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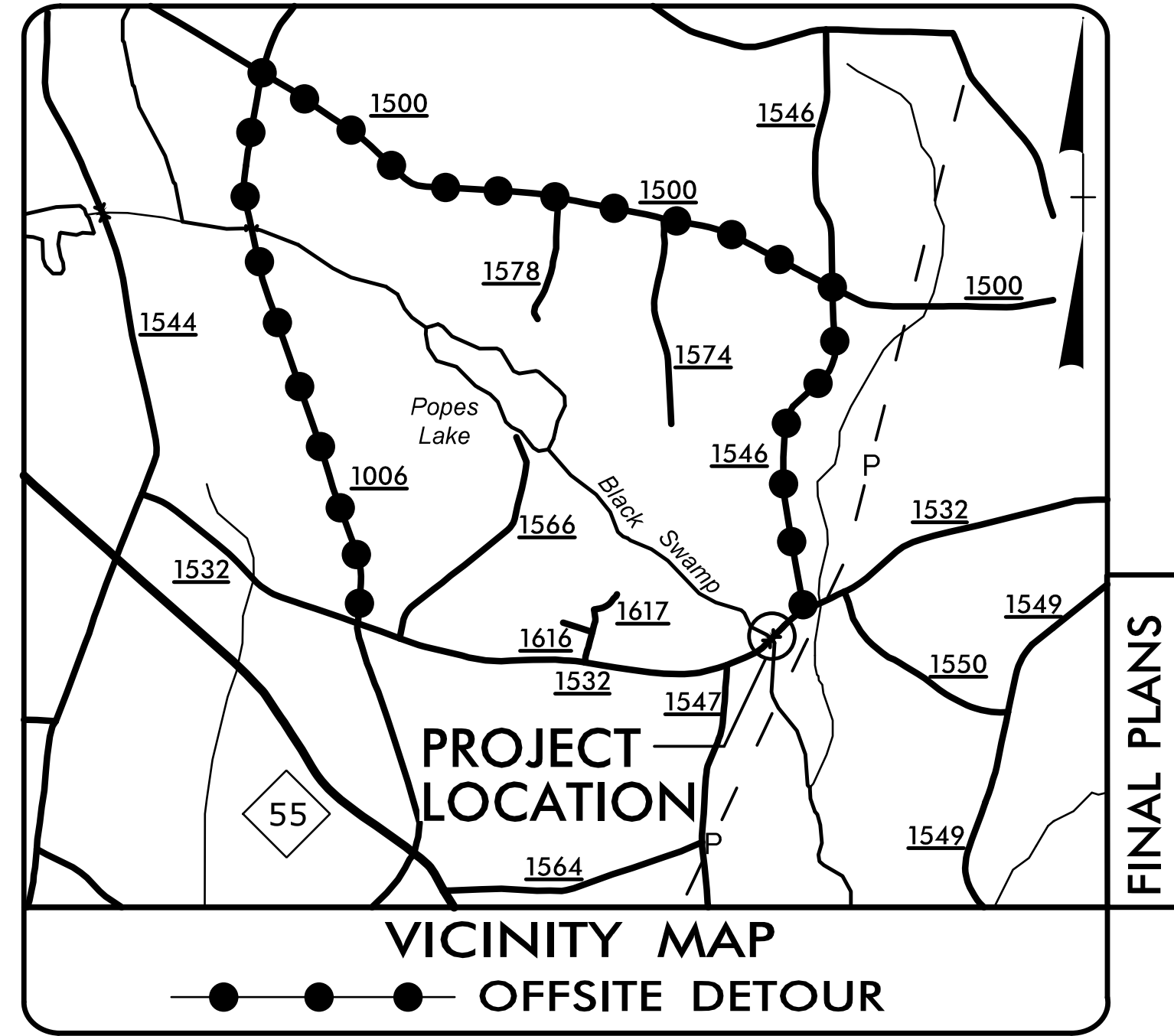
09/28/2019

7/21/2023  
 X:\NCDOT\Division 6 HS-2006Q Harnett 15\Roadway\Proj\HS-2006Q\_Rdy\_tsh.dgn  
 User:cbpueft

**PROJECT: HS-2006Q**

**CONTRACT: DF00446**

See Sheet 1A For Index of Sheets  
 See Sheet 1B For List of Conventional Symbols



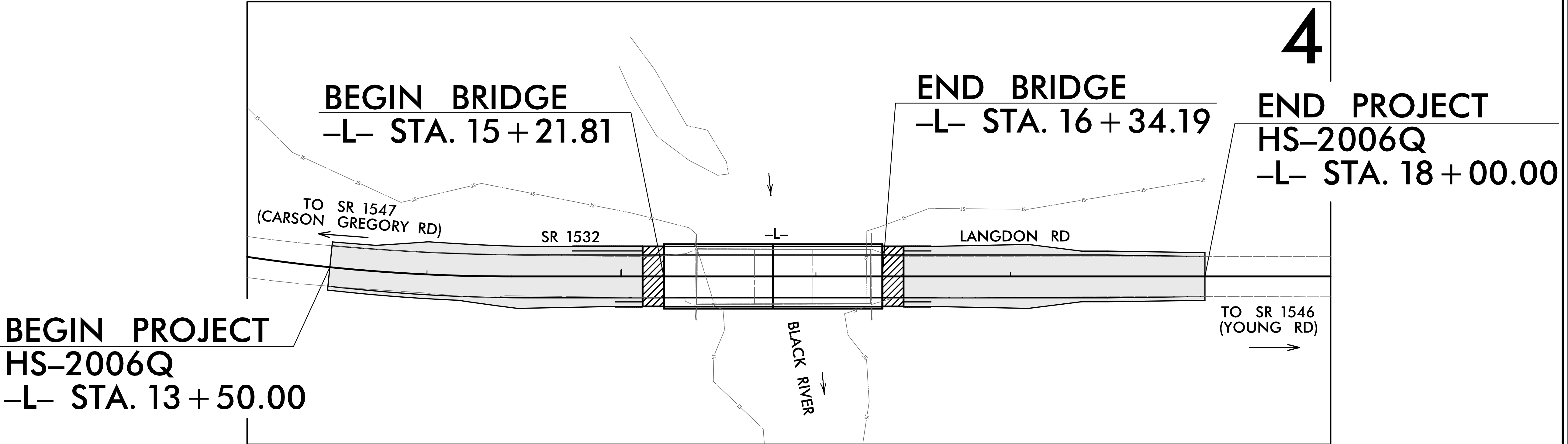
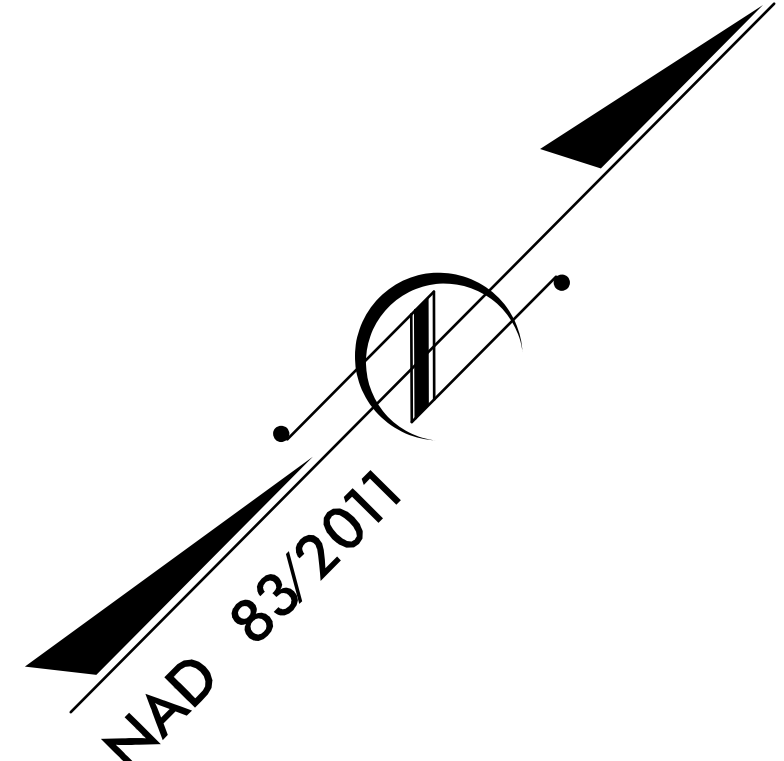
STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**HARNETT COUNTY**

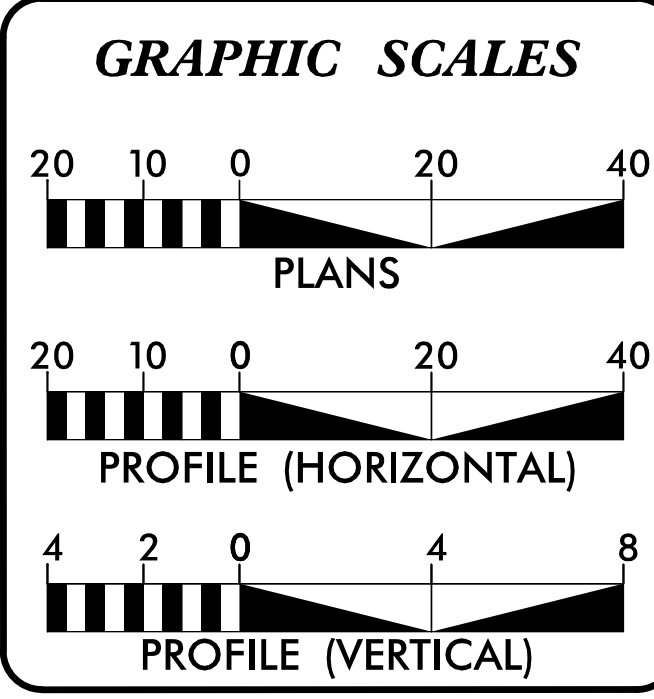
**LOCATION: BRIDGE #420015 OVER BLACK RIVER  
 ON SR 1532 (LANGDON RD)**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2006Q	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
49312.1.21	1532(006)	PE	
49312.2.21	1532(006)	UTIL & RW	
49312.3.21	1532(006)	CONST.	



DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2022 = 730
ADT 2045 = 910
T = 6 % *
V = 60 MPH
* TTST = 3% DUAL = 3%
FUNC CLASS = RURAL - LOCAL
SUB-REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT HS-2006Q #420015	= 0.064
LENGTH STRUCTURE PROJECT HS-2006Q #420015	= 0.021
TOTAL LENGTH PROJECT HS-2006Q #420015	= 0.085

**NCDOT CONTACT: ADAM BRITT**

<p>PLANS PREPARED BY:</p> <p>TGS ENGINEERS                  201 W. MARION ST                  SUITE 200                  SHELBY, NC 28150                  PH (704) 476-0003                  CORP. LICENSE NO.: C-0275</p>	<p>PLANS PREPARED FOR:</p> <p>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</p> <p>DIVISION 6                  558 Gillespie St                  Fayetteville, NC 28301</p>
<p><b>RIGHT OF WAY DATE:</b>                  MARCH 1, 2023</p>	<p><b>JIMMY L. TERRY, PE</b>                  PROJECT ENGINEER</p>
<p><b>LETTING DATE:</b>                  SEPT. 20, 2023</p>	<p><b>AUSTIN R. TURNER, PE</b>                  PROJECT DESIGN ENGINEER</p>

2018 STANDARD SPECIFICATIONS

**HYDRAULICS ENGINEER**  
 7/24/2023

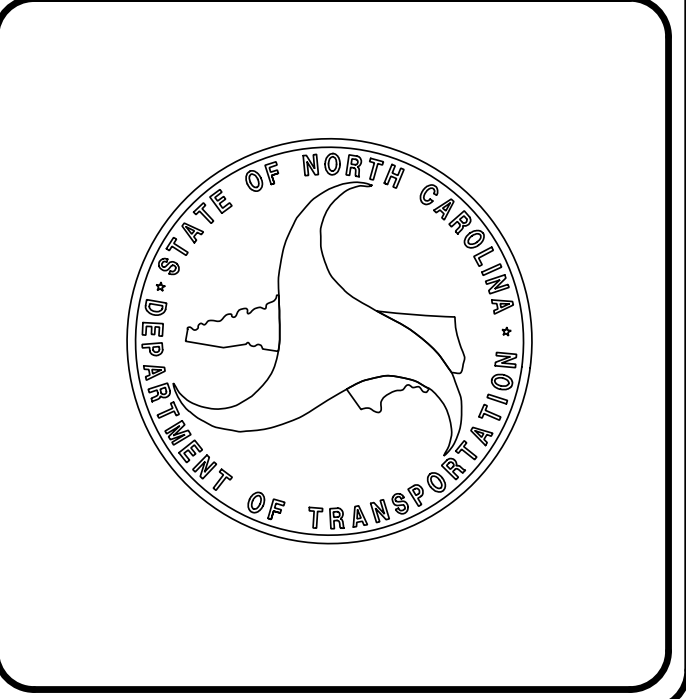
DocuSigned by:  
**John W. Twisdale, Jr.**  
 P.E.

SIGNATURE:

**ROADWAY DESIGN ENGINEER**  
 7/21/2023

DocuSigned by:  
**Jimmy Terry**  
 P.E.

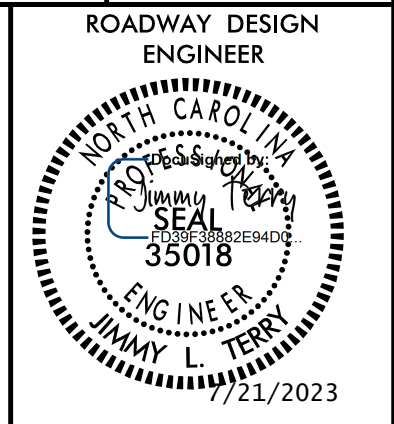
SIGNATURE:





8/17/99

PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. <i>1A</i>
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UNLESS ALL SIGNATURES COMPLETED**

# INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1	SPECIAL DETAIL - TYPE III ANCHOR UNIT
2C-2	SPECIAL DETAIL - W BEAM RAIL SECTION
2G-1	GEOTECHNICAL CONSTRUCTION DETAIL - ROCK EMBANKMENTS
3B-1	ROADWAY AND DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4	PLAN SHEET
5	PROFILE SHEET
RW-01 THRU RW-04	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-4	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
UC-1 THRU UC-5	UTILITIES CONSTRUCTION PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-3	CROSS-SECTIONS
S-1 THRU S-18	STRUCTURE PLANS
STRUCTURE STANDARD NOTES	

# GENERAL NOTES

GENERAL NOTES: 2018 SPECIFICATIONS  
EFFECTIVE: 01-16-2018  
REVISED:

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 MODIFIED.

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

SUBSURFACE DRAINS:  
SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

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.

END BENTS:  
THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:  
UTILITY OWNERS ON THIS PROJECT ARE BRIGHTSPEED, CHARTER, AND HARNETT REGIONAL WATER  
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.

# STANDARD DRAWINGS

EFF. 01-16-2018  
REV.  
2018 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, 2018 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 Modified  
225.02 Guide for Grading Subgrade - Secondary and Local  
225.04 Method of Obtaining Superelevation - Two Lane Pavement

DIVISION 3 - PIPE CULVERTS

300.01 Method of Pipe Installation

DIVISION 4 - MAJOR STRUCTURES

422.02 Bridge Approach Fills - Type II Modified Approach Fill

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS

560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I

DIVISION 8 - INCIDENTALS

840.00 Concrete Base Pad for Drainage Structures  
840.20 Frames and Wide Slot Flat Grates  
840.25 Anchorage for Frames - Brick or Concrete or Precast  
840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates  
840.46 Traffic Bearing Precast Drainage Structure  
840.66 Drainage Structure Steps  
846.01 Concrete Curb, Gutter and Curb & Gutter  
846.04 Drop Inlet Installation in Shoulder Berm Gutter  
862.01 Guardrail Placement  
862.02 Guardrail Installation  
862.03 Structure Anchor Units  
876.02 Guide for Rip Rap at Pipe Outlets

7/21/2023 1:21:00 PM 6 HS-2006Q Harnett\_15\Roadway\Proj\HS-2006Q\_Rdwy\_tsh.dgn

9/10/2021

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale*

### BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin (EIP)	
Computed Property Corner	
Existing Concrete Monument (ECM)	
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	_____
Existing Historic Property Boundary	_____
Known Contamination Area: Soil	_____
Potential Contamination Area: Soil	_____
Known Contamination Area: Water	_____
Potential Contamination Area: Water	_____
Contaminated Site: Known or Potential	

### 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 & PROJECT CONTROL:

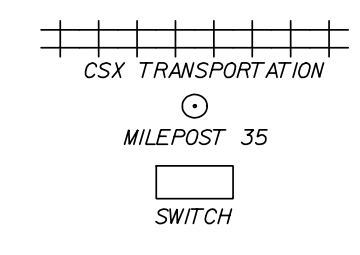
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Secondary Horiz and Vert Control Point	
Vertical Benchmark	
Existing Right of Way Monument	
Proposed Right of Way Monument (Rebar and Cap)	
Proposed Right of Way Monument (Concrete)	
Existing Permanent Easement Monument	
Proposed Permanent Easement Monument (Rebar and Cap)	
Existing C/A Monument	
Proposed C/A Monument (Rebar and Cap)	
Proposed C/A Monument (Concrete)	
Existing Right of Way Line	_____
Proposed Right of Way Line	_____
Existing Control of Access Line	_____
Proposed Control of Access Line	_____
Proposed ROW and CA Line	_____
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	_____

### 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:

\* SUE - Subsurface Utility Engineering  
LOS - Level of Service - A, B, C or D (Accuracy)

#### 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	
U/G Power Line Test Hole (SUE - LOS A)*	
U/G Power Line (SUE - LOS B)*	_____
U/G Power Line (SUE - LOS C)*	_____
U/G Power Line (SUE - LOS D)*	_____

#### TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Test Hole (SUE - LOS A)*	
U/G Telephone Cable (SUE - LOS B)*	_____
U/G Telephone Cable (SUE - LOS C)*	_____
U/G Telephone Cable (SUE - LOS D)*	_____
U/G Telephone Conduit (SUE - LOS B)*	_____
U/G Telephone Conduit (SUE - LOS C)*	_____
U/G Telephone Conduit (SUE - LOS D)*	_____
U/G Fiber Optics Cable (SUE - LOS B)*	_____
U/G Fiber Optics Cable (SUE - LOS C)*	_____
U/G Fiber Optics Cable (SUE - LOS D)*	_____

### WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line Test Hole (SUE - LOS A)*	
U/G Water Line (SUE - LOS B)*	_____
U/G Water Line (SUE - LOS C)*	_____
U/G Water Line (SUE - LOS D)*	_____
Above Ground Water Line	_____

#### TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Test Hole (SUE - LOS A)*	
U/G TV Cable (SUE - LOS B)*	_____
U/G TV Cable (SUE - LOS C)*	_____
U/G TV Cable (SUE - LOS D)*	_____
U/G Fiber Optic Cable (SUE - LOS B)*	_____
U/G Fiber Optic Cable (SUE - LOS C)*	_____
U/G Fiber Optic Cable (SUE - LOS D)*	_____

#### GAS:

Gas Valve	
Gas Meter	
U/G Gas Line Test Hole (SUE - LOS A)*	
U/G Gas Line (SUE - LOS B)*	_____
U/G Gas Line (SUE - LOS C)*	_____
U/G Gas Line (SUE - LOS D)*	_____
Above Ground Gas Line	_____

#### SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	_____
Above Ground Sanitary Sewer	_____
SS Force Main Line Test Hole (SUE - LOS A)*	
SS Force Main Line (SUE - LOS B)*	_____
SS Force Main Line (SUE - LOS C)*	_____
SS Force Main Line (SUE - LOS D)*	_____

#### MISCELLANEOUS:

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

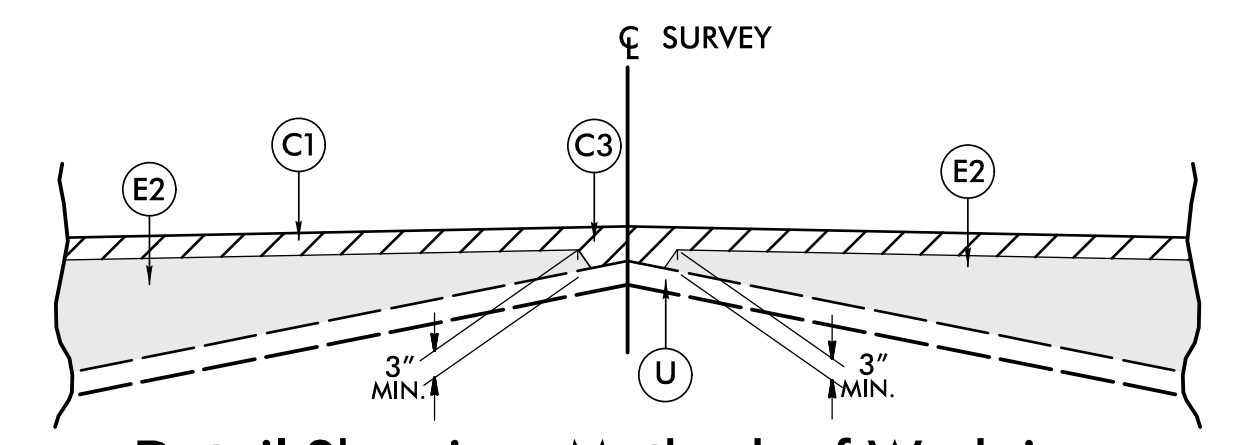


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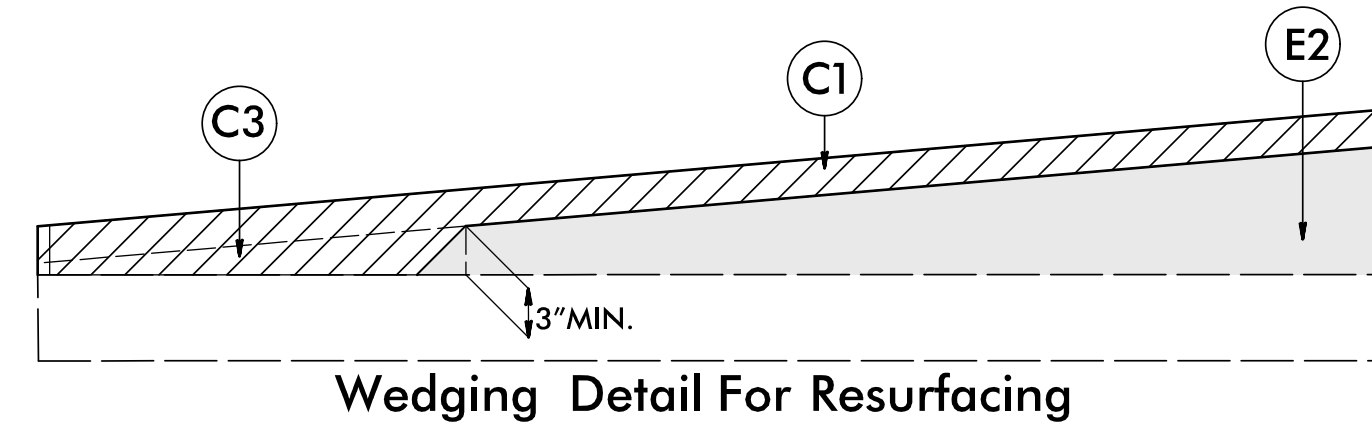
PROJECT REFERENCE NO. HS-2006Q	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 TGS ENGINEERS 201 W. MARION ST SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 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 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, 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.
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING EXISTING PAVEMENT (SEE MILLING DETAIL THIS SHEET)
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL THIS SHEET)

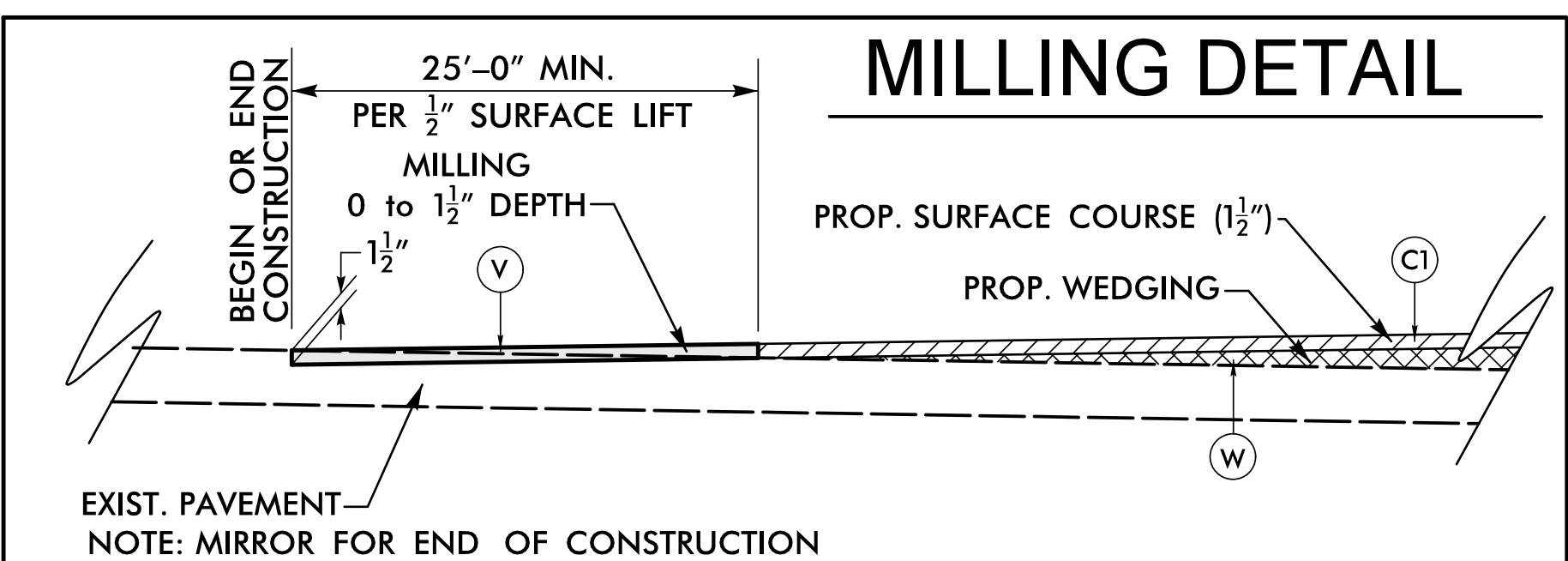
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging

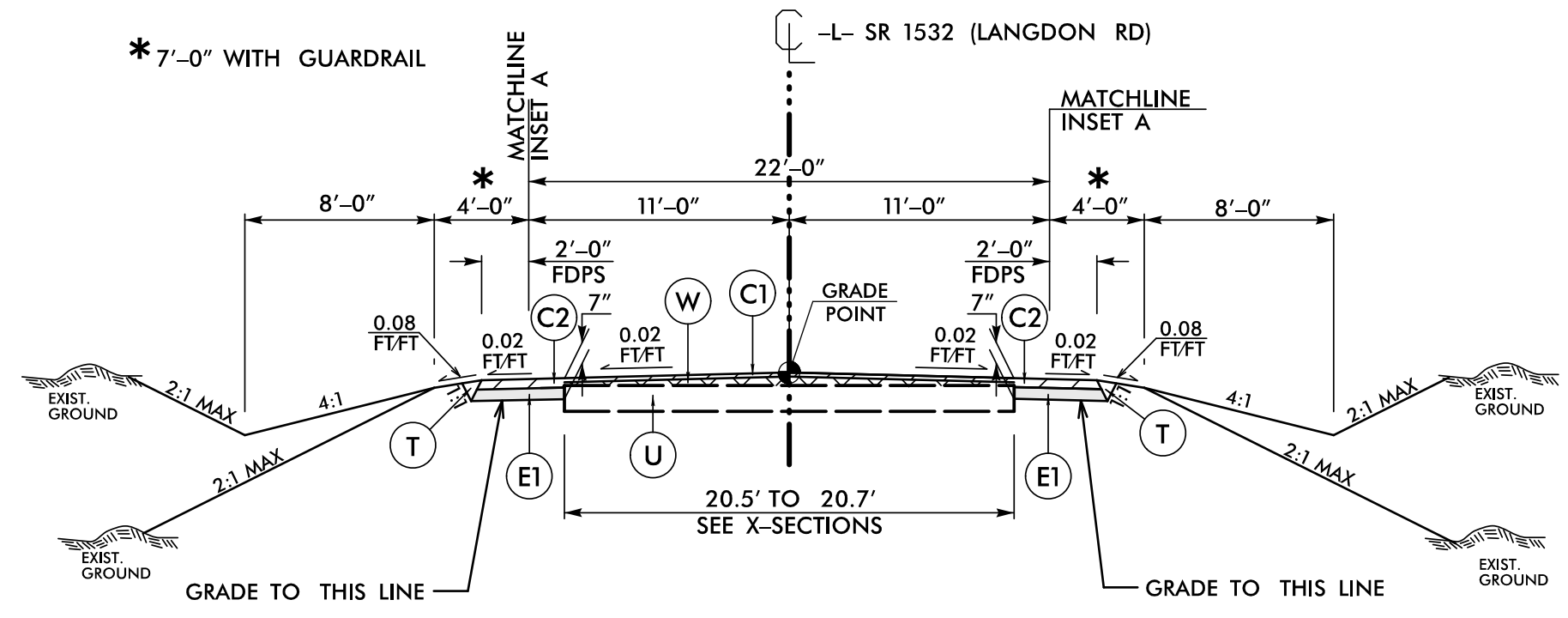


Wedging Detail For Resurfacing



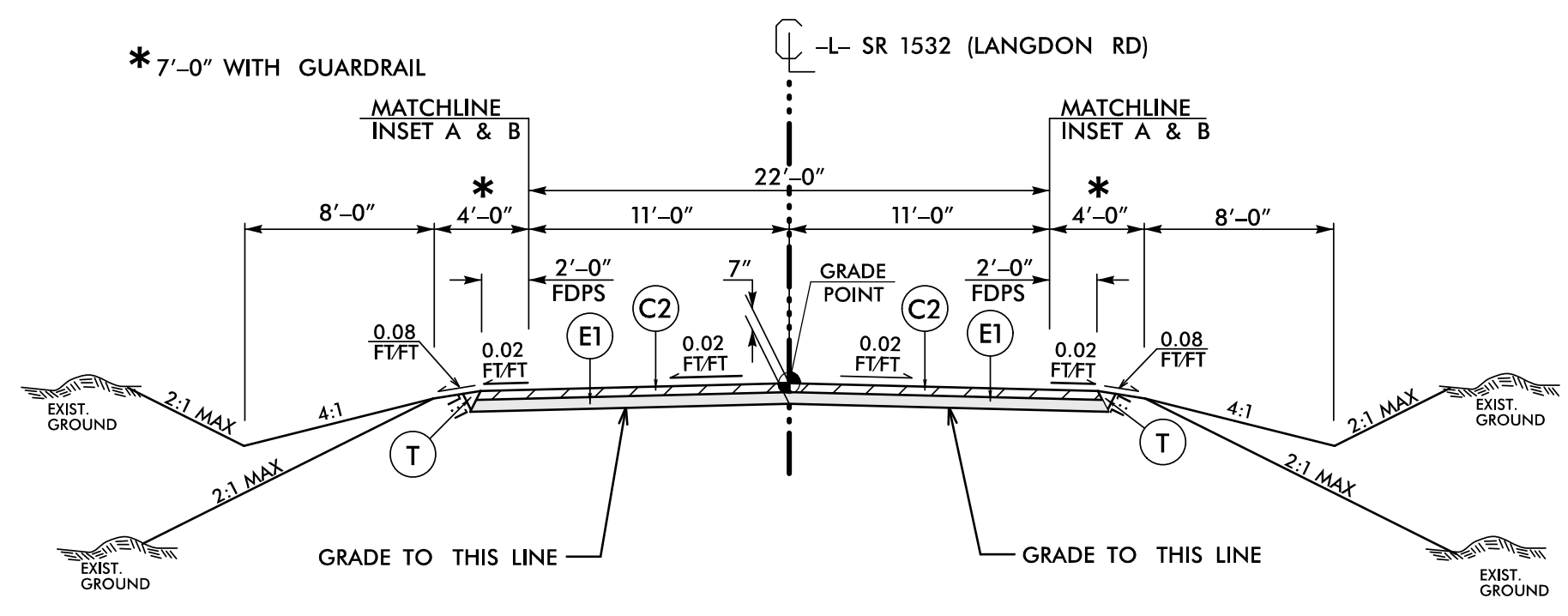
USE MILLING DETAIL AS FOLLOWS:

- MILLING AND RESURFACING:  
 -L- STA. 13+50.00 TO -L- STA. 14+25.00  
 -L- STA. 17+25.00 TO -L- STA. 18+00.00



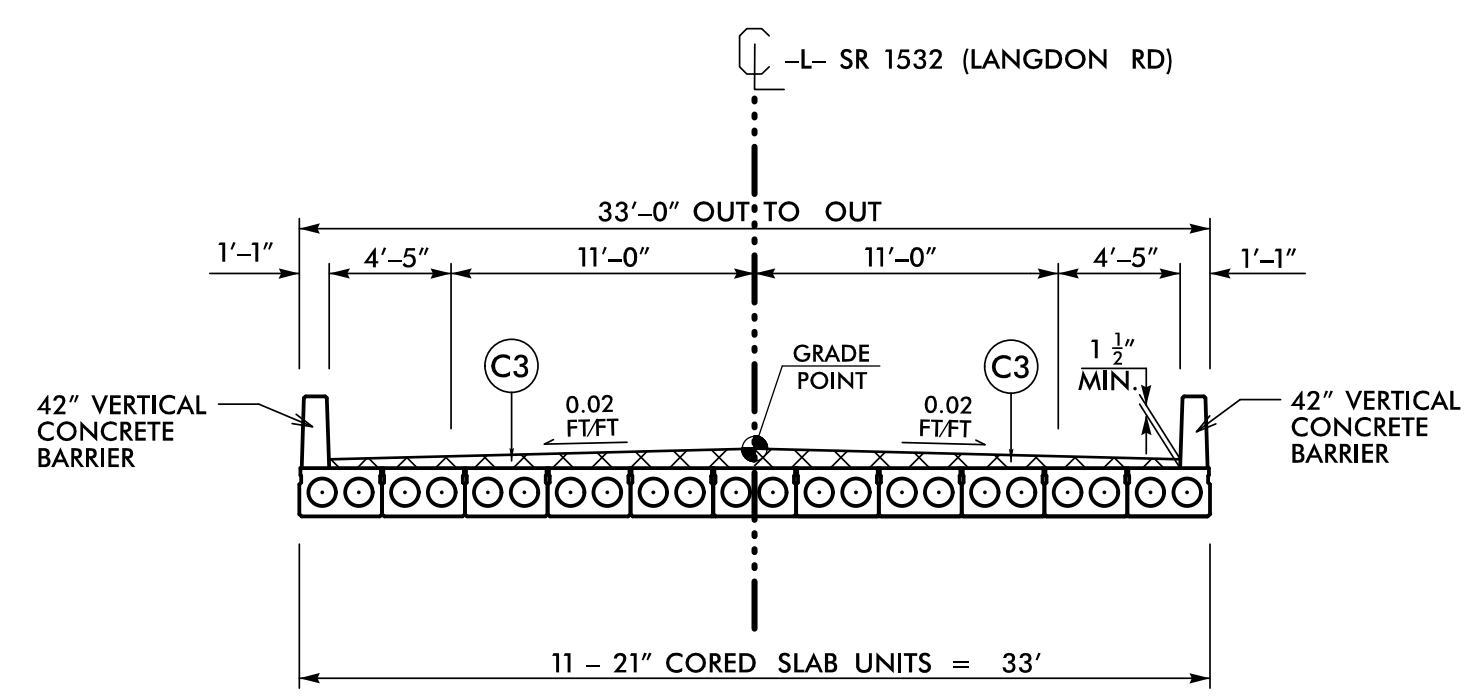
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1  
 -L- STA. 13+50.00 TO -L- STA. 14+50.00  
 -L- STA. 17+00.00 TO -L- STA. 18+00.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2  
 -L- STA. 14+50.00 TO -L- STA. 15+21.81 (BEGIN BRIDGE)  
 -L- STA. 16+34.19 (END BRIDGE) TO -L- STA. 17+00.00



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3  
 -L- STA. 15+21.81 TO -L- STA. 16+34.19

\* ADD 3' FOR GUARDRAIL LOCATIONS  
ADD MINIMUM 2' PAST PAVED SHOULDER LIMITS FOR ALL OTHER LOCATIONS

**INSET A**

USE INSET A

-L- STA. 13+72.67 TO -L- STA. 14+74.80 (BEGIN SBG), LT  
 -L- STA. 14+16.51 TO -L- STA. 14+96.81 (BEGIN SBG), RT  
 -L- STA. 16+59.19 (END SBG) TO -L- STA. 17+36.52, LT & RT

NOTE:  
 AT GUARDRAIL LOCATIONS PAVE TO FACE OF GUARDRAIL (UNLESS OTHERWISE SHOWN ON THE PLANS)

**INSET B**

USE INSET B

-L- STA. 14+74.80 TO -L- STA. 15+10.94 (BEGIN APPROACH SLAB), LT  
 -L- STA. 14+96.81 TO -L- STA. 15+10.94 (BEGIN APPROACH SLAB), RT  
 -L- STA. 16+45.06 (END APPROACH SLAB) TO -L- STA. 16+59.19, LT & RT

6/2/2019 15:00:00 Harnett\_15\Roadway\Proj\HS-2006Q\_Rdy\_tjw.dgn



14-DEC-2017 10:36 S:\Contracts\2018 Standard Drawings\Special Details\Lieu of Standards\Division 8\0862d0301.dgn

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

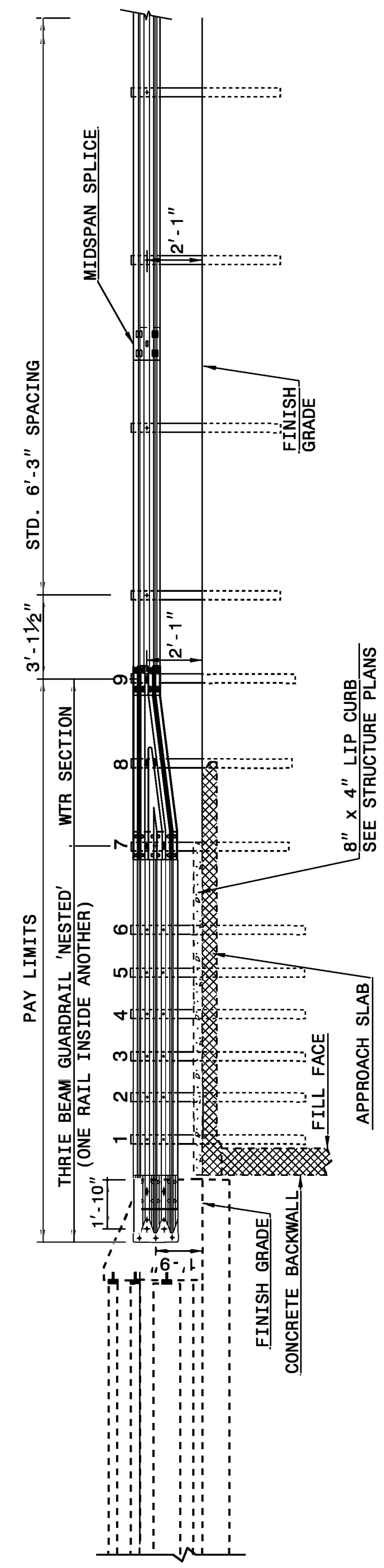
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7 862D03

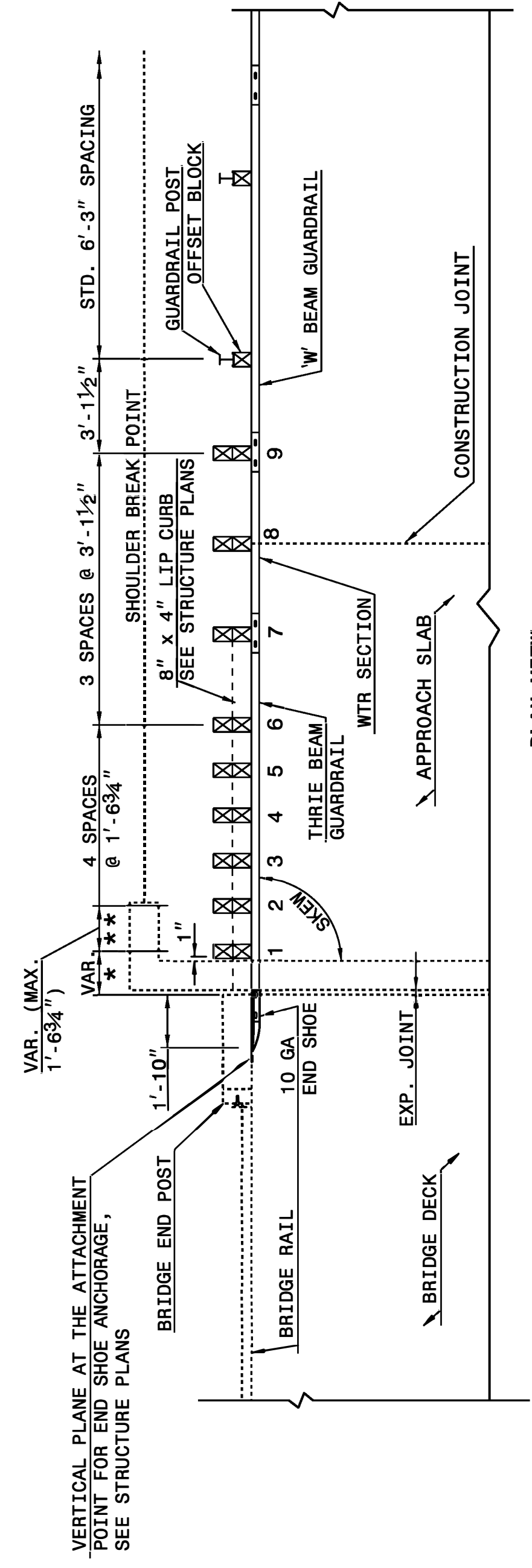
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7 862D03



NOTE: \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER. \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT. -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB. -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER). -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW. -SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

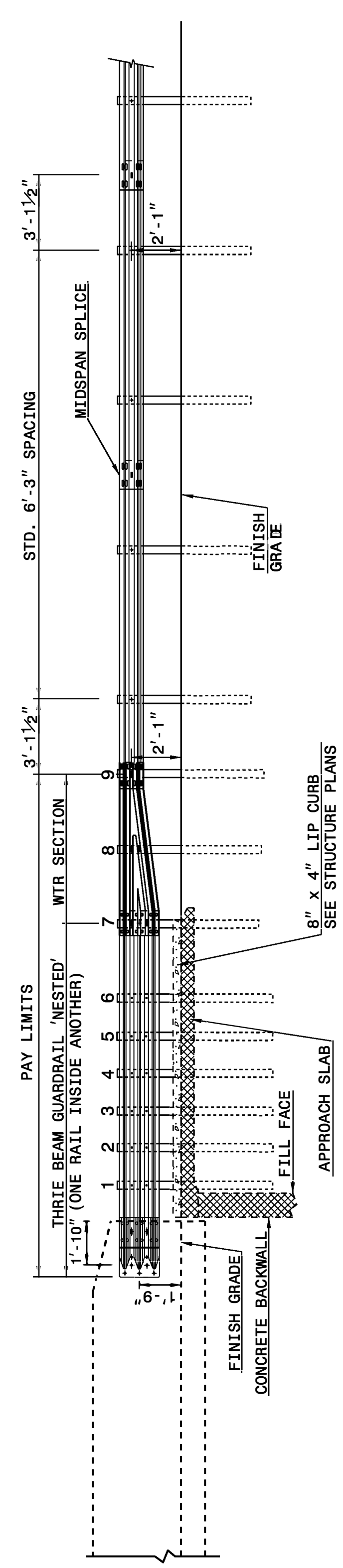
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7 862D03

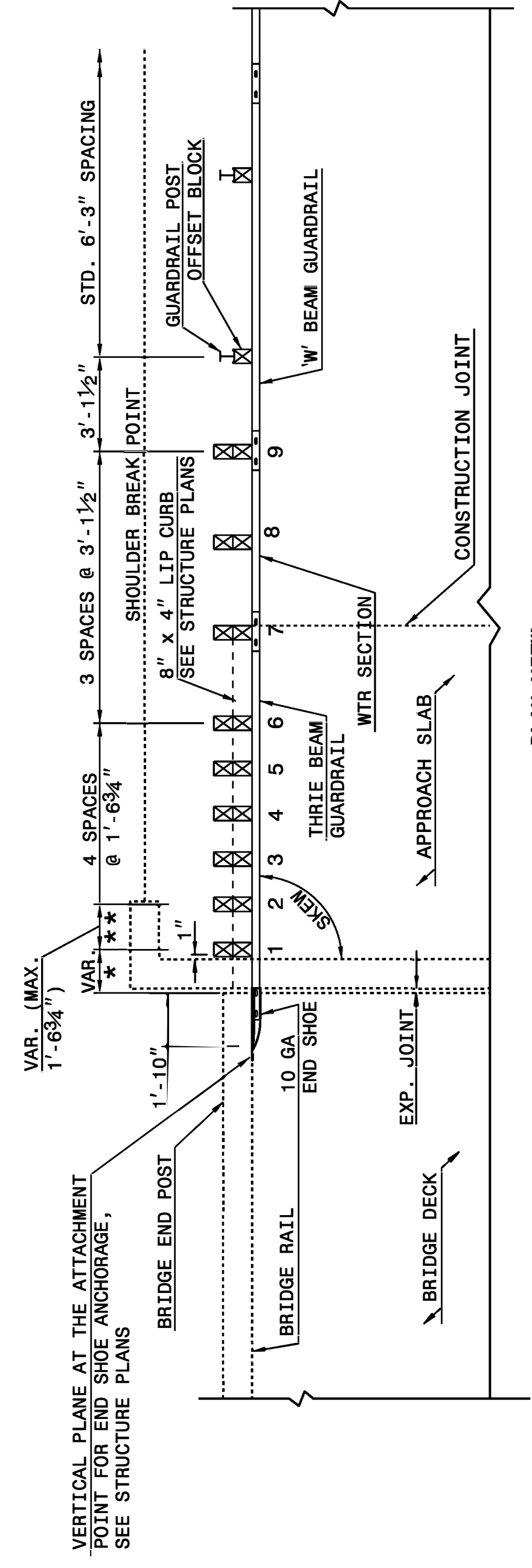
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7 862D03



NOTE: \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER. \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT. -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB. -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER). -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW. -SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

CONTRACT STANDARDS AND DEVELOPMENT UNIT Office 919-707-6950 FAX 919-250-4119 SEE TITLE BLOCK ORIGINAL BY: J. HOWERTON DATE: 06-22-12 MODIFIED BY: DATE: CHECKED BY: DATE: FILE SPEC.: DATE:



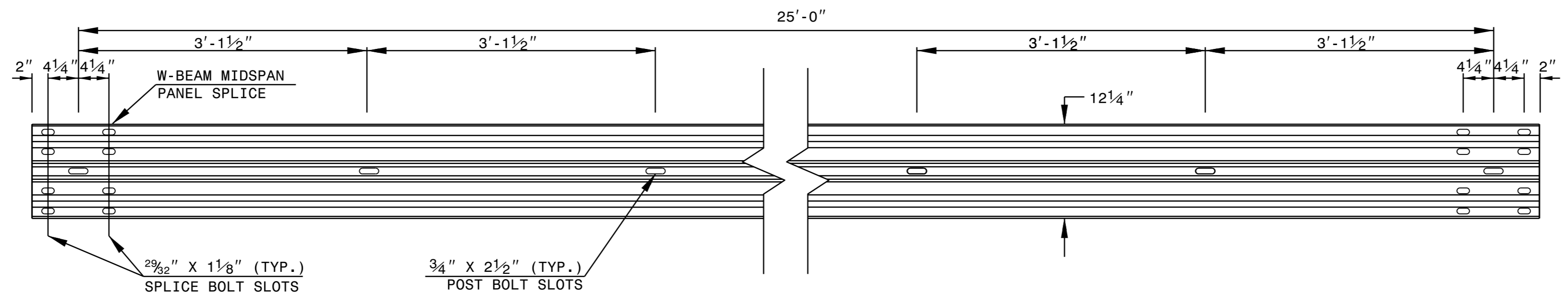
7/21/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

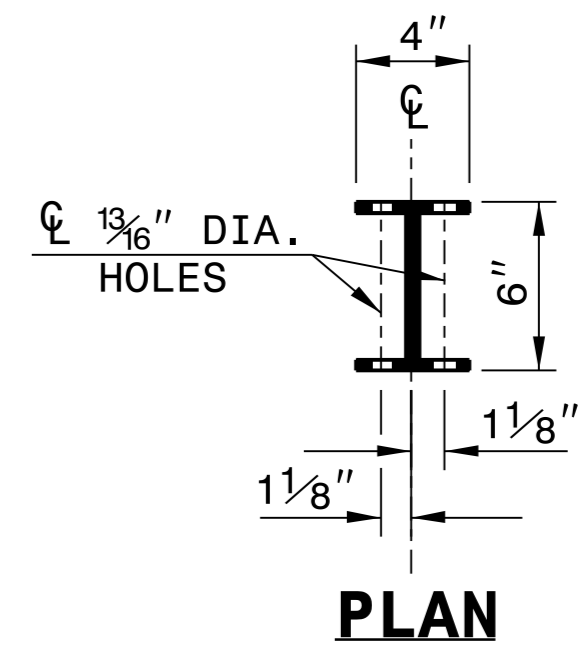
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

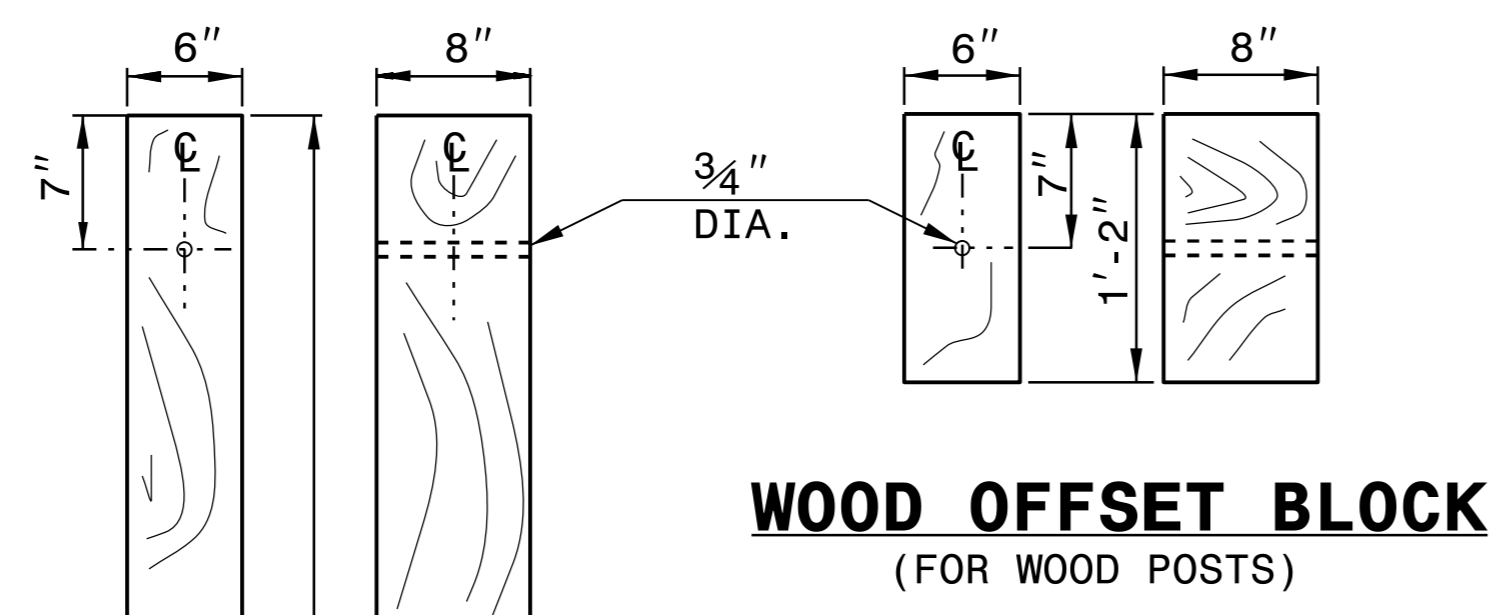
SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



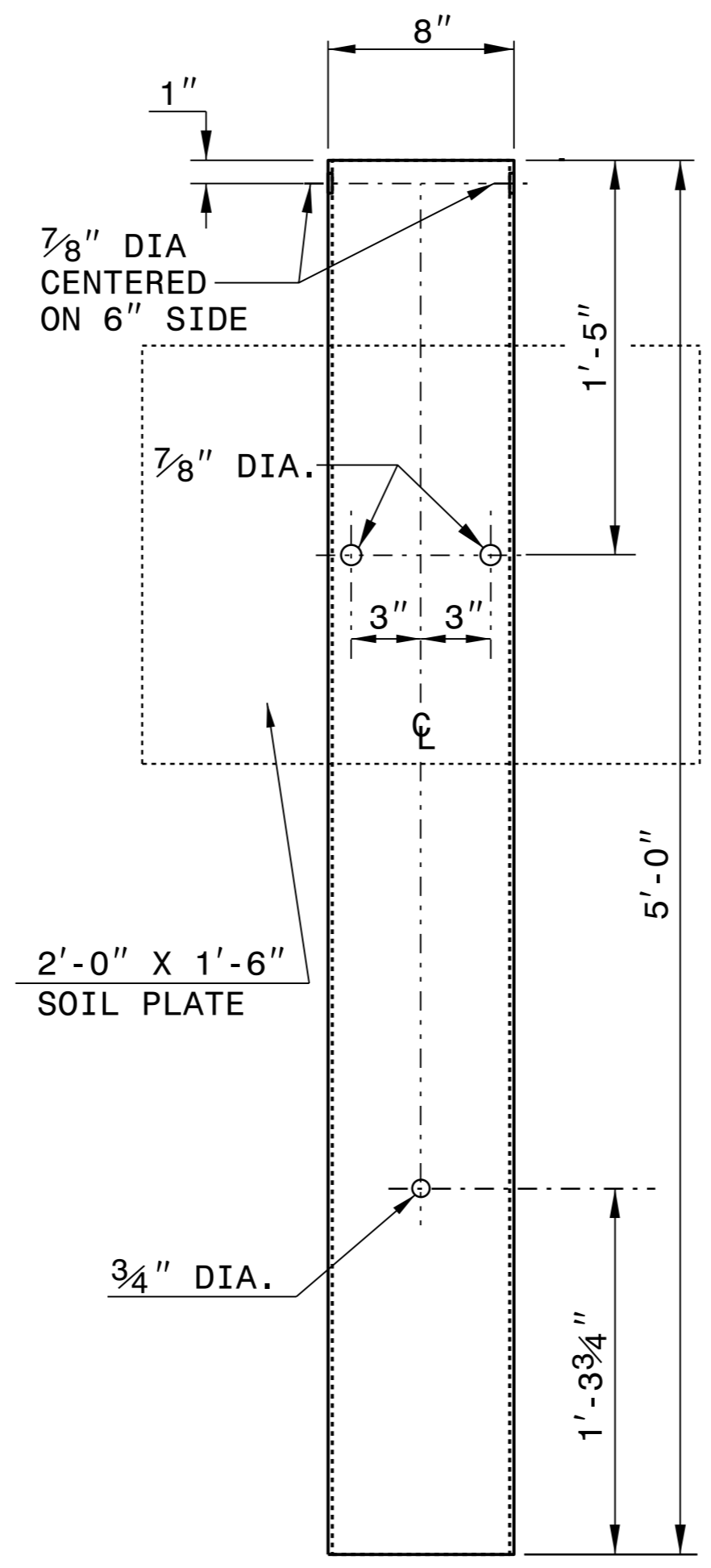
**PLAN**



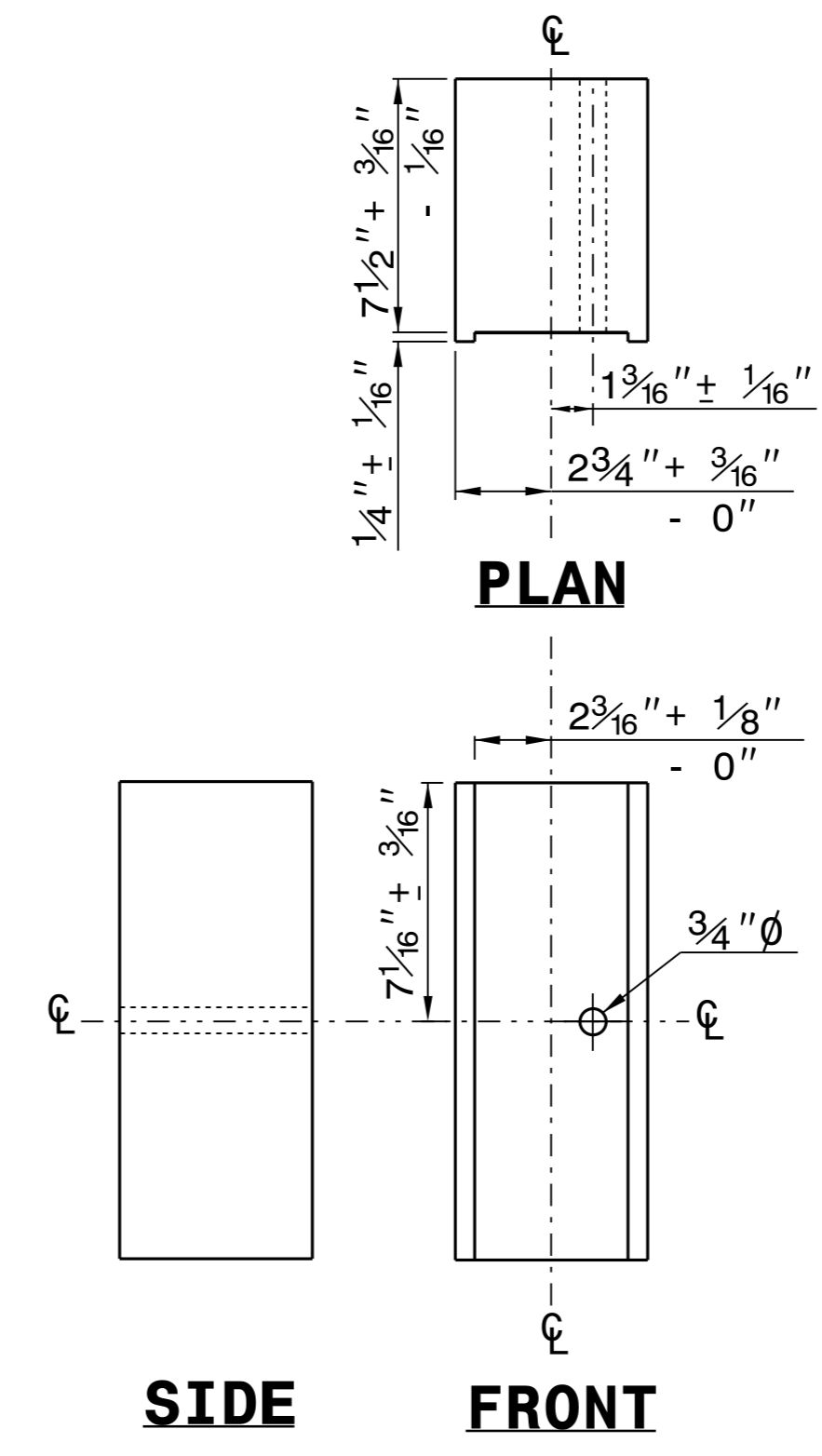
**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

**STANDARD  
LINE POST**

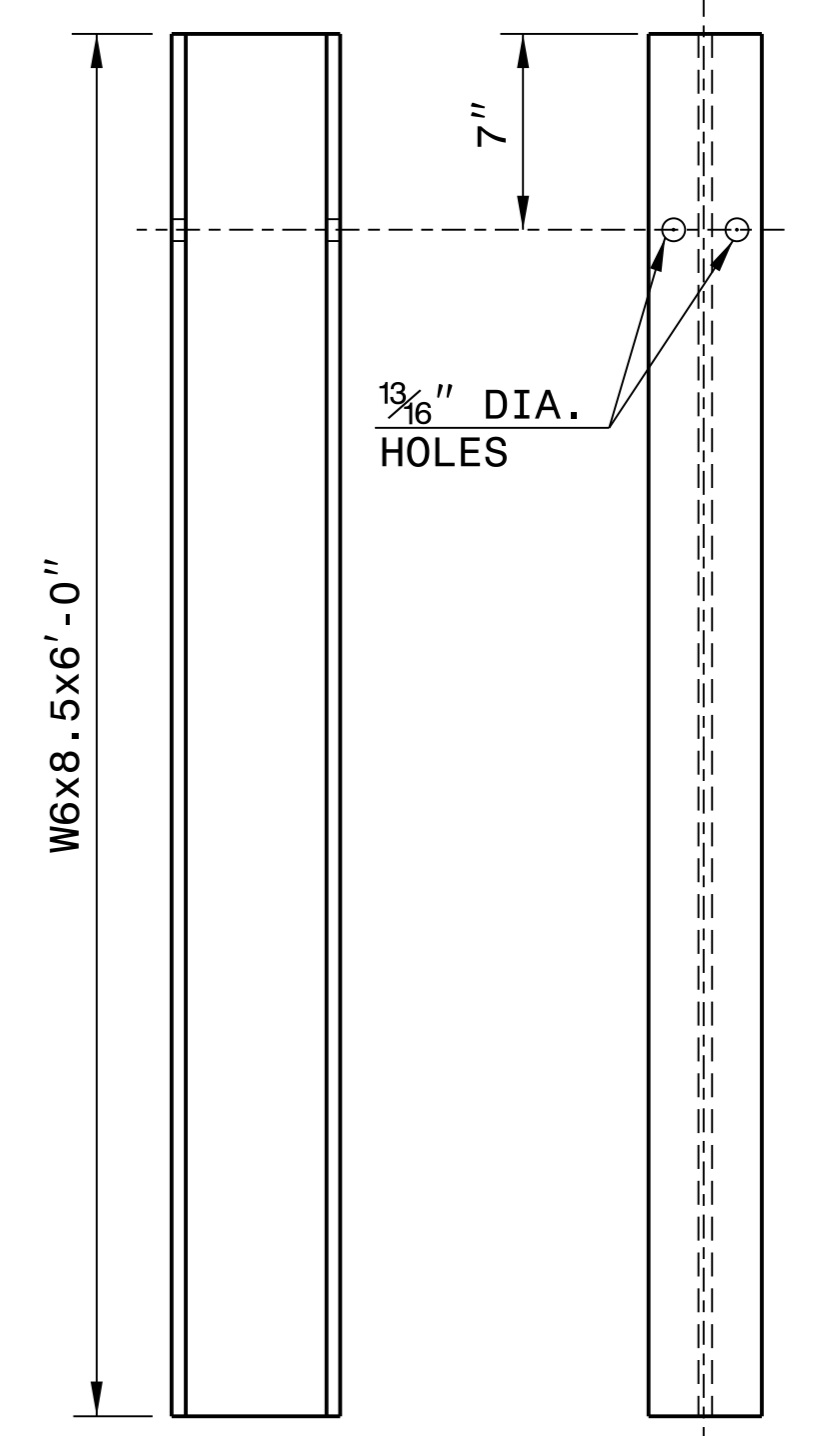
**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"x8"x0.1875"**



**SIDE  
FRONT  
ROUTED  
OFFSET BLOCK**



**SIDE  
FRONT  
"W6" STEEL POST**

**SYSTEM PARTS**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**




**CONTRACTS STANDARDS  
AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 3-7-2018  
MODIFIED BY: DATE: \_\_\_\_\_  
CHECKED BY: DATE: \_\_\_\_\_  
FILE SPEC.: \_\_\_\_\_



<b>PROJECT REFERENCE NO.</b> HS-2006Q	<b>SHEET NO.</b> 2G-1
GEOTECHNICAL ENGINEER  SEAL 042642 ROBERT E. KRAL ENGINEER	ENGINEER
DocuSigned by: Robert E. Kral 06/06/2023 SIGNATURE DATE	SIGNATURE DATE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

FOR USE IN THE FOLLOWING LOCATIONS,  
OR AS DIRECTED BY THE ENGINEER.

STATIONS:  
-L- 14+50 TO 15+29, LT

**NOTES:**

TRANSITION FROM ROADWAY TYPICAL NO. 2 ON SHEET 2A-1 TO THIS DETAIL FROM 14+50 +/- TO 14+75 +/- . USE THIS DETAIL FROM 14+75 +/- TO 15+29 +/- LT

FOR ROCK EMBANKMENTS, SEE ROCK EMBANKMENTS SPECIAL PROVISION

CONSTRUCT ROCK EMBANKMENTS AS SHOWN IN THE DETAIL AND IN ACCORDANCE WITH THE ROCK EMBANKMENTS SPECIAL PROVISION

CONSTRUCT ROCK EMBANKMENTS A MINIMUM OF 2 FT. ABOVE SURFACE WATER ELEVATION

USE SELECT MATERIAL, CLASS VII, RIP RAP, CLASS A, RIP RAP, CLASS B, AND SELECT MATERIAL, CLASS VI TO CONSTRUCT ROCK EMBANKMENTS AS SHOWN. RIP RAP, CLASS A AND B AND SELECT MATERIAL, CLASS VI SHALL BE USED TO CHOKE OFF VOIDS IN SELECT MATERIAL, CLASS VII BEFORE PLACING GEOTEXTILE FOR ROCK EMBANKMENTS AND SOIL EMBANKMENT FILL

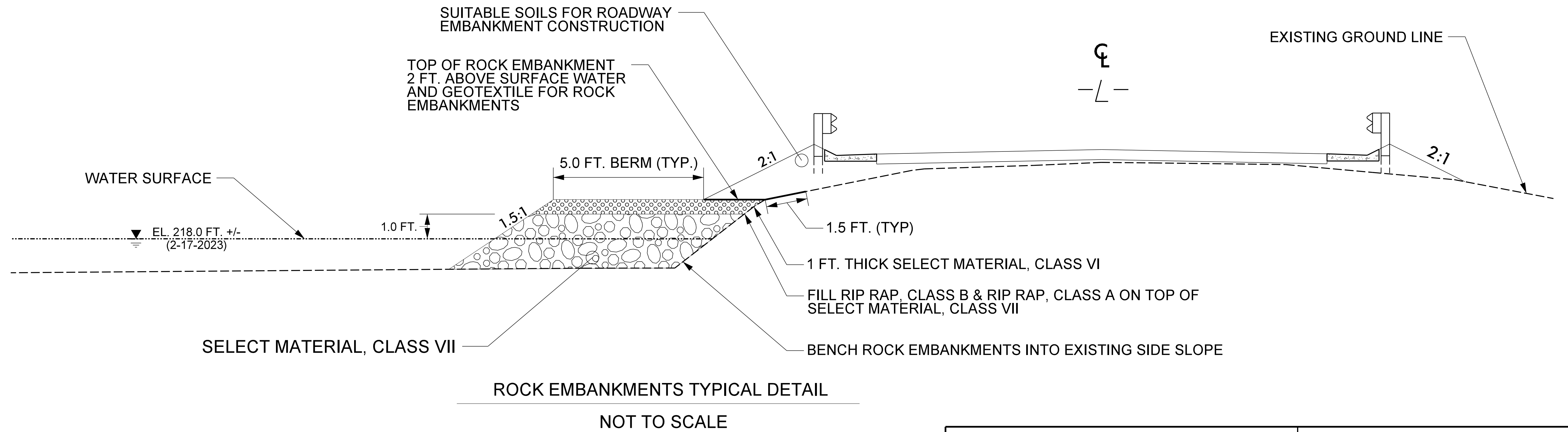
RIP RAP, CLASS A AND B SHALL MEET THE REQUIREMENTS OF SECTION 1042 OF THE STANDARD SPECIFICATIONS

SELECT MATERIAL, CLASS VII SHALL MEET THE GRADATION REQUIREMENTS IN SECTION 1016 OF THE STANDARD SPECIFICATIONS

SELECT MATERIAL, CLASS VI SHALL MEET THE GRADATION REQUIREMENTS IN SECTION 1016 OF THE STANDARD SPECIFICATIONS

INSTALL GEOTEXTILE FOR ROCK EMBANKMENTS ON TOP OF ROCK EMBANKMENTS IN ACCORDANCE WITH THE ROCK EMBANKMENTS SPECIAL PROVISION AND ARTICLE 270-3 OF THE STANDARD SPECIFICATIONS

ESTIMATED QUANTITIES ROCK EMBANKMENTS	
SELECT MATERIAL, CLASS VII FOR ROCK EMBANKMENTS	270 TON
SELECT MATERIAL, CLASS VI FOR ROCK EMBANKMENTS	90 TON
RIP RAP, CLASS B	40 TON
RIP RAP, CLASS A	40 TON
GEOTEXTILE FOR ROCK EMBANKMENTS	110 SY



PREPARED BY: ROBERT E. KRAL, P.E.	DATE: 6/2/2023
REVIEWED BY: D. MATTHEW BREWER, P.E.	DATE: 6/2/2023

*Prepared in the Office of:*



**CAROLINAS  
GEOTECHNICAL  
GROUP**  
2400 CROWNPOINT EXECUTIVE DRIVE  
SUITE 800  
CHARLOTTE, NC 28227  
(980) 339-8684

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

**GEOTECHNICAL  
CONSTRUCTION DETAILS -  
ROCK EMBANKMENTS**

STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

Table with columns: Station, Station, Uncl. Excav., Embank. +%, Borrow, Waste. Includes sub-totals and grand totals for earthwork quantities.

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for grading.

Note: Earthwork quantities are calculated by TGS Engineers. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

EST. DDE = 20 CY  
EST. SHALLOW UNDERCUT = 100 CY  
SELECT GRANULAR MATERIAL = 400 CY  
CLASS IV SUBGRADE STABILIZATION = 200 TON  
PER GEOTECH RECOMMENDATION, ESTIMATED 400 CUBIC YARDS OF UNDERCUT TO BE USED IN THE DISCRETION OF THE RESIDENT ENGINEER.

PAVEMENT REMOVAL SUMMARY

Table with columns: SURVEY LINE, Station, Station, LOCATION LT/RT/CL, ASPHALT REMOVAL, ASPHALT BREAKUP, CONCRETE REMOVAL, CONCRETE BREAKUP. Includes total and say values.

SHOULDER BERM GUTTER SUMMARY

Table with columns: LINE, Station, Station, LENGTH. Includes total and say values for shoulder berm gutter.

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL  
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.  
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.  
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.  
G = GATING IMPACT ATTENUATOR TYPE 350  
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

Main Guardrail Summary table with columns: LINE, BEG. STA., END STA., LOC., LENGTH (STRAIGHT, SHOP CURVED, DOUBLE FACED), WARRANT POINT (APPR. END, TRAIL END), "N" DIST. FROM E.O.L., TOTAL SHLDR WIDTH, FLAIR LENGTH (APPR. END, TRAIL END), W (APPR. END, TRAIL END), ANCHORS (III, GREU TL-3), IMP. ATTEN. TYPE (EA, G, NG), REMOVE EXISTING GUARDRAIL, REMOVE & RESET EXISTING GUARDRAIL, REMARKS.

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Large table listing pipes and endwalls with columns: STATION, LOCATION (LT, RT, OR CL), STRUCTURE NO., TOP ELEVATION, INVERT ELEVATION, SLOPE CRITICAL, DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC), C.S. PIPE (12" to 48"), R.C. PIPE CLASS III (12" to 48"), R.C. PIPE CLASS IV (12" to 48"), ENDWALLS (STD. 838.01, STD. 838.89), QUANTITIES FOR DRAINAGE STRUCTURES (PER EACH, 50' THRU 100', 100' AND ABOVE), LIN. FT. (A, B), FRAME GRATES AND HOOD (TYPE OF GRATE), CONCRETE MANHOLE SECTION (DROP INLET, CATCH BASIN, D.I. STD. 840.14, G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20, T.B.D.I. STD. 840.35, FRAME AND NARROW FLAT GRATE STD. 840.29, 15" C.S. ELBOW), CONC. & BRICK PIPE PLUG, CONC. COLLARS, PIPE REMOVAL LIN. FT., ABBREVIATIONS (C.B., N.D.I., D.I., G.D.I., G.D.I.(N.S.), J.B., M.H., T.B.D.I., T.B.J.B.), REMARKS.

COMPUTED BY: DMB DATE: 3/27/23  
 CHECKED BY: REK DATE: 3/27/23

(2-3-23)

PROJECT NO.	SHEET NO.
HS-2006Q	3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
			CONTINGENCY	SD	200
				TOTAL LF:	200

\*UD = Underdrain  
 \*BD = Blind Drain  
 \*SD = Subsurface Drain

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
			CONTINGENCY	ASU(1)	12	100	200	300	
				TOTAL CY/TONS/SY:		100	200**	300**	0

\*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)  
 \*AST = Aggregate Stabilization  
 \*\*Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

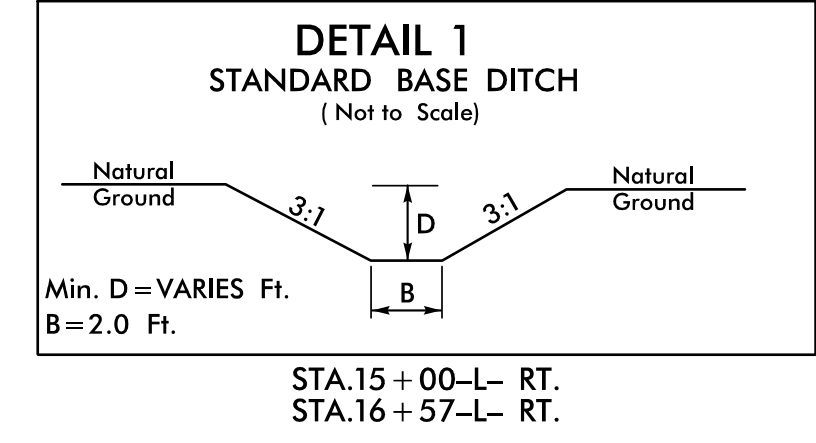


8/17/99

**-L- CURVE DATA**  
 PI Sta 12+65.07  
 $\Delta = 22^\circ 23' 08.3" (LT)$   
 $D = 6' 11" 14.8"$   
 $L = 361.79'$   
 $T = 183.23'$   
 $R = 926.00'$   
 $SE = 0.04$   
 $DS = 50 MPH$

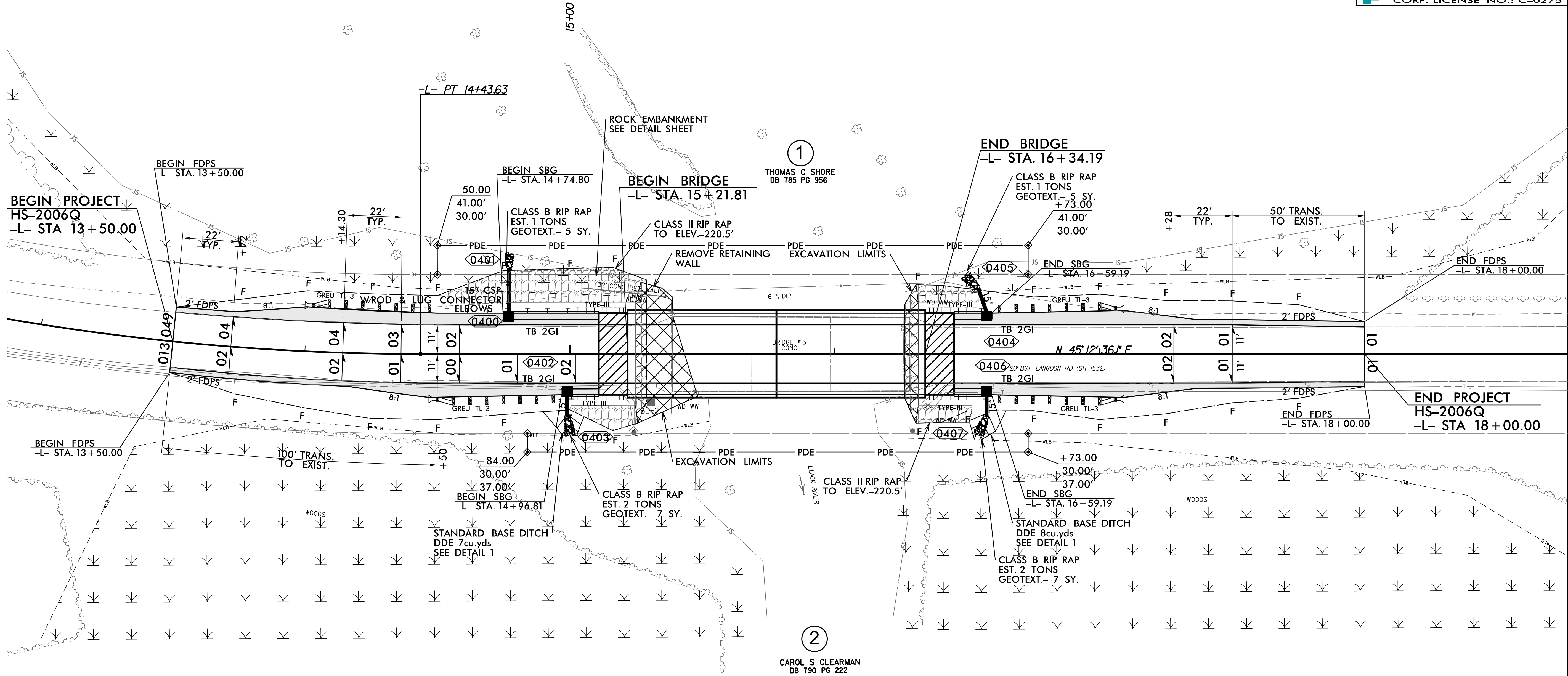
**HARNETT COUNTY**  
**BRIDGE #420015**

PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. 4
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>TGS ENGINEERS</b> 201 W. MARION ST SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



REVISIONS

6/2/2023 Division 6 HS-2006Q Harnett 15\Road\Proj\HS-2006Q\_Rd\psh.dgn  
 11/2/2023 Division 6 HS-2006Q Harnett 15\Road\Proj\HS-2006Q\_Rd\psh.dgn  
 11/2/2023 Division 6 HS-2006Q Harnett 15\Road\Proj\HS-2006Q\_Rd\psh.dgn

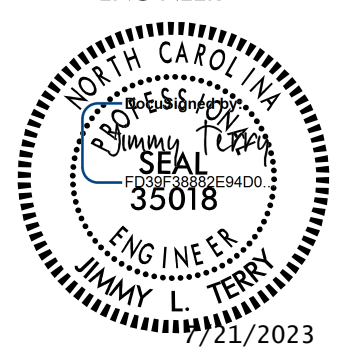




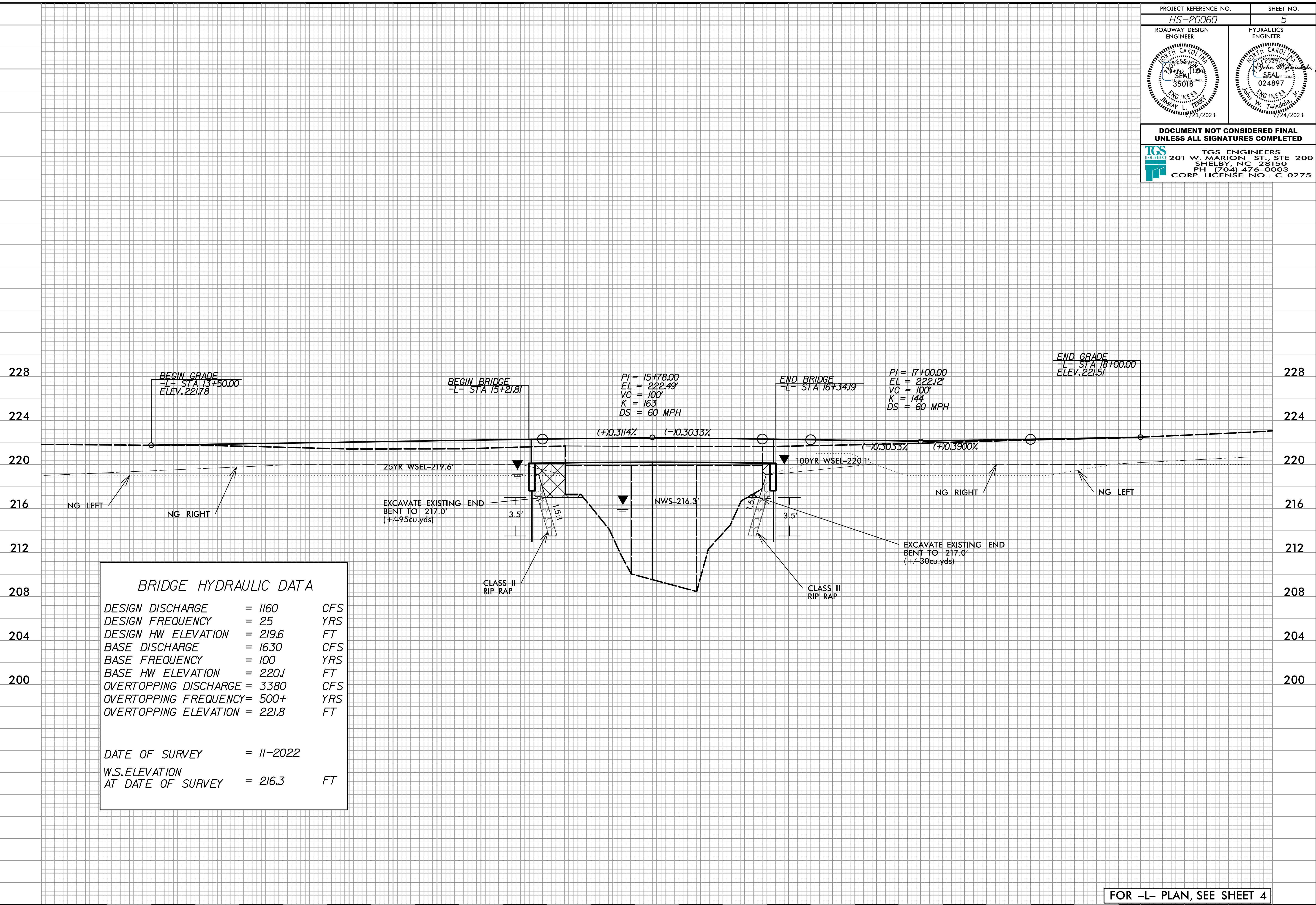
1  
 THOMAS C. SHORE  
 DB 785 PG 956

2  
 CAROL S. CLEARMAN  
 DB 790 PG 222

FOR -L- PROFILE, SEE SHEET 5

5/14/19

PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. 5
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>TGS ENGINEERS</b> 201 W. MARION ST. STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 1160	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 219.6	FT
BASE DISCHARGE	= 1630	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 220.1	FT
OVERTOPPING DISCHARGE	= 3380	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 221.8	FT
DATE OF SURVEY	= 11-2022	
W.S. ELEVATION AT DATE OF SURVEY	= 216.3	FT

FOR -L- PLAN, SEE SHEET 4

5/14/2023 10:00 AM Division 6 HS-2006Q Harnett 15\Roadway\Proj\HS-2006Q\_Rdy\_pfl.dgn  
 User: jsmal



09/06/99

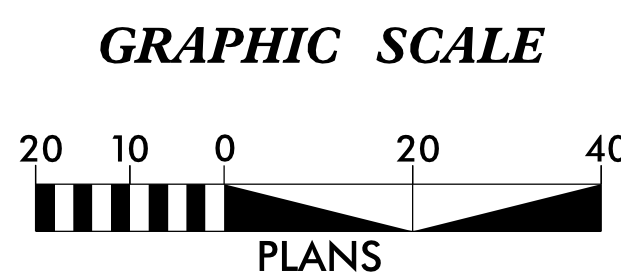
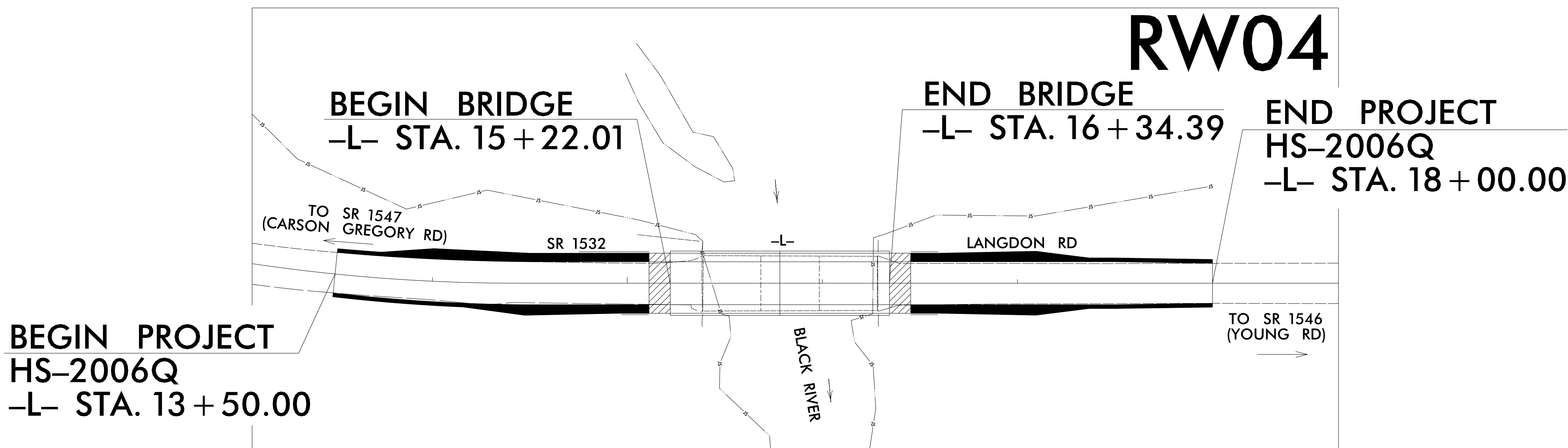
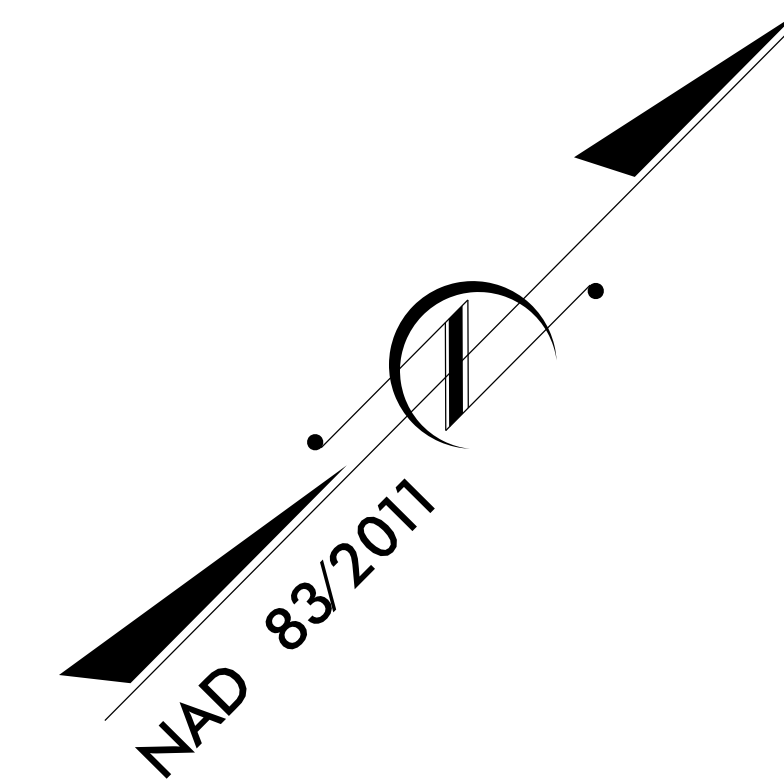
**TIP PROJECT: HS-2006Q**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2006Q	RW01	5

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

SURVEY CONTROL, EXISTING CENTERLINES,  
 RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

**HARNETT COUNTY**



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "HS-2006Q-102" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 624848.3383(sft) EASTING: 2096823.4598(sft) ELEVATION: 253.00(sft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999872362 (1/X: 1.0001276539)

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "HS-2006Q-102" TO -L- STATION 13+50.00 IS N 67°51'59"E 1034.86(sft)

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

Prepared in the Office of:

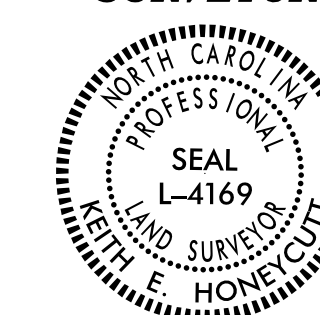
**NCDOT LOCATION AND SURVEYS**  
 4834 US HWY 301 S  
 HOPE MILLS, NC 28348

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
 0630/2023

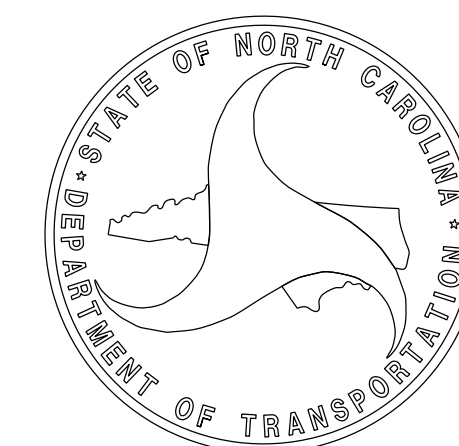
**LETTING DATE:**  
 0920/2023

**PROFESSIONAL LAND SURVEYOR**



DocuSigned by:  
 Keith E. Overmyer  
 SIGNATURE

04/06/2023  
 Date:

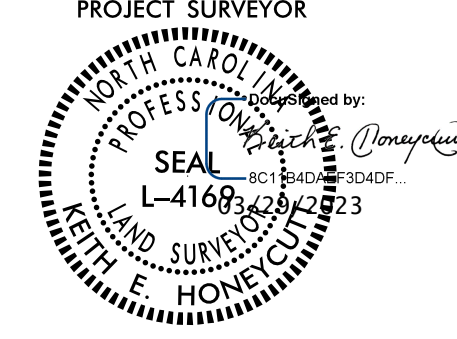


04-APR-2023 07:16  
 S:\Unit1s\Div06\HOPE Mills\PROJECTS\Control Sheets\hs2006-q\work\rw\hs2006q\_ls\_rw01.dgn  
 wimilson AT LS-32949L



# SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO. HS-2006Q	SHEET NO. RW02C-1
<b>Location and Surveys</b>	
NCDOT LOCATION AND SURVEYS 4834 US HWY 301 S HOPE MILLS, NC 28348	
PROJECT SURVEYOR 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

BL	POINT	DESC.	NORTH	EAST	ELEVATION
1	HS20060	BL-1	625076.1957	2097529.3023	222.08
2	HS20060	BL-2	625349.0040	2097926.3679	221.29
3	HS20060	BL-3	625714.4163	2098300.6221	224.67

\*\*\*\*\*  
 BM1 ELEVATION = 220.75  
 N 625097 E 2097603  
 RR SPIKE IN BASE OF 20" OAK  
 \*\*\*\*\*

EL POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	625070.615	2097476.630							
LINE			N 67°35'44.4" E	84.01					
PC	625102.635	2097554.299							
CURVE			N 56°24'10.3" E	355.22	22°23'08.3"(LT)	06°15'42.6"	357.49	181.06	915.00
PT	625299.198	2097850.182							
LINE			N 45°12'36.1" E	510.50					
POT	625658.850	2098212.481							

I, Keith E. Honeycutt, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

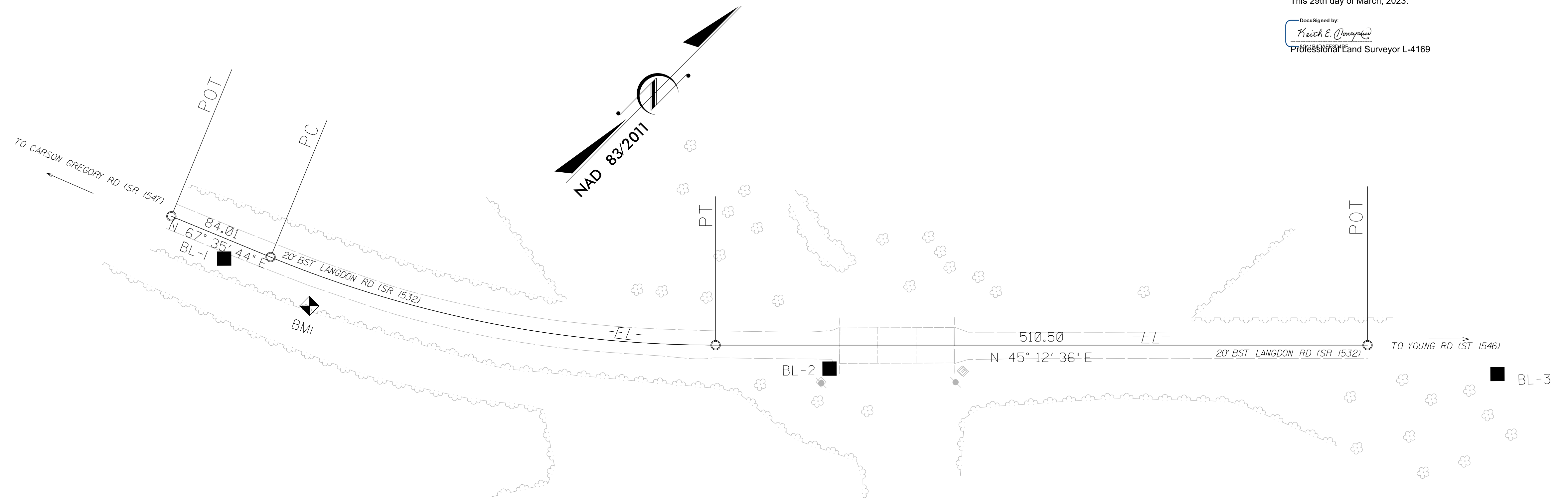
Class of survey: AA  
 Type of GPS field procedure: VRS  
 Dates of survey: November 2022  
 Datum/Epoch: NAD 83/NA 2011  
 Published/Fixed-control use: N/A  
 Localized around: HS-2006Q-102  
 Northing: 624848.3383  
 Easting: 2096023.4598  
 Combined grid factor: 0.999872362  
 (1/X: 1.0001276539)  
 Geoid model: GNC12B  
 Units: SFT

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed November 2022, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 29th day of March, 2023.

DocuSigned by:  
  
 Keith E. Honeycutt  
 Professional Land Surveyor L-4169

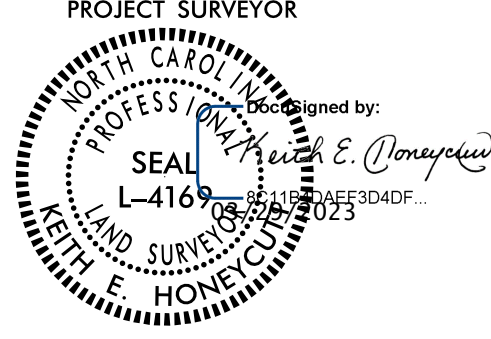
GPS-I02



**NOTES:**

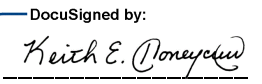
1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

# PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO. HS-2006Q	SHEET NO. RW02D-1
<b>Location and Surveys</b>	
NCDOT LOCATION AND SURVEYS 4834 US HWY 301 S HOPE MILLS, NC 28348	
PROJECT SURVEYOR 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

I, Keith E Honeycutt, PLS, certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

This 29th day of March, 2023.

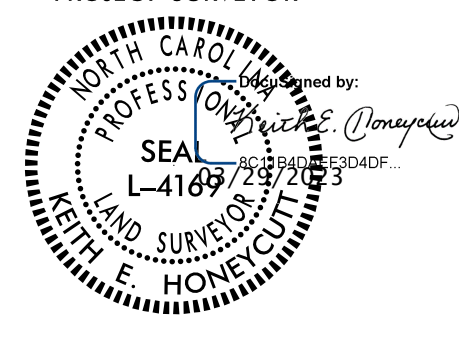
DocuSigned by:  
  
 Keith E. Honeycutt  
 Professional Land Surveyor L-4169

L			
TYPE	STATION	NORTH	EAST
POT	10+00.00	625070.6150	2097476.6295
PC	10+81.83	625101.8052	2097552.2865
PT	14+43.63	625300.7314	2097851.7269
POT	19+51.95	625658.8503	2098212.4811

**NOTES:**

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

# RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
HS-2006Q	RW03E-1
<b>Location and Surveys</b>	
NCDOT LOCATION AND SURVEYS 4834 US HWY 301 S HOPE MILLS, NC 28348	
PROJECT SURVEYOR 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

I, Keith E Honeycutt, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed March 23, 2023, and all coordinates are based on NAD83/2011. That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 29th day of March, 2023.

*Keith E. Honeycutt*  
 Professional Land Surveyor L-4169

REVISIONS

### ROW MARKER PERMANENT EASEMENT - E

ALIGN	STATION	OFFSET	NORTH	EAST	
L	14+50.00	-30.00	625326.5144	2097835.1168	NOT SET
L	14+50.00	-41.00	625334.3200	2097827.3662	NOT SET
L	14+84.00	30.00	625307.8851	2097901.5160	
L	14+84.00	37.00	625302.9172	2097906.4476	
L	16+73.00	-41.00	625491.4257	2097985.6281	NOT SET
L	16+73.00	-30.00	625483.6191	2097993.3777	
L	16+73.00	30.00	625441.0375	2098035.6483	
L	16+73.00	37.00	625436.0696	2098040.5798	

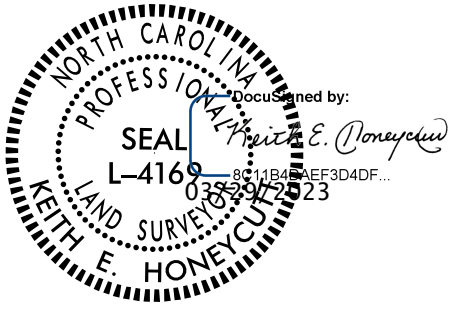
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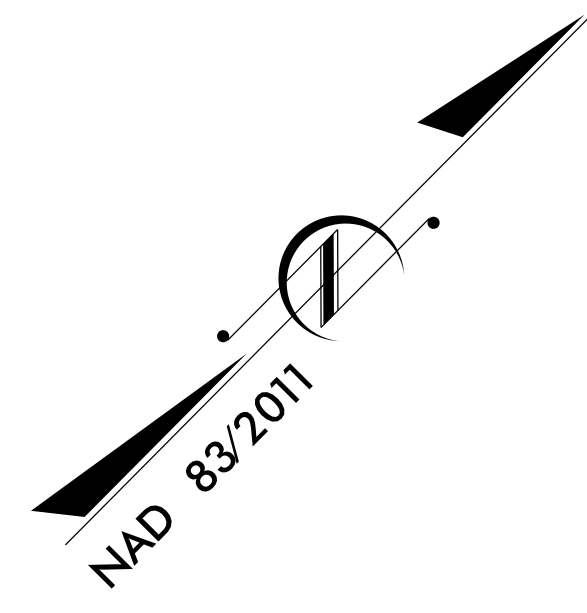
1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED MARCH 23, 2023.



6/2/19

-L- CURVE DATA  
 PI Sta 12+65.07  
 $\Delta = 22^\circ 23' 08.3" (LT)$   
 $D = 6' 11" 14.8"$   
 $L = 361.79'$   
 $T = 183.23'$   
 $R = 926.00'$   
 $SE = 0.04$   
 $DS = 50 MPH$

PROJECT REFERENCE NO.	SHEET NO.
HS-2006Q	RW04
<b>Location and Surveys</b>	
NCDOT LOCATION AND SURVEYS 4834 US HWY 301 S HOPE MILLS, NC 28348	
PROJECT SURVEYOR	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

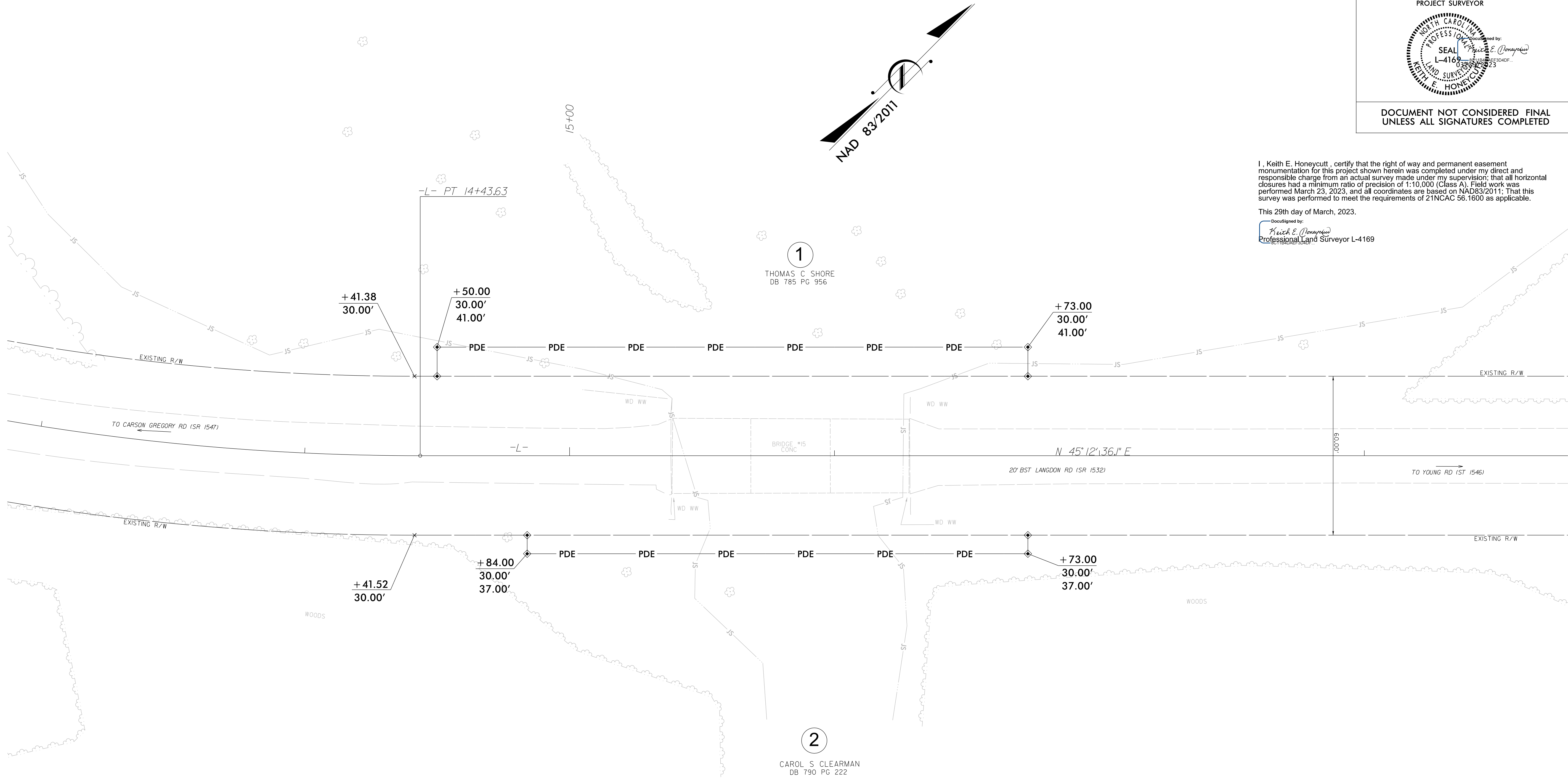


I, Keith E. Honeycutt, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed March 23, 2023, and all coordinates are based on NAD83/2011. That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 29th day of March, 2023.

DocuSigned by:  
 Keith E. Honeycutt  
 Professional Land Surveyor L-4169

REVISIONS



1  
 THOMAS C SHORE  
 DB 785 PG 956

2  
 CAROL S CLEARMAN  
 DB 790 PG 222

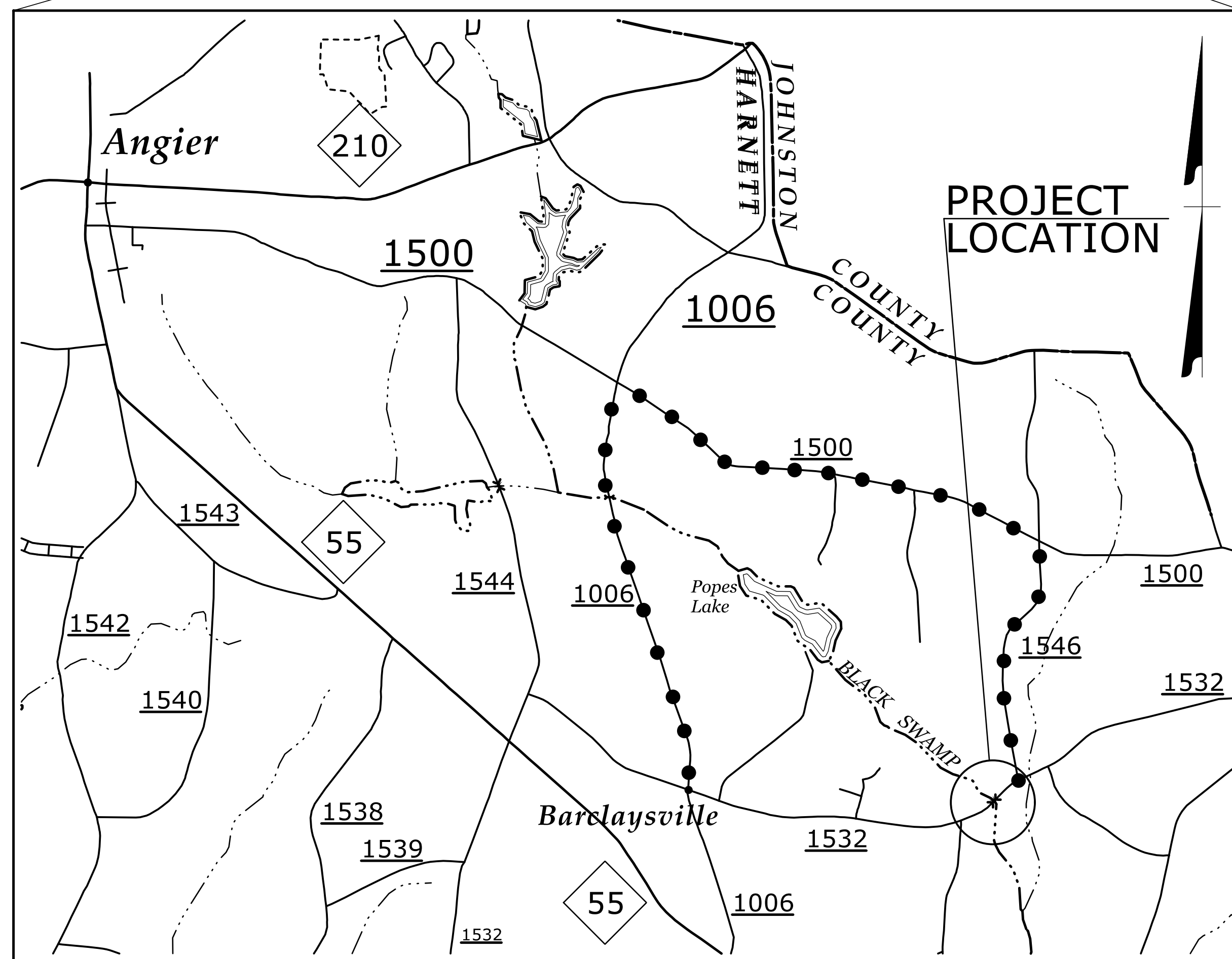
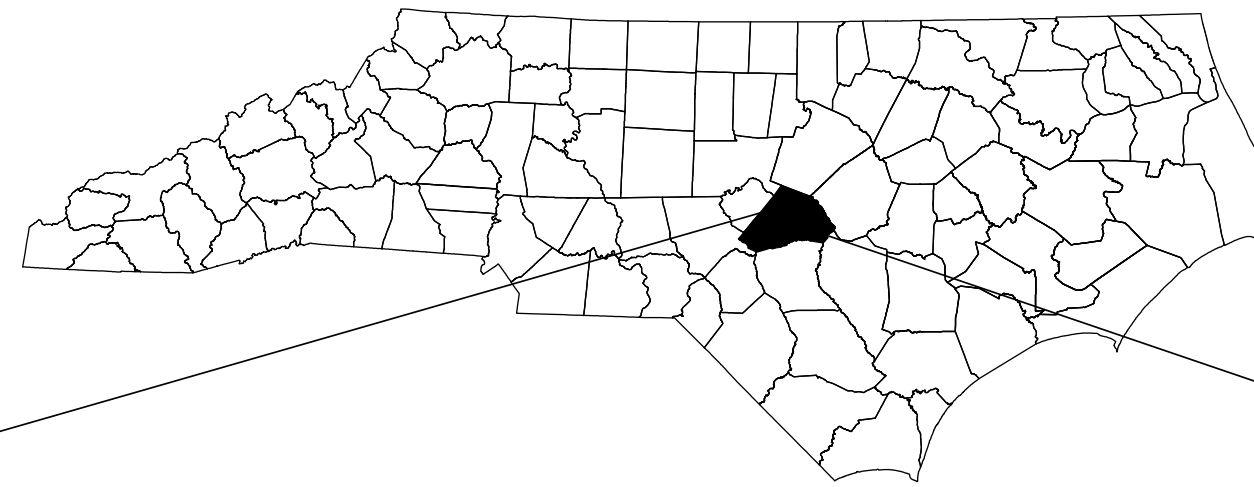
**NOTES:**

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED MARCH 23, 2023.

23-MAR-2023 08:59  
 S:\Units\000000\PE MILLS\_PROJECTS\Control Sheets\hs2006-q\work\1-r\hs2006q\_ls\_rw04.dgn  
 jennett AT LS-325011

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**TRANSPORTATION MANAGEMENT PLAN**  
**HARNETT COUNTY**



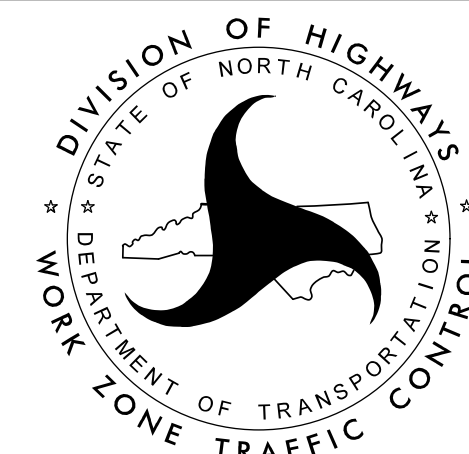
**VICINITY MAP**  
OFFSITE DETOUR

**NCDOT CONTACT INFORMATION:**  
Phone: 910 364 0603  
**ADAM BRITT**  
DIVISION BRIDGE PROJECT MANAGER

PLAN PREPARED FOR N.C.D.O.T. BY:

**TGS ENGINEERS**  
201 W. MARION ST. STE. 200  
SHELBY, NC 28150  
PH (704) 476-0003  
CORP. LICENSE NO.: C-0275

**JIMMY TERRY, PE** PROJECT ENGINEER  
**SANDRA MELVIN** DESIGN ENGINEER



**INDEX OF SHEETS**

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, AND LOCAL NOTES)
TMP-2	SPECIAL SIGN DESIGN
TMP-3	OVERVIEW AND PHASING
TMP-4	OFFSITE DETOUR LOCATIN AND BARRICADE PLACEMENT

SHEET NO.  
TMP-1

**PROJECT: HS-2006Q**

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

APPROVED: Jimmy Terry  
DATE: 7/21/2023



SEAL

6/1/2023 10:41:11 AM \\ncdot\div\division 6 HS-2006Q Harnett 15\Traffic\TrafficControl\TCP\HS-2006Q\_Tc\_TMP\_01.dgn User:smelvin









# ROADWAY STANDARD DRAWINGS


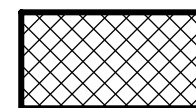


THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUMS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - (PERMANENT AND TEMPORARY)
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION


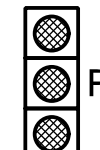


# LEGEND

## GENERAL

-  DIRECTION OF TRAFFIC FLOW
-  DIRECTION OF PEDESTRIAN TRAFFIC FLOW
-  EXIST. PVMT.
-  NORTH ARROW
-  PROPOSED PVMT.
-  TEMP. SHORING (LOCATION PURPOSES ONLY)

-  WORK AREA
-  REMOVAL
-  USER DEFINED (IF NEEDED)
-  USER DEFINED (IF NEEDED)








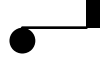
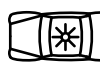

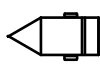
## SIGNALS

-  EXISTING
-  PROPOSED
-  TEMPORARY
-  PORTABLE


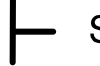

## PAVEMENT MARKINGS

-  EXISTING LINES
-  TEMPORARY LINES




## TRAFFIC CONTROL DEVICES

-  BARRICADE (TYPE III)
-  CONE
-  DRUM
-  SKINNY DRUM
-  TUBULAR MARKER
-  TEMPORARY CRASH CUSHION
-  FLASHING ARROW BOARD
-  FLAGGER
-  LAW ENFORCEMENT
-  TRUCK MOUNTED ATTENUATOR (TMA)
-  CHANGEABLE MESSAGE SIGN

## TEMPORARY SIGNING

-  PORTABLE SIGN
-  STATIONARY SIGN
-  STATIONARY OR PORTABLE SIGN

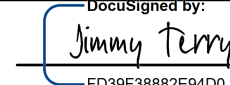

## PAVEMENT MARKERS

-  CRYSTAL/CRYSTAL
-  CRYSTAL/RED
-  YELLOW/YELLOW


## PAVEMENT MARKING SYMBOLS

-  PAVEMENT MARKING SYMBOLS

6/1/2023 10:01:11 AM Division 6 HS-20060 Harnett 15\Traffic\TrafficControl\TCP\HS-20060\_TC\_TMP\_01A.dgn User:smelvin

APPROVED:  DATE: 7/21/2023 SEAL			ROADWAY STANDARD DRAWINGS & LEGEND
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



PROJ. REFERENCE NO.	SHEET NO.
HS-2006Q	TMP-1B
 TGS ENGINEERS 201 W. MARION ST. STE 200 SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	

### 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 UNDESIRE 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 THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

#### SIGNING

- B) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- 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 AND PAVEMENT MARKERS ON THE FINAL SURFACE.
- H) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

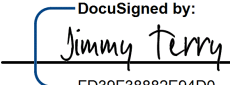
### LOCAL NOTES

LOCAL ACCESS TO ALL RESIDENCES AND BUSINESSES WILL BE MAINTAINED BETWEEN THE CLOSURE POINTS AT ALL TIMES DURING CONSTRUCTION.


### MANAGEMENT STRATEGIES

DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, SR 1532 (LANGDON RD) WILL BE CLOSED TO THROUGH TRAFFIC. SR 1532 (LANGDON RD) TRAFFIC WILL BE MAINTAINED ON THE FOLLOWING DETOUR:  
FROM SR 1546 (YOUNG RD) TO SR 1500 (BENSON RD) TO SR 1006 (OLD STAGE RD) BACK TO SR 1532 (LANGDON RD)

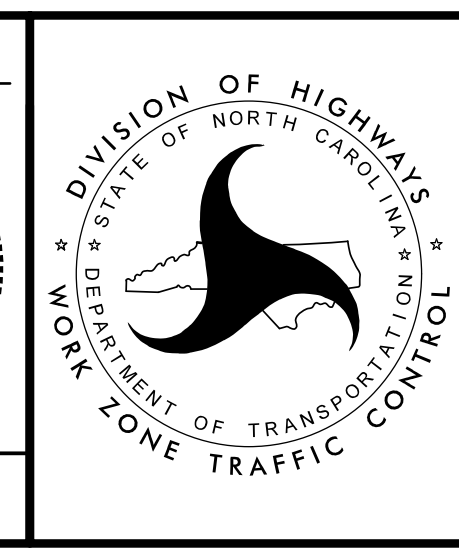
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APPROVED:   
 DATE: 7/21/2023

SEAL

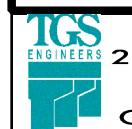


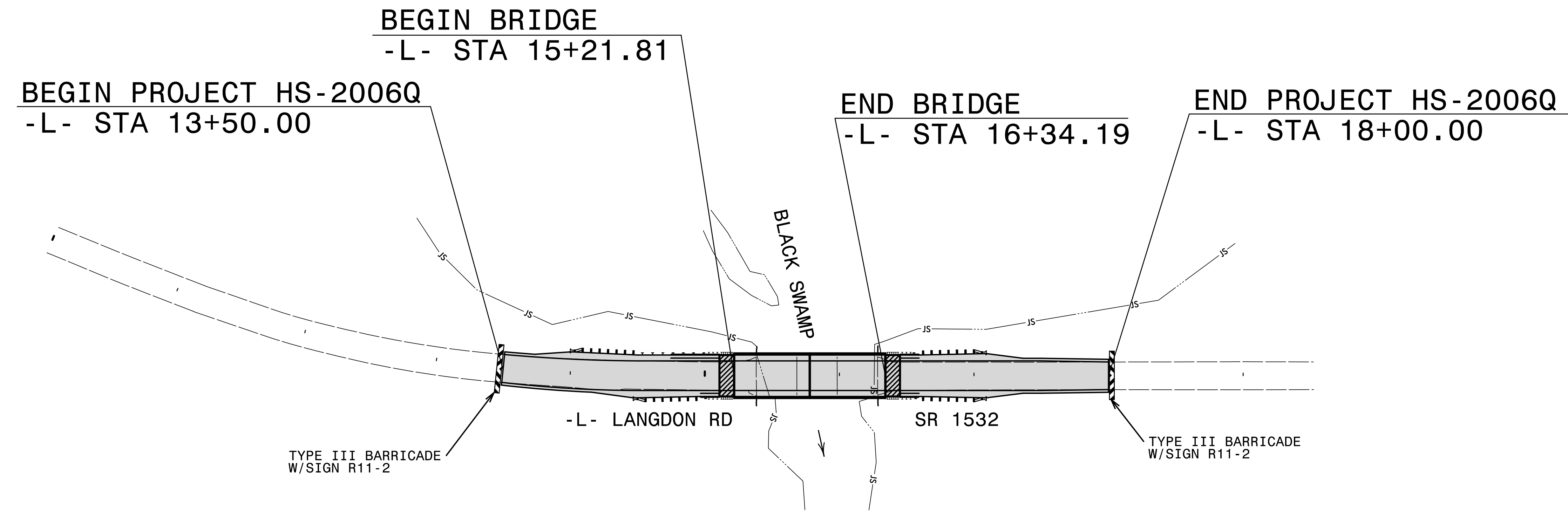
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



TRANSPORTATION  
OPERATIONS  
PLAN

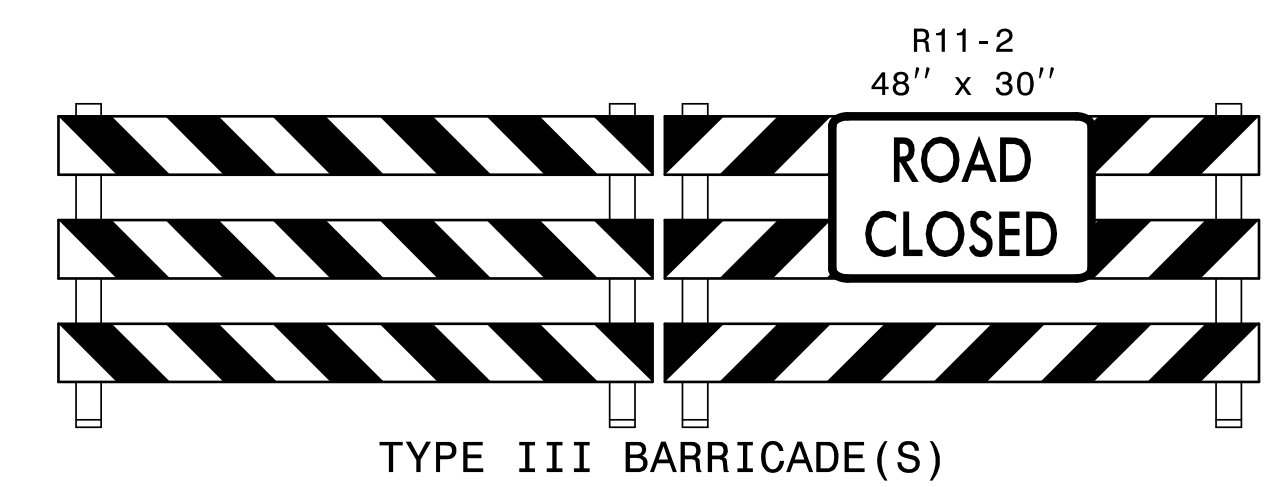


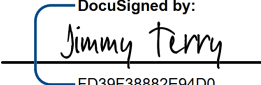
PROJ. REFERENCE NO.	SHEET NO.
H2-2006Q	TMP-3
 TGS ENGINEERS 201 W. MARION ST. STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



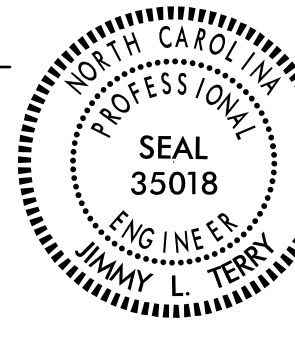
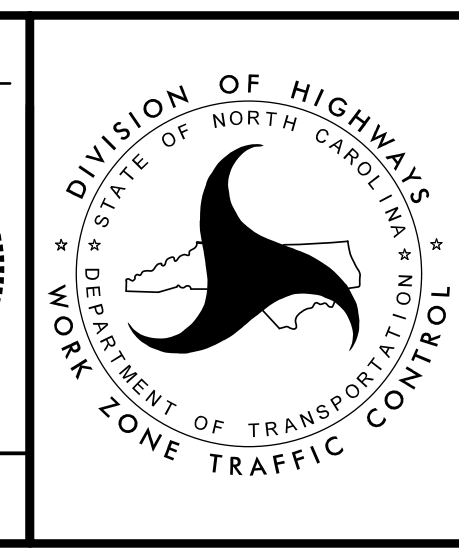
**PHASING NOTES**

- STEP 1: INSTALL ALL ADVANCE WORK ZONE WARNING SIGNS IN ACCORDANCE TO NCDOT ROADWAY STD. DRAWING 1101.01 (SHEET 3 OF 3). INSTALL ALL DETOUR SIGNS IN ACCORDANCE WITH NCDOT ROADWAY STD. DRAWING 1101.03 (SHEET 1 OF 9) AND AS SHOWN ON SHEET TMP-4. COVER ALL DETOUR SIGNS UNTIL NEXT STEP.
- STEP 2: INSTALL TYPE III BARRICADES AND UNCOVER DETOUR SIGNS, AND CLOSE SR 1532 (LANGDON RD) TO TRAFFIC. (TMP-3 AND TMP-4).  
  
PLACE TRAFFIC ON DETOUR.
- STEP 3: DEMOLISH AND REMOVE THE EXISTING BRIDGE OVER BLACK SWAMP.  
  
CONSTRUCT THE NEW BRIDGE OVER BLACK SWAMP FROM -L- STA. 15+21.81 TO 16+34.19.  
  
CONSTRUCT THE ROADWAY ON SR 1532 (LANGDON RD.) FROM -L- STA. 13+50.00 TO -L- STA. 15+21.81 (BEGIN BRIDGE) AND FROM -L- STA. 16+34.19 (END BRIDGE) TO TO -L- STA. 18+00.00 UP TO AND INCLUDING THE FINAL LAYER OF SURFACE COURSE.
- STEP 4: REFERRING TO PAVEMENT MARKING PLANS, PLACE FINAL PAVEMENT MARKINGS AND MARKERS ON THE FOLLOWING:  
SR 1532 (LANGDON RD.) FROM STA. 13+50.00 TO STA. 18+00.00.
- STEP 5: REMOVE BARRICADES, SIGNS, AND ALL OTHER TRAFFIC CONTROL DEVICES AND OPEN SR 1532 (LANGDON RD.) TO TRAFFIC IN FINAL PATTERN.



APPROVED:   
DocuSigned by: Jimmy Terry  
 DATE: 7/21/2023  
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SEAL

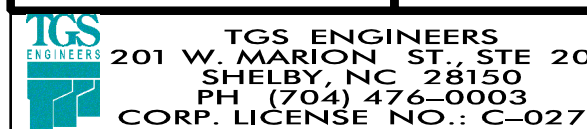



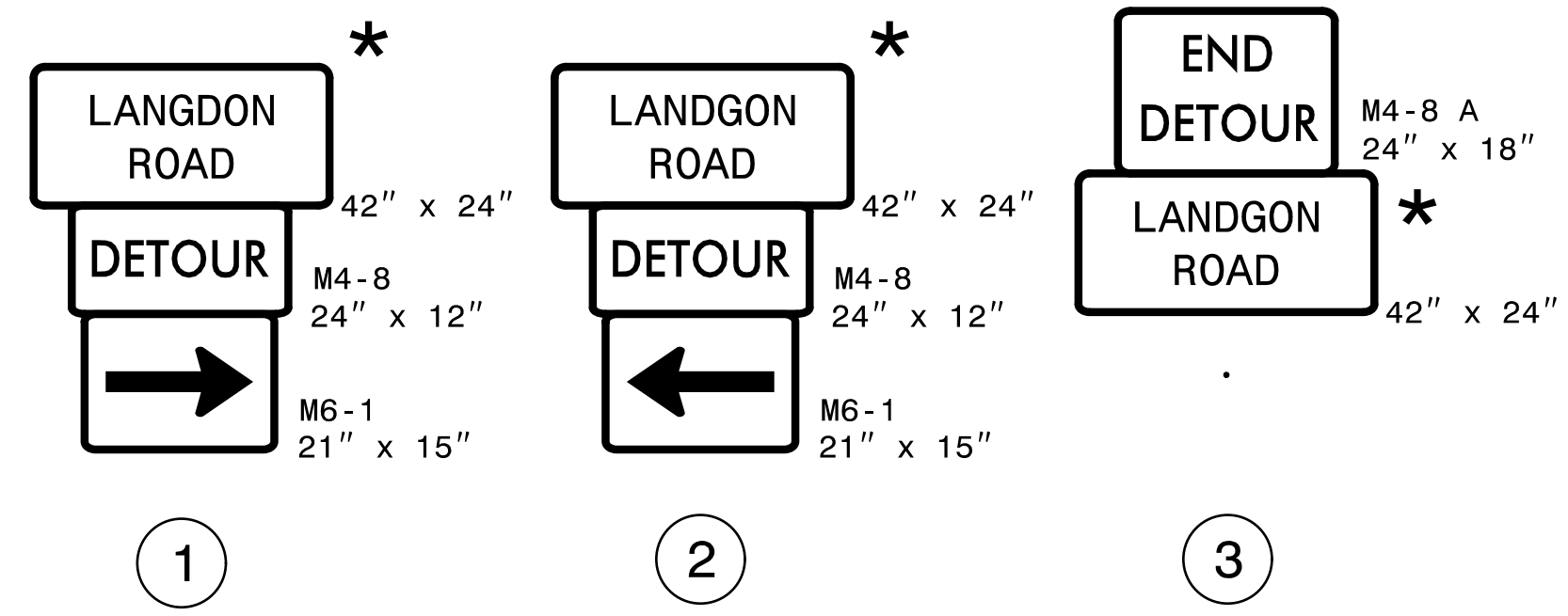
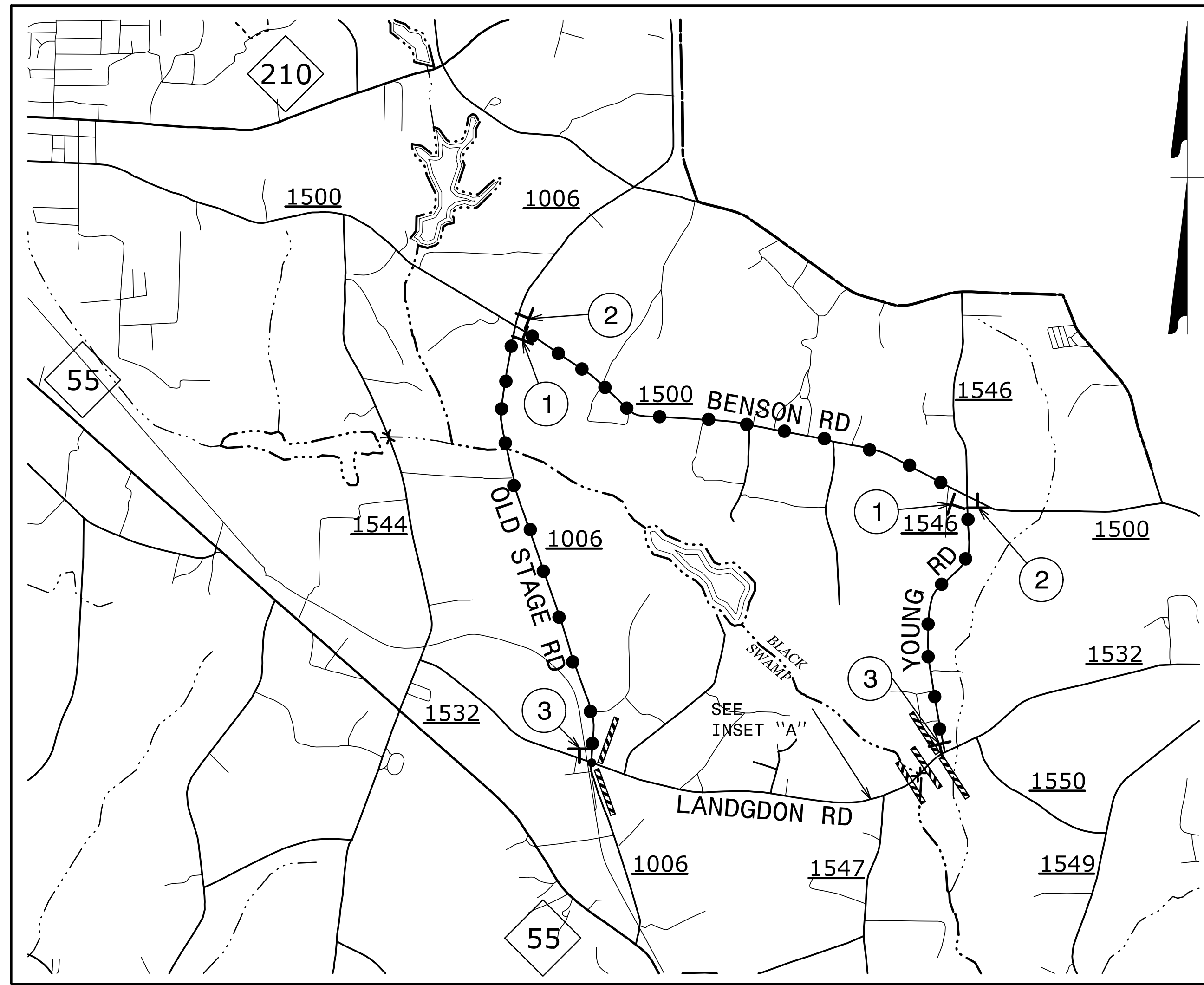
**OVERVIEW  
AND PHASING**

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

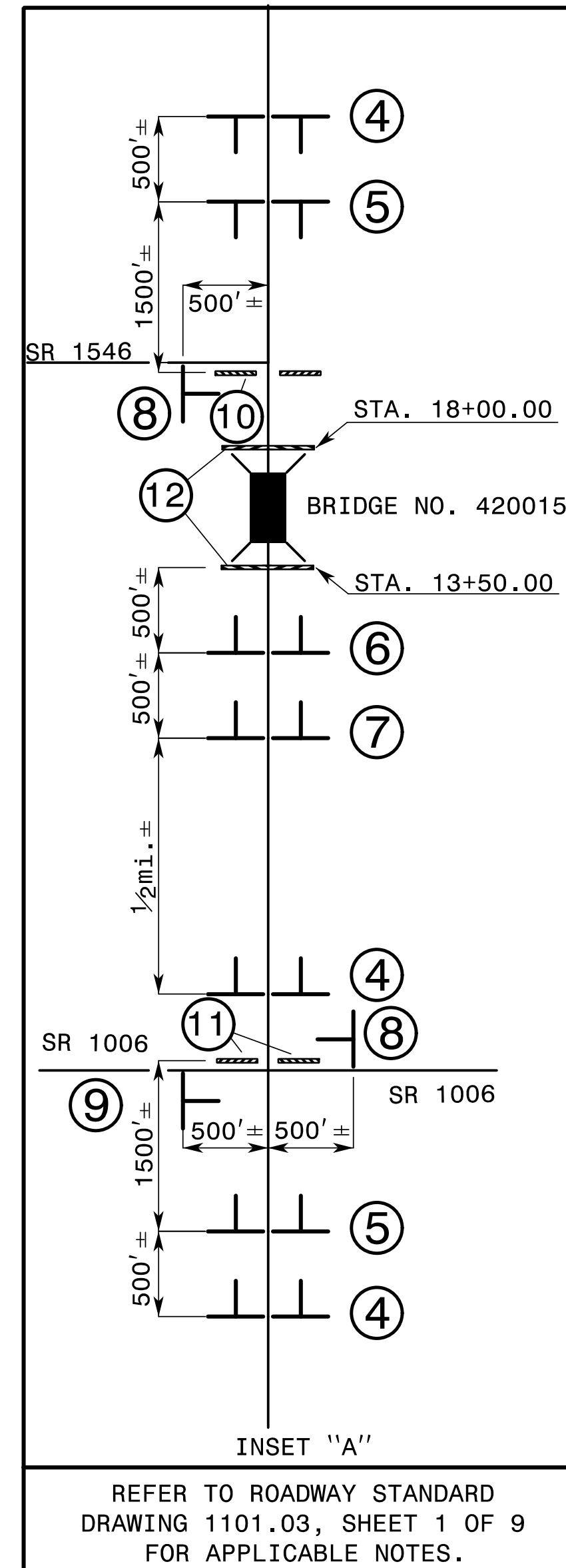
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 User: jsmelvin



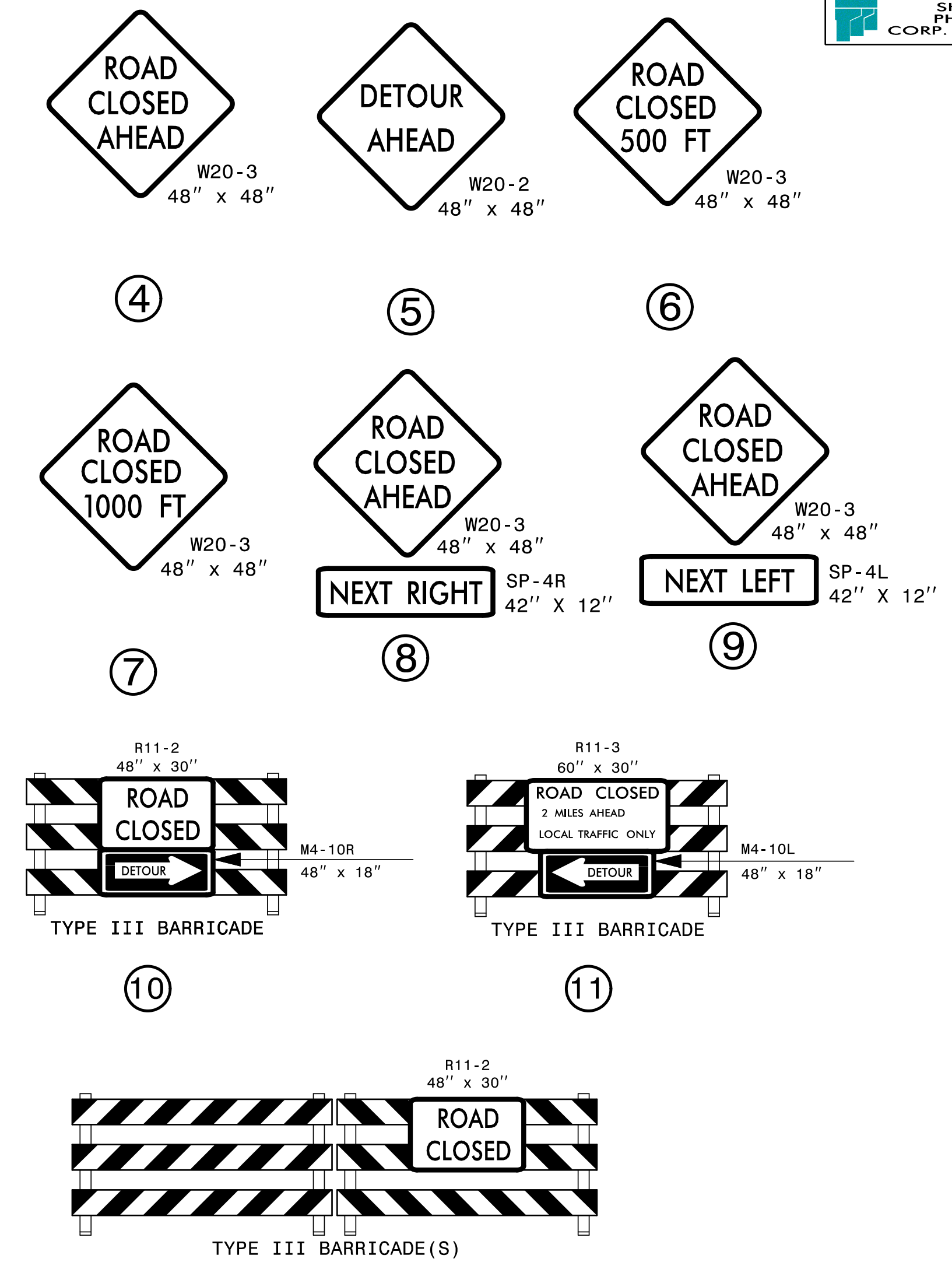
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H2-2006Q	TMP-4
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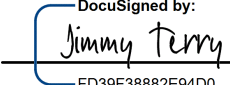
OFFSITE DETOUR ●●●●●  
 \* SEE TMP-2 FOR SIGN DESIGN



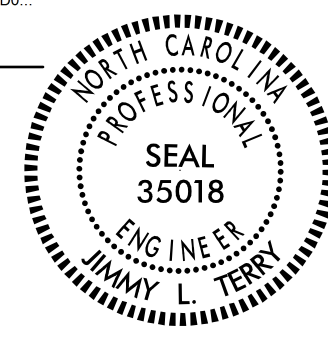
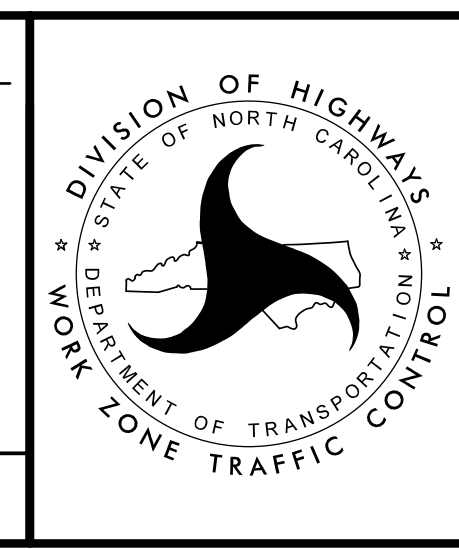
REFER TO ROADWAY STANDARD  
 DRAWING 1101.03, SHEET 1 OF 9  
 FOR APPLICABLE NOTES.



6/1/2023 15:20:23 Division 6 HS-20060 Harnett 15:Traffic\TrafficControl\TC-TMP-04.dgn User:smelvin

APPROVED:   
 DATE: 7/21/2023

SEAL

OFFSITE DETOUR LOCATION  
 AND BARRICADE PLACEMENT

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

**PROJECT: HS-2006Q**

**STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION**

**PAVEMENT MARKING PLAN  
HARNETT COUNTY**

**LOCATION: STRUCTURE #420015 OVER BLACK SWAMP  
ON SR 1532 (LANGDON RD)**

<small>PROJECT NO.</small> HS-2006Q	<small>SHEET NO.</small> PMP-1
<small>APPROVED:</small> <small>DATE:</small> 7/21/2023	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

**ROADWAY STANDARD DRAWING**

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

<u>STD. NO.</u>	<u>TITLE</u>
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING

**SUMMARY OF QUANTITIES**

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4072000000	SUPPORTS, 3 LB STEEL U-CHANNEL	35	L.F.
4102000000	SIGN ERECTION, TYPE E	4	EA.

**FINAL PAVEMENT MARKING SCHEDULE**

SYMBOL	DESCRIPTION
PAVEMENT MARKINGS	
PAINT (4")	
P1	(4") WHITE EDGELINE
P13	(4") YELLOW DOUBLE CENTER
MARKERS	
PERMANENT RAISED PAVEMENT MARKERS	
MA	YELLOW & YELLOW

PLAN PREPARED FOR N.C.D.O.T. BY:

<b>TGS ENGINEERS</b> 201 W. MARION ST. STE. 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	<table style="width: 100%;"> <tr> <td style="width: 50%;"><u>JIMMY TERRY, PE</u> PROJECT ENGINEER</td> <td style="width: 50%;"></td> </tr> <tr> <td><u>SANDRA MELVIN</u> DESIGN TECHNICIAN</td> <td></td> </tr> </table>	<u>JIMMY TERRY, PE</u> PROJECT ENGINEER		<u>SANDRA MELVIN</u> DESIGN TECHNICIAN	
<u>JIMMY TERRY, PE</u> PROJECT ENGINEER					
<u>SANDRA MELVIN</u> DESIGN TECHNICIAN					

**GENERAL NOTES  
PAVEMENT MARKINGS**

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.

- A) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:
 

ROAD NAME LANGDON RD (-L-)	MARKING PAINT	MARKER PERMANENT RAISED
-------------------------------	------------------	----------------------------
- B) PLACE TWO APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL WEARING SURFACE. PLACE THE SECOND APPLICATION OF PAINT UPON SUFFICIENT DRYING TIME OF THE FIRST.
- C) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- D) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

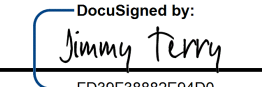

**GENERAL NOTES  
SIGNING**

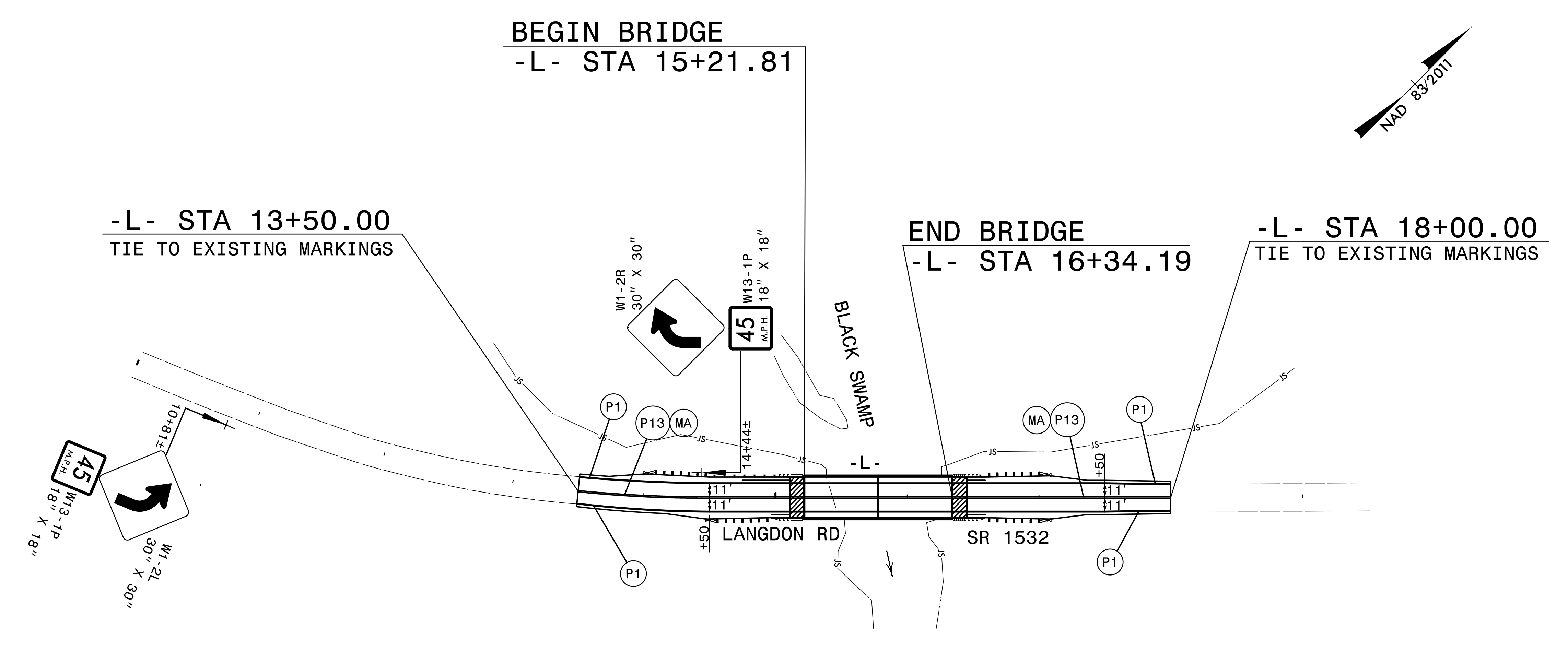
- . SIGNS FURNISHED BY STATE
- . CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
- . THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.

**INDEX**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
PMP-1	PAVEMENT MARKING PLAN TITLE AND SCHEDULE SHEET
PMP-2	PAVEMENT MARKING & SIGNING DETAIL



TIP NO. HS-2006Q	SHEET NO. PMP-2
APPROVED:  7/21/2023	
DATE: 7/21/2023	
SEAL 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST., STE 200 SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	



6/1/2023 8:11:00 AM X:\NC0001\Division 6 HS-2006Q Harnett 15\Traffic\Pavement Markings\HS-2006Q\_Sgn\_FMP\_02.dgn User:smelvin

SEE SHEET PMP-1 FOR PAVEMENT MARKING SCHEDULE

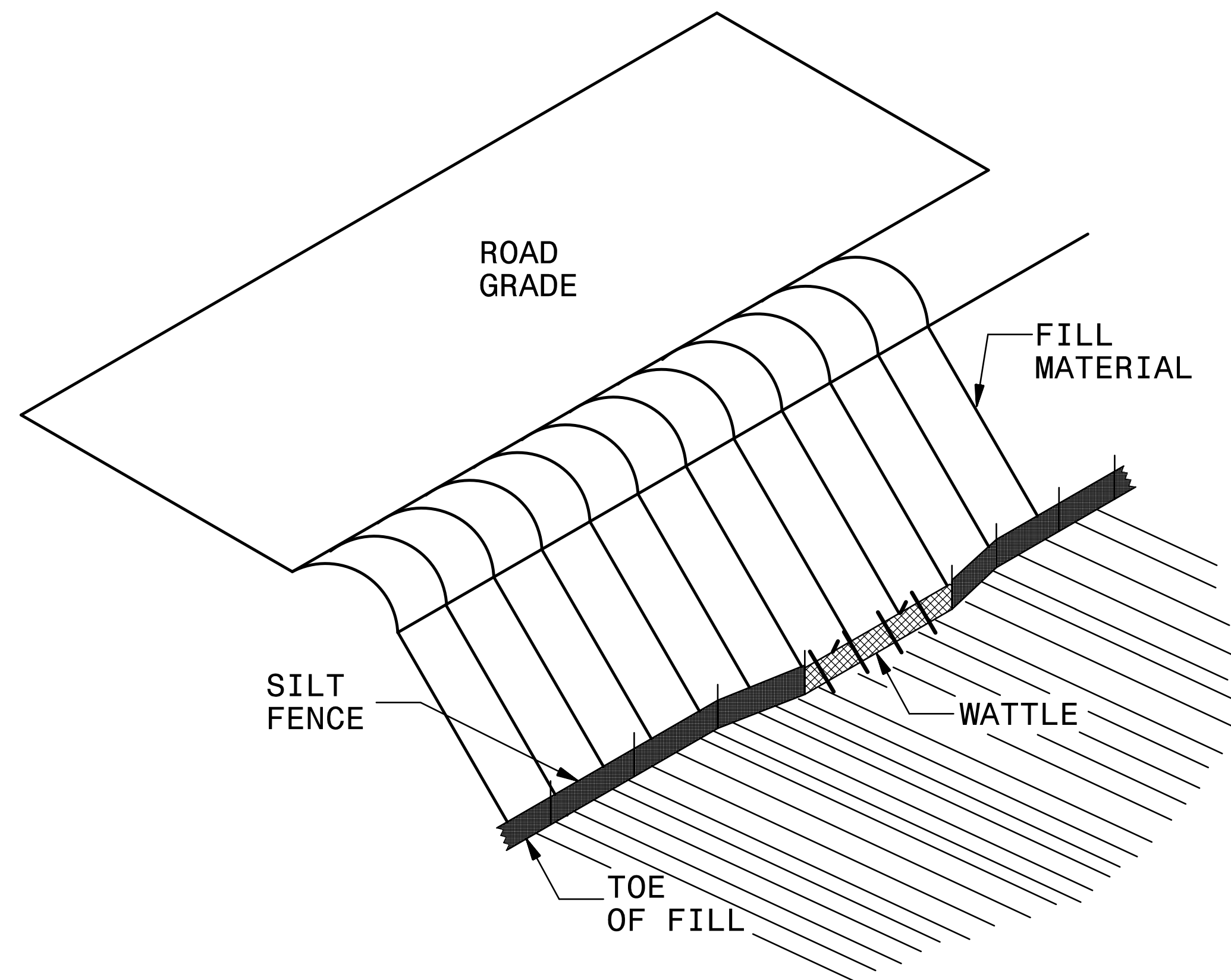
PAVEMENT MARKING DETAIL





PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. <i>EC-2</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

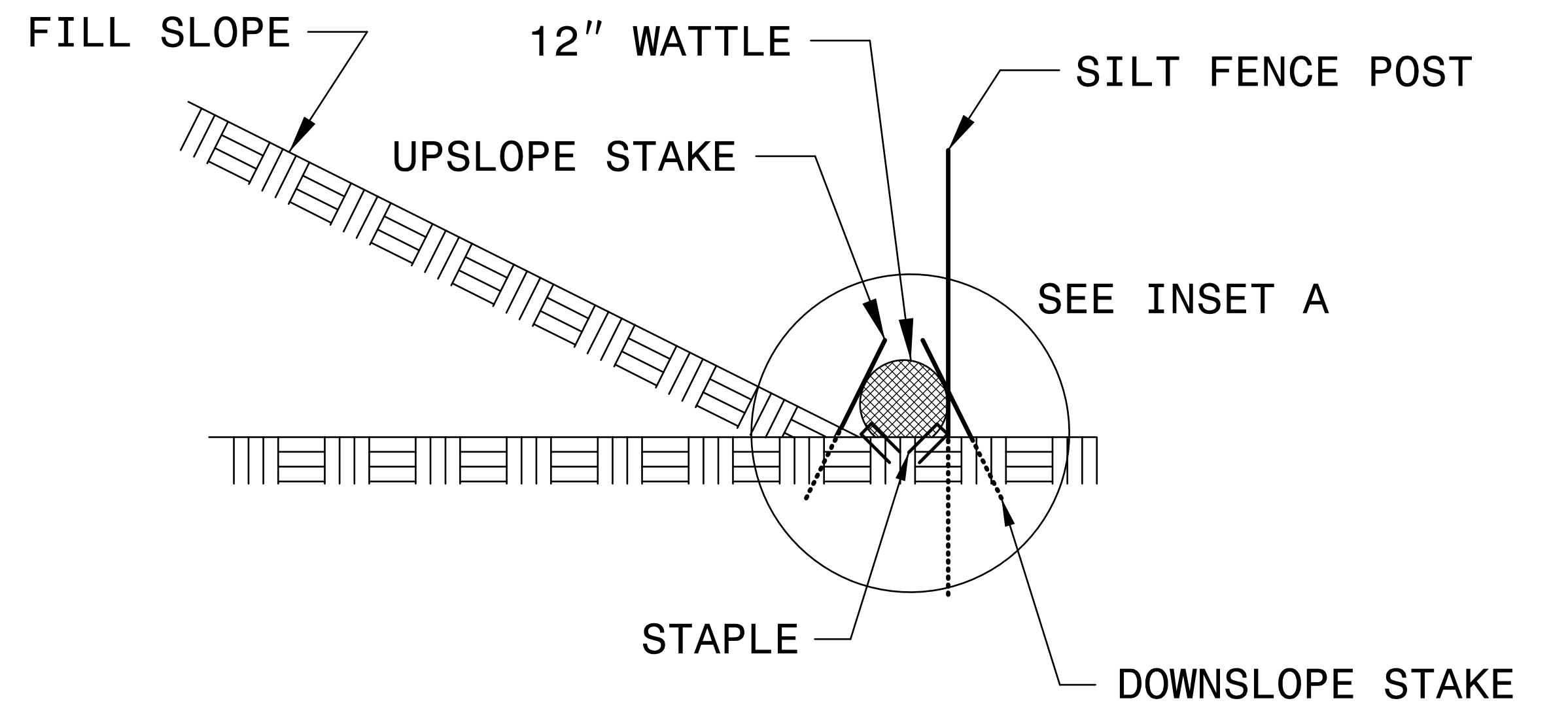
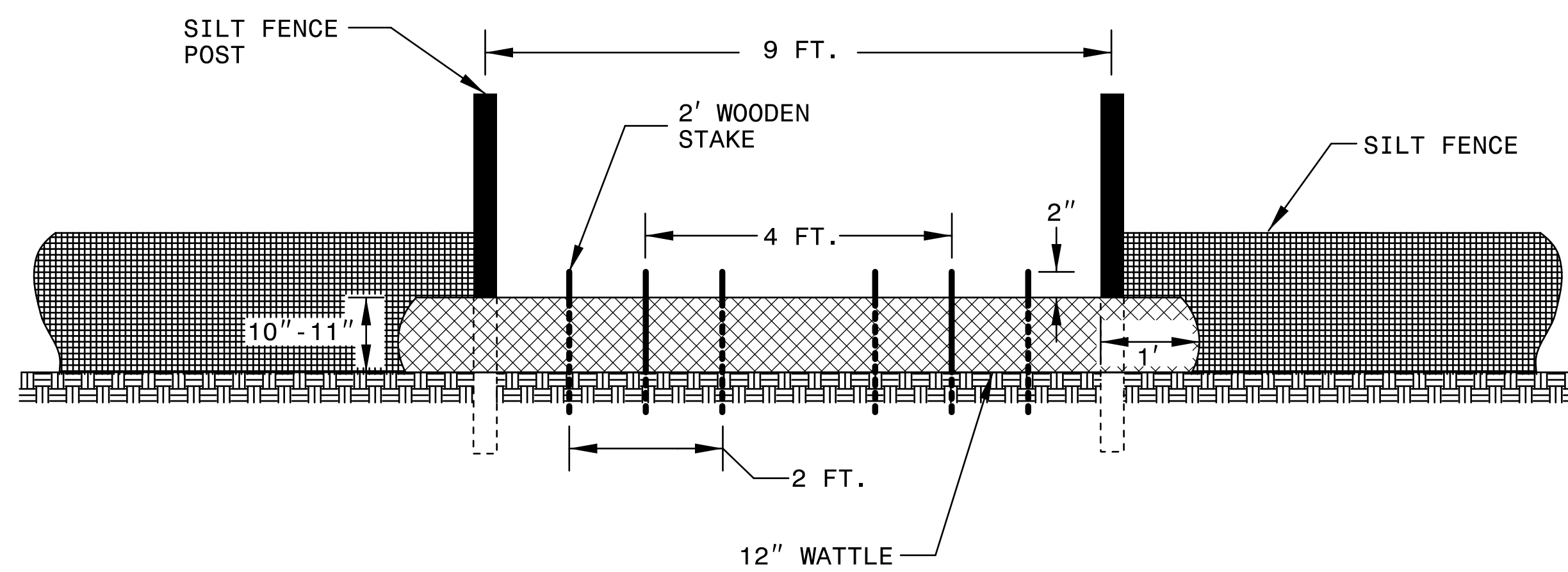
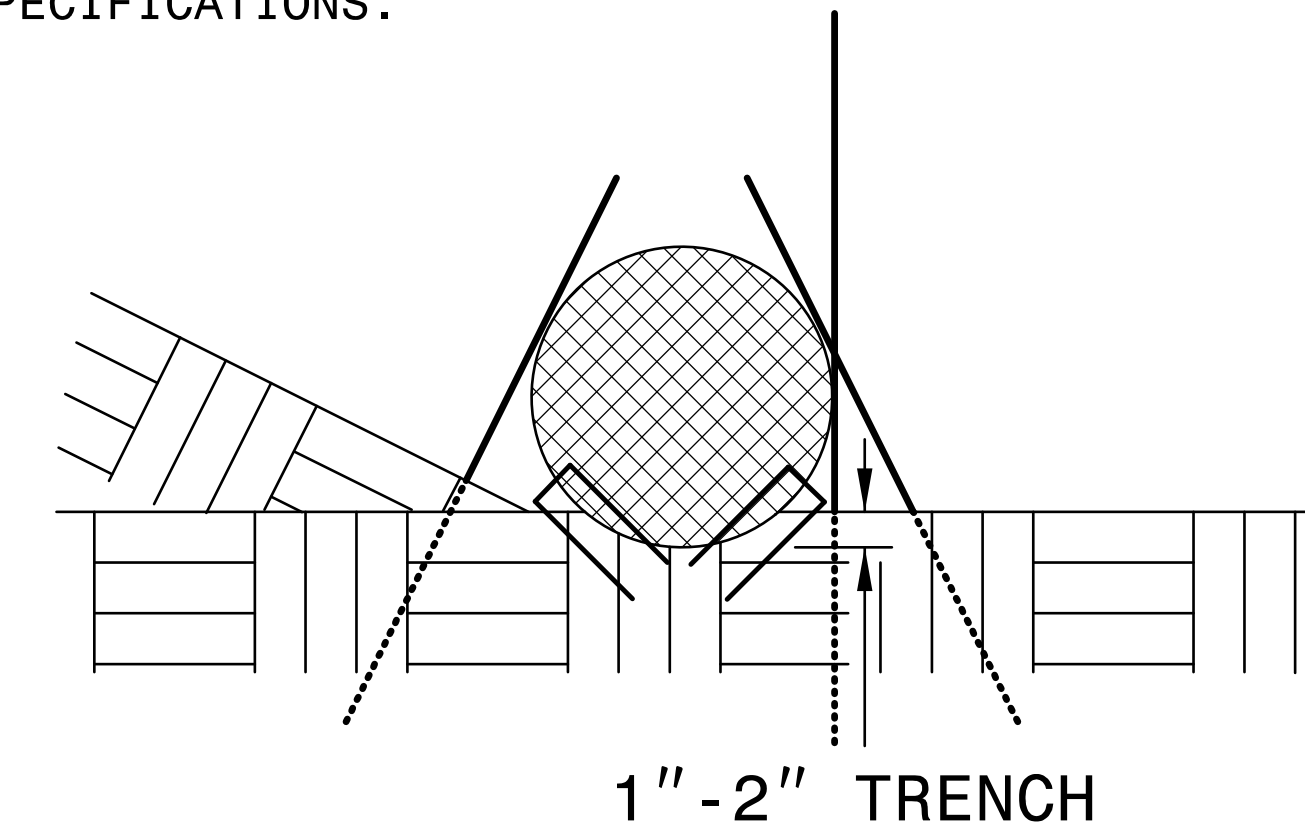
# SILT FENCE COIR FIBER WATTLE BREAK DETAIL



**NOTES:**

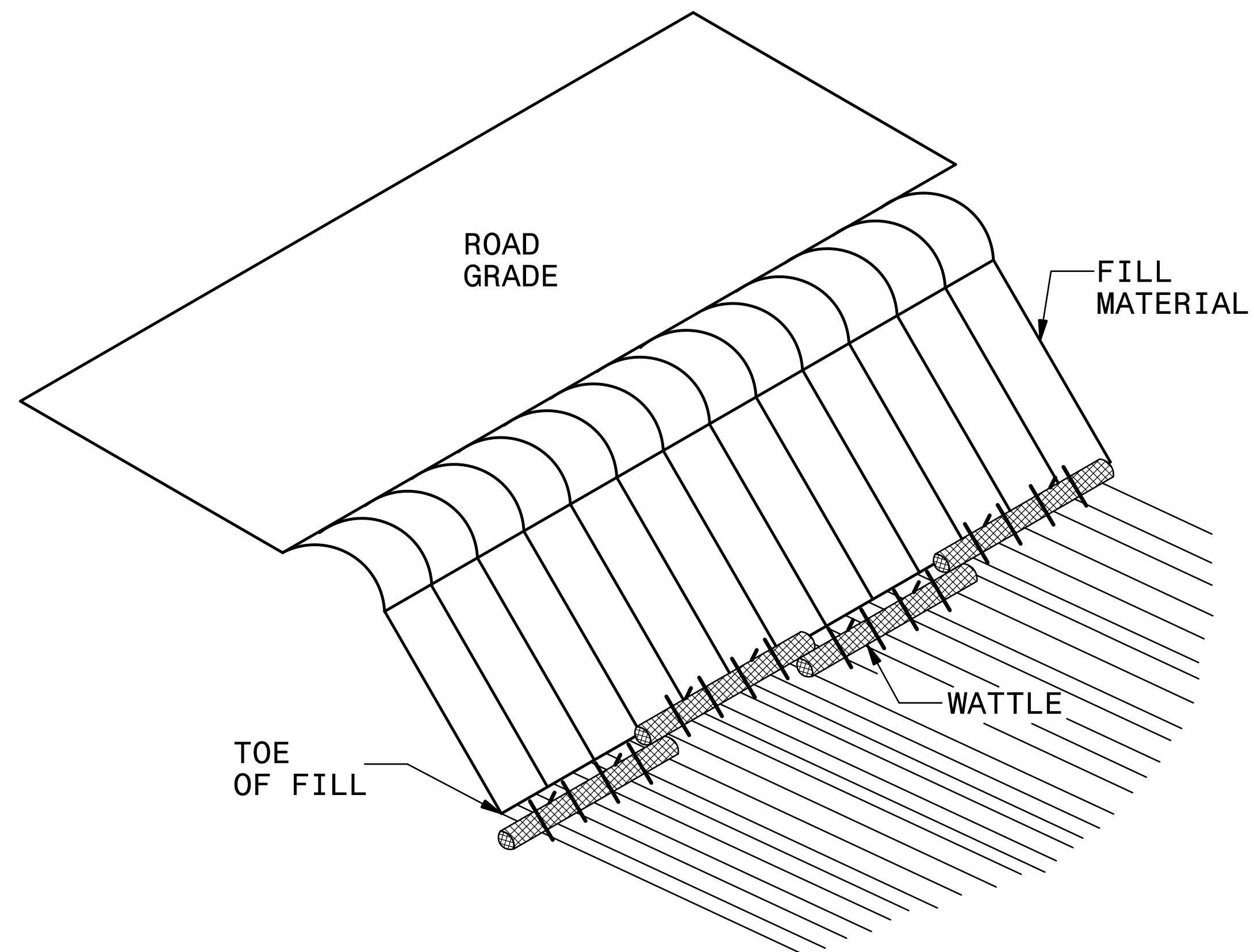
- USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.
- EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.
- DO NOT PLACE WATTLE ON TOE OF SLOPE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.
- 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.
- WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.
- INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

**INSET A**



PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. <i>EC-2A</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

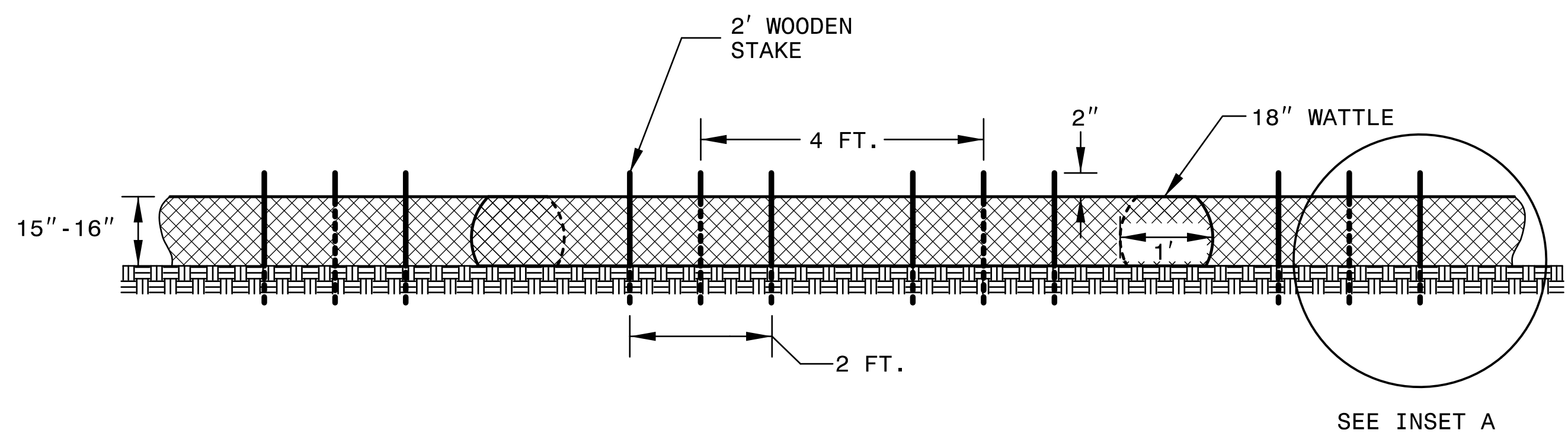
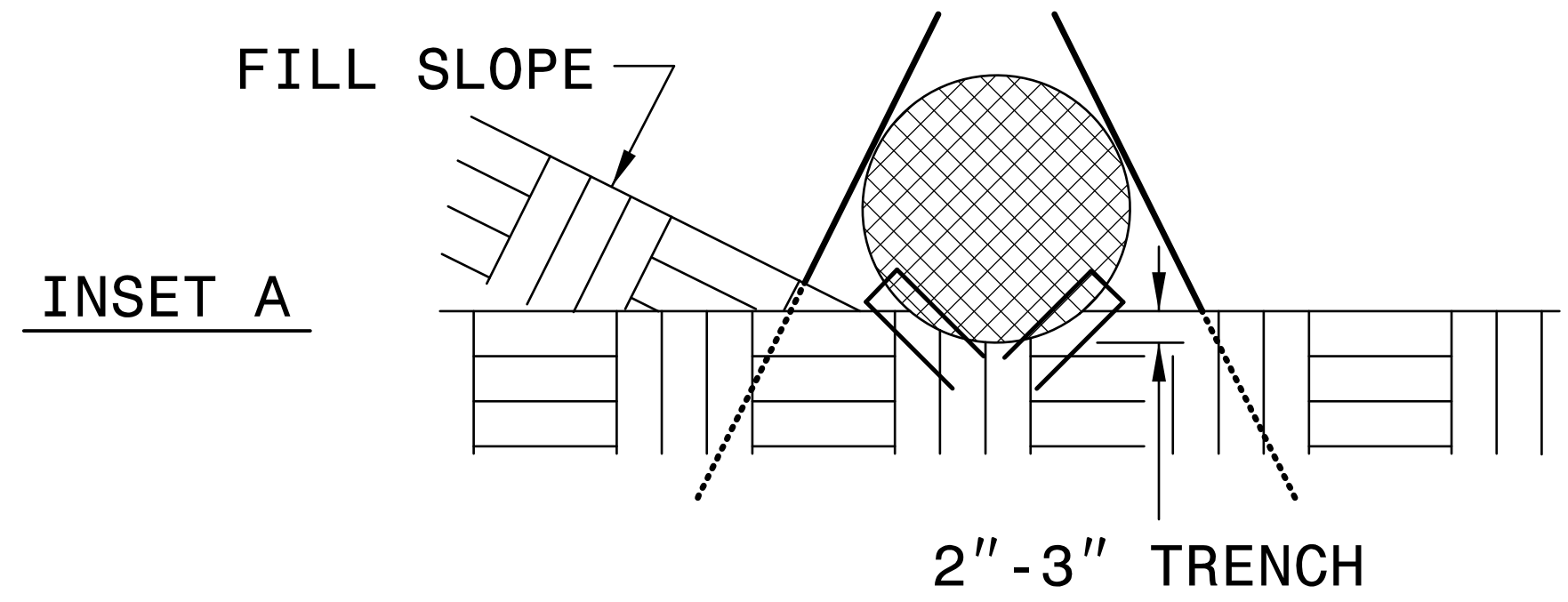
# COIR FIBER WATTLE BARRIER DETAIL



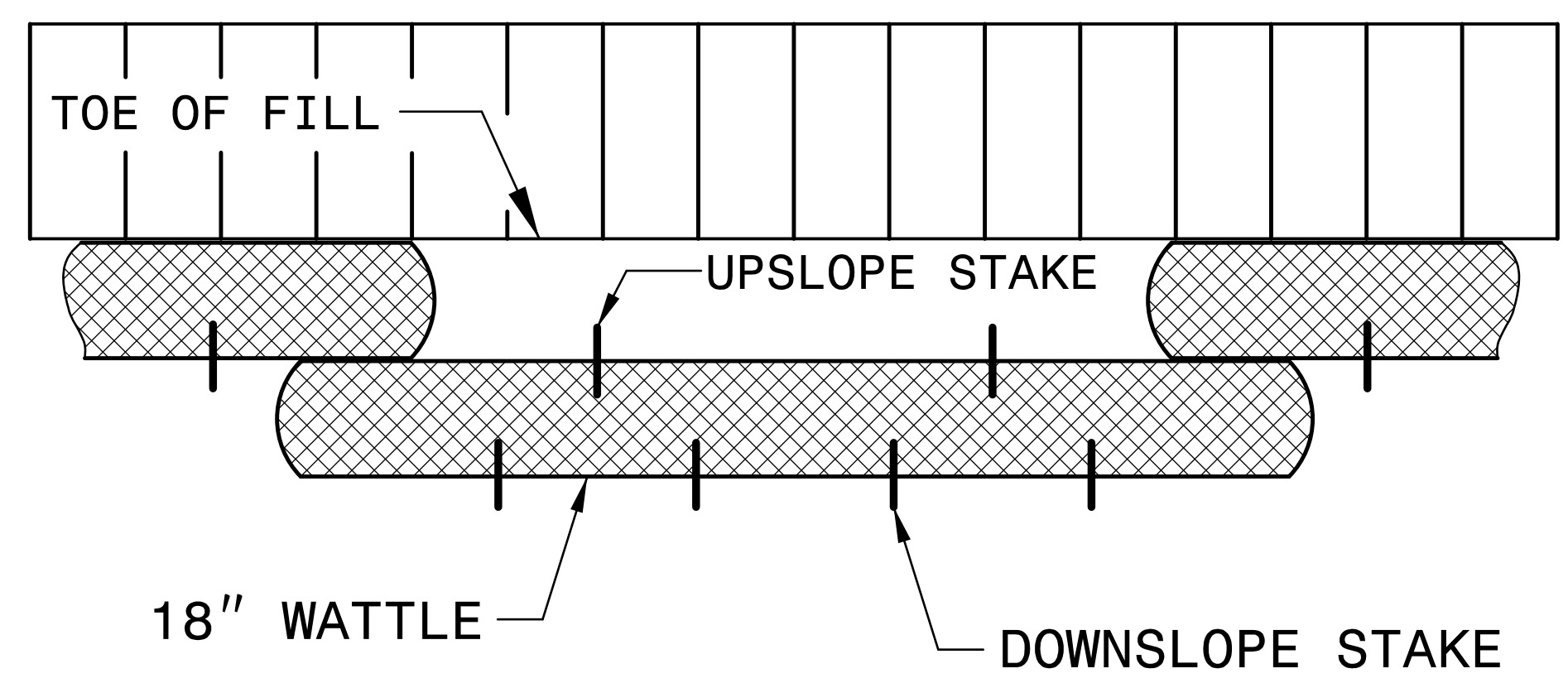
**ISOMETRIC VIEW**

**NOTES:**

- USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.
- EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.
- DO NOT PLACE WATTLES ON TOE OF SLOPE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.
- 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.
- FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 25 FT.



**FRONT VIEW**



**TOP VIEW**



DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

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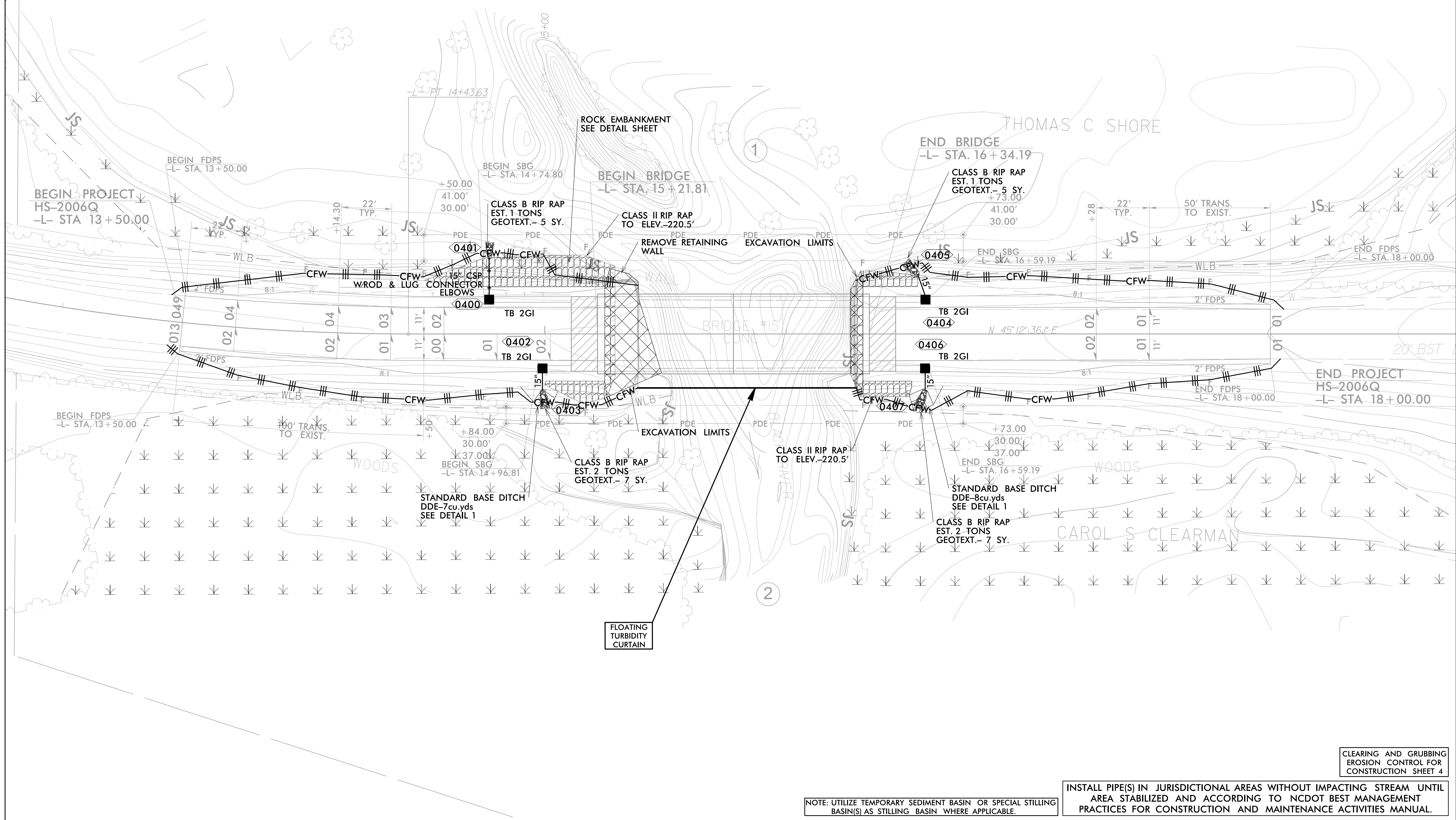
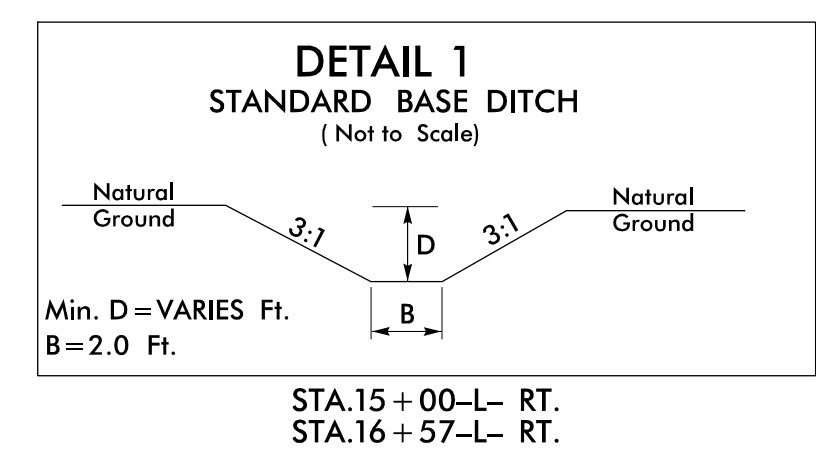
PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. <i>EC-3</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# ***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.

PROJECT REFERENCE NO. HS-2006Q	SHEET NO. EC-4/CONST.4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS  
201 W. MARION ST-STE 200  
SHELBY, NC 28150  
PH (704) 476-0003  
CORP. LICENSE NO.: C-0275



NOTE: UTILIZE TEMPORARY SEDIMENT BASIN OR SPECIAL STILLING BASIN(S) AS STILLING BASIN WHERE APPLICABLE.

INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.

CLEARING AND GRUBBING  
EROSION CONTROL FOR  
CONSTRUCTION SHEET 4







09/08/09

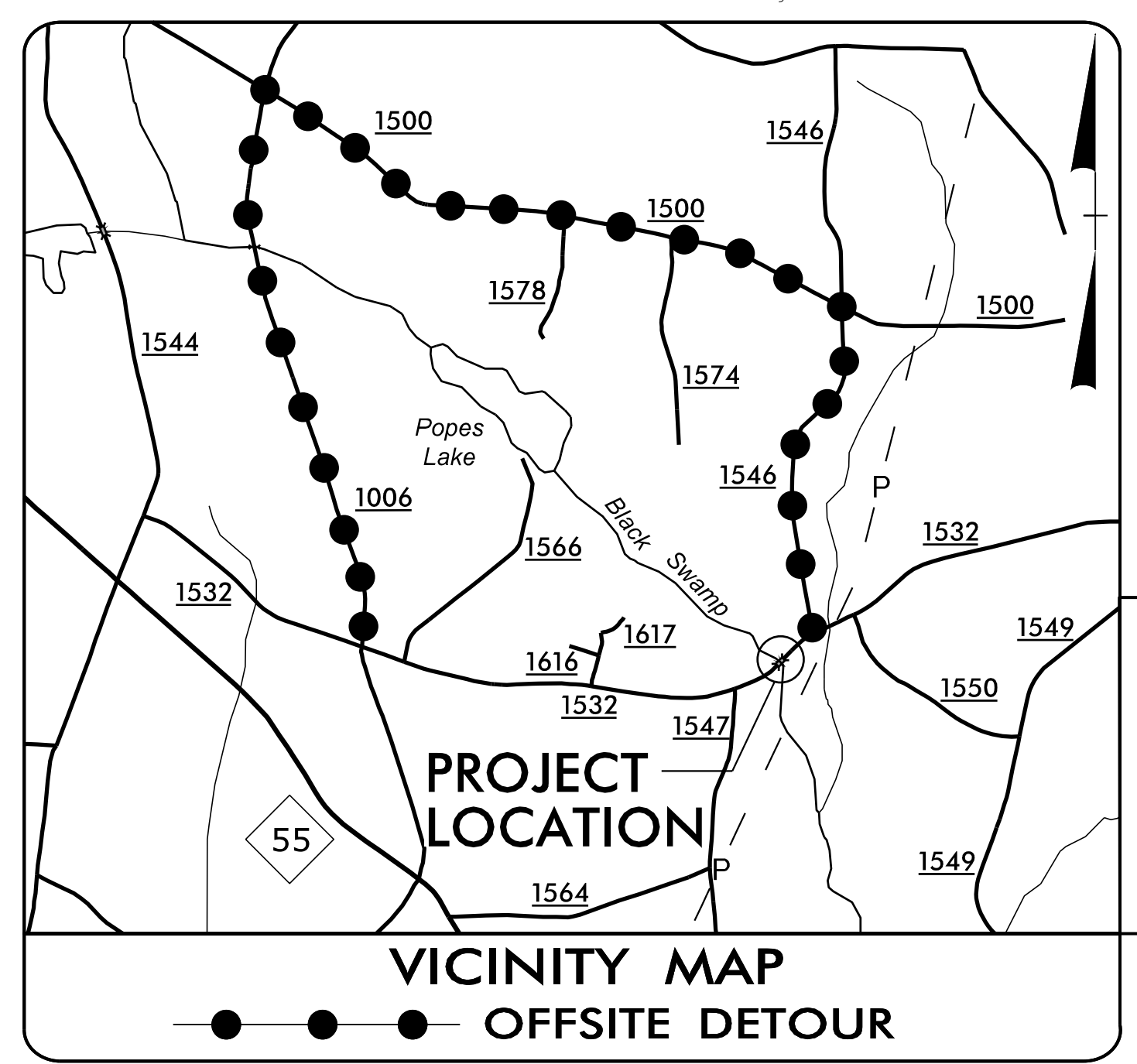
TIP PROJECT: HS-2006Q

See Sheet 1A For Index of Sheets  
See Sheet 1B For List of Conventional Symbols

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

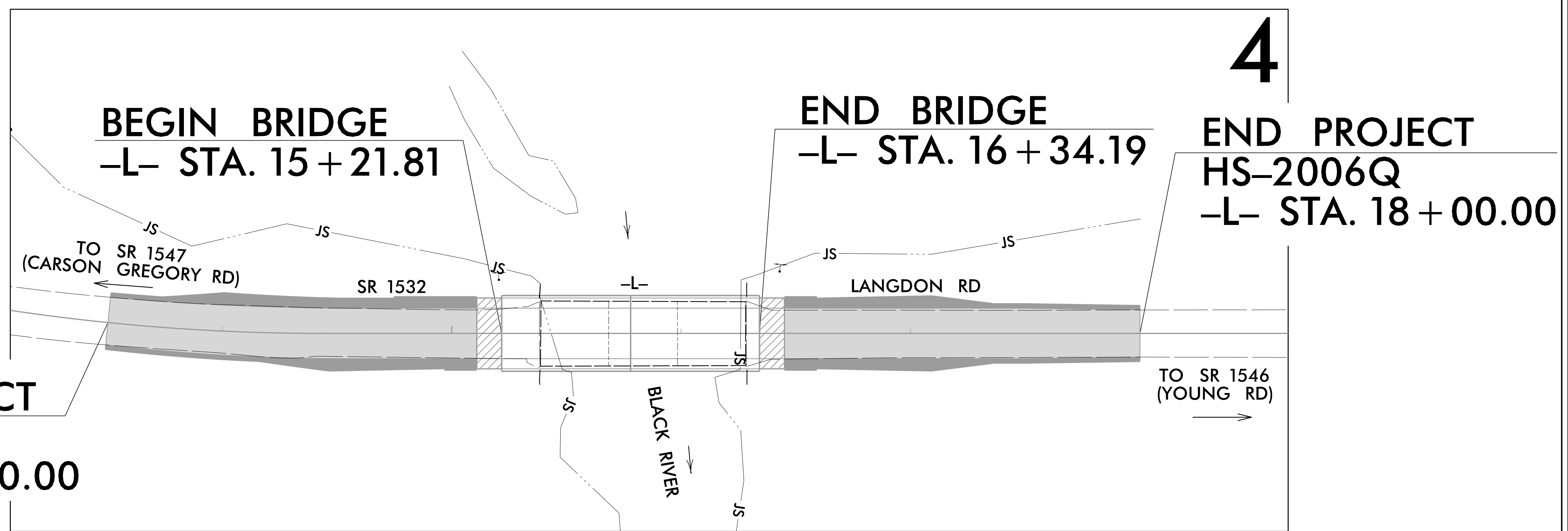
T.I.P. NO.	SHEET NO.
HS-2006Q	UC-1

## UTILITY CONSTRUCTION PLANS HARNETT COUNTY

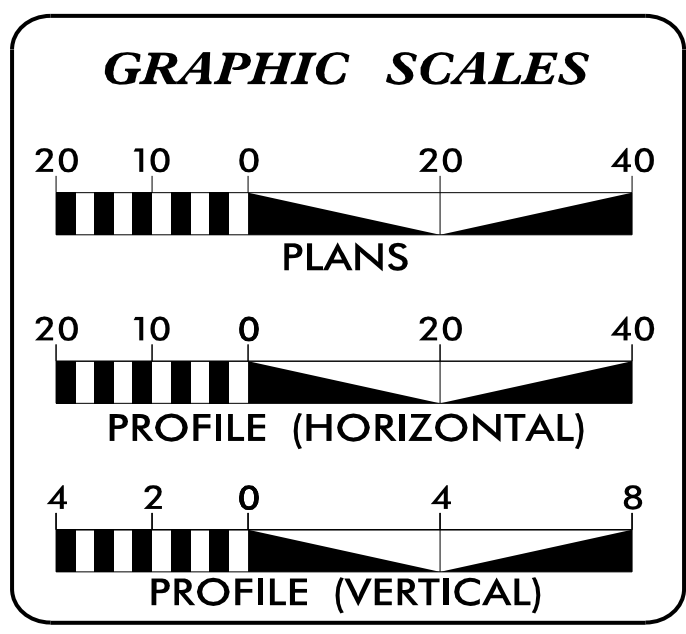


LOCATION: BRIDGE #420015 OVER BLACK RIVER  
ON SR 1532 (LANGDON RD)

TYPE OF WORK: UTILITY CONSTRUCTION



DOCUMENT NOT CONSIDERED FINAL  
UNTIL ALL SIGNATURES ARE COMPLETED



SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	UTILITY NOTES
UC-3A	UTILITY DETAILS
UC-4	UTILITY CONSTR. PLANS
UC-5	UTILITY CONSTR. PROFILE

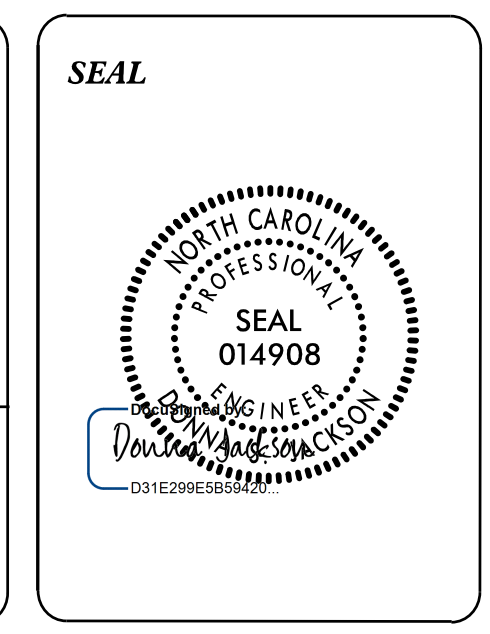
WATER OWNERS ON PROJECT

(A) WATER - HARNETTE REGIONAL WATER (HRW)

PREPARED IN THE OFFICE OF

**M** MOTT MACDONALD  
7621 Purfoy Rd, Suite 115  
Fuquay-Varina, NC 27526  
www.mottmac.com/americas  
LICENSE NO. F-0669

DONNA JACKSON P.E. CONSULTANT CONTACT #1  
PADDY JORDAN CONSULTANT CONTACT #2



DIVISION OF HIGHWAYS  
UTILITIES UNIT  
1555 MAIL SERVICES CENTER  
RALEIGH, NC 27699-1555  
PHONE (919) 707-6690  
FAX (919) 250-4151

RICK HANDLIN DIVISION UTILITIES ENGINEER

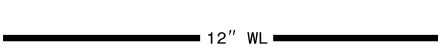























JOHN WATERS DIVISION UTILITIES COORDINATOR

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JDR66165

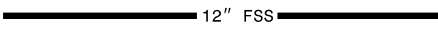


# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## UTILITIES PLAN SHEET SYMBOLS





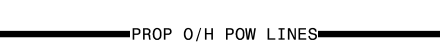
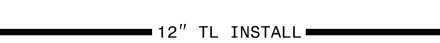
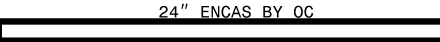
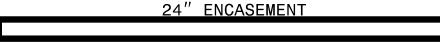
### PROPOSED WATER SYMBOLS







Water Line (Sized as Shown)	
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	REM FH
Water Meter	
Relocate Water Meter	
Remove Water Meter	REM WM
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

### PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

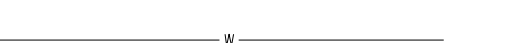
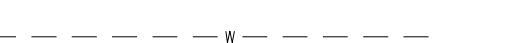
### PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

### EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records	AATUR	Sanitary Sewer Cleanout	
End of Information	E.O.I.		

\*For Existing Utilities  
 Utility Line Drawn from Record (Type as Shown)   
 Designated Utility Line (Type as Shown) 

5/14/99  
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 REV: 2/1/2012



# UTILITY CONSTRUCTION

## 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 2018.
2. THE EXISTING UTILITIES BELONG TO HARNETT REGIONAL WATER (HRW) .
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. 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.

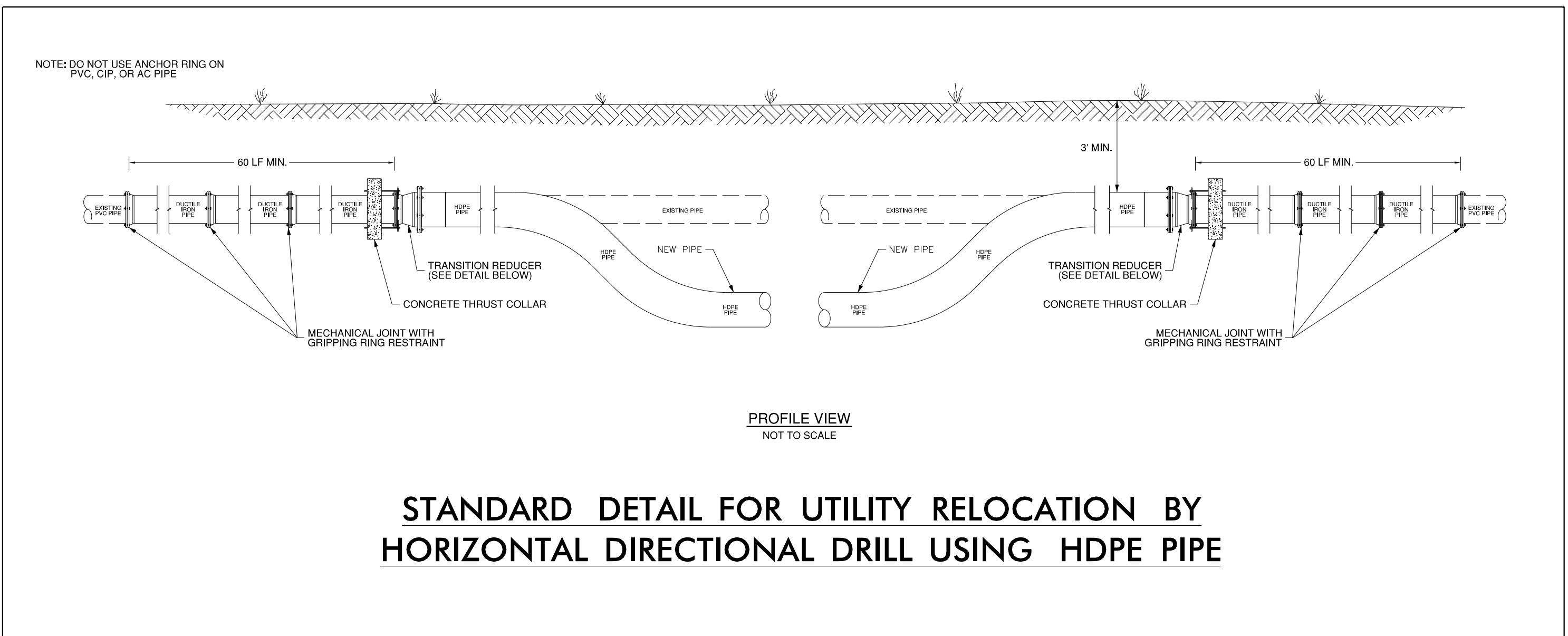
## PROJECT SPECIFIC NOTES:

1. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.
2. IF HDPE PIPE IS INSTALLED BY DIRECTIONAL DRILL. IT SHALL BE FILLED WITH WATER AND NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR ONE WEEK FROM THE TIME OF INSTALLATION.
3. ALL EXISTING WATER SERVICES ON WATER MAINS TO BE TAKEN OUT OF SERVICE SHALL BE REPLACED WITH A NEW SERVICE, METER SETTERS AND METER BOX OF EQUAL SIZE IN ACCORDANCE WITH MCPU STANDARDS.

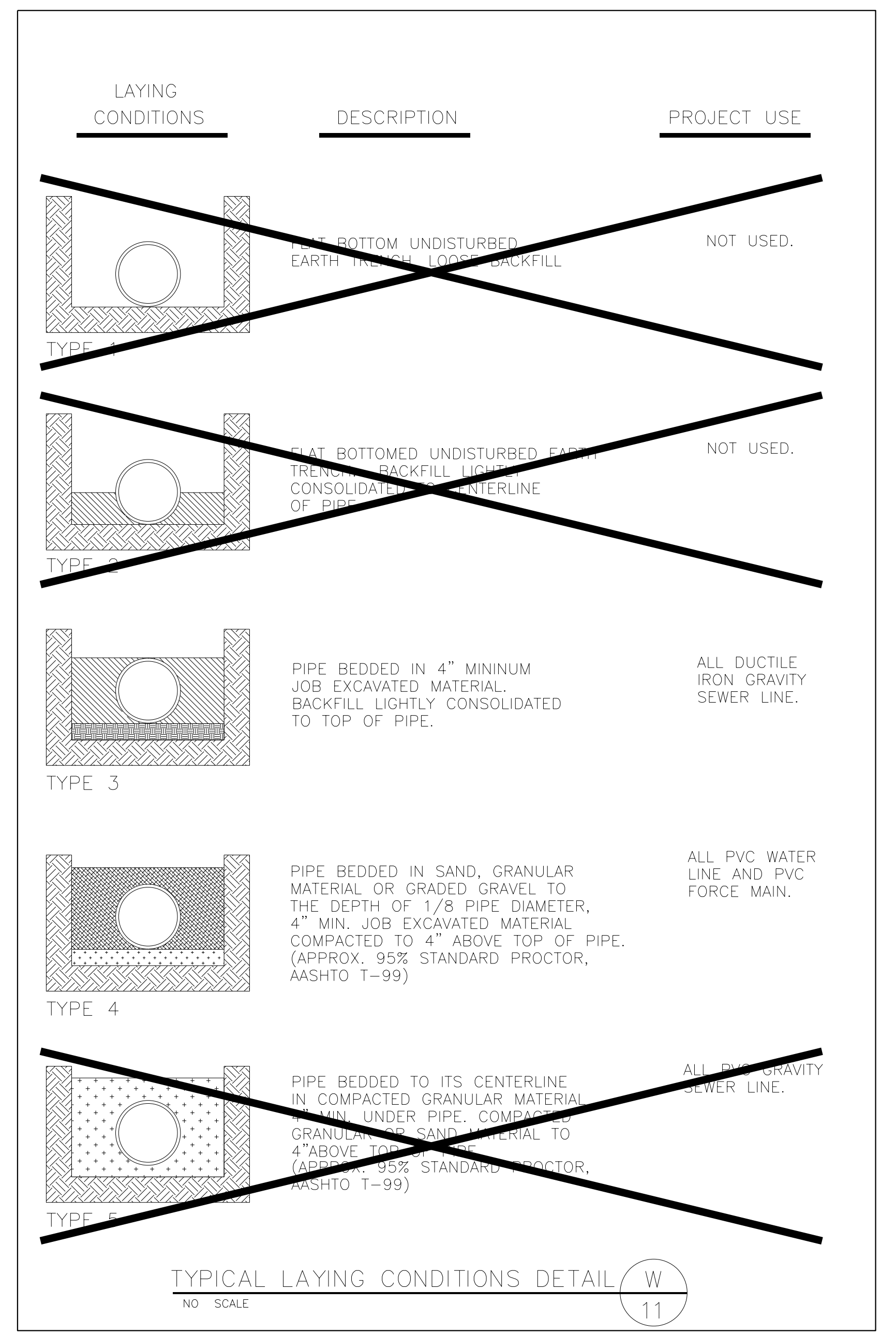
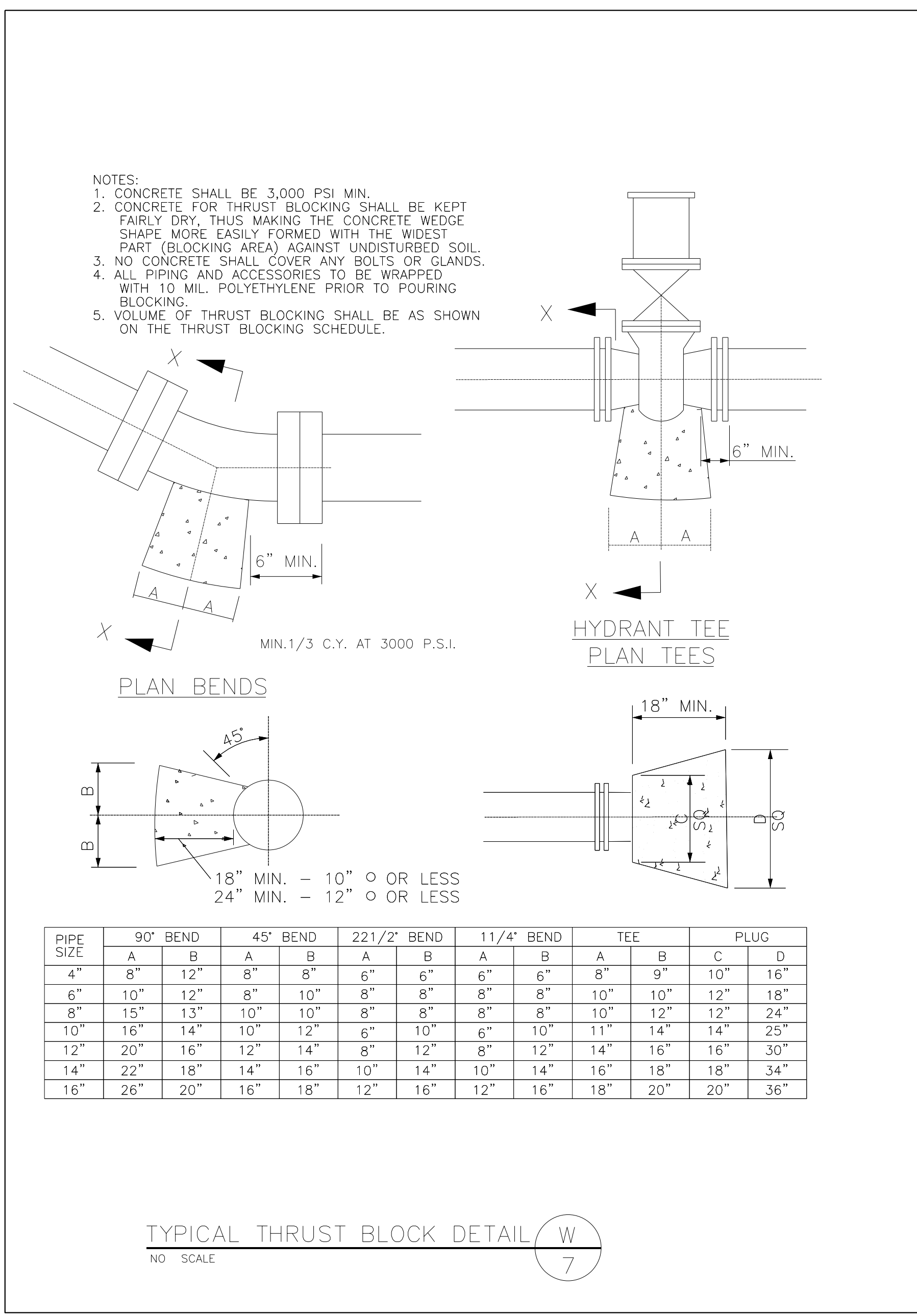
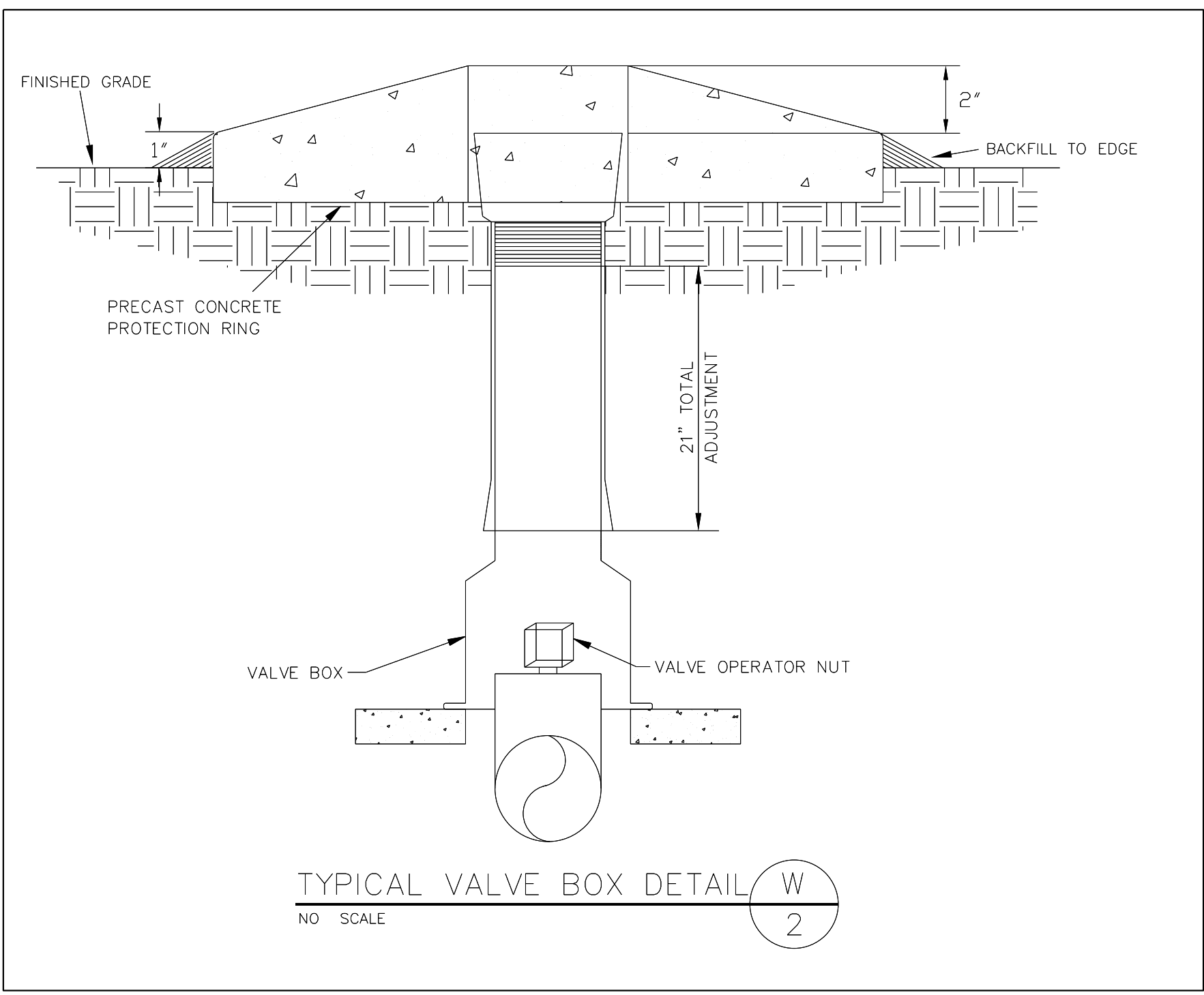
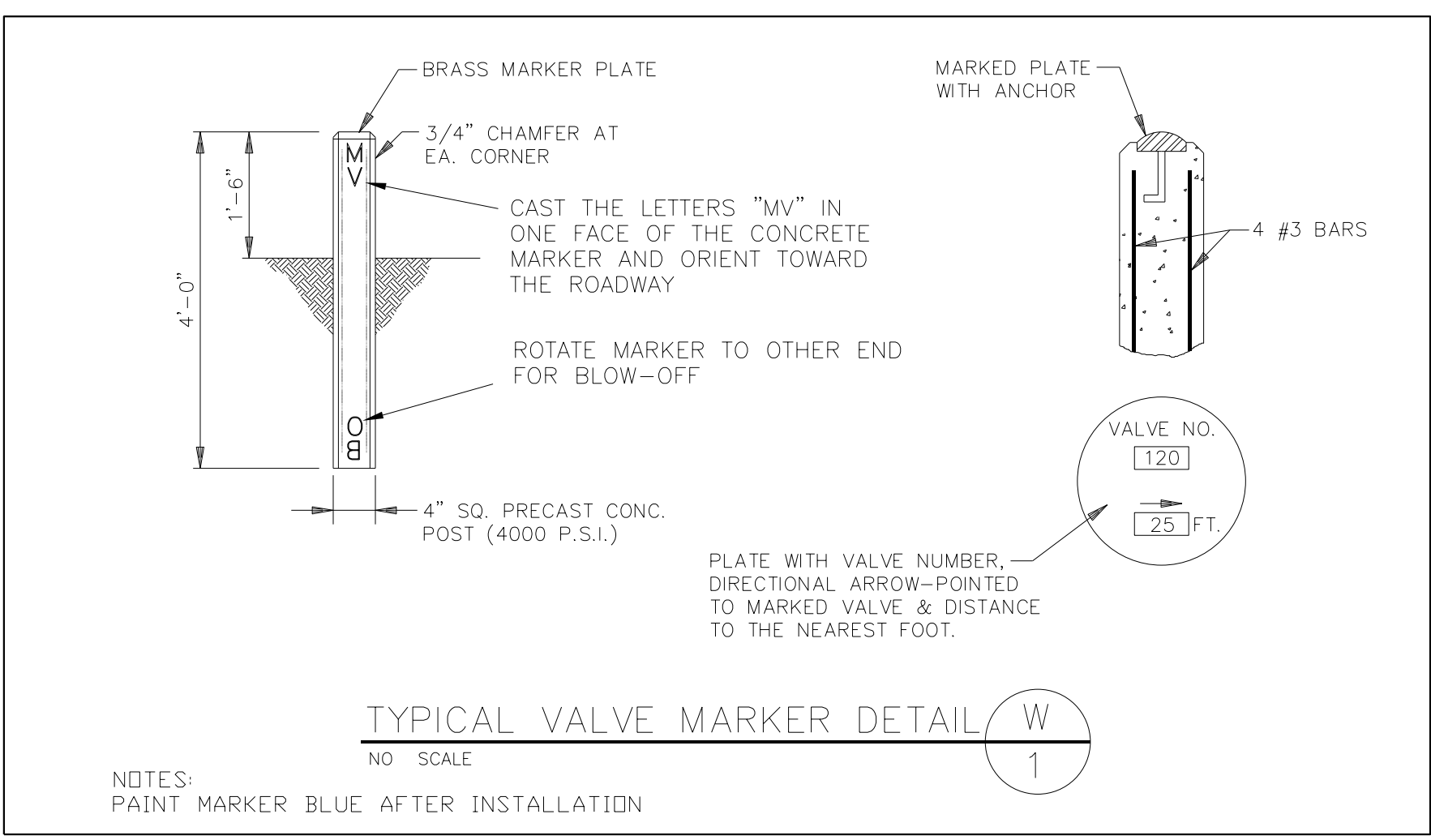
PROJECT REFERENCE NO. <b>HS-2006Q</b>	SHEET NO. <b>UC-3</b>
DESIGNED BY: <b>DSJ</b>	
DRAWN BY: <b>PJJ</b>	
CHECKED BY: <b>DSJ</b>	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of: <b>MOTT MACDONALD</b>	
<b>UTILITY CONSTRUCTION</b>	



TYPICAL WATER DETAILS  
WATER DISTRIBUTION SYSTEM  
**HARNETT COUNTY SPECIFICATIONS**  
HARNETT COUNTY - NORTH CAROLINA



**STANDARD DETAIL FOR UTILITY RELOCATION BY HORIZONTAL DIRECTIONAL DRILL USING HDPE PIPE**



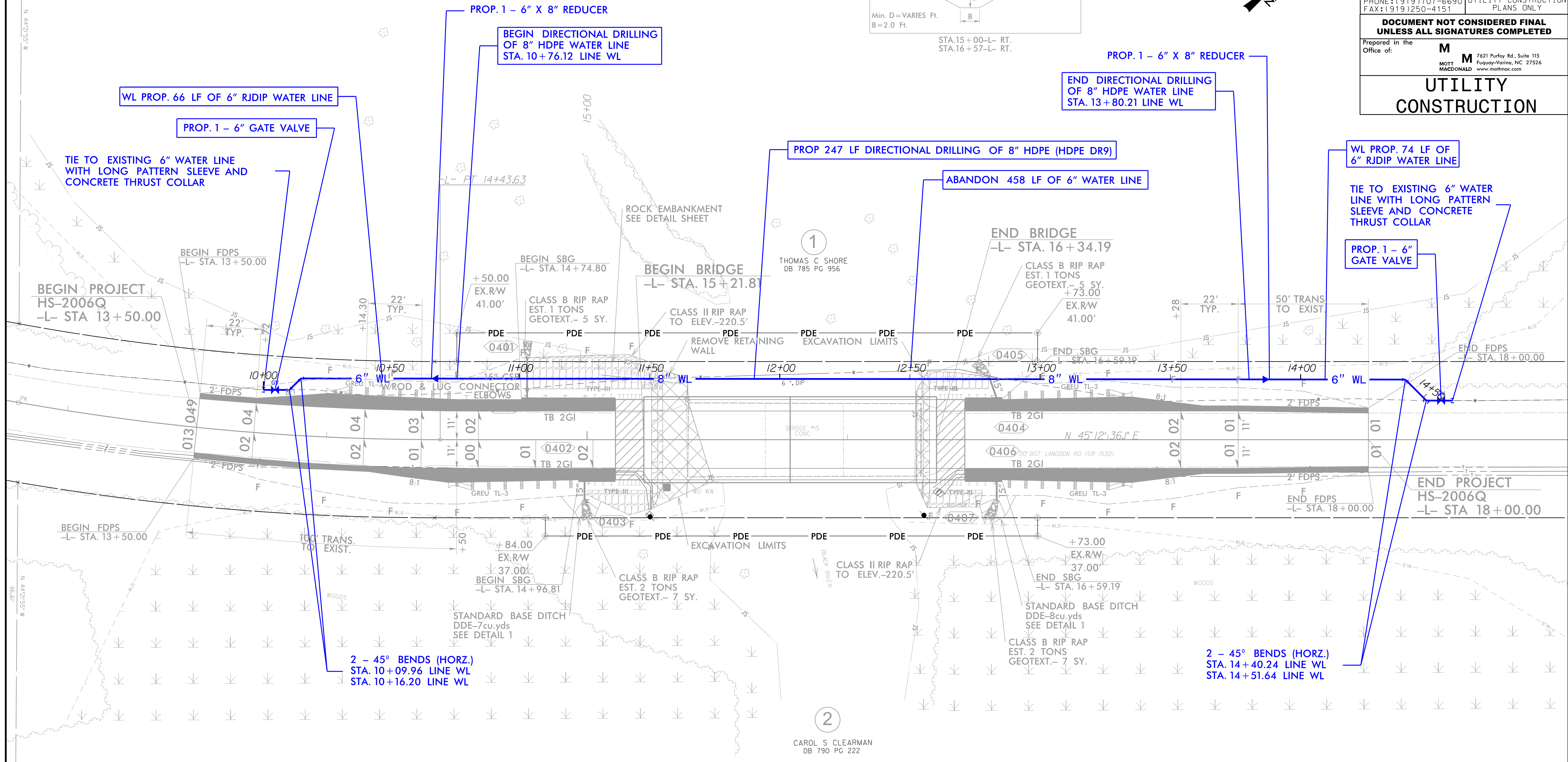
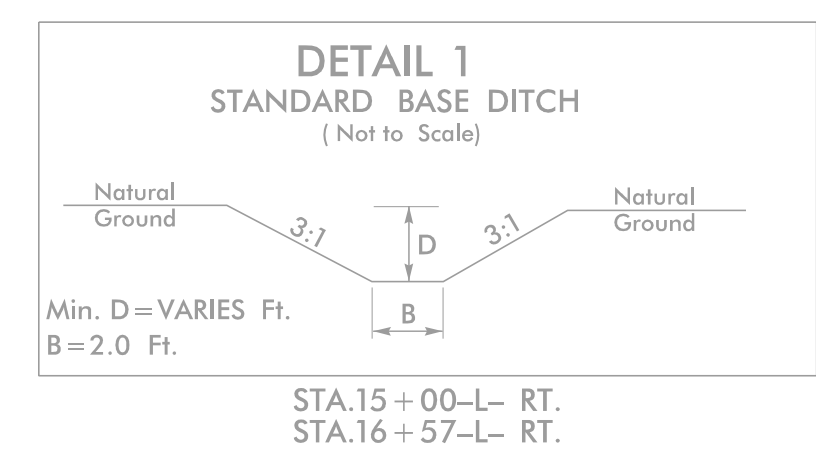
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-L- CURVE DATA  
 PI Sta 12+65.07  
 $\Delta = 22^\circ 23' 08.3" (LT)$   
 $D = 6' 11" 14.8"$   
 $L = 361.79'$   
 $T = 183.23'$   
 $R = 926.00'$   
 $SE = 0.04$   
 $DS = 50 \text{ MPH}$

HARNETT COUNTY  
 BRIDGE #420015

PROJECT REFERENCE NO.	HS-2006Q	SHEET NO.	UC-4
DESIGNED BY:	DSJ		
DRAWN BY:	PJJ		
CHECKED BY:	DSJ		
APPROVED BY:	DSJ		
REVISED:		NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
<b>DOCUMENT NOT CONSIDERED FINAL          UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared in the Office of:			
<b>UTILITY CONSTRUCTION</b>			



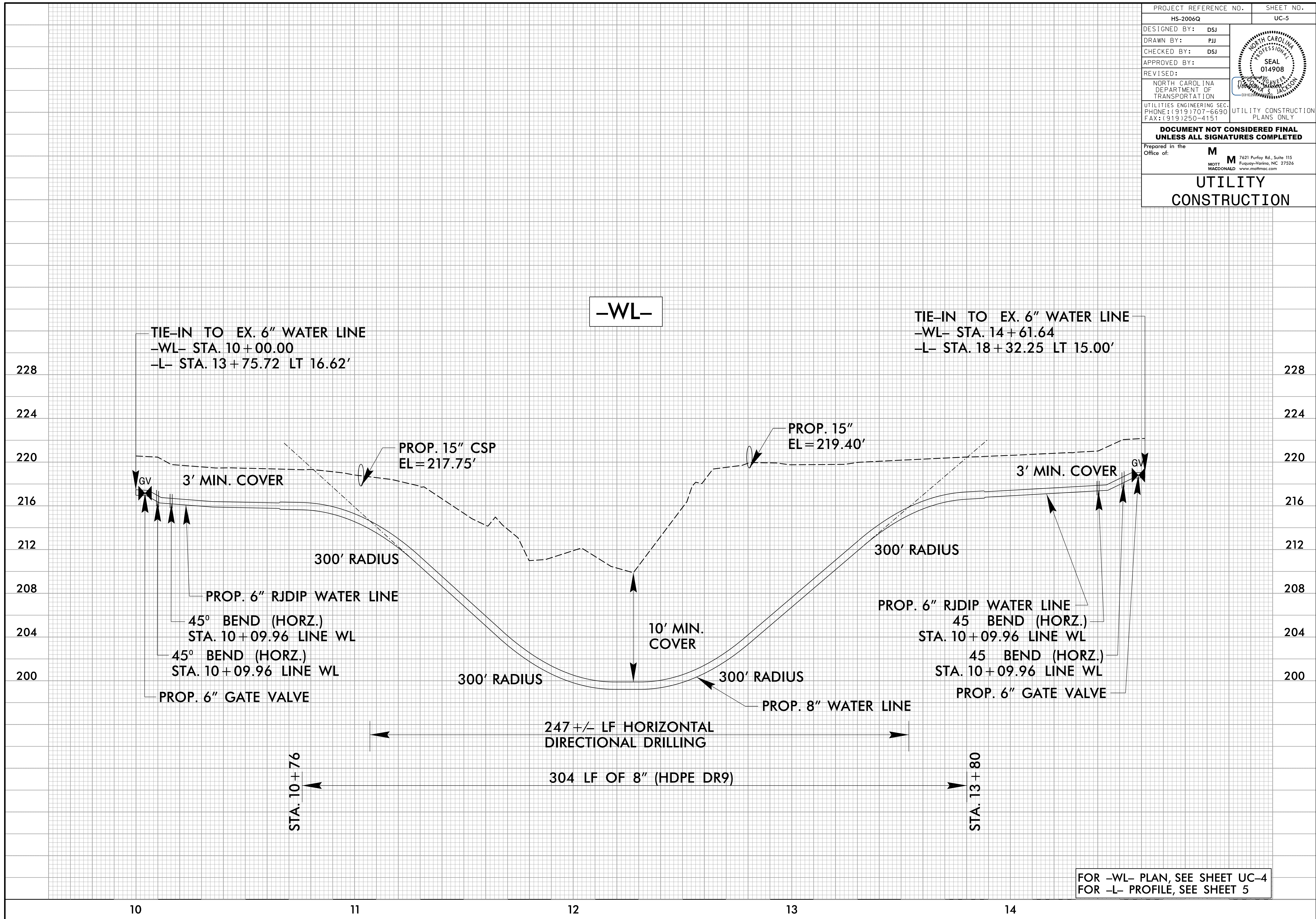
2  
 CAROL S. CLEARMAN  
 DB 790 PG 222

NOTE:  
 THE ESTIMATE QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 700 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTING WILL VARY BASED ON FIELD CONDITIONS.

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PROJECT REFERENCE NO.	HS-2006Q	SHEET NO.	UC-5
DESIGNED BY:	DSJ		
DRAWN BY:	PJJ		
CHECKED BY:	DSJ		
APPROVED BY:	DSJ		
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		UTILITY CONSTRUCTION PLANS ONLY	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151			
<b>DOCUMENT NOT CONSIDERED FINAL          UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared in the Office of:		<b>M</b> MOTT MACDONALD <small>7521 Purfoy Rd., Suite 115          Fuquay-Varina, NC 27526          www.mottmac.com</small>	
<b>UTILITY          CONSTRUCTION</b>			

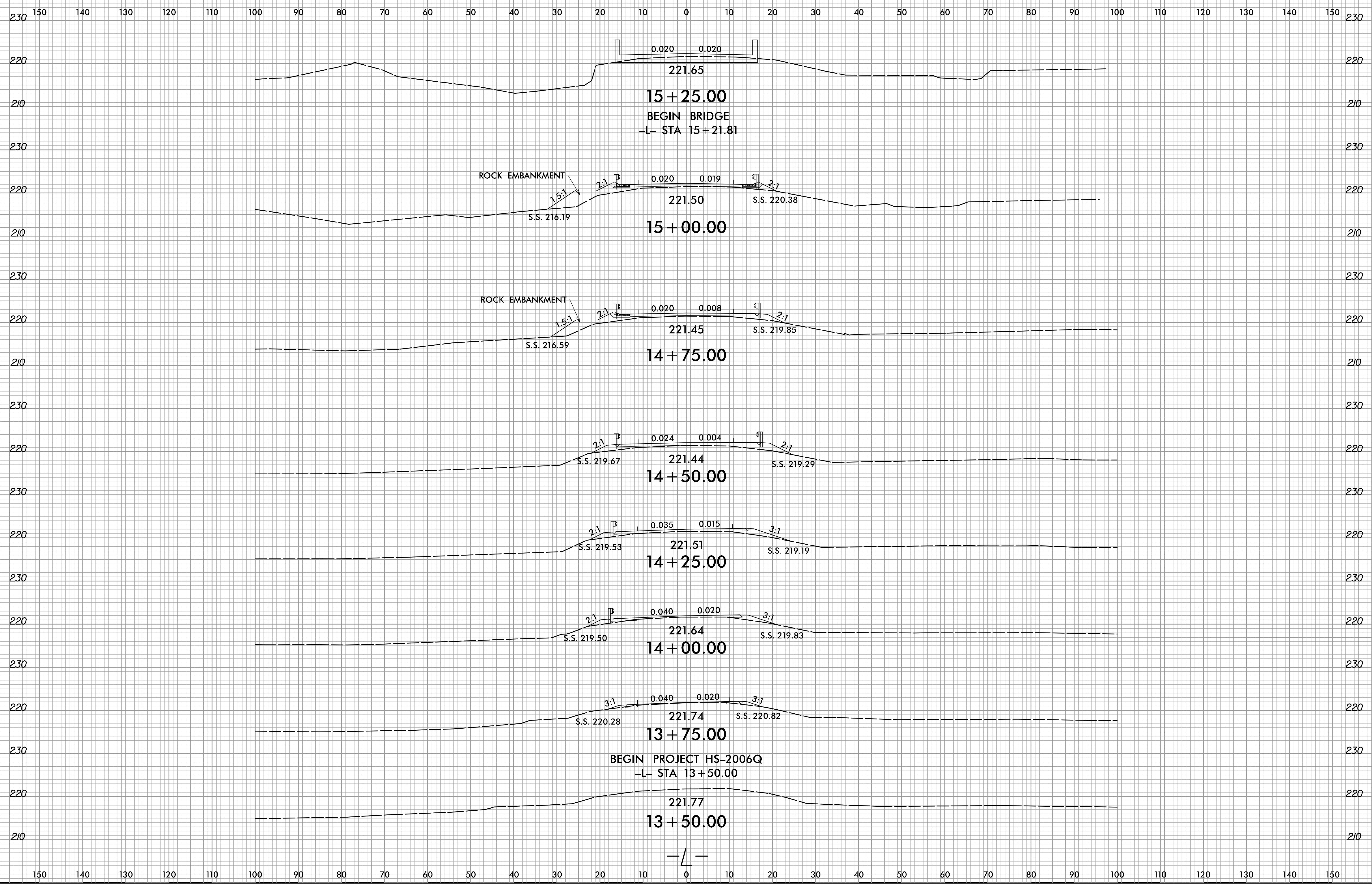


FOR -WL- PLAN, SEE SHEET UC-4  
 FOR -L- PROFILE, SEE SHEET 5

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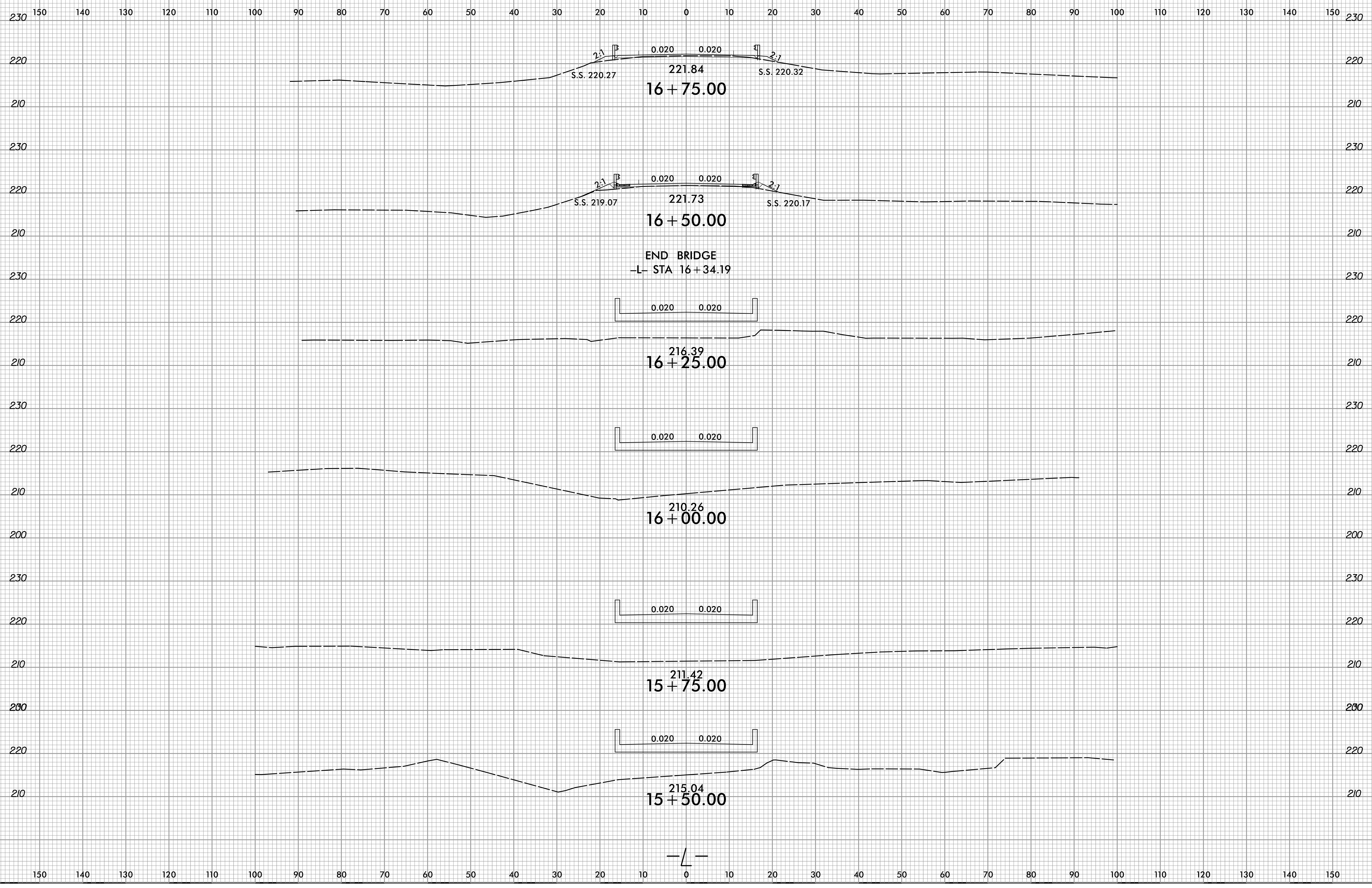






6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HS-2006Q	X-2

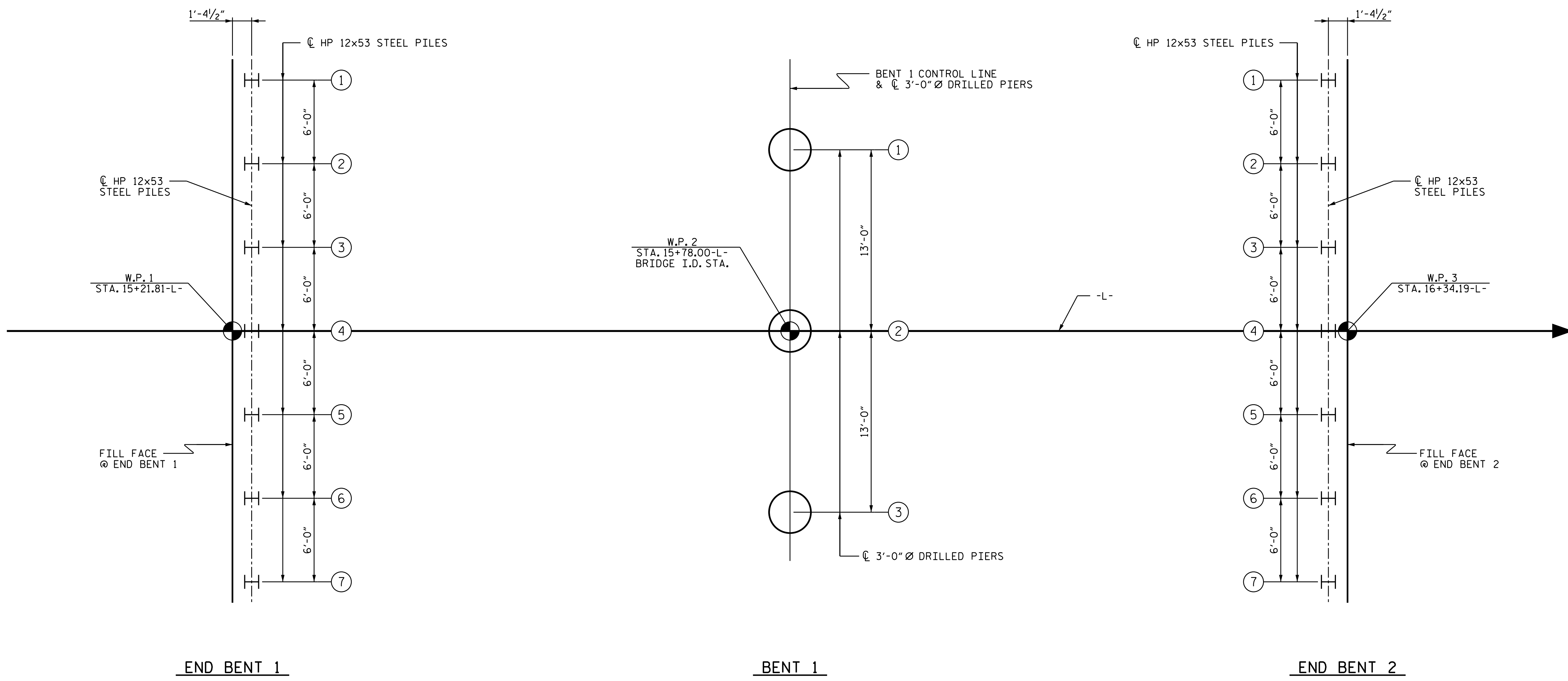


6/1/2023  
User:ismelvin









**FOUNDATION LAYOUT PLAN**

ALL PILES ARE HP 12x53 STEEL PILES.  
DIMENSIONS LOCATION PILES ARE SHOWN TO THE CENTERLINE OF PILES.

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 2 OF 5

		STATE OF NORTH CAROLINA		SHEET NO.	
		DEPARTMENT OF TRANSPORTATION RALEIGH		S-2	
GENERAL DRAWING FOR BRIDGE OVER BLACK RIVER ON SR 1532 BETWEEN SR 1547 AND SR 1546				TOTAL SHEETS	
				18	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY : JLA      DATE : 3/23  
 CHECKED BY : MGC      DATE : 3/23

TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275



**SUMMARY OF PILE INFORMATION/INSTALLATION**  
(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

End Bent/ Bent No. Pile(s) *-* (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling For Piles *			Drilled-in-Piles		
					Min. Pile Tip (Tip No Higher Than) Elev. FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Exc Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile LIN FT	Pile Exc In Soil per Pile LIN FT
End Bent 1, Piles 1-7	71	218.45	35			120	7						
End Bent 2, Piles 1-3	71	218.45	35			120							
End Bent 2, Piles 4-7	71	218.45	40			120							

\* Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

\*\*RDR =  $\frac{\text{Factored Resistance} + \text{Factored Downdrag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Downdrag Resistance} + \frac{\text{Nominal Scour Resistance}}{\text{Scour Resistance Factor}}$

**PILE DESIGN INFORMATION**

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

End Bent/ Bent No. Pile(s) *-* (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load * per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-7	71			0.60			1.00
End Bent 2, Piles 1-7	71			0.60			1.00

\* Factored Dead Load is factored weight of pile above the ground.

**SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION**

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

End Bent/ Bent No. Pier(s) *-* (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance Per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier LIN FT	Drilled Pier Length per Pier LIN FT	Drilled Pier Length Not In Soil per Pier LIN FT	Drilled Pier Length In Soil per Pier LIN FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length * per Pier LIN FT
Bent 1, Piers 1-3	360	154.0	5	200.0		63.08			Yes	195.0	22.04

\* Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

**NOTES:**

- The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Robert E. Kral, P.E. No. 042642) on 3/24/2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a required Driving Resistance.
- The Engineer will determine the need for PDA Testing, SPTs, CSL Testing and SID Inspections when these items may be required.
- For Drilled Piers, See Section 411 of the Standard Specifications.
- Install Permanent Steel Casing at Bent No. 1 by vibrating, screwing, or driving permanent casing before excavating or disturbing any material below elevation 203.0 ft.
- For Piles, See Piles Provision and Section 450 of the Standard Specifications.
- It has been estimated that a hammer with an equivalent rated energy in the range of 25,000 to 35,000 ft-Lbs per blow will be required to drive piles at End Bent No. 1 and End Bent No. 2. This estimated energy range does not release the contractor from providing driving equipment in accordance with Subarticle 450-3 (d)(2) of the Standard Specifications.

DRAWN BY : JLA      DATE : 3/23  
CHECKED BY : MGC      DATE : 3/23

**SUMMARY OF PDA / PILE ORDER LENGTHS**  
(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No.	PDA Testing Required? YES OR MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis * EST or PDA
End Bent 1, Piles 1-7	Maybe	40	1		
End Bent 2, Piles 1-3	Maybe	40			
End Bent 2, Piles 4-7	Maybe	45			

\* EST = Pile Order Lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

**SUMMARY OF DRILLED PIER TESTING**

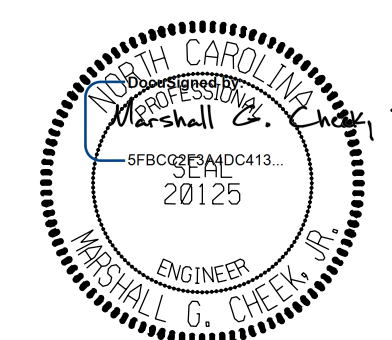
(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

End Bent/ Bent No. Pier(s) *-* (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required? * YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier LIN FT	Shaft Inspection Device (SID) Required? YES OR MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-3	Maybe	Maybe	258.33	Maybe	
<b>TOTAL QUANTITY:</b>	1	1	775.00	1	

\* CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

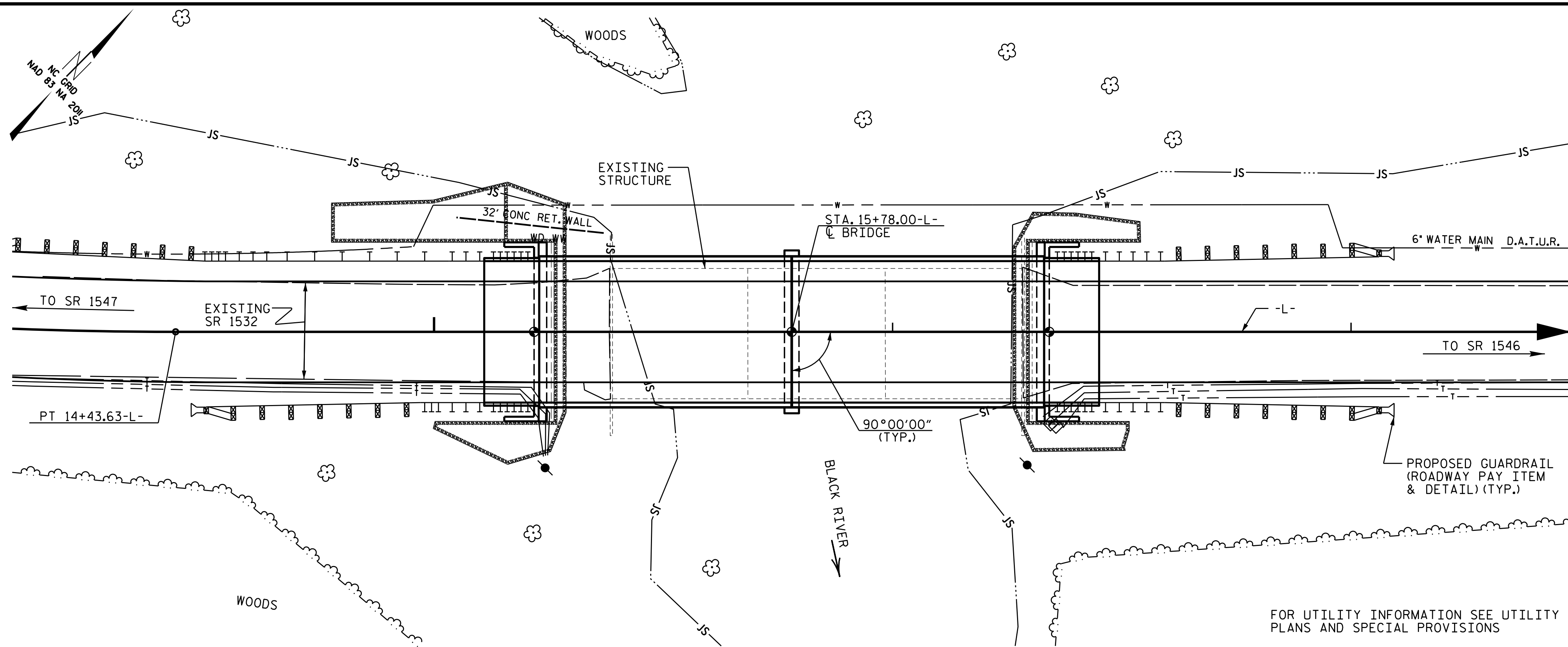
PROJECT NO. HS-2006Q  
HARNETT COUNTY  
STATION: 15+78.00 -L-

SHEET 3 OF 5

 7/25/2023	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH																					
	GENERAL DRAWING FOR BRIDGE OVER BLACK RIVER ON SR 1532 BETWEEN SR 1547 AND SR 1546																					
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	REVISIONS	SHEET NO.																				
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	<table border="1"> <thead> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> <th>BY</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table>	NO.	BY	DATE	NO.	BY	DATE	1			3			2			4			<table border="1"> <thead> <tr> <th>TOTAL SHEETS</th> </tr> </thead> <tbody> <tr> <td align="center">S-3 18</td> </tr> </tbody> </table>	TOTAL SHEETS	S-3 18
NO.	BY	DATE	NO.	BY	DATE																	
1			3																			
2			4																			
TOTAL SHEETS																						
S-3 18																						



BM#: RAILROAD SPIKE IN BASE OF 20" OAK TREE, STA. 11+25.5-L-, 24.5' RT, ELEV. 220.75'



LOCATION SKETCH

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:  
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60\text{ksi}$ .

FOR UTILITY INFORMATION SEE UTILITY PLANS AND SPECIAL PROVISIONS

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (3 @ 30'-0") WITH A CLEAR ROADWAY WIDTH OF 29'-5" WITH 1/2" ASPHALT OVERLAY ON PRESTRESSED CONCRETE CORED SLABS, AND A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE CAP ABUTMENTS & BENT WITH STEEL PILES AND LOCATED AT THE SAME SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE INTEGRITY OF THE BRIDGE DETERIORATE, A LOAD LIMIT MAY BE POSTED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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.

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

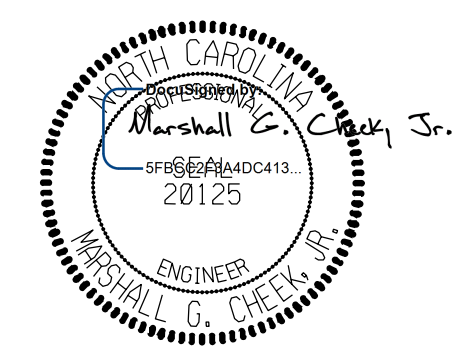
THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT & BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN-PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 5 SHALL BE EXCAVATED FOR A DISTANCE OF 25' EACH SIDE OF THE -L- AT END BENT 1 AND END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 4 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 BLACK RIVER  
 ON SR 1532 BETWEEN  
 SR 1547 AND SR 1546

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						SHEET NO.	
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275						S-4	
REVISIONS						TOTAL SHEETS	
NO.	BY:	DATE:	NO.	BY:	DATE:	18	
1			3				
2			4				

DRAWN BY : JLA      DATE : 2/23  
 CHECKED BY : MGC      DATE : 2/23

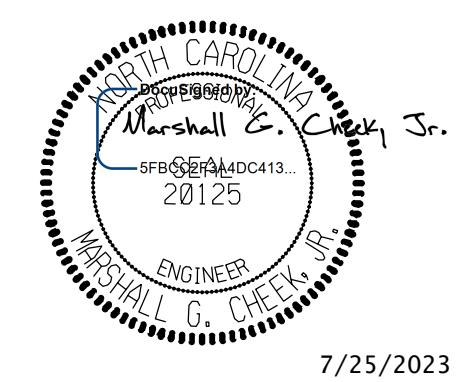
**TOTAL BILL OF MATERIAL**

ITEM	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-0" DIA. DRILLED PIERS	PERMANENT STEEL CASING FOR 3'-0" DIA. DRILLED PIERS	PDA TESTING	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EA.	EA.	EA.	EA.	LUMP SUM	CU. YDS.	LUMP SUM
SUPERSTRUCTURE											LUMP SUM
END BENT 1									LUMP SUM	14.2	
BENT 1			189.25	66.12						14.5	
END BENT 2									LUMP SUM	14.2	
TOTALS	LUMP SUM	LUMP SUM	189.25	66.12	1	1	1	1	LUMP SUM	42.9	LUMP SUM

ITEM	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 x 53 STEEL PILES	PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS		
	LBS.	LBS.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE							220.25				22	1,210.00
END BENT 1	2,115		7	7	245			100	110			
BENT 1	15,289	3,207										
END BENT 2	2,115		7	7	265			120	135			
TOTALS	19,519	3,207	14	14	510	7	220.25	220	245	LUMP SUM	22	1,210.00

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 5 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
**FOR BRIDGE OVER**  
**BLACK RIVER**  
**ON SR 1532 BETWEEN**  
**SR 1547 AND SR 1546**

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TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275											
REVISIONS											
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.					
1			3			S-5					
2			4			TOTAL SHEETS 18					

DRAWN BY : JLA      DATE : 3/23  
 CHECKED BY : MGC      DATE : 4/23



## LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	<b>1</b>	1.055	--	1.75	0.275	1.23	55'	EL	27	0.523	1.23	55'	EL	5.4	0.80	0.275	<b>1.05</b>	55'	EL	<b>27</b>		
	HL-93(OPr)	N/A	--	1.591	--	1.35	0.275	1.59	55'	EL	27	0.523	1.59	55'	EL	5.4	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	<b>2</b>	1.322	47.585	1.75	0.275	1.54	55'	EL	27	0.523	1.47	55'	EL	5.4	0.80	0.275	<b>1.32</b>	55'	EL	<b>27</b>		
	HS-20(OPr)	36.000	--	1.9	68.396	1.35	0.275	1.99	55'	EL	27	0.523	1.9	55'	EL	5.4	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13,500	--	2.776	37.476	1.4	0.275	4.04	55'	EL	27	0.523	4.17	55'	EL	5.4	0.80	0.275	2.78	55'	EL	27	
		SNGARBS2	20,000	--	2.155	43.095	1.4	0.275	3.14	55'	EL	27	0.523	3.02	55'	EL	5.4	0.80	0.275	2.15	55'	EL	27	
		SNAGRIS2	22,000	--	2.079	45.734	1.4	0.275	3.03	55'	EL	27	0.523	2.83	55'	EL	5.4	0.80	0.275	2.08	55'	EL	27	
		SNCOTTS3	27,250	--	1.384	37.708	1.4	0.275	2.01	55'	EL	27	0.523	2.09	55'	EL	5.4	0.80	0.275	1.38	55'	EL	27	
		SNAGGRS4	34,925	--	1.189	41.527	1.4	0.275	1.73	55'	EL	27	0.523	1.77	55'	EL	5.4	0.80	0.275	1.19	55'	EL	27	
		SNS5A	35,550	--	1.16	41.255	1.4	0.275	1.69	55'	EL	27	0.523	1.82	55'	EL	5.4	0.80	0.275	1.16	55'	EL	27	
		SNS6A	39,950	--	1.079	43.102	1.4	0.275	1.57	55'	EL	27	0.523	1.68	55'	EL	5.4	0.80	0.275	1.08	55'	EL	27	
	SNS7B	42,000	--	1.028	43.175	1.4	0.275	1.5	55'	EL	27	0.523	1.67	55'	EL	5.4	0.80	0.275	1.03	55'	EL	27		
	TTST	TNAGRIT3	33,000	--	1.32	43.556	1.4	0.275	1.92	55'	EL	27	0.523	1.98	55'	EL	5.4	0.80	0.275	1.32	55'	EL	27	
		TNT4A	33,075	--	1.33	43.979	1.4	0.275	1.94	55'	EL	27	0.523	1.91	55'	EL	5.4	0.80	0.275	1.33	55'	EL	27	
		TNT6A	41,600	--	1.101	45.811	1.4	0.275	1.6	55'	EL	27	0.523	1.83	55'	EL	5.4	0.80	0.275	1.10	55'	EL	27	
		TNT7A	42,000	--	1.114	46.804	1.4	0.275	1.62	55'	EL	27	0.523	1.71	55'	EL	5.4	0.80	0.275	1.11	55'	EL	27	
		TNT7B	42,000	--	1.163	48.848	1.4	0.275	1.69	55'	EL	27	0.523	1.62	55'	EL	5.4	0.80	0.275	1.16	55'	EL	27	
		TNAGRIT4	43,000	--	1.101	47.33	1.4	0.275	1.6	55'	EL	27	0.523	1.56	55'	EL	5.4	0.80	0.275	1.10	55'	EL	27	
TNAGT5A		45,000	--	1.031	46.405	1.4	0.275	1.5	55'	EL	27	0.523	1.58	55'	EL	5.4	0.80	0.275	1.03	55'	EL	27		
TNAGT5B	45,000	<b>3</b>	1.013	45.582	1.4	0.275	1.47	55'	EL	27	0.523	1.48	55'	EL	5.4	0.80	0.275	<b>1.01</b>	55'	EL	<b>27</b>			

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

**NOTES:**

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

**COMMENTS:**

- 1.
- 2.
- 3.
- 4.

**# CONTROLLING LOAD RATING**

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

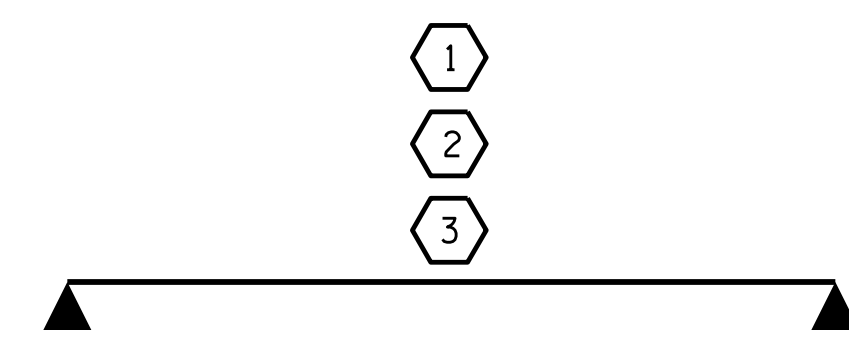
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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**GIRDER LOCATION**

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



**LRFR SUMMARY**  
FOR SPANS 'A & B'

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

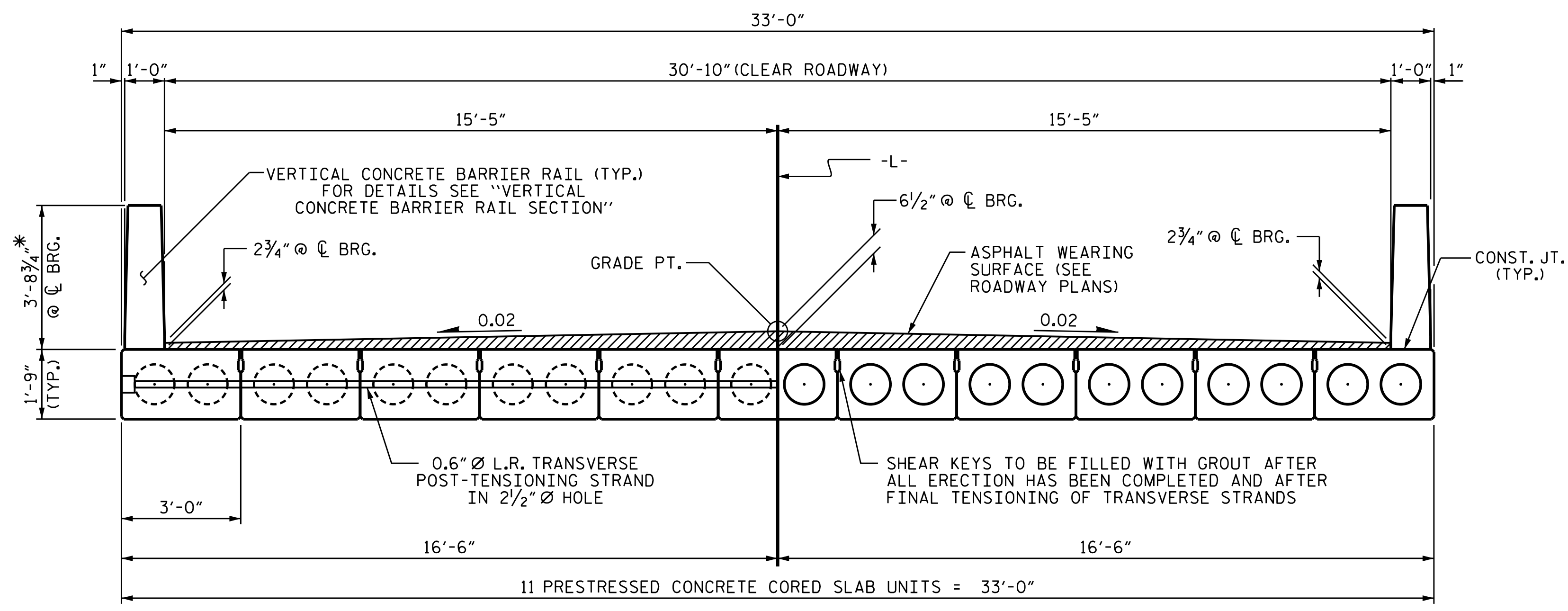
ASSEMBLED BY : JLA	DATE : 3/23
CHECKED BY : MGC	DATE : 3/23
DRAWN BY : CVC 6/10	
CHECKED BY : DNS 6/10	

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 55' CORED SLAB UNIT  
 90° SKEW  
 (NON-INTERSTATE TRAFFIC)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

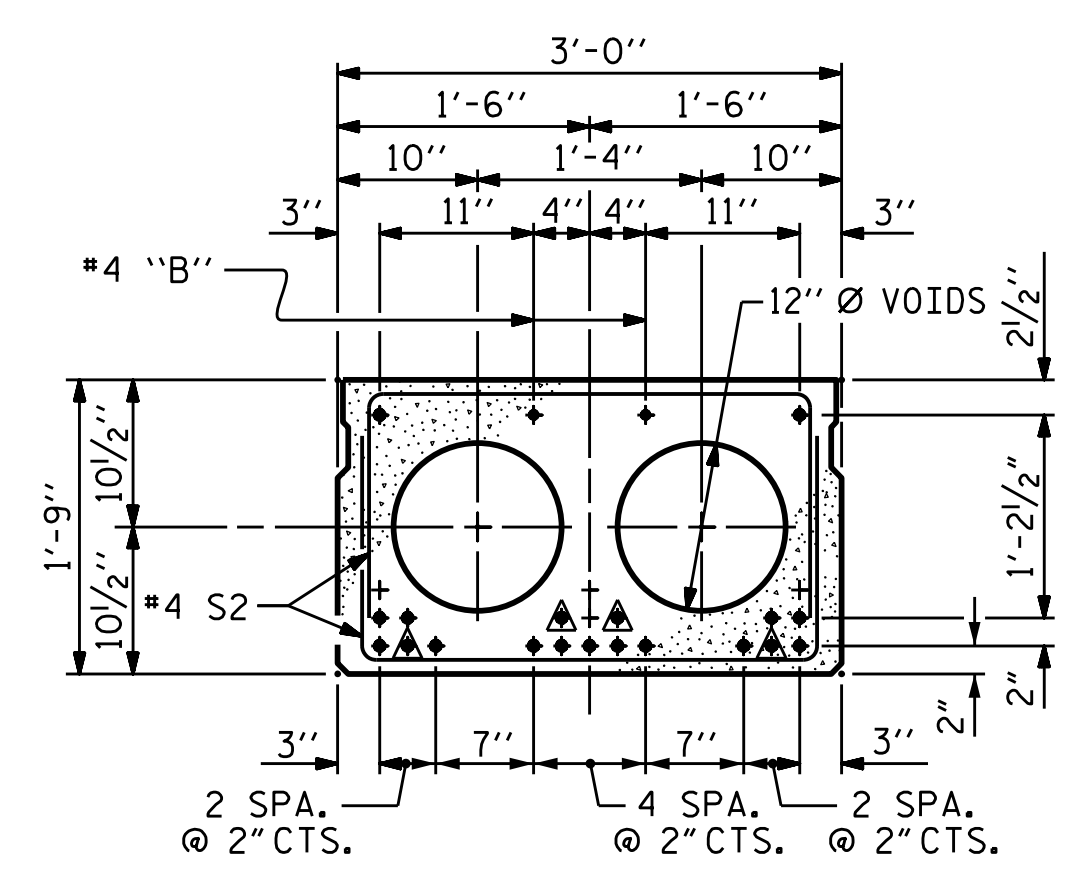
SHEET NO. S-6	TOTAL SHEETS 18
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HALF SECTION AT INTERMEDIATE DIAPHRAGMS      HALF SECTION THROUGH VOIDS

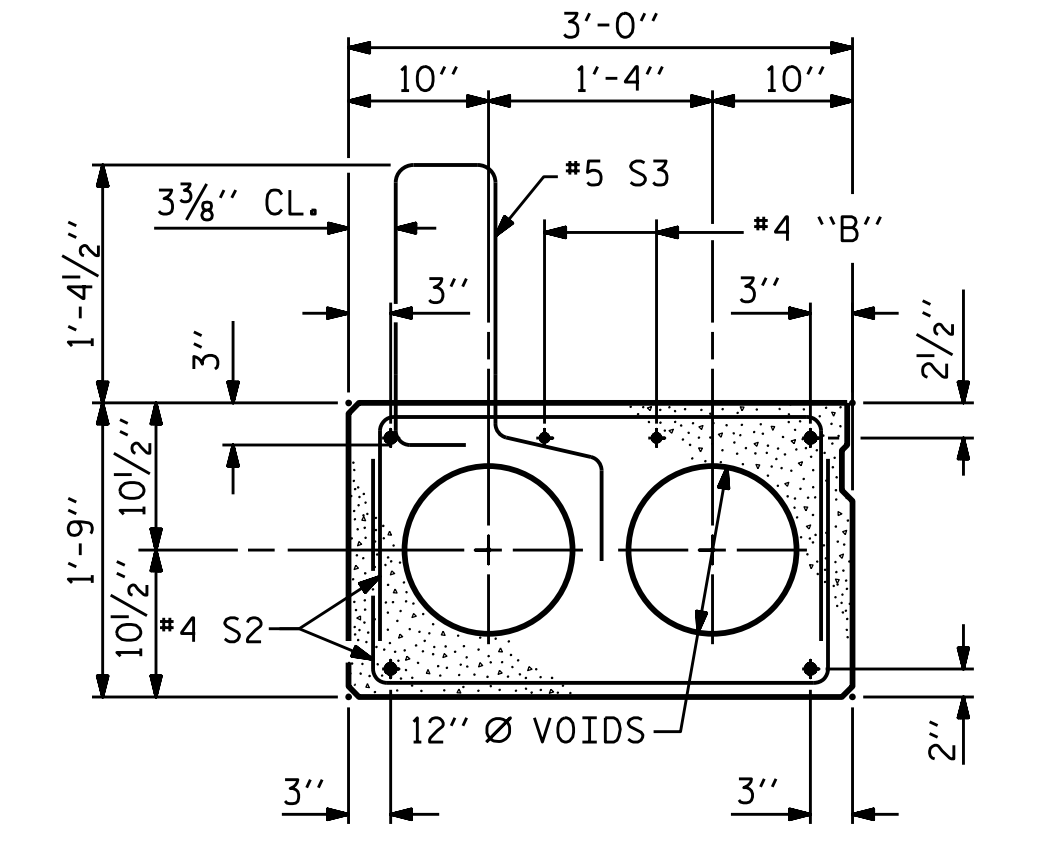
**TYPICAL SECTION**

\* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



**INTERIOR SLAB SECTION (55' UNIT)**  
(19 STRANDS REQUIRED)

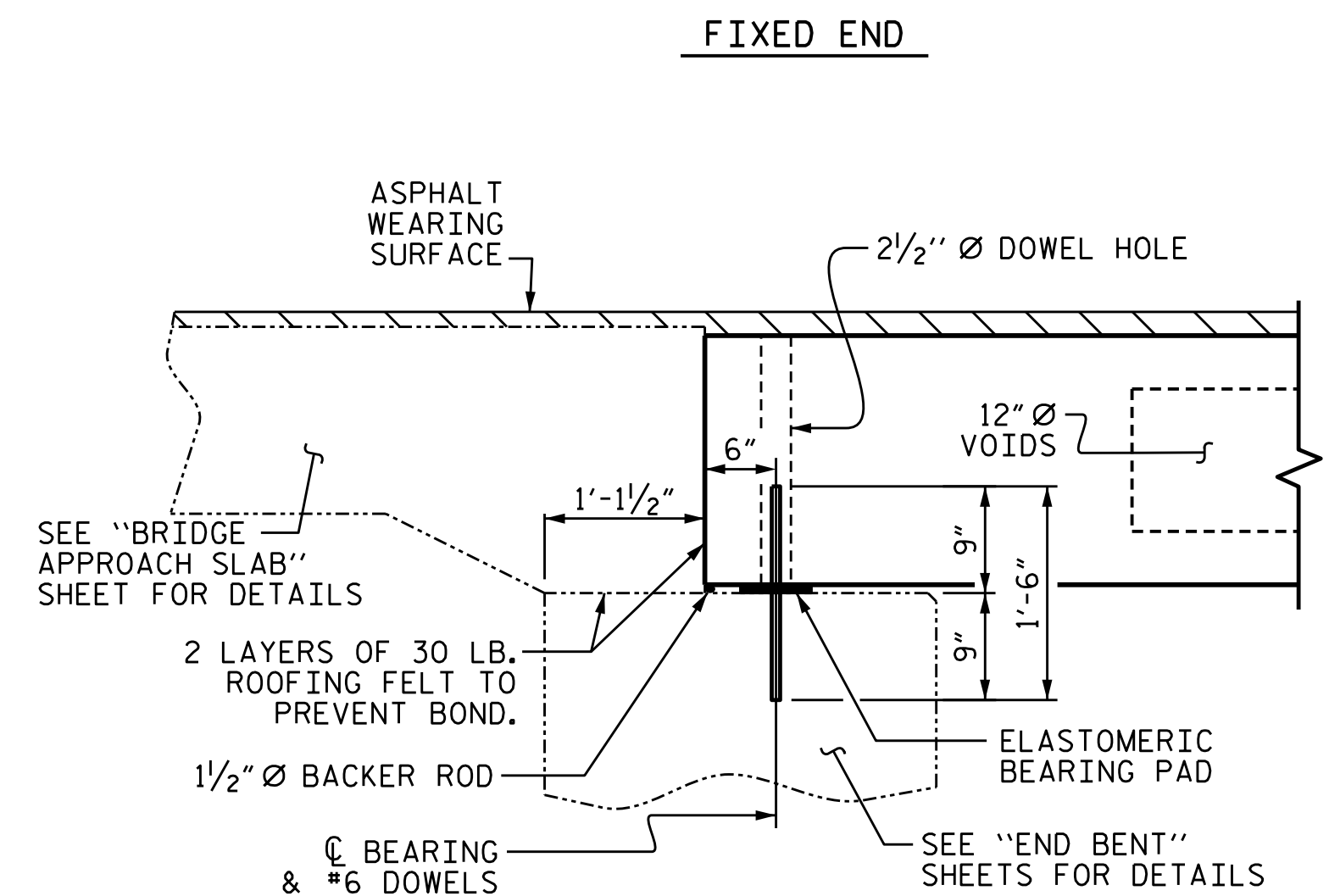
**0.6" Ø LOW RELAXATION STRAND LAYOUT**



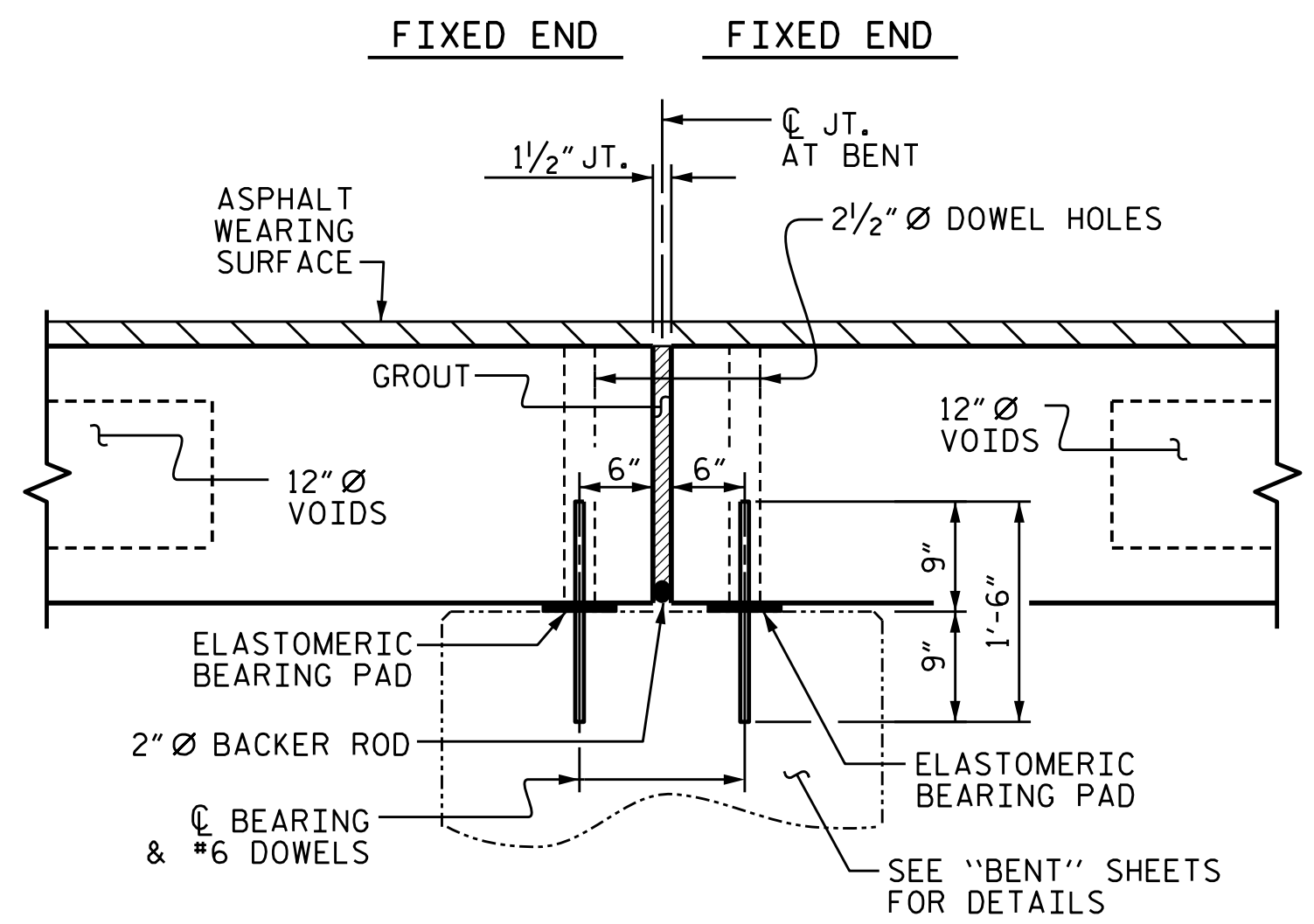
**EXT. SLAB SECTION**  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

**DEBONDING LEGEND**

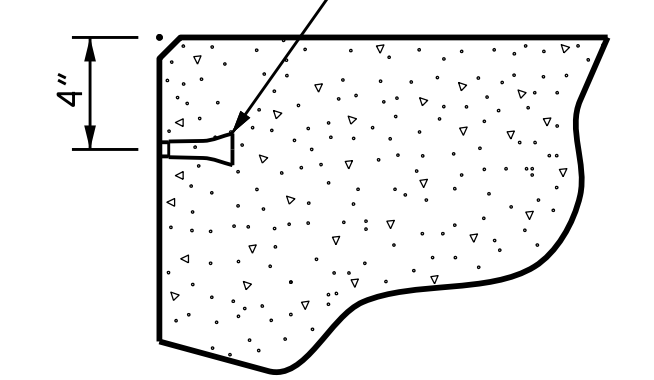


**SECTION AT END BENT**

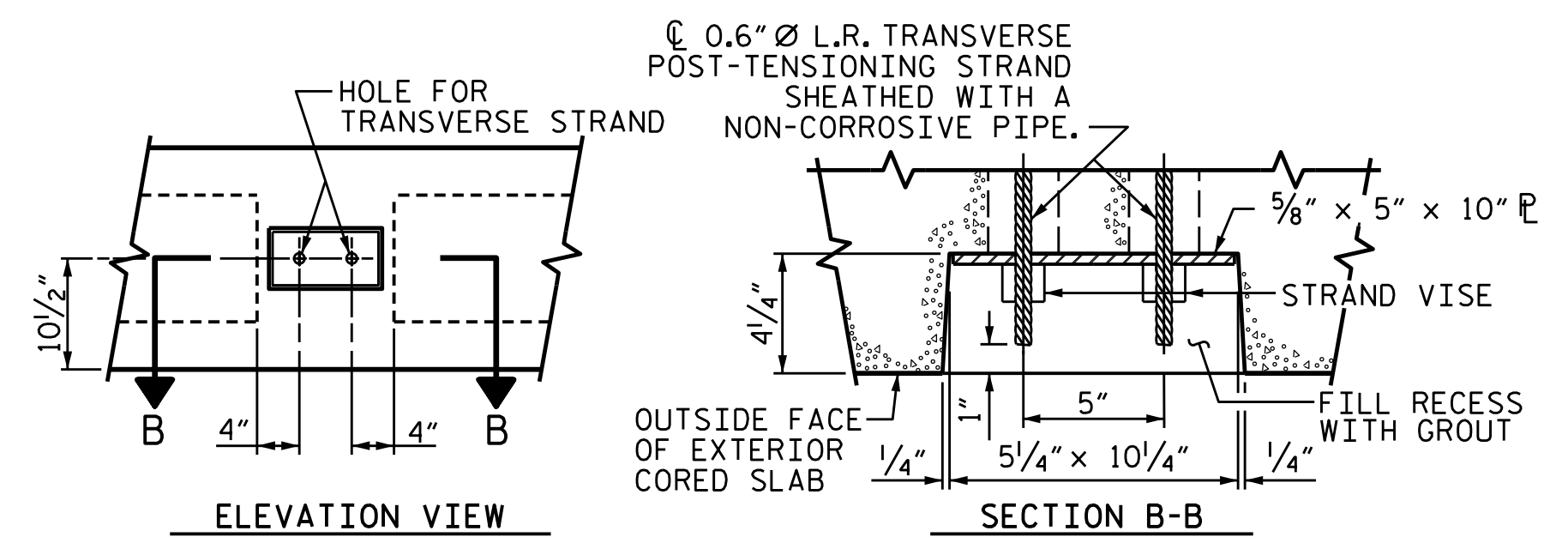


**SECTION AT BENT**

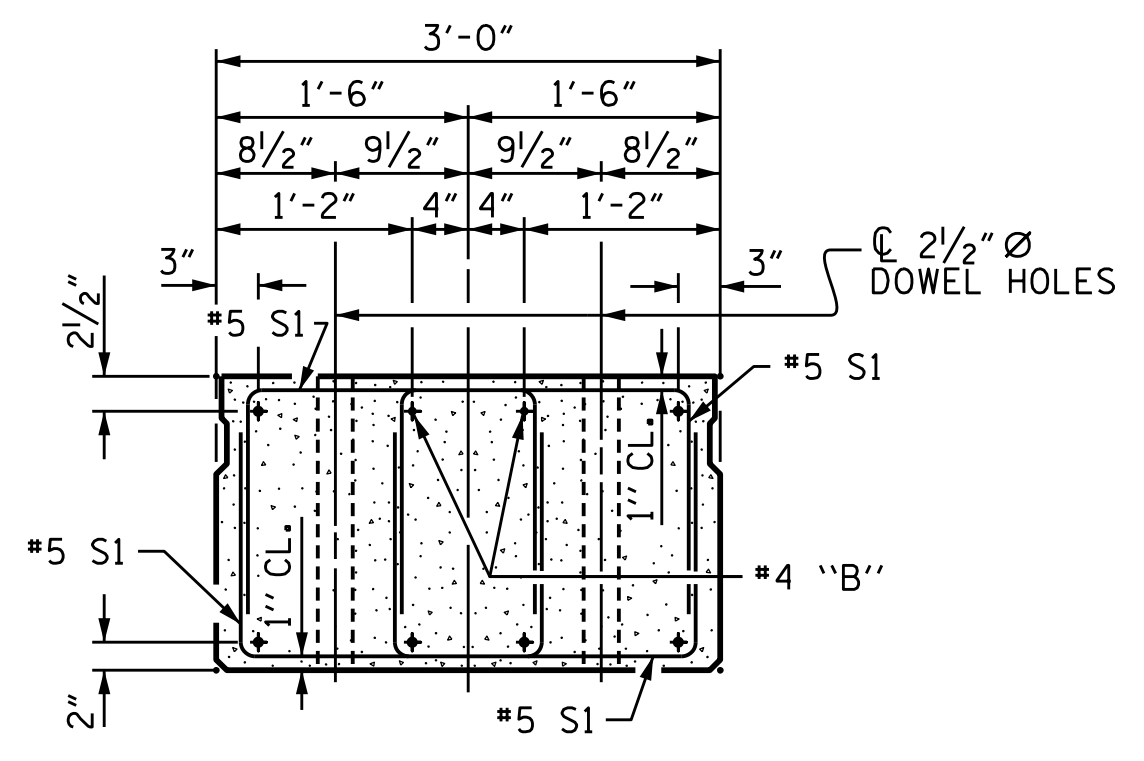
PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



**THREADED INSERT DETAIL**

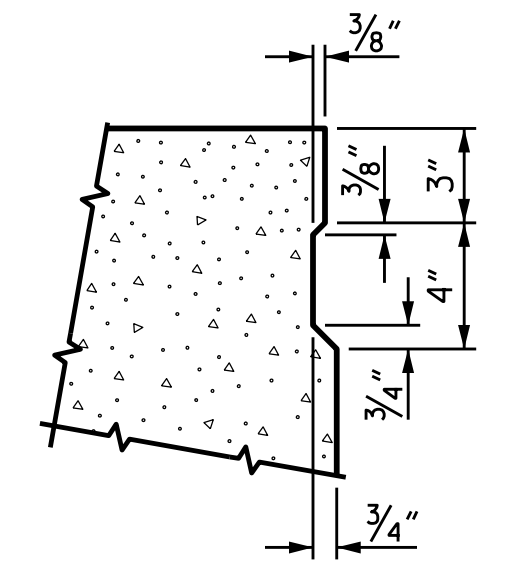


**GRAUDED RECESS AT END OF POST-TENSIONED STRAND-CORED SLABS**



**END ELEVATION**

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN). INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	5/09	REV. 9/14
CHECKED BY :	BCH	6/09	MAA/TMG

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 90° SKEW

7/25/2023

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

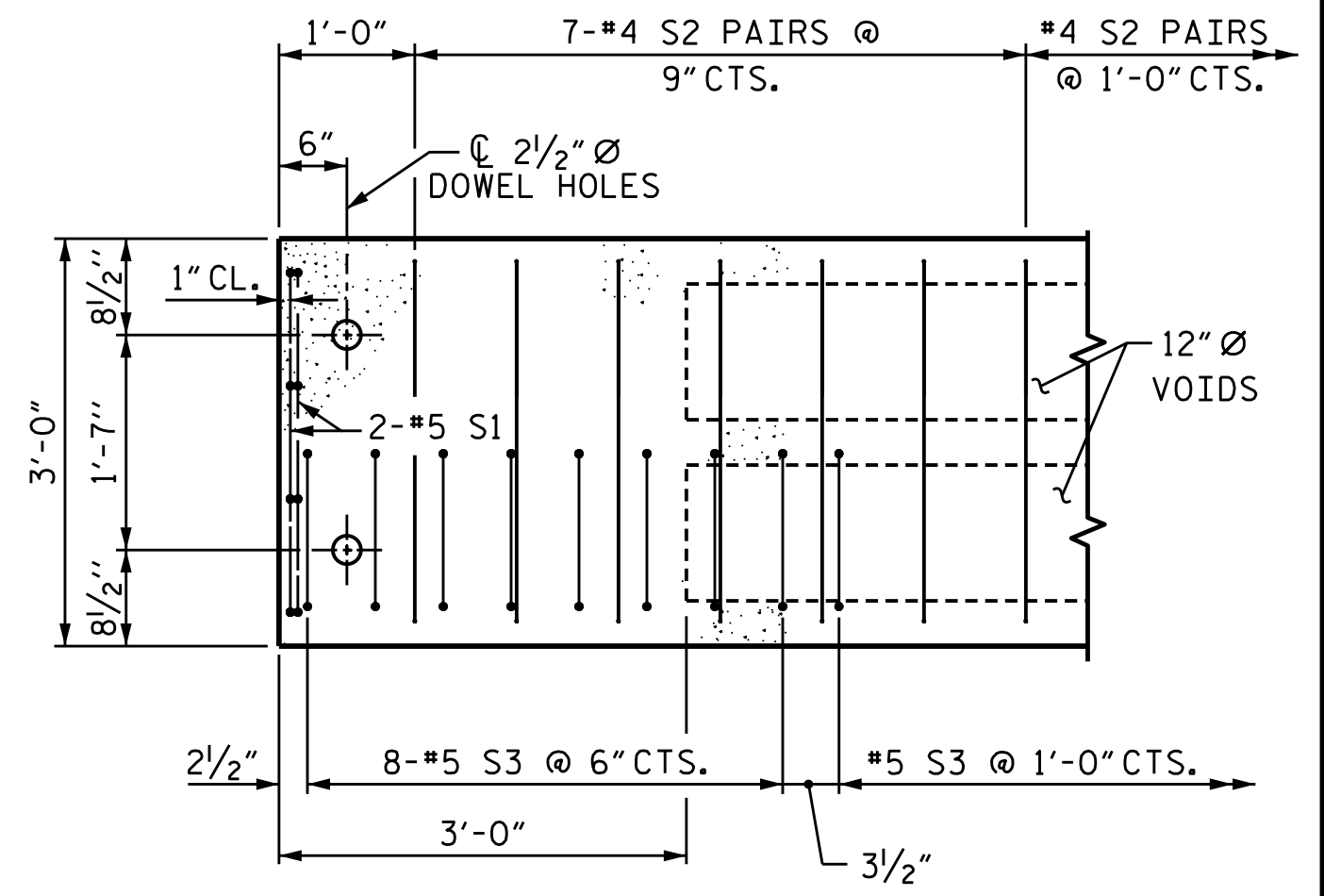
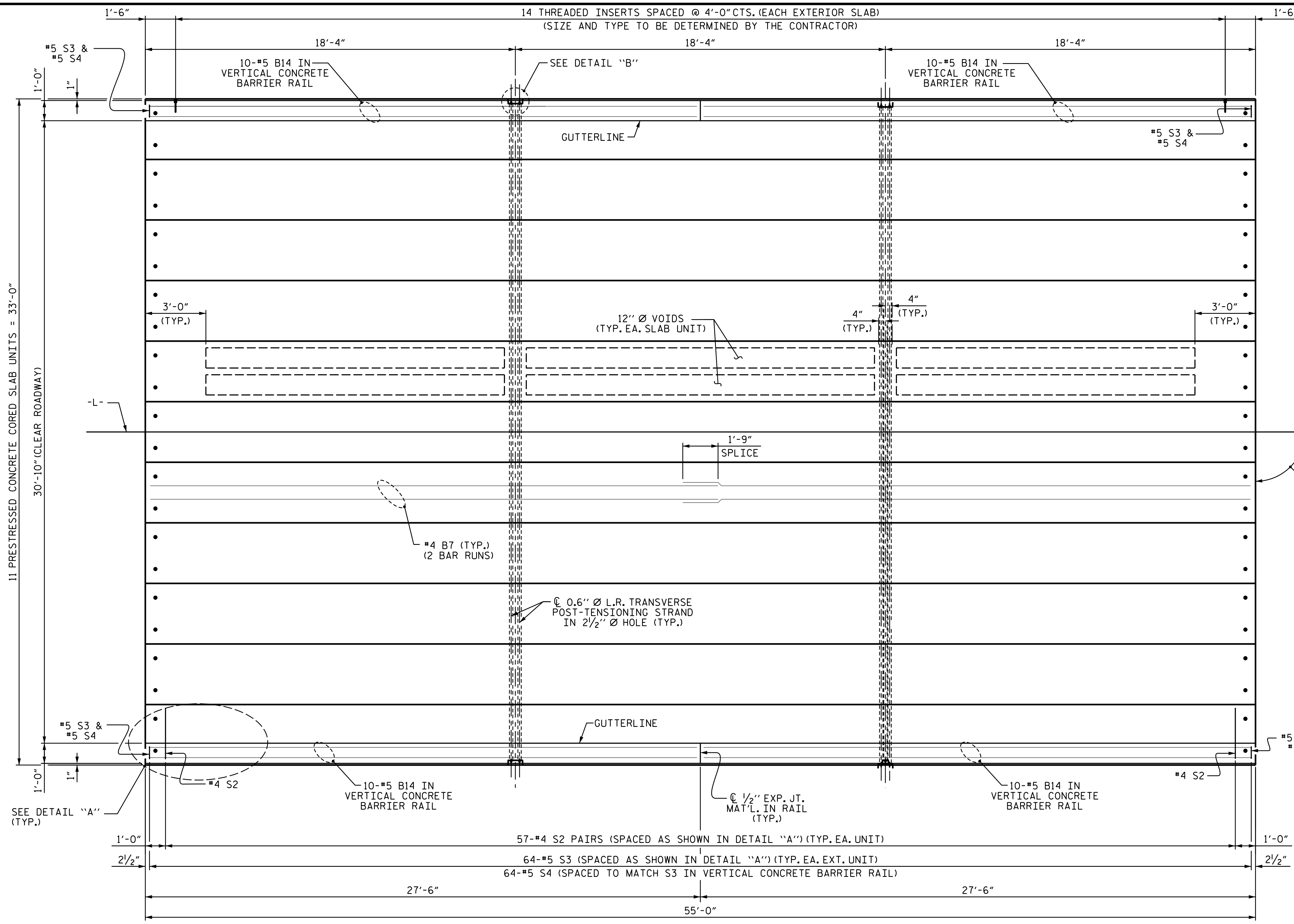
TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

PROJECT NO. HS-2006Q  
 HARNETT COUNTY  
 STATION: 15+78.00 -L-

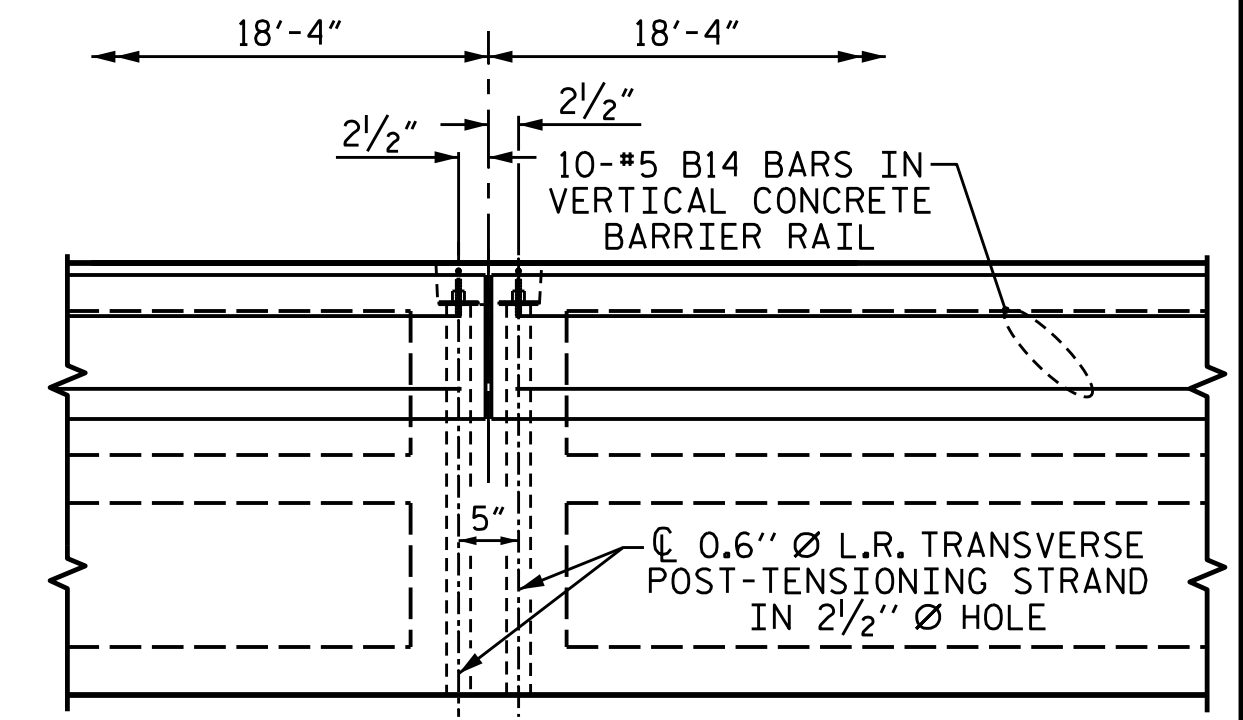
SHEET 1 OF 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-7
1			3			TOTAL SHEETS
2			4			18





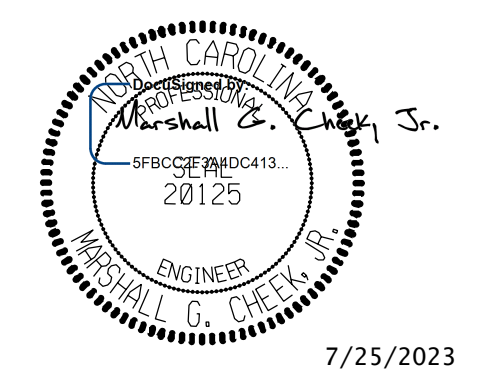
**DETAIL "A"**  
 (TYPICAL EACH END OF UNIT)  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



**DETAIL "B"**  
 #4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

**PLAN OF UNIT**

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 PLAN OF 55' UNIT  
 30'-10" CLEAR ROADWAY  
 90° SKEW

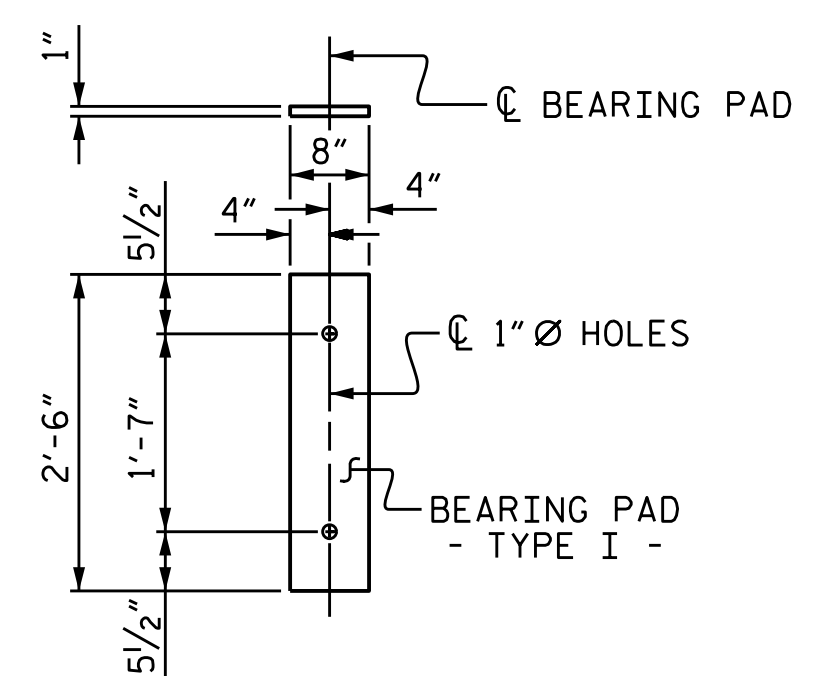
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CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	REV. 12/5/11	MAA/AAC
CHECKED BY :	BCH	REV. 8/14	MAA/TMG

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 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			18





**FIXED END**  
(TYPE I - 44 REQ'D)

**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

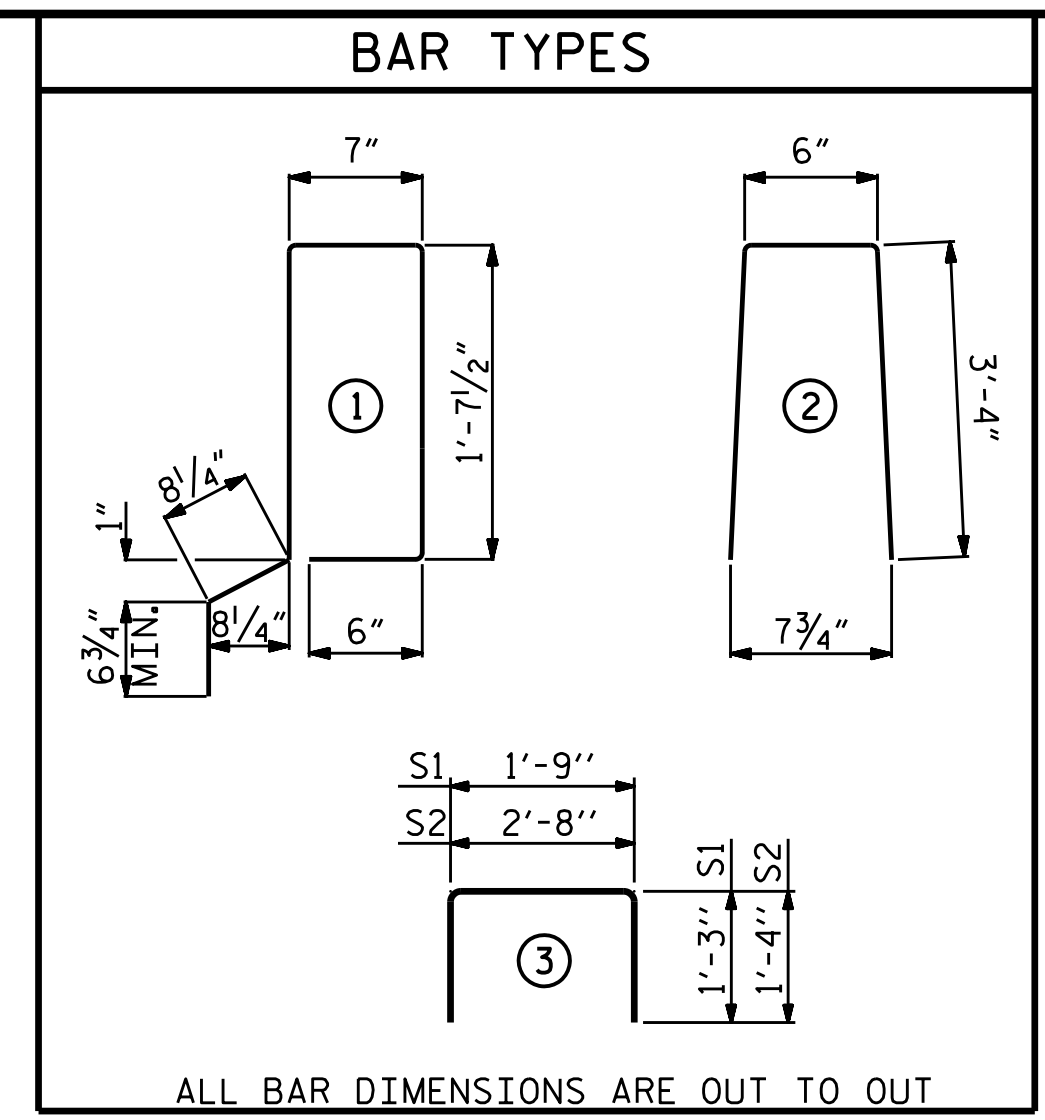
CORED SLABS REQUIRED			
55' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	4	55'-0"	220'-00"
INTERIOR C.S.	18	55'-0"	990'-0"
<b>TOTAL</b>	<b>22</b>	<b>55'-0"</b>	<b>1,210'-0"</b>

DEAD LOAD DEFLECTION AND CAMBER	
55' CORED SLAB UNIT	3'-0" x 1'-9"
CAMBER (SLAB ALONE IN PLACE)	1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8" ↓
FINAL CAMBER	1/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	114	#4	3	5'-4"	406	5'-4"	406
* S3	64	#5	1	5'-7"	373		
REINFORCING STEEL				LBS.	516		516
* EPOXY COATED REINFORCING STEEL				LBS.	373		
6500 P.S.I. CONCRETE				CU. YDS.	7.9		7.9
0.6" Ø L.R. STRANDS				No.	19		19

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
55' UNIT						
* B14	40	80	#5	STR	27'-1"	2260
* S4	128	256	#5	2	7'-2"	1914
* EPOXY COATED REINFORCING STEEL					LBS.	4174
CLASS AA CONCRETE					CU. YDS.	27.8
TOTAL VERTICAL CONCRETE BARRIER RAIL					LN. FT.	220.25



**BAR TYPES**

**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 CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

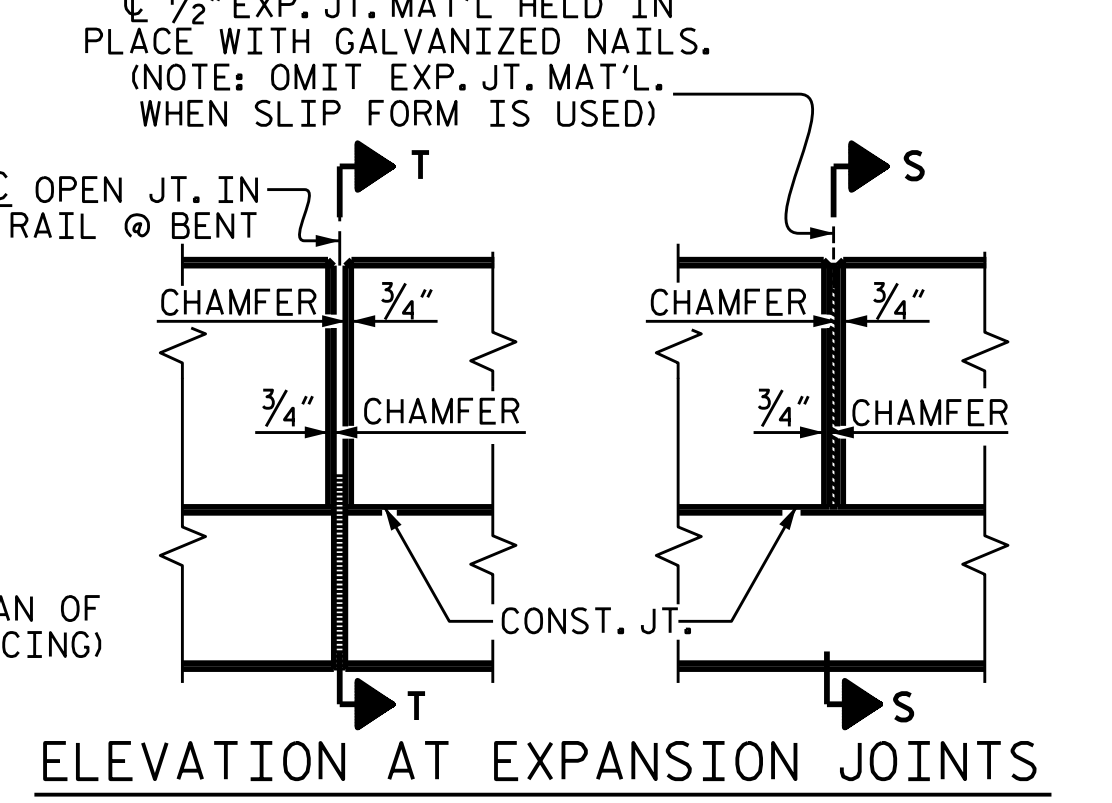
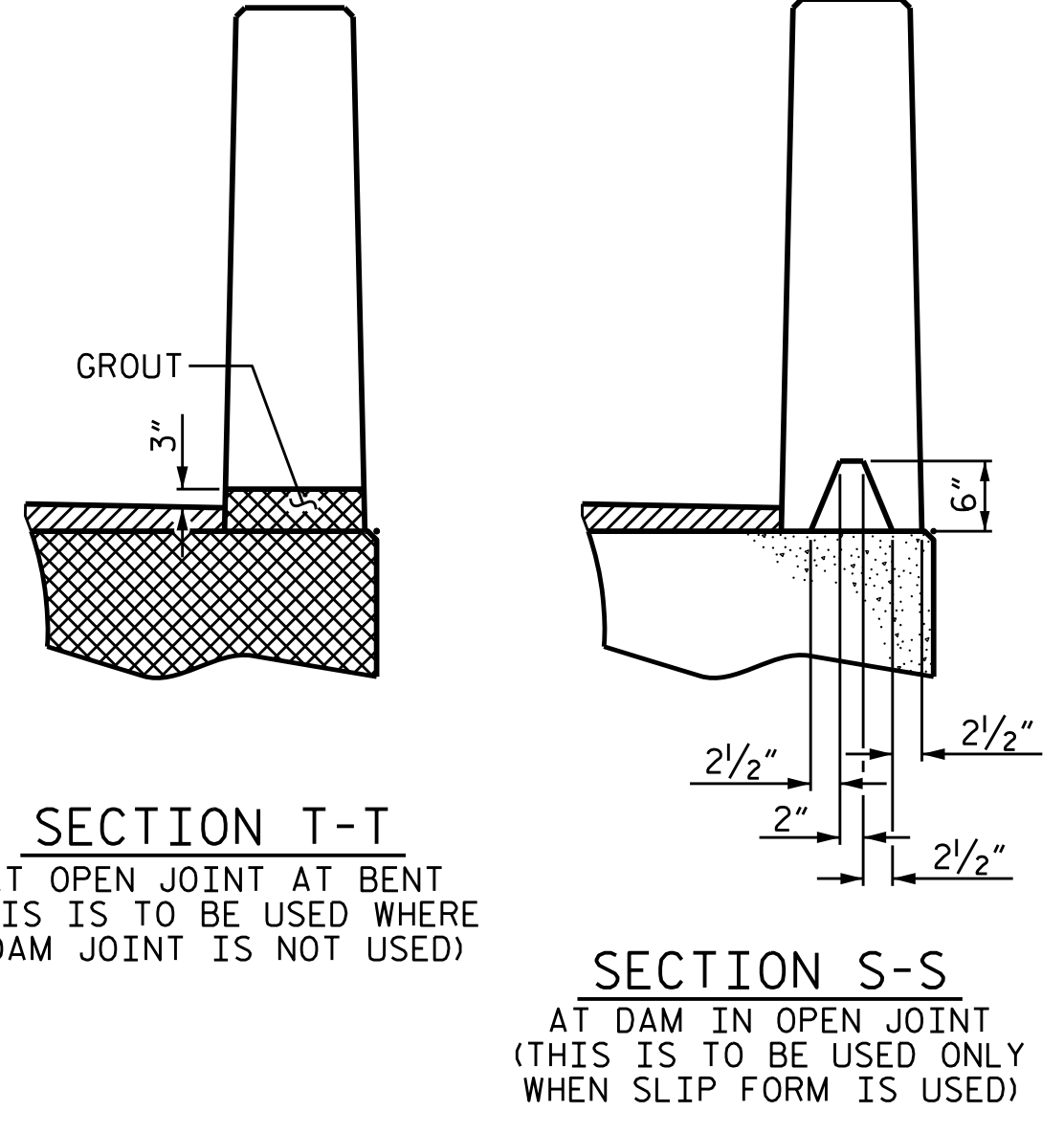
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

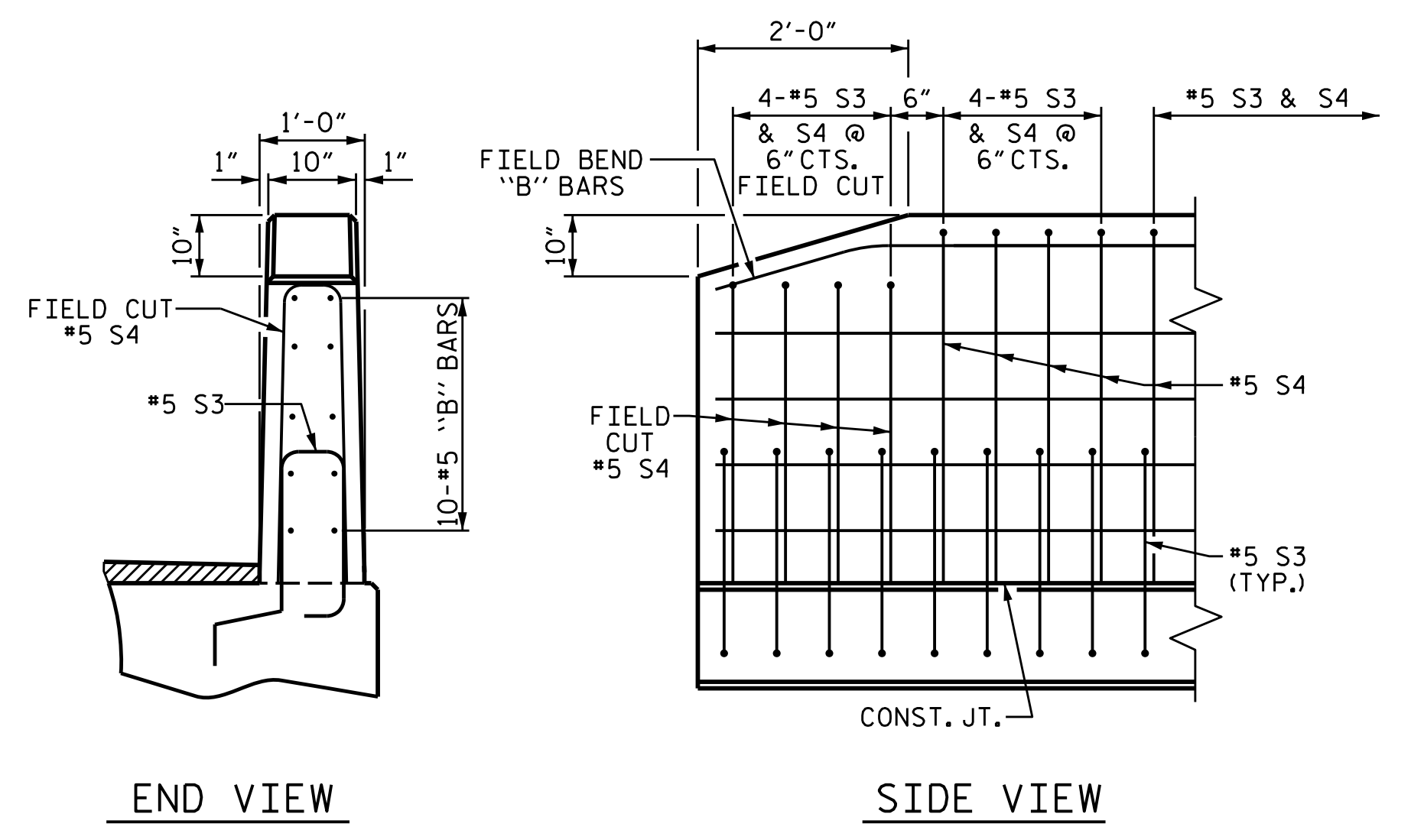
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
55' UNITS	1 1/8"	3'-7 5/8"

CONCRETE RELEASE STRENGTH	
UNIT	PSI
55' UNITS	4900

GRADE 270 STRANDS	
AREA ( SQUARE INCHES )	0.6" Ø L.R.
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950



**ELEVATION AT EXPANSION JOINTS**



**END VIEW**      **SIDE VIEW**

**END OF RAIL DETAILS**

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 90° SKEW

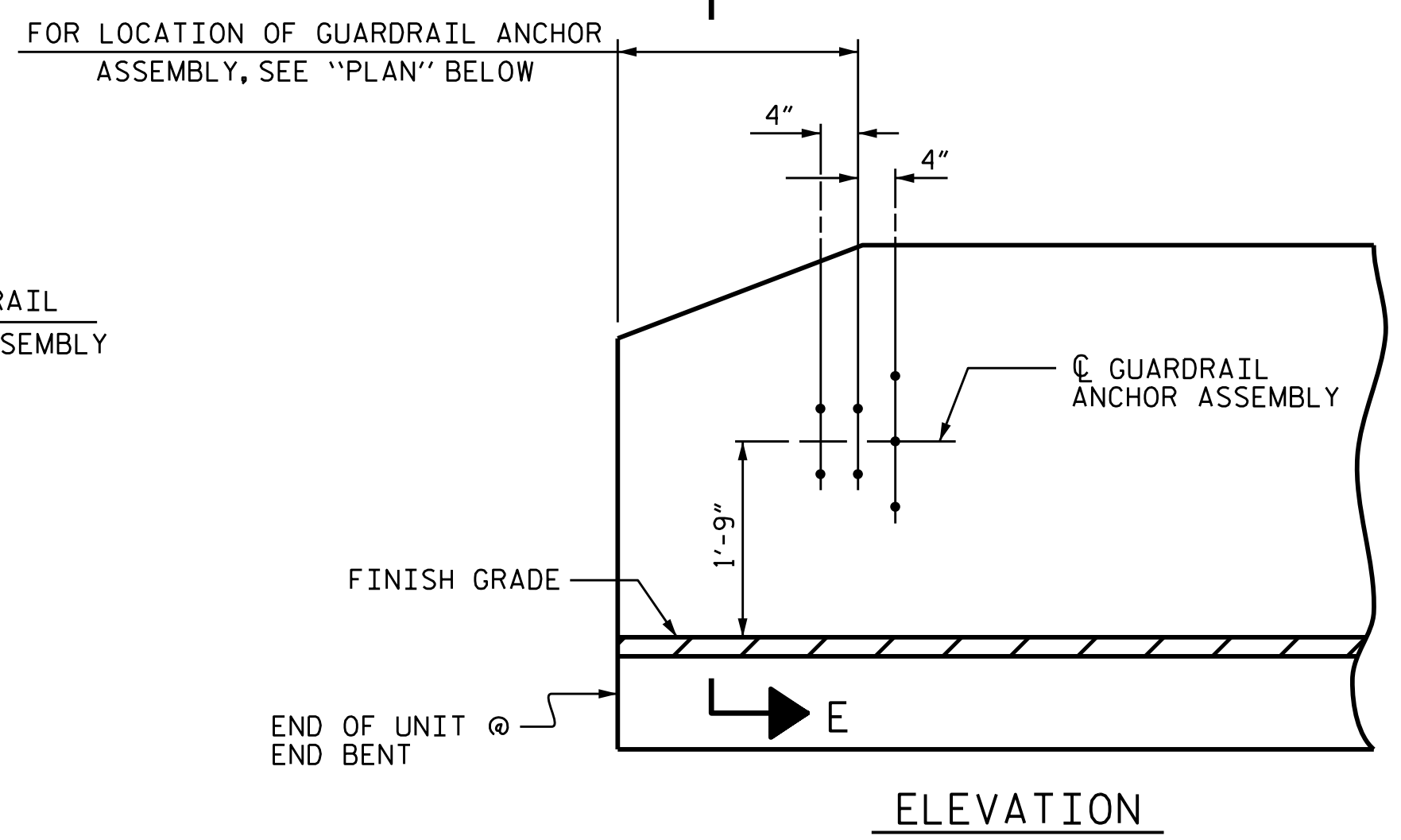
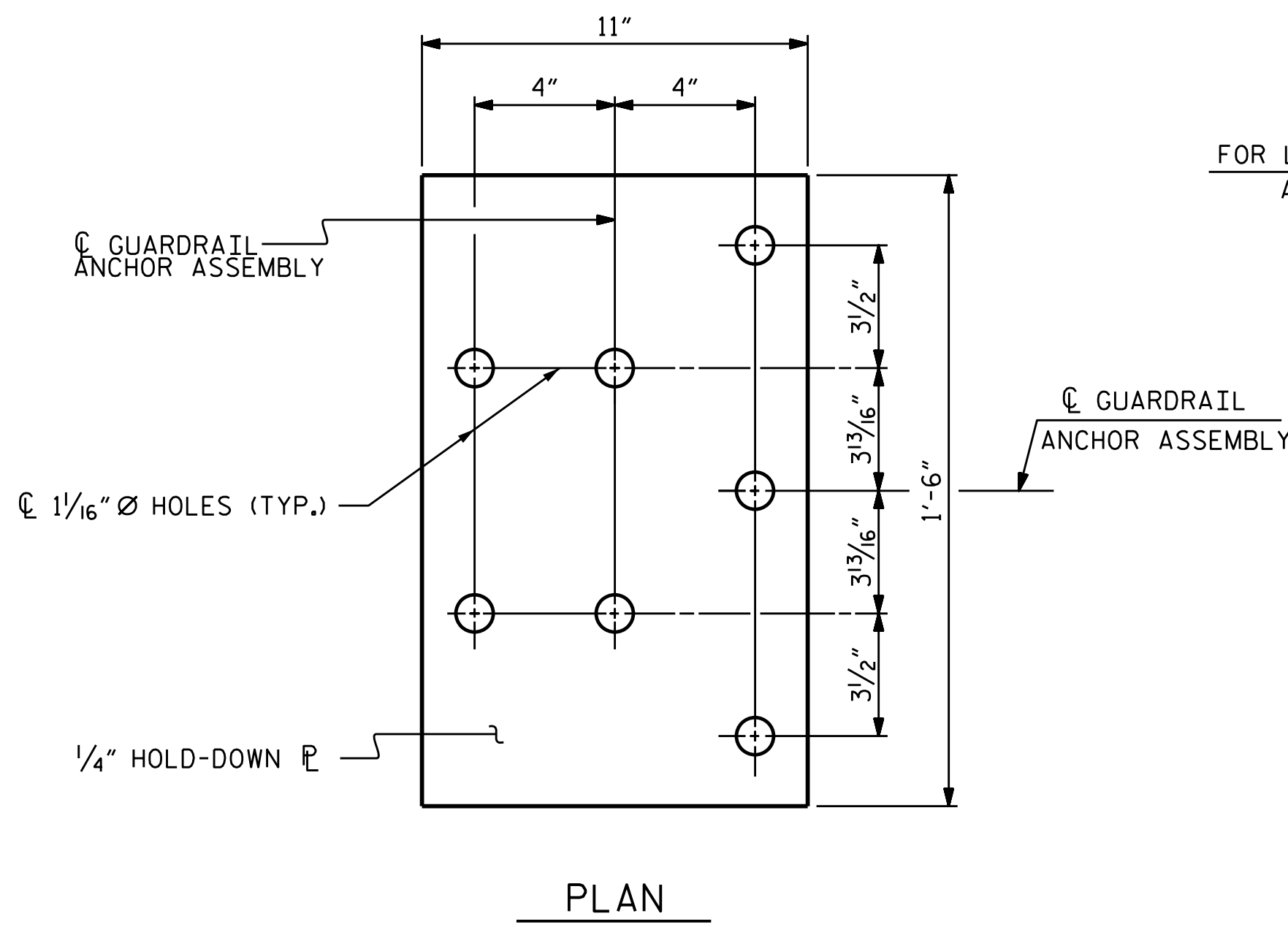
7/25/2023

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TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-9
1			3			TOTAL SHEETS 18
2			4			

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	5/09	REV. 5/18
CHECKED BY :	BCH	6/09	MAA/THC



PLAN

ELEVATION

**NOTES**

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 1/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36, 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 M291. 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 1/8" 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.)

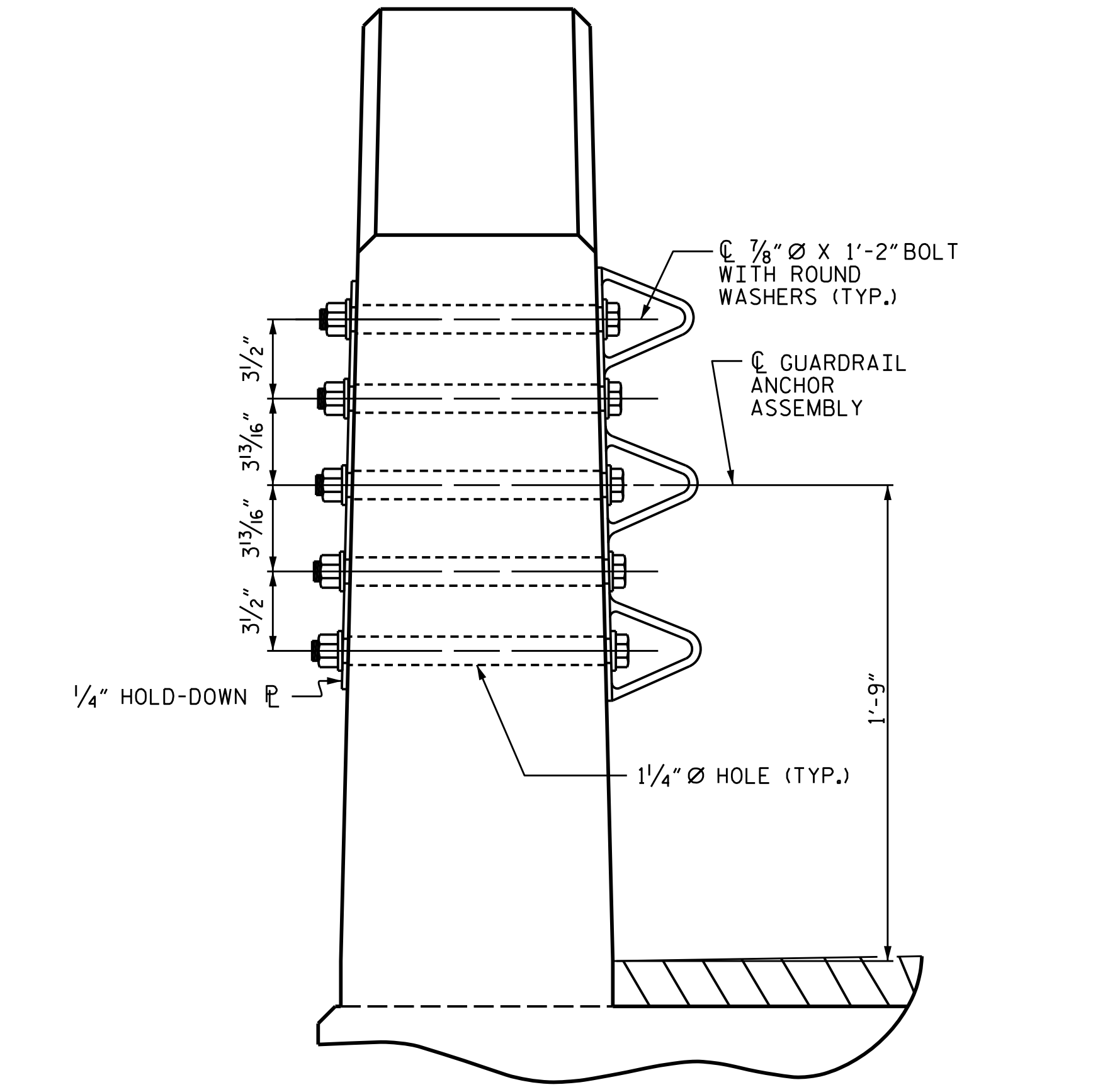
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

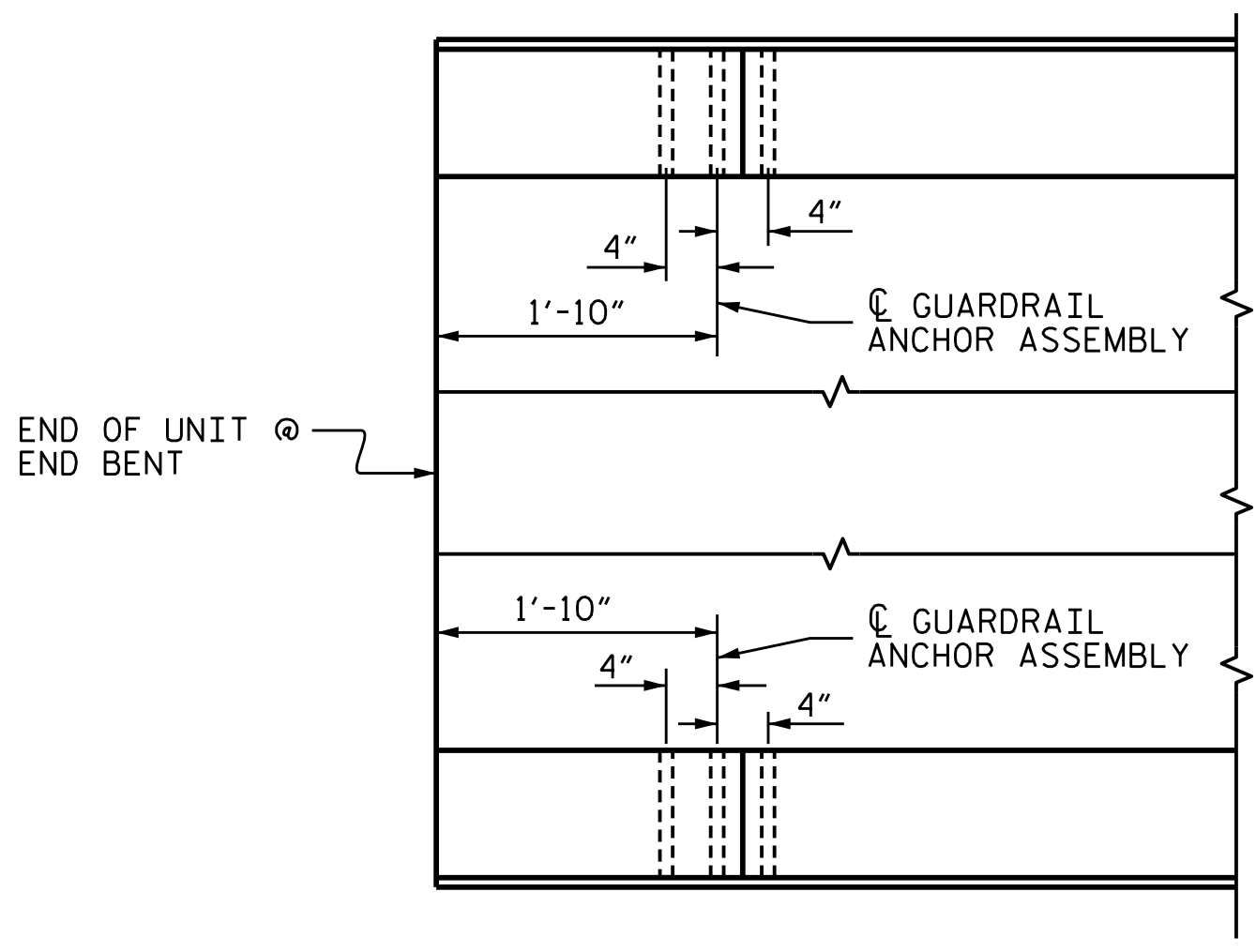
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

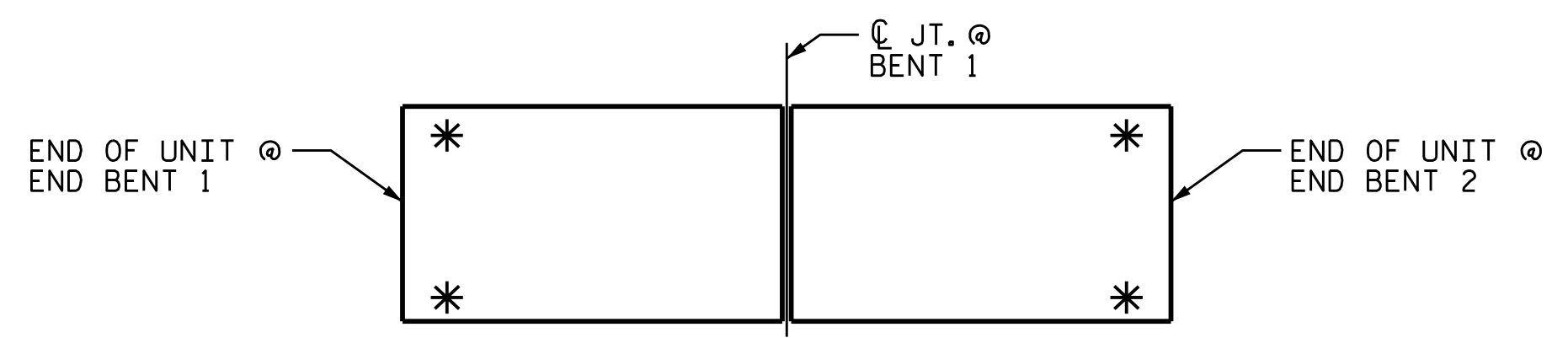
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN  
LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR VERTICAL CONCRETE  
 BARRIER RAIL

7/25/2023

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TGS ENGINEERS  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	MAA	REV. 1/15	MAA/TMG
CHECKED BY :	GM	REV. 12/17	MAA/TMG
		REV. 5/18	MAA/TMG



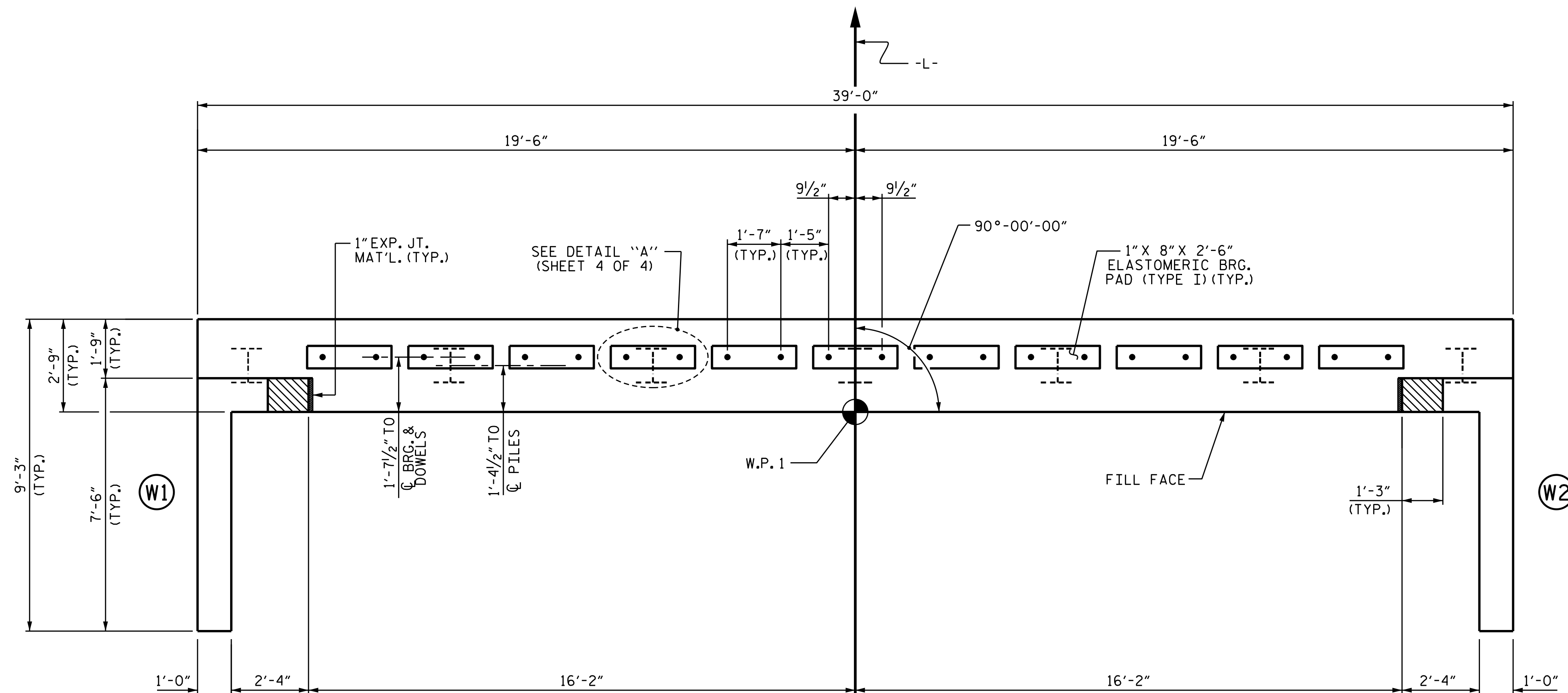
**NOTES**

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

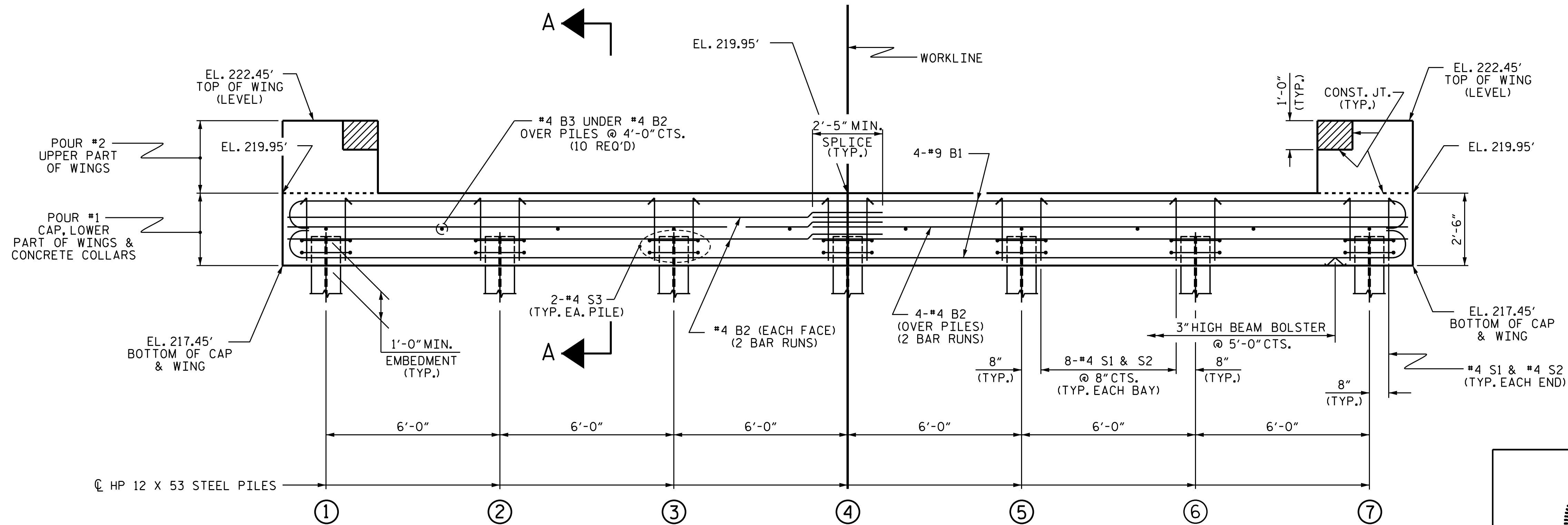
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



**PLAN**

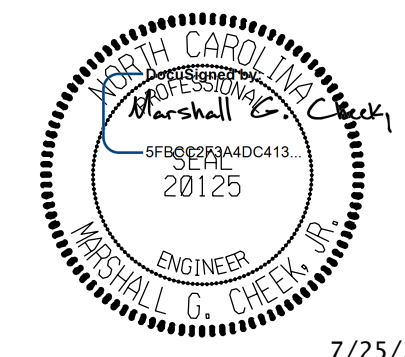


**ELEVATION**

WINGS NOT SHOWN FOR CLARITY.  
FOR SECTION A-A, SEE SHEET 4 OF 4.  
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 1 OF 4



7/25/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	01/10	REV. 4/15
CHECKED BY :	MKT	01/10	MAA/TMG

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-11
2			4			18

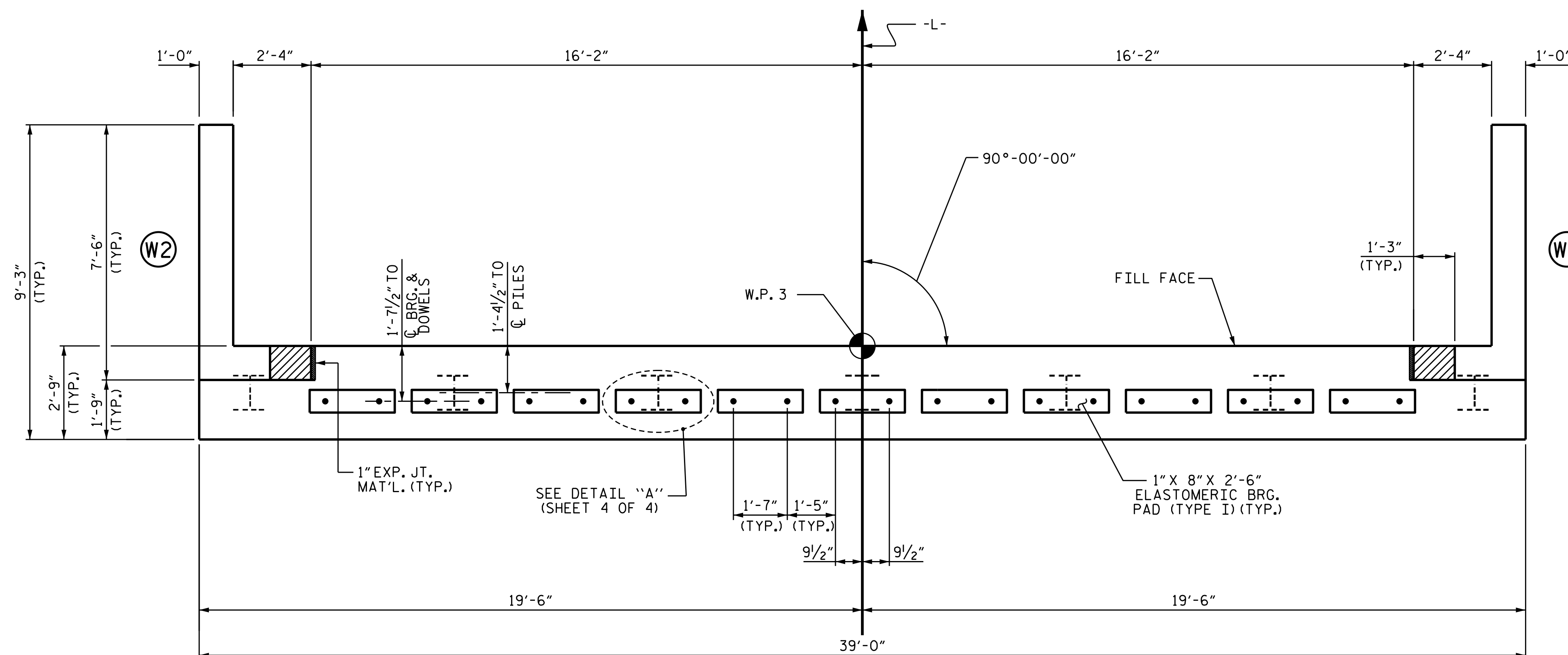
**NOTES**

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

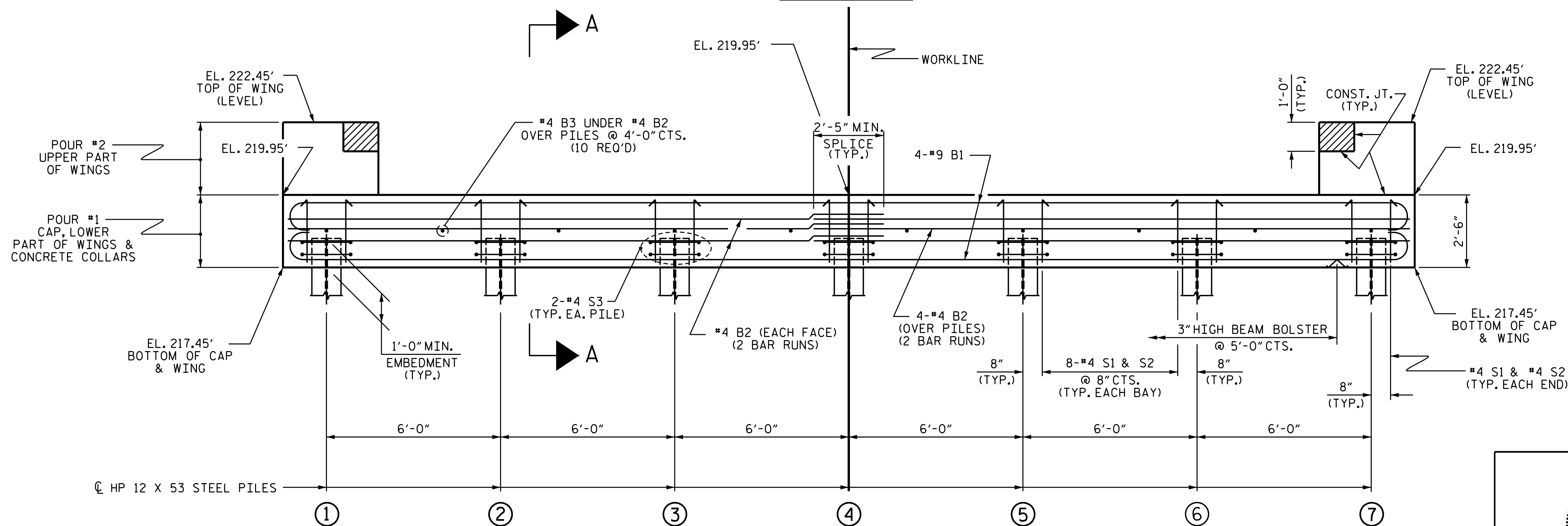
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



**PLAN**



**ELEVATION**

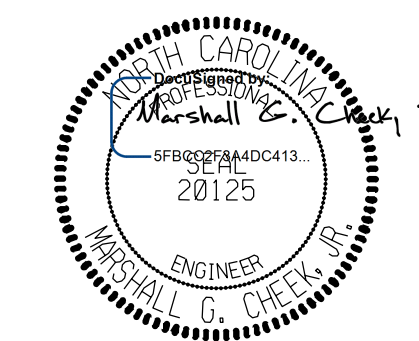
WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. HS-2006Q

HARNETT COUNTY

STATION: 15+78.00 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2

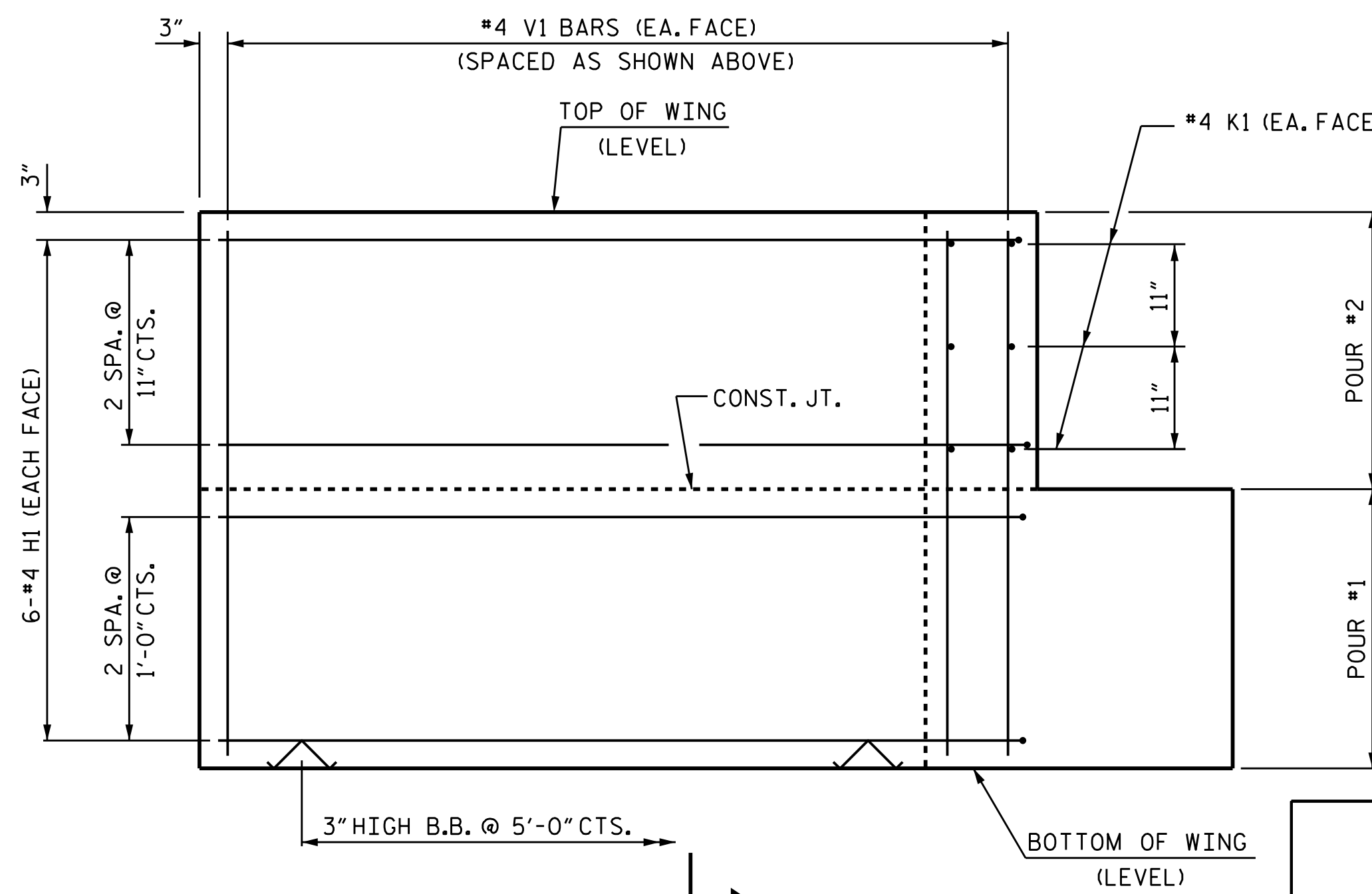
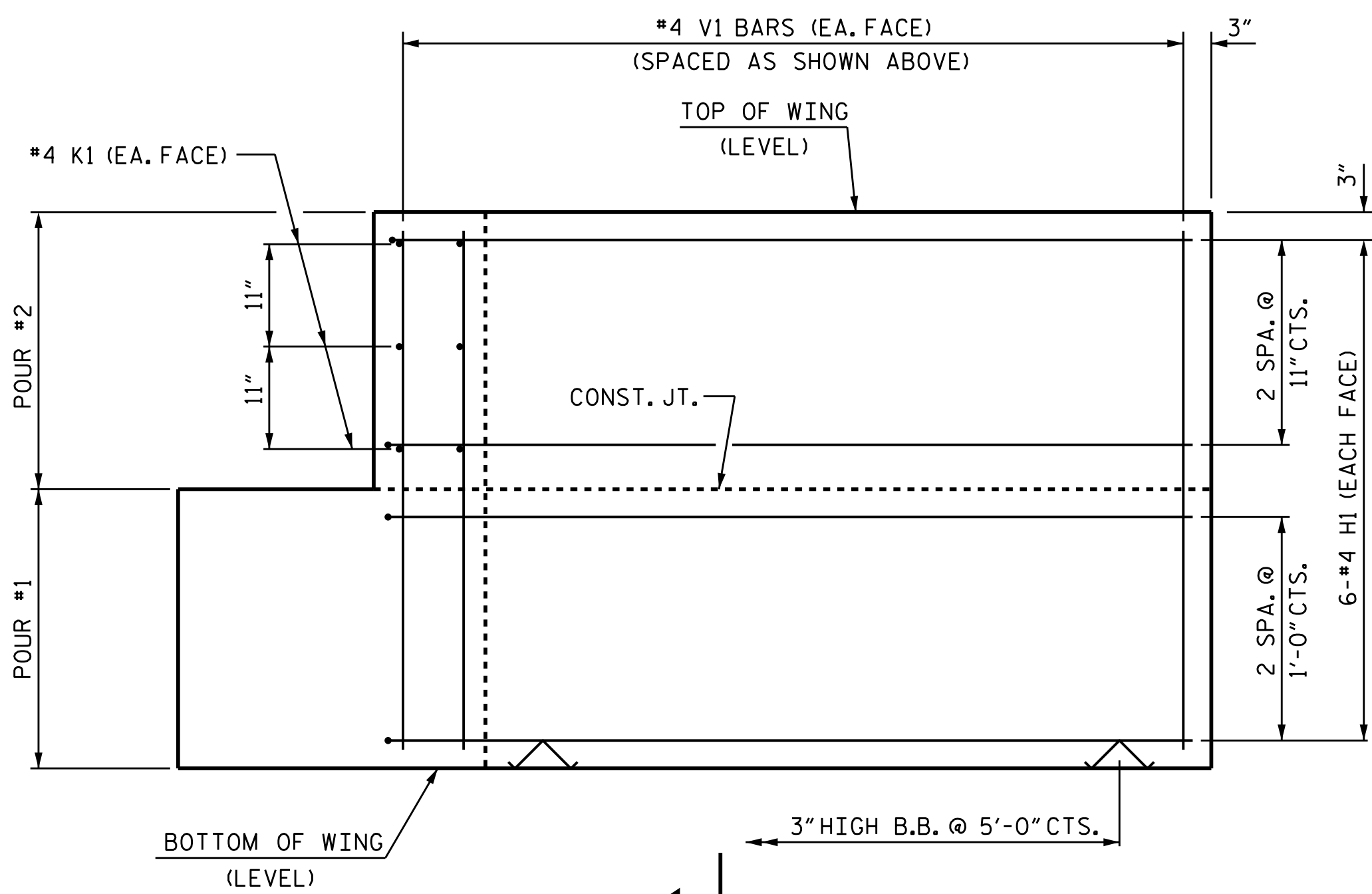
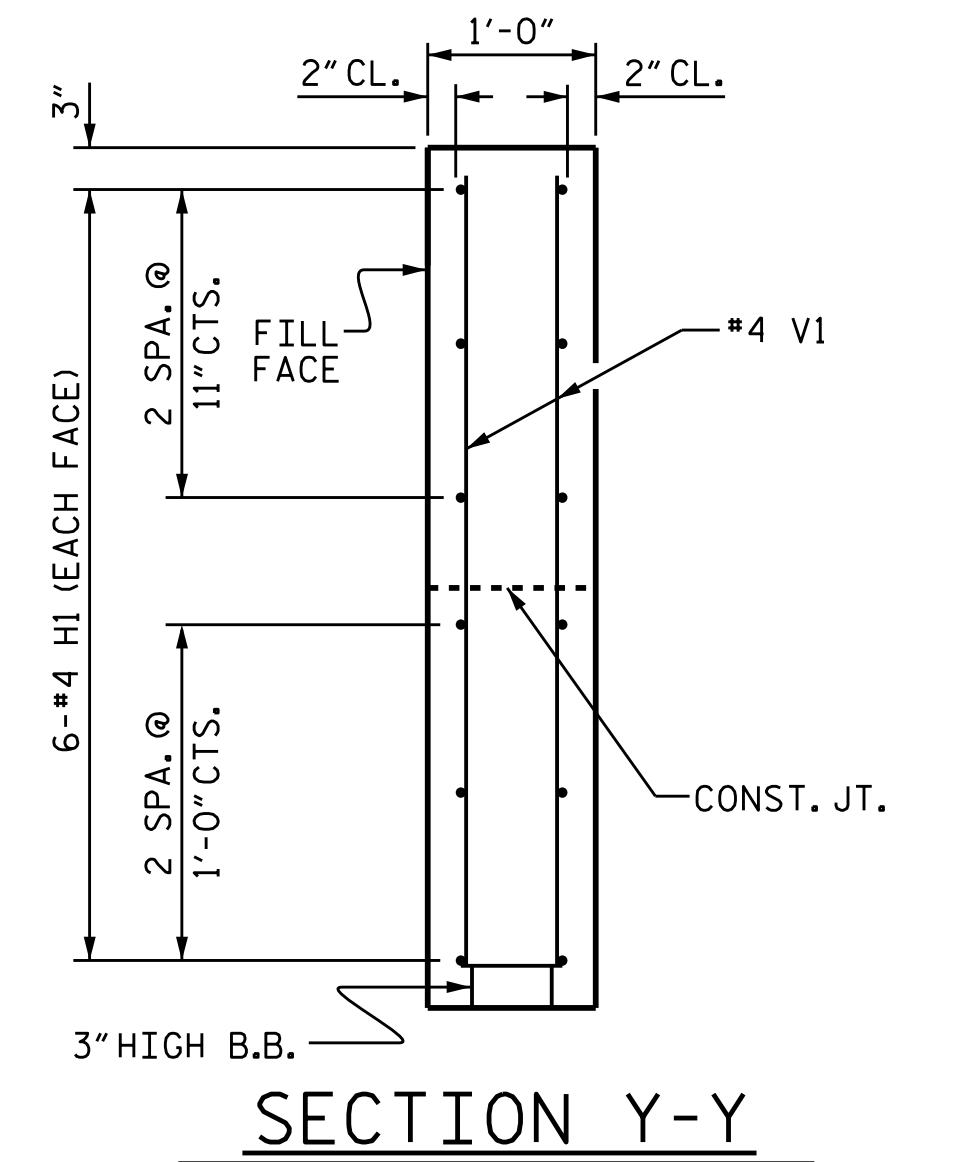
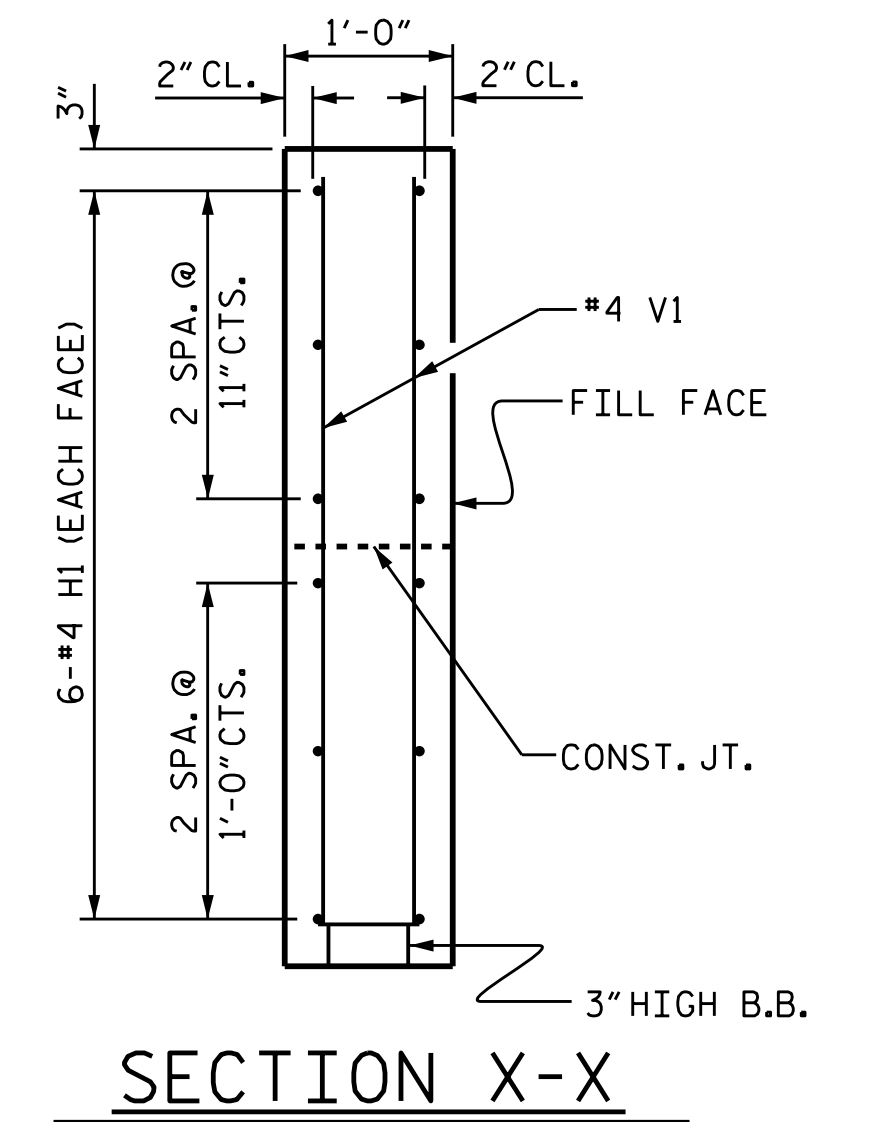
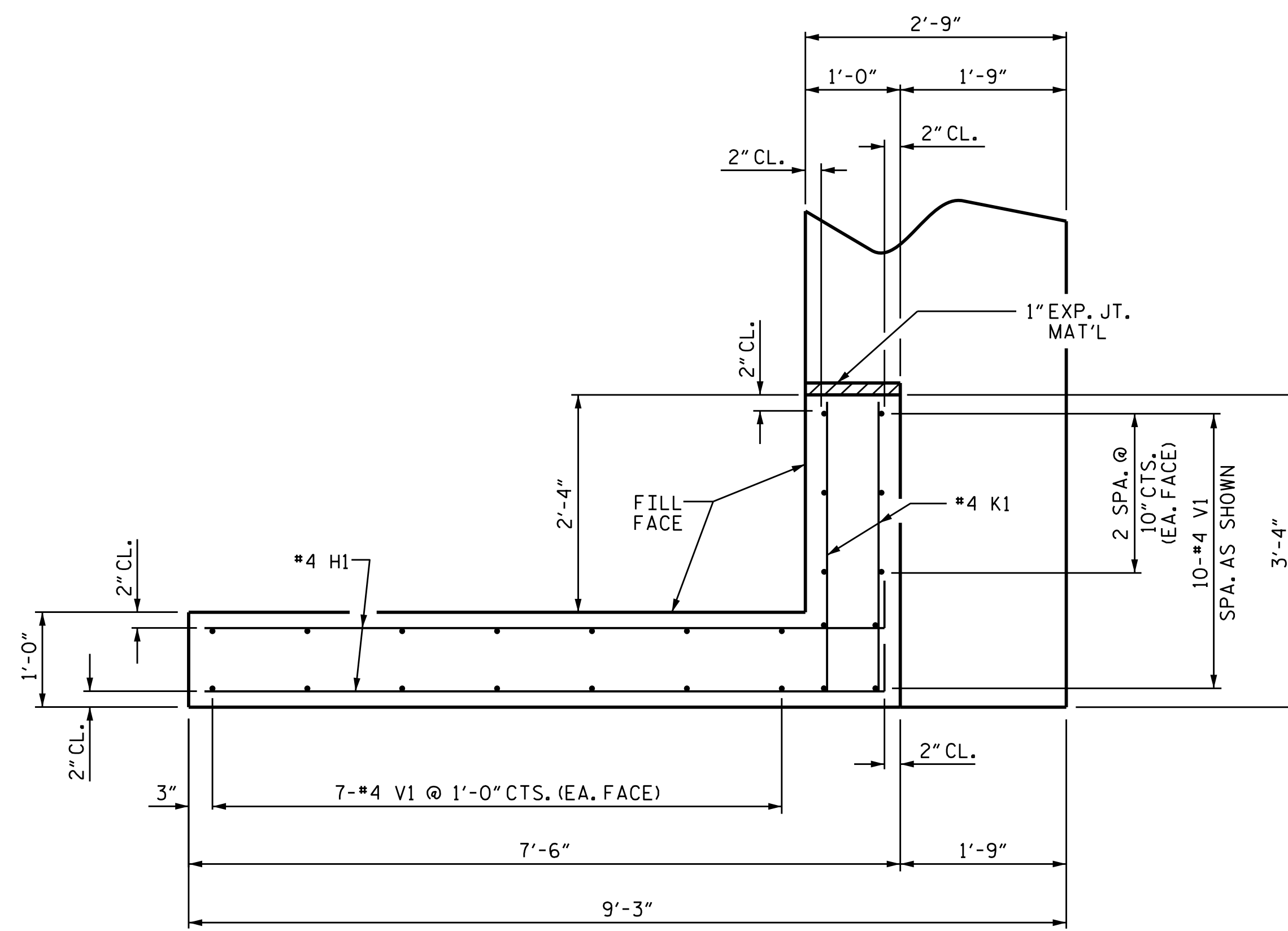
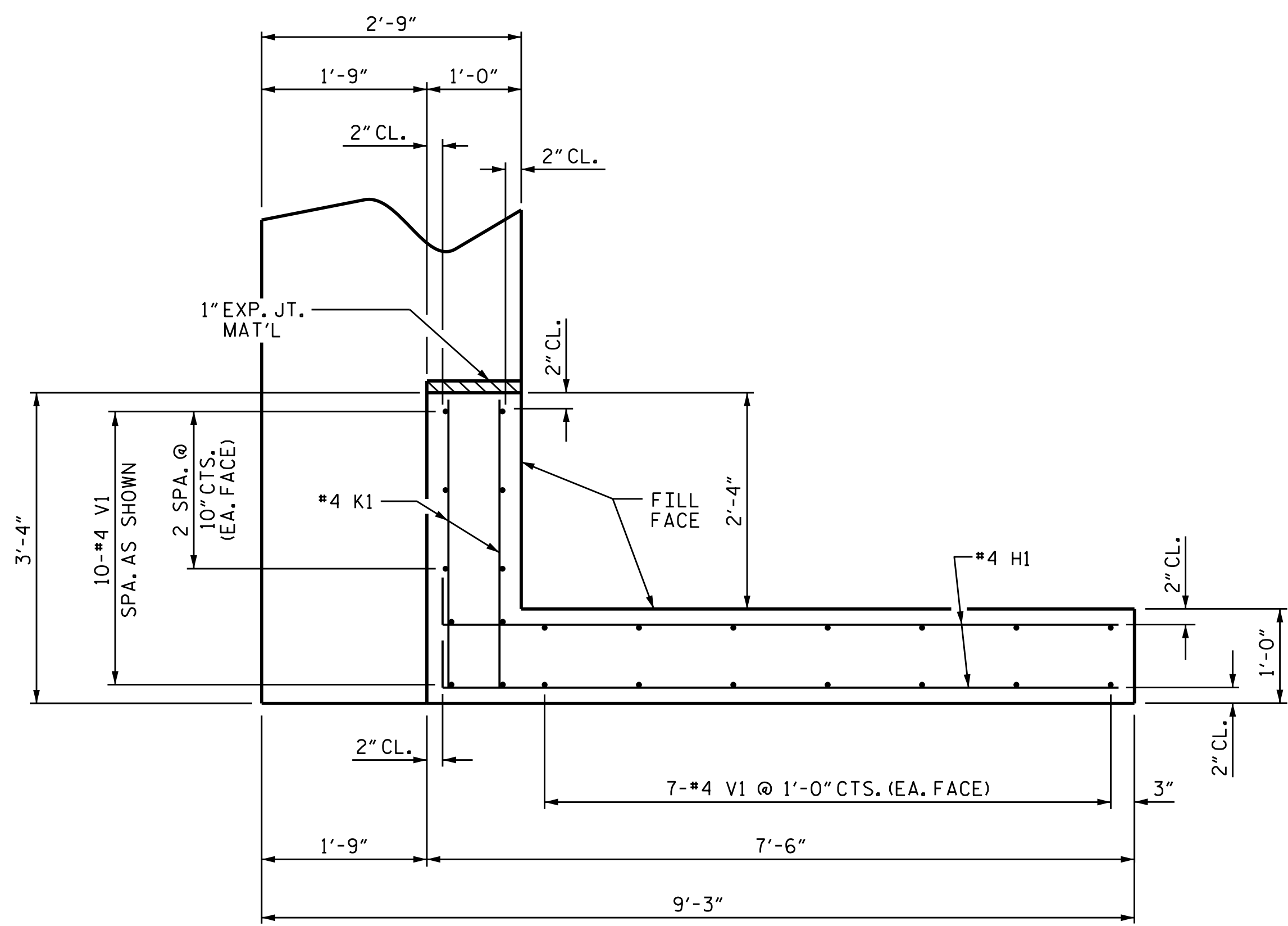
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CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	01/10	REV. 4/15
CHECKED BY :	MKT	01/10	MAA/TMG

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			18
2			4			18





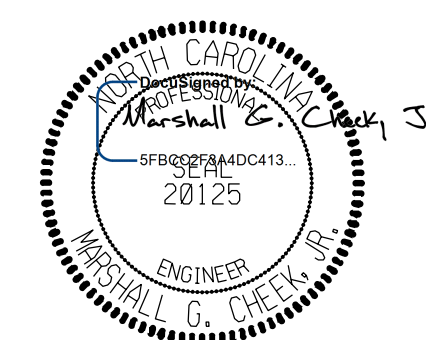
ELEVATION OF WING (W1)

ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. HS-2006Q  
 HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 3 OF 4



7/25/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT  
 WING DETAILS

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	02/10	REV. 4/15
CHECKED BY :	MKT	02/10	MAA/TMG

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

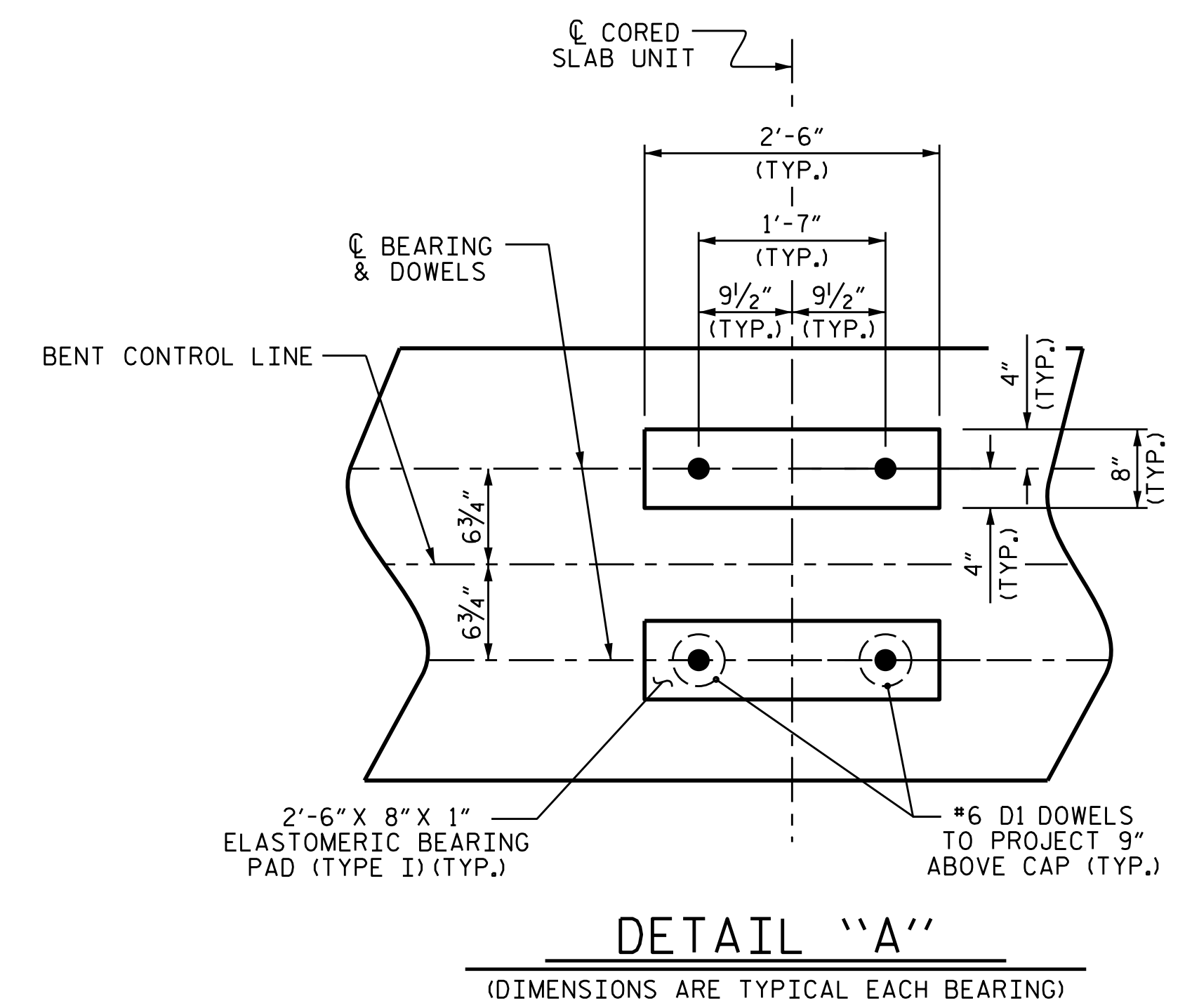
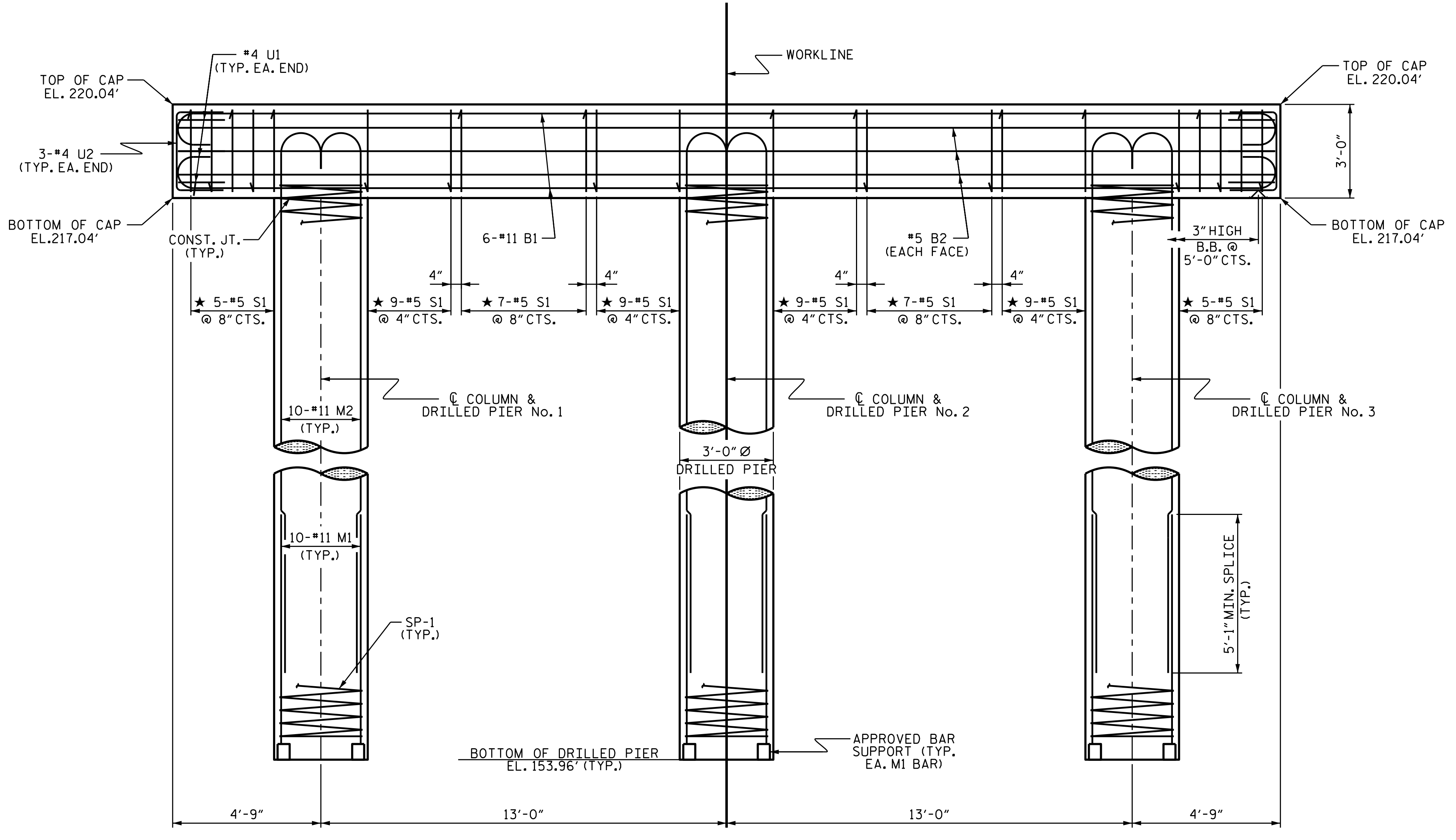
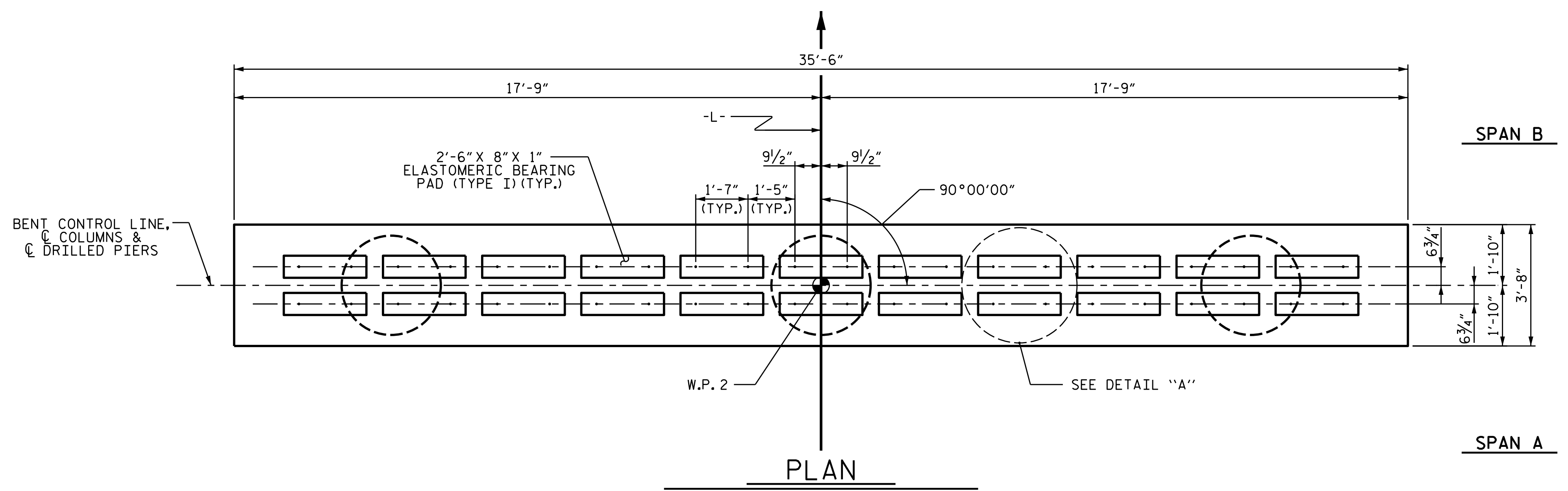
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			18





**NOTES**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON M2 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE STIRRUPS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE M1 BARS ARE DETAILED WITH 3 FEET OF EXTRA LENGTH.



PROJECT NO. HS-2006Q  
HARNETT COUNTY  
 STATION: 15+78.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**ENGINEER**  
 MARSHALL G. CHESTNUT  
 7/25/2023

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

SUBSTRUCTURE						SHEET NO. S-15	
BENT 1						TOTAL SHEETS 18	
REVISIONS							
NO.	BY	DATE	NO.	BY	DATE		
1			3				
2			4				

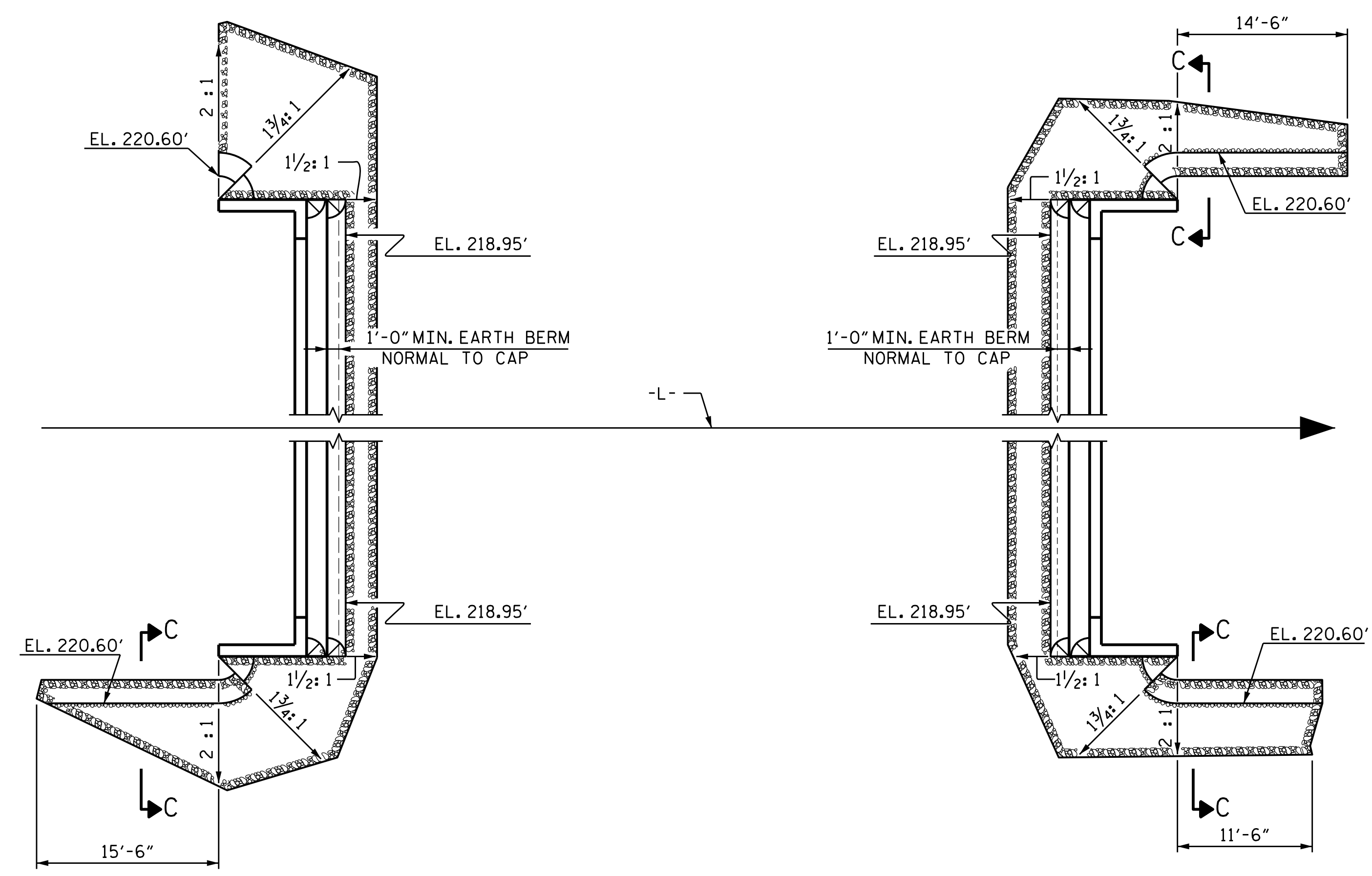
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CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	DGE	4/10	REV. 11/14
CHECKED BY :	MKT	4/10	MAA/TMG

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

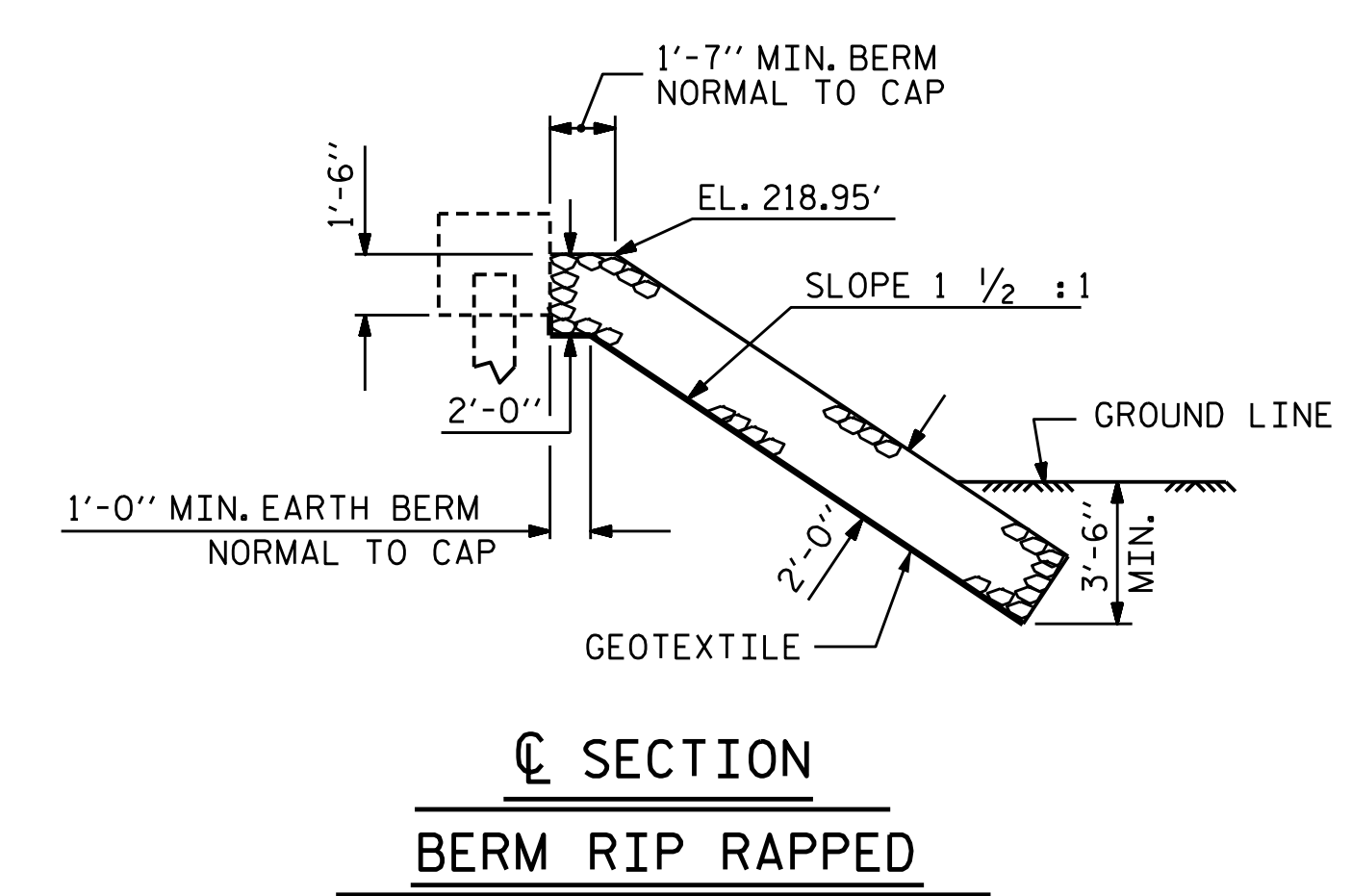




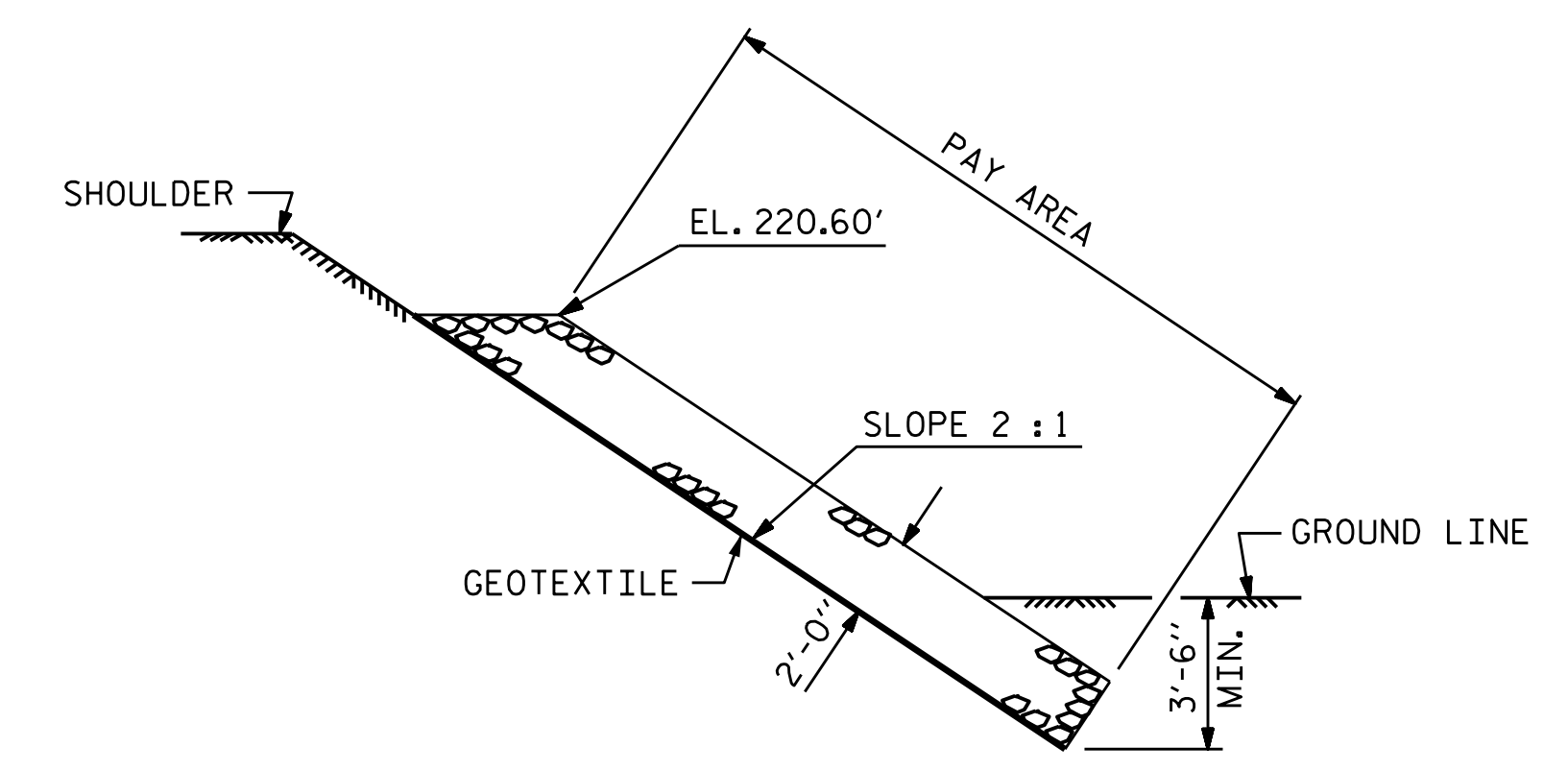
NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+78.00-L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	100	110
END BENT 2	120	135

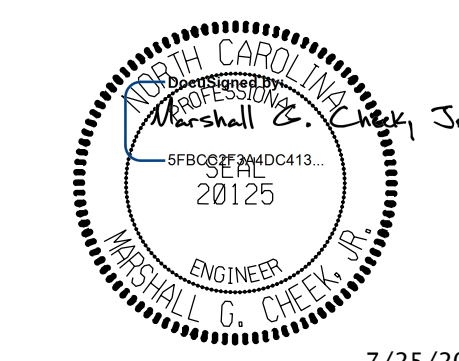


SECTION  
BERM RIP RAPPED



SECTION C-C

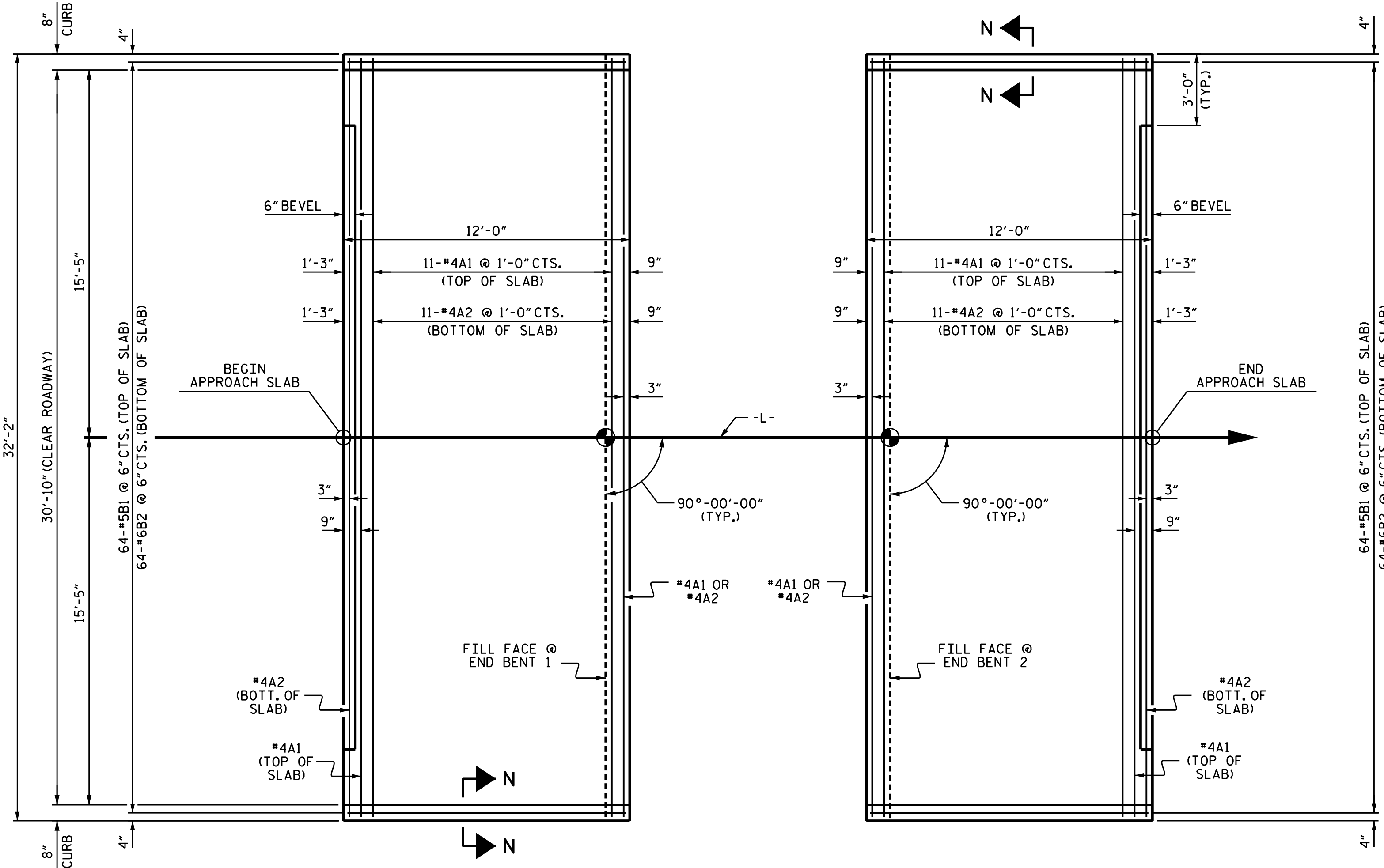
PROJECT NO. HS-2006Q  
HARNETT COUNTY  
STATION: 15+78.00 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RIP RAP DETAILS

ASSEMBLED BY :	JLA	DATE :	3/23
CHECKED BY :	MGC	DATE :	3/23
DRAWN BY :	REK	REV. 10/17/11	MAA/GM
CHECKED BY :	RDU	REV. 12/21/11	MAA/GM
		REV. 12/17	MAA/THC

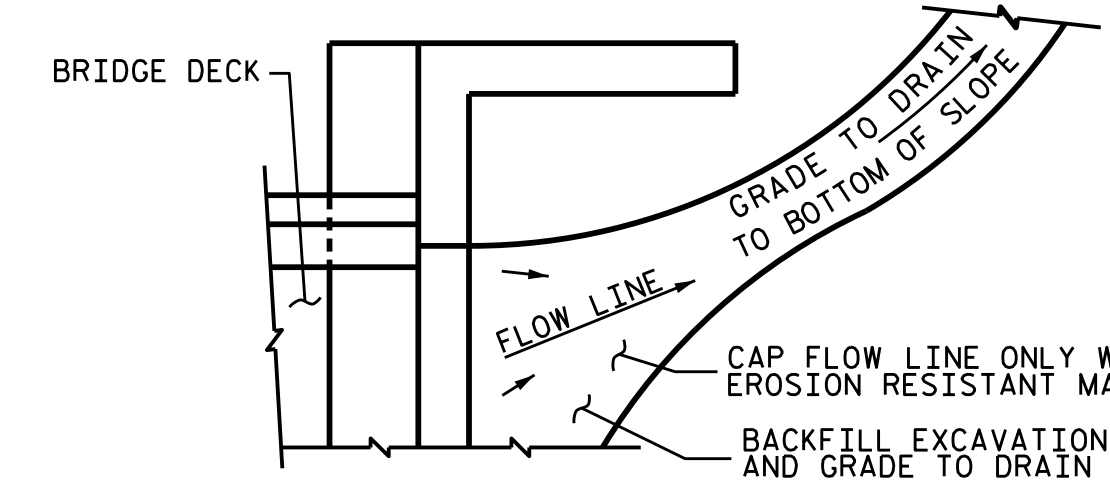
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						REVISIONS			SHEET NO.			
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275						NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
						1			3			TOTAL SHEETS
						2			4			18



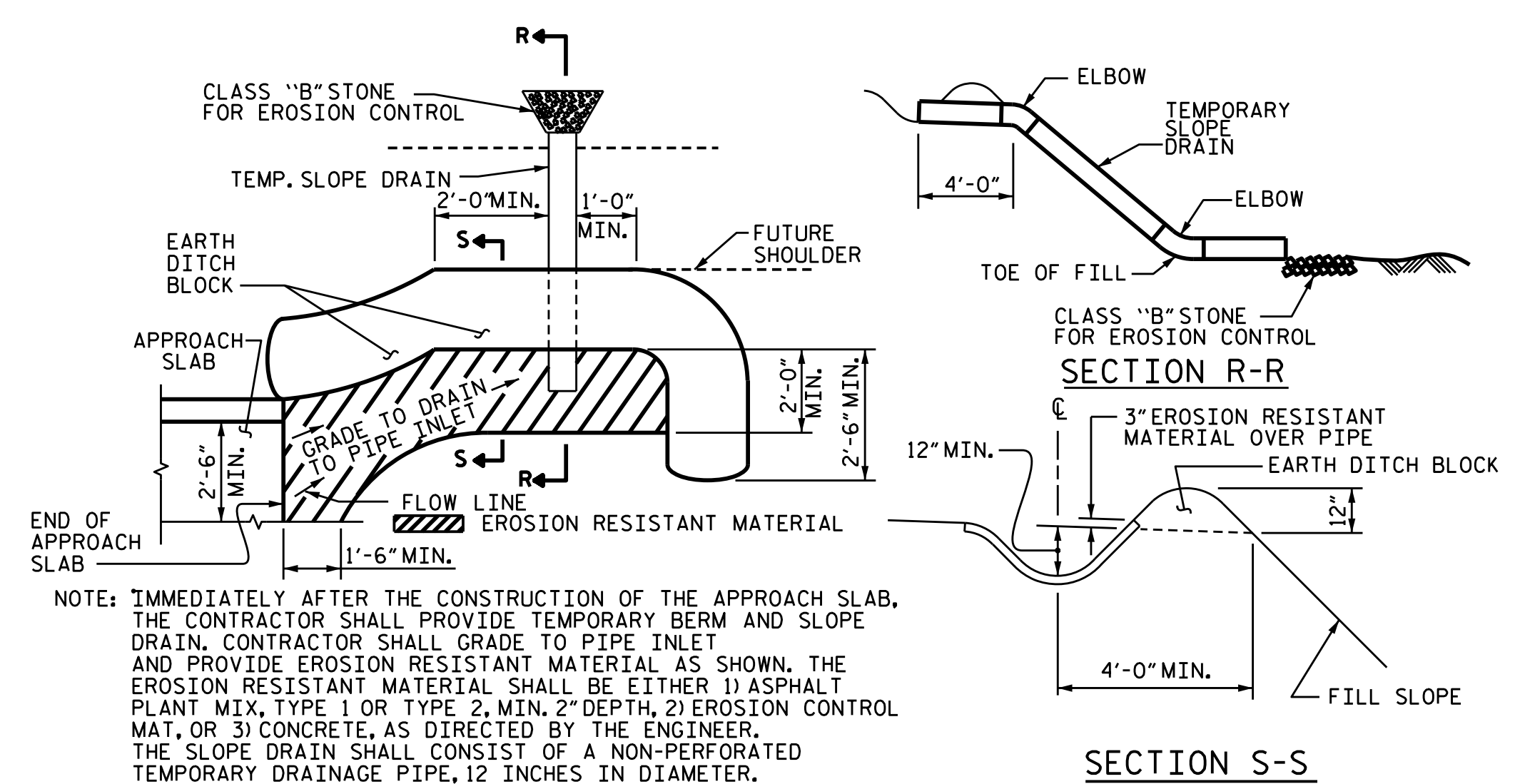
PLAN @ END BENT 1  
PLAN @ END BENT 2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.  
 GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.  
 SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.  
 SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.  
 FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.  
 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.  
 APPROACH SLAB GROOVING IS NOT REQUIRED.



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.



PLAN VIEW  
TEMPORARY BERM AND SLOPE DRAIN DETAILS  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

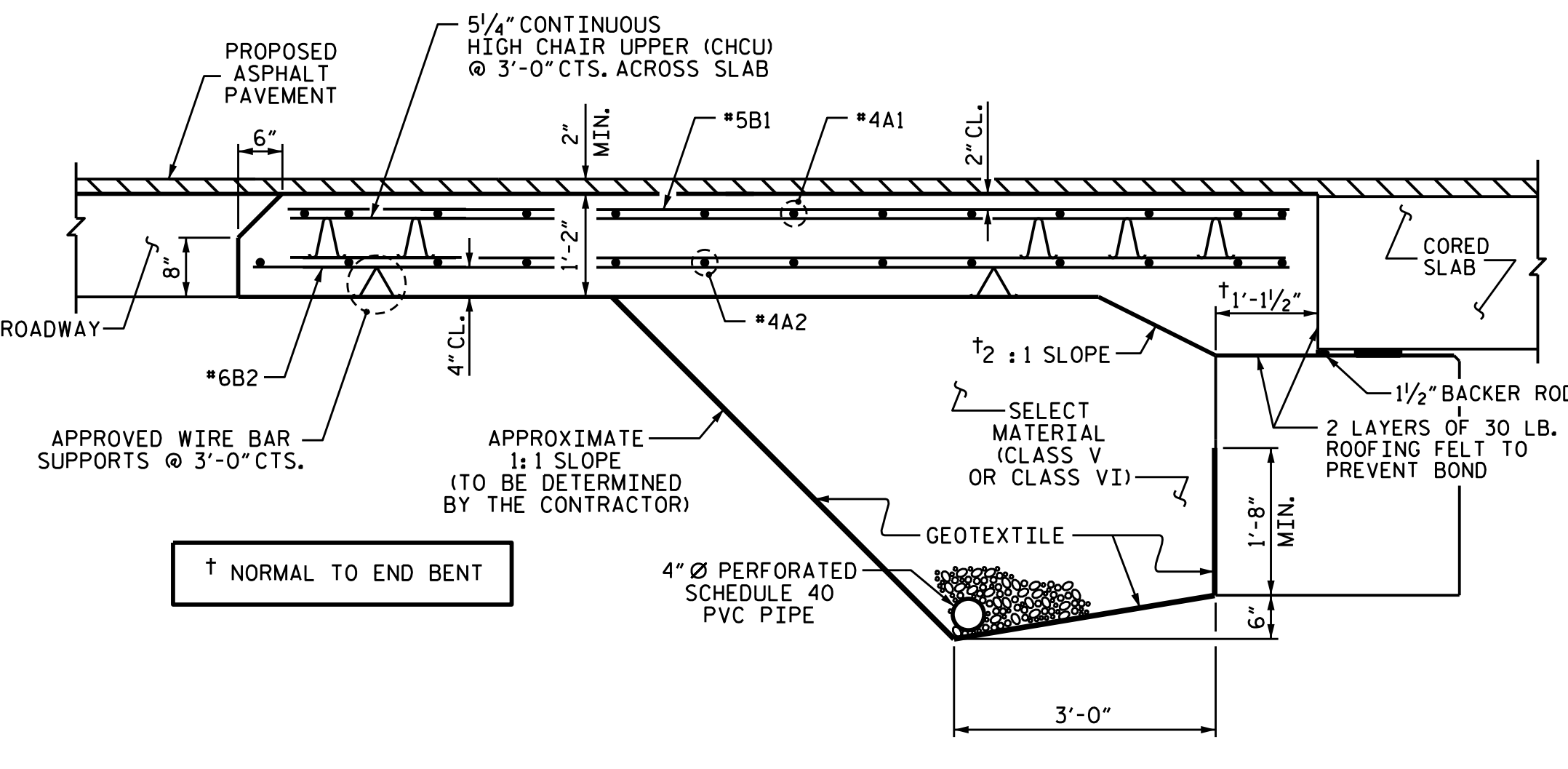
**BILL OF MATERIAL**

**APPROACH SLAB AT EB 1**

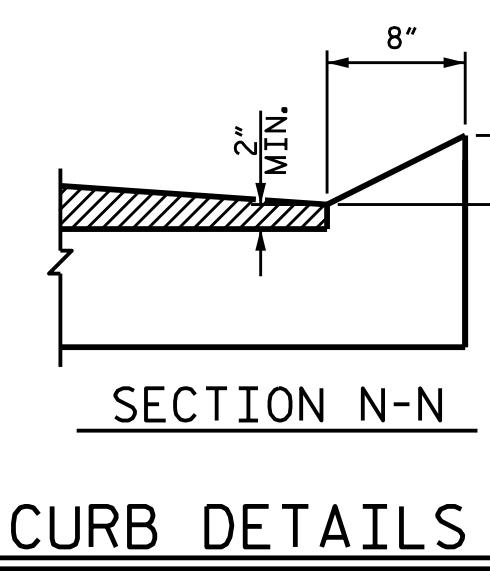
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	31'-10"	276	
A2	13	#4	STR	31'-10"	276	
*B1	64	#5	STR	11'-2"	745	
B2	64	#6	STR	11'-8"	1121	
REINFORCING STEEL					LBS.	1397
* EPOXY COATED REINFORCING STEEL					LBS.	1021
CLASS AA CONCRETE					C. Y.	18.4

**APPROACH SLAB AT EB 2**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	31'-10"	276	
A2	13	#4	STR	31'-10"	276	
*B1	64	#5	STR	11'-2"	745	
B2	64	#6	STR	11'-8"	1121	
REINFORCING STEEL					LBS.	1397
* EPOXY COATED REINFORCING STEEL					LBS.	1021
CLASS AA CONCRETE					C. Y.	18.4



SECTION THRU SLAB  
(TYPE II - MODIFIED APPROACH FILL)



**SPLICE LENGTHS**

BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW  
 7/25/2023  
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
 TGS ENGINEERS  
 804-C N. LAFAYETTE ST  
 SHELBY, NC 28150  
 PH (704) 476-0003  
 CORP. LICENSE NO.: C-0275

PROJECT NO. HS-2006Q  
 HARNETT COUNTY  
 STATION: 15+78.00 -L-

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

ASSEMBLED BY : JLA DATE : 3/23  
 CHECKED BY : MGC DATE : 3/23  
 DRAWN BY : SHS/MAA 5-09 REV. 12-17 MAA/THC  
 CHECKED BY : BCH 5-09 REV. 08-19 BNB/THC



## 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 2018 "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  $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO  $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A  $\frac{1}{4}$ " 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  $\frac{1}{4}$ " 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  $\frac{1}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{1}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{1}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{1}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  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  $\frac{3}{16}$ " 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  $\frac{1}{16}$  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.

REFERENCE: HS-2006Q

PROJECT: 00579838

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

**CONTENTS**

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
-L-	13+50 - 18+00	4	N/A

**CROSS SECTIONS**

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	14+75 - 16+25	5-7

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

---

**ROADWAY**

---

**SUBSURFACE INVESTIGATION**

COUNTY HARNETT  
PROJECT DESCRIPTION BRIDGE NO. 420015 OVER BLACK  
RIVER ON SR 1532 (LANGDON ROAD)

**INVENTORY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2006Q	1	7

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

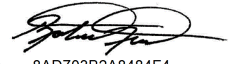
- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL  
CG2 EXPLORATION  
S. PATTERSON, P.G.

INVESTIGATED BY CG2, PLLC  
DRAWN BY S. PATTERSON, P.G.  
CHECKED BY R. KRAL, P.E.  
SUBMITTED BY CG2, PLLC  
DATE MARCH 2023

Prepared in the Office of:  
 **CAROLINAS  
GEOTECHNICAL  
GROUP**  
2400 CROWNPOINT EXECUTIVE DRIVE  
SUITE 800  
CHARLOTTE, NC 28227  
(980) 339-8684



DocuSigned by:  
  
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SIGNATURE DATE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, legends, and definitions for geotechnical engineering.

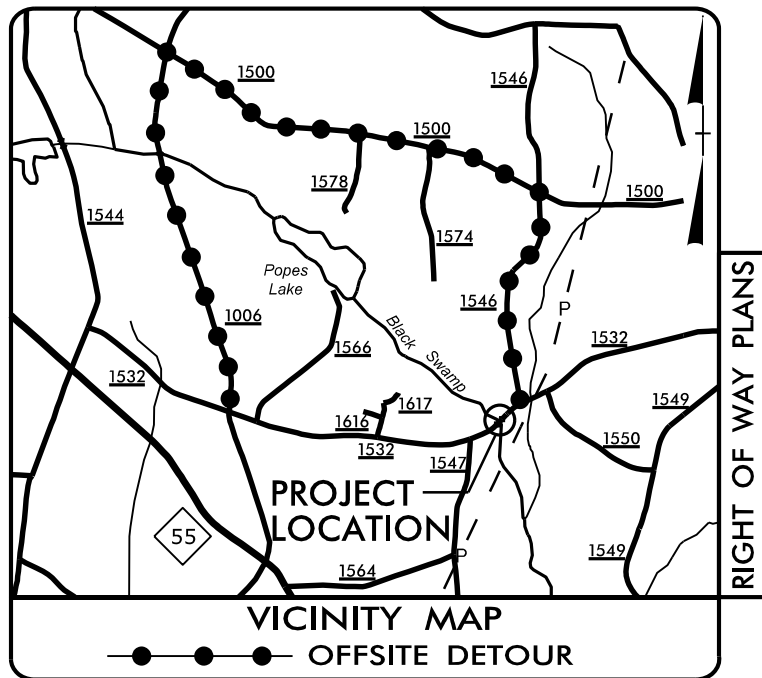
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09/08/99

**PROJECT: HS-2006Q**

**CONTRACT:**

See Sheet 1A For Index of Sheets  
See Sheet 1B For List of Conventional Symbols



RIGHT OF WAY PLANS

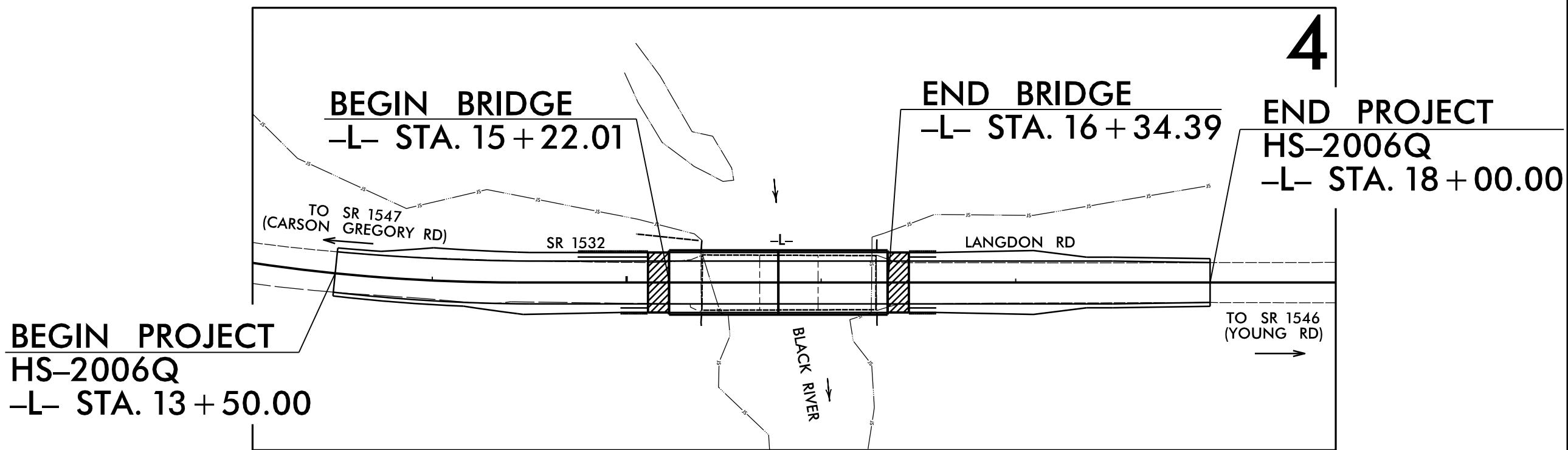
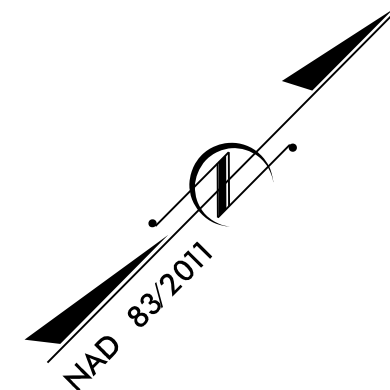
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HARNETT COUNTY**

**LOCATION: BRIDGE #420015 OVER BLACK RIVER  
ON SR 1532 (LANGDON RD)**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2006Q	3	7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
00579838	1532(006)	PE	
00579852	1532(006)	UTIL & RW	
00579853	1532(006)	CONST.	



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II MODIFIED.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

<p><b>GRAPHIC SCALES</b></p> <p>20 10 0 20 40 PLANS</p> <p>20 10 0 20 40 PROFILE (HORIZONTAL)</p> <p>4 2 0 4 8 PROFILE (VERTICAL)</p>	<p><b>DESIGN DATA</b></p> <p>ADT 2022 = 730 ADT 2045 = 910 T = 6 % * V = 60 MPH * TTST = 3% DUAL = 3% FUNC CLASS = RURAL - LOCAL SUB-REGIONAL TIER</p>	<p><b>PROJECT LENGTH</b></p> <p>LENGTH ROADWAY PROJECT HS-2006Q #420015 = 0.064 LENGTH STRUCTURE PROJECT HS-2006Q #420015 = 0.021 TOTAL LENGTH PROJECT HS-2006Q #420015 = 0.085</p>	<p>NCDOT CONTACT: ADAM BRITT</p>	<p><b>HYDRAULICS ENGINEER</b></p> <p>_____ SIGNATURE: _____ P.E.</p>	
			<p>PLANS PREPARED BY:</p> <p>TGS ENGINEERS 201 W. MARION ST SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275</p>		

2018 STANDARD SPECIFICATIONS



3/27/2023

STATE PROJECT: 00579838  
 TIP NO.: HS-2006Q  
 I.D. NO.: SF-420015  
 COUNTY: Harnett  
 DESCRIPTION: Bridge No. 420015 over Black River on SR 1532 (Langdon Road)

SUBJECT: Geotechnical Roadway Inventory Report

### PROJECT DESCRIPTION

Based on a review of the plans provided to us by TGS Engineers, Inc., we understand this project consists of a bridge replacement on SR 1532 (Langdon Rd) over Black River. The project alignment of SR 1532 begins approximately 172 feet southwest of the proposed bridge over Black River and ends approximately 166 feet northeast of the proposed bridge. The project is approximately 0.085 miles in length, measured along -L- (SR 1532) from Station 13+50 to 18+00. The proposed construction consists of a new structure, grading, paving, roadway improvements, and associated drainage. The following alignments are included as part of this investigation:

<u>Alignment</u>	<u>Stations</u>
-L- (SR 1532)	13+50 to 18+00

The provided roadway plans generally indicate fill on the order of 1 to 3 feet are planned along the alignment from -L- Stations 13+75 to 17+75. Cuts were not proposed on the provided roadway plans at this time.

The geotechnical field investigation was conducted by CG2 during the period of February 9 through February 14, 2023. A subcontracted drilling crew was used to drill and sample each of the five (5) borings included in this report. The drill rig utilized was an ATV-mounted CME 550X equipped with an automatic hammer. Standard Penetration Tests (SPT) were performed at selected depths within each boring. Representative soil samples were collected for visual-manual classification in the field and evaluated in the office by a licensed engineer or geologist.

### PHYSIOGRAGHY AND GEOLOGY

The project corridor is located within the Coastal Plain Physiographic Province and in proximity to the Piedmont Physiographic Province of North Carolina. The Coastal Plain is generally flat, with a gradual decrease in elevation towards the coastline and varies in thickness from zero feet, closest to the Piedmont to 4,000 feet deep towards the coast, in an almost wedge-like shape. The Piedmont generally consists of hills and ridges which are intertwined with an established system of draws and streams. The Piedmont is predominately underlain by igneous and metamorphic rock.

Within the project alignment, near-surface material consists of coastal plain, residual, and alluvial soils. The USGS 1985 Geologic Map of North Carolina shows the project area lies within the Middendorf

Formation of the Coastal Plain. Underlying the Middendorf is an unconformable basal Coastal Plain unit classified as the Cape Fear Formation. Coastal Plain deposits generally consist of unconsolidated marine sands, silts, clays, gravels, and marl (unconsolidated clay and lime), cemented sands, and near-surface calcareous rock (e.g., limestone). Underlying the Coastal Plain soils within the project alignment is the contact of residuum from the Piedmont Province.

Residual soils are derived from in situ chemical and physical weathering of the rock in the area and vary in thickness. The residual soils in this region are typically finer grained with a higher clay content near the surface due to advanced weathering, and typically become coarser grained with increasing depth as the degree of weathering decreases. As the degree of weathering decreases, the residual soils generally retain the overall appearance and fabric of the parent rock (sometimes referred to as "saprolite"). The boundary between soil and rock is not always sharply defined. A transitional zone termed "weathered rock" is often found overlying the parent bedrock. Weathered rock is defined as material requiring 100 blows with less than one foot of penetration from the SPT hammer. Rock encountered during the investigation was classified as Schist.

Alluvial soils are transported and deposited by water and are naturally variable in character, consistency/density, and often contain organic materials. Alluvial soil deposits of varying age were observed within the project alignment in low lying areas adjacent to Black River and were encountered within borings performed for the roadway investigation.

### Soil Properties

Soils and rock encountered during the roadway investigation include roadway embankment, alluvial soils, coastal plain soils, residual soils, and weathered rock.

A pavement section consisting of approximately 0.8 feet of asphalt, was recorded at the ground surface of Borings EB1-B and EB2-B. The remaining roadway borings encountered approximately 0.1 to 0.2 feet of organic topsoil at the existing ground surface.

Roadway embankment (RE) soils are similar in nature to residual soils and may be derived from nearby sources. RE soils were encountered in all borings during the roadway investigation due to the presence of state-maintained roadways and existing bridge structure. The RE coarse-grained material generally consists of very loose to loose, sandy gravel (A-1-a) and silty sand (A-2-4), with trace gravel. Fine-grained RE material generally consists of soft to medium stiff sandy clay (A-6), with trace organics.

Alluvial soils were observed in proximity to the Black River and generally consist of very soft to medium stiff, fine sandy clay (A-6) and silty clay (A-7), with trace organics and root fragments.

Coastal Plain (CP) soils belonging to the Middendorf Formation were encountered beneath the alluvial soils. These CP soils generally consist of loose to medium dense, silty fine sand (A-3), clayey fine to coarse sand (A-2-6), silty fine to coarse sand (A-2-4), and gravelly fine to coarse sand (A-1-b), with trace root fragments, mottling, and organic odor. Underlying the CP soils from the Middendorf Formation, CP soils of the Cape Fear Formation were encountered and consist of loose to very dense, clayey, gravelly fine to coarse sand (A-1-b) and clayey fine to coarse sand (A-2-6).

Residual soils were encountered underlying the Cape Fear Formation CP soils. The residual soils generally consist of very stiff to hard, silt (A-5), with trace mica and sand. Residual soils were encountered intermittently within the weathered rock units.

Weathered rock was encountered along the project corridor within all roadway borings. The weathered rock consisted of Schist. The weathered rock was encountered at depths ranging from approximately 33.9 to 41.2 feet below existing grades near the proposed bridge end bents and along the project corridor.

#### Groundwater

Groundwater measurements were taken during February 2023. Groundwater measurements were not collected at the completion of drilling in each boring, due to drilling method utilizing drilling fluids. Subsequent groundwater measurements were attempted after at least 24 hours following the completion of drilling in each boring. At the time of subsequent water level measurements groundwater was encountered in all roadway borings at depths ranging from 3.2 and 4.0 feet below existing grades. The soils encountered were generally described as moist to saturated above and below groundwater elevation.

Water Wells: There are several residences near the project site which could indicate that water wells may be present. Water wells were not observed within the proposed construction corridor. However, wells may be encountered that were not observed during our field services.

#### Areas of Special Geotechnical Interest

The following borehole locations encountered very soft to soft or very loose to loose soils which have the potential to cause embankment stability and/or long-term settlement problems:

<u>Alignment</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	14+71	12 LT
-L-	15+18	5 RT
-L-	15+20	11 LT
-L-	16+36	12 LT
-L-	16+36	13 RT

Highly Plastic Clays: Highly plastic soils (PI > 25) were not encountered in borings of the project.

Shallow groundwater was encountered within 3.0 to 4.0 feet of the existing ground and within 6 feet of the proposed subgrade at the proposed borehole locations:

<u>Alignment</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	14+71	12 LT
-L-	15+18	5 RT
-L-	15+20	11 LT
-L-	16+36	12 LT
-L-	16+36	13 RT

Crystalline rock was not encountered above or within 6 feet of proposed grade.

#### Geotechnical Testing

No geotechnical sample testing was included in the scope of work.

Sincerely,  
Carolinan Geotechnical Group, PLLC


Sierra N. Patterson, PG  
Project Geologist

D. Matthew Brewer, PE  
Senior Project Engineer

8/17/99

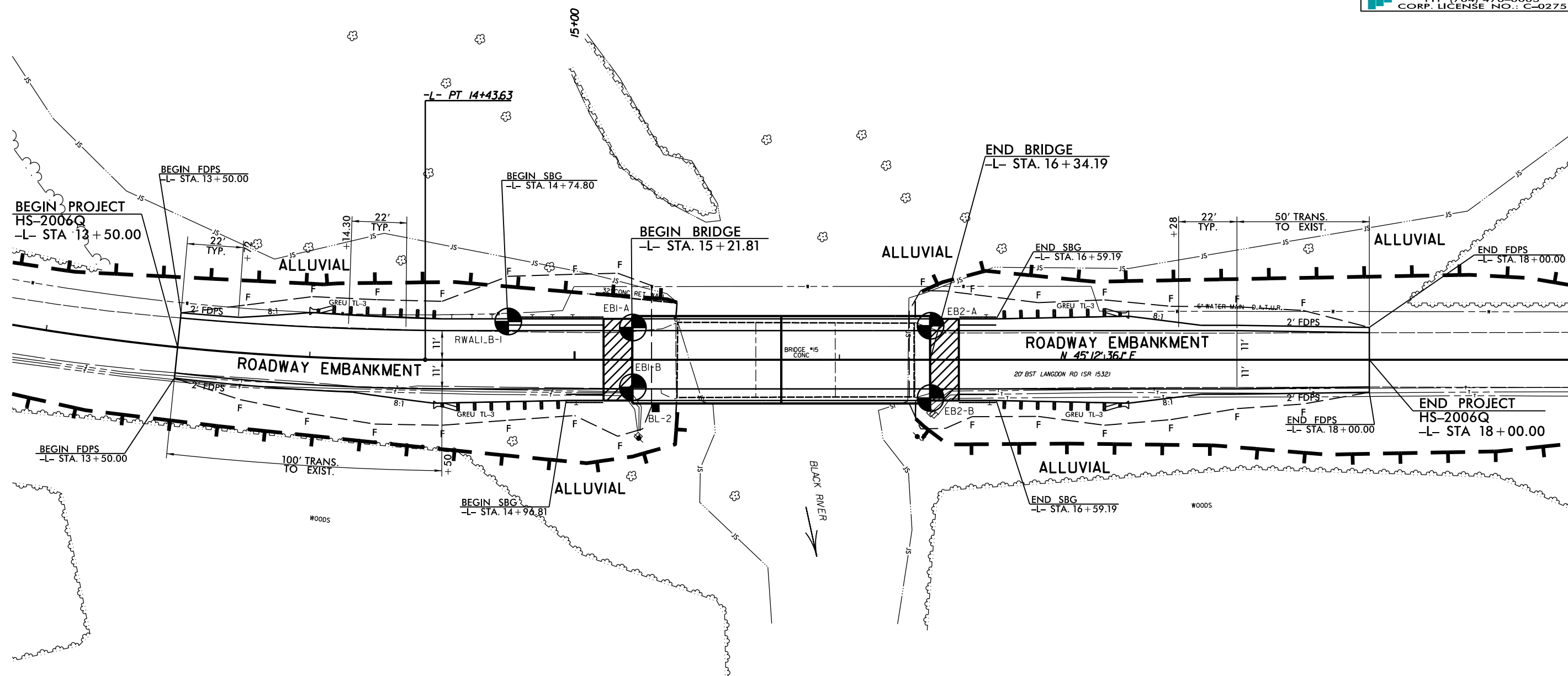
**-L- CURVE DATA**  
 PI Sta 12+65.07  
 $\Delta = 22^\circ 23' 08.3" (LT)$   
 $D = 611' 14.8"$   
 $L = 361.79'$   
 $T = 183.23'$   
 $R = 926.00'$   
 $SE = 0.04$   
 $DS = 50 MPH$

HARNETT COUNTY  
 BRIDGE #420015

PROJECT REFERENCE NO. <i>HS-2006Q</i>	SHEET NO. <b>4</b>
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>TGS ENGINEERS</b> 201 W. MARION ST SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

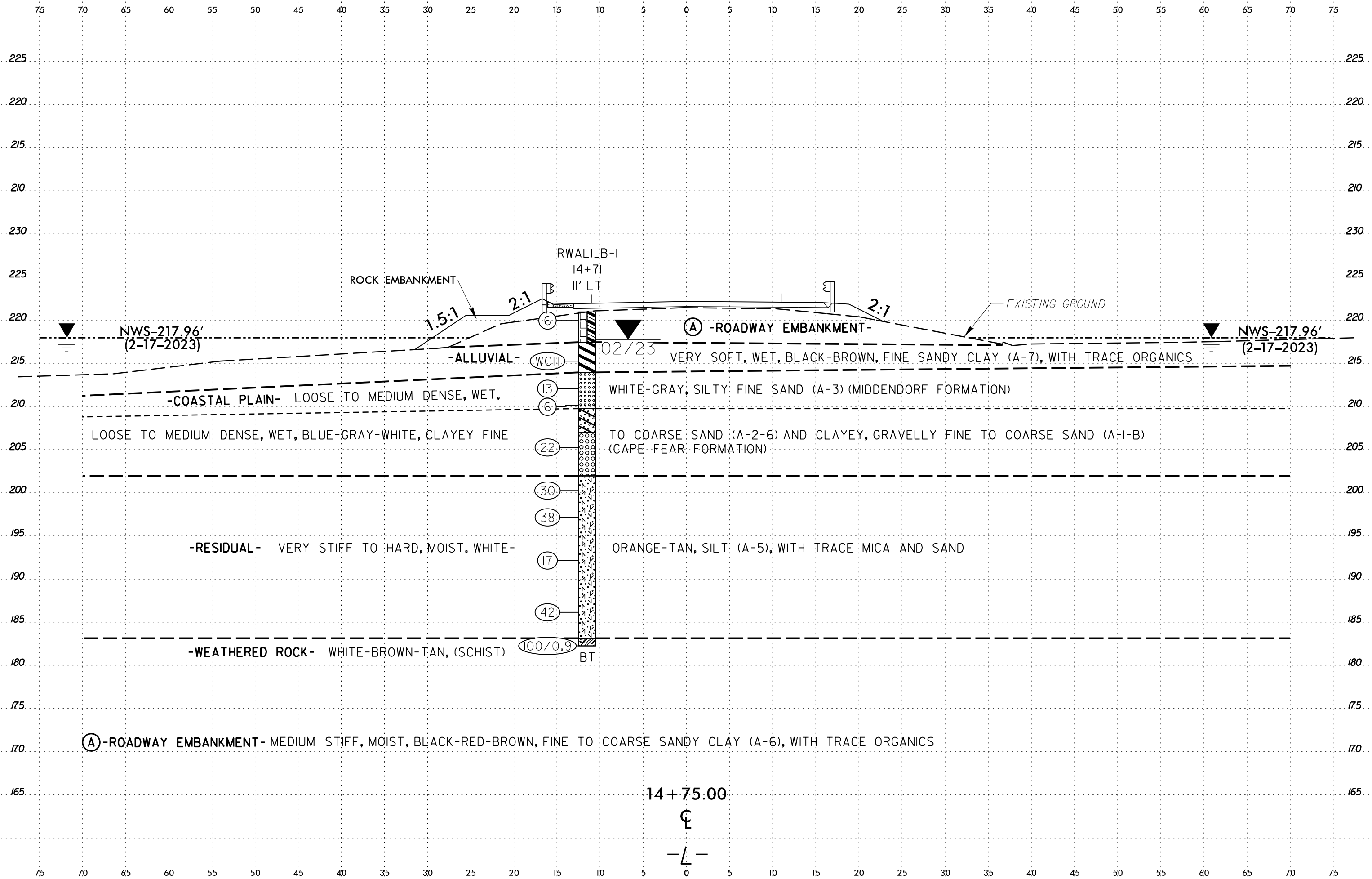


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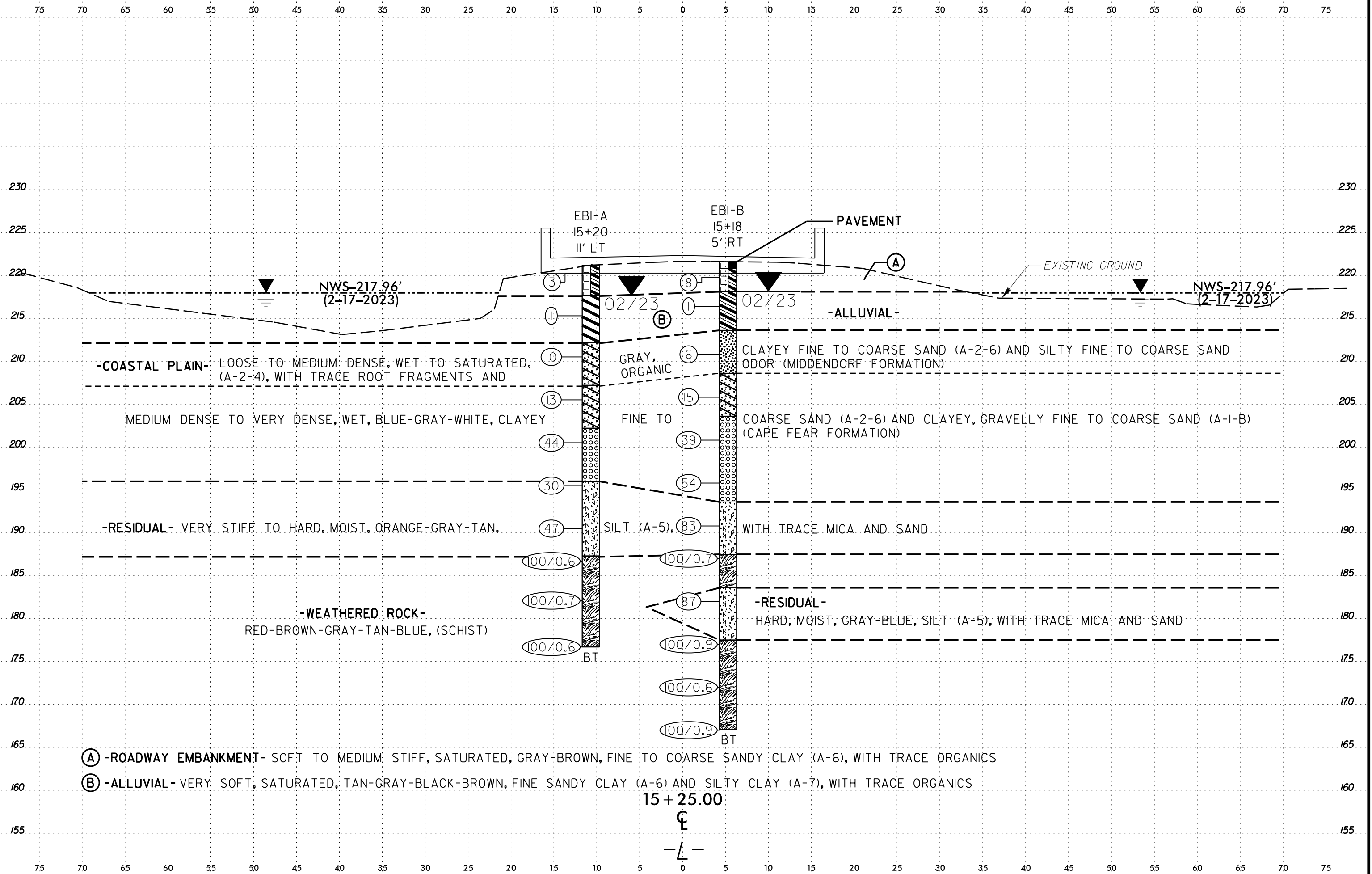
FOR -L- PROFILE, SEE SHEET 5





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REFERENCE: HS-2006Q

PROJECT: 00579838

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY HARNETT  
PROJECT DESCRIPTION BRIDGE NO. 420015 OVER BLACK RIVER ON SR 1532 (LANGDON ROAD)

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-11	BORE LOGS
12	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2006Q	1	12

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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PERSONNEL

CG2 EXPLORATION

S. PATTERSON, P.G.

INVESTIGATED BY CG2, PLLC

DRAWN BY S. PATTERSON, P.G.

CHECKED BY R. KRAL, P.E.

SUBMITTED BY CG2, PLLC

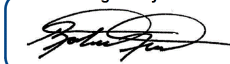
DATE MARCH 2023

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(980) 339-8684



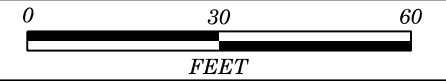
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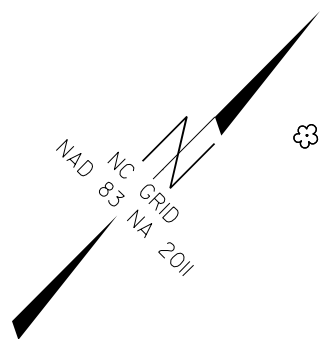
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DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, and INDURATION.

# SITE PLAN



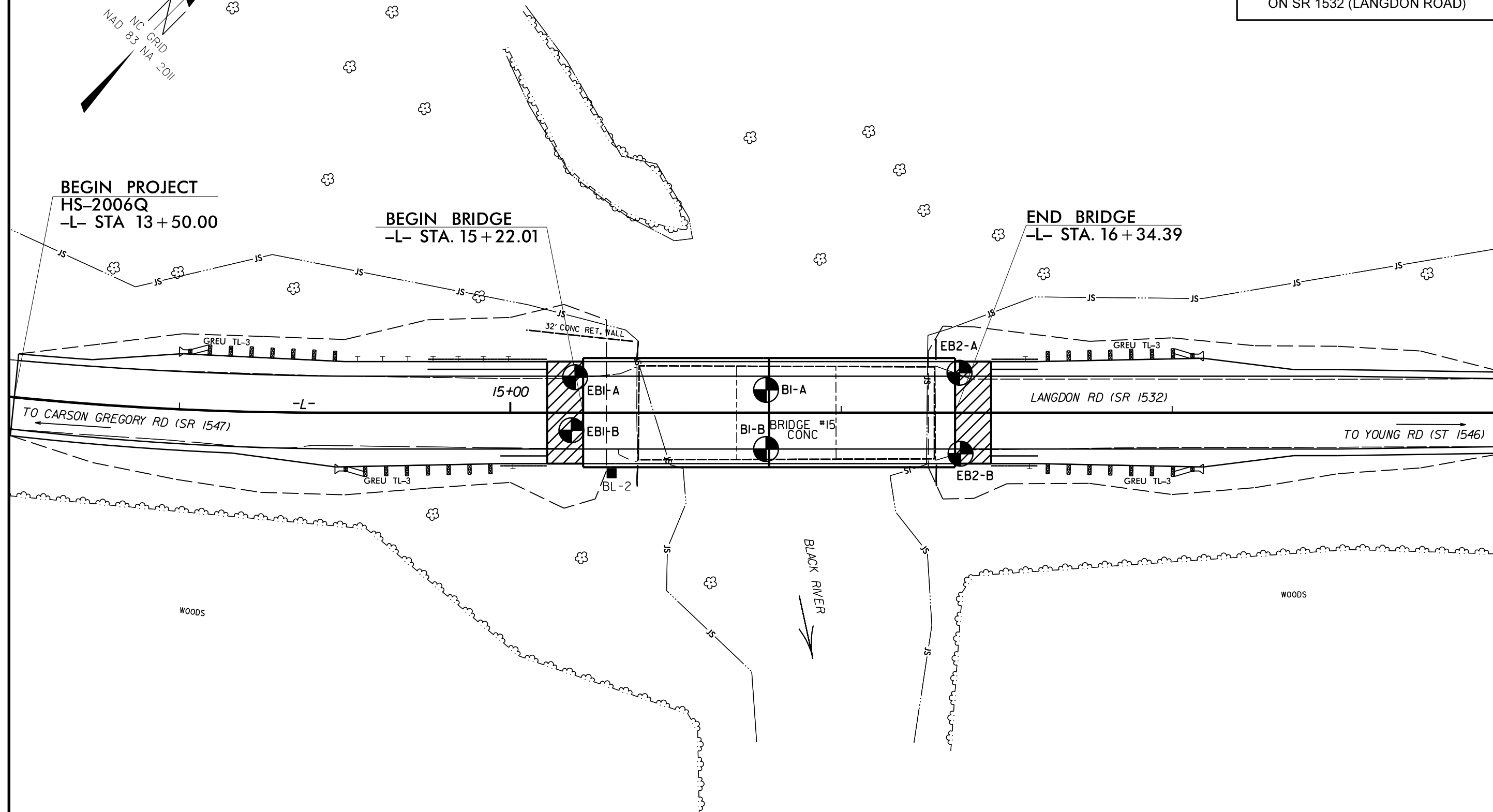
BRIDGE NO. 015 OVER BLACK RIVER  
ON SR 1532 (LANGDON ROAD)



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HS-2006Q  
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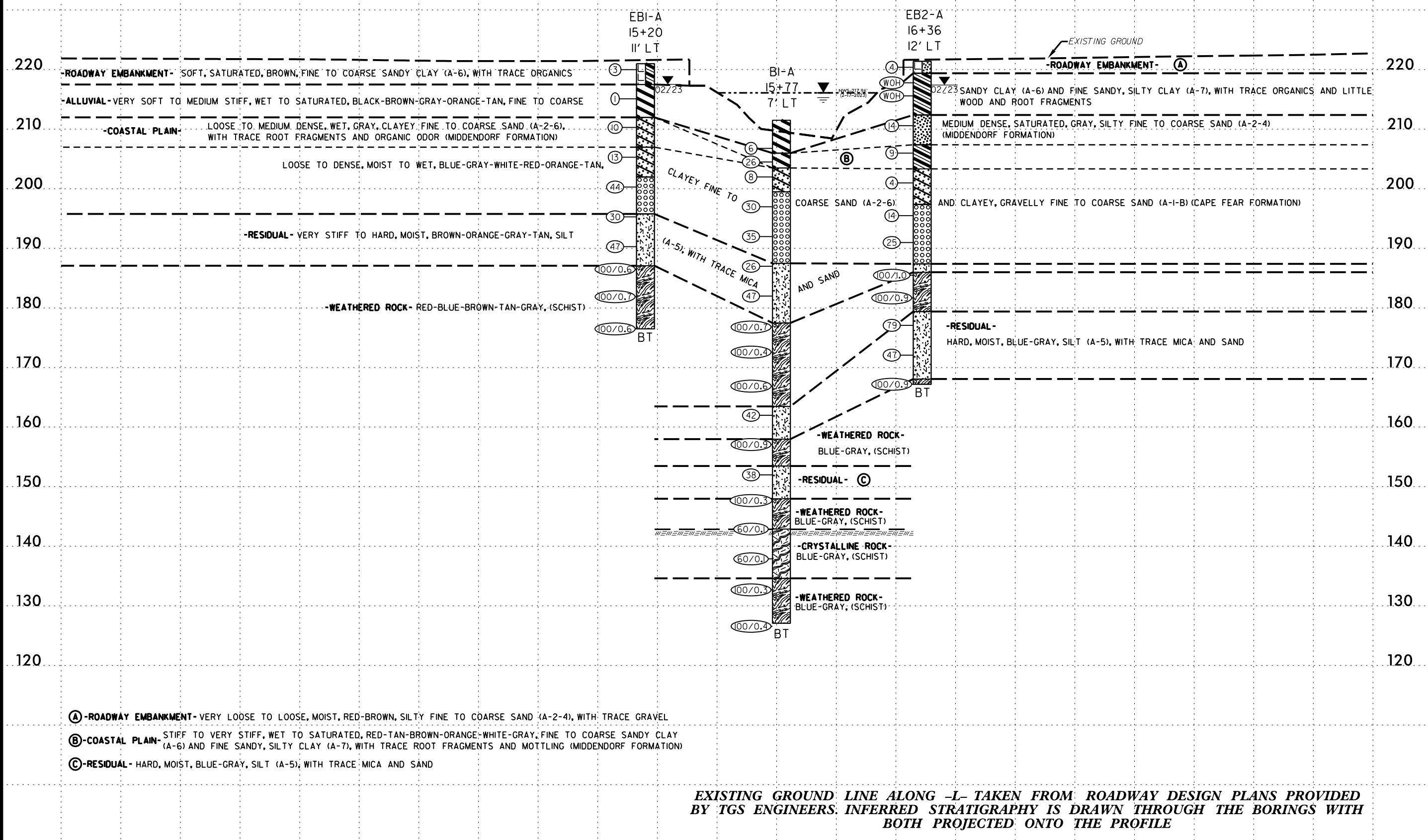
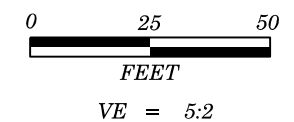
BEGIN BRIDGE  
-L- STA. 15+22.01

END BRIDGE  
-L- STA. 16+34.39





5/14/99



- Ⓐ -ROADWAY EMBANKMENT- VERY LOOSE TO LOOSE, MOIST, RED-BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL
- Ⓑ -COASTAL PLAIN- STIFF TO VERY STIFF, WET TO SATURATED, RED-TAN-BROWN-ORANGE-WHITE-GRAY, FINE TO COARSE SANDY CLAY (A-6) AND FINE SANDY, SILTY CLAY (A-7), WITH TRACE ROOT FRAGMENTS AND MOTTLING (MIDDENDORF FORMATION)
- Ⓒ -RESIDUAL- HARD, MOIST, BLUE-GRAY, SILT (A-5), WITH TRACE MICA AND SAND

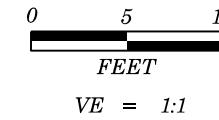
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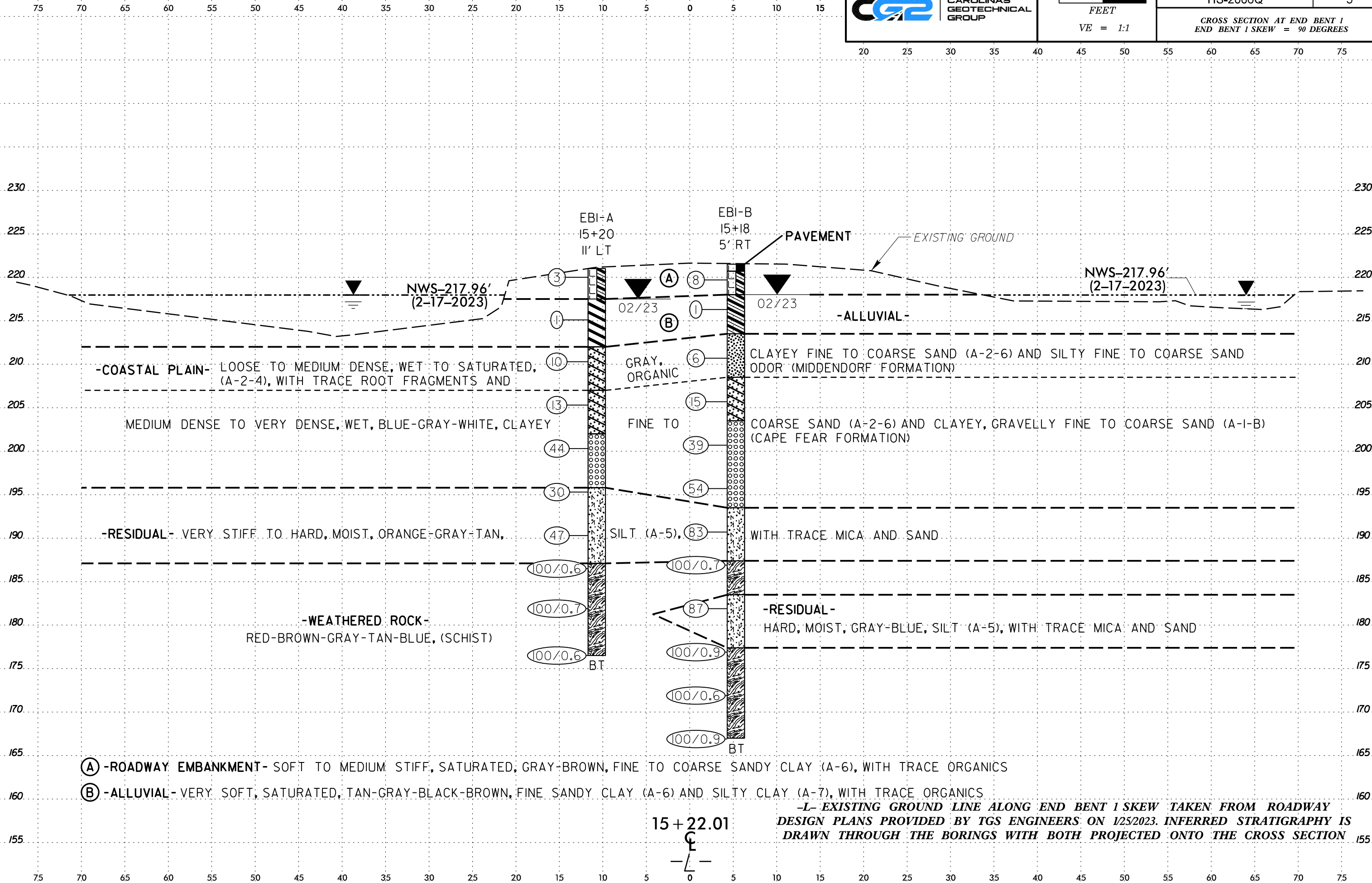
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PROJECT REFERENCE NO. SHEET NO.

HS-2006Q 5

CROSS SECTION AT END BENT 1  
END BENT 1 SKEW = 90 DEGREES

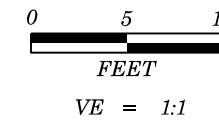


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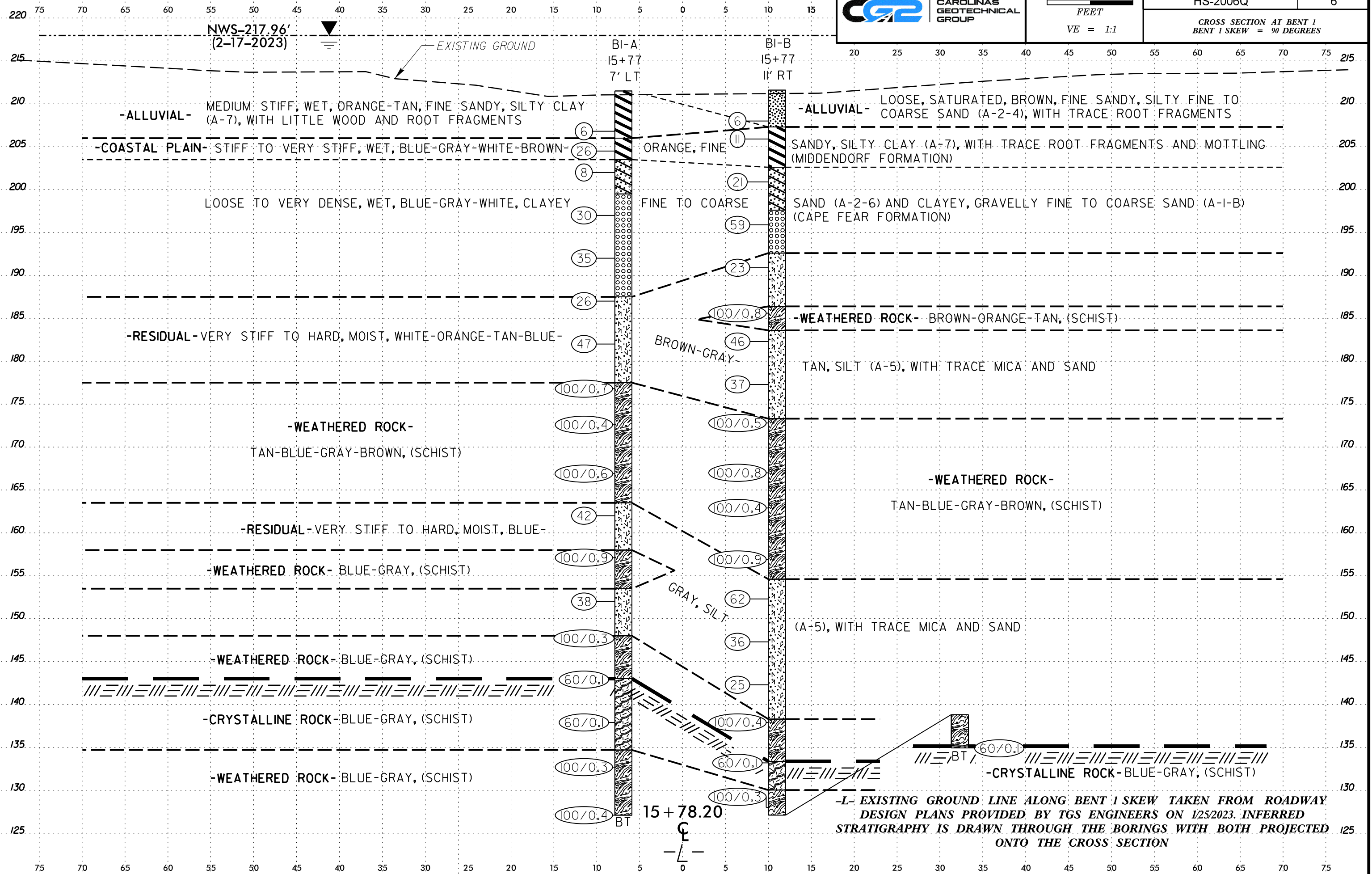
Prepared in the Office of:



PROJECT REFERENCE NO. SHEET NO.

HS-2006Q 6

CROSS SECTION AT BENT 1 BENT 1 SKEW = 90 DEGREES



NWS-217.96' (2-17-2023)

EXISTING GROUND

BI-A 15+77 7' LT

BI-B 15+77 11' RT

-ALLUVIAL- MEDIUM STIFF, WET, ORANGE-TAN, FINE SANDY, SILTY CLAY (A-7), WITH LITTLE WOOD AND ROOT FRAGMENTS

-ALLUVIAL- LOOSE, SATURATED, BROWN, FINE SANDY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE ROOT FRAGMENTS

-COASTAL PLAIN- STIFF TO VERY STIFF, WET, BLUE-GRAY-WHITE-BROWN-

ORANGE, FINE

SANDY, SILTY CLAY (A-7), WITH TRACE ROOT FRAGMENTS AND MOTTLING (MIDDENDORF FORMATION)

LOOSE TO VERY DENSE, WET, BLUE-GRAY-WHITE, CLAYEY

FINE TO COARSE

SAND (A-2-6) AND CLAYEY, GRAVELLY FINE TO COARSE SAND (A-I-B) (CAPE FEAR FORMATION)

-RESIDUAL- VERY STIFF TO HARD, MOIST, WHITE-ORANGE-TAN-BLUE-

-WEATHERED ROCK- BROWN-ORANGE-TAN, (SCHIST)

BROWN-GRAY-

TAN, SILT (A-5), WITH TRACE MICA AND SAND

-WEATHERED ROCK-

TAN-BLUE-GRAY-BROWN, (SCHIST)

-WEATHERED ROCK-

TAN-BLUE-GRAY-BROWN, (SCHIST)

-RESIDUAL- VERY STIFF TO HARD, MOIST, BLUE-

-WEATHERED ROCK- BLUE-GRAY, (SCHIST)

GRAY, SILT

(A-5), WITH TRACE MICA AND SAND

-WEATHERED ROCK- BLUE-GRAY, (SCHIST)

-CRYSTALLINE ROCK- BLUE-GRAY, (SCHIST)

-WEATHERED ROCK- BLUE-GRAY, (SCHIST)

-CRYSTALLINE ROCK- BLUE-GRAY, (SCHIST)

-L- EXISTING GROUND LINE ALONG BENT 1 SKEW TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 1/25/2023. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

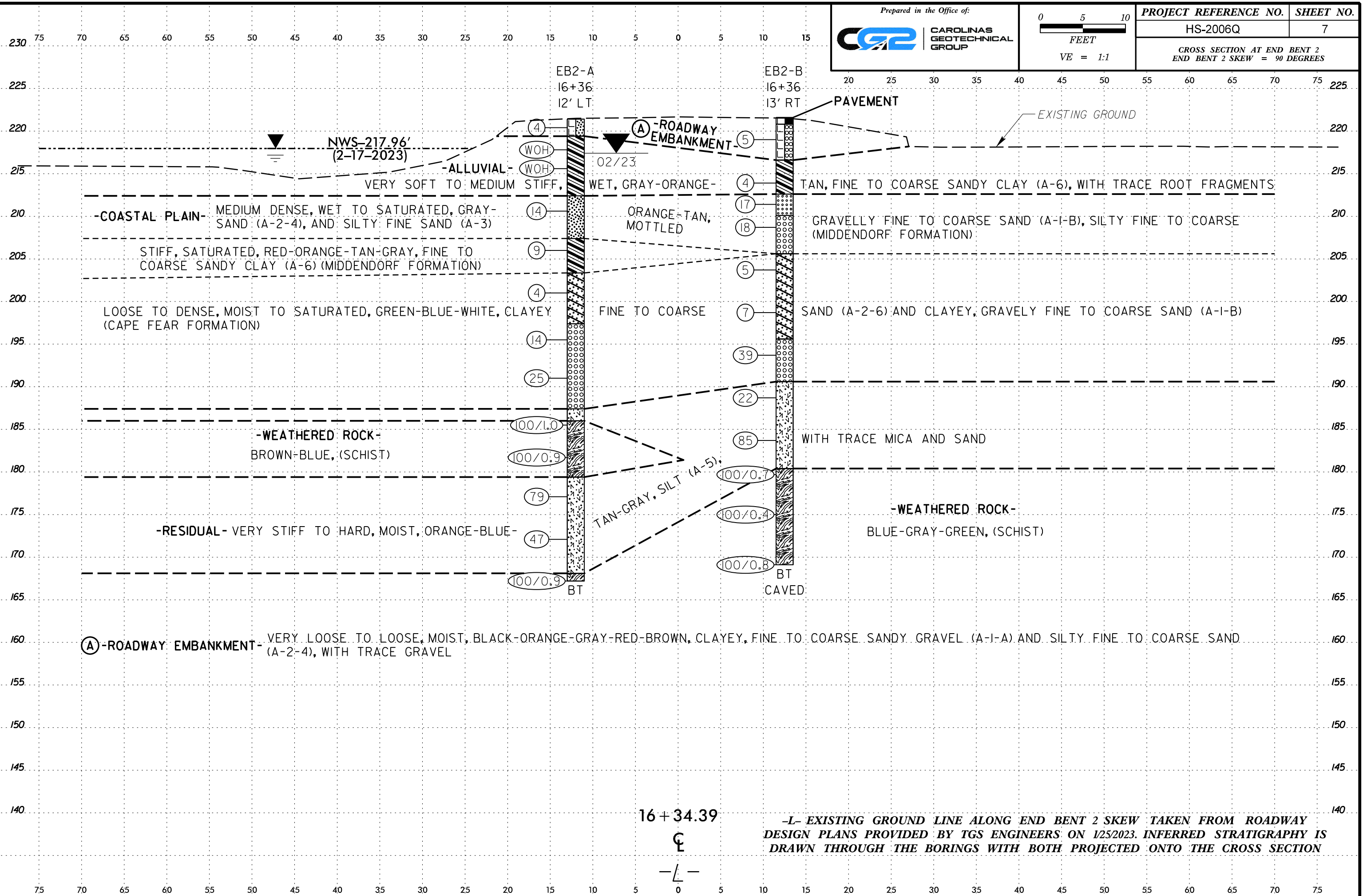
15 + 78.20

BT



6/23/16

22-MAR-2023 11:27 C:\Users\matt\OneDrive\Documents\Projects\0169 - Harnett\015\_TGS\CADD\GEO\TECH\Site\Sub\HS-2006Q\_GEO\_BRDC015\_HARNETT.XSL.dgn



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 00579838		TIP HS-2006Q		COUNTY HARNETT		GEOLOGIST S. Patterson, P.G.									
SITE DESCRIPTION Bridge No. 420015 over Black River on SR 1532 (Langdon Road)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 15+20		OFFSET 11 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 221.0 ft		TOTAL DEPTH 44.5 ft		NORTHING 625,362		EASTING 2,097,898									
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER C. Odom		START DATE 02/14/23		COMP. DATE 02/14/23		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
225															
220	221.0	0.0	2	1	2								Sat.	221.0 GROUND SURFACE 0.0	
														ROADWAY EMBANKMENT	
														Soft, Brown, Fine to Coarse Sandy CLAY (A-6), with trace organics	
215	216.1	4.9	WOH	WOH	1								Sat.	217.5 ALLUVIAL 3.5	
														Very Soft, Black-Brown, Silty CLAY (A-7), with trace organics	
210	211.3	9.7												212.0 COASTAL PLAIN 9.0	
														Loose to Medium Dense, Gray, Clayey Fine to Coarse SAND (A-2-6), with trace root fragments and organic odor (Middendorf Formation)	
205	206.3	14.7	3	6	7									207.0 Medium Dense, Blue-Gray-White, Clayey Fine to Coarse SAND (A-2-6) (Cape Fear Formation) 14.0	
200	201.3	19.7	10	18	26									202.0 Dense, Blue-Gray-White, Clayey, Gravelly Fine to Coarse SAND (A-1-b) (Cape Fear Formation) 19.0	
195	196.3	24.7	8	18	12									195.8 RESIDUAL 25.2	
														Very Stiff to Hard, Orange-Gray-Tan, SILT (A-5), with trace mica and sand	
190	191.3	29.7	9	17	30										
185	187.6	33.4	23	60	40/0.1									187.1 WEATHERED ROCK 33.9	
														Red-Blue-Brown-Tan, (SCHIST)	
180	182.6	38.4	50	50/0.2											
	177.6	43.4	25	70	30/0.1									176.5 Boring Terminated at Elevation 176.5 ft In Weathered Rock (SCHIST) 44.5	

WBS 00579838		TIP HS-2006Q		COUNTY HARNETT		GEOLOGIST S. Patterson, P.G.									
SITE DESCRIPTION Bridge No. 420015 over Black River on SR 1532 (Langdon Road)							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 15+18		OFFSET 5 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 221.5 ft		TOTAL DEPTH 54.5 ft		NORTHING 625,350		EASTING 2,097,909									
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER C. Odom		START DATE 02/14/23		COMP. DATE 02/14/23		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
225															
220	220.7	0.8	3	5	3									221.5 GROUND SURFACE 0.0	
														220.7 Asphalt (0.8 ft) 0.8	
														ROADWAY EMBANKMENT	
														Medium Stiff, Gray-Brown, Fine Sandy CLAY (A-6)	
215	217.3	4.2	WOH	WOH	1									218.0 ALLUVIAL 3.5	
														Very Soft, Tan-Gray, Fine Sandy CLAY (A-6)	
210	211.7	9.8	2	3	3									213.5 COASTAL PLAIN 8.0	
														Loose, Gray, Silty Fine to Coarse SAND (A-2-4) (Middendorf Formation)	
205	206.7	14.8	6	7	8									208.5 Medium Dense, Gray-White, Clayey Fine to Coarse SAND (A-2-6) (Cape Fear Formation) 13.0	
200	201.7	19.8	11	17	22									203.5 Dense to Very Dense, Blue-Gray-White, Clayey, Gravelly Fine to Coarse SAND (A-1-b) (Cape Fear Formation) 18.0	
195	196.7	24.8	12	22	32										
190	191.7	29.8	16	27	56									193.5 RESIDUAL 28.0	
														Hard, Gray-Tan, SILT (A-5), with trace mica and sand	
185	187.9	33.6	24	59	41/0.2									187.4 WEATHERED ROCK 34.1	
														Gray-Tan, (SCHIST)	
180	182.9	38.6	20	33	54									183.5 RESIDUAL 38.0	
														Hard, Gray-Blue, SILT (A-5), with trace mica and sand	
175	177.9	43.6	18	41	59/0.4									177.4 WEATHERED ROCK 44.1	
														Tan-Blue, (SCHIST)	
170	172.9	48.6	20	70	30/0.1										
	167.9	53.6	20	80/0.4										167.0 Boring Terminated at Elevation 167.0 ft In Weathered Rock (SCHIST) 54.5	

NCDOT BORE DOUBLE HARNETT015.GPJ NC\_DOT.GDT 3/10/23







# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 00579838		TIP HS-2006Q		COUNTY HARNETT		GEOLOGIST S. Patterson, P.G.										
SITE DESCRIPTION Bridge No. 420015 over Black River on SR 1532 (Langdon Road)							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 16+36		OFFSET 12 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 221.4 ft		TOTAL DEPTH 54.2 ft		NORTHING 625,445		EASTING 2,097,980										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER C. Odom		START DATE 02/13/23		COMP. DATE 02/13/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
225																
220	221.4	0.0	3	2	2											
	218.8	2.6	WOH	WOH	WOH											
	216.6	4.8	WOH	WOH	WOH											
215																
	211.6	9.8	6	7	7											
210																
	207.0	14.4	3	3	6											
205																
	202.0	19.4	3	2	2											
200																
	196.5	24.9	6	7	7											
195																
	192.0	29.4	9	11	14											
190																
	186.5	34.9	14	20	80/0.5											
185																
	183.1	38.3	27	46	54/0.4											
180																
	178.1	43.3	20	33	46											
175																
	173.1	48.3	13	21	26											
170																
	168.1	53.3	18	82/0.4												

WBS 00579838		TIP HS-2006Q		COUNTY HARNETT		GEOLOGIST S. Patterson, P.G.										
SITE DESCRIPTION Bridge No. 420015 over Black River on SR 1532 (Langdon Road)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 16+36		OFFSET 13 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 221.6 ft		TOTAL DEPTH 52.5 ft		NORTHING 625,428		EASTING 2,097,997										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER J. Kiker		START DATE 02/09/23		COMP. DATE 02/10/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
225																
220	220.0	1.6	7	3	2											
215	214.9	6.7	1	2	2											
	212.4	9.2	16	10	7											
210	209.7	11.9	6	6	12											
205	204.7	16.9	3	2	3											
200	199.7	21.9	4	3	4											
195	194.7	26.9	11	18	21											
190	189.7	31.9	10	8	14											
185	184.7	36.9	14	27	58											
180	180.4	41.2	36	64/0.2												
175	175.4	46.2	100/0.4													
170	170.4	51.2	21	63	36/0.3											

NCDOT BORE DOUBLE HARNETT015.GPJ NC\_DOT.GDT 3/10/23



**SITE PHOTOS**



PHOTO #1: BRIDGE NO. 015 AT END BENT 1 (LT) LOOKING EAST (UPSTATION)



PHOTO #2: BRIDGE NO. 015 AT END BENT 1 (RT) LOOKING EAST (UPSTATION)



PHOTO #3: BRIDGE NO. 015 AT END BENT 2 LOOKING WEST (DOWNSTATION)