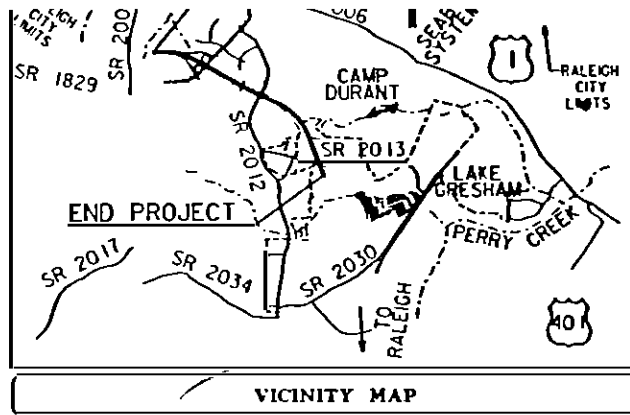


R-20

PROJECT: 6.408001B



# STATE HIGHWAY

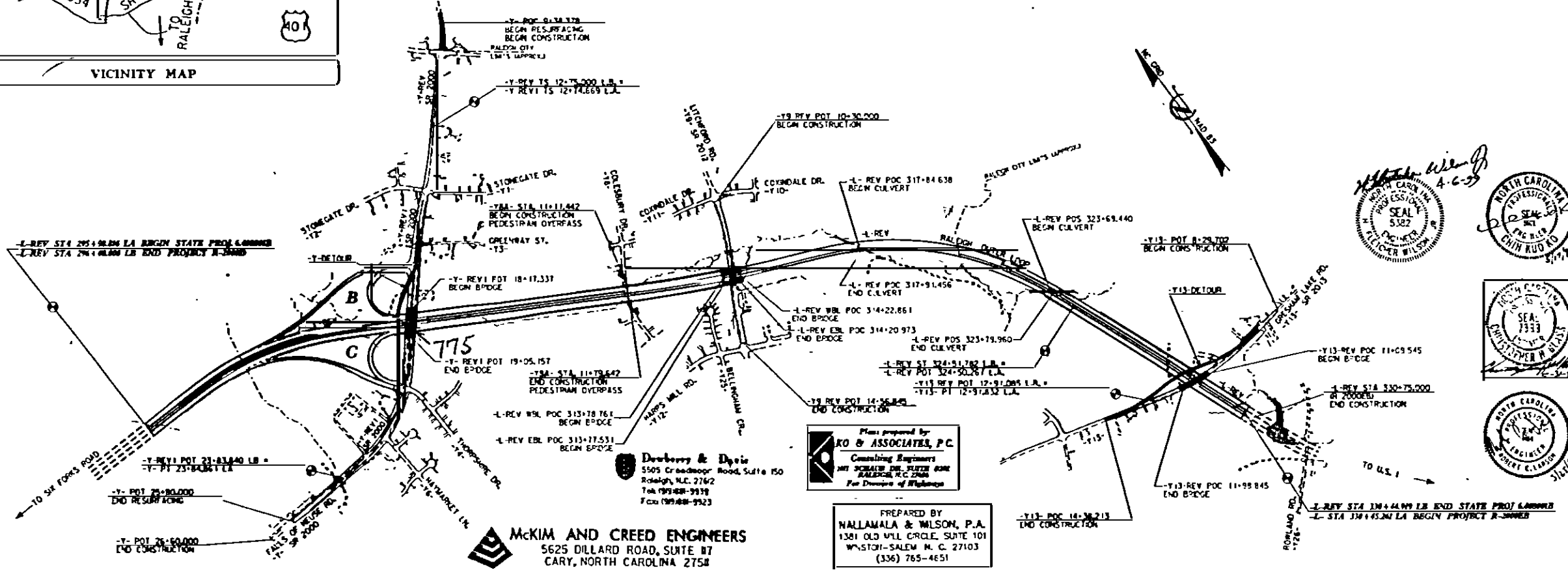
## WAKE COUNTY

LOCATION: RALEIGH OUTER LOOP FROM APPROX. 850 METERS WEST OF FALLS OF NEUSE ROAD TO APPROX. 245 METERS EAST OF GRESHAM LAKE ROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNING, SIGNALS, CULVERTS, NOISE WALLS, LONG LIFE PAVEMENT MARKING AND RAISED REFLECTIVE PAVEMENT MARKERS

91-0775

STRUCTURES



4-6-99

**Dowberry & Davis**  
 Consulting Engineers  
 5505 Creedmoor Road, Suite 150  
 Raleigh, N.C. 27612  
 Tel: 1919-488-9939  
 Fax: 1919-488-9523

Plans prepared by  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 101 SHELTON DR. SUITE 400  
 RALEIGH, N.C. 27606  
 For Division of Highways

PREPARED BY  
**NALLAMALA & WILSON, P.A.**  
 1381 OLD MILL CIRCLE, SUITE 101  
 WYSTON-SALEM, N. C. 27103  
 (336) 765-4651

**MCKIM AND CREED ENGINEERS**  
 5625 DILLARD ROAD, SUITE 87  
 CARY, NORTH CAROLINA 27513

--

DESIGN DATA	
ADT =	54,800 (1999)
ADT =	89,600 (2019)
DHV =	9%
D =	55%
T =	16%
	(175% 10% + DUAL 6%)
V =	110 km/h

PROJECT LENGTH	
LENGTH ROADWAY STATE PROJECT 6.408001B =	3.387 km
LENGTH STRUCTURES STATE PROJECT 6.408001B =	0.061 km
TOTAL LENGTH STATE PROJECT 6.408001B =	3.448 km

Plans Prepared For The North Carolina Department Of Transportation
1994 STANDARD SPECIFICATIONS
LETTING DATE:
SEPTEMBER 21, 1999

NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL  
 495  
 WILLIAM J. ROGERS

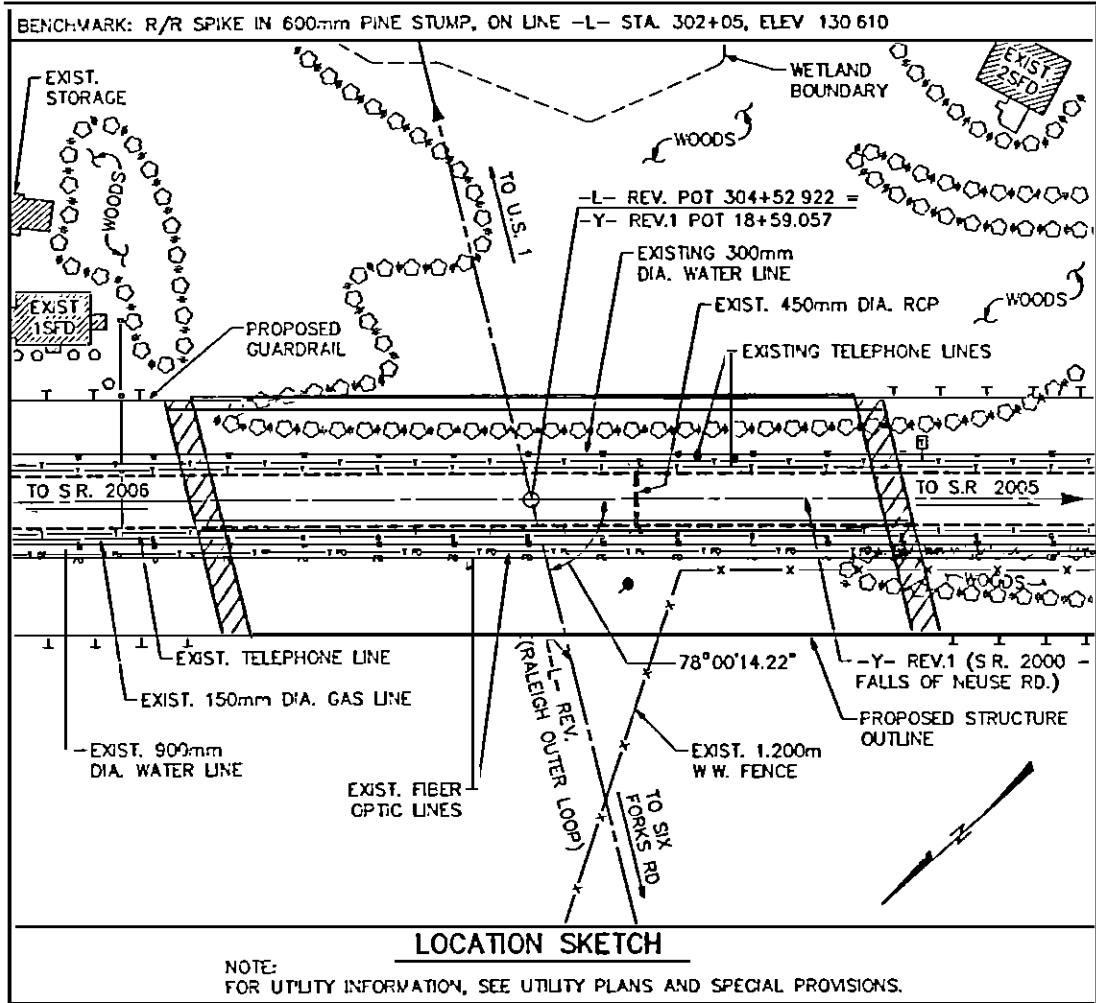
*William J. Rogers*  
 9/27/99

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

*D. M. Barbour*  
 P.E.  
 STATE HIGHWAY ENGINEER - DESIGN  
 DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED FOR  
 DIVISION ADMINISTRATOR





**GENERAL NOTES**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = MS18 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES, FOR SEISMIC PERFORMANCE CATEGORY A.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET S-NSM.

PILES FOR END BENT 1, BENT 1 AND END BENT 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 450 kN EACH.

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

THE EXISTING PAVEMENT WITHIN THE AREA OF THE END BENT PILES SHALL BE REMOVED AND THE ROADBED SCARIFIED TO A MINIMUM DEPTH OF 610mm.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 345W AND PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.

FOR REINFORCED CONCRETE DECK SLAB, SEE SPECIAL PROVISIONS.

FOR FABRICATED METAL STAY-IN-PLACE FORMS, SEE SPECIAL PROVISIONS.

FOR CURING BRIDGE DECK SLABS, SEE THE SPECIAL PROVISION "REINFORCED CONCRETE DECK SLAB".

THIS BRIDGE HAS BEEN DESIGNED BY STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO SPECIFICATIONS.

FOR 355mm x 790mm CONCRETE PARAPET, SEE SPECIAL PROVISIONS.

FOR REINFORCING STEEL, SEE SPECIAL PROVISIONS.

FOR SPIRAL COLUMN REINFORCING STEEL, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR PILE DRIVING ACCURACY, SEE SPECIAL PROVISIONS.

FOR DRIVING STEEL PILES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR SHEAR STUDS, SEE SPECIAL PROVISIONS.

FOR GROOVING BRIDGE FLOORS AND APPROACH SLABS, SEE SPECIAL PROVISIONS.

**TOTAL BILL OF MATERIAL**

	FOUNDATION EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP310x79 STEEL PILES	TWO BAR METAL RAIL	355mm X 790mm CONCRETE PARAPET	100MM SLOPE PROTECTION	POT BEARINGS	EVAZOTE JOINT SEALS	ELECTRICAL CONDUIT SYSTEM
	LUMP SUM	SQ. METERS	SQ. METERS	CU. METERS	LUMP SUM	KG	KG	APPROXIMATE KG	NO.	METERS	LN. METERS	SQ. METERS	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	---	2,815.3	2,530.0	---	---	---	---	440,700	---	---	169,540	---	LUMP SUM	LUMP SUM	LUMP SUM
END BENT 1	---	---	---	73.3	LUMP SUM	6,932	---	---	34	408.0	---	415	---	---	---
BENT 1	LUMP SUM	---	---	149.9	---	17,006	1,419	---	72	720.0	---	---	---	---	---
END BENT 2	---	---	---	75.9	LUMP SUM	6,983	---	---	34	612.0	---	394	---	---	---
TOTAL	LUMP SUM	2,815.3	2,530.0	299.1	LUMP SUM	30,901	1,419	440,700	140	1,740.0	169,540	809	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT No. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922-L- REV. POT

SHEET 3 OF 3

PREPARED BY  
 NALLAMALA & WILSON, P.A.  
 1381 OLD MILL CIRCLE, SUITE 101  
 WINSTON-SALEM, N. C. 27103  
 (336) 765-4651

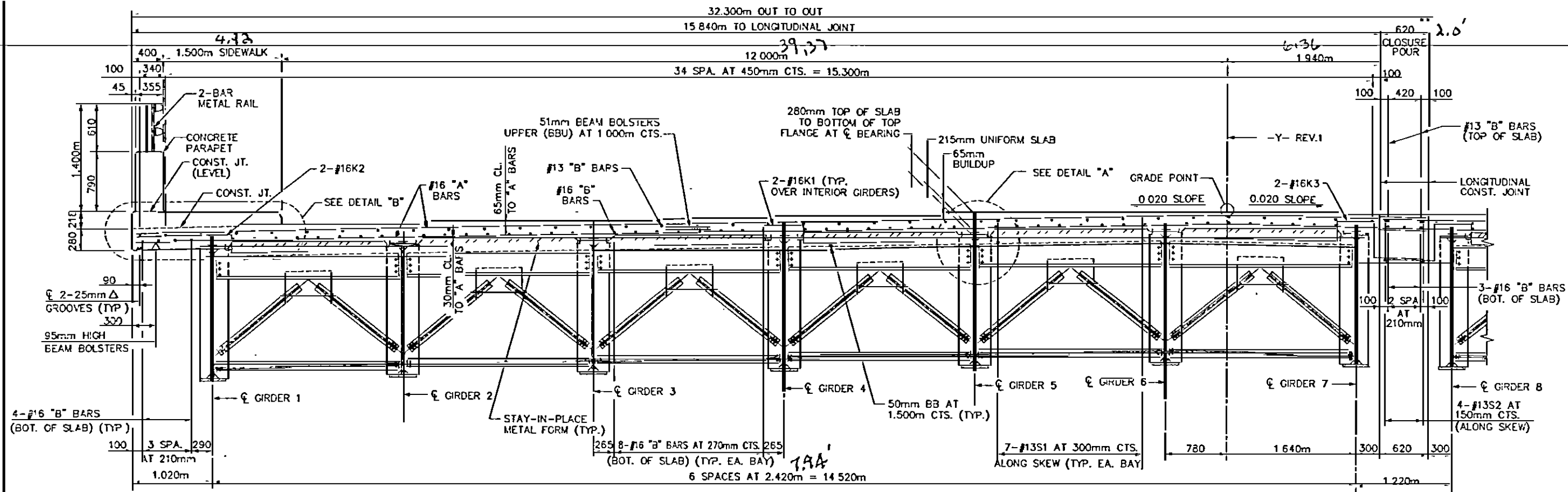


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING FOR BRIDGE  
 ON S.R. 2000 (FALLS OF NEUSE ROAD)  
 OVER RALEIGH OUTER LOOP  
 BETWEEN S.R. 2006 AND S.R. 2005

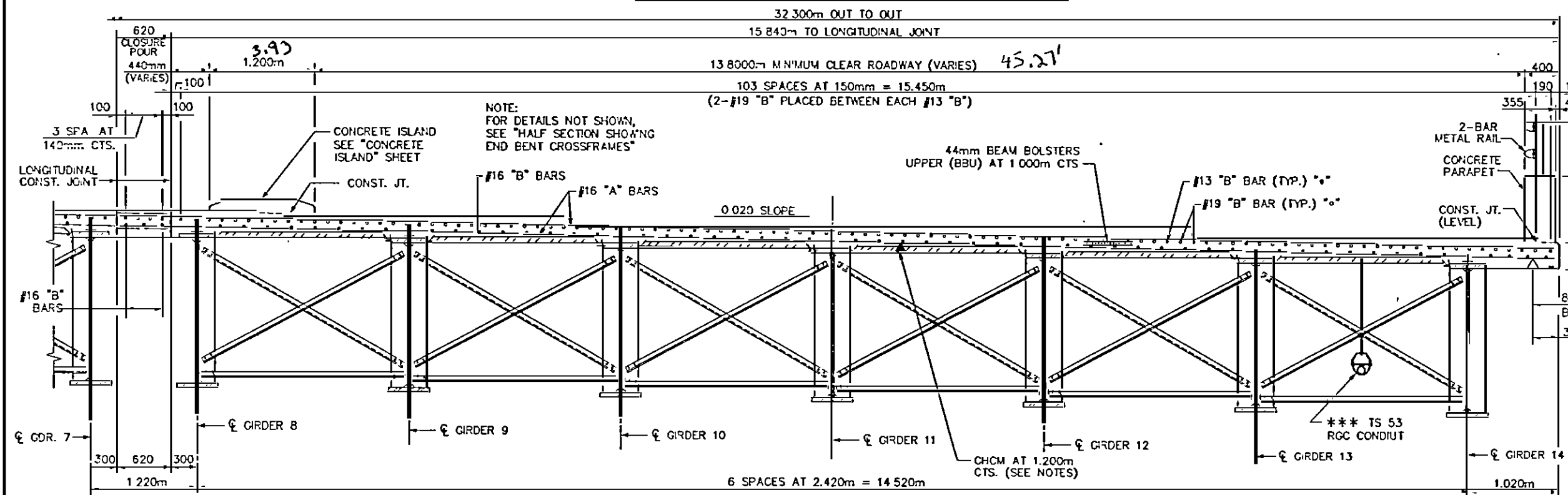
REVISIONS						SHEET NO. S-3
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DESIGNED BY: A. STEPHEN CALLARAY DATE: 8/7/99  
 CHECKED BY: DATE: 5-20-99  
 APPROVED BY: DATE:

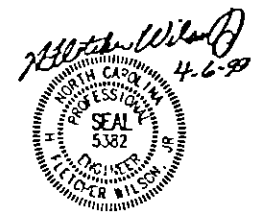
DWG. NO. 9705-3



HALF SECTION SHOWING END BENT CROSSFRAMES



HALF SECTION SHOWING INTERMEDIATE AND BENT CROSSFRAMES



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
TYPICAL SECTION

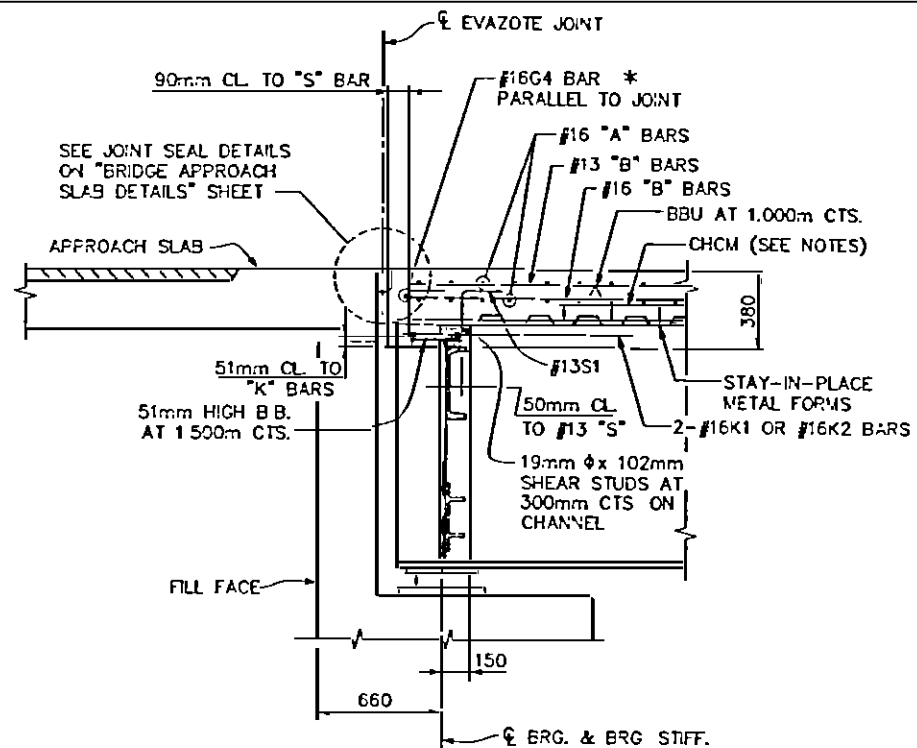
\*\*\* SEE "ELECTRICAL CONDUIT SYSTEM"  
PROJECT SPECIAL PROVISIONS AND DETAILS



REVISIONS						SHEET NO. S-4
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			170

DESIGNED BY: A. STEPHEN CALLAWAY  
CHECKED BY: [Signature]  
DATE: JULY, 1997

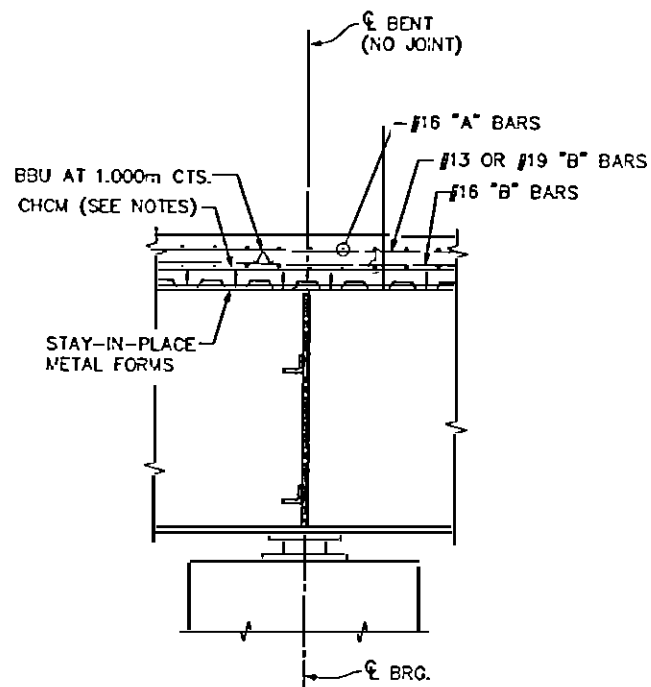
DWG NO 9705-4-



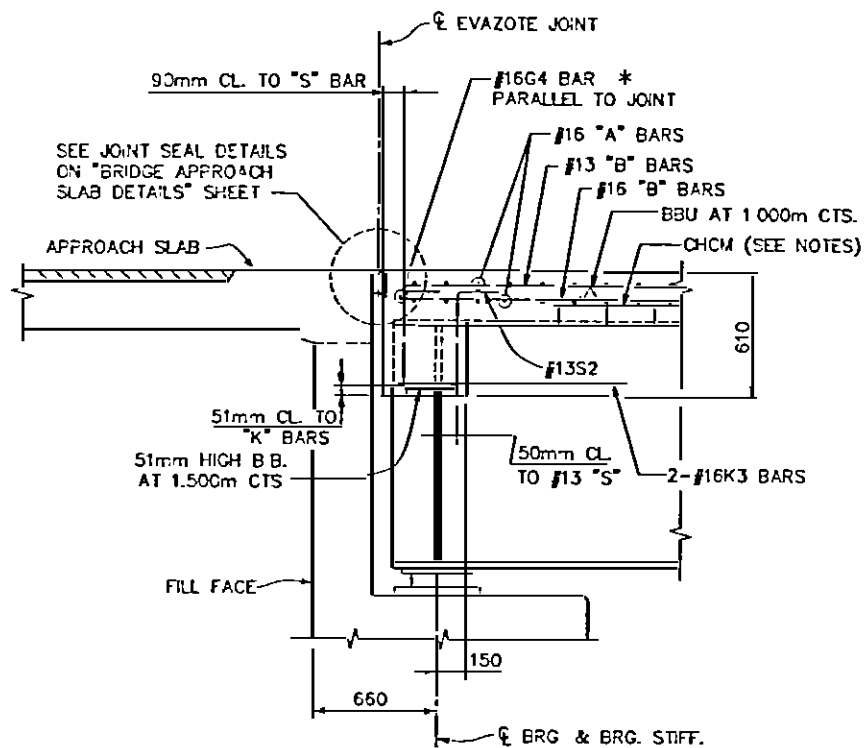
SECTION THRU END BENT CROSSFRAME

SECTION THRU END BENT 1  
(END BENT 2 SIMILAR)

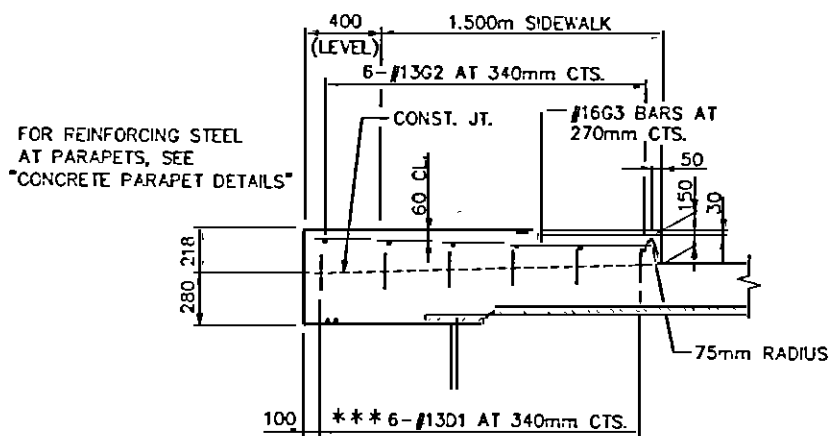
\*#16 "G" BARS MAY BE  
SHIFTED SLIGHTLY AS  
NECESSARY TO CLEAR  
REINFORCING STEEL AND  
STIRRUPS.



SECTION THRU DECK AT BENT



SECTION THRU END BENT AT CLOSURE POUR



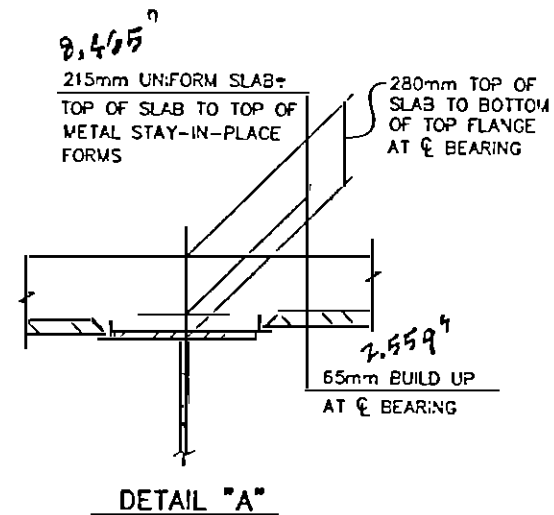
DETAIL "B"

PARAPET NOT SHOWN FOR CLARITY

\*\*\* DOWELS MAY BE PUSHED INTO  
GREEN CONCRETE AFTER SPAN  
HAS BEEN SCREEDED OFF.

REINFORCING STEEL FOR DECK SLAB  
NOT SHOWN FOR CLARITY.

FOR REINFORCING STEEL  
AT PARAPETS, SEE  
"CONCRETE PARAPET DETAILS"



DETAIL "A"

NOTES:

PROVIDE CONTINUOUS HIGH CHAIR FOR METAL DECK (C.H.C.M.) AT 1.200m CENTERS WITH LEG SPACING TO MATCH THE PITCH OF THE FORM AND WITH A HEIGHT TO SUPPORT THE BOTTOM LAYER OF SLAB REINFORCEMENT A CLEAR DISTANCE OF 30mm ABOVE THE TOP OF THE STAY-IN-PLACE FORM.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK AND FORMS ARE PLACED ON THE UNIT.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

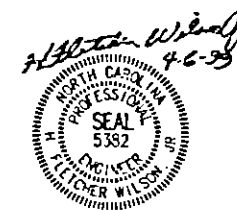
CONCRETE PARAPET, END POSTS, SIDEWALK AND CONCRETE ISLAND IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENER OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

METAL STAY-IN-PLACE FORMS AND FALSEWORK SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V NOTCH TESTS. SEE STRUCTURAL STEEL DETAIL SHEETS.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILD-UPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 13mm, SEE SPECIAL PROVISION FOR POT BEARINGS.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE CONCRETE CURB, SIDEWALK, CONCRETE ISLAND AND THE PARAPET.



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
DETAILS

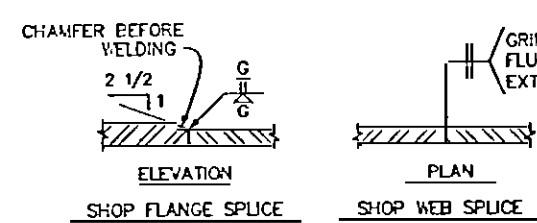
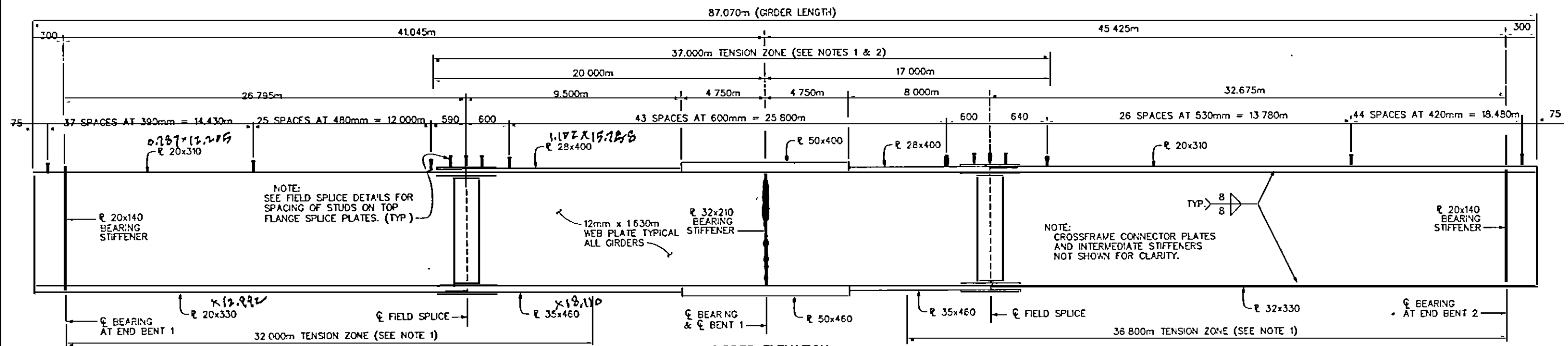
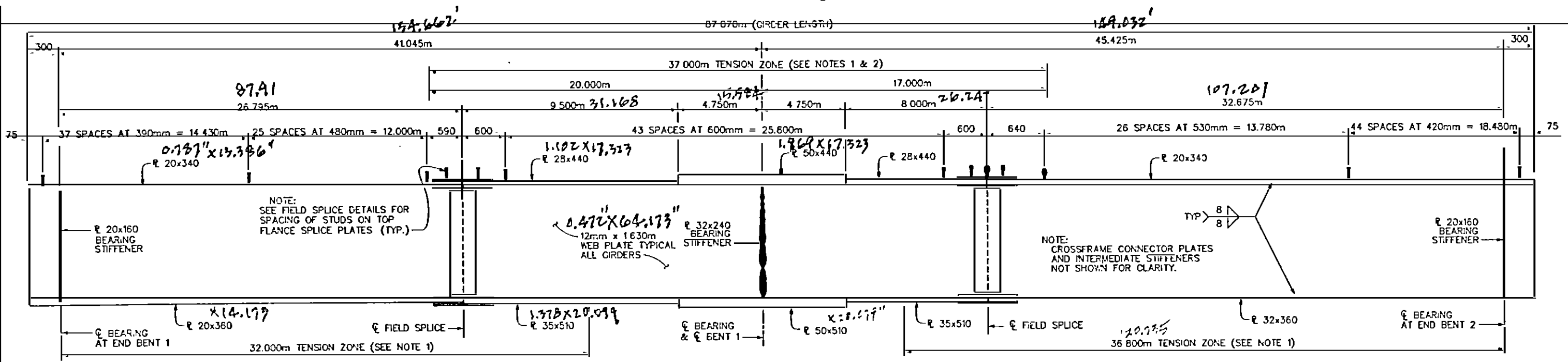
REVISIONS						SHEET NO. 3-5
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DWG NO. 9705-5

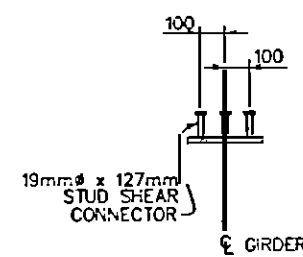
DATE: 10-21-98  
BY: [Signature]  
CHECKED BY: [Signature]  
DATE: [Signature]







**SHOP SPICE DETAILS**



**SHEAR CONNECTOR DETAILS**  
AT GIRDER FLANGE  
SEE FIELD SPICE DETAILS FOR SPACING OF STUDS ON TOP FLANGE SPICE PLATES (TYP.)

**NOTES:**

FOR NOTES AND DETAILS, SEE "STRUCTURAL STEEL DETAILS" SHEET.

FOR FIELD SPICES, SEE "FIELD SPICE DETAILS" SHEET.

546 TOTAL 19mm  $\phi$  SHEAR STUDS PER GIRDER (INCLUDES SHEAR STUDS ON TOP FLANGE SPICE PLATES).

BEARING STIFFENERS SHOWN ARE ON BOTH SIDES OF GIRDER.

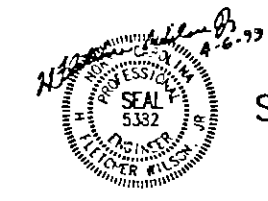
BEARING STIFFENERS NOT SHOWN ON SKEW FOR CLARITY. BEARING STIFFENERS SHALL BE PLACED ALONG THE SKEW. SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.

**NOTES FOR CHARPY V-NOTCH TEST:**

① CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR TOP OR BOTTOM FLANGE PLATE WHICH FALLS WITHIN "TENSION ZONE" LIMITS. ALSO, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR ALL WEB PLATES, WEB SPICE PLATES AND FLANGE SPICE PLATES. FOR CHARPY V-NOTCH TESTS, SEE SPECIAL PROVISIONS.

IF THE PERMITTED SHOP FLANGE SPICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE.

② NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN "TENSION ZONE" REGION.



PREPARED BY  
**NALLAMALA & WILSON, P.A.**  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4551



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922 -L- REV. POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

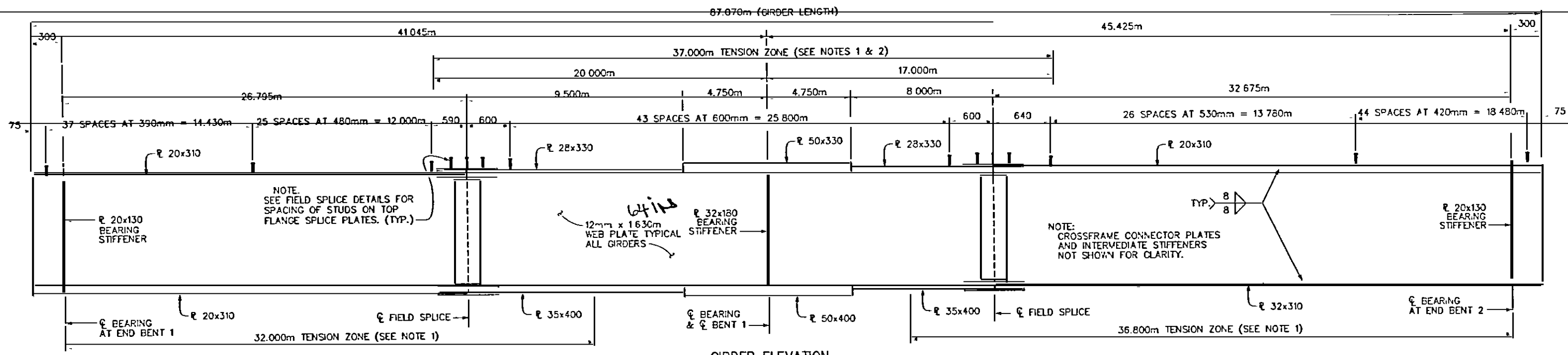
**SUPERSTRUCTURE  
GIRDER DETAILS**

REVISIONS						SHEET NO. 3-9
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

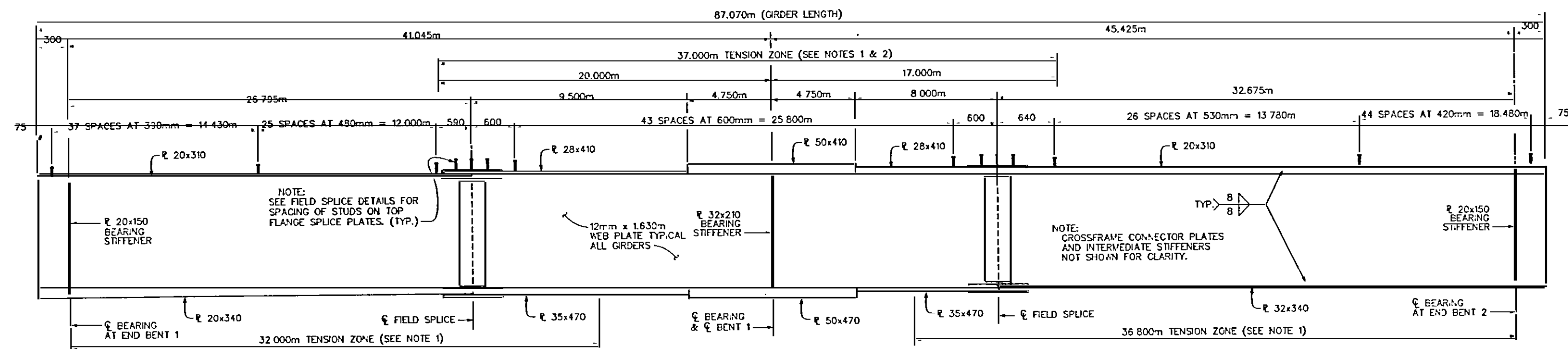
DESIGNED BY: JOYCE WHITE DATE: 7/16/88  
CHECKED BY: R. J. [unclear] DATE: 10-21-90  
APPROVED BY: [unclear] DATE: [unclear]

DWG NO 9705-9



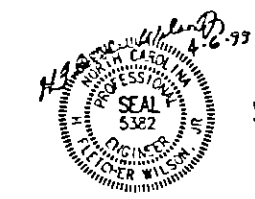


**GIRDER ELEVATION**  
GIRDERS 7 & 8



**GIRDER ELEVATION**  
GIRDERS 12, 13 & 14

NOTE:  
SEE SHEET 1 OF 2 FOR NOTES AND DETAILS.



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



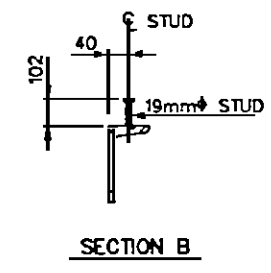
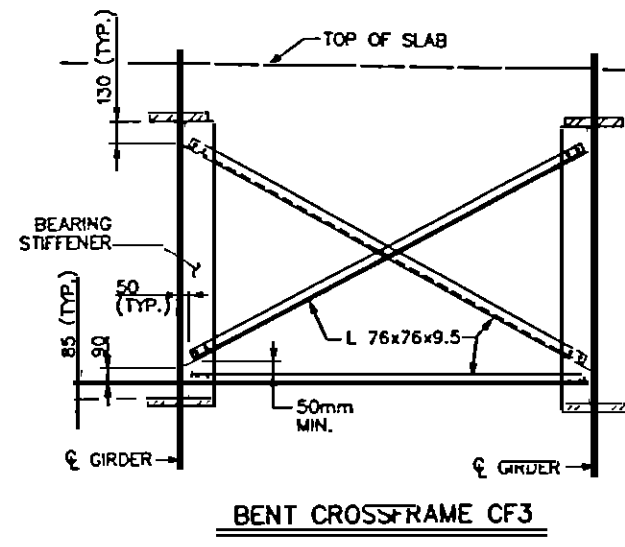
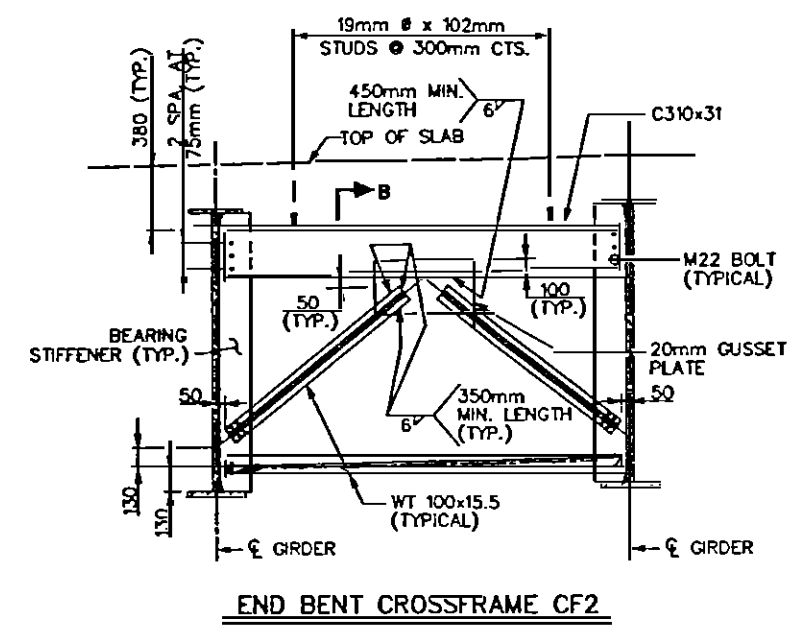
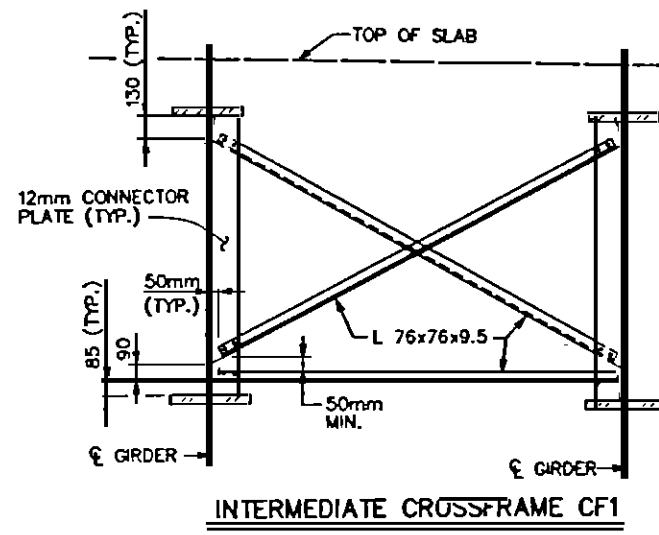
PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922 -L- REV. POT

SHEET 2 OF 2  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
GIRDER DETAILS

REVISIONS						SHEET NO. S-10 TOTAL SHEETS 170
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

DATE: 7/14/98  
DRAWN BY: JOYCE WHITE  
CHECKED BY: NALLAMALA & WILSON

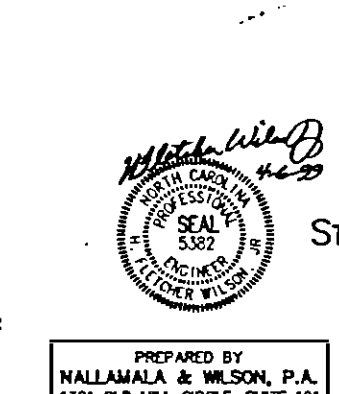
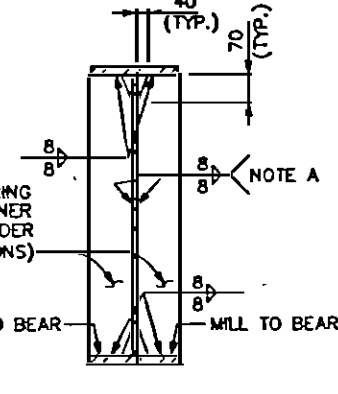
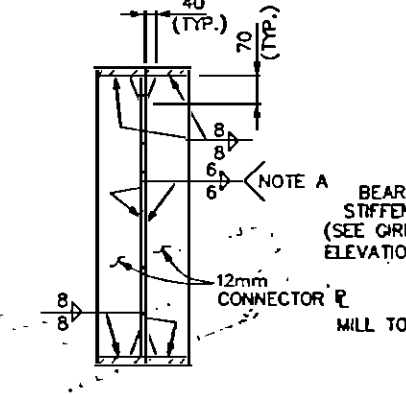
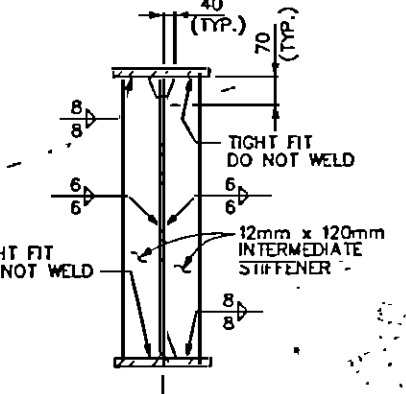
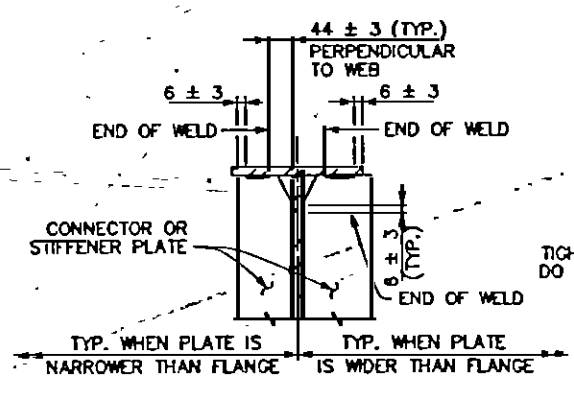
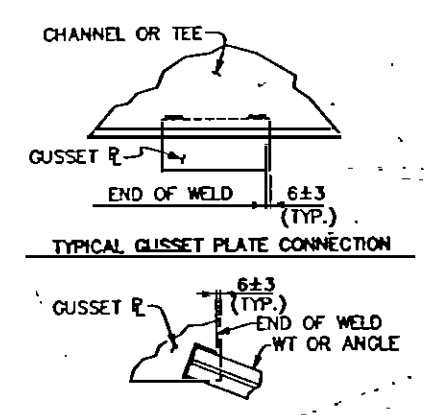
DWG. NO. 9705-10



NOTE A:  
PER BRIDGE WELDING  
CODE FIG. 2.3 (c)  
BEVEL IF NECESSARY

**STRUCTURAL STEEL NOTES:**

- ALL STRUCTURAL STEEL SHALL BE AASHTO M270, GRADE 345W AND PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE PLANS
- ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.
- ALL FIELD CONNECTIONS TO BE MADE WITH M22 HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.
- BEARING STIFFENERS SHALL BE PLUMB.
- ENDS OF THE CONTINUOUS PLATE GIRDERS SHALL BE IN A PLUMB POSITION AFTER THE TOTAL DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.
- SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 18 METERS AND WEB PIECE LENGTHS TO 14 METERS. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 4.5 METERS OF MAXIMUM DEAD LOAD DEFLECTION NOR WITHIN 4.5 METERS OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS. KEEP 610mm MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 150mm MINIMUM BETWEEN CONNECTOR PLATE OR INTERMEDIATE STIFFENER PLATE WELDS AND WEB OR FLANGE SHOP SPLICES.
- STUDS ON GIRDERS MAY BE SHIFTED UP TO 25mm IF NECESSARY TO CLEAR FLANGE SPLICE WELDS.
- FOR RADIOGRAPHIC TESTING OF BUTT WELDS, SEE SPECIAL PROVISIONS.
- IN LIEU OF THE TURN THE NUT METHOD, TENSION ON A325M BOLTS MAY BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.
- CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.
- INTERMEDIATE STIFFENER PLATES SHALL BE PLACED NORMAL TO GIRDER FLANGES AND WEB.
- INTERMEDIATE CROSSFRAME CONNECTOR PLATES AND BEARING STIFFENER PLATES SHALL BE PLACED PARALLEL TO THE SKEW OF THE BRIDGE.
- FOR CHARPY V-NOTCH TESTS, SEE SPECIAL PROVISIONS.
- STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.
- MAIN TENSION MEMBERS SHALL BE CVN IMPACT TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIAL PROVISIONS. FOR THE PURPOSE OF IMPACT TESTING, THE FOLLOWING MEMBERS SHALL BE CLASSIFIED AS MAIN TENSION MEMBERS:
  - ALL FLANGE PLATES WHICH FALL WITHIN THE TENSION ZONES AS INDICATED ON GIRDER DETAILS
  - ALL WEB PLATES
  - ALL GIRDER SPLICE PLATES
- THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OF FORMS AND GIRDER STIFFENER OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.
- FOR SURFACE PREPARATION OF UNPAINTED STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.
- FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.
- FOR PROTECTION OF PAINTED STEEL, SEE SPECIAL PROVISIONS.



**TYPICAL "TEE" OR ANGLE TO GUSSET PLATE CONNECTION**

**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS**

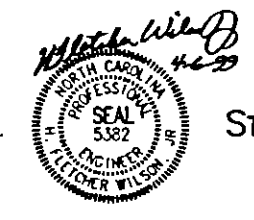
**DETAIL WHERE BOTTOM FLANGE IS IN TENSION**

**DETAIL WHERE TOP FLANGE IS IN TENSION**

**CONNECTOR PLATES**

**BEARING STIFFENERS**

NOTE:  
WHERE BOTH TOP AND BOTTOM FLANGES CAN EXPERIENCE TENSION, TIGHT FIT STIFFENER TO TOP FLANGE AND SHOP WELD STIFFENER TO BOTTOM FLANGE.



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922 -L- REV. POT

PREPARED BY  
MALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

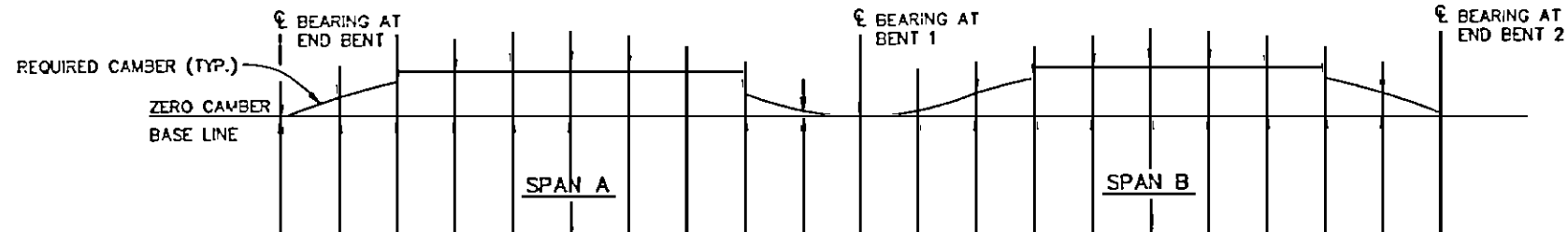
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
STRUCTURAL  
STEEL DETAILS



REVISIONS						SHEET NO. S-12
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DESIGNED BY: JOYCE WHITE DATE: 07/17/98  
CHECKED BY: DATE: 10/2/98  
APPROVED BY: DATE:

DMC NO. 9705-12



**NOTES:**

VALUES SHOWN ARE IN METERS (m) EXCEPT "REQUIRED CAMBER" WHICH IS SHOWN IN MILLIMETERS (mm).

"\*" INCLUDES SLAB, BUILD-UPS AND STAY-IN-PLACE METAL FORMS.

VALUES GIVEN ARE AT TENTH POINTS BETWEEN CENTERLINE OF BEARINGS.

FOR GIRDER DESIGNATIONS, SEE "FRAMING PLAN" SHEET.

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
<b>GIRDER 1</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.008	0.008	0.007	0.005	0.002	0.000	-0.000	0.000	0.003	0.008	0.013	0.018	0.021	0.022	0.020	0.015	0.008	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.023	0.043	0.055	0.058	0.053	0.041	0.025	0.011	0.002	0.000	0.007	0.021	0.040	0.057	0.070	0.074	0.069	0.053	0.029	0.000
DEFLECTION DUE TO WEIGHT OF RAIL AND SIDEWALK	0.000	0.003	0.006	0.007	0.008	0.007	0.005	0.003	0.001	0.000	0.000	0.001	0.004	0.007	0.010	0.012	0.013	0.012	0.009	0.005	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.030	0.056	0.070	0.074	0.067	0.051	0.030	0.012	0.001	0.000	0.011	0.033	0.050	0.065	0.073	0.074	0.070	0.053	0.029	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	45	82	104	113	108	90	64	38	16	0	29	65	102	133	153	157	143	109	60	0
<b>GIRDERS 2 &amp; 3</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.009	0.009	0.007	0.005	0.003	0.000	-0.000	0.000	0.003	0.008	0.014	0.019	0.022	0.023	0.021	0.015	0.009	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.024	0.044	0.057	0.060	0.055	0.042	0.026	0.012	0.002	0.000	0.007	0.022	0.041	0.059	0.072	0.077	0.071	0.055	0.030	0.000
DEFLECTION DUE TO WEIGHT OF RAIL AND SIDEWALK	0.000	0.003	0.006	0.007	0.008	0.007	0.005	0.003	0.001	0.000	0.000	0.001	0.004	0.007	0.010	0.012	0.013	0.011	0.009	0.005	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.031	0.057	0.073	0.077	0.069	0.052	0.032	0.013	0.001	0.000	0.011	0.034	0.062	0.088	0.106	0.113	0.103	0.080	0.044	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	46	83	107	116	110	91	66	39	16	0	29	66	104	136	156	161	145	112	62	0
<b>GIRDERS 4,5,6,10 &amp; 11</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.009	0.009	0.008	0.006	0.003	0.000	-0.000	0.000	0.003	0.008	0.014	0.019	0.022	0.023	0.021	0.015	0.009	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.026	0.048	0.062	0.066	0.060	0.045	0.029	0.013	0.003	0.000	0.008	0.024	0.045	0.065	0.078	0.083	0.077	0.059	0.033	0.000
DEFLECTION DUE TO WEIGHT OF RAIL AND SIDEWALK	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.030	0.055	0.071	0.075	0.068	0.052	0.032	0.013	0.002	0.000	0.011	0.032	0.059	0.084	0.100	0.106	0.098	0.075	0.042	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	45	81	105	114	109	91	66	39	17	0	29	64	101	132	150	154	140	107	60	0
<b>GIRDERS 7 &amp; 8</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.008	0.010	0.010	0.009	0.006	0.003	0.001	-0.000	0.000	0.003	0.008	0.014	0.019	0.022	0.023	0.021	0.015	0.009	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.022	0.039	0.051	0.054	0.050	0.039	0.024	0.011	0.002	0.000	0.007	0.021	0.039	0.056	0.067	0.070	0.065	0.050	0.027	0.000
DEFLECTION DUE TO WEIGHT OF MEDIAN	0.000	0.001	0.002	0.002	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.027	0.049	0.063	0.066	0.061	0.047	0.028	0.012	0.001	0.000	0.010	0.030	0.055	0.075	0.093	0.098	0.090	0.069	0.037	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	42	75	97	105	102	85	62	38	16	0	28	62	97	127	143	146	132	101	55	0
<b>GIRDER 9</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.009	0.009	0.008	0.006	0.003	0.000	-0.000	0.000	0.003	0.008	0.014	0.019	0.022	0.023	0.021	0.015	0.009	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.026	0.048	0.062	0.066	0.060	0.045	0.029	0.013	0.003	0.000	0.008	0.024	0.045	0.065	0.078	0.083	0.077	0.059	0.033	0.000
DEFLECTION DUE TO WEIGHT OF MEDIAN	0.000	0.001	0.001	0.002	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.003	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.031	0.056	0.073	0.077	0.070	0.053	0.033	0.013	0.002	0.000	0.011	0.033	0.061	0.087	0.103	0.109	0.101	0.077	0.043	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	46	82	107	116	111	92	67	39	17	0	29	65	103	135	153	157	143	109	61	0
<b>GIRDERS 12 &amp; 13</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.009	0.009	0.008	0.005	0.003	0.000	-0.000	0.000	0.003	0.008	0.014	0.019	0.022	0.023	0.021	0.015	0.009	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.026	0.047	0.060	0.064	0.058	0.045	0.028	0.013	0.002	0.000	0.007	0.023	0.044	0.063	0.076	0.081	0.075	0.058	0.032	0.000
DEFLECTION DUE TO WEIGHT OF RAIL	0.000	0.001	0.003	0.003	0.004	0.003	0.003	0.002	0.001	0.000	0.000	0.001	0.002	0.004	0.005	0.006	0.006	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.031	0.057	0.072	0.077	0.069	0.053	0.033	0.014	0.001	0.000	0.011	0.033	0.062	0.087	0.104	0.110	0.101	0.078	0.043	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	45	83	106	116	110	92	67	40	16	0	29	65	104	135	154	158	143	110	61	0
<b>GIRDER 14</b>																					
DEFLECTION DUE TO WEIGHT OF STEEL	0.000	0.004	0.007	0.008	0.009	0.007	0.005	0.003	0.000	-0.000	0.000	0.003	0.008	0.013	0.018	0.021	0.022	0.020	0.015	0.008	0.000
DEFLECTION DUE WEIGHT OF SLAB *	0.000	0.025	0.045	0.058	0.062	0.056	0.043	0.027	0.012	0.002	0.000	0.007	0.023	0.042	0.061	0.074	0.078	0.072	0.056	0.031	0.000
DEFLECTION DUE TO WEIGHT OF RAIL	0.000	0.002	0.003	0.003	0.004	0.003	0.003	0.002	0.001	0.000	0.000	0.001	0.002	0.004	0.005	0.005	0.006	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.031	0.055	0.069	0.075	0.068	0.051	0.032	0.013	0.001	0.000	0.011	0.033	0.059	0.084	0.101	0.106	0.098	0.075	0.041	0.000
VERTICAL CURVE ORDINATE	0.000	0.015	0.026	0.034	0.039	0.041	0.039	0.034	0.026	0.015	0.000	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0.000
REQUIRED CAMBER (mm)	0	45	81	103	114	107	90	66	39	16	0	29	65	101	132	151	154	140	107	59	0

**SCHEMATIC CAMBER ORDINATES**



PROJECT No. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922-L- REV. POT

PREPARED BY  
 NALLAMALA & WILSON, P.A.  
 1381 OLD MILL CIRCLE, SUITE 101  
 WINSTON-SALEM, N. C. 27103  
 (336) 765-4651

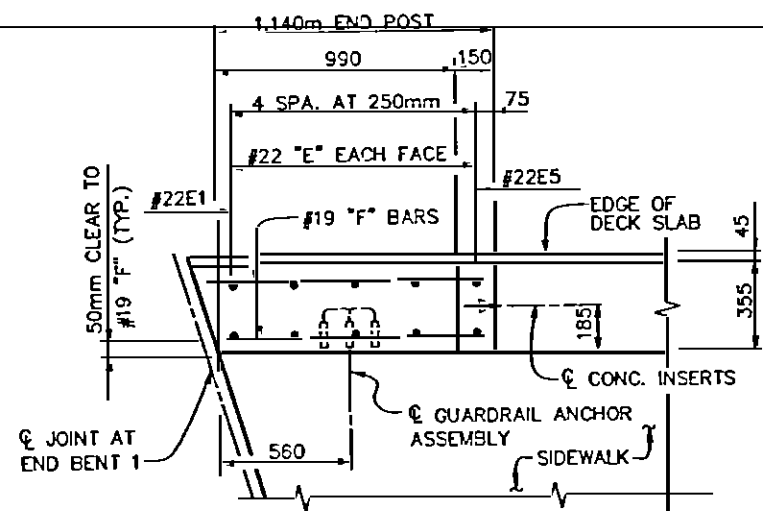
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 SCHEMATIC CAMBER  
 ORDINATES



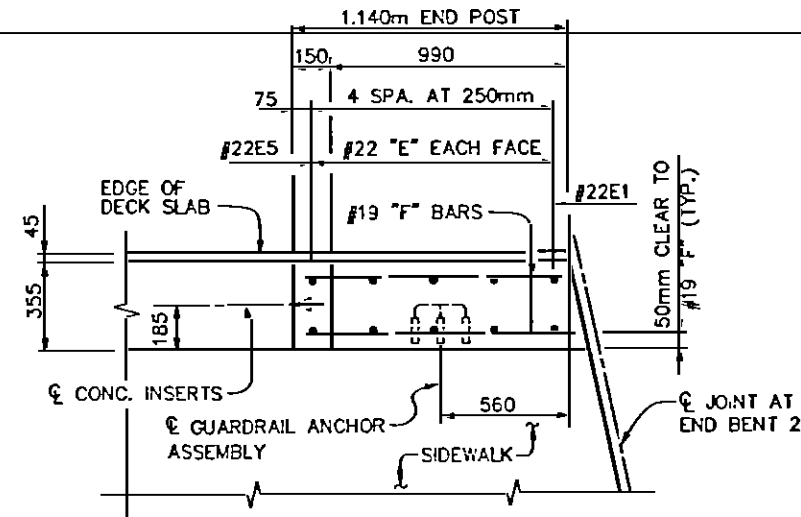
REVISIONS						SHEET NO. 5-14
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DWG. NO 9705-14

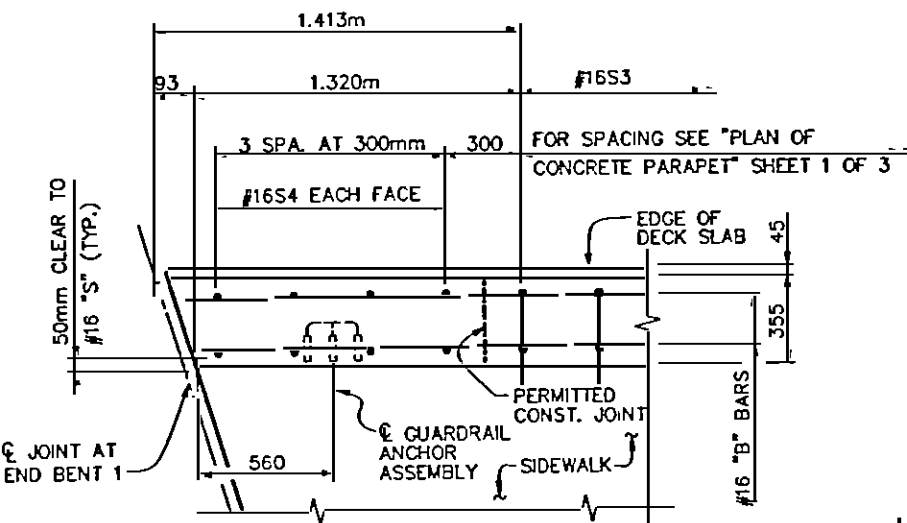
DESIGNED BY: ANDY R. QUINN  
 CHECKED BY: H.H. Wilson  
 DATE: 8/28/98  
 DATE: 10-21-92



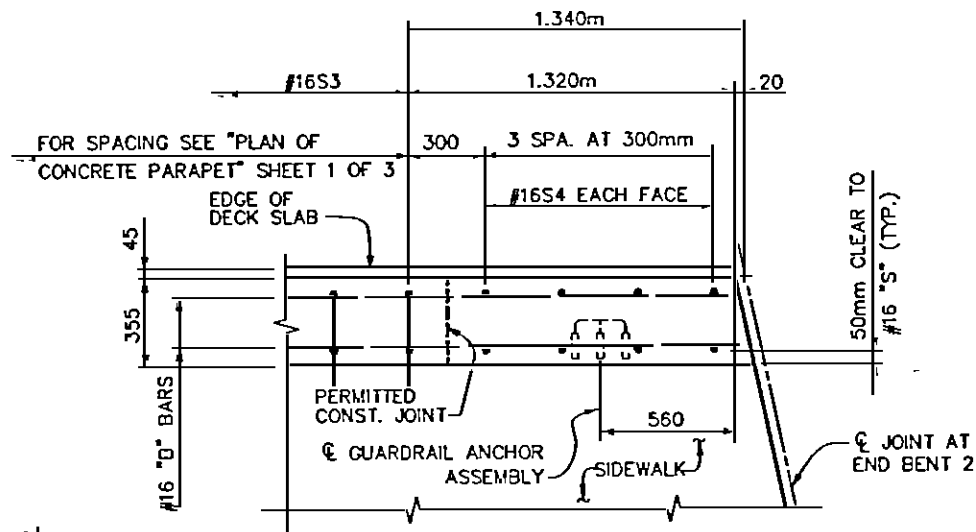
PLAN OF END POST AT END BENT 1



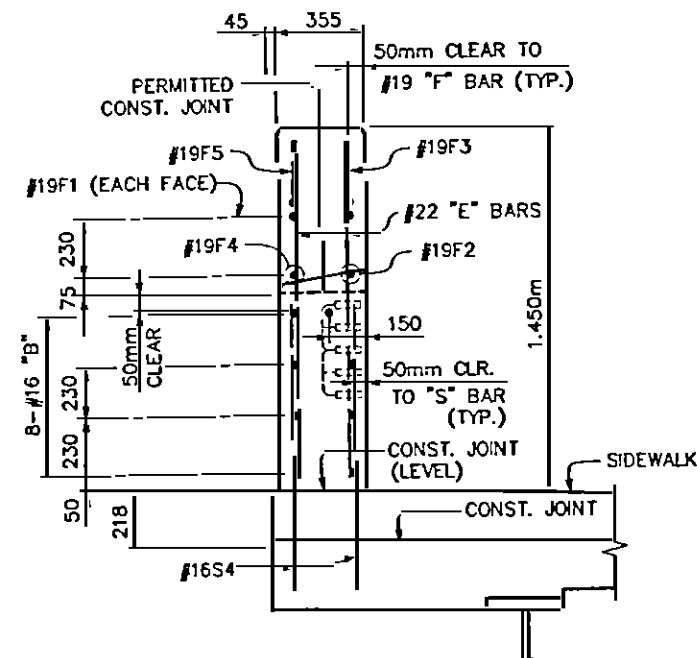
PLAN OF END POST AT END BENT 2



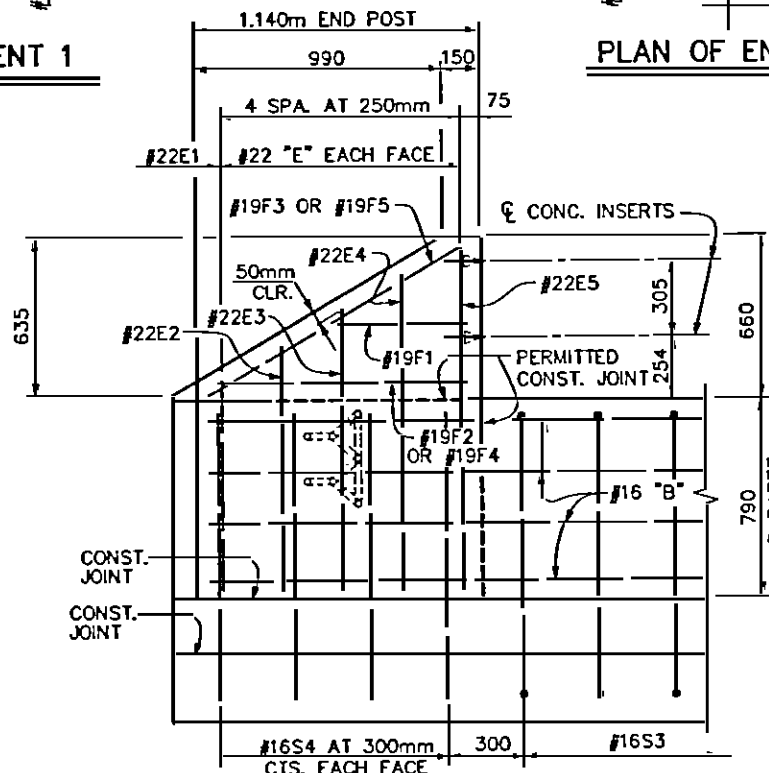
PLAN OF END OF PARAPET AT END BENT 1



PLAN OF END OF PARAPET AT END BENT 2

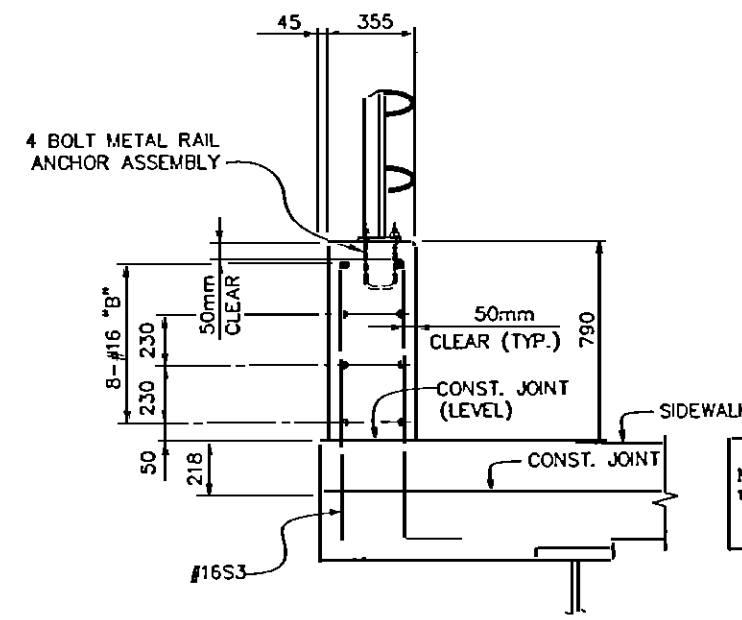


END VIEW OF END POST



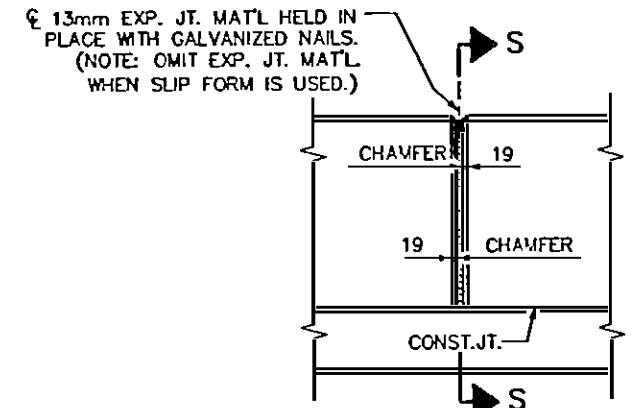
ELEVATION OF END POST

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

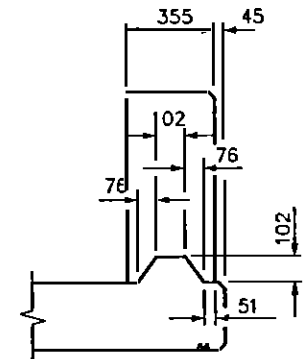


TYPICAL SECTION THRU PARAPET

NOTE  
FOR BILL OF MATERIAL SEE "CONCRETE PARAPET DETAILS", SHEET 3 OF 3.



ELEVATION AT EXPANSION JOINTS



SECTION S-S

AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

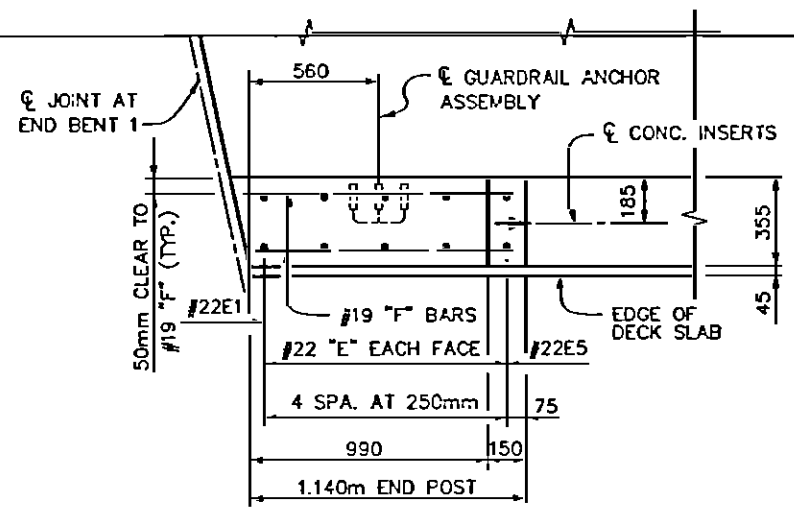
PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922 -L- REV. POT

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
CONCRETE PARAPET DETAILS

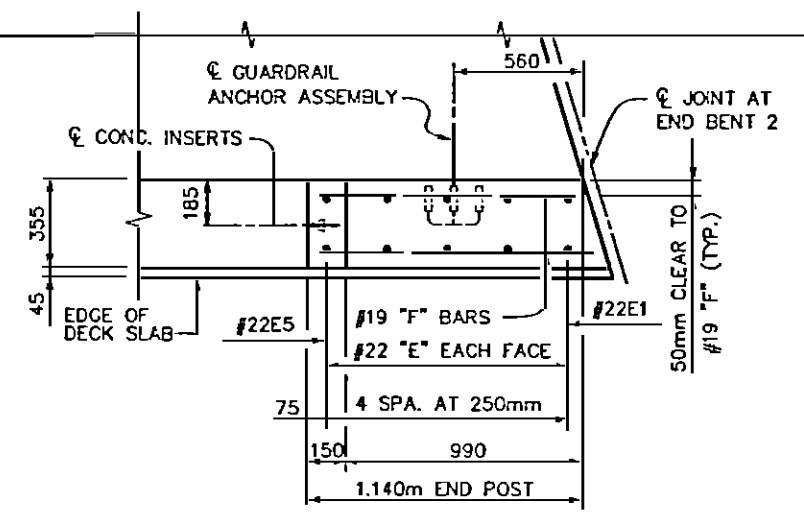
REVISIONS						SHEET NO. S-1C
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DWG NO. 9705-1G

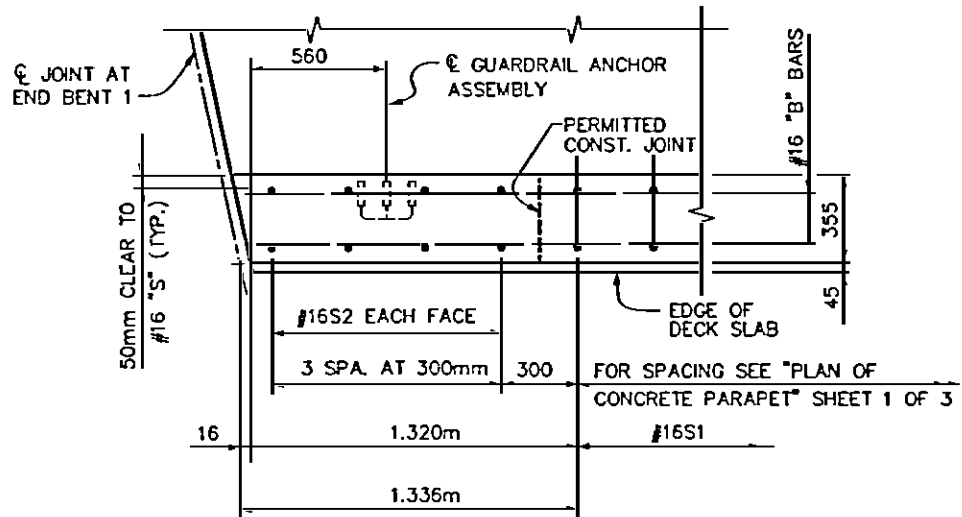
DESIGNED BY: A. STEPHEN CALLAWAY  
CHECKED BY: H. L. LUTCHER  
DATE: 8/3/98  
DATE: 10-21-98



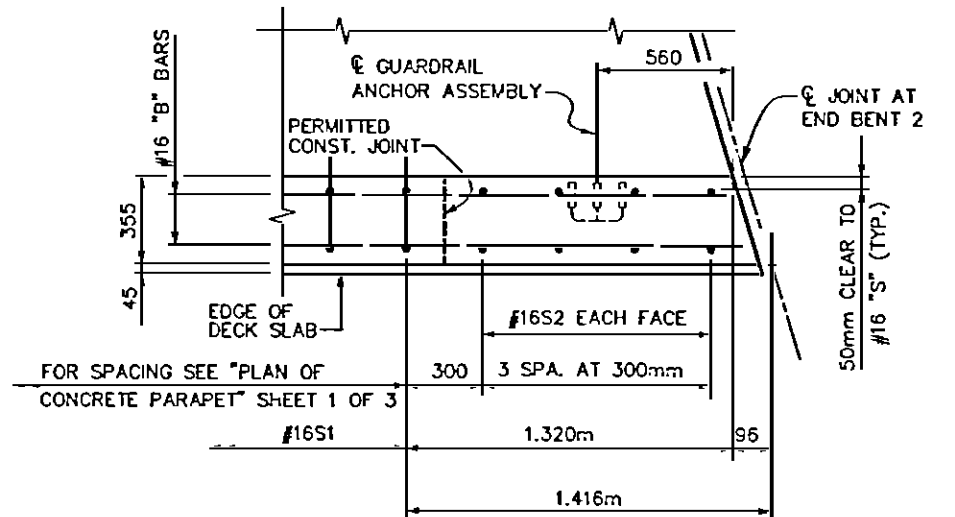
PLAN OF END POST AT END BENT 1



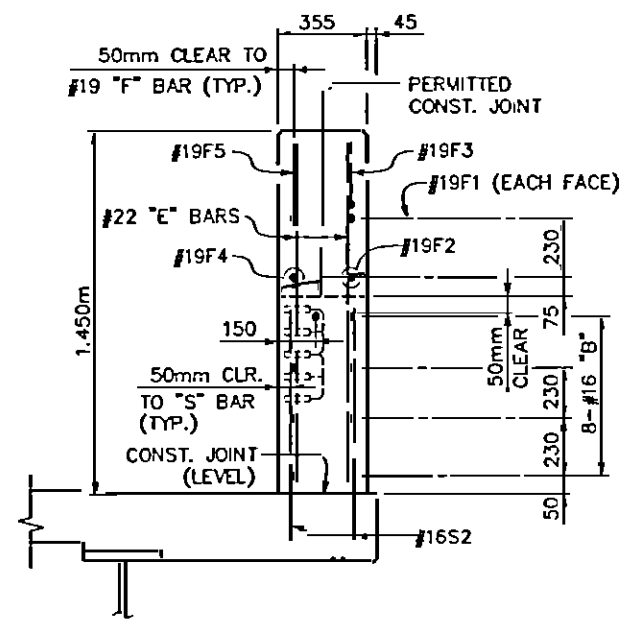
PLAN OF END POST AT END BENT 2



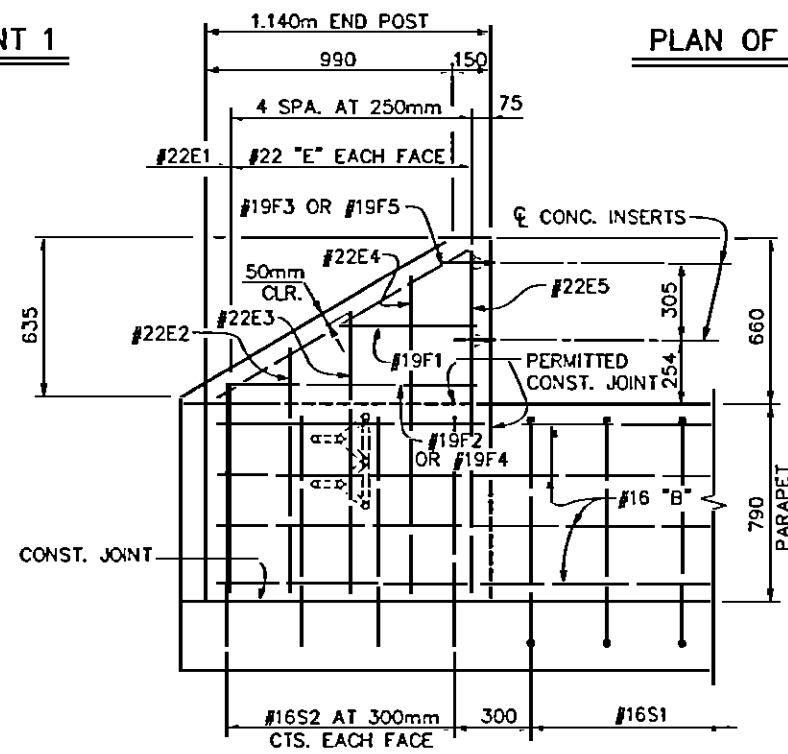
PLAN OF END OF PARAPET AT END BENT 1



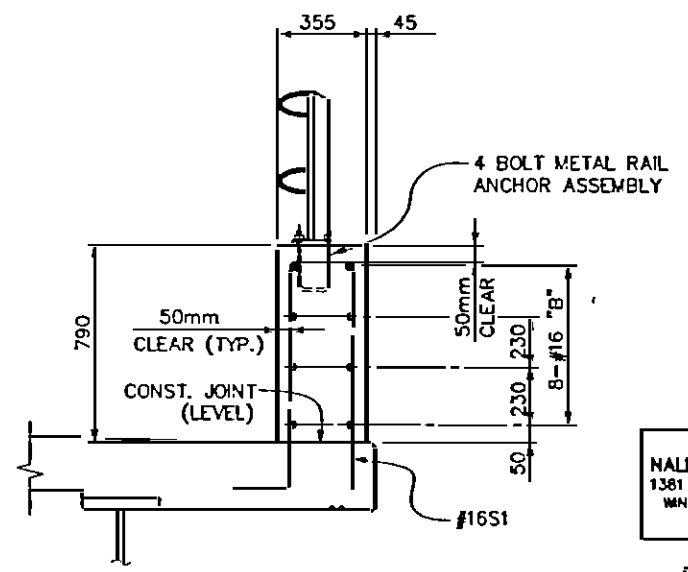
PLAN OF END OF PARAPET AT END BENT 2



END VIEW OF END POST



ELEVATION OF END POST  
(END BENT 2 SHOWN, END BENT 1 SIMILAR)



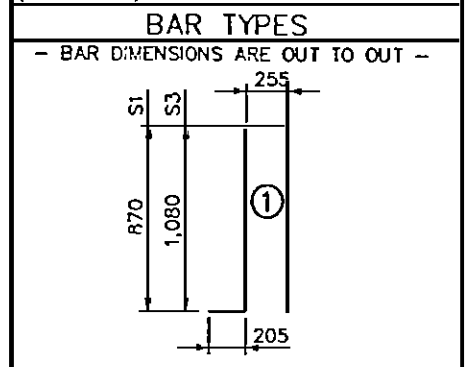
TYPICAL SECTION THRU PARAPET

BILL OF MATERIAL

CONCRETE PARAPET					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	287	#16	1	2,200	980
S2	16	#16	STR.	940	23
S3	287	#16	1	2,620	1,167
S4	16	#16	STR.	1,160	29
B1	32	#16	STR.	4,600	228
B2	64	#16	STR.	8,180	813
B3	80	#16	STR.	7,560	941
B4	32	#16	STR.	4,140	206
E1	8	#22	STR.	800	19
E2	8	#22	STR.	940	23
E3	8	#22	STR.	1,080	26
E4	8	#22	STR.	1,240	30
E5	8	#22	STR.	1,340	33
F1	8	#19	STR.	540	10
F2	4	#19	STR.	1,040	9
F3	4	#19	STR.	1,140	10
F4	4	#19	STR.	1,080	10
F5	4	#19	STR.	1,180	11

SUMMARY OF QUANTITIES

EPOXY COATED REINF. STEEL (kg)	4,563
CLASS "AA" CONCRETE (CU. METER)	49.5
355x790mm CONC. PARAPET (LIN. METER)	174 320



NOTE: ALL REINFORCING STEEL IS EPOXY COATED.

PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922 -L- REV. POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
CONCRETE PARAPET DETAILS



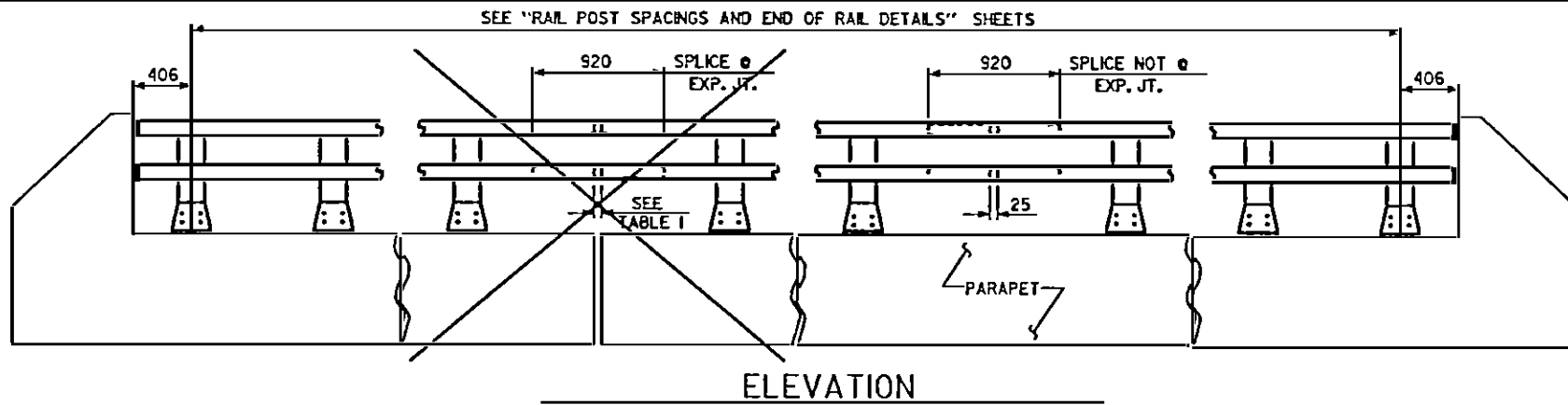
PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



REVISIONS						SHEET NO. S-17
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170

DESIGNED BY: A. STEPHEN CALLAWAY  
CHECKED BY: H. FLETCHER WILSON  
DATE: 8/3/98

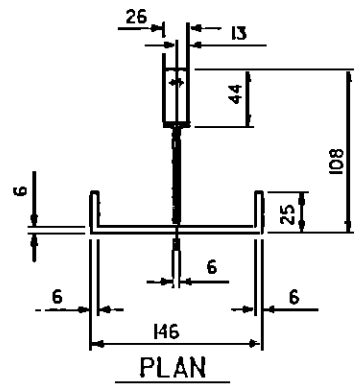
DWG. NO. 0705-17



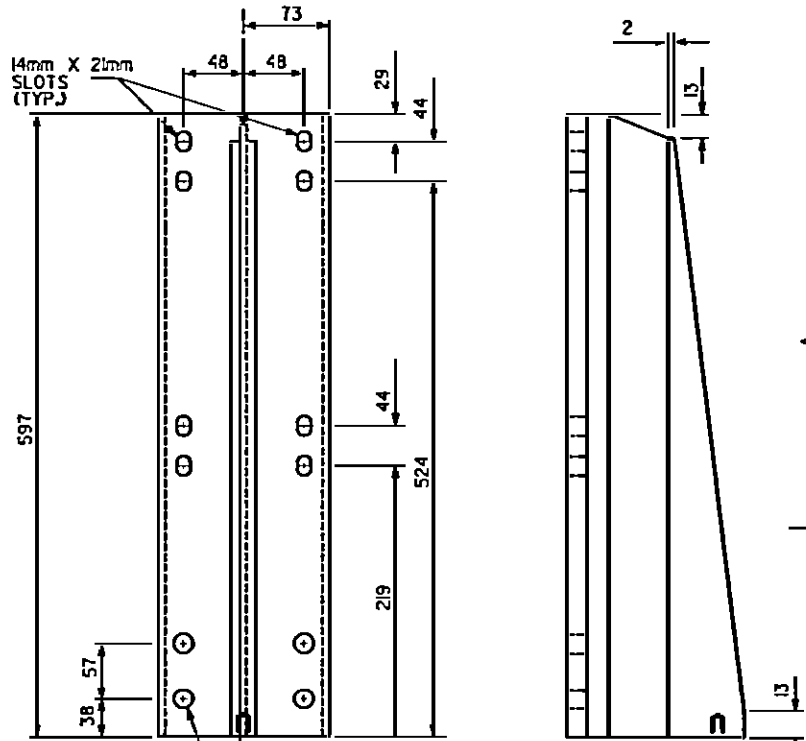
SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEETS

ELEVATION

NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEETS.



PLAN

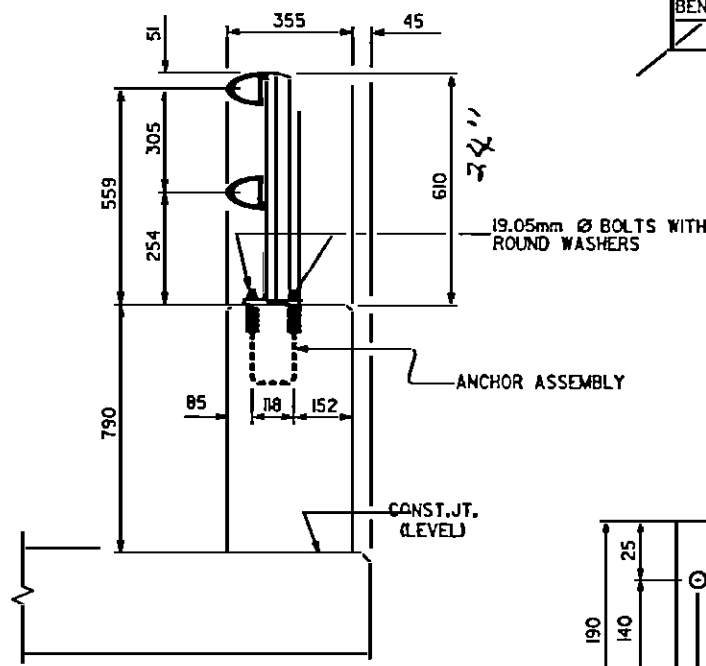


FRONT ELEVATION

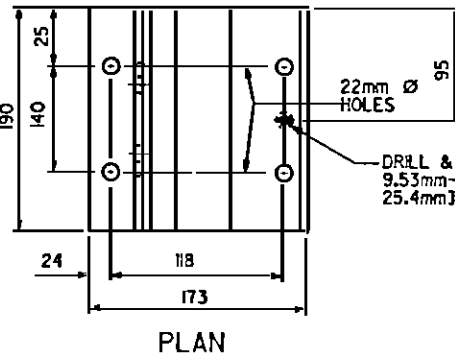
SIDE ELEVATION

DETAILS OF POST

19.45mm DIA. (4) HOLES PUNCHED FOR RIVETS  
8mm DIA. DRILL 25mm DEEP & 9.53mm-C16 THREADS PER 25.4mm TAP 22mm DEEP FOR 9.53mm - C16 THREADS PER 25.4mm X 38.10mm STAINLESS STEEL CAP SCREW

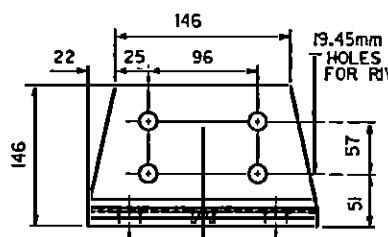


SECTION THRU PARAPET AND RAIL-RIGHT SIDE

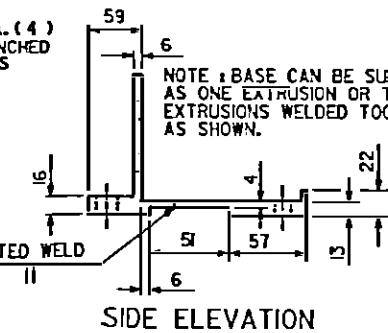


PLAN

DRILL & CORE FOR 9.53mm-C16 THREADS PER 25.4mm TAP SCREW



FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B-316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING. THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY. MATERIAL FOR SHIMS TO BE ASTM B-209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:  
POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 250 STRUCTURAL STEEL - GALVANIZED TO ASTM A-123.  
RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A-502 FOR GRADE I RIVETS.  
THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE I, OR OF FEDERAL SPECIFICATIONS TT-P-64L.  
SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A-570M FOR GRADE 230 OR A-611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123.  
RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A-245 GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123.

GENERAL NOTES

- RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.
- FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEETS.
- CAP SCREWS SHALL BE ASTM F593 TYPE 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
- CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.
- METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.
- METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.
- CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.
- TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.
- SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.
- ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.
- MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

EXP. JT. @	RAIL OPENING
BENT No. 1	
BENT No. 2	
BENT No. 3	

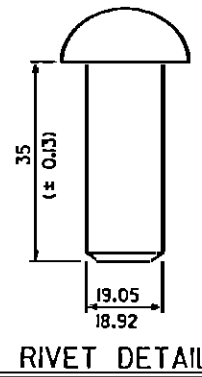
PAY LENGTH = 169.540 METERS

PREPARED BY  
NALLANALA & WILSON, P.A.  
138 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N.C. 27013  
(336) 765-4651

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT  
SHEET 1 OF 2



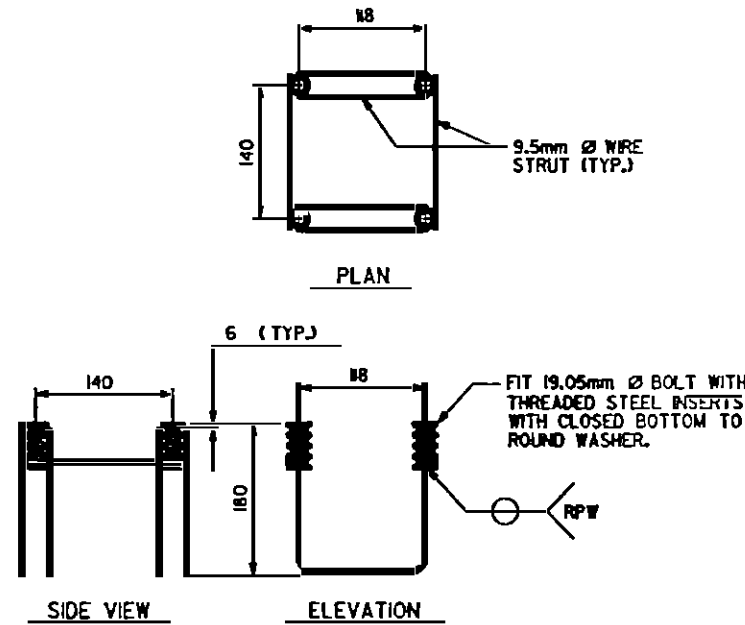
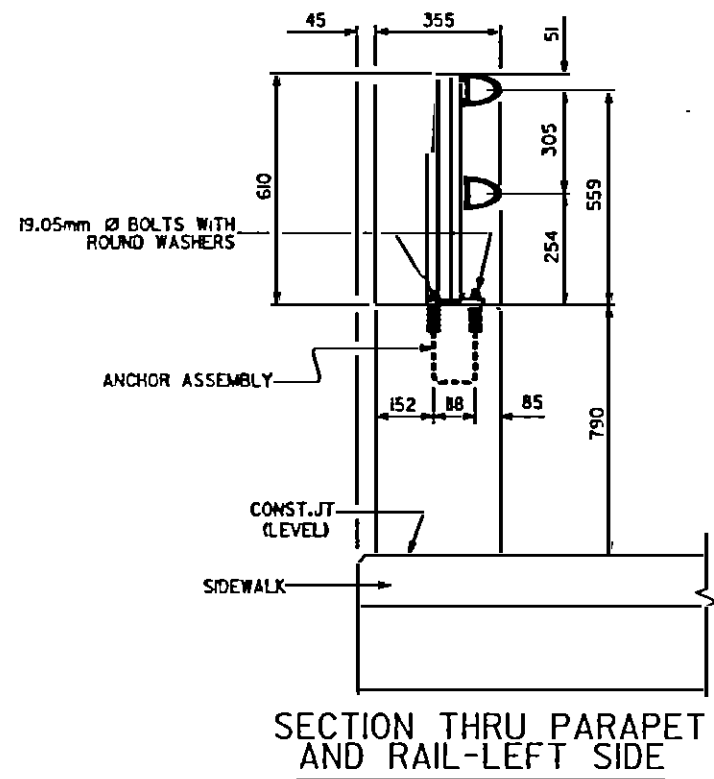
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
STANDARD  
2 BAR METAL RAIL



RIVET DETAIL

ASSEMBLED BY: ASC DATE: 8/28/98  
CHECKED BY: [Signature] DATE: 10-21-98  
DRAWN BY: EEM 6/94 REV. 5/16/97 EEM/RGW  
CHECKED BY: RGW 6/94

NO.	BY	DATE	REV.	DATE	SHEET NO.
1			3		8-18
2			4		170



MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) = 44mm

**4-BOLT METAL RAIL ANCHOR ASSEMBLY**

( 90 ASSEMBLIES REQUIRED )

**NOTES**

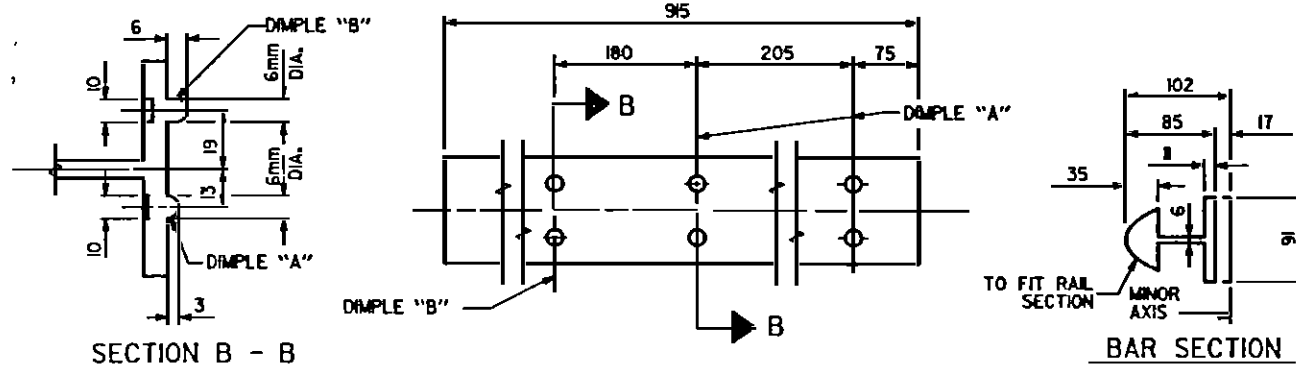
**STRUCTURAL CONCRETE ANCHOR ASSEMBLY**

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

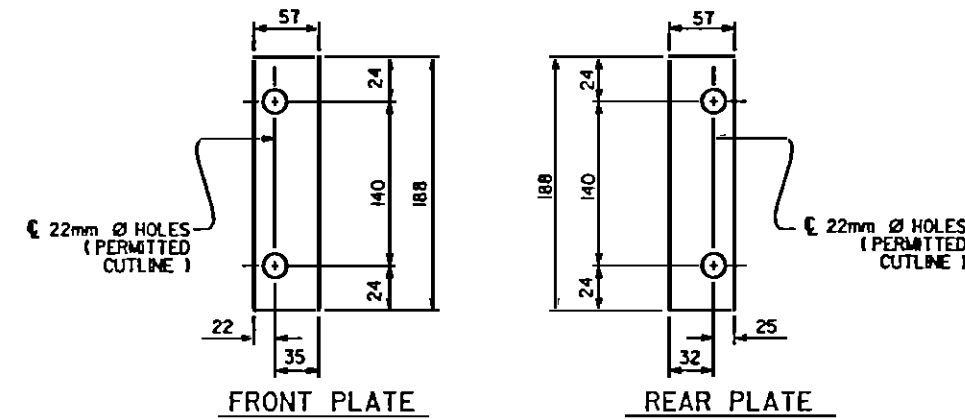
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF ASTM A108, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 51mm FOR 19mm FERRULES.
- B. 4 - 19.05mm DIA. X 64mm BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 19.05mm DIA. X 64mm 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 STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A-123.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR METERS OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR, AT HIS OPTION, MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL ANCHOR ASSEMBLY. THE YIELD LOAD OF THE 19.05mm DIA. BOLT IS 53.4 kN. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS REQUIRED. SEE SPECIAL PROVISIONS FOR "ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS".

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 TYPE 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

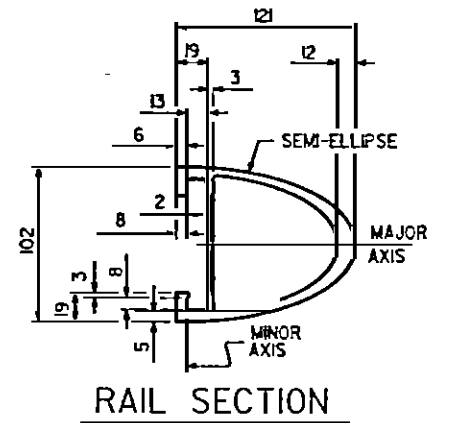


**EXPANSION BAR DETAILS**

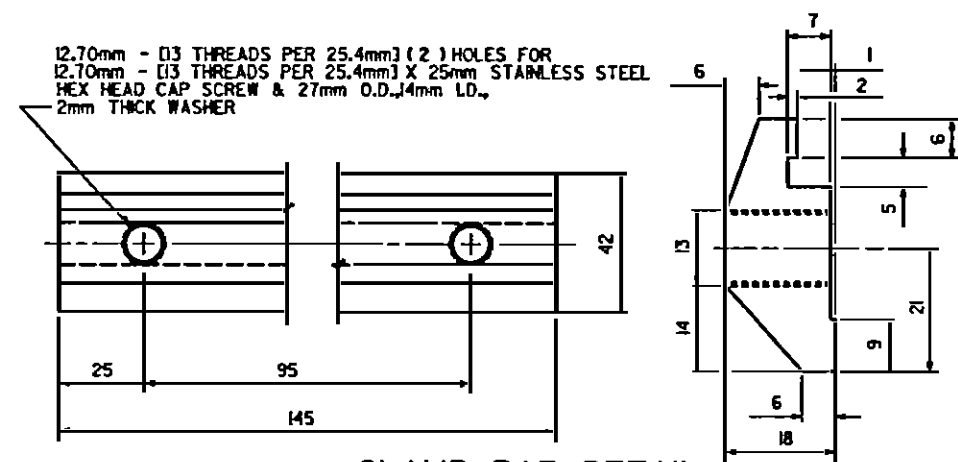


**SHIM DETAILS**

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

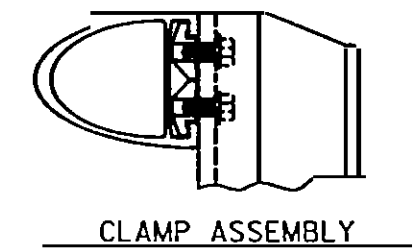


**RAIL SECTION**

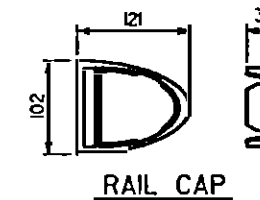


**CLAMP BAR DETAIL**

( 4 REQUIRED PER POST )



**CLAMP ASSEMBLY**



**RAIL CAP**

PREPARED BY  
NALLAMALA & WILSON, P.A.  
130 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N.C. 27103  
(336) 765-4651

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
STANDARD  
2 BAR METAL RAIL

ASSEMBLED BY : ASC DATE : 8/28/98  
CHECKED BY : *[Signature]* DATE : 10-21-98  
DRAWN BY : EDM 6/94 REV. 5/16/97 EDM/RCW  
CHECKED BY : RCW 6/94

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1			2			S-17
						170





NOTES  
STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF ASTM A108, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 38mm.
  - 1- 19.05mm DIA. X 4mm BOLT WITH WASHER BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED, (AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 19.05mm DIA. X 4mm GALVANIZED BOLT AND WASHER, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
  - WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 693 MPa.

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS :
- 12mm PLATES SHALL CONFORM TO AASHTO M270 GRADE 250 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - 19.05mm STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 214 kN. THE FERRULES SHALL ENGAGE A 19.05mm DIA. X 4mm BOLT WITH 5mm O.D. WASHER IN PLACE. THE 19.05mm DIA. X 4mm BOLT SHALL HAVE N.C. THREADS.
  - CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 TYPE 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 16° C.
  - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - 13mm DIA. PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

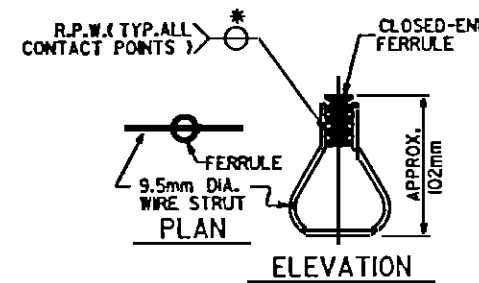
THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR METERS OF 2 BAR METAL RAIL.

THE 19.05mm STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 19.05mm STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 12mm PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

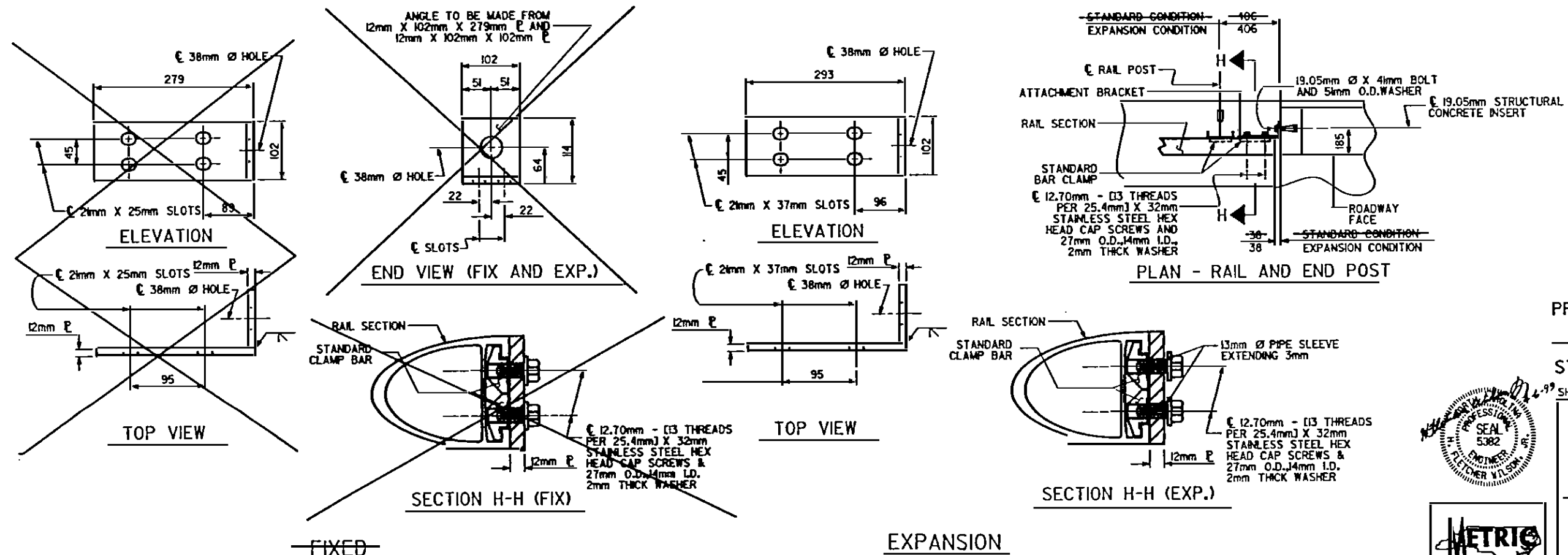
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 19.05mm DIA. X 4mm BOLT WITH WASHER SHALL BE REPLACED WITH A 19.05mm DIA. X 165mm BOLT AND 5mm O.D. WASHER. ALL SPECIFICATIONS WHICH APPLY TO THE 19.05mm DIA. X 4mm BOLT SHALL APPLY TO THE 19.05mm DIA. X 165mm BOLT SEE SPECIAL PROVISIONS FOR "ADHESIVELY ANCHORED ANCHOR BOLTS AND DOWELS". THE YIELD LOAD OF THE 19.05mm DIA. BOLT IS 53.4 kN. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

SEE SHEET 1 OF 3 FOR  
PLAN OF RAIL POST SPACINGS



STRUCTURAL CONCRETE INSERT

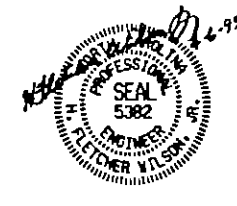
\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



PREPARED BY  
NALLAWALA & WILSON, P.A.  
1301 OLD MILL CIRCLE, SUITE 101  
WRESTON-SALEM, N.C. 27173  
(336) 765-4651

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR ONE OR TWO BAR METAL RAILS

ASSEMBLED BY: ASC DATE: 9/17/98  
CHECKED BY: *[Signature]* DATE: 1/10/99  
DRAWN BY: NJH 3/89 REV: 5/16/97 EEM/RGT  
CHECKED BY: CRK 3/89 REV: 7/1/96 RHW/LES

DETAILS FOR ATTACHING METAL RAIL TO END POST

STD. NO. BMR2SM DWG. NO. 9705-21

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	3-21
1			3			170
2			4			

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

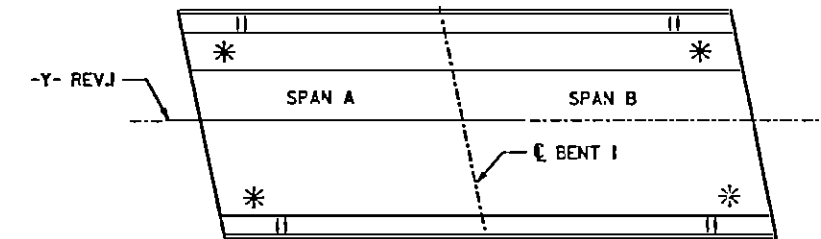
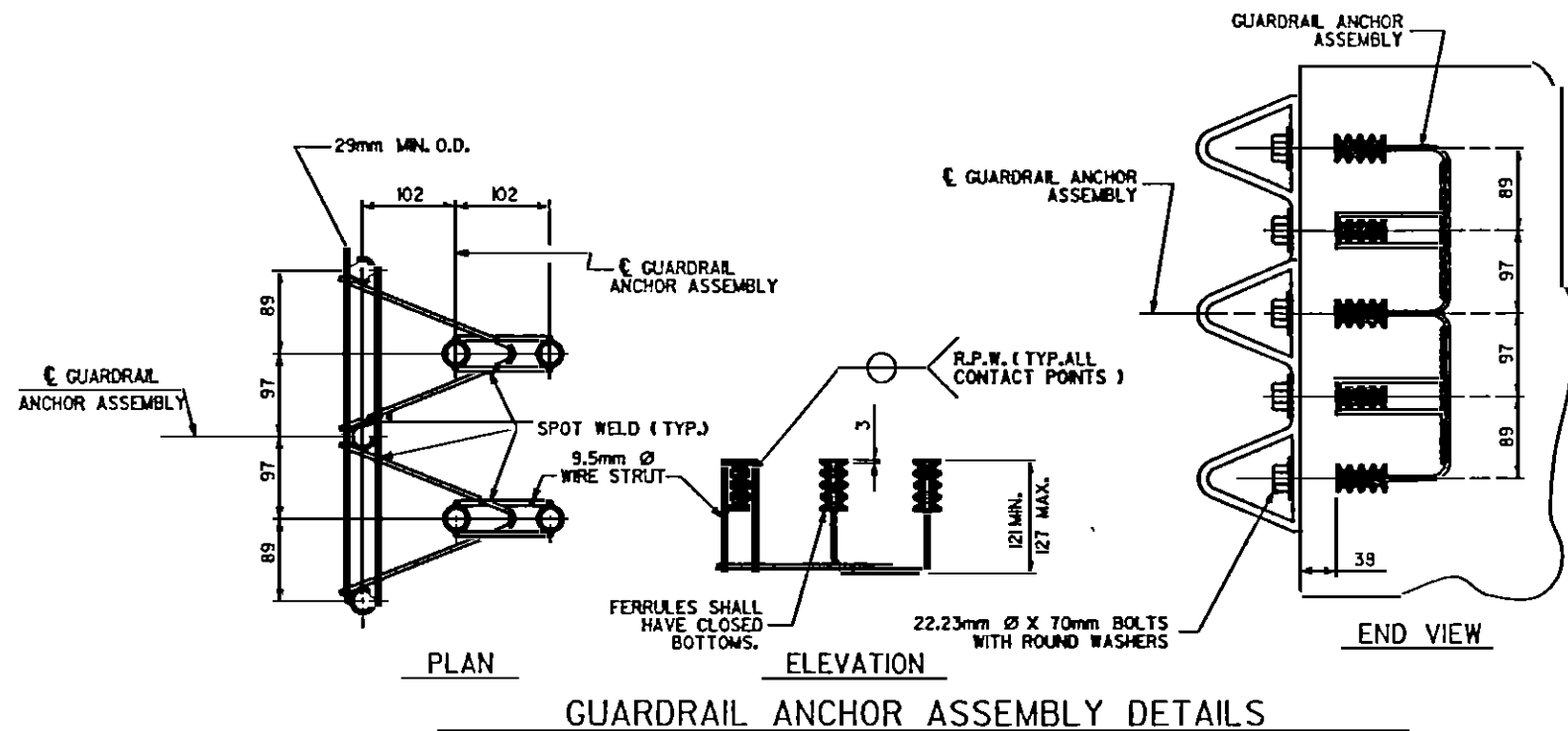
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF ASTM A108, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 38mm.
- B. 7 - 22.23mm Ø X 70mm BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø X 70mm 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 ANCHOR ASSEMBLY DETAIL ARE THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa.

THE 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 WITH BOLTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

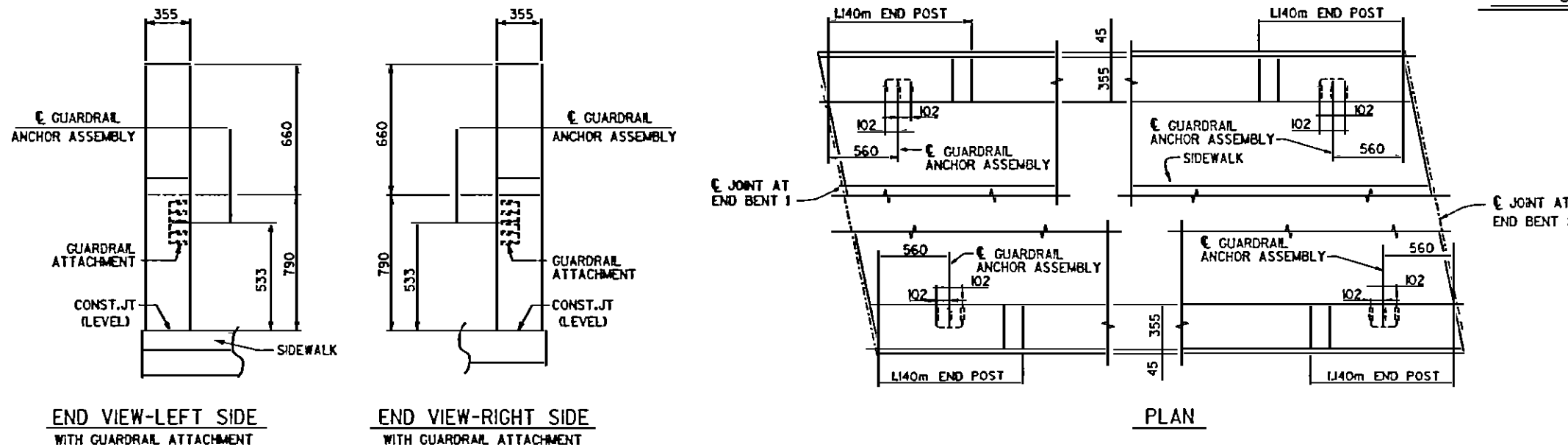
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE GUARDRAIL IS TO BE ATTACHED TO THE END POST. FOR POINTS OF ATTACHMENT, SEE SKETCH.

THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. SEE SPECIAL PROVISIONS FOR "ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS". THE YIELD LOAD OF THE 22.23mm Ø BOLTS IS 73.8 kN. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



\* LOCATION OF GUARDRAIL ATTACHMENT

SKETCH SHOWING LOCATION OF GUARDRAIL ATTACHMENTS

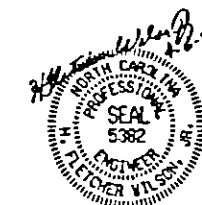


LOCATION OF GUARDRAIL ANCHOR AT END POST

PREPARED BY  
 NALLAMALA & WILSON, P.A.  
 ONE OLD HILL CIRCLE, SUITE 101  
 WINSTON-SALEM, N.C. 27103  
 (336) 755-4651

PROJECT NO. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922-L-REV. POT

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 STANDARD  
 RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS  
 FOR TWO BAR METAL RAILS



ASSEMBLED BY : ASC DATE : 8/28/98  
 CHECKED BY : N. S. M. DATE : 10-2-98  
 DRAWN BY : EEM 6/94 REV. : 9/16/97 EEM/RGW  
 CHECKED BY : RGW 6/94

STD. NO. BMR5SM DWG. NO. 9705-22

REVISIONS				SHEET NO.	
NO.	DATE	BY	DATE	NO.	DATE
1		3		8	22
2		4		17	0

**BILL OF MATERIAL**

SPANS A AND B										CONCRETE ISLAND							
EPOXY COATED REINFORCING STEEL					PLAIN REINFORCING STEEL					EPOXY COATED REINFORCING STEEL							
MARK	NO.	SIZE	TYPE	LENGTH (mm)	MASS (kg)	MARK	NO.	SIZE	TYPE	LENGTH (mm)	MASS (kg)	MARK	NO.	SIZE	TYPE	LENGTH (mm)	MASS (kg)
A1*	928	#16	STR.	16,360	23,563	A101	928	#16	STR.	16,360	23,563	B5*	220	#13	STR.	780	171
A2*	2	#16	STR.	16,020	50	A102	2	#16	STR.	16,020	50	B6*	33	#13	STR.	8,380	275
A3*	2	#16	STR.	15,160	47	A103	2	#16	STR.	15,160	47	B7*	3	#13	STR.	4,920	15
A4*	2	#16	STR.	14,320	44	A104	2	#16	STR.	14,320	44	B8*	3	#13	STR.	4,880	15
A5*	2	#16	STR.	13,460	42	A105	2	#16	STR.	13,460	42						
A6*	2	#16	STR.	12,620	39	A106	2	#16	STR.	12,620	39						
A7*	2	#16	STR.	11,780	37	A107	2	#16	STR.	11,780	37						
A8*	2	#16	STR.	10,920	34	A108	2	#16	STR.	10,920	34						
A9*	2	#16	STR.	10,080	31	A109	2	#16	STR.	10,080	31						
A10*	2	#16	STR.	9,240	29	A110	2	#16	STR.	9,240	29						
A11*	2	#16	STR.	8,380	26	A111	2	#16	STR.	8,380	26						
A12*	2	#16	STR.	7,540	23	A112	2	#16	STR.	7,540	23						
A13*	2	#16	STR.	6,700	21	A113	2	#16	STR.	6,700	21						
A14*	2	#16	STR.	5,840	18	A114	2	#16	STR.	5,840	18						
A15*	2	#16	STR.	5,000	16	A115	2	#16	STR.	5,000	16						
A16*	2	#16	STR.	4,160	13	A116	2	#16	STR.	4,160	13						
A17*	2	#16	STR.	3,300	10	A117	2	#16	STR.	3,300	10						
A18*	2	#16	STR.	2,460	8	A118	2	#16	STR.	2,460	8						
A19*	2	#16	STR.	1,620	5	A119	2	#16	STR.	1,620	5						
A20*	2	#16	STR.	15,800	49	A120	2	#16	STR.	15,800	49						
A21*	2	#16	STR.	14,960	46	A121	2	#16	STR.	14,960	46						
A22*	2	#16	STR.	14,120	44	A122	2	#16	STR.	14,120	44						
A23*	2	#16	STR.	13,280	41	A123	2	#16	STR.	13,280	41						
A24*	2	#16	STR.	12,420	39	A124	2	#16	STR.	12,420	39						
A25*	2	#16	STR.	11,560	36	A125	2	#16	STR.	11,560	36						
A26*	2	#16	STR.	10,720	33	A126	2	#16	STR.	10,720	33						
A27*	2	#16	STR.	9,880	31	A127	2	#16	STR.	9,880	31						
A28*	2	#16	STR.	9,020	28	A128	2	#16	STR.	9,020	28						
A29*	2	#16	STR.	8,180	25	A129	2	#16	STR.	8,180	25						
A30*	2	#16	STR.	7,340	23	A130	2	#16	STR.	7,340	23						
A31*	2	#16	STR.	6,480	20	A131	2	#16	STR.	6,480	20						
A32*	2	#16	STR.	5,640	18	A132	2	#16	STR.	5,640	18						
A33*	2	#16	STR.	4,800	15	A133	2	#16	STR.	4,800	15						
A34*	2	#16	STR.	3,940	12	A134	2	#16	STR.	3,940	12						
A35*	2	#16	STR.	3,100	10	A135	2	#16	STR.	3,100	10						
A36*	2	#16	STR.	2,260	7	A136	2	#16	STR.	2,260	7						
A37*	2	#16	STR.	1,400	4	A137	2	#16	STR.	1,400	4						
B1*	814	#13	STR.	8,480	6,861	B101	550	#16	STR.	17,960	15,331						
B2*	140	#19	STR.	12,940	4,049												
B3*	140	#19	STR.	18,000	5,532												
B4*	140	#19	STR.	10,220	3,199												
D1*	1,140	#13	STR.	260	295												
G2*	65	#13	STR.	8,480	556												
G3*	322	#16	STR.	1,740	870												
G4*	4	#16	STR.	16,400	102												
K1*	40	#16	1	3,740	232												
K2*	8	#16	2	2,860	36												
K3*	8	#16	4	3,180	39												
S1*	168	#13	3	1,120	187												
S2*	8	#13	3	1,580	13												

\* EPOXY COATED REINFORCING STEEL

DRAWN BY: A. STEPHEN CALLAWAY DATE: 7/29/98  
 CHECKED BY: [Signature] DATE: 8/22/99

**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

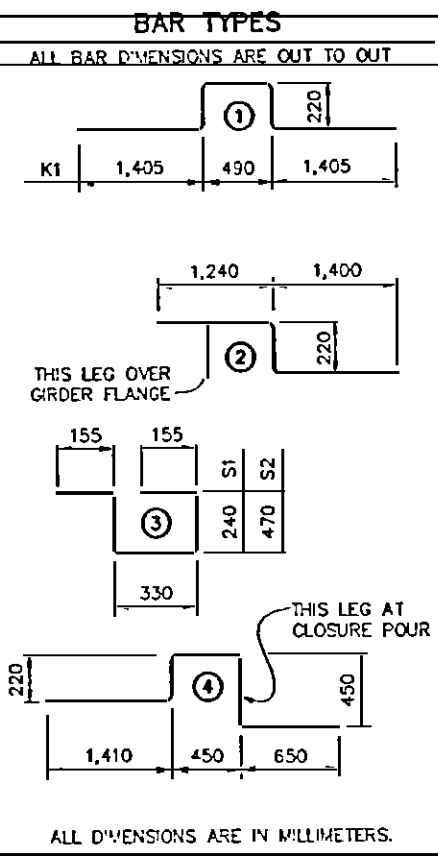
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET & BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#13	610	540	610	540	840
#16	770	660	770	660	1,050
#19	920	790	1,170	790	1,330

ALL DIMENSIONS ARE IN MILLIMETERS.

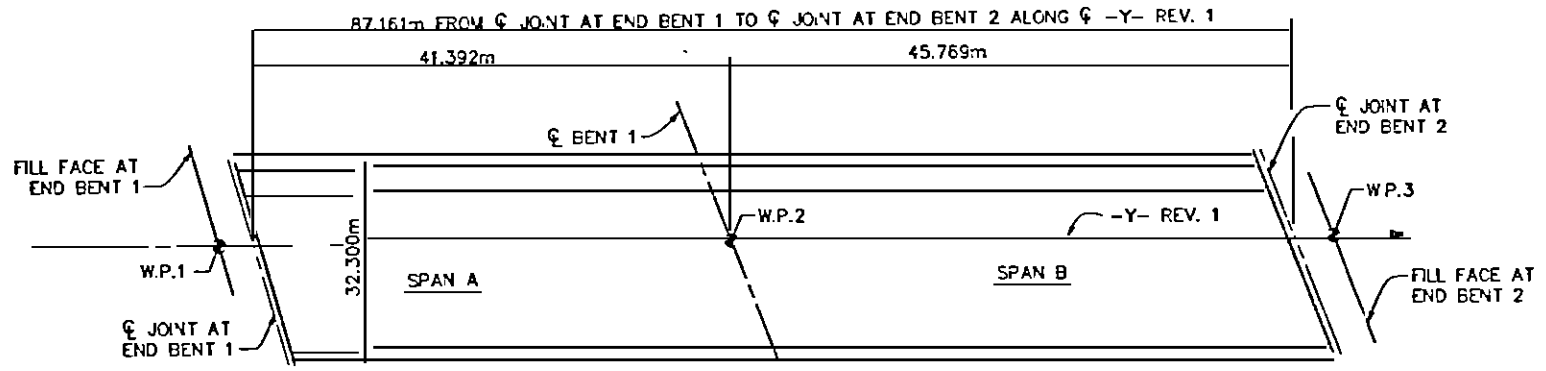
**SUMMARY OF QUANTITIES - SUPERSTRUCTURE**

SPAN	EPOXY COATED REINF. STEEL	REINF. STEEL	GROOVING BRIDGE FLOORS
	kg.	kg	SQ. METERS
A & B	47,083 **	39,869 **	2,530.0 ***

\*\* QUANTITIES FOR CONCRETE ISLAND ON APPROACH SLABS ARE INCLUDED. QUANTITIES FOR CONC. PARAPET AND END POSTS FOR RAILS ARE NOT INCLUDED.  
 \*\*\* APPROACH SLABS SHALL NOT BE GROOVED



ALL DIMENSIONS ARE IN MILLIMETERS.

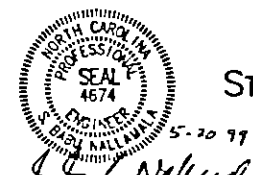


**LAYOUT FOR COMPUTING SURFACE AREA FOR REINFORCED CONCRETE DECK SLAB**  
 (AREA = 2,815.3 SQ. METERS)

**SUMMARY OF QUANTITIES CLASS AA CONCRETE**

POUR	CU. METERS **
1	88.1
2	87.7
3	115.1
4	114.6
5	139.2
6	138.6
7 (CLOSURE)	15.6
SIDEWALK	30.7
CONCRETE ISLAND	13.7
TOTAL	743.3

\*\* QUANTITIES FOR CONCRETE ISLAND ON APPROACH SLABS ARE INCLUDED. QUANTITIES FOR CONC. PARAPET AND END POSTS FOR RAILS ARE NOT INCLUDED.



PREPARED BY  
 NALLAMALA & WILSON, P.A.  
 1331 OLD MILL CIRCLE, SUITE 101  
 WINSTON-SALEM, N.C. 27103  
 (336) 765-4651



PROJECT No. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922 -L- REV. POT

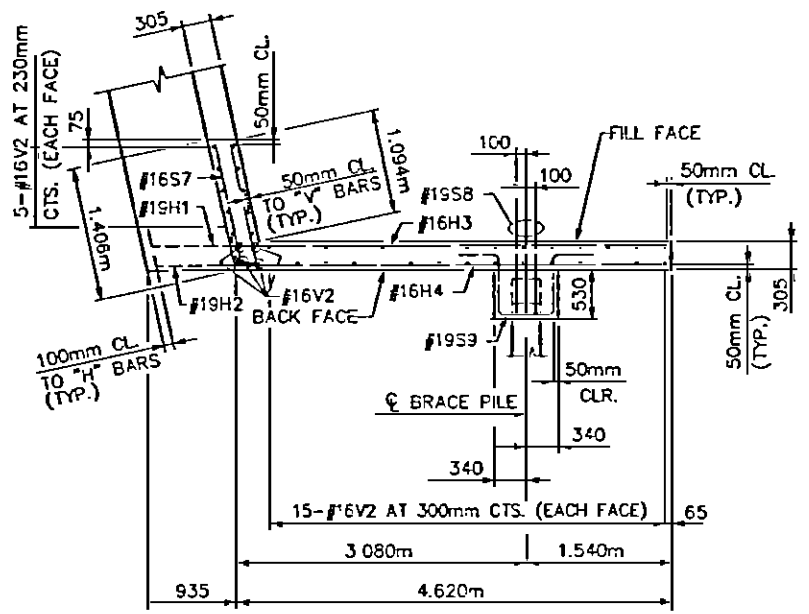
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BILL OF MATERIAL

REVISIONS						SHEET NO. S-23
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

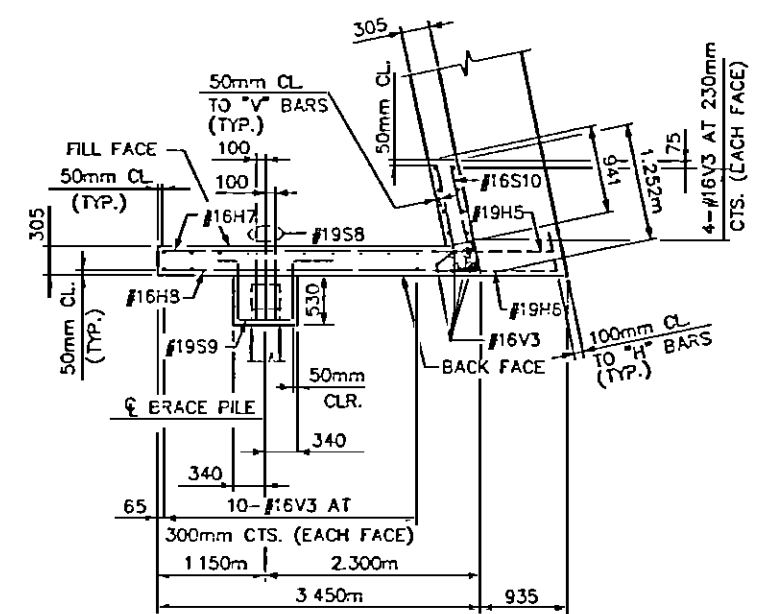
DWG. NO 9705-23



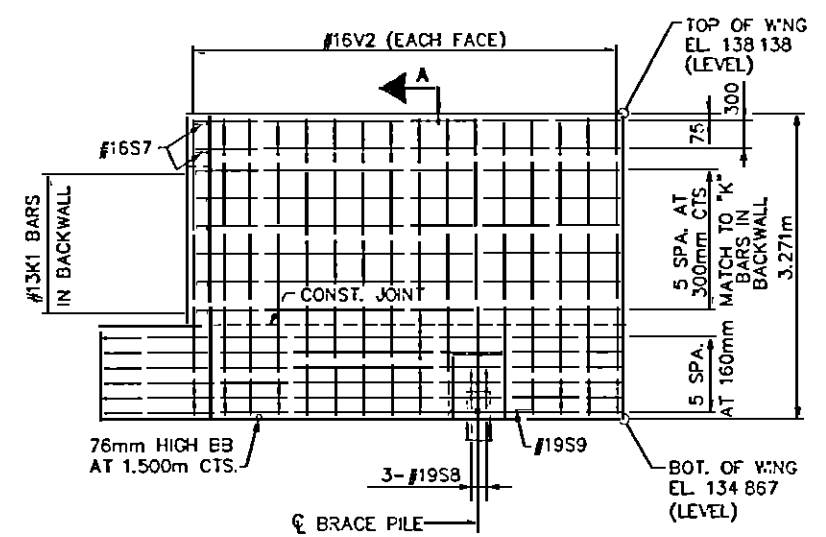




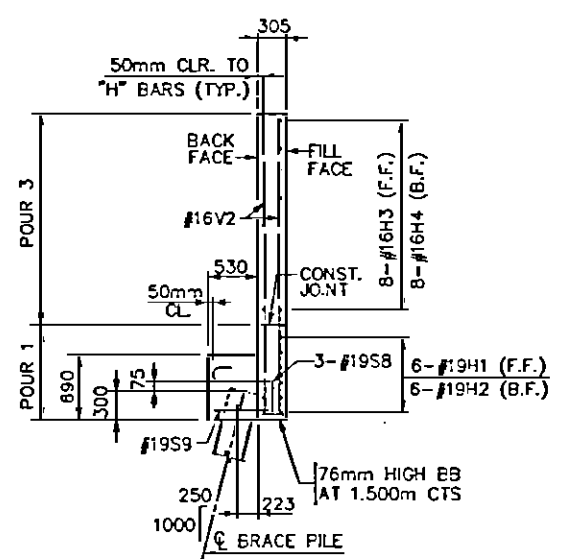
PLAN OF WING (W1)



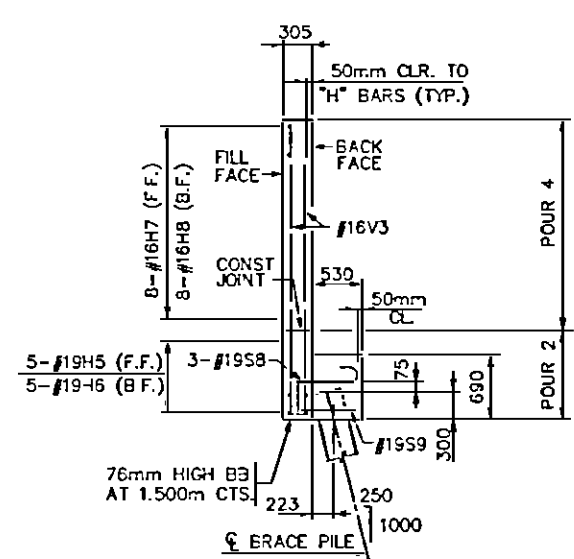
PLAN OF WING (W2)



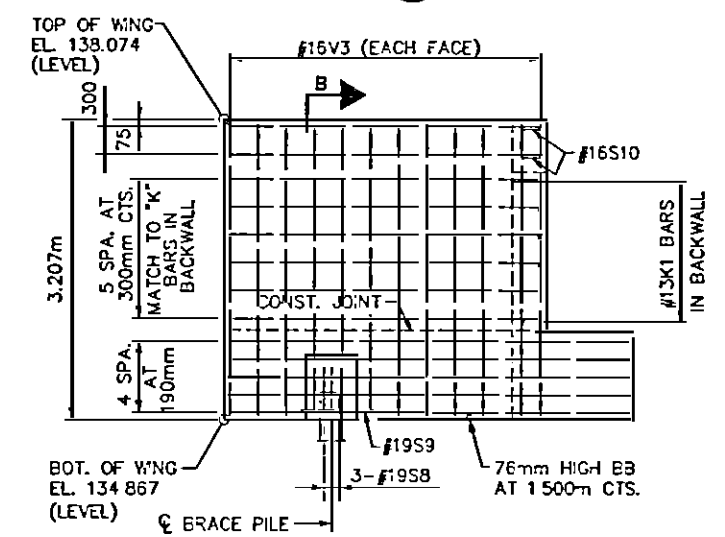
ELEVATION OF WING (W1)



SECTION "A" - WING (W1)

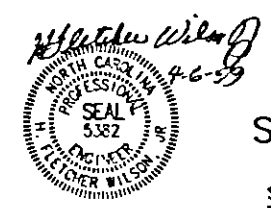


SECTION "B" - WING (W2)



ELEVATION OF WING (W2)

NOTE:  
F.F. DENOTES FILL FACE  
B.F. DENOTES BACK FACE



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD HILL CIRCLE, SUITE 101  
WYNSTON-SALEM, N. C. 27103  
(336) 765-4651

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 1



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

TOTAL SHEETS: 170

DESIGNED BY: A. STEPHEN CALLAWAY  
DATE: 8/24/93  
CHECKED BY: [Signature]  
DATE: 10-21-93

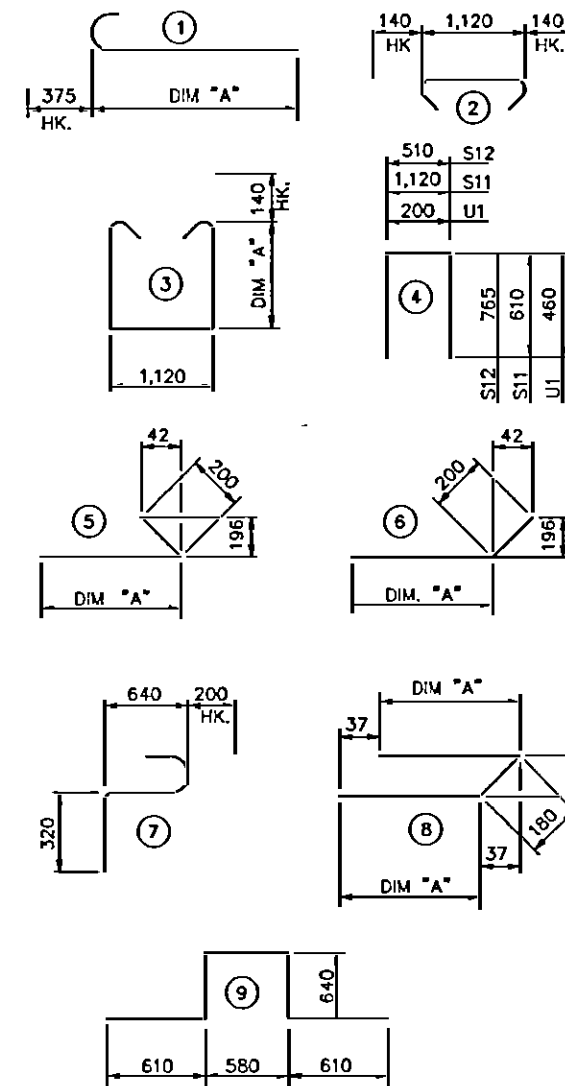
DWG. NO. 9705-26

**BILL OF MATERIAL**

SUMMARY OF QUANTITIES - END BENT 1	
HP310x79 PILES	NO. 34 LN. METERS 408
REINFORCING STEEL (kg)	6,932
CLASS A CONCRETE (CU. METERS)	
POUR 1 (CAP, LOWER WING)	22.5
POUR 2 (CAP, LOWER WING)	26.6
POUR 3 (WALL, UPPER WING)	11.6
POUR 4 (WALL, UPPER WING)	12.6
TOTAL CLASS A CONCRETE	73.3

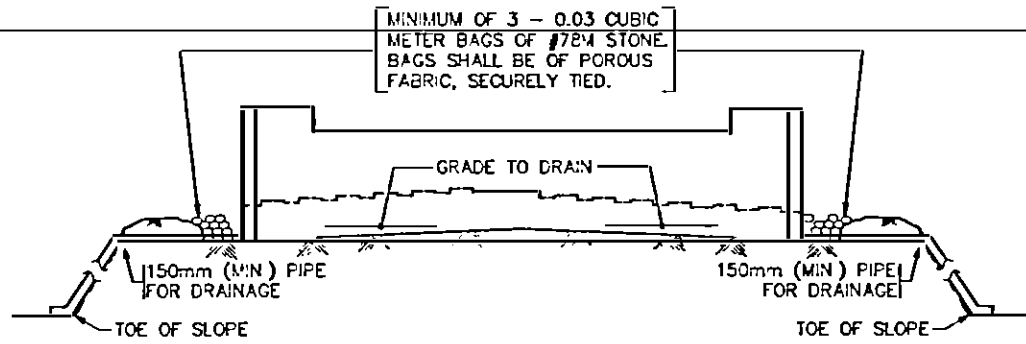
**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT



**REINFORCING STEEL - END BENT 1**

BAR	NO.	SIZE	TYPE	DIM "A"	LENGTH	WEIGHT
B1	10	#29	1	12,925	13,300	673
B2	5	#29	STR.	--	12,920	327
B3	37	#13	STR.	--	1,120	41
B4	40	#13	STR.	--	7,580	301
B5	12	#19	STR.	--	12,440	334
B6	5	#29	1	9,265	9,640	244
B7	5	#29	1	9,185	9,560	242
B8	4	#19	STR.	--	10,180	91
B9	10	#29	STR.	--	7,520	386
B10	5	#29	STR.	--	12,240	310
B11	25	#13	STR.	--	1,100	27
B12	5	#13	STR.	--	2,340	12
K1	60	#13	STR.	--	7,580	452
S1	184	#16	2	--	1,400	400
S2	34	#16	3	800	3,000	158
S3	26	#16	3	890	3,180	128
S4	64	#16	3	980	3,360	334
S5	27	#16	3	960	3,320	139
S6	33	#16	3	880	3,160	162
S7	2	#16	8	1,260	2,700	8
S8	6	#19	7	--	1,160	16
S9	2	#19	9	--	3,080	14
S10	2	#16	8	1,110	2,400	7
S11	64	#13	4	--	2,340	149
S12	96	#13	4	--	2,040	195
H1	6	#19	6	5,440	5,640	76
H2	6	#19	6	5,400	5,600	75
H3	8	#16	6	4,560	4,760	59
H4	8	#16	6	4,520	4,720	59
H5	5	#19	5	4,180	4,380	49
H6	5	#19	5	4,220	4,420	49
H7	8	#16	5	3,300	3,500	43
H8	8	#16	5	3,320	3,520	44
V1	216	#16	STR.	--	2,500	838
V2	44	#16	STR.	--	3,160	216
V3	32	#16	STR.	--	3,100	154
U1	108	#13	4	--	1,120	120

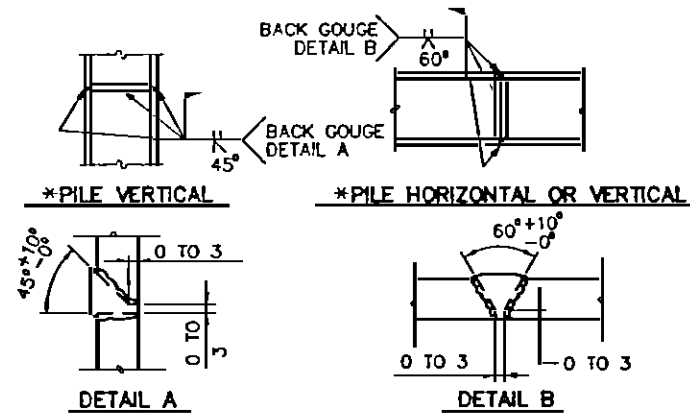


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

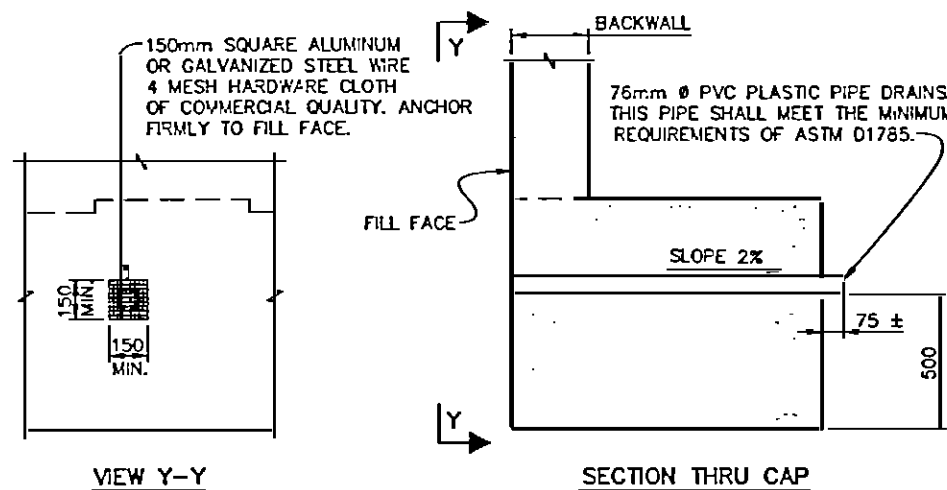
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**PILE SPlice DETAILS**

\* POSITION OF PILE DURING WELDING

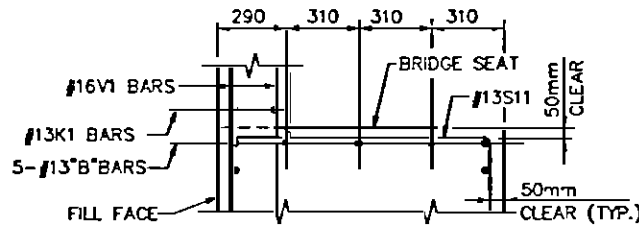


VIEW Y-Y

SECTION THRU CAP

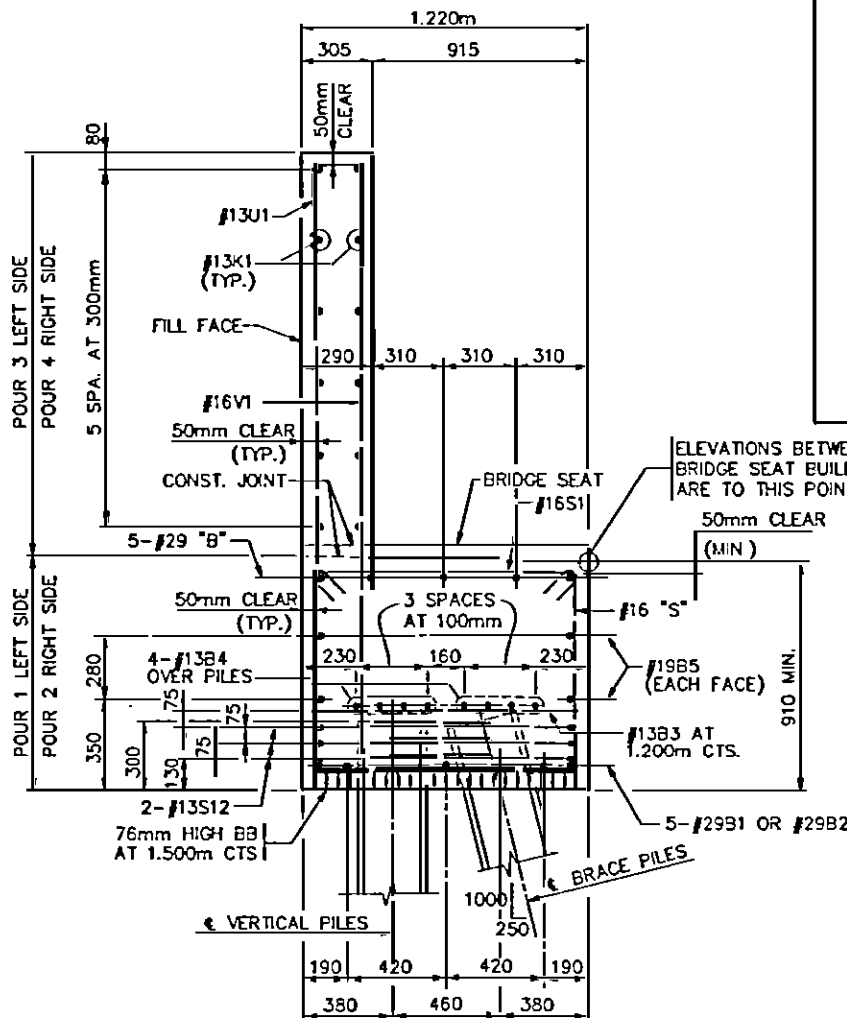
NOTE: NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE PVC PLASTIC PIPE DRAINS, HARDWARE CLOTH AND FASTENERS. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

**PIPE DRAIN DETAILS**



**SECTION B**

NOTE: SEE SECTION A-A FOR NOTES AND REINFORCING STEEL NOT SHOWN



**SECTION A-A**



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



PROJECT No. R-2000EA

WAKE COUNTY

STATION: 304+52.922-L- REV. POT

SHEET 4 OF 4

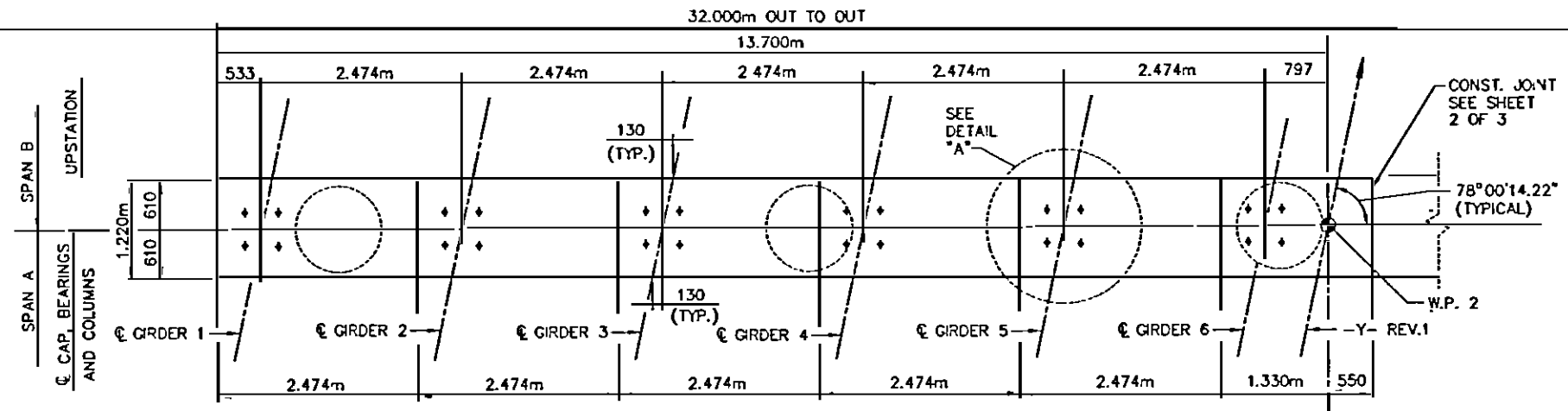
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1

REVISIONS						SHEET NO. S-27
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DRAWN BY: A. STEPHEN CALLAWAY DATE: 8/24/98  
CHECKED BY: [Signature] DATE: 10-21-98  
APPROVED BY: [Signature] DATE:

DWG. NO. 9705-27



**NOTES:**

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR SPIRAL COLUMN REINFORCING STEEL, SEE SPECIAL PROVISIONS.

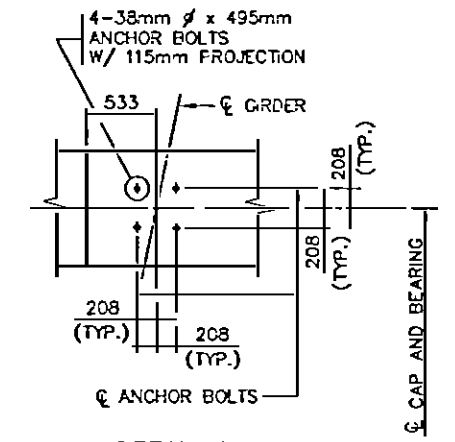
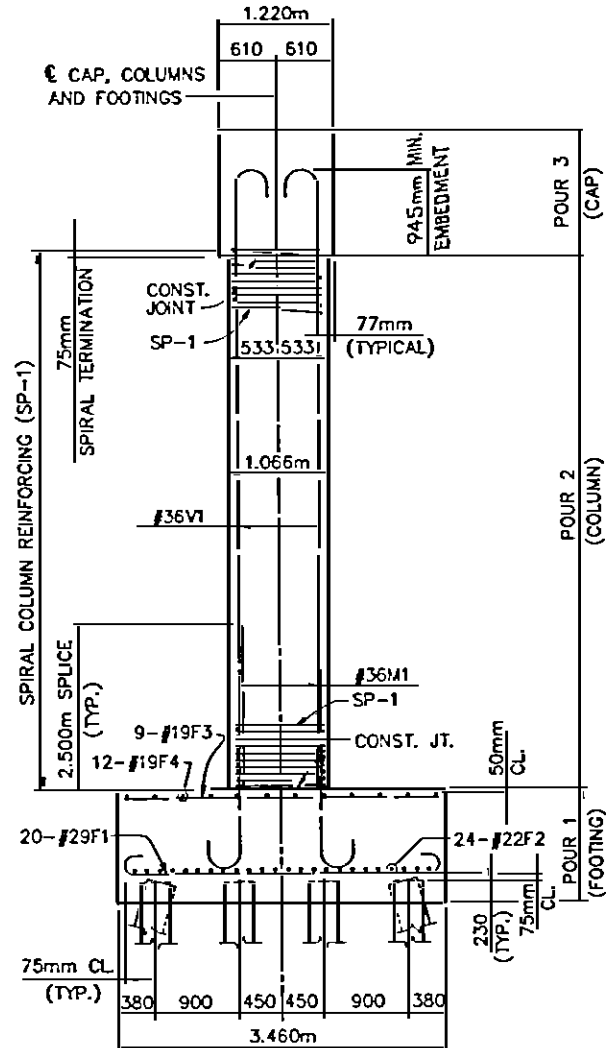
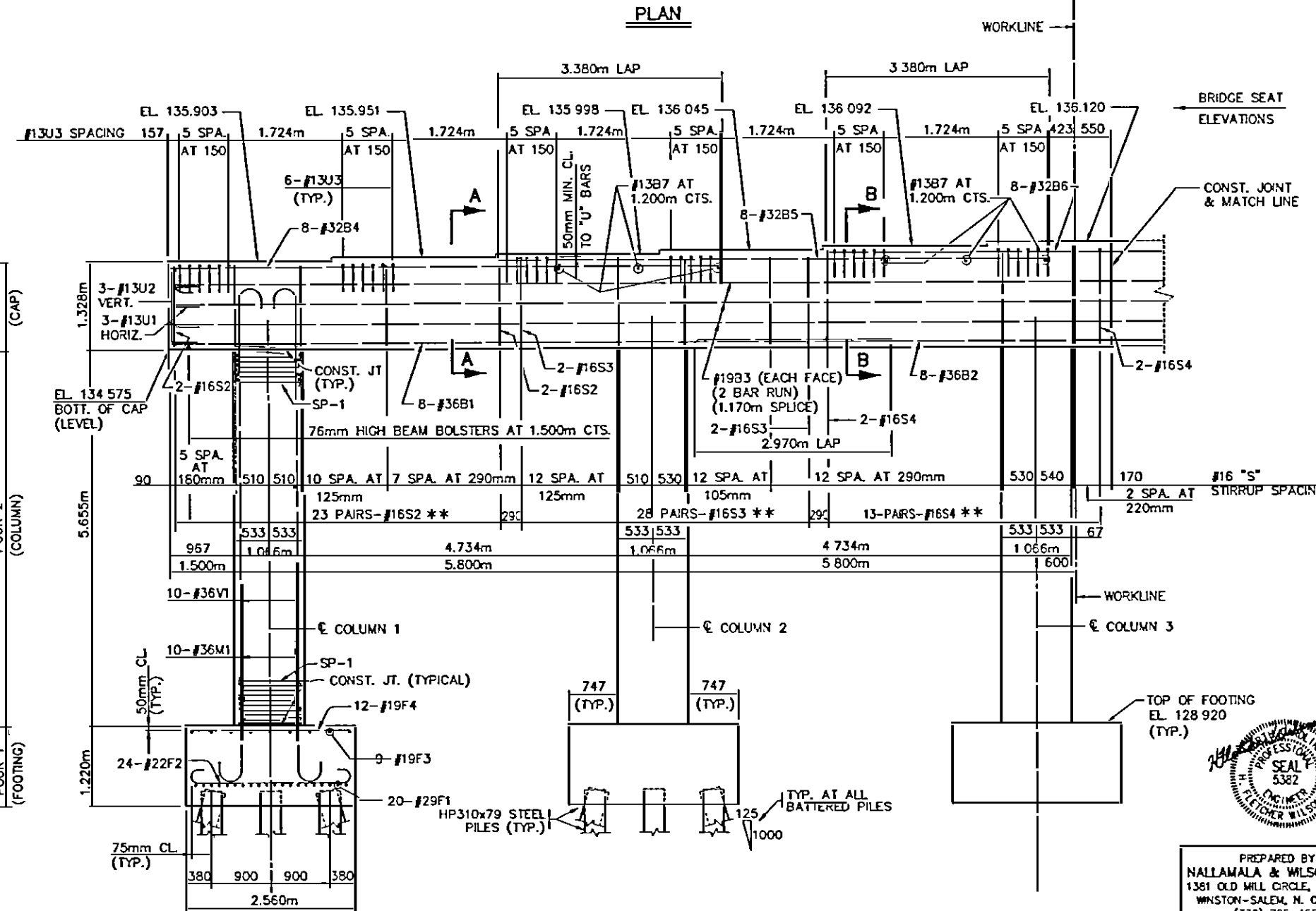
REINFORCING STEEL IN BOTTOM OF CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR COLUMN REINFORCING.

ALL DIMENSIONS ARE HORIZONTAL AND VERTICAL.

HOOKS ON "V" AND "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING NECESSARY REINFORCING STEEL.

PILES SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 450 Kn. EACH.

FOR PILE SPLICE DETAILS SEE END BENT 1 SHEET 4 OF 4.



NOTE: FOOTINGS, PILES, COLUMN DIMENSIONS AND REINFORCING STEEL ARE TYPICAL AT EACH COLUMN.

\*\* INVERT ALTERNATE PAIRS OF STIRRUPS.



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

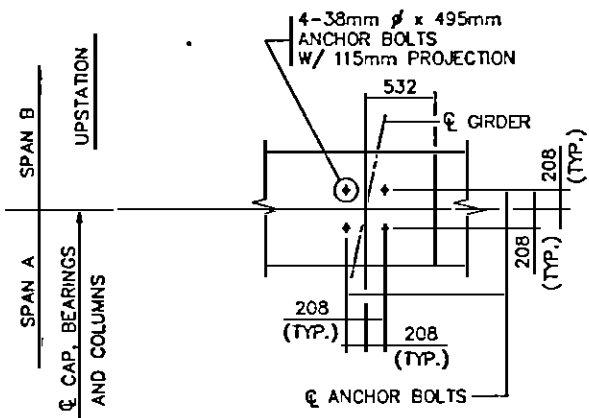
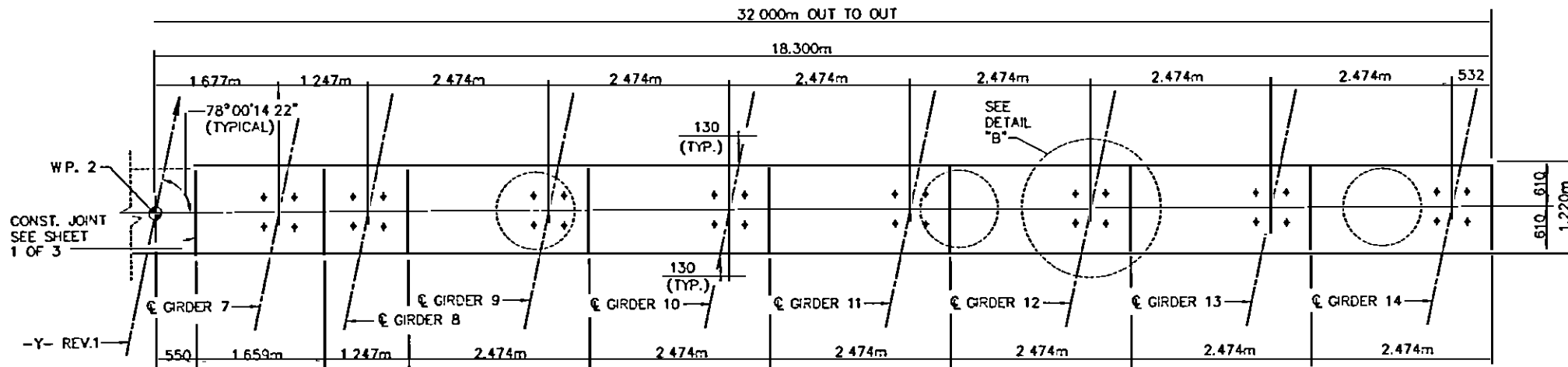
SUBSTRUCTURE  
BENT 1

REVISIONS					SHEET NO. 3-28
NO.	BY	DATE	NO.	DATE	
1			3		TOTAL SHEETS 170
2			4		

JOYCE WHITE 08/20/98  
10-21-98

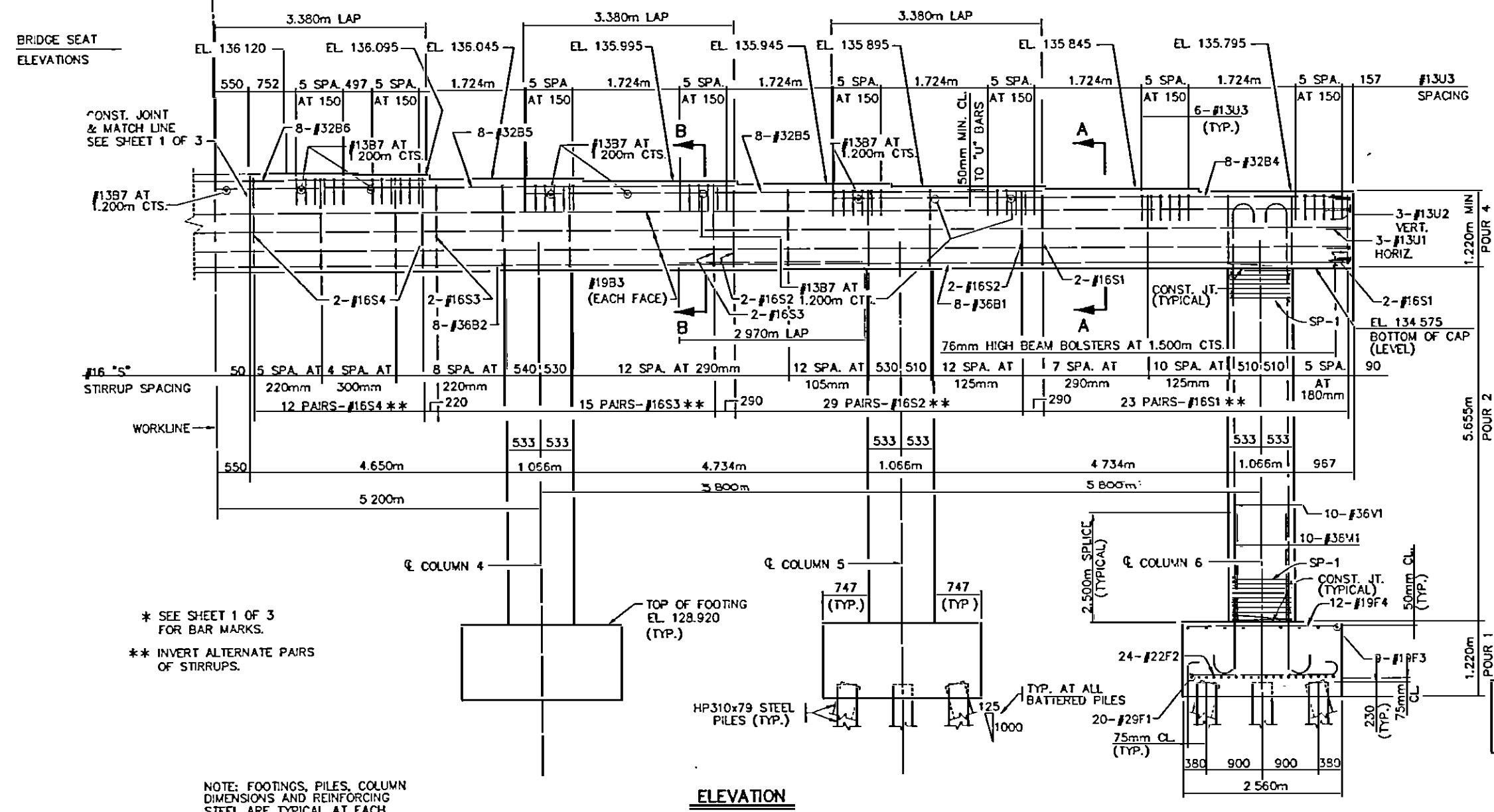
DWG. NO. 9706-20





**PLAN**

**DETAIL B**



**ELEVATION**

\* SEE SHEET 1 OF 3 FOR BAR MARKS.  
\*\* INVERT ALTERNATE PAIRS OF STIRRUPS.

NOTE: FOOTINGS, PILES, COLUMN DIMENSIONS AND REINFORCING STEEL ARE TYPICAL AT EACH COLUMN.



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



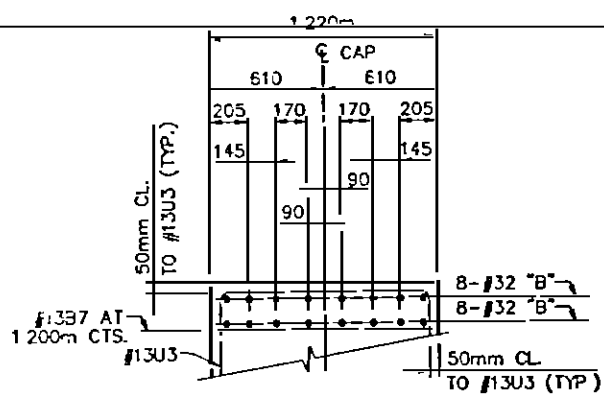
PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

SHEET 2 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
BENT 1

REVISIONS					SHEET NO. S-29
NO.	BY	DATE	NO.	DATE	
1			3		TOTAL SHEETS 170
2			4		

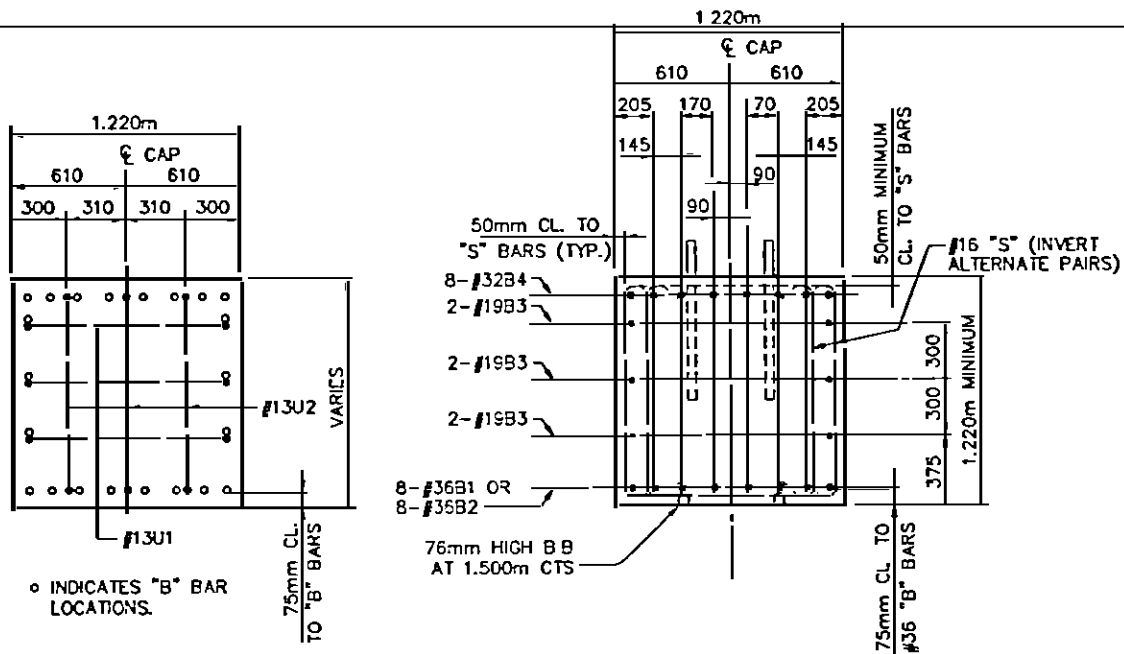
DRAWN BY: JOYCE WHITE DATE: 08/20/98  
CHECKED BY: DATE: 10-21-98  
APPROVED BY: DATE:

DWG NO. 9705-29



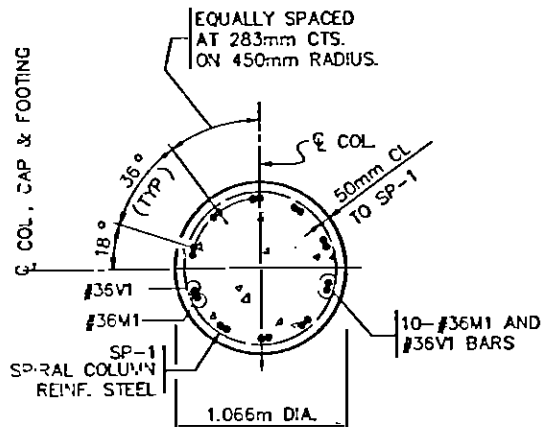
**SECTION B-B**

NOTE: STIRRUPS NOT SHOWN FOR CLARITY.



**END VIEW**

**SECTION A-A**



**TYPICAL SECTION THRU COLUMN**

**BAR TYPES**  
(ALL BAR DIMENSIONS ARE CUT TO CUT)

B4	8,335	425	
V1	6,600	480	
M1	3,360	480	

375	3,310	375	F1
HK.		HK.	
250	2,400	250	F2
HK.		HK.	

U1	1,080
U2	1,060
U3	1,120

**QUANTITIES - BENT 1**

REINFORCING STEEL	kg	17,006
SPIRAL COLUMN REINFORCING STEEL	kg	1,419

**CLASS A CONCRETE:**

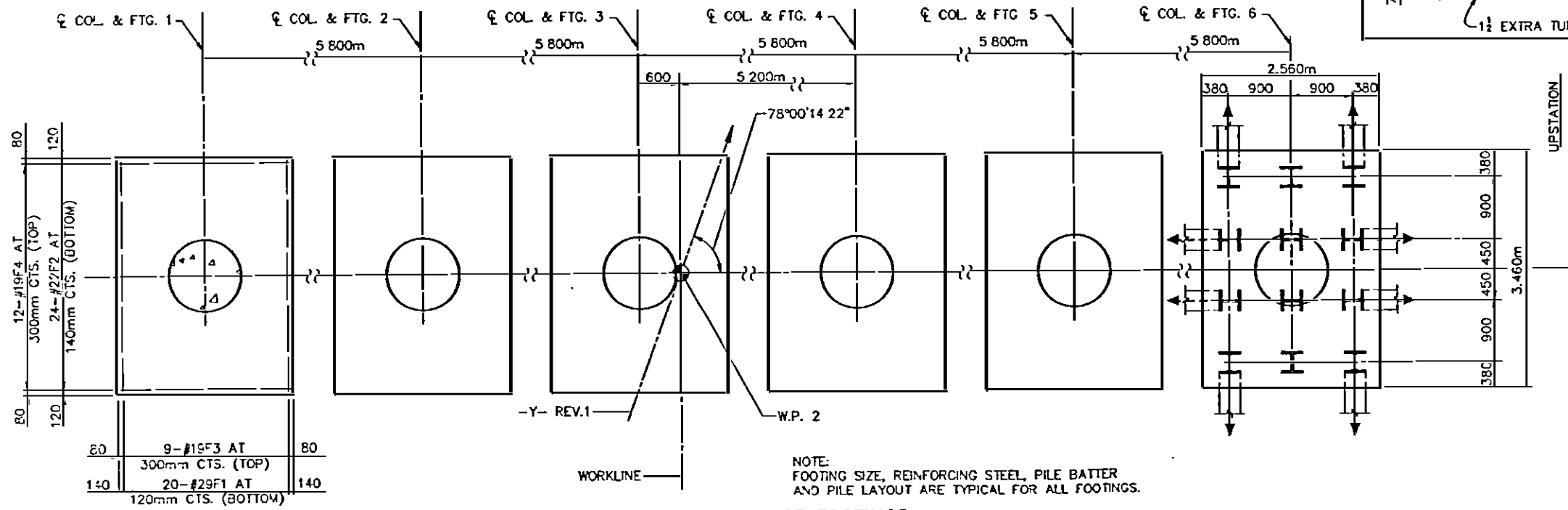
POUR 1 (FOOTINGS)	CU. METERS	64.8
POUR 2 (COLUMNS)	CU. METERS	30.3
POUR 3 (CAP)	CU. METERS	25.0
POUR 4 (CAP)	CU. METERS	29.8
TOTAL CLASS A CONCRETE	CU. METERS	149.9

FOUNDATION EXCAVATION	LUMP SUM	LUMP SUM
-----------------------	----------	----------

HP310x79 PILES | NO. 72 | LIN METERS 720



**PLAN OF FOOTINGS**

▲ INDICATES BATTERED 125:1000 PILE



PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

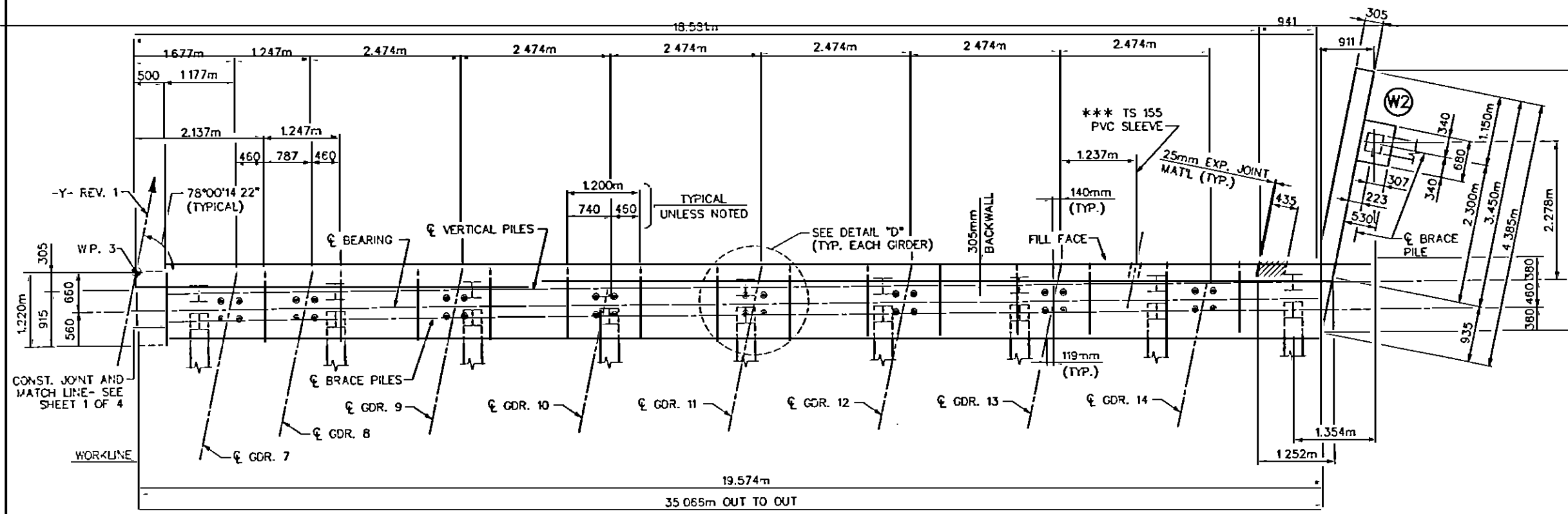


PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

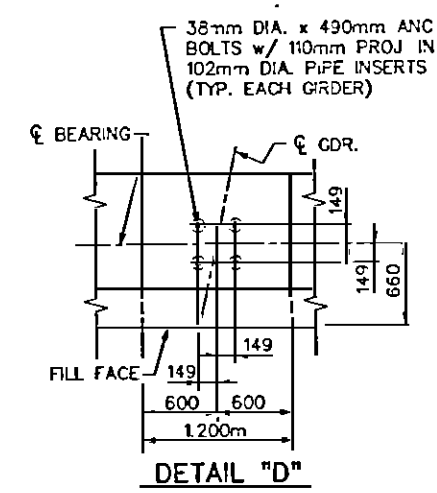
SHEET 3 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
BENT 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			178





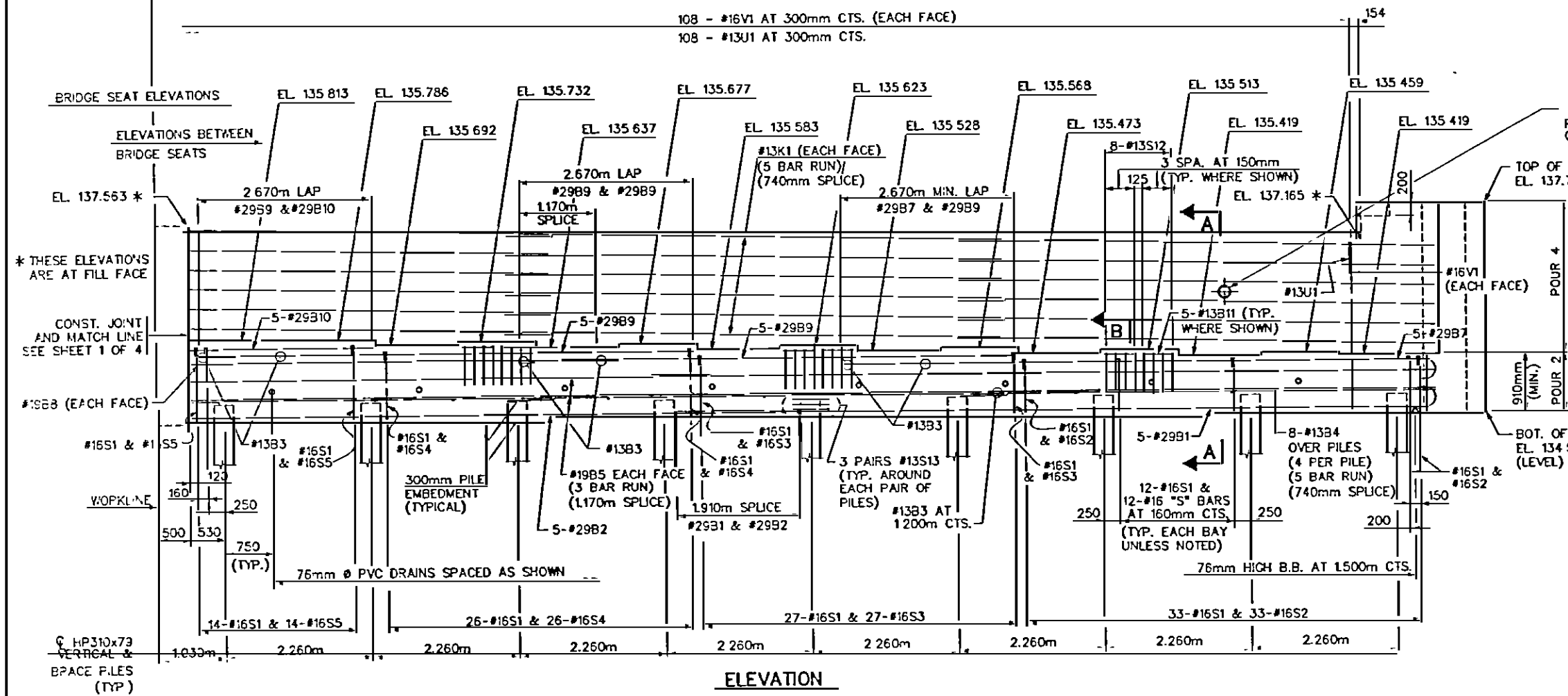
PLAN



DETAIL "D"

\*\*\* SEE "ELECTRICAL CONDUIT SYSTEM" PROJECT SPECIAL PROVISIONS AND DETAILS.

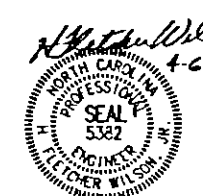
108 - #16V1 AT 300mm CTS. (EACH FACE)  
108 - #13U1 AT 300mm CTS.



ELEVATION

\*\*\* TS 155 PVC SLEEVE  
EL. 136.016

NOTE: PILE AND PILE CAP AT WING NOT SHOWN FOR CLARITY.



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

SHEET 2 OF 4  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 2

PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

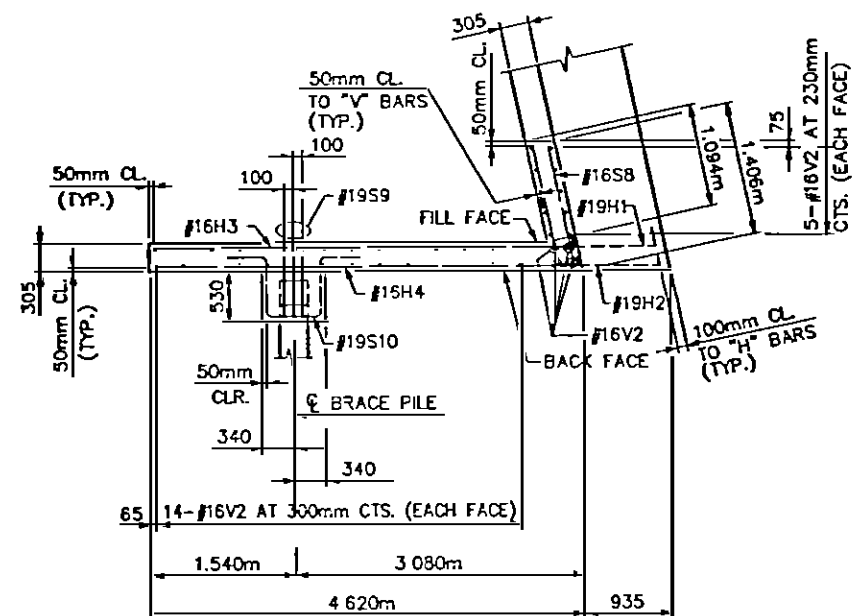


REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			9-32 TOTAL SHEETS 170
2			4			

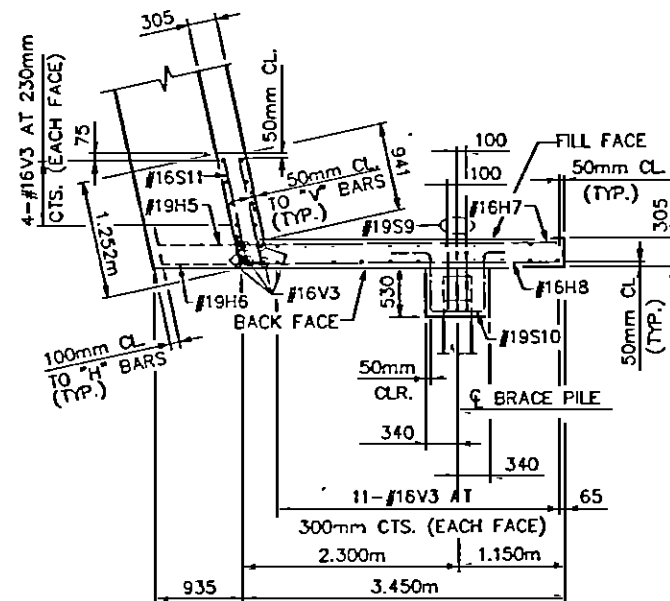
DWG. NO. 9705-32

FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE "SECTION A-A" ON SHEET 4 OF 4.

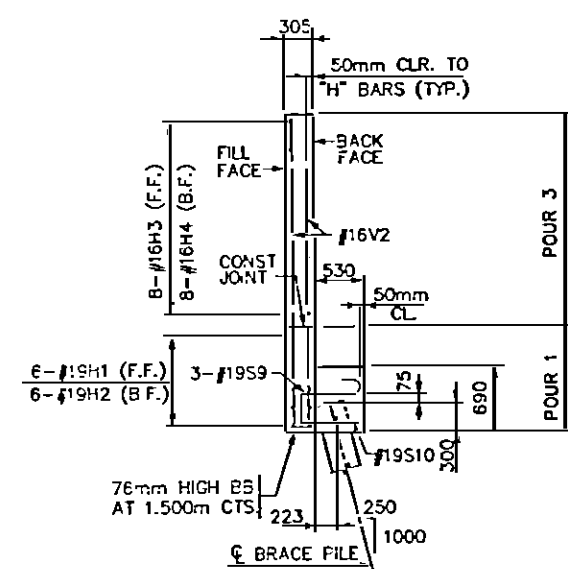
DATE: 10/12/98  
DRAWN BY: A. STEPHEN CALLAWAY  
CHECKED BY: N. C. Wilson  
DATE: 10-21-98



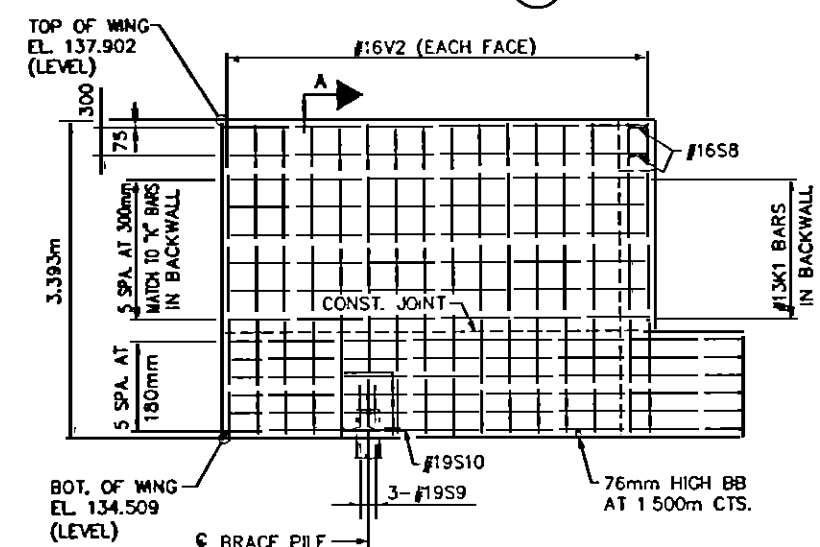
PLAN OF WING (W1)



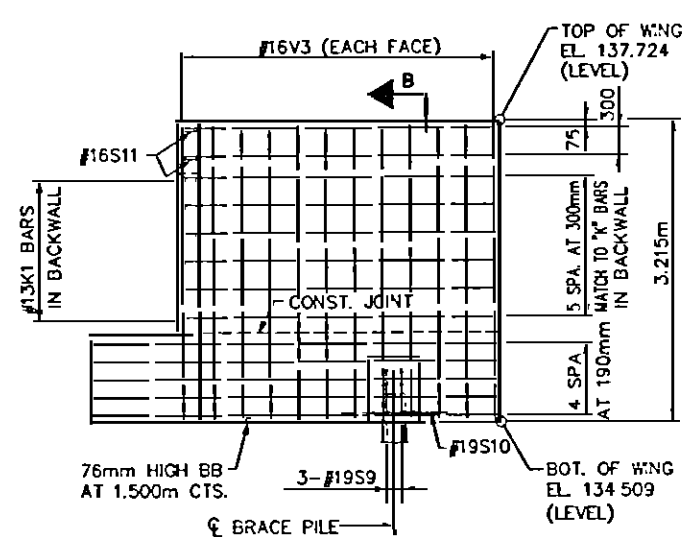
PLAN OF WING (W2)



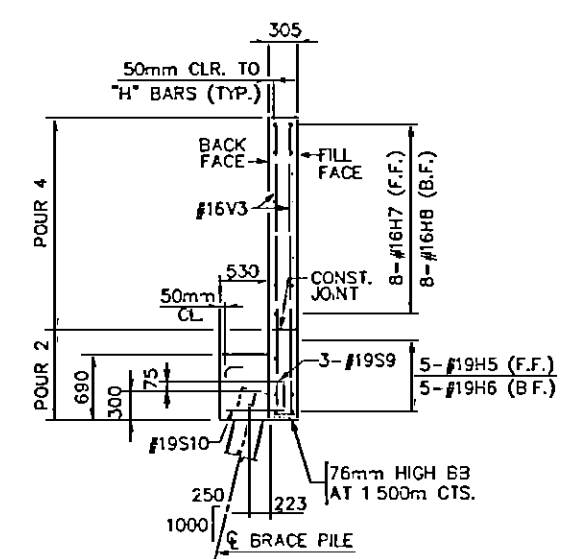
SECTION "A" - WING (W1)



ELEVATION OF WING (W1)

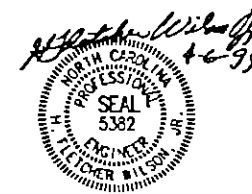


ELEVATION OF WING (W2)



SECTION "B" - WING (W2)

NOTE:  
F.F. DENOTES FILL FACE  
B.F. DENOTES BACK FACE



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

SHEET 3 OF 4  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 2

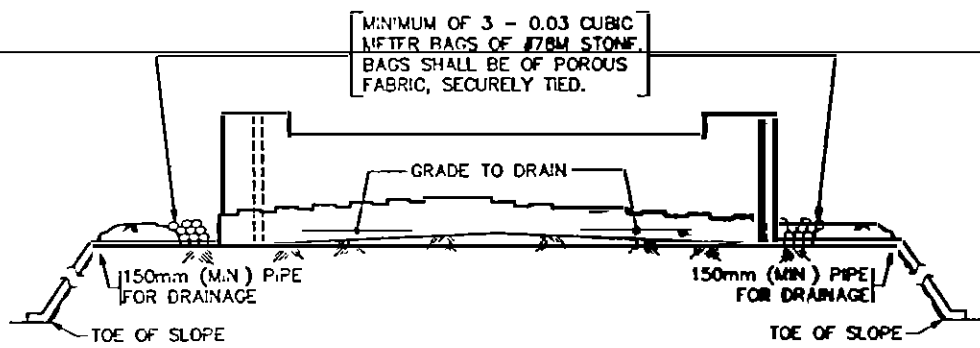
PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651



REVISIONS						SHEET NO. 3-33
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DESIGNED BY: A. STEPHEN CALLAWAY DATE: 10/13/98  
CHECKED BY: DATE: 10-21-98

DWG NO 9705-33

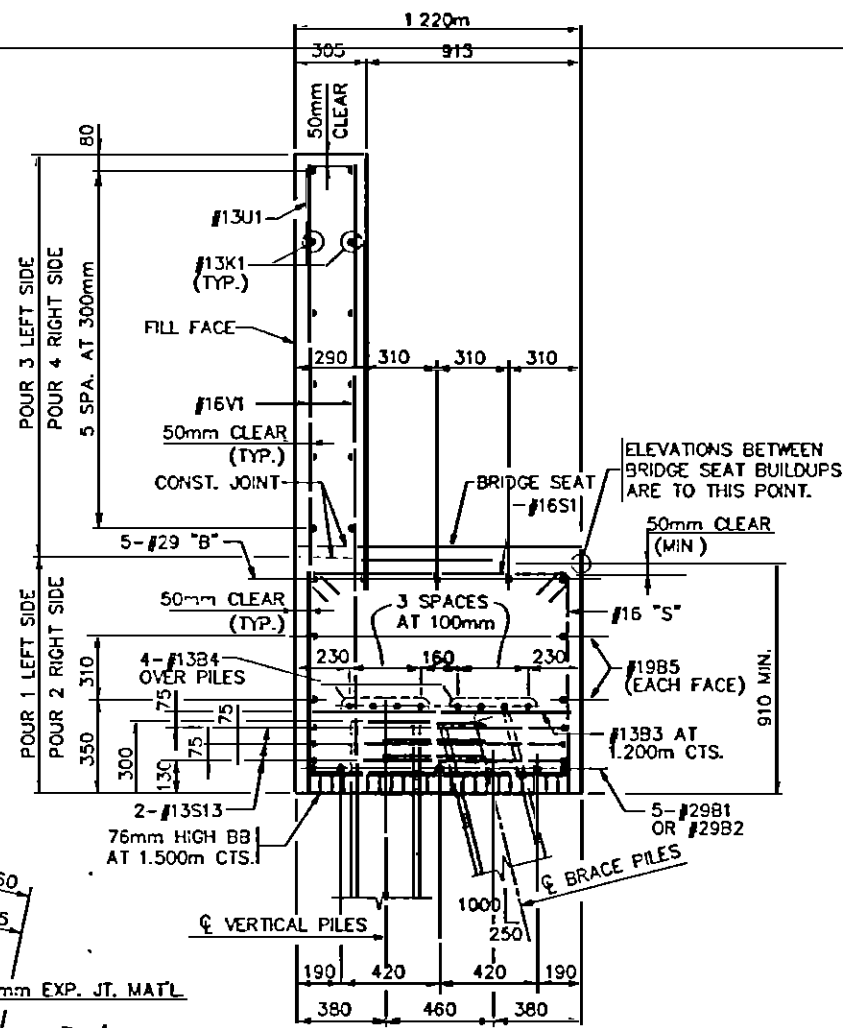


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

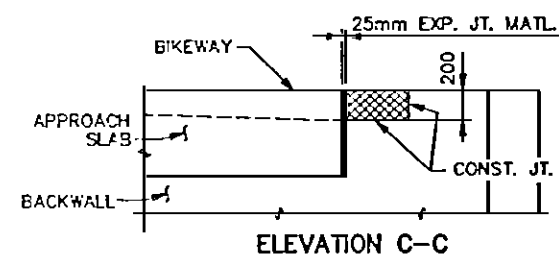
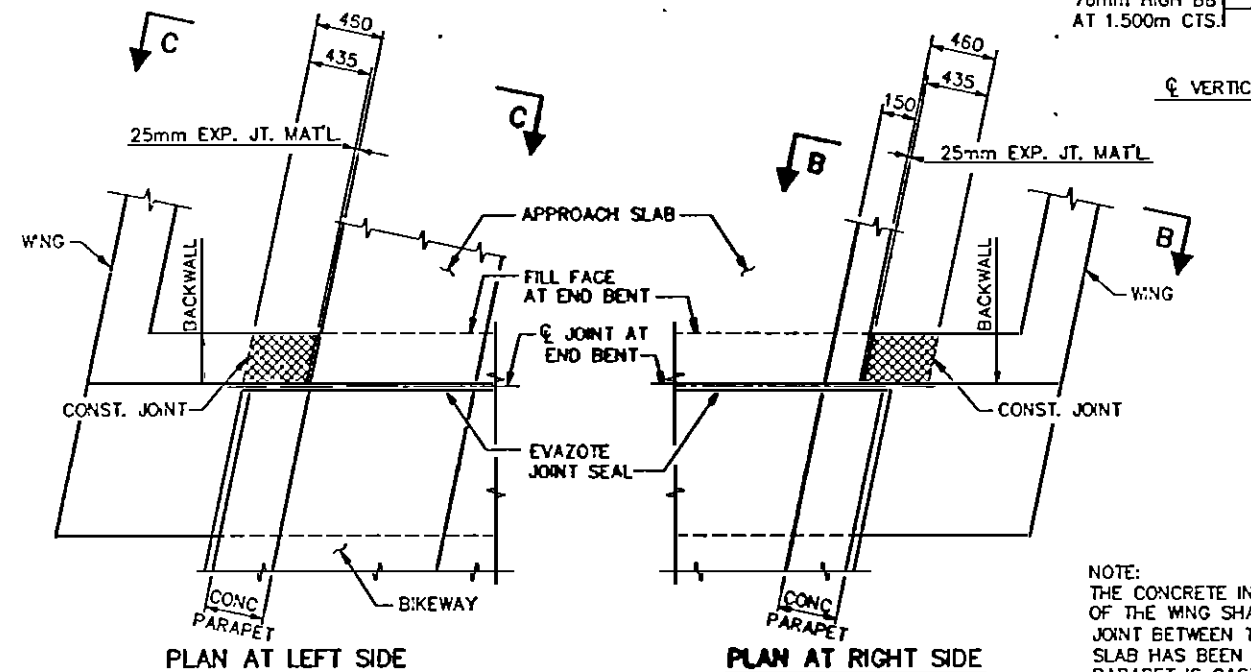
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DEGRADED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS

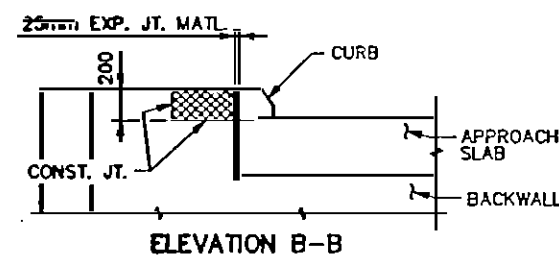
**TEMPORARY DRAINAGE AT END BENT**



**SECTION A-A**



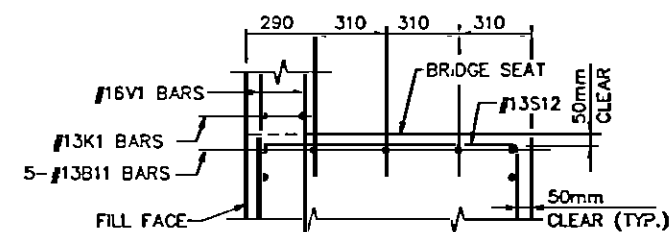
ELEVATION C-C



ELEVATION B-B

**BLOCKOUT IN WING WALL FOR FITTING EVAZOTE JOINT SEAL**

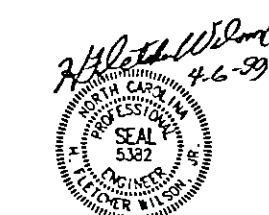
NOTE: THE CONCRETE IN THE CROSS HATCHED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.



NOTE: SEE SECTION A-A FOR NOTES AND REINFORCING STEEL NOT SHOWN.

SUMMARY OF QUANTITIES - END BENT 2	
HP310x79 PILES	NO. 34
	LIN. METERS 612
REINFORCING STEEL (kg.)	6,963
CLASS A CONCRETE	(CU. METERS)
POUR 1 (CAP, LOWER WING)	24.7
POUR 2 (CAP, LOWER WING)	26.8
POUR 3 (WALL, UPPER WING)	11.7
POUR 4 (WALL, UPPER WING)	12.7
TOTAL CLASS A CONCRETE	75.9

BAR TYPES		REINFORCING STEEL - END BENT 2					
ALL BAR DIMENSIONS ARE OUT TO OUT		BAR NO.	SIZE	TYPE	D'M "A"	LENGTH	WEIGHT
①	140 1,120 140	B1	10	#29	1	12,925	13,300
②	510 S13	B2	5	#29	STR.	---	12,920
③	1,120 S12	B3	39	#13	STR.	---	1,120
④	200 U1	B4	40	#13	STR.	---	7,580
⑤	765 S13	B5	12	#19	STR.	---	12,440
⑥	610 S12	B6	5	#29	1	9,205	9,560
⑦	460 U1	B7	5	#29	1	9,165	9,540
⑧		B8	2	#19	STR.	---	14,200
⑨		B9	15	#29	STR.	---	7,620
		B10	5	#29	STR.	---	7,280
		B11	25	#13	STR.	---	1,100
		K1	60	#13	STR.	---	7,580
		S1	184	#16	2	---	1,400
		S2	33	#16	3	800	3,000
		S3	27	#16	3	910	3,220
		S4	26	#16	3	1,020	3,440
		S5	38	#16	3	1,130	3,660
		S6	26	#16	3	1,050	3,500
		S7	34	#16	3	960	3,320
		S8	2	#16	8	1,280	2,740
		S9	6	#19	7	---	1,160
		S10	2	#19	9	---	3,080
		S11	2	#16	8	1,120	2,420
		S12	40	#13	4	---	2,340
		S13	96	#13	4	---	2,040
		H1	6	#19	5	5,340	5,540
		H2	6	#19	5	5,380	5,580
		H3	8	#16	5	4,460	4,660
		H4	8	#16	5	4,500	4,700
		H5	5	#19	6	4,280	4,480
		H6	5	#19	6	4,240	4,440
		H7	8	#16	6	3,400	3,600
		H8	8	#16	6	3,360	3,560
		V1	216	#16	STR.	---	2,540
		V2	42	#16	STR.	---	3,280
		V3	34	#16	STR.	---	3,100
		U1	108	#13	4	---	1,120



PROJECT No. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L- REV. POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 2

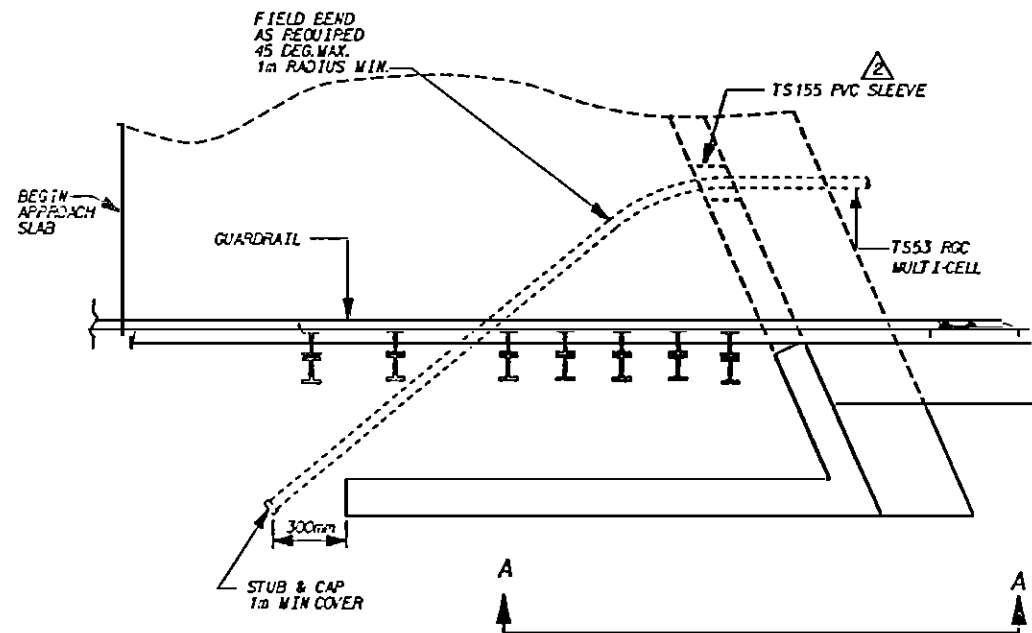
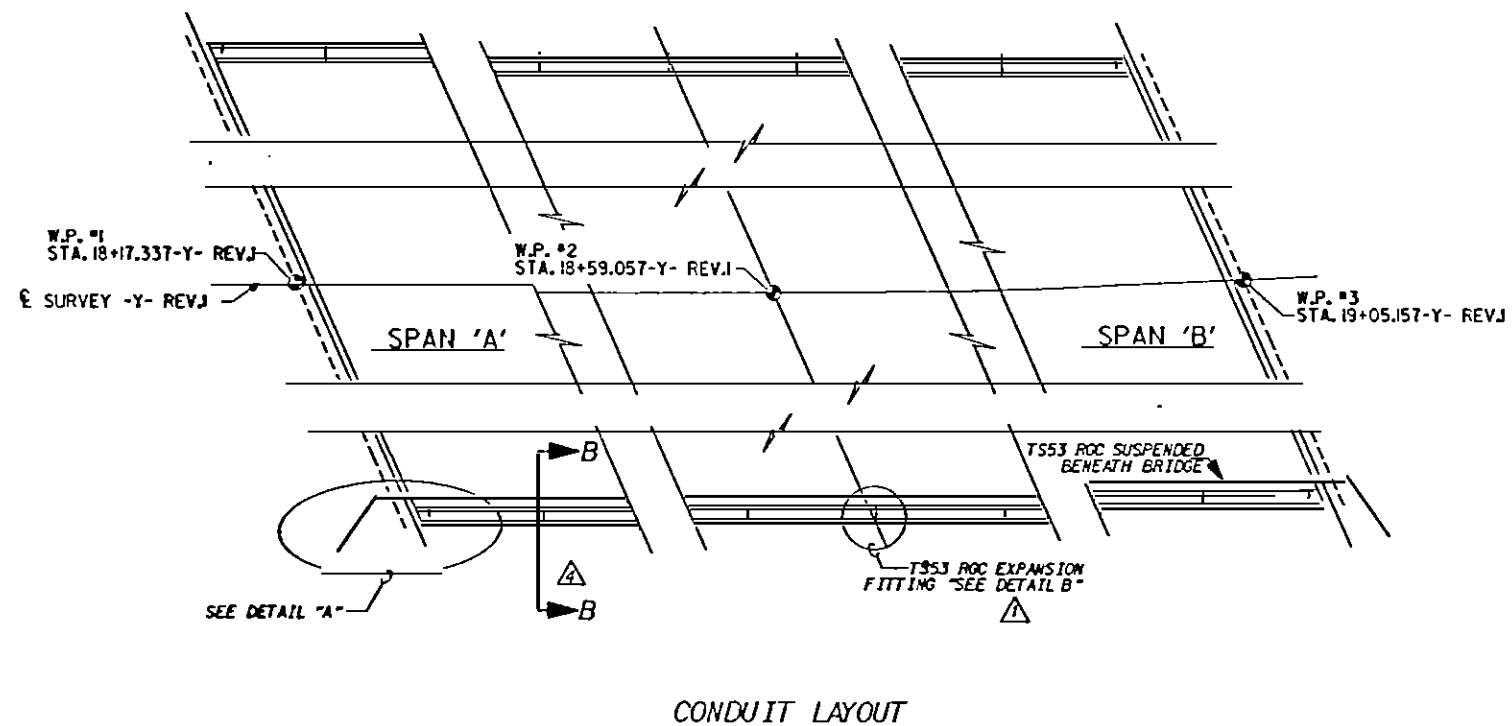
REVISIONS						SHEET NO. S-3A	TOTAL SHEETS 170
NO.	BY	DATE	NO.	BY	DATE		
1			3				
2			4				

PREPARED BY  
NALLAMALA & WILSON, P.A.  
1381 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N. C. 27103  
(336) 765-4651

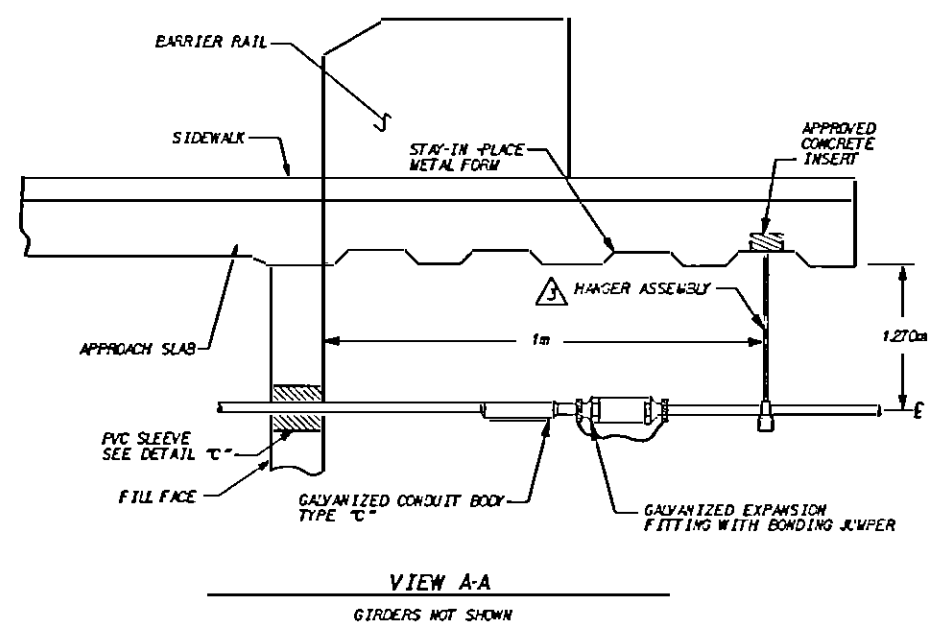


DWG NO. 9705-34

DESIGNED BY: A. STEPHEN CALLAWAY DATE: 10/13/98  
CHECKED BY: N. C. WILSON DATE: 10-21-98  
APPROVED BY: DATE:



DETAIL A  
TERMINATION OF CONDUIT AT WING WALL



VIEW A-A  
GIRDERS NOT SHOWN

- NOTES**
- △ PROVIDE EXPANSION FITTING AT ALL LOCATIONS WHERE CONDUIT CROSSES AN EXPANSION/COMPRESSION JOINT.
  - △ SEE DETAIL C ON SHEET 2 OF 2 FOR SLEEVE INSTALLATION.
  - △ SEE DETAIL D ON SHEET 2 OF 2 FOR HANGER ASSEMBLY INSTALLATION.
  - △ SEE SHEET 2 OF 2 FOR SECTION B-B.

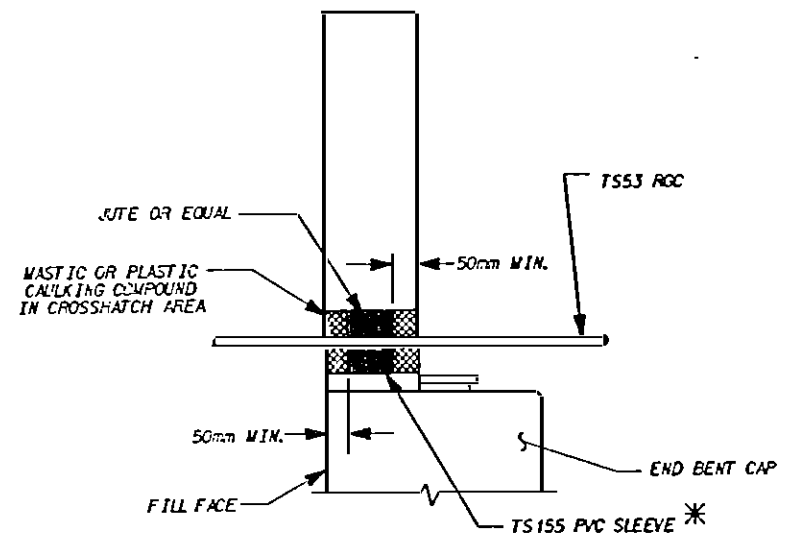
PROJECT NO. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922 -L-REV.  
18+59.057 -Y- REV.1  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ELECTRICAL  
 CONDUIT  
 SYSTEM**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	3-35
1			3			1348 SHEETS
2			4			170

SEE PROJECT SPECIAL PROVISIONS TITLED "ELECTRICAL CONDUIT SYSTEM" FOR MATERIALS CONSTRUCTION METHODS AND PAYMENT.

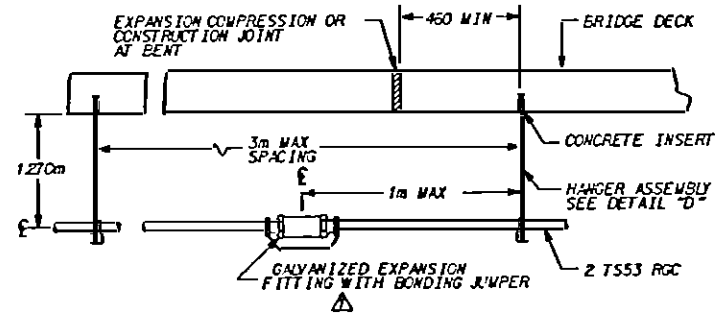
DRAWN BY: J.R. CLAYTON DATE: 5/17/99  
 CHECKED BY: [Signature] DATE: 5/18/99



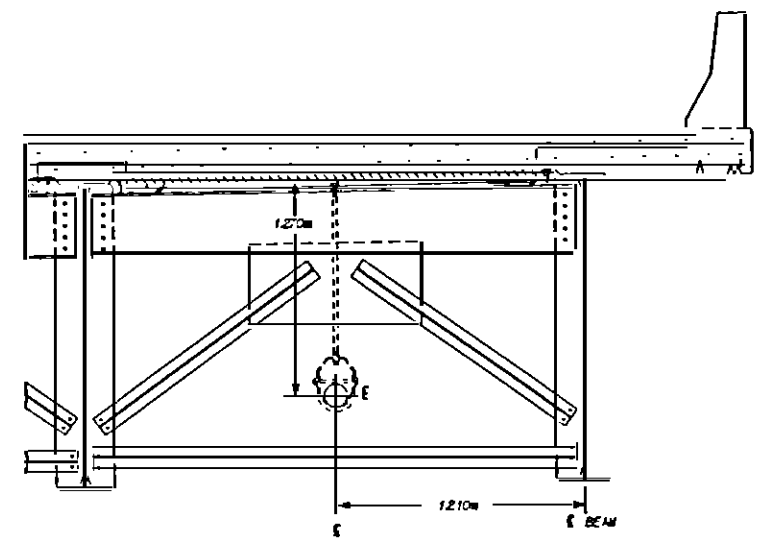
\*INSTALL SLEEVE PARALLEL TO GIRDERS

**DETAIL C**

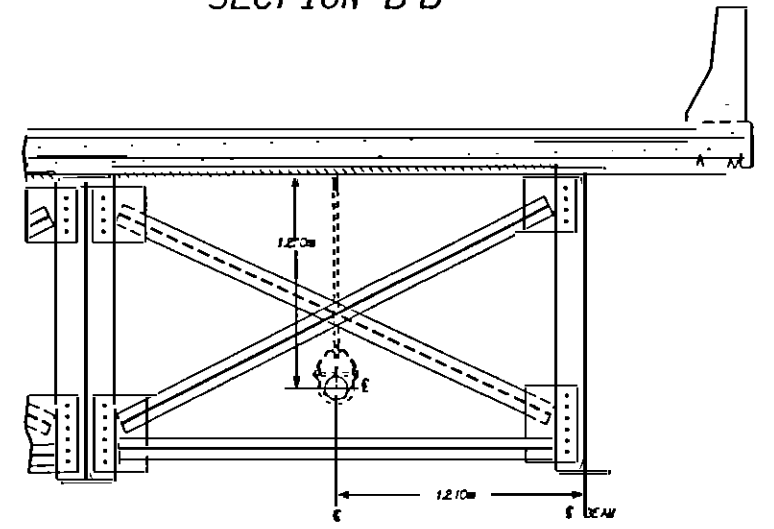
PVC SLEEVE INSTALLATION



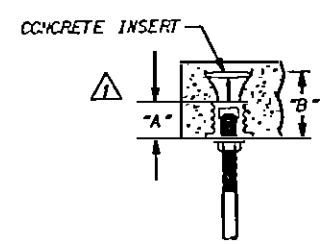
**DETAIL "B"**  
BARRIER RAIL NOT SHOWN



TYPICAL SECTION AT END BENT DIAPHRAGM  
SECTION B-B

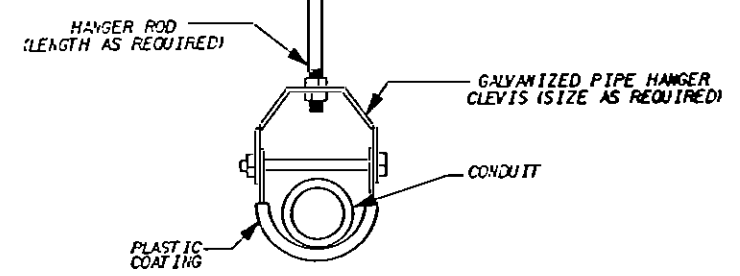


TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM  
SECTION B-B



CONCRETE INSERT			
SIZE mm (Inches)	"A" MIN. mm (Inches)	"B" TYP. mm (Inches)	PULLOUT FORCE Kg (Lbs)
9,525 (37.5)	22,225 (87.5)	57,150 (2250)	276 (610)
12,700 (50.0)	22,225 (87.5)	57,150 (2250)	512 (1130)
15,875 (62.5)	25,4 (10)	57,150 (2250)	571 (1260)
19,050 (75.0)	34,925 (137.5)	63,500 (2500)	1134 (2500)

\* PER APPROVED MANUFACTURER'S SPECIFICATIONS



**DETAIL D**  
HANGER ASSEMBLY

ESTIMATED BILL OF MATERIAL FOR "ELECTRICAL CONDUIT SYSTEM"		
QTY.	UNIT	ITEMS
30	EA	TS53 RGC HANGER ASSEMBLY
2	EA	TS155 PVC SLEEVE
58	M	TS53 RGC
2	M	TS53 GALVANIZED CONDUIT BODIES TYPE "C"
3	EA	TS53 RGC EXPANSION JOINT
100	M	POLYETHYLENE PULL LINE
1	LOT	MASTIC
1	LOT	JUTE

PROJECT NO. R-2000EA  
 WAKE \_\_\_\_\_ COUNTY  
 STATION: 304+52922 -L-REV-  
18+59057 -Y- REV.1

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 Raleigh

**ELECTRICAL  
 CONDUIT  
 SYSTEM**

REVISIONS						SHEET NO. S-36
NO.	DATE	BY	CHKD.	DATE	BY	
1						176
2						

SEE PROJECT SPECIAL PROVISIONS TITLED  
 "ELECTRICAL CONDUIT SYSTEM" FOR MATERIALS  
 CONSTRUCTION METHODS AND PAYMENT.

DRAWN BY: JR. CANNON DATE: 5/17/99  
 CHECKED BY: ETW/AG DATE: 5/18/99



**GENERAL NOTES**

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR AT HIS OPTION MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE. IN RURAL UNPOPULATED AREAS, STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. METHOD OF MEASUREMENT AND BASIS OF PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

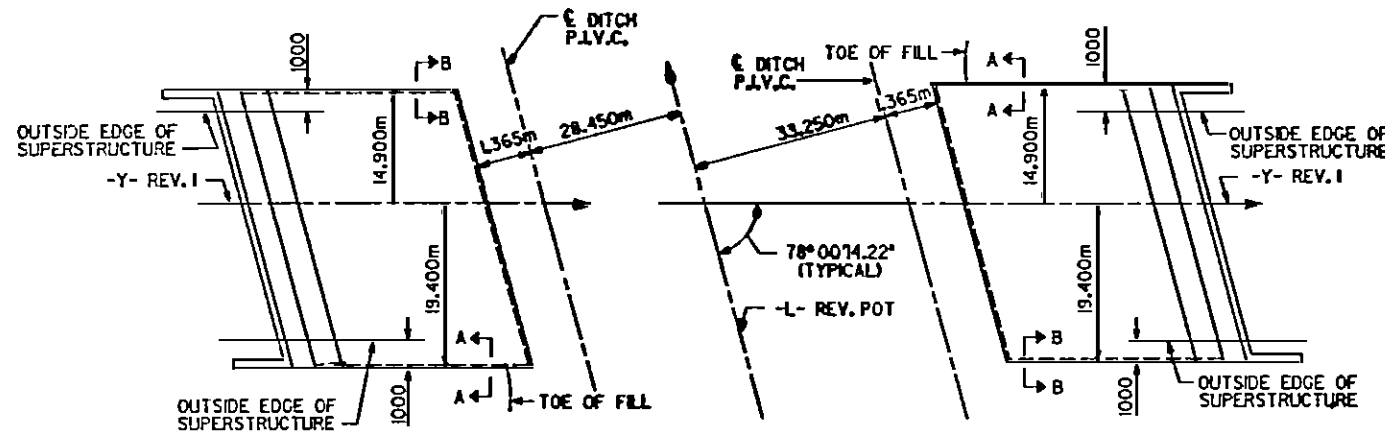
**ALTERNATE "A"**

ALTERNATE "A" SHALL CONSIST OF 100mm POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 152 X 152 MW9J X MW9J, 1524mm WIDE. ADJACENT RUNS OF WELDED WIRE FABRIC SHALL LAP AT LEAST 150mm. SLOPE PROTECTION SHALL BE POURED IN ALTERNATE 1220mm AND 1520mm STRIPS AS SHOWN IN THE POURING DETAIL. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE METER FOR SLOPE PROTECTION.

**ALTERNATE "B"**

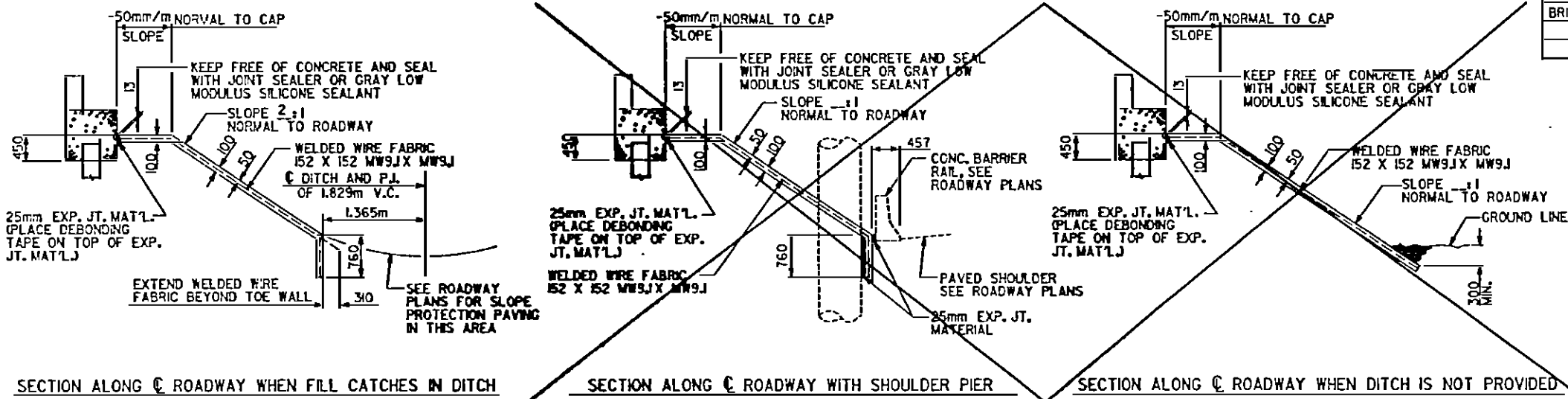
ALTERNATE "B" SHALL CONSIST OF A COMBINATION CONCRETE SLAB AND STONE SLOPE PROTECTION. THE CONCRETE PORTIONS SHALL CONSIST OF PAVED STRIPS ALONG THE DITCH AS SHOWN IN THE DETAILS. 200mm OF STONE SHALL BE PLACED OVER THE REMAINING AREA SHOWN ON THE PLANS TO BE COVERED WITH SLOPE PROTECTION. CONCRETE SHALL BE CLASS "B". THE COST OF THE CONCRETE, STONE AND WELDED WIRE FABRIC 152 X 152 MW9J X MW9J SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE METER FOR SLOPE PROTECTION. SUBGRADING, STONE TYPE, STONE SIZING, AND HERBICIDE PROTECTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE HERBICIDE TYPE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION.

	100 mm SLOPE PROTECTION SQUARE METERS		WELDED WIRE FABRIC 1524mm WIDE APPROX. METERS
	END BENT 1	END BENT 2	
BRIDGE @ STA. 304+52.992 -L- POT	415	394	590

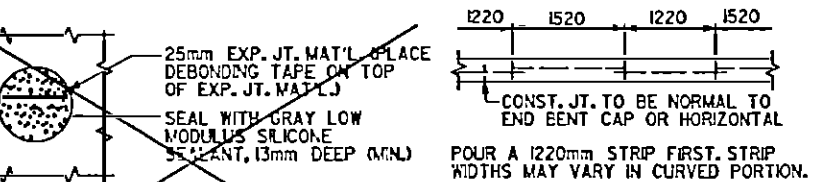
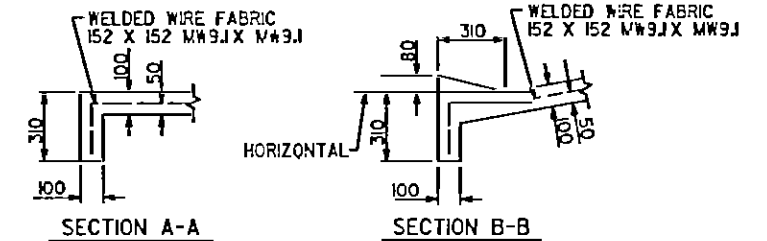


PLAN AT END BENT 1

PLAN AT END BENT 2



DETAILS FOR ALTERNATE "A"



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN

PREPARED BY  
NALLAWALA & WILSON, P.A.  
200 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N.C. 27103  
(336) 765-4651

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT

SHEET 1 OF 2

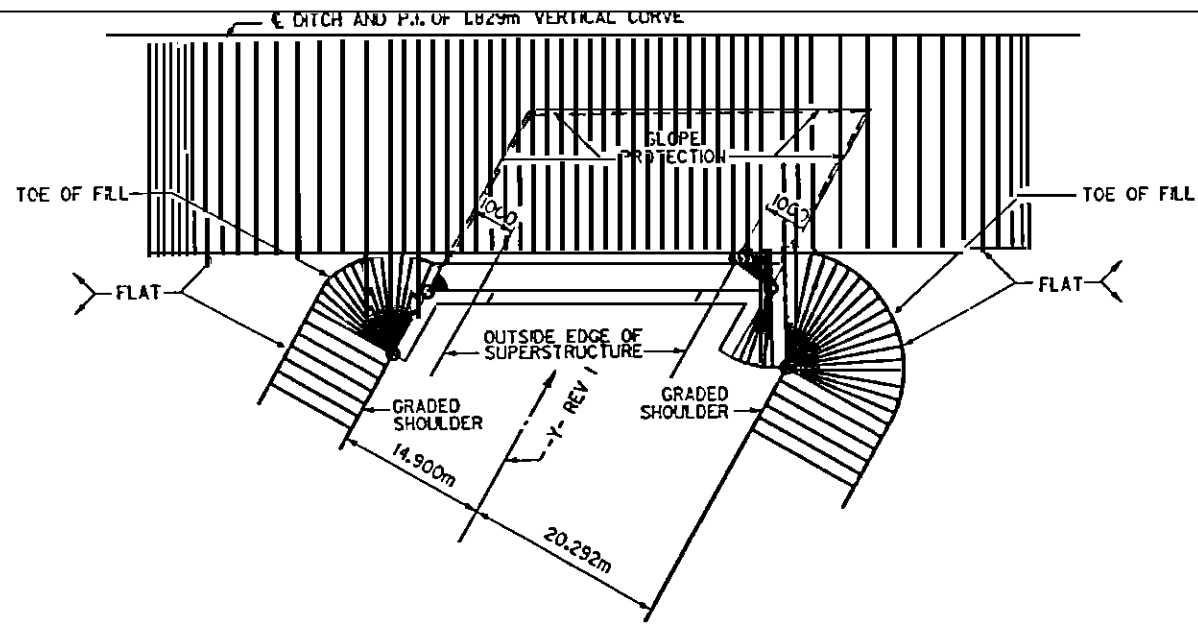
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
SLOPE PROTECTION  
DETAILS

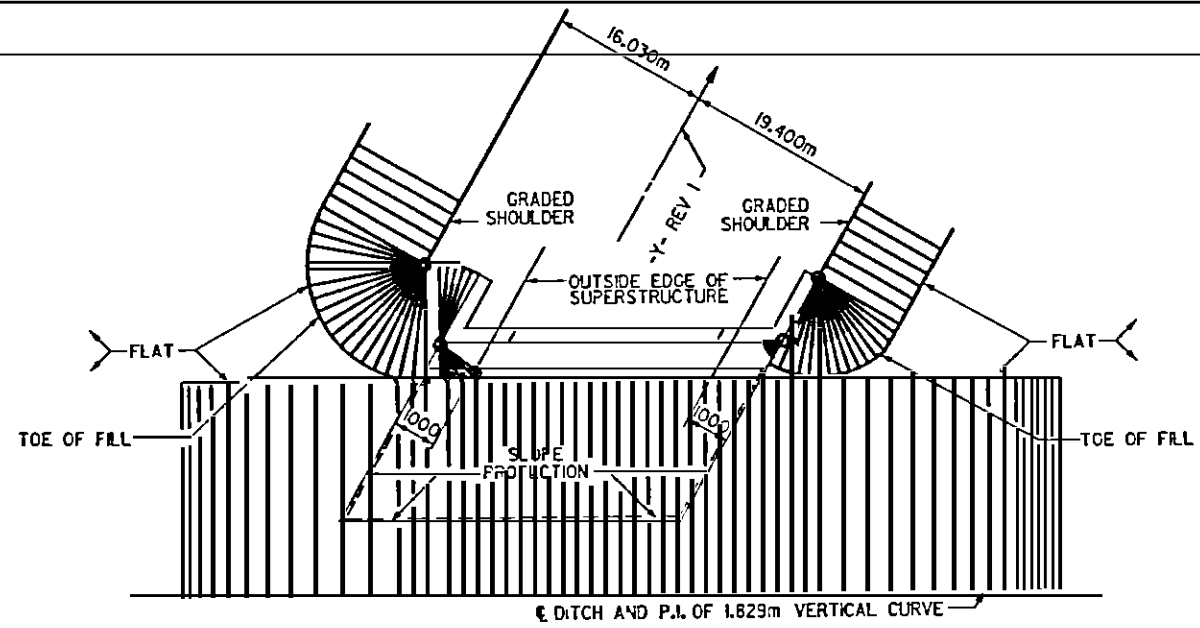


REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			1			S-37
2			2			170

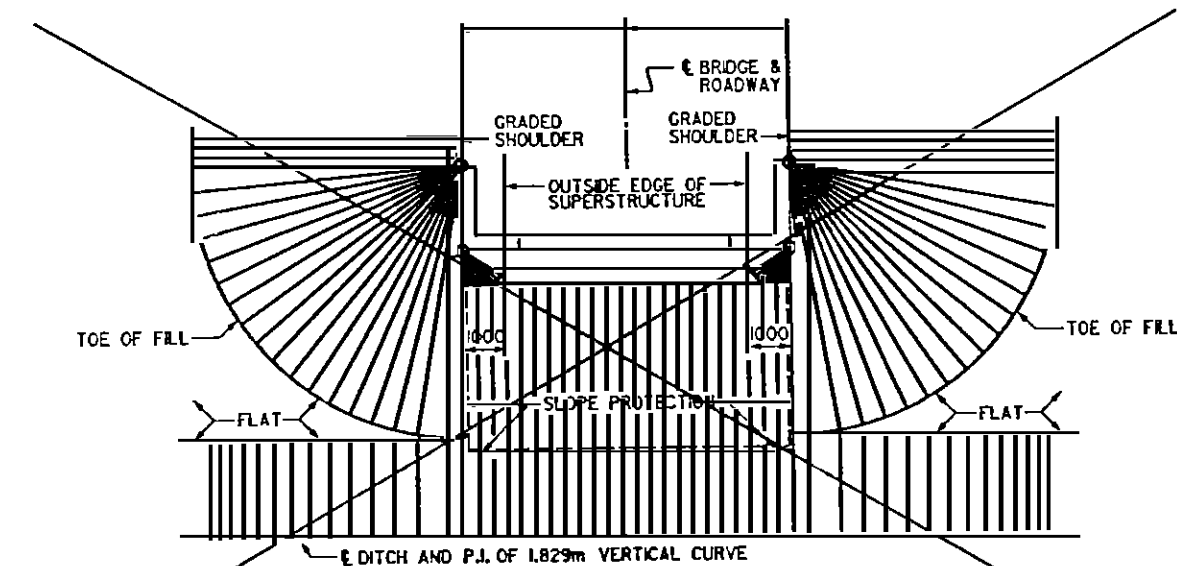
ASSEMBLED BY: ASC DATE: 8/18/98  
CHECKED BY: [Signature] DATE: 8/21/98  
DRAWN BY: ELR 5/92 REV. 5/16/97 EEM/RCW  
CHECKED BY: CRP 6/92 REV. 1/17/98 RWW/LES



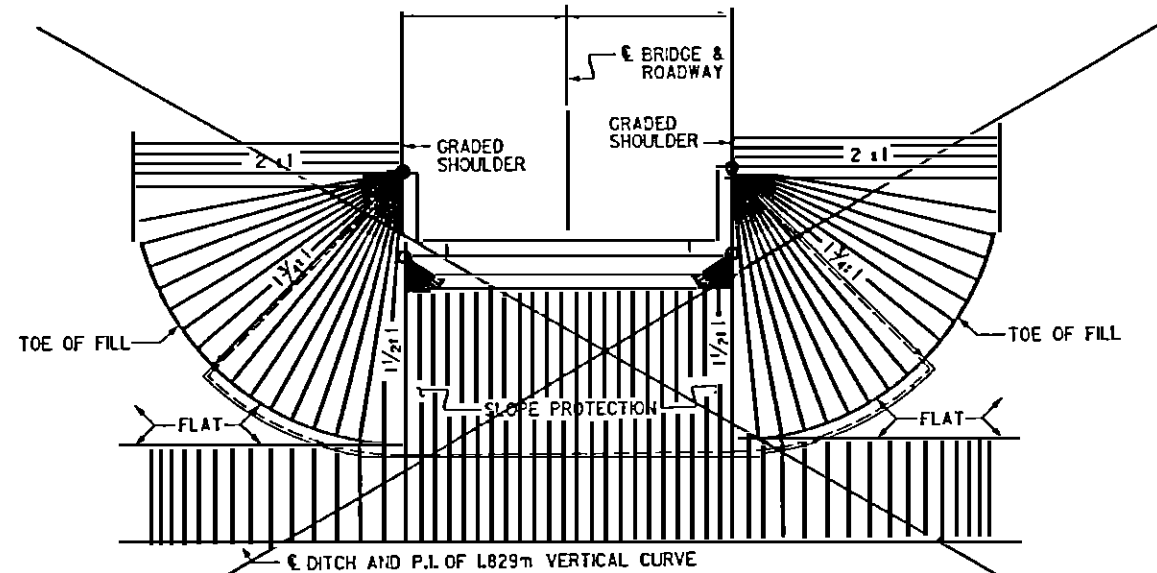
PLAN - END BENT 1 WITH SWEEP BACK WINGS - SKEWED  
( 2:1 SLOPE )



PLAN - END BENT 2 WITH SWEEP BACK WINGS - SKEWED  
( 2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 2:1 SLOPE )

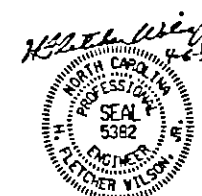


PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 1 1/2:1 SLOPE )

PREPARED BY  
NALLAVALA & WILSON, P.A.  
131 OLD MILL CIRCLE, SUITE 101  
WESTON-SALEM, N.C. 27033  
(336) 765-4659

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAILROAD

STANDARD  
SLOPE PROTECTION  
DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	3-28
1			3			170
2			4			

ASSEMBLED BY: ASC DATE: 8/28/98  
CHECKED BY: *[Signature]* DATE: 1/10-21-98  
DRAWN BY: WJH 10/88 REV: 5/16/97 EEM/RGW  
CHECKED BY: FCJ 10/88 REV: 1/17/93 REK/RWW

STD. NO. SP2SM | DWG. NO. 9705-3G

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 100mm Ø DRAINAGE PIPE, #76M STONE, AND SELECT GRANULAR FILL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLABS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE.

THE AREAS BETWEEN THE WINGWALLS AND THE APPROACH SLABS SHALL BE PAVED, SEE ROADWAY PLANS.

THE 150mm COMP. A.B.C. SHALL EXTEND 300mm OUTSIDE OF EACH EDGE OF THE SLAB.

THE CONTRACTOR MAY, AT HIS OPTION, USE EITHER 100mm TYPE B3 ASPHALT CONCRETE BASE COURSE OR 125mm CLASS 'A' CONCRETE IN LIEU OF 150mm A.B.C. IF 125mm CLASS 'A' CONCRETE IS USED, THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 13.6 kg ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE WIDTH OF THE CONCRETE BASE SHALL BE THE SAME WIDTH AS THE APPROACH SLAB. THE APPROACH SLABS SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE 400mm TEMPORARY A.B.C. SHALL EXTEND FROM THE END OF THE APPROACH SLAB TO 3m BEYOND THE SLAB AS SHOWN AND SHALL EXTEND TO EACH EDGE OF THE APPROACH SLAB. THE TEMPORARY A.B.C. MAY BE PLACED IN TWO LIFTS. EACH LIFT SHALL BE COMPACTED BY A MINIMUM OF TWO PASSES OF A VIBRATORY ROLLER.

DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE SLAB HAS BEEN SCREDED AND FLOAT FINISHED EXCEPT AS NOTED ON THE PLANS.

THE JOINT SHALL BE SAWS PPIOR TO THE CASTING OF THE CONCRETE CURB, SIDEWALK, CONCRETE ISLAND AND THE PARAPET.

FOR CONCRETE AND REINFORCING STEEL QUANTITIES IN CONCRETE ISLAND, SEE "STANDARD SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PAYMENT FOR THE CONCRETE ISLAND IS INCLUDED IN THE PAY ITEM "REINFORCED CONCRETE DECK SLAB". SEE "STANDARD SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PAYMENT FOR THE SIDEWALK IS INCLUDED IN THE PAY ITEM "BRIDGE APPROACH SLAB". SEE "STANDARD SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

APPROACH SLAB GROOVING IS NOT REQUIRED.

~~FOR SPANS BETWEEN 70' AND 100', THE CONTRACTOR MAY, AT HIS OPTION, USE A COMPRESSION JOINT SEAL IN LIEU OF THE EVAZOTE JOINT SEAL. SEE SPECIAL PROVISION FOR OPTIONAL PREFORMED COMPRESSION JOINT SEALS.~~

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

PAYMENT FOR EVAZOTE JOINT SEALS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR EVAZOTE JOINT SEALS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 87mm AT END BENT 1 AND 95mm AT END BENT 2.

WITH OPTIONAL COMPRESSION JOINT SEAL

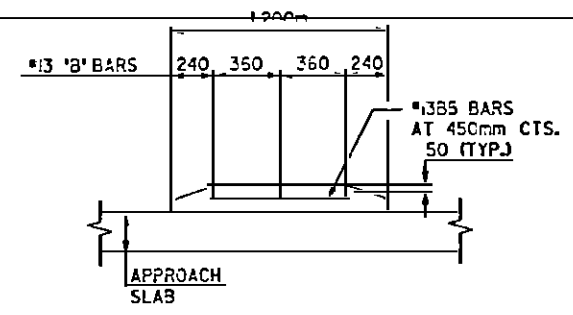
~~PAYMENT FOR OPTIONAL COMPRESSION JOINT SEALS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR EVAZOTE JOINT SEALS.~~

~~THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE COMPRESSION JOINT SEAL SHALL BE 76mm.~~

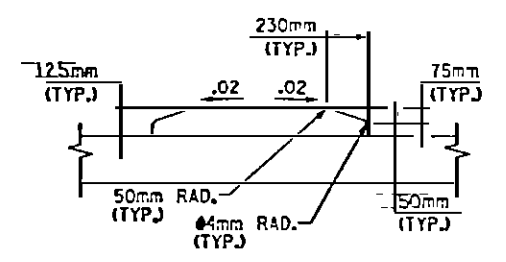
BILL OF MATERIAL

APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH (mm)	WEIGHT (kg)
A1	64	#13	STR.	8,490	539
A2*	60	#13	STR.	8,520	508
B1	211	#9	STR.	5,060	2,386
B2*	211	#9	STR.	4,920	2,320
B3*	6	#13	STR.	5,060	30
D1*	72	#13	STR.	260	19
D2*	6	#19	STR.	460	6
G5*	28	#13	STR.	1,380	38
REINFORCING STEEL					2,931 kgs.
EPOXY COATED RENF. STEEL					2,515 kgs.
CLASS AA CONCRETE (LEFT SIDE APP. SLAB)					21.2 CU. M.
CLASS AA CONCRETE (RIGHT SIDE APP. SLAB)					21.6 CU. M.
TOTAL CLASS AA CONCRETE (APPROACH SLAB)					42.8 CU. M.
CLASS AA CONC. (SIDEWALK)					1.8 CU. M.
APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH (mm)	WEIGHT (kg)
A1	64	#13	STR.	8,490	539
A2*	60	#13	STR.	8,520	508
B1	211	#9	STR.	5,060	2,386
B2*	211	#9	STR.	4,920	2,320
B3*	6	#13	STR.	5,060	30
D1*	72	#13	STR.	260	19
D2*	6	#19	STR.	460	6
G5*	28	#13	STR.	1,380	38
REINFORCING STEEL					2,931 kgs.
EPOXY COATED RENF. STEEL					2,515 kgs.
CLASS AA CONCRETE (LEFT SIDE APP. SLAB)					21.2 CU. M.
CLASS AA CONCRETE (RIGHT SIDE APP. SLAB)					21.6 CU. M.
TOTAL CLASS AA CONCRETE (APPROACH SLAB)					42.8 CU. M.
CLASS AA CONC. (SIDEWALK)					1.8 CU. M.

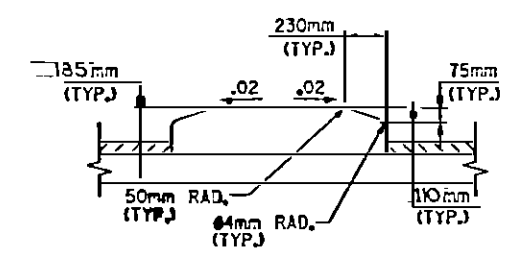
\* DENOTES EPOXY COATED RENF. STEEL.



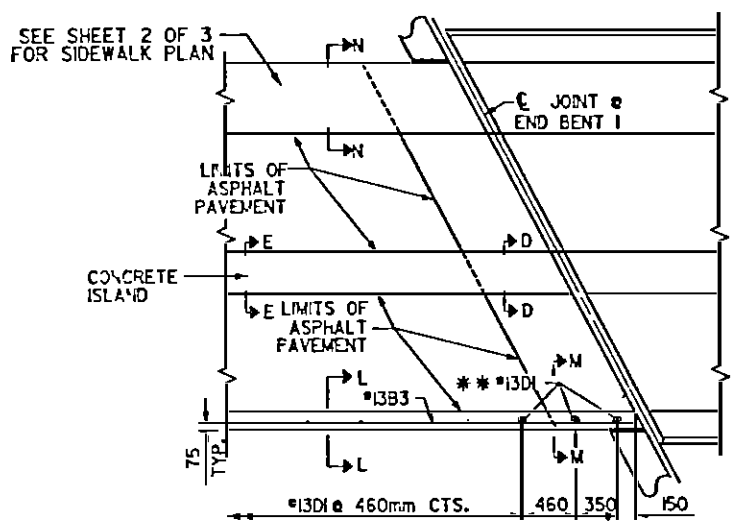
REINFORCING STEEL DETAILS



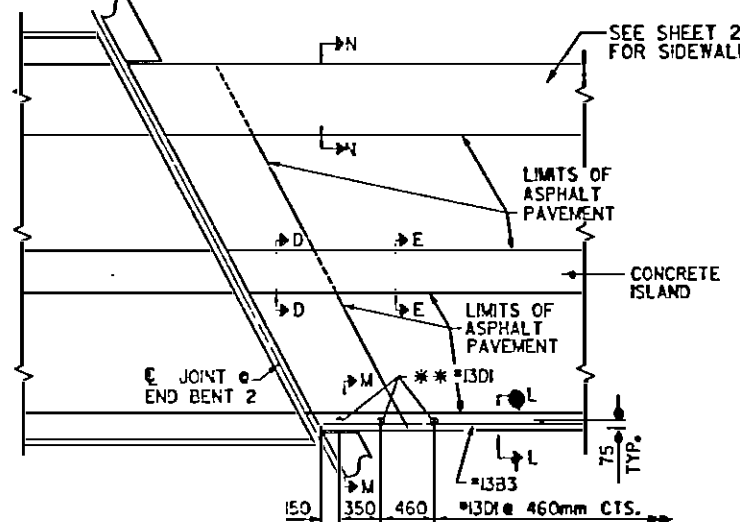
SECTION D-D



SECTION E-E

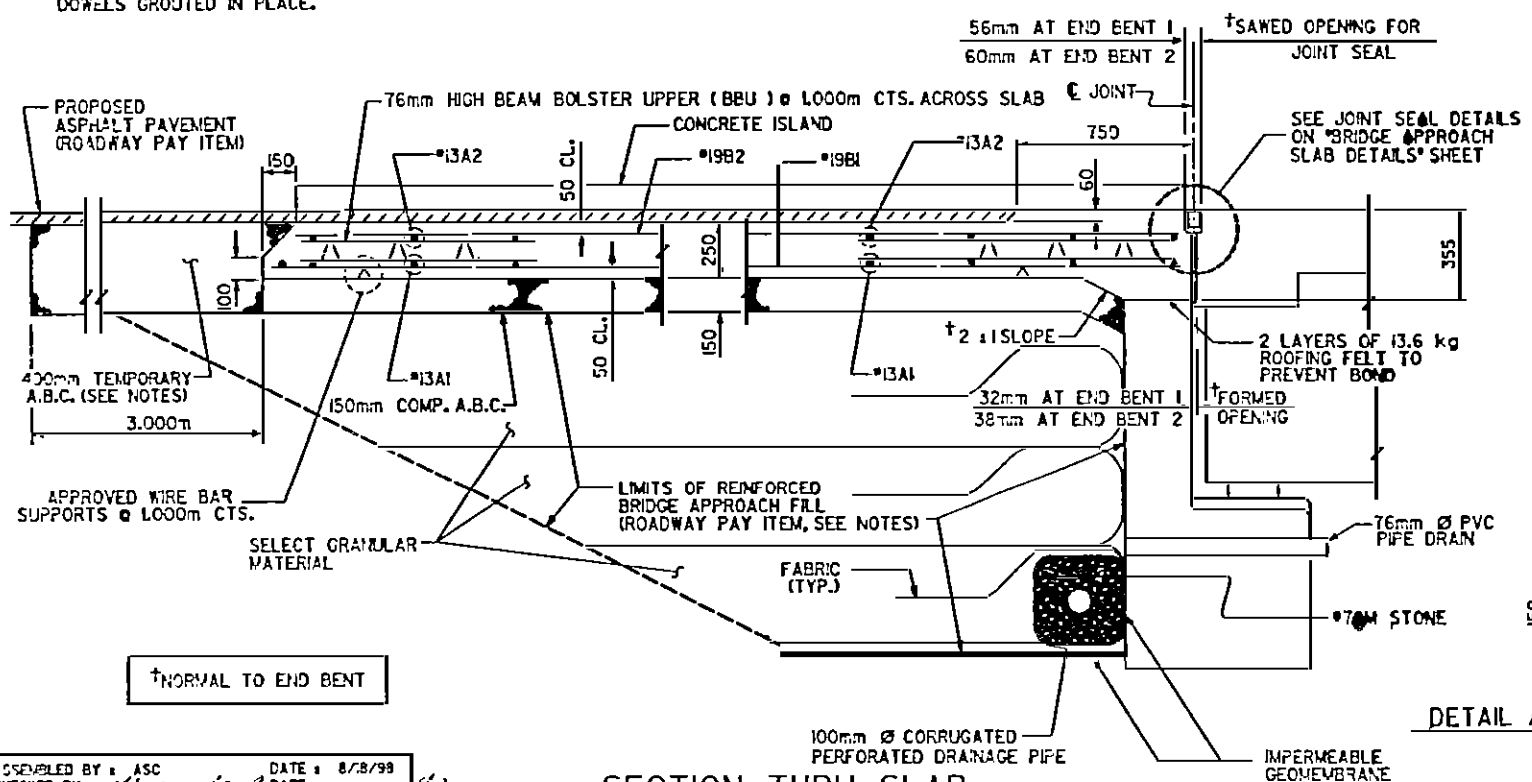


PLAN AT END BENT 1

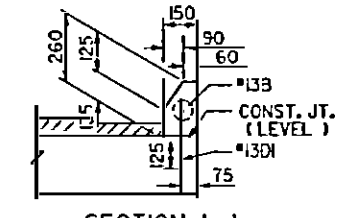


PLAN AT END BENT 2

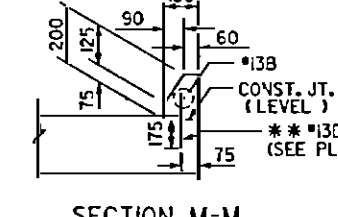
\*\*THESE DOWELS ARE TO BE PLACED AFTER SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED IN PLACE.



SECTION THRU SLAB



SECTION L-L



SECTION M-M

DETAIL AT END OF CURB WITHOUT SPECIAL DRAINAGE CURB DETAILS

PREPARED BY  
NALLAMALA & WILSON, P.A.  
108 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N.C. 27103  
(336) 765-4651

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT



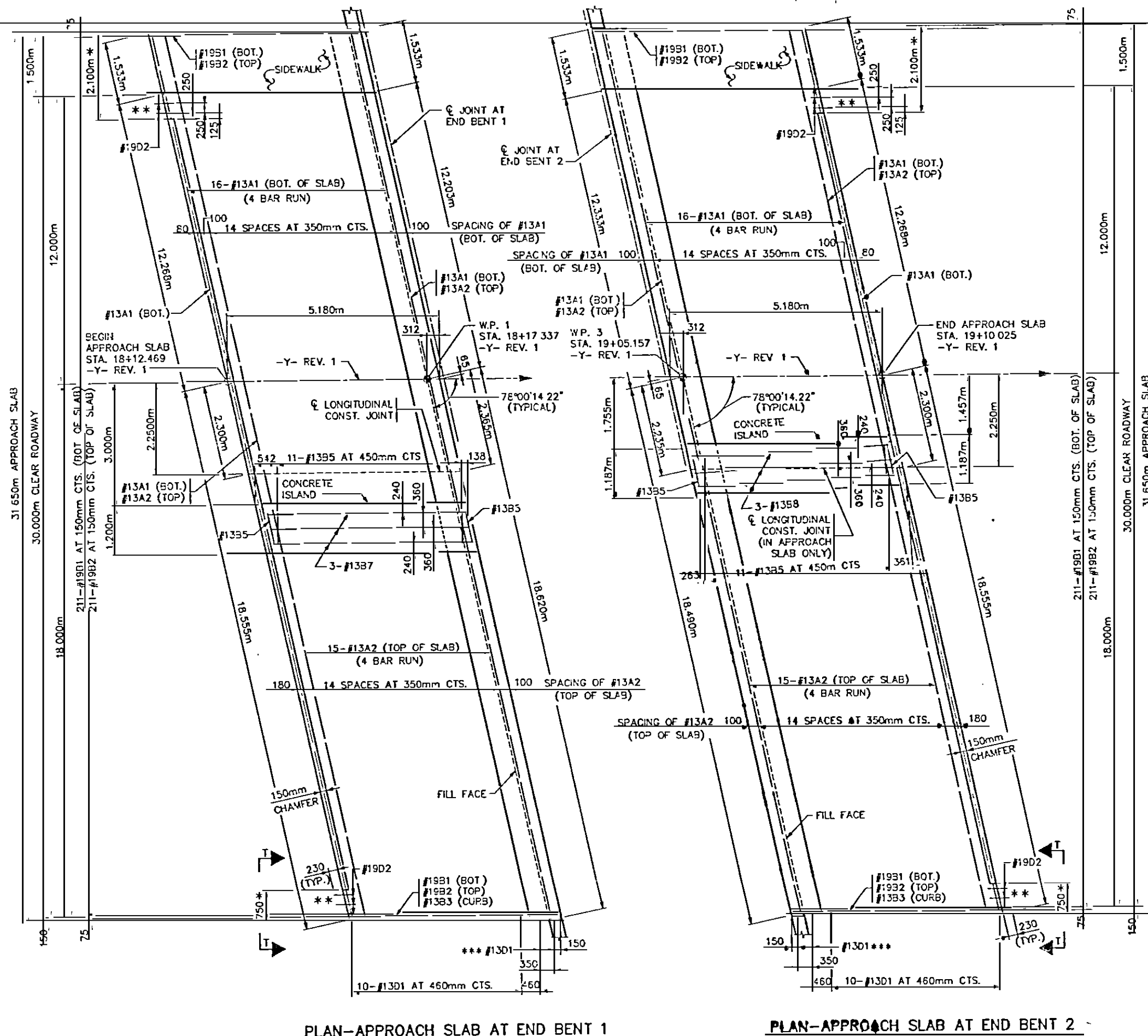
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
STANDARD  
BRIDGE APPROACH SLAB  
FOR FLEXIBLE PAVEMENT  
WITH REINFORCED BRIDGE  
APPROACH FILL

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

5-59  
170

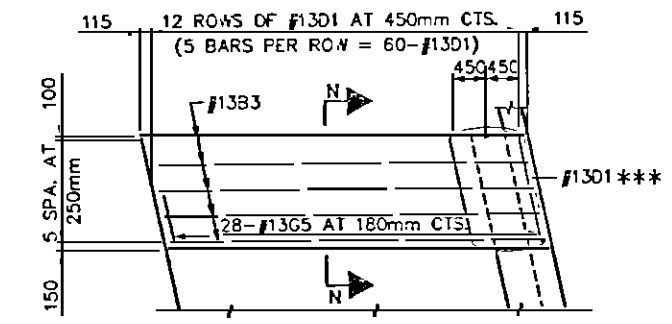
ASSEMBLED BY: ASC DATE: 8/8/98  
CHECKED BY: [Signature] DATE: 10-21-98  
DRAWN BY: EEM 3/95 REV. 5/16/97 EEM/RCW  
CHECKED BY: VAP 3/95



PLAN-APPROACH SLAB AT END BENT 1

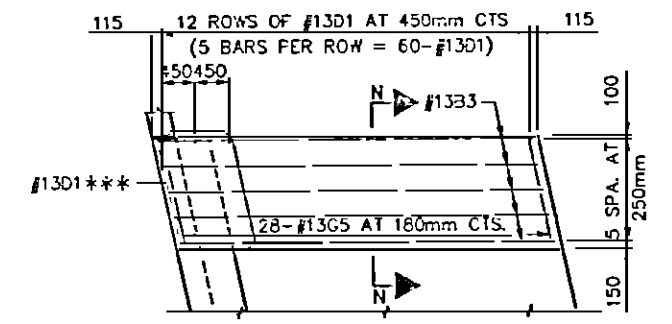
PLAN-APPROACH SLAB AT END BENT 2

NOTES:  
 \* THE APPROACH SLAB SHALL HAVE A VERTICAL FACE AT THE LOCATION OF THE PROPOSED SIDEWALK, THE PROPOSED CURB AND GUTTER, AND THE PROPOSED SHOULDER BERM GUTTER  
 \*\* TEMPORARY BERM AND SLOPE DRAIN REQUIRED AT THIS LOCATION FOR DETAILS SEE SHEET "STANDARD BRIDGE APPROACH SLAB DETAILS". THE #19D2 DOWELS SHALL BE HELD SECURELY IN PLACE.  
 SEE "STANDARD BRIDGE APPROACH SLAB DETAILS" SHEET FOR SECTIONS.  
 FOR CONCRETE AND REINFORCEMENT QUANTITIES FOR CONCRETE ISLAND SEE "STANDARD SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

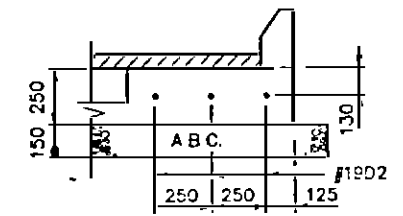


APPROACH SLAB SIDEWALK AT END BENT 1

\*\*\* THESE DOWELS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED INTO PLACE.



APPROACH SLAB SIDEWALK AT END BENT 2



SECTION T-T  
 AS SHOWN AT END BENT 1  
 OPPOSITE HAND AT END BENT 2



PREPARED BY  
 NALLAMALA & WILSON, P.A.  
 1381 OLD VILL CIRCLE, SUITE 101  
 WASHINGTON-SALEM, N.C. 27103  
 (336) 765-4651



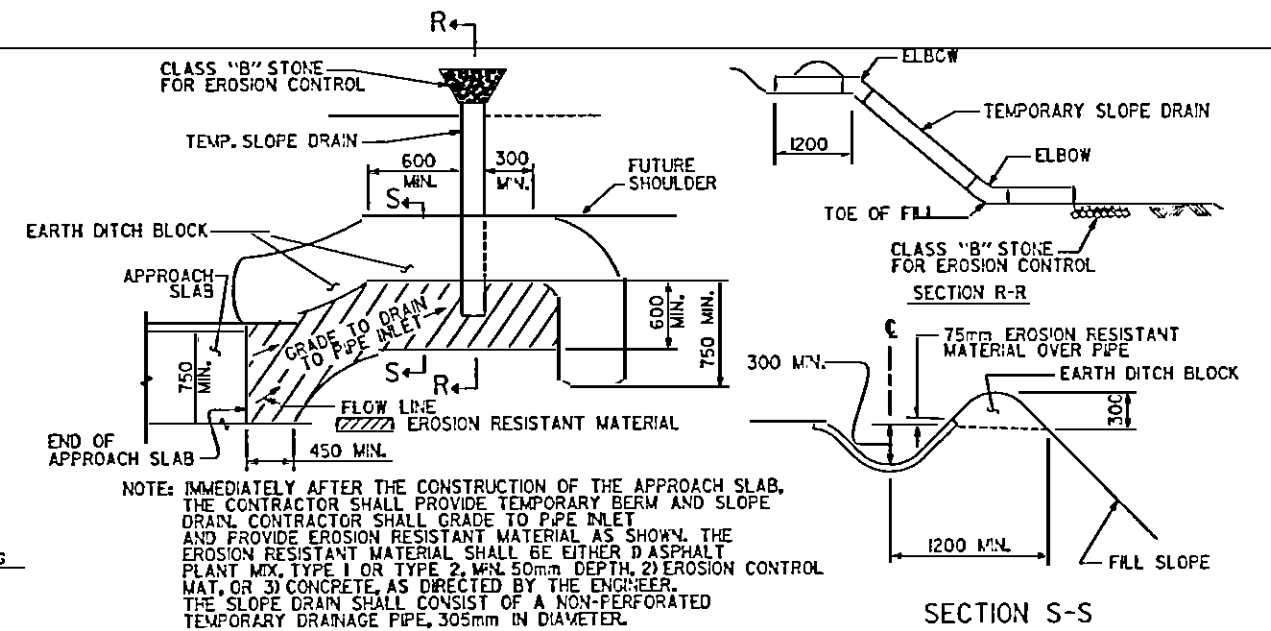
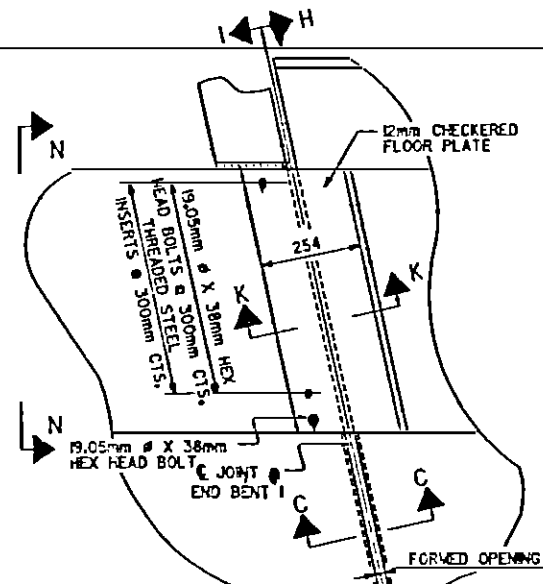
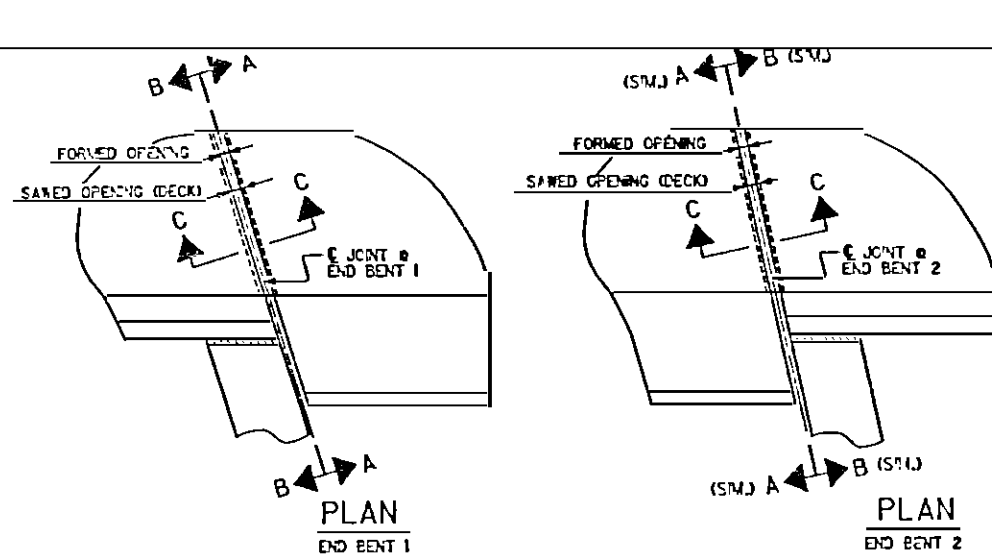
PROJECT No. R-2000EA  
 WAKE COUNTY  
 STATION: 304+52.922-L- REV. POT

SHEET 2 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 BRIDGE APPROACH SLAB  
 FOR FLEXIBLE PAVEMENT

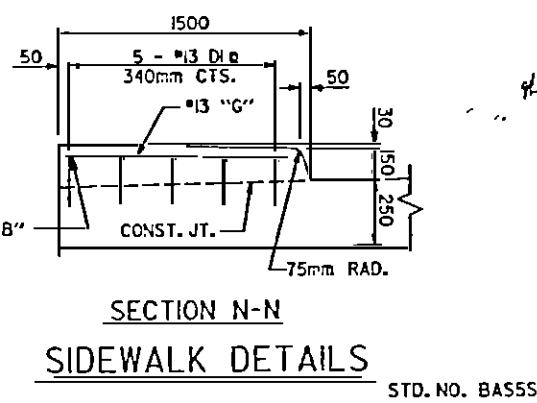
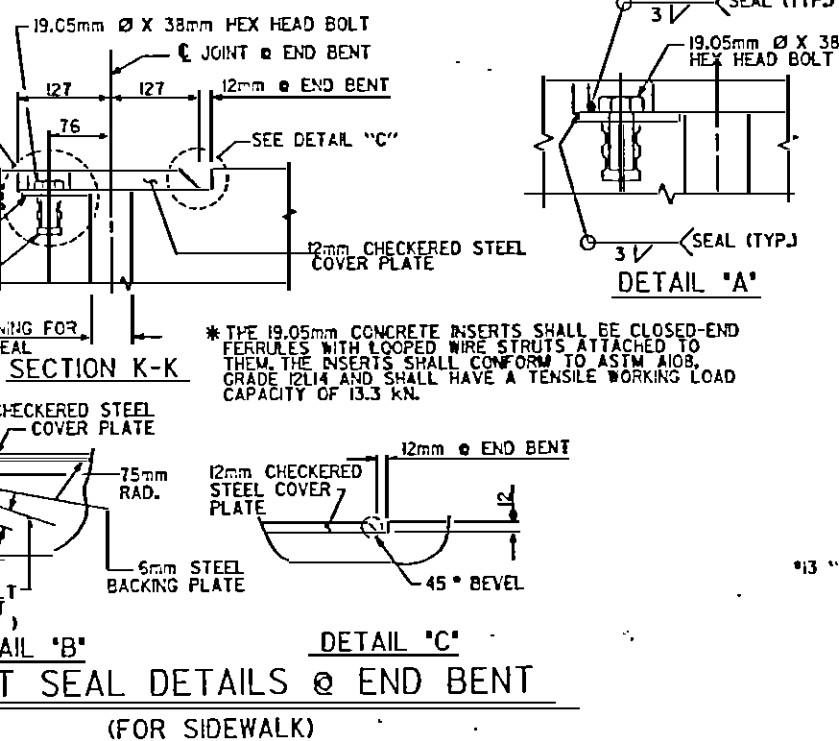
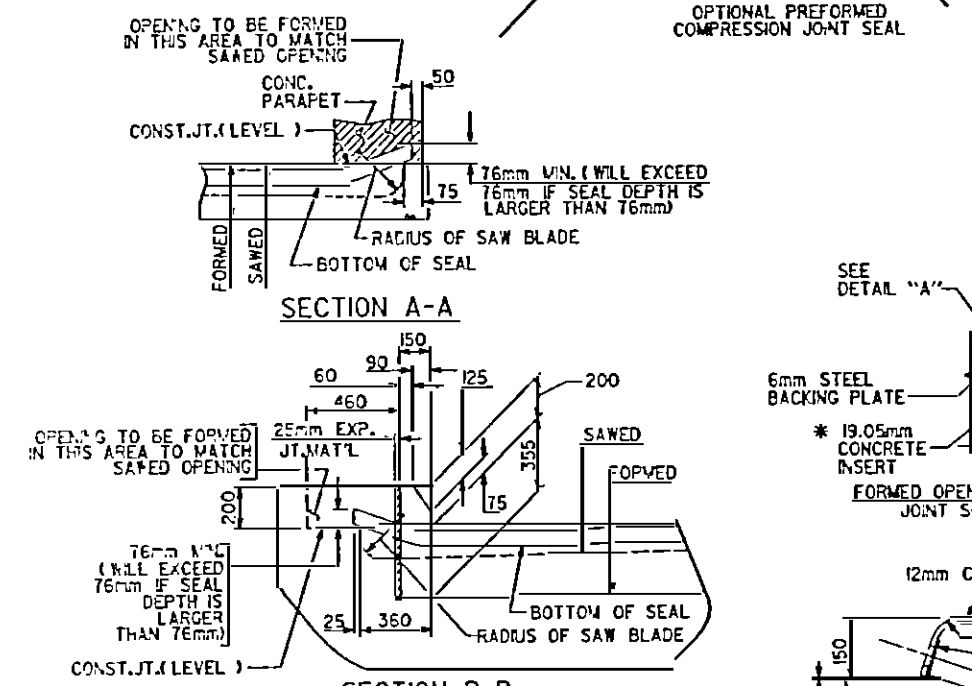
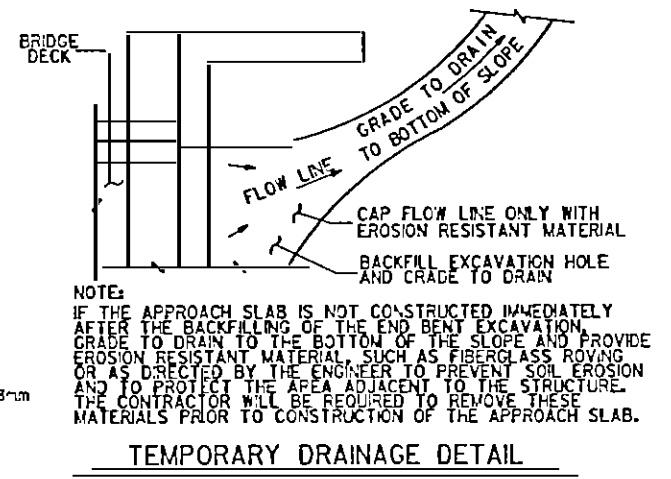
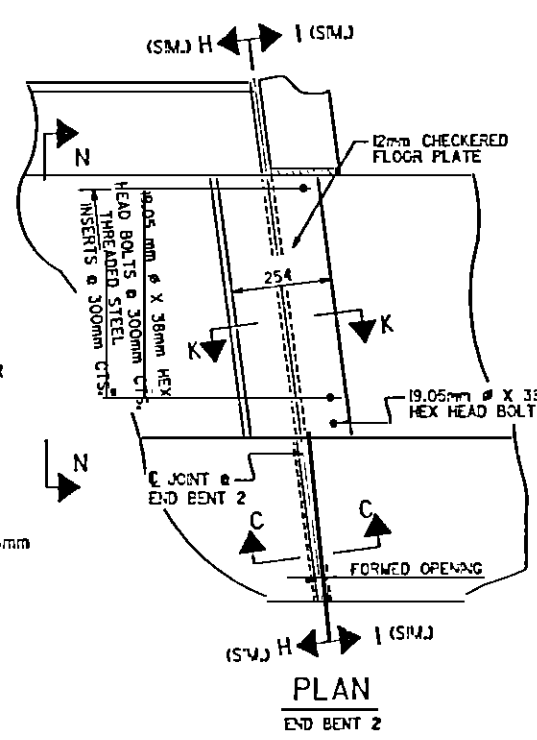
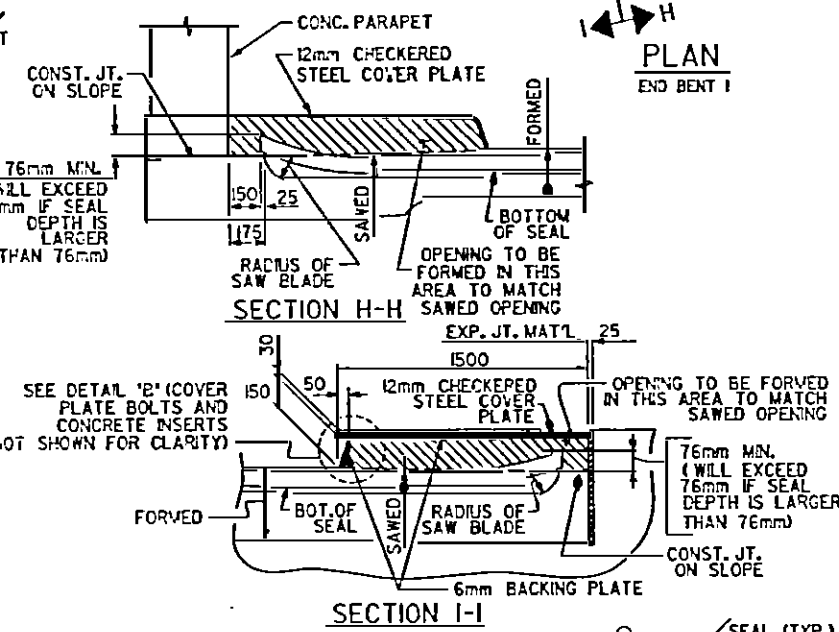
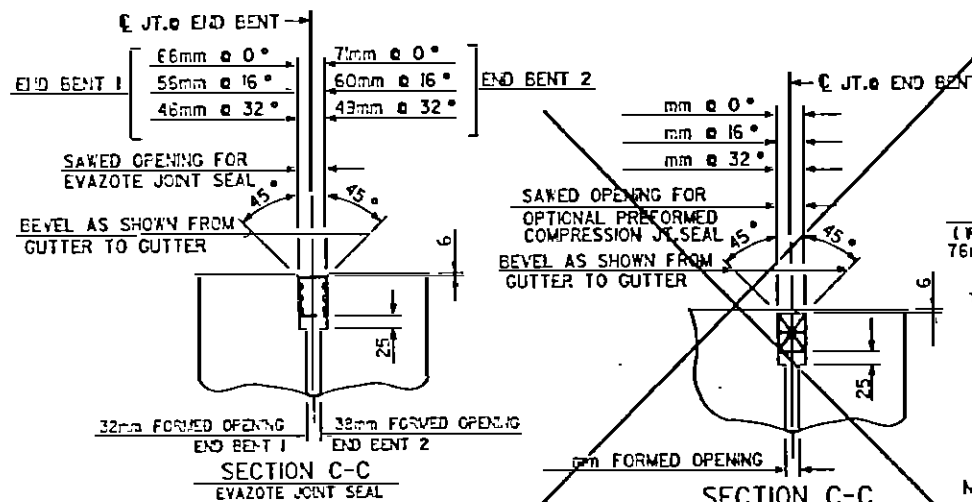
REVISIONS						SHEET NO. S-20
NO	BY	DATE	NO	BY	DATE	
1			3			TOTAL SHEETS 170
2			4			

DWG. NO 9705-38

DESIGNED BY: A. STEPHEN CALLAHAN DATE: 7/23/98  
 CHECKED BY: DATE: 10-21-98



**TEMPORARY BERM AND SLOPE DRAIN DETAILS**



PREPARED BY  
NALLAMALA & WILSON, P.A.  
133 OLD MILL CIRCLE, SUITE 101  
WINSTON-SALEM, N.C. 27103  
(336) 765-4639

PROJECT NO. R-2000EA  
WAKE COUNTY  
STATION: 304+52.922-L-REV. POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION

STANDARD  
BRIDGE APPROACH  
SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			3-41
2			4			170

DESIGNED BY: ASC DATE: 8/7/78  
CHECKED BY: [Signature] DATE: 8/21/78  
DRAWN BY: PCJ 11/78  
REVISIONS: [Table]  
REV. 1/7/78



STD. NO. BASSM DWG. NO. 9705-39