9/09/99

CONTRACT: C202623 TIP PROJECT: B-4183

CULVERTS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MADISON COUNTY

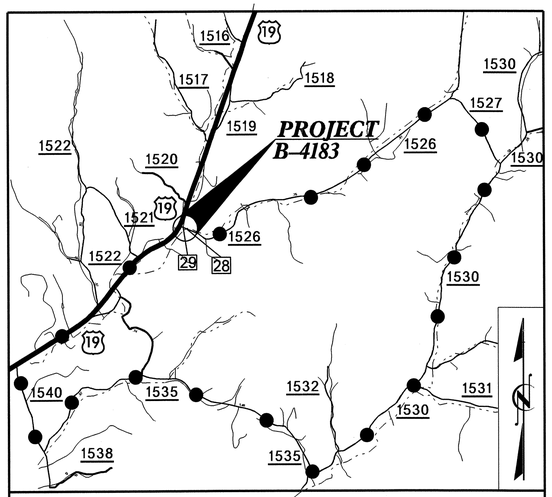
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4183		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33530.1.1	BRZ-1526(2)	PE
33530.2.1	BRZ-1526(2)	R/W & UTIL
33530.3.1	BRZ-1526(2)	CONST.

METRIC
ALL DIMENSIONS IN THESE PLANS ARE IN METERS

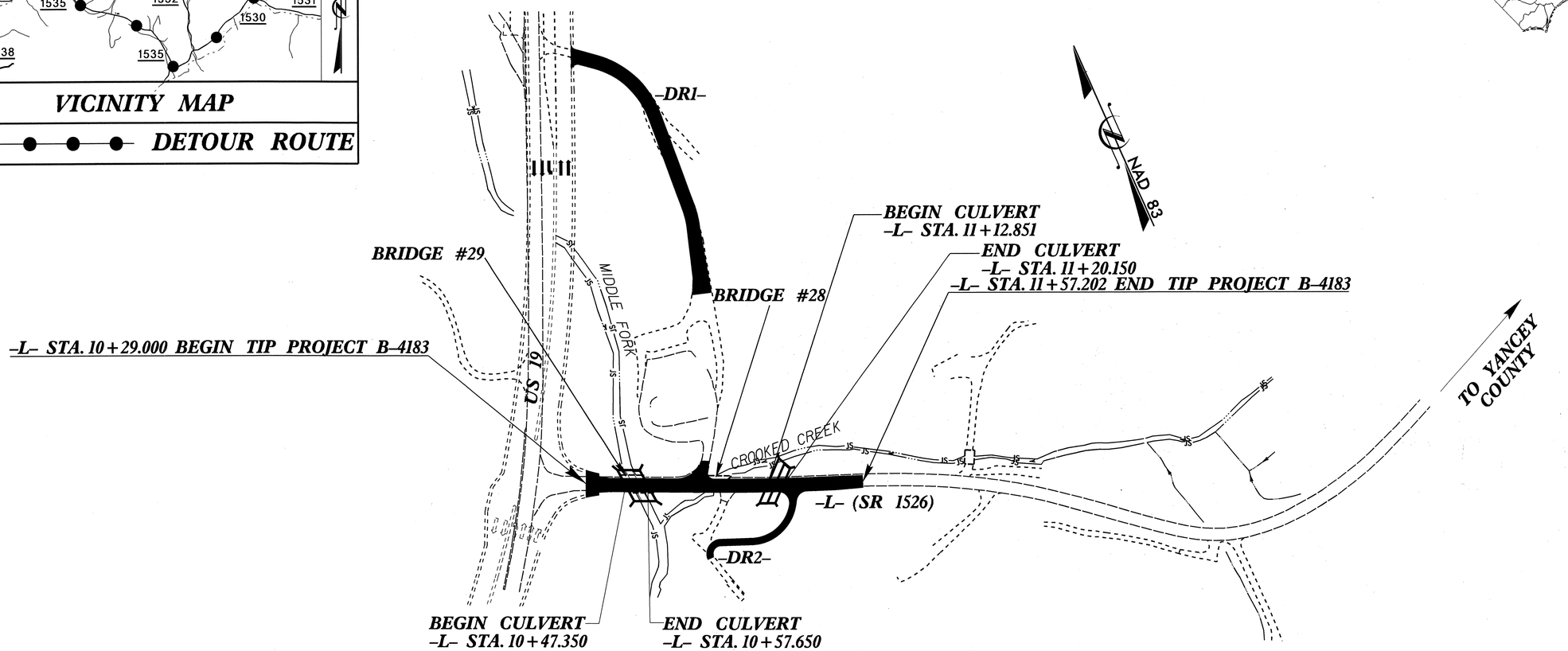
LOCATION: BRIDGE NO. 29 OVER MIDDLE FORK CREEK ON SR 1526 AND BRIDGE NO. 28 OVER CROOKED CREEK ON SR 1526

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND CULVERTS



VICINITY MAP

DETOUR ROUTE



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2011 = 1,192
ADT 2031 = 1,775
DHV = 12 %
D = 70 %
T = 4 % *
V = 50 km/h
* TTST 1% DUAL 3%
FUNC. CLASS = LOCAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4183 = 0.110 km
LENGTH STRUCTURES TIP PROJECT B-4183 = 0.018 km
TOTAL LENGTH ROADWAY TIP PROJECT B-4183 = 0.128 km

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

2006 STANDARD SPECIFICATIONS

LETTING DATE:
DECEMBER 20, 2011

QUANG H. NGUYEN, P.E.
PROJECT ENGINEER

JOHN R. DUGGINS JR. P.E.
PROJECT DESIGN ENGINEER

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

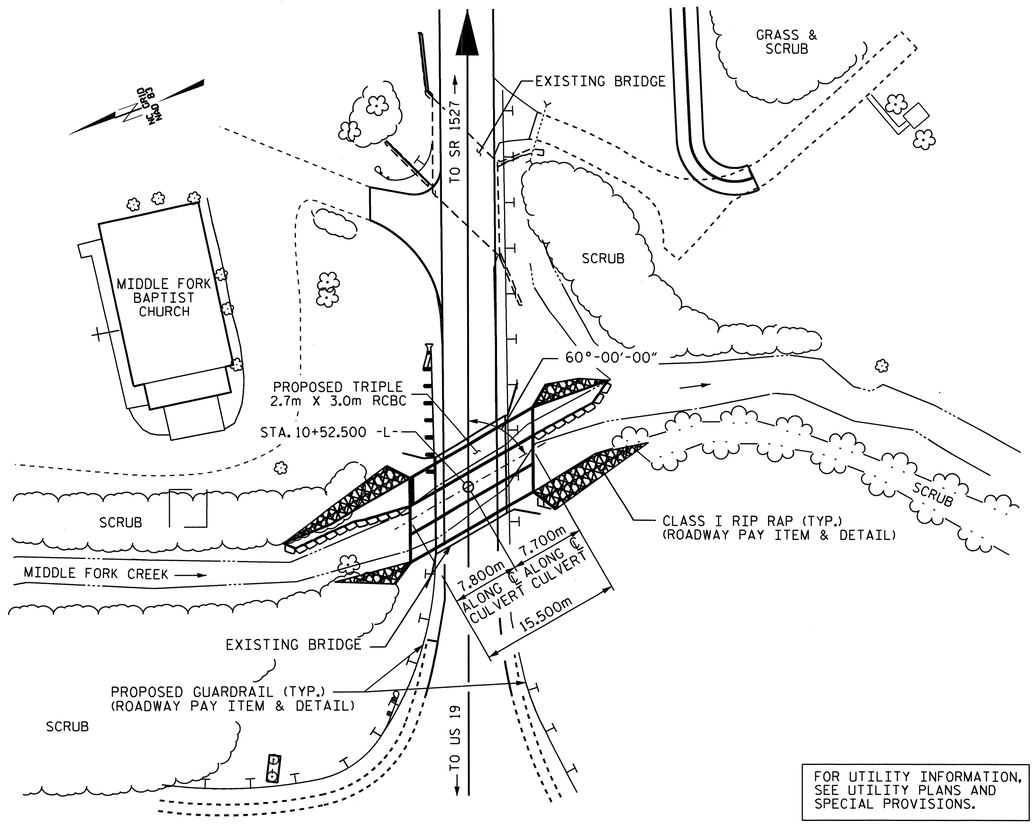
P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

13-OCT-2011 11:41
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$

BM #5: RAILROAD SPIKE IN POWER POLE 27.836M LEFT OF -BL- STA. 5+74.742, ELEV. = 682.835, NGVD 29



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 49.80 m^3/s
FREQUENCY OF DESIGN FLOOD	= 25 yrs.
DESIGN HIGH WATER ELEVATION	= 678.690
DRAINAGE AREA	= 19.700 km^2
BASE DISCHARGE (Q100)	= 74.90 m^3/s
BASE HIGH WATER ELEVATION	= 679.420

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 86.60 m^3/s
FREQUENCY OF OVERTOPPING FLOOD	= 100+ yrs.
OVERTOPPING FLOOD ELEVATION	= 680.000

GRADE DATA

GRADE POINT ELEV. @ STA. 10+52.500 -L-	= 680.157
BED ELEV. @ STA. 10+52.500 -L-	= 675.900
ROADWAY FILL SLOPES	= 2 : 1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE

BARREL @	6.66 m^3/m		103.2 m^3
WINGS ETC.			30.5 m^3
SILL			0.6 m^3
TOTAL			134.3 m^3

REINFORCING STEEL

BARREL	12,133 kg
WING ETC.	1,286 kg
TOTAL	13,419 kg

CULVERT EXCAVATION ---------- LUMP SUM
FOUNDATION COND. MAT'L ---- 94 METRIC TONS
REMOVAL OF EXISTING STRUCTURE-----LUMP SUM

NOTES

ASSUMED LIVE LOAD ----------MS18 OR ALTERNATE LOADING.

MAXIMUM DESIGN FILL ----------1.290m

MINIMUM DESIGN FILL ----------1.180m

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. PHASE I WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF PHASE I VERTICAL WALLS.

2. THE REMAINING PORTIONS OF PHASE I WALLS AND PHASE I WINGS FULL HEIGHT.

3. PHASE II WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF PHASE II VERTICAL WALLS.

4. THE REMAINING PORTIONS OF PHASE II WALLS AND PHASE II WINGS FULLHEIGHT.

5. PHASE III THE ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

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

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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 36,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm 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.

A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

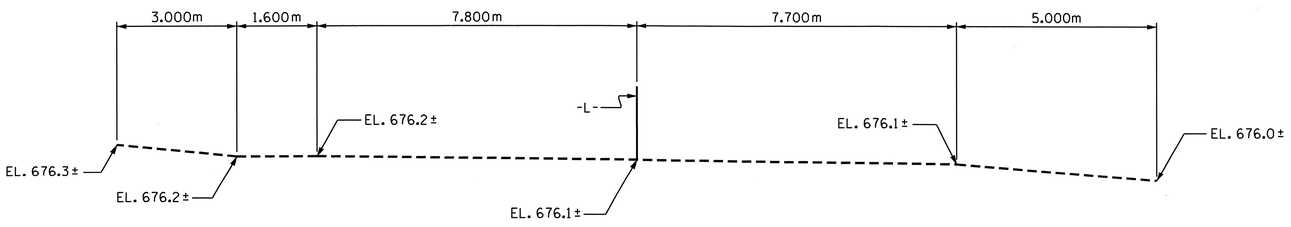
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

THE EXISTING STRUCTURE CONSISTING OF 2-SPANS (5.5m EACH) WITH A TIMBER DECK ON CONTINUOUS I-BEAMS SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 7.5m ON A SUBSTRUCTURE CONSISTING OF YOUNT MASONRY ABUTMENTS AND A CRUTCH BENT CONSTRUCTED OF TIMBER CAP WITH TIMBER POST AND SILL AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. FOR REMOVAL OF EXISTING STRUCTURE, 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE".



PROFILE ALONG ℄ CULVERT

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-4183

MADISON COUNTY

STATION: 10+52.500 -L-

SHEET 1 OF 7 REPLACES BRIDGE NO. 29

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 2.700m X 3.000m CONCRETE BOX CULVERT 60° SKEW

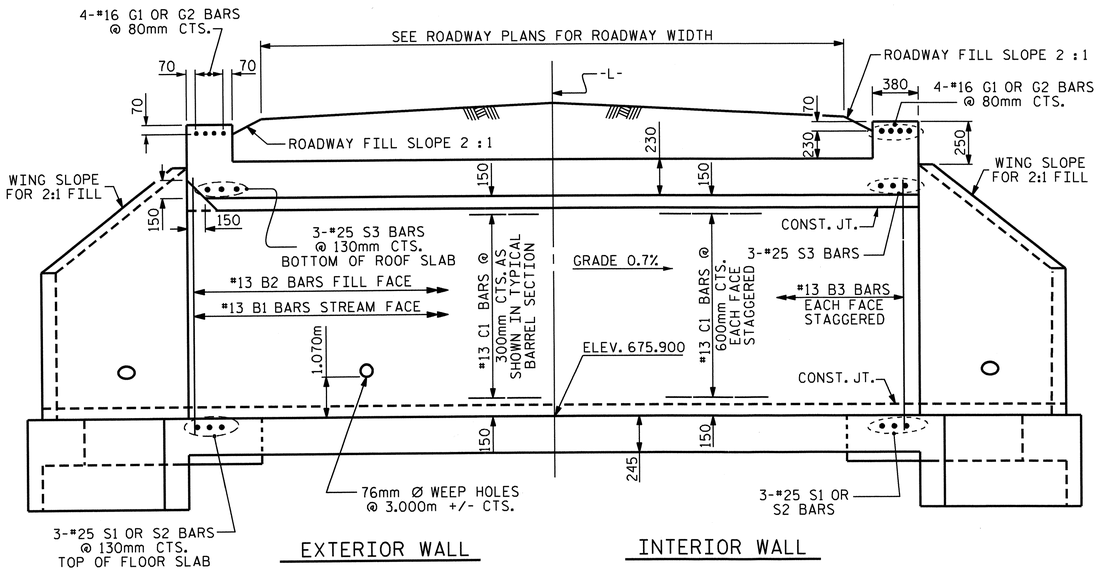
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY :	A. SORSENGINH	DATE :	2/3/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY : EEM	6/97		
CHECKED BY : ARB	7/97		

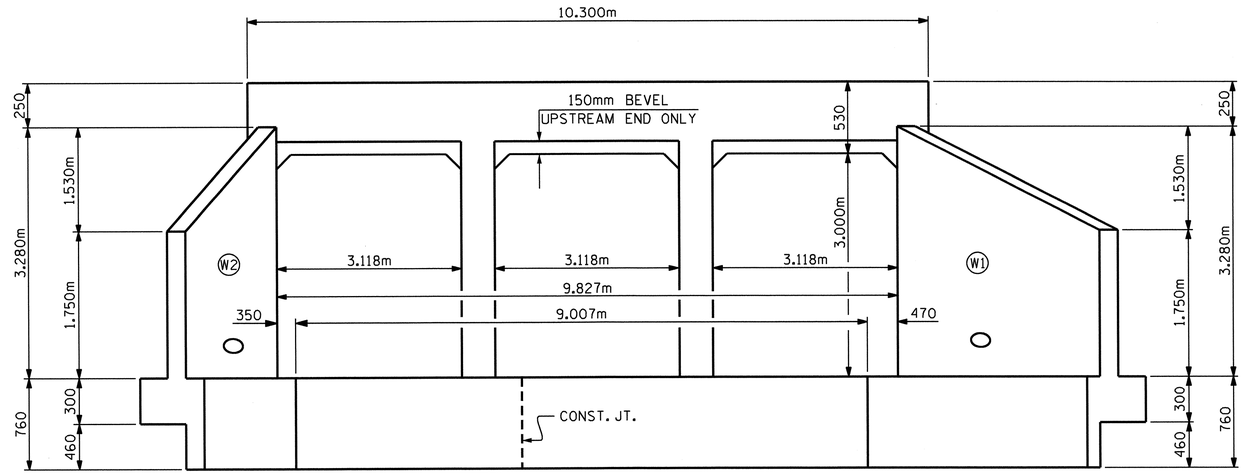
METRIC

NORTH CAROLINA PROFESSIONAL SEAL 13014 ENGINEER QUANG H. NGUYEN
Quang H. Nguyen 10-14-11

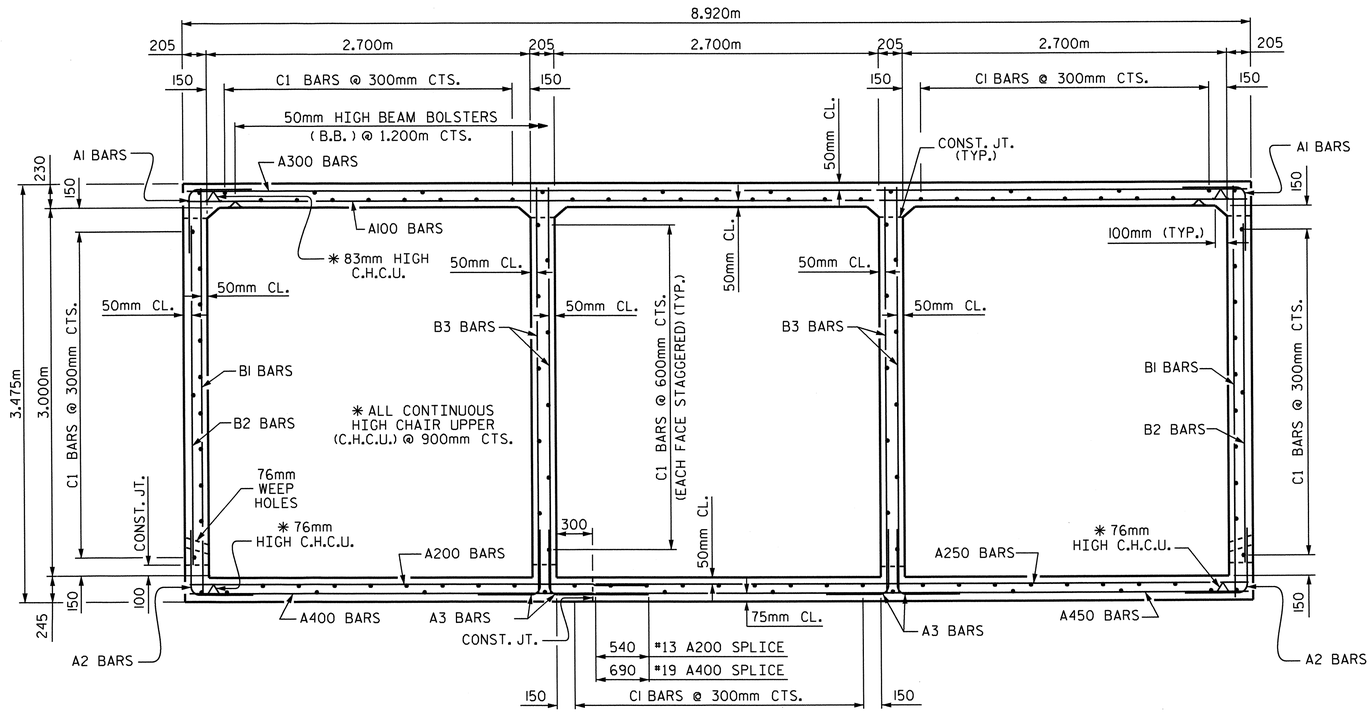
NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
John R. Duggins, Jr. 10/14/11



CULVERT SECTION NORMAL TO ROADWAY



OUTLET END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 116 "C" BARS IN SECTION OF BARREL.
(LOOKING UPSTREAM)

ASSEMBLED BY :	A. SORSENGINH	DATE :	2/3/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY :	EEM 6/97		
CHECKED BY :	ARB 7/97		

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/19/11

PROJECT NO. B-4183
MADISON COUNTY
STATION: 10+52.500 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 2.700m X 3.000m CONCRETE BOX CULVERT 60° SKEW

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

12-SEP-2011 16:03
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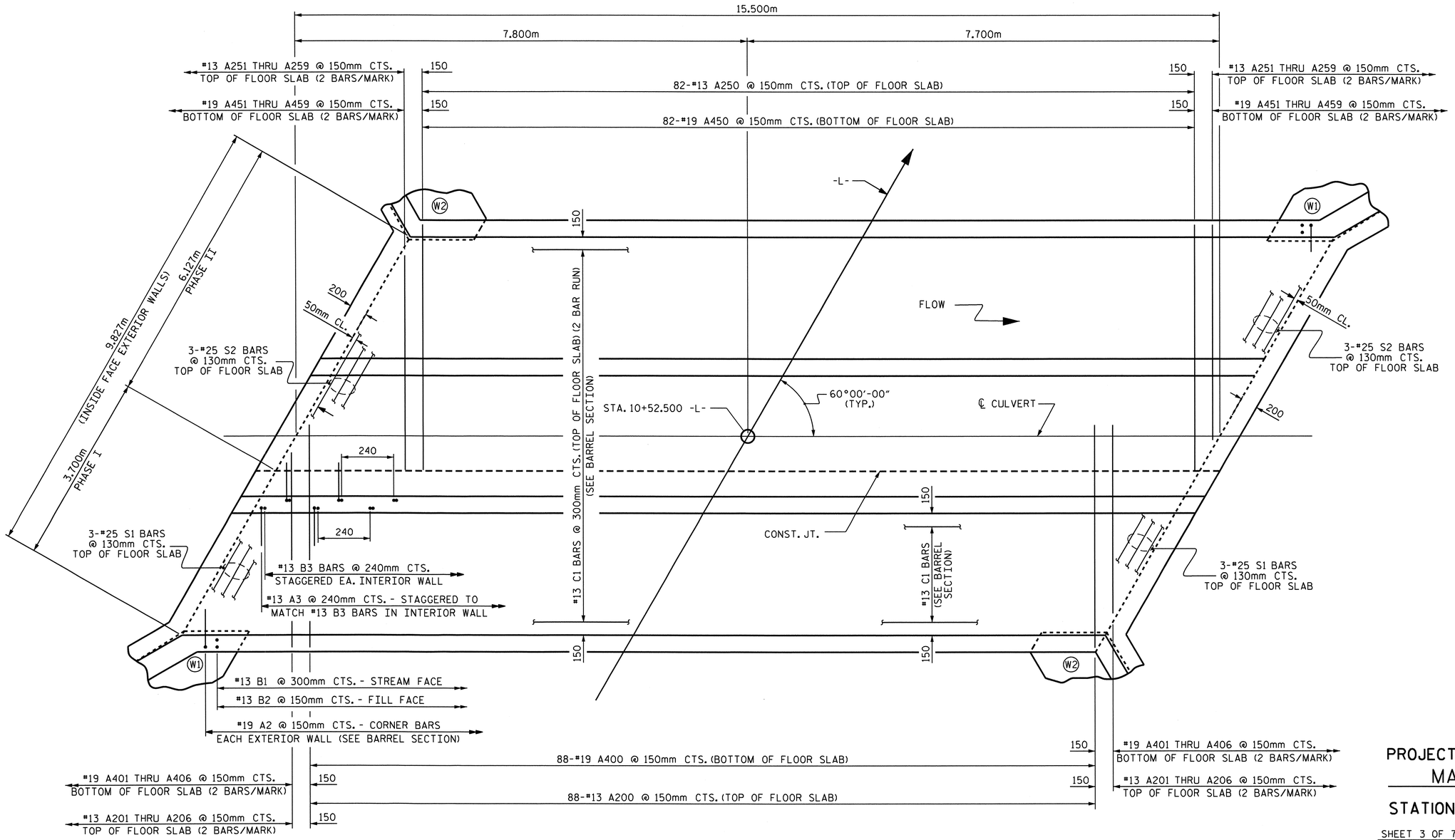
dahodge



PLAN OF FLOOR SLAB

PROJECT NO. B-4183

MADISON COUNTY

STATION: 10+52.500 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 2.700m X 3.000m CONCRETE BOX CULVERT 60° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/14/11

ASSEMBLED BY : A. SORSENGINH	DATE : 2/4/09
CHECKED BY : J. LAMBERT	DATE : 2/10
DRAWN BY : EEM 6/97	
CHECKED BY : ARB 7/97	

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

12-SEP-2011 16:03
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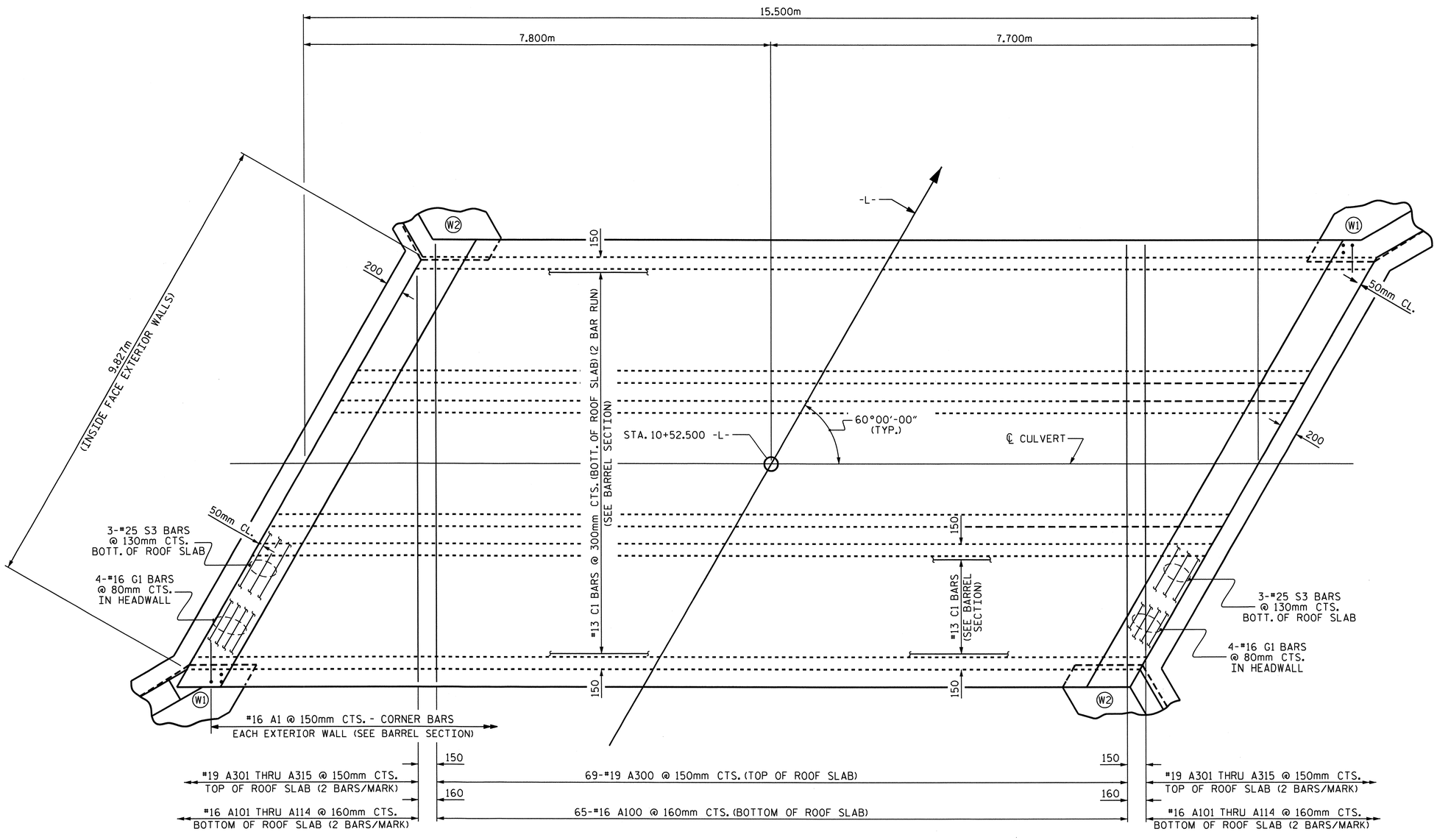


PLAN OF ROOF SLAB

PROJECT NO. B-4183

MADISON COUNTY

STATION: 10+52.500 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 2.700m X 3.000m CONCRETE BOX CULVERT 60° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DILGINS, JR.
10/14/11

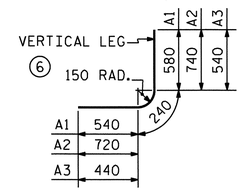
ASSEMBLED BY : A. SORSENGINH	DATE : 2/4/09
CHECKED BY : J. LAMBERT	DATE : 2/10
DRAWN BY : EEM 6/97	
CHECKED BY : ARB 7/97	

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

BAR TYPE

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A100	16	540
A200	13	540
A300	19	690
A400	19	690
B1	13	540
B2	13	540
B3	13	540
C1	13	590
S2	25	1500



DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

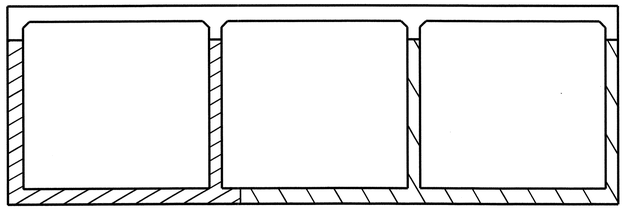
BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	208	16	6	1360	439
A2	208	19	6	1700	790
A3	260	13	6	1220	315
A100	65	16	STR	8760	884
A101	4	16	STR	8180	51
A102	4	16	STR	7620	47
A103	4	16	STR	7060	44
A104	4	16	STR	6520	40
A105	4	16	STR	5960	37
A106	4	16	STR	5420	34
A107	4	16	STR	4860	30
A108	4	16	STR	4300	27
A109	4	16	STR	3760	23
A110	4	16	STR	3200	20
A111	4	16	STR	2640	16
A112	4	16	STR	2080	13

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A113	4	16	STR	1520	9
A114	4	16	STR	960	6
A200	88	13	STR	3900	341
A201	4	13	STR	3440	14
A202	4	13	STR	2920	12
A203	4	13	STR	2400	10
A204	4	13	STR	1880	7
A205	4	13	STR	1360	5
A206	4	13	STR	840	3
A250	82	13	STR	5420	442
A251	4	13	STR	4980	20
A252	4	13	STR	4460	18
A253	4	13	STR	3940	16
A254	4	13	STR	3420	14
A255	4	13	STR	2900	12
A256	4	13	STR	2380	9
A257	4	13	STR	1860	7

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A258	4	13	STR	1340	5
A259	4	13	STR	820	3
A300	69	19	STR	8760	1351
A301	4	19	STR	8200	73
A302	4	19	STR	7700	69
A303	4	19	STR	7100	63
A304	4	19	STR	6660	60
A305	4	19	STR	6140	55
A306	4	19	STR	5620	50
A307	4	19	STR	5100	46
A308	4	19	STR	4580	41
A309	4	19	STR	4060	36
A310	4	19	STR	3540	32
A311	4	19	STR	3020	27
A312	4	19	STR	2480	22
A313	4	19	STR	1980	18
A314	4	19	STR	1440	13
A315	4	19	STR	940	8
A400	88	19	STR	4060	799
A401	4	19	STR	3440	31
A402	4	19	STR	2920	26
A403	4	19	STR	2400	21

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A404	4	19	STR	1880	17
A405	4	19	STR	1360	12
A406	4	19	STR	840	8
A450	82	19	STR	5420	993
A451	4	19	STR	4980	45
A452	4	19	STR	4460	40
A453	4	19	STR	3940	35
A454	4	19	STR	3420	31
A455	4	19	STR	2900	26
A456	4	19	STR	2380	21
A457	4	19	STR	1860	17
A458	4	19	STR	1340	12
A459	4	19	STR	820	7
B1	104	13	STR	3300	341
B2	208	13	STR	2800	579
B3	260	13	STR	3300	853
C1	232	13	STR	7980	1840
D1	4	19	STR	720	6
G1	8	16	STR	10160	126
S1	6	25	STR	5380	128
S2	6	25	STR	6300	150
S3	6	25	STR	10160	242

REINFORCING STEEL = 12,133 kg



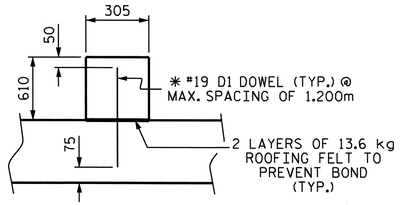
CONSTRUCTION PHASING

(LOOKING UPSTREAM)

PHASE I CONSTRUCTION

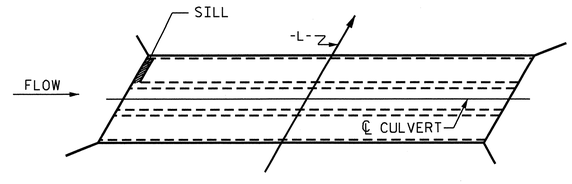
PHASE II CONSTRUCTION

PHASE III CONSTRUCTION

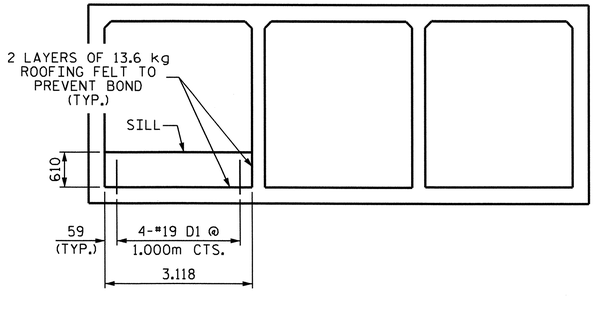


* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

SECTION THRU SILL



PLAN OF SILL LOCATION



ELEVATION

(LOOKING DOWNSTREAM)

CULVERT SILL DETAILS

PROJECT NO. B-4183

MADISON COUNTY

STATION: 10+52.500 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 2.700m X 3.000m CONCRETE BOX CULVERT 60° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DILEGINS, JR.
10/14/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : A. SORSENGINH DATE : 2/4/09
CHECKED BY : J. LAMBERT DATE : 2/10

13-OCT-2011 11:40
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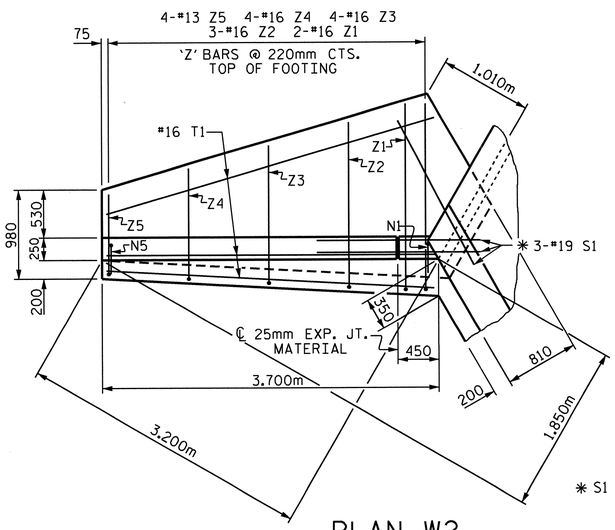
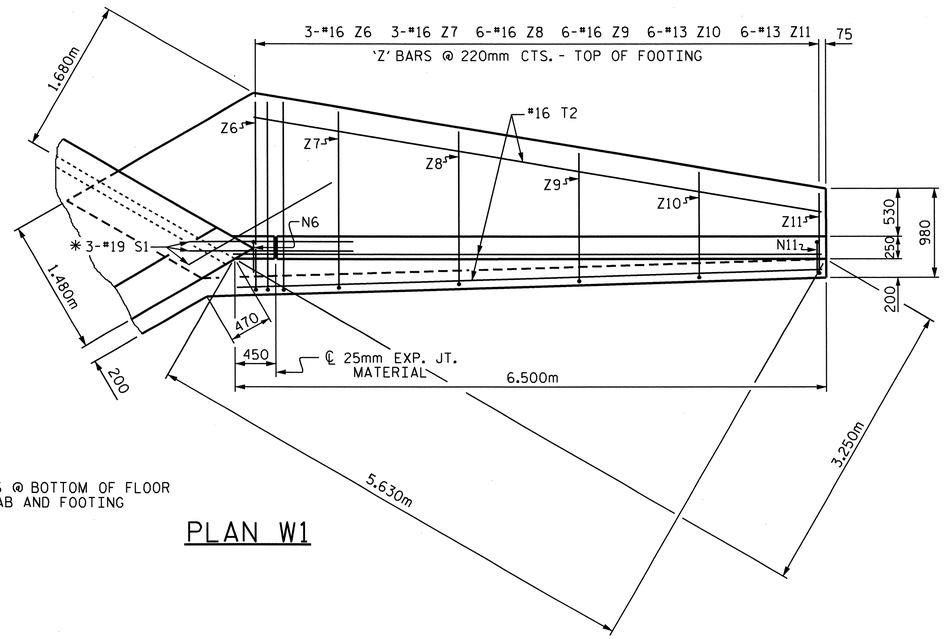
dahodge

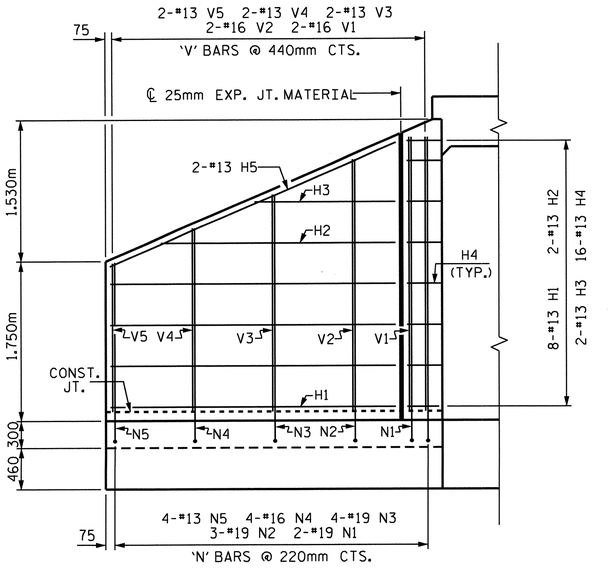


PLAN W2

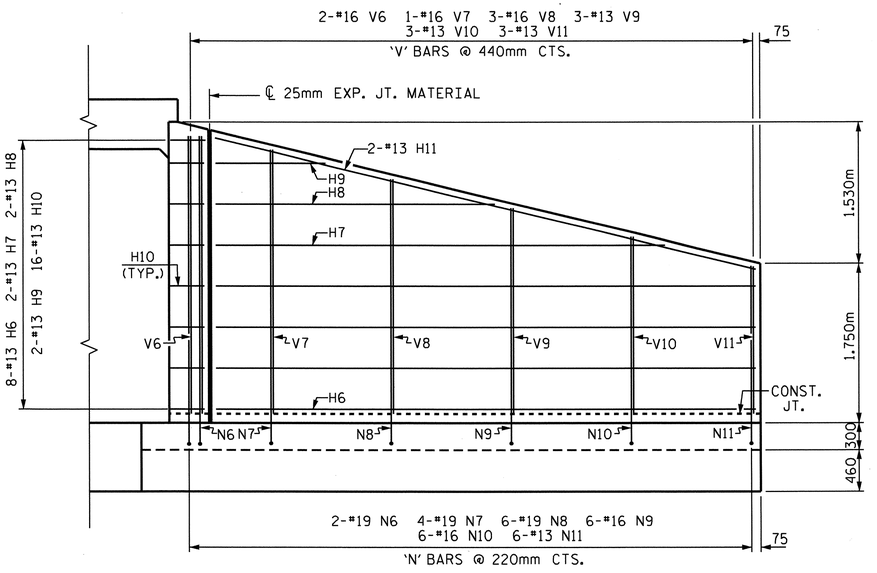


PLAN W1

* S1 BARS @ BOTTOM OF FLOOR SLAB AND FOOTING



ELEVATION W2

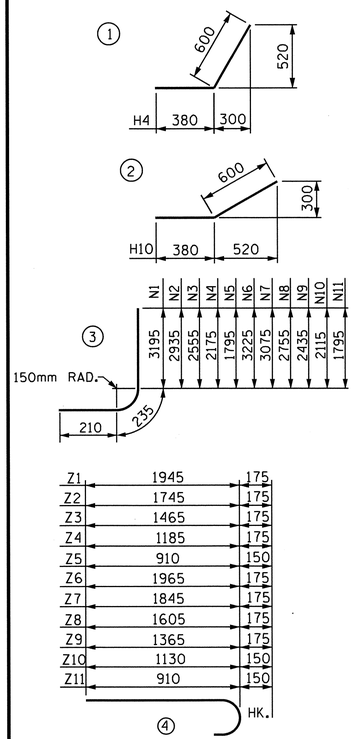


ELEVATION W1

FOR WING ORIENTATION, SEE SHEET C-3.

BAR TYPES

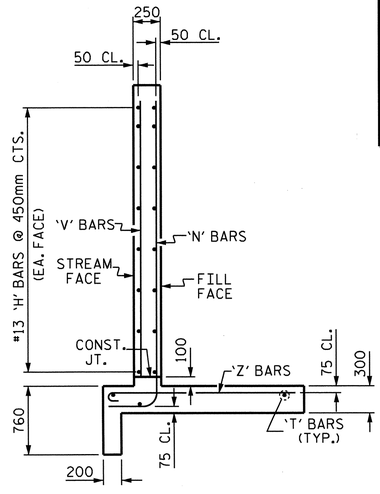
ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	13	STR	3140	50
H2	4	13	STR	2600	10
H3	4	13	STR	1540	6
H4	32	13	1	980	31
H5	4	13	STR	3400	14
H6	16	13	STR	5940	94
H7	4	13	STR	5040	20
H8	4	13	STR	3200	13
H9	4	13	STR	1360	5
H10	32	13	2	980	31
H11	4	13	STR	6100	24
N1	4	19	3	3640	33
N2	6	19	3	3380	45
N3	8	19	3	3000	54
N4	8	16	3	2620	33
N5	8	13	3	2240	18
N6	4	19	3	3680	33
N7	8	19	3	3520	63
N8	12	19	3	3200	86
N9	12	16	3	2880	54
N10	12	16	3	2560	48
N11	12	13	3	2240	27
S1	12	19	STR	1800	48
T1	6	16	STR	3700	34
T2	6	16	STR	6500	61
V1	4	16	STR	3020	19
V2	4	16	STR	2760	17
V3	4	13	STR	2380	9
V4	4	13	STR	2000	8
V5	4	13	STR	1620	6
V6	4	16	STR	3020	19
V7	2	16	STR	2900	9
V8	6	16	STR	2580	24
V9	6	13	STR	2260	13
V10	6	13	STR	1940	12
V11	6	13	STR	1620	10
Z1	4	16	4	2120	13
Z2	6	16	4	1920	18
Z3	8	16	4	1640	20
Z4	8	16	4	1360	17
Z5	8	13	4	1060	8
Z6	6	16	4	2140	20
Z7	6	16	4	2020	19
Z8	12	16	4	1780	33
Z9	12	16	4	1540	29
Z10	12	13	4	1280	15
Z11	12	13	4	1060	13

REINFORCING STEEL FOR 4 WING WALLS	1286	kg
CLASS A CONCRETE		
4 WINGS	25.5	m^3
2 HEADWALLS	2.3	m^3
2 END CURTAIN WALLS	2.7	m^3
TOTAL	30.5	m^3



TYPICAL WING SECTION

PROJECT NO. B-4183
MADISON COUNTY
STATION: 10+52.500 -L-

SHEET 6 OF 7

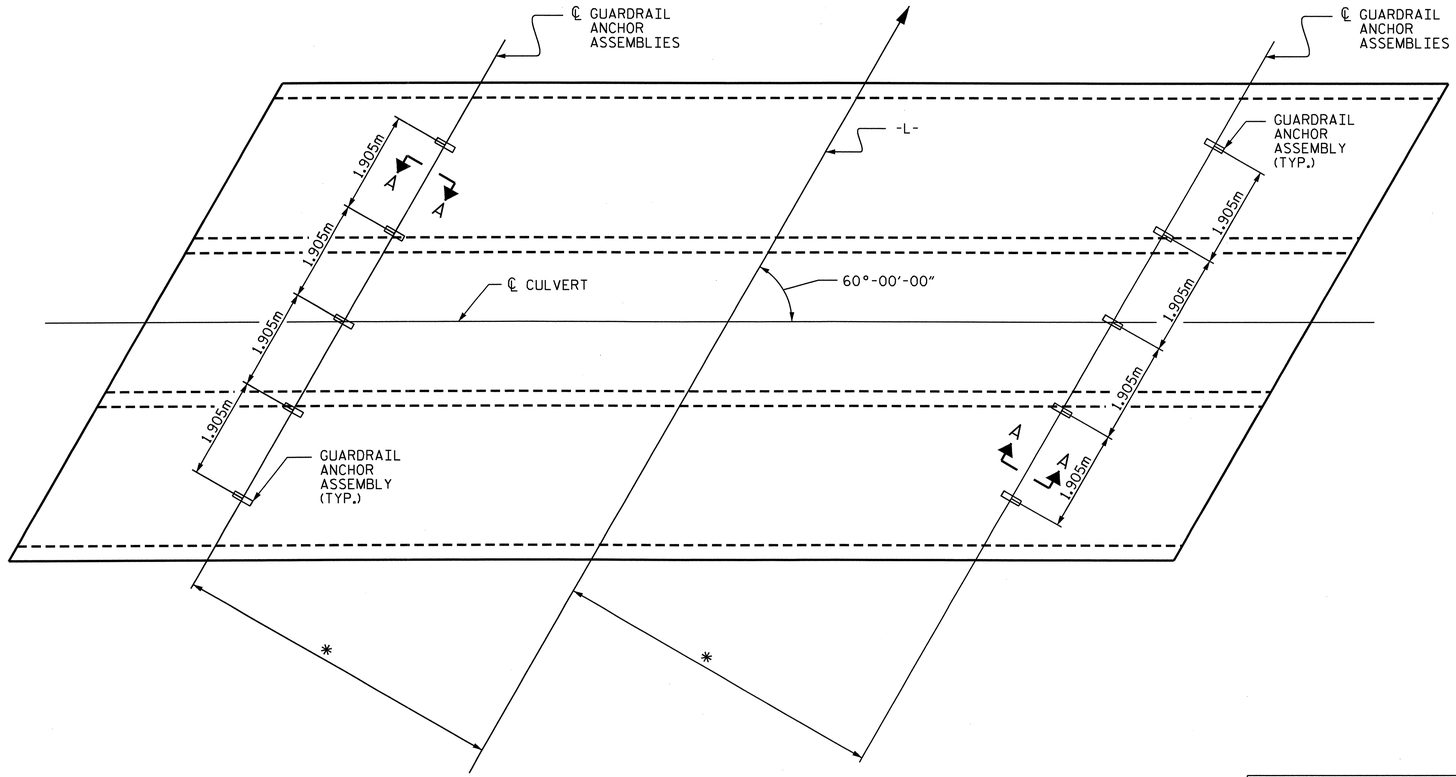
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# WINGS FOR CONCRETE BOX CULVERT
H=3.000m SLOPE=2:1
60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY :	A. SORSENGINH	DATE :	3/5/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY :	JLR	6/97	
CHECKED BY :	VAP	5/98	

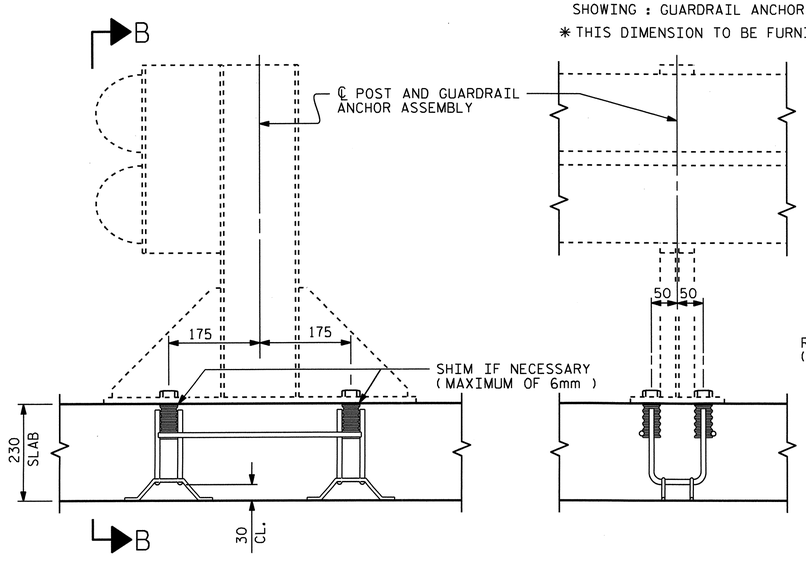
STD. NO. CW6030



PLAN

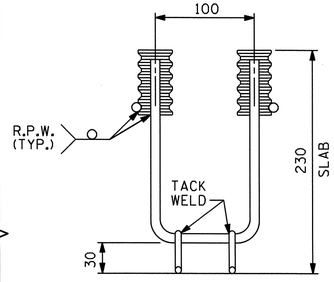
SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.

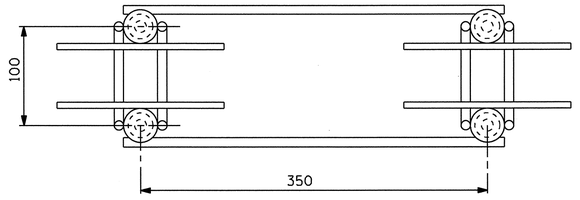


SECTION A-A

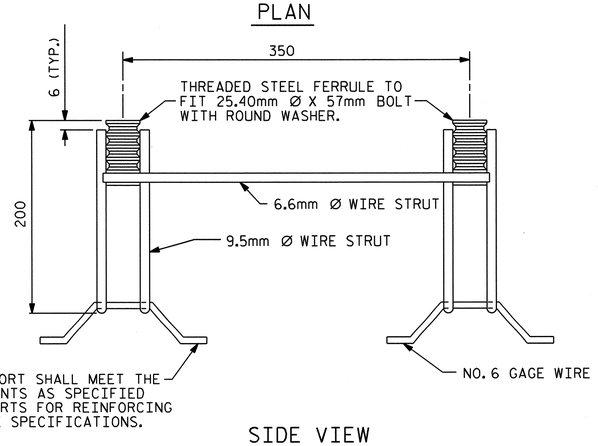
SECTION B-B



ELEVATION



PLAN



SIDE VIEW

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 64mm.

B. 4 - 25.40mm DIA. X 57mm 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 25.40mm DIA. X 57mm 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 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 620 MPa. 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 25.40mm Ø BOLT IS 97.0 kN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY : D. HODGE	DATE : 9/11		
CHECKED BY : J.R. DUGGINS	DATE : 9/11		
DRAWN BY : FCJ 6/88	REV. 7/10/01	LES/RDR	
CHECKED BY : ARB 6/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

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dahodge

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR. 10/4/11

PROJECT NO. B-4183

MADISON COUNTY

STATION: 10+52.500 -L-

SHEET 7 OF 7

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-7
1			3			TOTAL SHEETS
2			4			15

STD. NO. GRA1SM

13-OCT-2011 11:38
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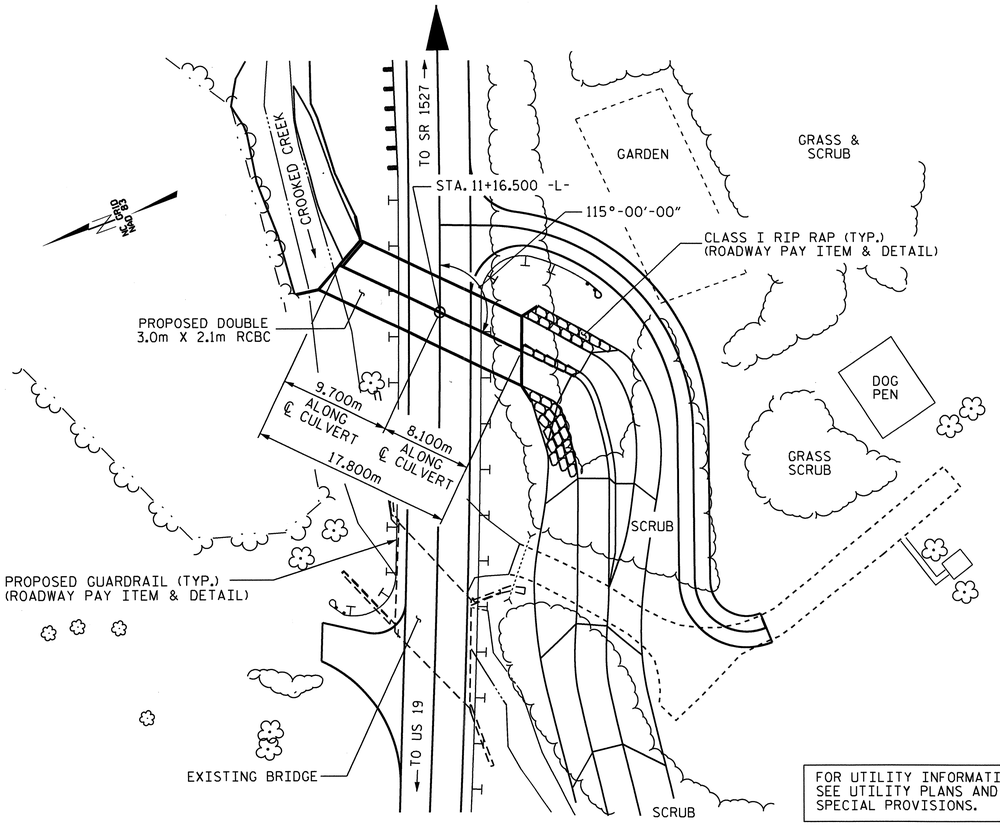
dahodge

BM #5: RAILROAD SPIKE IN POWER POLE 27.836m LEFT OF -BL- STA. 5+74.742, ELEV. = 682.835, NGVD 29



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 25.00 m^3/s
FREQUENCY OF DESIGN FLOOD	= 25 yrs.
DESIGN HIGH WATER ELEVATION	= 679.080
DRAINAGE AREA	= 6.720 km^2
BASE DISCHARGE (Q100)	= 38.50 m^3/s
BASE HIGH WATER ELEVATION	= 679.830

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 41.10 m^3/s
FREQUENCY OF OVERTOPPING FLOOD	= 100+ yrs.
OVERTOPPING FLOOD ELEVATION	= 680.000

GRADE DATA

GRADE POINT ELEV. @ STA. 11+16.500 -L-	= 680.048
BED ELEV. @ STA. 11+16.500 -L-	= 676.520
ROADWAY FILL SLOPES	= 2 : 1

TOTAL STRUCTURE QUANTITIES

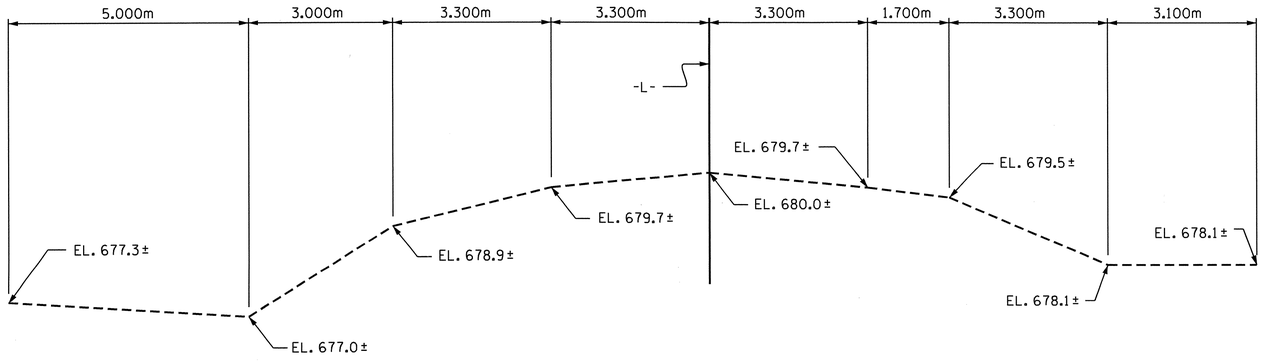
CLASS A CONCRETE

BARREL @	4.41 m^3/m	78.5 m^3
WINGS ETC.		16.9 m^3
SILL		0.6 m^3
TOTAL		96.0 m^3

REINFORCING STEEL

BARREL	10,154 kg
WING ETC.	570 kg
TOTAL	10,724 kg

CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L	80 METRIC TONS
REMOVAL OF EXISTING STR.	LUMP SUM



PROFILE ALONG ℄ CULVERT

NOTES

ASSUMED LIVE LOAD ----------MS18 OR ALTERNATE LOADING.

MAXIMUM DESIGN FILL ----------1.480m

MINIMUM DESIGN FILL ----------1.260m

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

76mm ∅ WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. PHASE I WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF PHASE I VERTICAL WALLS.

2. THE REMAINING PORTIONS OF PHASE I WALLS AND PHASE I WINGS FULL HEIGHT.

3. PHASE II WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF PHASE II VERTICAL WALLS.

4. THE REMAINING PORTIONS OF PHASE II WALLS AND PHASE II WINGS FULLHEIGHT.

5. PHASE III THE ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

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

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL 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 36,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm 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.

A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

THE EXISTING STRUCTURE CONSISTING OF 2-SPANS (5.5m EACH) WITH A TIMBER DECK ON CONTINUOUS I-BEAMS AND CHANNELS SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 7.5m ON A SUBSTRUCTURE CONSISTING OF YOUNT MASONRY ABUTMENTS AND A CRUTCH BENT CONSTRUCTED OF TIMBER CAP WITH TIMBER POST AND SILL AND LOCATED 29.7m WEST OF THE PROPOSED STRUCTURE SHALL BE REMOVED. FOR REMOVAL OF EXISTING STRUCTURE, 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE".

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-4183

MADISON COUNTY

STATION: 11+16.500 -L-

SHEET 1 OF 8 REPLACES BRIDGE No. 28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 3.000m X 2.100m CONCRETE BOX CULVERT 115° SKEW

REVISIONS						SHEET NO. C-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 15
2			4			

METRIC

NORTH CAROLINA PROFESSIONAL SEAL 13014 ENGINEER DUANG H. NGUYEN 10-14-11

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR. 10/14/11

ASSEMBLED BY :	A. SORSENGINH	DATE :	1/28/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY : EEM	6/97		
CHECKED BY : ARB	7/97		

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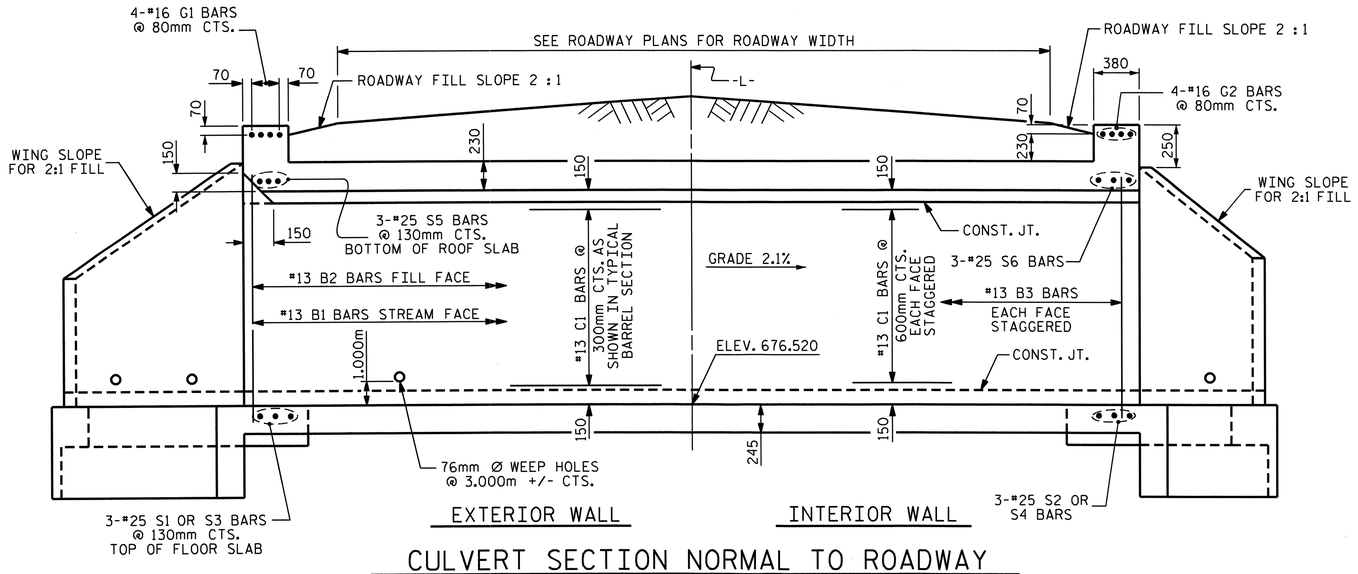
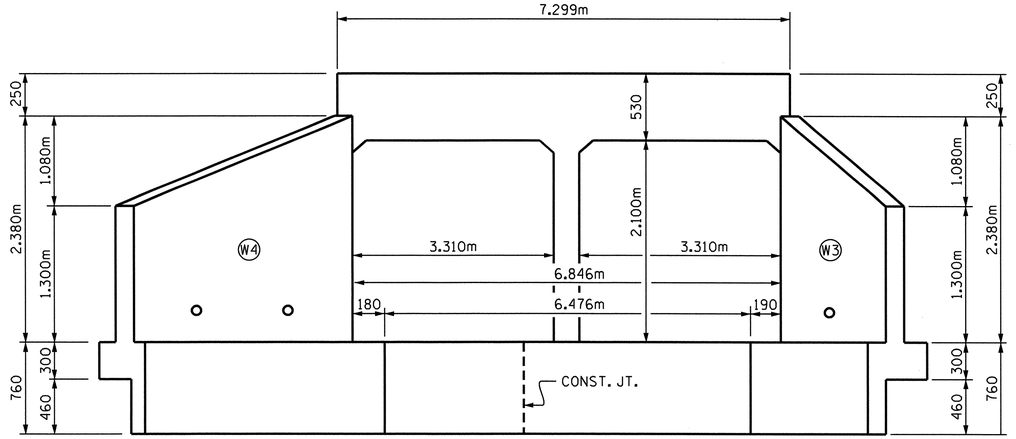
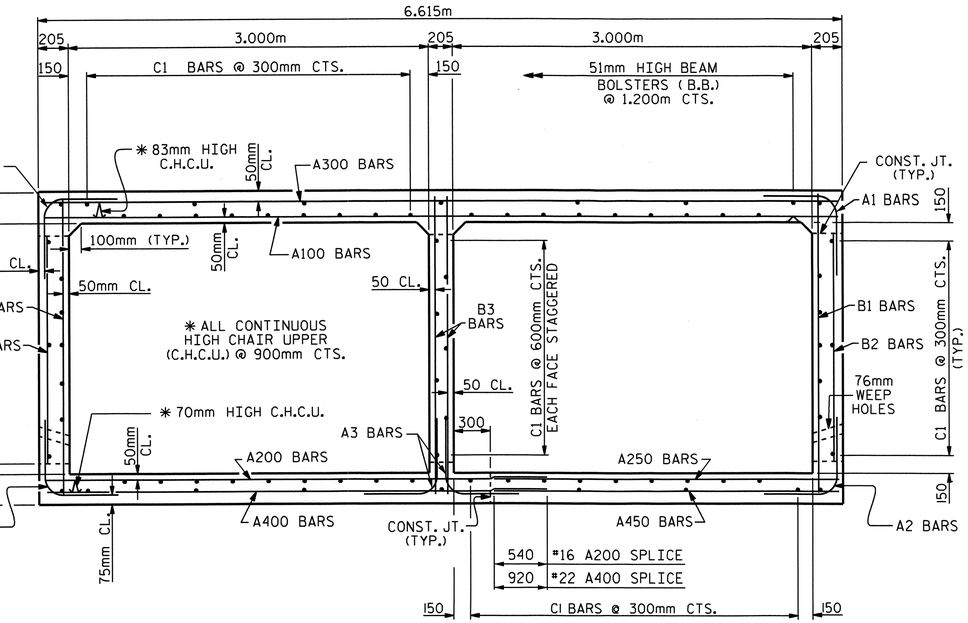


CULVERT SECTION NORMAL TO ROADWAY

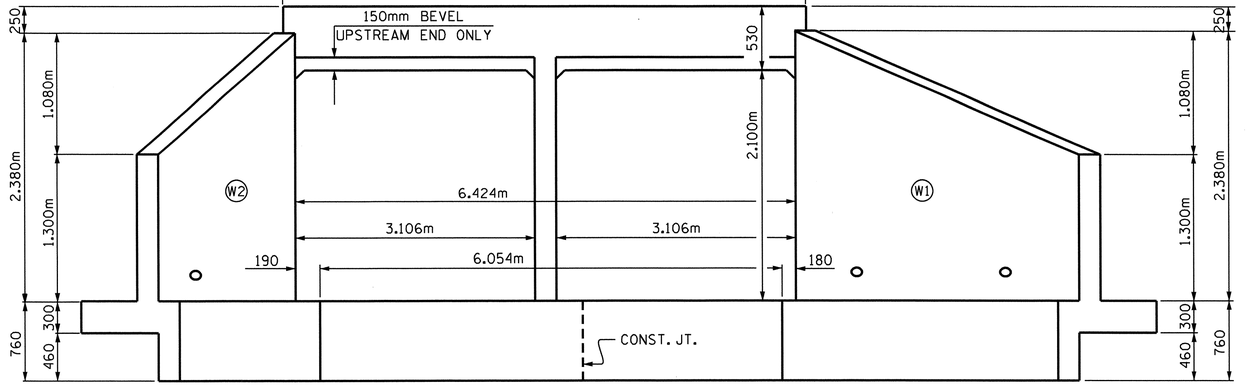


OUTLET END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 77 "C" BARS IN SECTION OF BARREL.
(LOOKING DOWNSTREAM)



INLET END ELEVATION NORMAL TO SKEW

ASSEMBLED BY :	A. SORSENGINH	DATE :	1/28/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY :	EEM	6/97	
CHECKED BY :	ARB	7/97	

PROJECT NO. B-4183

MADISON COUNTY

STATION: 11+16.500 -L-

SHEET 2 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 3.000m X 2.100m CONCRETE BOX CULVERT 115° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/14/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			15

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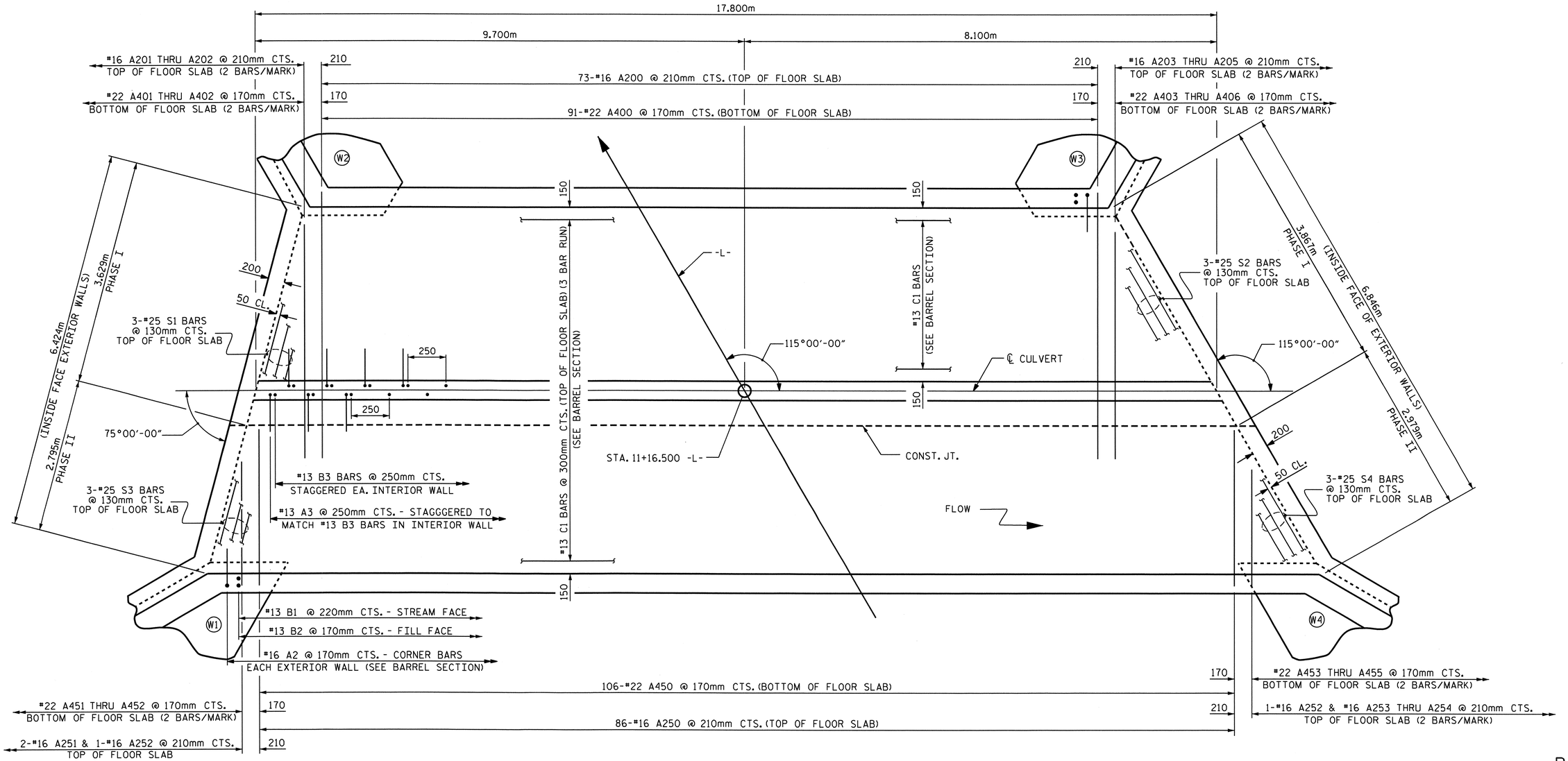

PLAN OF FLOOR SLAB

PROJECT NO. B-4183

MADISON COUNTY

STATION: 11+16.500 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 3.000m X 2.100m CONCRETE BOX CULVERT 115° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/14/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : A. SORSENGINH	DATE : 1/28/09	
CHECKED BY : J. LAMBERT	DATE : 2/10	
DRAWN BY : EEM 6/97		
CHECKED BY : ARB 7/97		

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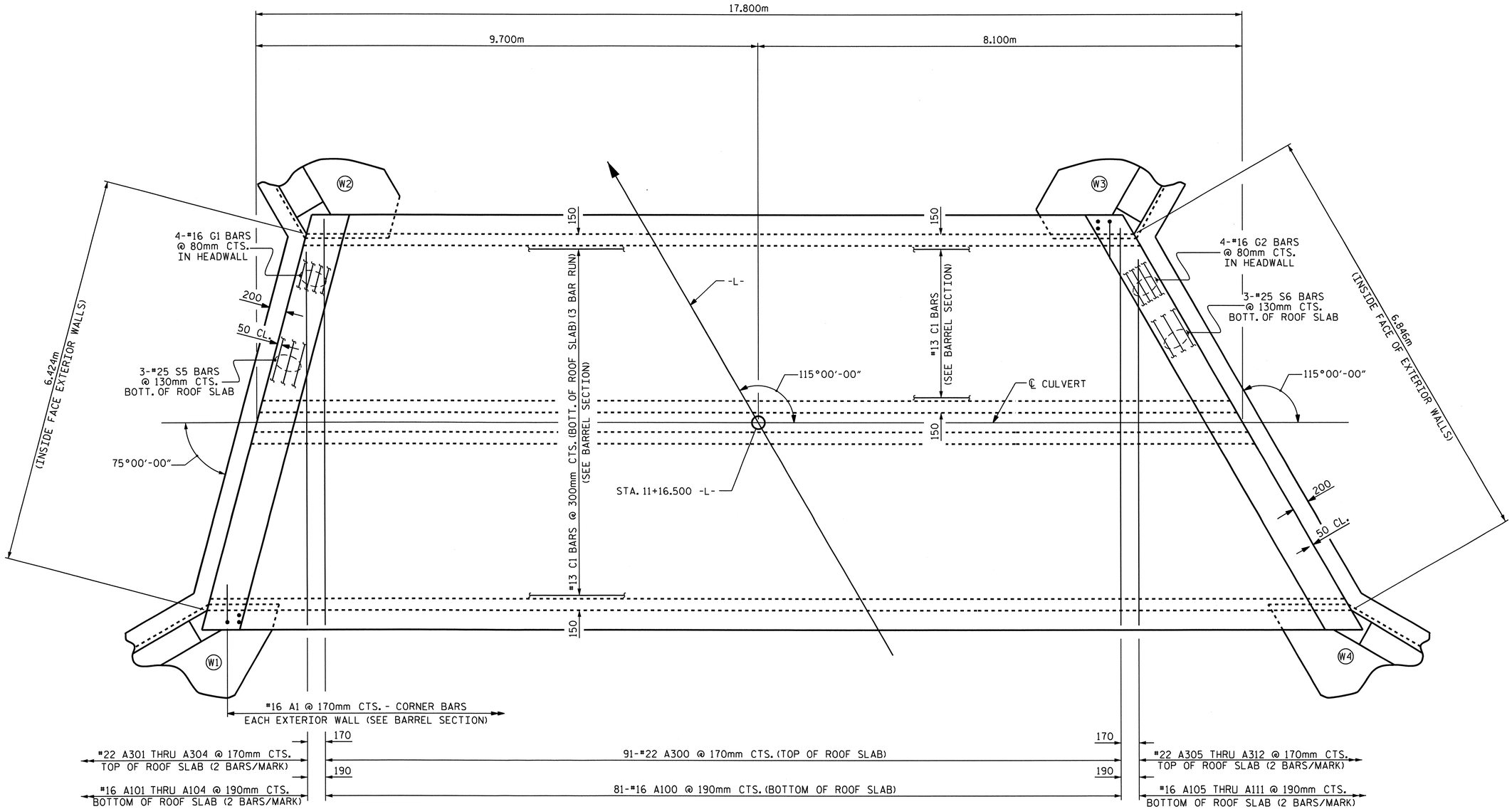


PLAN OF ROOF SLAB

PROJECT NO. B-4183

MADISON COUNTY

STATION: 11+16.500 -L-

SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 3.000m X 2.100m CONCRETE BOX CULVERT 115° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUDDING, JR.
10/14/11

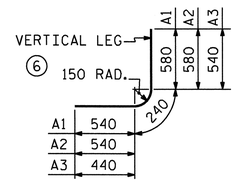
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY :	A. SORSENGINH	DATE : 1/28/09
CHECKED BY :	J. LAMBERT	DATE : 2/10
DRAWN BY : EEM	6/97	
CHECKED BY : ARB	7/97	

BAR TYPE

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A100	16	540
A200	16	540
A300	22	920
A400	22	920
B1	13	540
B2	13	540
B3	13	540
C1	13	590
S1	25	1500
S2	25	1500



DIMENSIONS ARE OUT TO OUT

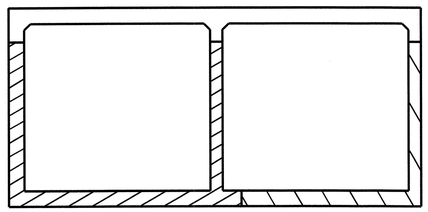
BILL OF MATERIAL

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	210	16	6	1360	443
A2	210	16	6	1360	443
A3	71	13	6	1220	86
A100	81	16	STR	6480	815
A101	2	16	STR	5280	16
A102	2	16	STR	3920	12
A103	2	16	STR	2380	7
A104	2	16	STR	960	3
A105	2	16	STR	5800	18
A106	2	16	STR	5000	16
A107	2	16	STR	4180	13
A108	2	16	STR	3360	10
A109	2	16	STR	2540	8
A110	2	16	STR	1740	5
A111	2	16	STR	920	3
A200	73	16	STR	4200	476
A201	2	16	STR	2980	9
A202	2	16	STR	1420	4
A203	2	16	STR	3500	11
A204	2	16	STR	2600	8
A205	2	16	STR	1700	5

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A250	86	16	STR	2860	382
A251	2	16	STR	1560	5
A252	2	16	STR	760	2
A253	2	16	STR	2100	7
A254	2	16	STR	1200	4
A300	91	22	STR	6480	1794
A301	2	22	STR	5240	32
A302	2	22	STR	3980	24
A303	2	22	STR	2700	16
A304	2	22	STR	1440	9
A305	2	22	STR	5780	35
A306	2	22	STR	5060	31
A307	2	22	STR	4320	26
A308	2	22	STR	3600	22
A309	2	22	STR	2880	18
A310	2	22	STR	2140	13
A311	2	22	STR	1420	9
A312	2	22	STR	680	4
A400	91	22	STR	4580	1268
A401	2	22	STR	3320	20
A402	2	22	STR	2060	13
A403	2	22	STR	3860	23
A404	2	22	STR	3140	19

BARS	NO.	SIZE	TYPE	LENGTH	WEIGHT
A405	2	22	STR	2400	15
A406	2	22	STR	1680	10
A450	106	22	STR	2860	922
A451	2	22	STR	1880	11
A452	2	22	STR	580	4
A453	2	22	STR	2280	14
A454	2	22	STR	1560	9
A455	2	22	STR	820	5
B1	144	13	STR	2420	346
B2	210	13	STR	1880	392
B3	120	13	STR	2420	289
C1	231	13	STR	6500	1492
D1	4	19	STR	720	6
G1	4	16	STR	6740	42
G2	4	16	STR	7160	44
S1	3	25	STR	5280	63
S2	3	25	STR	5540	66
S3	3	25	STR	2960	35
S4	3	25	STR	3140	37
S5	3	25	STR	6740	80
S6	3	25	STR	7160	85

REINFORCING STEEL = 10,154 kg



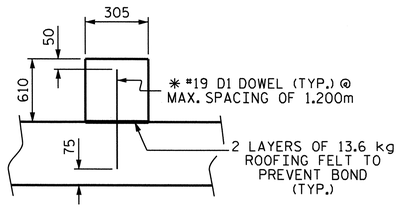
CONSTRUCTION PHASING

(LOOKING DOWNSTREAM)

PHASE I CONSTRUCTION

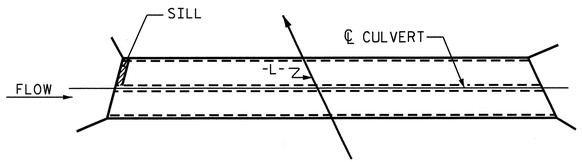
PHASE II CONSTRUCTION

PHASE III CONSTRUCTION

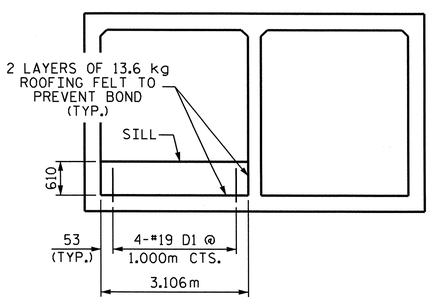


* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

SECTION THRU SILL



PLAN OF SILL LOCATION



ELEVATION

(LOOKING DOWNSTREAM)

CULVERT SILL DETAILS

PROJECT NO. B-4183

MADISON COUNTY

STATION: 11+16.500 -L-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

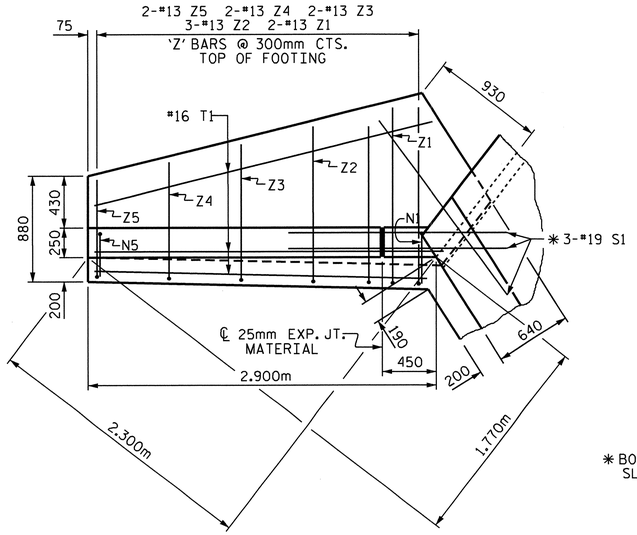
DOUBLE 3.000m X 2.100m CONCRETE BOX CULVERT 115° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DILGENS, JR.
10/14/11

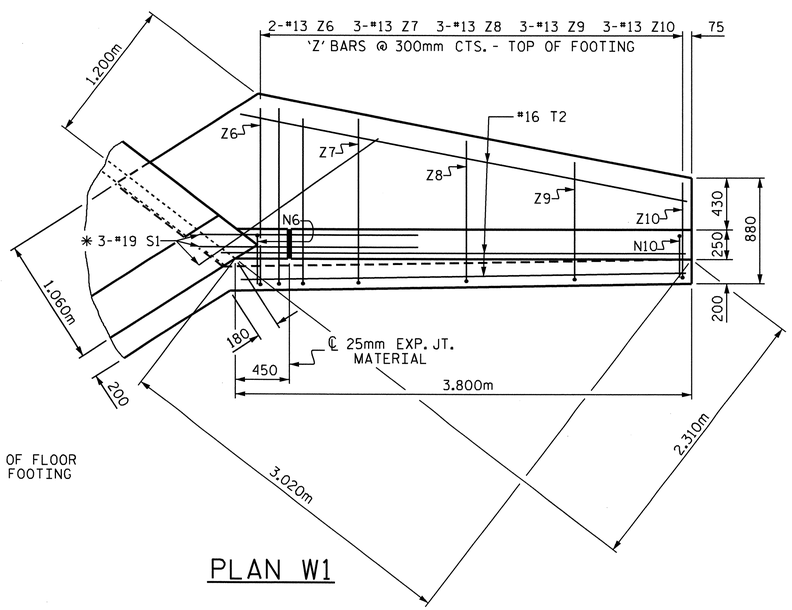
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : A. SORSENGINH DATE : 1/28/09
CHECKED BY : J. LAMBERT DATE : 2/10

13-OCT-2011 11:38
R:\Structures\asorsenginh\Microstation\STR28\B-4183_sd_CU
dahodge



PLAN W2

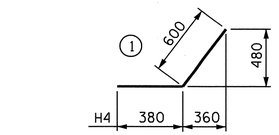


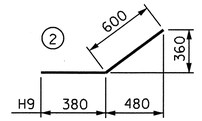
PLAN W1

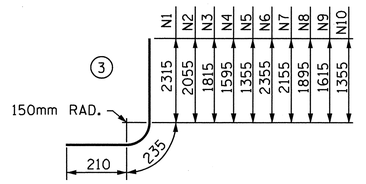
* BOTTOM OF FLOOR SLAB & FOOTING

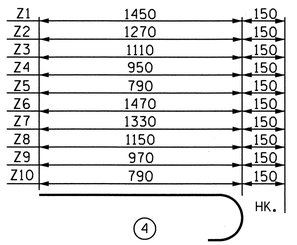
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.







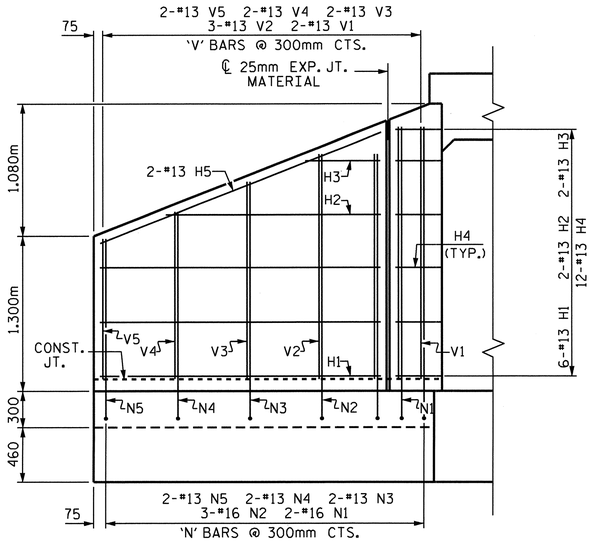


BILL OF MATERIAL

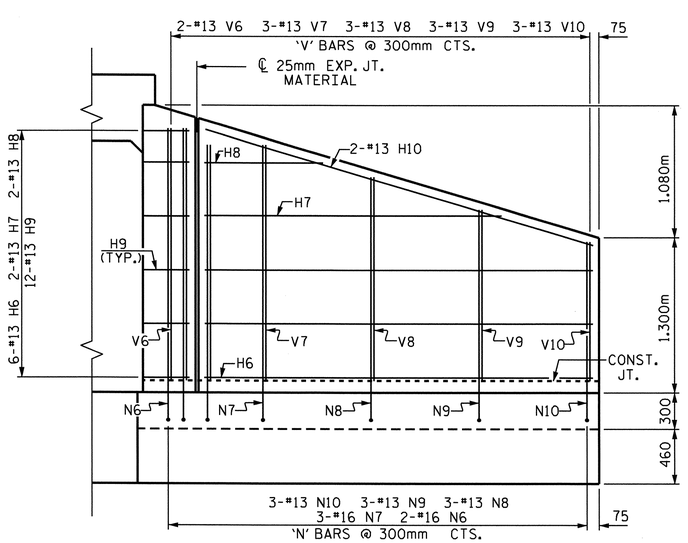
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	13	STR	2340	14
H2	2	13	STR	1740	3
H3	2	13	STR	600	1
H4	12	13	1	980	12
H5	2	13	STR	2500	5
H6	6	13	STR	3240	19
H7	2	13	STR	2500	5
H8	2	13	STR	1000	2
H9	12	13	2	980	12
H10	2	13	STR	3360	7
N1	2	16	3	2760	9
N2	3	16	3	2500	12
N3	2	13	3	2260	4
N4	2	13	3	2040	4
N5	2	13	3	1800	4
N6	2	16	3	2800	9
N7	3	16	3	2600	12
N8	3	13	3	2340	7
N9	3	13	3	2060	6
N10	3	13	3	1800	5
S1	6	19	STR	1800	24
T1	3	16	STR	2900	14
T2	3	16	STR	3800	18
V1	2	13	STR	2140	4
V2	3	13	STR	1880	6
V3	2	13	STR	1640	3
V4	2	13	STR	1420	3
V5	2	13	STR	1180	2
V6	2	13	STR	2180	4
V7	3	13	STR	1980	6
V8	3	13	STR	1720	5
V9	3	13	STR	1440	4
V10	3	13	STR	1180	4
Z1	2	13	4	1600	3
Z2	3	13	4	1420	4
Z3	2	13	4	1260	3
Z4	2	13	4	1100	2
Z5	2	13	4	940	2
Z6	2	13	4	1620	3
Z7	3	13	4	1480	4
Z8	3	13	4	1300	4
Z9	3	13	4	1120	3
Z10	3	13	4	940	3

REINFORCING STEEL FOR 2 WING WALLS — 280 kg

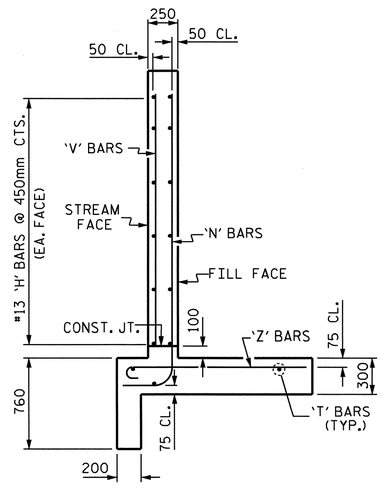
CLASS A CONCRETE
- 2 WINGS — 6.4 m^3
- 1 HEADWALL — 0.8 m^3
- 1 END CURTAIN WALL — 0.9 m^3
- TOTAL — 8.1 m^3



ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

FOR WING ORIENTATION, SEE SHEET C-10.

ASSEMBLED BY : A. SORSENGINH	DATE : 2/3/09
CHECKED BY : J. LAMBERT	DATE : 2/10
DRAWN BY : JLR 5/97	
CHECKED BY : VAP 10/97	

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER DAVID R. DILLGINS
10/14/11

PROJECT NO. B-4183
MADISON COUNTY
STATION: 11+16.500 -L-

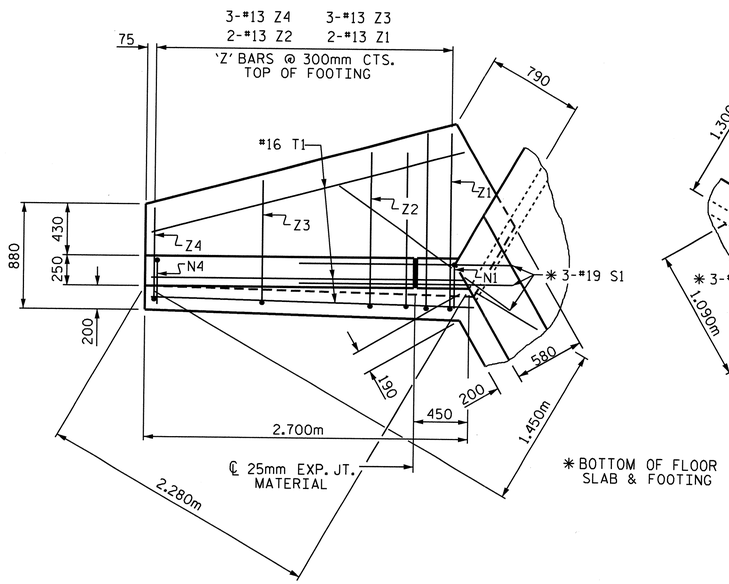
SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

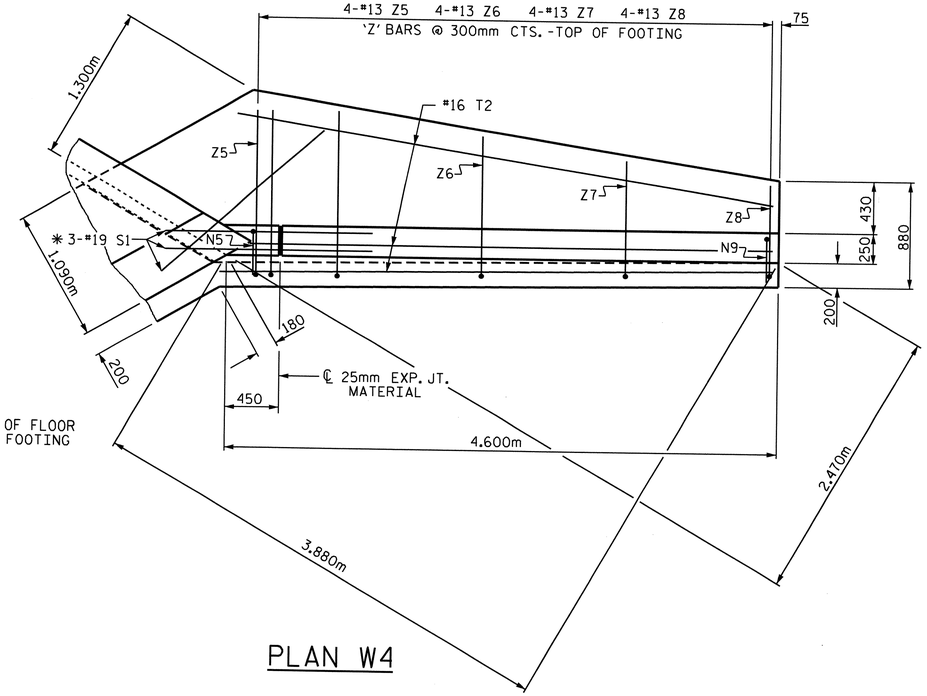
WING FOR CONCRETE BOX CULVERT H=2.100m SLOPE=2:1 75° OR 105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13
1			3			TOTAL SHEETS
2			4			15

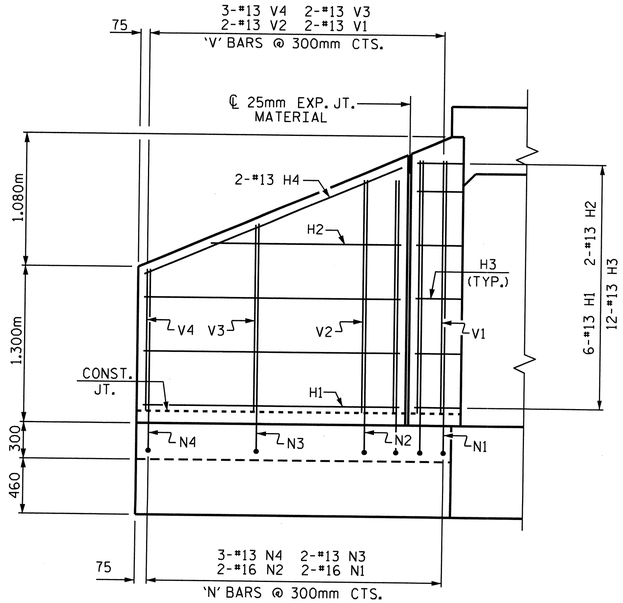
STD. NO. CW7521



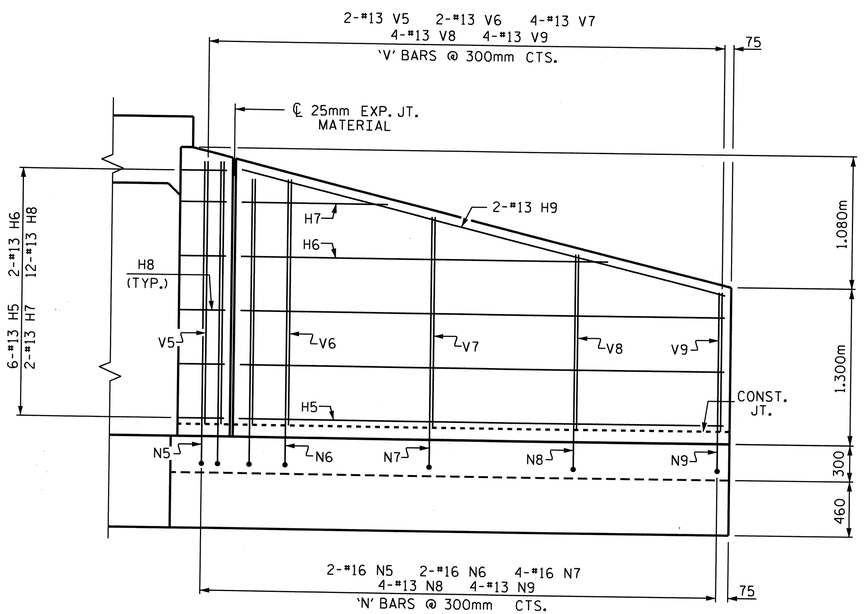
PLAN W3



PLAN W4



ELEVATION W3



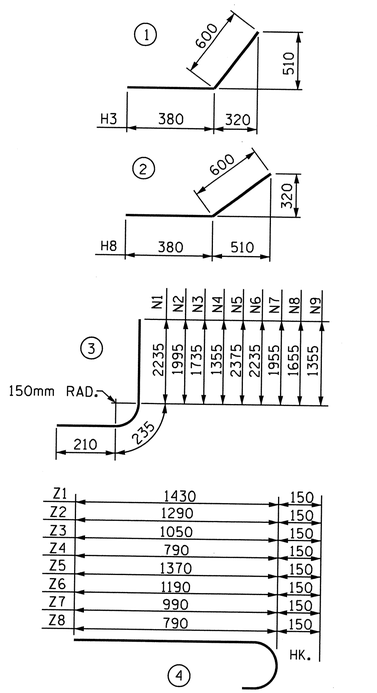
ELEVATION W4

FOR WING ORIENTATION, SEE SHEET C-10.

ASSEMBLED BY :	A. SORSENGINH	DATE :	2/3/09
CHECKED BY :	J. LAMBERT	DATE :	2/10
DRAWN BY : FPP	06/97		
CHECKED BY : VAP	08/97		

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



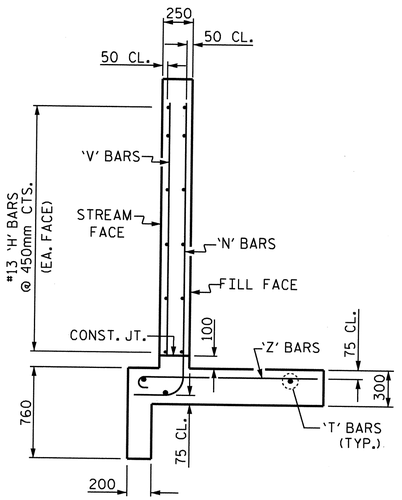
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	13	STR	2140	13
H2	2	13	STR	1580	3
H3	12	13	1	980	12
H4	2	13	STR	2300	5
H5	6	13	STR	4040	24
H6	2	13	STR	3160	6
H7	2	13	STR	1340	3
H8	12	13	2	980	12
H9	2	13	STR	4140	8
N1	2	16	3	2680	8
N2	2	16	3	2440	8
N3	2	13	3	2180	4
N4	3	13	3	1800	5
N5	2	16	3	2820	9
N6	2	16	3	2680	8
N7	4	16	3	2400	15
N8	4	13	3	2100	8
N9	4	13	3	1800	7
S1	6	19	STR	1800	24
T1	3	16	STR	2700	13
T2	3	16	STR	4600	21
V1	2	13	STR	2060	4
V2	2	13	STR	1820	4
V3	2	13	STR	1560	3
V4	3	13	STR	1180	4
V5	2	13	STR	2200	4
V6	2	13	STR	2060	4
V7	4	13	STR	1780	7
V8	4	13	STR	1480	6
V9	4	13	STR	1180	5
Z1	2	13	4	1580	3
Z2	2	13	4	1440	3
Z3	3	13	4	1200	4
Z4	3	13	4	940	3
Z5	4	13	4	1520	6
Z6	4	13	4	1340	5
Z7	4	13	4	1140	5
Z8	4	13	4	940	4

REINFORCING STEEL
FOR 2 WINGS 290 kg

CLASS A CONCRETE

2 WINGS	7.0	m^3
1 HEADWALL	0.8	m^3
1 END CURTAIN WALL	1.0	m^3
TOTAL	8.8	m^3



TYPICAL WING SECTION

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/14/11

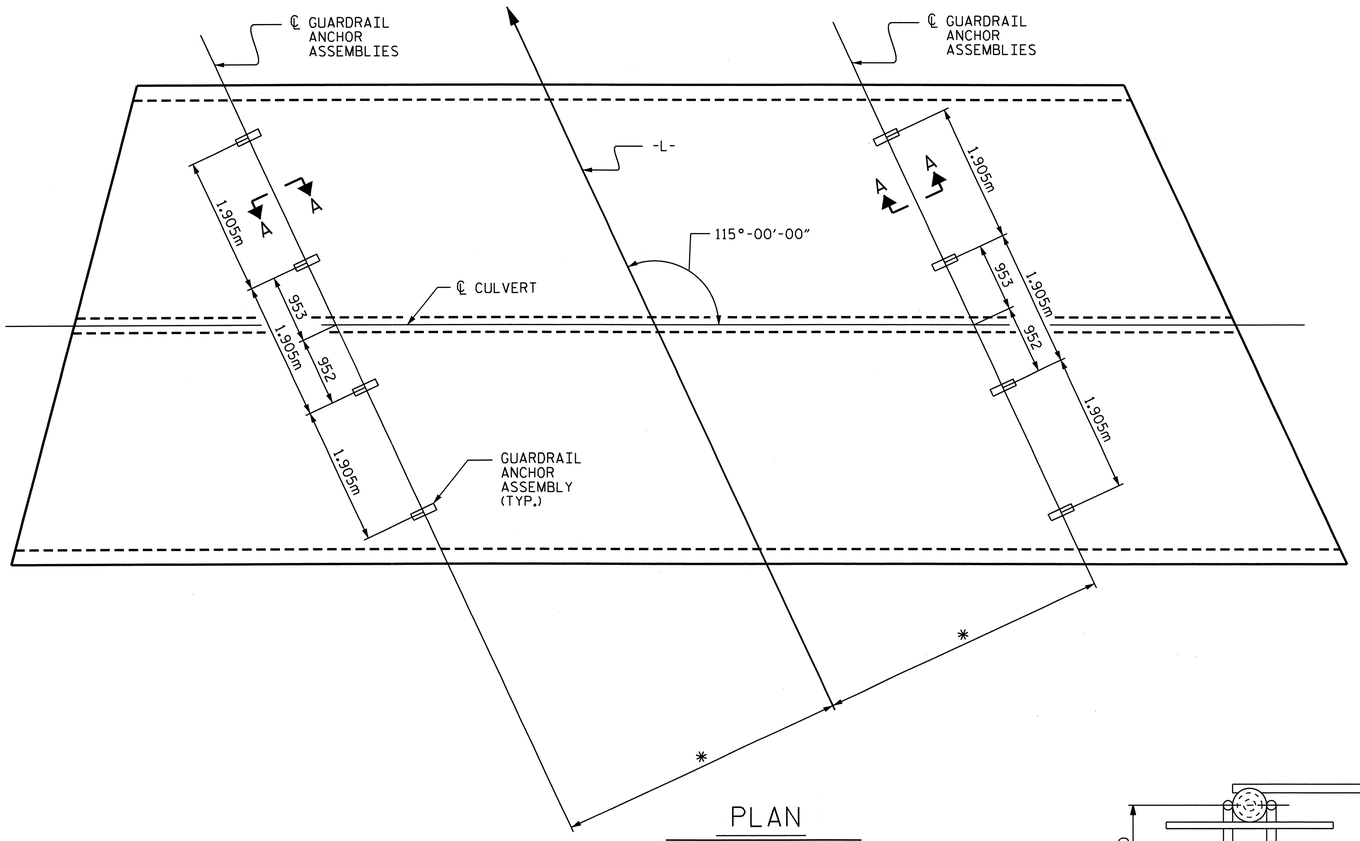
PROJECT NO. B-4183
MADISON COUNTY
STATION: 11+16.500 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

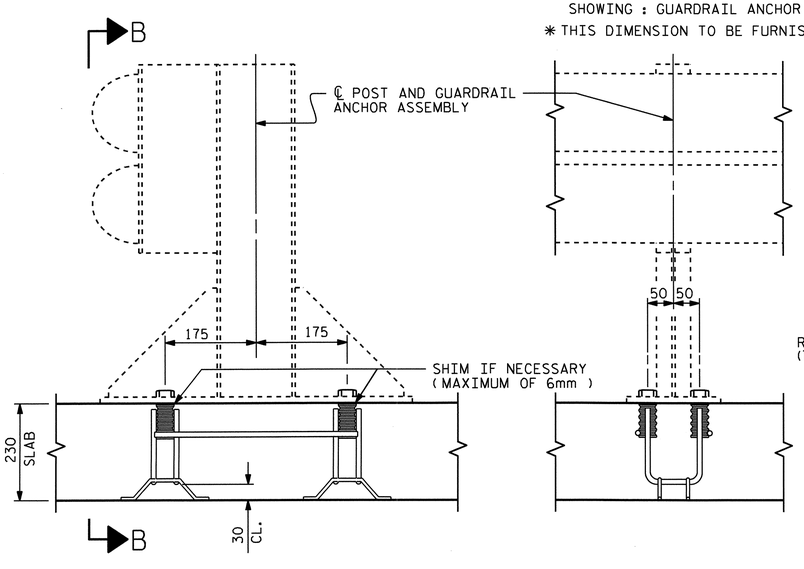
WING FOR CONCRETE BOX CULVERT H = 2.1m SLOPE = 2 : 1 115° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14
1			3			TOTAL SHEETS
2			4			15



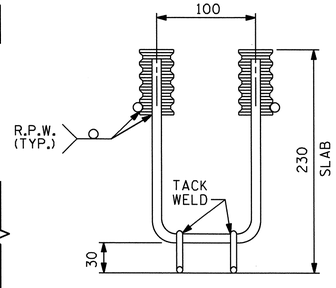
PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.
* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.

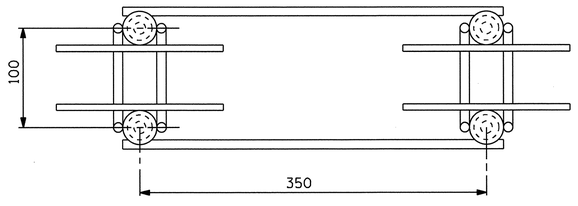


SECTION A-A

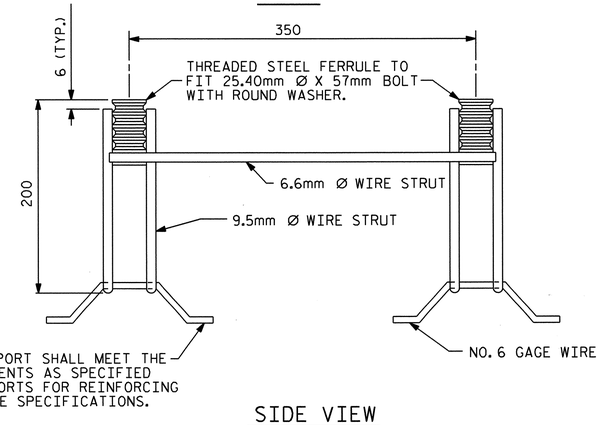
SECTION B-B



ELEVATION



PLAN



THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

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 64mm.

B. 4 - 25.40mm DIA. X 57mm 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 25.40mm DIA. X 57mm 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 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 620 MPa. 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 25.40mm Ø BOLT IS 97.0 kN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4183
MADISON COUNTY
STATION: 11+16.500 -L-

SHEET 8 OF 8

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-15
1			3			TOTAL SHEETS
2			4			15

STD. NO. GRA1SM

ASSEMBLED BY : D. HODGE	DATE : 9/11	
CHECKED BY : J.R. DUGGINS	DATE : 9/11	
DRAWN BY : FCJ 6/88	REV. 7/10/01	LES/RDR
CHECKED BY : ARB 6/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06R	KMM/GM

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
10/14/11

13-OCT-2011 11:36
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dahodge

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. 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 (c) RGW REV. 5-7-03 RWW (c) JTE
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM

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