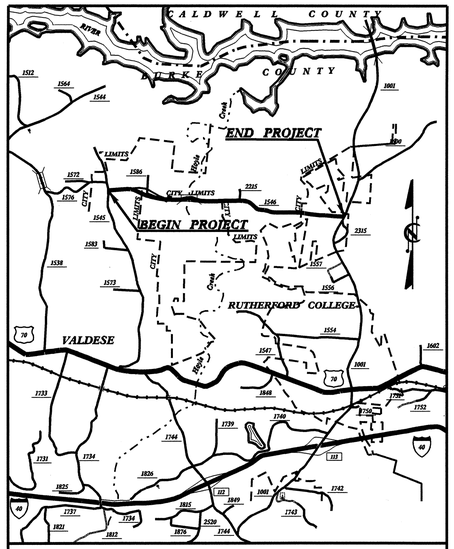
CONTRACT: C201242 TIP PROJECT: R-2824

STRUCTURE




VICINITY MAP

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

# BURKE COUNTY

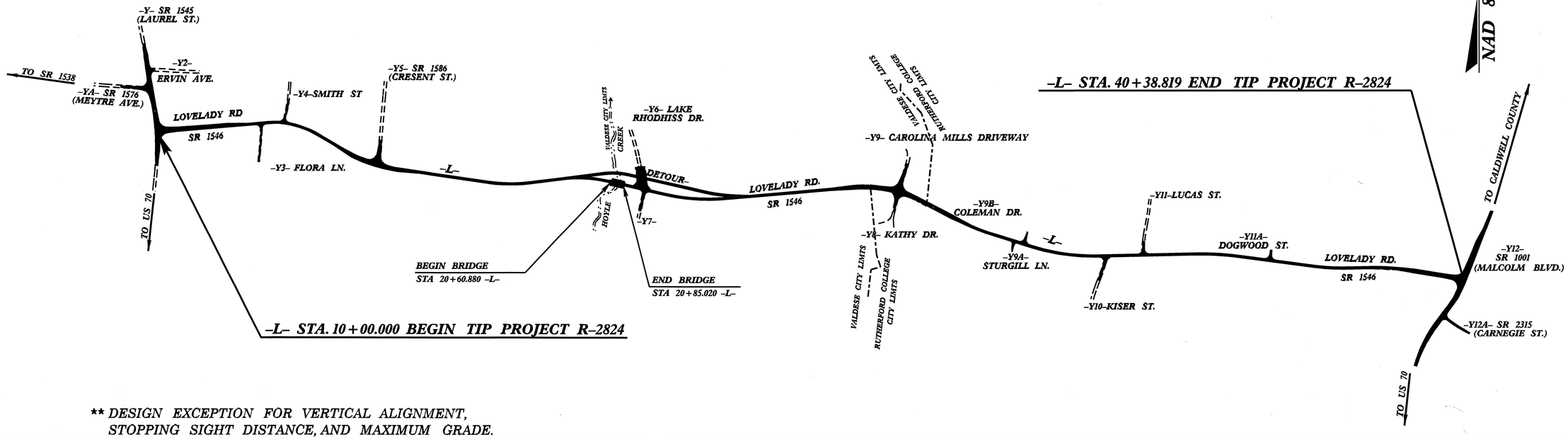
| STATE | STATE PROJECT REFERENCE NO. | | |
|---|---|---|---|
| N.C. | R-2824 | | |
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION | |
| 34510.1.1 | STP-1546(8) | PE | |
| 34510.3.1 | STP-1546(8) | R/W, UTIL. | |
| 34510.2.2 | STP-1546(16) | CONST. | |

***LOCATION:*** *SR 1546 (LOVELADY ROAD) FROM SR 1545 (LAUREL ST.) TO SR 1001 (MALCOLM BLVD.)*

***TYPE OF WORK:*** *GRADING, DRAINAGE, PAVING, STRUCTURE, AND SIGNALS*

METRIC

NAD 83




** *DESIGN EXCEPTION FOR VERTICAL ALIGNMENT, STOPPING SIGHT DISTANCE, AND MAXIMUM GRADE.*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

## DESIGN DATA

*ADT 2009 = 4105*
*ADT 2035 = 6800*
*DHV = 14 %*
*D = 60 %*
** T = 10 %*
*** V = 65 km/h*
**(TTST 3% + DUAL 7% )*
*FUNC. CLASS = URBAN COLLECTOR*

## PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2824 = 3.015 km

LENGTH STRUCTURE TIP PROJECT R-2824 = 0.024 km

TOTAL LENGTH OF TIP PROJECT R-2824 = 3.039 km

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

Prepared In the Office of:

**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**
*1000 Birch Ridge Drive, Raleigh, N. C. 27610*

*2006 STANDARD SPECIFICATIONS*

*LETTING DATE : JUNE 15, 2010*

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

*K.W. ALFORD, P.E.*
*PROJECT DESIGN ENGINEER*

**DIVISION OF HIGHWAYS**
**STATE OF NORTH CAROLINA**

*P.E.*
*STATE HIGHWAY ENGINEER – DESIGN*

**DEPARTMENT OF TRANSPORTATION**
**FEDERAL HIGHWAY ADMINISTRATION**

*APPROVED FOR*
*DIVISION ADMINISTRATOR* *DATE*

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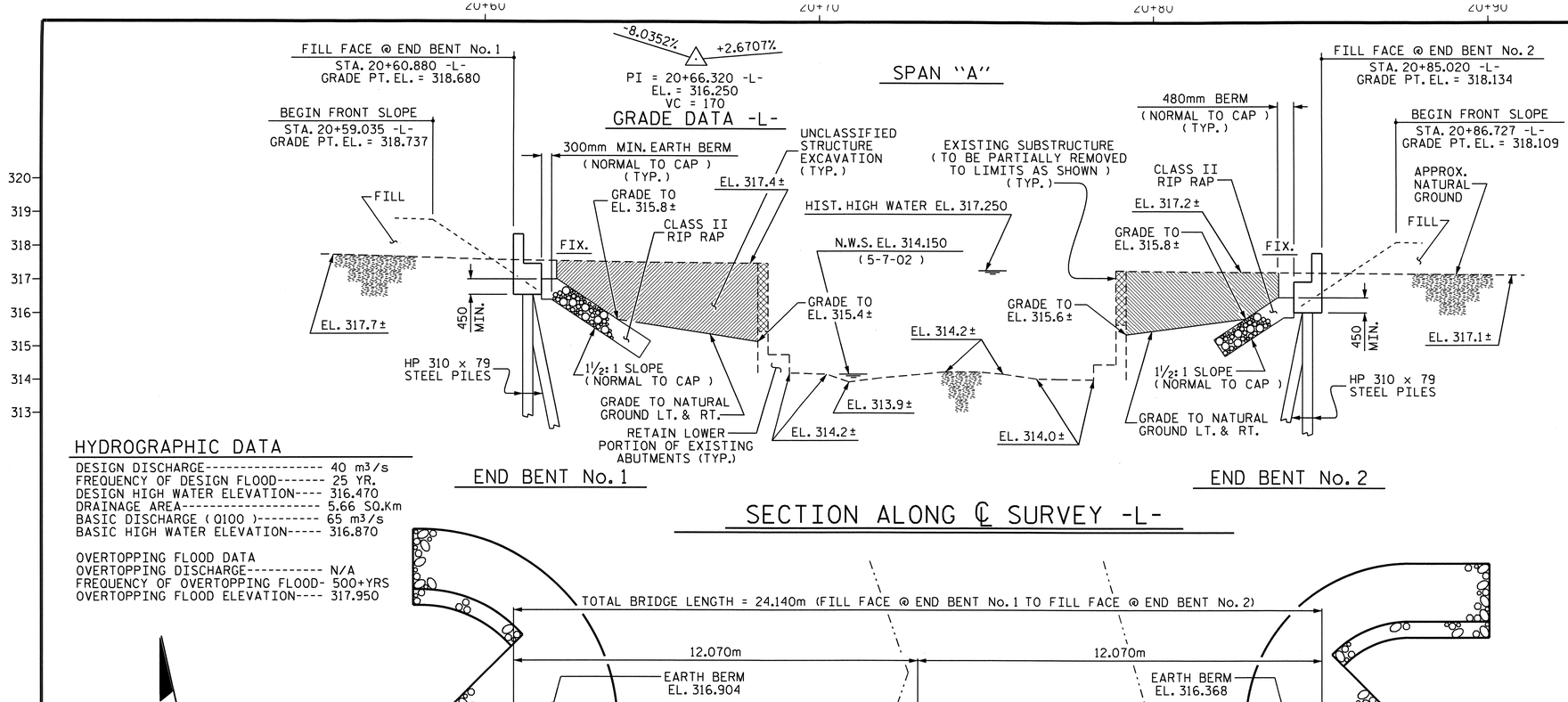
tjbankovich

F.A. PROJECT No. STP-1546 (16)

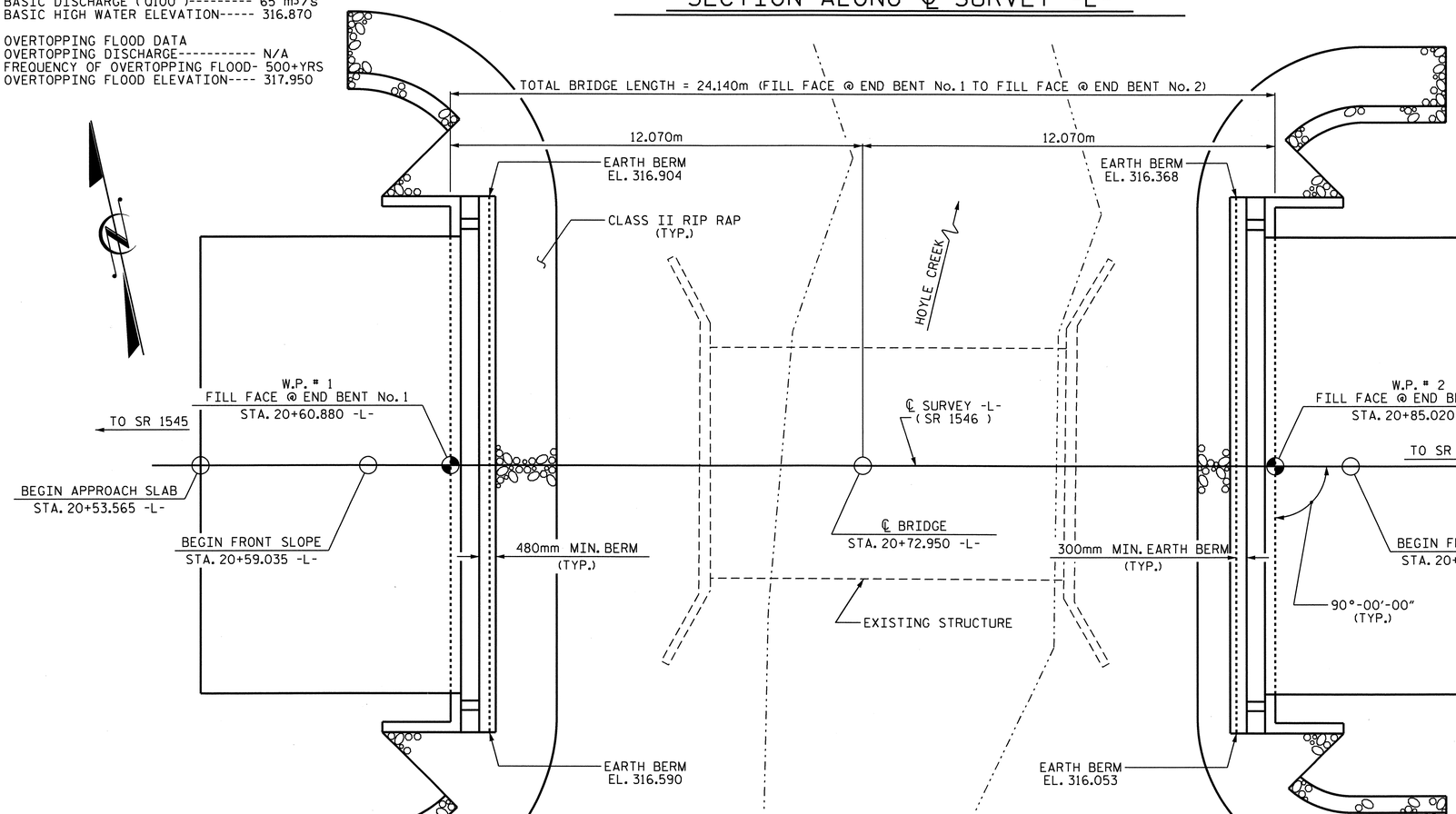



## HYDROGRAPHIC DATA

DESIGN DISCHARGE---------- 40 m³/s
FREQUENCY OF DESIGN FLOOD------- 25 YR.
DESIGN HIGH WATER ELEVATION---- 316.470
DRAINAGE AREA---------- 5.66 SQ.Km
BASIC DISCHARGE ( Q100 )--------- 65 m³/s
BASIC HIGH WATER ELEVATION----- 316.870

OVERTOPPING FLOOD DATA
OVERTOPPING DISCHARGE---------- N/A
FREQUENCY OF OVERTOPPING FLOOD- 500+YRS
OVERTOPPING FLOOD ELEVATION---- 317.950

## SECTION ALONG ℄ SURVEY -L-




PLAN
( FOR CLARITY, PILES NOT SHOWN IN PLAN VIEW )

## NOTES :

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = MS 18 OR ALTERNATE LOADING, EXCEPT THAT BOX BEAM UNITS HAVE BEEN DESIGNED FOR MS 22.5.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SNSM.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF ONE SPAN TIMBER FLOOR WITH ASPHALT WEARING SURFACE ON I-BEAMS AT 11.278m LENGTH; 6.370m CLEAR ROADWAY WIDTH ON YOUNT MASONRY ABUTMENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED TO THE LIMITS SHOWN IN THE SECTION VIEW. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

EXISTING YOUNT MASONRY ABUTMENTS SHALL BE PARTIALLY REMOVED TO THE LIMITS SHOWN IN THE SECTION VIEW AND AS DIRECTED BY THE ENGINEER.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 20+72.950 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 8.900m EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18,"EVALUATING SCOUR AT BRIDGES", MAY 2001.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 20+72.950 -L-".

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. SEE CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE SPECIAL PROVISION.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

NOTES CONTINUED ON SHEET 2 OF 2.

METRIC

PROJECT NO. R-2824
BURKE COUNTY
STATION: 20+72.950 -L-

SHEET 1 OF 2 REPLACES BRIDGE No. 110

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# GENERAL DRAWING
BRIDGE ON
SR 1546 ( LOVELADY RD. )
OVER HOYLE CREEK
BETWEEN SR 1545 AND SR 1001

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

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
2-17-10

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

15-FEB-2010 14:57
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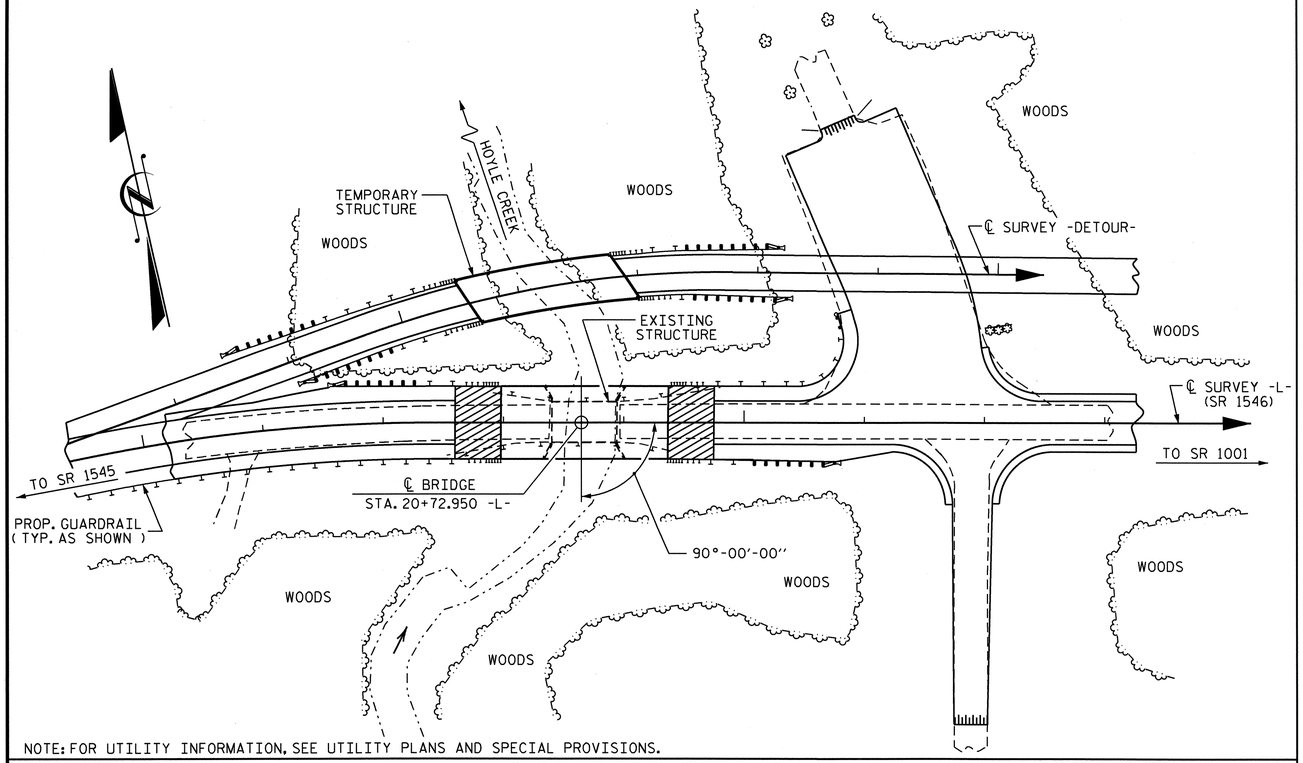
tjbankovich

BM #60, NAIL IN BASE OF 300mm MAPLE, 32m LT. -L- STA 21+01, EL. 316.138




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

## LOCATION SKETCH

## NOTES: (CONTINUED FROM SHEET 1 OF 2)

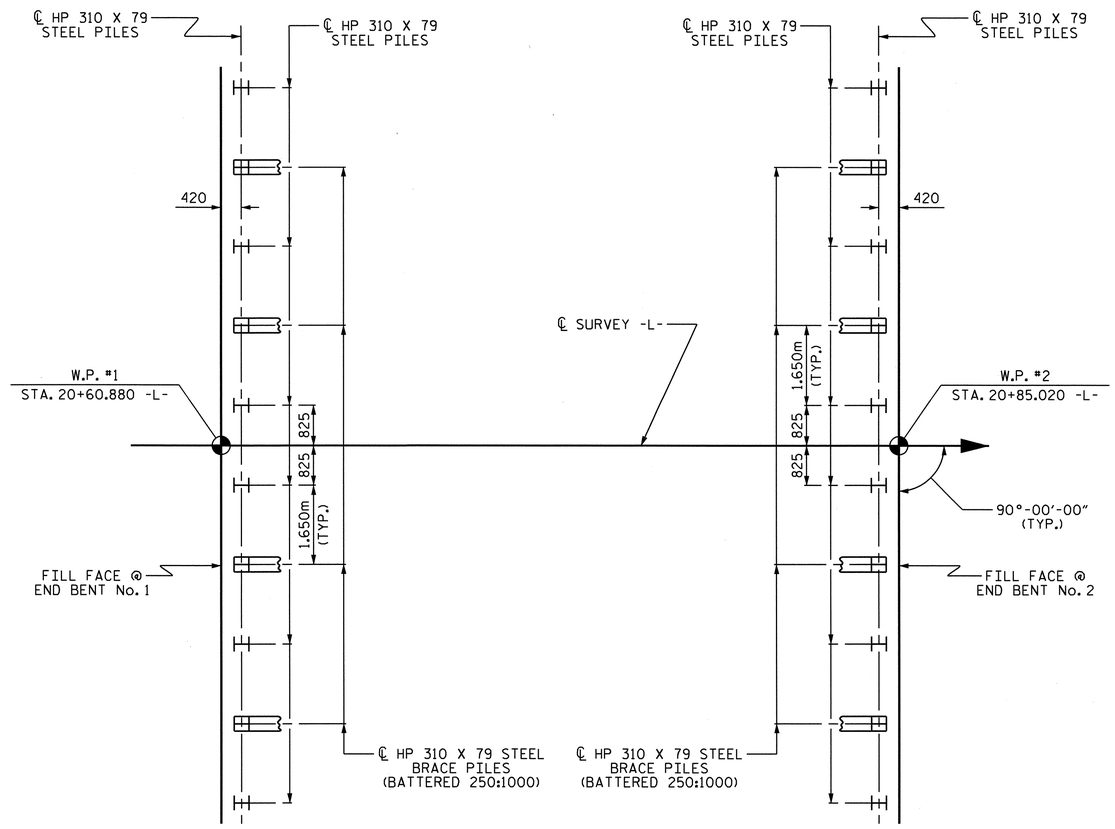
DRIVE PILES AT END BENT No. 1 AND END BENT No. 2 TO A REQUIRED BEARING CAPACITY OF 1068 kN PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT No. 1 AND END BENT No. 2 IS 534 kN PER PILE.

STEEL PILES POINTS ARE REQUIRED FOR STEEL PILES AT END BENT No. 1 AND END BENT No. 2.

FOR PILES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000 kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000 kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.




## FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE AT THE BOTTOM OF CAP)

## TOTAL BILL OF MATERIAL

| | CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE | REMOVAL OF EXISTING STRUCTURE | UNCLASSIFIED STRUCTURE EXCAVATION | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | HP 310 X 79 STEEL PILES | | STEEL PILE POINTS | TWO BAR METAL RAIL | 355mm X 800mm CONCRETE PARAPET | RIP RAP CLASS II (600mm THICK) | FILTER FABRIC FOR DRAINAGE | ELASTOMERIC BEARING | 914mm X 838mm PRESTRESSED CONCRETE BOX BEAMS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LUMP SUM | LUMP SUM | LUMP SUM | $m^3$ | LUMP SUM | kg. | NO. | METERS | EACH | METERS | METERS | METRIC TONS | $m^2$ | LUMP SUM | NO. | METERS |
| SUPERSTRUCTURE | | | | | | | | | | 42.360 | 46.920 | | | LUMP SUM | 15 | 351.900 |
| | | | | | | | | | | | | | | | | |
| END BENT No. 1 | | | | 16.6 | | 1,547 | 10 | 30 | 10 | | | 120 | 125 | | | |
| END BENT No. 2 | | | | 16.6 | | 1,547 | 10 | 45 | 10 | | | 110 | 115 | | | |
| | | | | | | | | | | | | | | | | |
| TOTAL | LUMP SUM | LUMP SUM | LUMP SUM | 33.2 | LUMP SUM | 3,094 | 20 | 75 | 20 | 42.360 | 46.920 | 230 | 240 | LUMP SUM | 15 | 351.900 |

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# GENERAL DRAWING

BRIDGE ON
SR 1546 ( LOVELADY RD. )
OVER HOYLE CREEK
BETWEEN SR 1545 AND SR 1001

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
Betsy S. Cox 4-14-10

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

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

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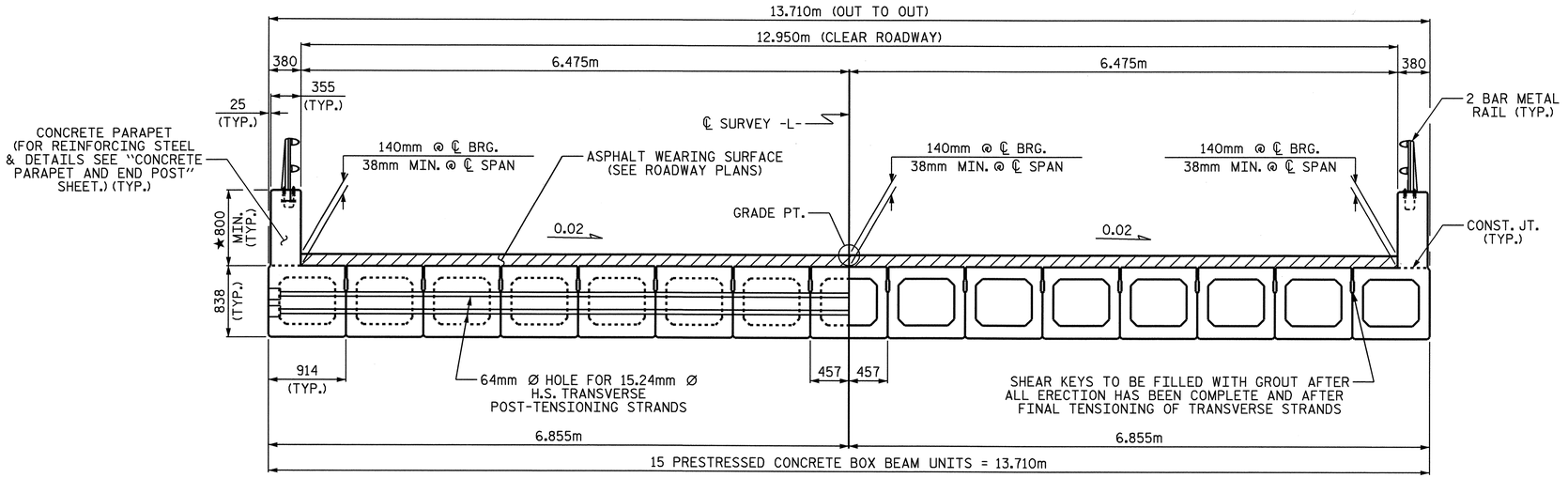



HALF SECTION @ INTERMEDIATE DIAPHRAGMS

HALF SECTION @ VOIDS

## TYPICAL SECTION

## NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 420 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 30.3 MPa.

ALL REINFORCING STEEL IN THE CONCRETE PARAPET SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 12mm IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 6.1m IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 3.5m IN LENGTH.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

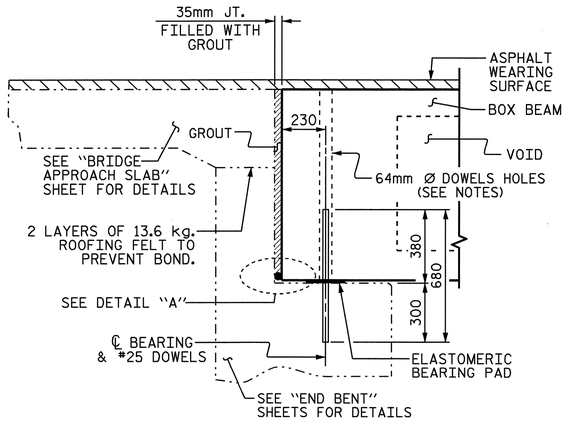
THE 51mm Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS. THE JOINT OPENING BETWEEN THE BACKWALL AND BOX BEAM UNITS SHALL BE FILLED WITH GROUT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

THE 64mm Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH GROUT.

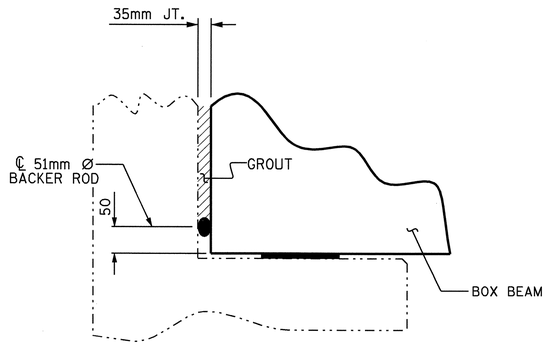
★ THE MINIMUM HEIGHT OF THE CONCRETE PARAPET IS SHOWN. THE HEIGHT OF THE CONCRETE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.



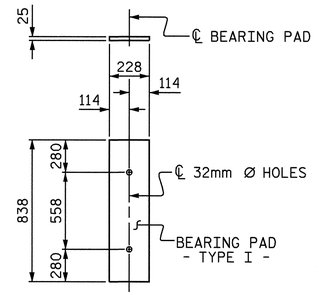

FIXED END

## SECTION AT END BENT

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR)




## DETAIL "A"




FIXED END

( TYPE I - 30 REQ'D )

## ELASTOMERIC BEARING DETAILS

60 DUROMETER

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

Betsy S. Cox 2/17/10

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

914mm X 838mm
PRESTRESSED CONCRETE
BOX BEAM UNIT

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

| | |
|---|---|
| ASSEMBLED BY : T. BANKOVICH | DATE : 6-2008 |
| CHECKED BY : D.G. ELY | DATE : 8-2008 |
| DRAWN BY : TLA 5/05 | ADDED 7/11/05R |
| CHECKED BY : GM 6/05 | REV. 5/1/06R KMM/GM |

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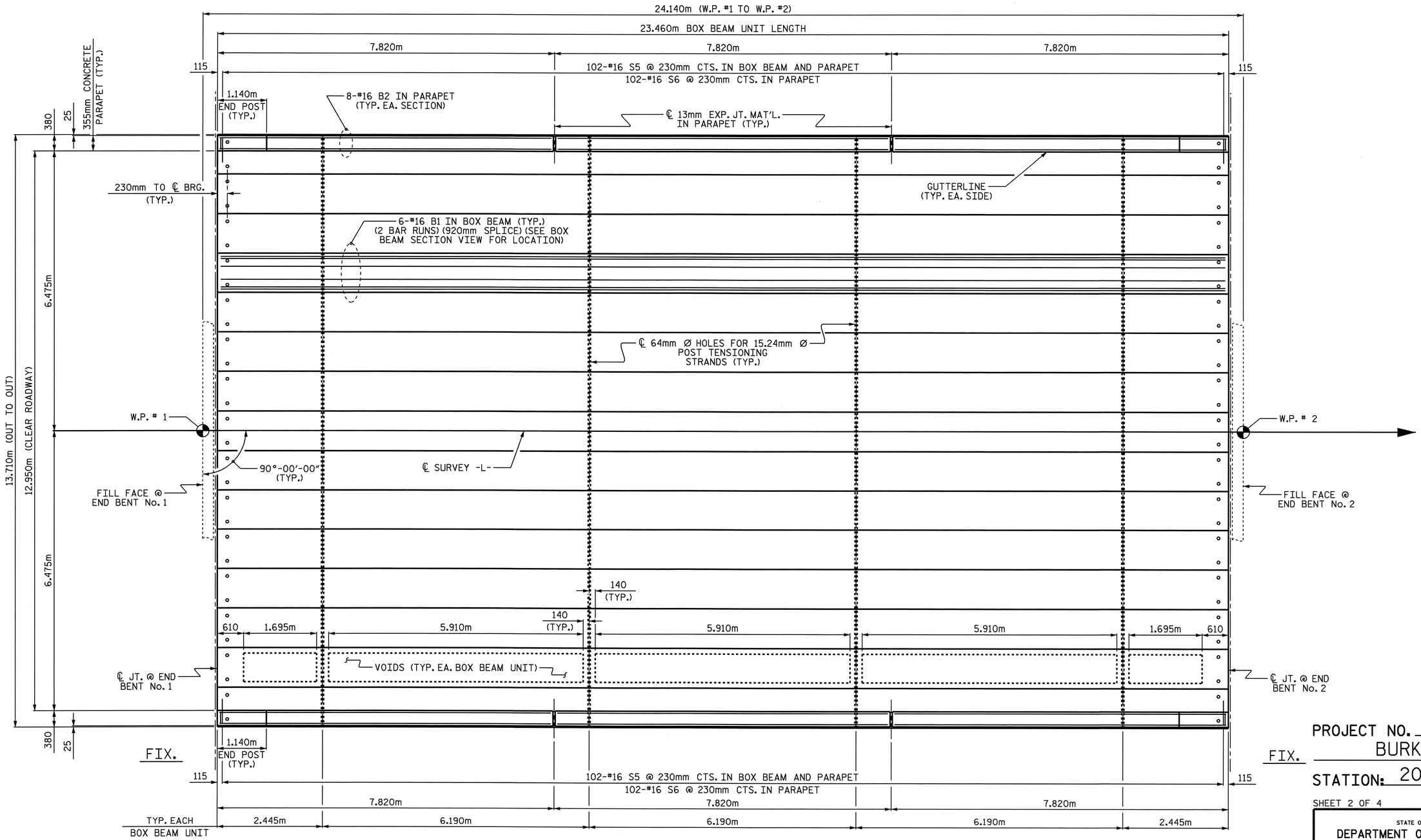
STD. NO. PCBB1SM




## PLAN OF SPAN "A"

FOR DETAILS AND REINFORCING STEEL
IN PARAPET AND END POST,
SEE "CONCRETE PARAPET AND END POST DETAILS" SHEET.

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

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

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

Betsy S. Cox 2-17-10

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 6-2008

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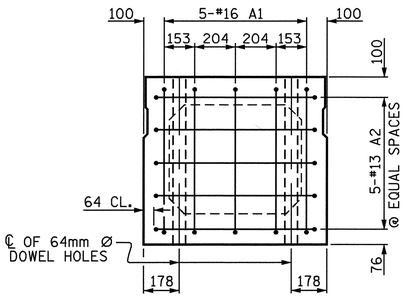
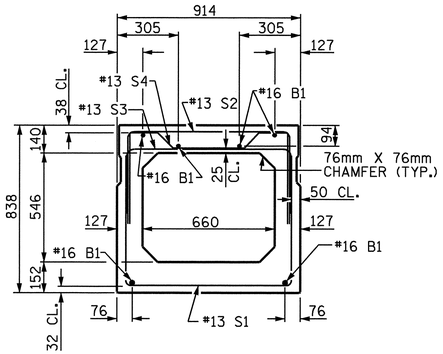


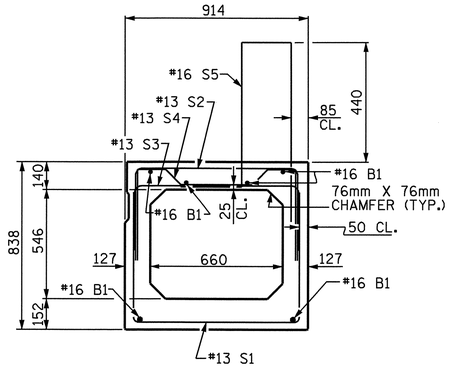

## END ELEVATION

SHOWING PLACEMENT OF #16 & #13 "A" BARS AND LOCATION OF DOWEL HOLES.
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.
STRAND LAYOUT NOT SHOWN.)



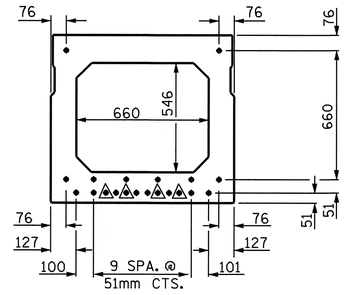

## INTERIOR BOX BEAM SECTION

( STRAND LAYOUT NOT SHOWN)




## EXTERIOR BOX BEAM SECTION

( STRAND LAYOUT NOT SHOWN)




## TYPICAL STRAND LOCATION

( 20 STRANDS REQUIRED)

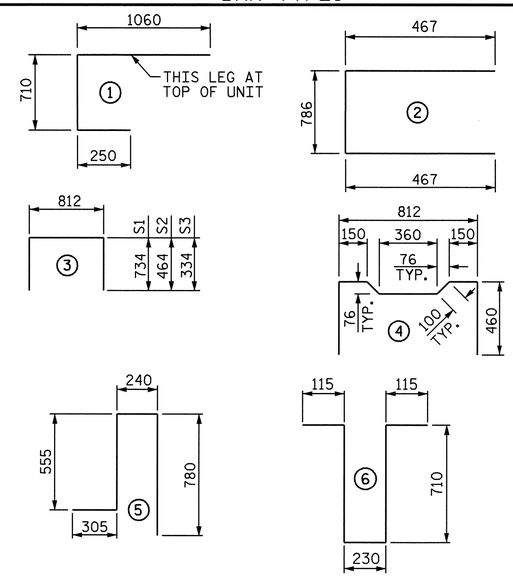
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

### DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 1.220m FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM.
SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

## BAR TYPES



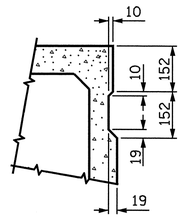

ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL FOR ONE BOX BEAM SECTION

| | | | | EXTERIOR UNIT | | INTERIOR UNIT | |
|---|---|---|---|---|---|---|---|
| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT | LENGTH | WEIGHT |
| A1 | 10 | #16 | 1 | 2020 | 31 | 2020 | 31 |
| A2 | 34 | #13 | 2 | 1720 | 58 | 1720 | 58 |
| | | | | | | | |
| B1 | 12 | #16 | STR | 12140 | 226 | 12140 | 226 |
| | | | | | | | |
| K1 | 12 | #13 | 6 | 1880 | 22 | 1880 | 22 |
| K2 | 8 | #13 | STR | 800 | 6 | 800 | 6 |
| | | | | | | | |
| S1 | 64 | #13 | 3 | 2280 | 145 | 2280 | 145 |
| S2 | 64 | #13 | 3 | 1740 | 111 | 1740 | 111 |
| S3 | 109 | #13 | 3 | 1480 | 160 | 1480 | 160 |
| S4 | 45 | #13 | 4 | 1780 | 80 | 1780 | 80 |
| ✳S5 | 102 | #16 | 5 | 1880 | 298 | ——— | ——— |
| | | | | | | | |
| REINFORCING STEEL | | | | | 839 kg. | | 839 kg. |
| ✳EPOXY COATED REINF. STEEL | | | | | 298 kg. | | |
| 41.4 MPa CONCRETE | | | | | 10.5m³ | | 10.4m³ |
| | | | | | | | |
| 15.24mm Ø L.R. STRANDS | | | | | No. 20 | | No. 20 |

## GRADE 270 STRANDS

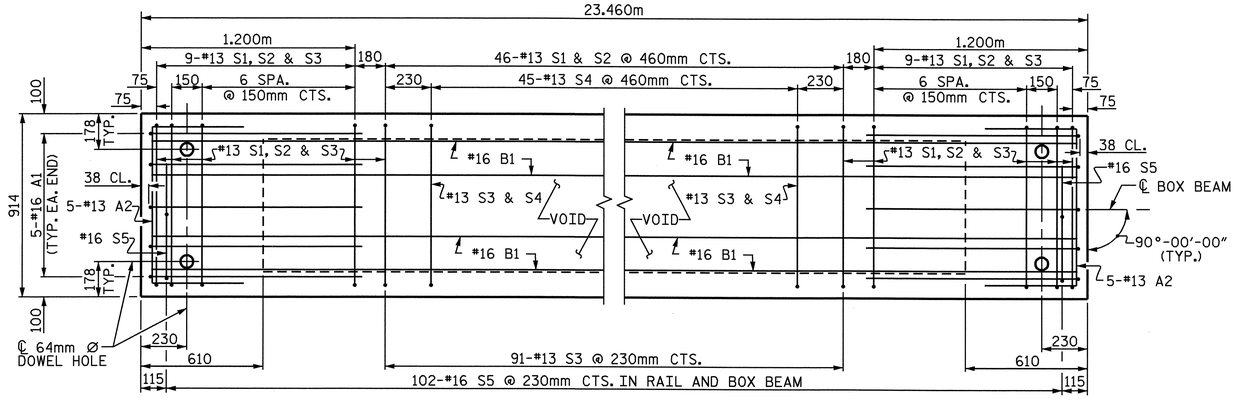
| | 15.24mm Ø L.R. |
|---|---|
| AREA ( mm² ) | 140.00 |
| ULTIMATE STRENGTH ( KN PER STRAND ) | 260.7 |
| APPLIED PRESTRESS ( KN PER STRAND ) | 195.5 |




## SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

## 15.24mm Ø LOW RELAXATION STRAND LAYOUT




## PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #16 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS.
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

PROJECT NO. R-2824
BURKE COUNTY
STATION: 20+72.950 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
914mm X 838mm
PRESTRESSED CONCRETE
BOX BEAM UNIT

SPAN "A"

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
Betsy S. Cox 2-17-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

| | |
|---|---|
| ASSEMBLED BY : T. BANKOVICH | DATE : 6-2008 |
| CHECKED BY : D. G. ELY | DATE : 8-2008 |
| DRAWN BY : TLA 5/05 | ADDED 7/11/05 |
| CHECKED BY : GM 6/05 | REV. 5/1/06 TLA/GM |

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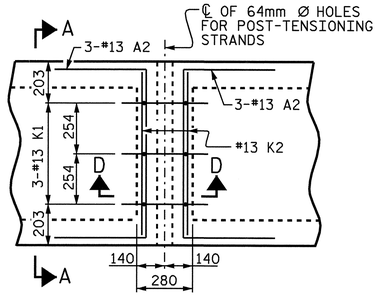
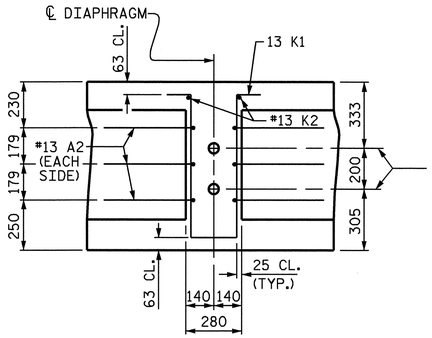
tjbankovich

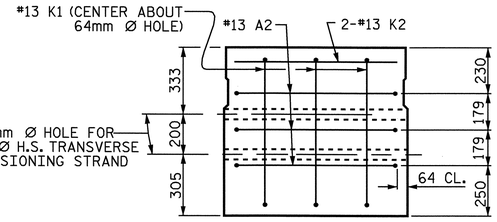
STD. NO. PCBB4SM




PLAN




SECTION D-D

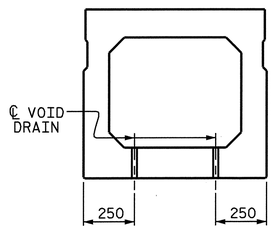



SECTION A-A

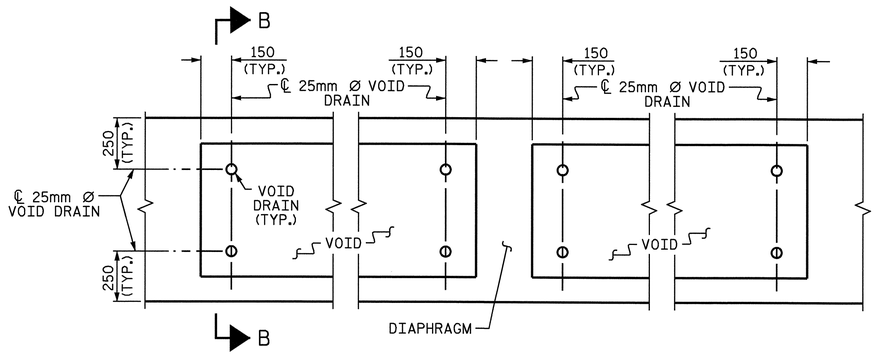
VOIDS NOT SHOWN

## DOUBLE DIAPHRAGM DETAILS

#13 "S" BARS NOT SHOWN. #13 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 64mm Ø HOLE.



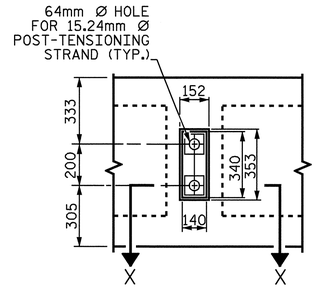

SECTION B-B




PART PLAN

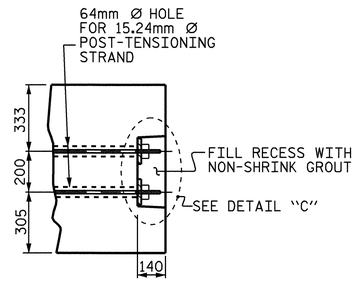
## VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

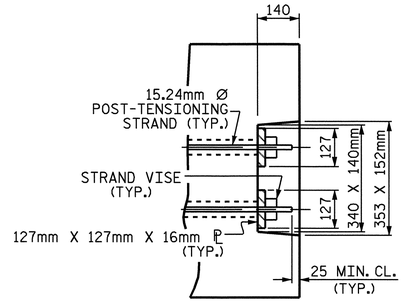



VIEW Y-Y

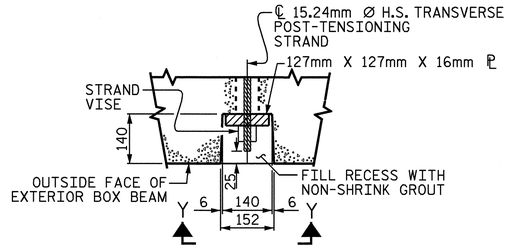
SHOWING ELEVATION VIEW OF GROUTED RECESS




PART SECTION AT RECESS




DETAIL "C"




SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

## GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

| DEAD LOAD DEFLECTION AND CAMBER | |
|---|---|
| | 914mm x 838mm |
| | |
| | SPAN "A" |
| CAMBER (BEAM ALONE IN PLACE) ↑ | 70mm |
| DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ** ↓ | 11mm |
| | |
| FINAL CAMBER ↑ | 59mm |

** INCLUDES FUTURE WEARING SURFACE

| BOX BEAM UNITS REQUIRED | | | |
|---|---|---|---|
| | NUMBER | LENGTH | TOTAL LENGTH |
| SPAN A | | | |
| EXTERIOR B.B. | 2 | 23.460m | 46.920m |
| INTERIOR B.B. | 13 | 23.460m | 304.980m |
| TOTAL | 15 | ——— | 351.900m |

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

914mm X 838mm
PRESTRESSED CONCRETE
BOX BEAM UNIT

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-6 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

Betsy S. Cox 1-7-10

| | |
|---|---|
| ASSEMBLED BY : T. BANKOVICH | DATE : 6-2008 |
| CHECKED BY : D.G. ELY | DATE : 8-2008 |
| DRAWN BY : TLA 5/05 | ADDED 7/11/05 |
| CHECKED BY : GM 6/05 | REV. 5/1/06 TLA/GM |

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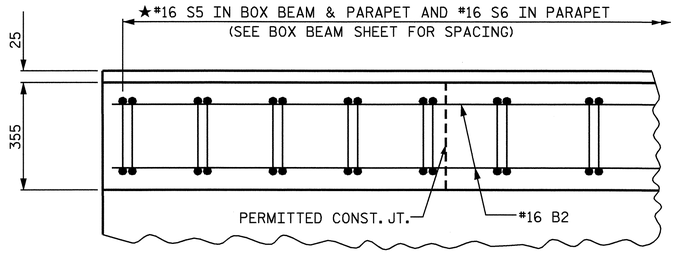
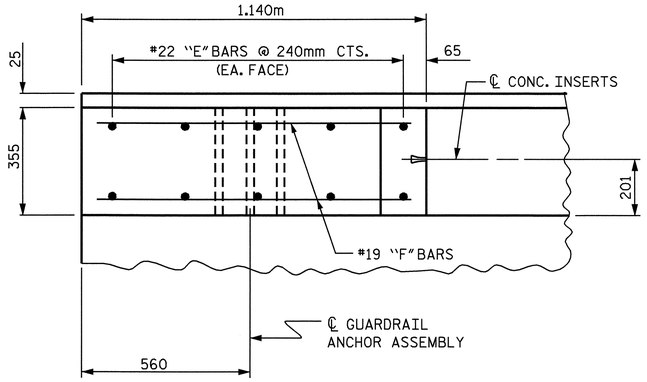
tjbankovich

STD. NO. PCBB5SM

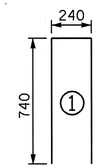



PLAN OF PARAPET




PLAN OF END POST

## BAR TYPE




BAR DIMENSIONS ARE OUT TO OUT

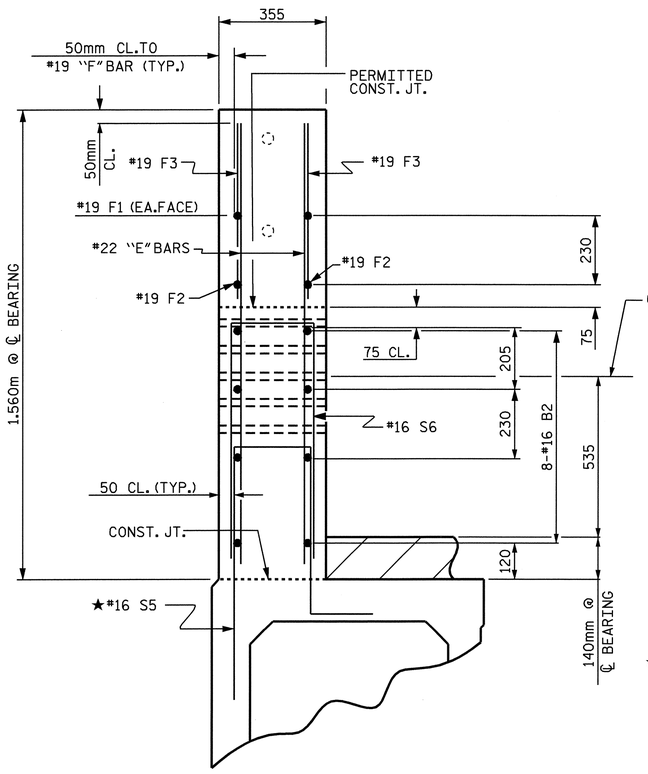
## BILL OF MATERIALS

PARAPET AND END POSTS

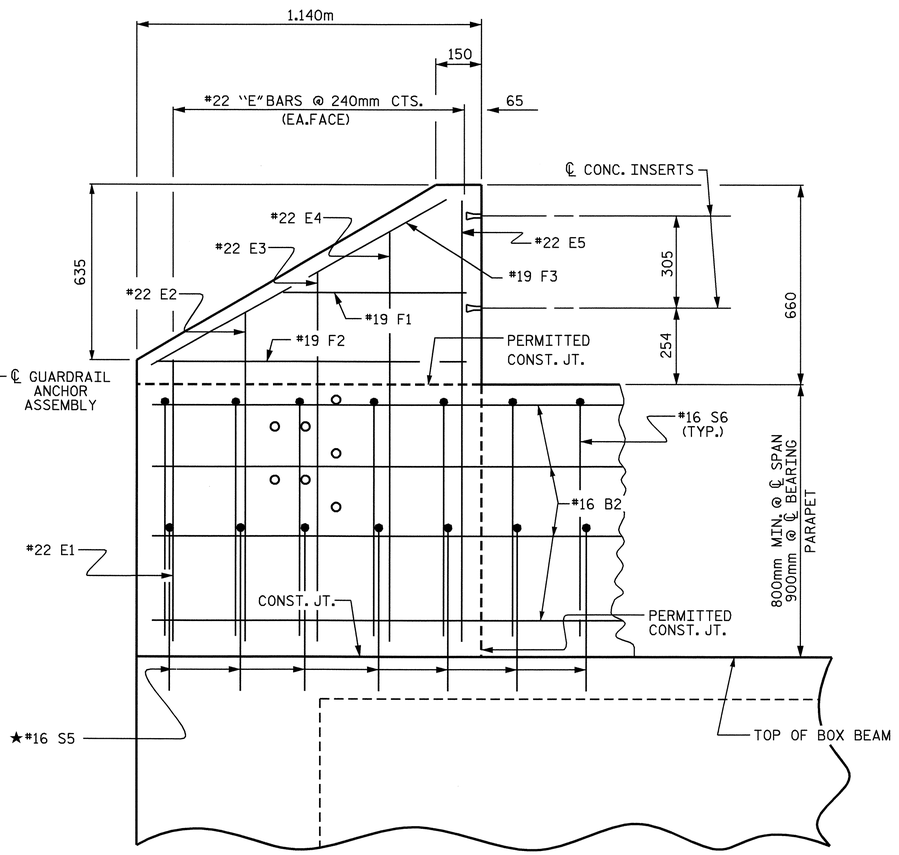
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| ✳B2 | 48 | #16 | STR | 7700 | 574 |
| | | | | | |
| ✳E1 | 8 | #22 | STR | 900 | 22 |
| ✳E2 | 8 | #22 | STR | 1040 | 25 |
| ✳E3 | 8 | #22 | STR | 1200 | 29 |
| ✳E4 | 8 | #22 | STR | 1360 | 33 |
| ✳E5 | 8 | #22 | STR | 1460 | 36 |
| | | | | | |
| ✳F1 | 8 | #19 | STR | 620 | 11 |
| ✳F2 | 8 | #19 | STR | 920 | 16 |
| ✳F3 | 8 | #19 | STR | 1060 | 19 |
| | | | | | |
| ✳S6 | 204 | #16 | 1 | 1720 | 545 |
| | | | | | |
| ✳EPOXY COATED REINF. STEEL | | | | | 1310 kg. |
| | | | | | |
| CLASS AA CONCRETE | | | | | 14.9m³ |
| TOTAL LENGTH OF CONCRETE PARAPET | | | | | 46.920m |

## NOTE:

★ #16 S5 BARS ARE INCLUDED IN THE BILL OF MATERIAL FOR BOX BEAM SECTION.




END VIEW




ELEVATION

# PARAPET AND END POST FOR TWO BAR RAIL

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

## CONCRETE PARAPET AND END POST DETAILS

NORTH CAROLINA PROFESSIONAL SEAL U268 ENGINEER BETSY S. COX

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-7 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T.BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

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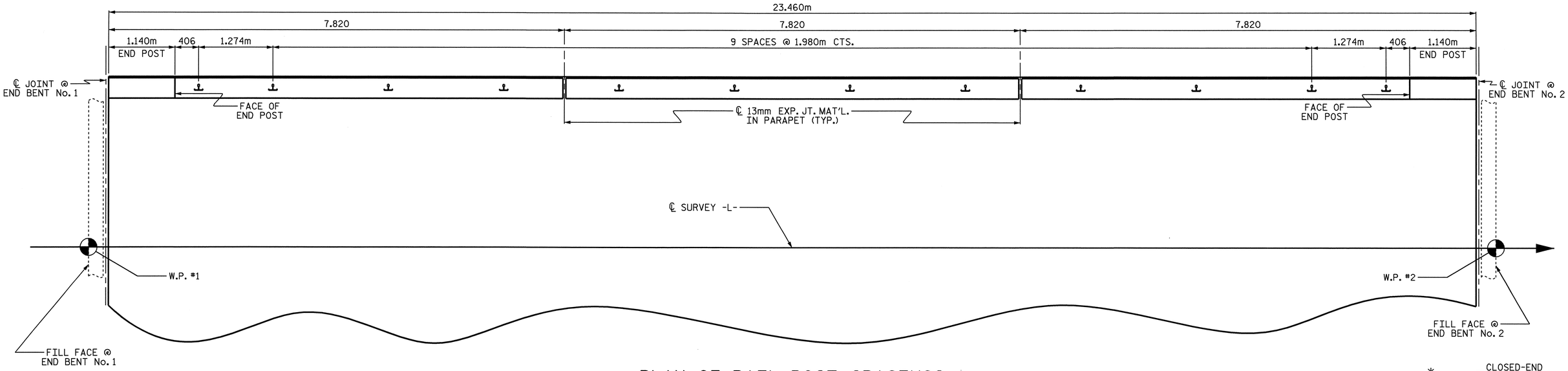
tjbankovich




## PLAN OF RAIL POST SPACINGS

(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)

## NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 38mm.

B. 1 - 19.05mm Ø X 41mm BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 19.05mm Ø X 41mm 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 ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 620 MPa. IS ACCEPTABLE.

## NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. 12mm PLATES SHALL CONFORM TO AASHTO M270 GRADE 250 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 19.05mm STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 21.4 kN. THE FERRULES SHALL ENGAGE A 19.05mm Ø X 41mm BOLT WITH 51mm O.D. WASHER IN PLACE. THE 19.05mm X 41mm BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 16° C.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

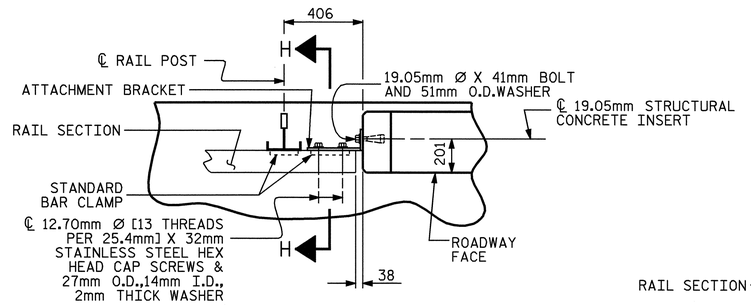
E. 13mm Ø PIPE SLEEVES (IF REQUIRED) TO BE GALANIZED.

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 RAILS.

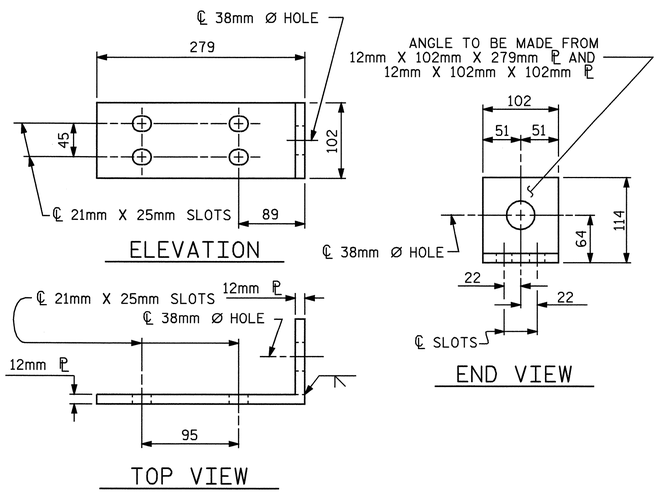
THE 19.05mm STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

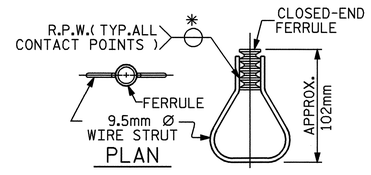
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 19.05mm Ø X 41mm BOLT WITH WASHER SHALL BE PLACED WITH A 19.05mm Ø X 165mm BOLT AND 51mm O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 19.05mm Ø X 41mm BOLT SHALL APPLY TO THE 19.05mm Ø X 165mm BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.




PLAN - RAIL AND END POST

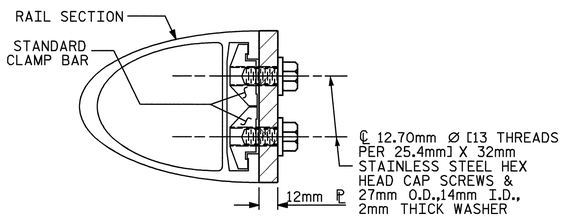



## DETAILS FOR ATTACHING METAL RAIL TO END POST




## STRUCTURAL CONCRETE INSERT

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




SECTION H-H

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# RAIL POST SPACING AND END OF RAIL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX — 2-17-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-8 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

25-FEB-2009 10:48
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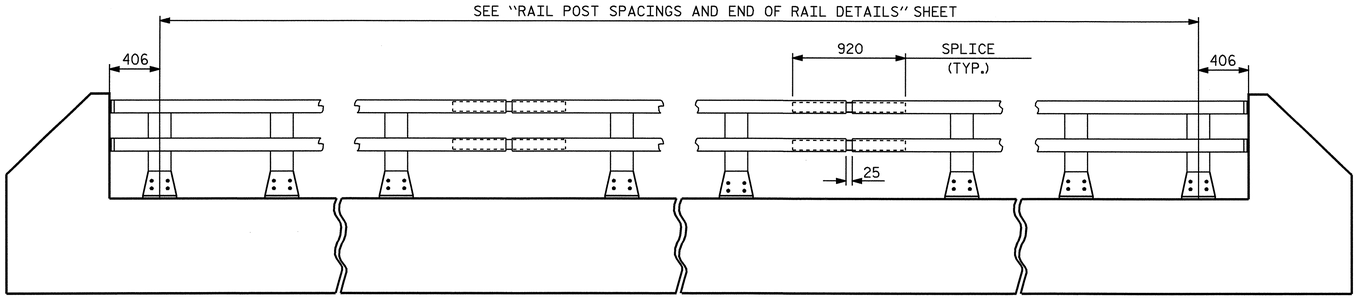
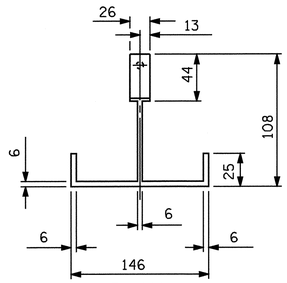
tjbankovich

STD. NO. BMR2SM

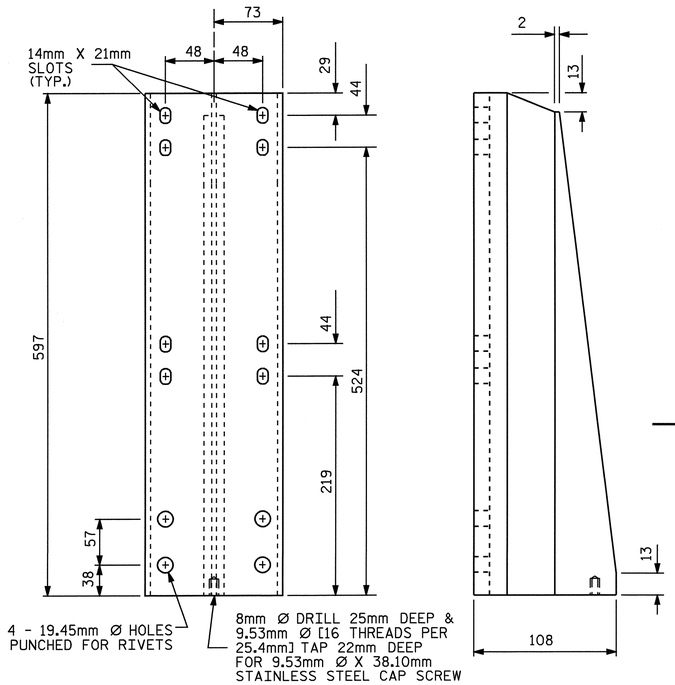



## ELEVATION

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD No. BMR2SM

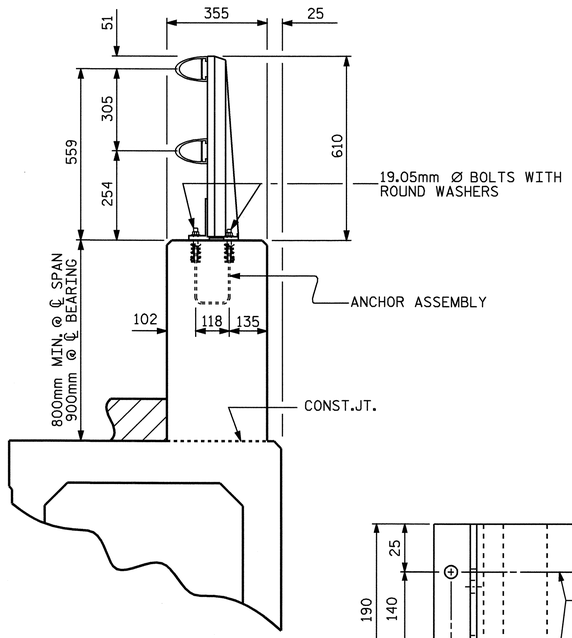



PLAN

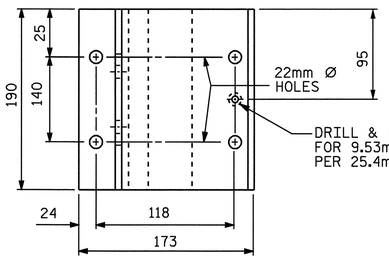


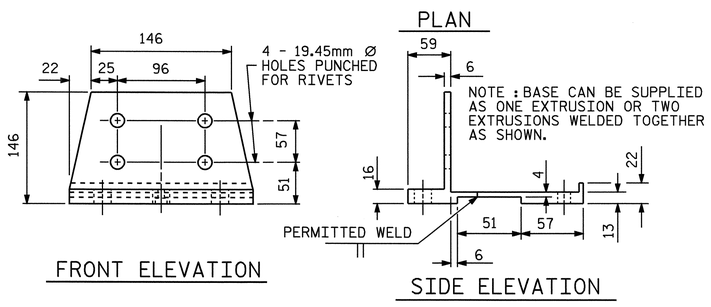

FRONT ELEVATION SIDE ELEVATION

## DETAILS OF POST



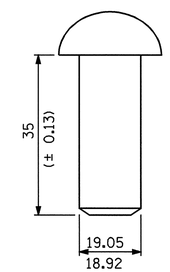

## SECTION THRU PARAPET AND RAIL




FRONT ELEVATION SIDE ELEVATION

## POST BASE DETAILS




RIVET DETAIL

# 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 B221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 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 B209 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 AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 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 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570M FOR GRADE 230 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570M FOR GRADE 230 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

## 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 STANDARD NO. BMR2SM.

CAP SCREWS SHALL BE ASTM F593 ALLOY 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.

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.

GROOVED CONTRACTION JOINTS, 12mm IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 2.4m TO 3.5m BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 3.5m IN LENGTH.

PAY LENGTH = 42.360 METERS

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# 2 BAR METAL RAIL

| ASSEMBLED BY : T.BANKOVICH | DATE : 6-2008 |
|---|---|
| CHECKED BY : D.G. ELY | DATE : 8-2008 |

| DRAWN BY : EEM 6/94 | REV. 10/17/00 LES/RDR |
|---|---|
| CHECKED BY : RGW 6/94 | REV. 5/7/03R RWW/JTE |
| | REV. 5/1/06 TLA/GM |

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-9 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

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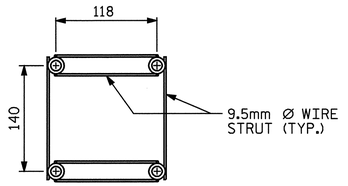
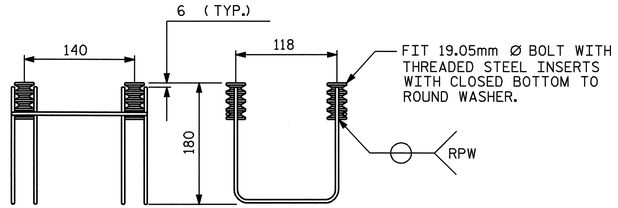
tjbankovich

STD. NO. BMR3SM




PLAN




SIDE VIEW ELEVATION

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

# 4-BOLT METAL RAIL ANCHOR ASSEMBLY

(24 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 AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 51mm FOR 19mm FERRULES.

B. 4 - 19.05mm Ø 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 Ø 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. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A TENSILE STRENGTH OF 620 MPa. IS ACCEPTABLE.

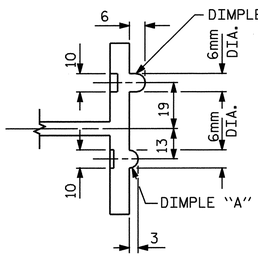
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

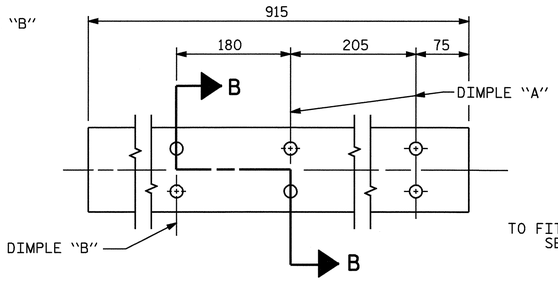
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

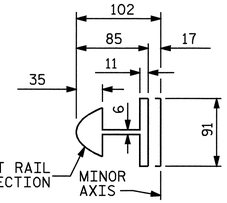
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 19.05mm Ø BOLT IS 44.5kN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 517 MPa ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



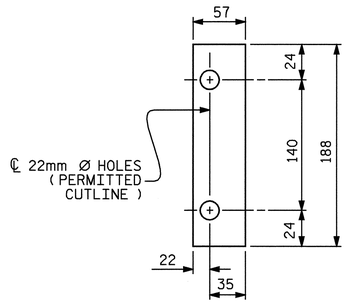

SECTION B - B



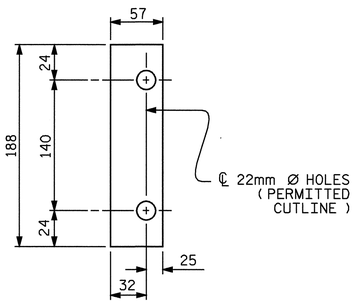




BAR SECTION

EXPANSION BAR DETAILS



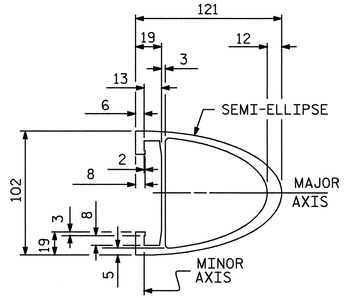

FRONT PLATE



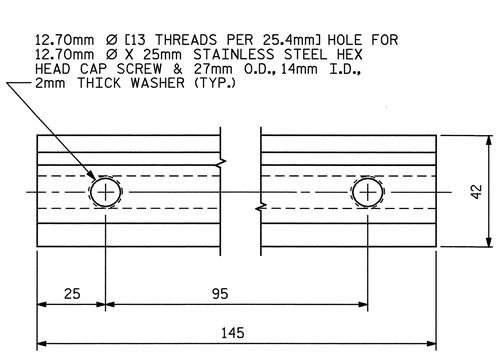

REAR PLATE

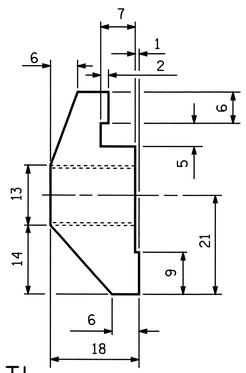
SHIM DETAILS

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



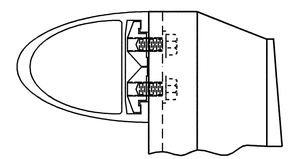

RAIL SECTION



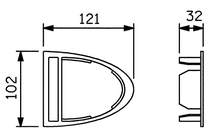




CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY




RAIL CAP

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

2-17-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-10 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

| | |
|---|---|
| ASSEMBLED BY : T.BANKOVICH | DATE : 6-2008 |
| CHECKED BY : D.G. ELY | DATE : 8-2008 |
| DRAWN BY : EEM 6/94 | REV. 10/17/00 LES/RDR |
| CHECKED BY : RGW 6/94 | REV. 5/7/03 RWW/JTE |
| | REV. 5/1/06R KMM/GM |

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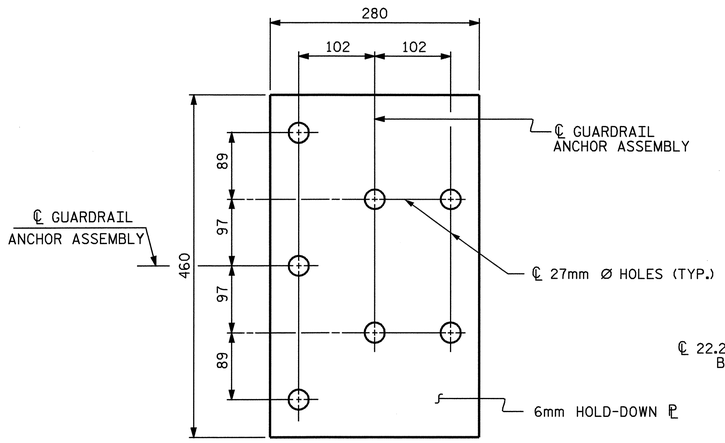
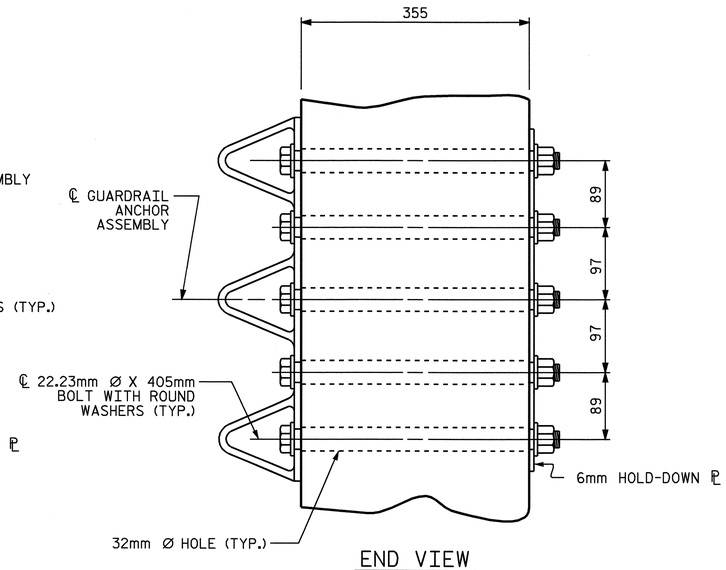
STD. NO. BMR4SM




PLAN




END VIEW

## GUARDRAIL ANCHOR ASSEMBLY DETAILS

## NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 6mm HOLD DOWN PLATE AND 7 - 22.23mm Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 250. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

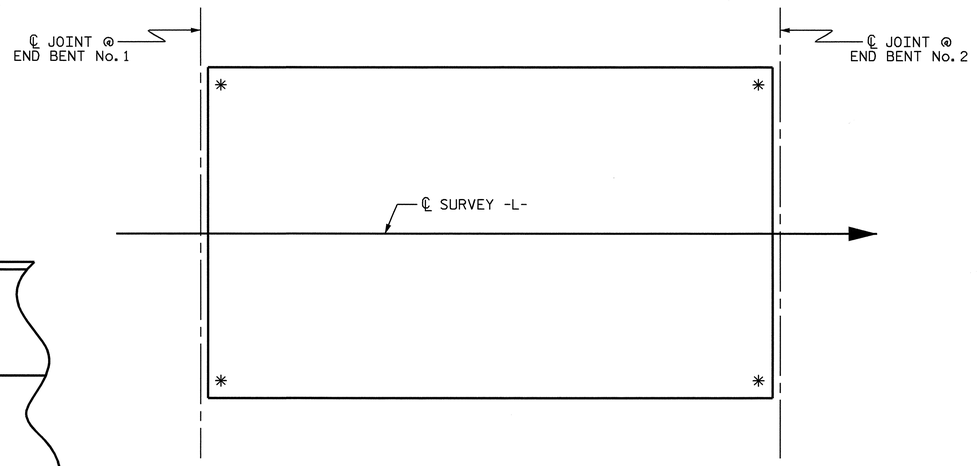
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

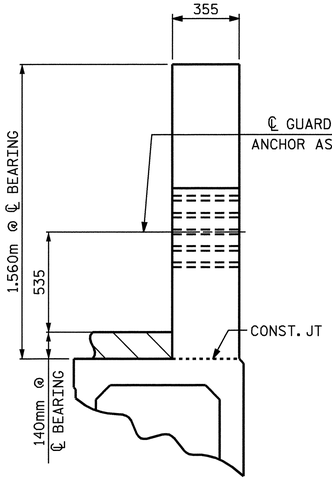
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 32mm Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

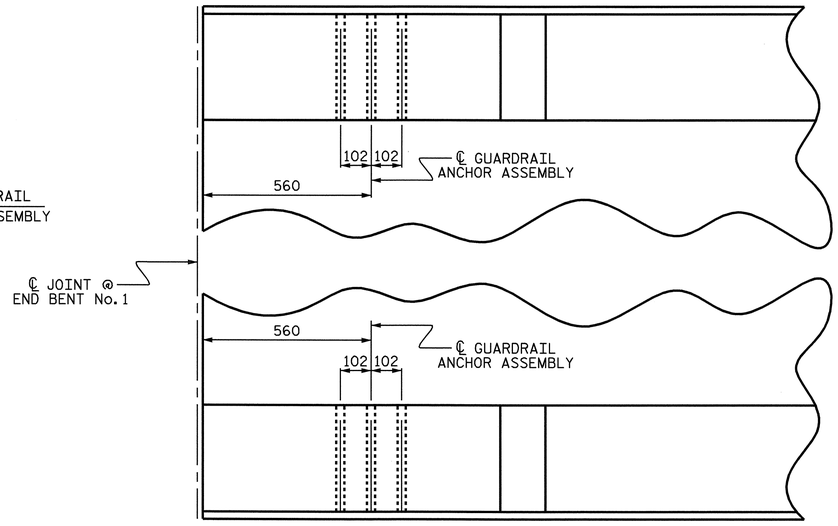



SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT




END VIEW




PLAN
(END BENT No 1 SHOWN, END BENT No. 2 SIMILAR)

## LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-2824
BURKE COUNTY
STATION: 20+72.950 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
Betsy S. Cox 2-17-10

| | | | |
|---|---|---|---|
| ASSEMBLED BY : T. BANKOVICH | DATE : 6-2008 | | |
| CHECKED BY : D.G. ELY | DATE : 8-2008 | | |
| DRAWN BY : EEM 6/94 | REV. 10/17/00 | RWW/LES | |
| CHECKED BY : RGW 6/94 | REV. 5/7/03 | RWW/JTE | |
| | REV. 5/1/06 | TLA/GM | |

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-11 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

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STD. NO. BMR8SM

## NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

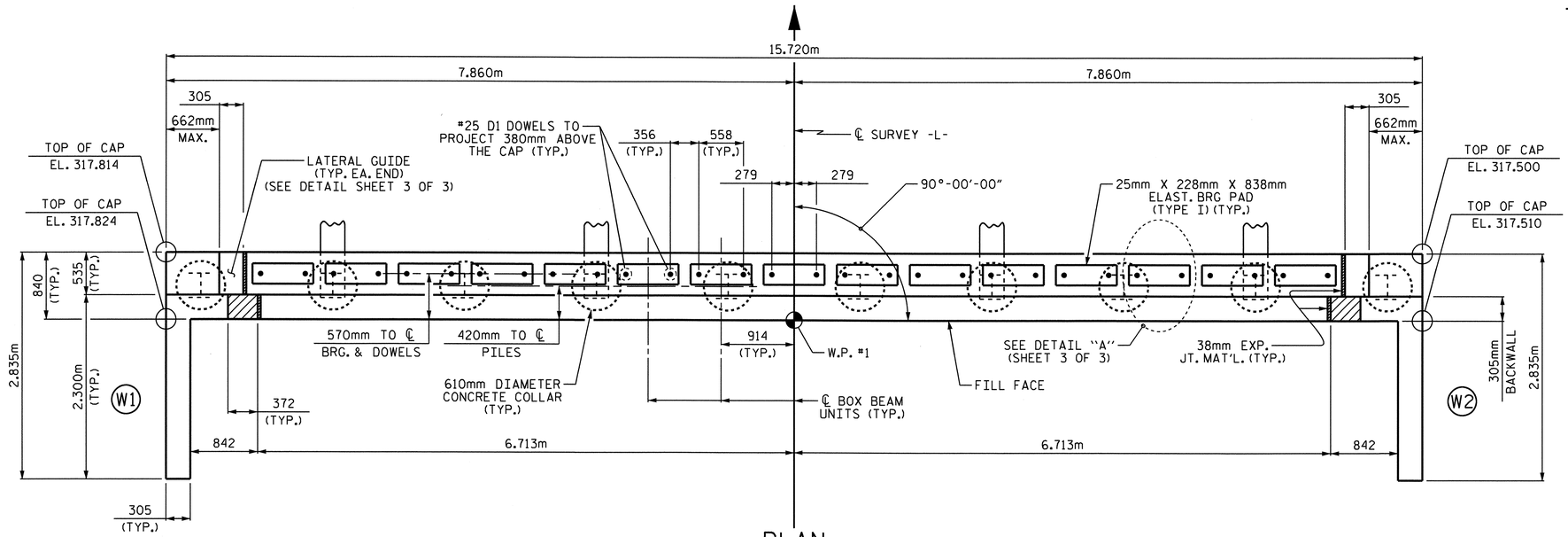
THE LATERAL GUIDES AT EACH END OF CAP ARE NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

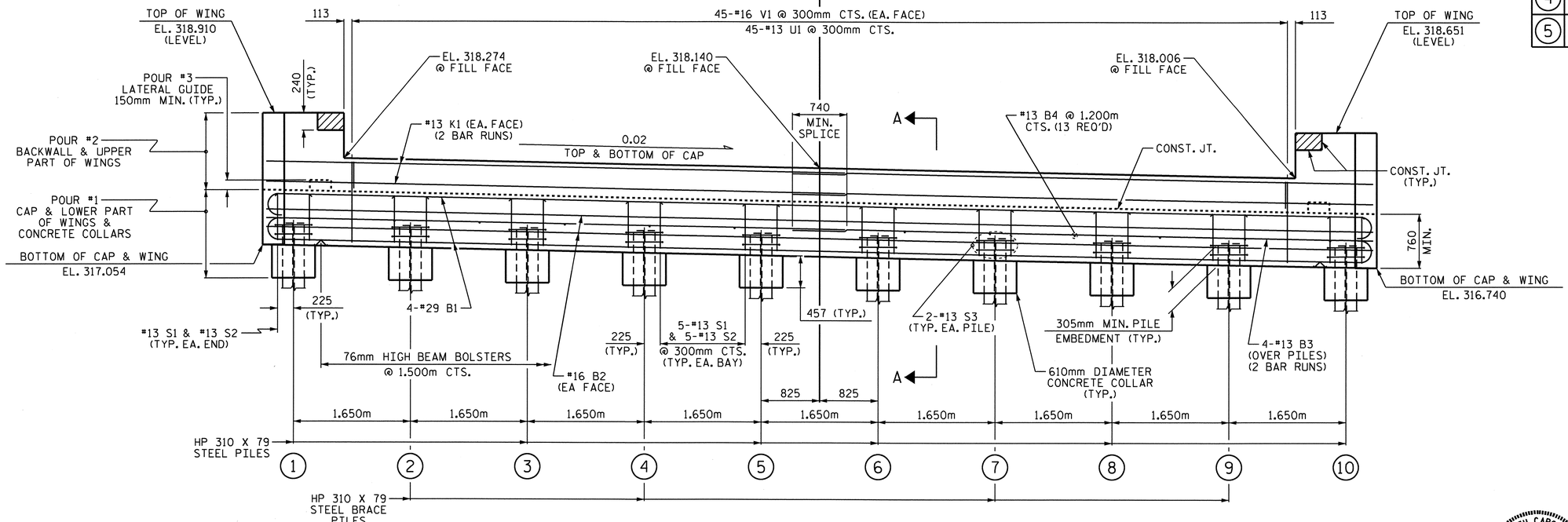
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 102mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR SECTION A-A, SEE SHEET 3 OF 3.

| TOP OF PILE ELEVATIONS | | | |
|---|---|---|---|
| 1 | 317.350 | 6 | 317.186 |
| 2 | 317.317 | 7 | 317.153 |
| 3 | 317.284 | 8 | 317.120 |
| 4 | 317.251 | 9 | 317.087 |
| 5 | 317.218 | 10 | 317.054 |




## PLAN




## ELEVATION

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

Date: 2-17-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-12 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

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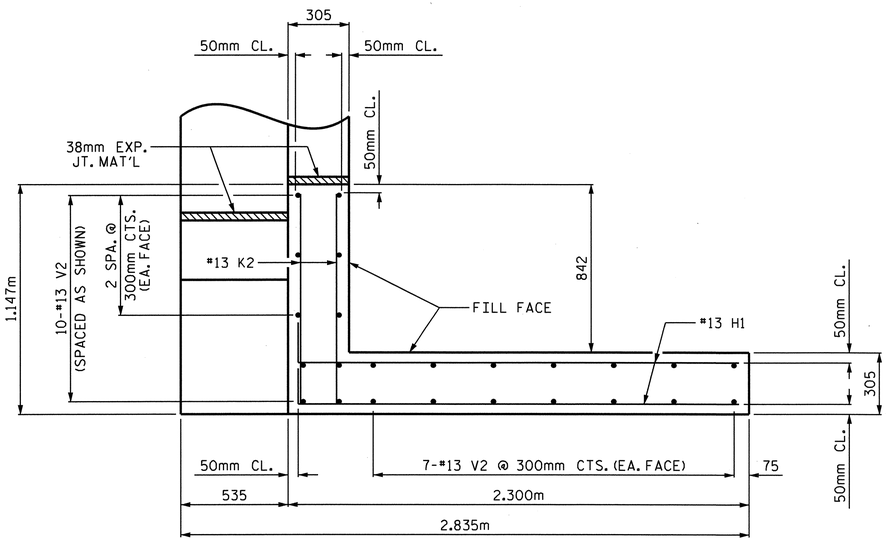
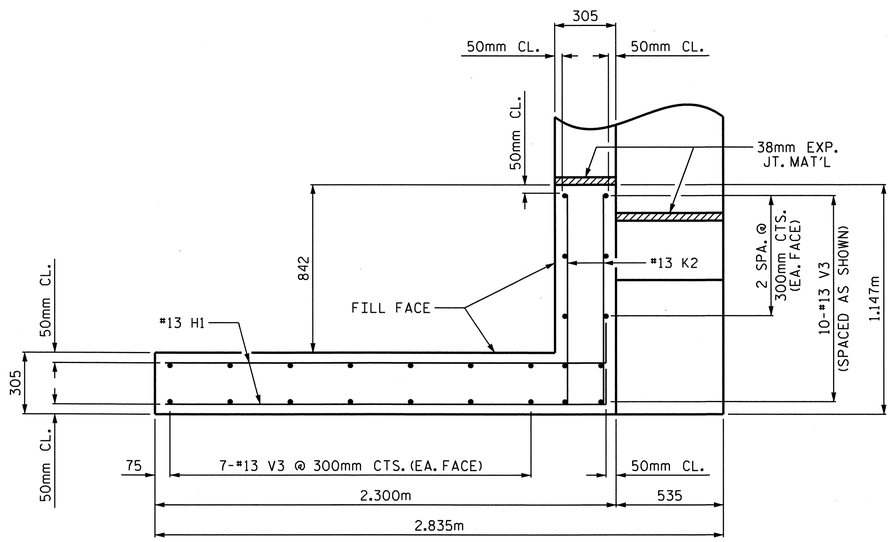
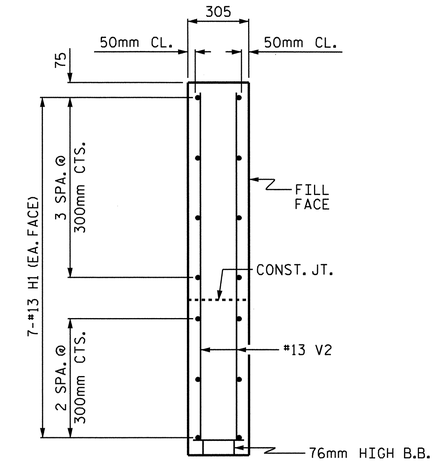
tjbankovich



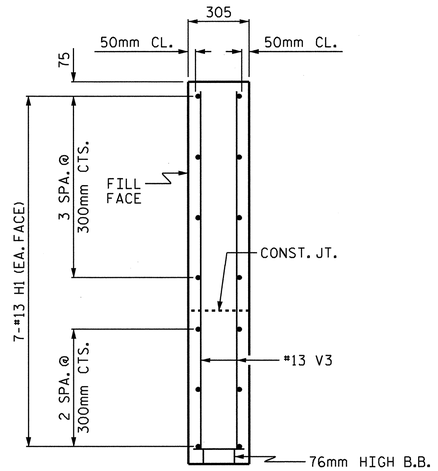

PLAN OF WING (W1)



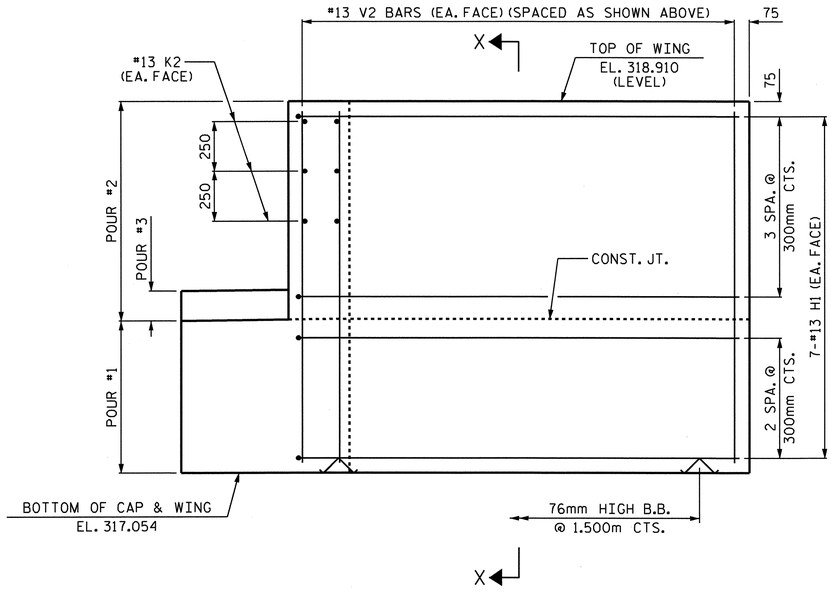

PLAN OF WING (W2)



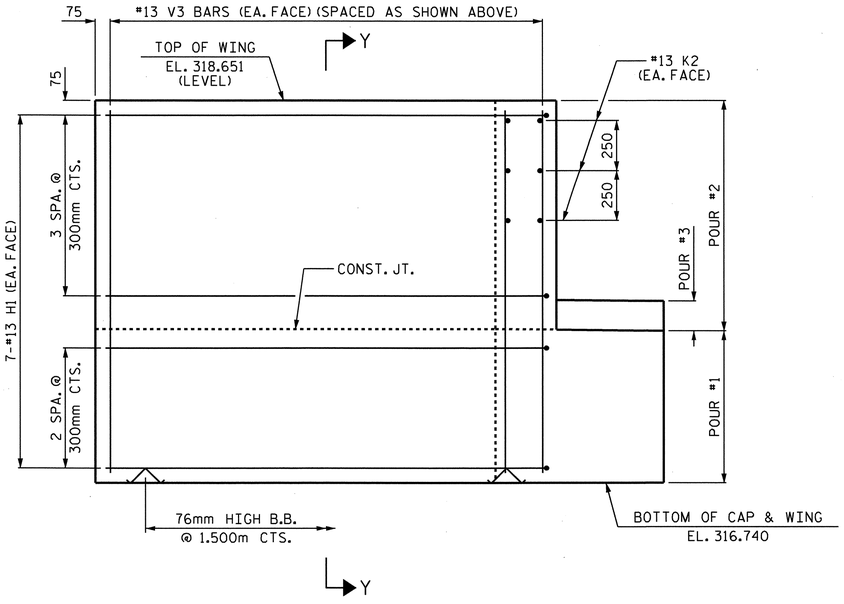

SECTION X-X




SECTION Y-Y




ELEVATION OF WING (W1)




ELEVATION OF WING (W2)

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

4-14-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-13 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

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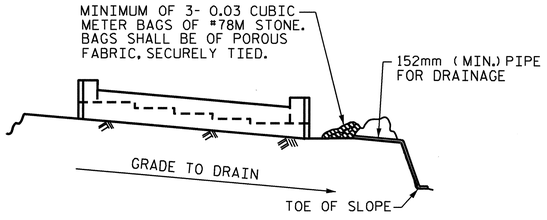
tjbankovich

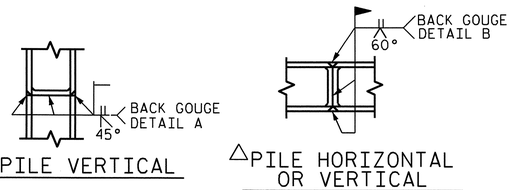



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

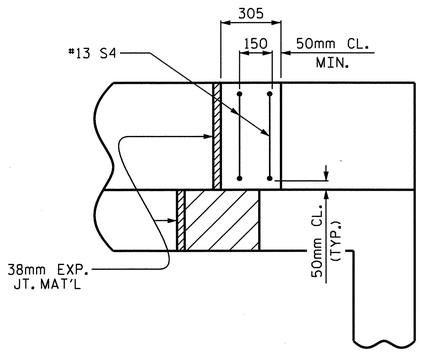
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

## TEMPORARY DRAINAGE AT END BENT

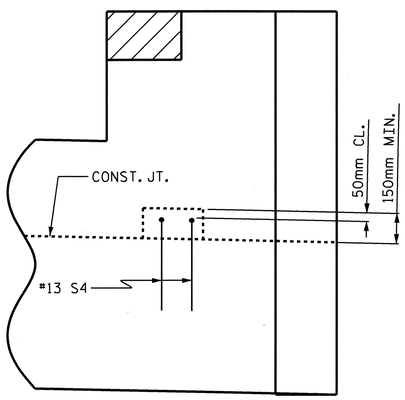



△ POSITION OF PILE DURING WELDING.

## PILE SPLICE DETAILS



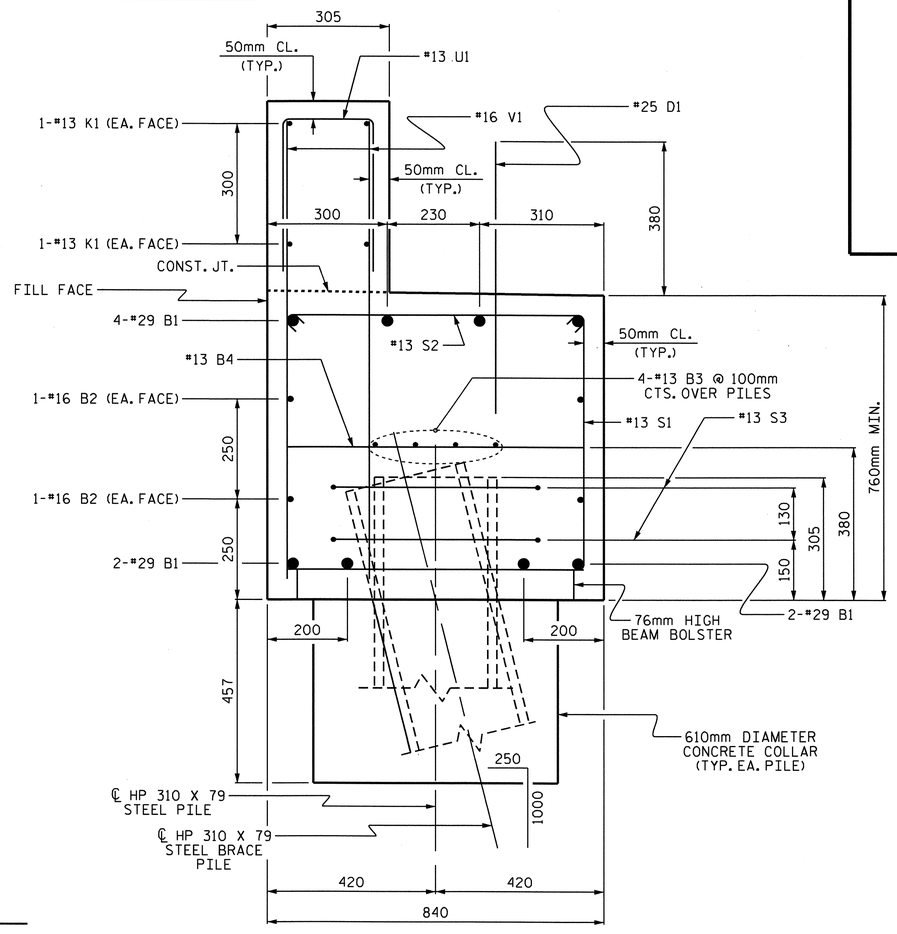

PLAN




ELEVATION

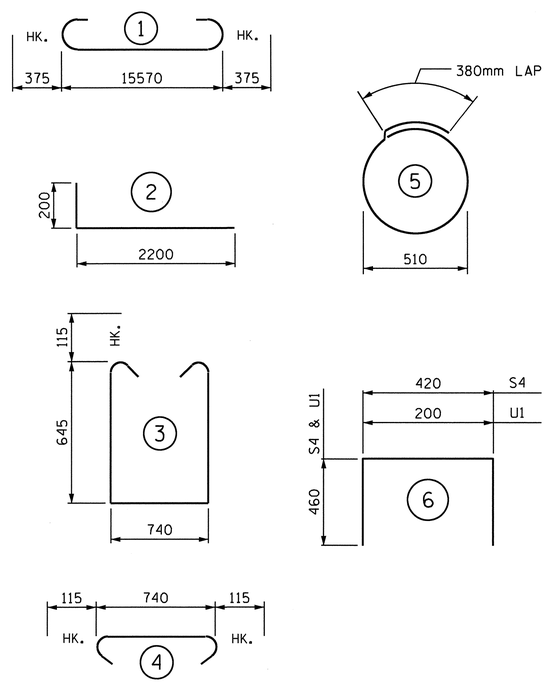
## LATERAL GUIDE DETAIL

(RIGHT LATERAL GUIDE SHOWN, LEFT END SIMILAR)




## SECTION A-A

## BAR TYPES



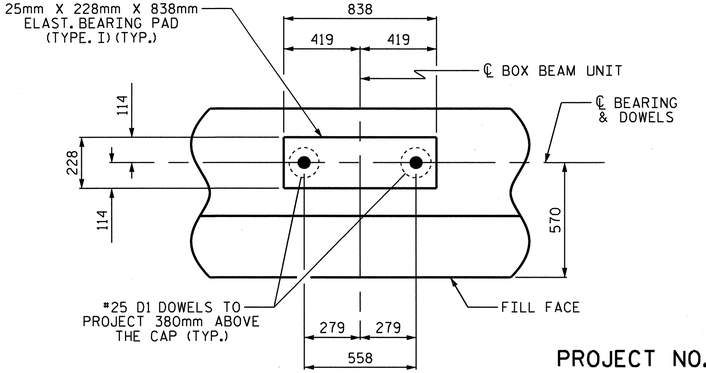

ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

### END BENT No. 1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 8 | #29 | 1 | 16320 | 661 |
| B2 | 4 | #16 | STR | 15620 | 97 |
| B3 | 8 | #13 | STR | 8200 | 65 |
| B4 | 13 | #13 | STR | 740 | 10 |
| | | | | | |
| D1 | 30 | #25 | STR | 680 | 81 |
| | | | | | |
| H1 | 28 | #13 | 2 | 2400 | 67 |
| | | | | | |
| K1 | 8 | #13 | STR | 8200 | 65 |
| K2 | 12 | #13 | STR | 1040 | 12 |
| | | | | | |
| S1 | 47 | #13 | 3 | 2260 | 106 |
| S2 | 47 | #13 | 4 | 970 | 45 |
| S3 | 20 | #13 | 5 | 1980 | 39 |
| S4 | 4 | #13 | 6 | 1340 | 5 |
| | | | | | |
| U1 | 45 | #13 | 6 | 1120 | 50 |
| | | | | | |
| V1 | 90 | #16 | STR | 1140 | 159 |
| V2 | 24 | #13 | STR | 1740 | 42 |
| V3 | 24 | #13 | STR | 1800 | 43 |

| | |
|---|---|
| REINFORCING STEEL | 1547 kg. |
| CLASS A CONCRETE | |
| POUR #1 | |
| CAP, LOWER WINGS & CONC. COLLARS | 12.4 m³ |
| POUR #2 | |
| UPPER WINGS & BACKWALL | 4.1 m³ |
| POUR #3 | |
| LATERAL GUIDE | 0.1 m³ |
| TOTAL CLASS A CONCRETE | 16.6 m³ |
| HP 310 X 79 STEEL PILES | |
| No. = 10 | 30 METERS |
| STEEL PILE POINTS | No. = 10 |




## DETAIL "A"

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
Betsy S. Cox 4-14-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-14 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

14-APR-2010 14:30
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tjbankovich

## NOTES:

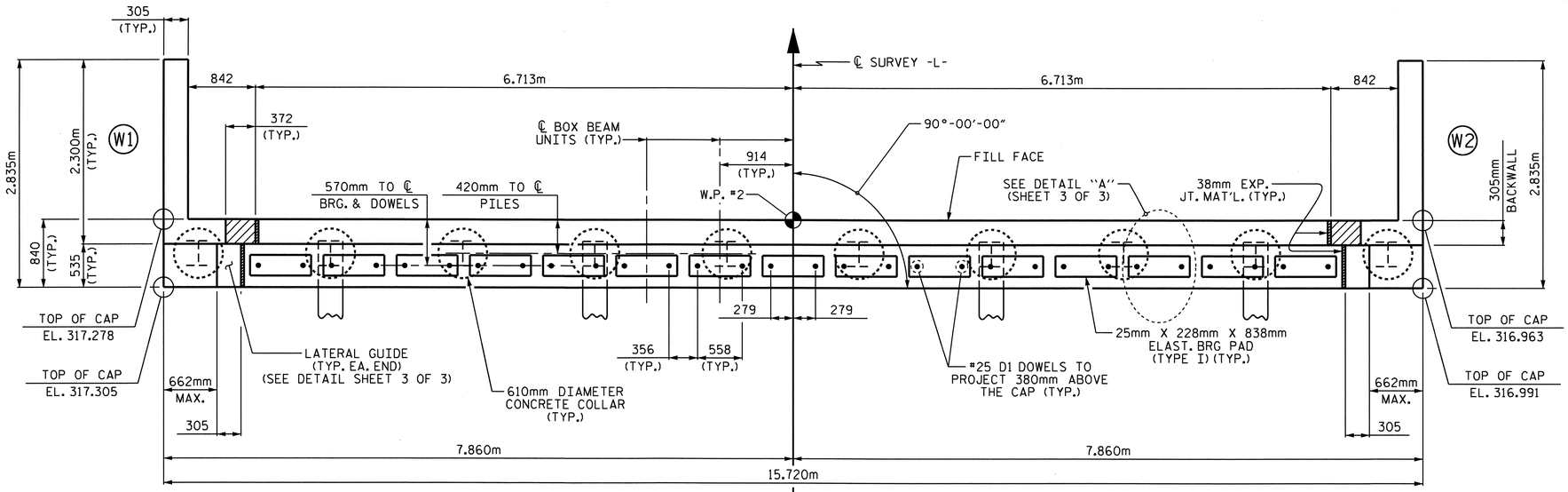
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES AT EACH END OF CAP ARE NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

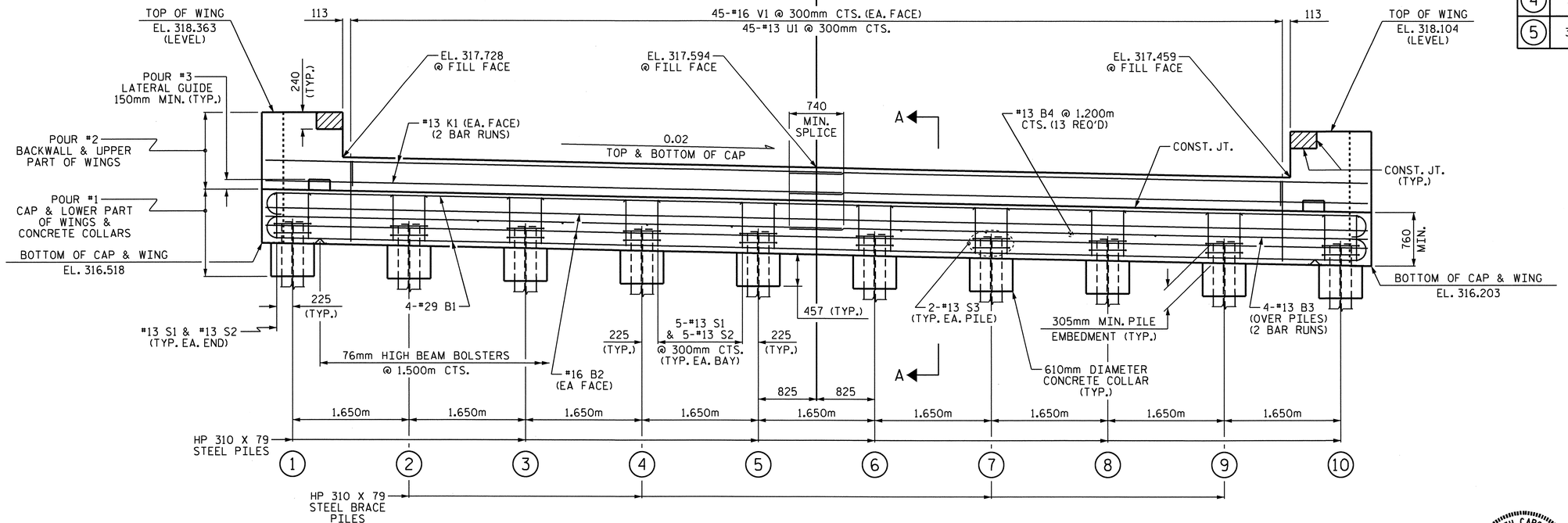
THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 102mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR SECTION A-A, SEE SHEET 3 OF 3.




## PLAN




## ELEVATION

| TOP OF PILE ELEVATIONS | | | |
|---|---|---|---|
| 1 | 316.814 | 6 | 316.649 |
| 2 | 316.781 | 7 | 316.616 |
| 3 | 316.748 | 8 | 316.583 |
| 4 | 316.715 | 9 | 316.550 |
| 5 | 316.682 | 10 | 316.517 |

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX — 2-17-10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-15 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
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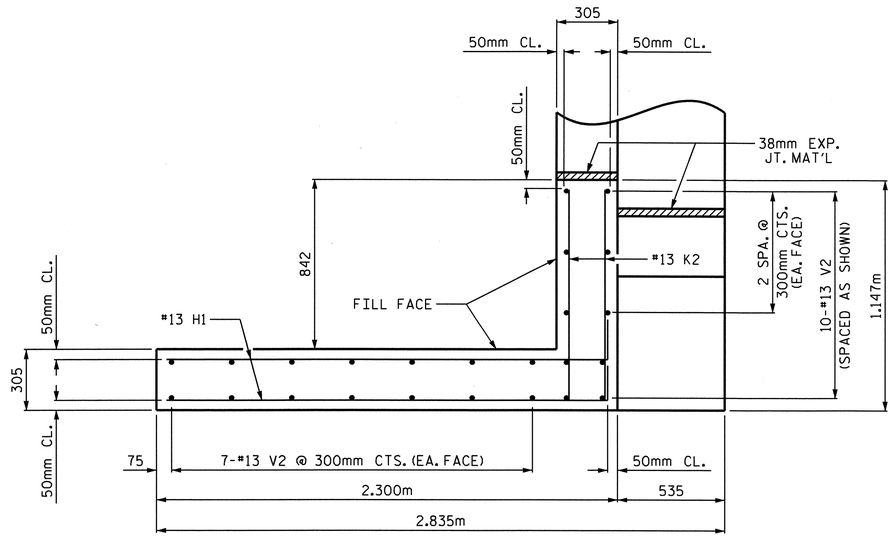
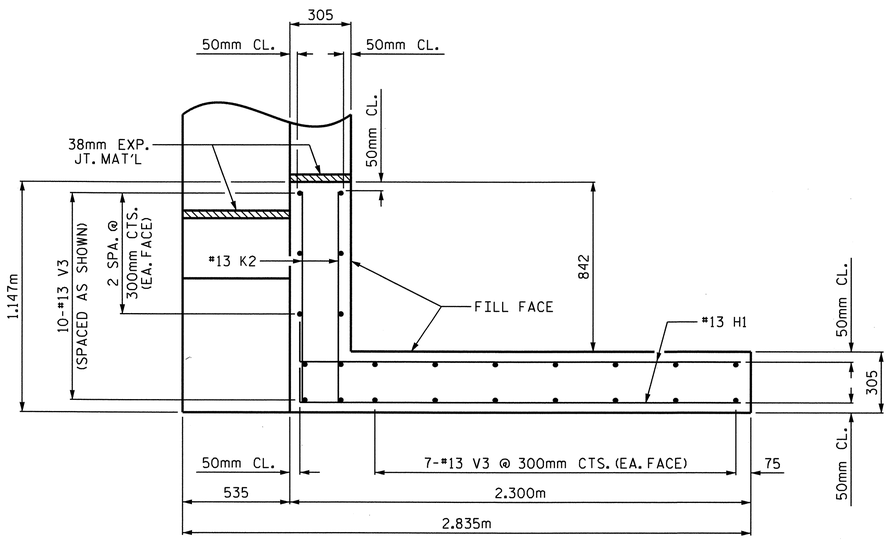
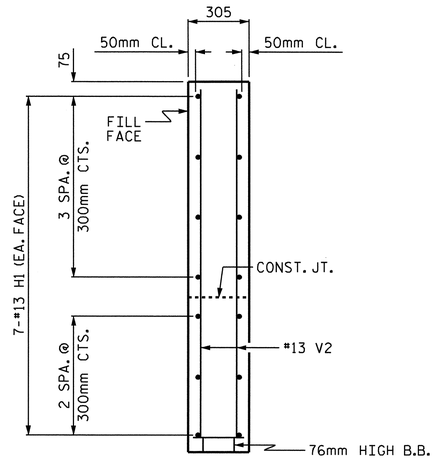


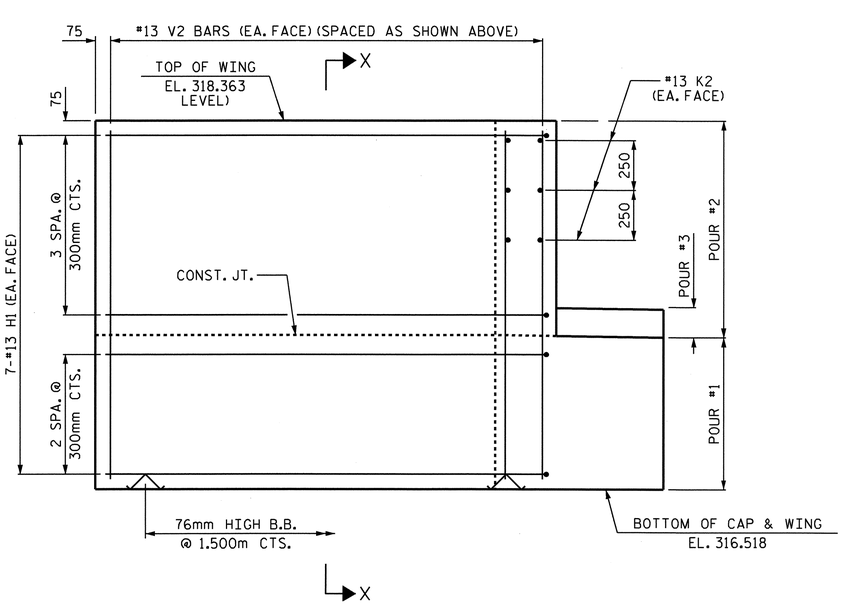

## PLAN OF WING (W1)



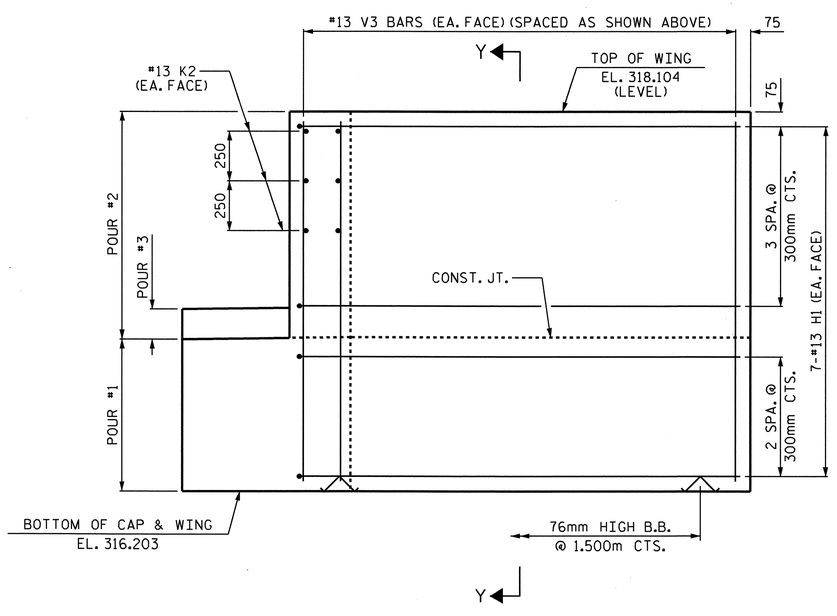

## PLAN OF WING (W2)



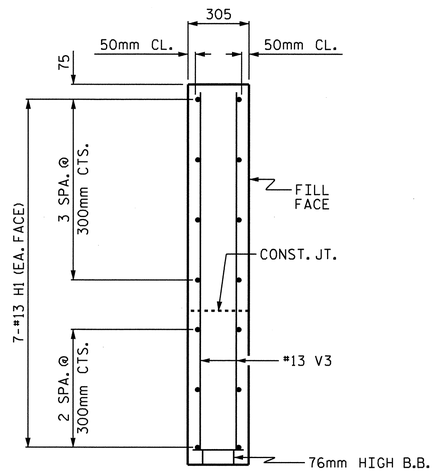

## SECTION X-X




## ELEVATION OF WING (W1)




## ELEVATION OF WING (W2)




## SECTION Y-Y

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

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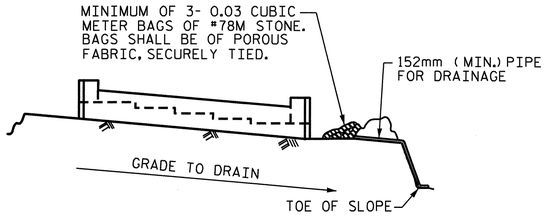
tjbankovich

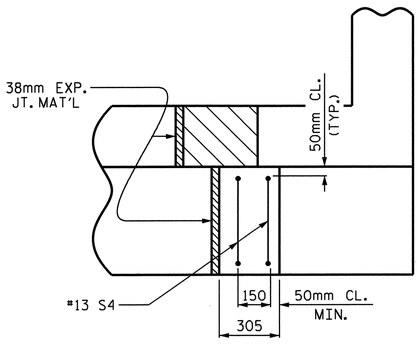



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

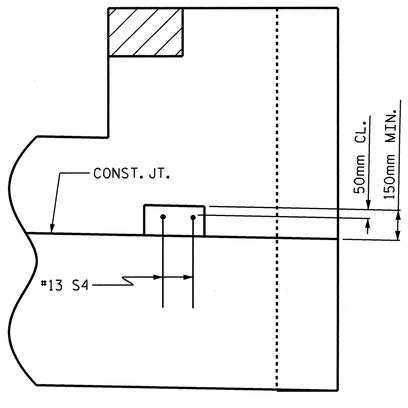
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

## TEMPORARY DRAINAGE AT END BENT



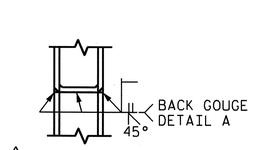

PLAN



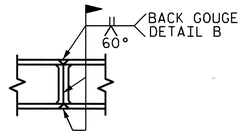

ELEVATION

## LATERAL GUIDE DETAIL

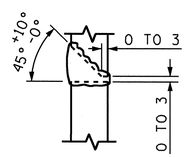
(RIGHT LATERAL GUIDE SHOWN, LEFT END SIMILAR)



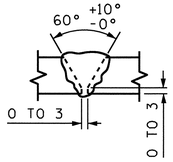

△PILE VERTICAL




△PILE HORIZONTAL OR VERTICAL



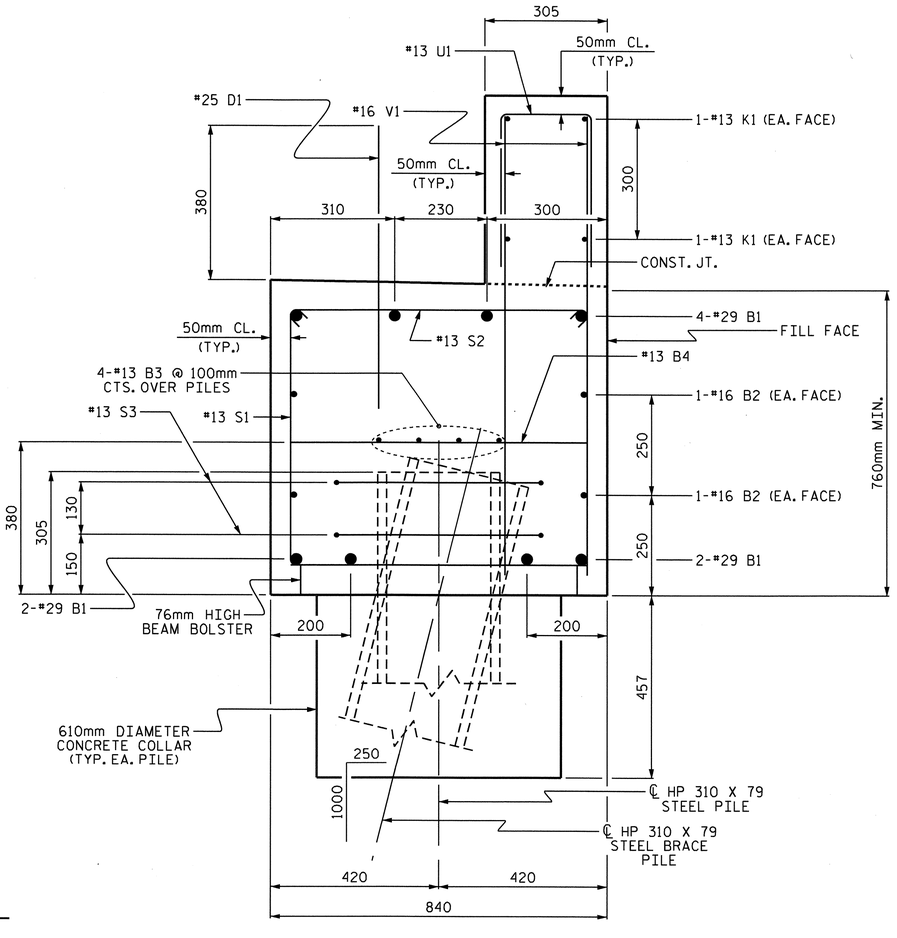

DETAIL A




DETAIL B

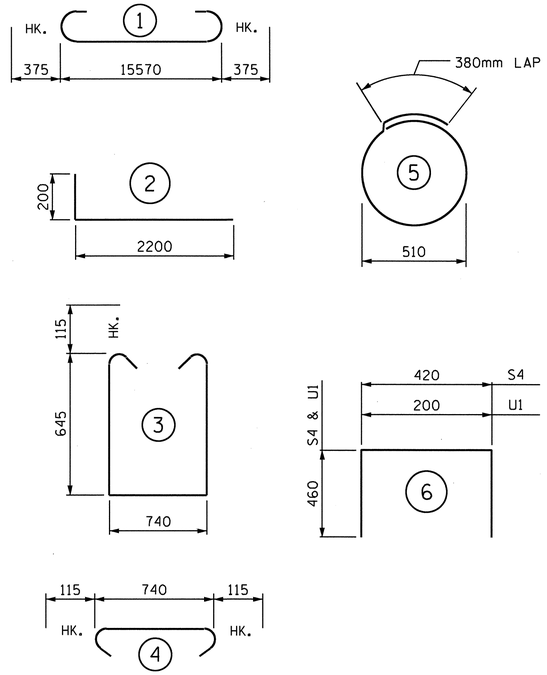
△ POSITION OF PILE DURING WELDING.

## PILE SPLICE DETAILS




## SECTION A-A

## BAR TYPES



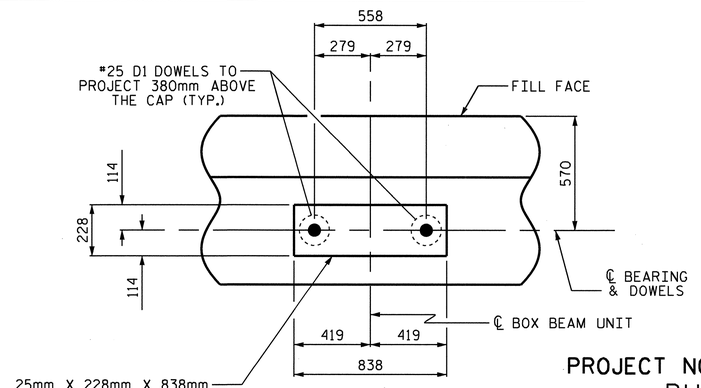

ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

### END BENT No. 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 8 | #29 | 1 | 16320 | 661 |
| B2 | 4 | #16 | STR | 15620 | 97 |
| B3 | 8 | #13 | STR | 8200 | 65 |
| B4 | 13 | #13 | STR | 740 | 10 |
| | | | | | |
| D1 | 30 | #25 | STR | 680 | 81 |
| | | | | | |
| H1 | 28 | #13 | 2 | 2400 | 67 |
| | | | | | |
| K1 | 8 | #13 | STR | 8200 | 65 |
| K2 | 12 | #13 | STR | 1040 | 12 |
| | | | | | |
| S1 | 47 | #13 | 3 | 2260 | 106 |
| S2 | 47 | #13 | 4 | 970 | 45 |
| S3 | 20 | #13 | 5 | 1980 | 39 |
| S4 | 4 | #13 | 6 | 1340 | 5 |
| | | | | | |
| U1 | 45 | #13 | 6 | 1120 | 50 |
| | | | | | |
| V1 | 90 | #16 | STR | 1140 | 159 |
| V2 | 24 | #13 | STR | 1740 | 42 |
| V3 | 24 | #13 | STR | 1800 | 43 |

| | |
|---|---|
| REINFORCING STEEL | 1547 kg. |
| CLASS A CONCRETE | |
| POUR #1 | |
| CAP, LOWER WINGS & CONC. COLLARS | 12.4 m³ |
| POUR #2 | |
| UPPER WINGS & BACKWALL | 4.1 m³ |
| POUR #3 | |
| LATERAL GUIDE | 0.1 m³ |
| TOTAL CLASS A CONCRETE | 16.6 m³ |
| HP 310 X 79 STEEL PILES | |
| No. = 10 | 45 METERS |
| STEEL PILE POINTS | No. = 10 |




## DETAIL "A"

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
14 APR 10

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-17 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

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CHECKED BY : D.G. ELY DATE : 8-2008

14-APR-2010 14:30
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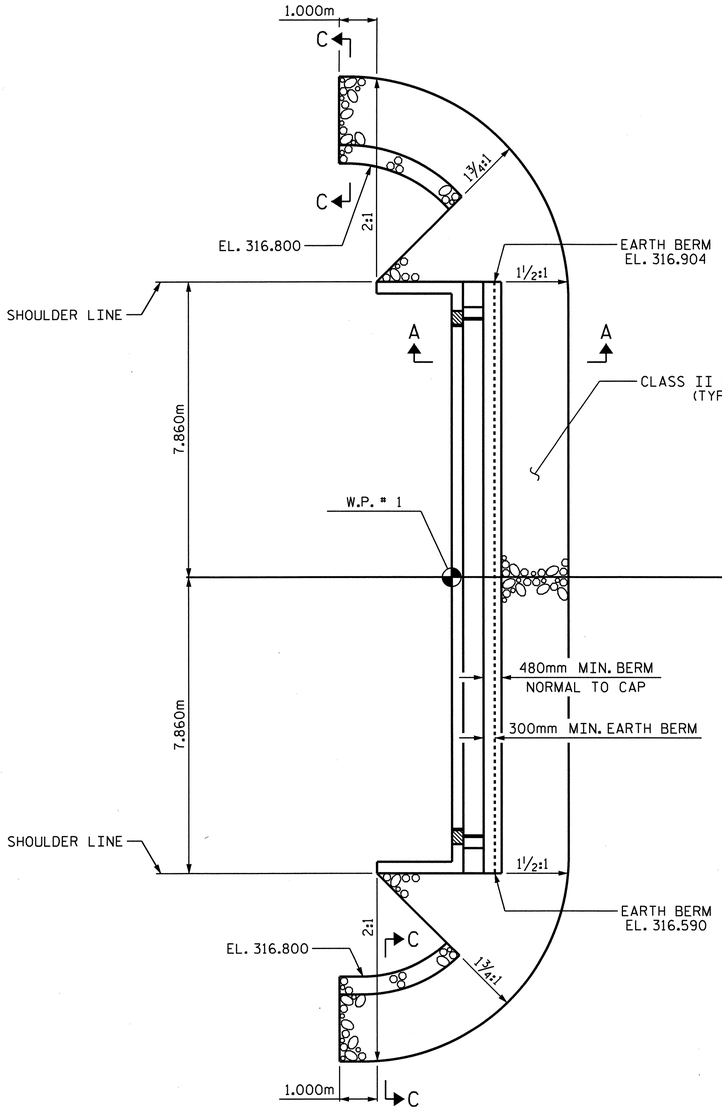
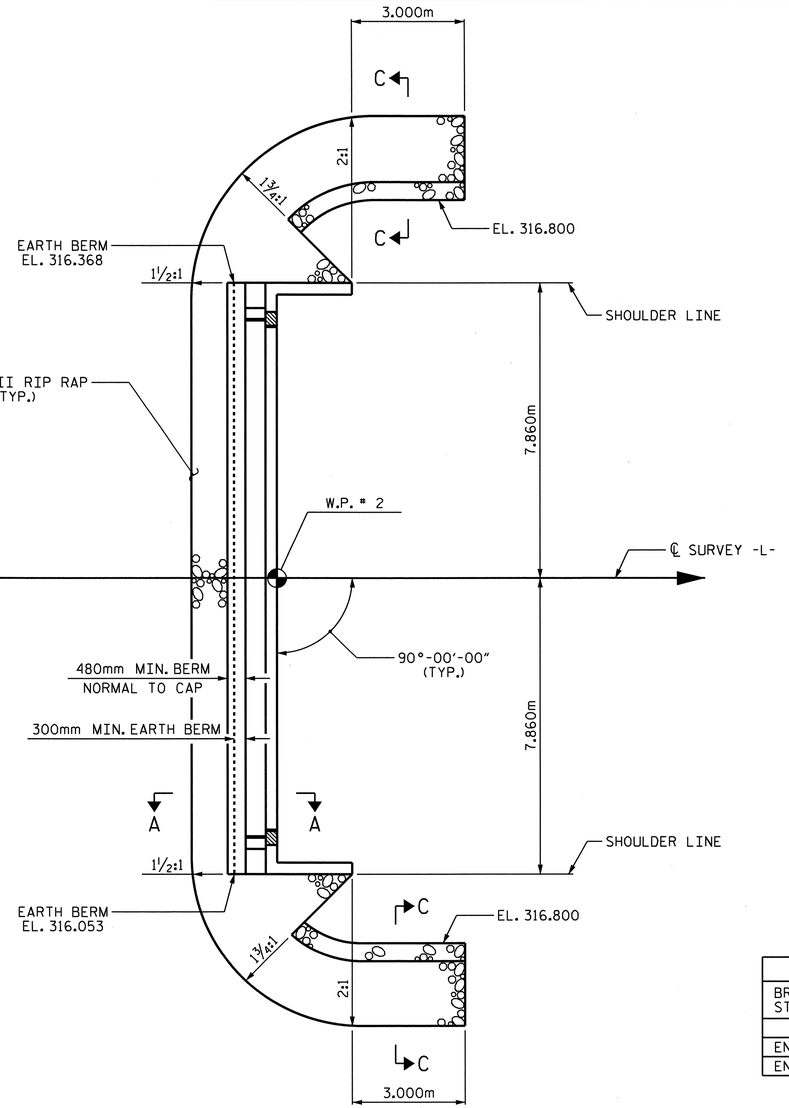
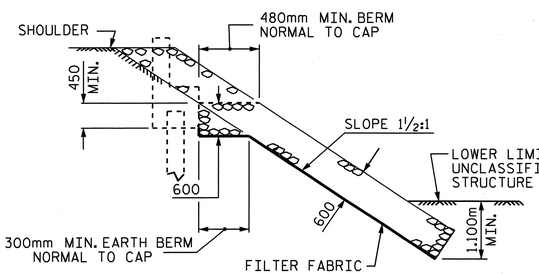



PLAN OF RIP RAP @
END BENT No. 1

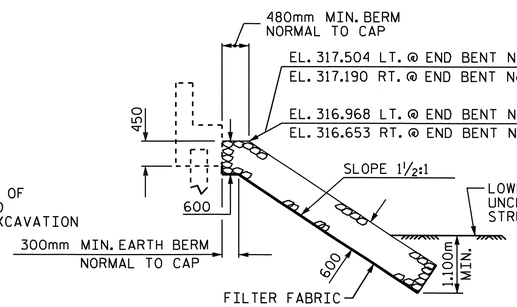



PLAN OF RIP RAP @
END BENT No. 2

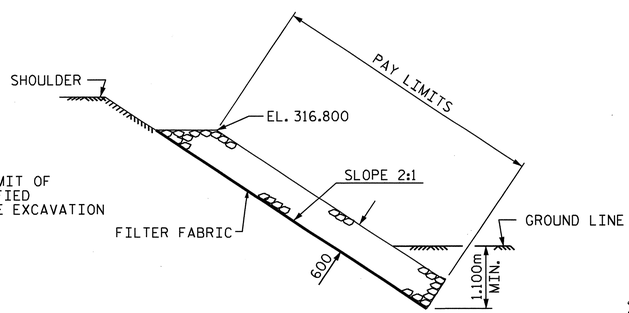
| ESTIMATED QUANTITIES | | |
|---|---|---|
| BRIDGE @ STA. 20+72.950 -L- | RIP RAP CLASS II | FILTER FABRIC FOR DRAINAGE |
| | METRIC TON | SQUARE METERS |
| END BENT 1 | 120 | 125 |
| END BENT 2 | 110 | 115 |




SECTION A-A




℄ SECTION
BERM RIP RAPPED




SECTION C-C

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-18 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

14-APR-2010 14:31
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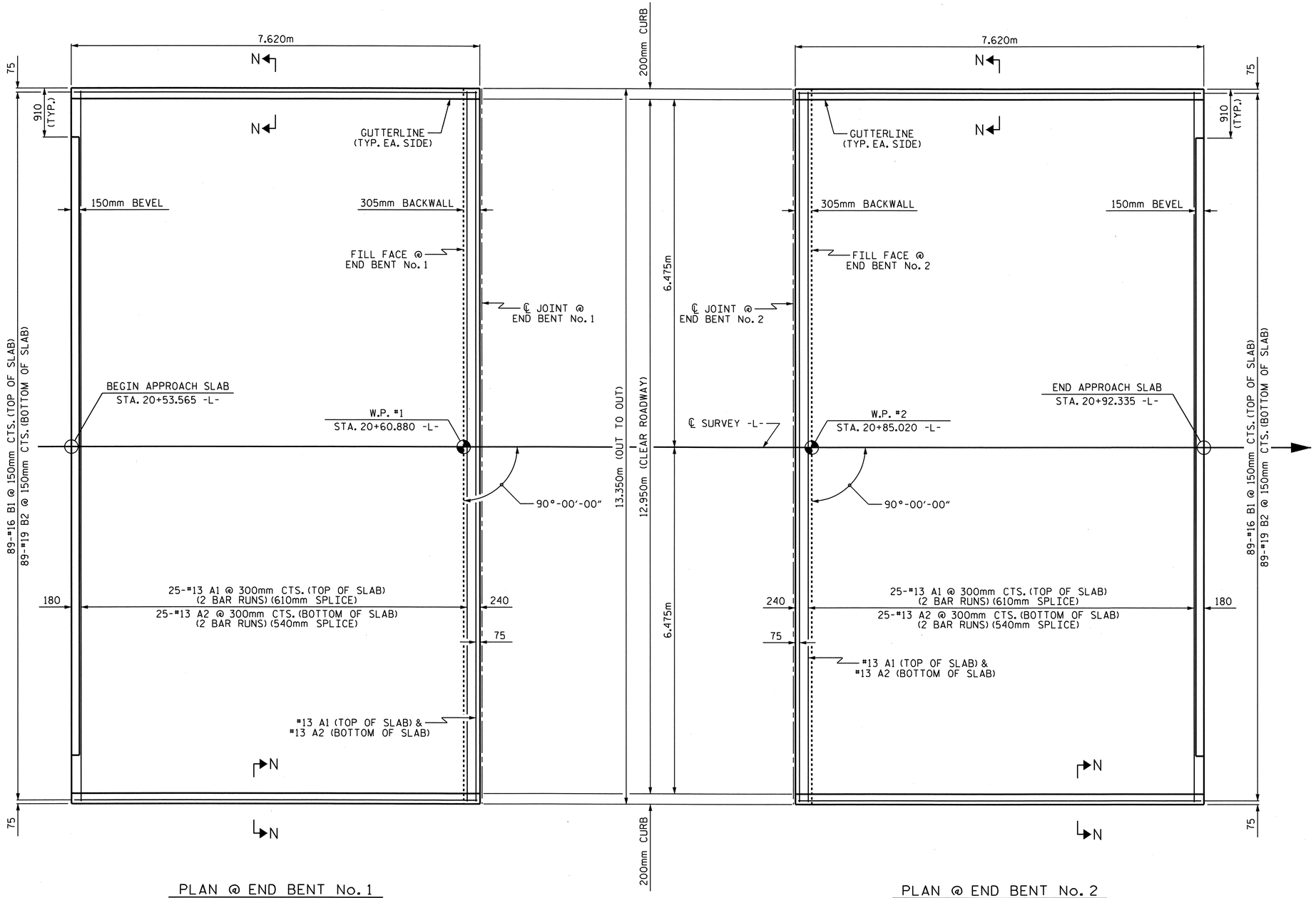
tjbankovich

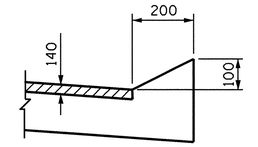
STD. NO. RR2SM



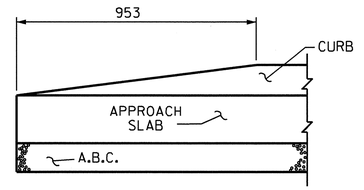

PLAN @ END BENT No. 1

PLAN @ END BENT No. 2

## PLAN OF APPROACH SLABS




SECTION N-N




END OF CURB WITHOUT SHOULDER BERM GUTTER

## CURB DETAILS

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-19 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 20 |

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX

DRAWN BY : T. BANKOVICH DATE : 6-2008
CHECKED BY : D.G. ELY DATE : 8-2008

14-APR-2010 14:31
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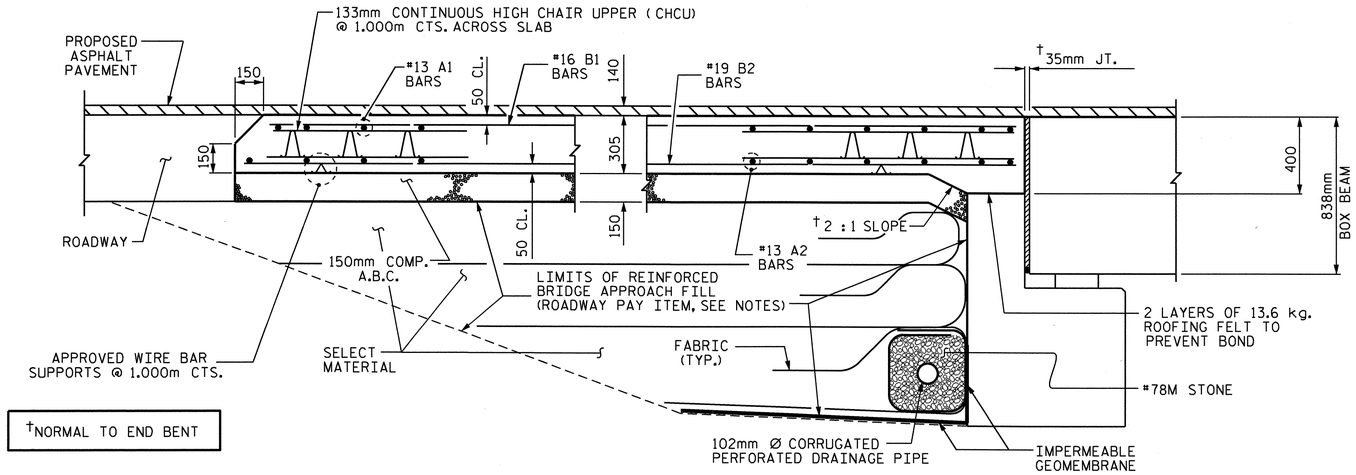
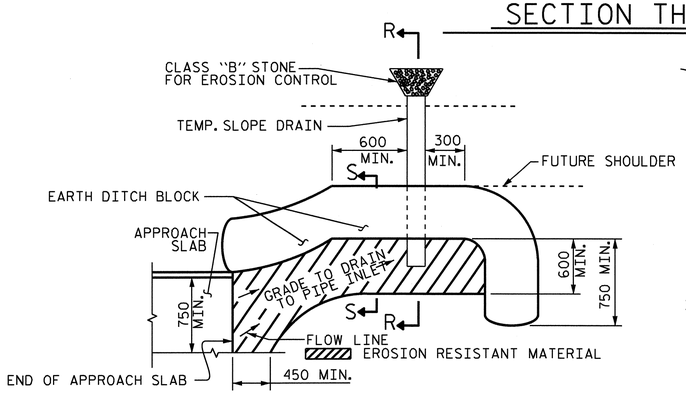
tjbankovich



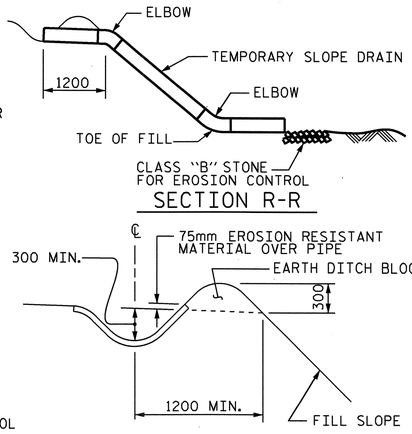

†NORMAL TO END BENT

## SECTION THRU SLAB




NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 50mm DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 305mm IN DIAMETER.

PLAN VIEW




SECTION R-R




SECTION S-S

# TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

## NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 102mm Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

THE 150mm COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 300mm OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 100mm TYPE B-25.0B ASPHALT CONCRETE COURSE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 125mm CLASS "A" CONCRETE BASE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. 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 APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

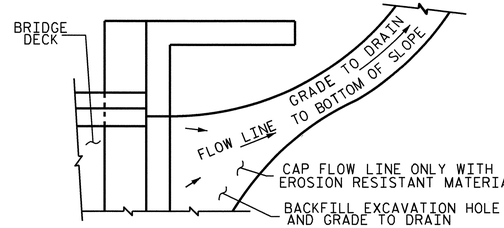
## BILL OF MATERIAL

### APPROACH SLAB AT EB No. 1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| ✱A1 | 52 | #13 | STR | 6940 | 359 |
| A2 | 52 | #13 | STR | 6900 | 357 |
| | | | | | |
| ✱B1 | 89 | #16 | STR | 7360 | 1017 |
| B2 | 89 | #19 | STR | 7520 | 1496 |
| | | | | | |
| REINFORCING STEEL | | | | | 1853 kg. |
| ✱EPOXY COATED REINFORCING STEEL | | | | | 1376 kg. |
| | | | | | |
| CLASS AA CONCRETE | | | | | 32.0m³ |

### APPROACH SLAB AT EB No. 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| ✱A1 | 52 | #13 | STR | 6940 | 359 |
| A2 | 52 | #13 | STR | 6900 | 357 |
| | | | | | |
| ✱B1 | 89 | #16 | STR | 7360 | 1017 |
| B2 | 89 | #19 | STR | 7520 | 1496 |
| | | | | | |
| REINFORCING STEEL | | | | | 1853 kg. |
| ✱EPOXY COATED REINFORCING STEEL | | | | | 1376 kg. |
| | | | | | |
| CLASS AA CONCRETE | | | | | 32.0m³ |




NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. R-2824

BURKE COUNTY

STATION: 20+72.950 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX
4-14-10

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

| | | |
|---|---|---|
| ASSEMBLED BY : T. BANKOVICH | DATE : 6-2008 | |
| CHECKED BY : D.G. ELY | DATE : 8-2008 | |
| DRAWN BY : FCJ 6/87 | REV. 7/10/01 | LES/RDR |
| CHECKED BY : EGA 6/87 | REV. 5/7/03R | RWW/JTE |
| | REV. 5/1/06R | KMM/GM |

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tjbankovich

# STANDARD NOTES

## DESIGN DATA:

| | |
|---|---|
| SPECIFICATIONS | A.A.S.H.T.O. (CURRENT) |
| LIVE LOAD | SEE PLANS |
| IMPACT ALLOWANCE | SEE A.A.S.H.T.O. |
| STRESS IN EXTREME FIBER OF | |
| STRUCTURAL STEEL - AASHTO M270 GRADE 250 | 140 MPa |
| - AASHTO M270 GRADE 345W | 190 MPa |
| - AASHTO M270 GRADE 345 | 190 MPa |
| REINFORCING STEEL IN TENSION | |
| GRADE 420 | 165 MPa |
| CONCRETE IN COMPRESSION | 8.3 MPa |
| CONCRETE IN SHEAR | SEE A.A.S.H.T.O. |
| STRUCTURAL TIMBER - TREATED OR | |
| UNTREATED - EXTREME FIBER STRESS | 12 MPa |
| COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER | 2.6 MPa |
| EQUIVALENT FLUID PRESSURE OF EARTH | 480 $kg/m^3$ (MINIMUM) |

## MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

## CONCRETE:

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

## CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 19mm WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 38mm RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 6mm FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 6mm RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

## DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 300mm INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1 :2 CEMENT MORTAR.

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

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

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

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

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

## REINFORCING STEEL:

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

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

## STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 22.23mm Ø SHEAR STUDS FOR THE 19.05mm Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 22.23mm Ø STUDS ALONG THE BEAM AS SHOWN FOR 19.05mm Ø STUDS BASED ON THE RATIO OF 3 - 22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 610mm.

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 8mm IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 50mm OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991. THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 2mm OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

## HANDRAILS AND POSTS:

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

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

## SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

METRIC

JANUARY, 1990

STD. NO. SNSM

REV. 5/16/97 EEM/RGW REV. 5/7/03 RWW (/) JTE
REV. 8/16/99 RWW (/) LES REV. 5/1/06 TLA (/) GM

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