TIP PROJECT: B-5138

CONTRACT: C203301

CULVERT

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

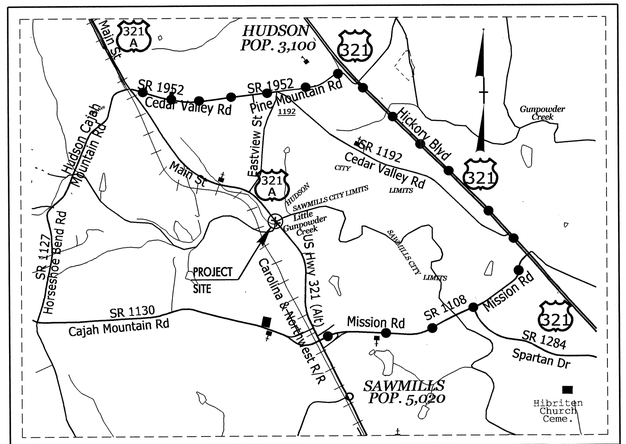
CALDWELL COUNTY

LOCATION: BRIDGE NO. 6 OVER LITTLE GUNPOWDER CREEK AND APPROACHES ON US 321A

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND CULVERT

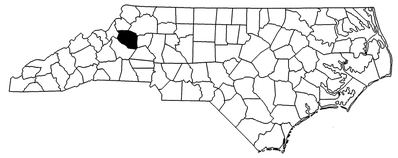
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5138		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42299.1.1	BRSTP-321A(3)	P.E.
42299.2.1	BRSTP-321A(3)	R/W, UTIL.
42299.3.FR1	BRSTP-321A(3)	CONST.



VICINITY MAP

DETOUR ROUTE



DESIGN DATA

ADT 2014 = 6,870 VPD
ADT 2035 = 8,000 VPD
DHV = 11 %
D = 55 %
T = 6 % *
V = 50 MPH
*(TTST=2% + DUAL=4%)
FUNC CLASS =
RURAL COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5138 = 0.029 MILE
LENGTH STRUCTURE TIP PROJECT B-5138 = 0.009 MILE
TOTAL LENGTH OF PROJECT B-5138 = 0.038 MILE

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 21, 2014

Q. H. NGUYEN, PE
PROJECT ENGINEER

B. D. KLAPPENBACH, PE
PROJECT DESIGN ENGINEER

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

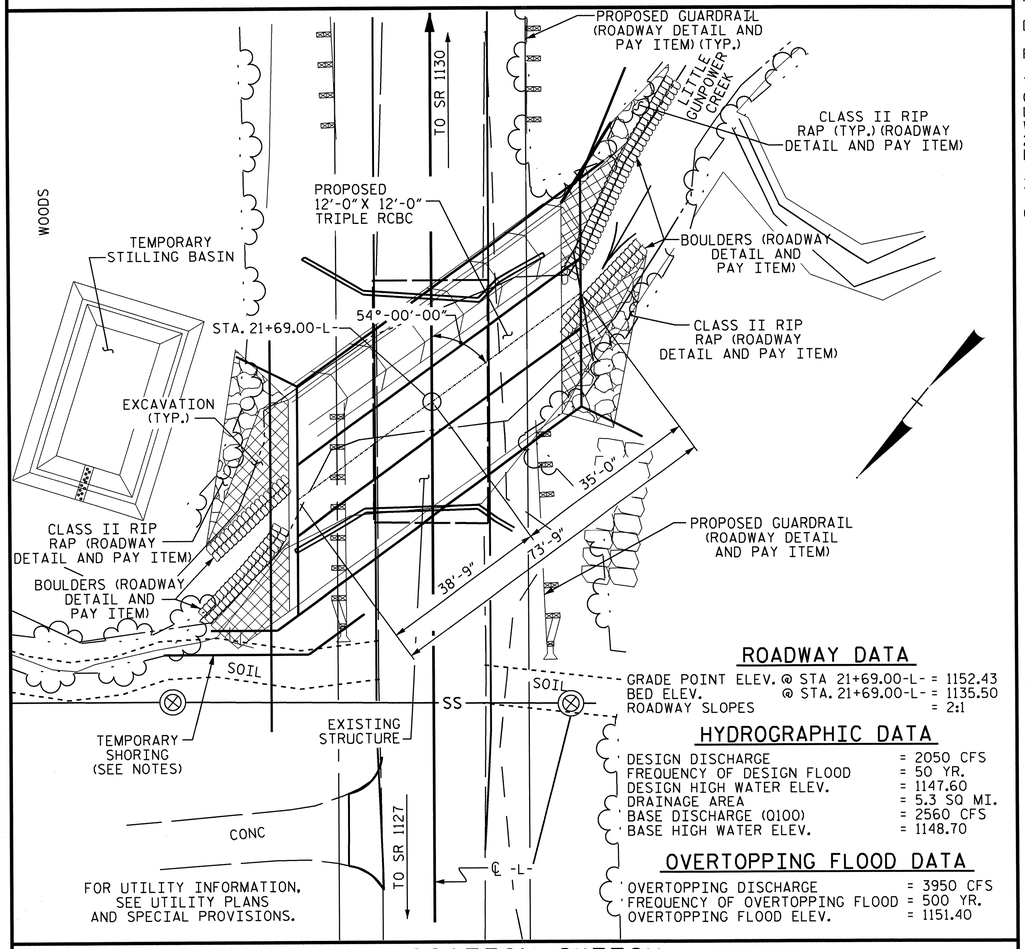
P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
ENGINEER DIVISION ADMINISTRATION *DATE*

15-NOV-2013 07:35
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
tbarbour

BM #1: 8" SPIKE IN ROOT OF 10" Ø SYCAMORE TREE EL. 1145.54
N 768670, E 1264583 STA. 21+00.00-L- 93.00' RT. NAVD 88



LOCATION SKETCH

ROADWAY DATA

GRADE POINT ELEV.	@ STA 21+69.00-L-	= 1152.43
BED ELEV.	@ STA. 21+69.00-L-	= 1135.50
ROADWAY SLOPES		= 2:1

HYDROGRAPHIC DATA

DESIGN DISCHARGE	= 2050 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEV.	= 1147.60
DRAINAGE AREA	= 5.3 SQ MI.
BASE DISCHARGE (Q100)	= 2560 CFS
BASE HIGH WATER ELEV.	= 1148.70

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 3950 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500 YR.
OVERTOPPING FLOOD ELEV.	= 1151.40

NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 3.91 FT. (MIN.) AND 5.52 FT. (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

THE EXISTING STRUCTURE CONSISTING OF ONE SPAN @ 47'-0", WITH A 6" ASPHALT OVERLAY ON 3 LINES OF 44" STEEL REINFORCED CONCRETE DECK GIRDERS AND 1 LINE OF 39" STEEL REINFORCED CONCRETE DECK GIRDER, WITH A CLEAR ROADWAY WIDTH OF 23.8' ON STEEL REINFORCED CONCRETE ABUTMENTS @ END BENTS 1 AND 2 LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. SEE SPECIAL PROVISION FOR THE REMOVAL OF EXISTING STRUCTURE AT STA. 21+69.00-L-.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF BARRELS 1 & 2 VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.
2. THE REMAINING PORTIONS OF BARRELS 1 & 2 WALLS, CONCRETE SILL IN BARREL 1 AND WINGS FULL HEIGHT.

STAGE II

1. WING FOOTINGS AND FLOOR SLAB AND INCLUDING 4" OF BARREL 3 EXTERIOR VERTICAL WALL AND CURTAIN WALLS TO CONSTRUCTION JOINTS.
2. THE REMAINING PORTION OF BARREL 3 EXTERIOR WALL, CONCRETE SILL AND WING FULL HEIGHT.
3. ROOF SLAB FOR ALL BARRELS 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 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

TEMPORARY SHORING NOTES

FOR TEMPORARY SHORING AND POSITIVE PROTECTION FOR TEMPORARY SHORING, SEE PLANS AND TEMPORARY SHORING PROVISION.

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

DESIGN TEMPORARY SHORING FROM STATION 21+23-L-, 10 FT. LEFT. TO STATION 21+10-L-, 63 FT. LEFT. FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

UNIT WEIGHT (γ) = 120 LB/CF
FRICTION ANGLE (Φ) = 30 DEGREES
COHESION (c) = 0 LB/SF
GROUNDWATER ELEVATION = 1138 FT.

NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM STATION 21+23-L-, 10 FT. LEFT, TO STATION 21+10-L-, 63 FT. LEFT. THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING FOR TEMPORARY SHORING FROM STATION 21+23-L-, 10FT. LEFT. TO STATION 21+10-L-, 63 FT. LEFT. SEE STANDARD DRAWING No. 1801.01 FOR STANDARD TEMPORARY SHORING.

IT MAY BE PREFERRED TO USE A TEMPORARY SOIL NAIL WALL FROM STATION 21+23-L-, 10 FT. LEFT, TO STATION 21+10-L-, 63 FT. LEFT. FOR TEMPORARY SOIL NAIL WALLS, SEE TEMPORARY SOIL NAIL WALLS PROVISION.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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

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 SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

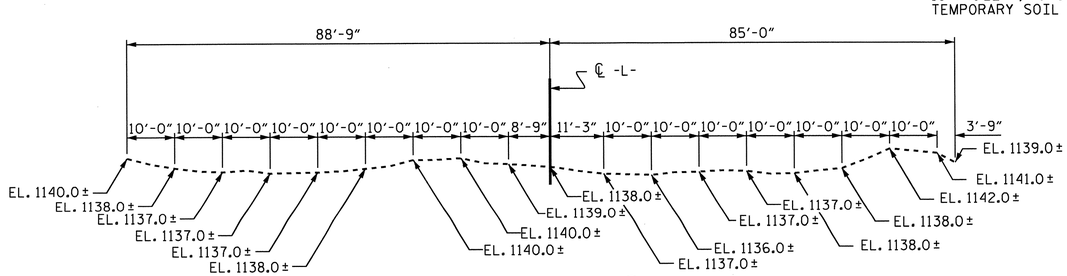
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.



PROFILE ALONG ℄ CULVERT

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 3.926 CY/FT	290.0	C.Y.
WING ETC.	71.2	C.Y.
TOTAL	361.2	C.Y.
REINFORCING STEEL		
BARREL	44652	LBS.
WINGS ETC.	5901	LBS.
TOTAL	50553	LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL		222 TONS
REMOVAL OF EXISTING STRUCTURE		LUMP SUM
TEMPORARY SHORING		430 SF

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 13014 ENGINEER QUANG H. NGUYEN
Quang H. Nguyen 11-21-13

NORTH CAROLINA PROFESSIONAL SEAL 5828 ENGINEER BRUCE D. KLAPPENBACH
11-21-2013

F. A. PROJECT NO. BRSTP-321A(3)

PROJECT NO. B-5138
CALDWELL COUNTY
STATION: 21+69.00-L-
SHEET 1 OF 9 REPLACES BRIDGE #6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 12 FT. CONCRETE BOX CULVERT 54°-00'-00" SKEW

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

DRAWN BY : H. T. BARBOUR DATE : 2-22-12
CHECKED BY : D. A. GLADDEN DATE : 2-12

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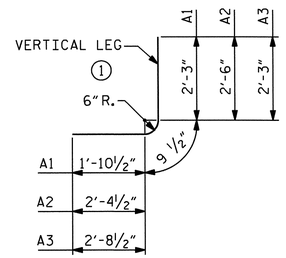
tbarbour

BILL OF MATERIAL

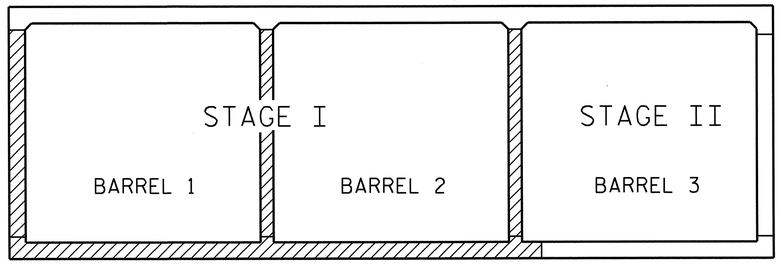
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	322	#4	1	4'-11"	1058	A250	142	#4	STR	11'-4"	1075	A421	3	#5	STR	16'-2"	51
A2	322	#5	1	5'-8"	1903	A251	3	#4	STR	9'-10"	20	A422	3	#5	STR	14'-3"	45
A3	294	#4	1	5'-9"	1129	A252	3	#4	STR	7'-11"	16	A423	3	#5	STR	12'-5"	39
						A253	3	#4	STR	6'-0"	12	A424	3	#5	STR	10'-6"	33
A100	99	#5	STR	38'-5"	3967	A254	3	#4	STR	4'-1"	8	A425	3	#5	STR	8'-7"	27
A101	6	#5	STR	36'-10"	231	A255	3	#4	STR	2'-3"	5	A426	3	#5	STR	6'-9"	21
A102	6	#5	STR	34'-11"	219	A256	3	#4	STR	9'-9"	20	A427	3	#5	STR	4'-10"	15
A103	6	#5	STR	33'-1"	207	A257	3	#4	STR	7'-10"	16						
A104	6	#5	STR	31'-2"	195	A258	3	#4	STR	5'-11"	12						
A105	6	#5	STR	29'-3"	183	A259	3	#4	STR	4'-0"	8	A450	142	#5	STR	11'-4"	1679
A106	6	#5	STR	27'-4"	171	A260	3	#4	STR	2'-2"	4	A451	3	#5	STR	9'-10"	31
A107	6	#5	STR	25'-6"	160							A452	3	#5	STR	7'-11"	25
A108	6	#5	STR	23'-7"	148	A300	99	#5	STR	38'-5"	3967	A453	3	#5	STR	6'-0"	19
A109	6	#5	STR	21'-8"	136	A301	6	#5	STR	36'-10"	231	A454	3	#5	STR	4'-1"	13
A110	6	#5	STR	19'-10"	124	A302	6	#5	STR	34'-11"	219	A455	3	#5	STR	2'-3"	7
A111	6	#5	STR	17'-11"	112	A303	6	#5	STR	33'-1"	207	A456	3	#5	STR	9'-9"	31
A112	6	#5	STR	16'-0"	100	A304	6	#5	STR	31'-2"	195	A457	3	#5	STR	7'-10"	25
A113	6	#5	STR	14'-2"	89	A305	6	#5	STR	29'-3"	183	A458	3	#5	STR	5'-11"	19
A114	6	#5	STR	12'-3"	77	A306	6	#5	STR	27'-4"	171	A459	3	#5	STR	4'-0"	13
A115	6	#5	STR	10'-4"	65	A307	6	#5	STR	25'-6"	160	A460	3	#5	STR	2'-2"	7
A116	6	#5	STR	8'-5"	53	A308	6	#5	STR	23'-7"	148						
A117	6	#5	STR	6'-7"	41	A309	6	#5	STR	21'-8"	136	B1	162	#5	STR	13'-4"	2253
A118	6	#5	STR	4'-8"	29	A310	6	#5	STR	19'-10"	124	B2	322	#4	STR	11'-4"	2438
A119	6	#5	STR	2'-9"	17	A311	6	#5	STR	17'-11"	112	B3	296	#4	STR	13'-4"	2636
						A312	6	#5	STR	16'-0"	100						
A200	114	#4	STR	29'-1"	2215	A313	6	#5	STR	14'-2"	89	C1	444	#4	STR	25'-10"	7662
A201	3	#4	STR	27'-4"	55	A314	6	#5	STR	12'-3"	77						
A202	3	#4	STR	25'-6"	51	A315	6	#5	STR	10'-4"	65	D1	6	#6	STR	2'-11"	26
A203	3	#4	STR	23'-7"	47	A316	6	#5	STR	8'-5"	53						
A204	3	#4	STR	21'-8"	43	A317	6	#5	STR	6'-7"	41	G1	8	#5	STR	47'-5"	396
A205	3	#4	STR	19'-10"	40	A318	6	#5	STR	4'-8"	29						
A206	3	#4	STR	17'-11"	36	A319	6	#5	STR	2'-9"	17	S2	6	#8	STR	47'-5"	760
A207	3	#4	STR	16'-0"	32							S3	6	#8	STR	14'-1"	226
A208	3	#4	STR	14'-2"	28	A400	114	#5	STR	29'-1"	3458	S4	6	#8	STR	38'-5"	615
A209	3	#4	STR	12'-3"	25	A401	3	#5	STR	27'-4"	86						
A210	3	#4	STR	10'-4"	21	A402	3	#5	STR	25'-6"	80						
A211	3	#4	STR	8'-5"	17	A403	3	#5	STR	23'-7"	74						
A212	3	#4	STR	6'-7"	13	A404	3	#5	STR	21'-8"	68						
A213	3	#4	STR	4'-8"	9	A405	3	#5	STR	19'-10"	62						
A214	3	#4	STR	2'-9"	6	A406	3	#5	STR	17'-11"	56						
A215	3	#4	STR	27'-7"	55	A407	3	#5	STR	16'-0"	50						
A216	3	#4	STR	25'-8"	51	A408	3	#5	STR	14'-2"	44						
A217	3	#4	STR	23'-9"	48	A409	3	#5	STR	12'-3"	38						
A218	3	#4	STR	21'-10"	44	A410	3	#5	STR	10'-4"	32						
A219	3	#4	STR	20'-0"	40	A411	3	#5	STR	8'-5"	26						
A220	3	#4	STR	18'-1"	36	A412	3	#5	STR	6'-7"	21						
A221	3	#4	STR	16'-2"	32	A413	3	#5	STR	4'-8"	15						
A222	3	#4	STR	14'-3"	29	A414	3	#5	STR	2'-9"	9						
A223	3	#4	STR	12'-5"	25	A415	3	#5	STR	27'-7"	86						
A224	3	#4	STR	10'-6"	21	A416	3	#5	STR	25'-8"	80						
A225	3	#4	STR	8'-7"	17	A417	3	#5	STR	23'-9"	74						
A226	3	#4	STR	6'-9"	14	A418	3	#5	STR	21'-10"	68						
A227	3	#4	STR	4'-10"	10	A419	3	#5	STR	20'-0"	63						
						A420	3	#5	STR	18'-1"	57						

REINFORCING STEEL = 44652 LBS

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT



STAGE I & II LOOKING DOWNSTREAM

DENOTES STAGE I

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
A200	#4	2'-0"
A400	#5	2'-0"
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-11"

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 12 FT. CONCRETE BOX CULVERT 54°-00'-00" SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER D. KLAPPENBACH
11-21-2013

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

DRAWN BY : H. T. BARBOUR DATE : 2-23-12
CHECKED BY : D. A. GLADDEN DATE : 2-12

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tbarbour

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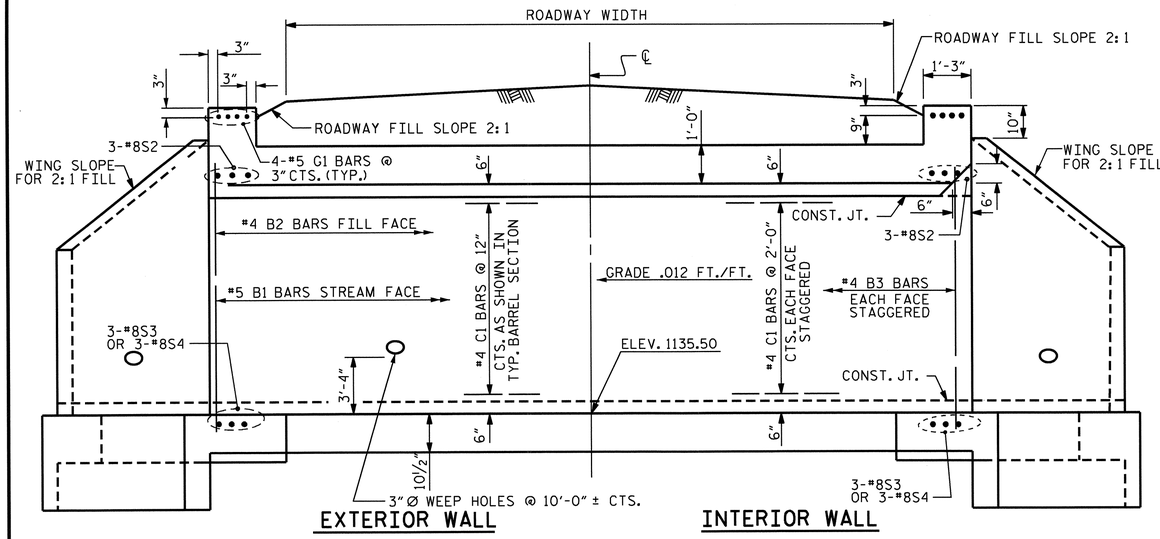
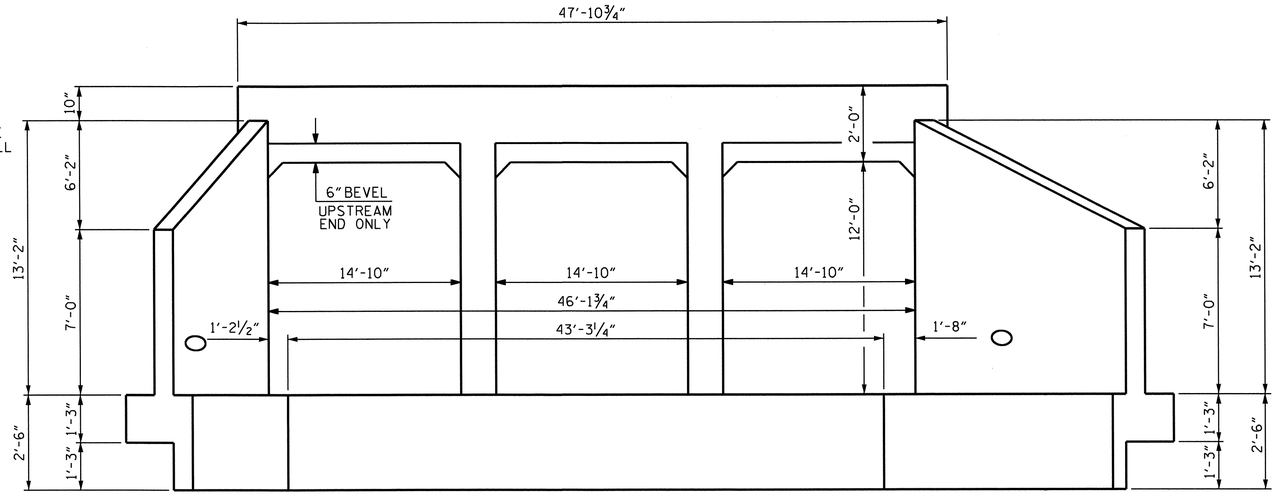
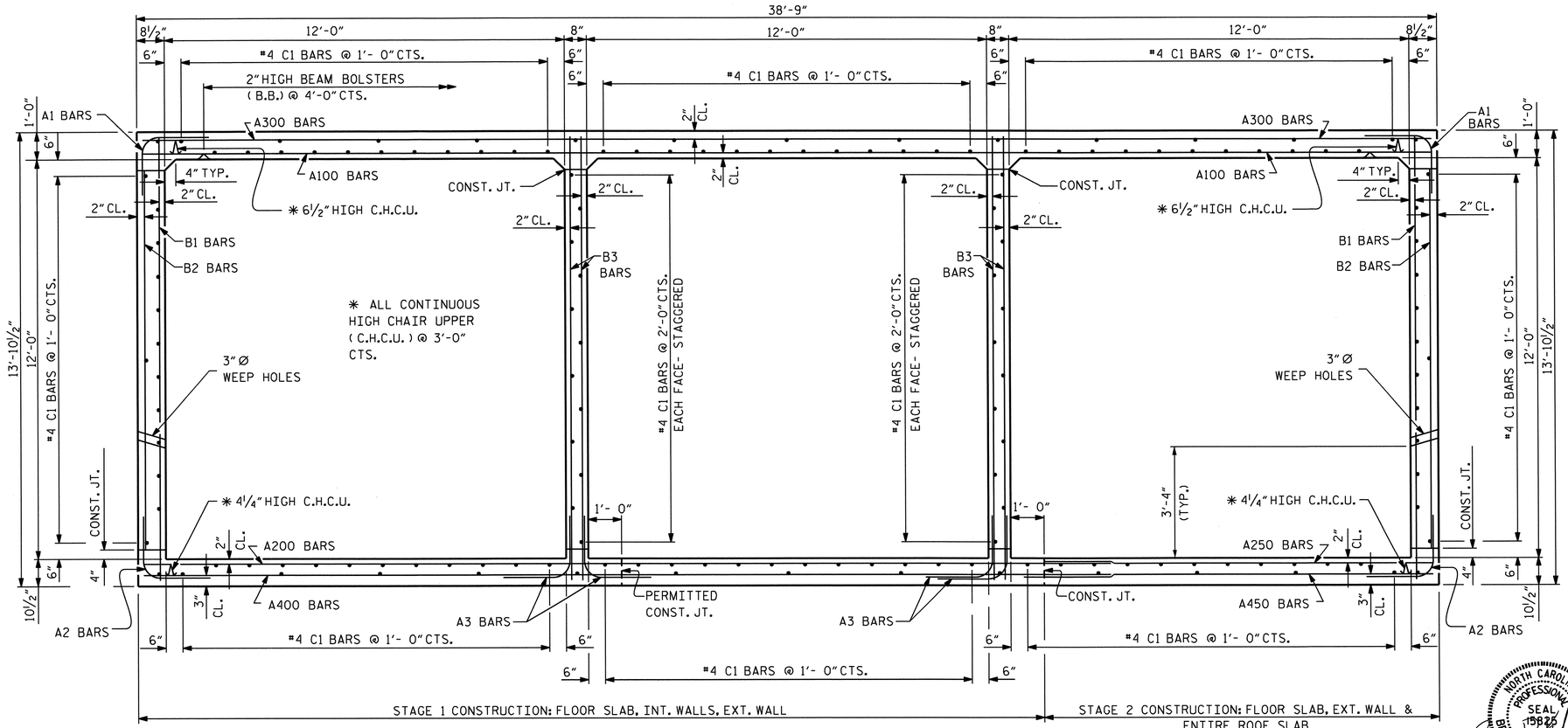
tbarbour



CULVERT SECTION NORMAL TO ROADWAY

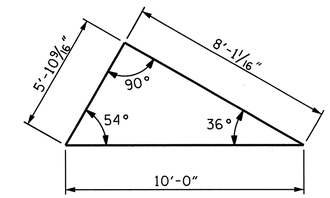


END ELEVATION-NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 148 "C" BARS IN SECTION OF BARREL.
(LOOKING DOWNSTREAM)



SKEW TRIANGLE

REVISED 11-19-99 BY M.W. CHECKED BY R.W.W.
REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
REDRAWN NOV.1990 BY B.E.W., CHECKED BY M.A.J.

ASSEMBLED BY : H. T. BARBOUR DATE : 2-20-12
CHECKED BY : D. A. GLADDEN DATE : 2-12

DRAWN BY : H.A. JUDEH DATE : JULY 15,1971
CHECKED BY : RALPH D. UNDERWOOD DATE : AUG.4, 1971

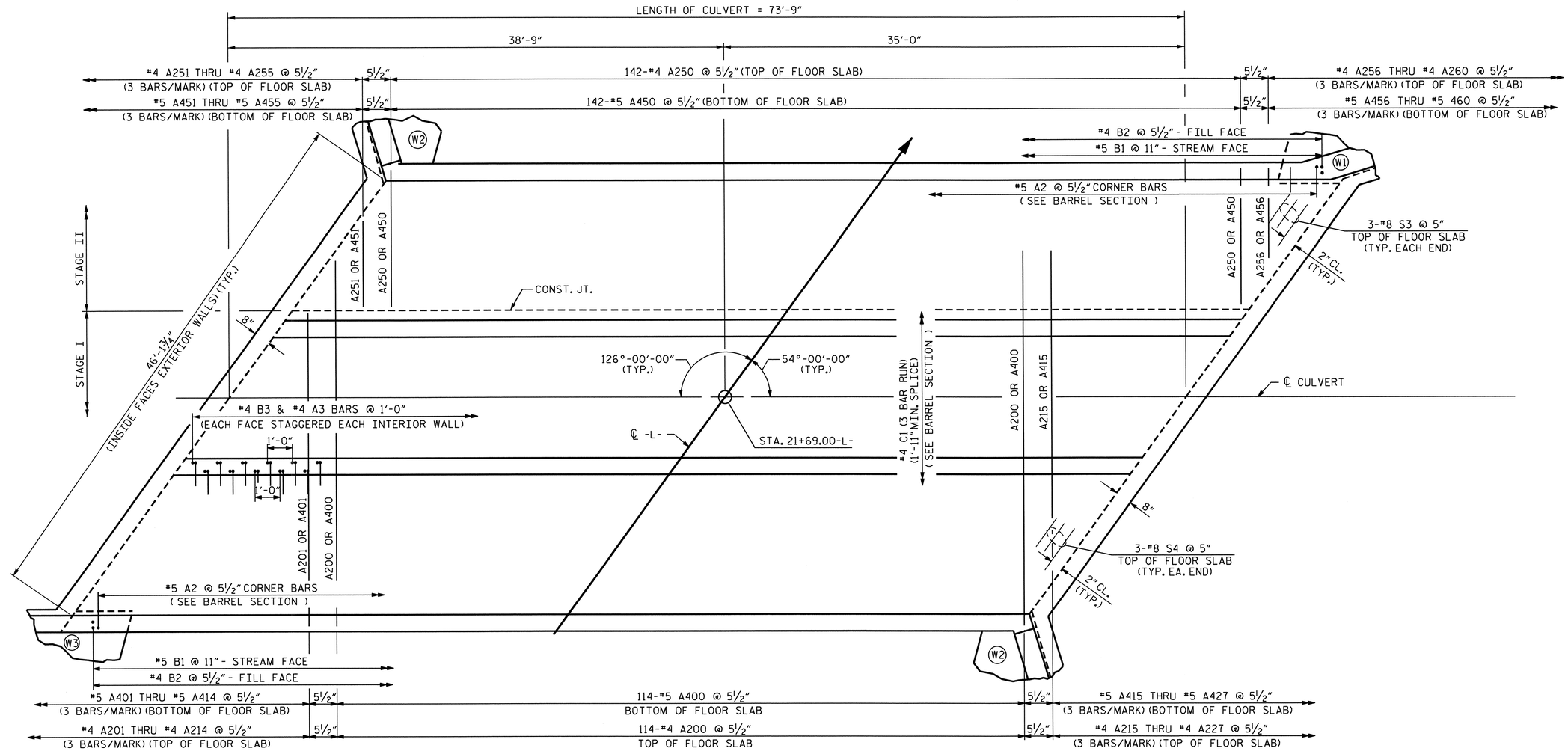
PROJECT NO. B-5138
CALDWELL COUNTY
STATION: 21+69.00-L-

SHEET 3 OF 9

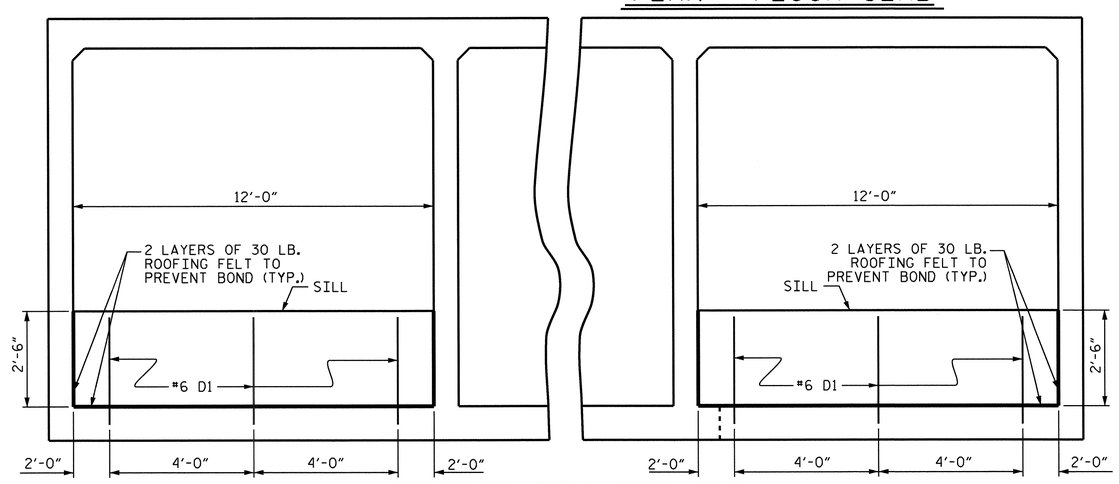
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
TRIPLE 12 FT. X 12 FT.
CONCRETE BOX CULVERT
54°-00'-00" SKEW

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

STD. NO. CB33

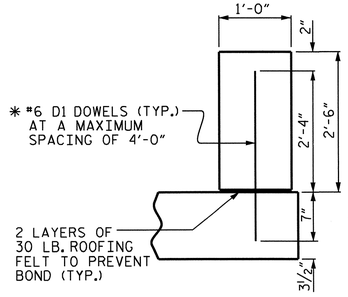


PLAN - FLOOR SLAB



CULVERT SILL DETAILS

(INLET END ONLY)



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

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 12 FT. CONCRETE BOX CULVERT 54°-00'-00" SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBERGER
11-14-2013

DRAWN BY : H. T. BARBOUR DATE : 2-20-12
CHECKED BY : D. A. GLADDEN DATE : 2-12

15-NOV-2013 09:11
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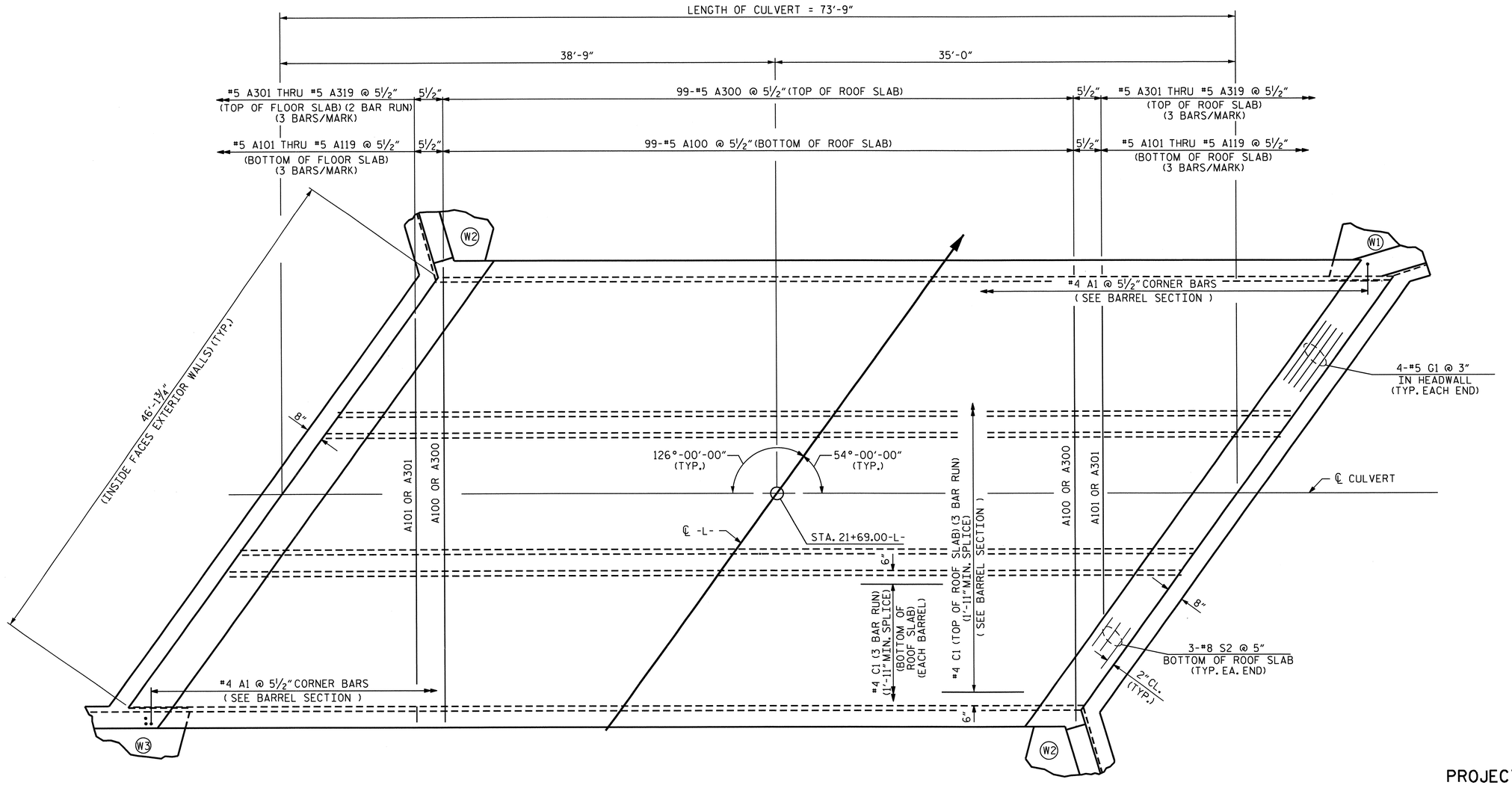
tbarbour



PLAN - ROOF SLAB

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 12 FT. CONCRETE BOX CULVERT 54°-00'-00" SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15822 ENGINEER D. KLAPPENBACH
11-21-2013

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			9

DRAWN BY : H. T. BARBOUR DATE : 2-21-12
CHECKED BY : D. A. GLADDEN DATE : 2-12

15-NOV-2013 07:34
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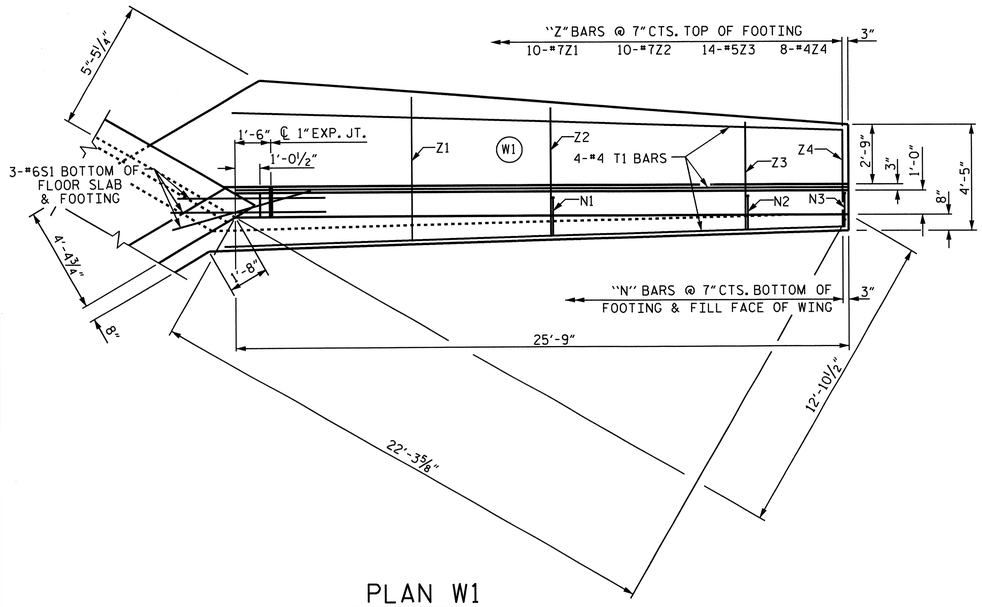
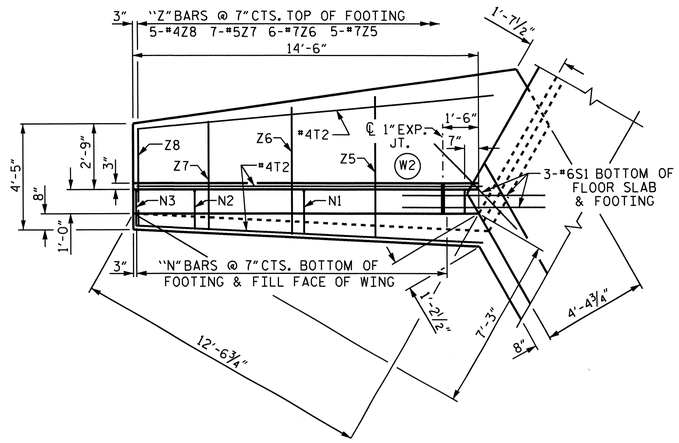
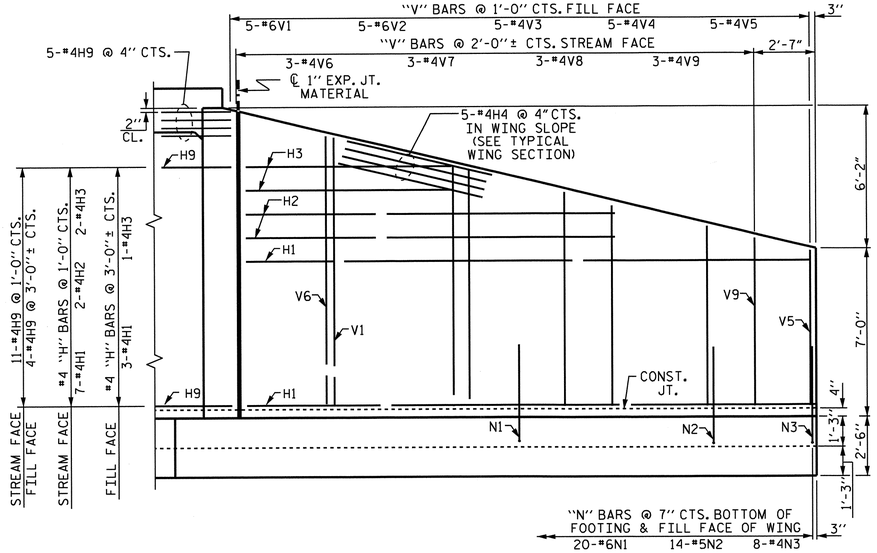
tbarbour



PLAN W1

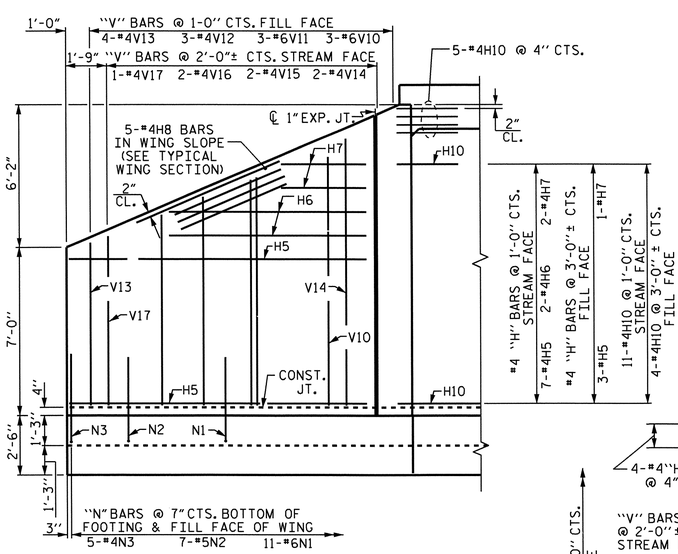


PLAN W2



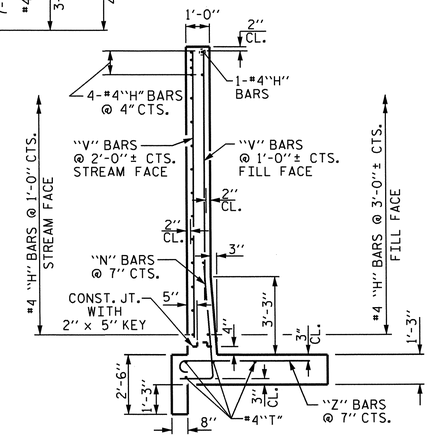
ELEVATION W1

(1 REQUIRED)



ELEVATION W2

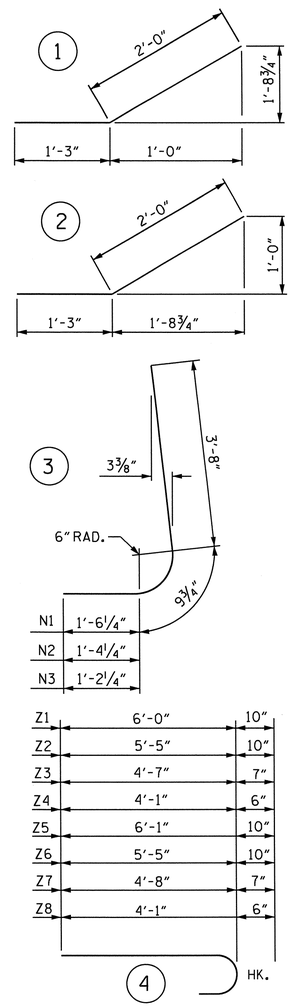
(2 REQUIRED)



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	10	#4	STR	23'-11"	160
H2	2	#4	STR	17'- 2"	23
H3	3	#4	STR	8'- 5"	17
H4	5	#4	STR	23'- 5"	78
H5	20	#4	STR	12'- 7"	168
H6	4	#4	STR	8'-10"	24
H7	6	#4	STR	4'- 1"	16
H8	10	#4	STR	13'- 2"	88
H9	20	#4	2	3'- 3"	43
H10	40	#4	1	3'- 3"	87
N1	42	#6	3	6'- 0"	379
N2	28	#5	3	5'-10"	170
N3	18	#4	3	5'- 8"	68
S1	9	#6	STR	6'- 0"	81
T1	4	#4	STR	25'- 9"	69
T2	8	#4	STR	14'- 6"	77
V1	5	#6	STR	11'- 0"	83
V2	5	#6	STR	10'- 0"	75
V3	5	#4	STR	8'- 0"	27
V4	5	#4	STR	6'- 9"	23
V5	5	#4	STR	5'- 9"	19
V6	3	#4	STR	11'- 0"	22
V7	3	#4	STR	9'- 9"	20
V8	3	#4	STR	8'- 3"	17
V9	3	#4	STR	6'- 9"	14
V10	6	#6	STR	11'- 0"	99
V11	6	#6	STR	9'- 9"	88
V12	6	#4	STR	7'- 3"	29
V13	8	#4	STR	5'- 9"	31
V14	4	#4	STR	11'- 3"	30
V15	4	#4	STR	9'- 6"	25
V16	4	#4	STR	8'- 0"	21
V17	2	#4	STR	7'- 0"	9
Z1	10	#7	4	6'-10"	140
Z2	10	#7	4	6'- 3"	128
Z3	14	#5	4	5'- 2"	75
Z4	8	#4	4	4'- 7"	24
Z5	10	#7	4	6'-11"	141
Z6	12	#7	4	6'- 3"	153
Z7	14	#5	4	5'- 3"	77
Z8	10	#4	4	4'- 7"	31
REINFORCING STEEL					2,949 LBS

CLASS "A" CONCRETE	
3 WINGS (1 W1, 2 W2)	41.6 CY
2 HEADWALLS	4.4 CY
2 END CURTAIN WALLS	5.3 CY
2 CULVERT SILLS	2.7 CY
TOTAL	54.0 CY

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT H=12' SLOPE 2:1 54° SKEW

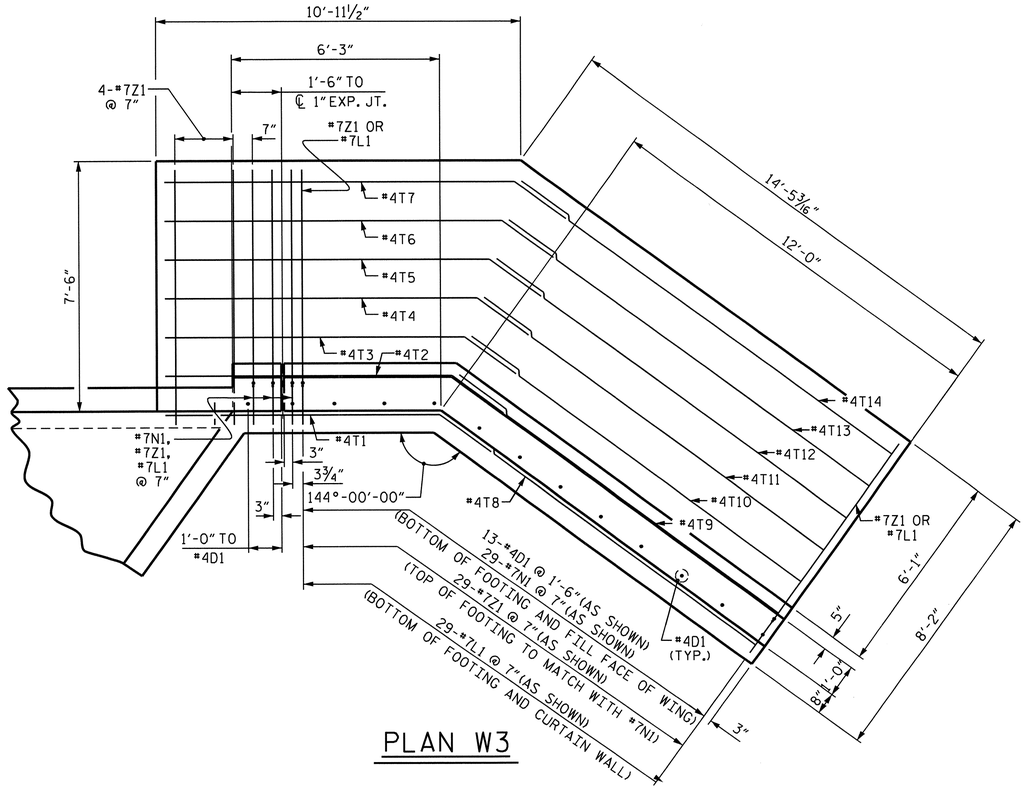
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			9

STD. No. CW6012

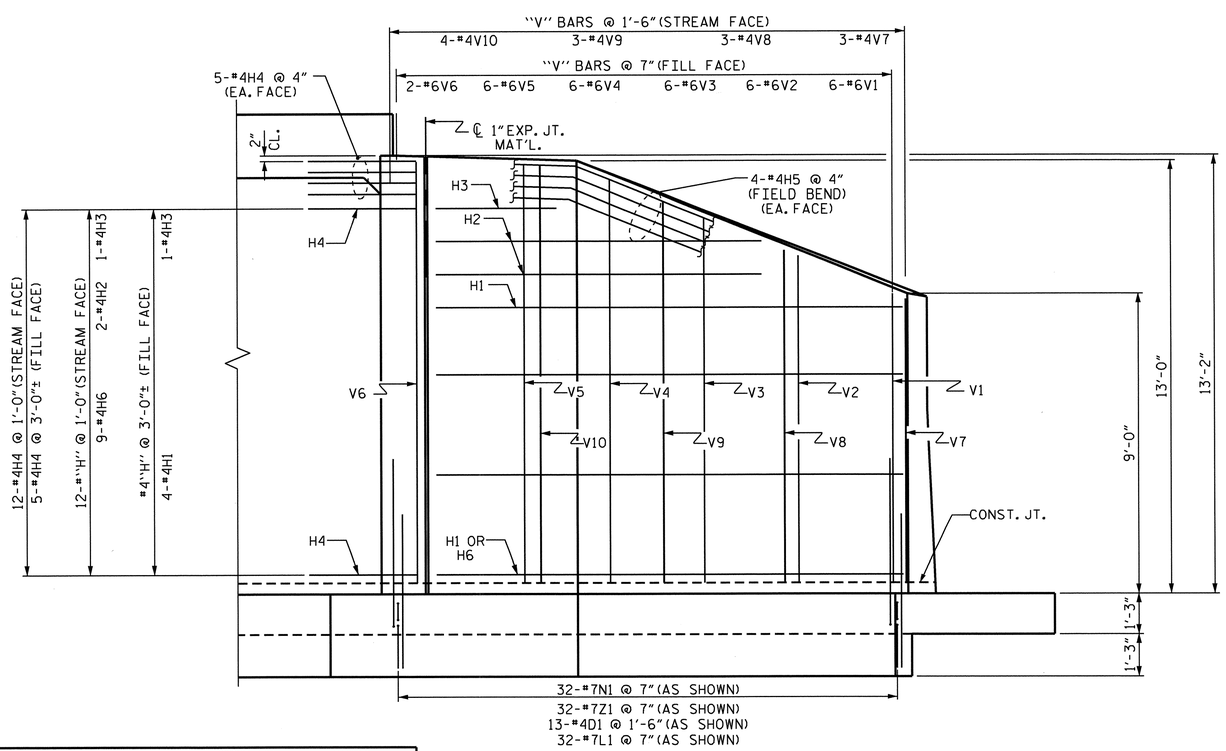
NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBACH
11-21-2013

ASSEMBLED BY :	H. T. BARBOUR	DATE : 2-22-12
CHECKED BY :	D. A. GLADDEN	DATE : 2-12
DRAWN BY :	DAN PLATICA	DATE : 12/2004
CHECKED BY :	M. K. BEARD	DATE : 12/2004

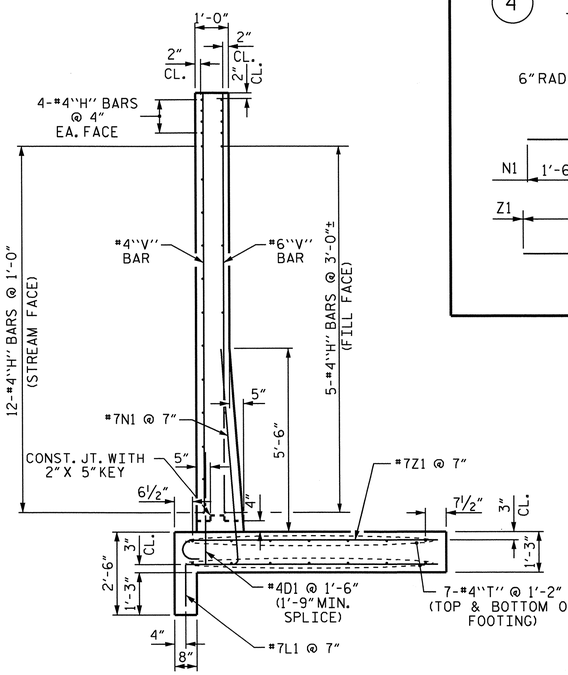
08-OCT-2013 16:12
R:\Structures\Plans\tbarbour\Microstation\B-5138_SD_CU.dgn
bklappenbach



PLAN W3



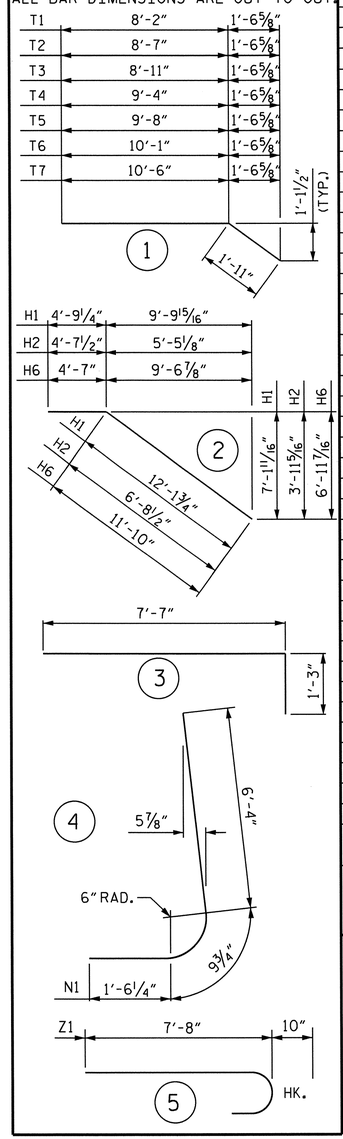
ELEVATION W3



WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



W3 BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	13	#4	STR	3'-5"	30
H1	4	#4	2	16'-7"	44
H2	2	#4	2	11'-4"	15
H3	2	#4	STR	4'-7"	6
H4	27	#4	STR	3'-6"	63
H5	8	#4	STR	16'-6"	88
H6	9	#4	STR	16'-5"	99
L1	32	#7	3	8'-10"	578
N1	32	#7	4	8'-8"	567
T1	2	#4	1	10'-1"	13
T2	2	#4	1	10'-6"	14
T3	2	#4	1	10'-10"	14
T4	2	#4	1	11'-3"	15
T5	2	#4	1	11'-7"	15
T6	2	#4	1	12'-0"	16
T7	2	#4	1	12'-5"	17
T8	2	#4	STR	11'-6"	15
T9	2	#4	STR	11'-11"	16
T10	2	#4	STR	12'-4"	16
T11	2	#4	STR	12'-9"	17
T12	2	#4	STR	13'-1"	17
T13	2	#4	STR	13'-6"	18
T14	2	#4	STR	13'-10"	18
V1	6	#6	STR	8'-7"	77
V2	6	#6	STR	9'-9"	88
V3	6	#6	STR	10'-11"	98
V4	6	#6	STR	12'-1"	109
V5	6	#6	STR	12'-6"	113
V6	2	#6	STR	12'-7"	38
V7	3	#4	STR	8'-6"	17
V8	3	#4	STR	10'-0"	20
V9	3	#4	STR	11'-6"	23
V10	4	#4	STR	12'-6"	33
Z1	36	#7	5	8'-6"	625

REINFORCING STEEL	2,952 LBS
CLASS "A" CONCRETE	
1 WING	17.2 CY
TOTAL	17.2 CY

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WING 3 FOR CONCRETE BOX CULVERT

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

NORTH CAROLINA PROFESSIONAL SEAL 15823 ENGINEER BRADLEY D. KLAPPENBACH 11-21-2013

DRAWN BY : H. T. BARBOUR DATE : 8-20-13
CHECKED BY : S. B. WILLIAMS DATE : 8-28-13
DESIGN ENGINEER OF RECORD: B. D. KLAPPENBACH DATE : 9-13

04-OCT-2013 16:22
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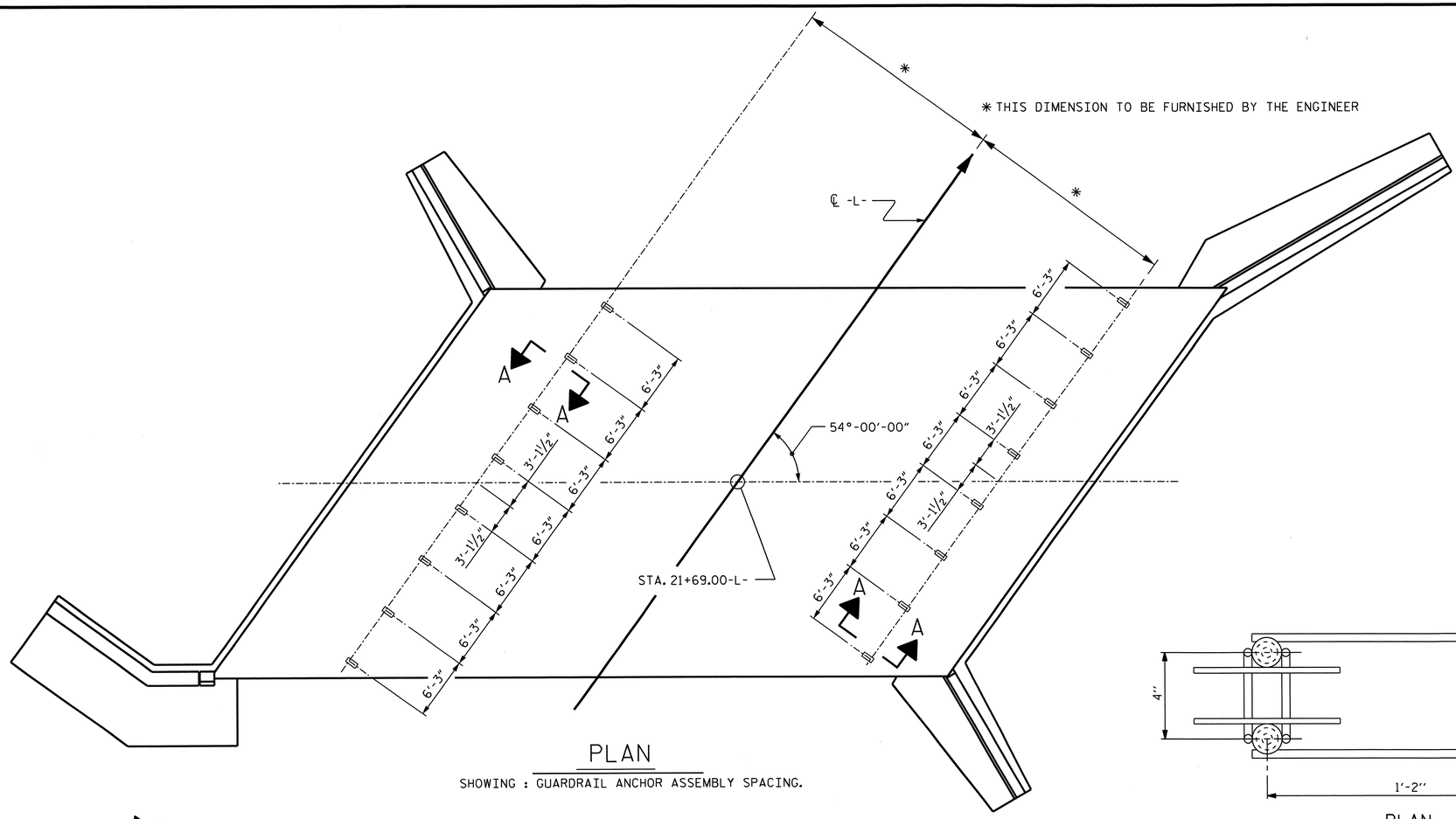
bklappenbach



PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

NOTES

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" Ø X 2 ¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

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

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

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

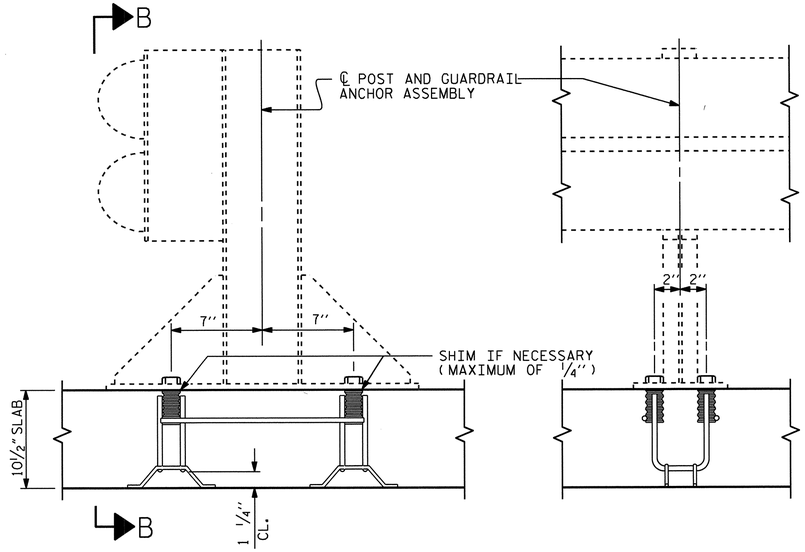
AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

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

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

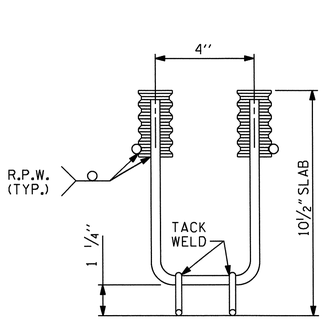
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1"Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

PLAN

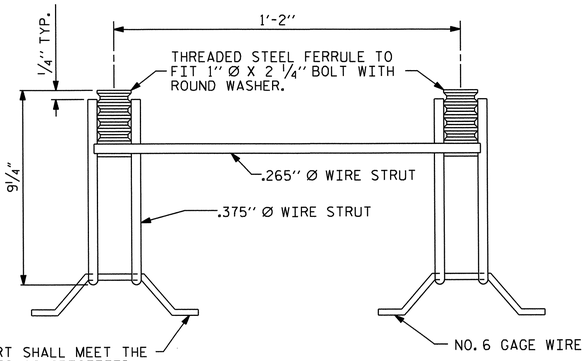


SECTION A-A

SECTION B-B



ELEVATION



SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY :	H. T. BARBOUR	DATE :	2-22-12
CHECKED BY :	D. A. GLADDEN	DATE :	2-12
DRAWN BY : FCJ	6/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	6/88	REV. 5/1/06R	KMM/GM
		REV. 10/1/11	MAA/GM

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00-L-

SHEET 8 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			9

NORTH CAROLINA PROFESSIONAL SEAL 15835 ENGINEER BRUCE O. KLAPPENBACH
11-21-2013

STD. NO. GRA1

08-OCT-2013 16:12
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bklappenbach

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.15	--	1.75	1.15	1	TOP SLAB	5.39	1.22	1	TOP SLAB	11.63	
		HL-93 (OPERATING)	N/A		1.49	--	1.35	1.49	1	TOP SLAB	5.39	1.58	1	TOP SLAB	11.63	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.42	50.96	1.75	1.42	1	TOP SLAB	5.71	1.48	1	TOP SLAB	11.63	
		HS-20 (OPERATING)	36.000		1.83	66.05	1.35	1.83	1	TOP SLAB	5.71	1.92	1	TOP SLAB	11.63	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.23	30.16	1.40	2.23	1	TOP CORNER WALL	0.65	2.78	1	TOP SLAB	11.63	
		SNGARBS2	20.000		2.16	43.18	1.40	2.16	1	TOP CORNER WALL	0.65	2.62	1	TOP SLAB	11.63	
		SNAGRIS2	22.000		2.23	49.15	1.40	2.23	1	TOP CORNER WALL	0.65	2.78	1	TOP SLAB	11.63	
		SNCOTTS3	27.250	⟨3⟩	1.44	39.17	1.40	1.44	1	TOP SLAB	5.39	1.50	1	TOP SLAB	11.63	
		SNAGGRS4	34.925		1.74	60.84	1.40	1.74	1	TOP CORNER WALL	0.65	1.76	1	TOP SLAB	11.63	
		SNS5A	35.550		1.63	58.10	1.40	1.63	1	TOP SLAB	5.71	1.65	1	TOP SLAB	11.63	
		SNS6A	39.950		1.57	62.87	1.40	1.63	1	TOP SLAB	5.71	1.57	1	TOP SLAB	11.63	
		SNS7B	42.000		1.53	64.43	1.40	1.69	1	TOP SLAB	5.71	1.53	1	TOP SLAB	11.63	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.04	67.30	1.40	2.23	1	TOP CORNER WALL	0.65	2.04	1	BOTTOM SLAB	11.72	
		TNT4A	33.075		1.71	56.63	1.40	1.71	1	TOP SLAB	5.39	1.77	1	TOP SLAB	11.63	
		TNT6A	41.600		1.55	64.60	1.40	1.77	1	TOP SLAB	5.39	1.55	1	TOP SLAB	11.63	
		TNT7A	42.000		1.59	66.74	1.40	1.85	1	TOP SLAB	5.39	1.59	1	TOP SLAB	11.63	
		TNT7B	42.000		1.63	68.51	1.40	1.66	1	TOP SLAB	5.71	1.63	1	BOTTOM SLAB	11.72	
		TNAGRIT4	43.000		1.58	67.79	1.40	1.63	1	TOP SLAB	5.39	1.58	1	BOTTOM SLAB	11.72	
		TNAGT5A	45.000		1.51	68.09	1.40	1.67	1	TOP SLAB	5.71	1.51	1	BOTTOM SLAB	11.72	
		TNAGT5B	45.000		1.51	68.10	1.40	1.71	1	TOP SLAB	5.39	1.51	1	BOTTOM SLAB	11.72	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

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

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

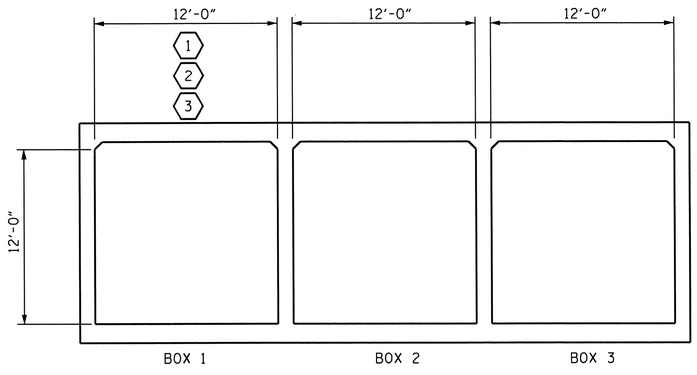
⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-5138

CALDWELL COUNTY

STATION: 21+69.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

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

STR. #3 STD. NO. LRFR5

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBACH
11-26-2013

ASSEMBLED BY : S.T. CHAMPION DATE : SEPT. 13
CHECKED BY : B.A. DUKE DATE : 10-7-13

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

REV. 10/1/11 MAA/GM

26-NOV-2013 14:20
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bklappenbach

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

REV. 6-16-95 EEM (W) RGW REV. 5-7-03 RWW (W) JTE REV. 10-1-11 MAA (W) GM
REV. 8-16-99 RWW (W) LES REV. 5-1-06 TLA (W) GM