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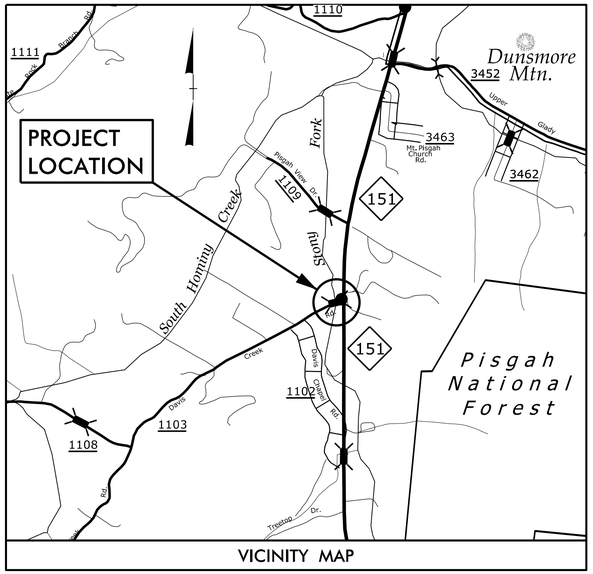
This file or an individual page shall not be considered a certified document.

09/08/49

T.I.P NO.: B-5396

CONTRACT: C203724



VICINITY MAP

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

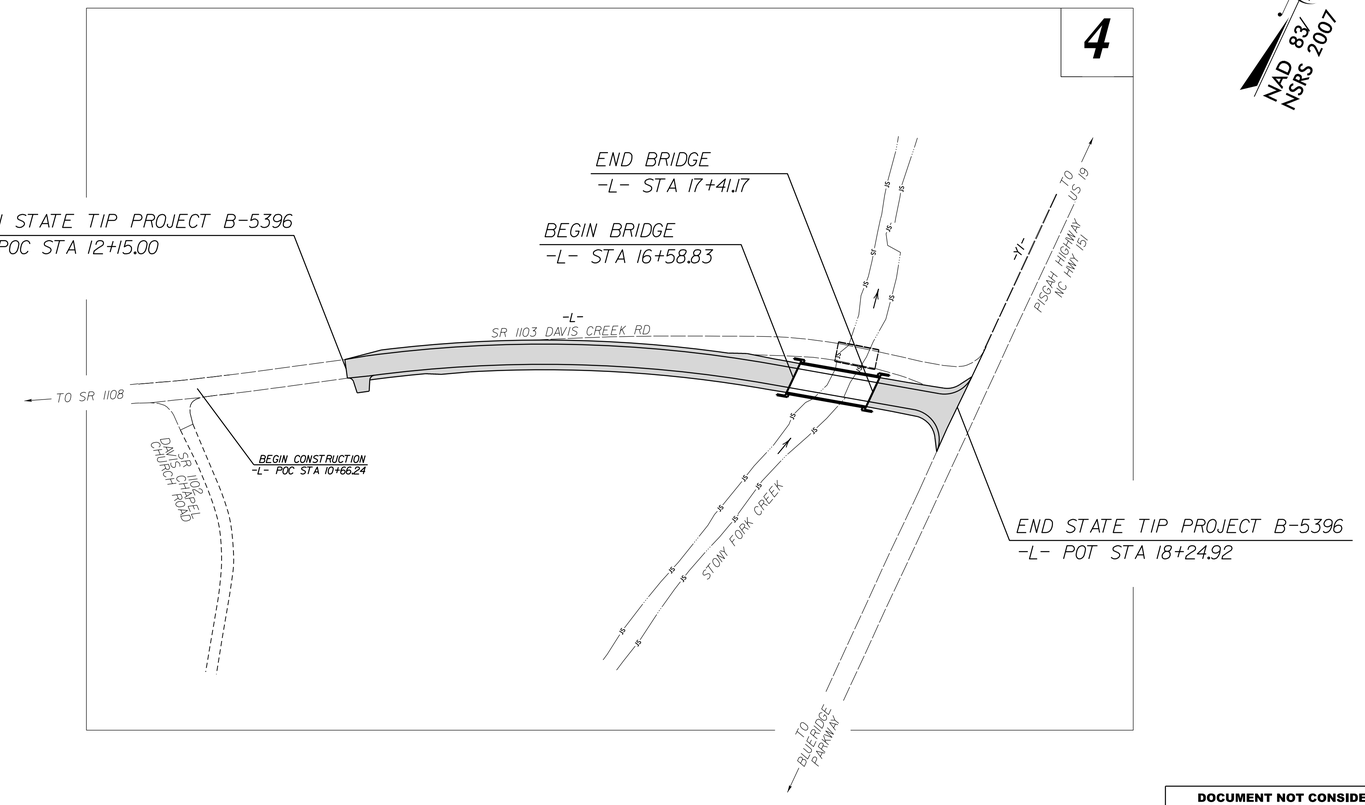
BUNCOMBE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5396	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46111.1.1	BRZ-1103(24)	PE
46111.2.FD1	BRZ-1103(24)	ROW & UTILITY
46111.3.FD1	BRZ-1103(24)	CONST.

LOCATION: ***BRIDGE NO. 416 OVER STONY FORK CREEK ON SR 1103***

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



NAD 83/ NSRS 2007

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

2016 ADT = 1370
2036 ADT = 1645
K = 11%
D = 75%
T = 7% *
V = 30 MPH
* TTST 1% DUAL 6%
FUNC. CLASS = RURAL LOCAL

SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT B-5396	=	0.100 mi.
LENGTH STRUCTURES STATE PROJECT B-5396	=	0.016 mi.
TOTAL LENGTH STATE PROJECT B-5396	=	0.116 mi.

Prepared in the Office of:

STEWART
421 FAYETTEVILLE ST, STE 400
RALEIGH, NC 27601
T 919.380.8750
Firm License #: C-1051
www.stewartinc.com
PROJECT #:H14001.00

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 17, 2015

LETTING DATE:
APRIL 19, 2016

DOUG TAYLOR, PE
PROJECT ENGINEER

MICHAEL BURNS, EI
PROJECT DESIGN ENGINEER

REKHA PATEL, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20147 ENGINEER FRANK F. FLEMING

3/1/2016

DocuSigned by: Frank F Fleming P.E.
SIGNATURE

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 030984 ENGINEER BRYAN DOUGLAS TAYLOR

2/29/2016

DocuSigned by: Bryan Douglas Taylor P.E.
SIGNATURE

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

2/29/2016
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USER:dayoung

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 030984 ENGINEER BRYAN DOUGLAS TAYLOR

2/29/2016

DocuSigned by:
Bryan Douglas Taylor
21A622FAB4D4408...

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INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1C-1 THRU 1C-2	SURVEY CONTROL SHEETS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1	GUARDRAIL ANCHOR UNIT DETAIL
2C-2	SPECIAL FENCE FOR STREAM CROSSING
2G-1	TEMPORARY SHORING DETAIL
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARY
3G-1	GEOTECHNICAL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-6	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1 THRU RF-3	REFORESTATION PLANS
SIGN-1	SIGNING PLANS
SIG-1 THRU SIG-2.2	SIGNAL PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-1A	CROSS SECTION SUMMARY SHEET
X-1 THRU X-4	CROSS SECTIONS
S-1 THRU S-18	STRUCTURE PLANS

EFF. 01-17-2012
REV. 10-30-2012

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.11	Reinforced Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
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
866.01	Chain Link Fence - 4', 5' and 6' High Fence
866.04	Barbed Wire Fence with Wood Posts (2 - 7 Strands)
876.02	Guide for Rip Rap at Pipe Outlets

GENERAL NOTES:

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

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

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.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

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

END BENTS:

THE SURVEYOR 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

HAYWOOD EMC

AT&T COMMUNICATIONS

CHARTER COMMUNICATIONS

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

2/29/2016
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...

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1-B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- 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 — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

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

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- 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 — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

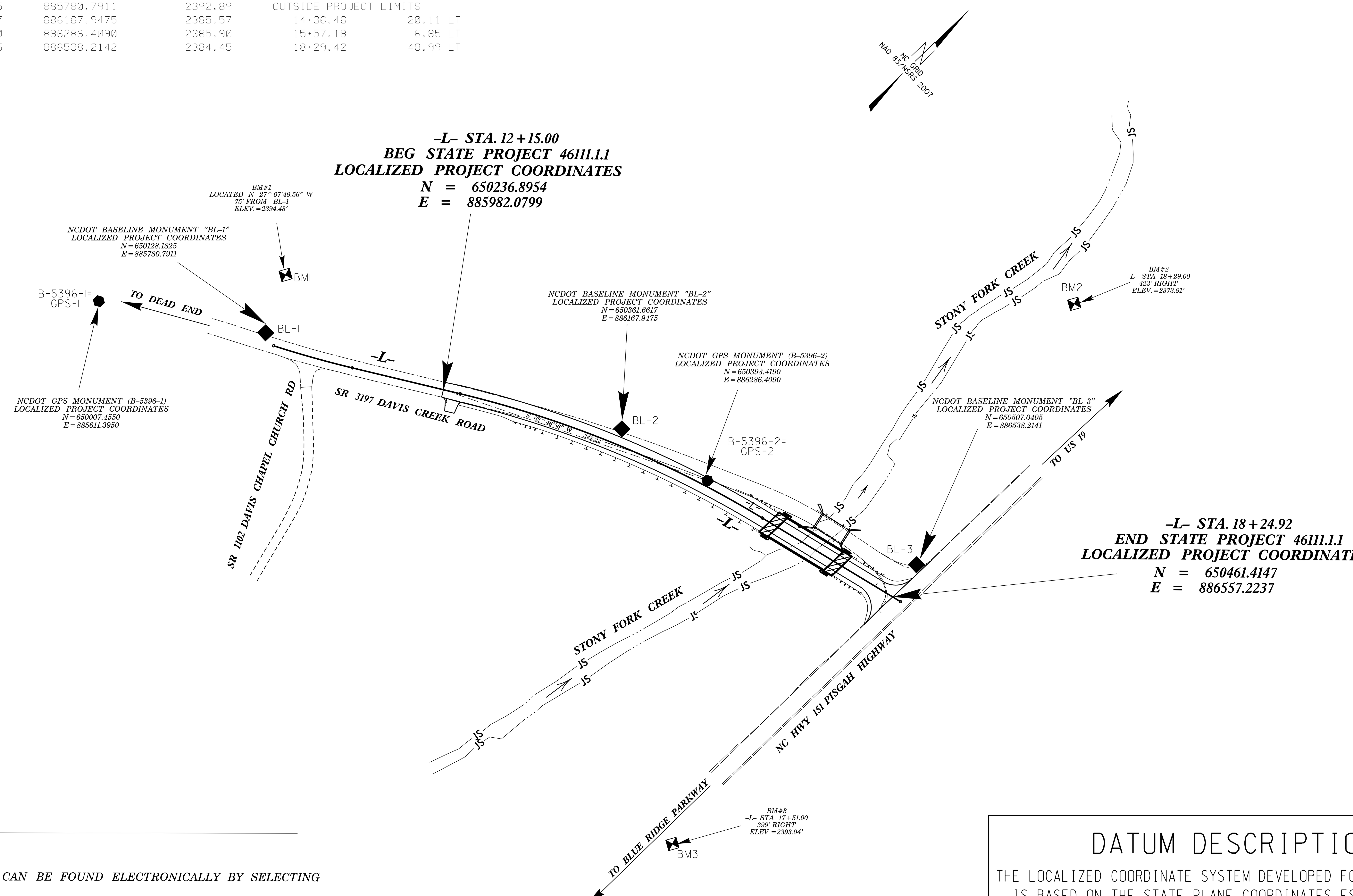
SURVEY CONTROL SHEET B–5396

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
GPS1	B5396-1	650007.4550	885611.3950	2401.38	OUTSIDE PROJECT LIMITS	
1	BL-1	650128.1825	885780.7911	2392.89	OUTSIDE PROJECT LIMITS	
2	BL-2	650361.6617	886167.9475	2385.57	14+36.46	20.11 LT
GPS2	B5396-2	650393.4190	886286.4090	2385.90	15+57.18	6.85 LT
3	BL-3	650507.0405	886538.2142	2384.45	18+29.42	48.99 LT

BM1 ELEVATION = 2394.43
N 650195 E 885747
LOCATED N 27°07'50" W DIST 75' FROM BL-1
8" SPIKE SET IN ROOT OF A 24" WALNUT TREE

BM2 ELEVATION = 2373.91
N 650868 E 886441
L STATION 18+29.00 423 LEFT
8" SPIKE SET IN ROOT OF A 20" DOUBLE PRONG LOCUST TREE

BM3 ELEVATION = 2393.04
N 650054 E 886578
L STATION 17+51.00 399 RIGHT
CONCRETE NAIL SET IN CENTER OF CONCRETE HEADWALL



NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B5396_LS_CONTROL.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

- *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
  PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
  NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-5396-2=GPS-2"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 650393.4190(ft) EASTING: 886286.4090(ft)
ELEVATION: 2385.90(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999668088
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-5396-2=GPS-2" TO -L- STATION 12+15.00 IS
S62°46'56"W 342.22'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

SURVEY CONTROL SHEET B-5396

(PRELIMINARY)

(DESIGN ALIGNMENTS)

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	650124.2226	885799.1138
PT	11+00.13	650175.0054	885885.3872
PC	12+36.27	650248.5300	885999.9627
PT	16+38.03	650410.2379	886365.9898
POT	18+35.99	650461.4147	886557.2237

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	650687.7647	886557.2945
POT	15+40.53	650147.2371	886557.1255

(PERMANENT EASEMENTS)

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+66.24	52.21	650112.4116	885883.6743
L	13+45.00	46.13	650262.5892	886115.4007
L	15+85.00	-46.45	650439.8330	886301.2327
L	15+85.00	-61.00	650453.7235	886296.9012
L	16+00.00	-61.00	650458.3118	886311.9197
L	16+00.00	-50.03	650447.8002	886315.0650

(ROW MARKERS)

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+00.00	40.00	650195.2756	885991.0385
L	12+00.00	-35.00	650258.3969	885950.5328
L	12+00.00	-13.00	650239.8813	885962.4145
L	12+00.00	15.00	650216.3161	885977.5366
L	12+36.27	40.00	650214.8654	886021.5657
L	12+36.27	-35.00	650277.9866	885981.0600
L	13+45.00	40.00	650268.0068	886112.5326
L	13+45.00	60.00	650250.3310	886121.8902
L	15+30.00	-35.00	650410.9529	886251.0929
L	16+00.00	60.00	650342.3899	886346.6054
L	16+38.03	-60.00	650468.1983	886350.4788
L	16+38.03	75.00	650337.7874	886385.3786
L	16+93.55	75.00	650352.1420	886439.0178
L	17+02.79	56.59	650372.3185	886443.1838
L	17+60.00	-43.50	650483.7941	886472.5718
L	17+60.00	-60.00	650499.7307	886468.3069

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	13+43.64	13.50	650344.1316	886543.6870

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+57.99	23.24	650132.8631	885861.4639
L	10+61.29	15.00	650141.6592	885860.1101
L	11+00.13	15.00	650162.3811	885893.4883

NOTES:

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PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

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8/17/99

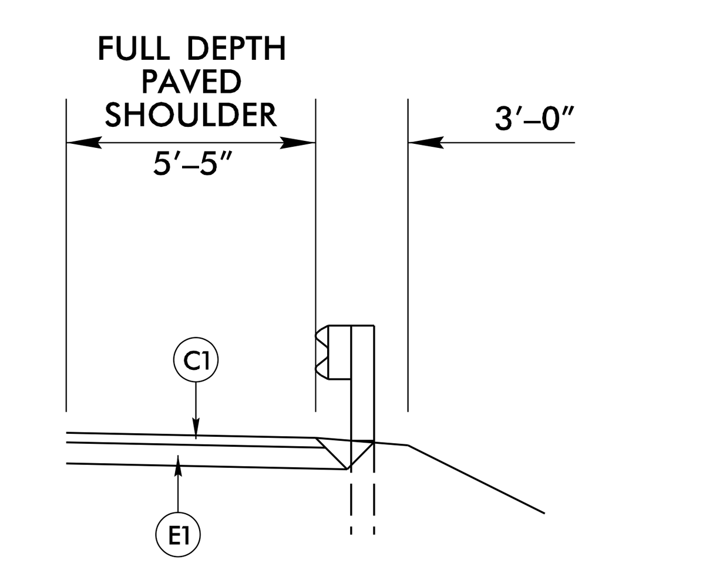
STEWART
Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030984 BRYAN DOUGLAS TAYLOR 2/29/2016	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22896 CLARK S. MORRISON /1/2016
DocuSigned by: Bryan Douglas Taylor	DocuSigned by: Clark Morrison

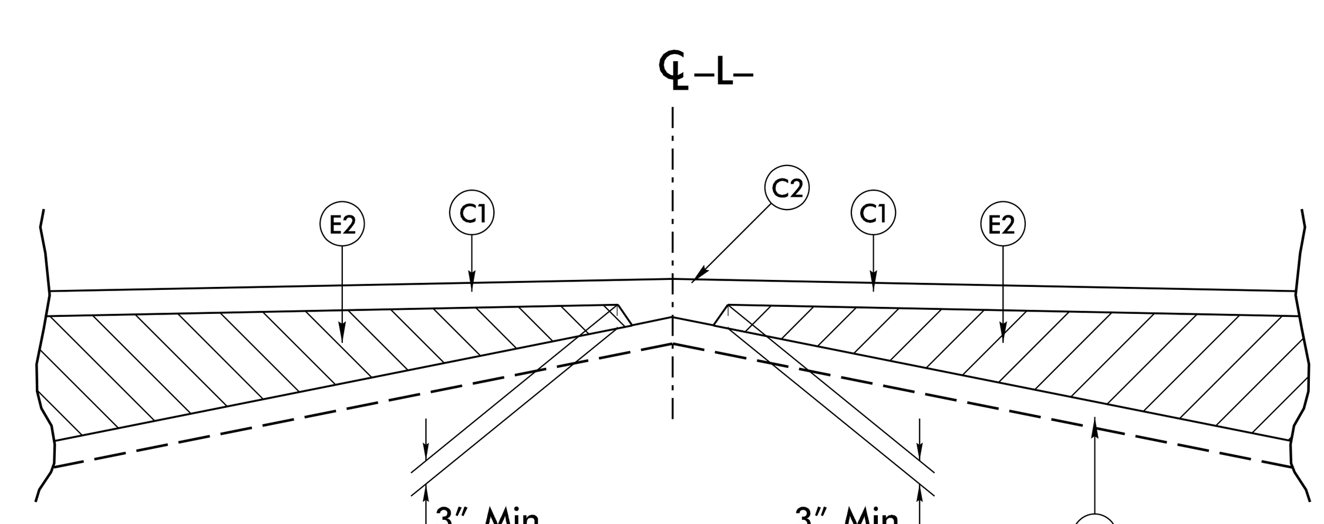
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	ASPHALT WEDGING (SEE DETAIL)

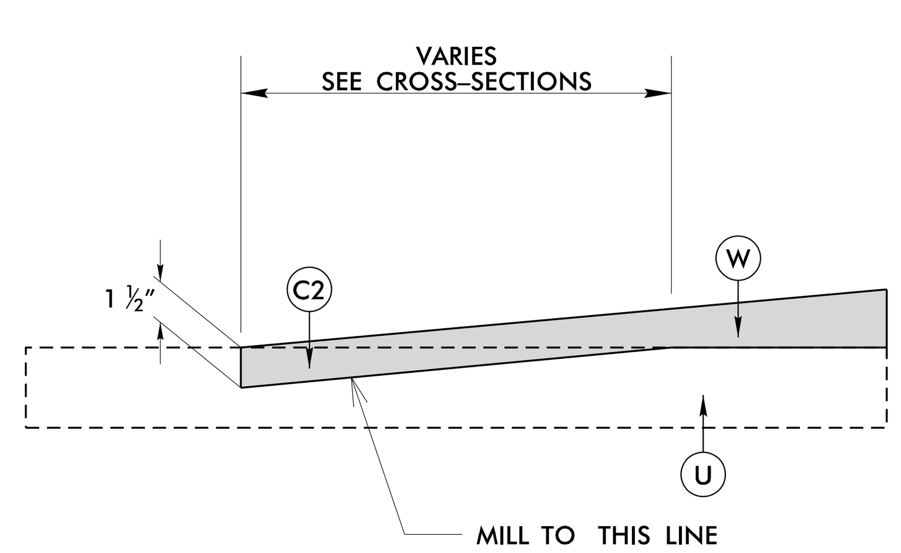
NOTE: PAVEMENT EDGE SLOPES ARE 1:1, UNLESS SHOWN OTHERWISE



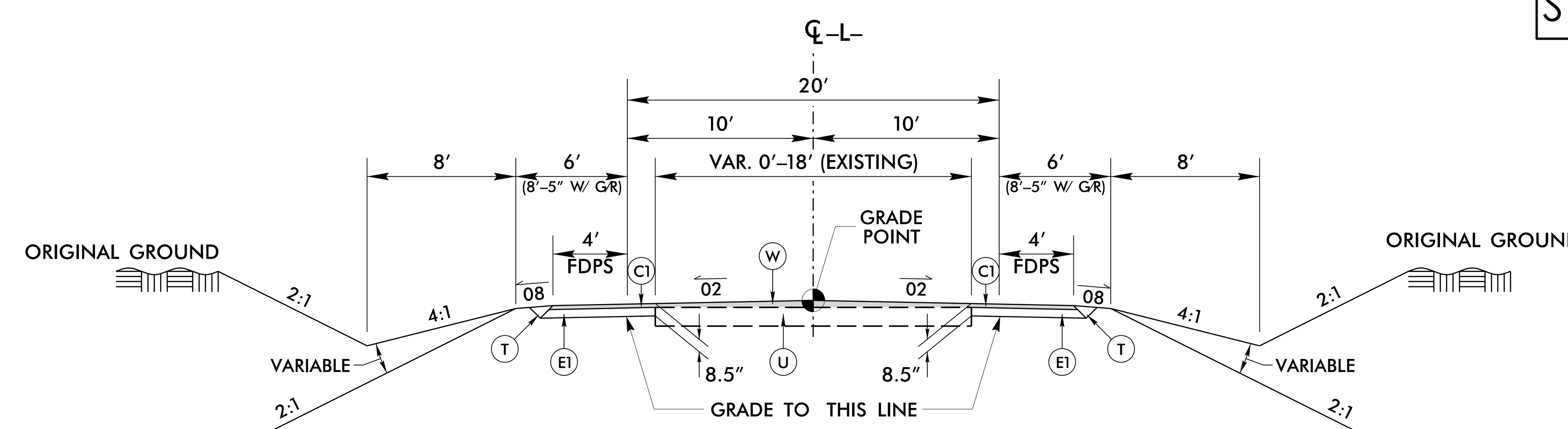
DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL



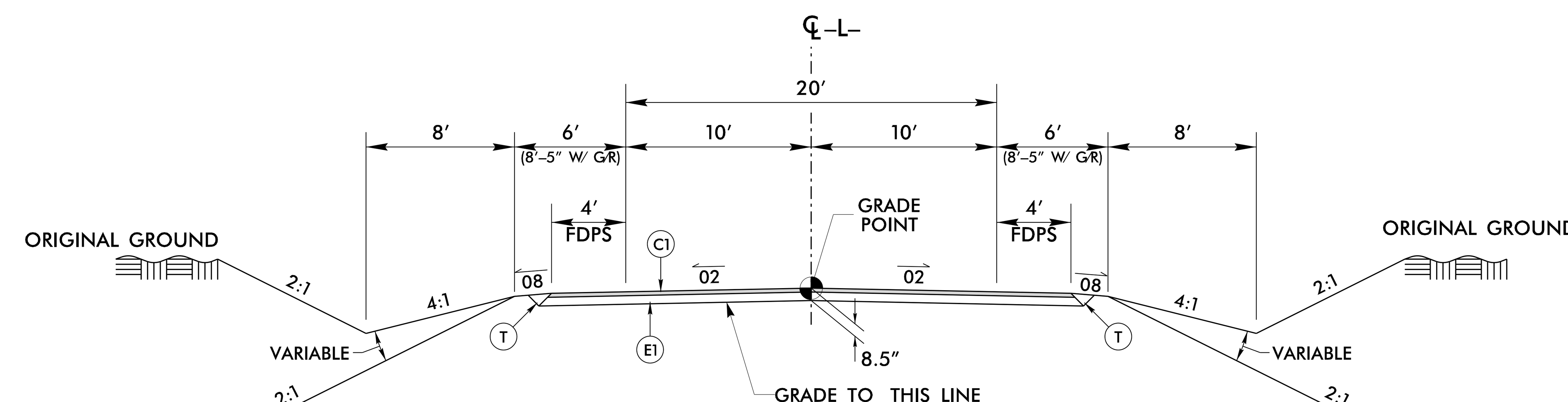
DETAIL SHOWING METHOD OF WEDGING



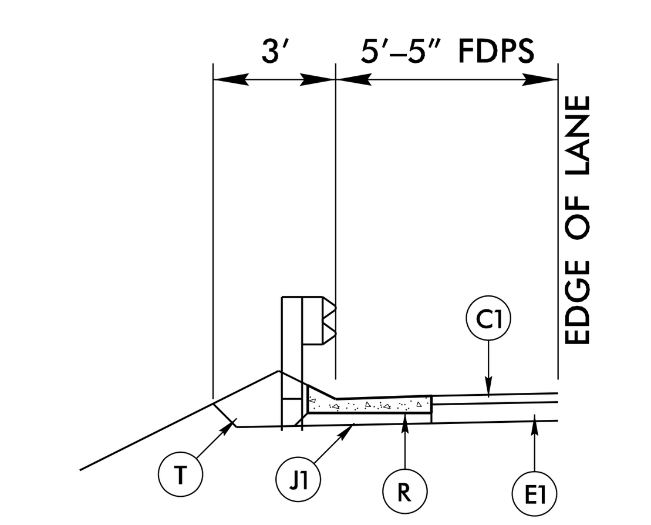
DETAIL SHOWING MILLED PAVEMENT TIE-IN



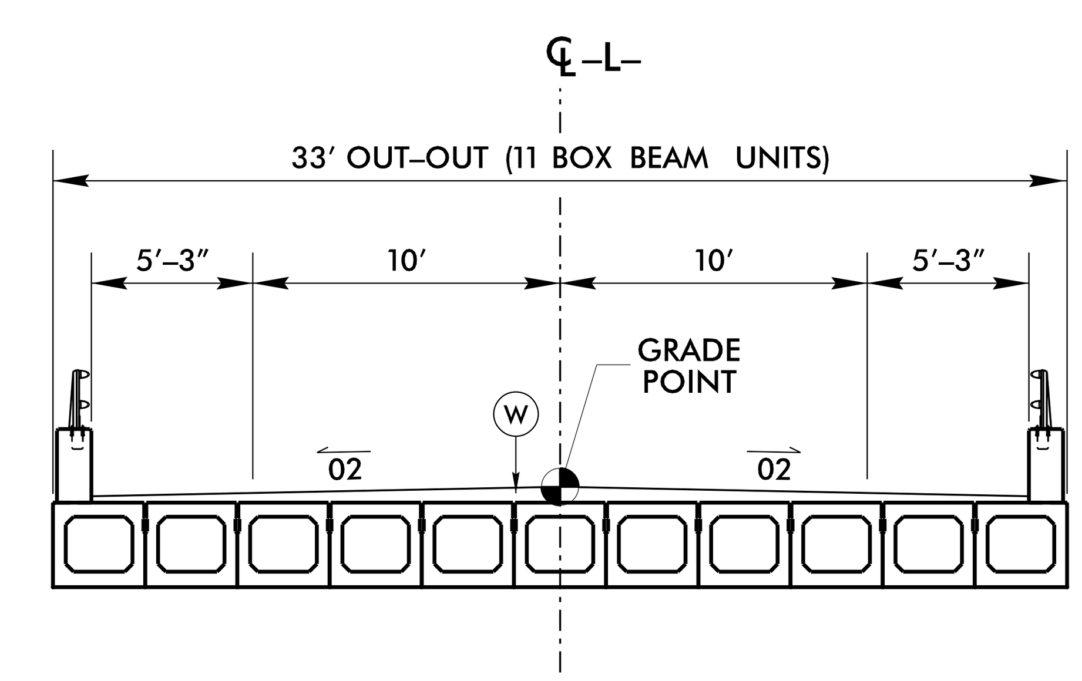
TYPICAL SECTION NO. 1
-L- STA. 12+15.00 TO -L- STA. 15+70.35



TYPICAL SECTION NO. 2
-L- STA. 15+70.35 TO -L- STA. 16+58.83 (BEGIN BRIDGE)
-L- STA. 17+41.17 (END BRIDGE) TO -L- STA. 18+24.92



DETAIL SHOWING GUARDRAIL WITH SHOULDER BERM GUTTER
-L- STA. 17+48.49 TO -L- STA. 17+62 (RIGHT)
-L- STA. 17+55.33 TO -L- STA. 17+70 (LEFT)

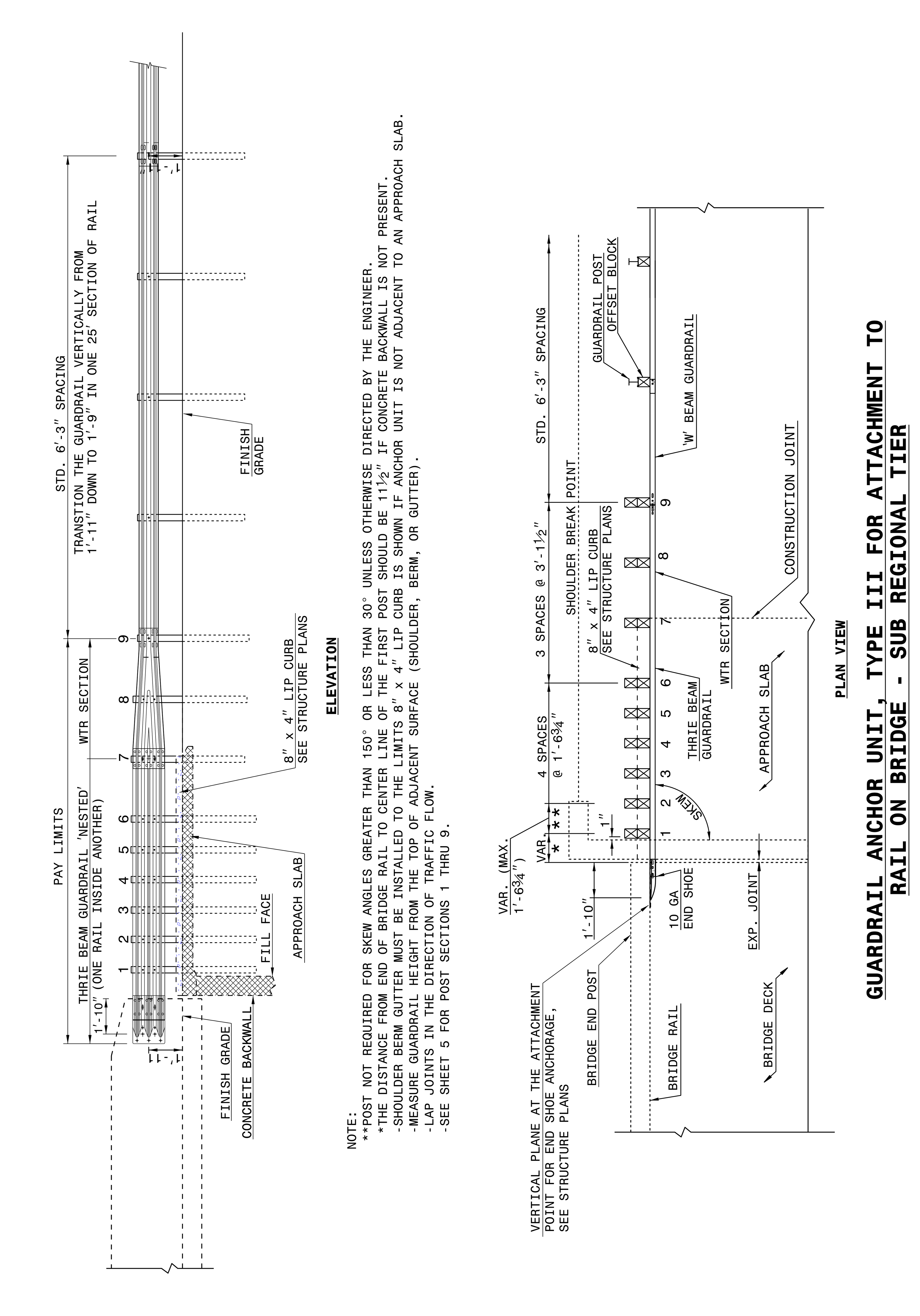


TYPICAL SECTION ON STRUCTURE
-L- STA. 16+58.83 TO -L- STA. 17+41.17

2/25/2016
...\Roadway\Proj\B5396_RDY_TYP.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2C-1

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

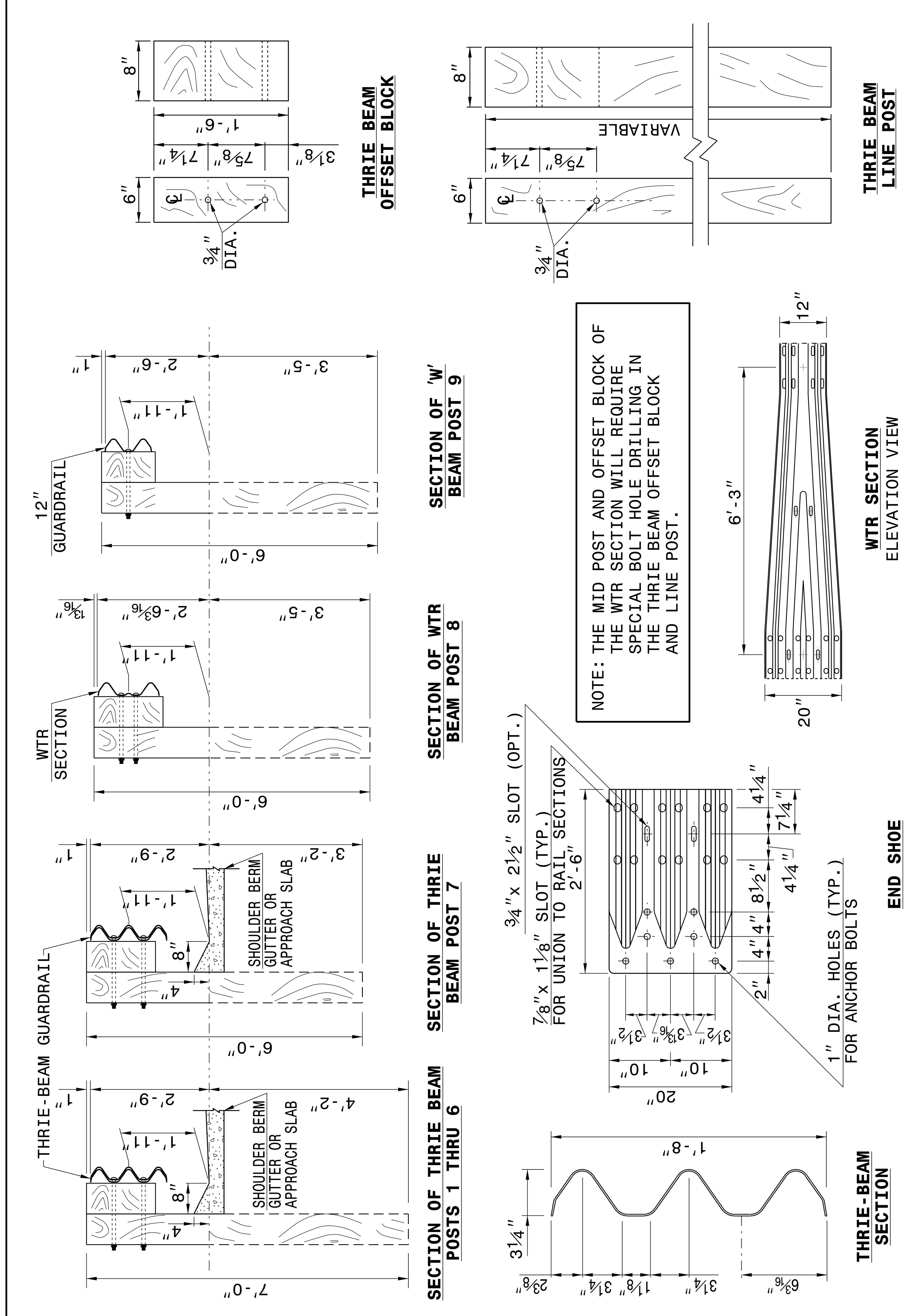


STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH 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.
ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III
SHEET 3 OF 7 862d03



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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 3 OF 7
862d03

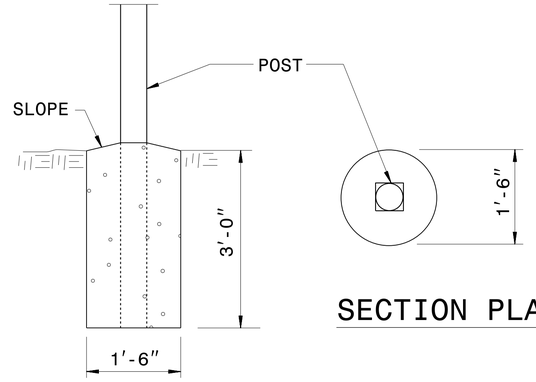
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton 3/2/2016
DocuSigned by: Joel Howerton, PE

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.:

PROJ. REFERENCE NO.	SHEET NO.
B-5396	2C-2

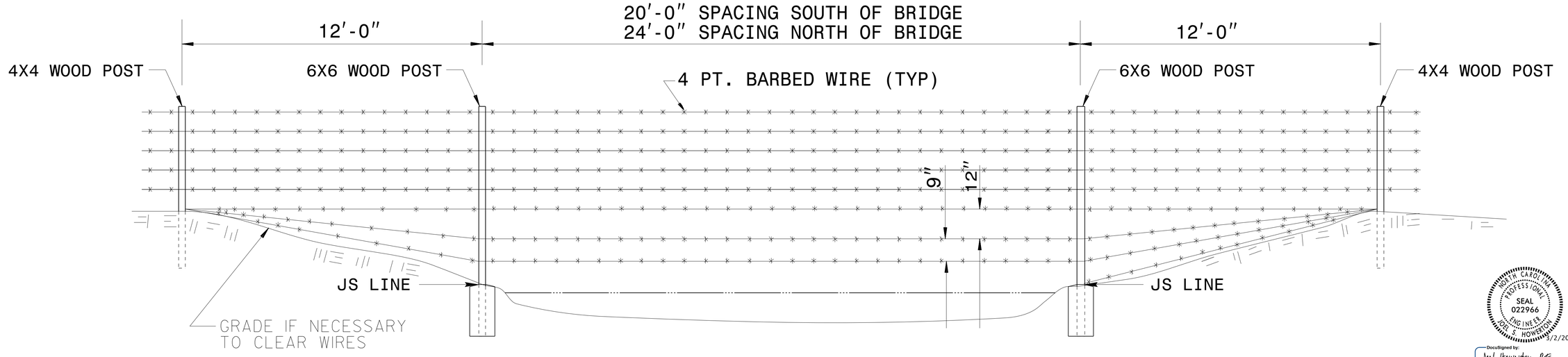


SECTION PLAN

DETAIL OF POST ANCHOR

- SEE R.S.D.N. 866.04 FOR FIVE STRAND BARBED WIRE FENCE

- STRAND SPACING AND PLACEMENT MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.



NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON

3/2/2016

DocuSigned by:
Joel Howerton, PE
87F3FD17DCDC45F...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

SPECIAL FENCE FOR STREAM CROSSING

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: KKEMPF DATE: 02-09-16
CHECKED BY: _____ DATE: _____
FILE SPEC.: kkempf/english/barbed wire stream crossing.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022246 SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 1/21/2016

F760CAE806FC4C6... SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

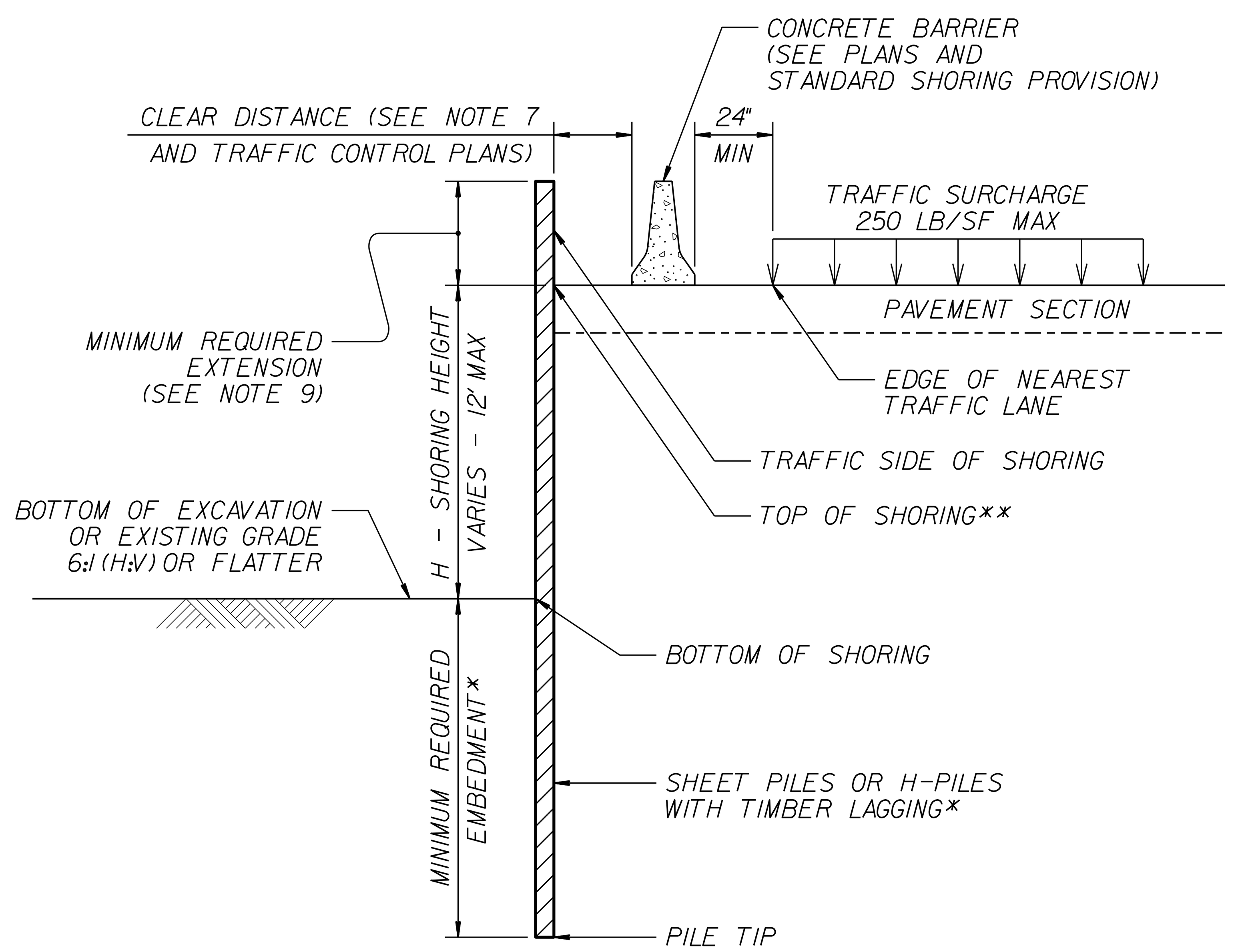
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED EMBEDMENT (FT)	SHEET PILES: MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	H-PILES WITH TIMBER LAGGING: MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10): HP 10x42	HP 12x53	HP 14x73	SURCHARGE CASE WITH TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED EMBEDMENT (FT)	SHEET PILES: MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	H-PILES WITH TIMBER LAGGING: MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10): HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

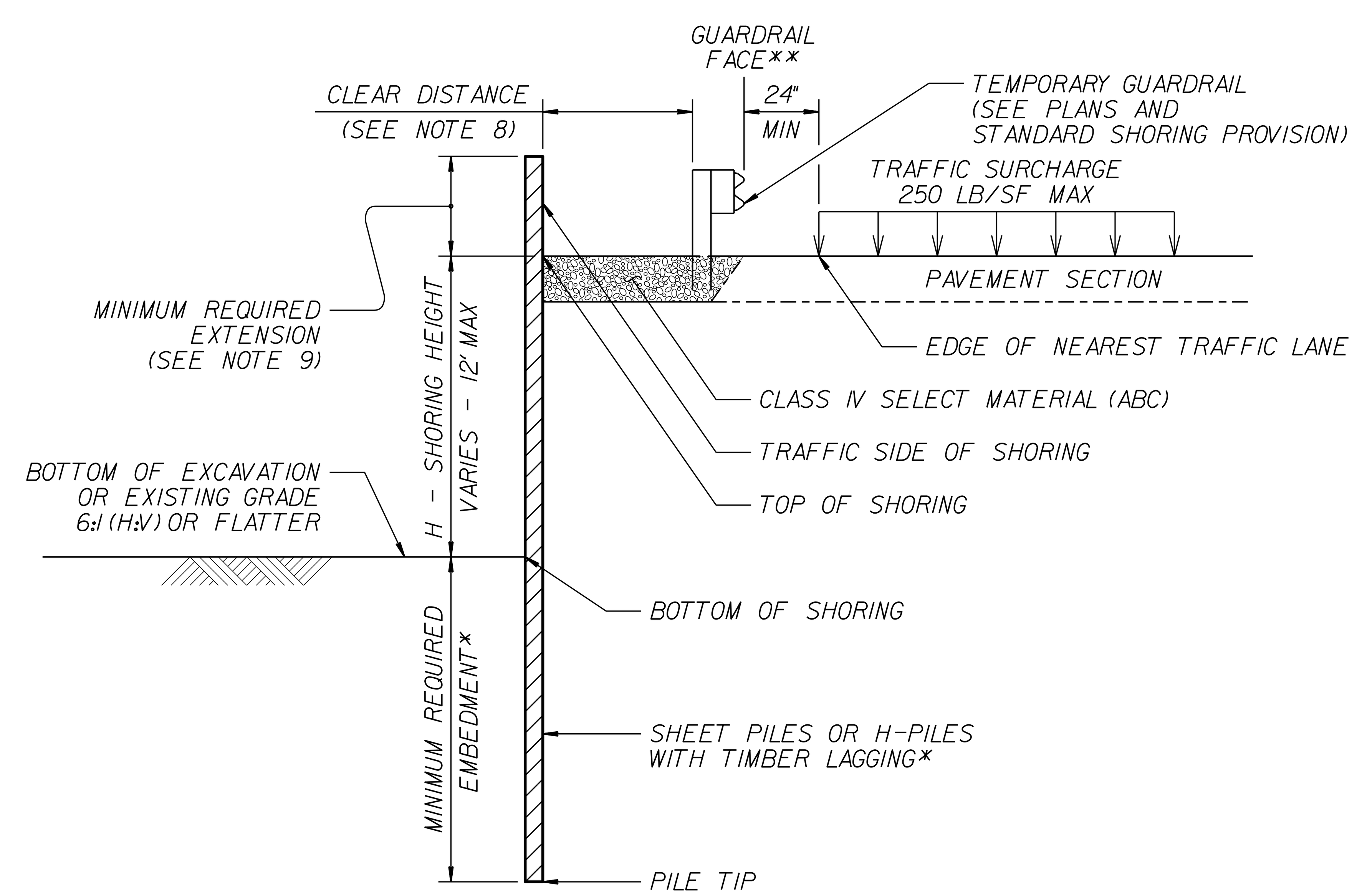
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT

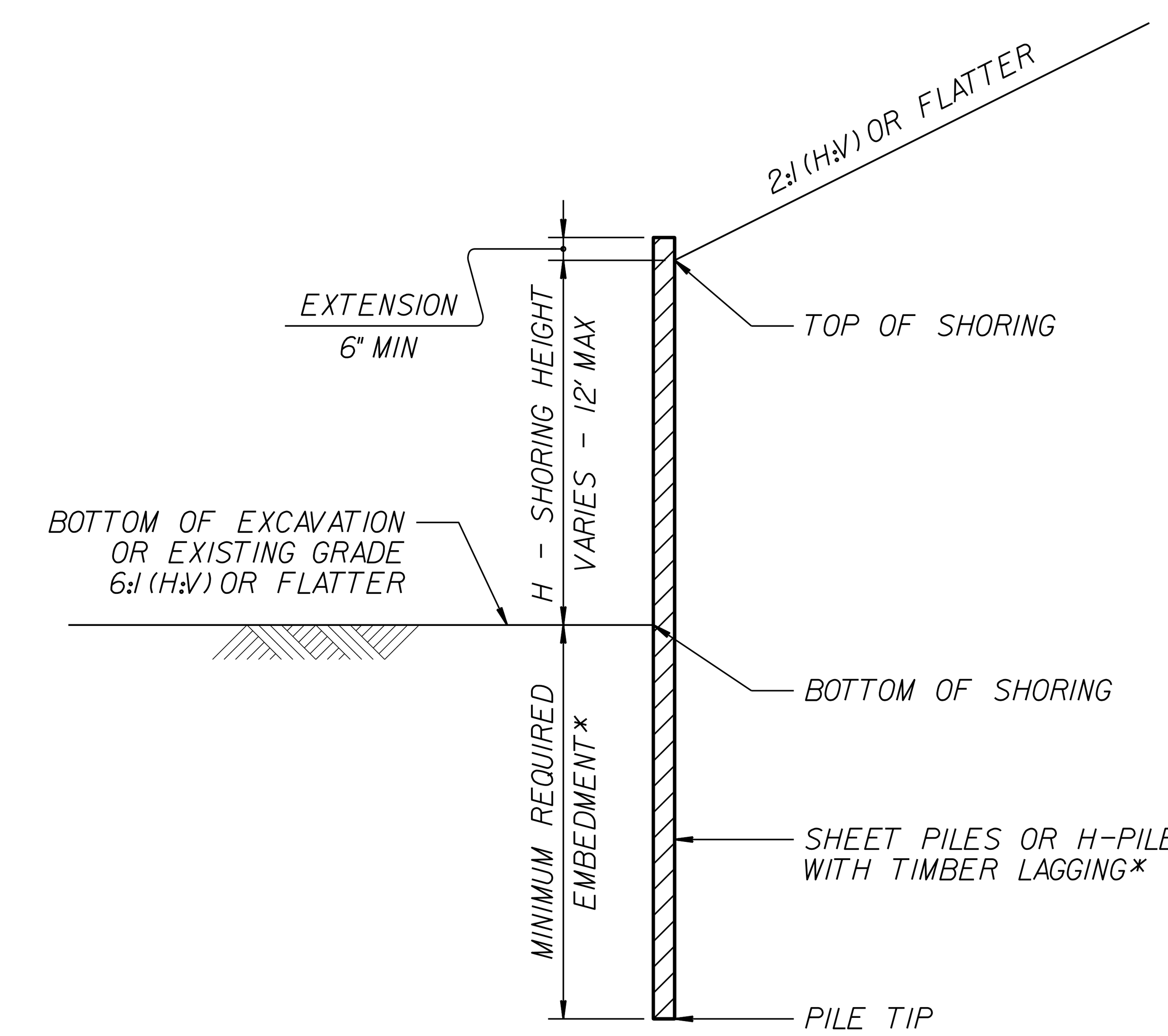


TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

8/17/99

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- Sta. 12+50.00 RT (PHASE I)	-L- Sta. 16+50.00 RT	21	1630	1609	
-L- Sta. 17+50.00 RT (PHASE I)	-L- Sta. 18+20.00 RT	84	75		9
-L- Sta. 12+50.00 LT (PHASE I)	-L- Sta. 14+00.00 LT	0	61	61	
SUBTOTALS:		105	1766	1670	9
-L- Sta. 14+00.00 (PHASE II)	-L- Sta. 16+50.00	93	70		23
-L- Sta. 17+50.00 (PHASE II)	-L- Sta. 18+20.00	31	25		6
SUBTOTALS:		124	95	0	29
TOTALS:		124	95	1670	38
USE WASTE IN LIEU OF BORROW				-9	-9
SUBTOTALS:		229	1861	1661	29
EST. 5% REPLACE TOPSOIL ON BORROW PIT				83	
GRAND TOTALS:		229		1744	
SAY:		**250**		**1750**	

DDE	100 CY
Undercut (Contingency)	150 CY
Geotextile for Soil Stabilization	300 SY
Shallow Undercut (Contingency)	100 CY
Class IV Subgrade Stabilization (Contingency)	200 Tons
Select Granular Material (Contingency)	100 CY

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION (LT/RT/CL)	ASPHALT REMOVAL (SQUARE YARDS)
-L-	12+20	19+98	LT	464.84
-L-	17+38.50	18+30	LT	247.99
		TOTAL:		712.83
		SAY:		725

SHOULDER BERM GUTTER SUMMARY

LINE	Station	Station	LENGTH
-L- (Right)	17+48.49 (End Approach Slab)	17+62	14
-L- (Left)	17+55.33 (End Approach Slab)	17+70	15
		TOTAL:	29
		SAY:	30

"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

GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350 TL-2	Type III							G	NG				
-L-	16+14.42	16+64.42 (BR)	LT	50				16+64.42 (Bridge)	5'-5"	8'-5"		25		0.5	1	1											
-L-	13+12.12	16+55.87 (BR)	RT	350			13+87		5'-5"	8'-5"	25		0.5		1	1											
-L-	17+44.42 (BR)	17+94.42	LT	50			17+44.42 (Bridge)		5'-5"	8'-5"	25		0.5		1	1											
-L-	17+35.58 (BR)	17+85.58	RT	50				17+35.58 (Bridge)	5'-5"	8'-5"		25		0.5	1	1											
			SUBTOTALS	500											4	4											
			LESS ANCHOR DEDUCTIONS:																								
			TYPE III (4 @ 18.75')	-75																							
			GRAU-350 TL-2 (4 @ 25')	-100																							
			GRAND TOTAL	325											4	4											
			SAY	**325**																							
			ADDITIONAL GUARDRAIL POSTS = 5 EA																								

REVISIONS

COMPUTED BY:	RBR	DATE:	1/16/2015
CHECKED BY:	ECOLOGICAL ENGINEERING, LLP	DATE:	1/16/2015

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-5396	3D-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
17+65 -L-	LT	0401		2385.55			
		0401	OUT1		2382.80	2382.74	
17+57 -L-	RT	0402		2385.57			
		0402	OUT2		2382.82	2382.75	
12+29 -L-	RT	0403					
SHEET TOTALS							

DRAINAGE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) and C.S. PIPE (SIZE / THICKNESS OR GAUGE)

STATION	FROM	TO	DDP 12"	DDP 15"	DDP 18"	DDP 24"	DDP 30"	DDP 36"	DDP 42"	DDP 48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. 12" .064	C.S. 15" .064	C.S. 18" .064	C.S. 24" .064	C.S. 30" .079	C.S. 36" .079	C.S. 42" .109	C.S. 48" .109
17+65 -L-	0401																					
	0401	OUT1																				
17+57 -L-	0402																					
	0402	OUT2																				
12+29 -L-	0403																					
SHEET TOTALS																						

R.C. PIPE CLASS III and R.C. PIPE CLASS IV

STATION	FROM	TO	III 12"	III 15"	III 18"	III 24"	III 30"	III 36"	III 42"	III 48"	IV 12"	IV 15"	IV 18"	IV 24"	IV 30"	IV 36"	IV 42"	IV 48"
17+65 -L-	0401																	
	0401	OUT1		12														
17+57 -L-	0402																	
	0402	OUT2		16														
12+29 -L-	0403																	
SHEET TOTALS				28														

STATION	FROM	TO	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	ENDWALLS CU. YARDS C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CONCRETE TRANSITIONAL SECTION CATCH BASIN
17+65 -L-	0401									1								
	0401	OUT1																
17+57 -L-	0402									1								
	0402	OUT2																
12+29 -L-	0403					20												
SHEET TOTALS						20				2								

STATION	FROM	TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	T.B.D.I. STD. 840.35			SIDE DRAIN PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
17+65 -L-	0401												1	1							
	0401	OUT1																			
17+57 -L-	0402												1	1							
	0402	OUT2																			
12+29 -L-	0403																				
SHEET TOTALS													2	2							

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: ____ pql 11/24/2014
CHECKED BY: ____________ DATE: ________

(11-19-13)

PROJECT NO.	SHEET NO.
B-5396	3G-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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	250
				TOTAL LF:	250

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

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		100	200	200**		
				TOTAL CY/TONS/SY:	100	200	200**	0	0

*ASU = Aggregate Subgrade
*AST = Aggregate Stabilization
**Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

REVISIONS

8/17/99

2/25/2016 ...\Proj\B5396_RDY_SUM_03G-1.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5396	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5396	5

ROADWAY DESIGN ENGINEER — SEAL 030984 — BRYAN DOUGLAS TAYLOR — Bryan Douglas Taylor

HYDRAULICS ENGINEER — SEAL 20147 — FRANK F. FLEMING — Frank F Fleming

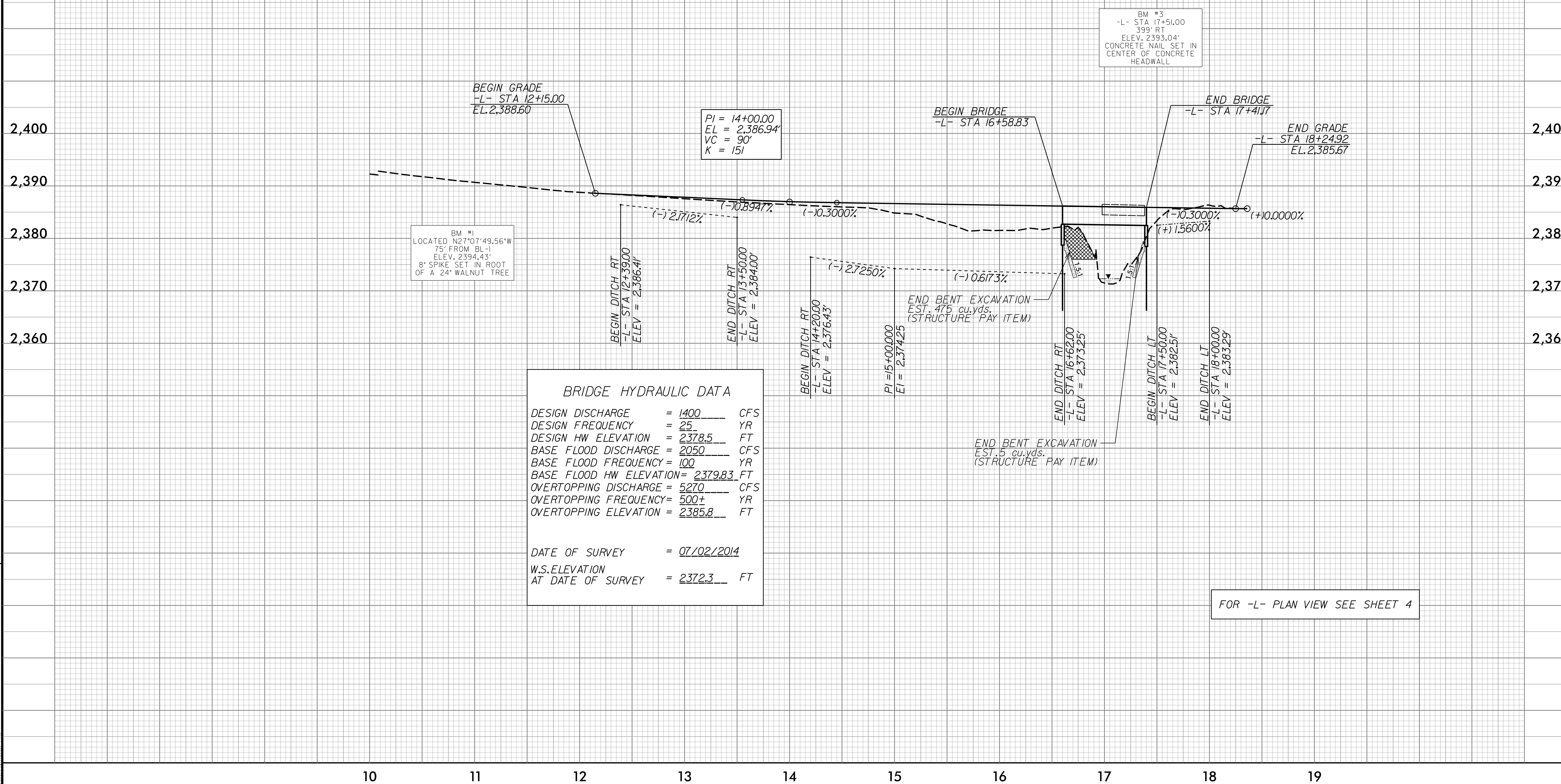
STEWART

ECOLOGICAL ENGINEERING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

-L-



BRIDGE HYDRAULIC DATA

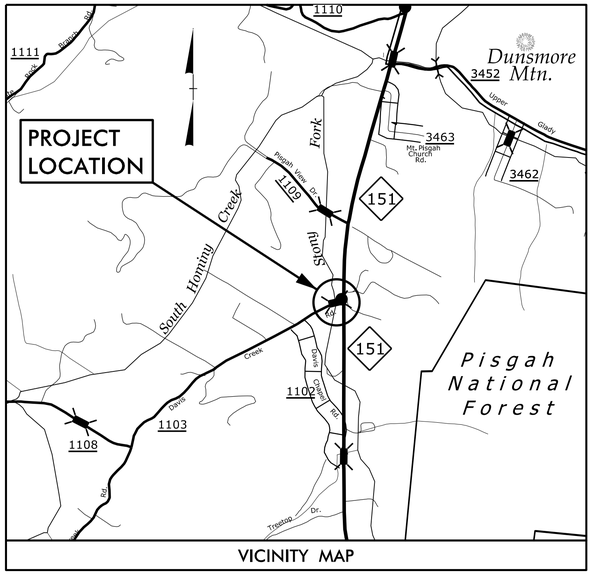
DESIGN DISCHARGE	=	1400	CFS
DESIGN FREQUENCY	=	25	YR
DESIGN HW ELEVATION	=	2378.5	FT
BASE FLOOD DISCHARGE	=	2050	CFS
BASE FLOOD FREQUENCY	=	100	YR
BASE FLOOD HW ELEVATION	=	2379.83	FT
OVERTOPPING DISCHARGE	=	5270	CFS
OVERTOPPING FREQUENCY	=	500+	YR
OVERTOPPING ELEVATION	=	2385.8	FT
DATE OF SURVEY	=	07/02/2014	
W.S.ELEVATION AT DATE OF SURVEY	=	2372.3	FT

FOR -L- PLAN VIEW SEE SHEET 4

09/08/49

T.I.P NO.: B-5396

CONTRACT: C203724



VICINITY MAP

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

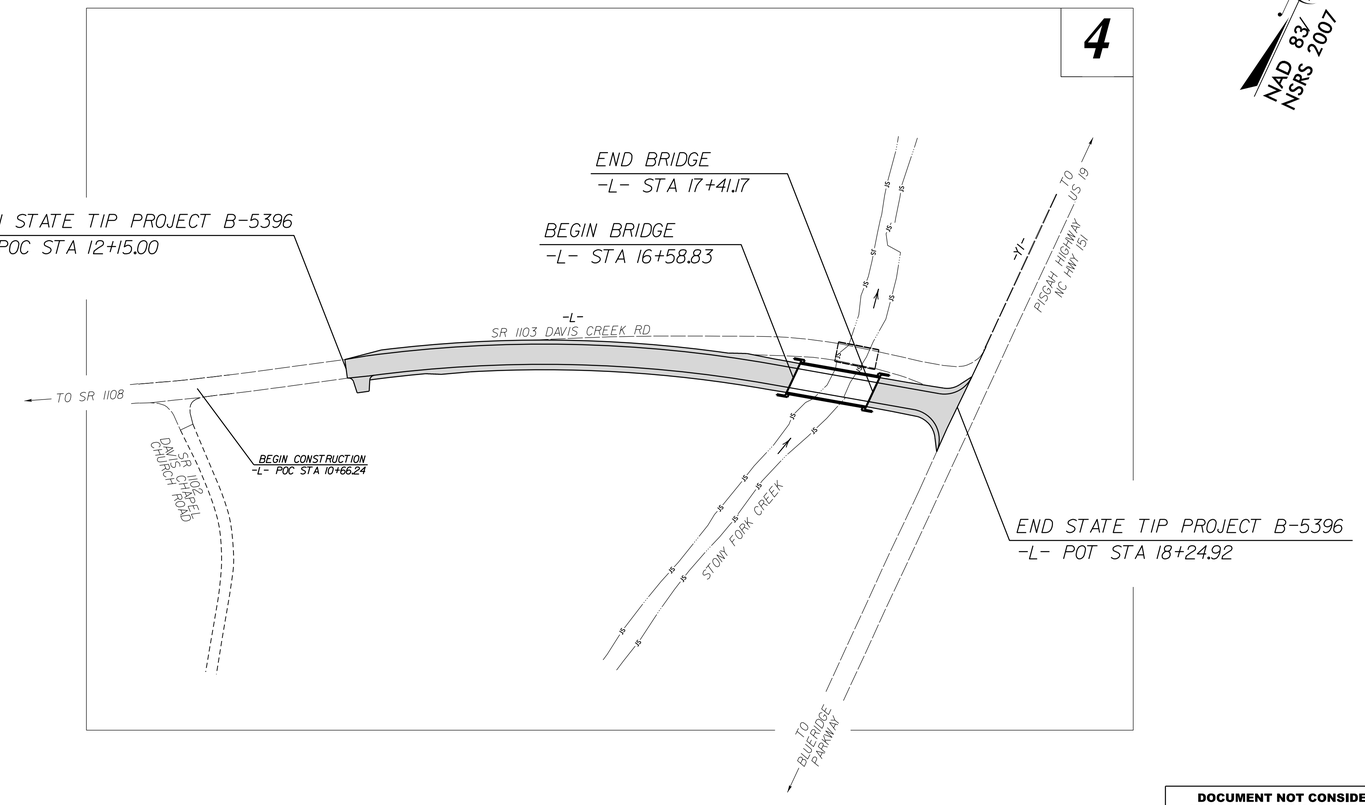
BUNCOMBE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5396	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46111.1.1	BRZ-1103(24)	PE
46111.2.FD1	BRZ-1103(24)	ROW & UTILITY
46111.3.FD1	BRZ-1103(24)	CONST.

LOCATION: ***BRIDGE NO. 416 OVER STONY FORK CREEK ON SR 1103***

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



NAD 83/ NSRS 2007

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

2016 ADT = 1370
2036 ADT = 1645
K = 11%
D = 75%
T = 7% *
V = 30 MPH
* TTST 1% DUAL 6%
FUNC. CLASS = RURAL LOCAL

SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT B-5396	=	0.100 mi.
LENGTH STRUCTURES STATE PROJECT B-5396	=	0.016 mi.
TOTAL LENGTH STATE PROJECT B-5396	=	0.116 mi.

Prepared in the Office of:

STEWART
421 FAYETTEVILLE ST, STE 400
RALEIGH, NC 27601
T 919.380.8750
Firm License #: C-1051
www.stewartinc.com
PROJECT #:H14001.00

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 17, 2015

LETTING DATE:
APRIL 19, 2016

DOUG TAYLOR, PE
PROJECT ENGINEER

MICHAEL BURNS, EI
PROJECT DESIGN ENGINEER

REKHA PATEL, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20147 ENGINEER FRANK F. FLEMING

3/1/2016

DocuSigned by: Frank F Fleming P.E.
SIGNATURE

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 030984 ENGINEER BRYAN DOUGLAS TAYLOR

2/29/2016

DocuSigned by: Bryan Douglas Taylor P.E.
SIGNATURE

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

2/29/2016
i:\Roadway\Proj\B5396_RDY_TSH.dgn
USER:dayoung

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 030984 ENGINEER BRYAN DOUGLAS TAYLOR

2/29/2016

DocuSigned by:
Bryan Douglas Taylor
21A622FAB4D4408...

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STEWART

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

INDEX OF SHEETS

EFF. 01-17-2012
REV. 10-30-2012

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.11	Reinforced Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
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
866.01	Chain Link Fence - 4', 5' and 6' High Fence
866.04	Barbed Wire Fence with Wood Posts (2 - 7 Strands)
876.02	Guide for Rip Rap at Pipe Outlets

GENERAL NOTES:

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

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

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.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

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

END BENTS:

THE SURVEYOR 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

HAYWOOD EMC

AT&T COMMUNICATIONS

CHARTER COMMUNICATIONS

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1-B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- 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 — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

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

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- 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 — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1C-1

Location and Surveys

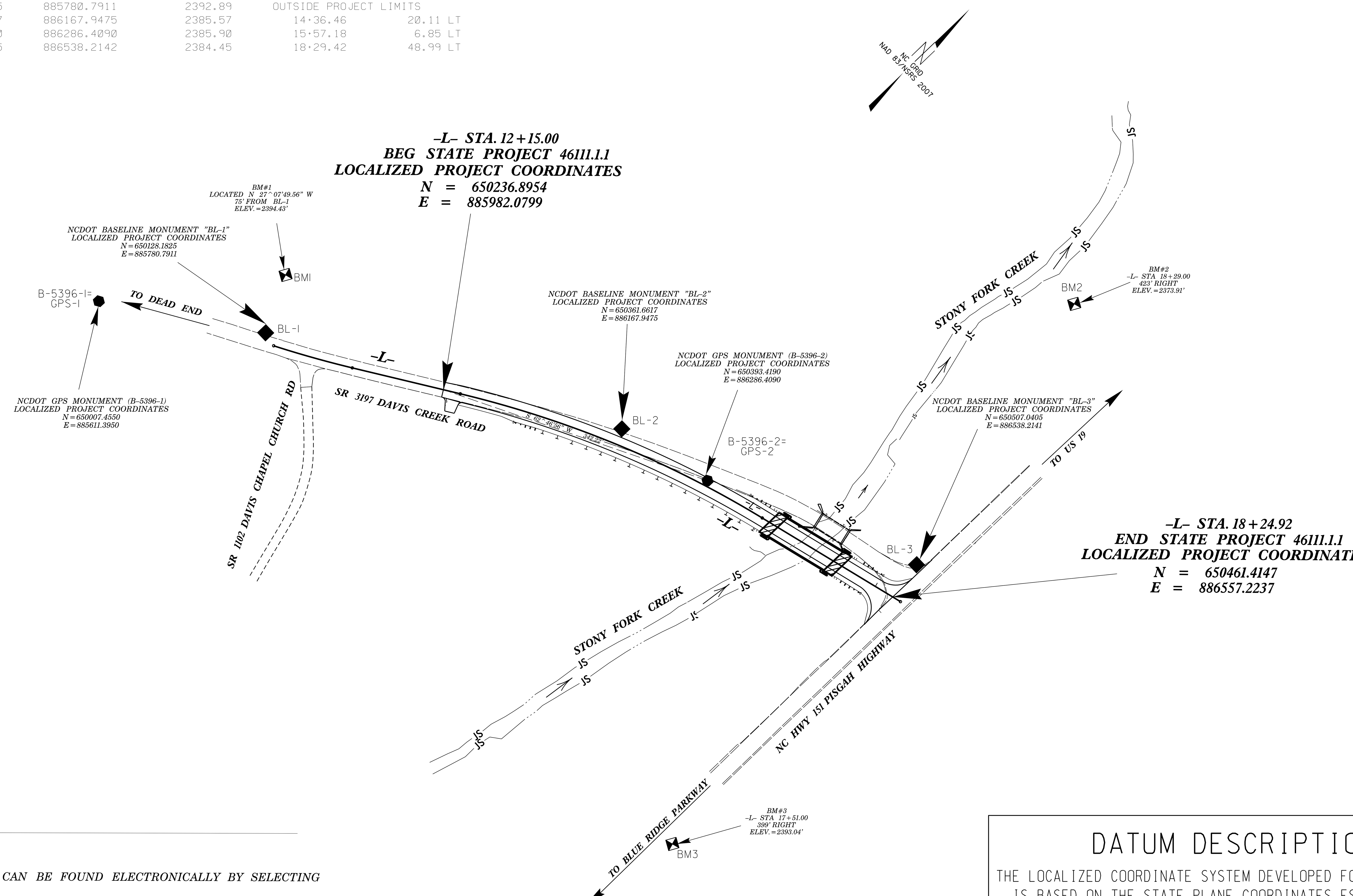
SURVEY CONTROL SHEET B-5396

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
GPS1	B5396-1	650007.4550	885611.3950	2401.38	OUTSIDE PROJECT LIMITS	
1	BL-1	650128.1825	885780.7911	2392.89	OUTSIDE PROJECT LIMITS	
2	BL-2	650361.6617	886167.9475	2385.57	14+36.46	20.11 LT
GPS2	B5396-2	650393.4190	886286.4090	2385.90	15+57.18	6.85 LT
3	BL-3	650507.0405	886538.2142	2384.45	18+29.42	48.99 LT

BM1 ELEVATION = 2394.43
N 650195 E 885747
LOCATED N 27°07'50" W DIST 75' FROM BL-1
8" SPIKE SET IN ROOT OF A 24" WALNUT TREE

BM2 ELEVATION = 2373.91
N 650868 E 886441
L STATION 18+29.00 423 LEFT
8" SPIKE SET IN ROOT OF A 20" DOUBLE PRONG LOCUST TREE

BM3 ELEVATION = 2393.04
N 650054 E 886578
L STATION 17+51.00 399 RIGHT
CONCRETE NAIL SET IN CENTER OF CONCRETE HEADWALL



NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B5396_LS_CONTROL.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

● *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-5396-2=GPS-2"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 650393.4190(ft) EASTING: 886286.4090(ft)
ELEVATION: 2385.90(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999668088
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-5396-2=GPS-2" TO -L- STATION 12+15.00 IS S62°46'56"W 342.22'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-5396	1C-2
Location and Surveys	

SURVEY CONTROL SHEET B-5396

(PRELIMINARY)

(DESIGN ALIGNMENTS)

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	650124.2226	885799.1138
PT	11+00.13	650175.0054	885885.3872
PC	12+36.27	650248.5300	885999.9627
PT	16+38.03	650410.2379	886365.9898
POT	18+35.99	650461.4147	886557.2237

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	650687.7647	886557.2945
POT	15+40.53	650147.2371	886557.1255

(PERMANENT EASEMENTS)

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+66.24	52.21	650112.4116	885883.6743
L	13+45.00	46.13	650262.5892	886115.4007
L	15+85.00	-46.45	650439.8330	886301.2327
L	15+85.00	-61.00	650453.7235	886296.9012
L	16+00.00	-61.00	650458.3118	886311.9197
L	16+00.00	-50.03	650447.8002	886315.0650

(ROW MARKERS)

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+00.00	40.00	650195.2756	885991.0385
L	12+00.00	-35.00	650258.3969	885950.5328
L	12+00.00	-13.00	650239.8813	885962.4145
L	12+00.00	15.00	650216.3161	885977.5366
L	12+36.27	40.00	650214.8654	886021.5657
L	12+36.27	-35.00	650277.9866	885981.0600
L	13+45.00	40.00	650268.0068	886112.5326
L	13+45.00	60.00	650250.3310	886121.8902
L	15+30.00	-35.00	650410.9529	886251.0929
L	16+00.00	60.00	650342.3899	886346.6054
L	16+38.03	-60.00	650468.1983	886350.4788
L	16+38.03	75.00	650337.7874	886385.3786
L	16+93.55	75.00	650352.1420	886439.0178
L	17+02.79	56.59	650372.3185	886443.1838
L	17+60.00	-43.50	650483.7941	886472.5718
L	17+60.00	-60.00	650499.7307	886468.3069

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	13+43.64	13.50	650344.1316	886543.6870

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+57.99	23.24	650132.8631	885861.4639
L	10+61.29	15.00	650141.6592	885860.1101
L	11+00.13	15.00	650162.3811	885893.4883

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

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PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

DATUM DESCRIPTION

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VERTICAL DATUM USED IS NAVD 88

6/2/99

2/25/2016
...\Roadway\Proj\B5396_LS_1C-2.dgn
USER:mburns

8/17/99

STEWART
Firm License No. C-1051
421 Fayetteville St,
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2A-I

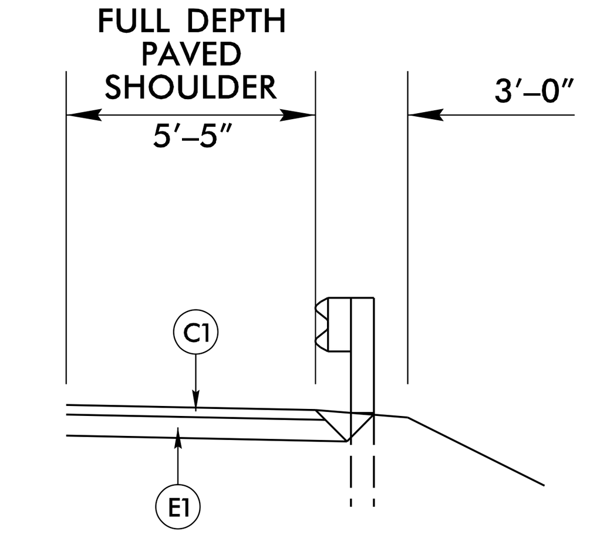
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 030984 ENGINEER BRYAN DOUGLAS TAYLOR	NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
/29/2016	/1/2016
DocuSigned by: Bryan Douglas Taylor 21A622FAB4D4408...	DocuSigned by: Clark Morrison B0A110DD1F004C4...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

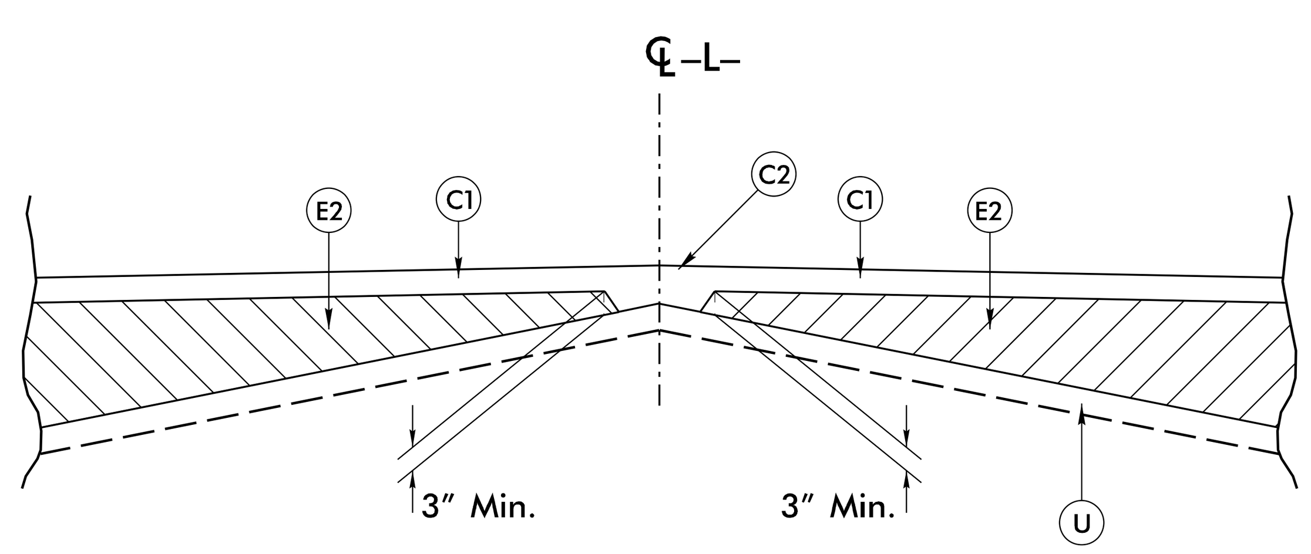
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	ASPHALT WEDGING (SEE DETAIL)

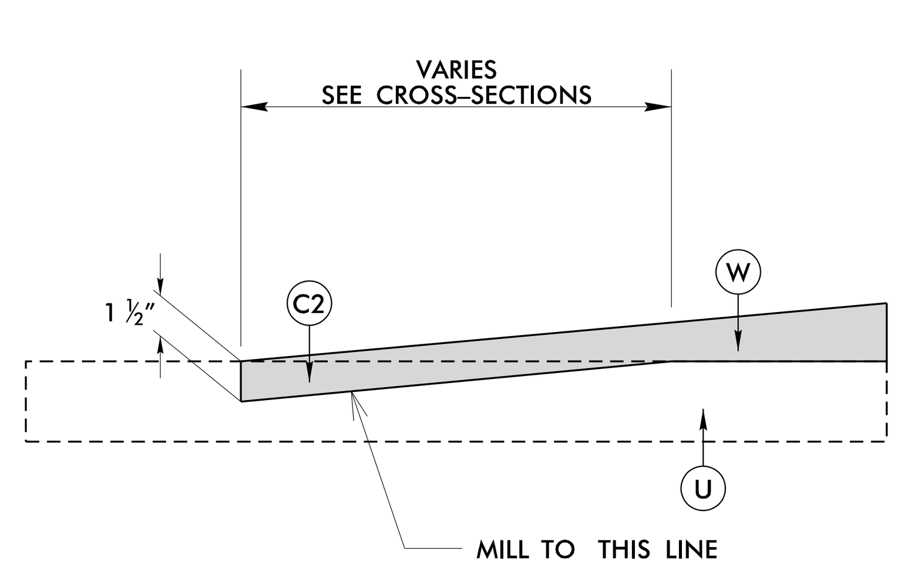
NOTE: PAVEMENT EDGE SLOPES ARE 1:1, UNLESS SHOWN OTHERWISE



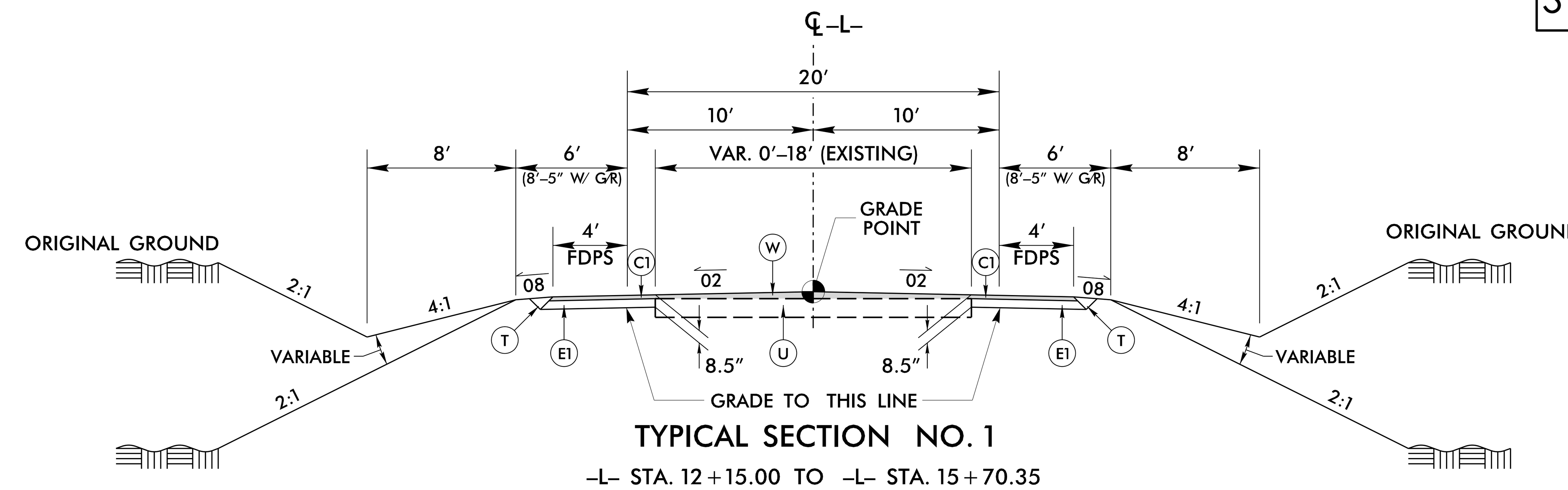
DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL



DETAIL SHOWING METHOD OF WEDGING

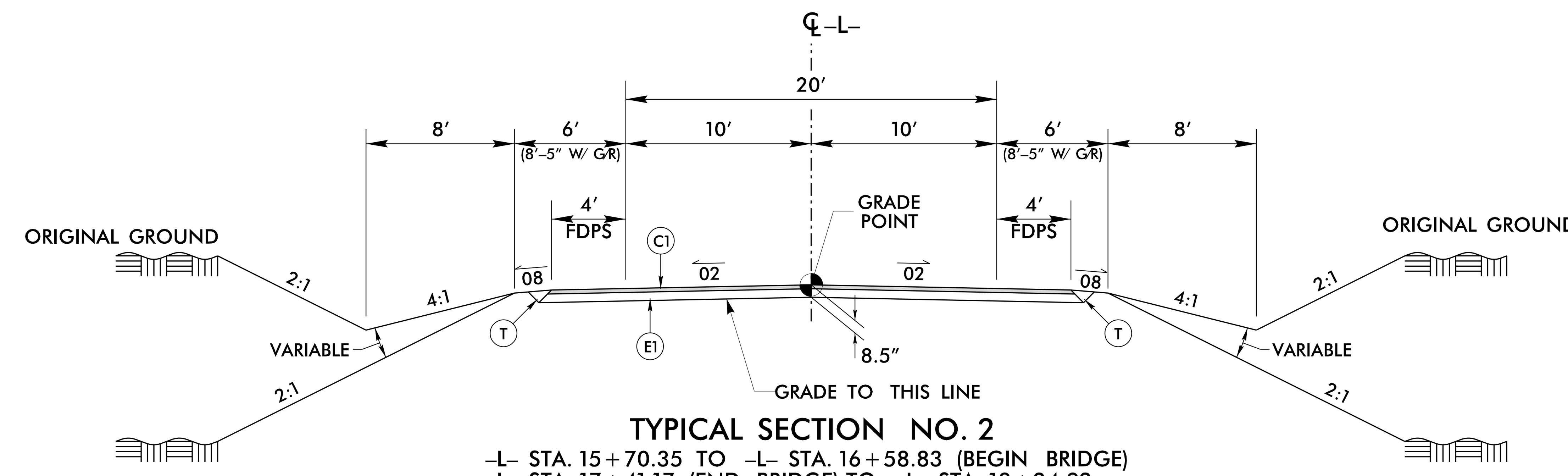


DETAIL SHOWING MILLED PAVEMENT TIE-IN



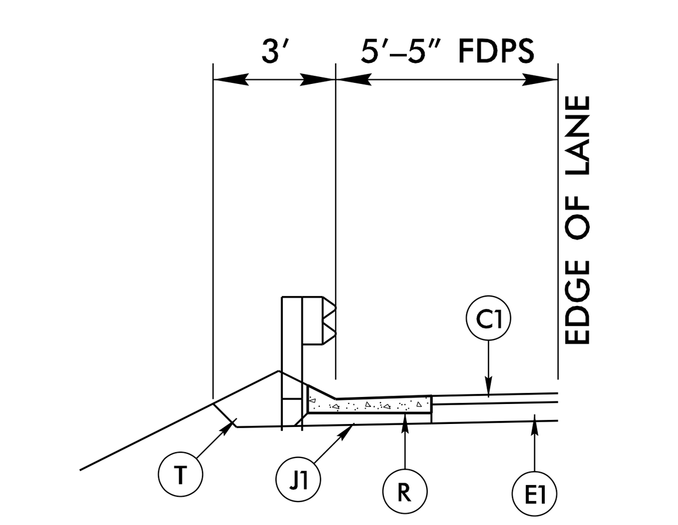
TYPICAL SECTION NO. 1

-L- STA. 12+15.00 TO -L- STA. 15+70.35



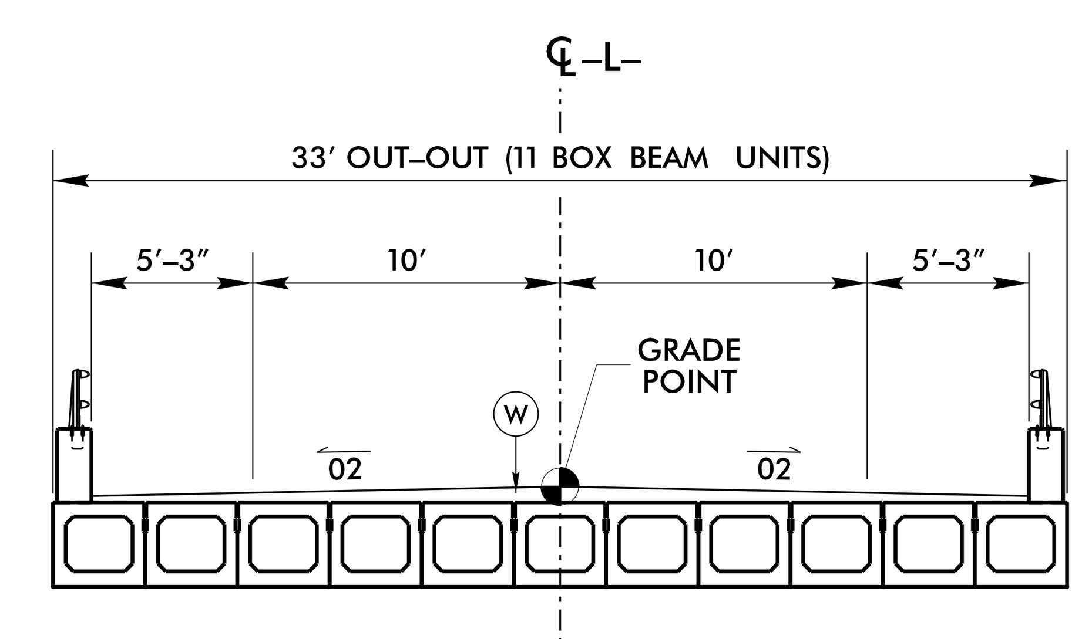
TYPICAL SECTION NO. 2

-L- STA. 15+70.35 TO -L- STA. 16+58.83 (BEGIN BRIDGE)
-L- STA. 17+41.17 (END BRIDGE) TO -L- STA. 18+24.92



DETAIL SHOWING GUARDRAIL WITH SHOULDER BERM GUTTER

-L- STA. 17+48.49 TO -L- STA. 17+62 (RIGHT)
-L- STA. 17+55.33 TO -L- STA. 17+70 (LEFT)

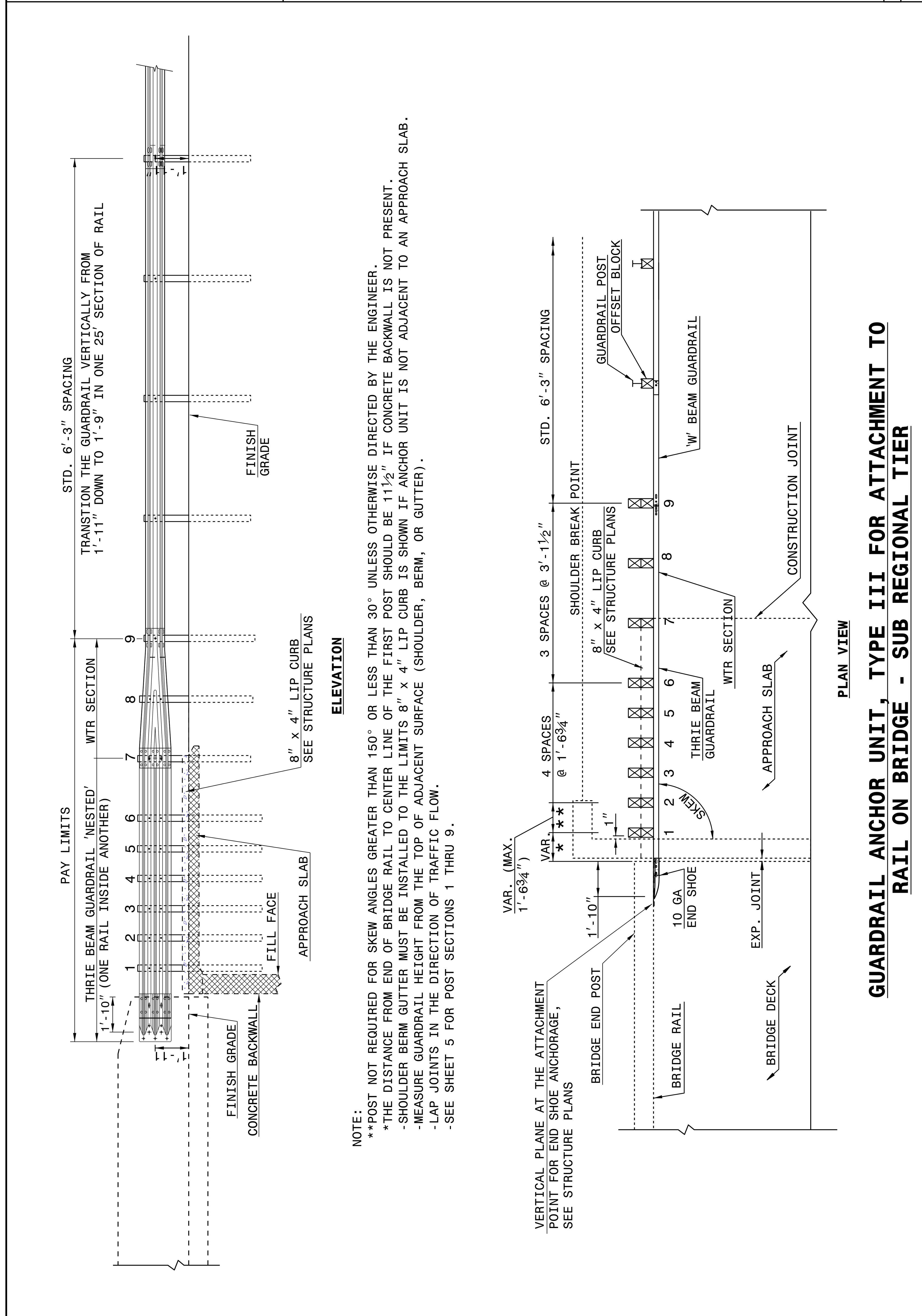


TYPICAL SECTION ON STRUCTURE

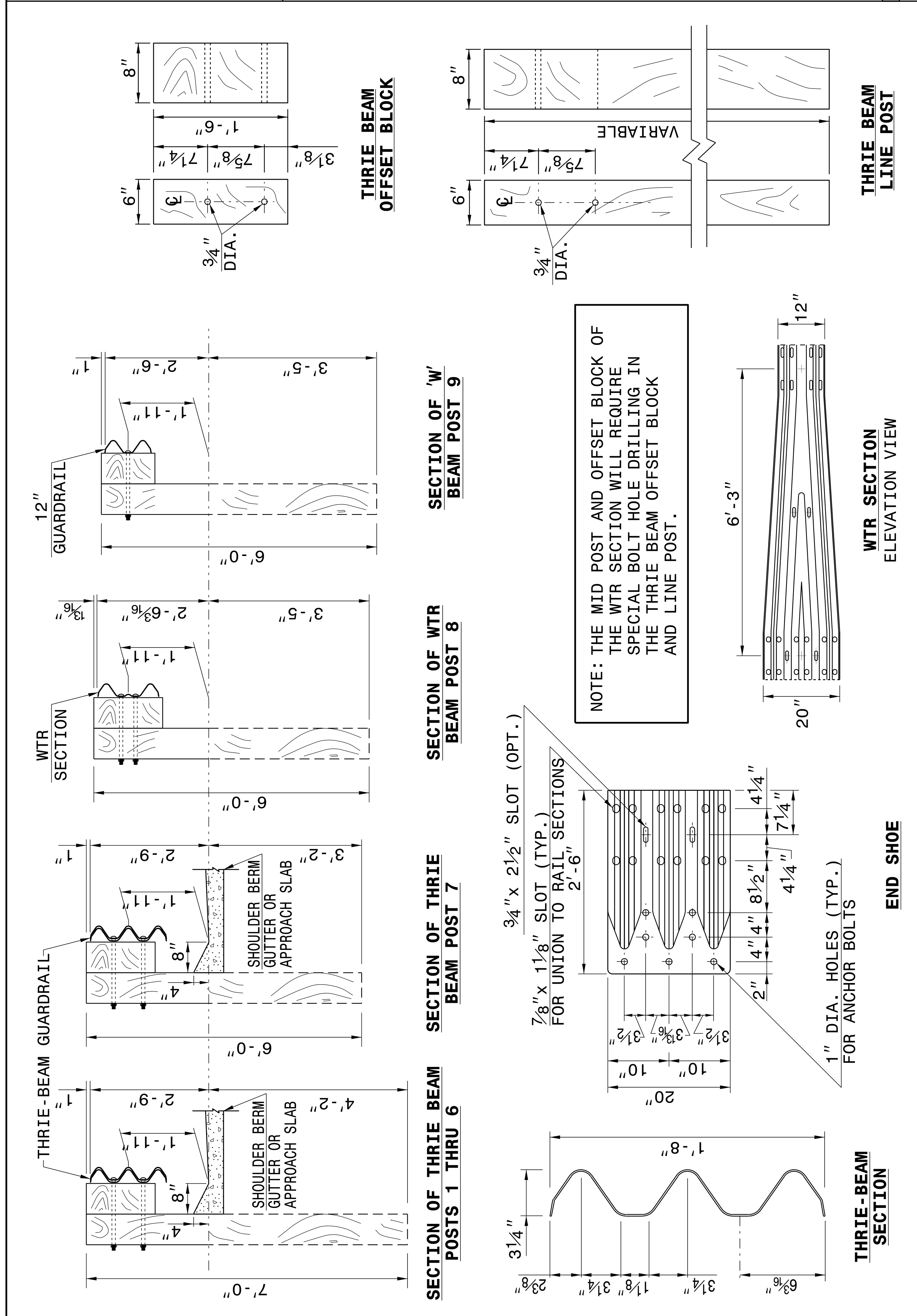
-L- STA. 16+58.83 TO -L- STA. 17+41.17

2/25/2016
...\Roadway\Proj\B5396_RDY_TYP.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2C-1


GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER
ELEVATION
PLAN VIEW
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 11½" 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 5 FOR POST SECTIONS 1 THRU 9.

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


THRIE BEAM OFFSET BLOCK
THRIE BEAM LINE POST
NOTE: THE MID POST AND OFFSET BLOCK OF THE WTR SECTION WILL REQUIRE SPECIAL BOLT HOLE DRILLING IN THE THRIE BEAM OFFSET BLOCK AND LINE POST.
WTR SECTION ELEVATION VIEW
SECTION OF 'W' BEAM POST 9
SECTION OF WTR BEAM POST 8
SECTION OF THRIE BEAM POST 7
SECTION OF THRIE BEAM POSTS 1 THRU 6
END SHOE
THRIE-BEAM SECTION

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **STRUCTURE ANCHOR UNITS** GUARDRAIL ANCHOR UNIT, TYPE III	SHEET 3 OF 7 **862d03**

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton 3/2/2016

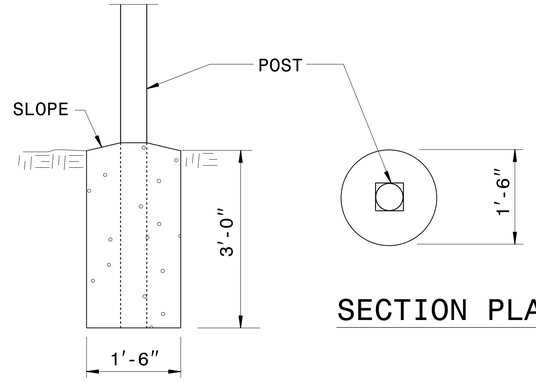
DocuSigned by: Joel Howerton, PE

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.:

PROJ. REFERENCE NO.	SHEET NO.
B-5396	2C-2

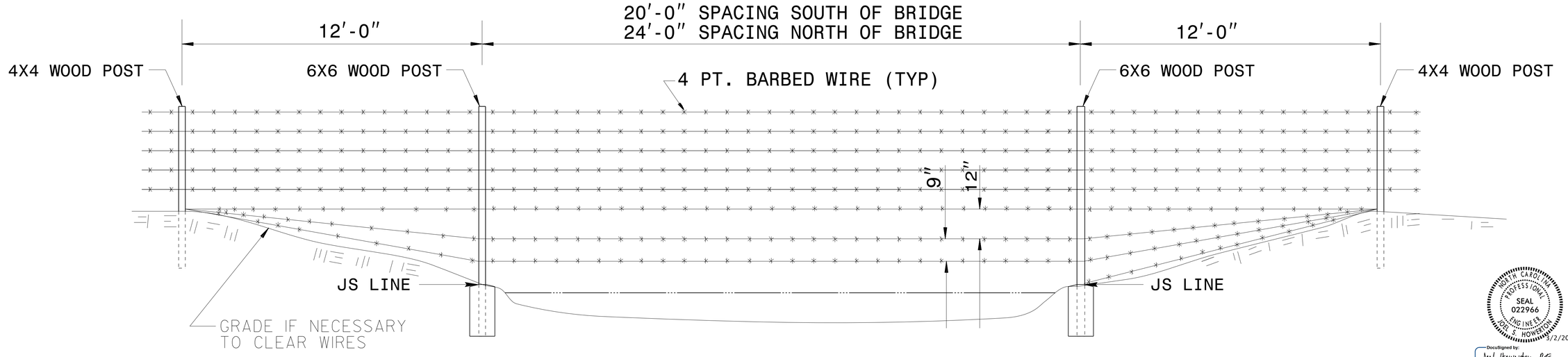


SECTION PLAN

DETAIL OF POST ANCHOR

- SEE R.S.D.N. 866.04 FOR FIVE STRAND BARBED WIRE FENCE

- STRAND SPACING AND PLACEMENT MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.



NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON

3/2/2016

DocuSigned by:
Joel Howerton, PE
87F3FD17DCDC45F...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

SPECIAL FENCE FOR STREAM CROSSING

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: KKEMPF DATE: 02-09-16
CHECKED BY: _____ DATE: _____
FILE SPEC.: kkempf/english/barbed wire stream crossing.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5396	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022246 SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 1/21/2016

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

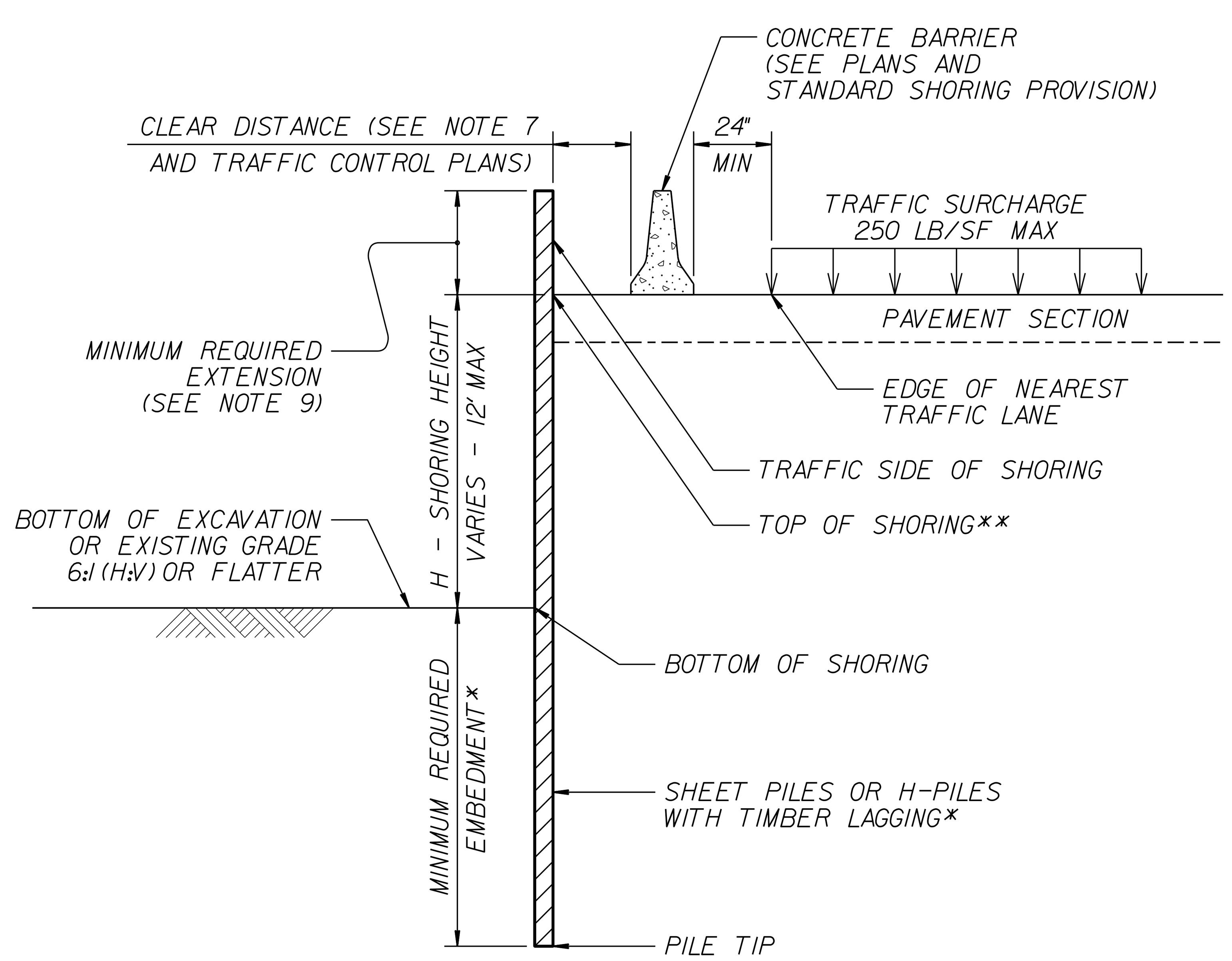
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

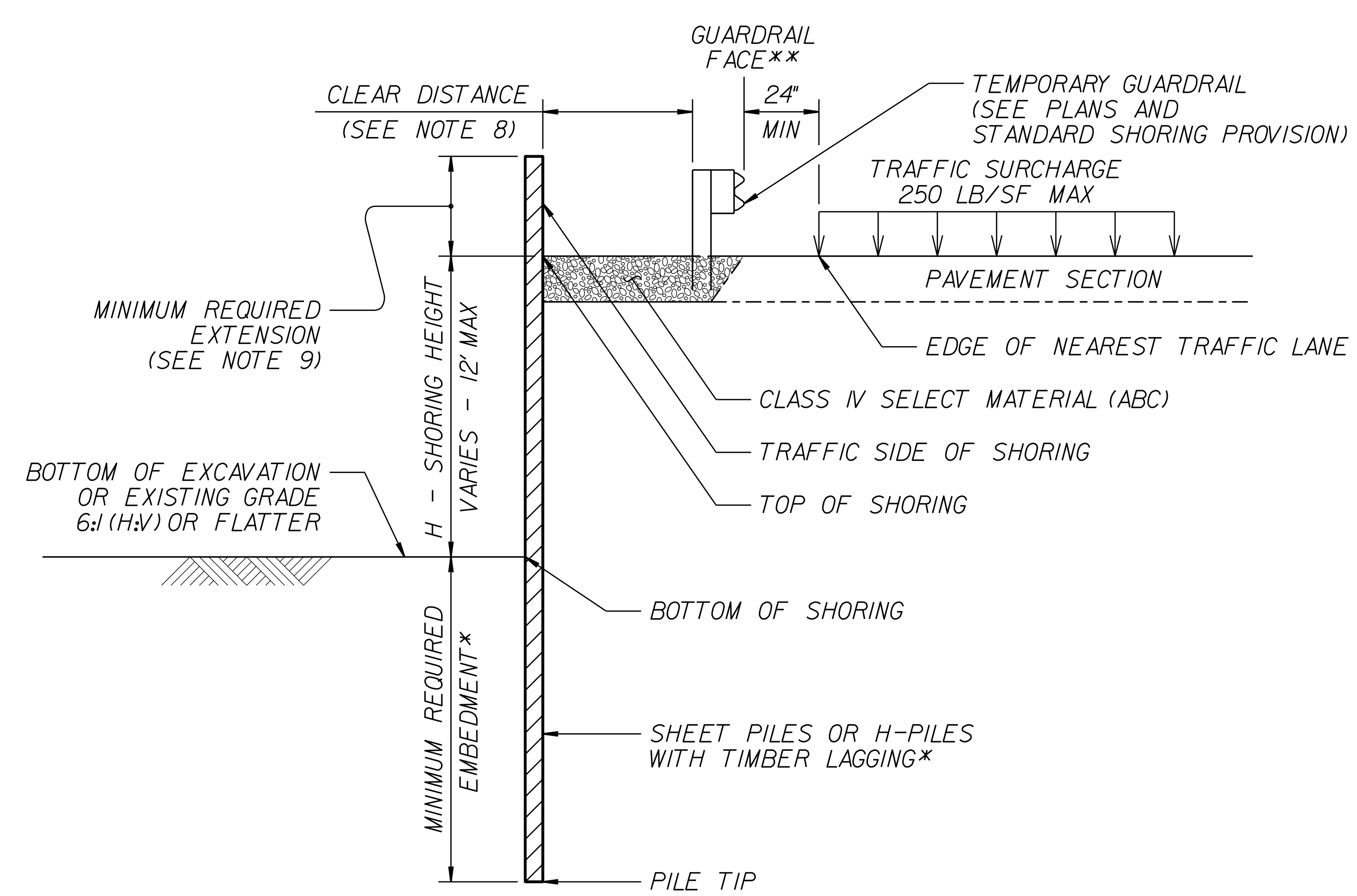
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
    connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT

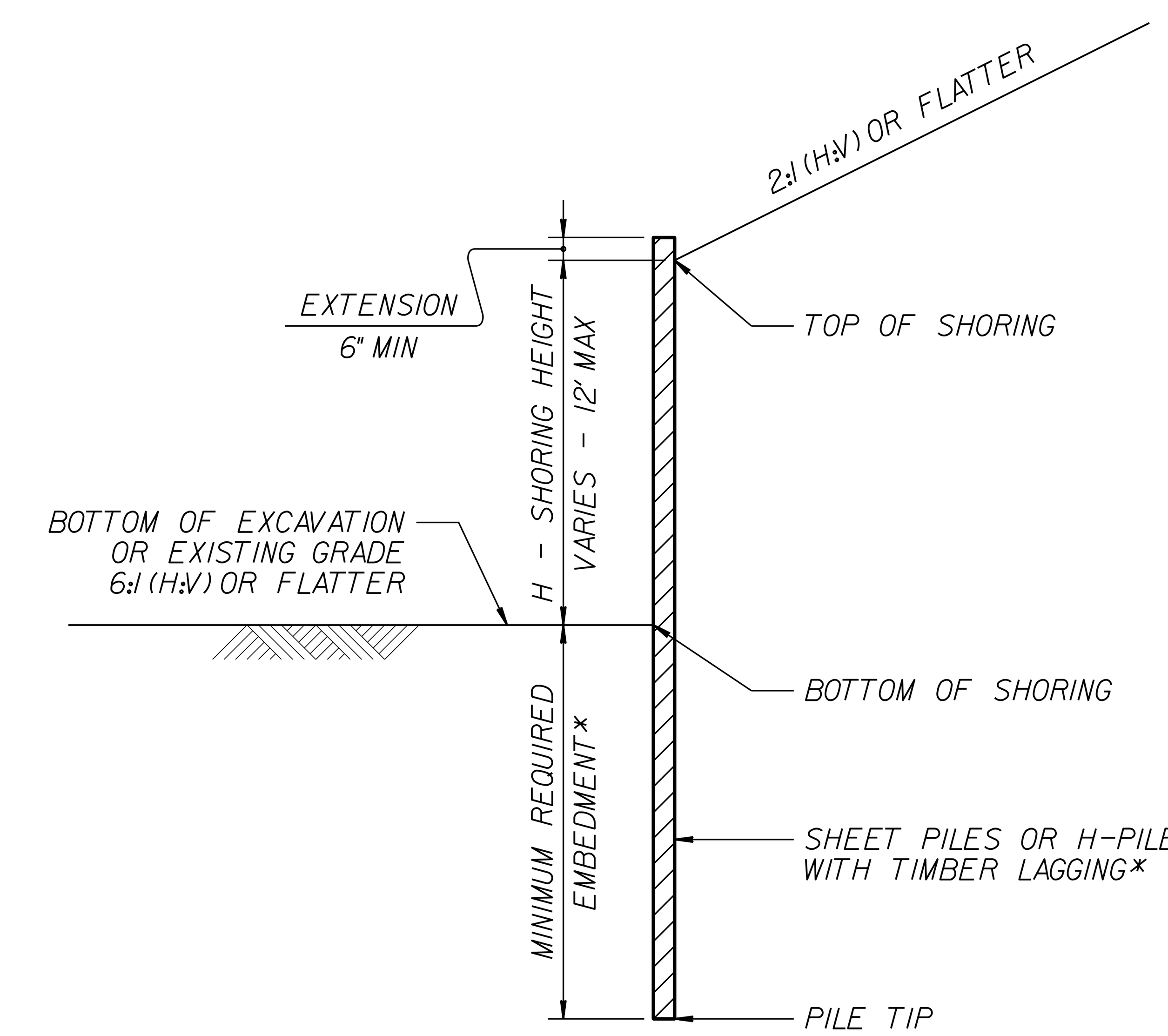


TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

8/17/99

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- Sta. 12+50.00 RT (PHASE I)	-L- Sta. 16+50.00 RT	21	1630	1609	
-L- Sta. 17+50.00 RT (PHASE I)	-L- Sta. 18+20.00 RT	84	75		9
-L- Sta. 12+50.00 LT (PHASE I)	-L- Sta. 14+00.00 LT	0	61	61	
SUBTOTALS:		105	1766	1670	9
-L- Sta. 14+00.00 (PHASE II)	-L- Sta. 16+50.00	93	70		23
-L- Sta. 17+50.00 (PHASE II)	-L- Sta. 18+20.00	31	25		6
SUBTOTALS:		124	95	0	29
TOTALS:		124	95	1670	38
USE WASTE IN LIEU OF BORROW				-9	-9
SUBTOTALS:		229	1861	1661	29
EST. 5% REPLACE TOPSOIL ON BORROW PIT				83	
GRAND TOTALS:		229		1744	
SAY:		**250**		**1750**	

DDE	100 CY
Undercut (Contingency)	150 CY
Geotextile for Soil Stabilization	300 SY
Shallow Undercut (Contingency)	100 CY
Class IV Subgrade Stabilization (Contingency)	200 Tons
Select Granular Material (Contingency)	100 CY

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION (LT/RT/CL)	ASPHALT REMOVAL (SQUARE YARDS)
-L-	12+20	19+98	LT	464.84
-L-	17+38.50	18+30	LT	247.99
		TOTAL:		712.83
		SAY:		725

SHOULDER BERM GUTTER SUMMARY

LINE	Station	Station	LENGTH
-L- (Right)	17+48.49 (End Approach Slab)	17+62	14
-L- (Left)	17+55.33 (End Approach Slab)	17+70	15
		TOTAL:	29
		SAY:	30

"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

GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350 TL-2	Type III							G	NG				
-L-	16+14.42	16+64.42 (BR)	LT	50				16+64.42 (Bridge)	5'-5"	8'-5"		25		0.5	1	1											
-L-	13+12.12	16+55.87 (BR)	RT	350			13+87		5'-5"	8'-5"	25		0.5		1	1											
-L-	17+44.42 (BR)	17+94.42	LT	50			17+44.42 (Bridge)		5'-5"	8'-5"	25		0.5		1	1											
-L-	17+35.58 (BR)	17+85.58	RT	50				17+35.58 (Bridge)	5'-5"	8'-5"		25		0.5	1	1											
			SUBTOTALS	500											4	4											
			LESS ANCHOR DEDUCTIONS:																								
			TYPE III (4 @ 18.75')	-75																							
			GRAU-350 TL-2 (4 @ 25')	-100																							
			GRAND TOTAL	325											4	4											
			SAY	**325**																							
			ADDITIONAL GUARDRAIL POSTS = 5 EA																								

COMPUTED BY:	RBR	DATE:	1/16/2015
CHECKED BY:	ECOLOGICAL ENGINEERING, LLP	DATE:	1/16/2015

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-5396	3D-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
17+65 -L-	LT	0401		2385.55			
		0401	OUT1		2382.80	2382.74	
17+57 -L-	RT	0402		2385.57			
		0402	OUT2		2382.82	2382.75	
12+29 -L-	RT	0403					
SHEET TOTALS							

STATION	DRAINAGE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
17+65 -L-												
17+57 -L-												
12+29 -L-												
SHEET TOTALS												

STATION	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
17+65 -L-								
17+57 -L-								
12+29 -L-								
SHEET TOTALS								

STATION	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
17+65 -L-																
		12														
17+57 -L-																
		16														
12+29 -L-																
SHEET TOTALS		28														

STATION	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE
17+65 -L-								1		
17+57 -L-								1		
12+29 -L-				20						
SHEET TOTALS				20				2		

STATION	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	T.B.D.I. STD. 840.35		
17+65 -L-																	1	1		
17+57 -L-																	1	1		
12+29 -L-																				
SHEET TOTALS																	2	2		

STATION	SIDE DRAIN PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
17+65 -L-					
17+57 -L-					
12+29 -L-					
SHEET TOTALS					

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

REVISIONS

8/17/99

2/25/2016
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USER:mburns

COMPUTED BY: ____ pql 11/24/2014
CHECKED BY: ______________ DATE: _________

(11-19-13)

PROJECT NO.	SHEET NO.
B-5396	3G-1

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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	250
				TOTAL LF:	250

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

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		100	200	200**		
			TOTAL CY/TONS/SY:		100	200	200**	0	0

*ASU = Aggregate Subgrade
*AST = Aggregate Stabilization
**Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

REVISIONS

8/17/99

2/25/2016
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PROJECT REFERENCE NO.	SHEET NO.
B-5396	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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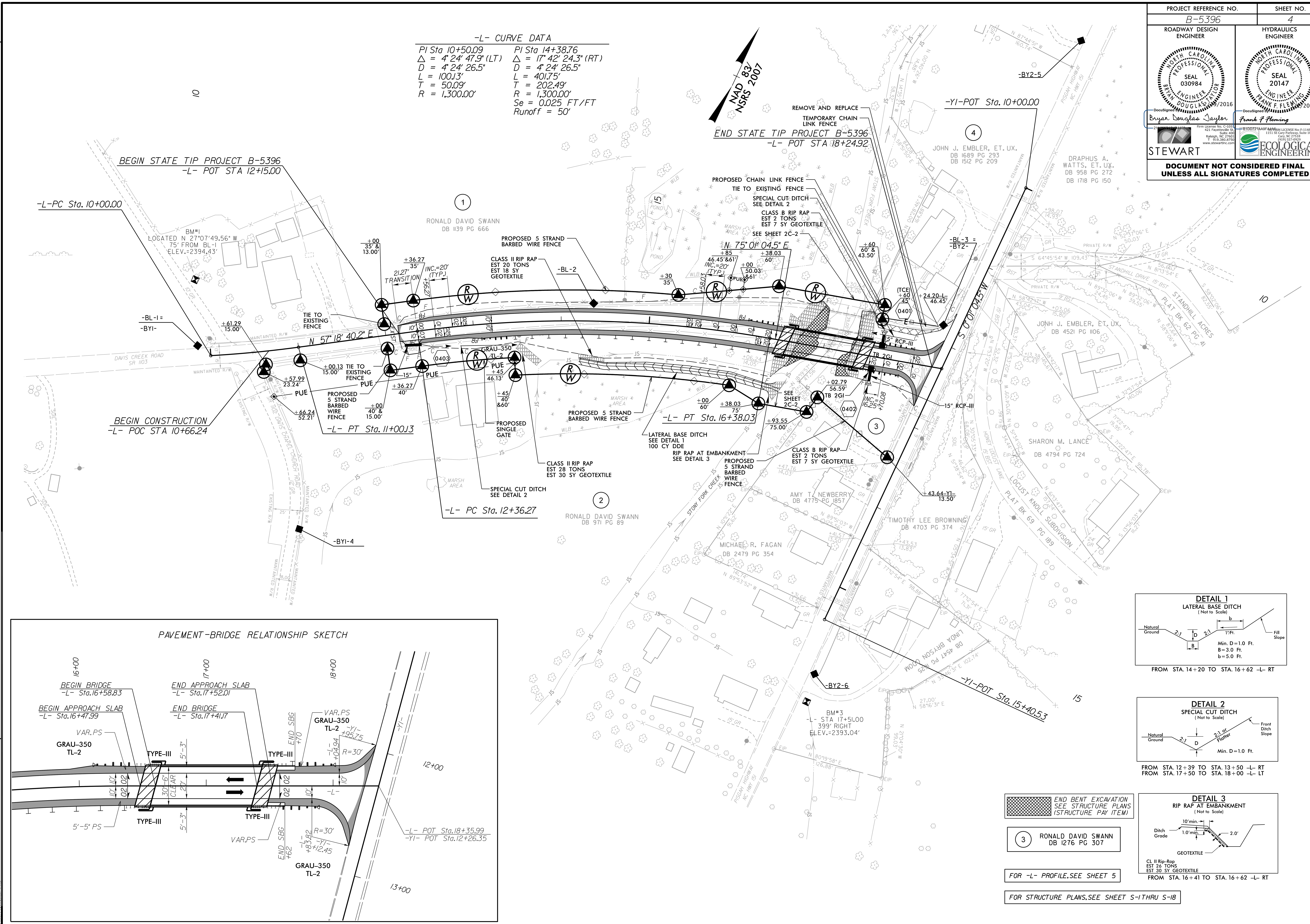

PROJECT REFERENCE NO.	SHEET NO.
B-5396	5

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030984 BRYAN DOUGLAS TAYLOR — 2/29/2016
DocuSigned by: Bryan Douglas Taylor 21A622FAB4D4408...

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20147 FRANK F. FLEMING — 3/1/2016
DocuSigned by: Frank F Fleming B1DD721AA9FA4A6...

STEWART — Firm License No. C-1051, 421 Fayetteville St, Suite 400, Raleigh, NC 27601, T 919.380.8750, www.stewartinc.com

ECOLOGICAL ENGINEERING — NC FIRM LICENSE No: F-1148, 1151 SE Cary Parkway, Suite 101, Cary, NC 27518, (919) 557-0929

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REVISIONS

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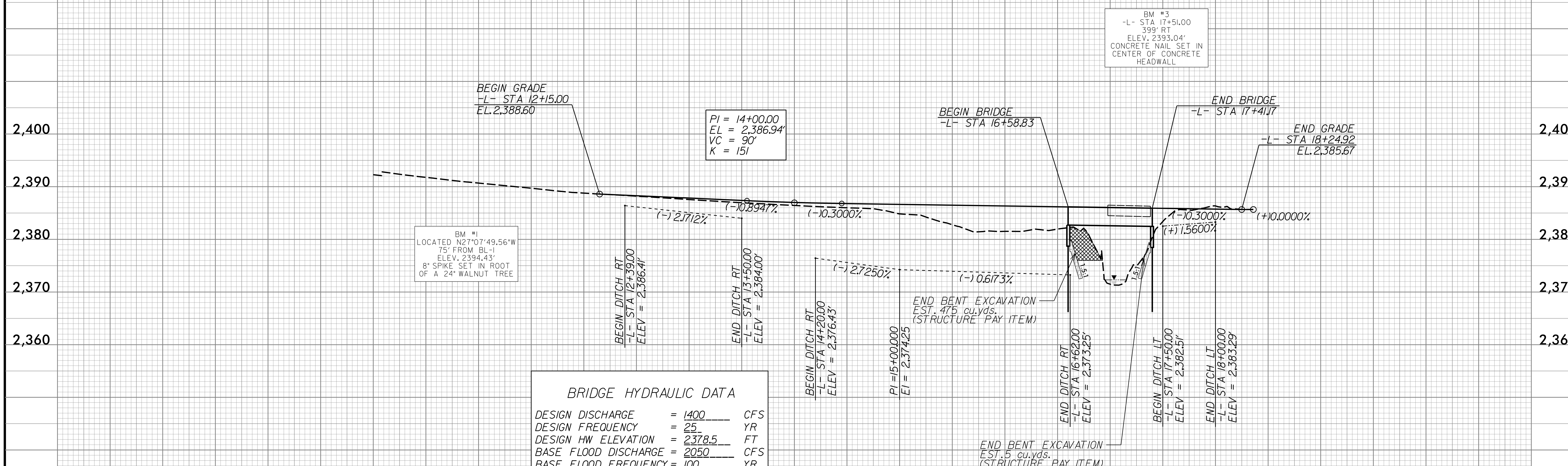

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	1400	CFS
DESIGN FREQUENCY	=	25	YR
DESIGN HW ELEVATION	=	2378.5	FT
BASE FLOOD DISCHARGE	=	2050	CFS
BASE FLOOD FREQUENCY	=	100	YR
BASE FLOOD HW ELEVATION	=	2379.83	FT
OVERTOPPING DISCHARGE	=	5270	CFS
OVERTOPPING FREQUENCY	=	500+	YR
OVERTOPPING ELEVATION	=	2385.8	FT
DATE OF SURVEY	=	07/02/2014	
W.S. ELEVATION AT DATE OF SURVEY	=	2372.3	FT

FOR -L- PLAN VIEW SEE SHEET 4

10 11 12 13 14 15 16 17 18 19

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