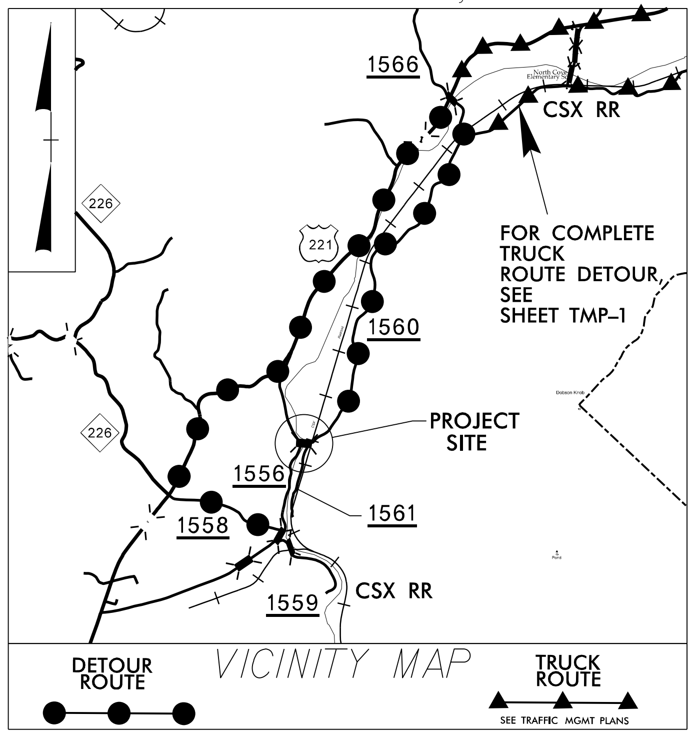
STATE PROJECT: BP13-R048

CONTRACT: DM00458

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

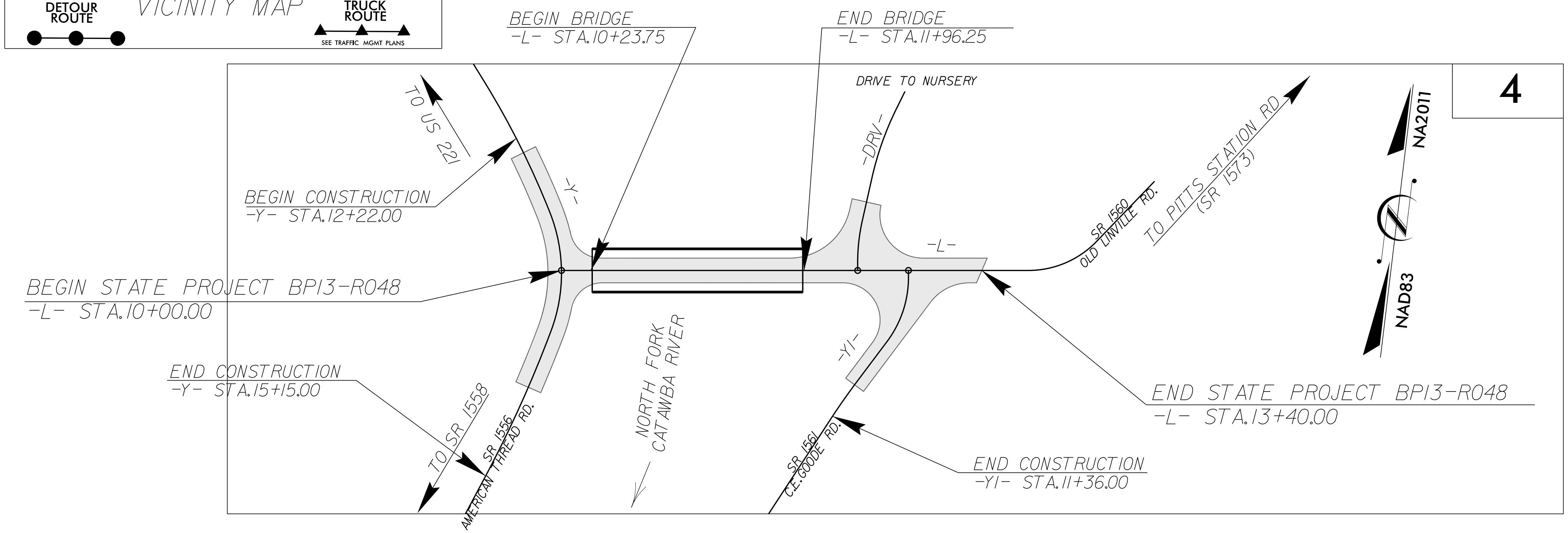
MCDOWELL COUNTY

LOCATION: REPLACE BRIDGE NO. 580108 OVER NORTH FORK CATAWBA RIVER ON SR 1560 (OLD LINVILLE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP13-R048	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
BP13.R048.1		PE
BP13.R048.2		RW & UTIL
BP13.R048.3		CON



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 500
V = 25 MPH
T = 6% *
* TTST = 3% DUAL = 3%
FUNC CLASS = LOCAL
SUB - REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT BP13-R048 = 0.031 MILES

LENGTH OF STRUCTURE PROJECT BP13-R048 = 0.033 MILES

TOTAL LENGTH OF PROJECT BP13-R048 = 0.064 MILES

Prepared In the Office of:

KCI Associates of N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: FEBRUARY 27, 2024

LETTING DATE: NOVEMBER 19, 2025

NCDOT CONTACT: MARK HILL, P.E. — DIVISION 13 BRIDGE PROGRAM MANAGER

Plans Prepared For:

DIVISION OF HIGHWAYS
55 Orange Street
Asheville, NC 28801

BARRY C. SMITH, P.E. — KCI ROADWAY PRACTICE LEAD

TYLER M. KRAUSS, P.E. — KCI ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER — SIGNATURE: 10/24/2025 P.E. — SEAL 033860 LEAH M. YOUNG

ROADWAY DESIGN ENGINEER — SIGNATURE: Tyler Krauss 10/24/2025 P.E. — SEAL 052888 TYLER M. KRAUSS

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER KRAUSS

DocuSigned by: Tyler Krauss 10/24/2025

INDEX OF SHEETS

GENERAL NOTES:

2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024

GRADING AND SURFACING:

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

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY MODIFIED METHOD II (SEE SPECIAL DETAIL, SHEET 2C-1).

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

GUARDRAIL:

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

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 Rutherford EMC (Power),

Charter / Spectrum (Communications), Frontier (Communications)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

2024 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, 2024 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 Modified (Detail in Lieu of Standard)
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Detail in Lieu of Standard)
310.02	Parallel Pipe End Section
DIVISION 4 - MAJOR STRUCTURES	
423.01	Bridge Approach Fills - Type 1 Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.20	Frames and Wide Slot Flat Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.04	Drop Inlet Installation in Shoulder Berm Gutter
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (5801108)	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Existing Control of Access Line — CA
- Proposed Control of Access Line — CA
- Proposed ROW and CA Line — RW CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage/Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge

- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)* — FSS
- SS Force Main Line (SUE – LOS C)* — FSS
- SS Force Main Line (SUE – LOS D)* — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	2A-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER KRAUSS DocuSigned by: Tyler Krauss 10/24/2025	NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH HOLLAND Signed by: Joseph Holland 10/27/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

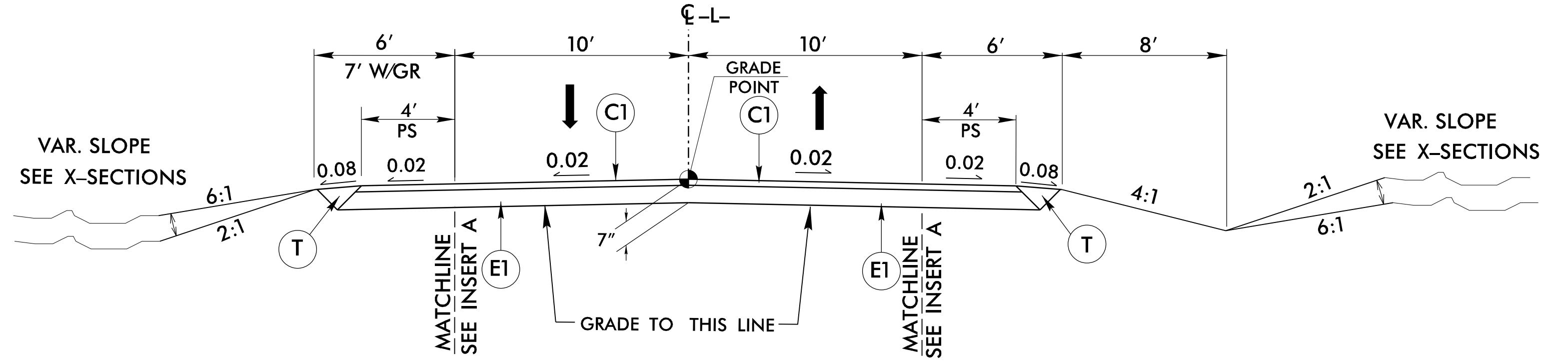
KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

8/17/99

FINAL PAVEMENT DESIGN

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

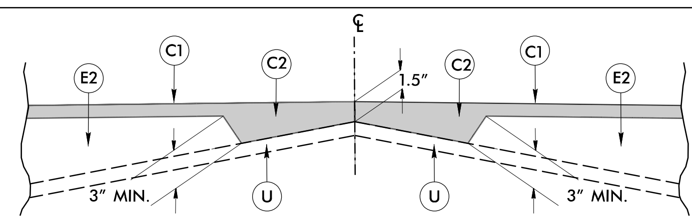
ALL PAVEMENT EDGE SLOPES ARE 1:1



TYPICAL SECTION 1

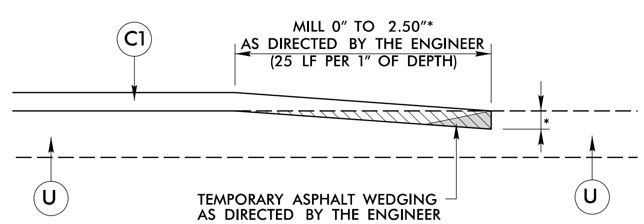
TYPICAL SECTION 1

-L- STA. 10+11.00 TO STA. 10+23.75 (BEG BRIDGE)
-L- STA. 11+96.25 (END BRIDGE) TO STA. 13+40.00



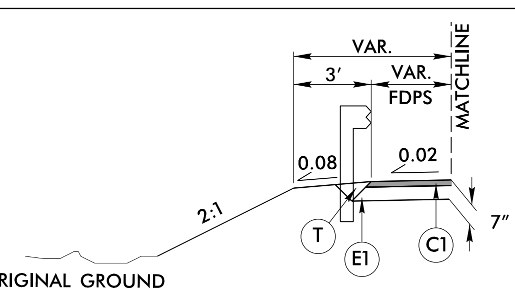
Detail Showing Method of Wedging

PROFILE KEY-IN DETAIL



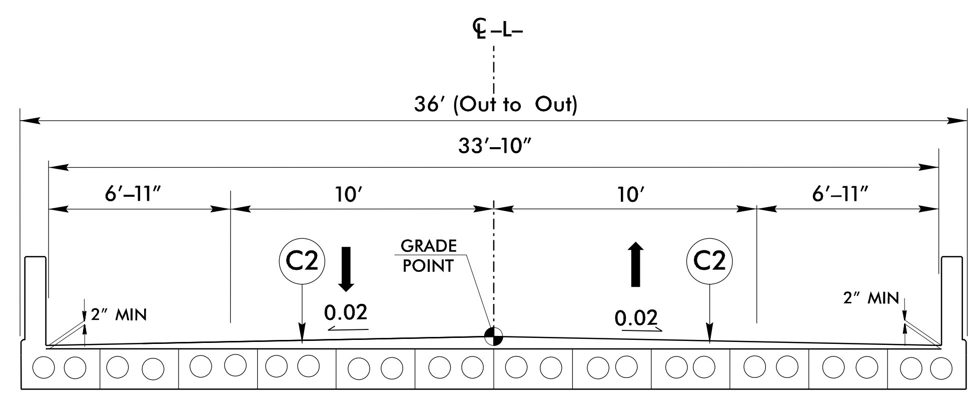
* MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

** SEE TYPICALS FOR MIX TYPE



INSET A

USE IN GUARDRAIL LOCATIONS



TYPICAL SECTION 2

21" CORED SLAB
24" CORED SLAB

TYPICAL SECTION 2

-L- STA. 10+23.75 TO STA. 11+96.25

REVISIONS

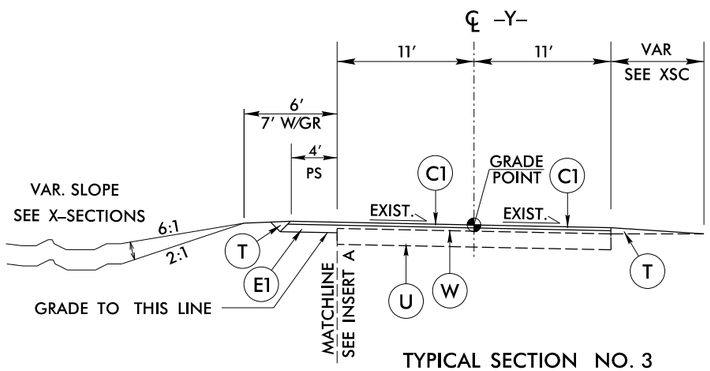
8/17/99

REVISIONS

FINAL PAVEMENT DESIGN

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

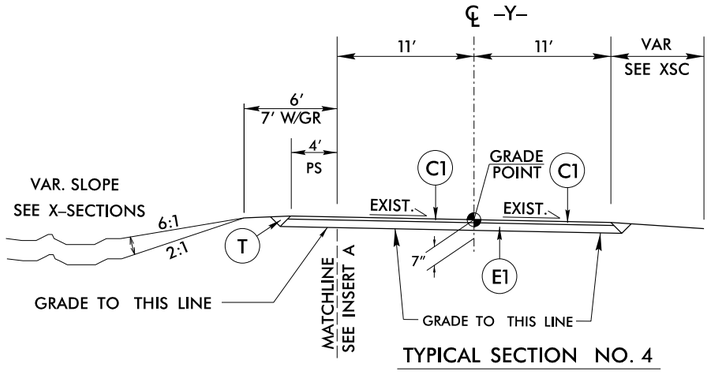
ALL PAVEMENT EDGE SLOPES ARE 1:1



TYPICAL SECTION NO. 3

TYPICAL SECTION 3

–Y– STA. 12+35.00 TO STA. 13+00.00
–Y– STA. 13+65.00 TO STA. 14+35.00



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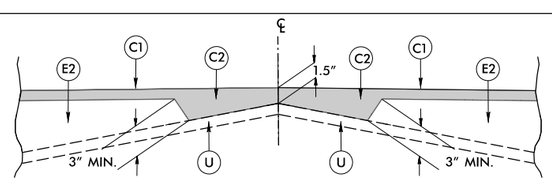
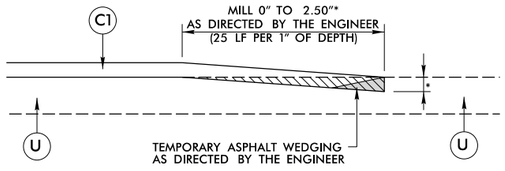
TYPICAL SECTION 4

–Y– STA. 13+00.00 TO STA. 13+65.00



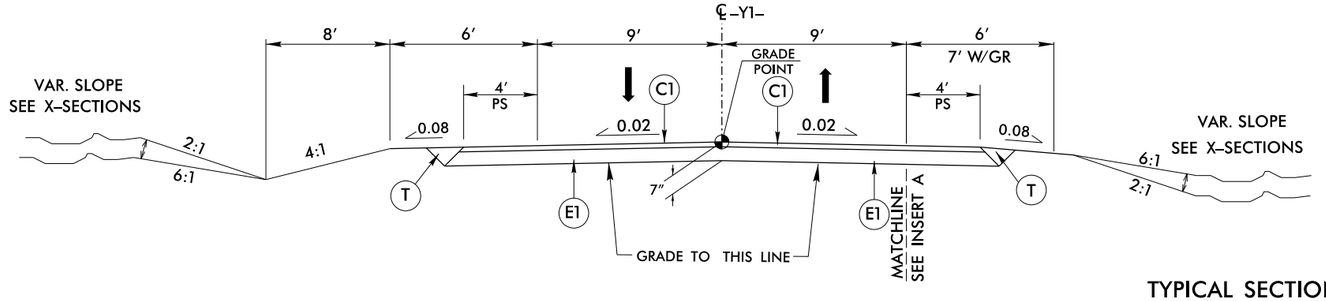
Detail Showing Method of Wedging

PROFILE KEY–IN DETAIL



* MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

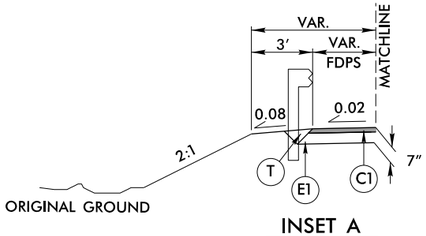
** SEE TYPICALS FOR MIX TYPE



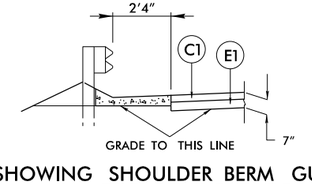
TYPICAL SECTION NO. 5

TYPICAL SECTION NO. 5

–Y1– STA. 10+10.00 TO STA. 11+05.00

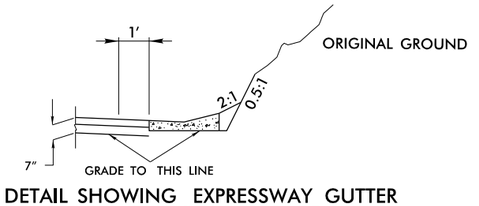


INSET A
USE IN GUARDRAIL LOCATIONS



DETAIL SHOWING SHOULDER BERM GUTTER (SBG) ON TOP OF SUBGRADE

–Y– STA. 12+88.00 TO STA. 13+13.60 (LT)
–Y– STA. 13+61.40 TO STA. 13+90.00 (LT)



DETAIL SHOWING EXPRESSWAY GUTTER ON TOP OF SUBGRADE

–Y– STA. 12+45.00 TO –Y– STA. 14+25.00 (RT)

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	2A-2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER KRAUSE

Tyler Krause 10/24/2025

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH HOLLAND

Joseph Holland 10/27/2025

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KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
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24-OCT-2025 10:21
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$$$$USERNAME$$$$

8/17/99

REVISIONS

ROADWAY DESIGN ALIGNMENT AND DIMENSIONS

FOR PLANS SEE SHEET 4

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	2B-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER KRAUSS

Tyler Krauss 10/24/2025

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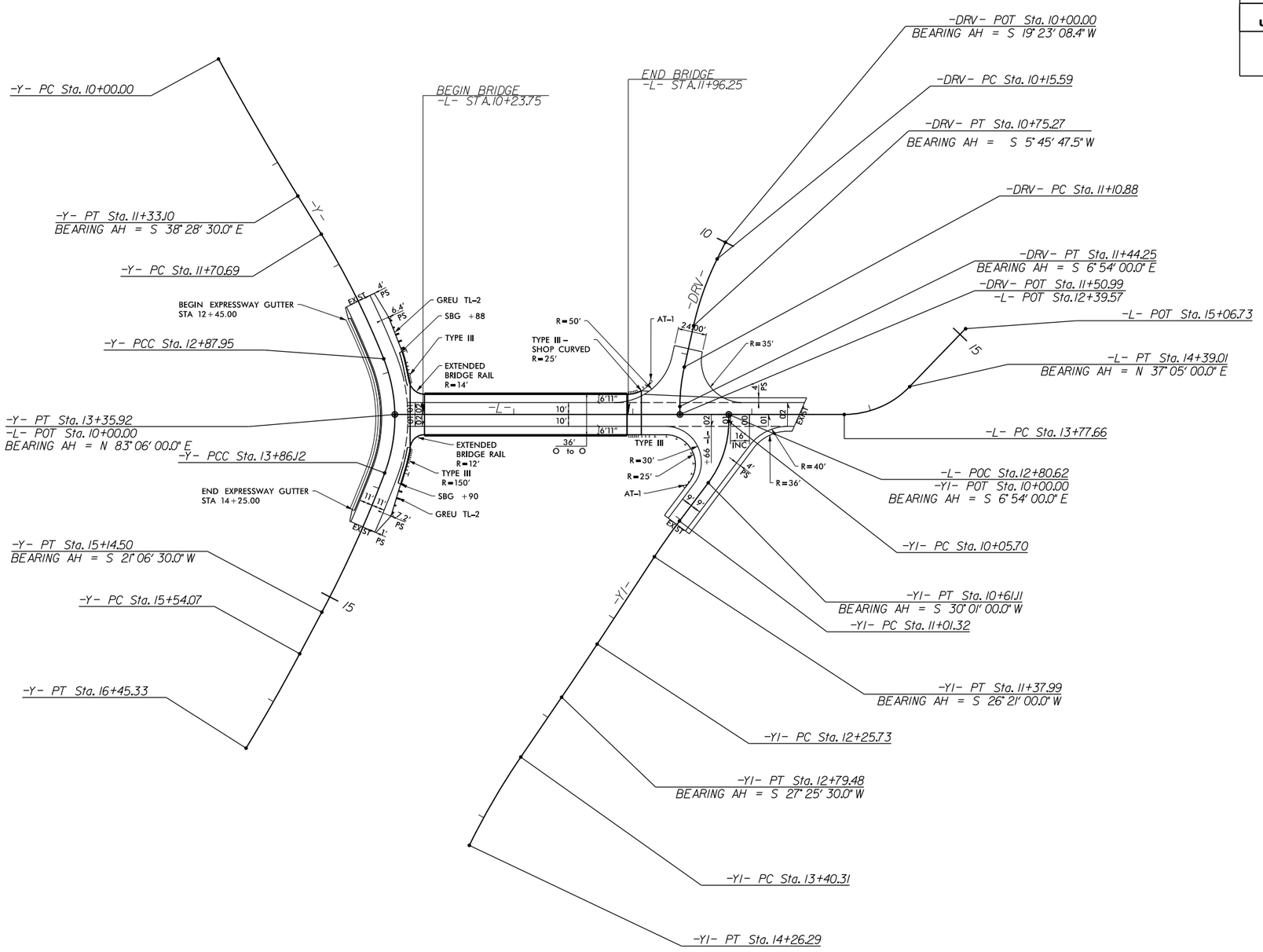

-L-

PI Sta 14+10.10
△ = 46° 01' 00.0" (LT)
D = 75° 00' 00.0"
L = 61.36'
T = 32.44'
R = 76.39'

-Y- AMERICAN THREAD ROAD (SR 1556)

PI Sta 10+66.56	PI Sta 12+29.47	PI Sta 13+39.39	PI Sta 14+50.40	PI Sta 15+99.71
△ = 2° 59' 40.9" (LT)	△ = 9° 58' 03.5" (RT)	△ = 42° 14' 01.1" (RT)	△ = 7° 22' 55.4" (RT)	△ = 3° 11' 39.2" (RT)
D = 2° 15' 00.0"	D = 8° 30' 00.0"	D = 43° 01' 23.5"	D = 5° 45' 00.0"	D = 3° 30' 00.0"
L = 133.10'	L = 117.27'	L = 98.16'	L = 128.38'	L = 91.26'
T = 66.56'	T = 58.78'	T = 51.43'	T = 64.28'	T = 45.64'
R = 2,546.48'	R = 674.07'	R = 133.17'	R = 996.45'	R = 1,637.02'

-DRV-

PI Sta 10+45.57	PI Sta 11+27.63
△ = 13° 37' 20.9" (LT)	△ = 12° 39' 47.5" (LT)
D = 22° 49' 37.2"	D = 37° 56' 39.2"
L = 59.68'	L = 33.37'
T = 29.98'	T = 16.75'
R = 251.00'	R = 151.00'

-Y1- C.E.GOODE ROAD (SR 1561)

PI Sta 10+34.40	PI Sta 11+19.66	PI Sta 12+52.60	PI Sta 13+83.38
△ = 36° 55' 00.0" (RT)	△ = 3° 40' 00.0" (LT)	△ = 1° 04' 30.0" (RT)	△ = 8° 10' 05.7" (LT)
D = 66° 37' 22.8"	D = 10° 00' 00.0"	D = 2° 00' 00.0"	D = 9° 30' 00.0"
L = 55.41'	L = 36.67'	L = 53.75'	L = 85.98'
T = 28.71'	T = 18.34'	T = 26.88'	T = 43.06'
R = 86.00'	R = 572.96'	R = 2,864.79'	R = 603.11'

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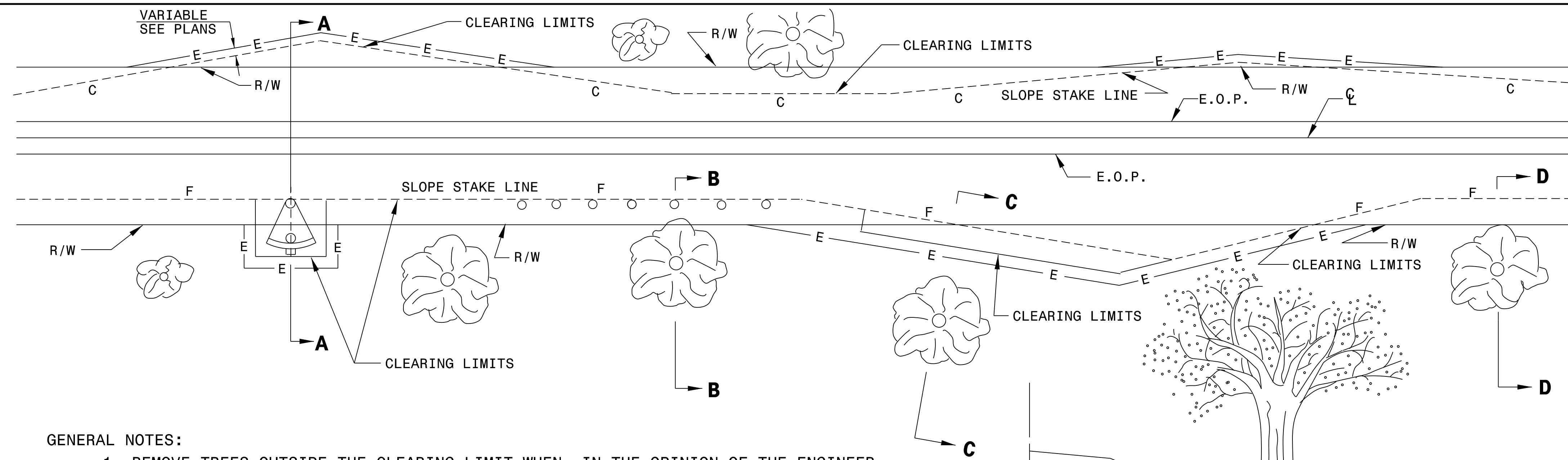
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

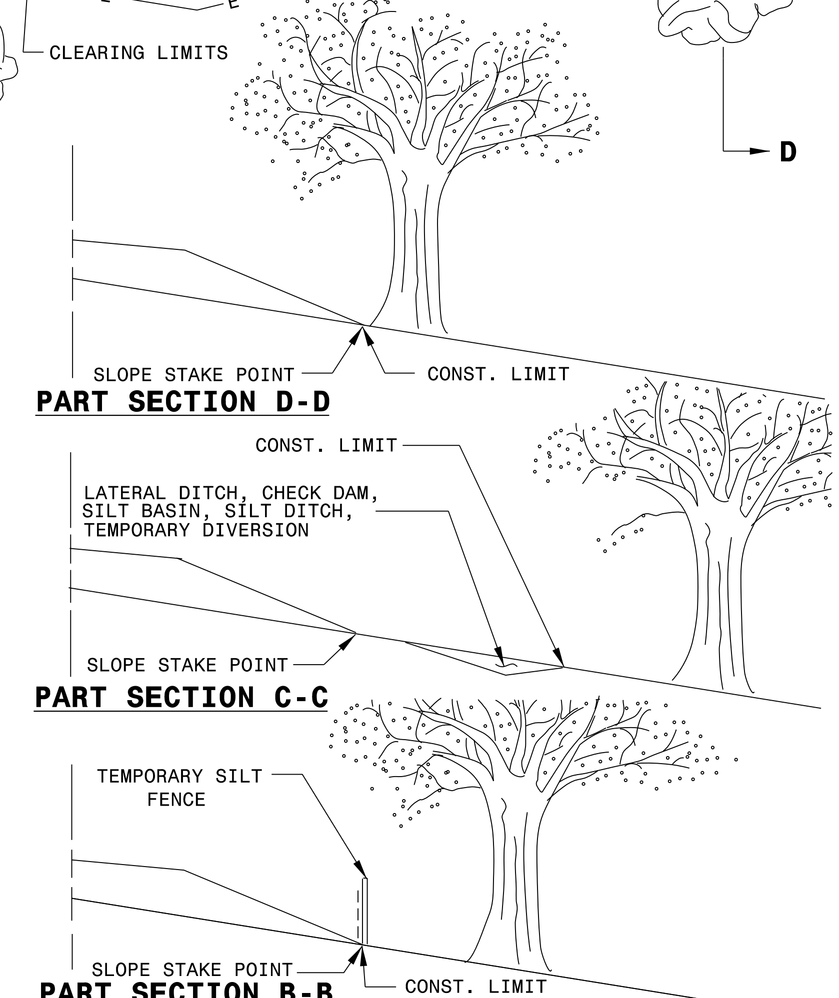
ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
MODIFIED METHOD - II

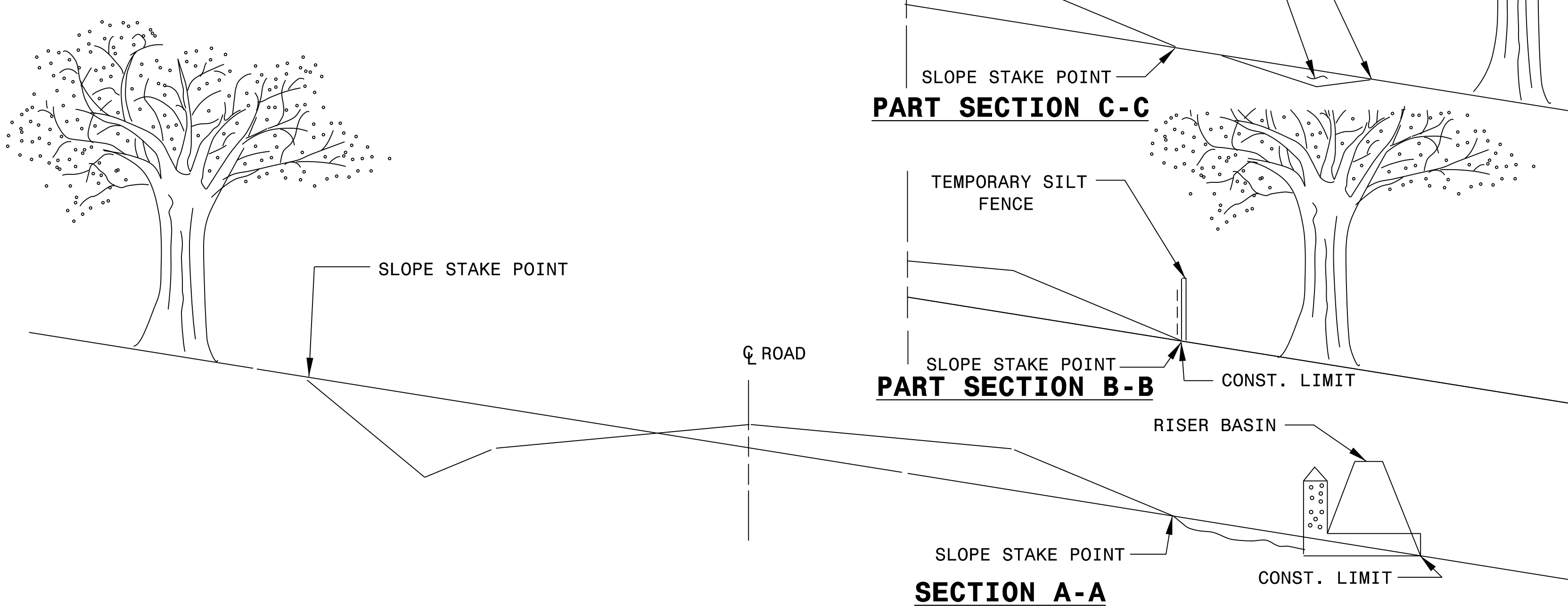


GENERAL NOTES:

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.
3. FOR SECTIONS WITH WIDE MEDIANS WHERE TREES ARE TO REMAIN, CLEAR THE MEDIAN SIDE IN THE SAME MANNER AS ON THE OUTSIDE.
4. HAND CLEAR AS NEEDED TO 5' OUTSIDE THE SLOPE STAKE LINES FOR INSTALLATION OF EROSION CONTROL DEVICES.

CLEAR TO SLOPE STAKE LINE OR CONSTRUCTION LIMITS





SHEET 1 OF 1
200d02

7/7/2021

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton

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CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
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ORIGINAL BY: rnbritt DATE: 05-02-11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: details/nbritt/english/urban/u3615aconcreteflume.dgn

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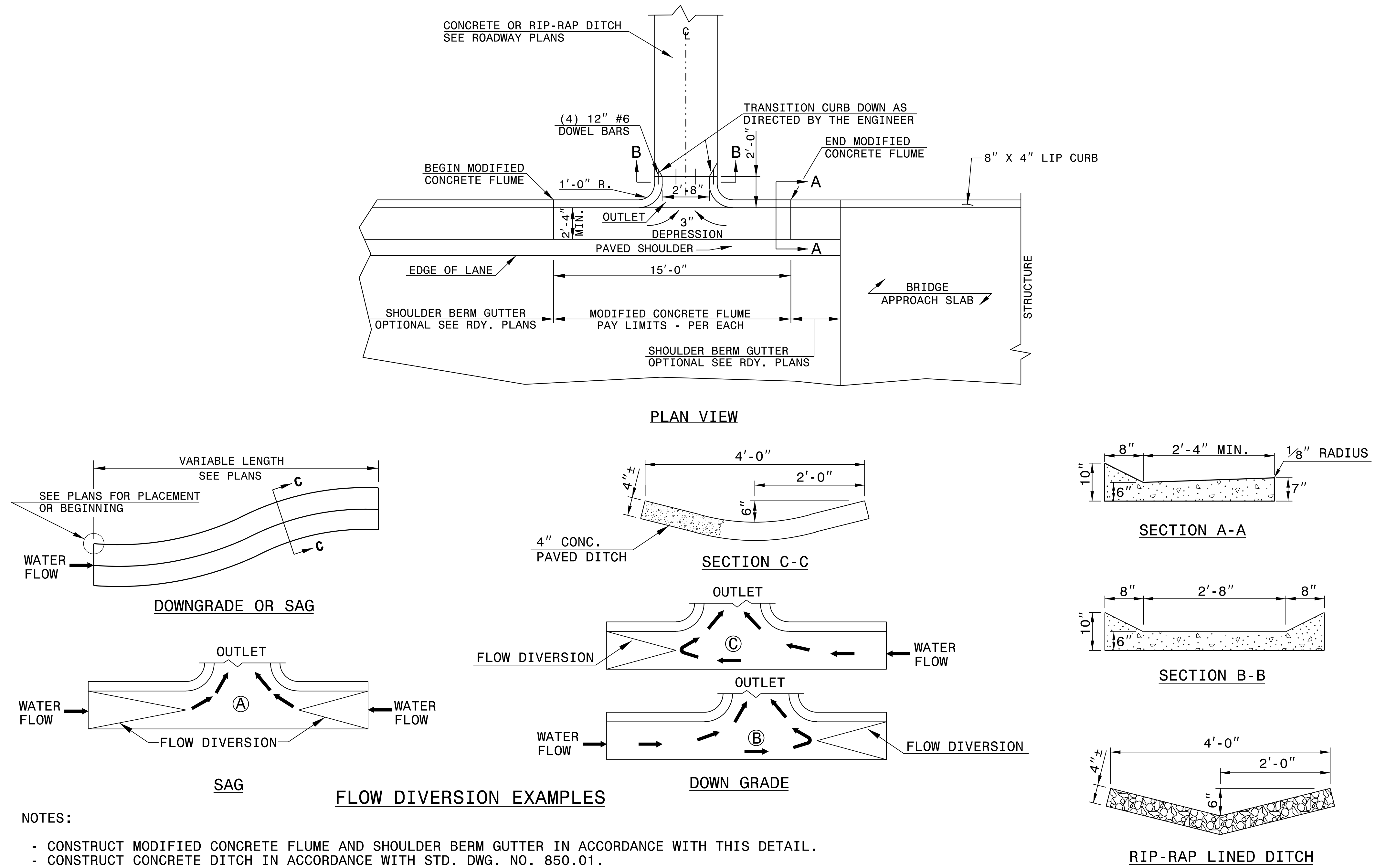
ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH



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

7/7/2021

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

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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
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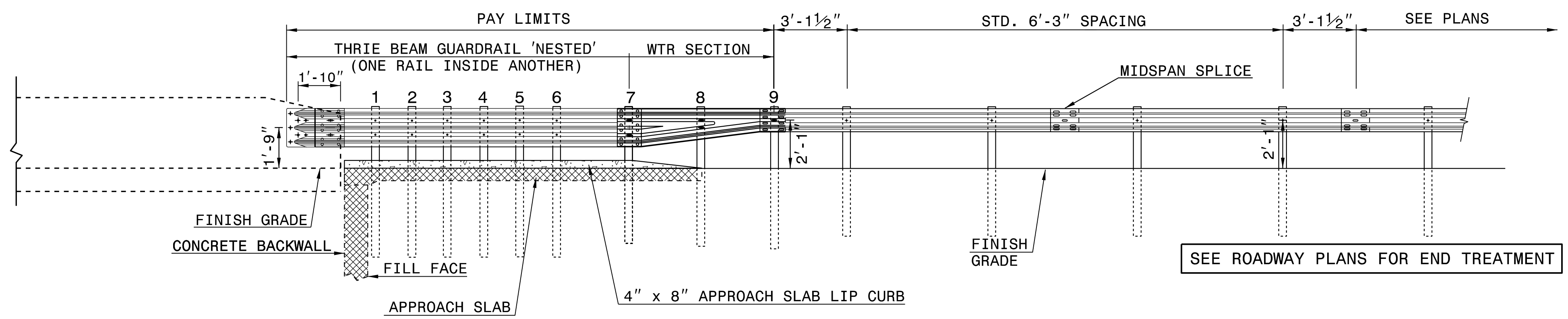
jhowerton AT CSD-292595

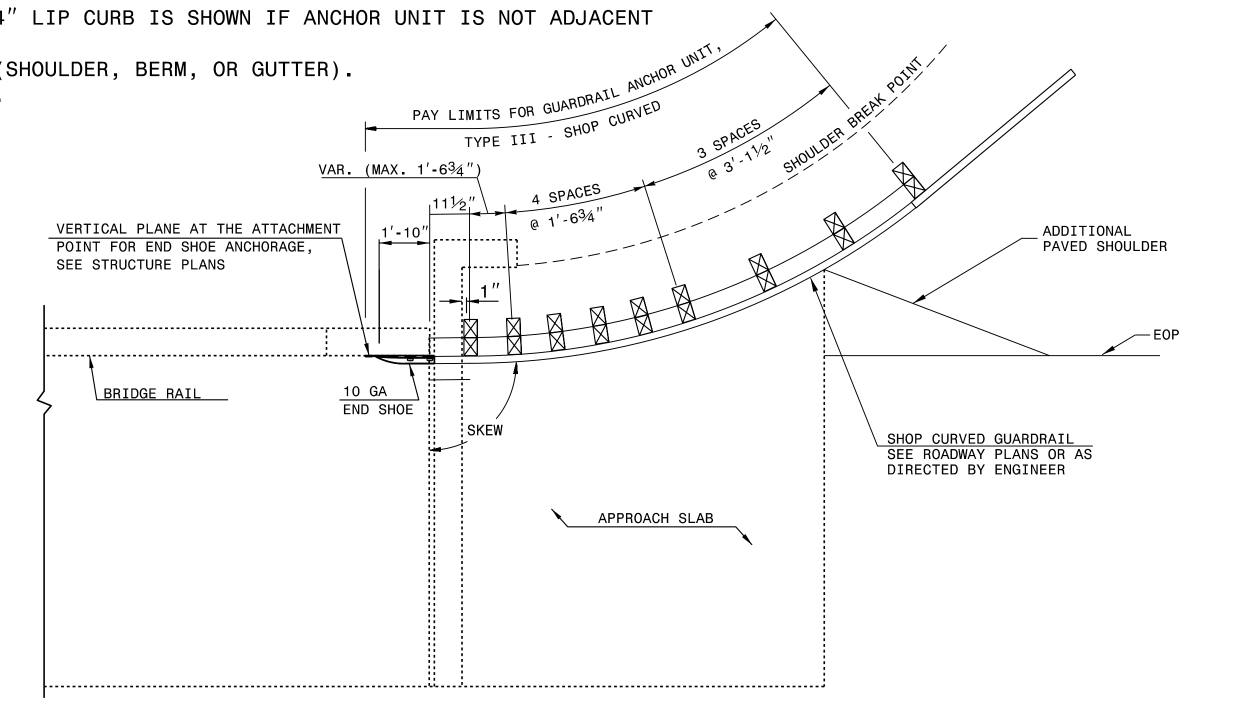
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT



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).
-USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE STANDARD 862.03 SHEET 4 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

SHEET 1 OF 1
TYPE III SC

7/7/2021

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
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ORIGINAL BY: E.E.Ward DATE: 4-4-02
MODIFIED BY: T.S.Spell DATE: 2-01-18
CHECKED BY: DATE:
FILE SPEC.: \jhowerton\guardrail\31inguardrail\typeiiisc.dgn

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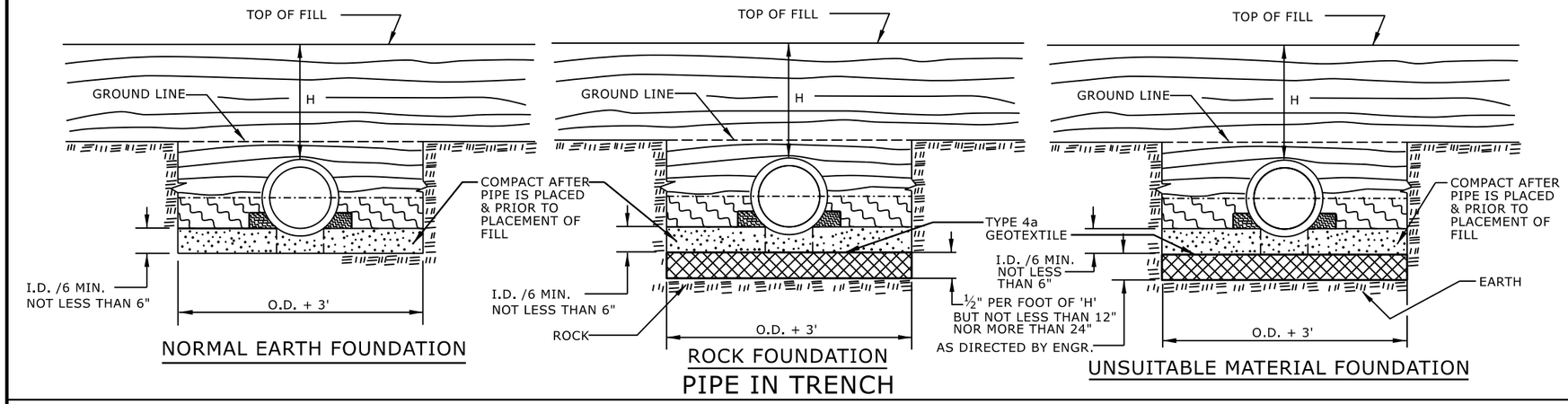
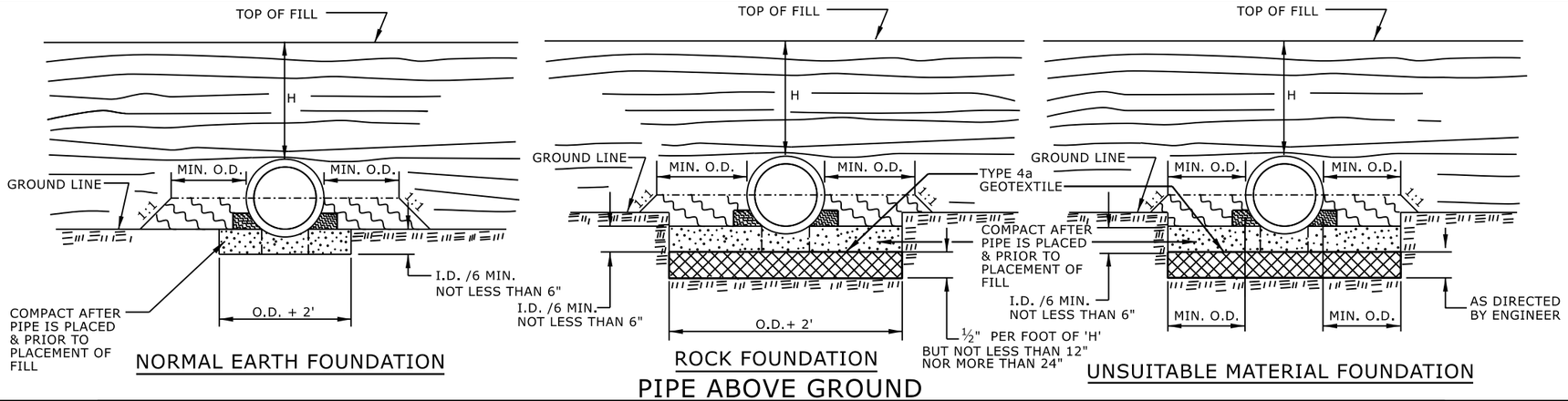
jhowerton AT CSU-242595
5/14/99



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

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

UNDISTURBED EARTH MATERIAL

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

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

10/24/2025

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE HACKLER

Signed by: Nicole M Hackler

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MODIFIED BY: _____ DATE: _____

CHECKED BY: _____ DATE: _____

FILE SPEC.: _____

4/04/06

COMPUTED BY: TK	DATE: 3/10/21
CHECKED BY: DS	DATE: 3/18/21

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	3B-1

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

RIP RAP, FABRIC, & DDE

GT - GEOTEXTILE FABRIC
DDE- DRAINAGE DITCH EXCAVATION

LINE	STATION	STATION	LOC	CLASS & TONS				GT (SY)	DDE (CY)	DETAIL	COMMENTS
				I	II	A	B				
-L-	10+28	10+51.8	RT		30			35		C	15" PIPE OUTLET
-Y-	12+88	12+88	LT		10			10		2C-2	MODIFIED CONCRETE FLUME
TOTALS					40			45			

EARTHWORK (CUBIC YARDS)

STATION	STATION	UNCL. EXCAV.	UNDERCUT EXCAV.	EMBANK. +15%	BORROW	WASTE
-L- 10+11.00	-L- 10+23.75	0		22	22	
-L- 11+96.25	-L- 13+40.00	2		208	206	
-Y- 12+35.00	-Y- 14+75.00	140		99	0	41
-Y1- 10+10.00	-Y1- 11+05.00	42		40	0	2
SUBTOTAL:		184		369	228	43
ADDITIONAL UNDERCUT						
WASTE IN LEIU OF BORROW						
PROJECT TOTAL:		184		369	228	43
EST 5% TO REPLACE TOP SOIL ON BORROW PIT					11	
GRAND TOTAL:		184		368	239	
SAY:		**200**			**250**	

RIGHT OF WAY AREA DATA

PARCEL NO.	PROPERTY OWNERS NAMES	AREA						COMMENTS
		DUE	TCE	TUE	TDE	PDE	ROW	
1	MYRON J. MOODY		0.023 AC	0.666 AC		0.020 AC	0.120 AC	
2	JEFFREY L. BENFIELD		0.036 AC			0.015 AC		
3	LYNN DIXON		402 SF	0.205 AC		730 SF		
4	HATTIE ALICE WHISENANT			0.010 AC				

EXISTING PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
-L-	10+12	10+32	CL	99
-L-	11+92	13+40	CL	364
-Y1-	10+12	11+05	CL	343
			TOTAL:	806
			SAY:	810

SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	FT
-Y-	12+88.00	13+13.60	LT	26
-Y-	13+61.40	13+90.00	LT	29
			TOTAL:	55
			SAY:	60

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
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END		
-Y-	12+57.72	13+13.56	LT	43.75	12.50			13+13.56	VAR 4.4'-6.4'	VAR 7.4'-9.4'
-Y-	13+61.42	14+17.64	LT	56.25			13+61.42		VAR 4.1'-7.2'	VAR 7.1'-10.2'
-L-	11+95.13	12+14.60	LT		25.00		11+95.13 BRG		6.92'	9.92'
-L-	11+95.13	12+45.42	RT	37.50	62.50			11+95.13 BRG	VAR 4'-6.92'	VAR 7'-12.92'
			SUBTOTAL	137.50	100.00					
		LESS ANCHOR DEDUCTIONS:								
		GREU TYPE TL-2	2 @ 25.00' =	50						
	3 TYPE III & 1 TYPE III-SC		@ 18.75' =	56.25	18.75					
		AT-1	2 @ 6.25' =	6.25	6.25					
		ANCHOR DEDUCTION TOTAL:		112.50	25.00					
			PROJECT TOTAL	25	75					
			SAY	25	75					
		ADDITIONAL GUARDRAIL POST =		5						

SURVEY LINE	FLARE LENGTH		W		ANCHORS									TEMP. CRASH CUSHIONS			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
	APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	B-77	GRAU 350	M-350	XIII	TYPE III	TYPE III SHOP CURVE	GREU TL-2	AT-1	EA	G	NG				
-Y-		25'		1'						1		1								
-Y-	25'		1'							1		1								
-L-											1		1							
-L-										1			1							
ADDITIONAL GUARDRAIL POST =										3	1	2	2							

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KCI-GKG6BS3

COMPUTED BY: MTU **DATE:** 02/02/2021

CHECKED BY: CM **DATE:** 1/16/2024

PROJECT NO.	SHEET NO.
BP13.R048	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

LINE & STATION SIZE THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	R. C. PIPE CLASS IV 12	R. C. PIPE CLASS IV 15	R. C. PIPE CLASS IV 18	R. C. PIPE CLASS IV 24	R. C. PIPE CLASS IV 30	R. C. PIPE CLASS IV 36	R. C. PIPE CLASS IV 42	R. C. PIPE CLASS IV 48	R. C. PIPE CLASS V 12	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE		SPRING BOX STD. 840.41		M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	CONVERT EXISTING J.B. TO D.I.	ADJUST C.B.	ADJUST D.I.		15" DRAINAGE PIPE ELBOW				15" PARALLEL PIPE END SECTION (PPES)	MODIFIED CONC. FLUME	PREFORMED SCOUR HOLE (PER EACH)	ENERGY DISSIPATION BASIN	18" CONCRETE PIPE PLUG STD. 840.71 CY	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
Y 14+32	17 RT	0401		1393.0																																																																																PPES on Upstream End of Pipe
		0401	0402		1391.7	1389.1			32																																																																	1									
Y 14+02	14 RT	0402		1394.0																				1																		1												1																													
		0402	0403		1389.1	1388.9			16																																																																									
Y 13+84	14 RT	0403		1394.2																				1	0.3																	1												1																													
		0403	0405		1388.9	1388.6			28																																																																									
Y 12+88	17 LT	0404		1395.6																																																																								1								
Y 13+84	15 LT	0405		1396.3																				1	2.7																	1												1																													
		0405	0406		1388.6	1385.8			32																																																																									
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Y 14+10	23 LT	0000																																																																															14	
SHEET TOTALS									108															3	3.0																	3												3																				1	1			0	2			16	
PROJECT TOTALS									108															3	3.0																	3												3																				1	1			0	2			16	

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (58010B)	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 052888, NORTH CAROLINA PROFESSIONAL ENGINEER, Tyler Krauss, 10/24/2025

HYDRAULICS ENGINEER — SEAL 033860, NORTH CAROLINA PROFESSIONAL ENGINEER, 10/24/2025

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KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

REVISIONS

8/17/99

-Y- AMERICAN THREAD ROAD (SR 1556)

	PI Sta 10+66.56	PI Sta 12+29.47	PI Sta 13+39.39	PI Sta 14+50.40	PI Sta 15+99.71
Δ	2° 59′ 40.9″ (LT)	9° 58′ 03.5″ (RT)	42° 14′ 01.1″ (RT)	7° 22′ 55.4″ (RT)	3° 11′ 39.2″ (RT)
D	2° 15′ 00.0″	8° 30′ 00.0″	43° 01′ 23.5″	5° 45′ 00.0″	3° 30′ 00.0″
L	133.10′	117.27′	98.16′	128.38′	91.26′
T	66.56′	58.78′	51.43′	64.28′	45.64′
R	2,546.48′	674.07′	133.17′	996.45′	1,637.02′

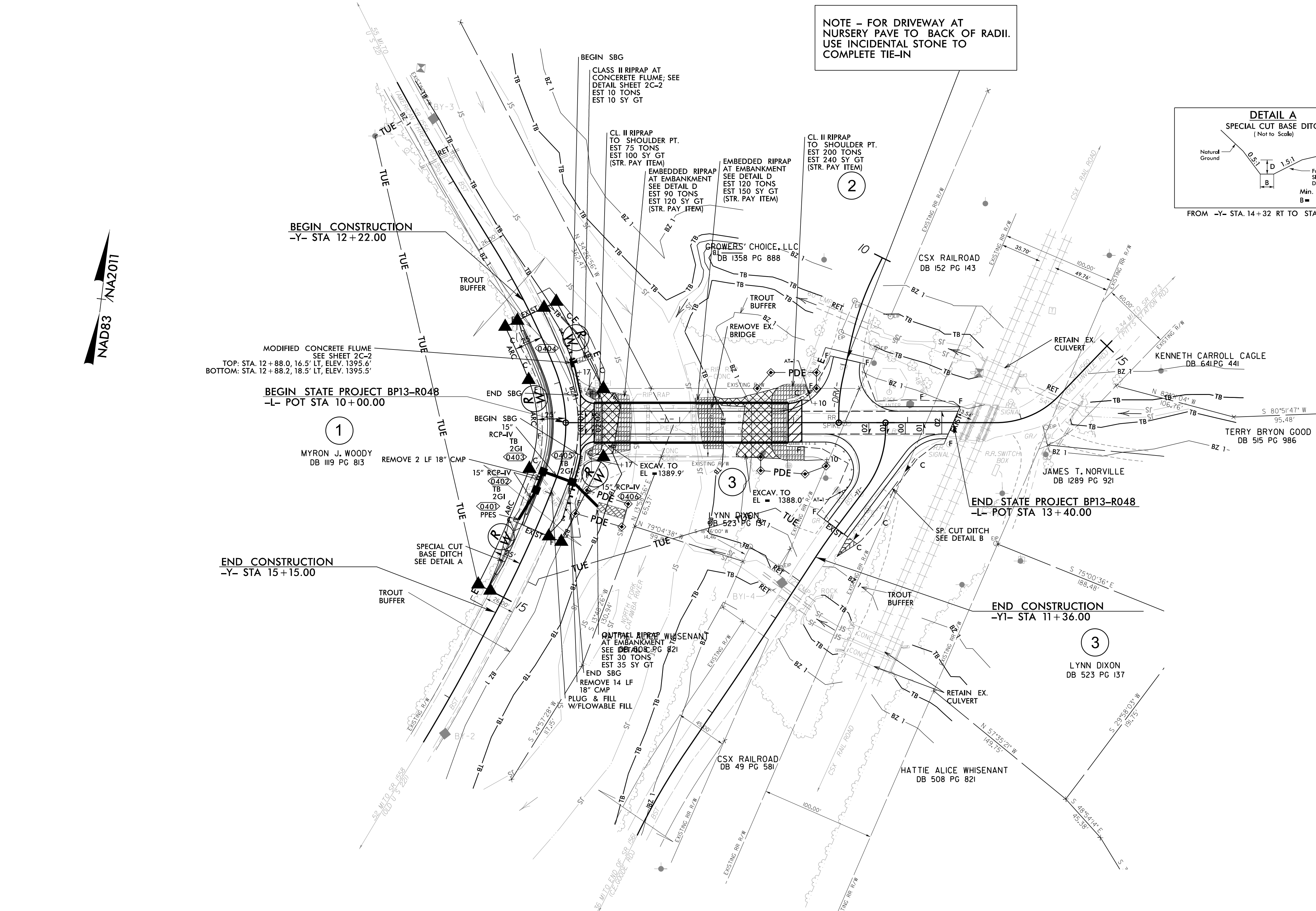
-L-

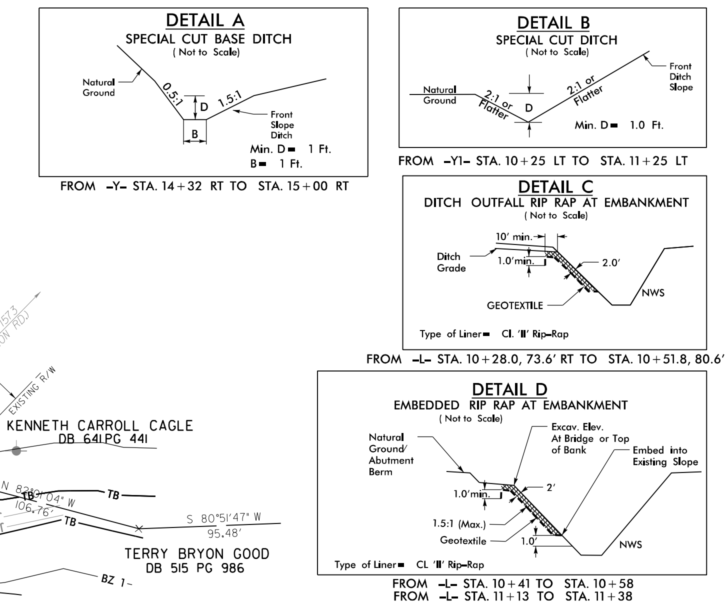
	PI Sta 14+10.10
Δ	46° 01′ 00.0″ (LT)
D	75° 00′ 00.0″
L	61.36′
T	32.44′
R	76.39′

-DRV-

	PI Sta 10+45.57	PI Sta 11+27.63
Δ	13° 37′ 20.9″ (LT)	12° 39′ 47.5″ (LT)
D	22° 49′ 37.2″	37° 56′ 39.2″
L	59.68′	33.37′
T	29.98′	16.75′
R	251.00′	151.00′

NOTE – FOR DRIVEWAY AT NURSERY PAVE TO BACK OF RADII. USE INCIDENTAL STONE TO COMPLETE TIE-IN


NAD83 / NA2011
BEGIN CONSTRUCTION -Y- STA 12+22.00
TROUT BUFFER
MODIFIED CONCRETE FLUME SEE SHEET 2C-2
TOP: STA. 12+88.0, 16.5′ LT, ELEV. 1395.6′
BOTTOM: STA. 12+88.2, 18.5′ LT, ELEV. 1395.5′
BEGIN STATE PROJECT BP13-R048 -L- POT STA 10+00.00
1
MYRON J. WOODY DB 1119 PG 813
REMOVE 2 LF 18″ CMP
END SBG
BEGIN SBG
15″ RCP-IV
SPECIAL CUT BASE DITCH SEE DETAIL A
END CONSTRUCTION -Y- STA 15+15.00
BEGIN SBG
CLASS II RIPRAP AT CONCRETE FLUME; SEE DETAIL SHEET 2C-2 EST 10 TONS EST 10 SY GT
CL. II RIPRAP TO SHOULDER PT. EST 75 TONS EST 100 SY GT (STR. PAY ITEM)
EMBEDDED RIPRAP AT EMBANKMENT SEE DETAIL D EST 90 TONS EST 120 SY GT (STR. PAY ITEM)
EMBEDDED RIPRAP AT EMBANKMENT SEE DETAIL D EST 120 TONS EST 150 SY GT (STR. PAY ITEM)
CL. II RIPRAP TO SHOULDER PT. EST 200 TONS EST 240 SY GT (STR. PAY ITEM)
2
GROWERS' CHOICE, LLC DB 1358 PG 888
TROUT BUFFER
REMOVE EX. BRIDGE
CSX RAILROAD DB 152 PG 143
RETAIN EX. CULVERT
KENNETH CARROLL CAGLE DB 641 PG 441
TERRY BRYON GOOD DB 515 PG 986
JAMES T. NORVILLE DB 1289 PG 921
END STATE PROJECT BP13-R048 -L- POT STA 13+40.00
EXCAV. TO EL = 1389.9′
EXCAV. TO EL = 1388.0′
3
LYNN DIXON DB 523 PG 137
SP. CUT DITCH SEE DETAIL B
TROUT BUFFER
END CONSTRUCTION -Y1- STA 11+36.00
3
LYNN DIXON DB 523 PG 137
OUTFALL RIPRAP AT EMBANKMENT SEE DETAIL C EST 30 TONS EST 35 SY GT
END SBG
REMOVE 14 LF 18″ CMP
PLUG & FILL W/FLOWABLE FILL
RETAIN EX. CULVERT
CSX RAILROAD DB 49 PG 581
HATTIE ALICE WHISENANT DB 508 PG 821


DETAIL A
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground
Front Slope Ditch
Min. D= 1 Ft.
B= 1 Ft.
FROM -Y- STA. 14+32 RT TO STA. 15+00 RT
DETAIL B
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D= 1.0 Ft.
FROM -Y1- STA. 10+25 LT TO STA. 11+25 LT
DETAIL C
DITCH OUTFALL RIP RAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
GEOTEXTILE
NWS
Type of Liner= Cl. 'B' Rip-Rap
FROM -L- STA. 10+28.0, 73.6′ RT TO STA. 10+51.8, 80.6′ RT
DETAIL D
EMBEDDED RIP RAP AT EMBANKMENT
(Not to Scale)
Natural Ground/ Abutment Berm
Excav. Elev. At Bridge or Top of Bank
Embed into Existing Slope
1.5:1 (Max.)
Geotextile
NWS
Type of Liner= CL 'B' Rip-Rap
FROM -L- STA. 10+41 TO STA. 10+58
FROM -L- STA. 11+13 TO STA. 11+38

-Y1- C.E.GOODE ROAD (SR 1561)

	PI Sta 10+34.40	PI Sta 11+19.66	PI Sta 12+52.60	PI Sta 13+83.38
Δ	36° 55′ 00.0″ (RT)	3° 40′ 00.0″ (LT)	1° 04′ 30.0″ (RT)	8° 10′ 05.7″ (LT)
D	66° 37′ 22.8″	10° 00′ 00.0″	2° 00′ 00.0″	9° 30′ 00.0″
L	55.41′	36.67′	53.75′	85.98′
T	28.71′	18.34′	26.88′	43.06′
R	86.00′	572.96′	2,864.79′	603.11′

FOR DIMENSIONS AND ALIGNMENT INFO SEE SHEET 2B-1
FOR PROPERTY LINE INFO SEE SHEET RW04
FOR EASEMENT STATIONS AND OFFSETS SEE SHEET RW04

FOR PROFILES SEE SHEET 5

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	5

ROADWAY DESIGN ENGINEER — SEAL 052888 — Tyler Krauss — 10/24/2025

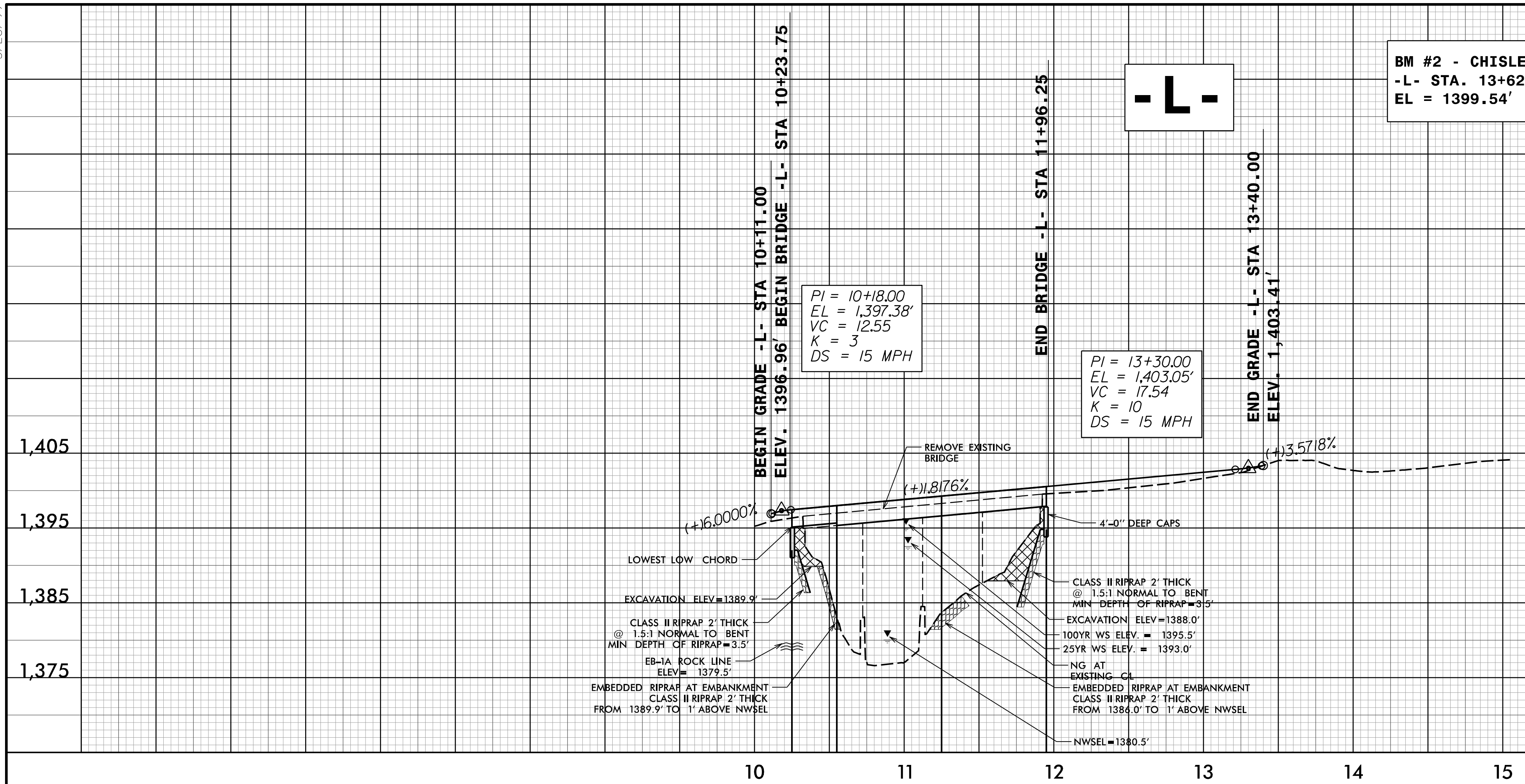
HYDRAULICS ENGINEER — SEAL 033860 — 10/24/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

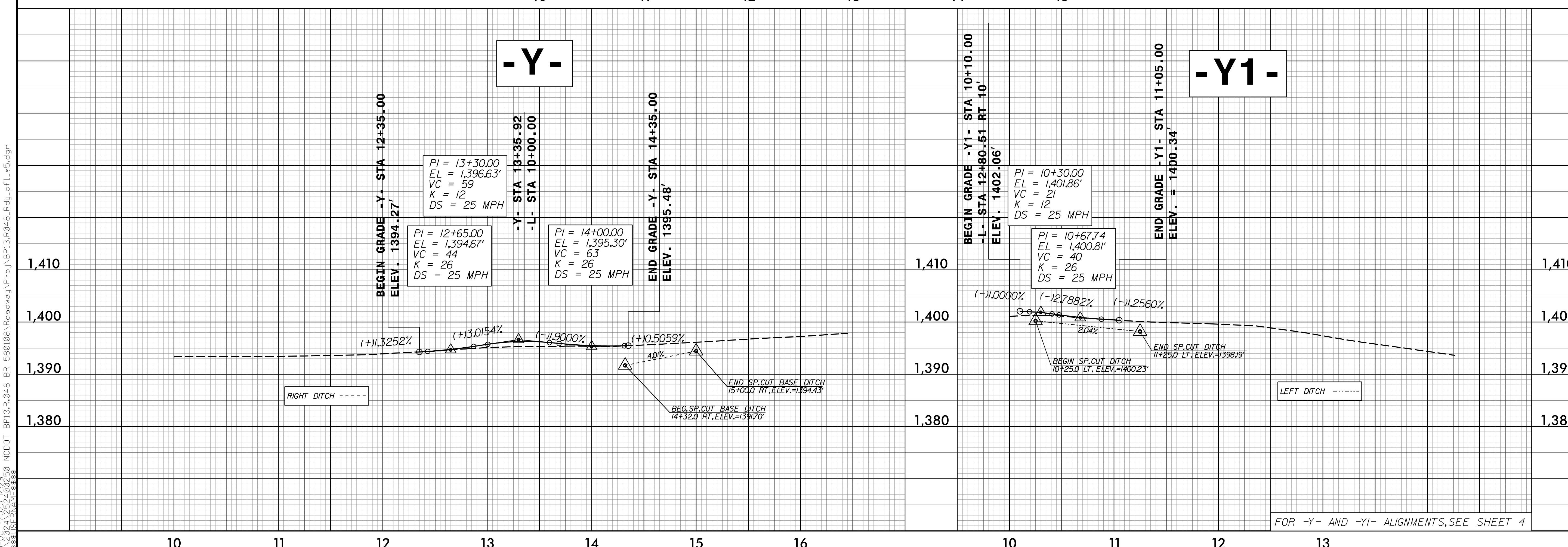
BRIDGE 580108

BM #2 - CHISLED "X" IN CONCRETE HEAD WALL OF RR CULVERT
-L- STA. 13+62.74, 43.68' LT
EL = 1399.54'


-L-
BEGIN GRADE -L- STA 10+11.00
ELEV. 1396.96'
BEGIN BRIDGE -L- STA 10+23.75
END BRIDGE -L- STA 11+96.25
END GRADE -L- STA 13+40.00
ELEV. 1,403.41'
PI = 10+18.00
EL = 1,397.38'
VC = 12.55
K = 3
DS = 15 MPH
PI = 13+30.00
EL = 1,403.05'
VC = 17.54
K = 10
DS = 15 MPH
(+)6.0000%
(+)1.8176%
(+)3.5718%
REMOVE EXISTING BRIDGE
4'-0" DEEP CAPS
LOWEST LOW CHORD
EXCAVATION ELEV=1389.9'
CLASS II RIPRAP 2' THICK @ 1.5:1 NORMAL TO BENT MIN DEPTH OF RIPRAP=3.5'
EB-1A ROCK LINE ELEV= 1379.5'
EMBEDDED RIPRAP AT EMBANKMENT CLASS II RIPRAP 2' THICK FROM 1389.9' TO 1' ABOVE NWSEL
CLASS II RIPRAP 2' THICK @ 1.5:1 NORMAL TO BENT MIN DEPTH OF RIPRAP=3.5'
EXCAVATION ELEV=1388.0'
100YR WS ELEV. = 1395.5'
25YR WS ELEV. = 1393.0'
NG AT EXISTING CL
EMBEDDED RIPRAP AT EMBANKMENT CLASS II RIPRAP 2' THICK FROM 1386.0' TO 1' ABOVE NWSEL
NWSEL=1380.5'
1,405
1,395
1,385
1,375
10
11
12
13
14
15
FOR -L- ALIGNMENT, SEE SHEET 4

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 13000	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1393.0	FT
BASE DISCHARGE (FEMA)	= 18300	CFS
BASE FREQUENCY (FEMA)	= 100	YRS
BASE HW ELEV. (FEMA)	= 1395.5	FT
OVERTOPPING DISCHARGE	= 20400	CFS
OVERTOPPING FREQUENCY	= >100,<500	YRS
OVERTOPPING ELEVATION	= 1399.9	FT
DATE OF SURVEY	= 01/15/2019	
W.S.ELEVATION AT DATE OF SURVEY (NWSEL)	= 1380.5	FT


-Y-
BEGIN GRADE -Y- STA 12+35.00
ELEV. 1394.27'
-Y- STA 13+35.92
-L- STA 10+00.00
END GRADE -Y- STA 14+35.00
ELEV. 1395.48'
PI = 13+30.00
EL = 1,396.63'
VC = 59
K = 12
DS = 25 MPH
PI = 12+65.00
EL = 1,394.67'
VC = 44
K = 26
DS = 25 MPH
PI = 14+00.00
EL = 1,395.30'
VC = 63
K = 26
DS = 25 MPH
(+)1.3252%
(+)3.0154%
(-)1.9000%
(+)0.5059%
.40%
END SP.CUT BASE DITCH 15+00.0 RT.,ELEV.=1394.43'
BEG.SP.CUT BASE DITCH 14+32.0 RT.,ELEV.=1391.70'
RIGHT DITCH
1,410
1,400
1,390
1,380
10
11
12
13
14
15
16
-Y1-
BEGIN GRADE -Y1- STA 10+10.00
-L- STA 12+80.51 RT 10'
ELEV. 1402.06'
END GRADE -Y1- STA 11+05.00
ELEV. = 1400.34'
PI = 10+30.00
EL = 1,401.86'
VC = 21
K = 12
DS = 25 MPH
PI = 10+67.74
EL = 1,400.81'
VC = 40
K = 26
DS = 25 MPH
(-)1.0000%
(-)2.7882%
(-)1.2560%
2.04%
BEGIN SP.CUT DITCH 10+25.0 LT., ELEV.=1400.23'
END SP.CUT DITCH 11+25.0 LT., ELEV.=1398.19'
LEFT DITCH
10
11
12
13
FOR -Y- AND -Y1- ALIGNMENTS, SEE SHEET 4

09/08/99

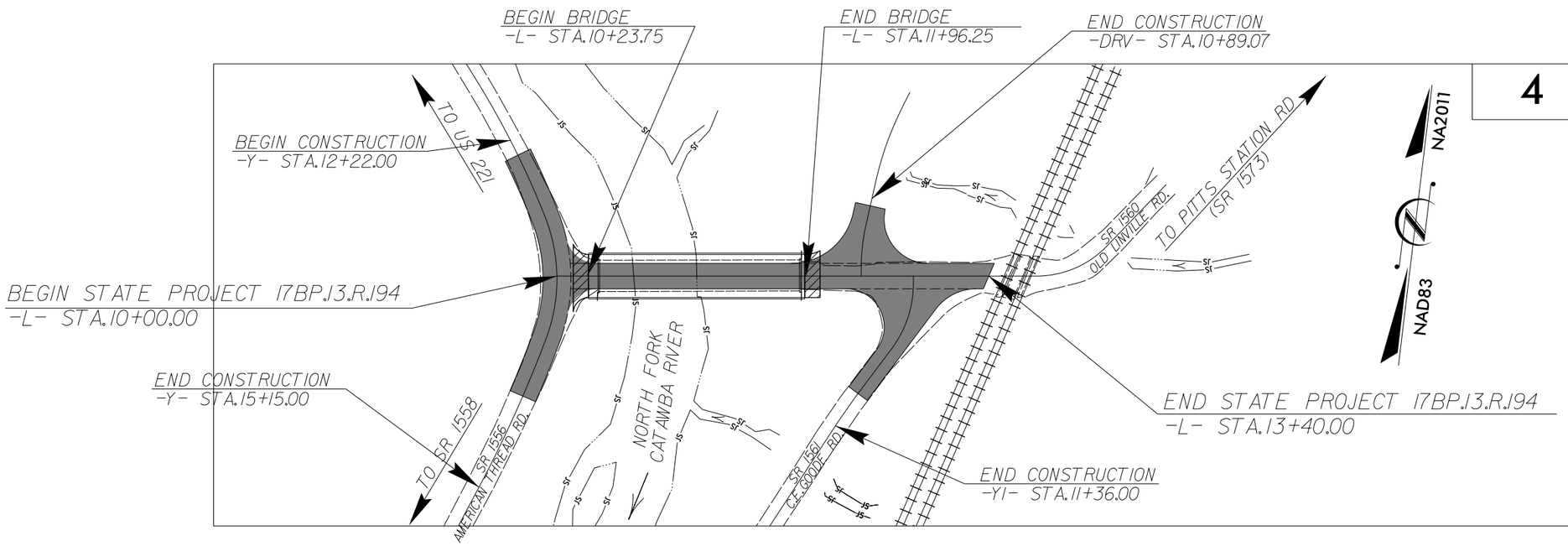
TIP PROJECT: BP13-R048

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP13-R048	RW01	6

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

McDOWELL COUNTY



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 "B5885-100" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 760,700.090(ft) EASTING: 1,105,491.490(ft) ELEVATION: 1,400.80(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985652
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B5885-100" TO -L- STATION 10+00.00 IS S 79-31'05.8" W 339.10(ft)
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:
Vaughn & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	LETTING DATE:
10/08/2018	11/19/2025

PROFESSIONAL LAND SURVEYOR

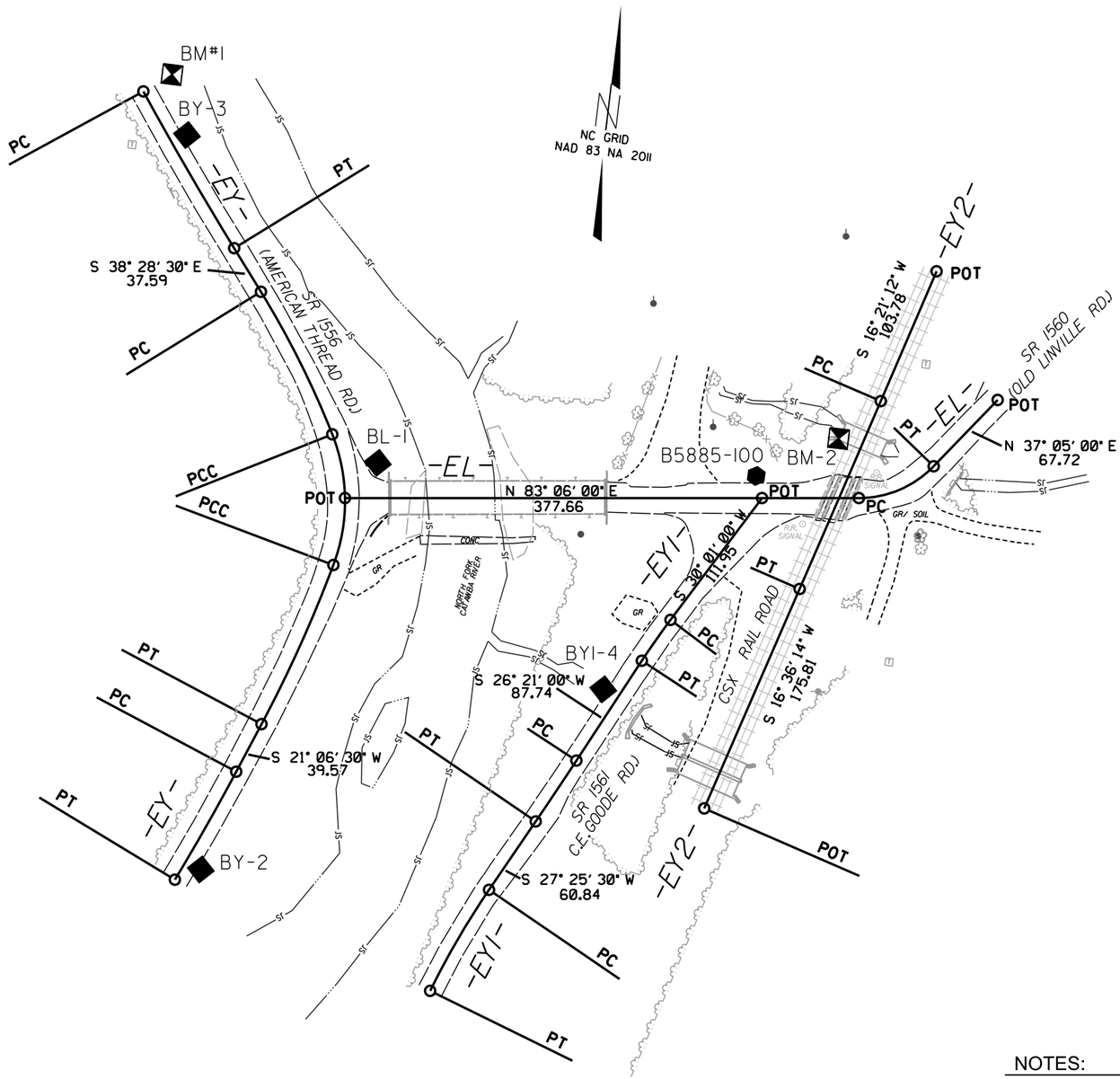
NORTH CAROLINA PROFESSIONAL SEAL L-4529 LAND SURVEYOR MARK A PARRIS

Signed by: 1570CB80C7249A...
10/27/2025 | 12:28:39 PM PDT

SIGNATURE: *Date:*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

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



6/2/99

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	RW02C-1

Location and Surveys

Vaughn & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

PROJECT SURVEYOR

SEAL
L-4529
MARK A. PARRIS

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

I, Mark A. Parris, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: RTN
Dates of survey: 3/07/2016
Datum/Epoch:NAD 83/ NA 2011
Published/Fixed-control use: N/A
Localized around: B5885-100
Northing:760700.090
Easting:1105491.490
Combined grid factor:0.99985652
Geoid model:12A (Conus)
Units:US Ft.

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 3/08/16 to 3/09/16 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 27th day of October, 2025.

Signed by:
Mark Parris
F1570CB85C7248A...
Professional Land Surveyor L-4529

SEE SHEET RW02C-2
FOR FURTHER
ALIGNMENT DETAILS

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

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	RW02C-2

Location and Surveys

Vaughn & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

PROJECT SURVEYOR

SEAL L-4529 MARK A. PARRIS

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

```
BL
    POINT       DESC.           NORTH           EAST           ELEVATION
------------ -------------- -------------- -------------- --------------
1                     BL-1    760676.1600   1105214.1636          1395.59
GPS100           B5885-100    760700.0899   1105491.4899          1400.80
GPS101           B5885-101    760960.9441   1105906.5361          1415.13
```

```
BY
    POINT       DESC.           NORTH           EAST           ELEVATION
------------ -------------- -------------- -------------- --------------
3                     BY-3    760898.4459   1105046.0349          1392.37
Y1                    BL-1    760676.1600   1105214.1636          1395.59
2                     BY-2    760364.0856   1105120.9159          1396.73
```

```
BY1
    POINT       DESC.           NORTH           EAST           ELEVATION
------------ -------------- -------------- -------------- --------------
Y100             B5885-100    760700.0899   1105491.4899          1400.80
4                   BY1-4     760531.0451   1105398.6942          1398.87
```

```
****************************************
BM1        ELEVATION - 1393.14
N 760941       E 1105030
SPIKE IN BASE OF 6" CHERRY
****************************************
****************************************
BM2        ELEVATION - 1399.54
N 760735       E 1105548
CHISELED 'X' IN CONC. HW OF R/R CULVERT
****************************************
```

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	760647.693	1105193.416							
LINE			N 83°06'00.0" E	377.66					
PC	760693.063	1105568.339							
CURVE			N 60°05'30.0" E	59.72	46°01'00.0"(LT)	75°00'00.0"	61.36	32.44	76.39
PT	760722.840	1105620.106							
LINE			N 37°05'00.0" E	67.72					
POT	760776.861	1105660.937							

EY

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	760926.437	1105010.459							
CURVE			S 36°58'39.5" E	133.08	02°59'40.9"(LT)	02°15'00.0"	133.10	66.56	2546.48
PT	760820.121	1105090.509							
LINE			S 38°28'30.0" E	37.59					
PC	760790.693	1105113.896							
CURVE			S 33°29'28.2" E	117.12	09°58'03.5"(RT)	08°30'00.0"	117.27	58.78	674.07
PCC	760693.019	1105178.523							
CURVE			S 07°23'25.9" E	95.96	42°14'01.1"(RT)	43°01'23.5"	98.16	51.43	133.17
PCC	760597.859	1105190.866							
CURVE			S 17°25'02.3" W	128.29	07°22'55.4"(RT)	05°45'00.0"	128.38	64.28	996.45
PT	760475.446	1105152.464							
LINE			S 21°06'30.0" W	39.57					
PC	760438.536	1105138.215							
CURVE			S 22°42'19.6" W	91.25	03°11'39.2"(RT)	03°30'00.0"	91.26	45.64	1637.02
PT	760354.356	1105102.993							

EY1

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	760684.510	1105497.663							
LINE			S 30°01'00.0" W	111.95					
PC	760587.575	1105441.660							
CURVE			S 28°11'00.0" W	36.66	03°40'00.0"(LT)	10°00'00.0"	36.67	18.34	572.96
PT	760555.261	1105424.345							
LINE			S 26°21'00.0" W	87.74					
PC	760476.641	1105385.404							
CURVE			S 26°53'15.0" W	53.75	01°04'30.0"(RT)	02°00'00.0"	53.75	26.88	2864.79
PT	760428.703	1105361.096							
LINE			S 27°25'30.0" W	60.84					
PC	760374.703	1105333.075							
CURVE			S 23°20'27.2" W	85.91	08°10'05.7"(LT)	09°30'00.0"	85.98	43.06	603.11
PT	760295.825	1105299.038							

EY2

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	760865.283	1105604.987							
LINE			S 16°21'12.0" W	103.78					
PC	760765.700	1105575.766							
CURVE			S 16°28'43.0" W	150.33	00°15'02.0"(RT)	00°10'00.0"	150.33	75.17	34377.47
PT	760621.542	1105533.123							
LINE			S 16°36'14.0" W	175.81					
POT	760453.058	1105482.883							

I, Mark A. Parris, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: RTN
Dates of survey: 3/07/2016
Datum/Epoch:NAD 83/ NA 2011
Published/Fixed-control use: N/A
Localized around: B5885-100
Northing:760700.090
Easting:1105491.490
Combined grid factor:0.99985652
Geoid model:12A (Conus)
Units:US Ft.

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 3/08/16 to 3/09/16 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 27th day of October, 2025.

Signed by:
Mark Parris
F1570CB85C7248A...
Professional Land Surveyor L-4529

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

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

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	RW02D-1

Location and Surveys

Vaughan & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4529 LAND SURVEYOR MARK A PARRIS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

This 27th day of October, 2025.

Signed by:
F1570CB86C7248A...

Professional Land Surveyor L-4529

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	760647.6925	1105193.4157
PC	13+77.66	760693.0632	1105568.3392
PT	14+39.01	760722.8404	1105620.1057
POT	15+06.73	760776.8611	1105660.9366

Y

TYPE	STATION	NORTH	EAST
PC	10+00.00	760926.4372	1105010.4588
PT	11+33.10	760820.1211	1105090.5086
PC	11+70.69	760790.6925	1105113.8962
PCC	12+87.95	760693.0190	1105178.5233
PCC	13+86.12	760597.8587	1105190.8664
PT	15+14.50	760475.4462	1105152.4641
PC	15+54.07	760438.5356	1105138.2153
PT	16+45.33	760354.3559	1105102.9928

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	760681.4056	1105472.0058
PC	10+05.70	760675.7518	1105472.6899
PT	10+61.11	760622.3984	1105461.7785
PC	11+01.32	760587.5750	1105441.6597
PT	11+37.99	760555.2611	1105424.3452
PC	12+25.73	760476.6415	1105385.4036
PT	12+79.48	760428.7028	1105361.0960
PC	13+40.31	760374.7030	1105333.0753
PT	14+26.29	760295.8248	1105299.0382

Y2

TYPE	STATION	NORTH	EAST
POT	10+00.00	760865.2829	1105604.9866
PC	11+03.78	760765.6999	1105575.7658
PT	12+54.11	760621.5416	1105533.1227
POT	14+29.93	760453.0578	1105482.8831

DRV

TYPE	STATION	NORTH	EAST
POT	10+00.00	760824.7107	1105451.8213
PC	10+15.59	760810.0036	1105446.6462
PT	10+75.27	760751.8951	1105433.6847
PC	11+10.88	760716.4652	1105430.1088
PT	11+44.25	760683.1615	1105430.4392
POT	11+50.99	760676.4735	1105431.2485

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.

Docusign Envelope ID: CD2AC9AE-AB4E-4F7A-A852-E4BF973F3761

6/2/99

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	RW03E-1

Location and Surveys

Vaughn & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4529 LAND SURVEYOR MARK A. PARRIS

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+33.00	30.00	760621.8724	1105229.7810
L	10+33.00	-30.00	760681.4398	1105222.5726

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y	12+35.00	25.00	760724.8941	1105130.4838
Y	12+35.00	13.00	760731.4313	1105140.5469
Y	12+35.00	-13.00	760745.5951	1105162.3502
Y	12+35.00	-25.00	760752.1323	1105172.4133
Y	12+87.95	25.00	760681.0872	1105156.5544
Y	13+86.12	25.00	760603.7908	1105166.5804
Y	14+35.00	-13.00	760546.9775	1105190.5704
Y	14+35.00	-25.00	760543.5619	1105202.0741
Y	15+00.00	25.00	760497.6767	1105134.1374
Y	15+00.00	13.00	760493.5185	1105145.3939

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+68.00	-30.00	760697.6581	1105356.5942
L	11+71.00	30.00	760638.4532	1105366.7813
L	11+71.00	42.00	760626.5401	1105368.2229
L	11+80.00	-44.00	760712.9987	1105366.8278
L	12+10.00	45.00	760628.2472	1105407.3009
L	12+20.00	-44.00	760717.8039	1105406.5363
L	12+20.00	-30.00	760703.9053	1105408.2182
L	12+31.00	37.07	760638.6472	1105427.1956

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y	13+85.00	-67.00	760583.5971	1105256.3454
Y	13+86.00	-28.84	760591.1576	1105218.9138
Y	14+04.00	-69.00	760562.9553	1105253.1929
Y	14+08.00	-26.80	760569.7318	1105211.3332

I , Mark A. Parris , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 6/02/21 to 6/10/21, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 27th day of October, 2025.

Signed by:
F1570CB85C7248A...

Professional Land Surveyor L-4529

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 6/02/21 TO 6/10/21 .

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

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	RW04

Location and Surveys

V&M
Vaughn & Melton
1318-F Patton Avenue
Asheville, NC 28806
Firm License # F-1088

PROJECT SURVEYOR
NORTH CAROLINA PROFESSIONAL SEAL L-4529 LAND SURVEYOR MARK A. PARRIS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y- AMERICAN THREAD ROAD (SR 1556)

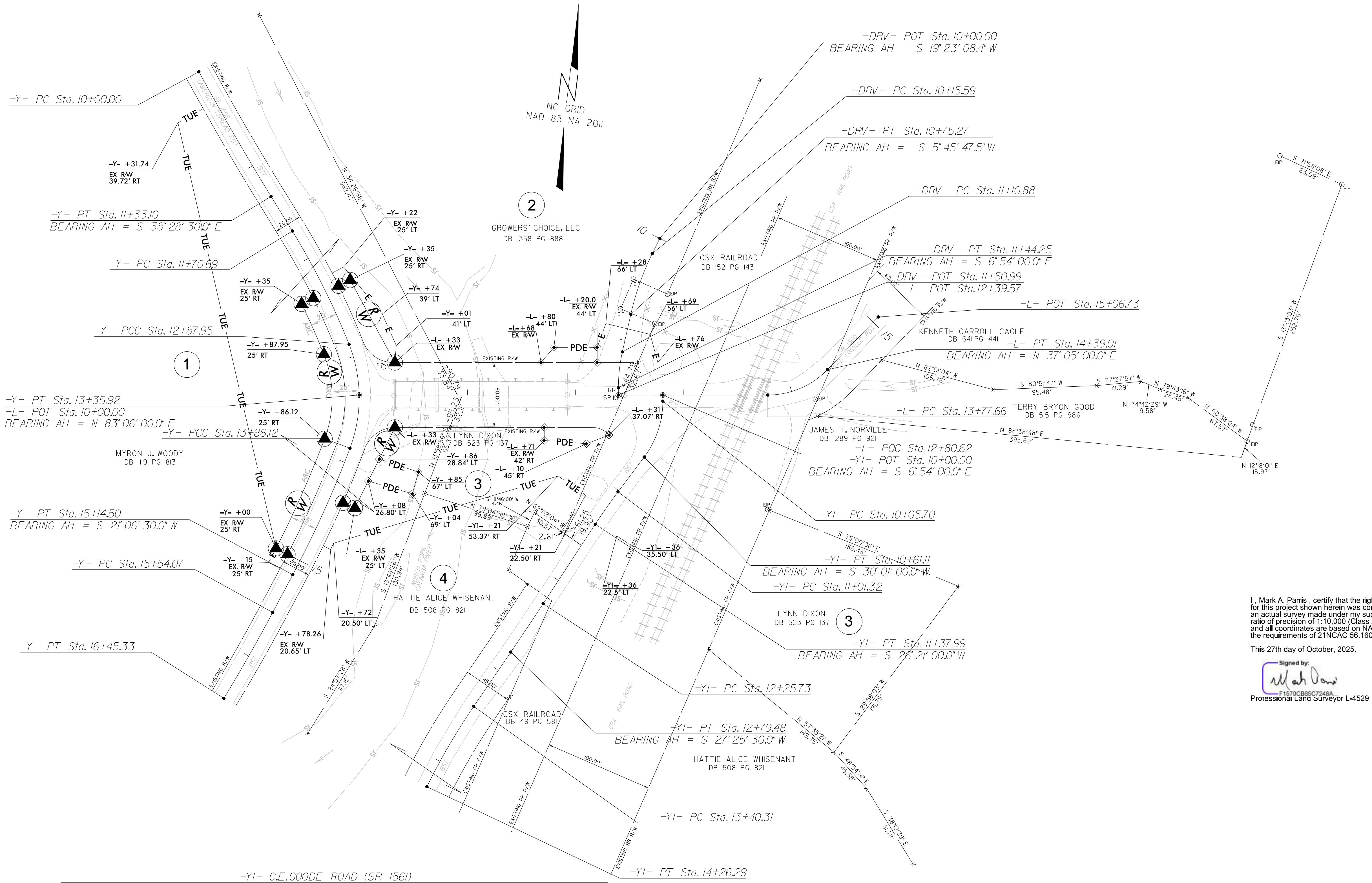
PI Sta 10+66.56	PI Sta 12+29.47	PI Sta 13+39.39	PI Sta 14+50.40	PI Sta 15+99.71
△ = 2° 59' 40.9" (LT)	△ = 9° 58' 03.5" (RT)	△ = 42° 14' 01.1" (RT)	△ = 7° 22' 55.4" (RT)	△ = 3° 11' 39.2" (RT)
D = 2° 15' 00.0"	D = 8° 30' 00.0"	D = 43° 01' 23.5"	D = 5° 45' 00.0"	D = 3° 30' 00.0"
L = 133.10'	L = 117.27'	L = 98.16'	L = 128.38'	L = 91.26'
T = 66.56'	T = 58.78'	T = 51.43'	T = 64.28'	T = 45.64'
R = 2,546.48'	R = 674.07'	R = 133.17'	R = 996.45'	R = 1,637.02'

-L-

PI Sta 14+10.10
△ = 46° 01' 00.0" (LT)
D = 75° 00' 00.0"
L = 61.36'
T = 32.44'
R = 76.39'

-DRV-

PI Sta 10+45.57	PI Sta 11+27.63
△ = 13° 37' 20.9" (LT)	△ = 12° 39' 47.5" (LT)
D = 22° 49' 37.2"	D = 37° 56' 39.2"
L = 59.68'	L = 33.37'
T = 29.98'	T = 16.75'
R = 251.00'	R = 151.00'



-Y1- C.E.GOODE ROAD (SR 1561)

PI Sta 10+34.40	PI Sta 11+19.66	PI Sta 12+52.60	PI Sta 13+83.38
△ = 36° 55' 00.0" (RT)	△ = 3° 40' 00.0" (LT)	△ = 1° 04' 30.0" (RT)	△ = 8° 10' 05.7" (LT)
D = 66° 37' 22.8"	D = 10° 00' 00.0"	D = 2° 00' 00.0"	D = 9° 30' 00.0"
L = 55.41'	L = 36.67'	L = 53.75'	L = 85.98'
T = 28.71'	T = 18.34'	T = 26.88'	T = 43.06'
R = 86.00'	R = 572.96'	R = 2,864.79'	R = 603.11'

I, Mark A. Parris , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 6/02/21 to 6/10/21, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 27th day of October, 2025.

Signed by: [signature]
F1570CB85C7248A...
Professional Land Surveyor L-4529

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 6/02/21 TO 6/10/21.

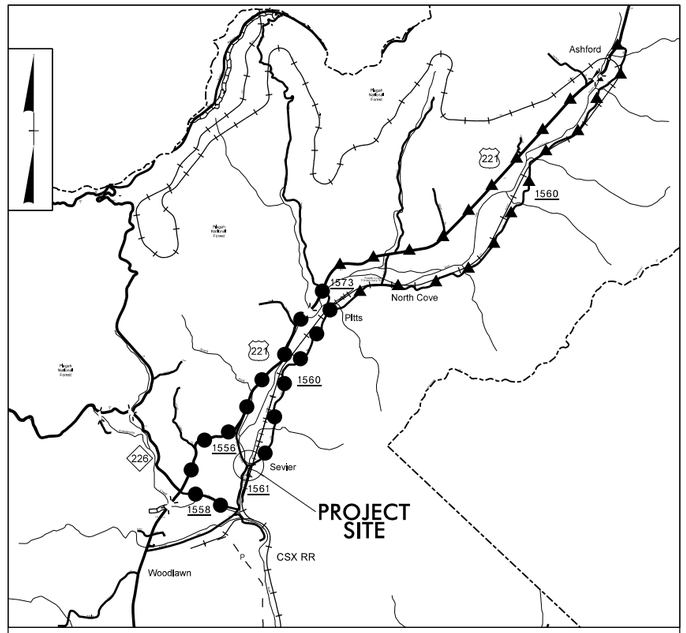
REVISIONS

6/2/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

MCDOWELL COUNTY



VICINITY MAP

LOCATION: REPLACE BRIDGE NO. 580108 OVER NORTH FORK CATAWBA RIVER ON SR 1560 (OLD LINVILLE RD.)

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

OFFSITE DETOUR ROUTE
TRUCK ROUTE

INDEX OF SHEETS

SHEET NO.
TMP-1

PROJECT: BP13-R048

CONTRACT: DM00458

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

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

D. A. PARKER, P.E. — *TRAFFIC CONTROL PROJECT ENGINEER*

KARMEN DAIS, P.E. — *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

KCI
KCI Associates of N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____
DATE: 10/24/2025

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER M. KRAMES
DocuSigned by: Tyler Krames 6F9B8A862062458...

23-OCT-2025 12:29
M:\2024\2524002\50 NCDOT BP13.R.048 BR 580108\Traffic\TrafficControl\TCP\BP13.R048_TCP_1.dgn
$$$$USERNAME$$$$

BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-1A

ROADWAY STANDARD DRAWINGS

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

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUM
1145.01	BARRICADES
1150.01	FLAGGERS

LEGEND

GENERAL

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

SIGNALS

EXISTING PROPOSED TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

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

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

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

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER EF M. KRAUSS

DocuSigned by: Tyler Krauss 6F9B8A9632062458...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS & LEGEND

23-OCT-2025 12:29
M:\2024\252400250 NCDOT BP13.R.048 BR 580108\Traffic\TrafficControl\TCP\BP13.R048_TCP_1A.dgn
$$$$USERNAME$$$$

MANAGEMENT STRATEGIES

1. CLOSE SR 1556 (AMERICAN THREAD ROAD) FROM ITS INTERSECTION WITH SR 1558 UNTIL ITS INTERSECTION WITH US 221. SR 1560 SHOULD BE CLOSED FROM SR 1556 TO EXISTING NURSERY DRIVEWAY ENTRANCE. DETOUR TRAFFIC OFF-SITE VIA SR 1558, US 221, SR 1573, AND SR 1560. TRUCK TRAFFIC SHOULD FOLLOW DESIGNATED TRUCK ROUTE ALONG SR 1560 UNTIL ITS INTERSECTION WITH US 221.

2. LOCAL ACCESS TO ALL RESIDENCES AND BUSINESSES WILL BE MAINTAINED BETWEEN CLOSURE POINTS AT ALL TIMES DURING CONSTRUCTION.

GENERAL NOTES

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

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

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER, COUNTY EMS, AND COUNTY SCHOOL OFFICIALS THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

B) NOTIFY THE ENGINEER FIFTEEN (15) DAYS PRIOR TO INSTALLATION OF A LANE CLOSURE AND SUBMIT DETAILS FOR APPROVAL BY THE ENGINEER.

C) AS APPROVED BY THE ENGINEER, LANE CLOSURES WILL BE ALLOWED FOR GEOTECHNICAL BORINGS AND THE RELOCATION OF UTILITIES PRIOR TO THE ROAD CLOSURE.

SIGNING

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

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

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

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

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

TRAFFIC CONTROL DEVICES

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

PAVEMENT MARKINGS AND MARKERS

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

BRIDGE #	MARKING	MARKER
580108	PAINT	NONE

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

PHASING

NOTE: BEFORE BEGINNING CONSTRUCTION THE CONTRACTOR SHALL PLACE ADVANCE WORK ZONE WARNING SIGNS ALONG SR 1556 (AMERICAN THREAD ROAD), US 221, SR 1558, SR 1560, AND SR 1561. (SEE RSD 1101.01, SHEET 3 OF 3)

STEP 1) CLOSE SR 1556 (AMERICAN THREAD ROAD) FROM ITS INTERSECTION WITH SR 1558 UNTIL ITS INTERSECTION WITH US 221. SR 1560 SHOULD BE CLOSED FROM SR 1556 TO EXISTING NURSERY DRIVEWAY ENTRANCE. NURSERY TRAFFIC WOULD BE ALLOWED TO TURN LEFT ONTO SR 1560 AND FOLLOW DETOUR TO US 221. TRUCK TRAFFIC SHOULD FOLLOW DESIGNATED TRUCK ROUTE ALONG SR 1560 UNTIL ITS INTERSECTION WITH US 221.

STEP 2) WHILE UTILIZING OFF-SITE DETOUR REMOVE EXISTING BRIDGE ON SR 1560.

STEP 3) WHILE UTILIZING OFF-SITE DETOUR, CONSTRUCT NEW BRIDGE ON SR 1560. CONSTRUCT WEST APPROACH TO NEWLY CONSTRUCTED BRIDGE 580108 INCLUDING WEDGING AND RESURFACING ALONG SR 1556 (AMERICAN THREAD ROAD).

STEP 4) WHILE UTILIZING OFF-SITE DETOUR AND FLAGGING OPERATION ON SR 1560 AND SR 1561 AS NECESSARY, CONSTRUCT EAST APPROACH FROM NEWLY CONSTRUCTED BRIDGE TO RAILROAD TRACKS AS INDICATED ON TMP-5A AND TMP-5B. INSTALL PAVEMENT MARKINGS ALONG SR 1560, SR 1556, AND SR 1561. RE-INSTALL ANY PERMANENT SIGNING.

STEP 5) REMOVE OFF-SITE DETOUR SIGNING AND OPEN TRAFFIC TO NEWLY CONSTRUCTED BRIDGE.

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER ER M. KRAUSS

DocuSigned by: Tyler Krauss 6F9B8A9520624S8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TRANSPORTATION OPERATIONS PLAN

SP-1

SIGN NUMBER: SP-1
TYPE: D
QUANTITY: 1

SIGN WIDTH: 4′-0″
HEIGHT: 2′-0″
TOTAL AREA: 8.0 Sq.Ft.

BORDER TYPE: RECESSED
RECESS: 0.38″
WIDTH: 0.63″
RADII: 1.50″

NO. Z BARS: N/A
LENGTH: N/A

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

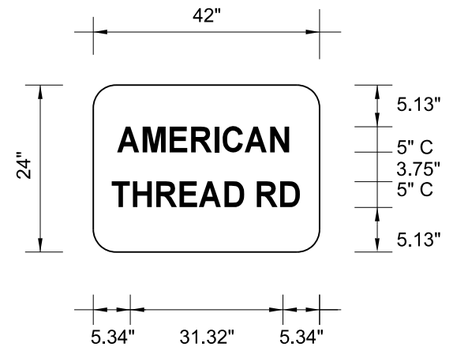
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ ALUMINUM

USE NOTES: 1,4

1. Legend and border shall be direct applied black non-reflective sheeting.
4. Background shall be encapsulated lens reflective.

DESIGN BY: TMK
PROJECT ID: 580108
CHECKED BY:
DIV: 13
DATE: MAY 18, 2020



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																										Series/Size Text Length
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		T	H	R	E	A	D		R	D																C 2000
	5.34	3.34	3.79	3.79	3.07	3.97	2.74	4.10	3.79	2.74	5.34															27.23

FILENAME: 580108 DETOUR SIGN FACE LAYOUT

NORTH CAROLINA D.O.T. SIGN DETAIL

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER M. KRAUSS

DocuSigned by: Tyler Krauss

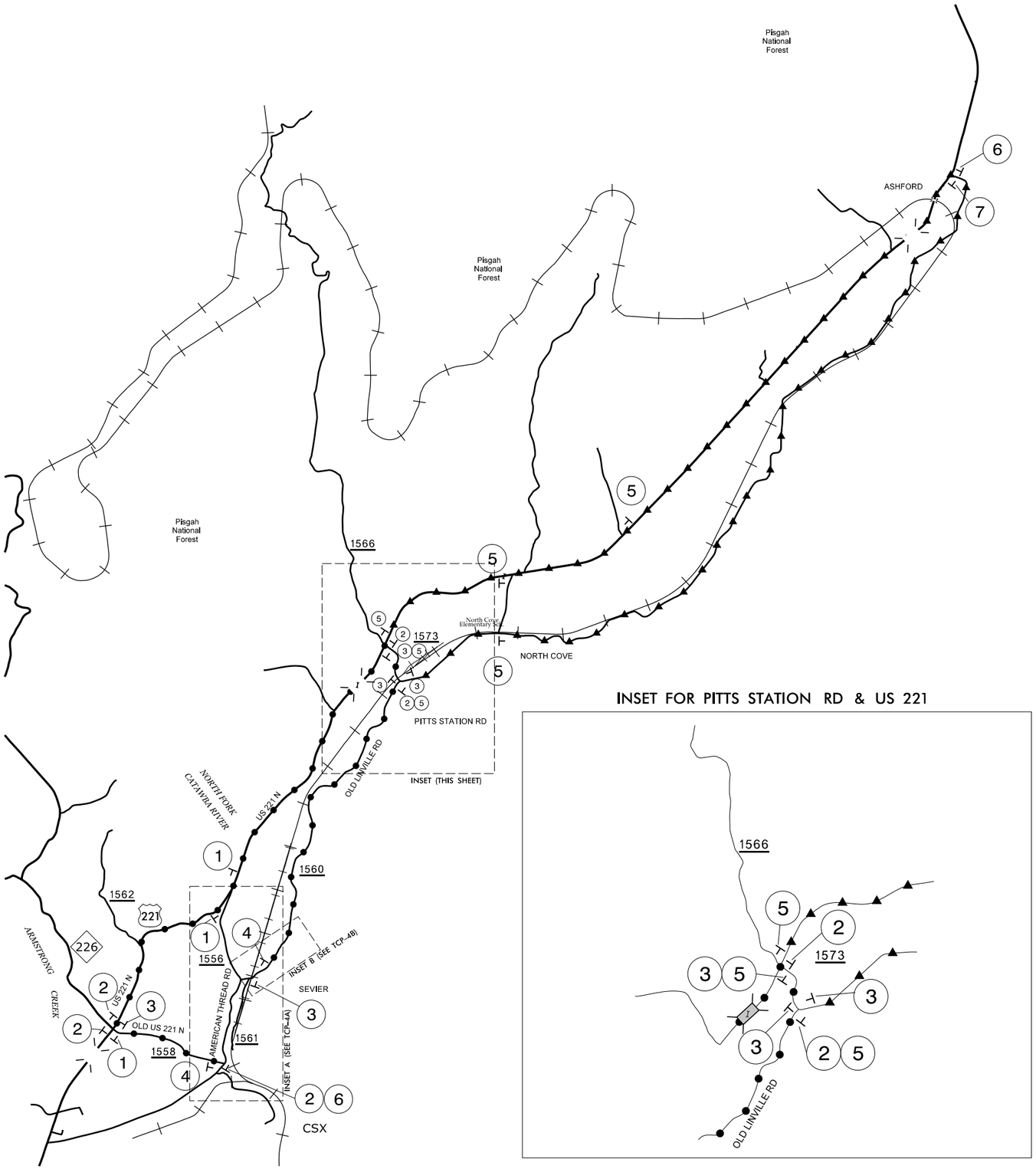
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

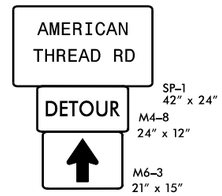
SPECIAL SIGN DESIGN

BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-3



INSET FOR PITTS STATION RD & US 221



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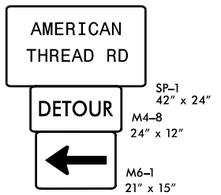

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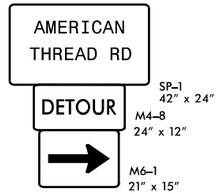

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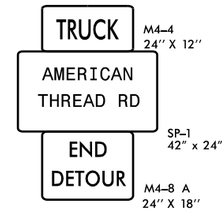

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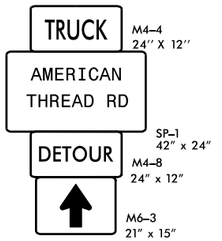

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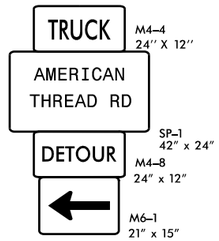

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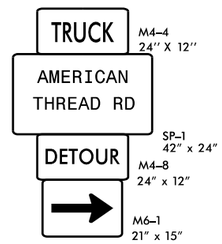


7

NOTES:
1. REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.
2. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS NECESSARY OR AS DIRECTED BY THE ENGINEER.
3. SEE SHEET TMP-2 FOR THE SPECIAL SIGN DESIGN
4. ALL DETOUR SIGN LOCATIONS ARE APPROXIMATE.

DETOUR ROUTE

TRUCK ROUTE

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER ERIC M. KRAUSS

DocuSigned by: Tyler Krauss 6F90BA8620624S8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

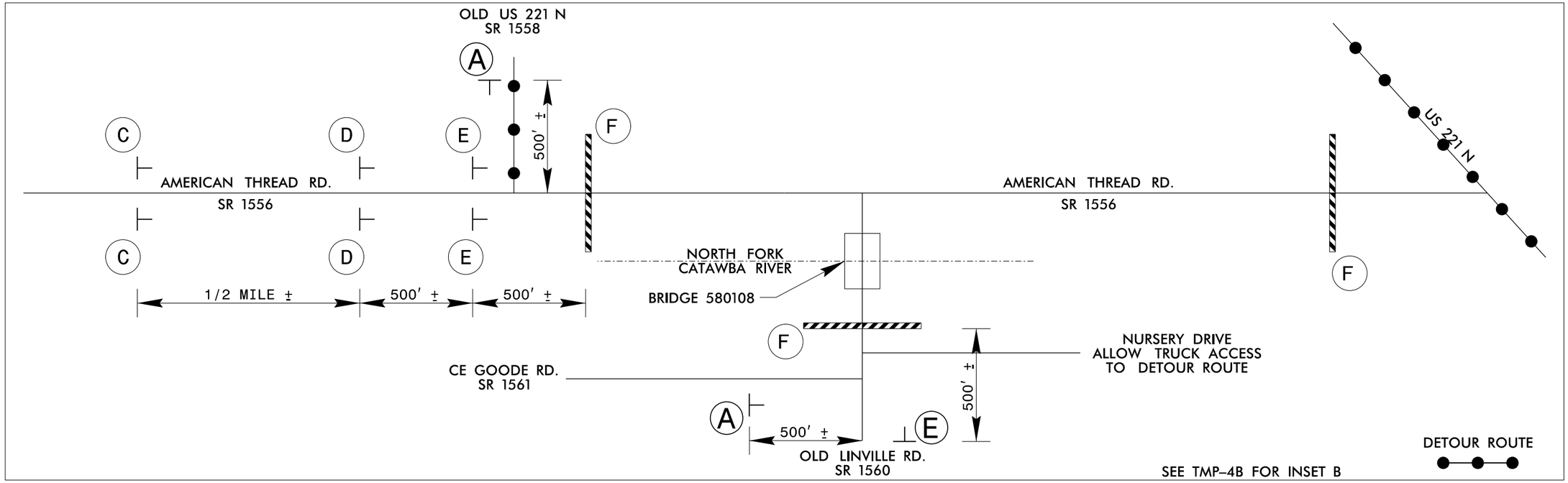
OFFSITE DETOUR ROUTE

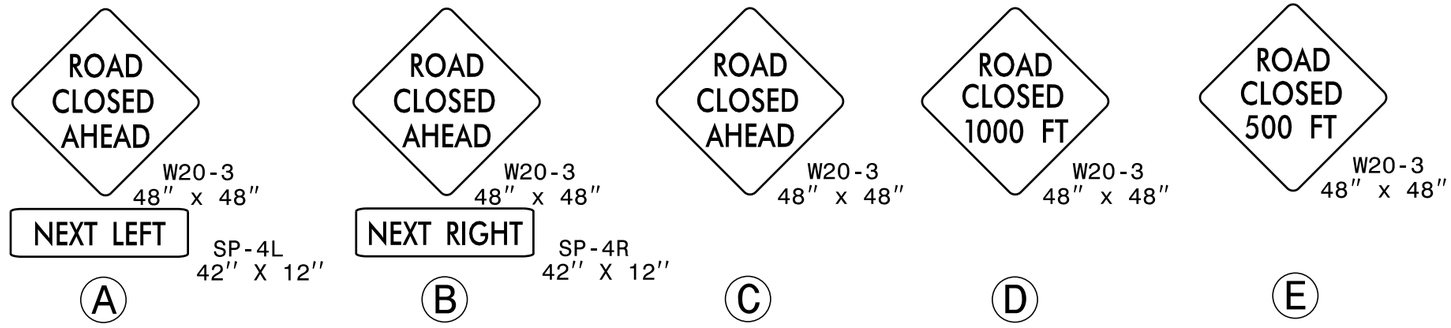
23-OCT-2025 12:29
M:\2024\2524002\50 NCDOT BP13_R_048 BR 58008\Traffic\TrafficControl\TCP\BP13_R048_TCP_3.dgn
$$$$USERNAME$$$$

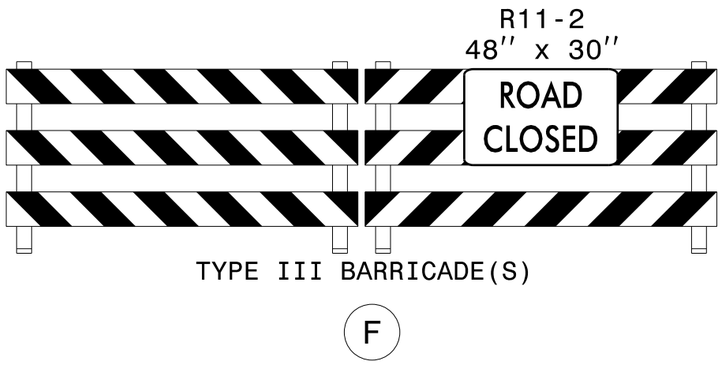
INSET A

BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-4A







NOTES:
1. REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.
2. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS NECESSARY OR AS DIRECTED BY THE ENGINEER.
3. SEE SHEET TMP-2 FOR THE SPECIAL SIGN DESIGN
4. ALL DETOUR SIGN LOCATIONS ARE APPROXIMATE.

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER M. KRAUSS

DocuSigned by: Tyler Krauss

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

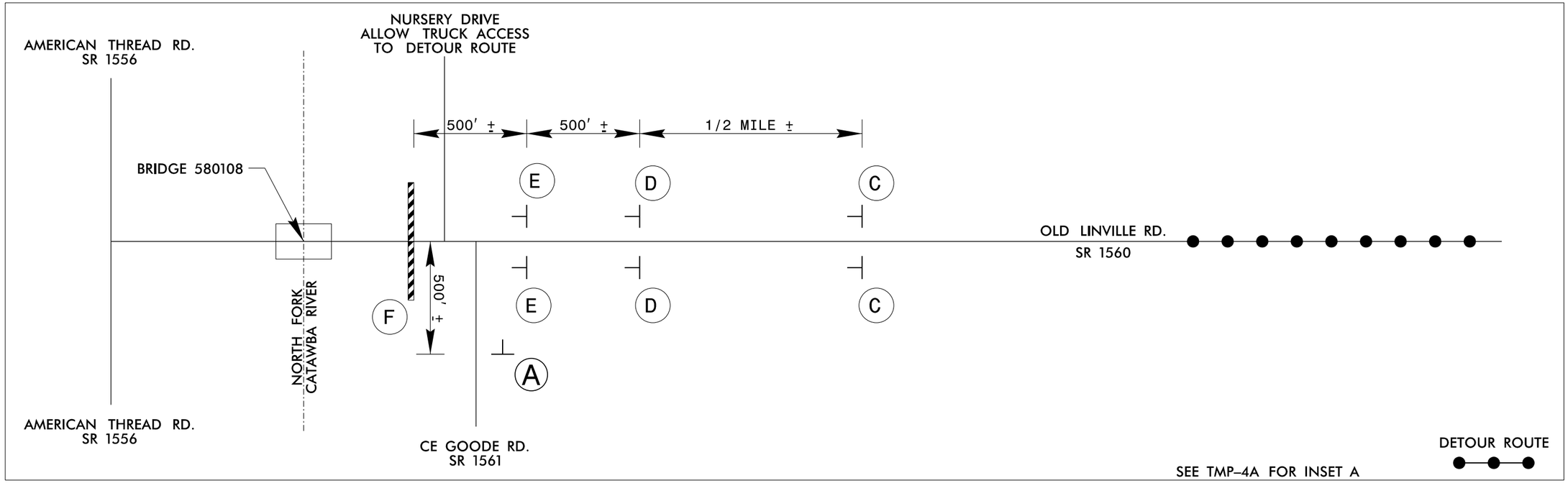
DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

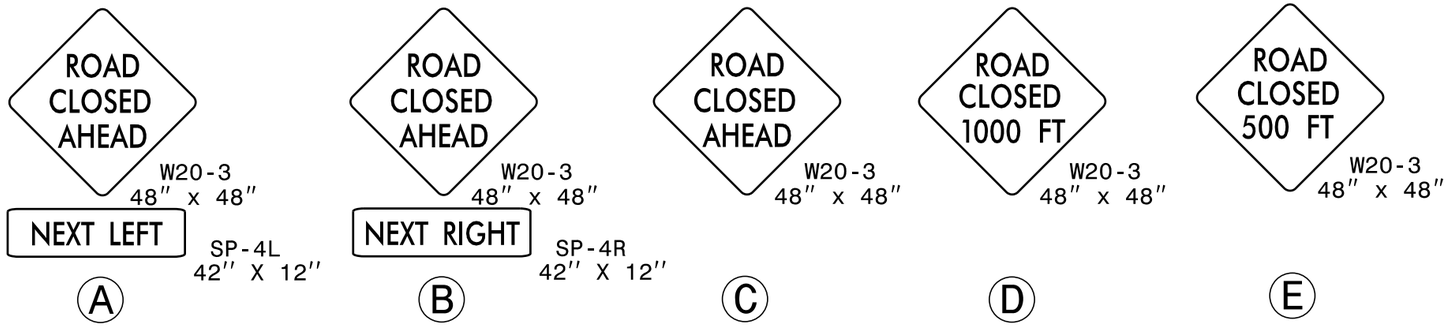
OFFSITE DETOUR ROUTE

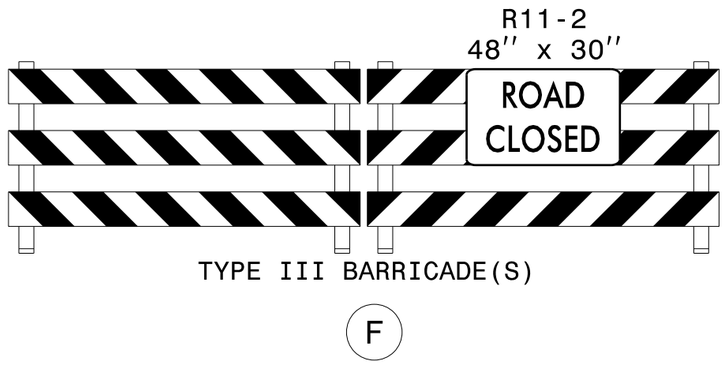
INSET B

BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-4B







NOTES:
1. REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.
2. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS NECESSARY OR AS DIRECTED BY THE ENGINEER.
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NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER TYLER M. KRAUSS

DocuSigned by: Tyler Krauss

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OFFSITE DETOUR ROUTE

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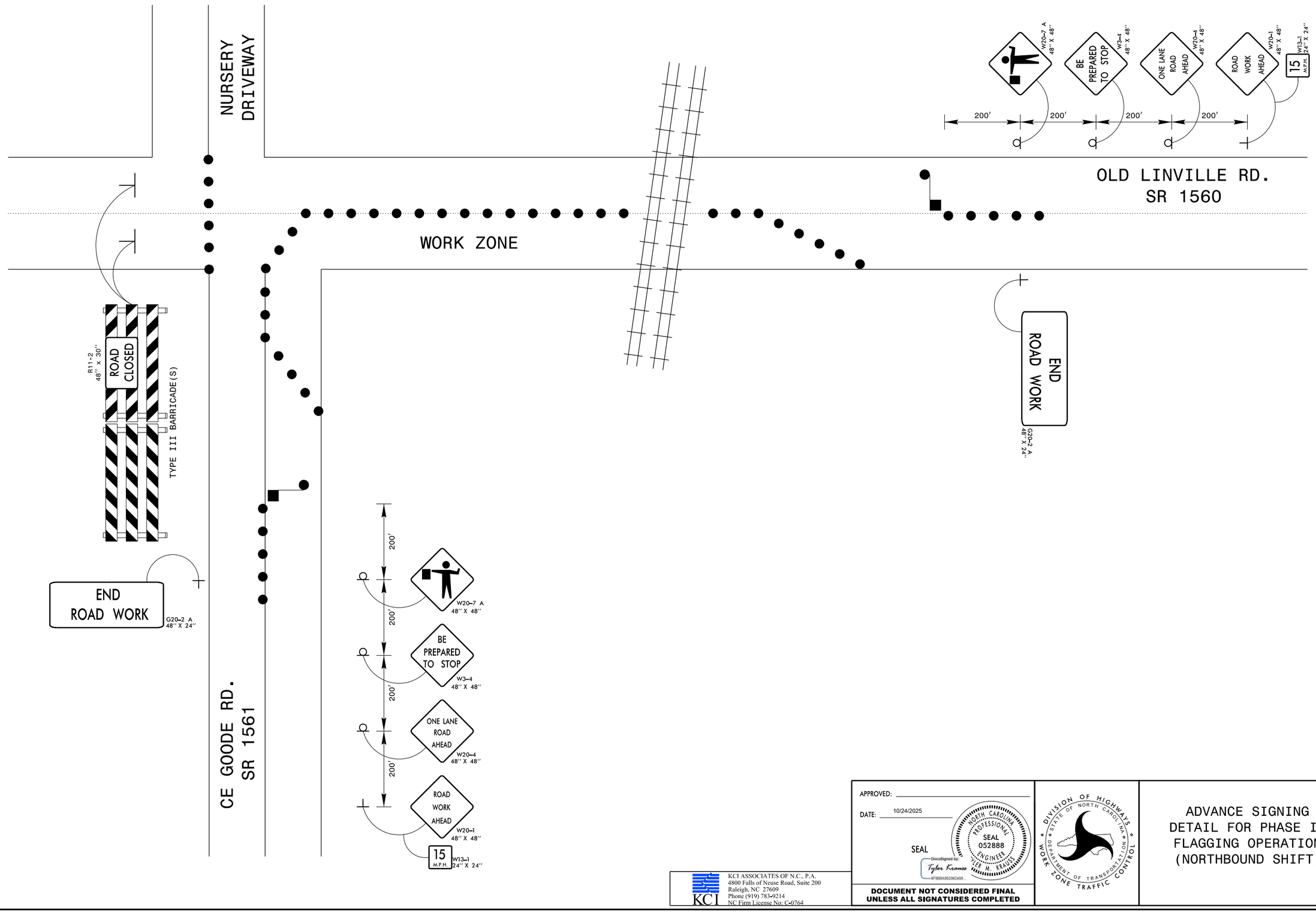
$$$$USERNAME$$$$

BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-5A



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Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER VEER N. KRAUSS

DocuSigned by: Tyler Krauss 6F988A9620624S8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ADVANCE SIGNING DETAIL FOR PHASE IV FLAGGING OPERATION (NORTHBOUND SHIFT)

23-OCT-2025 12:29
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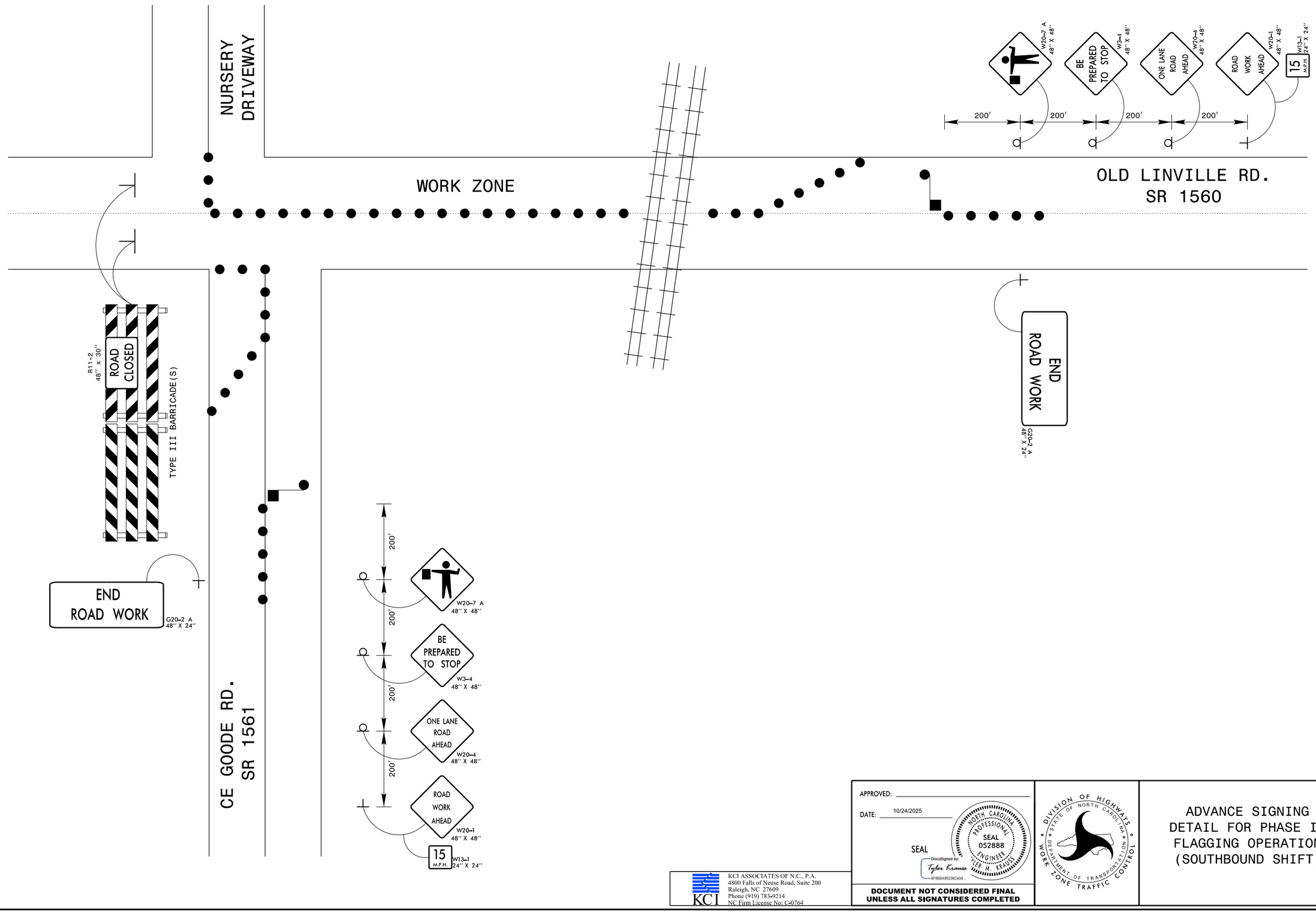
BRIDGE 580108

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	TMP-5B



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NC Firm License No: C-0764

APPROVED: _____

DATE: 10/24/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER VEER N. KRAUSS

DocuSigned by: Tyler Krauss 6F988A9620624S8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ADVANCE SIGNING DETAIL FOR PHASE IV FLAGGING OPERATION (SOUTHBOUND SHIFT)

PROJECT: BP13-R048

CONTRACT: DM00458

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	PMP-1

APPROVED: _____

DATE: 10/24/2025

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 052888 ENGINEER S. M. KRAUSS

DocuSigned by: Tyler Krauss 6F9B8A9520624S8...

KCI ASSOCIATES OF N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PAVEMENT MARKING PLANS

MCDOWELL COUNTY

LOCATION: BRIDGE No. 580108 ON SR 1560 (OLD LINVILLE RD.) OVER NORTH FORK CATAWBA RIVER

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - 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
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.08	PAVEMENT MARKINGS - RAILROAD RXR SYMBOL
1205.11	PAVEMENT MARKINGS - RAILROAD CROSSINGS
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

GENERAL NOTES

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

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

BRIDGE #	MARKING	MARKER
No. 580108	PAINT	NONE

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

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

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

PAVEMENT MARKING SCHEDULE

FINAL PAVEMENT MARKING

SYMB	DESCRIPTION
P1	PAINT (4") WHITE EDGELINE
P5	PAINT (4") 2'-6" WHITE MINISKIP
P13	PAINT (4") YELLOW DOUBLE CENTER
P60	PAINT (16") WHITE LINE, RR X
P61	PAINT (24") WHITE STOPBAR

INDEX

KELVIN L. JORDAN — SIGNING & DELINEATION REGIONAL ENGINEER

RENEE B. ROACH, PE, CPM — STATE SIGNING & DELINEATION ENGINEER

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

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PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	PMP-2

APPROVED: _____

DATE: 10/24/2025

SEAL:

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4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
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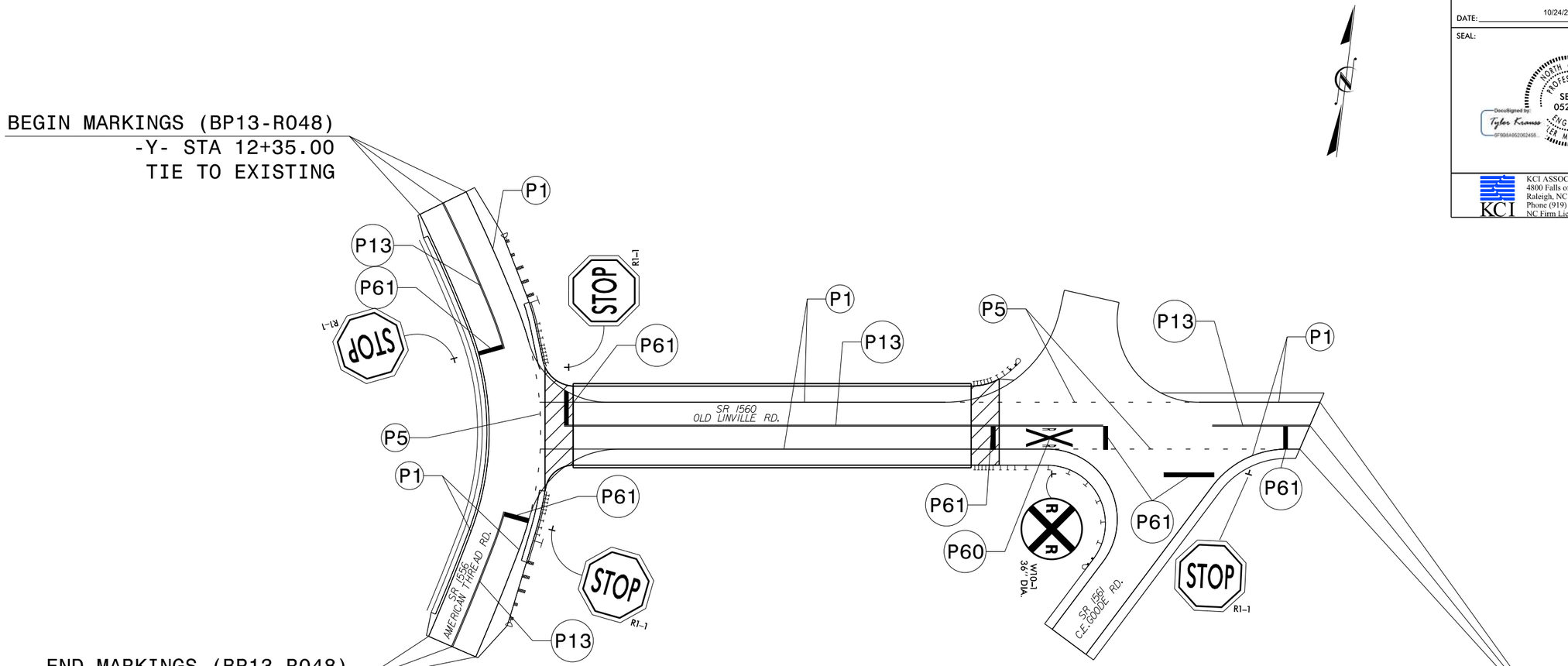

PAVEMENT MARKING LEGEND

P1	WHITE EDGELINE (4″)
P5	2′-6″ WHITE MINISKIP (4″)
P13	YELLOW DOUBLE CENTER (4″)
P60	WHITE LINE, RR X (16″)
P61	WHITE STOPBAR (24″)

PAVEMENT MARKING DETAIL

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$$$$USERNAME$$$$

STATE PROJECT: BP13-R048

CONTRACT: DM00458

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP13-R048	EC-1	7

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

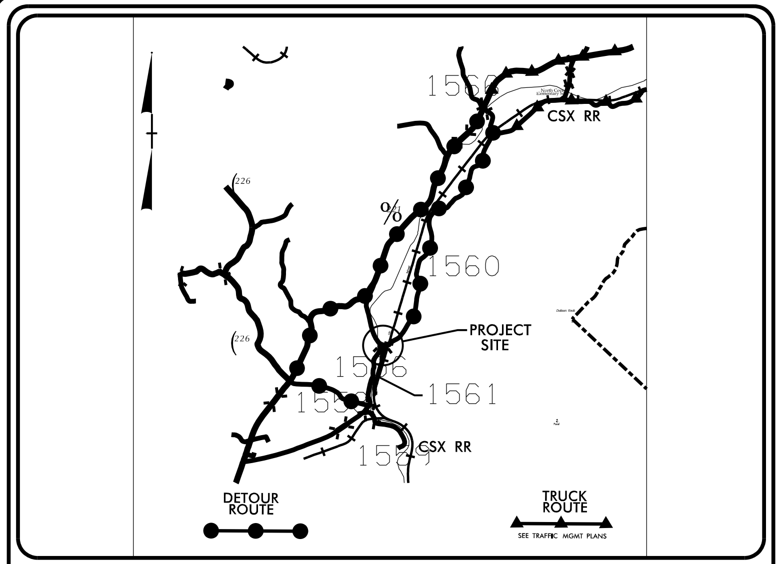
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

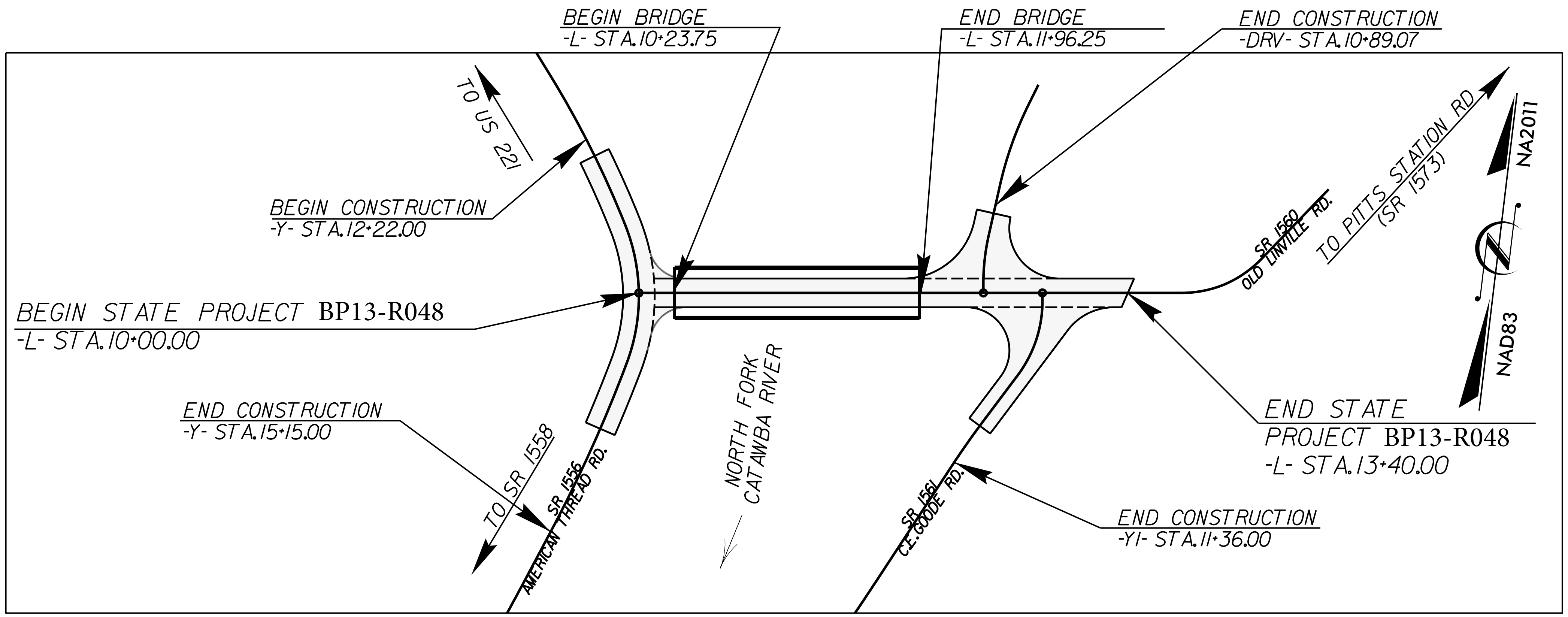
MCDOWELL COUNTY

LOCATION: REPLACE BRIDGE NO. 580108 OVER NORTH FORK CATAWBA RIVER ON SR 1560 (OLD LINVILLE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



VICINITY MAP
NOT TO SCALE



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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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

THIS PROJECT IS NOT WITHIN MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II (MODIFIED).

GRAPHIC SCALE

50 25 0 50 100

PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2024 STANDARD SPECIFICATIONS

MICHAEL UNDERWOOD, PE — *#4517*
NAME — LEVEL III CERTIFICATION NO.

Roadway Standard Drawings

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

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	EC-1A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

EROSION & SEDIMENT CONTROL LEGEND

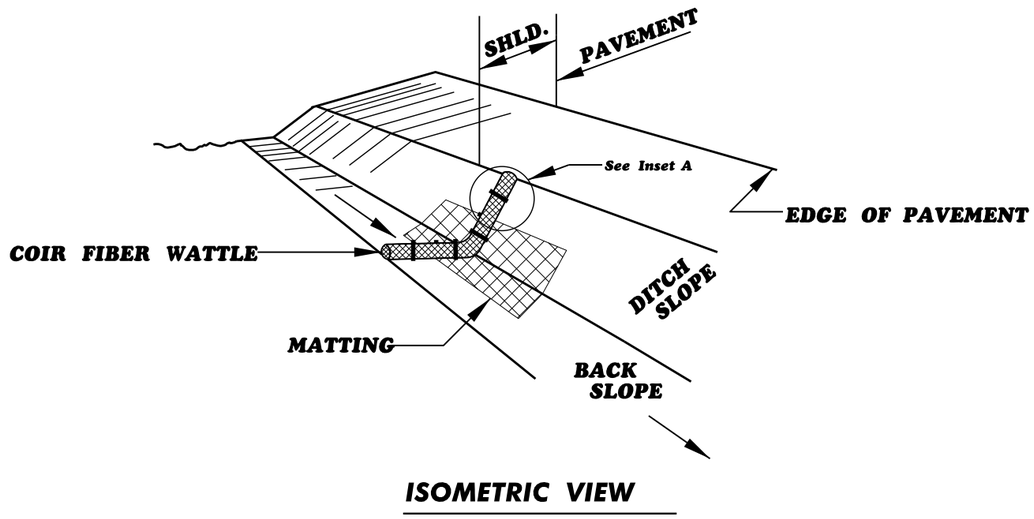
Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer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

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

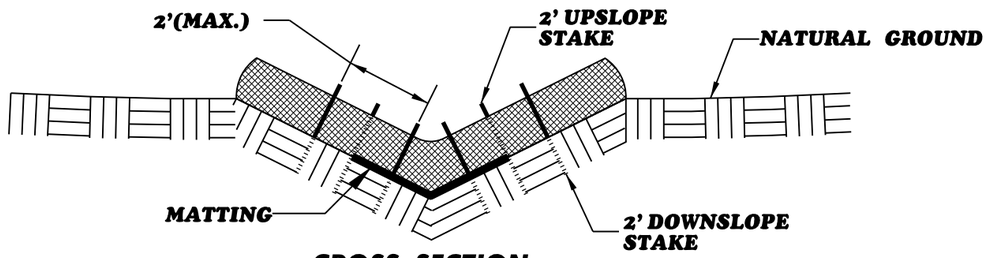
PROJECT REFERENCE NO.	SHEET NO.
BPI3-R048 (580108)	EC-2

COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL

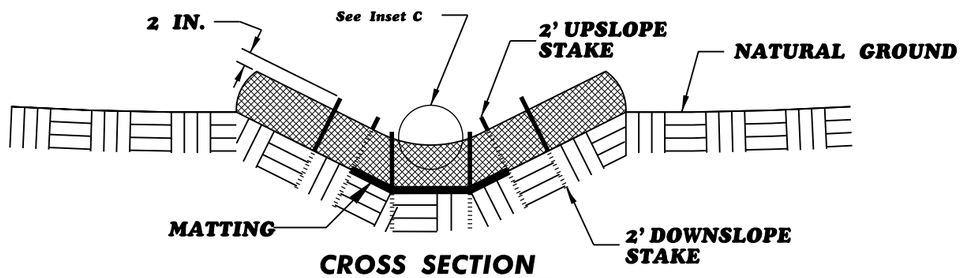
RELEASE FOR CONSTRUCTION DATE: _____



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.

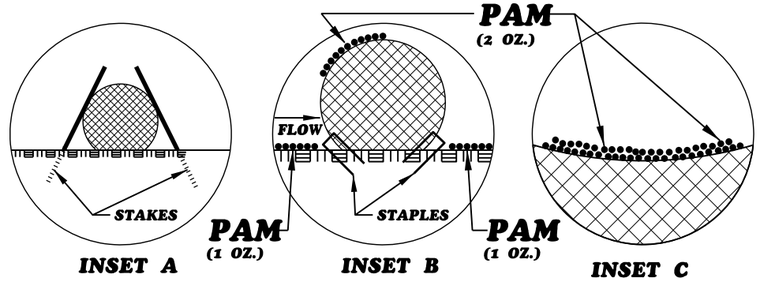
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

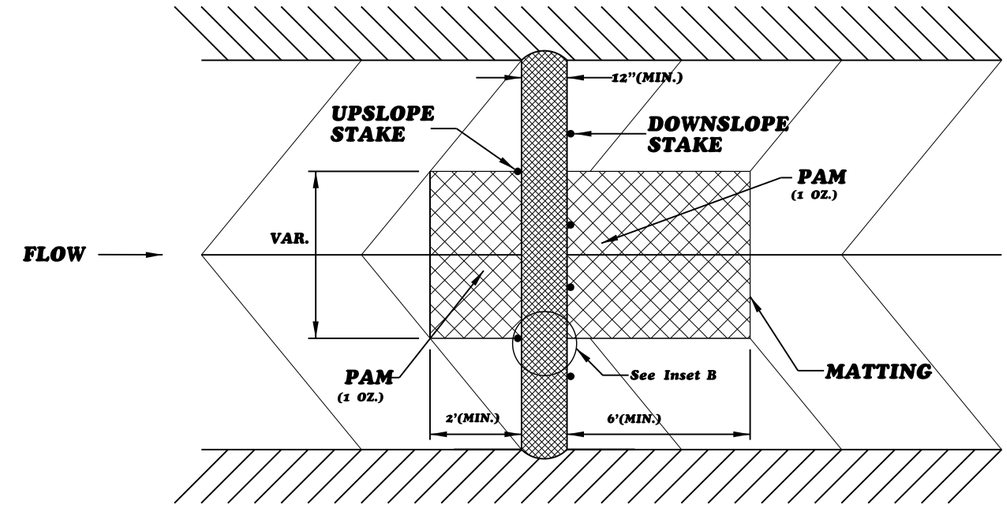
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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

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

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.





TOP VIEW

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

RELEASE FOR CONSTRUCTION DATE: _____

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-Y1-	10+25	11+25	LT	50 (EXCELSIOR)
4	-Y-	14+32	15+00	RT	30 (STRAW)
			SUBTOTAL		80
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					620
				TOTAL	700
				SAY	700

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES

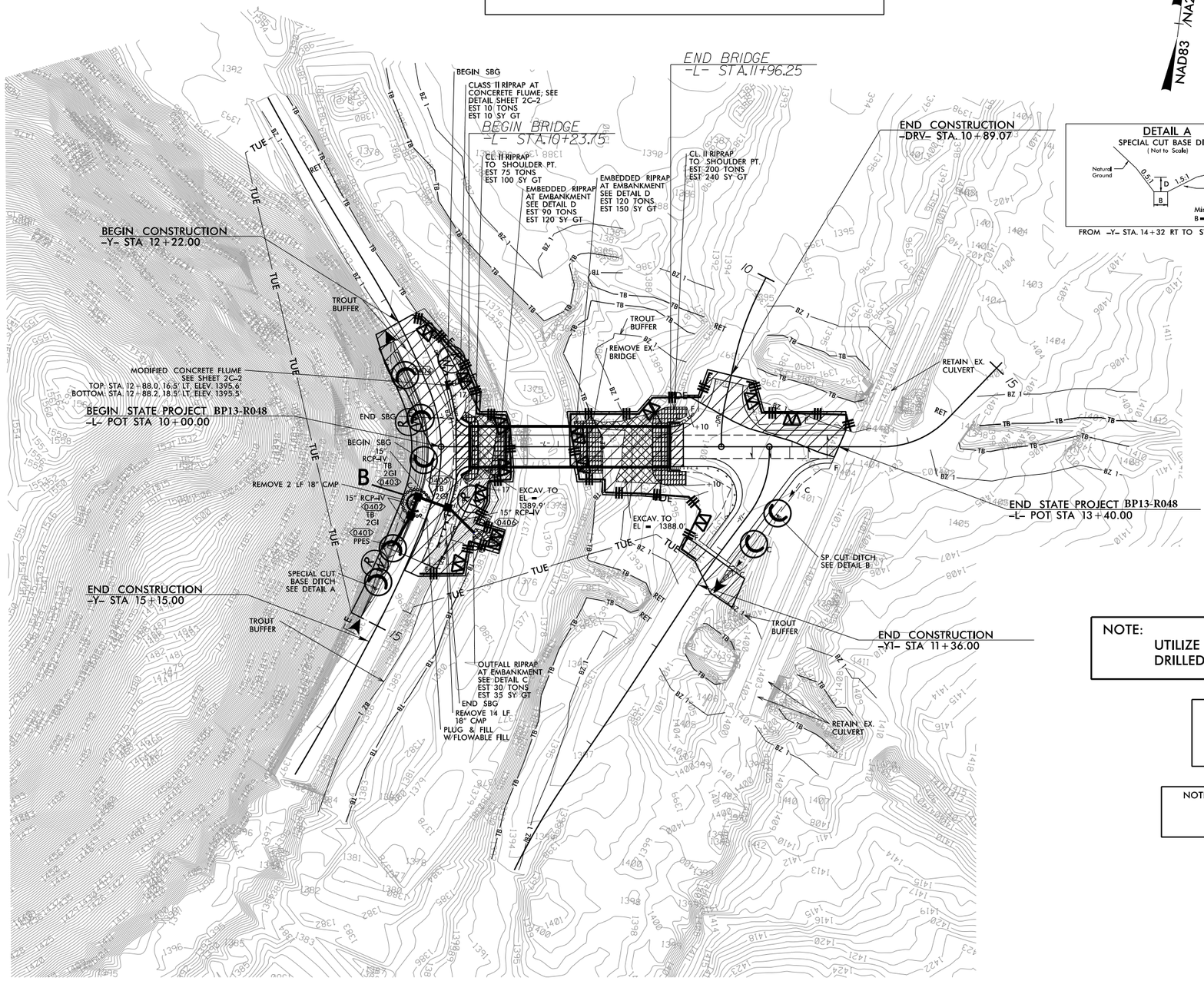
PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	EC-4/CONST.4
R/W SHEET NO.	4

KCI Engineers • Planners • Scientists • Construction Managers
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
http://www.kci.com
Phone (919) 783-9214 • Fax (919) 783-9266

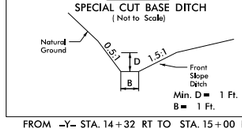
NAD83 /NA2011

RELEASE FOR CONSTRUCTION
DATE: _____

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

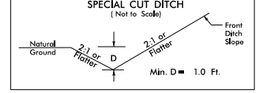


DETAIL A
SPECIAL CUT BASE DITCH
(Not to Scale)



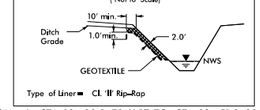
FROM -Y- STA. 14+32 RT TO STA. 15+00 RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



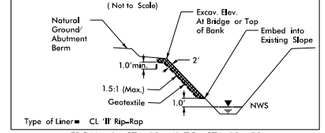
FROM -Y1- STA. 10+25 LT TO STA. 11+25 LT

DETAIL C
DITCH OUTFALL RIP RAP AT EMBANKMENT
(Not to Scale)



FROM -L- STA. 10+28.0, 73.6' RT TO STA. 10+51.8, 80.6' RT

DETAIL D
EMBEDDED RIP RAP AT EMBANKMENT
(Not to Scale)



FROM -L- STA. 10+41 TO STA. 10+58
FROM -L- STA. 11+13 TO STA. 11+38

NOTE:
UTILIZE SPECIAL STILLING BASINS FOR DRILLED PIERS.

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

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

REVISIONS
8/17/99

9/3/2025
M:\2018\11806013 NCDOT Express D-B 13B\580108 B-5885 Roadside\PSH\580108_eu_psh_4.dgn
Crystal Moore

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	EC-5/CONST.4
R/W SHEET NO.	4

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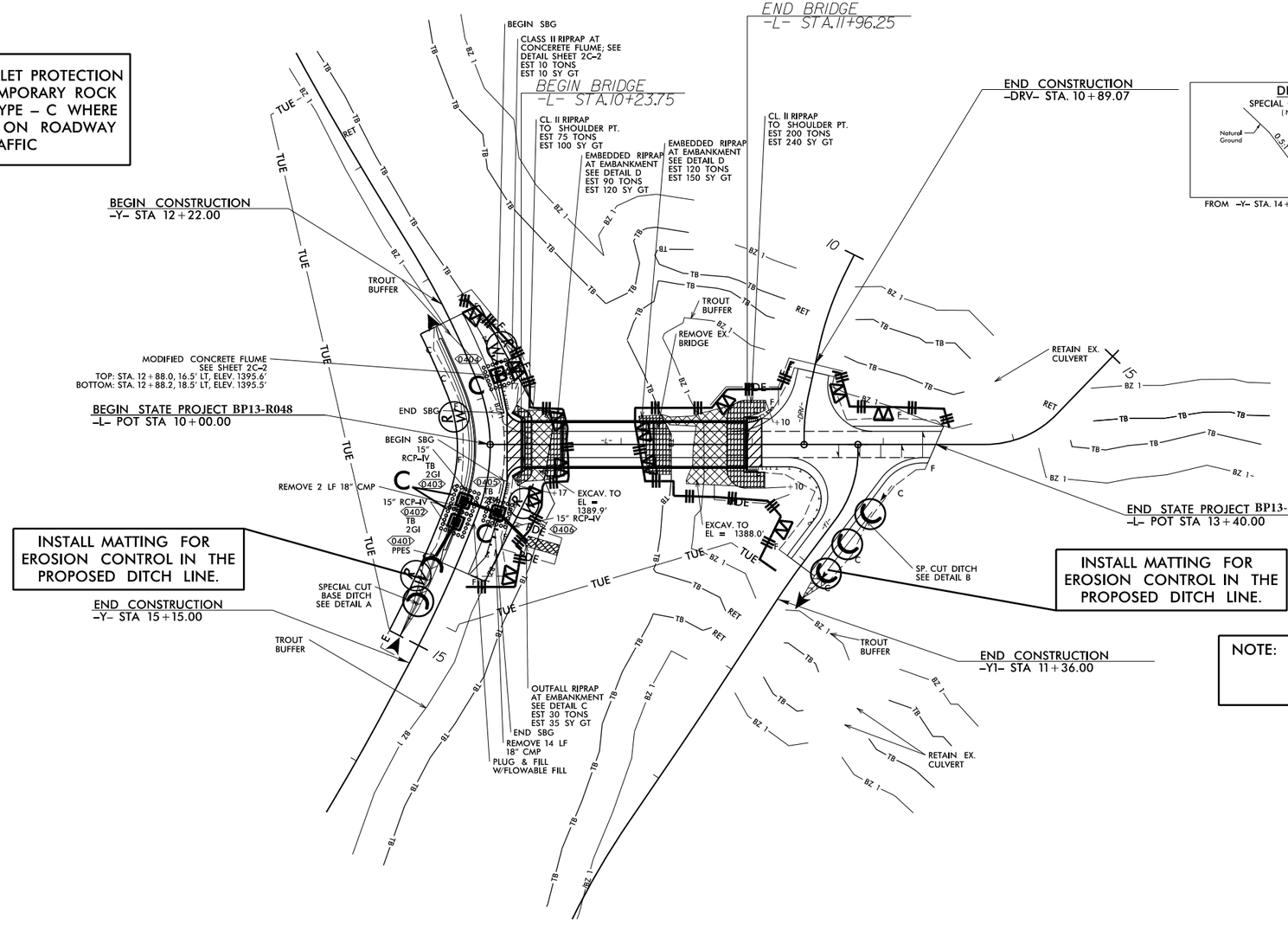
NAD83 NA2011

RELEASE FOR CONSTRUCTION DATE: _____

Place Matting for Erosion Control on Slope as Work Allows.

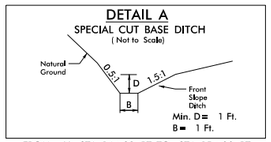
UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF TEMPORARY ROCK INLET SEDIMENT TRAPS TYPE – C WHERE PONDING MAY OCCUR ON ROADWAY OPEN TO TRAFFIC



INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

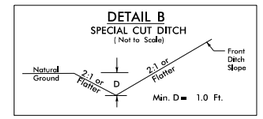
INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

DETAIL A
SPECIAL CUT BASE DITCH
(Not to Scale)



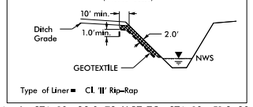
FROM –Y– STA. 14+32 RT TO STA. 15+00 RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM –Y1– STA. 10+25 LT TO STA. 11+25 LT

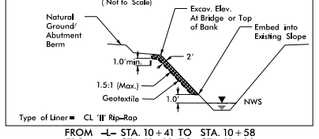
DETAIL C
DITCH OUTFALL RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL 'II' Rip–Rap

FROM –L– STA. 10+28.0, 73.6' RT TO STA. 10+51.8, 80.6' RT

DETAIL D
EMBEDDED RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL 'II' Rip–Rap

FROM –L– STA. 10+41 TO STA. 10+58
FROM –L– STA. 11+13 TO STA. 11+38

NOTE:
UTILIZE SPECIAL STILLING BASINS FOR DRILLED PIERS.

REVISIONS 8/17/99

9/3/2025
M:\2018\11806013 NCDOT Express D-B 13B\580108 B-5885\Roadside\PSH\580108_rev_psh_5.dgn
Crystal Moore

PROJECT REFERENCE NO.	SHEET NO.
BP13-R048 (580108)	RF-1

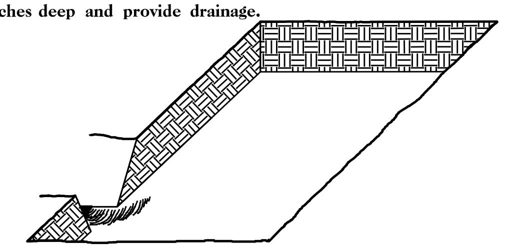
RELEASE FOR CONSTRUCTION DATE: ________

PLANTING DETAILS

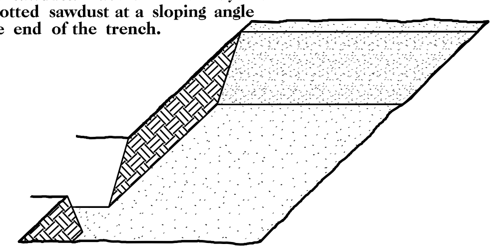
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

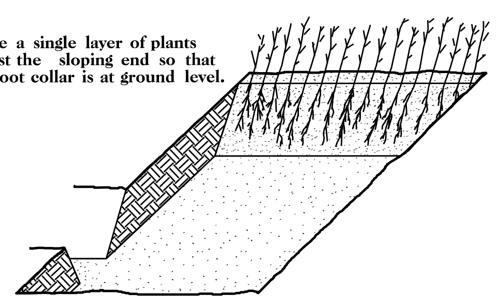
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



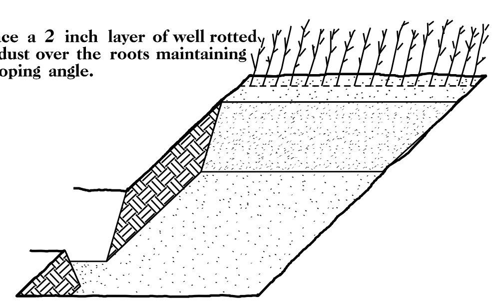
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

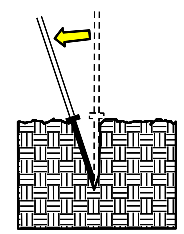


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

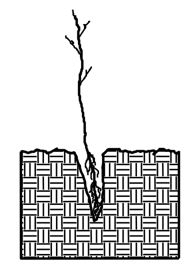


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

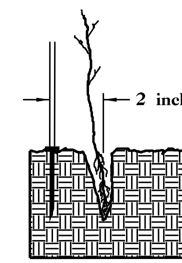
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



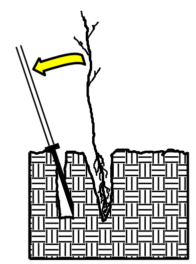
1. Insert planting bar as shown and pull handle toward planter.



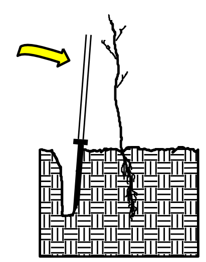
2. Remove planting bar and place seedling at correct depth.



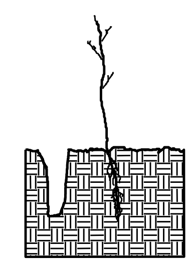
3. Insert planting bar 2 inches toward planter from seedling.



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



5. Push handle forward firming soil at top.

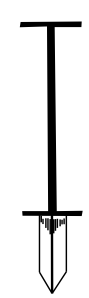


6. Leave compaction hole open. Water thoroughly.

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.

☐ 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:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25%	NYSSA SYLVATICA	BLACK GUM	12 in - 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

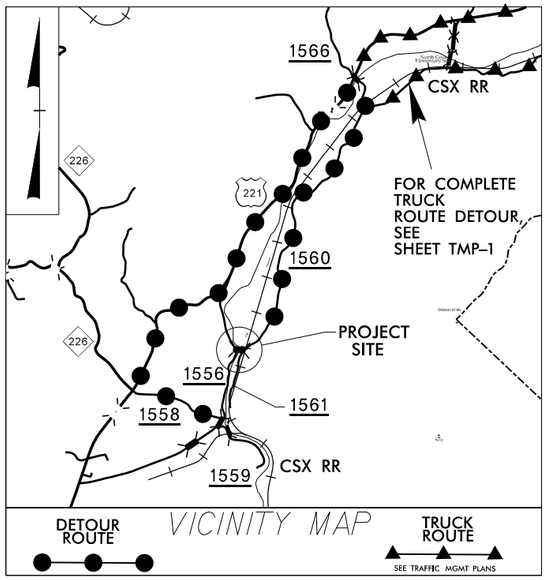
REFORESTATION DETAIL SHEET

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

09/08/99

STATE PROJECT: BP13-R048

CONTRACT: DM00458



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
MCDOWELL COUNTY

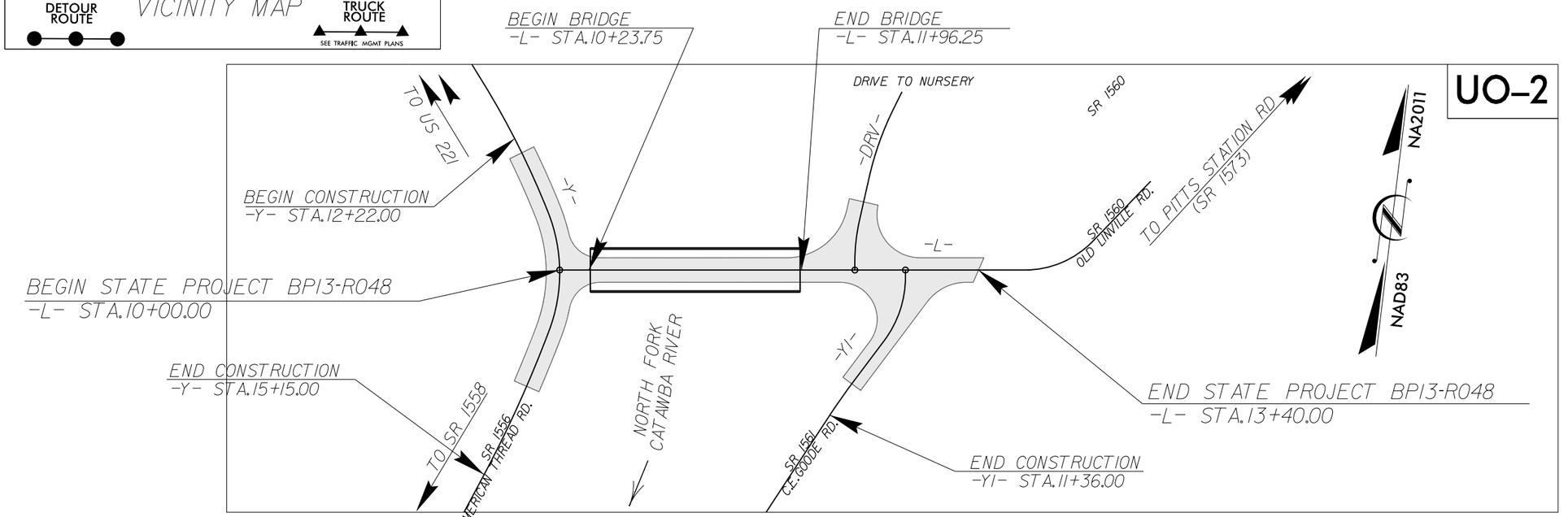
T.I.P. NO.	SHEET NO.
BP13-R048	UO-1

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

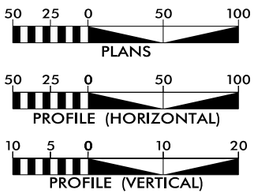
LOCATION: REPLACE BRIDGE NO. 580108 OVER NORTH FORK CATAWBA RIVER ON SR 1560 (OLD LINVILLE RD.)

TYPE OF WORK: RELOCATION OF UTILITIES

UO-2



GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	*DESCRIPTION:*
UO-1	*TITLE SHEET*
UO-2	*UBO PLAN SHEET*

UTILITY OWNERS WITH CONFLICTS

(A) RUTHERFORD EMC – POWER

(B) CHARTER/SPECTRUM – COMMUNICATION

(C) FRONTIER COMMUNICATIONS – COMMUNICATION

PREPARED IN THE OFFICE OF:

KCI
http://www.kci.com

KCI Associates of N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC Firm License No: C-0764

DIVISION OF HIGHWAYS
UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

KEITH RADCLIFF	*SENIOR UTILITY ENGINEER*
MARK GIBBS, P.E.	*DIVISION ENGINEER*
JOHN D. METCALF	*DIVISION UTILITY COORDINATOR*
JOHN FAISON	*PROJECT UTILITY COORDINATOR*
DANIEL ALLEN	*PROJECT UTILITY DESIGNER*

18-JAN-2024 14:49
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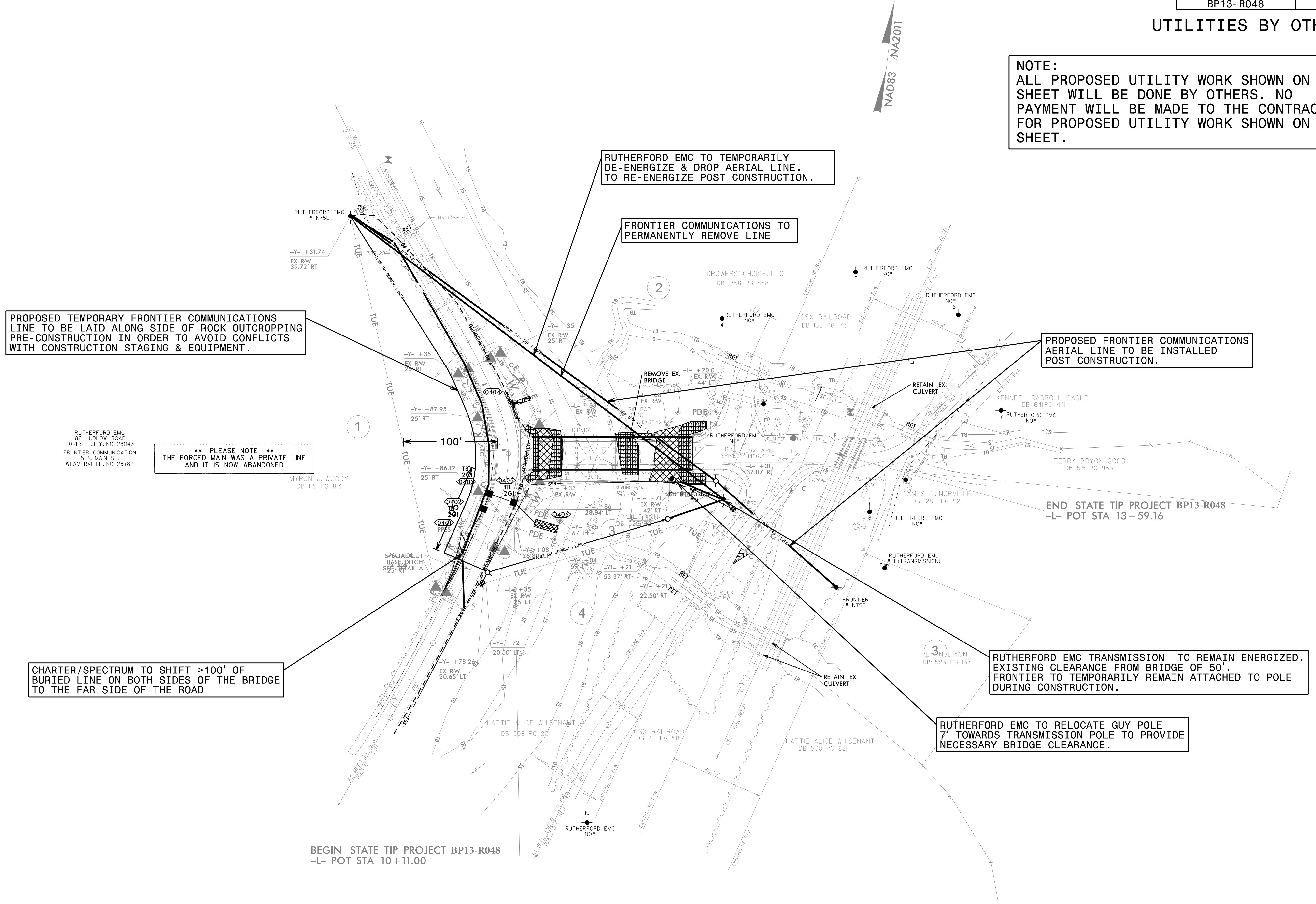
PROJECT REFERENCE NO.	SHEET NO.
BP13-R048	UO-2

UTILITIES BY OTHERS

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



COMPUTED BY: M. Armstrong DATE: 4/22/21
CHECKED BY: R. ALLEN DATE: 4/22/21

5/9/06

BRIDGE 580108	PROJ. REFERENCE NO.	SHEET NO.
	BP13-R048	X-0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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".

CROSS-SECTION SUMMARY

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+11.00	0	0
10+23.75	0	19

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
11+96.25	0	0
12+00.00	0	5
12+25.00	0	32
12+50.00	0	50
12+75.00	0	44
13+00.00	0	27
13+25.00	0	20
13+40.00	2	3

Station Y	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+35.00	0	0
12+50.00	13	0
12+75.00	32	0
13+00.00	20	3
13+25.00	3	12
13+50.00	0	17
13+75.00	3	9
14+00.00	13	4
14+25.00	20	30
14+35.00	12	11
14+50.00	16	0
14+75.00	8	0

Station Y1	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+10.00	0	0
10+25.00	1	8
10+50.00	6	10
10+75.00	15	6
11+00.00	17	9
11+05.00	3	2

26-AUG-2025 08:56
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6/23/16

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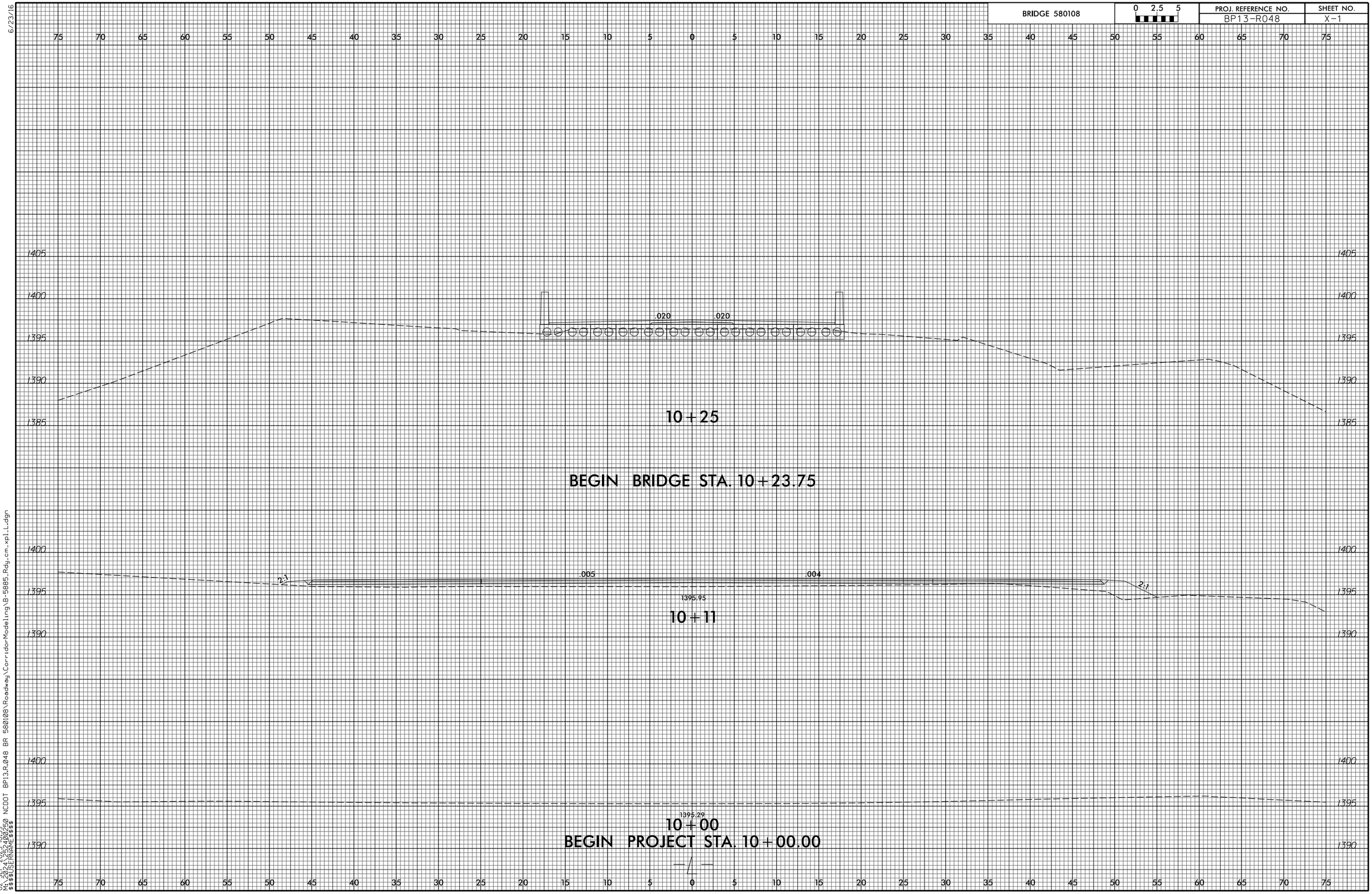

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6/23/16

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1400
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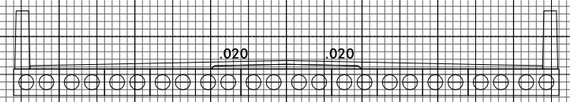
1390
1385
1380
1375



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10 + 75

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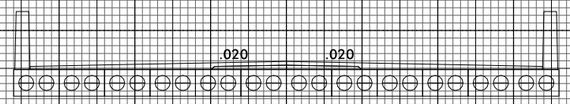

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6/23/16

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1405
1400
1395
1390
1385
1380
1375
1370

.020 .020

1383.76

11+25

.020 .020

1377.08

11+00

6/23/16

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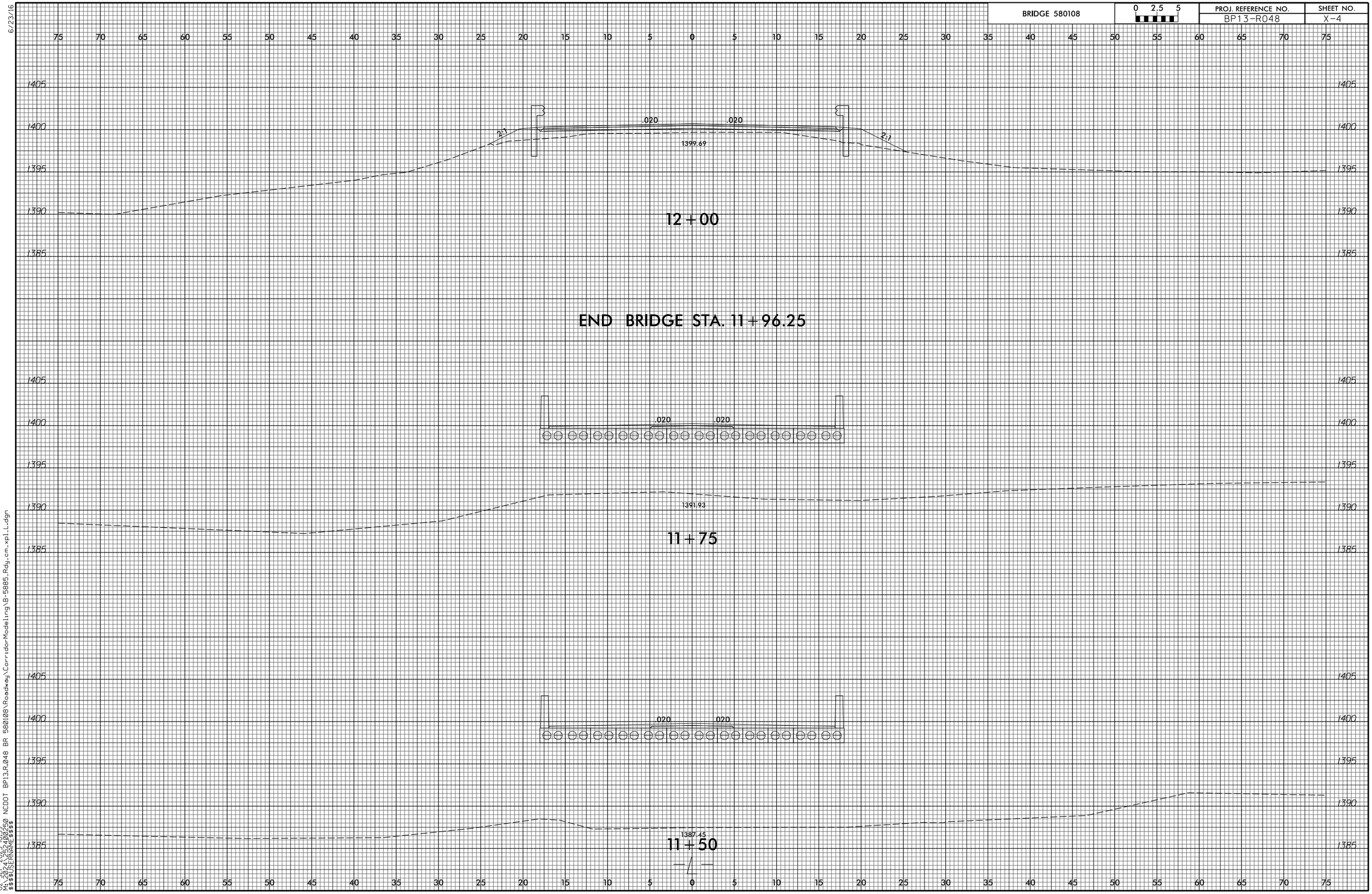

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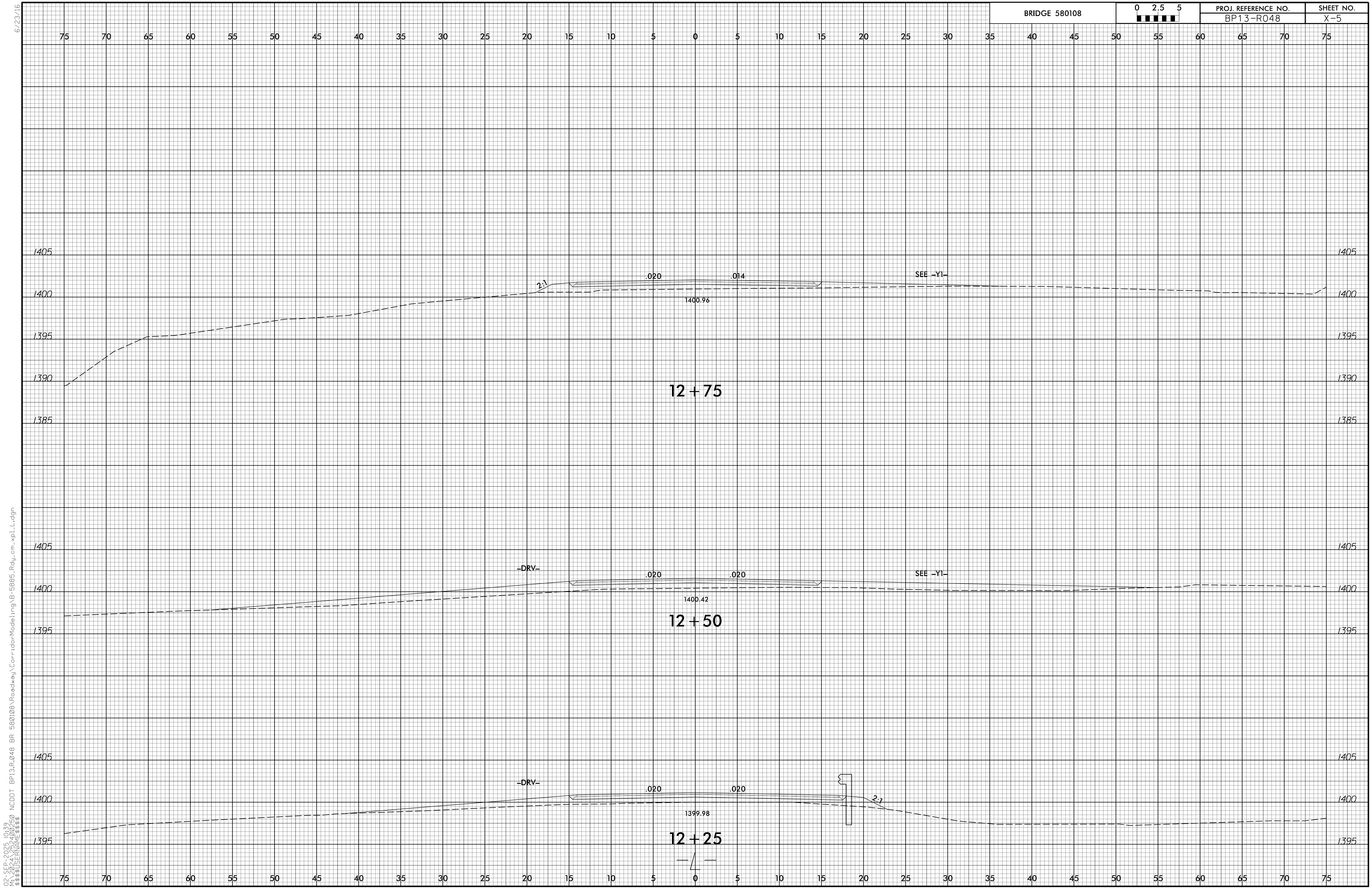

6/23/16

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END PROJECT STA. 13+40.00

1405 1400 1395 1390

2:1 .026 1403.41

13+40

1405 1400 1395 1390

2:1 .020 .017 2:1 1402.46

13+25

1405 1400 1395 1390

2:1 .020 .001 SEE -Y1- 1401.69

13+00

1405 1400 1395 1390 1385

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6/23/16

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1410 1405 1400 1395

1402.76

14+00

1405 1400 1395

1404.06

13+75

1405 1400 1395

1404.08

13+50

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

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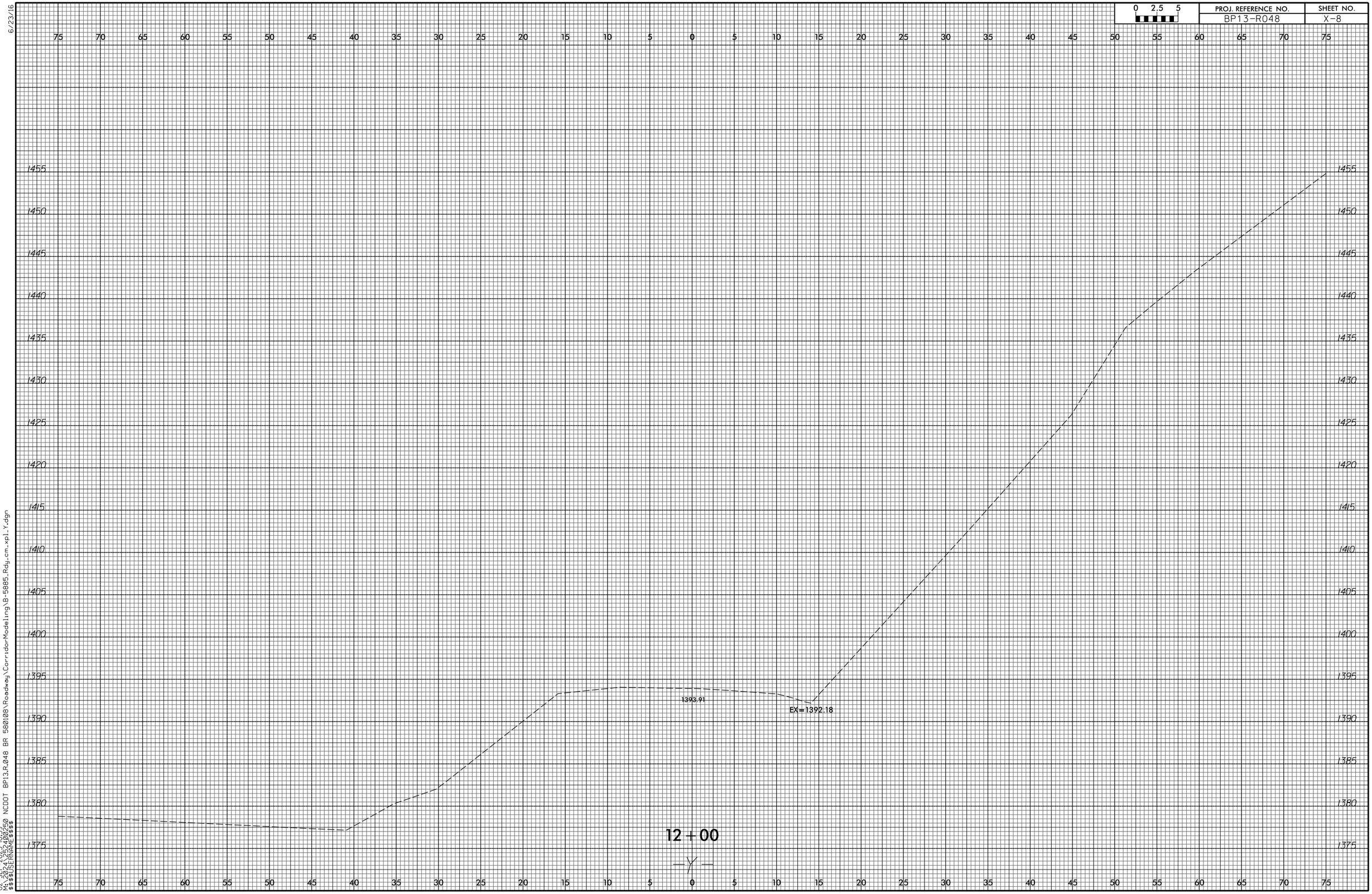

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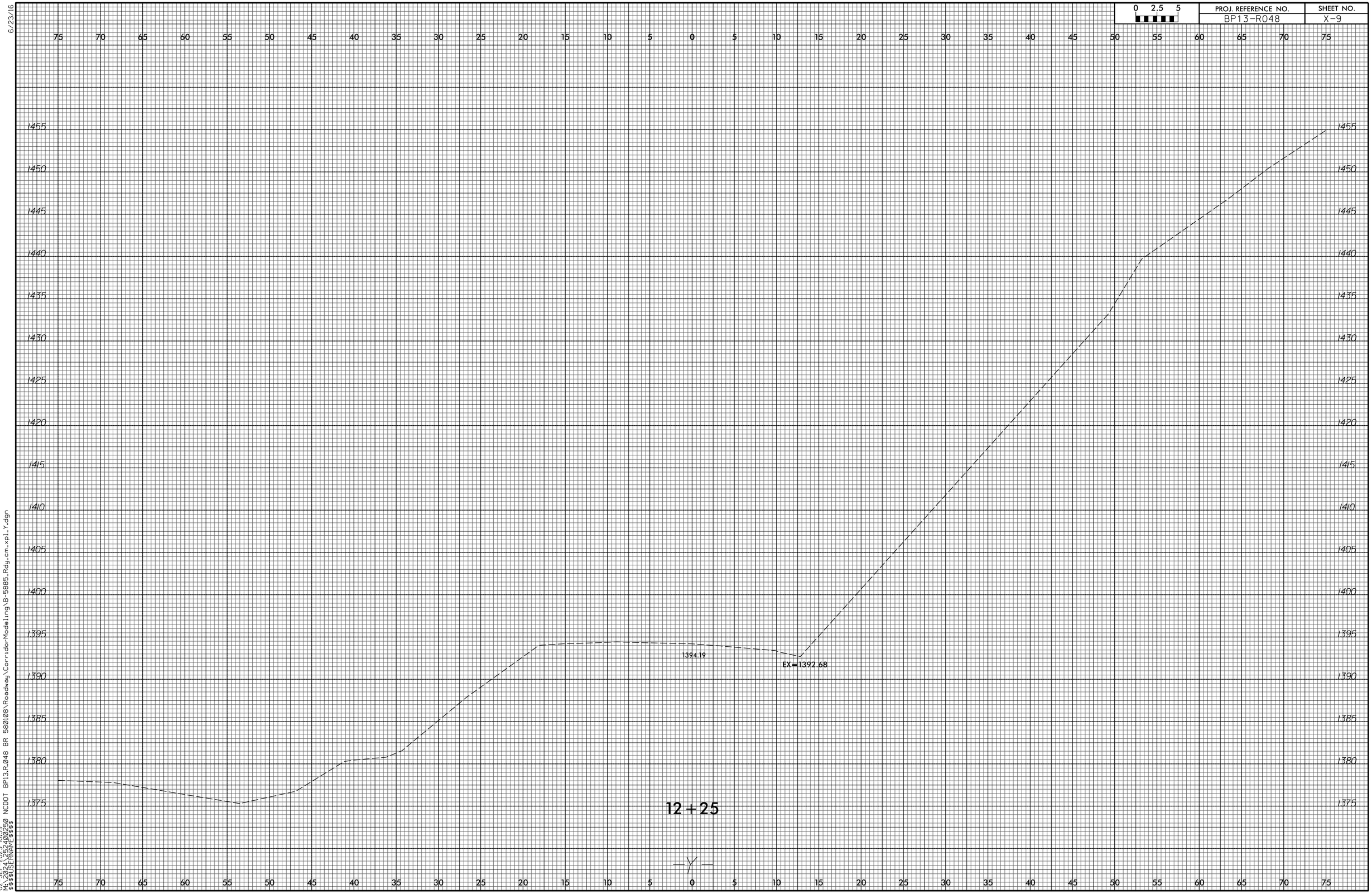

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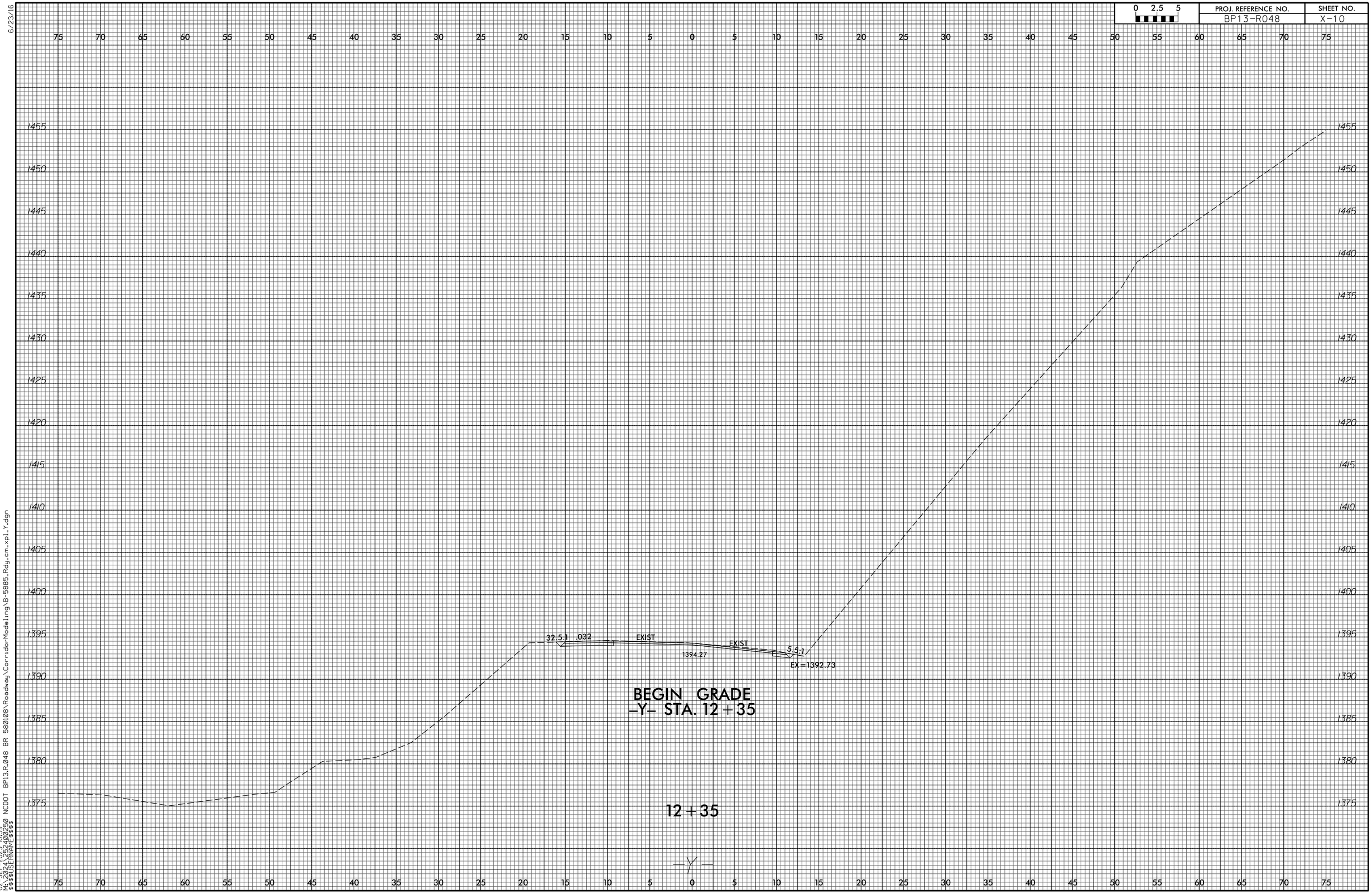

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6/23/16

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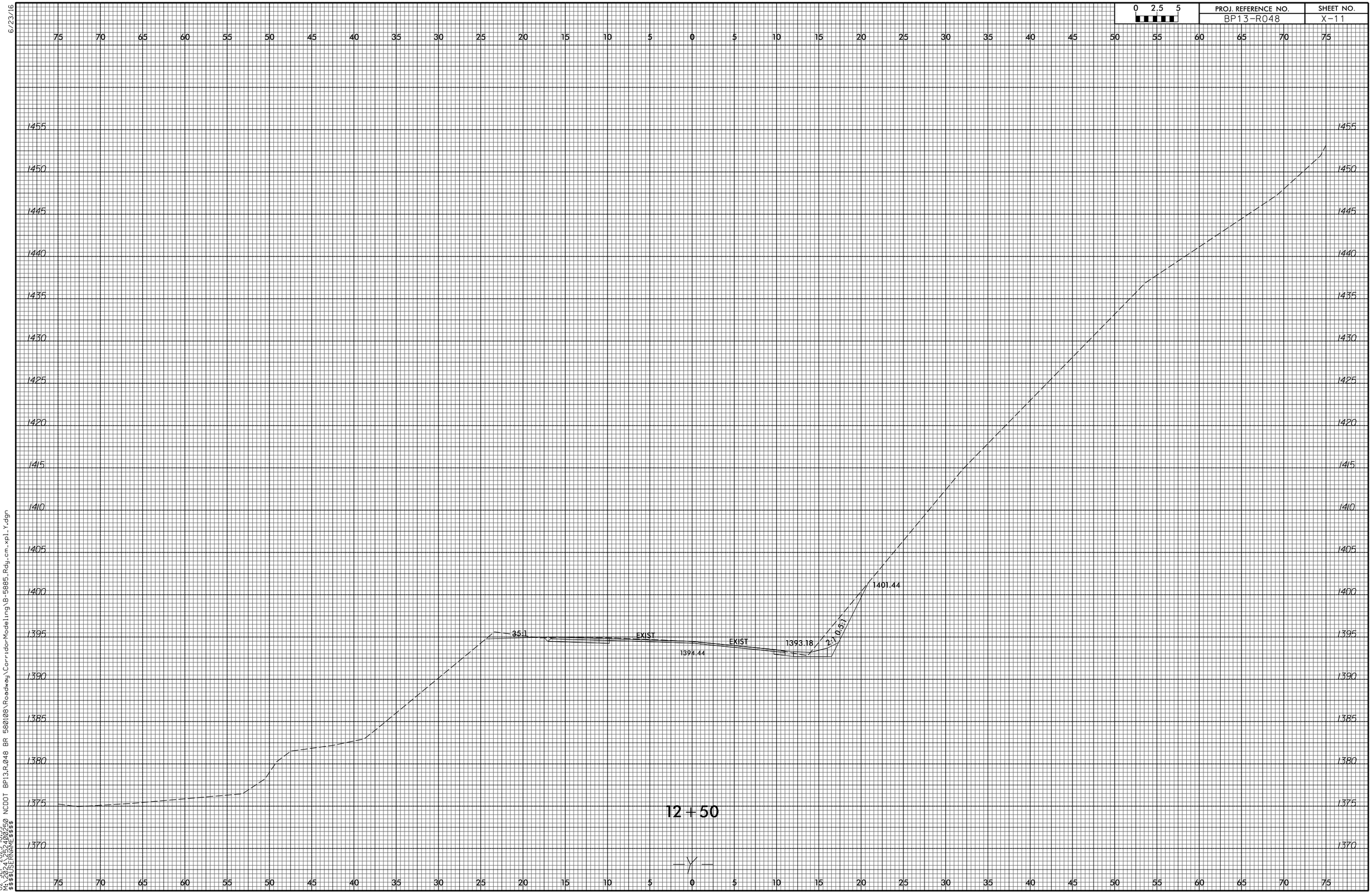

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6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
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1450 1445 1440 1435 1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380 1375

51:1

EXIST

1394.81

EXIST

1393.75

2:1

1397.58

12+75

—Y—

02-SEP-2025 10:39
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6/23/16

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	BP13-R048	X-13

6/23/16

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	BP13-R048	X-14

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1445 1440 1435 1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380 1375

SEE -L-
EXIST
EXIST
1395.06
1395.26
2%
1397.66

13+25

-Y-

6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	X-15

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1450 1445 1440 1435 1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380 1375

SEE -L-

EXIST

EXIST

1394.98

1395.28

2:1

1397.60

13+50

-Y-

6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
BP13-R048	X-16

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

1450 1445 1440 1435 1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380 1375

1396.4
2:1
1395.18
EXIST
EXIST
1395.39
1394.40
2:1
0.5:1
1396.37

13+75

—Y—

02-SEP-2025 10:39
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6/23/16

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	BP13-R048	X-17

6/23/16

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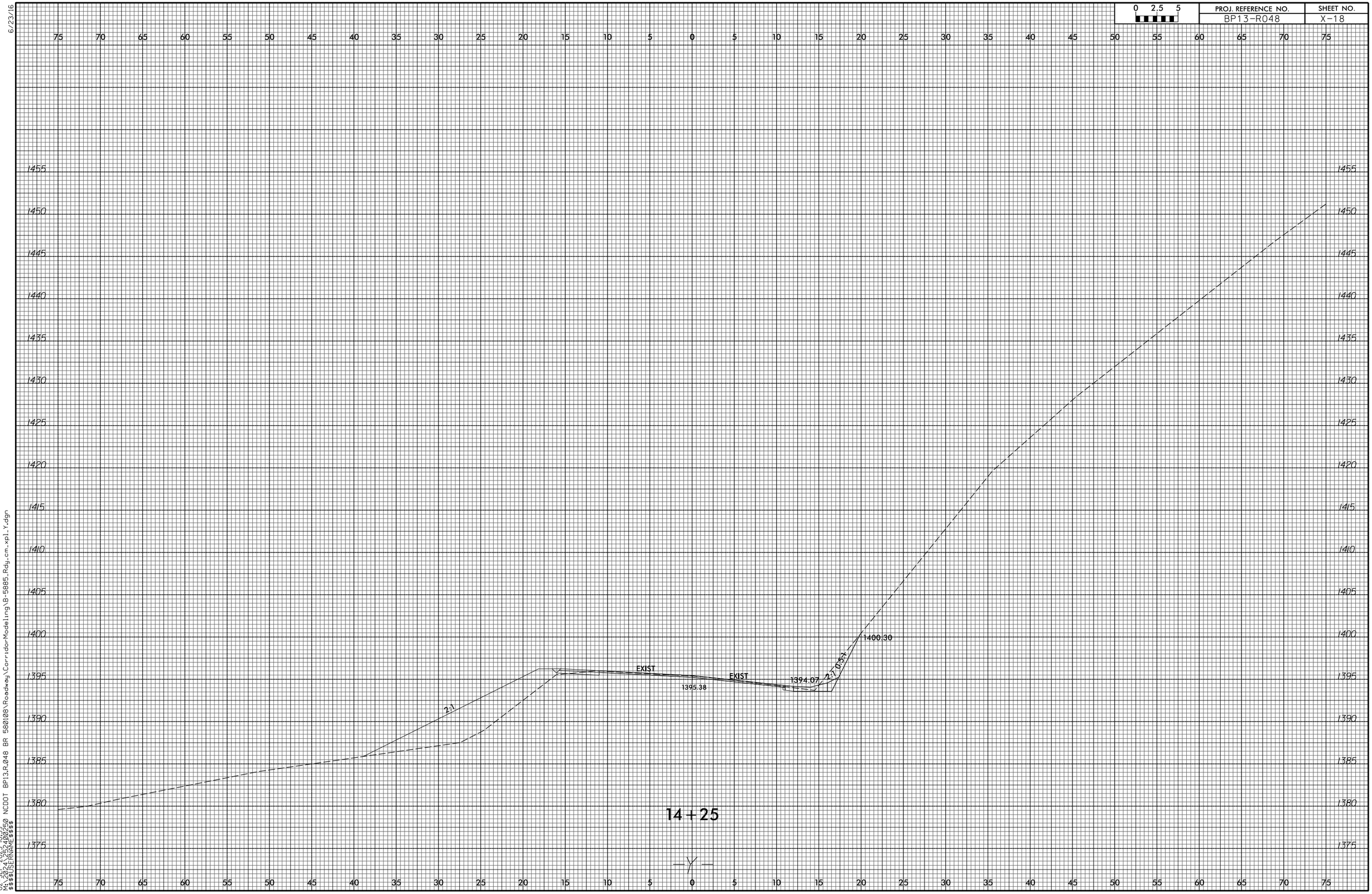
	BP13-R048	X-18



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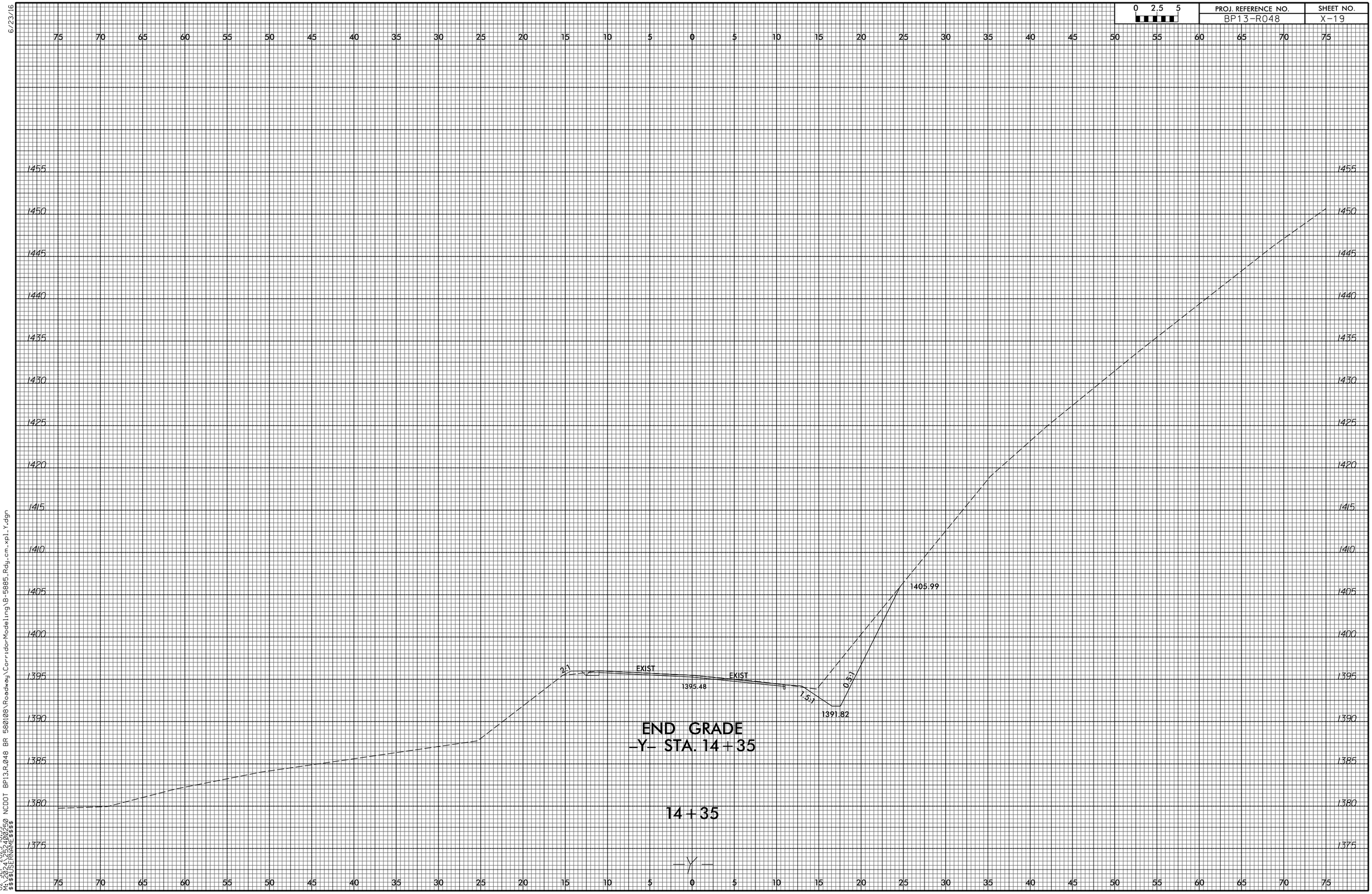

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6/23/16

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	BP13-R048	X-20

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	BP13-R048	X-21

6/23/16

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

1450 1445 1440 1435 1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380 1375

1395.86

1396.52

1.5:1

0.5:1

1393.43

14+75

—Y—

6/23/16

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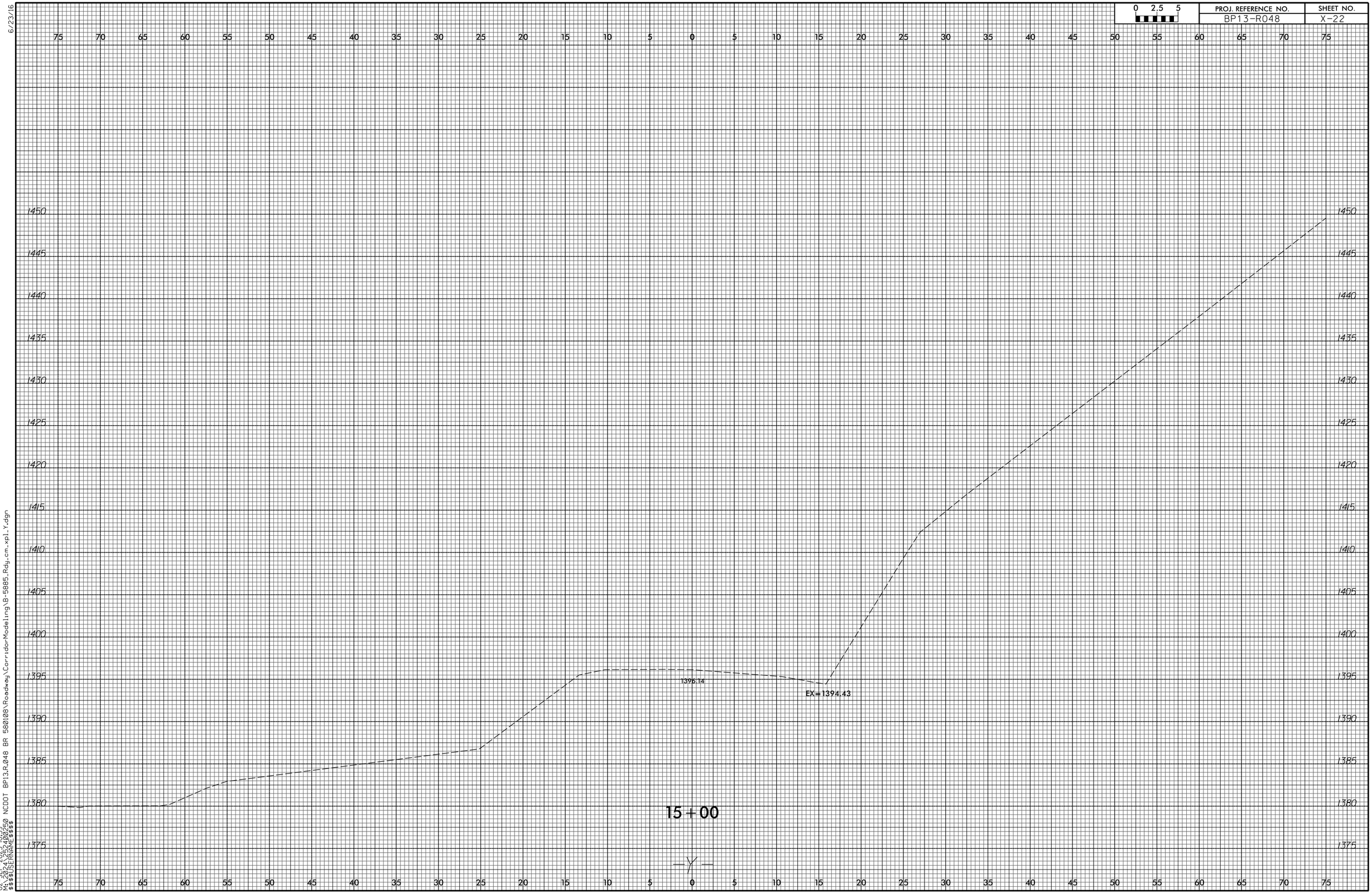

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6/23/16

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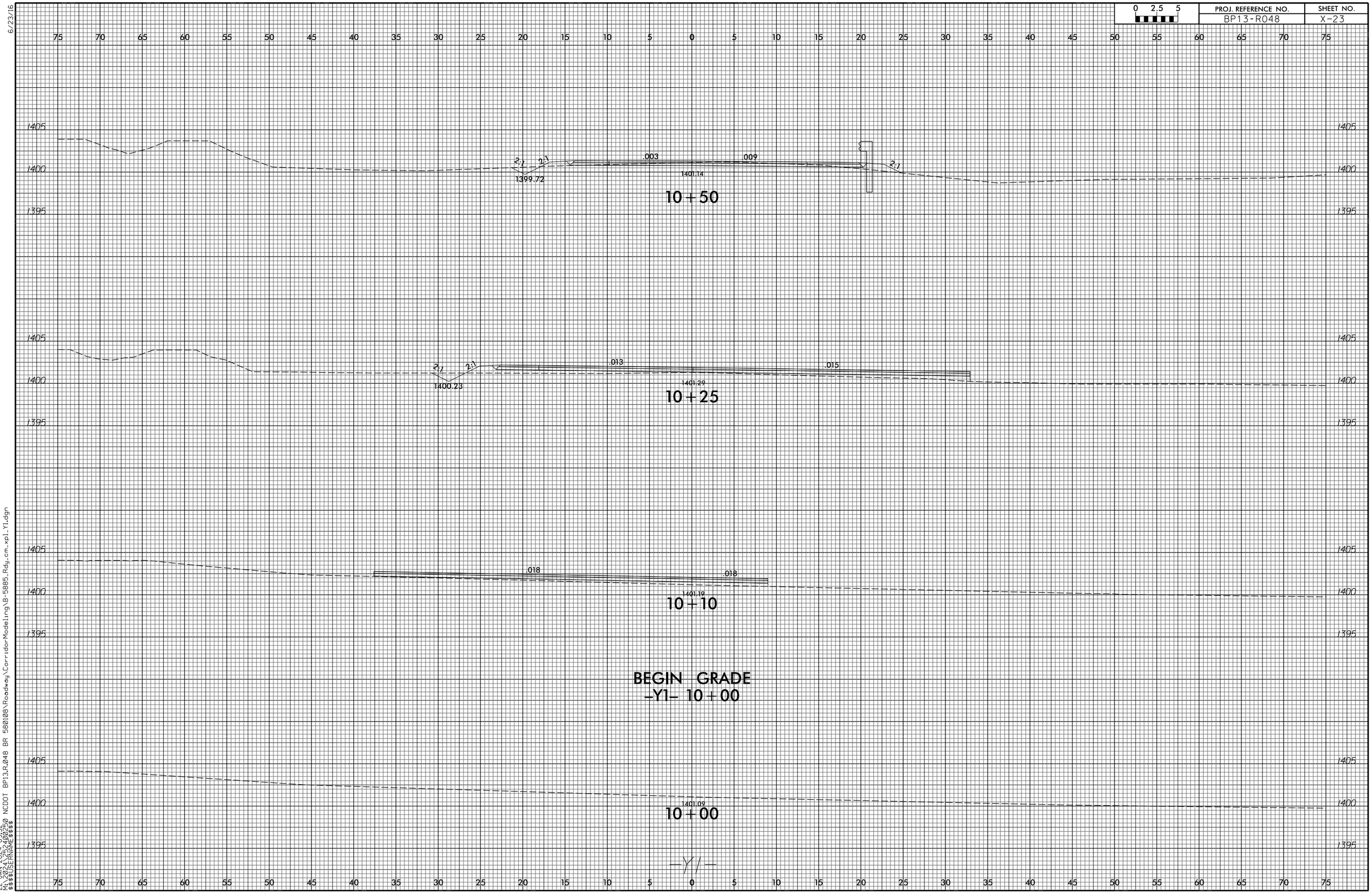

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6/23/16

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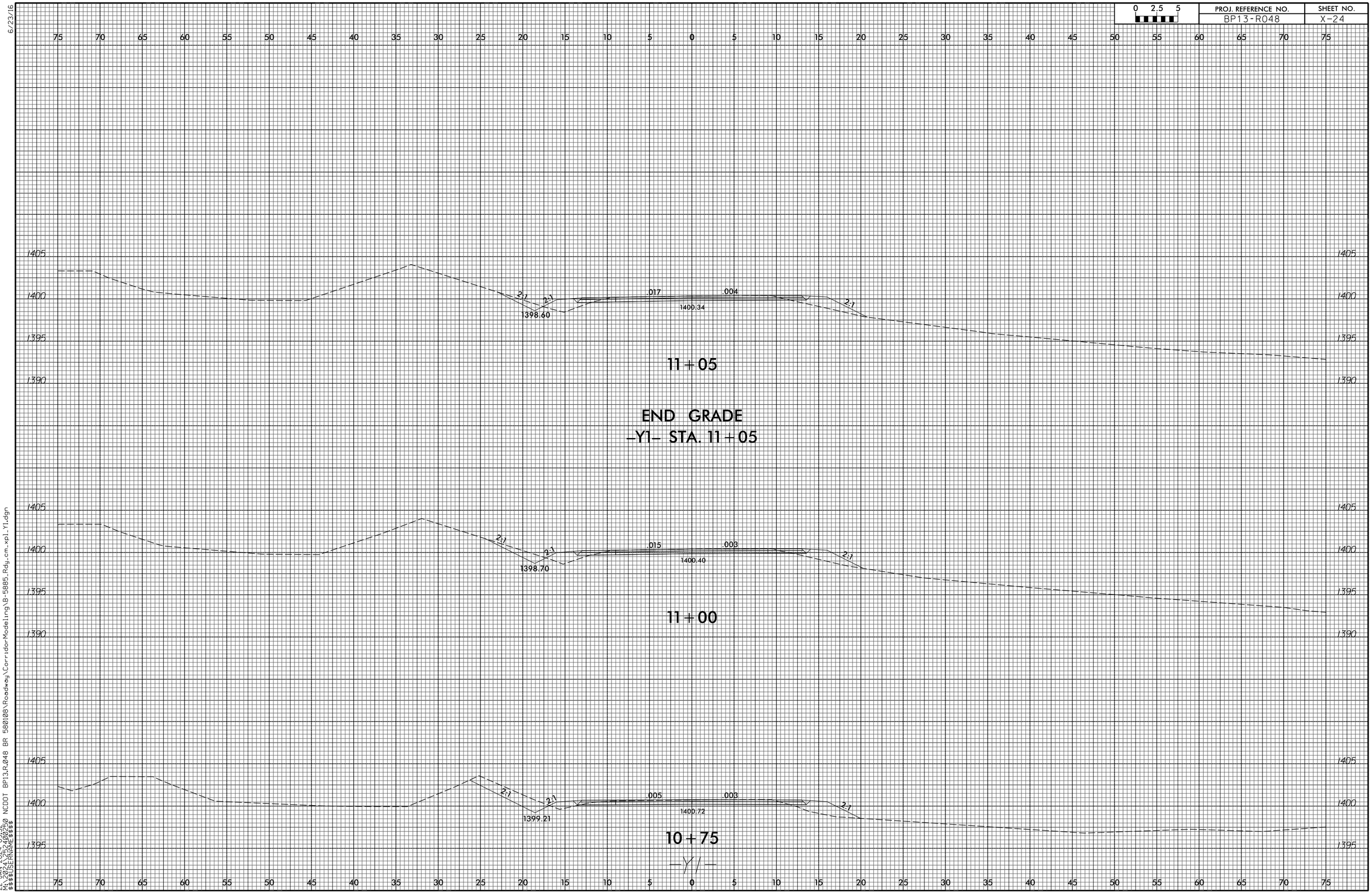

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$$$$USERNAME$$$$

6/23/16

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	BP13-R048	X-25

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1405
1400
1395
1390

EX=1397.94

1399.90

11+50

1410
1405
1400
1395
1390

EX=1398.19

1400.12

11+25

—Y1—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

22-JAN-2024 09:52
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$$$$USERNAME$$$$

Docusign Envelope ID: DF4D3AAF-6D32-4E79-9E08-6EB984EAECC1

09/08/99

STATE PROJECT: BP13-R048

CONTRACT: DM00458

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

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MCDOWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP13-R048	1	26

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP13.R048.1		PE
BP13.R048.2		RW & UTIL
BP13.R048.3		CON

LOCATION: REPLACE BRIDGE NO. 580108 OVER NORTH FORK CATAWBA RIVER ON SR 1560 (OLD LINVILLE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STRUCTURES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2013 = 310
V = 25 MPH
T = 6% *
* TTST = 3% DUAL = 3%
FUNC CLASS = LOCAL
SUB – REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT BP13-R048 (580108) = 0.031 MILES

LENGTH OF STRUCTURE PROJECT BP13-R048 (580108) = 0.033 MILES

TOTAL LENGTH OF PROJECT BP13-R048 (580108) = 0.064 MILES

Prepared in the Office of:

KCI
http://www.kci.com
KCI Associates of N.C., P.A.
4800 Falls of Neuse Road, Suite 200
Raleigh, NC 27609
Phone (919) 783-9214
NC LICENSE No. C-0764

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 27, 2024

LETTING DATE:
NOVEMBER 21, 2025

Plans Prepared For:

DIVISION OF HIGHWAYS
55 Orange Street
Asheville, NC 28801

JAMES D. FITZ MORRIS, P.E.
KCI PROJECT MANAGER

SHAWN M. MCCOY, P.E.
KCI DESIGN ENGINEER

NCDOT CONTACT: MIKE HILL, P.E.
DIVISION 13 BRIDGE PROGRAM MANAGER

SEAL 047237
SHAWN M. MCCOY

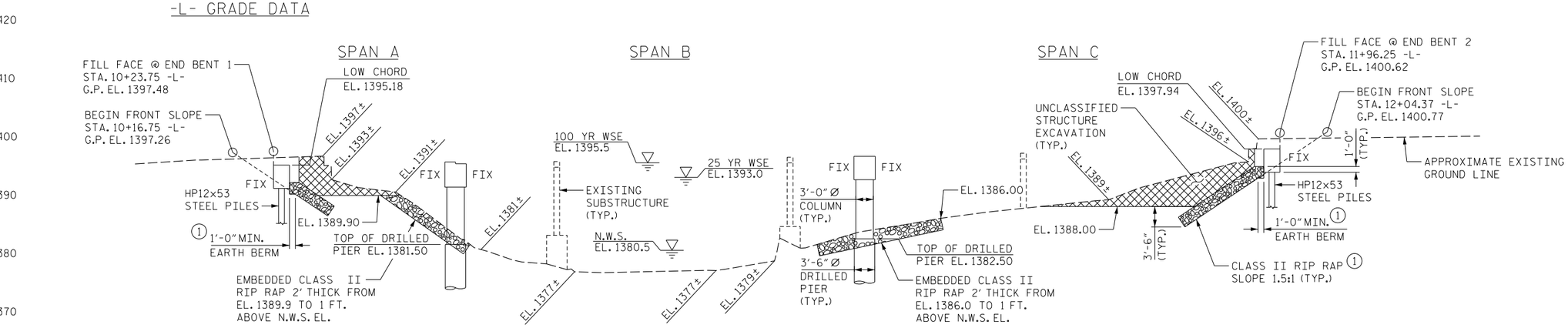
Signed by:
Shawn M McCoy
529B15315630458...
10/24/2025 P.E.
SIGNATURE:

10+00 11+00 12+00

(+)6.0000% (+)1.8176%

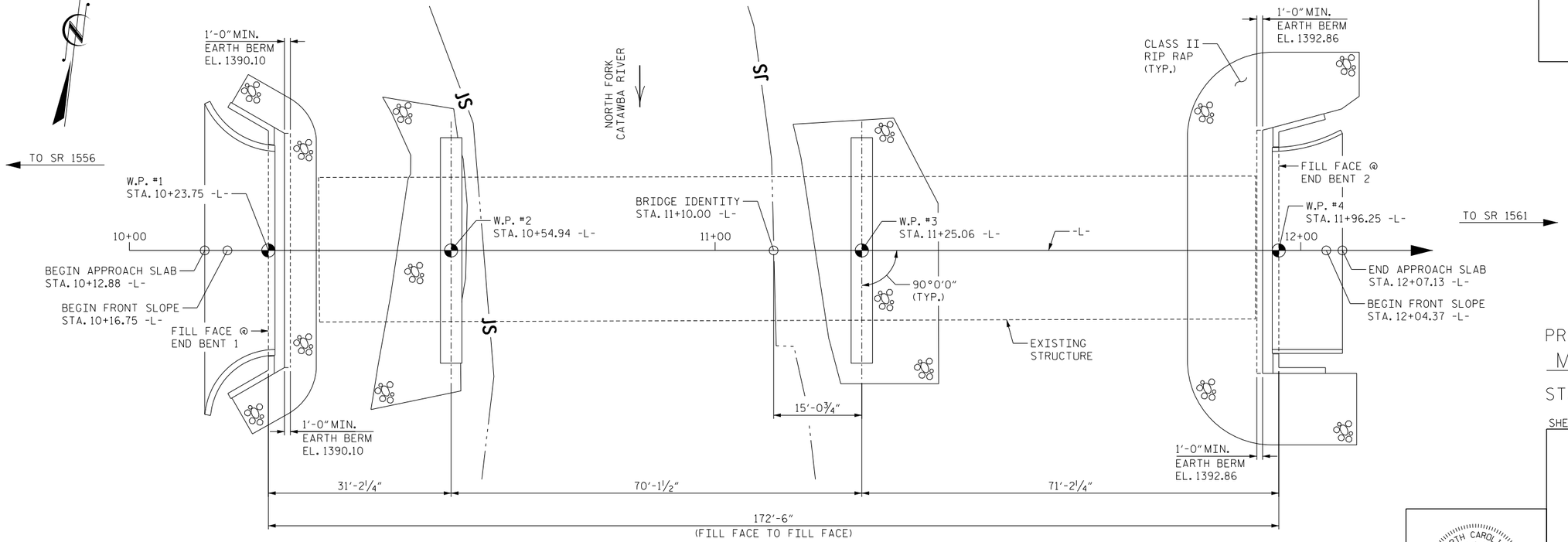
PVI = 10+18.00 -L-
EL. = 1397.38
VC = 12.55 FT.

-L- GRADE DATA



SECTION ALONG -L-

(1) NORMAL TO BENT



PLAN

(PILES NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 108

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

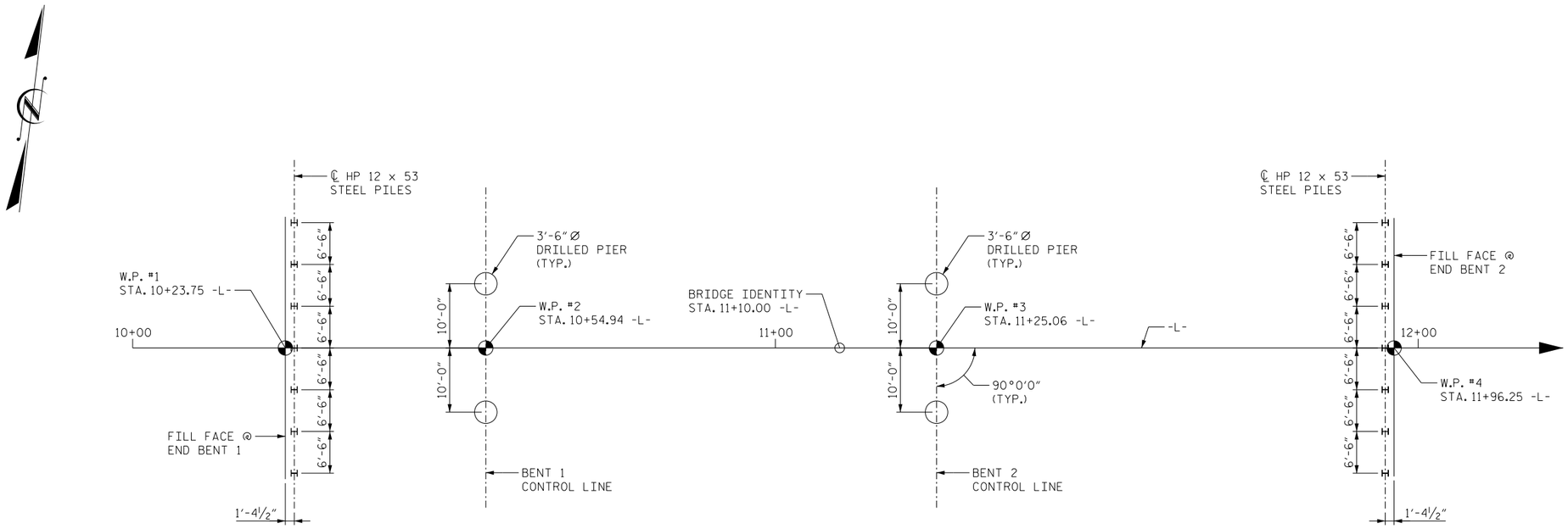
FOR BRIDGE ON SR 1560
OVER NORTH FORK CATAWBA RIVER
BETWEEN SR 1556 AND SR 1561

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			SHEETS
2			4			26

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 529B153116030458...
10/24/2025

DRAWN BY : DLK DATE : 01/24
CHECKED BY : AMC DATE : 01/24



FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES)

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 55 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.

DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 1,381 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE OR GROUT IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

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

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

DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 435 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 5 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 1,374 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

IF REQUIRED, INSTALL PERMANENT STEEL CASINGS AT BENT NO. 1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 1,374.7 FT.

INSTALL DRILLED PIERS AT BENT No. 1 (LEFT SIDE) TO A TIP ELEVATION NO HIGHER THAN 1,360 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 14 FT. INTO WEATHERED ROCK OR BETTER MATERIALS.

INSTALL DRILLED PIERS AT BENT NO. 1 (RIGHT SIDE) TO A TIP ELEVATION NO HIGHER THAN 1,363 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 11 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 120 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO. 2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 1,377 FT (LT) AND 1,375 FT (RT) WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

IF REQUIRED, INSTALL PERMANENT STEEL CASINGS AT BENT NO. 2 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 1,377.7 FT (LT) AND 1375.5 FT (RT).

INSTALL DRILLED PIERS AT BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 1,358 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 19 FT INTO WEATHERED ROCK OR BETTER MATERIALS.

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

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

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 1,373 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 2 IS ELEVATION 1,376 FT (LT) AND 1,374 FT (RT). SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 10/24/2025

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1560
OVER NORTH FORK CATAWBA RIVER
BETWEEN SR 1556 AND SR 1561

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			SHEETS
2			4			26

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 11+10.00 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" Ø DRILLED PIER IN SOIL	3'-6" Ø DRILLED PIER NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 11+10.00 -L-	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONC. SLABS		3'-0" X 2'-0" PRESTRESSED CONC. SLABS	
	LUMP SUM	LUMP SUM	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	EA.	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN.FT.	NO.	LIN.FT.
SUPERSTRUCTURE												LUMP SUM							372.75			LUMP SUM	12	360	24	1680
END BENT NO. 1			24	49							22.1		3,016			7	105			75	100						
BENT NO. 1					14	25	15				26.9		8,287	1,560						90	120						
BENT NO. 2					11	38	13				26.2		8,600	1,828						120	150						
END BENT NO. 2											23.2		2,976		7	7	158	7		200	240						
TOTAL	LUMP SUM	LUMP SUM	24	49	25	63	28	2	2	LUMP SUM	98.4	LUMP SUM	22,879	3,388	7	14	263	7	372.75	485	610	LUMP SUM	12	360	24	1680

HYDRAULIC DATA

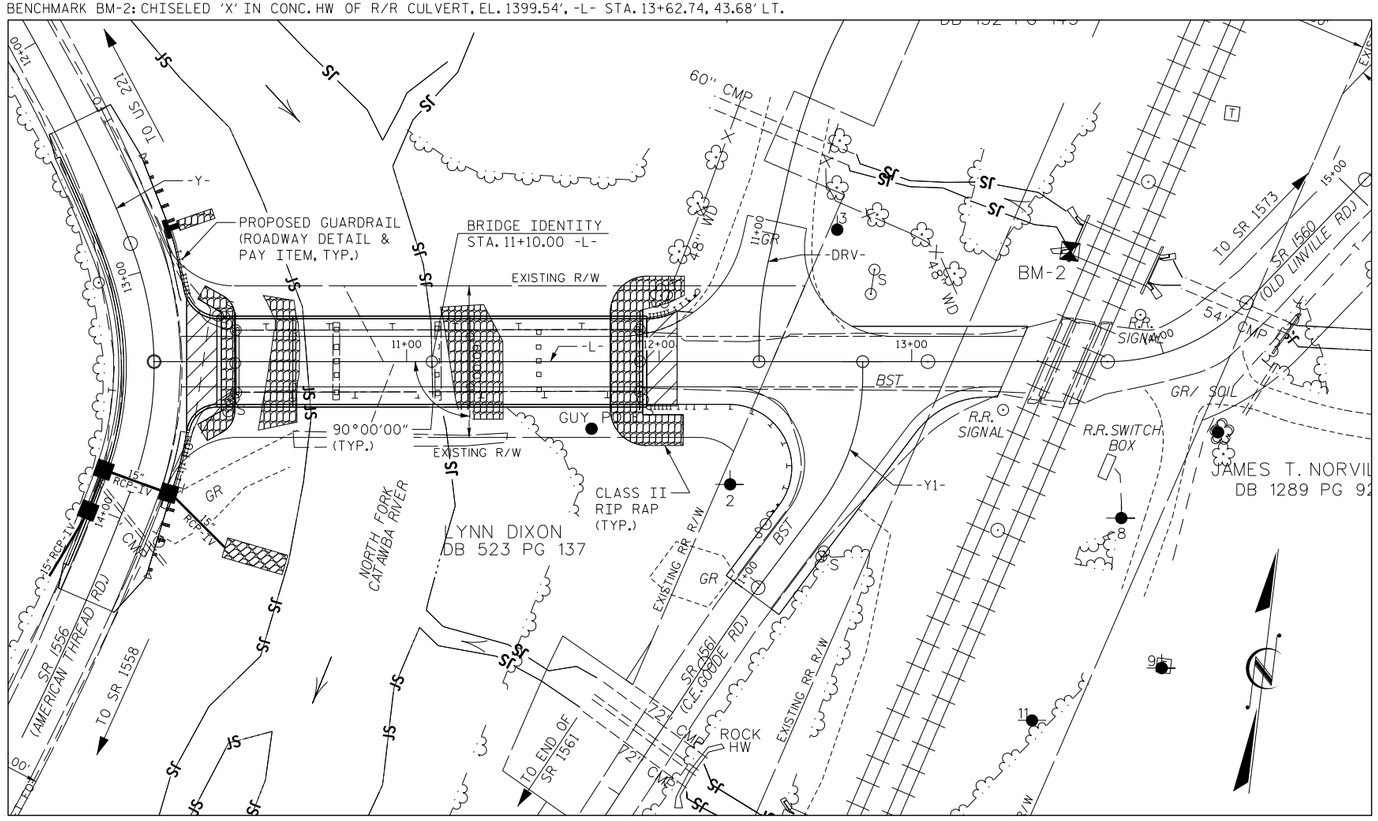
DESIGN DISCHARGE	= 13000 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS
DESIGN HIGH WATER ELEVATION	= 1393.0
DRAINAGE AREA	= 43.7 SQ.MI.
BASE DISCHARGE (Q100)	= 18300 CFS
BASE HIGH WATER ELEVATION	= 1395.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 20400 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100+ YRS
OVERTOPPING FLOOD ELEVATION	= 1399.9

OVERTOPPING OCCURS WHEN WSEL EXCEEDS UPSTREAM LT CHANNEL LIMITS @ STA. 10+27.5 -L-, EL. 1397.64'

BENCHMARK BM-2: CHISELED 'X' IN CONC. HW OF R/R CULVERT, EL. 1399.54', -L- STA. 13+62.74, 43.68' LT.



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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.

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATION SCOUR AT BRIDGES".

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE EXISTING BRIDGE CONSISTING OF FOUR SPANS OF APPROXIMATELY 40'-0" WITH AN ASPHALT OVERLAY ON A CONCRETE, CORED SLAB SUPERSTRUCTURE WITH A CLEAR ROADWAY WIDTH OF 24'-0" ON A SUBSTRUCTURE CONSISTING OF STEEL PILES AND CONCRETE CAPS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.

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 11+10.00 -L-."

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT± EACH SIDE OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1560
OVER NORTH FORK CATAWBA RIVER
BETWEEN SR 1556 AND SR 1561

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			SHEETS
2			4			26

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 529B153115030458...

10/24/2025

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.037	–	1.75	0.283	1.83	30'	EL	14.5	0.574	1.04	30'	EL	1.45	0.80	0.283	1.58	30'	EL	14.5	
		HL-93 (OPERATING)	N/A	--	1.344	–	1.35	0.283	2.38	30'	EL	14.5	0.574	1.34	30'	EL	1.45	N/A	--	--	–	–	–	
		HS-20 (INVENTORY)	36.000	2	1.183	42.587	1.75	0.283	2.53	30'	EL	11.6	0.574	1.18	30'	EL	1.45	0.80	0.283	2.20	30'	EL	11.6	
		HS-20 (OPERATING)	36.000	--	1.533	55.205	1.35	0.283	3.28	30'	EL	11.6	0.574	1.53	30'	EL	1.45	N/A	--	--	–	–	–	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	--	2.895	39.081	1.4	0.283	5.18	30'	EL	14.5	0.574	2.89	30'	EL	1.45	0.80	0.283	3.56	30'	EL	14.5	
		SNGARBS2	20.000	--	2.240	44.792	1.4	0.283	4.53	30'	EL	11.6	0.574	2.24	30'	EL	1.45	0.80	0.283	3.15	30'	EL	11.6	
		SNAGRIS2	22.000	--	2.157	47.463	1.4	0.283	4.60	30'	EL	11.6	0.574	2.16	30'	EL	1.45	0.80	0.283	3.20	30'	EL	11.6	
		SNCOTTS3	27.250	--	1.462	39.849	1.4	0.283	2.60	30'	EL	14.5	0.574	1.46	30'	EL	1.45	0.80	0.283	1.79	30'	EL	14.5	
		SNAGGRS4	34.925	--	1.346	46.999	1.4	0.283	2.50	30'	EL	14.5	0.574	1.35	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5	
		SNS5A	35.550	--	1.427	50.733	1.4	0.283	2.42	30'	EL	14.5	0.574	1.43	30'	EL	1.45	0.80	0.283	1.67	30'	EL	14.5	
		SNS6A	39.950	--	1.341	53.590	1.4	0.283	2.29	30'	EL	14.5	0.574	1.34	30'	EL	1.45	0.80	0.283	1.58	30'	EL	14.5	
		SNS7B	42.000	--	1.369	57.505	1.4	0.283	2.23	30'	EL	14.5	0.574	1.37	30'	EL	1.45	0.80	0.283	1.53	30'	EL	14.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.593	52.580	1.4	0.283	2.97	30'	EL	14.5	0.574	1.59	30'	EL	1.45	0.80	0.283	2.04	30'	EL	14.5	
		TNT4A	33.075	--	1.483	49.043	1.4	0.283	2.82	30'	EL	14.5	0.574	1.48	30'	EL	1.45	0.80	0.283	1.94	30'	EL	14.5	
		TNT6A	41.600	--	1.433	59.622	1.4	0.283	2.56	30'	EL	14.5	0.574	1.43	30'	EL	1.45	0.80	0.283	1.76	30'	EL	14.5	
		TNT7A	42.000	--	1.363	57.264	1.4	0.283	2.64	30'	EL	14.5	0.574	1.36	30'	EL	1.45	0.80	0.283	1.82	30'	EL	14.5	
		TNT7B	42.000	--	1.331	55.915	1.4	0.283	2.49	30'	EL	14.5	0.574	1.33	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5	
		TNAGRIT4	43.000	--	1.287	55.356	1.4	0.283	2.58	30'	EL	14.5	0.574	1.29	30'	EL	1.45	0.80	0.283	1.78	30'	EL	14.5	
		TNAGT5A	45.000	--	1.381	62.151	1.4	0.283	2.50	30'	EL	14.5	0.574	1.38	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5	
		TNAGT5B	45.000	3	1.212	54.540	1.4	0.283	2.41	30'	EL	11.6	0.574	1.21	30'	EL	1.45	0.80	0.283	1.66	30'	EL	11.6	
EMERGENCY VEHICLE (EV)		EV2	28.750	--	1.701	48.915	1.3	0.283	3.55	30'	EL	11.6	0.574	1.70	30'	EL	1.45	0.80	0.283	2.22	30'	EL	11.6	
		EV3	43.000	4	1.164	50.052	1.3	0.283	2.32	30'	EL	14.5	0.574	1.16	30'	EL	1.45	0.80	0.283	1.44	30'	EL	14.5	

LRFR SUMMARY

FOR SPAN " A "

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.

2.

3.

4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING * *

(4) EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER- EXTERIOR RIGHT GIRDER

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 30' CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			SHEETS 26
2			4			

DRAWN BY : SMM DATE : 01/24

CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⟨1⟩	1.006	--	1.75	0.273	1.03	70'	EL	34.5	0.507	1.32	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
		HL-93 (OPERATING)	N/A	--	1.341	--	1.35	0.273	1.34	70'	EL	34.5	0.507	1.72	70'	EL	6.9	N/A	–	--	--	–	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.306	47.02	1.75	0.273	1.34	70'	EL	34.5	0.507	1.65	70'	EL	6.9	0.80	0.273	1.31	70'	EL	34.5	
		HS-20 (OPERATING)	36.000	--	1.740	62.64	1.35	0.273	1.74	70'	EL	34.5	0.507	2.14	70'	EL	6.9	N/A	–	--	--	–	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	--	2.917	39.379	1.4	0.273	3.75	70'	EL	34.5	0.507	4.87	70'	EL	6.9	0.80	0.273	2.92	70'	EL	34.5	
		SNGARBS2	20.000	--	2.187	43.741	1.4	0.273	2.81	70'	EL	34.5	0.507	3.47	70'	EL	6.9	0.80	0.273	2.19	70'	EL	34.5	
		SNAGRIS2	22.000	--	2.077	45.690	1.4	0.273	2.67	70'	EL	34.5	0.507	3.23	70'	EL	6.9	0.80	0.273	2.08	70'	EL	34.5	
		SNCOTTS3	27.250	--	1.452	39.565	1.4	0.273	1.87	70'	EL	34.5	0.507	2.43	70'	EL	6.9	0.80	0.273	1.45	70'	EL	34.5	
		SNAGGRS4	34.925	--	1.218	42.554	1.4	0.273	1.57	70'	EL	34.5	0.507	2.03	70'	EL	6.9	0.80	0.273	1.22	70'	EL	34.5	
		SNS5A	35.550	--	1.191	42.346	1.4	0.273	1.53	70'	EL	34.5	0.507	2.06	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	
		SNS6A	39.950	--	1.095	43.747	1.4	0.273	1.41	70'	EL	34.5	0.507	1.88	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		SNS7B	42.000	--	1.043	43.801	1.4	0.273	1.34	70'	EL	34.5	0.507	1.85	70'	EL	6.9	0.80	0.273	1.04	70'	EL	34.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.336	44.087	1.4	0.273	1.72	70'	EL	34.5	0.507	2.23	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT4A	33.075	--	1.342	44.401	1.4	0.273	1.72	70'	EL	34.5	0.507	2.17	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT6A	41.600	--	1.100	45.746	1.4	0.273	1.41	70'	EL	34.5	0.507	1.98	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		TNT7A	42.000	--	1.106	46.462	1.4	0.273	1.42	70'	EL	34.5	0.507	1.94	70'	EL	6.9	0.80	0.273	1.11	70'	EL	34.5	
		TNT7B	42.000	--	1.147	48.180	1.4	0.273	1.47	70'	EL	34.5	0.507	1.80	70'	EL	6.9	0.80	0.273	1.15	70'	EL	34.5	
		TNAGRIT4	43.000	--	1.089	46.838	1.4	0.273	1.40	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.09	70'	EL	34.5	
		TNAGT5A	45.000	--	1.026	46.175	1.4	0.273	1.32	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.03	70'	EL	34.5	
		TNAGT5B	45.000	⟨3⟩	1.013	45.579	1.4	0.273	1.30	70'	EL	34.5	0.507	1.66	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
EMERGENCY VEHICLE (EV)		EV2	28.750	--	1.816	52.212	1.3	0.273	2.11	70'	EL	34.5	0.507	2.59	70'	EL	6.9	0.80	0.273	1.82	70'	EL	34.5	
		EV3	43.000	⟨4⟩	1.188	51.068	1.3	0.273	1.38	70'	EL	34.5	0.507	1.75	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	

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 * *

⟨4⟩ EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER- EXTERIOR RIGHT GIRDER

⟨1⟩
⟨2⟩
⟨3⟩
⟨4⟩

LRFR SUMMARY

FOR SPAN " B & C "

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

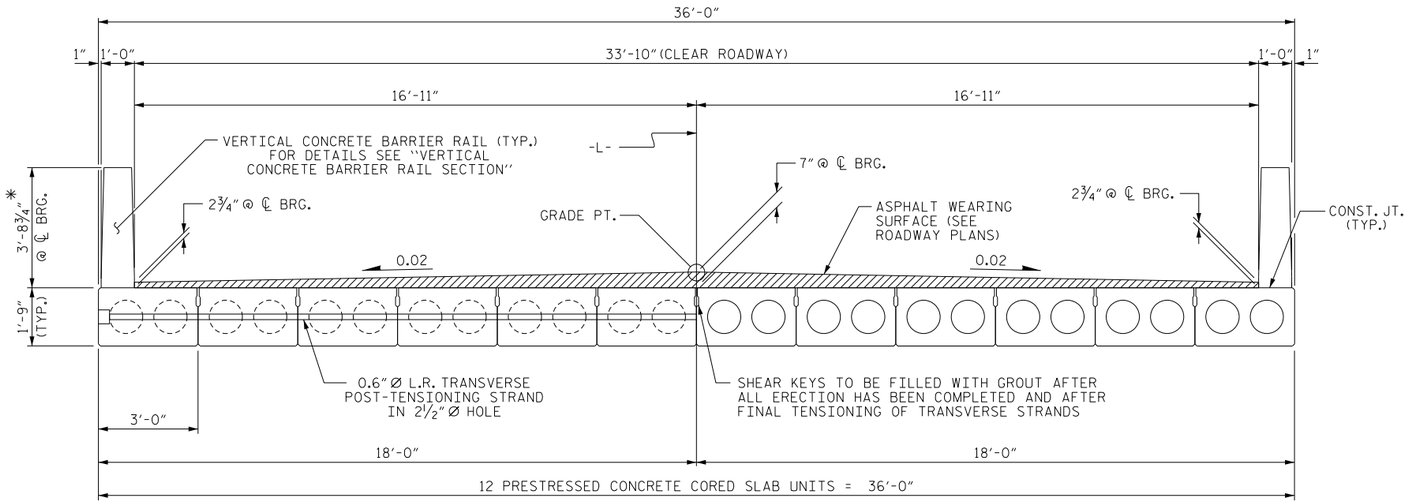
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			SHEETS 26
2			4			

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

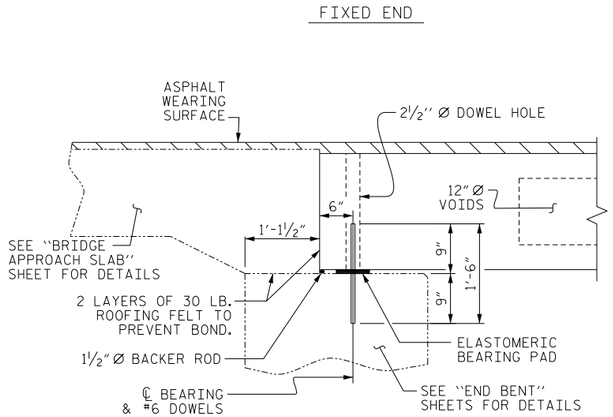


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

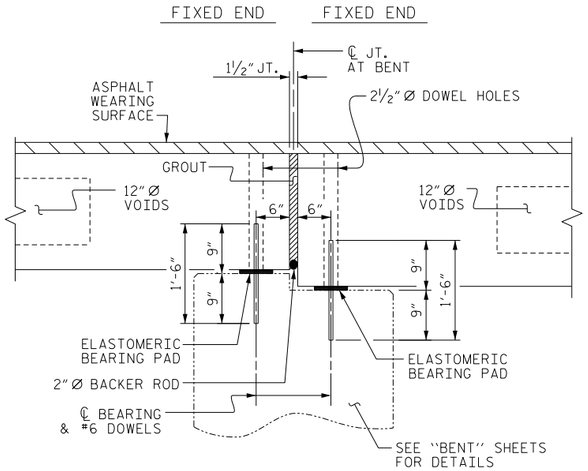
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

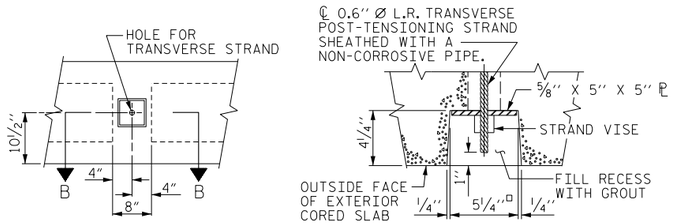
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



SECTION AT END BENT 1



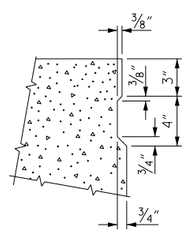
SECTION AT BENT 1



ELEVATION VIEW

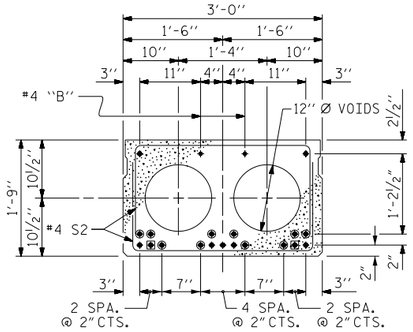
SECTION B-B

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



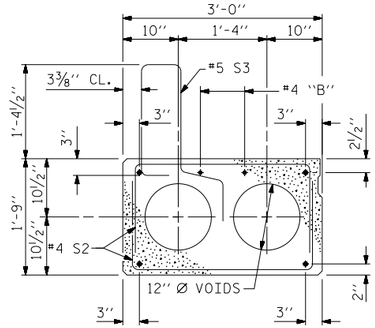
SHEAR KEY DETAIL

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



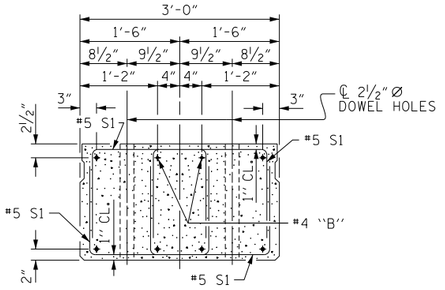
INTERIOR SLAB SECTION (30' UNIT)

(9 STRANDS REQUIRED)



EXT. SLAB SECTION

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



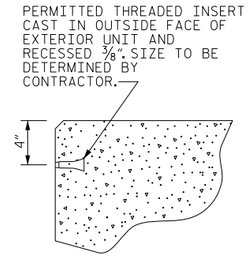
END ELEVATION

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.

◉ 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



THREADED INSERT DETAIL

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

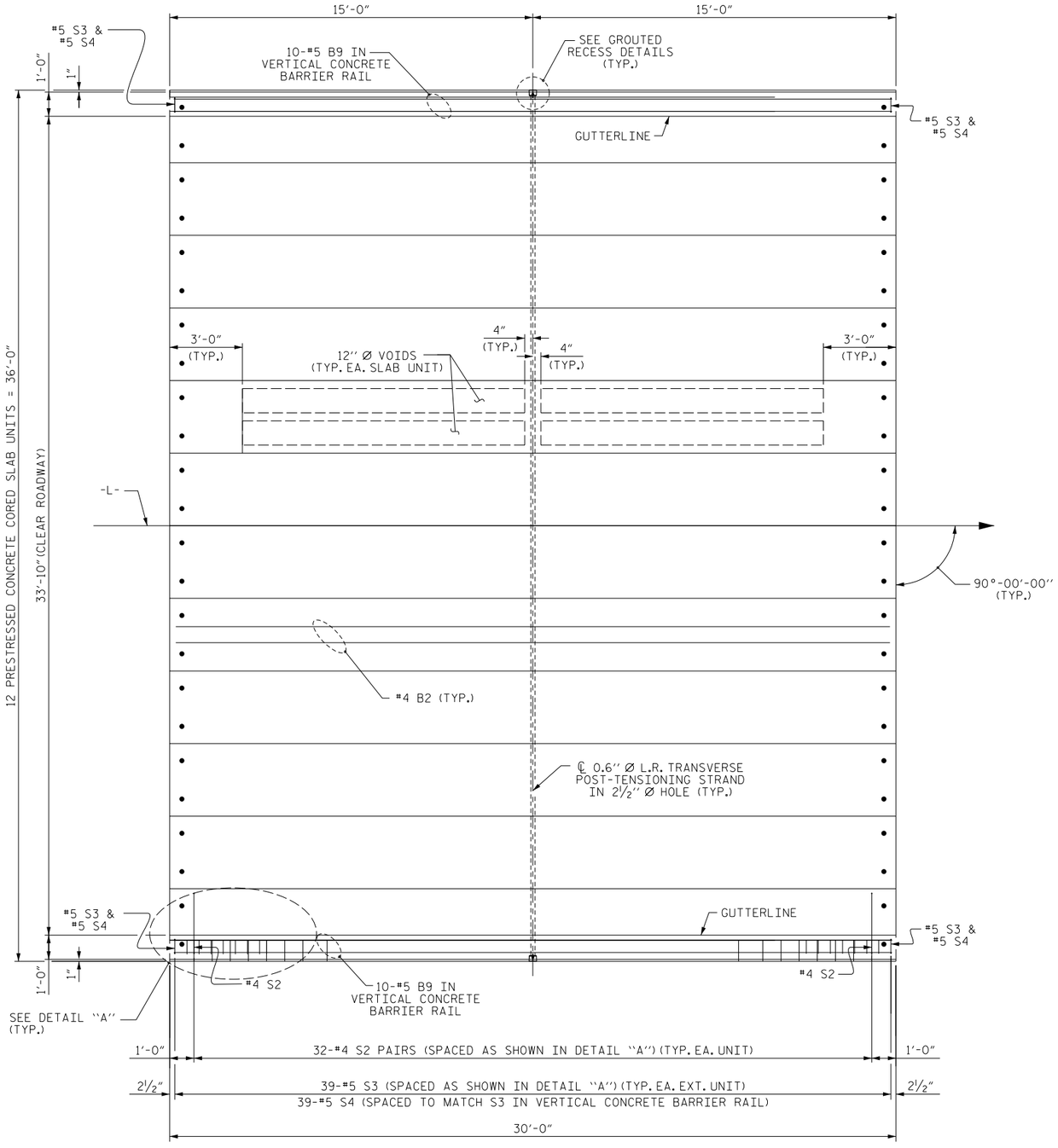
3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			SHEETS 26
2			4			

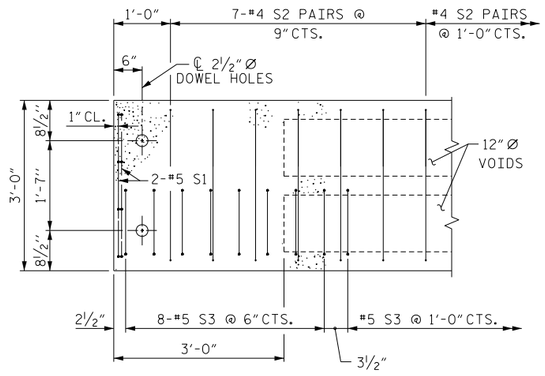
DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC
KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. McCOY
Signed by: Shawn M McCoy 10/24/2025



PLAN OF UNIT



DETAIL "A"

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

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 30' UNIT 33'-10" CLEAR ROADWAY 90° SKEW

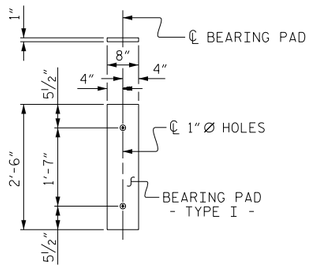
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			SHEETS
2			4			26

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

$$USERNAME$$1/25/2024 Y:\Jobs\2024 Jobs\B24-01 (252400250) NCDOT Div 13 - Bridge 108 - See B18-03\Structures\Drawings\100 Percent\SH07_BP13_R048_SMU_PSA_580108.dgn



FIXED END
(TYPE I - 24 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

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

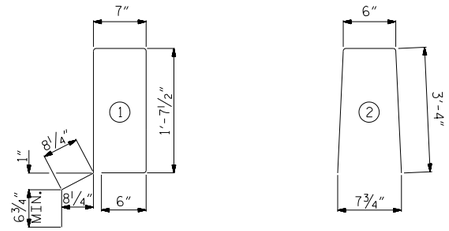
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
30' UNITS	2⅝"	3'-8⅝"

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
30' UNIT			
EXTERIOR C.S.	2	30'-0"	60'-0"
INTERIOR C.S.	10	30'-0"	300'-0"
TOTAL	12		360'-0"

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-9"
30' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	⅛" ↓
FINAL CAMBER	⅛" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



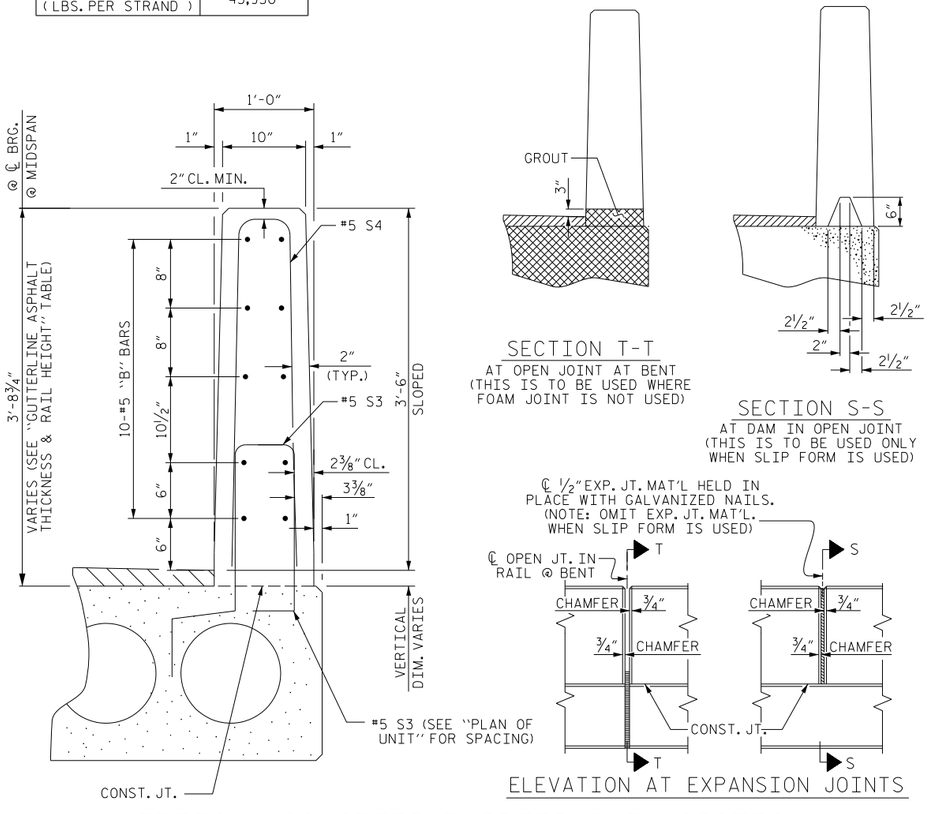
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 30' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B2	2	#4	STR	29'-8"	40	29'-8"	40
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	64	#4	3	5'-4"	228	5'-4"	228
* S3	39	#5	1	5'-7"	227		
REINFORCING STEEL			LBS.		303		303
*EPOXY COATED REINFORCING STEEL			LBS.		227		
5000 P.S.I. CONCRETE			CU. YDS.		4.4		4.4
0.6"Ø L.R. STRANDS			No.		9		9

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	30' UNIT					
* B9	20	20	#5	STR	29'-7"	617
* S4	78	78	#5	2	7'-2"	583
*EPOXY COATED REINFORCING STEEL				LBS.		1200
CLASS AA CONCRETE				CU.YDS.		7.7
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		60.25



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

NOTES

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

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

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

THE 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

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

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

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

CONCRETE RELEASE STRENGTH	
UNIT	PSI
30' UNITS	4000

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

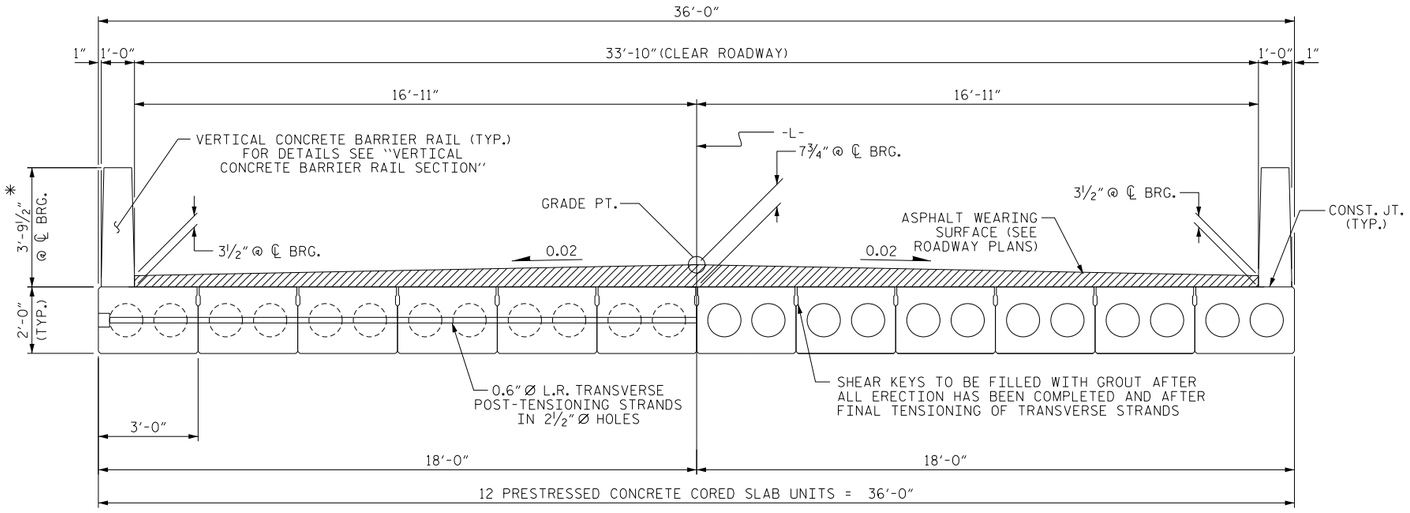
STANDARD
3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			SHEETS
2			4			26

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 10/24/2025

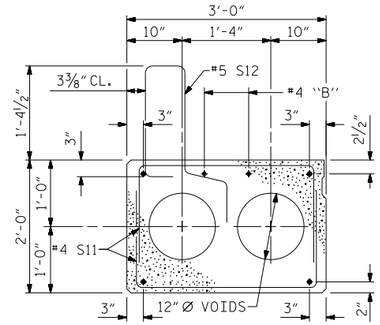


HALF SECTION AT INTERMEDIATE DIAPHRAGMS

HALF SECTION THROUGH VOIDS

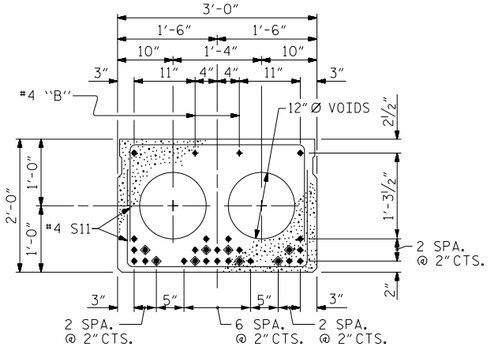
TYPICAL SECTION

* - 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.



EXTERIOR SLAB SECTION

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



INTERIOR SLAB SECTION (70' UNIT)

(28 STRANDS REQUIRED)

0.6'' Ø LOW RELAXATION STRAND LAYOUT

◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

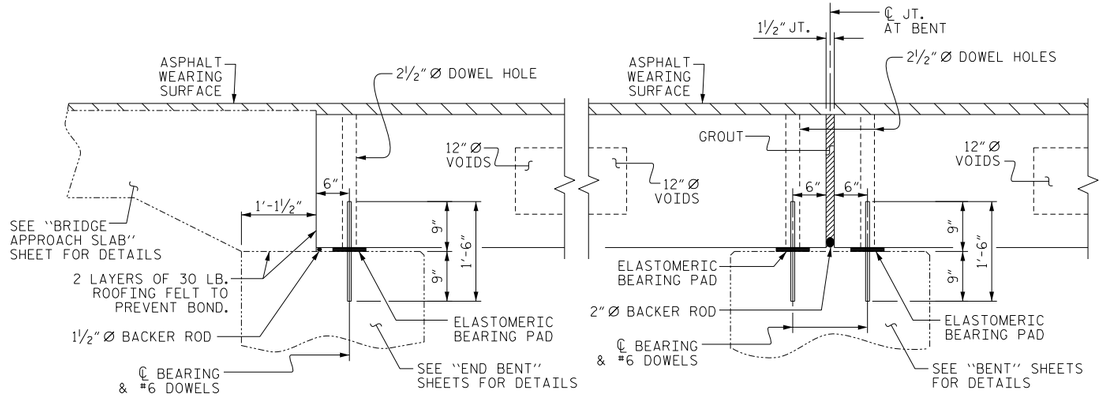
◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

FIXED END

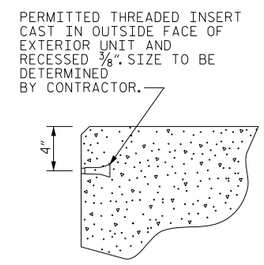
FIXED END

FIXED END

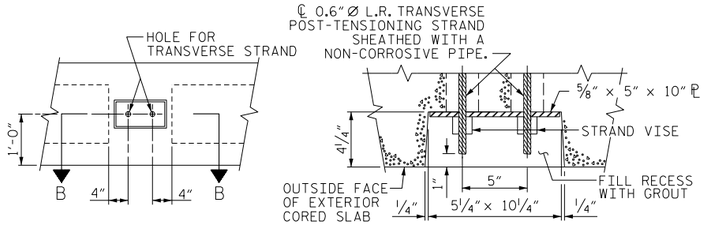


SECTION AT END BENT 2

SECTION AT BENT 2



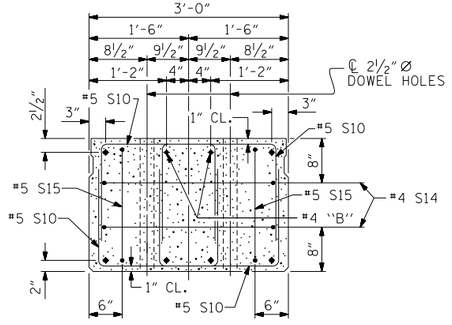
THREADED INSERT DETAIL



ELEVATION VIEW

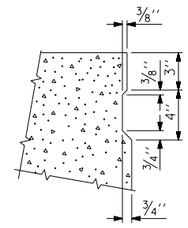
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND 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.

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0'' X 2'-0'' PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			SHEETS 26
2			4			

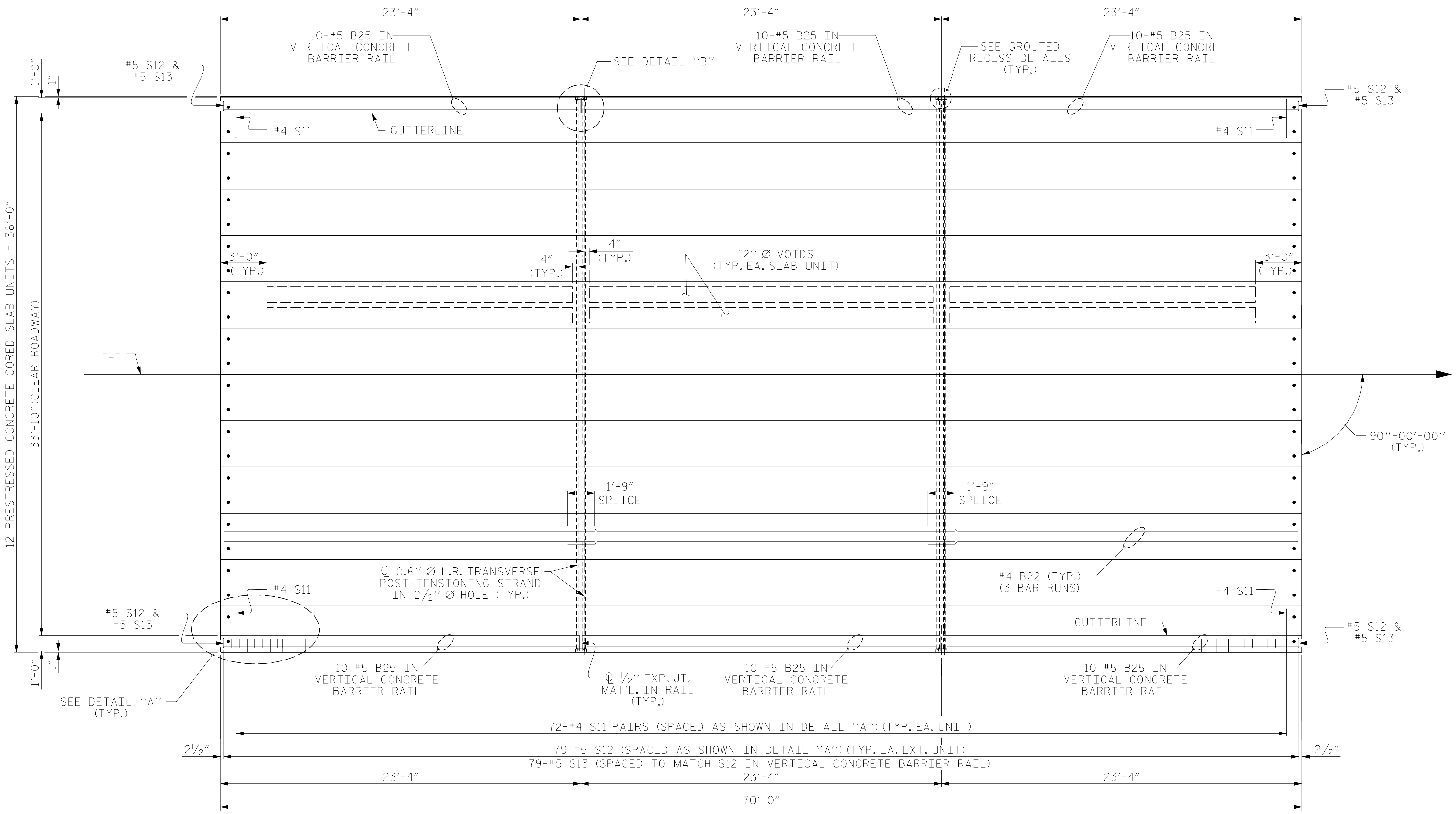
KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

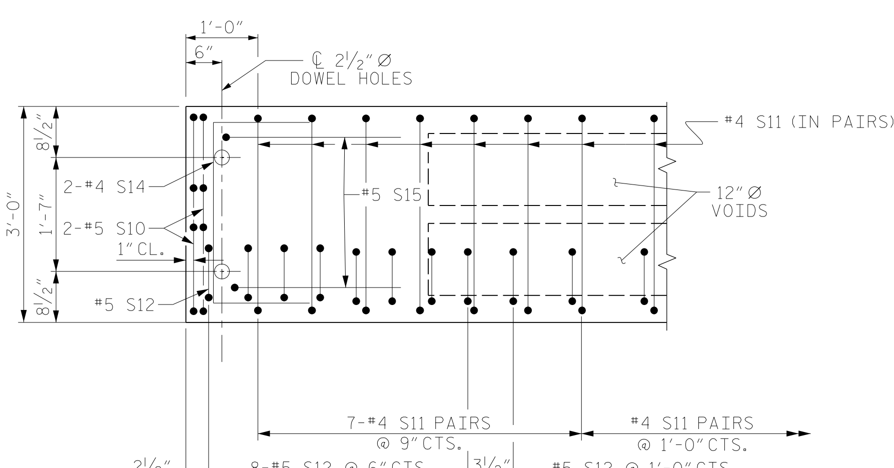
Signed by: Shawn M McCoy 529B153115530458...

10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

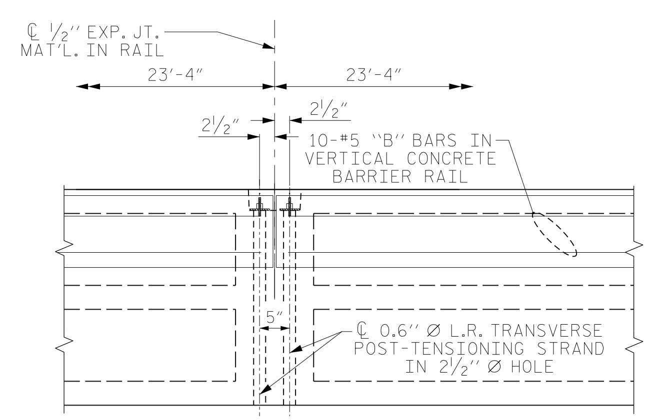


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70' UNIT 33'-10" CLEAR ROADWAY 90° SKEW

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CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

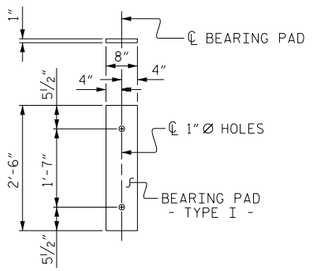
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO. S-10
1			3			
2			4			SHEETS 26

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

$$USERNAME$$ 1/25/2024 Y:\Jobs\2024 Jobs\B24-01 (252400250) NCDOT Div 13 - Bridge 108 - See B18-031\Structures\Drawings\100 Percent\SHID_BP13_R048_SMU_PS8&C_580108.dgn



FIXED END
(TYPE I - 48 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	70' UNIT					
✳B25	60	120	#5	STR	22'-11"	2868
✳S13	158	316	#5	2	7'-2"	2362
✳EPOXY COATED REINFORCING STEEL				LBS.		5230
CLASS AA CONCRETE				CU.YDS.		36.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		280.5

CORED SLABS REQUIRED

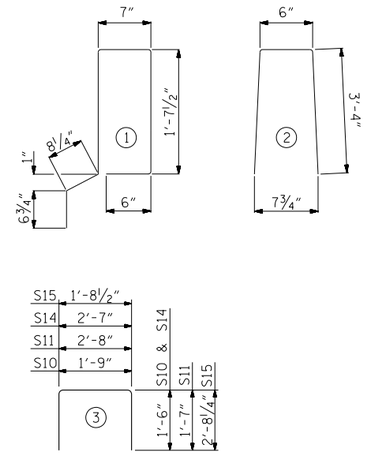
	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	4	70'-0"	280'-0"
INTERIOR C.S.	20	70'-0"	1400'-0"
TOTAL	24		1680'-0"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↓
FINAL CAMBER	1½" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
✳S12	79	#5	1	5'-7"	460		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		744		744
✳EPOXY COATED REINFORCING STEEL			LBS.		460		
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8
0.6"Ø L.R. STRANDS			No.		28		28

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
70' UNITS	2"	3'-8"

NOTES

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

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

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

THE 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

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

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

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.

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

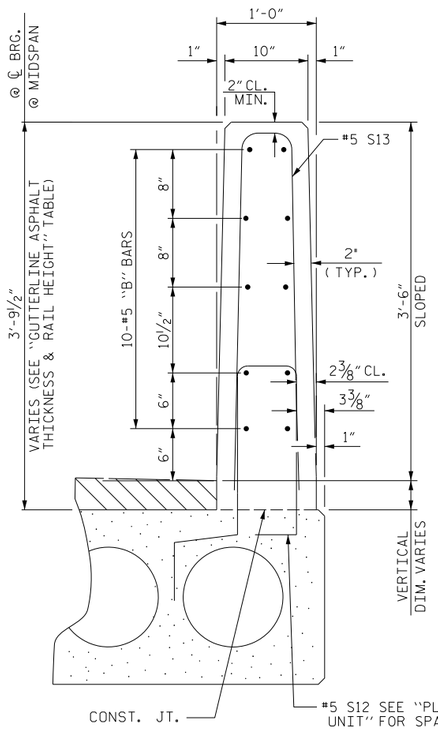
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

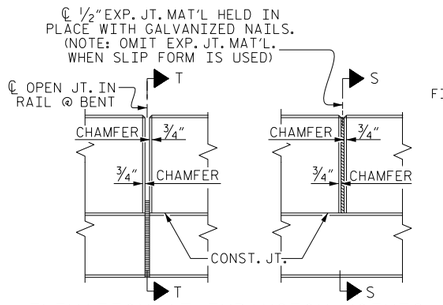
THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.



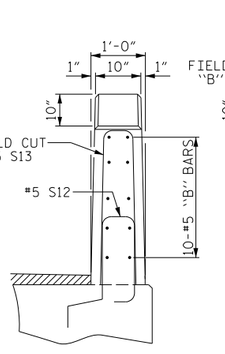
SECTION THRU RAIL

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

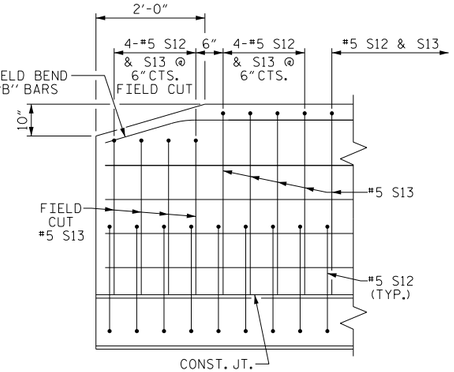
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

CONCRETE RELEASE STRENGTH

UNIT	PSI
70' UNITS	5500

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

VERTICAL CONCRETE BARRIER RAIL DETAILS

END OF RAIL DETAILS

(SPAN C ONLY)

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy
10/24/2025

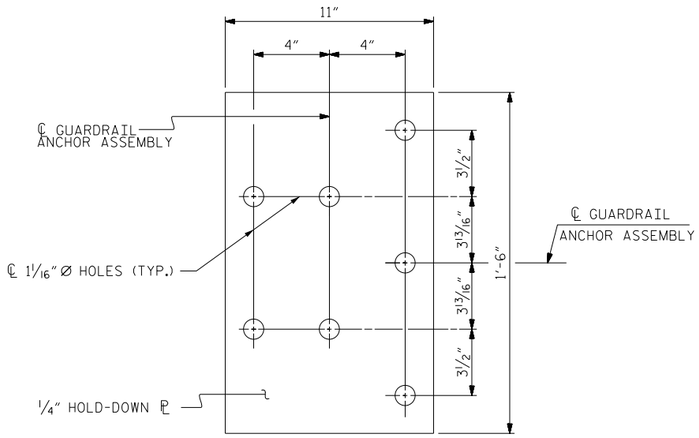
PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 3 OF 3

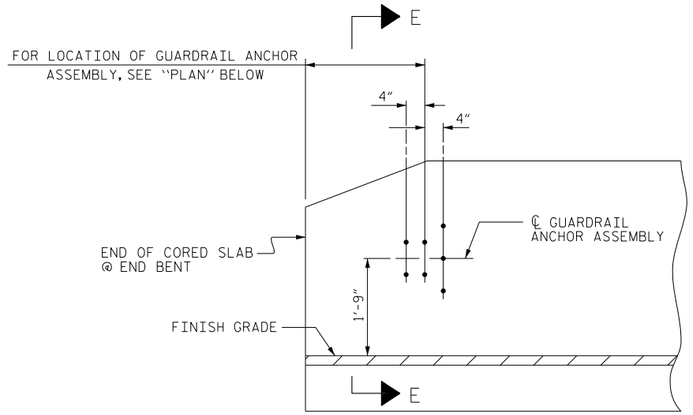
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			SHEETS
2			4			26



PLAN



ELEVATION

NOTES

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

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

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

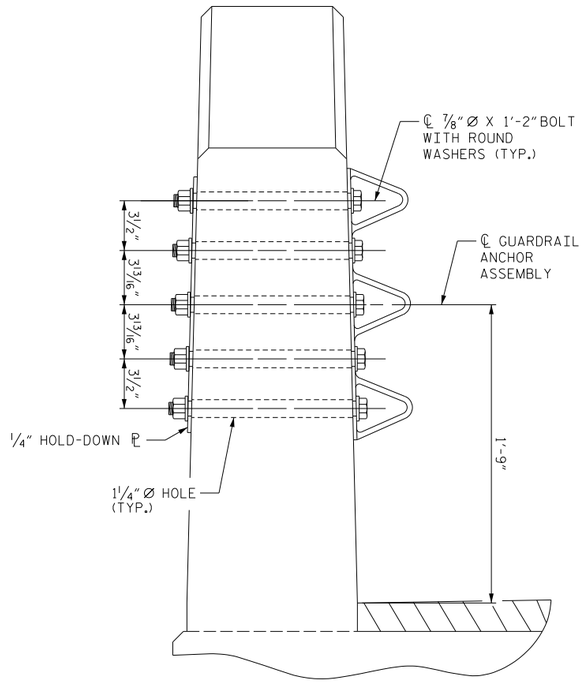
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

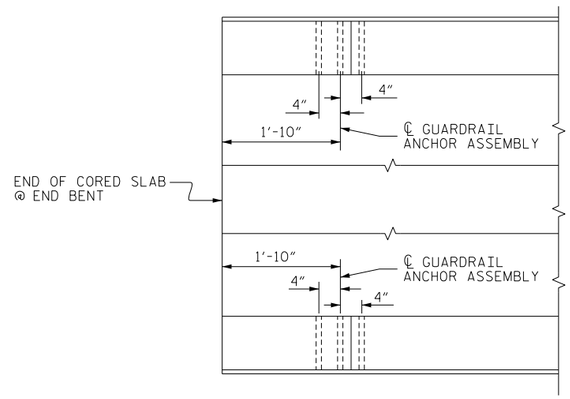
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR VERTICAL CONCRETE BARRIER RAIL

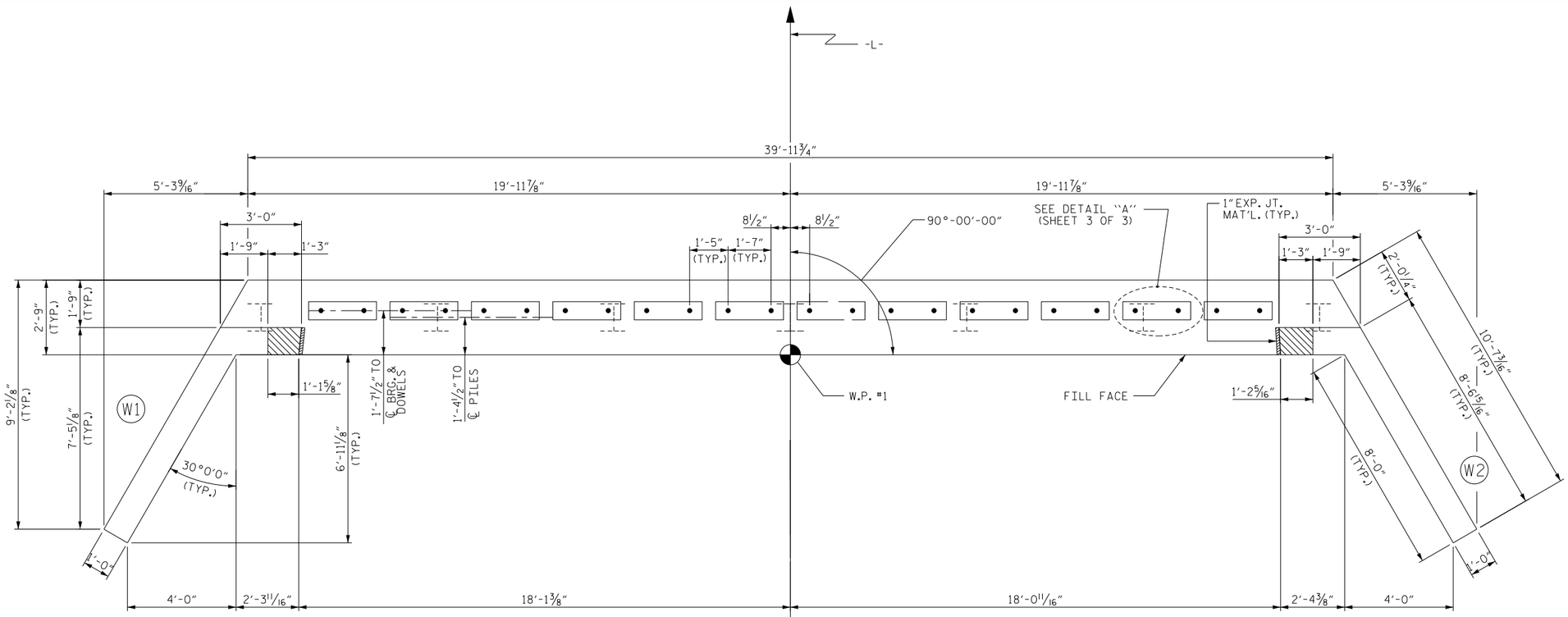
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			SHEETS 26
2			4			

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

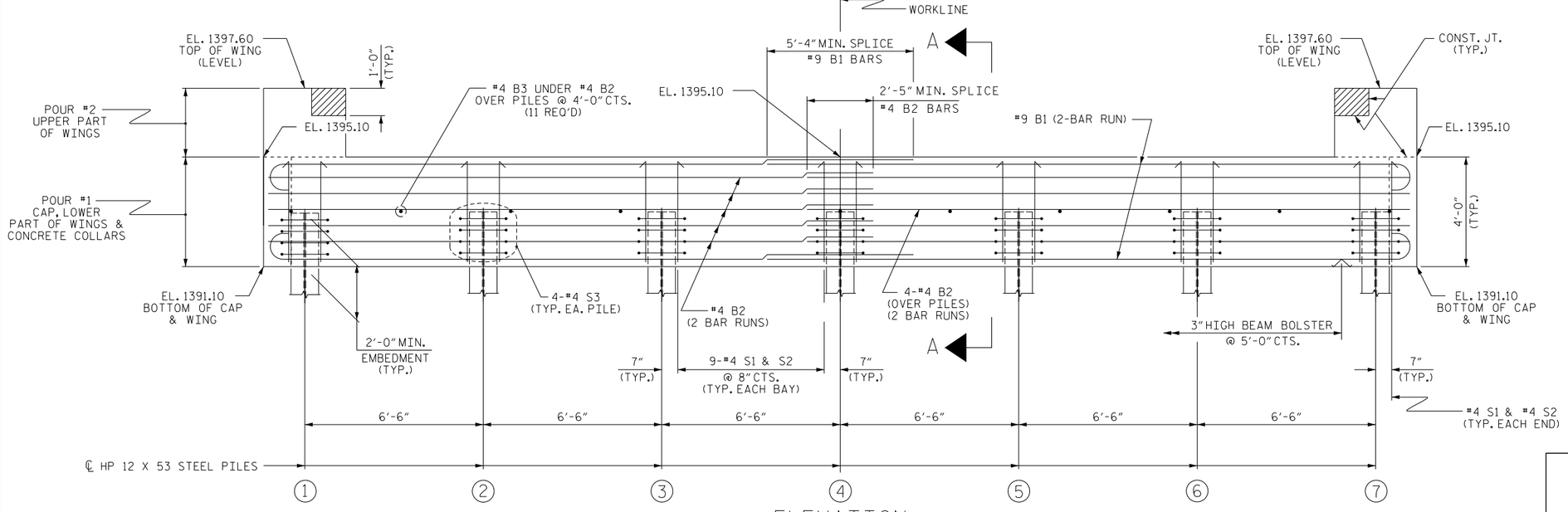
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

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 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			SHEETS 26
2			4			

DRAWN BY : SMM DATE : 01/24
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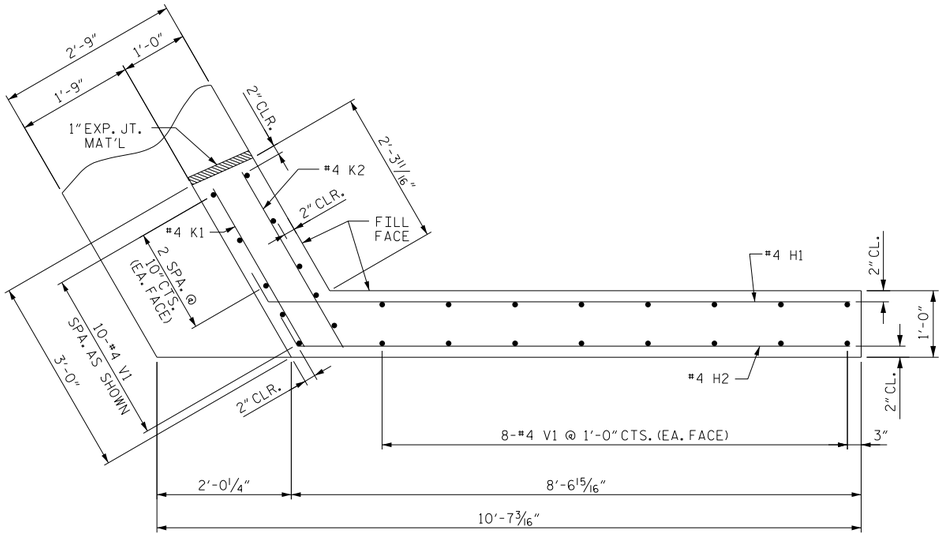
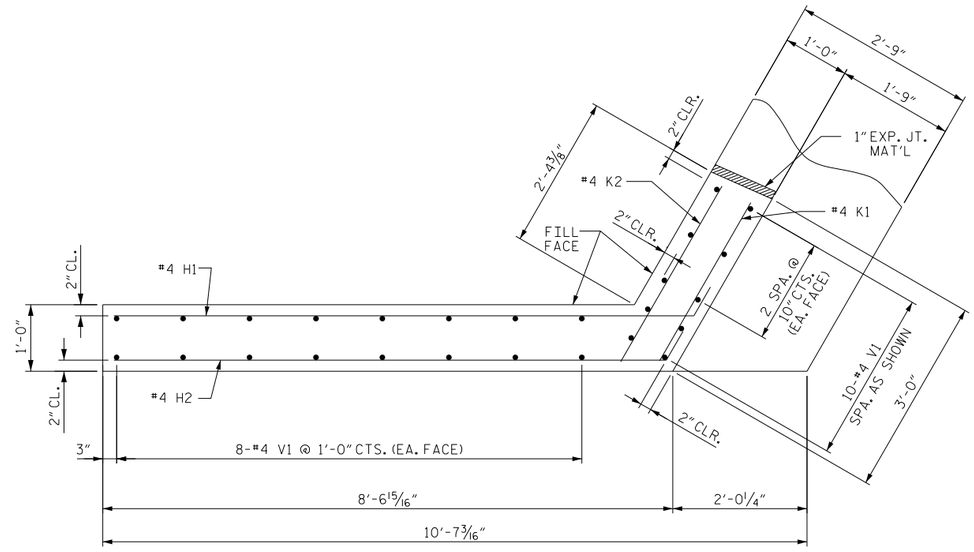
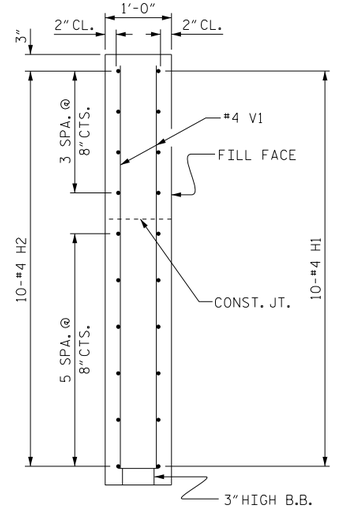
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 529B153155304...
10/24/2025



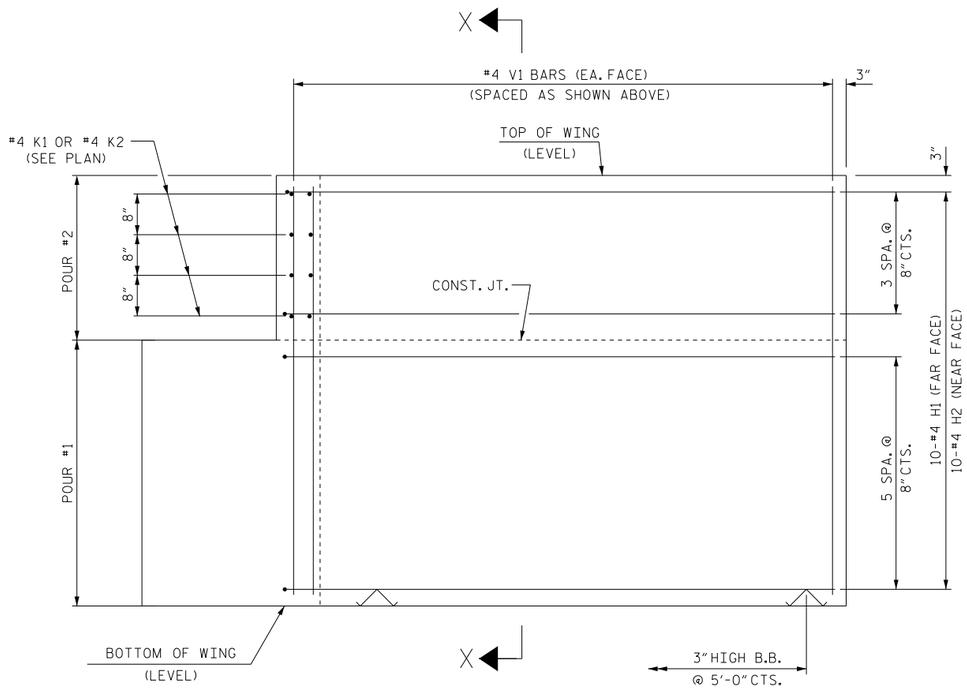
PLAN OF WING (W1)



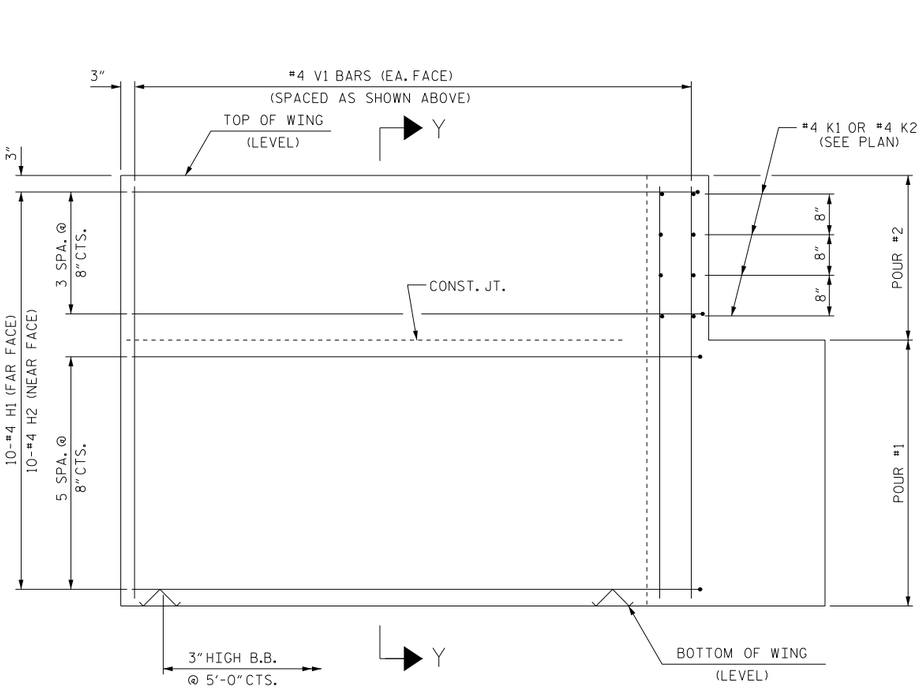
PLAN OF WING (W2)



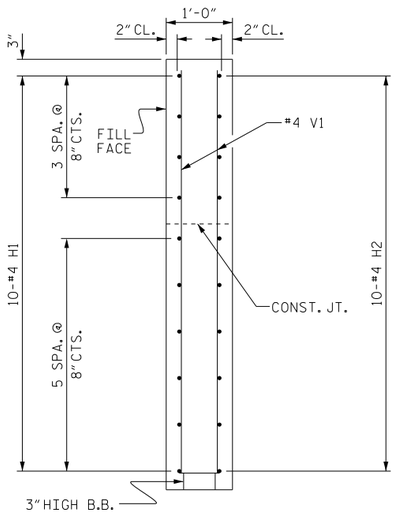
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 2 OF 3

DRAWN BY : SMM DATE : 01/24

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704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 529B153115530458...

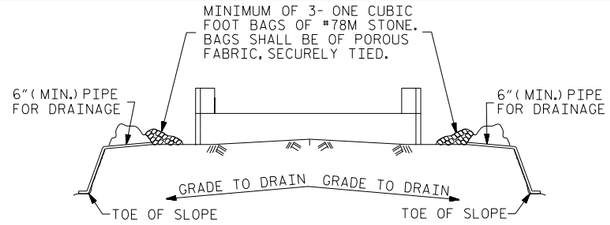
10/24/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			SHEETS
2			4			26

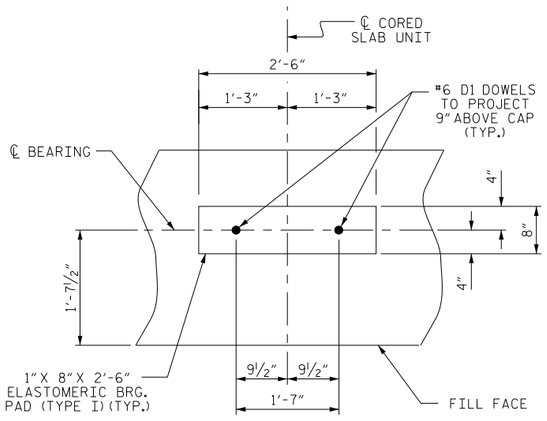


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

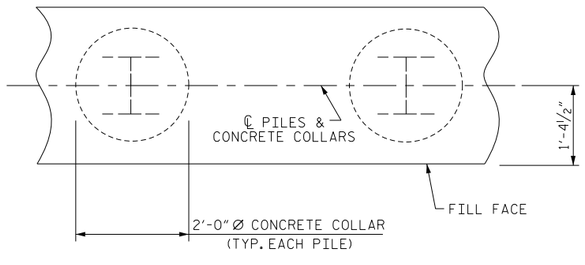
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

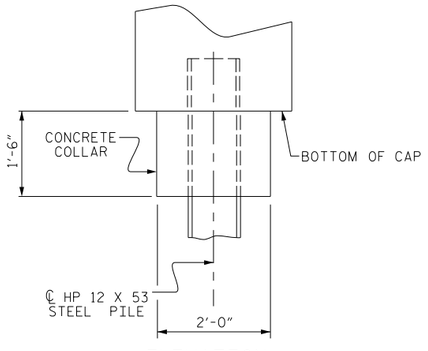
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

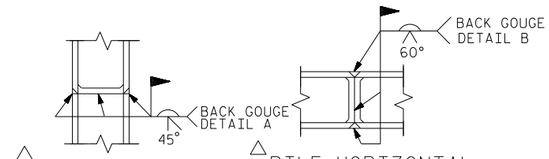


PLAN



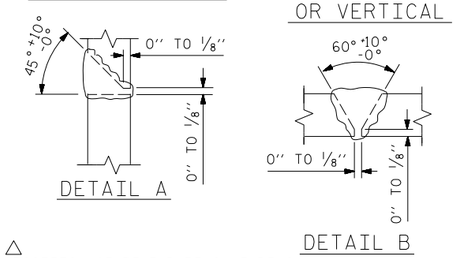
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL



△ PILE VERTICAL

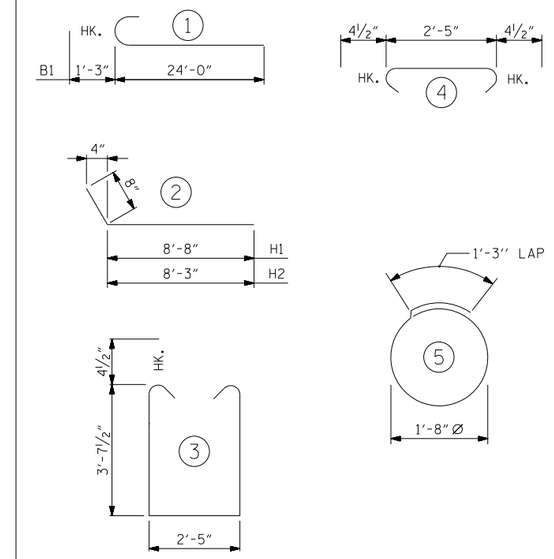
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1			
HP 12 X 53 STEEL PILES			
NO: 7	LIN. FT.= 105	PILE EXCAVATION IN SOIL	LIN. FT.= 24.0
		PILE EXCAVATION NOT IN SOIL	LIN. FT.= 49.0

BILL OF MATERIAL

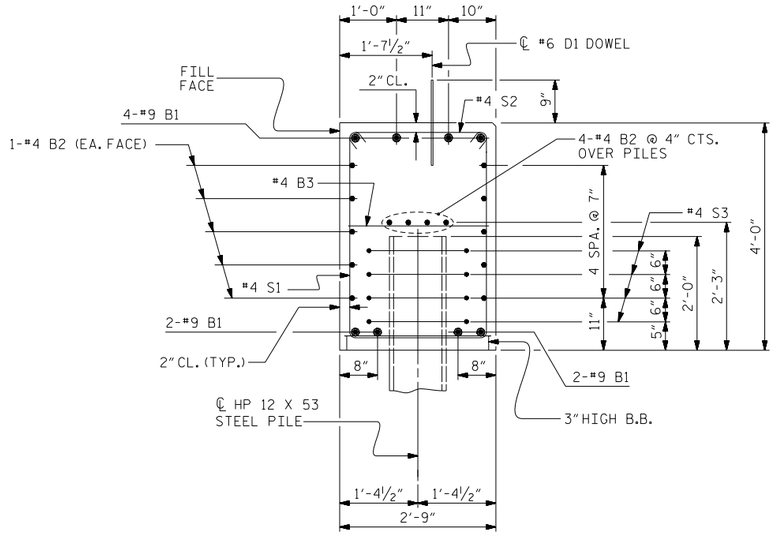
FOR END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	25'-3"	1374
B2	28	#4	STR	22'-6"	421
B3	11	#4	STR	2'-5"	18
D1	24	#6	STR	1'-6"	54
H1	20	#4	2	9'-4"	125
H2	20	#4	2	8'-11"	119
K1	16	#4	STR	2'-8"	29
K2	16	#4	STR	3'-0"	32
S1	56	#4	3	10'-5"	390
S2	56	#4	4	3'-2"	118
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT) 3016 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	20.6 C.Y.
POUR #2	UPPER PART OF WINGS	1.5 C.Y.
TOTAL CLASS A CONCRETE		22.1 C.Y.



SECTION A-A

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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			SHEETS
2			4			26

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SUITE A
CHARLOTTE, NC 28273
704-499-9452
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NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
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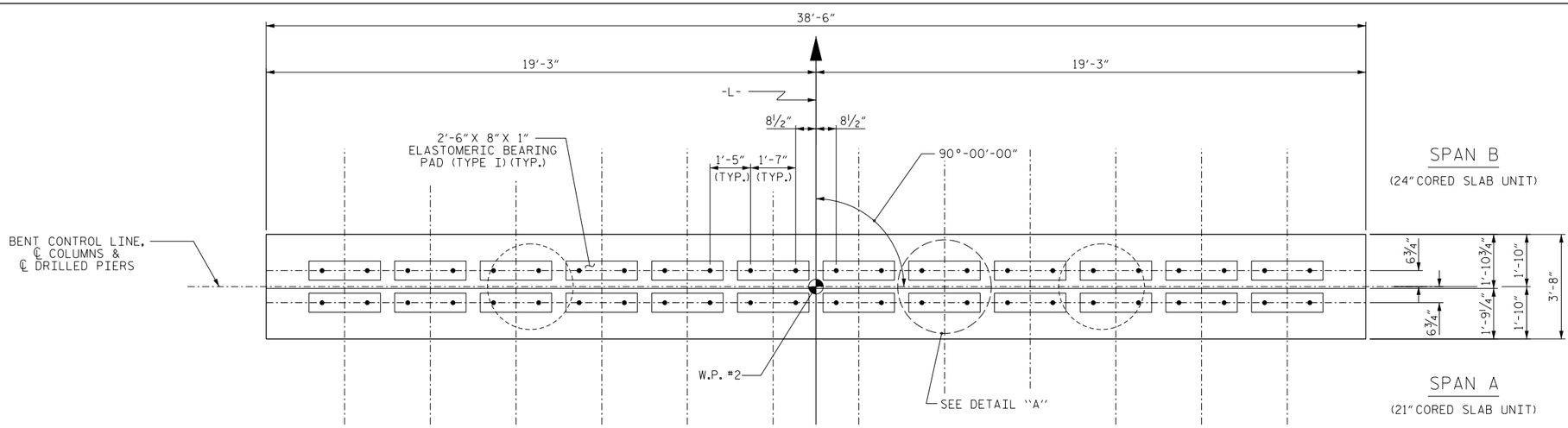
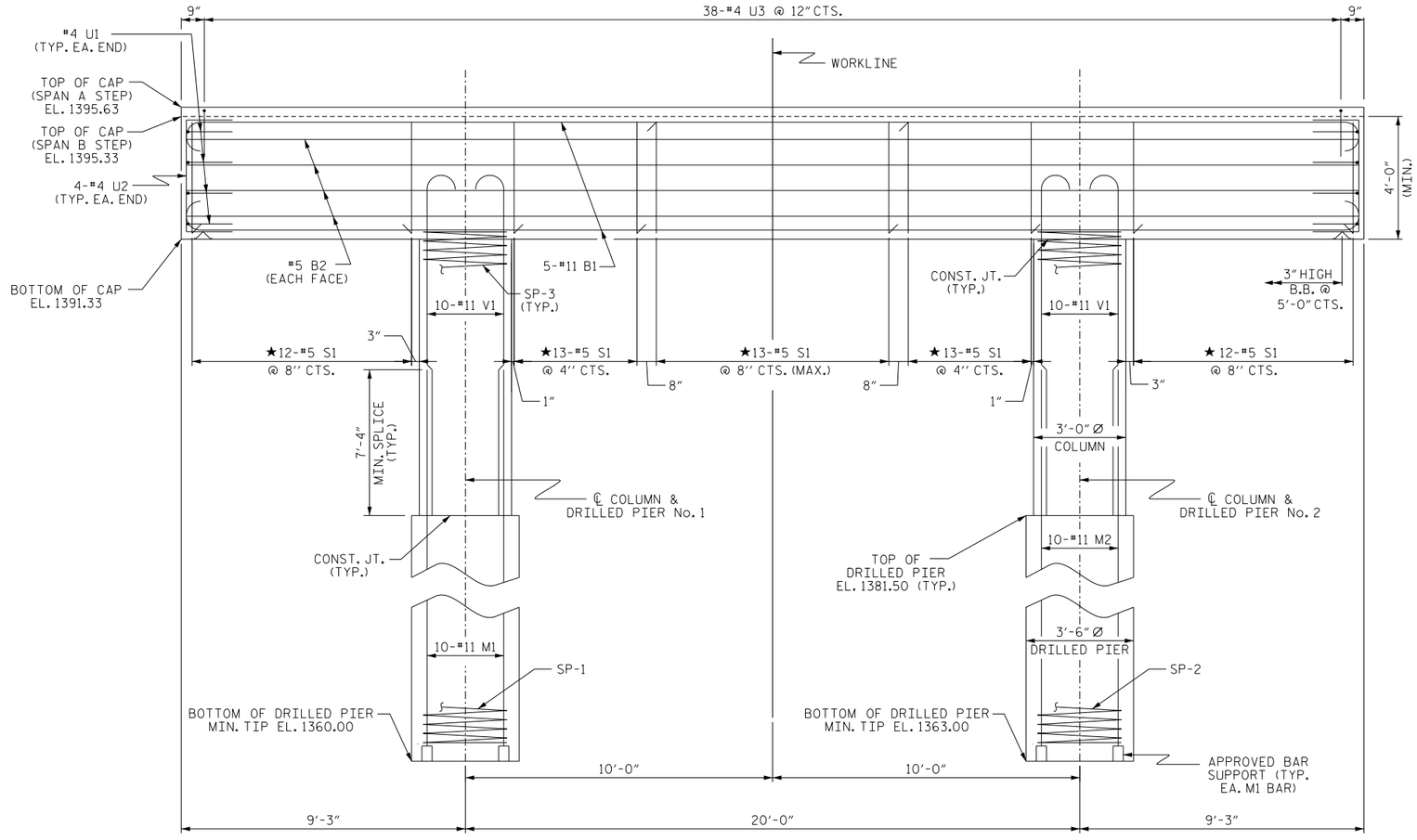


PLAN



ELEVATION

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

NOTES

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

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

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

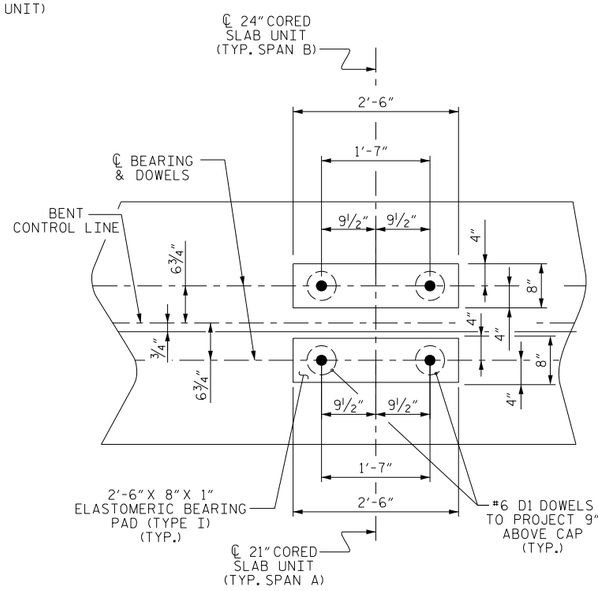
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

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

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

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



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			SHEETS 26
2			4			

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9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
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NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : CNB DATE : 01/24
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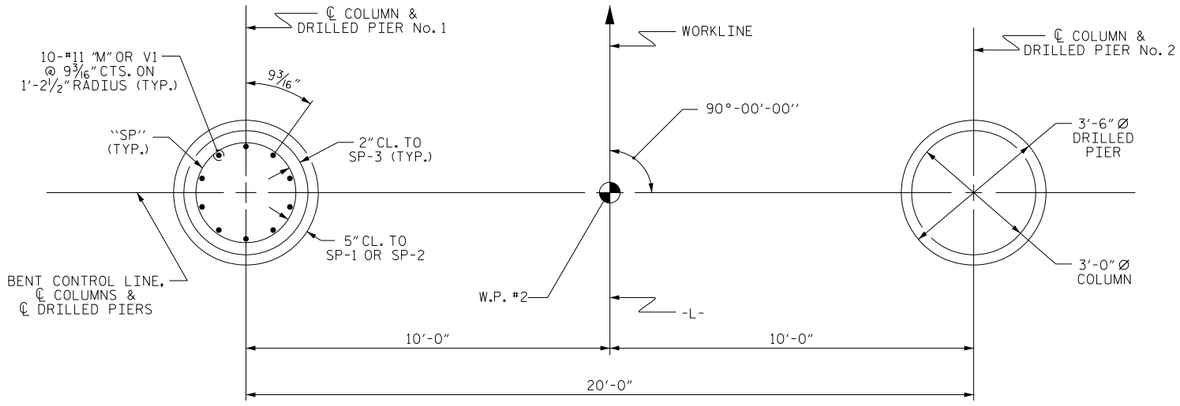
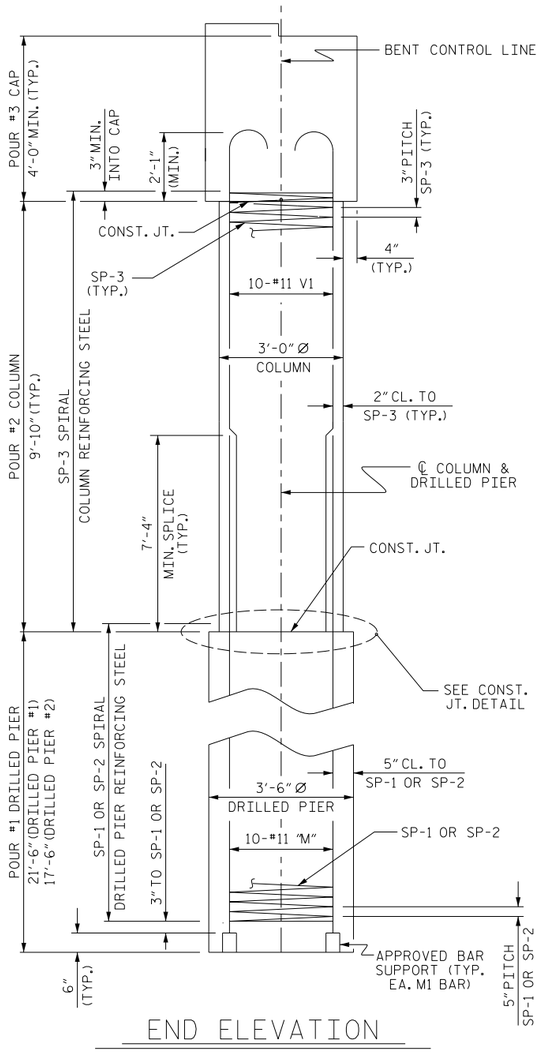
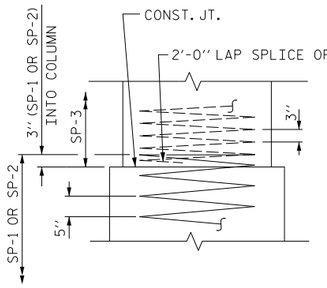


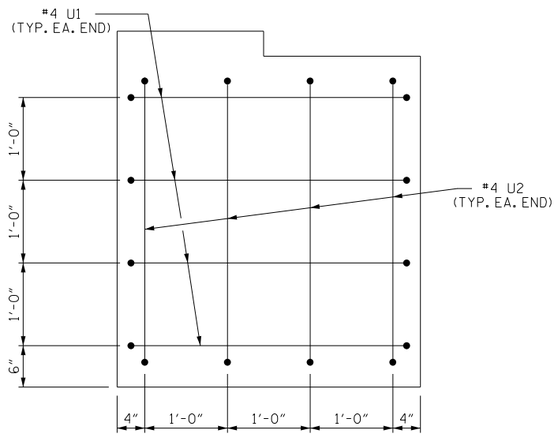
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION



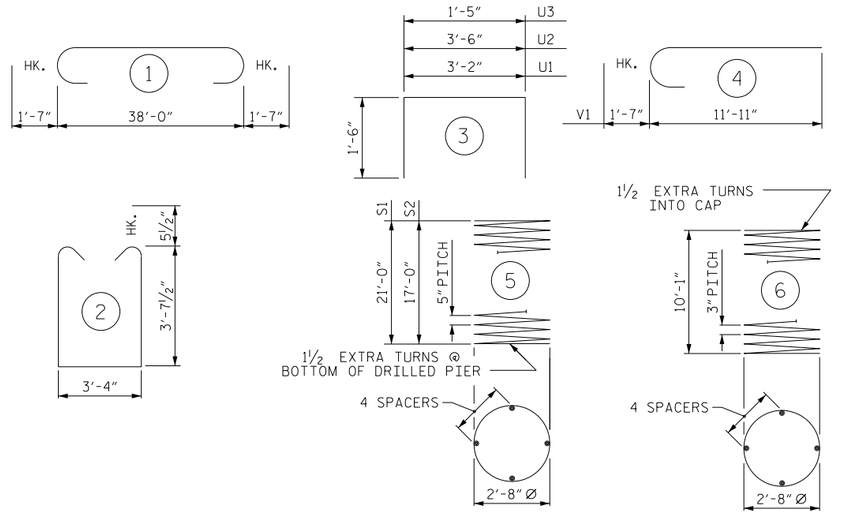
CONSTRUCTION JOINT DETAIL



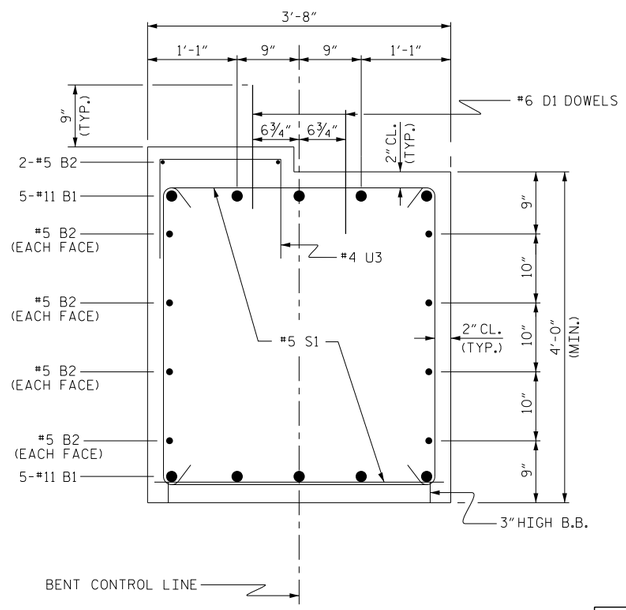
END OF CAP VIEW

(TYPICAL BOTH ENDS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION THRU CAP

BILL OF MATERIAL

FOR BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	41'-2"	2187
B2	10	#5	STR	38'-2"	398
D1	48	#6	STR	1'-6"	108
M1	10	#11	STR	31'-10"	1691
M2	10	#11	STR	28'-10"	1532
S1	63	#5	2	11'-6"	756
U1	8	#4	3	6'-2"	33
U2	8	#4	3	6'-6"	35
U3	38	#4	3	4'-5"	112
V1	20	#11	4	13'-6"	1435

REINFORCING STEEL (FOR BENT No. 1) 8287 LBS.

SP-1	1	*	5	521'-8"	544
SP-2	1	*	5	433'-1"	452
SP-3	2	**	6	421'-7"	564

SPIRAL COLUMN REINFORCING STEEL (FOR BENT No. 1) 1560

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

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

CLASS A CONCRETE BREAKDOWN (FOR BENT No. 1)

POUR #2 (COLUMNS)	5.2 C.Y.
POUR #3 (CAP)	21.7 C.Y.
TOTAL CLASS A CONCRETE	26.9 C.Y.

DRILLED PIERS: (FOR BENT No. 1)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	13.9 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	25 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	14 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	15 LIN. FT.
CSL TUBES	168 LIN. FT.

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+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-17
1			3			SHEETS
2			4			26

DRAWN BY : CNB DATE : 01/24
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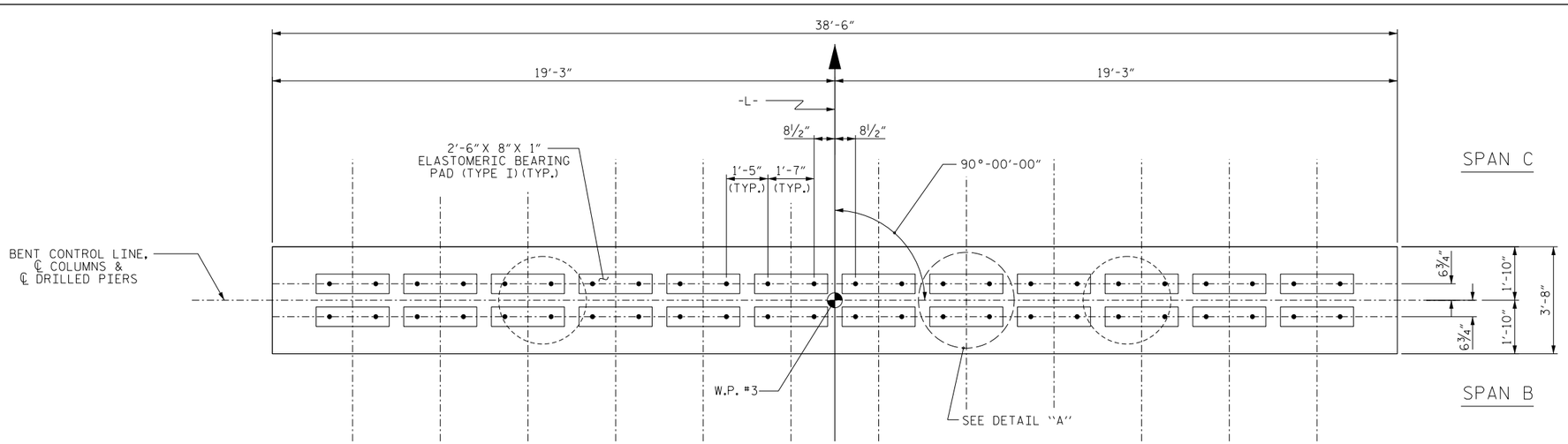
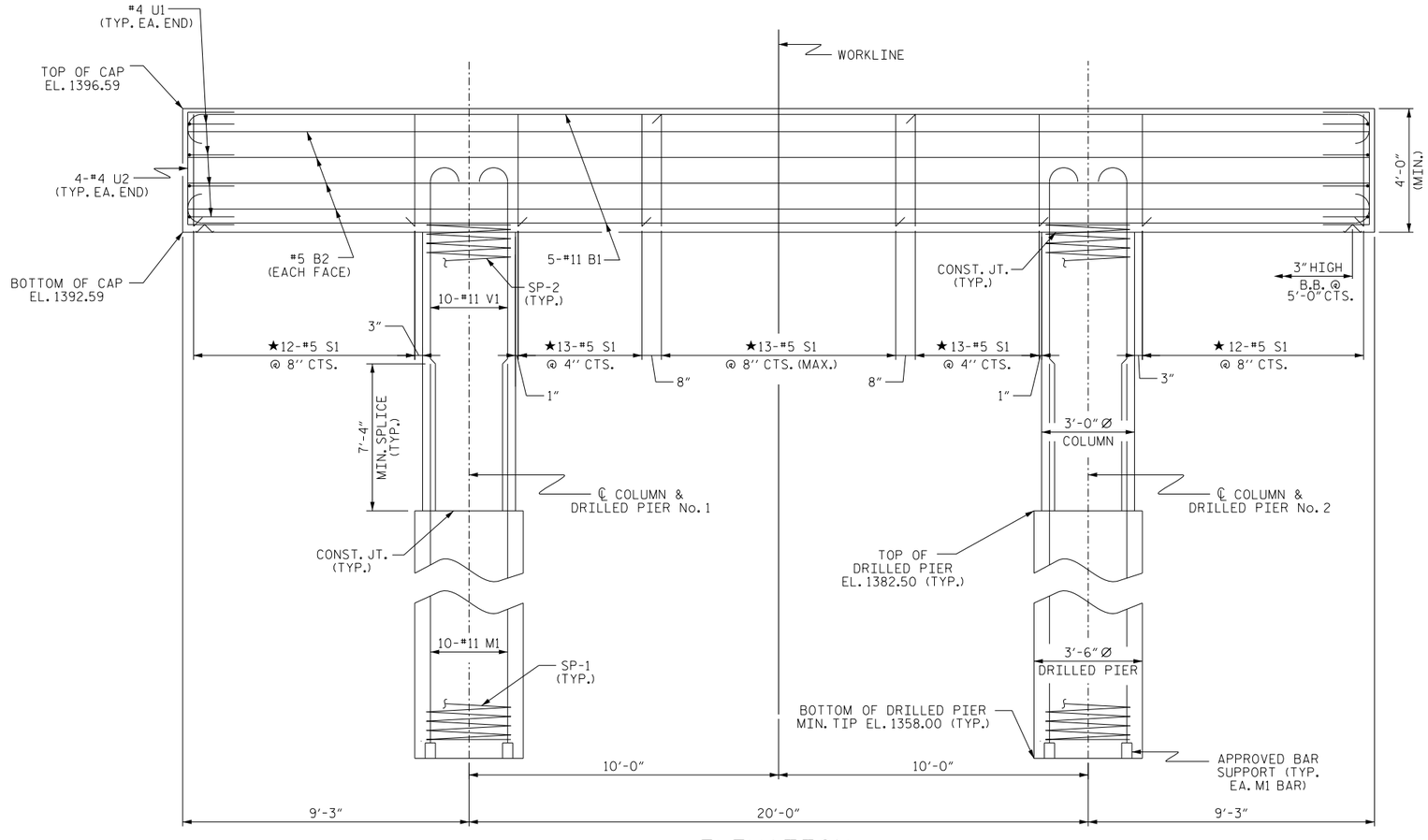
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025



PLAN



ELEVATION

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

NOTES

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

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

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

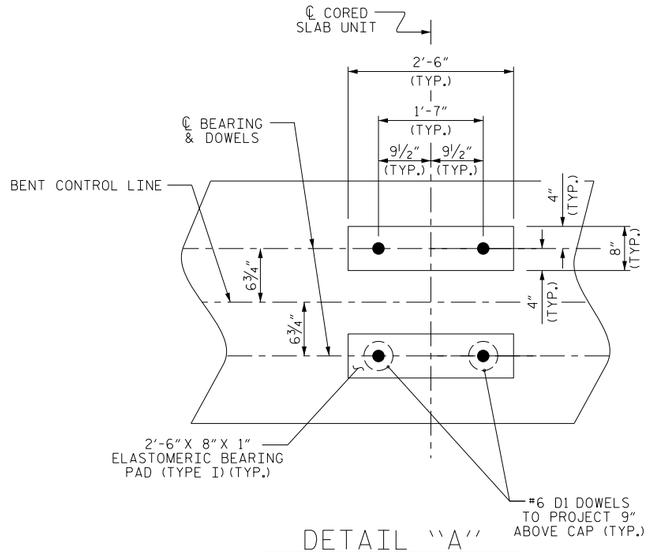
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR ″REINFORCING STEEL″ AND ″SPIRAL COLUMN REINFORCING STEEL.″

★ INVERT ALTERNATE STIRRUPS.

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

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

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



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			SHEETS
2			4			26

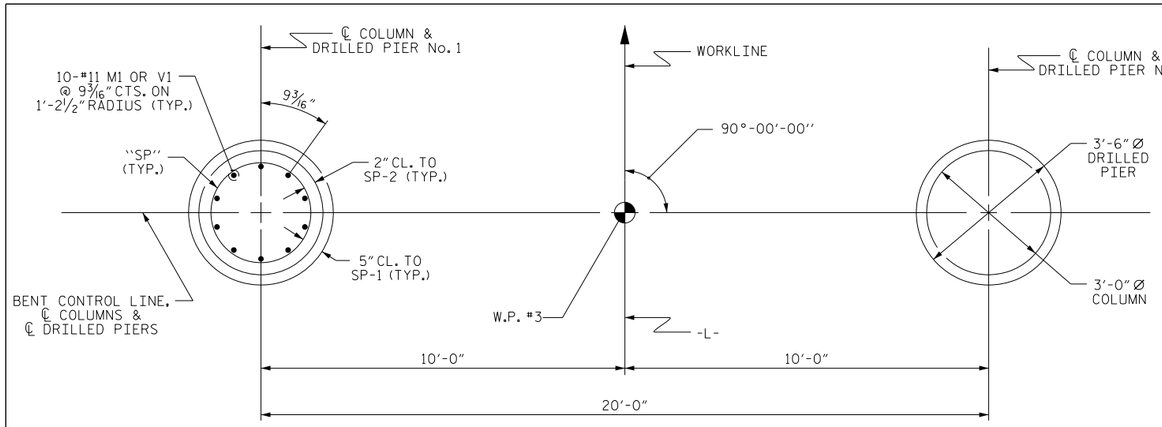
KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

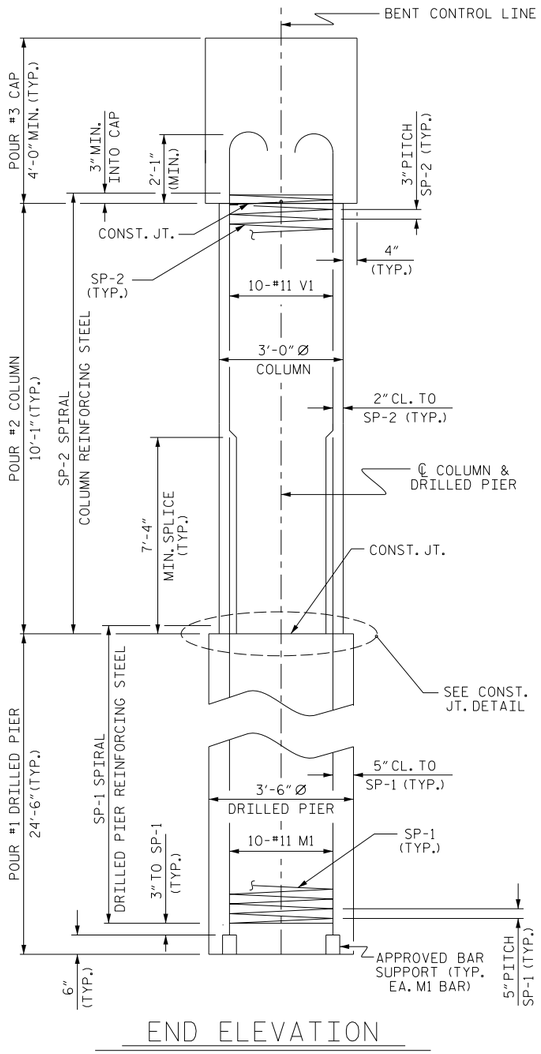
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : CNB DATE : 01/24
CHECKED BY : DLK DATE : 01/24

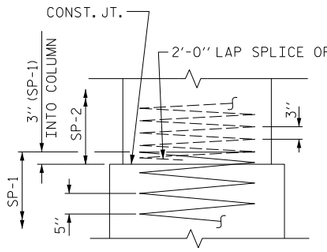
$$USERNAME$$ 1/25/2024 Y:\Jobs\2024 Jobs\B24-01 (25240025O) NCDOT Div 13 - Bridge 108 - See B18-03\Structures\Drawings\100 Percent\SH18_BP13_R048_SMU_B2_580108.dgn



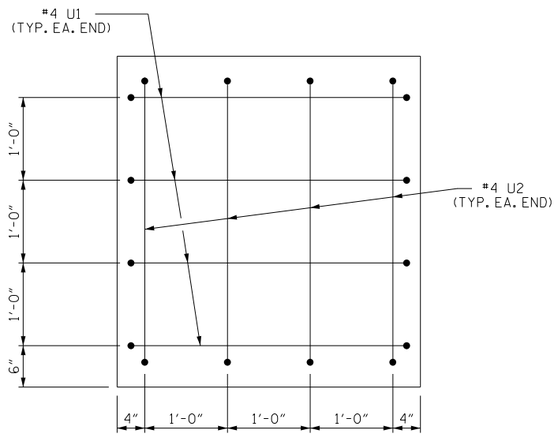
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

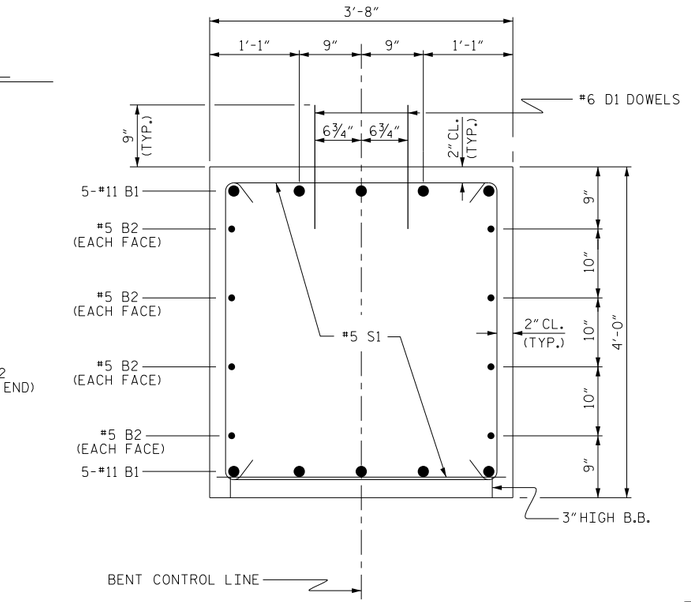


CONSTRUCTION JOINT DETAIL



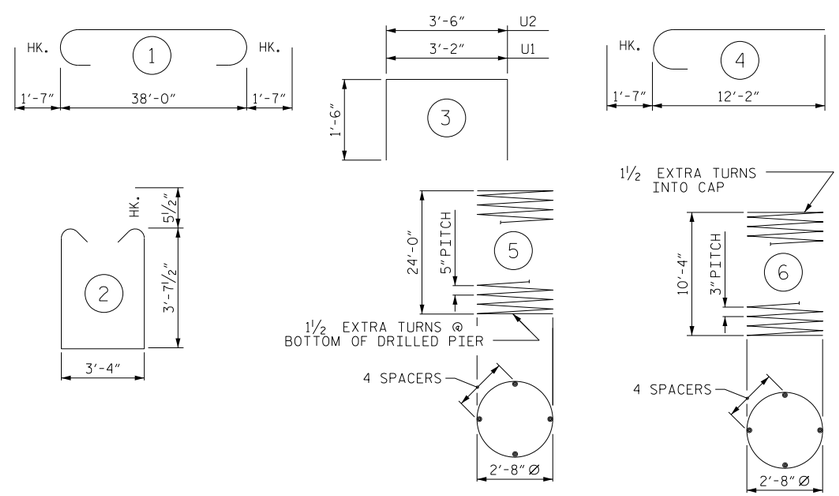
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	41'-2"	2187
B2	8	#5	STR	38'-2"	319
D1	48	#6	STR	1'-6"	108
M1	20	#11	STR	34'-10"	3701
S1	63	#5	2	11'-6"	756
U1	8	#4	3	6'-2"	33
U2	8	#4	3	6'-6"	35
V1	20	#11	4	13'-9"	1461

REINFORCING STEEL (FOR BENT No. 2) 8600 LBS.

SP-1	2	*	5	600'-5"	1252
SP-2	2	**	6	431'-5"	576

SPIRAL COLUMN REINFORCING STEEL (FOR BENT No. 2) 1828 LBS.

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

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

CLASS A CONCRETE BREAKDOWN (FOR BENT No. 2)

POUR #2 (COLUMNS)	5.3 C.Y.
POUR #3 (CAP)	20.9 C.Y.
TOTAL CLASS A CONCRETE	26.2 C.Y.

DRILLED PIERS: (FOR BENT No. 2)

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	17.5 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	38 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	11 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	13 LIN. FT.
CSL TUBES	208 LIN. FT.

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+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-19
1			3			SHEETS
2			4			26

DRAWN BY : CNB DATE : 01/24
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704-499-9452
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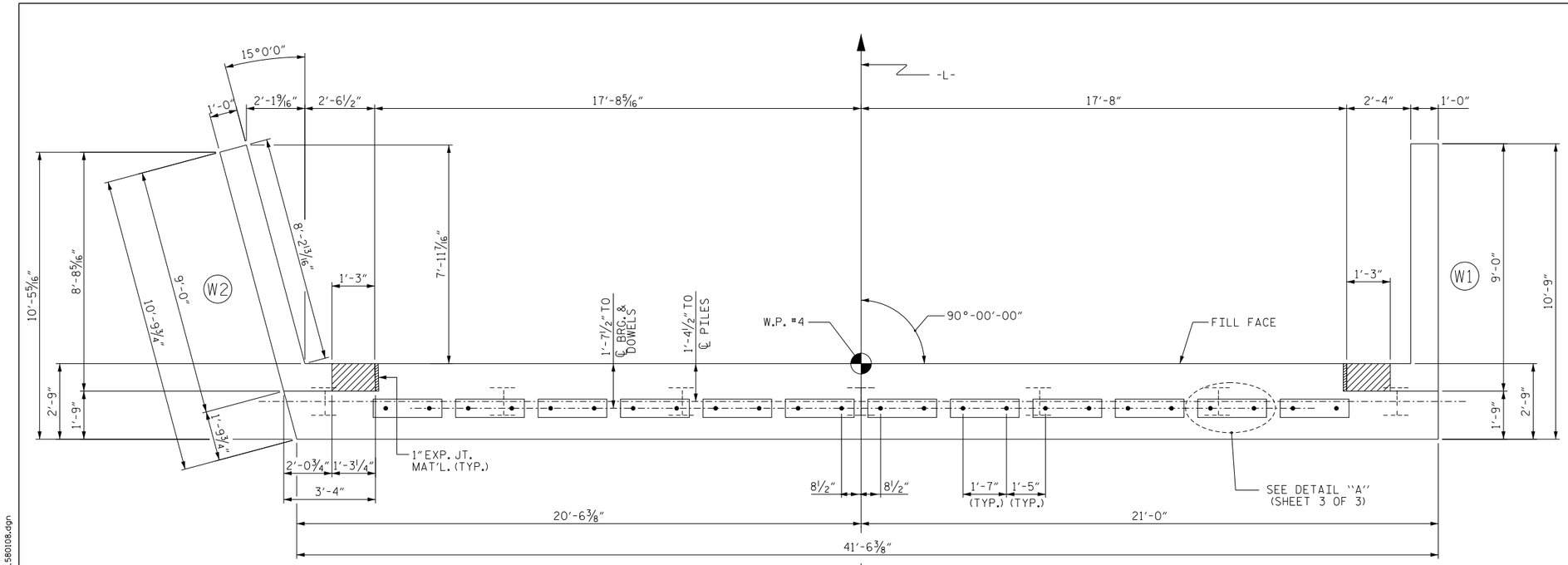
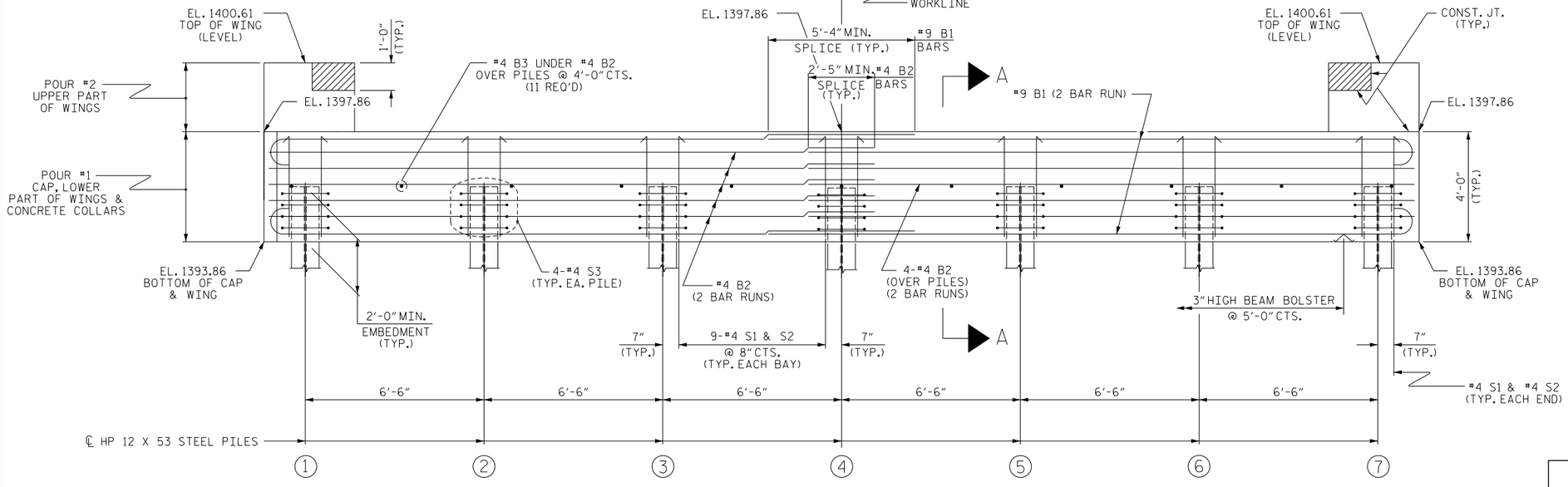
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

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 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			SHEETS
2			4			26

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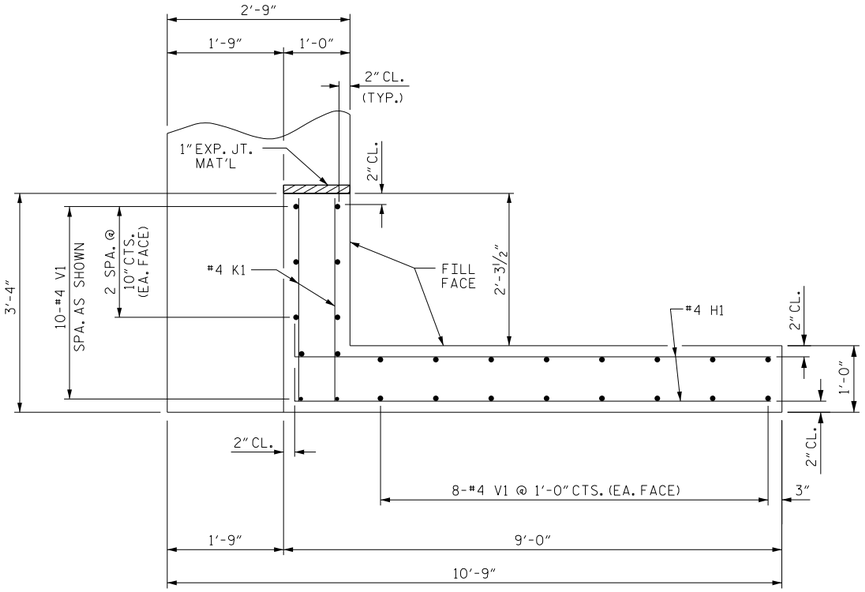
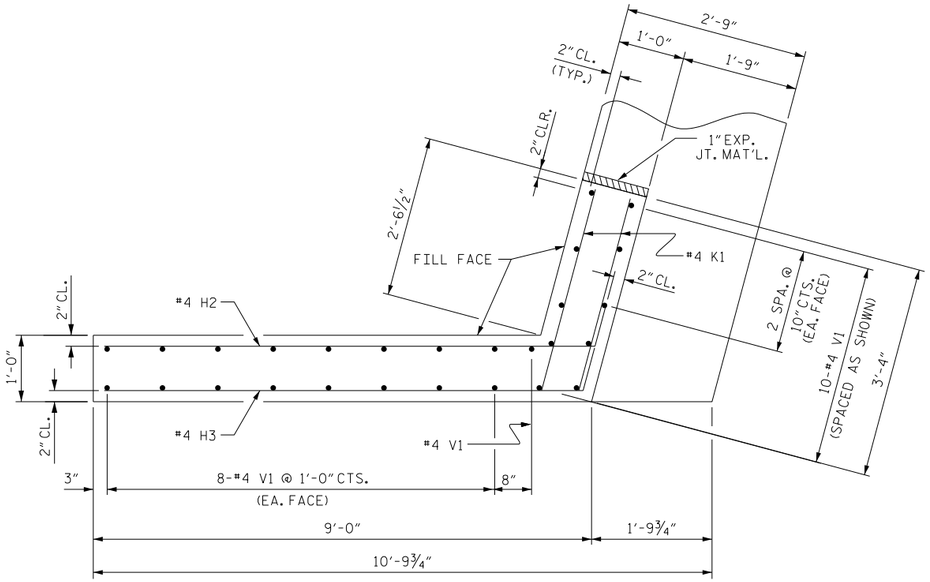
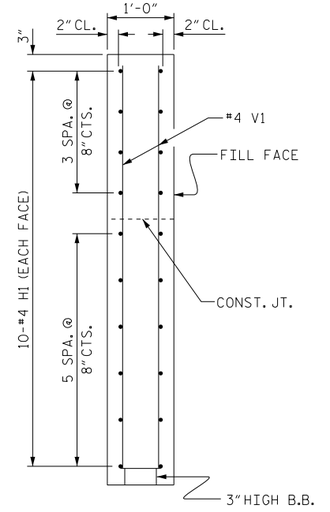


PLAN OF WING (W1)

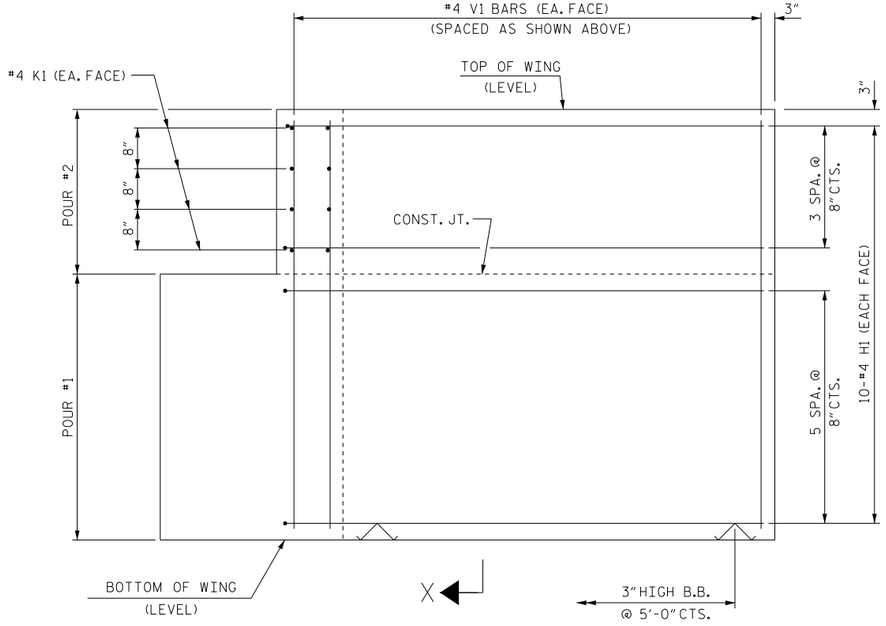


PLAN OF WING (W2)

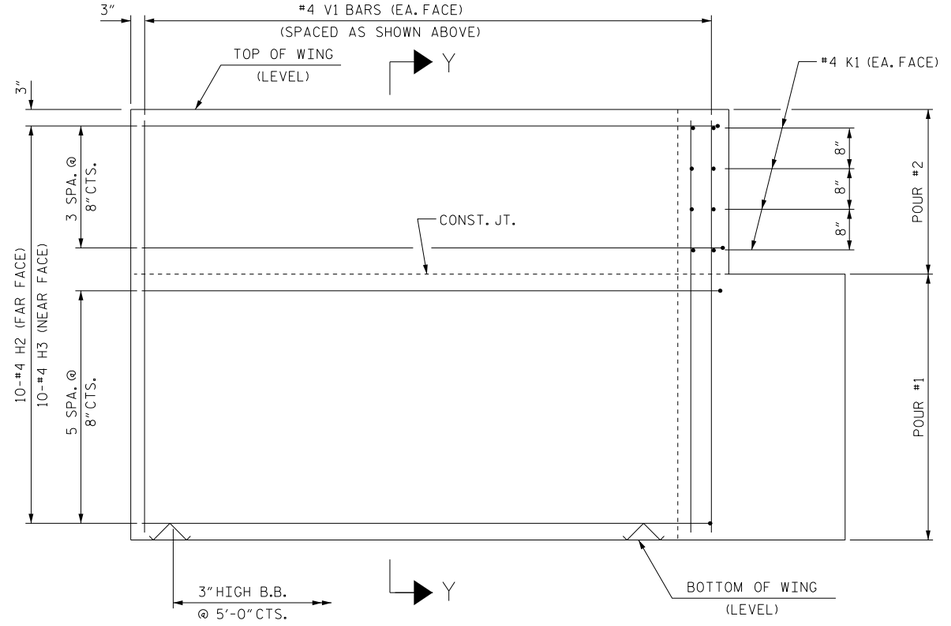


SECTION X-X

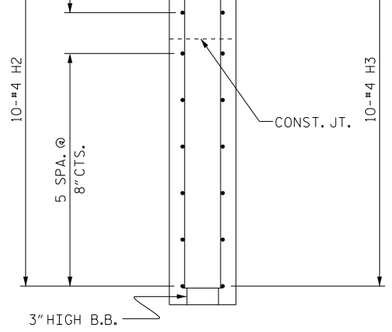
X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			SHEETS
2			4			26

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704-499-9452
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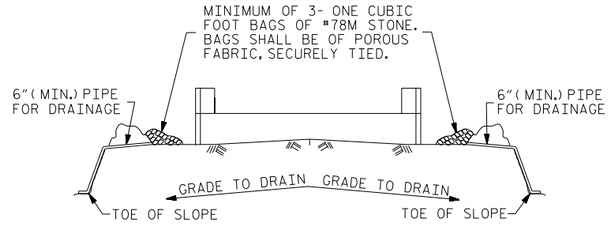
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 529B153115530458...
10/24/2025

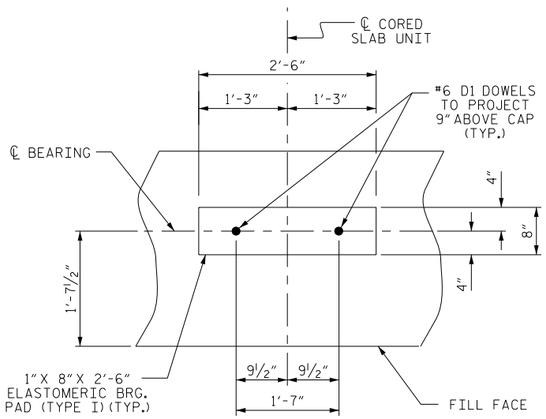


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

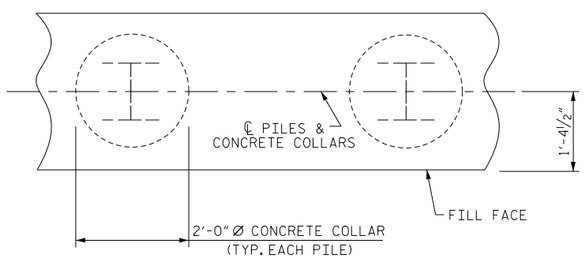
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

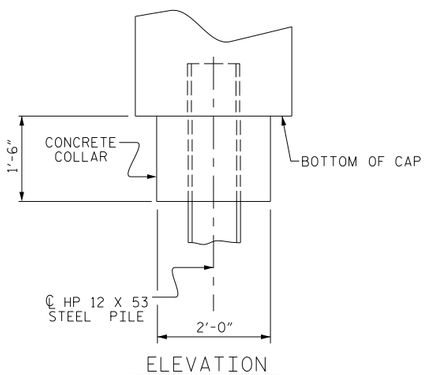


DETAIL "A"

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



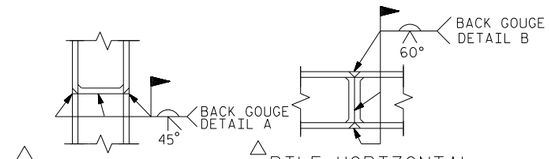
PLAN



ELEVATION

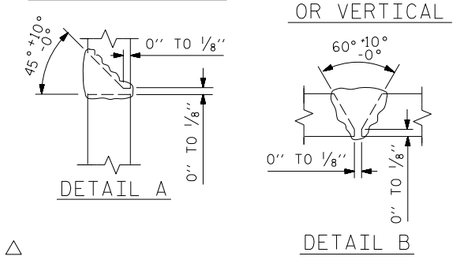
CORROSION PROTECTION FOR STEEL PILES DETAIL

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



△ PILE VERTICAL

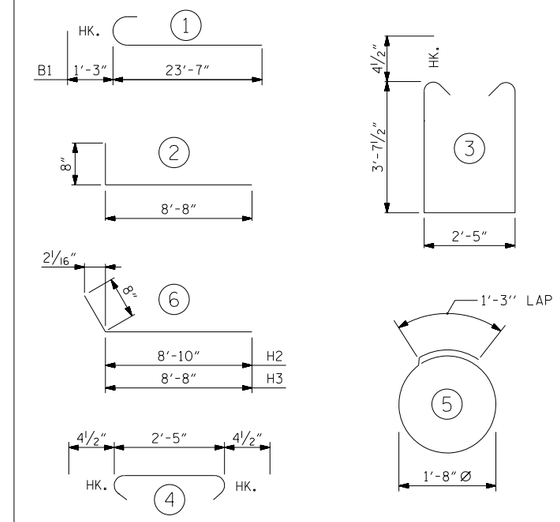
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 2
HP 12 X 53 STEEL PILES
NO: 7 LIN. FT.= 158

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
NO: 7

STEEL PILE POINTS = 7 EA.

BILL OF MATERIAL

FOR END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	24'-10"	1351
B2	28	#4	STR	22'-2"	414
B3	11	#4	STR	2'-5"	18
D1	24	#6	STR	1'-6"	54
H1	20	#4	2	9'-4"	125
H2	10	#4	6	9'-6"	63
H3	10	#4	6	9'-4"	62
K1	8	#4	STR	2'-11"	16
K2	8	#4	STR	3'-0"	16
S1	56	#4	3	10'-5"	390
S2	56	#4	4	3'-2"	118
S3	28	#4	5	6'-6"	122
V1	53	#4	STR	6'-5"	227

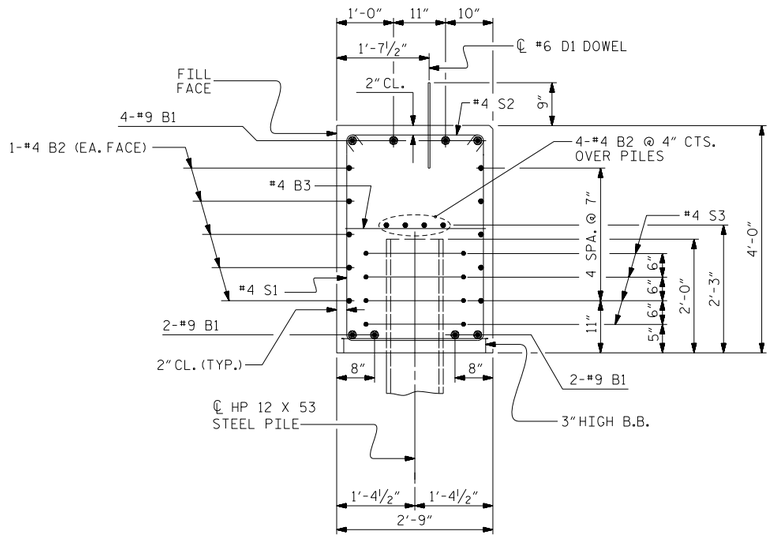
REINFORCING STEEL (FOR ONE END BENT) 2976 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 20.9 C.Y.

POUR #2 UPPER PART OF WINGS 2.3 C.Y.

TOTAL CLASS A CONCRETE 23.2 C.Y.



SECTION A-A

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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			SHEETS 26
2			4			

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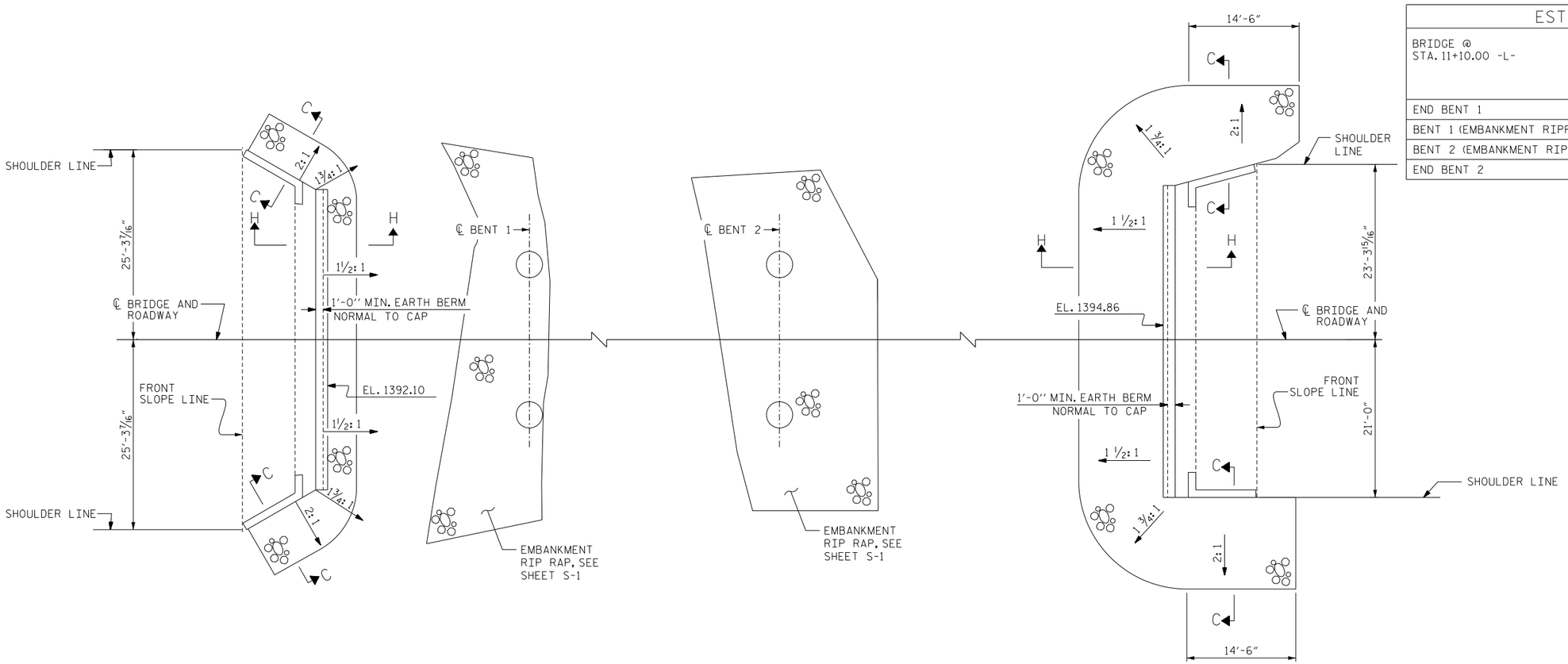
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

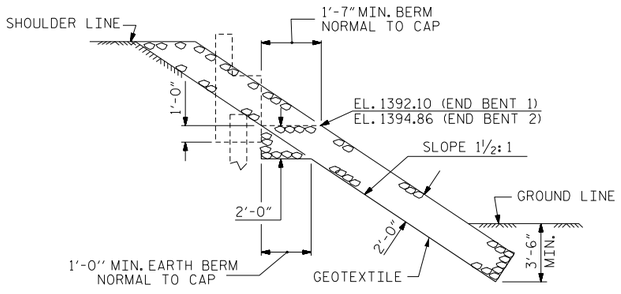
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

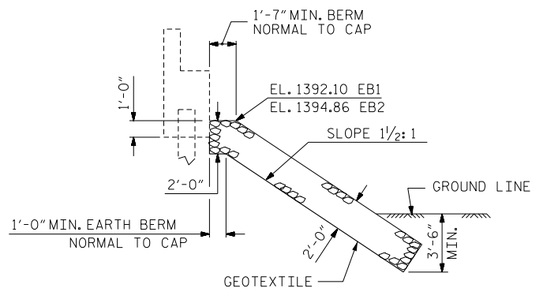
ESTIMATED QUANTITIES		
BRIDGE @ STA. 11+10.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	75	100
BENT 1 (EMBANKMENT RIPRAP)	90	120
BENT 2 (EMBANKMENT RIPRAP)	120	150
END BENT 2	200	240



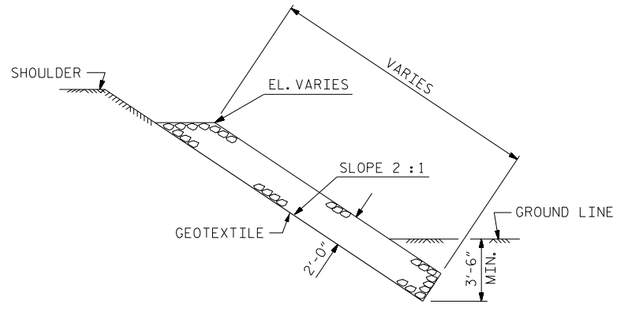
END BENT 1 | BENT 1 | BENT 2 | END BENT 2



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. BP13-R048
MCDOWELL COUNTY
STATION: 11+10.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			SHEETS 26
2			4			

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NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
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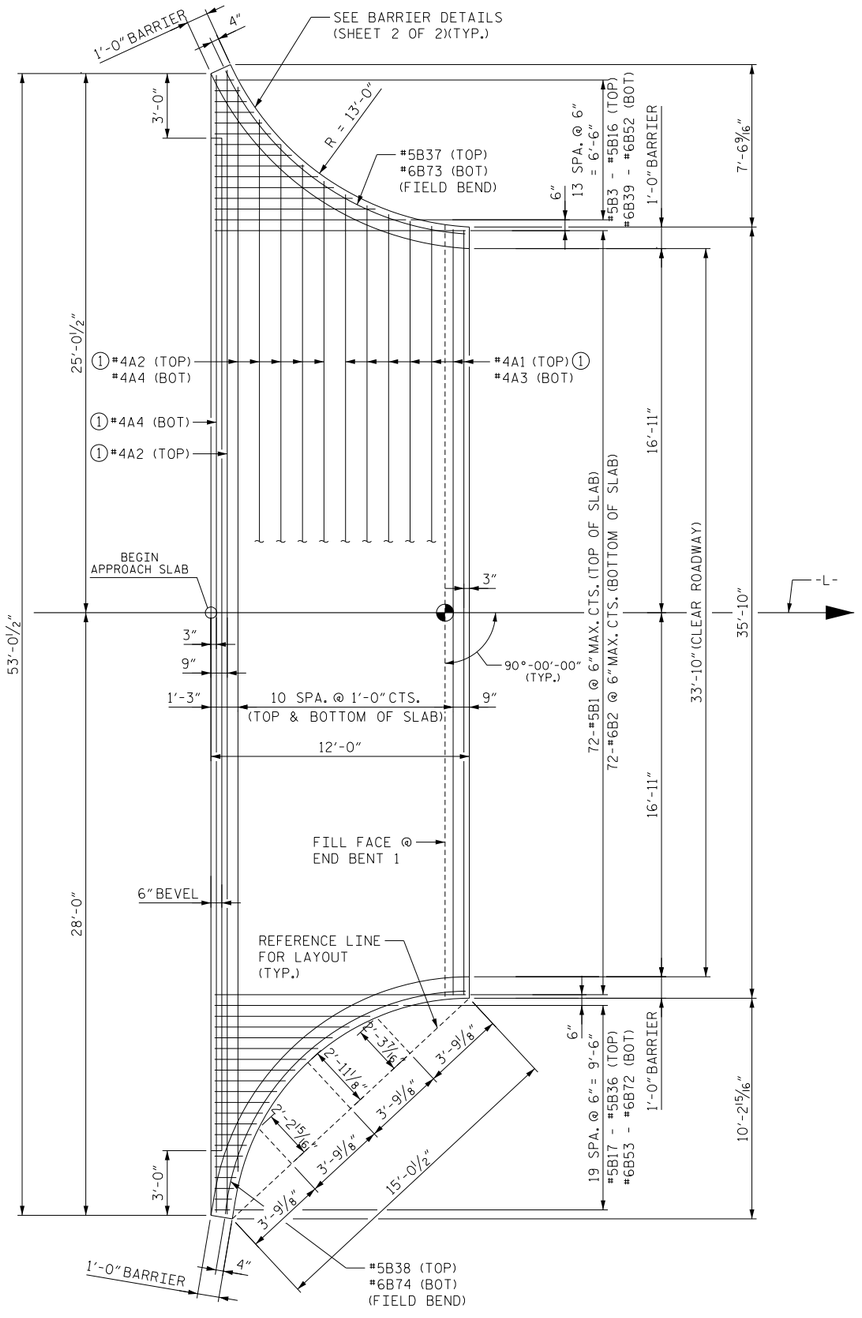
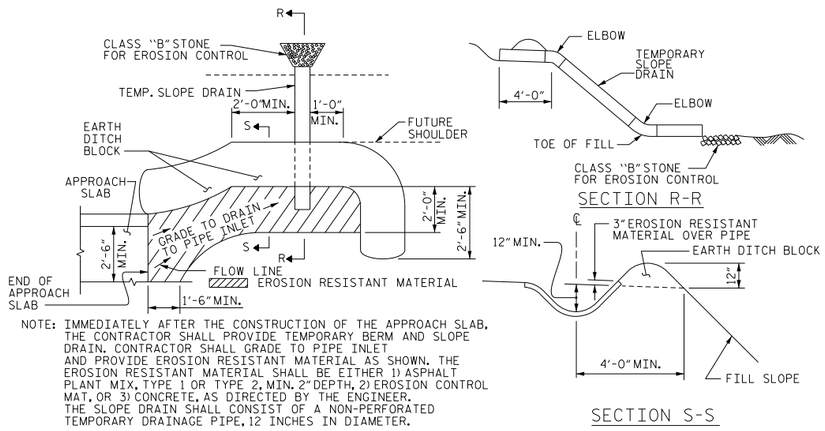
$$USERNAME$$ 1/25/2024 Y:\Jobs\2024 Jobs\B24-01 (252400250) NCDOT Div 13 - Bridge 108 - See B18-03\Structures\Drawings\100 Percent\Sh23_BP13_R048_SMU_RR_580108.dgn



PLAN @ END BENT #1

① SPLICE LENGTH WILL VARY (MIN. 1'-11")



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)

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.

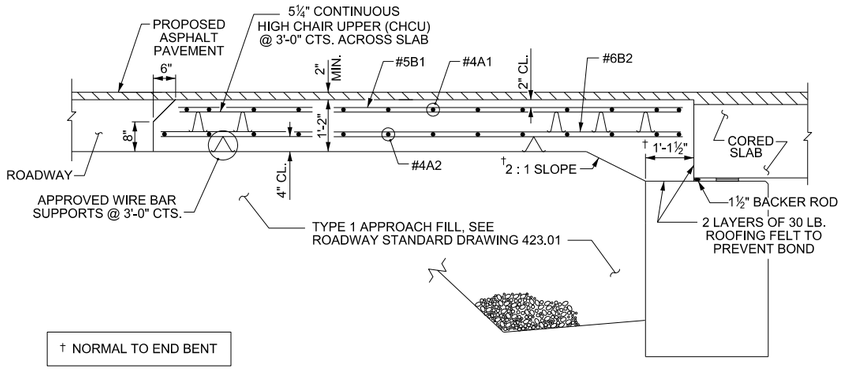
SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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.

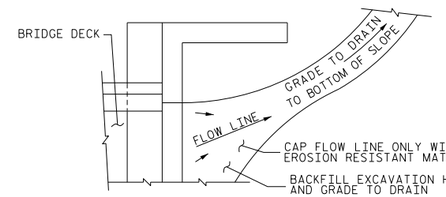
APPROACH SLAB GROOVING IS NOT REQUIRED.

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



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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB EB1 FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

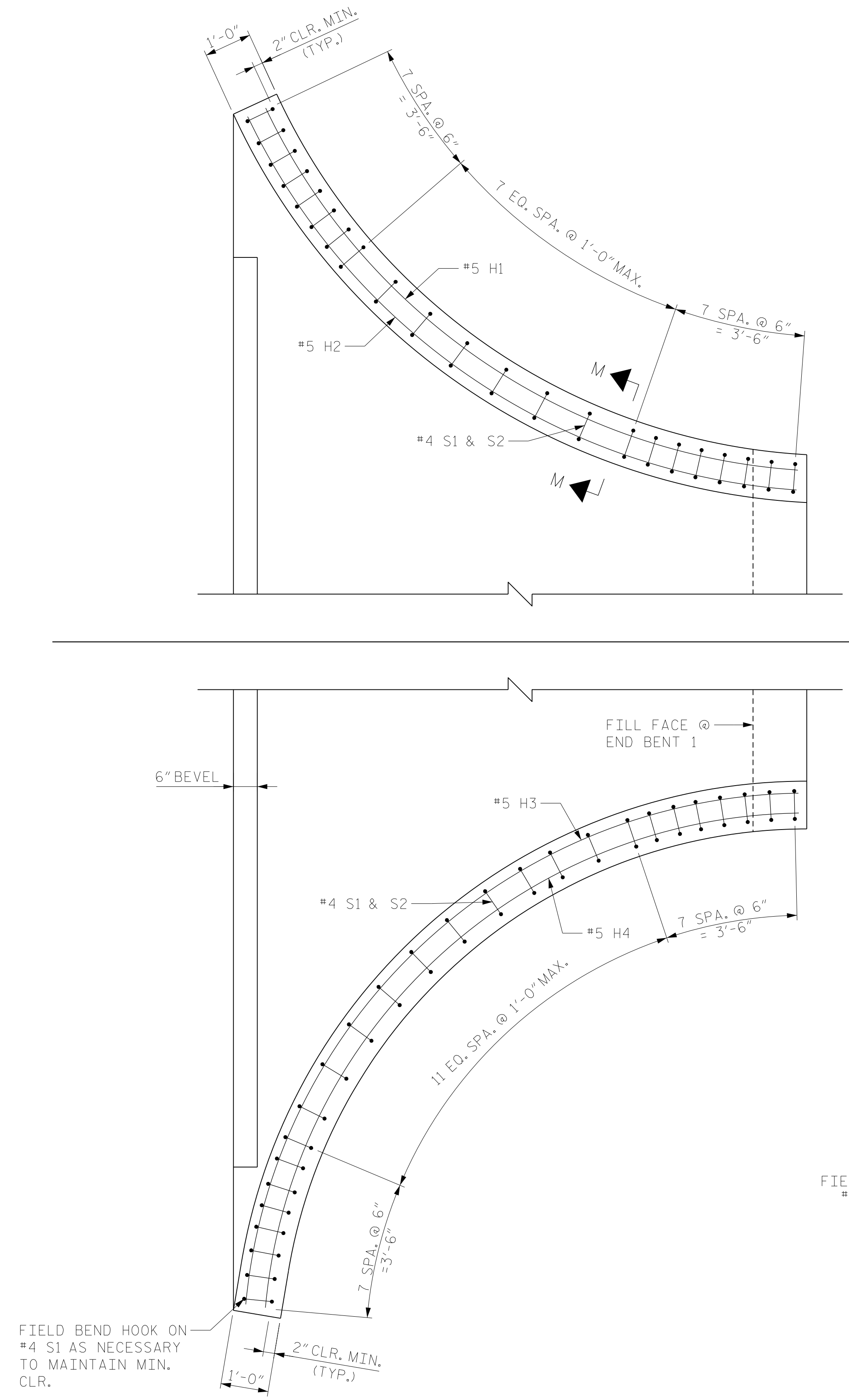
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			SHEETS 26
2			4			

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

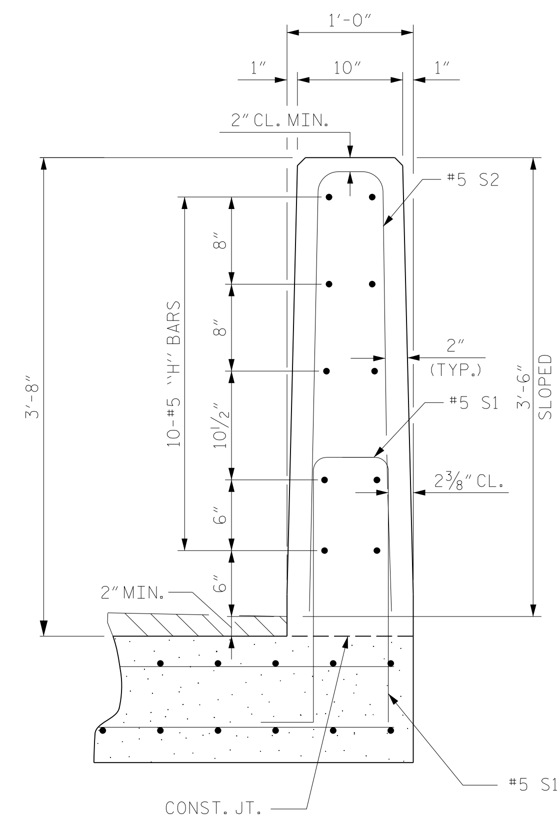
NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24

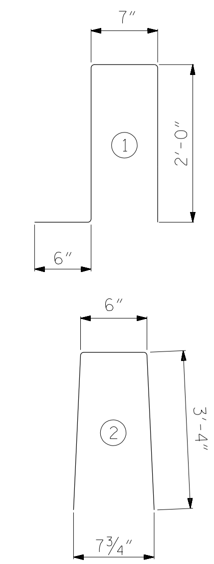


PLAN OF BARRIER RAIL ON APPROACH SLAB @ END BENT 1

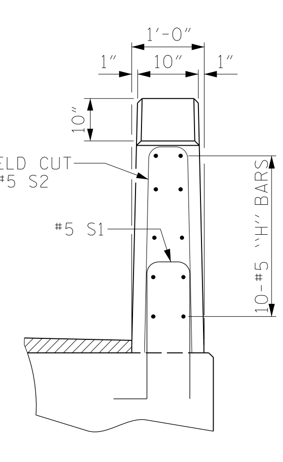


SECTION M-M

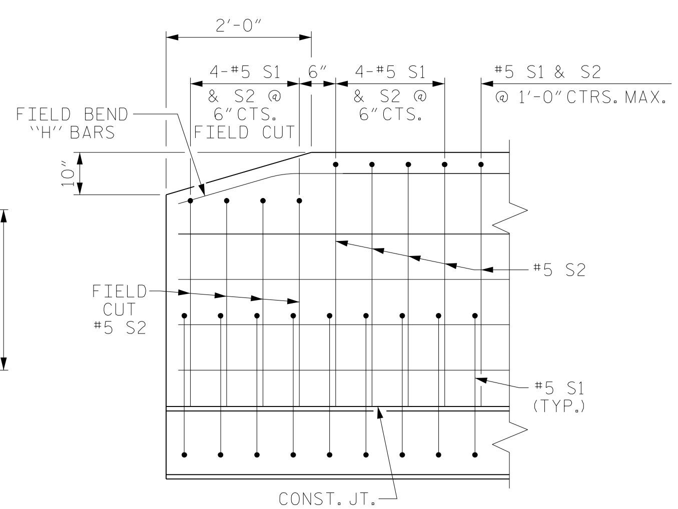
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



END VIEW



SIDE VIEW

END OF RAIL DETAILS

BILL OF MATERIAL APPROACH SLAB

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	14	#4	STR	20'-5"	191	B39	1	#6	STR	8'-11"	13
✳ A2	12	#4	STR	27'-7"	221	B40	1	#6	STR	7'-6"	11
A3	14	#4	STR	20'-3"	189	B41	1	#6	STR	6'-5"	10
A4	12	#4	STR	27'-6"	220	B42	1	#6	STR	5'-7"	8
						B43	1	#6	STR	4'-10"	7
✳ B1	72	#5	STR	11'-2"	839	B44	1	#6	STR	4'-2"	6
B2	72	#6	STR	11'-8"	1262	B45	1	#6	STR	3'-7"	5
✳ B3	1	#5	STR	8'-5"	9	B46	1	#6	STR	3'-1"	5
✳ B4	1	#5	STR	7'-0"	7	B47	1	#6	STR	2'-8"	4
✳ B5	1	#5	STR	5'-11"	6	B48	1	#6	STR	2'-3"	3
✳ B6	1	#5	STR	5'-1"	5	B49	1	#6	STR	1'-10"	3
✳ B7	1	#5	STR	4'-4"	5	B50	1	#6	STR	1'-6"	2
✳ B8	1	#5	STR	3'-8"	4	B51	1	#6	STR	1'-2"	2
✳ B9	1	#5	STR	3'-1"	3	B52	1	#6	STR	0'-11"	1
✳ B10	1	#5	STR	2'-7"	3	B53	1	#6	STR	0'-9"	1
✳ B11	1	#5	STR	2'-8"	3	B54	1	#6	STR	0'-10"	1
✳ B12	1	#5	STR	2'-3"	2	B55	1	#6	STR	0'-11"	1
✳ B13	1	#5	STR	1'-10"	2	B56	1	#6	STR	1'-0"	2
✳ B14	1	#5	STR	1'-6"	2	B57	1	#6	STR	1'-2"	2
✳ B15	1	#5	STR	1'-2"	1	B58	1	#6	STR	1'-4"	2
✳ B16	1	#5	STR	0'-11"	1	B59	1	#6	STR	1'-6"	2
✳ B17	1	#5	STR	0'-9"	1	B60	1	#6	STR	1'-9"	3
✳ B18	1	#5	STR	0'-10"	1	B61	1	#6	STR	2'-0"	3
✳ B19	1	#5	STR	0'-11"	1	B62	1	#6	STR	2'-3"	3
✳ B20	1	#5	STR	1'-0"	1	B63	1	#6	STR	2'-7"	4
✳ B21	1	#5	STR	1'-2"	1	B64	1	#6	STR	2'-11"	4
✳ B22	1	#5	STR	1'-4"	1	B65	1	#6	STR	3'-4"	5
✳ B23	1	#5	STR	1'-0"	1	B66	1	#6	STR	3'-9"	6
✳ B24	1	#5	STR	1'-3"	1	B67	1	#6	STR	4'-3"	6
✳ B25	1	#5	STR	1'-6"	2	B68	1	#6	STR	4'-10"	7
✳ B26	1	#5	STR	1'-9"	2	B69	1	#6	STR	5'-6"	8
✳ B27	1	#5	STR	2'-1"	2	B70	1	#6	STR	6'-3"	9
✳ B28	1	#5	STR	2'-5"	3	B71	1	#6	STR	7'-3"	11
✳ B29	1	#5	STR	2'-10"	3	B72	1	#6	STR	8'-7"	13
✳ B30	1	#5	STR	3'-3"	3	B73	1	#6	STR	14'-2"	21
✳ B31	1	#5	STR	3'-9"	4	B74	1	#6	STR	16'-8"	25
✳ B32	1	#5	STR	4'-4"	4						
✳ B33	1	#5	STR	5'-0"	5	✳ S1	48	#5	1	5'-1"	255
✳ B34	1	#5	STR	5'-9"	6						
✳ B35	1	#5	STR	6'-9"	7	REINFORCING STEEL				LBS.	1890
✳ B36	1	#5	STR	7'-1"	7	✳ EPOXY COATED REINFORCING STEEL				LBS.	1647
✳ B37	1	#5	STR	14'-2"	15						
✳ B38	1	#5	STR	16'-8"	17						
						CLASS AA CONCRETE				C.Y.	22.8

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB AT END BENT 1

BAR	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ H1	5	#5	STR	14'-0"	73
✳ H2	5	#5	STR	14'-7"	76
✳ H3	5	#5	STR	17'-2"	90
✳ H4	5	#5	STR	16'-7"	87
✳ S2	48	#5	2	7'-2"	359
✳ EPOXY COATED REINFORCING STEEL				LBS.	685
CLASS AA CONCRETE				CU.YDS.	4.7
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	32.0

SPLICE LENGTHS

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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB EB1 FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

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

SHEET NO. S-25

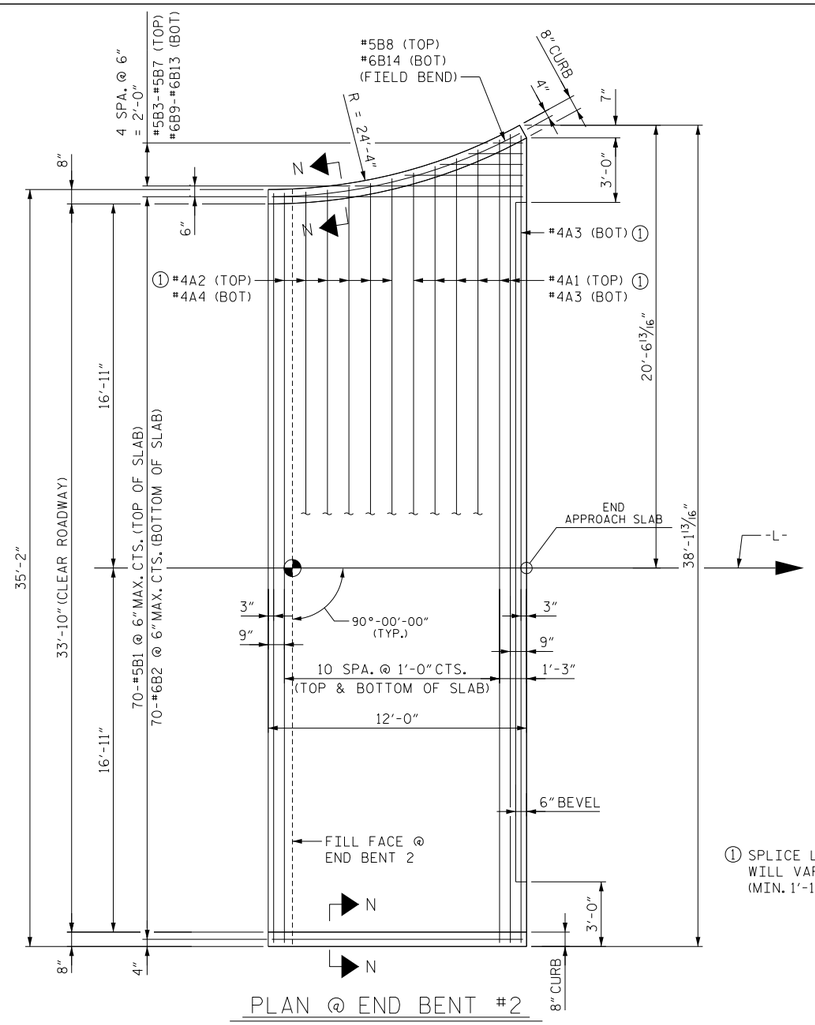
SHEETS 26

KCI ASSOCIATES OF NC, P.A.
9711 SOUTHERN PINE BLVD
SUITE A
CHARLOTTE, NC 28273
704-499-9452
NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY

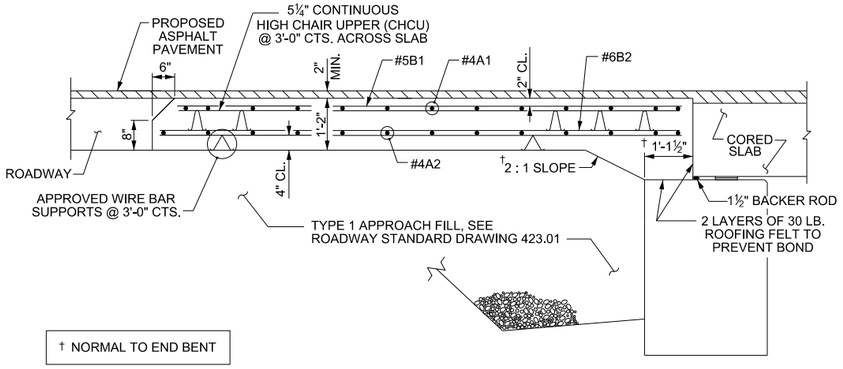
Signed by: Shawn M McCoy 10/24/2025

DRAWN BY : SMM DATE : 01/24
CHECKED BY : DLK DATE : 01/24



PLAN @ END BENT #2

① SPLICE LENGTH WILL VARY. (MIN. 1'-11")



† NORMAL TO END BENT

SECTION THRU SLAB

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.

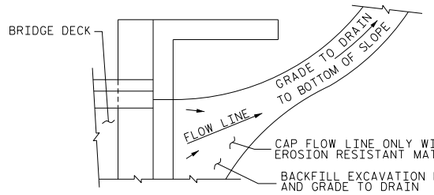
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

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.

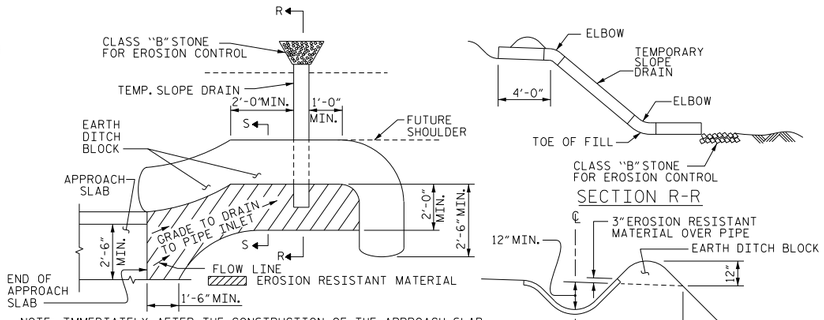
TEMPORARY DRAINAGE DETAIL

BILL OF MATERIAL

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	12	#4	STR	20'-0"	160
✱ A2	14	#4	STR	19'-0"	178
A3	14	#4	STR	20'-1"	188
A4	14	#4	STR	19'-1"	178
✱ B1	70	#5	STR	11'-2"	815
B2	70	#6	STR	11'-8"	1227
✱ B3	1	#5	STR	7'-10"	8
✱ B4	1	#5	STR	5'-6"	6
✱ B5	1	#5	STR	3'-10"	4
✱ B6	1	#5	STR	2'-6"	3
✱ B7	1	#5	STR	1'-5"	1
✱ B8	1	#5	STR	12'-2"	13
B9	1	#6	STR	7'-10"	12
B10	1	#6	STR	5'-6"	8
B11	1	#6	STR	3'-10"	6
B12	1	#6	STR	2'-6"	4
B13	1	#6	STR	1'-5"	2
B14	1	#6	STR	12'-2"	18

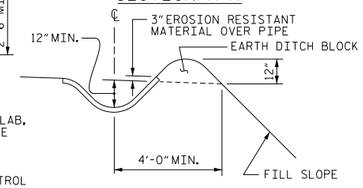
REINFORCING STEEL	LBS.	1643
✱ EPOXY COATED REINFORCING STEEL	LBS.	1188
CLASS AA CONCRETE	C.Y.	20.6



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

PLAN VIEW

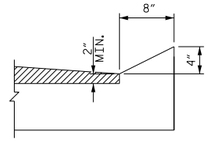
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

CURB DETAILS

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

PROJECT NO. BP13-R048

MCDOWELL COUNTY

STATION: 11+10.00 -L-

SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB EB2
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			SHEETS
2			4			26

DRAWN BY : SMM DATE : 01/24
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NC LICENSE No. C-0764

NORTH CAROLINA PROFESSIONAL SEAL 047237 ENGINEER SHAWN M. MCCOY
Signed by: Shawn M McCoy 529B153115530458...
10/24/2025

8/26/21

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞"Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$" 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 $\frac{1}{16}$" 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.