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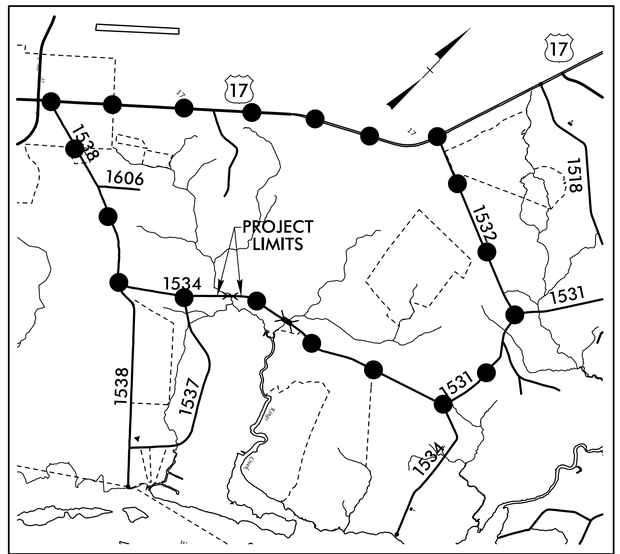
09/08/49

TIP PROJECT: 17BP.3.R.47

CONTRACT: DC-00188

See Sheet 1-A For Index of Sheets



VICINITY MAP

OFFSITE DETOUR

100% SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ONSLOW COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.3.R.47	1	56

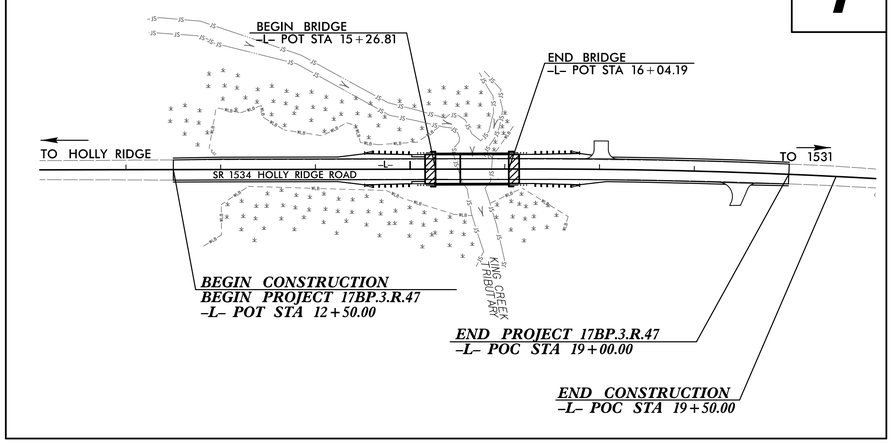
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.3.R.47		P.E.
17BP.3.R.47		ROW/UTIL.
17BP.3.R.47		CONSTR.

LOCATION: REPLACE BRIDGE #142 OVER KINGS CREEK TRIB. ON SR 1534 (HOLLY RIDGE RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

NAD 83/
NSRS 2011

4



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GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2012 = 840
ADT 2032 = 1680
DHV = 10 %
D = 60 %
T = 6 % *
V = 60 MPH
* TTST = DUAL
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT 17BP.3.R.47 = 0.108 MILES

LENGTH OF STRUCTURE PROJECT 17BP.3.R.47 = 0.015 MILES

TOTAL LENGTH OF PROJECT 17BP.3.R.47 = 0.123 MILES

Prepared In the Office of:

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 26, 2017

LETTING DATE:
SEPTEMBER 28, 2017

DAVID W. BASS, PE
PROJECT ENGINEER

MONICA J. DUVAL
PROJECT DESIGN ENGINEER

ALTON R. EDGERTON
NCDOT CONTACT

HYDRAULICS ENGINEER

DocuSigned by: John F. Watson
9/5/2017
SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 039760 ENGINEER JOHN F. WATSON P.E.

ROADWAY DESIGN ENGINEER

DocuSigned by: David W. Bass, PE
9/1/2017
SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 020107 ENGINEER DAVID W. BASS P.E.

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

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HNTB

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	1A-1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020107 ENGINEER DAVID W. BASS

7/27/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

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 MODIFIED METHOD III.

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.

GUARDRAIL:

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

SUBSURFACE PLANS:

STRUCTURE SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT.

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 APPROCHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

POWER – JONES-ONSLOW EMC
WATER – ONWASA
SEWER – PLURIS
PHONE – CENTURYLINK

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.

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

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Modified Method III (Use detail in lieu of standard)
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	
422.10	Reinforced Bridge Approach Fills
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
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.66	Drainage Structure steps
846.01	Concrete Curb, Gutter and Curb & Gutter
862.01	Guardrail Placement (Beg. July 2017 Letting use detail in lieu of standard)
862.02	Guardrail Installation (Beg. July 2017 Letting use detail in lieu of standard)
862.03	Structure Anchor Units (Beg. July 2017 Letting use detail in lieu of Standard)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

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04/06/15

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	1B-1

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

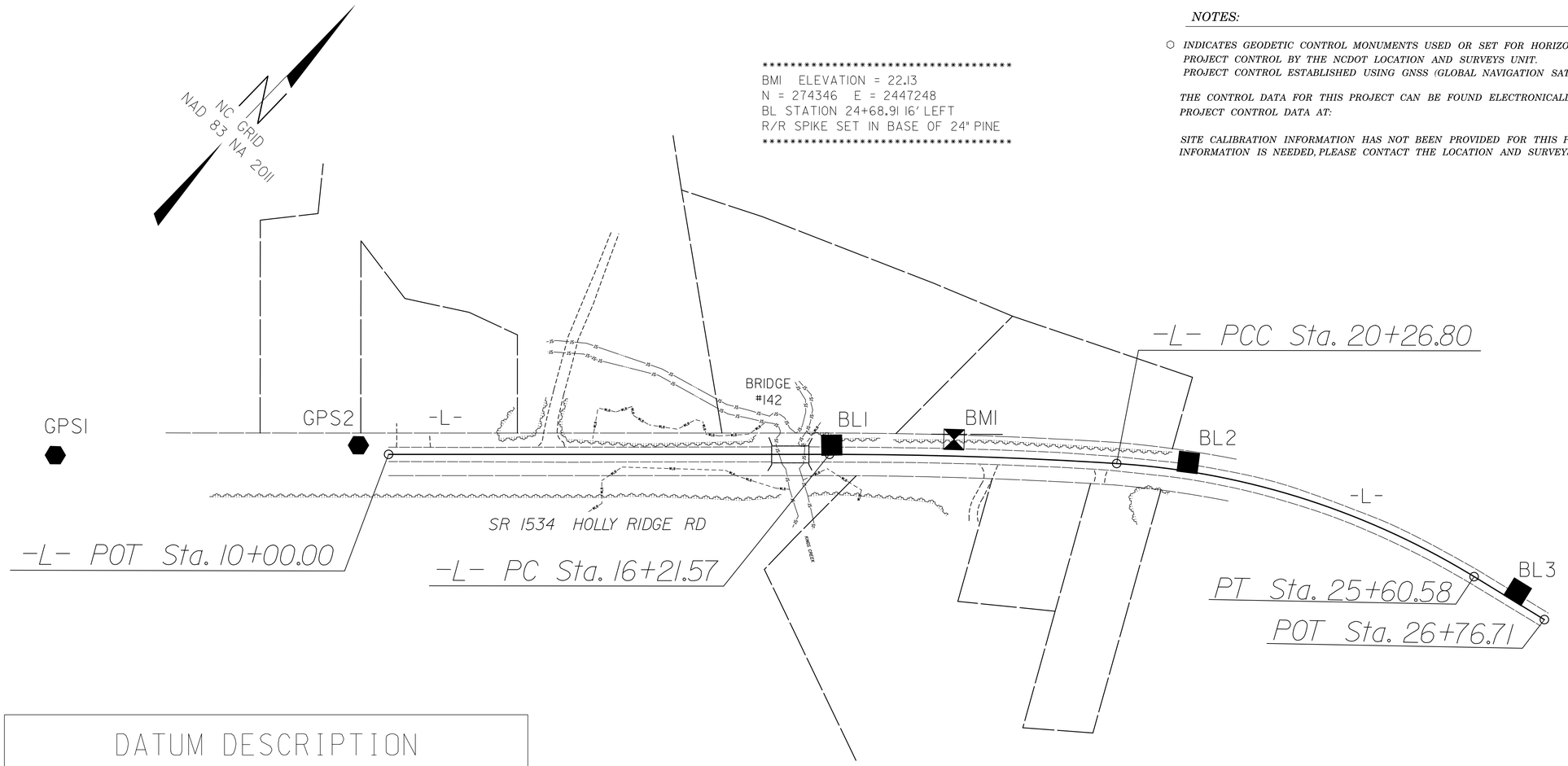
MISCELLANEOUS:

- 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.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	1C-1
Location and Surveys	

SURVEY CONTROL SHEET 66-0142



NOTES:

⬡ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL AND VERTICAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT. PROJECT CONTROL ESTABLISHED USING GNSS (GLOBAL NAVIGATION SATELLITE SYSTEM).*

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

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

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "GPS2" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 273756.608(ft) EASTING: 2446649.794(ft) ELEVATION: 16.872(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999646400

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS2" TO -L- STATION 10+00.00 IS N 62°48'50" E 44.43'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES

VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
GPS1	GPS CAP & REBAR	272950.4050	2445858.3250	33.49	OUTSIDE PROJECT LIMITS	
GPS2	GPS CAP & REBAR	273756.6080	2446649.7940	16.87	OUTSIDE PROJECT LIMITS	
BL1	TRV CAP & REBAR	274220.1040	2447129.6840	11.35	16+24.63	13.09 LT
BL2	TRV CAP & REBAR	274551.6690	2447508.3460	26.31	21+26.32	12.61 LT
BL3	TRV CAP & REBAR	274742.9170	2447969.1400	25.70	26+23.96	13.81 LT

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	1C-2
Location and Surveys	

SURVEY CONTROL SHEET 66-0142

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	273776.9080	2446689.3170
PC	16+21.57	274208.5520	2447136.5649
PCC	20+26.80	274480.4676	2447436.9228
PT	25+60.58	274715.6908	2447910.2603
POT	26+76.71	274740.8718	2448023.6265

R/W

ALIGN	STATION	OFFSET	NORTH	EAST
L	15+85.00	30.00	274161.57095	2447131.08551
L	15+85.00	40.00	274154.37547	2447138.02994
L	15+85.00	-45.00	274215.53700	2447079.00226
L	15+85.00	-30.00	274204.74379	2447089.41891
L	16+21.57	40.00	274179.77015	2447164.34263
L	16+21.57	-45.00	274240.93168	2447105.31495
L	17+00.00	40.00	274233.54566	2447220.75521
L	19+00.00	-29.74	274419.73869	2447321.38791
L	19+00.00	30.26	274374.78093	2447361.12207

PDE

ALIGN	STATION	OFFSET	NORTH	EAST
L	14+97.00	30.00	274100.45993	2447067.76534
L	14+97.00	45.00	274089.66672	2447078.18199
L	15+14.00	45.00	274101.47226	2447090.41430
L	15+14.00	30.00	274112.26547	2447079.99765

TCE

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+50.00	30.00	273928.93242	2446890.03714
L	12+50.00	35.00	273925.33468	2446893.50936
L	14+00.00	-30.00	274076.27177	2446956.30265
L	14+00.00	-45.00	274087.06498	2446945.88600
L	14+97.00	35.00	274096.86219	2447071.23756
L	15+14.00	50.00	274097.87452	2447093.88651
L	16+21.57	50.00	274172.57468	2447171.28707
L	17+00.00	45.00	274229.90734	2447224.18488
L	17+99.96	-33.80	274355.58964	2447243.86927
L	18+50.00	-42.00	274395.44495	2447275.68894
L	19+00.00	35.00	274371.22813	2447364.26207
L	19+00.00	-35.00	274423.67882	2447317.90558

NOTE: DRAWING NOT TO SCALE

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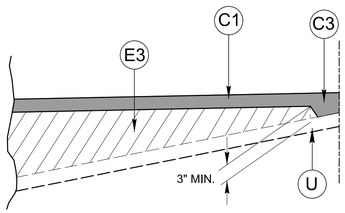
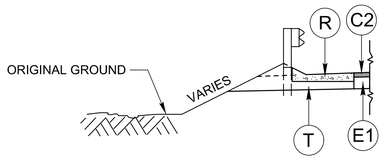
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C3	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YARD.
E2	PROP. APPROX. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
E3	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
J	PROP. 6" AGGREGATE BASE COURSE
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE DETAIL)

ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



DETAIL SHOWING METHOD OF WEDGING

SEE TYPICAL SECTIONS



DETAIL A

SHOULDER BERM GUTTER LOCATIONS

-L- STA 15+01.81 to STA 15+15.81 LT/RT

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	2A–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020107 ENGINEER DAVID ANDREW BASS

DocuSigned by: David Bass 7FC49CF50D39407... 7/26/2017

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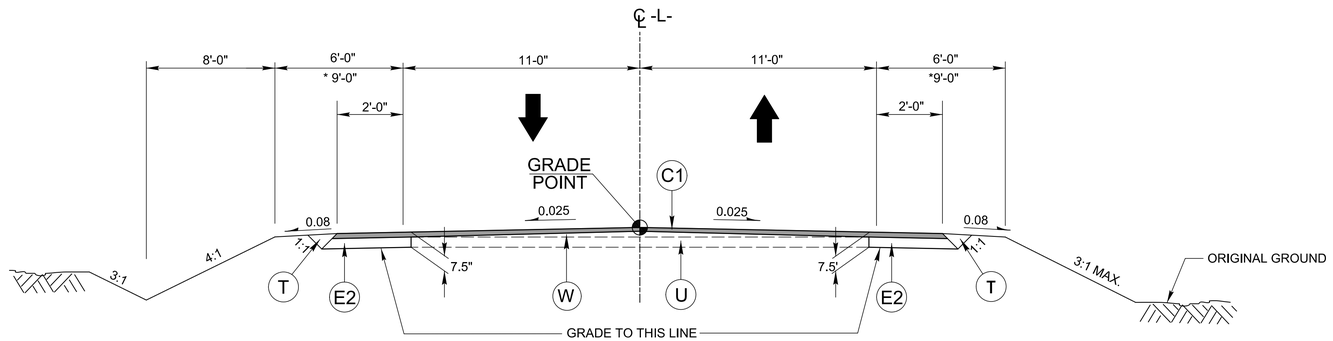

TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 FROM:

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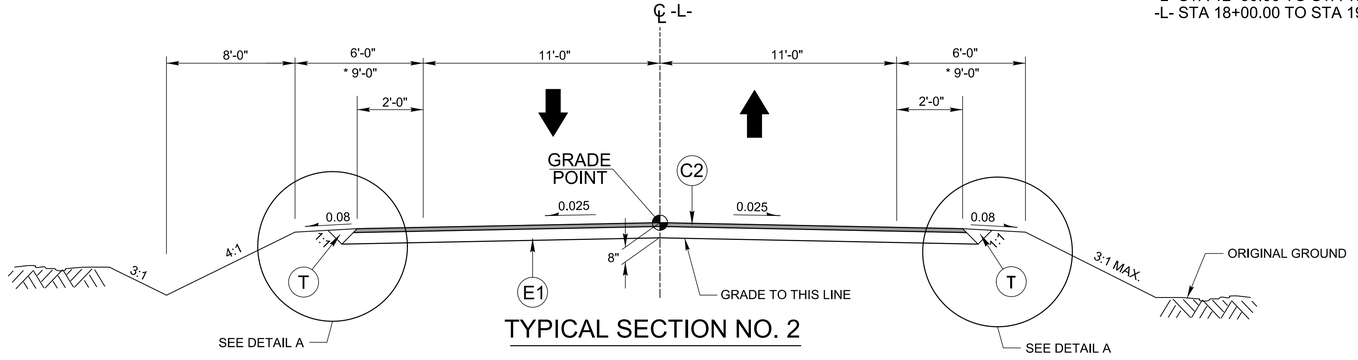
-L- STA 18+00.00 TO STA 19+00.00

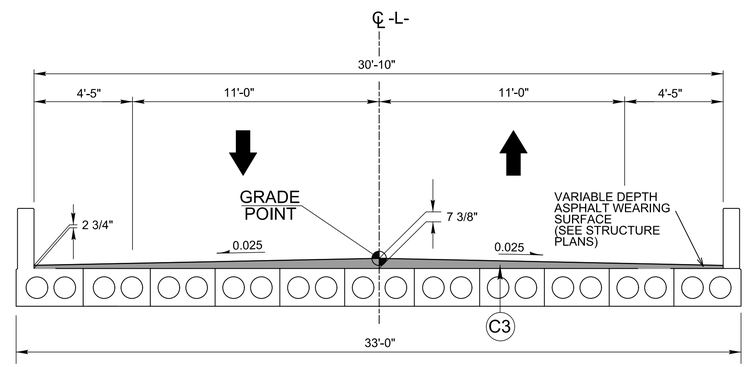


TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 FROM:

-L- STA 13+50.00 TO STA 15+26.81(BRIDGE)

-L- STA 16+04.19(BRIDGE) TO STA 18+00.00



TYPICAL SECTION NO. 3

CORED SLAB BRIDGE OVERLAY

USE TYPICAL SECTION NO. 3 FROM:

-L- STA 15+26.81 TO STA 16+04.19

NOTES: * SHOULDER WIDTH INCREASED 3' WITH THE USE OF GUARDRAIL

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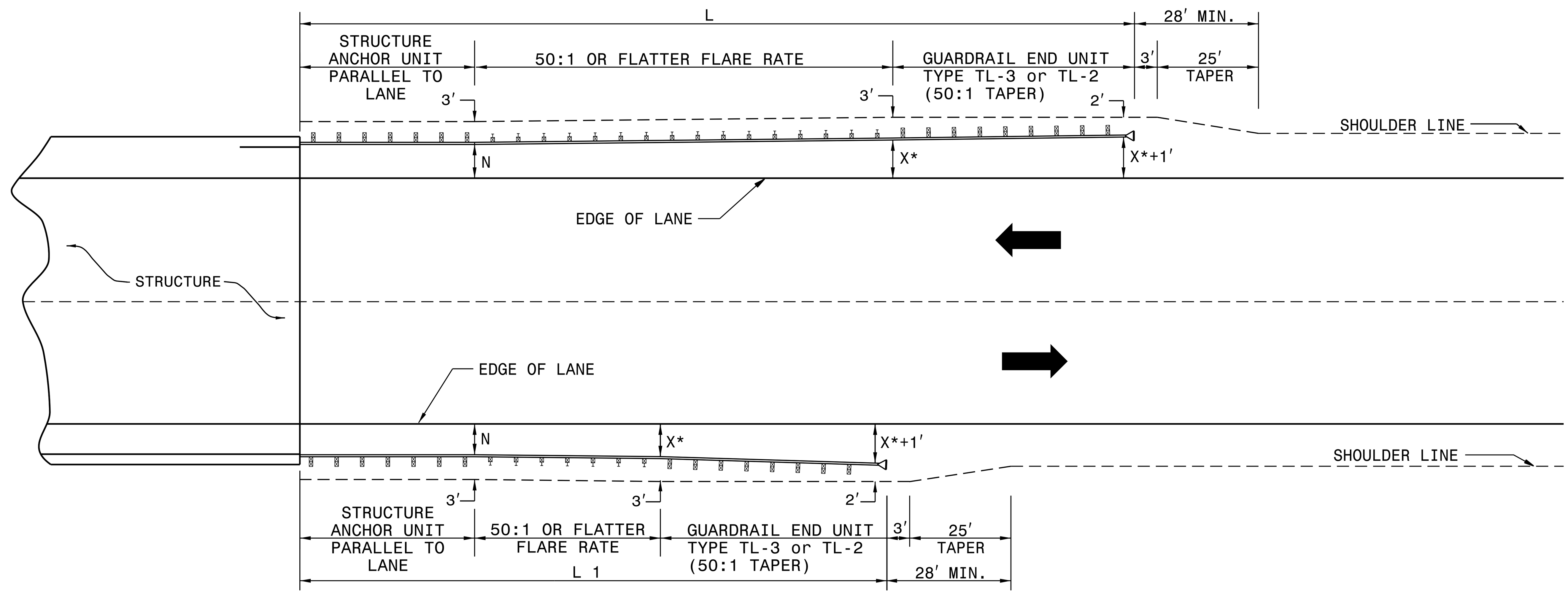
jhowerton AT CSD-292595



* USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1).

"N"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

GUARDRAIL INSTALLATION AT BRIDGE APPROACHES FOR TWO-LANE, TWO-WAY TRAFFIC

DESIGN SPEED (MPH)	"L" APPROACH LENGTH (FT.)				"L1" TRAILING LENGTH (FT.)			
	DESIGN YEAR ADT	CURRENT YEAR ADT			DESIGN YEAR ADT	CURRENT YEAR ADT		
	OVER 2000	1001-2000	400-1000	UNDER 400	OVER 2000	1001-2000	400-1000	UNDER 400
70	362.5'	362.5'	350.0'	287.5'	187.5'	187.5'	175.0'	75.0'
60	300.0'	287.5	275.0'	225.0'	137.5'	137.5'	100.0'	75.0'
50	212.5'	212.5'	200.0'	162.5'	87.5'	75.0'	75.0'	75.0'
40	175.0'	150.0'	137.5'	112.5'	75.0'	75.0'	75.0'	75.0'
X *	8'	6'	4'	4'	8'	6'	4'	4'

LENGTHS AND OFFSETS FOR PROPOSED GUARDRAIL AT TWO LANE - TWO WAY LOCATIONS

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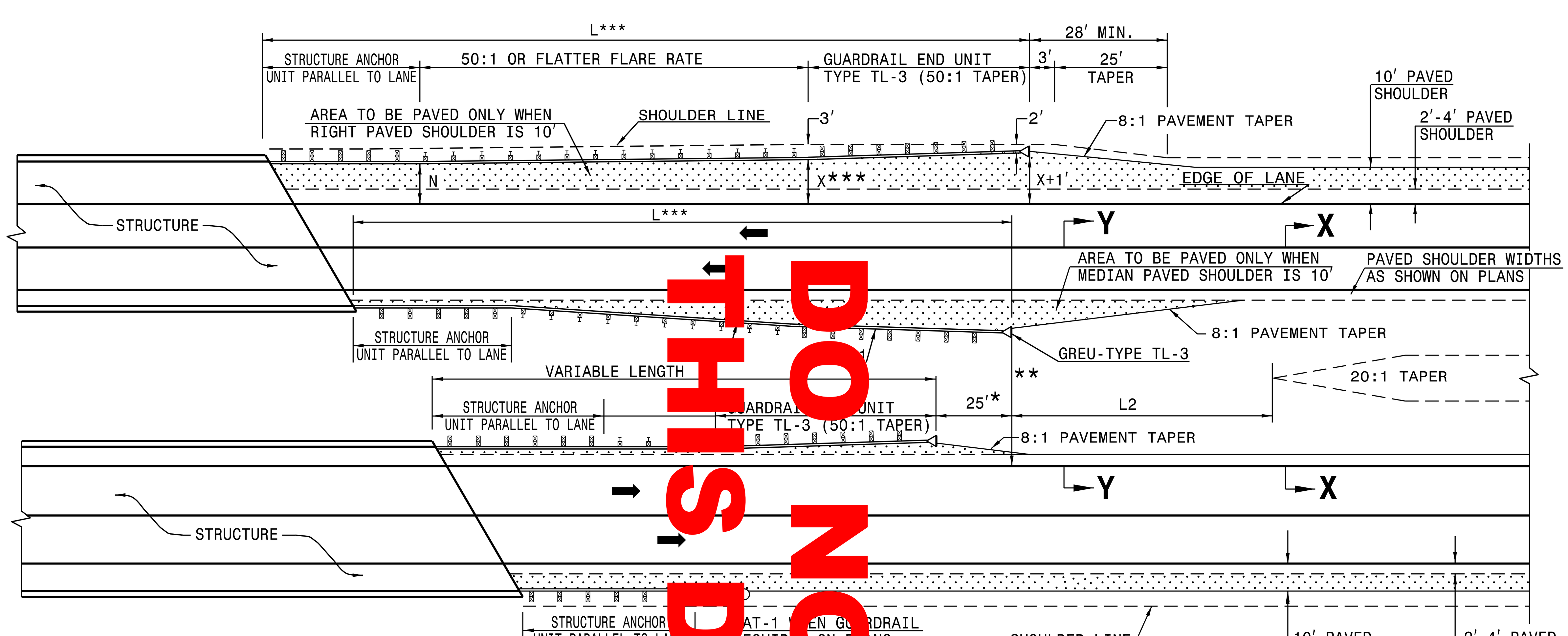
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 3 OF 11
862D01



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DIMENSIONS FOR LE[illegible] GUARDRAIL APPROACHING DUAL LANE BRIDGES

MEDIAN WIDTH	[illegible]					-L2- DIM.
	70 MPH	60 MPH	50 MPH			
30'	300.0'	250[illegible]	150.0'			80.0'
36'	300.0'	[illegible]0.0'	[illegible]0.0'			60.0'
40' & ABOVE	300.0'	[illegible]	[illegible]			40.0'

NOTES: * MINOR VARIATION TO THE [illegible] DIMEN[illegible] PERMISSIBLE TO ACCOMODATE THE 12'-6" IN GUARDRAIL LENGTHS.

** NO GUARDRAIL IS REQUIR[illegible] THE TR[illegible] END WHEN THIS DISTANCE EXCEEDS CLEAR ROADSIDE RECOVERY AREA FOR THE [illegible]PROPRIATE [illegible] SPEED.

*** BASED ON "X" OF 12'
USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1A).

"N"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.

THE DESIGN LAYOUT FOR LENGTHS SHOWN ON THIS STANDARD ARE MINIMUM DESIGN LENGTHS.

SEE SHEET 1 OF 12 FOR SECTIONS XX, YY

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

PROJECT REFERENCE NO. 17BP.3.R.47 | SHEET NO. 2C-1

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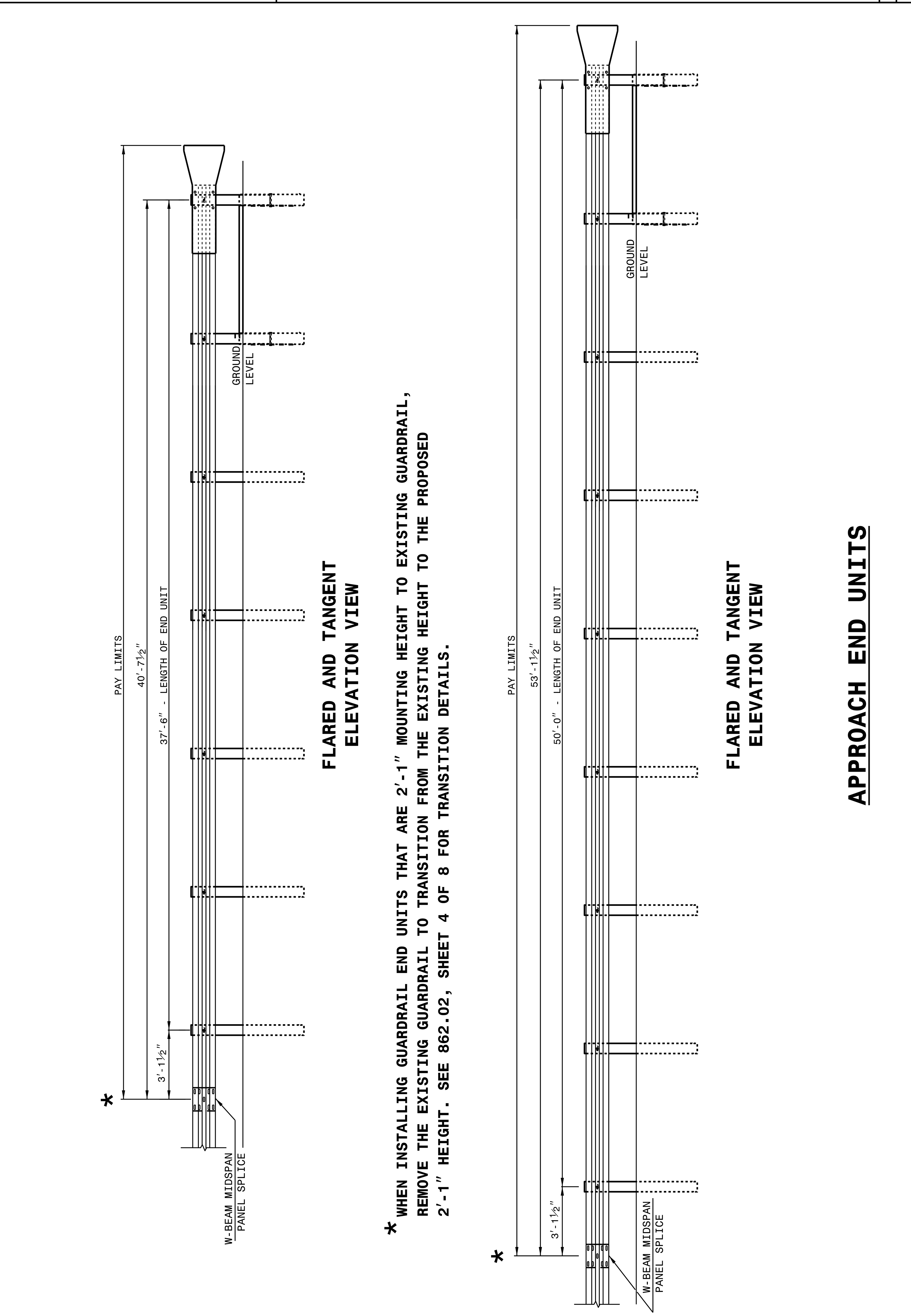
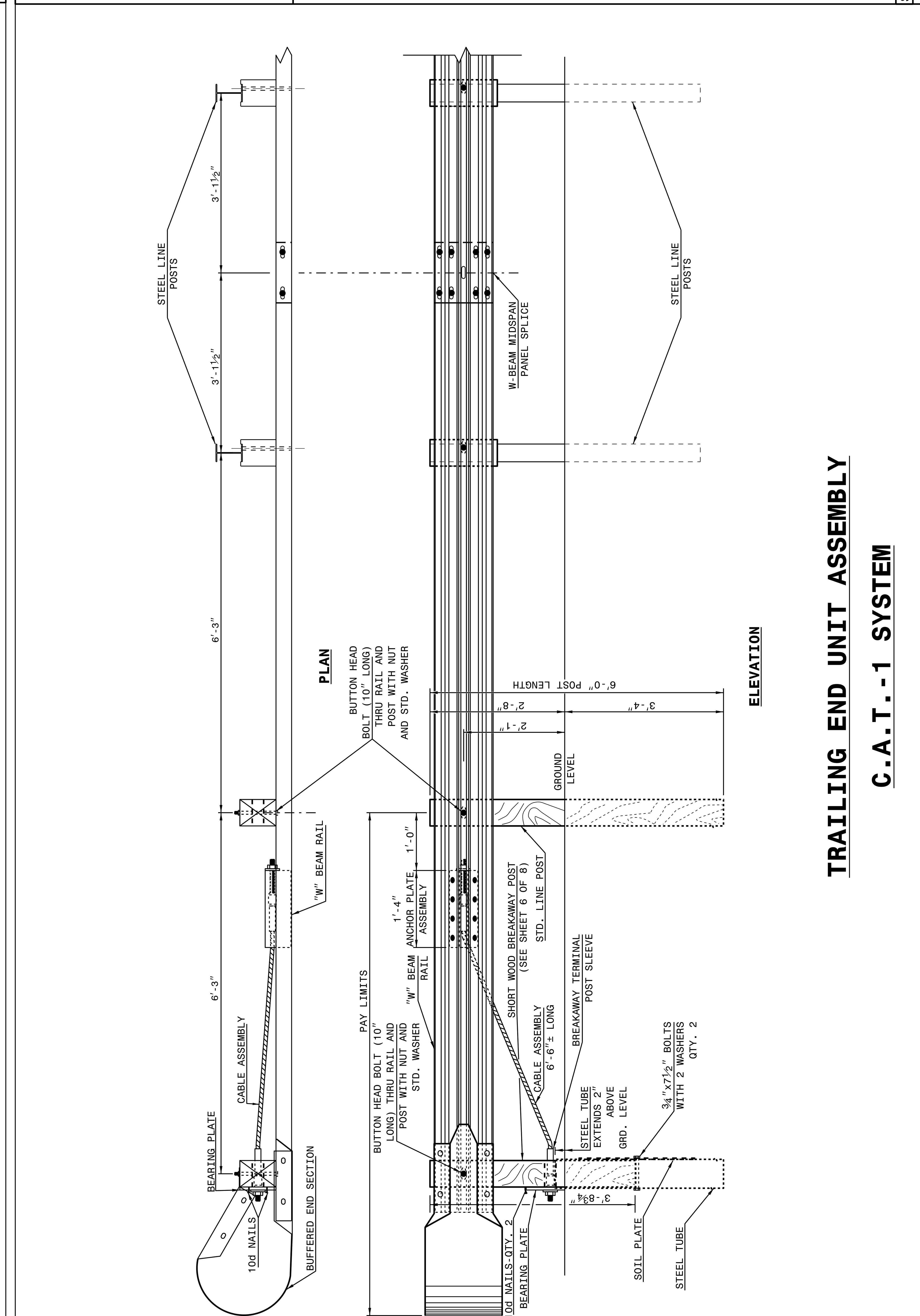
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 J. Howerton 7/26/2017

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	2C-2

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ROADWAY DETAIL DRAWING FOR GUARDRAIL INSTALLATION
SHEET 2 OF 8 862D02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ROADWAY DETAIL DRAWING FOR GUARDRAIL INSTALLATION
SHEET 1 OF 8 862D02





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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8 **862D02**

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 1 OF 8 **862D02**

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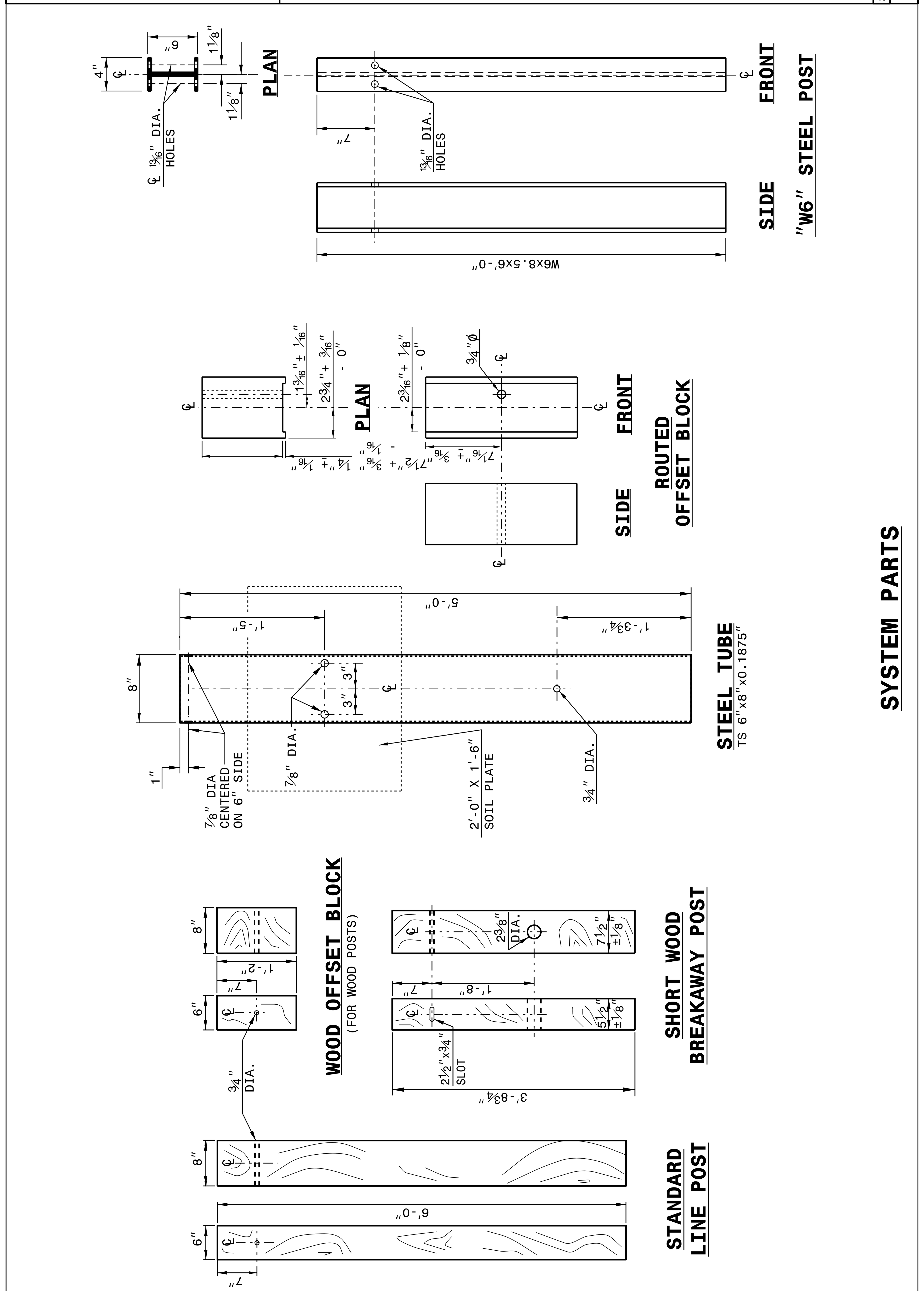
17BP.3.R.47	2C-3



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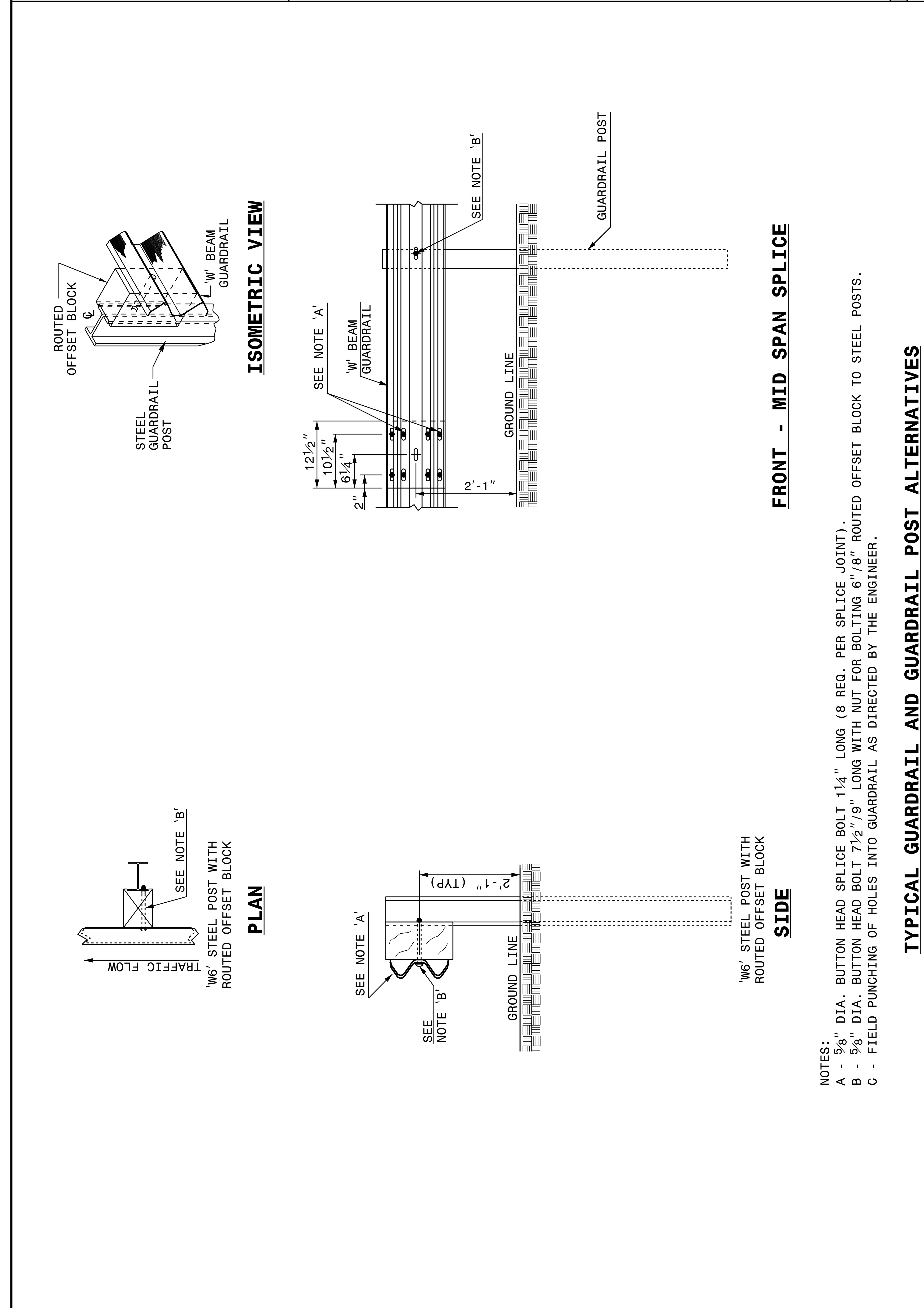
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 8
862D02

SEAL 022966

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17BP.3.R.47	2C-4

STATE OF
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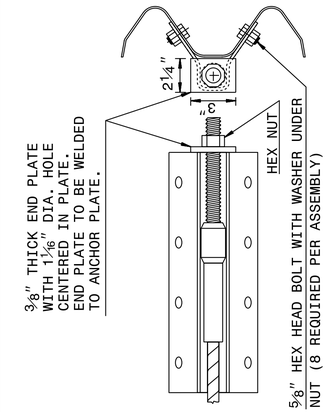
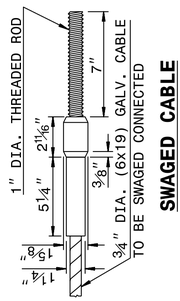
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

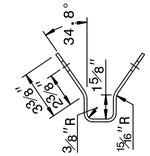
SHEET 7 OF 8
862D02



ANCHOR PLATE ASSEMBLY



SWAGED CABLE

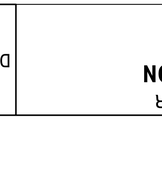


ANCHOR PLATE

CABLE ASSEMBLY

SYSTEM PARTS - GENERAL USE

BREAKAWAY TERMINAL POST SLEEVE

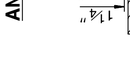


DETAIL OF STANDARD WASHER

STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST

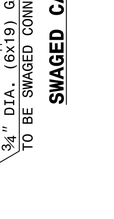
SOIL PLATE

¼" THICK PLATE



BEARING PLATE

⅝" THICK PLATE



DETAIL OF STANDARD HEX BOLT AND NUT

DETAIL OF BUTTON HEAD BOLT AND NUT

SYSTEM PARTS

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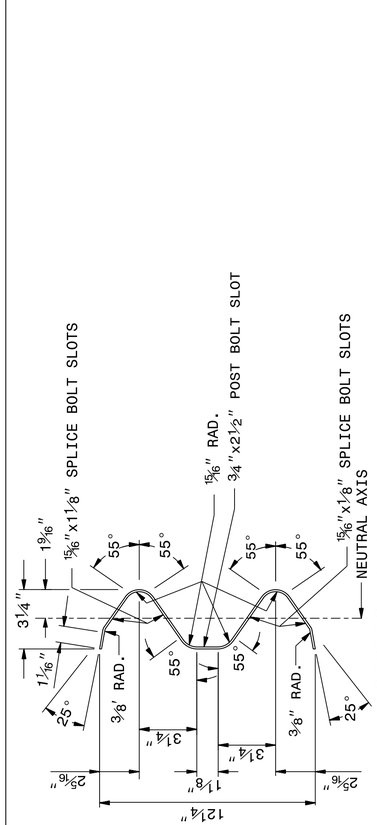
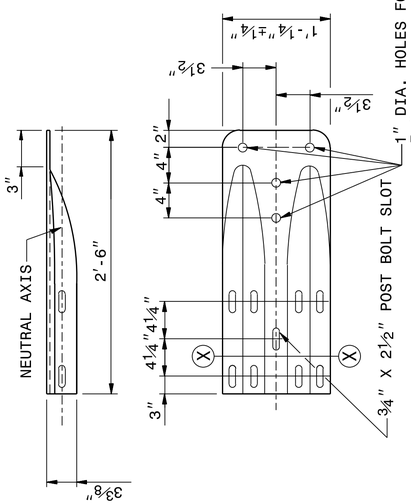
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

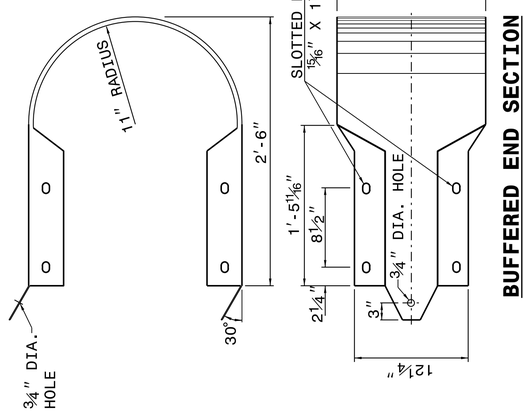
SHEET 8 OF 8
862D02



SECTION X-X



TYPICAL END SHOE



BUFFERED END SECTION

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 8 OF 8
862D02

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	2C-5

STATE OF
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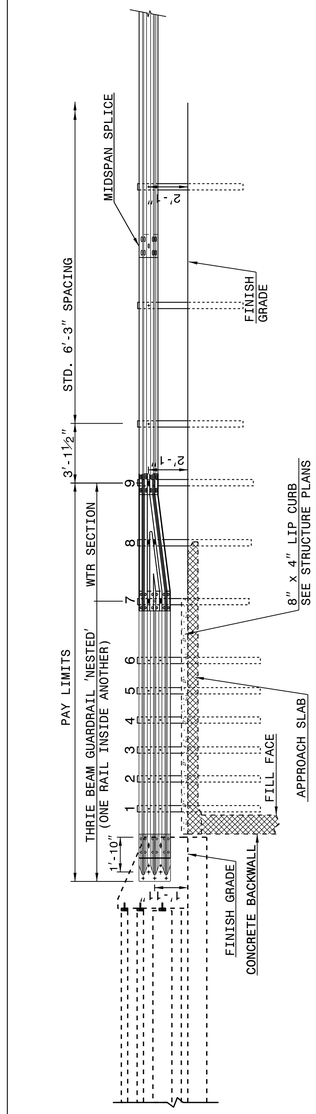
RALEIGH, N.C.

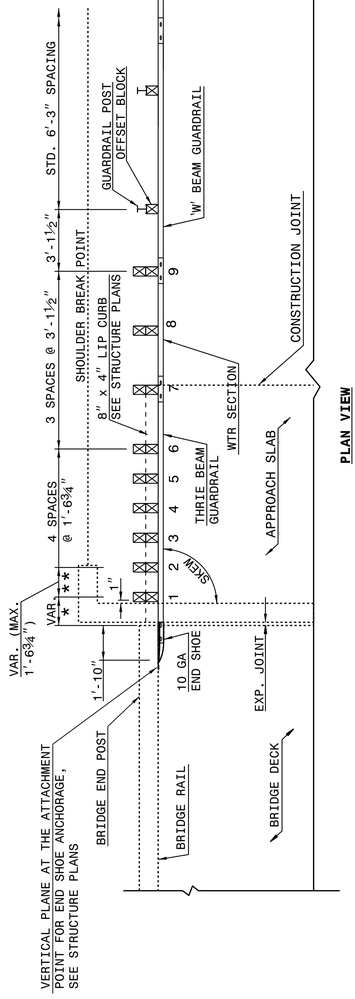
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

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 1½" 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.



PLAN VIEW

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

STATE OF
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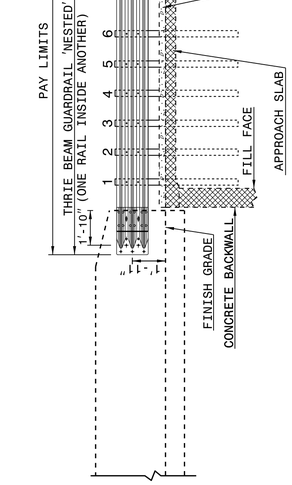
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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



ELEVATION

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 1½" 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.

PLAN VIEW

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

STATE OF
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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

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PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.47	2C-6

STATE OF
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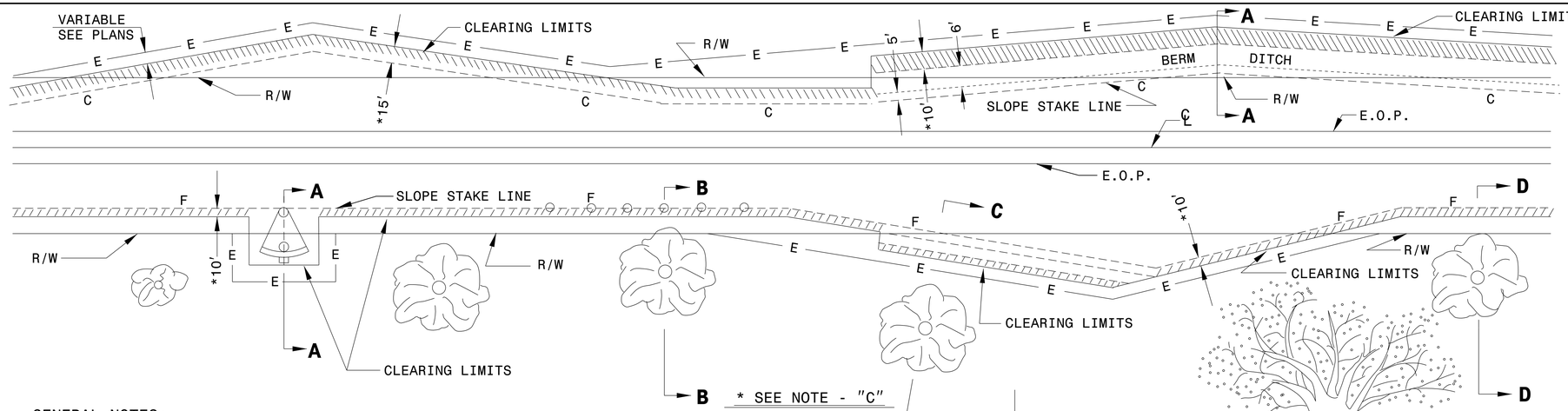
ENGLISH DETAIL DRAWING FOR

METHOD OF CLEARING

MODIFIED METHOD - III

SHEET 1 OF 1

200D03



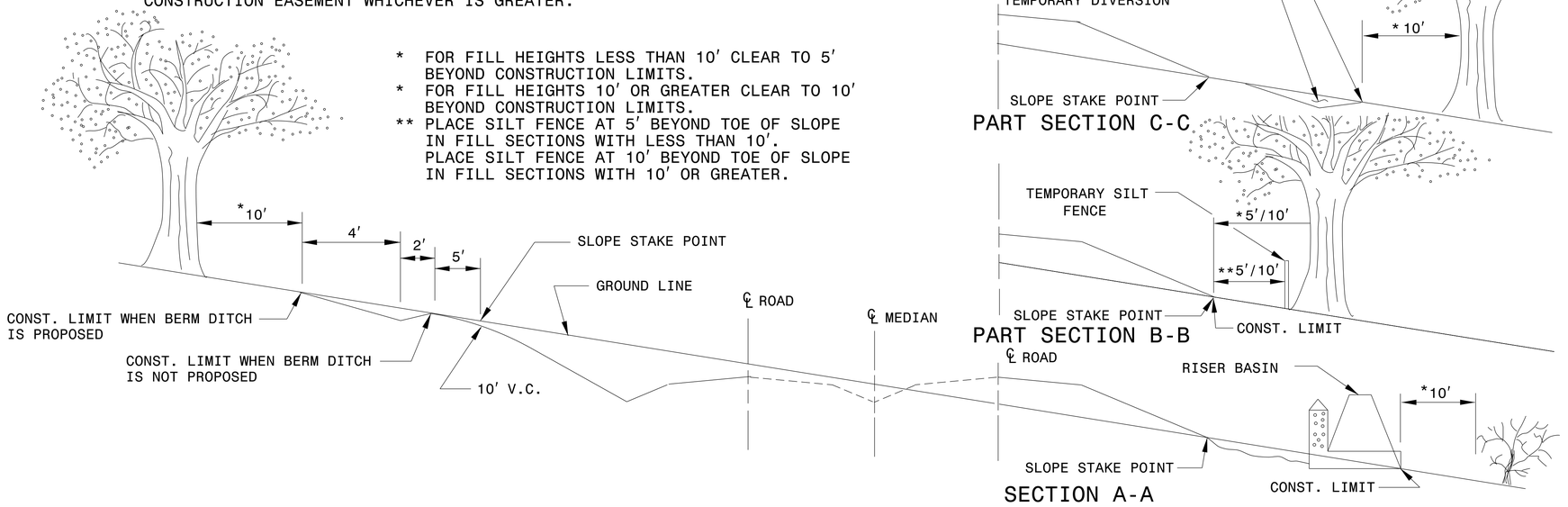
GENERAL NOTES:

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.

METHOD III CLEARING LIMITS

(A) CUTS -- CLEAR TO CONSTRUCTION LIMITS.
(B) FILLS - CLEAR TO 5′/10′ * BEYOND CONSTRUCTION LIMITS, UNLESS SPECIFIED OTHERWISE BY WETLAND PERMIT.
(C) CUTS AND FILLS - WHEN THE CLEARING LIMITS (A AND B) EXCEED THE PROPOSED R/W OR PROPOSED CONSTRUCTION EASEMENTS, THEN CLEAR ONLY TO THE R/W OR CONSTRUCTION EASEMENT WHICHEVER IS GREATER.

* FOR FILL HEIGHTS LESS THAN 10′ CLEAR TO 5′ BEYOND CONSTRUCTION LIMITS.
* FOR FILL HEIGHTS 10′ OR GREATER CLEAR TO 10′ BEYOND CONSTRUCTION LIMITS.
** PLACE SILT FENCE AT 5′ BEYOND TOE OF SLOPE IN FILL SECTIONS WITH LESS THAN 10′. PLACE SILT FENCE AT 10′ BEYOND TOE OF SLOPE IN FILL SECTIONS WITH 10′ OR GREATER.



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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

METHOD OF CLEARING

MODIFIED METHOD - III

SHEET 1 OF 1

200D03

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ORIGINAL BY:	T.S.S.	DATE:	FEB.2000
MODIFIED BY:	K.A.K.	DATE:	AUG.2016
CHECKED BY:		DATE:	
FILE SPEC.:	kkempf/english/0200d301.dgn		

$$$$SYSTIME$$$$
$$$$USERNAME$$$$ $$$$DGN$$$$

COMPUTED BY: MONICA DUVAL	DATE: 10/31/16
CHECKED BY: DAVID W. BASS, PE	DATE: 10/31/16

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	3B–1

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
–L– STA 12+50.00	STA 15+26.81(BRIDGE)	39	403	364	
–L– STA 16+04.19(BRIDGE)	STA 19+00.00	357	553	196	
SUBTOTALS:		396	956	560	
PROJECT TOTALS:		396	956	560	
5% TO REPLACE BORROW				28	
GRAND TOTALS:		396	956	588	
SAY:		400		600	

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."

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	13+50.00	15+40+/–	CL	443
	15+93+/–	18+00.00	CL	483
			TOTAL:	926
			SAY:	930

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH (FT)
–L–	15+01.81 RT	15+15.81 RT	14
	15+01.81 LT	15+15.81 LT	14
		TOTAL:	28
		SAY:	30

ROW AREA DATA SUMMARY

PARCEL NO.	PROPERTY OWNERS NAMES	PROP. R/W	PERM. UTILTIY EASE.	PERM. DRAIN. EASE.	PERM. DRAINAGE UTILITY EASE.	CONST. EASE.
1	WENDELL M. MURRAY, JR.					1031.00 S.F.
2	FRED TYRON HARDISON, JR	691.59 S.F.		255.00 S.F.		3239.94 S.F.
3	FELIX I & CONNIE R. OTTAWAY	1701.46 S.F.				1744.00 S.F.
4	LISA CUMMINGS/KIM HAUGAN	1450.39 S.F.				1214.34 S.F.
5	KIM DAVIS HAUGEN	682.12 S.F.				656.49 S.F.
6	STEVENSON D & LEAH E. SMITH	71.36 S.F.				233.34 S.F.

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
–L– 15+05.00	LT	0401		11.36			
		0401	0402		7.53	7.40	
–L– 15+05.00	LT	0402		11.36			
		0402	OUT		7.40	7.24	
–L– 17+01.00	LT						
–L– 18+48.00	RT						
TOTAL							

STATION	CAAP 12"	CAAP 15"	CAAP 18"	CAAP 24" .064	CAAP 30" .079	CAAP 36"	CAAP 42" .109	CAAP 48"
–L– 15+05.00								
–L– 15+05.00								
–L– 17+01.00								
–L– 18+48.00								
TOTAL								

STATION	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"
–L– 15+05.00													
–L– 15+05.00													
–L– 17+01.00													
–L– 18+48.00													
TOTAL													

STATION	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
–L– 15+05.00								
		28						
–L– 15+05.00								
		16						
–L– 17+01.00								
–L– 18+48.00								
TOTAL		44						

STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02
–L– 15+05.00						1			
–L– 15+05.00						1			
–L– 17+01.00	28								
–L– 18+48.00	32								
TOTAL	60					2			

STATION	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G			D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE 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. 840.22	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	TB GRATED D.I., TYPE 'B' STD. 840.35	T.B.D.I. (N.S.) FRAME AND TWO GRATES STD. 840.29
–L– 15+05.00																1	1
–L– 15+05.00																1	1
–L– 17+01.00																	
–L– 18+48.00																	
TOTAL																2	2

STATION					CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
–L– 15+05.00									
–L– 15+05.00									
–L– 17+01.00								21'	REMOVE 15" CMP
–L– 18+48.00								31'	REMOVE 15" CMP
TOTAL									

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

"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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END
–L–	STA 14+51.81	STA 15+26.81(BRIDGE)	RT	75'			STA 15+26.81(BRIDGE)		4.42'	7.42'	50'		1'	
	STA 14+51.81	STA 15+26.81(BRIDGE)	LT	75'				STA 15+26.81(BRIDGE)	4.42'	7.42'		50'		1'
	STA 16+04.19(BRIDGE)	STA 16+79.19	RT	75'				STA 16+04.19(BRIDGE)	4.42'	7.42'		50'		1'
	STA 16+04.19(BRIDGE)	STA 16+79.19	LT	75'			STA 16+04.19(BRIDGE)		4.42'	7.42'	50'		1'	
			SUBTOTAL:	300'										
			ANCHOR DEDUCTIONS:											
			GRAU 350: 4@50'	–200'										
			TYPE III:4@18.75'	–75'										
			TOTAL:	25'										
			SAY:	37.5'										
			5 ADDITIONAL POST											

SURVEY LINE	ANCHORS XI MOD	TYPE III	GREU TL–3	M–350	XIII	CAT–1	VI MOD	BIC	AT–1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
–L–		1	1													
		1	1													
		1	1													
		1	1													
SUBTOTAL:		4	4													
SAY:		4	4													

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

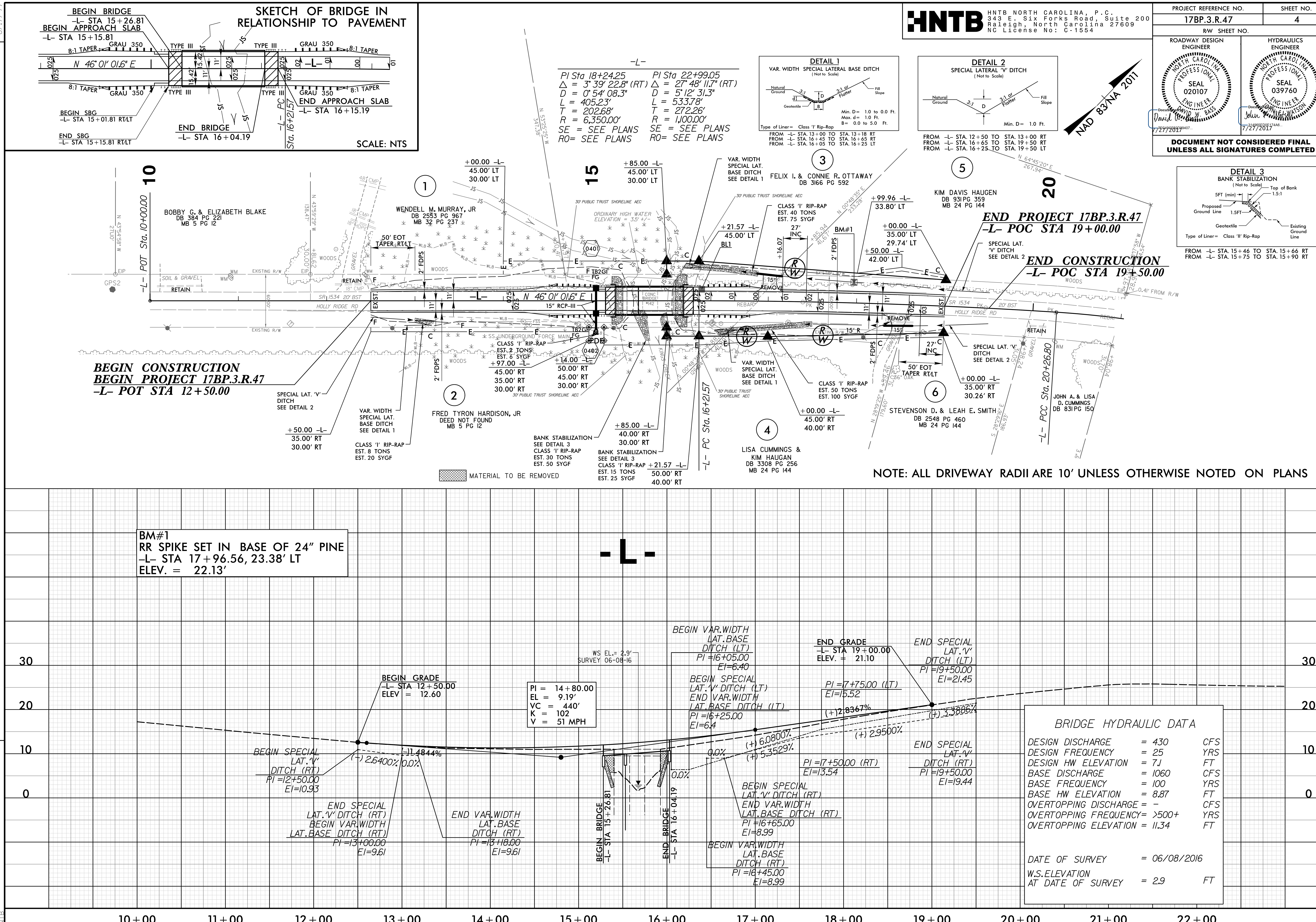
PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — SEAL 020107 — 7/27/2017

HYDRAULICS ENGINEER — SEAL 039760 — 7/27/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	430	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	7.1	FT
BASE DISCHARGE	=	1060	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	8.87	FT
OVERTOPPING DISCHARGE	=	-	CFS
OVERTOPPING FREQUENCY	=	>500+	YRS
OVERTOPPING ELEVATION	=	11.34	FT
DATE OF SURVEY	=	06/08/2016	
W.S.ELEVATION AT DATE OF SURVEY	=	2.9	FT

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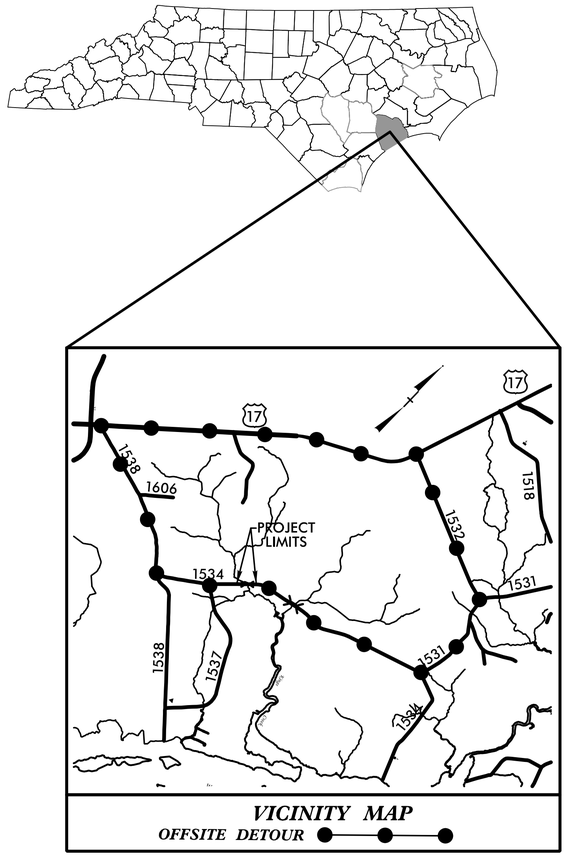
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

ONSLOW COUNTY



VICINITY MAP
OFFSITE DETOUR

LOCATION: REPLACE BRIDGE NO. 142 OVER KINGS CREEK TRIB. ON SR 1534 (HOLLY RIDGE RD)

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY, INDEX OF SHEETS AND LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS
TMP-2	TEMPORARY TRAFFIC CONTROL PHASING, GENERAL NOTES AND DETOUR

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C. DATED JAN 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & 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 DELINEATOR SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPE
1262.01	GUARDRAIL END DELINEATION

R. B. EARLY, PE — *TRAFFIC CONTROL PROJECT ENGINEER*
R. B. EARLY, PE — *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*
J. A. PHILLIPS — *TRAFFIC CONTROL DESIGN ENGINEER*

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WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. – DIVISION 3

JESSI LEONARD, PE — *DIVISION TRAFFIC ENGINEER*

DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Ste 200
Raleigh, North Carolina 27609
NC License No: C-1554

APPROVED: DocuSigned by: Rhonda B. Early F34CAF5AC6BF48A...

DATE: 7/25/2017

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023521 ENGINEER RHONDA B. EARLY

SHEET NO.
TMP-1

17BP.3.R.47

TIP PROJECT:

7/25/2017
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PROJ. REFERENCE NO.	SHEET NO.
17BP.3.R.46	TMP-2

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 THE DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATIONS MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

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

LANE AND SHOULDER CLOSURE REQUIREMENTS

A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

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

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN ON THIS SHEET.

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 DETUR 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 MARKING AND MARKERS

G) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKERS
SR 1534 (HOLLY RIDGE RD)	PAINT	RAISED

H) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

I) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

J) PASSING ZONE WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PHASING

PHASE I

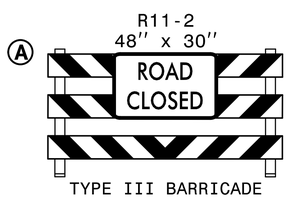
PRIOR TO ANY CONSTRUCTION OPERATIONS, PLACE AND COVER OFF-SITE DETOUR SIGNS AS SHOWN AND IN ACCORDANCE WITH RSD 1101.03 (SHEET 1 OF 9).

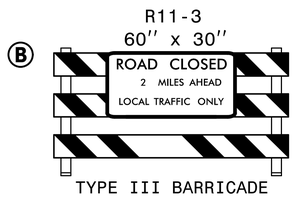
PHASE II

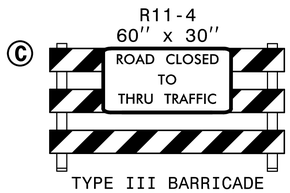
USING OFF-SITE, UNCOVER DETOUR SIGNS, CLOSE -L- (SR 1534 /HOLLY RIDGE RD) TO TRAFFIC AND CONSTRUCT BRIDGE, APPROACHES AND ROADWAY UP TO AND INCLUDING THE FINAL LAYER OF SURFACE COURSE.

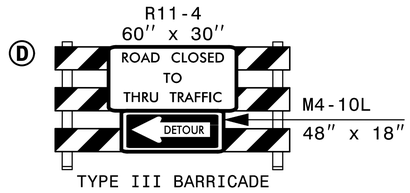
PHASE III

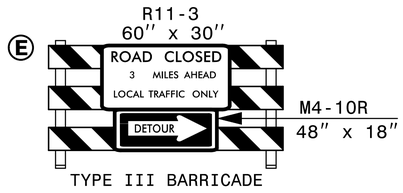
UPON COMPLETION OF BRIDGE, APPROACHES AND ROADWAY, PLACE FINAL PAVEMENT MARKINGS AND MARKERS IN ACCORDANCE WITH RSD 1205.01, 1205.02, 1205.12, 1250.01 AND 1251.01. REMOVE BARRICADES AND DETOUR SIGNS AND OPEN -L- (SR 1534 / HOLLY RIDGE RD) TO TRAFFIC.

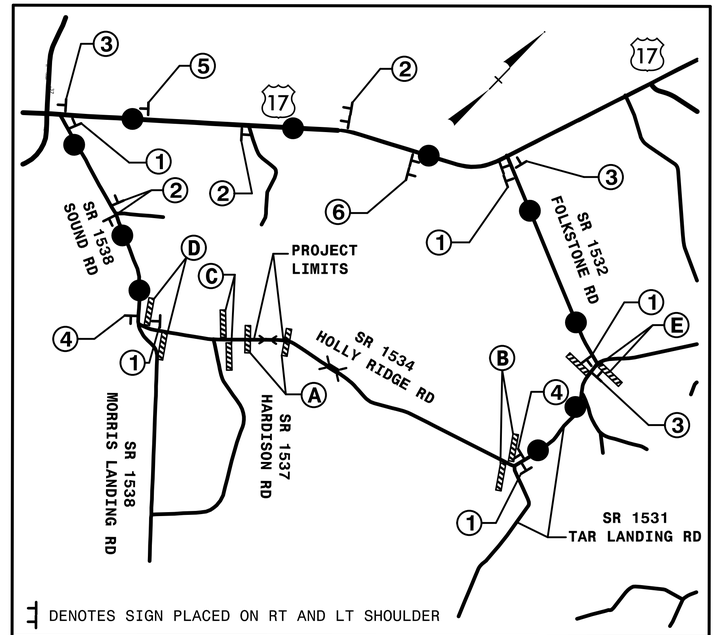






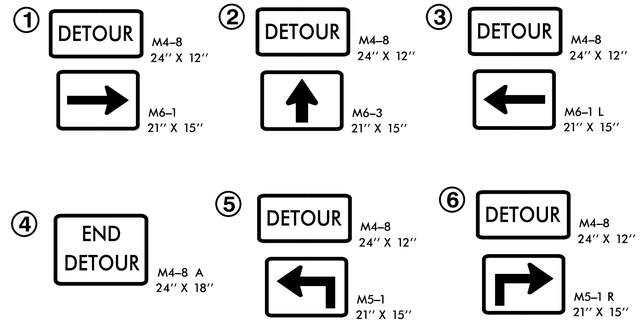






VICINITY MAP
OFFSITE DETOUR

ESTIMATED ADDITIONAL SIGNS REQUIRED PER RSD 1101.03.
SEE RSD FOR SIGN PLACEMENT & SIGN WORDING REQUIREMENTS.
- W20-3 (18 EACH)
- SP-4 (4 EACH)
- W20-2 (4 EACH)



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APPROVED:
Docusigned by:
Rhonda B. Early
F34CAF5AC8BF48A...
DATE: 7/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 023521 ENGINEER RHONDA B. EARLY SEAL

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

TRANSPORTATION MANAGEMENT PLAN

PHASING, PROJECT NOTES, AND DETOUR

7/25/2017
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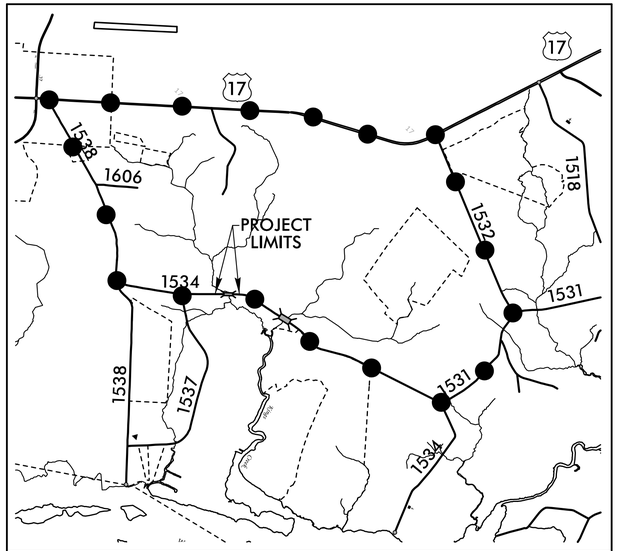
HNTB

TIP PROJECT: 17BP.3.R.47



VICINITY MAP

OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

ONSLOW COUNTY

LOCATION: REPLACE BRIDGE #142 OVER KINGS CREEK
TRIB. ON SR 1534 (HOLLY RIDGE RD.)
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

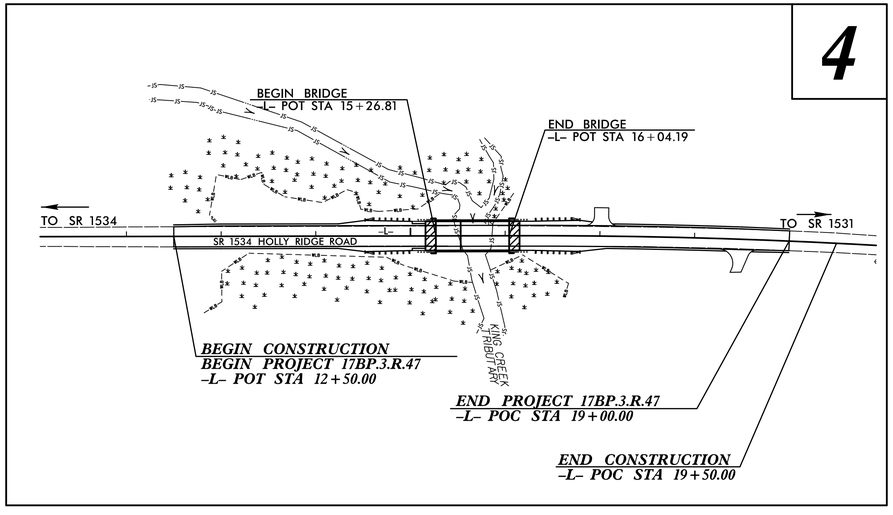
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.3.R.47	EC-1	#

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

EROSION AND SEDIMENT CONTROL MEASURES

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

NAD 83/ NSRS 2011



THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

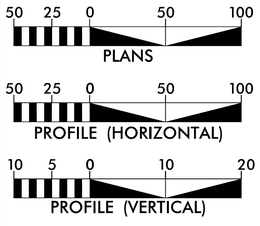
HIGH QUALITY WATER(S) EXIST ON THIS PROJECT

High Quality Water Zone(s) Exist
From Sta. Beginning
to Sta. End
Refer To E. C. Special Provisions for Special Considerations.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALES



ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 1, 2016 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared In the Office of:

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

NATALIE CHAN, P.E.
EROSION CONTROL
LEVEL III
CERTIFICATION #3444

Roadway Standard Drawings

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

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

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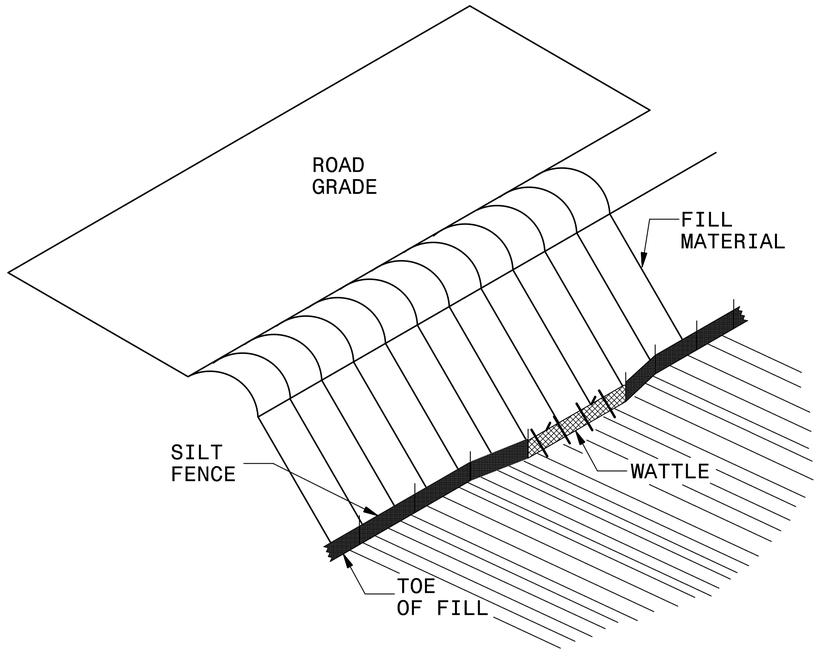
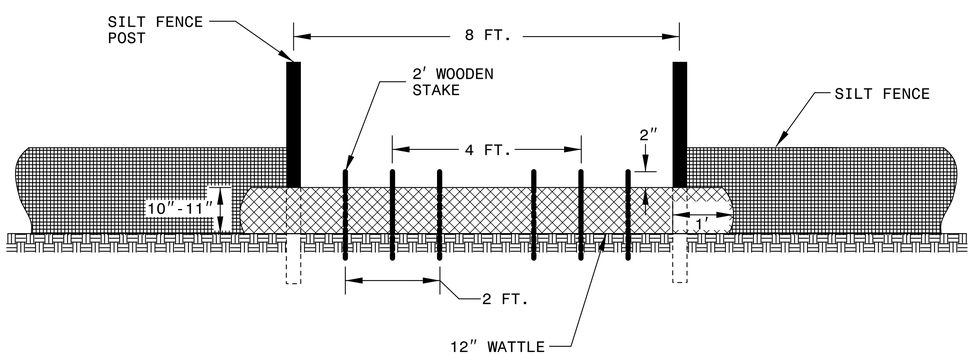
PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC-2

SILT FENCE WATTLE BREAK DETAIL



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR 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.

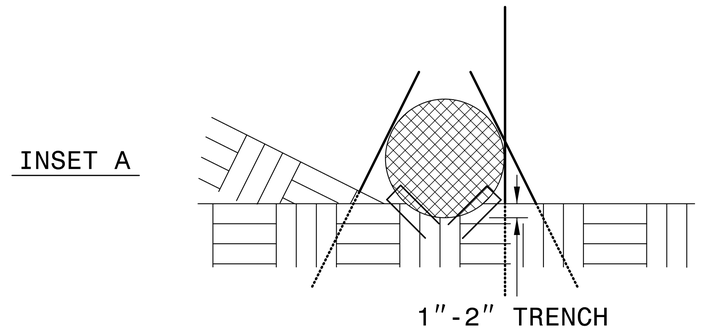
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

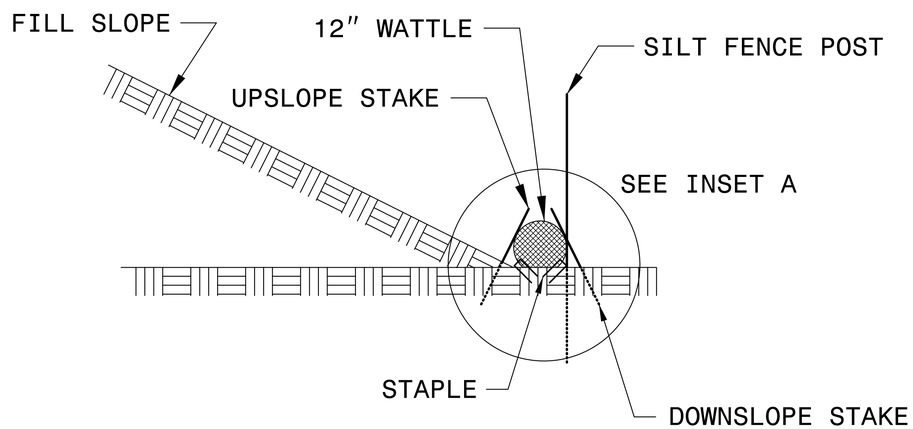
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

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.

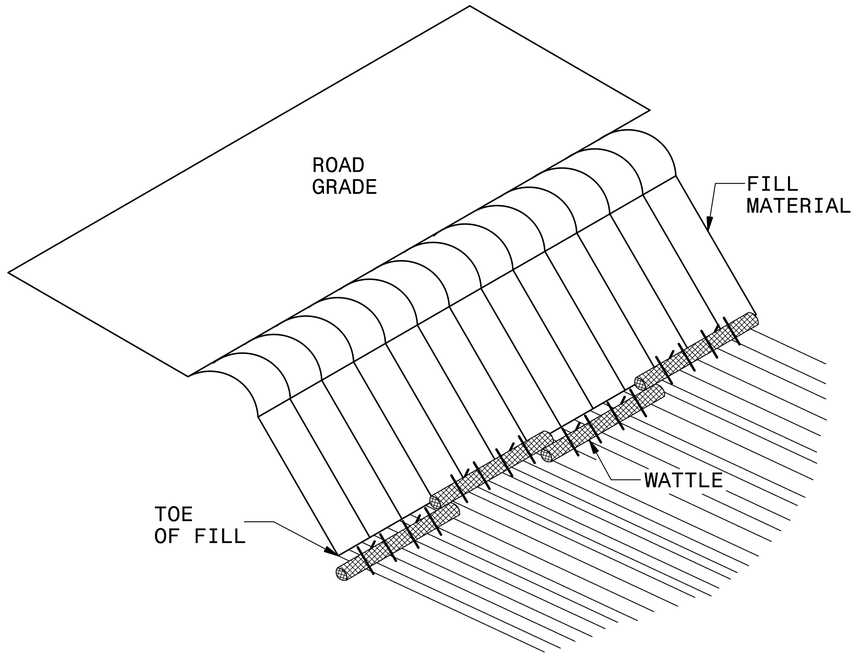




SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC-2A

WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 18 IN. NOMINAL DIAMETER EXCELSIOR 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.

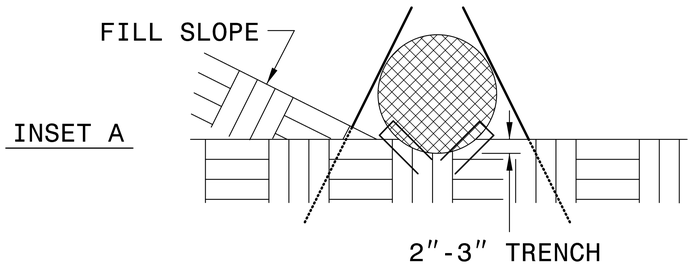
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

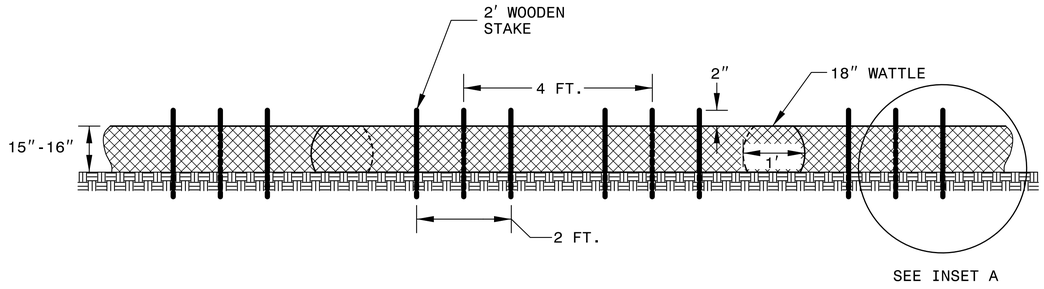
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

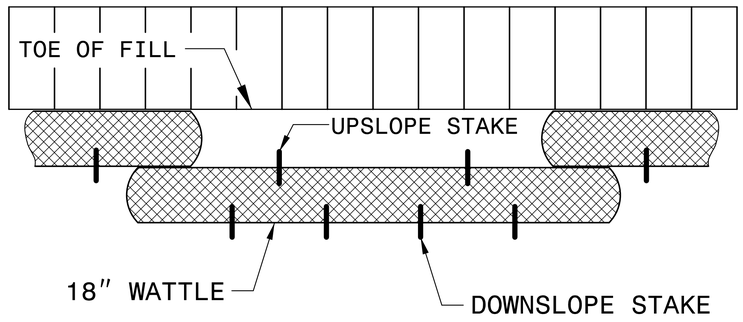
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 25 FT.





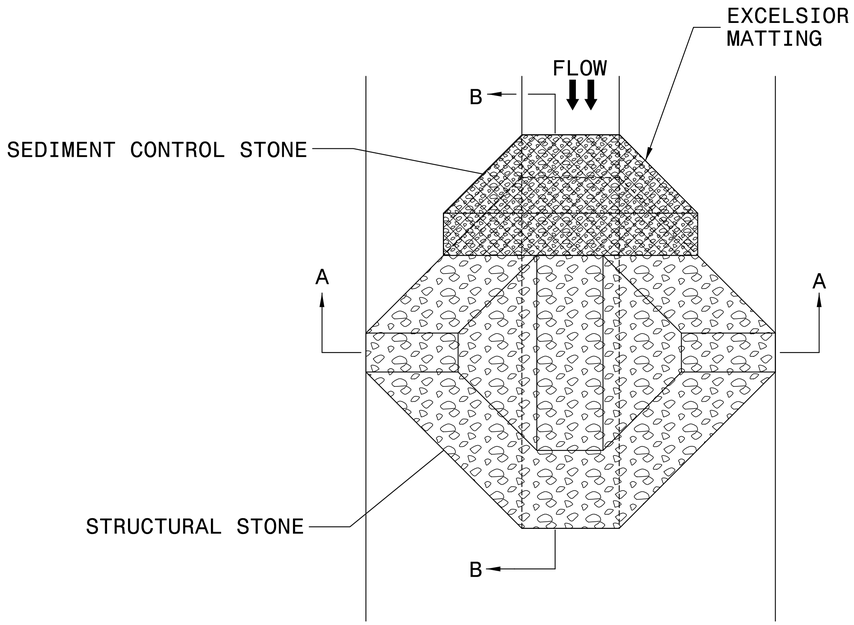
FRONT VIEW



TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC-2B

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



PLAN

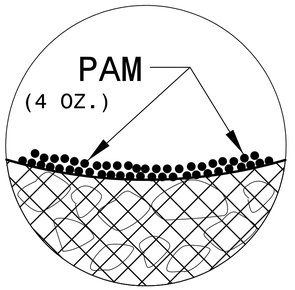
NOTES:

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

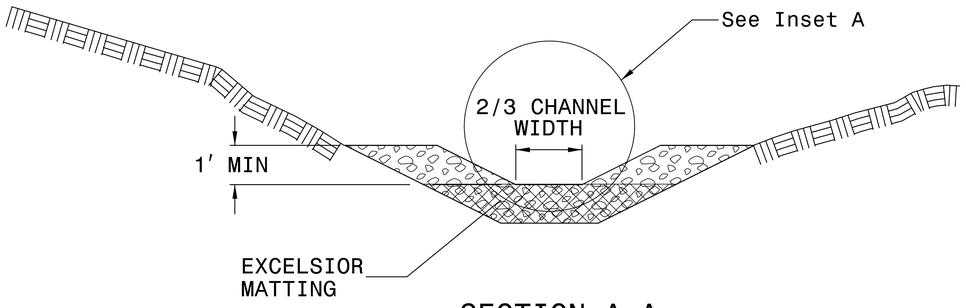
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

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

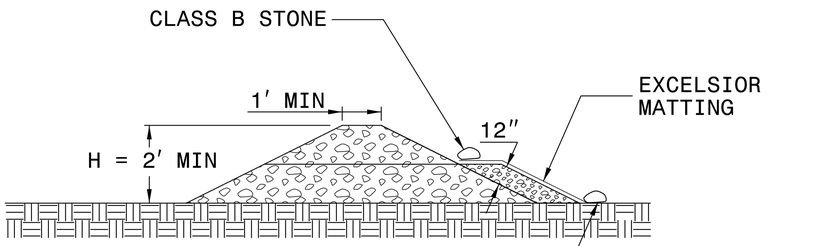
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A



SECTION B-B

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	12+50	13+00	RT	20
4	-L-	16+65	19+50	RT	200
			SUBTOTAL		220
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					1310
				TOTAL	1530
				SAY	1550

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	16+25	19+50	LT	230
			SUBTOTAL		230
		ADDITIONAL PSRM TO BE INSTALLED			0
				TOTAL	230
				SAY	230

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC-3A

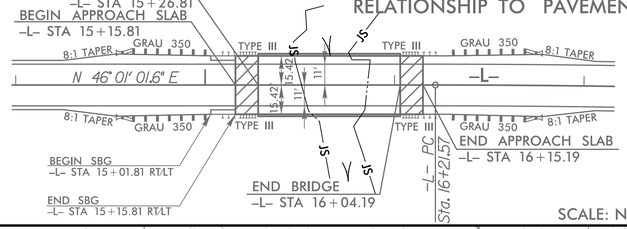
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
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.

8/17/99

SKETCH OF BRIDGE IN RELATIONSHIP TO PAVEMENT



SCALE: NTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	EC–4
R/W SHEET NO.	

NATALIE CHAN, P.E.
EROSION CONTROL
LEVEL III
CERTIFICATION #3444

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

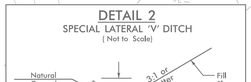
NAD 83/NA 2011

DETAIL 1
VAR. WIDTH SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D= 1.0 to 0.0 Ft.
Max. d= 1.0 Ft.
B= 0.0 to 5.0 Ft.
Type of Liner= Class 'B' Rip-Rap

FROM –L– STA. 13+00 TO STA. 13+18 RT
FROM –L– STA. 16+45 TO STA. 16+65 RT
FROM –L– STA. 16+05 TO STA. 16+25 LT

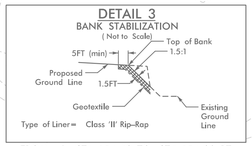
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.

FROM –L– STA. 12+50 TO STA. 13+00 RT
FROM –L– STA. 16+65 TO STA. 19+50 RT
FROM –L– STA. 16+25 TO STA. 19+50 LT

DETAIL 3
BANK STABILIZATION
(Not to Scale)



Type of Liner= Class 'II' Rip-Rap

FROM –L– STA. 15+46 TO STA. 15+66 RT
FROM –L– STA. 15+75 TO STA. 15+90 RT

NOTES: 1. THE CONTRACTOR SHALL INSTALL SPECIAL SEDIMENT CONTROL FENCE OR WATTLES IN LOW AREAS OFSILT FENCE AND UNDER THE BRIDGE, AS NEEDED OR DIRECTED BY THE ENGINEER.
2. THE OUTSIDE BUFFER, WETLAND OR WATER BOUNDARY SHALL BE CLEARLY MARKED BY HIGHLY VISIBLE FENCING (ORANGE SAFETY FENCE).

MATERIAL TO BE REMOVED

BM#1
RR SPIKE SET IN BASE OF 24" PINE
–L– STA 17+96.56, 23.38' LT
ELEV. = 22.13'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 430	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 7.1	FT
BASE DISCHARGE	= 1060	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 8.87	FT
OVERTOPPING DISCHARGE	= –	CFS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 11.34	FT
DATE OF SURVEY	= 06/08/2016	
W.S.ELEVATION AT DATE OF SURVEY	= 2.9	FT

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HNTB

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	*17BP.3.R.47*	RF–1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

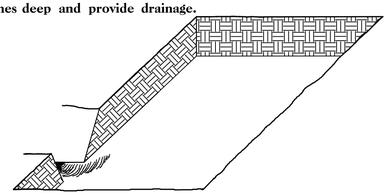
PLANTING DETAILS

SEEDLING / LINER 3AREROOT PLANTING DETAIL

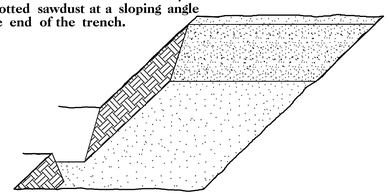
HEALING IN

1. Locate a healing–in site in a shady, well protected area.

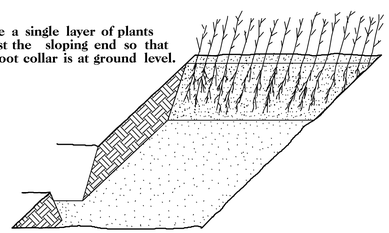
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



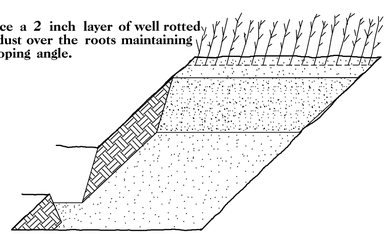
3. 3ackfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

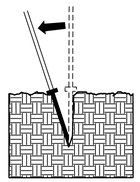


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

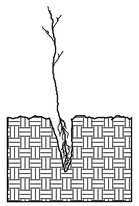


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

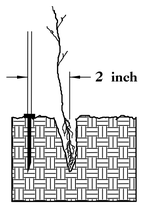
DI33LE PLANTING METHOD USING THE K3C PLANTING 3AR



1. Insert planting bar as shown and pull handle toward planter.

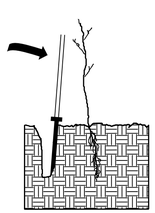


2. Remove planting bar and place seedling at correct depth.

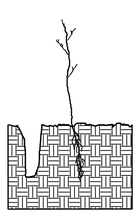


3. Insert planting bar 2 inches toward planter from seedling.

4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING 3AG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

K3C PLANTING 3AR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

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

REFORESTATION

☐ TREE REFORESTATION SHALL 3E PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

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

25%	*LIRIODENDRON TULIPIFERA*	*TULIP POPLAR*	12 in – 18 in 3R
25%	*PLATANUS OCCIDENTALIS*	*AMERICAN SYCAMORE*	12 in – 18 in 3R
25%	*FRAXINUS PENNSYLVANICA*	*GREEN ASH*	12 in – 18 in 3R
25%	*BETULA NIGRA*	*RIVER BIRCH*	12 in – 18 in 3R

REFORESTATION DETAIL SHEET

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

TIP PROJECT: 17BP.3.R.47

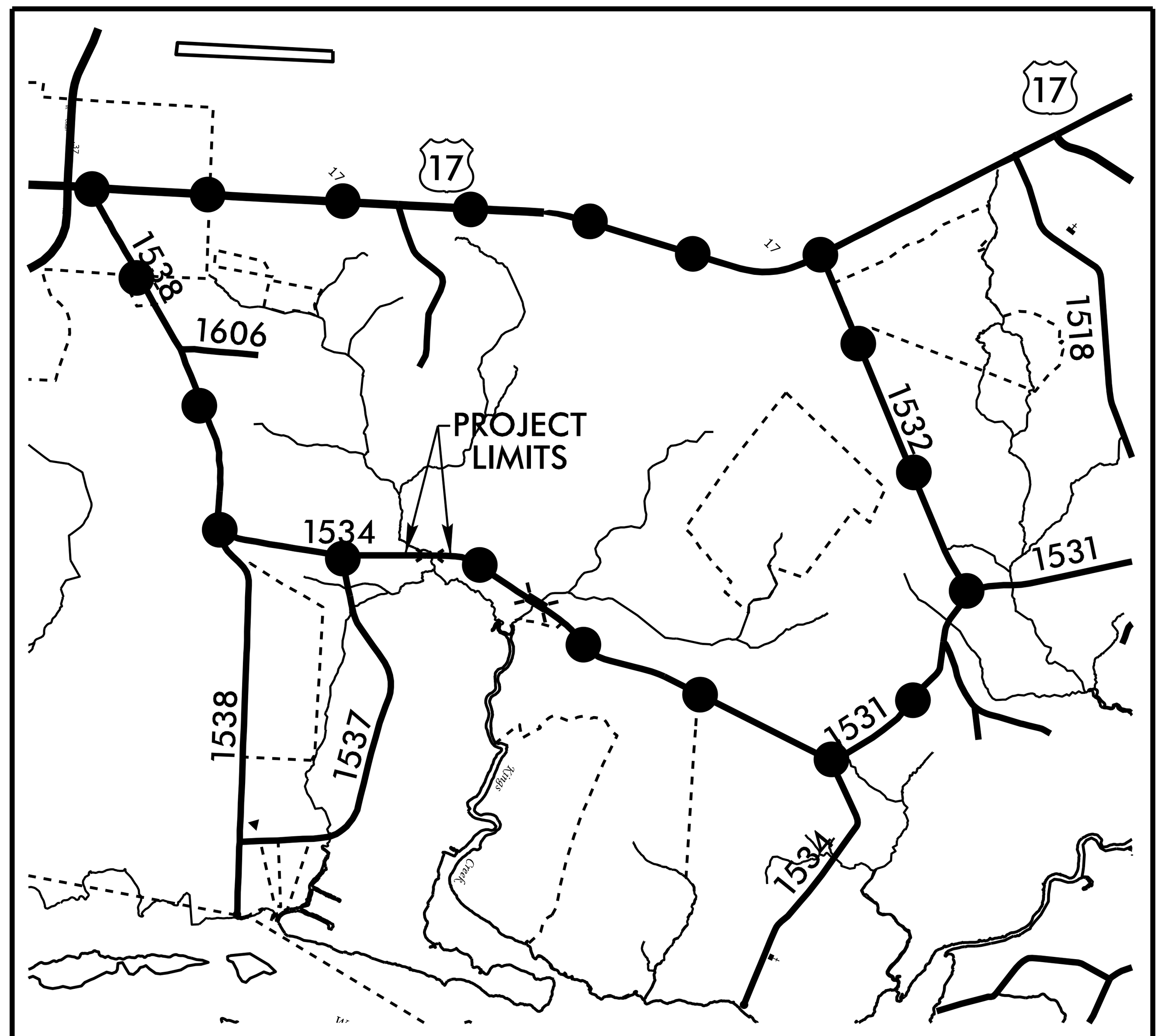
T.I.P. NO.	SHEET NO.
17BP.3.R.47	UC-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS
ONSLOW COUNTY

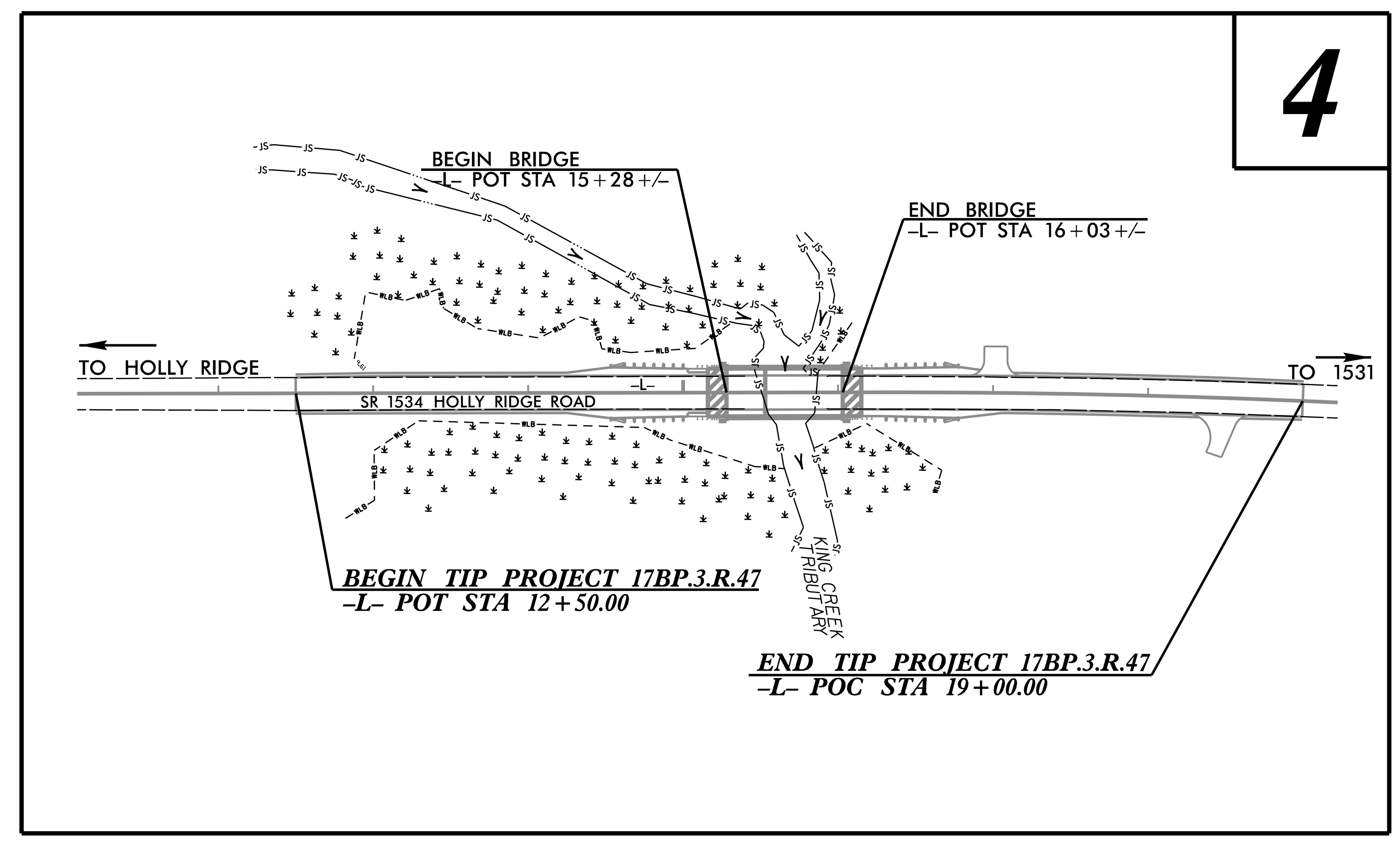
LOCATION: REPLACE BRIDGE #142 OVER KINGS CREEK TRIB. ON SR 1534 (HOLLY RIDGE RD.)

TYPE OF WORK: WATER LINE RELOCATION



VICINITY MAP
OFFSITE DETOUR

NAD 83/
NSRS 2011



NOTES:

1. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) WATER - ONWASA
(B) SANITARY SEWER - ONWASA

PREPARED IN THE OFFICE OF

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: F-0160

FOR

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

WEBB WHITE	PROJECT UTILITY COORDINATOR
KEVIN ZDEB, PE	PROJECT ENGINEER
GARY BLUE	PROJECT DESIGN ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27611 KEVIN C. ZDEB

5/19/2017

DIVISION OF HIGHWAYS
DIVISION 3
5501 BARBADOS BLVD
CASTLE HAYNE NC 28429
PHONE (910) 341-2000
FAX (910) 675-0143

AL EDGERTON, PE	DIVISION BRIDGE PROGRAM ENGINEER
J. STEVE DAVIS	UTILITIES AREA COORDINATOR

4/20/2017
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Symbol	Label
Water Line (Sized as Shown)	12" WL
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	GV
Butterfly Valve	BV
Tapping Valve	TGV
Line Stop	LS
Line Stop with Bypass	LS/BP
Blow Off	BO
Fire Hydrant	PFH
Relocate Fire Hydrant	RFH
Remove Fire Hydrant	REM FH
Water Meter	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Water Pump Station	PS(W)
RPZ Backflow Preventer	PRPZ
DCV Backflow Preventer	PBFP
Relocate RPZ Backflow Preventer	RRPZ
Relocate DCV Backflow Preventer	RBFP

PROPOSED SEWER SYMBOLS

Symbol	Label
Gravity Sewer Line (Sized as Shown)	12" SS
Force Main Sewer Line (Sized as Shown)	12" FSS
Manhole (Sized per Note)	
Sewer Pump Station	PS(SS)

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

Symbol	Label
Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	TEL PED
Utility Line by Others (Type as Shown)	PROP O/H POW LINES
Trenchless Installation	12" TL INSTALL
Encasement by Open Cut	24" ENCAS BY OC
Encasement	24" ENCASEMENT
Thrust Block	
Air Release Valve	AR
Utility Vault	UV
Concrete Pier	CP
Steel Pier	SP
Plan Note	NOTE
Pay Item Note	PAY ITEM

EXISTING UTILITIES SYMBOLS

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

*For Existing Utilities

Symbol	Label
Utility Line Drawn from Record (Type as Shown)	W
Designated Utility Line (Type as Shown)	W

REV: 2/1/2012

5/14/99

$$$$$$SYSTIME$$$$ $$$$$USERNAME$$$$ $$$$$$$$$$$$$$$DGN$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	UC-3

DESIGNED BY: GJB
DRAWN BY: GJB
CHECKED BY: KCZ
APPROVED BY: KCZ
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

NORTH CAROLINA PROFESSIONAL SEAL 27611 ENGINEER KEVIN C. ZDEB
DocuSigned by: Kevin C. Zdeb
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5/19/2017

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

M A Engineering Consultants, Inc. 598 East Chatham Street - Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221 NC License: F-0160

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 2012.

2. THE EXISTING WATER LINE UTILITIES BELONG TO ONSLOW WATER AND SEWER AUTHORITY (ONSWASA).

   CONTACT: DAVID M. MOHR, PE
   PHONE: 910-937-7521

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF ENVIRONMENTAL HEALTH.

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 OPPROTUNITY 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 ADDITONAL 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.

10. CONTRACTOR SHALL NOT OPERATE ANY VALVES ON THE EXISTING UTILITY SYSTEMS. CONTRACTOR SHALL CONTACT THE UTILITY OWNER TO CONDUCT STRATEGIC OPERATION OF VALVES FOR SERVICE INTERRUPTION IN ORDER TO PERFORM SPECIFIC WORK.

PROJECT SPECIFIC NOTES:

1. PROPOSED PIPE FOR OPEN TRENCH INSTALLATION SHALL BE 8" DIP WITH RESTRAINED JOINT CONSTRUCTION, PRESSURE CLASS OF 350.

2. PIPE FOR TRENCHLESS INSTALLATION SHALL BE 10" HDPE, DR-9, C906, DIPS, PRESSURE RATING OF 200 PSI CONFORMING TO NSF-61.

3. ALL WATER LINE FITTINGS, 4-INCHES THROUGH 12-INCHES IN DIAMETER, SHALL BE DUCTILE IRON, PRESSURE CLASS 350.

4. ALL UTILITY CONSTRUCTION SHALL BE SUBJECT TO A FINAL INSPECTION BY AN ONWASA REPRESENTATIVE TO INSURE CONFORMANCE TO ONWASA STANDARDS PRIOR TO FINAL ACCEPTANCE BY THE DEPARTMENT.

5. ALL PROPOSED FITTINGS (BENDS, TEES, CROSSES, REDUCERS, PLUGS, ETC.) SHALL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINED JOINT CONSTRUCTION AND/OR CAST IN PLACE CONCRETE THRUST RESTRAINTS AS DETAILED ON THESE DRAWINGS, OR AS DIRECTED BY THE RESIDENT ENGINEER.

6. 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, STREAM, CREEK, WETLANDS, OR BUFFER ZONES.

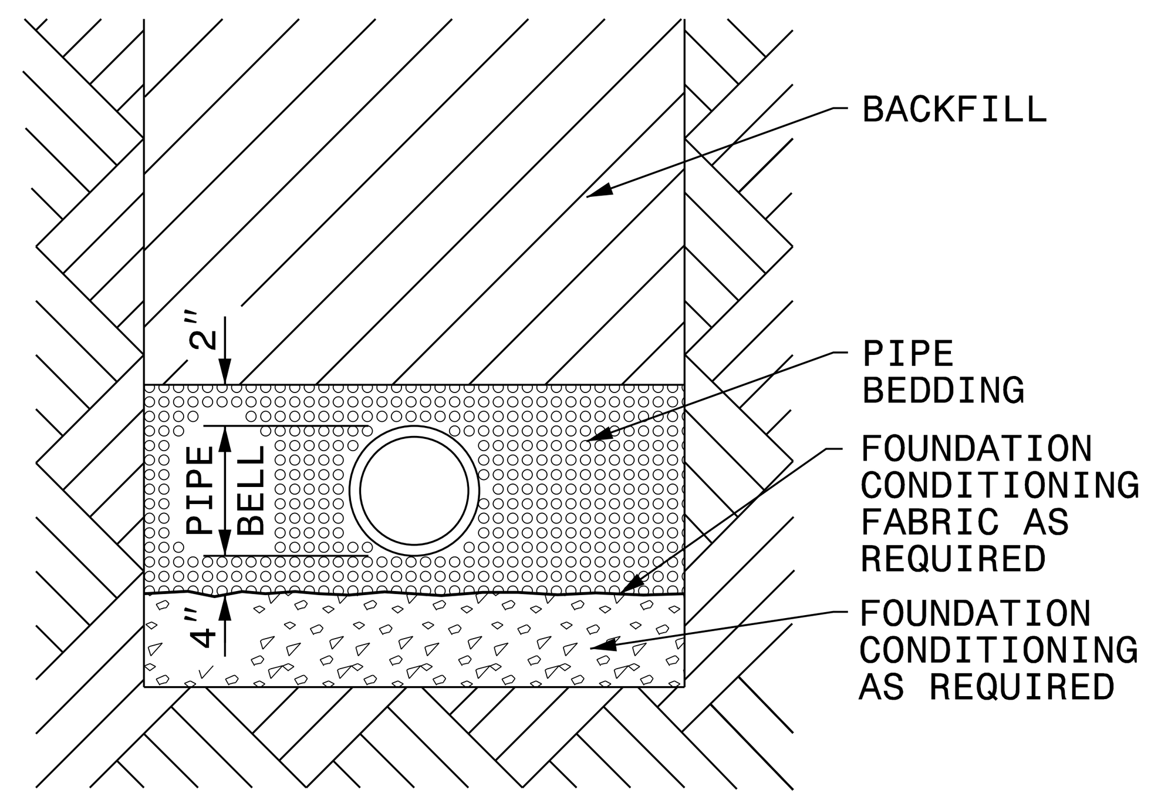
7. EXISTING PVC PIPE SHALL BE EXCAVATED AND FIELD BENT AS NEEDED TO PROVIDE FOR HORIZONTAL TRANSITION AND TIE-IN TO PROPOSED PIPE.

8. EXISTING BURIED WATER LINE TO BE ABANDONED SHALL BE FILLED WITH FLOWABLE FILL AND CAPPED AT EACH END.

PROJECT QUANTITIES

ITEM NUMBER	DESCRIPTION	QUANTITY	
5325800000-E	8" WATER LINE	182	LF
5326000000-E	10" WATER LINE	278	LF
5329000000-E	DUCTILE IRON WATER PIPE FITTINGS	710	POUNDS
5546000000-E	8" VALVE	2	EA
5801000000-E	ABANDON 8" UTILITY PIPE	459	LF
5871600000-E	TRENCHLESS INSTALLATION OF 10" IN SOIL	139	LF
5871610000-E	TRENCHLESS INSTALLATION OF 10" NOT IN SOIL	139	LF

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



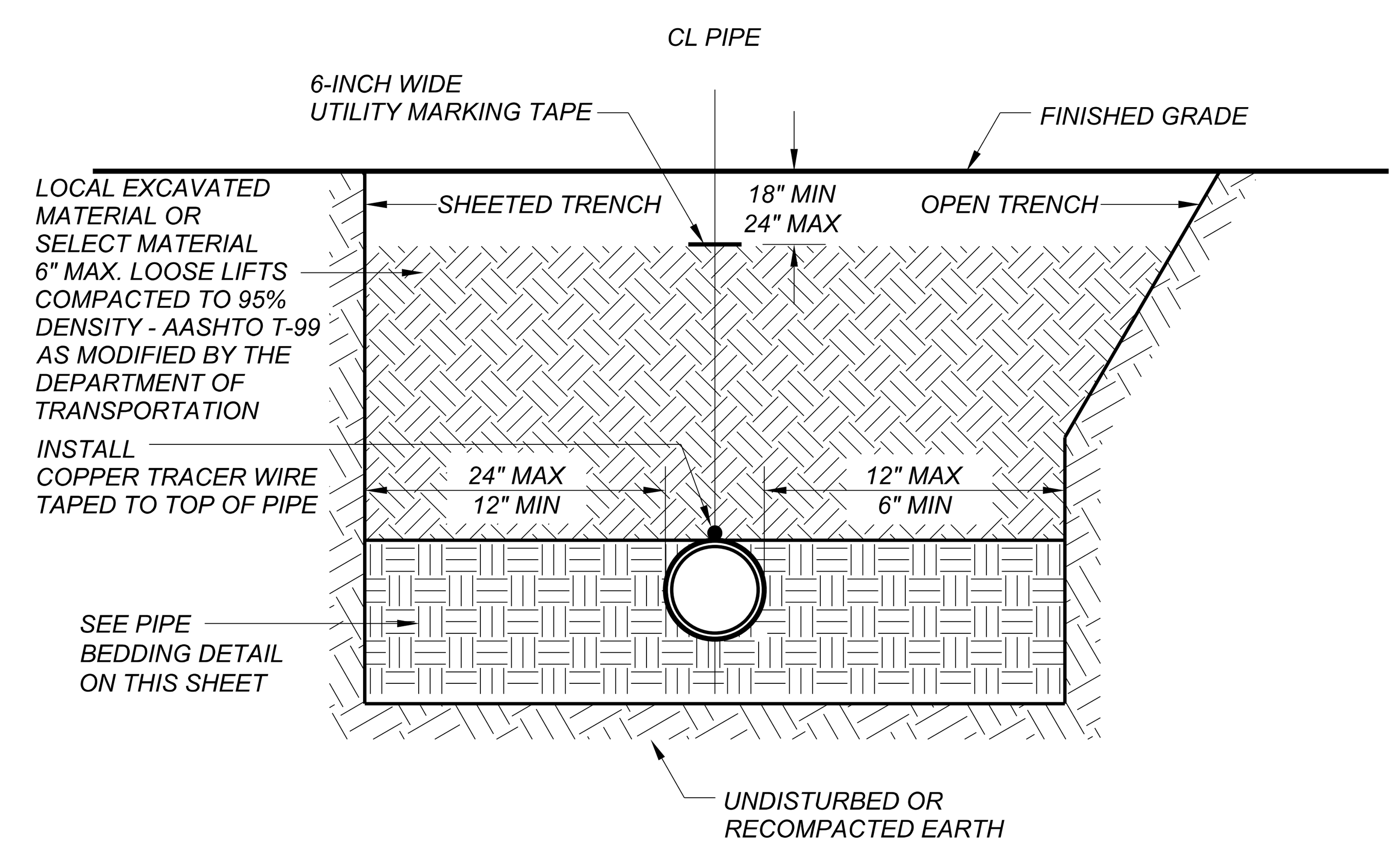
PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER.
PIPE BEDDING SHALL BE SELECT MATERIAL, EITHER CLASS II (TYPE 1) OR CLASS III, AS PER SECTION 1016.
TRENCH SHALL BE BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL.
ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.
COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

PIPE BEDDING DETAIL

NOT TO SCALE

MAXIMUM OPEN TRENCH WIDTH AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		



NOTES:
1. BELL HOLES NOT SHOWN.
2. ALL SHORING & TRENCHING SHALL COMPLY WITH OSHA SAFETY STANDARDS FOR THE CONSTRUCTION INDUSTRY.
3. ALL BACKFILL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.

GENERAL TRENCH DETAIL

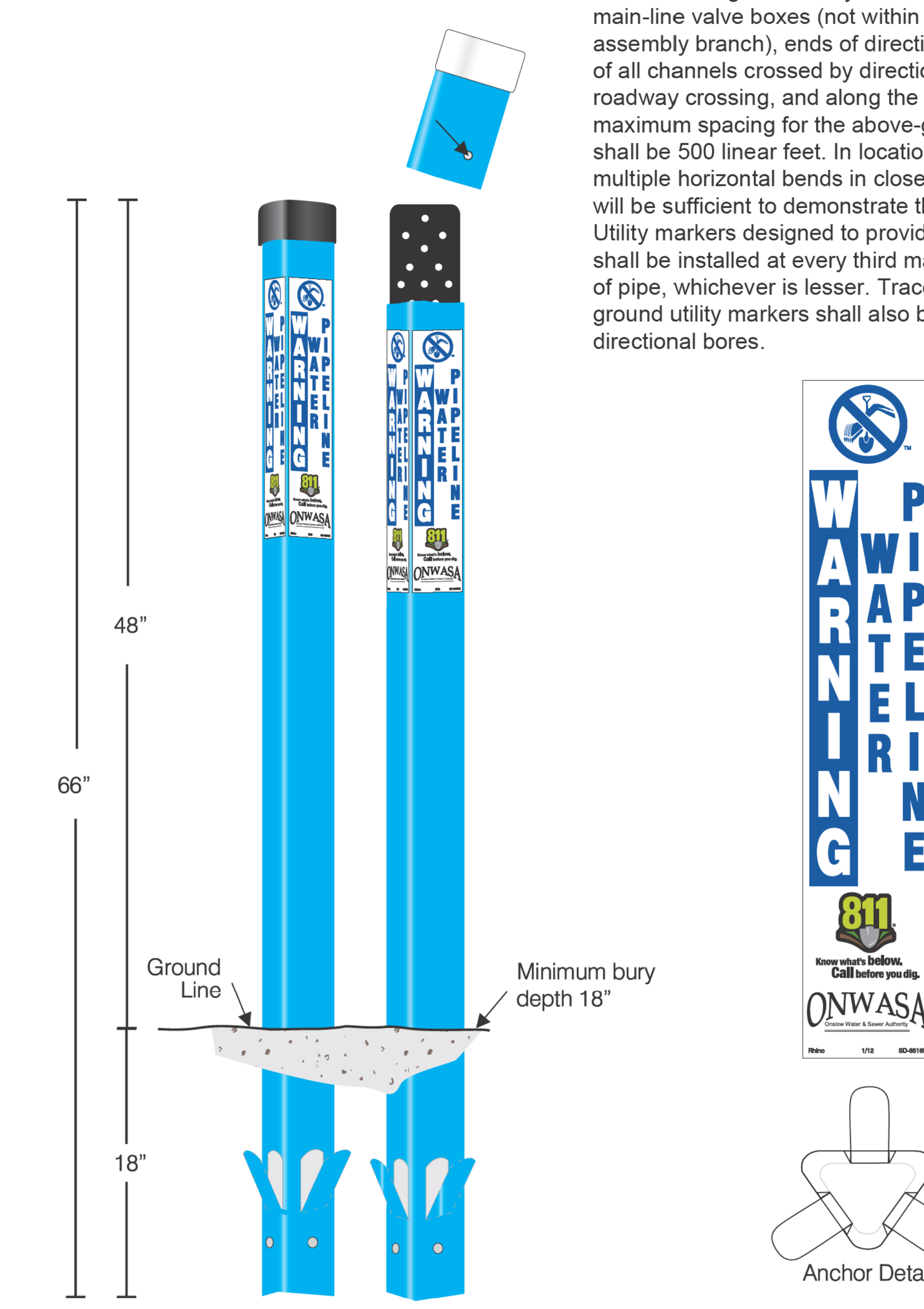
NOT TO SCALE

Parts List
1 - Rhino # TVF66UB - Rhino TriView Flex™, 66" Blue with Black Cap OR
1 - Rhino # TVTI66UW2 - Rhino TriView™ Test Station, 66", 2 Inside Terminals, Blue with White Cap
1 - Cap Lock - TS-LOCK for Test Stations
3 - Decal # SD-8516K Custom Decals

NOTES:
The TriGrip Anchor Flaps™ shall be extended priorty to burial of the post. Soil shall be compacted during placement of marker post.

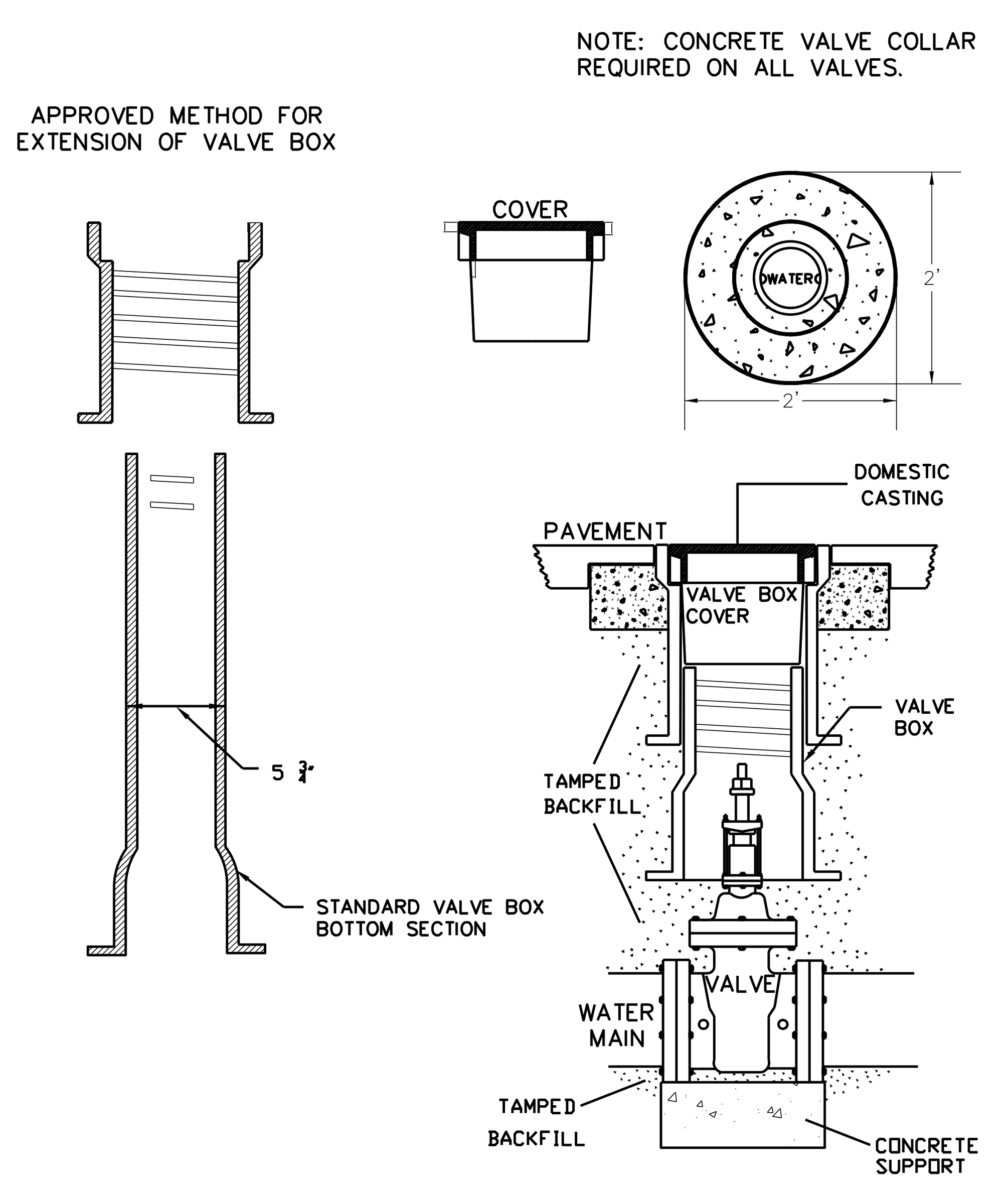
All materials shall be provided by Rhino Marking & Protection Sytems, Inc.

Install above-ground utility markers at horizontal bends, main-line valve boxes (not within 10 feet of a fire hydrant assembly branch), ends of directional bores, bank edge of all channels crossed by directionl bores, each side of a roadway crossing, and along the piping alignment. The maximum spacing for the above-ground utility markers shall be 500 linear feet. In locations where there are multiple horizontal bends in close proximity, one marker will be sufficient to demonstrate the change in direction. Utility markers designed to provide access to tracer wire shall be installed at every third marker, or every 1000 feet of pipe, whichever is lesser. Tracer wire accesible above-ground utility markers shall also be installed at ends of directional bores.



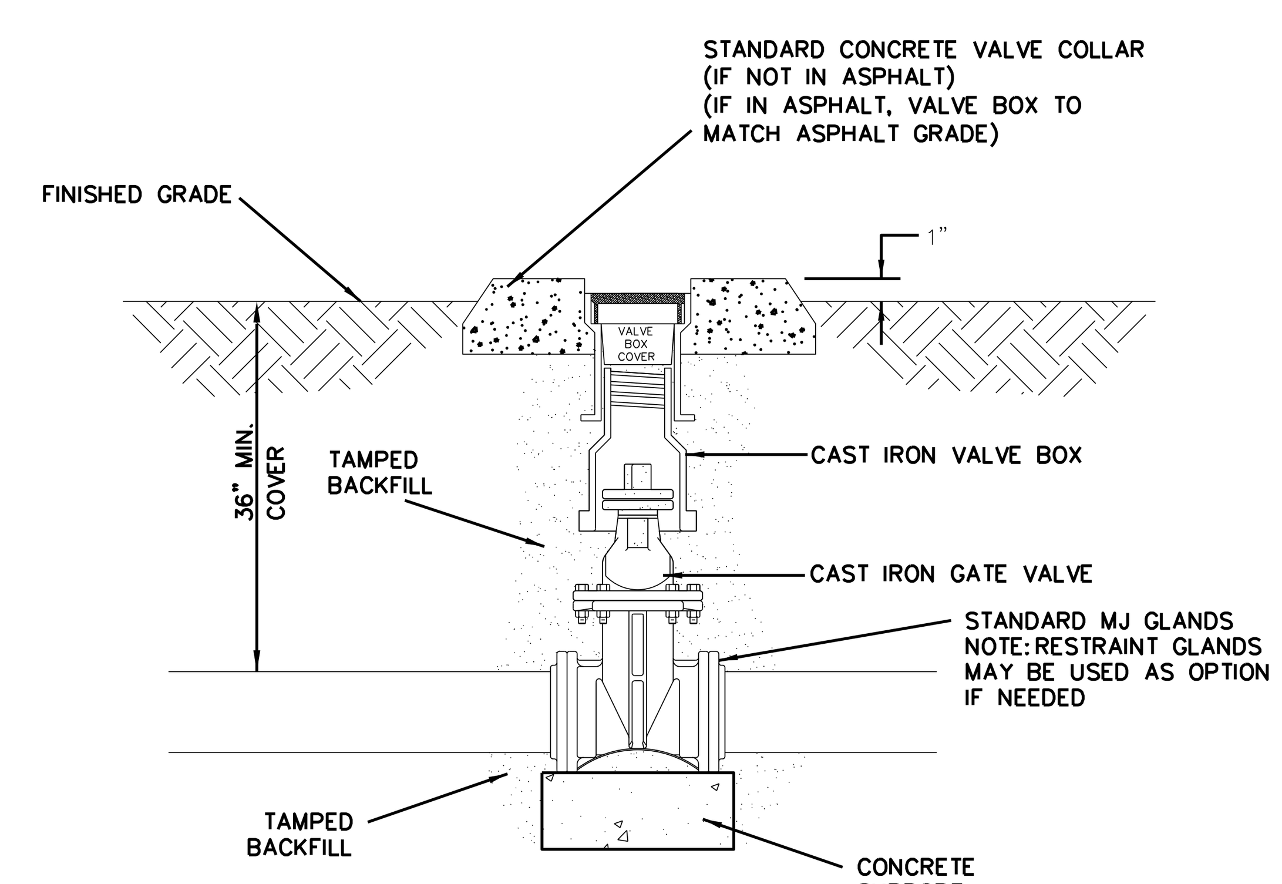
ABOVE GROUND WATER LINE MARKER

NOT TO SCALE



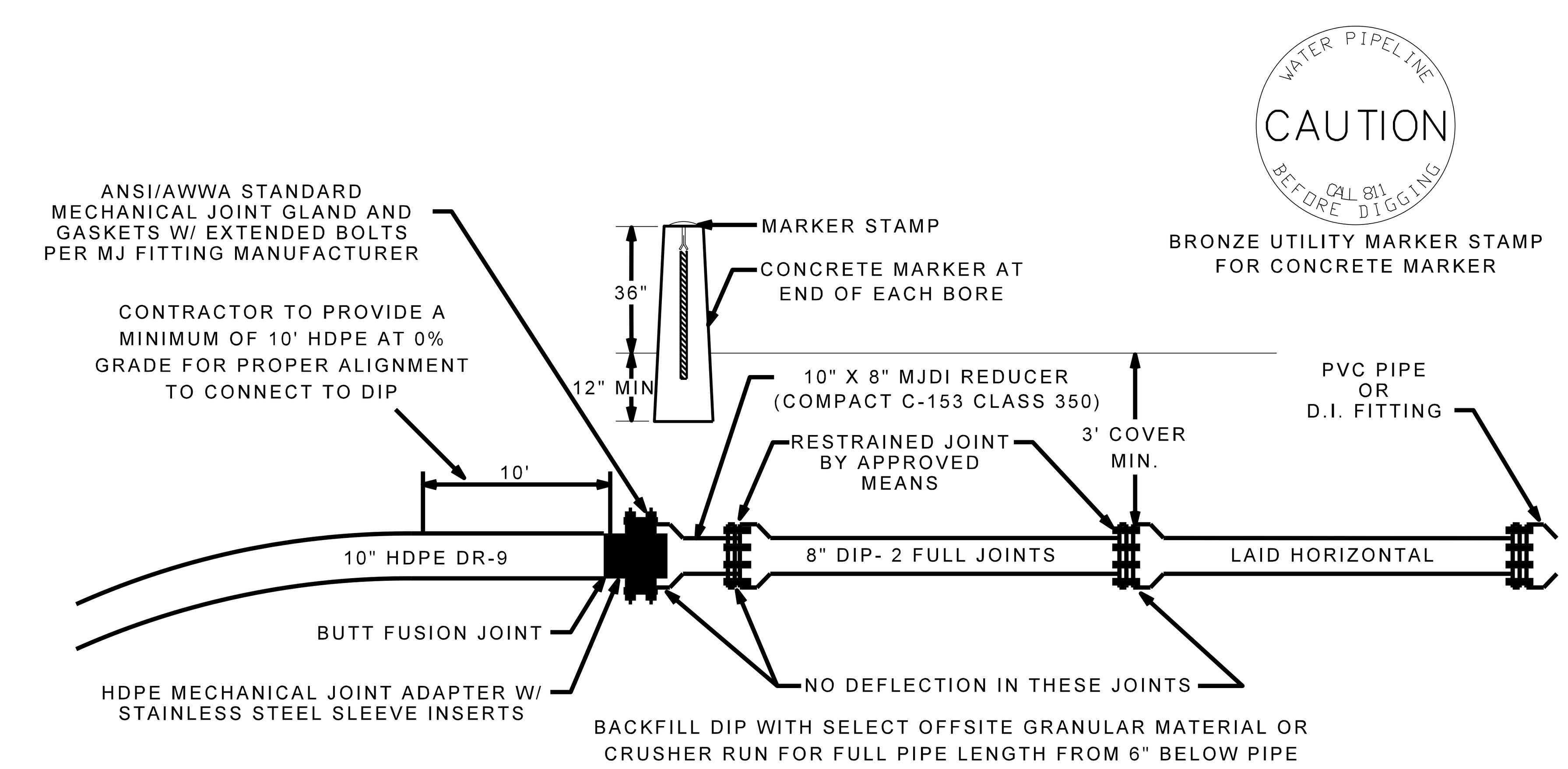
VALVE BOX INSTALLATION AND EXTENSION DETAIL

NOT TO SCALE



TYPICAL INLINE VALVE DETAIL

NOT TO SCALE



10" HDPE X 8" DIP TRANSITION DETAIL

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	UC-3A

DESIGNED BY: GJB
DRAWN BY: GJB
CHECKED BY: KCZ
APPROVED BY: KCZ
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027661 KEVIN C. ZDEB
DocuSigned by: Kevin C. Zdeb F0C1B5C37A66451...
5/19/2017

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: F-0160

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	UC-3B

DESIGNED BY: GJB
DRAWN BY: GJB
CHECKED BY: KCZ
APPROVED BY: KCZ
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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FAX:(919)250-4151

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZOEB
DocuSigned by: Kevin C. Zoeb
5/19/2017

UTILITY CONSTRUCTION PLANS ONLY

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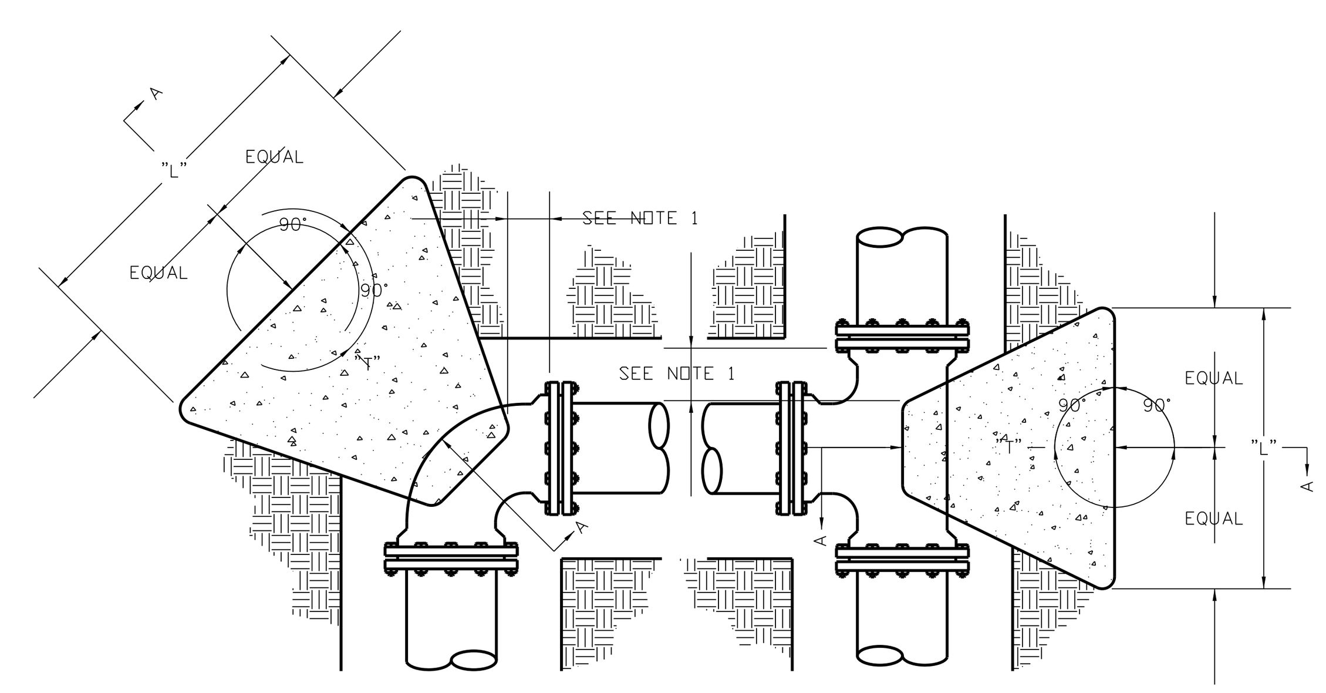
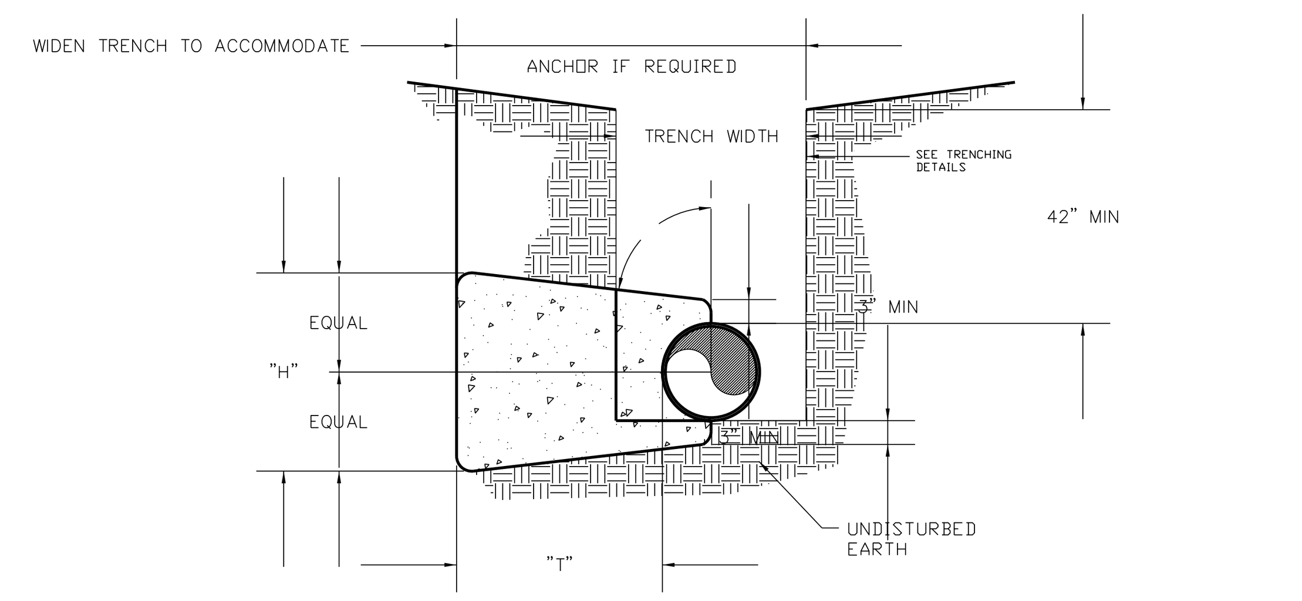
M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: F-0160

TEST PRESSURE = 200 PSI

PIPE SIZE	TYPE FITTING	DIMENSIONS (FT) "L"	"H"	"T"	VOLUME CONCRETE CU. YD.
<4 INCHES	11 1/4°	1.00	1.00	1.00	0.04
	22 1/2°	1.00	1.00	1.50	0.06
	45°	1.00	1.00	1.50	0.06
	90°	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
4 INCHES	11 1/4°	1.00	1.00	2.50	0.09
	22 1/2°	1.00	1.00	2.50	0.09
	45°	1.50	1.50	2.50	0.15
	90°	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
6 INCHES	11 1/4°	1.50	1.50	2.50	0.15
	22 1/2°	1.50	1.50	2.50	0.15
	45°	1.50	1.50	2.50	0.15
	90°	2.50	2.00	3.00	0.33
	TEE	2.50	2.00	2.50	0.28
8 INCHES	11 1/4°	2.00	2.00	2.50	0.23
	22 1/2°	2.00	2.00	2.50	0.23
	45°	2.00	2.00	2.75	0.23
	90°	4.00	2.00	3.00	0.50
	TEE	4.00	2.00	2.50	0.42
12 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	3.00	2.00	3.00	0.39
	45°	4.00	2.50	3.00	0.61
	90°	5.50	3.00	3.50	1.13
	TEE	5.50	3.00	3.00	0.97
16 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	4.00	2.00	3.00	0.50
	45°	5.50	3.00	3.50	1.13
	90°	7.50	4.00	3.50	2.01
	TEE	7.50	4.00	3.00	1.72

CHART NOTES:
1. IF BLOCKING EXCAVATION IS IN LIGHTLY COMPACTED FILL AREAS, OR IN AREAS WHERE BOULDERS OR STUMPS HAVE BEEN REMOVED, BLOCKING SIZE MUST BE RE-SIZED FOR THE SPECIFIC LOCATION/CIRCUMSTANCE BY A NC LICENSED PROFESSIONAL ENGINEER.
2. BLOCKING SIZES SHOWN IN THESE TABLES ASSUME THE FOLLOWING:
   a. BLOCKING IS CONSTRUCTED IN RESIDUAL SOILS AS SHOWN IN DETAIL
   b. SOIL BEARING PRESSURE = 2000 PSF
   c. VELOCITY OF FLOW = 15 FPS
3. THIS DETAIL NOT APPLICABLE TO REDUCING BENDS.
4. NEITHER THE WEIGHT OF THE CONCRETE BLOCKING NOR FRICTION BETWEEN CONCRETE BLOCKING AND SOIL WAS ADDED INTO BLOCKING SIZES COMPUTATION. THEREFORE, BLOCKING SIZE IS CONSERVATIVE.

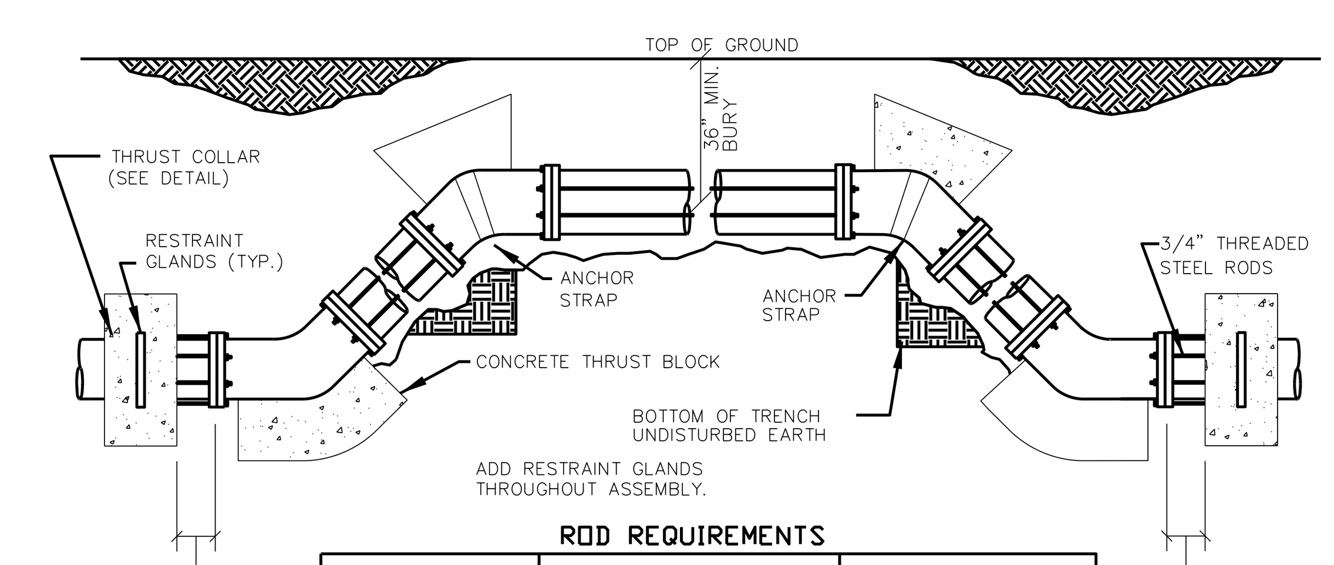




SECTION A-A

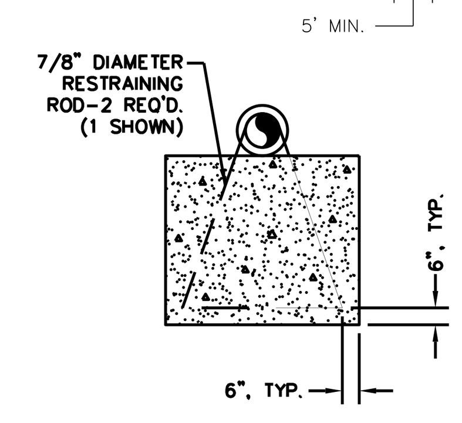
NOTES:
1. CONCRETE BLOCKING IS TO BE FORMED TO ENSURE ACCESSIBILITY TO FITTINGS AND POURED AGAINST UNDISTURBED EARTH.
2. ALL FITTINGS SHALL BE WRAPPED IN POLYETHYLENE TO PREVENT CONCRETE FROM CONTACTING FITTINGS, BOLTS, OR ENDS OF MECHANICAL JOINT BENDS.
3. CONCRETE TO BE MINIMUM 3,000 PSI @ 28 DAYS.
4. WHEN SACKRETE IS TO BE USED, IT SHALL BE PROPERLY MIXED PER MANUFACTURER SPECIFICATIONS.

THRUST BLOCKING
NOT TO SCALE



ROD REQUIREMENTS

SIZE OF BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	4
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

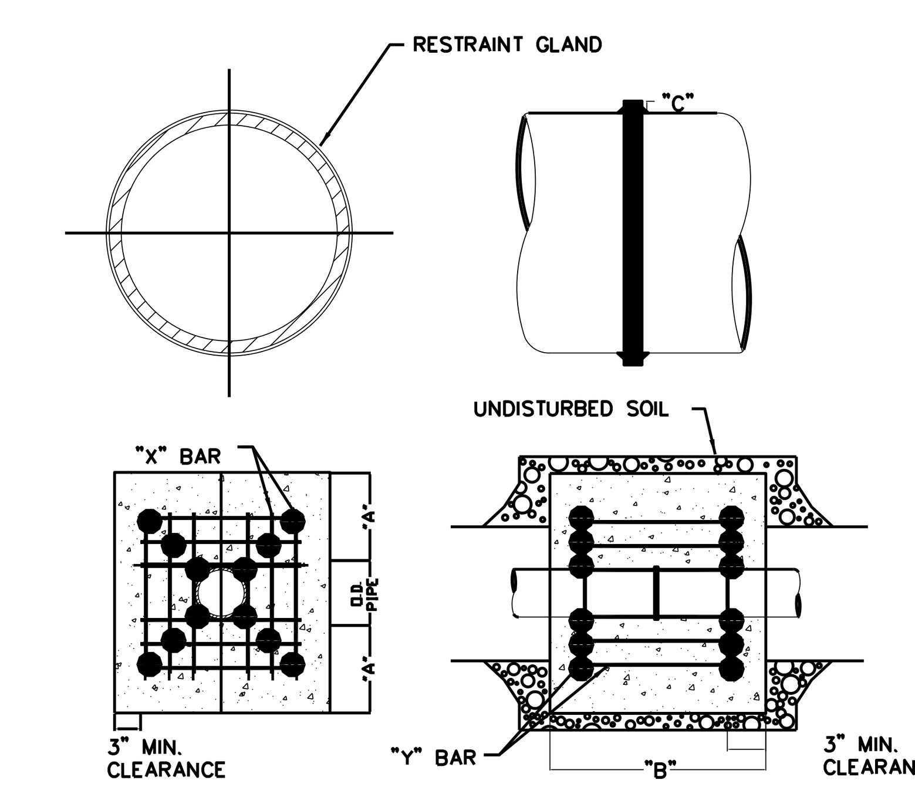


BLOCKING CROSS SECTION
NO SCALE

GENERAL NOTES:

1. ALL FITTINGS SHALL BE WRAPPED IN POLYETHYLENE TO PREVENT CONCRETE FROM CONTACTING FITTINGS, BOLTS, OR ENDS OF MECHANICAL JOINT BENDS.
2. EACH FITTING SHALL BE SECURED BY TWO FORMS OF RESTRAINT. RESTRAINING GLANDS AND CONCRETE THRUST BLOCKING ARE PREFERRED. WEDGE-ACTION RESTRAINT GLANDS (I.E. MEGALUGS) ARE APPROVED ONLY FOR USE ON DUCTILE IRON PIPE. FULL-CIRCUMFERENTIAL PIPE RESTRAINT GLANDS (I.E. GRIP RINGS) MAY BE USED ON PVC OR DUCTILE IRON PIPE. ALL RESTRAINT GLANDS SHALL BE SPECIFICALLY DESIGNED FOR USE ON THE TYPE OF PIPE FOR WHICH THEY ARE BEING INSTALLED. OTHER FORMS OF RESTRAINT SUCH AS THREADED ROD, BELL RESTRAINT HARNESSES, ETC. MAY BE APPROVED BY ONWASA ON A CASE-BY-CASE BASIS.
3. IF APPROVED FOR USE BY ONWASA, STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.

THRUST BLOCKING DESIGN QUANTITY TABLE
NOT TO SCALE



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
48" & greater	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

THRUST COLLAR, AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C-6"-16", 20"-24", 30"-36", 48"
6" - 36"	1'-4"	1'-7"	2" 3" 4"
48" & greater	1'-8"	1'-9"	6"

NOTES:
1. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD EMBEDMENT DETAIL.
4. BACKFILL TAMPED IN 6" LIFTS PER STANDARD EMBEDMENT DETAIL.

THRUST COLLAR DESIGN QUANTITY TABLE
NOT TO SCALE

5/19/2017
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PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	UC-4

DESIGNED BY: GJB
DRAWN BY: GJB
CHECKED BY: KCZ
APPROVED BY: KCZ
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
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UTILITY CONSTRUCTION PLANS ONLY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27611 KEVIN C. ZOEB 6/30/2017

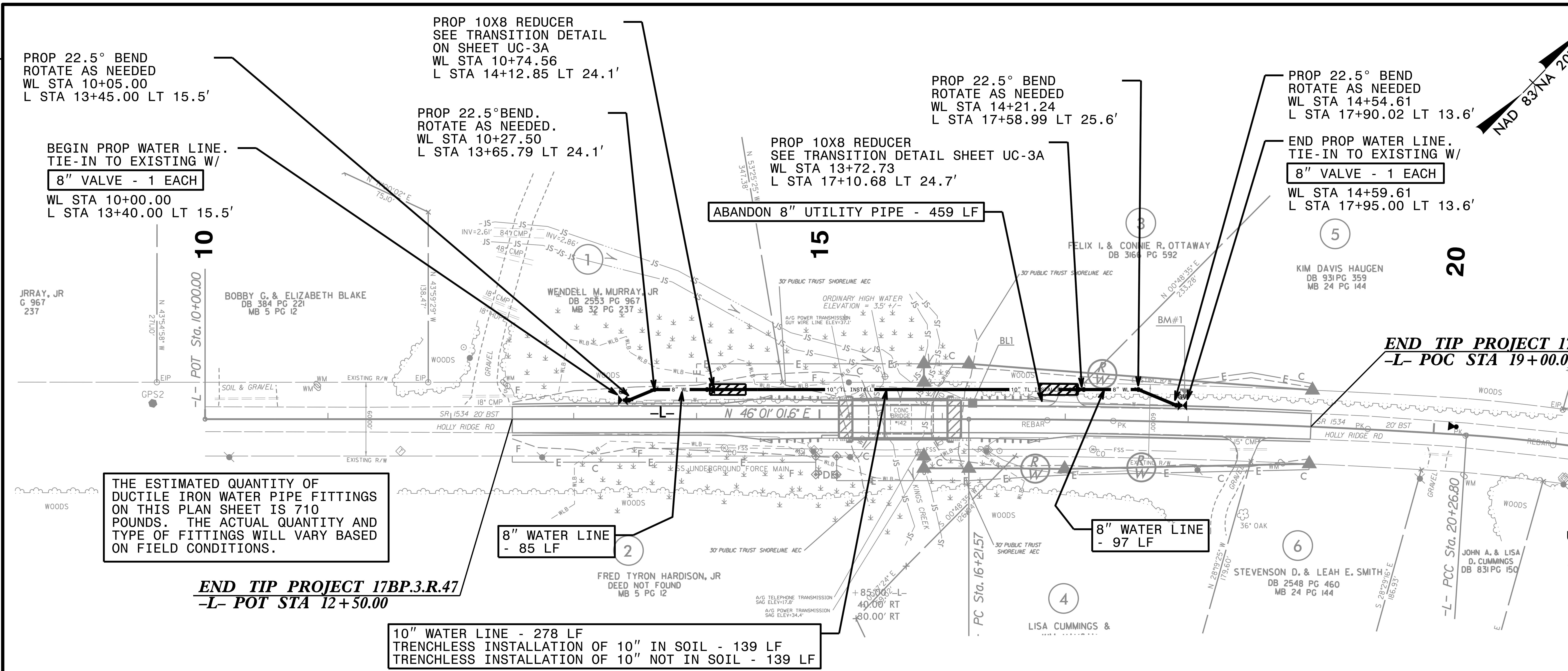
UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

M A Engineering Consultants, Inc. 598 East Chatham Street - Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221 NC License: F-0160

REVISIONS

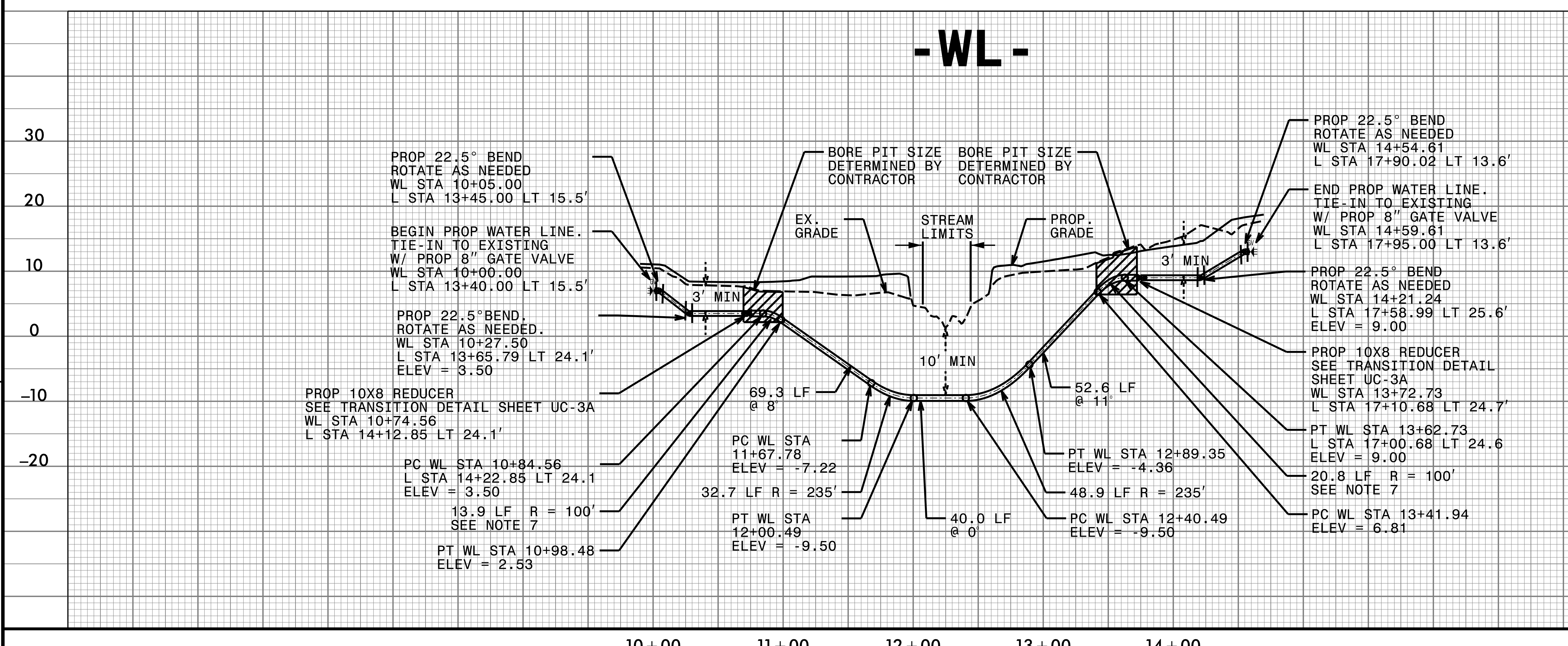
8/17/99



NAD 83/NA 2011
PROP 22.5° BEND ROTATE AS NEEDED WL STA 10+05.00 L STA 13+45.00 LT 15.5′
PROP 10X8 REDUCER SEE TRANSITION DETAIL ON SHEET UC-3A WL STA 10+74.56 L STA 14+12.85 LT 24.1′
PROP 22.5°BEND. ROTATE AS NEEDED. WL STA 10+27.50 L STA 13+65.79 LT 24.1′
BEGIN PROP WATER LINE. TIE-IN TO EXISTING W/
8″ VALVE - 1 EACH
WL STA 10+00.00 L STA 13+40.00 LT 15.5′
PROP 10X8 REDUCER SEE TRANSITION DETAIL SHEET UC-3A WL STA 13+72.73 L STA 17+10.68 LT 24.7′
PROP 22.5° BEND ROTATE AS NEEDED WL STA 14+21.24 L STA 17+58.99 LT 25.6′
PROP 22.5° BEND ROTATE AS NEEDED WL STA 14+54.61 L STA 17+90.02 LT 13.6′
END PROP WATER LINE. TIE-IN TO EXISTING W/
8″ VALVE - 1 EACH
WL STA 14+59.61 L STA 17+95.00 LT 13.6′
ABANDON 8″ UTILITY PIPE - 459 LF
10
15
20
BOBBY G. & ELIZABETH BLAKE DB 384 PG 221 MB 5 PG 12
WENDELL M. MURRAY, JR DB 2553 PG 967 MB 32 PG 237
FELIX I. & CONNIE R. OTTAWAY DB 3160 PG 592
KIM DAVIS HAUGEN DB 931 PG 359 MB 24 PG 144
END TIP PROJECT 17BP.3.R.47
-L- POC STA 19+00.00
SR 1534 20′ BST HOLLY RIDGE RD
N 46°01′01.6″ E
THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 710 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.
8″ WATER LINE - 85 LF
8″ WATER LINE - 97 LF
FRED TYRON HARDISON, JR DEED NOT FOUND MB 5 PG 12
STEVENSON D. & LEAH E. SMITH DB 2548 PG 460 MB 24 PG 144
JOHN A. & LISA D. CUMMINGS DB 831 PG 150
LISA CUMMINGS &
END TIP PROJECT 17BP.3.R.47
-L- POT STA 12+50.00
10″ WATER LINE - 278 LF
TRENCHLESS INSTALLATION OF 10″ IN SOIL - 139 LF
TRENCHLESS INSTALLATION OF 10″ NOT IN SOIL - 139 LF
-L- POT Sta. 10+00.00
PC Sta. 16+21.57
-L- PCC Sta. 20+26.80
WOODS

UTILITY OWNERS ON THIS PROJECT:

1. ONWASA
   UTILITY: 8″ WATER LINE
   12″ SS FORCE MAIN
   CONTACT: DAVID M. MOHR, PE
   PHONE: 910-937-7521



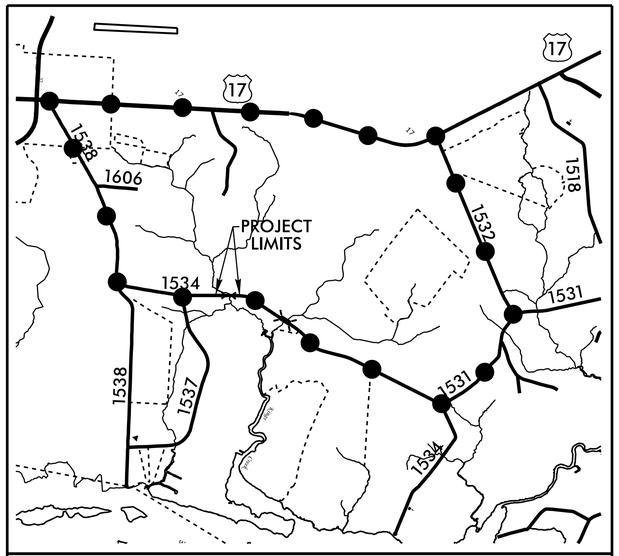
-WL-
30
20
10
0
-10
-20
PROP 22.5° BEND ROTATE AS NEEDED WL STA 10+05.00 L STA 13+45.00 LT 15.5′
BEGIN PROP WATER LINE. TIE-IN TO EXISTING W/ PROP 8″ GATE VALVE WL STA 10+00.00 L STA 13+40.00 LT 15.5′
PROP 22.5°BEND. ROTATE AS NEEDED. WL STA 10+27.50 L STA 13+65.79 LT 24.1′ ELEV = 3.50
PROP 10X8 REDUCER SEE TRANSITION DETAIL SHEET UC-3A WL STA 10+74.56 L STA 14+12.85 LT 24.1′
PC WL STA 10+84.56 L STA 14+22.85 LT 24.1 ELEV = 3.50
13.9 LF R = 100′ SEE NOTE 7
PT WL STA 10+98.48 ELEV = 2.53
BORE PIT SIZE DETERMINED BY CONTRACTOR
BORE PIT SIZE DETERMINED BY CONTRACTOR
EX. GRADE
STREAM LIMITS
PROP. GRADE
3′ MIN
3′ MIN
10′ MIN
69.3 LF @ 8°
PC WL STA 11+67.78 ELEV = -7.22
32.7 LF R = 235′
PT WL STA 12+00.49 ELEV = -9.50
40.0 LF @ 0°
52.6 LF @ 11°
PT WL STA 12+89.35 ELEV = -4.36
48.9 LF R = 235′
PC WL STA 12+40.49 ELEV = -9.50
PROP 22.5° BEND ROTATE AS NEEDED WL STA 14+54.61 L STA 17+90.02 LT 13.6′
END PROP WATER LINE. TIE-IN TO EXISTING W/ PROP 8″ GATE VALVE WL STA 14+59.61 L STA 17+95.00 LT 13.6′
PROP 22.5° BEND ROTATE AS NEEDED WL STA 14+21.24 L STA 17+58.99 LT 25.6′ ELEV = 9.00
PROP 10X8 REDUCER SEE TRANSITION DETAIL SHEET UC-3A WL STA 13+72.73 L STA 17+10.68 LT 24.7′
PT WL STA 13+62.73 L STA 17+00.68 LT 24.6 ELEV = 9.00
20.8 LF R = 100′ SEE NOTE 7
PC WL STA 13+41.94 ELEV = 6.81
10+00
11+00
12+00
13+00
14+00

NOTES:

1. OPEN TRENCH CONSTRUCTION SHALL PROVIDE 3 FEET MINIMUM COVER TO TOP OF PIPE.
2. BRIDGE SURVEY & HYDRAULIC DESIGN REPORT BY OTHERS STATES THE THEORETICAL OT SCOUR ELEVATION IS -1.2 FT.
3. TRENCHLESS INSTALLATION SHALL PROVIDE 5 FEET MINIMUM COVER FROM 100 YEAR SCOUR BED ELEVATION TO TOP OF PIPE OR 10 FEET MINIMUM COVER FROM BOTTOM OF STREAM TO TOP OF PIPE, WHICHEVER IS GREATER.
4. ALL PROPOSED PIPE ELEVATIONS IN PROFILE REFER TO CENTER OF PIPE.
5. WATER LINE SHALL BE INSTALLED A MINIMUM OF 5 FEET INSIDE THE NCDOT RIGHT OF WAY.
6. EXISTING PIPE AT TIE-IN LOCATIONS ARE ASSUMED TO HAVE MINIMUM 3′ COVER. CONTRACTOR SHALL VERIFY PIPE LOCATION BEFORE STARTING WORK.
7. HDPE PIPE SHALL BE FIELD BENT WITH THE MANUFACTURER'S MINIMUM ALLOWABLE BEND RADIUS.
8. THE EXISTING 12″ SANITARY SEWER FORCE MAIN ON THE SOUTH SIDE OF THE ROAD IS NOT IN CONFLICT WITH THE PROJECT AS SURVEYED.

09/08/99

TIP PROJECT: 17BP.3.R.47



VICINITY MAP
OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
ONSLOW COUNTY

T.I.P. NO.	SHEET NO.
17BP.3.R.47	UO–1

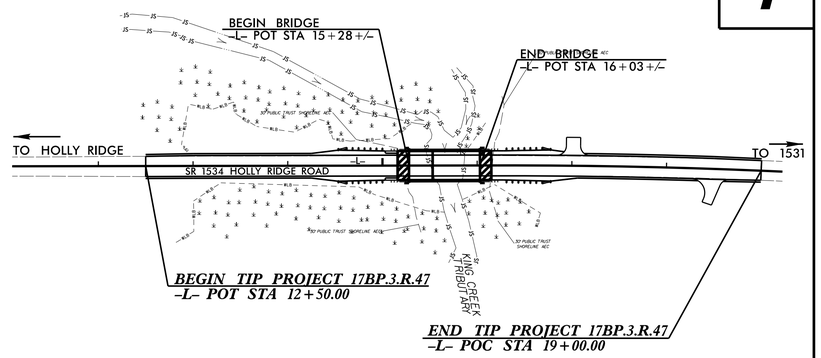
NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

LOCATION: REPLACE BRIDGE #142 OVER KINGS CREEK TRIB. ON SR 1534 (HOLLY RIDGE RD.)

TYPE OF WORK: RELOCATION OF POWER AND PHONE

NAD 83/
NSRS 2011

4



BEGIN TIP PROJECT 17BP.3.R.47
-L- POT STA 12+50.00

END TIP PROJECT 17BP.3.R.47
-L- POC STA 19+00.00

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) POWER – JONES–ONSLOW EMC
(B) PHONE – CENTURYLINK

PREPARED IN THE OFFICE OF:

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: F-0160

WEBB WHITE — *UTILITY PROJECT MANAGER, MA ENGINEERING*
STEVE DAVIS — *NCDOT DIVISION 3 UTILITY COORDINATOR*

DIVISION OF HIGHWAYS
DIVISION 3
5501 BARBADOS BLVD.
CASTLE HAYNE, NC 28429

AL EDGERTON — *DIVISION 3 BRIDGE PROGRAM MANAGER*

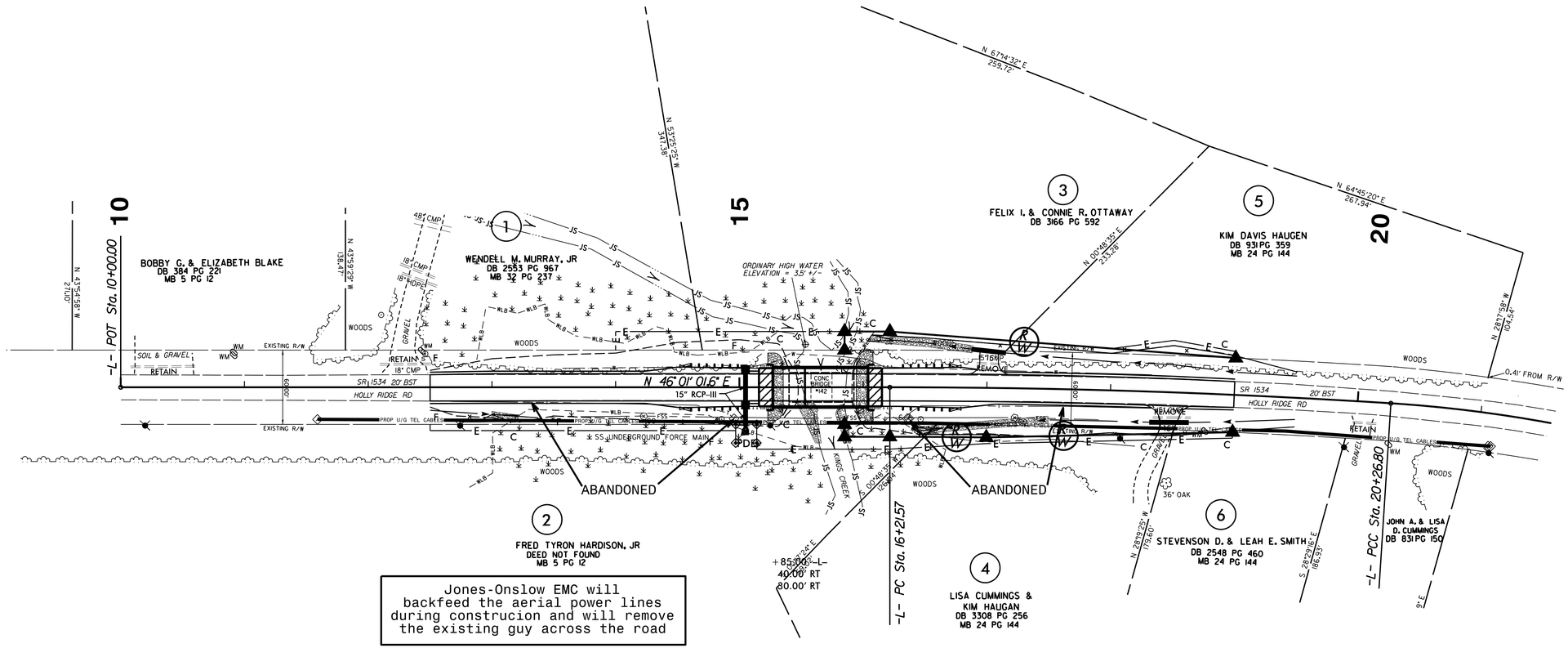
1/6/2017
P:\JOBS\0696\026\1000 Onslow 42\Utilities\Proj\UBOs\660142_UO_tsh.dgn
4:16:28 PM

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.47	U0-2

UTILITIES BY OTHERS

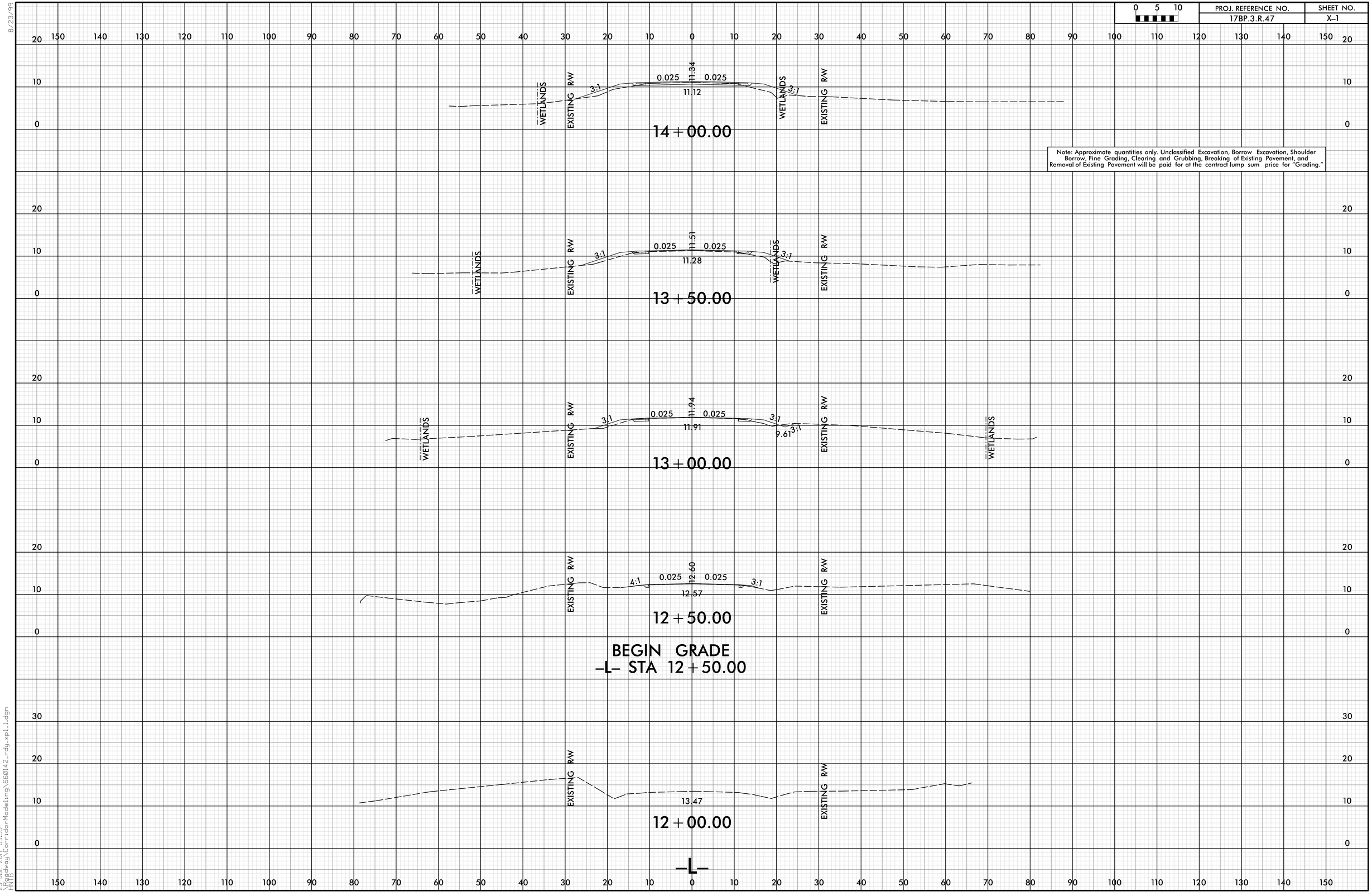
NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



Jones-Onslow EMC will backfeed the aerial power lines during construcion and will remove the existing guy across the road

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	17BP.3.R.47	X-1



25-JUL-2017 09:35
\Roadway Corridor Modeling\660142_rdy_xpl1.dgn
HNTB

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	17BP.3.R.47	X–2

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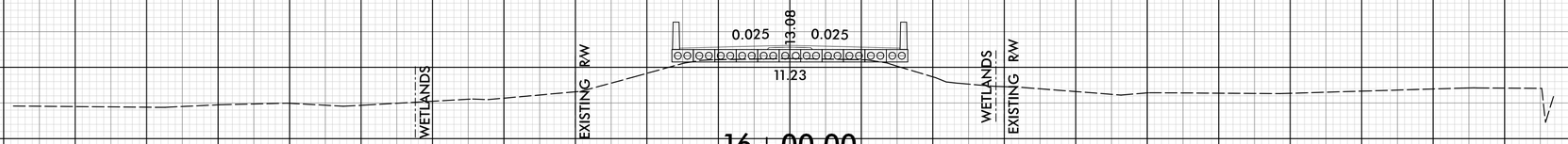
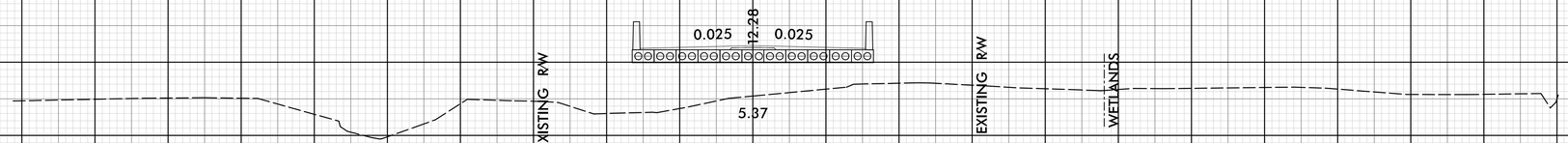
END GRADE
–L– STA 16+04.19

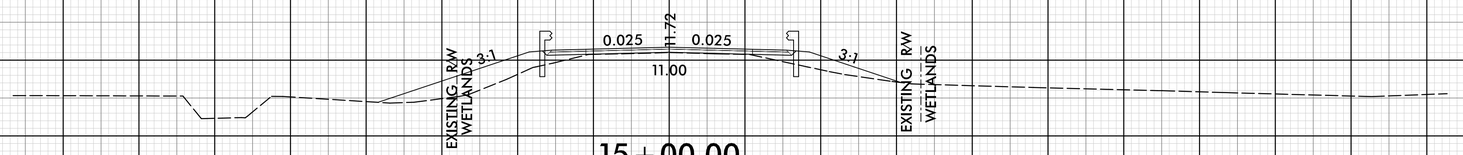


16+00.00



15+50.00

BEGIN BRIDGE
–L– STA 15+26.81



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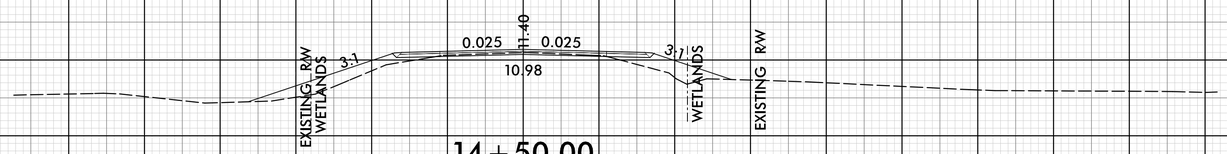

14+50.00

–L–

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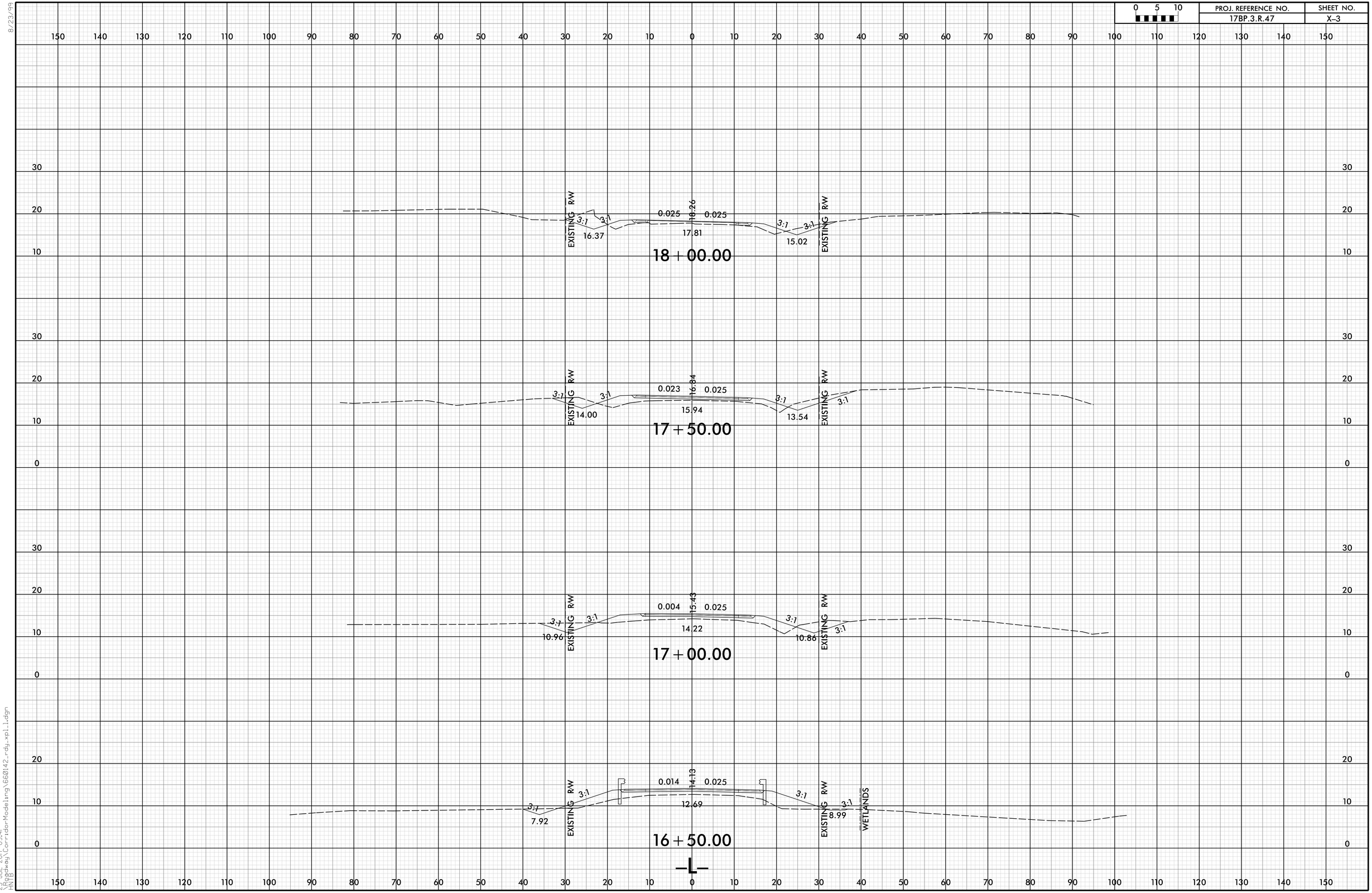
HNTB

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	17BP.3.R.47	X-3



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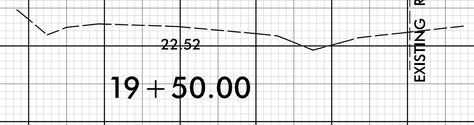
HNTB

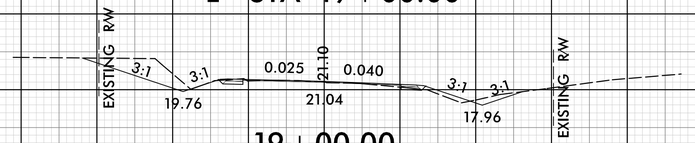
8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	17BP.3.R.47	X–4

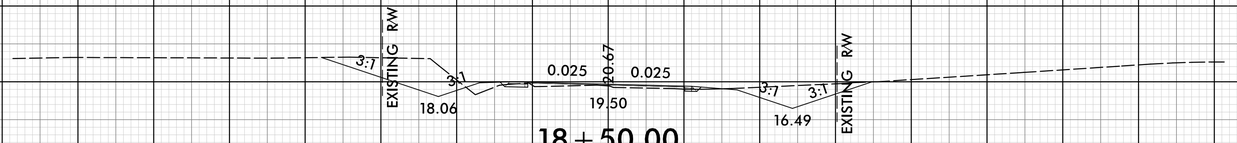


19 + 50.00

END GRADE
–L– STA 19 + 00.00



19 + 00.00



18 + 50.00

–L–

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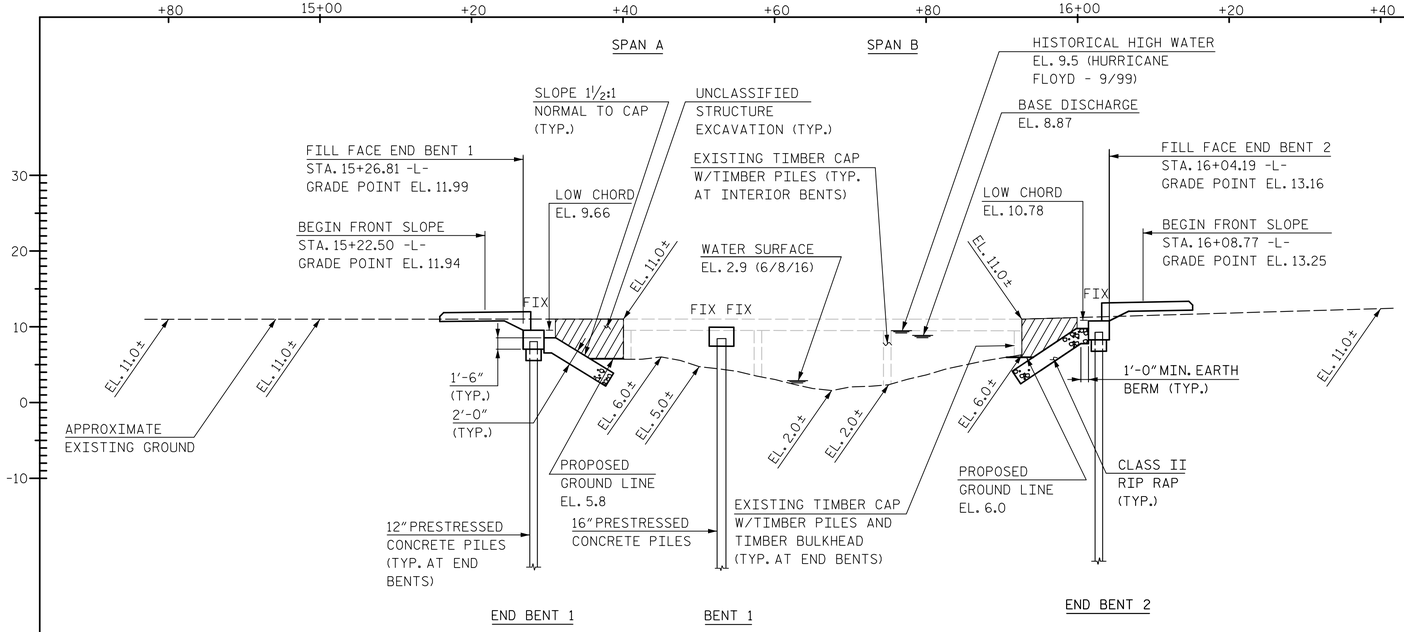
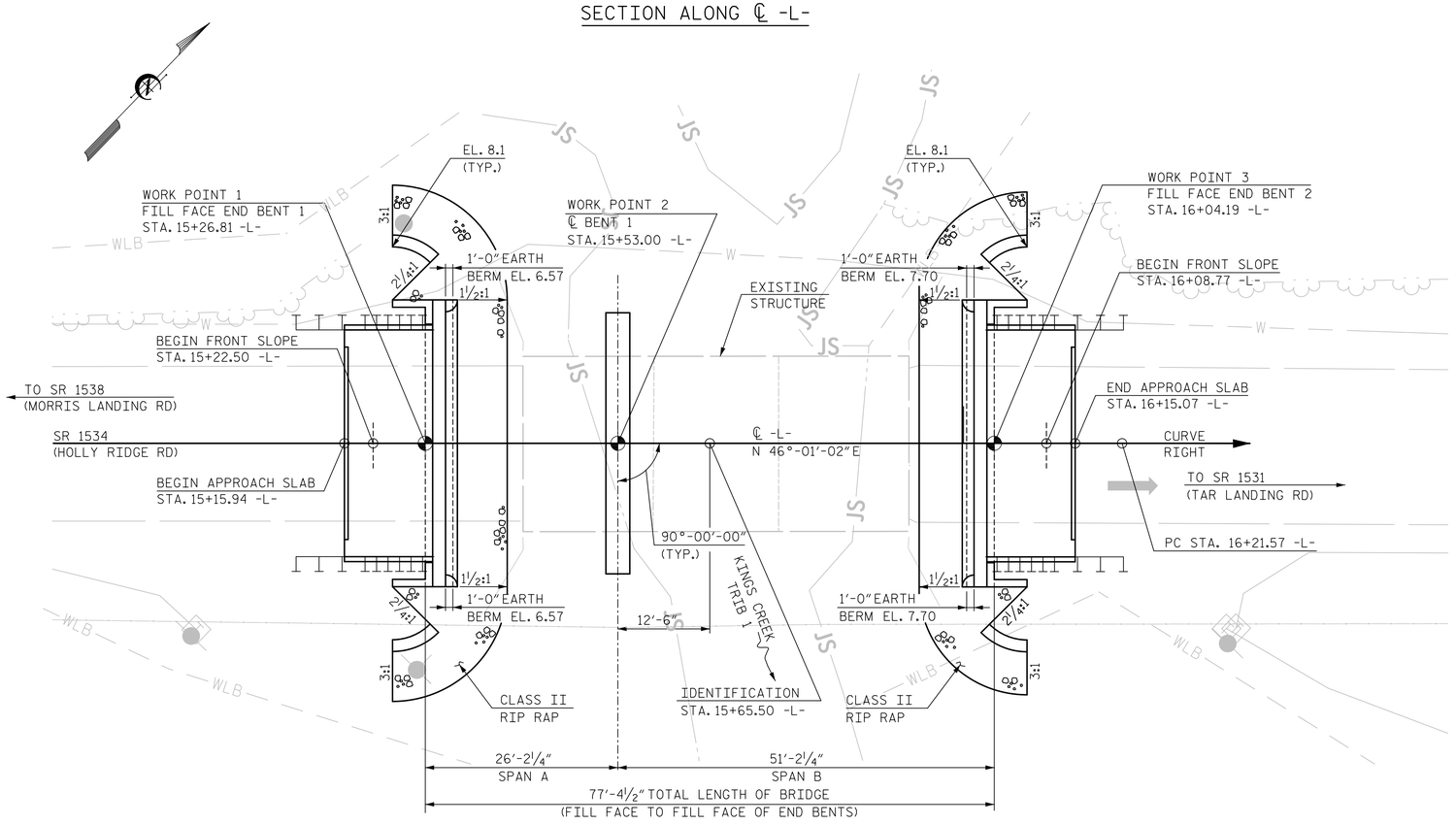
HNTB



SECTION ALONG ℄ -L-



PLAN

NOTE: PILES NOT SHOWN FOR CLARITY.

FOR GENERAL NOTES, SEE SHEET 2.

BRIDGE HYDRAULIC DATA

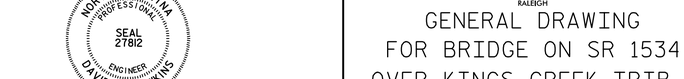
DESIGN DISCHARGE	=	430 CFS
FREQUENCY OF DESIGN FLOOD	=	25 YR
DESIGN HIGH WATER ELEVATION	=	7.1 FT.
DRAINAGE AREA	=	2.5 SQ. MI.
BASIC DISCHARGE (Q100)	=	1,060 CFS
BASIC HIGH WATER ELEVATION	=	8.87 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	N/A CFS
FREQUENCY OF OVERTOPPING FLOOD	=	> 500-YR (+)
OVERTOPPING FLOOD ELEVATION	=	11.34 FT.

NOTE: OVERTOPPING OCCURS AT ROADWAY STA. 14+11.15

PI STA. = 14+80.00
ELEV = 9.19
V.C. = 440'



GRADE DATA -L-

I HEREBY CERTIFY THESE PLANS
ARE AS-BUILT PLANS

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 142

DocuSigned by:
David W. Hawkins
6/14/2017

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

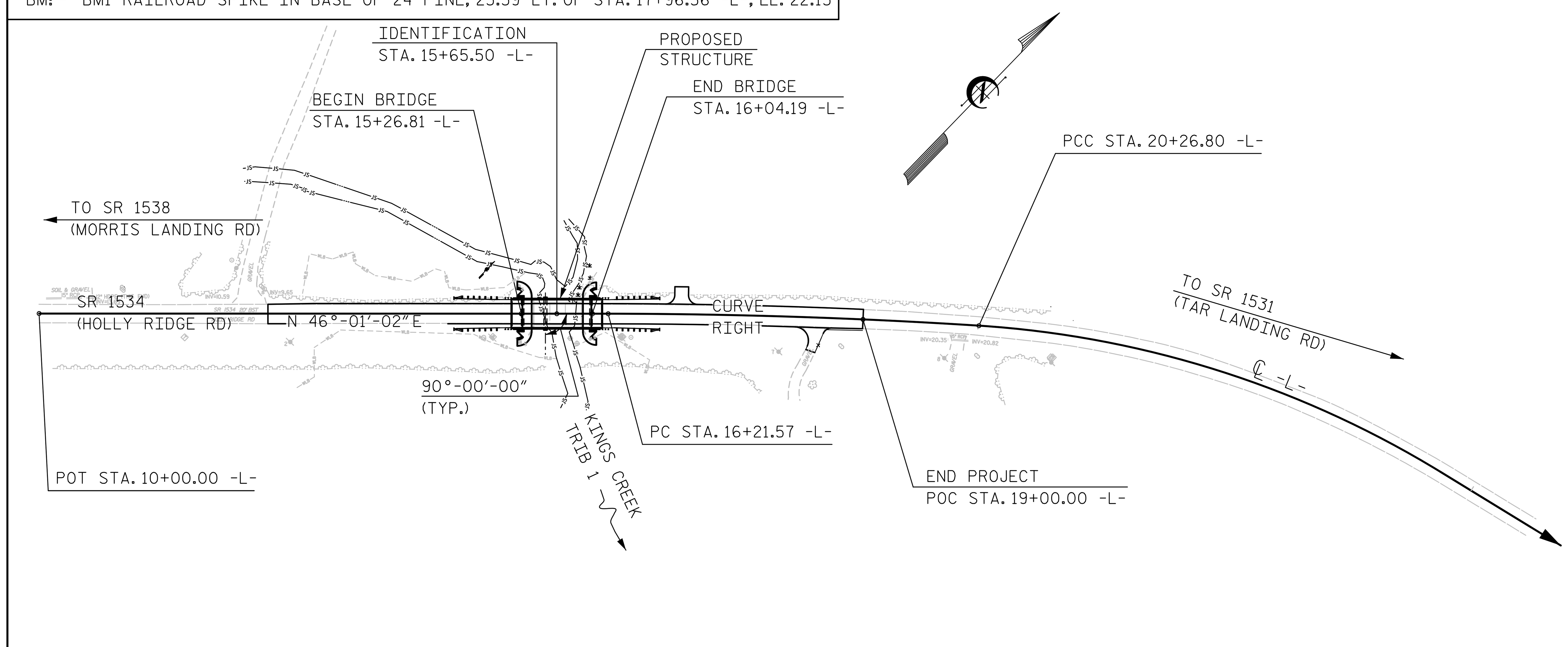
DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 6/17
DWG. NO. 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON SR 1534 OVER KINGS CREEK TRIB. 1 BETWEEN SR 1538 AND SR 1531

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

BM: - "BM1" RAILROAD SPIKE IN BASE OF 24" PINE, 23.39' LT. OF STA. 17+96.56 -L-, EL. 22.13



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

FOUNDATION NOTES:

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 46 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 80 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 67 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 115 TONS PER PILE

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN -17.0 FT.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION -3.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT NO. 1 OR END BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 15+65.50 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 15+65.50 -L-	CLASS AA CONCRETE	BRIDGE APPROACH SLABS AT STATION 15+65.50 -L-	EPOXY COATED REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR 12" PRESTRESSED CONCRETE PILES	PILE DRIVING EQUIPMENT SETUP FOR 16" PRESTRESSED CONCRETE PILES	12" PRESTRESSED CONCRETE PILES		16" PRESTRESSED CONCRETE PILES		PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0"x1'-9" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	NO.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE	LUMP SUM	—	—	—	LUMP SUM	—	—	—	—	—	—	—	—	150.50	—	—	LUMP SUM	22	825.00	—
END BENT 1	—	—	LUMP SUM	12.7	—	2,077	7	—	7	175	—	—	4	—	85	95	—	—	—	—
BENT 1	—	—	—	10.2	—	2,090	—	7	—	—	7	175	4	—	—	—	—	—	—	—
END BENT 2	—	—	LUMP SUM	12.7	—	2,077	7	—	7	175	—	—	4	—	100	110	—	—	—	—
TOTAL	LUMP SUM	2	LUMP SUM	35.6	LUMP SUM	6,244	14	7	14	350	7	175	12	150.50	185	205	LUMP SUM	22	825.00	LUMP SUM

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 19.5 FT. ON EACH SIDE OF CENTERLINE BRIDGE AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING THREE SPAN STRUCTURE WITH SPAN LENGTHS OF 17'-9", 17'-1", AND 17'-9" WITH 19 LINES OF 6x12 TIMBER JOISTS AT VARIOUS CTS WITH A REINFORCED CONCRETE DECK WITH A 25.1' OUT TO OUT DECK WIDTH ON TIMBER CAPS AND TIMBER PILES (ONE WITH CONCRETE ENCASEMENT) SHALL BE REMOVED. IN ADDITION, ANY PILES REMAINING FROM PREVIOUS BRIDGE CONSTRUCTION OR MAINTENANCE OPERATIONS SHALL BE REMOVED AND INCLUDED IN THE LUMP SUM PAY ITEM FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 15+65.50 -L-"

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

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

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS, AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL BAR SUPPORTS USED IN THE BARRIER RAIL, BENT CAPS, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE BENT CAPS AND PILES IN END BENT NO. 1, BENT NO. 1 AND END BENT NO. 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 2 OF 2

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

8/15/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB — HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 6/17

DWG. NO. 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON SR 1534 OVER KINGS CREEK TRIB. 1 BETWEEN SR 1538 AND SR 1531

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

SHEET NO. S-2

TOTAL SHEETS 19

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	1	1.018	--	1.75	0.284	2.53	25′	EL	12	0.591	1.02	25′	EL	1.2	0.80	0.284	2.34	25′	EL	12	
		HL-93(Opr)	N/A	--	1.319	--	1.35	0.284	3.29	25′	EL	12	0.591	1.32	25′	EL	1.2	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.178	42.397	1.75	0.284	3.76	25′	EL	12	0.591	1.18	25′	EL	1.2	0.80	0.284	3.46	25′	EL	12	
		HS-20(Opr)	36.000	--	1.527	54.959	1.35	0.284	4.87	25′	EL	12	0.591	1.53	25′	EL	1.2	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.728	36.833	1.4	0.284	6.83	25′	EL	12	0.591	2.73	25′	EL	1.2	0.80	0.284	5.04	25′	EL	12	
		SNGARBS2	20.000	--	2.186	43.718	1.4	0.284	6.39	25′	EL	12	0.591	2.19	25′	EL	1.2	0.80	0.284	4.72	25′	EL	12	
		SNAGRIS2	22.000	--	2.141	47.107	1.4	0.284	6.83	25′	EL	12	0.591	2.14	25′	EL	1.2	0.80	0.284	5.04	25′	EL	12	
		SNCOTTS3	27.250	--	1.385	37.731	1.4	0.284	3.57	25′	EL	12	0.591	1.38	25′	EL	1.2	0.80	0.284	2.64	25′	EL	12	
		SNAGGRS4	34.925	--	1.332	46.511	1.4	0.284	3.56	25′	EL	12	0.591	1.33	25′	EL	1.2	0.80	0.284	2.62	25′	EL	12	
		SNS5A	35.550	--	1.392	49.477	1.4	0.284	3.45	25′	EL	12	0.591	1.39	25′	EL	1.2	0.80	0.284	2.54	25′	EL	12	
		SNS6A	39.950	--	1.334	53.31	1.4	0.284	3.23	25′	EL	12	0.591	1.33	25′	EL	1.2	0.80	0.284	2.39	25′	EL	12	
		SNS7B	42.000	--	1.344	56.455	1.4	0.284	3.23	25′	EL	12	0.591	1.34	25′	EL	1.2	0.80	0.284	2.37	25′	EL	12	
	TTST	TNAGRIT3	33.000	--	1.634	53.934	1.4	0.284	4.55	25′	EL	12	0.591	1.63	25′	EL	1.2	0.80	0.284	3.36	25′	EL	12	
		TNT4A	33.075	--	1.483	49.049	1.4	0.284	3.95	25′	EL	12	0.591	1.48	25′	EL	1.2	0.80	0.284	2.92	25′	EL	12	
		TNT6A	41.600	--	1.398	58.138	1.4	0.284	3.71	25′	EL	12	0.591	1.4	25′	EL	1.2	0.80	0.284	2.74	25′	EL	12	
		TNT7A	42.000	--	1.391	58.419	1.4	0.284	3.84	25′	EL	12	0.591	1.39	25′	EL	1.2	0.80	0.284	2.83	25′	EL	12	
		TNT7B	42.000	--	1.343	56.385	1.4	0.284	3.46	25′	EL	12	0.591	1.34	25′	EL	1.2	0.80	0.284	2.55	25′	EL	12	
		TNAGRIT4	43.000	--	1.340	57.604	1.4	0.284	3.71	25′	EL	12	0.591	1.34	25′	EL	1.2	0.80	0.284	2.73	25′	EL	12	
		TNAGT5A	45.000	--	1.367	61.501	1.4	0.284	3.71	25′	EL	12	0.591	1.37	25′	EL	1.2	0.80	0.284	2.73	25′	EL	12	
		TNAGT5B	45.000	3	1.239	55.766	1.4	0.284	3.65	25′	EL	9.6	0.591	1.24	25′	EL	1.2	0.80	0.284	2.71	25′	EL	9.6	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{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

GIRDER LOCATION

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

LRFR SUMMARY

FOR SPAN 'A'

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 25′ CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : J. BAYNE	DATE : 5/17		
CHECKED BY : D. HAWKINS	DATE : 5/17		
DRAWN BY : CVC 6/10			
CHECKED BY : DNS 6/10			

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17

DWG. NO. 3

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

STD. NO. 21LRFR1_90S_25L

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	1	1.394	--	1.75	0.276	1.57	50′	EL	24.5	0.531	**1.39**	50′	EL	**2.45**	0.80	0.276	1.44	50′	EL	24.5	
		HL-93(Opr)	N/A	--	1.807	--	1.35	0.276	2.03	50′	EL	24.5	0.531	1.81	50′	EL	2.45	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.667	60.007	1.75	0.276	1.95	50′	EL	24.5	0.531	**1.67**	50′	EL	**2.45**	0.80	0.276	1.79	50′	EL	24.5	
		HS-20(Opr)	36.000	--	2.161	77.787	1.35	0.276	2.52	50′	EL	24.5	0.531	2.16	50′	EL	2.45	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.635	49.079	1.4	0.276	4.95	50′	EL	24.5	0.531	4.7	50′	EL	2.45	0.80	0.276	3.64	50′	EL	24.5	
		SNGARBS2	20.000	--	2.871	57.42	1.4	0.276	3.91	50′	EL	24.5	0.531	3.42	50′	EL	2.45	0.80	0.276	2.87	50′	EL	24.5	
		SNAGRIS2	22.000	--	2.778	61.109	1.4	0.276	3.78	50′	EL	19.6	0.531	3.21	50′	EL	2.45	0.80	0.276	2.78	50′	EL	24.5	
		SNCOTTS3	27.250	--	1.814	49.418	1.4	0.276	2.47	50′	EL	24.5	0.531	2.36	50′	EL	2.45	0.80	0.276	1.81	50′	EL	24.5	
		SNAGGRS4	34.925	--	1.577	55.063	1.4	0.276	2.15	50′	EL	24.5	0.531	2.01	50′	EL	2.45	0.80	0.276	1.58	50′	EL	24.5	
		SNS5A	35.550	--	1.537	54.657	1.4	0.276	2.09	50′	EL	24.5	0.531	2.07	50′	EL	2.45	0.80	0.276	1.54	50′	EL	24.5	
		SNS6A	39.950	--	1.438	57.43	1.4	0.276	1.96	50′	EL	24.5	0.531	1.91	50′	EL	2.45	0.80	0.276	1.44	50′	EL	24.5	
		SNS7B	42.000	--	1.370	57.54	1.4	0.276	1.87	50′	EL	24.5	0.531	1.91	50′	EL	2.45	0.80	0.276	1.37	50′	EL	24.5	
	TTST	TNAGRIT3	33.000	--	1.761	58.118	1.4	0.276	2.4	50′	EL	24.5	0.531	2.25	50′	EL	2.45	0.80	0.276	1.76	50′	EL	24.5	
		TNT4A	33.075	--	1.777	58.759	1.4	0.276	2.42	50′	EL	24.5	0.531	2.17	50′	EL	2.45	0.80	0.276	1.78	50′	EL	24.5	
		TNT6A	41.600	--	1.480	61.558	1.4	0.276	2.01	50′	EL	24.5	0.531	2.08	50′	EL	2.45	0.80	0.276	1.48	50′	EL	24.5	
		TNT7A	42.000	--	1.502	63.087	1.4	0.276	2.05	50′	EL	24.5	0.531	1.94	50′	EL	2.45	0.80	0.276	1.50	50′	EL	24.5	
		TNT7B	42.000	--	1.566	65.773	1.4	0.276	2.13	50′	EL	24.5	0.531	1.84	50′	EL	2.45	0.80	0.276	1.57	50′	EL	24.5	
		TNAGRIT4	43.000	--	1.486	63.902	1.4	0.276	2.02	50′	EL	24.5	0.531	1.77	50′	EL	2.45	0.80	0.276	1.49	50′	EL	24.5	
		TNAGT5A	45.000	--	1.388	62.47	1.4	0.276	1.89	50′	EL	24.5	0.531	1.8	50′	EL	2.45	0.80	0.276	1.39	50′	EL	24.5	
		TNAGT5B	45.000	3	1.360	61.206	1.4	0.276	1.85	50′	EL	24.5	0.531	1.68	50′	EL	2.45	0.80	0.276	**1.36**	50′	EL	**24.5**	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{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

GIRDER LOCATION

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

LRFR SUMMARY

FOR SPAN 'B'

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17

DWG. NO. 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

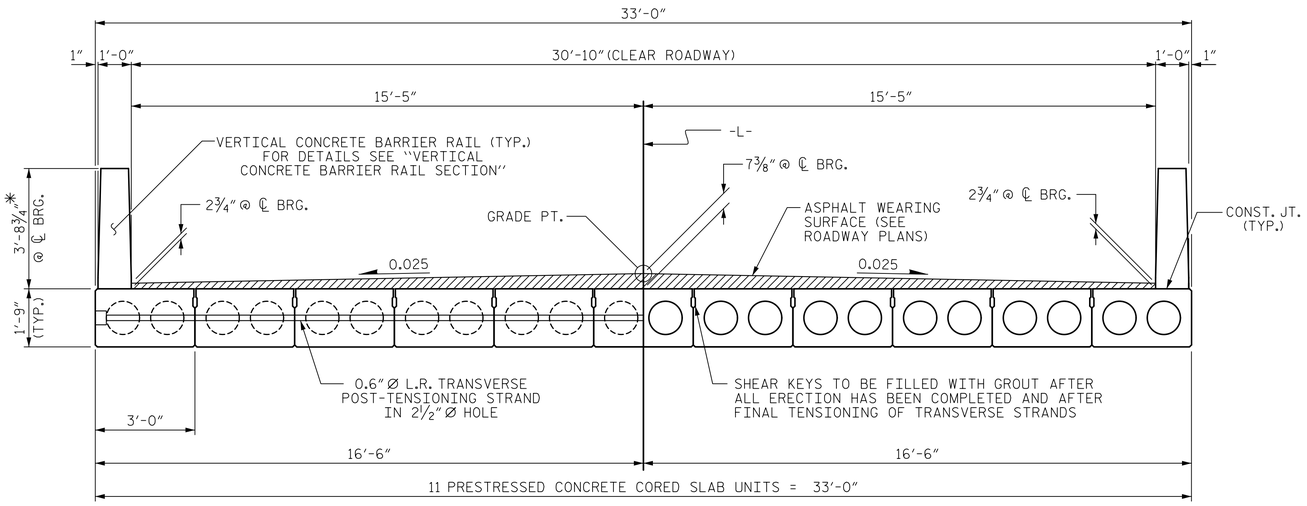
LRFR SUMMARY FOR 50′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY : J. BAYNE DATE : 5/17
CHECKED BY : D. HAWKINS DATE : 5/17

DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

STD. NO. 21LRFR1_90S_50L



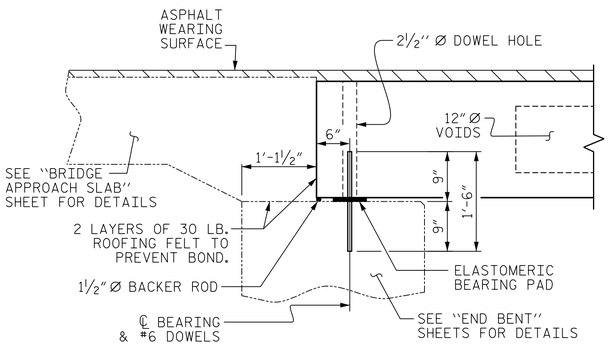
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

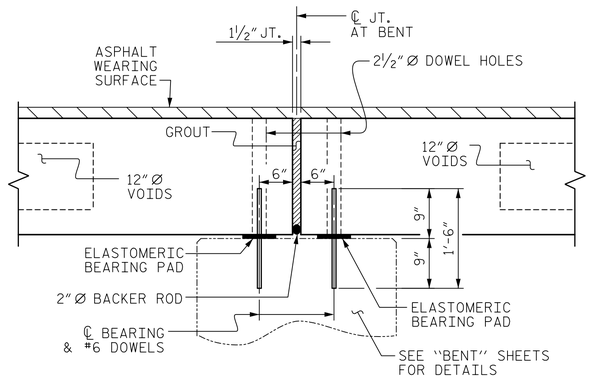
*- THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE ''VERTICAL CONCRETE BARRIER RAIL SECTION'' DETAIL.

FIXED END

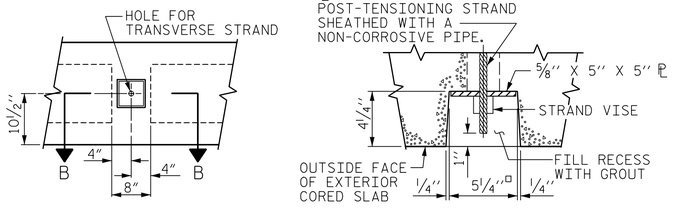


SECTION AT END BENT

FIXED END FIXED END



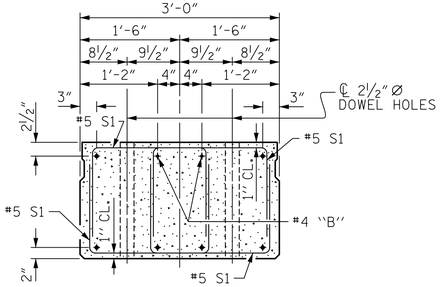
SECTION AT BENT



ELEVATION VIEW

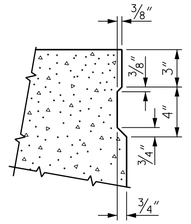
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



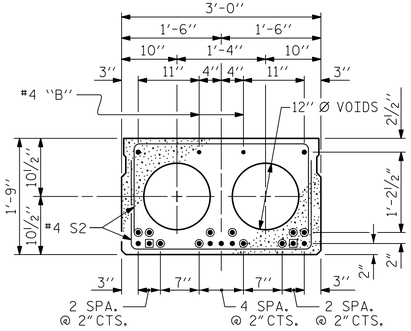
END ELEVATION

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.



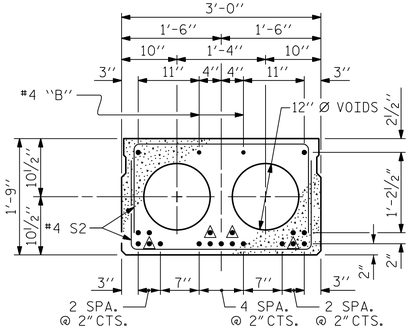
SHEAR KEY DETAIL

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



INTERIOR SLAB SECTION (25′ UNIT)

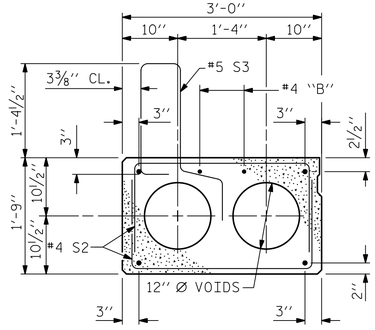
(9 STRANDS REQUIRED)



INTERIOR SLAB SECTION (50′ UNIT)

(19 STRANDS REQUIRED)

0.6″ Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

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

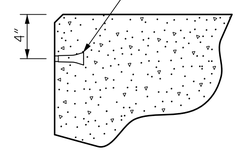
▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6′-0″FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2′-0″FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED ⅜″. SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 1 OF 4

DocuSigned by: David W. Hawkins
6/14/2017

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3′-0″ X 1′-9″
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

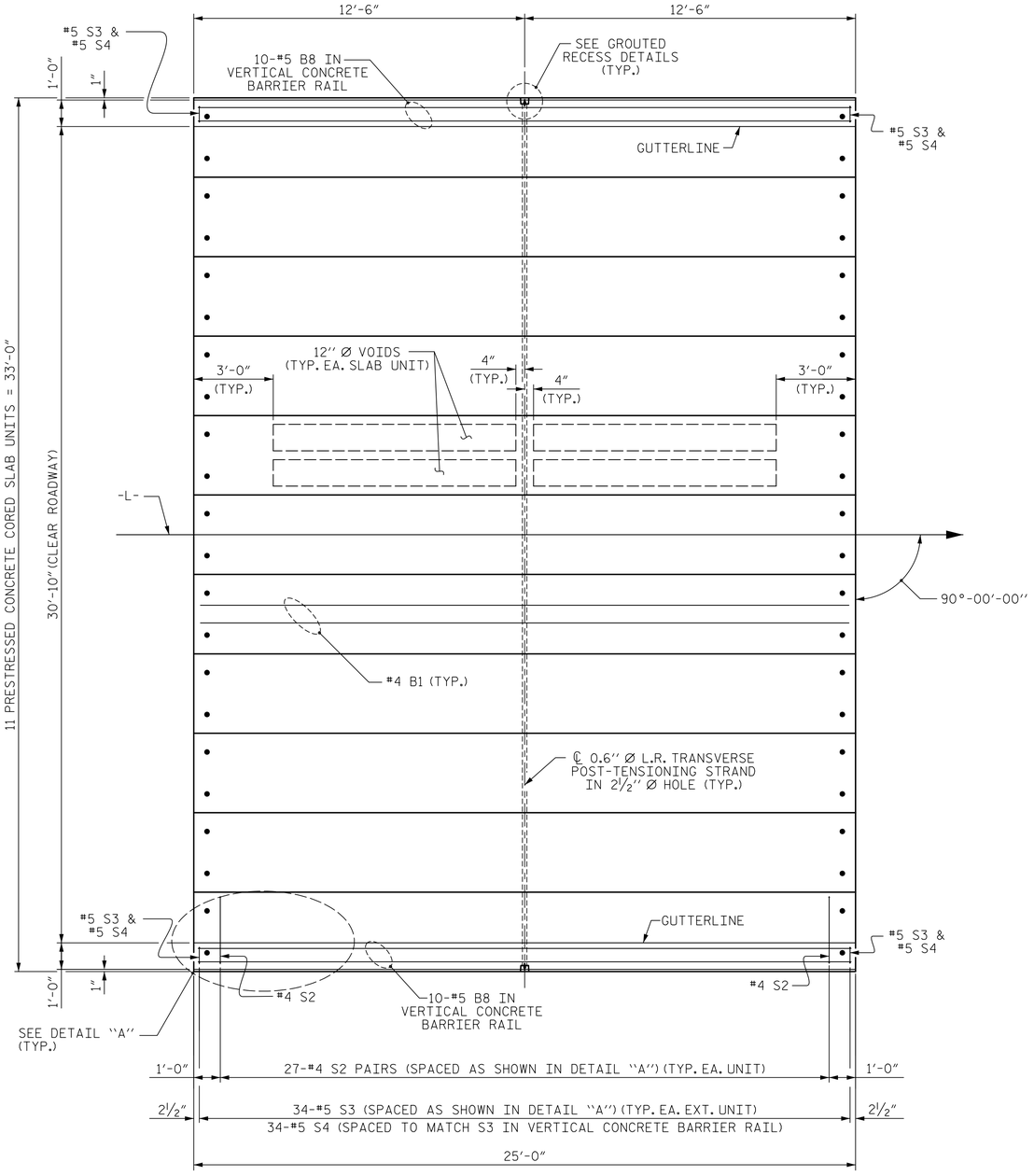
ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : DGE 5/09	REV. 9/14 MAA/TMG
CHECKED BY : BCH 6/09	

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

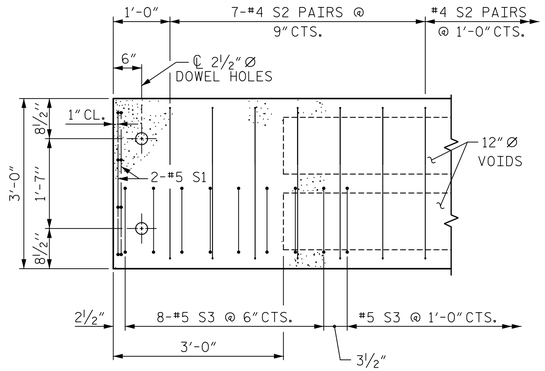
DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17
DWG. NO. 5

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			19

STD. NO. 21″PCS2_33_90S



PLAN OF UNIT



DETAIL ″A″

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

ASSEMBLED BY : J. BAYNE		DATE : 5/17			
CHECKED BY : D. HAWKINS		DATE : 5/17			
DRAWN BY : DGE	3/09	REV.	12/5/11	MAA/AAC	
CHECKED BY : BCH	3/09	REV.	8/14	MAA/TMG	

DocuSigned by: David W. Hawkins
NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
6/14/2017

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DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17
DWG. NO. 6

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			19

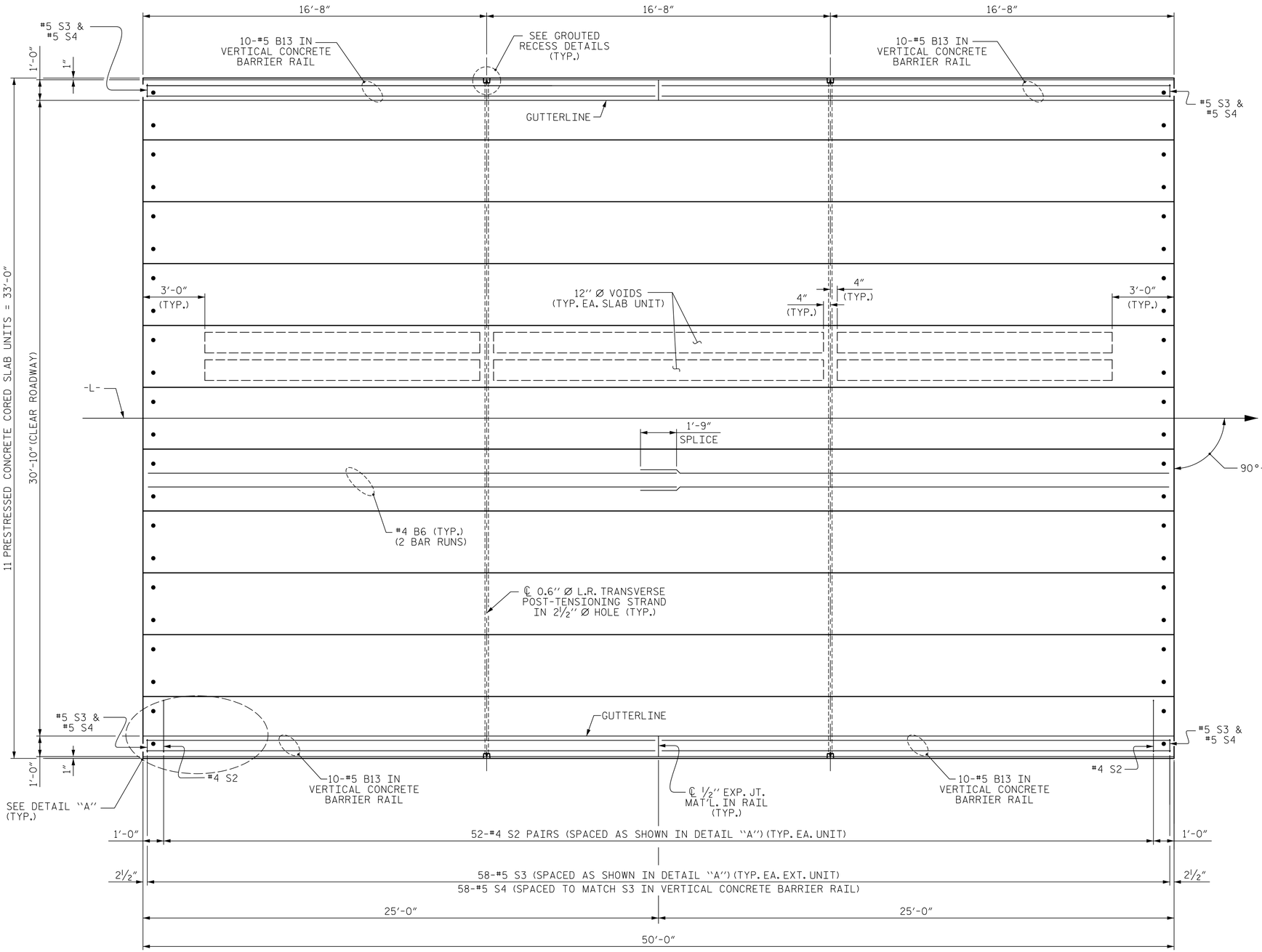
PROJECT NO. 17BP.3.R.47
ONSLOW COUNTY
STATION: 15+65.50 -L-

SHEET 2 OF 4

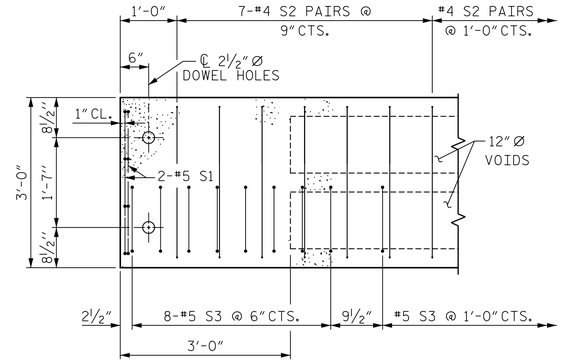
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 25′ UNIT 30′-10″ CLEAR ROADWAY 90° SKEW

STD. NO. 21″PCS_33_90S_25L



PLAN OF UNIT



DETAIL ″A″

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

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 50′ UNIT 30′-10″ CLEAR ROADWAY 90° SKEW

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : J. BAYNE	DATE : 5/17		
CHECKED BY : D. HAWKINS	DATE : 5/17		
DRAWN BY : DGE 3/09	REV. 12/5/11	MAA/AAC	
CHECKED BY : BCH 3/09	REV. 8/14	MAA/TMG	

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DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17

DWG. NO. 7

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			19

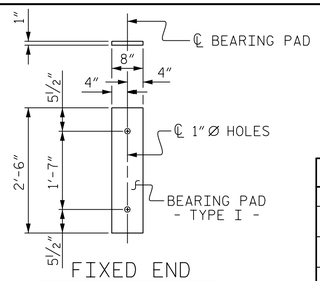
STD. NO. 21″PCS_33_90S_50L

BILL OF MATERIAL FOR ONE 25′ CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B1	2	#4	STR	24′-8″	33	24′-8″	33
S1	8	#5	3	4′-3″	35	4′-3″	35
S2	54	#4	3	5′-4″	192	5′-4″	192
✳ S3	34	#5	1	5′-7″	198		
REINFORCING STEEL			LBS.		260		260
✳ EPOXY COATED REINFORCING STEEL			LBS.		198		
5000 P.S.I. CONCRETE			CU. YDS.		3.7		3.7
0.6″ Ø L.R. STRANDS			No.		9		9

BILL OF MATERIAL FOR ONE 50′ CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B6	4	#4	STR	25′-9″	69	25′-9″	69
S1	8	#5	3	4′-3″	35	4′-3″	35
S2	104	#4	3	5′-4″	371	5′-4″	371
✳ S3	58	#5	1	5′-7″	338		
REINFORCING STEEL			LBS.		475		475
✳ EPOXY COATED REINFORCING STEEL			LBS.		338		
6500 P.S.I. CONCRETE			CU. YDS.		7.1		7.1
0.6″ Ø L.R. STRANDS			No.		19		19



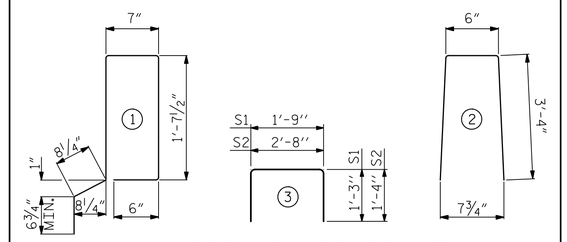
FIXED END
(TYPE I - 44 REQ′D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

GRADE 270 STRANDS	0.6″ Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
25′ UNIT			
EXTERIOR C.S.	2	25′-0″	50′-0″
INTERIOR C.S.	9	25′-0″	225′-0″
TOTAL	11	25′-0″	275′-0″

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
50′ UNIT			
EXTERIOR C.S.	2	50′-0″	100′-0″
INTERIOR C.S.	9	50′-0″	450′-0″
TOTAL	11	50′-0″	550′-0″

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	25′ UNIT					
✳ B8	20	20	#5	STR	24′-7″	513
✳ S4	68	68	#5	2	7′-2″	508
✳ EPOXY COATED REINFORCING STEEL				LBS.		1021
CLASS AA CONCRETE				CU.YDS.		6.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		50.25

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	50′ UNIT					
✳ B13	40	40	#5	STR	24′-7″	1026
✳ S4	116	116	#5	2	7′-2″	867
✳ EPOXY COATED REINFORCING STEEL				LBS.		1893
CLASS AA CONCRETE				CU.YDS.		12.8
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		100.25

DEAD LOAD DEFLECTION AND CAMBER

	3′-0″ × 1′-9″ 0.6″ Ø L.R. STRAND
25′ CORED SLAB UNIT	
CAMBER (SLAB ALONE IN PLACE)	¼″ ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ✳✳	⅛″ ↓
FINAL CAMBER	⅛″ ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3′-0″ × 1′-9″ 0.6″ Ø L.R. STRAND
50′ CORED SLAB UNIT	
CAMBER (SLAB ALONE IN PLACE)	1½″ ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ✳✳	⅜″ ↓
FINAL CAMBER	1⅛″ ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
25′ UNIT	2⅝″	3′-8⅝″
50′ UNIT	1⅝″	3′-7⅝″

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 2½″ 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, ½″ 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.

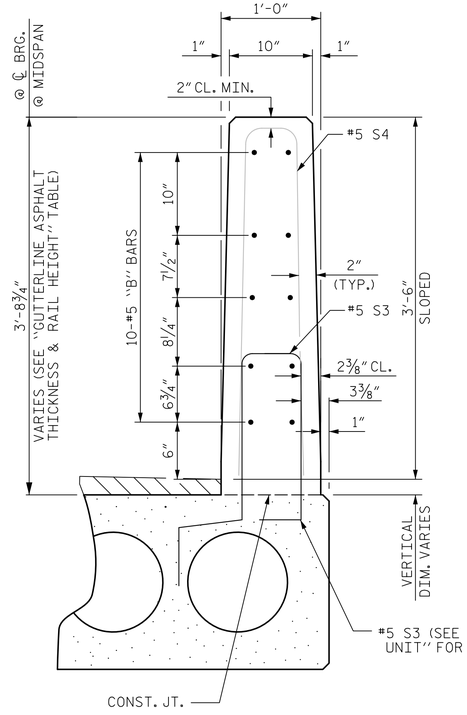
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4′-0″ CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

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.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

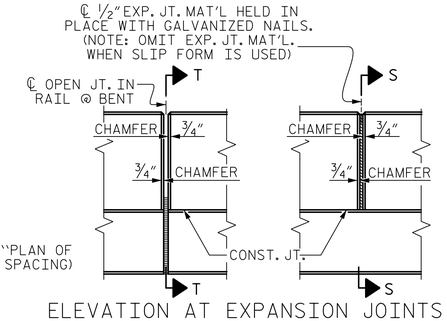
PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.



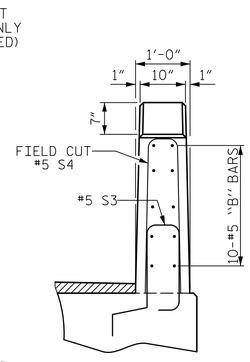
VERTICAL CONCRETE BARRIER RAIL SECTION

SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

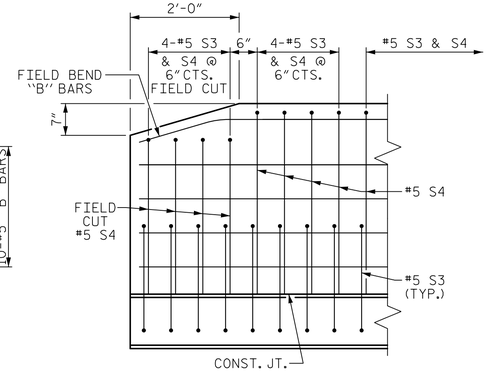
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

CONCRETE RELEASE STRENGTH

UNIT	PSI
25′, 30′ & 35′ UNITS	4000
40′ & 45′ UNITS	4000
50′ & 55′ UNITS	4900

PROJECT NO. 17BP.3.R.47
ONSLOW COUNTY
STATION: 15+65.50 -L-

SHEET 4 OF 4

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6/14/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3′-0″ X 1′-9″
PRESTRESSED CONCRETE CORED SLAB UNIT
90° SKEW

ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : DGE 5/09	REV. 11/14 MAA/TMG
CHECKED BY : BCH 6/09	

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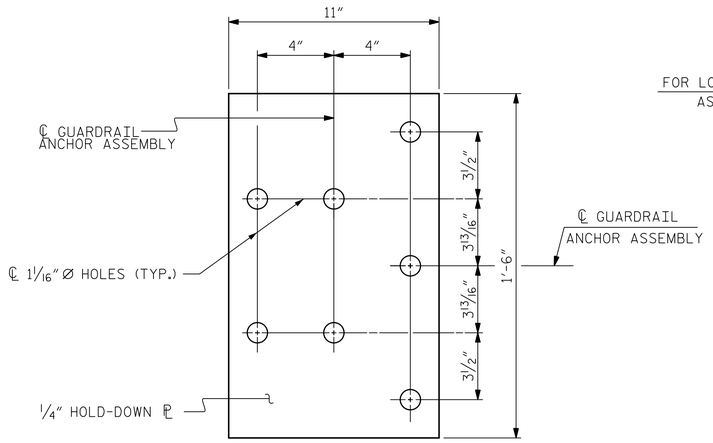
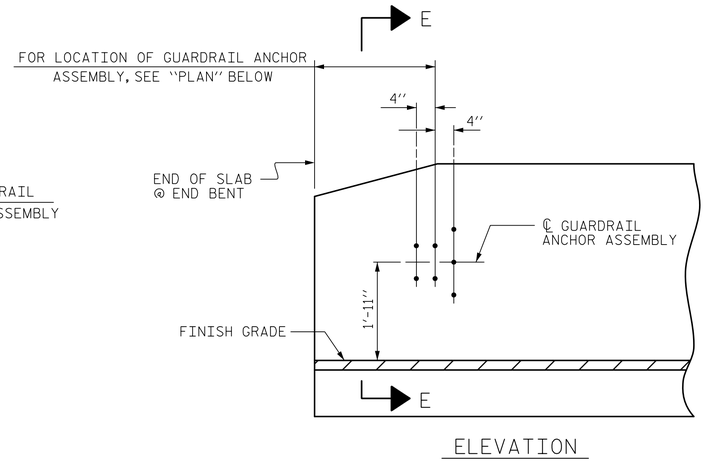
STD. NO. 21″PCS3_33_90S



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4″ HOLD DOWN PLATE AND 7 - 7/8″ 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 7/8″ 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.)

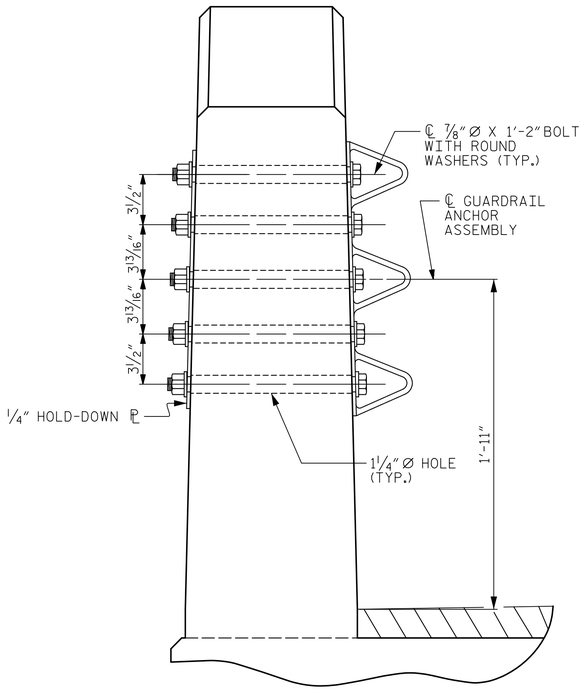
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

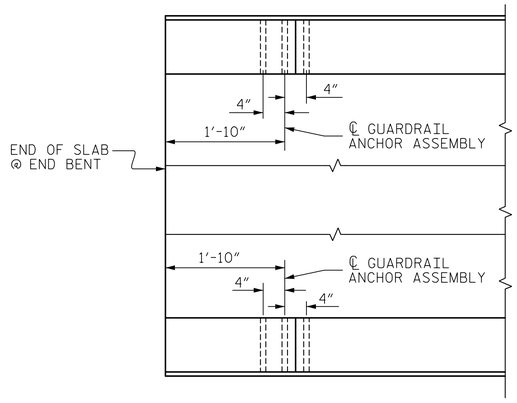
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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

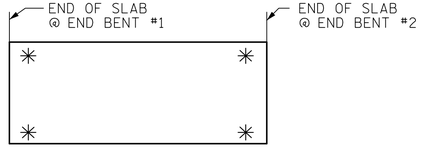
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

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6/14/2017

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CHECKED BY : GM 5/10	REV. 6/13	MAA/GM
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
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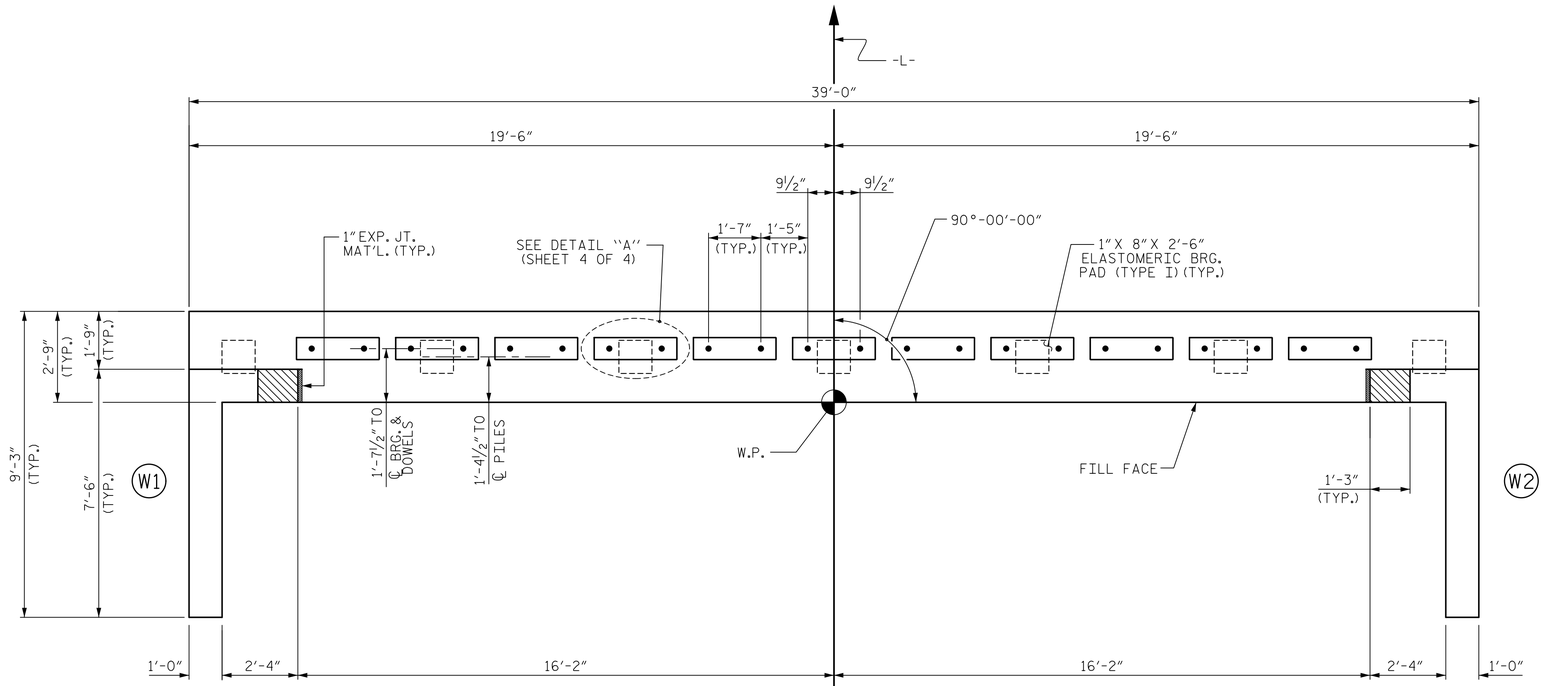
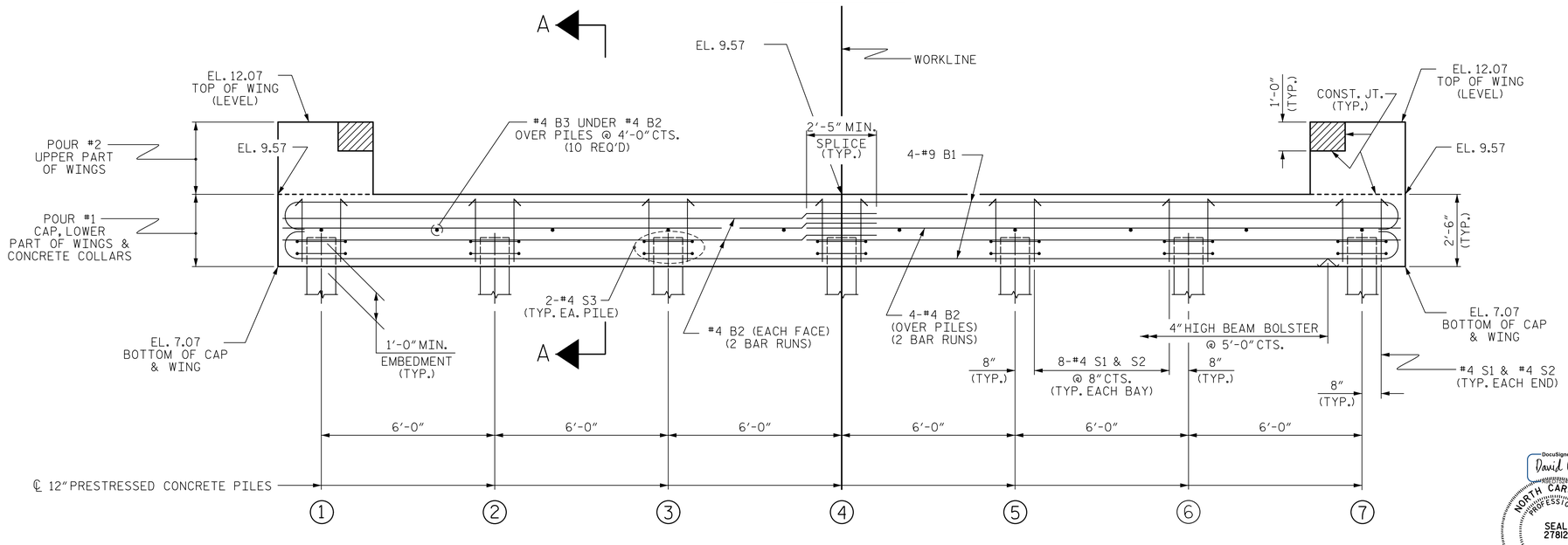
(SHT 1) STD. NO. GRA3



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.

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.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE COROSSION INHIBITOR.

ALL BAR SUPPORTS USED IN THE BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN END BENT NO. 1 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PATRIALLY SUBSTITUTE CALSS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

FOR WING DETAILS, SEE SHEET 3 OF 4.

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED. FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 1 OF 4

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6/14/2017

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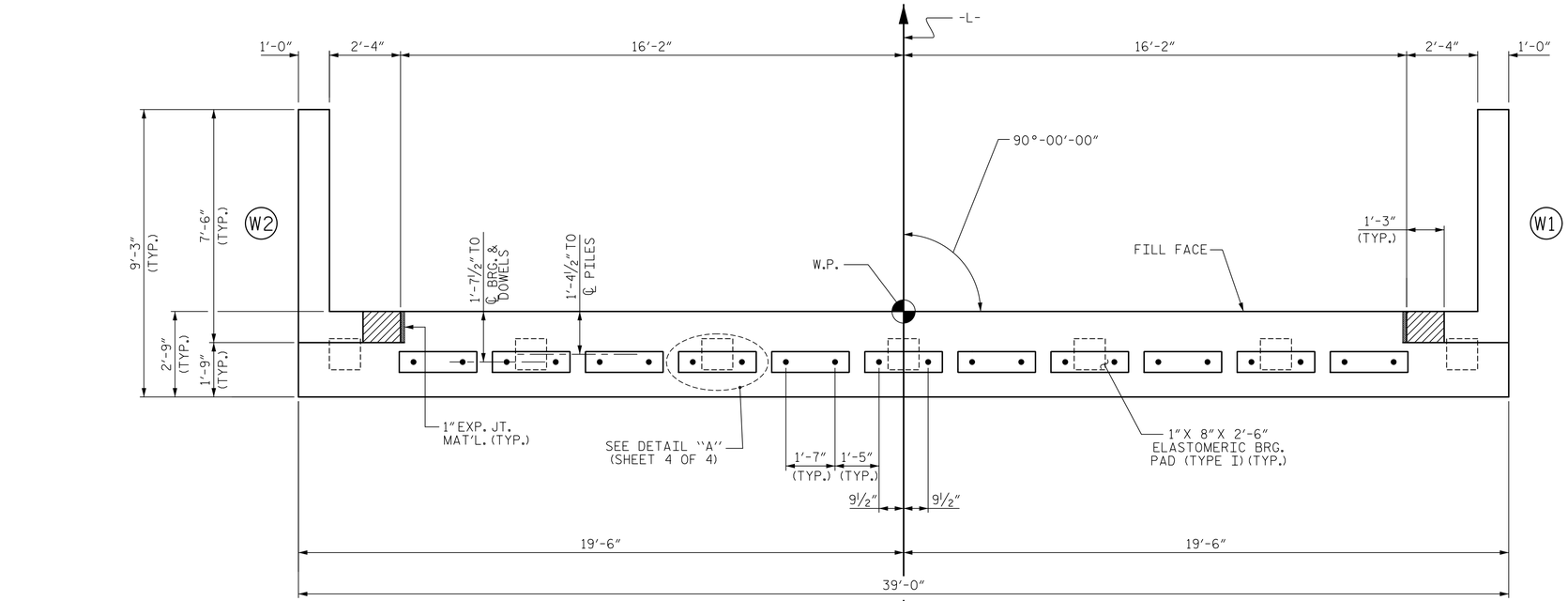
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

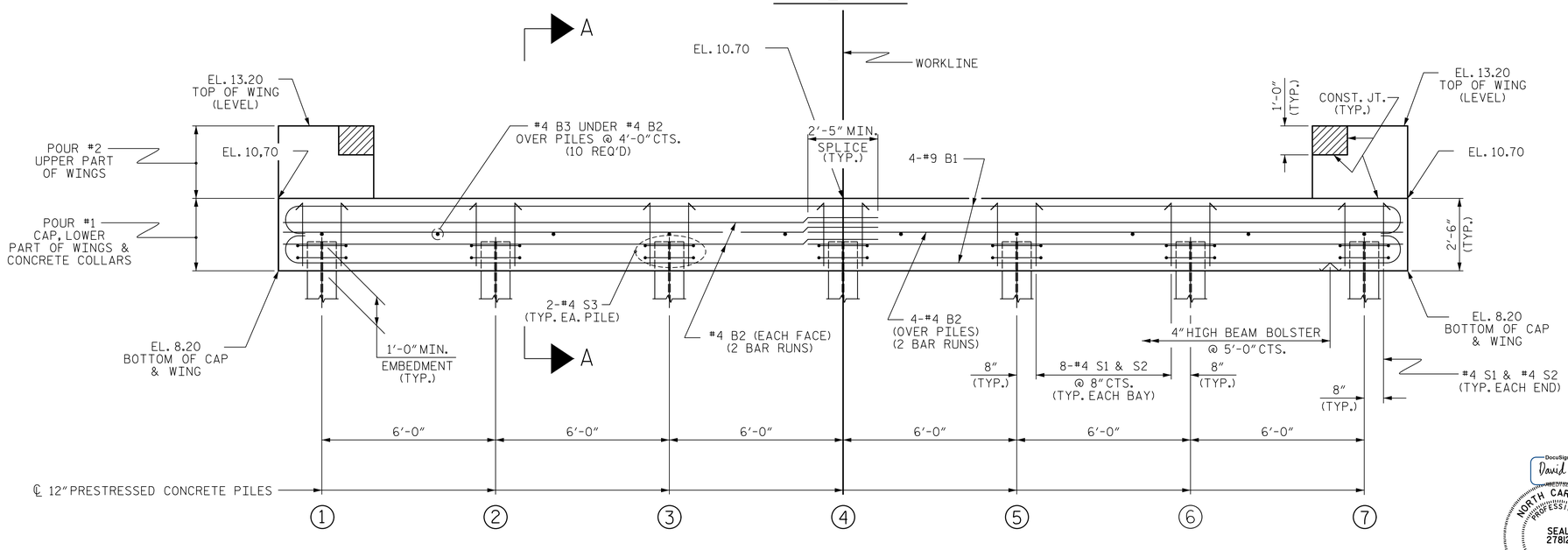
SUBSTRUCTURE

END BENT No. 1

STD. NO. EB_33_90S



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.

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.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE COROSSION INHIBITOR.

ALL BAR SUPPORTS USED IN THE BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN END BENT NO. 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PATRIALLY SUBSTITUTE CALSS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

FOR WING DETAILS, SEE SHEET 3 OF 4.

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED. FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 2 OF 4

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6/14/2017

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STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

END BENT No. 2

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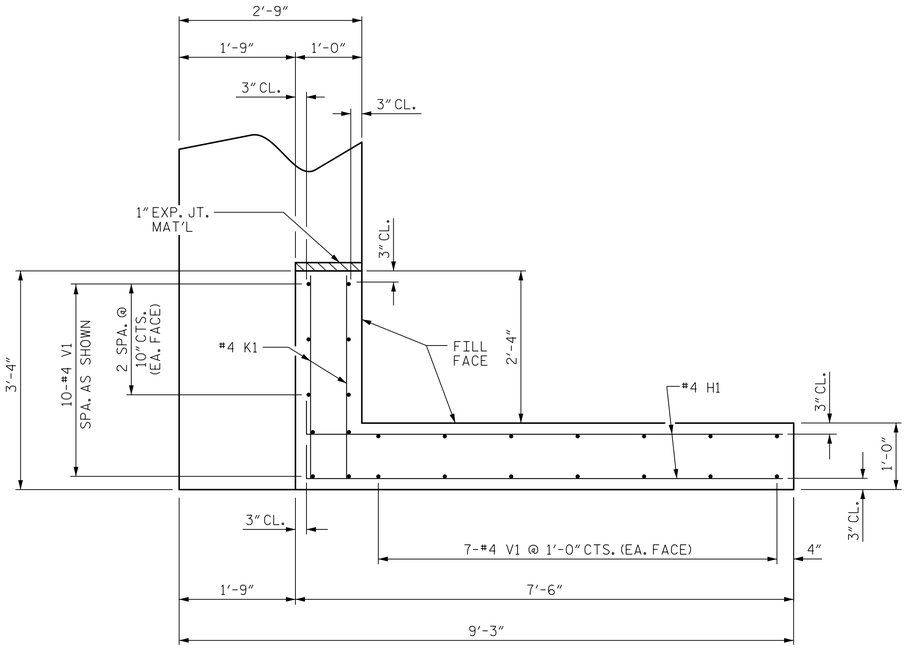
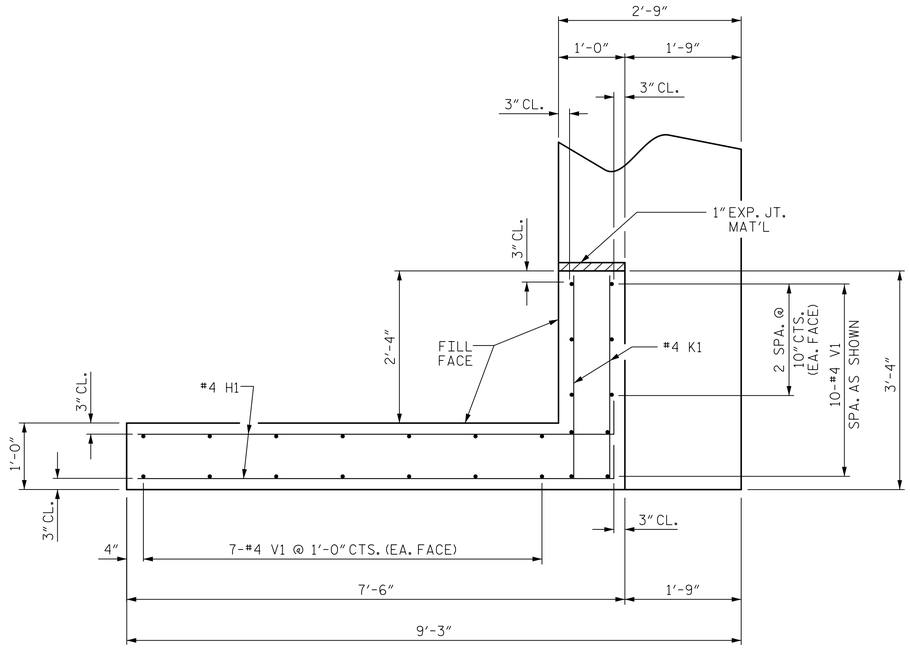
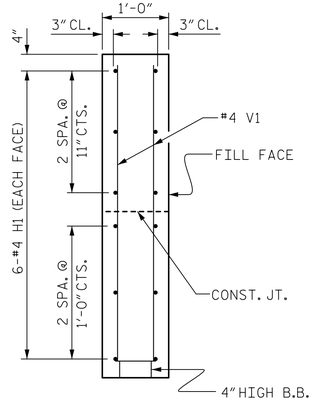


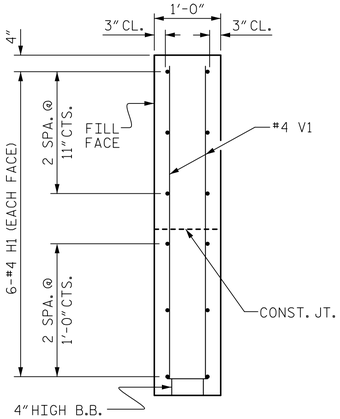
PLAN OF WING (W1)



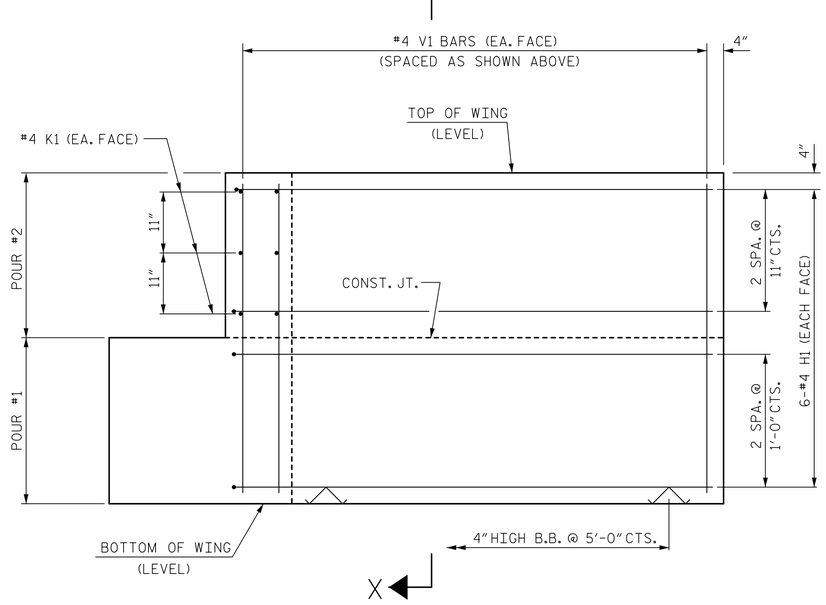
PLAN OF WING (W2)



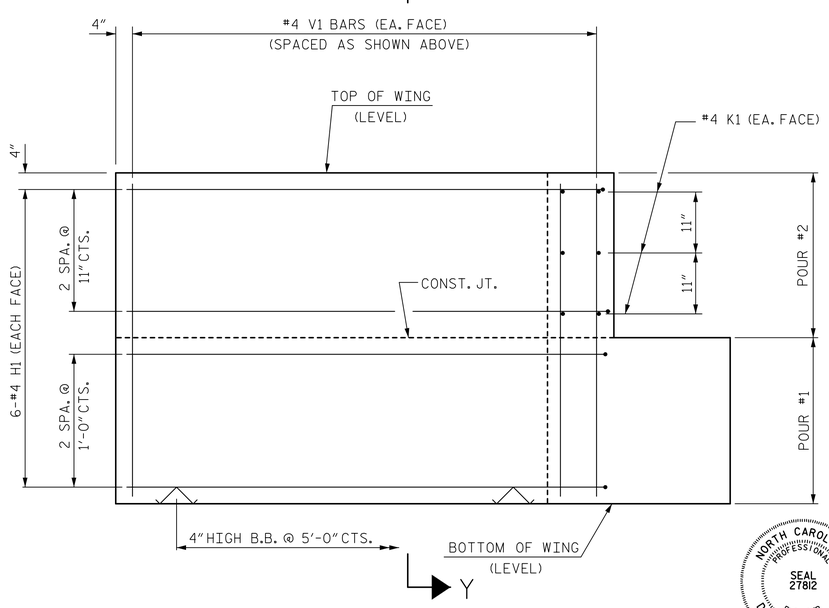
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

DocuSigned by:
David W. Hawkins
A9ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

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PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

WING DETAILS

ASSEMBLED BY : J. BAYNE	DATE : 5/17		
CHECKED BY : D. HAWKINS	DATE : 5/17		
DRAWN BY : DGE 02/10	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 02/10			

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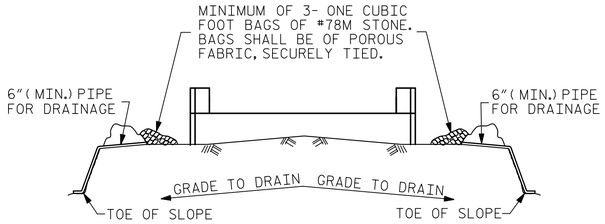
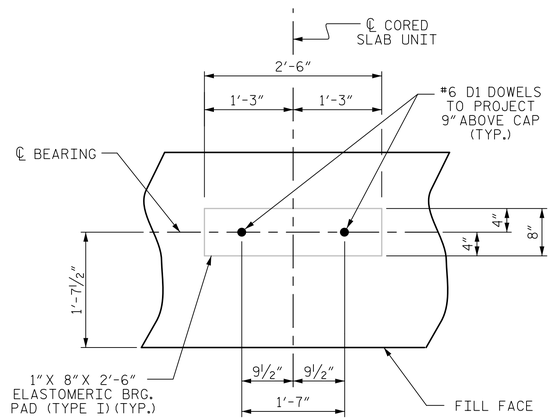


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

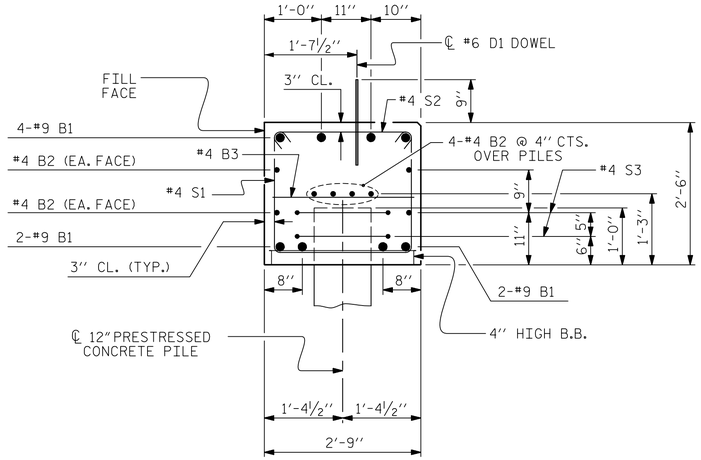
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



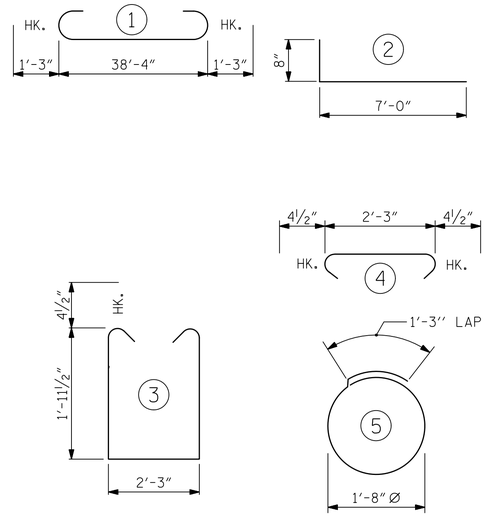
DETAIL "A"

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



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	8	#9	1	40'-10"	1,111
✳ B2	16	#4	STR	20'-6"	219
✳ B3	10	#4	STR	2'-3"	15
✳ D1	22	#6	STR	1'-6"	50
✳ H1	24	#4	2	7'-8"	123
✳ K1	12	#4	STR	2'-10"	23
✳ S1	50	#4	3	6'-11"	231
✳ S2	50	#4	4	3'-0"	100
✳ S3	14	#4	5	6'-6"	61
✳ V1	48	#4	STR	4'-6"	144

✳ EPOXY COATED REINFORCING STEEL (FOR ONE END BENT) 2077 LBS.

CLASS AA CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS ▲ 10.9 C.Y.

POUR #2 UPPER PART OF WINGS 1.8 C.Y.

TOTAL CLASS AA CONCRETE 12.7 C.Y.

▲ CONCRETE DISPLACED BY THE 12" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

END BENT No. 1	END BENT No. 2
12" PRESTRESSED CONCRETE PILES	12" PRESTRESSED CONCRETE PILES
NO: 7 LIN. FT.= 175	NO: 7 LIN. FT.= 175
PILE DRIVING EQUIPMENT SETUP FOR 12" PRESTRESSED CONCRETE PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR 12" PRESTRESSED CONCRETE PILES NO: 7
PILE REDRIVES NO: 4	PILE REDRIVES NO: 4

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 4 OF 4

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : DGE 12/09	REV. 4/17 MAA/THC
CHECKED BY : MKT 01/10	

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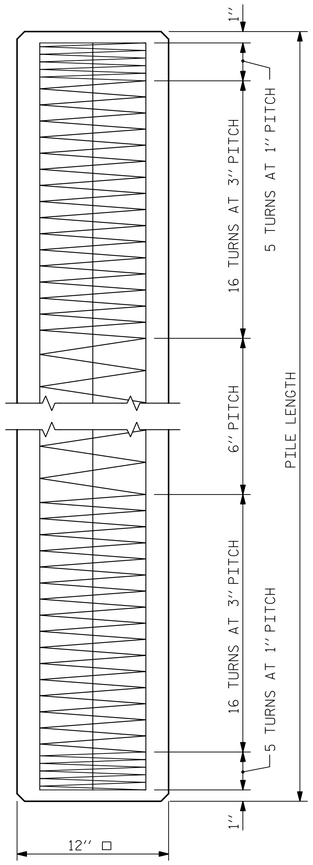
DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 6/17
DWG. NO. 13

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

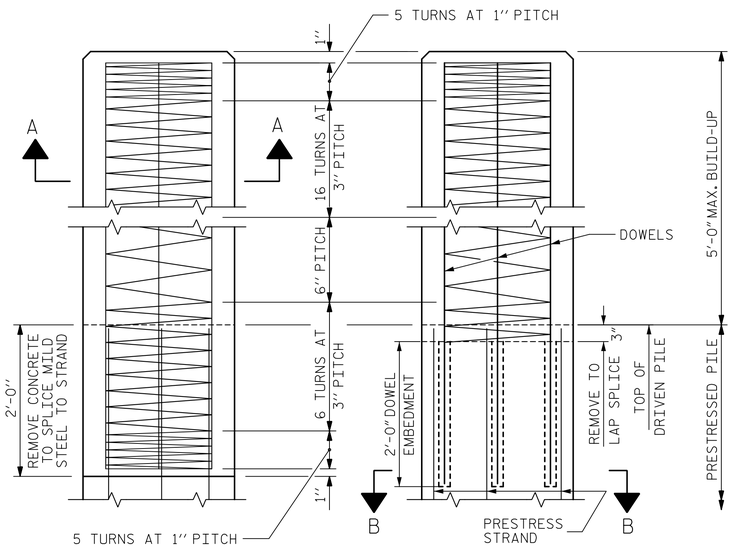
SHEET NO. S-13

TOTAL SHEETS 19

STD. NO. EB_33_90S

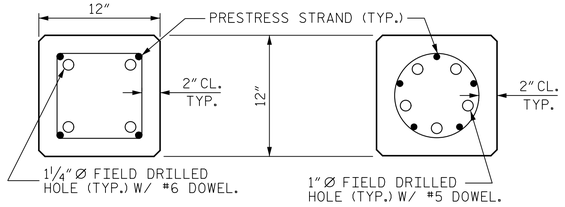


ELEVATION



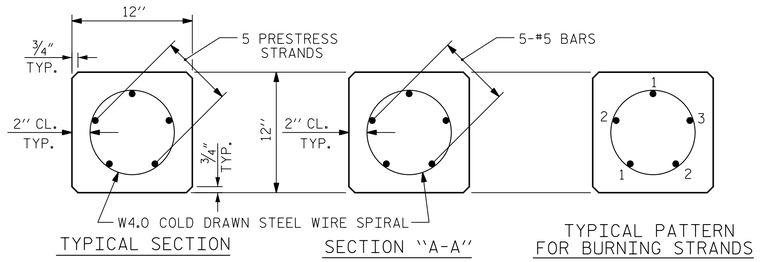
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



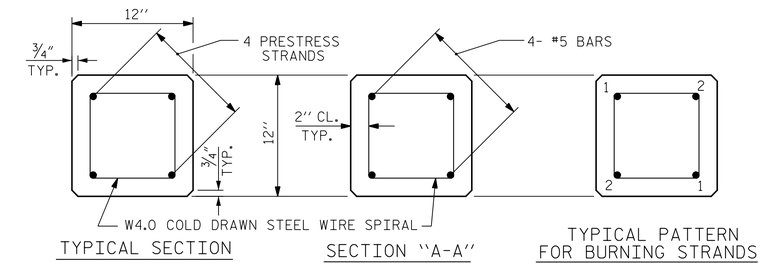
SECTION ''B-B''

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6''Ø GRADE 270 L.R. PRESTRESS STRANDS



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6''Ø GRADE 270 L.R. PRESTRESS STRANDS

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3'' OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½'' CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 5,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½''	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6''	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½'' OR 0.6'' STRANDS MAY BE USED IN EITHER THE 4 OR 5 STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN PAIRS, EXCEPT WHERE 5 STRANDS ARE USED, THE LAST STRAND MAY BE BURNED SINGLY ACCORDING TO BURNING PATTERNS SHOWN. NOT MORE THAN 4 STRANDS MAY BE BURNED AT ANY ONE SECTION BEFORE THE SAME STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2'' WIDE BLACK MARK.

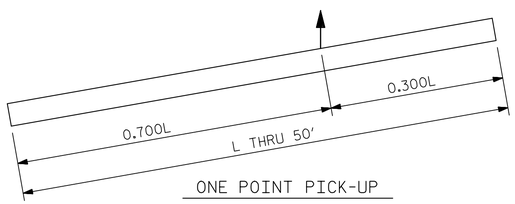
DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

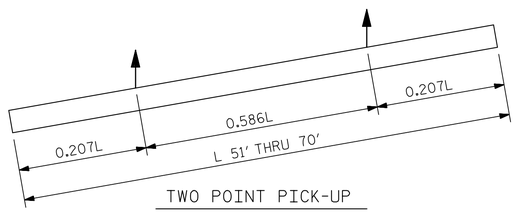
THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

PRESTRESSED PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE PILES OF END BENT NO. 1 AND END BENT NO. 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PATRIALLY SUBSTITUTE CALSS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.



ONE POINT PICK-UP



TWO POINT PICK-UP

PICK-UP POINTS

QUANTITIES FOR ONE 12'' PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0''	0.91	1.85	7'-6''	17'-6''		
30'-0''	1.10	2.22	9'-0''	21'-0''		
35'-0''	1.28	2.59	10'-6''	24'-6''		
40'-0''	1.46	2.96	12'-0''	28'-0''		
45'-0''	1.64	3.33	13'-6''	31'-6''		
50'-0''	1.83	3.72	15'-0''	35'-0''		
55'-0''	2.01	4.09			11'-4½''	32'-3''
60'-0''	2.19	4.46			12'-5''	35'-2''
65'-0''	2.38	4.81			13'-5½''	38'-1''
70'-0''	2.57	5.18			14'-6''	41'-0''

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

12'' PRESTRESSED CONCRETE PILE

ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : FCJ 7/88	REV. 11/30/10 WMC/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/14 MAA/TMG

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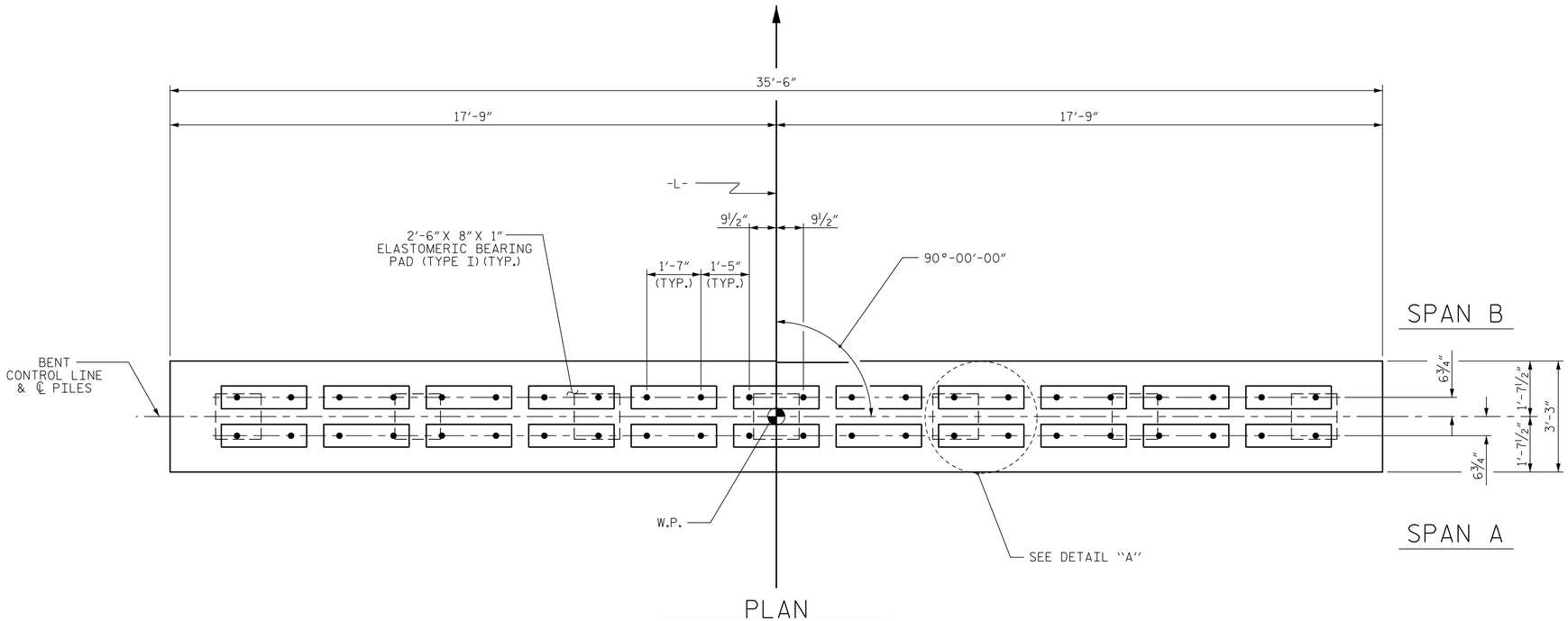
DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 6/17

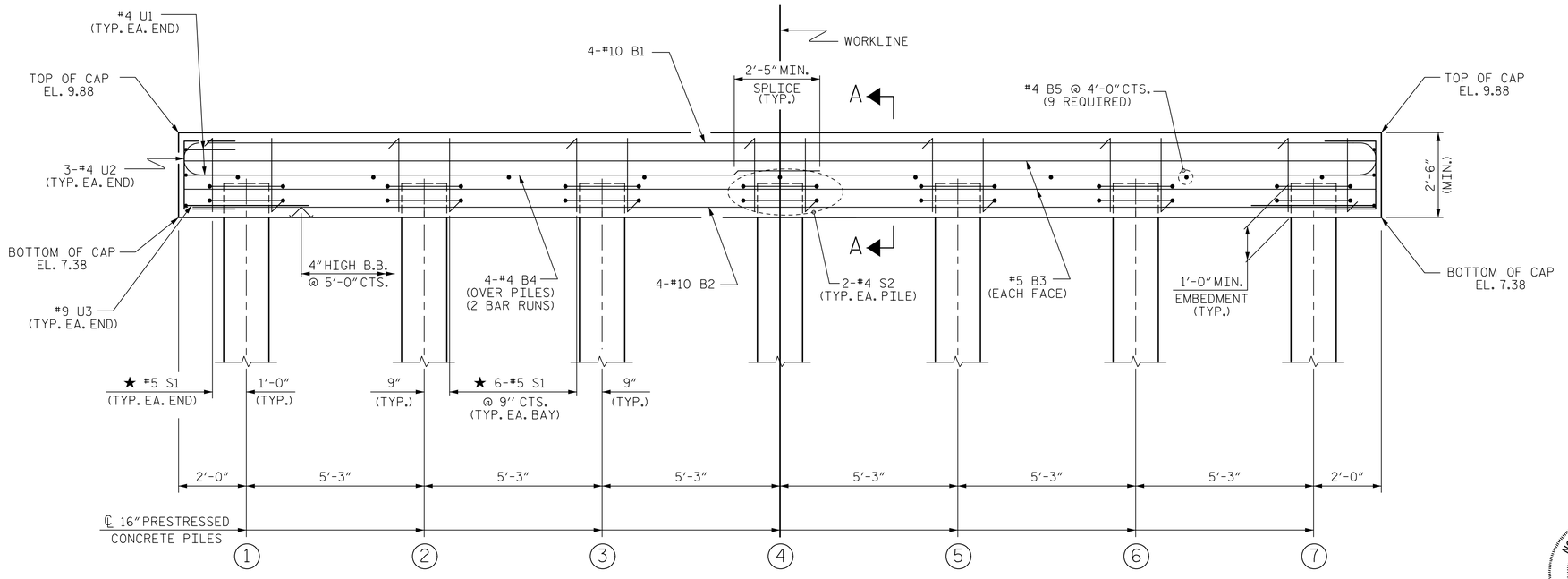
DWG. NO. 14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			19

STD. NO. PCP1



PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

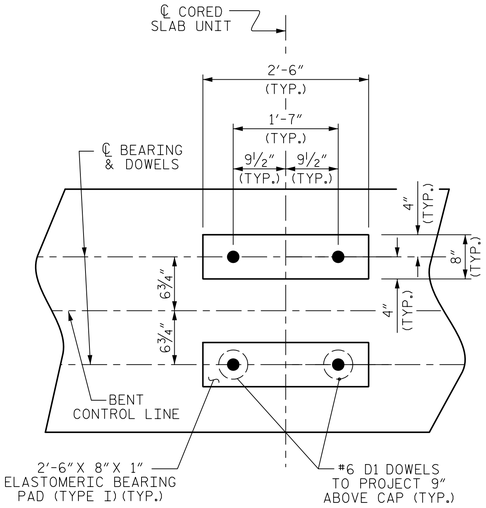
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE COROSSION INHIBITOR.

ALL BAR SUPPORTS USED IN THE BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE BENT CAPS OF BENT NO.1 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PATRIALLY SUBSTITUTE CALSS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

DocuSigned by: David W. Hawkins
NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
6/14/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : J. BAYNE	DATE : 5/17		
CHECKED BY : D. HAWKINS	DATE : 5/17		
DRAWN BY : DGE 5/10	REV. 11/14	MAA/TMG	
CHECKED BY : MKT 5/10			

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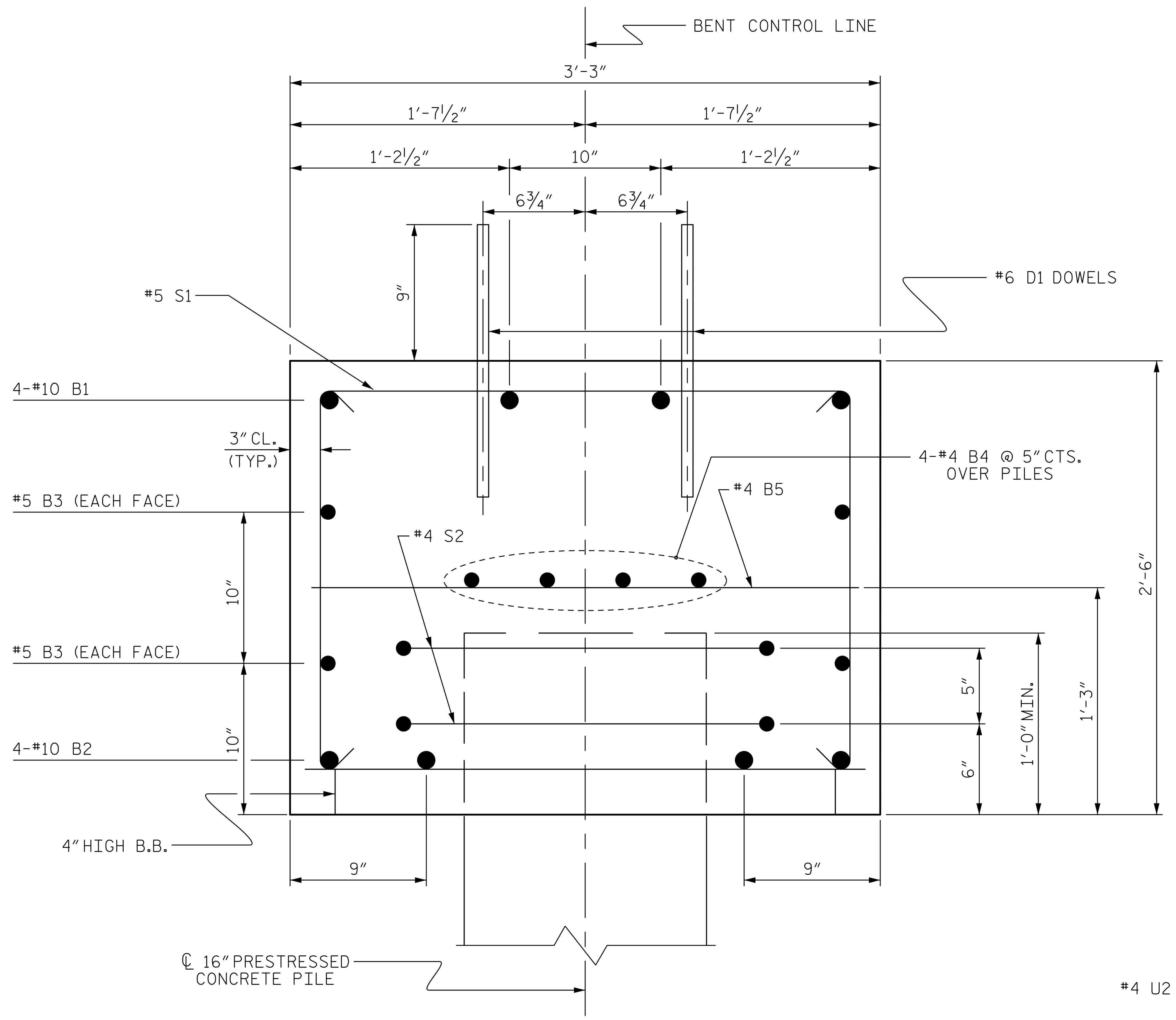
DRAWN BY J. BAYNE	DATE 5/17	DWG. NO. 15	
CHECKED BY D. HAWKINS	DATE 5/17		

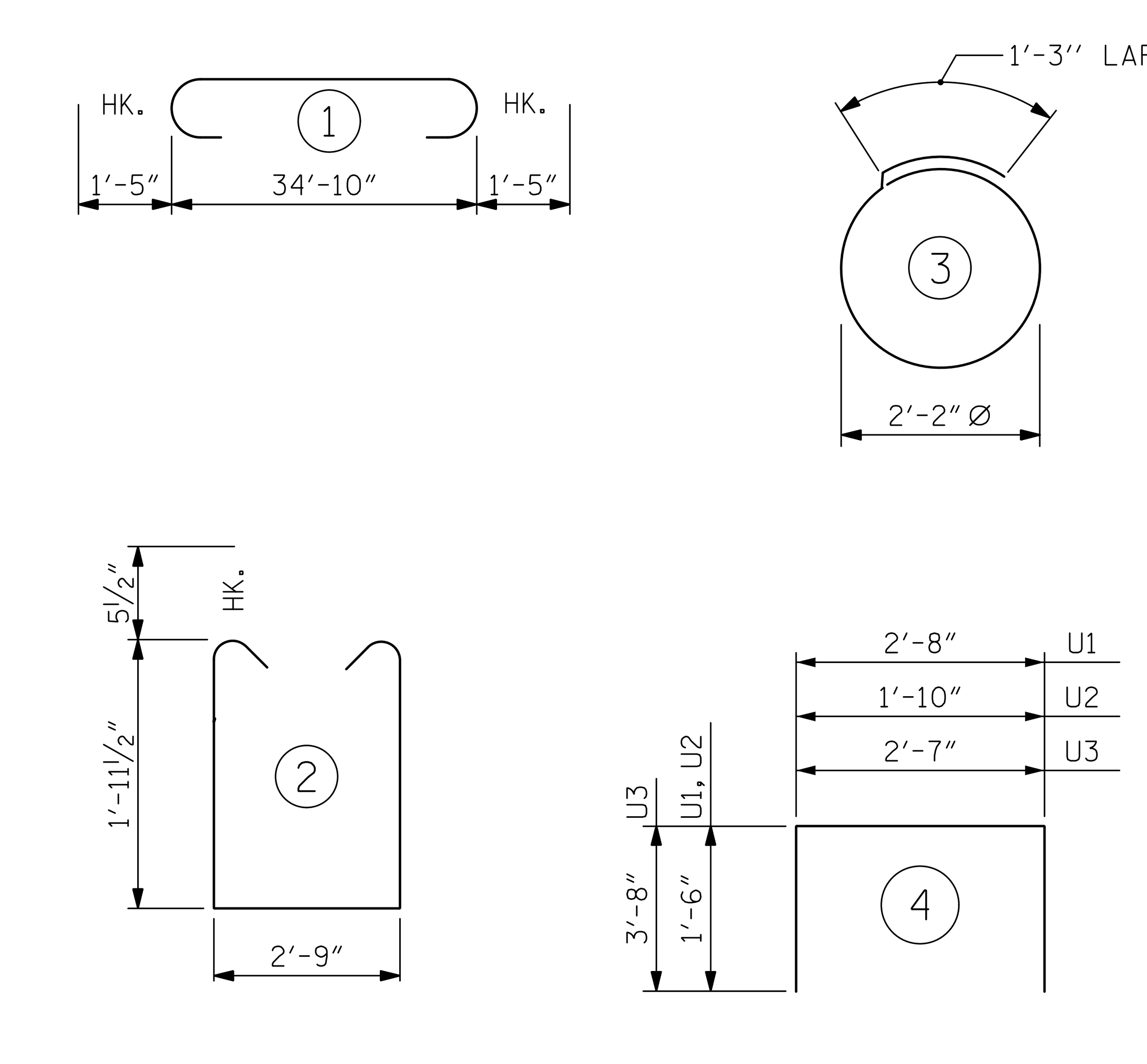
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			19

STD.NO. 16″PS_BT_33_90S_<60′



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#10	1	37'-8"	648
* B2	4	#10	STR	35'-0"	602
* B3	4	#5	STR	35'-0"	146
* B4	8	#4	STR	18'-9"	100
* B5	9	#4	STR	2'-9"	17
* D1	44	#6	STR	1'-6"	99
* S1	38	#5	2	7'-7"	301
* S2	14	#4	3	8'-1"	76
* U1	4	#4	4	5'-8"	15
* U2	6	#4	4	4'-10"	19
* U3	2	#9	4	9'-11"	67

* EPOXY COATED REINFORCING STEEL (FOR ONE BENT) 2090 LBS

CLASS AA CONCRETE BREAKDOWN (FOR ONE BENT)

TOTAL CLASS AA CONCRETE ▲ 10.2 C.Y.

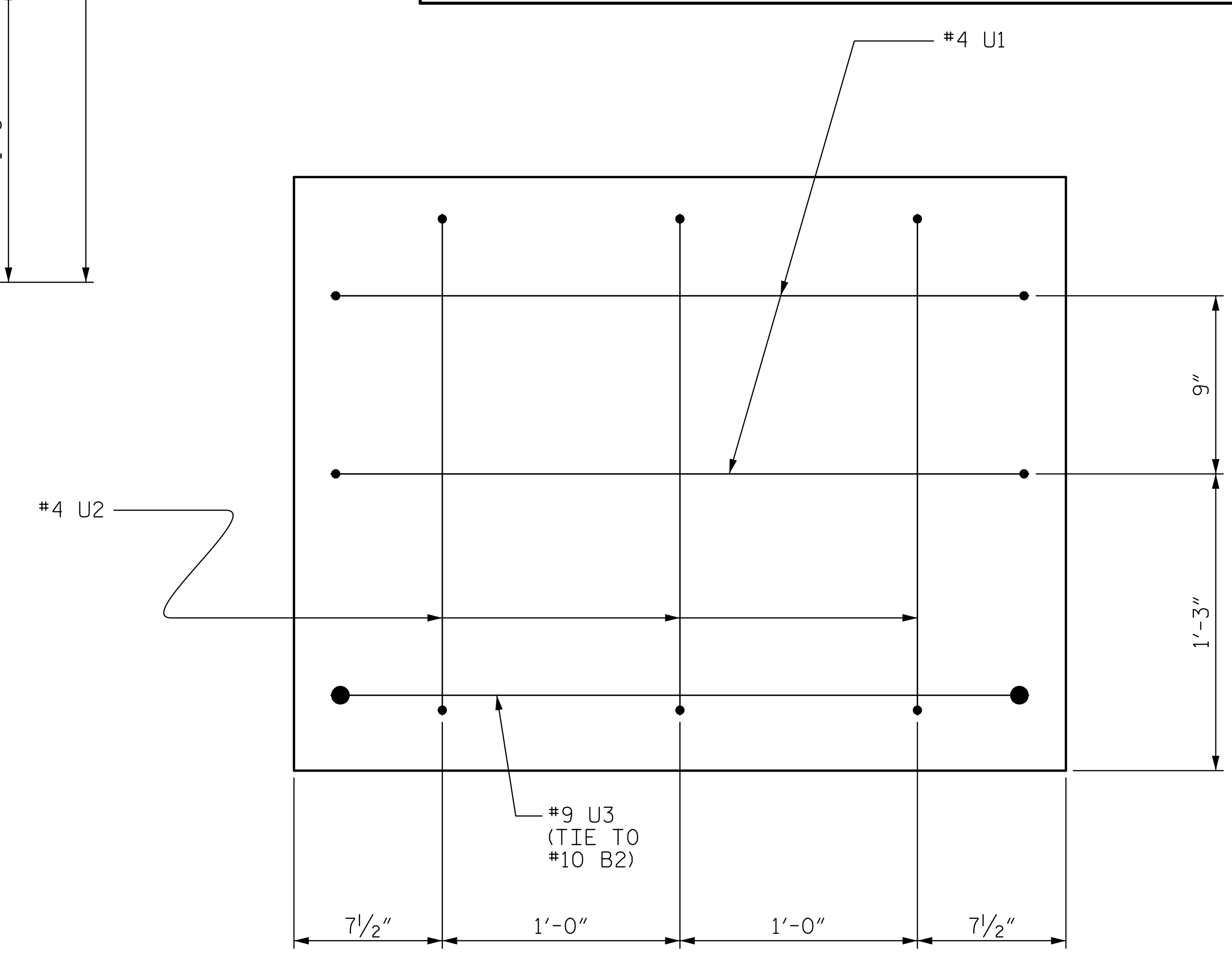
16" PRESTRESSED CONCRETE PILES (FOR ONE BENT)

No. 7 175

PILE DRIVING EQUIPMENT SETUP FOR 16" PRESTRESSED CONCRETE PILES (FOR ONE BENT) No. 7

PILE REDRIVES NO: 4

▲ CONCRETE DISPLACED BY THE 16" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.



END OF CAP VIEW

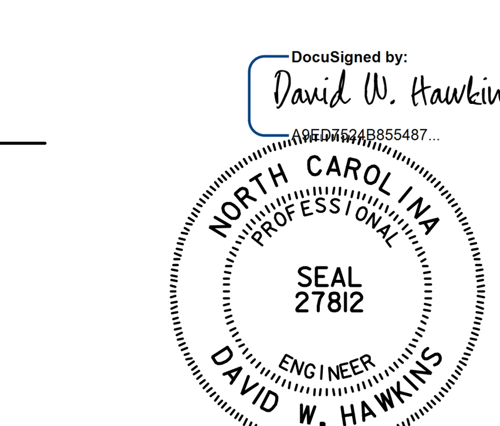
(TYPICAL BOTH ENDS)

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

SHEET 2 OF 2



6/14/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

ASSEMBLED BY : J. BAYNE DATE : 5/17
CHECKED BY : D. HAWKINS DATE : 5/17

DRAWN BY : DGE 05/10 REV. 4/17 MAA/THC
CHECKED BY : MKT 05/10

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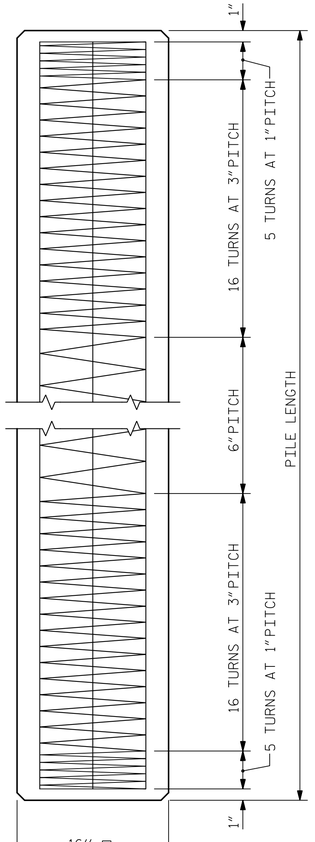
DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17
DWG. NO. 16

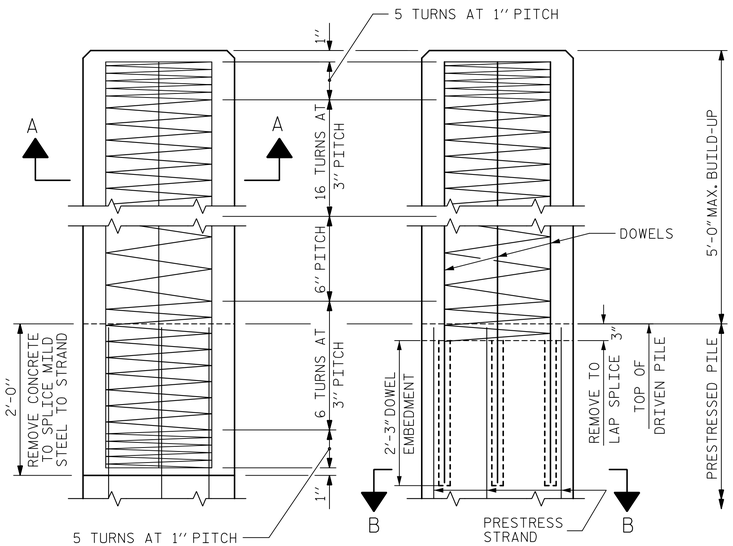
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-16
TOTAL SHEETS 19

STD. NO. 16"PS_BT_33_90S_<60'

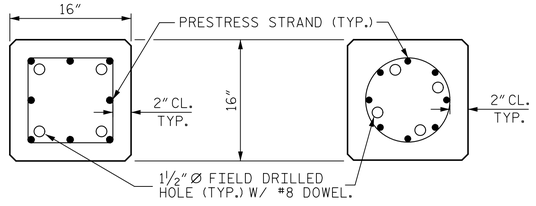


ELEVATION



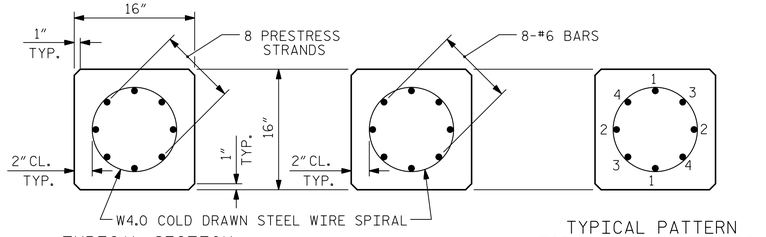
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



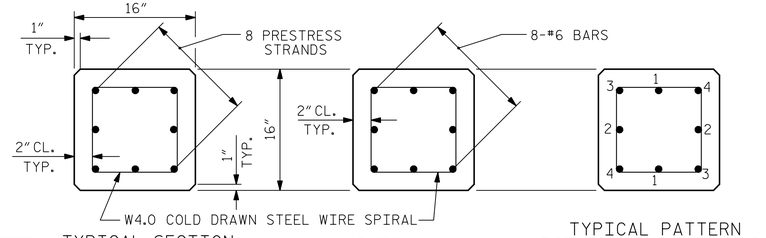
SECTION "B-B"

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



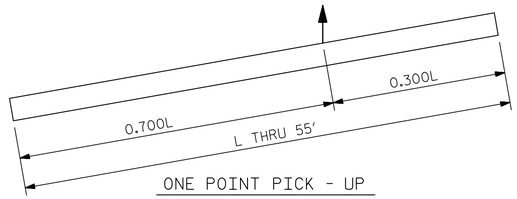
TYPICAL SECTION — SECTION "A-A" — TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS

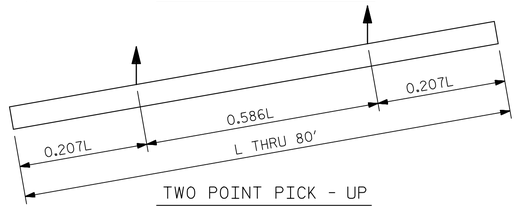


TYPICAL SECTION — SECTION "A-A" — TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS



ONE POINT PICK - UP



TWO POINT PICK - UP

PICK - UP POINTS

QUANTITIES FOR ONE 16" PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0"	1.63	3.31	7'-6"	17'-6"	5'-2"	14'-8"
30'-0"	1.96	3.97	9'-0"	21'-0"	6'-2½"	17'-7"
35'-0"	2.29	4.63	10'-6"	24'-6"	7'-3"	20'-6"
40'-0"	2.61	5.29	12'-0"	28'-0"	8'-3½"	23'-5"
45'-0"	2.94	5.95	13'-6"	31'-6"	9'-4"	26'-4"
50'-0"	3.27	6.61	15'-0"	35'-0"	10'-4"	29'-4"
55'-0"	3.59	7.28	16'-6"	38'-6"	11'-4½"	32'-3"
60'-0"	3.92	7.94			12'-5"	35'-2"
65'-0"	4.25	8.60			13'-5½"	38'-1"
70'-0"	4.57	9.26			14'-6"	41'-0"
75'-0"	4.90	9.92			15'-6½"	43'-11"
80'-0"	5.23	10.58			16'-7"	46'-10"

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½" OR 0.6" STRANDS MAY BE USED IN EITHER STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

PRESTRESSED PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE PILES OF BENT NO. 1 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PATRIALLY SUBSTITUTE CALSS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

16" PRESTRESSED CONCRETE PILE

ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : RH 9/98	REV. 11/30/10 WMC/GM
CHECKED BY : LES 10/98	REV. 10/1/11 MAA/GM
	REV. 12/14 MAA/TMG

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17

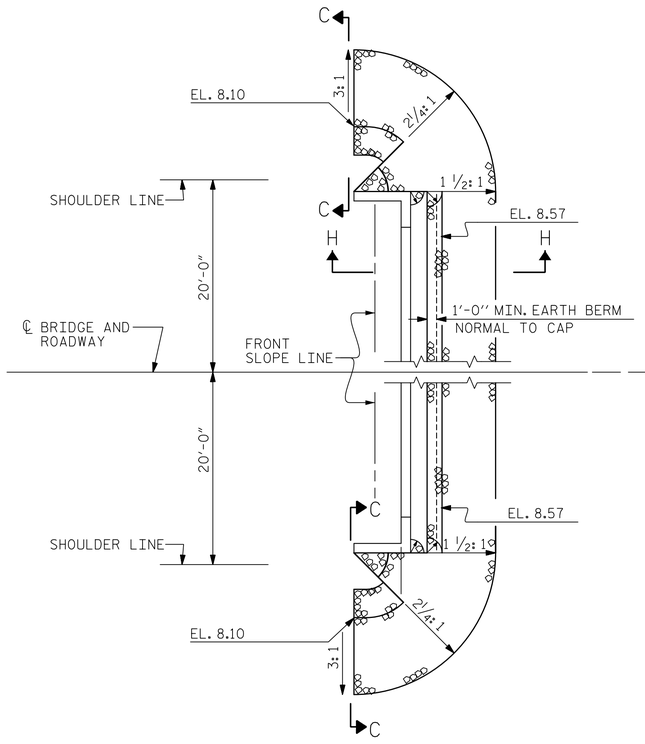
DWG. NO. 17

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			19

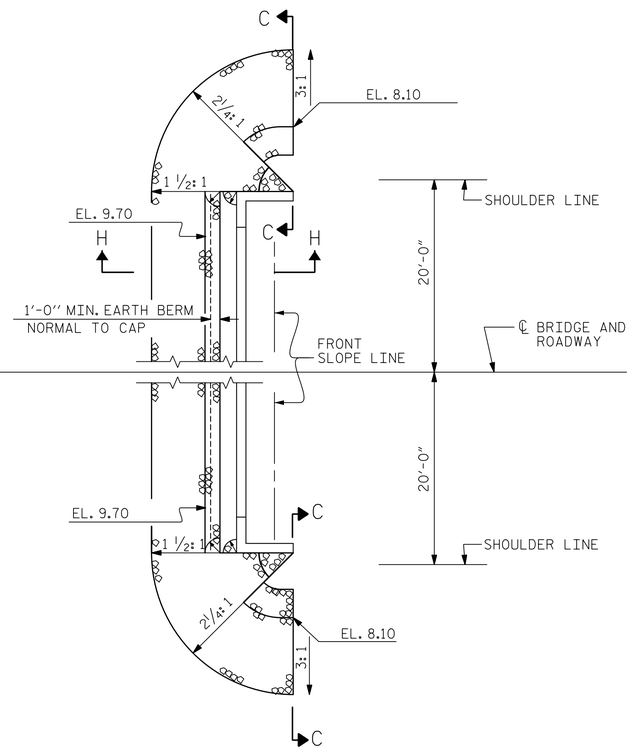
STD. NO. PCP2

NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

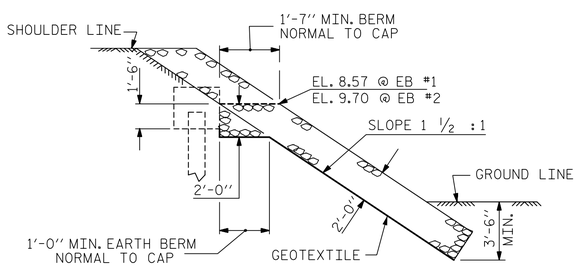


END BENT 1

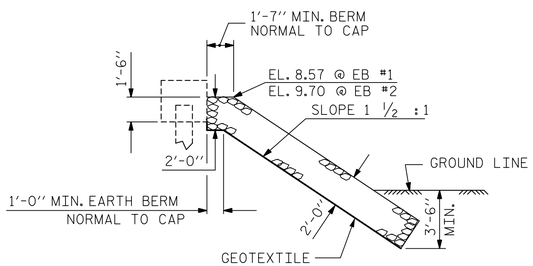


END BENT 2

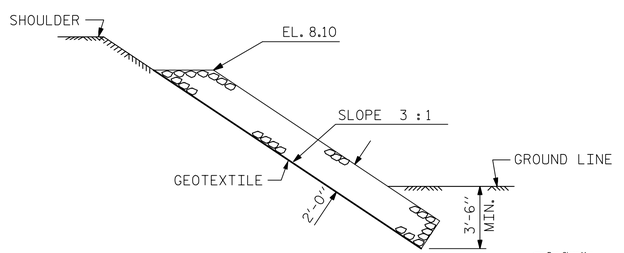
ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+65.50	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	85	95
END BENT 2	100	110



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

DocuSigned by:
David W. Hawkins
A9ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

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PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

ASSEMBLED BY : J. BAYNE	DATE : 5/17		
CHECKED BY : D. HAWKINS	DATE : 5/17		
DRAWN BY : REK 1/84	REV. 5/1/06R	TLA/GM	
CHECKED BY : RDU 1/84	REV. 10/1/11	MAA/GM	
	REV. 12/21/11	MAA/GM	

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DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 6/17
DWG. NO. 18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
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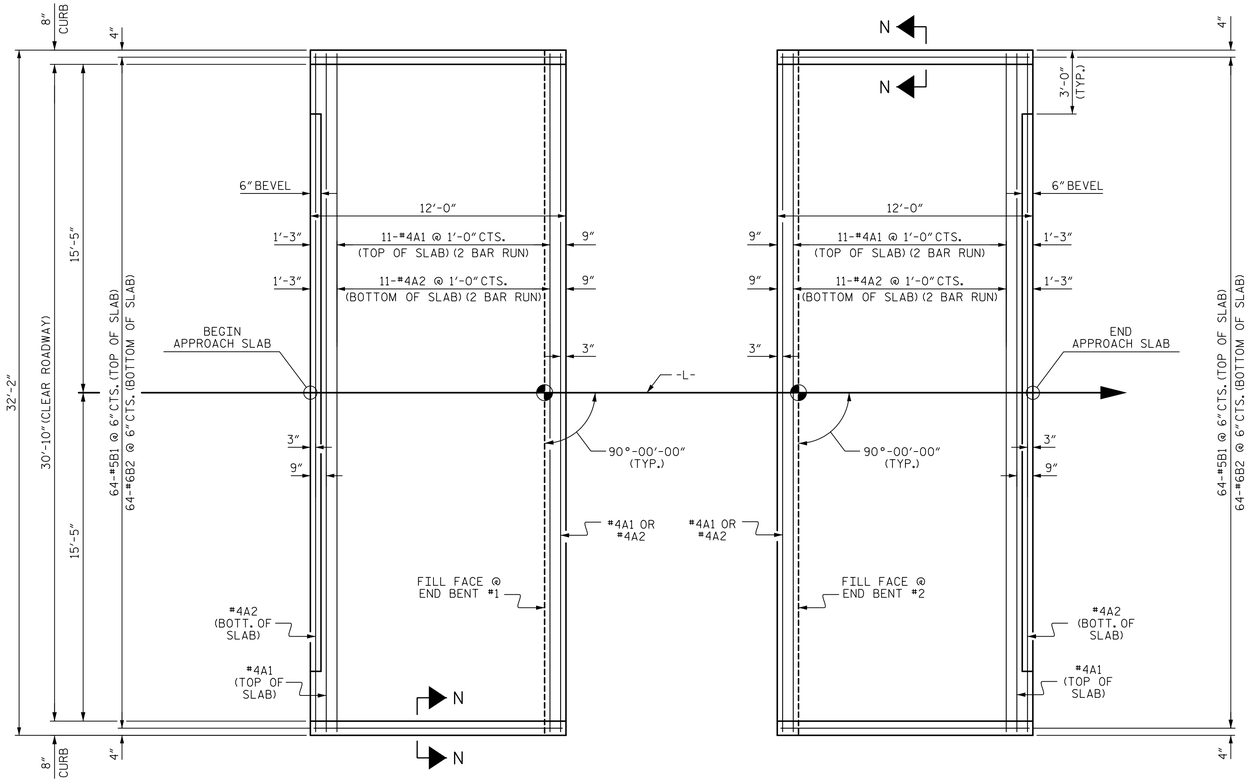
2			4			19

STD. NO. RR1



PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

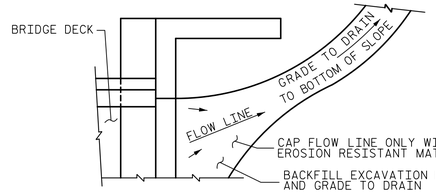
BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
* EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C. Y.	18.4

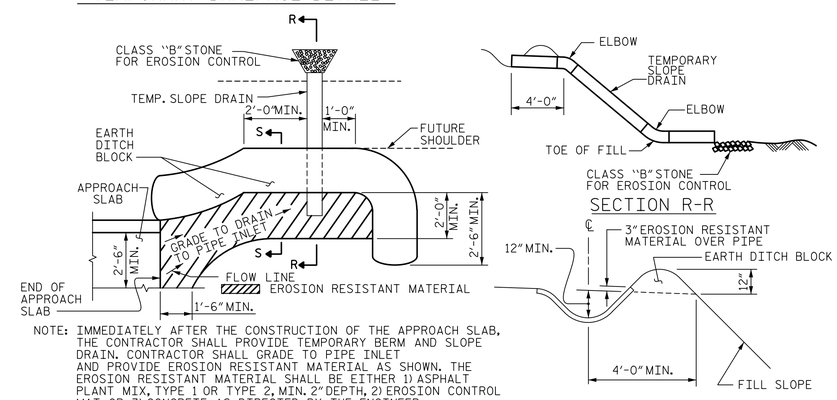
APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
* EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C. Y.	18.4



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

TEMPORARY DRAINAGE DETAIL

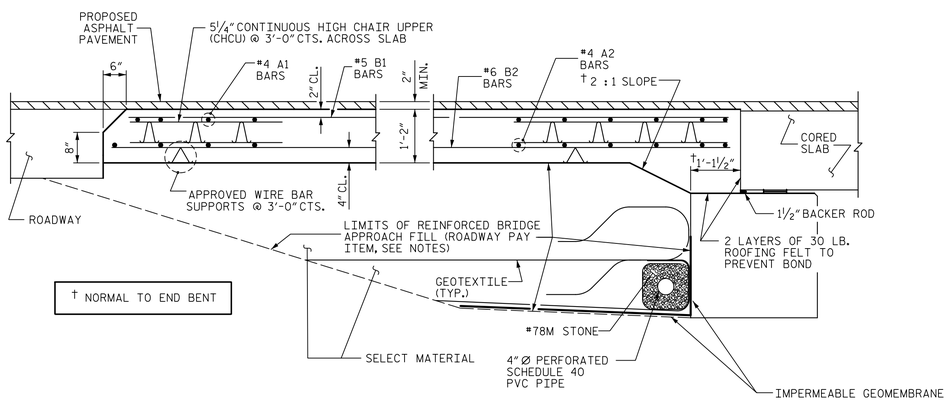


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

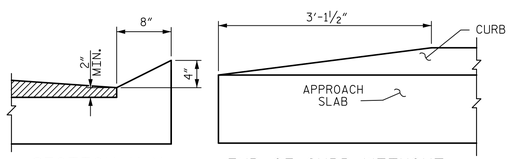
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. 17BP.3.R.47

ONSLOW COUNTY

STATION: 15+65.50 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

6/14/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

ASSEMBLED BY : J. BAYNE	DATE : 5/17
CHECKED BY : D. HAWKINS	DATE : 5/17
DRAWN BY : SHS/MAA 5-09	
CHECKED BY : BCH 5-09	REV. 9-15 MAA/TMG

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 5/17
CHECKED BY D. HAWKINS DATE 5/17

DWG. NO. 19

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

STD. NO. BAS_33_90S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

REV. 6-16-95 EEM (V) RGW REV. 5-7-03 RWW (V) JTE REV. 10-1-11 MAA (V) GM
REV. 8-16-99 RWW (V) LES REV. 5-1-06 TLA (V) GM