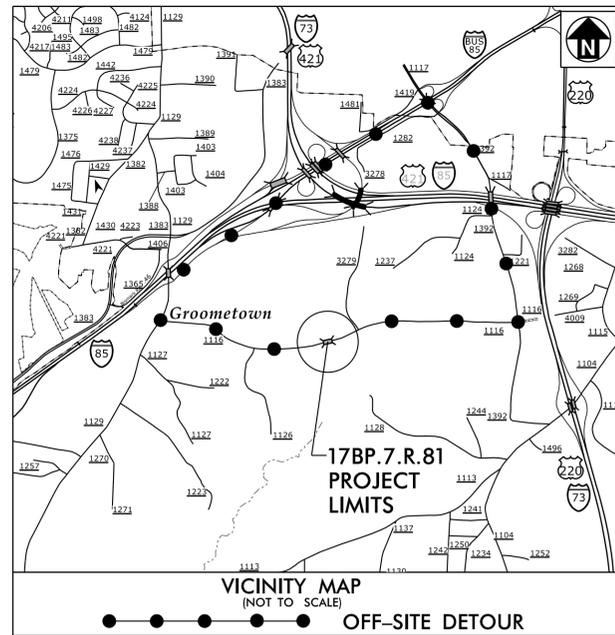


TIP PROJECT: 17BP.7.R.81

CONTRACT:

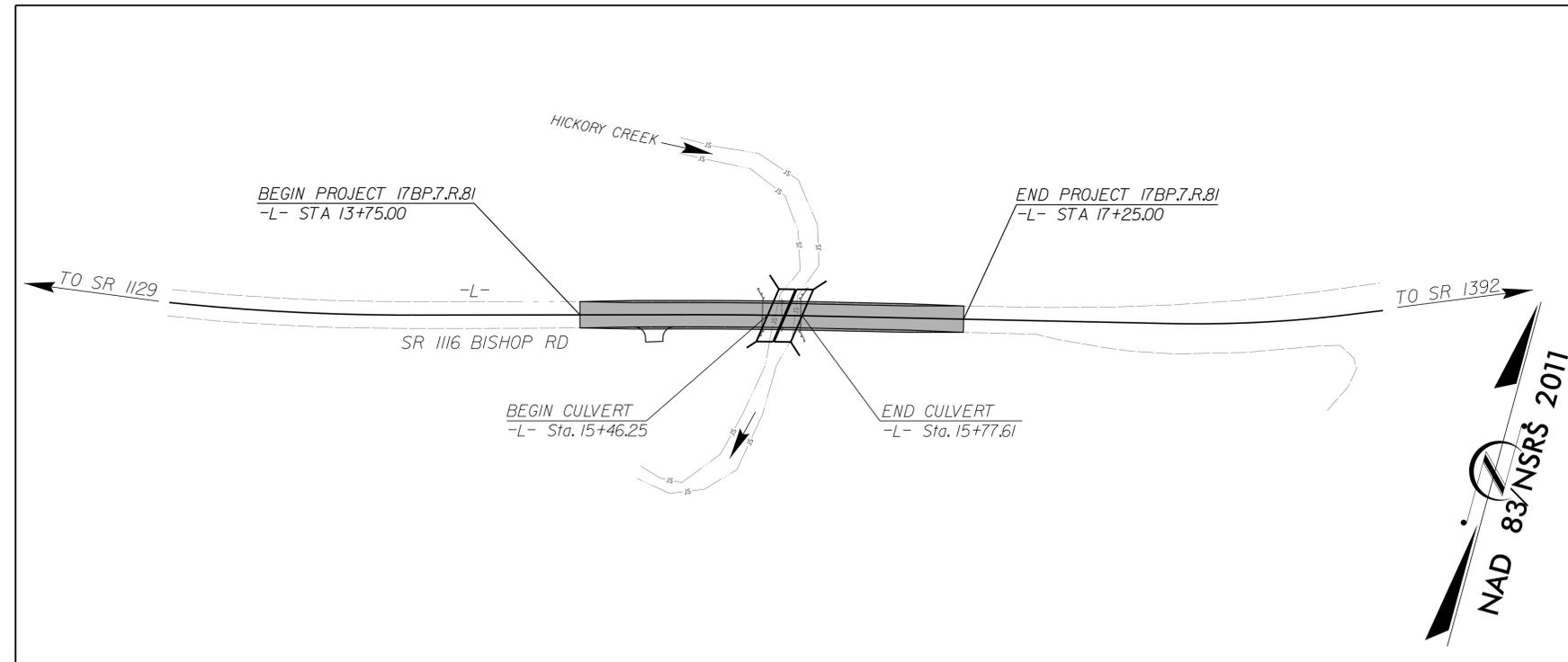


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
GUILFORD COUNTY

LOCATION: BRIDGE NO.40 OVER HICKORY CREEK ON SR 1116 (BISHOP ROAD)

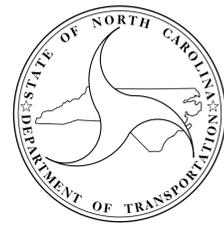
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------------------|-----------------------------|-------------|--------------|
| N.C. | 17BP.7.R.81 | 1 | |
| STATE PROJECT NO. | F.A. PROJ. NO. | DESCRIPTION | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



***DESIGN EXCEPTION:**
SAG VERTICAL CURVE K
VERTICAL SSD

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



DESIGN DATA

ADT 2011 = 2250
V = 45 MPH
SUB REGIONAL TIER
LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT = 0.060 MILES
LENGTH STRUCTURE TIP PROJECT = 0.006 MILES
TOTAL LENGTH TIP PROJECT = 0.066 MILES

Prepared in the Office of Hatch Matt MacDonald for
DIVISION 7
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

| 2012 STANDARD SPECIFICATIONS | |
|------------------------------|---|
| LETTING DATE: | TIM JORDAN, PE PROJECT ENGINEER |
| | GALEN CAIL, PE HYDRAULICS ENGINEER |
| NCDOT CONTACT: | TIM POWERS, PE DIVISION BRIDGE PROGRAM MANAGER |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA
PROFESSIONAL
SEAL
21102
ENGINEER
TIMOTHY JORDAN
9/27/2016
P.E.

HYDRAULICS ENGINEER

NORTH CAROLINA
PROFESSIONAL
SEAL
022000
ENGINEER
GALEN CAIL
9/28/2016
P.E.

PLANS PREPARED BY:

M M
MOTT
MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
(919) 552-2254 (Fax)
www.mottmac.com
LICENSE NO. F-0669

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 10-31-2014

**GRADE LINE:
GRADING AND SURFACING:**

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE AT&T, TIME WARNER CABLE, DUKE ENERGY, CITY OF GREENSBORO, AND PIEDMONT NATURAL GAS.
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

| | |
|--|---|
| PROJECT REFERENCE | SHEET NO. |
| 17BP.7.R.81 - GUILFORD #40 | 1-A |
| ROADWAY DESIGN ENGINEER | |
| | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
| Prepared in the Office of: | |
| | MOTT MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com |

| SHEET NUMBER | INDEX OF SHEETS DESCRIPTION |
|------------------|---|
| 1 | TITLE SHEET |
| 1-A | INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS |
| 1-B | CONVENTIONAL SYMBOLS |
| 2 | PAVEMENT SCHEDULE AND TYPICAL SECTIONS |
| 4 | PLAN SHEET AND PROFILE SHEET |
| TMP-1 THRU TMP-4 | TRAFFIC MANAGEMENT PLANS |
| EC-1 THRU EC-5 | EROSION CONTROL PLANS |
| RF-1 | REFORESTATION DETAIL |
| UC-1 THRU UC-5 | UTILITY CONSTRUCTION PLANS |
| UD-1 | UTILITIES BY OTHERS PLAN |
| X-1 THRU X-4 | CROSS-SECTIONS |
| C-1 THRU C-7 | CULVERT PLANS |

EFF. 01-17-2012
REV. 02-29-2016

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

| STD.NO. | TITLE |
|---|---|
| DIVISION 2 - EARTHWORK | |
| 200.02 | Method of Clearing - Method II |
| 225.02 | Guide for Grading Subgrade - Secondary and Local |
| 225.04 | Method of Obtaining Superelevation - Two Lane Pavement |
| DIVISION 5 - SUBGRADE, BASES AND SHOULDERS | |
| 560.01 | Method of Shoulder Construction - High Side of Superelevated Curve - Method I |
| DIVISION 8 - INCIDENTALS | |
| 862.01 | Guardrail Placement |
| 862.02 | Guardrail Installation |
| 876.01 | Rip Rap in Channels |
| 876.04 | Drainage Ditches with Class 'B' Rip Rap |

I:\66165
 R:\Roadway\Proj\400040_rdl_psh1A.dgn
 9/27/2016 9:34:49 AM

GRADING (LUMP SUM)

| ITEM | QUANTITIES | UNIT |
|--|-------------------|-----------------|
| CLEARING AND GRUBBING | <u>0.50</u> | ACRES |
| UNCLASSIFIED EXCAVATION | <u>21</u> | YD ³ |
| BORROW EXCAVATION | <u>1,668</u> | YD ³ |
| SHOULDER BORROW | <u> </u> | YD ³ |
| FINE GRADING | <u>390</u> | YD ² |
| REMOVAL OF EXISTING ASPHALT PAVEMENT | <u>215</u> | YD ² |
| REMOVAL OF EXISTING CONCRETE PAVEMENT | <u> </u> | YD ² |
| BREAKING OF EXISTING ASPHALT PAVEMENT | <u> </u> | YD ² |
| BREAKING OF EXISTING CONCRETE PAVEMENT | <u> </u> | YD ² |

The above quantities are ESTIMATES. Differences in the estimated quantities and actual quantities shall not be grounds for a claim or a change in unit price.

Note: Not to Scale

***S.U.E. = Subsurface Utility Engineering**

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

| | |
|--|--|
| State Line | ----- |
| County Line | ----- |
| Township Line | ----- |
| City Line | ----- |
| Reservation Line | ----- |
| Property Line | ----- |
| Existing Iron Pin | -----  |
| Property Corner | -----  |
| Property Monument | -----  |
| Parcel/Sequence Number | -----  |
| Existing Fence Line | -----  |
| Proposed Woven Wire Fence | -----  |
| Proposed Chain Link Fence | -----  |
| Proposed Barbed Wire Fence | -----  |
| Existing Wetland Boundary | -----  |
| Proposed Wetland Boundary | -----  |
| Existing Endangered Animal Boundary | -----  |
| Existing Endangered Plant Boundary | -----  |
| Known Soil Contamination: Area or Site | -----  |
| Potential Soil Contamination: Area or Site | -----  |

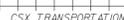
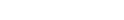
BUILDINGS AND OTHER CULTURE:

| | |
|-------------------------------|---|
| Gas Pump Vent or U/G Tank Cap | -----  |
| Sign | -----  |
| Well | -----  |
| Small Mine | -----  |
| Foundation | -----  |
| Area Outline | -----  |
| Cemetery | -----  |
| Building | -----  |
| School | -----  |
| Church | -----  |
| Dam | -----  |

HYDROLOGY:

| | |
|------------------------------------|--|
| Stream or Body of Water | ----- |
| Hydro, Pool or Reservoir | -----  |
| Jurisdictional Stream | -----  |
| Buffer Zone 1 | -----  |
| Buffer Zone 2 | -----  |
| Flow Arrow | -----  |
| Disappearing Stream | -----  |
| Spring | -----  |
| Wetland | -----  |
| Proposed Lateral, Tail, Head Ditch | -----  |
| False Sump | -----  |

RAILROADS:

| | |
|--------------------|---|
| Standard Gauge | -----  |
| RR Signal Milepost | -----  |
| Switch | -----  |
| RR Abandoned | -----  |
| RR Dismantled | -----  |

RIGHT OF WAY:

| | |
|---|---|
| Baseline Control Point | -----  |
| Existing Right of Way Marker | -----  |
| Existing Right of Way Line | -----  |
| Proposed Right of Way Line | -----  |
| Proposed Right of Way Line with Iron Pin and Cap Marker | -----  |
| Proposed Right of Way Line with Concrete or Granite RW Marker | -----  |
| Proposed Control of Access Line with Concrete CA Marker | -----  |
| Existing Control of Access | -----  |
| Proposed Control of Access | -----  |
| Existing Easement Line | -----  |
| Proposed Temporary Construction Easement | -----  |
| Proposed Temporary Drainage Easement | -----  |
| Proposed Permanent Drainage Easement | -----  |
| Proposed Permanent Drainage / Utility Easement | -----  |
| Proposed Permanent Utility Easement | -----  |
| Proposed Temporary Utility Easement | -----  |
| Proposed Aerial Utility Easement | -----  |
| Proposed Permanent Easement with Iron Pin and Cap Marker | -----  |

ROADS AND RELATED FEATURES:

| | |
|----------------------------|---|
| Existing Edge of Pavement | ----- |
| Existing Curb | ----- |
| Proposed Slope Stakes Cut | -----  |
| Proposed Slope Stakes Fill | -----  |
| Proposed Curb Ramp | -----  |
| Existing Metal Guardrail | -----  |
| Proposed Guardrail | -----  |
| Existing Cable Guiderail | -----  |
| Proposed Cable Guiderail | -----  |
| Equality Symbol | -----  |
| Pavement Removal | -----  |

VEGETATION:

| | |
|--------------|---|
| Single Tree | -----  |
| Single Shrub | -----  |
| Hedge | -----  |
| Woods Line | -----  |

| | |
|----------|---|
| Orchard | -----  |
| Vineyard | -----  |

EXISTING STRUCTURES:

| | |
|--|---|
| MAJOR: | |
| Bridge, Tunnel or Box Culvert | -----  |
| Bridge Wing Wall, Head Wall and End Wall | -----  |
| MINOR: | |
| Head and End Wall | -----  |
| Pipe Culvert | -----  |
| Footbridge | -----  |
| Drainage Box: Catch Basin, DI or JB | -----  |
| Paved Ditch Gutter | -----  |
| Storm Sewer Manhole | -----  |
| Storm Sewer | -----  |

UTILITIES:

| | |
|-------------------------------------|---|
| POWER: | |
| Existing Power Pole | -----  |
| Proposed Power Pole | -----  |
| Existing Joint Use Pole | -----  |
| Proposed Joint Use Pole | -----  |
| Power Manhole | -----  |
| Power Line Tower | -----  |
| Power Transformer | -----  |
| U/G Power Cable Hand Hole | -----  |
| H-Frame Pole | -----  |
| Recorded U/G Power Line | -----  |
| Designated U/G Power Line (S.U.E.*) | -----  |

TELEPHONE:

| | |
|---|---|
| Existing Telephone Pole | -----  |
| Proposed Telephone Pole | -----  |
| Telephone Manhole | -----  |
| Telephone Booth | -----  |
| Telephone Pedestal | -----  |
| Telephone Cell Tower | -----  |
| U/G Telephone Cable Hand Hole | -----  |
| Recorded U/G Telephone Cable | -----  |
| Designated U/G Telephone Cable (S.U.E.*) | -----  |
| Recorded U/G Telephone Conduit | -----  |
| Designated U/G Telephone Conduit (S.U.E.*) | -----  |
| Recorded U/G Fiber Optics Cable | -----  |
| Designated U/G Fiber Optics Cable (S.U.E.*) | -----  |

WATER:

| | |
|-------------------------------------|---|
| Water Manhole | -----  |
| Water Meter | -----  |
| Water Valve | -----  |
| Water Hydrant | -----  |
| Recorded U/G Water Line | -----  |
| Designated U/G Water Line (S.U.E.*) | -----  |
| Above Ground Water Line | -----  |

TV:

| | |
|--|---|
| TV Satellite Dish | -----  |
| TV Pedestal | -----  |
| TV Tower | -----  |
| U/G TV Cable Hand Hole | -----  |
| Recorded U/G TV Cable | -----  |
| Designated U/G TV Cable (S.U.E.*) | -----  |
| Recorded U/G Fiber Optic Cable | -----  |
| Designated U/G Fiber Optic Cable (S.U.E.*) | -----  |

GAS:

| | |
|-----------------------------------|---|
| Gas Valve | -----  |
| Gas Meter | -----  |
| Recorded U/G Gas Line | -----  |
| Designated U/G Gas Line (S.U.E.*) | -----  |
| Above Ground Gas Line | -----  |

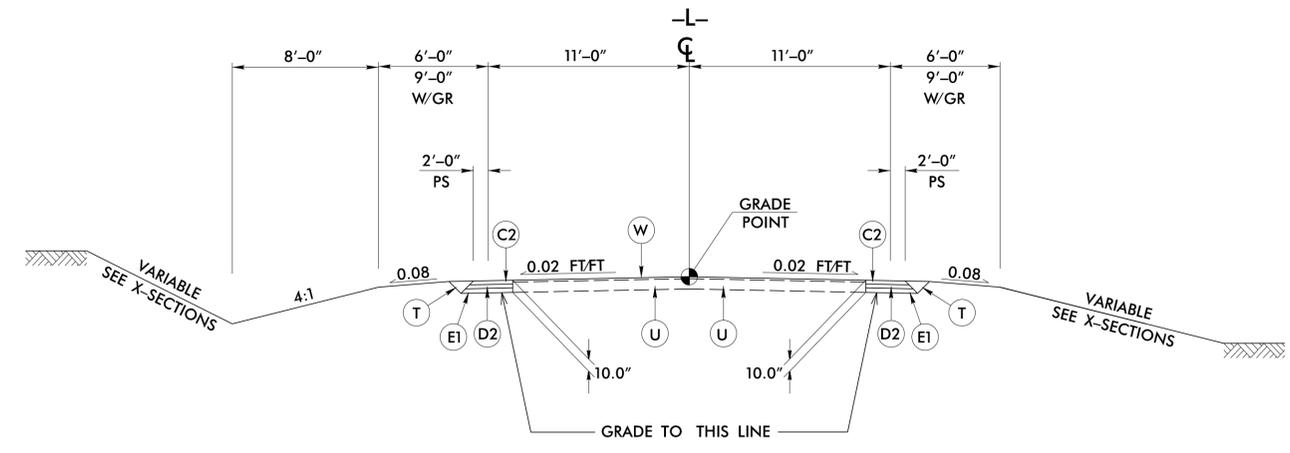
SANITARY SEWER:

| | |
|--|---|
| Sanitary Sewer Manhole | -----  |
| Sanitary Sewer Cleanout | -----  |
| U/G Sanitary Sewer Line | -----  |
| Above Ground Sanitary Sewer | -----  |
| Recorded SS Forced Main Line | -----  |
| Designated SS Forced Main Line (S.U.E.*) | -----  |

MISCELLANEOUS:

| | |
|--|---|
| Utility Pole | -----  |
| Utility Pole with Base | -----  |
| Utility Located Object | -----  |
| Utility Traffic Signal Box | -----  |
| Utility Unknown U/G Line | -----  |
| U/G Tank; Water, Gas, Oil | -----  |
| Underground Storage Tank, Approx. Loc. | -----  |
| A/G Tank; Water, Gas, Oil | -----  |
| Geoenvironmental Boring | -----  |
| U/G Test Hole (S.U.E.*) | -----  |
| Abandoned According to Utility Records | -----  |
| End of Information | -----  |

| | |
|--|--|
| PROJECT REFERENCE | SHEET NO. |
| 17BP.7.R.81 - GUILFORD #40 | 2 |
| ROADWAY DESIGN ENGINEER | |
| | |
| MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669 | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
| Prepared in the Office of: | MOTT MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmcc.com |

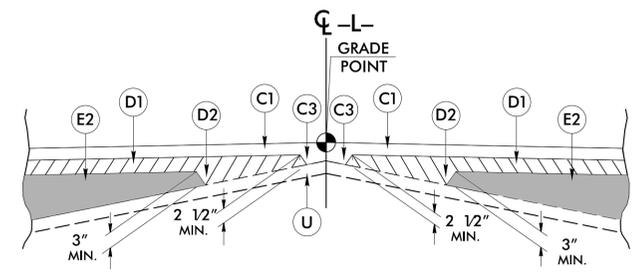


TYPICAL SECTION NO. 1

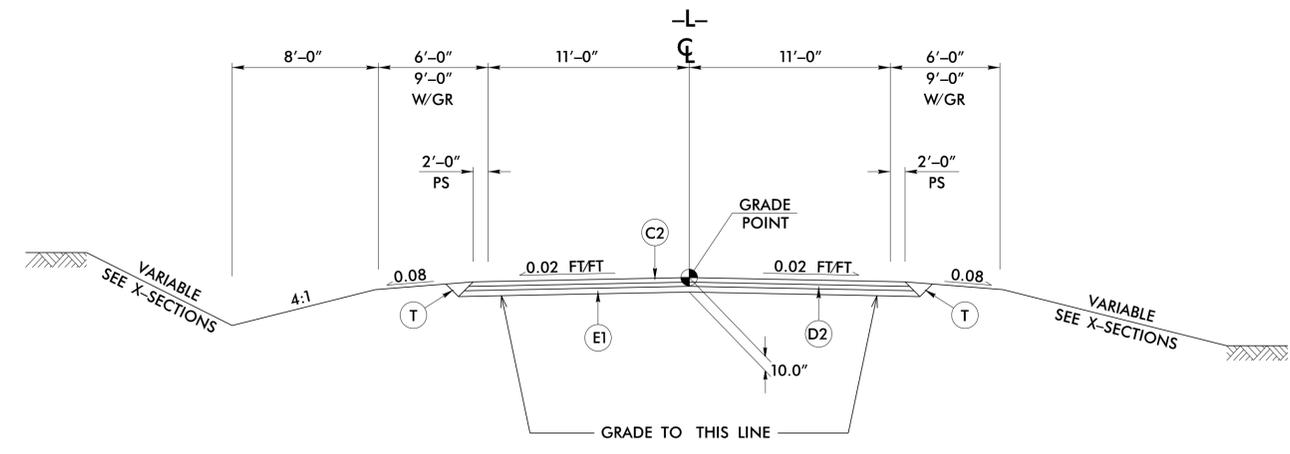
TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
 -L- STA 13+75.00 TO 14+25.00

USE TYPICAL SECTION NO. 1:
 -L- STA 14+25.00 TO 15+10.00
 -L- STA 16+15.00 TO 16+75.00

TRANSITION FROM TYPICAL SECTION NO. 2 TO EXISTING:
 -L- STA 16+75.00 TO 17+25.00



Detail Showing Method of Wedging



TYPICAL SECTION NO. 2

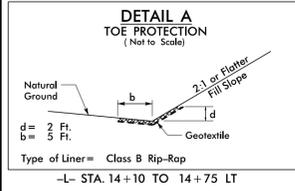
USE TYPICAL SECTION NO. 2:
 -L- STA 15+10.00 TO 16+15.00

| PAVEMENT SCHEDULE | |
|-------------------|--|
| C1 | PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. |
| C2 | PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS. |
| C3 | PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" IN DEPTH OR GREATER THAN 2" IN DEPTH. |
| D1 | PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. |
| D2 | PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH. |
| E1 | PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. |
| E2 | PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH. |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| W | WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING). |

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

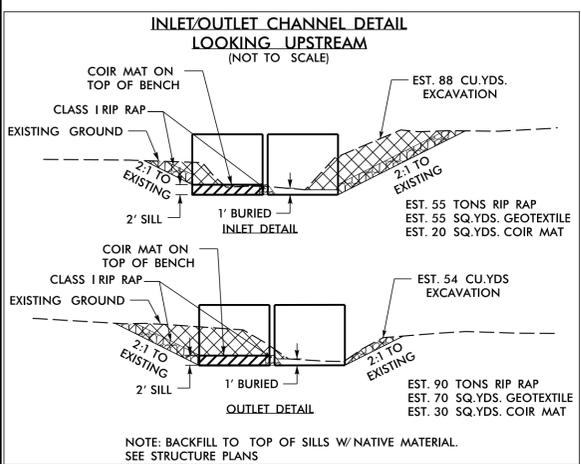
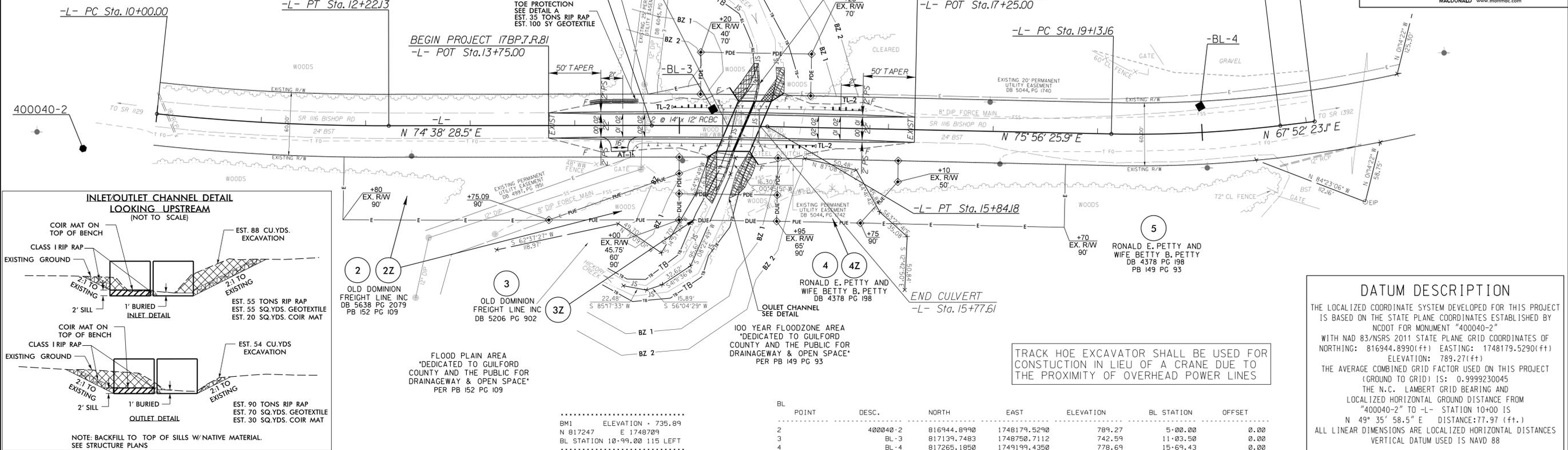
jcr66165
 R:\Roadway\17BP.7.R.81\400040_rdl_tjup.dgn
 9/27/2016 9:34:54 AM

*DESIGN EXCEPTION:
SAG VERTICAL CURVE K
VERTICAL SSD



-L-
 PI Sta 11+11.7 PI Sta 15+28.91 PI Sta 19+94.26
 $\Delta = 6^{\circ}03'38.2''$ (LT) $\Delta = 1^{\circ}17'57.4''$ (RT) $\Delta = 8^{\circ}04'02.8''$ (LT)
 $D = 2^{\circ}43'42.1''$ $D = 1^{\circ}10'31.1''$ $D = 4^{\circ}58'56.1''$
 $L = 222.13'$ $L = 110.55'$ $L = 161.92'$
 $T = 111.17'$ $T = 55.28'$ $T = 81.10'$
 $R = 2,100.00'$ $R = 4,875.00'$ $R = 1,150.00'$

| | |
|--|---|
| PROJECT REFERENCE 17BP.7.R.81 - GUILFORD #40 | SHEET NO. 4 |
| ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 21102 MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669 | HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 022000 MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669 |
| <p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>Prepared in the Office of:</p> | |
| <p>MOTT MACDONALD 1 & E, LLC PO Box 700 Fuquay-Varina, NC 27526 www.mottmcc.com</p> | |



| BL POINT | DESC. | NORTH | EAST | ELEVATION | BL STATION | OFFSET |
|----------|--------------------|-------------|--------------|-----------|------------|--------|
| BMI | ELEVATION = 735.89 | | | | | |
| 2 | 400040-2 | 816944.8990 | 1748179.5290 | 789.27 | 5+00.00 | 0.00 |
| 3 | BL-3 | 817139.7483 | 1748750.7112 | 742.59 | 11+03.50 | 0.00 |
| 4 | BL-4 | 817265.1850 | 1749199.4350 | 778.69 | 15+69.43 | 0.00 |

DATUM DESCRIPTION

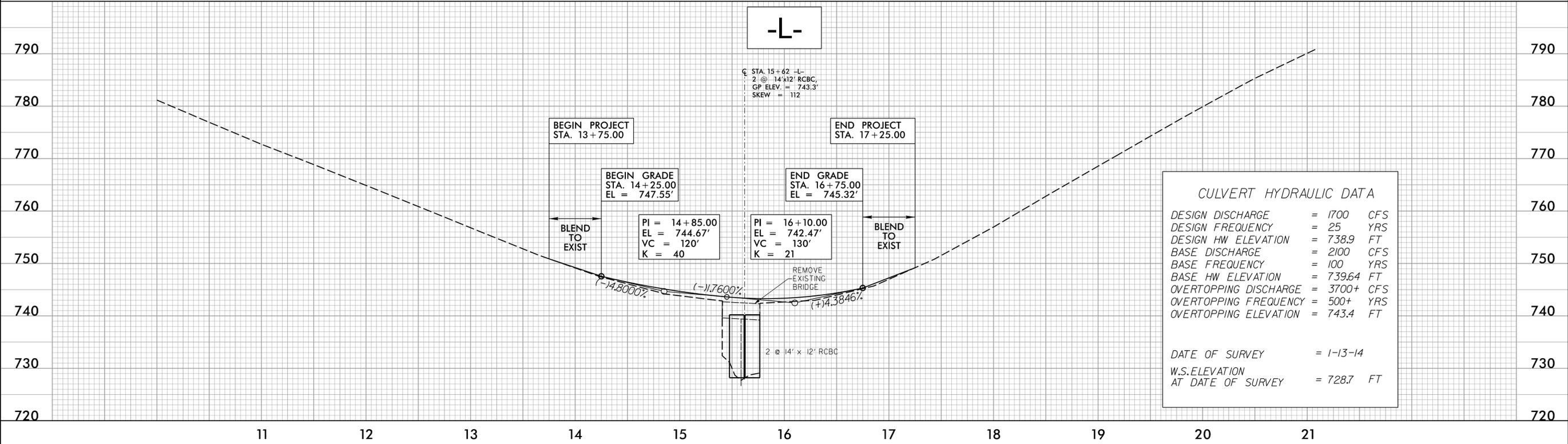
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "400040-2" WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 816944.8990(ft) EASTING: 1748179.5290(ft) ELEVATION: 789.27(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999230045

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "400040-2" TO -L- STATION 10+00 IS N 49° 35' 58.5" E DISTANCE: 77.97 (ft.)

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

TRACK HOE EXCAVATOR SHALL BE USED FOR CONSTRUCTION IN LIEU OF A CRANE DUE TO THE PROXIMITY OF OVERHEAD POWER LINES



CULVERT HYDRAULIC DATA

| | |
|----------------------------------|-------------|
| DESIGN DISCHARGE | = 1700 CFS |
| DESIGN FREQUENCY | = 25 YRS |
| DESIGN HW ELEVATION | = 738.9 FT |
| BASE DISCHARGE | = 2100 CFS |
| BASE FREQUENCY | = 100 YRS |
| BASE HW ELEVATION | = 739.64 FT |
| OVERTOPPING DISCHARGE | = 3700+ CFS |
| OVERTOPPING FREQUENCY | = 500+ YRS |
| OVERTOPPING ELEVATION | = 743.4 FT |
| DATE OF SURVEY | = 1-13-14 |
| W.S. ELEVATION AT DATE OF SURVEY | = 728.7 FT |

9/28/2016 4:50:40 PM
 P:\Roadway\17BP.7.R.81\400040_r.dwg_psh.dgn
 ID: 66165

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" – HIGHWAY DESIGN BRANCH– N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

| STD. | TITLE |
|---------|--|
| 1101.03 | TEMPORARY ROAD CLOSURES |
| 1110.01 | STATIONARY WORK ZONE SIGNS |
| 1145.01 | BARRICADES |
| 1205.01 | PAVEMENT MARKINGS – LINE TYPES AND OFFSETS |
| 1205.02 | PAVEMENT MARKINGS – TWO-LANE AND MULTI-LANE ROADWAYS |
| 1261.01 | GUARDRAIL AND BARRIER DELINEATORS – INSTALLATION SPACING |
| 1261.02 | GUARDRAIL AND BARRIER DELINEATORS – TYPES AND MOUNTING |
| 1262.01 | GUARDRAIL END DELINEATION |

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRABLE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

- A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- B) PROVIDE PERMANENT SIGNING.
- C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

- D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

- E) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

- F) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

- G) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE.

| PROJECT REFERENCE | SHEET NO. |
|--|---|
| 17BP.7.R.81 – GUILFORD #40 | TMP-1 |
| ROADWAY DESIGN ENGINEER  | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
| Prepared in the Office of: | M MOTT MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmcc.com |

PHASING

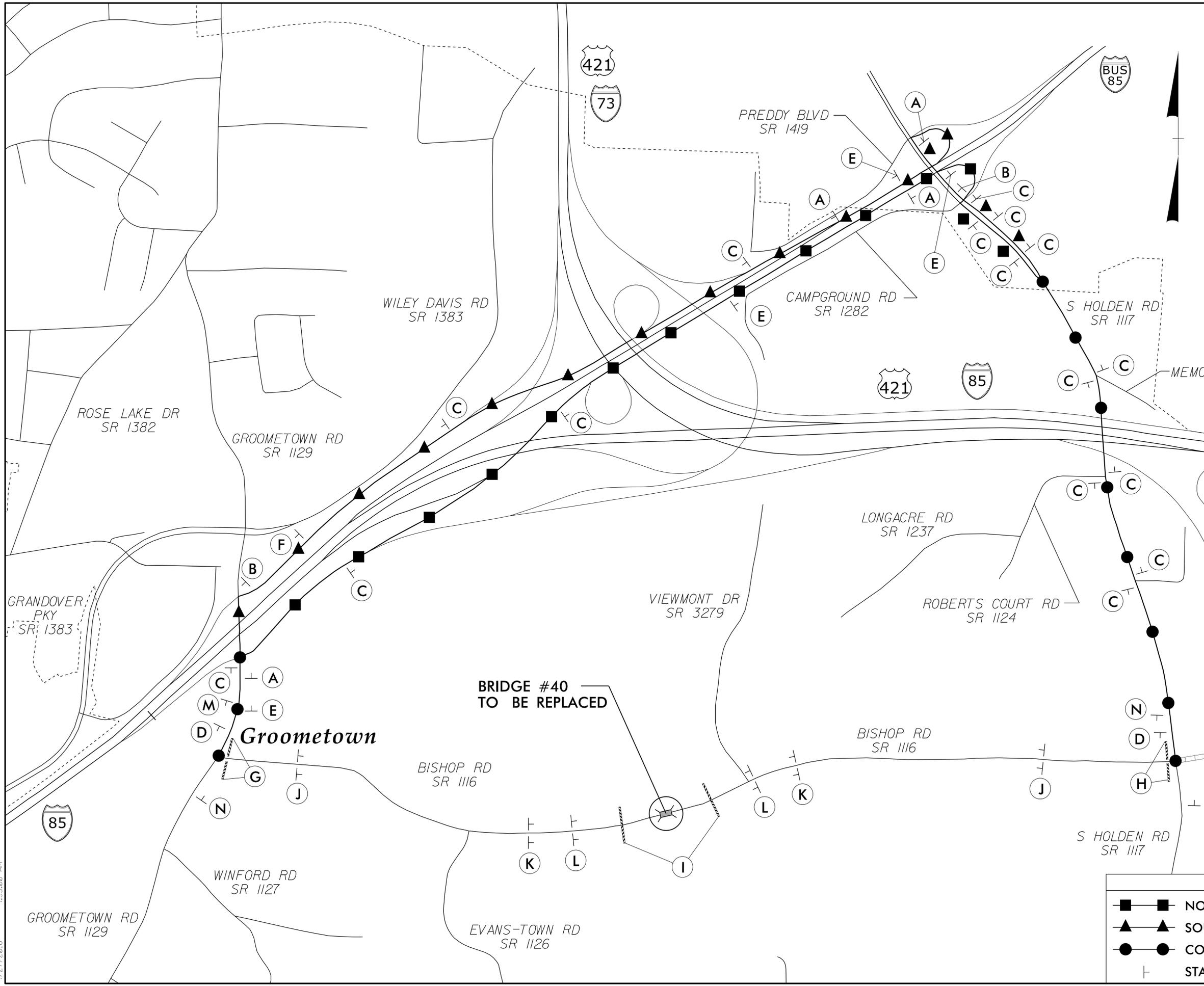
- STEP 1: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, AND SHEETS TMP-2 & TMP-3, PERFORM THE FOLLOWING:
 – INSTALL ALL ROAD CLOSURE AND DETOUR SIGNING INCLUDING BARRICADES
 – CLOSE SR 1116 (BISHOP ROAD)
 – PLACE TRAFFIC ONTO OFF-SITE DETOUR
- STEP 2: REMOVE EXISTING BRIDGE #40 AND CONSTRUCT THE PROPOSED CULVERT AND APPROACHES AS SHOWN IN THE CONSTRUCTION PLANS.
- STEP 3: INSTALL FINAL PAVEMENT MARKINGS.
- STEP 4: REMOVE ALL TRAFFIC CONTROL SIGNING AND DEVICES AND RE-OPEN SR 1116 (BISHOP ROAD) TO THE FINAL TRAFFIC PATTERN.

PAVEMENT MARKING

PAINT WHITE EDGELINE (4") 1,400 LF
 PAINT YELLOW DOUBLE CENTER (4") 1,400 LF

NOTE: QUANTITY INCLUDES 2 APPLICATIONS OF EACH

| | |
|---|---|
| PROJECT REFERENCE | SHEET NO. |
| 17BP.7.R.81 - GUILFORD #40 | TMP-2 |
| ROADWAY DESIGN ENGINEER | |
|  | |
| DOCUMENT NOT CONSIDERED FINAL | |
| UNLESS ALL SIGNATURES COMPLETED | |
| Prepared in the Office of: | M |
| | MOTT MACDONALD I & E, LLC Furqay-Vanino, NC 27526 www.mottmcc.com |

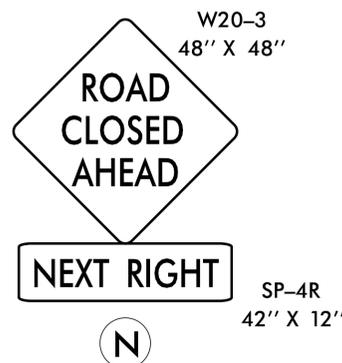
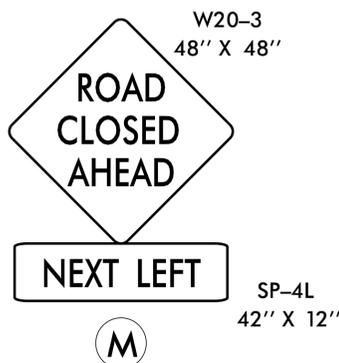
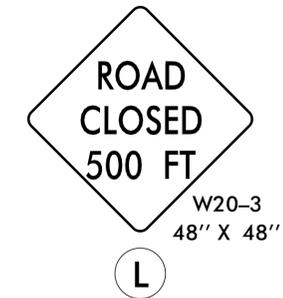
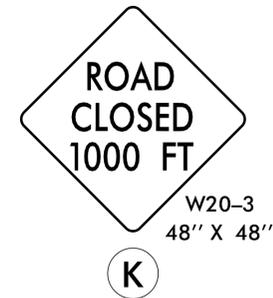
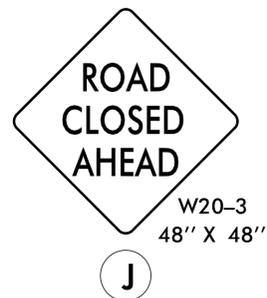
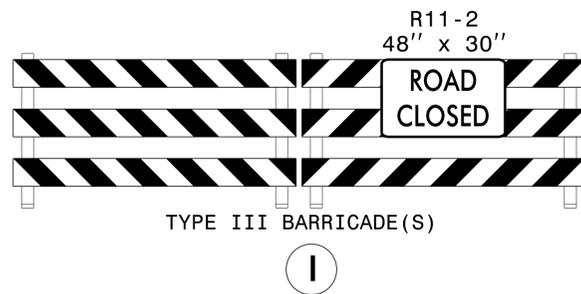
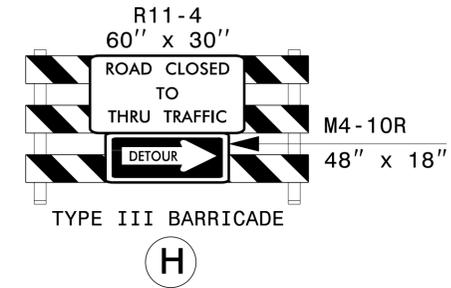
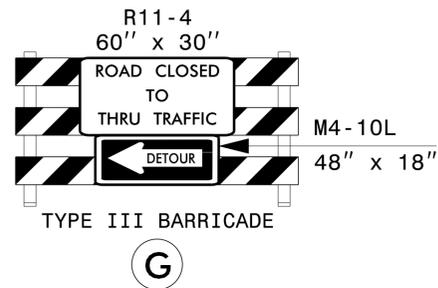
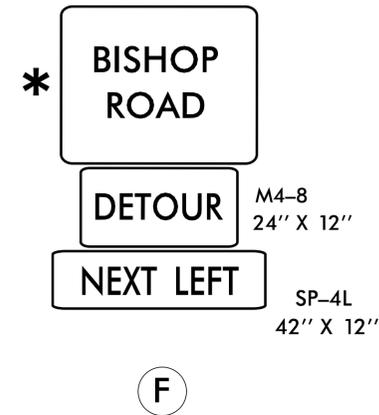
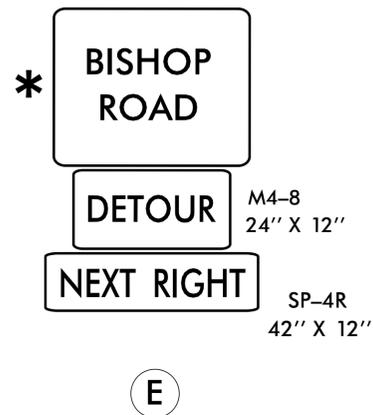
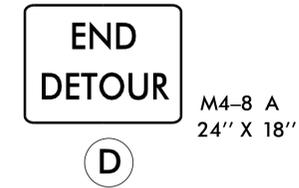
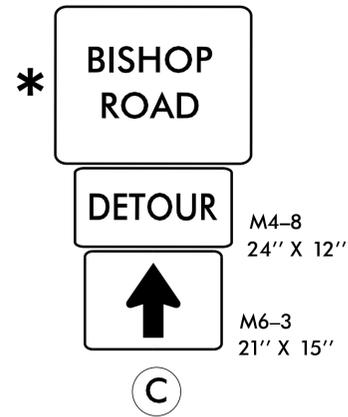
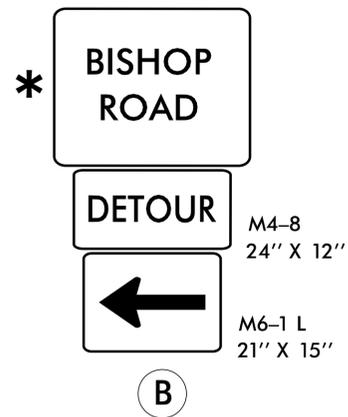
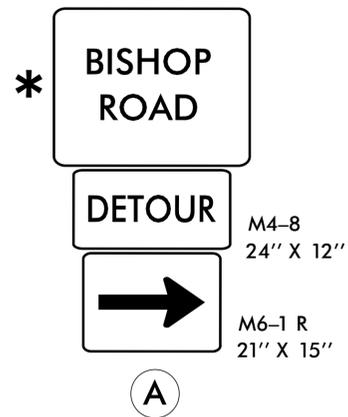


LEGEND

- — ■ NORTHBOUND DETOUR ROUTE
- ▲ — ▲ SOUTHBOUND DETOUR ROUTE
- — ● COMMON DETOUR ROUTE
- ⊥ STATIONARY SIGN

jcr-66165
 At: Roadway\ProJ\400040_rdl_rdl_tmp.dgn
 9/27/2016 9:35:00 AM

* SEE SHEET TMP-4 FOR SPECIAL SIGN DESIGNS



| | |
|--|--|
| PROJECT REFERENCE | SHEET NO. |
| 17BP.7.R.81 - GUILFORD #40 | TMP-3 |
| ROADWAY DESIGN ENGINEER | |
| | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
| Prepared in the Office of: | M MOTT MACDONALD & E, LLC PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com |

I:\66165\Roadway\Proj\400040_rdy_tmp.dgn 9/27/2016 9:35:01 AM

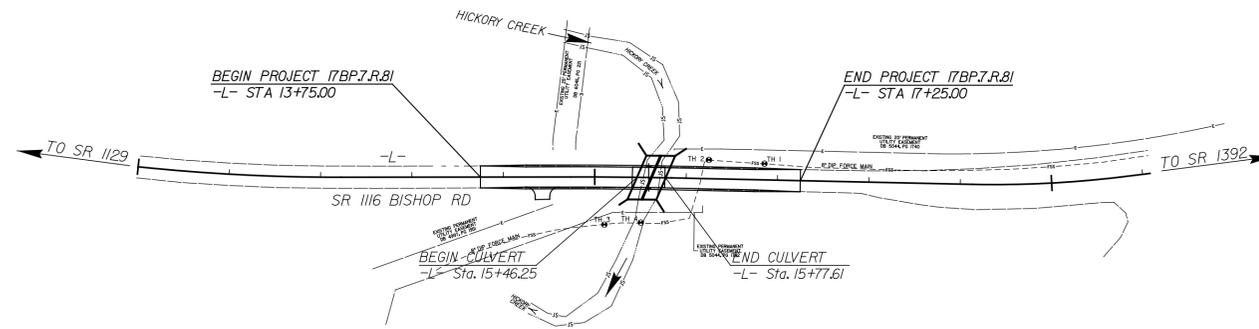
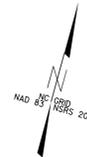
| | | | |
|-----------------|-----------------------------|-------------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | 17BP.7.R.81 | EC-1 | |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| | | | |
| | | | |
| | | | |

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

GUILFORD COUNTY

BRIDGE NO. 40 ON SR 1116
OVER HICKORY CREEK

17BP.7.R.81



EROSION AND SEDIMENT CONTROL MEASURES

| Std. # | Description | Symbol |
|---------|--|----------|
| 1630.03 | Temporary Silt Ditch | —ms— |
| 1630.05 | Temporary Diversion | —TD— |
| 1605.01 | Temporary Silt Fence | |
| 1606.01 | Special Sediment Control Fence | ▲▲▲▲▲▲▲▲ |
| 1622.01 | Temporary Berms and Slope Drains | —B— |
| 1630.02 | Silt Basin Type B | ▨ |
| 1633.01 | Temporary Rock Silt Check Type-A | ▩ |
| | Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM) | ▩ |
| 1633.02 | Temporary Rock Silt Check Type-B | ▶ |
| | Wattle / Coir Fiber Wattle | ⤵ |
| | Wattle / Coir Fiber Wattle with Polyacrylamide (PAM) | ⤵ |
| 1634.01 | Temporary Rock Sediment Dam Type-A | ▩ |
| 1634.02 | Temporary Rock Sediment Dam Type-B | ▩ |
| 1635.01 | Rock Pipe Inlet Sediment Trap Type-A | ⌋ |
| 1635.02 | Rock Pipe Inlet Sediment Trap Type-B | ⌋ |
| 1630.04 | Stilling Basin | ▭ |
| 1630.06 | Special Stilling Basin | ▭ |
| | Rock Inlet Sediment Trap: | |
| 1632.01 | Type A | A |
| 1632.02 | Type B | B |
| 1632.03 | Type C | C |
| | Skimmer Basin | ▭ |
| | Tiered Skimmer Basin | ▭ |
| | Infiltration Basin | ▭ |

**THIS PROJECT CONTAINS
EROSION CONTROL PLANS
FOR CLEARING AND
GRUBBING PHASE OF
CONSTRUCTION.**

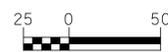
**ENVIRONMENTALLY
SENSITIVE AREA(S) EXIST
ON THIS PROJECT**
*Refer To E. C. Special Provisions
for Special Considerations.*

**THIS PROJECT HAS
BEEN DESIGNED TO
SENSITIVE WATERSHED
STANDARDS.**



5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

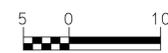
GRAPHIC SCALE



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

LEVEL III CERTIFIED BY:
ALEXANDER SNIDER, P.E.
CERTIFICATION NUMBER: 3064
ISSUED: SEPTEMBER 21, 2016

**THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY
WITH THE REGULATIONS SET FORTH BY THE
NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011
ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES DIVISION OF WATER QUALITY.**

Prepared in the Office of:

HDR | ICA
5121 KINGDOM WAY, SUITE 100
RALEIGH NC 27607
NC License No: F-0258

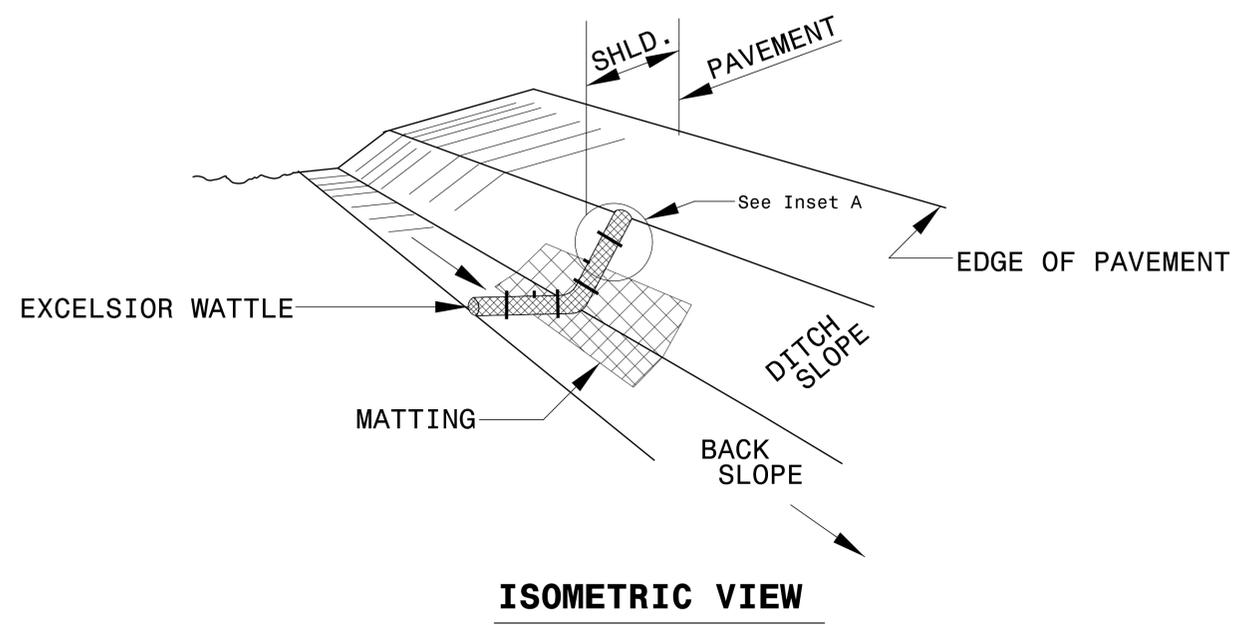
2012 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

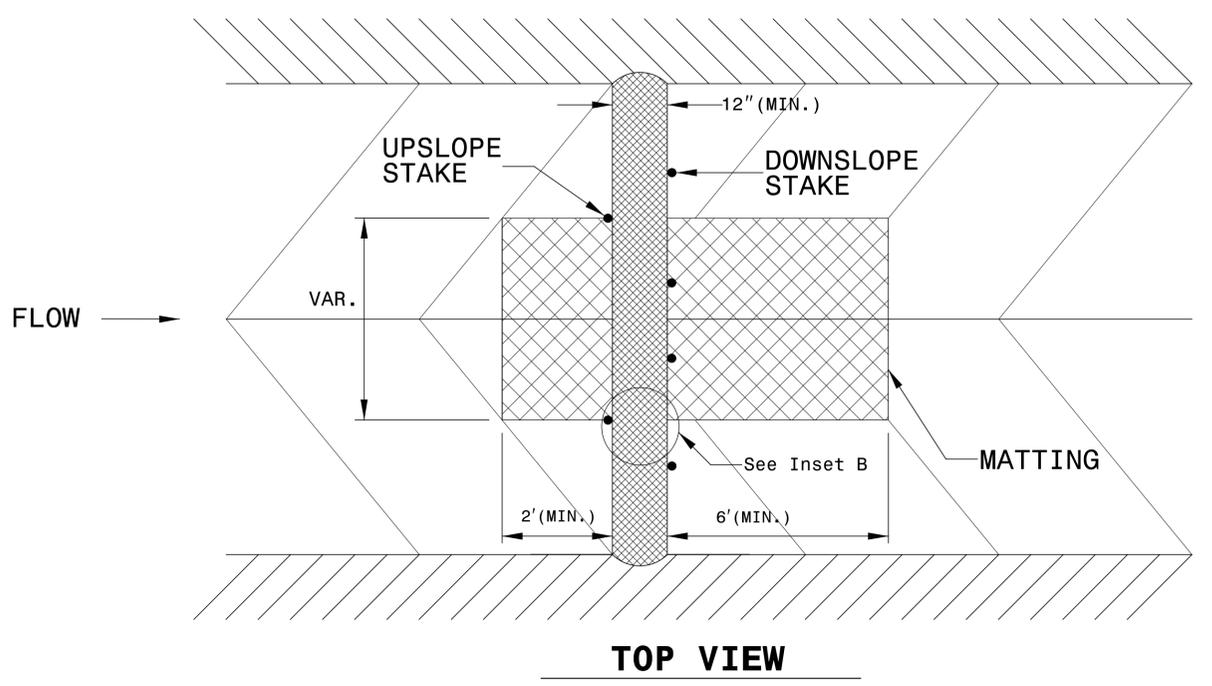
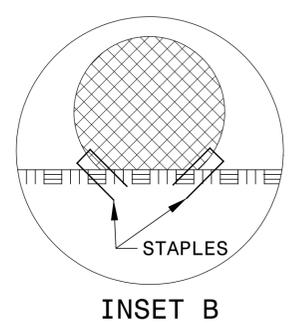
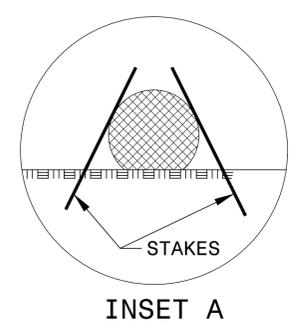
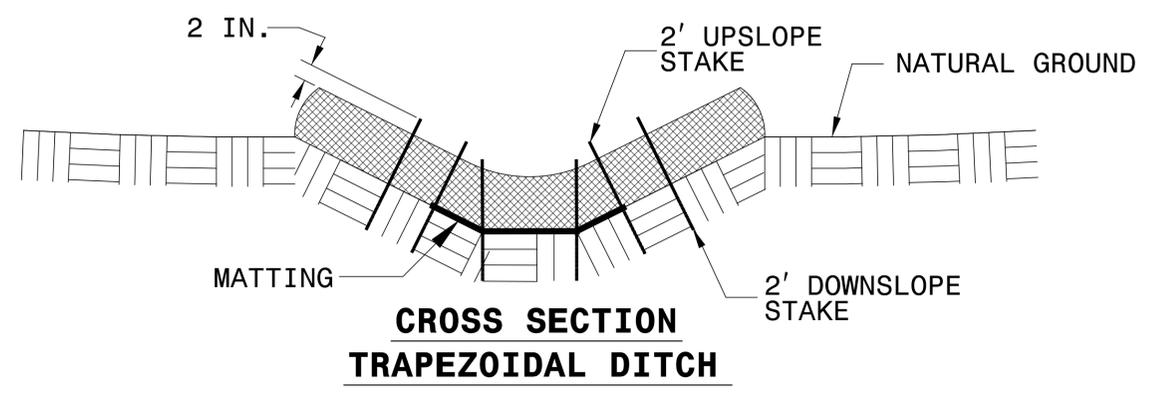
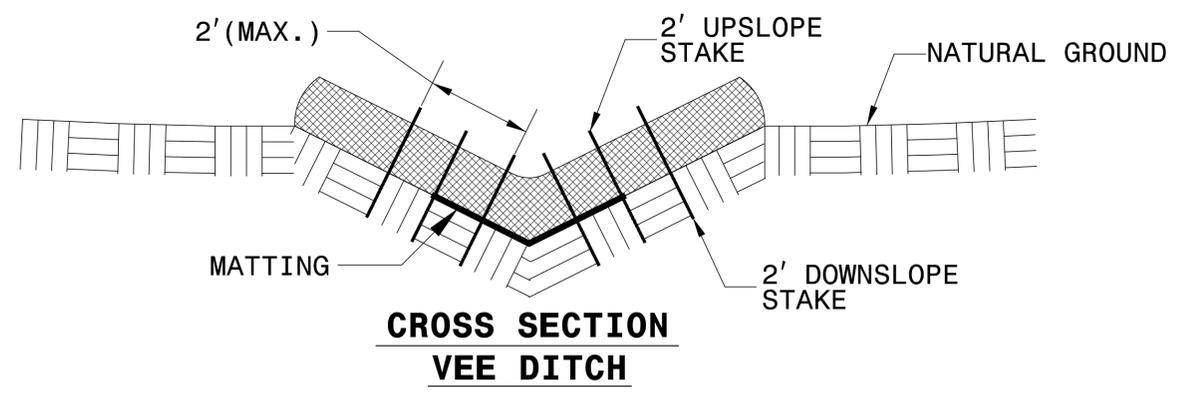
| | |
|--|--|
| 1604.01 Railroad Erosion Control Detail | 1632.01 Rock Inlet Sediment Trap Type A |
| 1605.01 Temporary Silt Fence | 1632.02 Rock Inlet Sediment Trap Type B |
| 1606.01 Special Sediment Control Fence | 1632.03 Rock Inlet Sediment Trap Type C |
| 1607.01 Gravel Construction Entrance | 1633.01 Temporary Rock Silt Check Type A |
| 1622.01 Temporary Berms and Slope Drains | 1633.02 Temporary Rock Silt Check Type B |
| 1630.01 Riser Basin | 1634.01 Temporary Rock Sediment Dam Type A |
| 1630.02 Silt Basin Type B | 1634.02 Temporary Rock Sediment Dam Type B |
| 1630.03 Temporary Silt Ditch | 1635.01 Rock Pipe Inlet Sediment Trap Type A |
| 1630.04 Stilling Basin | 1635.02 Rock Pipe Inlet Sediment Trap Type B |
| 1630.05 Temporary Diversion | 1640.01 Coir Fiber Baffle |
| 1630.06 Special Stilling Basin | 1645.01 Temporary Stream Crossing |
| 1631.01 Matting Installation | |

WATTLE DETAIL

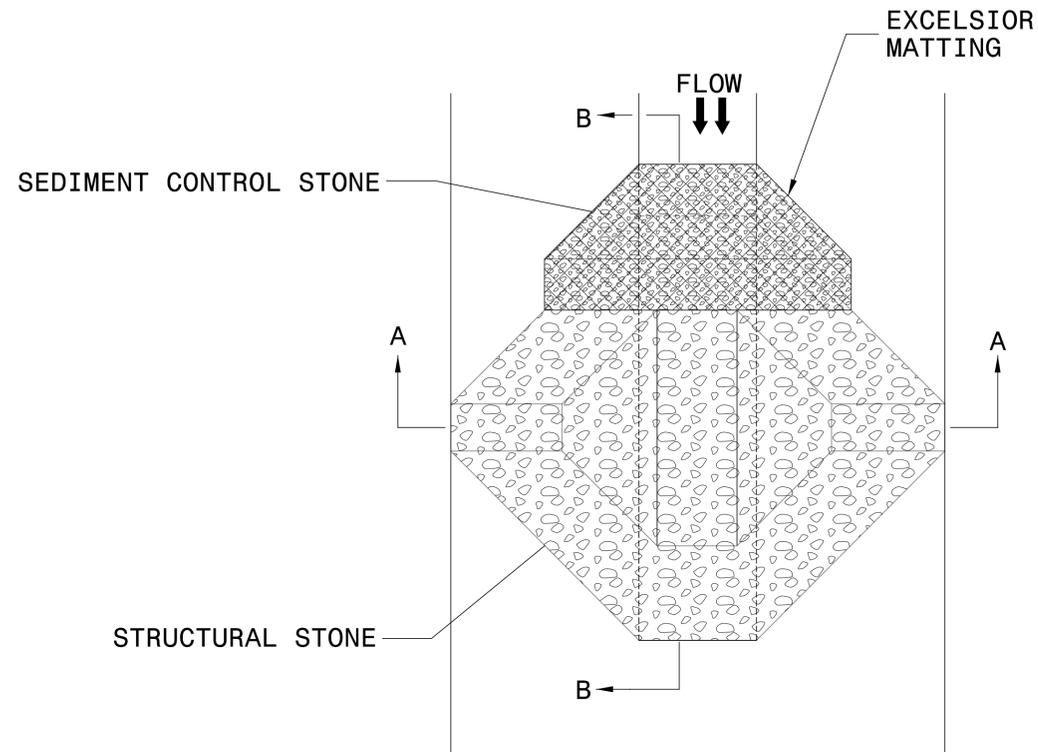


NOTES:

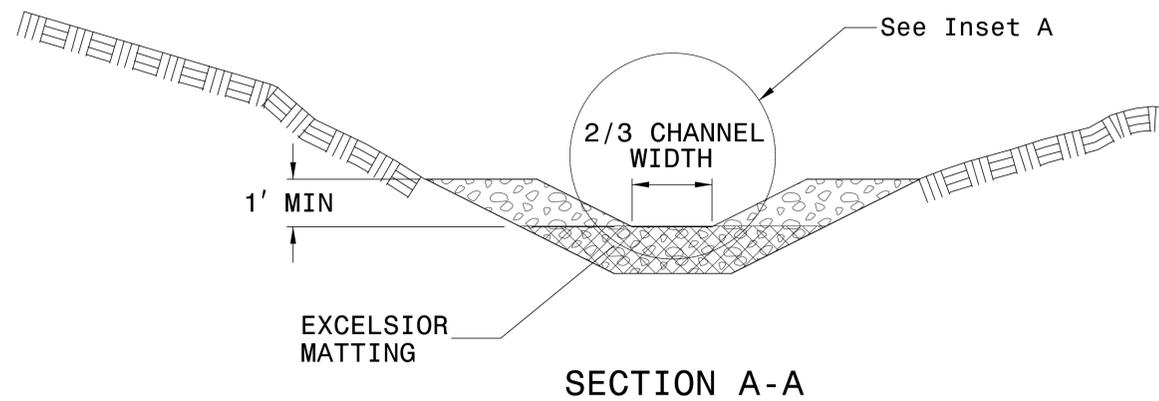
- USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
- PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
- INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
- INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.



TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN



SECTION A-A

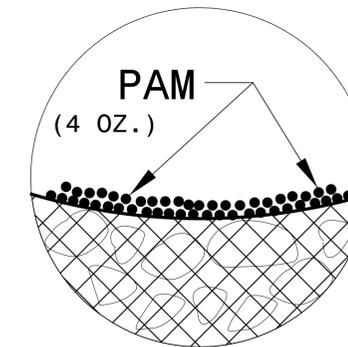
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

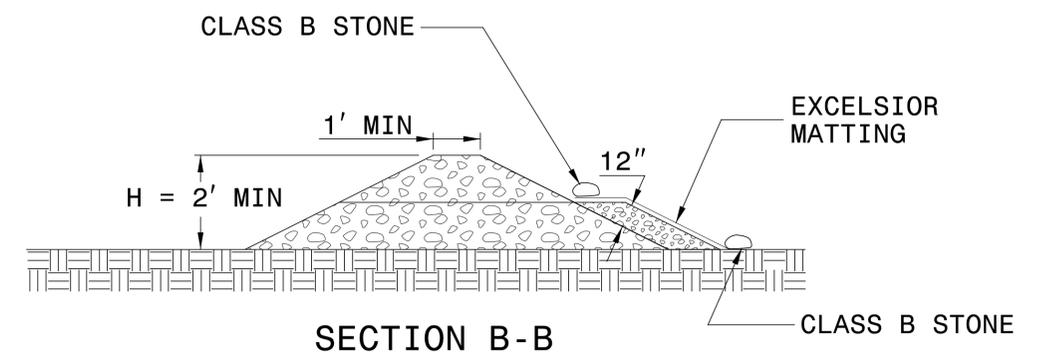
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION B-B

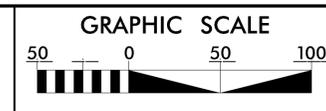
NOT TO SCALE

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

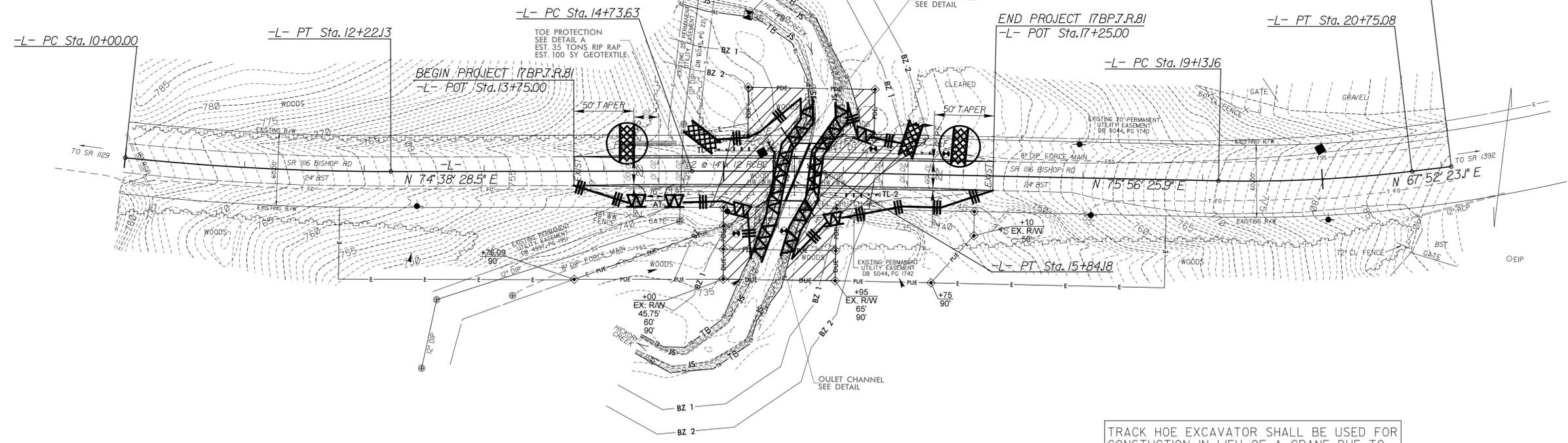
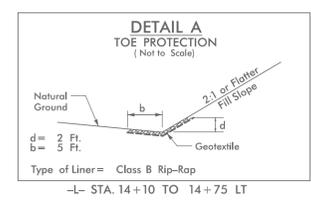
| <i>SITE DESCRIPTION</i> | <i>STABILIZATION TIME</i> | <i>TIMEFRAME EXCEPTIONS</i> |
|--|---------------------------|--|
| PERIMETER DIKES, SWALES, DITCHES AND SLOPES | 7 DAYS | NONE |
| HIGH QUALITY WATER (HQW) ZONES | 7 DAYS | NONE |
| SLOPES STEEPER THAN 3:1 | 7 DAYS | IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED. |
| SLOPES 3:1 OR FLATTER | 14 DAYS | 7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH. |
| ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1 | 14 DAYS | NONE, EXCEPT FOR PERIMETERS AND HQW ZONES. |

5/14/99



| | |
|---|--------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| 17BP.7.R.81 | EC-4/CONST.4 |
| RW SHEET NO. | |
| ROADSIDE ENVIRONMENTAL PROJECT ENGINEER | |
| LEVEL III CERTIFIED BY: ALEXANDER SNIDER, P.E. CERTIFICATION NUMBER: 3064 ISSUED: SEPTEMBER 21, 2016 | |

CLEARING AND GRUBBING FOR
CONSTRUCTION SHEET 4



TRACK HOE EXCAVATOR SHALL BE USED FOR CONSTRUCTION IN LIEU OF A CRANE DUE TO THE PROXIMITY OF OVERHEAD POWER LINES



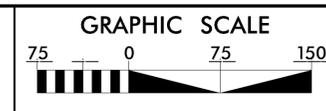
CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING/PROPOSED RW OR EASEMENT.

HR ICA
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

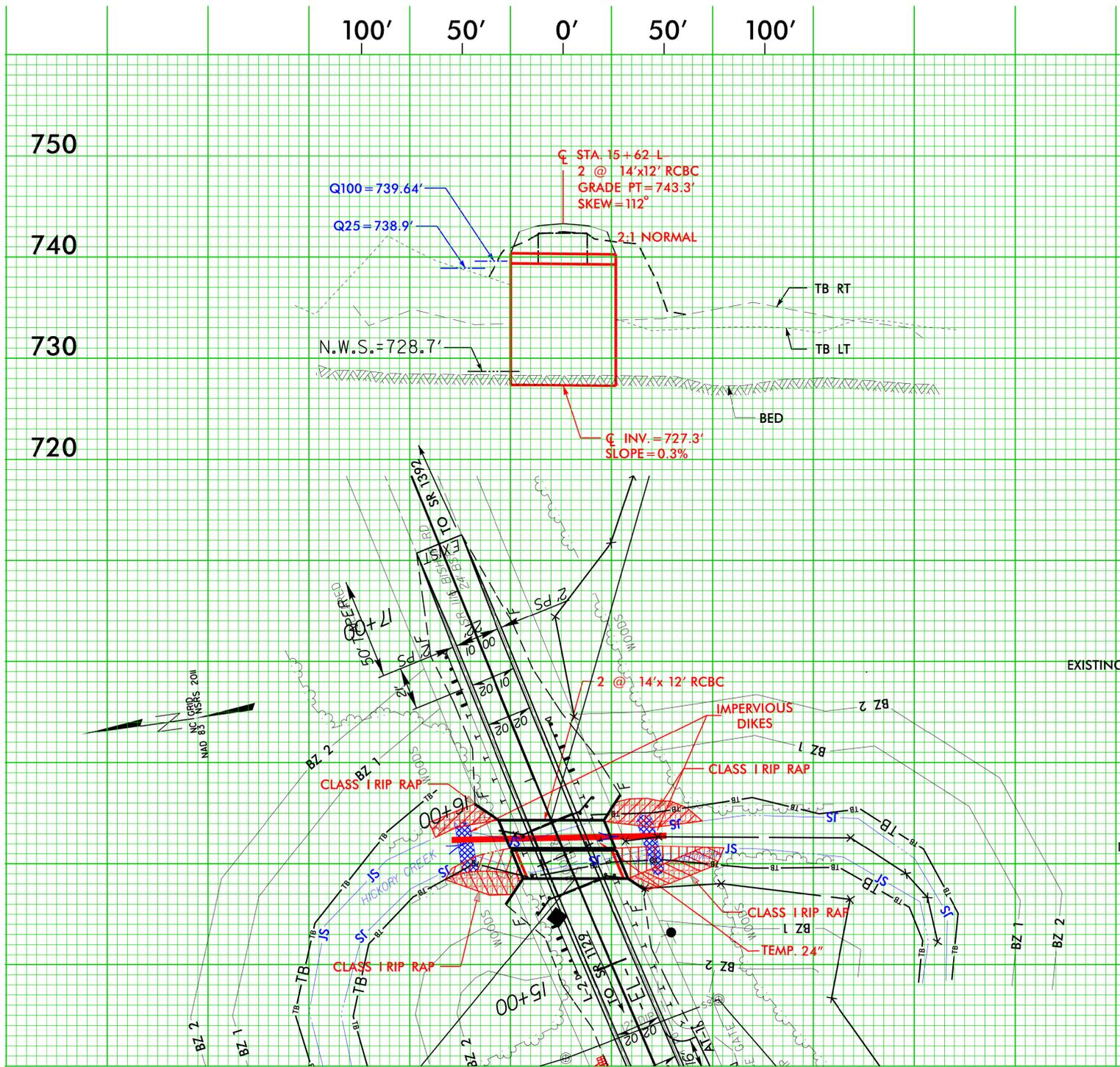
5/21/2016 @ 8:56:58 AM
S:\21\2016\05\05\17BP.7.R.81\17BP.7.R.81.ec4.const.4.dwg

5/14/99
S:\21\006\00\hwy\const\construction_sequence.dgn
TCA ENGINEERING, INC.



| | |
|--------------------------------------|----------------------------|
| PROJECT REFERENCE NO. 17BP.7.R.81 | SHEET NO. EC-4A/CONST.4 |
| RW SHEET NO. | |

CONSTRUCTION SEQUENCE



CULVERT PHASING SF-400040

NOTE: USE SANDBAGS FOR ALL IMPERVIOUS DYKES.

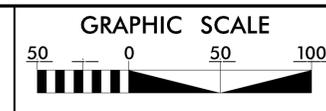
PHASE 1

- 1.) INSTALL ALL TEMPORARY SEDIMENT CONTROL DEVICES NECESSARY FOR CULVERT CONSTRUCTION.
- 2.) CONSTRUCT TEMPORARY STILLING BASIN WITHIN FOOTPRINT OF PROPOSED ROADWAY. STILLING BASIN CAPACITY SHOULD ALLOW FOR A MINIMUM OF 35 CUBIC YARDS OF EFFLUENT, WHICH IS HALF OF THE VOLUME FROM THE PROPOSED CULVERT.
- 3.) INSTALL IMPERVIOUS DYKES AND INSTALL 24 INCH TEMP. PIPE.
- 4.) DE-WATER EFFLUENT FROM WORK SITE INTO STILLING BASIN.
- 5.) CONSTRUCT PROPOSED 2 @ 14 FT. X 12 FT. RCBC AND FLOOD BENCH PER PLANS AND SPECIFICATIONS.

PHASE 2

- 6.) REMOVE TEMPORARY IMPERVIOUS DYKES TO ALLOW FLOW THROUGH NEWLY CONSTRUCTED CULVERT.
- 7.) UPON STABILIZATION OF ALL DISTURBED AREAS, REMOVE ALL TEMPORARY SEDIMENT CONTROL DEVICES.

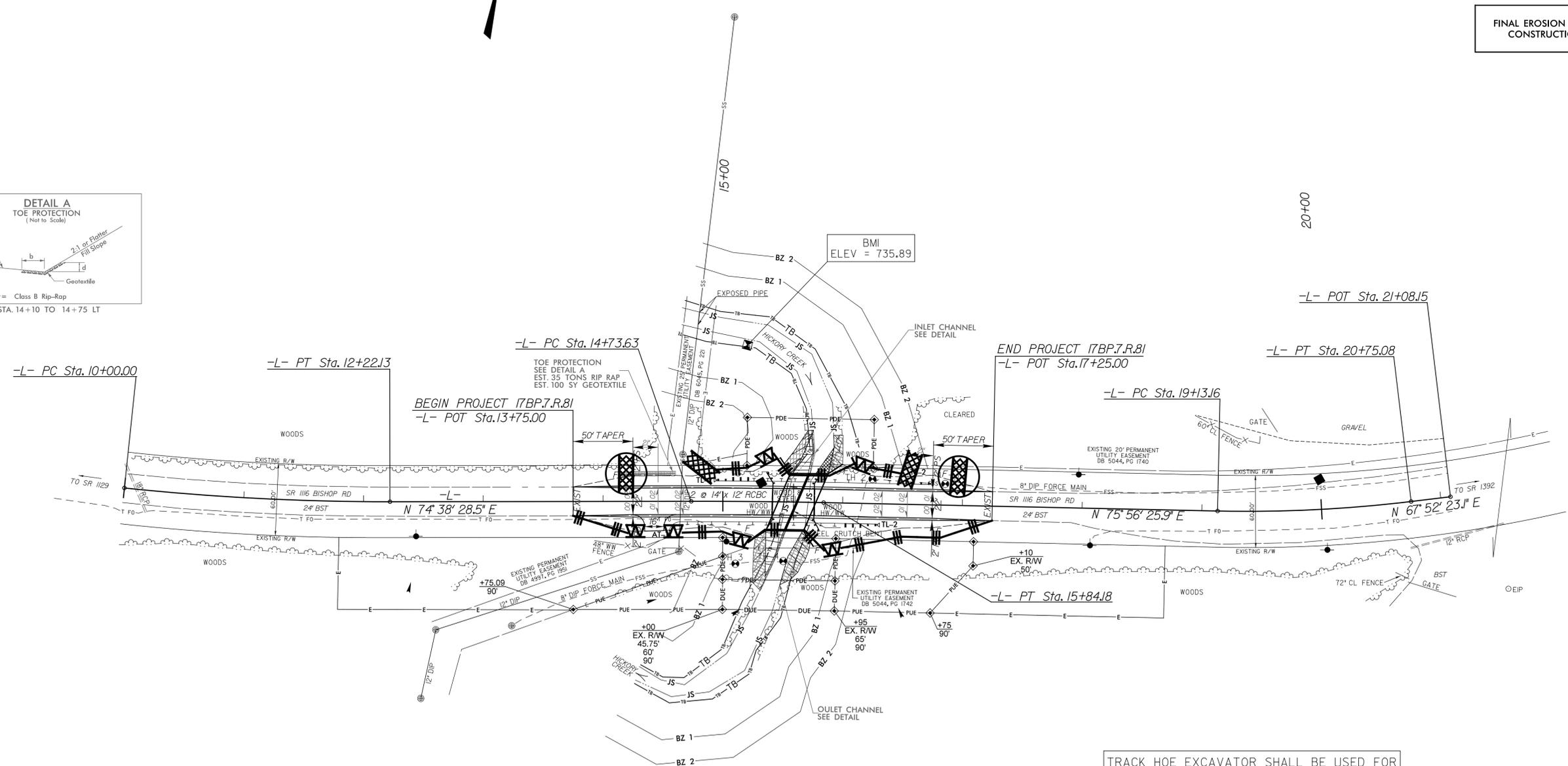
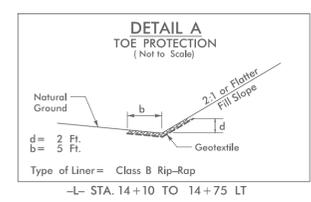
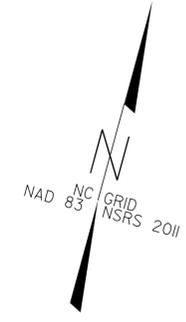
5/14/99



| | |
|---|--------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| 17BP.7.R.81 | EC-5/CONST.4 |
| RW SHEET NO. | |
| ROADSIDE ENVIRONMENTAL PROJECT ENGINEER | |

LEVEL III CERTIFIED BY:
ALEXANDER SNIDER, P.E.
CERTIFICATION NUMBER: 3064
ISSUED: SEPTEMBER 21, 2016

FINAL EROSION CONTROL FOR
CONSTRUCTION SHEET 4



TRACK HOE EXCAVATOR SHALL BE USED FOR CONSTRUCTION IN LIEU OF A CRANE DUE TO THE PROXIMITY OF OVERHEAD POWER LINES

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING/PROPOSED RW OR EASEMENT.

HR ICA
5121 Kingdom Way
Suite 100
Raleigh, NC 27607
NC License No: F-0258

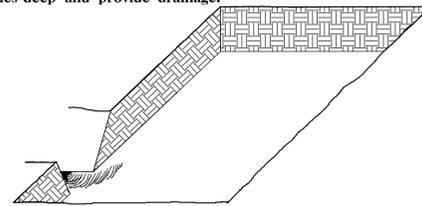
5/21/2016
S:\21\006\00\hickory\erosion-final.dgn
ICA ENGINEERING, INC.

PLANTING DETAILS

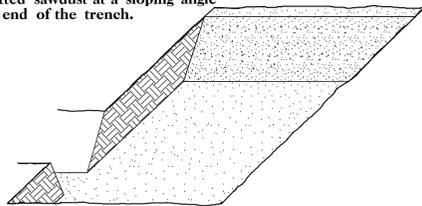
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

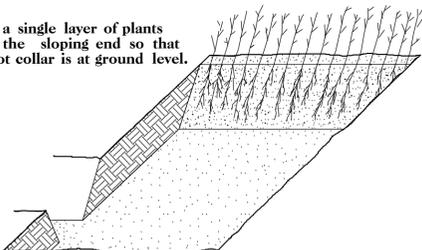
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



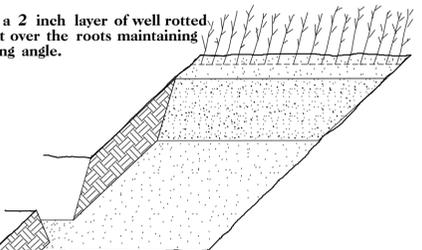
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

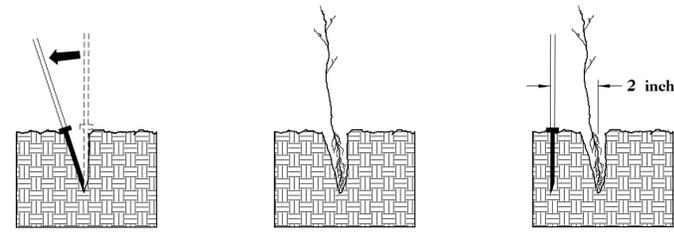


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

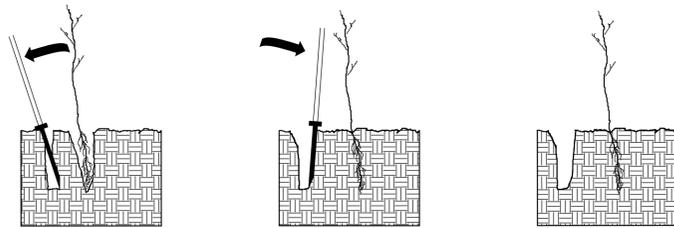


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

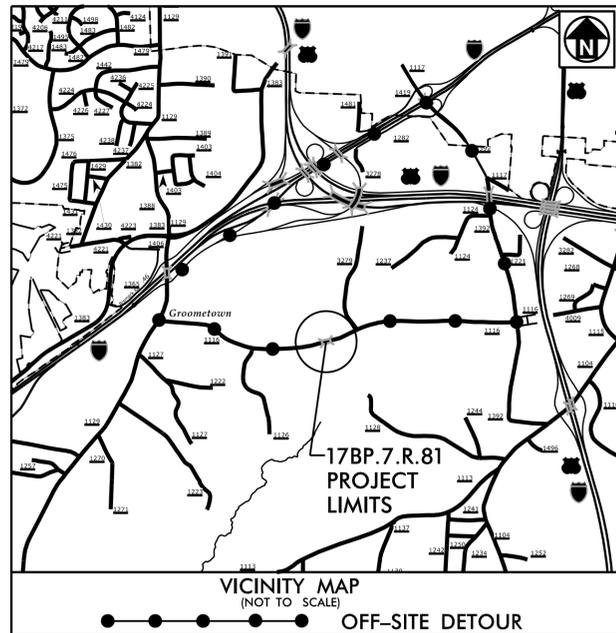
MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

| | | | |
|-----|-------------------------|--------------|------------------|
| 25% | LIRIODENDRON TULIPIFERA | TULIP POPLAR | 12 in - 18 in BR |
| 25% | PLATANUS OCCIDENTALIS | SYCAMORE | 12 in - 18 in BR |
| 25% | FRAXINUS PENNSYLVANICA | GREEN ASH | 12 in - 18 in BR |
| 25% | BETULA NIGRA | RIVER BIRCH | 12 in - 18 in BR |

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

TIP PROJECT: 17BP.7.R.81



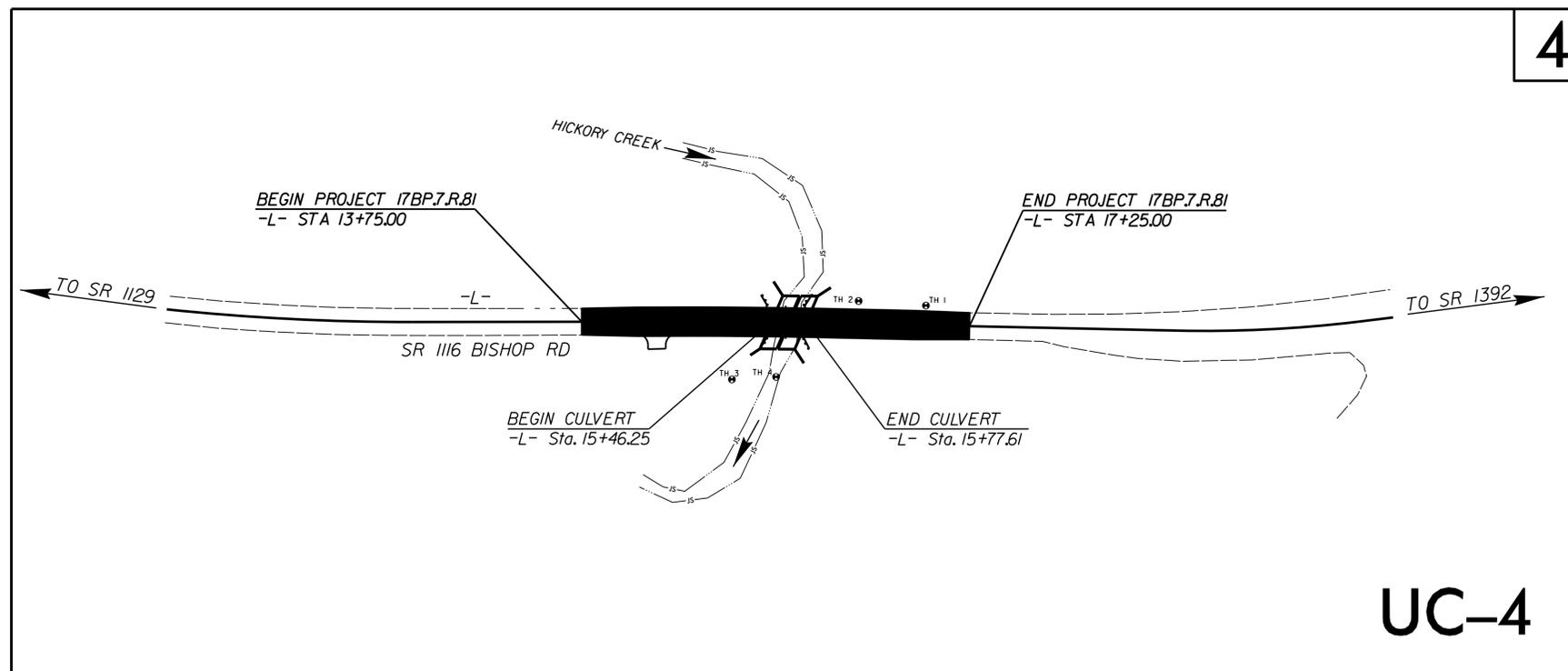
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS GUILFORD COUNTY

| | |
|-------------|-----------|
| T.I.P. NO. | SHEET NO. |
| 17BP.7.R.81 | UC-1 |

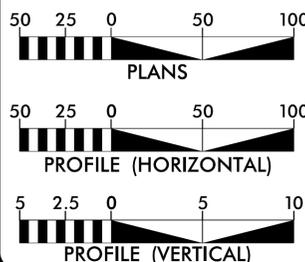
LOCATION: BRIDGE NO. 40 OVER HICKORY CREEK ON SR 1116 (BISHOP ROAD)

TYPE OF WORK: UTILITY CONSTRUCTION



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



INDEX OF SHEETS

| SHEET NO. | DESCRIPTION |
|-----------|----------------------------|
| UC-1 | TITLE SHEET |
| UC-2 | UTILITY SYMBOLOGY |
| UC-3 | NOTES |
| UC-4 | UTILITY CONSTRUCTION SHEET |
| UC-5 | PROFILE SHEET |

WATER AND SEWER OWNERS ON PROJECT

WATER - N/A

SEWER - CITY OF GREENSBORO

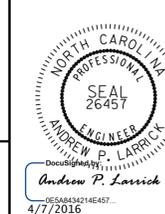
PREPARED IN THE OFFICE OF:

DAVIS • MARTIN • POWELL
ENGINEERS & SURVEYORS

6415 OLD PLANK RD., HIGH POINT, NC 27265
PHONE: (336)886-4821 FAX: (336)886-4458
WWW.DMP-INC.COM LICENSE: F-0245

| | |
|-------------------------|----------------------------|
| Randy L. McNeill, P.E. | UTILITIES PROJECT MANAGER |
| Andrew P. Larrick, P.E. | UTILITIES PROJECT ENGINEER |
| Andrew P. Larrick, P.E. | UTILITIES PROJECT DESIGNER |

SEAL



**DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING**

1555 MAIL SERVICE CENTER
RALEIGH, NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

| | |
|-------------------------|---|
| Roger Worthington, P.E. | UTILITIES SECTION ENGINEER |
| | UTILITIES SQUAD LEADER PROJECT ENGINEER |
| | UTILITIES PROJECT DESIGN ENGINEER |

\$SYTIME\$\$\$\$\$DN\$\$\$\$\$SERNAME\$\$\$\$\$

UTILITY CONSTRUCTION

| | |
|---|---------------------------------|
| PROJECT REFERENCE NO. 17BP.7.R.81 | SHEET NO. UC-3 |
| DESIGNED BY: DMP | |
| DRAWN BY: DMP | |
| CHECKED BY: DMP | |
| APPROVED BY: | |
| REVISED: | |
|  | |
| NORTH CAROLINA DEPARTMENT OF TRANSPORTATION | |
| UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 | UTILITY CONSTRUCTION PLANS ONLY |

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.
2. THE EXISTING SEWER UTILITIES BELONG TO THE CITY OF GREENSBORO.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF ENVIRONMENTAL HEALTH. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER QUALITY. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. UNLESS OTHERWISE NOTED, PIPE AND FITTINGS FOR PROPOSED SEWER FORCE MAINS 4" AND LARGER SHALL BE DUCTILE IRON, PC 350.
2. THE CONTRACTOR SHALL BE AWARE OF THE USE OF FUSIBLE PVC PIPE IN THE DESIGNATED AREAS AS SHOWN ON THE PLAN AND PROFILE SHEETS. NO ADDITIONAL COMPENSATION SHALL BE AWARDED TO THE CONTRACTOR FOR FUSIBLE PVC PIPE. THIS IS INCIDENTAL TO THE UNIT PRICE BID FOR 8" FORCE MAIN SEWER.
3. NOTES CONCERNING FUSIBLE PVC PIPE:
 - A. FUSIBLE POLYVINYLCHLORIDE (PVC) PIPE SHALL CONFORM TO AWWA C900 FOR STANDARD DIMENSIONS, AS APPLICABLE. TESTING SHALL BE IN ACCORDANCE WITH THE REFERENCED AWWA STANDARDS FOR ALL PIPE TYPES. 8" DR18 DIPS OD PIPE SHALL BE USED. PIPE SHALL BE COLORED PURPLE FOR WASTEWATER APPLICATION.
 - B. FUSIBLE PVC PIPE SHALL BE EXTRUDED WITH PLAIN ENDS. THE ENDS SHALL BE SQUARE TO THE PIPE AND FREE OF ANY BEVEL OR CHAMFER. THERE SHALL BE NO BELL OR GASKET OF ANY KIND INCORPORATED INTO THE PIPE. THE PIPE SHALL BE MANUFACTURED IN A STANDARD 40' NOMINAL LENGTHS, OR CUSTOM LENGTHS AS SPECIFIED AND SHALL BE BLUE FOR WATER.
 - C. FUSIBLE PVC PIPE SHALL BE BUTT FUSED BY QUALIFIED, CERTIFIED AND LICENSED TECHNICIANS. A DATA LOGGER SHALL BE AFFIXED TO THE FUSION MACHINE AND ALL PRESSURE/TIME DATA COLLECTED FOR USE BY OWNER OR ENGINEER, IF REQUESTED.
 - D. THE FUSIBLE PVC PIPE WILL BE INSTALLED IN A MANNER SO AS NOT TO EXCEED THE RECOMMENDED BENDING RADIUS, AND WHEN INSTALLED BY PULLING IN TENSION, THE RECOMMEND SAFE PULLING FORCE ESTABLISHED BY THE PIPE SUPPLIER SHALL NOT BE EXCEEDED.
 - E. TWO (2) TRACER WIRES SHALL BE INSTALLED WITH THE FUSIBLE PVC PIPE AS PART OF THE TRENCHLESS INSTALLATION. THE TRACER WIRES SHALL BE DESIGNED TO BE INSTALLED AS PART OF A HORIZONTAL DIRECTIONAL DRILLING PIPE INSTALLATION.
 - F. AFTER INSTALLATION, CONNECTIONS TO OTHER MATERIALS SHALL BE BY MECHANICAL JOINT FITTINGS WITH RESTRAINED RETAINER GLANDS. PVC PIPE ENDS SHALL NOT BE BENT INTO POSITION WITH HEAVY EQUIPMENT. INSTEAD, ALIGNMENT SHALL BE ACCOMPLISHED WITH FITTINGS.

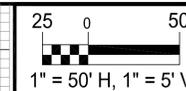
UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

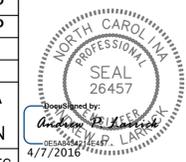
REVISIONS

LIST OF STANDARD DRAWINGS

N/A



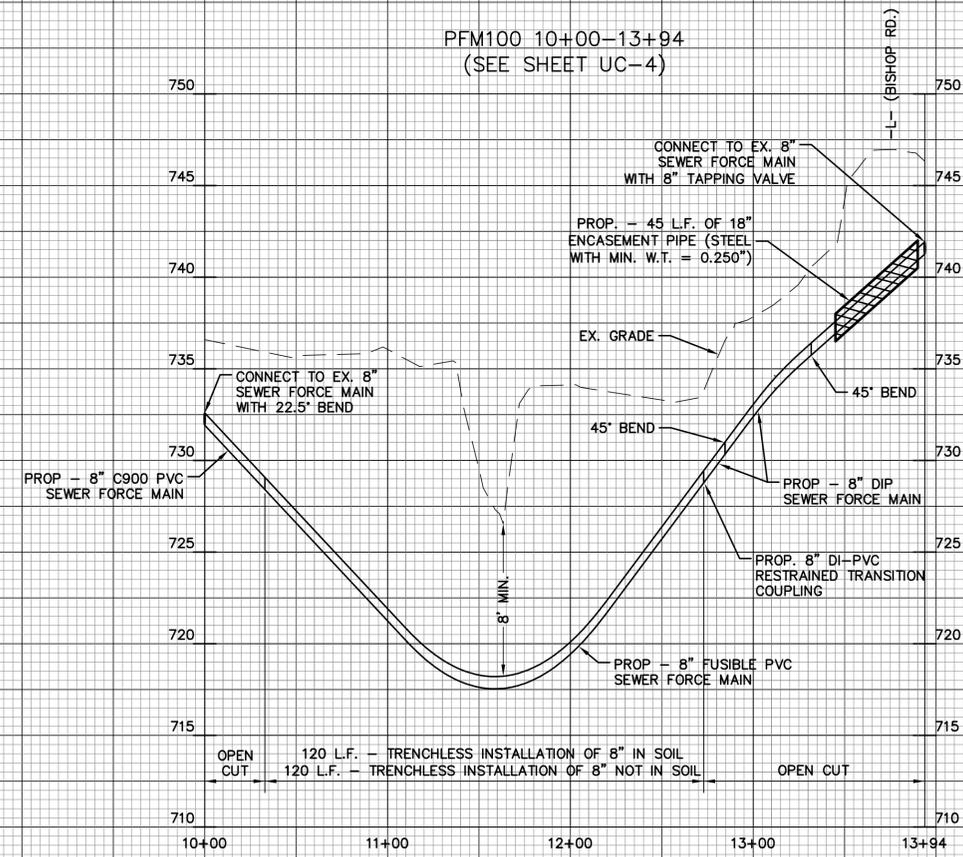
| | |
|--|-------------------|
| PROJECT REFERENCE NO. 17BP.7.R.81 | SHEET NO. UC-5 |
| DESIGNED BY: DMP | |
| DRAWN BY: DMP | |
| CHECKED BY: DMP | |
| APPROVED BY: DMP | |
| REVISED: | |
| NORTH CAROLINA DEPARTMENT OF TRANSPORTATION | |
| UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 | |



UTILITY CONSTRUCTION

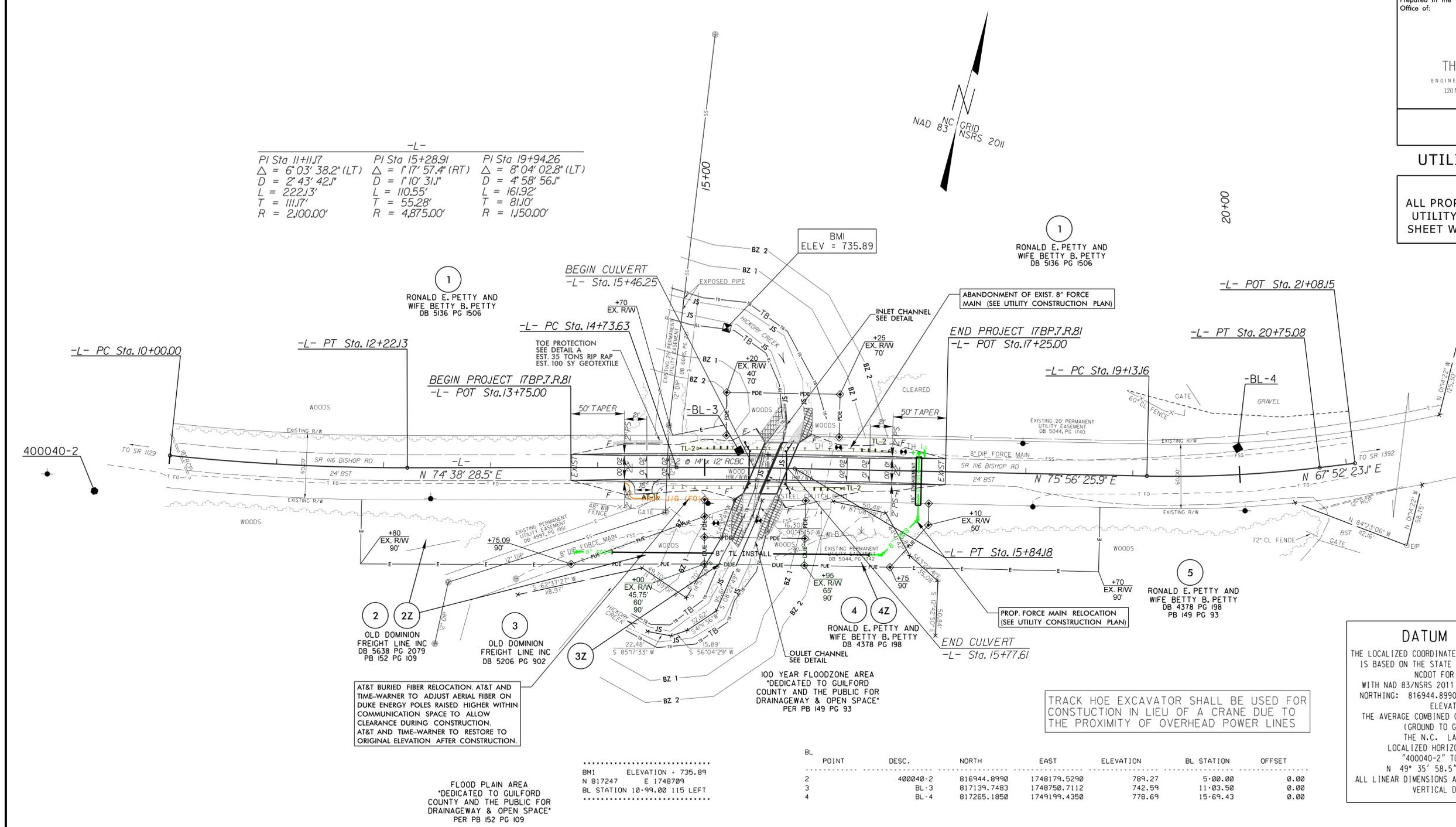
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REVISIONS



UTILITIES BY OTHERS

NOTE:
ALL PROPOSED COMMUNICATIONS UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS



| -L- | | |
|--------------------------------|--------------------------------|--------------------------------|
| PI Sta 11+11.7 | PI Sta 15+28.91 | PI Sta 19+94.26 |
| $\Delta = 6' 03'' 38.2''$ (LT) | $\Delta = 1' 17'' 57.4''$ (RT) | $\Delta = 8' 04'' 02.8''$ (LT) |
| $D = 2' 43'' 42.1''$ | $D = 1' 10'' 31.1''$ | $D = 4' 58'' 56.1''$ |
| $L = 222.13'$ | $L = 110.55'$ | $L = 161.92'$ |
| $T = 111.7'$ | $T = 55.28'$ | $T = 81.10'$ |
| $R = 2,100.00'$ | $R = 4,875.00'$ | $R = 1,150.00'$ |

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "400040-2"
 WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 816944.8990(ft) EASTING: 1748179.5290(ft) ELEVATION: 789.27(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999230045
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "400040-2" TO -L- STATION 10+00 IS N 49° 35' 58.5" E DISTANCE: 77.97 (ft.)
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

TRACK HOE EXCAVATOR SHALL BE USED FOR CONSTRUCTION IN LIEU OF A CRANE DUE TO THE PROXIMITY OF OVERHEAD POWER LINES

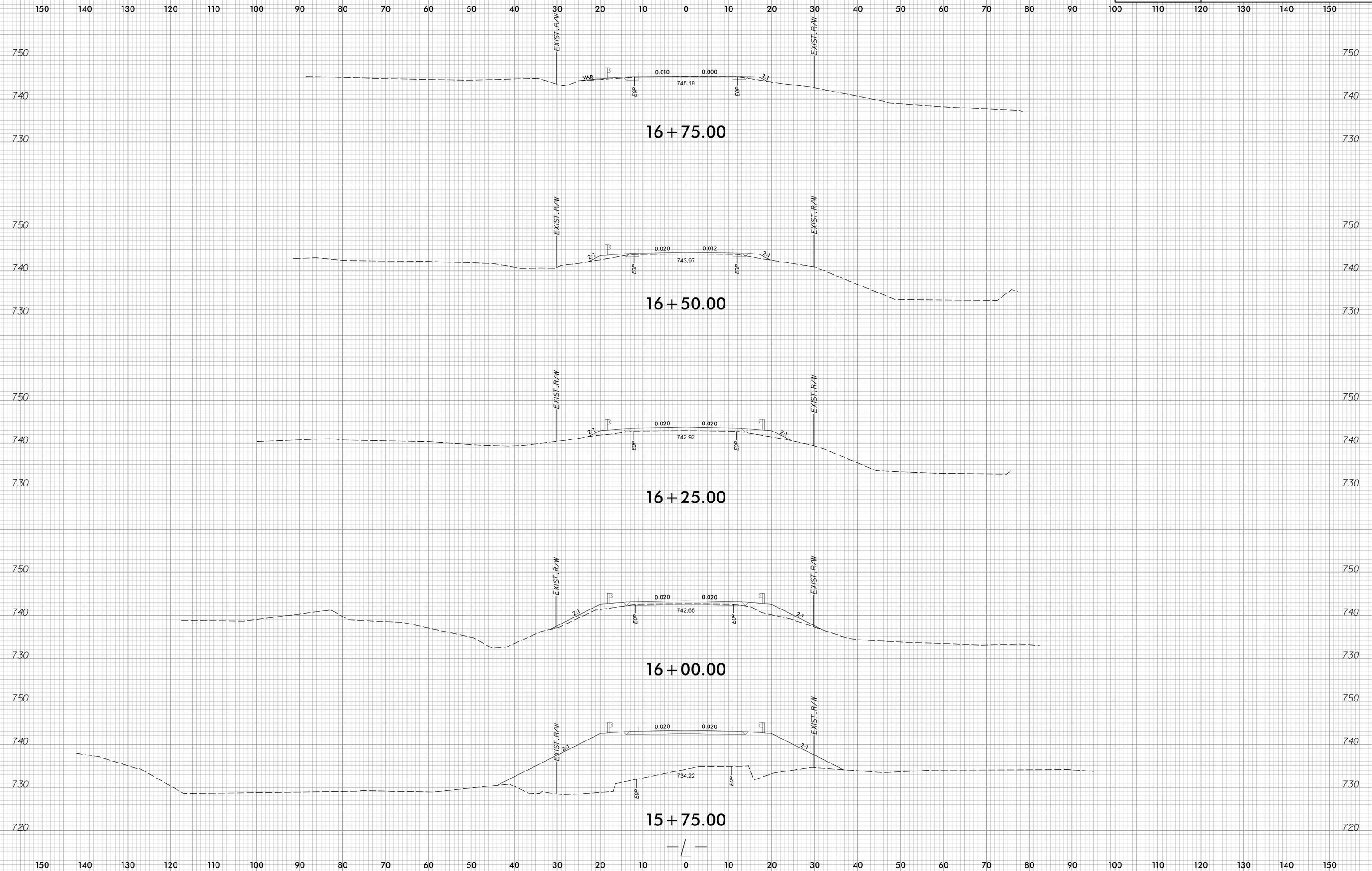
| BL | POINT | DESC. | NORTH | EAST | ELEVATION | BL STATION | OFFSET |
|----|----------|-------|-------------|--------------|-----------|------------|--------|
| 2 | 400040-2 | | 816944.8990 | 1748179.5290 | 789.27 | 5+00.00 | 0.00 |
| 3 | BL-3 | | 817139.7483 | 1748750.7112 | 742.59 | 11+03.50 | 0.00 |
| 4 | BL-4 | | 817265.1850 | 1749199.4350 | 778.69 | 15+69.43 | 0.00 |

AT&T BURIED FIBER RELOCATION, AT&T AND TIME-WARNER TO ADJUST AERIAL FIBER ON DUKE ENERGY POLES RAISED HIGHER WITHIN COMMUNICATION SPACE TO ALLOW CLEARANCE DURING CONSTRUCTION. AT&T AND TIME-WARNER TO RESTORE TO ORIGINAL ELEVATION AFTER CONSTRUCTION.

FLOOD PLAIN AREA
 "DEDICATED TO GUILFORD COUNTY AND THE PUBLIC FOR DRAINAGEWAY & OPEN SPACE"
 PER PB 152 PG 109



| | |
|---------------------|-----------|
| PROJ. REFERENCE NO. | SHEET NO. |
| 17BP.7.R.81 | X-3 |
| GUILFORD #40 | |

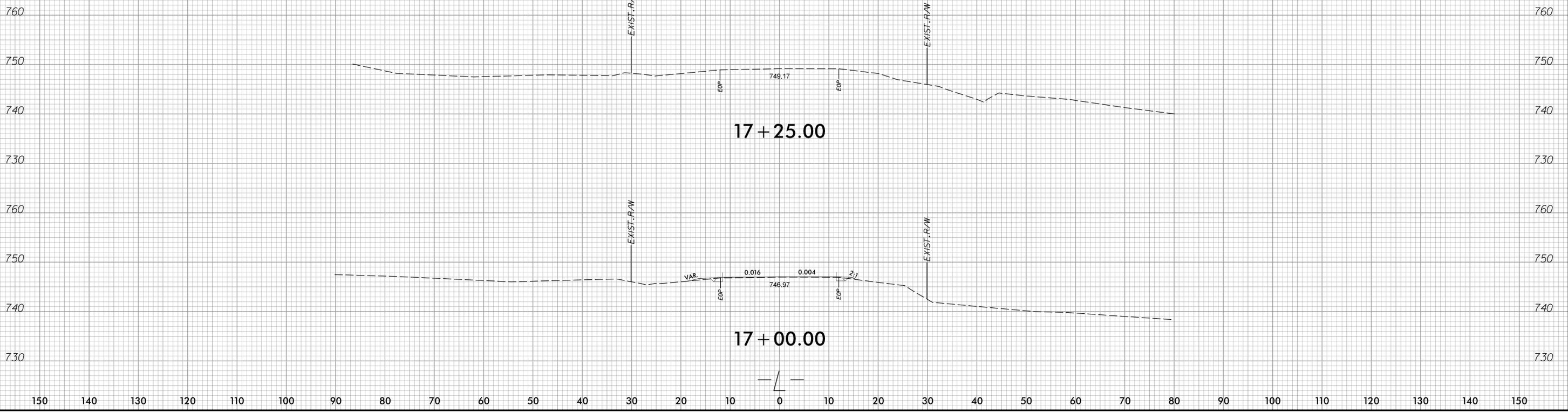


10/6/66165
C:\092009\Xsc\X\1400040_r.dwg - xp1.dgn
9/27/2016 9:35:28 AM



| | |
|---------------------|-----------|
| PROJ. REFERENCE NO. | SHEET NO. |
| 17BP.7.R.81 | X-4 |
| GUILFORD #40 | |

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



10166165
C:\Users\jguy\OneDrive\Xsc\Xa\1400040_r-dj-xpl.dgn
9/27/2016 9:35:28 AM

NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 MAXIMUM DESIGN FILL----- 4.32'
 MINIMUM DESIGN FILL----- 3.67'
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
 THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 THE EXISTING STRUCTURE CONSISTING OF 2 @ 17'-8" SPANS OF TIMBER DECK WITH 7" AWS ON I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 21'-0", ON TIMBER CAP AND PILES END BENTS WITH CONCRETE ENCASUREMENT AND STEEL CAP AND PILES INTERIOR BENT AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS SHOWN 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.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
 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 15+62.00 -L-".
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

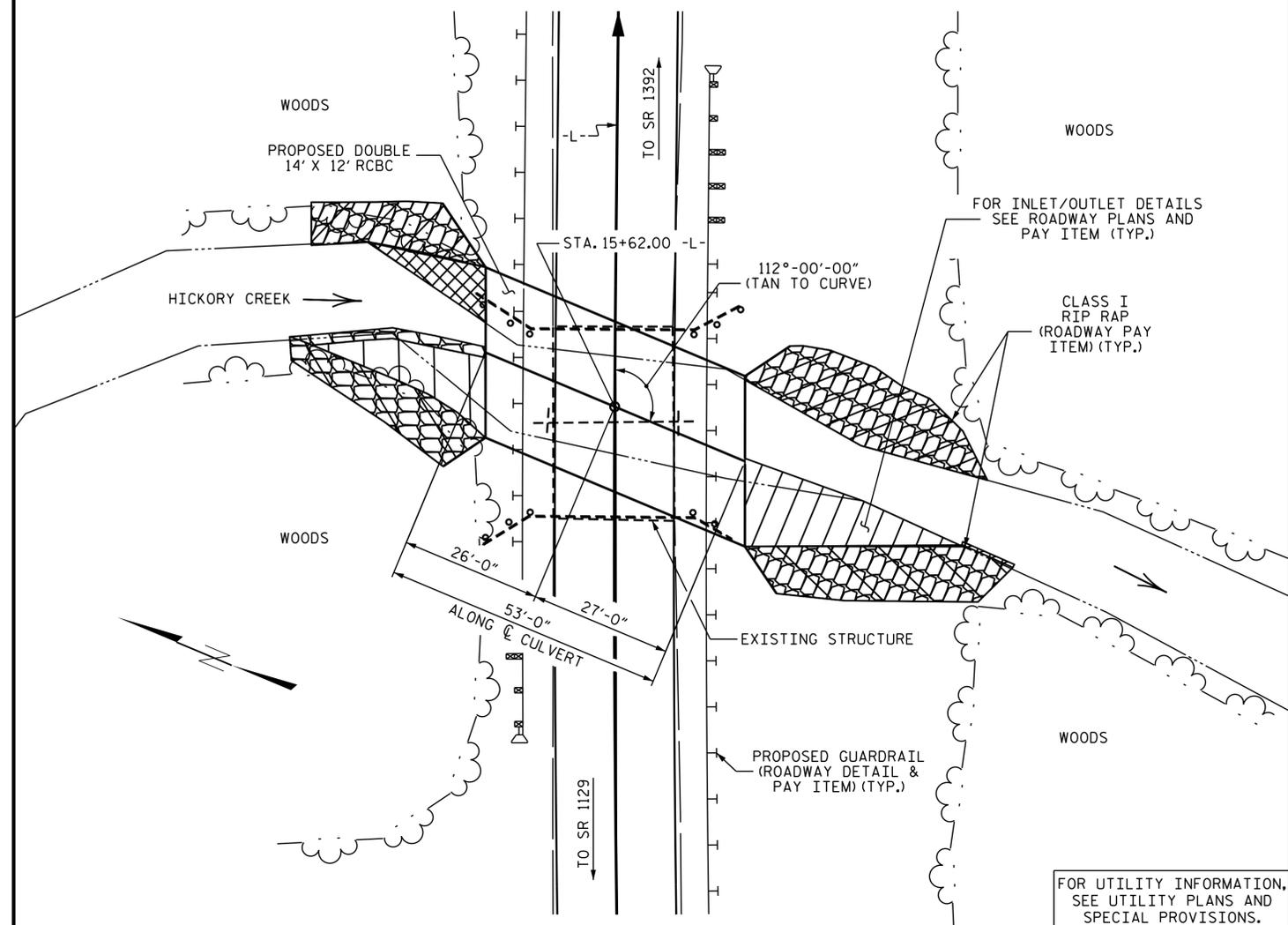
| | |
|-----------------------------|----------------|
| DESIGN DISCHARGE | = 1700 CFS |
| FREQUENCY OF DESIGN FLOOD | = 25 YRS. |
| DESIGN HIGH WATER ELEVATION | = 738.90 |
| DRAINAGE AREA | = 2.40 SQ. MI. |
| BASE DISCHARGE (Q100) | = 2100 CFS |
| BASE HIGH WATER ELEVATION | = 739.64 |

OVERTOPPING FLOOD DATA

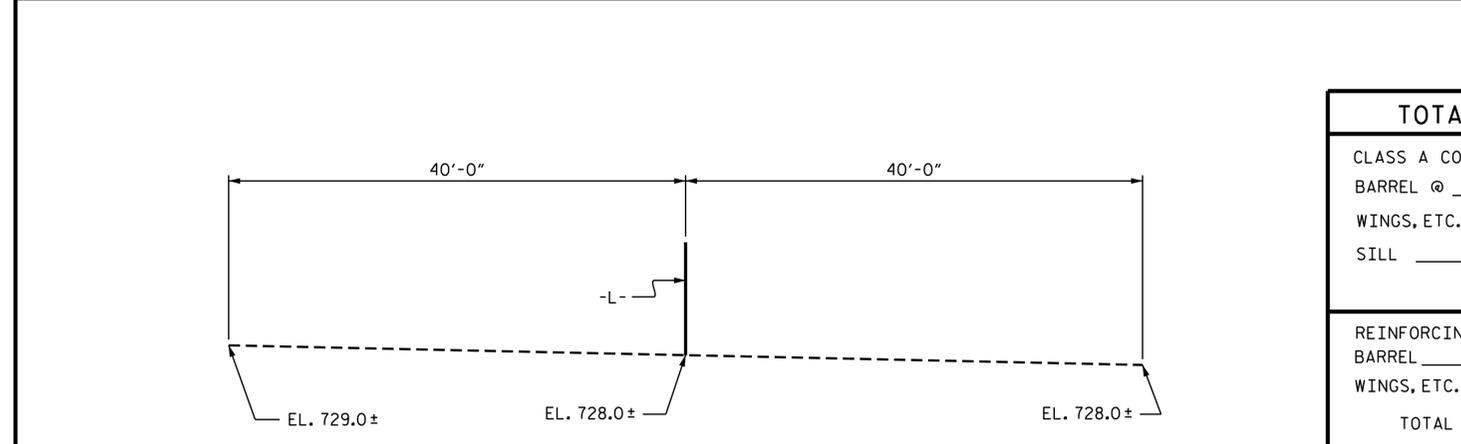
| | |
|--------------------------------|-------------|
| OVERTOPPING DISCHARGE | = 3700± CFS |
| FREQUENCY OF OVERTOPPING FLOOD | = 500± YRS. |
| OVERTOPPING FLOOD ELEVATION | = 743.40 |

GRADE DATA

| | |
|---|-----------|
| GRADE POINT ELEVATION @ STA. 15+62.00 -L- | = 743.38' |
| BED ELEVATION @ STA. 15+62.00 -L- | = 727.30' |
| ROADWAY FILL SLOPES | = 2:1 |



LOCATION SKETCH



PROFILE ALONG CULVERT

| TOTAL STRUCTURE QUANTITIES | |
|----------------------------------|-------------|
| CLASS A CONCRETE | |
| BARREL @ 3.305 CY/FT | 175.2 C.Y. |
| WINGS, ETC. | 62.7 C.Y. |
| SILL | 2.2 C.Y. |
| TOTAL | 240.1 C.Y. |
| REINFORCING STEEL | |
| BARREL | 23,149 LBS. |
| WINGS, ETC. | 4,325 LBS. |
| TOTAL | 27,474 LBS. |
| FOUNDATION CONDITIONING MATERIAL | 127 TONS |
| CULVERT EXCAVATION | LUMP SUM |
| REMOVAL OF EXISTING STRUCTURE | LUMP SUM |
| ASBESTOS ASSESSMENT | LUMP SUM |

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.7.R.81
 GUILFORD COUNTY
 STATION: 15+62.00 -L-

SHEET 1 OF 7 REPLACES BRIDGE NO. 40



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 14 FT. X 12 FT. CONCRETE BOX CULVERT
 112° SKEW

DRAWN BY : A. SORSENGINH DATE : 9/2016
 CHECKED BY : WF PARKER/A.K. PATEL DATE : 9/2016
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2016

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

| LEVEL | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING LOAD RATING # | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
|--------------------|-----------------------------------|----------------------|---------------------------|-----------------------------|---------------|--------------------------------------|---------------|----------|------------------|--|---------------|-------------|--------------|----------------|--|--|
| | | | | | | MOMENT | | | | SHEAR | | | | | | |
| | | | | | | LIVE-LOAD FACTORS (γ _{LL}) | RATING FACTOR | BOX NO. | ELEMENT TYPE | DISTANCE FROM LEFT END OF ELEMENT (ft) | RATING FACTOR | BOX NO. | ELEMENT TYPE | | DISTANCE FROM LEFT END OF ELEMENT (ft) | |
| DESIGN LOAD RATING | HL-93 (INVENTORY) | N/A | ① | 1.05 | -- | 1.75 | 1.05 | 1 | TOP SLAB | 6.23 | 1.14 | 1 | TOP SLAB | 13.46 | | |
| | HL-93 (OPERATING) | N/A | | 1.36 | -- | 1.35 | 1.36 | 1 | TOP SLAB | 6.23 | 1.48 | 1 | TOP SLAB | 13.46 | | |
| | HS-20 (INVENTORY) | 36,000 | ② | 1.05 | 37.83 | 1.75 | 1.05 | 1 | TOP SLAB | 13.57 | 1.21 | 1 | BOTTOM SLAB | 13.61 | | |
| | HS-20 (OPERATING) | 36,000 | | 1.36 | 49.04 | 1.35 | 1.36 | 1 | TOP SLAB | 13.57 | 1.57 | 1 | BOTTOM SLAB | 13.61 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13,500 | | 1.79 | 24.17 | 1.40 | 1.79 | 1 | TOP CORNER WALL | 0.65 | 2.14 | 1 | EXTERIOR WALL | 12.10 | |
| | | SNGARBS2 | 20,000 | | 1.74 | 34.87 | 1.40 | 1.74 | 1 | TOP CORNER WALL | 0.65 | 2.14 | 1 | EXTERIOR WALL | 12.10 | |
| | | SNAGRIS2 | 22,000 | | 1.62 | 35.75 | 1.40 | 1.62 | 1 | BOT. CORNER WALL | 12.76 | 2.13 | 1 | EXTERIOR WALL | 12.10 | |
| | | SNCOTTS3 | 27,250 | | 1.31 | 35.76 | 1.40 | 1.31 | 1 | TOP SLAB | 6.23 | 1.41 | 1 | TOP SLAB | 13.46 | |
| | | SNAGGRS4 | 34,925 | | 1.38 | 48.09 | 1.40 | 1.38 | 1 | TOP SLAB | 13.57 | 1.38 | 1 | BOTTOM SLAB | 13.61 | |
| | | SNS5A | 35,550 | | 1.34 | 47.79 | 1.40 | 1.34 | 1 | BOT. CORNER WALL | 12.76 | 1.36 | 1 | BOTTOM SLAB | 13.61 | |
| | | SNS6A | 39,950 | | 1.21 | 48.46 | 1.40 | 1.28 | 1 | BOT. CORNER WALL | 12.76 | 1.21 | 1 | BOTTOM SLAB | 13.61 | |
| | SNS7B | 42,000 | | 1.25 | 52.48 | 1.40 | 1.25 | 1 | BOT. CORNER WALL | 12.76 | 1.27 | 1 | BOTTOM SLAB | 13.61 | | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33,000 | | 1.43 | 47.24 | 1.40 | 1.43 | 1 | BOT. CORNER WALL | 12.76 | 1.47 | 1 | BOTTOM SLAB | 13.61 | |
| | | TNT4A | 33,075 | | 1.43 | 47.35 | 1.40 | 1.43 | 1 | TOP CORNER WALL | 0.65 | 1.46 | 1 | BOTTOM SLAB | 13.61 | |
| | | TNT6A | 41,600 | | 1.34 | 55.91 | 1.40 | 1.34 | 1 | BOT. CORNER WALL | 12.76 | 1.35 | 1 | BOTTOM SLAB | 13.61 | |
| | | TNT7A | 42,000 | | 1.22 | 51.28 | 1.40 | 1.34 | 1 | BOT. CORNER WALL | 12.76 | 1.22 | 1 | BOTTOM SLAB | 13.61 | |
| | | TNT7B | 42,000 | | 1.21 | 50.84 | 1.40 | 1.39 | 1 | BOT. CORNER WALL | 12.76 | 1.21 | 1 | BOTTOM SLAB | 13.61 | |
| | | TNAGRIT4 | 43,000 | | 1.13 | 48.40 | 1.40 | 1.33 | 1 | TOP SLAB | 13.57 | 1.13 | 1 | BOTTOM SLAB | 13.61 | |
| TNAGT5A | | 45,000 | | 1.10 | 49.54 | 1.40 | 1.21 | 1 | TOP SLAB | 13.57 | 1.10 | 1 | BOTTOM SLAB | 13.61 | | |
| TNAGT5B | 45,000 | ③ | 1.09 | 49.15 | 1.40 | 1.12 | 1 | TOP SLAB | 13.57 | 1.09 | 1 | BOTTOM SLAB | 13.61 | | | |

LOAD FACTORS:

| DESIGN LOAD RATING FACTORS | | |
|----------------------------|------------|--------------|
| LOAD TYPE | MAX FACTOR | MIN FACTOR |
| DC | 1.25 | 0.90 |
| DW | 1.50 | 0.65 |
| EV | 1.30 | 0.90 |
| EH | 1.35 | 0.50 OR 0.90 |
| ES | 1.35 | 0.50 OR 0.90 |
| LS | 1.75 | -- |
| WA | 1.00 | -- |

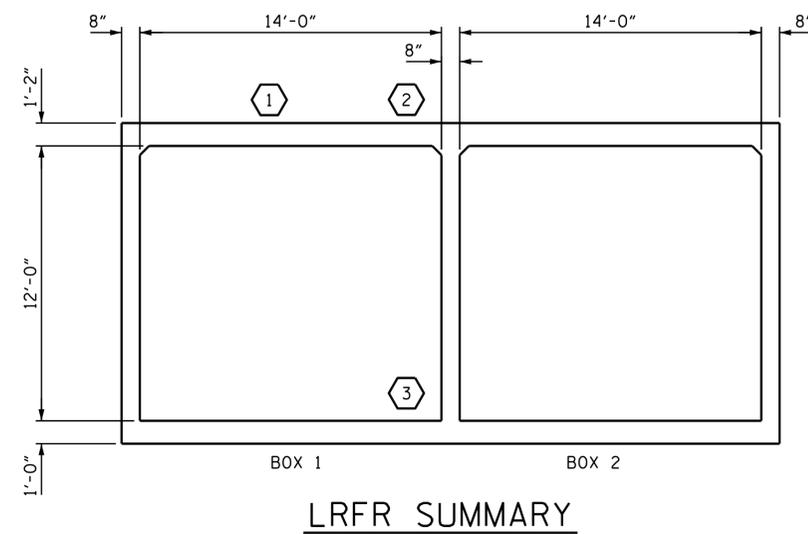
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

-
-
-
-

| | |
|-------------------------------|----------------------------|
| # | CONTROLLING LOAD RATING |
| ① | DESIGN LOAD RATING (HL-93) |
| ② | DESIGN LOAD RATING (HS-20) |
| ③ | LEGAL LOAD RATING ** |
| ** SEE CHART FOR VEHICLE TYPE | |



PROJECT NO. 17BP.7.R.81
GUILFORD COUNTY
 STATION: 15+62.00 -L-

SHEET 2 OF 7

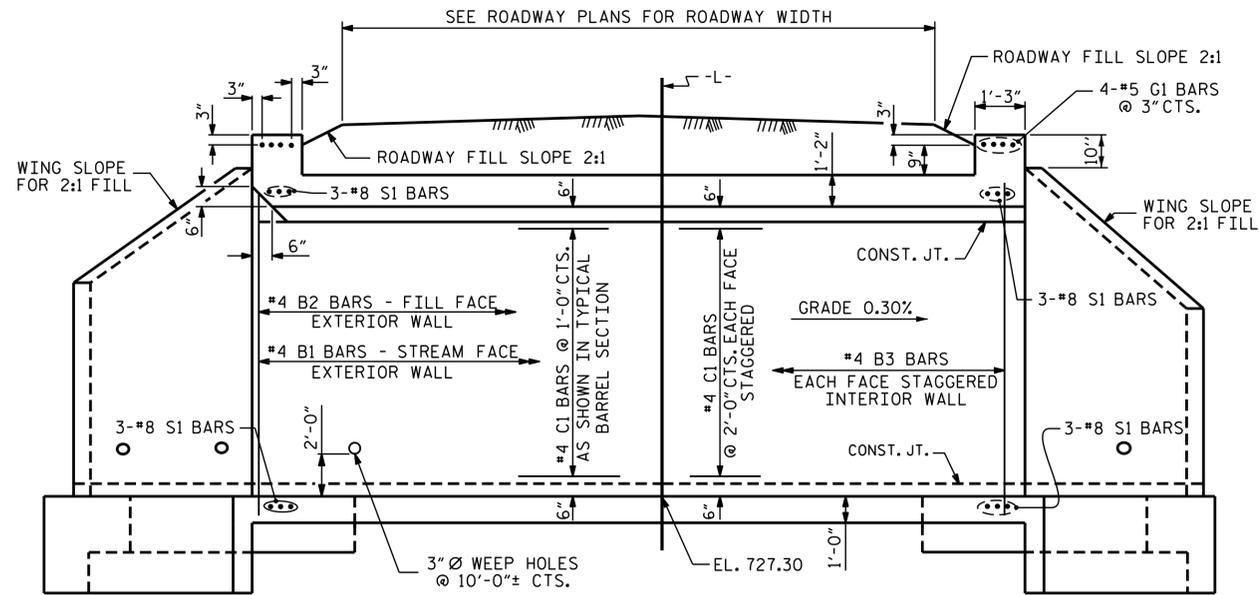


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRF SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

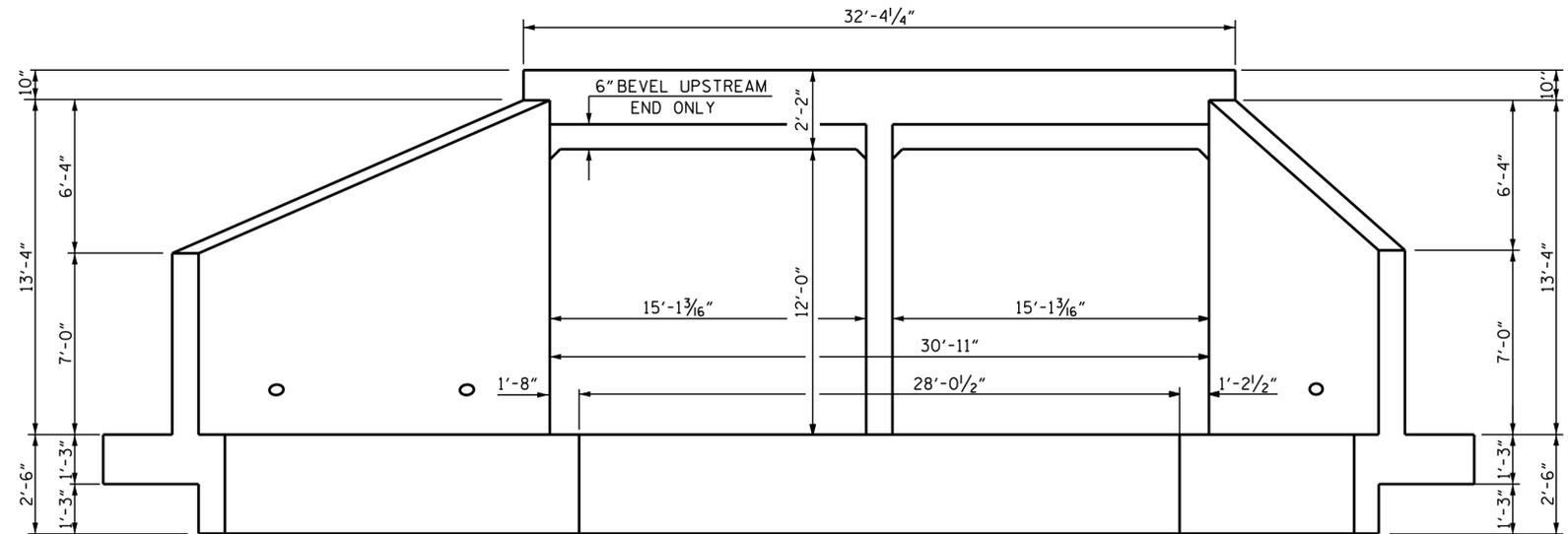
DRAWN BY : A. SORSENGINH DATE : 9/2016
 CHECKED BY : WF PARKER/A. K. PATEL DATE : 9/2016
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2016

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

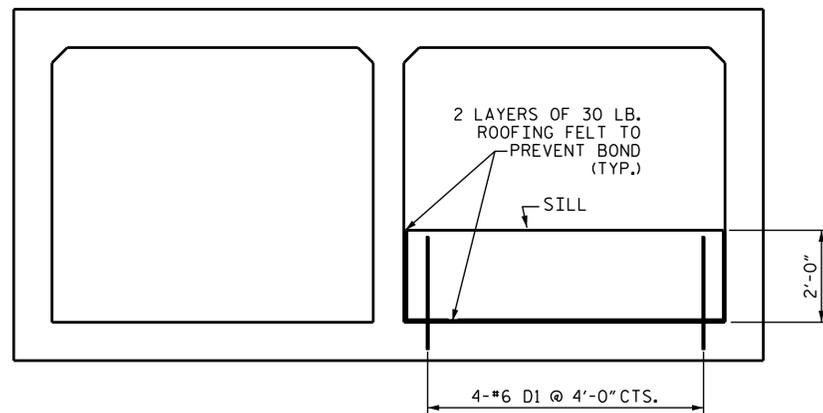
| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C-2 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 7 |



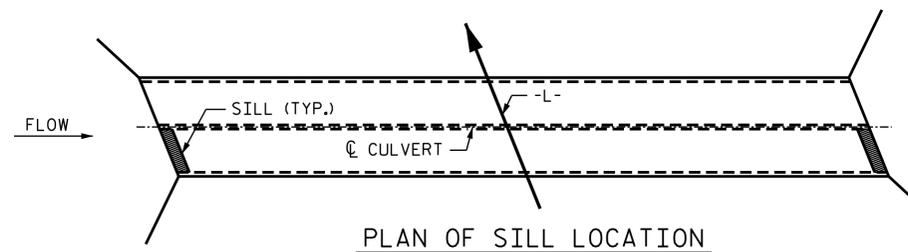
EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY



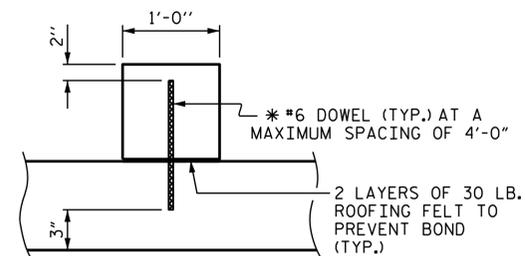
INLET END ELEVATION NORMAL TO SKEW



ELEVATION
CULVERT SILL DETAILS
 LOOKING DOWNSTREAM



PLAN OF SILL LOCATION



SECTION THROUGH SILL

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

NOTE:

BACKFILL TO TOP OF SILLS WITH NATIVE MATERIAL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S). IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROJECT NO. 17BP.7.R.81
GUILFORD COUNTY
 STATION: 15+62.00 -L-

SHEET 3 OF 7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE 14 FT. X 12 FT.
 CONCRETE BOX CULVERT
 112° SKEW**

DRAWN BY : A. SORSENGINH DATE : 9/2016
 CHECKED BY : WF PARKER/A.K. PATEL DATE : 9/2016
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2016

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

NOTES

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2 1/2".
- B. 4 - 1" Ø X 2 1/4" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

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

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

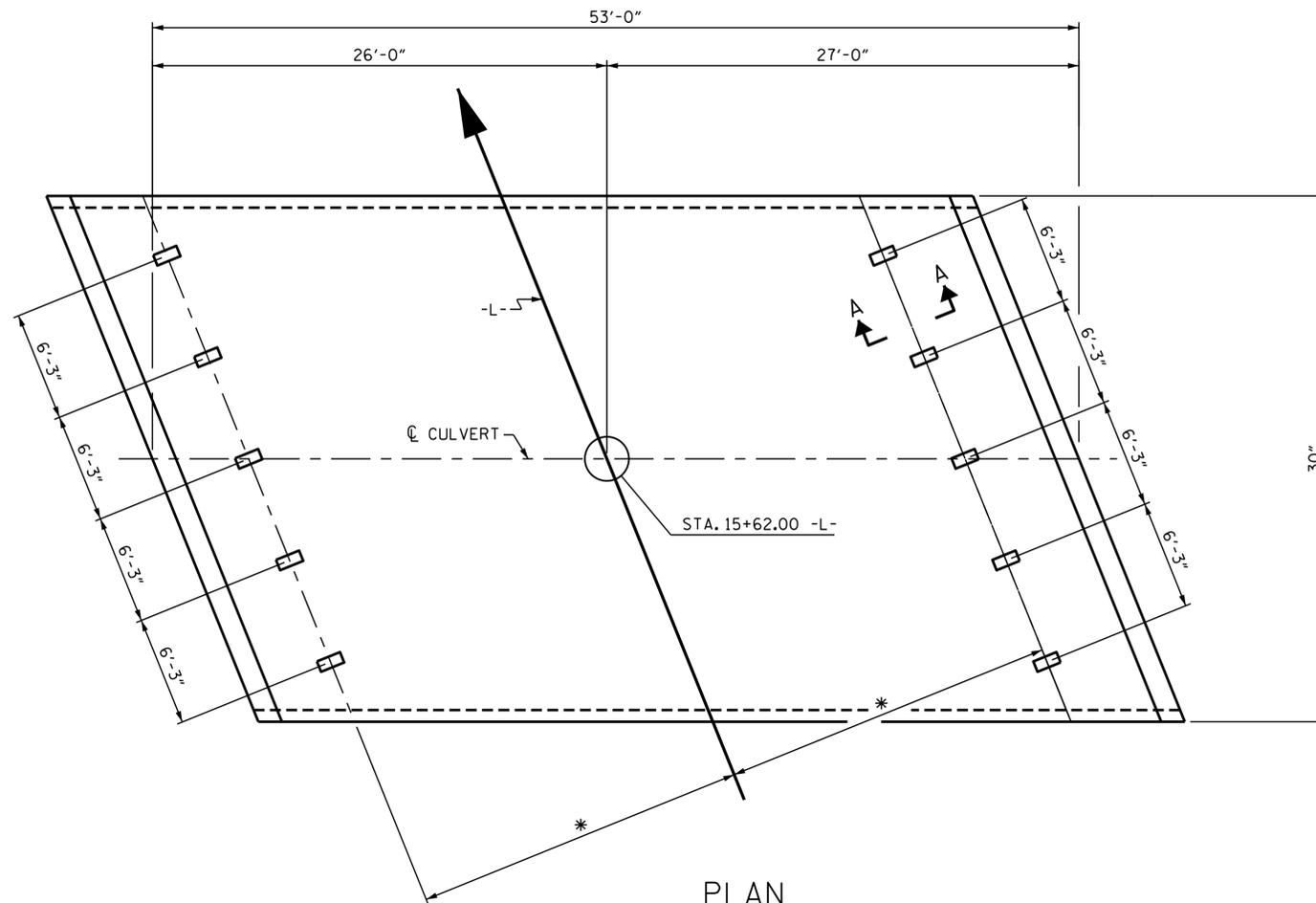
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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

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

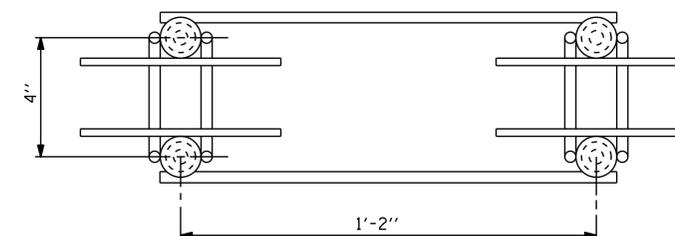
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

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

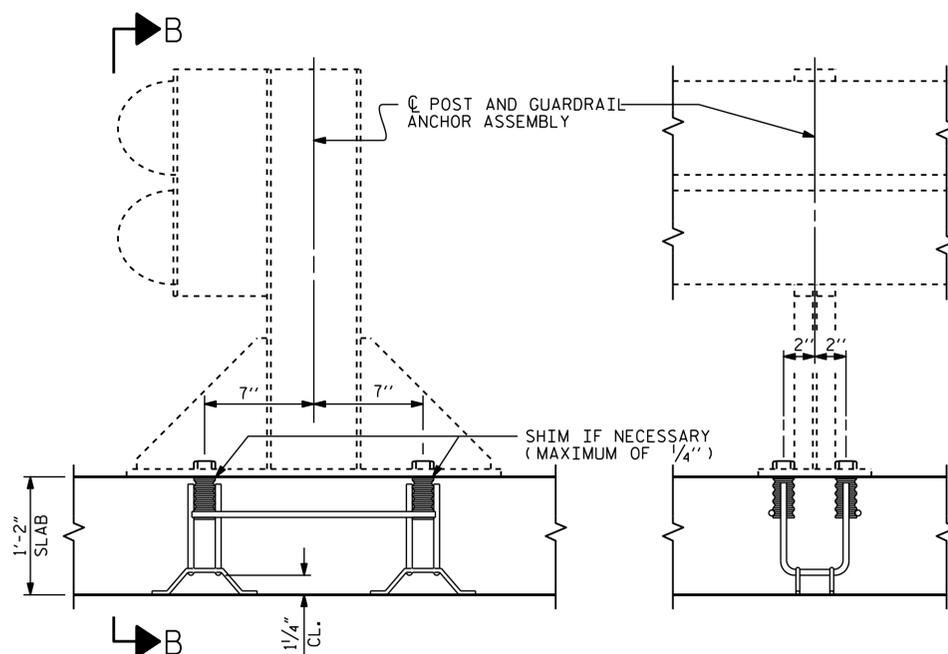


PLAN

SHOWING: GUARDRAIL ANCHOR ASSEMBLY SPACING.
* THIS DIMENSION TO BE LOCATED BY THE ENGINEER IN THE FIELD.

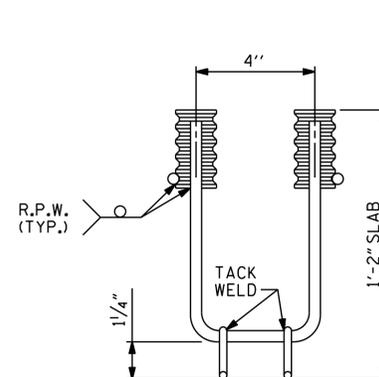


PLAN



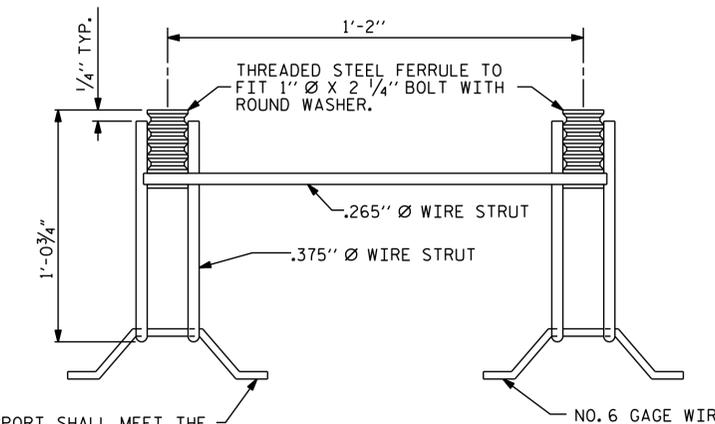
SECTION A-A

SECTION B-B



ELEVATION

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



SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. 17BP.7.R.81
GUILFORD COUNTY
STATION: 15+62.00 -L-

SHEET 7 OF 7



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ANCHORAGE DETAILS FOR
GUARDRAIL ANCHOR ASSEMBLY
FOR CULVERTS

DRAWN BY : A. SORSENGINH DATE : 9/2016
CHECKED BY : WF PARKER/A. K. PATEL DATE : 9/2016

29-SEP-2016 12:03
S:\NCPG1\Division7\17BP7R81\asorsenginh\Plans\17BP.7.R.81_SD.CU.dgn
gdickey

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

STD. NO. GRA1

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN