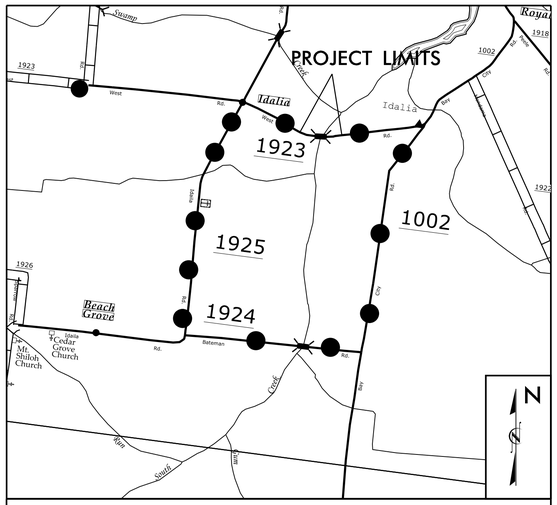
09/08/99

TIP PROJECT: 17BP.2.R.104

CONTRACT: DB00522

See Sheet 1A For Index of Sheets
See Sheet 1B For Symbology Sheet



VICINITY MAP — OFFSITE DETOUR

FINAL PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.2.R.104	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.2.PE.104		PE
17BP.2.PE.104		R/W / UTIL
17BP.2.R.104		CONSTRUCTION

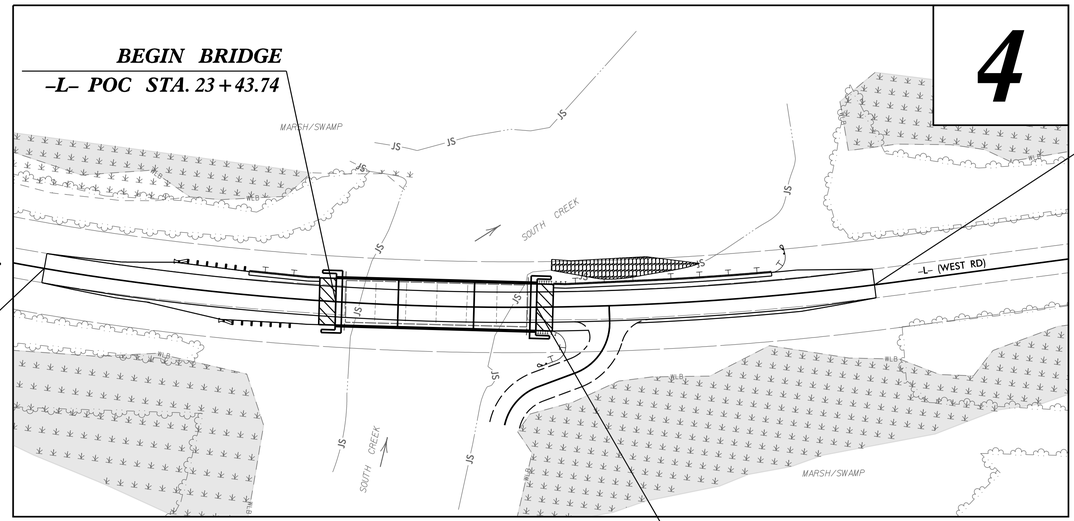
LOCATION: REPLACE BRIDGE NO. 37 OVER SOUTH CREEK ON SR 1923 (WEST RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

404 WETLANDS

CAMA WETLANDS

NC GRID NAD 83 NA 2011



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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 2013 = 310
ADT 2033 = 620
K = 10 %
D = 60 %
T = 4 % *
V = 50 MPH
* TTST = 1% DUAL 3%
FUNC CLASS = LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT 17BP.2.R.104 = 0.079 MILES

LENGTH OF STRUCTURE PROJECT 17BP.2.R.104 = 0.025 MILES

TOTAL LENGTH OF PROJECT 17BP.2.R.104 = 0.104 MILES

PREPARED IN THE OFFICE OF:
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
FOR NCDOT DIVISION 2

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 3, 2020

LETTING DATE: MARCH 9, 2022

ROY H. TELLIER, PE
PROJECT ENGINEER

MICHAEL C. AMAN, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A BYRD

DocuSigned by: James A. Byrd 1/25/2022
23592959E54F47C... *P.E.*
SIGNATURE:

ROADWAY DESIGN ENGINEER

THIS DOCUMENT WAS ORIGINALLY SEALED BY ROY TELLIER, PE (044575) ON JULY 7, 2021.

THIS SEAL ONLY APPLIES TO THE LET DATE REVISION

NORTH CAROLINA PROFESSIONAL SEAL 37950 ENGINEER JASON M PICKENS

DocuSigned by: Jason M. Pickens 1/25/2022
76DF15861D354B4... *P.E.*
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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HNTB

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER TIMOTHY H. TELLIER II

7/7/2021

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INDEX OF SHEETS

GENERAL NOTES: 2018 SPECIFICATIONS

EFFECTIVE: 01–16–2018
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 II.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SUBSURFACE DRAINS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104–7.

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

POWER – TIDELAND EMC
WATER – BEAUFORT COUNTY WATER

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

RIGHT–OF–WAY MARKERS:

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

EFF. 01–16–2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch – N. C. Department of Transportation – Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO. TITLE

DIVISION 2 – EARTHWORK
200.02 Method of Clearing – Method II
225.04 Method of Obtaining Superelevation – Two Lane Pavement

DIVISION 3 – PIPE CULVERTS
300.01 Method of Pipe Installation

DIVISION 4 – MAJOR STRUCTURES
422.02 Bridge Approach Fills – Type II Modified Approach Fill

DIVISION 5 – SUBGRADE, BASES AND SHOULDERS
560.02 Method of Shoulder Construction – High Side of Superelevated Curve – Method II

DIVISION 8 – INCIDENTALS
815.02 Subsurface Drain
840.29 Frames and Narrow Slot Flat Grates
840.35 Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.66 Drainage Structure Steps
846.01 Concrete Curb, Gutter and Curb & Gutter
846.04 Drop Inlet Installation in Shoulder Berm Gutter
862.01 Guardrail Placement
862.02 Guardrail Installation (Special Detail for Sheet 6 of 8)
862.03 Structure Anchor Units (Special Detail for Type III Anchor Units Sheets 1 of 7 and 2 of 7)
876.01 Rip Rap in Channels
876.02 Guide for Rip Rap at Pipe Outlets

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New 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:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	2A–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044575 TELLIER

7/7/2021

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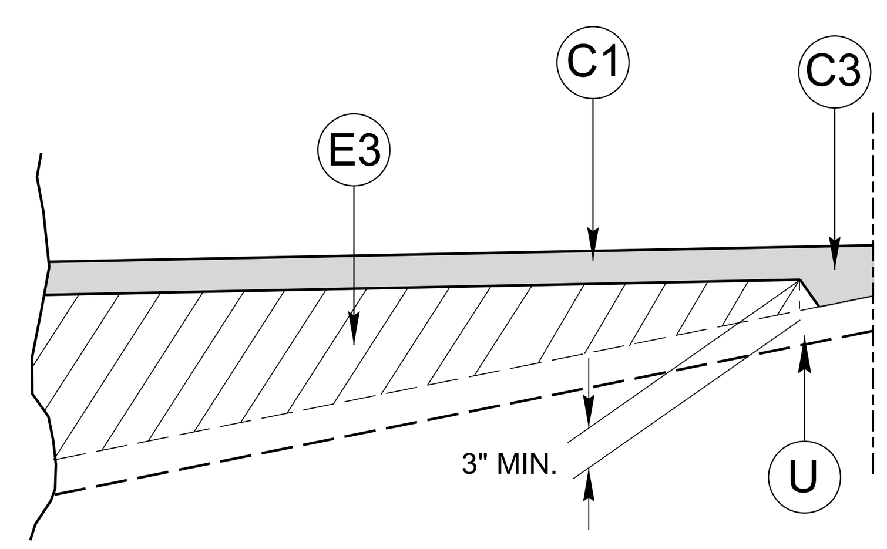
PAVEMENT SCHEDULE

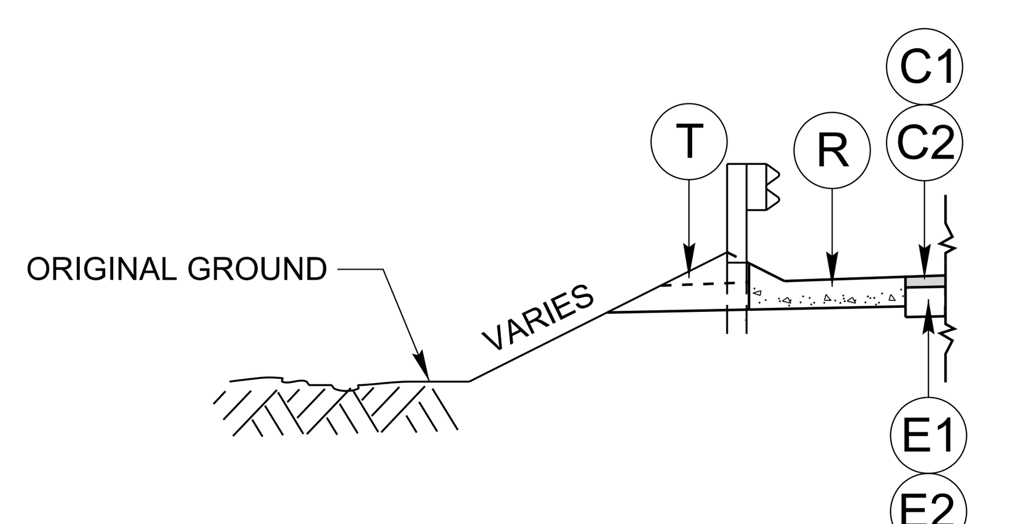
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C3	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YARD.
E2	PROP. APPROX. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
E3	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE DETAIL)

ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



DETAIL SHOWING METHOD OF WEDGING

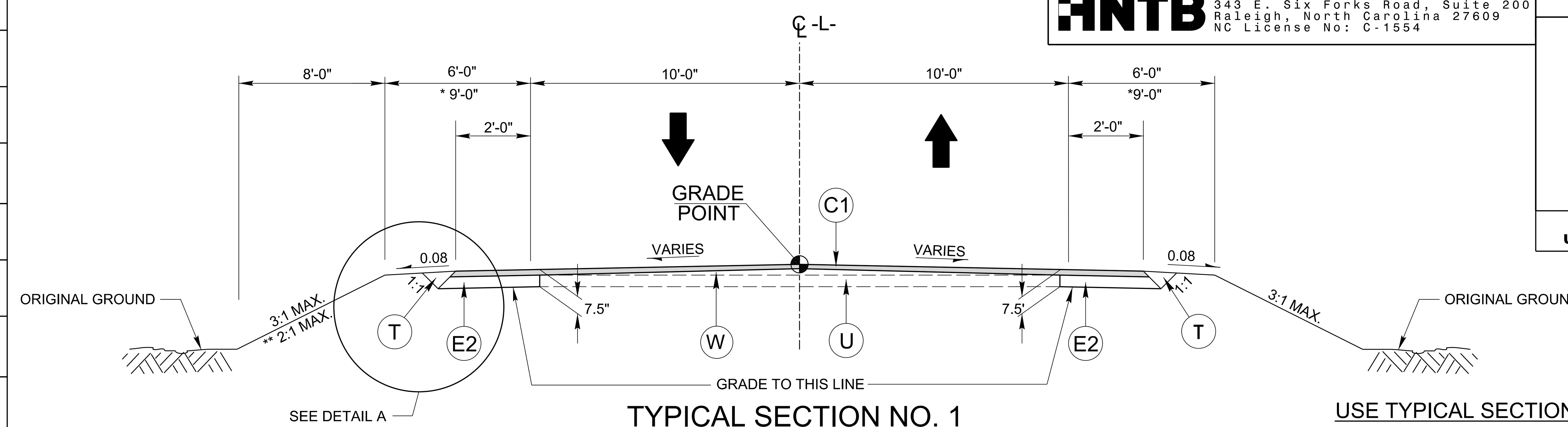
USE WITH TYPICAL SECTION 1



DETAIL A

SHOULDER BERM GUTTER LOCATIONS

-L- STA 22+85.00 TO STA 23+32.34 LT
-L- STA 24+87.66 TO STA 26+33.00 LT

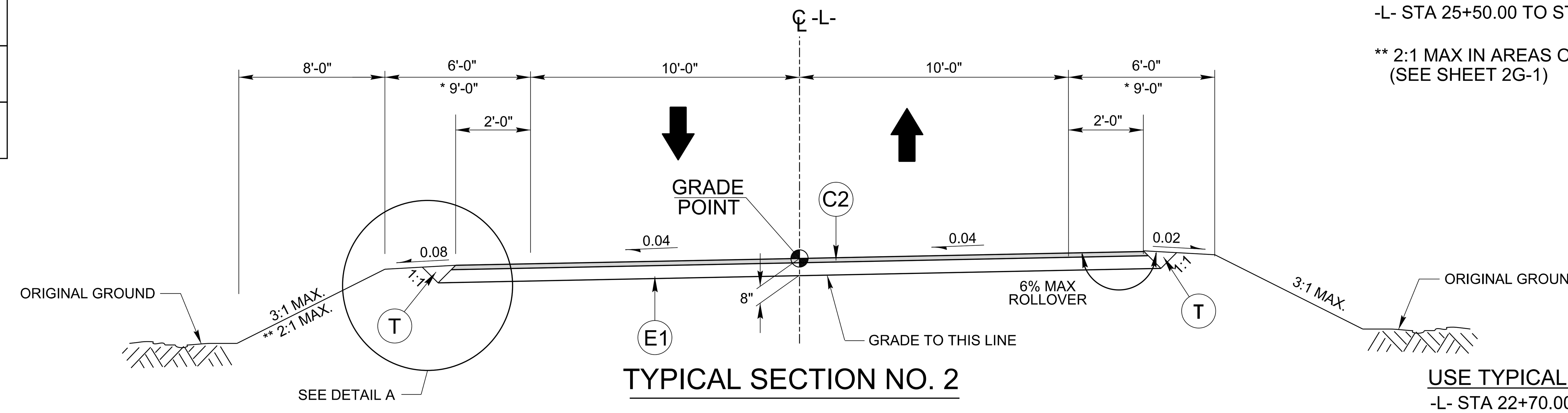


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 FROM:

-L- STA 21+50.00 TO STA 22+70.00
-L- STA 25+50.00 TO STA 27+00.00

** 2:1 MAX IN AREAS OF ROCK EMBANKMENT (SEE SHEET 2G-1)

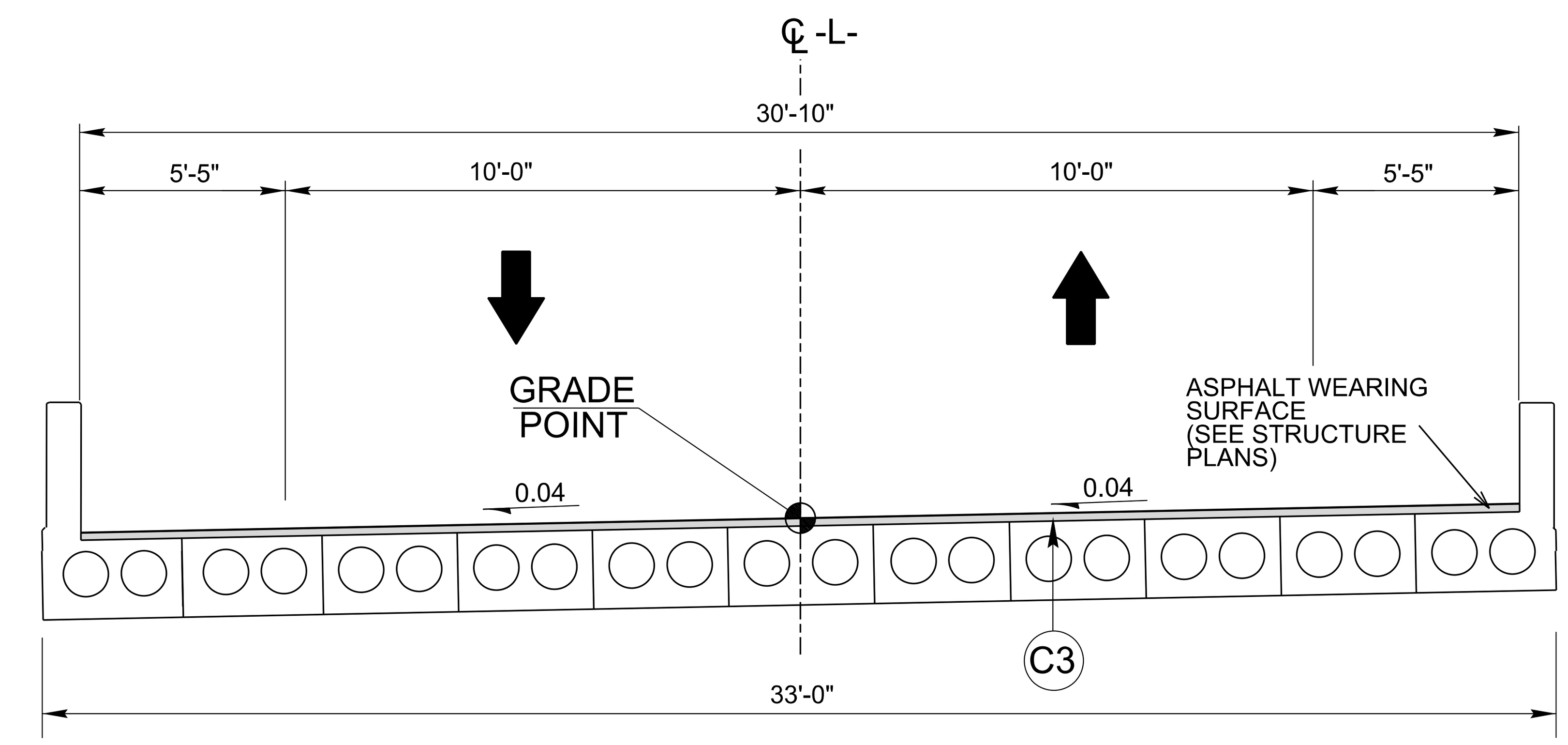


TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 FROM:

-L- STA 22+70.00 TO STA 23+43.74 (BRIDGE)
-L- STA 24+76.26 (BRIDGE) TO STA 25+50.00

** 2:1 MAX IN AREAS OF ROCK EMBANKMENT (SEE SHEET 2G-1)

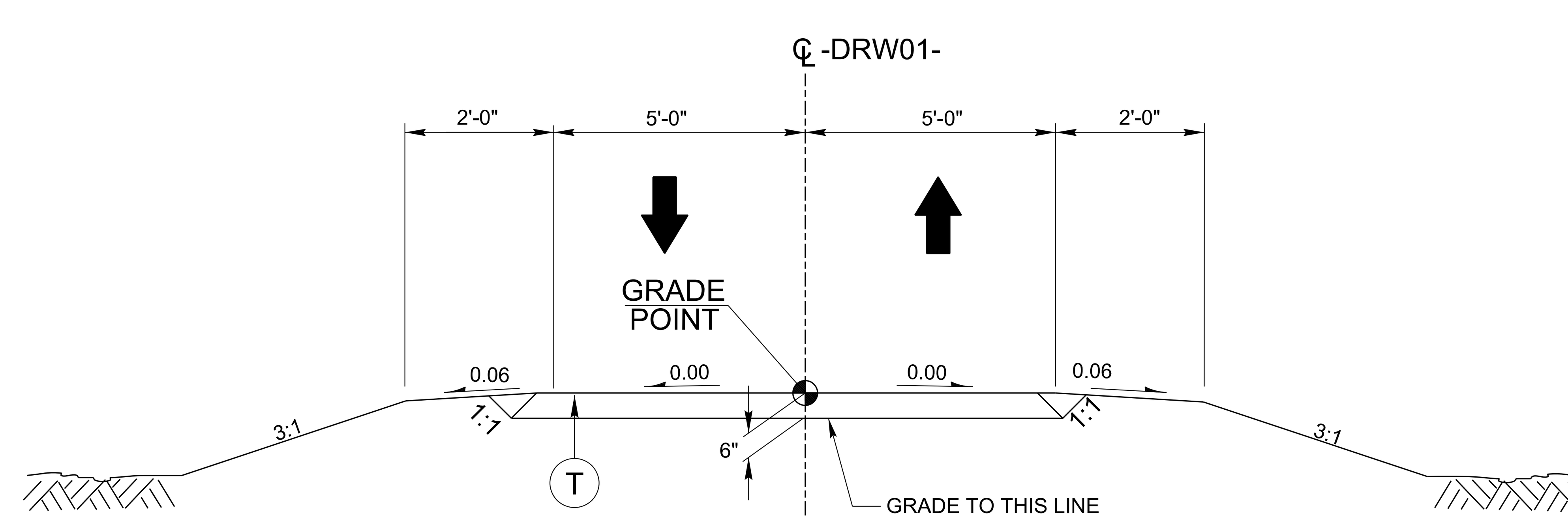


TYPICAL SECTION NO. 3

CORED SLAB BRIDGE OVERLAY

USE TYPICAL SECTION NO. 3 FROM:

-L- STA 23+43.74 TO STA 24+76.26



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 FROM:

-DRW01- STA 10+10.00 TO STA 11+15.25

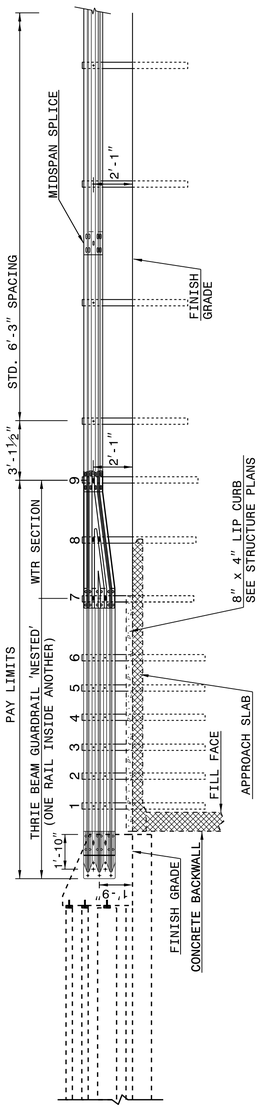
NOTES: * SHOULDER WIDTH INCREASED 3' WITH THE USE OF GUARDRAIL

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	2C-1

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

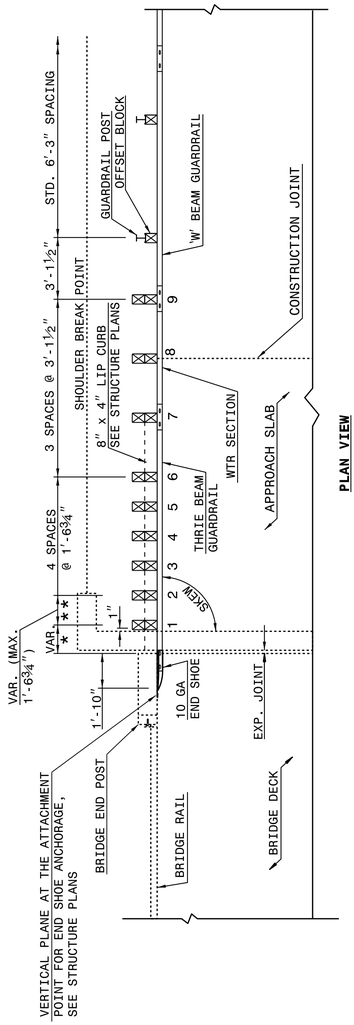
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



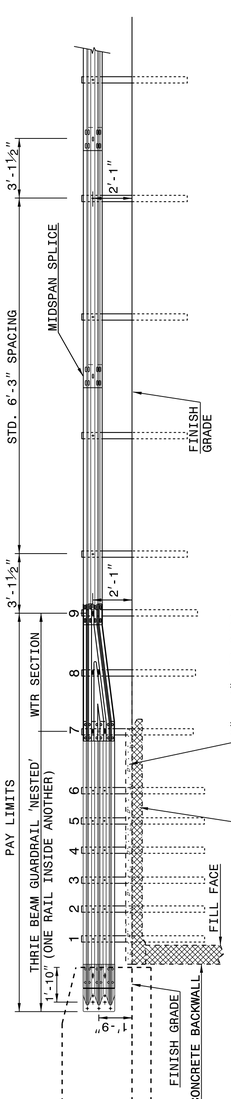
PLAN VIEW

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

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

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

SHEET 2 OF 7
862D03



ELEVATION

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
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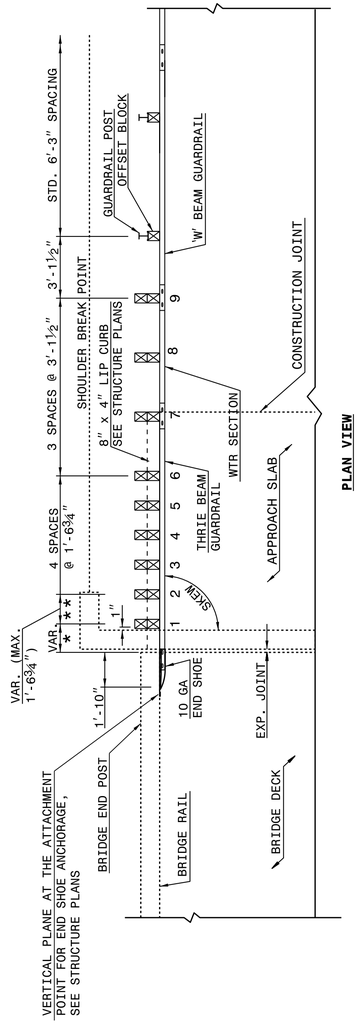
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by:
Joel S. Howerton
7/7/2021

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

SEE TITLE BLOCK

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

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jhowerton AT CSD-2425965

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	2C-2
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STATE OF
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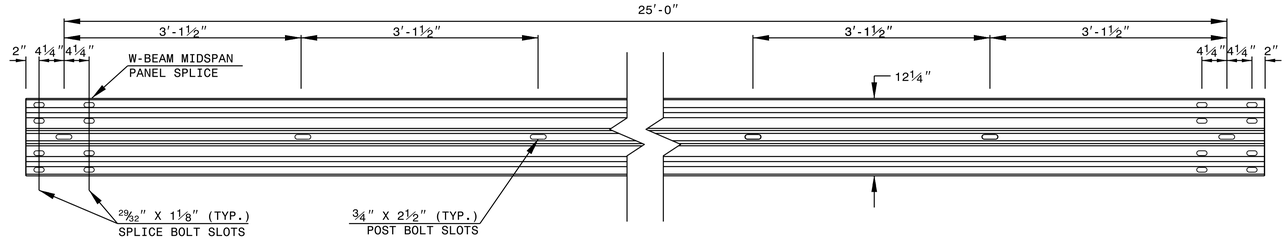
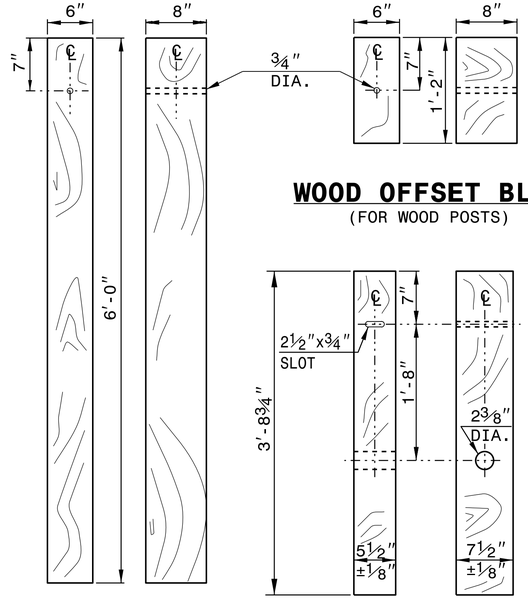
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



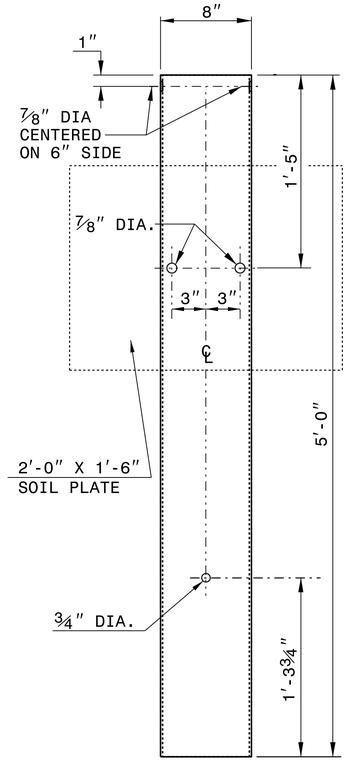
STANDARD W-BEAM GUARDRAIL



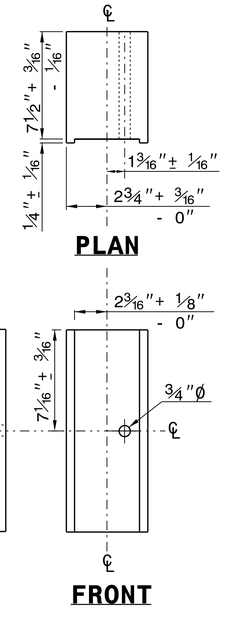
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

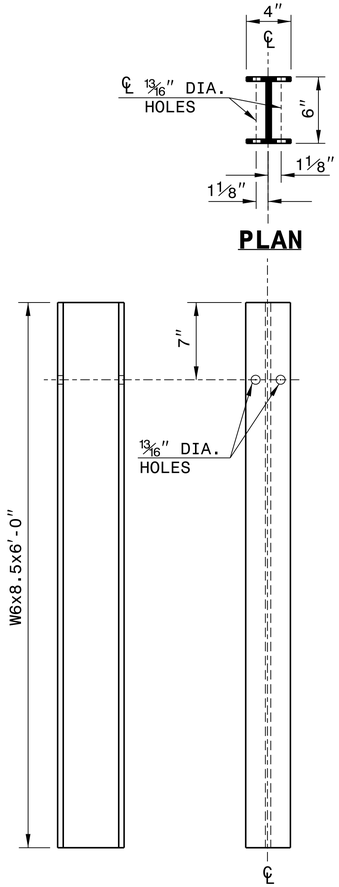
SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"



ROUTED OFFSET BLOCK



"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HOWERTON
DocuSigned by: 7/7/2021

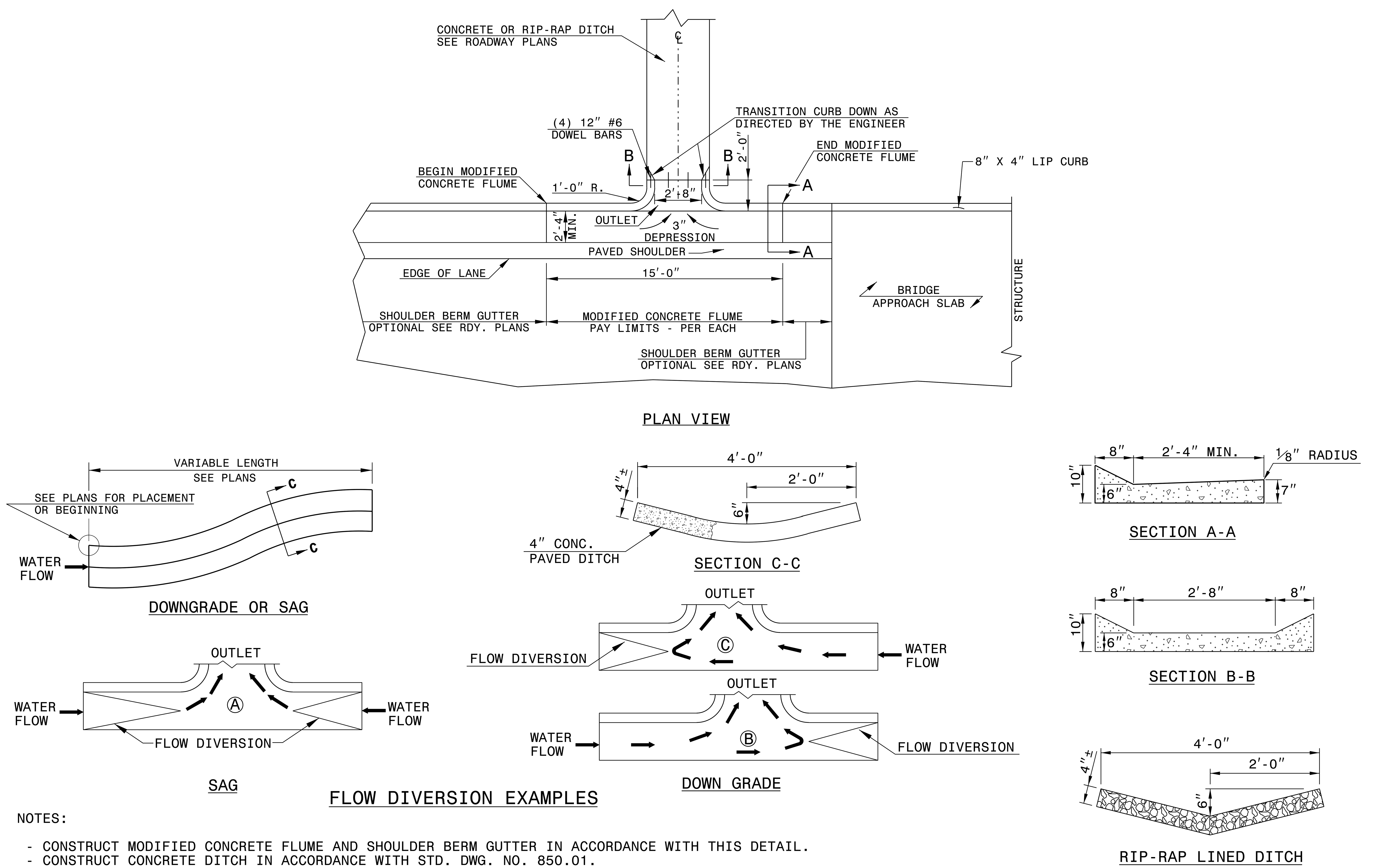
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

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



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.

SHEET 1 OF 1
MODFLMDTCH

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton
DocuSigned by:
7/7/2021

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 AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032171 ENGINEER JINYOUNG PARK

DocuSigned by:

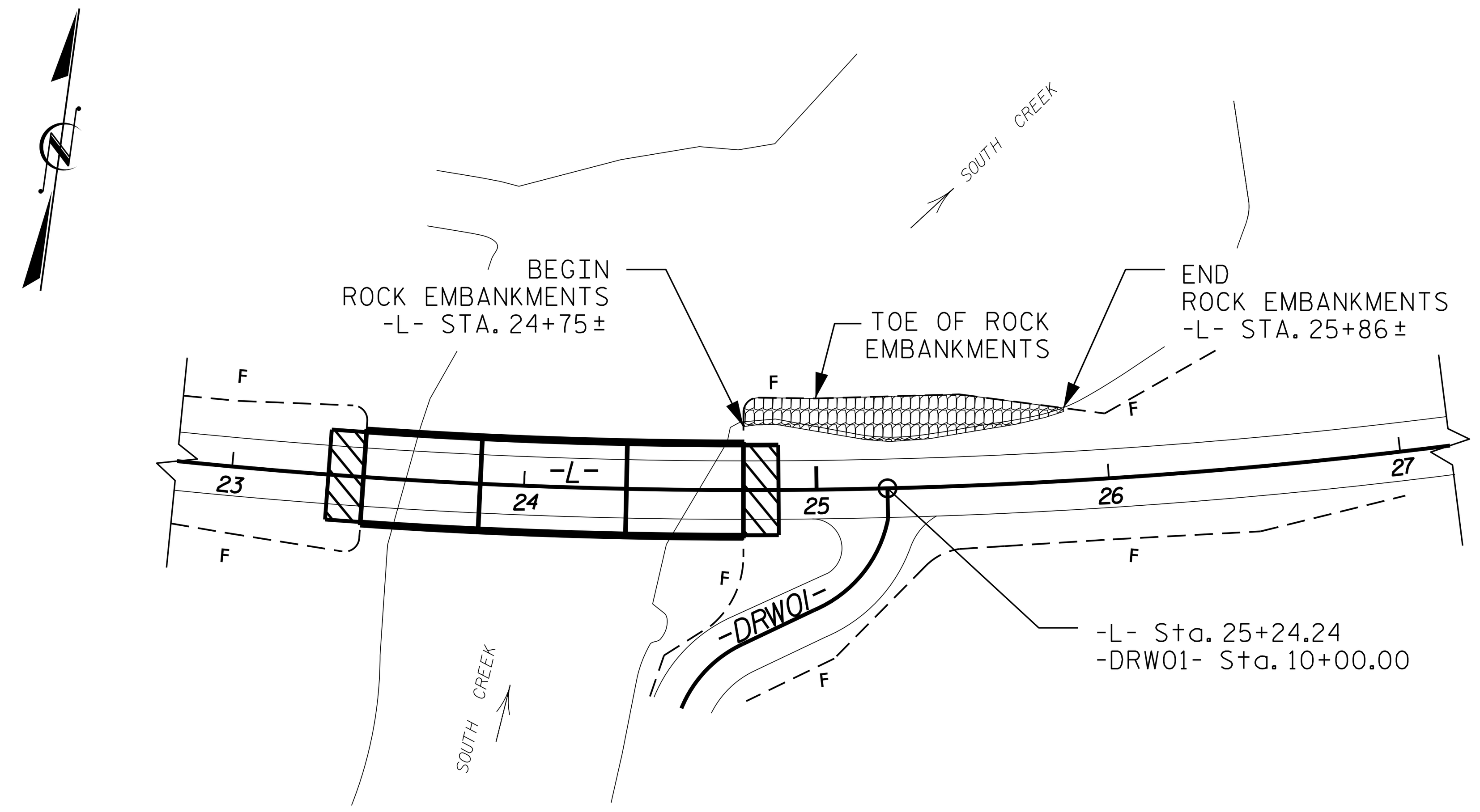
1/24/2020

SIGNATURE DATE

ENGINEER

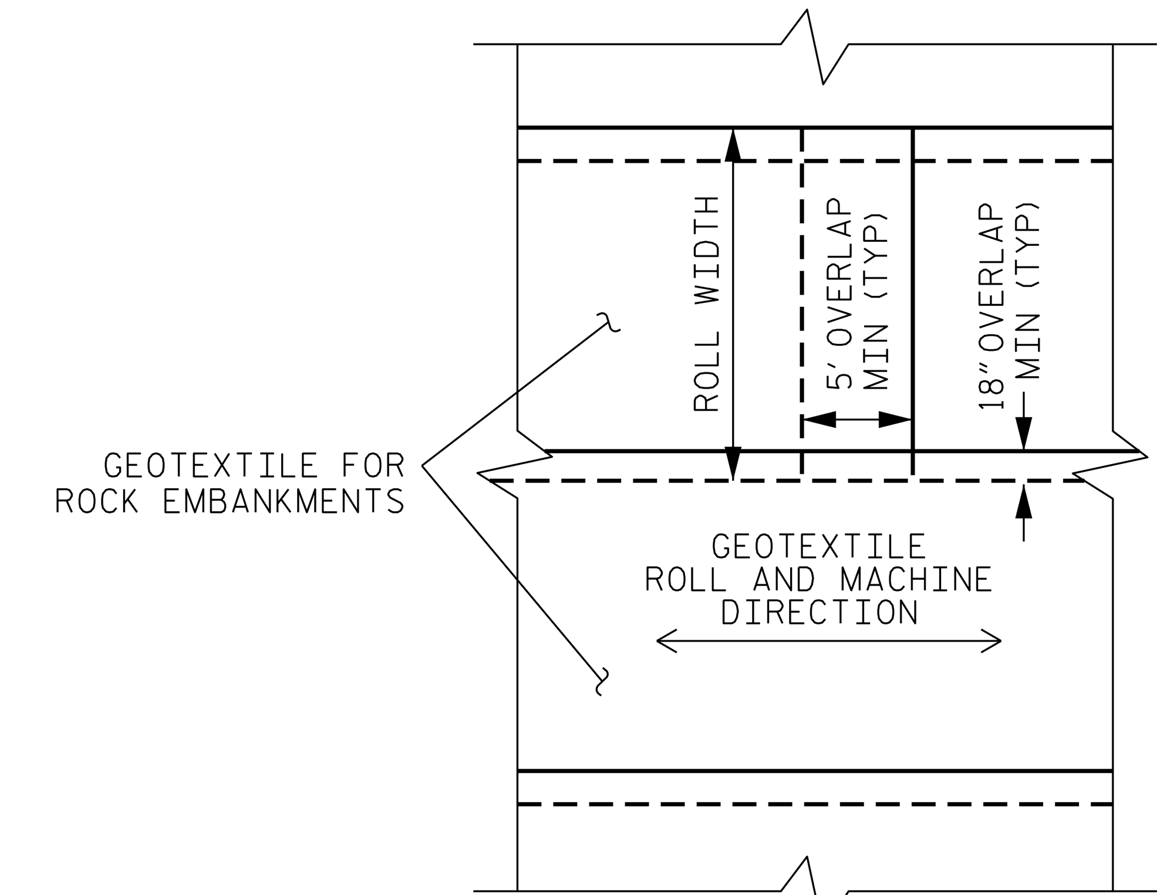
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN VIEW FOR LIMITS OF ROCK EMBANKMENTS

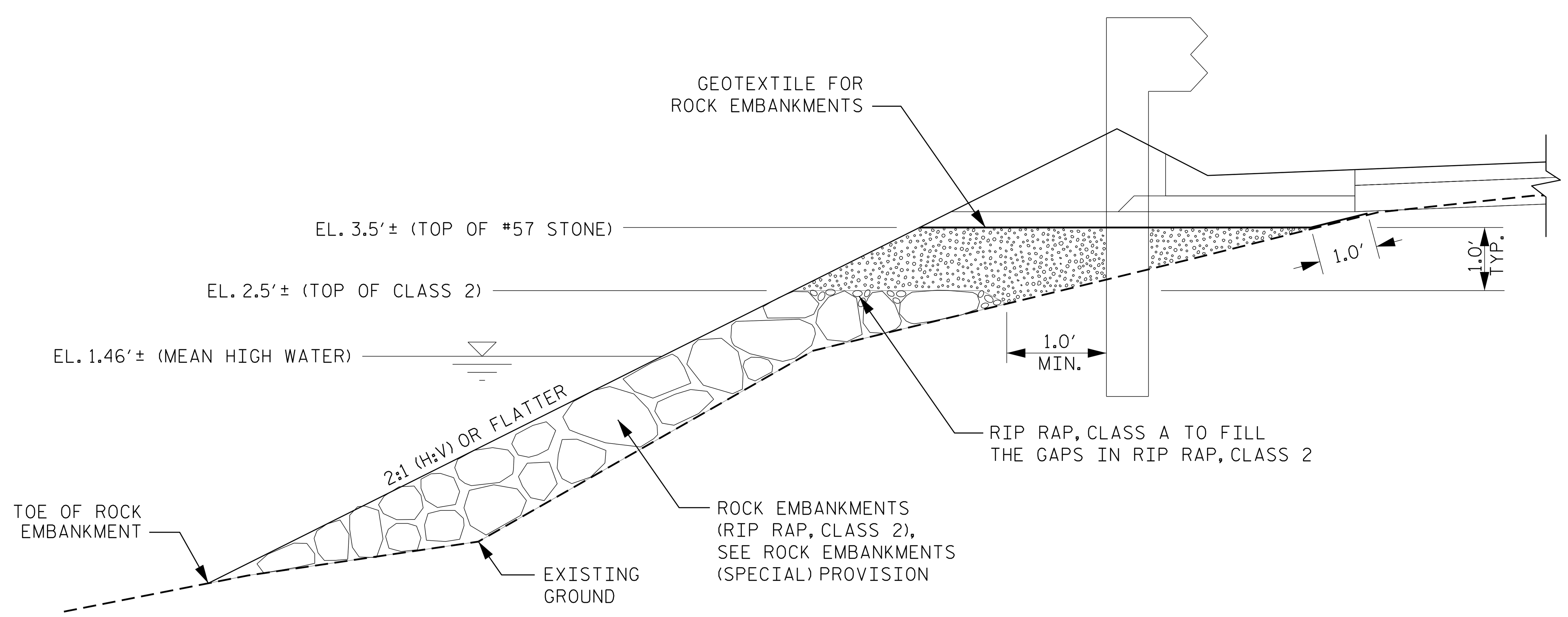
NOT TO SCALE



GEOTEXTILE FOR ROCK EMBANKMENTS OVERLAP DETAIL

PLAN VIEW, NOT TO SCALE

ESTIMATED QUANTITIES	
RIP RAP, CLASS 2	90 TONS
RIP RAP, CLASS A	20 TONS
#57 STONE (SELECT MATERIAL, CLASS VI)	35 TONS
GEOTEXTILE FOR ROCK EMBANKMENTS	100 SY



ROCK EMBANKMENT TYPICAL SECTION

NOT TO SCALE

NOTES

FOR ROCK EMBANKMENTS, SEE ROCK EMBANKMENTS (SPECIAL) PROVISIONS.

INSTALL ROCK EMBANKMENTS USING CLASS 2 RIP RAP AS SHOWN IN THE PLAN OR 1.0 FT ABOVE THE MEAN SEA LEVEL.

FILL VOIDS IN THE TOP OF ROCK EMBANKMENTS WITH RIP RAP, CLASS A.

PLACE #57 STONE (SELECT MATERIAL, CLASS VI) 1 FT. (TYP.) ABOVE RIP RAP, CLASS 2 AS SHOWN IN THE PLAN.

INSTALL GEOTEXTILE FOR ROCK EMBANKMENT ON TOP OF #57 STONE.

THE ESTIMATED QUANTITIES OF ROCK RIP RAP, CLASS 2 INCLUDES AN ADDITIONAL TONNAGE FOR SETTLEMENTS.

PREPARED BY: J. PARK	DATE: 01 / 2020
REVIEWED BY: J. BATTS	DATE: 01 / 2020

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

ROCK EMBANKMENT DETAILS

REVISIONS

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

COMPUTED BY: TATYANA S. GIBBS	DATE: 06/20/19
CHECKED BY: DOUGLAS M. WHEATLEY	DATE: 06/03/21

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	3B-1

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK +%	BORROW	WASTE
-L- 21+50.00	-L- 23+43.74 (BRIDGE)	18	63	45	
-L- 24+76.26 (BRIDGE)	-L- 27+00.00	9	226	217	
-DRW01- 10+25.00	-DRW01- 11+00.00	1	123	122	
TOTALS:		28	412	384	
WASTE IN LIEU OF BORROW					
PROJECT TOTALS:		28	412	384	
5% TO REPLACE TOP SOIL ON BORROW PIT				19	
GRAND TOTALS:		28	412	403	
SAY:		50		420	

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

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

REMOVAL OF EXISTING ASPHALT PAVEMENT SUMMARY

SURVEY LINE	STATION	STATION	SQUARE YARDS
-L-, CL	22+70.00	23+45.00	167.67
-L-, CL	24+75.00	25+50.00	167.67
		TOTAL:	333.33
		SAY:	350

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH (FT)
-L-, LT	22+85.00	23+32.34	47.34
-L-, LT	24+87.66	26+33.00	145.34
		TOTAL:	192.68
		SAY:	200

ROW AREA DATA SUMMARY

PARCEL NO.	PROPERTY OWNERS NAMES	PROP. R/W	PERM. UTILITY EASE.	PERM. DRAIN. EASE.	DRAINAGE & UTILITY EASE.	CONST. EASE.
1	PCS PHOSPHATE COMPANY, INC		3162.96 SF			
2	BURNETT PURNELL		3594.89 SF		365.55 SF	3157.66 SF
3	YANCEY TYRE, HEIRS		392.66 SF			123.72 SF

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR 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	AT-1	GREU TL-3	TYPE-III	SC TYPE-III						EA	G	NG				
-L-	22+35.00	23+43.20	LT	108.20'				BRIDGE	5.42'	8.42'		50'		1'		1	1													
-L-	22+69.27	23+44.27	RT	75'			BRIDGE		5.42'	8.42'	50'		1'			1	1													
-L-	24+76.80	26+43.05	LT	162.45'	17.07'				5.42'	8.42'					1		1													
-L-	24+75.00		RT						5.42'	8.42'					1			1												
-DRW01-		10+74.96	RT	6.25'	49.25'																									
			SUBTOTAL:	351.90'	66.32'										2	2	3	1												
			ANCHOR DEDUCTIONS:																											
			GREU, TL-3: 2@50'	-100.00'																										
			AT-1: 2@6.25'		-12.50'																									
			TYPE-III: 3@18.75'	-56.25'																										
			SC TYPE-III: 1@18.75'		-18.75'																									
			TOTAL:	195.65'	35.07'																									
			SAY:	200'	37.5'																									
			5 ADDITIONAL POST																											

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CAAP 12"	CAAP 15"	CAAP 18"	CAAP 24"	CAAP 30"	CAAP 36"	CAAP 42"	CAAP 48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	CLASS V R.C. PIPE 12"	15"	18"	24"	30"	36"	42"	48"
SIZE																															
THICKNESS OR GAUGE											.064	.079		.109		.064	.064	.064	.064	.079	.079	.109	.109								
-L- STA 22+91	LT	0401																													
-L- STA 24+91	LT	0402		4.3'																											
	LT	0402	0403		2.0'	1.6'																			132						
-L- STA 26+24	LT	0403		3.4'																											
	LT	0403	0404		1.6'	1.5'																			44						
TOTAL																									176						

STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G			D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	TB GRATED D.I., TYPE 'B' STD. 840.35	T.B.D.I. (N.S.) FRAME AND TWO GRATES STD. 840.29	MODIFIED CONCRETE FLUME (SHEET 2C-3)				CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-L- STA 22+91																												1								
-L- STA 24+91						1																					1									
-L- STA 26+24						1																					1									
TOTAL						2																					2	1								

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

REMARKS

COMPUTED BY: Tyler C. Bottoms DATE: 10/24/19
CHECKED BY: Jinyoung Park DATE: 1/22/20

(12-17-19)

PROJECT NO.	SHEET NO.
17BP.2.R.104	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

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

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

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
CONTINGENCY				
		TOTAL SY/TONS:	0	0*

*Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

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

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

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
							TOTAL SY:	0

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
					TOTAL SY:	0	0	0*	0**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.
**Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

SUMMARY OF PRE-SPLITTING OF ROCK

LINE	Beginning Rock Cut Slope (H:V)	Approx. Station	Ending Rock Cut Slope (H:V)	Approx. Station	Location LT/RT	Pre-splitting of Rock SY
					TOTAL SY:	0

SUMMARY OF HORIZONTAL DRAINS

LINE	Approximate Station	Location LT/RT	Elevation Above or Below Grade (+/-) FT	Inclination Angle DEGREES	PVC Pipe Schedule 40/80 or NO PIPE	Horizontal Drain FT	Horizontal Drain W/O Pipe FT
CONTINGENCY							
					TOTAL FT:	0	0

SUMMARY OF SETTLEMENT GAUGES

Gauge No.	LINE and Station	Offset	
		Distance FT	Direction LT/RT
	TOTAL GAUGES (EACH):		

SUMMARY OF SURCHARGES AND SURCHARGE WAITING PERIODS

LINE	Station	Station	Surcharge Height FT	MONTHS

SUMMARY OF EMBANKMENT WAITING PERIODS

LINE	Station	Station	MONTHS

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge No. 37 on SR 1923 over South Creek	EB1, EB2	1

8/17/99

REVISIONS

404 WETLANDS

CAMA WETLANDS

BEGIN PROJECT 17BP.2.R.104
–L– POC STA. 21+50.00

END PROJECT 17BP.2.R.104
–L– POC STA. 27+00.00

PCS PHOSPHATE COMPANY, INC
DB 1295 PG 250
DB 1219 PG 385
UNRECORDED MAP

1
PCS PHOSPHATE COMPANY, INC
DB 1295 PG 250
DB 1219 PG 385
UNRECORDED MAP

2
BURNETT PURNELL
NDR

3
YANCEY TYRE, HEIRS
NDR

MODIFIED CONCRETE FLUME
STA. 22+91.08 LT

CLASS 'I' RIP-RAP
EST. 2 TONS
EST. 8 SYGF

ROCK EMBANKMENT
FOR 2:1 SLOPES

CLASS 'B' RIP-RAP
EST. 1 TONS
EST. 5 SYGF

BM#1

–L– PCC Sta. 21+87.19

–L– PC Sta. 25+24.24

–L– PT Sta. 27+17.19

–L– PC Sta. 30+25.56

–BL– 2

–BL– 3

–DRW01– Sta. 10+00.00
S 9° 19' 36.9" E

–DRW01– PC Sta. 10+10.45

–DRW01– PT Sta. 10+54.11

S 62° 08' 32.2" W

–DRW01– PC Sta. 10+80.26

END CONSTRUCTION
–DRW01– PT Sta. 11+15.25

N 74° 53' 05.9" E

S 85° 48' 43" W
787.35'

+40.00 –L– EXIST R/W 42.00' RT

+87.19 –L– 42.00' RT

+50.03 –L– EXIST R/W

+40.51 –L– EXIST P/L

+75.00 –L– 84.50' RT

+43.00 –DRW01– 42.00' LT

+15.00 –L– EXIST R/W 42.00' RT

+45.00 –L– EXIST R/W 42.00' RT

+74.00 –L– EXIST R/W 42.00' RT

+17.19 –L– 42.00' RT

+60.00 –L– 40.00' LT EXIST R/W

+20.00 –L– 40.00' LT EXIST R/W

+60.00 –L– 40.00' LT EXIST R/W

+50.00

+15.00

20' INC.

50' TAPER TO EXIST LT/RT

50' TAPER TO EXIST LT/RT

MATERIAL TO BE REMOVED

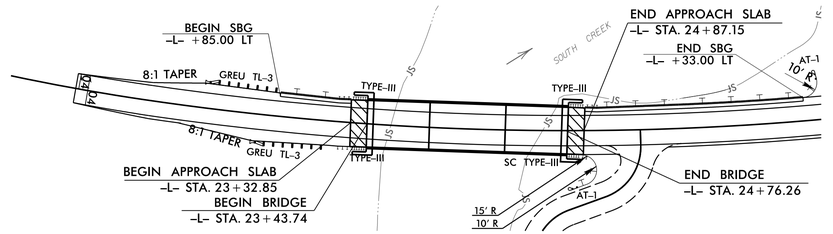
–L–

PI Sta 12+21.34	PI Sta 18+94.35	PI Sta 24+53.91	PI Sta 31+79.77
Δ = 4°58' 38.4" (RT)	Δ = 24°48' 00.9" (LT)	Δ = 15°53' 55.8" (LT)	Δ = 0°47' 49.1" (RT)
D = 2°08' 59.2"	D = 4°10' 01.1"	D = 2°59' 59.2"	D = 0°15' 30.2"
L = 231.53'	L = 595.16'	L = 530.00'	L = 308.43'
T = 115.84'	T = 302.32'	T = 266.71'	T = 154.22'
R = 2,665.20'	R = 1,375.00'	R = 1,910.00'	R = 22,173.76'
	SE = 0.04		
	RO = 80'		

DRW01

PI Sta 10+87.71	PI Sta 11+55.47
Δ = 87°29' 45.3" (RT)	Δ = 76°17' 21.5" (LT)
D = 114°35' 29.6"	D = 114°35' 29.6"
L = 76.35'	L = 66.57'
T = 47.86'	T = 39.27'
R = 50.00'	R = 50.00'
SE = N/A	SE = N/A

SKETCH OF BRIDGE IN RELATIONSHIP TO PAVEMENT



PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER
DocuSigned by: Roy Tellier
7/7/2021

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER
DocuSigned by: James Bryan
7/7/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC GRID 83 NA 2011

–L–

BM#1 BENCHTIE IN 12" GUM TREE
–L– STA 27+30.11, 147.25 LT
ELEV. = 4.12

PI = 22+25.00
EL = 3.62'
K = 98
VC = 150'

PI = 24+00.00
EL = 5.77'
K = 97
VC = 200'

PI = 26+00.00
EL = 4.11'
K = 376
VC = 200'

BEGIN GRADE
–L– STA 21+50.00
ELEV. = 3.84

WS EL. = 1.0'
SURVEY 04-10-19

(–)0.3000% (+)1.2300% (–)0.8313% (–)0.8313% (+)1.2300% (–)0.3000%

END GRADE
–L– STA 27+00.00
ELEV. = 3.81

BEGIN BRIDGE
–L– STA 23+43.74

END BRIDGE
–L– STA 24+76.26

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2326	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1.8	FT
BASE DISCHARGE	= 3550	CFS
BASE FREQUENCY	= 100 (FEMA)	YRS
BASE HW ELEVATION	= 2.1	FT
OVERTOPPING DISCHARGE	= >5332 (+)	CFS
OVERTOPPING FREQUENCY	= >500 (+)	YRS
OVERTOPPING ELEVATION	= 3.29	FT
DATE OF SURVEY	= 4-10-19	
W.S. ELEVATION AT DATE OF SURVEY	= 1.0	FT

–DRW01–

PI = 10+35.00
EL = 4.89'
K = 12
VC = 50'

PI = 10+85.00
EL = 2.25'
K = 18
VC = 50'

(–)1.0000% (–)5.2900% (–)5.2900% (–)2.5000%

END GRADE
–DRW01– STA 11+15.25
ELEV. = 1.49

BEGIN GRADE
–DRW01– STA 10+10.00
ELEV. = 5.14

30' 20' 10' 0' –10' –20'

20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00

10+00 11+00 12+00

08-JUN-2021 10:12
\Roadway\Proj\17BP2R104_Rdy_psh4.dgn
HNTB

09/08/99

TIP PROJECT: 06-0037

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	06-0037	RW01	

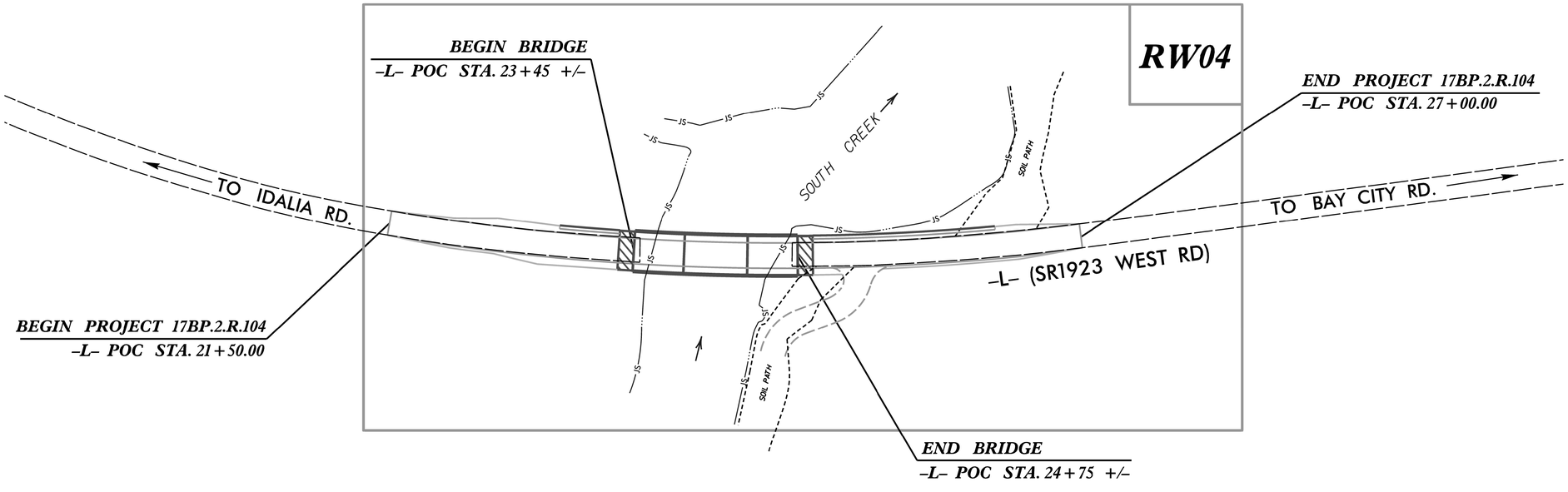
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

BEAUFORT COUNTY

LOCATION: REPLACE BRIDGE NO. 37 OVER SOUTH CREEK

NC GRID
NAD 83 NA 2011



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
NCDOT FOR MONUMENT "060037-2"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 563751.109(ft) EASTING: 2660192.127(ft)
ELEVATION: 3.360(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987838649
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"060037-2" TO -L- STATION 21+50.00 IS
S 71-15'33.6" E 821.15(ft)
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

DIVISION 2
LOCATION & SURVEYS

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
MARCH 3, 2020	SEPTEMBER 9, 2020

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4007 LAND SURVEYOR ROBERT J. REIGNER

DocuSigned by:
R.J. Reigner
3/24/2020
SIGNATURE: Date:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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

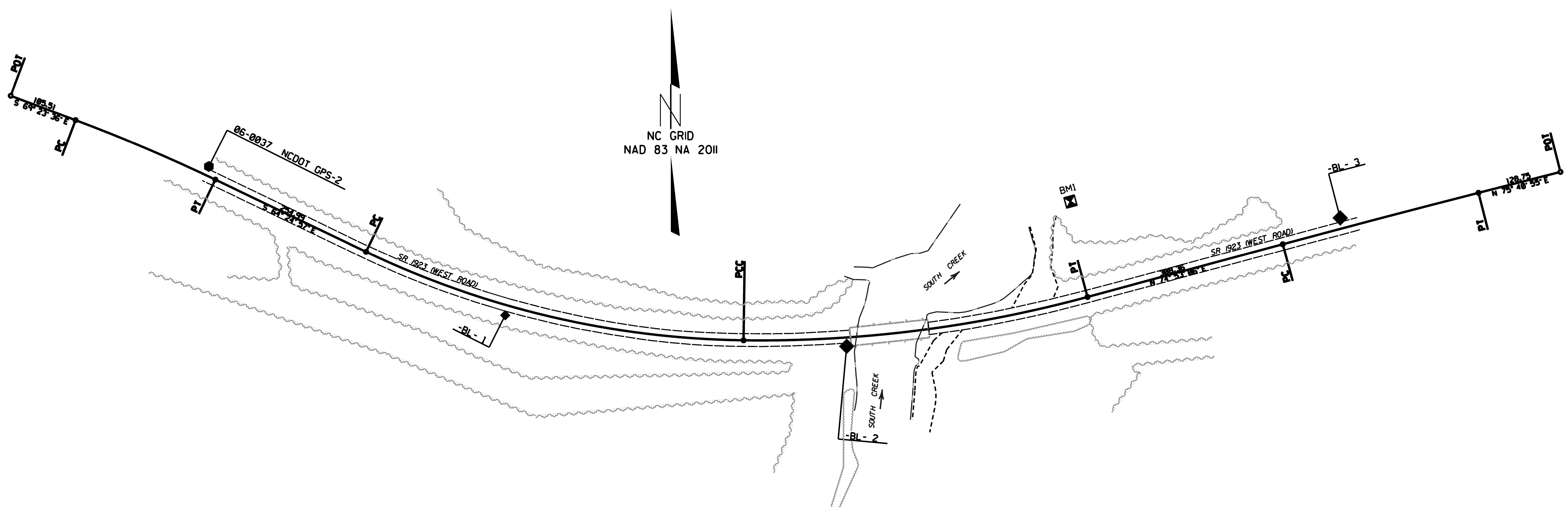
PROJECT REFERENCE NO.	SHEET NO.
06-0037	RW02C-1

Location and Surveys

DIVISION 2
LOCATION & SURVEYS

SURVEY CONTROL SHEET 06–0037

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



BASELINE

BL POINT	DESC.	NORTH	EAST	ELEVATION
GPS2	06-0037 NCDOT	563751.1090	2660192.1270	3.36
1	BL--1	563524.3030	2660643.7640	3.08
2	BL-2	563477.0790	2661164.1500	4.07
3	BL-3	563672.6680	2661916.0650	2.52

BENCHMARK

BM1 ELEVATION - 4.12
N 563698 E 2661505
BENCHTIE SET IN 12" GUM TREE

EXISTING ALIGNMENT

EL POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	563858.999	2659890.305							
LINE			S 69°23'35.8" E	105.51					
PC	563821.866	2659989.060							
CURVE			S 66°54'16.6" E	231.46	04°58'38.4"(RT)	02°08'59.2"	231.53	115.84	2665.20
PT	563731.075	2660201.965							
LINE			S 64°24'57.4" E	254.99					
PC	563620.959	2660431.958							
CURVE			S 76°48'57.9" E	590.53	24°48'00.9"(LT)	04°10'01.1"	595.16	302.32	1375.00
PCC	563486.273	2661006.922							
CURVE			N 82°50'03.7" E	528.30	15°53'55.8"(LT)	02°59'59.2"	530.00	266.71	1910.00
PT	563552.172	2661531.097							
LINE			N 74°53'05.9" E	308.36					
PC	563632.580	2661828.793							
CURVE			N 75°17'00.4" E	308.43	00°47'49.1"(RT)	00°15'30.2"	308.43	154.22	22173.76
PT	563710.932	2662127.100							
LINE			N 75°40'54.9" E	128.75					
POT	563742.772	2662251.849							

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.

6/2/99

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
06-0037	RW02D-1

Location and Surveys

DIVISION 2
LOCATION & SURVEYS

PROPOSED ALIGNMENT CONTROL SHEET

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	563858.9990	2659890.3050
PC	11+05.51	563821.8662	2659989.0599
PT	13+37.03	563731.0747	2660201.9653
PC	15+92.03	563620.9592	2660431.9584
PCC	21+87.19	563486.2729	2661006.9221
PT	27+17.19	563552.1721	2661531.0972
PC	30+25.56	563632.5804	2661828.7927
PT	33+33.98	563710.9319	2662127.0999
POT	34+62.73	563742.7720	2662251.8490

DRW01

TYPE	STATION	NORTH	EAST
POT	10+00.00	563511.3450	2661342.5987
PC	10+10.45	563501.0309	2661344.2926
PT	10+54.11	563464.4146	2661326.1101
PC	10+80.26	563452.1948	2661302.9895
PT	11+15.25	563424.2238	2661284.4707

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 INFORMATINO REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

18-MAR-2020 15:02
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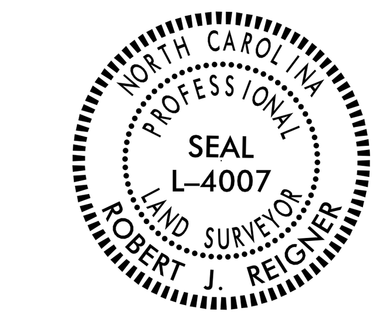
RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
06-0037	RW03E-1

Location and Surveys

DIVISION 2
LOCATION & SURVEYS

PROJECT SURVEYOR



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

I, ROBERT J. REIGNER, a Professional Land Surveyor in the state of North Carolina hereby certify to the best of my knowledge and belief that the following work item(s) (R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this 18th day of March, 2020.

DocuSigned by: R.J. Reigner

Professional Land Surveyor — PLS # L-4007 — Seal

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST	
L	21+40.00	30.00	563457.7625	2660958.3152	
L	21+40.00	42.00	563445.7764	2660957.7394	
L	21+87.19	42.00	563444.2768	2661006.3476	
L	26+15.00	30.00	563498.8370	2661438.0375	
L	26+15.00	42.00	563487.1014	2661440.5426	
L	26+20.00	-40.00	563568.3229	2661428.2106	STAKE SET
L	26+20.00	-30.00	563558.5487	2661430.3238	
L	26+45.00	30.00	563505.4318	2661467.7862	
L	26+45.00	42.00	563493.7370	2661470.4753	
L	26+60.00	-40.00	563576.9982	2661466.3992	
L	26+60.00	-30.00	563567.2709	2661468.7165	
L	27+17.19	42.00	563511.6251	2661542.0490	
L	27+74.00	42.00	563526.4382	2661596.8915	
L	27+74.00	30.00	563538.0231	2661593.7624	

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.

REVISIONS

6/2/99

24-MAR-2020 08:21
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cpfulcher AT LS-299764

PROJECT REFERENCE NO.	SHEET NO.
06-0037	RW04

Location and Surveys

DIVISION 2
LOCATION & SURVEYS

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4007 LAND SURVEYOR ROBERT J. REIGNER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, ROBERT J. REIGNER, a Professional Land Surveyor in the state of North Carolina hereby certify to the best of my knowledge and belief that the following work item(s) (R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this 18th day of March, 2020.

DocuSigned by: R.J. Reigner D6C2785356820460...

Professional Land Surveyor — L-4007 PLS # — Seal

6/2/99

REVISIONS

NC GRID NAD 83 NA 2011

20 -L-

25 -L-

30 -L-

BEGIN PROJECT 17BP.2.R.104
-L- POC STA. 21+50.00

PCS PHOSPHATE COMPANY, INC
DB 1295 PG 250
DB 1219 PG 385
UNRECORDED MAP

END PROJECT 17BP.2.R.104
-L- POC STA. 27+00.00

WOODED

N 33°03'49" E 220.04'

N 61°32'51" E 114.50'

N 15°28'29" E 7.68'

+60.00 -L- 40.00' LT 30.00' LT

+20.00 -L- 40.00' LT 30.00' LT

ALONG CREEK RUNS

SOIL PATH

PROPERTY LINE

SOUTH CREEK DRAINAGE DISTRICT

3
YANCEY TYRE, HEIRS
NDR

-L- PC Sta. 30+25.56

EXISTING R/W

SR 1923 (WEST ROAD) 19' BST

N 74°53'05.9" E

-L- PT Sta. 27+17.19

BRIDGE No. 37

PUE

+40.00 -L- 30.00' RT 42.00' RT

+87.19 -L- 42.00' RT

-L- PCC Sta. 21+87.19

+47.81 -L- 42.00' RT

+40.51 -L- 82.95' RT

TREES/SHRUBS

+15.00 -L- 30.00' RT 42.00' RT

+45.00 -L- 30.00' RT 42.00' RT

+74.00 -L- 30.00' RT 42.00' RT

+17.19 -L- 42.00' RT

S 85°48'43" W 787.35'

2
BURNETT PURNELL
NDR

-L- Sta. 25+24.24 = DRW01 Sta. 10+00.00
S 9°19'36.9" E

+43.00 -L- 42.00' LT

16.82

48.35' LT

-DRW01- PC Sta. 10+10.45
-DRW01- PT Sta. 10+54.11

S 62°08'32.2" W

-DRW01- PC Sta. 10+80.26

S 02°27'32" W 249.17'

ALONG CENTER OF SOUTH CREEK

S 02°27'32" W 142.81'

300.00'

+75.00 -L- 84.50' RT

1
PCS PHOSPHATE COMPANY, INC
DB 1295 PG 250
DB 1219 PG 385
UNRECORDED MAP

END CONSTRUCTION
-DRW01- PT Sta. 11+15.25

-L-			
PI Sta 12+21.34	PI Sta 18+94.35	PI Sta 24+53.91	PI Sta 31+79.77
Δ = 4°58'38.4" (RT)	Δ = 24°48'00.9" (LT)	Δ = 15°53'55.8" (LT)	Δ = 0°47'49.1" (RT)
D = 2°08'59.2"	D = 4°10'01.1"	D = 2°59'59.2"	D = 0°15'30.2"
L = 231.53'	L = 595.16'	L = 530.00'	L = 308.43'
T = 115.84'	T = 302.32'	T = 266.71'	T = 154.22'
R = 2,665.20'	R = 1,375.00'	R = 1,910.00'	R = 22,173.76'
	SE = 0.04		
	RO = 80'		

DRW01	
PI Sta 10+87.71	PI Sta 11+55.47
Δ = 87°29'45.3" (RT)	Δ = 76°17'21.5" (LT)
D = 114°35'29.6"	D = 114°35'29.6"
L = 76.35'	L = 66.57'
T = 47.86'	T = 39.27'
R = 50.00'	R = 50.00'
SE = N/A	SE = N/A

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

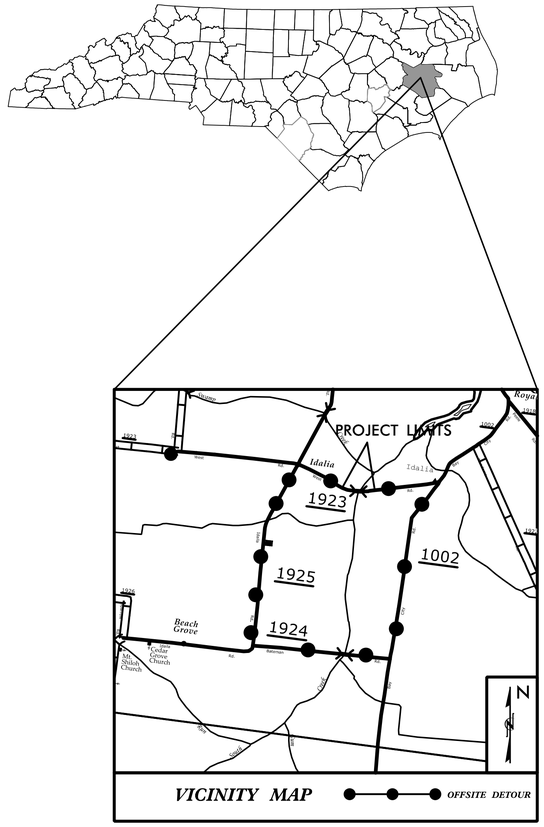
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

$$$$SYSTIME$$$$
$$$$SESSION$$$$
$$$$USERNAME$$$$

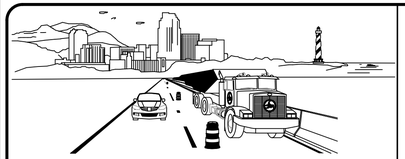
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

BEAUFORT COUNTY



LOCATION: REPLACE BRIDGE NO. 37 OVER SOUTH CREEK ON SR 1923 (WEST RD)



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

PLANS PREPARED BY:	*NCDOT CONTACTS:*
H. SHYU, P.E.	S. J. HAMILTON, P.E., CPM
PROJECT ENGINEER	*DIVISION TRAFFIC ENGINEER*
J. A. PHILLIPS	
PROJECT QC ENGINEER	

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

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, INDEX OF SHEETS AND GENERAL NOTES
TMP-2	OFF SITE DETOUR AND DETAIL

GENERAL NOTES

IMPLEMENT TRAFFIC CONTROL IN ACCORDANCE WITH THE ROADWAY STANDARD DRAWINGS LISTED ON TMP-2

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

STATE FORCES WILL INSTALL AND MAINTAIN THE PROJECT DETOUR AND TYPE III BARRICADES AT THE PROJECT LIMITS. STATE FORCES WILL INSTALL MARKINGS AND MARKERS ON THE FINISHED PROJECT. CONTACT JEFF DUNNING AT 252-830-3493 30 CALENDAR DAYS PRIOR TO CLOSING THE ROAD FOR DETOUR INSTALLATION.

GRADE AND SUPERELEVATION REVISIONS REQUIRE A TOTAL REPLACEMENT OF THE ROADWAY IN AREAS. COORDINATE WITH PROPERTY OWNERS CONCERNING ACCESS TO DRIVES DURING CONSTRUCTION. PROVIDE ACCESS USING INCIDENTAL STONE AND FLAGGERS AS NEEDED.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

APPROVED: DocuSigned by: Helen Shyu 0F15975A95E44EF...

DATE: 7/6/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 042517 ENGINEER HELEN SHYU

SHEET NO.
TMP-1

17BP.2.R.104

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PROJ. REFERENCE NO.	SHEET NO.
17BP.2.R.104	TMP-2

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

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

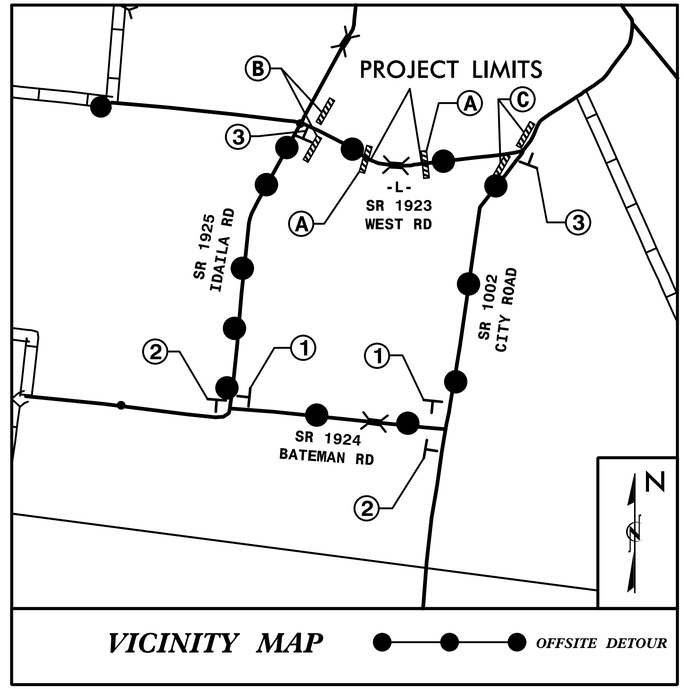
Ⓒ R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10L
48″ x 18″
TYPE III BARRICADE

① DETOUR M4-8 24″ X 12″
M6-1 21″ X 15″

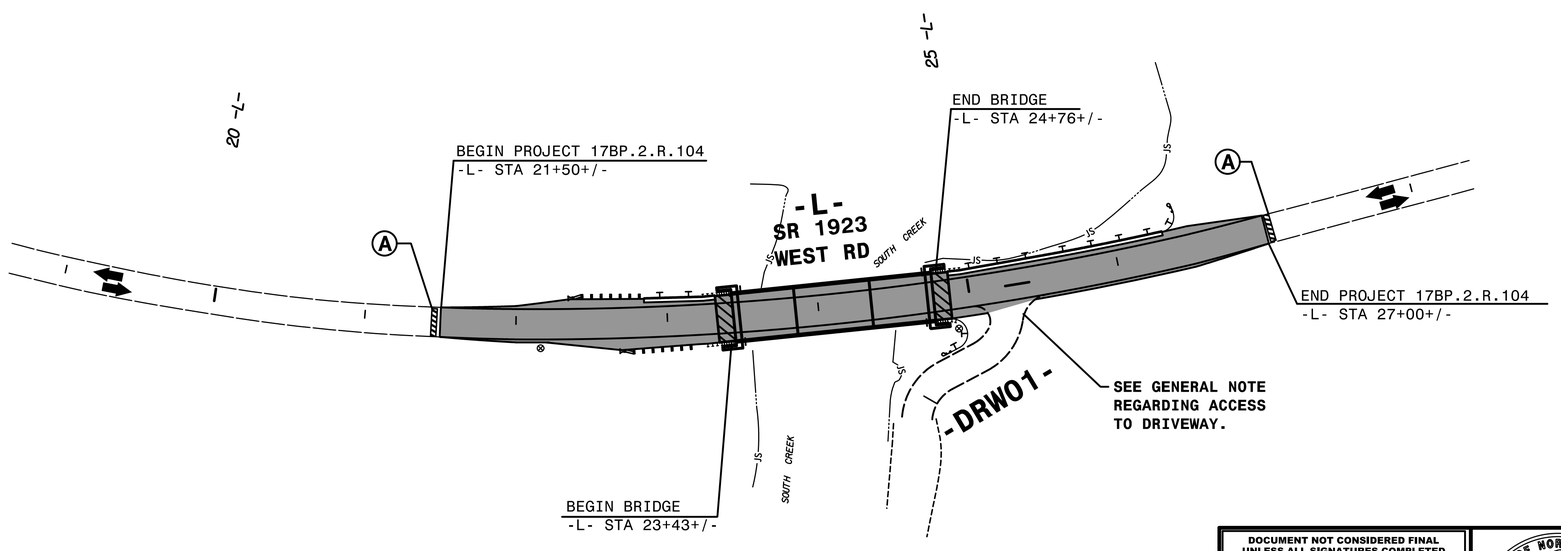
② DETOUR M4-8 24″ X 12″
M6-1 L 21″ X 15″

③ END DETOUR M4-8 A 24″ X 18″

REFER TO RSD 1101.01, 1101.03, (SHEET 1 OF 9) AND 1145.01 FOR ADDITINAL DEVICE REQUIREMENTS INCLUDING:
W20-3 (18 EA)
W20-2 (2 EA)
SP-4 (4 EA)



VICINITY MAP — *OFFSITE DETOUR*



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED Digitally signed by: Helen Shyu
DF15975A05E44EF...
DATE: 7/6/2021

NORTH CAROLINA PROFESSIONAL SEAL 042517 ENGINEER HELEN SHYU SEAL

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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

TRANSPORTATION MANAGEMENT PLAN

OFF SITE DETOUR AND DETAIL

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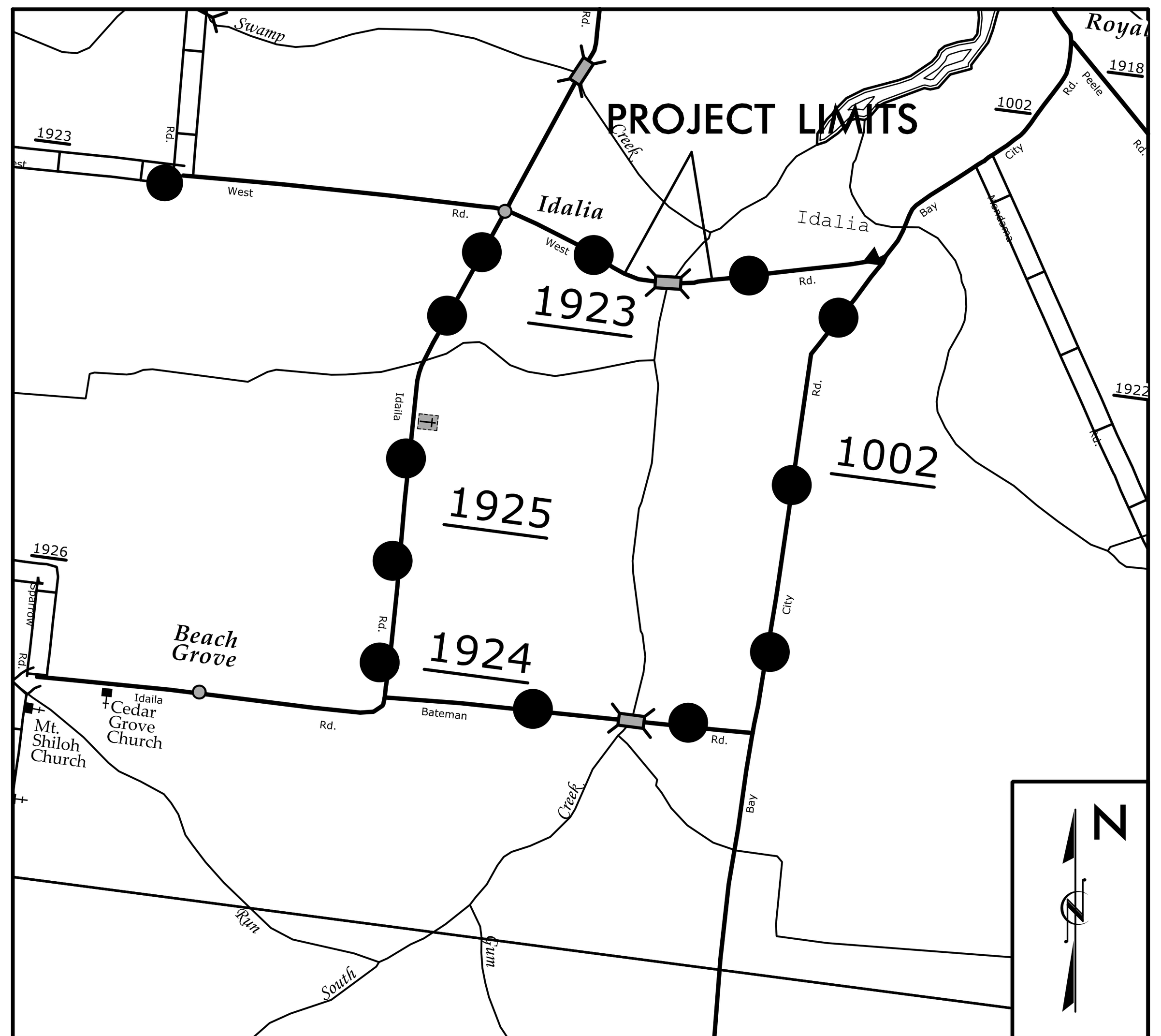
TIP PROJECT: 17BP.2.R.104

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.2.R.104	EC-1	

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



VICINITY MAP — OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

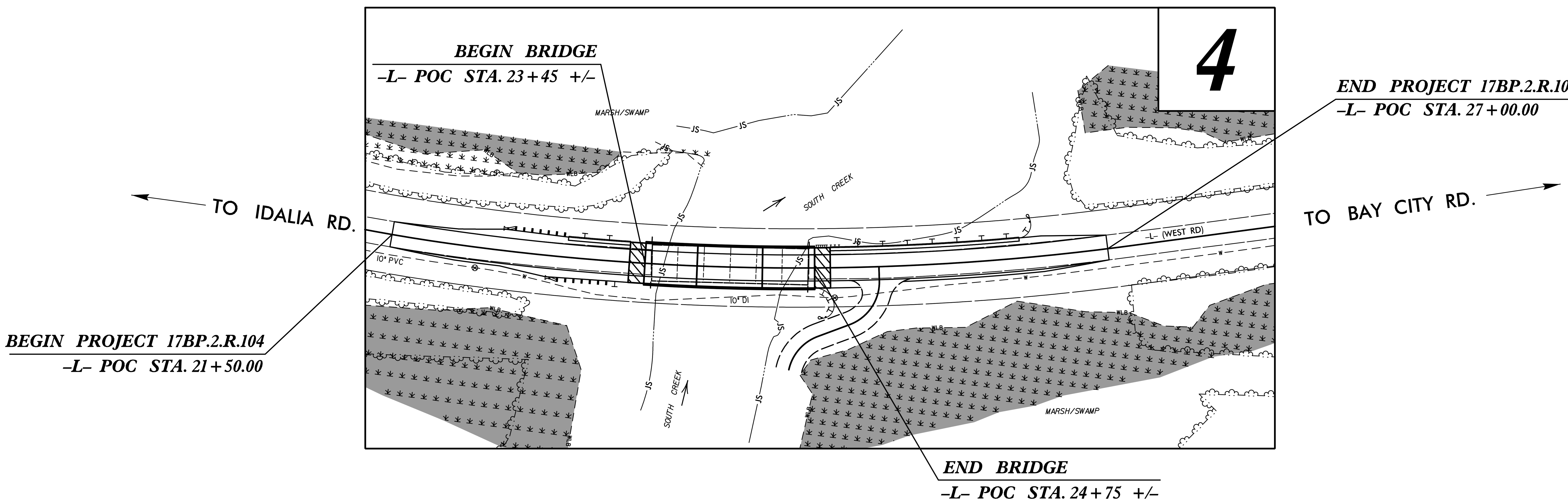
BEAUFORT COUNTY

LOCATION: REPLACE BRIDGE NO. 37 OVER SOUTH CREEK ON SR 1923 (WEST RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

404 WETLANDS

CAMA WETLANDS



NC GRID NAD 83 NA 2011

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle/Coir Fiber Wattle	EW / CFW
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

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, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

HNTB

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

PREPARED IN THE OFFICE OF:

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

FOR NCDOT DIVISION 2

Designed by:

NATALIE CHAN, P.E. — *3444*

NAME — LEVEL III CERTIFICATION NO.

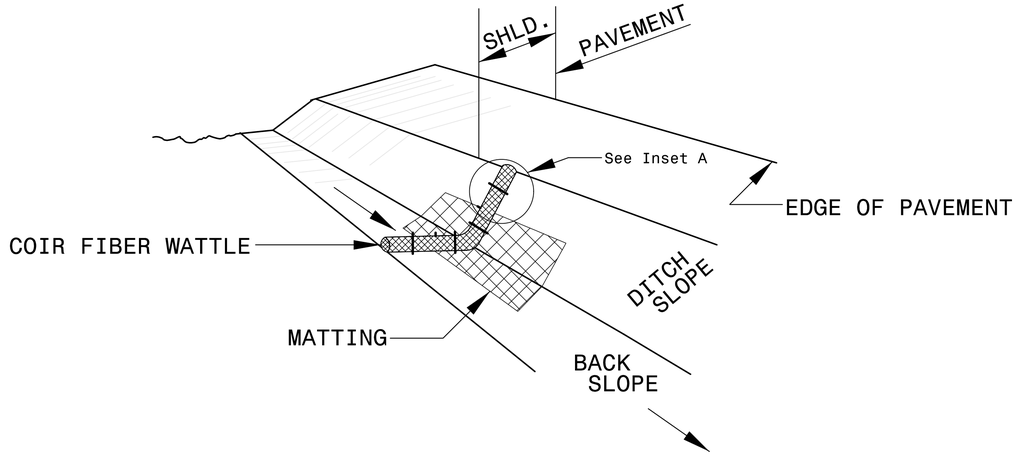
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

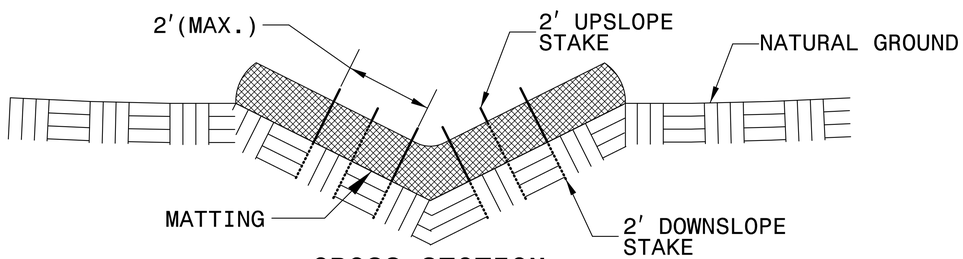
1604.01	Railroad Erosion Control Detail
1605.01	Temporary Silt Fence
1606.01	Special Sediment Control Fence
1607.01	Gravel Construction Entrance
1622.01	Temporary Berms and Slope Drains
1630.01	Riser Basin
1630.02	Silt Basin Type B
1630.03	Temporary Silt Ditch
1630.04	Stilling Basin
1630.05	Temporary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

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.RJ04	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

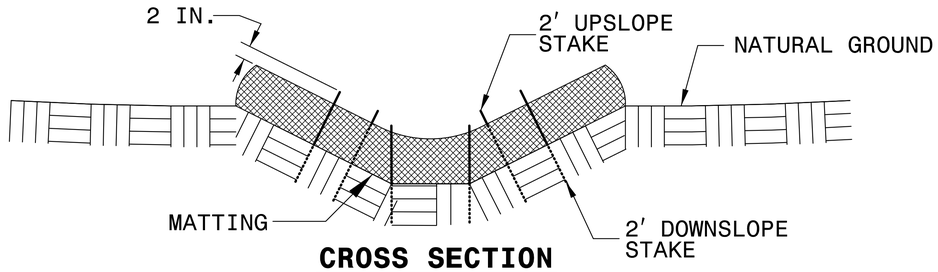
COIR FIBER WATTLE DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

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

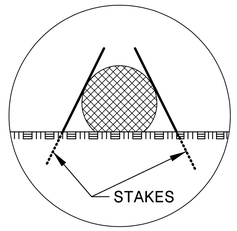
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

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

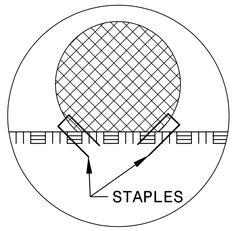
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

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

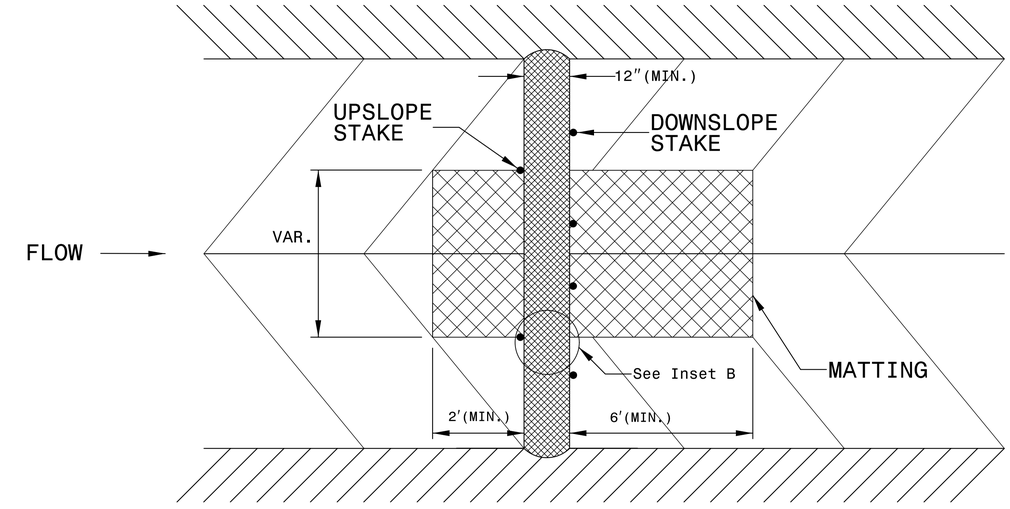
INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.



INSET A



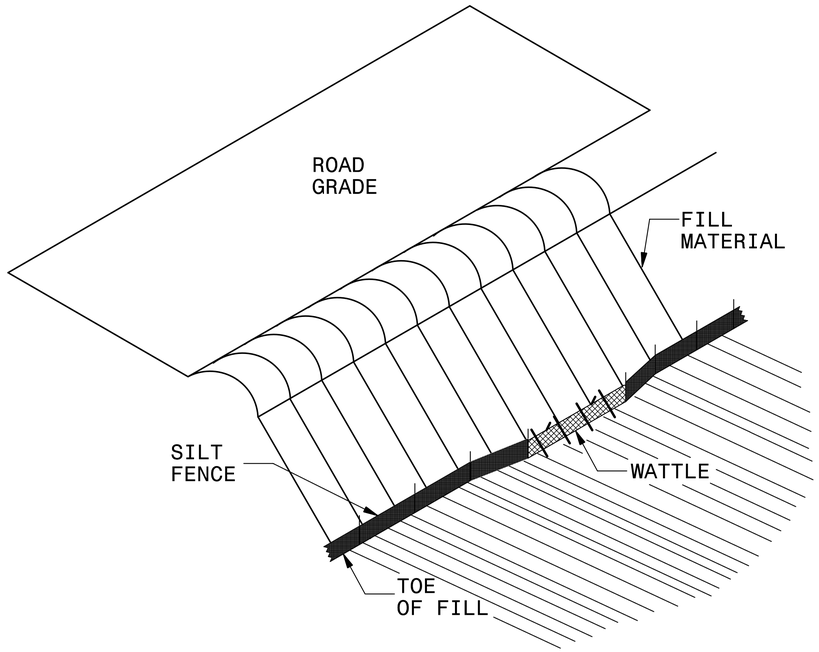
INSET B



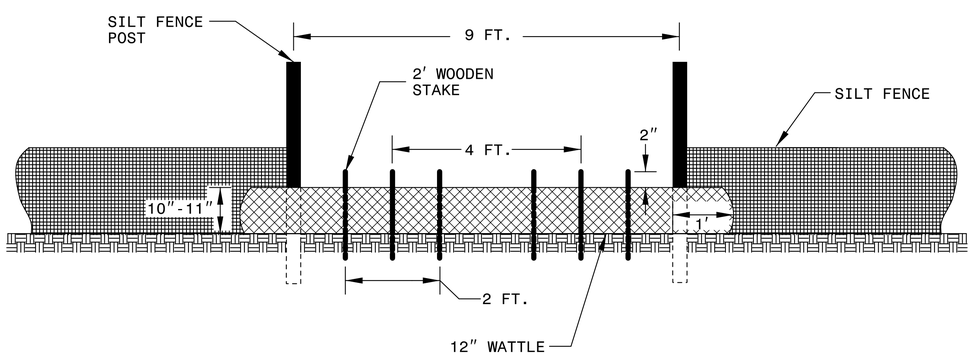
TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
I7BP.2.RJ04	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SILT FENCE COIR FIBER WATTLE BREAK DETAIL



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

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

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

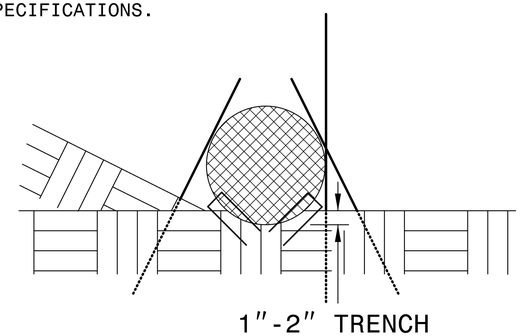
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

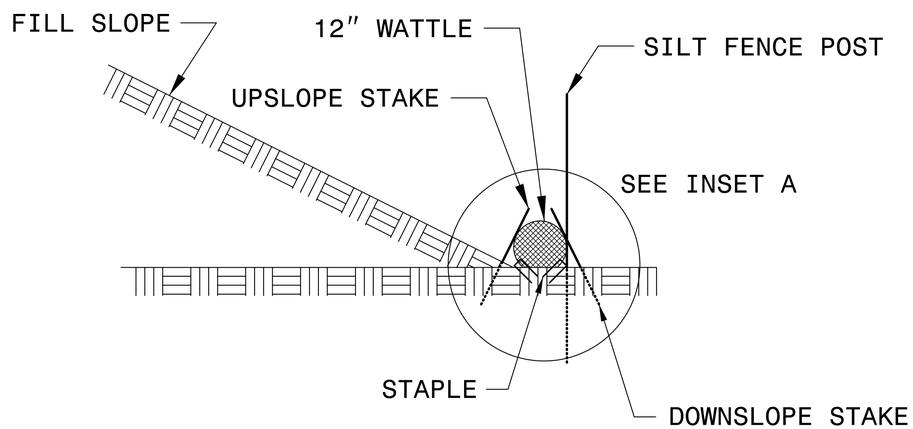
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A

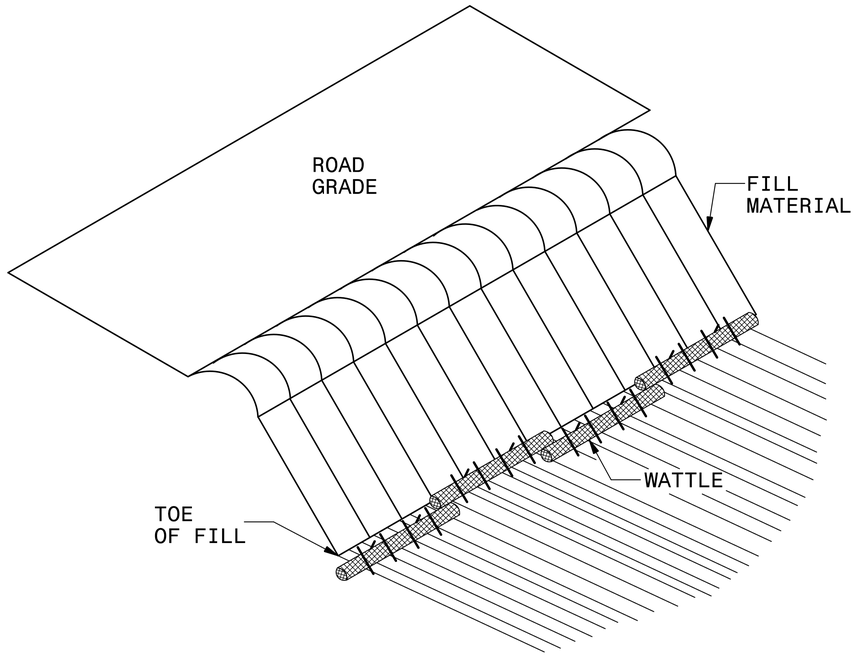




SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.RJ.04	EC-2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLES ON TOE OF SLOPE.

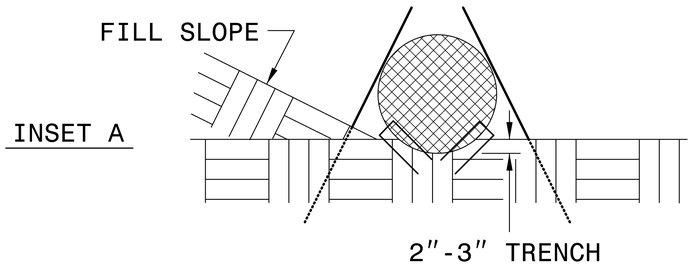
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

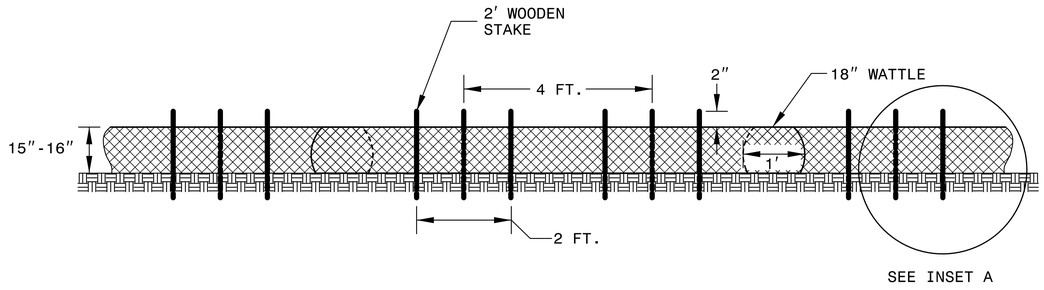
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

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

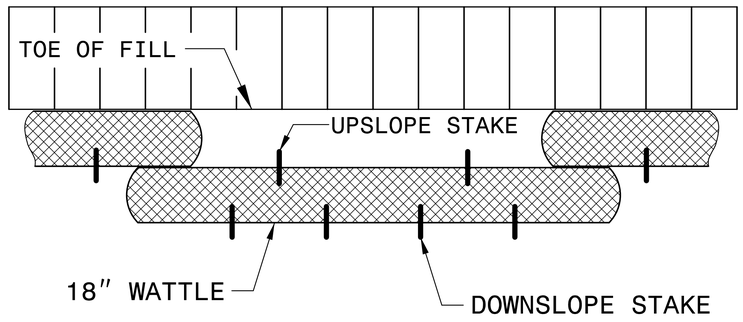
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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





FRONT VIEW



TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.RJ04	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 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

8/17/99

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

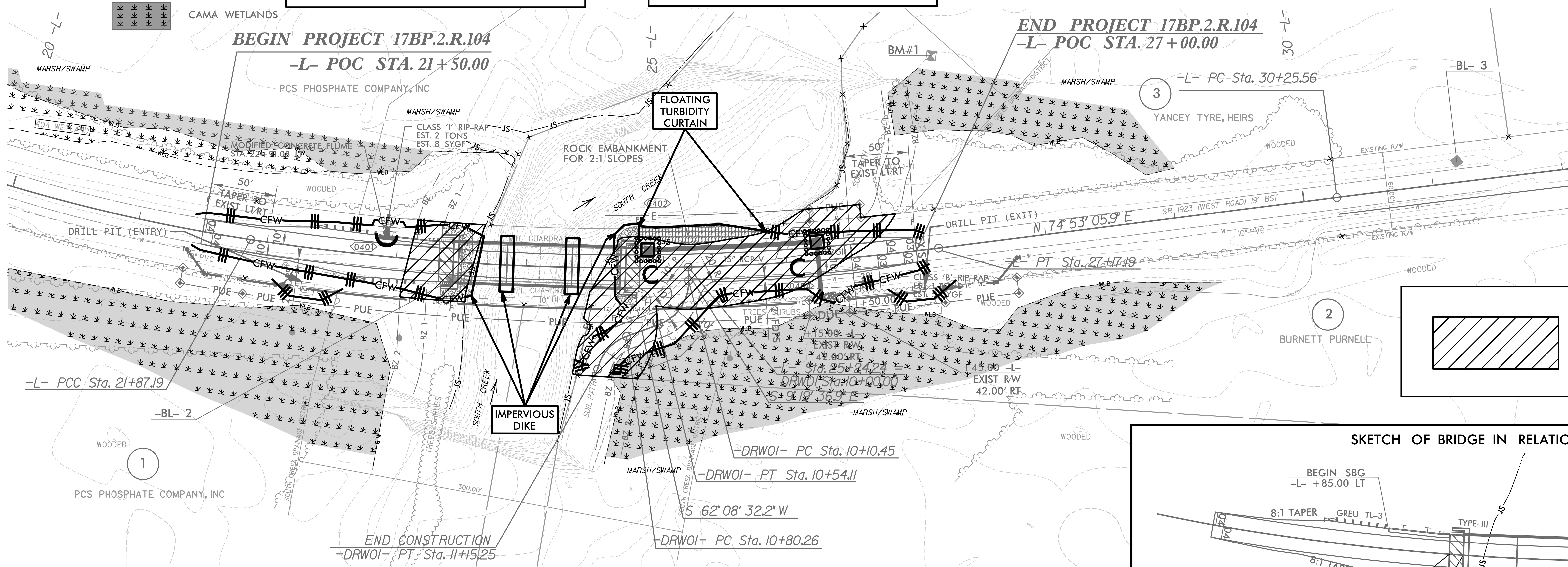
NATALIE CHAN P.E.
EROSION CONTROL
LEVEL III
CERTIFICATION #3444

404 WETLANDS

CAMA WETLANDS

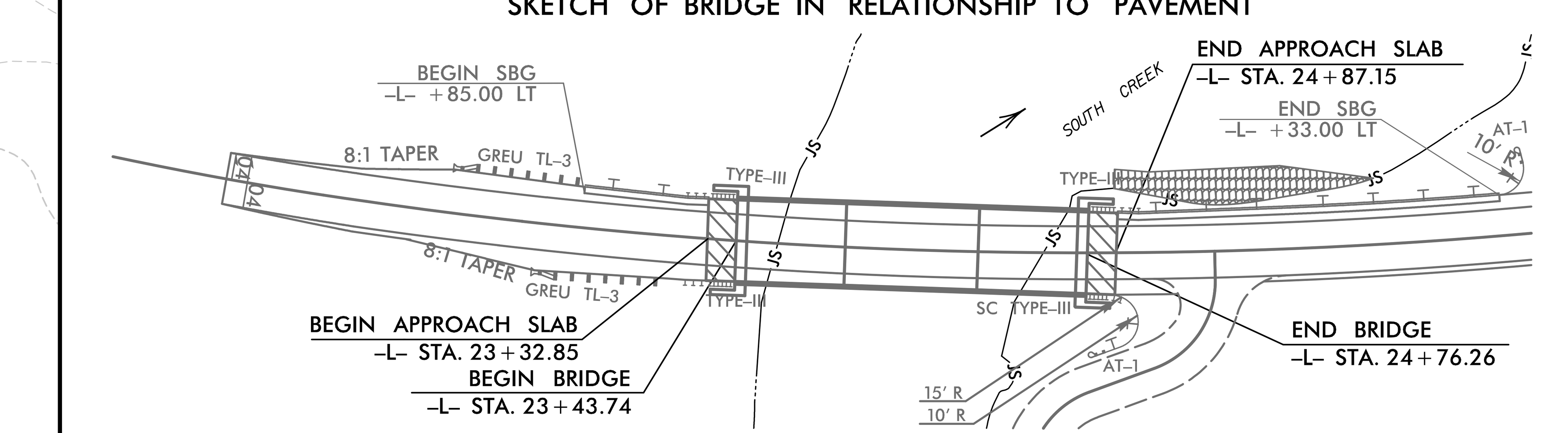
INSTALL SILT FENCE OR COIR FIBER WATTLE BARRIER ALONG END BENTS AFTER INSTALLATION OF INTERIOR BENTS AND IMPERVIOUS DIKES REMOVAL

MATTING WITH NYLON MESH CANNOT BE USED WITHIN 25 FT OF THE TOP OF STREAMBANK OR OPEN WATERS



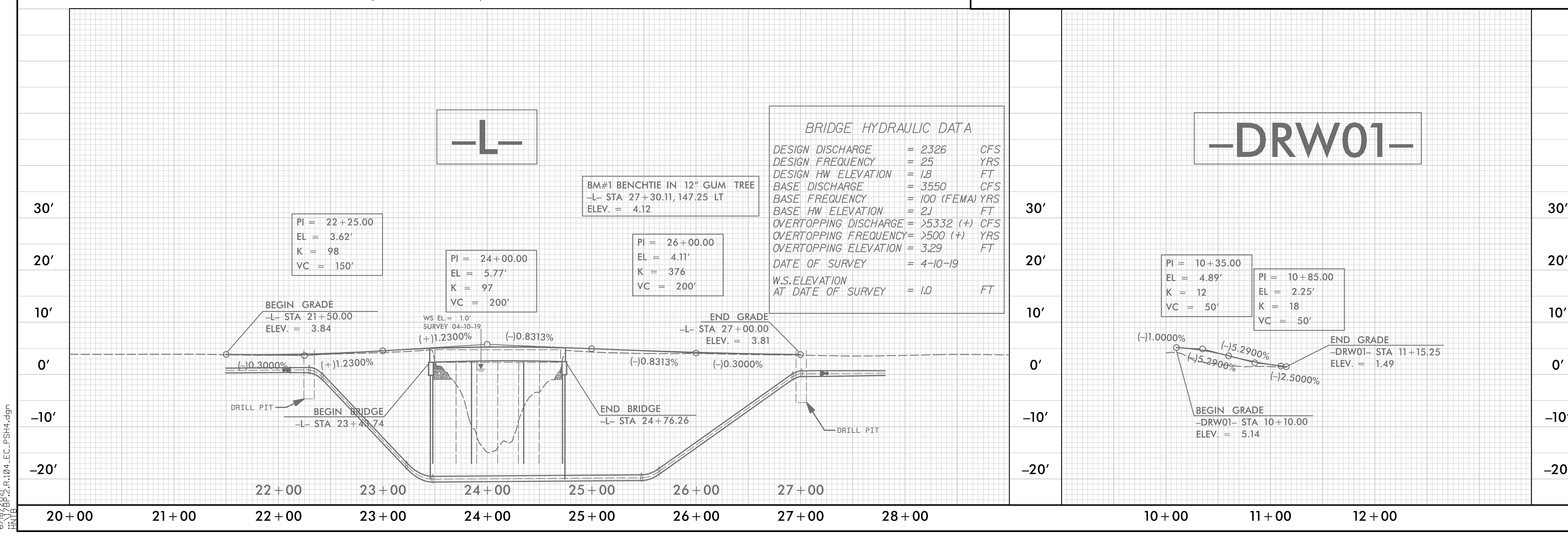
ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

SKETCH OF BRIDGE IN RELATIONSHIP TO PAVEMENT



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

MATERIAL TO BE REMOVED



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2326	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1.8	FT
BASE DISCHARGE	= 3550	CFS
BASE FREQUENCY	= 100 (FEMA)	YRS
BASE HW ELEVATION	= 2.1	FT
OVERTOPPING DISCHARGE	= >5332 (+)	CFS
OVERTOPPING FREQUENCY	= >500 (+)	YRS
OVERTOPPING ELEVATION	= 3.29	FT
DATE OF SURVEY	= 4-10-19	
W.S. ELEVATION AT DATE OF SURVEY	= 1.0	FT

6/18/2021
17BP.2.R.104_EC_PSH4.dgn
HNTB

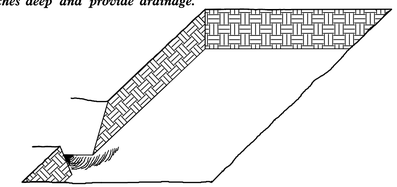
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.2.R.104	RF–1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

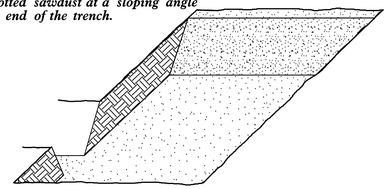
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

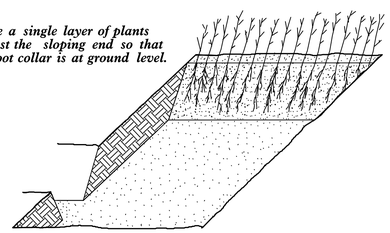
1. Locate a healing–in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



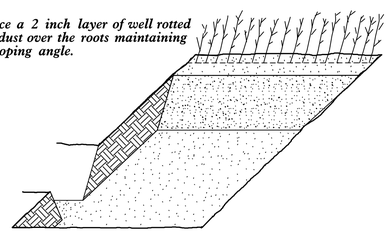
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

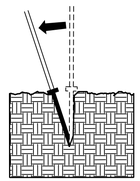


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

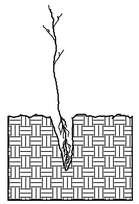


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

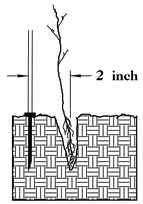
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



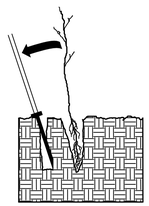
1. Insert planting bar as shown and pull handle toward planter.



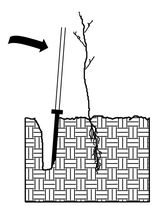
2. Remove planting bar and place seedling at correct depth.



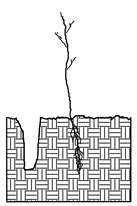
3. Insert planting bar 2 inches toward planter from seedling.



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:

30%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
30%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
40%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

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

09/08/99

TIP PROJECT: 17BP.2.R.104

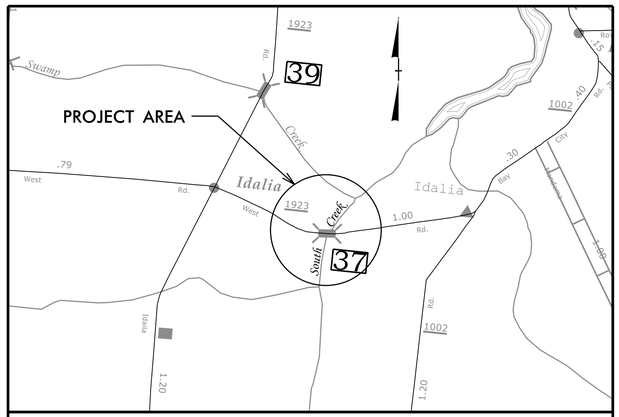
T.I.P. NO.	SHEET NO.
17BP.2.R.104	UC–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

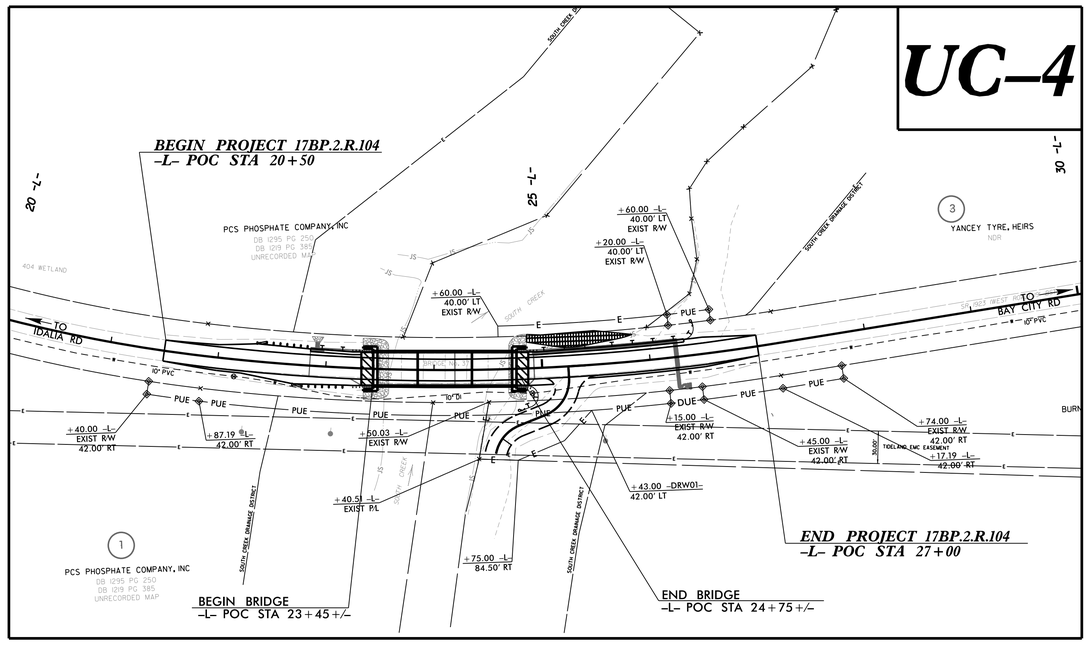
UTILITY CONSTRUCTION PLANS
BEAUFORT COUNTY

LOCATION: BRIDGE NO. 37 OVER SOUTH CREEK ON SR 1923 (WEST ROAD)

TYPE OF WORK: WATER LINE RELOCATION



VICINITY MAP



DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

GRAPHIC SCALES

30 15 0 30 60
PLANS

30 15 0 30 60
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) WATER – BEAUFORT COUNTY WATER DEPT

PREPARED IN THE OFFICE OF
Weston & Sampson
WSE of North Carolina, PC
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: C-4647

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

KEVIN ZDEB, PE — PROJECT ENGINEER
GAIL KOGUT — UTILITY COORDINATION MANAGER
SAM FORSTER — PROJECT DESIGN ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 27611 ENGINEER KEVIN C. ZDEB
Kevin C. Zdeb
7/9/2021

DIVISION OF HIGHWAYS
HIGHWAY DIVISION 2
105 PACTOLUS HIGHWAY (NC 33)
PO BOX 1587
GREENVILLE NC 27835
PHONE (252) 439-2800
FAX (252) 830-3352

MICHAEL AMAN, PE — DIVISION PROJECT DEVELOPMENT ENGINEER
DAVID KRAMER — DIVISION UTILITY ENGINEER

7/9/2021 4:11:58 PM
\\wse03.local\WSE\Projects\NC_CaryOldServer\Engineer\JOBS\0696\026\4000 Beaufort BR-037\Utilities\Engineering\UC\Proj\17BP.2.R.104_ut_UC_01_tsh.dgn

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	UC-2

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

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 — RFH
- Remove Fire Hydrant — REM FH
- Water Meter — PWM
- Relocate Water Meter — RWM
- Remove Water Meter — REM WM
- Water Pump Station — PS(W)
- RPZ Backflow Preventer — PRPZ
- DCV Backflow Preventer — PBFP
- Relocate RPZ Backflow Preventer — RRPZ
- Relocate DCV Backflow Preventer — RBFP

PROPOSED SEWER SYMBOLS

- 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 O/H POW LINES
- Trenchless Installation — 12" TL INSTALL
- Encasement by Open Cut — 24" ENCAS BY OC
- Encasement — 24" ENCASEMENT
- Thrust Block
- Air Release Valve — AR
- Utility Vault — UV
- Concrete Pier — CP
- Steel Pier — SP
- Plan Note — NOTE
- Pay Item Note — PAY ITEM

EXISTING UTILITIES SYMBOLS

- 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 — TR
- Telephone Pedestal — T
- CATV Pedestal — C
- Gas Valve
- Gas Meter
- Located Miscellaneous Utility Object
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.
- *Underground Power Line — P
- *Underground Telephone Cable — T
- *Underground Telephone Conduit — TC
- *Underground Fiber Optics Telephone Cable — T FO
- *Underground TV Cable — TV
- *Underground Fiber Optics TV Cable — TV FO
- *Underground Gas Pipeline — G
- Aboveground Gas Pipeline — A/G Gas
- *Underground Water Line — W
- Aboveground Water Line — A/G Water
- *Underground Gravity Sanitary Sewer Line — SS
- Aboveground Gravity Sanitary Sewer Line — A/G Sanitary Sewer
- *Underground SS Forced Main Line — FSS
- Underground Unknown Utility Line — ?UTL
- SUE Test Hole
- Water Meter
- Water Valve
- Fire Hydrant
- Sanitary Sewer Cleanout

*For Existing Utilities

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

REV: 2/1/2012

8/17/99

3/26/2020
10:44:42 AM
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UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.

2. THE EXISTING WATER LINE UTILITIES BELONG TO BEAUFORT COUNTY.

   CONTACT: ERICK JENNINGS
   PHONE: 252-975-0720

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

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPROTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

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

PROJECT NOTES:

1. PROPOSED OPEN TRENCH WATER LINE SHALL BE 10" DUCTILE IRON PIPE, CLASS 350, WITH GRIP RINGS.

2. PROPOSED WATER LINE FOR DIRECTIONAL DRILLING SHALL BE 200 PSI PRESSURE PIPE D.I.P.S. 12" HDPE SDR-9 WITH MATERIAL DESIGNATION PE 3608 THAT CONFORMS TO NSF-61.

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

4. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, STREAM, CREEK, WETLANDS, OR BUFFER ZONES.

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

PROJECT QUANTITIES

ITEM NUMBER	DESCRIPTION	QUANTITY	
5326000000-E	10" WATER LINE	155	LF
5326200000-E	12" WATER LINE	523	LF
5329000000-E	DUCTILE IRON WATER PIPE FITTINGS	1,000	POUNDS
5552000000-E	10" VALVE	2	EA
5802000000-E	ABANDON 10" UTILITY PIPE	658	LF
5872600000-E	DIRECTIONAL DRILLING OF 12" UTILITY PIPE	483	LF

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	UC-3
DESIGNED BY: SHF	
DRAWN BY: SHF	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27611 KEVIN C. ZOB
Digitally signed by SEAL 27611 KEVIN C. ZOB
7/8/2021

UTILITY CONSTRUCTION PLANS ONLY

Weston & Sampson
WSE of North Carolina, PC
598 East Chatham Street Suite 137
Phone: 919.297.0220
NC License: C-4647
Cary, NC 27511
Fax: 919.297.0221

UTILITY CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	UC-3A

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

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27611 KEVIN C. ZOEB 7/8/2021

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UTILITY CONSTRUCTION

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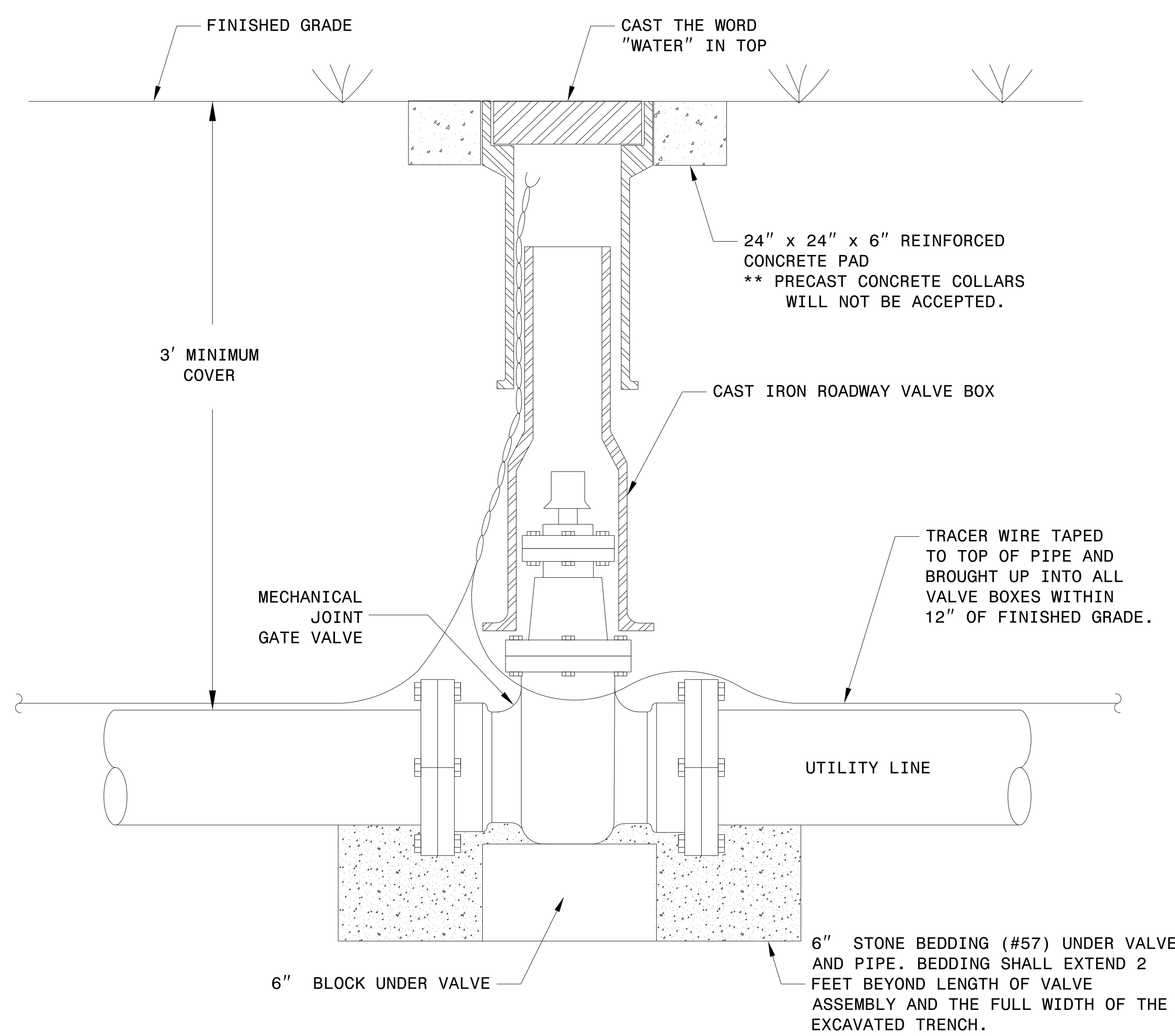
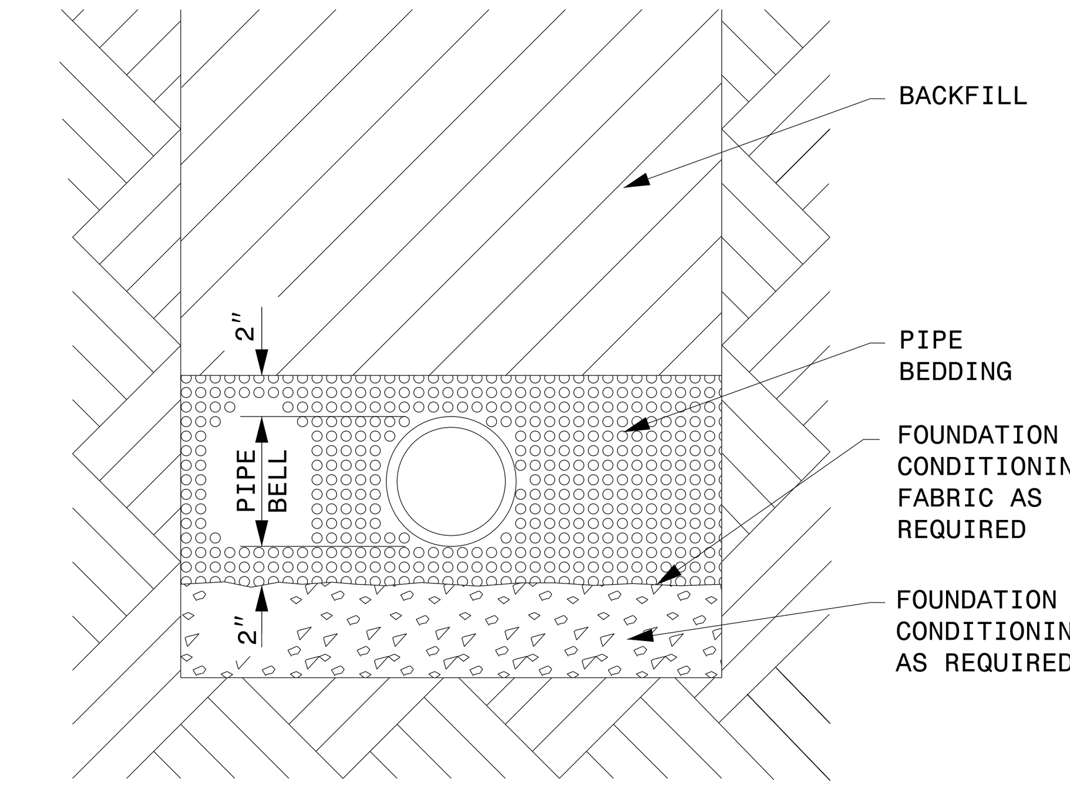
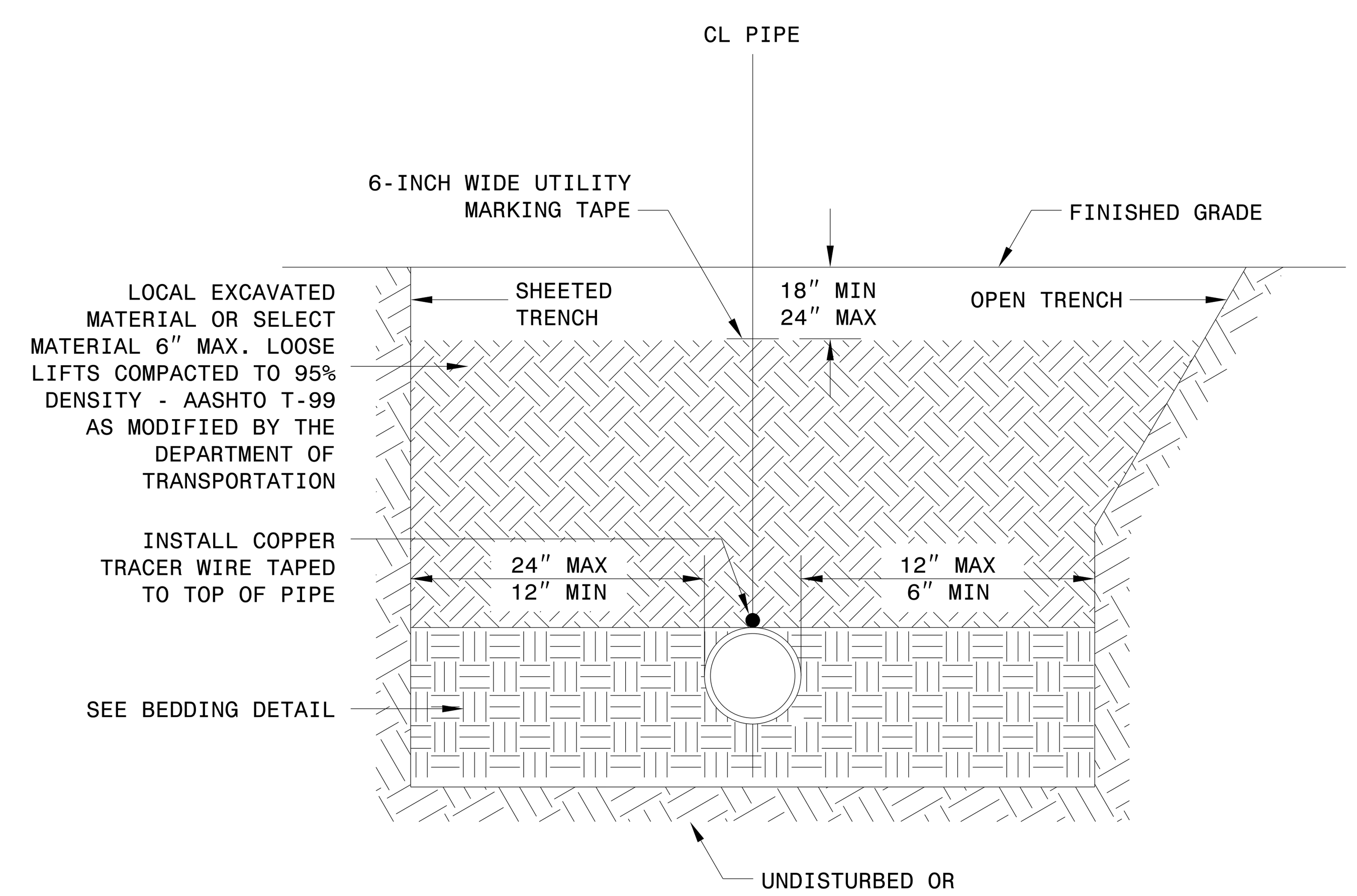


GATE VALVE DETAIL



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

PIPE BEDDING DETAIL



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

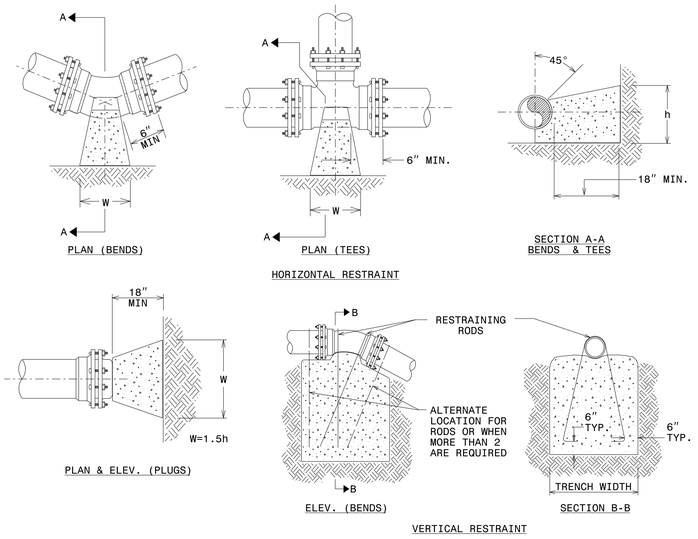
GENERAL TRENCH DETAIL

MAXIMUM OPEN TRENCH WIDTH AT TOP OF PIPE

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

8/17/99

7/8/2021 \\wse03.local\WSE\Projects\NC_CaryOldServer\Engineer\JOBS\0696\026\14000 Beaufort BR-037\Utilities\Engineering\UC\Proj\17BP.2.R.104_ut_UC_03A_dtl.dgn 1:01:24 PM



THRUST RESTRAINT FOR PIPE LINES

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT
(ALL AREAS GIVEN ARE IN SQUARE FEET)

PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF) 1000	2000	3000	4000	5000	6000	7000	8000
4"	11.25°	616	1	1	1	1	1	1	1	1
	22.5°	1226	1	1	1	1	1	1	1	1
	45°	2405	2	1	1	1	1	1	1	1
	90°	4444	4	2	1	1	1	1	1	1
	TEE/PLUG	3143	3	2	1	1	1	1	1	1
6"	11.25°	1385	2	1	1	1	1	1	1	1
	22.5°	2758	3	2	1	1	1	1	1	1
	45°	5409	5	3	2	2	1	1	1	1
	90°	9999	10	5	3	3	2	2	2	1
	TEE/PLUG	7068	7	4	3	2	2	1	1	1
8"	11.25°	2424	3	1	1	1	1	1	1	1
	22.5°	4904	5	3	2	1	1	1	1	1
	45°	9619	10	5	3	2	2	2	2	1
	90°	17773	18	9	6	4	4	3	3	2
	TEE/PLUG	12568	13	6	4	3	3	2	2	2
10"	11.25°	3846	4	2	2	1	1	1	1	1
	22.5°	7661	8	4	3	2	2	2	1	1
	45°	15028	15	8	5	4	3	3	2	2
	90°	27768	28	14	9	7	6	5	4	3
	TEE/PLUG	19635	20	10	7	5	4	3	3	2
12"	11.25°	5543	6	3	2	2	1	1	1	1
	22.5°	11032	11	6	4	3	2	2	2	2
	45°	21641	22	11	7	5	4	4	3	3
	90°	39987	40	20	13	10	8	7	6	5
	TEE/PLUG	28274	28	14	9	7	6	5	4	4
14"	11.25°	7544	8	4	3	2	2	2	1	1
	22.5°	15016	15	8	5	4	3	3	2	2
	45°	29455	29	15	10	7	6	5	4	4
	90°	54426	54	27	18	14	11	9	8	7
	TEE/PLUG	38485	38	19	13	10	8	6	5	5
16"	11.25°	9854	10	5	3	3	2	2	2	2
	22.5°	19612	20	10	7	5	4	3	3	3
	45°	38471	38	17	13	10	8	6	5	5
	90°	71085	71	36	24	18	14	12	10	9
	TEE/PLUG	50265	50	25	17	13	10	8	7	6

*INCLUDES 1.50 SAFETY FACTOR

VERTICAL RESTRAINT
(ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**

PIPE SIZE	RESTRAINING RODS NO. REQ'D	DIA.	DEGREE OF BEND 11.25°	22.5°	45°
4"	2	½"	0.25	0.50	0.75
6"	2	½"	0.50	1.00	1.75
8"	2	⅝"	0.75	1.50	3.00
10"	2	¾"	1.25	2.25	4.50
12"	2	⅞"	1.75	3.25	6.50
14"	4	⅝"	2.25	4.50	8.75
16"	4	¾"	3.00	6.00	11.5

**INCLUDES 1.50 SAFETY FACTOR

NOTES:
1. CONCRETE SHALL BE CLASS "B".
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES.(FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

THRUST RESTRAINT FOR WATER MAINS

RESTRAINED JOINT LENGTH TABLE FOR 10" D.I. PIPE (BARE)

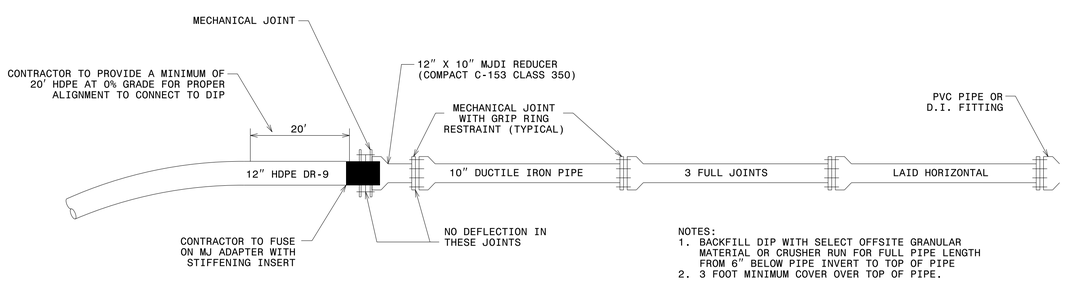
FITTING TYPE	REQUIRED LENGTH (IN FEET) OF RESTRAINT PER DEPTH OF COVER 3 FT	4 FT	5 FT	6 FT	7 FT	8 FT	9 FT	10 FT
11.25° HOR.	4	3	3	3	2	2	2	2
22.5° HOR.	8	7	6	5	5	5	4	4
45° HOR.	17	14	13	11	10	9	9	8
11.25° DOWN	12	10	9	8	7	7	6	6
22.5° DOWN	23	20	18	16	14	13	12	11
45° DOWN	49	42	37	33	30	27	25	23
11.25° UP	X	3	3	3	2	2	2	2
22.5° UP	X	7	6	5	5	5	4	4
45° UP	X	14	13	11	10	9	9	8

DESIGN ASSUMPTIONS:

PIPE LAYING CONDITION = TYPE 4
SOIL DESIGNATION = GC = COHESIVE GRANULAR
DESIGN PRESSURE = 200 PSI
SAFETY FACTOR = 1.5

NOTES:
1. RESTRAINED LENGTH IS MEASURED FROM THE CENTER OF THE BEND AS FOLLOWS:
   A. HORIZONTAL AND VERTICAL BENDS: ALONG EACH SIDE OF BEND.
   B. HORIZONTAL AND VERTICAL BENDS - OFFSET OR COMBINED: ALONG THE OUTER SIDE OF EACH BEND. ALL PIPE BETWEEN THE TWO BENDS SHALL BE RESTRAINED JOINT WHEN THE DISTANCE BETWEEN THEM IS EQUAL TO OR LESS THAN THE REQUIRED RESTRAINED LENGTH SHALL BE ADDED ON TO THE LENGTH ALONG THE OUTSIDE OF EACH BEND RESPECTIVELY TO MAKE UP FOR THE DEFICIENCY IN THAT DIRECTION.
2. WHEN IT IS NOT POSSIBLE TO INSTALL THE RESTRAINED LENGTHS AS NOTED BY THIS TABLE, THE CONTRACTOR SHALL INSTALL THE APPROPRIATE CONCRETE THRUST RESTRAINT AS PER THE DETAILS HEREIN.

RESTRAINED JOINT DESIGN TABLE



NOTES:
1. BACKFILL DIP WITH SELECT OFFSITE GRANULAR MATERIAL OR CRUSHER RUN FOR FULL PIPE LENGTH FROM 6" BELOW PIPE INVERT TO TOP OF PIPE
2. 3 FOOT MINIMUM COVER OVER TOP OF PIPE.

12" HDPE X 10" DIP TRANSITION DETAIL

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	UC-3B
DESIGNED BY: SHF	
DRAWN BY: SHF	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
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NORTH CAROLINA PROFESSIONAL SEAL 27611 ENGINEER KEVIN C. ZAK
Digitally signed by KEVIN C. ZAK
7/8/2021

UTILITY CONSTRUCTION PLANS ONLY

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Cary, NC 27511
Fax: 919.297.0221

UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
17BP.2.R.104	UC-4

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC.
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UTILITY CONSTRUCTION PLANS ONLY

NORTH CAROLINA PROFESSIONAL SEAL 27611 ENGINEER KEVIN C. ZDEB 7/8/2021

Weston & Sampson
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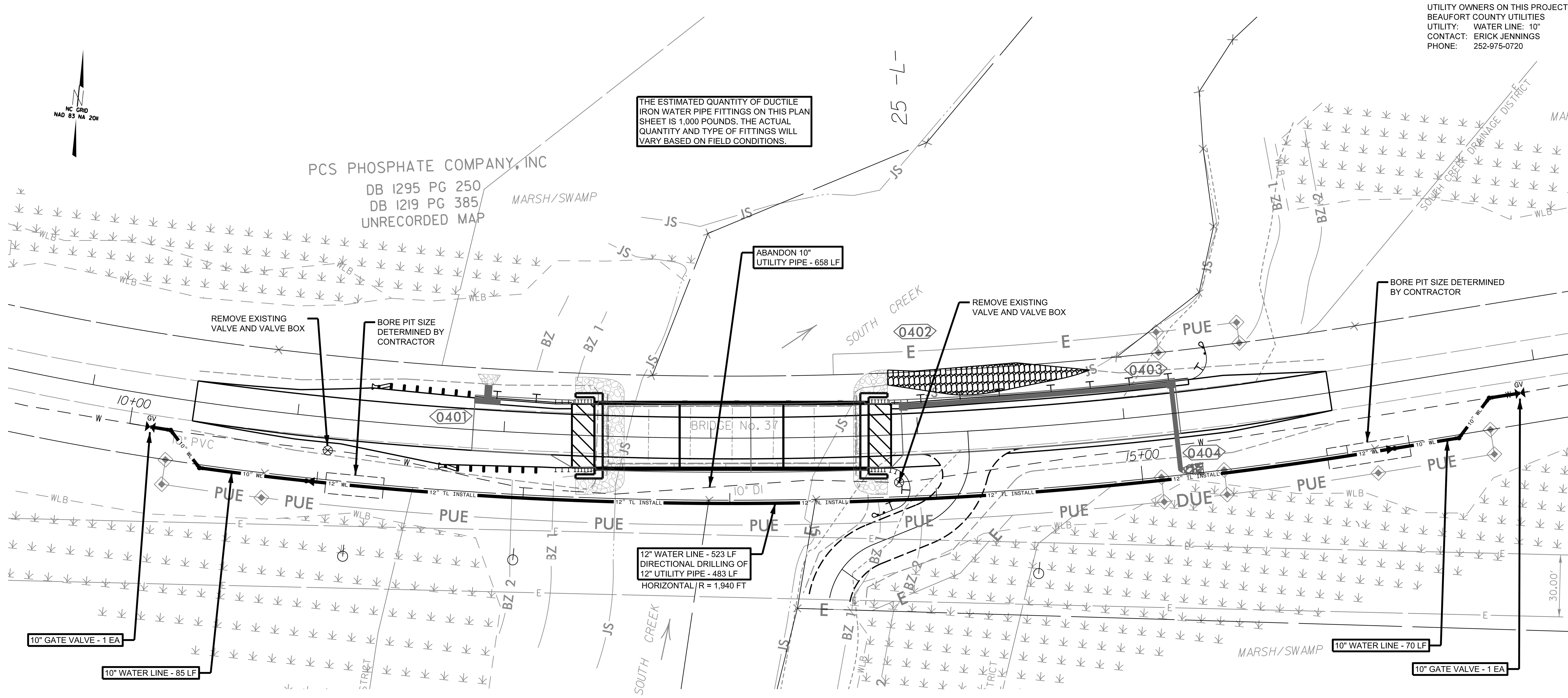
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: C-4647

UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

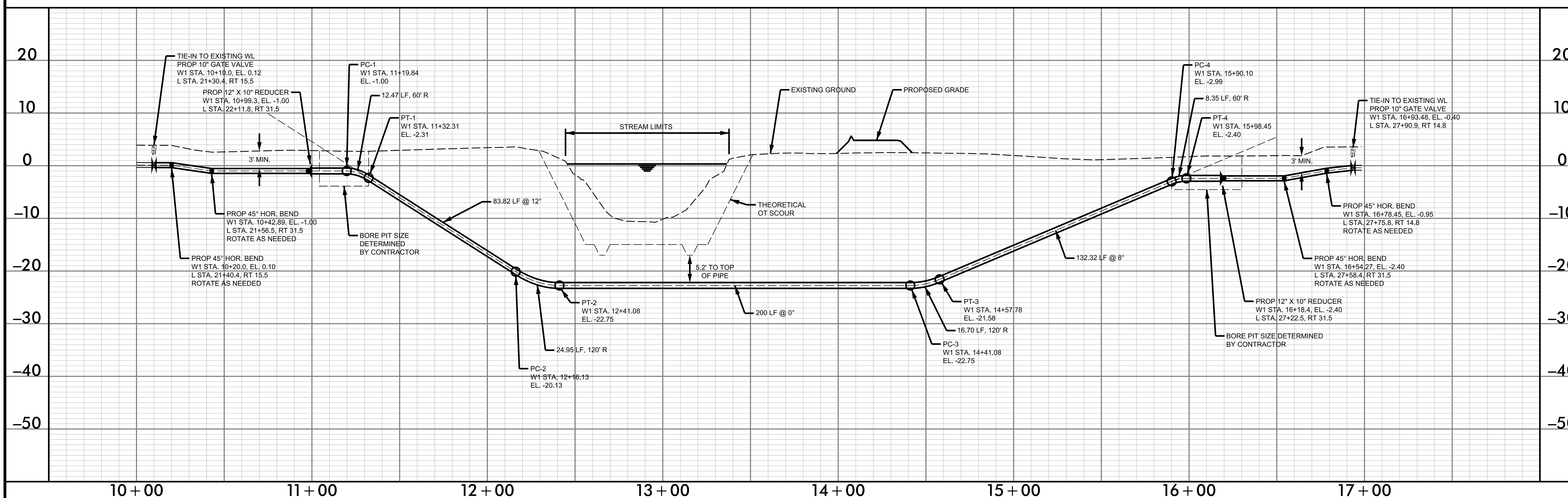
UTILITY OWNERS ON THIS PROJECT:
BEAUFORT COUNTY UTILITIES
UTILITY: WATER LINE: 10"
CONTACT: ERICK JENNINGS
PHONE: 252-975-0720

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,000 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.



PROFILE (HORIZONTAL): 30 15 0 30 60
PROFILE (VERTICAL): 10 5 0 10 20

NOTES:
1. PIPE TO BE INSTALLED WITH 3 FEET MINIMUM COVER TO TOP OF PIPE.
2. BRIDGE SURVEY & HYDRAULIC DESIGN REPORT BY OTHERS STATES THE THEORETICAL 100 YEAR SCOUR BED ELEVATION IS -17 FT.
3. TRENCHLESS INSTALLATION SHALL PROVIDE 5 FEET MINIMUM COVER FROM 100 YEAR SCOUR BED ELEVATION TO TOP OF PIPE OR 10 FEET MINIMUM COVER FROM BOTTOM OF STREAM TO TOP OF PIPE, WHICHEVER IS GREATER.
4. ALL PROPOSED PIPE ELEVATIONS IN PROFILE REFER TO CENTER OF PIPE.
5. WATER LINE SHALL BE INSTALLED A MINIMUM OF 5 FEET INSIDE EXISTING RIGHT OF WAY UNLESS OTHERWISE INDICATED.
6. EXISTING PIPE ELEVATION AT TIE-IN LOCATIONS ARE ESTIMATED BASED ON TEST HOLE REPORT PROVIDED BY OTHERS. CONTRACTOR SHALL VERIFY PIPE LOCATION BEFORE STARTING WORK.
7. HDPE PIPE SHALL BE FIELD BENT WITH A MINIMUM RADIUS = 50 X PIPE OD PER BEAUFORT COUNTY STANDARD PRACTICE OR WITH MANUFACTURERS MINIMUM ALLOWABLE BEND RADIUS, WHICHEVER IS GREATER.
8. PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, THE CONTRACTOR SHALL PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION THAT IS CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED BY THE STATE OF NORTH CAROLINA, AS REQUIRED BY SUBARTICLE 1550-3(B) OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES DATED JANUARY 2018.



6/23/16

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	17BP.2.R.104	X–1

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25 20 15 10 5 0 –5 –10

WLB RW RW CAMA WLB

3.87

21+00.00

WLB RW RW CAMA WLB

3.84

20+50.00

–L–

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

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6/23/16

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	17BP.2.R.104	X–2

22 + 00.00

WLB | RW | RW | CAMA WLB

3:1 | 0.040 | 0.040 | 3:1

3.68

21 + 50.00

WLB | RW | RW | CAMA WLB

3.01:1 | 0.039 | 0.036 | 3:1

3.77

BEGIN GRADE –L– STA. 21 + 50.00

–L–

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MNB

6/23/16

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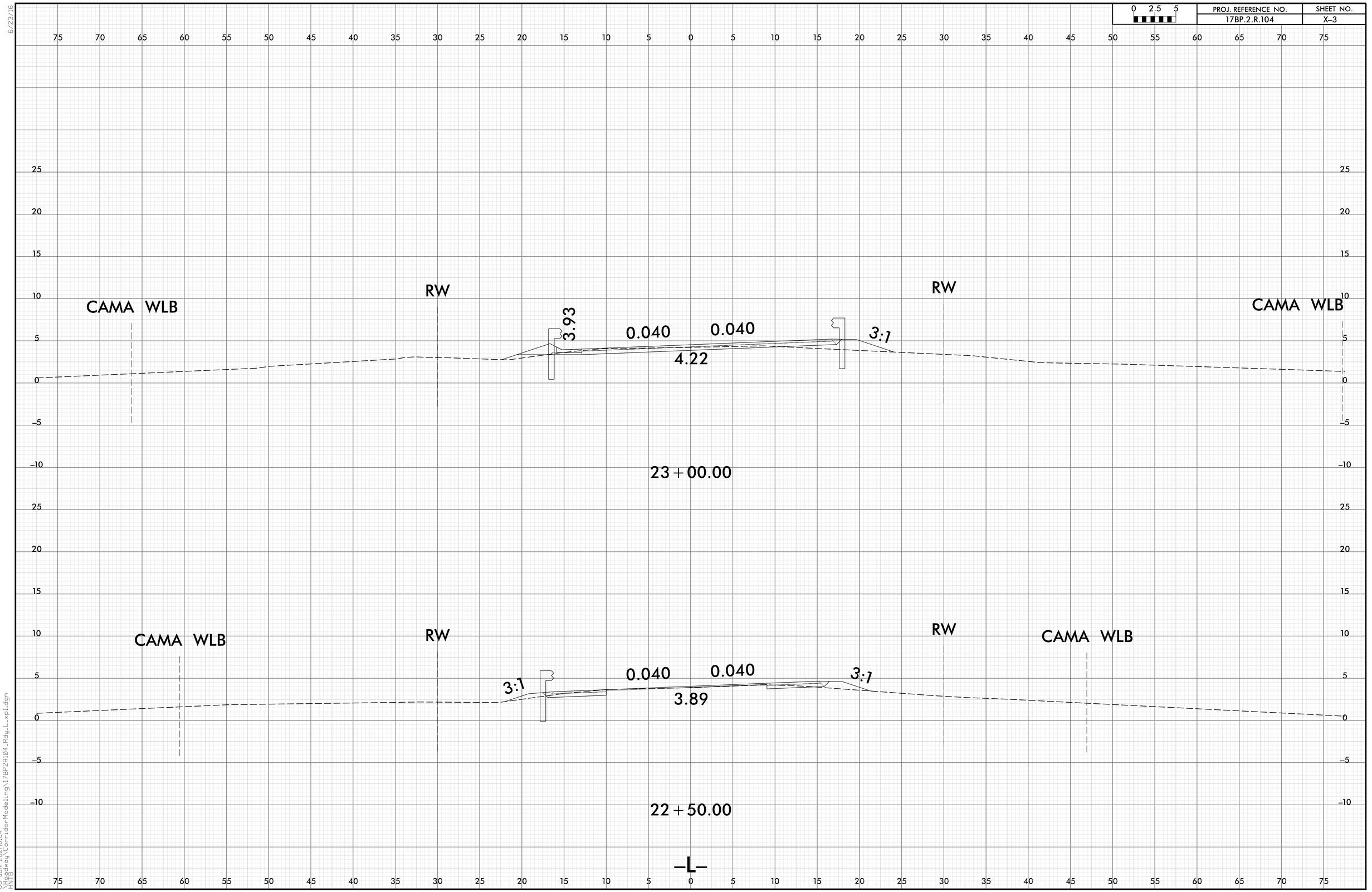

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NNB

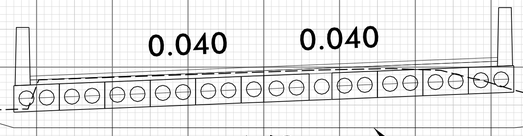
RW

RW

–11.79

24+00.00

RW



4.68

EXCAVATE TO EL = 1.0'

BEGIN BRIDGE –L– STA. 23+43.74

23+50.00

–L–

6/23/16

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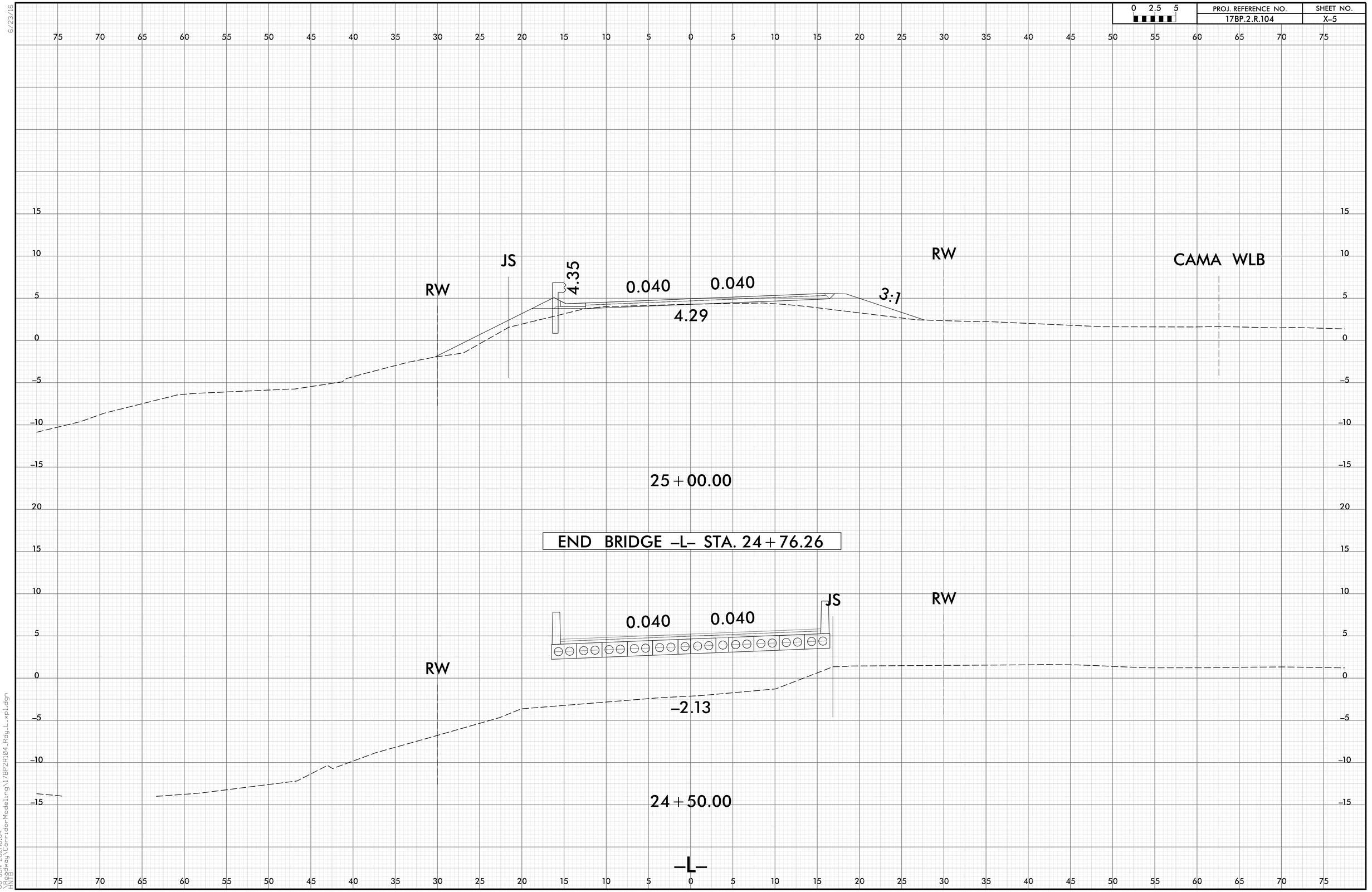
	17BP.2.R.104	X–5



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HNB

6/23/16

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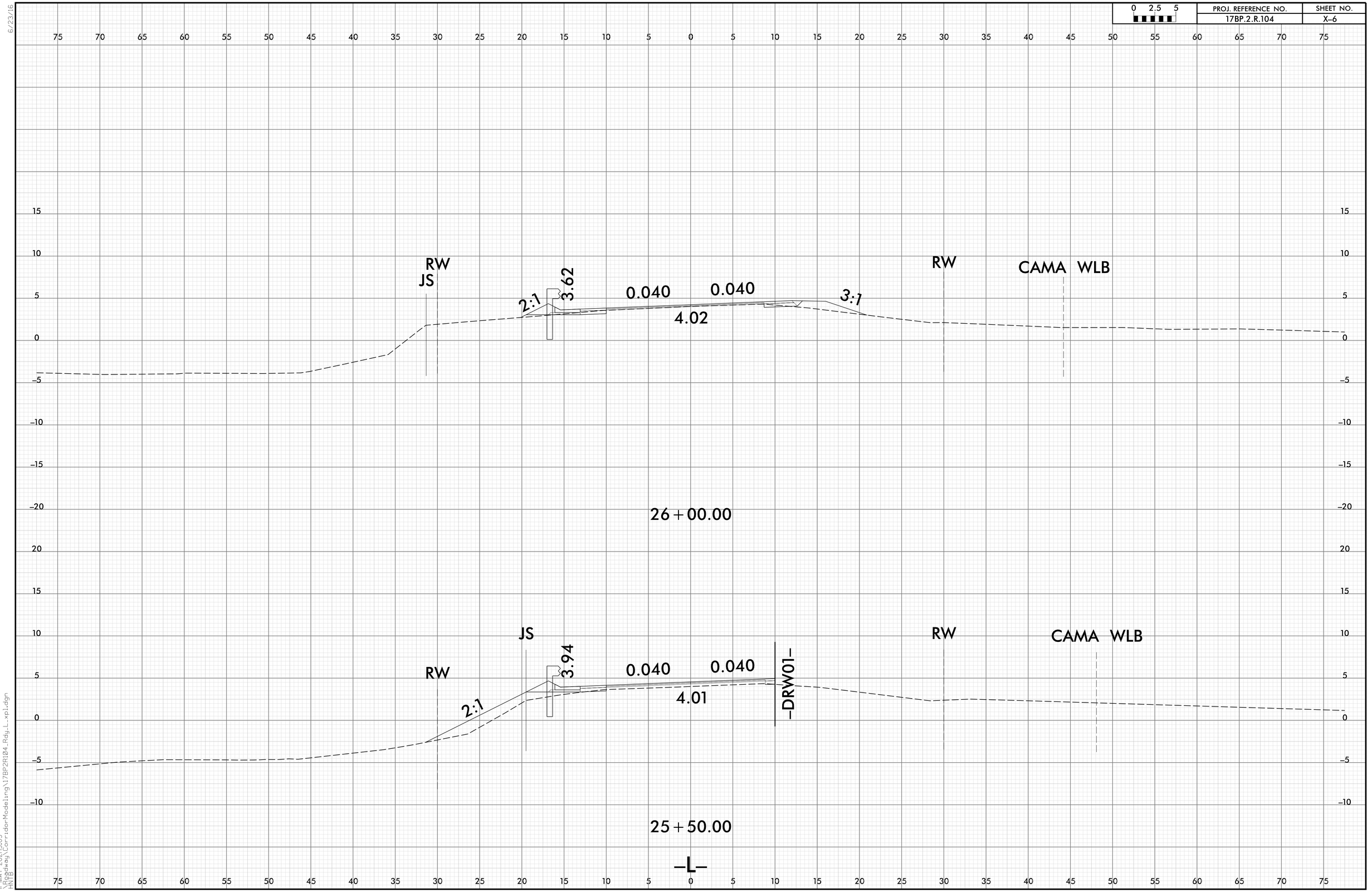
	17BP.2.R.104	X-6



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NNB

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.2.R.104	X–7

END GRADE –L– STA. 27+00.00

RW

0.029

0.015

3:1

3.71

RW

CAMA WLB

27+00.00

JS

RW

3:1

0.040

0.040

3:1

3.82

RW

CAMA WLB

26+50.00

–L–

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6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.2.R.104	X–8

RW

RW

CAMA WLB

3.53

27+50.00

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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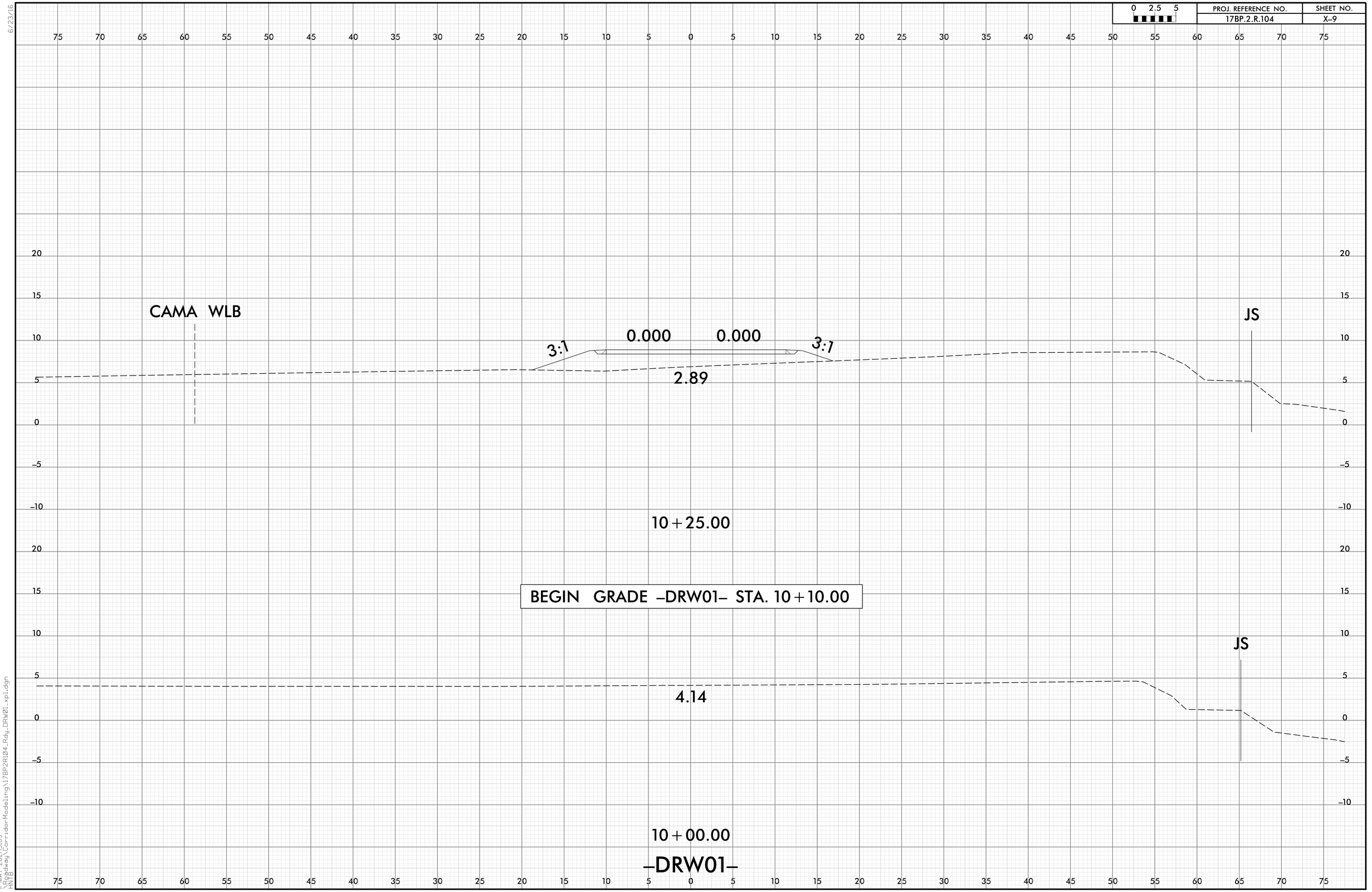

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.2.R.104	X–10

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20 15 10 5 0 –5 –10 –15 20 15 10 5 0 –5 –10

CAMA WLB

3:1 0.000 0.000 3:1

1.48

JS

10+75.00

CAMA WLB

3:1 0.000 0.000 3:1

1.95

JS

10+50.00

–DRW01–

11-MAY-2021|3:05
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NNB

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.2.R.104	X–11

END GRADE –DRW01– STA. 11+15.25

CAMA WLB

JS

3:1

0.000

0.000

3:1

1.48

11+00.00

–DRW01–

11-MAY-2021|3:05
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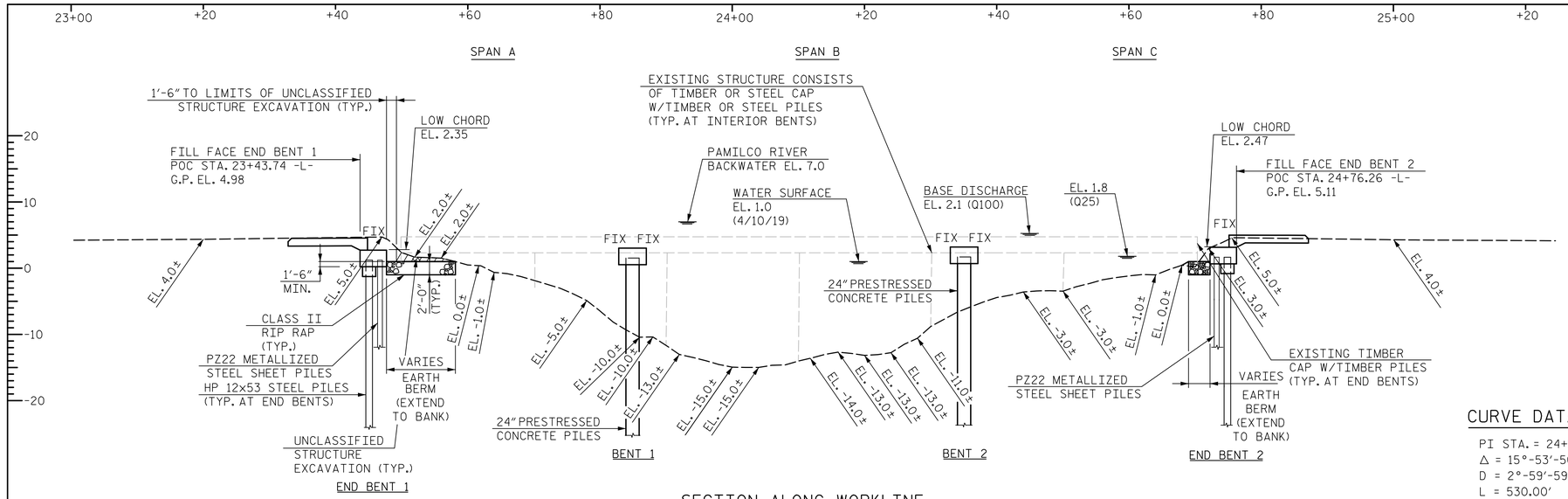


SECTION ALONG WORKLINE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2,326 CFS
FREQUENCY OF DESIGN FLOOD	=	25 YR
DESIGN HIGH WATER ELEVATION	=	1.8 FT.
DRAINAGE AREA	=	24.5 SQ. MI.
BASE DISCHARGE (Q100 FEMA)	=	3,550 CFS
BASE HIGH WATER ELEVATION	=	2.1 FT.

CURVE DATA -L-

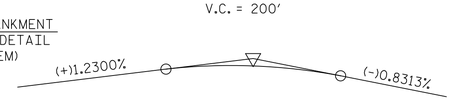
PI STA. = 24+53.91
Δ = 15°-53'-56" (LT.)
D = 2°-59'-59"
L = 530.00'
T = 266.71'
R = 1,910.00'

OVERTOPPING FLOOD DATA

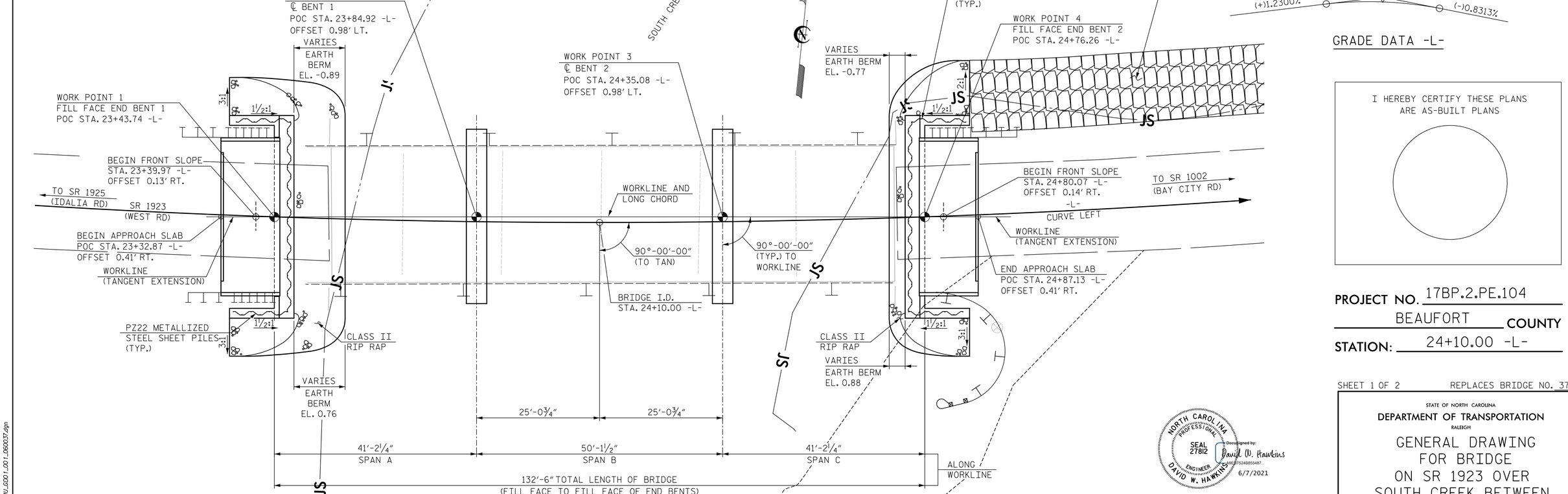
OVERTOPPING DISCHARGE	=	>5,332(+) CFS
FREQUENCY OF OVERTOPPING FLOOD	=	>500(+) YR
OVERTOPPING FLOOD ELEVATION	=	3.29 FT.

NOTE: ROADWAY OVERTOPS AT STA. 16+50.00 -L-

PI STA. = 24+00.00
ELEV = 5.77
V.C. = 200'



GRADE DATA -L-



PLAN

PILES NOT SHOWN FOR CLARITY.

WORKLINE FOR BRIDGE SHALL BE THE ROADWAY LONG CHORD BETWEEN FILL FACE WORK POINTS AND ITS EXTENSION.

I HEREBY CERTIFY THESE PLANS ARE AS-BUILT PLANS

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 37

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Docusigned by: David W. Hawkins 6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON SR 1923 OVER SOUTH CREEK BETWEEN SR 1925 AND SR 1902

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

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

6/7/2021
9:14:03 AM
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TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 24+10.00 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 24+10.00 -L-	CLASS AA CONCRETE	BRIDGE APPROACH SLABS AT STATION 24+10.00 -L-	EPOXY COATED REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR 24" PRESTRESSED CONC. PILES	HP 12x53 STEEL PILES		24" PRESTRESSED CONC. PILES		PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0"x1'-9" PRESTRESSED CONCRETE CORED SLABS		METALLIZED STEEL SHEET PILES
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	EACH	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	SQ. FT.
SUPERSTRUCTURE	LUMP SUM	———	———	———	———	———	———	———	———	—	—	—	———	———	260.75	———	———	———	LUMP SUM	33	1,430	———
END BENT 1	———	———	———	LUMP SUM	18.2	———	2,570	7	———	7	490	—	———	4	———	132	150	———	—	———	1296
BENT 1	———	———	———	———	12.7	———	2,415	———	7	—	———	7	665	4	———	———	———	———	—	———	———
BENT 2	———	———	———	———	12.7	———	2,415	———	7	—	———	7	665	4	———	———	———	———	—	———	———
END BENT 2	———	———	———	LUMP SUM	18.2	———	2,570	7	———	7	490	—	———	4	———	71	80	———	—	———	1303
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	61.8	LUMP SUM	9,970	14	14	14	980	14	1,330	16	260.75	203	230	LUMP SUM	33	1,430	2599

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

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

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.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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 24+10.00 -L-.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20.75 FT. ON EACH SIDE OF CENTERLINE BRIDGE AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THE EXISTING SIX SPAN STRUCTURE WITH SPAN LENGTHS OF 1 SPAN @ 20'-3", 4 SPANS @ 20'-0", AND 1 SPAN @ 20'-2" WITH A 27'-9" CLEAR ROADWAY WITH STEEL PLANK FLOOR W/ASPHALT WEARING SURFACE ON 12 LINES OF W21 X 55 CONTINUOUS I-BEAMS WITH A 28.02' OUT TO OUT DECK WIDTH ON TIMBER CAPS AND PILES AND STEEL CAPS AND PILES SHALL BE REMOVED. IN ADDITION, ANY PILES REMAINING FROM PREVIOUS BRIDGE CONSTRUCTION OR MAINTENANCE OPERATIONS SHALL BE REMOVED AND INCLUDED IN THE LUMP SUM PAY ITEM FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 24+10.00 -L-"

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

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

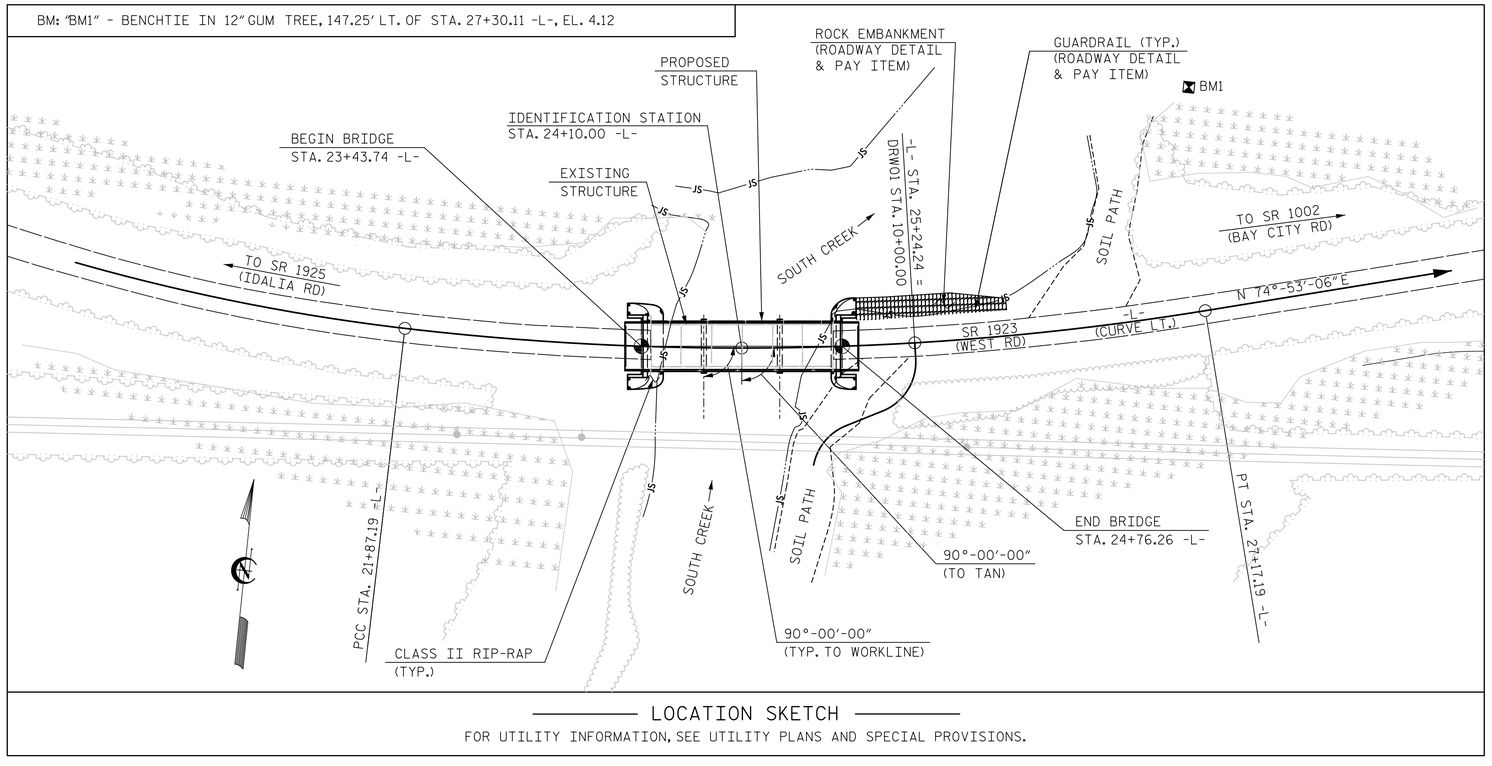
ALL BAR SUPPORTS USED IN THE BARRIER RAIL, BENT CAPS, END BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

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

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



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.

PILES AT BENT NO. 1 AND BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 AND BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

INSTALL PILES AT BENT NO. 1 AND BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN -51.0 FT.

THE SCOUR CRITICAL ELEVATIONS FOR BENT NO. 1 AND BENT NO. 2 ARE ELEVATION -19.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

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

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL. IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

INSTALL PZ22 OR EQUIVALENT STEEL SHEET PILING INTEGRATED INTO CAPS AT END BENT NO. 1 AND END BENT NO. 2. SHEET PILINGS SHALL BE METALLIZED WITH 100% ALUMINUM AND SEALED. INSTALL SHEET PILINGS AT END BENT NO. 1 AND END BENT NO. 2 TO TIP ELEVATION NO HIGHER THAN -19.0 FT.

PROJECT NO. 17BP.2.PE.104

BEAUFORT **COUNTY**

STATION: 24+10.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON SR 1923 OVER SOUTH CREEK BETWEEN SR 1925 AND SR 1002

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 6/7/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 2

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

6/7/2021
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LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE							COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.319	--	1.75	0.278	1.76	40′	EL	19.5	0.549	1.32	40′	EL	1.95	0.80	0.278	1.55	40′	EL	19.5	
		HL-93(Opr)	N/A	--	1.709	--	1.35	0.278	2.28	40′	EL	19.5	0.549	1.71	40′	EL	1.95	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.540	55.449	1.75	0.278	2.21	40′	EL	19.5	0.549	1.54	40′	EL	1.95	0.80	0.278	1.94	40′	EL	19.5	
		HS-20(Opr)	36.000	--	1.997	71.878	1.35	0.278	2.86	40′	EL	19.5	0.549	2	40′	EL	1.95	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.606	48.687	1.4	0.278	5.1	40′	EL	19.5	0.549	4.13	40′	EL	1.95	0.80	0.278	3.61	40′	EL	19.5	
		SNGARBS2	20.000	--	2.964	59.289	1.4	0.278	4.19	40′	EL	15.6	0.549	3.07	40′	EL	1.95	0.80	0.278	2.96	40′	EL	19.5	
		SNAGRIS2	22.000	--	2.906	63.929	1.4	0.278	4.09	40′	EL	15.6	0.549	2.91	40′	EL	1.95	0.80	0.278	2.92	40′	EL	15.6	
		SNCOTTS3	27.250	--	1.803	49.125	1.4	0.278	2.55	40′	EL	19.5	0.549	2.07	40′	EL	1.95	0.80	0.278	1.80	40′	EL	19.5	
		SNAGGRS4	34.925	--	1.623	56.667	1.4	0.278	2.29	40′	EL	19.5	0.549	1.82	40′	EL	1.95	0.80	0.278	1.62	40′	EL	19.5	
		SNS5A	35.550	--	1.578	56.107	1.4	0.278	2.23	40′	EL	19.5	0.549	1.9	40′	EL	1.95	0.80	0.278	1.58	40′	EL	19.5	
		SNS6A	39.950	--	1.502	59.992	1.4	0.278	2.12	40′	EL	19.5	0.549	1.77	40′	EL	1.95	0.80	0.278	1.50	40′	EL	19.5	
		SNS7B	42.000	3	1.432	60.149	1.4	0.278	2.02	40′	EL	19.5	0.549	1.81	40′	EL	1.95	0.80	0.278	1.43	40′	EL	19.5	
	TTST	TNAGRIT3	33.000	--	1.848	60.976	1.4	0.278	2.61	40′	EL	19.5	0.549	2.08	40′	EL	1.95	0.80	0.278	1.85	40′	EL	19.5	
		TNT4A	33.075	--	1.872	61.901	1.4	0.278	2.65	40′	EL	19.5	0.549	1.98	40′	EL	1.95	0.80	0.278	1.87	40′	EL	19.5	
		TNT6A	41.600	--	1.587	66.032	1.4	0.278	2.24	40′	EL	19.5	0.549	1.94	40′	EL	1.95	0.80	0.278	1.59	40′	EL	19.5	
		TNT7A	42.000	--	1.627	68.354	1.4	0.278	2.3	40′	EL	19.5	0.549	1.79	40′	EL	1.95	0.80	0.278	1.63	40′	EL	19.5	
		TNT7B	42.000	--	1.664	69.888	1.4	0.278	2.35	40′	EL	19.5	0.549	1.72	40′	EL	1.95	0.80	0.278	1.66	40′	EL	19.5	
		TNAGRIT4	43.000	--	1.619	69.61	1.4	0.278	2.28	40′	EL	15.6	0.549	1.65	40′	EL	1.95	0.80	0.278	1.62	40′	EL	19.5	
		TNAGT5A	45.000	--	1.498	67.412	1.4	0.278	2.12	40′	EL	19.5	0.549	1.71	40′	EL	1.95	0.80	0.278	1.50	40′	EL	19.5	
		TNAGT5B	45.000	--	1.455	65.486	1.4	0.278	2.06	40′	EL	19.5	0.549	1.56	40′	EL	1.95	0.80	0.278	1.46	40′	EL	19.5	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

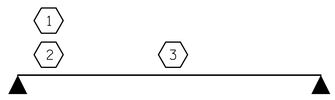
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPANS 'A' AND 'C'

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Docusigned by: David W. Hawkins 6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

ASSEMBLED BY : M. WRIGHT DATE : 3/21
CHECKED BY : D. HAWKINS DATE : 3/21
DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 3

STD. NO. 21LRFR1_90S_40L

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

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

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

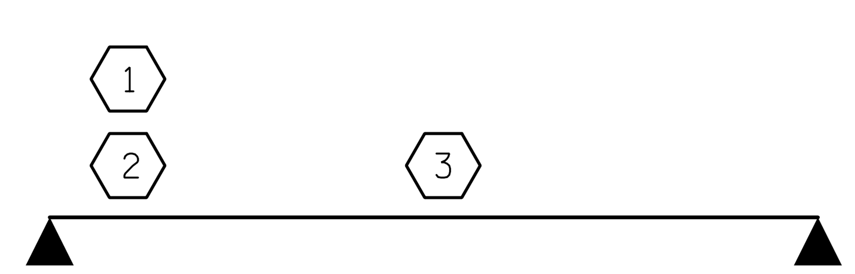
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'B'

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 2 OF 2

SEAL 27812 – NORTH CAROLINA PROFESSIONAL ENGINEER – DAVID W. HAWKINS

DocuSigned by: David W. Hawkins

6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

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

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 4

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

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ASSEMBLED BY : M. WRIGHT DATE : 3/21
CHECKED BY : D. HAWKINS DATE : 3/21

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

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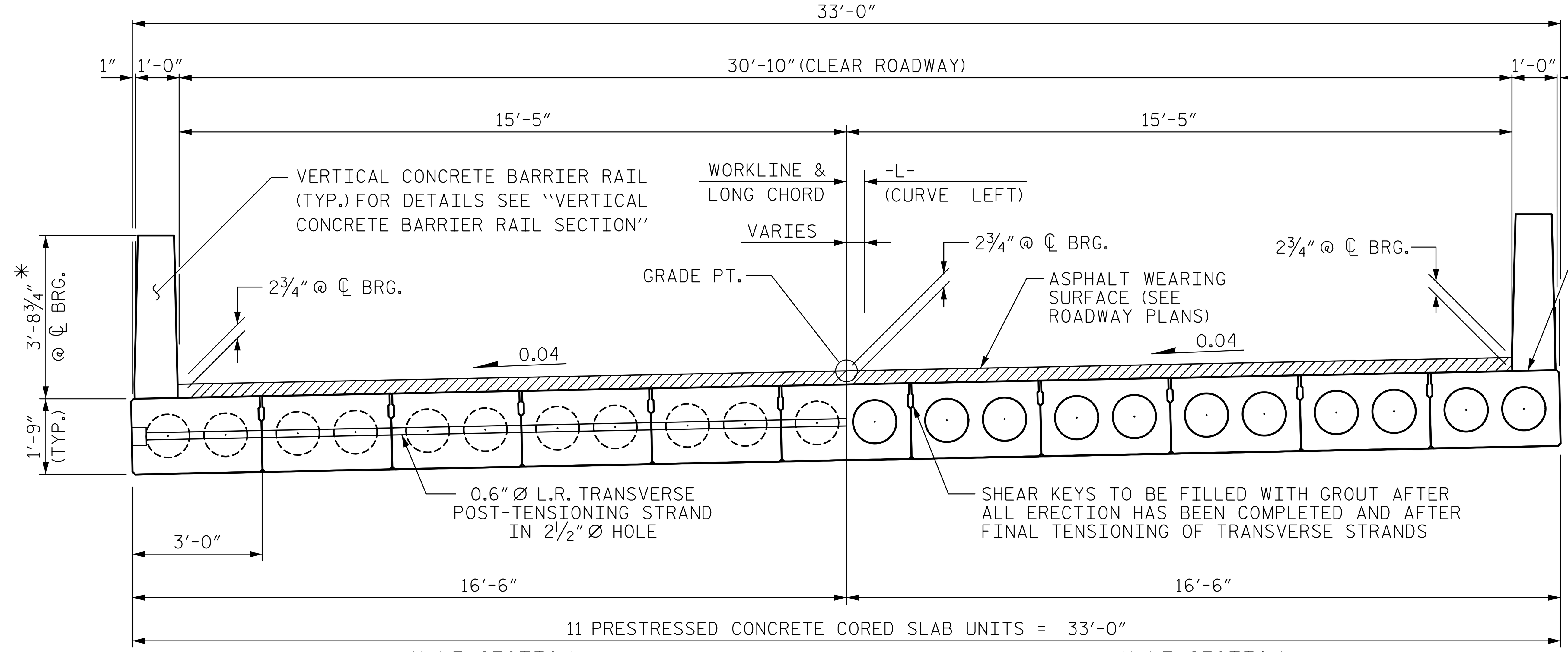
STD. NO. 21LRFR1_90S_50L

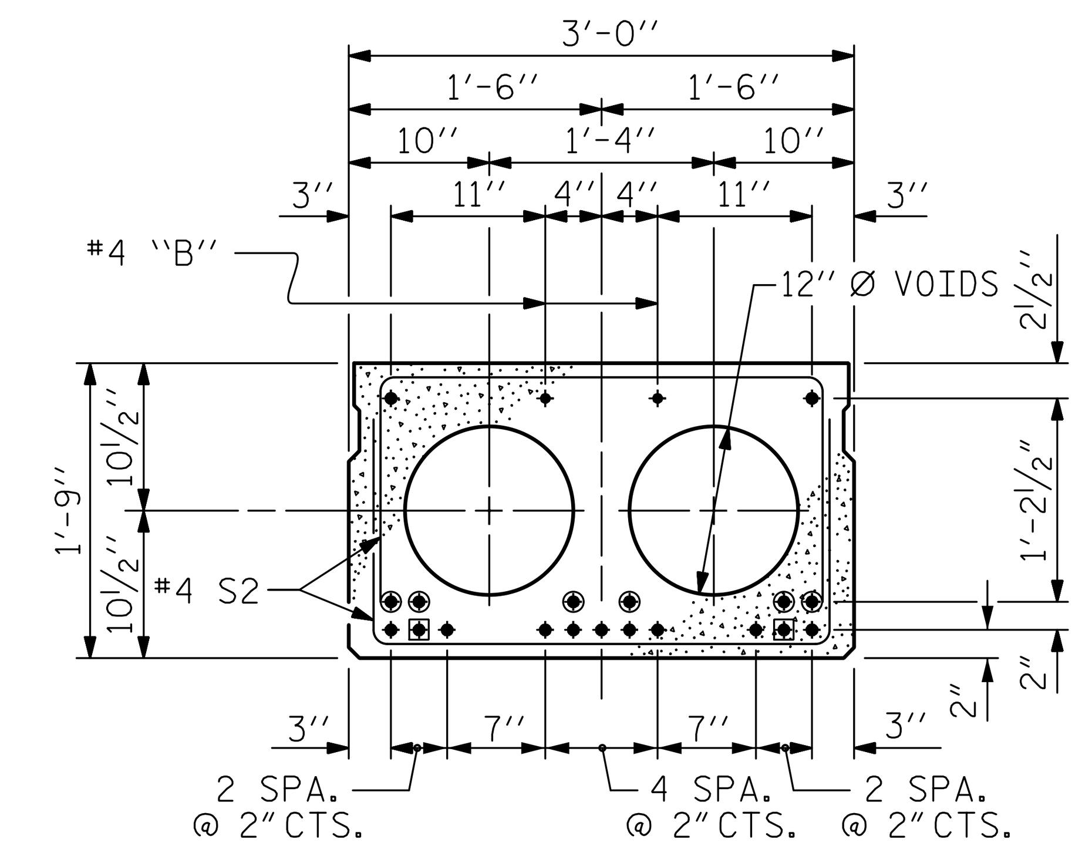


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

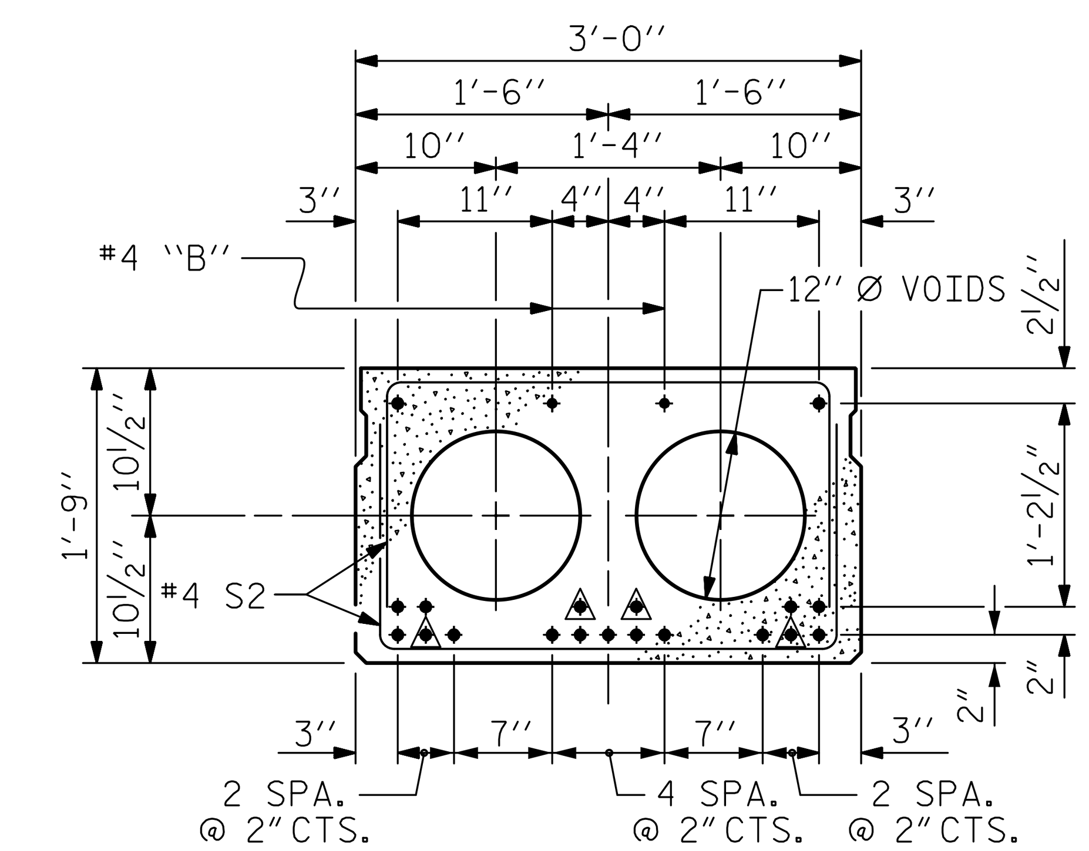
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

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

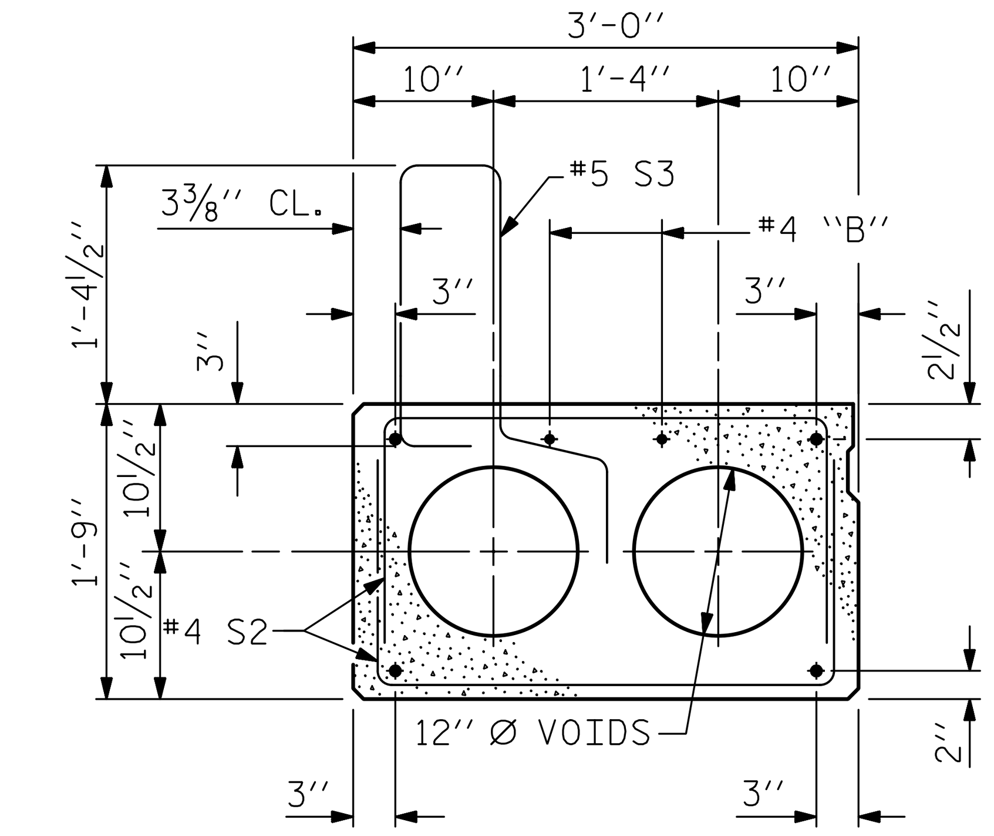


INTERIOR SLAB SECTION
(40' UNIT)
(13 STRANDS REQUIRED)



INTERIOR SLAB SECTION
(50' UNIT)
(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

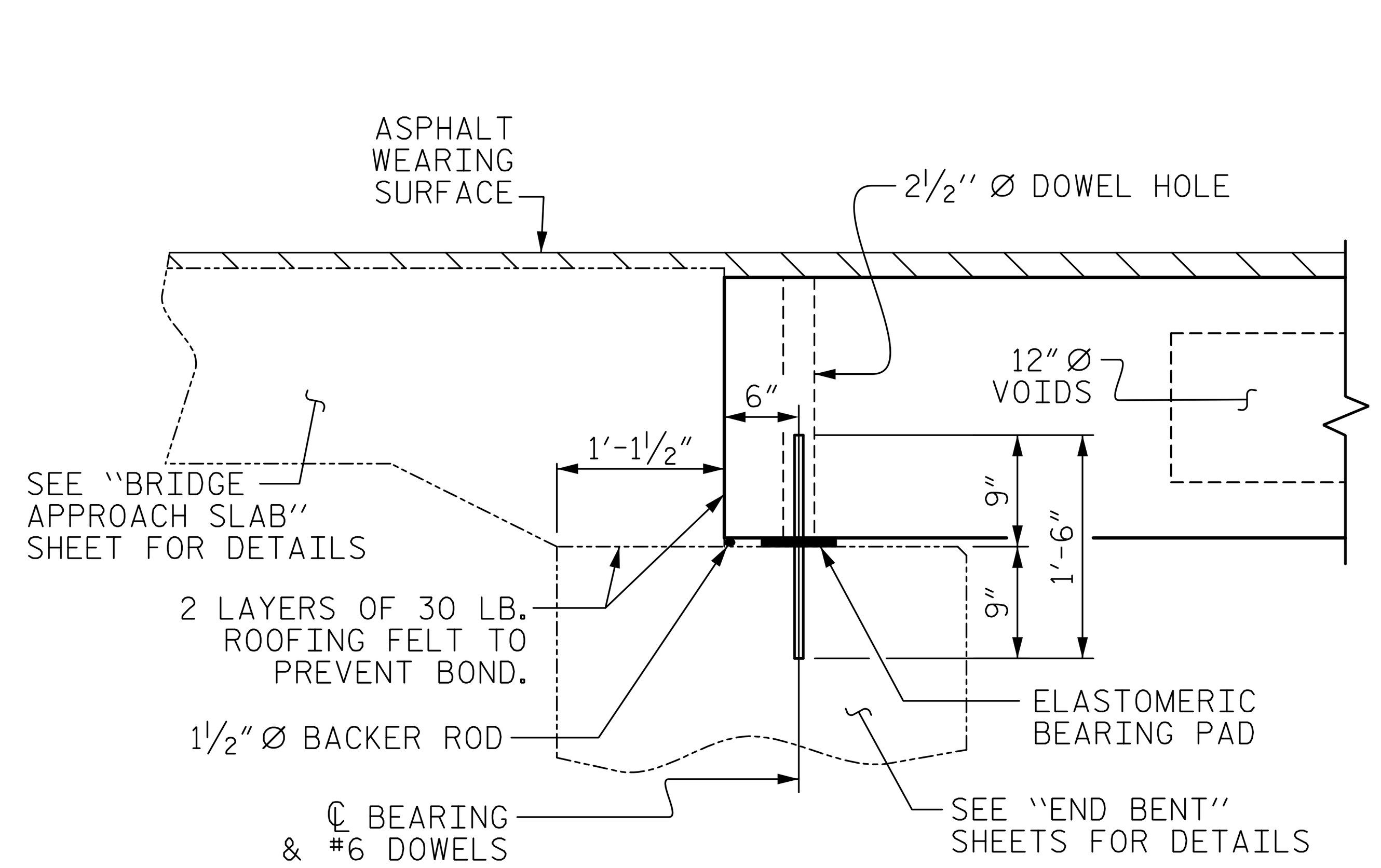
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

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

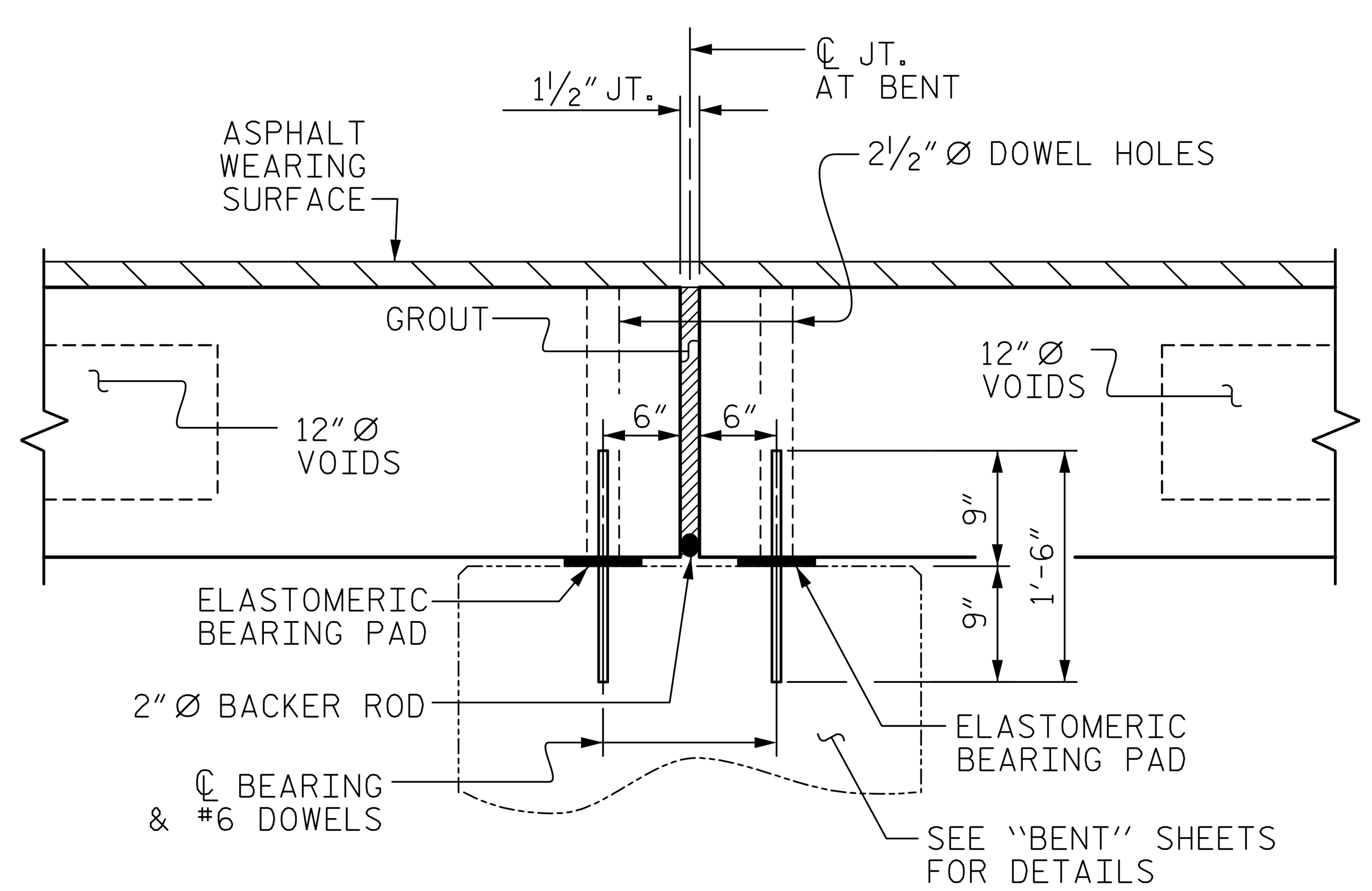
■ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

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

DEBONDING LEGEND



SECTION AT END BENT



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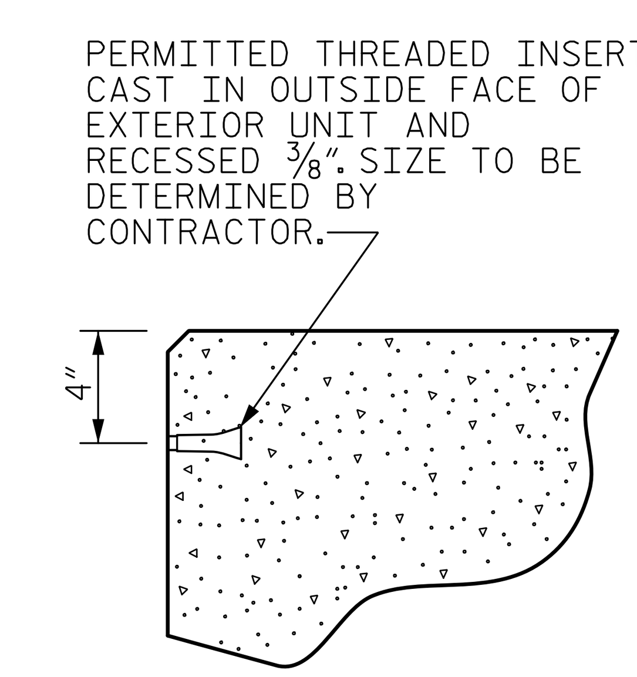
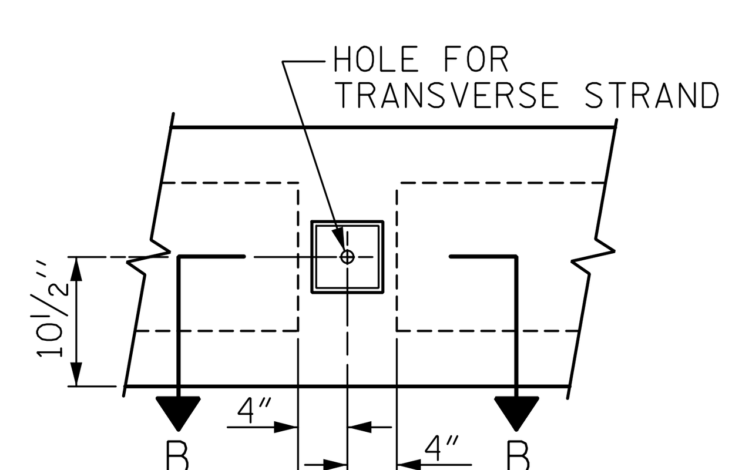
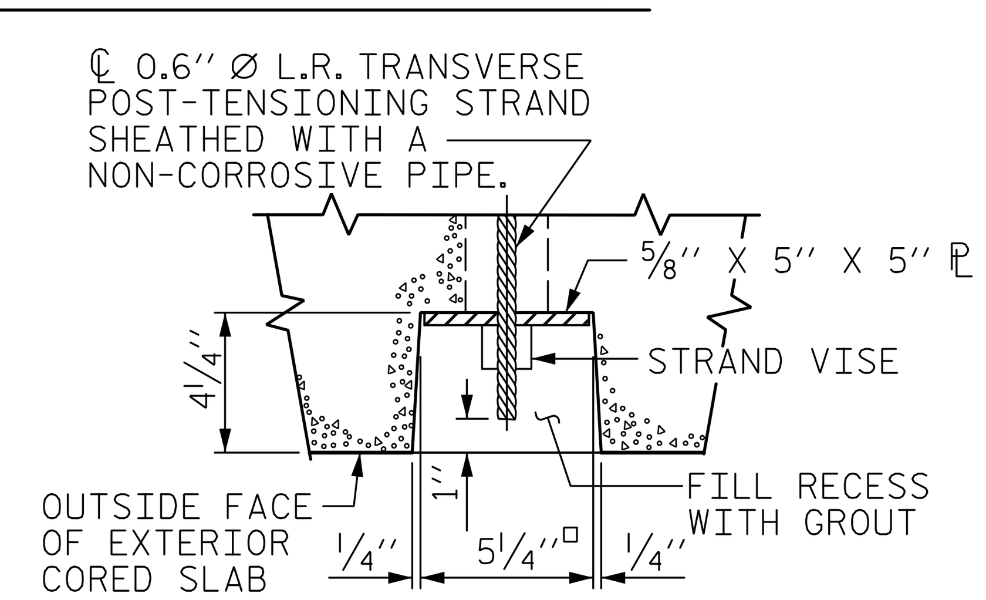


THREADED INSERT DETAIL

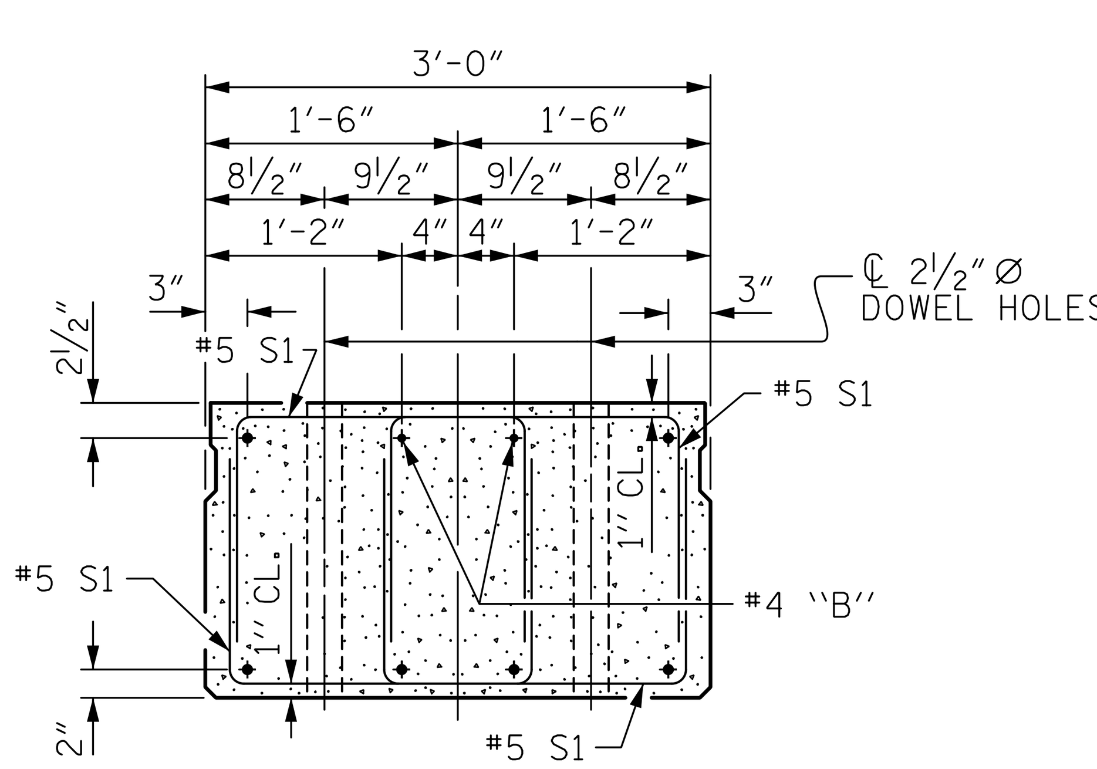


ELEVATION VIEW



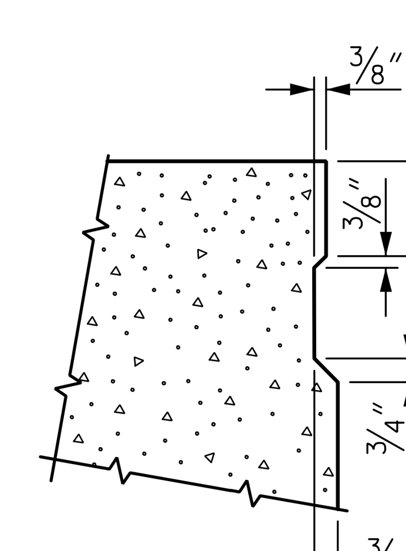
SECTION B-B

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



END ELEVATION

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



SHEAR KEY DETAIL

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
6/7/2021

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21

DRAWN BY : DGE 5/09	REV. 9/14	MAA/TMG
CHECKED BY : BCH 6/09		

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

DRAWN BY	M. WRIGHT	DATE 3/21	DWG. NO. 5
CHECKED BY	D. HAWKINS	DATE 3/21	
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21	

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

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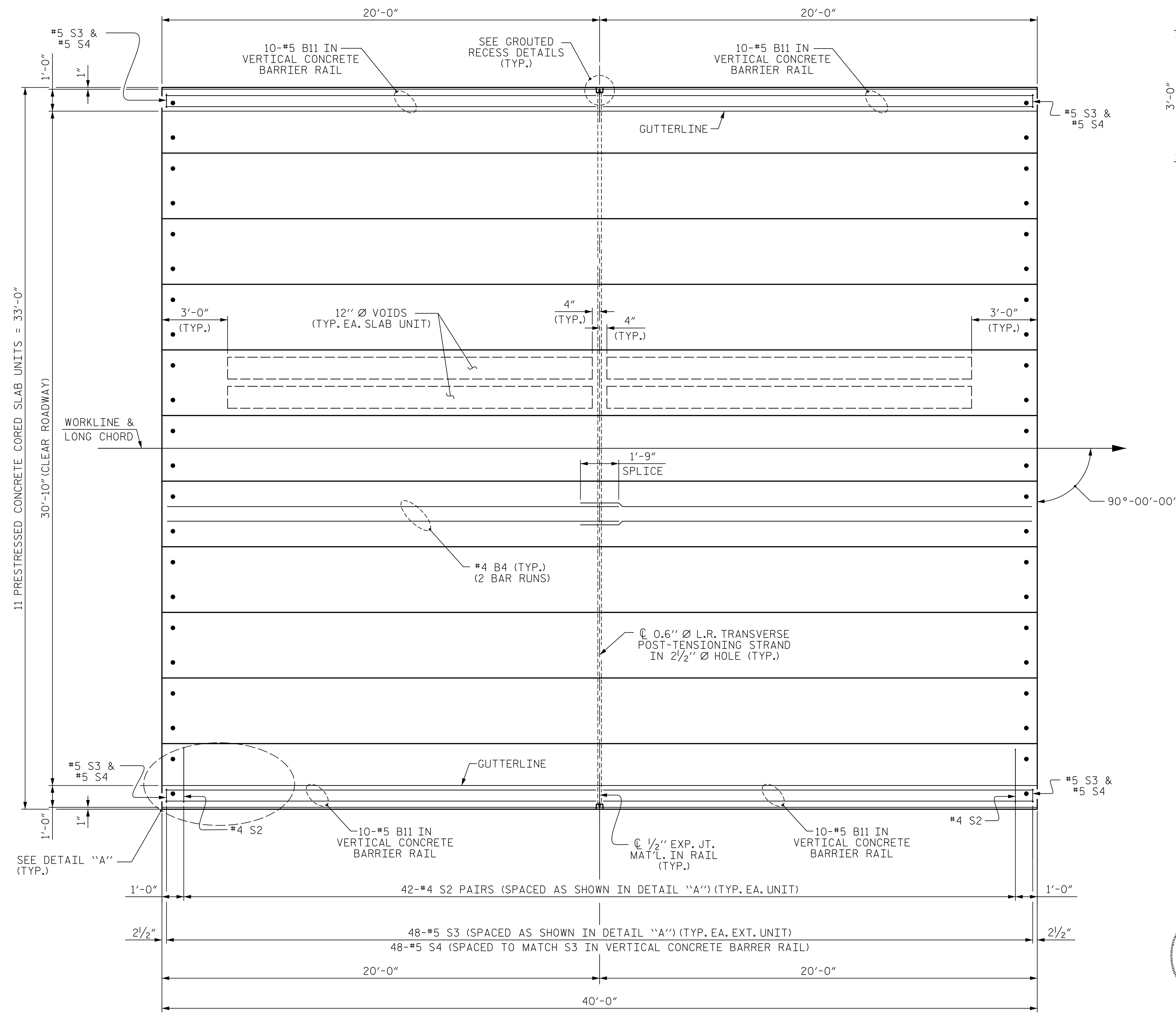
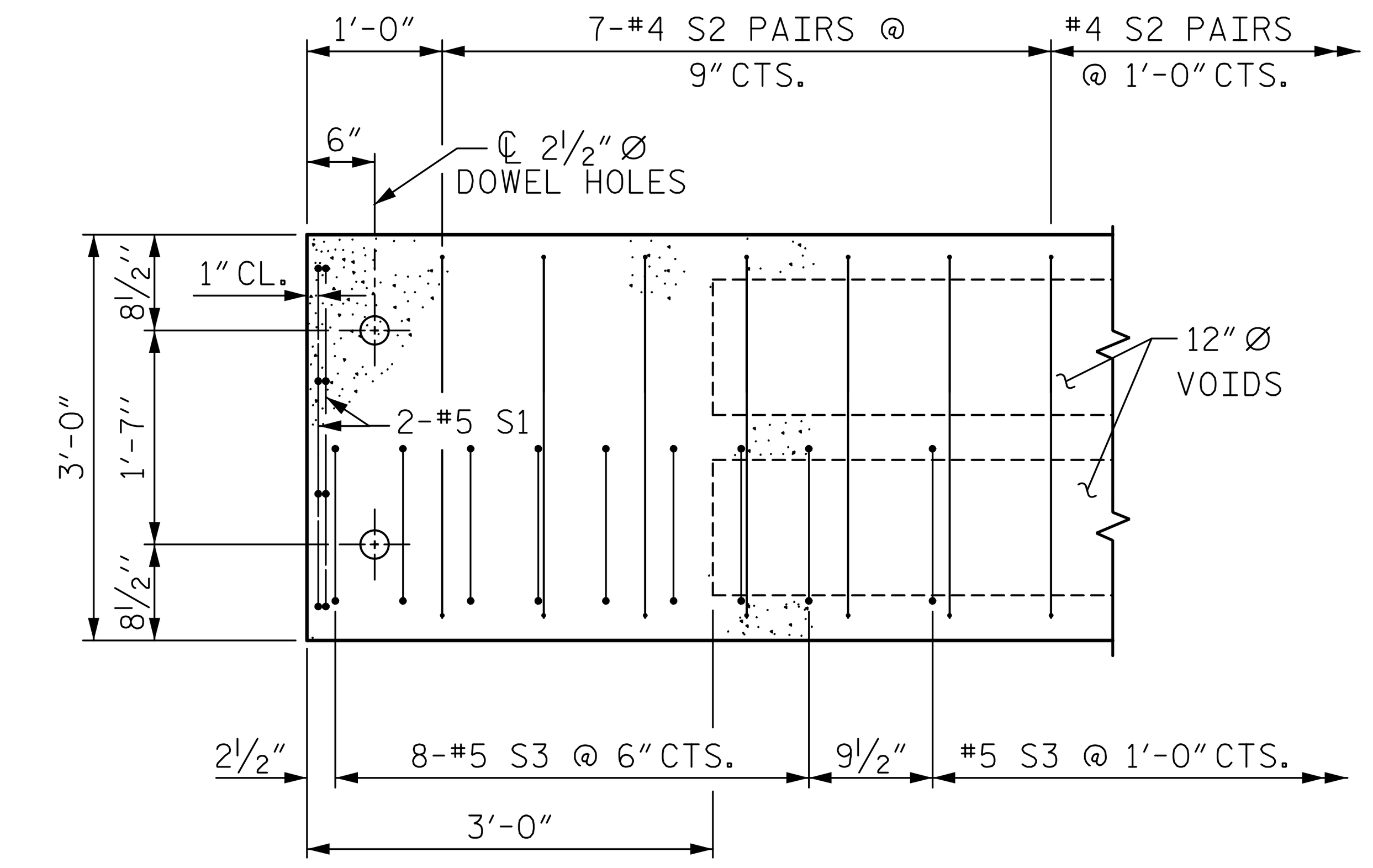
STD. NO. 21"PCS2_33_90S



PLAN OF UNIT



DETAIL "A"

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

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT
30'-10" CLEAR ROADWAY
90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
6/7/2021

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21

DRAWN BY : DGE 3/09	REV. 12/5/11 MAA/AAC
CHECKED BY : BCH 3/09	REV. 8/14 MAA/TMG

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DRAWN BY	M. WRIGHT	DATE 3/21	DWG. NO. 6
CHECKED BY	D. HAWKINS	DATE 3/21	
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21	

REVISIONS

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

SHEET NO. S-6
TOTAL SHEETS 20

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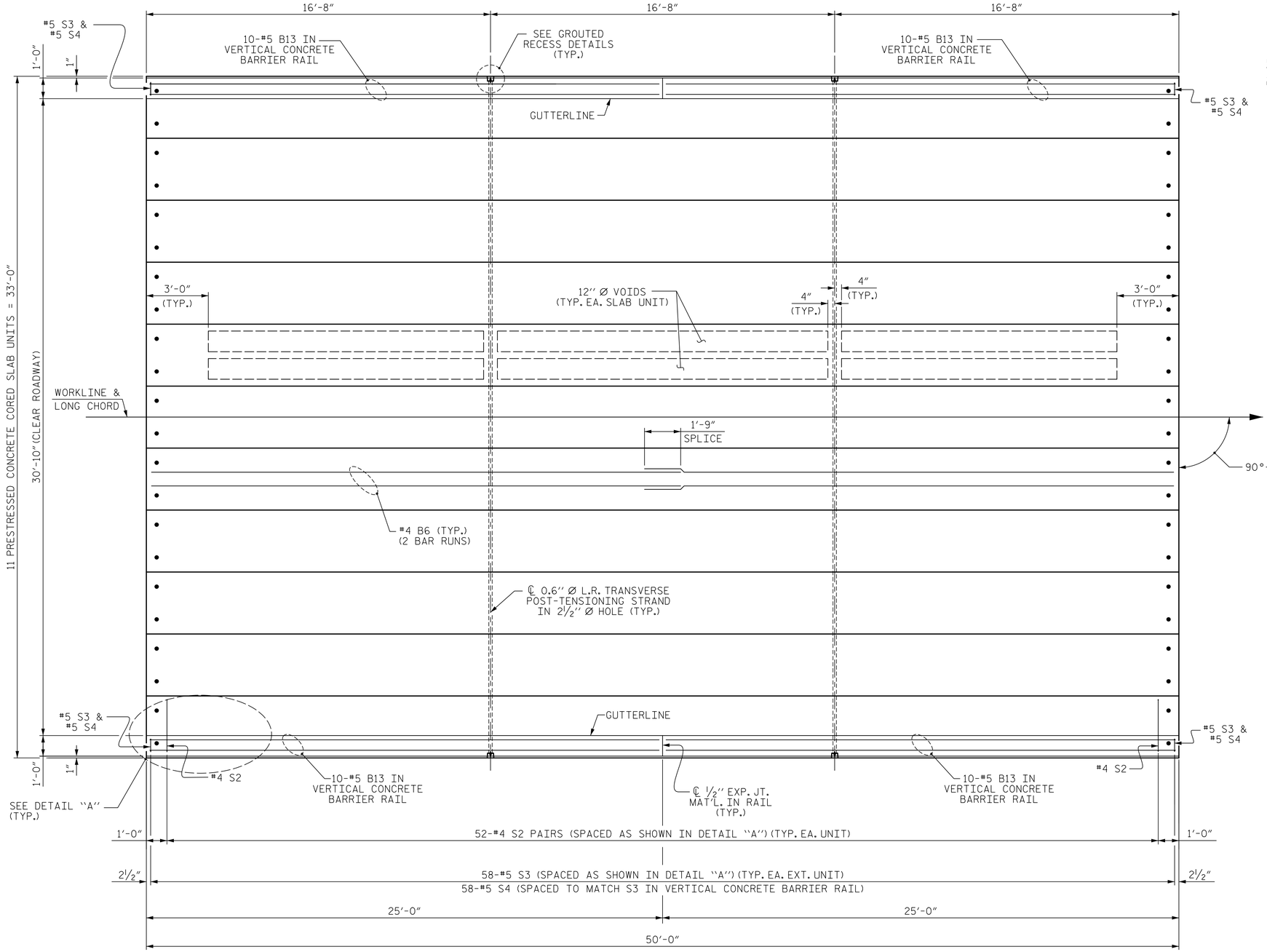
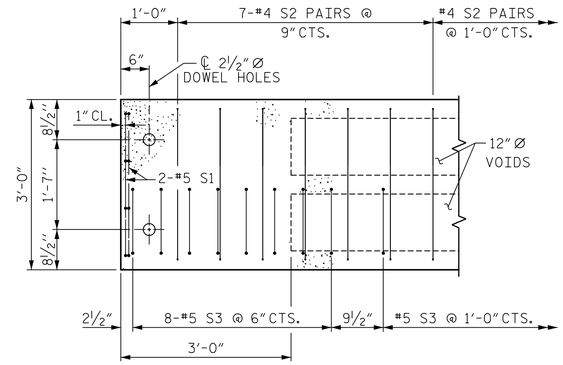
STD. NO. 21"PCS_33_90S_40L



PLAN OF UNIT



DETAIL ″A″

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 6/7/2021

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-7
1			3			TOTAL SHEETS
2			4			20

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

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT			DATE : 3/21		
CHECKED BY : D. HAWKINS			DATE : 3/21		
DRAWN BY : DGE	3/09	REV.	12/5/11	MAA/AAC	
CHECKED BY : BCH	3/09	REV.	8/14	MAA/TMG	

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STD. NO. 21″PCS_33_90S_50L

BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	84	#4	3	5'-4"	299	5'-4"	299
* S3	48	#5	1	5'-7"	280		
REINFORCING STEEL	LBS.				389		389
* EPOXY COATED REINFORCING STEEL	LBS.				280		
5000 P.S.I. CONCRETE	CU. YDS.				5.8		5.8
0.6"Ø L.R. STRANDS	No.				13		13

BILL OF MATERIAL FOR ONE 50' CORED SLAB UNIT

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

DEAD LOAD DEFLECTION AND CAMBER

40' CORED SLAB UNIT	3'-0"× 1'-9" 0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	7/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8" ↓
FINAL CAMBER	3/4" ↑

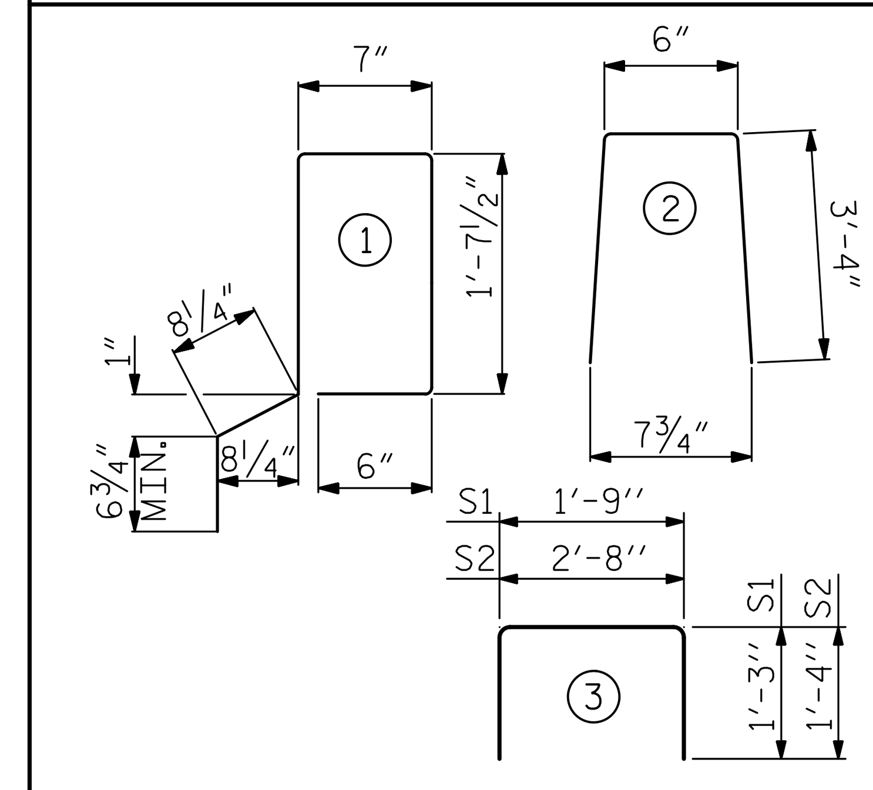
** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

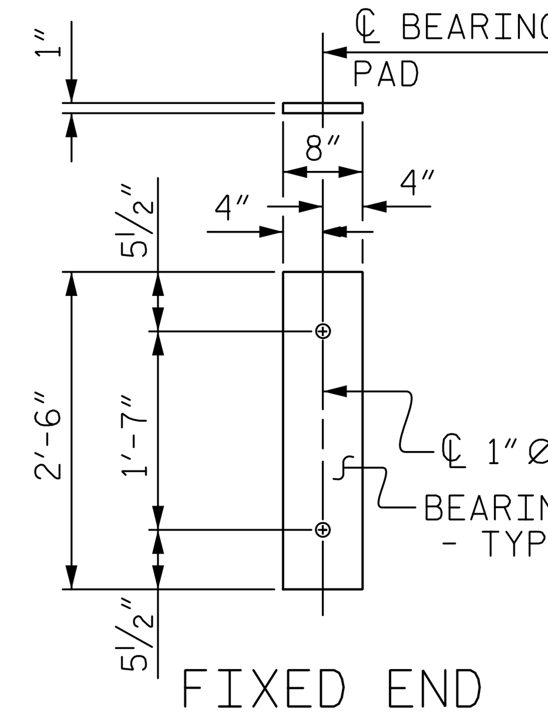
50' CORED SLAB UNIT	3'-0"× 1'-9" 0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8" ↓
FINAL CAMBER	1 1/8" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
40' UNITS	2"	3'-8"
50' UNITS	1 5/8"	3'-7 5/8"

CORED SLABS REQUIRED

40' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	4	40'-0"	160'-0"
INTERIOR C.S.	18	40'-0"	720'-0"
TOTAL	22		880'-0"

CORED SLABS REQUIRED

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

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS 40' UNIT	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
* B11	40	80	#5	STR	19'-7"	1,634
* S4	96	192	#5	2	7'-2"	1,436
* EPOXY COATED REINFORCING STEEL			LBS.			3,070
CLASS AA CONCRETE			CU.YDS.			20.4
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.			160.50

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

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

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

CONCRETE RELEASE STRENGTH

UNIT	PSI
40' UNITS	4000
50' UNITS	4900

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

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

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

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

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

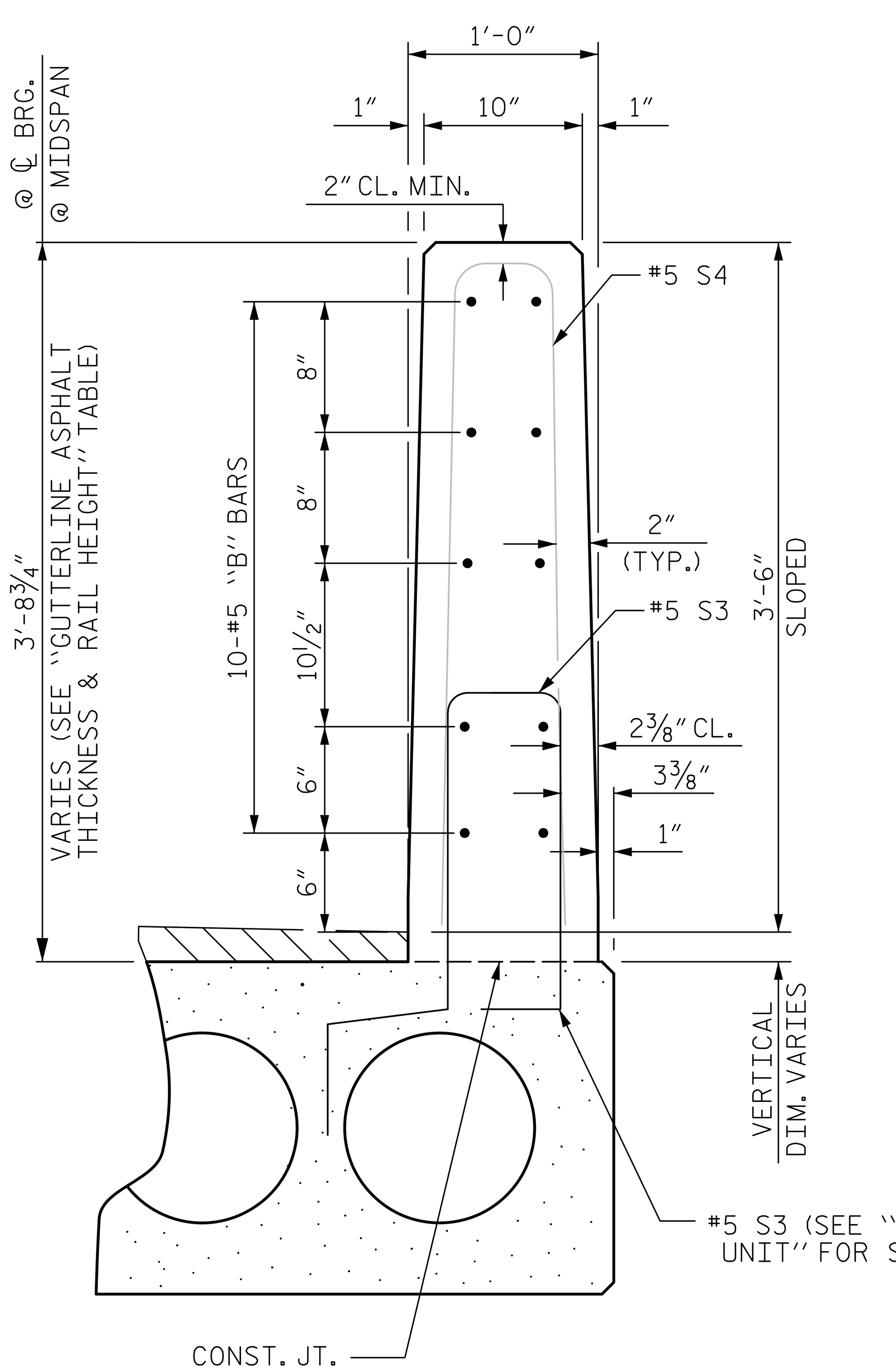
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

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

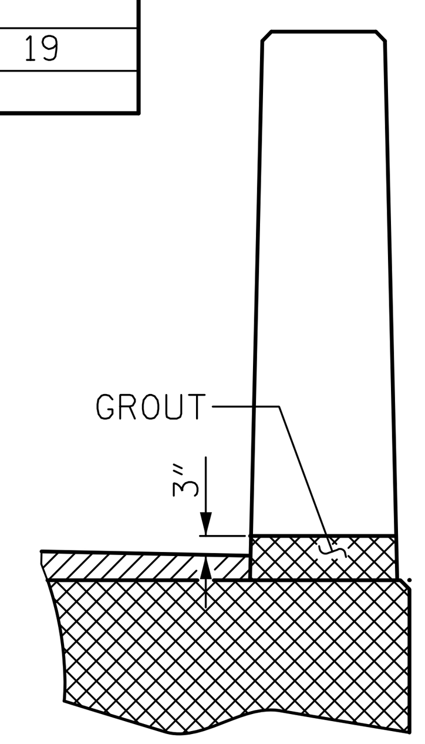
THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

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

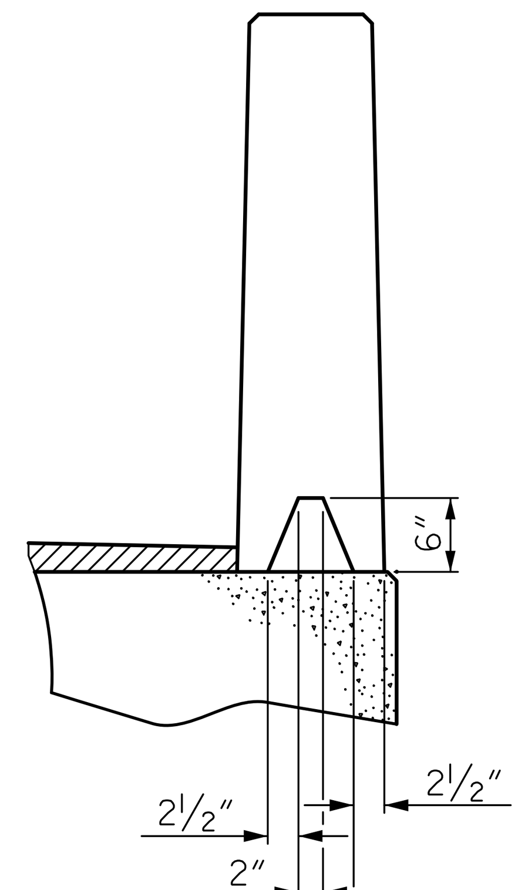
PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.



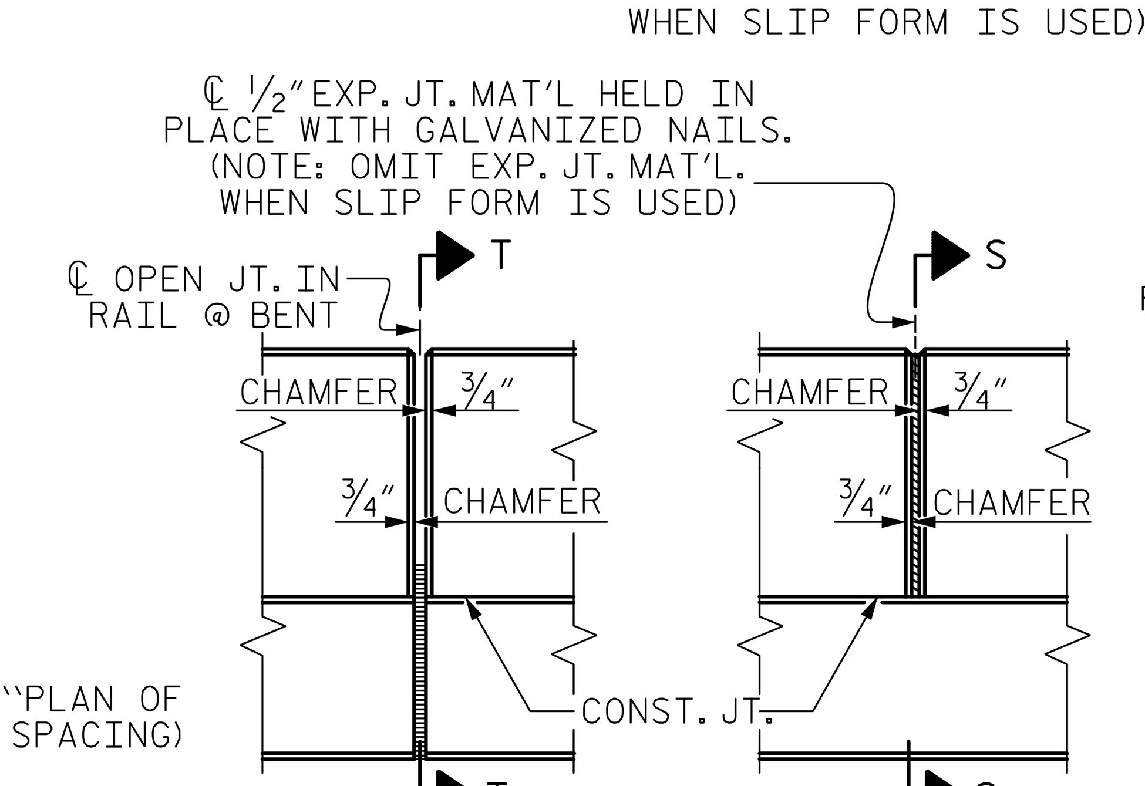
VERTICAL CONCRETE BARRIER RAIL SECTION



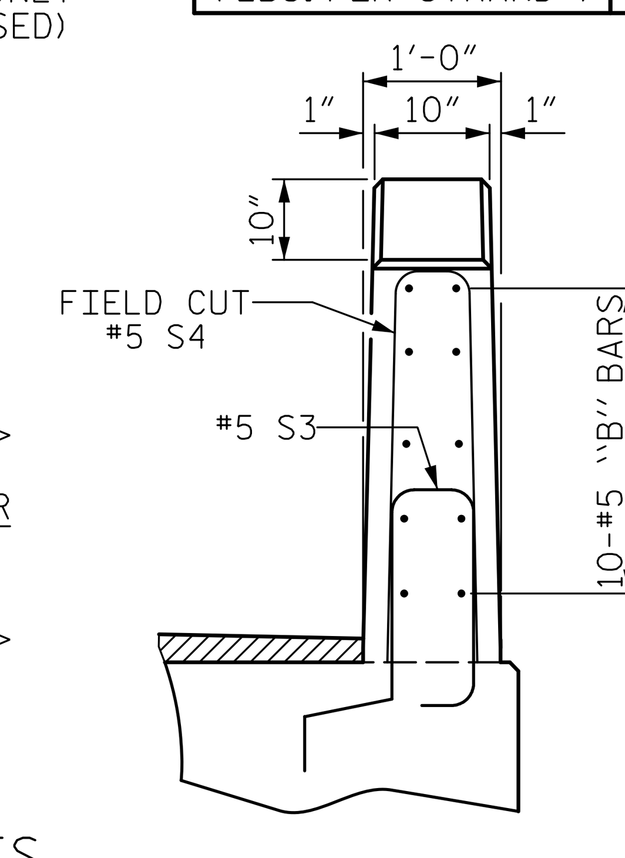
SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



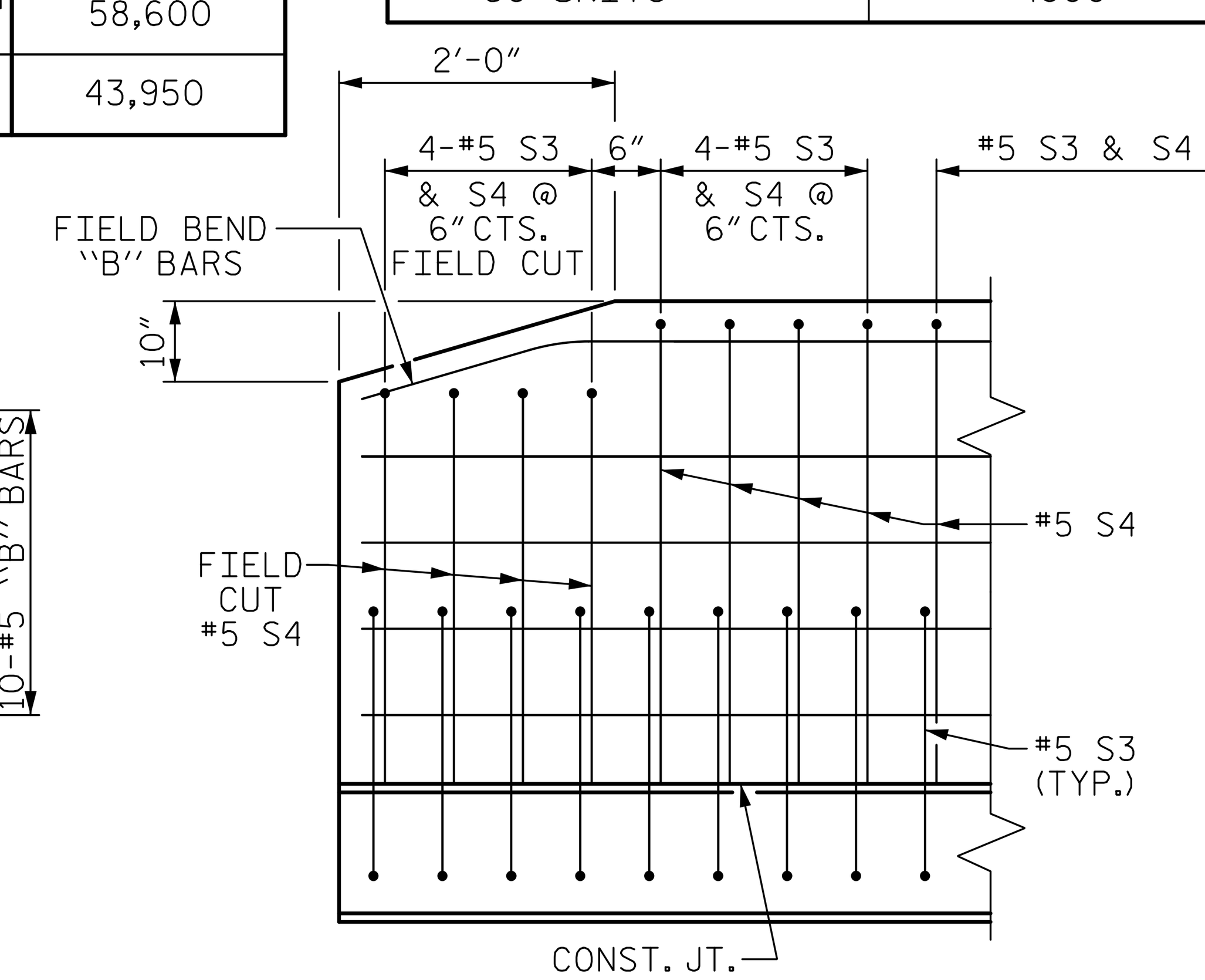
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



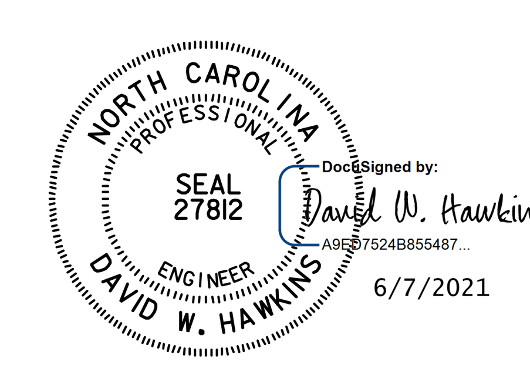
SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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



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

SHEET NO. S-8
TOTAL SHEETS 20

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21
DWG. NO. 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT DATE : 3/21
CHECKED BY : D. HAWKINS DATE : 3/21
DRAWN BY : DGE 5/09
CHECKED BY : BCH 6/09
REV. 5/18 MAA/THC

6/7/2021
9:22:23 AM
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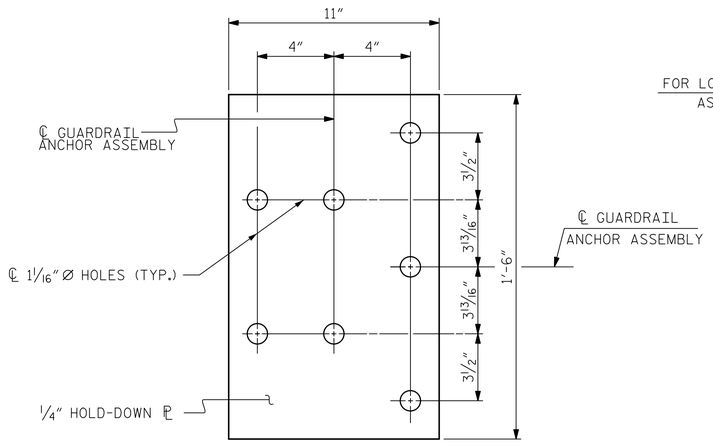
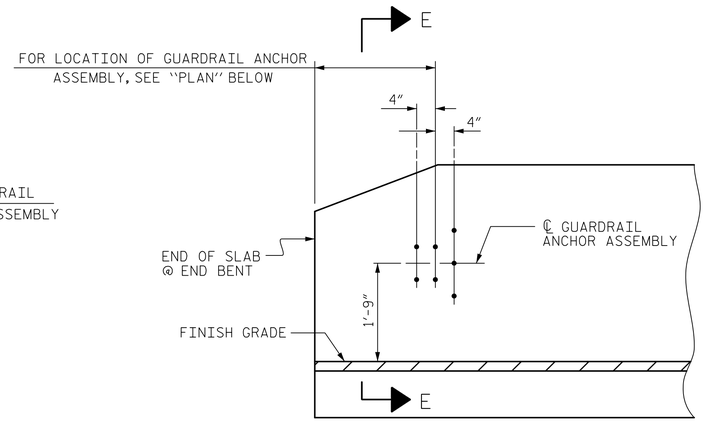
STD. NO. 21"PCS3_33_90S



PLAN



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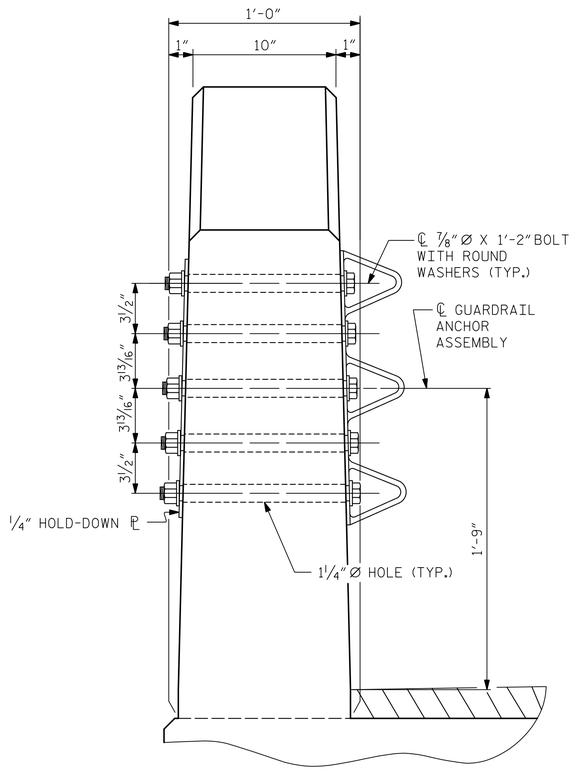


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

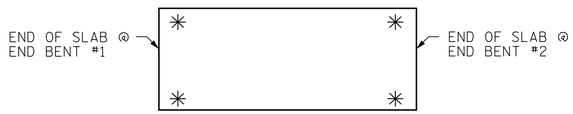
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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.

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. 17BP.2.PE.104

BEAUFORT **COUNTY**

STATION: 24+10.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Docusigned by: David W. Hawkins 6/7/2021

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-9
1			3			TOTAL SHEETS
2			4			20

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DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 9

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT		DATE : 3/21	
CHECKED BY : D. HAWKINS		DATE : 3/21	
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	

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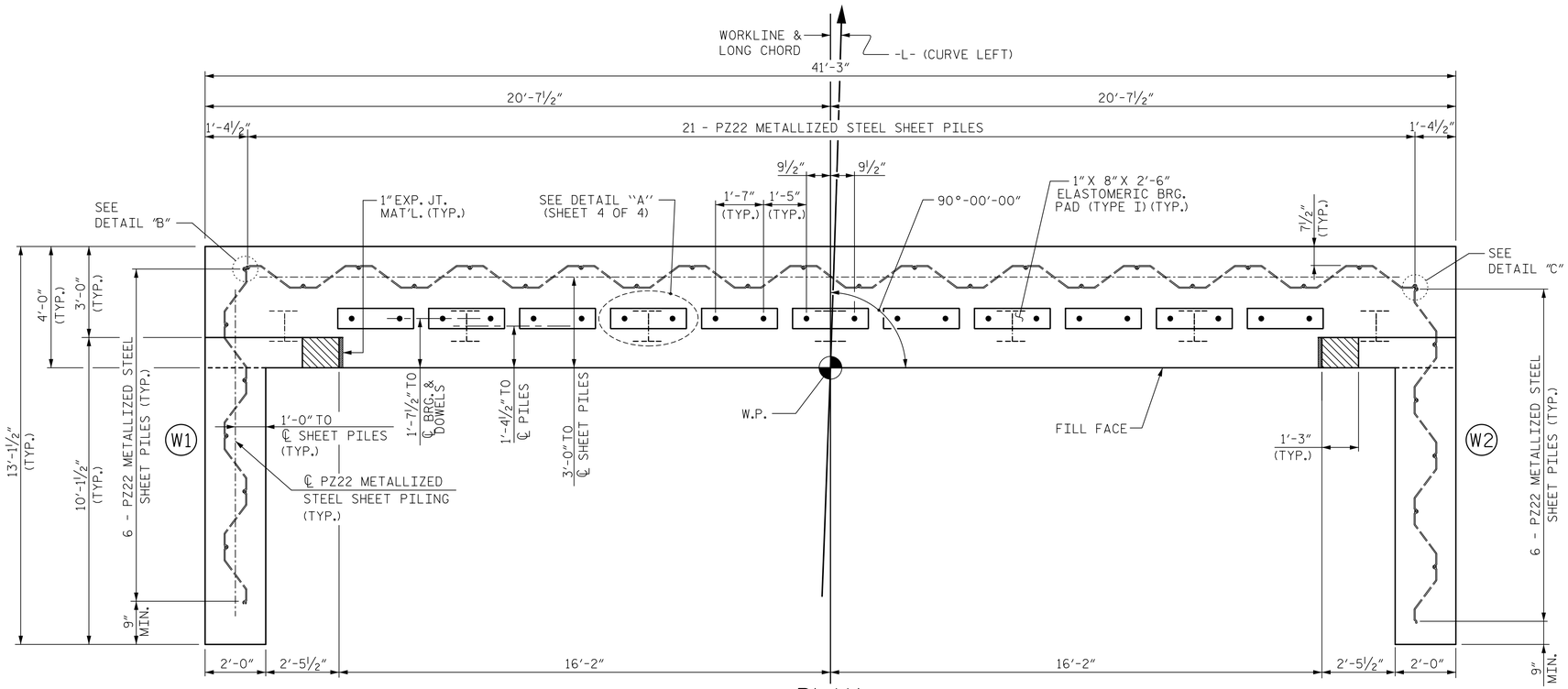
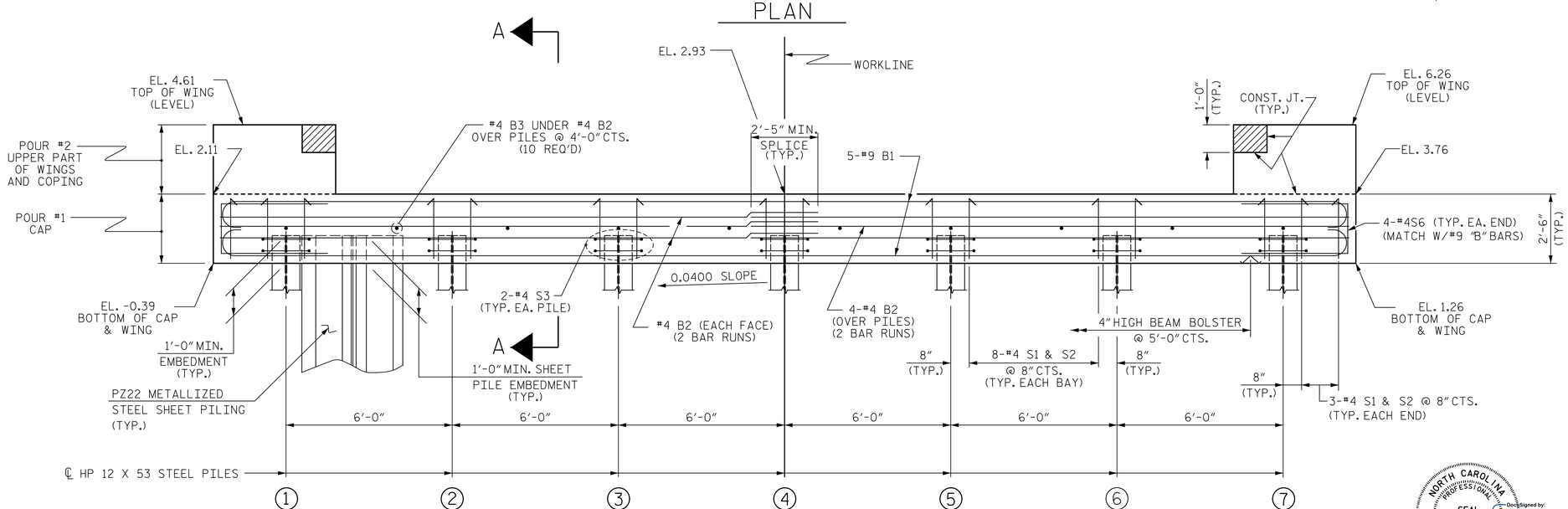


PLAN



ELEVATION

WINGS/COPING NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
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/COPING DETAILS, SEE SHEET 3 OF 4.

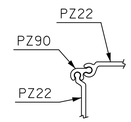
FOR STEEL SHEET PILE SYSTEM, SEE SPECIAL PROVISIONS.

INSTALL PZ22 OR EQUIVALENT STEEL SHEET PILING INTEGRATED INTO CAP AT END BENT NO. 1. SHEET PILINGS SHALL BE METALLIZED WITH 100% ALLUMINUM AND SEALED. INSTALL SHEET PILINGS AT END BENT NO. 1 TO TIP ELEVATION NO HIGHER THAN -19 FT.

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

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

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



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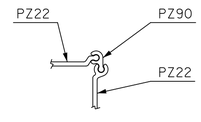

DETAIL "C"

TOP OF PILE ELEVATIONS	
①	0.72
②	0.96
③	1.20
④	1.44
⑤	1.68
⑥	1.92
⑦	2.16

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Doc Signed by: David W. Hawkins 6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21
DRAWN BY : DGE 01/10	REV. 4/15 MAA/TMG
CHECKED BY : MKT 01/10	

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DRAWN BY	M. WRIGHT	DATE 3/21
CHECKED BY	D. HAWKINS	DATE 3/21
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21

DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-10
1			3			TOTAL SHEETS
2			4			20

STD. NO. EB_33_90S

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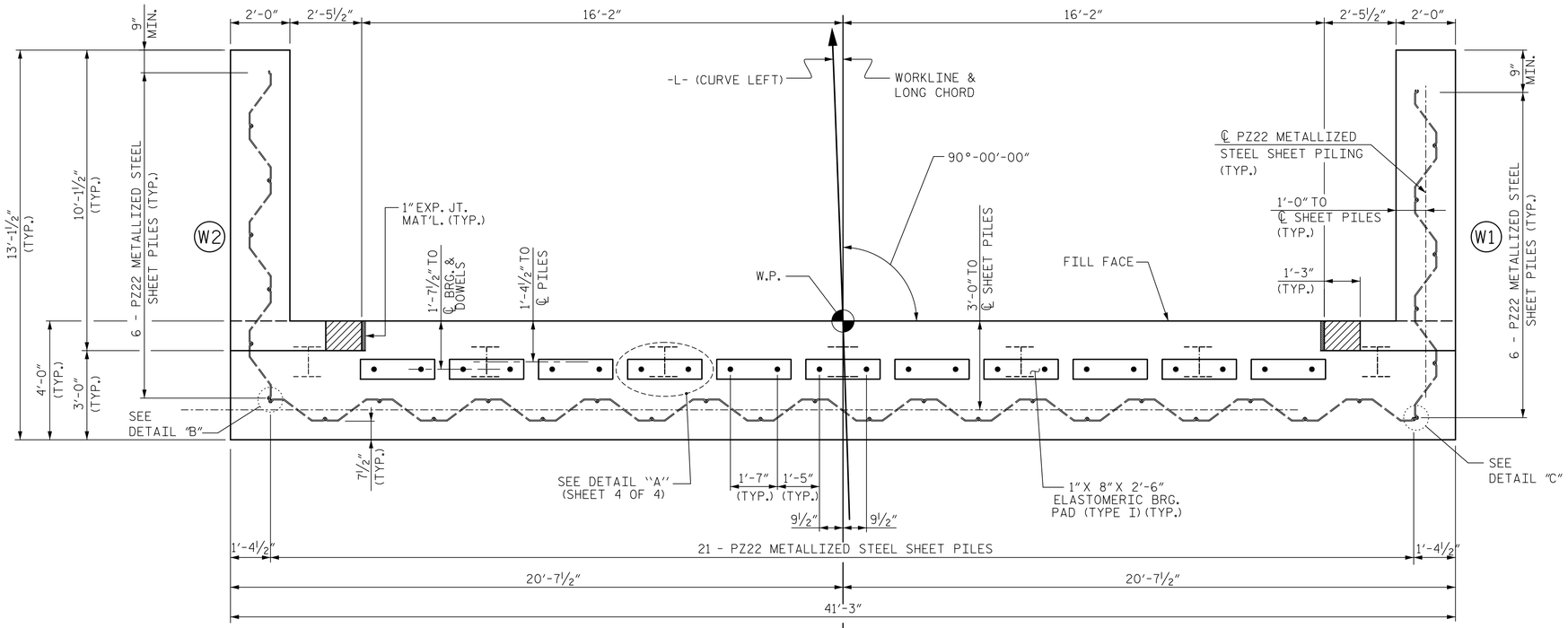
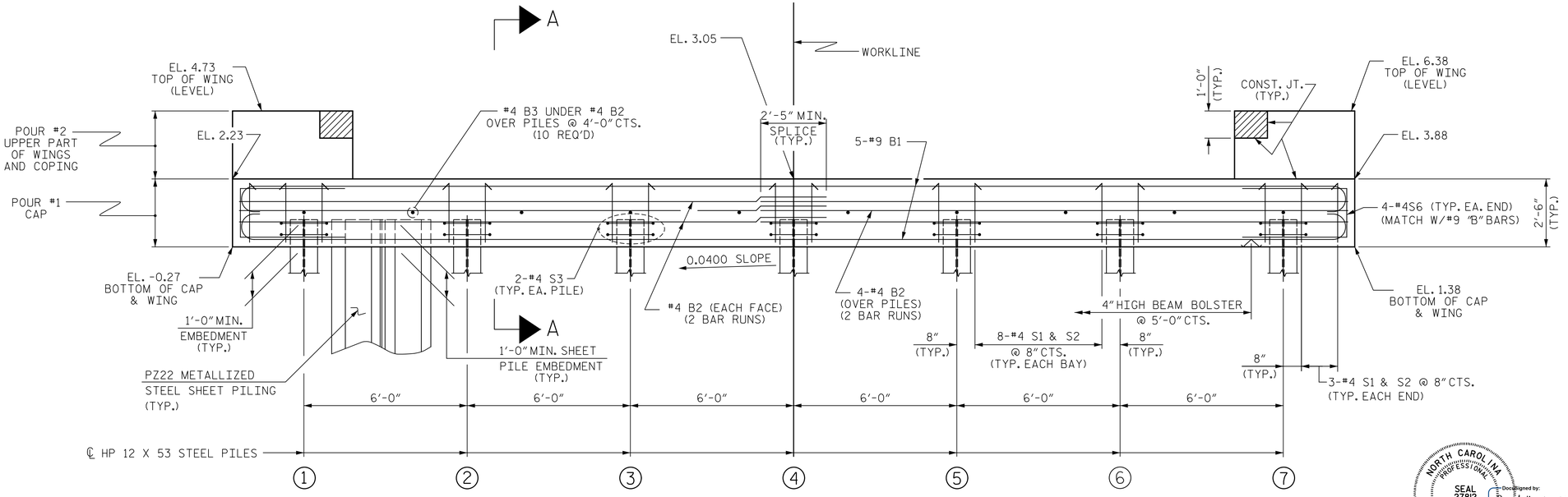


PLAN



ELEVATION

WINGS/COPING NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
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/COPING DETAILS, SEE SHEET 3 OF 4.

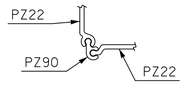
FOR STEEL SHEET PILE SYSTEM, SEE SPECIAL PROVISIONS.

INSTALL PZ22 OR EQUIVALENT STEEL SHEET PILING INTEGRATED INTO CAP AT END BENT NO. 2. SHEET PILINGS SHALL BE METALLIZED WITH 100% ALLUMINUM AND SEALED. INSTALL SHEET PILINGS AT END BENT NO. 2 TO TIP ELEVATION NO HIGHER THAN -19 FT.

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

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

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



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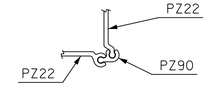

DETAIL "C"

TOP OF PILE ELEVATIONS	
①	0.83
②	1.07
③	1.31
④	1.55
⑤	1.79
⑥	2.03
⑦	2.27

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Docusigned by: David W. Hawkins 6/7/2021

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ASSEMBLED BY : M. WRIGHT	DATE : 3/21		
CHECKED BY : D. HAWKINS	DATE : 3/21		
DRAWN BY : DGE 01/10	REV. 4/15 MAA/TMG		
CHECKED BY : MKT 01/10			

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CHECKED BY	D. HAWKINS	DATE	3/21
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	6/21

DWG. NO. 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-11
1			3			TOTAL SHEETS
2			4			20

STD. NO. EB_33_90S

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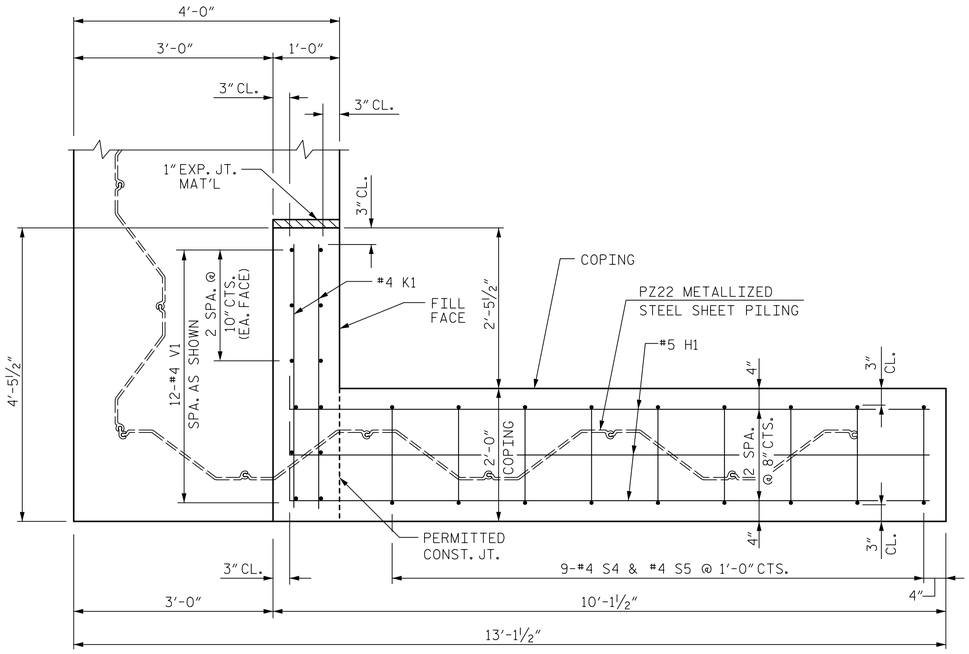
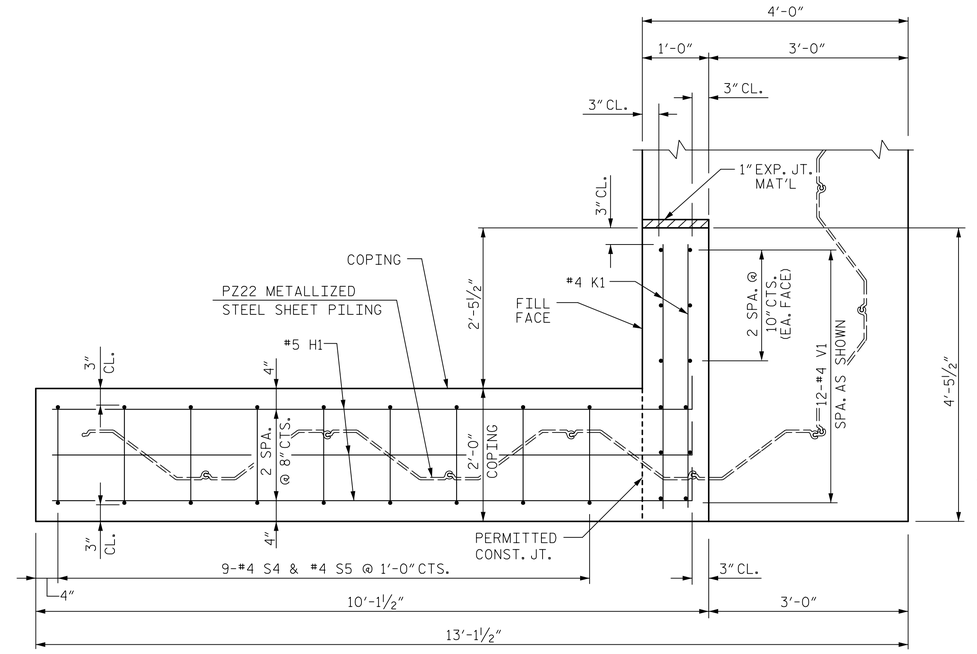
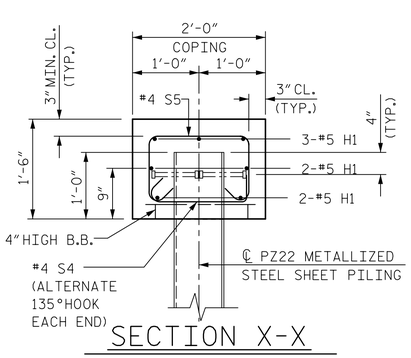


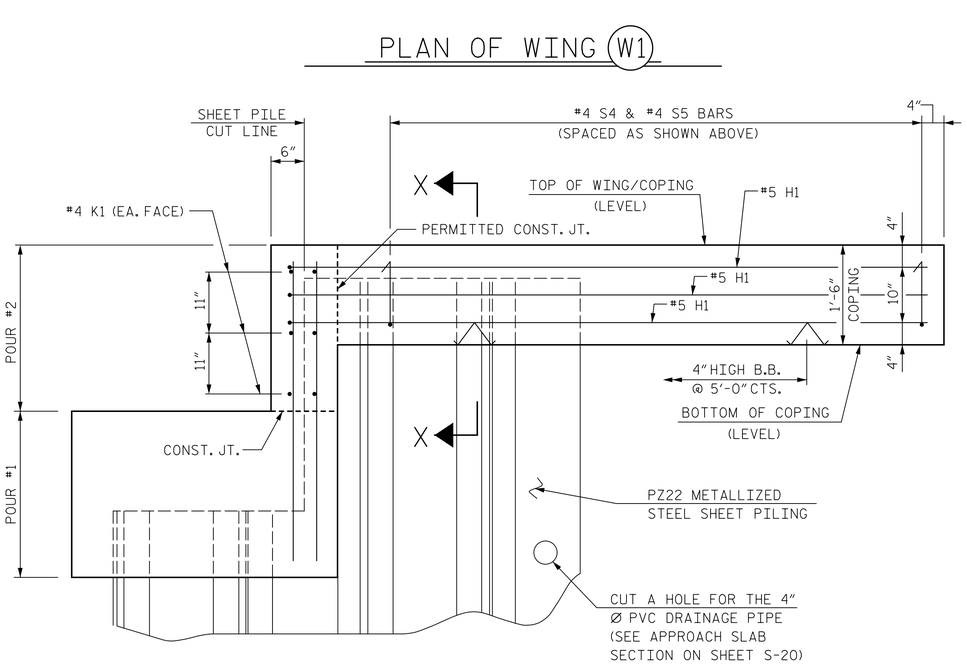
PLAN OF WING (W1)



PLAN OF WING (W2)

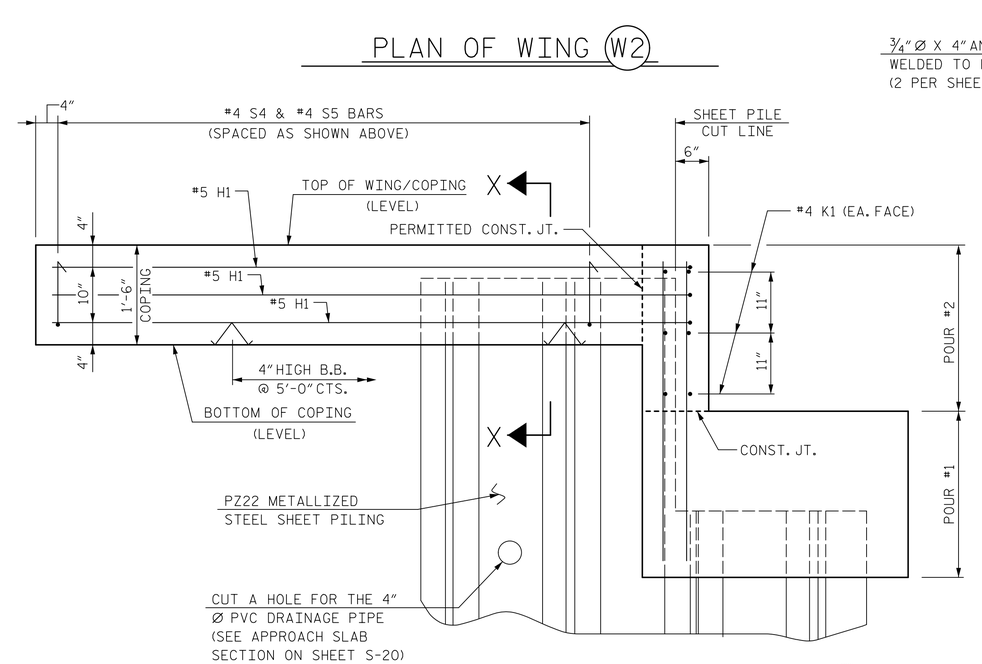


SECTION X-X



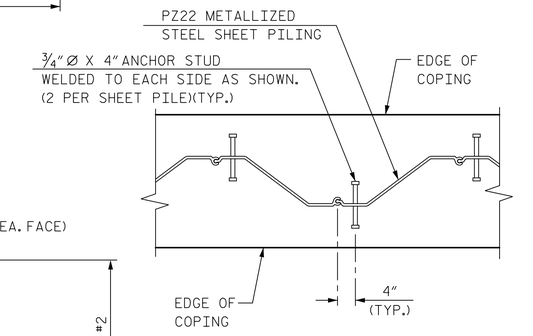
ELEVATION OF WING (W1)

(BURN 1½″ Ø MAX. HOLE IN SHEET PILE FOR #4K1 BARS)



ELEVATION OF WING (W2)

(BURN 1½″ Ø MAX. HOLE IN SHEET PILE FOR #4K1 BARS)



ANCHORAGE LAYOUT

WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 6/7/2021

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

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

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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 12

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ASSEMBLED BY : M. WRIGHT	DATE : 3/21
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DRAWN BY : DGE 02/10	REV. 4/15 MAA/TMG
CHECKED BY : MKT 02/10	

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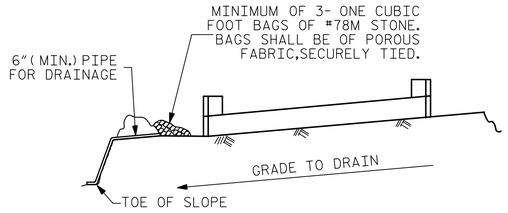
STD. NO. EB_33_90S

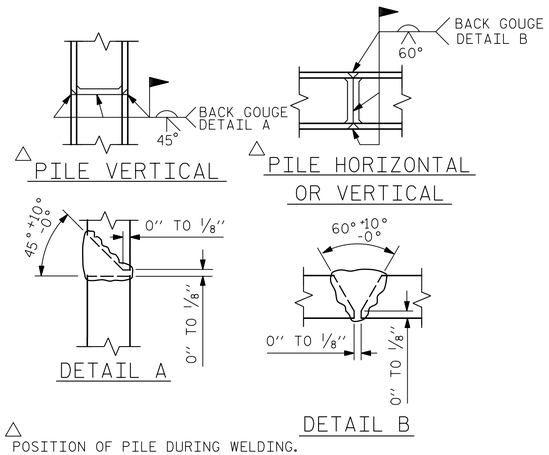


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

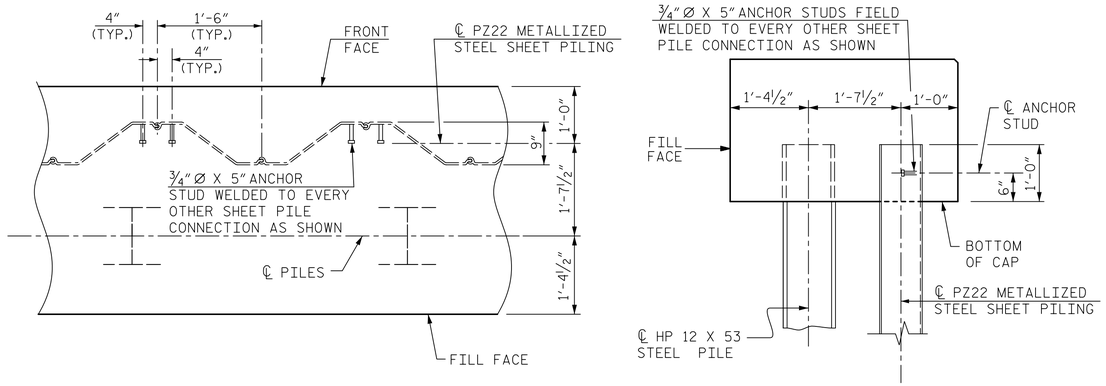
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

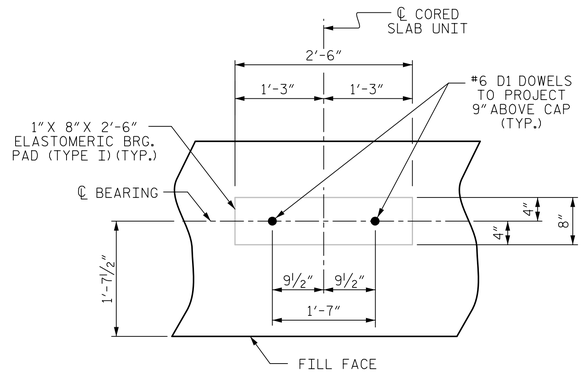
PILE SPLICE DETAILS



PLAN ELEVATION

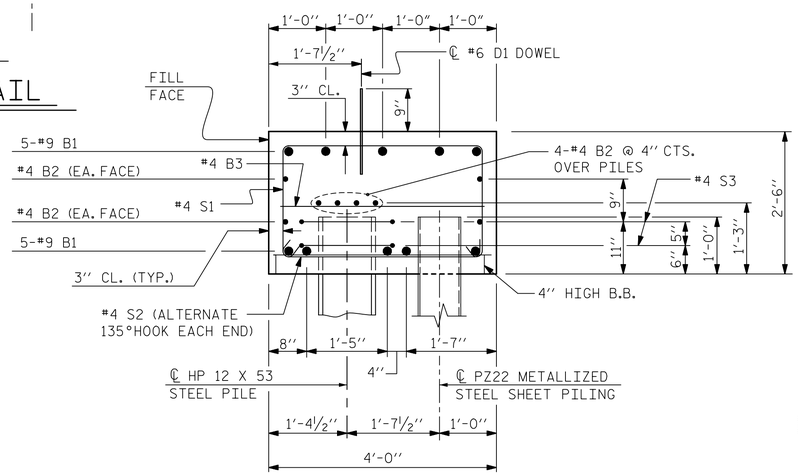
CORROSION PROTECTION FOR STEEL PILES DETAIL

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



DETAIL "A"

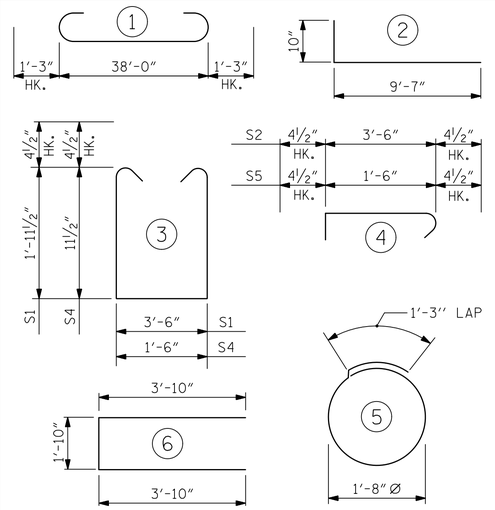
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



SECTION A-A

(SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")
(BURN 1½" Ø MAX. HOLE IN SHEET PILE FOR #4S2 AND #4S6 BARS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 490	HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 490
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7
PILE REDRIVES NO: 4	PILE REDRIVES NO: 4
METALLIZED STEEL SHEET PILES SQ. FT. = 1296	METALLIZED STEEL SHEET PILES SQ. FT. = 1303

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	40'-6"	1377
B2	16	#4	STR	21'-7"	231
B3	10	#4	STR	3'-6"	23
D1	22	#6	STR	1'-6"	50
H1	14	#5	2	10'-5"	152
K1	12	#4	STR	3'-11"	31
S1	54	#4	3	8'-2"	295
S2	54	#4	4	4'-3"	153
S3	14	#4	5	6'-6"	61
S4	18	#4	3	4'-2"	50
S5	18	#4	4	2'-3"	27
S6	8	#4	6	9'-6"	51
V1	24	#4	STR	4'-4"	69

EPOXY COATED REINFORCING STEEL (FOR ONE END BENT) 2570 LBS.

CLASS AA CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP 15.3 C.Y.

POUR #2 UPPER PART OF WINGS AND COPING 2.9 C.Y.

TOTAL CLASS AA CONCRETE 18.2 C.Y.

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins

6/7/2021

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21
DRAWN BY : DGE 12/09	REV. 4/17 MAA/THC
CHECKED BY : MKT 01/10	

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DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21

DWG. NO. 13

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-13
1			3			TOTAL SHEETS
2			4			20

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STD. NO. EB_33_90S

NOTES

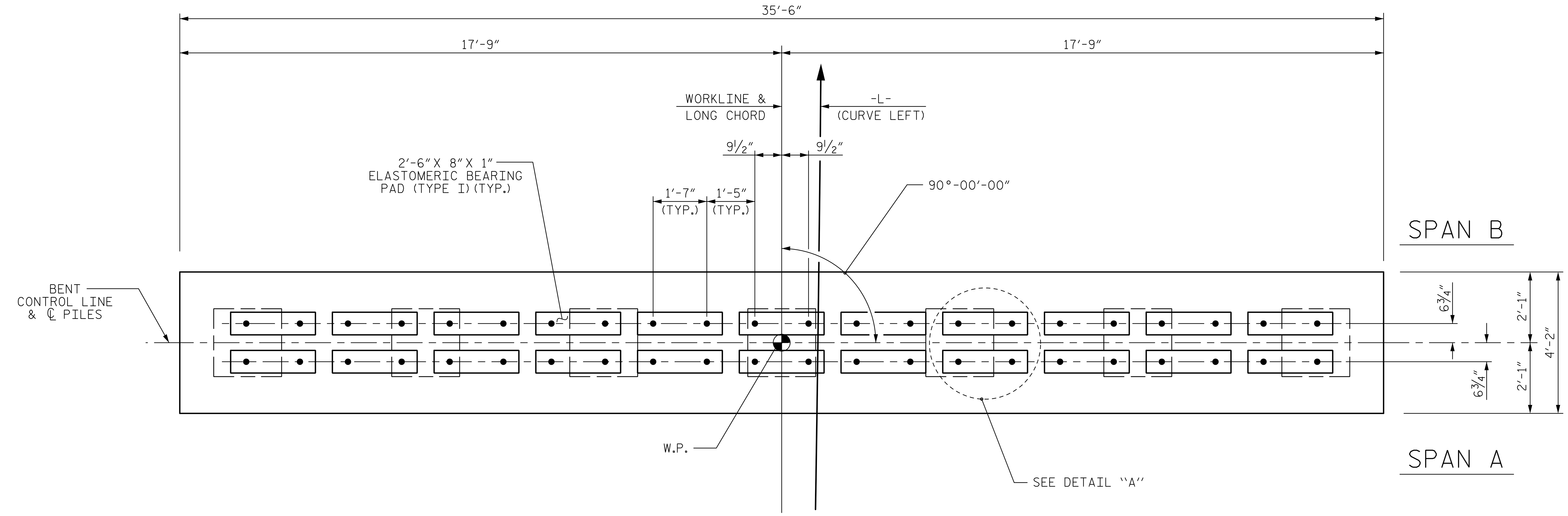
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

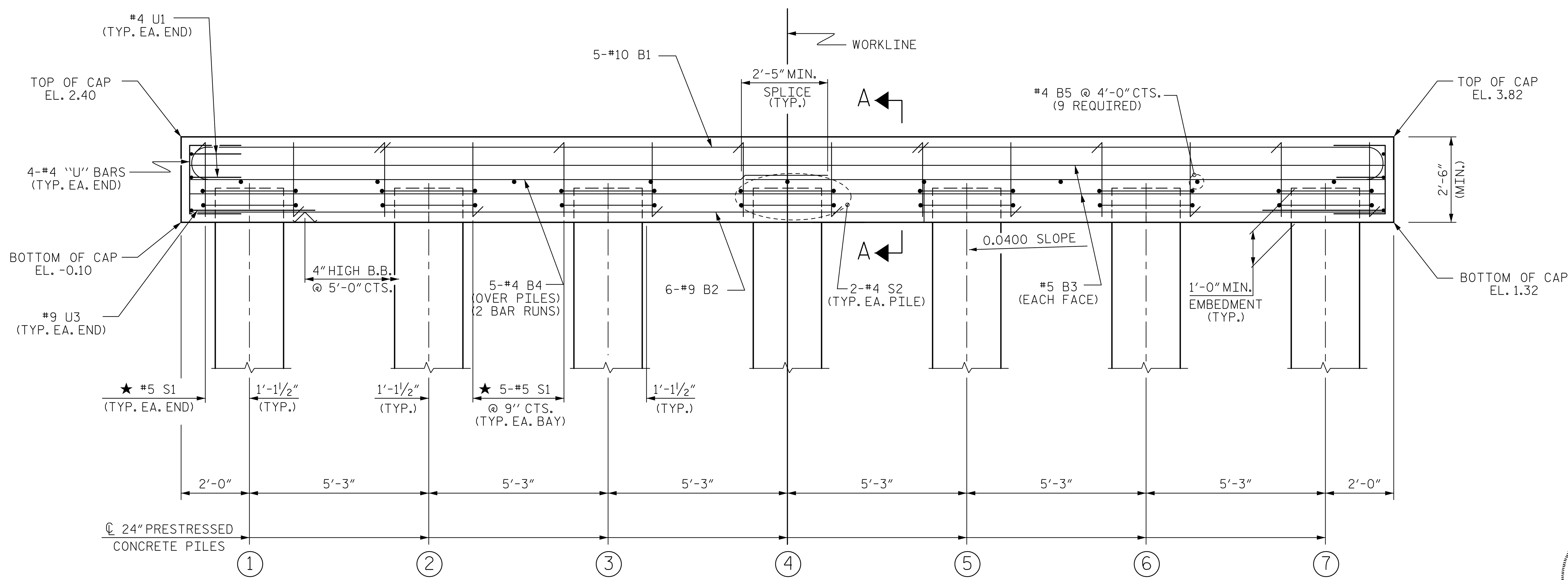
ALL BAR SUPPORTS USED IN THE BENT CAP AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

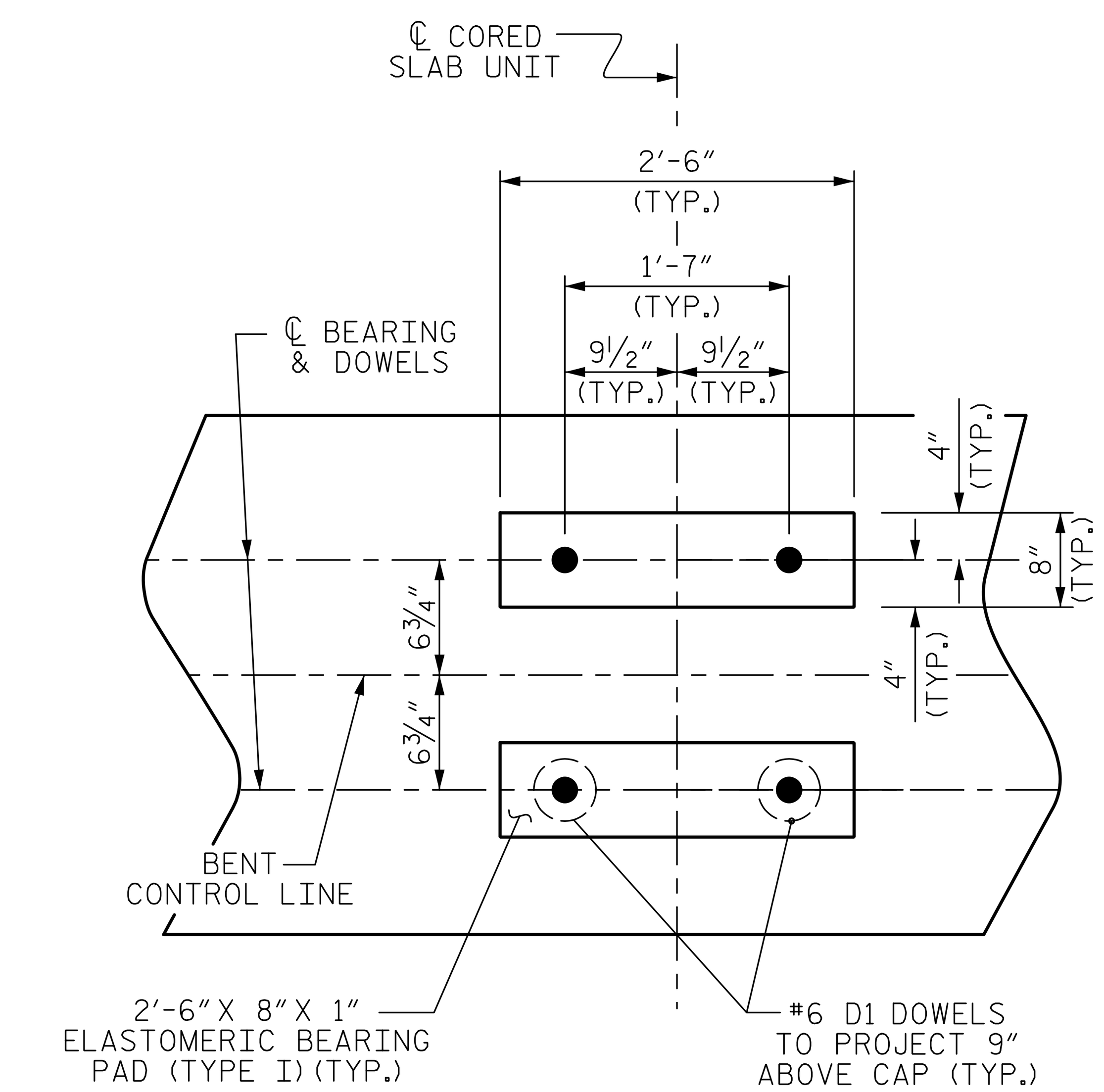


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
1	0.98
2	1.19
3	1.40
4	1.61
5	1.82
6	2.03
7	2.24

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
6/7/2021

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21
DRAWN BY : DGE 06/10	REV. 6/17 MAA/THC
CHECKED BY : MKT 06/10	

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CHECKED BY	D. HAWKINS	DATE 3/21	
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21	

REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.	S-14
1			3			TOTAL SHEETS	20
2			4				

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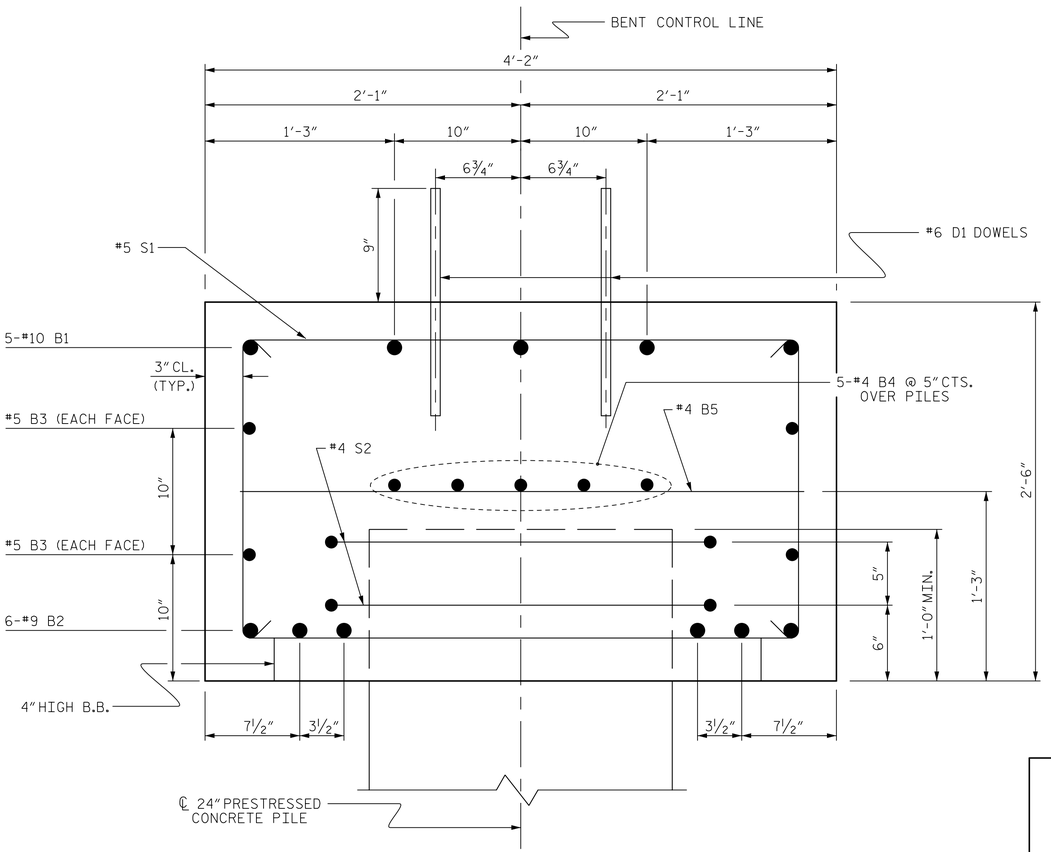
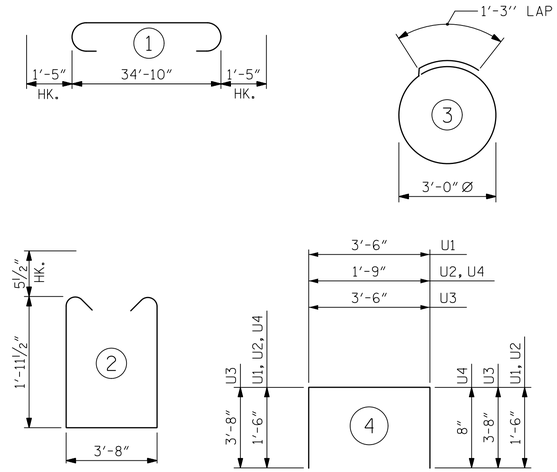


SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#10	1	37′-8″	810
B2	6	#9	STR	35′-0″	714
B3	4	#5	STR	35′-0″	146
B4	10	#4	STR	18′-9″	125
B5	9	#4	STR	3′-8″	22
D1	44	#6	STR	1′-6″	99
S1	32	#5	2	8′-6″	284
S2	14	#4	3	10′-9″	101
U1	4	#4	4	6′-6″	17
U2	4	#4	4	4′-9″	13
U3	2	#9	4	10′-10″	74
U4	4	#4	4	3′-11″	10

EPOXY COATED REINFORCING STEEL (FOR ONE BENT) 2415 LBS

CLASS AA CONCRETE BREAKDOWN (FOR ONE BENT)

TOTAL CLASS AA CONCRETE ▲ 12.7 C.Y.

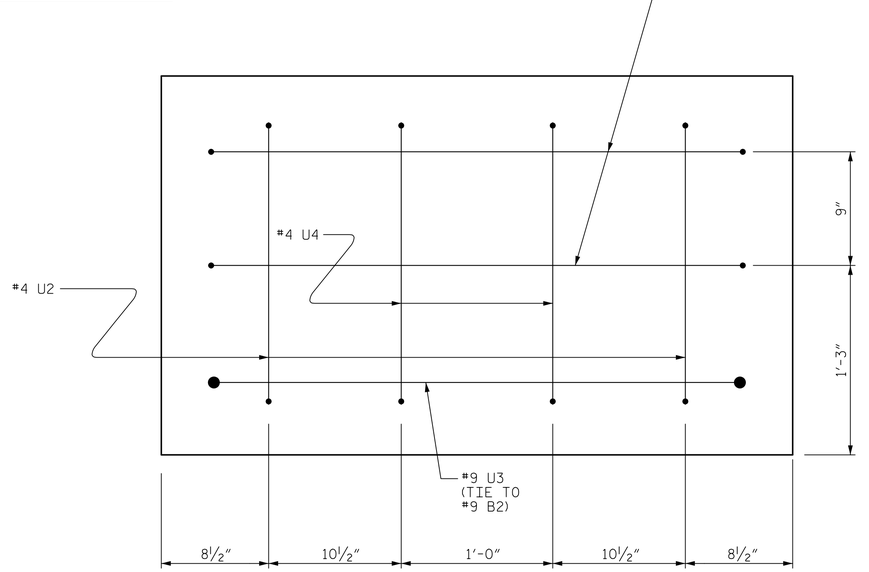
24″PRESTRESSED CONCRETE PILES (FOR ONE BENT)

NO. 7 LIN. FT. 665

PILE DRIVING EQUIPMENT SETUP FOR 24″PRESTRESSED CONCRETE PILES (FOR ONE BENT) NO. 7

PILE REDRIVES NO. 4

▲ CONCRETE DISPLACED BY THE 24″PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.



END OF CAP VIEW
(TYPICAL BOTH ENDS)

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
Docusigned by: David W. Hawkins 6/7/2021

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-15
1			3			TOTAL SHEETS
2			4			20

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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 15

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ASSEMBLED BY : M. WRIGHT DATE : 3/21
CHECKED BY : D. HAWKINS DATE : 3/21

DRAWN BY : DGE 05/10
CHECKED BY : MKT 05/10
REV. 6/17 MAA/THC

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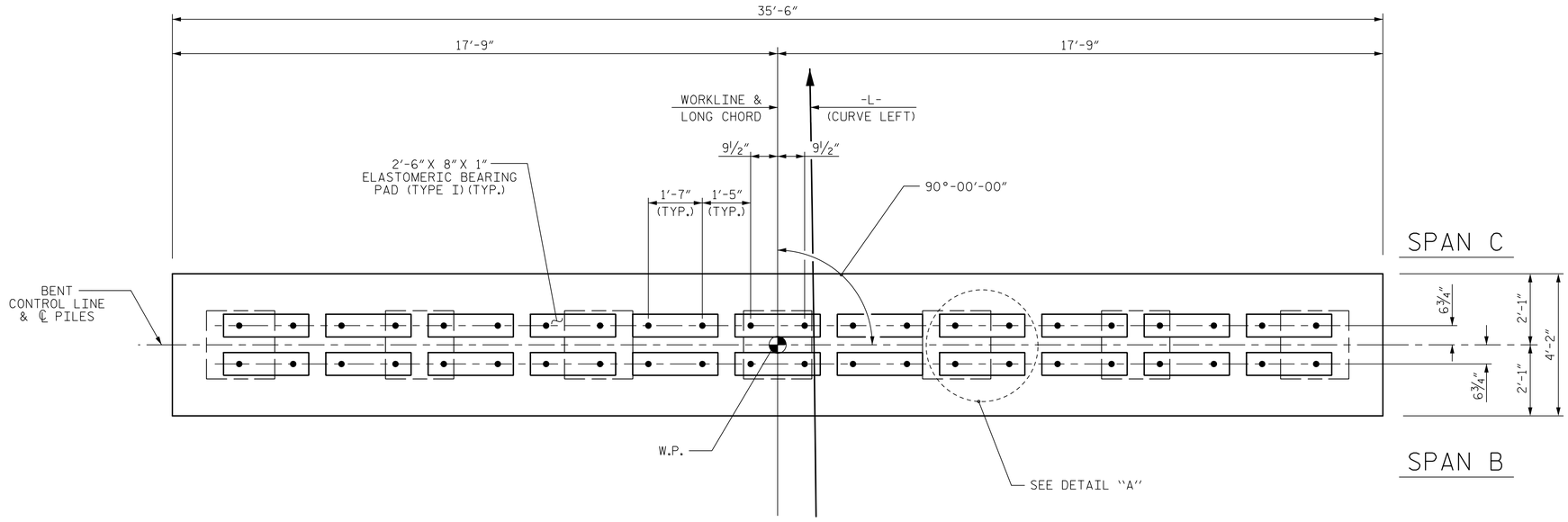
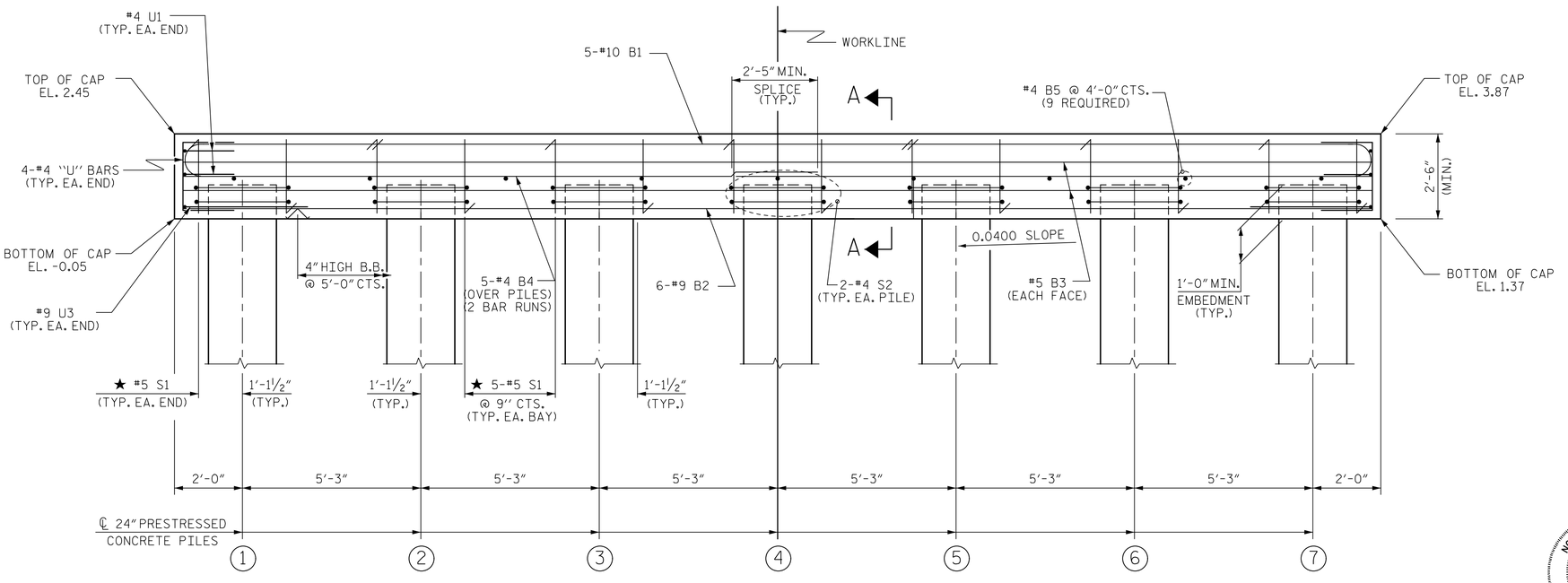


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

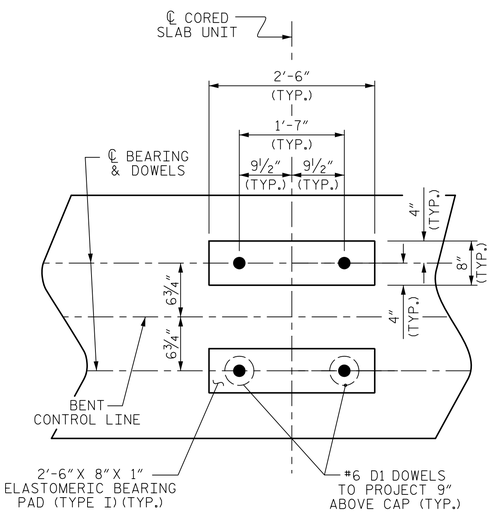
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

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

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

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



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
①	1.03
②	1.24
③	1.45
④	1.66
⑤	1.87
⑥	2.08
⑦	2.29

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

Docusigned by: David W. Hawkins 6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21
DRAWN BY : DGE 06/10	REV. 6/17 MAA/THC
CHECKED BY : MKT 06/10	

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DWG. NO. 16

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-16
1			3			TOTAL SHEETS
2			4			20

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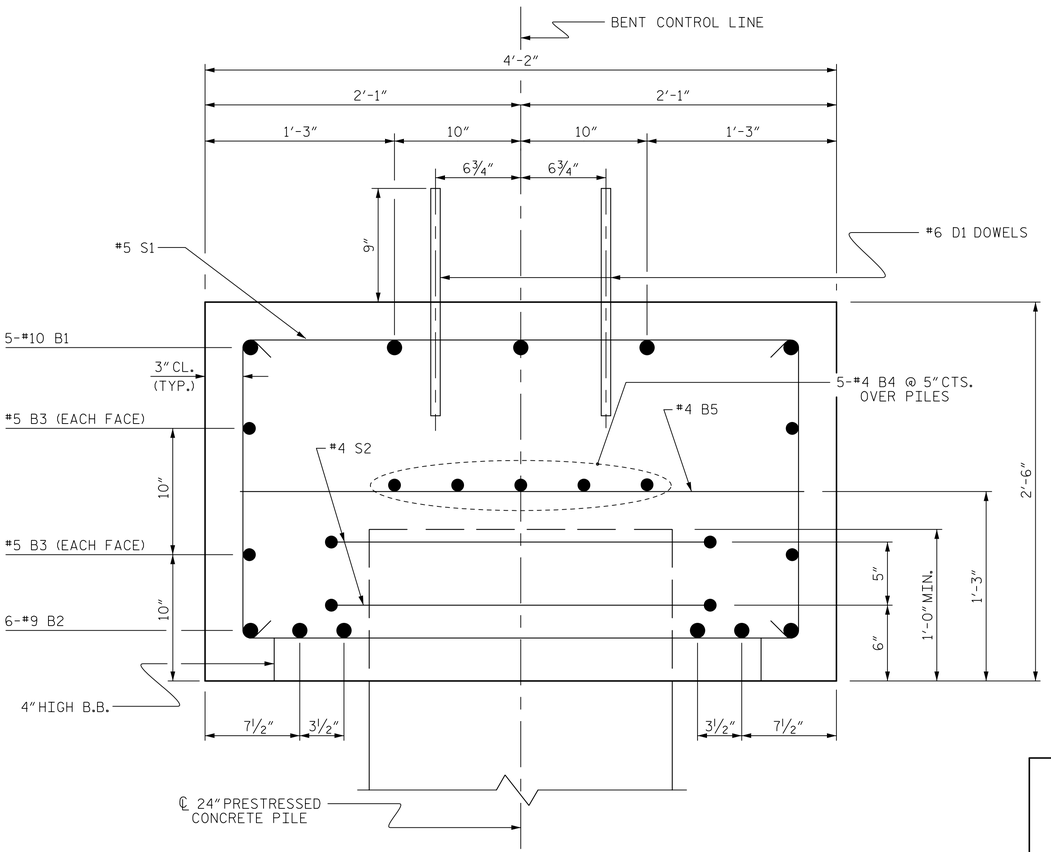
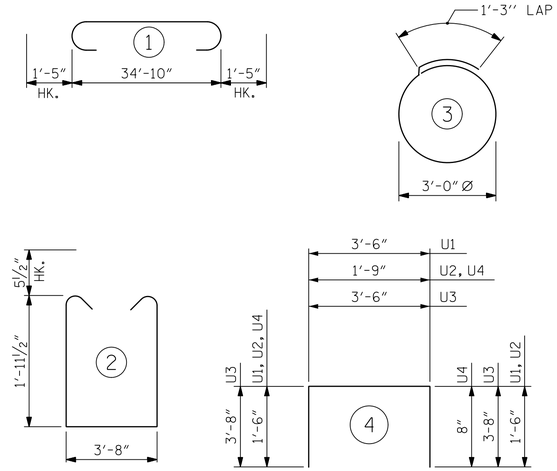
STD.NO. 20"PS_BT_33_90S_<60'



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#10	1	37′-8″	810
B2	6	#9	STR	35′-0″	714
B3	4	#5	STR	35′-0″	146
B4	10	#4	STR	18′-9″	125
B5	9	#4	STR	3′-8″	22
D1	44	#6	STR	1′-6″	99
S1	32	#5	2	8′-6″	284
S2	14	#4	3	10′-9″	101
U1	4	#4	4	6′-6″	17
U2	4	#4	4	4′-9″	13
U3	2	#9	4	10′-10″	74
U4	4	#4	4	3′-11″	10

EPOXY COATED REINFORCING STEEL (FOR ONE BENT) 2415 LBS

CLASS AA CONCRETE BREAKDOWN (FOR ONE BENT)

TOTAL CLASS AA CONCRETE ▲ 12.7 C.Y.

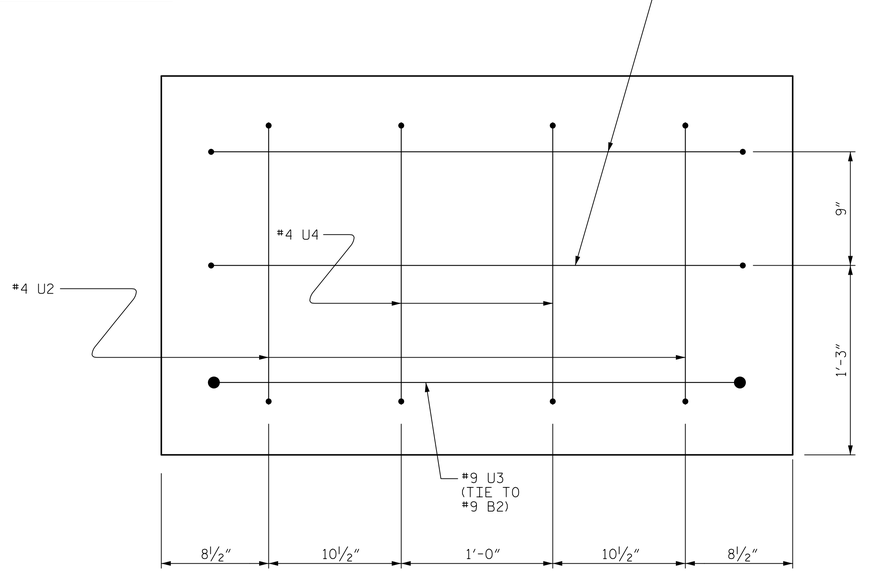
24″PRESTRESSED CONCRETE PILES (FOR ONE BENT)

NO. 7 LIN. FT. 665

PILE DRIVING EQUIPMENT SETUP FOR 24″PRESTRESSED CONCRETE PILES (FOR ONE BENT) NO. 7

PILE REDRIVES NO. 4

▲ CONCRETE DISPLACED BY THE 24″PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.



END OF CAP VIEW
(TYPICAL BOTH ENDS)

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins A9E8375248855487...
6/7/2021

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

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

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DWG. NO. 17

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ASSEMBLED BY : M. WRIGHT DATE : 3/21
CHECKED BY : D. HAWKINS DATE : 3/21

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CHECKED BY : MKT 05/10
REV. 6/17 MAA/THC

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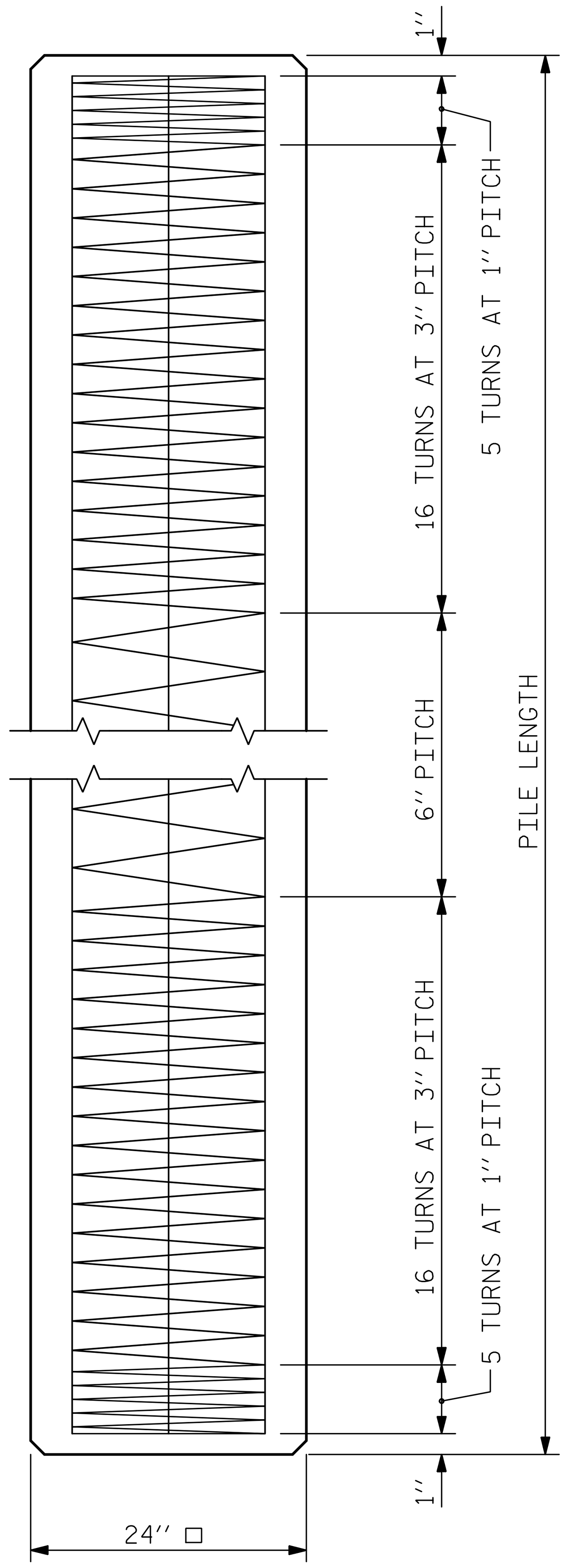
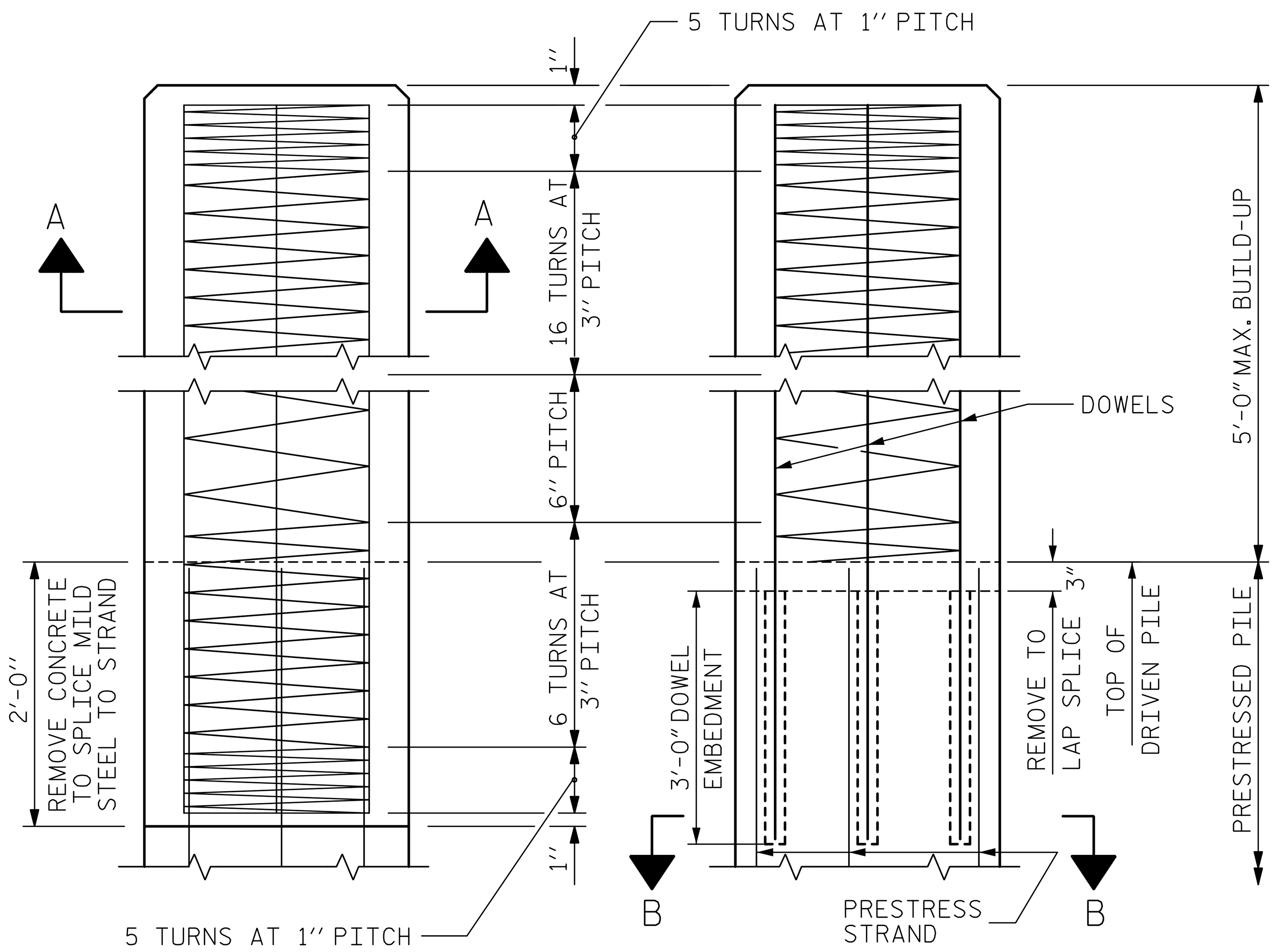
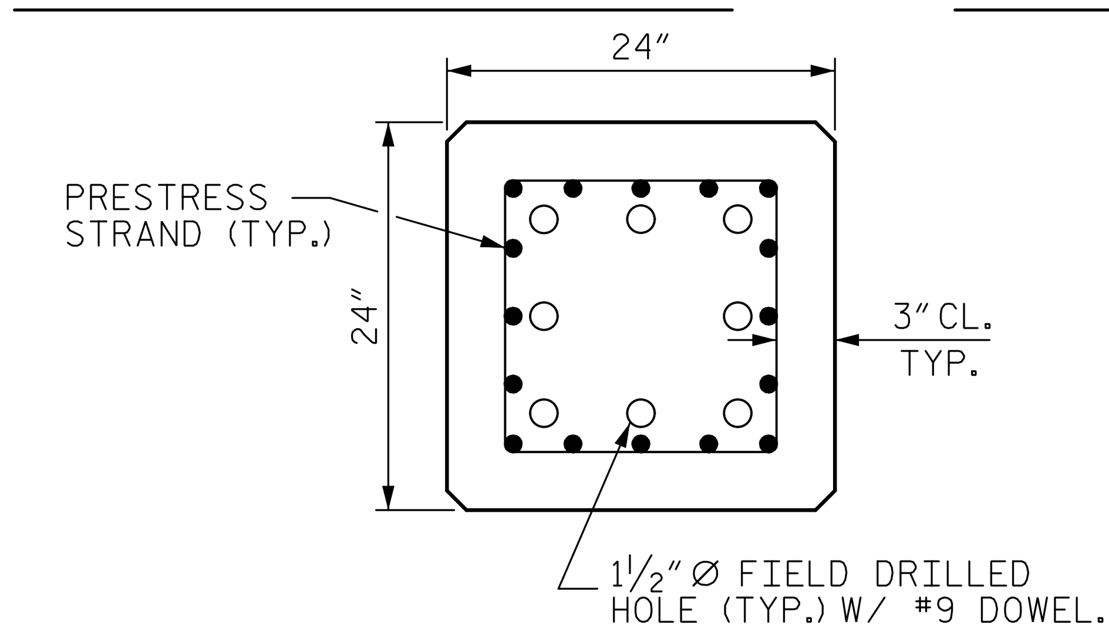


ELEVATION



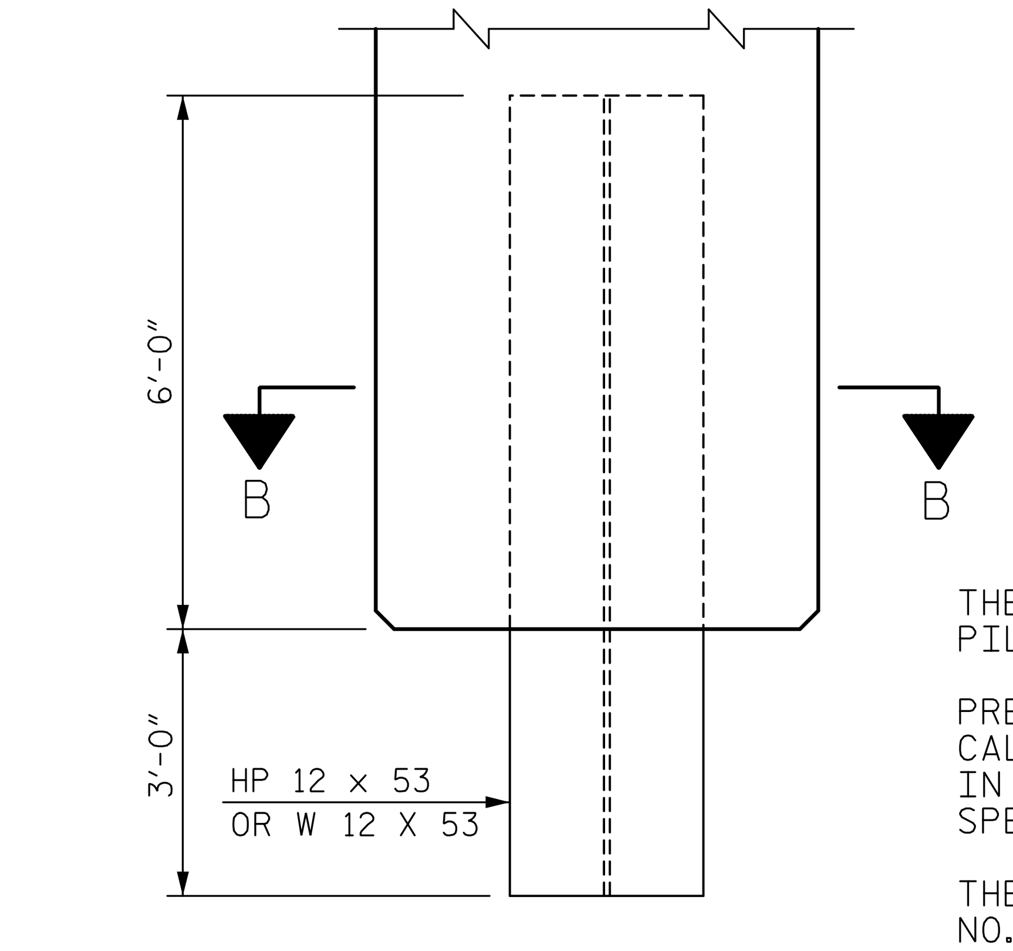
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS

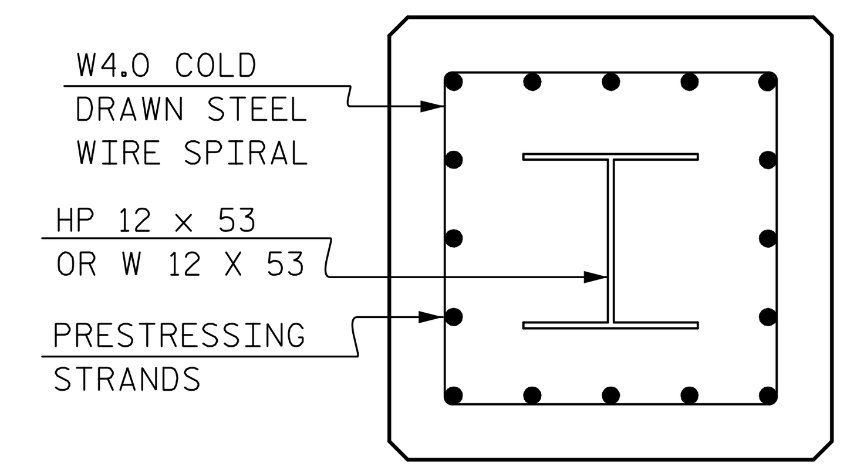


SECTION "B-B"

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



ELEVATION



SECTION B-B

PILE TIP DETAILS

FOR 24'' SQUARE PRESTRESSED CONCRETE PILE

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

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

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

NOTES

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

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

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
0.6''	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

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

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

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

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES, STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 5-5 AND 6-6, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

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

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

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

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

QUANTITIES FOR ONE 24'' SQUARE PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.3L	ONE POINT PICK-UP 0.7L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L	THREE POINT PICK-UP 0.145L	THREE POINT PICK-UP 0.355L
25'-0''	3.69	7.47	7'-6''	17'-6''				
30'-0''	4.43	8.97	9'-0''	21'-0''				
35'-0''	5.17	10.46	10'-6''	24'-6''				
40'-0''	5.91	11.96	12'-0''	28'-0''				
45'-0''	6.64	13.45	13'-6''	31'-6''				
50'-0''	7.38	14.95	15'-0''	35'-0''				
55'-0''	8.12	16.44	16'-6''	38'-6''				
60'-0''	8.86	17.94	18'-0''	42'-0''				
65'-0''	9.60	19.43	19'-6''	45'-6''				
70'-0''	10.33	20.93	21'-0''	49'-0''				
75'-0''	11.07	22.42			15'-6 1/2''	43'-11''		
80'-0''	11.81	23.92			16'-6 1/2''	46'-11''		
85'-0''	12.55	25.41			17'-7''	49'-10''		
90'-0''	13.29	26.91			18'-7 1/2''	52'-9''		
95'-0''	14.03	28.40			19'-8''	55'-8''		
100'-0''	14.76	29.90			20'-8 1/2''	58'-7''		
105'-0''	15.50	31.39					15'-3''	37'-3''
110'-0''	16.24	32.89					15'-11 1/2''	39'-0 1/2''
115'-0''	16.98	34.38					16'-8''	40'-10''
120'-0''	17.72	35.87					17'-5''	42'-7''

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

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

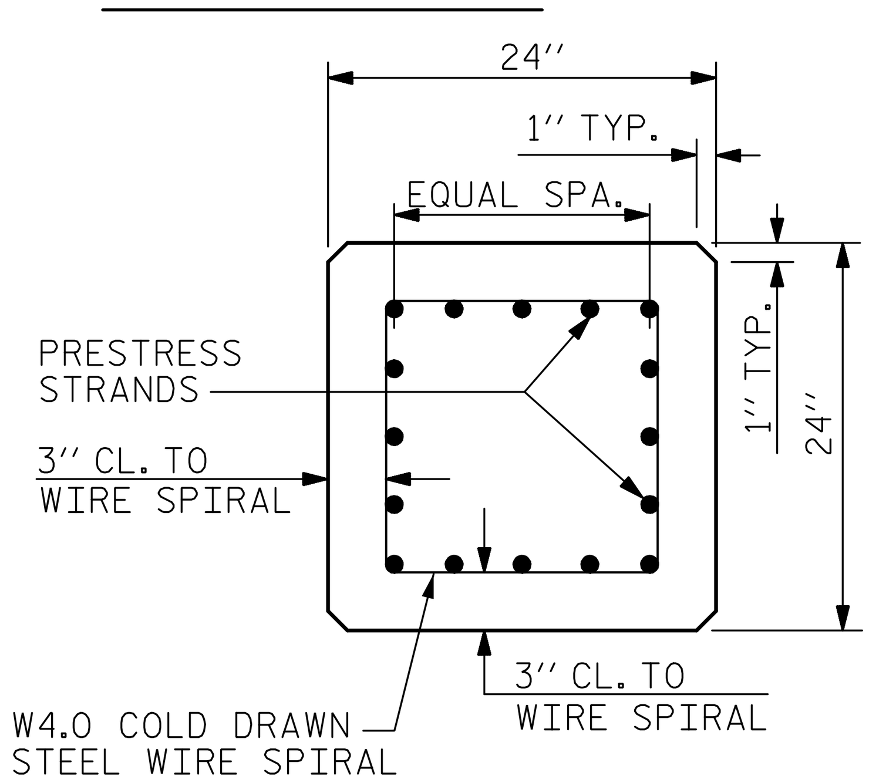
BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3'' OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1/2'' CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

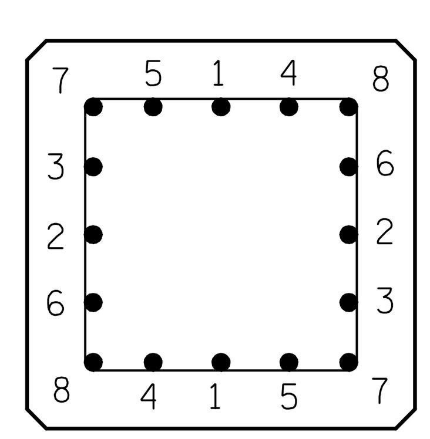
FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

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

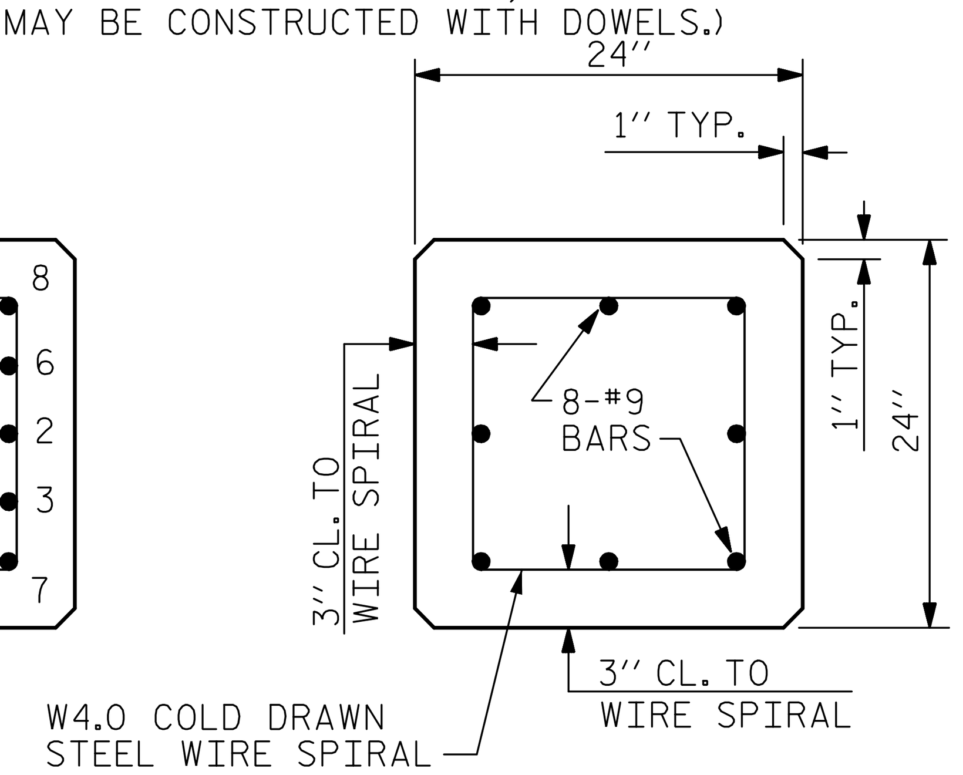
THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.



TYPICAL SECTION

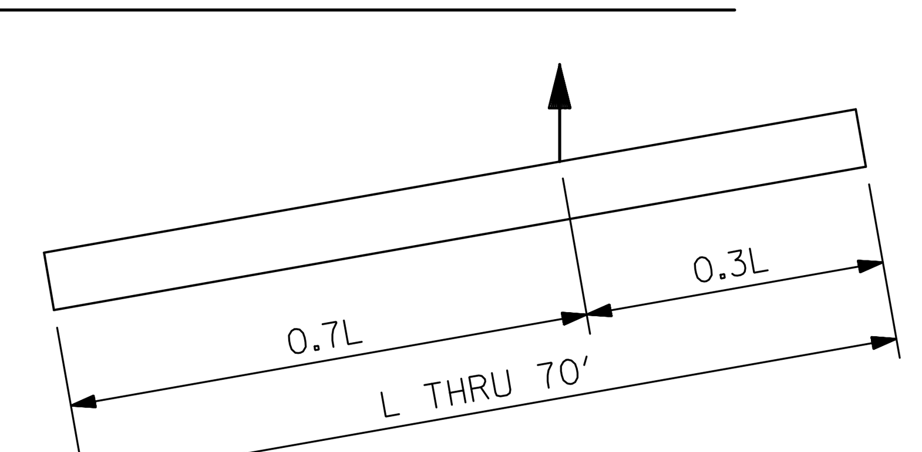


TYPICAL PATTERN FOR BURNING STRANDS

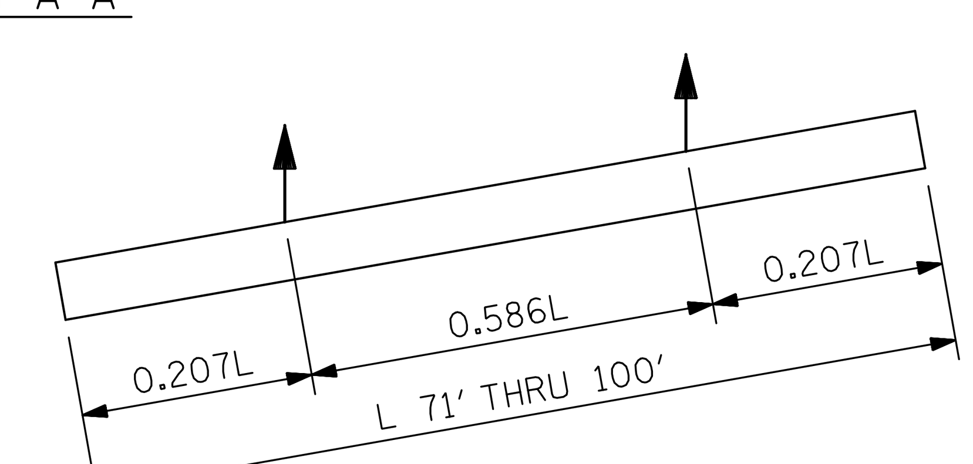


SECTION A-A

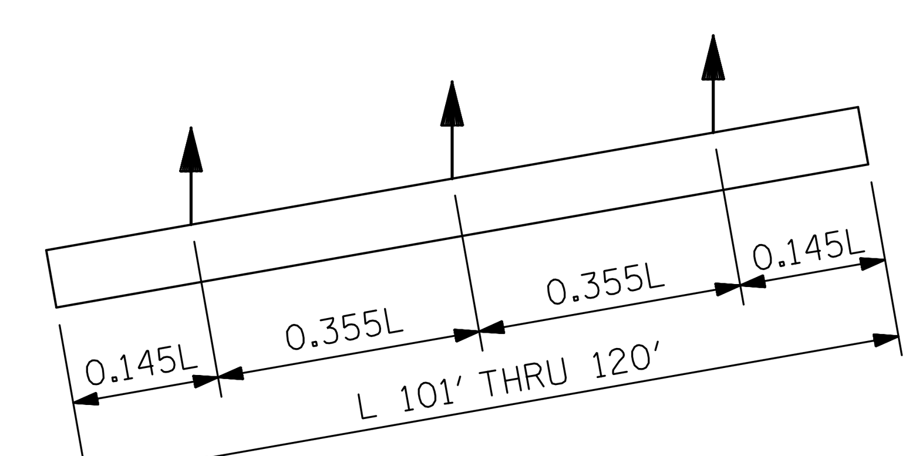
0.6'' Ø GRADE 270 L.R. PRESTRESS STRANDS



ONE POINT PICK-UP



TWO POINT PICK-UP



THREE POINT PICK-UP

PICK-UP POINTS

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

24'' PRESTRESSED CONCRETE PILE

ASSEMBLED BY : M. WRIGHT	DATE : 3/21
CHECKED BY : D. HAWKINS	DATE : 3/21

DRAWN BY : WJH 1/89	REV. 12/14	MAA/TMG
CHECKED BY : CRK 3/89	REV. 12/17	MAA/THC
	REV. 12/20	BNB/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

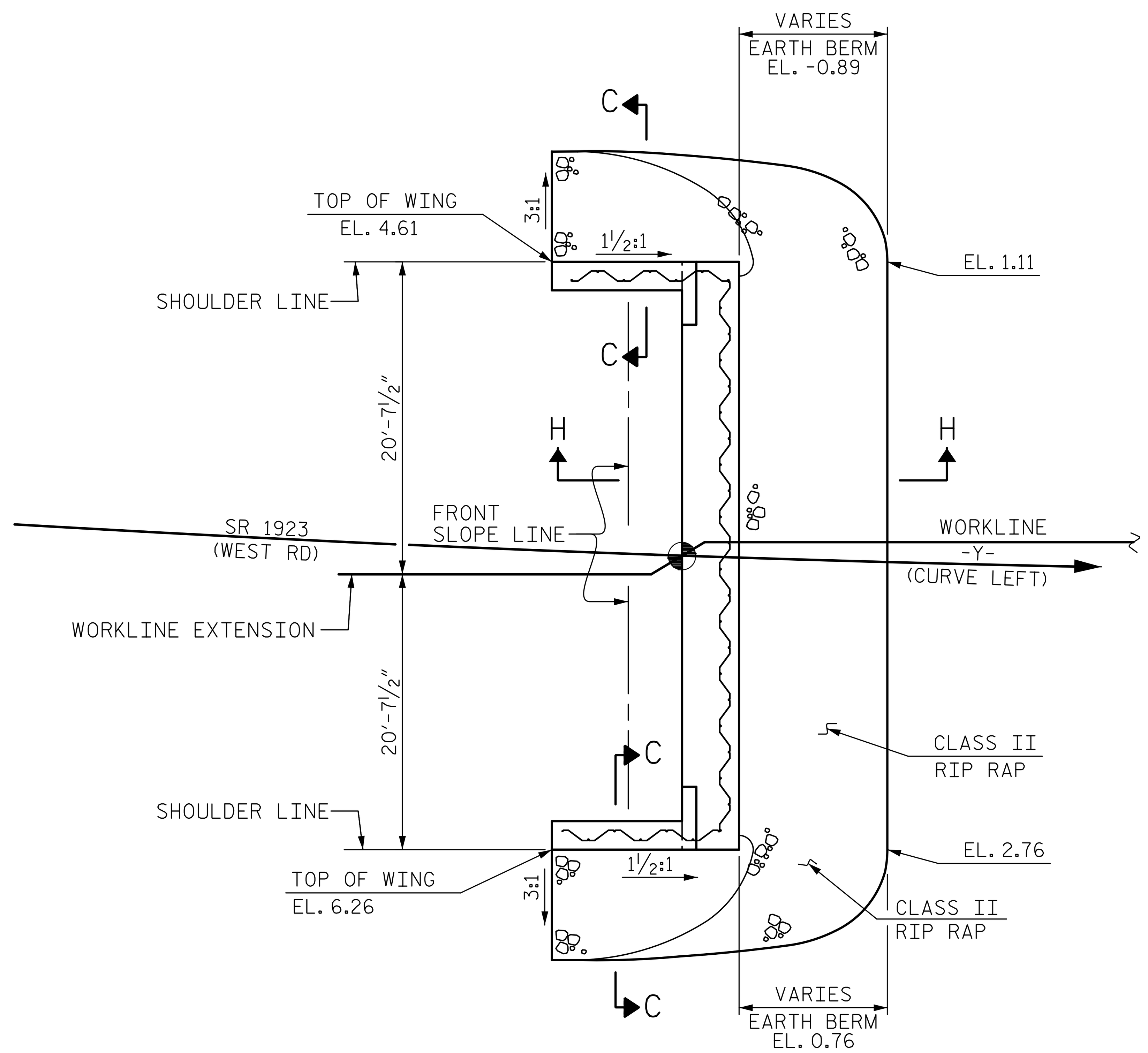
DRAWN BY M. WRIGHT DATE 3/21
CHECKED BY D. HAWKINS DATE 3/21
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 6/21

DWG. NO. 18

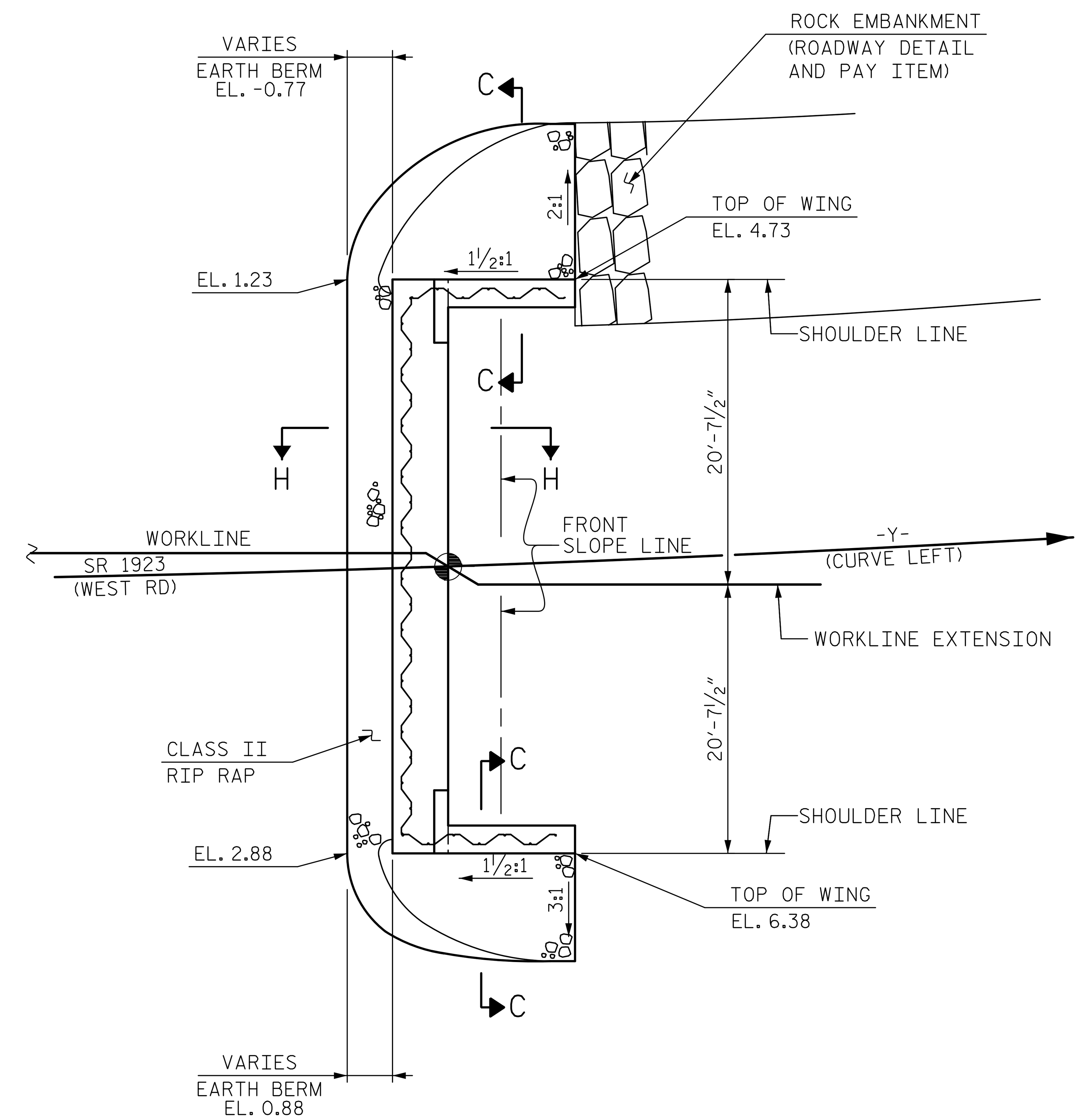
REVISIONS								SHEET NO.
NO.	BY	DATE		NO.	BY	DATE		S-18
1				3				TOTAL SHEETS
2				4				20

STD. NO. PCP4 (SHT 2)

NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



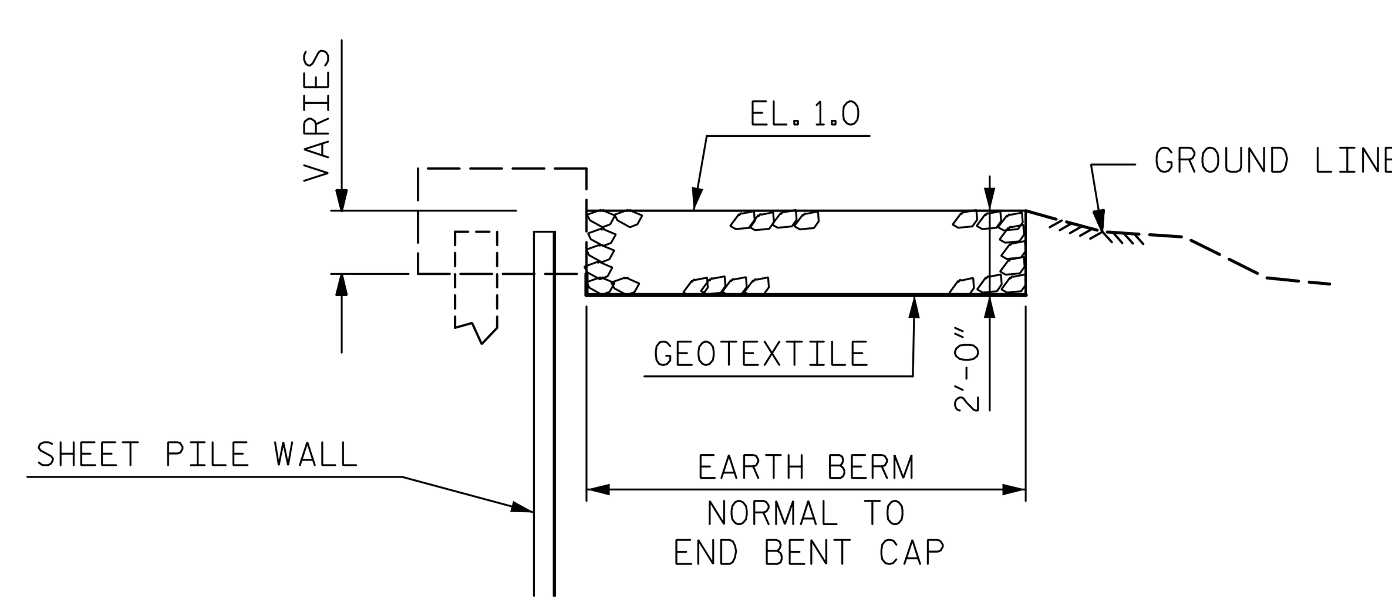
END BENT 1 PLAN



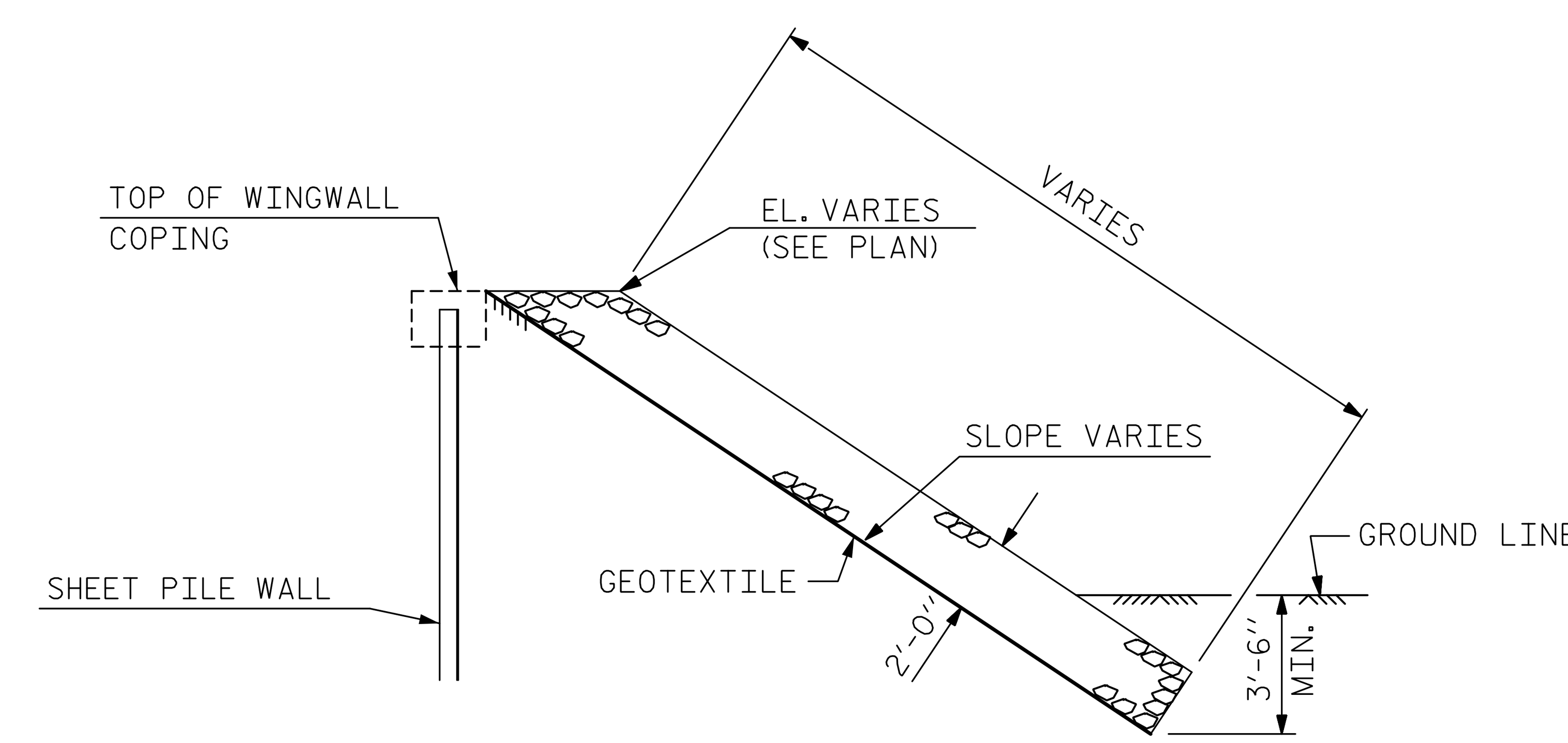
END BENT 2 PLAN

ESTIMATED QUANTITIES

BRIDGE @ STA. 24+10.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	132	150
END BENT 2	71	80



SECTION H-H



SECTION C-C

PROJECT NO. 17BP.2.PE.104
BEAUFORT COUNTY
STATION: 24+10.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins 49E975248855487...
6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

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

DRAWN BY	M. WRIGHT	DATE	3/21
CHECKED BY	D. HAWKINS	DATE	3/21
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	6/21

DWG. NO. 19

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

SHEET NO. S-19
TOTAL SHEETS 20

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT	DATE : 3/21	
CHECKED BY : D. HAWKINS	DATE : 3/21	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

6/7/2021
9:26:40 AM
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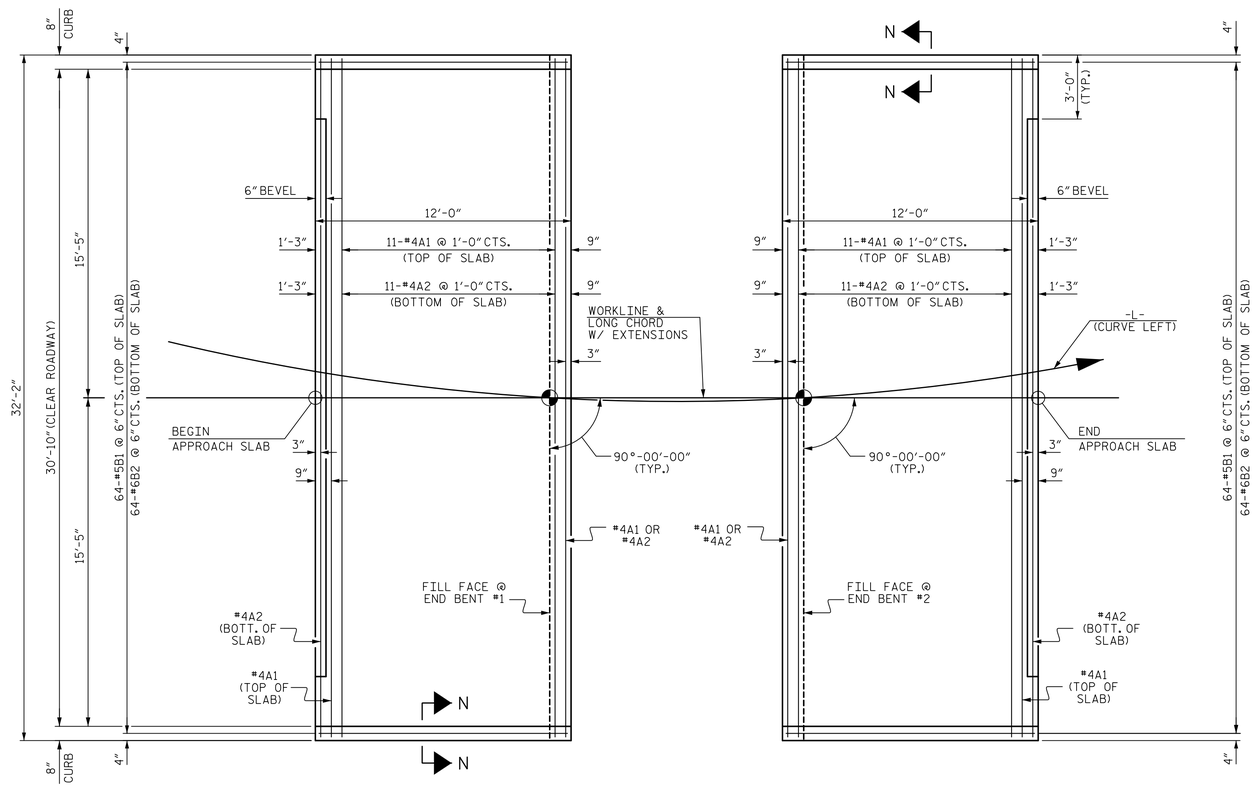
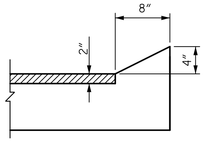
STD. NO. RR1



PLAN @ END BENT #1

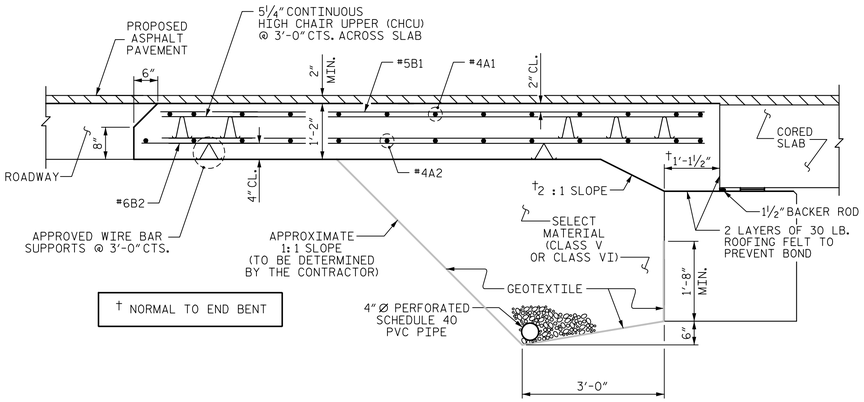
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION N-N

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



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

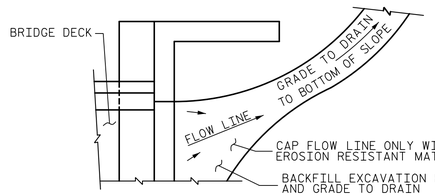
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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

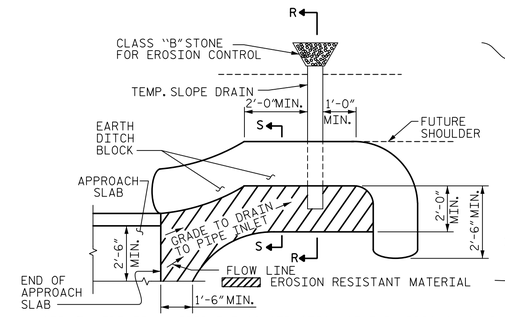
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



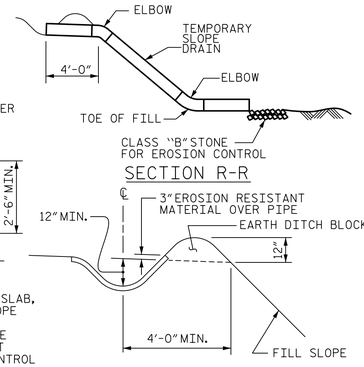
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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

PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	13	#4	STR	31'-10"	276
A2	13	#4	STR	31'-10"	276
✳ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1397
✳ EPOXY COATED REINFORCING STEEL				LBS.	1021
CLASS AA CONCRETE				C.Y.	18.4

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

PROJECT NO. 17BP.2.PE.104

BEAUFORT COUNTY

STATION: 24+10.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

Docusigned by: David W. Hawkins

6/7/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

ASSEMBLED BY : M. WRIGHT	DATE : 3/21	
CHECKED BY : D. HAWKINS	DATE : 3/21	
DRAWN BY : SHS/MAA 5-09	REV. 12-17	MAA/THC
CHECKED BY : BCH 5-09	REV. 08-19	BNB/THC

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

DRAWN BY	M. WRIGHT	DATE 3/21
CHECKED BY	D. HAWKINS	DATE 3/21
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 6/21

DWG. NO. 20

STD. NO. BAS_33_90S

6/7/2021 9:27:00 AM
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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 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 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

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

STD. NO. SN