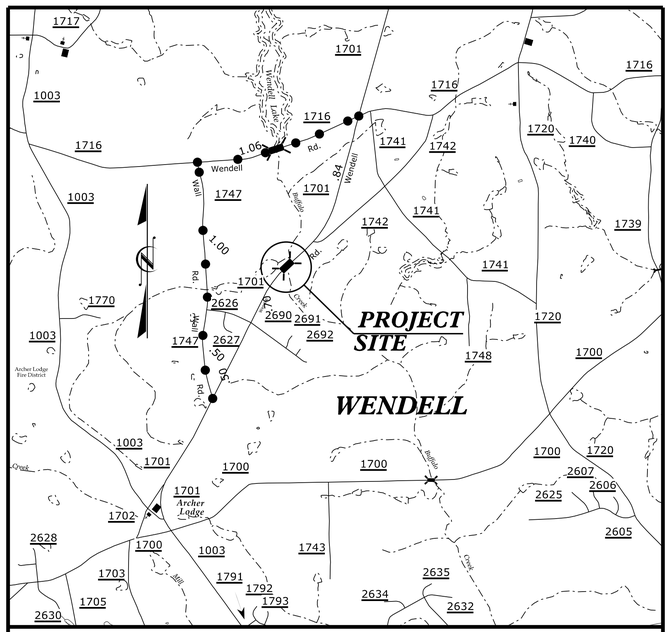
09/08/99

PROJECT: BP4–R007

CONTRACT: DD00477

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet RW02C-1 To RW02C-2 For Survey Control Sheets



VICINITY MAP

OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JOHNSTON COUNTY

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK ON SR 1701 (WENDELL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4–R007	1	

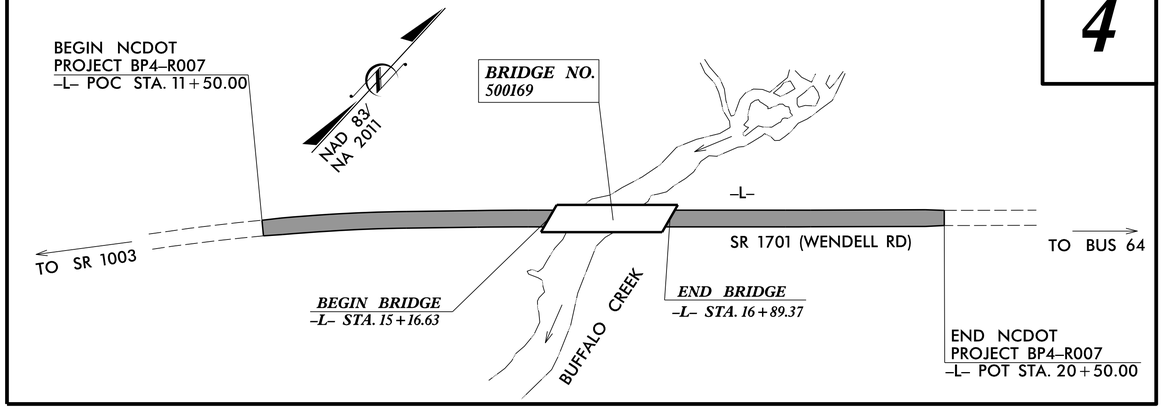
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP4–R007.1		PE
BP4–R007.2		ROW, UTIL.
BP4–R007.3		CONST.

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F–0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

STRUCTURE #500169

FINAL PLANS



4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2024 = 2,400

T = 8 % *
V = 55 MPH

* (TTST = 4% + DUAL = 4%)

FUNC CLASS =
MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP4–R007 =	0.137 MILES
LENGTH STRUCTURE PROJECT BP4–R007 =	0.033 MILES
TOTAL LENGTH PROJECT BP4–R007 =	0.170 MILES

NCDOT CONTACT: RACHEL C. EVANS, PE
PROJECT ENGINEER – NCDOT DIVISION 4

Prepared for:
DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard, Wilson NC, 27895

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 8, 2023

LETTING DATE:
JULY 22, 2025

EDWARD G, WETHERILL, PE
PROJECT ENGINEER

GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15833 ENGINEER JERRY L. LINDSEY

DocuSigned by: Jerry L. Lindsey P.E. 3/5/2025
4A5171090784A4A...
SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER GREG S. PURVIS

Signed by: Greg S. Purvis P.E. 3/5/2025
D1F5E7C256E3403...
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

3/5/2025
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USER:JRosado

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	1A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER CRAIG S. PURVIS

Signed by: Craig S. Purvis 6/20/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED 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 III.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.03 AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CHARTER COMMUNICATIONS (Television)

JOHNSTON COUNTY (Water & Sewer), AT&T (Telephone/Fiber Optics),

CONTERRA LIMITLESS COMMUNICATIONS (Telephone/Fiber Optics),

DUKE ENERGY (Power), UTILIPLEX (Telephone/Fiber Optics)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

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

2024 ROADWAY ENGLISH STANDARD DRAWINGS

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
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 (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
DIVISION 4 - MAJOR STRUCTURES	
423.01	Bridge Approach Fills - Type 1 Approach Fill for Bridge Abutment
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02	Guardrail Installation
862.03	Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

INDEX OF SHEETS

6/20/2025
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User:Rpsmith

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP) — EIP
- Computed Property Corner
- Existing Concrete Monument (ECM) — 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 & PROJECT CONTROL:

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

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:

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

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H–Frame Pole
- U/G Power Line Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)* — P
- U/G Power Line (SUE – LOS C)* — P
- U/G Power Line (SUE – LOS D)* — 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 Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)* — T
- U/G Telephone Cable (SUE – LOS C)* — T
- U/G Telephone Cable (SUE – LOS D)* — T
- U/G Telephone Conduit (SUE – LOS B)* — TC
- U/G Telephone Conduit (SUE – LOS C)* — TC
- U/G Telephone Conduit (SUE – LOS D)* — TC
- U/G Fiber Optics Cable (SUE – LOS B)* — T FO
- U/G Fiber Optics Cable (SUE – LOS C)* — T FO
- U/G Fiber Optics Cable (SUE – LOS D)* — T FO

WATER:

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

TV:

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

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)* — G
- U/G Gas Line (SUE – LOS C)* — G
- U/G Gas Line (SUE – LOS D)* — 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 Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)* — FSS
- SS Force Main Line (SUE – LOS C)* — FSS
- SS Force Main Line (SUE – LOS D)* — FSS

MISCELLANEOUS:

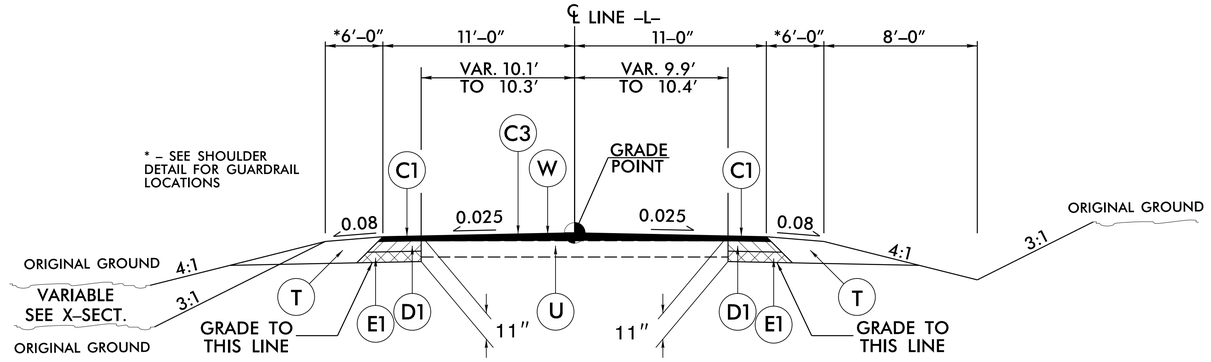
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE – LOS B)* — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to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

6/2/99

FINAL PAVEMENT SCHEDULE

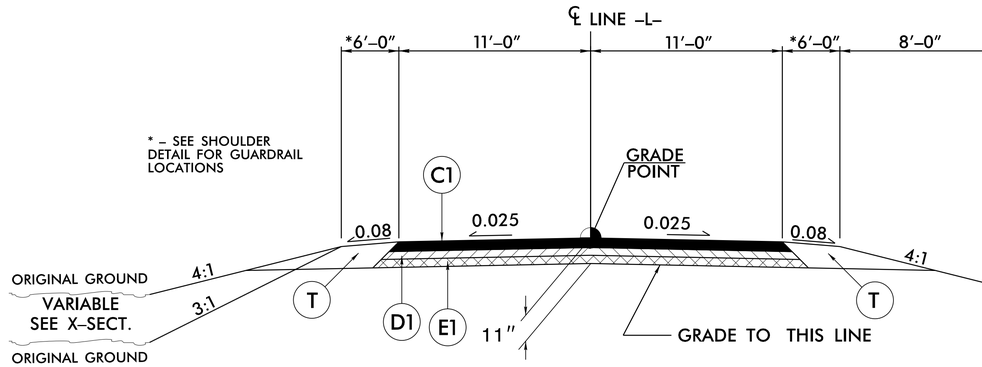
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.
C3	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
D1	PROP. APPROX. 4" ASPHALT CONCRETE SURFACE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING BITUMINOUS PAVEMENT. (SEE MILLING DETAIL)
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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



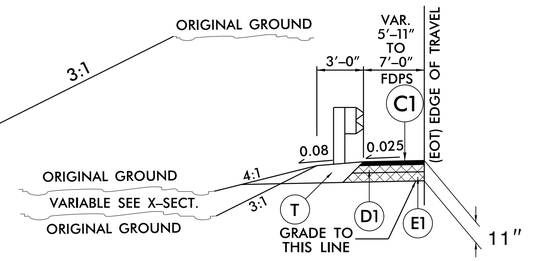
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:
–L– STA. 11+50.00 TO –L– STA. 14+68.00
–L– STA. 17+39.37 TO –L– STA. 20+50.00



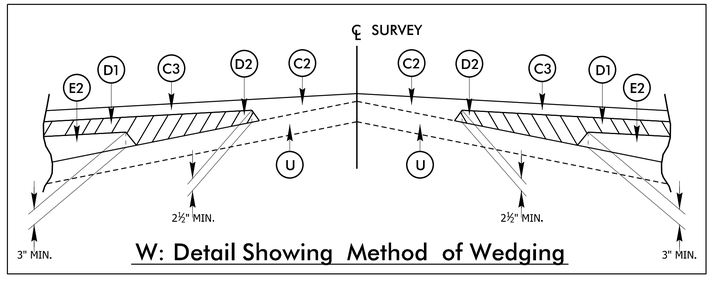
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:
–L– STA. 14+68.00 TO –L– STA. 15+16.63 (BEGIN BRIDGE)
–L– STA. 16+89.37 (END BRIDGE) TO –L– STA. 17+39.37

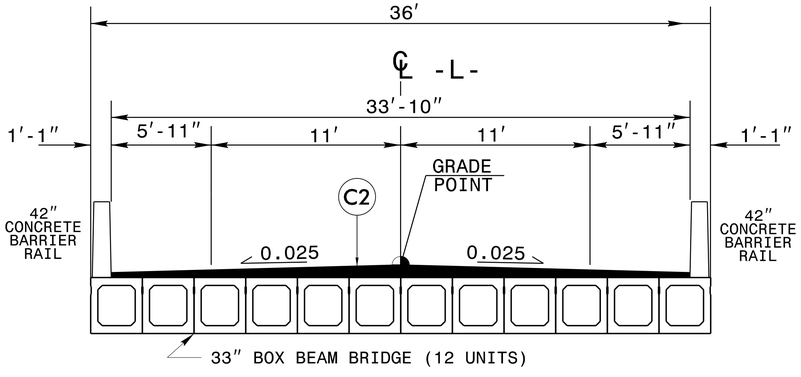


SHOULDER DETAIL

USE SHOULDER DETAIL IN CONJUNCTION WITH TYPICAL SECTIONS NO. 1 & 2:
–L– STA. 14+07.65 TO –L– STA. 15+26.40 LT.
–L– STA. 12+50.61 TO –L– STA. 15+06.86 RT.
–L– STA. 16+99.14 TO –L– STA. 19+55.39 LT.
–L– STA. 16+79.60 TO –L– STA. 17+98.35 RT.

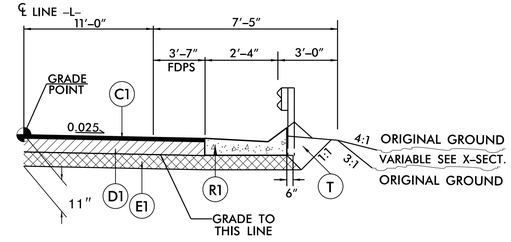


W: Detail Showing Method of Wedging



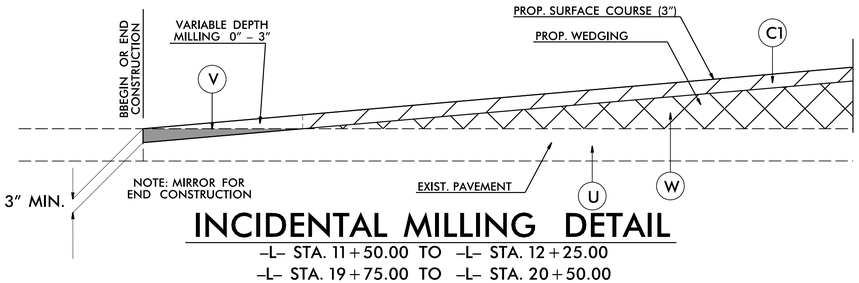
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 AS FOLLOWS:
–L– STA. 15+16.63 (BEGIN BRIDGE) TO –L– STA. 16+89.37 (END BRIDGE)
NOTE: SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS



SHOULDER BERM GUTTER DETAIL

USE SHOULDER BERM GUTTER DETAIL IN CONJUNCTION WITH TYPICAL SECTIONS NO. 1 & 2:
–L– STA. 13+12.00 TO –L– STA. 14+97.00 RT.
–L– STA. 14+95.00 TO –L– STA. 15+15.00 LT.
–L– STA. 16+91.00 TO –L– STA. 17+47.00 RT.
–L– STA. 17+07.00 TO –L– STA. 19+04.00 LT.



INCIDENTAL MILLING DETAIL

–L– STA. 11+50.00 TO –L– STA. 12+25.00
–L– STA. 19+75.00 TO –L– STA. 20+50.00

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2A-1

ROADWAY DESIGN ENGINEER
SEAL 022999 — GREG S. PURVIS — NORTH CAROLINA PROFESSIONAL ENGINEER
Signed by: Greg S. Purvis 12/12/2025

PAVEMENT DESIGN ENGINEER
SEAL 037392 — RACHEL C. EVANS — NORTH CAROLINA PROFESSIONAL ENGINEER
DocuSigned by: Rachel C. Evans 12/12/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

BRIDGE #500169

5/12/2025
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USER: tbrooks

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2C-1

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

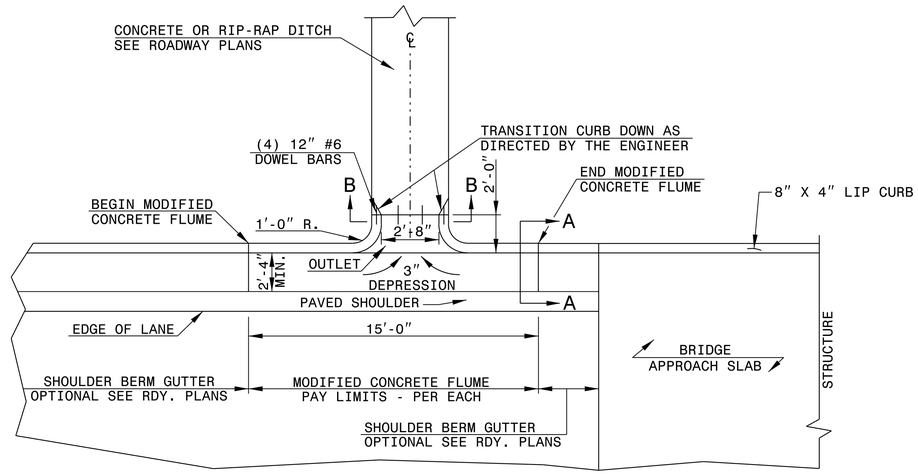
ENGLISH DETAIL DRAWING FOR

MODIFIED CONCRETE FLUME

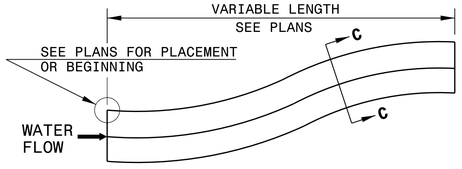
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1

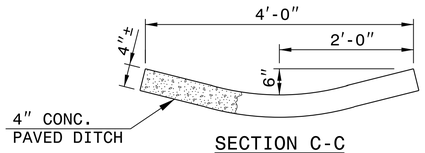
MODFLMDTCH



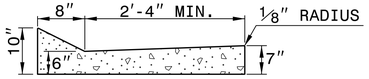
PLAN VIEW



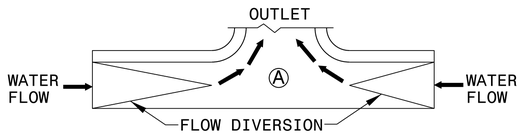
DOWNGRADE OR SAG



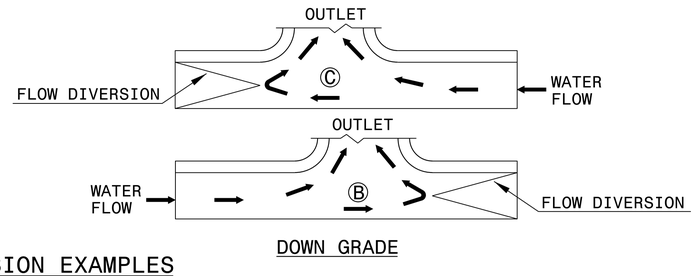
SECTION C-C



SECTION A-A

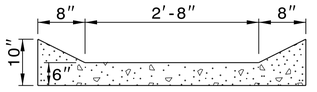


SAG

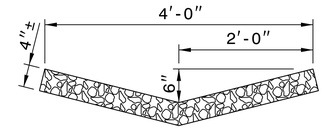


DOWN GRADE

FLOW DIVERSION EXAMPLES



SECTION B-B



RIP-RAP LINED DITCH

NOTES:

- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
- CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
- CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
- CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18″ PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
- MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1
MODFLMDTCH

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. HICKLER

Signed by: Nicole M. Hickler
3/4/2025

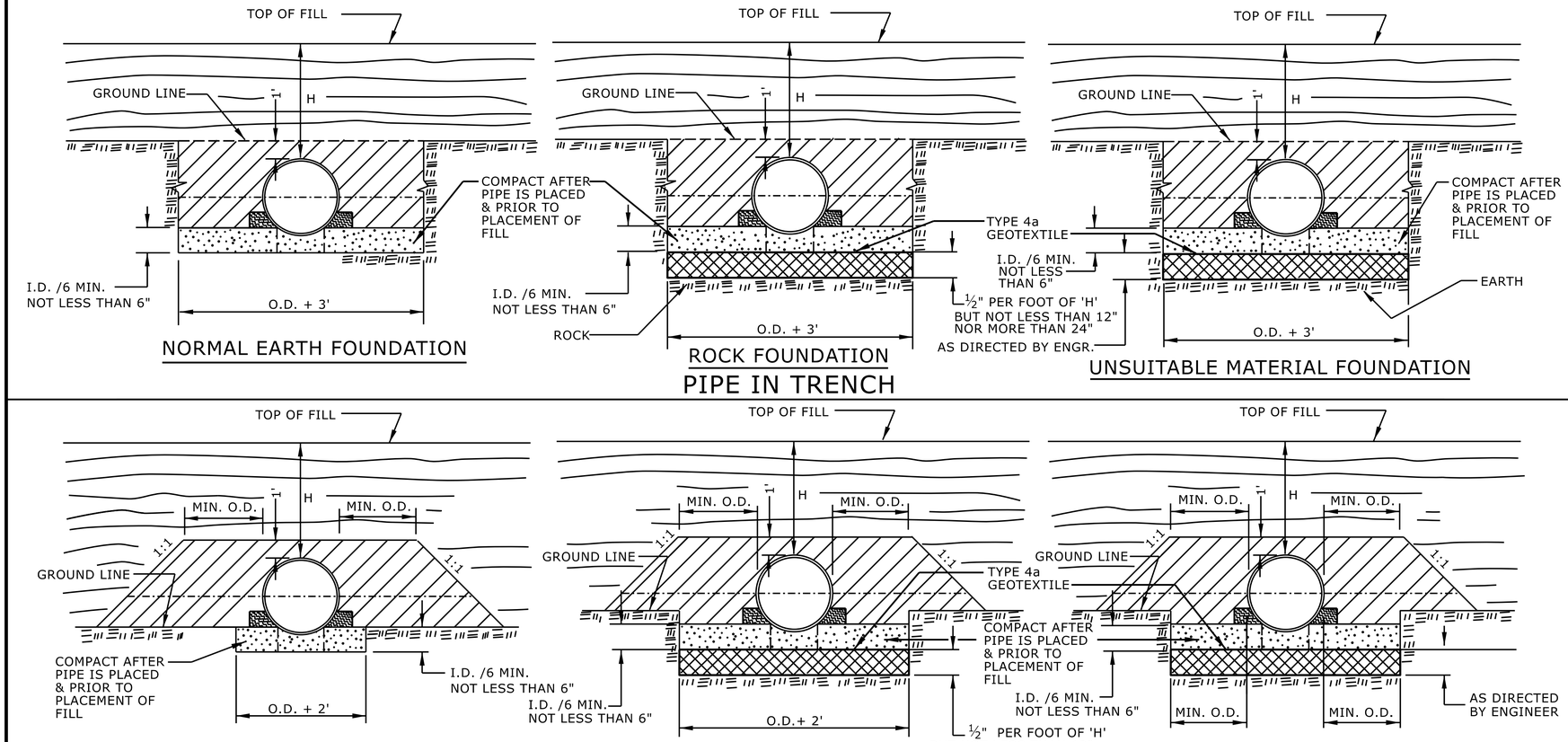
CONTRACT STANDARDS
AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. Ward DATE: Apr. 2002
MODIFIED BY: J.S. Howerton DATE: October 2017
CHECKED BY: _____ DATE: _____
FILE SPEC.: w:details\stand\modifiedflume.dgn

18-OCT-2017 14:17
S:\Contracts\Contracts\Special Details\ericward\usr\details\stand\modifiedflume.dgn
jhowerton 4I CSD-212595

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2C-2



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

Signed by: Nicole M. Hackler 588432303416405...

5/12/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

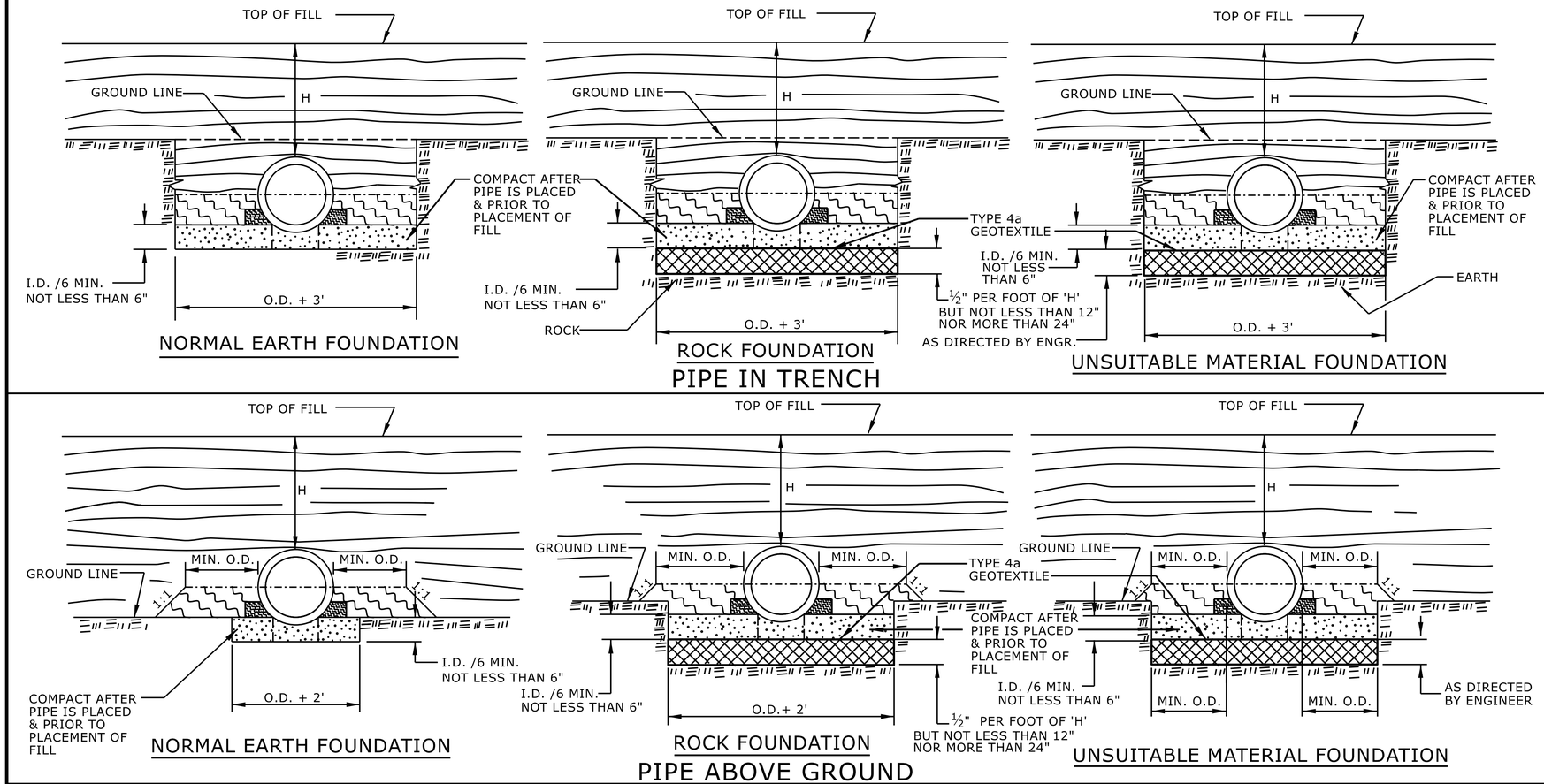
CONTRACTS STANDARDS AND DEVELOPMENT UNIT

Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2C-3



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

Signed by: Nicole M. Hackler 588432D34164C5...

5/12/2025

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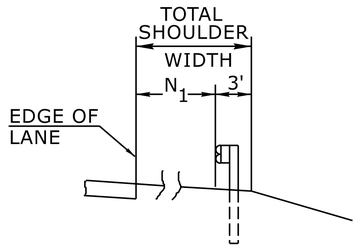
CONTRACTS STANDARDS AND DEVELOPMENT UNIT

Office 919-707-6950 FAX 919-250-4119

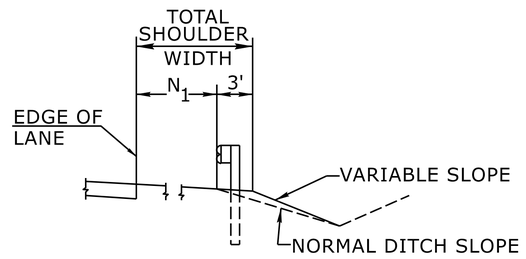
SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2C-4

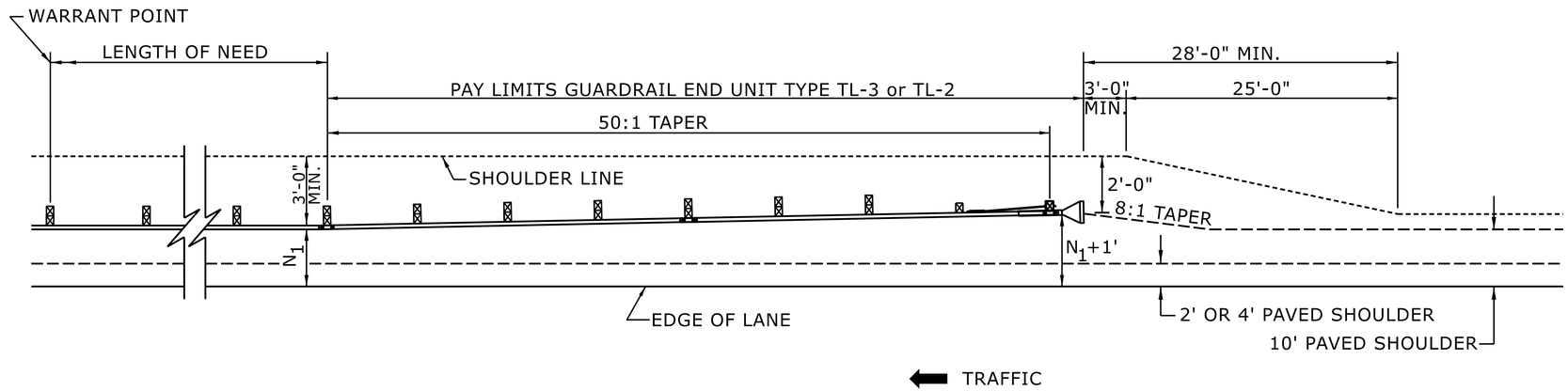


FILL SECTION



CUT SECTION

"N_1"= 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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER

Signed by: Nicole M. Hackler 5884323D3416405...
5/12/2025

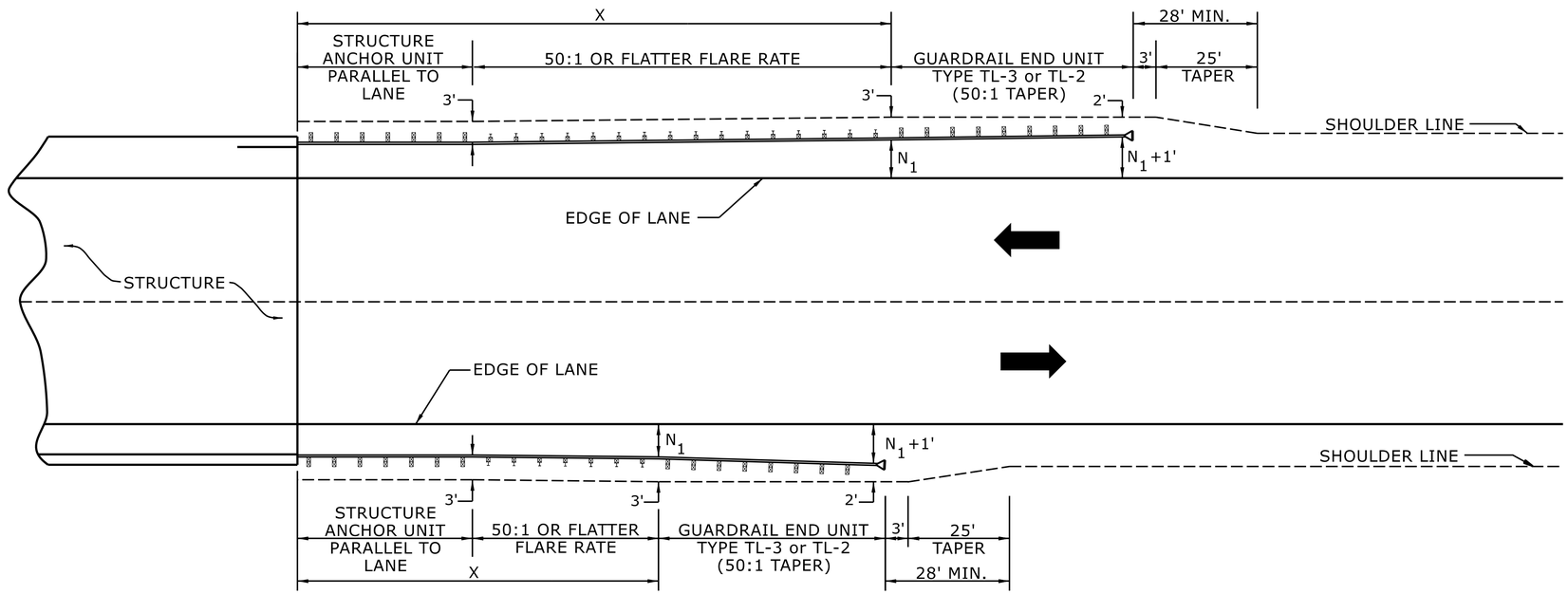
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2C-5



USE FLARE RATE AS THE CONTROL IF THE "N_1" DISTANCE IS NOT OBTAINED.
("N_1" IS BASED ON SHOULDER WIDTHS IN THE ROADWAY DESIGN MANUAL)

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 LENGTH OF NEED (X) IS CALCULATED BASED ON THE AASHTO ROADSIDE DESIGN GUIDE.

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

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

Signed by:
Nicole M. Hackler
5884323D34164C5...
5/12/2025

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

8/17/99

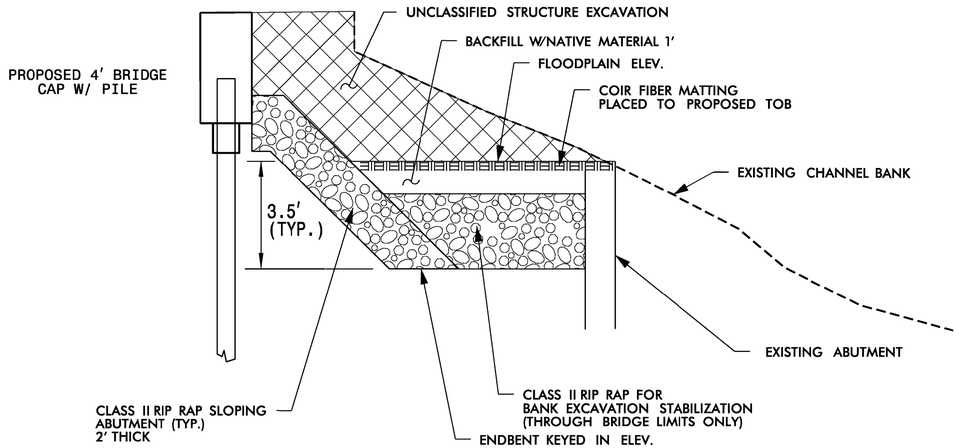
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	2D-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER GREG S PURVIS	NORTH CAROLINA PROFESSIONAL SEAL 15833 ENGINEER JERRY L LINDSEY
Signed by: Greg S. Purvis 3/5/2025	Docusigned by: Jerry L. Lindsey 3/5/2025

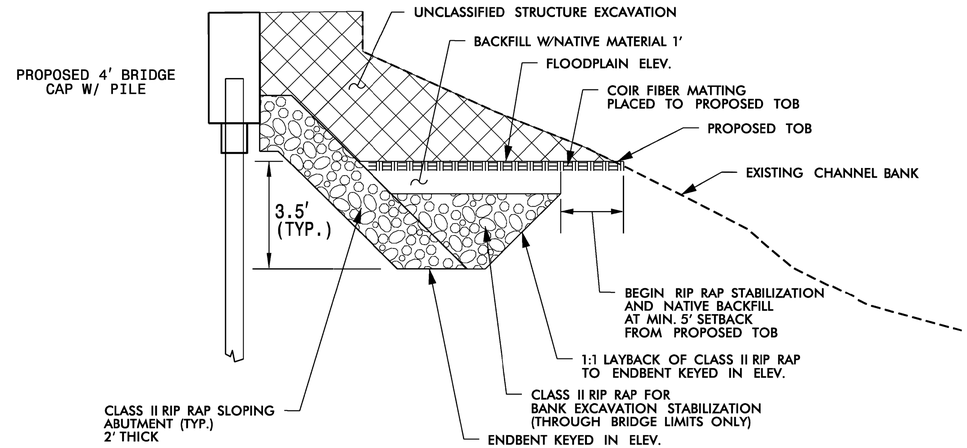
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE FLOODPLAIN EXCAVATION STABILIZATION DETAIL



DETAIL NOTES:

1. FOR USE WHERE EXISTING ABUTMENTS AND BULKHEADS ARE NOT TO BE COMPLETELY REMOVED
2. EXCAVATE TO FLOODPLAIN ELEVATION AS SPECIFIED ON PRELIMINARY GENERAL DRAWINGS
3. FLOODPLAIN STABILIZATION TO BEGIN WITH A 5' MINIMUM SETBACK FROM PROPOSED TOB
4. FOR ALL LOCATIONS OF CLASS II RIPRAP, FILL VOIDS WITH CLASS B RIP RAP
5. COIR FIBER MATTING TO BE INSTALLED OVER LIMITS OF FLOODPLAIN EXCAVATION AND AREAS BACKFILLED WITH NATIVE MATERIAL



DETAIL NOTES:

1. FOR USE WHERE EXISTING ABUTMENTS AND BULKHEADS ARE TO BE COMPLETELY REMOVED
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3/5/2025
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...\Plotscale

12/06/07

COMPUTED BY: JAR	DATE: 10/03/2024
CHECKED BY: GSP	DATE: 10/04/2024

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRIDGE #500169

PROJECT REFERENCE NO.	SHEET NO.
BP4-R007	3B-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV. (CY)	EMBANK. +% (CY)	BORROW (CY)	WASTE (CY)
–L– STA. 11+50.00	–L– STA. 15+16.63 (BEGIN BRIDGE)	80	1,150	1,070	
SUBTOTALS:		80	1,150	1,070	
–L– STA. 16+89.37 (END BRIDGE)	–L– STA. 20+50.00	36	1,179	1,143	
SUBTOTALS:		36	1,179	1,143	
PROJECT SUBTOTALS:		116	2,328	2,212	
MATERIAL FOR SHOULDER CONSTRUCTION				80	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				111	
GRAND TOTALS:		116	2,328	2,402	
SAY:		120		2,450	

Approximate quantities only. Unclassified excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the lump sum price for "Grading".

ASPHALT PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	14+68.00	15+26.67	CL	155.02
–L–	16+52.55	17+39.37	CL	199.45
			TOTAL:	354.47
			SAY:	360

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
–L– RT.	13+12.00	14+97.00	185.00′
–L– LT.	14+95.00	15+15.00	20.00′
–L– RT.	16+91.00	17+47.00	56.00′
–L– LT.	17+07.00	19+04.00	197.00′
		TOTAL:	458.00′
		SAY:	460′

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

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".

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC)											
SIZE								12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
THICKNESS OR GAUGE																			
–L– 13+75	RT.	402		233.6	230.6														
–L– 13+75	RT.	402	403		230.6	222.8				36′									
–L– 13+77	RT.	401		233.6	230.6														
–L– 14+95	RT.	401	402	233.9	230.6	230.9													
–L– 15+10	LT.	404		234.4	231.4														
–L– 15+10	LT.	404	405		231.4	223.1				36′									
–L– 16+95	RT.	406																	
–L– 17+17	LT.	408		234.6	231.6														
–L– 18+66	LT.	408	409	236.1	231.6	232.7													
–L– 18+68	XT.	409		236.1															
–L– 18+68	XT.	409	410		232.7	225.9				36′									
TOTAL										108′									

STATION	C.S. PIPE							R.C. PIPE (CLASS III)							R.C. PIPE (CLASS IV)							
SIZE	12"	15"	18"	24"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE	.064	.064	.064	.064	.079	.109	.109															
–L– 13+75																						
–L– 13+75																						
–L– 13+77																						
–L– 14+95																	120′					
–L– 15+10																						
–L– 15+10																						
–L– 16+95																						
–L– 17+17																						
–L– 18+66																	148′					
–L– 18+68																						
–L– 18+68																						
TOTAL																	268′					

STATION	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	ENDWALLS CU. YDS. 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'	LIN. *FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	CONCRETE TRANSITIONAL SECTION DROP INLET	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	T.B.D.I. STD. 840.35	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	M.H. FRAME & COVER STD. 840.54	MODIFIED CONCRETE FLUME	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+75								1												1	1							
–L– 13+75																								2@18"				
–L– 13+77								1												1	1							
–L– 14+95																												
–L– 15+10								1												1	1							
–L– 15+10																								2@18"				
–L– 16+95																							1					
–L– 17+17								1												1	1							
–L– 18+66																												
–L– 18+68								1												1	1							
–L– 18+68																								2@18"				
TOTAL								5												5	5		1	6@18"				

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

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			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE III	GREU TL–3	AT–1		CAT–1	VI MOD	BIC	AT–1	EA	G	NG				
–L–	12+50.61	15+06.86	RT.	256.25			15+06.86		5′-11″ TO 7′-0″	5′-11″ TO 7′-0″		50.00′		1′–0″		1	1													
–L–	14+07.65	15+26.40	LT.	118.75				15+26.40	5′-11″ TO 7′-0″	5′-11″ TO 7′-0″	50.00′		1′–0″			1	1													
–L–	16+79.60	17+98.35	RT.	118.75			16+79.60		5′-11″ TO 7′-0″	5′-11″ TO 7′-0″	50.00′		1′–0″			1	1													
–L–	16+99.14	19+55.39	LT.	256.25				16+99.14	5′-11″ TO 7′-0″	5′-11″ TO 7′-0″		50.00′		1′–0″		1	1													
			PROJECT SUBTOTAL	750.00′												4	4													
		LESS ANCHOR DEDUCTIONS		(–) 275.00′																										
		GR PROJECT TOTAL		475.00′																										
		PERMANENT GR SAY		475.00′		ADDITIONAL GUARDRAIL POSTS = 5 EACH													GUARDRAIL ANCHOR DEDUCTIONS											
																			TYPE III = 4 @ 18.75′ = 75.00′											
																			GREU TL–3 = 4 @ 50′ = 200.00′											
																			TOTAL DEDUCTIONS = 275.00′											

5/13/2025
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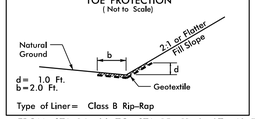
USER:JRosado

8/17/99

REVISIONS

PI Sta 11+19.48	PI Sta 12+89.30	PI Sta 14+67.14	PI Sta 18+57.14
△ = 4° 51' 19.3" (RT)	△ = 2° 49' 45.6" (RT)	△ = 0° 46' 10.1" (RT)	△ = 0° 11' 22.8" (LT)
D = 2° 01' 59.3"	D = 2° 48' 09.0"	D = 1° 08' 45.3"	D = 0° 34' 22.6"
L = 238.81'	L = 100.96'	L = 67.15'	L = 33.10'
T = 119.48'	T = 50.49'	T = 33.58'	T = 16.55'
R = 2,818.10'	R = 2,044.45'	R = 5,000.00'	R = 10,000.00'
DS=55MPH+	DS=55MPH+	DS=55MPH+	DS=55MPH+
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS

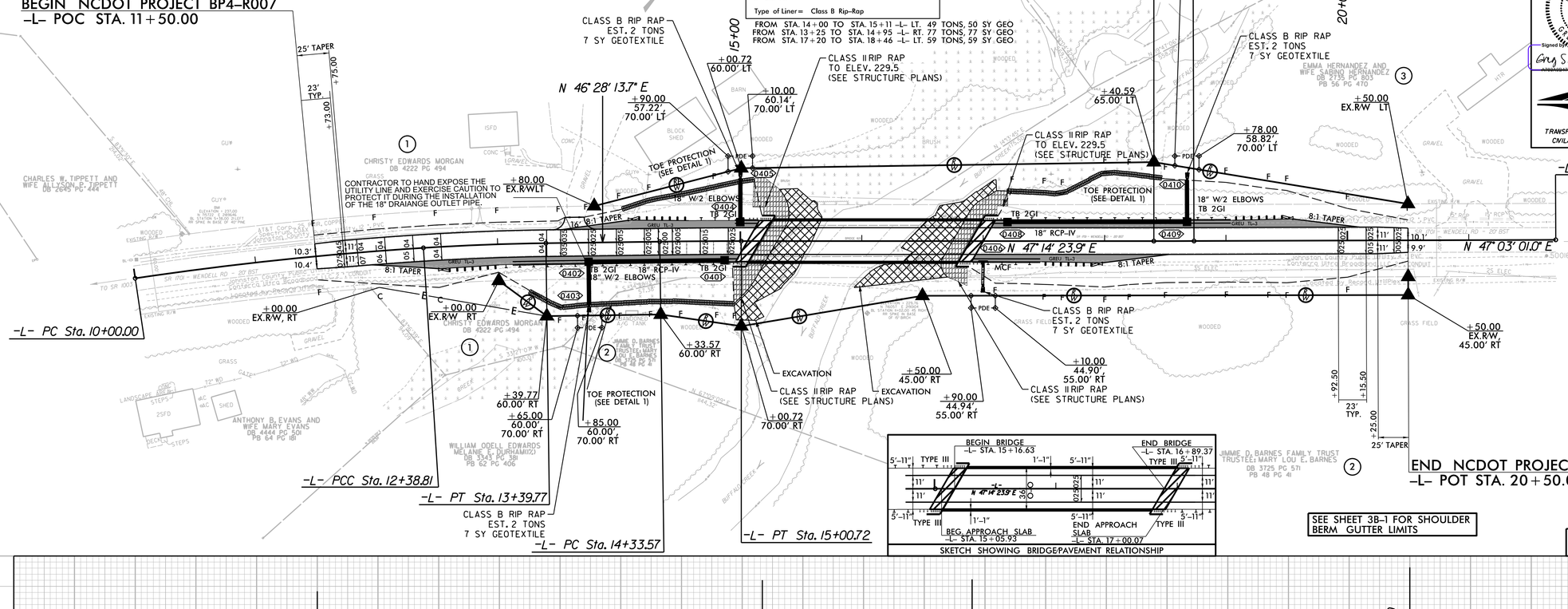
DETAIL 1
TOE PROTECTION
(Not to Scale)



Type of Liner= Class B Rip-Rap

FROM STA. 14+00 TO STA. 15+11 –L– LT. 49 TONS, 50 SY GEO
FROM STA. 13+25 TO STA. 14+95 –L– RT. 77 TONS, 77 SY GEO
FROM STA. 17+20 TO STA. 18+46 –L– LT. 59 TONS, 59 SY GEO

BEGIN NCDOT PROJECT BP4–R007
–L– POC STA. 11+50.00



END NCDOT PROJECT BP4–R007
–L– POT STA. 20+50.00

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

SEE SHEET 3B–1 FOR SHOULDER BERM GUTTER LIMITS

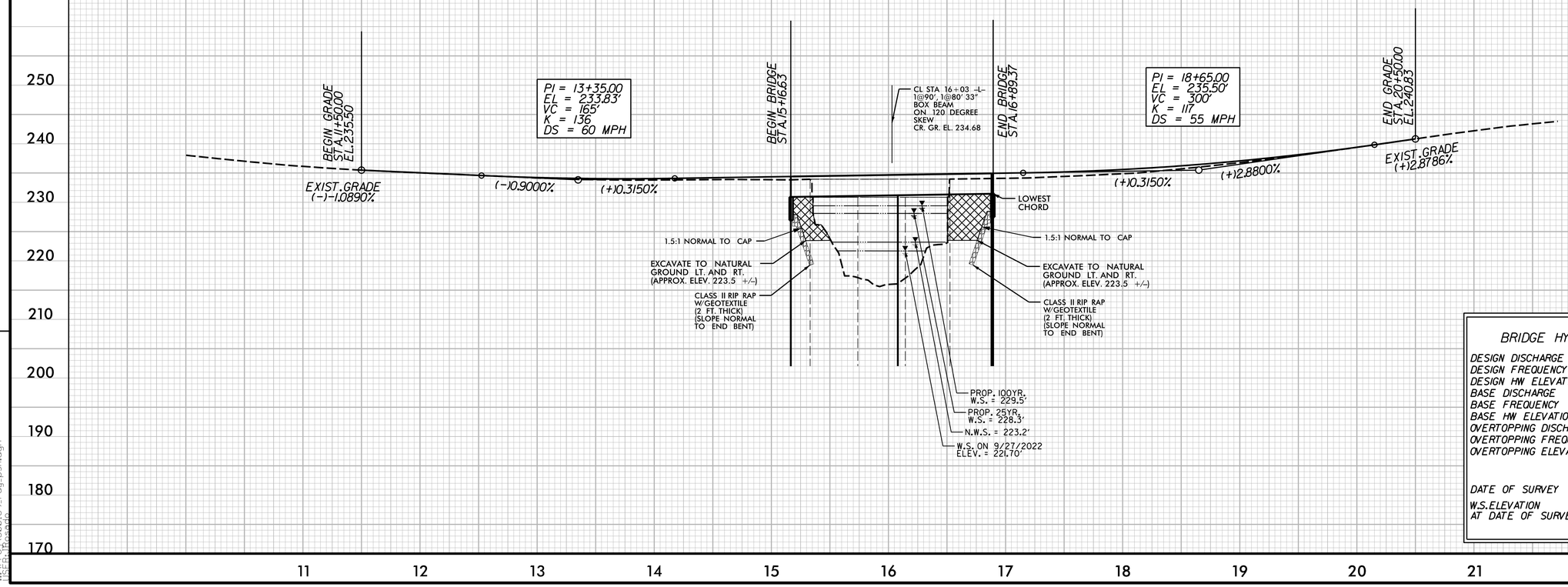
SEE SHEETS S–1 THRU S–21 FOR STRUCTURE PLANS

BRIDGE NO. 500169	
FINAL PLANS	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PROJECT REFERENCE NO.	SHEET NO.
BP4–R007	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER GREG S. PURVIS
Signed by: Greg S. Purvis 6/24/2025

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 15833 ENGINEER JERRY L. LINDSEY
DocuSigned by: Jerry L. Lindsey 6/24/2025

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Liscense No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 4400	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 228.3	FT
BASE DISCHARGE	= 5900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 229.5	FT
OVERTOPPING DISCHARGE	= 13000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 234.2	FT
DATE OF SURVEY	= 9/27/2022	
W.S. ELEVATION AT DATE OF SURVEY	= 221.7	FT

6/24/2025
\\Pr...\S00169_rdy_psh.dgn
USER:tfrazier

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4.R007	RW01	6

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

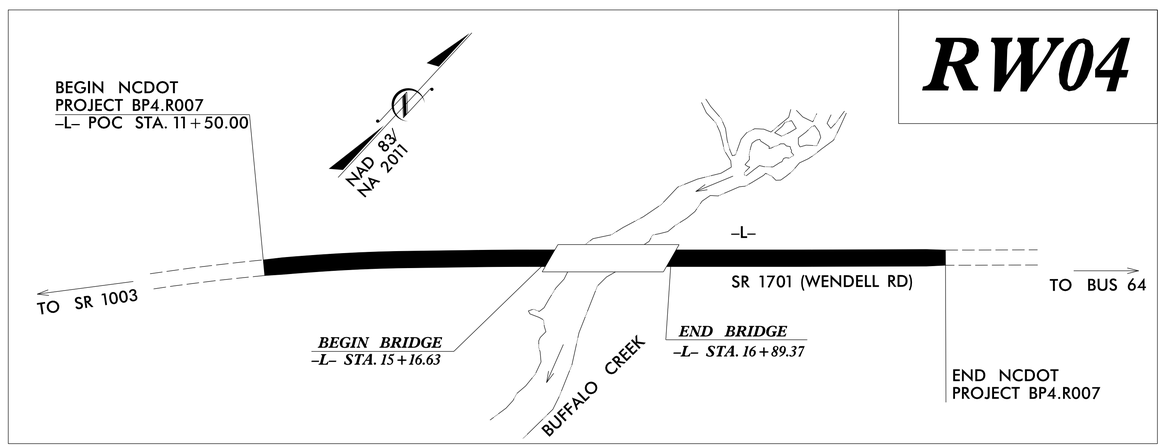
SURVEY CONTROL, EXISTING CENTERLINES,
RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

JOHNSTON COUNTY

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK

TIP PROJECT: BP4.R007

09/08/99



GRAPHIC SCALE

50 25 0 50 100
PLANS

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "500169-1" WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 716,471.4479(ft) EASTING: 2,190,483.1285(ft) ELEVATION: 243.383(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989917 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "500173-2" TO -L- STATION 10+00 IS S 46°19'34" W 1162.78(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

WithersRavenel
Engineers | Planners | Surveyors

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
NOVEMBER 8, 2023	*JULY 22, 2025*

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5146 LAND SURVEYOR RUDOLF A. VANDERVELDE JR.

DocuSigned by:
Rudolf A. Vandervelde Jr.
SIGNATURE:538

12/14/2023
Date:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

14-DEC-2023 15:21
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rvandervelde AT WR1963

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	RW02C-1

Location and Surveys

WithersRavenel
Engineers | Planners | Surveyors

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5146 LAND SURVEYOR RUDOLF A. VANDERVELDE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

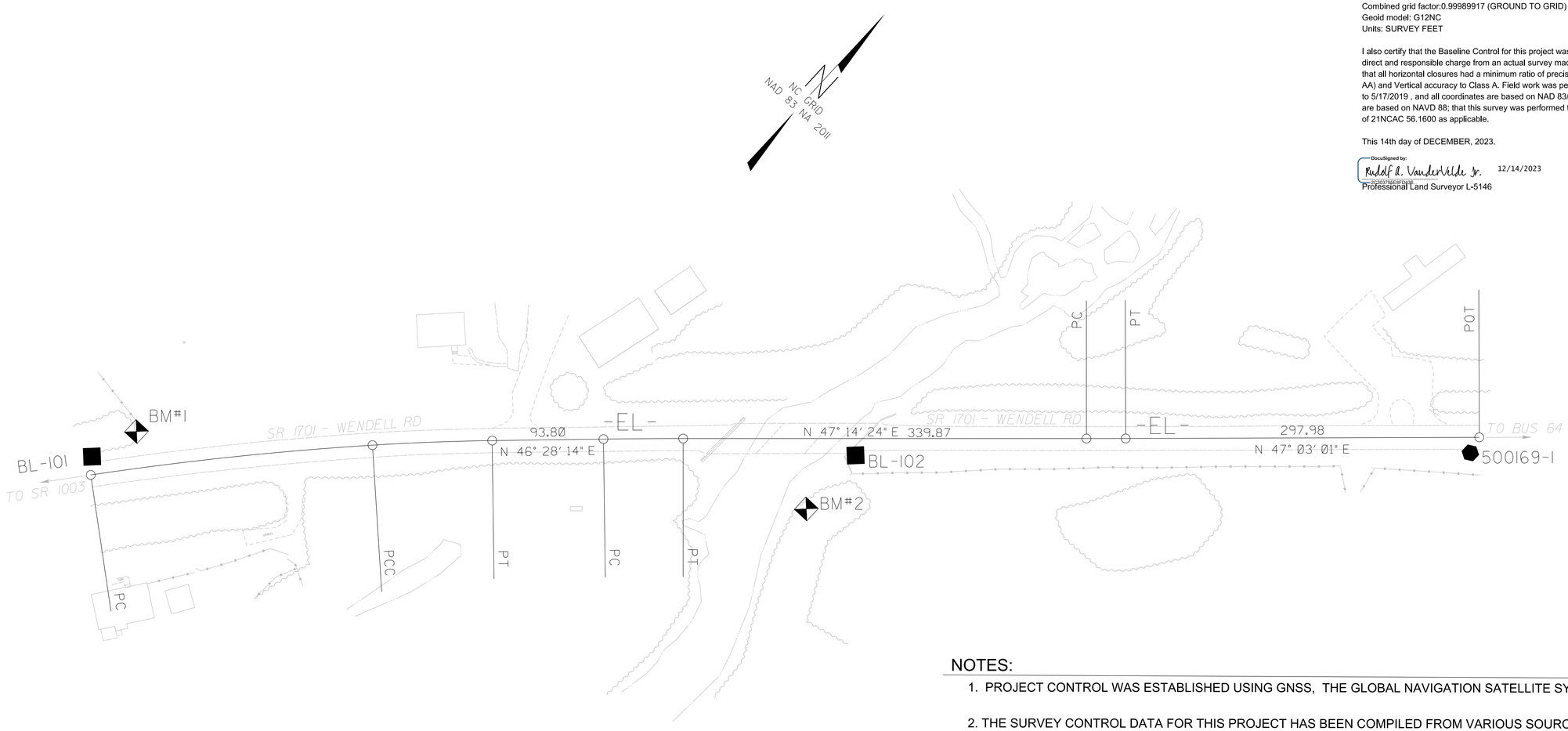
I, RUDOLF A. VANDERVELDE JR., PLS, certify that the Project Control was PERFORMED under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: RTN
Date of survey: May 2019
Datum/Epoch: NAD 83/2011
Published/Fixed-control use: N/A
Localized around: 500169-1
Northing: 716,471.4479
Easting: 2,190,483.1285
Combined grid factor:0.99989917 (GROUND TO GRID)
Geoid model: G12NC
Units: SURVEY FEET

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 5/1/2019 to 5/17/2019 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 14th day of DECEMBER, 2023.

DocuSigned by:
Rudolf A. VanderVelde Jr. 12/14/2023
E2A3...
Professional Land Surveyor L-5146



NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

3. POINT 500169-2 IS PRIMARY OFFSITE CONTROL

REVISIONS

6/2/99

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rvandervelde AT WR1963

6/2/99

REVISIONS

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	RW02C-2

Location and Surveys

WithersRavenel
Engineers | Planners | Surveyors

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5146 LAND SURVEYOR RUDOLF A. VANDERVELDE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Easting: 2,190,483.1285
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This 14th day of DECEMBER, 2023.

DocuSigned by:
Rudolf A. Vandervelde Jr. 12/14/2023
Professional Land Surveyor L-5146

BL

POINT	DESC.	NORTH	EAST	ELEVATION
101	BL-101	715680.4960	2189632.3700	237.79
102	BL-102	716118.1460	2190104.0920	233.25
1	500169-1	716471.4479	2190483.1285	243.38
2	500169-2	716882.8014	2190927.1440	243.13

BM2 ELEVATION = 229.76
N 716057 E 2190104
BL STATION 11+02.00 45 RIGHT
RR SPIKE IN BASE OF 15" BIRCH

BM1 ELEVATION = 237.00
N 715722 E 2189646
BL STATION 5+38.00 21 LEFT
RR SPIKE IN BASE OF 40" PINE

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	715668.489	2189642.110							
CURVE			N 41°12'48.5" E	238.74	04°51'19.3"(RT)	02°01'59.3"	238.81	119.48	2818.10
PCC	715848.083	2189799.408							
CURVE			N 45°03'20.9" E	100.95	02°49'45.6"(RT)	02°48'09.0"	100.96	50.49	2044.45
PT	715919.394	2189870.857							
LINE			N 46°28'13.7" E	93.80					
PC	715983.997	2189938.865							
CURVE			N 46°51'18.8" E	67.15	00°46'10.1"(RT)	01°08'45.3"	67.15	33.58	5000.00
PT	716029.917	2189987.859							
LINE			N 47°14'23.9" E	339.87					
PC	716260.663	2190237.390							
CURVE			N 47°08'42.4" E	33.10	00°11'22.8"(LT)	00°34'22.6"	33.10	16.55	10000.00
PT	716283.179	2190261.659							
LINE			N 47°03'01.0" E	297.98					
POT	716486.209	2190479.766							

NOTES:

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

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rvandervelde AT WR1963

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	RW02D-1

Location and Surveys

WithersRavenel
Engineers | Planners | Surveyors

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5146 LAND SURVEYOR RUDOLF A. VANDERVELDE JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

This 14th day of DECEMBER, 2023.

DocuSigned by:
Rudolf A. VanderVelde Jr. 12/14/2023
2C1037355E8E7434...

Professional Land Surveyor L-5146

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	715668.4890	2189642.1100
PCC	12+38.81	715848.0835	2189799.4077
PT	13+39.77	715919.3942	2189870.8575
PC	14+33.57	715983.9973	2189938.8647
PT	15+00.72	716029.9171	2189987.8588
PC	18+40.59	716260.6625	2190237.3901
PT	18+73.69	716283.1786	2190261.6586
POT	21+71.67	716486.2095	2190479.7660

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

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rvandervelde AT WR1963

6/2/99

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	RW02E-1

Location and Surveys

WithersRavenel
Engineers | Planners | Surveyors

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR RUDOLF A. VANDERVELDE JR. SEAL L-5146

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , RUDOLF A. VANDERVELDE JR., PLS , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 12/12/23 to 12/13/23, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 14TH day of DECEMBER, 2023.

DocuSigned by:
Rudolf A. VanderVelde Jr. 12/14/2023
Professional Land Surveyor L-5146

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	13+00.00	30.00	715870.3812	2189863.3737
L	13+39.77	60.00	715875.8931	2189912.1812
L	13+80.00	-30.00	715968.8533	2189879.3642
L	14+33.57	60.00	715940.4967	2189980.1890
L	15+00.72	-60.00	716073.9693	2189947.1230
L	15+00.72	70.00	715978.5228	2190035.3839
L	16+50.00	45.00	716098.2291	2190128.0132
L	18+40.59	-65.00	716308.3887	2190193.2628
L	20+50.00	45.00	716370.3703	2190421.3696
L	20+50.00	30.00	716381.3496	2190411.1493
L	20+50.00	-30.00	716425.2667	2190370.2679

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	13+65.00	70.00	715886.0204	2189937.3617
L	13+65.00	60.00	715893.2706	2189930.4744
L	13+85.00	70.00	715899.7950	2189951.8621
L	13+85.00	60.00	715907.0452	2189944.9748
L	14+90.00	-57.22	716064.5597	2189941.0575
L	14+90.00	-70.00	716073.9234	2189932.3615
L	15+10.00	-60.14	716080.3706	2189953.8444
L	15+10.00	-70.00	716087.6124	2189947.1478
L	16+90.00	44.94	716125.4332	2190157.3380
L	16+90.00	55.00	716118.0443	2190164.1707
L	17+10.00	55.00	716131.6228	2190178.8547
L	17+10.00	44.90	716139.0352	2190172.0004
L	18+58.00	-62.14	716318.0499	2190207.8943
L	18+58.00	-70.00	716323.8081	2190202.5509
L	18+78.00	-58.82	716329.1695	2190224.7343
L	18+78.00	-70.00	716337.3515	2190217.1179

NOTES:

THE LOCATION AND SURVEYS UNIT.

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY/PERMANENT EASEMENT MONUMENTATION ESTABLISHED 7/14/22 TO 7/15/22 .
4. R/W MONUMENT 15+00.72 70' RT NOT SET - FELL IN WATER - SET WD STAKE
5. PERMANENT EASEMENT MONUMENT 13+85.00 60' RT NOT SET - FELL IN TREE - SET WD STAKE

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rvander-velde AT WR1963

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	RW04

Location and Surveys

WithersRavenel
Engineers | Planners | Surveyors

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-5146 RUDOLF A. VANDERVELDE JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , RUDOLF A. VANDERVELDE JR., PLS , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 12/12/23 to 12/13/23, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 14TH day of DECEMBER, 2023.

DocuSigned by: Rudolf A. VanderVelde Jr. 12/14/2023
2C303795E8FD436...

Professional Land Surveyor L-5146

REVISIONS

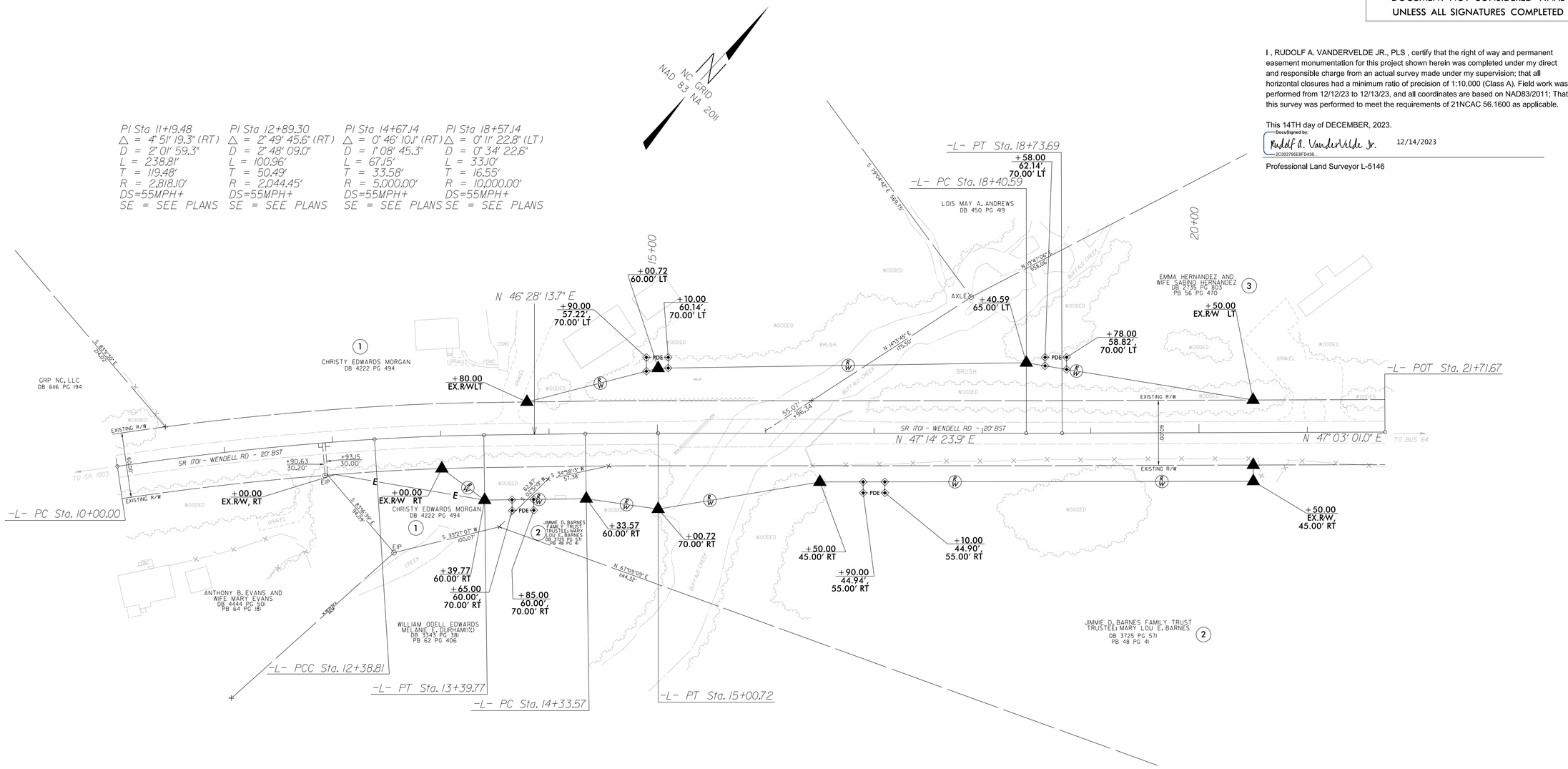
6/2/99

PI Sta 11+19.48
△ = 4° 51' 19.3" (RT)
D = 2° 01' 59.3"
L = 238.81'
T = 119.48'
R = 2,818.10'
DS=55MPH+
SE = SEE PLANS

PI Sta 12+89.30
△ = 2° 49' 45.6" (RT)
D = 2° 48' 09.0"
L = 100.96'
T = 50.49'
R = 2,044.45'
DS=55MPH+
SE = SEE PLANS

PI Sta 14+67.14
△ = 0° 46' 10.1" (RT)
D = 1° 08' 45.3"
L = 67.15'
T = 33.58'
R = 5,000.00'
DS=55MPH+
SE = SEE PLANS

PI Sta 18+57.14
△ = 0° 11' 22.8" (LT)
D = 0° 34' 22.6"
L = 33.10'
T = 16.55'
R = 10,000.00'
DS=55MPH+
SE = SEE PLANS



SEE SHEET RW02C-2 & RW02D-1
FOR FUTHER ALIGNMENT DETAILS

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 12/12/23 TO 12/13/23 .

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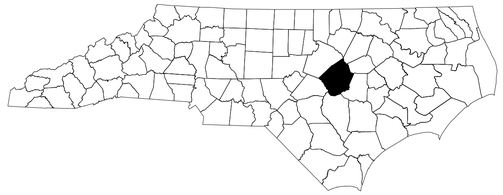
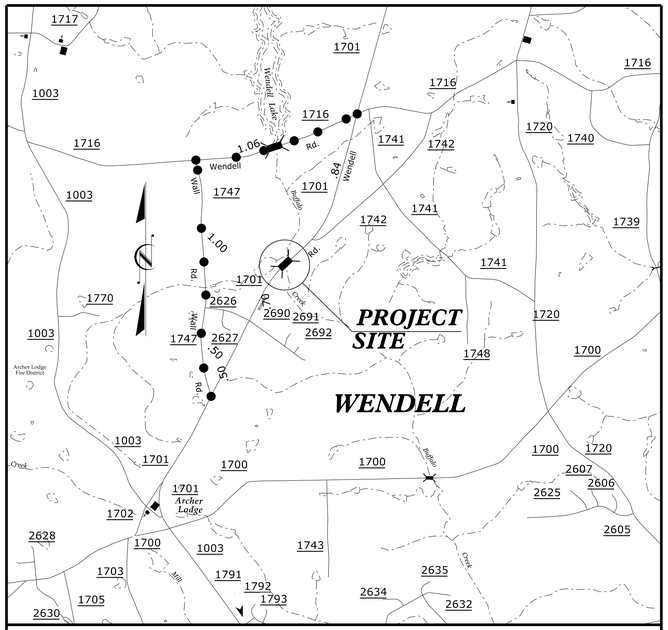
rvandervelde
AT WR1963

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

JOHNSTON COUNTY





VICINITY MAP
OFF–SITE DETOUR

...ON: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK
ON SR 1701 (WENDELL ROAD)
...F WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

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

PLANS PREPARED BY:

LARRY GREEN, P.E.

D. ALLEN HAYES, E.I.

NCDOT CONTACTS:

KARMEN MILLER, P.E.
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

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

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-01	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-01A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-01B	SIGN AND DEVICE LEGEND
TMP-02	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES AND GENERAL NOTES) AND PHASING
TMP-03	SPECIAL SIGN DESIGN
TMP-04	OFFSITE DETOUR

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

APPROVED: DocuSigned by: Lawrence H. Green 480870889868D48B...

DATE: 12/2/2024

SEAL

SEAL 028137 NORTH CAROLINA PROFESSIONAL ENGINEER LAWRENCE H. GREEN

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Liscense No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

SHEET NO.
TMP–01

BP4–R007

TIP PROJECT:

11/19/2024
\\Wei-fs01\projects\2022\22IN6.01_BP4,R007\Traffic\Traffic Design\Pre-Let\Plan\WZTC\BP4,R007_TMP_01Title.dgn
User:AHayes

PROJ. REFERENCE NO.	SHEET NO.
BP4-R007	TMP-01A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES

LEGEND

GENERAL

NORTH ARROW

TRAFFIC CONTROL DEVICES

BARRICADE (TYPE III)

TEMPORARY SIGNING

STATIONARY SIGN

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

APPROVED: DocuSigned by: Lawrence H. Green 480870889880D48B...

DATE: 12/2/2024

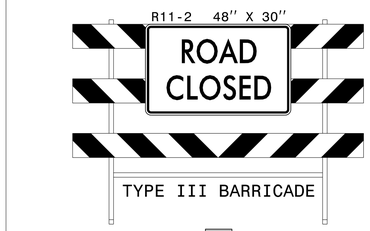
NORTH CAROLINA PROFESSIONAL SEAL 028137 ENGINEER LAWRENCE H. GREEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND

PROJ. REFERENCE NO.	SHEET NO.
BP4-R007	TMP-01B



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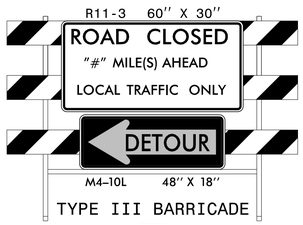

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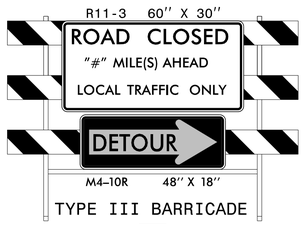
C



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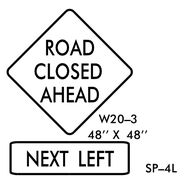

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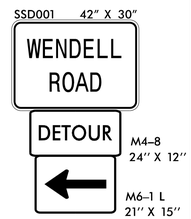
D

E

F



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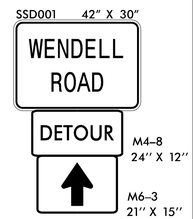

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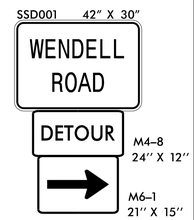

I

J

X BARRICADES
-WITH MOUNTED SIGNING

X SIGNING
-STATIONARY MOUNTED

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Bus: 919 851 8077
Fax: 919 851 8107
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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

APPROVED: DocuSigned by: Lawrence H. Green 480870889886D48B...
DATE: 12/2/2024

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028137 LAWRENCE H. GREEN

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

SIGN AND DEVICE LEGEND

PROJ. REFERENCE NO.	SHEET NO.
BP4-R007	TMP-02

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

SIGNING

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

AND

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

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

AND

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

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

TRAFFIC CONTROL DEVICES

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

MANAGEMENT STRATEGIES

THE FOLLOWING LISTED WORK ZONE STRATEGIES ARE RECOMMENDED FOR INCLUSION WITHIN THIS TRANSPORTATION MANAGEMENT PLAN (TMP).

RECOMMENDED STRATEGIES:

TRAFFIC MANAGEMENT STRATEGIES:
ONE-LANE, TWO WAY OPERATION (FLAGGING)
OFF-SITE DETOURS

LOCAL NOTES

1) IN ORDER TO HAVE TIME TO ADEQUATELY REROUTE SCHOOL BUSSES, JOHNSTON COUNTY SCHOOLS WILL BE CONTACTED AT (919) 934-6031 AT LEAST ONE MONTH PRIOR TO ROAD CLOSURE.

2) JOHNSTON COUNTY EMERGENCY MANAGEMENT WILL BE CONTACTED AT (919) 989-5050 LEAST ONE MONTH PRIOR TO ROAD CLOSURE TO MAKE THE NECESSARY TEMPORARY REASSIGNMENTS TO PRIMARY RESPONSE UNITS.

PHASING

STEP 1) INSTALL ALL OFFSITE DETOUR SIGNING AND ROAD CLOSURE SIGNING. COVER SIGNS USING AN APPROVED METHOD PER THE DISCRETION OF THE ENGINEER. [SEE SHEETS TMP-01B & 04]

STEP 2) WHEN READY TO CLOSE THE ROADWAY, UNCOVER THE DETOUR AND ROAD CLOSURE SIGNING, CLOSE -L- (SR 1701), AND DETOUR TRAFFIC. [SEE SHEETS TMP-01B & 04]

STEP 3) AWAY FROM TRAFFIC, REMOVE EXISTING BRIDGE, AND CONSTRUCT PROPOSED -L- STRUCTURE AND APPROACHES FROM THE BEGIN PROJECT LIMITS TO THE END PROJECT LIMITS UP TO AND INCLUDING THE FINAL LIFT OF SURFACE COURSE, AND FINAL PAVEMENT MARKINGS. [SEE ROADWAY PLANS AND FINAL PAVEMENT MARKING PLAN]

STEP 4) OPEN -L- TO THE FINAL TRAFFIC PATTERN, AND REMOVE ALL ROAD CLOSURE SIGNING, OFFSITE DETOUR SIGNING, TEMPORARY TRANSPORATION MANAGEMENT DEVICES. [SEE SHEET TMP-04 FOR SIGN LOCATIONS]

ETHERILL ENGINEERING
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Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

APPROVED: DocuSigned by: Lawrence H. Green 4808708898804BB...
DATE: 12/2/2024

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028137 LAWRENCE H. GREEN

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

TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES AND GENERAL NOTES) AND PHASING

PROJ. REFERENCE NO.	SHEET NO.
BP4-R007	TMP-03

SIGN NUMBER: SSD001
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-6″
HEIGHT: 2′-6″
TOTAL AREA: 8.8 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

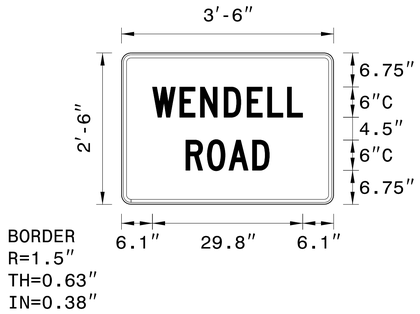
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 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 fluorescent orange retroreflective sheeting.

DESIGN BY: DAH
PROJECT ID: BP4.R007
CHECKED BY: WEI
LOCATION: OFFSITE DETOUR
Oct 17, 2022
DIV: 6



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

Series/Size
Text Length

W	E	N	D	E	L	L																		
6.1	11.5	15.6	20.3	24.8	28.9	32.8																		C 2000 29.8
R	O	A	D																					
12.7	17	21.2	25.9																					C 2000 16.6

FILENAME: BP4.R007_REF_BSSD

NORTH CAROLINA D.O.T. SIGN DETAIL

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APPROVED: DocuSigned by: Lawrence H. Green 4D0870898B0C46...
DATE: 12/2/2024

NORTH CAROLINA PROFESSIONAL SEAL 028137 ENGINEER LAWRENCE H. GREEN

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

SPECIAL SIGN DESIGN

11/9/2024
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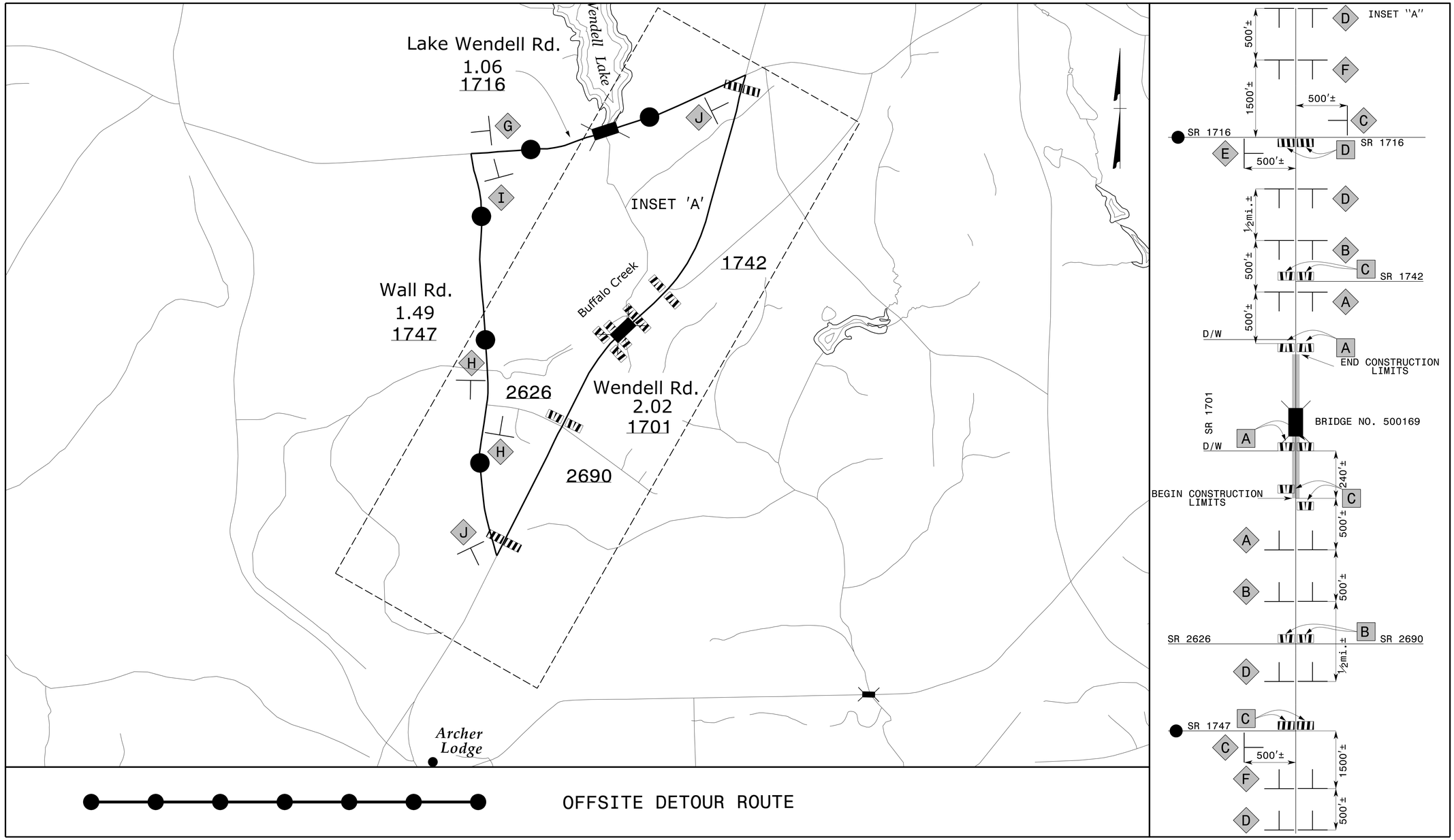
PROJ. REFERENCE NO.	SHEET NO.
BP4-R007	TMP-04



NOTES:
1) REFER TO SHEET TMP-01B FOR SIGN AND DEVICE LEGEND.
2) FOR INSET "A", REFER TO ROADWAY STANDARD DRAWINGS 1101.03, SHEETS 1 & 2 OF 9 FOR APPLICABLE NOTES.

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1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

APPROVED: DocuSigned by: Lawrence H. Green 48087086988D46B...
DATE: 12/2/2024

NORTH CAROLINA PROFESSIONAL SEAL 028137 ENGINEER LAWRENCE H GREEN

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

OFFSITE DETOUR

T.I.P.: BP4–R007

CONTRACT: DD00477

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
JOHNSTON COUNTY

TIP NO.	SHEET NO.
BP4-R007	PMP-01

APPROVED: DocuSigned by: Lawrence H. Green 4808708898B048B...

DATE: 3/10/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028137 ENGINEER LAWRENCE H. GREEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

FINAL PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION	PAY ITEM
T1	WHITE SOLID EDGE LINE	THERMOPLASTIC (4", 90 MIL)
T13	YELLOW DOUBLE CENTER	THERMOPLASTIC (4", 90 MIL)

GENERAL NOTES

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

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

ROAD NAME	MARKING	MARKER
SR 1701	THERMOPLASTIC (4",90 MIL)	NONE

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

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) PASSING ZONES WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

E) ALL STATIONS ARE CONSIDERED +/- UNLESS OTHERWISE SHOWN ON THE PLANS.

PLAN SUBMITTED TO:

Mitch Eaton, P.E., Signing and Delineation Regional Engineer

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · HIGHWAYS

PLAN PREPARED BY: Wetherill Engineering, Inc.

LARRY GREEN, P.E. — PROJECT MANAGER

D. ALLEN HAYES, E.I. — TRAFFIC DESIGN ENGINEER INTERN

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Liscense No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

3/10/2025
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User: ahayes
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TIP NO.	SHEET NO.
BP4-R007	PMP-02

APPROVED: DocuSigned by: Lawrence H. Green 480870889880488...

DATE: 3/10/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028137 ENGINEER LAWRENCE H. GREEN

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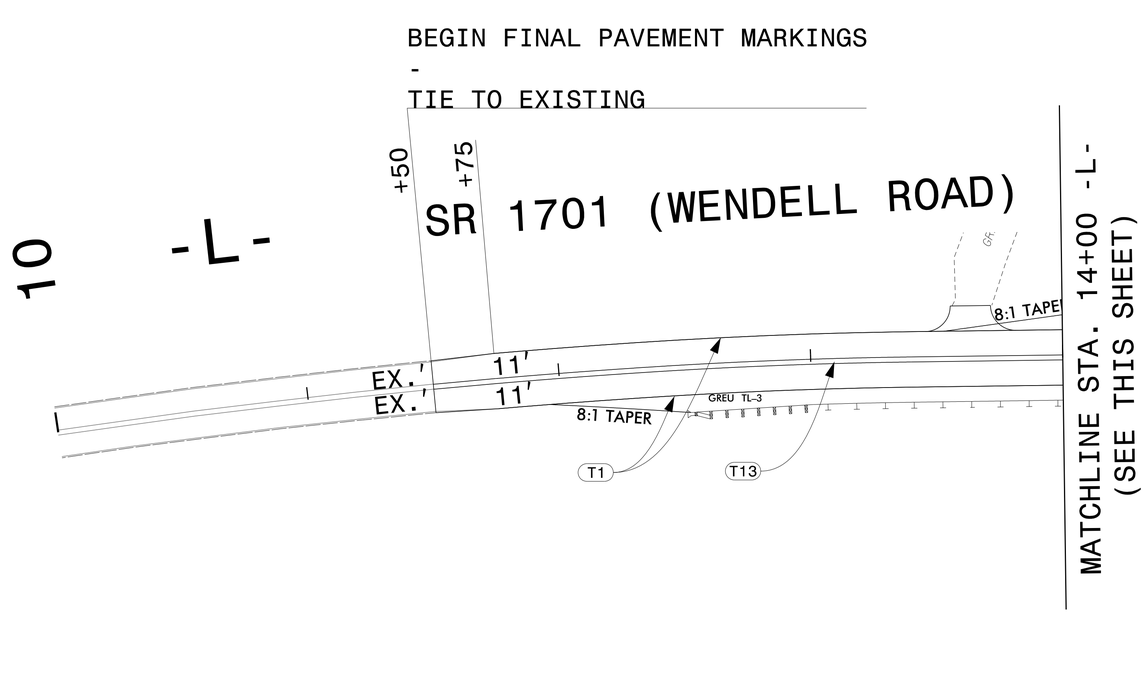
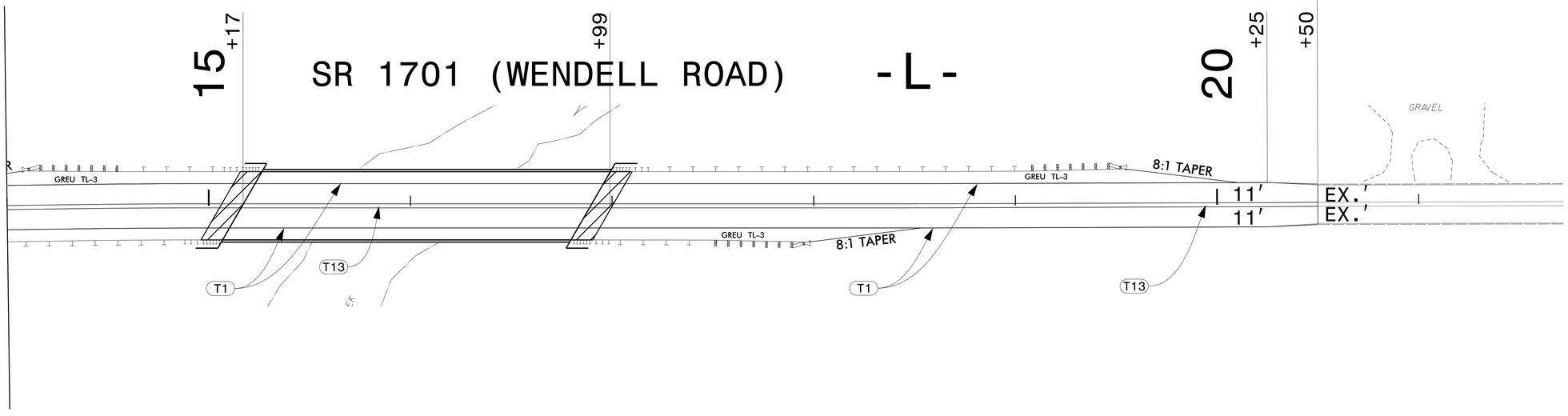
BEGIN FINAL PAVEMENT MARKINGS
-
TIE TO EXISTING



MATCHLINE STA. 14+00 -L-
(SEE THIS SHEET)

END FINAL PAVEMENT MARKINGS
-
TIE TO EXISTING



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PAVEMENT MARKING DETAIL

3/10/2025
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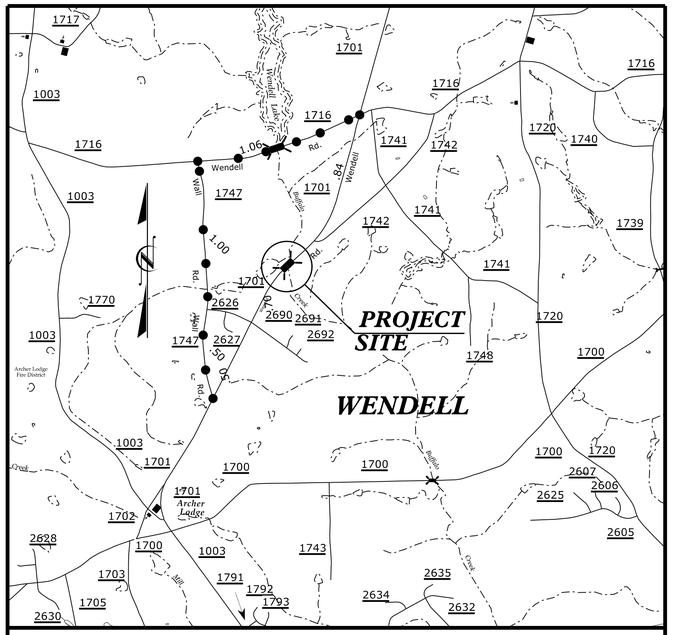
PROJECT: BP4.R007



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

JOHNSTON COUNTY

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK ON SR 1701 (WENDELL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4.R007	EC-1	

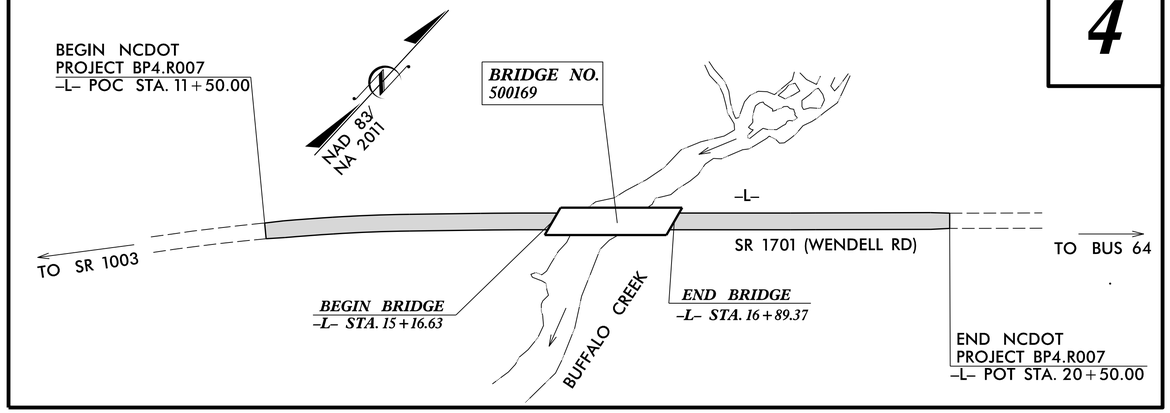
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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



4

GRAPHIC SCALE

50 25 0 50 100

PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG–010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2024 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Prepared in the Office of:

WETHERILL ENGINEERING, INC.

1223 JONES FRANKLIN ROAD
RALEIGH, NC 27606

Designed by:

KATIE ESTEP ***4485***

NAME *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	EC-02
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

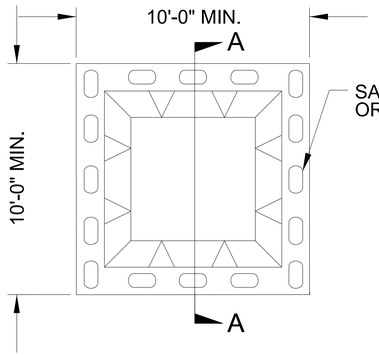
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

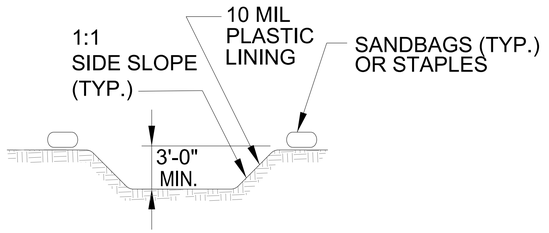
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	—EW—EW—EW—
1636.03	Coir Fiber Wattle Barrier	—CFW—CFW—CFW—

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

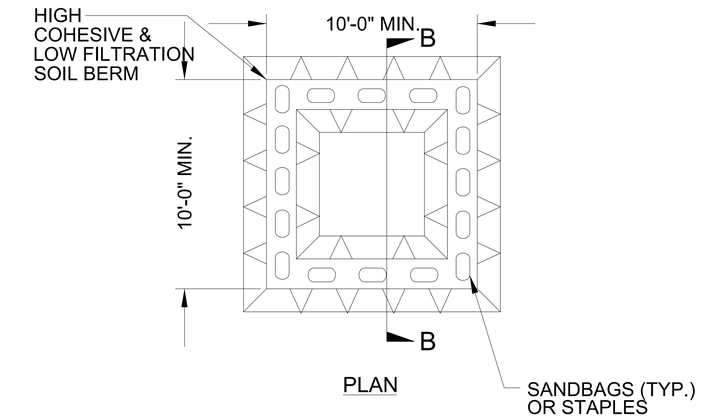
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

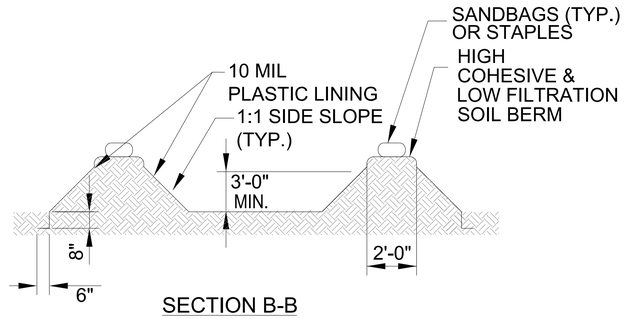
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES

8/17/99

REVISIONS

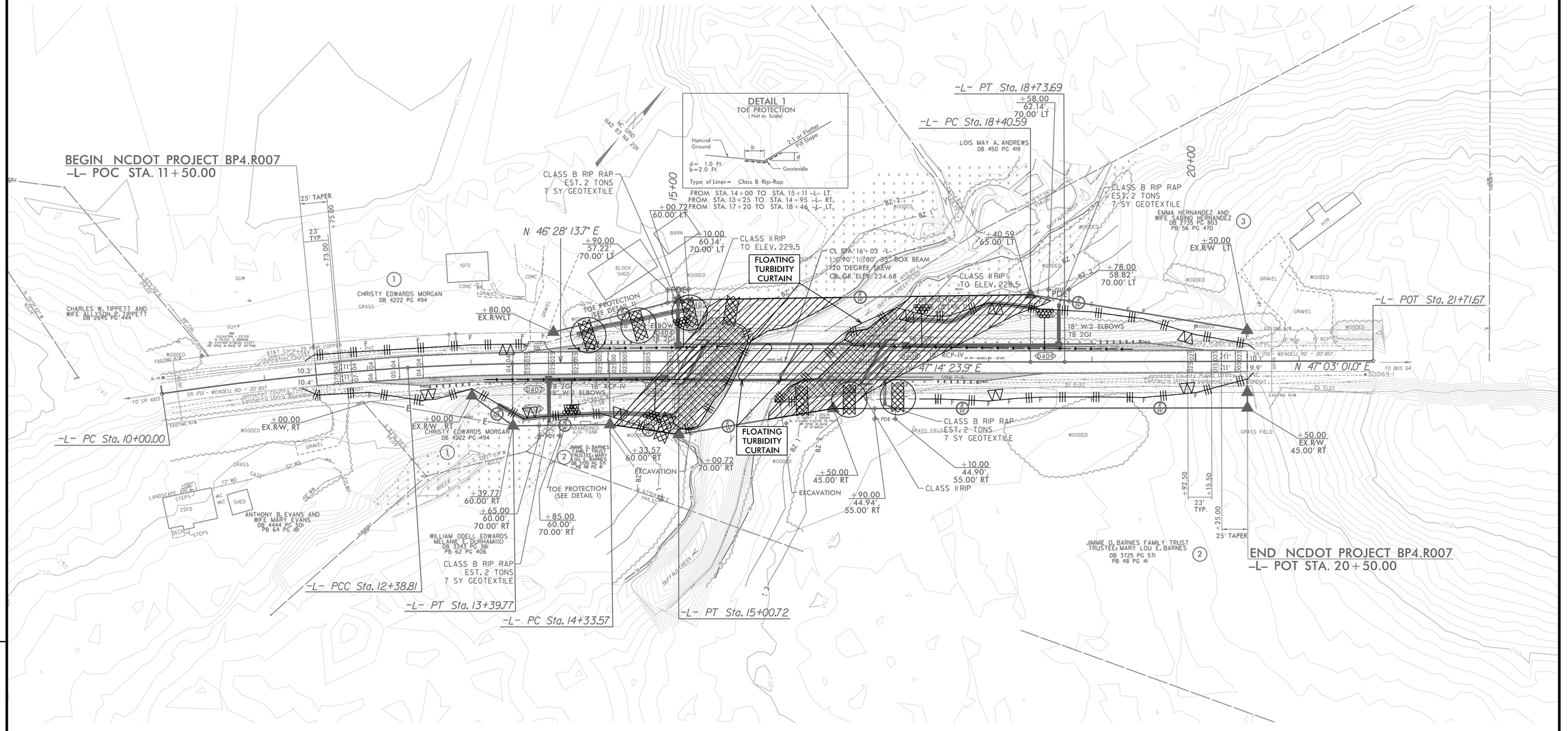
CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

BRIDGE NO. 500169	PROJECT REFERENCE NO.	SHEET NO.
	BP4.R007	EC-4
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Liscense No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



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USER:Rachel.Ford

11 12 13 14 15 16 17 18 19 20 21

BRIDGE NO. 500169	PROJECT REFERENCE NO.	SHEET NO.
	BP4.R007	EC-5
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Liscense No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS

8/17/99

BEGIN NCDOT PROJECT BP4.R007
-L- POC STA. 11+50.00

-L- PC Sta. 10+00.00

-L- PCC Sta. 12+38.81

-L- PT Sta. 13+39.77

-L- PC Sta. 14+33.57

-L- PT Sta. 15+00.72

-L- PC Sta. 18+40.59

-L- PT Sta. 18+73.69

-L- POT Sta. 21+71.67

END NCDOT PROJECT BP4.R007
-L- POT STA. 20+50.00

DETAIL 1
TOE PROTECTION
(Not to Scale)

Natural Ground
b
2:1 or Flatter Fill Slope
d
Geotextile

d= 1.0 Ft.
b=2.0 Ft.

Type of Liner= Class B Rip-Rap

FROM STA. 14+00 TO STA. 15+11 -L- LT.
FROM STA. 13+25 TO STA. 14+95 -L- RT.
FROM STA. 17+20 TO STA. 18+46 -L- LT.

NC GRID NAD 83 NA 2011

N 46° 28' 13.7" E

N 47° 14' 23.9" E

N 47° 03' 01.0" E

CLASS B RIP RAP
EST. 2 TONS
7 SY GEOTEXTILE

CLASS II RIP
TO ELEV. 229.5

FLOATING TURBIDITY CURTAIN

TOE PROTECTION (SEE DETAIL 1)

EXCAVATION

CL STA. 16+03 -L-
1 @90', 1 @80', 33° BOX BEAM
120 DEGREE SKEW
CR. GR. ELEV. 234.68

18" W/2 ELBOWS

18" RCP-IV

2GI

MCF

CHRISTY EDWARDS MORGAN
DB 4222 PG 494

CHARLES W. TIPPETT AND WIFE ALLYSON P. TIPPETT
DB 2649 PG 444

ANTHONY B. EVANS AND WIFE MARY EVANS
DB 4444 PG 501
PB 64 PG 181

WILLIAM ODELL EDWARDS
MELANIE F. DURHAM(2)
DB 3343 PG 381
PB 62 PG 406

JIMMIE D. BARNES FAMILY TRUST
TRUSTEES: MARY LOU E. BARNES
DB 3725 PG 571
PB 48 PG 41

LOIS MAY A. ANDREWS
DB 450 PG 419

EMMA HERNANDEZ AND WIFE SABINO HERNANDEZ
DB 2735 PG 803
PB 56 PG 470

SR 1701 - WENDELL RD - 20' BST

TO SR 1003

TO BUS 64

500169-I

10/20/2023
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Psh

11 12 13 14 15 16 17 18 19 20 21

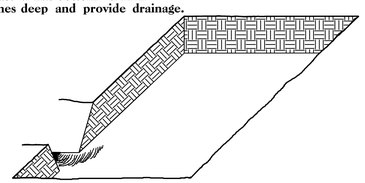
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4.R007	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

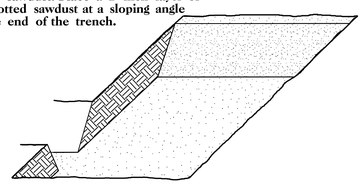
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

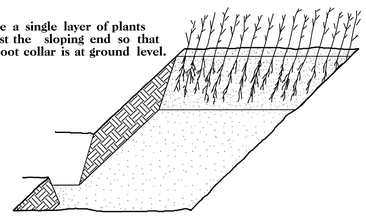
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



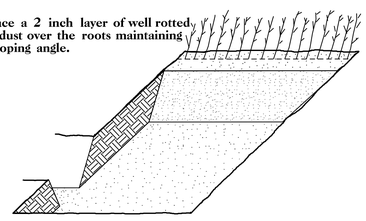
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the treneh.



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

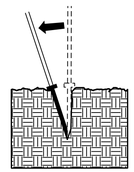


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

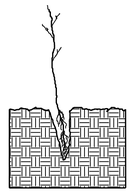


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

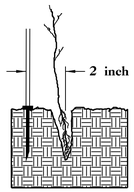
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



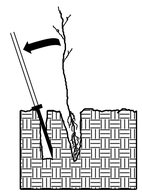
1. Insert planting bar as shown and pull handle toward planter.



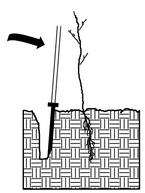
2. Remove planting bar and place seedling at correct depth.



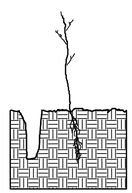
3. Insert planting bar 2 inches toward planter from seedling.



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



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

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

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

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

REFORESTATION

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

REFORESTATION

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

34%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
33%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
33%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

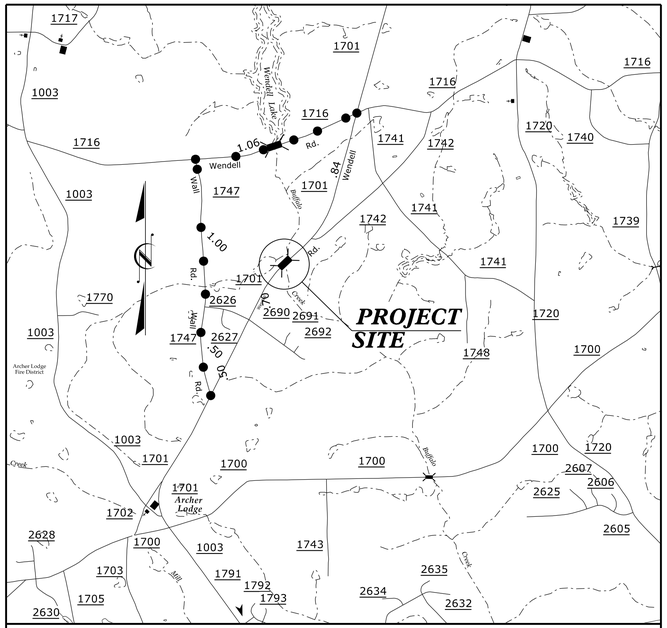
REFORESTATION DETAIL SHEET

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

09/08/99

PROJECT: BP4.R007

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet RW01 TO RW04 For Survey Control Sheets



VICINITY MAP
OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

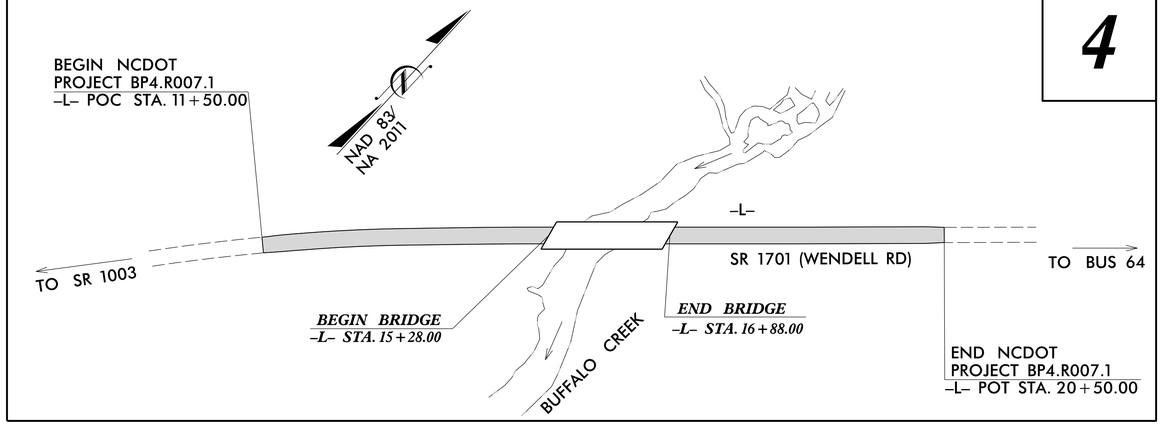
T.I.P. NO.	SHEET NO.
BP4.R007	UC–1

RELEASE FOR CONSTRUCTION
DATE: 11/15/2023

UTILITY CONSTRUCTION PLANS
JOHNSTON COUNTY

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK ON SR 1701 (WENDELL ROAD)

TYPE OF WORK: WATER AND SEWER RELOCATION



4

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GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

INDEX OF SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) WATER – JOHNSTON COUNTY
(B) SEWER – JOHNSTON COUNTY

PREPARED IN THE OFFICE OF
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

PANKIL K. PATEL — UTILITY PROJECT MANAGER
JOHN D. SCHRINER, PLS — UTILITY COORDINATOR

SEAL 11/15/2023
NORTH CAROLINA PROFESSIONAL SEAL 10773 ENGINEER EDWARD G. WETHERILL
Docusigned by: Edward G. Wetherill 6B0753EEBC0147D...

DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard
Wilson NC, 27895

ANDY BROWN, PE — ACTING DEPUTY DIVISION ENGINEER NCDOT DIVISION 4
KYLE PLEASANT — DIVISION UTILITY ENGINEER

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

5/14/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
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CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	UC-2

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UTILITY CONSTRUCTION

UTILITIES PLAN SHEET SYMBOLS

RELEASE FOR CONSTRUCTION
DATE: 11/15/2023

PROPOSED WATER SYMBOLS

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

PROPOSED SEWER SYMBOLS

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

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

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

EXISTING UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Utility Pole
- Utility Pole with Base
- H-Frame Pole
- Power Transmission Line Tower
- Water Manhole — W
- Power Manhole — P
- Telephone Manhole — T
- Sanitary Sewer Manhole — S
- Hand Hole for Cable — HH
- Power Transformer
- Telephone Pedestal — T
- CATV Pedestal — C
- Gas Valve
- Gas Meter
- Located Miscellaneous Utility Object
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

- *Underground Power Line — P
- *Underground Telephone Cable — T
- *Underground Telephone Conduit — TC
- *Underground Fiber Optics Telephone Cable — T FO
- *Underground TV Cable — TV
- *Underground Fiber Optics TV Cable — TV FO
- *Underground Gas Pipeline — G
- Aboveground Gas Pipeline — A/G Gas
- *Underground Water Line — W
- Aboveground Water Line — A/G Water
- *Underground Gravity Sanitary Sewer Line — SS
- Aboveground Gravity Sanitary Sewer Line — A/G Sanitary Sewer
- *Underground SS Forced Main Line — FSS
- Underground Unknown Utility Line
- SUE Test Hole
- Water Meter
- Water Valve
- Fire Hydrant
- Sanitary Sewer Cleanout

*For Existing Utilities

- Utility Line Drawn from Record (Type as Shown) — P
- Designated Utility Line (Type as Shown) — P

REV: 2/1/2012

11/15/2023
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USER: cshelton

5/14/99

UTILITY CONSTRUCTION

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	UC-3
DESIGNED BY: PKP	
DRAWN BY: JDS	
CHECKED BY: PKP	
APPROVED BY: EGW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE:(919)707-6690 FAX:(919)250-4151	UTILITY CONSTRUCTION PLANS ONLY

11/15/2023
NORTH CAROLINA PROFESSIONAL SEAL 10773 ENGINEER EDWARD G. WETHERILL
DocuSigned by: Edward Wetherill

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UTILITY CONSTRUCTION

RELEASE FOR CONSTRUCTION
DATE: 11/15/2023

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATIONS "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2024.
2. THE EXISTING UTILITIES BELONG TO JOHNSTON COUNTY. CONTACT MIKE KEEN (UTILITY PROJECT MANAGER) 919-209-8333.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.
6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, "SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.
10. JOHNSTON COUNTY SHALL BE PROVIDED WITH TWO COPIES OF SURVEYED AS-BUILTS OF THE INSTALLED UTILITY. THE AS-BUILTS SHALL INCLUDE NOTATIONS OF THE SIZE AND TYPE OF MATERIAL INSTALLED; GPS COORDINATES OF ALL: FITTINGS, UTILITY CONTROLS, AND THE HORIZONTAL AND VERTICAL LOCATIONS OF THE PIPING. PROVIDE BORING LOGS FROM TRENCHLESS INSTALLATIONS.

WATER INSTALLATION NOTES

1. CONTRACTOR SHALL FULLY INSTALL, PRESSURE & LEAKAGE TEST, AND CHLORINATE NEW WATER MAIN PRIOR TO CONNECTION TO EXISTING SYSTEM.
2. CONTRACTOR SHALL PERFORM THE CONNECTION DURING OFF PEAK HOURS WITH A MAXIMUM SHUT DOWN TIME OF FIVE HOURS. (12 PM MIDNIGHT TO 5 AM).
3. ANY WORK OR TEST PERFORMED WITHOUT NOTIFICATION AND CONTACT WITH TOWN OF CANTON FIELD INSPECTORS SHALL BE PERFORMED AT THE CONTRACTOR'S RISK. TESTING SHALL BE PERFORMED IN THE PRESENCE OF COUNTY PERSONNEL.
4. OPERATION OF EXISTING GATE VALVES SHALL BE DONE BY COUNTY OPERATIONS STAFF.
5. TIE NEW WATER MAIN INTO EXISTING. INSTALL THRUST BLOCKS AND RODDING AS REQUIRED.
6. NEW WATER MAIN SHALL NOT BE CONNECTED TO EXISTING MAIN WITHOUT PRIOR APPROVAL AND COORDINATION WITH COUNTY.
7. FOR NEW WATER MAIN CONNECTIONS, USE GRIP RING PIPE RESTRAINER AS REQUIRED.
8. NEW WATER MAIN SHALL BE INSTALLED WITH BOTH ELECTRONIC MARKER TAPE/ TRACER WIRE AND ELECTRONIC MARKER BALLS.

SEWER INSTALLATION NOTES

1. CONTRACTOR SHALL FULLY INSTALL, PRESSURE & LEAKAGE TEST NEW SEWER MAIN PRIOR TO CONNECTION TO EXISTING SYSTEM.
2. CONTRACTOR SHALL PERFORM THE CONNECTION DURING OFF PEAK HOURS WITH A MAXIMUM SHUT DOWN TIME OF FIVE HOURS. (12 PM MIDNIGHT TO 5 AM).
3. ANY TEST PERFORMED WITHOUT NOTIFICATION TO JOHNSTON COUNTY SHALL BE PERFORMED AT THE CONTRACTOR'S RISK. TESTING SHALL BE PERFORMED IN THE PRESENCE OF JOHNSTON COUNTY PERSONNEL. CONTACT MIKE KEEN, UTILITY PROJECT MANAGER AT 919-209-8333.
4. VERIFY LOCATION AND DEPTH OF EXISTING SEWER SERVICE LATERALS PRIOR TO INSTALLATION OF THE NEW SEWER MAIN.
5. NEW SEWER MAIN SHALL NOT BE CONNECTED TO EXISTING MAIN WITHOUT PRIOR APPROVAL AND COORDINATION WITH JOHNSTON COUNTY.
6. FOR NEW SEWER MAIN CONNECTIONS, USE GRIP RING PIPE RESTRAINER AS REQUIRED.
7. NEW FORCE MAIN SEWER SHALL BE INSTALLED WITH BOTH ELECTRONIC MARKER TAPE/ TRACER WIRE AND ELECTRONIC MARKER BALLS.

11/15/2023
X:\Projects\BP4.R007\ut\UC-3.psh.dgn
USER:pkeener

5/14/99

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	UC-3A
DESIGNED BY: PKP	11/15/2023
DRAWN BY: JDS	
CHECKED BY: PKP	
APPROVED BY: EGW	
REVISED:	

NORTH CAROLINA PROFESSIONAL SEAL 10773 ENGINEER EDWARD G. WETHERILL DocuSigned by: Edward G. Wetherill

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

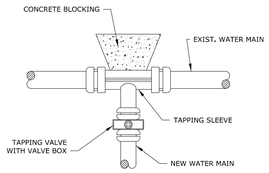
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

UTILITY CONSTRUCTION PLANS ONLY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

UTILITY CONSTRUCTION

RELEASE FOR CONSTRUCTION
DATE: 11/15/2023



TAPPING SLEEVE & VALVE ASSEMBLY

NOT TO SCALE

NOTES:
1. TAPPING SLEEVE SHALL BE FABRICATED OF TYPE 304 OR 316 S.S. AND PROVIDE A 360° SEAL AROUND EXISTING PIPE WITH FULL CIRCUMFERENTIAL GASKET.
2. TAPPING SLEEVE SHALL BE JCM 432, MUELLER H-304, FORD FTSS, ROMAC ST III OR APPROVED EQUAL.
3. ALL MATERIALS USED IN THE POTABLE WATER SYSTEM MUST BE NSF61 AND NSF372 CERTIFIED AND MEET THE LATEST FEDERAL SAFE DRINKING WATER ACT REQUIREMENTS.

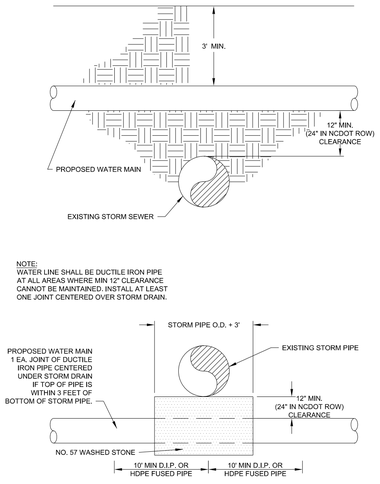
	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

WATER STANDARD DETAIL Tapping Sleeve and Valve Assembly

PAGE **5**



NOTE:
WATER LINE SHALL BE DUCTILE IRON PIPE AT ALL AREAS WHERE MIN 12" CLEARANCE CANNOT BE MAINTAINED. INSTALL AT LEAST ONE JOINT CENTERED OVER STORM DRAIN.

STORM SEWER CROSSING DETAILS

NOT TO SCALE

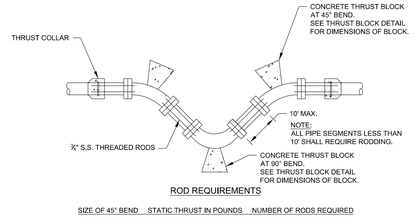
	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

STANDARD WATER DETAIL Storm Sewer Crossing

PAGE **12**



ROD REQUIREMENTS

SIZE OF 45° BEND	STATIC THRUST IN POUNDS	NUMBER OF RODS REQUIRED
6"	4,328	2
8"	7,694	2
12"	17,312	4
16"	30,779	6
20"	48,091	8
24"	69,252	10

GENERAL NOTES
1. RODS AND NUTS SHALL BE OF TYPE 304 OR TYPE 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.

VERTICAL BEND RODDING AND BLOCKING DETAIL

NOT TO SCALE

	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

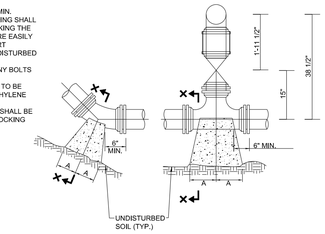
Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

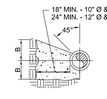
WATER STANDARD DETAIL Critical Bend Rodding and Blocking Details

PAGE **7**

NOTES:
1. CONCRETE SHALL BE 3,000 PSI MIN.
2. CONCRETE FOR THRUST BLOCKING SHALL BE KEPT FAIRLY DRY. THUS MAKING THE CONCRETE WEDGE SHAPE MORE EASILY FORMED WITH THE WIDEST PART (BLOCKING AREA) AGAINST UNDISTURBED SOIL.
3. NO CONCRETE SHALL COVER ANY BOLTS OR GLANDS.
4. ALL FITTING AND ACCESSORIES TO BE WRAPPED WITH 10 MIL POLYETHYLENE PRIOR TO POURING BLOCKING.
5. VOLUME OF THRUST BLOCKING SHALL BE AS SHOWN ON THE THRUST BLOCKING SCHEDULE.

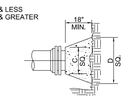


PLAN BENDS



SECTION X-X BENDS & TEES

PLAN TEES



PLAN & ELEV. PLUGS

PIPE SIZE	90° BEND A	90° BEND B	45° BEND A	45° BEND B	22 1/2° BEND A	22 1/2° BEND B	11 1/4° BEND A	11 1/4° BEND B	TEE A	TEE B	PLUG C	PLUG D
4"	8"	12"	8"	8"	8"	8"	8"	8"	8"	9"	10"	18"
6"	10"	12"	8"	10"	8"	8"	8"	10"	10"	12"	12"	18"
8"	10"	13"	10"	10"	8"	8"	8"	10"	10"	12"	12"	24"
10"	10"	14"	10"	12"	8"	10"	8"	10"	11"	14"	14"	25"
12"	20"	16"	12"	14"	8"	12"	8"	12"	14"	16"	16"	30"
14"	22"	18"	14"	16"	10"	14"	10"	14"	16"	18"	18"	34"
16"	26"	20"	16"	18"	12"	16"	12"	16"	18"	20"	20"	36"
20"	36"	26"	24"	18"	18"	13"	12"	9"	19"	18"	24"	48"
24"	48"	33"	30"	21"	18"	18"	15"	11"	21"	21"	28"	56"

THRUST BLOCK DETAIL

NOT TO SCALE

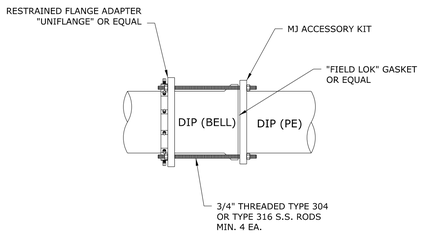
	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

WATER STANDARD DETAIL Thrust Block

PAGE **8**



HARNESS RESTRAINT DETAIL

NOT TO SCALE

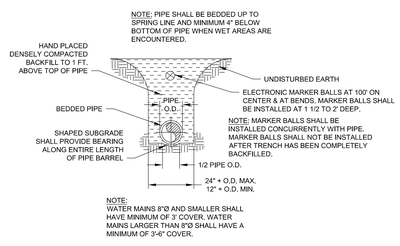
	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

WATER STANDARD DETAIL Restraint Harness

PAGE **10**



NOTE:
WATER MAINS 8"Ø AND SMALLER SHALL HAVE MINIMUM OF 3' COVER. WATER MAINS LARGER THAN 8"Ø SHALL HAVE A MINIMUM OF 3'-6" COVER.

PIPE LAYING CONDITION

NOT TO SCALE

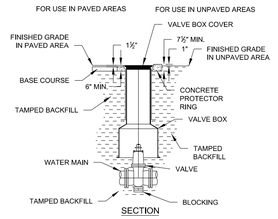
	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

WATER STANDARD DETAIL Pipe Laying Condition

PAGE **17**



NOTES:
1. D.I.P. MAY BE USED FOR VALVE BOX EXTENSIONS.
2. VALVE BOX SHOULD NOT CONTACT WATER MAIN OR VALVE.
3. CONCRETE PROTECTOR RING SHALL BE USED IN ALL UNPAVED AREAS.
4. ALL MATERIALS USED IN THE POTABLE WATER SYSTEM MUST BE NSF61 AND NSF372 CERTIFIED AND MEET THE LATEST FEDERAL SAFE DRINKING WATER ACT REQUIREMENTS.

VALVE AND VALVE BOX INSTALLATION

NOT TO SCALE

	Name	Date
Drawn By:		
Checked By:		
Approved By:		
Scale:		

Rev. Description Date Init.

JOHNSTON COUNTY
Department of Public Utilities
P.O. Box 2263
Smithfield, NC 27577

WATER STANDARD DETAIL Valve and Valve Box Installation

PAGE **13**

REVISIONS

NOTES:

1. CONTRACTOR TO FIELD VERIFY FSS DEPTH/LOCATION IS OUT OF CONFLICT WITH PROPOSED CONSTRUCTION DURING THE SEWER LINE INSTALLATION AND TIE-IN.

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	UC-4
DESIGNED BY: PKP	6/25/2024
DRAWN BY: JDS	
CHECKED BY: PKP	
APPROVED BY: EGW	
REVISED:	

NORTH CAROLINA PROFESSIONAL SEAL 10773 ENGINEER EDWARD G. WETHERILL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

Signed by: Edward G. Wetherill
UTILITY CONSTRUCTION PLANS ONLY

BRIDGE NO. 500169

FINAL PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

UTILITY CONSTRUCTION

RELEASE FOR CONSTRUCTION
DATE: 12/08/2023

NC GRID NAD 83 NAD 2011

ABANDON 290 LF 12" UTILITY LINE

290 LF 12" WATER LINE
WL-1; DIP

12" VALVE

TIE IN TO EXISTING 12" WATER LINE WITH LONG PATTERN SLEEVE AND CONCRETE THRUST COLLAR

EXISTING 12" WL STREAM CROSSING TO REMAIN

EXISTING AND PROPOSED BRIDGE

PROPOSED 18" RCP INV 226.50±
EXISTING 12" WATER INV 219.93±

4"x2" TAPPING SADDLE ON EXISTING 4" FSS

BEGIN NCDOT PROJECT BP4.R007
-L- POC STA. 11+50.00

4" LINE STOP

TH-1
N-716058.19'
E-2189957.70'
TOP OF UTILITY= 219.93'
DEPTH= 3.72'

TH-2
N-716210.76'
E-2190148.84'
TOP OF UTILITY= 228.19'
DEPTH= 3.48'

TH-3
N-716290.22'
E-2190248.46'
TOP OF UTILITY= 232.11'
DEPTH= 3.68'

TH-4
N-716342.84'
E-2190304.93'
TOP OF UTILITY= 234.28'
DEPTH= 3.49'

TH-5
N-716384.68'
E-2190349.63'
TOP OF UTILITY= 236.06'
DEPTH= 3.17'

TH-6
N-715827.37'
E-2189799.77'
TOP OF UTILITY= 229.81'
DEPTH= 3.54'

TH-7
N-715932.29'
E-2189905.57'
TOP OF UTILITY= 229.46'
DEPTH= 3.57'

TH-8
N-715968.43'
E-2189950.47'
TOP OF UTILITY= 2240.20'
DEPTH= 6.91'

TH-9
N-716146.47'
E-2190059.15'
TOP OF UTILITY= 226.16'
DEPTH= 3.20'

TH-10
N-716197.76'
E-2190192.17'
TOP OF UTILITY= 228.83'
DEPTH= 4.50'

-L- PC Sta. 10+00.00

-L- POT Sta. 21+71.67

TO SR 1003

TO BUS 64

SR 1701 (WENDELL ROAD)

END NCDOT PROJECT BP4.R007
-L- POT STA. 20+50.00

248 LF 4" FORCE MAIN SEWER
FSS-1; PVC C900 WITH EPOXY LINED FITTINGS

80 LF 4" FORCE MAIN SEWER
FSS-2; PVC C900 WITH EPOXY LINED FITTINGS

ABANDON 245 LF 4" UTILITY PIPE

ABANDON 80 LF 4" UTILITY PIPE

TIE IN TO EXISTING 4" FORCE MAIN SEWER WITH LONG PATTERN SLEEVE AND CONCRETE THRUST COLLAR (TYP)

LOCATE EXISTING COUPLING AND TIE 4" PVC FORCE MAIN TO EXISTING 4" HDPE FORCE MAIN (SEE NOTE 1)

EXISTING 4" FSS STREAM CROSSING TO REMAIN

PROPOSED DRAINAGE INV 231.83±
EXISTING 4" FSS INV 222.50±

NOTE:
THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 730 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

NOTE:
THE ESTIMATED QUANTITY OF DUCTILE IRON SEWER PIPE FITTINGS ON THIS PLAN SHEET IS 430 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

50 25 0 50 100
PLANS

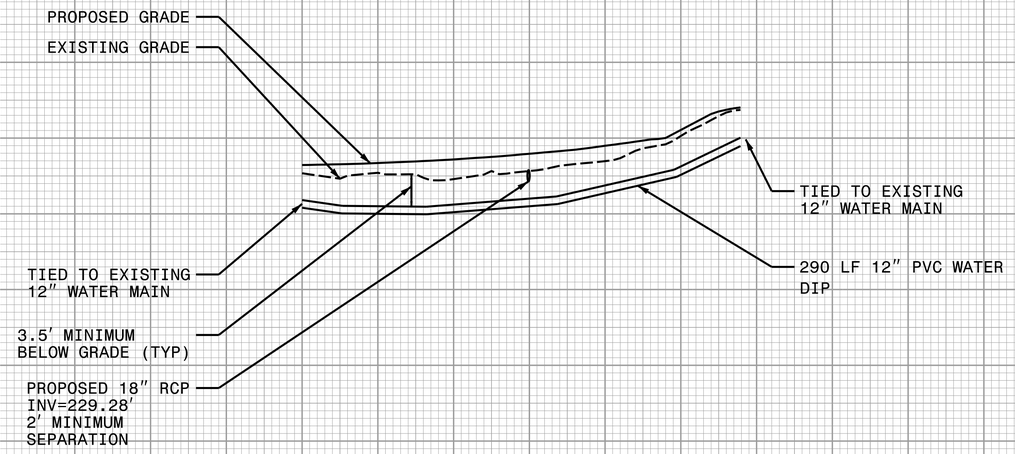
SEE SHEET UC-5 FOR PROFILES

6/25/2024
BP4.R007_ut_UC-4_psh.dgn
USER:PKP

8/17/99

REVISIONS

WL-1



SEE SHEET UC-4 FOR PLAN

RELEASE FOR CONSTRUCTION
DATE: 11/15/2023

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - SURVEY/SUE - UTILITIES - CONSTRUCTION OBSERVATION

BRIDGE NO. 500169

FINAL PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	UC-5
DESIGNED BY: PKP	
DRAWN BY: JDS	
CHECKED BY: PKP	
APPROVED BY: EGW	
REVISED:	

11/15/2023
NORTH CAROLINA PROFESSIONAL SEAL 10773 ENGINEER EDWARD G. WETHERILL
DocuSigned by: Edward G. Wetherill

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

UTILITY CONSTRUCTION PLANS ONLY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

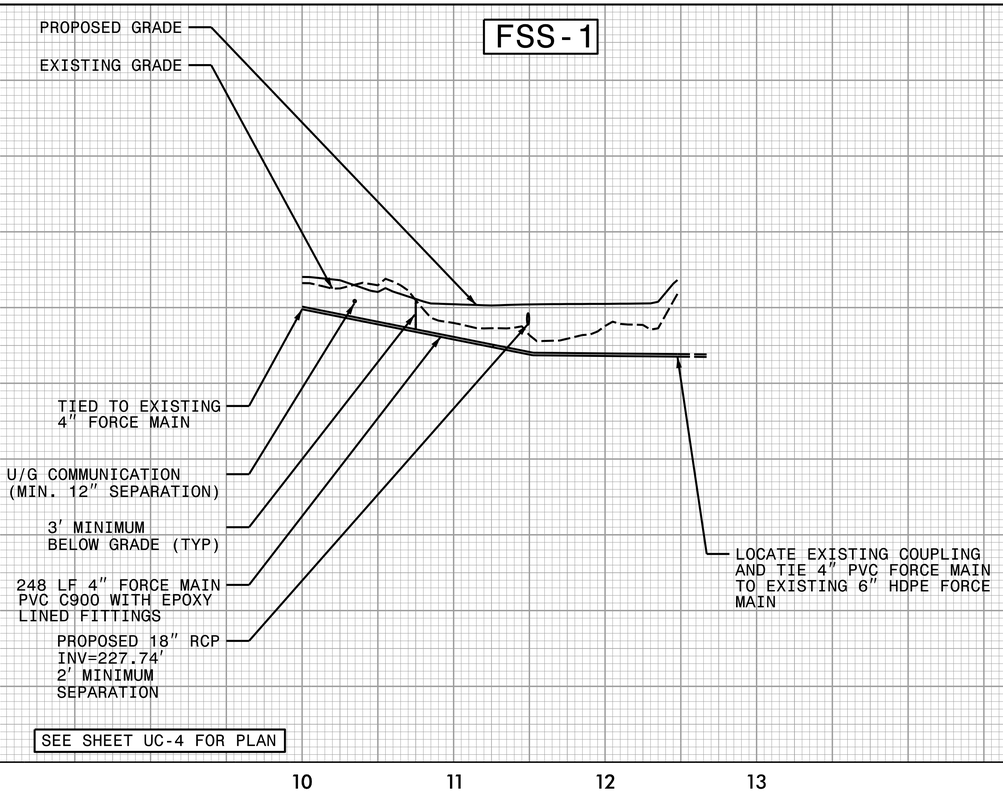
UTILITY CONSTRUCTION

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

10 11 12

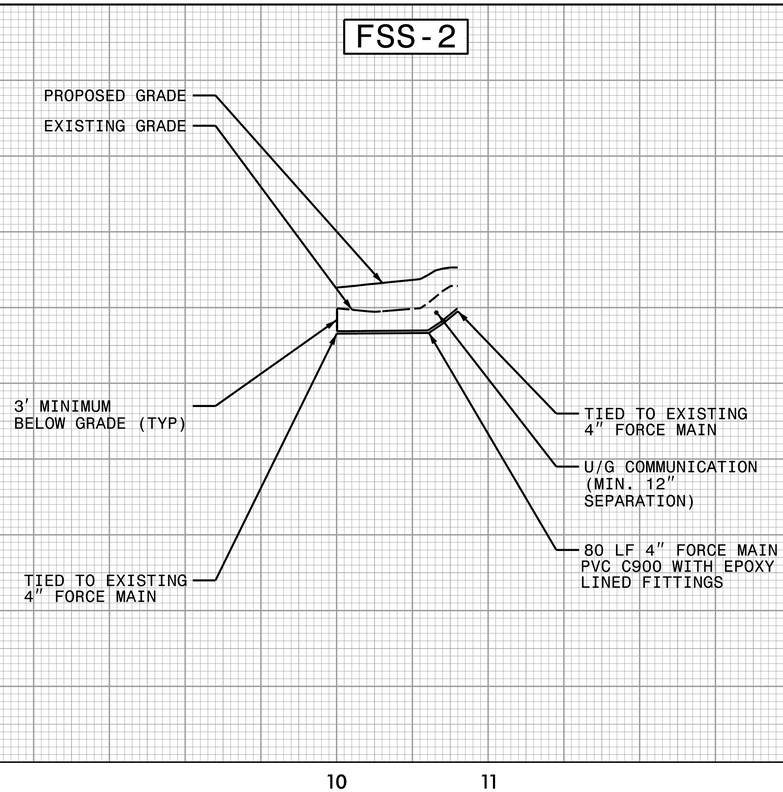
FSS-1



SEE SHEET UC-4 FOR PLAN

10 11 12 13

FSS-2



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11/15/2023
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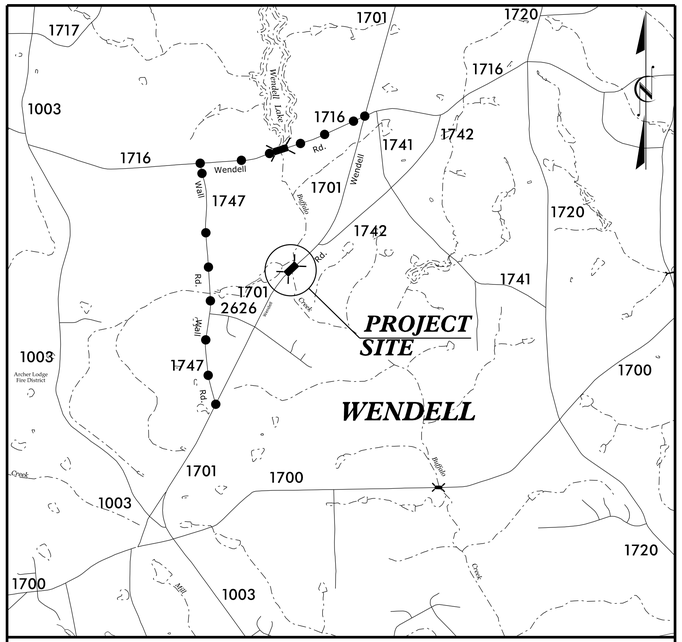
USER:jdsmith

09/08/99

PROJECT: BP4.R007

CONTRACT:



VICINITY MAP

OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS
JOHNSTON COUNTY

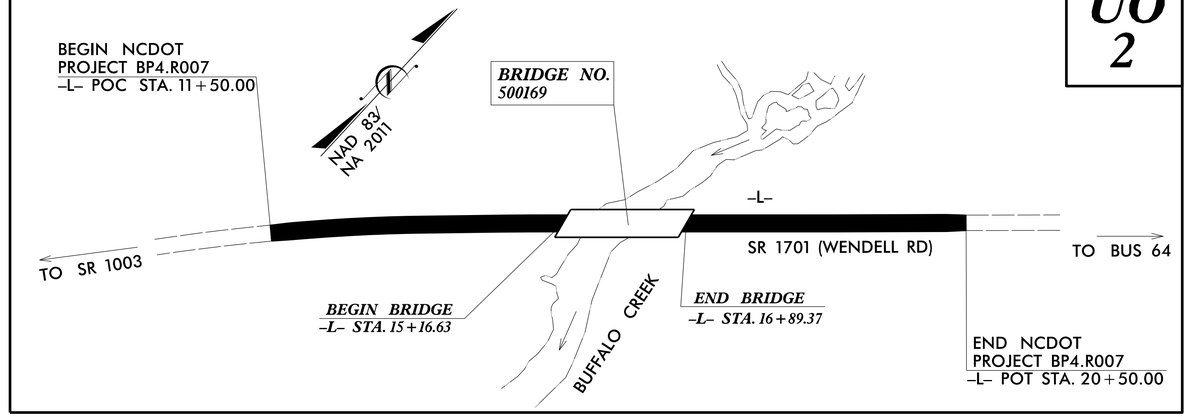
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4.R007	UO-1	2

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP4.R007.1		PE
BP4.R007.2		ROW, UTIL.
BP4.R007.3		CONST.

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK ON SR 1701 (WENDELL ROAD)

TYPE OF WORK: UTILITIES BY OTHERS

UO
2



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. CONTERRA – TELECOMMUNICATIONS
B. CHARTER/SPECTRUM – TELECOMMUNICATIONS
C. BRIGHTSPEED – TELECOMMUNICATIONS
D. AT&T – TELECOMMUNICATIONS
E. DUKE – POWER
F. UTILIPLEX – TELECOMMUNICATIONS

Prepared in the offices of:
DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard, Wilson NC, 27895

KYLE PLEASANT
PROJECT UTILITIES ENGINEER

RACHEL C. EVANS, PE
NCDOT DIVISION 4 PROJECT ENGINEER

DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard, Wilson NC, 27895

ADDISON GAINEY, PE
DIVISION CONTACT

20-JUN-2025 15:33
C:\Users\swhaddock\Desktop\UBO_Upload to S drive\BP4.R007\Electronic Files\CADD\Roadway\Proj
swhaddock AT DIV04-33082L

PROJECT REFERENCE NO.	SHEET NO.
BP4.R007	U0-2

REVISIONS

8/17/99

BEGIN NCDOT PROJECT BP4.R007
–L– POC STA. 11+50.00

–L– PC Sta. 10+00.00

–L– PCC Sta. 12+38.81

–L– PT Sta. 13+39.77

–L– PC Sta. 14+33.57

–L– PT Sta. 15+00.72

–L– PT Sta. 18+73.69

–L– PC Sta. 18+40.59

–L– POT Sta. 21+71.67

END NCDOT PROJECT BP4.R007
–L– POT STA. 20+50.00

N 46° 28' 13.7" E

N 47° 14' 23.9" E

N 47° 03' 01.0" E

CLASS B RIP RAP
EST. 2 TONS
7 SY GEOTEXTILE

CLASS II RIP RAP
TO ELEV. 229.5'
(SEE STRUCTURE PLANS)

GL STA. 16+03 –L–
1 @ 90'-1"@80', 33" BOX BEAM
120 DEGREE SKEW
GR. GR. ELEV. 234.58

TOE PROTECTION
(SEE DETAIL 1)

EXCAVATION
CLASS II RIP RAP
(SEE STRUCTURE PLANS)

18" W/2 ELBOWS
TB 2GI

18" RCP-IV

ABANDON IN PLACE/INCTIVE – SPECTRUM

AT&T – NO CONFLICT

DUKE – NO CONFLICT

CONTERRA – NO CONFLICT

AT&T Corp. 25 PAIR, COPPER
Construction Johnston County Public Utility 2", PVC

Johnston County Public Utility 4", PVC
Conterra Ultra Broadband, LLC 2", CONDUIT

CHRISTY EDWARDS MORGAN
DB 4422 PG 494

CHARLES W. TIPPETT AND
WIFE ALYSON P. TIPPETT
DB 2649 PG 444

ANTHONY B. EVANS AND
WIFE MARY EVANS
DB 4444 PG 501
PB 64 PG 181

WILLIAM ODELL EDWARDS
MELANIE E. DURHAM(D)
DB 5543 PG 391
PB 62 PG 406

LOIS MAY A. ANDREWS
DB 450 PG 419

EMMA HERNANDEZ AND
WIFE SABINO HERNANDEZ
DB 2710 PG 803
PB 56 PG 470

JIMMIE D. BARNES FAMILY TRUST
TRUSTEE: MARY LOU E. BARNES
DB 3725 PG 571
PB 48 PG 41

JIMMIE D. BARNES
FAMILY TRUST
TRUSTEE: MARY
LOU E. BARNES
DB 3725 PG 571
PB 48 PG 41

SR 1700 – WENDELL RD – 22' BST

TO SR 1003

TO BUS 64

17-JUN-2025 15:27
C:\Users\swhaddock\Desktop\U80_Upload to S drive\BP4.R007\Electronic Files\CADD\Roadway\Proj\500169_DDC4_U80_dsn.dgn
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
BP4–R007	X–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BP4.R007 CROSS SECTIONS (X–1 THRU X–8)

INDEX OF SHEETS

PROJ. REFERENCE NO.	SHEET NO.
BP4–R007	X–1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT.

CROSS–SECTION SUMMARY

Approximate quantities only. Unclassified excavation, fine grading, clearing and grubbing, removal of existing pavement will be paid for at the lump sum price for "Grading".

Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)	Undercut (cu. yd.)	Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)	Undercut (cu. yd.)	Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)	Undercut (cu. yd.)	Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)	Undercut (cu. yd.)
- L - 11+50 to 15+16.63															
11+50.00	0	0	0												
12+00.00	9	3	0												
12+50.00	19	3	0												
13+00.00	14	5	0												
13+50.00	6	83	0												
13+70.00	2	66	0												
14+00.00	4	121	0												
14+25.00	3	119	0												
14+50.00	3	131	0												
15+00.00	15	317	0												
15+10.00	4	56	0												
15+16.63	1	16	0												
- L - 16+89.37 to 20+50.00															
16+89.37	0	0	0												
17+00.00	1	22	0												
17+50.00	3	132	0												
17+65.00	0	42	0												
18+00.00	0	137	0												
18+20.00	0	103	0												
18+50.00	1	138	0												
19+00.00	4	176	0												
19+35.00	5	93	0												
19+50.00	3	29	0												
20+00.00	11	56	0												
20+50.00	8	15	0												

8/23/99

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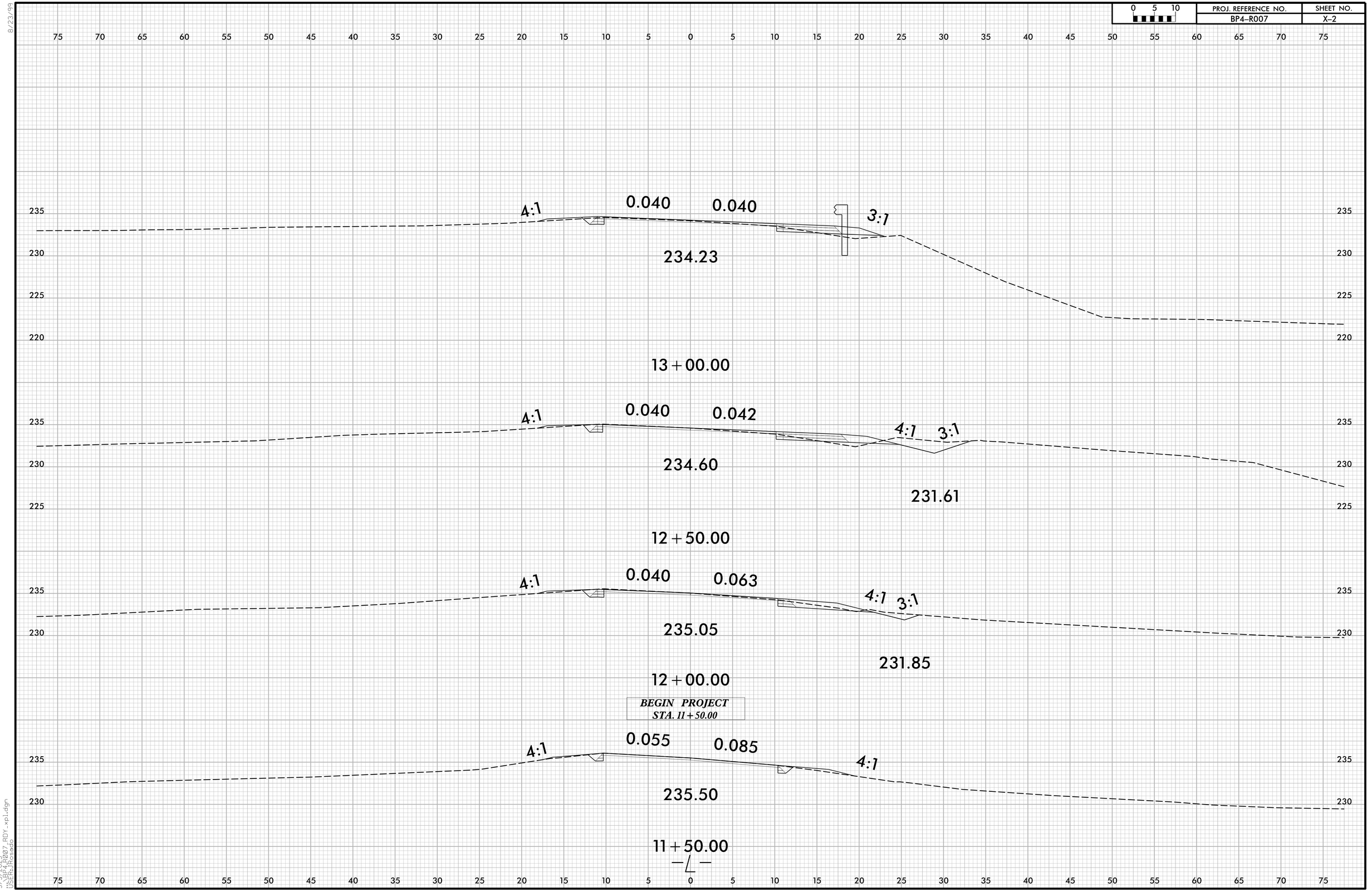

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8/23/99

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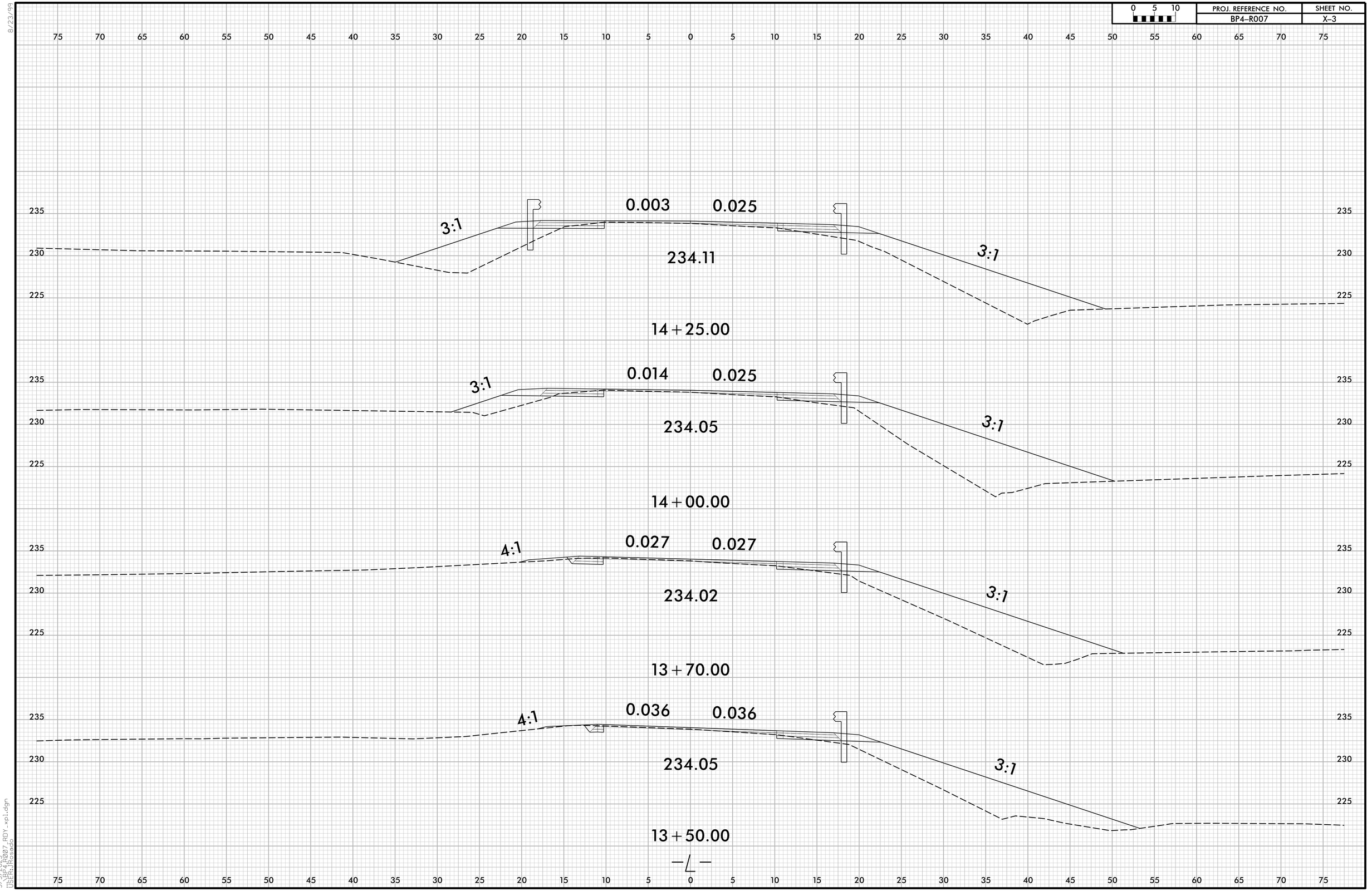

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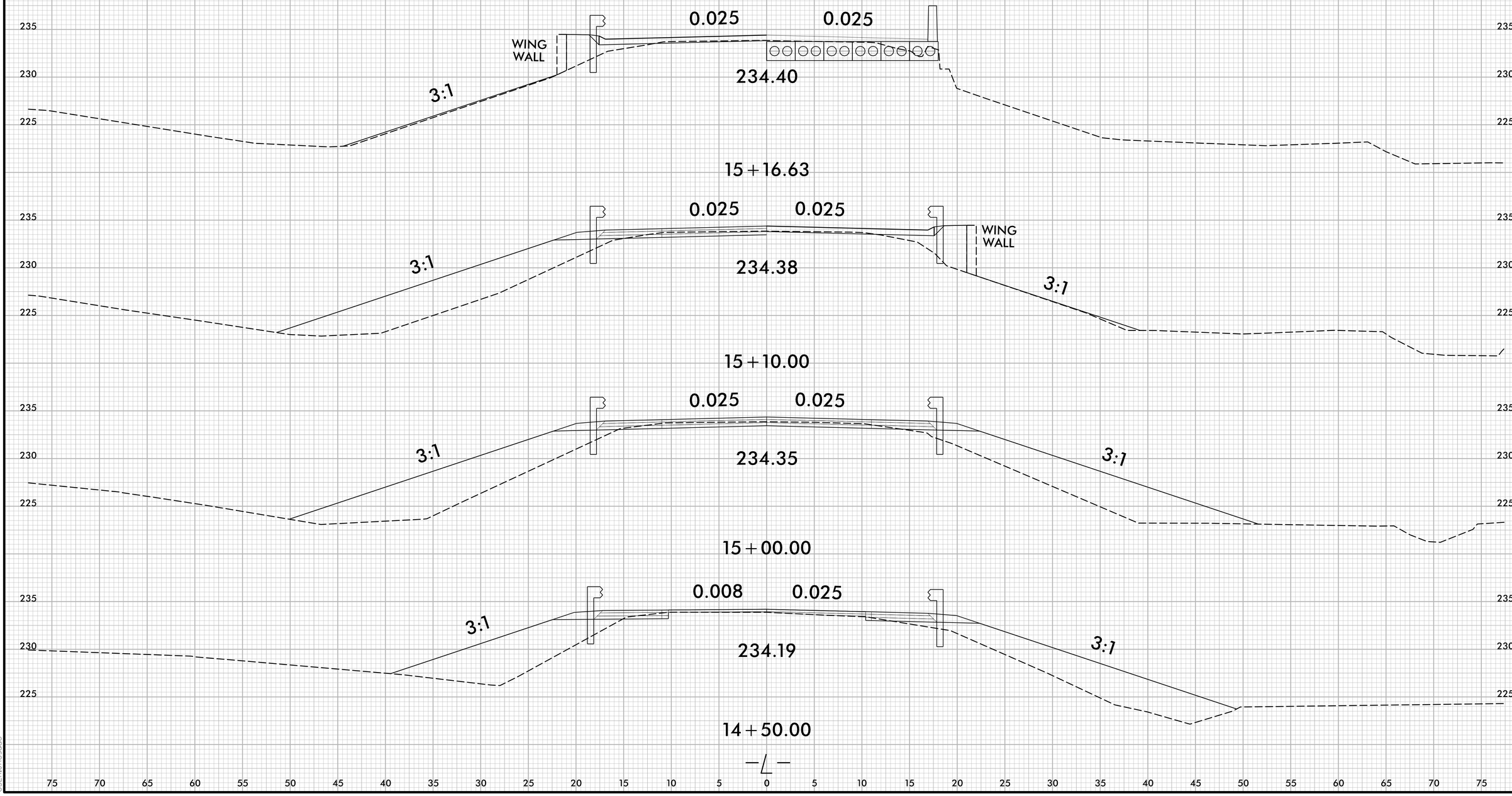
BEGIN BRIDGE
STA. 15+16.63



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0 5 10

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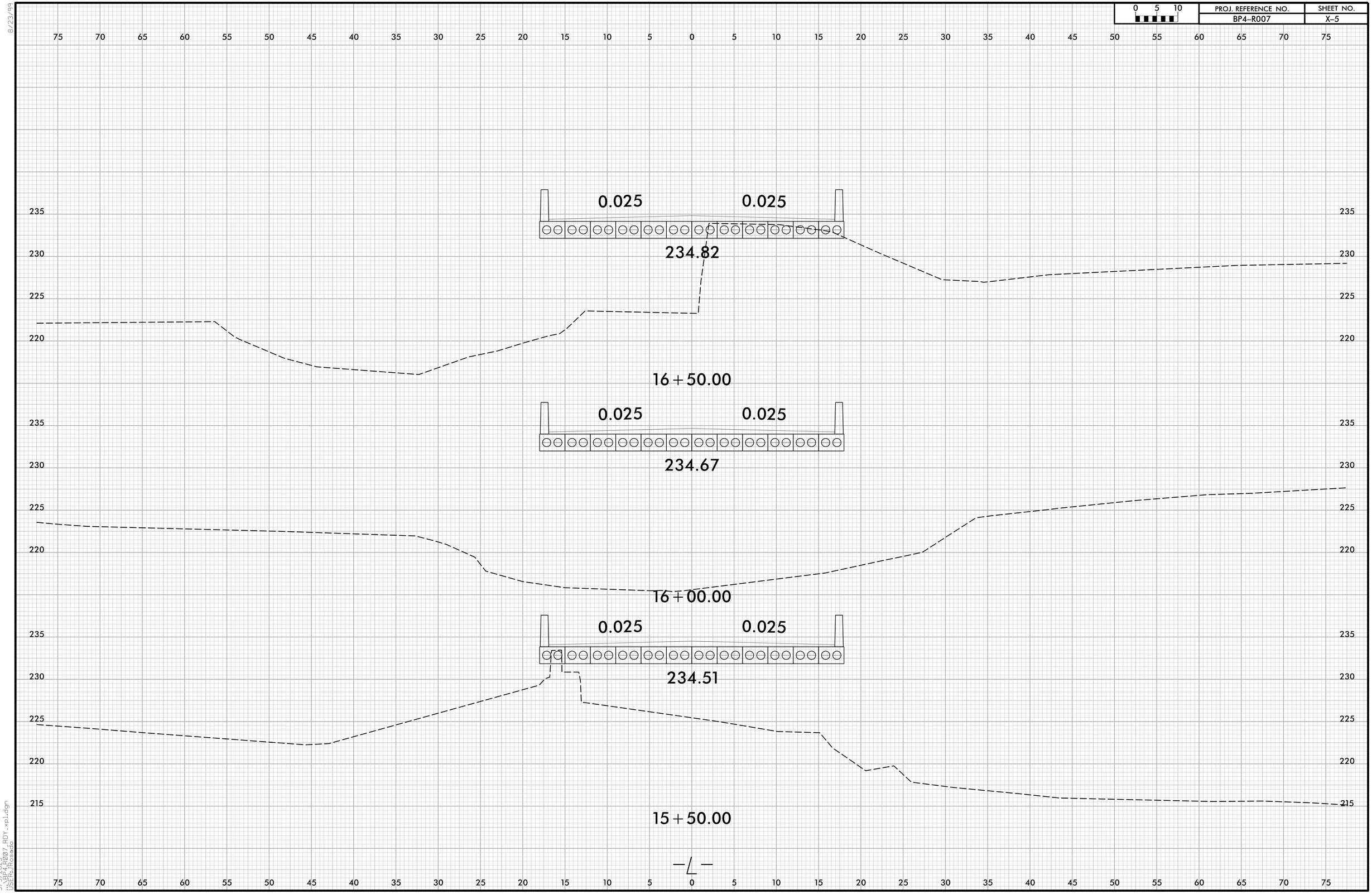

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0 5 10

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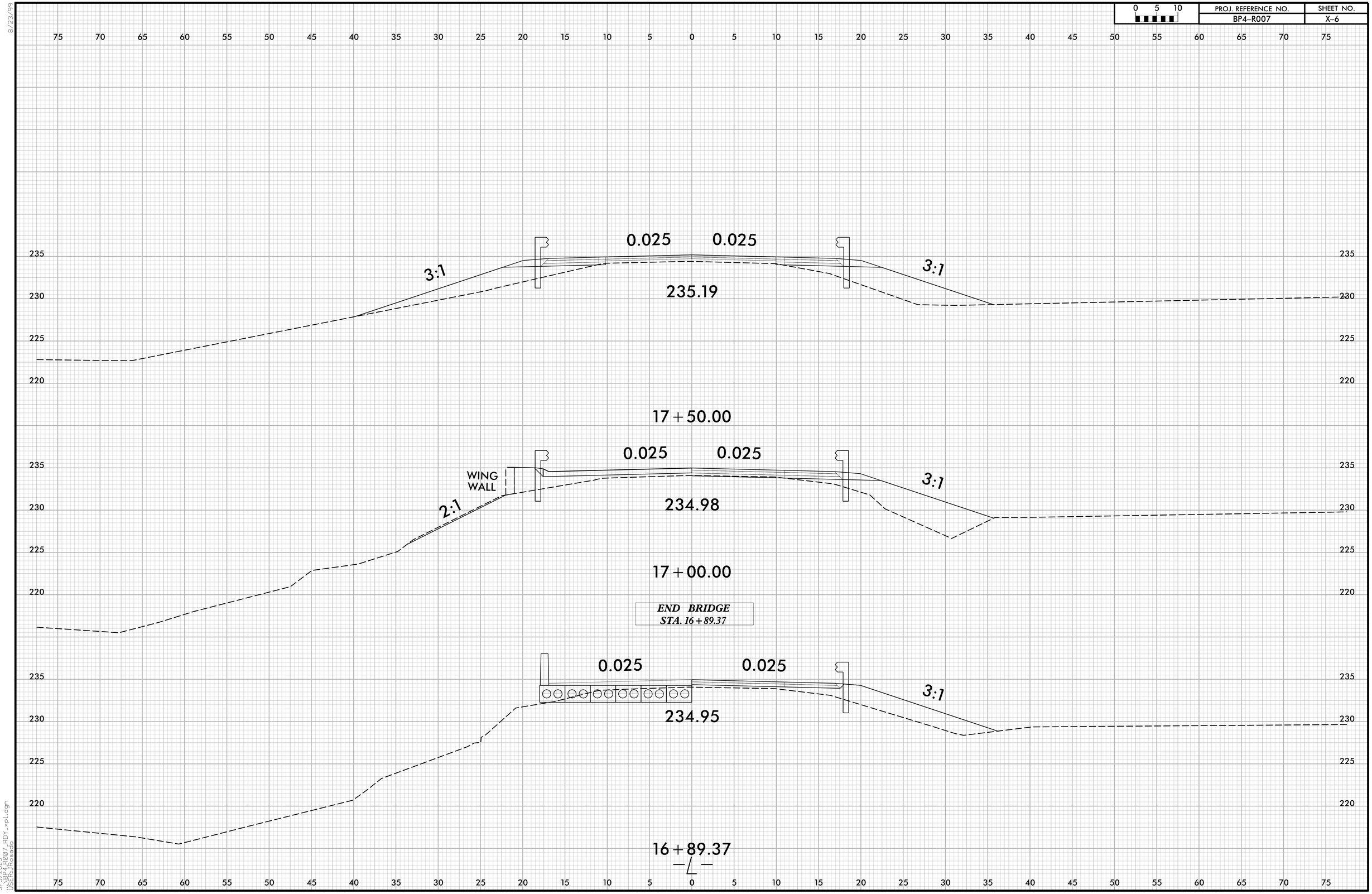

8/23/99

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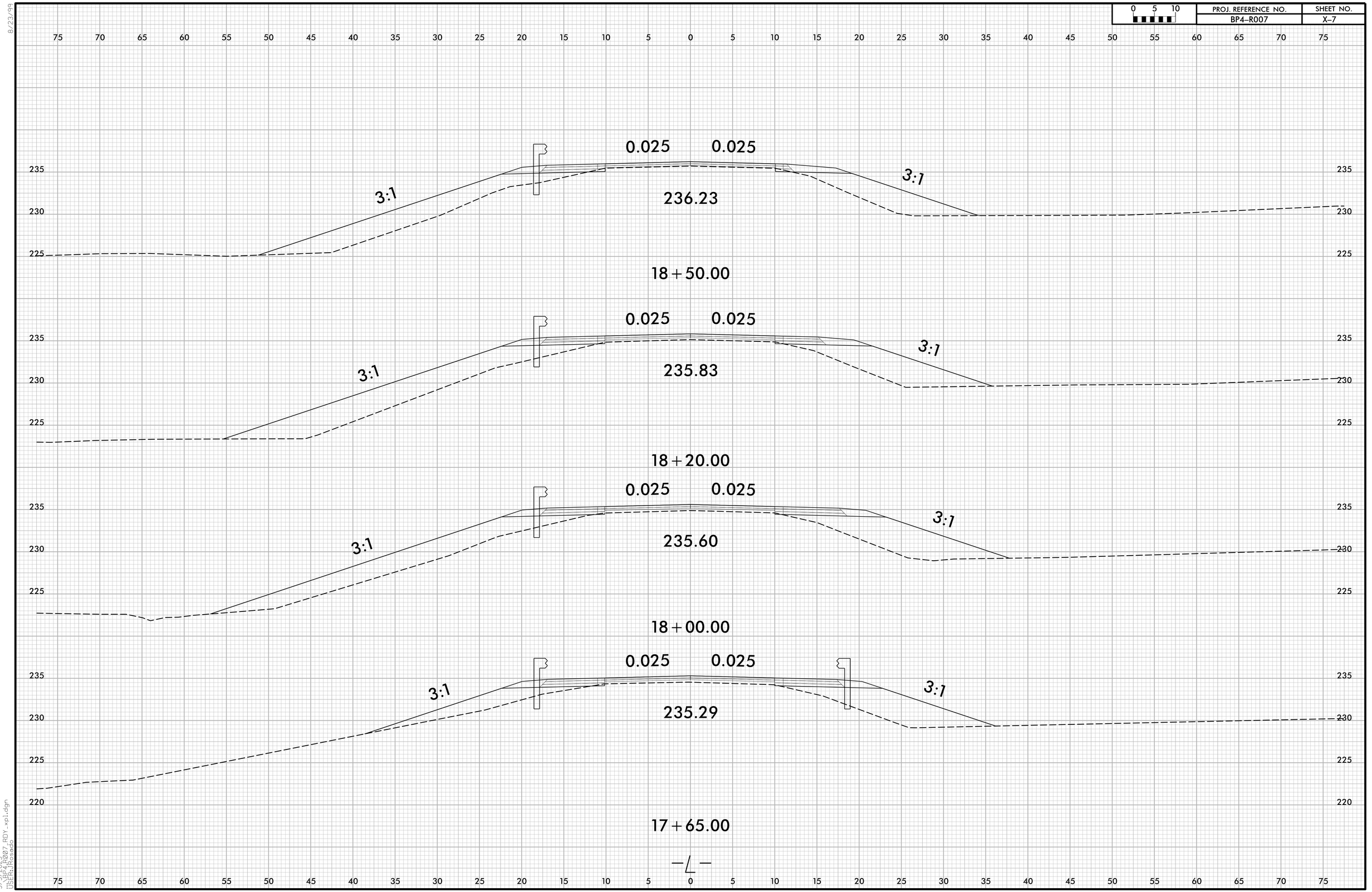

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USER:JRosado

8/23/99

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	BP4–R007	X–8

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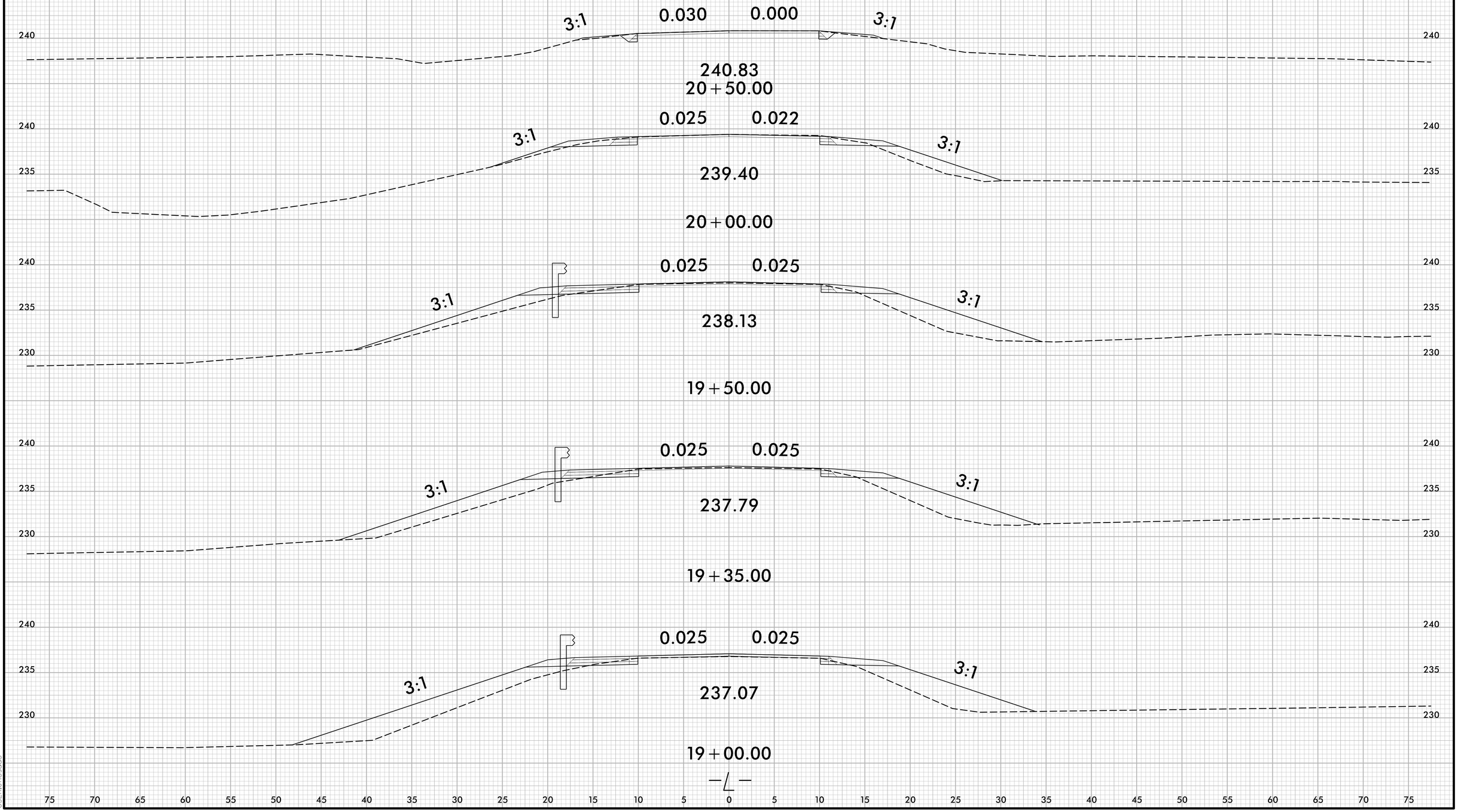
END PROJECT
STA. 20+50.00



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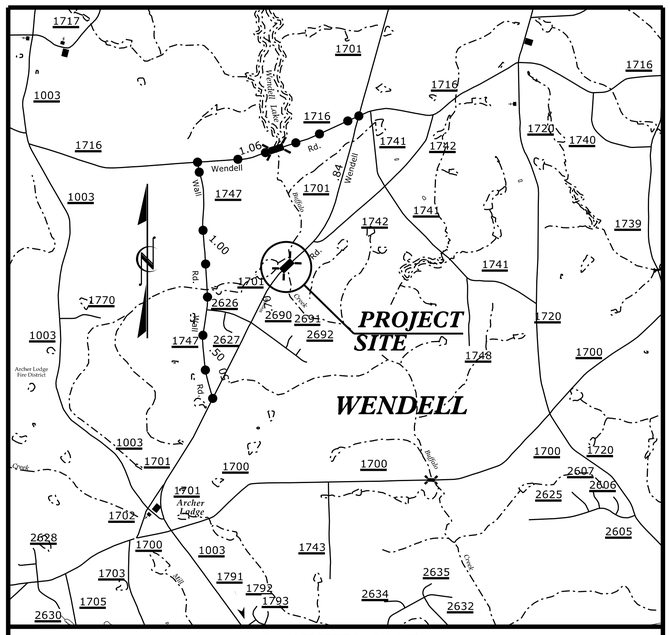
09/08/99

PROJECT: BP4–R007

CONTRACT: DD00477



VICINITY MAP

OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JOHNSTON COUNTY

LOCATION: REPLACE BRIDGE NO. 500169 OVER BUFFALO CREEK ON SR 1701 (WENDELL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP4–R007		

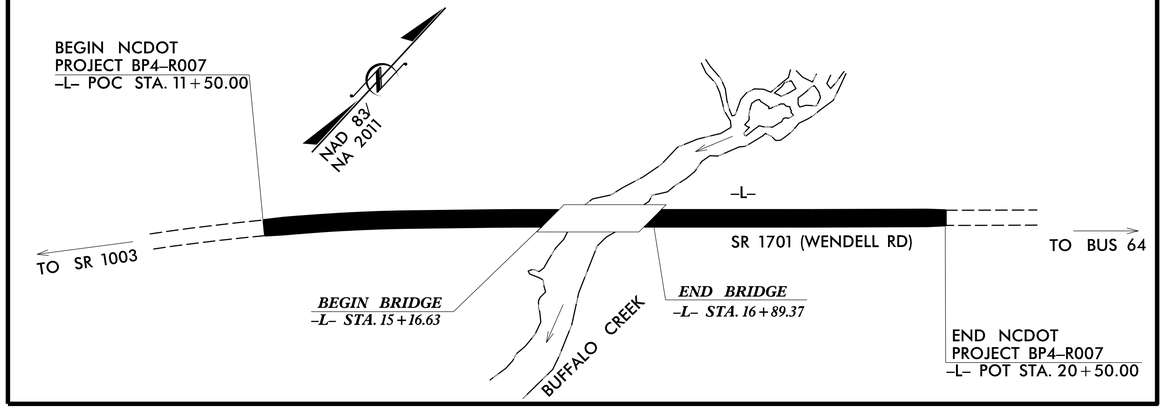
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP4–R007.1		PE
BP4–R007.2		ROW, UTIL.
BP4–R007.3		CONST.

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F–0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

STRUCTURE #500169

FINAL PLANS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2024 = 2,400

T = 8 % *
V = 55 MPH

* (TTST = 4% + DUAL = 4%)

FUNC CLASS =
MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP4–R007 =	0.137 MILES
LENGTH STRUCTURE PROJECT BP4–R007 =	0.033 MILES
TOTAL LENGTH PROJECT BP4–R007 =	0.170 MILES

NCDOT CONTACT: RACHEL C. EVANS, PE
PROJECT ENGINEER – NCDOT DIVISION 4

Prepared for:
DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard, Wilson NC, 27895

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 8, 2023

LETTING DATE:
JULY 22, 2025

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

JOHN A. DILWORTH, PE
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

11/19/2024
10:12:37 AM
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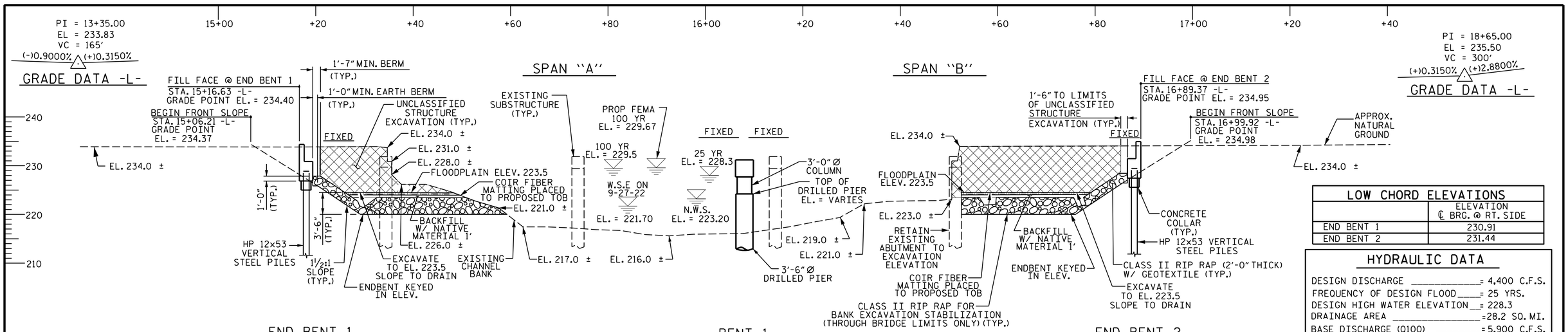
PI = 13+35.00
EL = 233.83
VC = 165'
(-)0.9000% (+)0.3150%

GRADE DATA -L-

PI = 18+65.00
EL = 235.50
VC = 300'
(+)0.3150% (+)2.8800%

GRADE DATA -L-



LOW CHORD ELEVATIONS	
	ELEVATION ℄ BRG. @ RT. SIDE
END BENT 1	230.91
END BENT 2	231.44

HYDRAULIC DATA

DESIGN DISCHARGE _____ = 4,400 C.F.S.
FREQUENCY OF DESIGN FLOOD____ = 25 YRS.
DESIGN HIGH WATER ELEVATION__ = 228.3
DRAINAGE AREA _____ = 28.2 SQ. MI.
BASE DISCHARGE (0100) _____ = 5,900 C.F.S.
BASE HIGH WATER ELEVATION __ = 229.5

OVERTOPPING FLOOD DATA

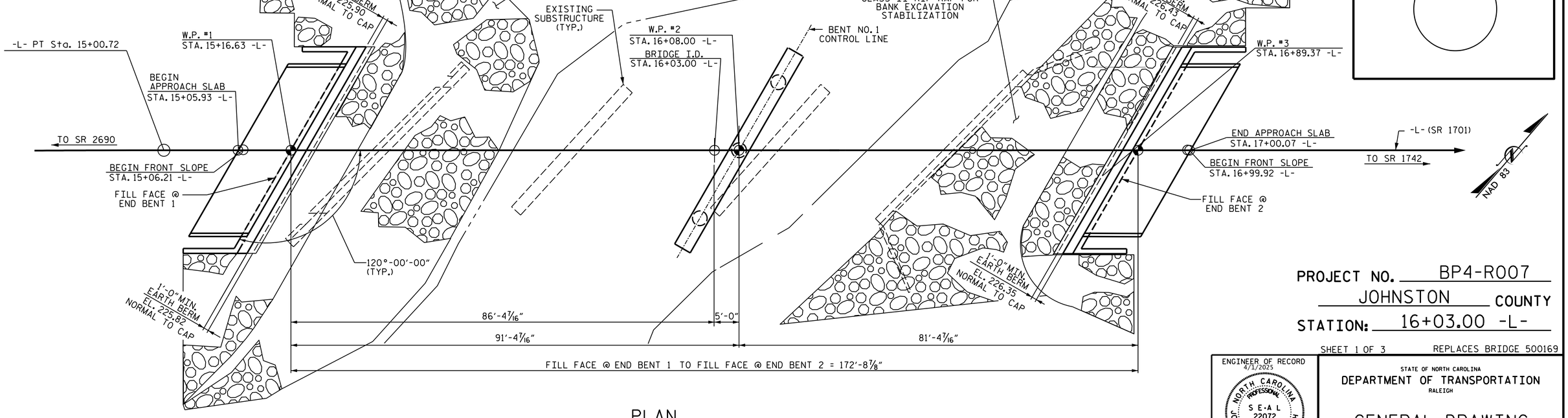
OVERTOPPING DISCHARGE_____ = 13,000 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD__ = 500± YRS.
OVERTOPPING FLOOD ELEVATION__ = 234.2 ✱
✱ BRIDGE OVERTOPS @ STA. -L- 14+25
WS EL. Taken @ River Station 93933.7

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

END BENT 1 — BENT 1 — END BENT 2

SECTION ALONG -L-

(SECTIONS AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. BP4-R007
JOHNSTON COUNTY
STATION: 16+03.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE 500169

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
6213BC0B4E1E4E8...

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER BUFFALO CREEK ON SR 1701 BETWEEN SR 2690 AND SR 1742

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : J. PENDERGRAFT DATE : 9-23
CHECKED BY : J. DILWORTH DATE : 9-23

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SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent No.1 Piles 1-7	110	228.86	20									1.0	13.0
End Bent No.2 Piles 1-7	105	229.39	15									7.0	3.0

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

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent No.1 Piles 1-7	109.5						
End Bent No.2 Piles 1-7	102						

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length* per Pier Lin FT	Drilled Pier Length Not In Soil* per Pier Lin FT	Drilled Pier Length In Soil* per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier Lin FT
Bent 1, Piers 1-3	485	205.0	160	210			9.6	9.65	YES	213.0	11.2
TOTAL QTY:							28.80	28.95			33.6

*Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "42" Dia. Drilled Piers" or 42" Dia. Drilled Piers Not in Soil" and 42" Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the *NCDOT Standard Specifications*.

**Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casting for 42" Dia. Drilled Pier" in accordance with Article 411-7 of the *NCDOT Standard Specifications*.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-3		MAYBE	83.0	MAYBE	
TOTAL QTY:		1	249.0	1	

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

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jinyoung Park #032171) on 11-27-2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for CSL Testing and SID Inspections when these items may be required.

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
PILE AND DRILLED PIER FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : J. PENDERGRAFT DATE : 12-23
CHECKED BY : J. DILWORTH DATE : 12-23

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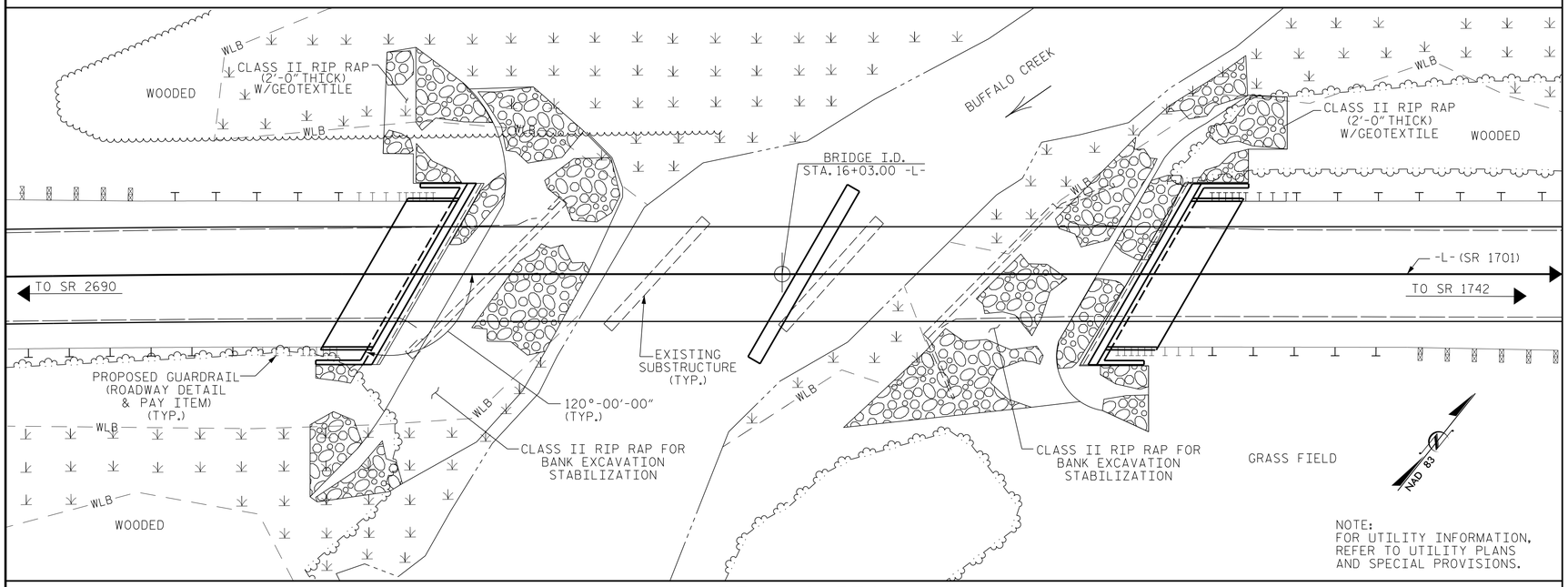

LOCATION SKETCH

NOTES :

ASSUMED LIVE LOAD = HL93 OR ALTERNATE LOADING.

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

THE BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 50' AT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTS OF 3 SPANS @ 40'-0" WITH A REINFORCED CONCRETE DECK ON STEEL GIRDER SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 25.8' ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE ABUTMENTS ON SPREAD FOOTING AND REINFORCED CONCRETE PIER AND WALL BENTS ON SPREAD FOOTINGS LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY POSTED FOR LOAD LIMIT.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

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.

A TEMPORARY CAUSEWAY WILL BE NEEDED TO ACCESS THE EXISTING BENTS FROM EACH SIDE FOR REMOVAL. THE STREAM CAN NOT BE BLOCKED MORE THAN 50% AT ANY TIME DURING CONSTRUCTION BY THE CAUSEWAY.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+03.00".

THE REMOVAL OF EXISTING STRUCTURE AT STA. 16+03.00 -L-, SEE SPECIAL PROVISINS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+03.00 -L-.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTANCE & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 x 53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS		EPOXY COATING
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YD.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE																		340.00				24	2040	
END BENT 1				91	7							30.1		4164		7	140		413	459				
BENT 1						28.95	28.80	33.6	1	1		24.6		7855	1464									
END BENT 2				21	49							30.1		4164		7	105		306	340				
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	112	56	28.95	28.80	33.6	1	1	LUMP SUM	84.8	LUMP SUM	16,183	1464	14	245	340.00	719	799	LUMP SUM	24	2040	LUMP SUM

FOUNDATION NOTES :

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DO NOT DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2. PLACE PILES AT BOTTOM OF PILE EXCAVATION.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE OR GROUT.

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

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 3 OF 3

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth 6213822...
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER BUFFALO CREEK ON SR 1701 BETWEEN SR 2690 AND SR 1742

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : J. PENDERGRAFT DATE : 12-23
CHECKED BY : J. DILWORTH DATE : 12-23

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LOAD TYPE		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
							LIVE-LOAD FACTORS (γ LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ LL)	MOMENT					
								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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	(1)	1.034	--	1.75	0.246	1.63	90'	ER	44.134	0.627	1.03	90'	ER	8.827	0.80	0.246	1.23	90'	ER	44.134	
		HL-93 (OPERATING)	N/A		1.343	--	1.35	0.246	2.11	90'	ER	44.134	0.627	1.34	90'	ER	8.827	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	(2)	1.343	48.336	1.75	0.246	2.21	90'	ER	44.134	0.627	1.34	90'	ER	8.827	0.80	0.246	1.67	90'	ER	44.134	
		HS-20 (OPERATING)	36.000		1.741	62.658	1.35	0.246	2.87	90'	ER	44.134	0.627	1.74	90'	ER	8.827	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.909	52.766	1.4	0.246	6.46	90'	ER	44.134	0.627	4.08	90'	ER	8.827	0.80	0.246	3.91	90'	ER	44.134	
		SNGARBS2	20.000		2.857	57.143	1.4	0.246	4.72	90'	ER	44.134	0.627	2.88	90'	ER	8.827	0.80	0.246	2.86	90'	ER	44.134	
		SNAGRIS2	22.000		2.658	58.474	1.4	0.246	4.44	90'	ER	44.134	0.627	2.66	90'	ER	8.827	0.80	0.246	2.68	90'	ER	44.134	
		SNCOTTS3	27.250		1.943	52.958	1.4	0.246	3.21	90'	ER	44.134	0.627	2.04	90'	ER	8.827	0.80	0.246	1.94	90'	ER	44.134	
		SNAGGRS4	34.925		1.603	55.974	1.4	0.246	2.65	90'	ER	44.134	0.627	1.67	90'	ER	8.827	0.80	0.246	1.60	90'	ER	44.134	
		SNS5A	35.550		1.569	55.767	1.4	0.246	2.59	90'	ER	44.134	0.627	1.68	90'	ER	8.827	0.80	0.246	1.57	90'	ER	44.134	
		SNS6A	39.950		1.431	57.149	1.4	0.246	2.36	90'	ER	44.134	0.627	1.53	90'	ER	8.827	0.80	0.246	1.43	90'	ER	44.134	
		SNS7B	42.000		1.362	57.202	1.4	0.246	2.25	90'	ER	44.134	0.627	1.49	90'	ER	8.827	0.80	0.246	1.36	90'	ER	44.134	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.742	57.481	1.4	0.246	2.88	90'	ER	44.134	0.627	1.82	90'	ER	8.827	0.80	0.246	1.74	90'	ER	44.134	
		TNT4A	33.075		1.747	57.786	1.4	0.246	2.89	90'	ER	44.134	0.627	1.78	90'	ER	8.827	0.80	0.246	1.75	90'	ER	44.134	
		TNT6A	41.600		1.420	59.082	1.4	0.246	2.35	90'	ER	44.134	0.627	1.57	90'	ER	8.827	0.80	0.246	1.42	90'	ER	44.134	
		TNT7A	42.000		1.423	59.764	1.4	0.246	2.35	90'	ER	44.134	0.627	1.54	90'	ER	8.827	0.80	0.246	1.42	90'	ER	44.134	
		TNT7B	42.000		1.461	61.373	1.4	0.246	2.42	90'	ER	44.134	0.627	1.46	90'	ER	8.827	0.80	0.246	1.46	90'	ER	44.134	
		TNAGRIT4	43.000		1.398	60.120	1.4	0.246	2.31	90'	ER	44.134	0.627	1.42	90'	ER	8.827	0.80	0.246	1.40	90'	ER	44.134	
		TNAGT5A	45.000		1.322	59.491	1.4	0.246	2.19	90'	ER	44.134	0.627	1.40	90'	ER	8.827	0.80	0.246	1.32	90'	ER	44.134	
		TNAGT5B	45.000	(3)	1.309	58.923	1.4	0.246	2.16	90'	ER	44.134	0.627	1.35	90'	ER	8.827	0.80	0.246	1.31	90'	ER	44.134	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.019	58.058	1.3	0.246	3.60	90'	ER	44.130	0.627	2.02	90'	ER	8.827	0.80	0.246	2.55	90'	ER	44.134	
		EV3	43.000	(4)	1.359	58.431	1.3	0.246	2.37	90'	ER	44.130	0.627	1.36	90'	ER	8.827	0.80	0.246	1.68	90'	ER	44.134	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ DC	γ DW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

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

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

COMMENTS:

1.

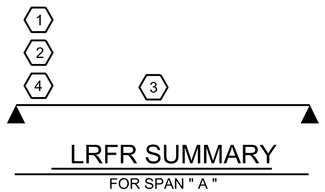
2.

3.

4.

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

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



LRFR SUMMARY
FOR SPAN " A "

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth 6215B2C...

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SPAN A
LRFR SUMMARY FOR
90' BOX BEAM UNIT
60° SKEW & 120° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			21

STD. NO. 33LRFR1_60&120S_90L

ASSEMBLED BY: J. PENDERGRAFT DATE : 6-23
CHECKED BY : J. DILWORTH DATE : 6-23
DRAWN BY : TMG II/II
CHECKED BY : AAC II/II
REV. 06/23 AKP/AAI

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LOAD TYPE		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						
							LIVE-LOAD FACTORS (γ LL)	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)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.162	--	1.75	0.247	1.91	80'	EL	39.134	0.623	1.16	80'	EL	7.827	0.80	0.247	1.29	80'	EL	39.134	
		HL-93 (OPERATING)	N/A		1.507	--	1.35	0.247	2.48	80'	EL	39.134	0.623	1.51	80'	EL	7.827	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.469	52.874	1.75	0.247	2.53	80'	EL	39.134	0.623	1.47	80'	EL	7.827	0.80	0.247	1.71	80'	EL	39.134	
		HS-20 (OPERATING)	36.000		1.904	68.541	1.35	0.247	3.29	80'	EL	39.134	0.623	1.90	80'	EL	7.827	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.905	52.721	1.4	0.247	7.25	80'	EL	39.134	0.623	4.41	80'	EL	7.827	0.80	0.247	3.91	80'	EL	39.134	
		SNGARBS2	20.000		2.888	57.750	1.4	0.247	5.36	80'	EL	39.134	0.623	3.12	80'	EL	7.827	0.80	0.247	2.89	80'	EL	39.134	
		SNAGRIS2	22.000		2.725	59.952	1.4	0.247	5.06	80'	EL	39.134	0.623	2.89	80'	EL	7.827	0.80	0.247	2.73	80'	EL	39.134	
		SNCOTTS3	27.250		1.943	52.939	1.4	0.247	3.61	80'	EL	39.134	0.623	2.20	80'	EL	7.827	0.80	0.247	1.94	80'	EL	39.134	
		SNAGGRS4	34.925		1.615	56.395	1.4	0.247	3.00	80'	EL	39.134	0.623	1.82	80'	EL	7.827	0.80	0.247	1.61	80'	EL	39.134	
		SNS5A	35.550		1.580	56.157	1.4	0.247	2.93	80'	EL	39.134	0.623	1.84	80'	EL	7.827	0.80	0.247	1.58	80'	EL	39.134	
		SNS6A	39.950		1.446	57.756	1.4	0.247	2.68	80'	EL	39.134	0.623	1.67	80'	EL	7.827	0.80	0.247	1.45	80'	EL	39.134	
		SNS7B	42.000		1.377	57.818	1.4	0.247	2.56	80'	EL	39.134	0.623	1.64	80'	EL	7.827	0.80	0.247	1.38	80'	EL	39.134	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.762	58.142	1.4	0.247	3.27	80'	EL	39.134	0.623	1.99	80'	EL	7.827	0.80	0.247	1.76	80'	EL	39.134	
		TNT4A	33.075		1.769	58.499	1.4	0.247	3.28	80'	EL	39.134	0.623	1.95	80'	EL	7.827	0.80	0.247	1.77	80'	EL	39.134	
		TNT6A	41.600		1.443	60.014	1.4	0.247	2.68	80'	EL	39.134	0.623	1.74	80'	EL	7.827	0.80	0.247	1.44	80'	EL	39.134	
		TNT7A	42.000		1.448	60.817	1.4	0.247	2.69	80'	EL	39.134	0.623	1.70	80'	EL	7.827	0.80	0.247	1.45	80'	EL	39.134	
		TNT7B	42.000		1.493	62.726	1.4	0.247	2.77	80'	EL	39.134	0.623	1.60	80'	EL	7.827	0.80	0.247	1.49	80'	EL	39.134	
		TNAGRIT4	43.000		1.424	61.237	1.4	0.247	2.64	80'	EL	39.134	0.623	1.55	80'	EL	7.827	0.80	0.247	1.42	80'	EL	39.134	
		TNAGT5A	45.000		1.344	60.496	1.4	0.247	2.50	80'	EL	39.134	0.623	1.54	80'	EL	7.827	0.80	0.247	1.34	80'	EL	39.134	
		TNAGT5B	45.000	3	1.330	59.828	1.4	0.247	2.47	80'	EL	39.134	0.623	1.48	80'	EL	7.827	0.80	0.247	1.33	80'	EL	39.134	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.280	65.550	1.3	0.247	4.14	80'	EL	39.134	0.623	2.28	80'	EL	7.827	0.80	0.247	2.46	80'	EL	39.134	
		EV3	43.000	4	1.536	66.034	1.3	0.247	2.72	80'	EL	39.134	0.623	1.54	80'	EL	7.827	0.80	0.247	1.62	80'	EL	39.134	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ DC	γ DW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

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

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

COMMENTS:

1.

2.

3.

4.

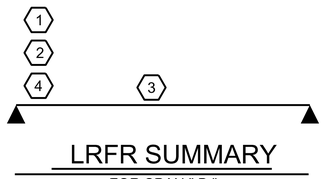
(#) CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING * *
4. EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPAN " B "

PROJECT NO. BP4-R007
JOHNSTON COUNTY
STATION: 16+03.00 -L-

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth 62138E...
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SPAN B
LRFR SUMMARY FOR
80' BOX BEAM UNIT
60° SKEW & 120° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY: J. PENDERGRAFT DATE : 6-23
CHECKED BY : J. DILWORTH DATE : 6-23
DRAWN BY : TMG II/II
CHECKED BY : AAC II/II
REV. 06/23 AKP/AAI

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STD. NO. 33LRFR1_60&120S_80L

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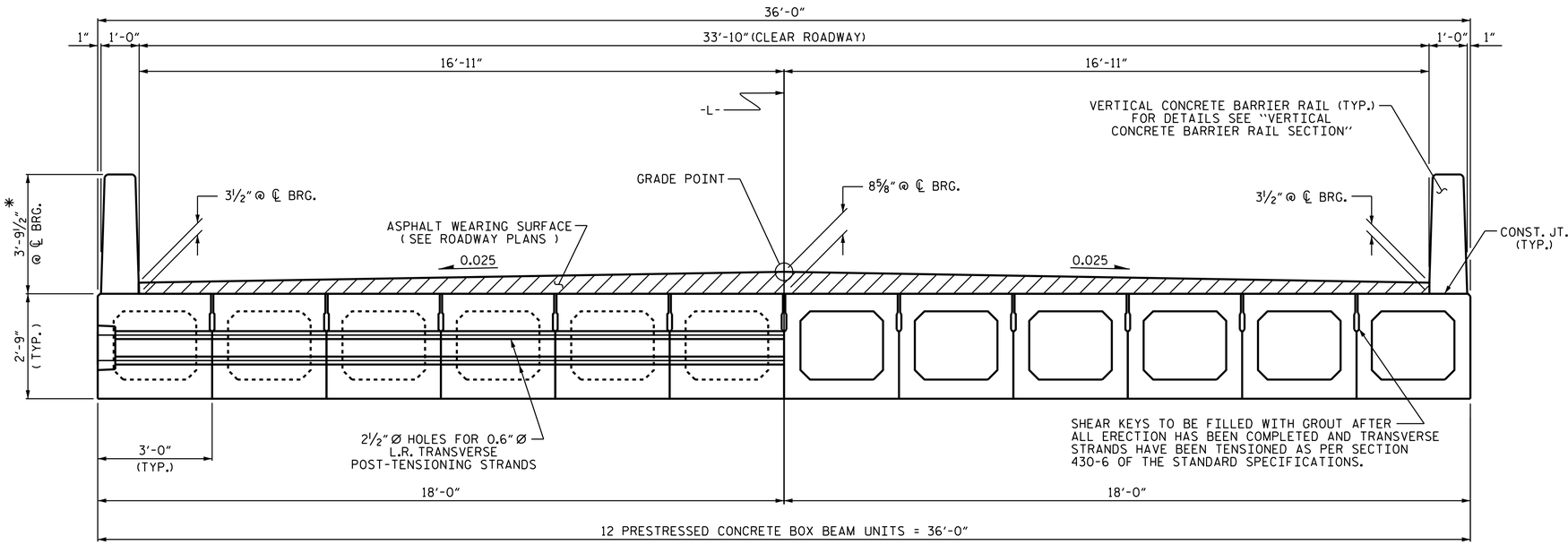
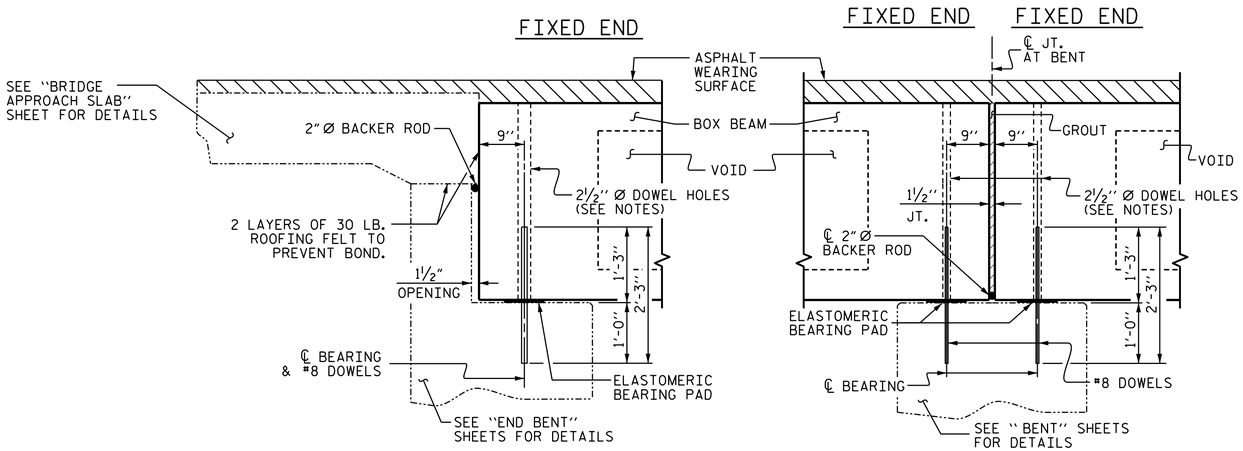


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

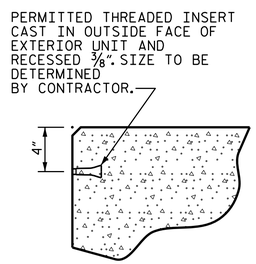
TYPICAL SECTION

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



SECTION AT END BENT

SECTION AT BENT NO. 1



THREADED INSERT DETAIL

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 BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

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

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

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM 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.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL 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 VERTICAL 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.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 1 OF 7

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23
CHECKED BY : J. DILWORTH	DATE : 9-23
DRAWN BY : DGE 8/11	REV. 9/14 MAA/TMG
CHECKED BY : TMG 11/11	

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			21

STD. NO. STD.33PCBB_36_90S

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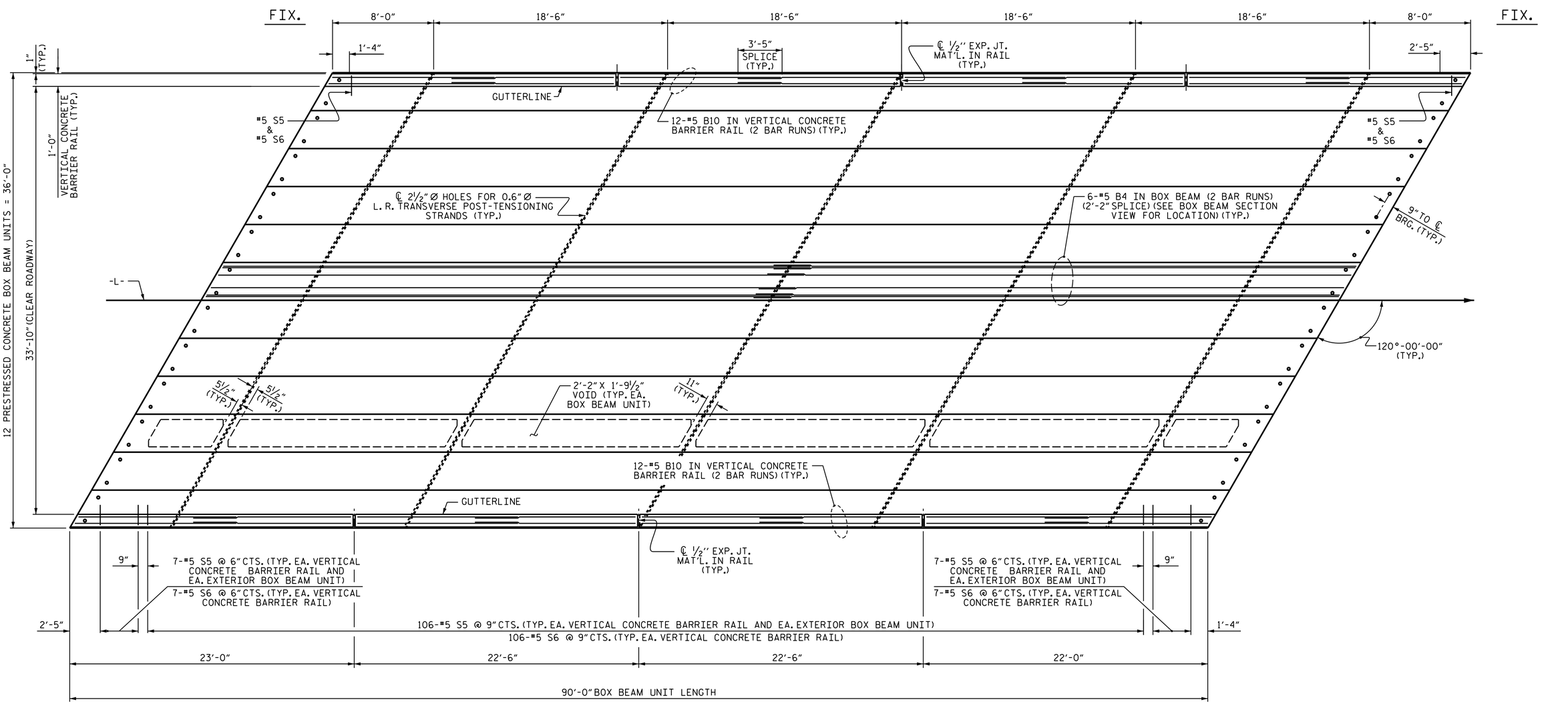
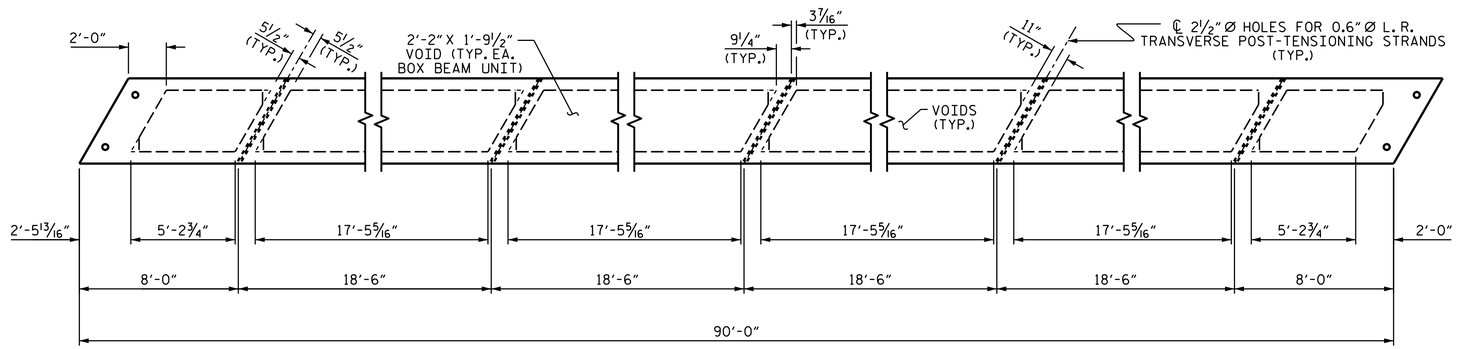


PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 2 OF 7

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
6213B8B0D0F4...
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN A
PLAN OF 90' UNIT
33'-10" CLEAR ROADWAY
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23	
CHECKED BY : J. DILWORTH	DATE : 9-23	
DRAWN BY : DGE 8/11	REV. 8/14	MAA/TMG
CHECKED BY : TMG 11/11		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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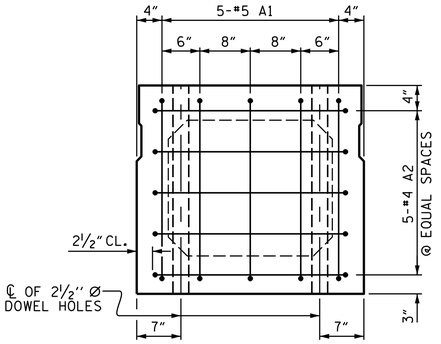
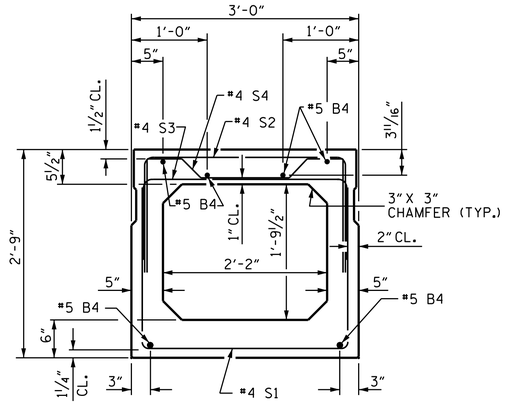
STD.NO.33PCBB_36_120S_90L



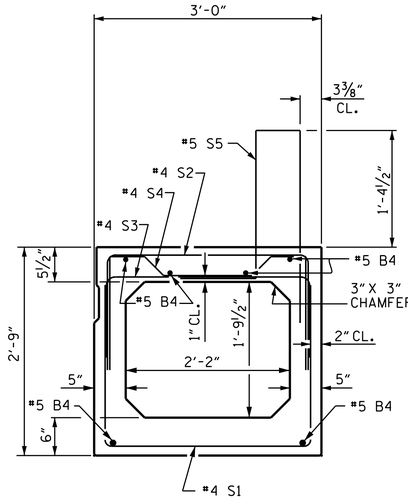
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION

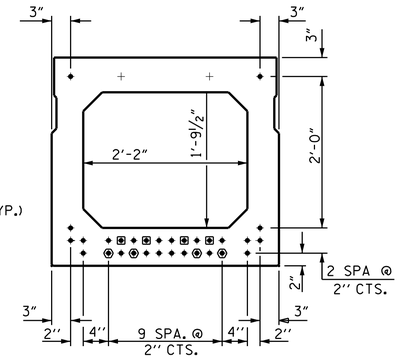
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(30 STRANDS REQUIRED)

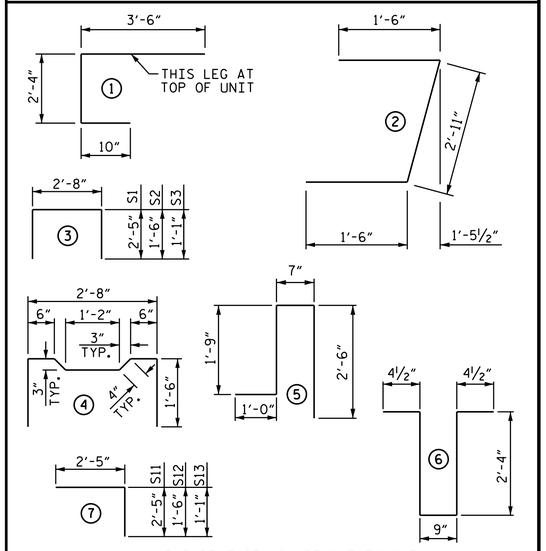
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◉ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⬢ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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

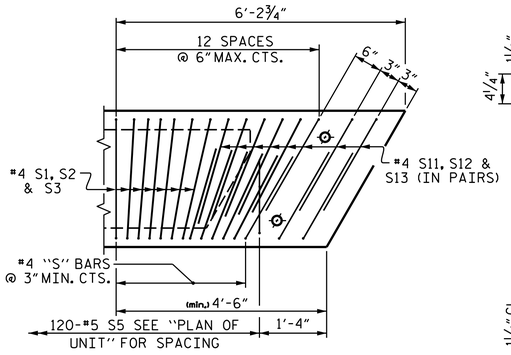
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

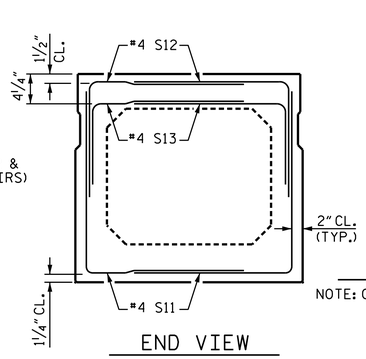
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	40	#4	2	5'-11"	158	5'-11"	158
B4	12	#5	STR	45'-11"	575	45'-11"	575
K1	15	#4	6	6'-2"	62	6'-2"	62
K2	10	#4	STR	2'-10"	19	2'-10"	19
S1	67	#4	3	7'-6"	336	7'-6"	336
S2	67	#4	3	5'-8"	254	5'-8"	254
S3	119	#4	3	4'-10"	384	4'-10"	384
S4	52	#4	4	5'-10"	203	5'-10"	203
S11	32	#4	7	4'-10"	103	4'-10"	103
S12	32	#4	7	3'-11"	84	3'-11"	84
S13	32	#4	7	3'-6"	75	3'-6"	75
✳ S5	120	#5	5	5'-10"	730	--	--
REINFORCING STEEL					2323 LBS.		2323 LBS.
✳ EPOXY COATED REINF. STEEL					730 LBS.		
8000 P.S.I. CONCRETE					16.1 CU. YDS.		16.0 CU. YDS.
0.6" Ø L.R. STRANDS					No. 30		No. 30



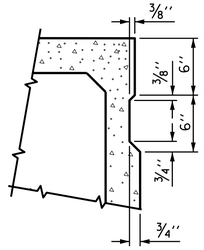
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



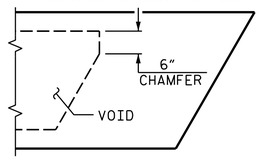
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



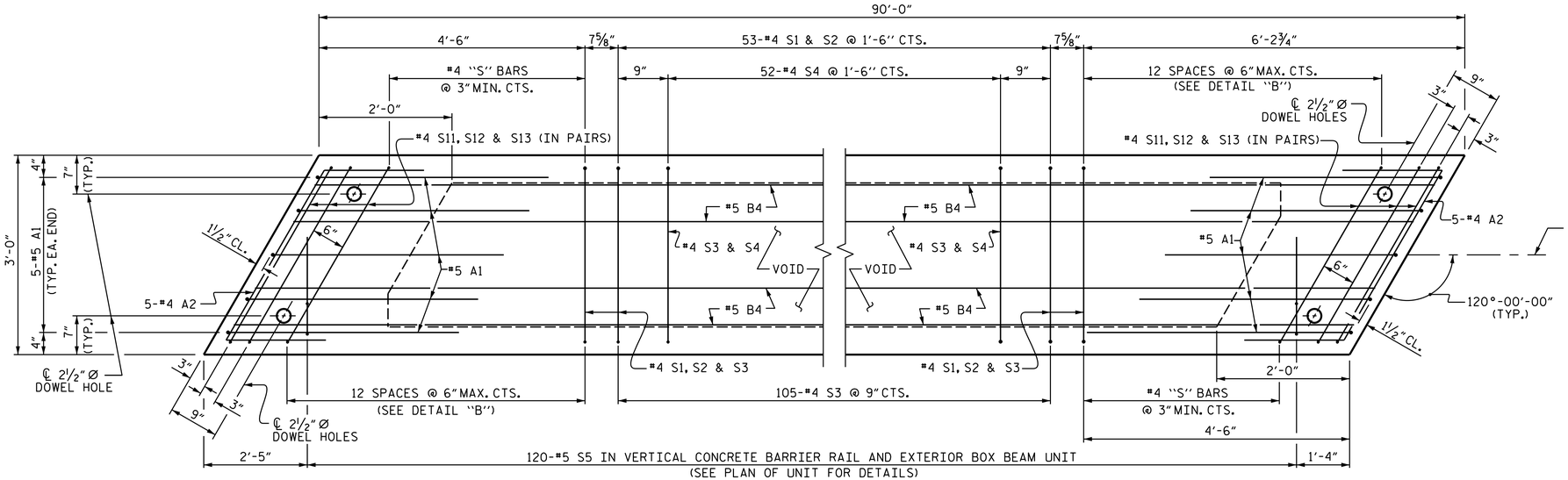
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



CHAMFER DETAIL

SHOWING 6" VOID CHAMFER



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 3 OF 7

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SPAN A 3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : DGE 11/11	REV. 4/15	MAA/TMG	
CHECKED BY : TMG 11/11			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 33PCBB4_120S_90L

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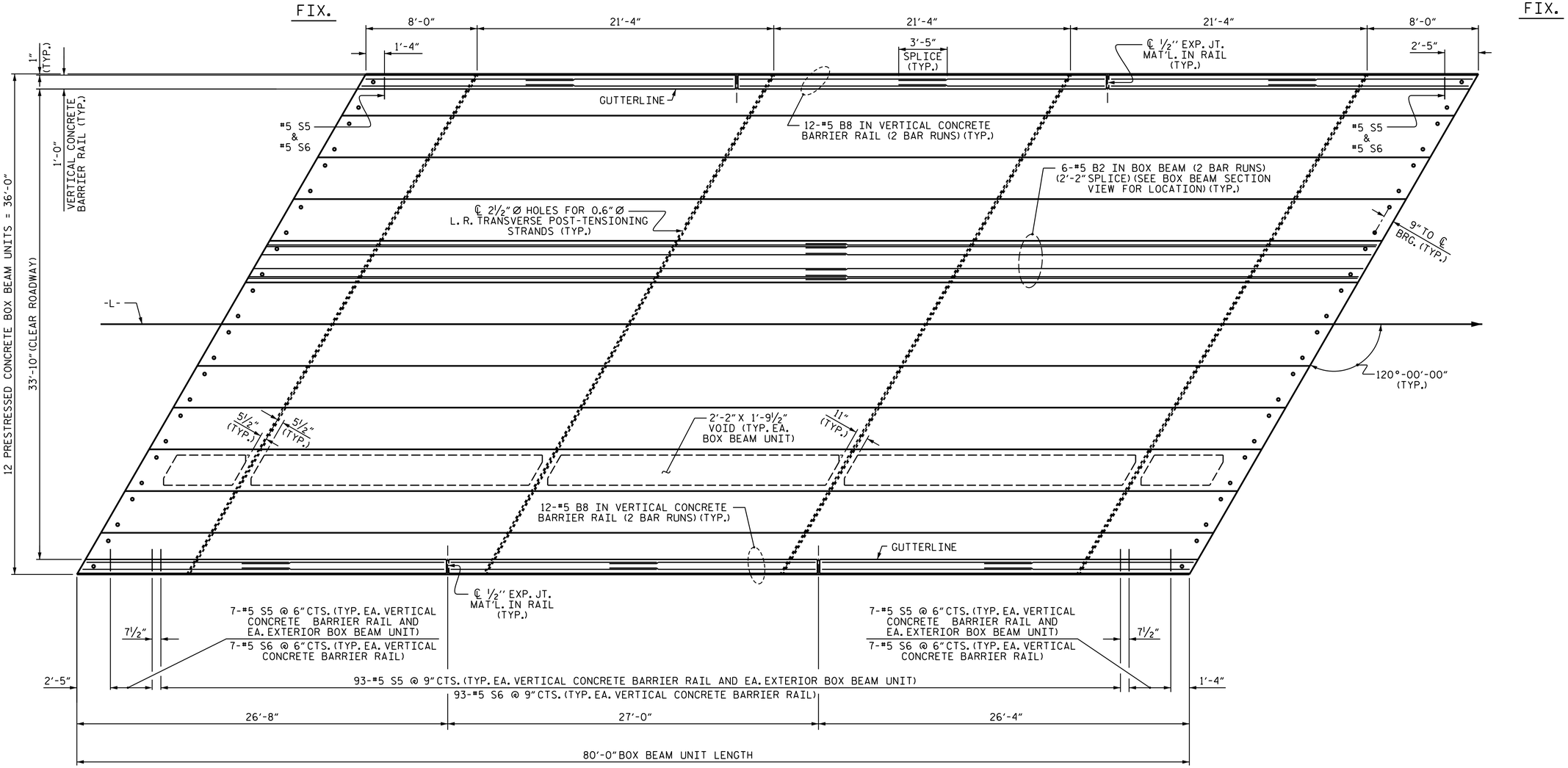
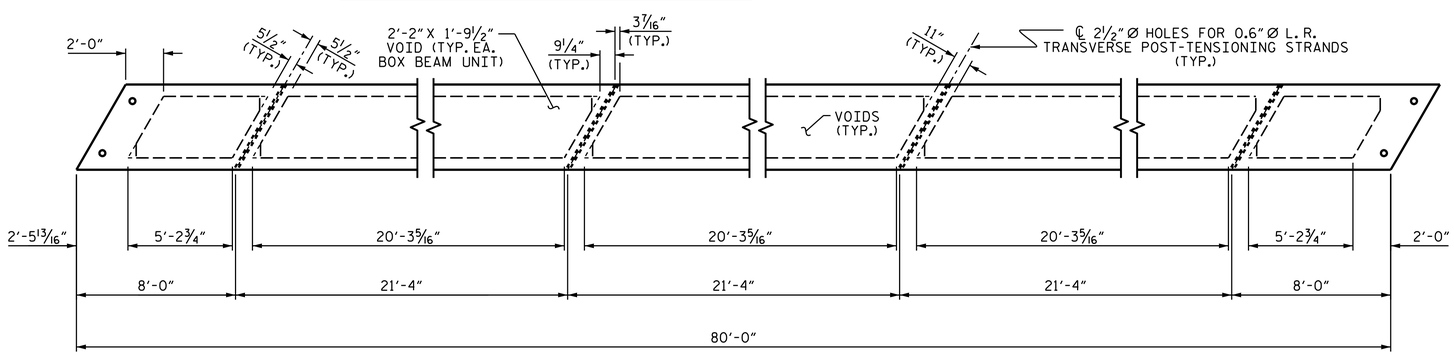
FIX.

FIX.



PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 4 OF 7

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN B
PLAN OF 80' UNIT
33'-10" CLEAR ROADWAY
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT	DATE :	9-23
CHECKED BY : J. DILWORTH	DATE :	9-23
DRAWN BY : DGE 8/11	REV. 8/14	MAA/TMG
CHECKED BY : TMG 11/11		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD.NO.33PCBB_36_120S_80L

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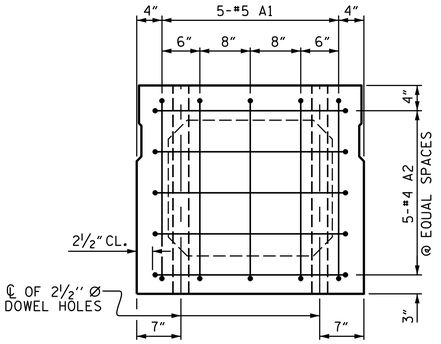
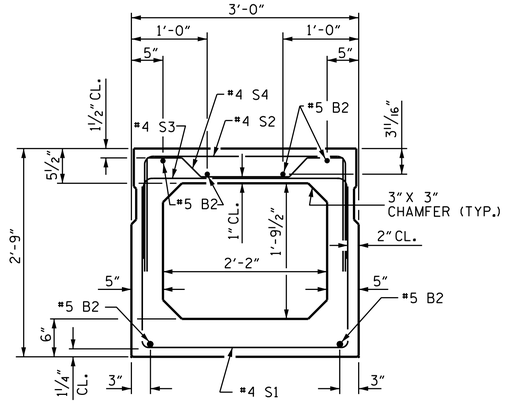


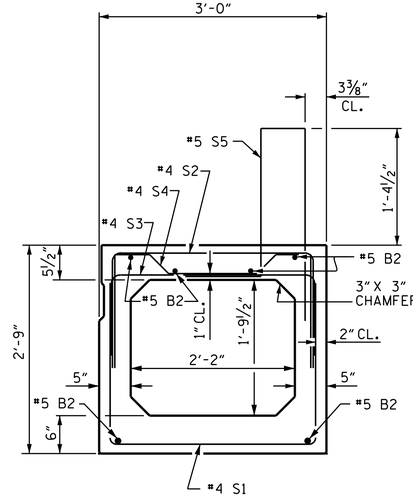
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION

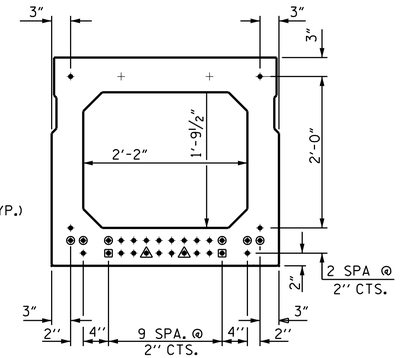
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

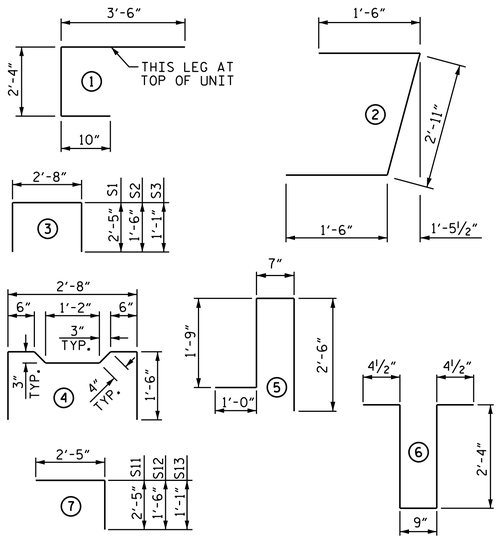
(24 STRANDS REQUIRED)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◙ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE BOX BEAM UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST.

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

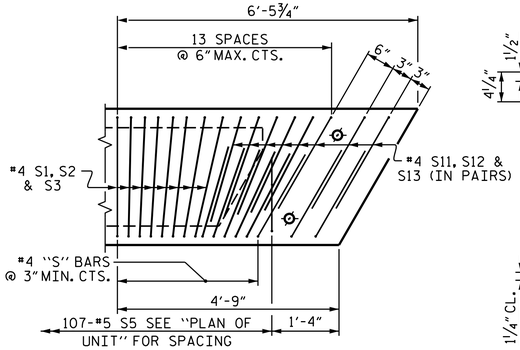
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

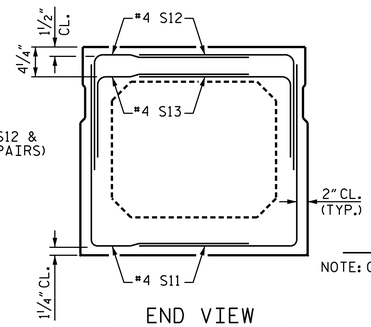
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	34	#4	2	5'-11"	134	5'-11"	134
B2	12	#5	STR	40'-11"	512	40'-11"	512
K1	12	#4	6	6'-2"	49	6'-2"	49
K2	8	#4	STR	2'-10"	15	2'-10"	15
S1	62	#4	3	7'-6"	311	7'-6"	311
S2	62	#4	3	5'-8"	235	5'-8"	235
S3	107	#4	3	4'-10"	345	4'-10"	345
S4	45	#4	4	5'-10"	175	5'-10"	175
S11	32	#4	7	4'-10"	103	4'-10"	103
S12	32	#4	7	3'-11"	84	3'-11"	84
S13	32	#4	7	3'-6"	75	3'-6"	75
✳ S5	107	#5	5	5'-10"	651	--	--
REINFORCING STEEL					2108 LBS.		2108 LBS.
✳ EPOXY COATED REINF. STEEL					651 LBS.		
8000 P.S.I. CONCRETE				14.3	CU. YDS.	14.2	CU. YDS.
0.6" Ø L.R. STRANDS				No. 24		No. 24	



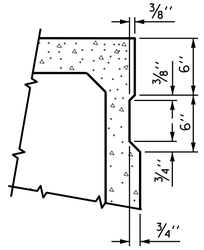
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



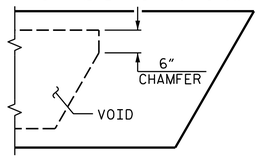
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



SHEAR KEY DETAIL

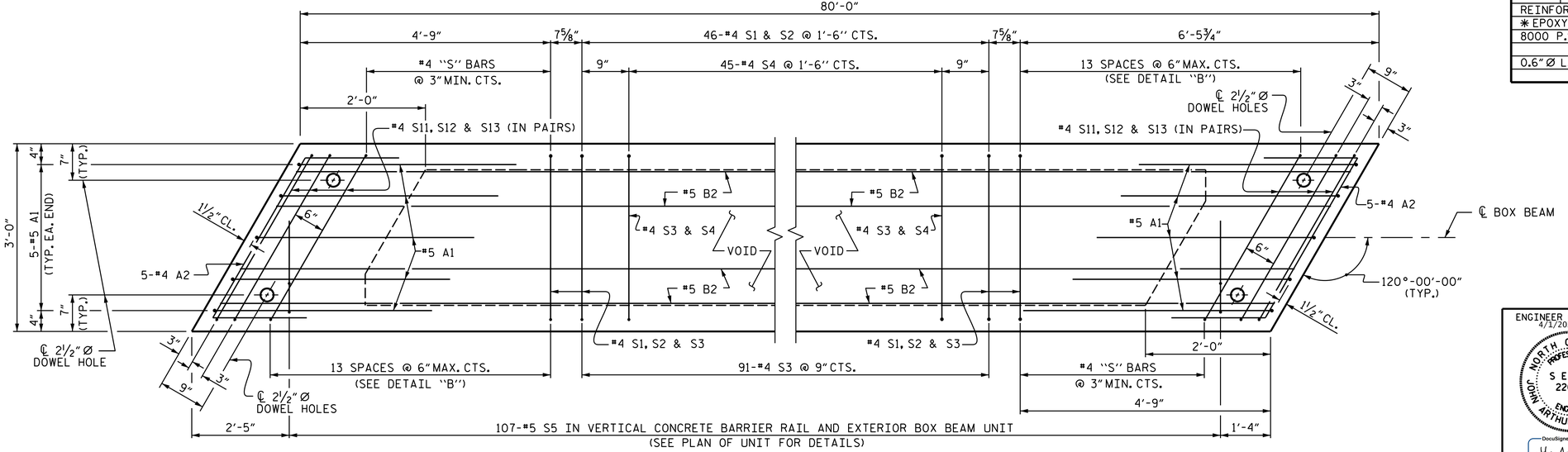
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



CHAMFER DETAIL

SHOWING 6" VOID CHAMFER

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



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 5 OF 7

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth 62138...

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SPAN B
3'-0" X 2'-9"
PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT DATE : 9-23
CHECKED BY : J. DILWORTH DATE : 9-23

DRAWN BY : DGE 11/11
CHECKED BY : TMG 11/11

REV. 4/15 MAA/TMG

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 33PCBB4_120S_80L

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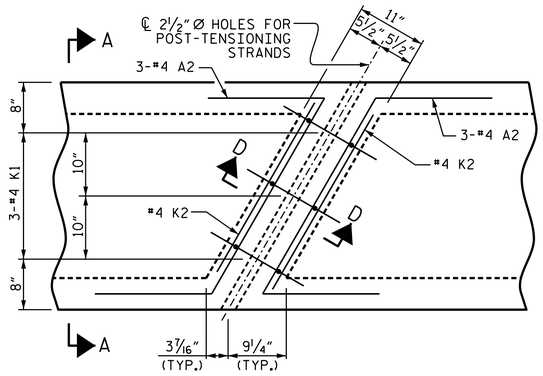
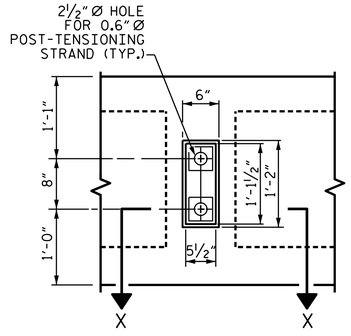
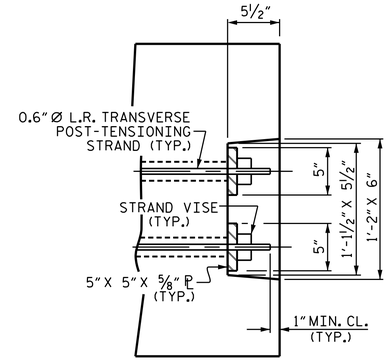


PLAN

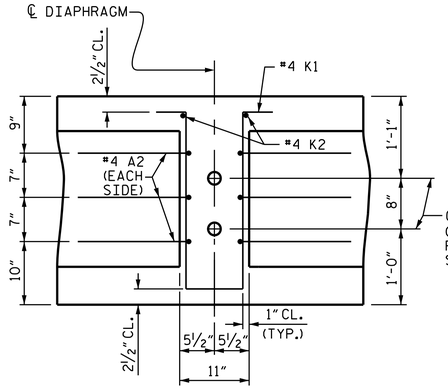


VIEW Y-Y

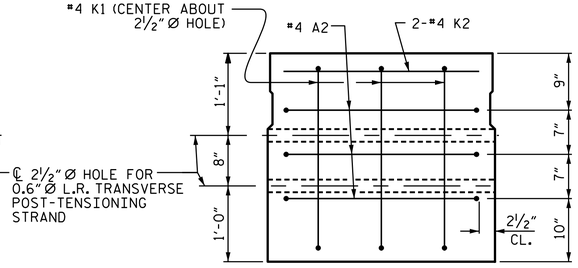
SHOWING ELEVATION VIEW OF GROUTED RECESS



DETAIL "C"

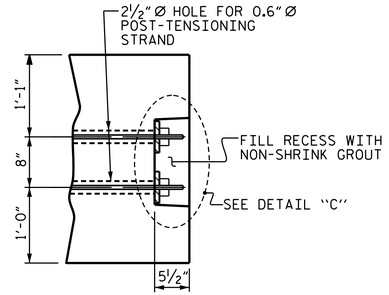


SECTION D-D

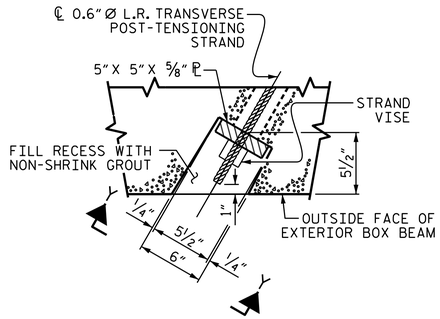


SECTION A-A

VOIDS NOT SHOWN



PART SECTION AT RECESS



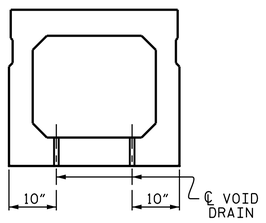
SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

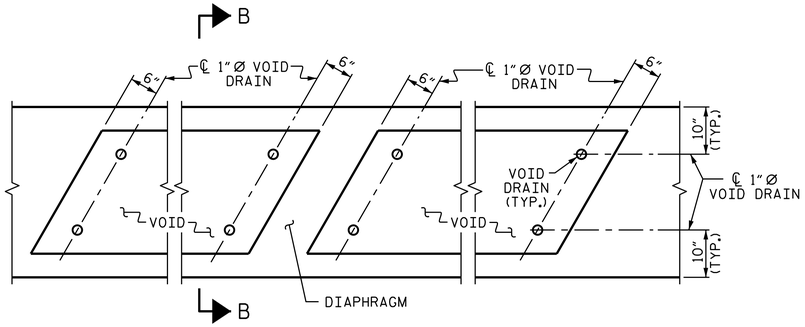
GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLE.



SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-9"
80' BOX BEAM UNIT (NC & SE)	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1¾"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	½"
FINAL CAMBER	1¼"

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-9"
90' BOX BEAM UNIT (NC & SE)	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¾"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	¾"
FINAL CAMBER	2"

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 6 OF 7

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : DGE II/II	REV. 8/14	MAA/TMG	
CHECKED BY : TMG II/II			

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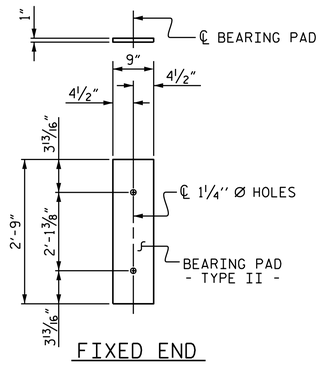
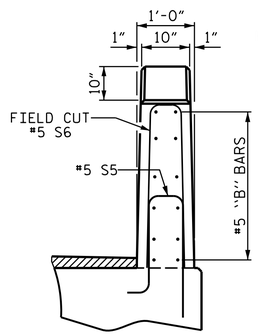
STD.NO.33PCBB5_120S

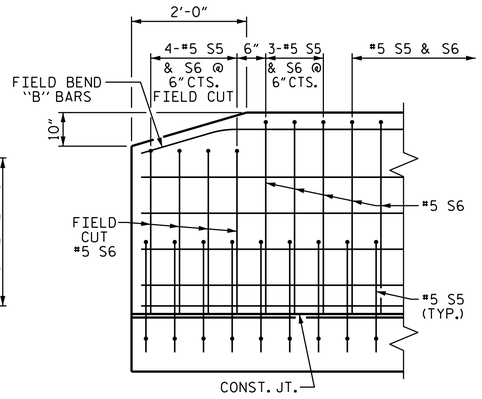


FIXED END

(TYPE II - 48 REQ'D)



END VIEW

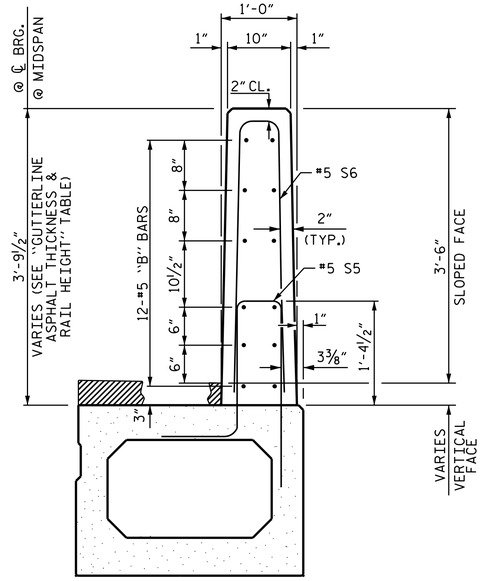


SIDE VIEW

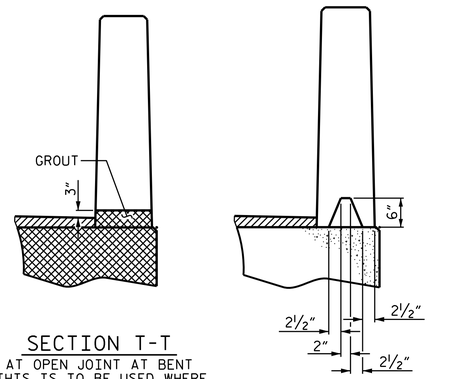
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

END OF RAIL DETAILS



SECTION THRU RAIL

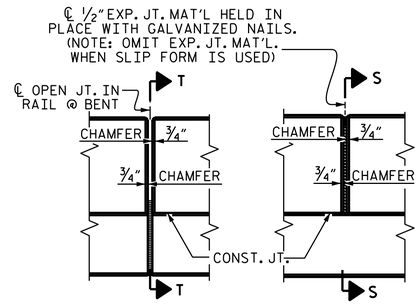


SECTION T-T

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)

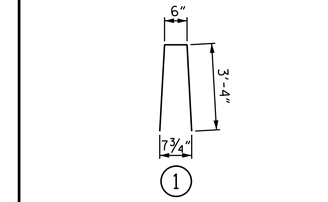


ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	80'-0"	160'-0"
INTERIOR B.B.	10	80'-0"	800'-0"
TOTAL	12	———	960'-0"

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	90'-0"	180'-0"
INTERIOR B.B.	10	90'-0"	900'-0"
TOTAL	12	———	1080'-0"



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	80' UNIT				
✳ B8	144	#5	STR	15'-1"	2265
✳ S6	214	#5	1	7'-2"	1600
✳ EPOXY COATED REINFORCING STEEL			LBS.		3865
CLASS AA CONCRETE			CU.YDS.		20.7
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		160.0

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	90' UNIT				
✳ B10	192	#5	STR	13'-0"	2603
✳ S6	240	#5	1	7'-2"	1794
✳ EPOXY COATED REINFORCING STEEL			LBS.		4397
CLASS AA CONCRETE			CU.YDS.		23.3
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		180.0

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
36' NC AND SE	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
80' UNITS	2¼"	3'-8¼"
90' UNITS	1½"	3'-7½"

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 7 OF 7

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by:
John Arthur Dilworth
621D...

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			21

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ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : DGE 10/11	REV. 5/18	MAA/THC	
CHECKED BY : TMG 11/11			

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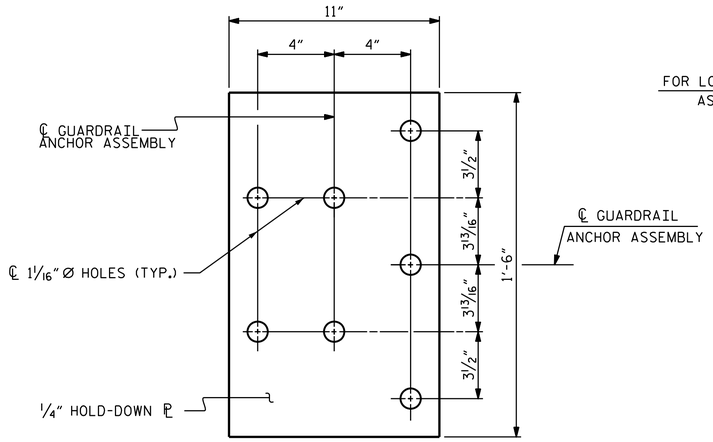
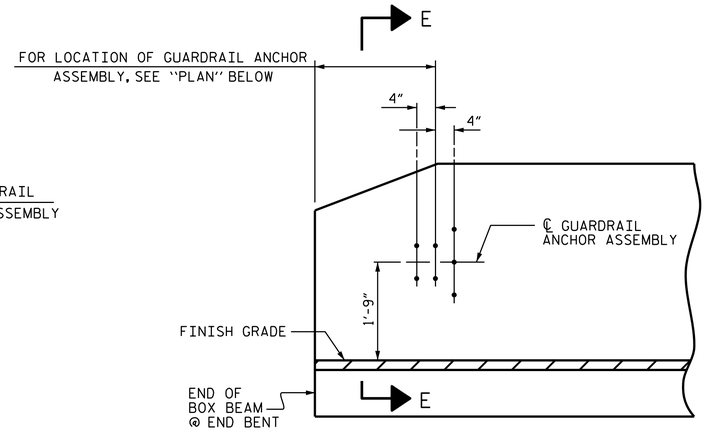


PLAN



ELEVATION

NOTES

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

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

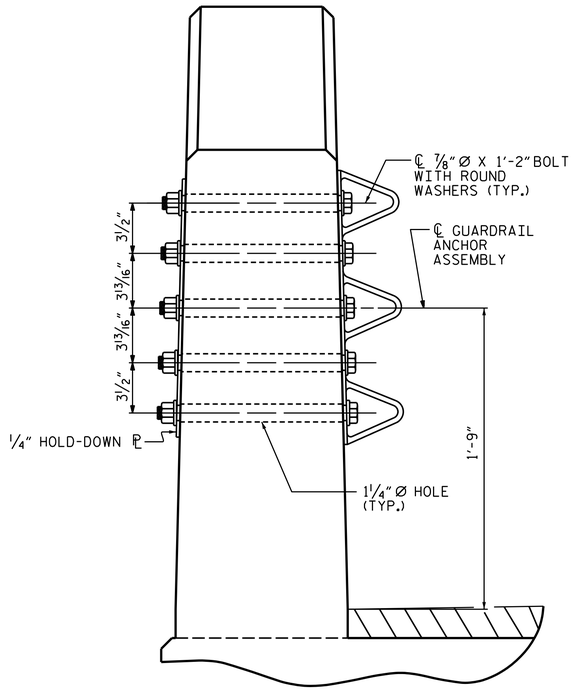
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

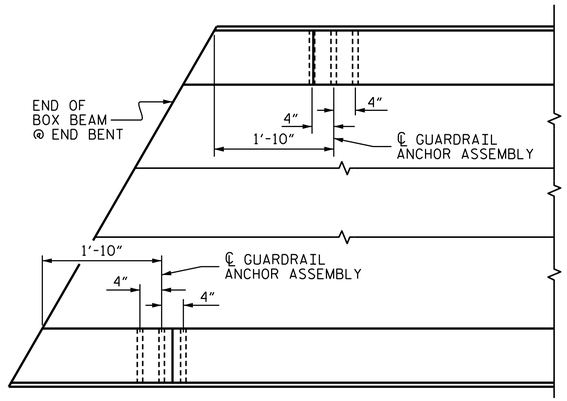
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

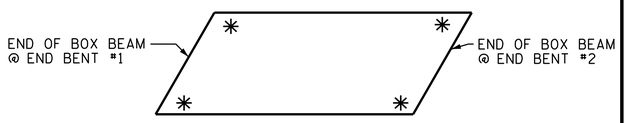
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			21

(SHT 1a) STD. NO. GRA3

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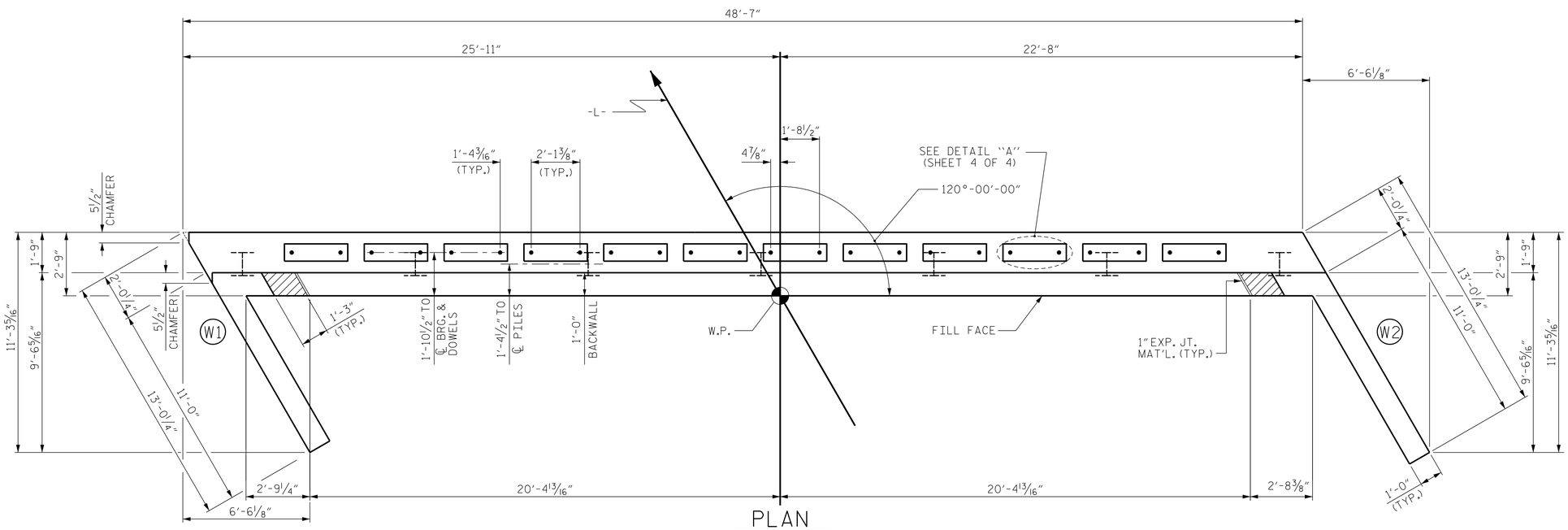
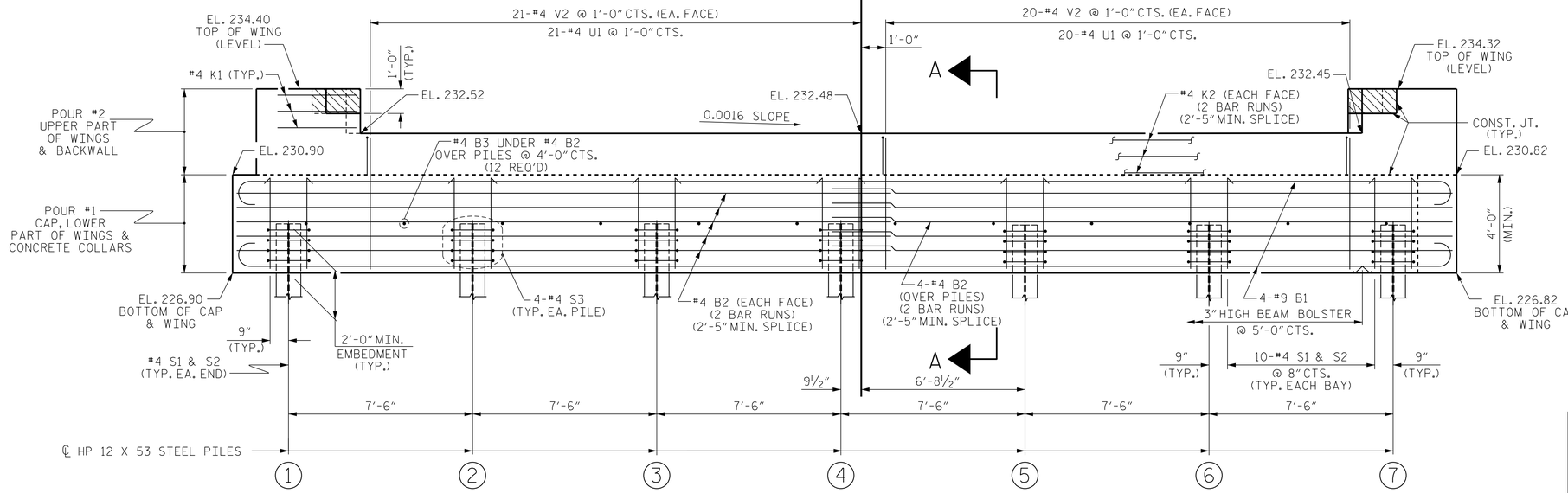


PLAN



ELEVATION

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

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.

APPLY EPOXY PROTECTIVE COATING TO THE TOP OF CAP. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

TOP OF PILE ELEVATIONS	
1	228.89
2	228.88
3	228.87
4	228.86
5	228.85
6	228.83
7	228.82

PROJECT NO. BP4-R007
JOHNSTON COUNTY
STATION: 16+03.00 -L-
SHEET 1 OF 4

ASSEMBLED BY : J. PENDERGRAFT DATE : 9-23
CHECKED BY : J. DILWORTH DATE : 9-23
DRAWN BY : WJH 12/11
CHECKED BY : AAC 12/11
REV. 4/15 MAA/TMG

ENGINEER OF RECORD 4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth 6213B
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			21

STD. NO. EB_36_120S_33BB

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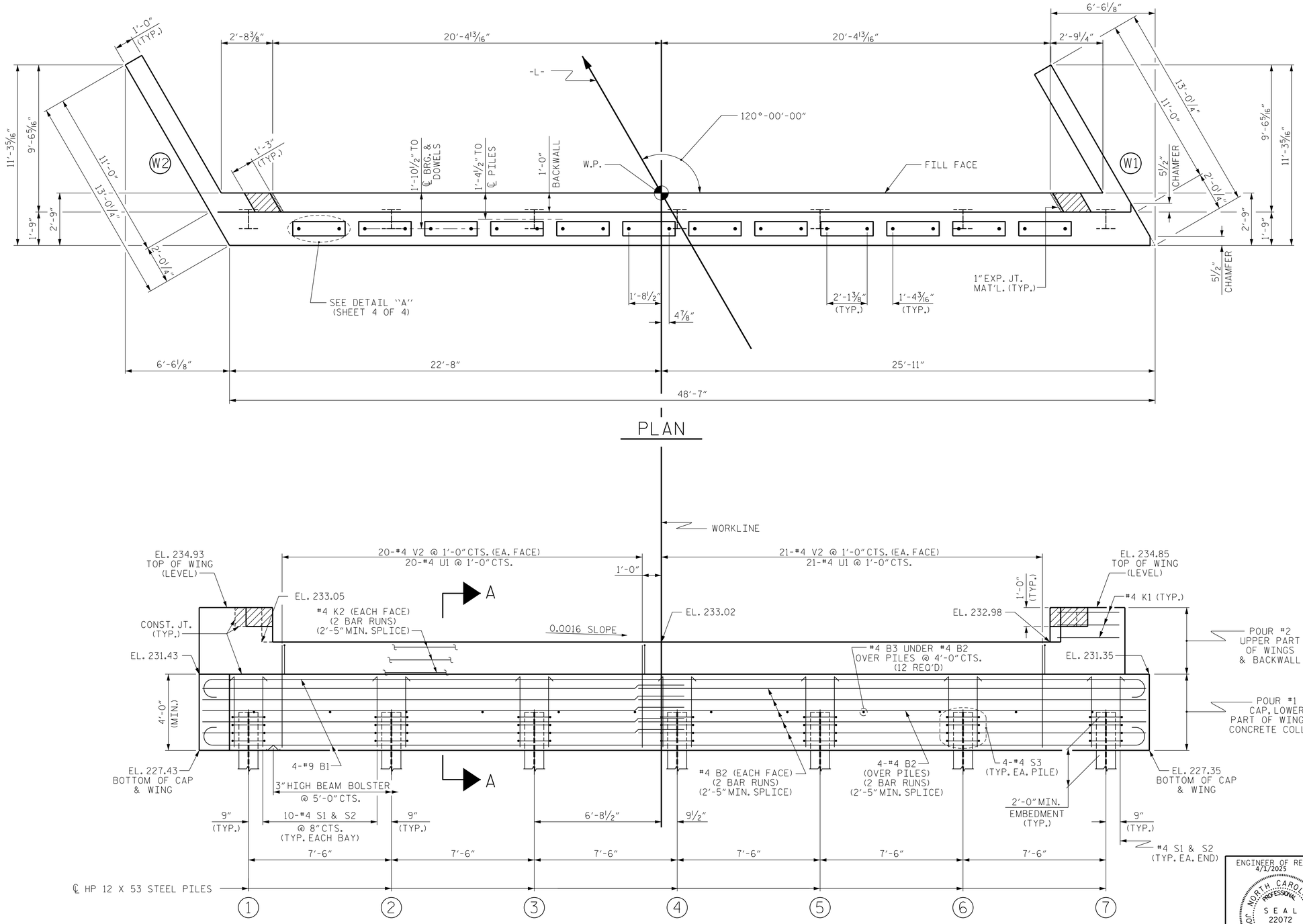

PLAN

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.

APPLY EPOXY PROTECTIVE COATING TO THE TOP OF CAP. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

TOP OF PILE ELEVATIONS	
①	229.42
②	229.41
③	229.40
④	229.39
⑤	229.38
⑥	229.37
⑦	229.35

ELEVATION

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

PROJECT NO. BP4-R007
JOHNSTON COUNTY
STATION: 16+03.00 -L-

SHEET 2 OF 4

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG		
CHECKED BY : AAC 12/11			

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ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

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

SHEET NO. S-15
TOTAL SHEETS 21

STD. NO. EB_36_120S4_33BB

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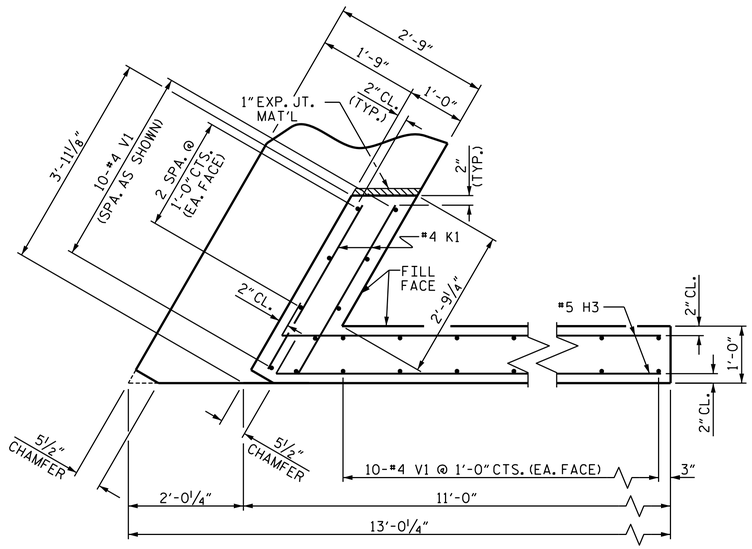
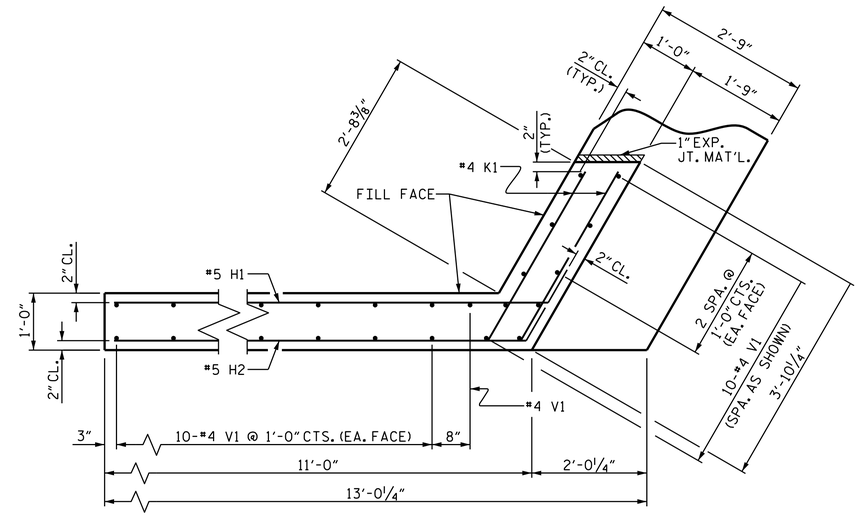
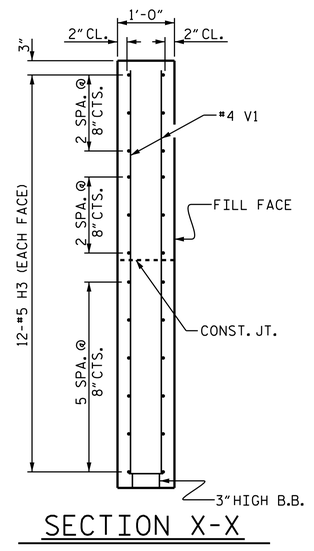


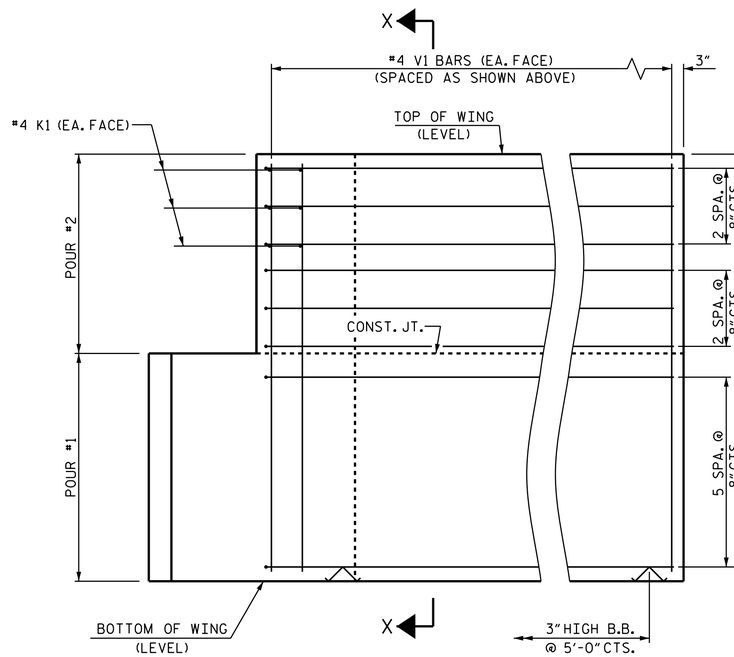
PLAN OF WING (W1)



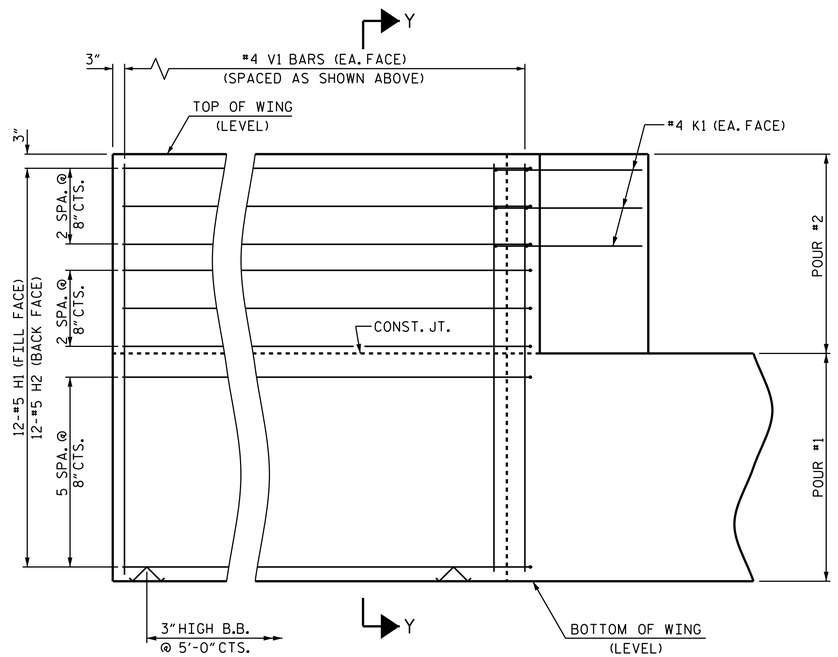
PLAN OF WING (W2)



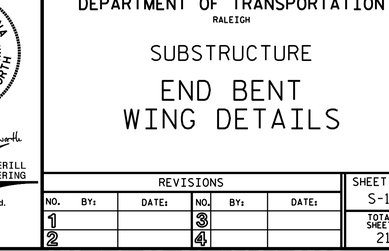
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 3 OF 4

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : WJH 12/11	REV. 4/15	MAA/TMG	
CHECKED BY : AAC 12/11			

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			21

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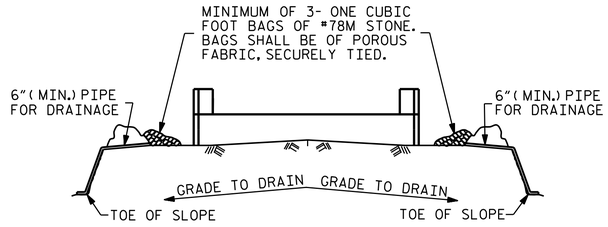
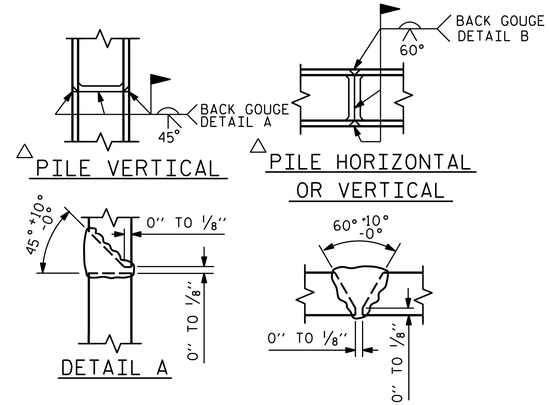


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

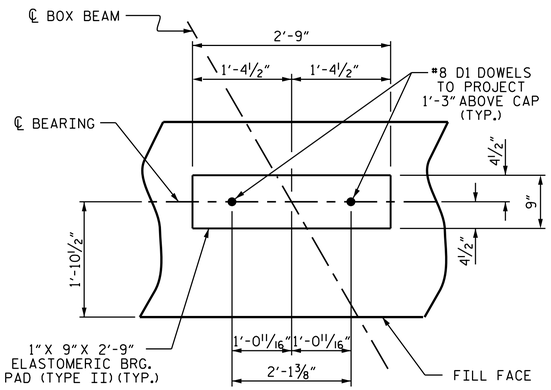
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



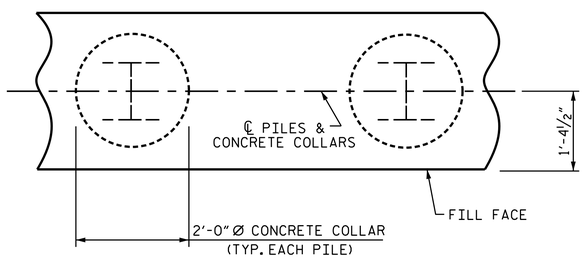
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

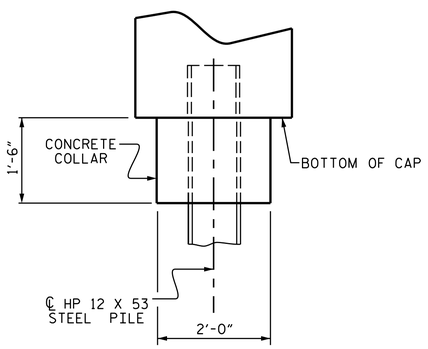


DETAIL ''A''

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



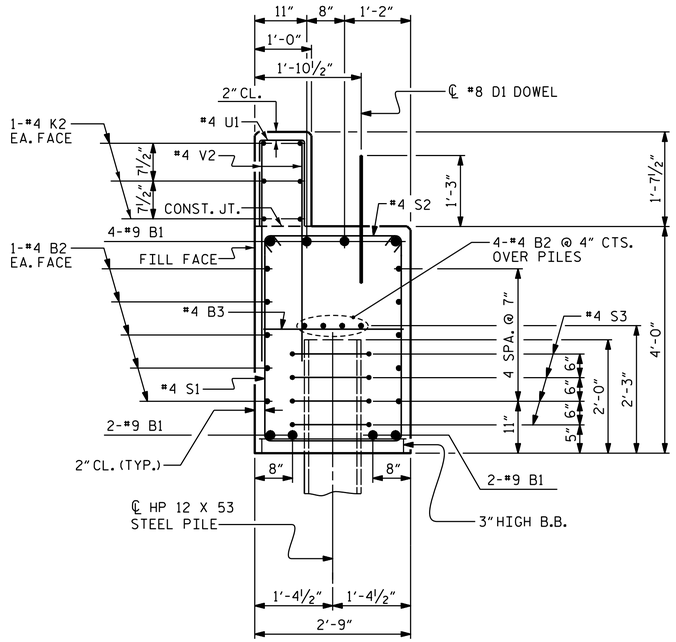
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

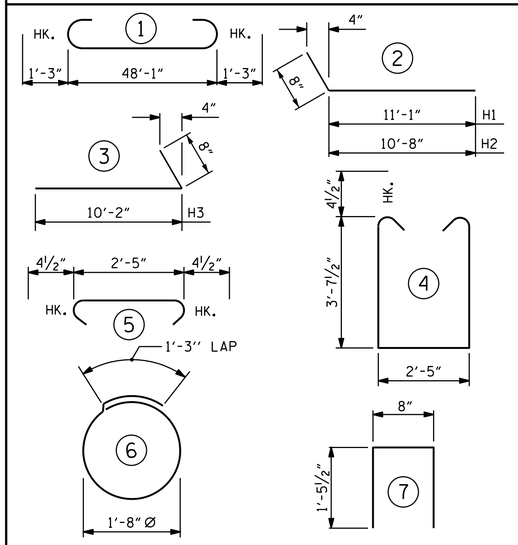
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



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.

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	50'-7"	1376
B2	28	#4	STR	25'-4"	474
B3	12	#4	STR	2'-5"	19
D1	24	#8	STR	2'-3"	144
H1	12	#5	2	11'-9"	147
H2	12	#5	2	11'-4"	142
H3	24	#5	3	10'-10"	271
K1	12	#4	STR	3'-3"	26
K2	12	#4	STR	25'-4"	203
S1	62	#4	4	10'-5"	431
S2	62	#4	5	3'-2"	131
S3	28	#4	6	6'-6"	122
U1	41	#4	7	3'-7"	98
V1	61	#4	STR	7'-2"	292
V2	82	#4	STR	5'-3"	288

REINFORCING STEEL (FOR ONE END BENT) 4164 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	24.0 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	6.1 C.Y.
TOTAL CLASS A CONCRETE		30.1 C.Y.

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 4 OF 4

ENGINEER OF RECORD 4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth 6213D...

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 5107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT	DATE : 9-23		
CHECKED BY : J. DILWORTH	DATE : 9-23		
DRAWN BY : WJH 12/11		REV. 4/17	MAA/THC
CHECKED BY : AAC 12/11			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. EB_36_120S4_33BB

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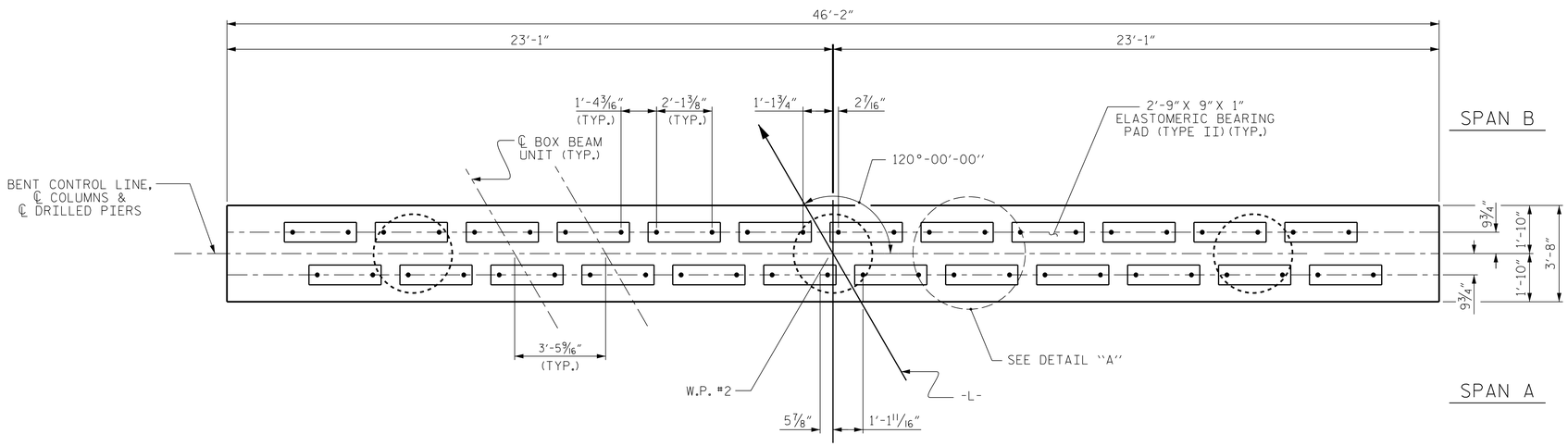
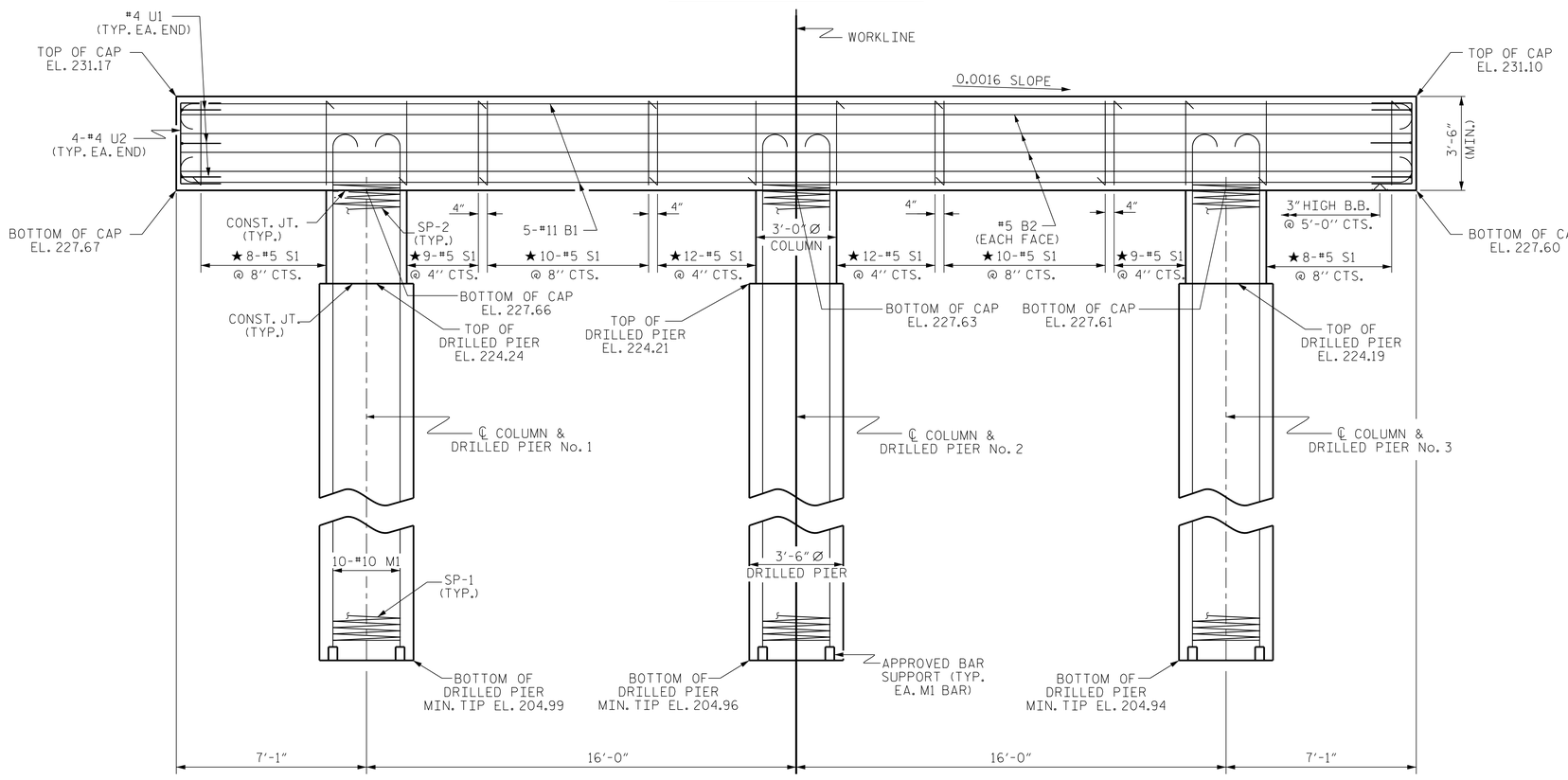


PLAN



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."

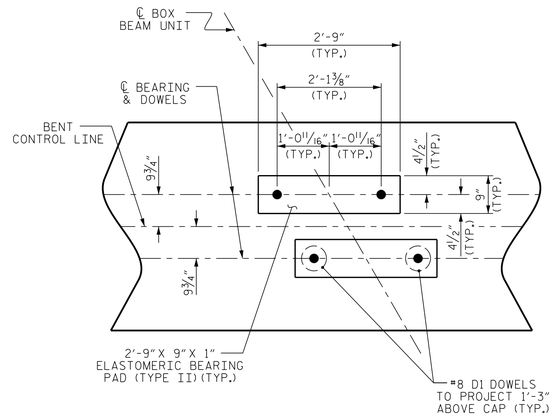
★ INVERT ALTERNATE STIRRUPS.

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.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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

APPLY EPOXY PROTECTIVE COATING TO THE TOP OF CAP. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 1 OF 2

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth 52138C...

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT DATE : 9-23
CHECKED BY : J. DILWORTH DATE : 9-23

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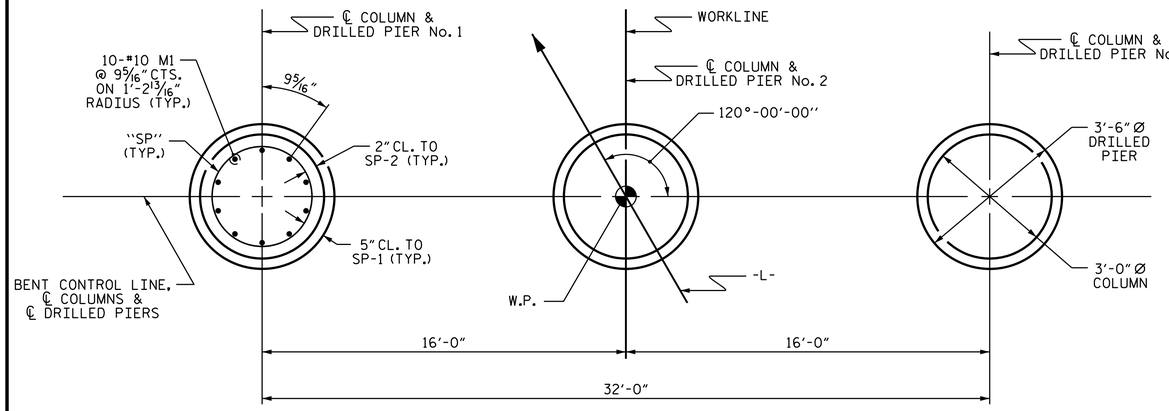
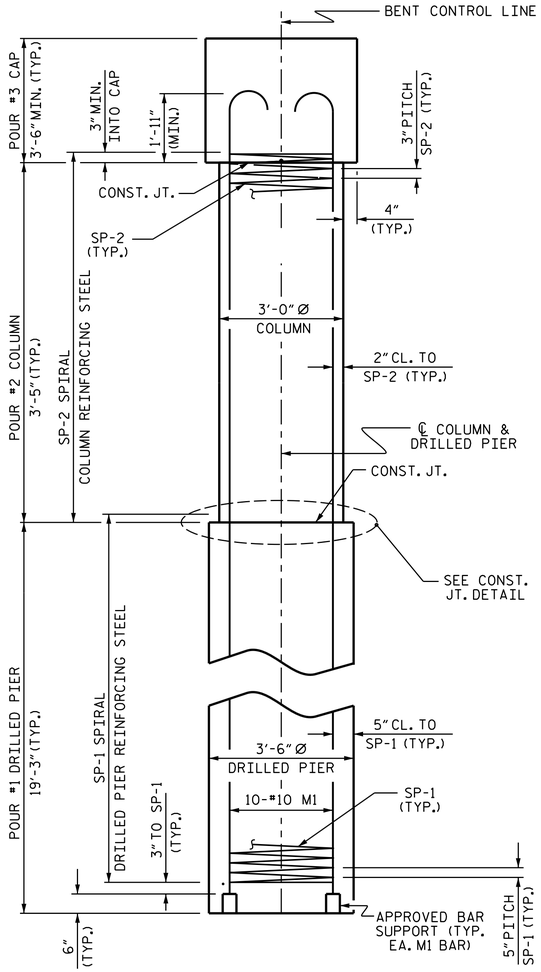
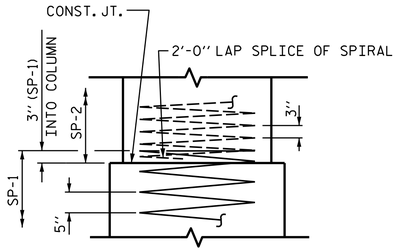


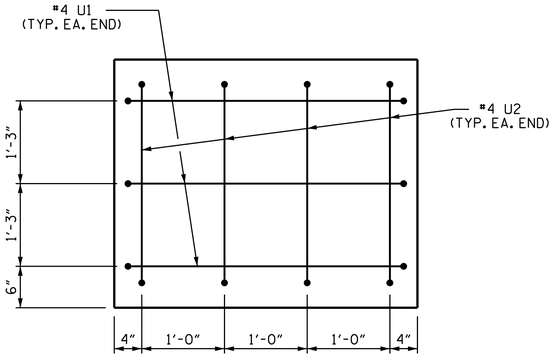
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

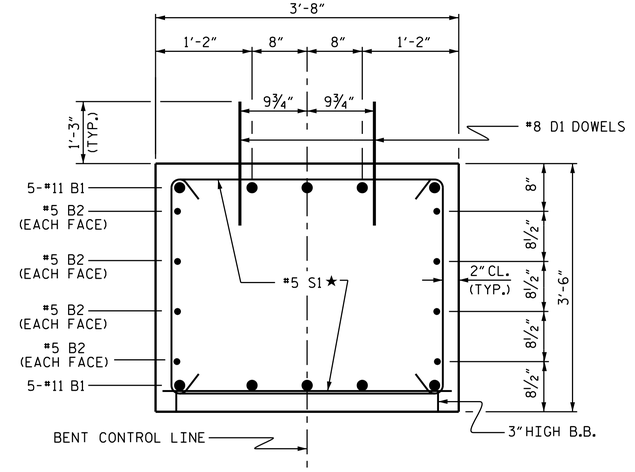


CONSTRUCTION JOINT DETAIL



END OF CAP VIEW

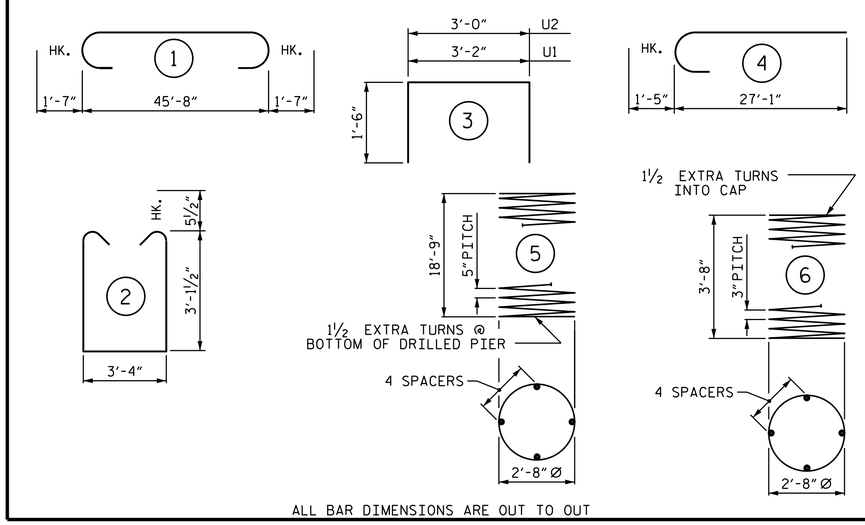
(TYPICAL BOTH ENDS)



SECTION THRU CAP

★ INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT NO. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	48'-10"	2595
B2	8	#5	STR	45'-10"	382
D1	48	#8	STR	2'-3"	288
M1	30	#10	4	28'-6"	3,679
S1	78	#5	2	10'-6"	854
U1	6	#4	3	6'-2"	25
U2	8	#4	3	6'-0"	32

REINFORCING STEEL (FOR ONE BENT) 7855 LBS.

SP-1	3	*	5	382'-6"	1,197
SP-2	3	**	6	133'-5"	267

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 1464 LBS.

* 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 (FOR ONE BENT)

POUR #2 (COLUMNS)	2.7 C.Y.
POUR #3 (CAP)	21.9 C.Y.
TOTAL CLASS A CONCRETE	24.6 C.Y.

DRILLED PIERS: (BENT NO. 1)

DRILLED PIER CONCRETE
POUR #1 (DRILLED PIERS) 20.6 C.Y.

3'-6" Ø DRILLED PIER NOT IN SOIL 28.80 LIN. FT.

3'-6" Ø DRILLED PIER IN SOIL 28.95 LIN. FT.

PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER 33.6 LIN. FT.

CSL TUBES 249 LIN. FT.

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

SHEET 2 OF 2

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
6213B0...
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : J. PENDERGRAFT DATE : 9-23
CHECKED BY : J. DILWORTH DATE : 9-23

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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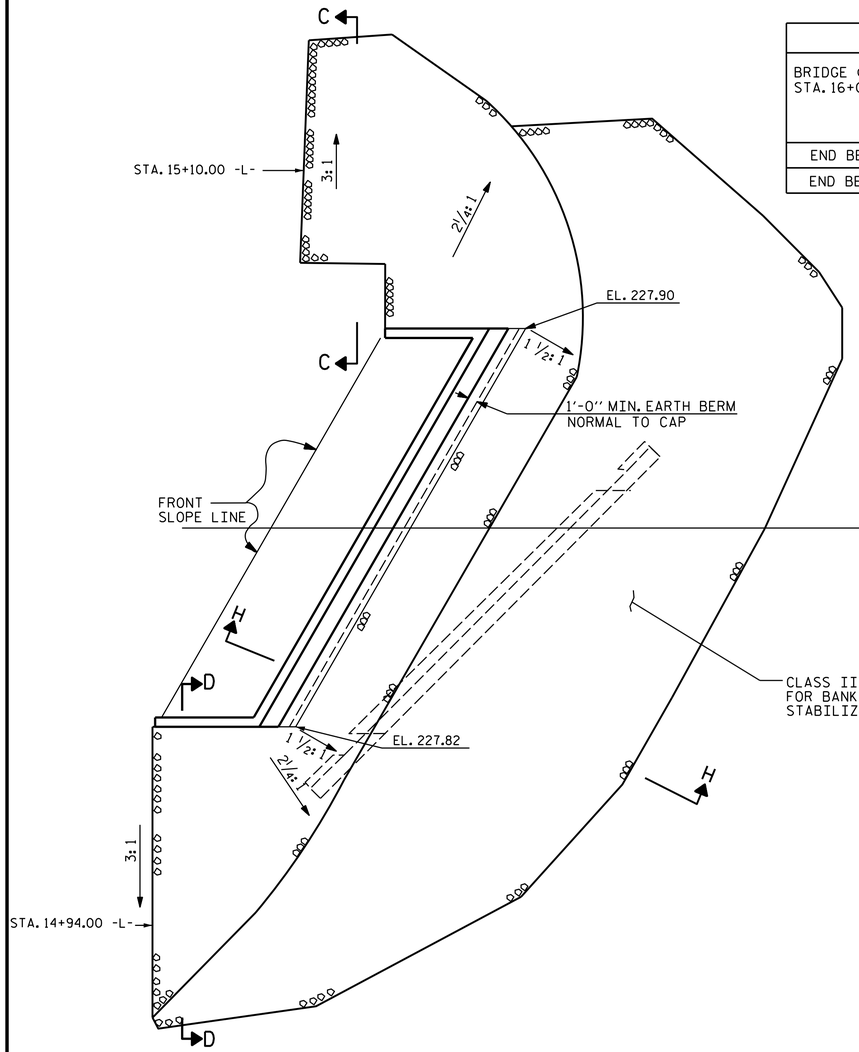
ESTIMATED QUANTITIES

BRIDGE @ STA. 16+03.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	BANK EXCAVATION STABILIZATION RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS	TONS	SQUARE YARDS
END BENT 1	167	186	246	273
END BENT 2	128	142	178	198

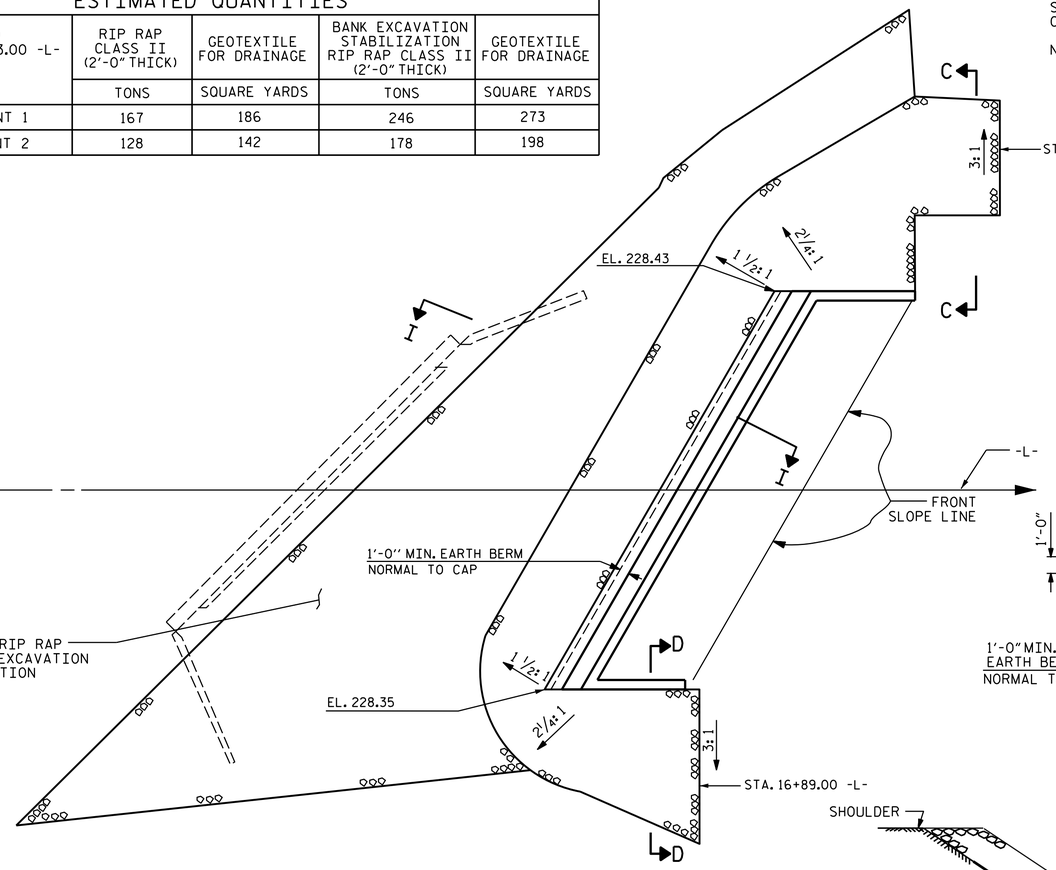
NOTES :

THE COST OF PROVIDING AND PLACING 1'-0" NATIVE MATERIAL SHALL BE INCLUDED IN THE PRICE PAID FOR TONS OF RIP RAP CLASS II (2'-0" THICK).

NO SEPARATE PAYMENT SHALL BE MADE FOR NATIVE MATERIAL.

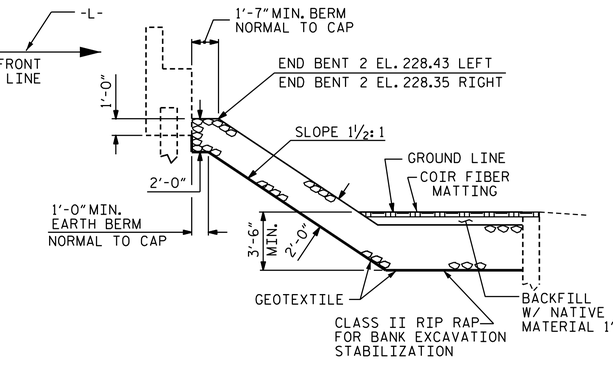


@ END BENT NO. 1

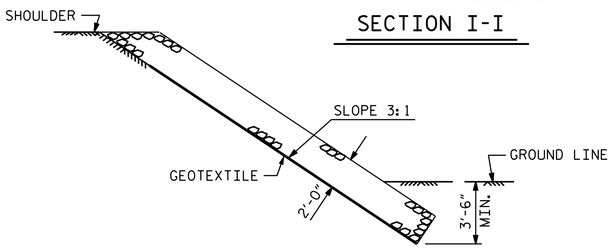


@ END BENT NO. 2

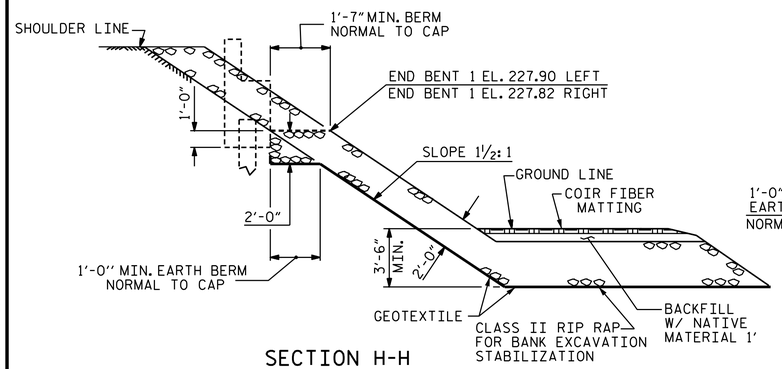
PLAN OF RIP RAP



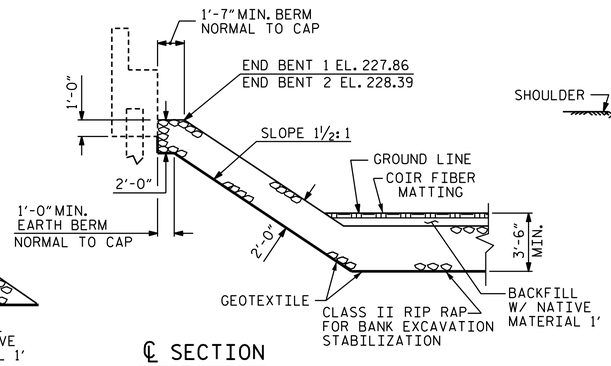
SECTION I-I



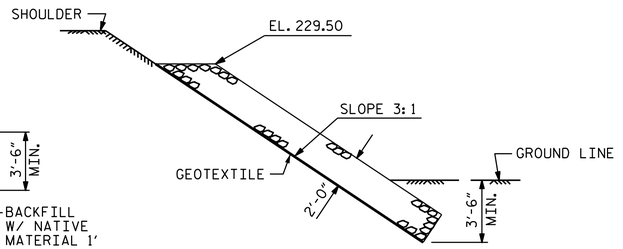
SECTION D-D



SECTION H-H



℄ SECTION BERM RIP RAPPED



SECTION C-C

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

DRAWN BY : J. PENDERGRAFT DATE : 10-23

CHECKED BY : J. DILWORTH DATE : 10-23

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD
4/1/2025
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			21

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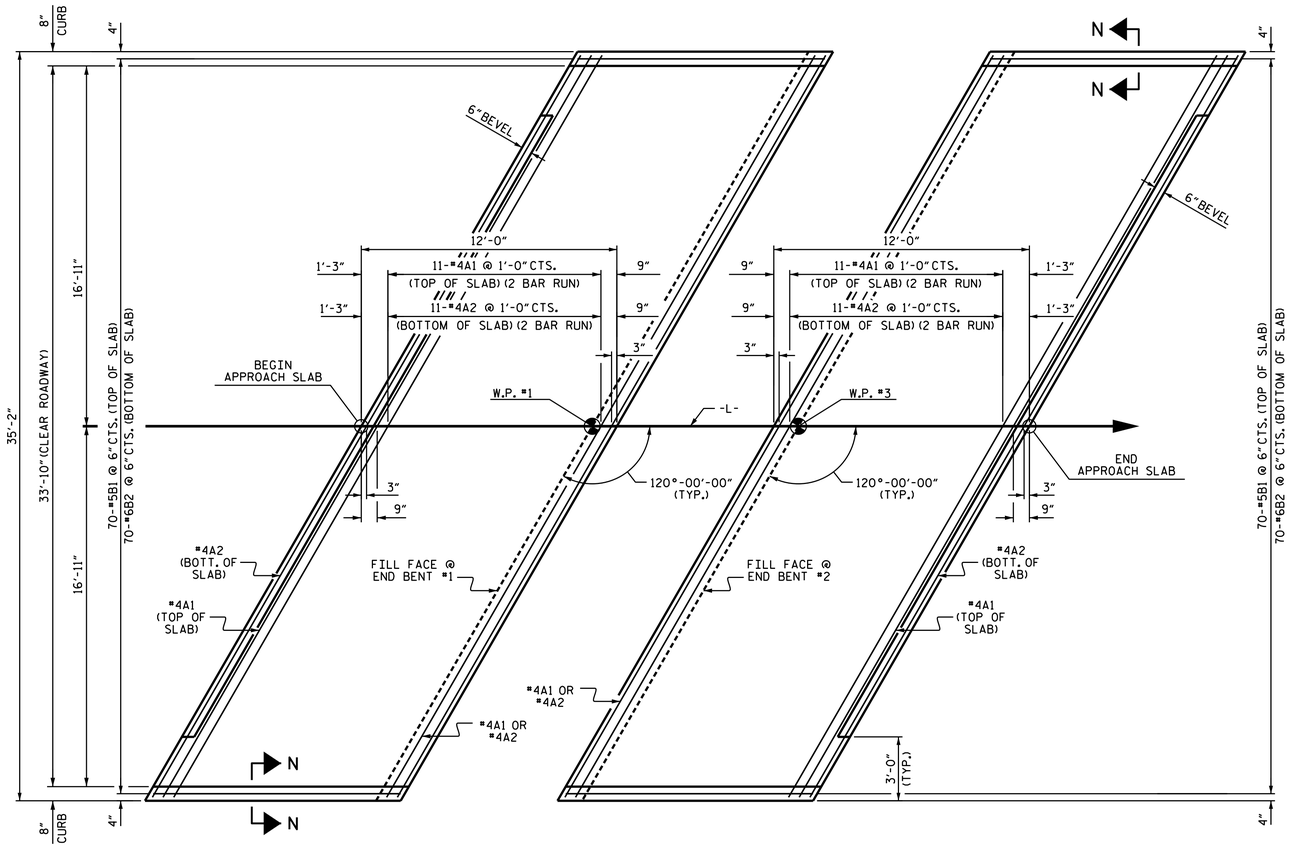
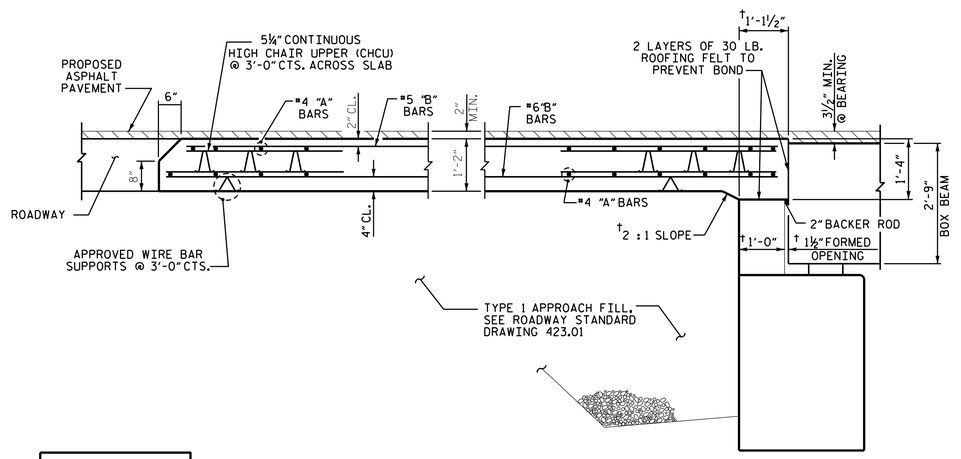


PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

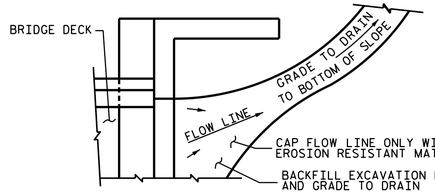
SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

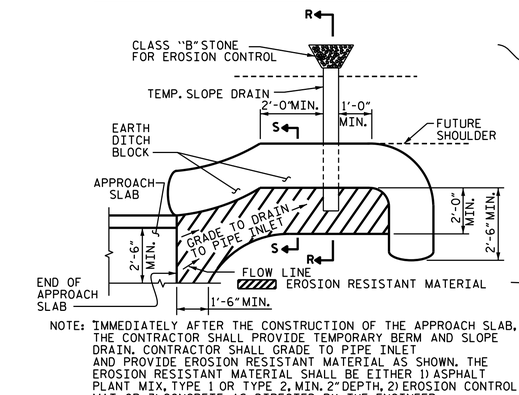
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



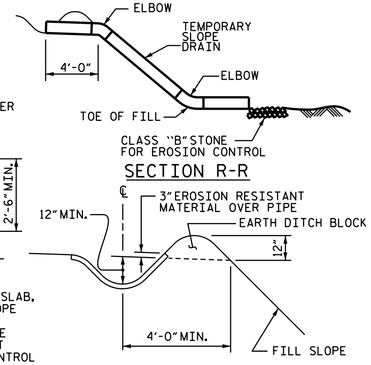
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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

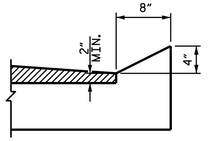


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

CURB DETAILS

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

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	21'-1"	366
A2	26	#4	STR	20'-11"	363
* B1	70	#5	STR	11'-1"	809
B2	70	#6	STR	11'-7"	1218
REINFORCING STEEL				LBS.	1581
* EPOXY COATED REINFORCING STEEL				LBS.	1175
CLASS AA CONCRETE				C.Y.	18.6

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	21'-1"	366
A2	26	#4	STR	20'-11"	363
* B1	70	#5	STR	11'-1"	809
B2	70	#6	STR	11'-7"	1177
REINFORCING STEEL				LBS.	1581
* EPOXY COATED REINFORCING STEEL				LBS.	1175
CLASS AA CONCRETE				C.Y.	18.6

PROJECT NO. BP4-R007

JOHNSTON COUNTY

STATION: 16+03.00 -L-

ENGINEER OF RECORD
4/1/2025

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
BOX BEAM UNIT
(SUB-REGIONAL TIER)
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			21

STD. NO. BAS_BB_36_120S

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : J. PENDERGRAFT	DATE : 11-23		
CHECKED BY : J. DILWORTH	DATE : 11-23		
DRAWN BY : MAA	11/11	REV. 12-17	MAA/THC
CHECKED BY : AAC	11/11	REV. 08-19	BNB/THC

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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 2024 "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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM, AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95	EEM	(/) RGW	REV. 5-7-03	RWW	(/) JTE	REV. 10-1-11	MAA	(/) GM	11/19/2024	
REV. 8-16-99	RWW	(/) LES	REV. 5-1-06	TLA	(/) GM	REV. 12-17	MAA	(/) THC	1:19:13 PM	
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