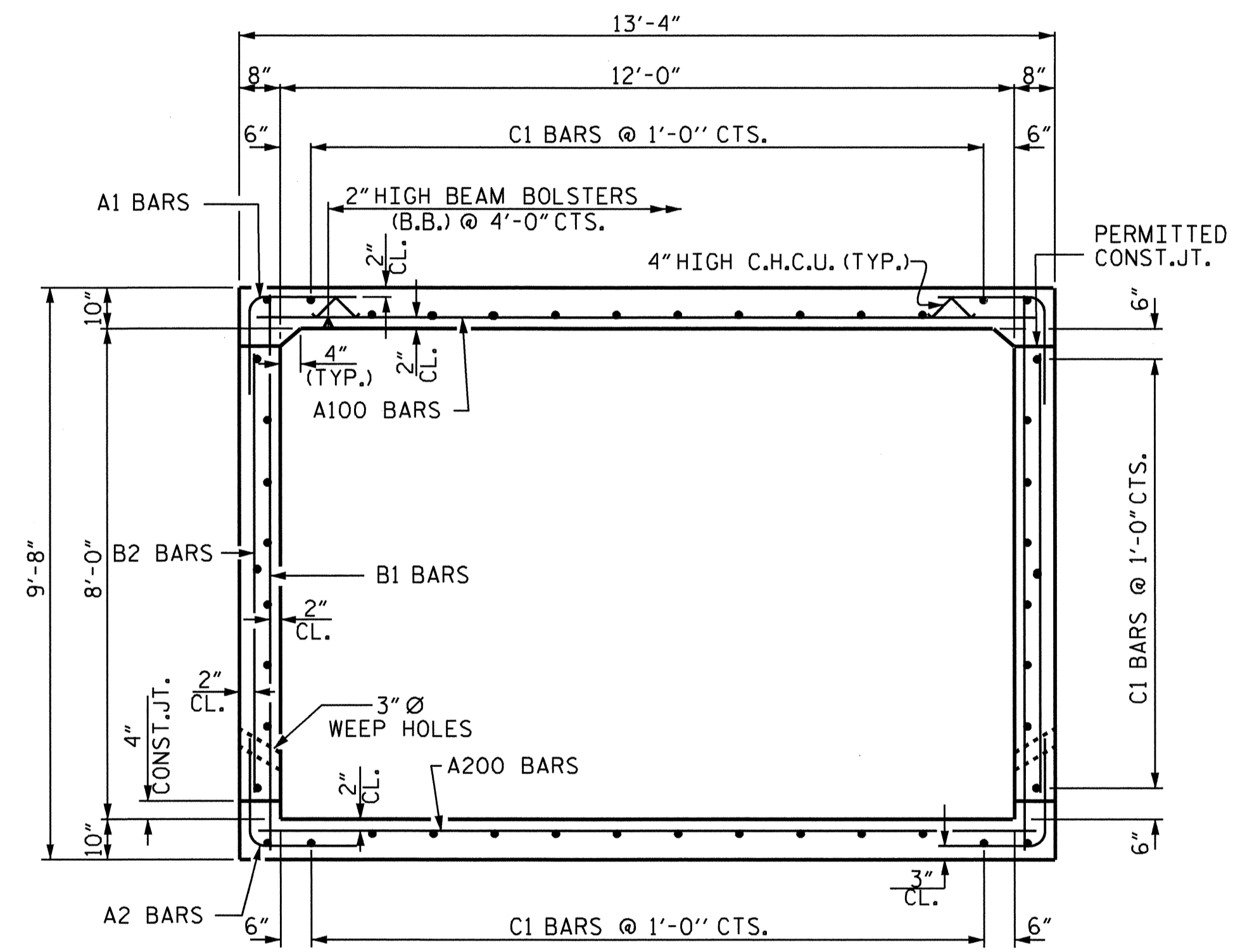
NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

BAR TYPE	BILL OF MATERIAL					
	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	A1	412	#6	1	5'-9"	3558
	A2	412	#6	1	5'-8"	3507
A100	A100	278	#7	STR	12'-11"	7340
	A101	4	#7	STR	8'-9"	72
A102	A102	4	#7	STR	4'-9"	39
	A200	258	#7	STR	12'-11"	6812
A201	A201	4	#7	STR	8'-8"	71
	A202	4	#7	STR	4'-4"	35
B1	B1	528	#4	STR	9'-2"	3233
	B2	412	#6	STR	7'-4"	4538
C1	C1	276	#4	STR	27'-6"	5055
	G1	4	#4	STR	13'-5"	36
S1	S1	12	#8	STR	13'-5"	430
	TOTAL REINFORCING STEEL (LBS)					

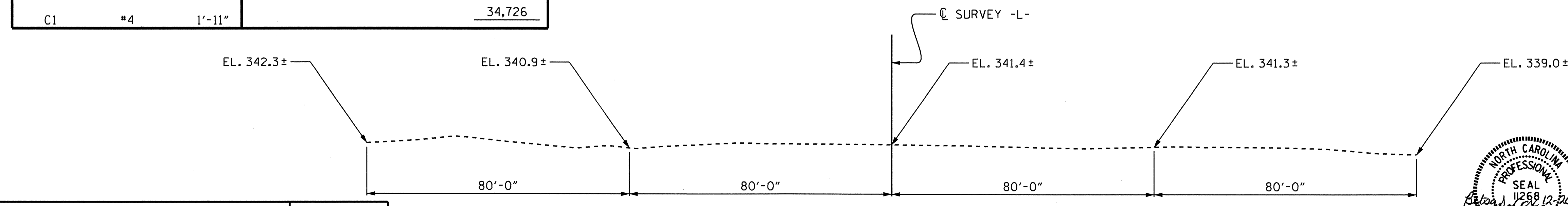
TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 1.222 CY/FT	188.2 C.Y.
WINGS ETC.	25.2 C.Y.
TOTAL	213.4 C.Y.
REINFORCING STEEL	
BARREL	34,726 LBS.
WINGS ETC.	1,547 LBS.
TOTAL	36,273 LBS.
FOUNDATION CONDITIONING MAT'L	145 TONS
CULVERT EXCAVATION	LUMP SUM

GRADE DATA	
GRADE POINT ELEV. @ STA. 274+65.00 -L-	= 354.080
BED ELEV. @ STA. 274+65.00 -L-	= 341.430
ROADWAY SLOPE	= 2:1



RIGHT ANGLE SECTION OF BARREL
THERE ARE 46 "C" BARS IN SECTION OF BARREL

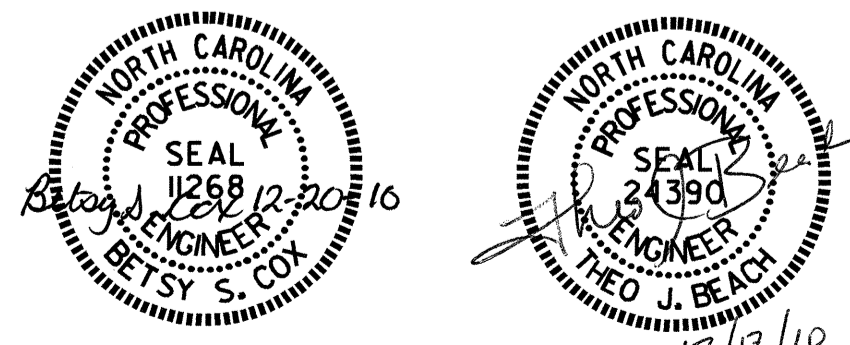
PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 274+65.00 -L-



PROFILE ALONG CULVERT

ASSEMBLED BY : <u>T. BANKOVICH</u>	DATE : <u>10-2009</u>	SPECIAL
CHECKED BY : <u>N. PIERCE</u>	DATE : <u>11-2009</u>	
DRAWN BY : <u>R. WRIGHT</u>	DATE : <u>AUG. 1989</u>	STANDARD
CHECKED BY : <u>C.R.K.</u>	DATE : <u>AUG. 1989</u>	

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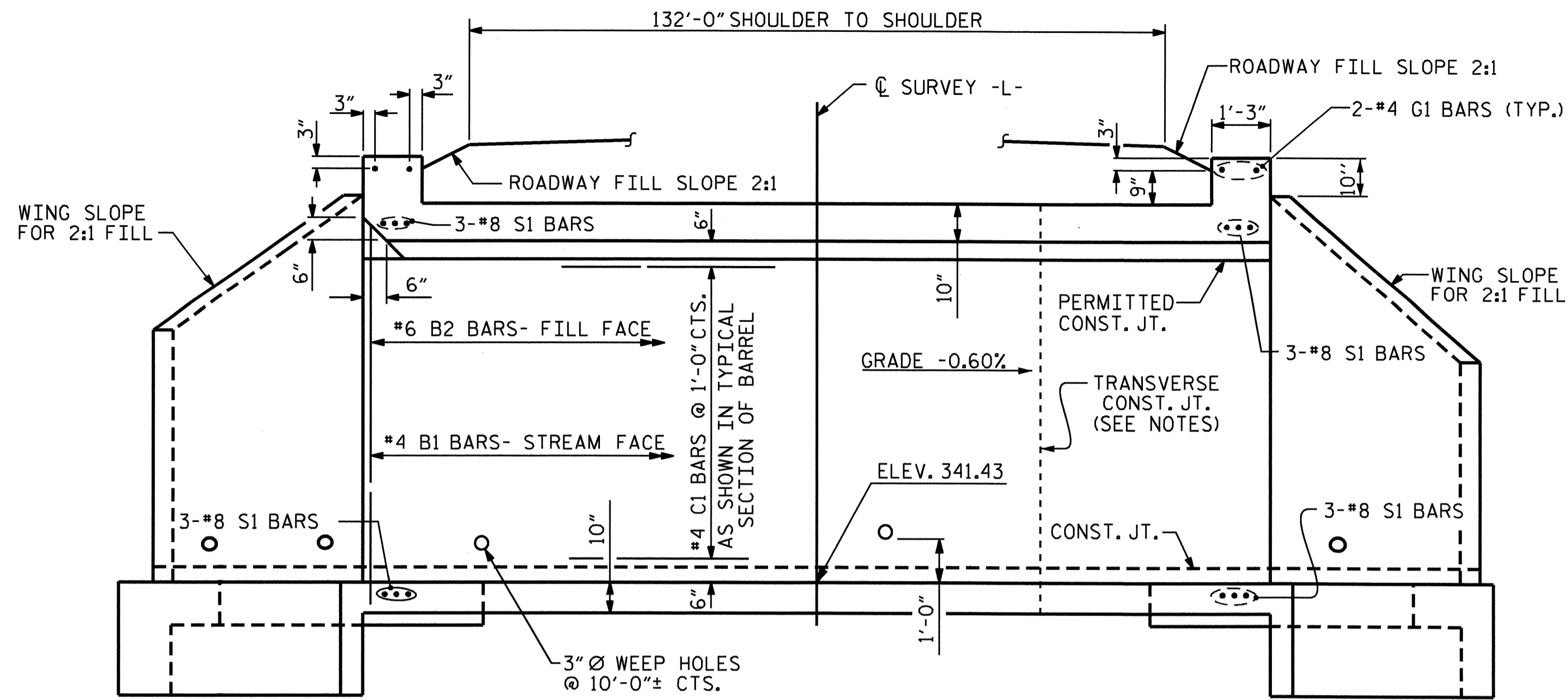


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
BARREL STANDARD
SINGLE 12 FT. X 8 FT.
PEDESTRIAN CONCRETE
BOX CULVERT
109° SKEW
 AUGUST 1989

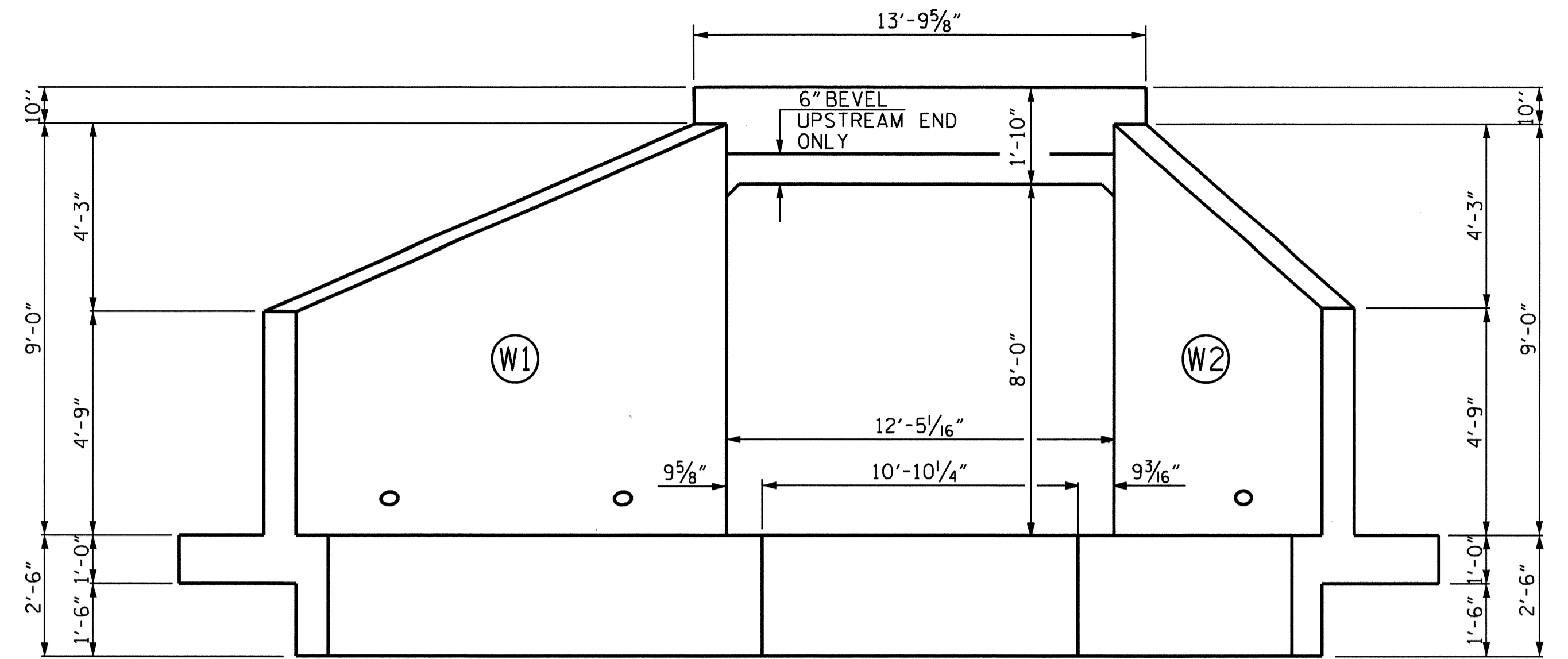
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-22
1			3			TOTAL SHEETS 29
2			4			

STD. NO. CB221A STR. #7

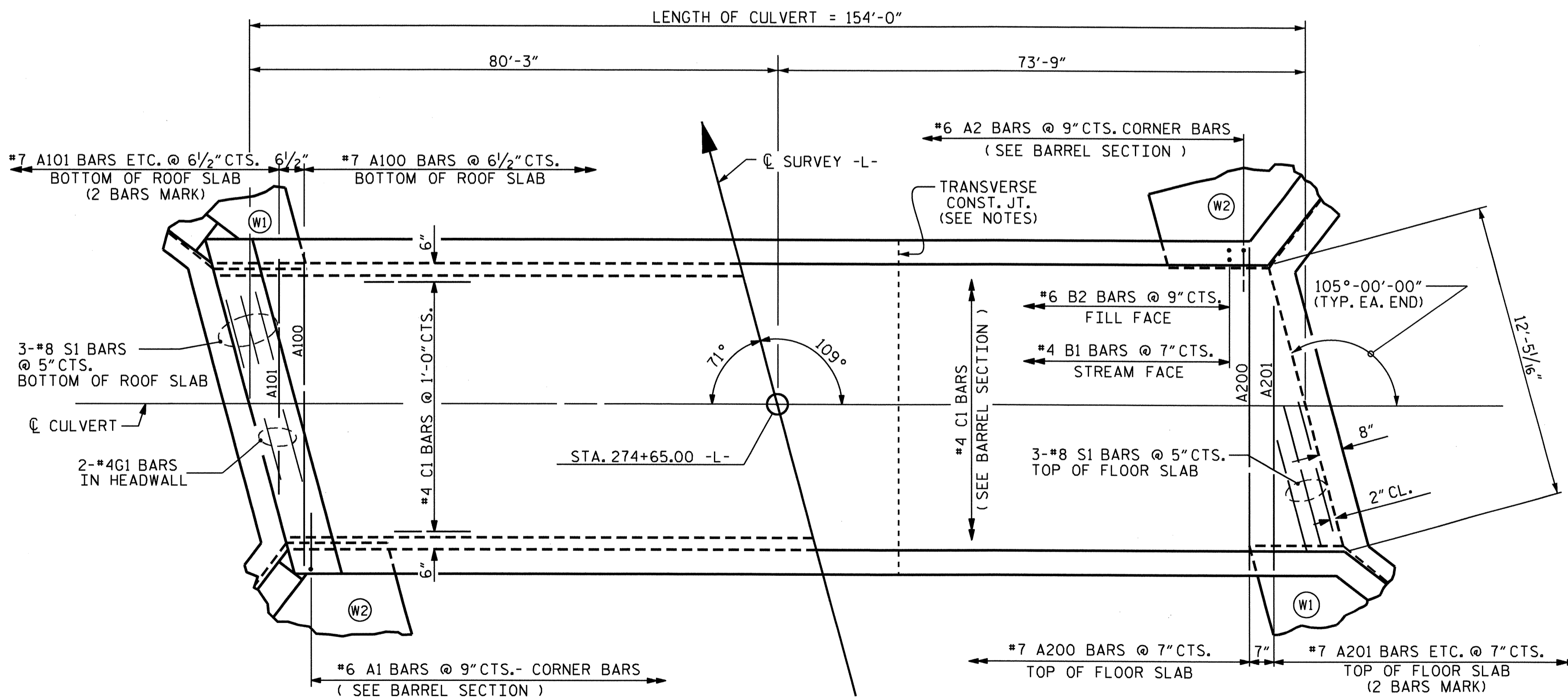
REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
 ADDED 8-22-89



CULVERT SECTION NORMAL TO ROADWAY

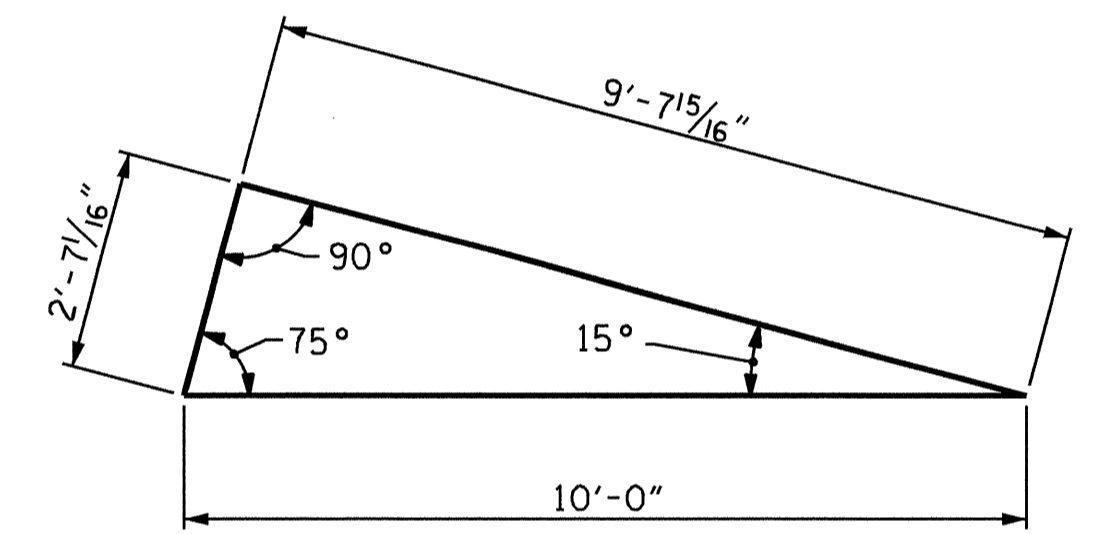


END ELEVATION NORMAL TO SKEW



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

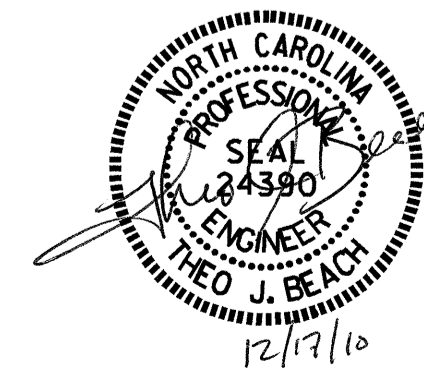


SKEW TRIANGLE

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 274+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 SINGLE 12 FT. X 8 FT.
 PEDESTRIAN CONCRETE BOX
 CULVERT
 109° SKEW
 1971



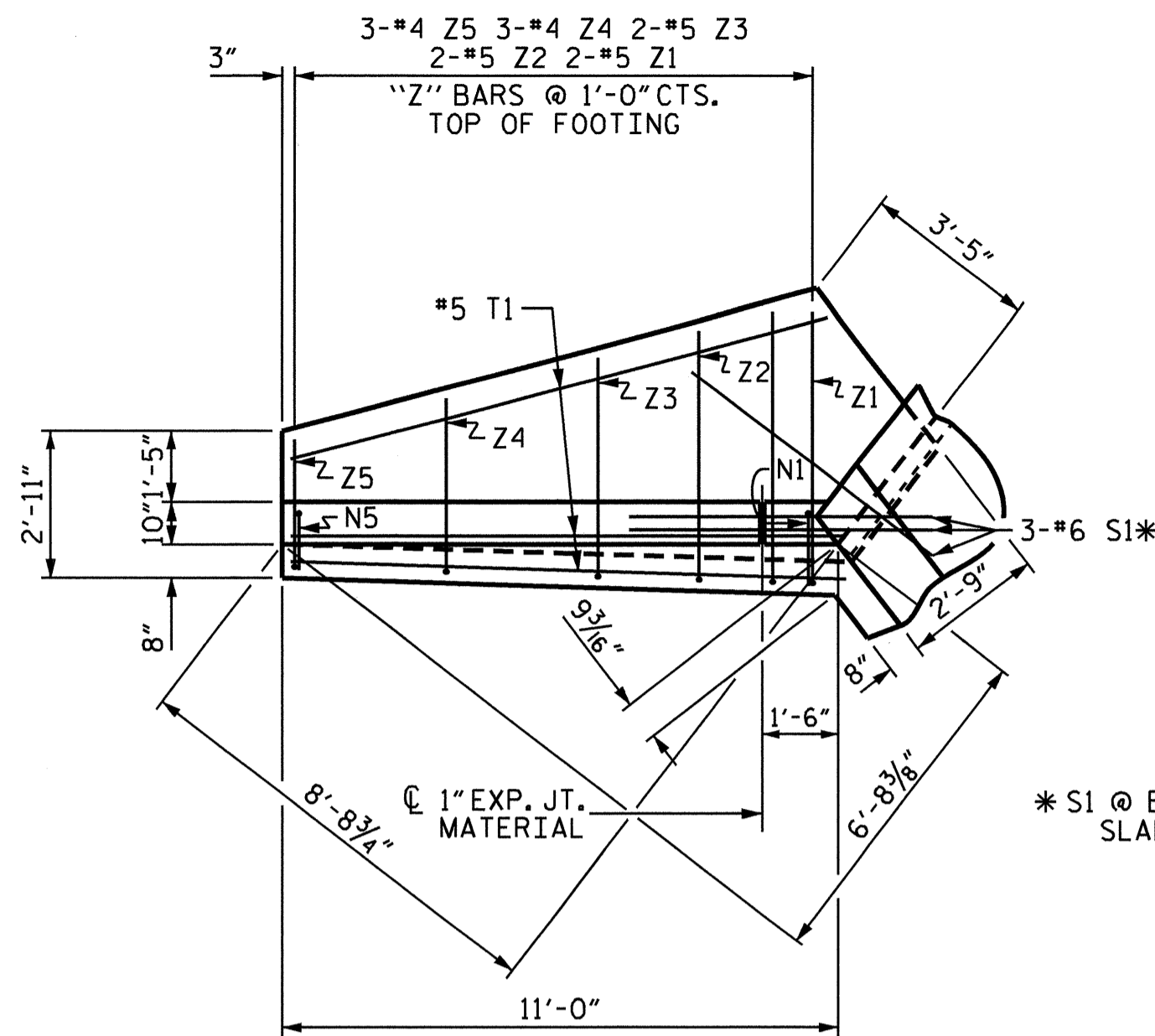
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-23
1			3			TOTAL SHEETS 29
2			4			

REVISED 8-28-92 BY E.L.B. CHECKED BY G.R.P.
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
 REDRAWN 8-22-89
 REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.

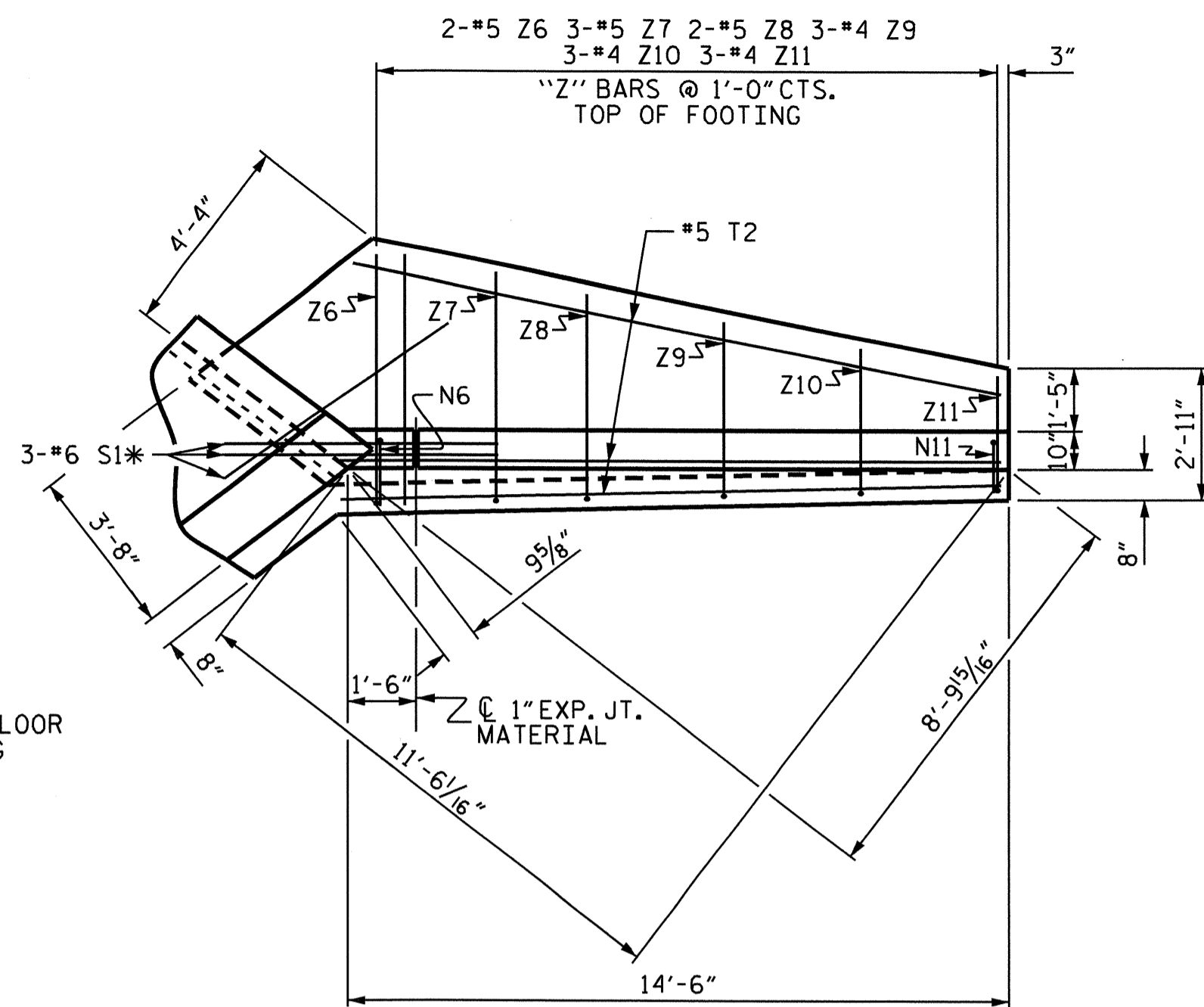
ASSEMBLED BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: N. PIERCE DATE: 11-2009
 DRAWN BY: R.W. WRIGHT DATE: AUG. 1989
 CHECKED BY: A.R. BISSETTE DATE: AUG. 1989

SPECIAL
STANDARD

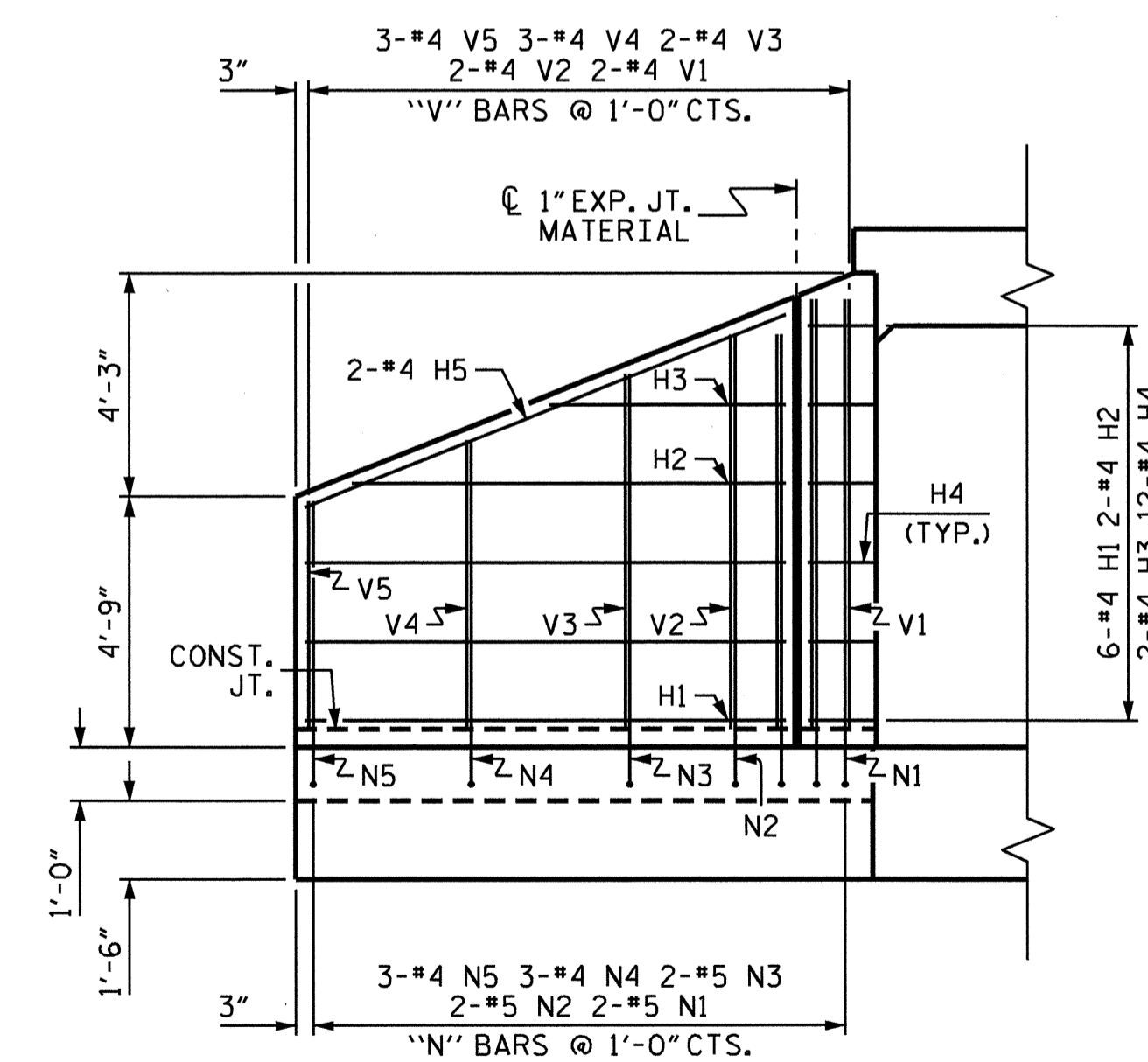
NOTE: C1 BARS ARE 6 BAR RUNS



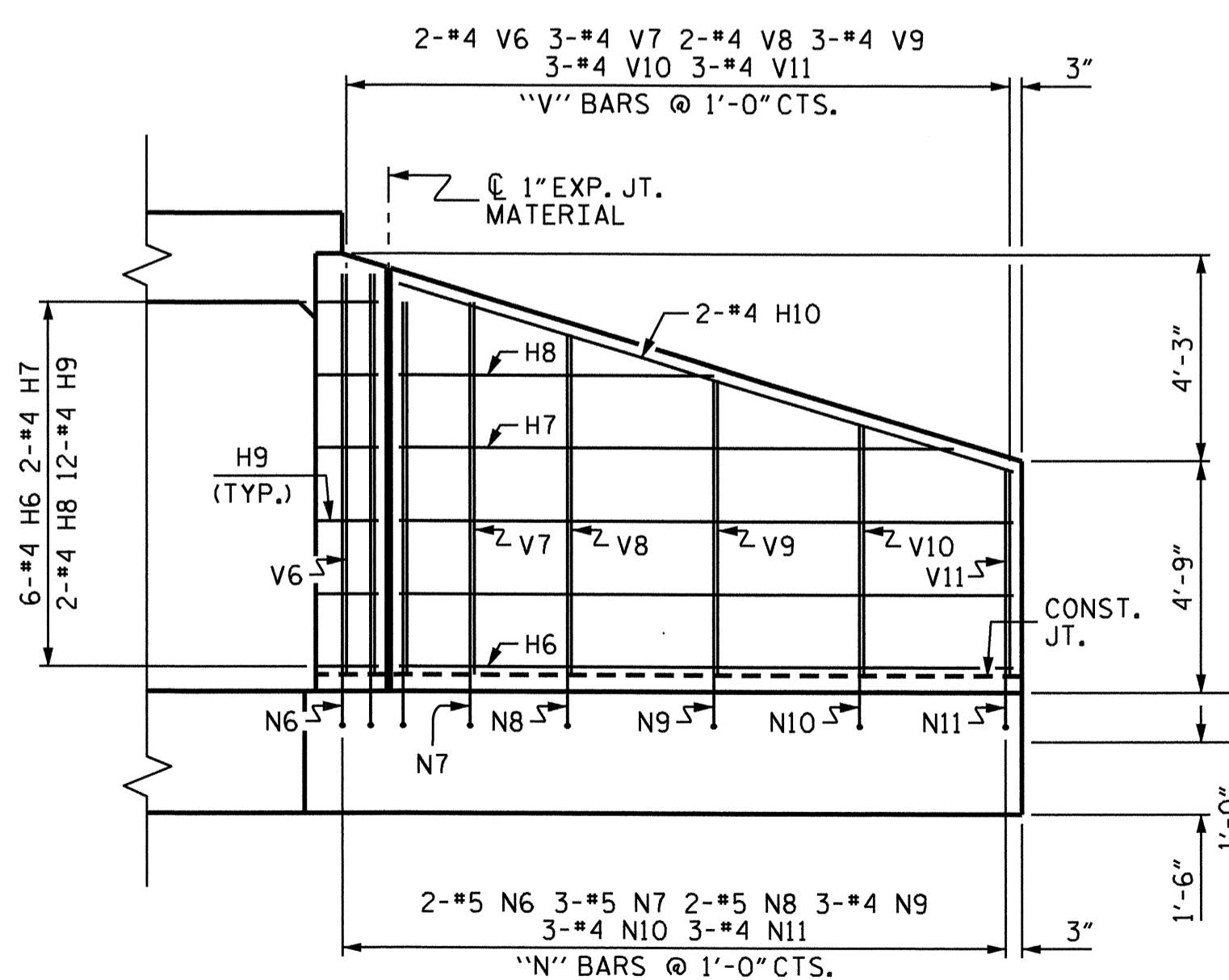
PLAN W2



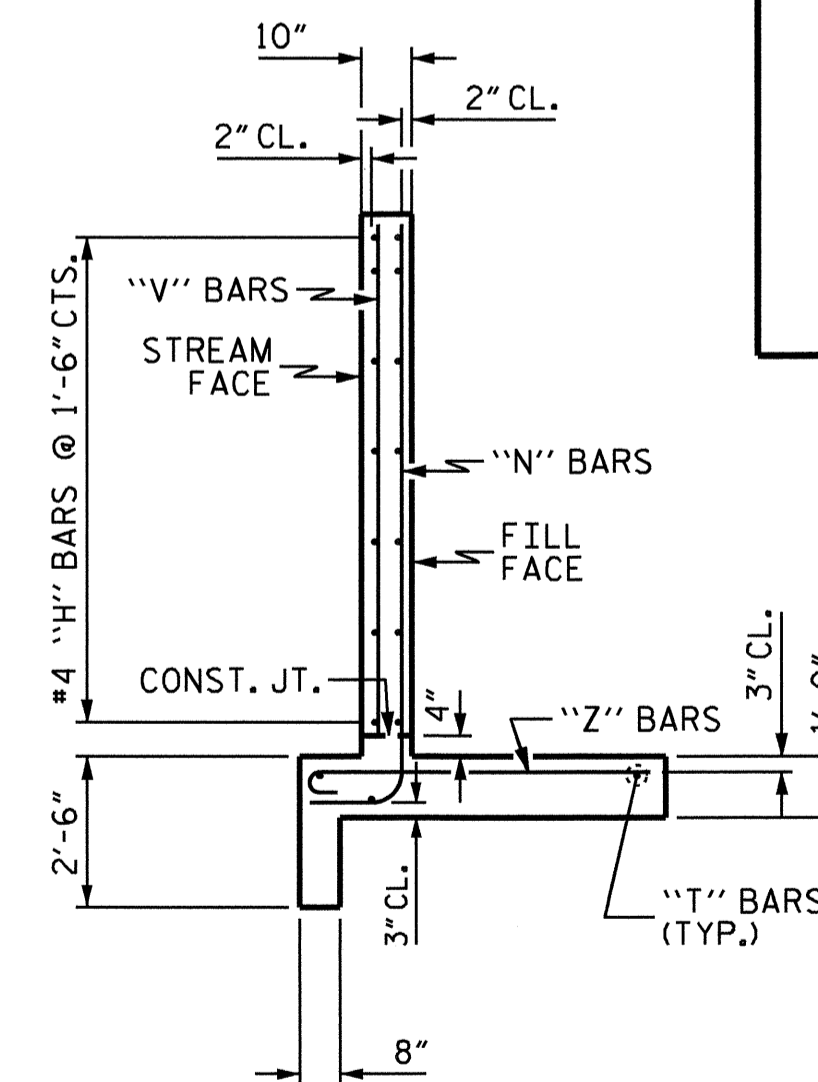
PLAN W1



ELEVATION W2



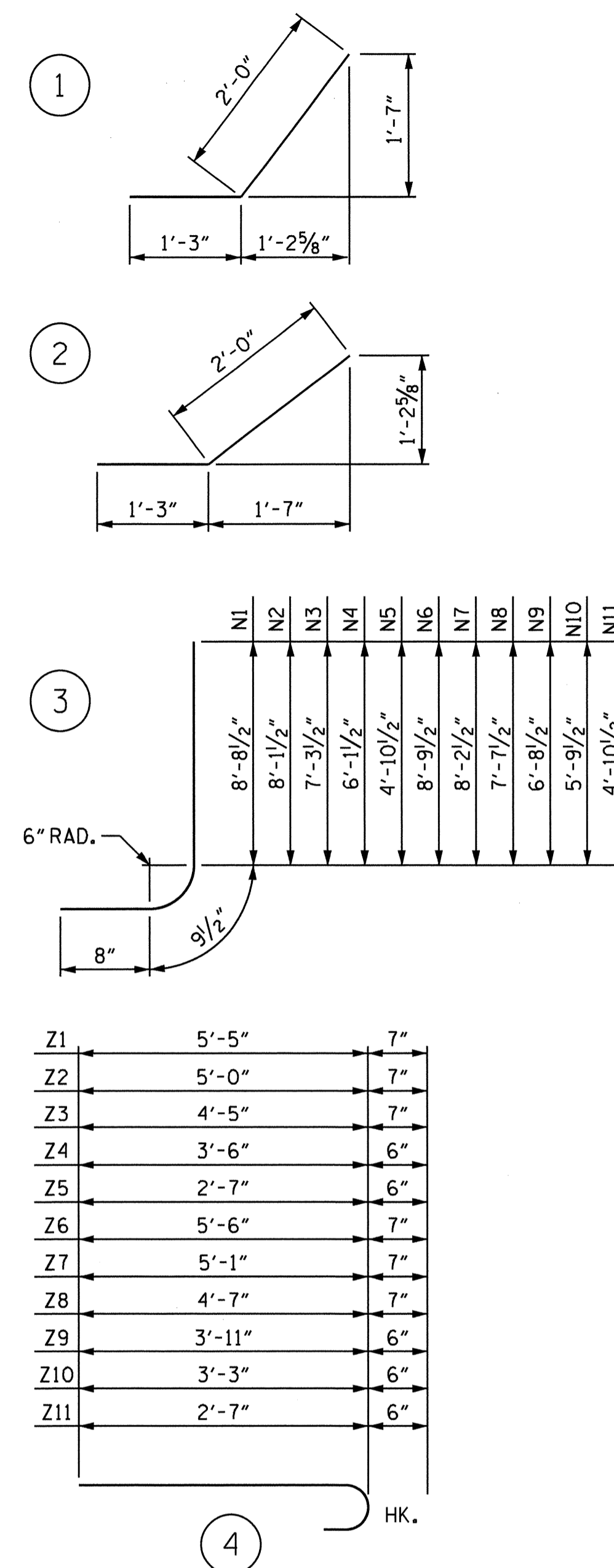
ELEVATION W1



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



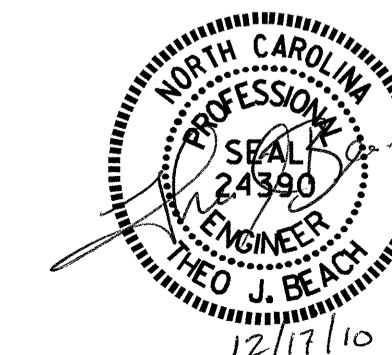
BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR 9'-1"	73
H2	4	#4	STR 8'-2"	22
H3	4	#4	STR 4'-5"	12
H4	24	#4	1 3'-3"	52
H5	4	#4	STR 9'-10"	26
H6	12	#4	STR 12'-7"	101
H7	4	#4	STR 11'-4"	30
H8	4	#4	STR 6'-5"	17
H9	24	#4	2 3'-3"	52
H10	4	#4	STR 13'-2"	35
N1	4	#5	3 10'-2"	42
N2	4	#5	3 9'-7"	40
N3	4	#5	3 8'-9"	37
N4	6	#4	3 7'-7"	30
N5	6	#4	3 6'-4"	25
N6	4	#5	3 10'-3"	43
N7	6	#5	3 9'-8"	60
N8	4	#5	3 9'-1"	38
N9	6	#4	3 8'-2"	33
N10	6	#4	3 7'-3"	29
N11	6	#4	3 6'-4"	25
S1	12	#6	STR 6'-0"	108
T1	6	#5	STR 11'-0"	69
T2	6	#5	STR 14'-6"	91
V1	4	#4	STR 8'-2"	22
V2	4	#4	STR 7'-6"	20
V3	4	#4	STR 6'-9"	18
V4	6	#4	STR 5'-6"	22
V5	6	#4	STR 4'-4"	17
V6	4	#4	STR 8'-3"	22
V7	6	#4	STR 7'-8"	31
V8	4	#4	STR 7'-0"	19
V9	6	#4	STR 6'-1"	24
V10	6	#4	STR 5'-2"	21
V11	6	#4	STR 4'-3"	17
Z1	4	#5	4 6'-0"	25
Z2	4	#5	4 5'-7"	23
Z3	4	#5	4 5'-0"	21
Z4	6	#4	4 4'-0"	16
Z5	6	#4	4 3'-1"	12
Z6	4	#5	4 6'-1"	25
Z7	6	#5	4 5'-8"	35
Z8	4	#5	4 5'-2"	22
Z9	6	#4	4 4'-5"	18
Z10	6	#4	4 3'-9"	15
Z11	6	#4	4 3'-1"	12
REINFORCING STEEL FOR 4 WINGS				1547 LBS
CLASS A CONCRETE				
4 WINGS				22.6 CY
2 HEADWALLS				1.3 CY
2 END CURTAIN WALLS				1.3 CY
TOTAL				25.2 CY

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 274+65.00 -L-

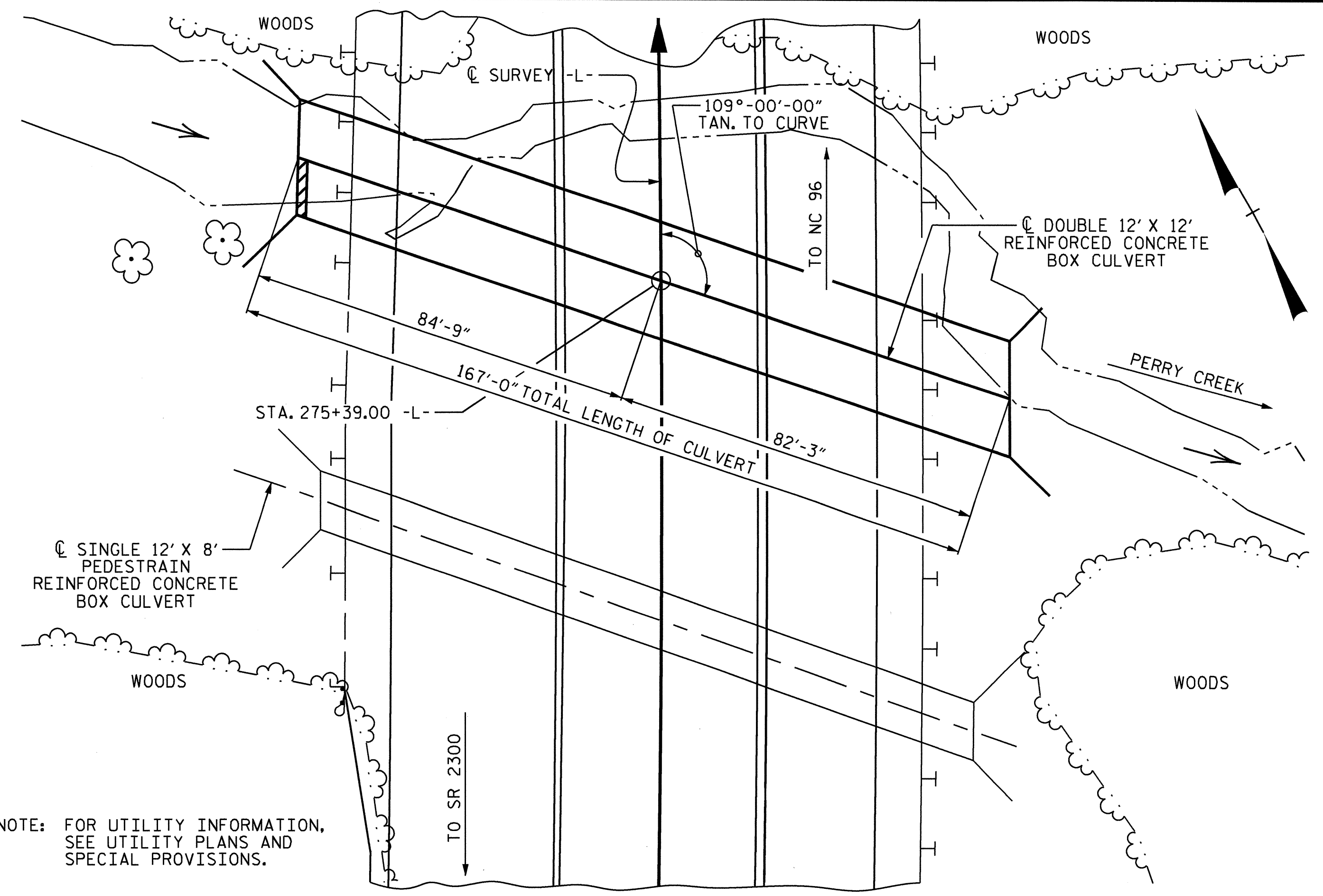
SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 8'-0" SLOPE = 2:1
 105° SKEW



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-24	
1			3			TOTAL SHEETS 29	
2			4				

ASSEMBLED BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: N. PIERCE DATE: 11-2009
 DRAWN BY: CCJ 01/00
 CHECKED BY: RWW 03/00



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

HYDROGRAPHIC DATA

DESIGN DISCHARGE	2865 CFS
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	348.0
DRAINAGE AREA	3.66 SQ. MI.
BASIC DISCHARGE (Q100)	3103 CFS
BASIC HIGH WATER ELEVATION	348.6

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	6230 CFS
FREQUENCY OVERTOPPING FLOOD	500± YR.
OVERTOPPING FLOOD ELEVATION	355.0

GRADE DATA

GRADE POINT ELEV. @ STA. 275+39.00 -L-	= 353.950
BED ELEV. @ STA. 275+39.00 -L-	= 333.830
ROADWAY SLOPE	= 2:1

NOTES:

ASSUMED LIVE LOAD-----HS20 OR ALTERNATE LOADING.

DESIGN FILL-----9.64'

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 WILL 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.

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.

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

FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED CONCRETE BOX CULVERT OPTION WILL BE ALLOWED.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 2.984 CY/FT	498.3 C.Y.
BAFFLES	2.3 C.Y.
SILL	0.9 C.Y.
WINGS ETC.	56.6 C.Y.
TOTAL	558.1 C.Y.
REINFORCING STEEL	
BARREL, SILL, AND BAFFLES	94,594 LBS.
WINGS ETC.	4,140 LBS.
TOTAL	98,734 LBS.
FOUNDATION CONDITIONING MAT'L	306 TONS
CULVERT EXCAVATION	LUMP SUM
CLASS B RIP RAP	59 TONS

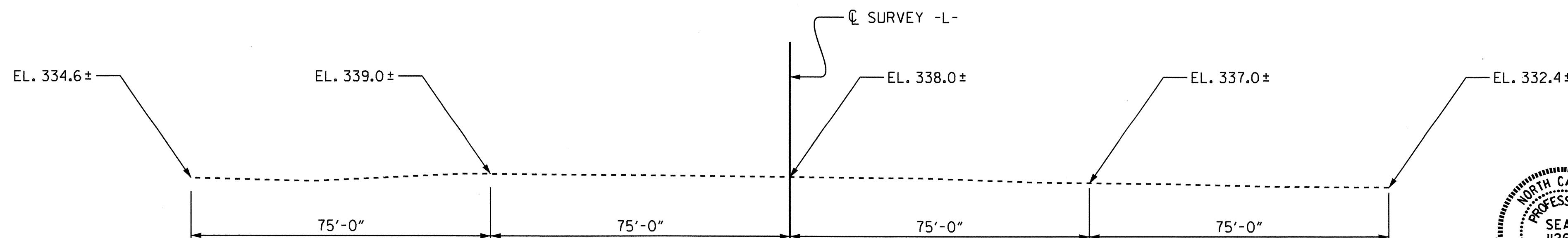
PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 275+39.00 -L-

SHEET 1 OF 5 CULVERT No. 1334

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
BARREL STANDARD
DOUBLE 12 FT. X 12 FT. CONCRETE BOX CULVERT
109° SKEW
 AUGUST 1989

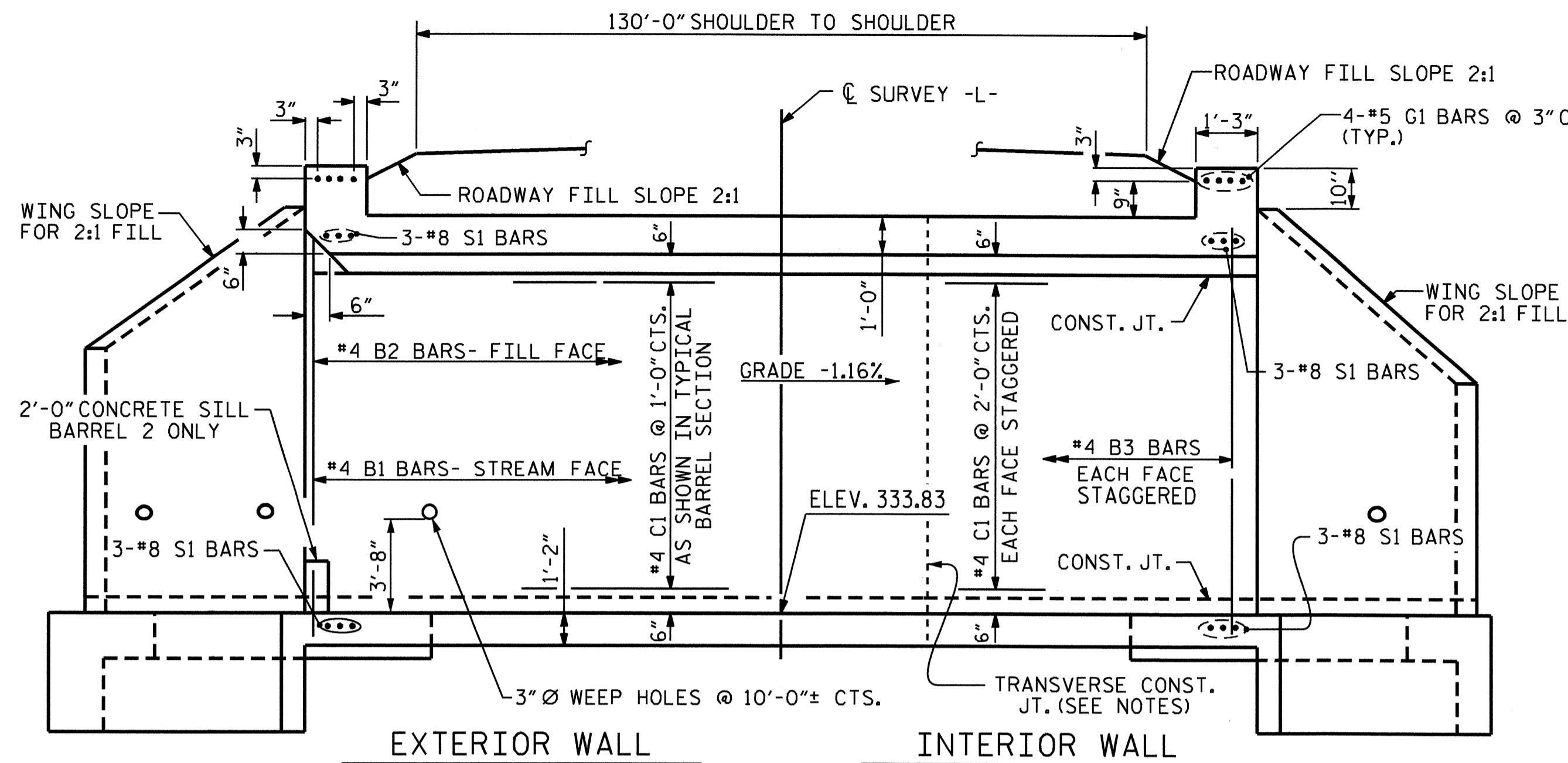
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. C-25
 TOTAL SHEETS 29

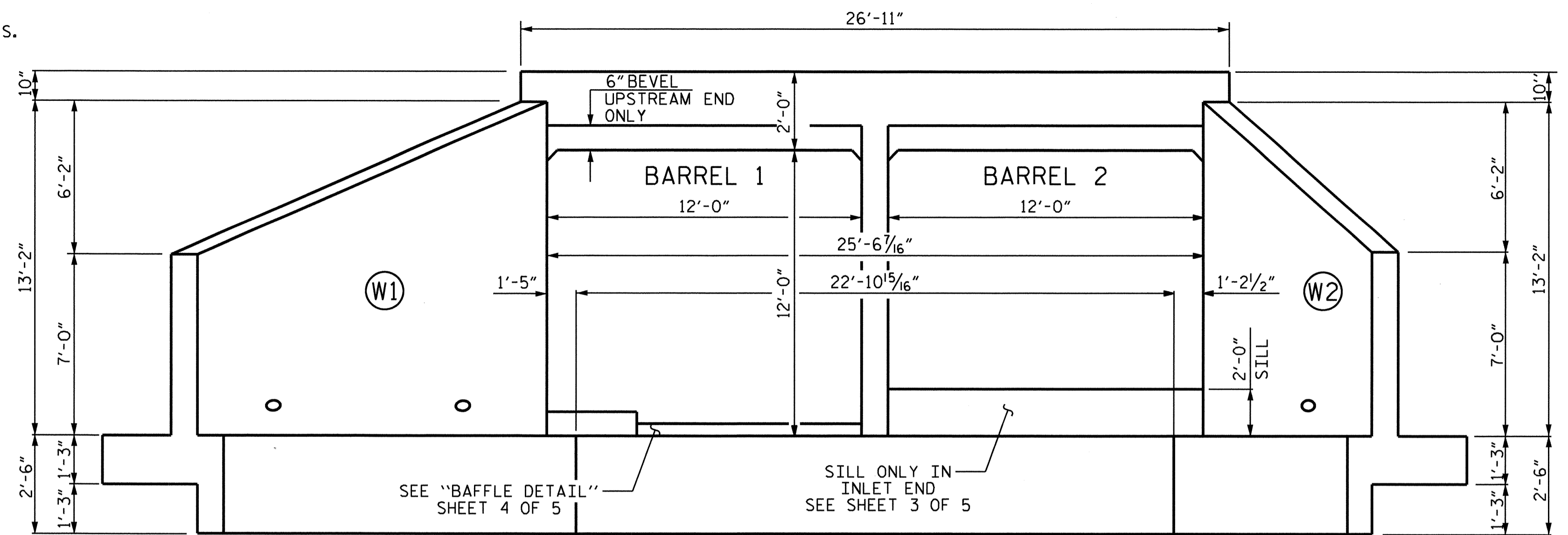


PROFILE ALONG CULVERT

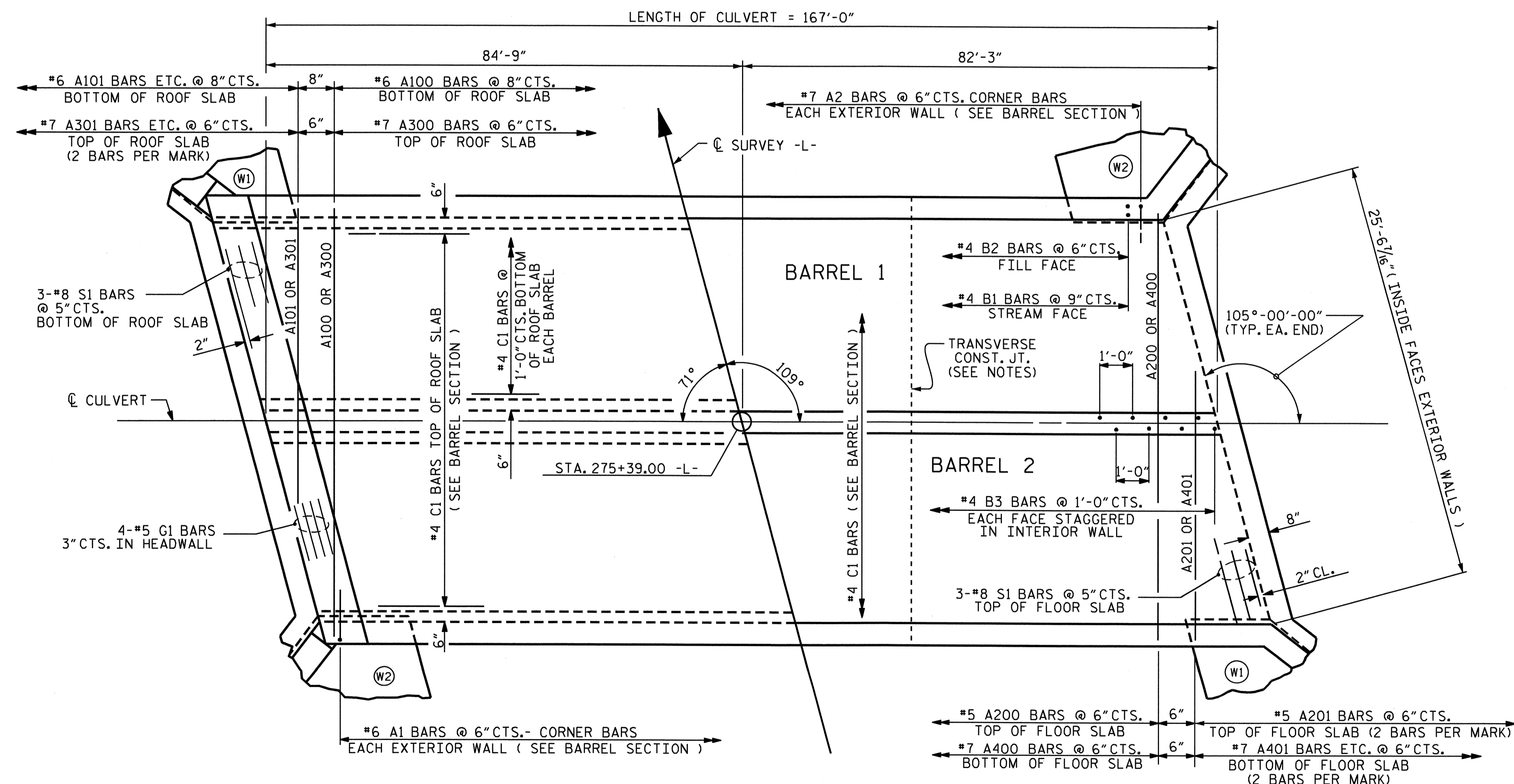
ASSEMBLED BY : T. BANKOVICH	DATE : 10-2009	SPECIAL
CHECKED BY : N. PIERCE	DATE : 11-2009	
DRAWN BY : R.W. WRIGHT	DATE : OCT. 1989	STANDARD
CHECKED BY : C.R.K.	DATE : OCT. 1989	



CULVERT SECTION NORMAL TO ROADWAY

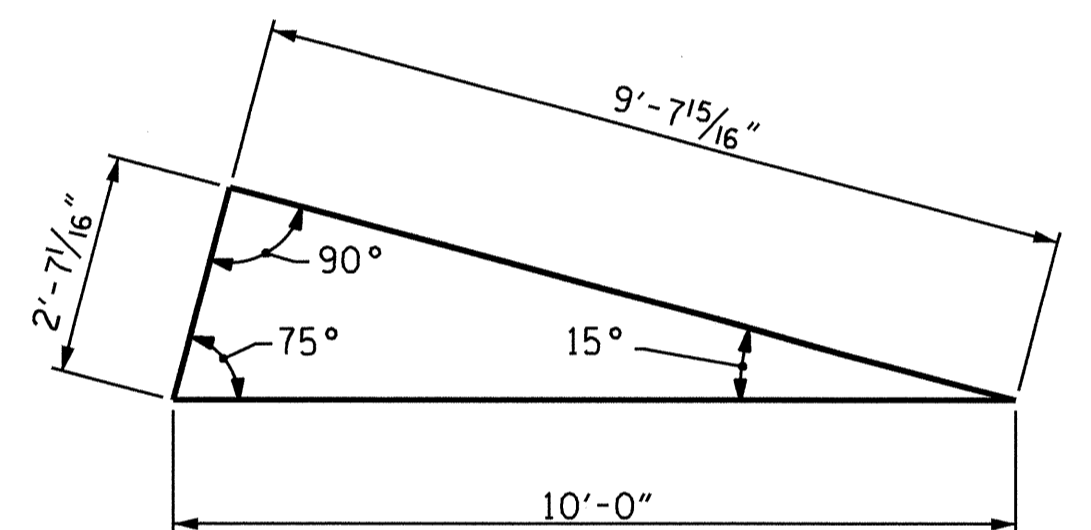


END ELEVATION NORMAL TO SKEW



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



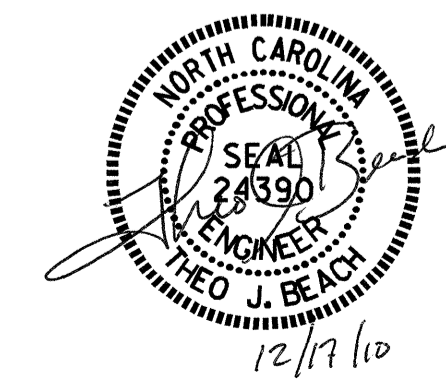
SKEW TRIANGLE

PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 275+39.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 12 FT. X 12 FT.
 CONCRETE BOX CULVERT
 109° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-26	
1			3			TOTAL SHEETS 29	
2			4				

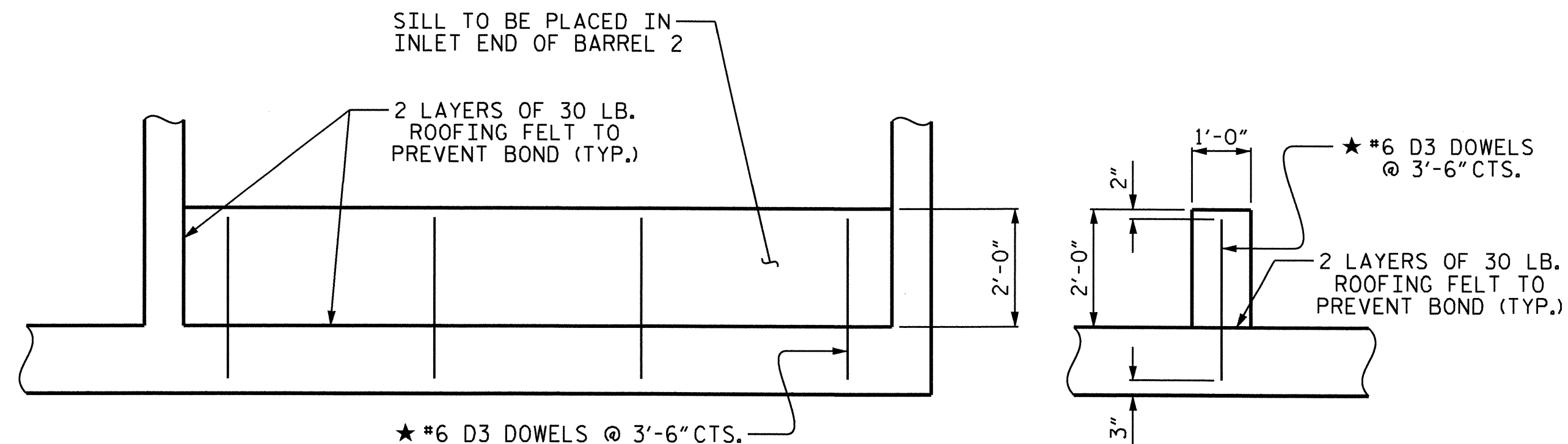


NOTE: C1 BARS ARE 6 BAR RUNS

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
 REDRAWN 11-30 BY A.R.B. CHECKED BY C.R.K.

ASSEMBLED BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: N. PIERCE DATE: 11-2009
 DRAWN BY: W. BRYAN STANLEY II DATE: NOV.1971
 CHECKED BY: JOEL A. JOHNSON DATE: DEC.1971

SPECIAL
 STANDARD



BARREL 2 SILL DETAILS

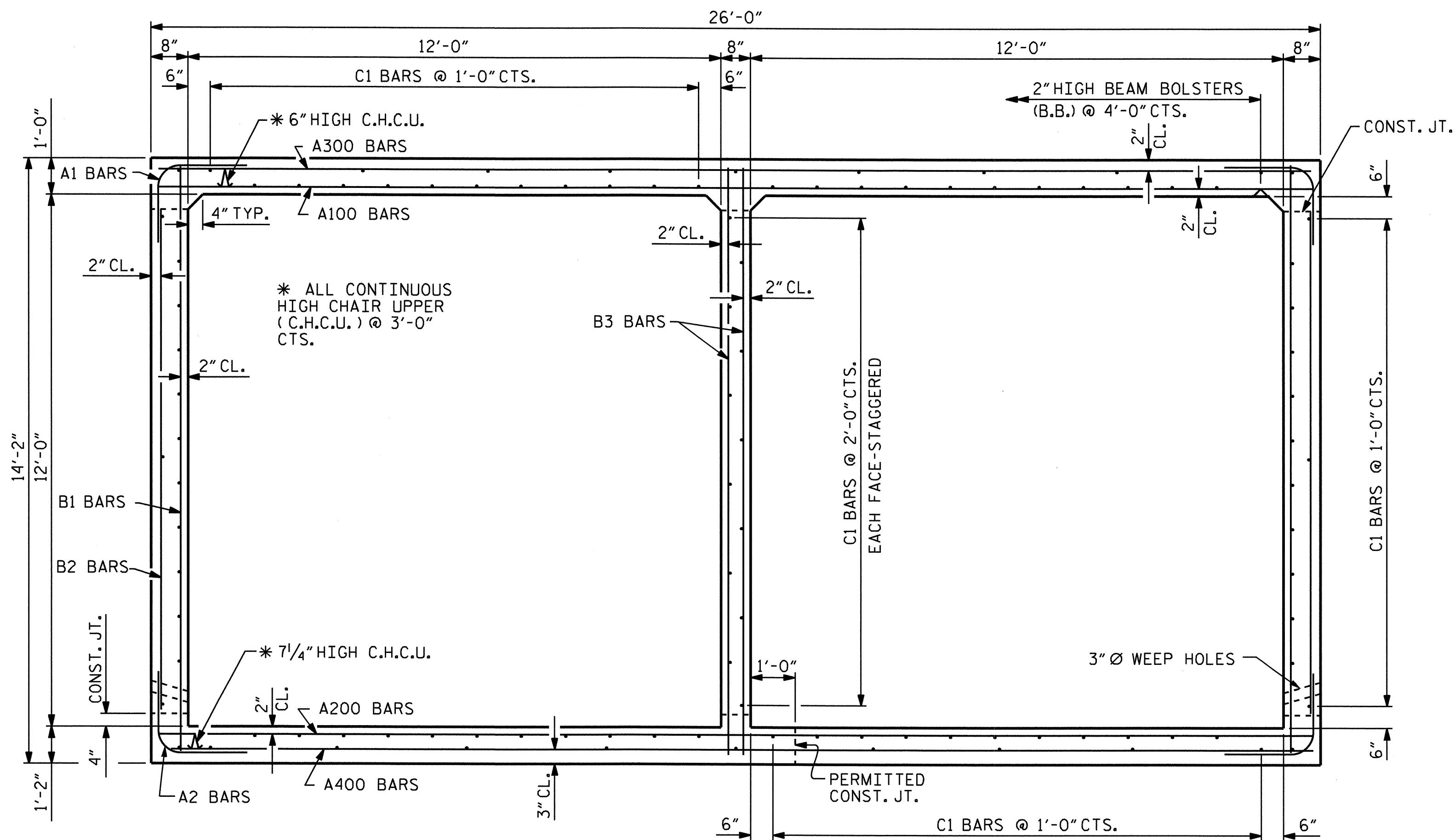
*DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

BAR TYPE		BILL OF MATERIAL										
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
A1	668	#6	1	5'-11"	5936	A305	4	#7	STR	7'-1"	58	
A2	668	#7	1	7'-2"	9785	A306	4	#7	STR	3'-4"	27	
A100	240	#6	STR	25'-7"	9222	A400	320	#7	STR	25'-7"	16734	
A101	2	#6	STR	23'-7"	71	A401	4	#7	STR	22'-0"	180	
A102	2	#6	STR	21'-1"	63	A402	4	#7	STR	18'-4"	150	
A103	2	#6	STR	18'-7"	56	A403	4	#7	STR	14'-7"	119	
A104	2	#6	STR	16'-1"	48	A404	4	#7	STR	10'-10"	89	
A105	2	#6	STR	13'-8"	41	A405	4	#7	STR	7'-1"	58	
A106	2	#6	STR	11'-2"	34	A406	4	#7	STR	3'-4"	27	
A107	2	#6	STR	8'-8"	26							
A108	2	#6	STR	6'-2"	19	B1	446	#4	STR	13'-8"	4072	
A109	2	#6	STR	3'-8"	11	B2	668	#4	STR	11'-4"	5057	
						B3	334	#4	STR	13'-8"	3049	
A200	320	#5	STR	25'-7"	8539							
A201	4	#5	STR	22'-0"	92	C1	624	#4	STR	29'-7"	12331	
A202	4	#5	STR	18'-4"	76							
A203	4	#5	STR	14'-7"	61	D1	18	#6	STR	1'-9"	47	
A204	4	#5	STR	10'-10"	45	D2	36	#6	STR	1'-3"	68	
A205	4	#5	STR	7'-1"	30	D3	4	#6	STR	2'-9"	17	
A206	4	#5	STR	3'-4"	14							
						G1	8	#5	STR	26'-6"	221	
B1	#4	1'-9"										
B3	#4	1'-9"										
C1	#4	1'-11"										
						A300	320	#7	STR	25'-7"	16734	
						A301	4	#7	STR	22'-0"	180	
						A302	4	#7	STR	18'-4"	150	
						A303	4	#7	STR	14'-7"	119	
						A304	4	#7	STR	10'-10"	89	
						TOTAL REINFORCING STEEL (LBS)						94,594

ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
A200	#5	1'-9"
A400	#7	3'-1"
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-11"



RIGHT ANGLE SECTION OF BARREL

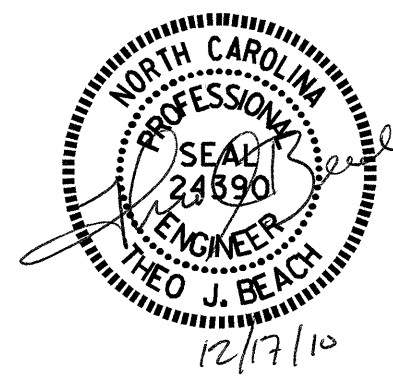
THERE ARE 104 "C" BARS IN SECTION OF BARREL.

PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 275+39.00 -L-
 SHEET 3 OF 5

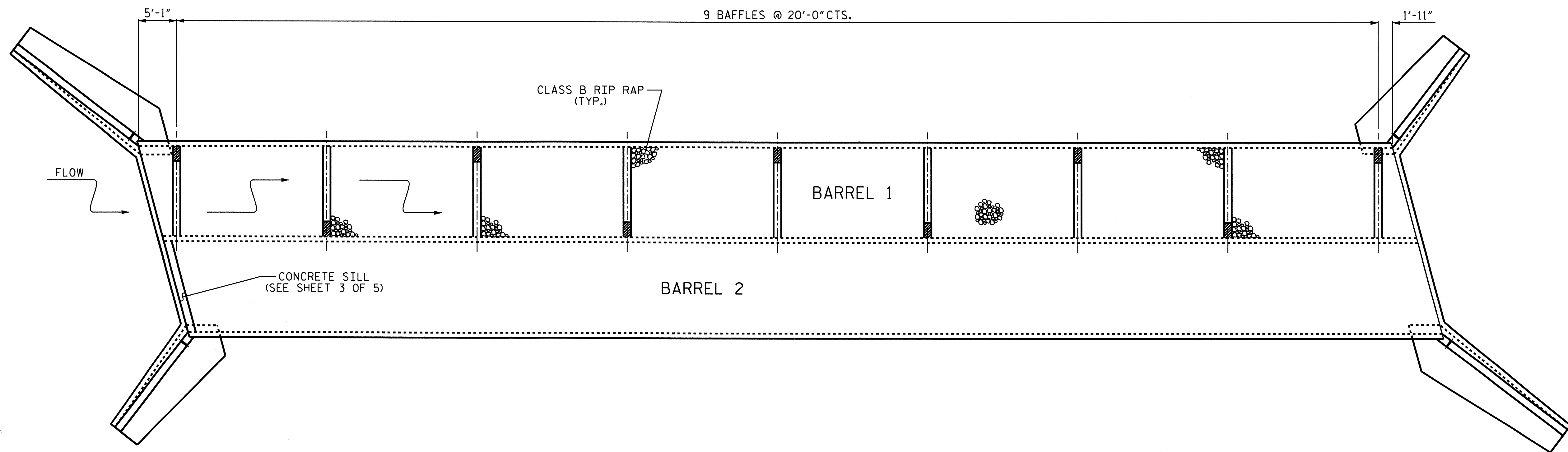
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 12 FT. X 12 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-27
1			3			TOTAL SHEETS 29
2			4			

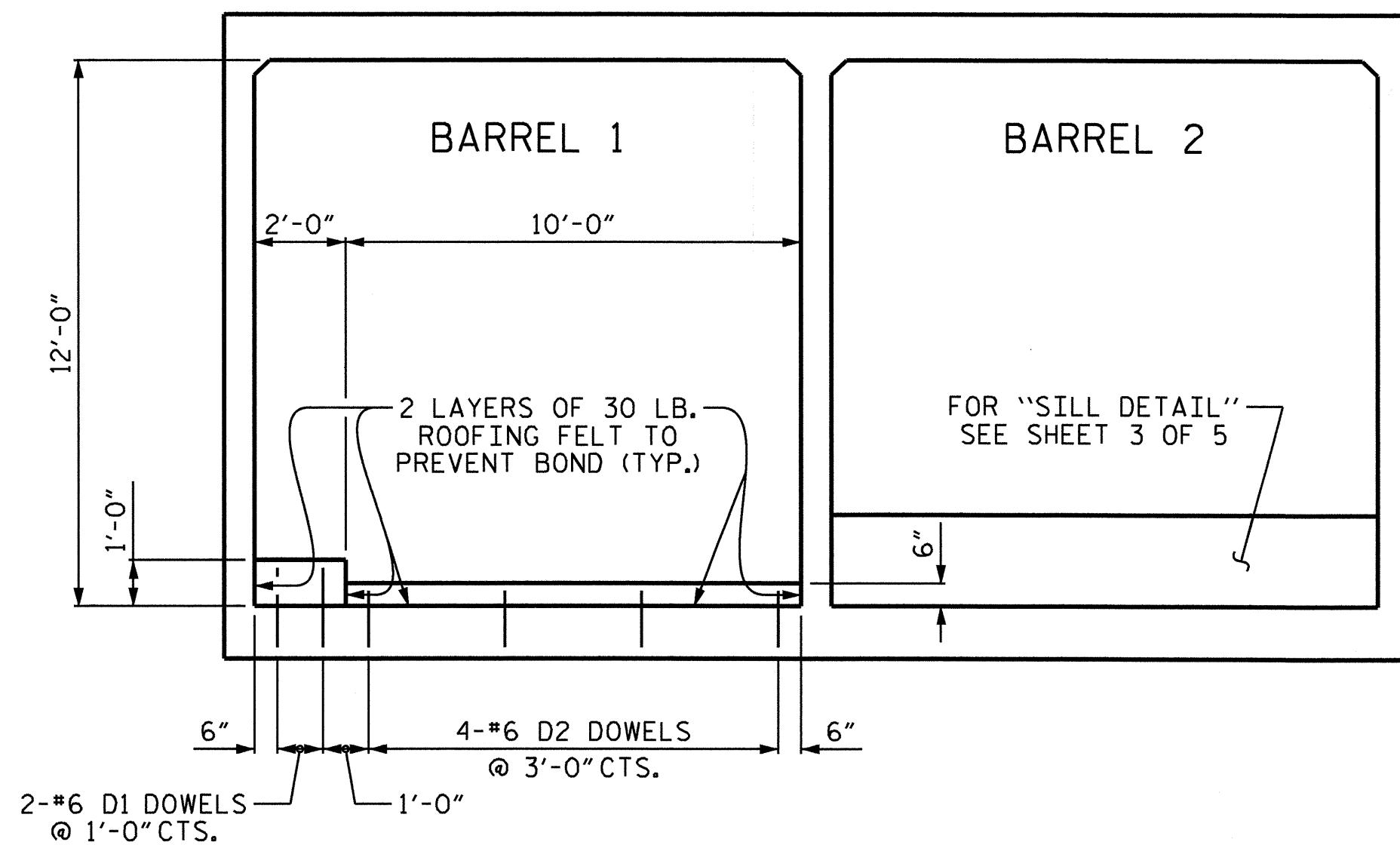


DRAWN BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: N. PIERCE DATE: 11-2009



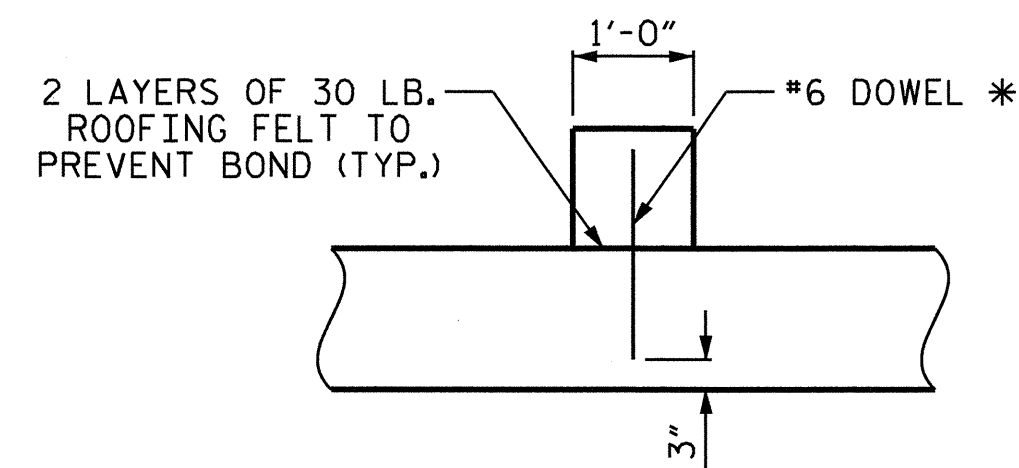
BAFFLE DETAIL - TOP VIEW

BED MATERIAL PLACED BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER BAFFLES. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER THAN 6 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER. PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION.



CULVERT BAFFLE DETAILS

ALTERNATE HIGH AND LOW SIDE OF BAFFLE TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT



SECTION THRU BAFFLE

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

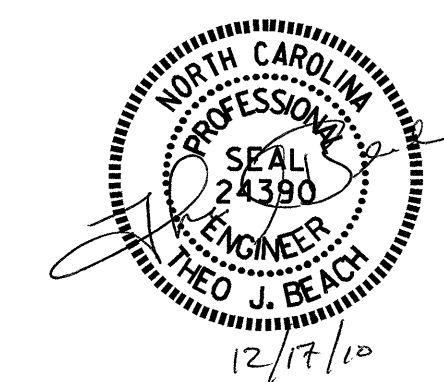
PROJECT NO. R-2814B
WAKE COUNTY
 STATION: 275+39.00 -L-

SHEET 4 OF 5

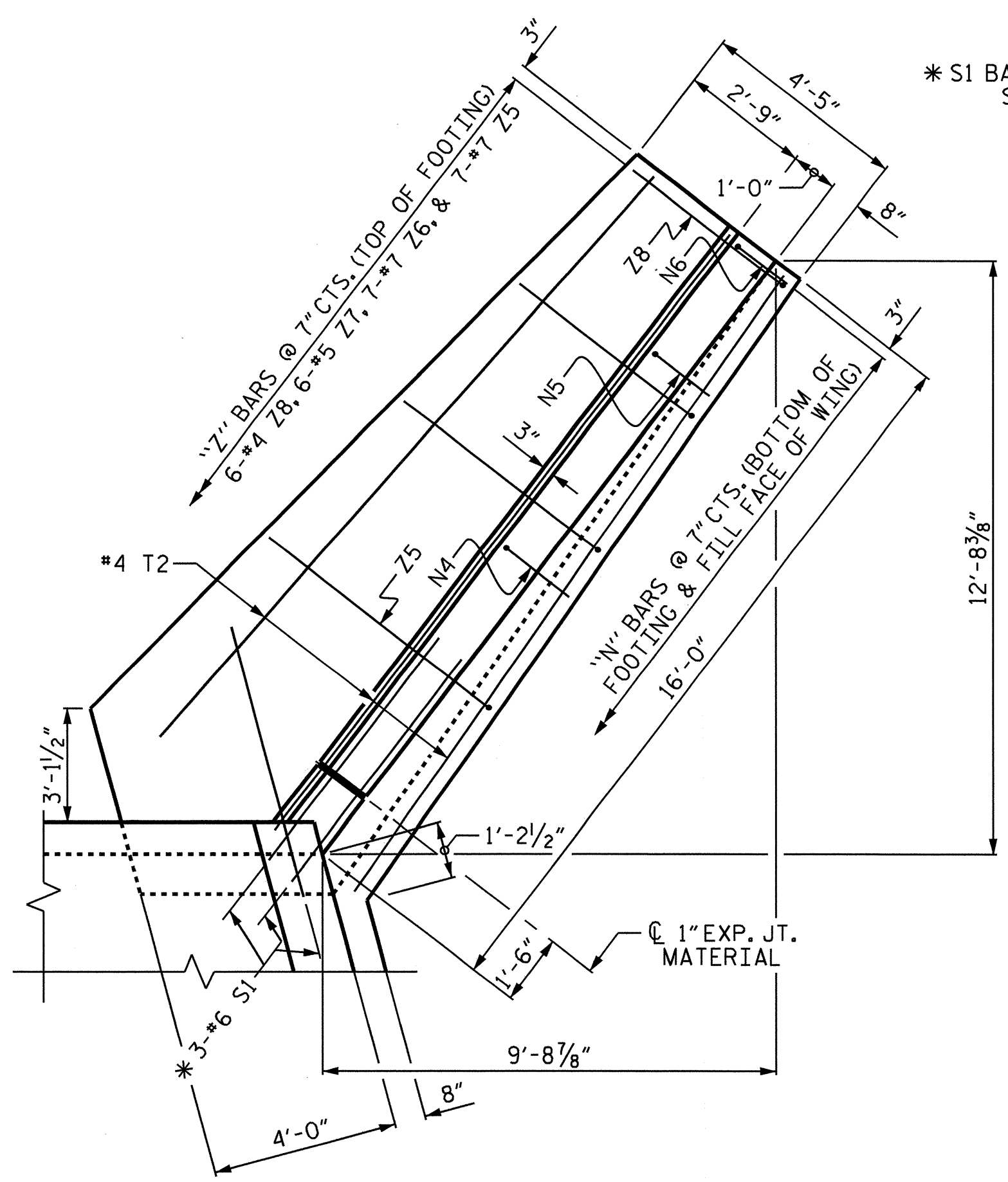
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BAFFLE DETAILS

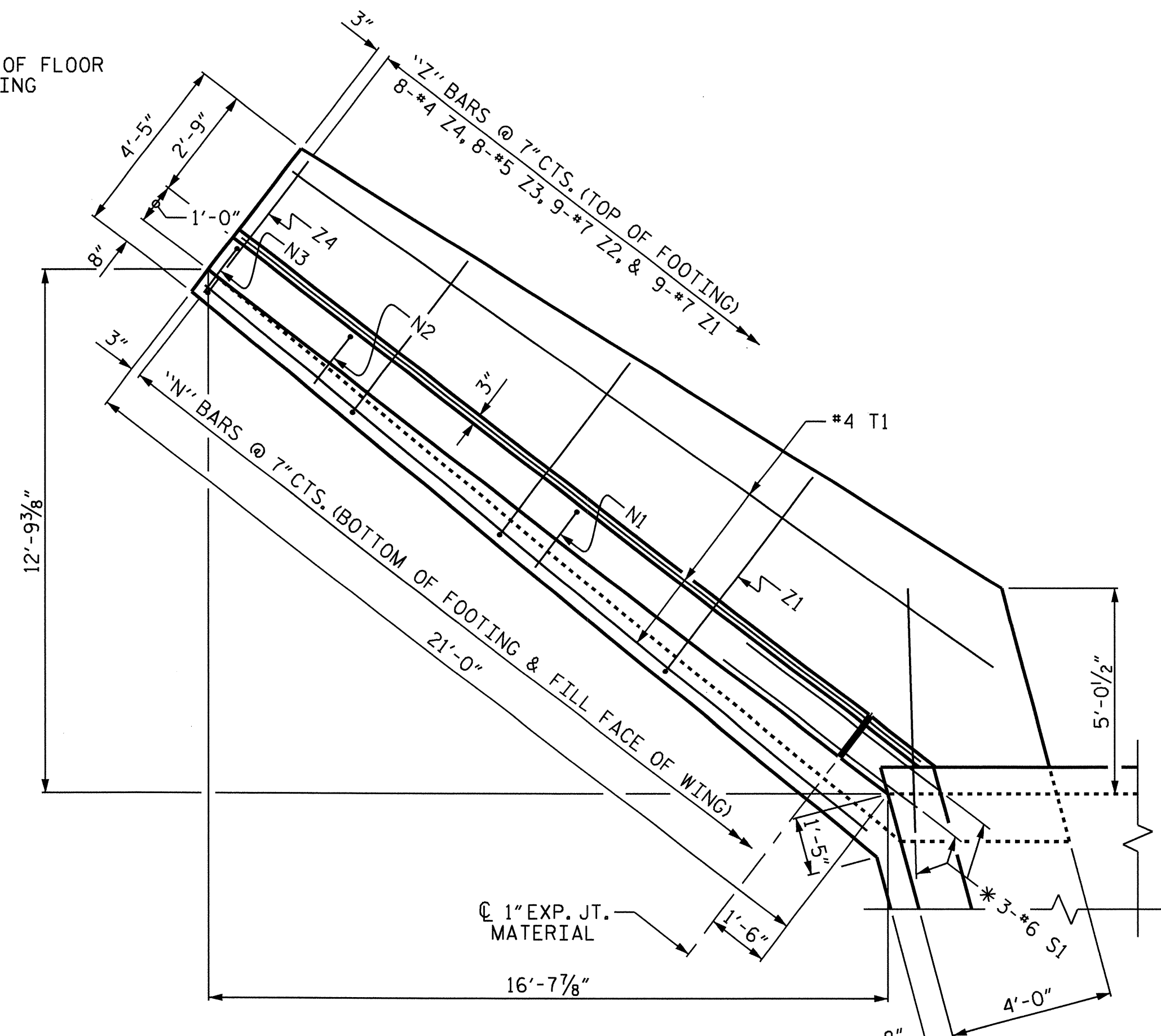
DRAWN BY : T. BANKOVICH DATE : 10-2009
 CHECKED BY : N. PIERCE DATE : 11-2009



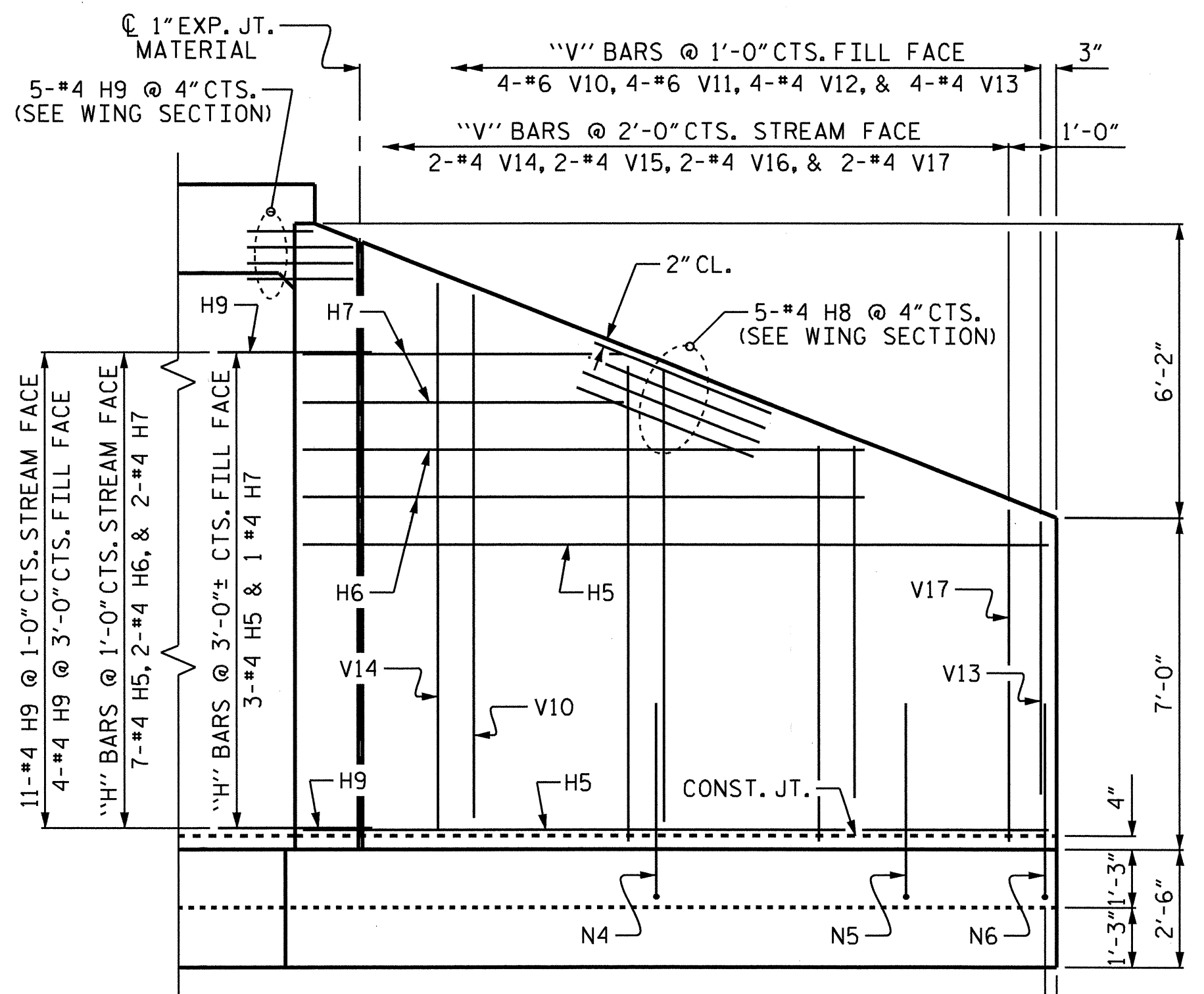
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-28
1			3			TOTAL SHEETS 29
2			4			



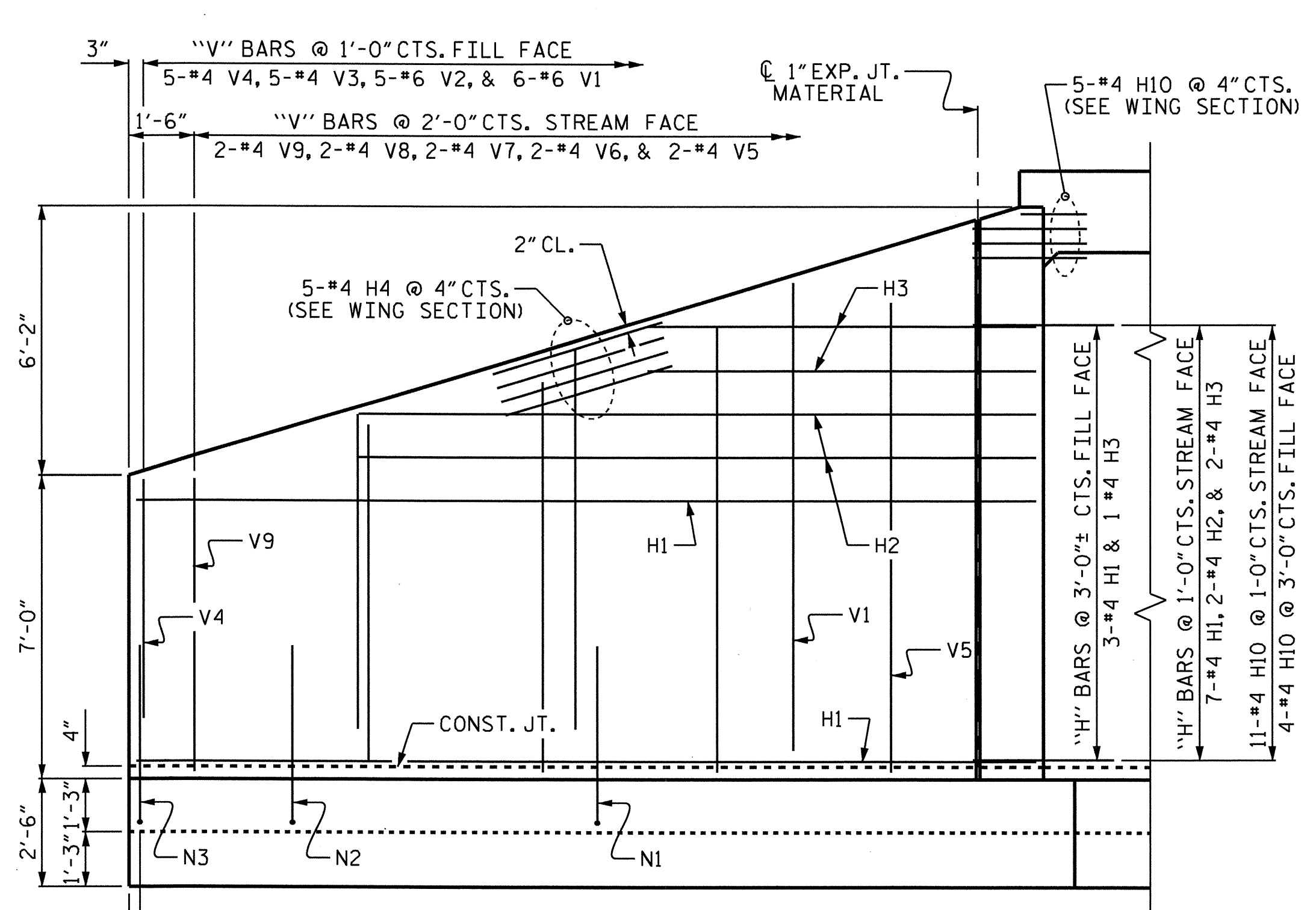
PLAN W2



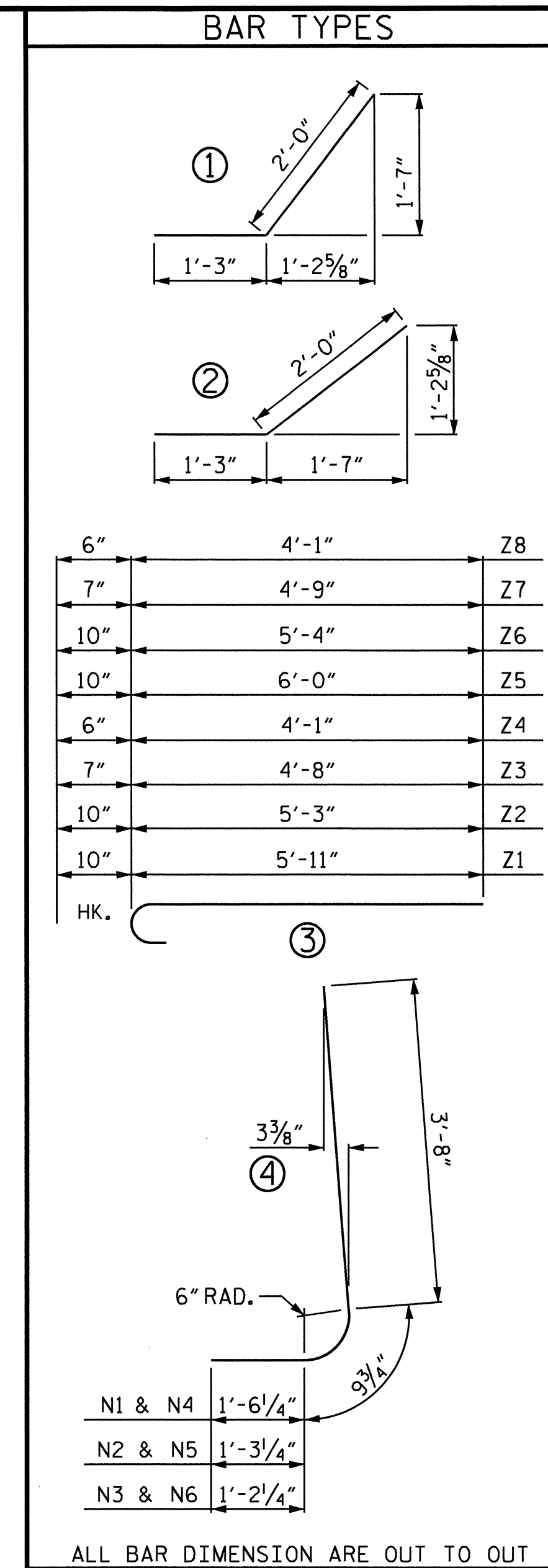
PLAN W1



ELEVATION W2



ELEVATION W1



ALL BAR DIMENSION ARE OUT TO OUT

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	20	#4	STR	19'-1"	255
H2	4	#4	STR	13'-7"	36
H3	6	#4	STR	6'-7"	26
H4	10	#4	STR	19'-3"	129
H5	20	#4	STR	14'-1"	188
H6	4	#4	STR	10'-1"	27
H7	6	#4	STR	4'-10"	19
H8	10	#4	STR	14'-6"	97
H9	40	#4	1	3'-3"	87
H10	40	#4	2	3'-3"	87
N1	32	#6	4	6'-0"	288
N2	24	#5	4	5'-9"	144
N3	12	#4	4	5'-8"	45
N4	24	#6	4	6'-0"	216
N5	18	#5	4	5'-9"	108
N6	10	#4	4	5'-8"	38
S1	12	#6	STR	6'-0"	108
T1	8	#4	STR	21'-0"	112
T2	8	#4	STR	16'-0"	86
V1	12	#6	STR	10'-9"	194
V2	10	#6	STR	9'-6"	143
V3	10	#4	STR	7'-3"	48
V4	10	#4	STR	5'-6"	37
V5	4	#4	STR	11'-6"	31
V6	4	#4	STR	10'-3"	27
V7	4	#4	STR	9'-0"	24
V8	4	#4	STR	7'-9"	21
V9	4	#4	STR	6'-9"	18
V10	8	#6	STR	11'-0"	132
V11	8	#6	STR	9'-6"	114
V12	8	#4	STR	7'-3"	39
V13	8	#4	STR	5'-9"	31
V14	4	#4	STR	11'-6"	31
V15	4	#4	STR	10'-0"	27
V16	4	#4	STR	8'-6"	23
V17	4	#4	STR	7'-0"	19
Z1	18	#7	3	6'-9"	248
Z2	18	#7	3	6'-1"	224
Z3	16	#5	3	5'-3"	88
Z4	16	#4	3	4'-7"	49
Z5	14	#7	3	6'-10"	196
Z6	14	#7	3	6'-2"	176
Z7	12	#5	3	5'-4"	67
Z8	12	#4	3	4'-7"	37

REINFORCING STEEL FOR 4 WINGS 4140 LBS.

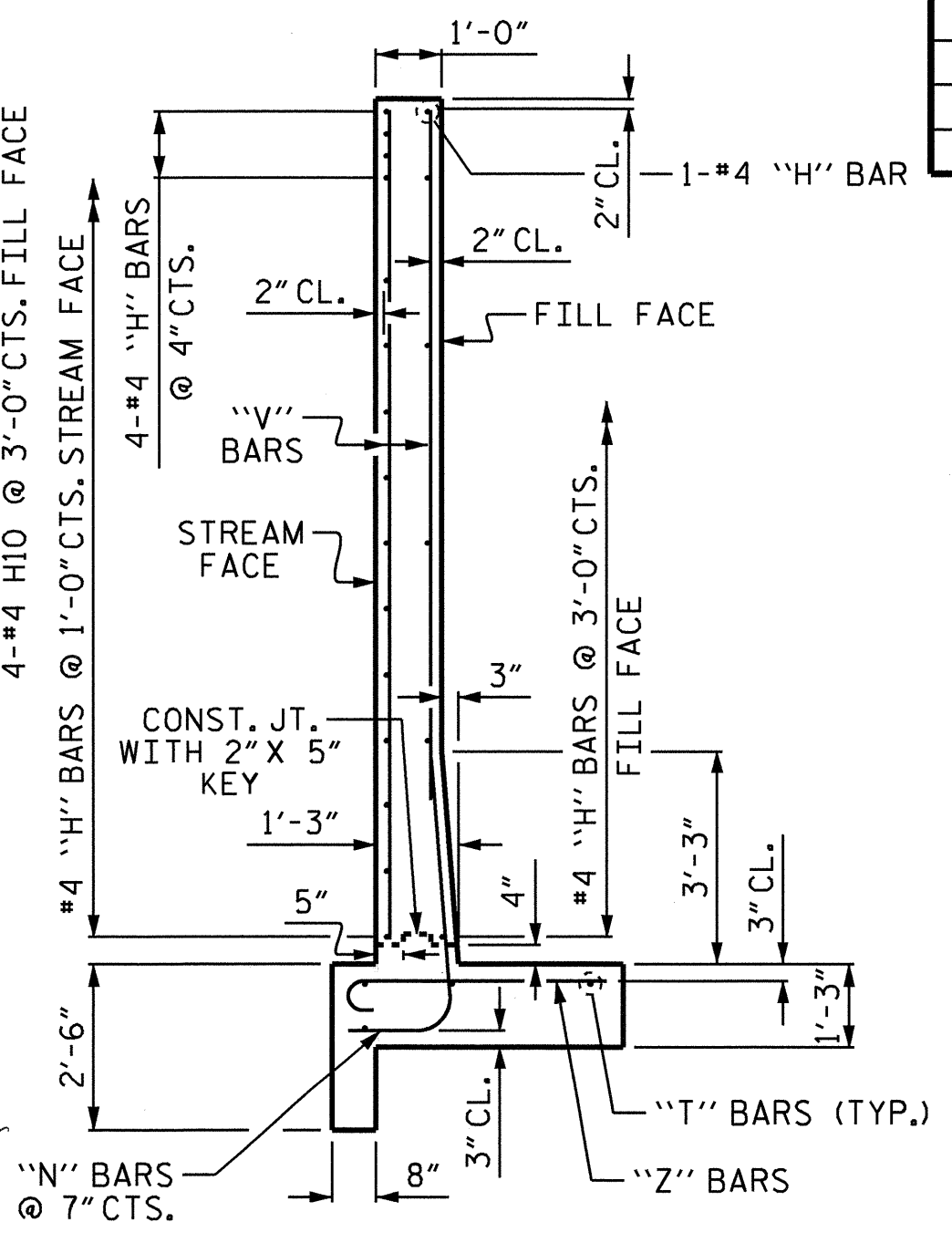
CLASS A CONCRETE

4 WINGS 51.3 CY

2 HEADWALLS 2.5 CY

2 CURTAIN WALLS 2.8 CY

TOTAL 56.6 CY



TYPICAL WING SECTION

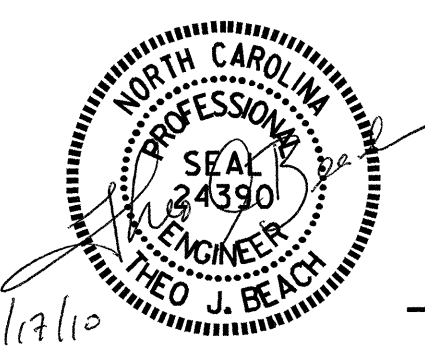
PROJECT NO. R-2814B
 WAKE COUNTY
 STATION: 275+39.00 -L-
 SHEET 5 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H= 12'-0" SLOPE = 2:1
 105° SKEW

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

SHEET NO. C-29
 TOTAL SHEETS 29

DRAWN BY: T. BANKOVICH DATE: 10-2009
 CHECKED BY: N. PIERCE DATE: 11-2009



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.

ENGLISH

JANUARY, 1990

STD. NO. SN