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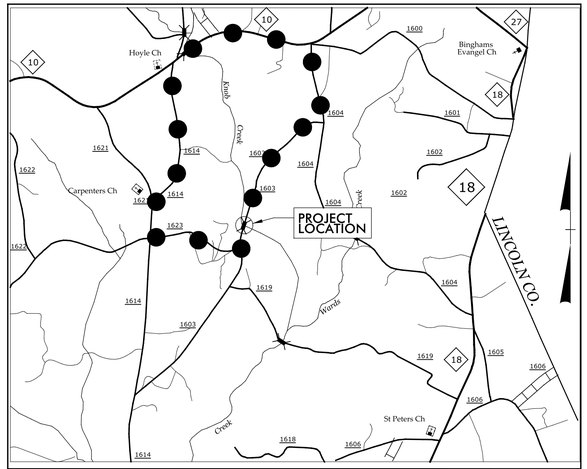
This file or an individual page shall not be considered a certified document.

09/08/99

TIP PROJECT: 17BP.12.R.43

CONTRACT: DL00127

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



VICINITY MAP

DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

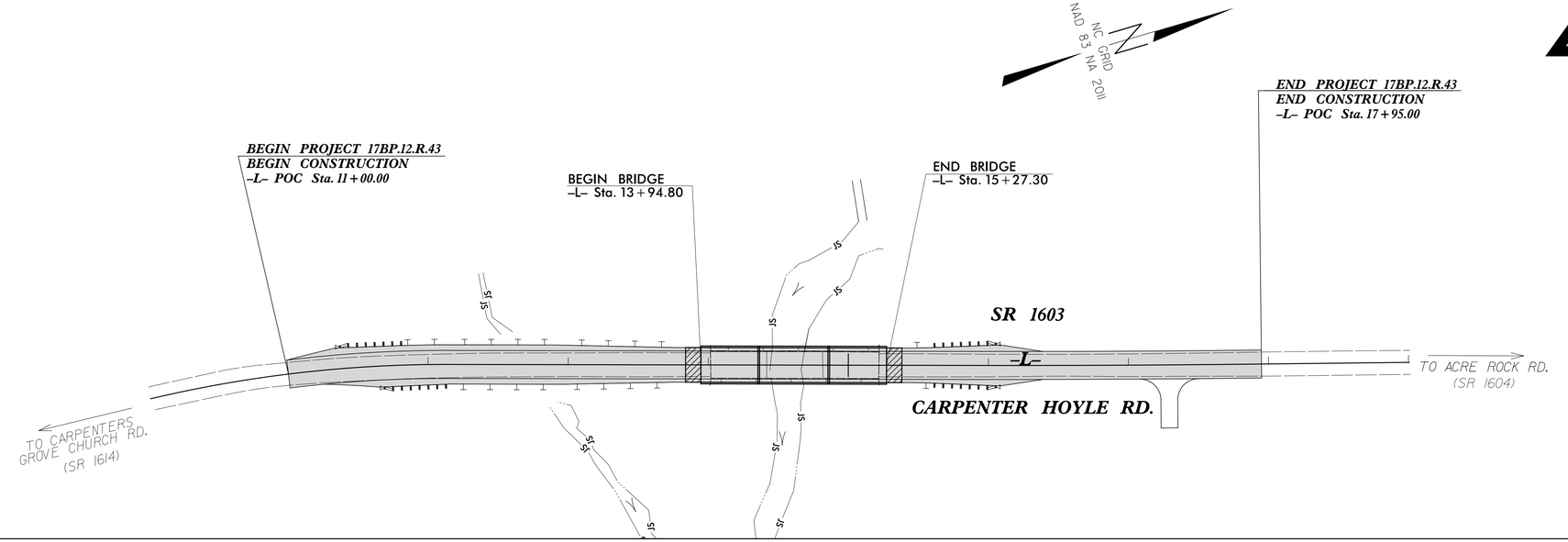
CLEVELAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.43	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.12.R.43		PE, R/W, UTILITY & CONST.

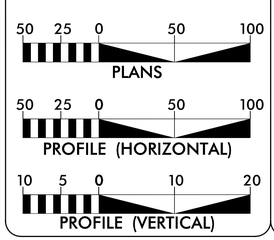
LOCATION: ***STRUCTURE NO. 275 OVER KNOB CREEK ON CARPENTER HOYLE RD. SR 1603***

TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2011 = 140 vpd

V = 55 MPH

FUNC CLASS = R. LOCAL SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.12.R.43	=	0.107 MI
LENGTH STRUCTURE PROJECT 17BP.12.R.43	=	0.025 MI
TOTAL LENGTH OF PROJECT 17BP.12.R.43	=	0.132 MI

NCDOT CONTACT: STEVE RACKLEY, PE
DIVISION 12

Prepared In the Office of:

Michael Baker INTERNATIONAL

Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600
Cary, NC 27518
Professional Corporation License Number: F-1084

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 22, 2015

LETTING DATE: NOVEMBER 28, 2017

TODD H. BUCKNER, PE
PROJECT ENGINEER

WARREN JOHNSON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28639 ENGINEER STEVEN D. SNYDER P.E.

DocuSigned by: Steven D. Snyder B29900704CE54DA...

10/26/2017

SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER P.E.

DocuSigned by: 1087011E67F6435...

10/26/2017

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

10/26/2017 10:37:59 AM
R:\17BP.12.R.43\Roadway\Proj\22-0275_RDY_TSH_01.dgn
USER: todd.buckner

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	1A–1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER
DocuSigned by: 1087011E67F64435...
9/29/2017

Michael Baker Engineering, Inc.
Michael Baker INTERNATIONAL
8000 Regency Pkwy Suite 600 Cary, NC 27518
NC License: P-1084

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

GENERAL NOTES

GENERAL NOTES: 2012 SPECIFICATIONS

EFFECTIVE: 01–17–12
REVISED: 07/30/12

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

GUARDRAIL:

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

SUBSURFACE PLANS:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE PROGRESS AND AT&T.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT–OF–WAY MARKERS:

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

STANDARD DRAWINGS

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Method II
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 – MAJOR STRUCTURES	
422.11	Reinforced Bridge Approach Fills – Sub Regional Tier
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 8 – INCIDENTALS	
838.27	Reinforced Concrete Endwall – for Single 60" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
866.02	Woven Wire Fence – with Wood Post
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.12.R.43	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 — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- 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

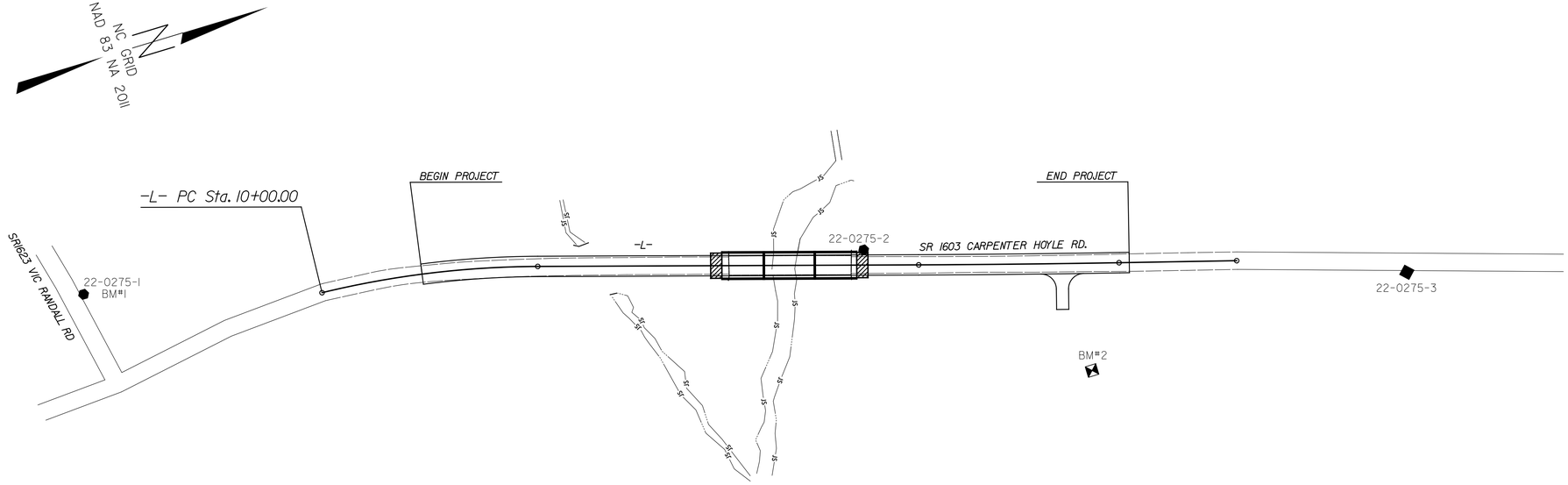
MISCELLANEOUS:

- 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.

1/26/17

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	1C-01
Location and Surveys	

SURVEY CONTROL SHEET



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "22-0275-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 653872.096(ft) EASTING: 1245371.786(ft) ELEVATION: 935.48(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998438799
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "22-0275-1" TO -L- STATION 10+00.00 IS N 16°25'24.8" E 234.163'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	22-0275-1	653872.0960	1245371.7860	935.48	OUTSIDE PROJECT LIMITS	
2	22-0275-2	654618.1400	1245551.7080	923.30	15+34.15	14.88 LT
3	22-0275-3	655122.4678	1245727.0213	936.52	OUTSIDE PROJECT LIMITS	

```
****************************************
BM1       ELEVATION = 935.48
N 653872      E 1245372
L STATION 10+00
 S 16°25'24.8" W  DIST   234.16'
ALUMINUM CAP SET FLUSH WITH THE GROUND
STAMPED 22-0275-1 ON VIC RANDAL RD.
****************************************
****************************************
BM2       ELEVATION = 934.30
N 654799      E 1245730
L STATION 17+57 105 RIGHT
R/R SPIKE SET IN BASE OF 28" HICKORY
****************************************
```

ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+00.00	-45.00	654203.43096	1245404.58751
L	11+00.00	-30.15	654200.99449	1245419.23970
L	11+00.00	45.00	654188.66784	1245493.36842
L	11+00.00	29.89	654191.14670	1245478.46133
L	12+13.97	-45.00	654319.86225	1245431.48810
L	12+13.97	45.00	654294.18370	1245517.74708
L	15+88.15	-45.00	654678.48990	1245538.24844
L	15+88.15	45.00	654652.81135	1245624.50742
L	17+84.96	-45.00	654866.91768	1245592.99864
L	17+84.96	-30.00	654862.82577	1245607.43408
L	17+84.96	45.00	654842.37309	1245679.58711
L	17+84.96	30.00	654846.46271	1245665.15973

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	654096.7047	1245437.9922
PT	12+13.97	654307.0230	1245474.6176
PC	15+88.15	654665.6506	1245581.3779
PT	17+84.96	654854.6454	1245636.2929
POT	19+00.51	654965.8155	1245667.8054

PERMANENT EASEMENT MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+85.00	45.00	654362.26058	1245538.01298
L	13+05.00	75.00	654372.86973	1245572.47231
L	13+20.00	45.00	654395.80574	1245547.99908
L	13+30.00	60.00	654401.11031	1245565.22875

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/*

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   220275_LS_CONTROL.TXT
   220275_LS_LOCAL.TXT

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

3. *PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM, UTILIZING THE NCGS RTN SYSTEM (VRS).*

   MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

- ⬢ *INDICATES GEODETIC CONTROL MONUMENTS FOR HORIZONTAL CONTROL*
- ■ *INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL*
- ⋈ *INDICATES BENCHMARKS FOR VERTICAL CONTROL*

NOTE: DRAWING NOT TO SCALE

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R:\17BP.12.R.43 LocationSurveys\220275_ls_1C_01.dgn
$$$$USERNAME$$$$

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	2A-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
SEAL 034367 NORTH CAROLINA PROFESSIONAL ENGINEER TODD H. BUCKNER — DocuSigned by: 10/26/2017	PAVEMENT DESIGN PROVIDED BY DIVISION

Michael Baker Engineering, Inc. 8000 Regency Pkwy Suite 600 Cary, NC 27518 NC License: F-1084

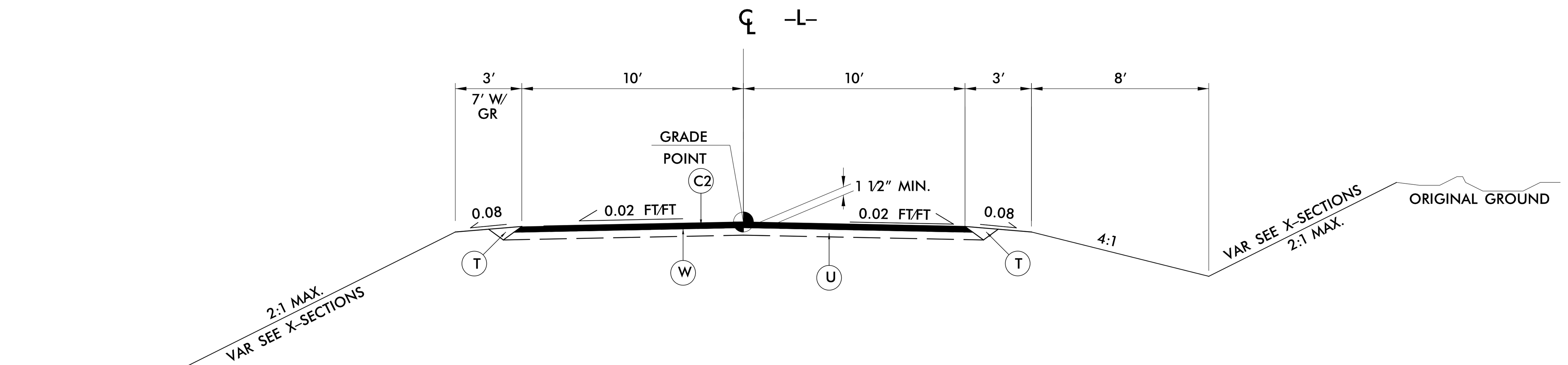
NC DEPARTMENT OF TRANSPORTATION PAVEMENT MANAGEMENT UNIT 1593 MAIL SERVICE CENTER RALEIGH, NC 27699-1593

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

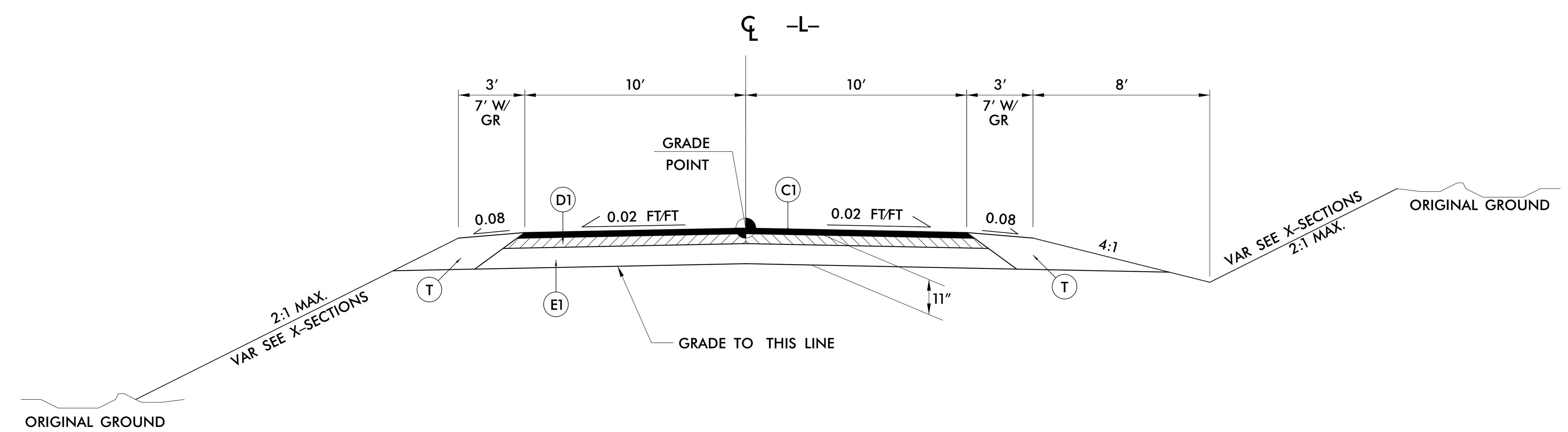
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS PER SQ. YARD.	D2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2½" OR GREATER THAN 4" IN DEPTH.	T	EARTH MATERIAL.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.	E1	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS PER SQ. YARD.	U	EXISTING PAVEMENT.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS PER SQ. YARD.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT GREATER THAN 5½" IN DEPTH OR LESS THAN 3" IN DEPTH.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

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



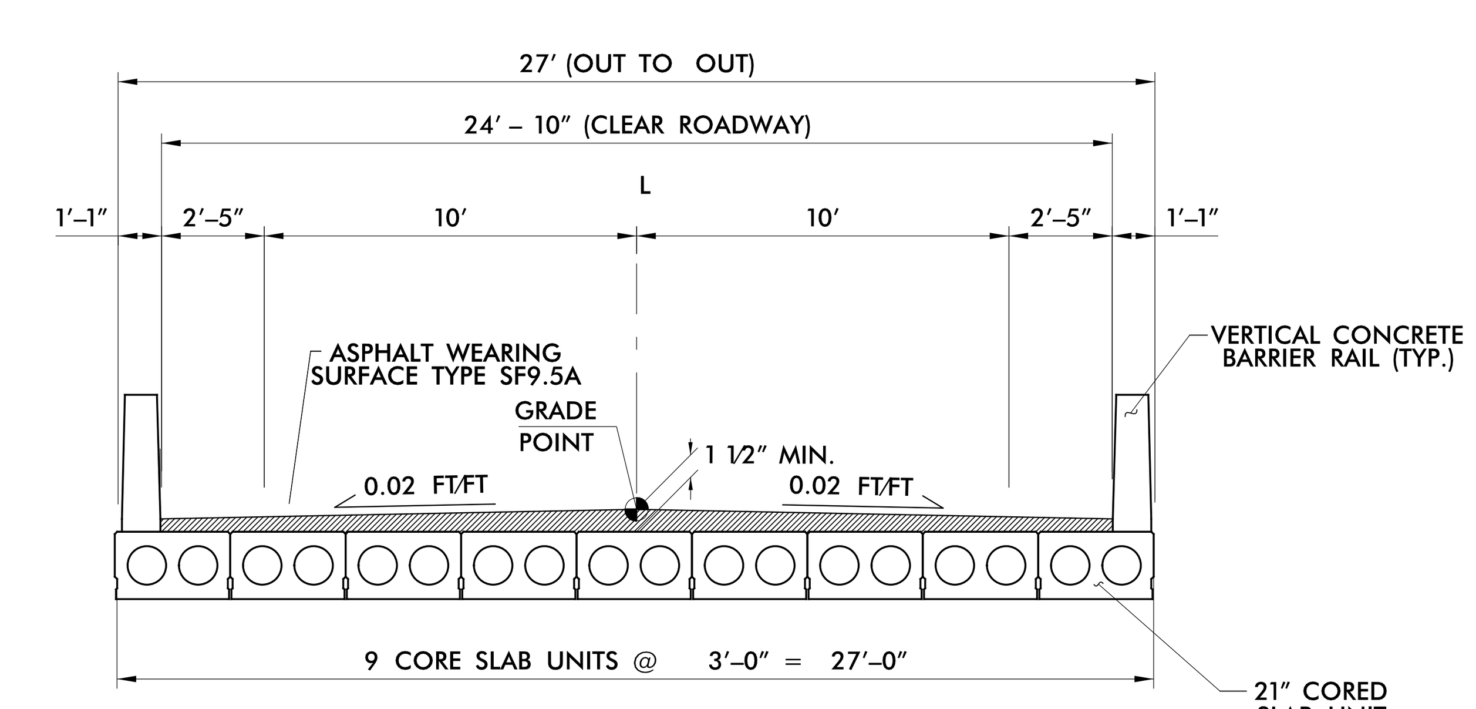
TYPICAL SECTION NO. 1

-L- STA. 11+00.00 TO 13+70.00
-L- STA. 15+50.00 TO 17+95.00



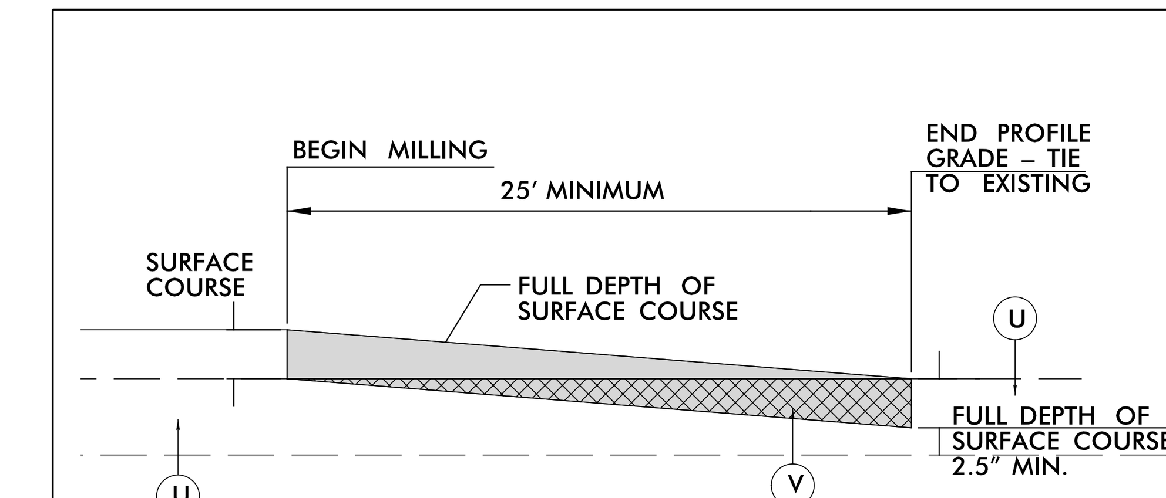
TYPICAL SECTION NO. 2

-L- STA. 13+70.00 TO 13+94.80 (BEGIN BRIDGE)
-L- STA. 15+27.30 (END BRIDGE) TO 15+50.00

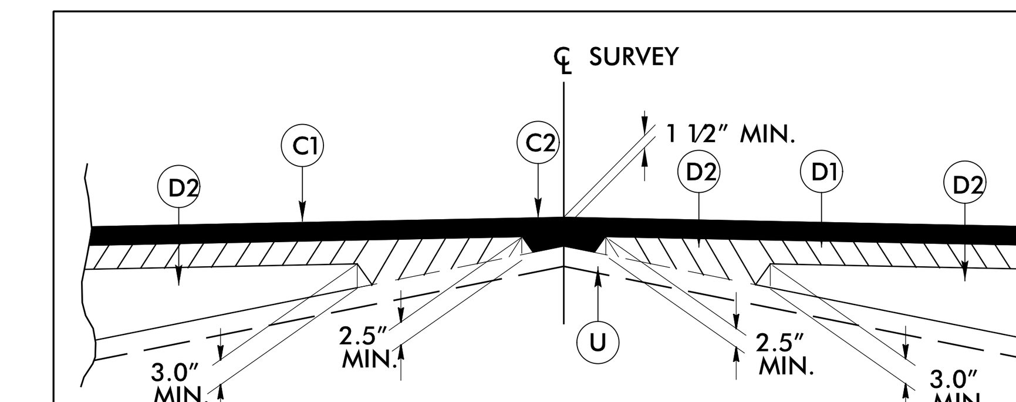


TYPICAL SECTION NO. 3

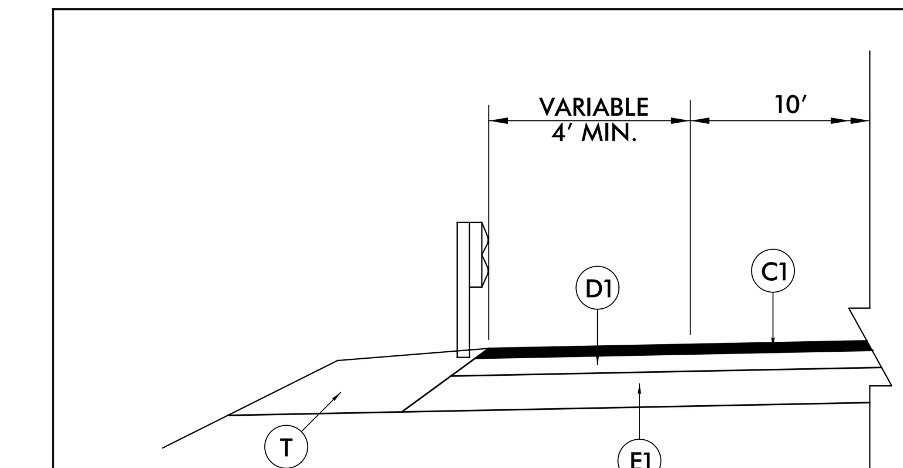
-L- STA. 13+94.80 (BEGIN BRIDGE) TO -L- STA. 15+27.30 (END BRIDGE)



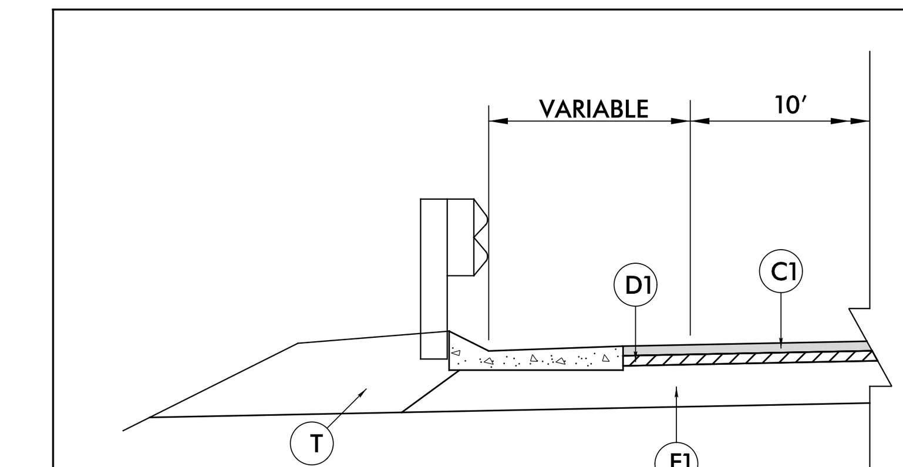
DETAIL 1
MILLING DETAIL
SEE PROFILE FOR LIMITS



Detail Showing Method of Wedging (W)



DETAIL 2
PAVEMENT TO FACE OF GUARDRAIL



DETAIL 3
SHOULDER BERM GUTTER

10/26/2017 10:38:42 AM
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USER: todd.buckner

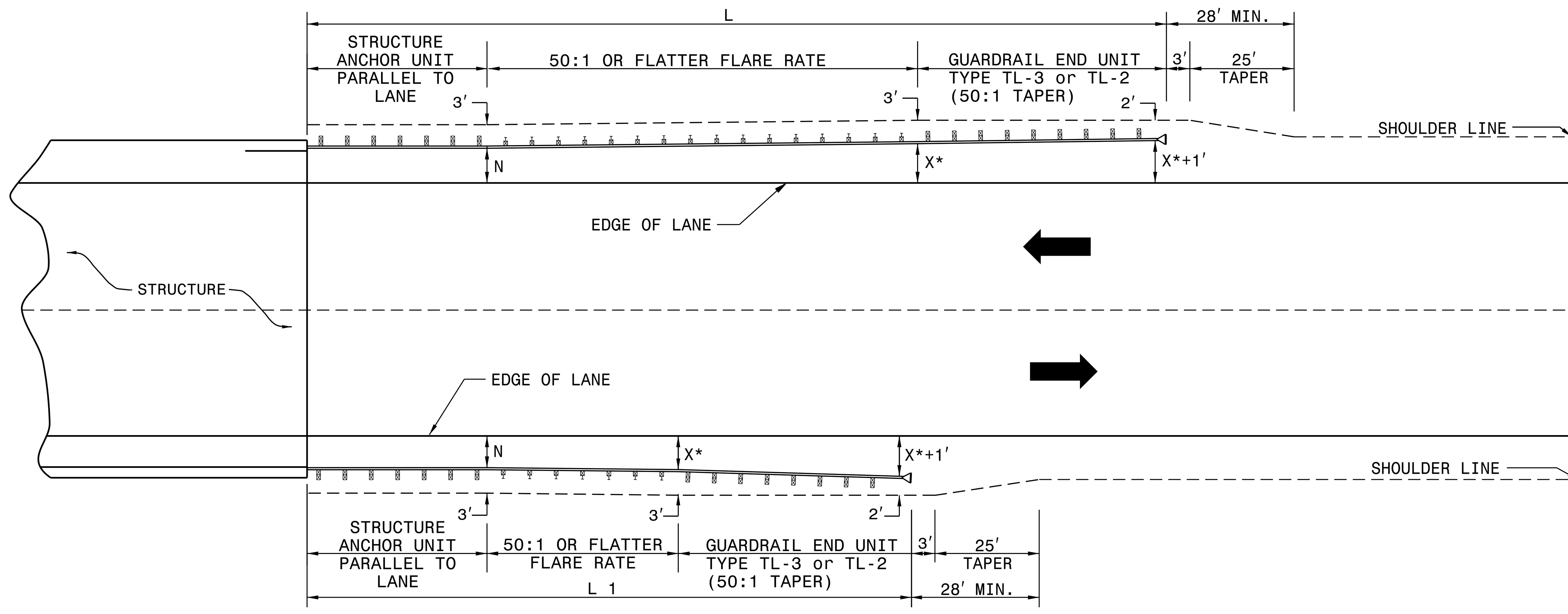
31-AUG-2017 07:57
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2012 Standard Drawings\Details in Lieu of Standards\Division 8\862d01 862d03 862d03\862d01.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	2C-1

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 11
862D01



* 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 4 OF 11
862D01

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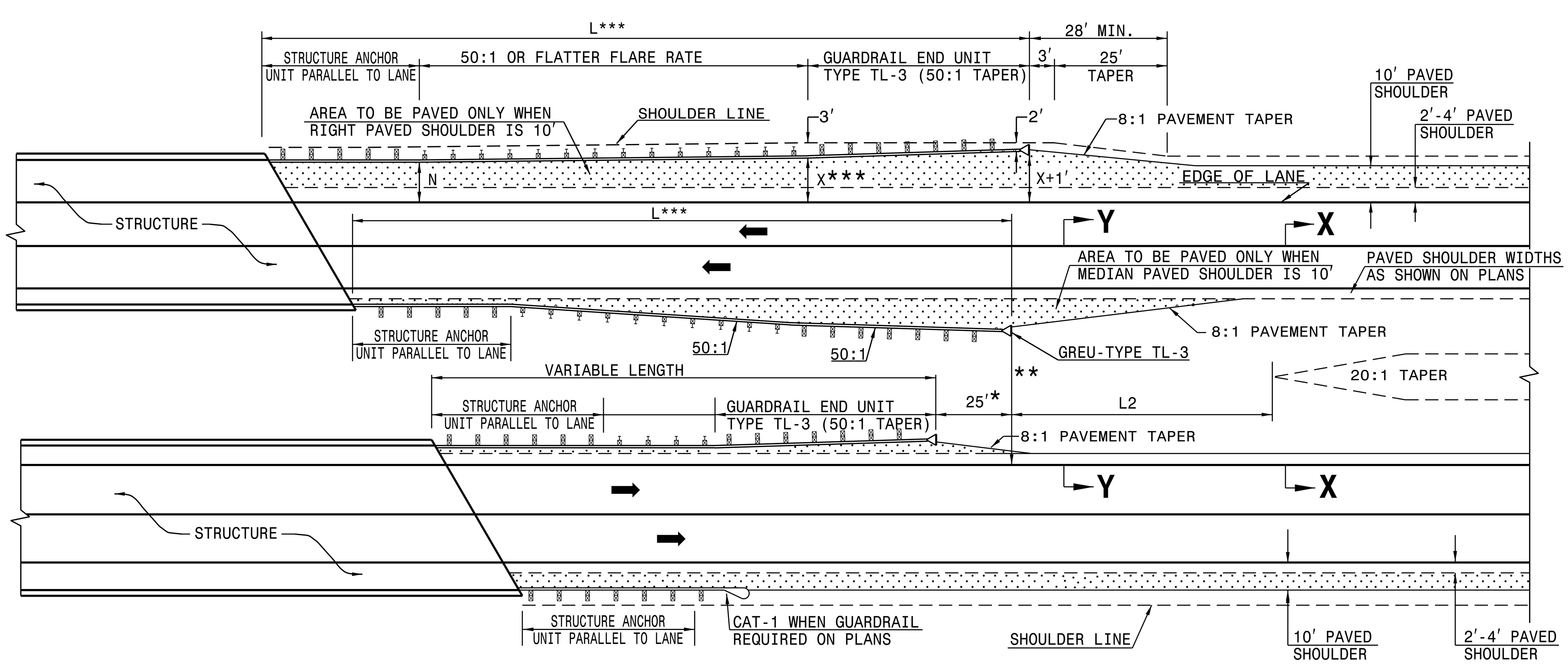
RALEIGH, N.C.

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 LENGTH OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

MEDIAN WIDTH	-L-***						-L2- DIM.
	70 MPH	60 MPH	50 MPH				
30'	300.0'	250.0'	150.0'				80.0'
36'	300.0'	250.0'	150.0'				60.0'
40' & ABOVE	300.0'	250.0'	150.0'				40.0'

NOTES:

* MINOR VARIATION TO THE 25'-0" DIMENSION IS PERMISSIBLE TO ACCOMODATE THE 12'-6" IN GUARDRAIL LENGTHS.

** NO GUARDRAIL IS REQUIRED ON THE TRAILING END WHEN THIS DISTANCE EXCEEDS CLEAR ROADSIDE RECOVERY AREA FOR THE APPROPRIATE DESIGN 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

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 3 OF 11
862D01

SEAL 022966 NORTH CAROLINA PROFESSIONAL ENGINEER Joel S. Howerton

DocuSigned by: Joel S Howerton 9/8/2017

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jhowerton AT CSD-292595

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RALEIGH, N.C.

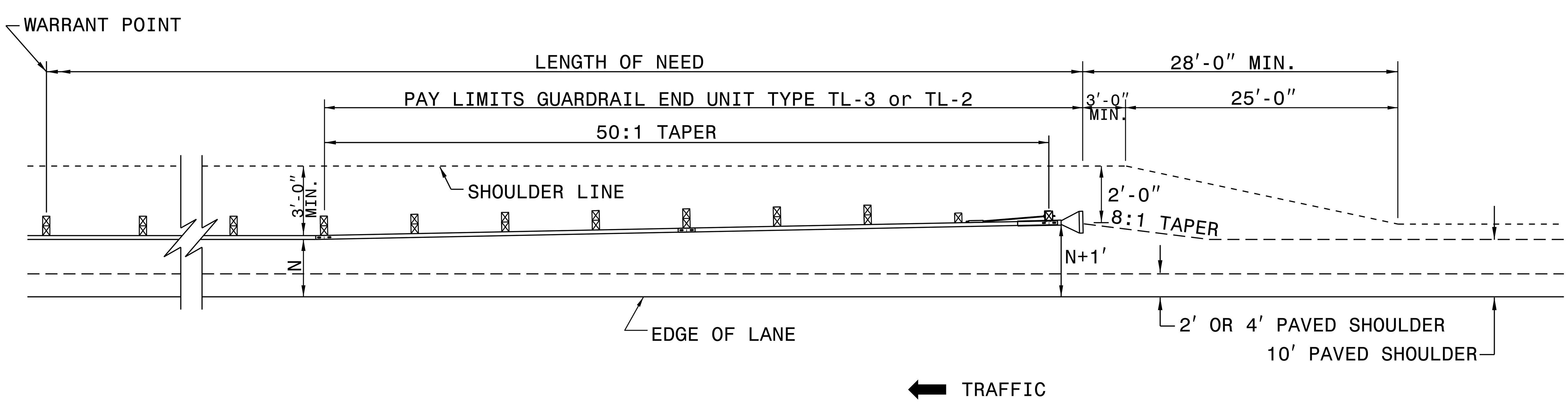
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 11
862D01

FILL SECTION

CUT SECTION

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



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

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 11
862D01

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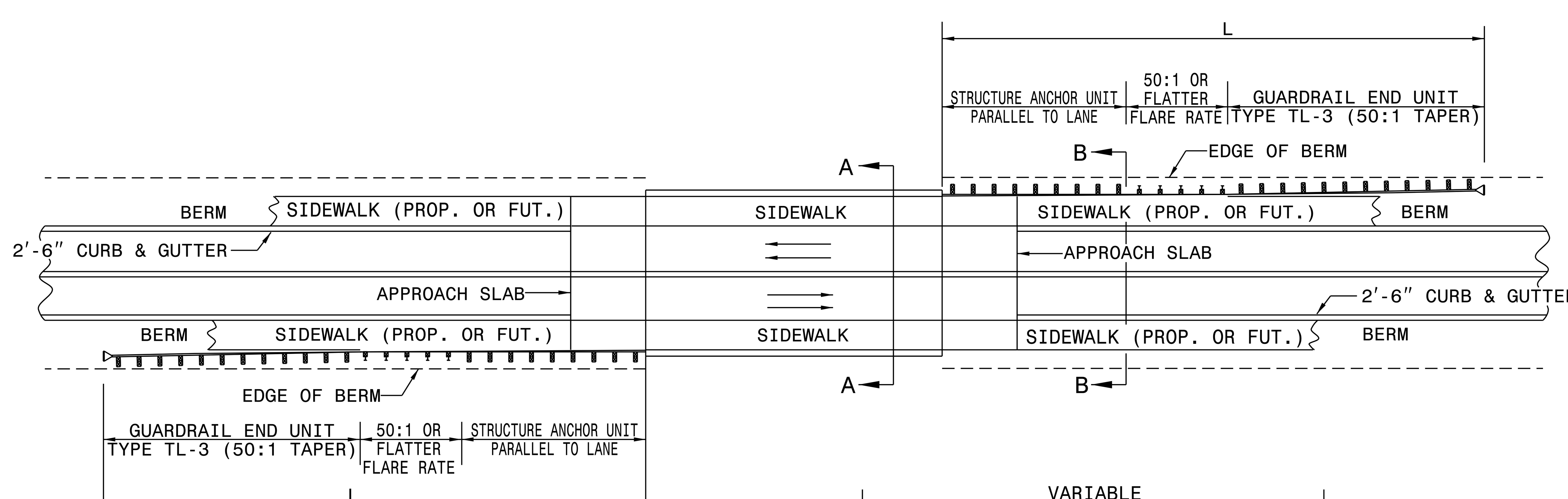
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

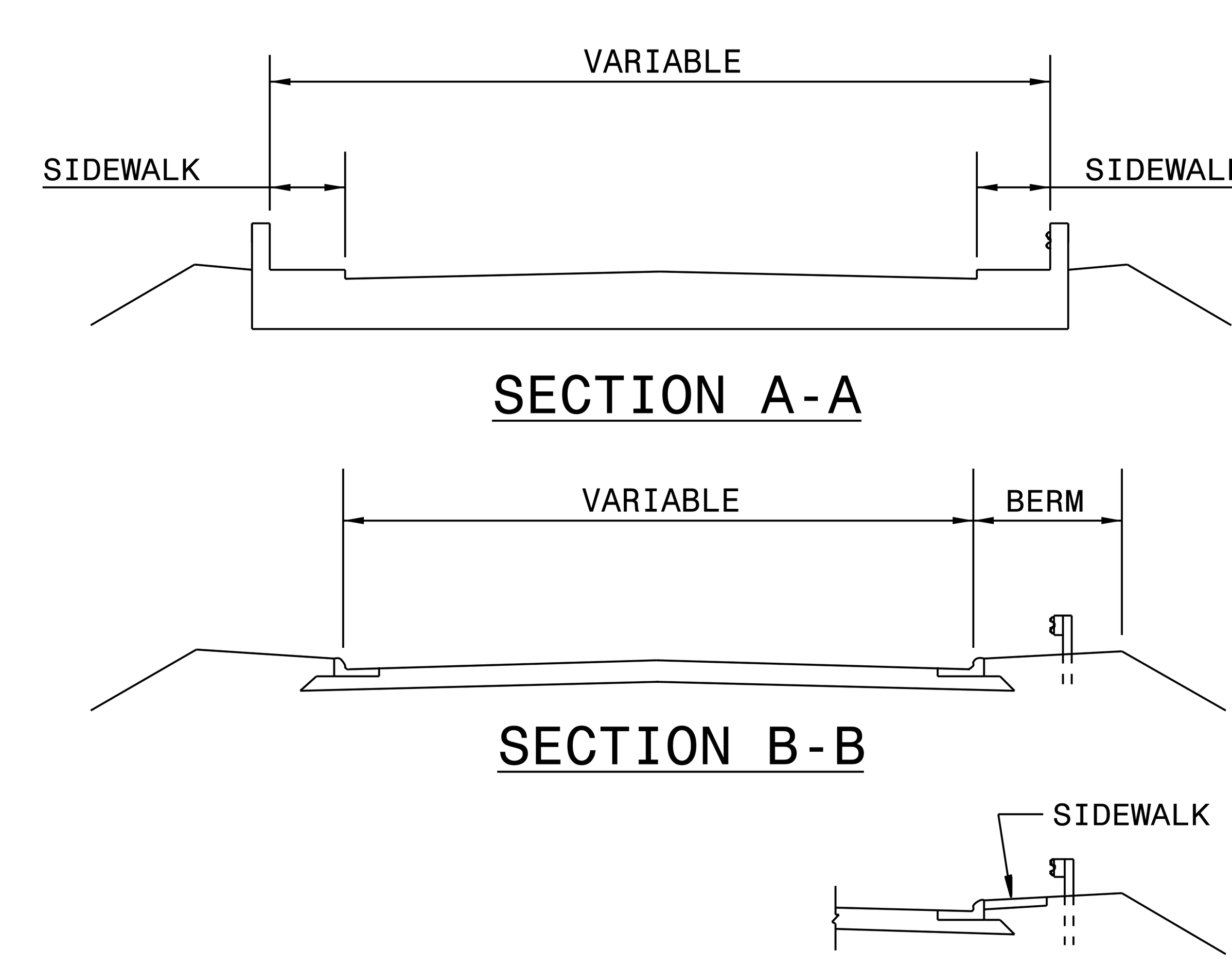
SHEET 5 OF 11
862D01



MINIMUM GUARDRAIL LENGTHS "L" REQUIRED AT BRIDGE APPROACHES ON 2′-6″ CONCRETE CURB AND GUTTER ROADWAYS	
DESIGN SPEED (MPH)	"L"
40	150′
50	225′

NOTE: "L" VALUES ARE BASED ON NO HAZARDS OTHER THAN END OF BRIDGE BEING PRESENT WITHIN THE CLEAR ZONE.

SEE STD. 862D03 FOR STRUCTURE ANCHOR UNITS.



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

STANDARD GUARDRAIL PLACEMENT AT BRIDGES WITH 2′-6″ CONCRETE CURB AND GUTTER

SHEET 5 OF 11
862D01

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	2C-2

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DocuSigned by: Joel S Howerton
9/8/2017

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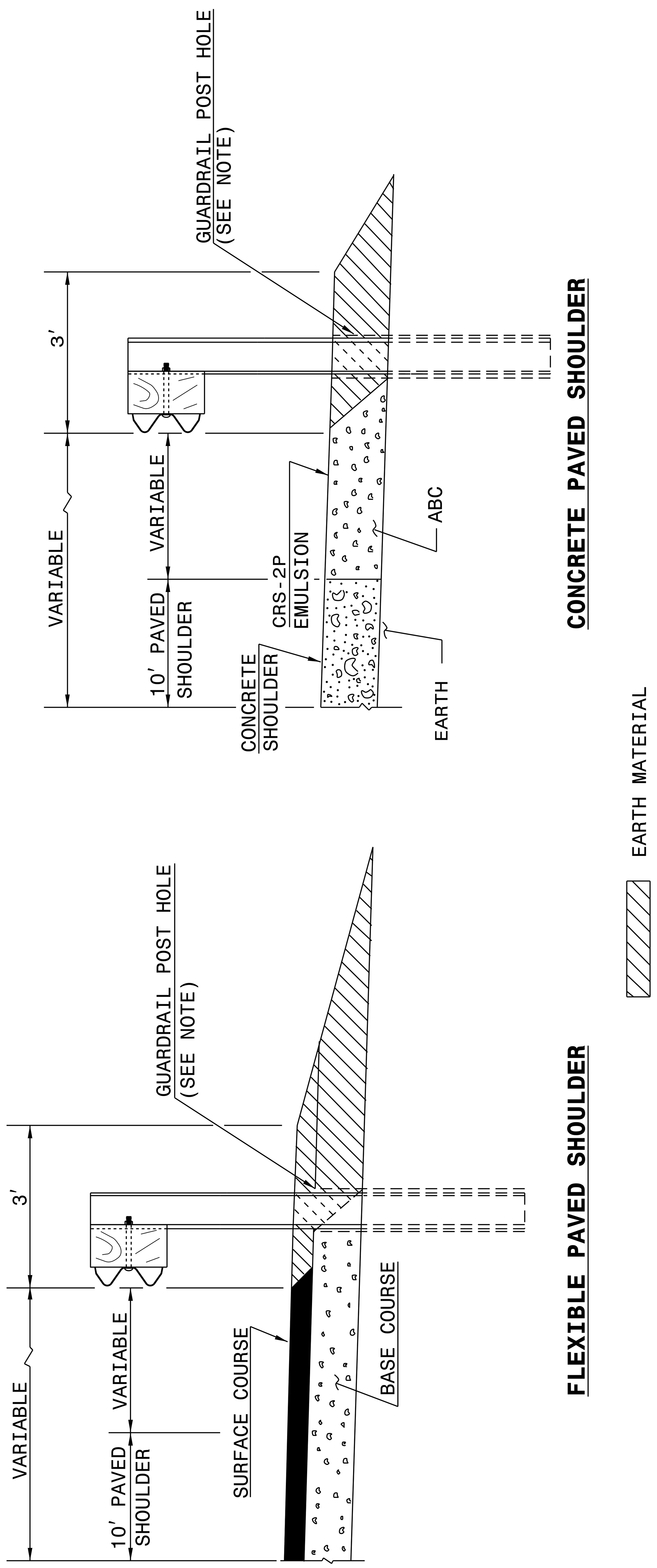
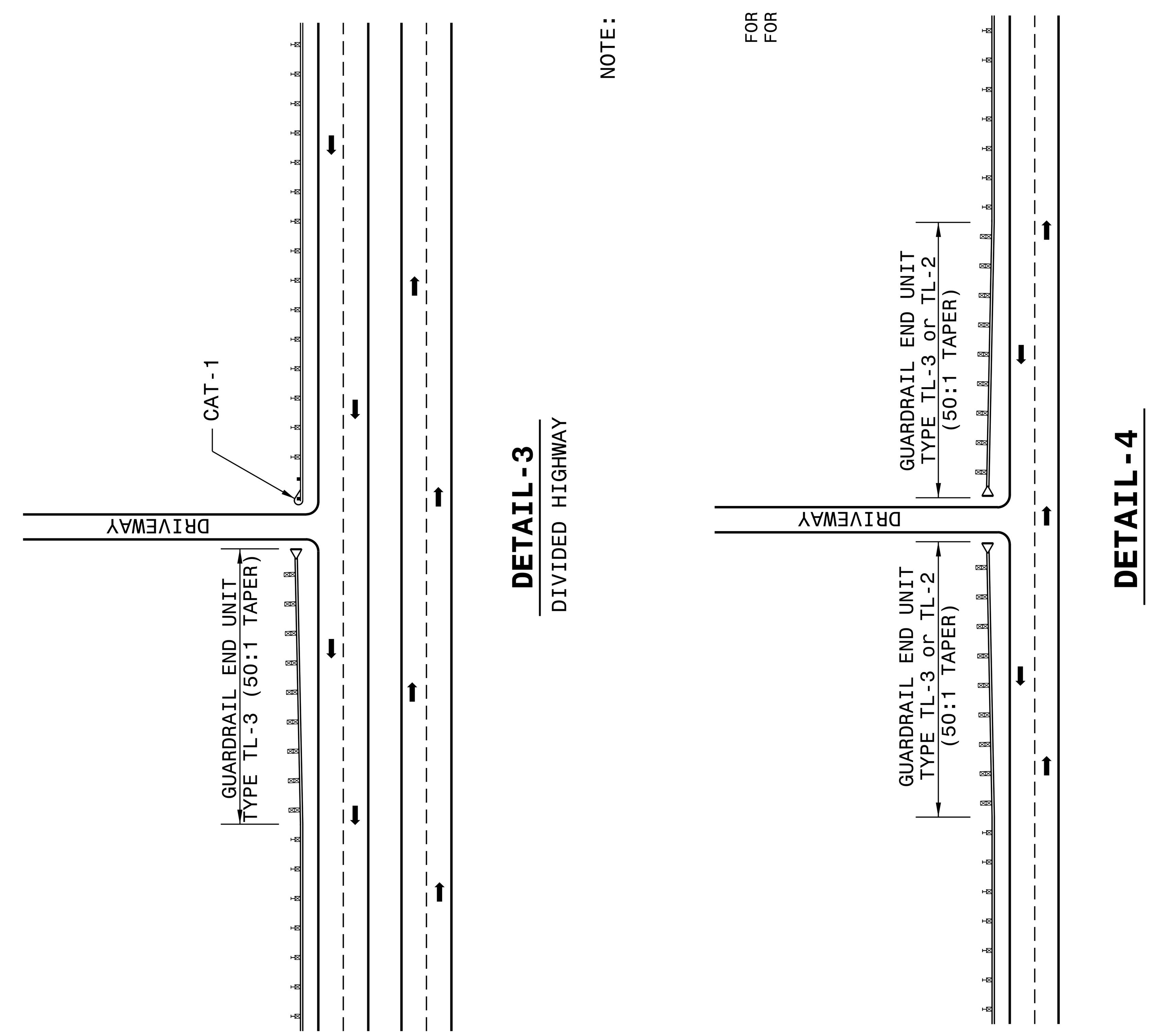


NOTE:
WHEN WOODEN GUARDRAIL POSTS ARE USED, DRILL HOLES THROUGH EARTH MATERIAL AND BASE COURSE.THE POST MAY THEN BE DRIVEN TO THE PROPER DEPTH. DRILL THE HOLE OF SUFFICIENT SIZE TO ACCOMMODATE THE PARTICULAR POST BEING USED. BACKFILL AND TAMP HOLES USING THE EXCAVATED MATERIAL.

NOTE: USE DETAIL 3 & 4 WHENEVER 20' OR LARGER RADIUS CANNOT BE UTILIZED.
MAINTAIN CLEAR SIGHT DISTANCE.

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



GUARDRAIL TREATMENT AT DRIVEWAYS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — ENGLISH DETAIL DRAWING FOR GUARDRAIL PLACEMENT — SHEET 10 OF 11 862D01
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT — SHEET 9 OF 11 862D01

STATE OF
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ENGLISH DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 10 OF 11 **862D01**

STATE OF
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 9 OF 11 **862D01**

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17BP.12.R.43	2C-4

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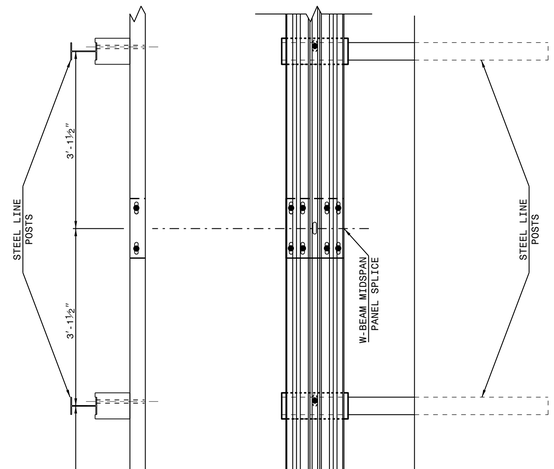
GUARDRAIL INSTALLATION

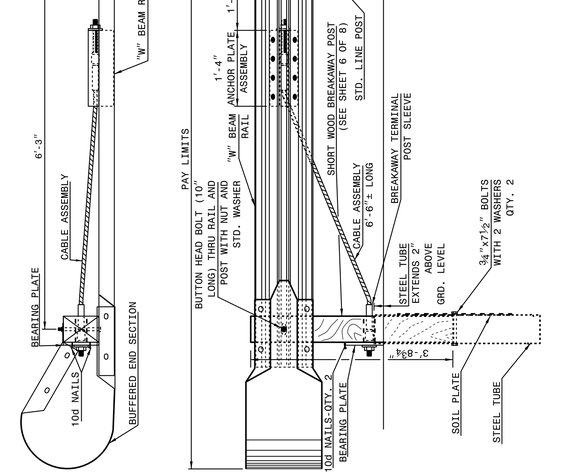
ROADWAY DETAIL DRAWING FOR

SHEET 1 OF 8 — 862D02



TRAILING END UNIT ASSEMBLY

C.A.T.-1 SYSTEM



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RALEIGH, N.C.

GUARDRAIL INSTALLATION

ROADWAY DETAIL DRAWING FOR

SHEET 2 OF 8 — 862D02

FLARED AND TANGENT
ELEVATION VIEW

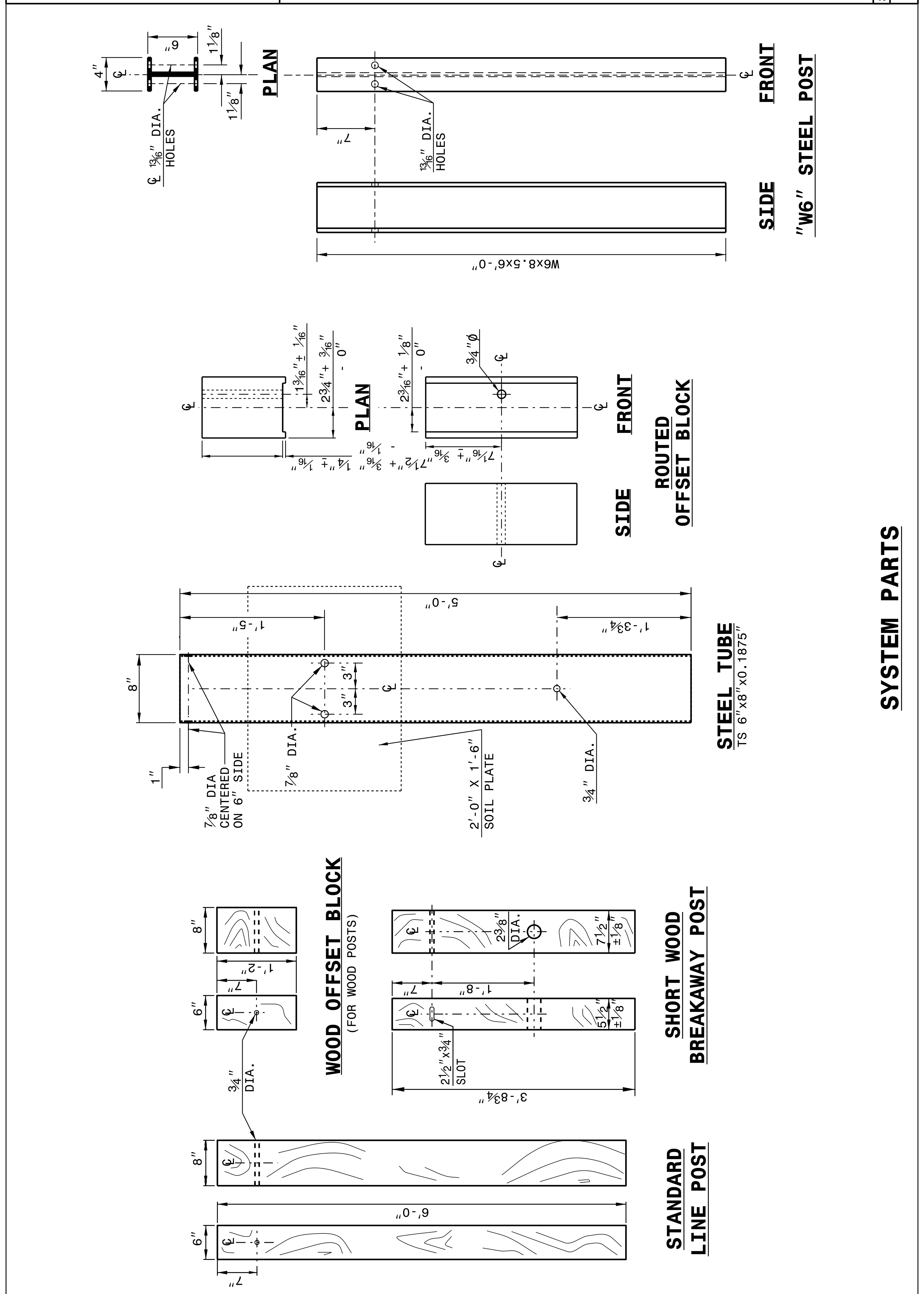
* **WHEN INSTALLING GUARDRAIL END UNITS THAT ARE 2'-1" MOUNTING HEIGHT TO EXISTING GUARDRAIL, REMOVE THE EXISTING GUARDRAIL TO TRANSITION FROM THE EXISTING HEIGHT TO THE PROPOSED 2'-1" HEIGHT. SEE 862.02, SHEET 4 OF 8 FOR TRANSITION DETAILS.**

FLARED AND TANGENT
ELEVATION VIEW

APPROACH END UNITS

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	2C-5



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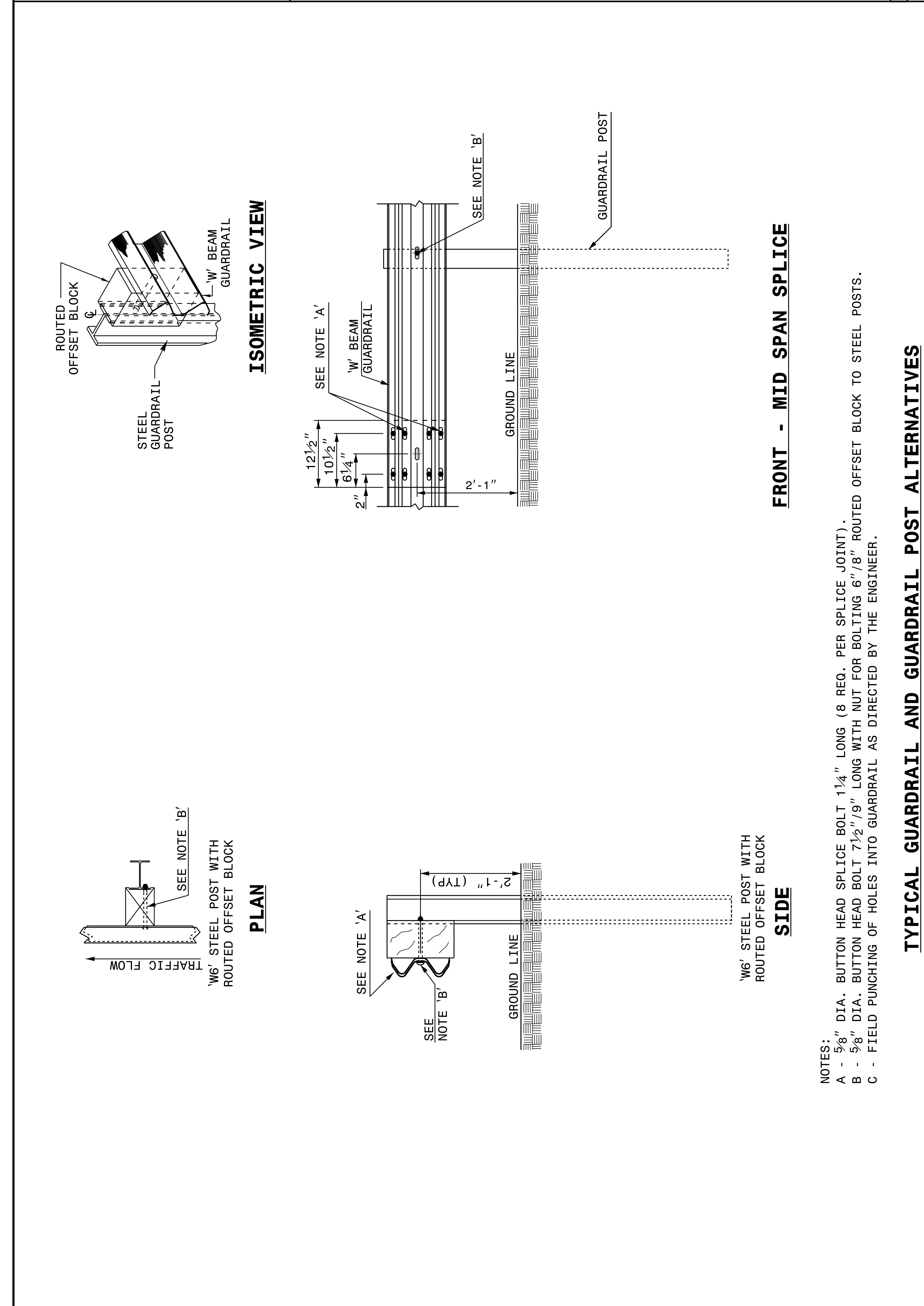
RALEIGH, N.C.

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

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17BP.12.R.43	2C-6

STATE OF
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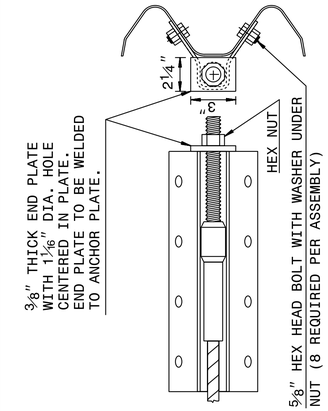
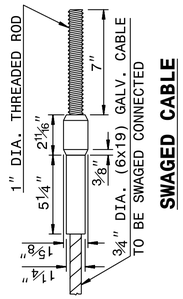
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 8
862D02

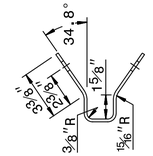
ANCHOR PLATE ASSEMBLY



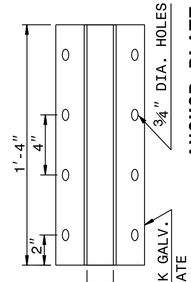
SWAGED CABLE



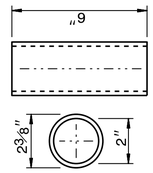
CABLE ASSEMBLY



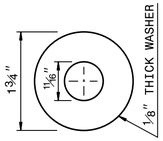
ANCHOR PLATE



SYSTEM PARTS

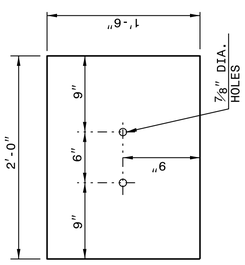


BREAKAWAY TERMINAL POST SLEEVE



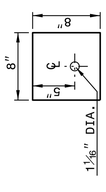
DETAIL OF STANDARD WASHER

STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST



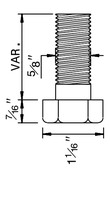
SOIL PLATE

¼" THICK PLATE

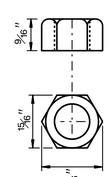


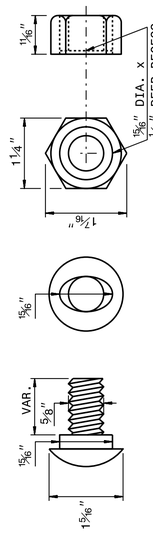
BEARING PLATE

⅝" THICK PLATE



DETAIL OF STANDARD HEX BOLT AND NUT





DETAIL OF BUTTON HEAD BOLT AND NUT

SYSTEM PARTS

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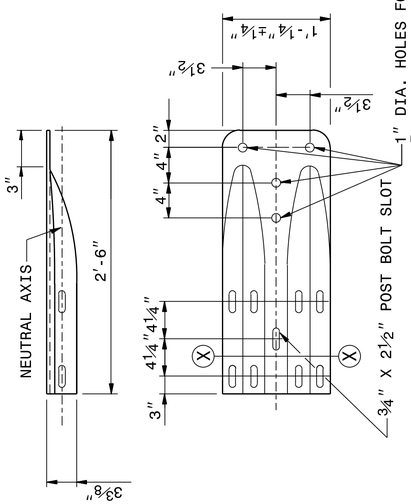
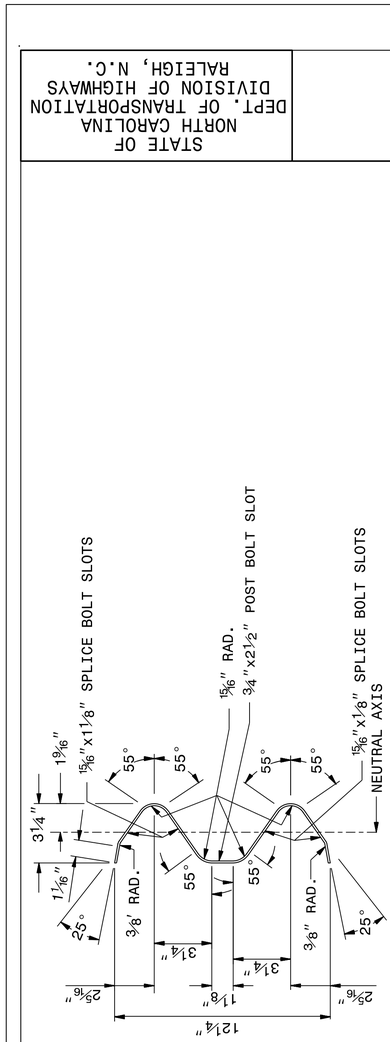
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 8 OF 8
862D02

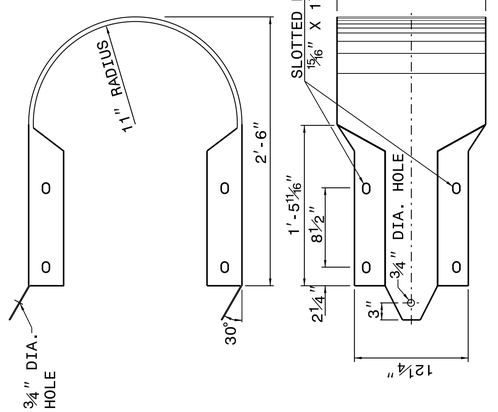
TYPICAL END SHOE



SECTION X-X



BUFFERED END SECTION



SYSTEM PARTS - GENERAL USE

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 8 OF 8
862D02

PROJECT REFERENCE NO.	SHEET NO.
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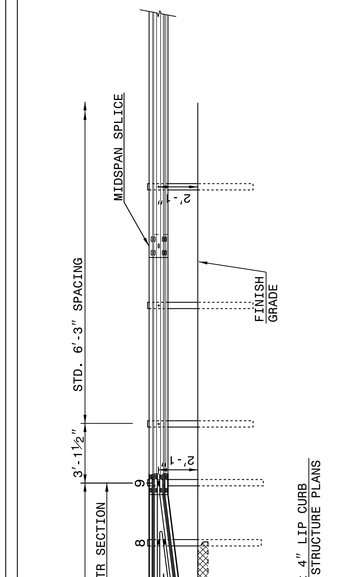
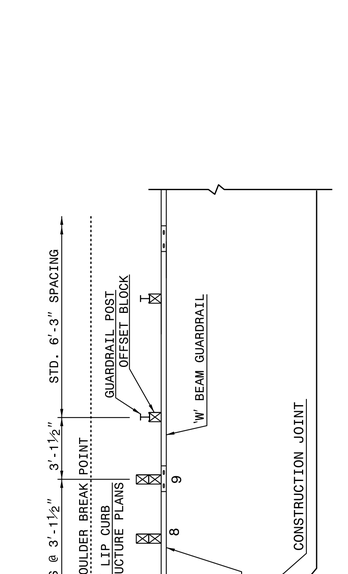
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

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 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

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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 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.

PLAN VIEW

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

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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

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S Howerton

DocuSigned by: Joel S Howerton
873F3D17DCDC45F...

9/8/2017

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

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
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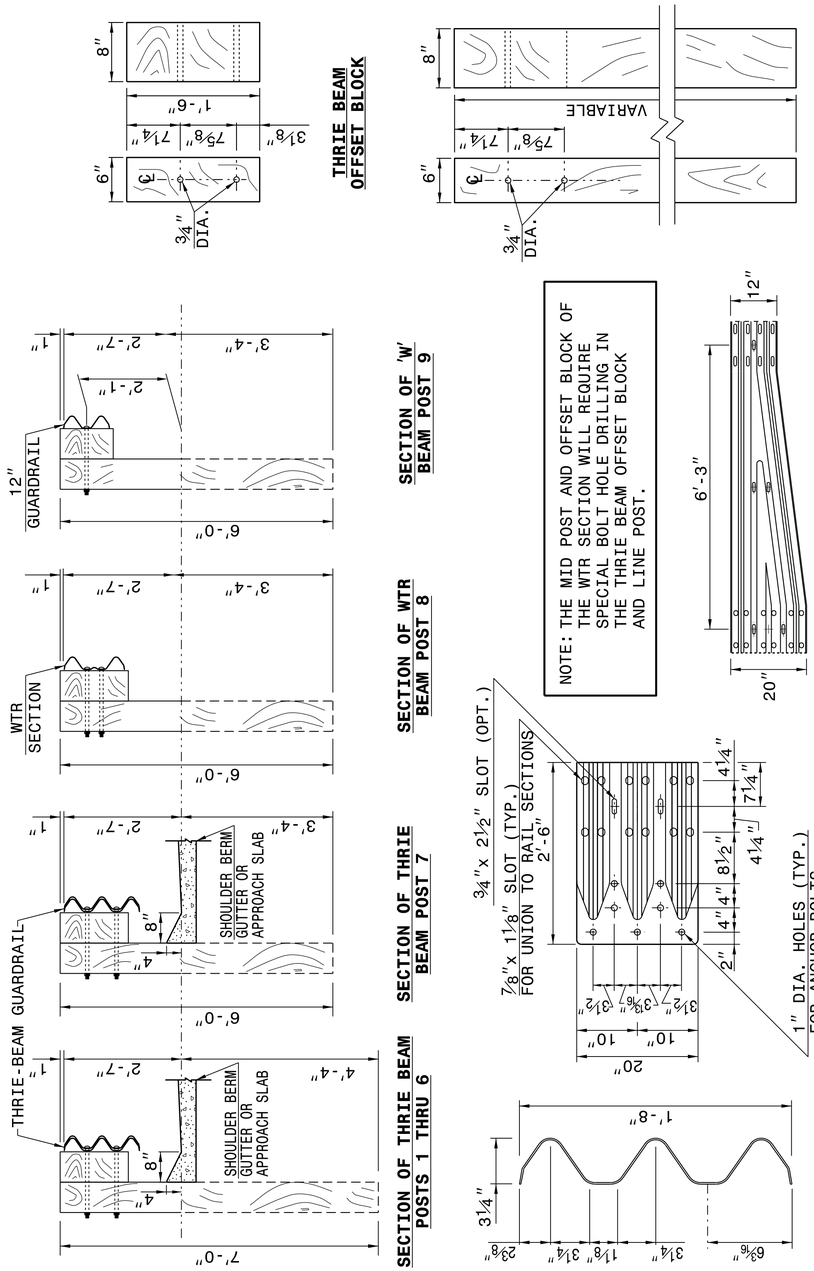
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	2C-8

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

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

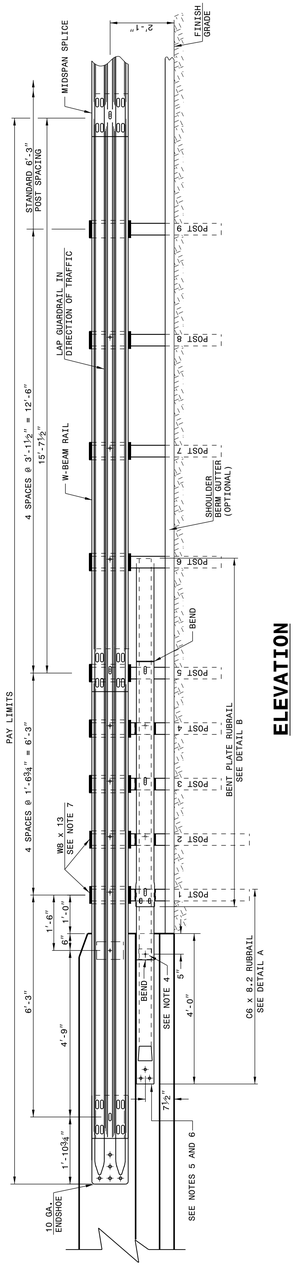
SHEET 3 OF 7
862D03



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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03



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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

COMPUTED BY: WEJ	DATE: 7/15
CHECKED BY: THB	DATE: 11/16

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	3A-1

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

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

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
	11+35	13+95	LT	262.50					4	7	N/A	50		1
L	11+65	13+95	RT	237.50					4	7	50	N/A	1	
L	15+27	16+08	LT	87.50					4	7	50	N/A	1	
L	15+27	16+08	RT	87.50					4	7	N/A	50		1
	LESS ANCHOR DEDUCTIONS													
	GREU TL-3	4@ 50'	=	-200										
	TYPE-III	4@ 18.75'	=	-75										
TOTAL				400										
			SAY	400										
	(5 ADDITIONAL GUARDRAIL POSTS)													

SURVEY LINE	BEG. STA.	ANCHORS XI MOD	ANCHORS XI	ANCHORS GREU TL-3	ANCHORS M-350	ANCHORS XIII	ANCHORS AT-1	ANCHORS VI MOD	ANCHORS III	SHOP CURVED III	IMPACT ATTENUATOR TYPE 350 G	IMPACT ATTENUATOR TYPE 350 NG	SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
	11+35			1					1							
L	11+65			1					1							
L	15+27			1					1							
L	15+27			1					1							
TOTAL				4					4							
SAY				4					4							

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

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
L 13+71	LT	0404		924.30			
		0404	0403		920.30	915.00	
L 13+71	RT	0405		924.30			
		0405	0406		920.30	916.00	
TOTAL							

STATION	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"
L 13+71																								
										20														
L 13+71																								
										24														
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	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
L 13+71						1						
L 13+71						1						
TOTAL						2						

STATION	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	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35	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 13+71											1	1					
L 13+71											1	1					
TOTAL											2	2					

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

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"
L 12+68	CL	0401	0402		912.00	909.00			100				
TOTAL									100				

STATION	C.S. PIPE 54" .109	54" .138	54" .168	54" SHOP ELON-GATED .138	54" SHOP ELON-GATED .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168	STRUCTURAL PLATE PIPE 60" 12	60" 10	66" 12	66" 10	72" 12	72" 10
L 12+68																	
TOTAL																	

STATION	REINFORCED ENDWALLS STD. 838.27 WITH R.C. – C.Y.	WITH C.S. – C.Y.	MASONARY DRAINAGE STRUCTURES CUBIC YARDS	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	FLOWABLE FILL C.Y.	REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
L 12+68	11.2																		60	REMOVE 42" CMP. BURY 60" 1' BELOW CHANNEL.
TOTAL	11.2																		60	

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

EARTHWORK SUMMARY

STATION	STATION	EXCAVATION TOTAL UNCLASS.	EXCAVATION UNDERCUT	EMBANK EMBANK.	BORROW	WASTE TOTAL
11+00.00	13+94.80	8		1,107	1,099	
15+27.30	17+95.00	27		384	357	
	SUBTOTAL	35		1,492	1,456	
TOTAL		35		1,492	1,456	
MATERIAL FOR SHOULDER CONSTRUCTION						
LOSS DUE TO CLEARING & GRUBBING						
ADDITIONAL UNDERCUT						
ROCK WASTE TO REPLACE BORROW						
ADJUST FOR ROCK WASTE						
WASTE IN LIEU OF BORROW						
PROJECT TOTAL		35		1,492	1,456	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					73	
GRAND TOTAL		35		1,492	1,528	
SAY		40			1,550	

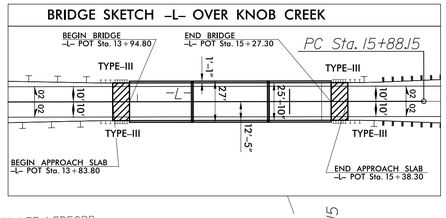
NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

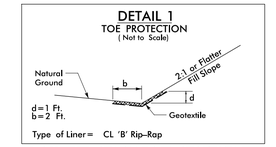
PAVEMENT REMOVAL SUMMARY

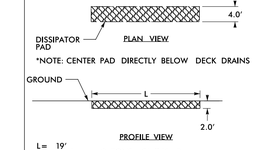
SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
L	13+75	14+04	CL	50
L	15+22	15+45	CL	45
			TOTAL:	95
			SAY:	100

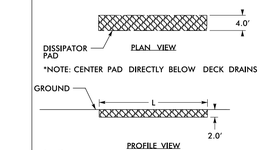
SHOULDER BERM GUTTER SUMMARY

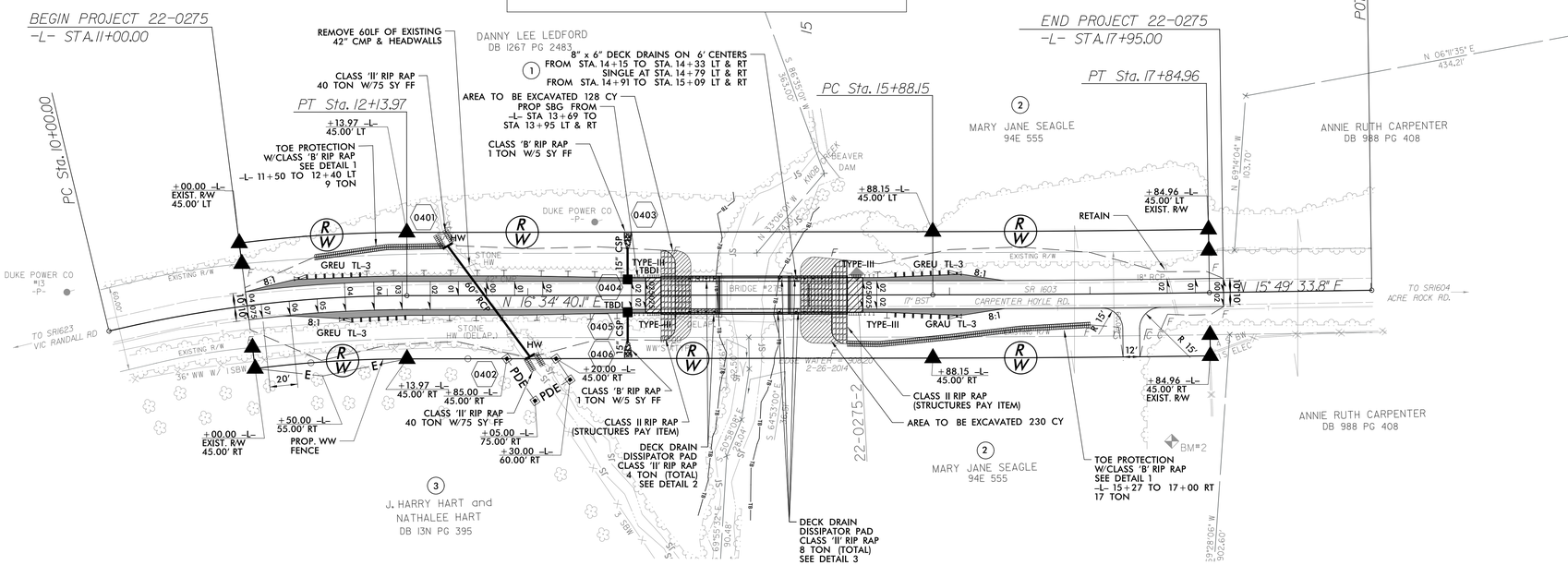
SURVEY LINE	STATION	STATION	LENGTH
L	13+69	13+95	26
L	13+69	13+95	26
		TOTAL:	52
		SAY:	52











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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 034367 TODD H. BUCKNER DocuSigned by: 1087011E67F6435... 9/27/2017	SEAL 28639 STEVEN D. SWYGERT DocuSigned by: Steve Swygert B29900704CE54DA... 9/27/2017
Michael Baker Engineering, Inc. Michael Baker INTERNATIONAL 8000 Regency Pkwy Suite 600 Cary, NC 27518 NC License: F-1084	Michael Baker Engineering, Inc. Michael Baker INTERNATIONAL 8000 Regency Pkwy Suite 600 Cary, NC 27518 NC License: F-1084

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REVISIONS

8/17/99

-L- LINE
PI Sta 11+07.48
△ = 13° 23′ 54.6″ (RT)
D = 6° 15′ 42.6″
L = 213.97′
T = 107.48′
R = 915.00′
Ds = 45 MPH
SE = .04

-L- LINE
PI Sta 16+86.56
△ = 0° 45′ 06.4″ (LT)
D = 0° 22′ 55.1″
L = 196.81′
T = 98.41′
R = 15,000.00′
Ds = 55 MPH
SE = NC

BRIDGE SKETCH -L- OVER KNOB CREEK

DETAIL 1

TOE PROTECTION
(Not to Scale)

d=1 Ft.
b=2 Ft.

Type of Liner= CL 'B' Rip-Rap

FROM -L- STA. 11+50 TO STA. 12+40 LT
FROM -L- STA. 15+27 TO STA. 17+00 RT

DETAIL 2

DECK DRAIN DISSIPATOR PAD
(Not to Scale)

L= 19′
Type of Liner= 3 TONS CL II Rip-Rap

FROM -L- STA. 14+13 TO STA. 14+35 LT
FROM -L- STA. 14+13 TO STA. 14+35 RT

DETAIL 3

DECK DRAIN DISSIPATOR PAD
(Not to Scale)

L=4′
Type of Liner= 2 TONS CL II Rip-Rap

FROM -L- STA. 14+77 TO STA. 14+81 RT
FROM -L- STA. 14+77 TO STA. 14+81 LT
FROM -L- STA. 14+89 TO STA. 15+11 RT
FROM -L- STA. 14+89 TO STA. 15+11 LT

-L-

PIPE HYDRAULIC DATA
-L- Sta. 12+69

DRAINAGE AREA	= 185	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 152	CFS
DESIGN HW ELEVATION	= 917.70	FT
100 YEAR DISCHARGE	= 242	CFS
100 YEAR HW ELEVATION	= 923.51	FT
OVERTOPPING FREQUENCY	= >100	YRS
OVERTOPPING DISCHARGE	= 251	CFS
OVERTOPPING ELEVATION	= 924.40	FT

BM1 ELEVATION = 935.48′
N 653872 E 1245372
EL STATION 10+00.00
S 16°21′55.85″ W DIST 235.17′
ALUMINUM CAP SET FLUSH WITH THE GROUND
STAMPED 22-0275-1 ON VIC RANDAL RD.

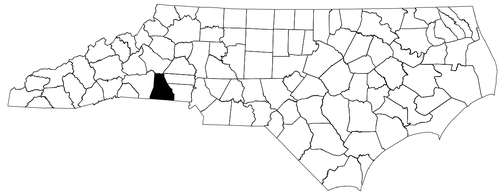
BM2 ELEVATION = 933.49′
N 654799 E 1245730
EL STATION 17+56.00 105′ RIGHT
R/R SPIKE SET IN BASE OF 28″ HICKORY

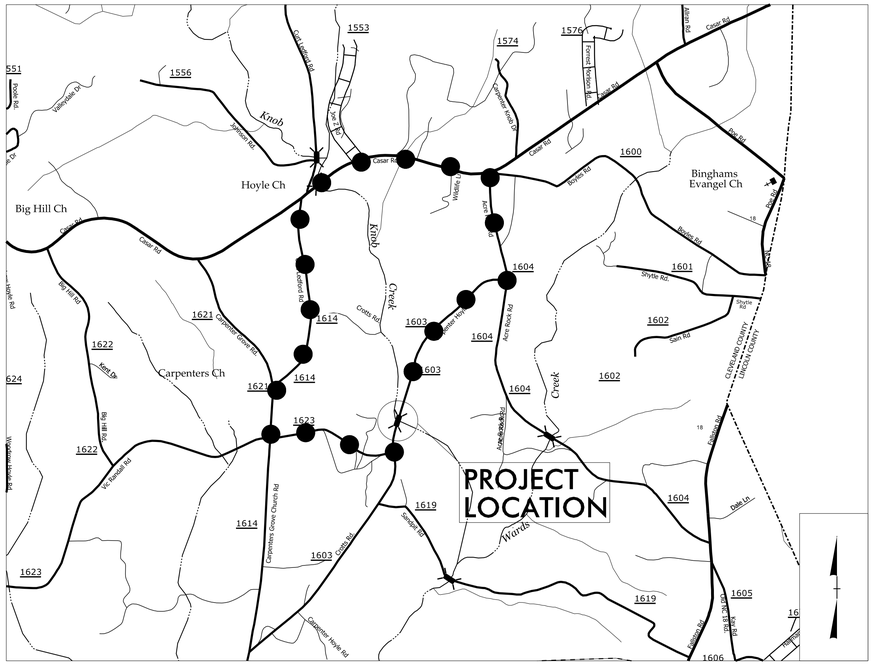
9/27/2017 11:00:39 AM
R:\17BP.12.R.43\Roadway\Proj\22-0275_RDY_PSH_04.dgn
USER: todd.buckner

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

CLEVELAND COUNTY





VICINITY MAP
(NOT TO SCALE)

DETOUR ROUTE

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	GENERAL NOTES AND PHASING
TMP-2	OFFSITE DETOUR PLAN - CARPENTER HOYLE ROAD (SR 1603)
TMP-3	CARPENTER HOYLE ROAD SIGN DESIGN

SHEET NO.
TMP-1

17BP.12.R.43

TIP PROJECT:

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

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. S. BOURNE, P.E. STATE TRAFFIC MANAGEMENT ENGINEER
BYRON ENGLE, PE DIVISION TRAFFIC ENGINEER
TODD H. BUCKNER, PE TRAFFIC CONTROL PROJECT ENGINEER

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker
INTERNATIONAL
MICHAEL BAKER ENGINEERING, INC.
8000 Regency Parkway, Suite 600
Cary, NC 27518
NC LICENSE NO. –F–1084

APPROVED: Docusigned by: 1087011E07F0435...
DATE: 1/12/2017

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.43	TMP-1A

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 JANAUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL
- USER DEFINED (IF NEEDED)
- USER DEFINED (IF NEEDED)

TRAFFIC CONTROL DEVICES

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

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

EXISTING PROPOSED TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKERS

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

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

Michael Baker Engineering, Inc.
Michael Baker INTERNATIONAL
8000 Regency Pkwy
Suite 600
Cary, NC 27518
NC License: F-1084

DocuSigned by:
APPROVED: [signature] DATE: 1/12/2017
10870116D7F6435...

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

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

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ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.43	TMP-1B

GENERAL NOTES

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

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

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

B) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

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

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

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

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

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

TRAFFIC CONTROL DEVICES

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

PAVEMENT MARKINGS AND MARKERS

G) UPON COMPLETION OF ALL OTHER CONSTRUCTION OPERATIONS, INSTALL 2 APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL SURFACE, ACCORDING TO RSD 1205.01, 1205.02 AND 1205.12.

PHASING NOTES

TRAFFIC CONTROL PHASING

NOTES: COORDINATE WITH THE ENGINEER FOR INSTALLATION AND REMOVAL OF ALL SIGNING AND TRAFFIC CONTROL DEVICES.

STEP 1: USING RSD 1101.01, SHEET 3 OF 3, INSTALL ADVANCE WORK ZONE WARNING SIGNS ON CARPENTER HOYLE ROAD (SR 1603).

STEP 2: USING RSD 1101.03, SHEET 1 OF 9 AND SHEET TMP–2, INSTALL DETOUR SIGNS AND BARRICADES AND CLOSE CARPENTER HOYLE ROAD (SR 1603).

STEP 3: REMOVE EXISTING BRIDGE NO. 87 AND CONSTRUCT PROPOSED BRIDGE AND ROADWAY, UP TO AND INCLUDING THE FINAL LAYER OF SURFACE COURSE. PLACE FINAL PAVEMENT MARKINGS ON CARPENTER HOYLE ROAD (SR 1603) FROM STA. 10+45.00 TO STA. 15+00.00.

STEP 4: REMOVE ALL ADVANCE WORK ZONE DETOUR SIGNS AND TRAFFIC CONTROL DEVICES AND OPEN CARPENTER HOYLE ROAD (SR 1603) TO TRAFFIC.

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Cary, NC 27518
NC License: F-1084

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APPROVED: DocuSigned by: [signature] DATE: 1/12/2017

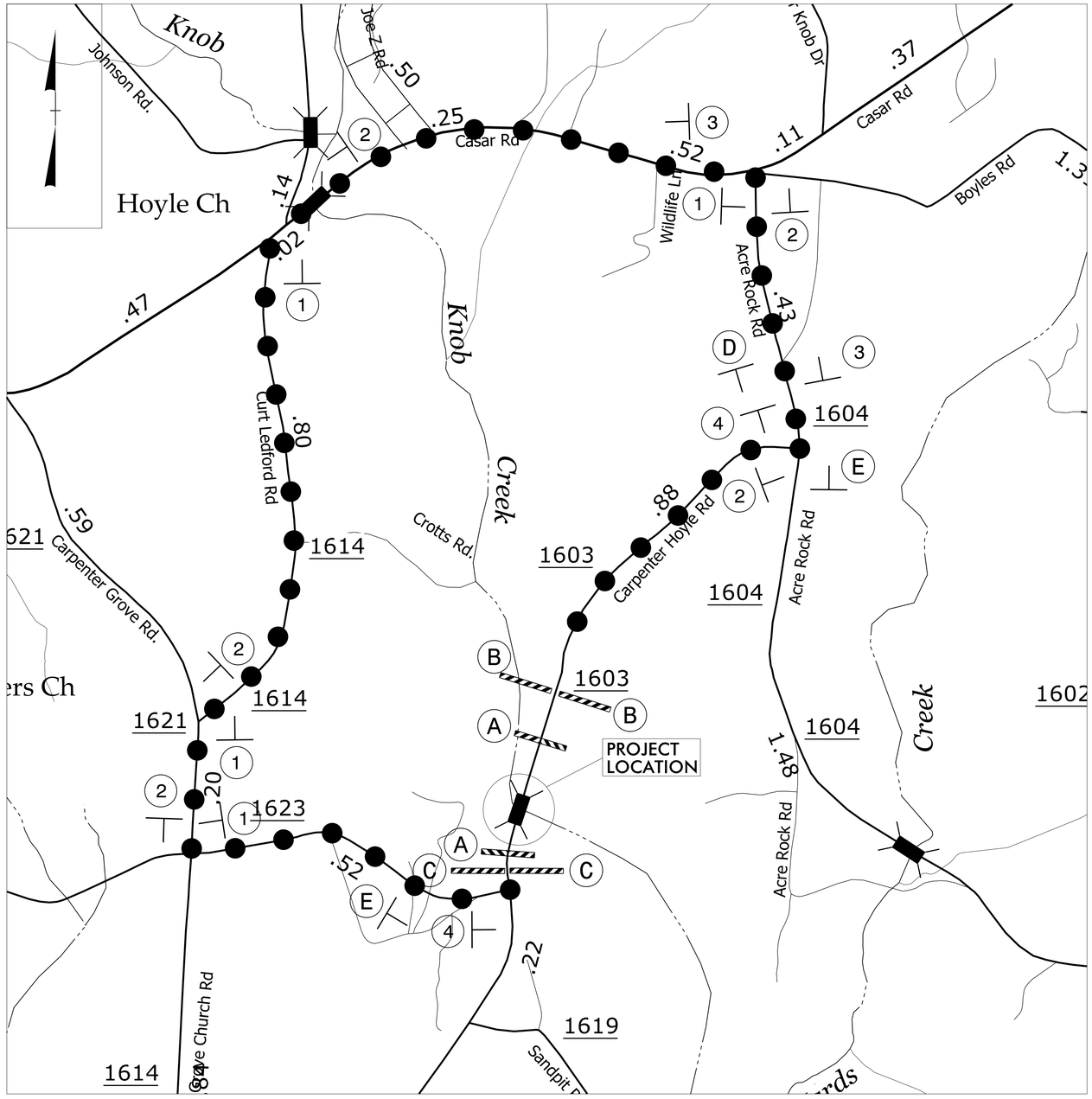
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

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

GENERAL NOTES AND PHASING

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.43	TMP-2



DETOUR ROUTE

REFER TO RSD 1101.03, SHEET 1 OF 9, FOR ADDITIONAL SIGN AND BARRICADE PLACEMENT

R11-2
48″ x 30″
ROAD CLOSED
TYPE III BARRICADE(S)
A

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10R
48″ x 18″
TYPE III BARRICADE
B

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10L
48″ x 18″
TYPE III BARRICADE(S)
C

ROAD CLOSED
W20-3
48″ X 48″
NEXT RIGHT
SP-4R
48″ X 12″
D

ROAD CLOSED
W20-3
48″ X 48″
NEXT LEFT
SP-4L
48″ X 12″
E

DETOUR M4-8 24″ x 12″
CARPENTER HOYLE RD SP-1 66″ x 18″
M6-1 21″ x 15″
1

DETOUR M4-8 24″ x 12″
CARPENTER HOYLE RD SP-1 66″ x 18″
M6-1 21″ x 15″
2

DETOUR M4-8 24″ x 12″
CARPENTER HOYLE RD SP-1 66″ x 18″
M6-3 21″ x 15″
3

END DETOUR M4-8 A 24″ X 18″
4

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APPROVED DocuSigned by: 10870115D7F6435 DATE: 1/12/2017

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

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

OFFSITE DETOUR PLAN CARPENTER HOYLE ROAD (SR 1603)

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USER: ToddBuckner

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.43	TMP-3

SIGN NUMBER: DET-1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 7′-6″
HEIGHT: 1′-6″
TOTAL AREA: 11.3 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT′L: 1.6 mm ALUMINUM

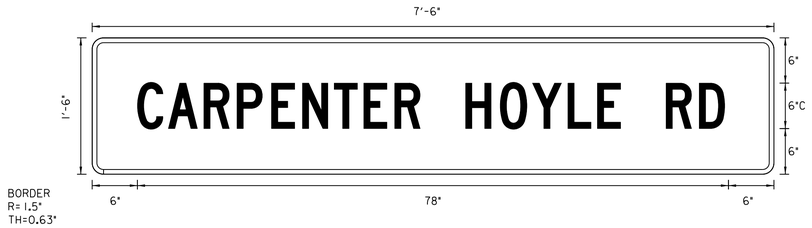
USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluoresent orange retroreflective sheeting.

DESIGN BY: _____
PROJECT ID: 17BP.12.R.43

CHECKED BY: _____
DIV: 12

DATE: Sept 9, 2014



Panel Style: Detour.ssi
M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

Series/Size
Text Length

C	A	R	P	E	N	T	E	R		H	O	Y	L	E		R	D									C 2000
6	10.1	14.7	19.1	23.7	27.8	32	35.9	39.9	43.3	49.3	53.9	58.1	62.8	66.7	69.8	75.8	80.1									78

FILENAME: 17BP.12.R.43_tc_sign

NORTH CAROLINA D.O.T. SIGN DETAIL

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USER: Todd.Buckner

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APPROVED: DocuSigned by: DATE: 1/12/2017
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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

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

SPECIAL SIGN DESIGN
CARPENTER HOYLE RD

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

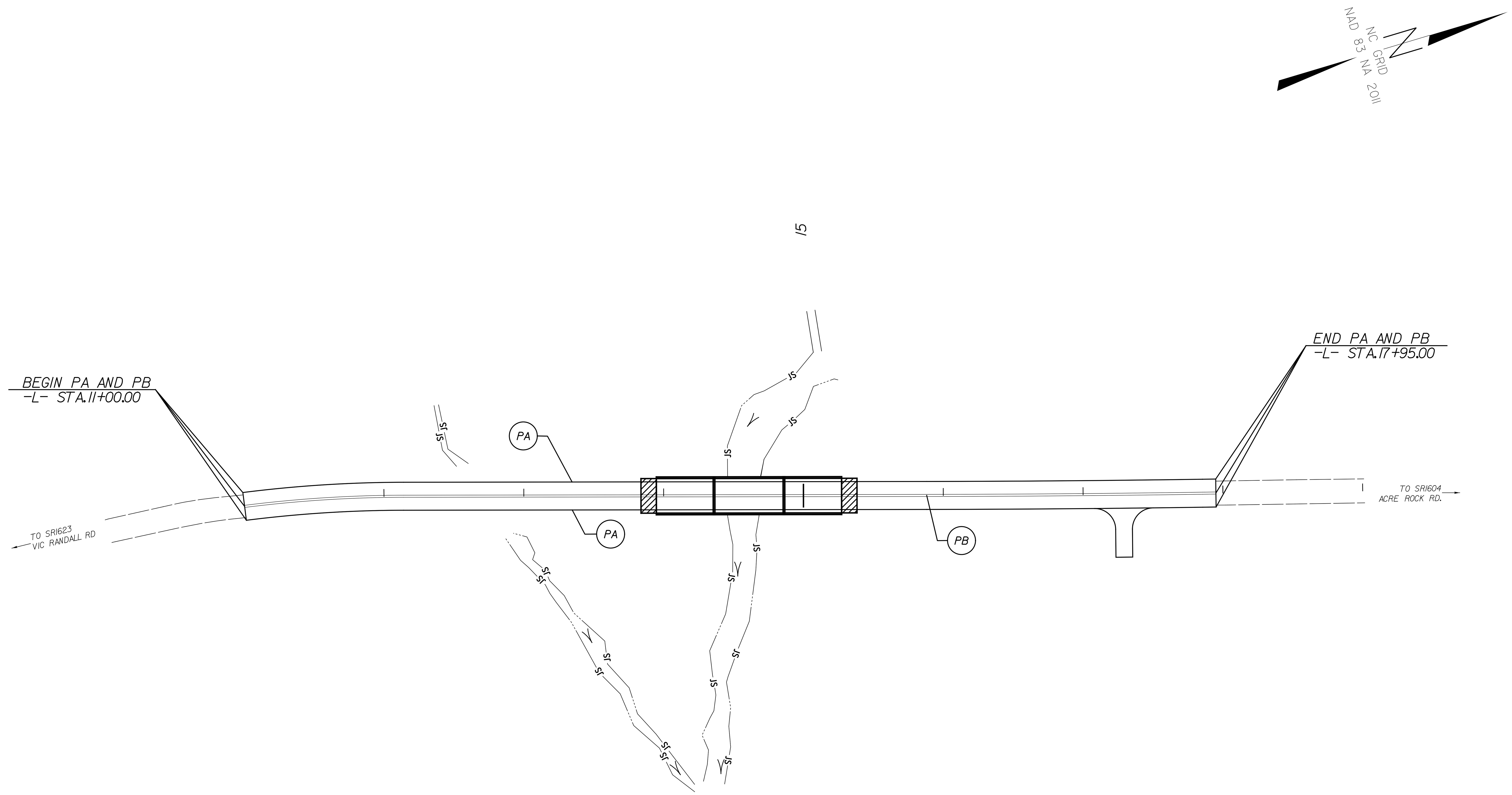
PAVEMENT MARKING PLAN

CLEVELAND COUNTY

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION (PAINT - 4")
PA	WHITE EDGELINE
PB	YELLOW DOUBLE CENTER

NOTE: FINAL PAINT TO BE A DOUBLE COAT.



NOTE: NOT TO SCALE

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Cary, NC 27518
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APPROVED:
DATE: 1/12/2017

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

SHEET NO.
PMP-1

WBS ELEMENT: 17BP.12.R.43

11-JAN-2017 16:07
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$$$$USERNAME$$$$

TIP PROJECT: 17BP.12.R.43

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.43	EC-1	

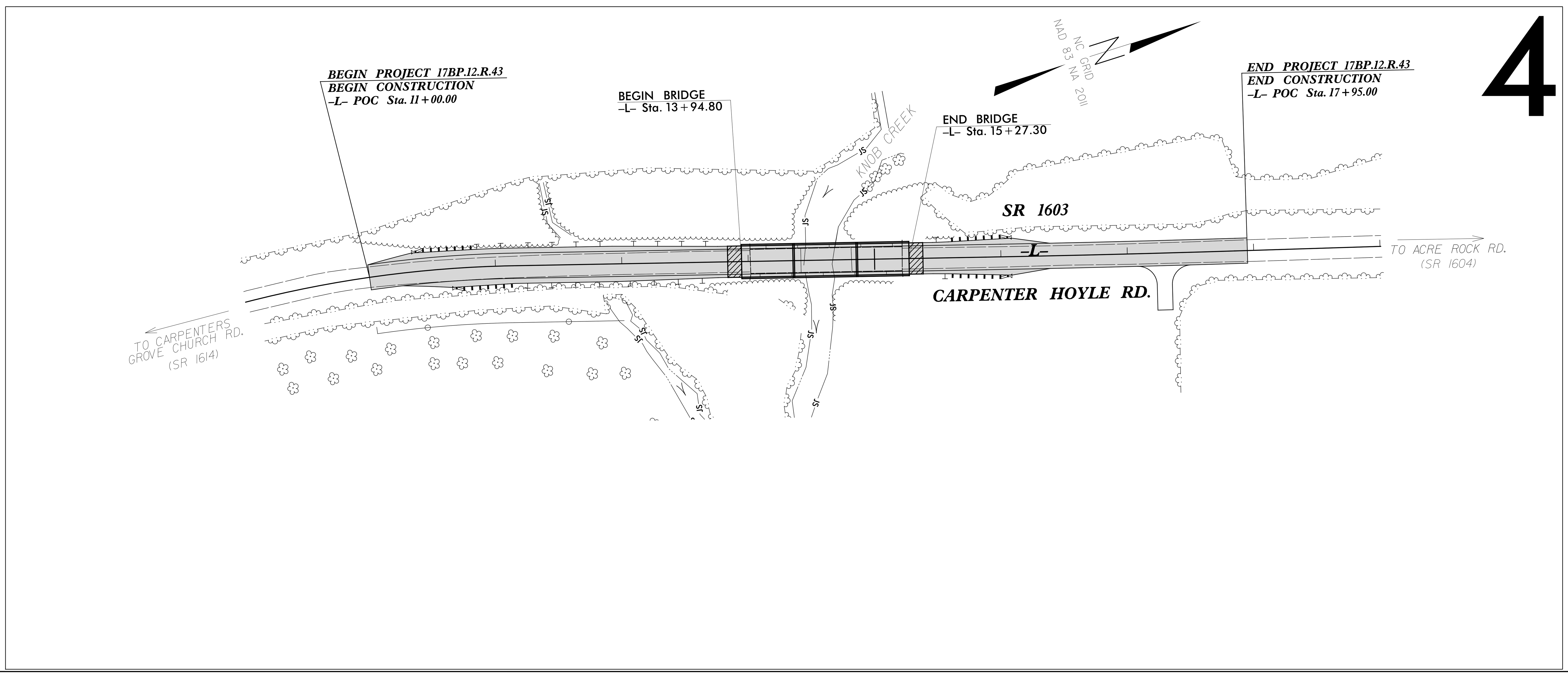
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.12.R.43		PE, RW, UTILITY, CONST

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

CLEVELAND COUNTY

LOCATION: STRUCTURE NO. 275 OVER KNOB CREEK ON CARPENTER HOYLE RD. SR 1603
TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE



4

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	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle/Coir Fiber Wattle	EW / CFW
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

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

GRAPHIC SCALE

25 0 50
PLANS

25 0 50
PROFILE (HORIZONTAL)

5 0 10
PROFILE (VERTICAL)

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

Prepared In the Office of:
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Professional Corporation License Number: F-1084

NCDOT DIVISION 12
NCDOT Contact:
STEVE RACKLEY, PE

2012 STANDARD SPECIFICATIONS

TODD H. BUCKNER, PE
LEVEL IIIA NAME
3542
LEVEL IIIA CERTIFICATION NO.

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.44	EC-2
R/W SHEET NO.	

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LEVEL III CERTIFICATION NO.

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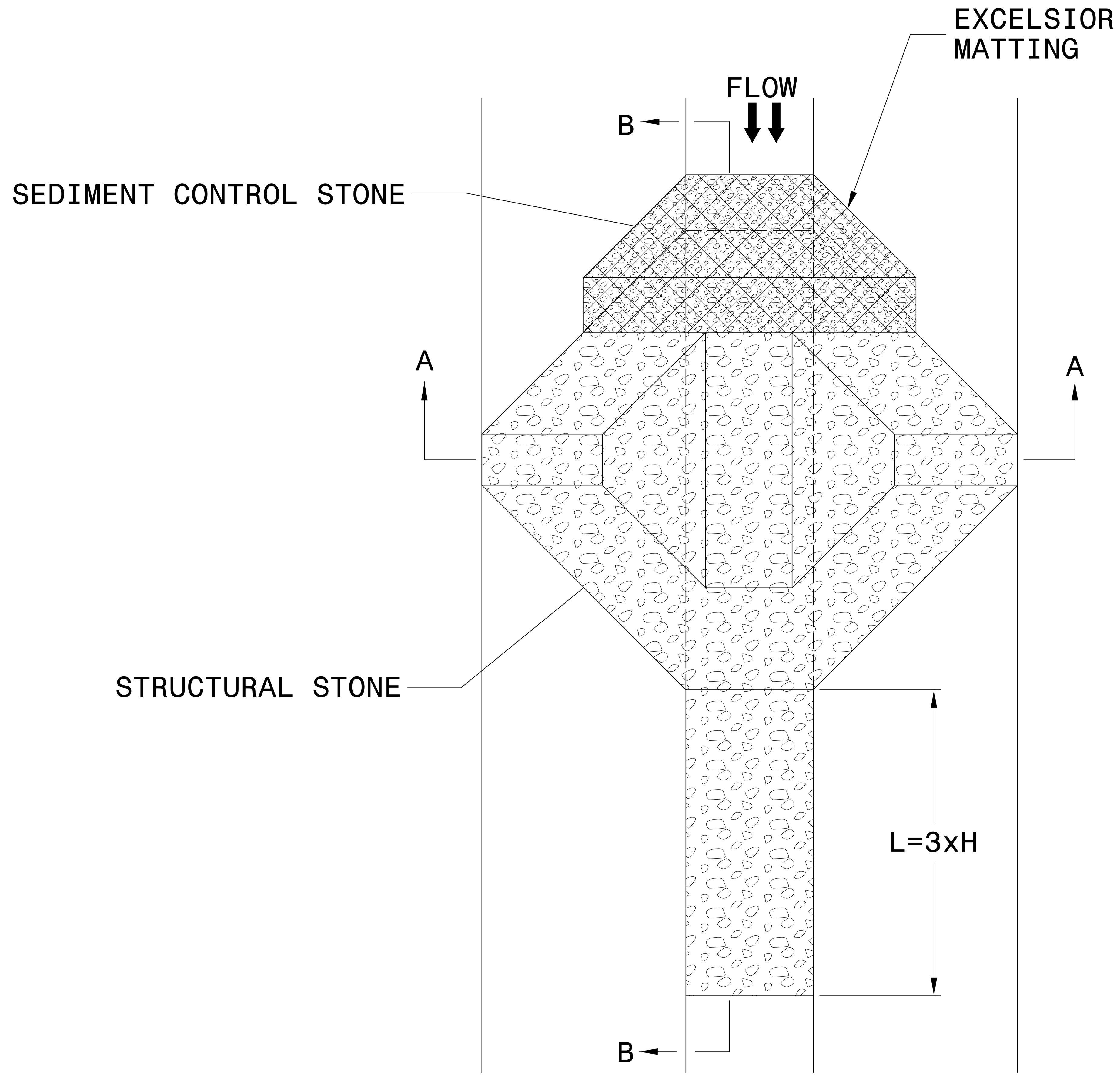
TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



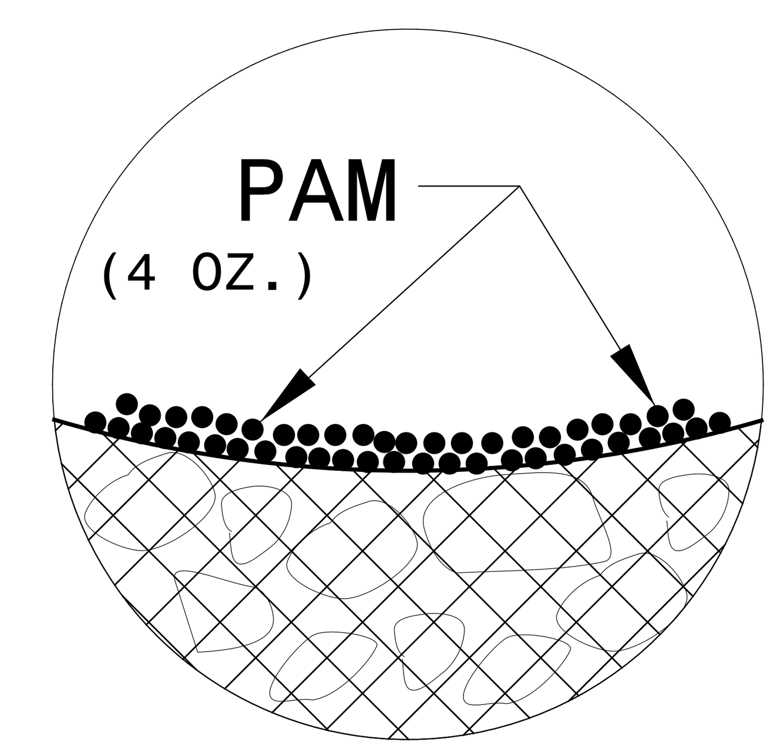
PLAN

NOTES

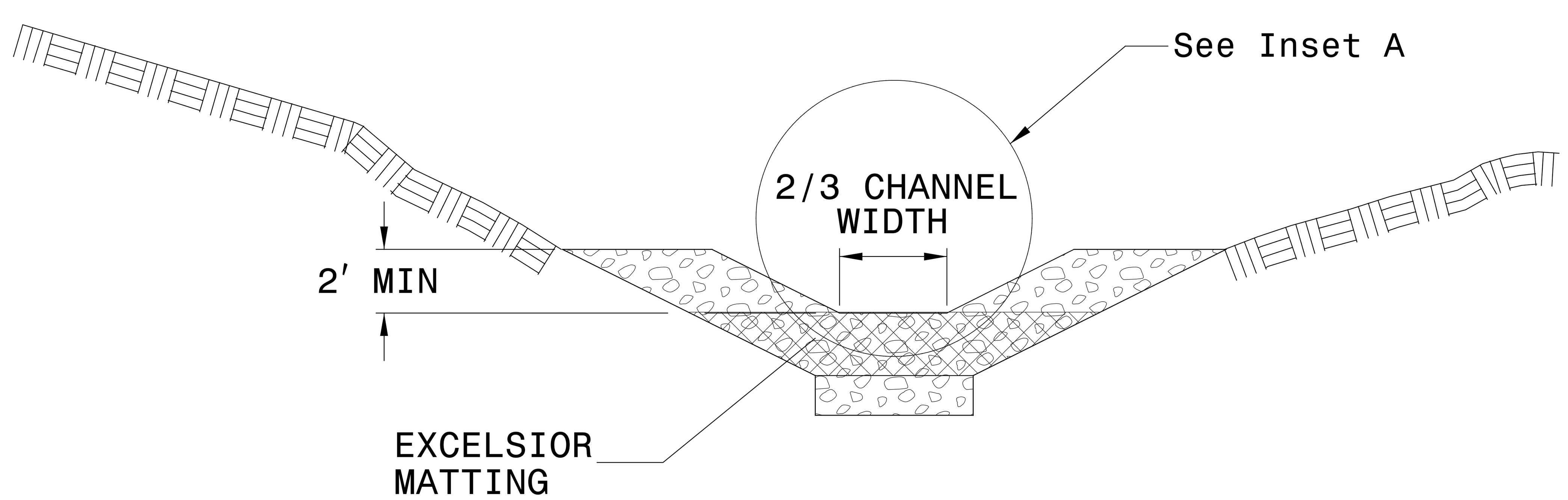
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

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.

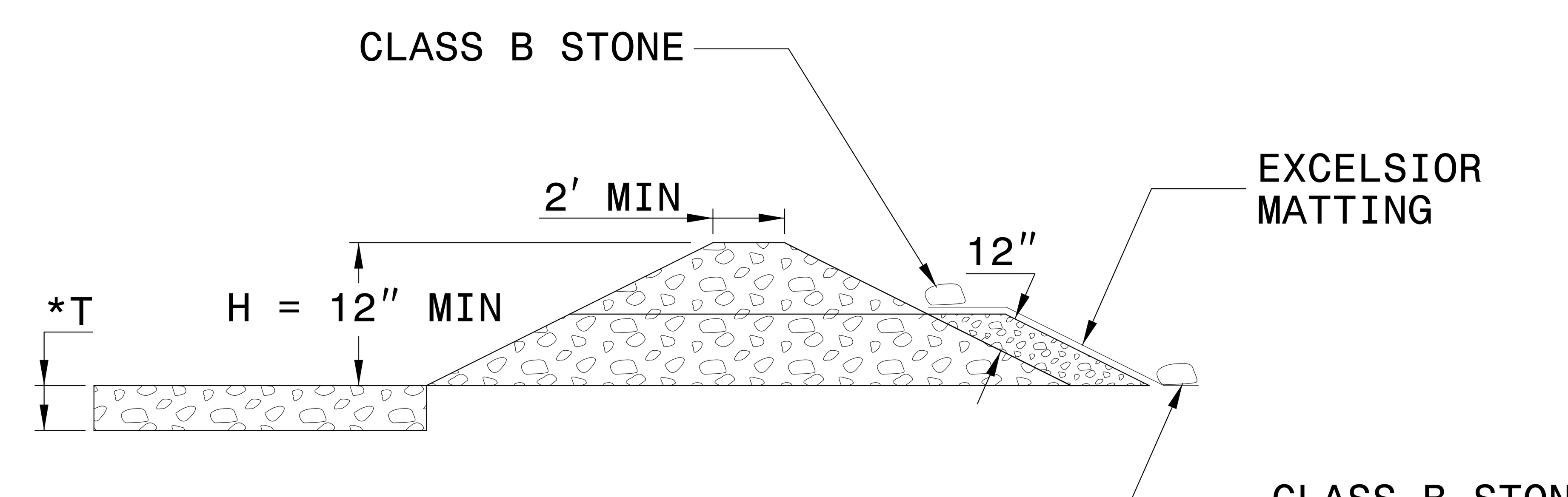
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A



SECTION B-B

*T = 12" MIN., 18" MAX.

NOT TO SCALE

REVISIONS

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.44	EC-3
R/W SHEET NO.	

TODD H. BUCKNER, PE
LEVEL III NAME

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SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	L	11+35	13+95	LT	520
4	L	11+65	13+95	LT	475
4	L	15+27	16+10	RT	115
4	L	15+27	16+10	LT	165
4	L	17+00	17+50	RT	25
				SUBTOTAL	1300
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					50
				TOTAL	1350
				SAY	1350

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
				SUBTOTAL	
		ADDITIONAL PSRM TO BE INSTALLED			
				TOTAL	
				SAY	

REVISIONS

8/14/99

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USER: Todd.Buckner

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.44	EC-3A
R/W SHEET NO.	

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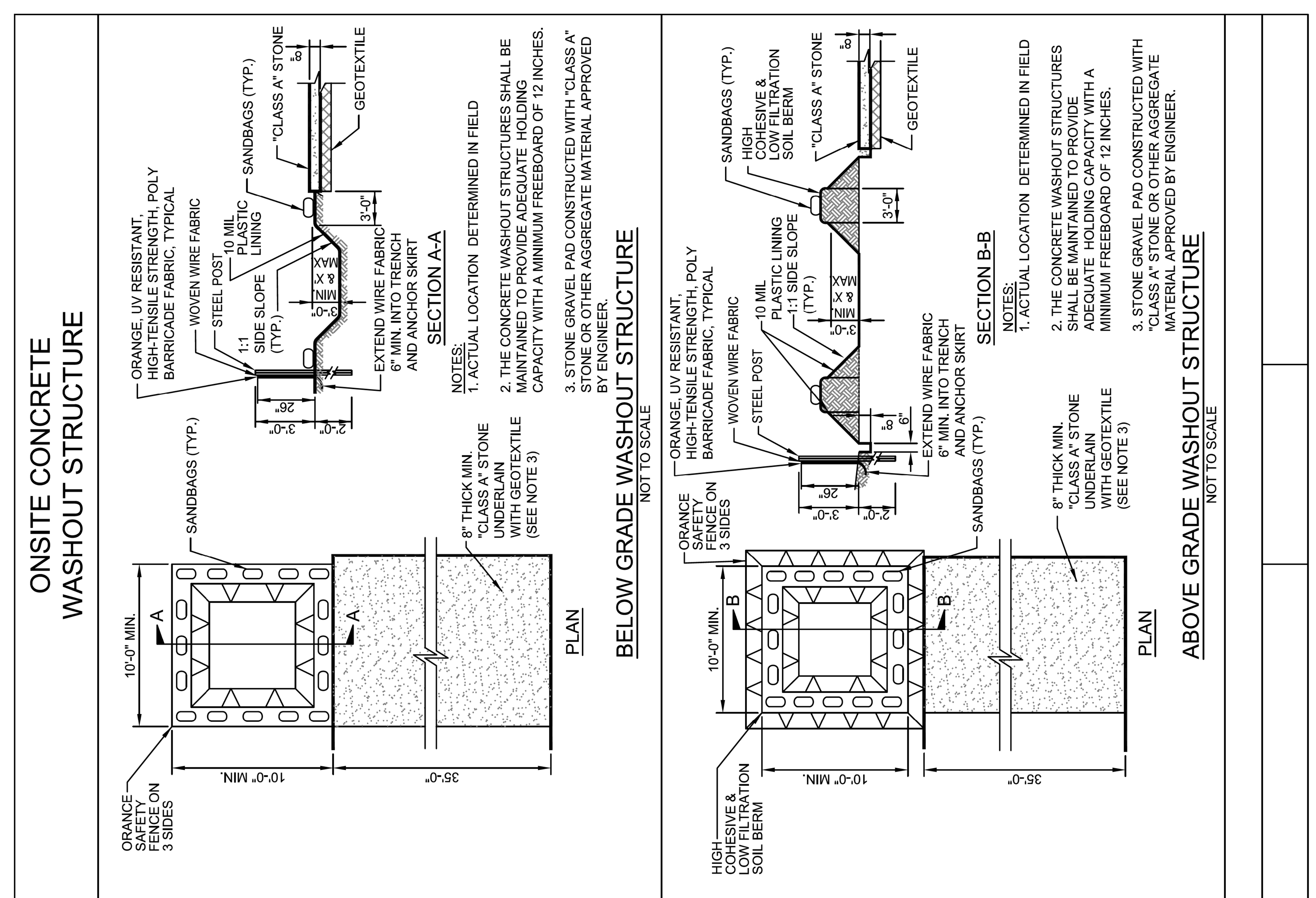
REVISIONS

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.



PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	EC. 4/CONST. 4
R/W SHEET NO.	

TODD H. BUCKNER, PE
LEVEL III NAME

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LEVEL III CERTIFICATION NO.

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CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

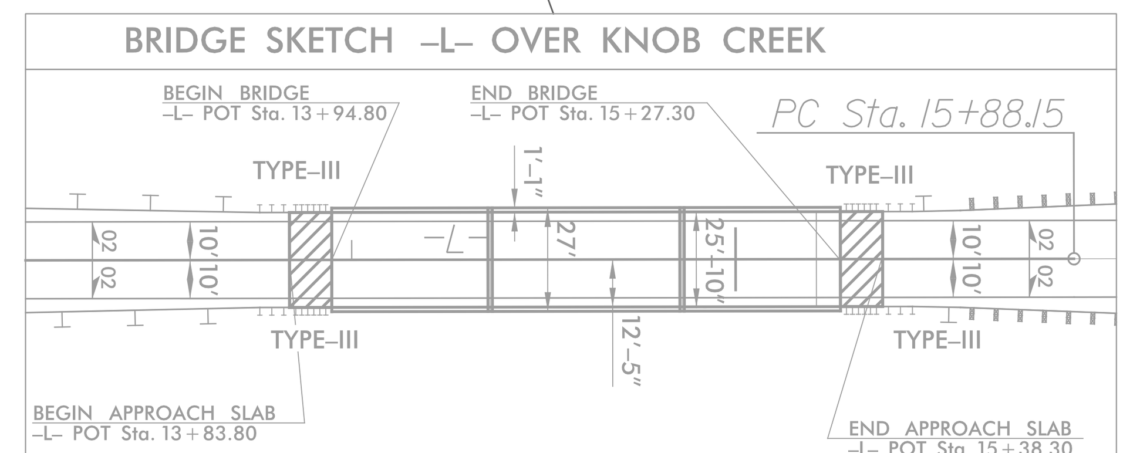
CLEARING AND GRUBBING PLAN

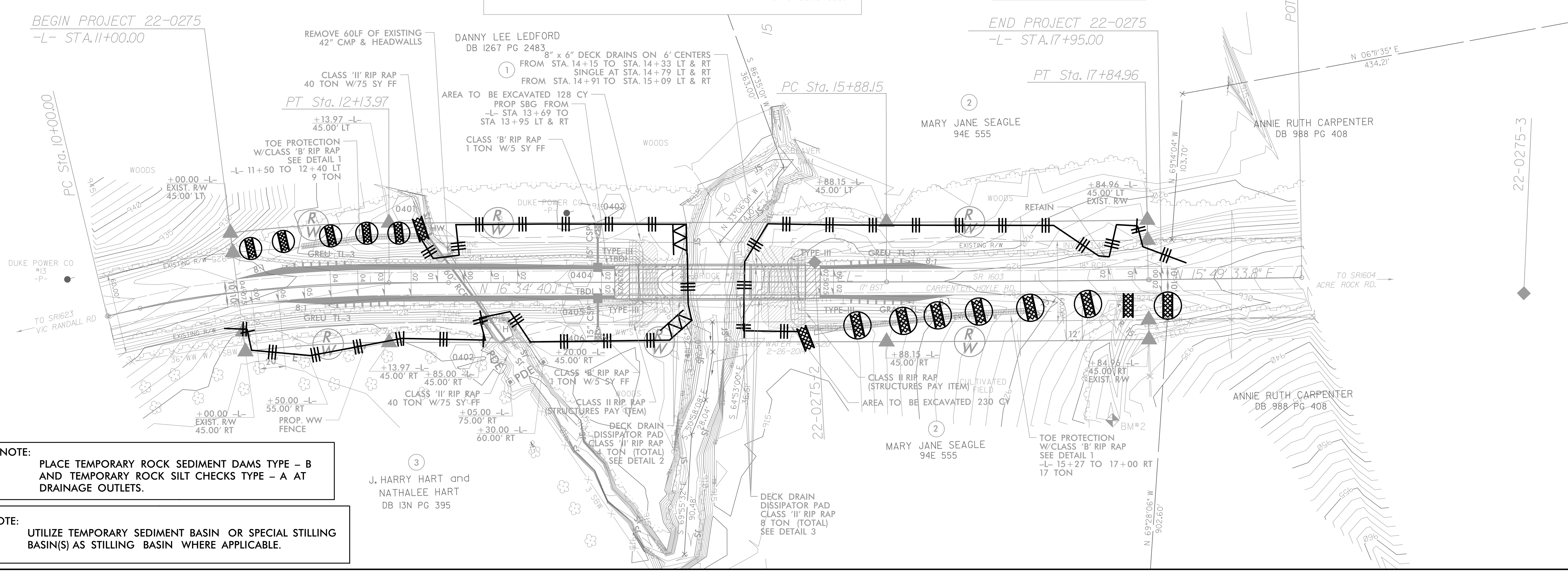
-L- LINE
PI Sta 11+07.48
Δ = 13° 23' 54.6" (RT)
D = 6° 15' 42.6"
L = 213.97'
T = 107.48'
R = 915.00'
Ds = 45 MPH
SE = .04

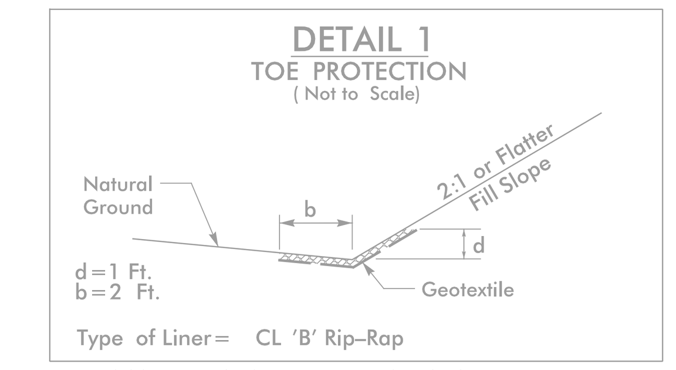
-L- LINE
PI Sta 16+86.56
Δ = 0° 45' 06.4" (LT)
D = 0° 22' 55.1"
L = 196.81'
T = 98.41'
R = 15,000.00'
Ds = 55 MPH
SE = NC

BEGIN PROJECT 22-0275
-L- STA.11+00.00

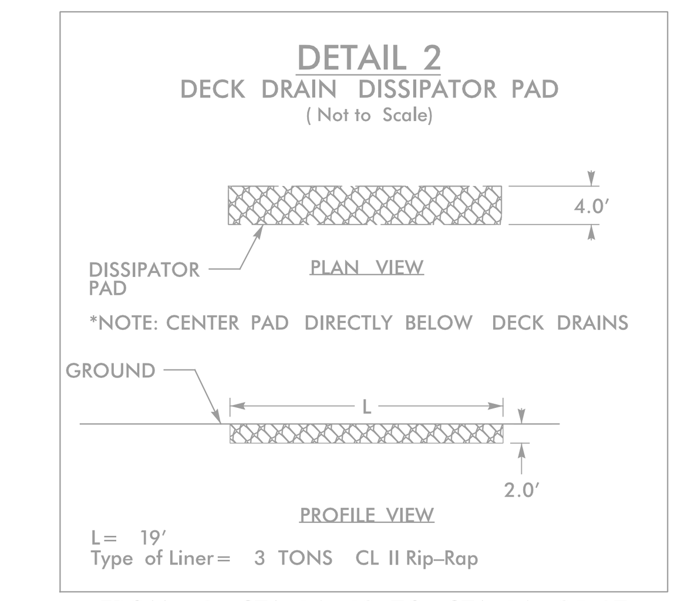
END PROJECT 22-0275
-L- STA.17+95.00



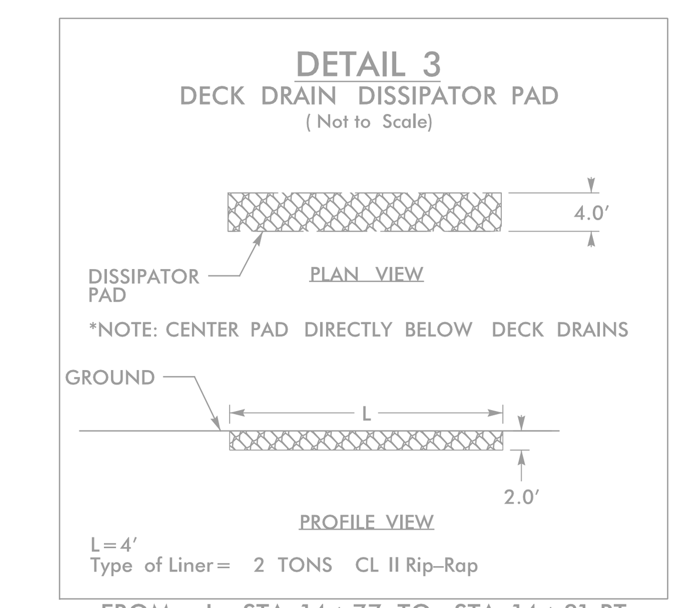




FROM -L- STA. 11+50 TO STA. 12+40 LT
FROM -L- STA. 15+27 TO STA. 17+00 RT



FROM -L- STA. 14+13 TO STA. 14+35 LT
FROM -L- STA. 14+13 TO STA. 14+35 RT

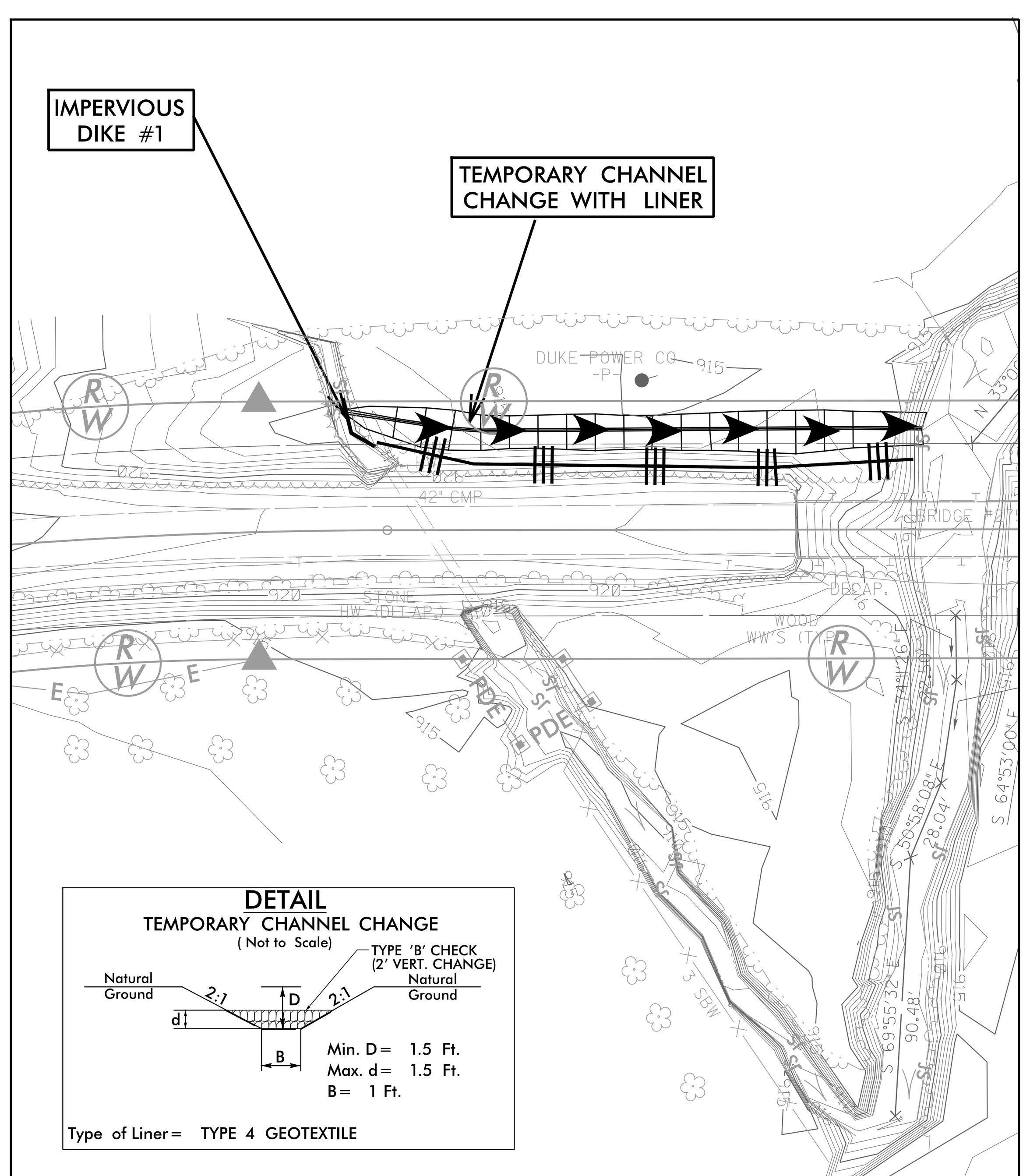


FROM -L- STA. 14+77 TO STA. 14+81 RT
FROM -L- STA. 14+77 TO STA. 14+81 LT
FROM -L- STA. 14+89 TO STA. 15+11 RT
FROM -L- STA. 14+89 TO STA. 15+11 LT

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

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

KNOB CREEK TRIB.

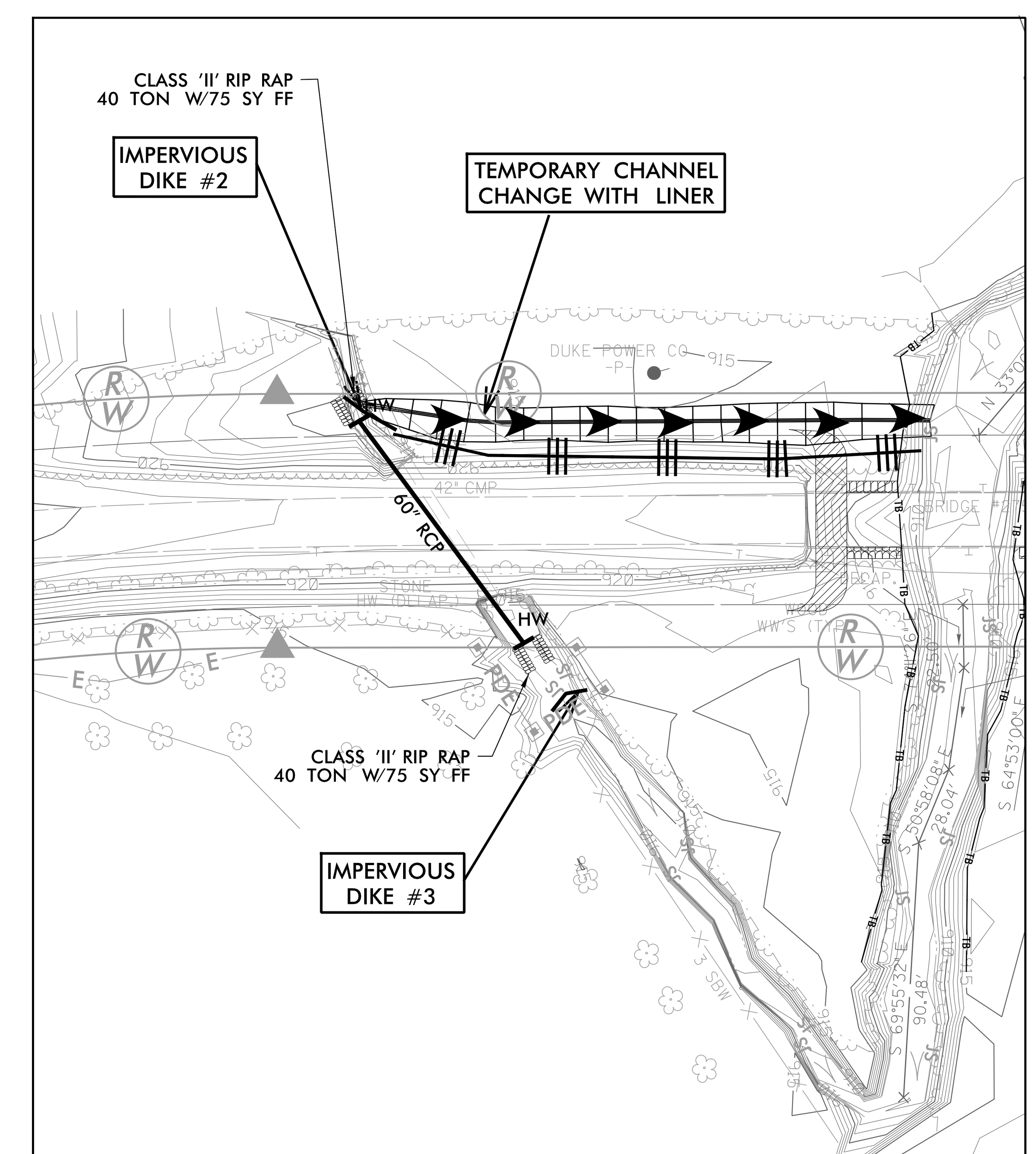


STAGE 1:

INSTALL IMPERVIOUS DIKE #1.

CONSTRUCT TEMPORARY CHANNEL CHANGE WITH LINER. TEMPORARY CHANNEL TO HAVE 1' BASE, 1.5' DEEP WITH 2:1 SIDESLOPES.

INSTALL SPECIAL STILLING BASIN.



STAGE 2:

INSTALL IMPERVIOUS DIKE #2 AND REMOVE IMPERVIOUS DIKE #1, DIVERTING FLOW INTO THE TEMPORARY CHANNEL.

INSTALL IMPERVIOUS DIKE #3 AND DEWATER CONSTRUCTION AREA AND TREAT EFFLUENT WATER USING A SPECIAL STILLING BASIN.

INSTALL 60" RCP CULVERT AND STABILIZE OUTLET WITH CLASS 'I' RIPRAP.

REMOVE IMPERVIOUS DIKE #3 AND #2 IN THAT ORDER AND DIVERT FLOW TO 60" RCP.

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

REVISIONS

9/1/2017 9:14:01 AM
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USER: todd.buckner

EROSION CONTROL FOR FINAL GRADING PLAN

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	EC. 5 CONST. 4
R/W SHEET NO.	

TODD H. BUCKNER, PE
LEVEL III NAME

3542
LEVEL III CERTIFICATION NO.

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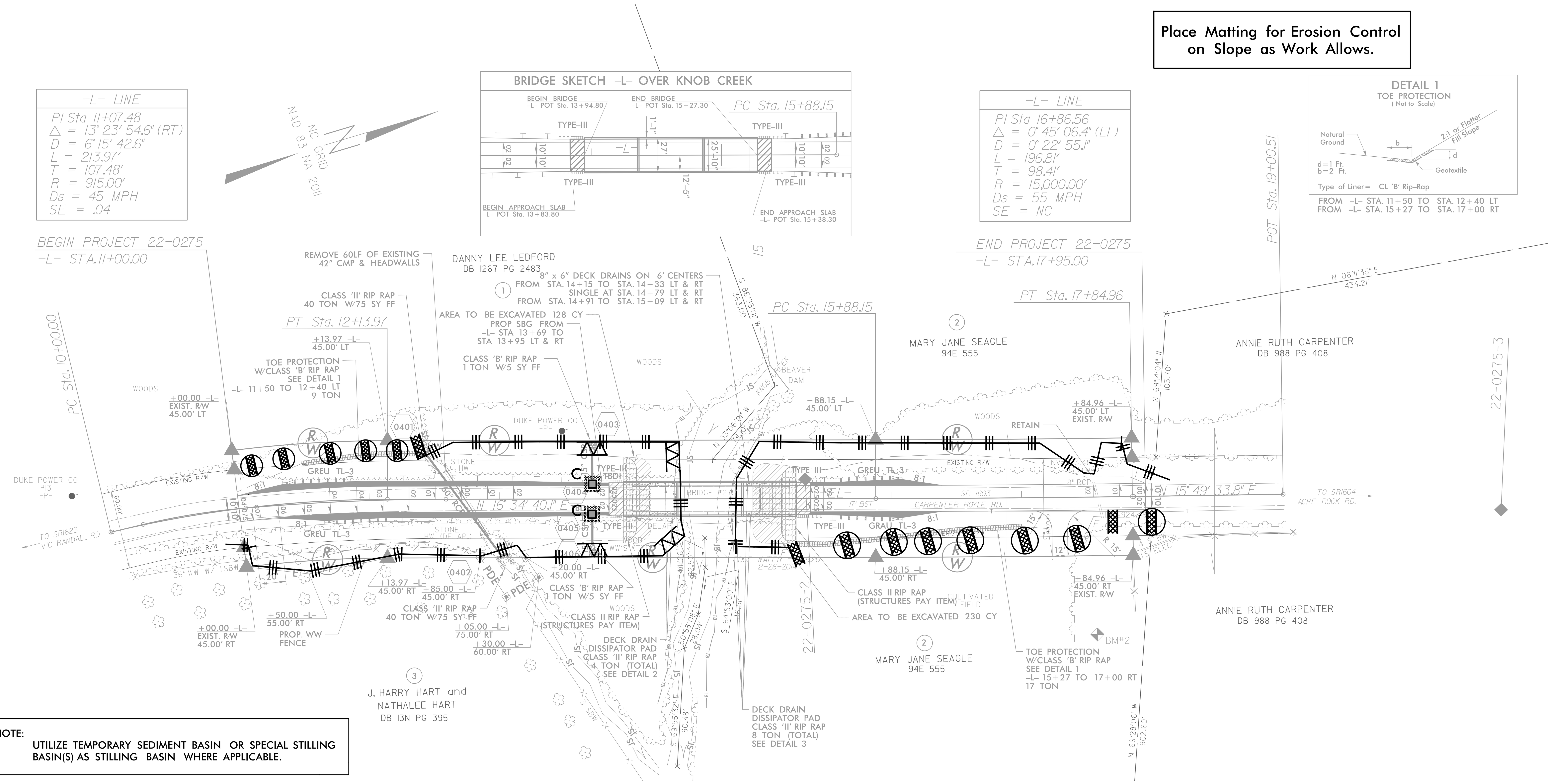
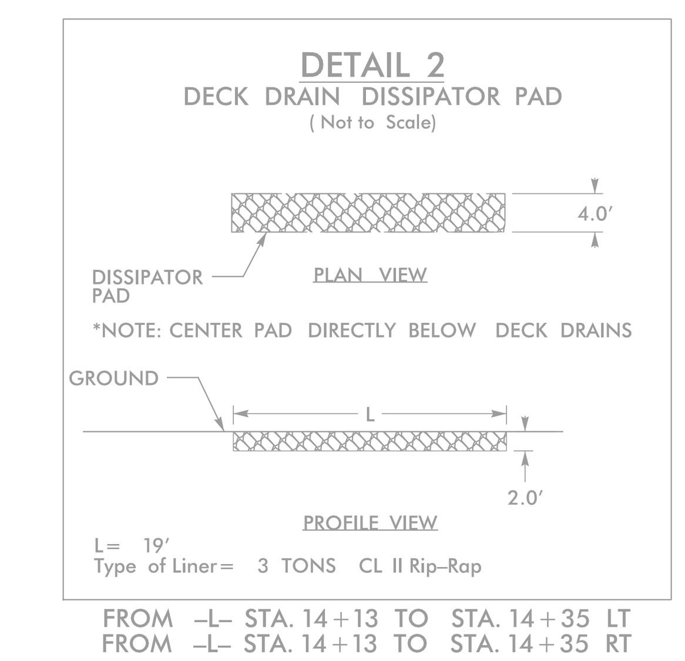
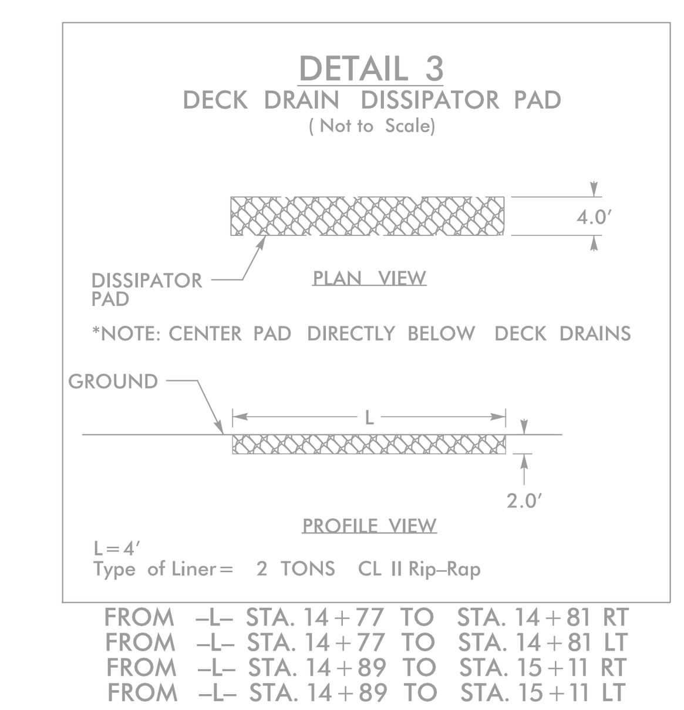
REVISIONS

Place Matting for Erosion Control on Slope as Work Allows.



-L- LINE
PI Sta 11+07.48
△ = 13° 23' 54.6" (RT)
D = 6° 15' 42.6"
L = 213.97'
T = 107.48'
R = 915.00'
Ds = 45 MPH
SE = .04
NC GRID NAD 83 NA 2011
BRIDGE SKETCH -L- OVER KNOB CREEK
BEGIN BRIDGE -L- POT Sta. 13+94.80
END BRIDGE -L- POT Sta. 15+27.30
TYPE-III
BEGIN APPROACH SLAB -L- POT Sta. 13+83.80
END APPROACH SLAB -L- POT Sta. 15+38.30
-L- LINE
PI Sta 16+86.56
△ = 0° 45' 06.4" (LT)
D = 0° 22' 55.1"
L = 196.81'
T = 98.41'
R = 15,000.00'
Ds = 55 MPH
SE = NC
DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground
2:1 or Flatter Fill Slope
Geotextile
d=1 Ft.
b=2 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM -L- STA. 11+50 TO STA. 12+40 LT
FROM -L- STA. 15+27 TO STA. 17+00 RT
BEGIN PROJECT 22-0275
-L- STA.11+00.00
END PROJECT 22-0275
-L- STA.17+95.00
POT Sta. 19+00.51
PC Sta. 10+00.00
PT Sta. 12+13.97
PC Sta. 15+88.15
PT Sta. 17+84.96
REMOVE 60LF OF EXISTING 42" CMP & HEADWALLS
DANNY LEE LEDFORD
DB 1267 PG 2483
8" x 6" DECK DRAINS ON 6' CENTERS
FROM STA. 14+15 TO STA. 14+33 LT & RT
SINGLE AT STA. 14+79 LT & RT
FROM STA. 14+91 TO STA. 15+09 LT & RT
CLASS 'II' RIP RAP
40 TON W/75 SY FF
AREA TO BE EXCAVATED 128 CY
PROP SBG FROM
-L- STA 13+69 TO
STA 13+95 LT & RT
CLASS 'B' RIP RAP
1 TON W/5 SY FF
TOE PROTECTION
W/CLASS 'B' RIP RAP
SEE DETAIL 1
-L- 11+50 TO 12+40 LT
9 TON
MARY JANE SEAGLE
94E 555
ANNIE RUTH CARPENTER
DB 988 PG 408
N 06°11'35" E
434.21'
22-0275-3
22-0275-2
RETAIN
GREU TL-3
GRAU TL-3
SR 1603
CARPENTER MOTLE RD.
N 16° 34' 40.1" E
N 15° 49' 33.8" E
TO SR1604
ACRE ROCK RD.
TO SR1623
VIC RANDALL RD
DUKE POWER CO
CLASS 'B' RIP RAP
1 TON W/5 SY FF
CLASS II RIP RAP
(STRUCTURES PAY ITEM)
DECK DRAIN
DISSIPATOR PAD
CLASS 'II' RIP RAP
4 TON (TOTAL)
SEE DETAIL 2
CLASS 'II' RIP RAP
40 TON W/75 SY FF
PROP. WW FENCE
J. HARRY HART and
NATHALEE HART
DB 13N PG 395
DECK DRAIN
DISSIPATOR PAD
CLASS 'II' RIP RAP
8 TON (TOTAL)
SEE DETAIL 3
CLASS II RIP RAP
(STRUCTURES PAY ITEM)
AREA TO BE EXCAVATED 230 CY
TOE PROTECTION
W/CLASS 'B' RIP RAP
SEE DETAIL 1
-L- 15+27 TO 17+00 RT
17 TON
BM#2
WOODS





DETAIL 3
DECK DRAIN DISSIPATOR PAD
(Not to Scale)
DISSIPATOR PAD
PLAN VIEW
*NOTE: CENTER PAD DIRECTLY BELOW DECK DRAINS
GROUND
PROFILE VIEW
L=4'
Type of Liner= 2 TONS CL II Rip-Rap
FROM -L- STA. 14+77 TO STA. 14+81 RT
FROM -L- STA. 14+77 TO STA. 14+81 LT
FROM -L- STA. 14+89 TO STA. 15+11 RT
FROM -L- STA. 14+89 TO STA. 15+11 LT

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

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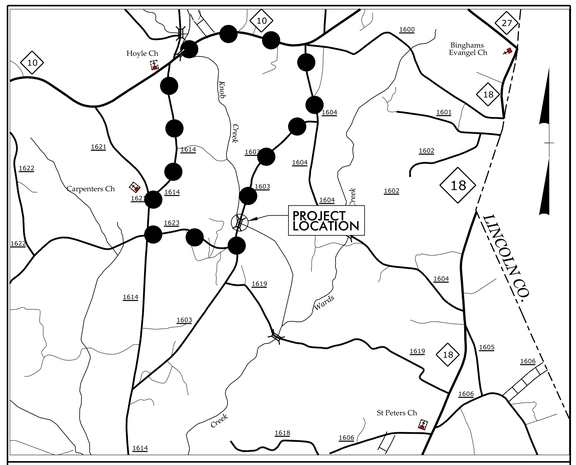


VICINITY MAP

DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
CLEVELAND COUNTY

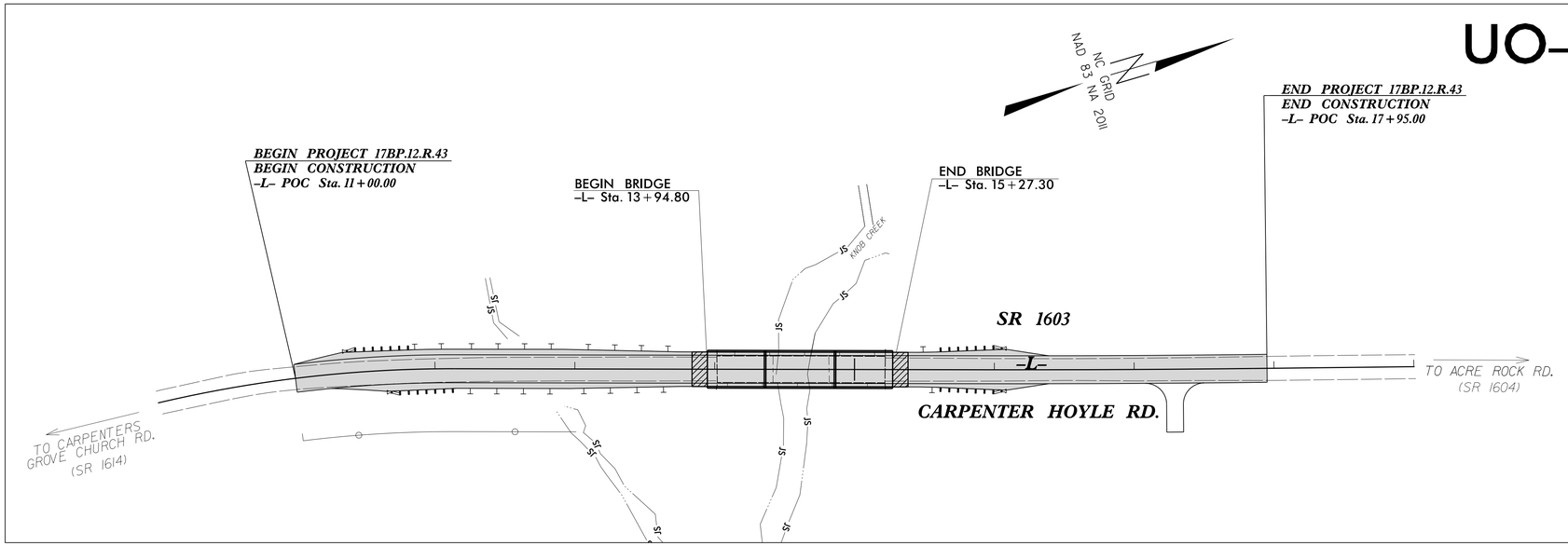
STATE PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	UO–1

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: STRUCTURE NO. 275 OVER KNOB CREEK ON CARPENTER HOYLE RD. SR 1603

TYPE OF WORK: POWER DISTRIBUTION AND TELEPHONE RELOCATION

UO–2



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

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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 DISTRIBUTION – DUKE ENERGY
(B) COMMUNICATIONS – AT&T

PREPARED IN THE OFFICE OF:

Michael Baker INTERNATIONAL
Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600
Cary, NC 27518
919-463-5488

Brandy Creech	UTILITY PROJECT MANAGER
Brandy Creech	PROJECT UTILITY COORDINATOR
Christina Newsome	PROJECT UTILITY TECHNICIAN

DIVISION OF HIGHWAYS
DIVISION 12

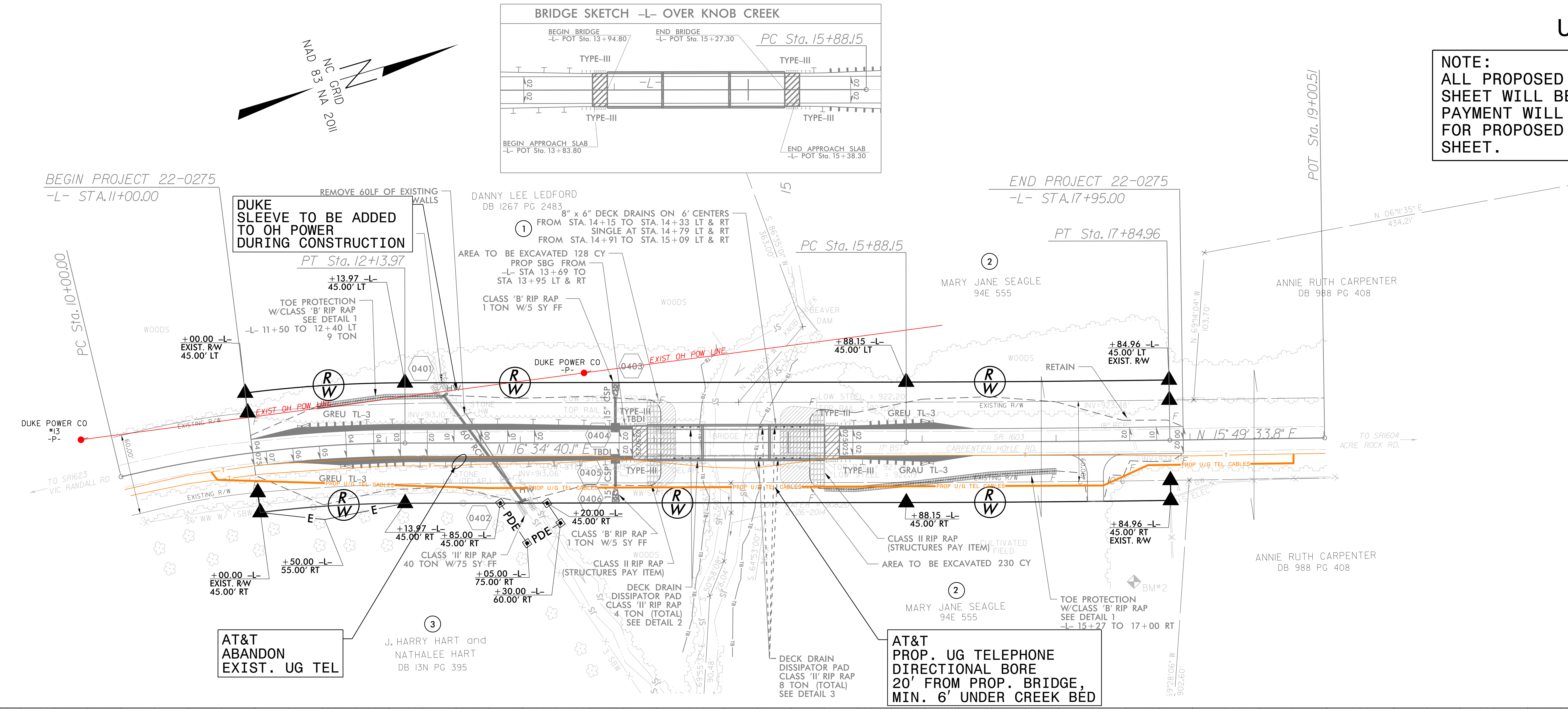
DIVISION OFFICE ADDRESS
P.O. BOX 47
1710 E. MARION ST.
SHELBY, NC 28151

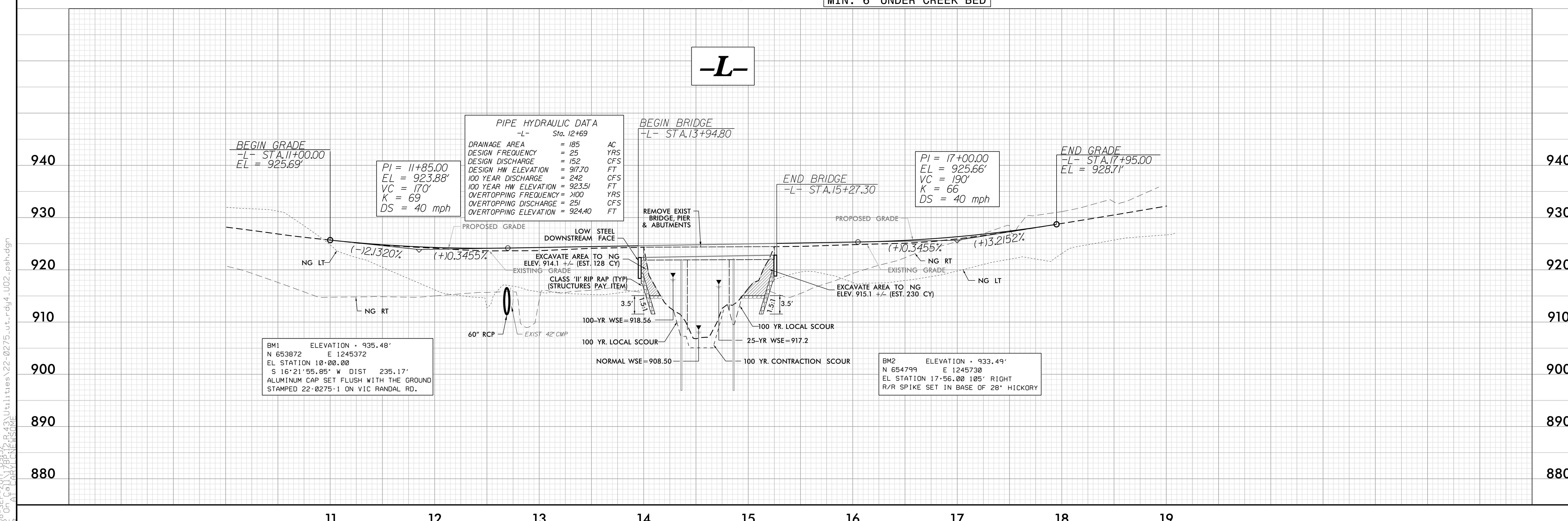
Steve Rackley, P.E.	DIVISION BRIDGE MANAGER
Chad Drewery	DIVISION UTILITY COORDINATOR

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	U0-2

UTILITIES BY OTHERS

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





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919-463-5488

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.43	X–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
17BP.12.R.43

INDEX OF SHEETS

CROSS–SECTION SUMMARY

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
11+00.0000	0	0
11+50.0000	4	77
12+00.0000	2	159
12+50.0000	1	191
13+00.0000	0	245
13+50.0000	0	188
13+94.8000	1	103
15+27.3000	0	0
15+50.0000	0	38
16+00.0000	0	110
16+50.0000	0	106
17+00.0000	1	56
17+50.0000	13	21
17+95.0000	13	3

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

8/17/99

REVISIONS

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	17BP.12.R.43	X-7

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USER: Todd.Buckner

13+50 14+00 14+50 15+00 15+50

(-)2.1320% (+)0.3455%

PI STA. 11+85.00
ELEV. 923.88
VC 170.000

-L- GRADE DATA

(+)0.3455% (+)3.2152%

PI STA. 17+00.00
ELEV. 925.66
VC 190.000

-L- GRADE DATA

SPAN A SPAN B SPAN C

940 930 920 910 900

W.P. #1 - BEGIN BRIDGE
STA. 13+94.80 -L-
FILL FACE @ END BENT 1
G.P. EL. 924.60

BEGIN FRONT SLOPE
STA. 13+87.58 -L-
G.P. EL. 924.58

1'-6" EXCAVATION LIMIT (TYP.)

LOW CHORD @ END BENT 1
EL. 922.38

DESIGN HIGH WATER SURFACE (Q25)
EL. 917.2

BASE HIGH WATER SURFACE (Q100)
EL. 918.54

HIGH WATER SURFACE
EL. 920.8
(7/13)

1'-7" MIN. RIP RAP BERM (TYP.)

LOW CHORD @ END BENT 2
EL. 922.82

W.P. #4 - END BRIDGE
STA. 15+27.30 -L-
FILL FACE @ END BENT 2
G.P. EL. 925.06

BEGIN FRONT SLOPE
STA. 15+34.52 -L-
G.P. EL. 925.08

PROPOSED GRADE

EL. 924±

FIX.

EL. 924± EL. 918± EL. 914± EL. 912± EL. 907± EL. 907± EL. 913± EL. 917± EL. 914± EL. 915± EL. 924±

APPROXIMATE LINE OF EXISTING GROUND

HP 12x53 STEEL PILES (TYP.)

1½:1 SLOPE (TYP.)

3'-6" MIN. (TYP.)

WATER SURFACE EL. 908.5

TOP OF DRILLED PIER EL. 910.43

EXISTING SUBSTRUCTURE (TYP.)

TOP OF DRILLED PIER EL. 912.11

3'-0" Ø DRILLED PIER (TYP.)

1'-0" (TYP.)

1'-0" MIN. EARTH BERM (TYP.)

RIP RAP (CLASS II) (2'-0" THK.) (TYP.)

END BENT 1 BENT 1 BENT 2 END BENT 2

SECTION ALONG -L-

UNCLASSIFIED STRUCTURE EXCAVATION

▲ GRADE TO DRAIN

N

132'-6"
(FILL FACE @ END BENT 1 TO FILL FACE @ END BENT 2)

41'-2¼" 50'-1½" 41'-2¼"

25'-0¾" 25'-0¾"

1'-0" MIN. EARTH BERM EL. 917.30 (LEVEL)

1'-0" MIN. EARTH BERM EL. 917.74 (LEVEL)

W.P. #1
STA. 13+94.80 -L-

BEGIN FRONT SLOPE
STA. 13+87.58 -L-

TO SR 1623

BEGIN APPROACH SLAB
STA. 13+83.80 -L-

FILL FACE @ END BENT 1

90°-00'-00" (TYP.)

1½:1

W.P. #2
STA. 14+35.99 -L-

N 16° 34' 40.1" E

BRIDGE ID
STA. 14+61.05 -L-

SR 1603
CARPENTER HOYLE RD.

W.P. #3
STA. 14+86.11 -L-

W.P. #4
STA. 15+27.30 -L-

BEGIN FRONT SLOPE
STA. 15+34.52 -L-

-L-

TO SR 1604

END APPROACH SLAB
STA. 15+38.30 -L-

FILL FACE @ END BENT 2

1½:1

BENT 1 CONTROL LINE

BENT 2 CONTROL LINE

KNOB CREEK

EXISTING SUBSTRUCTURE (TYP.)

RIP RAP CLASS II (2'-0" THK.) (TYP.)

PLAN

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 275

DRAWN BY : N. B. SPEAKS DATE : 9-28-17
CHECKED BY : B. J. BELL DATE : 9-28-17

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 042399 ENGINEER BRADLEY J. BELL

DocuSigned by: Bradley J. Bell C41A3F8ECA3C434...

9/28/2017

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1603
OVER KNOB CREEK
BETWEEN SR 1623 AND SR 1604

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

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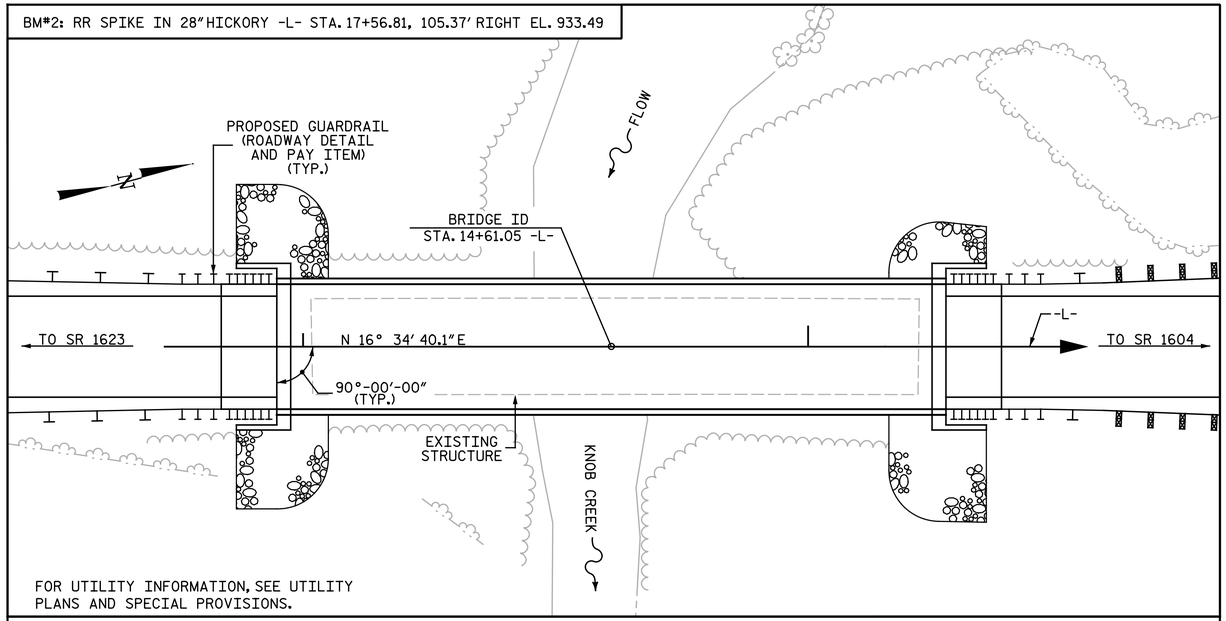

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 2,100 CFS.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 917.2
DRAINAGE AREA	= 7.20 SQ. MI.
BASE DISCHARGE (Q100)	= 3,090 CFS.
BASE HIGH WATER ELEVATION	= 918.54

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= ** CFS.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 924.6

** OVERTOPPING FLOOD IS >500+ YEAR EVENT

FOUNDATION NOTES:

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

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 66 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.

STEEL H PILE POINTS ARE REQUIRED FOR STEEL H PILES AT END BENT NO. 1 AND END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT NO. 1 AND BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 340 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.

INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 884 FT (LEFT) AND 888 FT (CENTER AND RIGHT) AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 14 FT INTO WEATHERED ROCK OR ROCK AS DETERMINED BY THE ENGINEER.

INSTALL DRILLED PIERS AT BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 890 FT AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 13 FT INTO WEATHERED ROCK OR ROCK AS DETERMINED BY THE ENGINEER.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT TESTING MAY BE REQUIRED AT BENT NO. 1 AND BENT NO. 2. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. IF REQUIRED, THE SPT N60 VALUE IS 3 INCHES OR LESS PENETRATION IN 100 BLOWS. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 AND BENT NO. 2 IS ELEVATION 900 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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.

THE MATERIAL SHOWN ON SHEET 1 OF 2 IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

THE EXISTING STRUCTURE CONSISTING OF 3 SIMPLE SPANS (1 @ 40'-3", 1 @ 40'-0", 1 @ 40'-3") WITH A CLEAR ROADWAY WIDTH OF 19'-2" AND A TIMBER DECK SUPPORTED BY STEEL I-BEAMS ON TIMBER BULKHEADS, CAPS AND PILES, LOCATED AT THE PROPOSED SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE @ STA. 14+61.05 -L-".

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

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE										
END BENT 1							LUMP SUM	18.8		2,299
BENT 1		29.50	42.00	1	2	1		15.3		9,875
BENT 2		27.50	39.00		2	1		14.5		9,370
END BENT 2							LUMP SUM	18.8		2,299
TOTAL	LUMP SUM	57.00	81.00	1	4	2	LUMP SUM	67.4	LUMP SUM	23,843

TOTAL BILL OF MATERIAL (CONT'D)

	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
			NO.	LIN. FT.						NO.	LIN. FT.	
	LBS.	EACH			EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM			LUMP SUM
SUPERSTRUCTURE						260.50			LUMP SUM	27	1,170	
END BENT 1		5	5	150	5		137	152				
BENT 1	1,717											
BENT 2	1,555											
END BENT 2		5	5	90	5		125	139				
TOTAL	3,272	10	10	240	10	260.50	262	291	LUMP SUM	27	1,170	LUMP SUM

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 042399 ENGINEER BRADLEY J. BELL

DocuSigned by: Bradley J. Bell C41A3F8ECA3C434...

9/28/2017

Michael Baker INTERNATIONAL

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8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1603
OVER KNOB CREEK
BETWEEN SR 1623 AND SR 1604

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

DRAWN BY : N. B. SPEAKS DATE : 9-28-17
CHECKED BY : B. J. BELL DATE : 9-28-17

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220275

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR CORED SLAB UNITS

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)	1.319	--	1.75	0.278	1.76	A,C	EL	19.5	0.549	**1.32**	A,C	EL	**1.95**	0.80	0.278	1.55	A,C	EL	19.5	
		HL-93(Opr)	N/A	--	1.709	--	1.35	0.278	2.28	A,C	EL	19.5	0.549	1.71	A,C	EL	1.95	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	(2)	1.540	55.449	1.75	0.278	2.21	A,C	EL	19.5	0.549	**1.54**	A,C	EL	**1.95**	0.80	0.278	1.94	A,C	EL	19.5	
		HS-20(Opr)	36.000	--	1.997	71.878	1.35	0.278	2.86	A,C	EL	19.5	0.549	2.00	A,C	EL	1.95	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.606	48.687	1.40	0.278	5.10	A,C	EL	19.5	0.549	4.13	A,C	EL	1.95	0.80	0.278	3.61	A,C	EL	19.5	
		SNGARBS2	20.000	--	2.964	59.289	1.40	0.278	4.19	A,C	EL	15.6	0.549	3.07	A,C	EL	1.95	0.80	0.278	2.96	A,C	EL	19.5	
		SNAGRIS2	22.000	--	2.906	63.929	1.40	0.278	4.09	A,C	EL	15.6	0.549	2.91	A,C	EL	1.95	0.80	0.278	2.92	A,C	EL	15.6	
		SNCOTTS3	27.250	--	1.803	49.125	1.40	0.278	2.55	A,C	EL	19.5	0.549	2.07	A,C	EL	1.95	0.80	0.278	1.80	A,C	EL	19.5	
		SNAGGRS4	34.925	--	1.623	56.667	1.40	0.278	2.29	A,C	EL	19.5	0.549	1.82	A,C	EL	1.95	0.80	0.278	1.62	A,C	EL	19.5	
		SNS5A	35.550	--	1.578	56.107	1.40	0.278	2.23	A,C	EL	19.5	0.549	1.90	A,C	EL	1.95	0.80	0.278	1.58	A,C	EL	19.5	
		SNS6A	39.950	--	1.502	59.992	1.40	0.278	2.12	A,C	EL	19.5	0.549	1.77	A,C	EL	1.95	0.80	0.278	1.50	A,C	EL	19.5	
		SNS7B	42.000	(3)	1.432	60.149	1.40	0.278	2.02	A,C	EL	19.5	0.549	1.81	A,C	EL	1.95	0.80	0.278	**1.43**	A,C	EL	**19.5**	
	TTST	TNAGRIT3	33.000	--	1.848	60.976	1.40	0.278	2.61	A,C	EL	19.5	0.549	2.08	A,C	EL	1.95	0.80	0.278	1.85	A,C	EL	19.5	
		TNT4A	33.075	--	1.872	61.901	1.40	0.278	2.65	A,C	EL	19.5	0.549	1.98	A,C	EL	1.95	0.80	0.278	1.87	A,C	EL	19.5	
		TNT6A	41.600	--	1.587	66.032	1.40	0.278	2.24	A,C	EL	19.5	0.549	1.94	A,C	EL	1.95	0.80	0.278	1.59	A,C	EL	19.5	
		TNT7A	42.000	--	1.627	68.354	1.40	0.278	2.30	A,C	EL	19.5	0.549	1.79	A,C	EL	1.95	0.80	0.278	1.63	A,C	EL	19.5	
		TNT7B	42.000	--	1.664	69.888	1.40	0.278	2.35	A,C	EL	19.5	0.549	1.72	A,C	EL	1.95	0.80	0.278	1.66	A,C	EL	19.5	
		TNAGRIT4	43.000	--	1.619	69.610	1.40	0.278	2.28	A,C	EL	15.6	0.549	1.65	A,C	EL	1.95	0.80	0.278	1.62	A,C	EL	19.5	
		TNAGT5A	45.000	--	1.498	67.412	1.40	0.278	2.12	A,C	EL	19.5	0.549	1.71	A,C	EL	1.95	0.80	0.278	1.50	A,C	EL	19.5	
		TNAGT5B	45.000	--	1.455	65.486	1.40	0.278	2.06	A,C	EL	19.5	0.549	1.56	A,C	EL	1.95	0.80	0.278	1.46	A,C	EL	19.5	

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.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

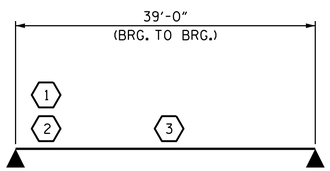
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



SPANS A & C

LRFR SUMMARY

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

DocuSigned by: Marshall G. Cheek Jr. 65490E6EBAA3B405...

6/6/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ASSEMBLED BY : N.D'AIUTO DATE : 2/20/15
CHECKED BY : T.R.PETERSON DATE : 3/2/15

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

06-JUN-2017 09:51
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mcheek

STD. NO. 21LRFR1_90S_40L

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR CORED SLAB UNITS

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	B	EL	24.5	0.531	**1.39**	B	EL	**2.45**	0.80	0.276	1.44	B	EL	24.5	
		HL-93(Opr)	N/A	--	1.807	--	1.35	0.276	2.03	B	EL	24.5	0.531	1.81	B	EL	2.45	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	(2)	1.667	60.007	1.75	0.276	1.95	B	EL	24.5	0.531	**1.67**	B	EL	**2.45**	0.80	0.276	1.79	B	EL	24.5	
		HS-20(Opr)	36.000	--	2.161	77.787	1.35	0.276	2.52	B	EL	24.5	0.531	2.16	B	EL	2.45	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.635	49.079	1.40	0.276	4.95	B	EL	24.5	0.531	4.70	B	EL	2.45	0.80	0.276	3.64	B	EL	24.5	
		SNGARBS2	20.000	--	2.871	57.420	1.40	0.276	3.91	B	EL	24.5	0.531	3.42	B	EL	2.45	0.80	0.276	2.87	B	EL	24.5	
		SNAGRIS2	22.000	--	2.778	61.109	1.40	0.276	3.78	B	EL	19.6	0.531	3.21	B	EL	2.45	0.80	0.276	2.78	B	EL	24.5	
		SNCOTTS3	27.250	--	1.814	49.418	1.40	0.276	2.47	B	EL	24.5	0.531	2.36	B	EL	2.45	0.80	0.276	1.81	B	EL	24.5	
		SNAGGRS4	34.925	--	1.577	55.063	1.40	0.276	2.15	B	EL	24.5	0.531	2.01	B	EL	2.45	0.80	0.276	1.58	B	EL	24.5	
		SNS5A	35.550	--	1.537	54.657	1.40	0.276	2.09	B	EL	24.5	0.531	2.07	B	EL	2.45	0.80	0.276	1.54	B	EL	24.5	
		SNS6A	39.950	--	1.438	57.430	1.40	0.276	1.96	B	EL	24.5	0.531	1.91	B	EL	2.45	0.80	0.276	1.44	B	EL	24.5	
		SNS7B	42.000	--	1.370	57.540	1.40	0.276	1.87	B	EL	24.5	0.531	1.91	B	EL	2.45	0.80	0.276	1.37	B	EL	24.5	
	TTST	TNAGRIT3	33.000	--	1.761	58.118	1.40	0.276	2.40	B	EL	24.5	0.531	2.25	B	EL	2.45	0.80	0.276	1.76	B	EL	24.5	
		TNT4A	33.075	--	1.777	58.759	1.40	0.276	2.42	B	EL	24.5	0.531	2.17	B	EL	2.45	0.80	0.276	1.78	B	EL	24.5	
		TNT6A	41.600	--	1.480	61.558	1.40	0.276	2.01	B	EL	24.5	0.531	2.08	B	EL	2.45	0.80	0.276	1.48	B	EL	24.5	
		TNT7A	42.000	--	1.502	63.087	1.40	0.276	2.05	B	EL	24.5	0.531	1.94	B	EL	2.45	0.80	0.276	1.50	B	EL	24.5	
		TNT7B	42.000	--	1.566	65.773	1.40	0.276	2.13	B	EL	24.5	0.531	1.84	B	EL	2.45	0.80	0.276	1.57	B	EL	24.5	
		TNAGRIT4	43.000	--	1.486	63.902	1.40	0.276	2.02	B	EL	24.5	0.531	1.77	B	EL	2.45	0.80	0.276	1.49	B	EL	24.5	
		TNAGT5A	45.000	--	1.388	62.470	1.40	0.276	1.89	B	EL	24.5	0.531	1.80	B	EL	2.45	0.80	0.276	1.39	B	EL	24.5	
		TNAGT5B	45.000	(3)	1.360	61.206	1.40	0.276	1.85	B	EL	24.5	0.531	1.68	B	EL	2.45	0.80	0.276	**1.36**	B	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.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

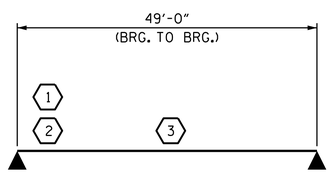
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



SPAN B

LRFR SUMMARY

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Docusigned by: Marshall G. Cheek Jr. 8549D6EBAA3B405...

6/6/2017

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			20

STD. NO. 21LRFR1_90S_50L

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : N.D'AIUTO DATE : 2/20/15
CHECKED BY : T.R.PETERSON DATE : 3/2/15

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

06-JUN-2017 09:51
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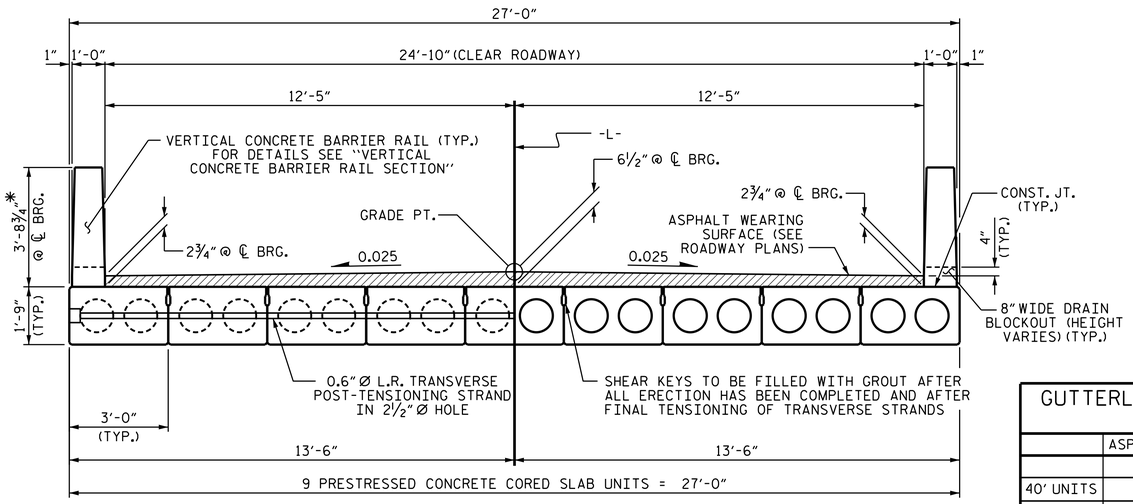
mcheek



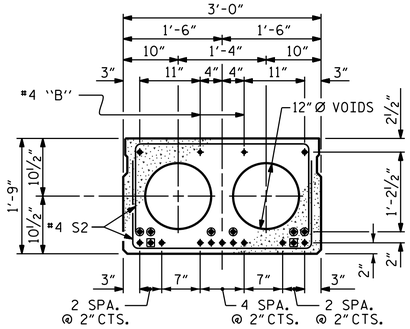
HALF SECTION AT INTERMEDIATE DIAPHRAGMS

HALF SECTION THROUGH VOIDS

TYPICAL SECTION

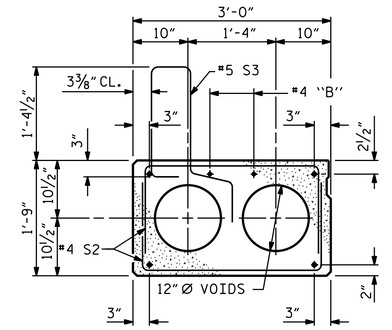
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT" TABLE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

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MIDSPAN	RAIL HEIGHT @ MIDSPAN
40' UNITS	2"	3'-8"
50' UNITS	1⅝"	3'-7⅝"



INTERIOR SLAB SECTION (40' UNIT)

(13 STRANDS REQUIRED)



EXT. SLAB SECTION

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

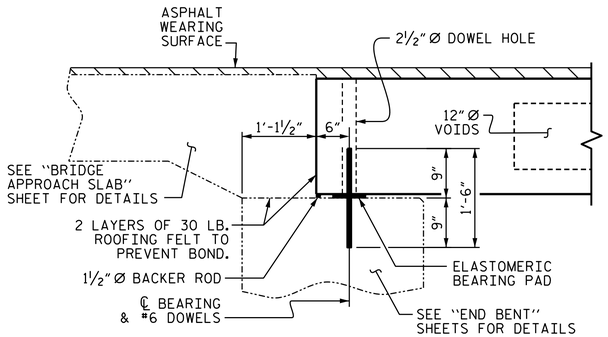
△ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

▣ 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.

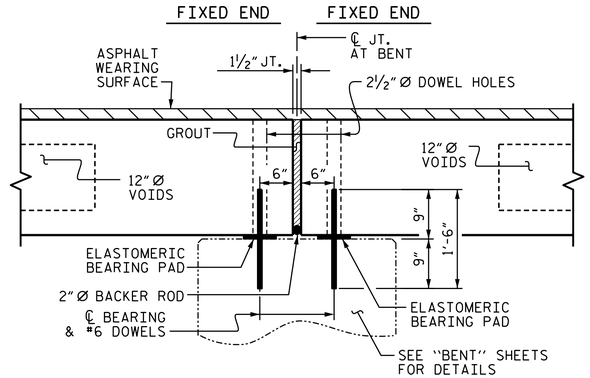
DEBONDING LEGEND

FIXED END

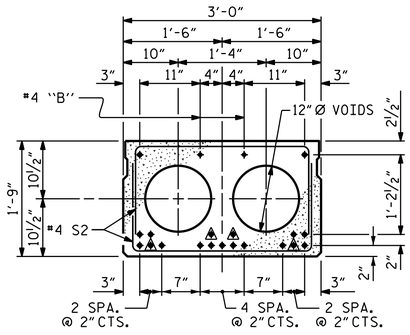


SECTION AT END BENT

FIXED END FIXED END



SECTION AT BENT

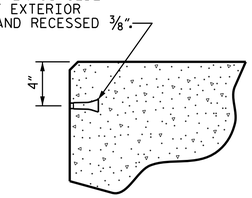


INTERIOR SLAB SECTION (50' UNIT)

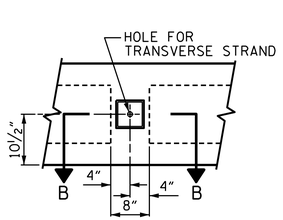
(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

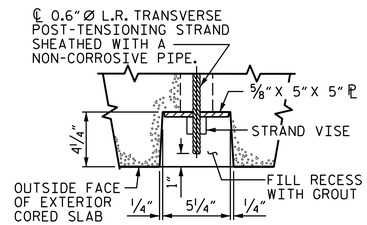
½" Ø THREADED INSERT @ 2'-0" SPACING, TO BE CAST IN OUTSIDE FACE OF EXTERIOR UNITS AND RECESSED ⅜".



THREADED INSERT DETAIL

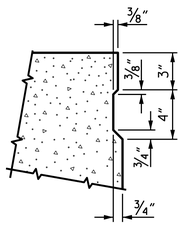


ELEVATION VIEW



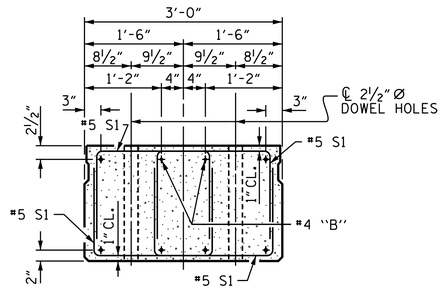
SECTION B-B

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



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR 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.

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

DocuSigned by: Marshall G. Creek, Jr. 6549D6EBAA3B405...

9/5/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 2/20/15
CHECKED BY : T.R.PETERSON	DATE : 3/2/15
DRAWN BY : DGE 5/09	REV. 8/14 MAA/TMG
CHECKED BY : BCH 6/09	

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

STD. NO. 21"PCS2_27_90S

$$$$$$SYSTIME$$$$$
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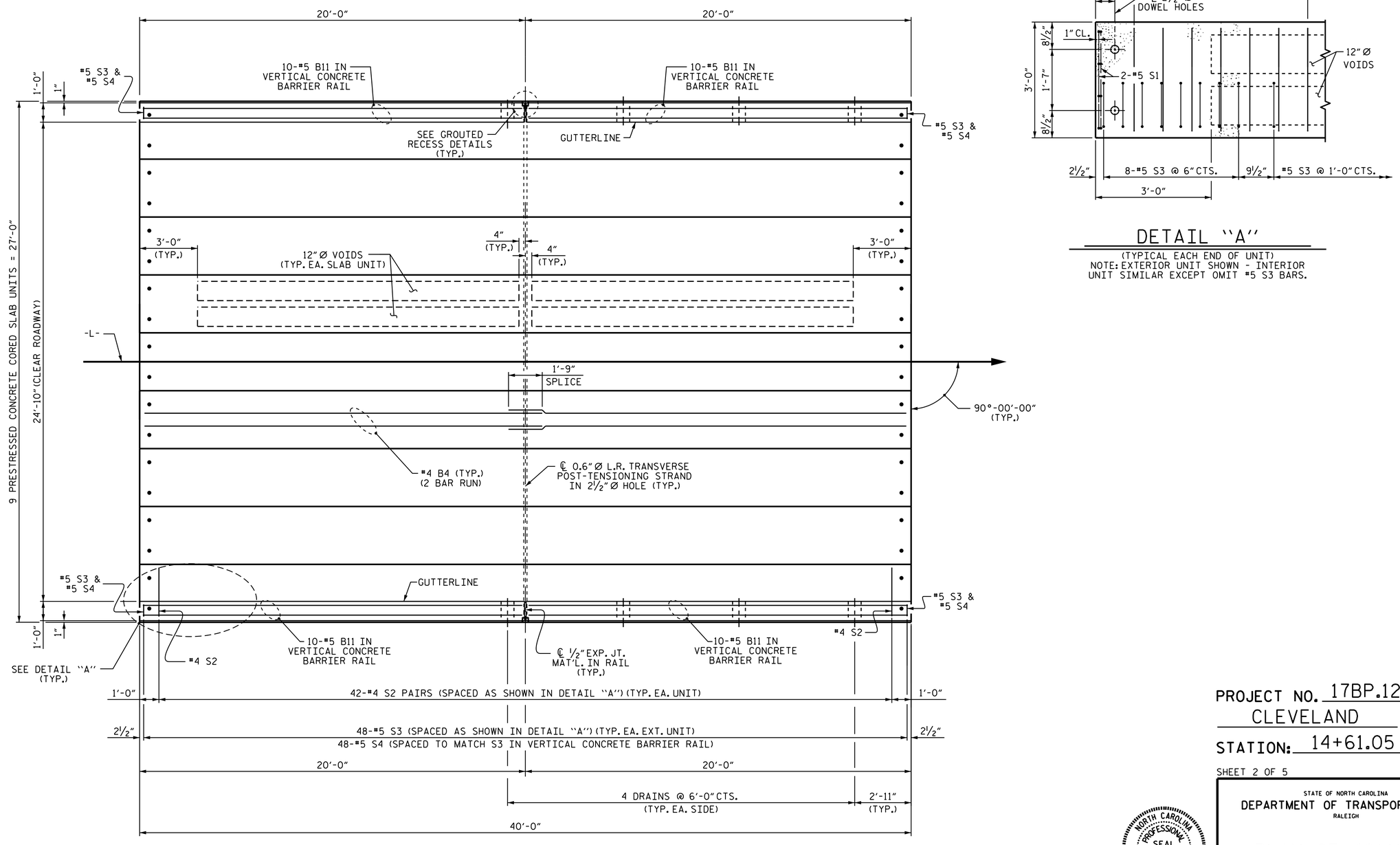
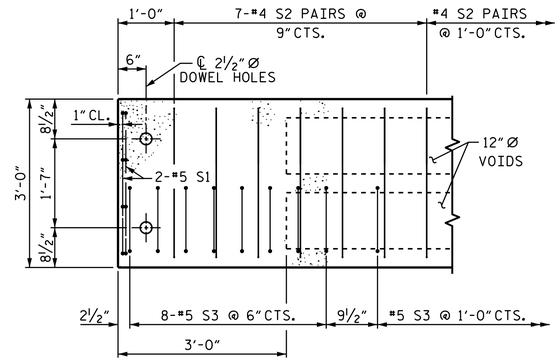


PLAN OF UNIT
SPAN A



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

PROJECT NO. 17BP.12.R.43
CLEVELAND COUNTY
STATION: 14+61.05 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT 24'-10" CLEAR ROADWAY

90° SKEW - SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

DocuSigned by: Marshall G. Cheek Jr. 6549D6EBAA3B405...

6/6/2017

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

ASSEMBLED BY :	N.D'AIUTO	DATE :	2/20/15
CHECKED BY :	T.R.PETERSON	DATE :	3/2/15
DRAWN BY : DGE	5/09	REV.	12/5/11 MAA/AAC
CHECKED BY : BCH	6/09	REV.	8/14 MAA/TMG

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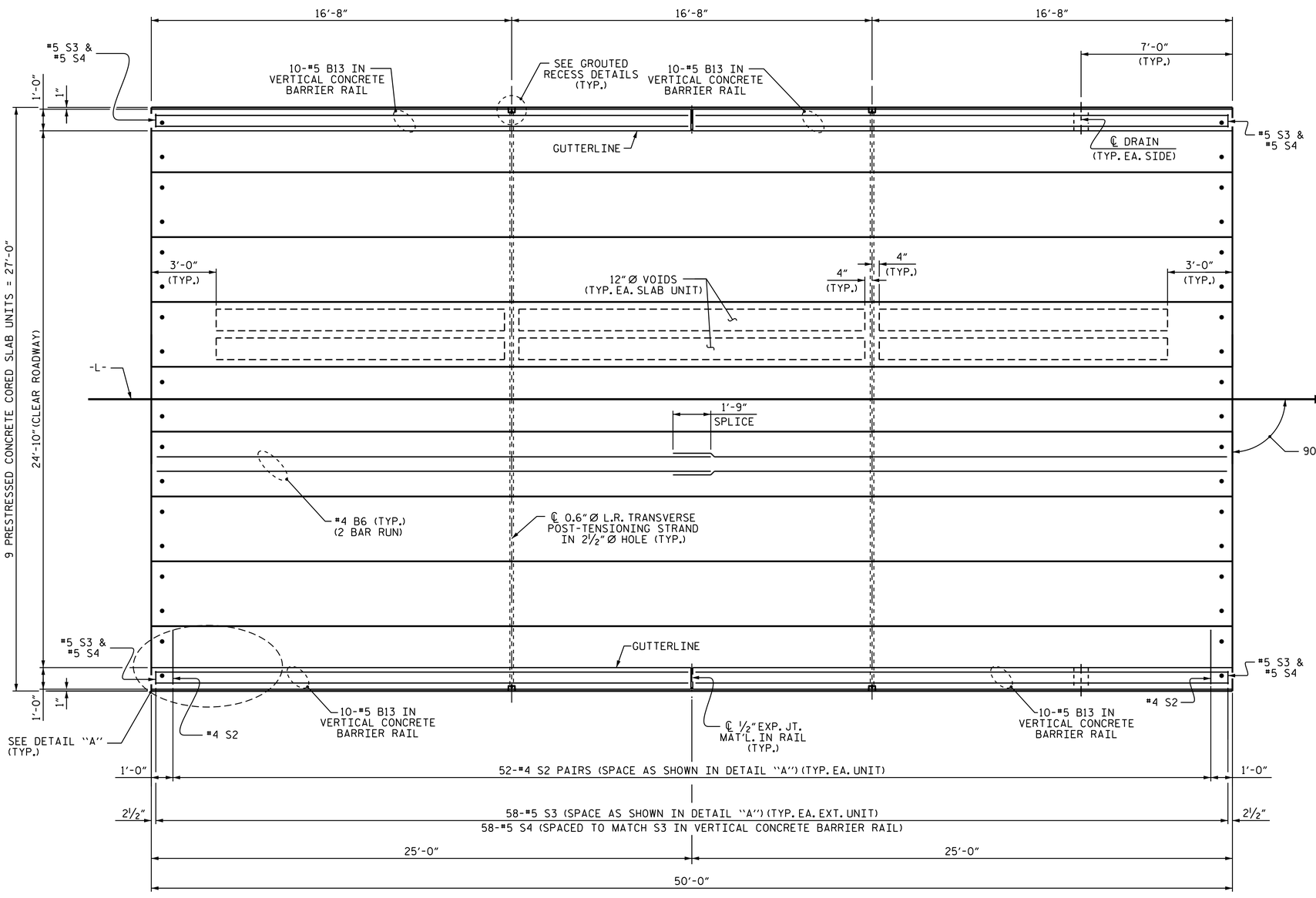
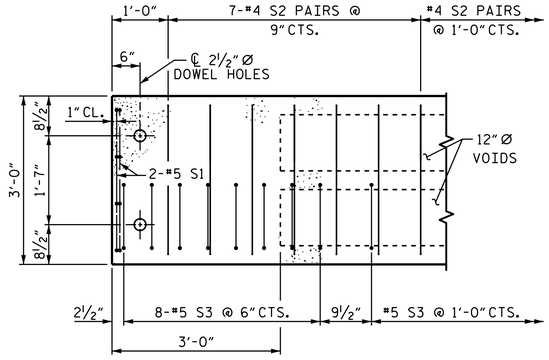


PLAN OF UNIT
SPAN B



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

PROJECT NO. 17BP.12.R.43
CLEVELAND COUNTY
STATION: 14+61.05 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 50' UNIT
24'-10" CLEAR ROADWAY

90° SKEW - SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek Jr.
6540D6EBAA3B405...
6/6/2017

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DRAWN BY :	DGE 5/09	REV.	12/5/11 MAA/AAC
CHECKED BY :	BCH 6/09	REV.	8/14 MAA/TMG

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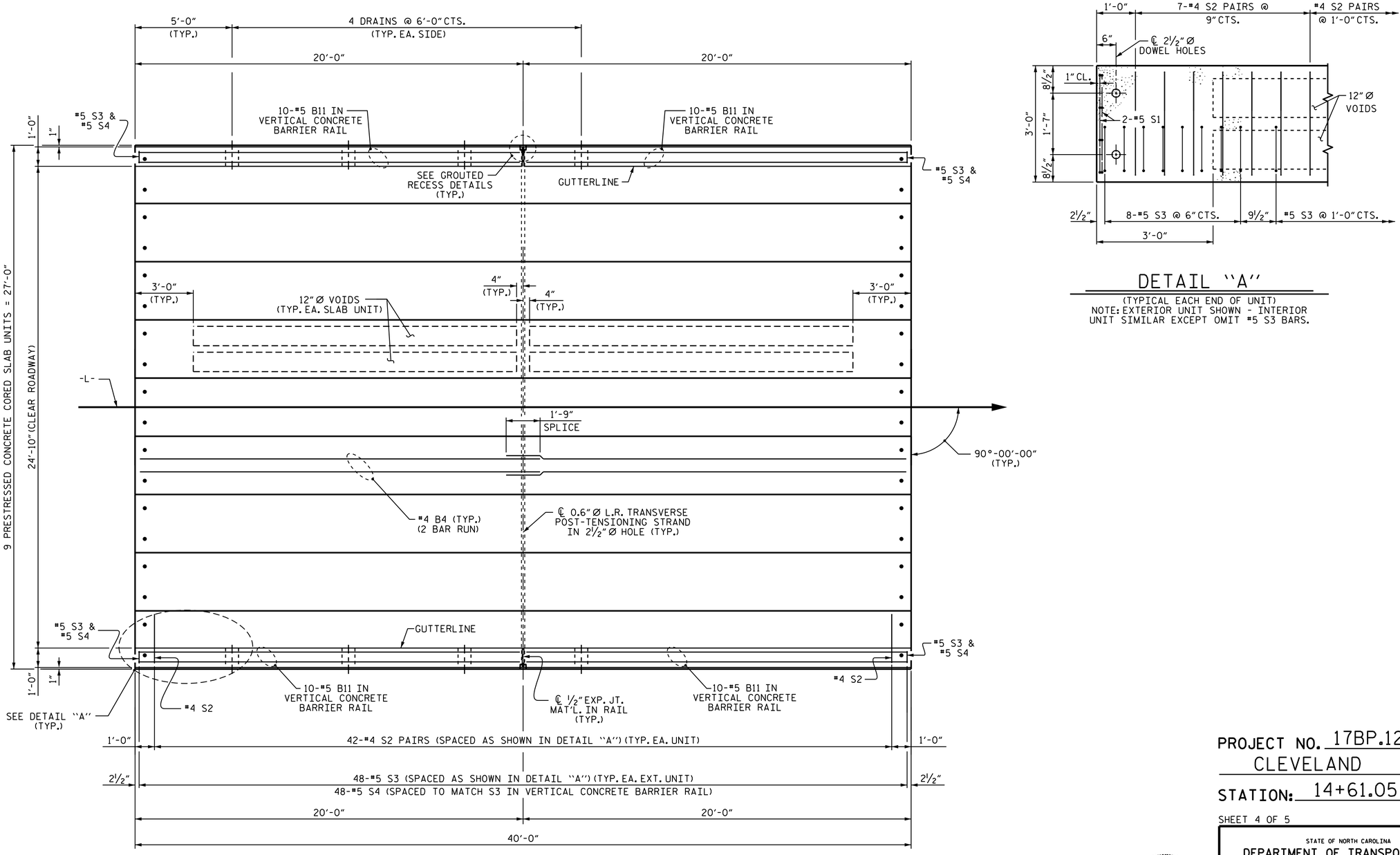
STD. NO. 21"PCS_27_90S_50L



PLAN OF UNIT
SPAN C

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

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PROJECT NO. 17BP.12.R.43
CLEVELAND COUNTY
STATION: 14+61.05 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT 24'-10" CLEAR ROADWAY

90° SKEW - SPAN C

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
DocuSigned by: Marshall G. Cheek Jr. 6549D8EBAA3B405...
6/6/2017

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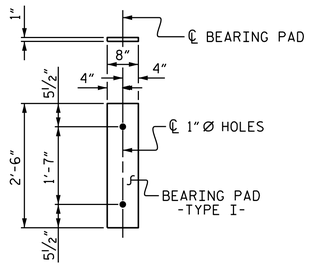


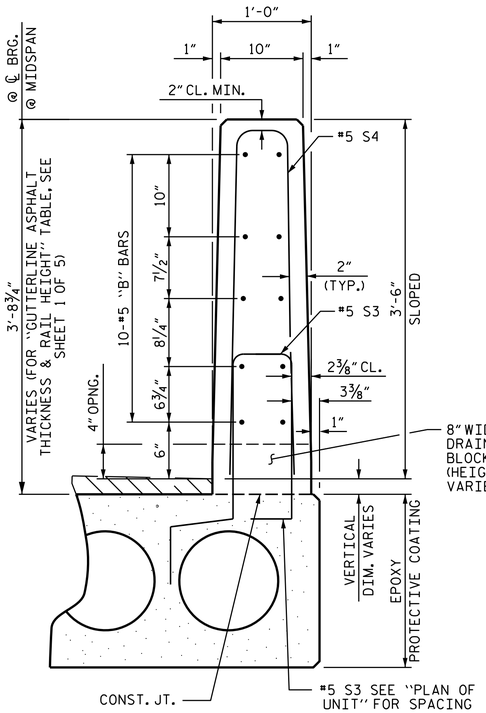
FIXED END
(TYPE I - 54 REQ'D)

ELASTOMERIC BEARING DETAILS

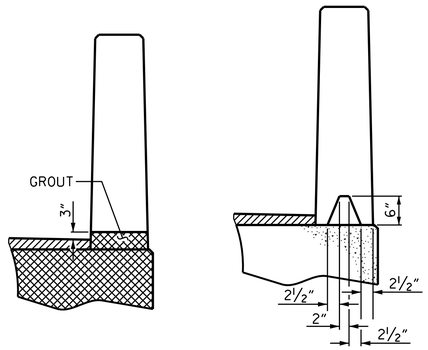
ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS			TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	SPAN A	SPAN B	SPAN C					
✳B11	40		40	80	#5	STR	19'-7"	1634
✳B13		40		40	#5	STR	24'-7"	1026
✳S4	96	116	96	308	#5	2	7'-2"	2302
✳EPOXY COATED REINFORCING STEEL							LBS.	4,962
CLASS AA CONCRETE							CU.YDS.	33.2
TOTAL VERTICAL CONCRETE BARRIER RAIL							LIN.FT.	260.50

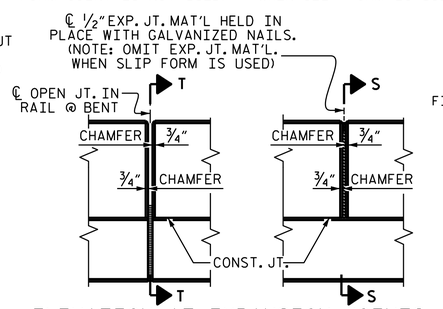


VERTICAL CONCRETE BARRIER RAIL SECTION



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

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

CORED SLABS REQUIRED

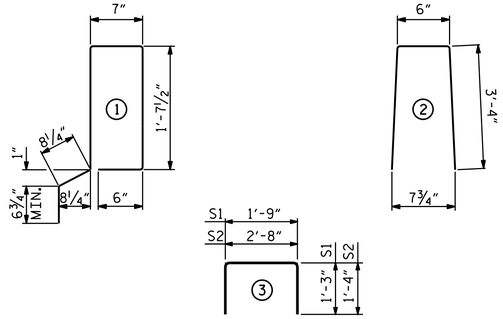
	NUMBER	LENGTH	TOTAL LENGTH
40' UNIT			
EXTERIOR C.S.	4	40'-0"	160'-0"
INTERIOR C.S.	14	40'-0"	560'-0"
50' UNIT			
EXTERIOR C.S.	2	50'-0"	100'-0"
INTERIOR C.S.	7	50'-0"	350'-0"
TOTAL	27		1170'-0"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0"x 1'-9"
40' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	⅞" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅛" ↓
FINAL CAMBER	¾" ↑
50' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅜" ↓
FINAL CAMBER	1⅛" ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

BAR TYPES



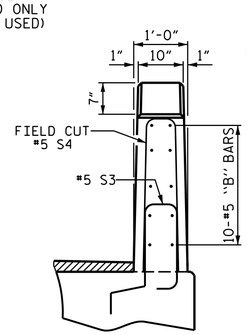
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT

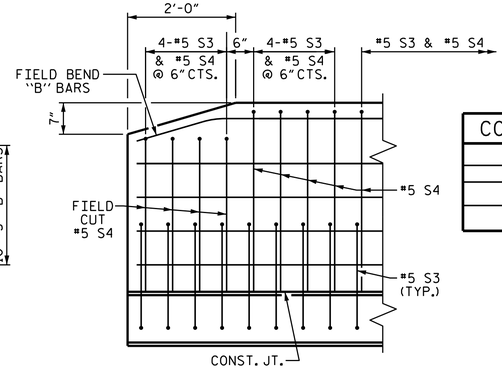
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	84	#4	3	5'-4"	299	5'-4"	299
✳S3	48	#5	1	5'-7"	280		
REINFORCING STEEL				LBS.	389		389
✳EPOXY COATED REINFORCING STEEL				LBS.	280		
5,000 P.S.I. CONCRETE				CU. YDS.	5.8		5.8
0.6"Ø L.R. STRANDS				No.	13		13

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		
6,500 P.S.I. CONCRETE				CU. YDS.	7.2		7.1
0.6"Ø L.R. STRANDS				No.	19		19



END VIEW



SIDE VIEW

END OF RAIL DETAILS

CONCRETE RELEASE STRENGTH

UNIT	PSI
40' UNITS	4,000
50' UNITS	4,900

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 CONTRACTOR SHALL NOT GROUT THE ½"Ø INSERTS AND SHALL LEAVE THEM OPEN FOR USE BY NCDOT MAINTENANCE FORCES.

THE ½"Ø THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SPACED AT 2'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE COST OF THE ½"Ø THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 8" X 4". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR CORED SLAB UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.

PROJECT NO. 17BP.12.R.43
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SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Docusigned by: Marshall G. Creek, Jr.
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9/5/2017

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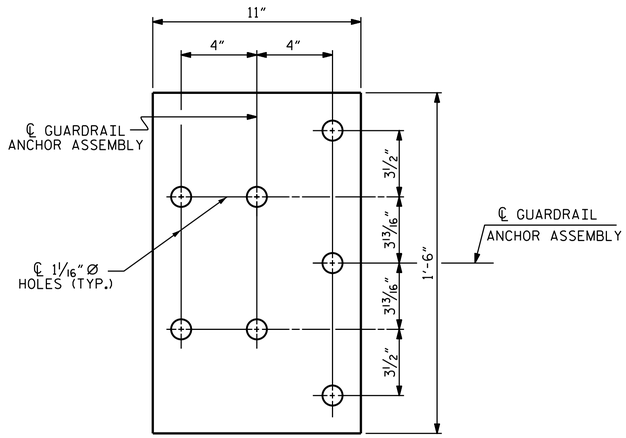

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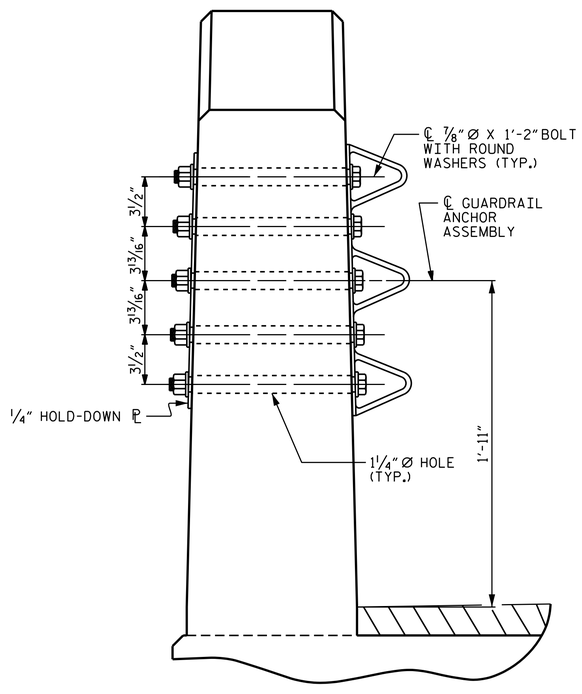
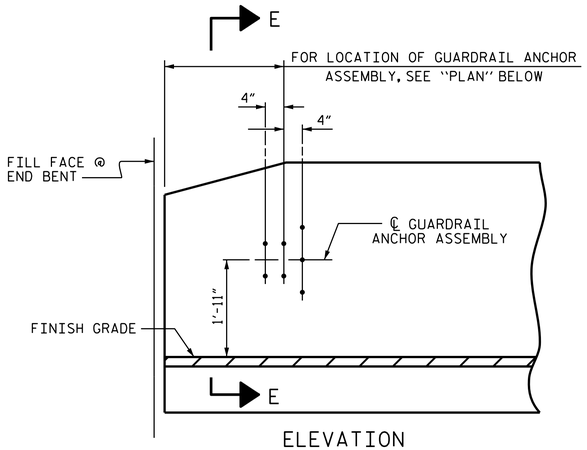


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



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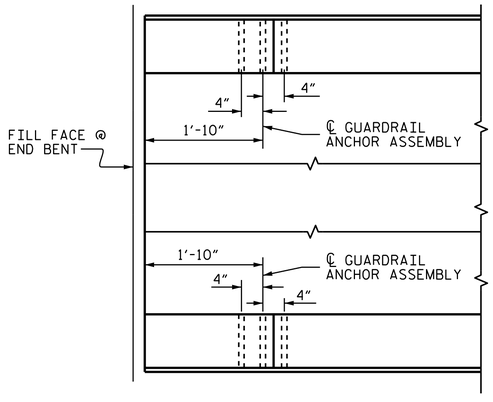


PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

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.)

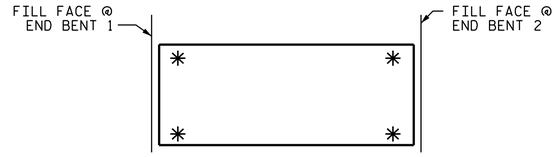
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Marshall G. Creek Jr.
6/6/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 2/20/15
CHECKED BY : T.R.PETERSON	DATE : 3/2/15
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

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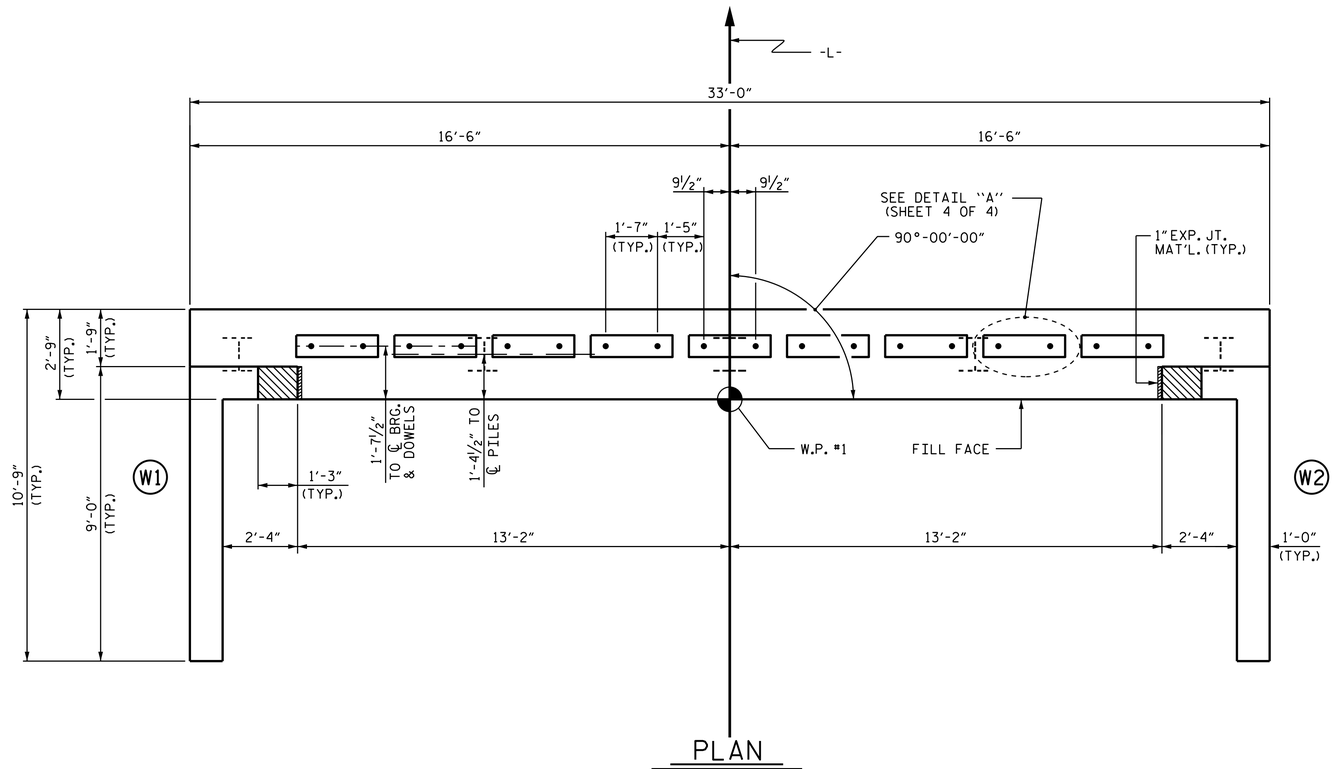

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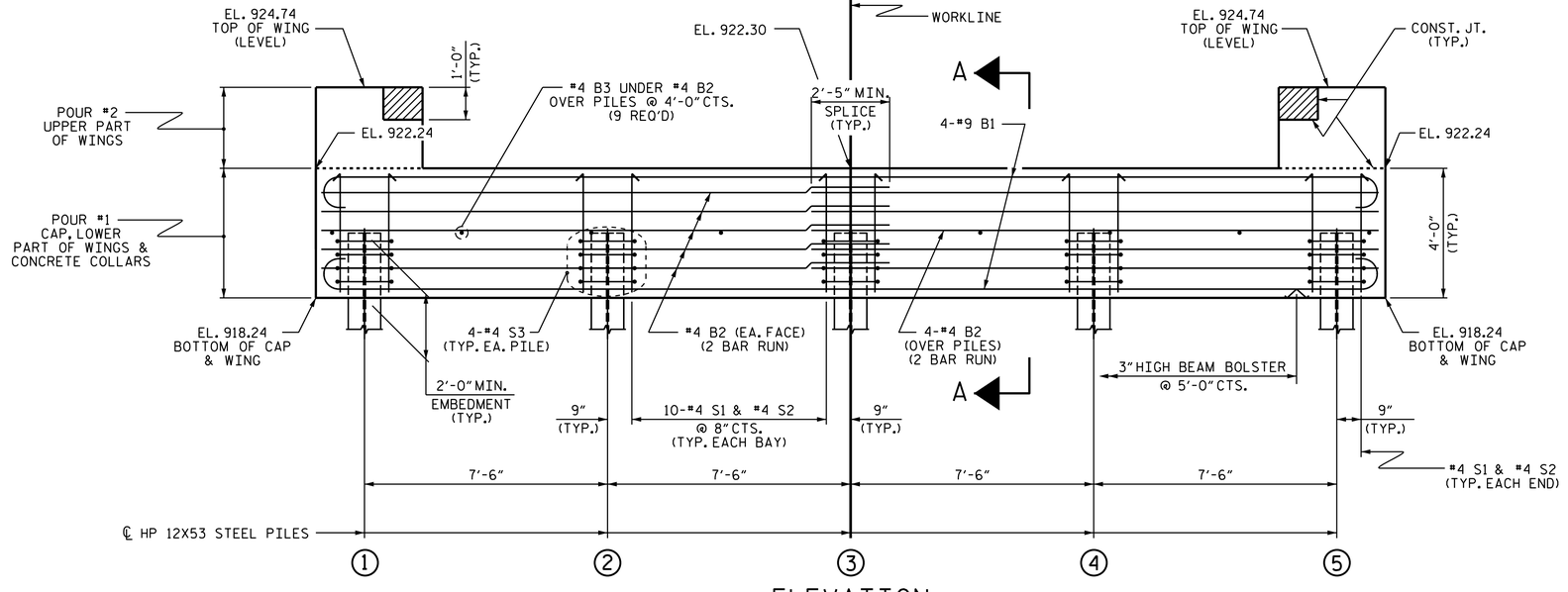

ELEVATION

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

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

PROJECT NO. 17BP.12.R.43
CLEVELAND COUNTY
STATION: 14+61.05 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Digitally signed by Marshall G. Cheek Jr.
8549D6EBAA3B405...
6/6/2017

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CHECKED BY :	AAC 12/11		

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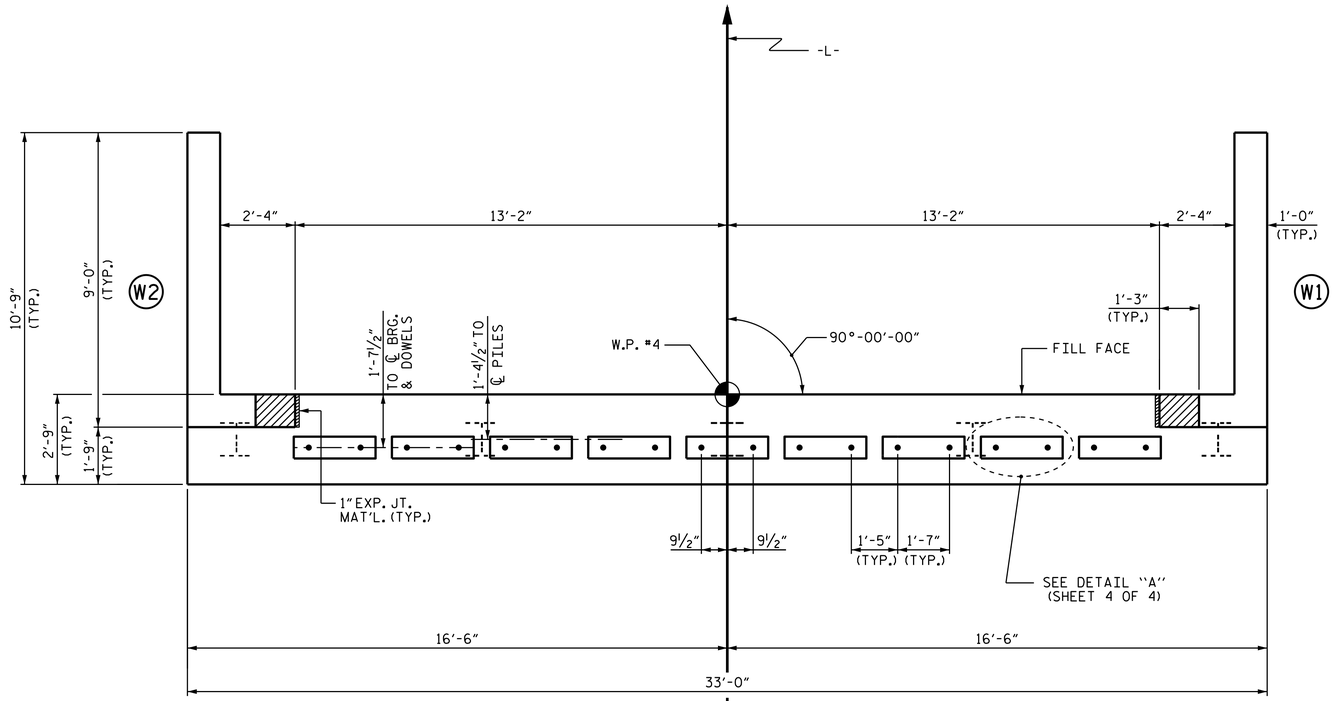

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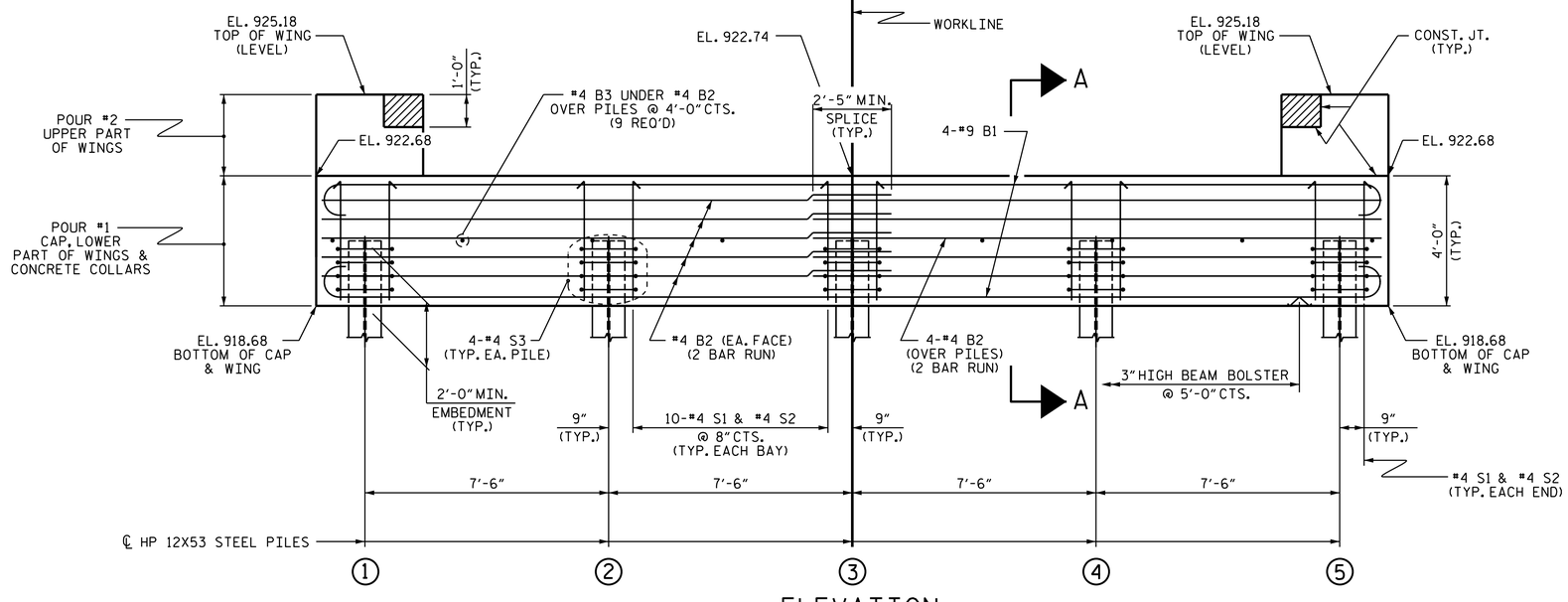

ELEVATION

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

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

ASSEMBLED BY : N.D'AIUTO	DATE : 2/20/15
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SHEET 2 OF 4

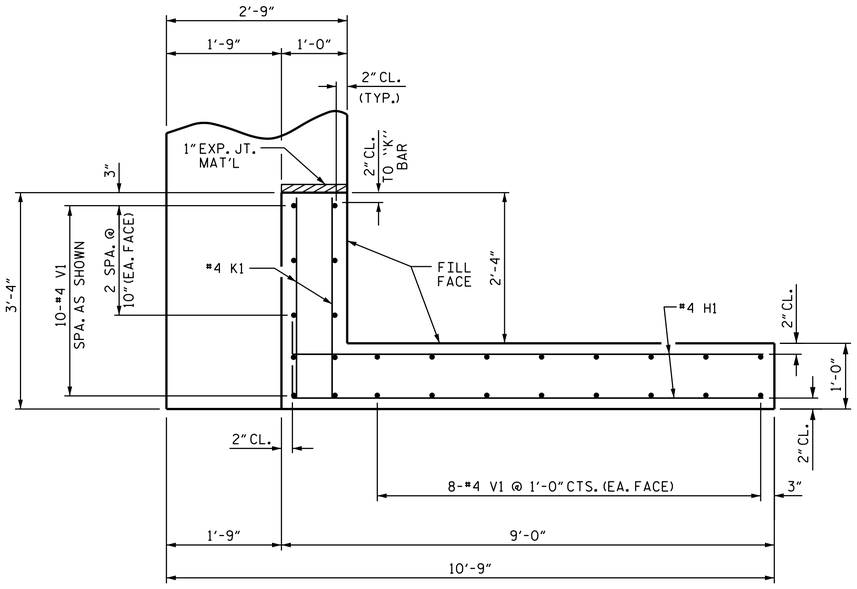
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

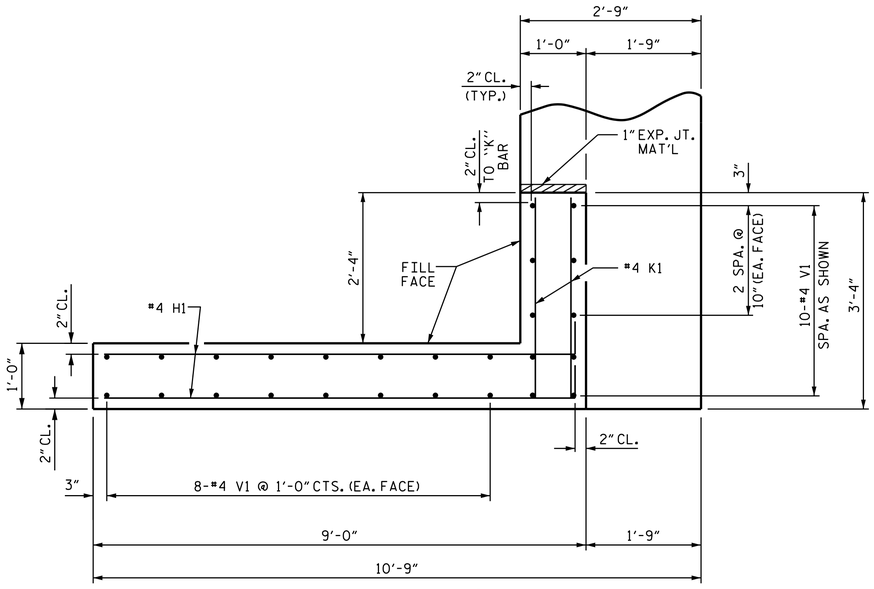
END BENT 2

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

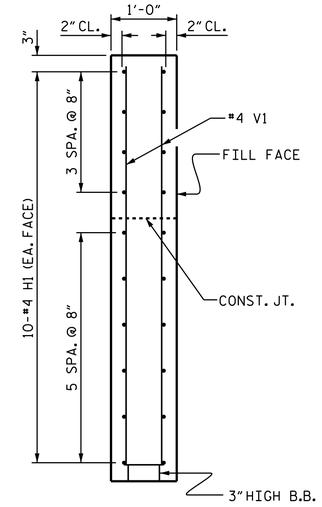
STD. NO. EB_27_90S4



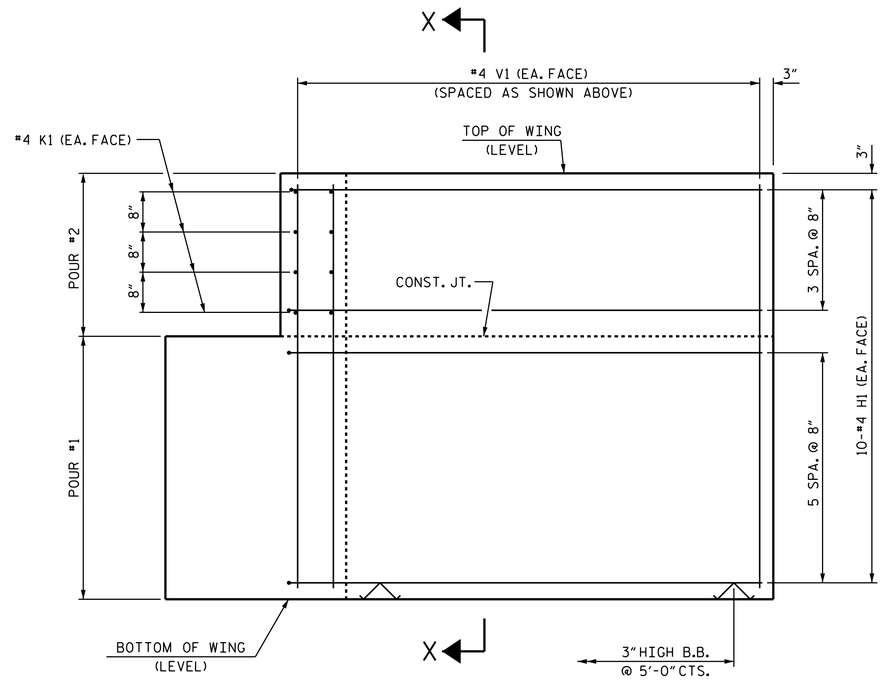
PLAN OF WING (W1)



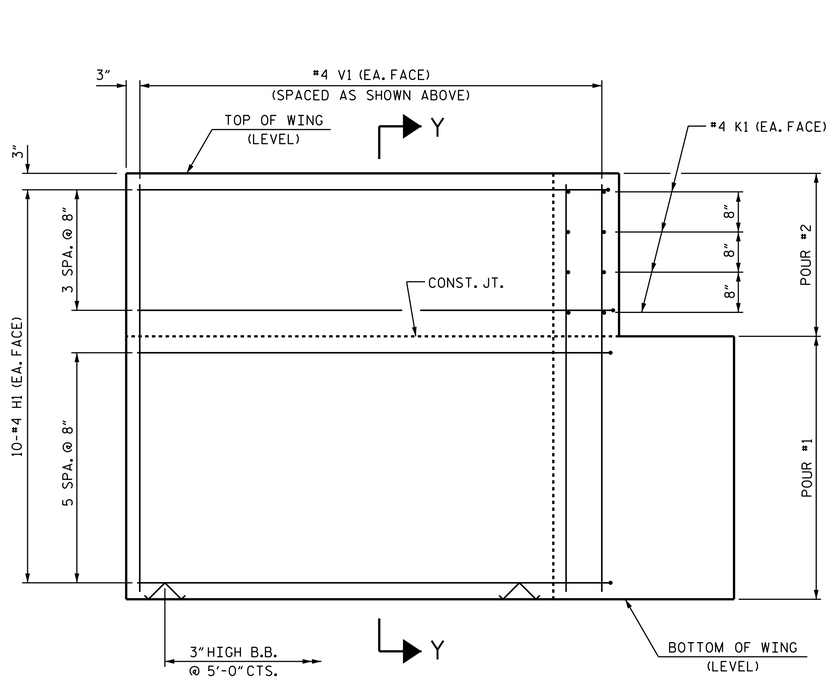
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)



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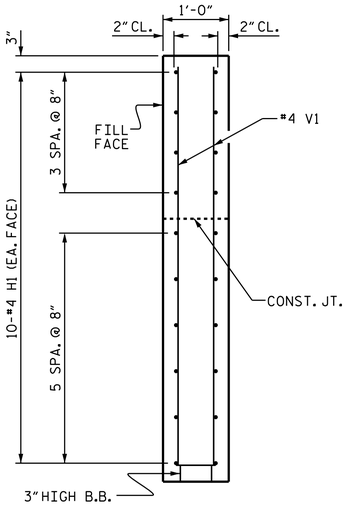

SECTION Y-Y

WING DETAILS

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK JR.

Marshall G. Cheek Jr.
6549D6EBAA3B405...

6/6/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 2/20/15		
CHECKED BY : T.R.PETERSON	DATE : 3/2/15		
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG		
CHECKED BY : AAC 12/11			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-13

TOTAL SHEETS 20

STD. NO. EB_27_90S4

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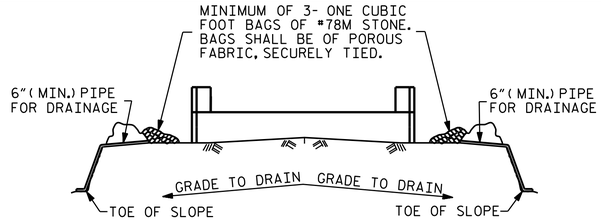
mcheek

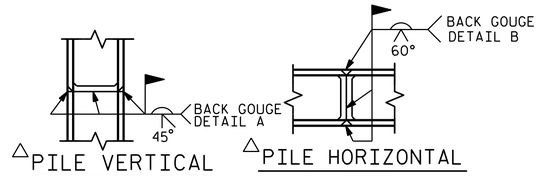


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

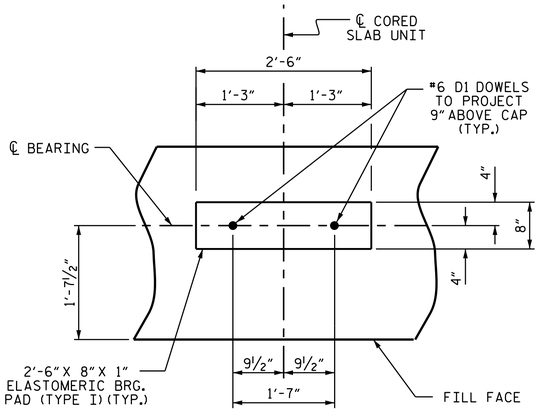
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



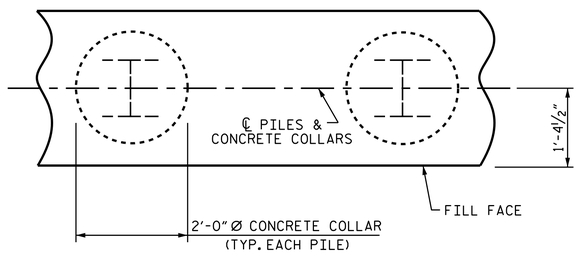
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

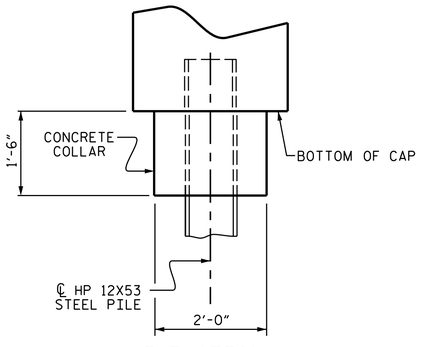


DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



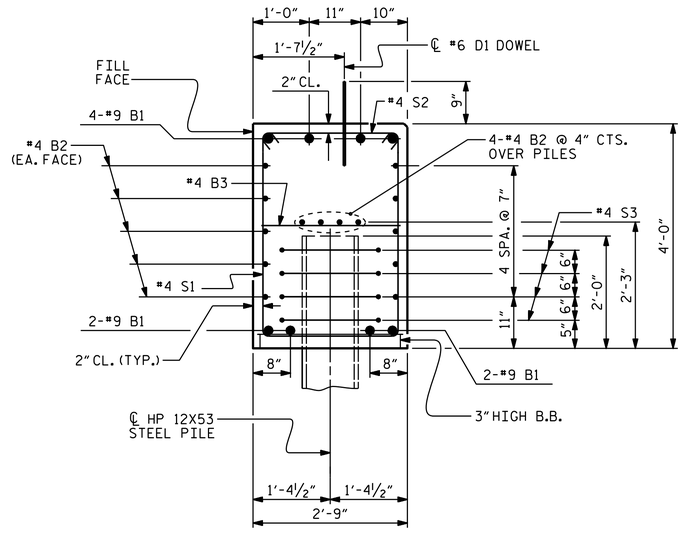
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

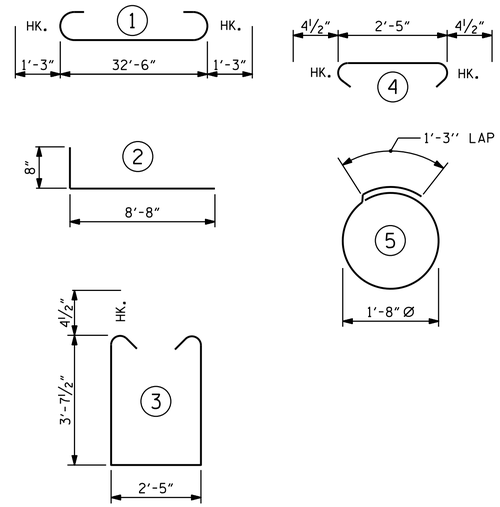
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1	END BENT 2
HP 12X53 STEEL PILES	HP 12X53 STEEL PILES
NO: 5 LIN. FT.= 150	NO: 5 LIN. FT.= 90
STEEL PILE POINTS EA. 5	STEEL PILE POINTS EA. 5
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
EACH = 5	EACH = 5

BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	35'-0"	952
B2	28	#4	STR	17'-7"	329
B3	9	#4	STR	2'-5"	15
D1	18	#6	STR	1'-6"	41
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	42	#4	3	10'-5"	292
S2	42	#4	4	3'-2"	89
S3	20	#4	5	6'-6"	87
V1	52	#4	STR	6'-2"	214
REINFORCING STEEL (FOR ONE END BENT)				LBS.	2,299

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	C.Y. 16.7
POUR #2	UPPER PART OF WINGS	C.Y. 2.1
TOTAL CLASS A CONCRETE		C.Y. 18.8

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 & 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek Jr.
6/6/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 2/20/15
CHECKED BY : T.R.PETERSON	DATE : 3/2/15
DRAWN BY : WJH 12/11	
CHECKED BY : AAC 12/11	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
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2			4			20

STD. NO. EB_27_90S4

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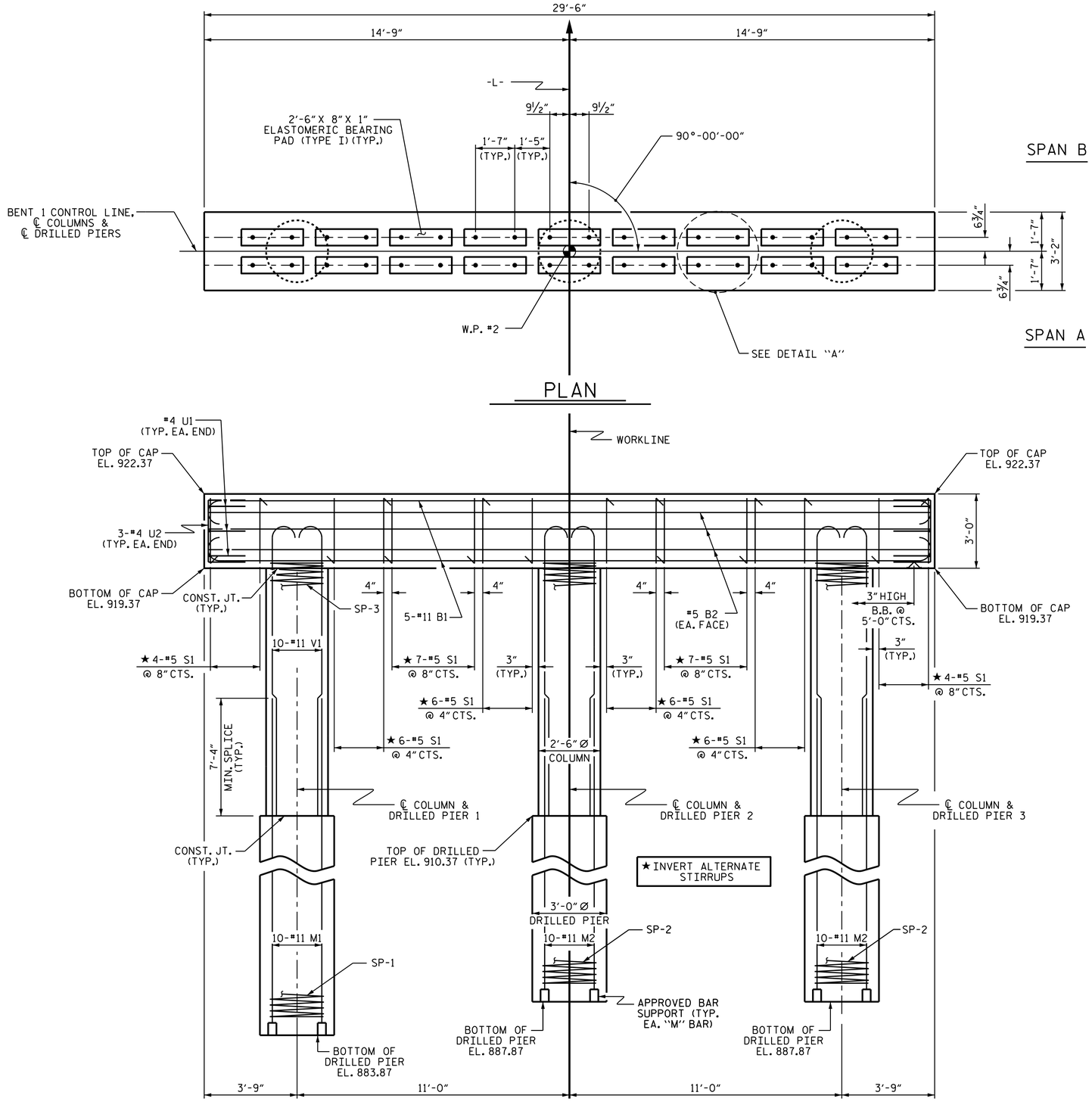


ELEVATION

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

NOTES

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

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

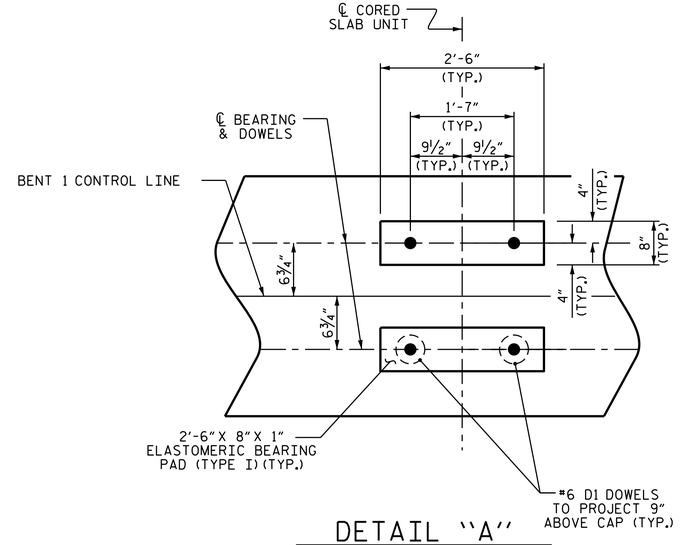
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek Jr.

6/6/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 5/11/15
CHECKED BY : T.R.PETERSON	DATE : 5/12/15
DRAWN BY : DGE 4/10	REV. 11/14 MAA/TMG
CHECKED BY : MKT 4/10	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
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2			4			20

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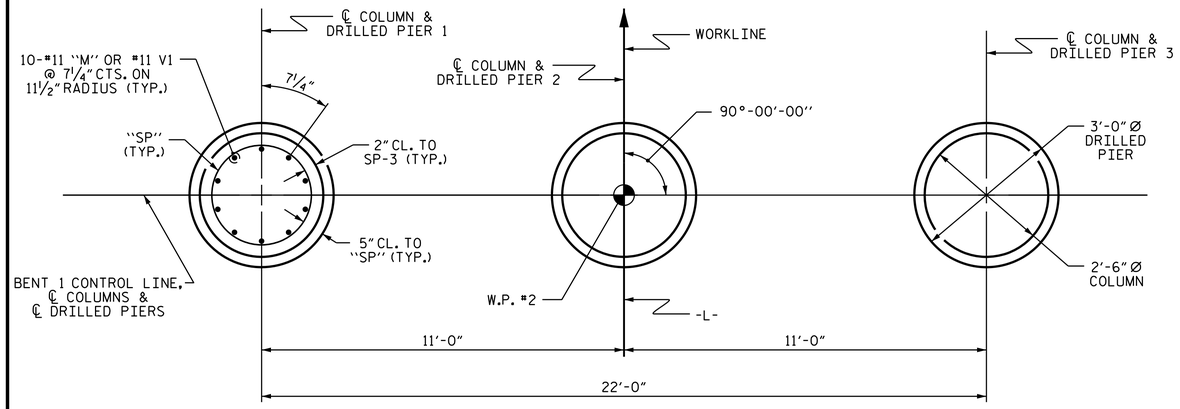
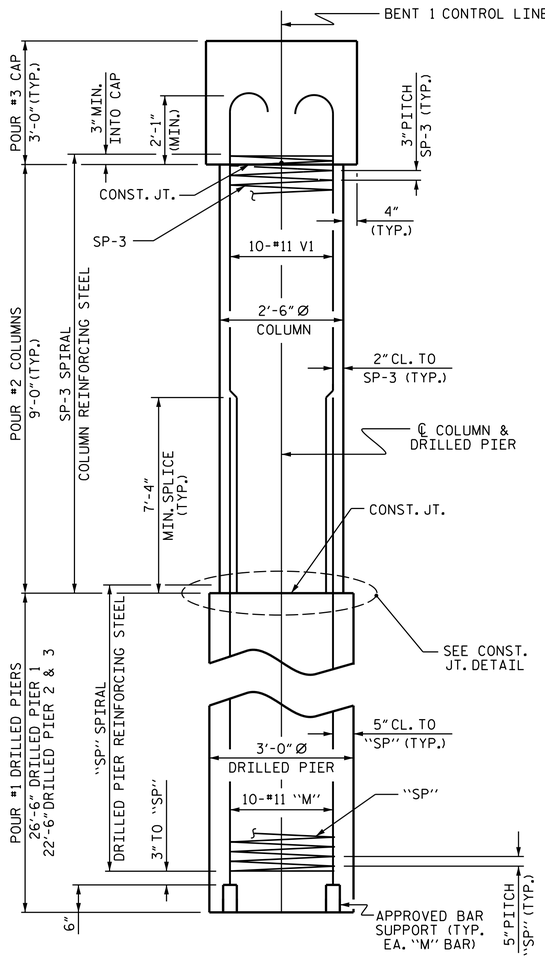
mcheek

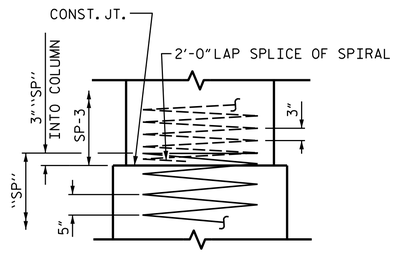
STD. NO. DP_BT_27_90S_<50'



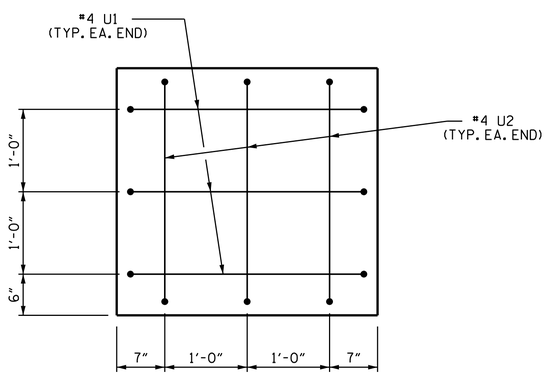
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

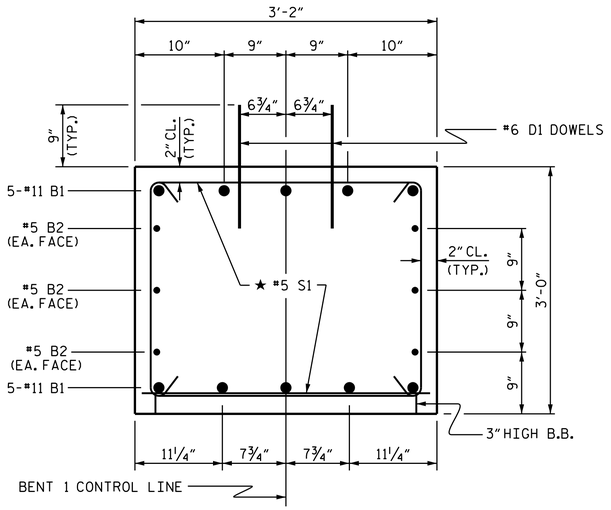


CONSTRUCTION JOINT DETAIL



END OF CAP VIEW

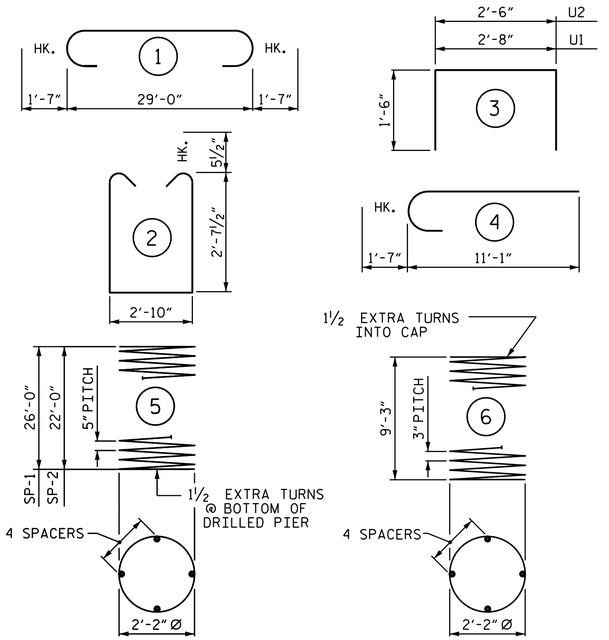
(TYPICAL BOTH ENDS)



SECTION THROUGH CAP

★ INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	32'-2"	1709
B2	6	#5	STR	29'-2"	183
D1	36	#6	STR	1'-6"	81
M1	10	#11	STR	36'-7"	1944
M2	20	#11	STR	32'-7"	3462
S1	46	#5	2	9'-0"	432
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
V1	30	#11	4	12'-8"	2019
REINFORCING STEEL				LBS.	9,875

SP-1	1	✳	5	426'-0"	444
SP-2	2	✳	5	362'-10"	757
SP-3	3	✳✳	6	257'-3"	516
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,717

✳ THE SP-1 & SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

✳✳ THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN		
POUR #2 (COLUMNS)	C.Y.	4.9
POUR #3 (CAP)	C.Y.	10.4
TOTAL CLASS A CONCRETE	C.Y.	15.3

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	C.Y.	18.7
3'-0" Ø DRILLED PIERS IN SOIL	LIN. FT.	29.50
3'-0" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	42.00
CSL TUBES	LIN. FT.	304.00
SID INSPECTIONS	EA.	1
SPT TESTING	EA.	2
CSL TESTING	EA.	1

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.

DocuSigned by: Marshall C. Cheek Jr. 6549D6EBAA3B405...

6/7/2017

ASSEMBLED BY :	N.D'AIUTO DATE : 5/11/15
CHECKED BY :	T.R.PETERSON DATE : 5/12/15
DRAWN BY : DGE 3/10	REV. 11/14 MAA/TMG
CHECKED BY : MKT 3/10	

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
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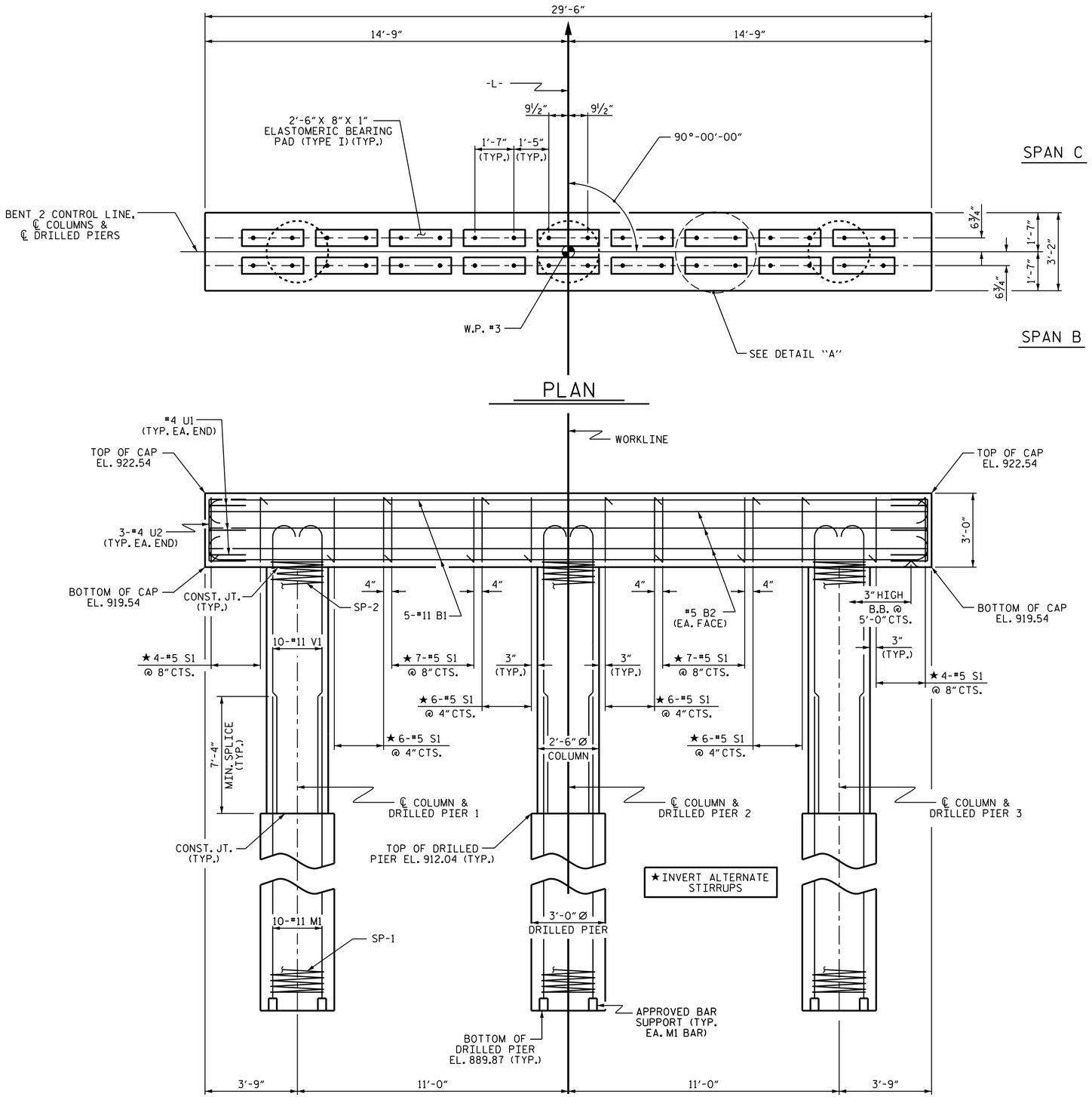

ELEVATION

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

NOTES

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

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

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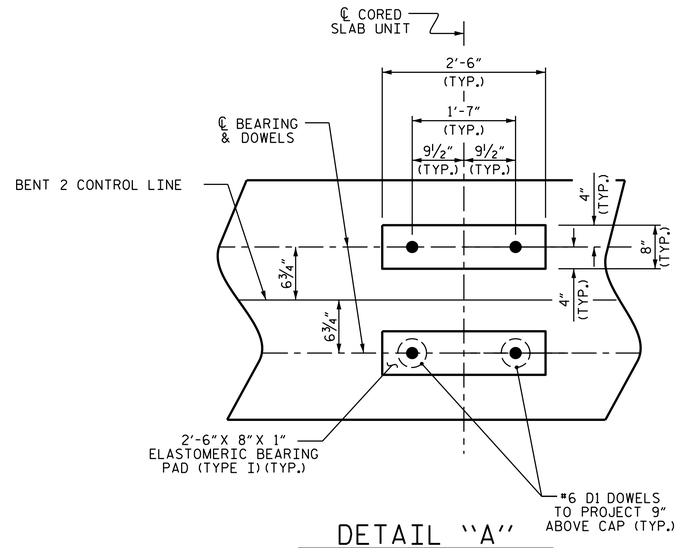
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Docusigned by: Marshall G. Cheek Jr. 6549D8EBAA3B405...

6/6/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ASSEMBLED BY :	N.D'AIUTO	DATE :	5/11/15
CHECKED BY :	T.R.PETERSON	DATE :	5/12/15
DRAWN BY : DGE	4/10	REV. 11/14	MAA/TMG
CHECKED BY : MKT	4/10		

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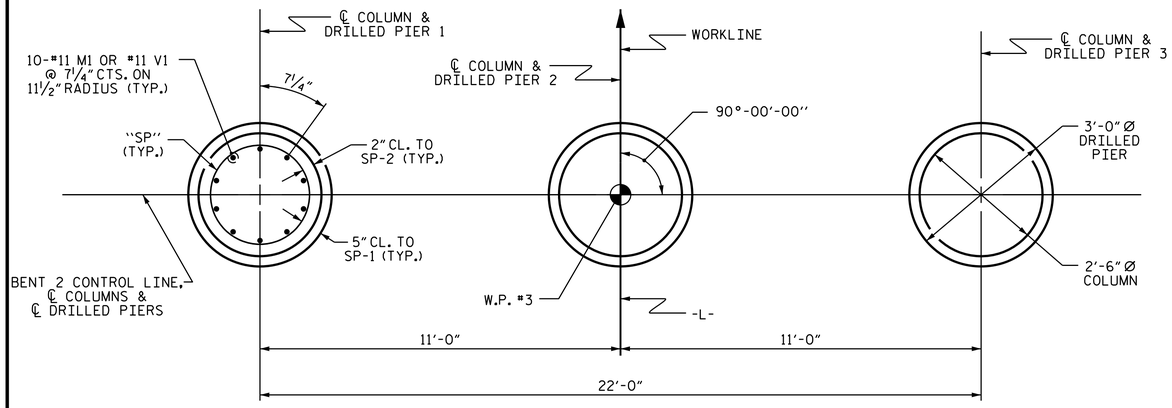
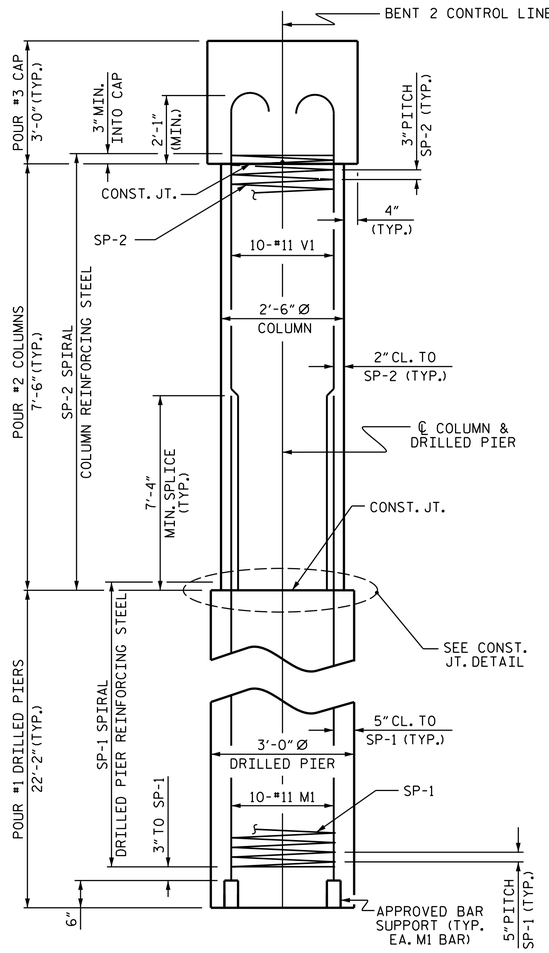
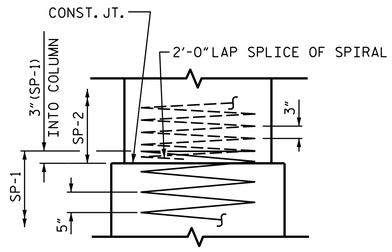


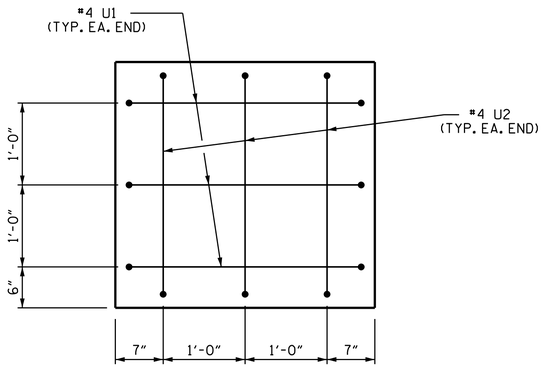
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

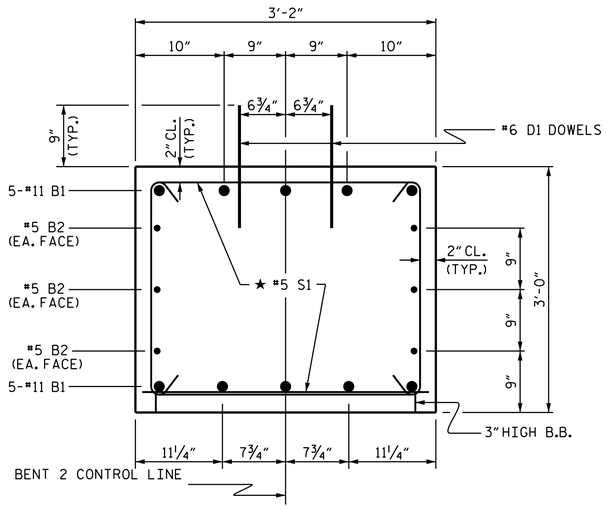


CONSTRUCTION JOINT DETAIL



END OF CAP VIEW

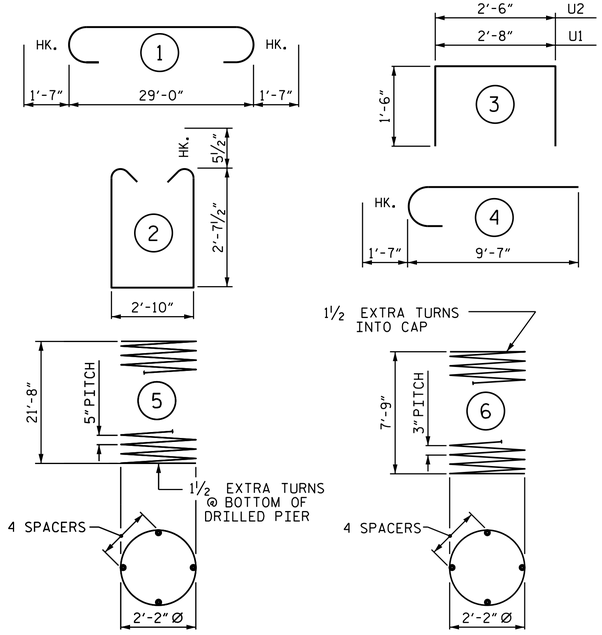
(TYPICAL BOTH ENDS)



SECTION THROUGH CAP

★ INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	32'-2"	1709
B2	6	#5	STR	29'-2"	183
D1	36	#6	STR	1'-6"	81
M1	30	#11	STR	32'-3"	5140
S1	46	#5	2	9'-0"	432
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
V1	30	#11	4	11'-2"	1780
REINFORCING STEEL				LBS.	9,370
SP-1	3	✳	5	357'-10"	1120
SP-2	3	✳✳	6	217'-2"	435
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,555

✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

✳✳ THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN		
POUR #2 (COLUMNS)	C.Y.	4.1
POUR #3 (CAP)	C.Y.	10.4
TOTAL CLASS A CONCRETE	C.Y.	14.5

DRILLED PIER CONCRETE		
POUR #1 (DRILLED PIERS)	C.Y.	17.4
3'-0" Ø DRILLED PIERS IN SOIL	LIN. FT.	27.50
3'-0" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	39.00
CSL TUBES	LIN. FT.	284.00
SPT TESTING	EA.	2
CSL TESTING	EA.	1

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.

DocuSigned by: Marshalll C. Cheek Jr. 6549D6EBAA3B405...

6/7/2017

ASSEMBLED BY : N.D'AIUTO	DATE : 5/11/15
CHECKED BY : T.R.PETERSON	DATE : 5/12/15
DRAWN BY : DGE 3/10	REV. 11/14 MAA/TMG
CHECKED BY : MKT 3/10	

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

STD. NO. DP_BT_27_90S_<50'

$$$$$$SYSTIME$$$$$
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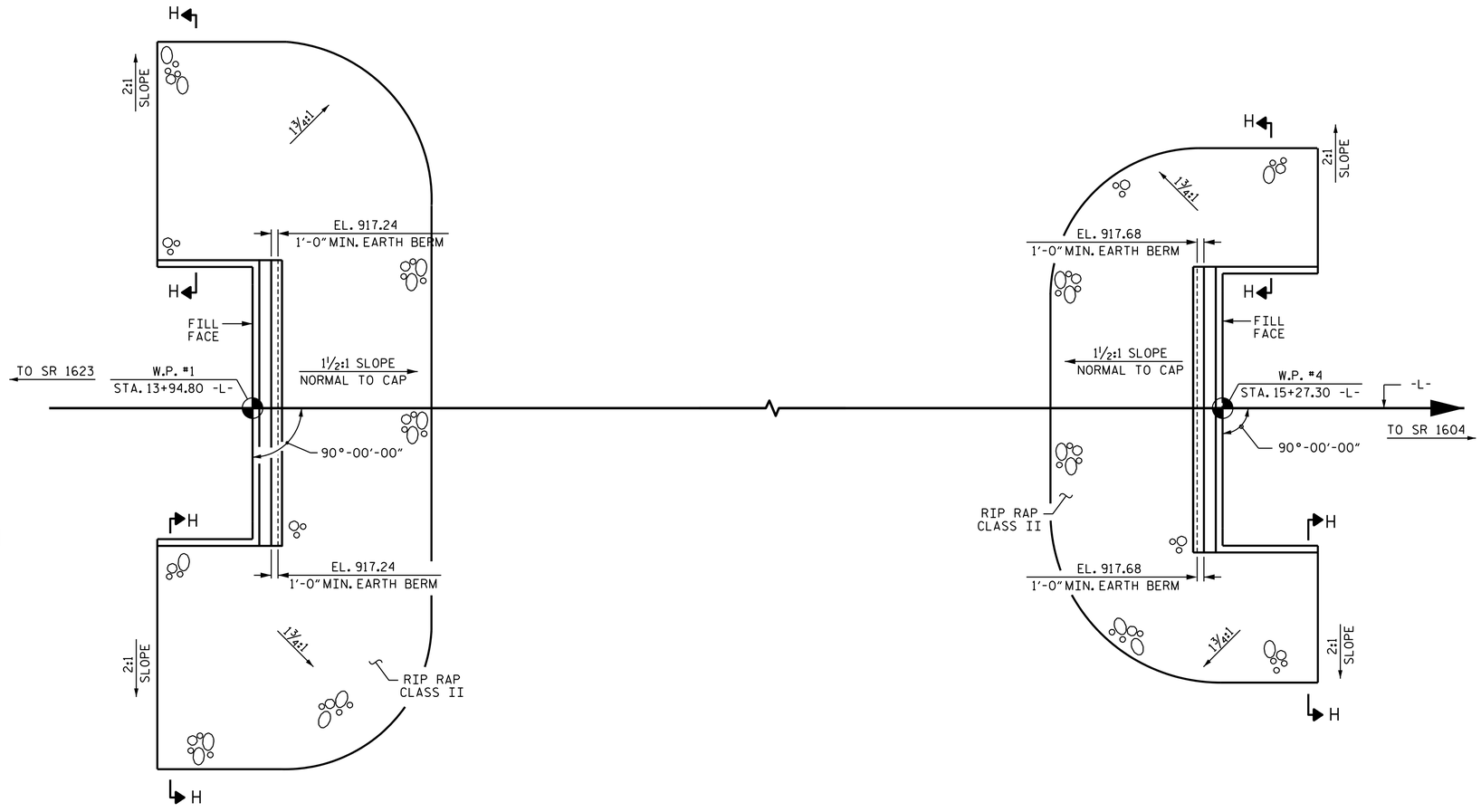
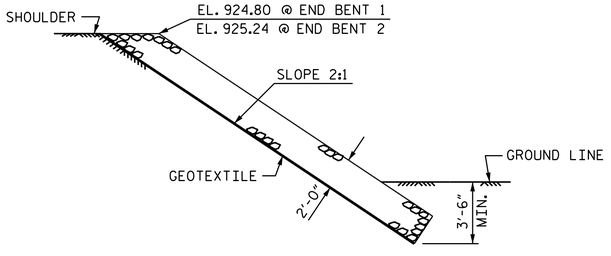
$$$$USERNAME$$$$

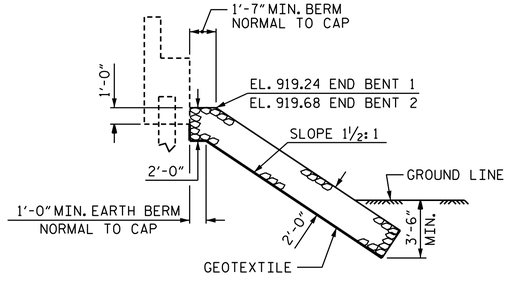
ESTIMATED QUANTITIES

BRIDGE @ STA. 14+61.05 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	137	152
END BENT 2	125	139
TOTAL	262	291





SECTION H-H



℄ SECTION
BERM RIP RAPPED

PROJECT NO. 17BP.12.R.43
CLEVELAND COUNTY
STATION: 14+61.05 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK JR.
DocuSigned by: Marshall G. Cheek Jr.
6549D6EBAA3B405...
6/7/2017

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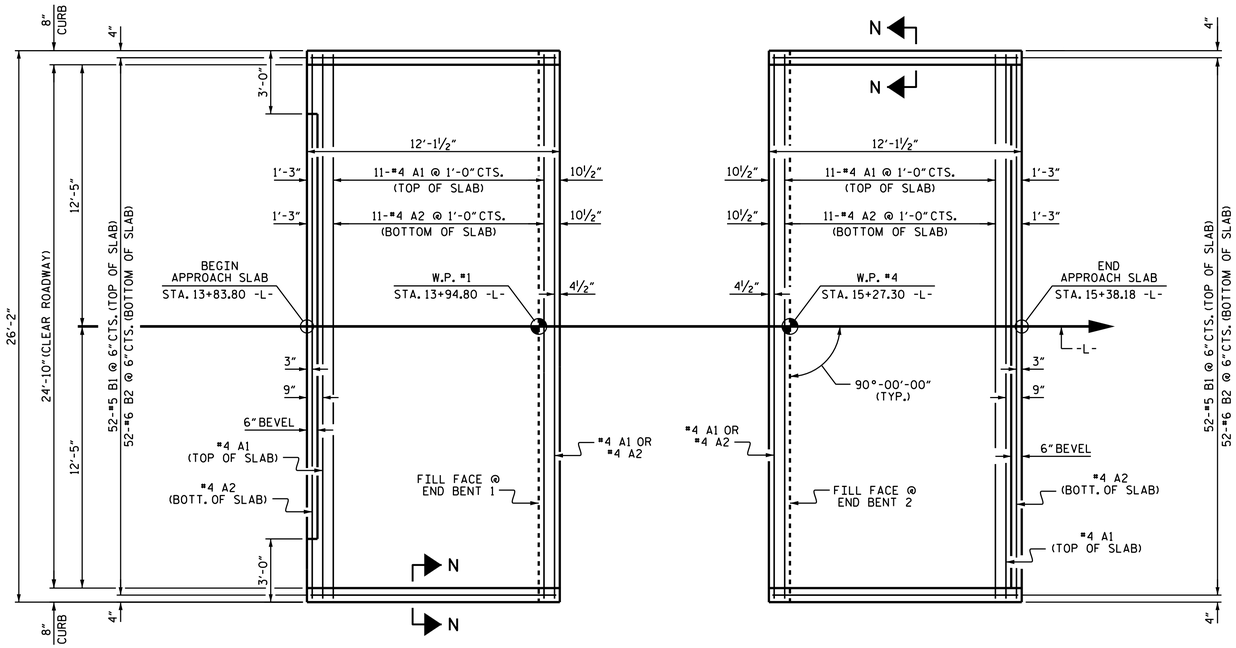
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			20

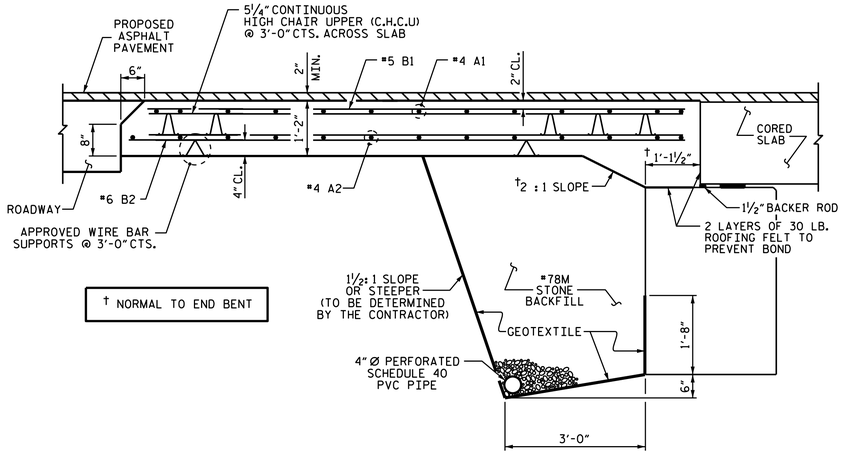
ASSEMBLED BY : N.D'AIUTO	DATE : 2/25/15	
CHECKED BY : T.R. PETERSON	DATE : 3/15	
DRAWN BY : FCJ 2/88	REV. 8/16/99	RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00	RWW/LES
	REV. 5/1/06R	TLA/GM

STD. NO. RR2

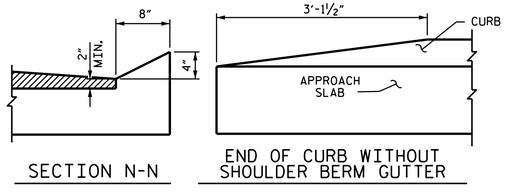


PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THROUGH SLAB



SECTION N-N END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

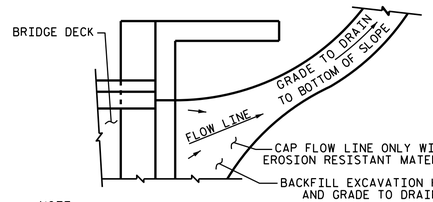
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

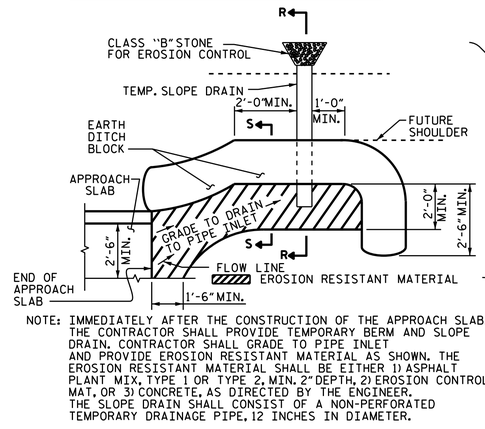
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



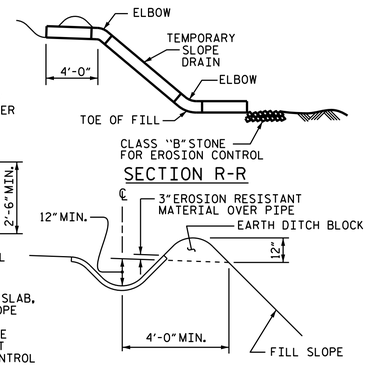
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

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



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	25'-10"	224
A2	13	#4	STR	25'-10"	224
* B1	52	#5	STR	11'-2"	606
B2	52	#6	STR	11'-8"	911
REINFORCING STEEL				LBS.	1,135
* EPOXY COATED REINFORCING STEEL				LBS.	830
CLASS AA CONCRETE				C.Y.	15.1

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	25'-10"	224
A2	13	#4	STR	25'-10"	224
* B1	52	#5	STR	11'-2"	606
B2	52	#6	STR	11'-8"	911
REINFORCING STEEL				LBS.	1,135
* EPOXY COATED REINFORCING STEEL				LBS.	830
CLASS AA CONCRETE				C.Y.	15.1

PROJECT NO. 17BP.12.R.43

CLEVELAND COUNTY

STATION: 14+61.05 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.

Docusigned by: Marshall C. Cheek Jr. 8549D6EBAA3B405...

6/6/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY :	N.D'AIUTO	DATE :	2/20/15
CHECKED BY :	T.R.PETERSON	DATE :	3/2/15
DRAWN BY : SHS/MAA 5-09	REV. 12-11		MAA/AAC
CHECKED BY : BCH 5-09	REV. 8-14		MAA/TMG

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STD. NO. BAS_27_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.

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

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ENGLISH

JANUARY, 1990

STD. NO. SN