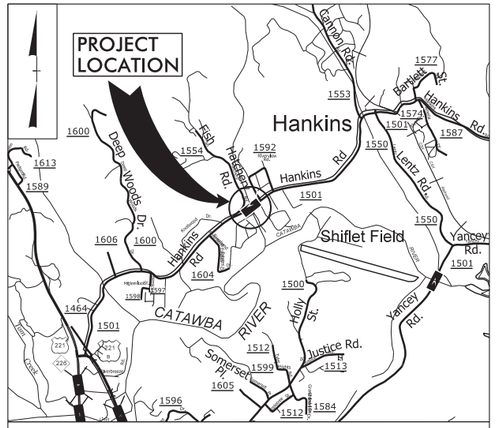
09/08/99

WBS: 17BP.13.R.176

CONTRACT: DM00364

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



VICINITY MAP

100% PLAN SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MCDOWELL COUNTY

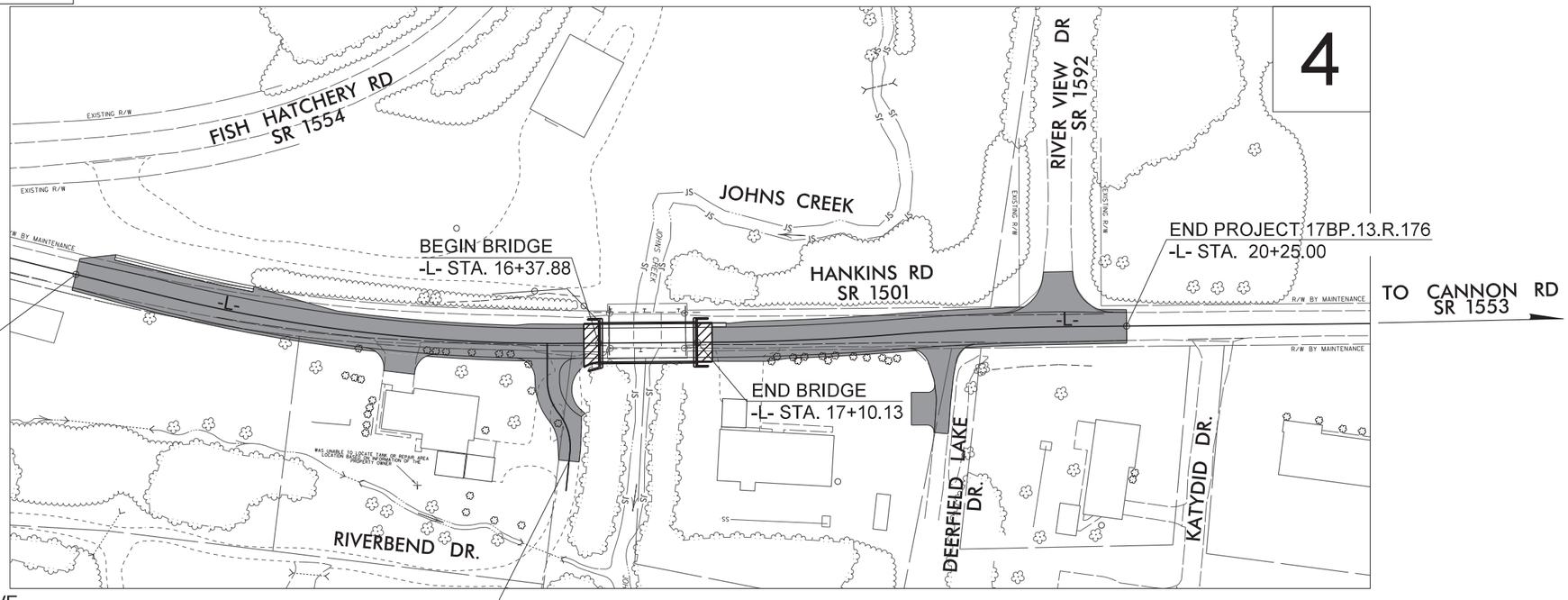
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.176	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.13.PE.176	N/A	PE
17BP.13.ROW.176	N/A	RIGHT-OF-WAY
17BP.13.CONST.176	N/A	CONSTRUCTION

LOCATION: REPLACE EXISTING BRIDGE NO. 77 OVER JOHNS CREEK ON HANKINS RD (SR 1501)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

NAD 83/2011



DESIGN EXCEPTION FOR VERTICAL CURVE.
THIS PROJECT HAS NO CONTROL OF ACCESS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

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 2016 = 2300
ADT 2040 = 2600
K = 11 %
D = 60 %
T = 7 % *
V = 45 MPH
SUB REGIONAL TIER
FUNC CLASS = MAJOR COLLECTOR
* TTST = 1 DUAL = 6

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.13.R.176	=	0.134 MI
LENGTH STRUCTURE PROJECT 17BP.13.R.176	=	0.013 MI
TOTAL LENGTH PROJECT 17BP.13.R.176	=	0.147 MI

Prepared In the Office of
WSP USA
421 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
FAX 1.919.836.4099
LICENSE NO. F-0165
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 02, 2019

LETTING DATE: DECEMBER 07, 2022

RONYELL THIGPEN, PE
PROJECT ENGINEER

ERIC MISAK
PROJECT DESIGN ENGINEER

NCDOT CONTACT: MICHAEL CALLOWAY
DIVISION 13 BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043232 ENGINEER VIDYA MOHANDAS P.E.

DocuSigned by: Vidya Mohandas 8/4/2022
SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 33290 ENGINEER RONYELL A. THIGPEN P.E.

DocuSigned by: Ronyell Thigpen 8/5/2022
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3,RJ76	1A

ROADWAY DESIGN ENGINEER
8/5/2022

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33290 RONNELL HIGDEN

DocuSigned by:
Ronnell Higden
9C23A1A2DB5E447...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

GENERAL NOTES: 2018 SPECIFICATIONS

EFFECTIVE: 01–16–2018
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE–IN.

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

NO UTILITY CONFLICT

RIGHT–OF–WAY MARKERS:

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

2018 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Method II
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation
310.03	Cross Pipe End Section – Precast Concrete Section for 18" to 30" Pipe
DIVISION 4 – MAJOR STRUCTURES	
422.02	Bridge Approach Fills – Type II Modified Approach Fill
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right–of–Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout – Radius Type
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.02	Woven Wire Fence – with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

10:19:34 AM
17BPJ3,RJ76_RDY_1A.dgn
8/4/2022

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.RJ76	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

8/17/99

REVISIONS

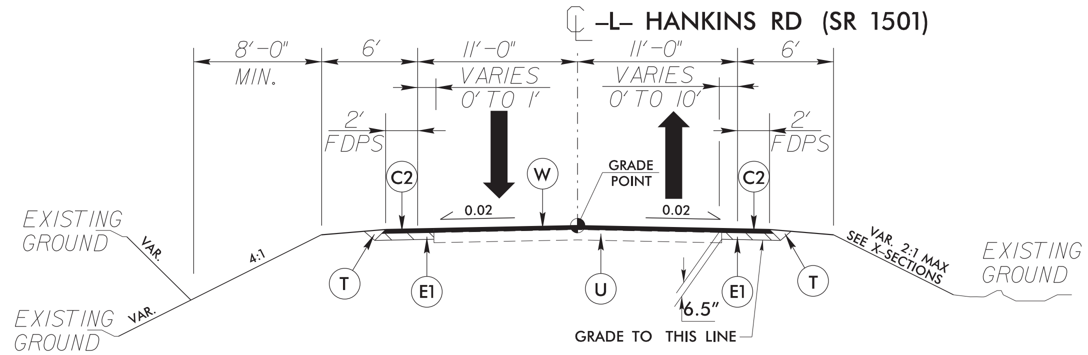
PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.R.176	2A-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER 8/3/2022	PAVEMENT DESIGN ENGINEER 7/29/2022

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33290 — Ronyell Thigpen

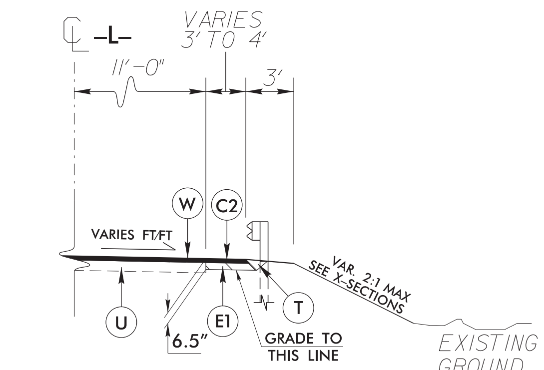
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022896 — Clark S. Morrison

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

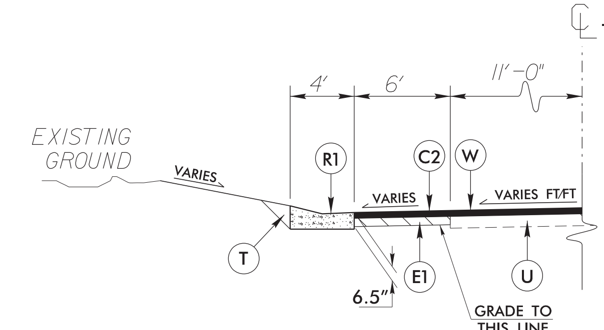
PLANS PREPARED BY:
WSP USA
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
FAX: 1.919.836.4099
LICENSE NO. F-0165



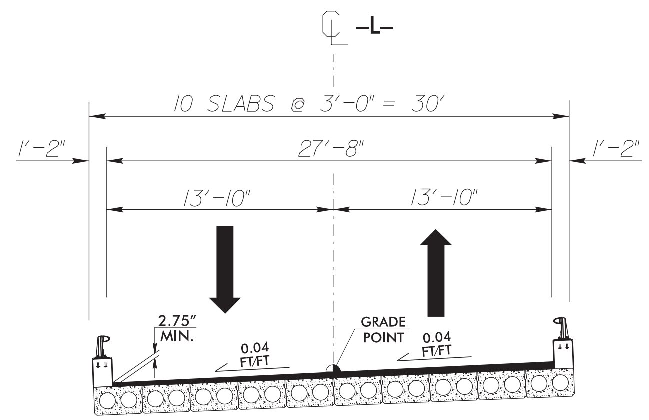
TYPICAL SECTION NO. 1
(USE IN CONJUNCTION WITH DETAIL A, B & DETAIL C)
-L- STA. 12+50.00 TO STA. 16+39+/- (BEGIN BRIDGE)
-L- STA. 17+09+/- (END BRIDGE) TO STA. 20+25.00



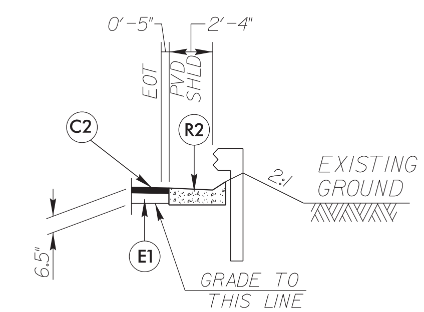
DETAIL A
GUARDRAIL
-L- STA. 15+89.71 TO 16+39.71 (LT)
-L- STA. 17+08.30 TO 19+60.69 (LT)
-L- STA. 17+08.30 TO 17+58.30 (RT)



DETAIL B
EXPRESSWAY GUTTER
-L- STA. 12+75.00 TO 13+80.00 (LT.)



TYPICAL SECTION NO. 2
-L- STA. 16+37.88 TO STA. 17+10.13

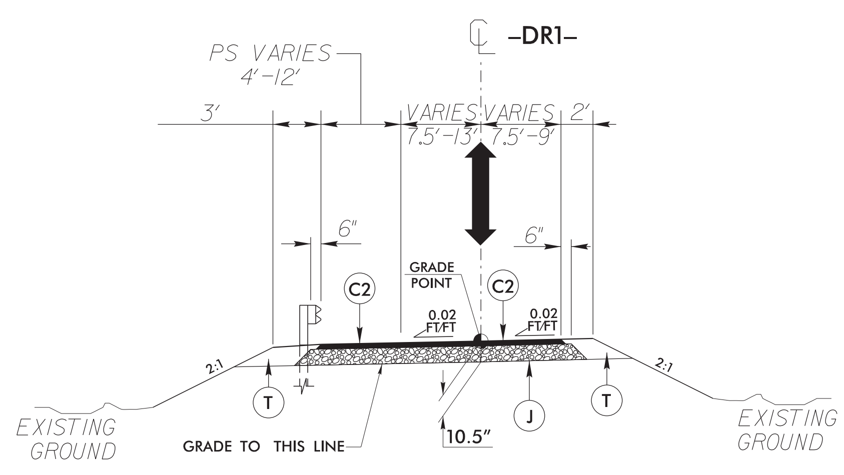


DETAIL C
SHOULDER BERM GUTTER
-L- STA. 17+23.26 TO 17+31.34 (LT)

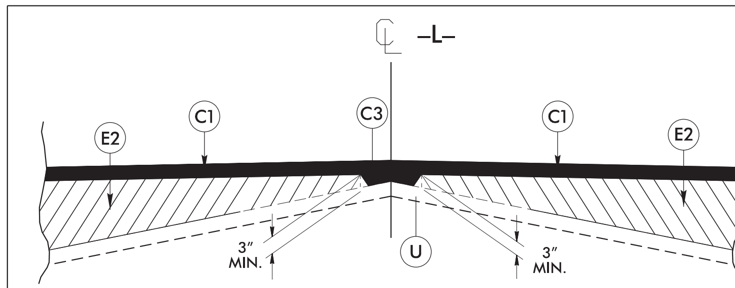
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.
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.
J	PROP. 8" ABC
R1	CONC. EXPRESSWAY GUTTER
R2	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL THIS SHEET).

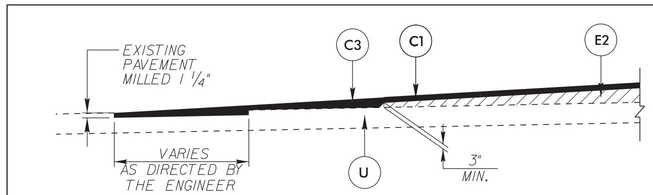
NOTES:
1. ALL SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



DRIVEWAY TYPICAL SECTION
-DR1- STA. 10+11.00 TO STA. 10+90.00
*SEE PLANS FOR GUARDRAIL LOCATIONS



WEDGING DETAIL



MILLING DETAIL FOR PROFILE CONNECTIONS
TYING PROPOSED PAVEMENTS TO EXISTING PAVEMENTS

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.R.176	2C-1

6/2/99

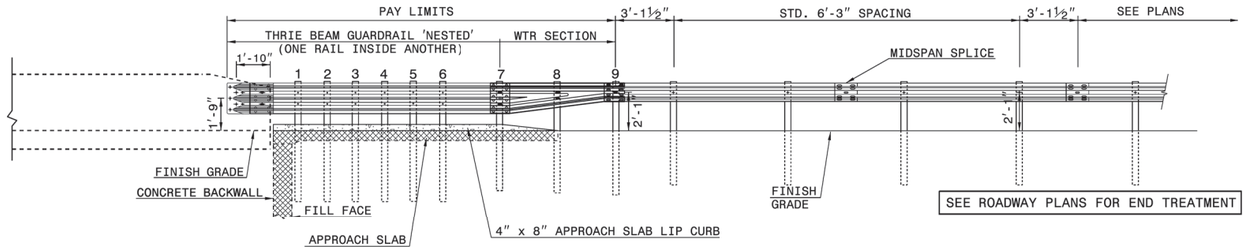
5/14/99

PROJECT REFERENCE NO.	SHEET NO.

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

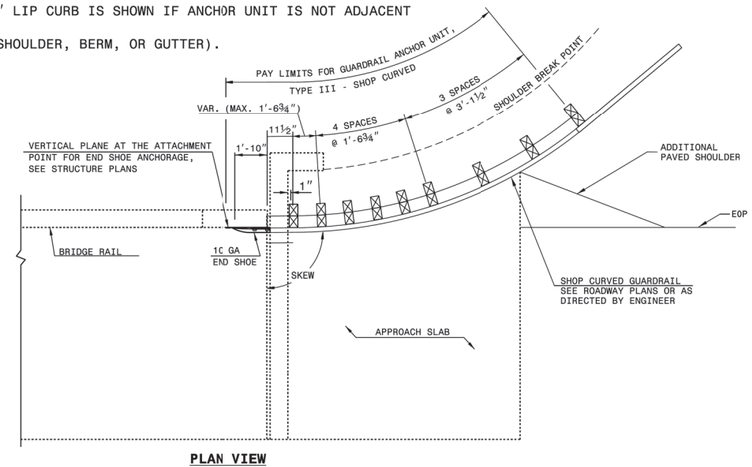
ENGLISH DETAIL DRAWING FOR
TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1
TYPE III SC



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

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

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

SHEET 1 OF 1
TYPE III SC

DOCUMENT NOT CONSIDERED FINAL
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SEAL
022071
RONALD ELTON DAVENPORT, JR.

DocuSigned by:
Ron Davenport
F81B6038A47A442...
7/28/2022

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

SEE PLATE FOR TITLE

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

01-FEB-2018 09:19
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jhowerton AT CSD-292595

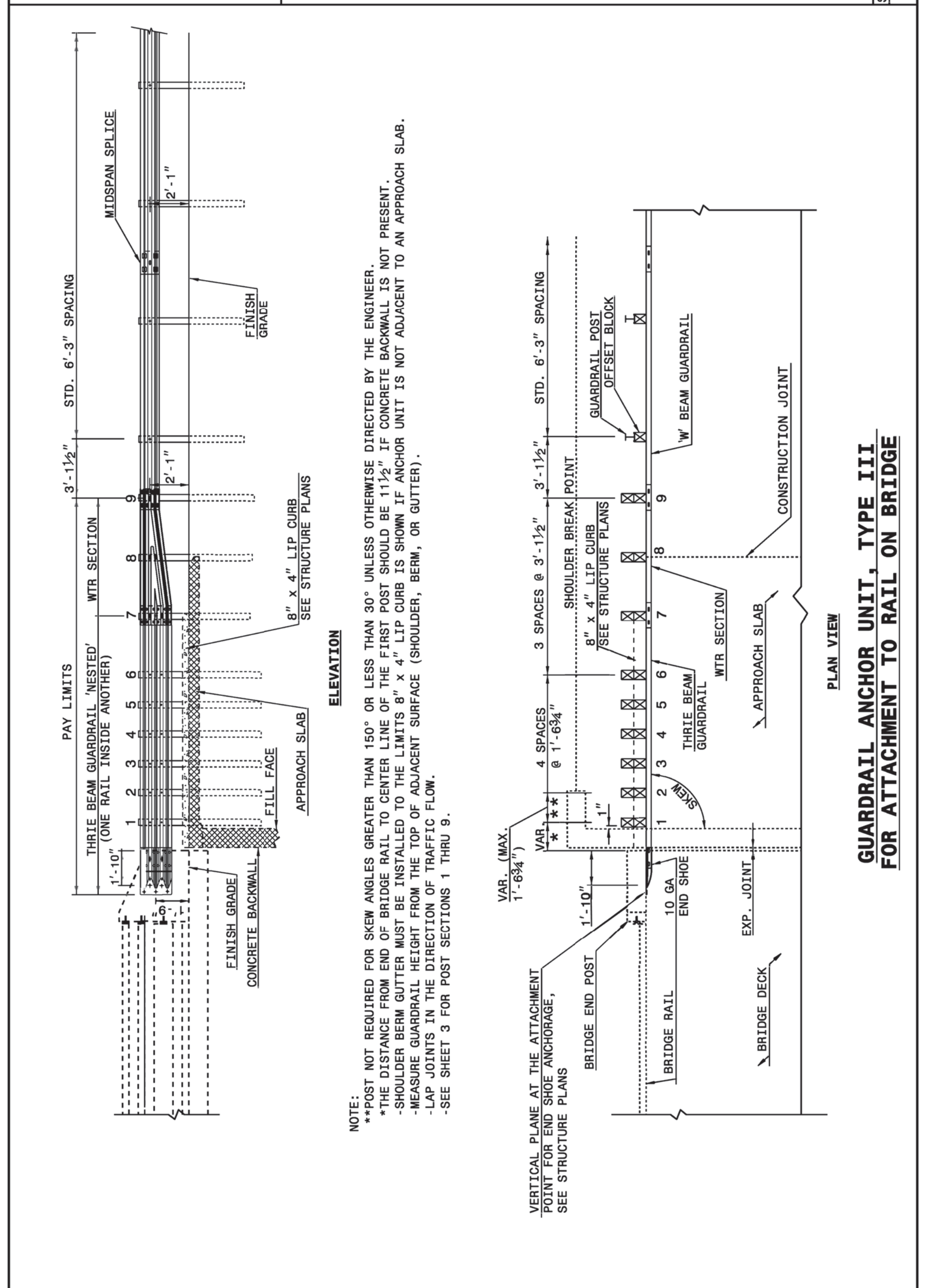
$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

DocuSign Envelope ID: 2859BAE5-8257-4C18-8A49-6CCB9850CE57

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.R176	2C-2

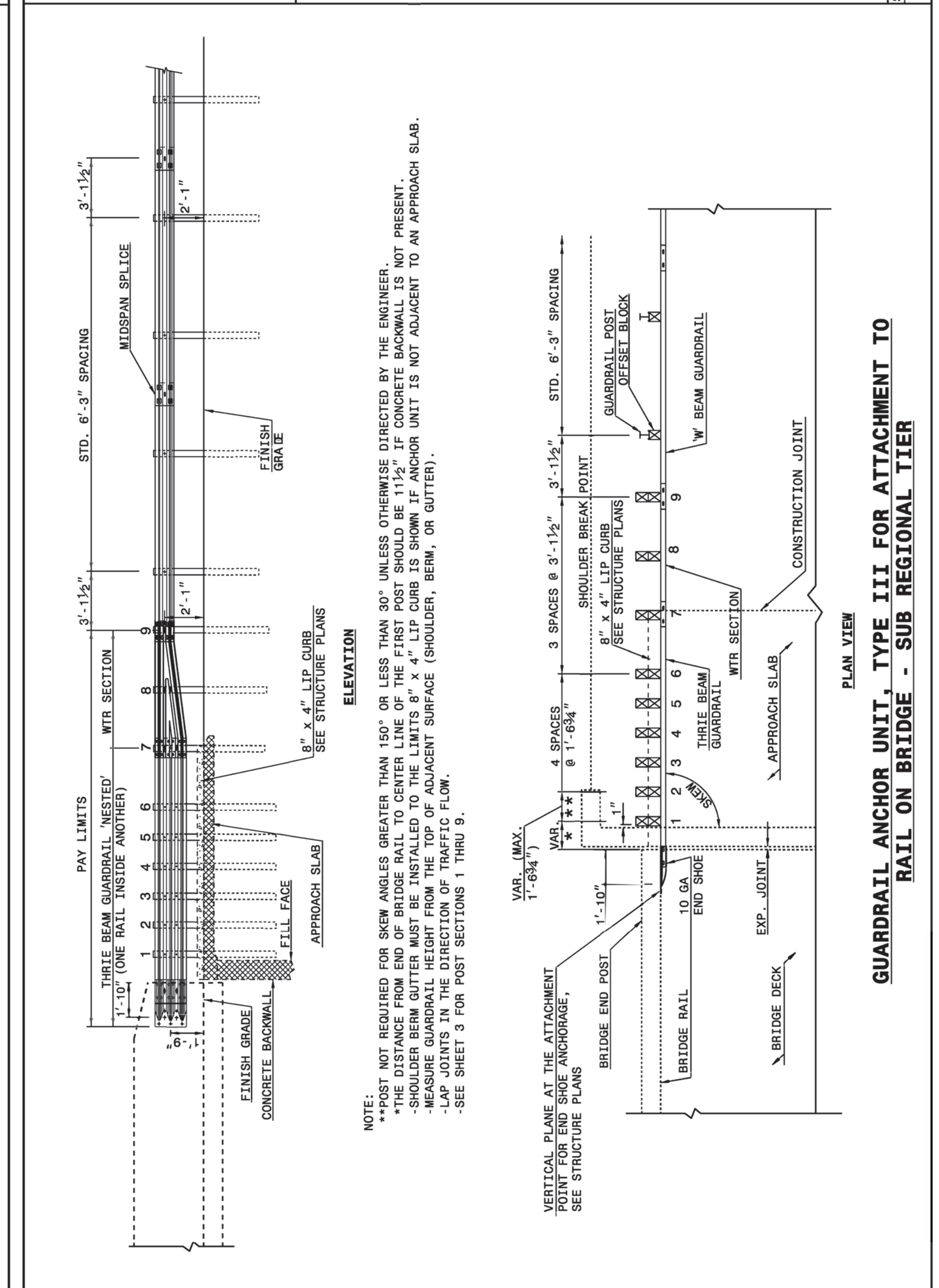
PROJECT REFERENCE NO.	SHEET NO.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE
SHEET 1 OF 7 862D03



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR **STRUCTURE ANCHOR UNITS** GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE	SHEET 1 OF 7 **862D03**

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER
SHEET 2 OF 7 862D03



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR **STRUCTURE ANCHOR UNITS** GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER	SHEET 2 OF 7 **862D03**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

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

14-DEC-2017 10:36 S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2018 Standard Drawings\Details in Lieu of Standards\Division 8\862d03.dgn

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.176	2C-3

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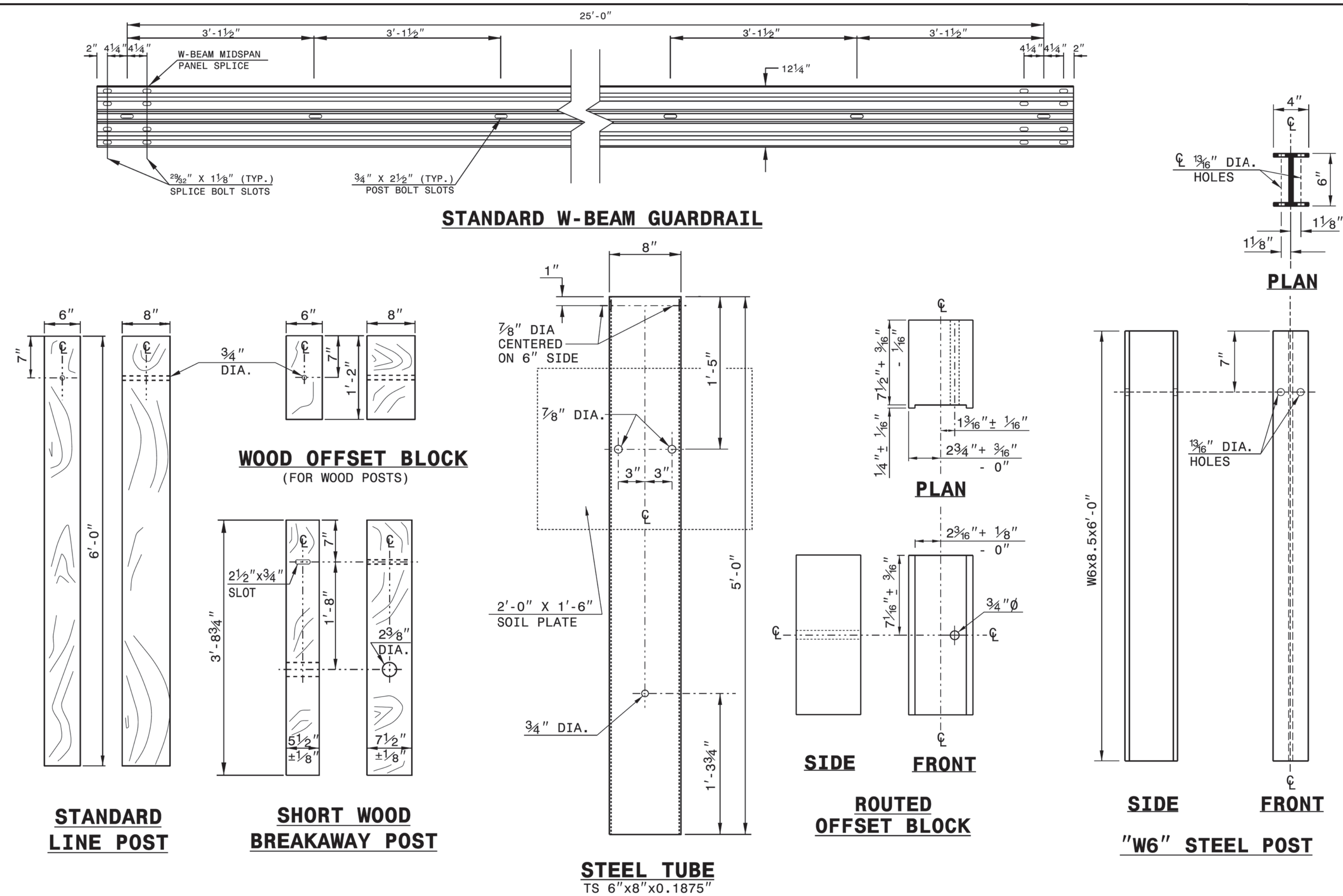
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



SYSTEM PARTS

SHEET 6 OF 8

862D02

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

SEE TITLE BLOCK

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

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER
DocuSigned by: Ron Davenport
7/28/2022

6/2/99

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6/2/99

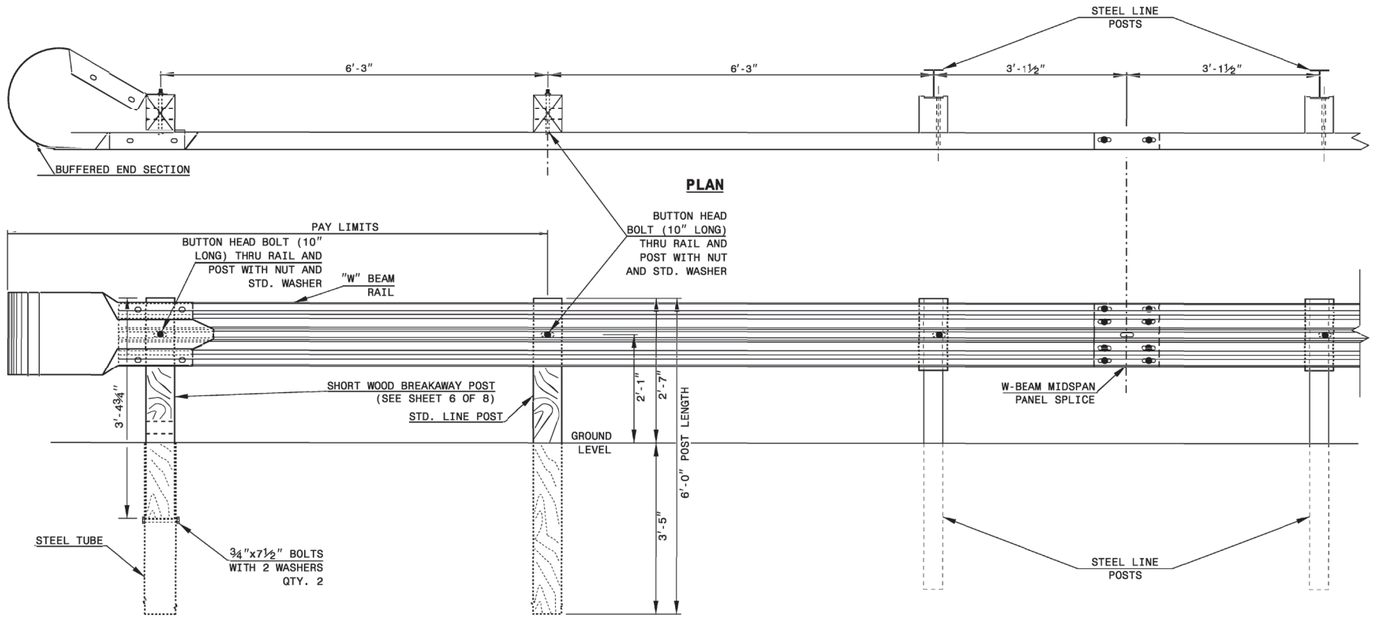
PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.176	2C-4

PROJECT REFERENCE NO.	SHEET NO.

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF



TRAILING END UNIT ASSEMBLY

A.T.-1 SYSTEM

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022071 RONALD EUGENE DAVENPORT

DocuSigned by: Ron Davenport
F81B8036A47A442...

7/28/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

A.T.-1 SYSTEM

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

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7/28/2022

6/21/00

COMPUTED BY: D. O'NEAL DATE: 04-24-19
CHECKED BY: _____ DATE: _____

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.176	3B-1

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV. (CY)	EMBANK. +15% (CY)	BORROW (CY)	WASTE (CY)
12+50.00 -L-	16+39.10 -L-	57	799	742	
17+09.10 -L-	20+25.00 -L-	58	592	534	
10+11.00 -DR1-	10+90.00 -DR1-	0	118	118	
SUBTOTAL 1:		115	1509	1394	0
EARTH TO REPLACE BORROW:					
PROJECT TOTALS		115	1509	1394	0
EST 5% TOPSOIL FOR BORROW PITS				70	
GRAND TOTALS:		115	1509	1463	0
SAY:		120	1510	1470	0

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

CONCRETE PAVEMENT REMOVAL SUMMARY

LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-L-	14+75.76	15+07.00	RT	58.98
			TOTAL:	58.98 SY
			SAY:	60

CONCRETE EXPRESSWAY GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
L	12+75.00	13+80.00	105'
		TOTAL:	105'
		SAY:	105'

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L-	17+21.00	17+31.14	10.1'
		TOTAL:	10.1'
		SAY:	11'

PAVEMENT REMOVAL SUMMARY

LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-L-	12+77.00	16+45.00	LT	251.24
-L-	13+57.14	16+45.00	RT	67.84
-L-	17+02.00	20+12.00	LT	158.97
-L-	17+23.26	19+21.00	RT	60.80
			TOTAL:	538.85 SY
			SAY:	540

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

GUARDRAIL SUMMARY

LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE III	GREU TL-2	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	EA	G	NG				
-L-	15+87.42	16+39.71	LT	75.00'				16+39.71	2'-10"	5'-10"		25'		0'-6"		1	1												
-DR1- /-L-	-DR1- 10+62.79	-L- 16+37.88	-DR1- LT /-L- RT		55.47'				2'-10"	5'-10"						1							1						
-L-	17+08.30	19+60.69	LT	226.70'	43.51'				2'-10"	5'-10"						1							1						
-L-	17+07.86	17+59.98	RT	50.00'					2'-10"	5'-10"		25'		0'-6"		1	1												
			SUBTOTAL	351.70'	98.98'																								
			LESS DEDUCTIONS																										
			GREU TL-2 (2 x 25) =	50'																									
			AT-1 (2 x 6.25) =		12.50'																								
			TYPE III (4 x 18.75) =	56.25'	18.75'																								
			SUBTOTAL	106.25'	31.25'																								
			TOTALS	245.45'	67.73'											4	2						2						
			SAY	250.00'	70.00'		ADDITIONAL GUARDRAIL POSTS = 5									4	2						2						

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17BP.13.R.176_RDY_SUM_3B-1.dgn
8/15/2022

764G2J3

COMPUTED BY: Jonathan T. May DATE: 08/04/2022
CHECKED BY: Vidya Mohandas DATE: 08/04/2022

PROJECT NO.	SHEET NO.
SF-580077	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)

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	C. S. PIPE											R. C. PIPE CLASS IV														
SIZE								12	15	18	24		30			36			12	15	18	24	30	36	42	48	54	60	66	72	78	84	
THICKNESS OR GAUGE								.064	.064	.064	.064		.079			.079																	
L 17+25	14 LT	0401		1217.9																													
		0401	0402		1213.6	1206.8			28																								
L 12+50	16 LT	0403																															
		0403	0404		1235.3	1225.0	1.0														124												
L 13+75	19 LT	0404		1229.5																													
		0404	0405		1225.0	1224.3	1.1														60												
L 19+16	CL	0406			1225.0	1218.3															60												
L 16+12	13 RT																																
L 19+17	CL																																
L 19+40	16 RT																																
SHEET TOTALS									28												244												
PROJECT TOTALS									28												244												

LINE & STATION	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	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	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 PIPE	SPRING BOX STD. 840.41			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
L 17+25	0401		1																								1						1												
	0401	0402																																											
L 12+50	0403																																												
	0403	0404																																											
L 13+75	0404		1																								1						1												
	0404	0405																																											
L 19+16	0406																																												
L 16+12																																												42	Removal of 12" RCP
L 19+17																																												39	Removal of 18" HDPE
L 19+40																																												34	Removal of 15" RCP
SHEET TOTALS			2																								2						2											115	
PROJECT TOTALS			2																								2						2											115	

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

MCDOWELL COUNTY LOW IMPACT BRIDGE

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.RJ76	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
8/3/2022	8/3/2022
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33290 RONYELL A THIGPEN	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043232 VIDYA MOHANDAS
DocuSigned by: Ronyell Thigpen 9C2341A2DB5E447	DocuSigned by: Vidya Mohandas 957C23E6FE3B404...

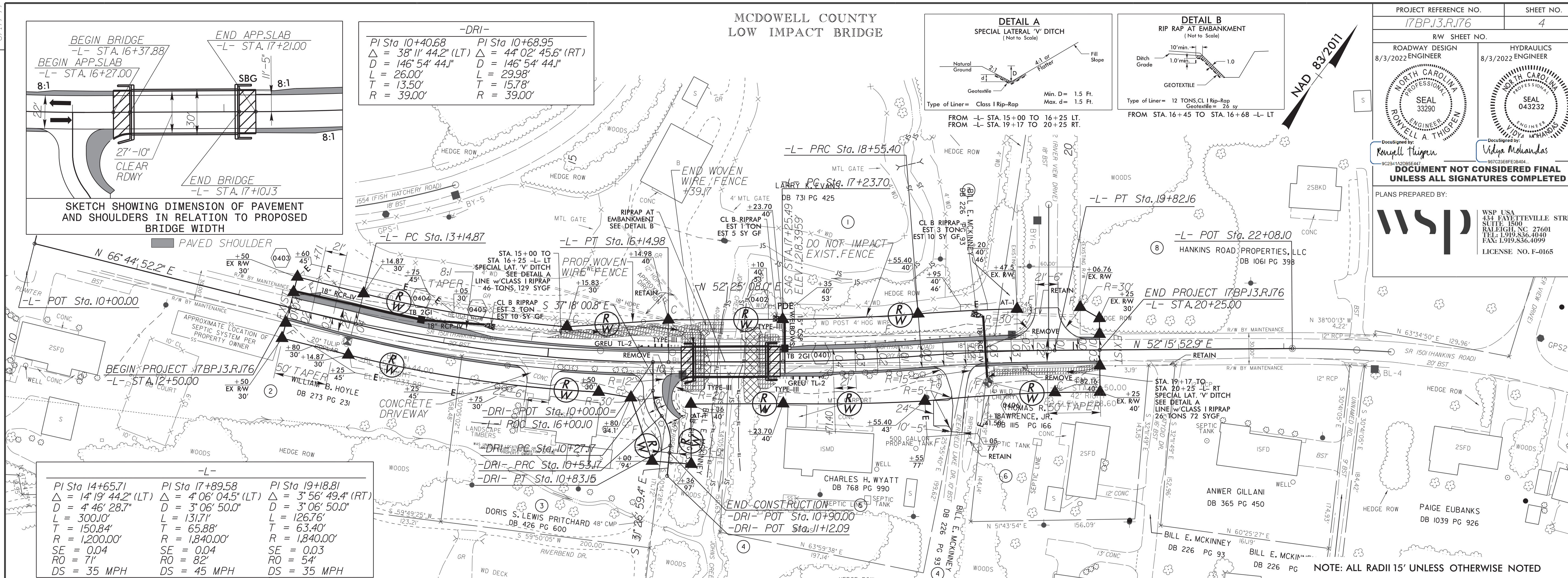
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:

WSP USA
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
FAX: 1.919.836.4099
LICENSE NO. F-0165

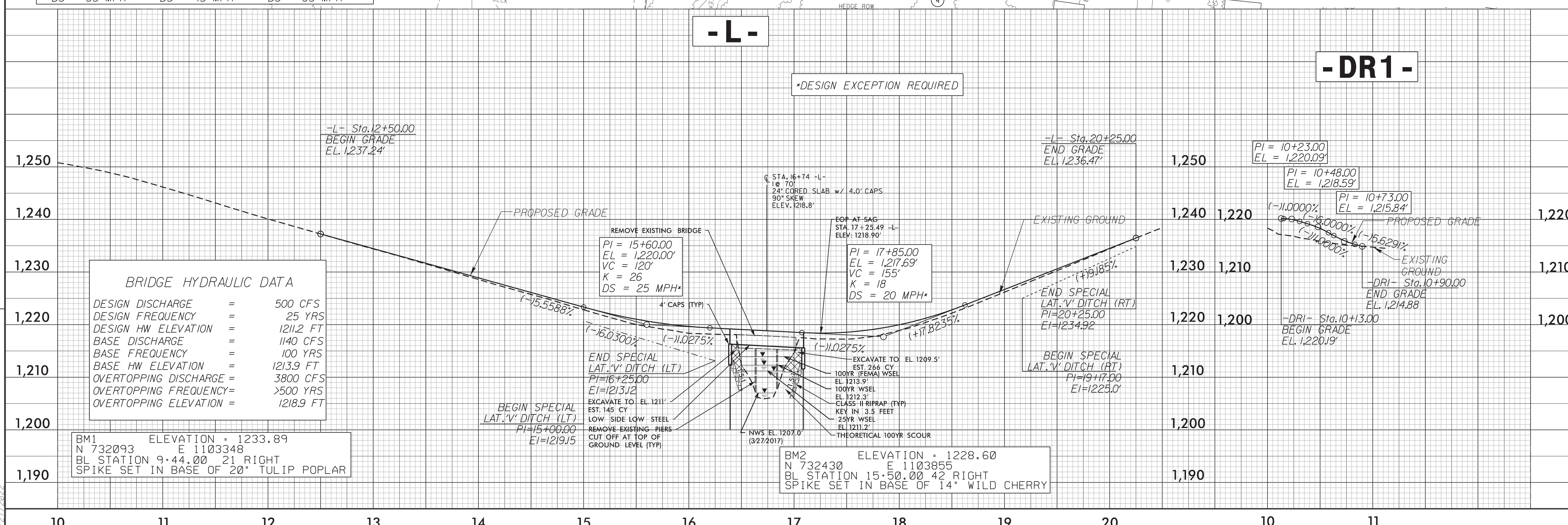
REVISIONS

07/30/2021 PARCEL 3 - CONVERT PROPOSED EASEMENT AROUND RIVER BEND DRIVE TO PROPOSED ROW.
07/30/2021 PARCEL 4 - CONVERT PROPOSED EASEMENT AROUND RIVER BEND DRIVE TO PROPOSED ROW. MOVED ROW MARKER AT STA. +15.40 TO STA. +36.40.
07/30/2021 PARCEL 5 - MOVED ROW MONUMENT FROM +55.40/40 TO +55.40/43. MOVED DRIVEWAY SOUTH ON DEERFIELD LAKE DR. TO AVOID UTILITY POLE.


BEGIN BRIDGE -L- STA. 16+37.88
BEGIN APP.SLAB -L- STA. 16+27.00
END APP.SLAB -L- STA. 17+21.00
SBG
8:1
27'-10" CLEAR RDWY
END BRIDGE -L- STA. 17+10.13
SKETCH SHOWING DIMENSION OF PAVEMENT AND SHOULDERS IN RELATION TO PROPOSED BRIDGE WIDTH
PAVED SHOULDER
DETAIL A
SPECIAL LATERAL 'V' DITCH (Not to Scale)
Type of Liner= Class I Rip-Rap
Min. D= 1.5 Ft. Max. d= 1.5 Ft.
FROM -L- STA. 15+00 TO 16+25 LT.
FROM -L- STA. 19+17 TO 20+25 RT.
DETAIL B
RIP RAP AT EMBANKMENT (Not to Scale)
Type of Liner= 12 TONS,CL I Rip-Rap Geotextile= 26 sy
FROM STA. 16+45 TO STA. 16+68 -L- LT
NAD 83/2011
-L- POT Sta. 10+00.00
-L- PC Sta. 13+14.87
-L- PT Sta. 16+14.98
-L- PRC Sta. 18+55.40
-L- PC Sta. 17+23.70
-L- PT Sta. 19+82.16
-L- POT Sta. 22+08.10
BEGIN PROJECT 17BPJ3.RJ76 -L- STA. 12+50.00
END PROJECT 17BPJ3.RJ76 -L- STA. 20+25.00
N 66° 44' 52.2" E
N 52° 25' 08.0" E
N 52° 15' 52.9" E
S 37° 18' 00.8" E
S 31° 26' 59.4" E
SAG STA. 17+25.49 ELEV. 1218.3959
END WOVEN WIRE FENCE +39.17
PROP. WOVEN WIRE FENCE
DO NOT IMPACT EXIST. FENCE
-DRI- POT Sta. 10+00.00
-L- POT Sta. 16+00.10
-DRI- PC Sta. 10+27.17
-DRI- PRC Sta. 10+53.17
-DRI- PT Sta. 10+83.15
END CONSTRUCTION -DRI- POT Sta. 10+90.00
-DRI- POT Sta. 11+12.09
LARRY K. EVANS DB 731 PG 425
HANKINS ROAD PROPERTIES, LLC DB 1061 PG 398
WILLIAM B. HOYLE DB 273 PG 231
CHARLES H. WYATT DB 768 PG 990
DORIS S. LEWIS PRITCHARD DB 426 PG 600
BILL E. MCKINNEY DB 226 PG 93
ANWER GILLANI DB 365 PG 450
PAIGE EUBANKS DB 1039 PG 926
THOMAS R. LAWRENCE, JR. DB 1115 PG 166
SR 1501 (HANKINS ROAD)
SR 1554 (FISH HATCHERY ROAD)
RIVERBEND DR.
CONCRETE DRIVEWAY
STA. 15+00 TO STA. 16+25 -L- LT SPECIAL LAT. 'V' DITCH SEE DETAIL A LINE w/CLASS I RIPRAP 46 TONS, 129 SYGF
STA. 19+17 TO STA. 20+25 -L- RT SPECIAL LAT. 'V' DITCH SEE DETAIL A LINE w/CLASS I RIPRAP 26 TONS 72 SYGF
RIPRAP AT EMBANKMENT SEE DETAIL B
NOTE: ALL RADII 15' UNLESS OTHERWISE NOTED

-DRI-	
PI Sta 10+40.68	PI Sta 10+68.95
Δ = 38° 11' 44.2" (LT)	Δ = 44° 02' 45.6" (RT)
D = 146° 54' 44.1"	D = 146° 54' 44.1"
L = 26.00'	L = 29.98'
T = 13.50'	T = 15.78'
R = 39.00'	R = 39.00'

-L-		
PI Sta 14+65.71	PI Sta 17+89.58	PI Sta 19+18.81
Δ = 14° 19' 44.2" (LT)	Δ = 4° 06' 04.5" (LT)	Δ = 3° 56' 49.4" (RT)
D = 4° 46' 28.7"	D = 3° 06' 50.0"	D = 3° 06' 50.0"
L = 300.10'	L = 131.71'	L = 126.76'
T = 150.84'	T = 65.88'	T = 63.40'
R = 1,200.00'	R = 1,840.00'	R = 1,840.00'
SE = 0.04	SE = 0.04	SE = 0.03
RO = 71'	RO = 82'	RO = 54'
DS = 35 MPH	DS = 45 MPH	DS = 35 MPH


-L-
-DR1-
*DESIGN EXCEPTION REQUIRED
-L- Sta. 12+50.00 BEGIN GRADE EL. 1,237.24'
-L- Sta. 20+25.00 END GRADE EL. 1,236.47'
PROPOSED GRADE
EXISTING GROUND
PI = 15+60.00 EL = 1,220.00' VC = 120' K = 26 DS = 25 MPH*
PI = 17+85.00 EL = 1,217.69' VC = 155' K = 18 DS = 20 MPH*
(-)5.5588%
(-)6.0300%
(-)1.0275%
(+)7.8235%
(+)9.1857%
END SPECIAL LAT. 'V' DITCH (LT) PI=16+25.00 El=1213.12
BEGIN SPECIAL LAT. 'V' DITCH (LT) PI=15+00.00 El=1219.15
END SPECIAL LAT. 'V' DITCH (RT) PI=20+25.00 El=1234.92
BEGIN SPECIAL LAT. 'V' DITCH (RT) PI=19+17.00 El=1225.0'
℄ STA. 16+74 -L- 1@ 70' 24" CORED SLAB w/ 4.0' CAPS 90° SKEW ELEV. 1218.8'
EOP AT SAG STA. 17+25.49 -L- ELEV: 1218.90'
REMOVE EXISTING BRIDGE
4' CAPS (TYP)
EXCAVATE TO EL. 1211' EST. 145 CY
LOW SIDE LOW STEEL
REMOVE EXISTING PIERS CUT OFF AT TOP OF GROUND LEVEL (TYP)
NWS EL. 1207.0' (3/27/2017)
EXCAVATE TO EL. 1209.5' EST. 266 CY
100YR (FEMA) WSEL EL. 1213.9'
100YR WSEL EL. 1212.3'
CLASS II RIPRAP (TYP) KEY IN 3.5 FEET
25YR WSEL EL. 1211.2'
THEORETICAL 100YR SCOUR
PI = 10+23.00 EL = 1,220.09'
PI = 10+48.00 EL = 1,218.59'
PI = 10+73.00 EL = 1,215.84'
(-)1.0000%
(-)6.0000%
(-)11.0000%
(-)5.6291%
-DRI- Sta. 10+90.00 END GRADE EL. 1,214.88
-DRI- Sta. 10+13.00 BEGIN GRADE EL. 1,220.19'
1,250
1,240
1,230
1,220
1,210
1,200
1,190
10
11
12
13
14
15
16
17
18
19
20

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	500 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	1211.2 FT
BASE DISCHARGE	=	1140 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	1213.9 FT
OVERTOPPING DISCHARGE	=	3800 CFS
OVERTOPPING FREQUENCY	=	>500 YRS
OVERTOPPING ELEVATION	=	1218.9 FT

BM1 ELEVATION = 1233.89
N 732093 E 1103348
BL STATION 9+44.00 21 RIGHT
SPIKE SET IN BASE OF 20" TULIP POPLAR

BM2 ELEVATION = 1228.60
N 732430 E 1103855
BL STATION 15+50.00 42 RIGHT
SPIKE SET IN BASE OF 14" WILD CHERRY

09/08/99

TIP PROJECT: B-5875

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5875	RW01	6

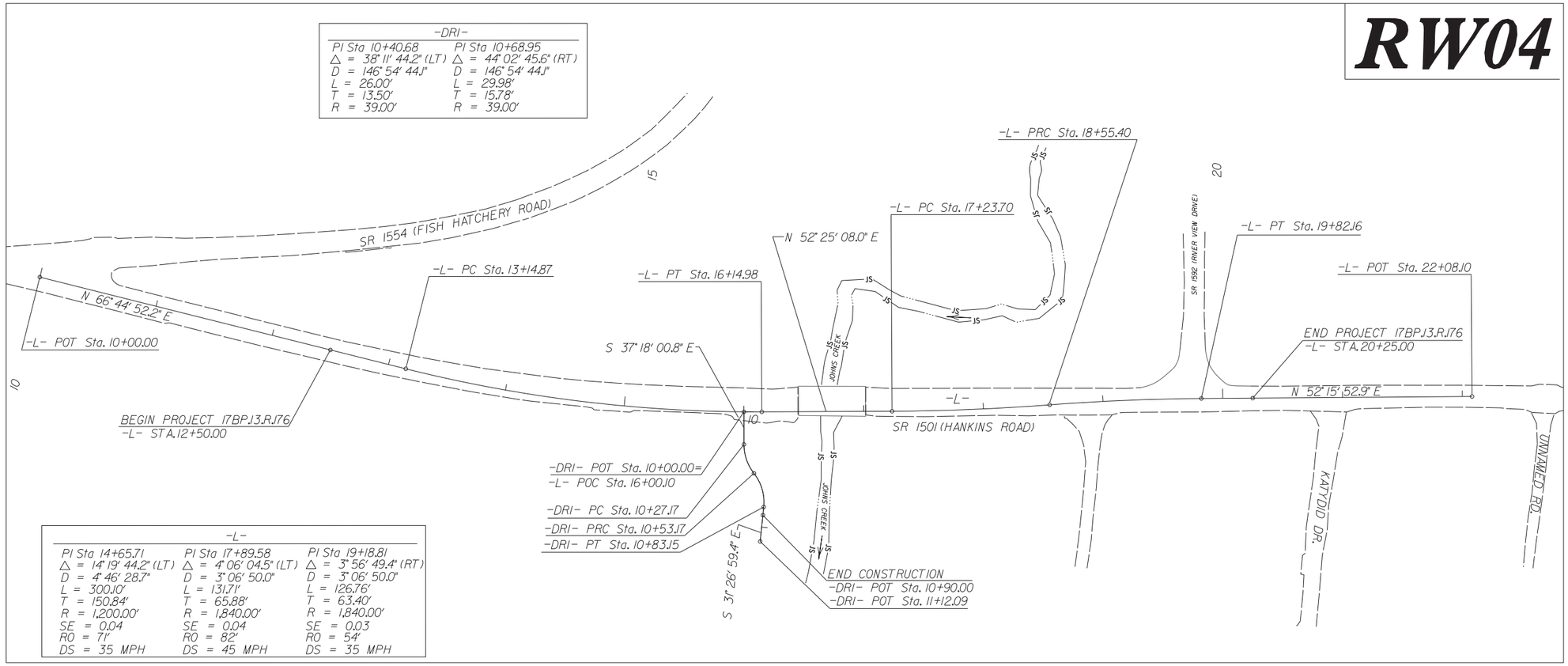
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

MCDOWELL COUNTY

NC GRID
NAD 83 NA 2011

RW04



-L-		
PI Sta 14+65.71	PI Sta 17+89.58	PI Sta 19+18.81
△ = 14° 19' 44.2" (LT)	△ = 4° 06' 04.5" (LT)	△ = 3° 56' 49.4" (RT)
D = 4° 46' 28.7"	D = 3° 06' 50.0"	D = 3° 06' 50.0"
L = 300.10'	L = 131.71'	L = 126.76'
T = 150.84'	T = 65.88'	T = 63.40'
R = 1,200.00'	R = 1,840.00'	R = 1,840.00'
SE = 0.04	SE = 0.04	SE = 0.03
RO = 71'	RO = 82'	RO = 54'
DS = 35 MPH	DS = 45 MPH	DS = 35 MPH

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 "B-5875 GPS1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 732210.4270(ft) EASTING: 1103303.5850(ft) ELEVATION: 1250.26(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985179
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-5875 GPS1" TO -L- STATION 10+00.00 IS S47°54'50"W 335.03(ft)
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:
Mattern & Craig
ENGINEERS·SURVEYORS
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
OCTOBER, 2021	DECEMBER 7, 2022

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5235 LAND SURVEYOR RON L. ZIETLOW

DocuSigned by:
Ron Zietlow
84E55C984005472...
10 /4 /2021
SIGNATURE: *Date:*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

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rzietlow AT MC-ASH-WKS-L52H

PROJECT REFERENCE NO.	SHEET NO.
B5875	RW02C-1

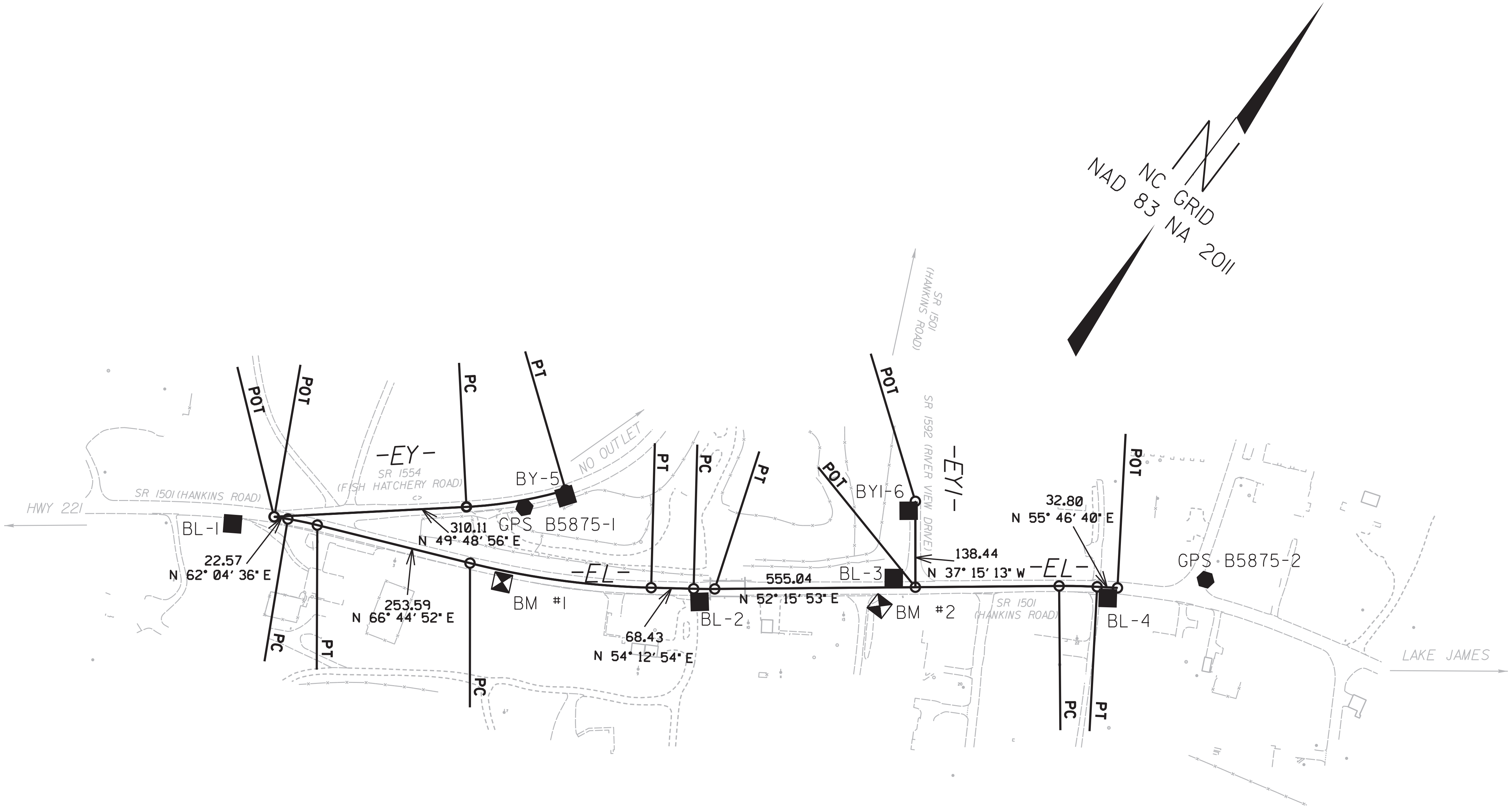
Location and Surveys

MATTERN AND CRAIG
ENGINEERS & SURVEYORS
12 BROAD STREET
ASHEVILLE NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

SURVEY CONTROL SHEET

W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

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.

REVISIONS

6/2/99

13-MAY-2019 15:15
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rizietlow AT SURV_ASH_JBH01

PROJECT REFERENCE NO.	SHEET NO.
B5875	RW02C–2

Location and Surveys

MATTERN AND CRAIG
ENGINEERS & SURVEYORS
12 BROAD STREET
ASHEVILLE NORTH CAROLINA 28801
(828) 254–2201
FAX (828) 254–4562
NC LIC. NO. C–1154

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BL

POINT	DESC.	NORTH	EAST	ELEVATION
1	BL-1	731904.8200	1102944.9190	1253.56
2	BL-2	732260.1940	1103620.2260	1217.24
3	BL-3	732480.1880	1103846.0530	1228.96
4	BL-4	732663.1130	1104140.2080	1254.08

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	731954.357	1102991.259							
LINE			N 62°04'36.1" E	22.57					
PC	731964.928	1103011.204							
CURVE			N 64°24'44.1" E	48.50	04°40'16.1"(RT)	09°37'46.4"	48.51	24.27	595.00
PT	731985.872	1103054.943							
LINE			N 66°44'52.2" E	253.59					
PC	732085.984	1103287.936							
CURVE			N 60°28'53.1" E	294.71	12°31'58.1"(LT)	04°14'38.9"	295.30	148.24	1350.00
PT	732231.189	1103544.390							
LINE			N 54°12'54.1" E	68.43					
PC	732271.204	1103599.903							
CURVE			N 53°14'23.5" E	34.04	01°57'01.2"(LT)	05°43'46.5"	34.04	17.02	1000.00
PT	732291.575	1103627.172							
LINE			N 52°15'52.9" E	555.04					
PC	732631.265	1104066.121							
CURVE			N 54°01'16.4" E	61.31	03°30'47.1"(RT)	05°43'46.5"	61.31	30.67	1000.00
PT	732667.281	1104115.732							
LINE			N 55°46'40.0" E	32.80					
POT	732685.728	1104142.853							

BY

POINT	DESC.	NORTH	EAST	ELEVATION
1	BL-1	731904.8200	1102944.9190	1253.56
5	BY-5	732265.0570	1103345.2900	1250.36

BY1

POINT	DESC.	NORTH	EAST	ELEVATION
6	BY1-6	732580.9630	1103799.5400	1231.54
3	BL-3	732480.1880	1103846.0530	1228.96

EY

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	731954.566	1102991.654							
LINE			N 49°48'55.5" E	310.11					
PC	732154.666	1103228.570							
CURVE			N 43°10'10.7" E	162.02	13°17'29.7"(LT)	08°11'06.4"	162.39	81.56	700.00
PT	732272.835	1103339.420							

BM1 ELEVATION = 1233.89
N 732093 E 1103348
SPIKE SET IN BASE OF 20" TULIP POPLAR

EY1

POINT	N	E	BEARING	DIST
POT	732489.468	1103882.891		
LINE			N 37°15'13.2" W	138.44
POT	732599.662	1103799.087		

BM2 ELEVATION = 1228.60
N 732430 E 1103855
SPIKE SET IN BASE OF 14" WILD CHERRY

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.

REVISIONS

6/2/99

REVISIONS

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-5875	RW02D-1

Location and Surveys

MATTERN AND CRAIG
ENGINEERS & SURVEYORS
12 BROAD STREET
ASHEVILLE NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5235 LAND SURVEYOR RON L. ZIETLOW

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, R. L. Zietlow, 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 4th day of October, 2021.

DocuSigned by:
Ron Zietlow
84E55C984005472...

Professional Land Surveyor L-5235

-L- SR 1501 (HANKINS ROAD)

TYPE	STATION	NORTH	EAST
POT	10+00.00	731985.8724	1103054.9433
PC	13+14.87	732110.1777	1103344.2415
PT	16+14.98	732261.7204	1103602.3679
PC	17+23.70	732328.0264	1103688.5268
PRC	18+55.40	732412.0182	1103789.9410
PT	19+82.16	732492.9847	1103887.4350
POT	22+08.10	732631.2653	1104066.1214

NOTES:

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

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

04-OCT-2021 13:21
rzietlow
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AT MC-ASH-WKS-152H

6/2/99

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-5875	RW03E-1

Location and Surveys

MATTERN AND CRAIG
ENGINEERS & SURVEYORS
12 BROAD STREET
ASHEVILLE NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5235 LAND SURVEYOR RON L. ZIETLOW

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , R. L. Zietlow , 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 5/11/21 to 10/1/21, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 4th day of October, 2021.

DocuSigned by:
Ron Zietlow
84E55C984005472...

Professional Land Surveyor L-5235

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST	
L	12+50.00	15.00	732070.7854	1103290.5590	
L	12+50.00	30.00	732057.0038	1103296.4807	
L	12+50.00	-30.00	732112.1303	1103272.7940	
L	12+50.00	-15.00	732098.3487	1103278.7157	
L	13+14.87	30.00	732082.6144	1103356.0849	
L	13+14.87	-30.00	732137.7410	1103332.3982	
L	15+15.83	-30.00	732229.7657	1103505.1109	
L	15+50.00	30.00	732198.7743	1103566.8088	
L	16+14.98	-40.00	732293.4200	1103577.9726	PK NAIL SET IN ROCK
L	16+15.00	40.00	732230.0341	1103626.7806	
L	17+23.70	-40.00	732359.7261	1103664.1315	
L	17+23.70	40.00	732296.3268	1103712.9222	
L	18+55.32	-40.00	732441.8361	1103763.2768	
L	18+55.40	40.00	732382.1445	1103816.5410	
L	19+47.52	-39.79	732502.5314	1103835.3026	
L	19+82.16	40.00	732461.3509	1103911.9156	
L	20+06.76	-40.70	732540.2275	1103881.9783	NOT SET FALLS IN EXISTING CONCRETE MONUMENT
L	20+25.00	-30.00	732542.9285	1103902.9541	
L	20+25.00	-15.00	732531.0658	1103912.1343	
L	20+25.00	40.00	732487.5692	1103945.7951	
L	20+25.00	15.00	732507.3404	1103930.4947	

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	17+10.00	-53.00	732361.6747	1103645.3480
L	17+10.00	-40.00	732351.3723	1103653.2765
L	17+35.00	-53.00	732376.7499	1103664.8816
L	17+35.00	-40.00	732366.4964	1103672.8732

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 5/11/21 TO 10/1/21 .

PROJECT REFERENCE NO.	SHEET NO.
B-5875	RW04

Location and Surveys

MATTERN AND CRAIG
ENGINEERS & SURVEYORS
12 BROAD STREET
ASHEVILLE NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

PROJECT SURVEYOR

SEAL L-5235 NORTH CAROLINA PROFESSIONAL LAND SURVEYOR RON L. ZIETLOW

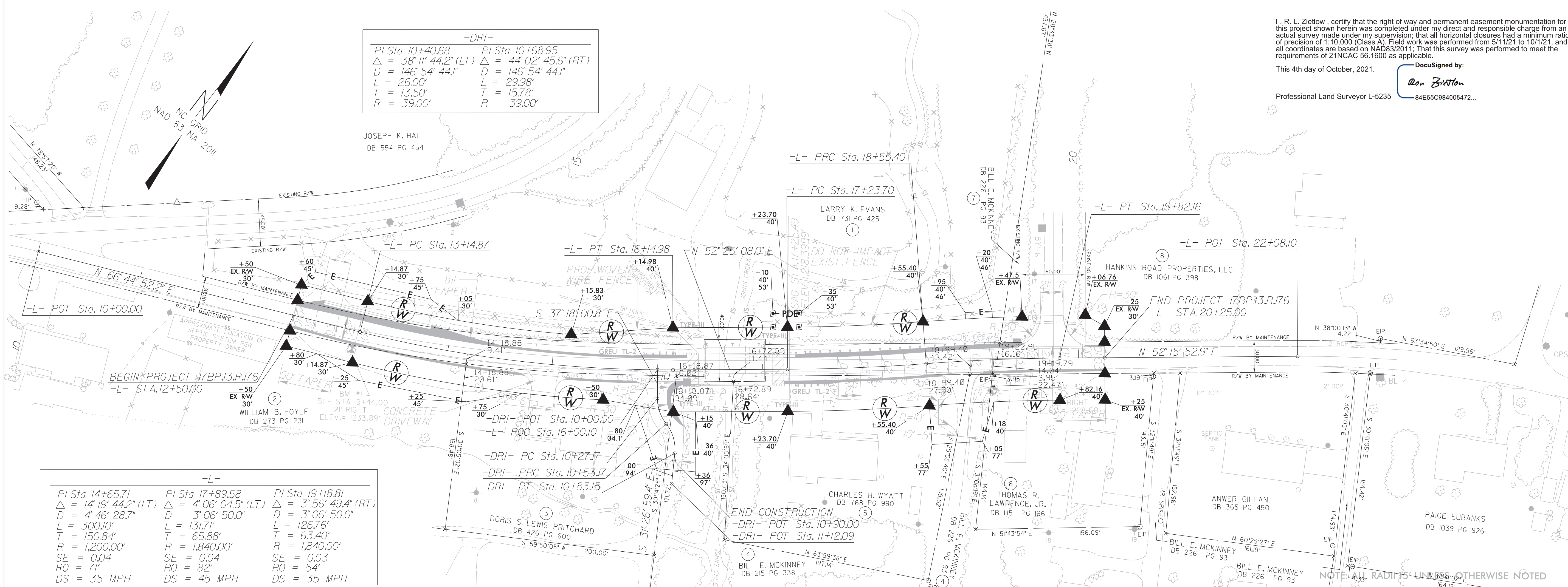
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , R. L. Zietlow , 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 5/11/21 to 10/1/21, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 4th day of October, 2021.

DocuSigned by: Ron Zietlow
84E55C984005472...

Professional Land Surveyor L-5235



-DRI-	
PI Sta 10+40.68	PI Sta 10+68.95
△ = 38° 11' 44.2" (LT)	△ = 44° 02' 45.6" (RT)
D = 146° 54' 44.1"	D = 146° 54' 44.1"
L = 26.00'	L = 29.98'
T = 13.50'	T = 15.78'
R = 39.00'	R = 39.00'

-L-		
PI Sta 14+65.71	PI Sta 17+89.58	PI Sta 19+18.81
△ = 14° 19' 44.2" (LT)	△ = 4° 06' 04.5" (LT)	△ = 3° 56' 49.4" (RT)
D = 4° 46' 28.7"	D = 3° 06' 50.0"	D = 3° 06' 50.0"
L = 300.10'	L = 131.71'	L = 126.76'
T = 150.84'	T = 65.88'	T = 63.40'
R = 1,200.00'	R = 1,840.00'	R = 1,840.00'
SE = 0.04	SE = 0.04	SE = 0.03
RO = 71'	RO = 82'	RO = 54'
DS = 35 MPH	DS = 45 MPH	DS = 35 MPH

REVISIONS

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 5/11/21 TO 10/1/21 .

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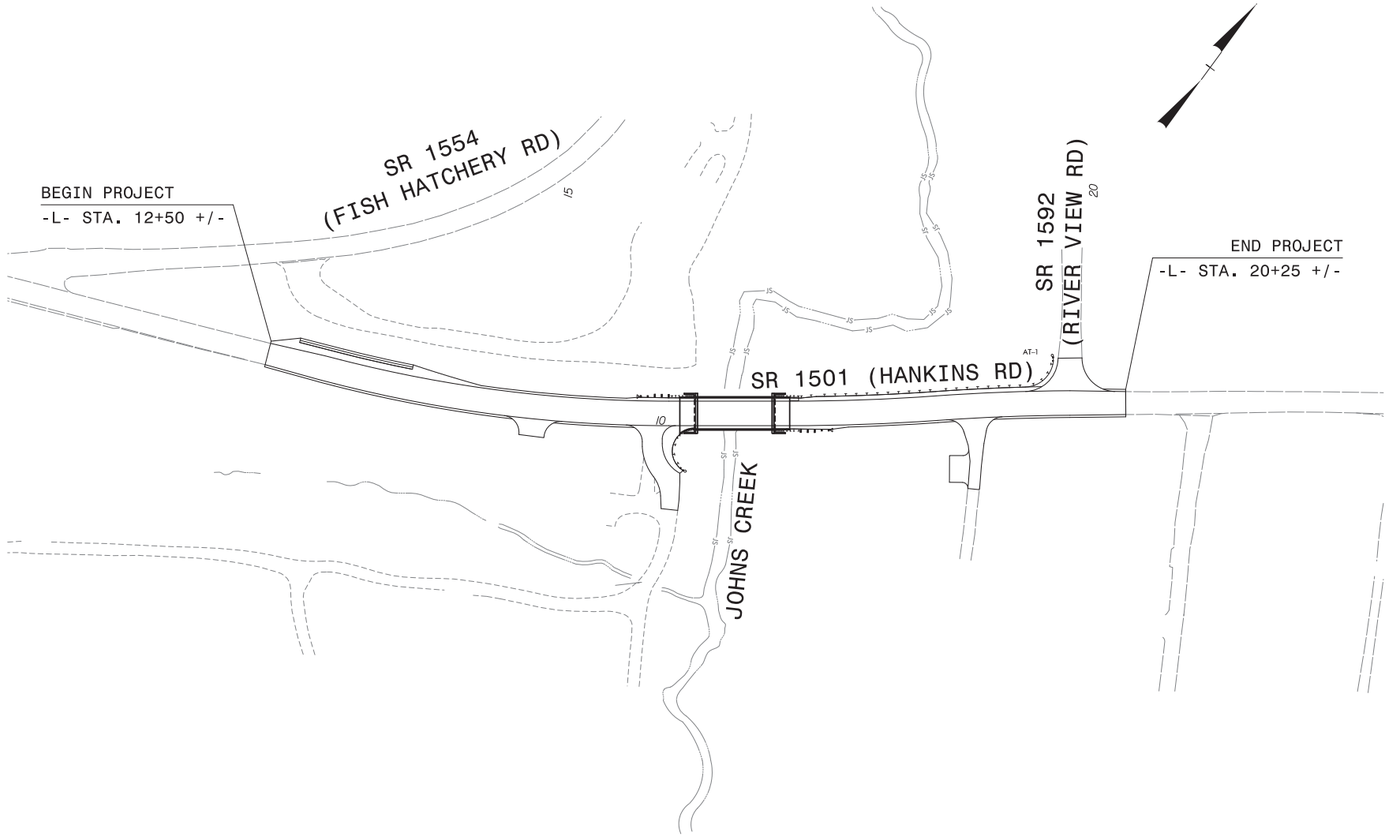
rlzietlow AT MC-ASH-WKS-L52H

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

MCDOWELL COUNTY



INDEX OF SHEETS

SHEET NO.	TITLE
TMP-01	TITLE SHEET, VICINITY MAP AND INDEX OF SHEETS
TMP-02	ROADWAY STANDARD DRAWINGS AND LEGEND
TMP-02A	TEMPORARY SHORING NOTES
TMP-02B	PCB AT SHORING
TMP-03	GENERAL NOTES AND WRITTEN PHASING
TMP-04	TEMPORARY TRAFFIC CONTROL PHASE I
TMP-05	TEMPORARY TRAFFIC CONTROL PHASE II
TMP-06	TEMPORARY TRAFFIC CONTROL PHASE III

SHEET NO.
TMP-01

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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) 814-5000 FAX: (919) 771-2745

_____ *STATE TRAFFIC MANAGEMENT ENGINEER*

_____ *TRAFFIC CONTROL PROJECT ENGINEER*

_____ *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*

_____ *TRAFFIC CONTROL DESIGN ENGINEER*

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

1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC. NO. F-0165

APPROVED: DocuSigned by: Richard Ostynski 8FB7EAA9AF814E4... _____

DATE: 7/27/2022

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037467 ENGINEER RICHARD A OSTYNSKI

PROJECT: 17BP.13.R.176

PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-02

ROADWAY STANDARD DRAWINGS

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

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES - TYPE III
1150.01	FLAGGING DEVICES
1170.01	POSITIVE PROTECTION
1180.01	SKINNY-DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1261.01	GUARDRAIL AND BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPES
1262.01	GUARDRAIL END DELINEATION

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- TEMPORARY PAVEMENT
- TEMPORARY SHORING

TEMPORARY PAVEMENT MARKING

PAINT (4")

P1 WHITE EDGELINE

PAINT (24")

P61 WHITE STOP BAR

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- PORTABLE CONCRETE BARRIER
- 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

APPROVED: DocuSigned by: Richard Odynski 3FB7EAA9AF814E4...

DATE: 7/27/2022

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037467 ENGINEER RICHARD A ODYNSKI

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

wsp

1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203

NC LIC. NO. F-0165

TRANSPORTATION MANAGEMENT PLAN
ROADWAY STANDARD DRAWINGS & LEGEND

7/27/2022
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dohmd

PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-02A

SHORING LOCATION No. 1 and 2

FOR TEMPORARY SHORING AND POSITIVE PROTECTION FOR TEMPORARY SHORING, SEE PLANS AND TEMPORARY SHORING PROVISION.

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

DESIGN TEMPORARY SHORING FROM STATION -L- 16+26, 7.5 FT (LT), TO STATION -L- 16+48, 7.5 FT (LT) AND FROM STATION -L- 16+99, 7.5 FT (LT), TO STATION -L- 17+22, 7.5 FT (LT), FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

UNIT WEIGHT (γ) = 115 PCF
FRICTION ANGLE (Φ) = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 1,207 FT

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM STATION -L- 16+26, 7.5 FT (LT), TO STATION -L- 16+48, 7.5 FT (LT) AND FROM STATION -L- 16+99, 7.5 FT (LT), TO STATION -L- 17+22, 7.5 FT (LT). THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING FOR TEMPORARY SHORING FROM STATION -L- 16+26, 7.5 FT (LT), TO STATION -L- 16+48, 7.5 FT (LT) AND FROM STATION -L- 16+99, 7.5 FT (LT), TO STATION -L- 17+22, 7.5 FT (LT). SEE GEOTECHNICAL STANDARD DETAIL NO. 1801.01 FOR STANDARD TEMPORARY SHORING.

IT MAY BE PREFERRED TO USE A TEMPORARY SOIL NAIL WALL FOR TEMPORARY SHORING FROM STATION -L- 16+26, 7.5 FT (LT), TO STATION -L- 16+48, 7.5 FT (LT) AND FROM STATION -L- 16+99, 7.5 FT (LT), TO STATION -L- 17+22, 7.5 FT (LT). FOR TEMPORARY SOIL NAIL WALLS, SEE TEMPORARY SOIL NAIL WALLS PROVISION.

SHORING LOCATION No. 3 and 4

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

DESIGN TEMPORARY SHORING FROM STATION 16+24.9, 4 ft (LT), TO STATION 16+37.9, 4 FT (LT) AND FROM STATION 17+10.1, 4 ft (LT), TO STATION 17+23.1, 4 FT (LT), FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

UNIT WEIGHT (γ) = 115 PCF
FRICTION ANGLE (Φ) = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 1,207 FT

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM STATION 16+24.9, 4 ft (LT), TO STATION 16+37.9, 4 FT (LT) AND FROM STATION 17+10.1, 4 ft (LT), TO STATION 17+23.1, 4 FT (LT). THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

AT THE CONTRACTOR'S OPTION, USE A STANDARD TEMPORARY WALL FOR TEMPORARY SHORING FROM STATION 16+24.9, 4 ft (LT), TO STATION 16+37.9, 4 FT (LT) AND FROM STATION 17+10.1, 4 ft (LT), TO STATION 17+23.1, 4 FT (LT). SEE GEOTECHNICAL STANDARD DETAIL NO. 1801.02 FOR STANDARD TEMPORARY WALLS.

WHEN BACKFILL FOR RETAINING WALLS AND BRIDGE APPROACH FILLS OVERLAPS WITH THE REINFORCED ZONE OF TEMPORARY WALLS, USE SHORING BACKFILL OR BACKFILL MATERIAL REQUIRED FOR RETAINING WALLS AND BRIDGE APPROACH FILLS, WHICHEVER IS BETTER, IN THE REINFORCED ZONE OF TEMPORARY WALLS.

APPROVED: DocuSigned by: Richard Odynski 8FB7EAA9AF814E4...

DATE: 7/27/2022

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037467 ENGINEER RICHARD A ODYNSKI

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC. NO. F-0165

TRANSPORTATION MANAGEMENT PLAN
TEMPORARY SHORING NOTES

7/27/2022
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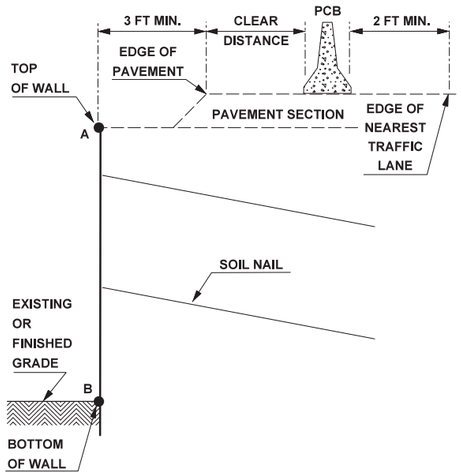
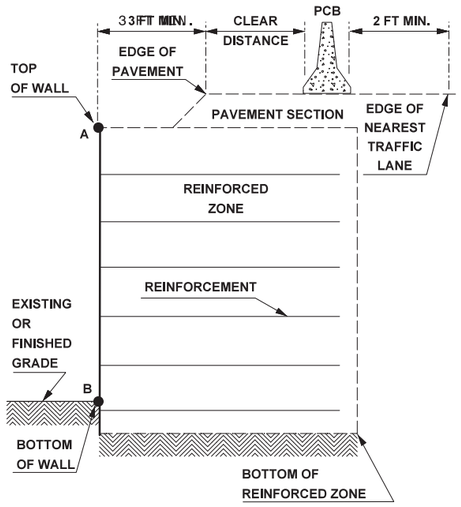
dohmd

PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-02B

TEMPORARY SOIL NAIL WALL



TEMPORARY MSE WALL



NOTE: WALL OR SHORING HEIGHT = A-B

TEMPORARY SHORING

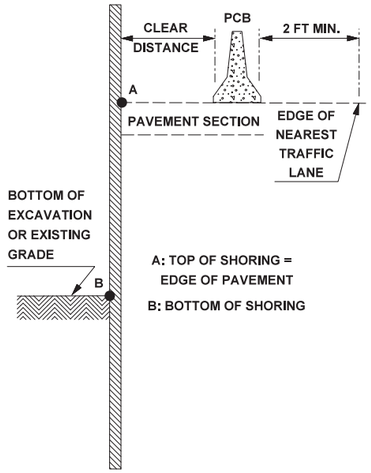


FIGURE A

NOTES

1- REFER TO THE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING LOCATIONS AND NOTES.

2- REFER TO THE "TEMPORARY SHORING" STANDARD PROVISION FOR INFORMATION ABOUT TEMPORARY SHORING AND PORTABLE CONCRETE BARRIER (PCB).

3- PCB IS REQUIRED IF TEMPORARY SHORING/WALL IS LOCATED WITHIN THE CLEAR ZONE IN ACCORDANCE WITH THE AASHTO ROADSIDE DESIGN GUIDE. DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE. (CONTACT NCDOT PAVEMENT MANAGEMENT FOR APPLICABLE PAVEMENT DESIGN).

4- BASED ON THE CLEAR DISTANCE, OFFSET, DESIGN SPEED AND PAVEMENT TYPE, CHOOSE AN UNANCHORED OR ANCHORED PCB FROM THE TABLE SHOWN IN FIGURE B. CLEAR DISTANCE IS DEFINED AS SHOWN IN FIGURE A AND OFFSET IS DEFINED AS SHOWN IN FIGURE B.

5- AT THE CONTRACTOR'S OPTION OR IF THE MINIMUM REQUIRED CLEAR DISTANCE IS NOT AVAILABLE, SET PCB NEXT TO AND UP AGAINST THE TRAFFIC SIDE OF THE TEMPORARY SHORING/WALLS EXCEPT FOR BARRIER ABOVE TEMPORARY WALLS. PCB WITH THE MINIMUM REQUIRED CLEAR DISTANCE IS REQUIRED ABOVE TEMPORARY WALLS.

6- USE NCDOT PORTABLE CONCRETE BARRIER (PCB) IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1170.01 AND SECTION 1170 OF THE STANDARD SPECIFICATIONS.

7- SET PCB WITH A MINIMUM HORIZONTAL DISTANCE OF 2 FT BETWEEN THE FRONT FACE OF THE BARRIER AND THE EDGE OF THE NEAREST TRAFFIC LANE AS SHOWN IN FIGURE A UNLESS OTHERWISE SHOWN IN THE PLANS OR APPROVED BY THE ENGINEER.

8- FOR PCB ABOVE AND BEHIND TEMPORARY WALLS, PROVIDE A MINIMUM DISTANCE OF 3 FT BETWEEN THE EDGE OF PAVEMENT AND THE WALL FACE AS SHOWN IN FIGURE A. IF THIS MINIMUM REQUIRED DISTANCE IS NOT AVAILABLE, CONTACT THE ENGINEER.

9- TABLE SHOWN IN FIGURE B IS BASED ON NCDOT RESEARCH PROJECT NO. 2005-010 WITH VEHICLE TYPE USED FOR NCHRP 350 CRASH TESTS.

MINIMUM REQUIRED CLEAR DISTANCE, inches

Barrier Type	Pavement Type	Offset * ft	Design Speed, mph					
			<30	31-40	41-50	51-60	61-70	71-80
Unanchored PCB	Asphalt	<8	24	26	29	32	36	40
		8-14	26	28	31	35	38	42
		14-20	27	29	34	36	39	43
		20-26	28	31	35	38	40	44
		26-32	29	32	36	39	42	45
		32-38	30	34	38	41	43	46
		38-44	31	34	41	43	45	48
		44-50	31	35	41	43	46	49
		50-56	32	36	42	44	47	50
		>56	32	36	42	45	47	51
	Concrete	<8	17	18	21	22	25	26
		8-14	19	20	23	25	26	29
		14-20	22	22	24	26	28	31
		20-26	23	24	26	27	30	34
		26-32	24	25	27	28	32	35
		32-38	24	26	27	30	33	36
		38-44	25	26	28	30	34	37
		44-50	26	26	28	32	35	37
		50-56	26	26	28	32	35	38
		>56	26	27	29	32	36	38
Anchored PCB	Asphalt	All Offsets	24 for All Design Speeds					
Anchored PCB	Concrete (including bridge approach slabs)	All Offsets	12 for All Design Speeds					

* See Figure Below

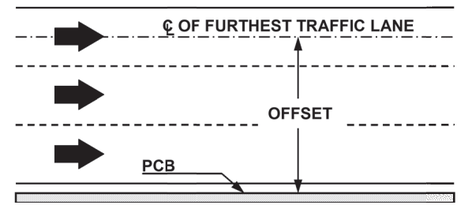


FIGURE B

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TRANSPORTATION MANAGEMENT PLAN
PCB AT SHORING

7/27/2022
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PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-03

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.

LANE AND SHOULDER CLOSURE REQUIREMENTS

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

B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

C) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

E) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

F) CONTRACTOR SHALL PROVIDE ACCESS TO ALL RESIDENCES AT ALL TIMES. COORDINATE WITH PROPERTY OWNERS DURING CONSTRUCTION ACTIVITIES IMPACTING DRIVEWAYS.

PAVEMENT EDGE DROP OFF REQUIREMENTS

G) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

H) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

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

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

TRAFFIC BARRIER

L) INSTALL TEMPORARY BARRIER ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS A MAXIMUM OF TWO (2) WEEKS PRIOR TO BEGINNING WORK IN ANY LOCATION. ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION PROCEED IN A CONTINUOUS MANNER TO COMPLETE THE PROPOSED WORK IN THAT LOCATION UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS OR AS DIRECTED BY THE ENGINEER.

DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE.

ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION AND NO WORK IS PERFORMED BEHIND THE TEMPORARY BARRIER FOR A PERIOD LONGER THAN TWO (2) MONTHS, REMOVE / RESET TEMPORARY BARRIER AT NO COST TO THE DEPARTMENT UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS, TEMPORARY BARRIER IS PROTECTING A HAZARD, OR AS DIRECTED BY THE ENGINEER.

INSTALL TEMPORARY BARRIER WITH THE TRAFFIC FLOW BEGINNING WITH THE UPSTREAM SIDE OF TRAFFIC. REMOVE TEMPORARY BARRIER AGAINST THE TRAFFIC FLOW BEGINNING WITH THE DOWNSTREAM SIDE OF TRAFFIC.

INSTALL AND SPACE DRUMS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (MPH) TO CLOSE OR KEEP THE SECTION OF THE ROADWAY CLOSED UNTIL THE TEMPORARY BARRIER CAN BE PLACED OR AFTER THE TEMPORARY BARRIER IS REMOVED.

M) PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER AT ALL TIMES DURING THE INSTALLATION AND REMOVAL OF THE BARRIER BY EITHER A TRUCK MOUNTED ATTENUATOR (MAXIMUM 72 HOURS) OR A TEMPORARY CRASH CUSHION.

PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER FROM ONCOMING TRAFFIC AT ALL TIMES BY A TEMPORARY CRASH CUSHION UNLESS THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER IS OFFSET FROM ONCOMING TRAFFIC AS FOLLOWS OR AS SHOWN IN THE PLANS: (SEE ALSO 1101.05)

POSTED SPEED LIMIT	MINIMUM OFFSET
40 OR LESS	15 FT
45 - 50	20 FT
55	25 FT
60 MPH or HIGHER	30 FT

PAVEMENT MARKINGS AND MARKERS

N) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	PAINT	NONE

O) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

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

Q) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

PHASING NOTES

PHASE I (TMP-04)

STEP 1: INSTALL WORK ZONE ADVANCE WARNING SIGNS ON ALL ROADS ACCORDING TO ROADWAY STANDARD DRAWING NO. 1101.01 WHERE WORK WILL BE OCCURRING NO MORE THAN THREE DAYS PRIOR TO BEGINNING CONSTRUCTION.

STEP 2: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AS NEEDED, CONSTRUCT TEMPORARY PAVEMENT FOR PHASE II SHIFT.

PHASE II (TMP-05)

NOTE: PORTABLE SIGNAL SYSTEMS AND DEVICES WILL NEED TO BE ACTIVE FOR 24 HOURS FOR THE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR DESIGN, MAINTENANCE, AND OPERATION OF ALL EQUIPMENT.

STEP 1: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AS NEEDED, INSTALL TEMPORARY MARKINGS, BARRIER, GUARDRAIL, AND TEMPORARY SHORING.
SHIFT TRAFFIC AND ACTIVATE PORTABLE TRAFFIC SIGNAL SYSTEM.

STEP 2: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AS NEEDED, CONSTRUCT ROADWAY AND BRIDGE IMPROVEMENTS ALONG -L- RT.

PHASE III (TMP-06)

STEP 1: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AND FLAGGERS AS NEEDED, INSTALL TEMPORARY MARKINGS AND BARRIER.

STEP 2: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AS NEEDED, CONSTRUCT ROADWAY AND BRIDGE IMPROVEMENTS ALONG -L- LT.

STEP 3: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, INSTALL FINAL OVERLAY AND PAVEMENT MARKINGS.

STEP 4: REMOVE LANE CLOSURE DEVICES AND SIGNS AFTER CONSTRUCTION IS COMPLETE.

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TRANSPORTATION MANAGEMENT PLAN GENERAL NOTES AND WRITTEN PHASING

7/27/2022
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PROJ. REFERENCE NO.	SHEET NO.
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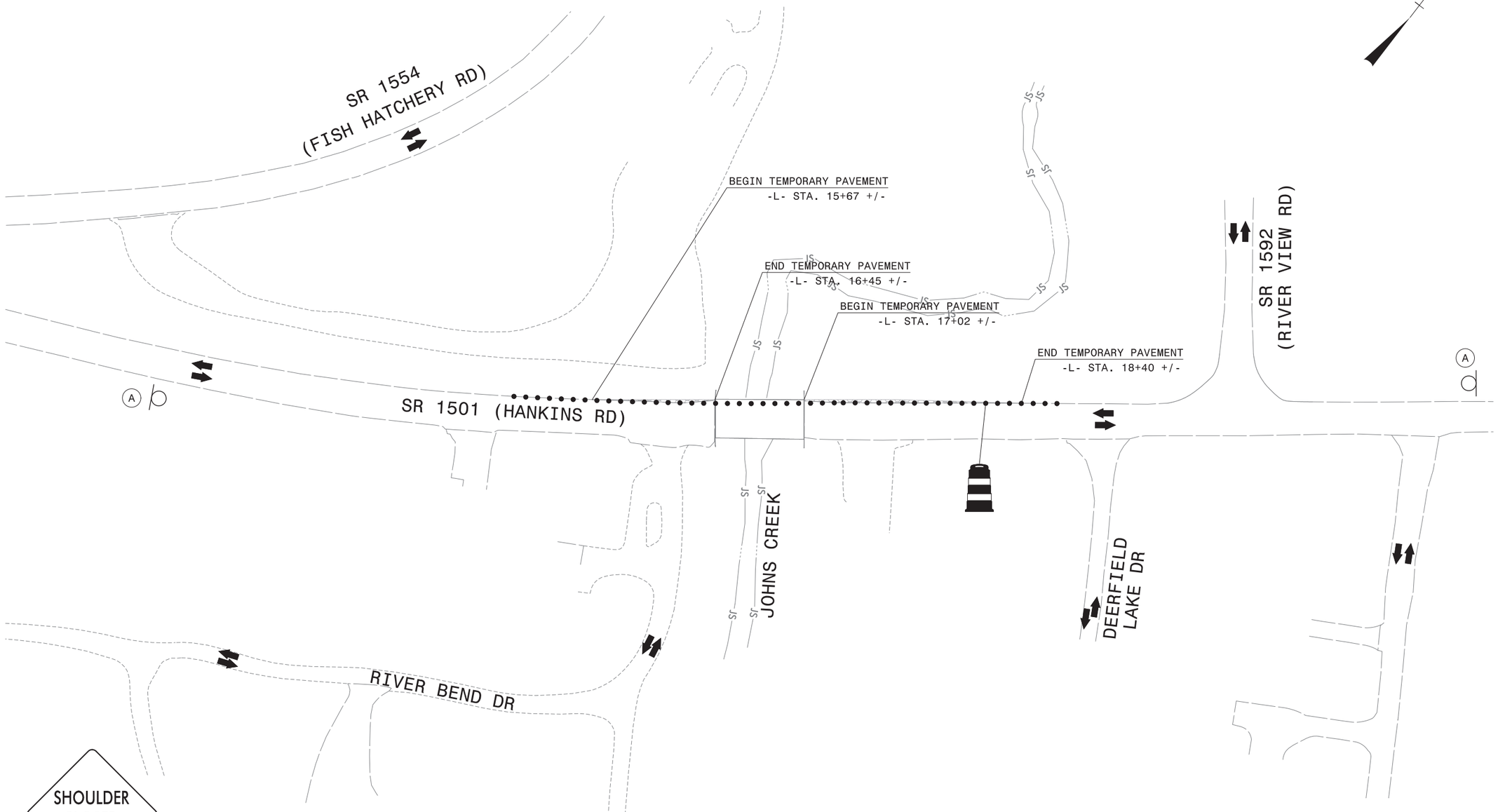

SHOULDER CLOSED AHEAD
SP-140
48'' X 48''
(A)
+/- 350' BEFORE SHOULDER CLOSURE

NOTE: TEMPORARY PAVEMENT DESIGN SHALL MATCH THE PROPOSED PAVEMENT DESIGN. SEE ROADWAY PLANS.

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TRANSPORTATION MANAGEMENT PLAN
TEMPORARY TRAFFIC CONTROL
PHASE I

8/24/2022
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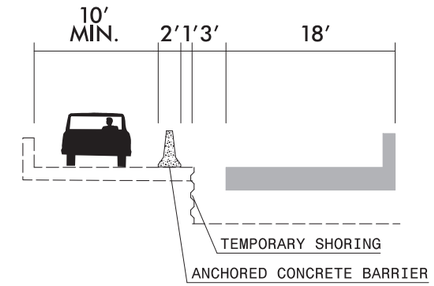
PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-05



SR 1554
(FISH HATCHERY RD)

15

-L- STA. 12+83 +/-

BEGIN (P1)
-L- STA. 13+12 +/-

P61

30′

P1

SR 1501 (HANKINS RD)

8:1 BARRIER FLARE RATE

BEGIN ANCHORED CONCRETE BARRIER
END PORTABLE CONCRETE BARRIER
-L- STA. 16+27 +/-

END ANCHORED CONCRETE BARRIER
BEGIN PORTABLE CONCRETE BARRIER
-L- STA. 17+27 +/-

END PORTABLE CONCRETE BARRIER
CRASH CUSHION
-L- STA. 17+87 +/-

END (P1)
-L- STA. 18+77 +/-

20

SR 1592
(RIVER VIEW RD)

USE NCDOT RSD 1101.02
SHEET 14 OF 14 FOR SIGNS
AND DETAILS FOR PORTABLE
SIGNAL SYSTEM

30′

10

USE NCDOT RSD 1101.02
SHEET 14 OF 14 FOR SIGNS
AND DETAILS FOR PORTABLE
SIGNAL SYSTEM

BEGIN PORTABLE CONCRETE BARRIER
CRASH CUSHION
-L- STA. 15+45 +/-

BEGIN CONSTRUCTION
-L- STA. 12+50 +/-

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

RIVER BEND DR

JOHNS CREEK

8:1 BARRIER FLARE RATE

02 QUANTITY = 112 SQ FT

TEMPORARY SHORING
FROM STA. 16+99, 7.5′ LT ±
TO STA. 17+22, 7.5′ LT ±

01 QUANTITY = 98 SQ FT

TEMPORARY SHORING
FROM STA. 16+26, 7.5′ LT ±
TO STA. 16+48, 7.5′ LT ±

DEERFIELD
LAKE DR

-L- STA. 19+18 +/-

END CONSTRUCTION
-L- STA. 20+25 +/-

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TRANSPORTATION MANAGEMENT PLAN TEMPORARY TRAFFIC CONTROL PHASE II

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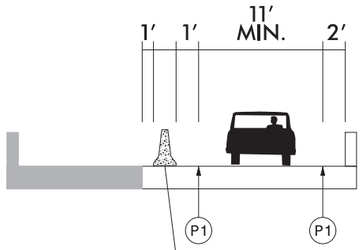
PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	TMP-06



SR 1554 (FISH HATCHERY RD)

15

03 QUANTITY = 52 SQ FT

TEMPORARY SHORING
FROM STA. 16+24.9, 4.0′ LT ±
TO STA. 16+37.9, 4.0′ LT ±

BEGIN CONSTRUCTION
-L- STA. 12+50 +/-

END CONSTRUCTION
-L- STA. 14+19 +/-

BEGIN CONSTRUCTION
-L- STA. 16+25 +/-

SR 1501 (HANKINS RD)

10

P1

PORT

USE NCDOT RSD 1101.02
SHEET 14 OF 14 FOR SIGNS
AND DETAILS FOR PORTABLE
SIGNAL SYSTEM

BEGIN PORTABLE CONCRETE BARRIER
CRASH CUSHION
-L- STA. 15+65 +/-

8:1 BARRIER FLARE RATE

END PORTABLE CONCRETE BARRIER
BEGIN ANCHORED CONCRETE BARRIER
-L- STA. 16+25 +/-

JOHNS CREEK

RIVER BEND DR

USE NCDOT RSD 1101.02
SHEET 14 OF 14 FOR SIGNS
AND DETAILS FOR PORTABLE
SIGNAL SYSTEM

20

04 QUANTITY = 52 SQ FT

TEMPORARY SHORING
FROM STA. 17+10.1, 4.0′ LT ±
TO STA. 17+23.1, 4.0′ LT ±

END CONSTRUCTION
-L- STA. 17+23 +/-

BEGIN CONSTRUCTION
-L- STA. 18+41 +/-

AT-1

SR 1592 (RIVER VIEW RD)

END CONSTRUCTION
-L- STA. 20+25 +/-

DEERFIELD LAKE DR

END PORTABLE CONCRETE BARRIER
CRASH CUSHION
-L- STA. 18+04 +/-

8:1 BARRIER FLARE RATE

END ANCHORED CONCRETE BARRIER
BEGIN PORTABLE CONCRETE BARRIER
-L- STA. 17+24 +/-

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TRANSPORTATION MANAGEMENT PLAN TEMPORARY TRAFFIC CONTROL PHASE III

7/27/2022
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PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	PMP-01

PAVEMENT MARKING SCHEDULE

P61 WHITE STOPBAR (24″, 2 COATS)
P5 2 FT.-6 FT./SP WHITE MINISKIP (4″, 2 COATS)
P1 PAINT WHITE EDGELINE (4″, 2 COATS)
P13 PAINT YELLOW DOUBLE CENTER LINE (4″, 2 COATS)

ROADWAY STANDARD DRAWINGS

1205.01 PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02 PAVEMENT MARKINGS - DIVIDED AND UNDIVIDED ROADWAYS
1205.04 PAVEMENT MARKINGS - INTERSECTIONS
1205.12 PAVEMENT MARKINGS - BRIDGES
1261.01 GUARDRAIL AND BARRIER DELINEATOR SPACING
1261.02 GUARDRAIL AND BARRIER DELINEATOR TYPES
1262.01 GUARDRAIL END DELINEATION
1264.01 OBJECT MARKERS
1264.02 PLACEMENT OF OBJECT MARKERS

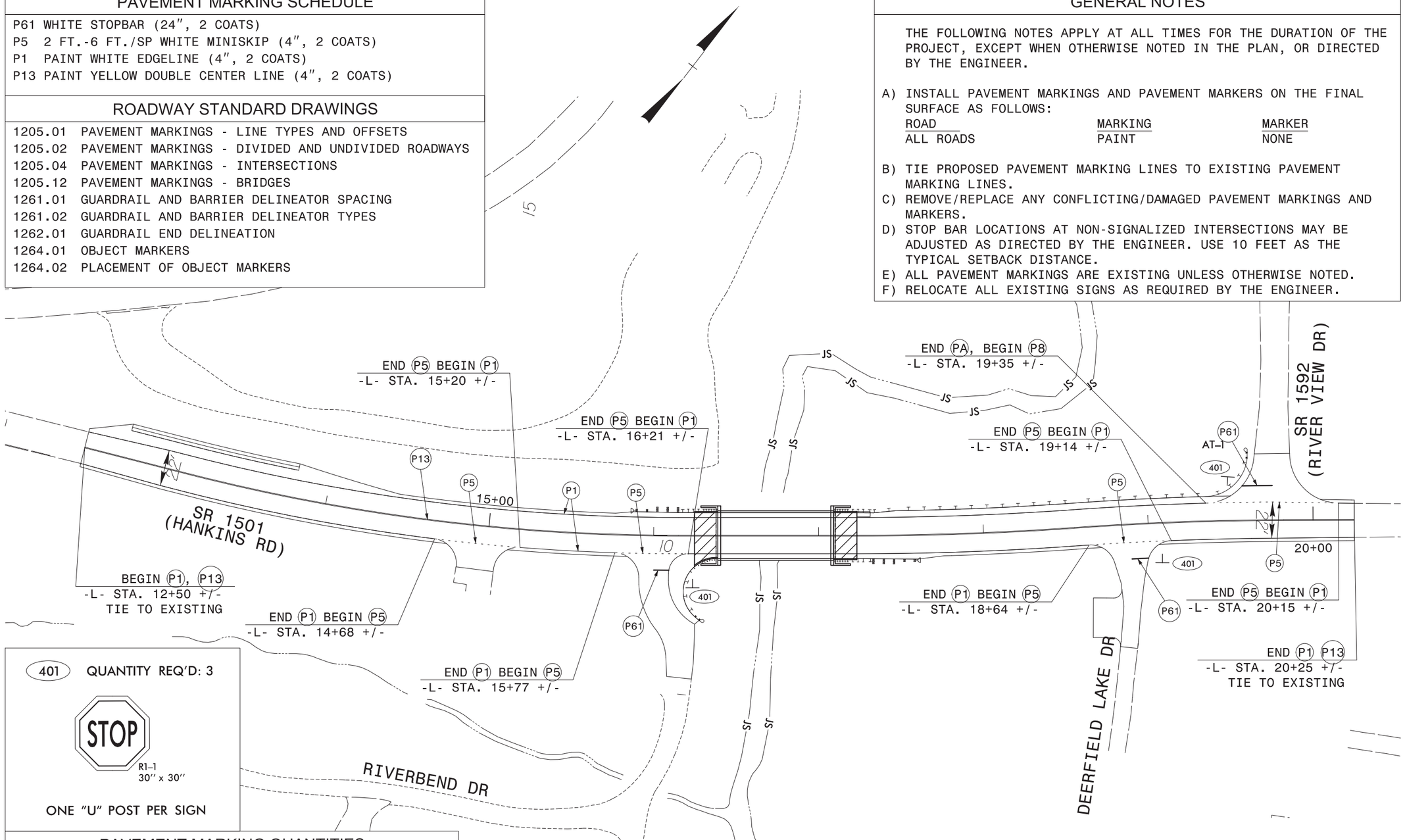
GENERAL NOTES

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

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

ROAD	MARKING	MARKER
ALL ROADS	PAINT	NONE

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.
D) STOP BAR LOCATIONS AT NON-SIGNALIZED INTERSECTIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER. USE 10 FEET AS THE TYPICAL SETBACK DISTANCE.
E) ALL PAVEMENT MARKINGS ARE EXISTING UNLESS OTHERWISE NOTED.
F) RELOCATE ALL EXISTING SIGNS AS REQUIRED BY THE ENGINEER.



401 QUANTITY REQ'D: 3

STOP
R1-1
30″ x 30″

ONE "U" POST PER SIGN

PAVEMENT MARKING QUANTITIES

P61	PAY ITEM LENGTH = 38 LF	TOTAL QUANTITY = 76 LF
P5	PAY ITEM LENGTH = 226 LF	TOTAL QUANTITY = 113 LF
P1	PAY ITEM LENGTH = 1324 LF	TOTAL QUANTITY = 2648 LF
P13	PAY ITEM LENGTH = 775 LF	TOTAL QUANTITY = 3100 LF

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PAVEMENT MARKING PLAN

7/27/2022
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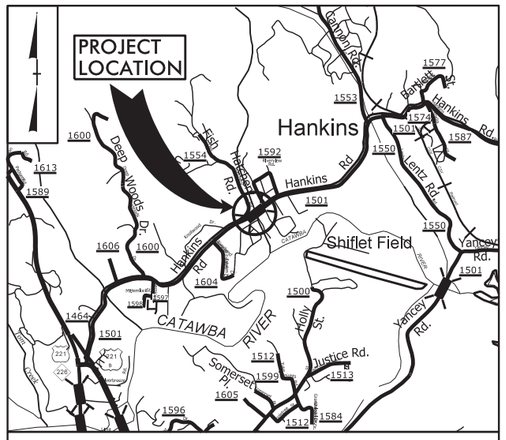
TIP PROJECT: 17BP.13.R.176

See Sheet 1A For Index of Sheets (Not Included)
See Sheet 1B For Symbology Sheet



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

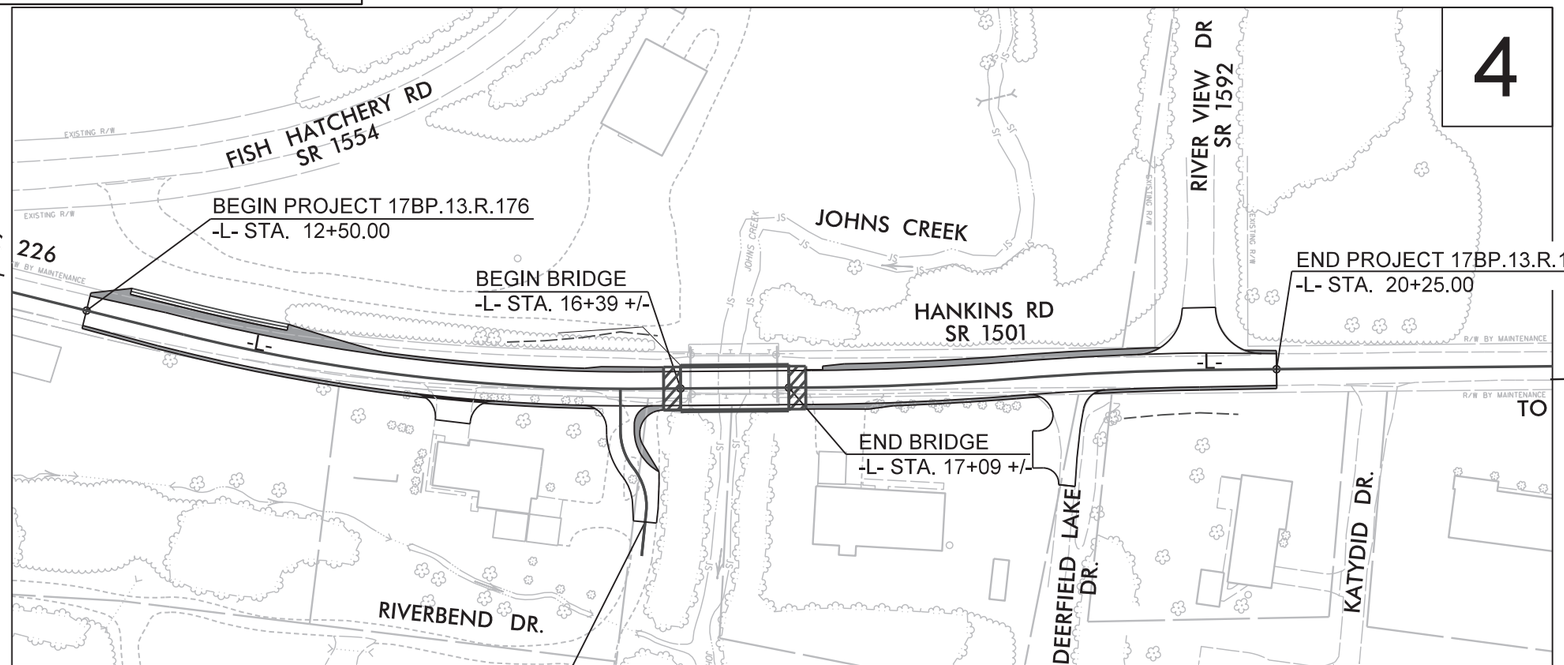
MCDOWELL COUNTY

LOCATION: REPLACE EXISTING BRIDGE NO. 77 OVER JOHNS CREEK ON HANKINS RD (SR 1501)
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

NAD 83/2011

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.176	EC-1	

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



EROSION AND SEDIMENT CONTROL MEASURES

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

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

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.

GRAPHIC SCALE

PLANS 0 20

PROFILE (HORIZONTAL) 0 50

PROFILE (VERTICAL) 0 10

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG–010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2018 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared In the Office of:

WSP USA
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
FAX: 1.919.836.4099
LICENSE NO. F-0165

Designed by:

John F. Watson — *3419*
NAME — *LEVEL III CERTIFICATION NO.*

Reviewed In the Office of:

ROADSIDE ENVIRONMENTAL UNIT
693 Mountain Road
Hendersonville, NC 28791

2018 STANDARD SPECIFICATIONS

Reviewed by:

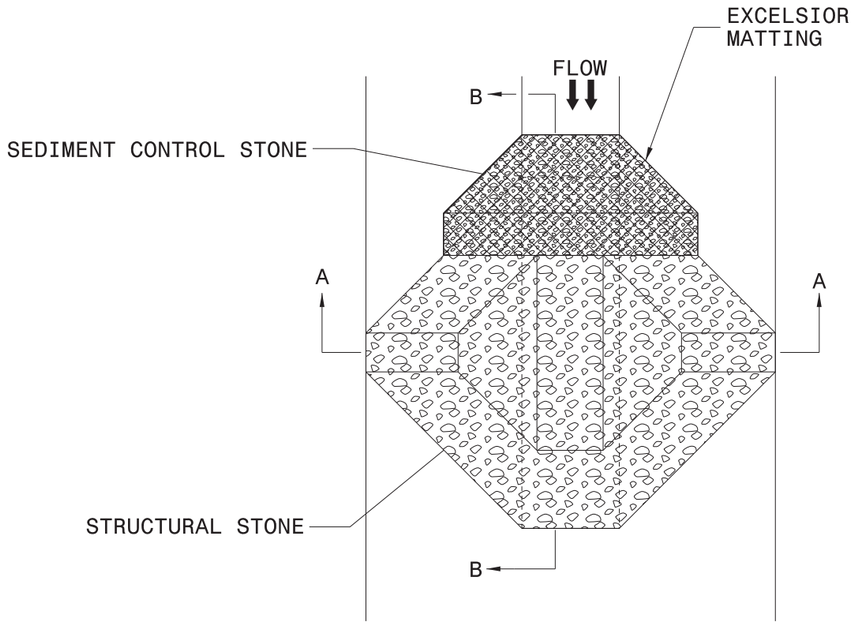
Roadway Standard Drawings

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

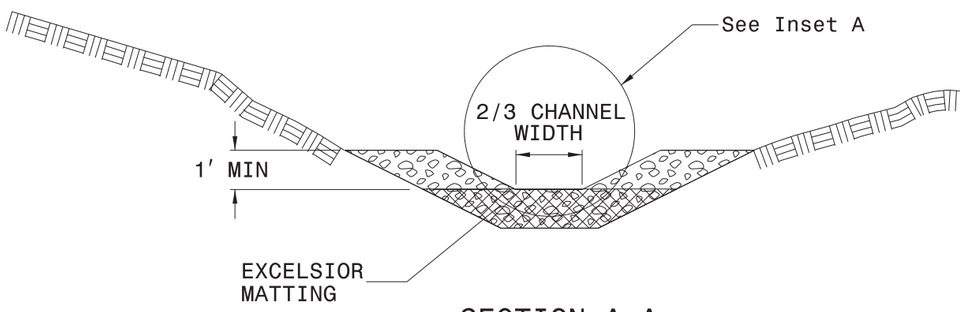
1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type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

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.RJ76	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



PLAN



SECTION A-A

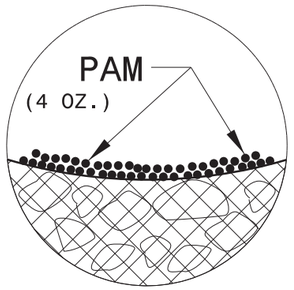
NOTES:

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

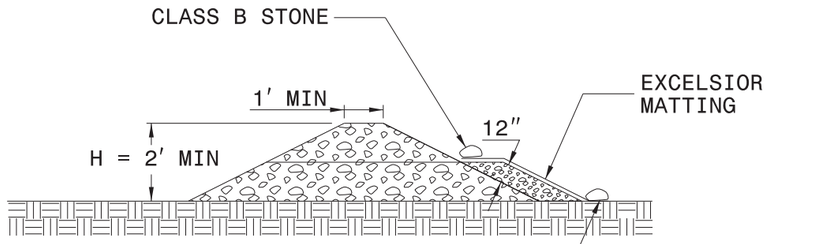
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

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

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



INSET A

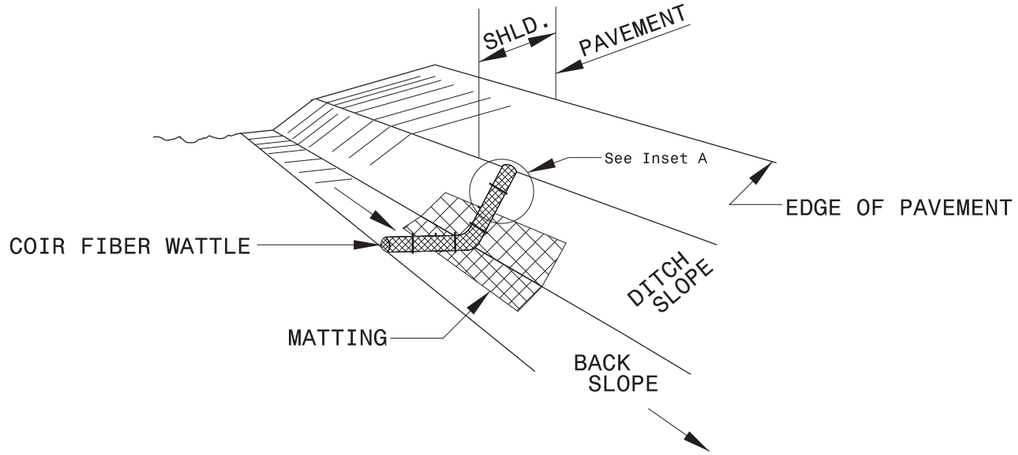


SECTION B-B

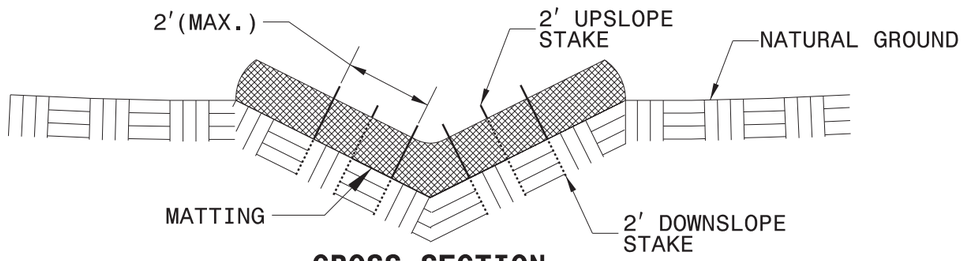
NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.RJ76	EC-2A
R/W SHEET NO.	___
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

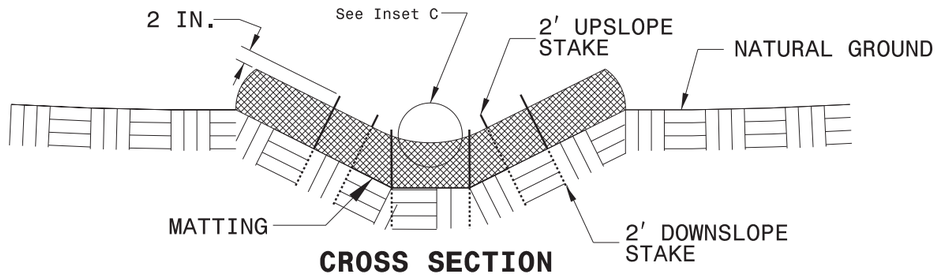
COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

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

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

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

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

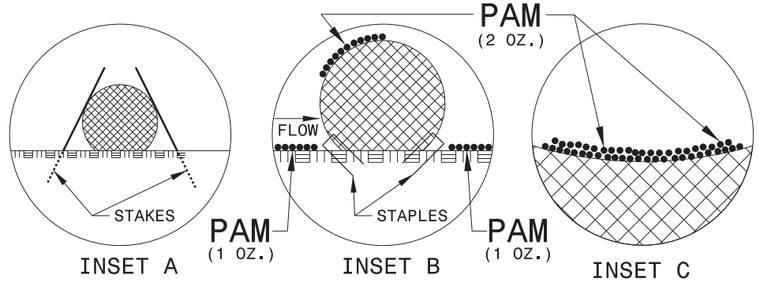
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

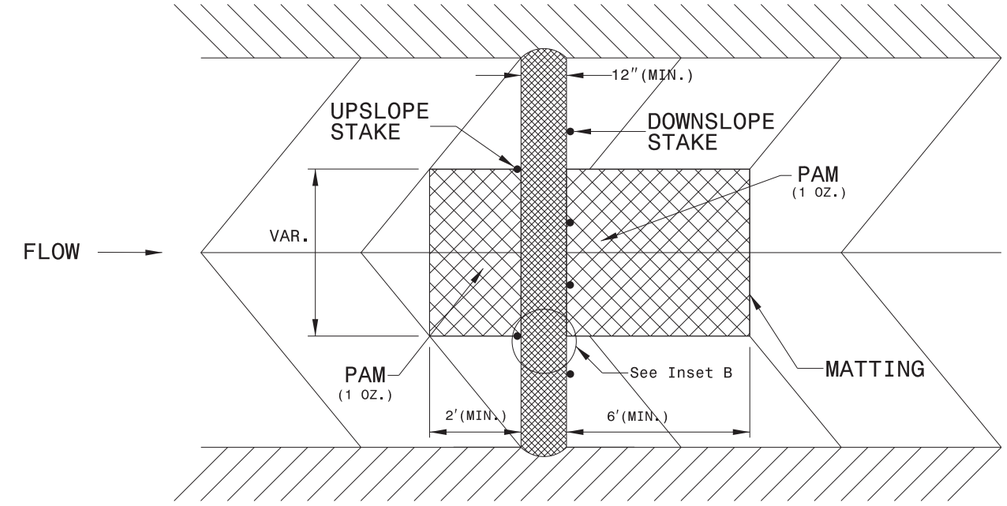
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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

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.

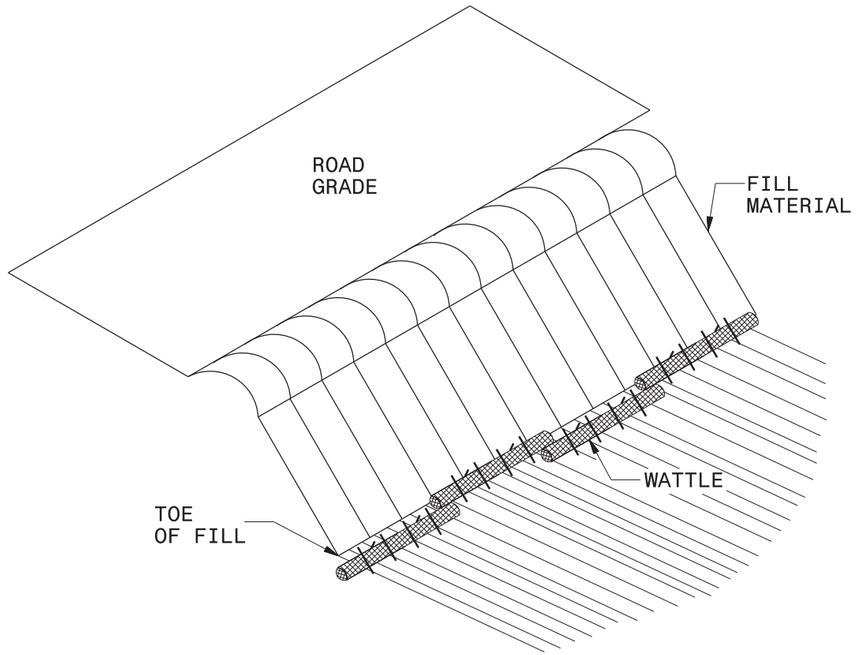




TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.RJ76	EC-2B
R/W SHEET NO.	___
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

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

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

DO NOT PLACE WATTLES ON TOE OF SLOPE.

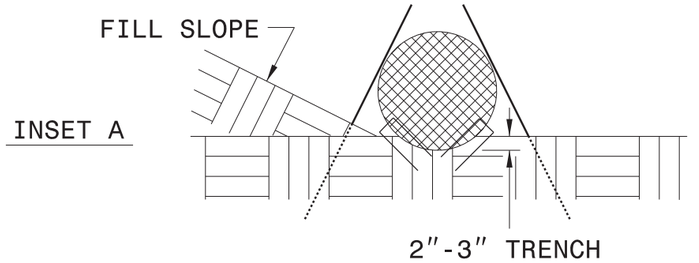
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

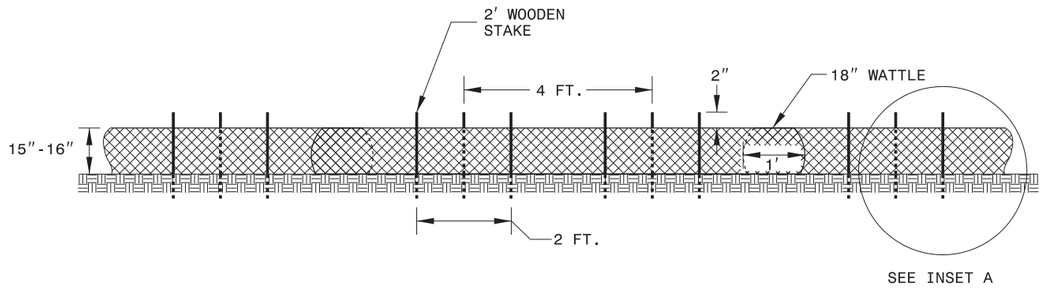
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

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

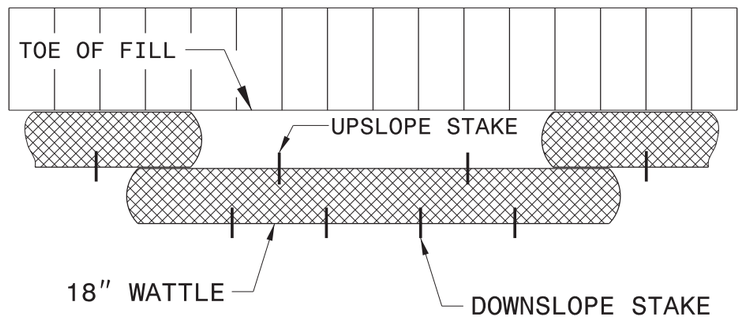
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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





FRONT VIEW



TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.176	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

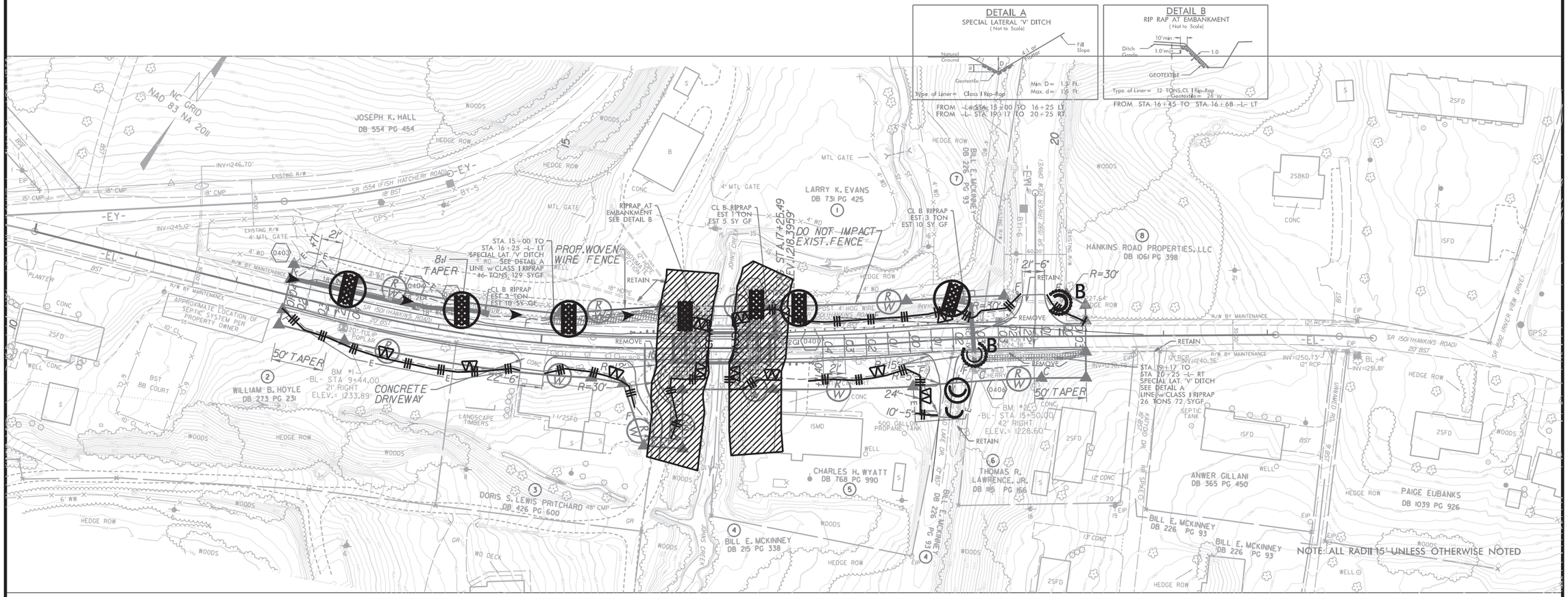
SOIL STABILIZATION TIMEFRAMES

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

EROSION CONTROL PLAN

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.R.J76	EC-04/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4



TROUT STREAM
BUFFER ZONE

NOTE:

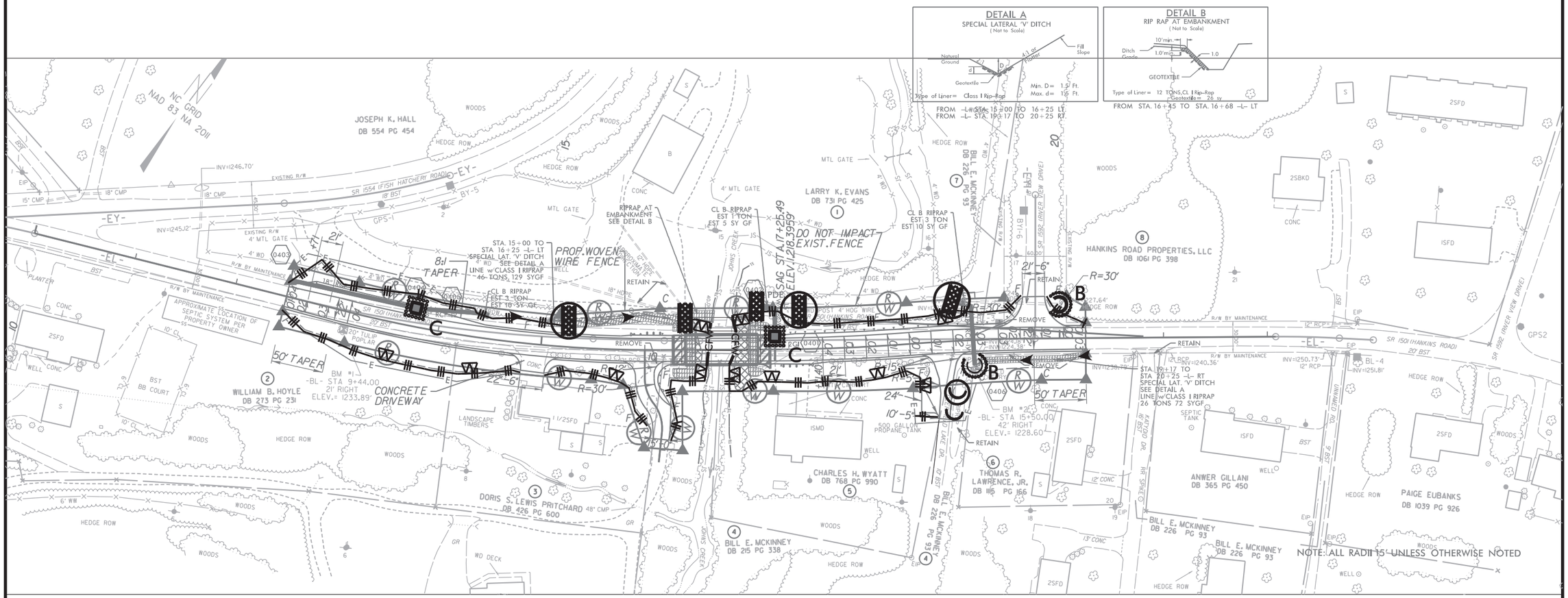
PLACE TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

BRIDGE REMOVAL AND BRIDGE CONSTRUCTION SHALL BE PER REQUIREMENTS IN THE NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL

CONTRACTOR SHALL INSTALL AN ONSITE CONCRETE WASHOUT STRUCTURE PER THE NCDOT DETAIL AND SPECIAL PROVISIONS. ACTUAL LOCATION OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD. CONCRETE WASHOUT STRUCTURE SHALL BE MAINTAINED BY THE CONTRACTOR. ALL CONCRETE TRUCKS SHALL USE THE CONCRETE WASHOUT STRUCTURE. NO WASHOUT OF CONCRETE TRUCKS SHALL BE ALLOWED EXCEPT IN THE CONCRETE WASHOUT STRUCTURE.

PROJECT REFERENCE NO.	SHEET NO.
17BPJ3.R176	EC-05/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EROSION CONTROL PLAN



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.176	RF–1	

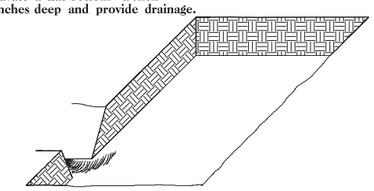
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

PLANTING DETAILS

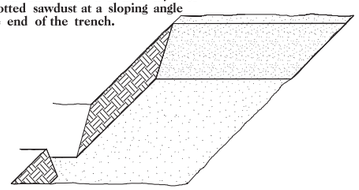
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

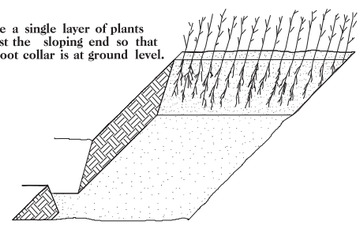
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



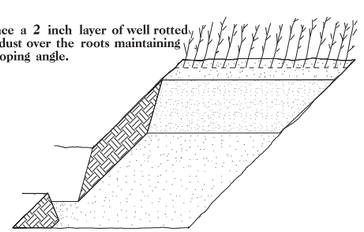
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

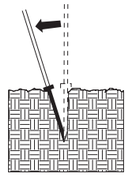


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

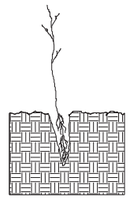


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

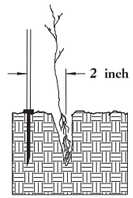
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



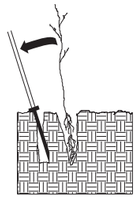
1. Insert planting bar as shown and pull handle toward planter.



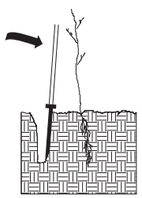
2. Remove planting bar and place seedling at correct depth.



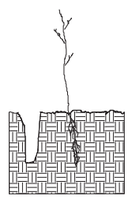
3. Insert planting bar 2 inches toward planter from seedling.



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



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

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

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

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

REFORESTATION

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

REFORESTATION

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

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	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

9/5/18

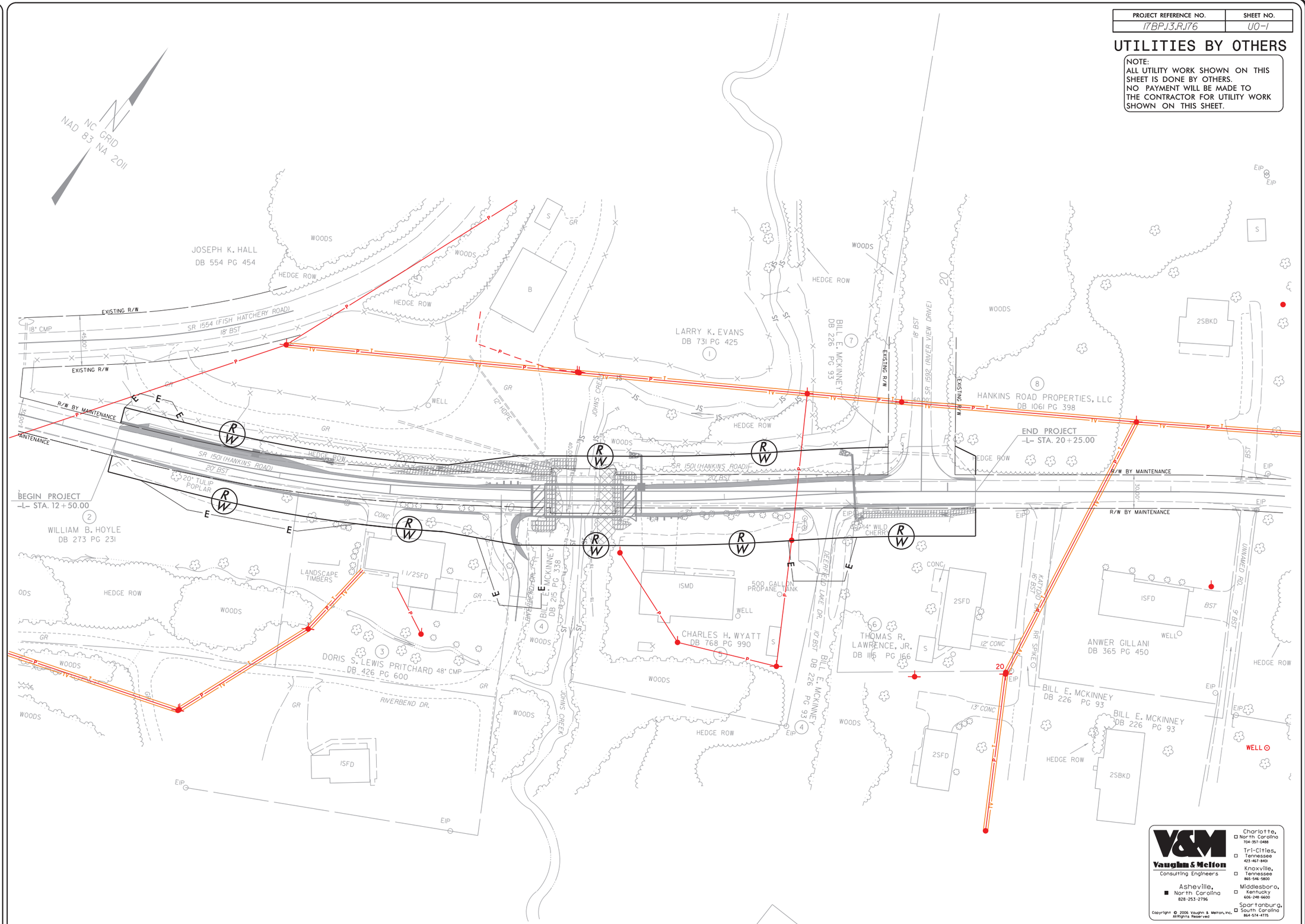
PROJECT: 17BP.13.R.176

CONTRACT: DM00364

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.176	U0-1

UTILITIES BY OTHERS

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



Vaughn & Melton
Consulting Engineers

Asheville, North Carolina 828-253-2796
Charlotte, North Carolina 704-357-0488
Tri-Cities, Tennessee 423-467-8410
Knoxville, Tennessee 865-546-5800
Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-574-4775

TRANSPORTATION\3630-17*17BP.13.R.176 McDowell 77\UTILITIES\B5883_UTL_U0-2.DGN

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

PROJ. REFERENCE NO.	SHEET NO.
17BP.13.R.176	X-1A

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

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+50.00		0
12+75.00		13
13+00.00		32
13+25.00		43
13+50.00		54
13+75.00		69
14+00.00		74
14+25.00		70
14+50.00		59
14+75.00		43
15+00.00		23
15+25.00		21
15+50.00		38
15+75.00		53
16+00.00		50
16+25.00		52

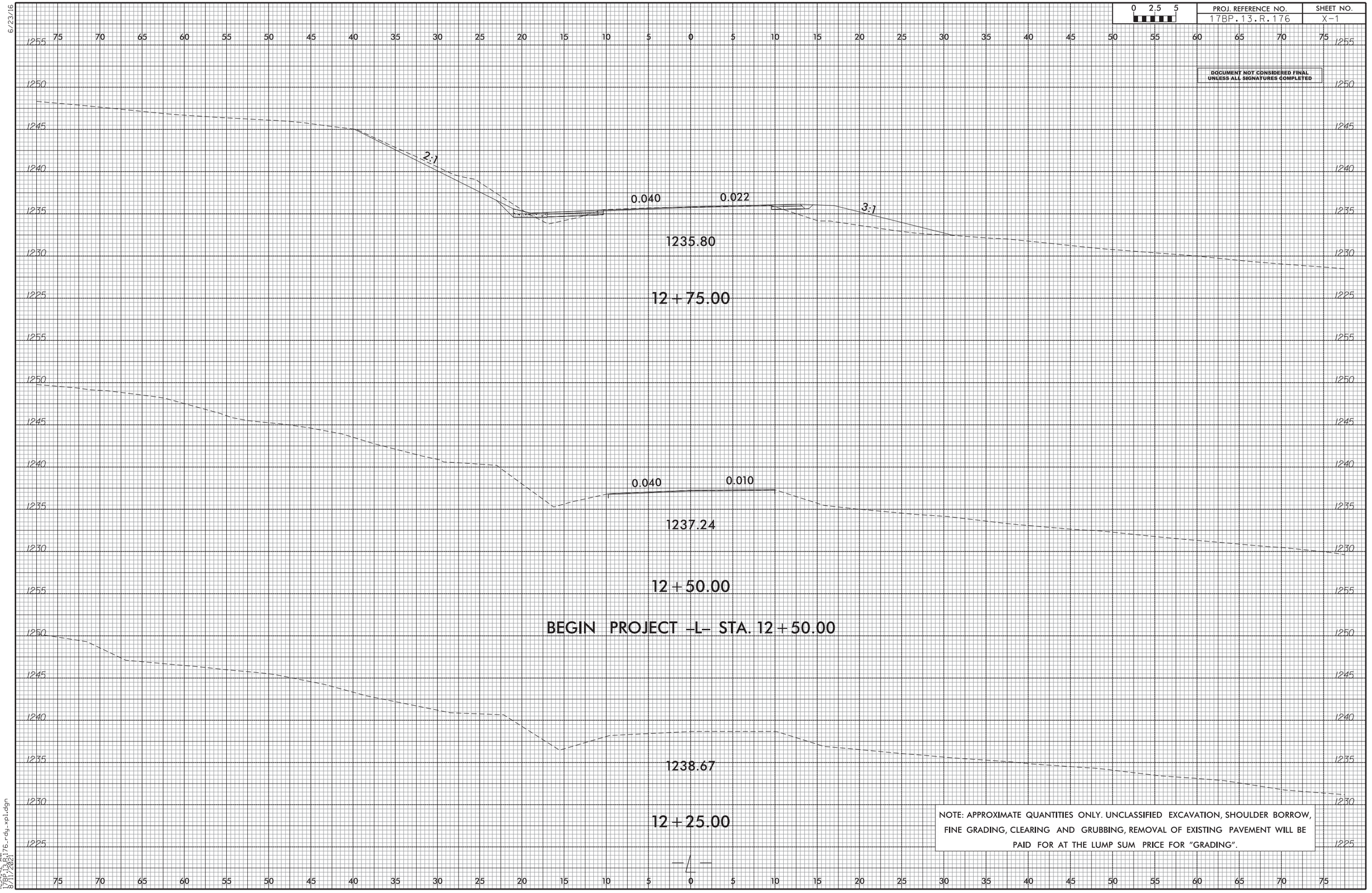
Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
17+25.00		0
17+50.00		76
17+75.00		83
18+00.00		86
18+25.00		71
18+50.00		46
18+75.00		32
19+00.00		33
19+25.00		33
19+50.00		25
19+75.00		14
20+00.00		9
20+25.00		6

Station Dr1	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+25.00		0
10+50.00		61
10+75.00		28

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.13.R.176	X-1

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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

11:34:42 AM
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8/11/2021

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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1245
1240
1235
1230
1225

4:1 0.040 0.040 3:1

1233.01

13+25.00

1255
1250
1245
1240
1235
1230
1225

3:1 0.040 0.034 3:1

1234.39

13+00.00

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

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8/11/2021

6/23/16

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1220

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1230.08

13+75.00

1250
1245
1240
1235
1230
1225
1220

4:1 0.040 0.040 3:1

1231.55

13+50.00

1215

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

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8/11/2021

6/23/16

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1215

0.040 0.040 3:1

1227.13

14+25.00

0.040 0.040 3:1

1228.59

14+00.00

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

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8/17/2021

6/23/16

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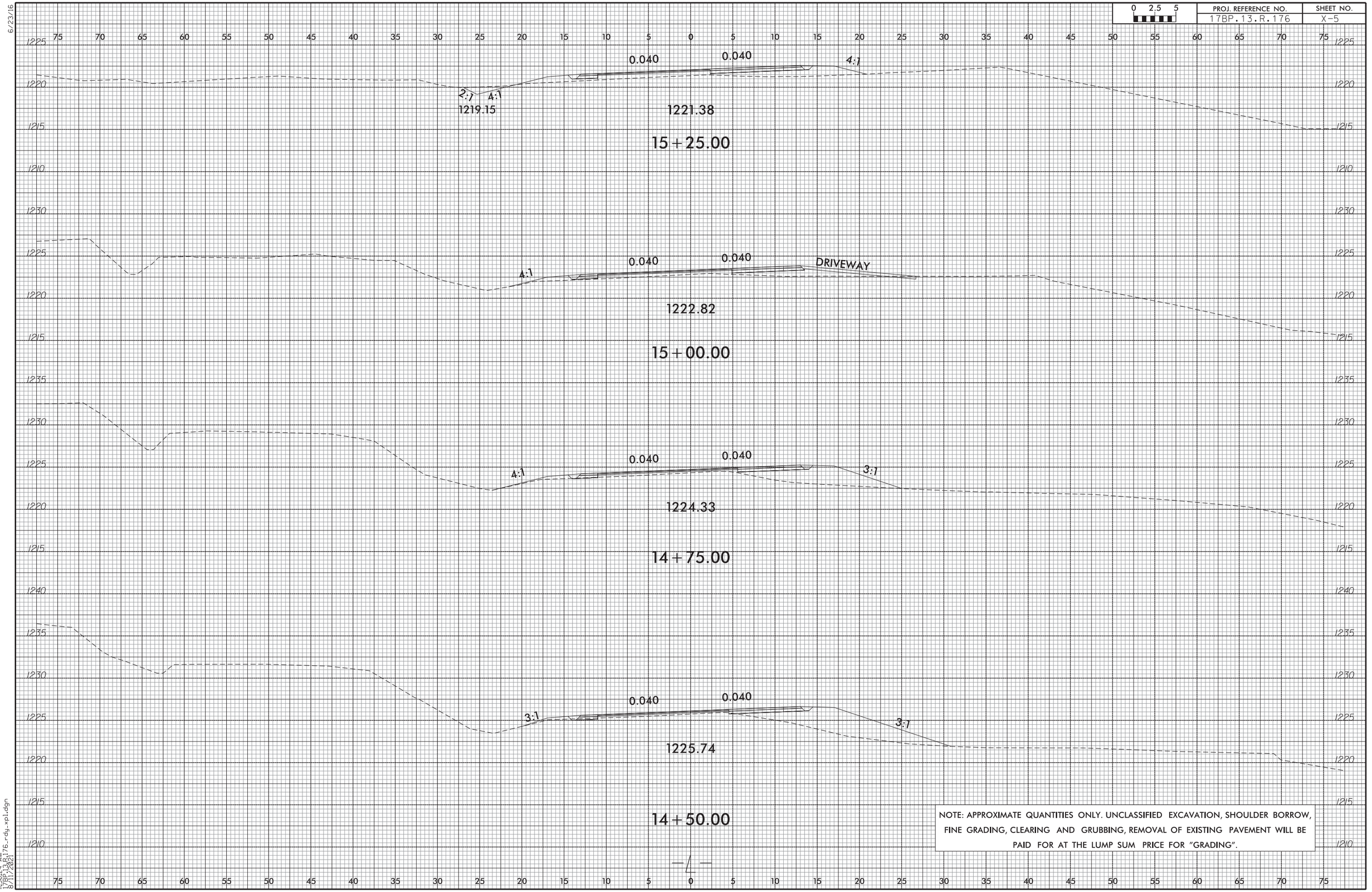

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

11:36:24 AM
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8/11/2021

6/23/16

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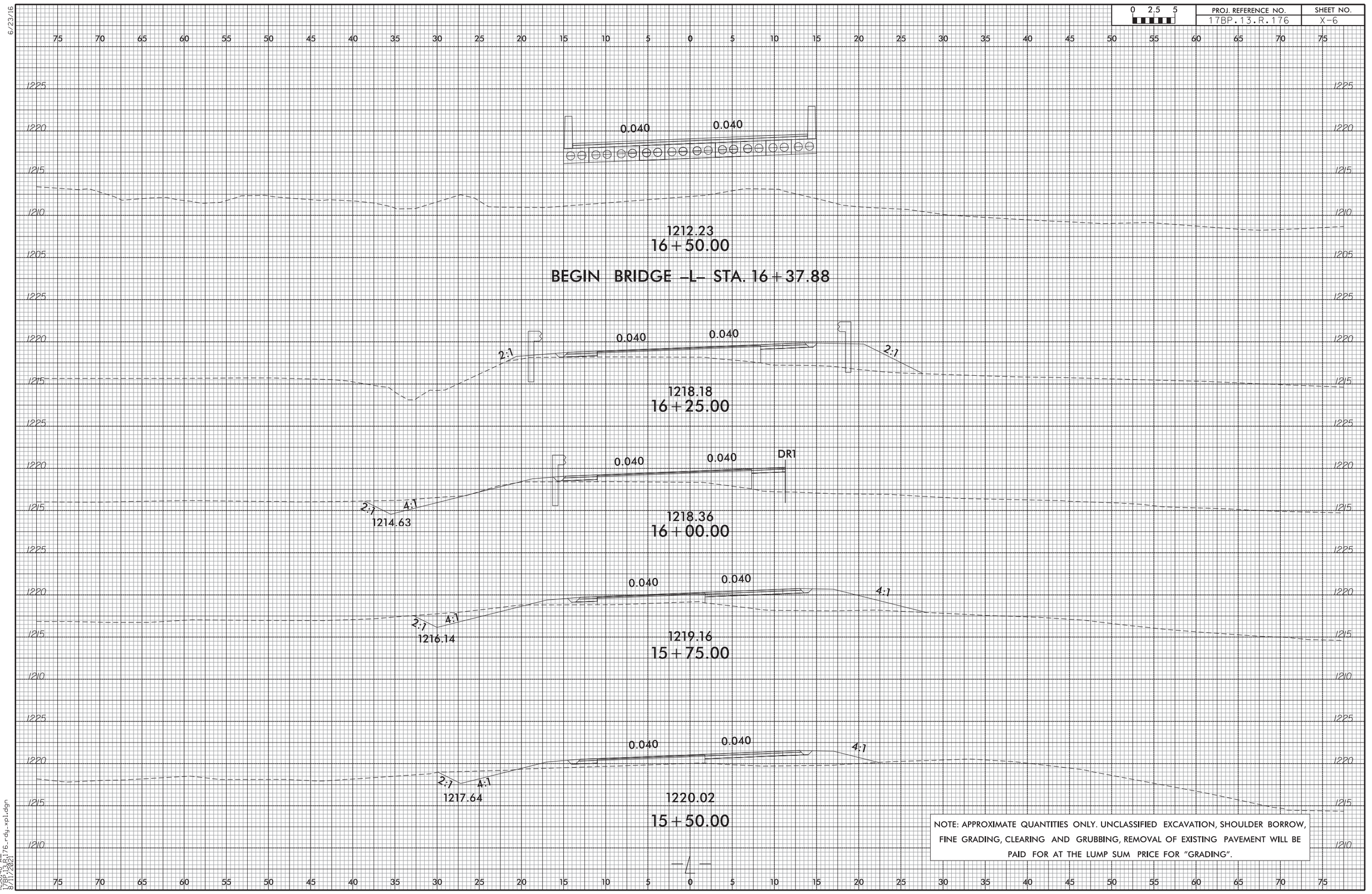

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

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8/17/2021

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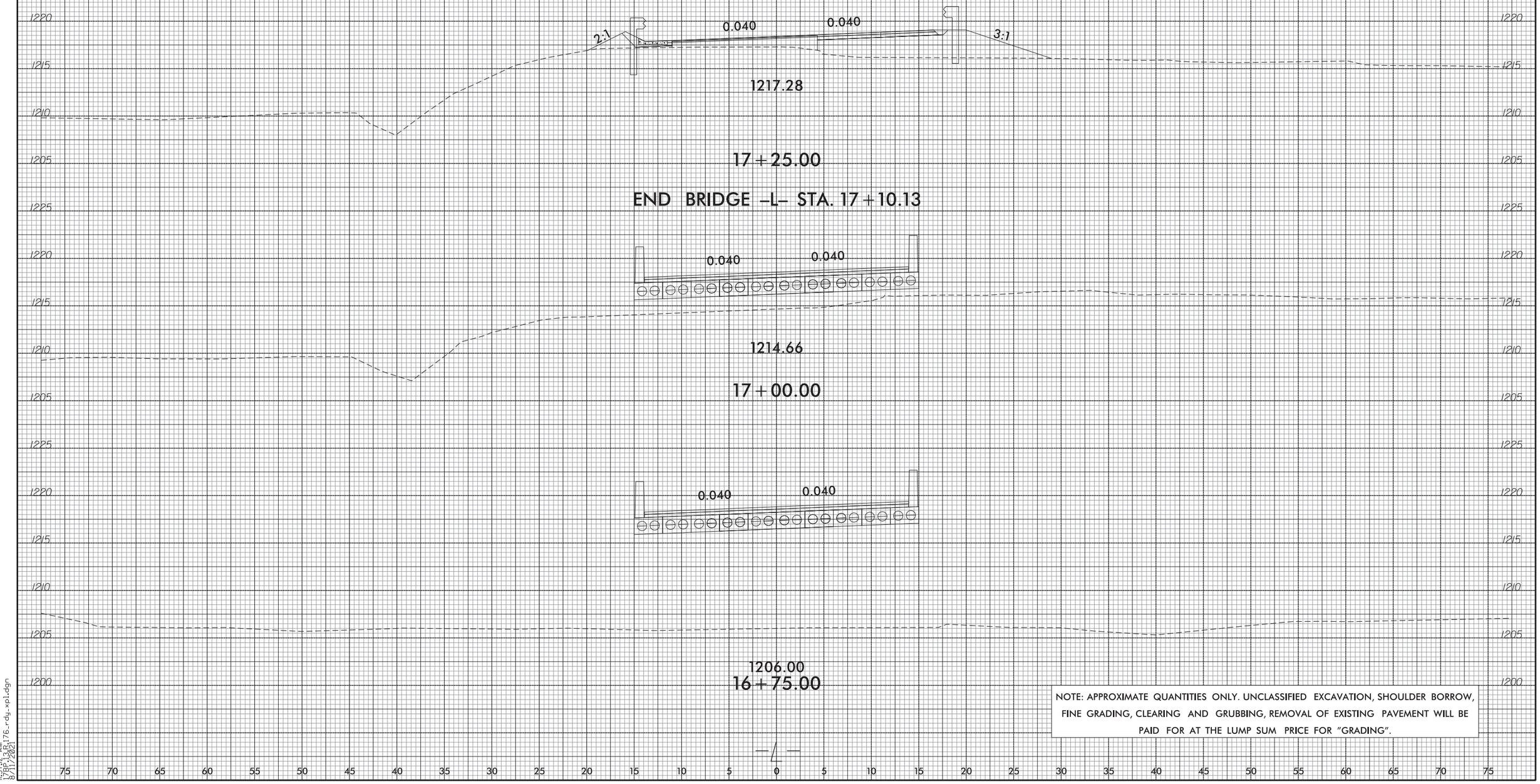

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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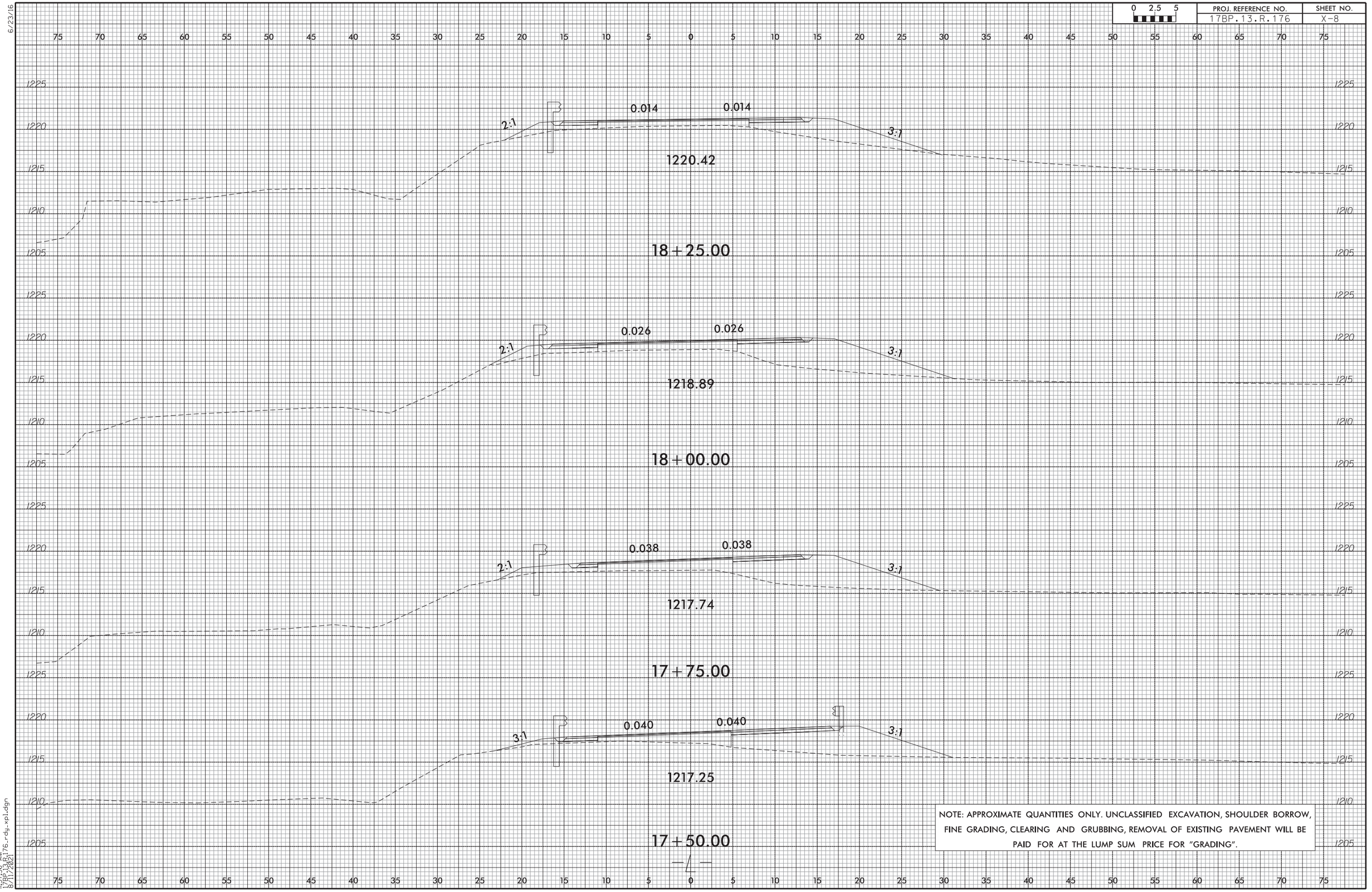

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

11:37:36 AM
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8/17/2021

6/23/16

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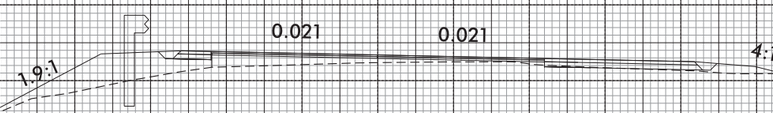

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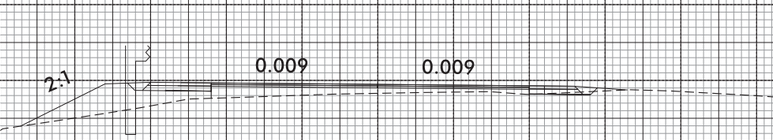
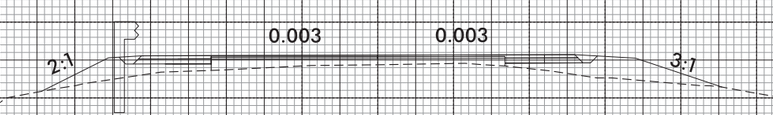
19+00.00



1224.15

18+75.00



1222.19

18+50.00

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

11:38:00 AM
17BP.13.R.176_rdy_xpl.dgn
8/11/2021

6/23/16

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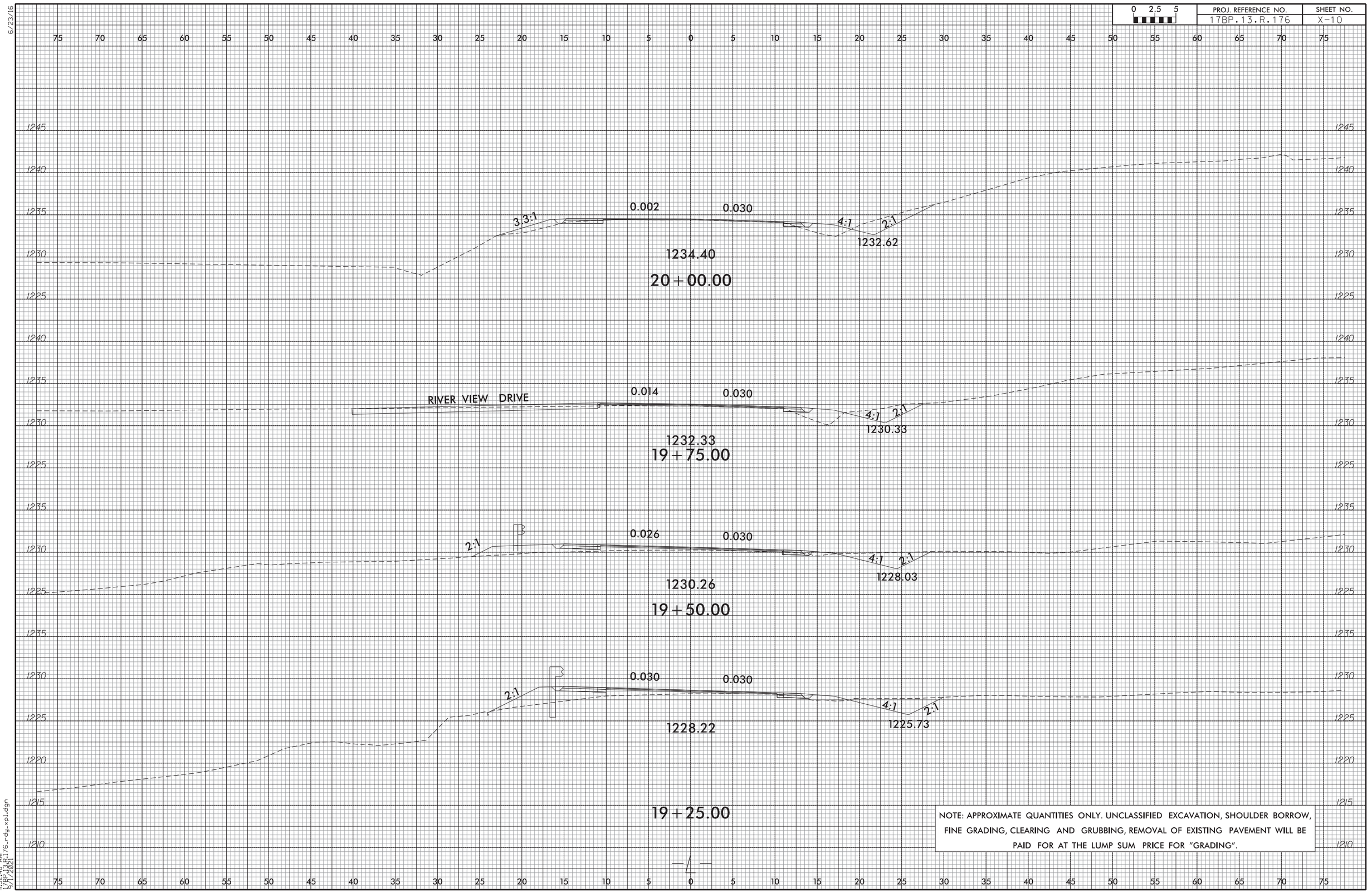

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

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9/1/2021

6/23/16

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1238.44
20+50.00

END PROJECT –L– STA. 20+25.00

0.010 0.030

1236.47
20+25.00

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

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8/11/2021

6/23/16

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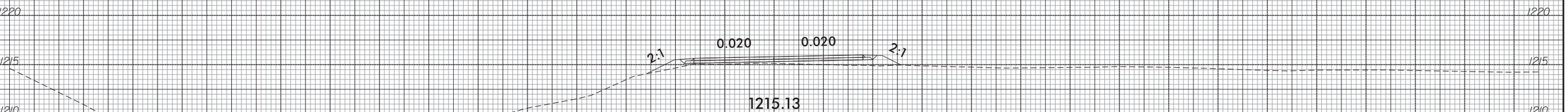
1205
1200



1215.13

10+75.00

1220
1215
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1205
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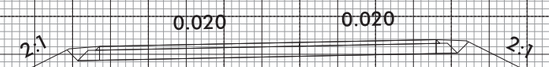
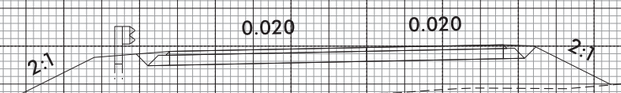


1215.77

10+50.00



1216.82

10+25.00

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

-DRI-

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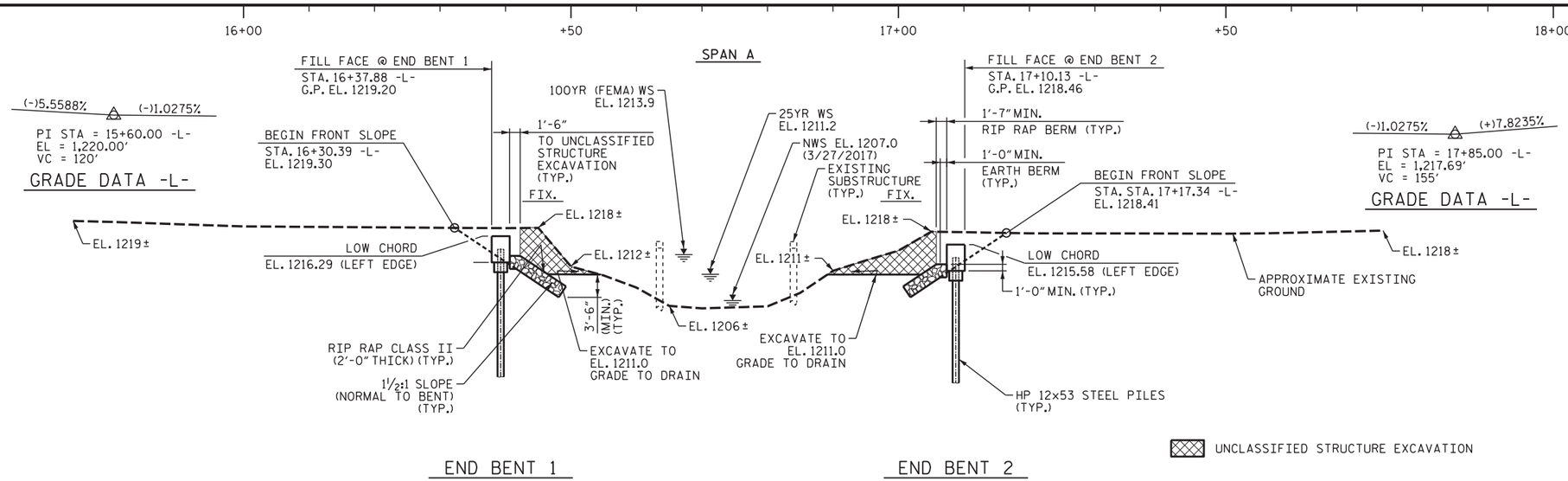
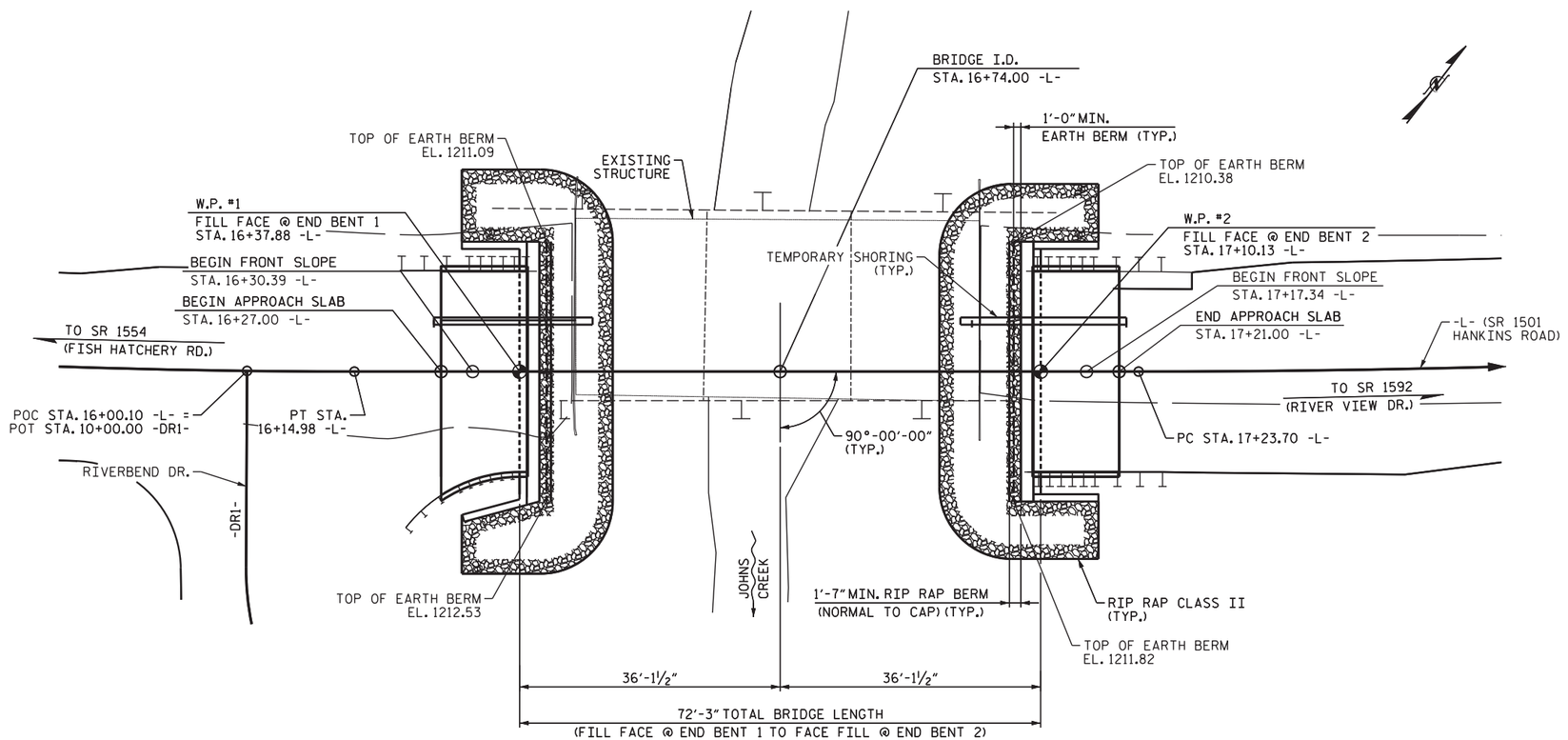
8/11/2021



SECTION ALONG -L-



PLAN

(FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

HORIZONTAL CURVE DATA

PI STA. 14+65.71 -L-
Δ = 14°-19'-44.2" (LT)
D= 4°-46'-28.7"
L= 300.10'
T = 150.84'
R = 1,200.00'

HORIZONTAL CURVE DATA

PI STA. 17+89.58 -L-
Δ = 4°-06'-04.5" (LT)
D= 3°-06'-50.0"
L= 131.71'
T = 65.88'
R = 1,840.00'

HYDRAULIC DATA

DESIGN DISCHARGE	500 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS.
DESIGN HIGH WATER ELEVATION	1211.2
DRAINAGE AREA	1.4 SQ.MI.
BASE DISCHARGE (FEMA)	1140 CFS
BASE HIGH WATER ELEVATION	1213.9

OVERTOPPING FLOOD DATA

OVERTOPPING FLOOD DISCHARGE	3800 CFS
FREQUENCY OF OVERTOPPING FLOOD	>500 YRS.
OVERTOPPING FLOOD ELEVATION	1218.9
@ STA. 17+25.49 -L-	

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 077

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1501
(HANKINS RD.) OVER JOHNS CREEK
BETWEEN SR 1554 & SR 1592

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			25

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

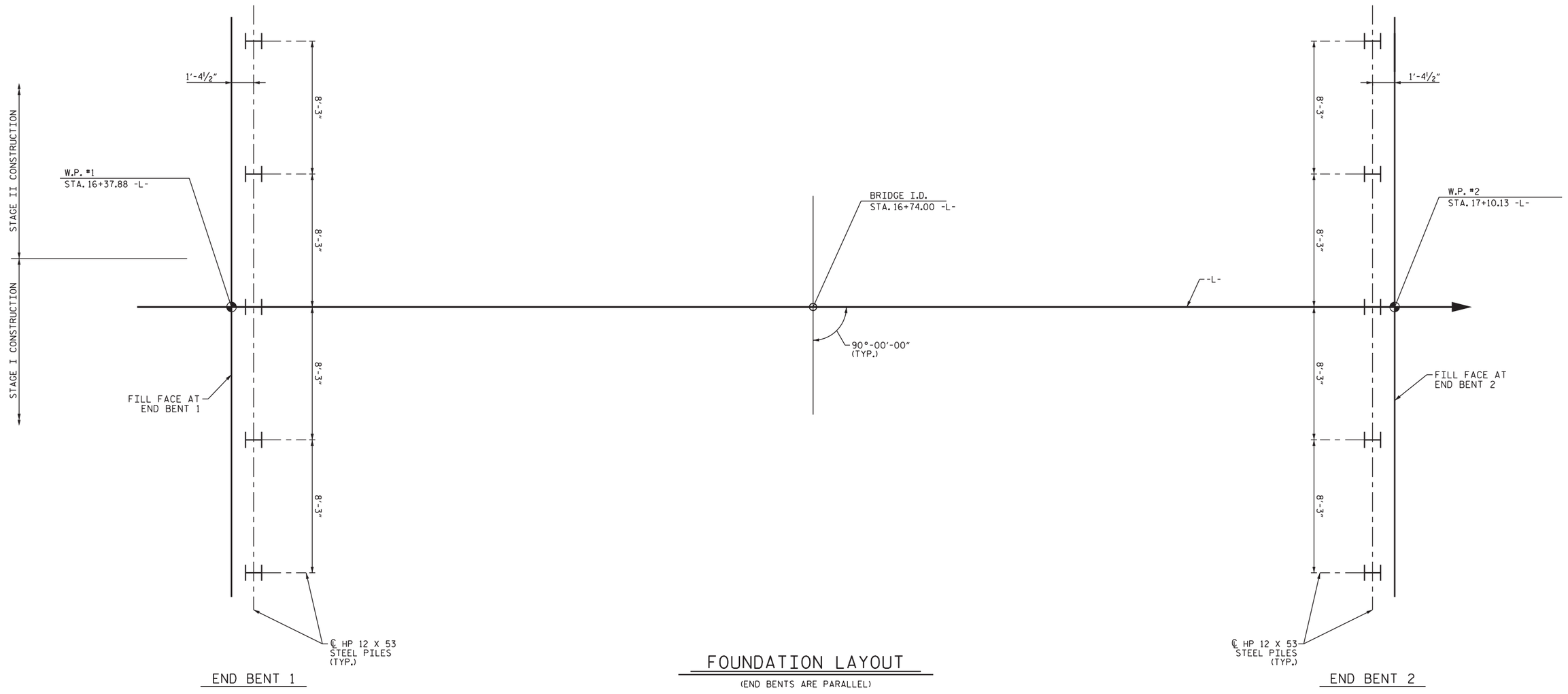
DocuSigned by: Thomas Harris 1/28/2022
F9EBC057AC1A4EF...

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040

LICENSE NO. F-0165

DESIGNED BY:	J. WHEATLEY	DATE : JUL 2022
DRAWN BY:	J. WHEATLEY	DATE : JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE : JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE : JUL 2022

7/27/2022 - J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401.001.17BP.13.R.176_SWU.GD01.dgn



END BENT 1

FOUNDATION LAYOUT

(END BENTS ARE PARALLEL)

END BENT 2

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 167 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 167 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 2 OF 3

DESIGNED BY:	J. WHEATLEY	DATE : JUL 2022
DRAWN BY:	J. WHEATLEY	DATE : JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE : JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE : JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 7/28/2022 F5EBC057AC1A4EF...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

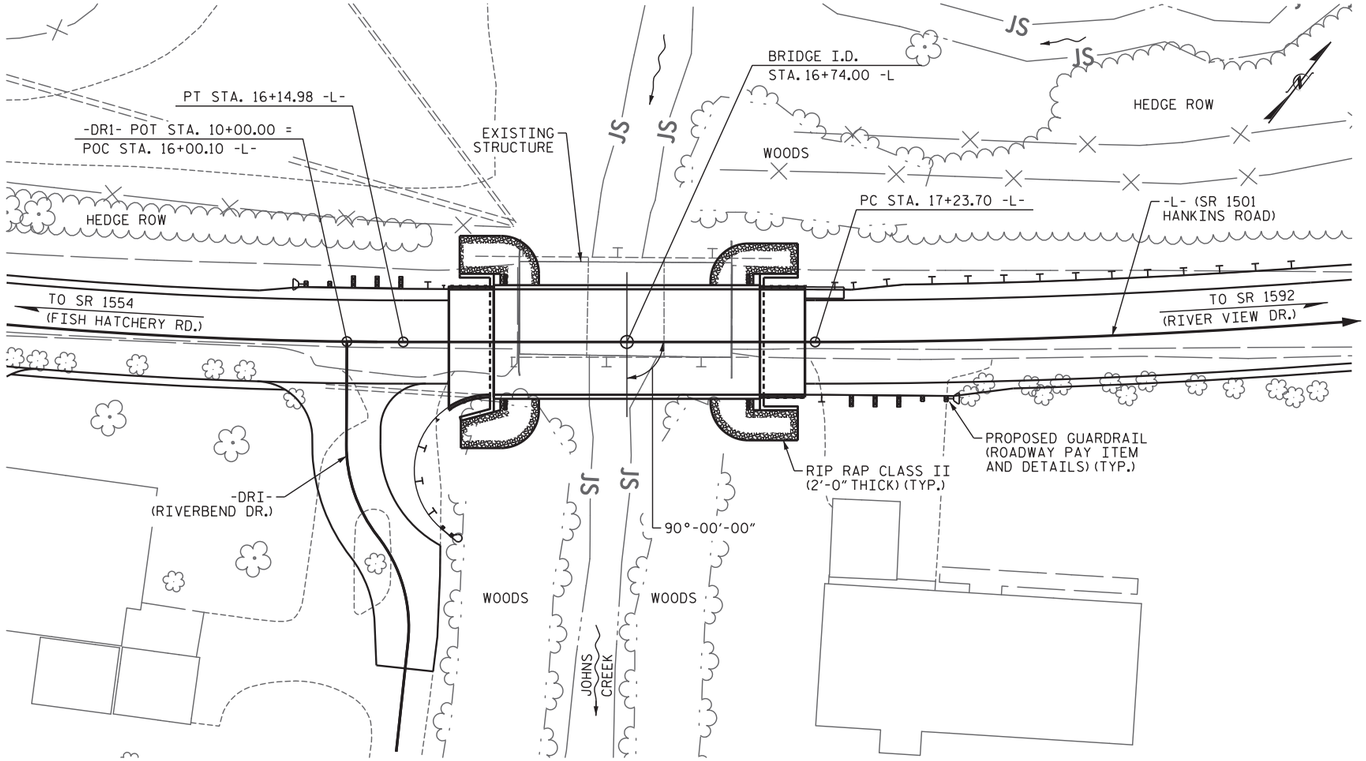
GENERAL DRAWING

FOR BRIDGE ON SR 1501
(HANKINS RD.) OVER JOHNS CREEK
BETWEEN SR 1554 & SR 1592

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			25

7/27/2022 J:\188360C - 2015 W Divisions Planning & Design On-Call\I188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401.003.17BP.13.R.176.SMU.GD02.dgn

BM #1 SPIKE SET IN BASE OF 20" TULIP POPLAR -L- STA. 13+11.00 OFFSET 17' RT., ELEV.= 1233.89



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

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.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF A THREE SPANS 18'-3", 20'-11", AND 18'-3" WITH A CLEAR ROADWAY WIDTH OF 24'-5"; TIMBER DECK WITH ASPHALT WEARING SURFACE ON STEEL I-BEAMS WITH TIMBER CAPS, TIMBER POSTS AND SILL END BENTS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

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 16+74.00 -L-".

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT (LEFT) AND 25 FT. (RIGHT) OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

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

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

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.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 16+74.00 -L-	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	ONE BAR METAL BARRIER RAIL	1'-0"X1'-9½" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	No.	No.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	No.	LIN. FT.
SUPERSTRUCTURE	LUMP SUM				LUMP SUM						125	140			LUMP SUM	10	700.00
END BENT 1			LUMP SUM	20.2		2481	5	5	170	5			102	113			
END BENT 2			LUMP SUM	20.2		2474	5	5	135	5			94	104			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	40.4	LUMP SUM	4955	10	10	305	10	125	140	196	217	LUMP SUM	10	700.00

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1501
(HANKINS RD.) OVER JOHNS CREEK
BETWEEN SR 1554 & SR 1592

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			25

DESIGNED BY: J. WHEATLEY DATE: JUL 2022
DRAWN BY: J. WHEATLEY DATE: JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE: JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE: JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 7/28/2022
F9EBC057AC1A4EF...

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.006	--	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(Opr)	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(Inv)	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(Opr)	36.000	--	1.74	62.64	1.35	0.273	1.74	70′	EL	34.5	0.507	2.14	70′	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	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	45.69	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	
	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	--	1.1	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	48.18	1.4	0.273	1.47	70′	EL	34.5	0.507	1.8	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	1.4	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	1.3	70′	EL	34.5	0.507	1.66	70′	EL	6.9	0.80	0.273	**1.01**	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)

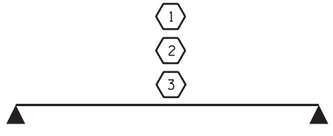
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPAN A

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

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-4
1			3			TOTAL SHEETS
2			4			25

STD. NO. 24LRFR1_90S_70L

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

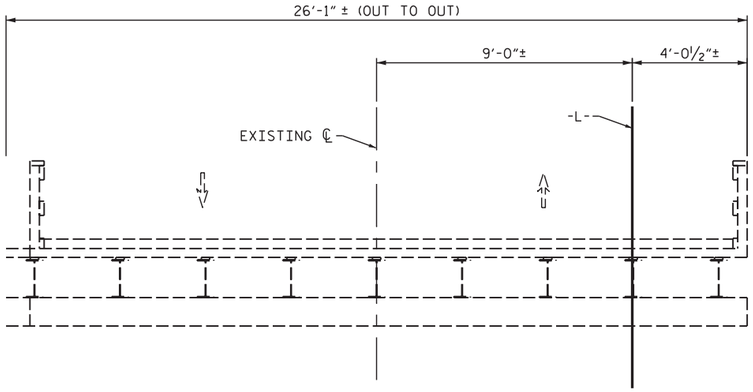
DocuSigned by: Thomas Harris F9ERC057AC1A4EF...

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

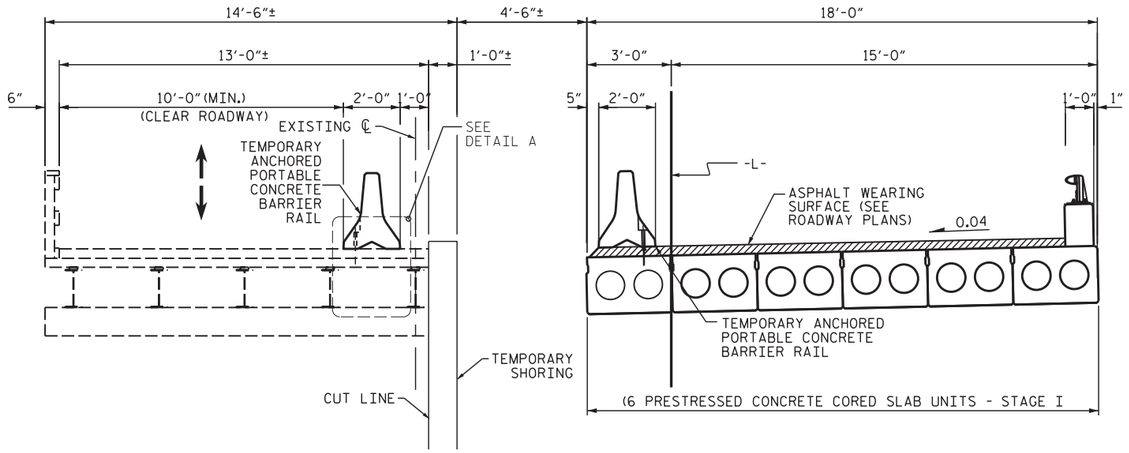
ASSEMBLED BY: J.WHEATLEY DATE : JUL 2022
CHECKED BY: T.KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T.HARRIS DATE : JUL 2022

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

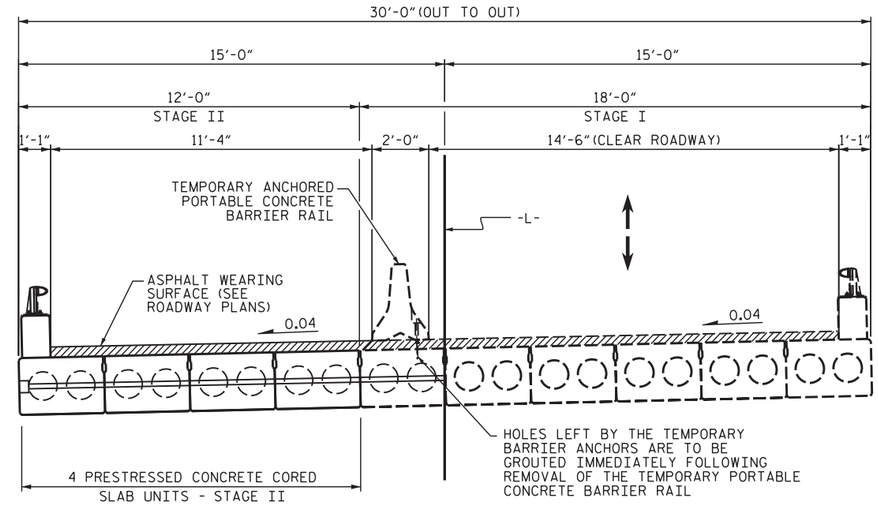
7/27/2022 - J:\183360C - 2015 W Divisions Planning & Design On-Call\183360 Division 13 Bridges\17BP.13.R.176 McDowell07\Structures\Drafting\DGNs\401.007.17BP.13.R.176.SMU.LRFR.dgn



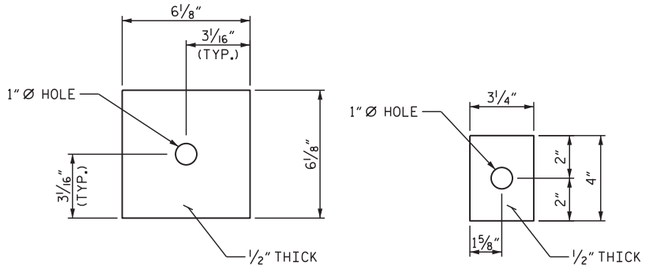
EXISTING STRUCTURE



STAGE I

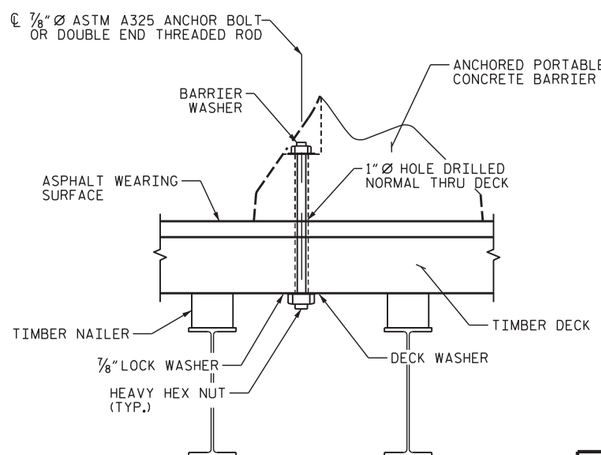


STAGE II



DECK WASHER
(ASTM A709 GRADE 50)

BARRIER WASHER
(ASTM A709 GRADE 50)



DETAIL A

DESIGNED BY:	J. WHEATLEY	DATE :	JUL 2022
DRAWN BY:	J. WHEATLEY	DATE :	JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE :	JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE :	JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

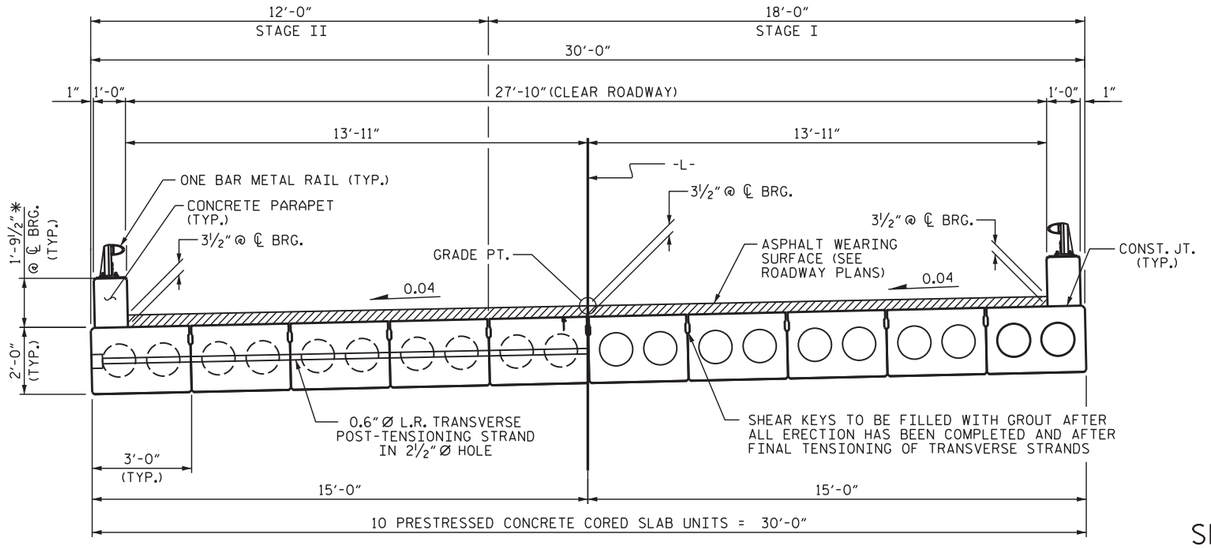
DocuSigned by: Thomas Harris F9FBC057AC1A4EF...

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PHASE CONSTRUCTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			25

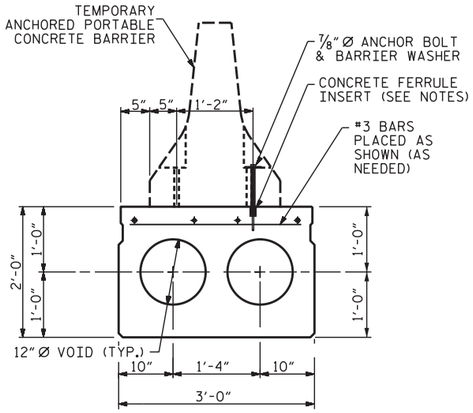


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* - THE MAXIMUM CONCRETE PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE CONCRETE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE CONCRETE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "CONCRETE PARAPET DETAILS" SHEET.



SECTION OF ANCHOR ASSEMBLY LOCATION

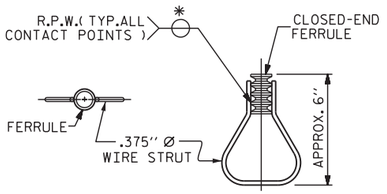
(TYPE III UNIT OF STAGE I)
THE #3 BARS ARE INCIDENTAL AND THEIR COST SHALL BE INCLUDED IN THE PRICE BID FOR THE PRESTRESSED CONCRETE CORED SLABS. (FOR PRESTRESSED STRAND LAYOUT SEE INTERIOR SLAB SECTION)

NOTES

FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

1 -⅞" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ⅞" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

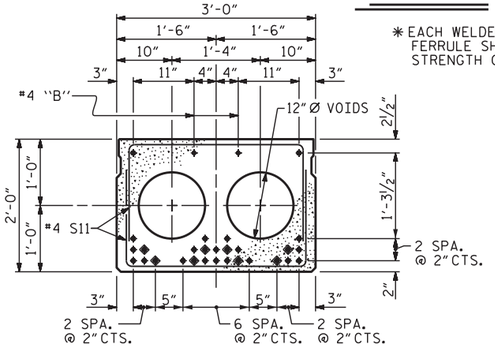
WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

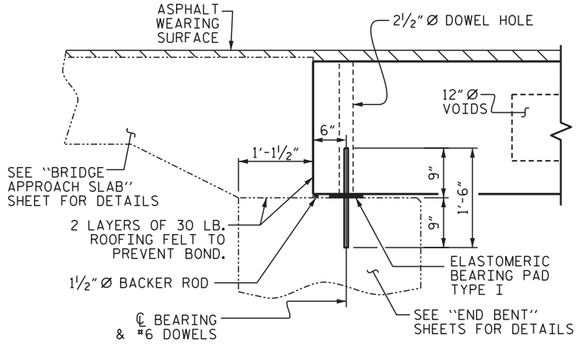


INTERIOR SLAB SECTION (70' UNIT)
(28 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

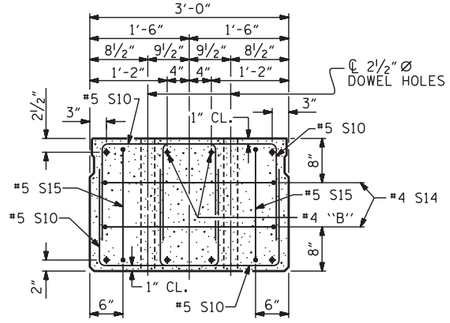
◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



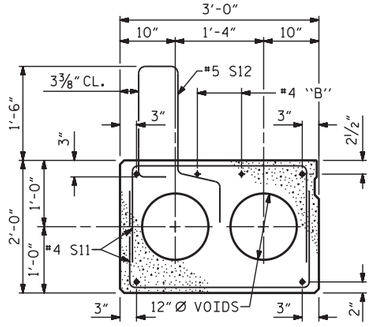
SECTION AT END BENT

(FIXED END)



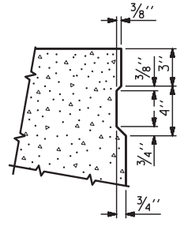
END ELEVATION

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.



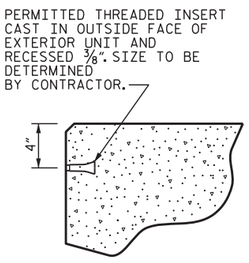
EXTERIOR SLAB SECTION

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



SHEAR KEY DETAIL

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



THREADED INSERT DETAIL

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 1 OF 5

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-6
1			3			TOTAL SHEETS
2			4			25

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
DocuSigned by: Thomas Harris 7/28/2022 F9EBC057AC1A4EF...

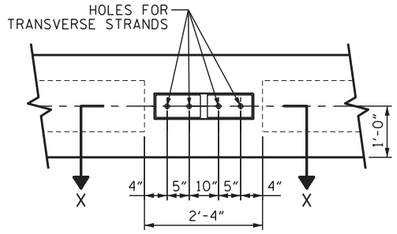
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

ASSEMBLED BY:	J.WHEATLEY	DATE :	JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE :	JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE :	JUL 2022

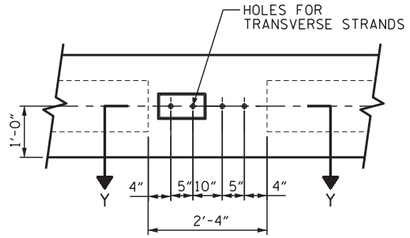
DRAWN BY :	MAA	6/10
CHECKED BY :	MKT	7/10
REV.	8/14	MAA/TMG

7/27/2022
J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401_011_17BP_13_R_176_SMU_CSO1.dgn

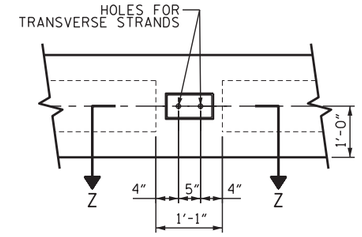
STD. NO. 24PCS4_30_90S



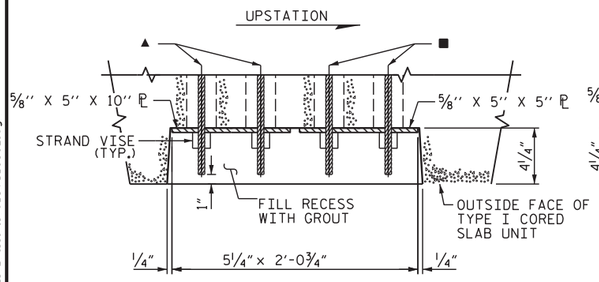
VIEW A-A



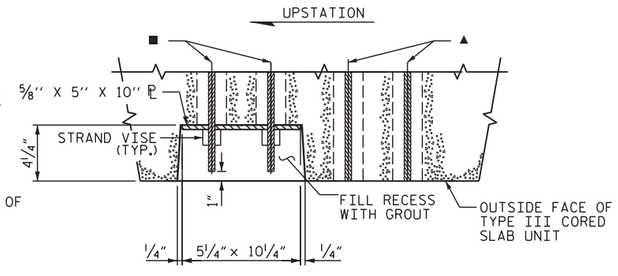
VIEW B-B



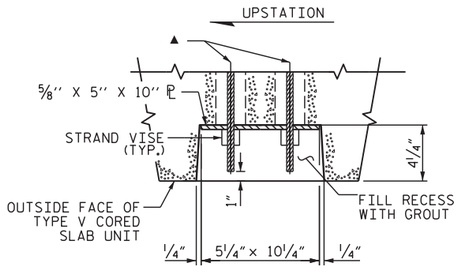
VIEW C-C



SECTION X-X



SECTION Y-Y



SECTION Z-Z

GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

■ ℄ 0.6" Ø H.S. TRANSVERSE POST-TENSIONING STRAND SHEATHED WITH A NON-CORROSIVE PIPE (TO BE TENSIONED DURING STAGE I CONST.)

▲ ℄ 0.6" Ø H.S. TRANSVERSE POST-TENSIONING STRAND SHEATHED WITH A NON-CORROSIVE PIPE (TO BE TENSIONED DURING STAGE II CONST.)

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			25

DESIGNED BY: J. WHEATLEY DATE : JUL 2022
DRAWN BY: J. WHEATLEY DATE : JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE : JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
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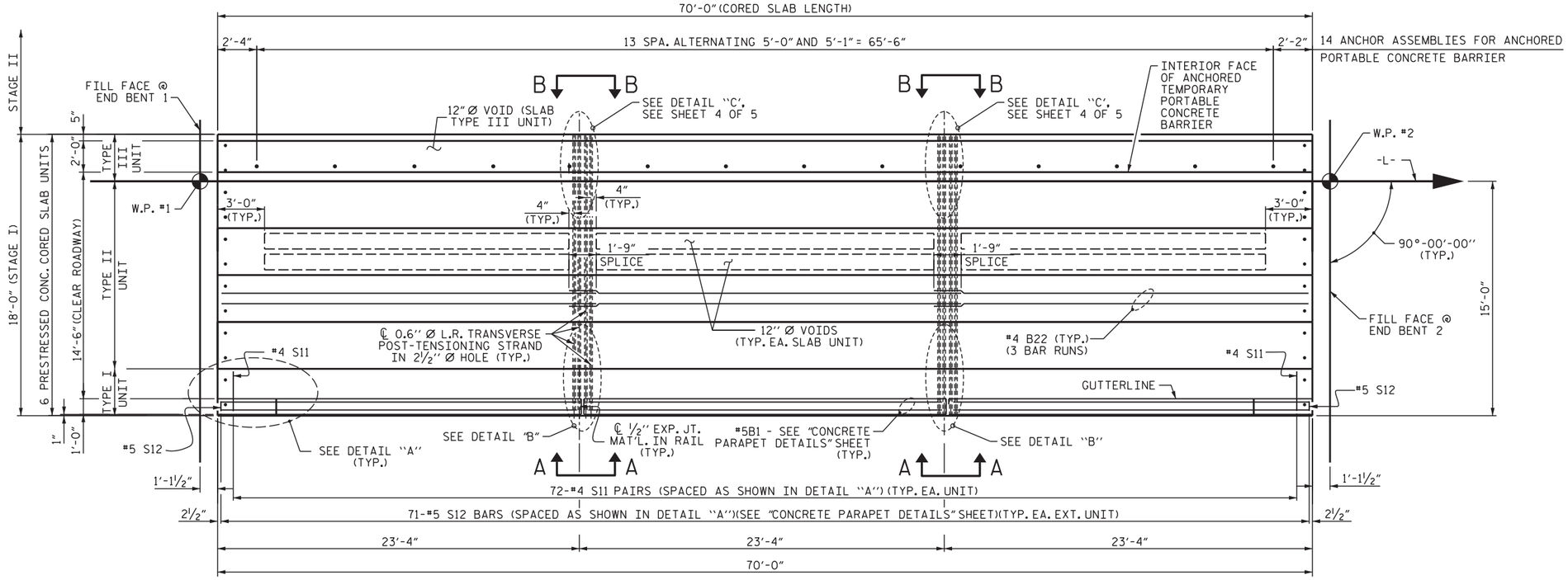
NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

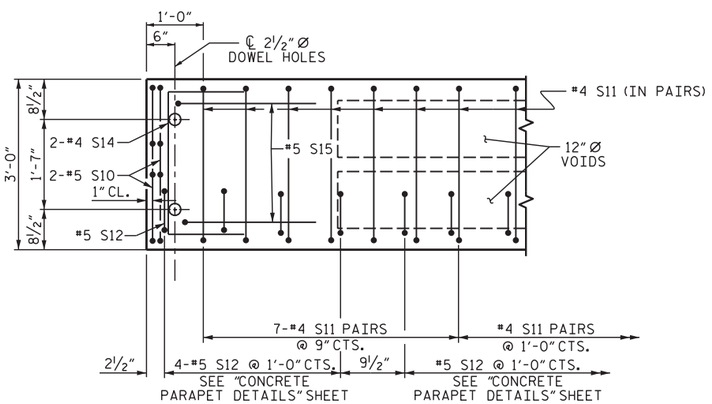
DocuSigned by: Thomas Harris F9ERC057AC1A4EF...

7/27/2022 - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell077\Structures\Drafting\DGNs\401.013.17BP.13.R.176_SWLCS02.dgn J:\188360C



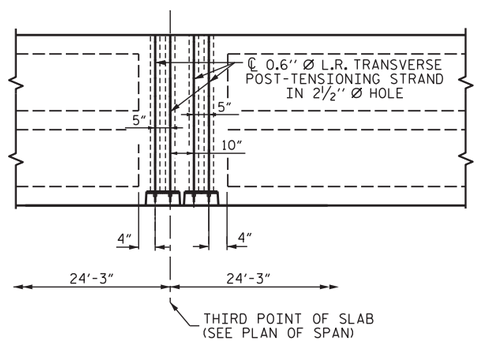
PLAN OF SPAN - STAGE I

(SEE GROUTED RECESS DETAIL VIEWS A-A, AND B-B SHEET 2 OF 5.)



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

DESIGNED BY:	J. WHEATLEY	DATE : JUL 2022
DRAWN BY:	J. WHEATLEY	DATE : JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE : JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE : JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris F9EBC057AC1A4EF...

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

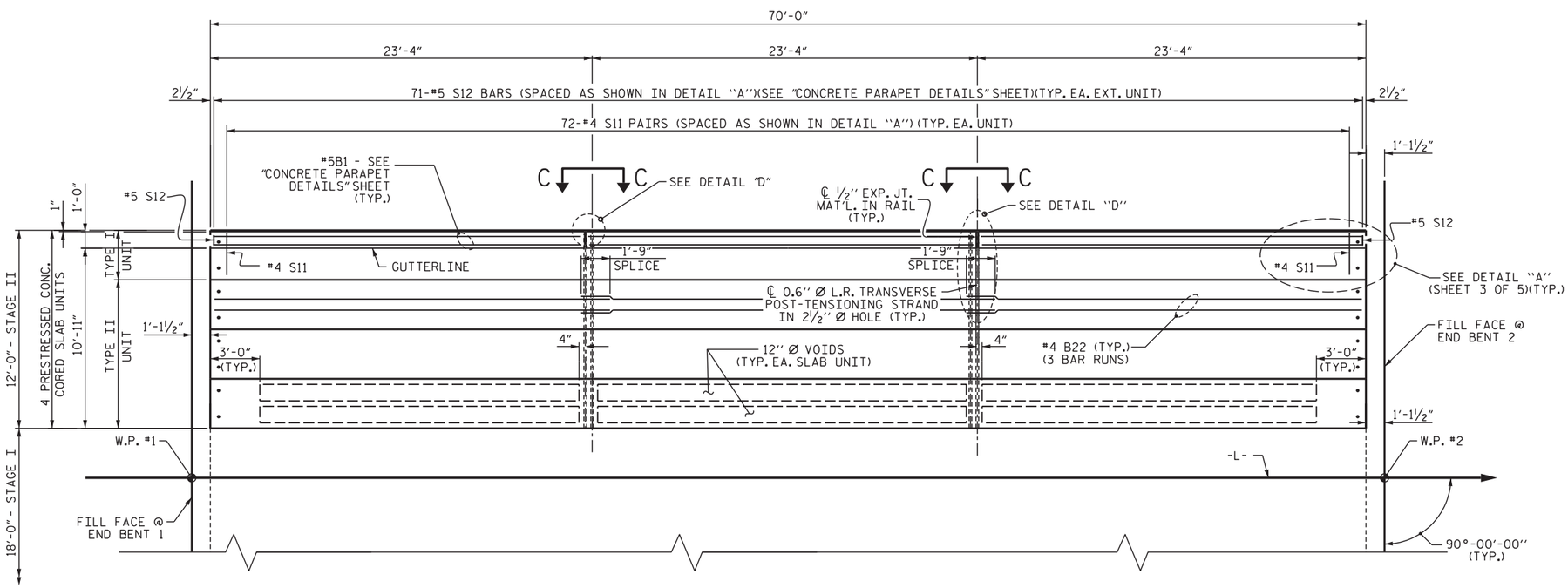
SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70′ UNIT 27′-10″ CLEAR ROADWAY 90° SKEW STAGE I

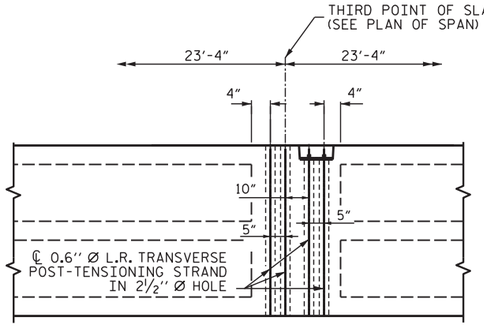
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			25

7/27/2022
J:\188360C - 2015 W Divisions Planning & Design On-Call\1188360 Division 13 Bridges\17BP.13.R.176 McDowell 07\Structures\Drafting\DGNs\401.015.17BP.13.R.176_SMU_CS03.dgn



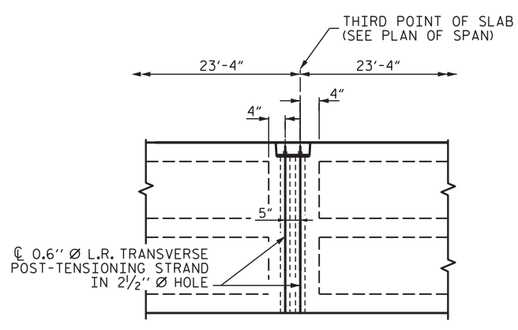
PLAN OF SPAN - STAGE II

(SEE GROUTED RECESS DETAIL VIEWS C-C SHEET 2 OF 5.)



DETAIL "C"

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



DETAIL "D"

#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. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70' UNIT 27'-10" CLEAR ROADWAY 90° SKEW STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			25

DESIGNED BY: J. WHEATLEY DATE: JUL 2022
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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 7/28/2022 F9ERC057AC1A4EF...

7/27/2022 - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell077\Structures\Drafting\DGNs\401.017.17BP.13.R.176_SWU_CS04.dgn
J:\188360C

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				TYPE I UNIT		TYPE II UNIT		TYPE III UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98	24'-6"	98
S10	8	#5	2	4'-9"	40	4'-9"	40	4'-9"	40
S11	144	#4	2	5'-10"	561	5'-10"	561	5'-10"	561
✳S12	71	#5	1	5'-10"	432	-	-	-	-
S14	4	#4	2	5'-7"	15	5'-7"	15	5'-7"	15
S15	4	#5	2	7'-1"	30	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		744		744		744
✳EPOXY COATED REINFORCING STEEL			LBS.		432				
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8		11.8
0.6"Ø L.R. STRANDS			No.		28		28		28

FOR S12 LAYOUT AND SPACING, SEE CONCRETE PARAPET DETAILS SHEET

CORED SLABS REQUIRED

		NUMBER	LENGTH	TOTAL LENGTH
STAGE I	TYPE I	1	70'-0"	70'-0"
	TYPE II	4	70'-0"	280'-0"
	TYPE III	1	70'-0"	70'-0"
		NUMBER	LENGTH	TOTAL LENGTH
STAGE II	TYPE I	1	70'-0"	70'-0"
	TYPE II	3	70'-0"	210'-0"
	TOTAL	10		700'-0"

GRADE 270 STRANDS

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

CONCRETE RELEASE STRENGTH

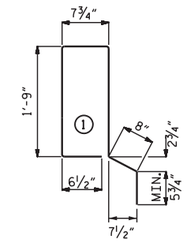
UNIT	PSI
70' UNITS	5500

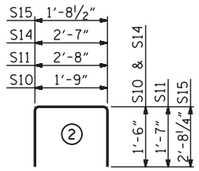
DEAD LOAD DEFLECTION AND CAMBER

	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

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 THE CONCRETE PARAPET 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 CONCRETE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN CONCRETE PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF CONCRETE PARAPET 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.

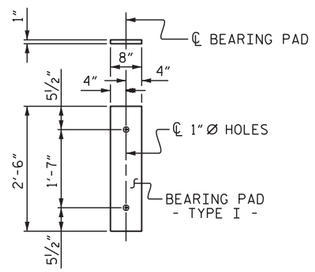
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.



FIXED END
(TYPE I - 20 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 5 OF 5

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-10
1			3			TOTAL SHEETS
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DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE :	JUL 2022

DRAWN BY :	MAA	6/10
CHECKED BY :	MKT	7/10

REV. 5/18 MAA/THC

7/27/2022
J:\188360C - 2015 W Divisions Planning & Design On-Call\1188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401.019.17BP.13.R.176_SWU_CS05.dgn

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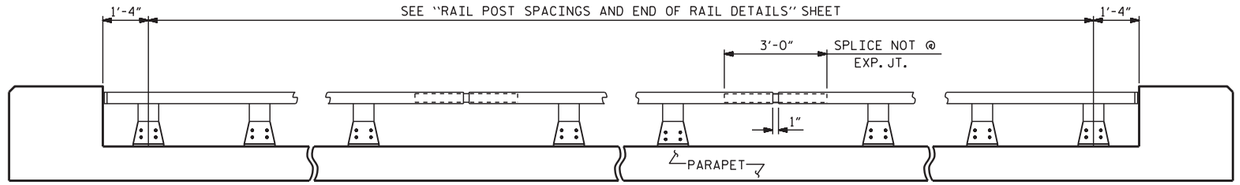
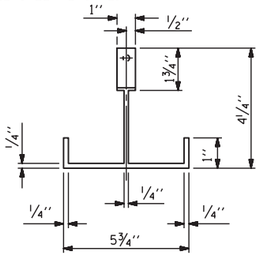
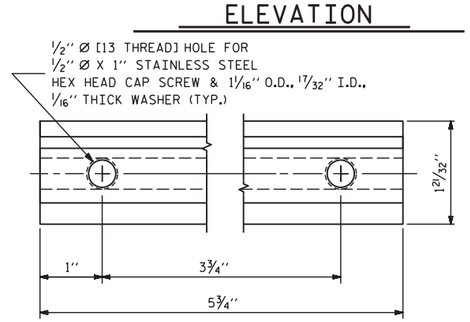


ELEVATION

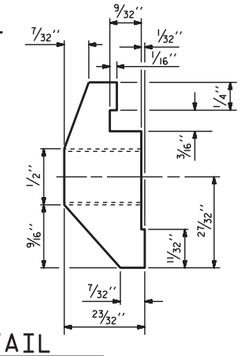
NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 2 OF 2.

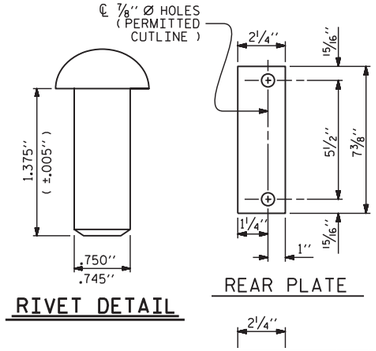


PLAN



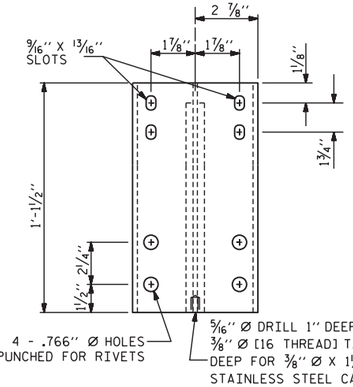
CLAMP BAR DETAIL
(2 REQUIRED PER POST)



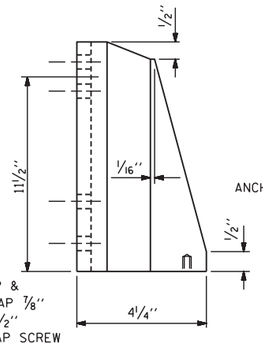


RIVET DETAIL

REAR PLATE

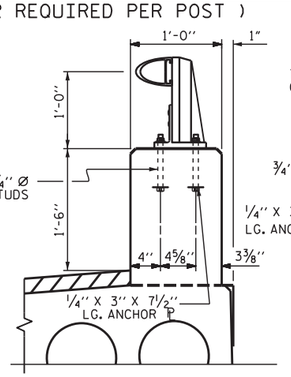


FRONT ELEVATION

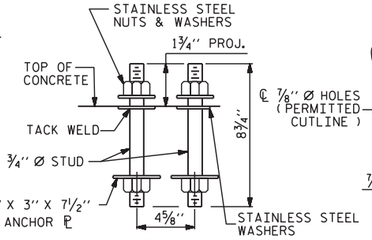


SIDE ELEVATION

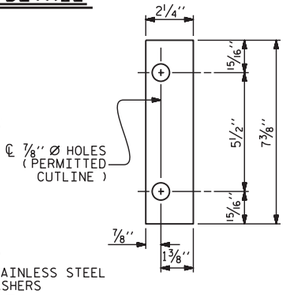
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



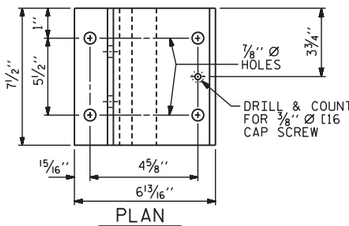
ANCHOR ASSEMBLY



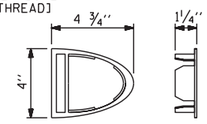
FRONT PLATE

SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

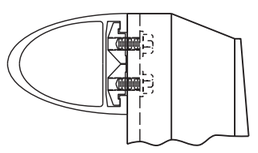


PLAN

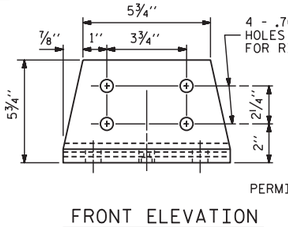


RAIL CAP

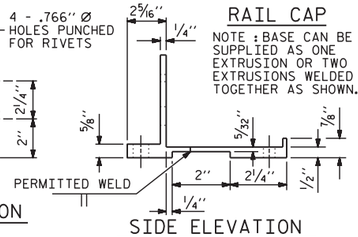
NOTE : BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.



CLAMP & RAIL ASSEMBLY

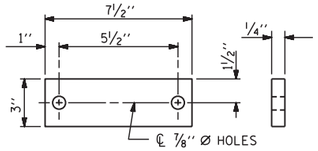


FRONT ELEVATION

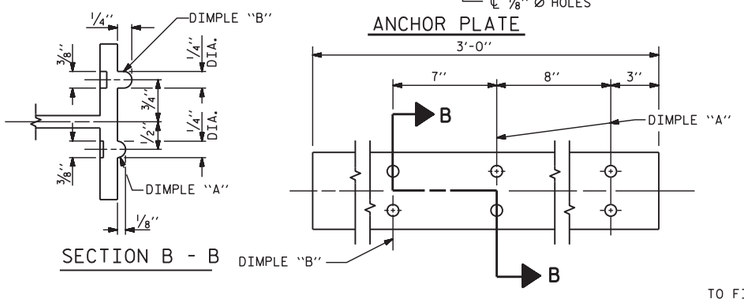


SIDE ELEVATION

POST BASE DETAILS

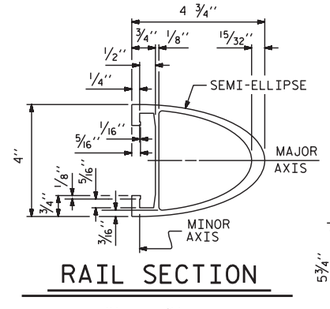


ANCHOR PLATE

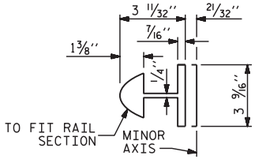


SECTION B - B

EXPANSION BAR DETAILS



RAIL SECTION



BAR SECTION

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

CLOSURE PLATES: CLOSURE PLATES SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

MATERIAL FOR ANCHOR STUDS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. STUDS TO BE EMBEDDED 7" IN CONCRETE. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK, CLASS 2B THREAD, AND MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ANCHOR ℄ SHALL BE AASHTO M270 GRADE 36.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKINGTO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS, NUTS AND WASHERS SHALL MEET THE SAME REQUIREMENTS AS THE ANCHOR STUDS, NUTS AND WASHERS FOR USE WITH THE ANCHOR ASSEMBLY.

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

PAY LENGTH = 125 LIN. FT.

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

1 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			25

STD. NO. BMR1

DRAWN BY : FCJ 1/88 | REV. 6/13 MAA/GM
CHECKED BY : CRK 3/89 | REV. 12/17 MAA/THC | REV. 5/18 MAA/THC

ASSEMBLED BY: J.WHEATLEY DATE : JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE : JUL 2022

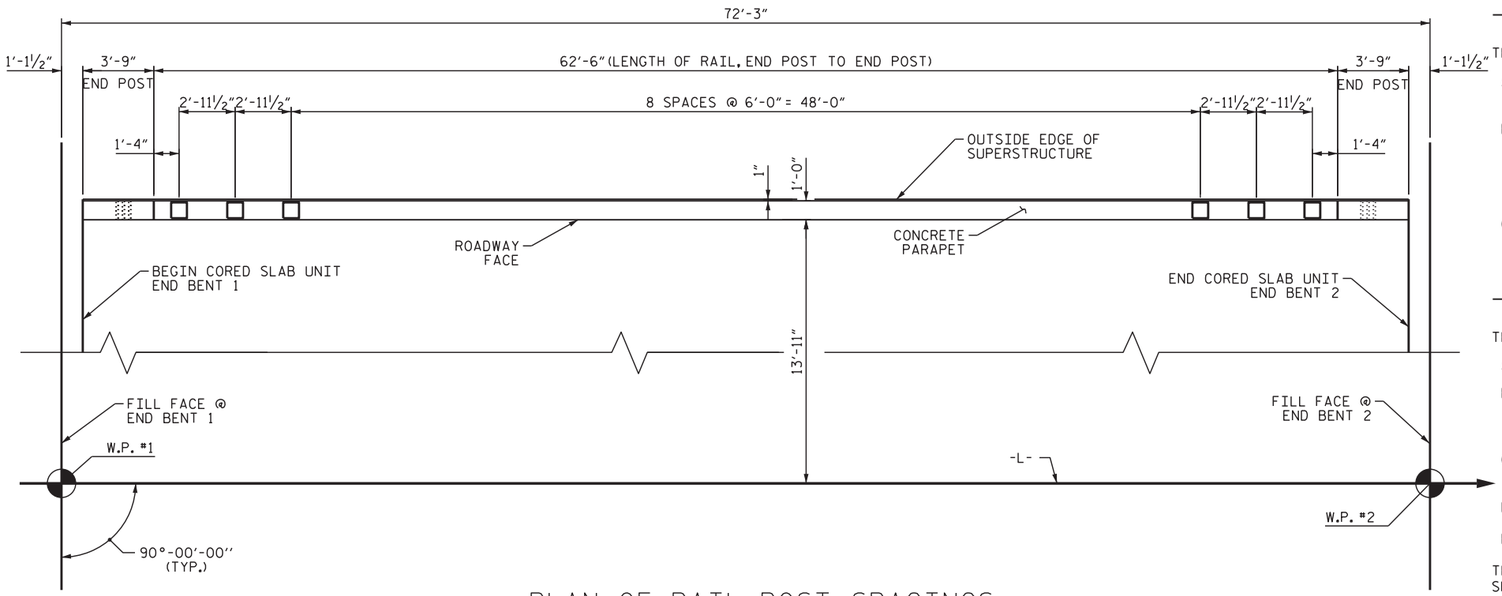
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS W. HARRIS

DocuSigned by: Thomas Harris F9EBC057AC1A4EF...

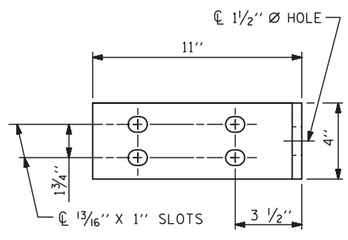
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040

LICENSE NO. F-0165

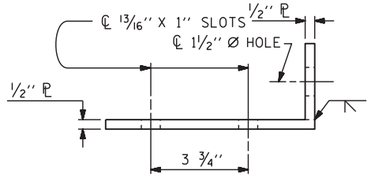


PLAN OF RAIL POST SPACINGS

LEFT RAIL SHOWN; RIGHT RAIL SIMILAR

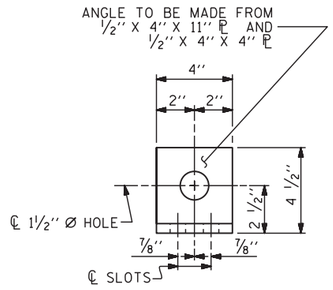


ELEVATION

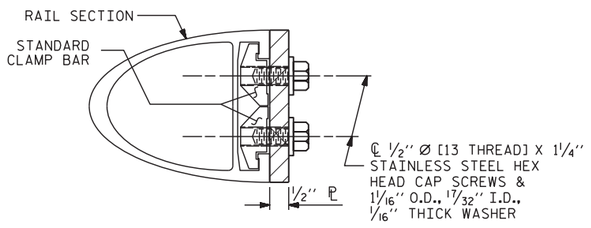


TOP VIEW

FIXED

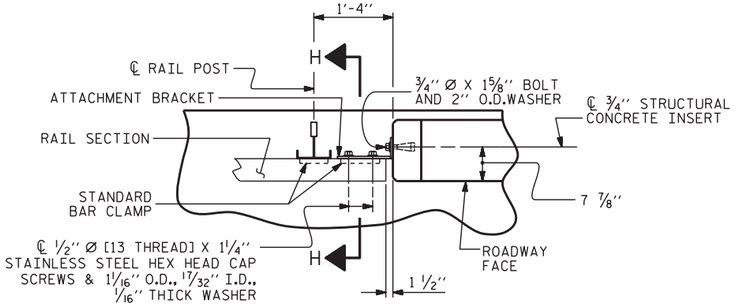


END VIEW (FIX)



SECTION H-H (FIX)

DETAILS FOR ATTACHING METAL RAIL TO END POST



PLAN - RAIL AND END POST

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE SHEET 1 OF 2).

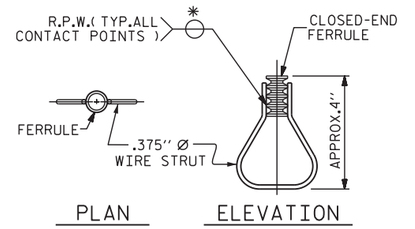
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

*EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 2 OF 2

DRAWN BY : FCJ 1/88	REV. 5/1/06	TLA/GM	
CHECKED BY : CRK 3/89	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	
ASSEMBLED BY: J.WHEATLEY	DATE : JUL 2022		
CHECKED BY: T. KIRSCHBAUM	DATE : JUL 2022		
DESIGN ENGINEER OF RECORD: T. HARRIS	DATE : JUL 2022		

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040

LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 1/28/2022 F9EBC057AC1A4EF...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

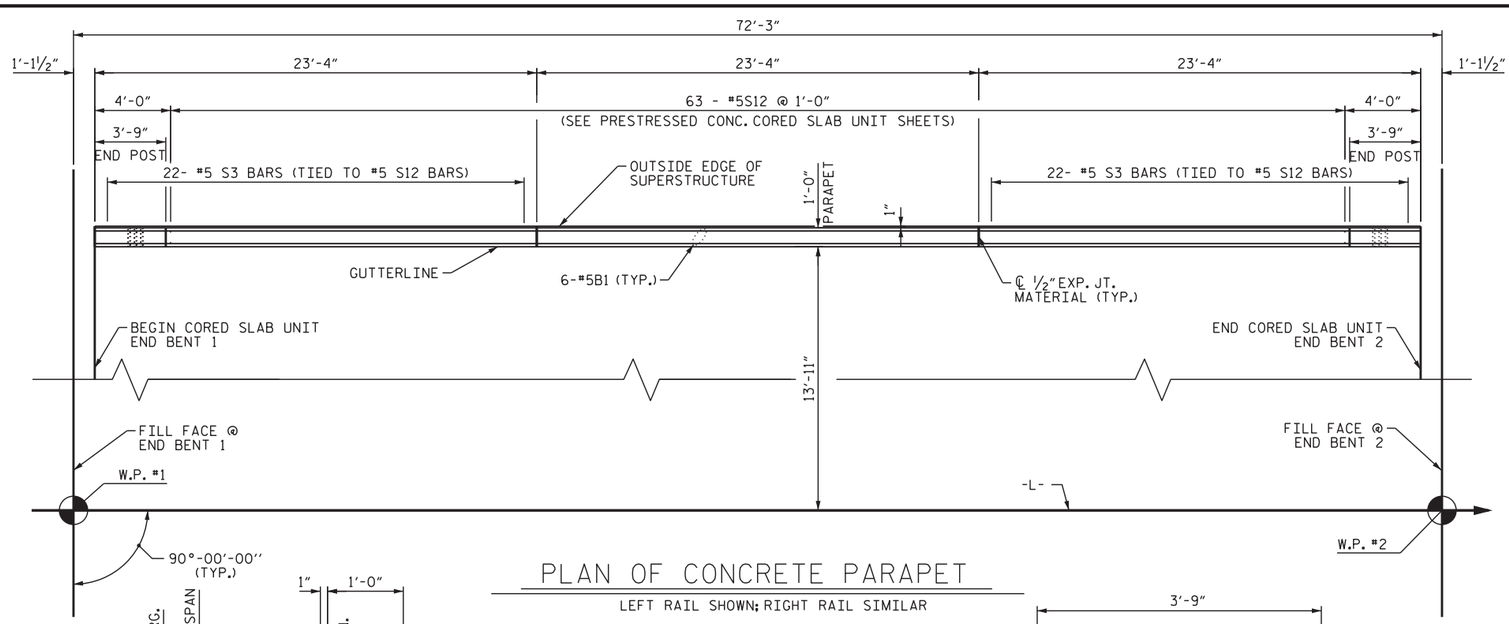
RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			25

STD. NO. BMR2

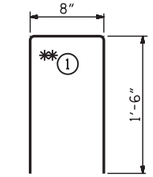
7/27/2022
J:\188360C - 2015 W Divisions Planning & Design On-Call\1188360 Division 13 Bridges\17BP.13.R.176 McDowell 07\Structures\Drafting\DGNs\401.023.17BP.13.R.176_SMU_BR02.dgn



PLAN OF CONCRETE PARAPET

LEFT RAIL SHOWN; RIGHT RAIL SIMILAR

BAR TYPES



✱✱ TO BE USED WHERE TOP CLEARANCE EXCEEDS 3" (FIRST AND LAST PARAPET SECTIONS)

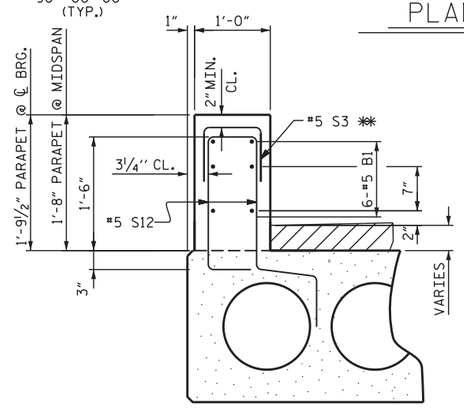
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE CONCRETE PARAPET

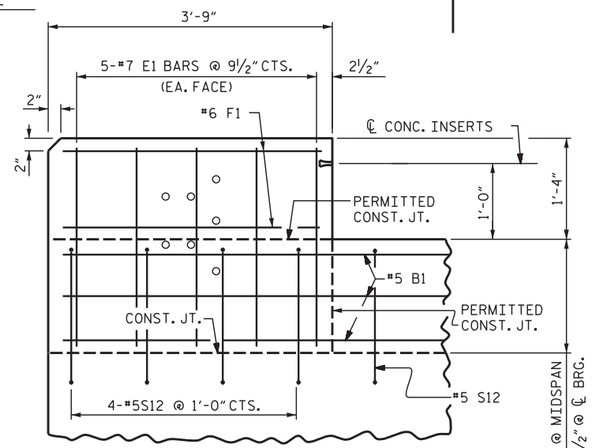
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	18	#5	STR	23'-0"	432
✱ E1	20	#7	STR	2'-8"	109
✱ F1	8	#6	STR	3'-5"	41
✱ S3	44	#5	1	3'-8"	168
✱ EPOXY COATED REINFORCING STEEL				LBS.	750
PARAPET				CU. YDS.	4.8
END POSTS				CU. YDS.	0.3
CLASS "AA" CONCRETE TOTAL				CU. YDS.	5.1
1'-0" x 1'-9½" ONE CONCRETE PARAPET				LIN. FT.	70.0

GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT

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

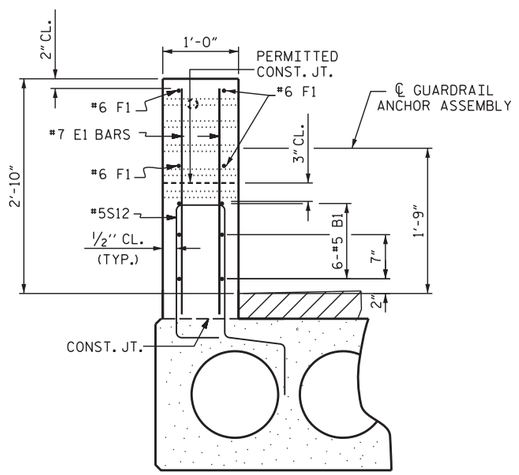


SECTION THRU PARAPET

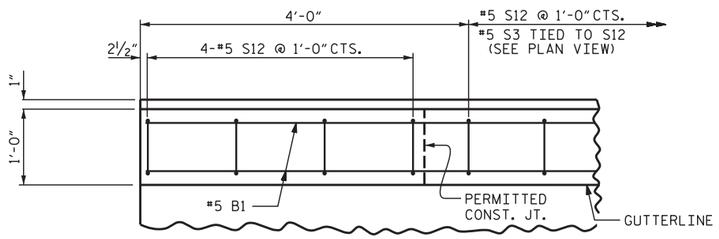


ELEVATION

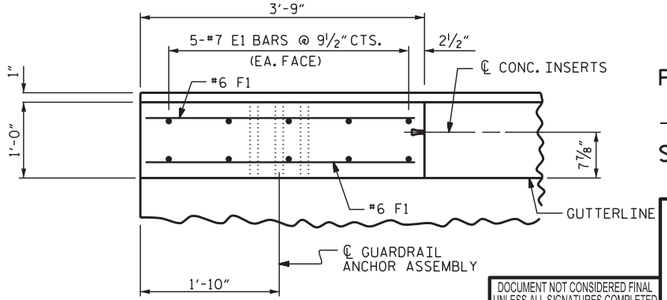
ELEVATION AT EXPANSION JOINTS



END VIEW



PLAN OF PARAPET



PLAN OF END POST

PARAPET AND END POST FOR ONE BAR RAIL

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			25

DESIGNED BY: J. WHEATLEY DATE : JUL 2022
DRAWN BY: J. WHEATLEY DATE : JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE : JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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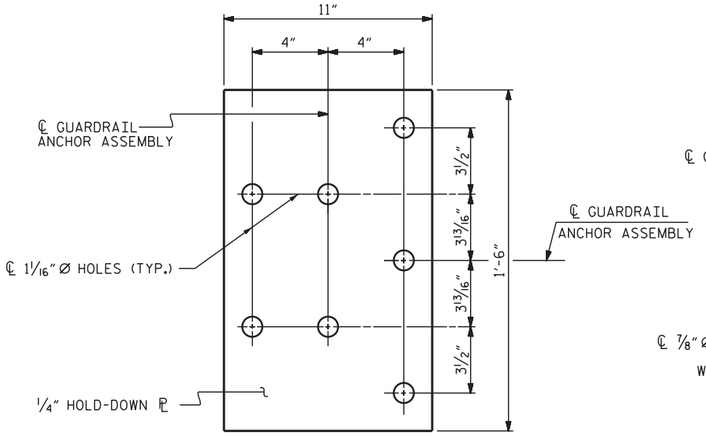
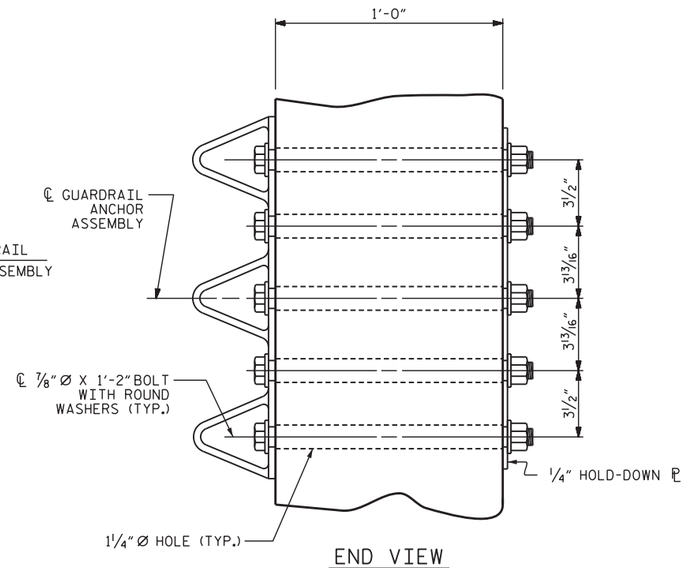
NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 7/28/2022 F9E8C057AC1A4EF...

7/27/2022 - J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401.025.17BP.13.R.176_SMU_BR03.dgn



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

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

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

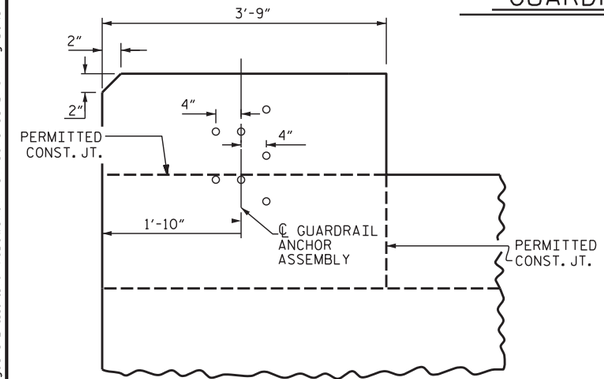
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

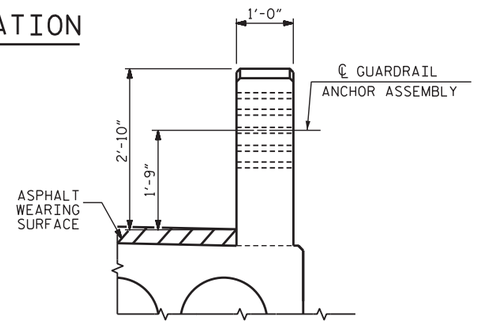
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

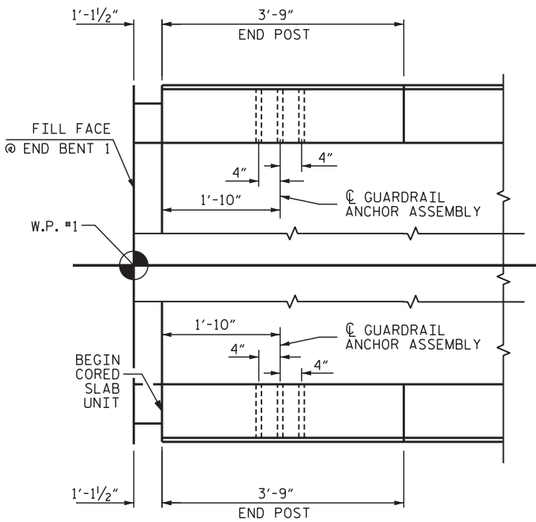
* LOCATION OF GUARDRAIL ATTACHMENT



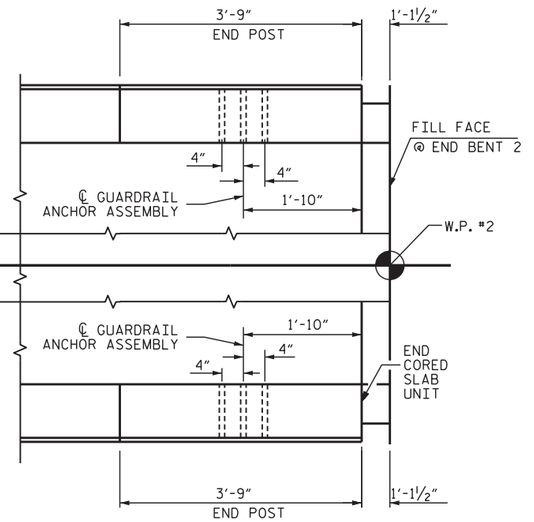
ELEVATION



END VIEW
(ONE BAR METAL RAIL)



PLAN END BENT 1



PLAN END BENT 2

LOCATION OF GUARDRAIL ANCHOR AT END POST

DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC
ASSEMBLED BY: J.WHEATLEY	DATE : JUL 2022	
CHECKED BY: T. KIRSCHBAUM	DATE : JUL 2022	
DESIGN ENGINEER OF RECORD: T. HARRIS	DATE : JUL 2022	

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434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS W. HARRIS

DocuSigned by: Thomas Harris F9EBC057AC1A4EF...

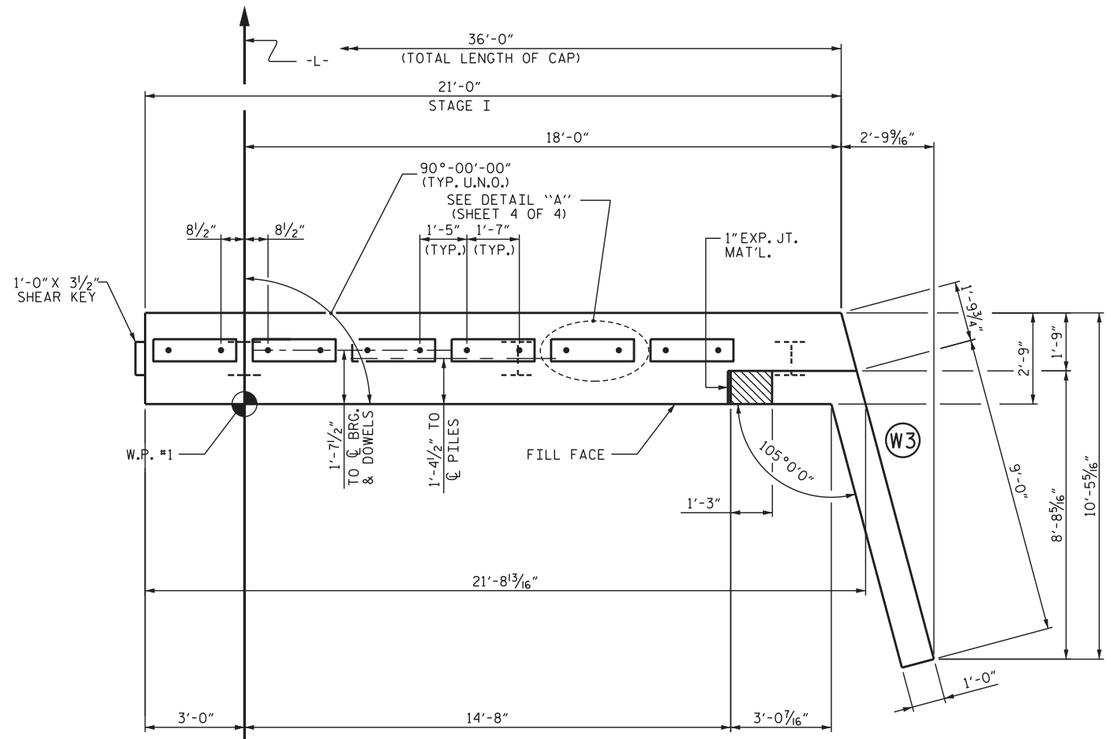
PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

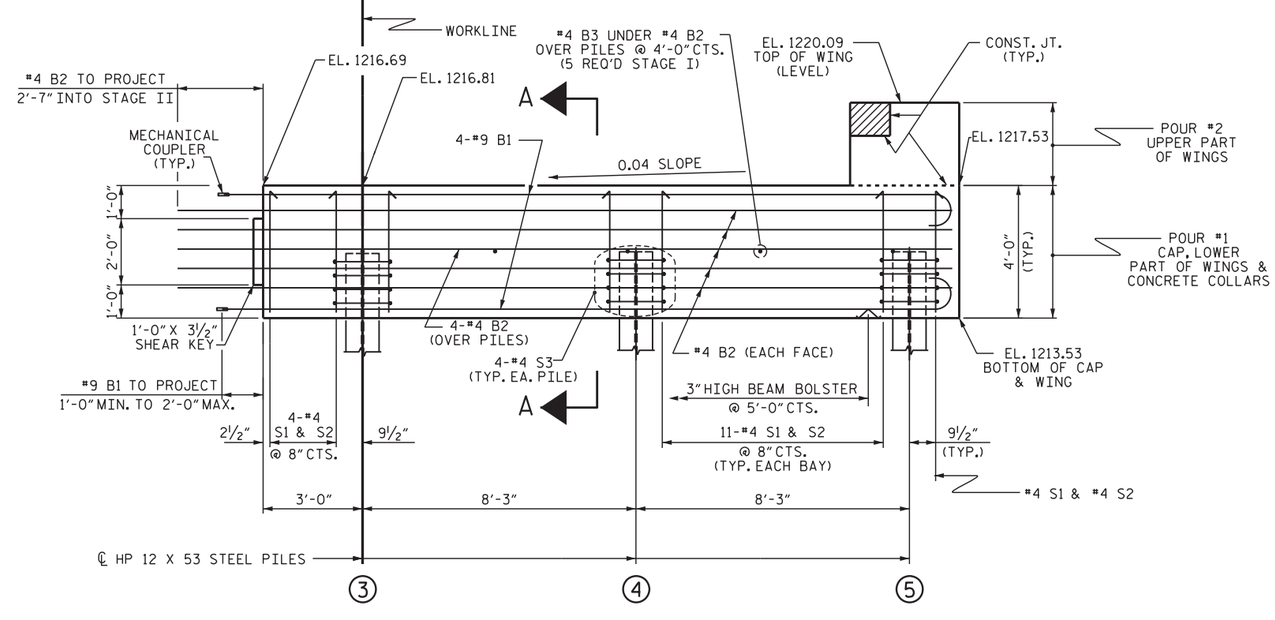
STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR ONE BAR METAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			25

STD. NO. GRA3



PLAN



ELEVATION

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

NOTES

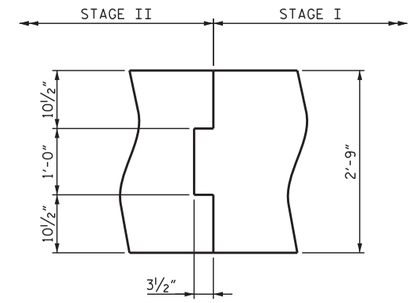
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

CONCRETE COUPLERS SHALL BE USED TO JOIN #9 B1 BARS IN STAGE I WITH #9 B4 BARS IN STAGE II. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY 1 FOOT AND THE BARS SHALL BE CUT ACCORDINGLY TO ALLOW A MINIMUM OF 1'-0" EXTENSION INTO STAGE II CONSTRUCTION.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 4 OF 4.



PLAN
CAP

SECTION THRU SHEAR KEY

TOP OF PILE ELEVATIONS	
③	1214.83
④	1215.16
⑤	1215.49

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			25

DESIGNED BY: J. WHEATLEY DATE: JUL 2022
DRAWN BY: J. WHEATLEY DATE: JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE: JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE: JUL 2022

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DocuSigned by: Thomas Harris 7/26/2022
F9ERC057AC1A4EF...

7/27/2022 - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell077\Structures\Drafting\DGNs\401.029.17BP.13.R.176_SMU_EB101.dgn
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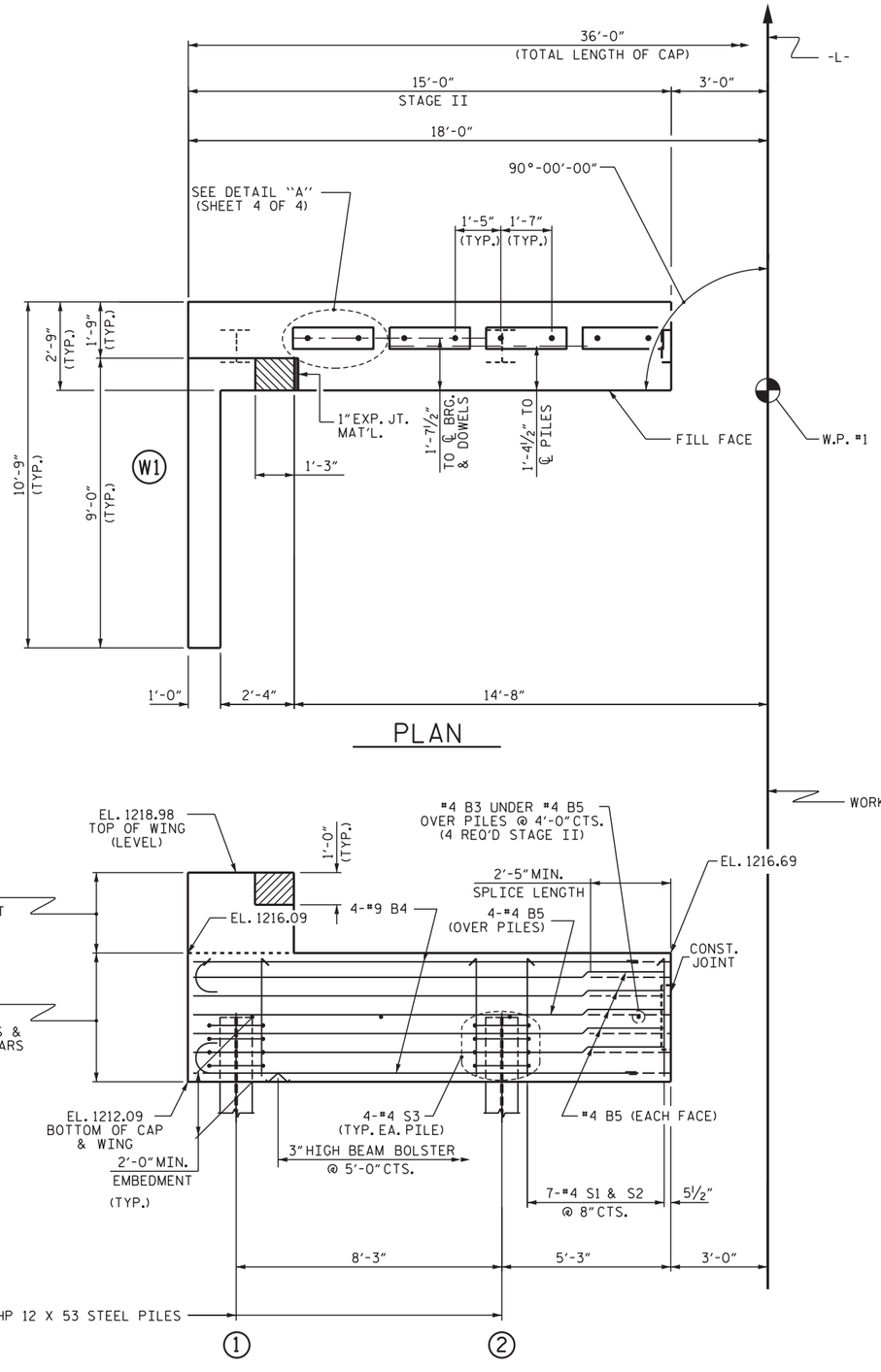


ELEVATION

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

NOTES

FOR NOTES, SEE SHEET 1 OF 4.

TOP OF PILE ELEVATIONS	
①	1214.17
②	1214.50

DESIGNED BY:	J. WHEATLEY	DATE :	JUL 2022
DRAWN BY:	J. WHEATLEY	DATE :	JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE :	JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE :	JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris F9ERC057AC1A4EF...

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

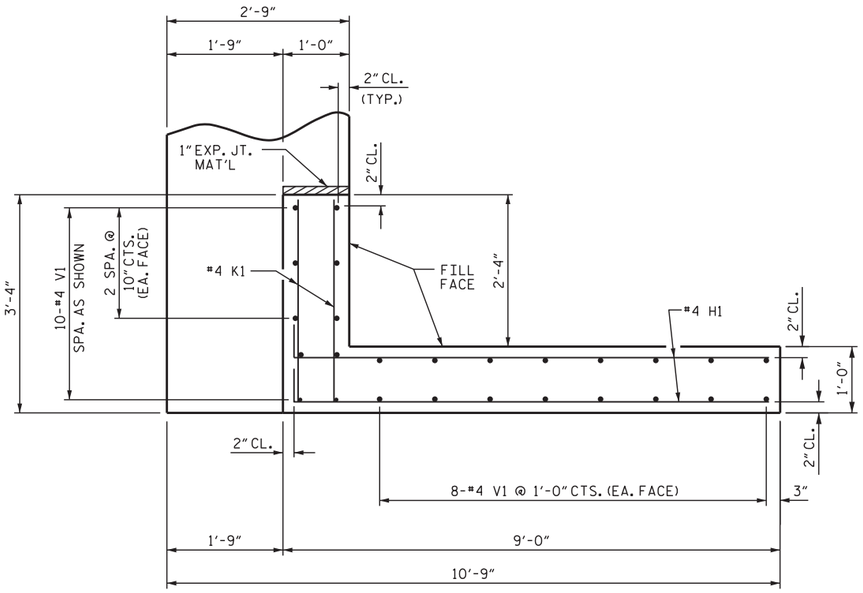
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

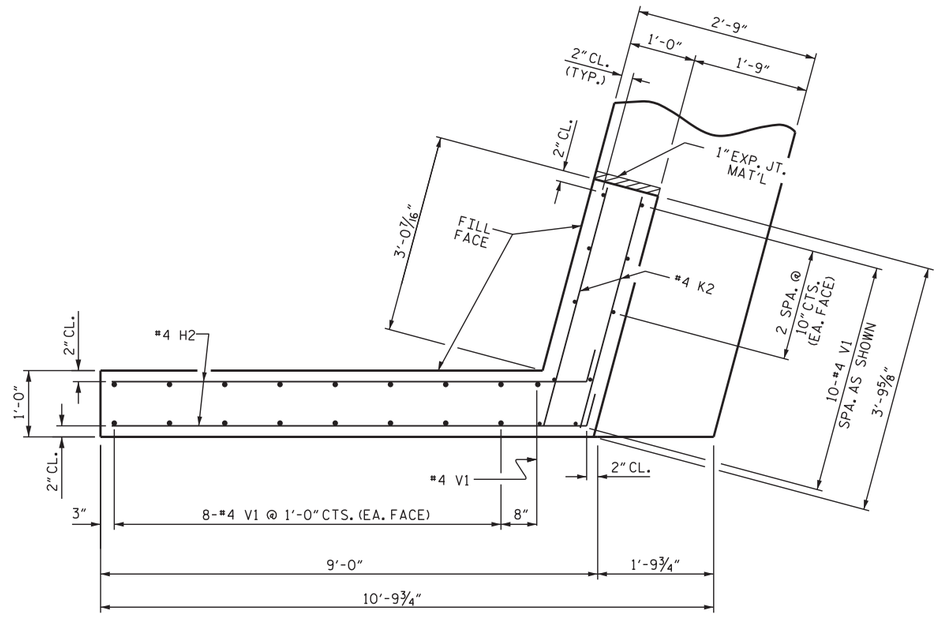
SUBSTRUCTURE

END BENT 1
STAGE II

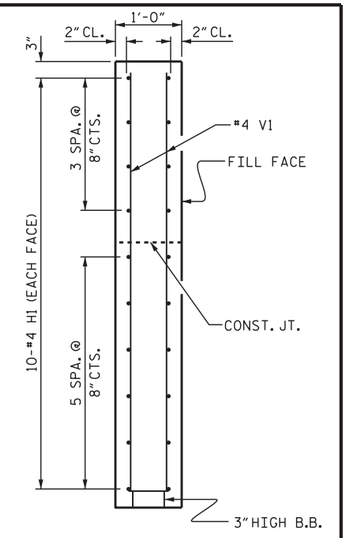
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			25



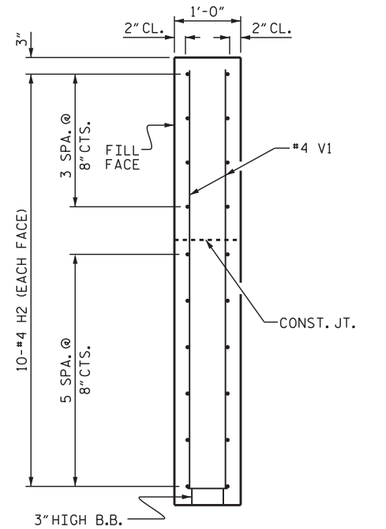
PLAN OF WING (W1)



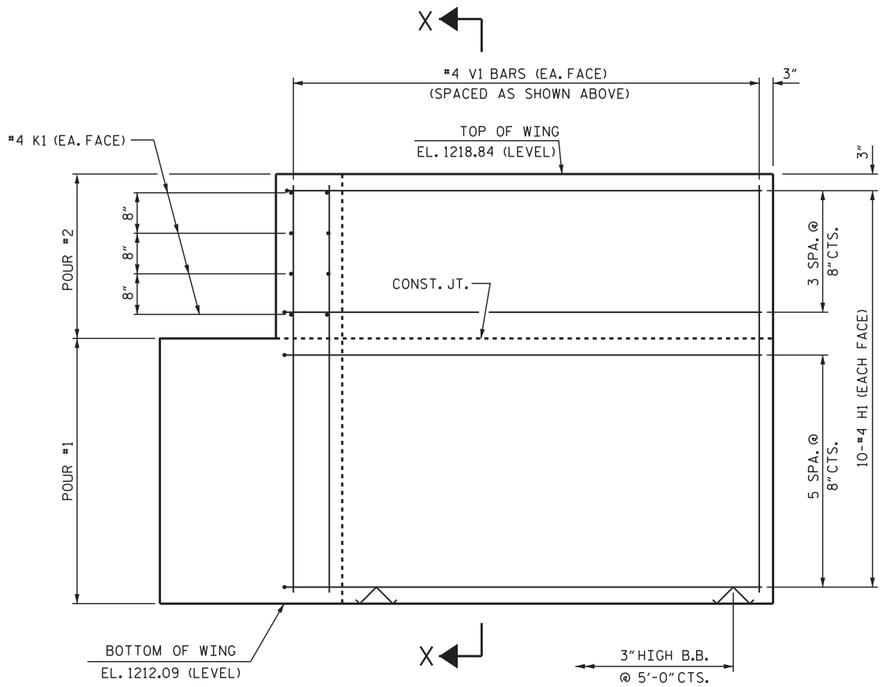
PLAN OF WING (W3)



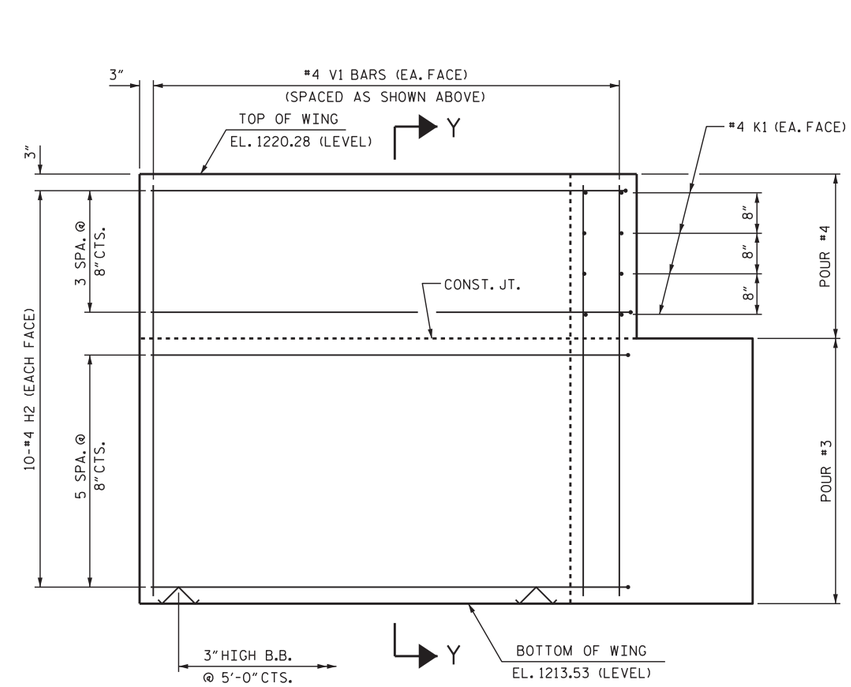
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W3)

WING DETAILS

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			25

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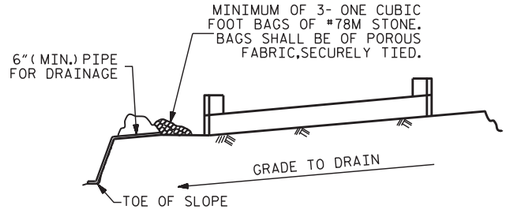
ASSEMBLED BY:	J.WHEATLEY	DATE :	JUL 2022
CHECKED BY:	T.KIRSCHBAUM	DATE :	JUL 2022
DESIGN ENGINEER OF RECORD:	T.HARRIS	DATE :	JUL 2022

DRAWN BY :	WJH	12/11
CHECKED BY :	AAC	12/11

REV. 4/15 MAA/TMG

STD. NO. EB_30_90S4

7/27/2022 - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell077\Structures\Drafting\DGNs\401.033.17BP.13.R.176_SMU_EB103.dgn
J:\188360C



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.

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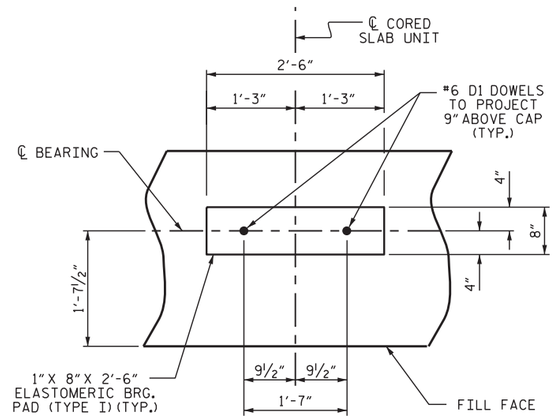
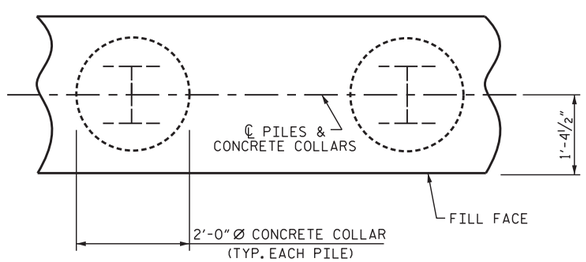
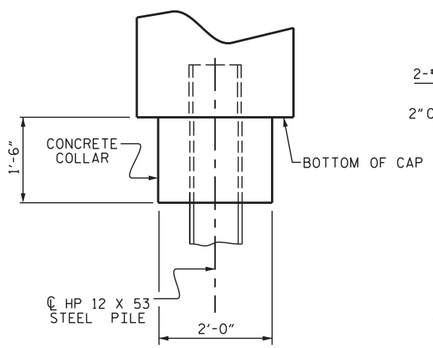
TEMPORARY DRAINAGE AT END BENT



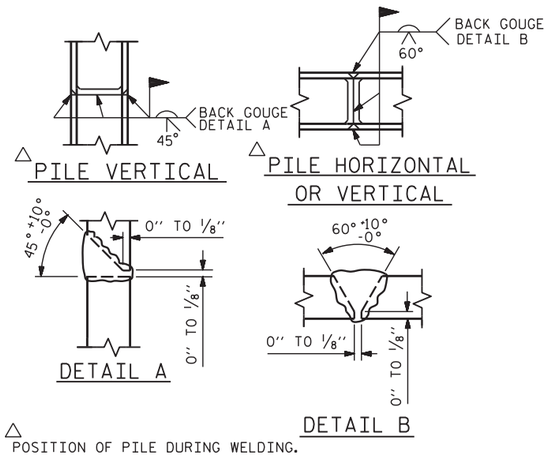
DETAIL "A"



PLAN

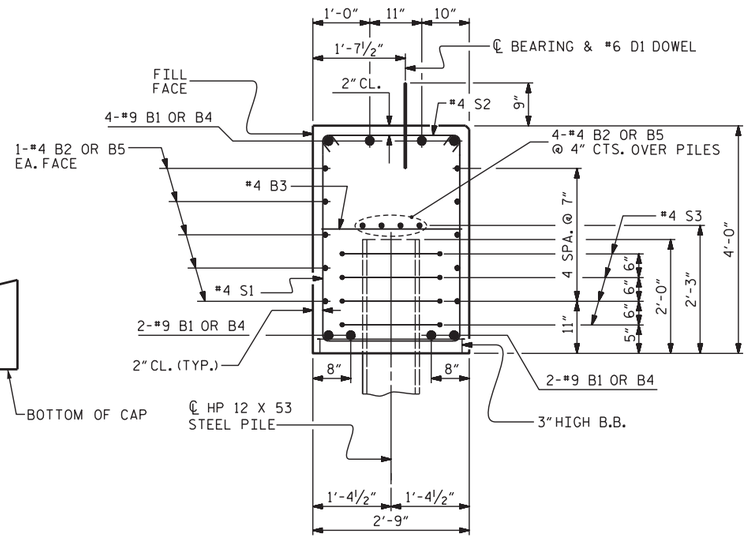


ELEVATION



△ POSITION OF PILE DURING WELDING.

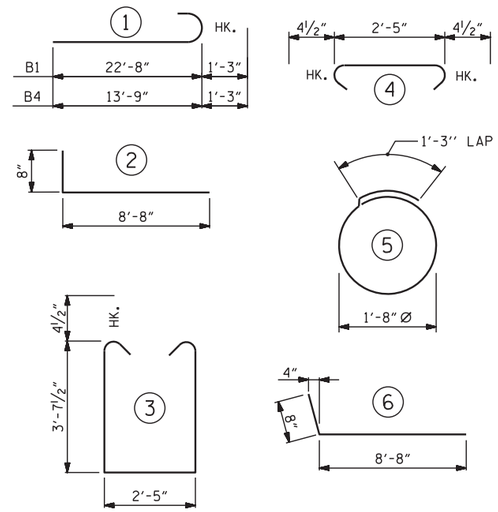
PILE SPLICE DETAILS



SECTION A-A

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

REBAR LENGTHS CAN BE ADJUSTED BASED ON SELECTED MECHANICAL COUPLER TYPE.

END BENT 1 - STAGE I
HP 12 X 53 STEEL PILES NO: 3 LIN. FT.= 120
END BENT 1 - STAGE II
HP 12 X 53 STEEL PILES NO: 2 LIN. FT.= 50
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES END BENT 1 NO: 5
STEEL PILE POINTS END BENT 1 NO: 5

BILL OF MATERIAL
END BENT 1 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	23'-11"	651
B2	14	#4	STR	23'-4"	218
B3	5	#4	STR	2'-5"	8
D1	12	#6	STR	1'-6"	27
H2	20	#4	6	9'-4"	125
K2	8	#4	STR	3'-4"	18
S1	27	#4	3	10'-5"	188
S2	27	#4	4	3'-2"	57
S3	12	#4	5	6'-6"	52
V1	27	#4	STR	6'-2"	111

REINFORCING STEEL (FOR END BENT 1 - STAGE I) 1455 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT 1 - STAGE I)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	10.3 C.Y.
POUR #2	UPPER PART OF WINGS	1.1 C.Y.
TOTAL CLASS A CONCRETE		11.4 C.Y.

BILL OF MATERIAL
END BENT 1 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B3	4	#4	STR	2'-5"	6
B4	8	#9	1	15'-1"	410
B5	14	#4	STR	14'-8"	137
D1	8	#6	STR	1'-6"	18
H1	20	#4	2	9'-4"	125
K1	8	#4	STR	2'-11"	16
S1	19	#4	3	10'-5"	132
S2	19	#4	4	3'-2"	40
S3	8	#4	5	6'-6"	35
V1	26	#4	STR	6'-2"	107

REINFORCING STEEL (FOR END BENT 1- STAGE II) 1026 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT 1 - STAGE II)

POUR #3	CAP, LOWER PART OF WINGS & COLLARS	7.6 C.Y.
POUR #4	UPPER PART OF WINGS	1.2 C.Y.
TOTAL CLASS A CONCRETE		8.8 C.Y.

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

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SHEET 4 OF 4

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE
END BENT 1 DETAILS

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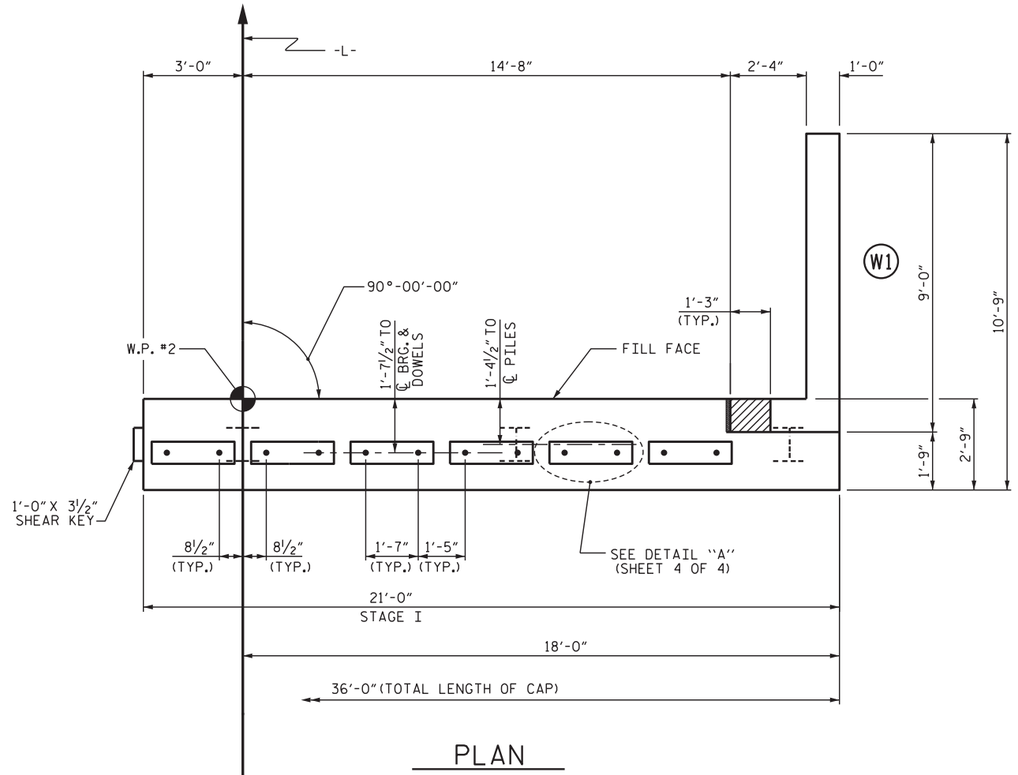
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			25

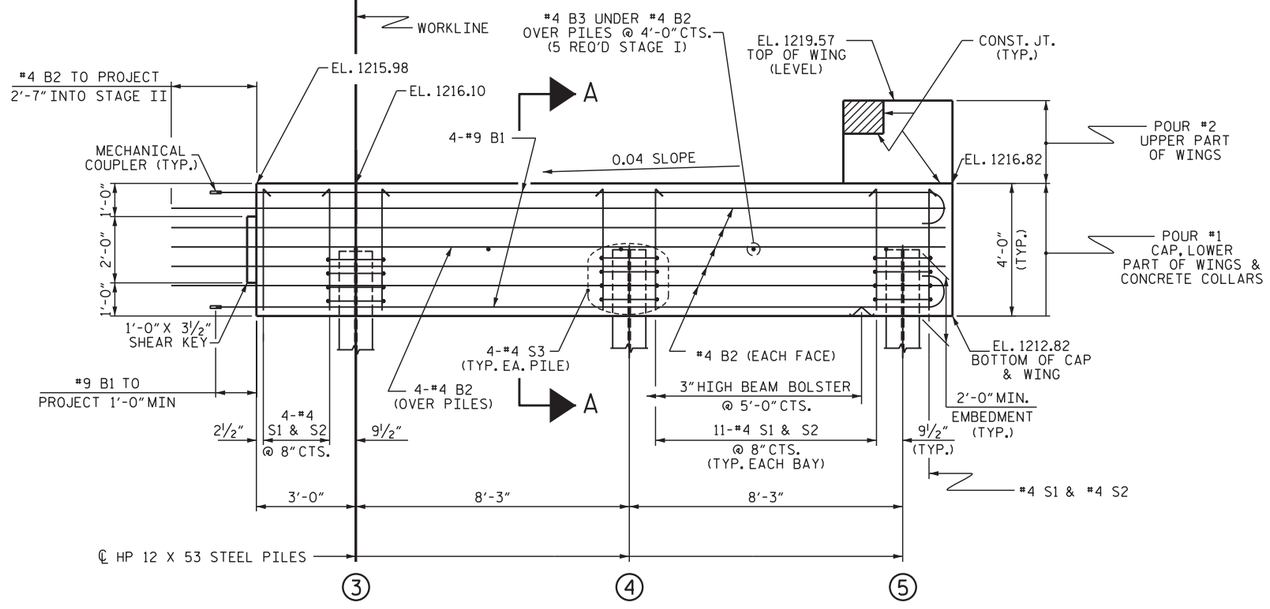
DESIGNED BY:	J. WHEATLEY	DATE :	JUL 2022
DRAWN BY:	J. WHEATLEY	DATE :	JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE :	JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE :	JUL 2022

CORROSION PROTECTION FOR STEEL PILES DETAIL

7/27/2022 - J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.176 McDowell 077\Structures\Drafting\DGNs\401.035.17BP.13.R.176.SMU.EB104.dgn



PLAN



ELEVATION

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

NOTES

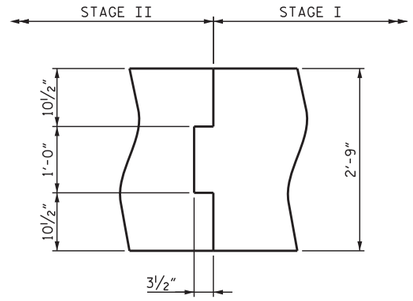
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

CONCRETE COUPLERS SHALL BE USED TO JOIN #9 B1 BARS IN STAGE I WITH #9 B4 BARS IN STAGE II. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY 1 FOOT AND THE BARS SHALL BE CUT ACCORDINGLY TO ALLOW A MINIMUM OF 1'-0" EXTENSION INTO STAGE II CONSTRUCTION.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 4 OF 4.



PLAN
CAP

SECTION THRU SHEAR KEY

TOP OF PILE ELEVATIONS	
③	1214.12
④	1214.45
⑤	1214.78

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			25

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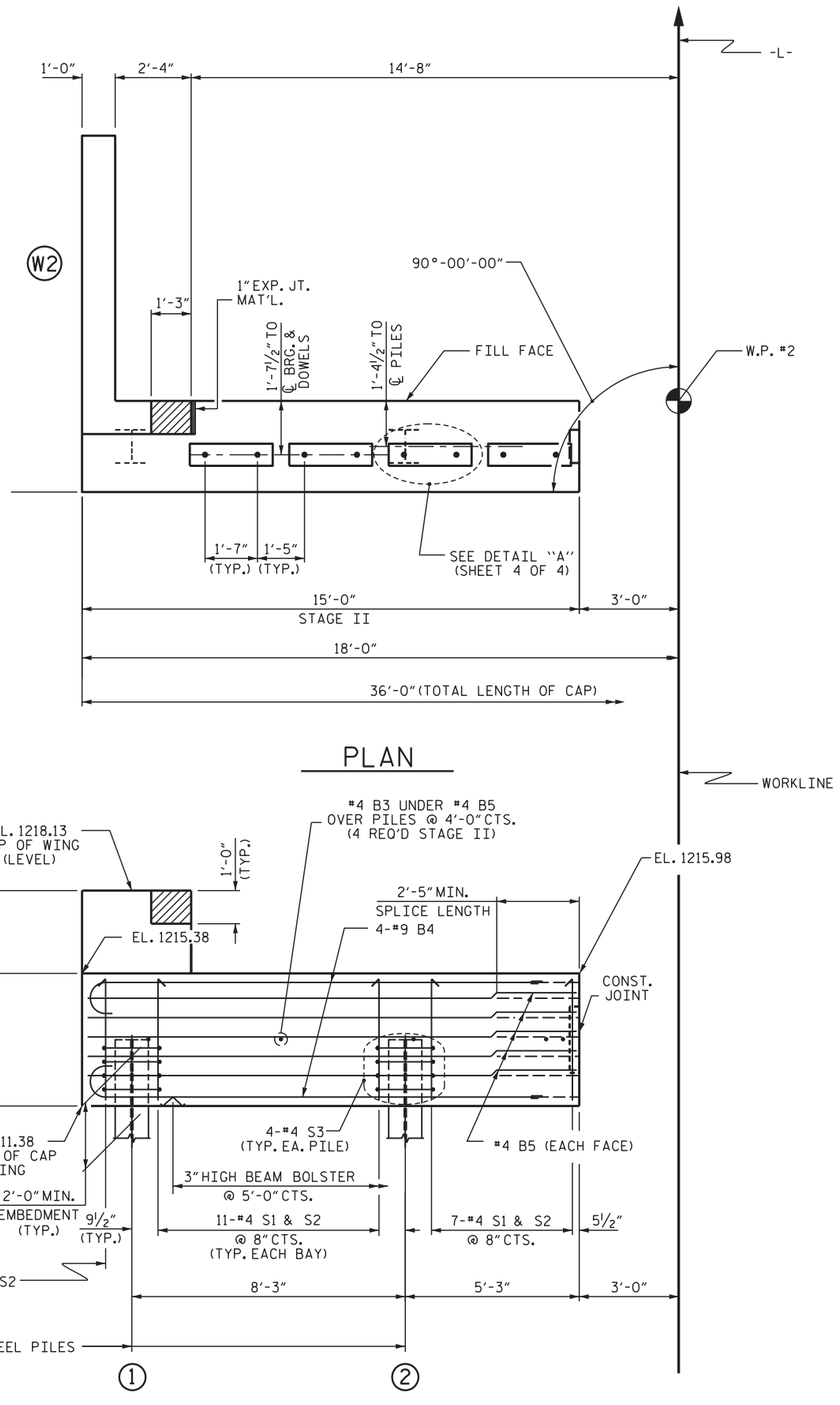
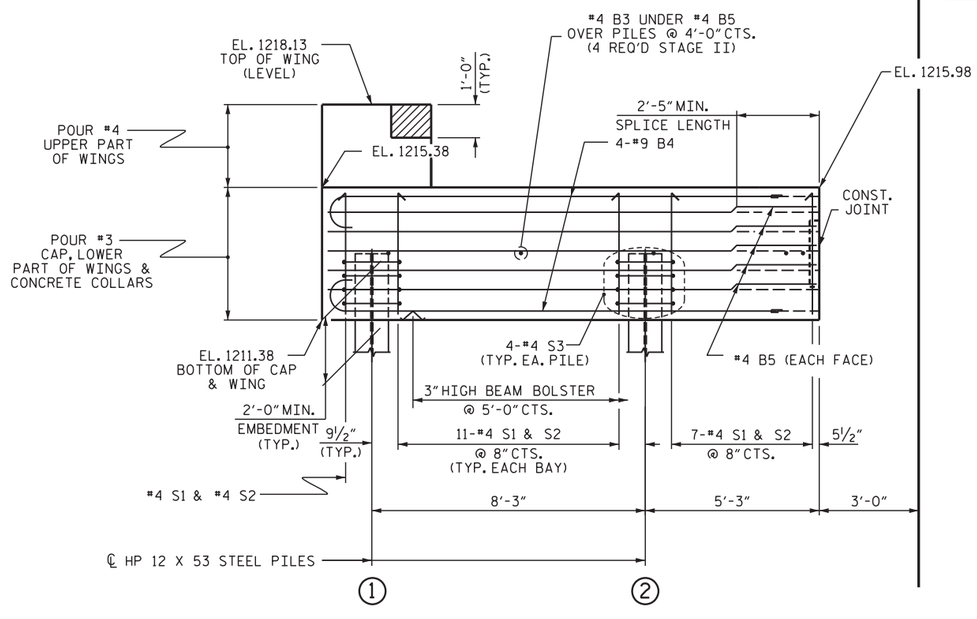


PLAN



ELEVATION

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

NOTES

FOR NOTES, SEE SHEET 1 OF 4.

TOP OF PILE ELEVATIONS	
①	1213.46
②	1213.79

PROJECT NO. 17BP.13.R.176
McDOWELL COUNTY
STATION: 16+74.00 -L-

SHEET 2 OF 4

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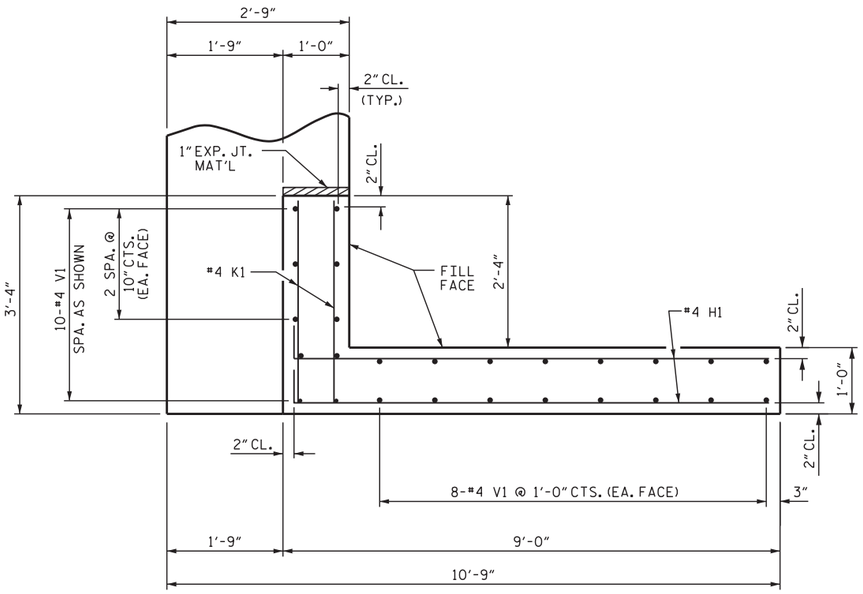
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

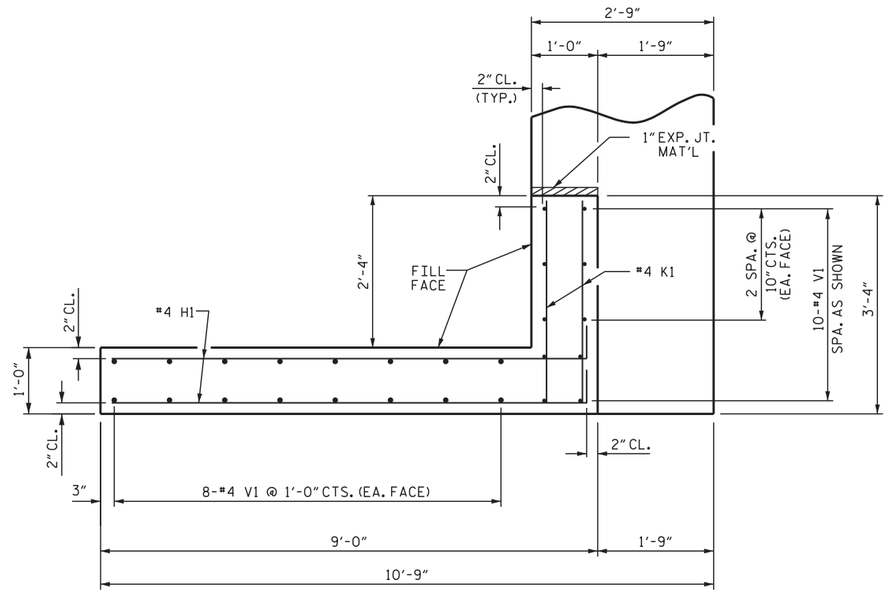
SUBSTRUCTURE

END BENT 2
STAGE II

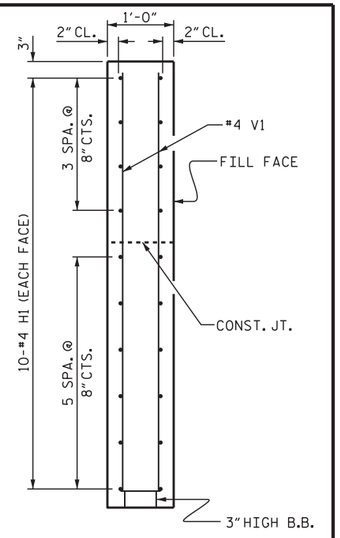
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			25



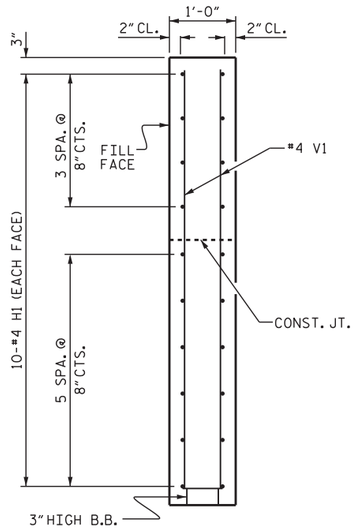
PLAN OF WING (W1)



PLAN OF WING (W2)

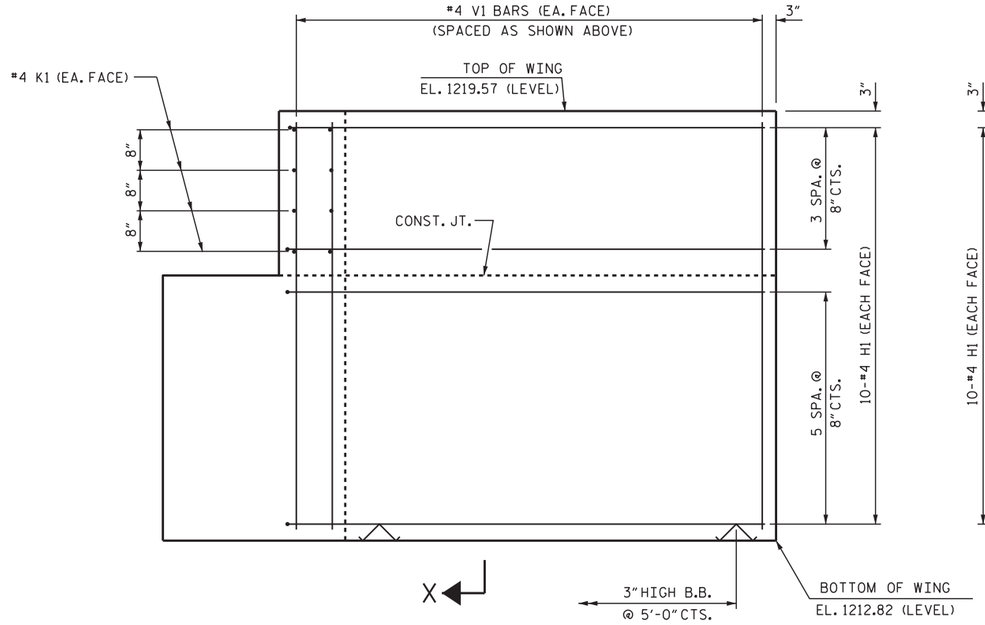


SECTION X-X

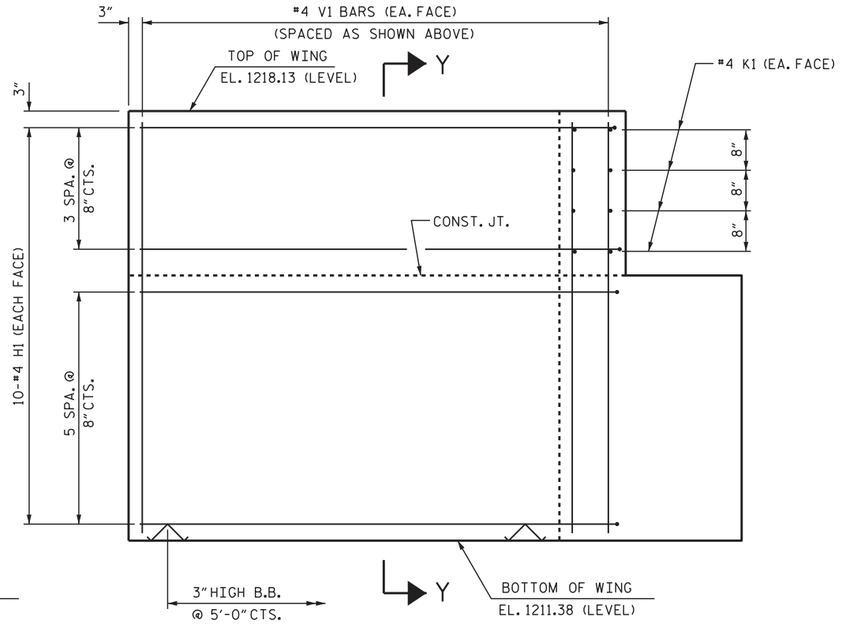


SECTION Y-Y

X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

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SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
WING DETAILS

REVISIONS						SHEET NO.
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REV. 4/15 MAA/TMG

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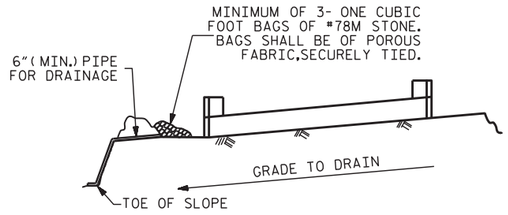

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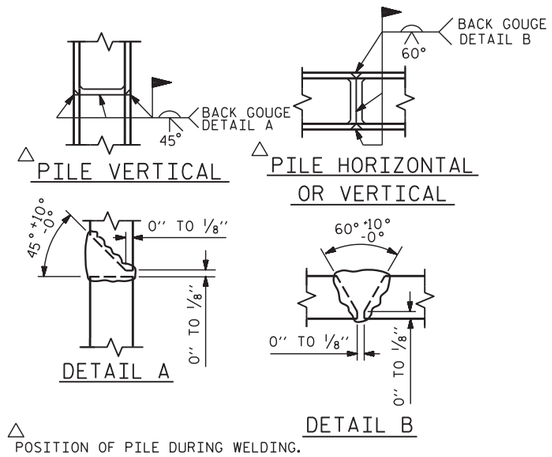
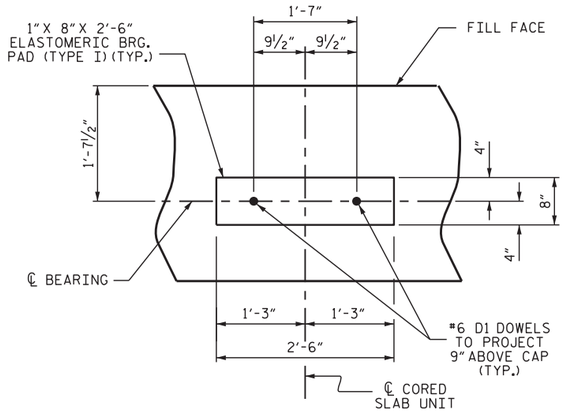
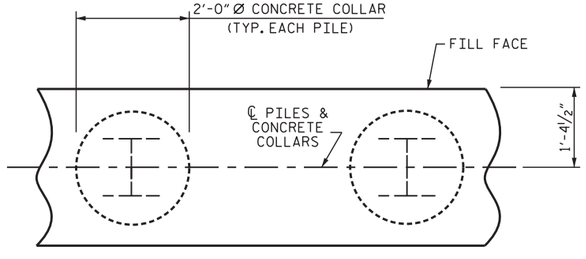


△ POSITION OF PILE DURING WELDING.

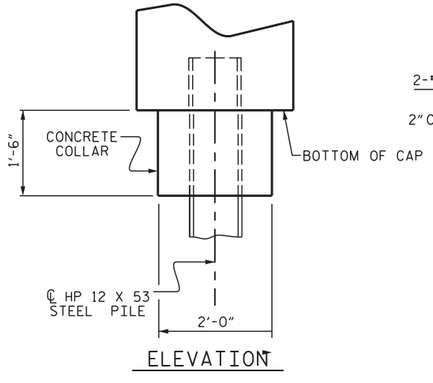
PILE SPLICE DETAILS



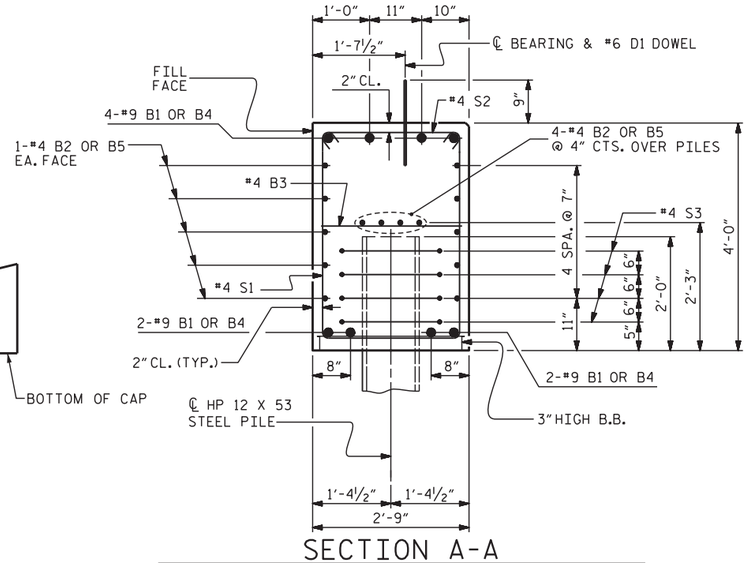
DETAIL ''A''



PLAN



ELEVATION

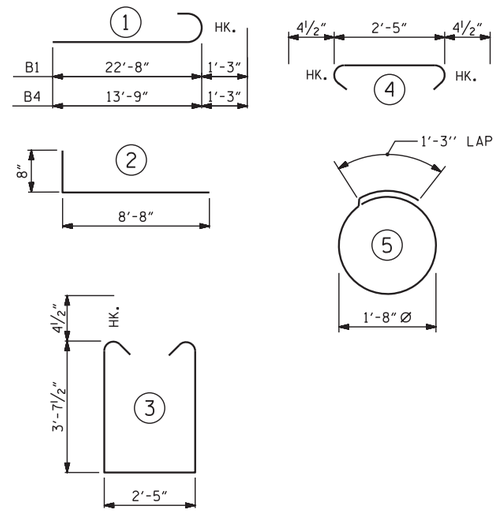


SECTION A-A

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

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

REBAR LENGTHS CAN BE ADJUSTED BASED ON SELECTED MECHANICAL COUPLER TYPE.

END BENT 2 - STAGE I
HP 12 X 53 STEEL PILES NO: 3 LIN. FT.= 75
END BENT 2 - STAGE II
HP 12 X 53 STEEL PILES NO: 2 LIN. FT.= 60
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES END BENT 2 NO: 5
STEEL PILE POINTS END BENT 2 NO: 5

BILL OF MATERIAL
END BENT 2 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	23'-11"	651
B2	14	#4	STR	23'-4"	218
B3	5	#4	STR	2'-5"	8
D1	12	#6	STR	1'-6"	27
H1	20	#4	2	9'-4"	125
K1	8	#4	STR	2'-11"	16
S1	27	#4	3	10'-5"	188
S2	27	#4	4	3'-2"	57
S3	12	#4	5	6'-6"	52
V1	26	#4	STR	6'-2"	107

REINFORCING STEEL (FOR END BENT 2 - STAGE I) 1448 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT 2 - STAGE I)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	10.3 C.Y.
POUR #2	UPPER PART OF WINGS	1.1 C.Y.
TOTAL CLASS A CONCRETE		11.4 C.Y.

BILL OF MATERIAL
END BENT 2 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B3	4	#4	STR	2'-5"	6
B4	8	#9	1	15'-1"	410
B5	14	#4	STR	14'-8"	137
D1	8	#6	STR	1'-6"	18
H1	20	#4	2	9'-4"	125
K1	8	#4	STR	2'-11"	16
S1	19	#4	3	10'-5"	132
S2	19	#4	4	3'-2"	40
S3	8	#4	5	6'-6"	35
V1	26	#4	STR	6'-2"	107

REINFORCING STEEL (FOR END BENT 2 - STAGE II) 1026 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT 2 - STAGE II)

POUR #3	CAP, LOWER PART OF WINGS & COLLARS	7.6 C.Y.
POUR #4	UPPER PART OF WINGS	1.2 C.Y.
TOTAL CLASS A CONCRETE		8.8 C.Y.

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2 DETAILS

DESIGNED BY: J. WHEATLEY DATE : JUL 2022
DRAWN BY: J. WHEATLEY DATE : JUL 2022
CHECKED BY: T. KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T. HARRIS DATE : JUL 2022

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

DocuSigned by: Thomas Harris 7/28/2022 F9ERC057AC1A4EF...

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1			3			TOTAL SHEETS
2			4			25

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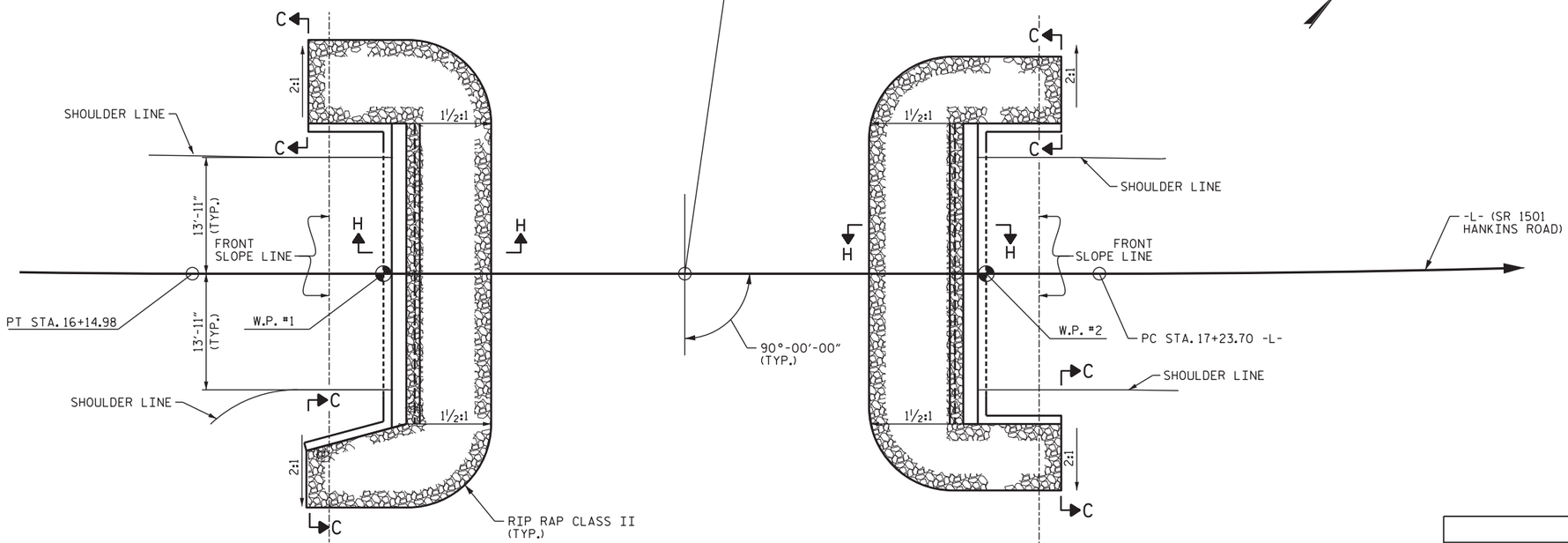
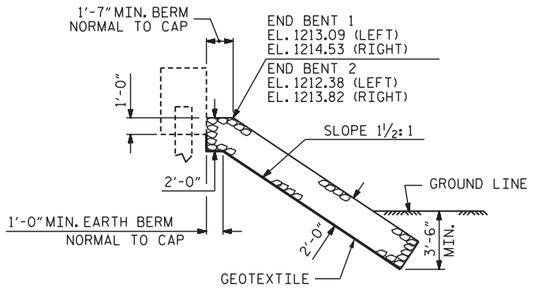


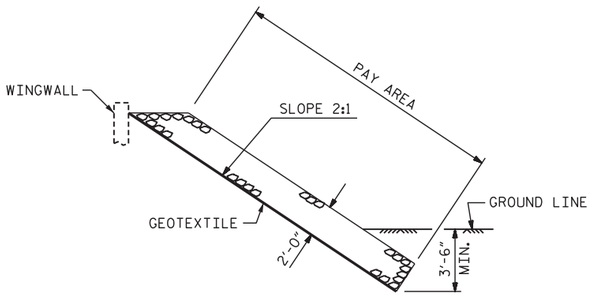
NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+74.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	102	113
END BENT 2	94	104



SECTION H-H



SECTION C-C

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

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2			4			25

DESIGNED BY:	J. WHEATLEY	DATE : JUL 2022
DRAWN BY:	J. WHEATLEY	DATE : JUL 2022
CHECKED BY:	T. KIRSCHBAUM	DATE : JUL 2022
DESIGN ENGINEER OF RECORD:	T. HARRIS	DATE : JUL 2022

7/27/2022
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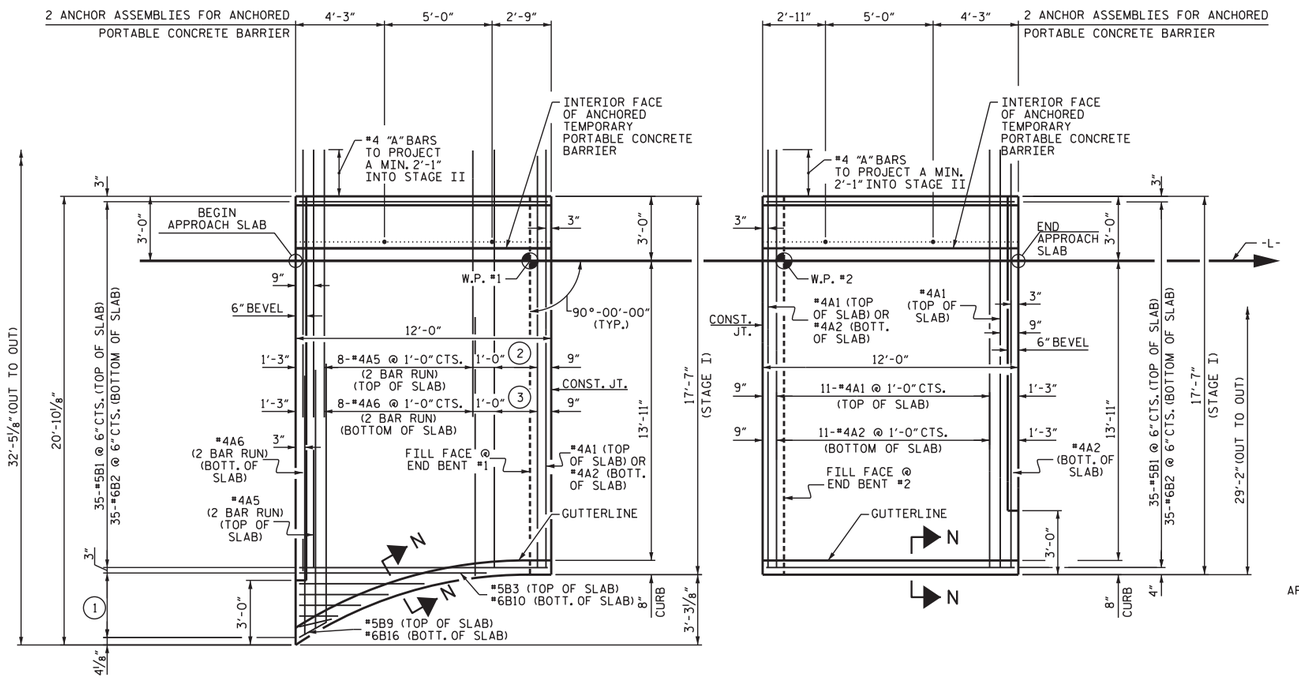


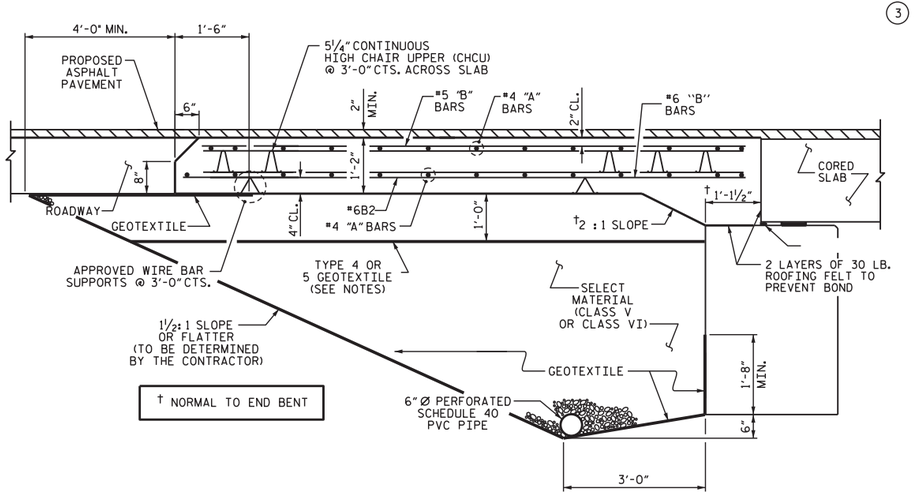
PLAN @ END BENT #1

PLAN @ END BENT #2

(1) #5B3 TO #5B9 @ 6" CTS. (TOP OF SLAB)
#6B10 TO #6B16 @ 6" CTS. (BOTTOM OF SLAB)

(2) 4-#4A1 @ 1'-0" CTS. (TOP OF SLAB)

(3) 4-#4A2 @ 1'-0" CTS. (BOTTOM OF SLAB)



SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

GEOTEXTILE SHALL BE TYPE I 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.

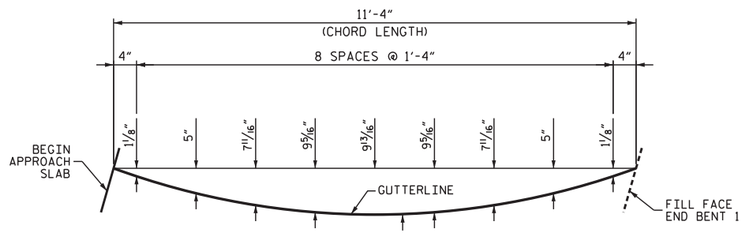
FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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.

APPLY TYPE 4 OR 5 GEOTEXTILE ONE FOOT BELOW THE APPROACH SLAB FOR THE FULL WIDTH OF THE APPROACH FILL PER NCDOT MEMO DATED 2/25/2021.

FOR OTHER DETAILS, SEE SHEET 2 OF 2.



ARC OFFSETS - RIGHT SIDE

AT END BENT 1 ONLY

BILL OF MATERIAL STAGE I APPROACH SLAB EB1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	4	#4	STR	19'-6"	52
A2	4	#4	STR	19'-6"	52
✱ A5	18	#4	STR	12'-5"	149
A6	18	#4	STR	12'-3"	275
✱ B1	35	#5	STR	11'-2"	408
B2	35	#6	STR	11'-8"	613
✱ B3	1	#5	STR	8'-8"	9
✱ B4	1	#5	STR	5'-10"	6
✱ B5	1	#5	STR	4'-2"	4
✱ B6	1	#5	STR	2'-10"	3
✱ B7	1	#5	STR	1'-10"	2
✱ B8	1	#5	STR	1'-7"	2
✱ B9	1	#5	STR	1'-6"	2
B10	1	#6	STR	8'-8"	13
B11	1	#6	STR	5'-10"	9
B12	1	#6	STR	4'-2"	6
B13	1	#6	STR	2'-10"	4
B14	1	#6	STR	1'-10"	3
B15	1	#6	STR	1'-7"	2
B16	1	#6	STR	1'-6"	2
REINFORCING STEEL				LBS.	979
✱ EPOXY COATED REINFORCING STEEL				LBS.	637
CLASS AA CONCRETE				C.Y.	11.0

BILL OF MATERIAL STAGE I APPROACH SLAB EB2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	19'-6"	169
A2	13	#4	STR	19'-6"	169
✱ B1	35	#5	STR	11'-2"	408
B2	35	#6	STR	11'-8"	613
REINFORCING STEEL				LBS.	782
✱ EPOXY COATED REINFORCING STEEL				LBS.	577
CLASS AA CONCRETE				C.Y.	10.7

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

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB

FOR PRESTRESSED CONCRETE CORED SLAB UNIT STAGE I

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

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LICENSE NO. F-0165

DRAWN BY : SHS/MAA 5-09
CHECKED BY : BCH 5-09
REV. 12-17 MAA/THC

ASSEMBLED BY: J.WHEATLEY DATE : JUL 2022
CHECKED BY: T.KIRSCHBAUM DATE : JUL 2022
DESIGN ENGINEER OF RECORD: T.HARRIS DATE : JUL 2022

STD. NO. BAS_30_90S

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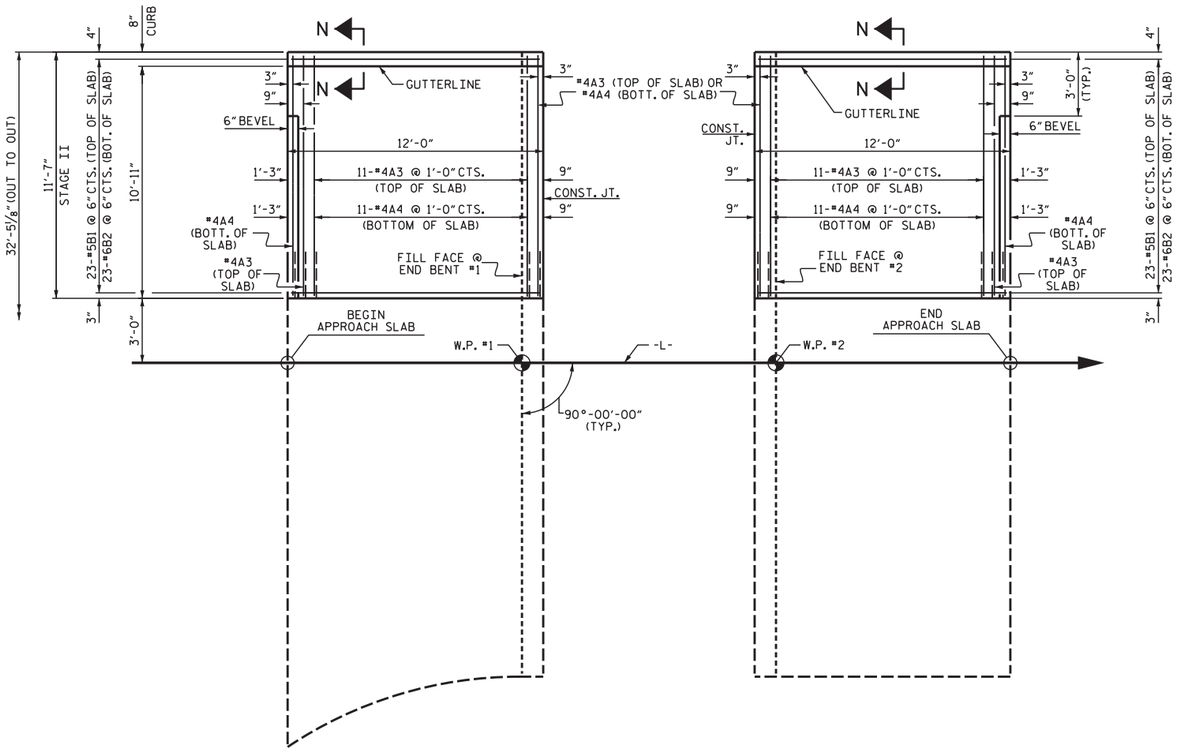


PLAN @ END BENT #1

PLAN @ END BENT #2

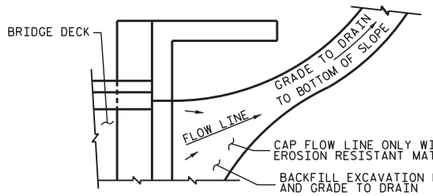
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR NOTES AND SECTION VIEW, SEE SHEET 1 OF 2.

BILL OF MATERIAL STAGE II FOR ONE APPROACH SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	13	#4	STR	11'-3"	98
A4	13	#4	STR	11'-3"	98
* B1	23	#5	STR	11'-2"	268
B2	23	#6	STR	11'-8"	403
REINFORCING STEEL				LBS.	501
* EPOXY COATED REINFORCING STEEL				LBS.	366
CLASS AA CONCRETE				C.Y.	7.0

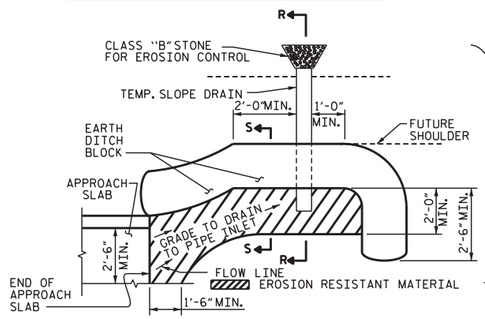


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

SPLICE LENGTHS

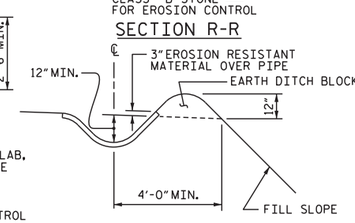
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

TEMPORARY DRAINAGE DETAIL



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

PLAN VIEW

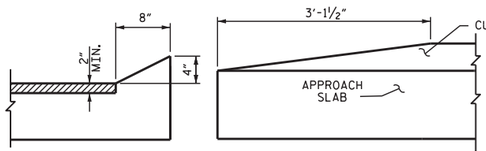


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. 17BP.13.R.176

McDOWELL COUNTY

STATION: 16+74.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB

FOR PRESTRESSED CONCRETE CORED SLAB UNIT STAGE II

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS W. HARRIS

DocuSigned by: Thomas Harris 7/28/2022 F9EBC057AC1A4EF...

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DESIGN ENGINEER OF RECORD: T.HARRIS DATE : JUL 2022

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JA\I188360C

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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