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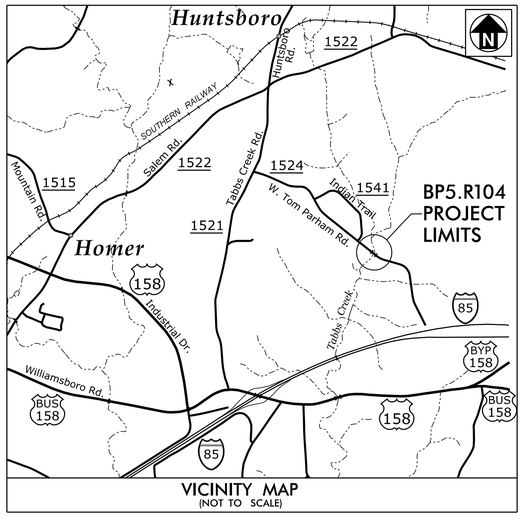
09/08/99

PROJECT: BP5.R104

CONTRACT: DE00389



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

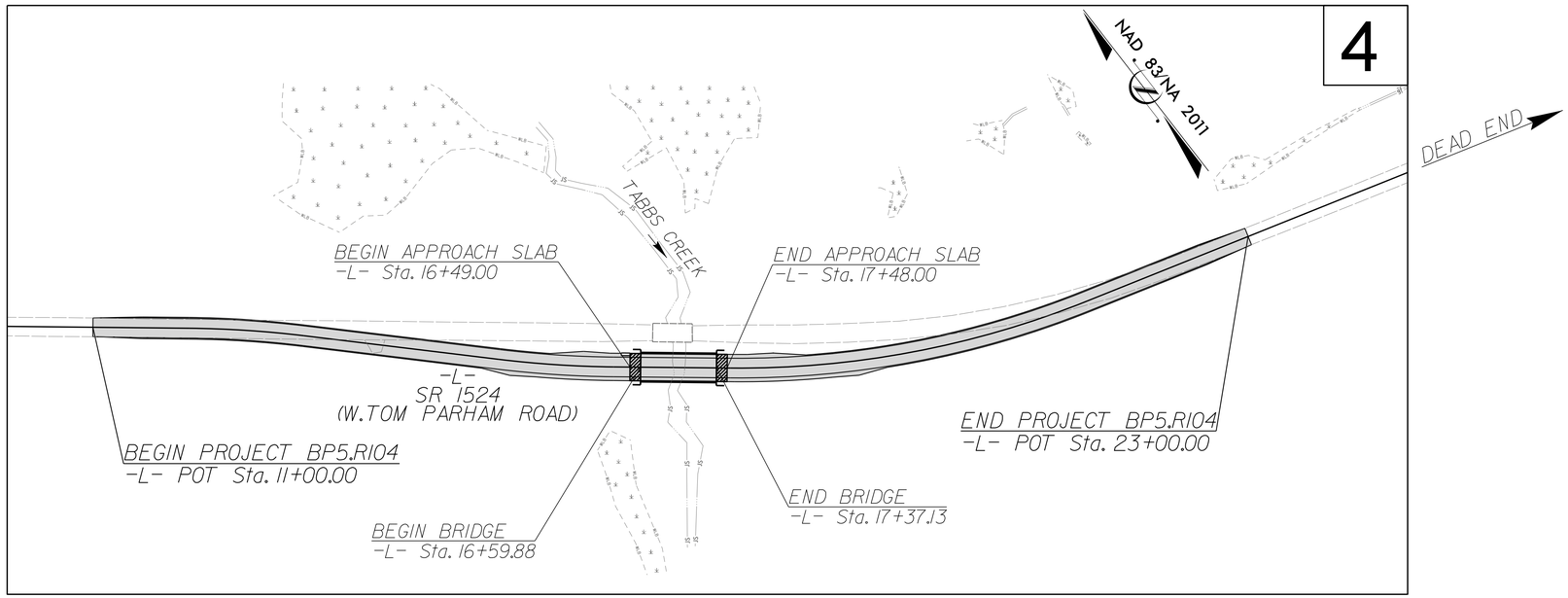
GRANVILLE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R104	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP5.R104.1		PE
BP5.R104.2		R/W
BP5.R104.3		CONSTRUCTION

LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT (2019) = 200
ADT (2025) = 400

V = 45 MPH

FUNC CLASS =
LOCAL – RURAL

SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.212 MILES

LENGTH STRUCTURE PROJECT = 0.015 MILES

TOTAL LENGTH PROJECT = 0.227 MILES

Prepared in the Office of WGI for
DIVISION 5
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 21, 2022

LETTING DATE: SEPTEMBER 11, 2024

TIM JORDAN, PE
PROJECT ENGINEER

MIRANDA SALZLER, PE
HYDRAULIC ENGINEER

NCDOT CONTACT: LISA B. GILCHRIST, EI
DIVISION BRIDGE PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

SIGNATURE: *P.E.*

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER

SIGNATURE: *P.E.*

PLANS PREPARED BY:

MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
(919) 552-2253
www.mottmac.com

LICENSE NO. F-0669

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

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PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN
6/13/2024
MOTT MACDONALD I& E, LLC LICENSE NO. F-0669

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Prepared in the Office of: MOTT MACDONALD 930 Main Campus Drive, Suite 200 Raleigh, NC 27606 www.mottmac.com

GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01–16–24

GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

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–SECTIONS PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE POWER: DUKE ENERGY AND COMMUNICATIONS: CENTURYLINK. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT–OF–WAY MARKERS:

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

LIST OF ROADWAY STANDARD DRAWINGS

EFF. 01–16–2024

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
	DIVISION 2 – EARTHWORK
200.03	Method of Clearing – Method III
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
	DIVISION 3 – PIPE CULVERTS
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
	DIVISION 4 – MAJOR STRUCTURES
423.01	Bridge Approach Fills – Type 1 Approach Fill for Bridge Abutment
	DIVISION 5 – SUBGRADE, BASES AND SHOULDERS
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
	DIVISION 8 – INCIDENTALS
806.01	Concrete Right–of–Way Marker
806.02	Granite Right–of–Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

INDEX OF SHEETS

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PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	1B

9/10/2021

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

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

- Standard Gauge
- RR Signal Milepost
- Switch
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- 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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

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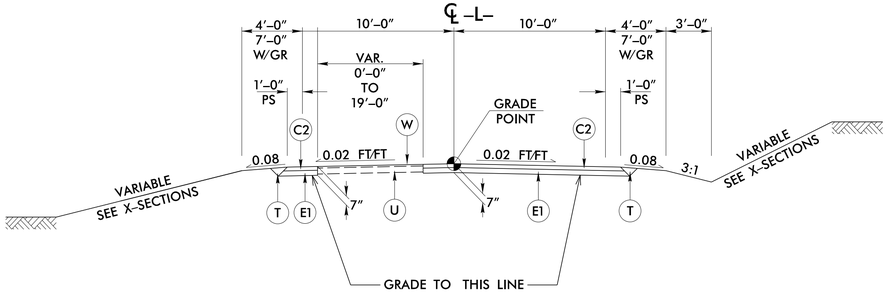
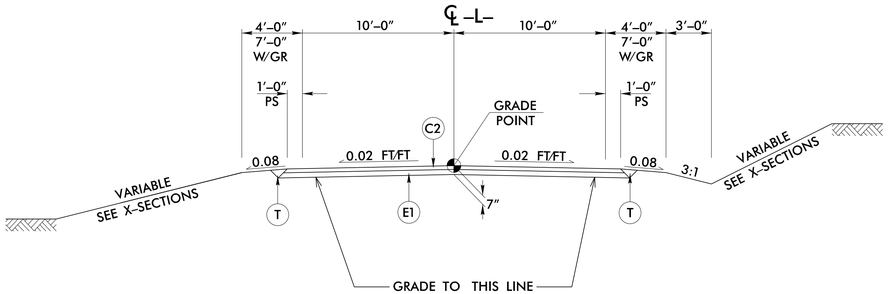


TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
–L– STA 11+00.00 TO 11+50.00

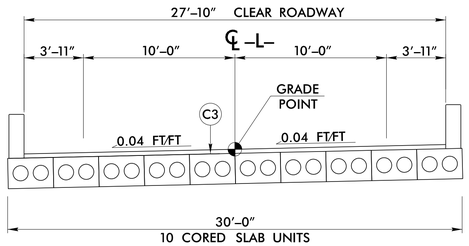
USE TYPICAL SECTION NO. 1:
–L– STA 11+50.00 TO 14+34.25
–L– STA 19+77.53 TO 22+50.00

TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING:
–L– STA 22+50.00 TO 23+00.00



TYPICAL SECTION NO. 2

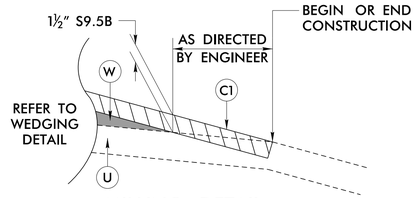
USE TYPICAL SECTION NO. 2:
–L– STA 14+34.25 TO 16+59.88 (BEGIN BRIDGE)
–L– STA 17+37.13 (END BRIDGE) TO 19+77.53



TYPICAL SECTION NO. 3

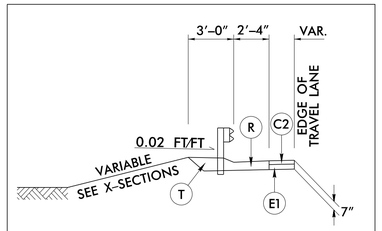
USE TYPICAL SECTION NO. 3:
–L– STA 16+59.88 (BEGIN BRIDGE) TO 17+37.13 (END BRIDGE)

NOTE: SEE STRUCTURE PLANS FOR PAVEMENT DEPTHS ON STRUCTURE



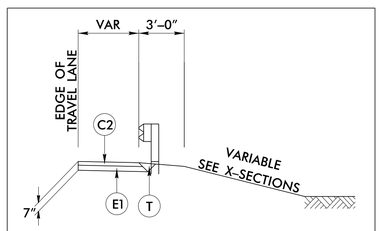
MILLING DETAIL

DETAIL SHOWING PROFILE VIEW

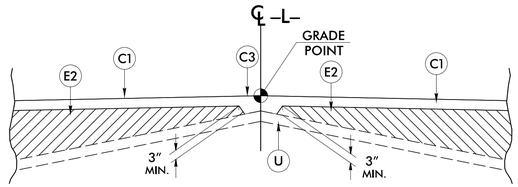


DETAIL FOR
SHOULDER BERM GUTTER IN
CONJUNCTION WITH GUARDRAIL

–L– STA 16+40.00 TO 16+49.00 LT



DETAIL FOR FULL DEPTH
PAVED SHOULDER IN
CONJUNCTION WITH GUARDRAIL



Detail Showing Method of Wedging

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
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.
R	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).

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

PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	2A–1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

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PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL KENNETH R. BASSEY JR. SEAL 038206 ENGINEER

Kenneth R. Bassey Jr. 5/31/2023
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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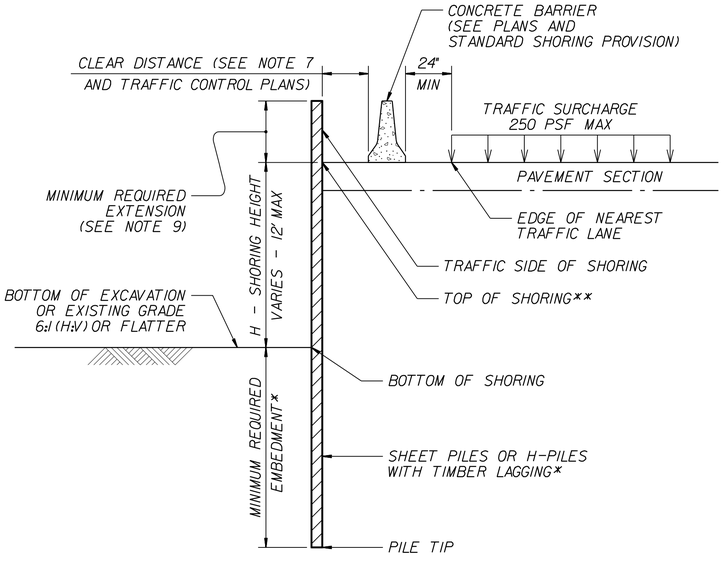
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

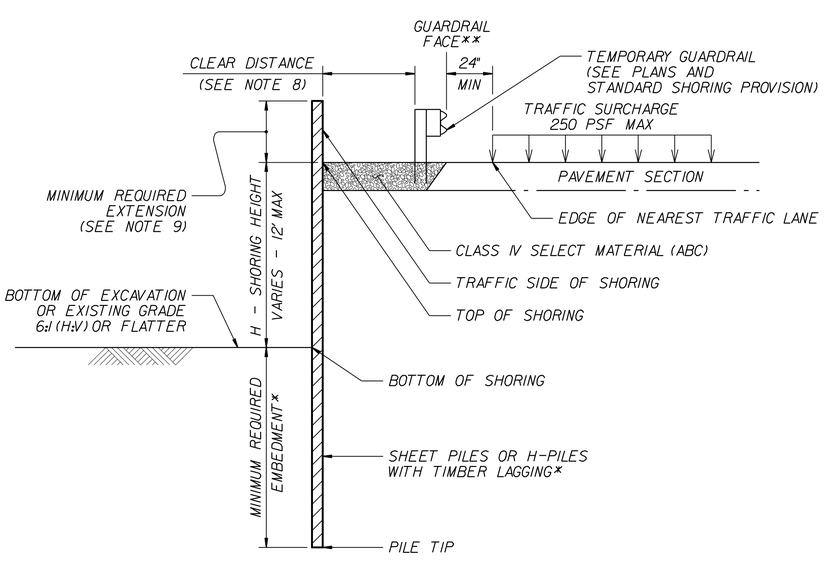
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



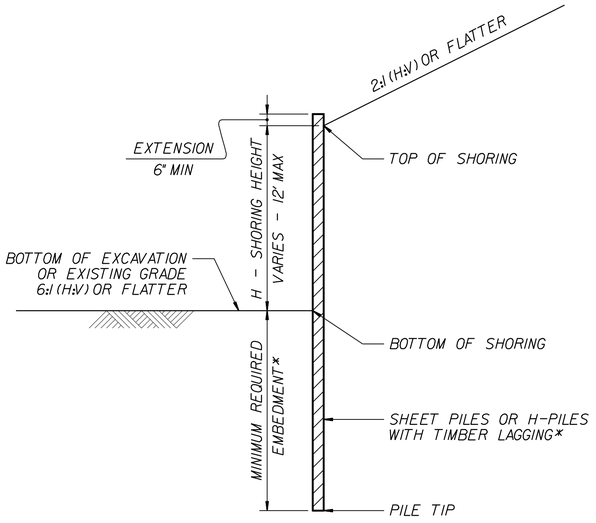
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)

*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

COMPUTED BY:	PADDY JORDAN	DATE:	2/22/24
CHECKED BY:	TIM JORDAN	DATE:	2/22/24

PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	38–1

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	AT–1	GREU TL–2	TYPE III						NO.	PERMITTED G	PERMITTED NG	
–L–	15+28.63	16+59.88	RT	131.25′			16+59.88 (BRIDGE)		4′	7′	50′		1′			1	1									
–L–	16+03.63	16+59.88	LT	56.25′				16+59.88 (BRIDGE)	4′	7′		50′		1′		1	1									
–L–	17+37.13	18+80.88	RT	143.75′				17+37.13 (BRIDGE)	4′	7′		50′		1′		1	1									
–L–	17+37.13	17+93.38	LT	56.25′			17+37.13 (BRIDGE)		4′	7′	50′		1′			1	1									
		SUBTOTAL		387.50′																						
		LESS ANCHOR DEDUCTIONS																								
		GREU TL–2 4 x 25.00′ =		–100.00′																						
		TYPE III 4 x 18.75′ =		–75.00′																						
		TOTAL		212.50′												4	4								5 ADDITIONAL GUARDRAIL POSTS	

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			REMOVE GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	CAT–1	GREU TL–2	GREU TL–3	TYPE III	B–77				NO.	PERMITTED G	PERMITTED NG		
–L–	15+84.31	16+71.81	LT	87.50′			16+71.81 (EX. BRIDGE)									2											SEE TMP PLANS
–L–	17+12.29	17+74.57	LT	137.50′				17+12.29 (BRIDGE)								2											SEE TMP PLANS
		SUBTOTAL		225.00′																							
		LESS ANCHOR DEDUCTIONS																									
		GREU TL–2 4 x 25.00′ =		–100.00′																							
		TOTAL		125.00′												4											

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
–L– 11+00.00 TO 16+59.88 (BEGIN BRIDGE)	88		1830	1742	
–L– 17+37.13 (END BRIDGE) TO 23+00.00	387		2682	2295	
SUBTOTAL	475		4512	4037	
EMBANKMENT EXCAVATION – SEE SHEET 4 (DETAIL 5)	2600				2600
SUBTOTAL	2600				2600
WASTE IN LIEU OF BORROW					
PROJECT TOTAL	3075		4512	4037	2600
5% TO REPLACE BORROW				202	
GRAND TOTAL	3075			4239	
SAY	3230			4460	

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
–L–	12+46.00	16+72.00	CL	653.66
–L–	17+12.00	22+00.00	CL	734.56
			TOTAL:	1,388.22
			SAY:	1,460

SUMMARY OF SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH
–L–	16+40.00	16+49.00	LT	9.00′
			TOTAL:	9.00′
			SAY:	10′

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

NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

COMPUTED BY:	PADDY JORDAN	DATE:	2/22/24
CHECKED BY:	TIM JORDAN	DATE:	2/22/24

PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	3D-1

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE PVC	DO NOT USE CAAP	DO NOT USE HDPE
16+45	LT	401	402	423.2′	420.5′	412.0′			32′							X			
13+95	RT	403																	
TOTAL									32′										

STATION	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	36" .079	42" .109	48" .109	R.C. PIPE (CLASS III) 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"
16+45																						
13+95																						
TOTAL																						

STATION	24" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET
16+45								1									
13+95					28′												
TOTAL					28′			1									

STATION		D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35	15" DRAINAGE PIPE ELBOWS	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
16+45					1	1	2				
13+95										25′	
TOTAL					1	1	2			25′	

ABBREVIATIONS

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

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

COMPUTED BY: KRB DATE: 10/7/22

(12-17-19)

PROJECT NO.	SHEET NO.
BP5.R104 - Granville 241	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1/2)	24	200	400	100		
			TOTAL CY/TONS/SY:		200	400**	100**	0	0

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

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge on SR 1524 over Tabbs Creek Between Parham Woods Ct. and Indian Trial Rd.	End Bent No. 1	1
	End Bent No. 2	1

PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	4

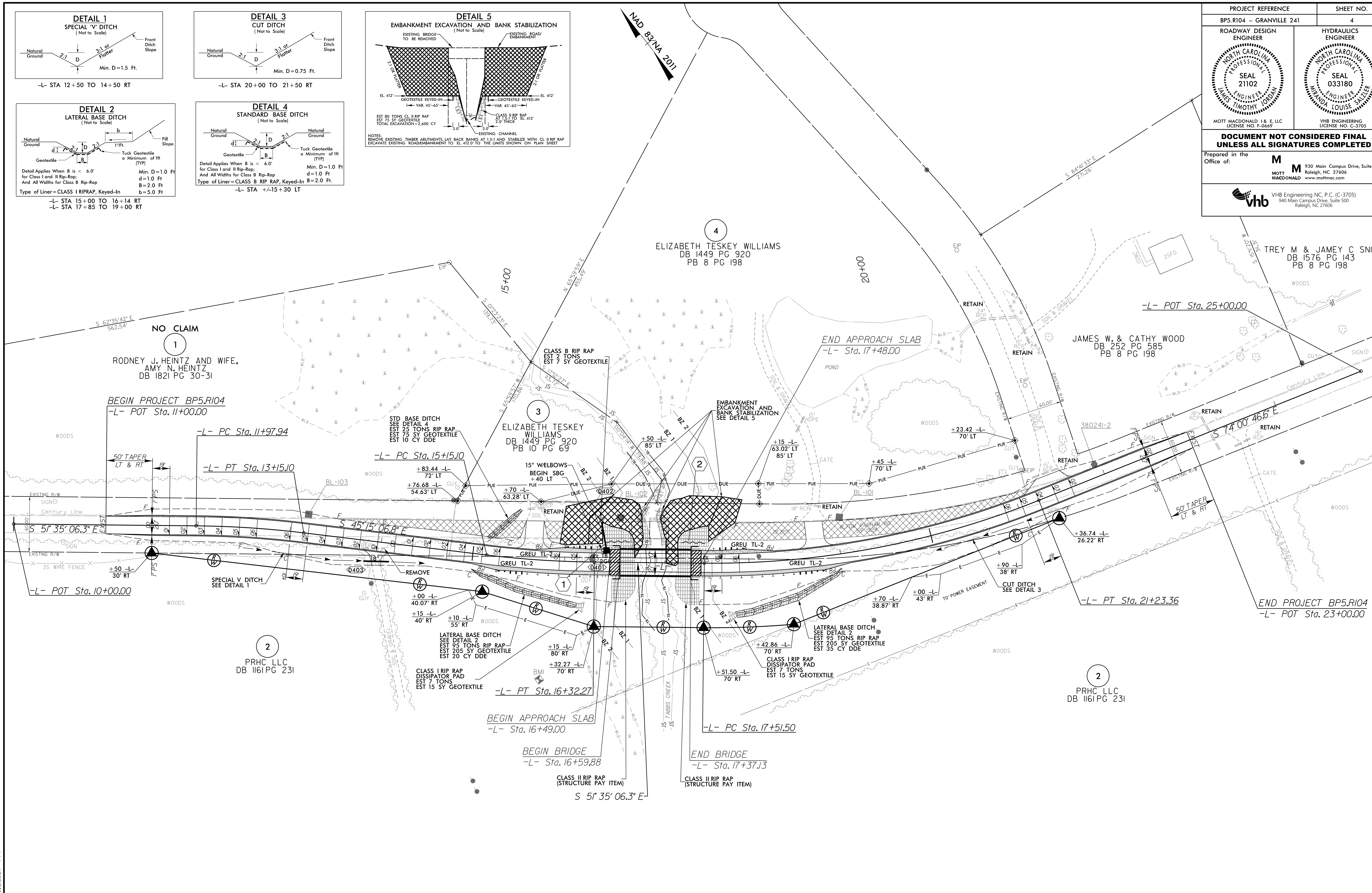
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 JAMES TIMOTHY JORDAN — MOTT MACDONALD I & E, LLC LICENSE NO. F-0669

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033180 MIRANDA LOUISE SAIZLER — VHB ENGINEERING LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: MOTT MACDONALD 930 Main Campus Drive, Suite 200 Raleigh, NC 27606 www.mottmac.com

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606



-L-		
PI Sta 12+56.58	PI Sta 15+73.75	PI Sta 19+39.84
Δ = 6° 19' 59.5" (RT)	Δ = 6° 19' 59.5" (LT)	Δ = 22° 25' 40.3" (LT)
D = 5° 24' 18.9"	D = 5° 24' 18.9"	D = 6° 01' 52.1"
L = 117.17'	L = 117.17'	L = 371.87'
T = 58.64'	T = 58.64'	T = 188.35'
R = 1,060.00'	R = 1,060.00'	R = 950.00'

(#) TEMP. SHORING (SEE TMP PLANS)

FOR STRUCTURE PLANS SEE SHEETS S-1 THRU S-15

NOTE:
TYPE III ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.
ALL DRIVEWAYS SHALL BE REPLACED WITH GRAVEL WITHIN THE LIMITS SHOWN.

FOR -L- PROFILE SEE SHEET 5

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PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 033180 ENGINEER MIRANDA LOUISE SALTZER

VHB ENGINEERING
LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:

MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
www.mottmac.com

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL SCALE 5′ 0 5′ 10′

HORIZONTAL SCALE 25′ 0 25′ 50′

-L-

BEGIN PROJECT
STA. 11+00.00

BEGIN GRADE
STA. 11+50.00
EL = 442.69′

MILL TO EXIST

PI = 12+10.00
EL = 439.90′
VC = 120′
K = 223

PI = 15+25.00
EL = 423.56′
VC = 270′
K = 49
DS = 35 MPH

PI = 18+25.00
EL = 424.46′
VC = 200′
K = 49
DS = 35 MPH

PI = 21+25.00
EL = 437.62′
VC = 230′
K = 61
DS = 45 MPH

END GRADE
STA. 22+50.00
EL = 438.35′

END PROJECT
STA. 23+00.00

MILL TO EXIST

(-)4.6500%
(-)5.1873%
(-)6.3300%
(-)1.3300%
(-)8.6600%
(-)15.1542%
(+)0.3000%
(+) 0.0000%
(+)16.0000%
(+)18.9400%
(+)4.3867%
(+)4.7000%
(+) 3.1600%
(+) 1.1400%
(+)0.5840%

BEGIN SP DITCH RT
-L- STA: 12+50
ELEV. = 434.78′

PI SP DITCH RT
-L- STA: 13+50
ELEV. = 428.22′

END SP DITCH RT
-L- STA: 14+50
ELEV. = 426.89′

BEGIN SP DITCH RT
-L- STA: 14+100
ELEV. = 425.53′

PI SP DITCH RT
-L- STA: 15+50
ELEV. = 421.20′

END SP DITCH RT
-L- STA: 16+14
ELEV. = 411.30′

LOWEST CHORD

EXCAVATE TO 412.0′

LOW CHORD AT CL

NWS = 407.7′
DATE OF SURVEY-
5/21/2019

BEGIN SP DITCH RT
-L- STA: 17+85
ELEV. = 410.00′

PI SP DITCH RT
-L- STA: 18+00
ELEV. = 410.00′

PI SP DITCH RT
-L- STA: 18+50
ELEV. = 418.00′

END SP DITCH RT
-L- STA: 19+30
ELEV. = 427.04′

BEGIN SP DITCH RT
-L- STA: 20+00
ELEV. = 431.80′

PI SP DITCH RT
-L- STA: 20+50
ELEV. = 434.15′

PI SP DITCH RT
-L- STA: 21+00
ELEV. = 435.73′

END SP DITCH RT
-L- STA: 21+50
ELEV. = 436.30′

BM1 ELEVATION = 419.41′
N 939392 E 2138853
BENCHTIE IN 30″ HARDWOOD
-L- STA. 15+79.96 (129.57′ RT)
(SEE SHEET RW02C-2)

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1035	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 414.7	FT
BASE DISCHARGE	= 1477	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 416.1	FT
OVERTOPPING DISCHARGE	= 4184	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 424.4	FT
DATE OF SURVEY	= 05/21/2019	
W.S.ELEVATION AT DATE OF SURVEY	= 407.7	FT

FOR -L- PLAN SEE SHEET 4

450 440 430 420 410 400 390 380 370 360 350 340 330

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09/08/99

TIP PROJECT: BP5.R104

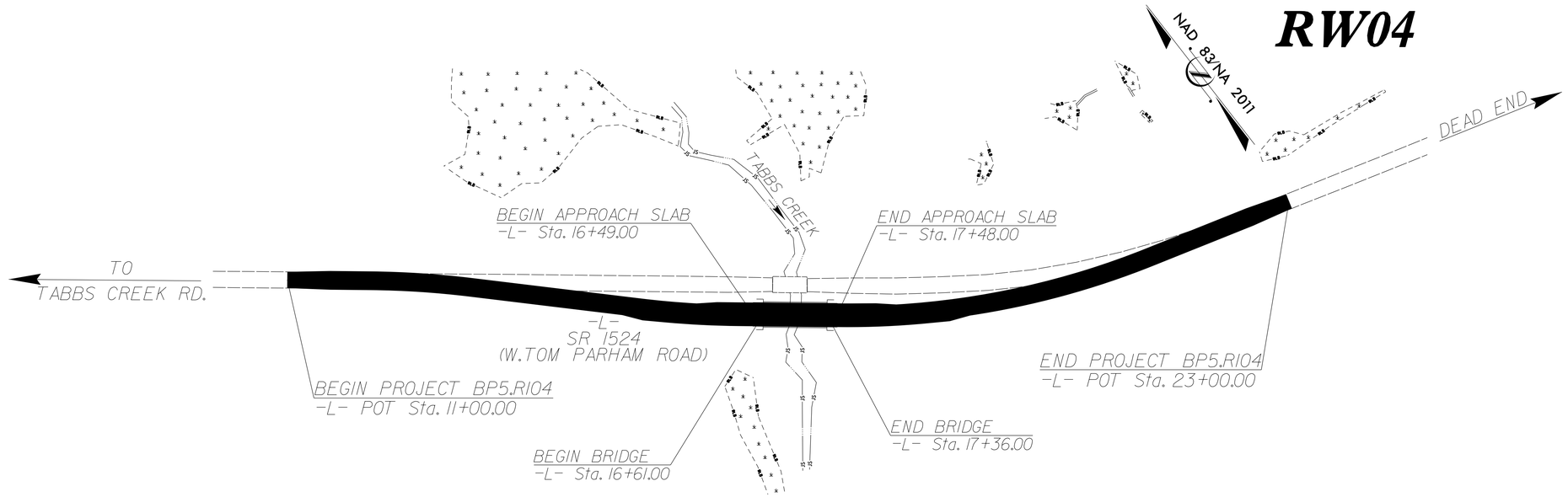
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R104	RW01	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

GRANVILLE COUNTY

RW04



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 "GPS 380241-2" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 939,206.704(ft) EASTING: 2,139,471.517(ft) ELEVATION: 436.931(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00003338 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS 380241-2" TO -L- STATION 10+00.00 IS N 55-19'00.3" W 1,174.41(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

ETHERILL ENGINEERING

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

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - SURVEYING - CONSTRUCTION OBSERVATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: ***JULY 21, 2022***

LETTING DATE: ***SEPTEMBER 13, 2023***

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4372 LAND SURVEYOR ANTHONY K. ALFORD

DocuSigned by: Anthony K. Alford 22BA29B2F0BA44E...

10/26/2022

SIGNATURE: ***Date:***

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

26-OCT-2022 13:07
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amoore AT RAL-WS094

6/2/99

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	RW02D-1

Location and Surveys

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

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4372 LAND SURVEYOR ANTHONY K. ALFORD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Anthony K. Alford, 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 26th day of October, 2022.

DocuSigned by:
Anthony K. Alford
22BA29B2F0BA44E...

Professional Land Surveyor L-4372

REVISIONS

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	939874.9881	2138505.7892
PC	11+97.94	939751.9992	2138660.8796
PT	13+15.10	939674.2766	2138748.4776
PC	15+15.10	939533.4783	2138890.5193
PT	16+32.27	939455.7556	2138978.1172
PC	17+51.50	939381.6761	2139071.5323
PT	21+23.36	939212.7735	2139400.1674
POT	25+00.00	939109.0402	2139762.2370

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.

26-OCT-2022 13:08
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emoore AT RAL-WS094

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	RW03E-1

Location and Surveys

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

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - SURVEYING - CONSTRUCTION OBSERVATION

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4372 LAND SURVEYOR ANTHONY K. ALFORD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Anthony K. Alford, PLS, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 10/24/2022 to 10/26/2022, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 26th day of October, 2022.

DocuSigned by:
Anthony K. Alford
22BA29B2F0BA44E...

Professional Land Surveyor L-4372

REVISIONS

ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+50.00	30.00	939758.2794	2138604.6784
L	15+15.00	40.00	939505.1438	2138862.2850
L	16+32.27	70.00	939400.9084	2138934.6226
L	17+51.50	70.00	939326.8289	2139028.0377
L	18+42.86	70.00	939269.6657	2139107.7064
L	21+36.74	26.22	939183.8865	2139405.8095

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 10/24/2022 TO 10/26/2022 .

6/2/99

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	RW03E-2

Location and Surveys

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

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - SURVEYING - CONSTRUCTION OBSERVATION

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-4372 ANTHONY K. ALFORD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Anthony K. Alford, PLS, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 10/24/2022 to 02/09/2023, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 9th day of February, 2023.

DocuSigned by:
Anthony K. Alford
22BA296E2F8A44E...

Professional Land Surveyor L-4372

ROW MARKER PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	14+76.68	-54.63	939599.3233	2138901.6874
L	14+83.44	-72.00	939606.9058	2138918.7173
L	15+70.00	-63.28	939543.0474	2138972.6520
L	16+50.00	-85.00	939511.3407	2139044.8223
L	18+15.00	-85.00	939413.8886	2139170.8197
L	18+15.00	-63.02	939395.7920	2139158.3427
L	19+45.00	-70.00	939340.1710	2139265.8067
L	21+23.42	-70.00	939280.0501	2139419.5029

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 10/24/2022 TO 02/09/2023 .

10-FEB-2023 08:50
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emoore AT RAL-WS094

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	RW04

Location and Surveys

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

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4372 LAND SURVEYOR ANTHONY K. ALFORD

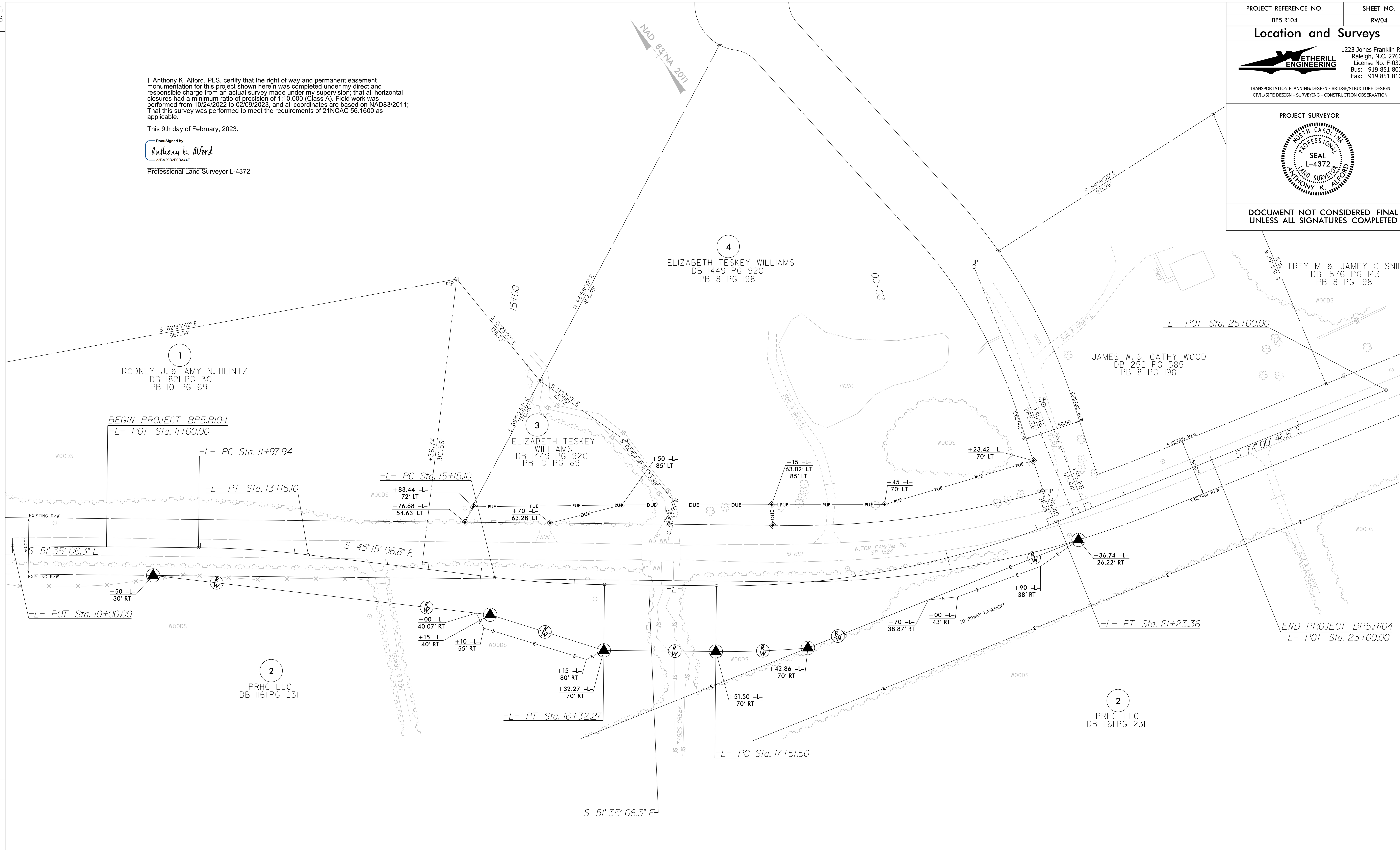
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Anthony K. Alford, PLS, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 10/24/2022 to 02/09/2023, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 9th day of February, 2023.

DocuSigned by:
Anthony K. Alford
22BA29B2F0BA44E...

Professional Land Surveyor L-4372



-L-		
PI Sta 12+56.58	PI Sta 15+73.75	PI Sta 19+39.84
Δ = 6° 19' 59.5" (RT)	Δ = 6° 19' 59.5" (LT)	Δ = 22° 25' 40.3" (LT)
D = 5° 24' 18.9"	D = 5° 24' 18.9"	D = 6° 01' 52.1"
L = 117.17'	L = 117.17'	L = 371.87'
T = 58.64'	T = 58.64'	T = 188.35'
R = 1,060.00'	R = 1,060.00'	R = 950.00'

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 10/24/2022 TO 02/09/2023.

REVISIONS

6/2/99

10-FEB-2023 08:51
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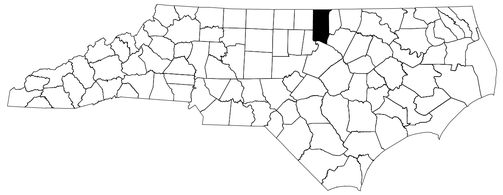
amoore AT RAL-WS094

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

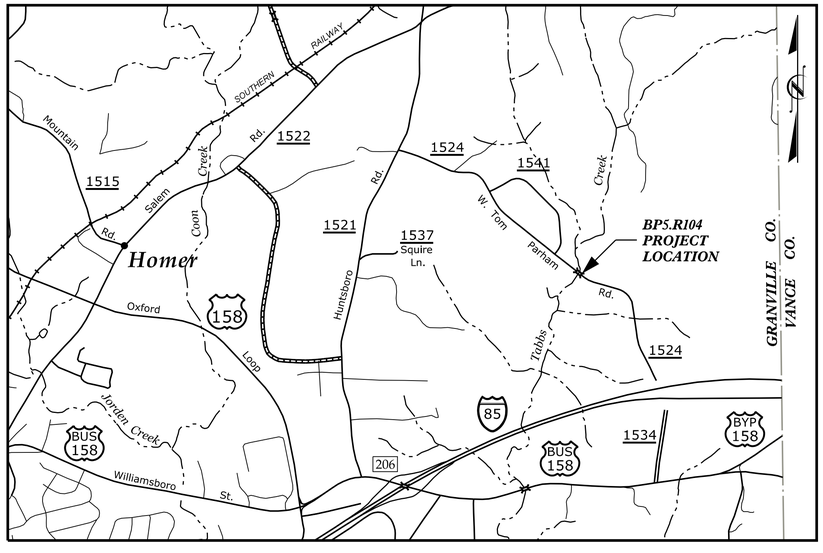
TRANSPORTATION MANAGEMENT PLAN

GRANVILLE COUNTY



LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



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

PLANS PREPARED BY:

MIKE RZEPKA, P.E.
TRAFFIC CONTROL PROJECT ENGINEER

CHRIS HARNDEN
TRAFFIC CONTROL DESIGN ENGINEER

NCDOT CONTACTS:

LISA BULLARD-GILCHRIST
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

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

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-2	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES AND GENERAL NOTES)
TMP-2A	TEMPORARY SHORING DATA
TMP-3	TEMPORARY TRAFFIC CONTROL PHASING
TMP-4	TEMPORARY TRAFFIC CONTROL PHASE 1 DETAIL
TMP-5	TEMPORARY TRAFFIC CONTROL PHASE 2 DETAIL

PLAN PREPARED BY:

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

SHEET NO.
TMP-1

BP5.R104

PROJECT NO.:

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ROADWAY STANDARD DRAWINGS

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

STD. NO.	TITLE
1101.01	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	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGERS
1180.01	SKINNY-DRUMS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-1A

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- WEDGING

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- DRUM
- SKINNY DRUM

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TEMPORARY PAVEMENT MARKING

- P1 — PAINT 4" WHITE EDGELINE
- P13 — PAINT 4" YELLOW DOUBLE CENTER

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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

ROADWAY STANDARD DRAWINGS & LEGEND

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PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-2

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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.

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) DO NOT INSTALL MORE THAN ONE LANE CLOSURE IN ANY ONE DIRECTION ON SR 1524 (W. TOM PARHAM RD).

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) [LENGTH] IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

I) NOTIFY THE ENGINEER THIRTY (30) 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.

L) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) [LENGTH] IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES

M) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

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

PAVEMENT MARKINGS AND MARKERS

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

ROAD NAME	MARKING	MARKER
SR 1524 (W. TOM PARHAM RD)	PAINT	NONE

P) 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.

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

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

MISCELLANEOUS

S) IN THE EVENT A TIE-IN CANNOT BE MADE IN ONE DAY'S TIME, BRING THE TIE-IN AREA TO AN APPROPRIATE ROADWAY ELEVATION AS DETERMINED BY THE ENGINEER. PLACE BLACK ON ORANGE "LOOSE GRAVEL" SIGNS (W8-7) AND BLACK ON ORANGE "PAVEMENT ENDS" SIGNS (W8-3) [LENGTH] AND [LENGTH] RESPECTIVELY IN ADVANCE OF THE UNEVEN AREAS. USE DRUMS TO DELINEATE THE EDGE OF ROADWAY ALONG UNPAVED AREAS.

MANAGEMENT STRATEGIES

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

RECOMMENDED STRATEGIES:

TRAFFIC MANAGEMENT STRATEGIES:

TEMPORARY LANE CLOSURES (FLAGGERS)

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TRANSPORTATION OPERATIONS PLAN

REVISIONS

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PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-2A

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

TEMPORARY SHORING DATA

SHORING LOCATION NO. 1

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 -L- STA. 16+45 +/-, 21.3′ LT, TO -L- STA. 16+71 +/-, 22.1′ LT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

UNIT WEIGHT (γ) = 120 PCF
FRICTION ANGLE (ϕ) = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 399.7 FT

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM -L- STA. 16+45 +/-, 21.3′ LT, TO -L- STA. 16+71 +/-, 22.1′ LT. THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

DRIVEN PILING FOR TEMPORARY SHORING FROM -L- STA. 16+45 +/-, 21.3′ LT, TO -L- STA. 16+71 +/-, 22.1′ LT, MAY NOT PENETRATE BELOW ELEVATION 396.9 FT DUE TO OBSTRUCTIONS, VERY DENSE OR HARD SOIL, BOULDERS OR WEATHERED OR HARD ROCK.

DO NOT USE A TEMPORARY WALL FOR TEMPORARY SHORING FROM -L- STA. 16+45 +/-, 21.3′ LT, TO -L- STA. 16+71 +/-, 22.1′ LT. AT THE CONTRACTOR'S OPTION, USE A STANDARD TEMPORARY SHORING FOR TEMPORARY SHORING FROM -L- STA. 16+45 +/-, 21.3′ LT, TO -L- STA. 16+71 +/-, 22.1′ LT. SEE GEOTECHNICAL STANDARD DETAIL NO. 1801.01 FOR STANDARD TEMPORARY WALLS.

SHORING LOCATION NO. 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 -L- STA. 17+26 +/-, 22.0′ LT, TO -L- STA. 17+52 +/-, 21.2′ LT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

UNIT WEIGHT (γ) = 120 PCF
FRICTION ANGLE (ϕ) = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 414.1 FT

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM -L- STA. 17+26 +/-, 22.0′ LT, TO -L- STA. 17+52 +/-, 21.2′ LT. THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

DRIVEN PILING FOR TEMPORARY SHORING FROM -L- STA. 17+26 +/-, 22.0′ LT, TO -L- STA. 17+52 +/-, 21.2′ LT MAY NOT PENETRATE BELOW ELEVATION 399.2 FT DUE TO OBSTRUCTIONS, VERY DENSE OR HARD SOIL, BOULDERS OR WEATHERED OR HARD ROCK.

AT THE CONTRACTOR'S OPTION, USE A STANDARD TEMPORARY SHORING FOR TEMPORARY SHORING FROM -L- STA. 17+26 +/-, 22.0′ LT, TO -L- STA. 17+52 +/-, 21.2′ LT. SEE GEOTECHNICAL STANDARD DETAIL NO. 1801.01 FOR STANDARD TEMPORARY WALLS.

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TEMPORARY SHORING DATA

REVISIONS

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PHASING

NOTES:
BEFORE BEGINNING ANY CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS AND TRAFFIC CONTROL DEVICES. FIELD VERIFY LOCATIONS WITH THE RESIDENT ENGINEER PRIOR TO INSTALLATION.

MAINTAIN VEHICULAR ACCESS TO ALL RESIDENCES AND BUSINESSES DURING THE LIFE OF THE CONTRACT, UNLESS OTHERWISE NOTED IN THE PHASING PLANS OR DIRECTED BY THE RESIDENT ENGINEER.

COMPLETE ANY PROPOSED OR TEMPORARY WIDENING IN SUCH A MANNER THAT NO PONDING OF WATER WILL OCCUR WITHIN THE TRAVEL LANE.

WHEN USING LANE CLOSURES (RSD 1101.02), RETURN TRAFFIC TO EXISTING AND/OR TEMPORARY TRAFFIC PATTERN UPON ACTIVITIES COMPLETION, UNLESS OTHERWISE NOTED IN THE PHASING PLANS.

WHEN PHASING STATES TO USE LANE CLOSURES, REFER TO THE FOLLOWING FOR ALL EXISTING AND PROPOSED ROADS:

- 2-LANE, 2-WAY ROADWAY - 1 LANE CLOSED, SEE RSD 1101.02 SHEET 1 OF 14

COMPLETE PAVING UP TO, BUT NOT INCLUDING, THE FINAL LAYER OF SURFACE COURSE UNTIL STATED TO PLACE FINAL LAYER IN THE PHASING PLANS.

WHEN WEDGING OVER EXISTING PAVEMENT, WEDGE TO PROPOSED ELEVATION (LESS THE FINAL LAYER OF SURFACE COURSE), OR WEDGE AS NEEDED TO MAINTAIN TRAFFIC. MAINTAIN POSITIVE DRAINAGE IN BOTH EXISTING AND/OR TEMPORARY TRAVEL LANES.

REPLACE MARKINGS AND RETURN TRAFFIC TO THE CURRENT TRAFFIC PATTERN AT THE END OF EACH WORK PERIOD UNLESS OTHERWISE NOTED IN THE PHASING OR DIRECTED BY THE ENGINEER.

PHASE 1 (SEE TMP-4)

BEFORE BEGINNING CONSTRUCTION IN STEP 1, INSTALL WORK ZONE ADVANCE WARNING SIGNS IN BOTH DIRECTIONS OF SR 1524 (SEE RSD 1101.01, SHEET 3 OF 3).

STEP 1

USING TEMPORARY LANE CLOSURES, INSTALL TEMPORARY GUARDRAIL AND TEMPORARY SHORING.

USING LANE CLOSURES, COMPLETE PROPOSED WEDGING, WIDENING, AND BRIDGE CONSTRUCTION.

PHASE 2 (SEE TMP-5)

STEP 1

USING TEMPORARY LANE CLOSURES, PLACE TEMPORARY PAVEMENT MARKINGS ALONG -L-, TYING TO EXISTING MARKINGS, AND SHIFT TRAFFIC TO -L- ALIGNMENT.

STEP 2

USING TEMPORARY LANE CLOSURES, REMOVE EXISTING STRUCTURE AND ROADWAY, AND CONSTRUCT REMAINING PROPOSED SHOULDER.

STEP 3

UPON COMPLETION OF ALL WORK, USING TEMPORARY LANE CLOSURES, PLACE THE FINAL LAYER OF SURFACE COURSE AND FINAL MARKINGS.

REMOVE ALL REMAINING TRAFFIC CONTROL DEVICES.

PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-3

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TEMPORARY TRAFFIC CONTROL PHASING

REVISIONS

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PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-4

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

10+00

15+00

20+00

-L- STA. 11+00 +/-
BEGIN CONSTRUCTION
BEGIN WEDGING

-L- STA. 14+43 +/-
END WEDGING

-L- STA. 19+69 +/-
BEGIN WEDGING

-L- STA. 23+00 +/-
END CONSTRUCTION
END WEDGING

-L-
SR 1524 (W. TOM PARHAM RD)

TEMPORARY GUARDRAIL

TEMPORARY GUARDRAIL

TEMPORARY GREU TL-2

TEMPORARY GREU TL-2

TEMPORARY GREU TL-2

TEMPORARY GREU TL-2

TRAFFIC DRUMS
@ 45′ SPACING

TRAFFIC DRUMS
@ 45′ SPACING

TRAFFIC DRUMS
@ 10′ SPACING

A

A

B

B

1 TEMPORARY SHORING

2 TEMPORARY SHORING

JS

JS

JS

JS

JS

JS

TABBS CREEK

R11-2
48″ x 30″
ROAD CLOSED

TYPE III BARRICADE(S)

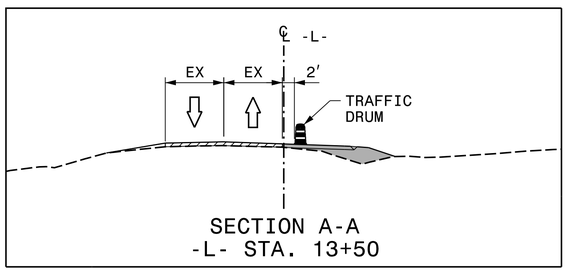
R11-2
48″ x 30″
ROAD CLOSED

TYPE III BARRICADE(S)

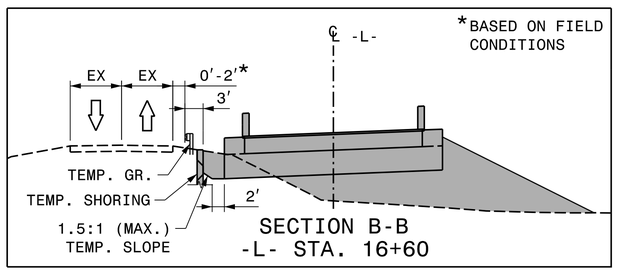
MAINTAIN ACCESS TO ALL DRIVEWAYS
DURING CONSTRUCTION

1 TEMPORARY SHORING = 97 SF
FROM -L-
STA. 16+45 +/-, 21.3′ LT
TO -L-
STA. 16+71 +/-, 22.1′ LT

2 TEMPORARY SHORING = 91 SF
FROM -L-
STA. 17+26 +/-, 22.0′ LT
TO -L-
STA. 17+52 +/-, 21.2′ LT



SECTION A-A
-L- STA. 13+50



SECTION B-B
-L- STA. 16+60

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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

PHASE 1

REVISIONS

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PROJ. REFERENCE NO.	SHEET NO.
BP5.R104	TMP-5

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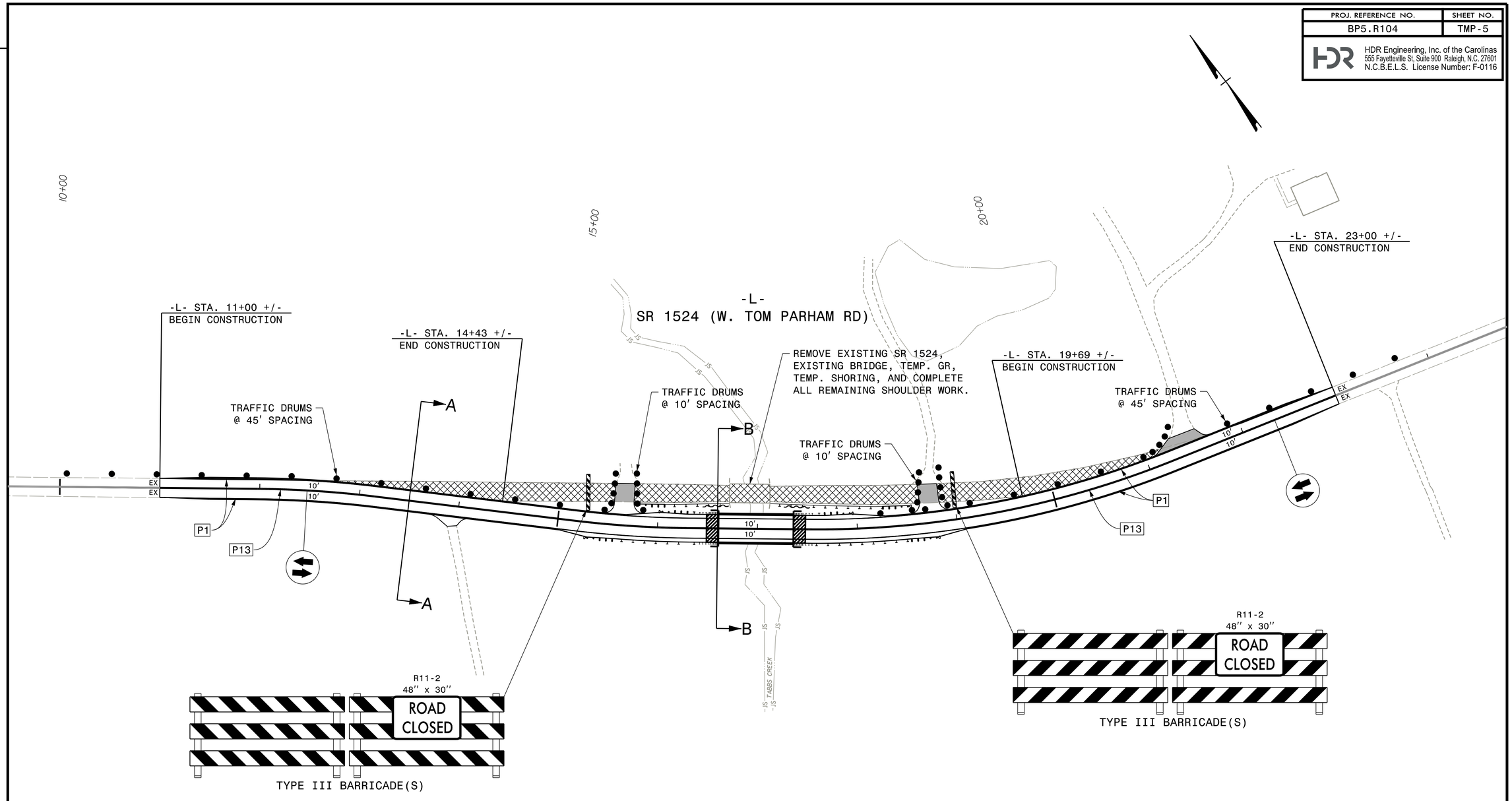
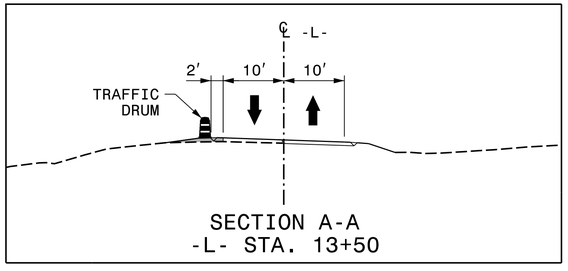
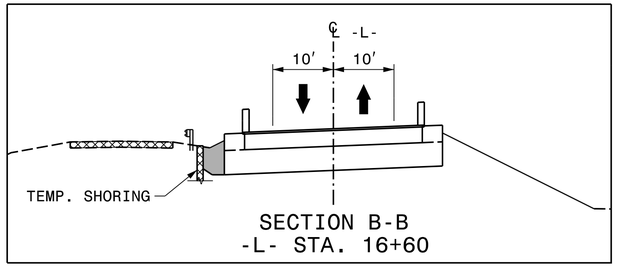
N.C.B.E.L.S. License Number: F-0116



MAINTAIN ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION



SECTION A-A
-L- STA. 13+50



SECTION B-B
-L- STA. 16+60

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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

PHASE 2

REVISIONS

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PROJECT NO.: BP5.R104

PROJECT NO.	SHEET NO.
BP5.R104	PMP-1

APPROVED: Michael T. Rzepka

DATE: 7/25/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN

GRANVILLE COUNTY

LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

INDEX

ROADWAY STANDARD DRAWING

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

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

GENERAL NOTES

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

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

ROAD NAME	MARKING	MARKER
SR 1524 (W. TOM PARHAM RD)	THERMOPLASTIC	NONE

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

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

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

RENEE ROACH, P.E. — SIGNING & DELINEATION STATE ENGINEER

MITCH EATON, P.E. — SIGNING & DELINEATION REGIONAL ENGINEER

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: HDR ENGINEERING, INC. OF THE CAROLINAS

MIKE RZEPKA, P.E. — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

CHRIS HARNDEN — SIGNING & DELINEATION PROJECT DESIGN TECHNICIAN

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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PAVEMENT MARKING SCHEDULE	
T1	THERMOPLASTIC 4″ WHITE EDGELINE (90 MIL)
T13	THERMOPLASTIC 4″ YELLOW DOUBLE CENTER (90 MIL)

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT NO.	SHEET NO.
BP5.R104	PMP-2

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

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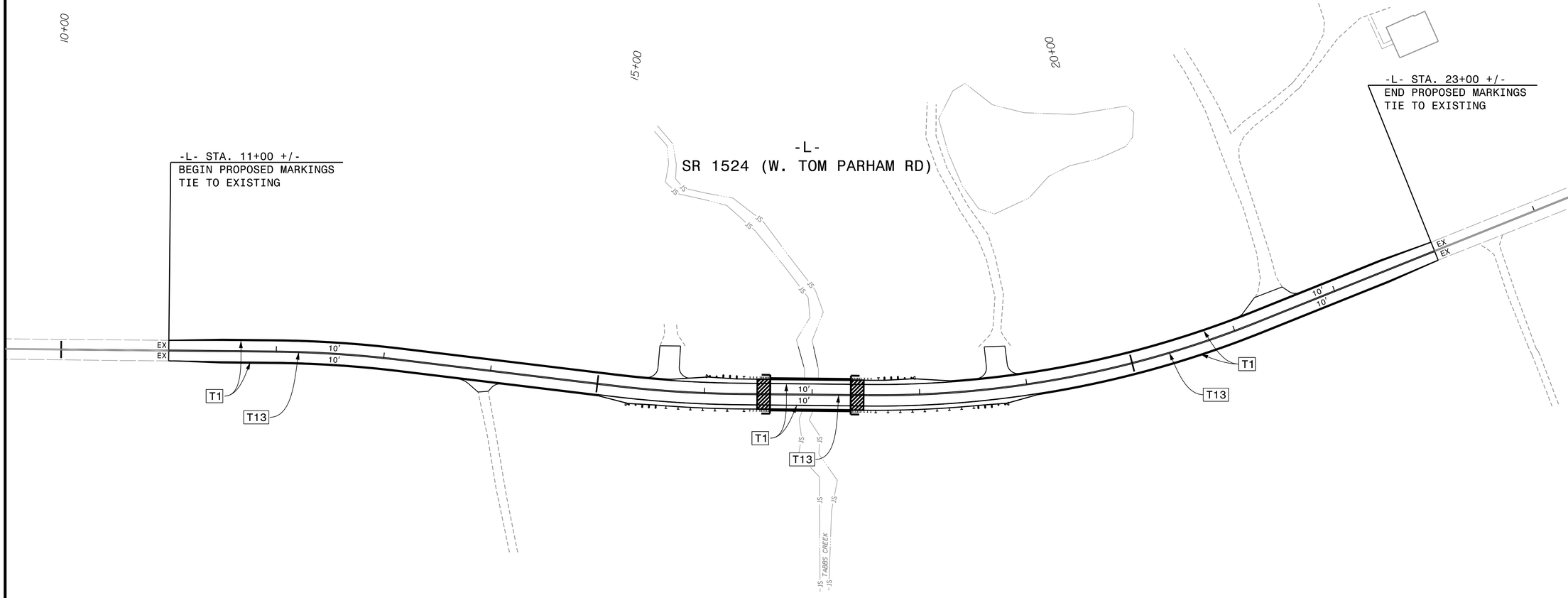

PAVEMENT MARKING PLAN

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PROJECT NO.	SHEET NO.
BP5.R104	PMP-1A

APPROVED: DocuSigned by: Matthew V. Springer BC60F6E8B584403...

DATE: 8/30/2019

SEAL

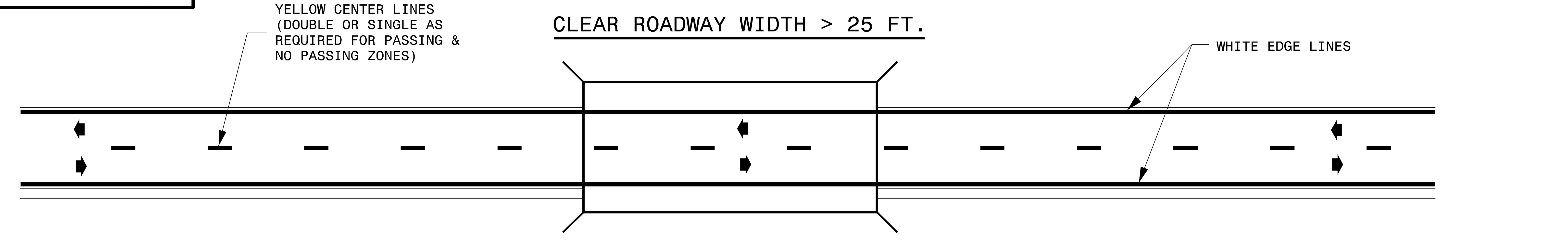
NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V. SPRINGER

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

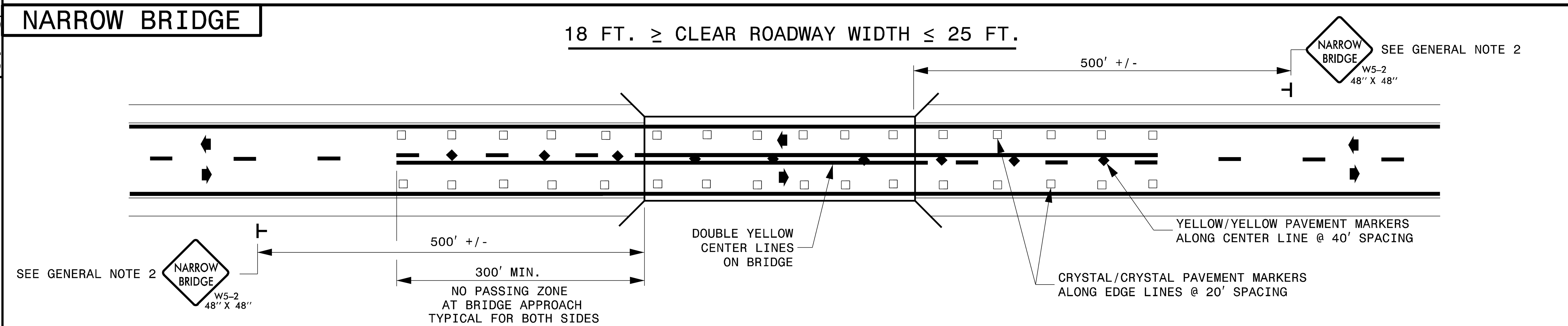
8-19

ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
BRIDGES

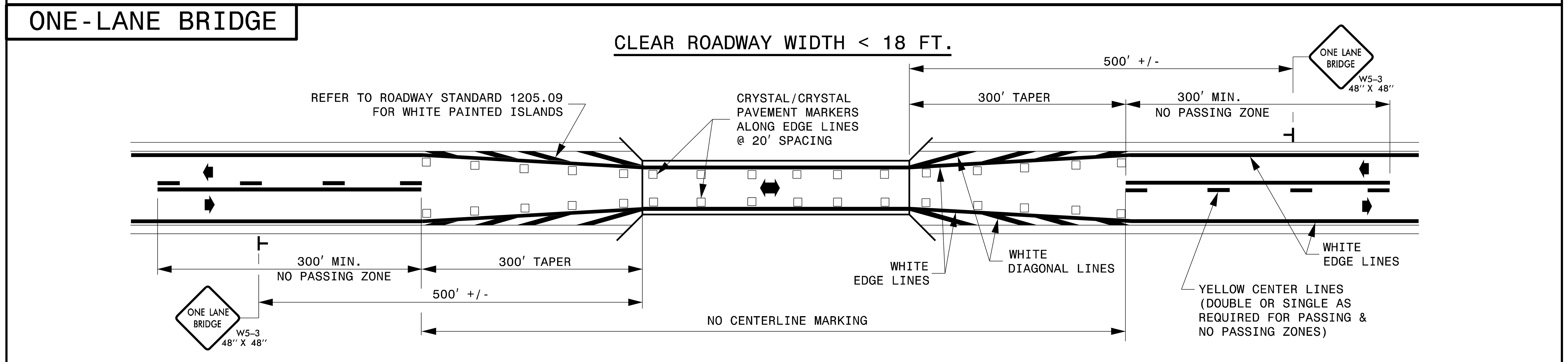
STANDARD BRIDGE



NARROW BRIDGE



ONE-LANE BRIDGE



GENERAL NOTES:

1- NO PASSING ZONES SHOWN ARE MINIMUMS. APPLY MINIMUM PASSING AND STOPPING SIGHT DISTANCES AS DETERMINED BY THE ENGINEER.

2- FOR BRIDGES WITH 18 TO 25 FEET CLEAR ROADWAY WIDTH, SIGNS MUST BE USED WHEN THE APPROACH PAVEMENT WIDTH IS 2 FOOT OR GREATER THAN THE CLEAR ROADWAY WIDTH.

LEGEND	
DIRECTION OF TRAFFIC FLOW	◆ YELLOW/YELLOW PAVEMENT MARKER
STATIONARY SIGN	□ CRYSTAL/CRYSTAL PAVEMENT MARKER

SHEET 1 OF 1
1205D12

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

8-19

ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
BRIDGES

SHEET 1 OF 1
1205D12

REVISED PAVEMENT MARKING
ROADWAY STANDARD DRAWING

08/30/19
S:\SRDU\Standards Group\Standards and Drawings\Drawings\2018 Standard Dwgs\Division 12 Final\1205\1205D12.08-29-19.dgn
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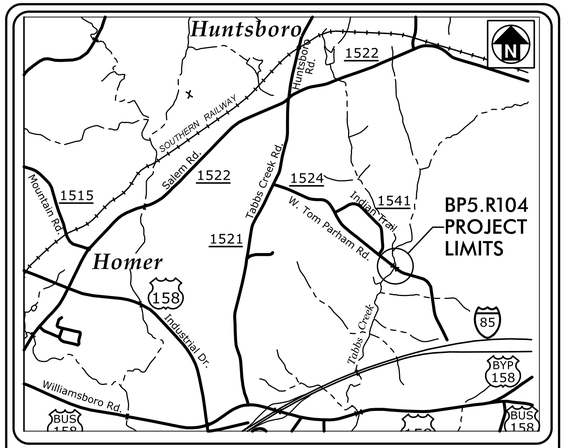
TIP PROJECT: BP5.R104



VICINITY MAP
NOT TO SCALE

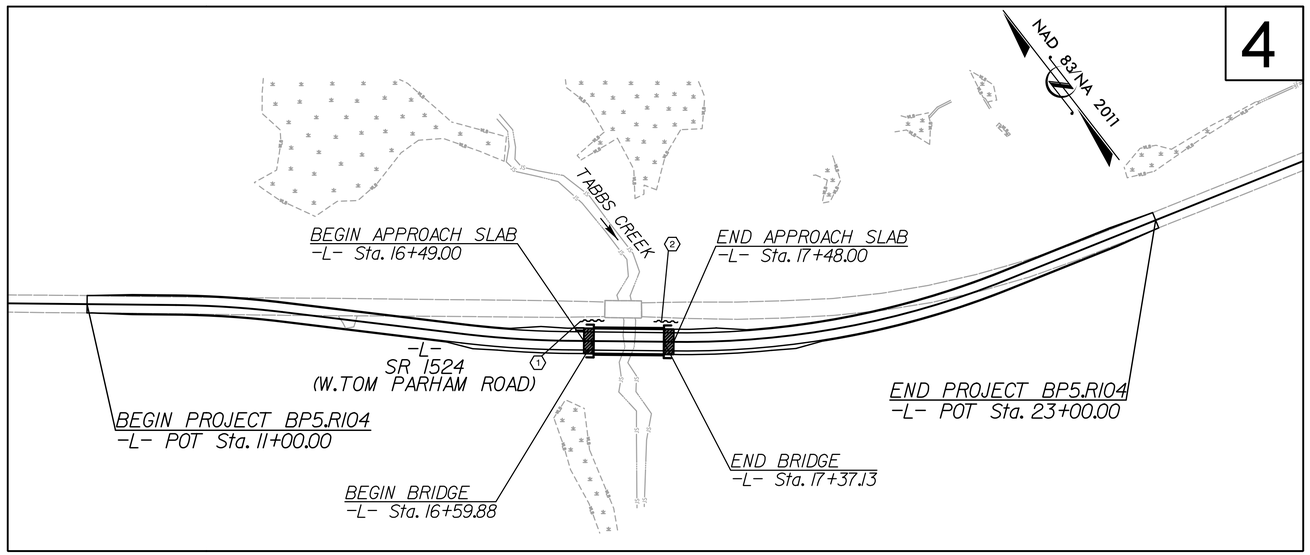
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R104	EC-1	

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL
GRANVILLE COUNTY

LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



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

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

GRAPHIC SCALE

50 25 0 50 100
PLANS

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

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Prepared In the Office of:

VHB ENGINEERING NC, P.C.
940 MAIN CAMPUS DRIVE, SUITE 500
RALEIGH, NC 27606

Designed by:

ERIC BERGER, PE ***4036***
NAME *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

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

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	EC-02
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

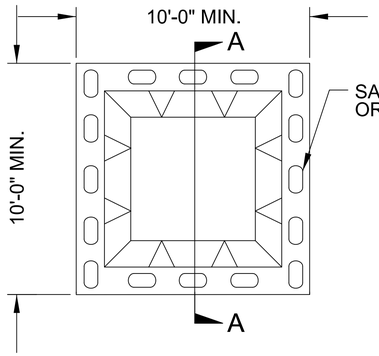
EROSION & SEDIMENT CONTROL LEGEND

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

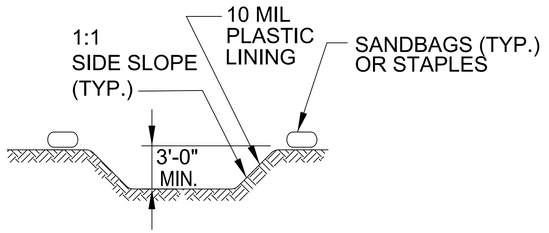
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet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

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

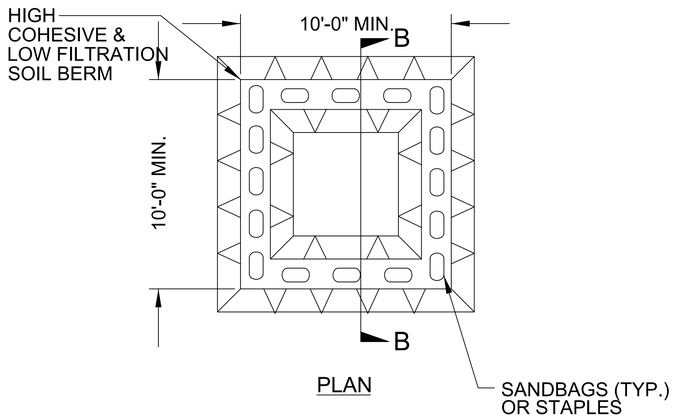
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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

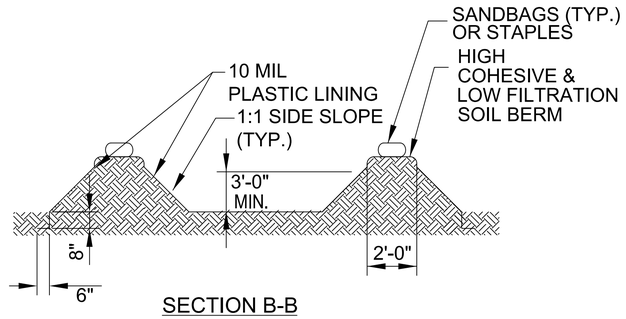
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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

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

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	12+50	13+50	RT	100
4	-L-	13+50	14+50	RT	70
4	-L-	20+00	20+50	RT	25
4	-L-	20+50	21+00	RT	25
4	-L-	21+00	21+50	RT	25
				SUBTOTAL	245
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					6640
				TOTAL	6885
				SAY	6900

MATTING FOR EROSION CONTROL

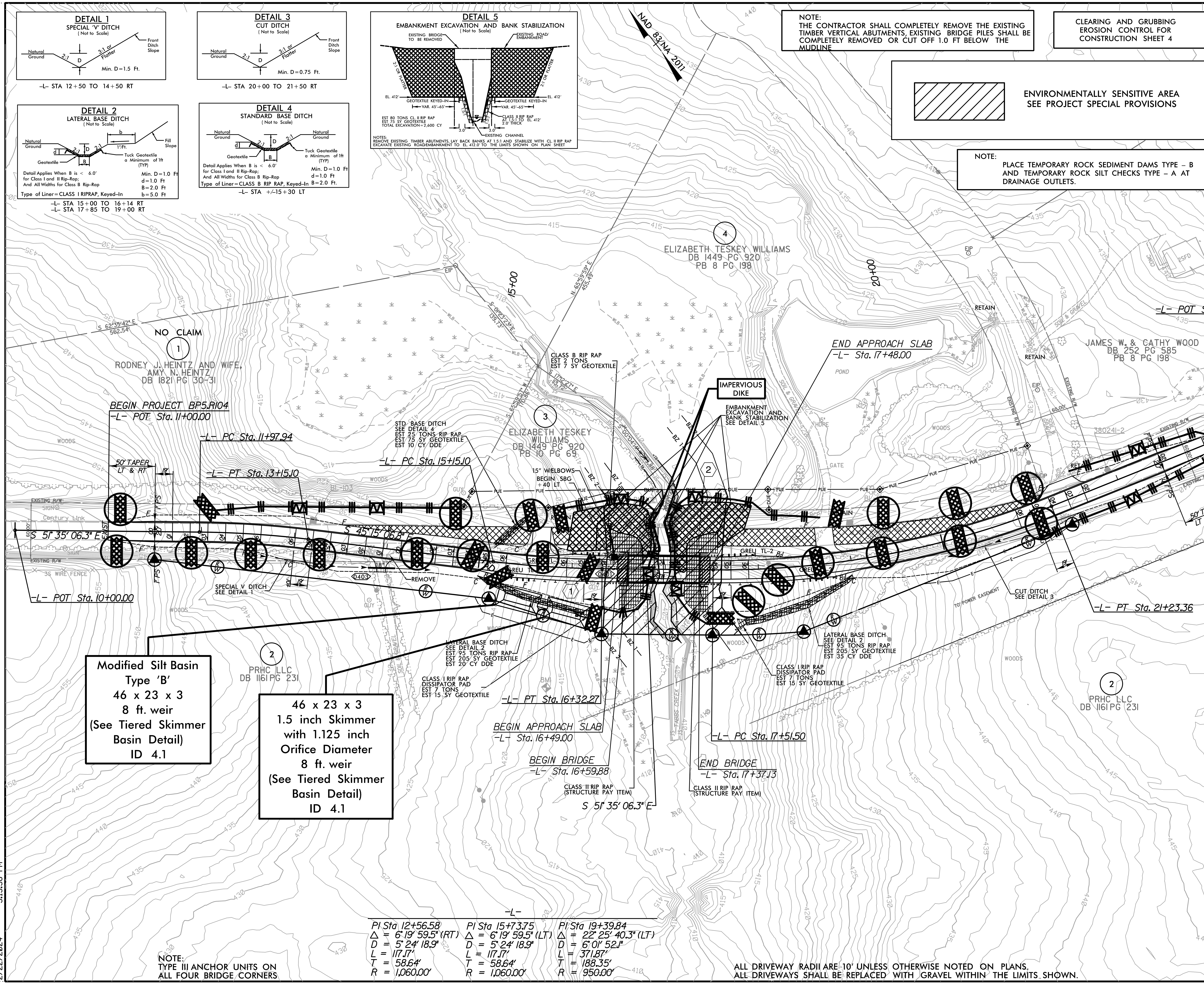
CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)

PROJECT REFERENCE NO.	SHEET NO.
BP5.RI04	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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


DETAIL 1
SPECIAL 'V' DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
3:1 or Flatter
Min. D=1.5 Ft.
-L- STA 12+50 TO 14+50 RT
DETAIL 2
LATERAL BASE DITCH
(Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D=1.0 Ft
d=1.0 Ft
B=2.0 Ft
b=5.0 Ft
Type of Liner=CLASS I RIPRAP, Keyed-In
-L- STA 15+00 TO 16+14 RT
-L- STA 17+85 TO 19+00 RT
DETAIL 3
CUT DITCH
(Not to Scale)
Min. D=0.75 Ft.
-L- STA 20+00 TO 21+50 RT
DETAIL 4
STANDARD BASE DITCH
(Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D=1.0 Ft
d=1.0 Ft
B=2.0 Ft.
Type of Liner=CLASS B RIP RAP, Keyed-In
-L- STA +/-15+30 LT
DETAIL 5
EMBANKMENT EXCAVATION AND BANK STABILIZATION
(Not to Scale)
EXISTING BRIDGE TO BE REMOVED
EXISTING ROAD/ EMBANKMENT
EST 80 TONS CL. II RIP RAP
EST 75 SY GEOTEXTILE
TOTAL EXCAVATION=2,600 CY
EXISTING CHANNEL
NOTES: REMOVE EXISTING TIMBER ABUTMENTS, LAY BACK BANKS AT 1.5:1 AND STABILIZE WITH CL II RIP RAP EXCAVATE EXISTING ROADEMBANKMENT TO EL 412.0 TO THE LIMITS SHOWN ON PLAN SHEET
NAD 83/NA 2011
NOTE: THE CONTRACTOR SHALL COMPLETELY REMOVE THE EXISTING TIMBER VERTICAL ABUTMENTS, EXISTING BRIDGE PILES SHALL BE COMPLETELY REMOVED OR CUT OFF 1.0 FT BELOW THE MUDLINE
CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4
ENVIRONMENTALLY SENSITIVE AREA SEE PROJECT SPECIAL PROVISIONS
NOTE: PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B AND TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.
NO CLAIM
1
RODNEY J. HEINTZ AND WIFE, AMY N. HEINTZ
DB 1821 PG 30-31
4
ELIZABETH TESKEY WILLIAMS
DB 1449 PG 920
PB 8 PG 198
3
ELIZABETH TESKEY WILLIAMS
DB 1449 PG 920
PB 10 PG 69
TREY M & JAMEY C SNIDE
DB 1576 PG 143
PB 8 PG 198
JAMES W. & CATHY WOOD
DB 252 PG 585
PB 8 PG 198
2
PRHC LLC
DB 1161 PG 231
BEGIN PROJECT BP5.R104
-L- POT Sta. 11+00.00
-L- PC Sta. 11+97.94
-L- PT Sta. 13+15.10
-L- PC Sta. 15+15.10
-L- POT Sta. 10+00.00
-L- POT Sta. 25+00.00
END APPROACH SLAB
-L- Sta. 17+48.00
IMPERVIOUS DIKE
EMBANKMENT EXCAVATION AND BANK STABILIZATION SEE DETAIL 5
CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE
STD BASE DITCH
SEE DETAIL 4
EST 25 TONS RIP RAP
EST 75 SY GEOTEXTILE
EST 10 CY DDE
15" W/ELBOWS
BEGIN SBG
S 51° 35' 06.3" E
S 45° 15' 06.3" E
S 74° 00' 46.6" E
50' TAPER LT & RT
SPECIAL V DITCH SEE DETAIL 1
REMOVE
CUT DITCH SEE DETAIL 3
-L- PT Sta. 21+23.36
END PROJECT BP5.R104
-L- POT Sta. 23+00.00
LATERAL BASE DITCH
SEE DETAIL 2
EST 95 TONS RIP RAP
EST 205 SY GEOTEXTILE
EST 20 CY DDE
CLASS I RIP RAP DISSIPATOR PAD
EST 7 TONS
EST 15 SY GEOTEXTILE
LATERAL BASE DITCH
SEE DETAIL 2
EST 95 TONS RIP RAP
EST 205 SY GEOTEXTILE
EST 35 CY DDE
CLASS I RIP RAP DISSIPATOR PAD
EST 7 TONS
EST 15 SY GEOTEXTILE
-L- PT Sta. 16+32.27
BEGIN APPROACH SLAB
-L- Sta. 16+49.00
BEGIN BRIDGE
-L- Sta. 16+59.88
-L- PC Sta. 17+51.50
END BRIDGE
-L- Sta. 17+37.13
CLASS II RIP RAP (STRUCTURE PAY ITEM)
CLASS II RIP RAP (STRUCTURE PAY ITEM)
S 51° 35' 06.3" E
Modified Silt Basin
Type 'B'
46 x 23 x 3
8 ft. weir
(See Tiered Skimmer Basin Detail)
ID 4.1
46 x 23 x 3
1.5 inch Skimmer
with 1.125 inch
Orifice Diameter
8 ft. weir
(See Tiered Skimmer Basin Detail)
ID 4.1
15+00
20+00
WOODS
RETAIN
POND
GATE
TO POWER EASEMENT
-L-
PI Sta 12+56.58
Δ = 6° 19' 59.5" (RT)
D = 5° 24' 18.9"
L = 117.17'
T = 58.64'
R = 1,060.00'
PI Sta 15+73.75
Δ = 6° 19' 59.5" (LT)
D = 5° 24' 18.9"
L = 117.17'
T = 58.64'
R = 1,060.00'
PI Sta 19+39.84
Δ = 22° 25' 40.3" (LT)
D = 6° 01' 52.1"
L = 371.87'
T = 188.35'
R = 950.00'
NOTE: TYPE III ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.
ALL DRIVEWAYS SHALL BE REPLACED WITH GRAVEL WITHIN THE LIMITS SHOWN.

PROJECT REFERENCE	SHEET NO.
BP5.R104 - GRANVILLE 241	EC-04/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	VHB ENGINEERING LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:

MOTT MACDONALD
7621 Purfoy Road, Suite 115
Fuquay-Varina, NC 27526
www.mottmac.com

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

GRAPHIC SCALE
25' 0 25' 50'

TEMP. SHORING (SEE TMP PLANS)

FOR -L- PROFILE SEE SHEET 5

tculpepper
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PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	EC-05/CONST.04

ROADWAY DESIGN ENGINEER — MOTT MACDONALD I & E, LLC LICENSE NO. F-0669

HYDRAULICS ENGINEER — VHB ENGINEERING LICENSE NO. C-3705

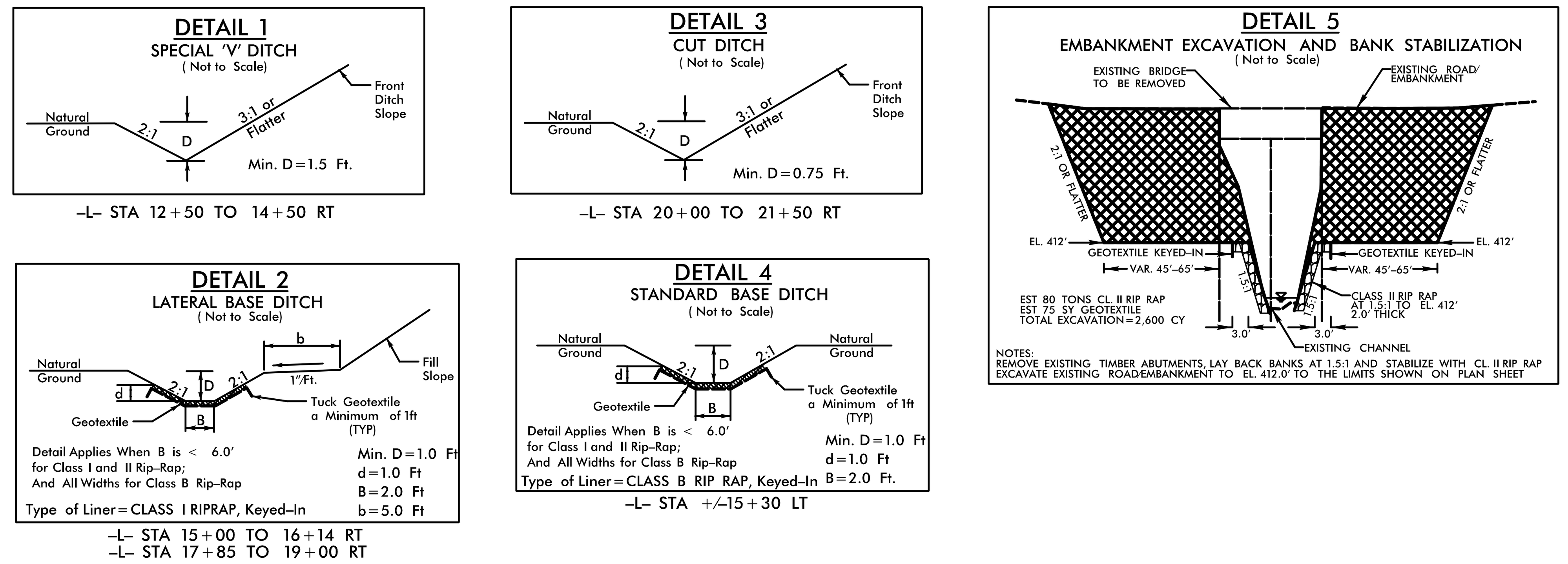
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: MOTT MACDONALD, 7621 Purfoy Road, Suite 115, Fuquay-Varina, NC 27526, www.mottmac.com

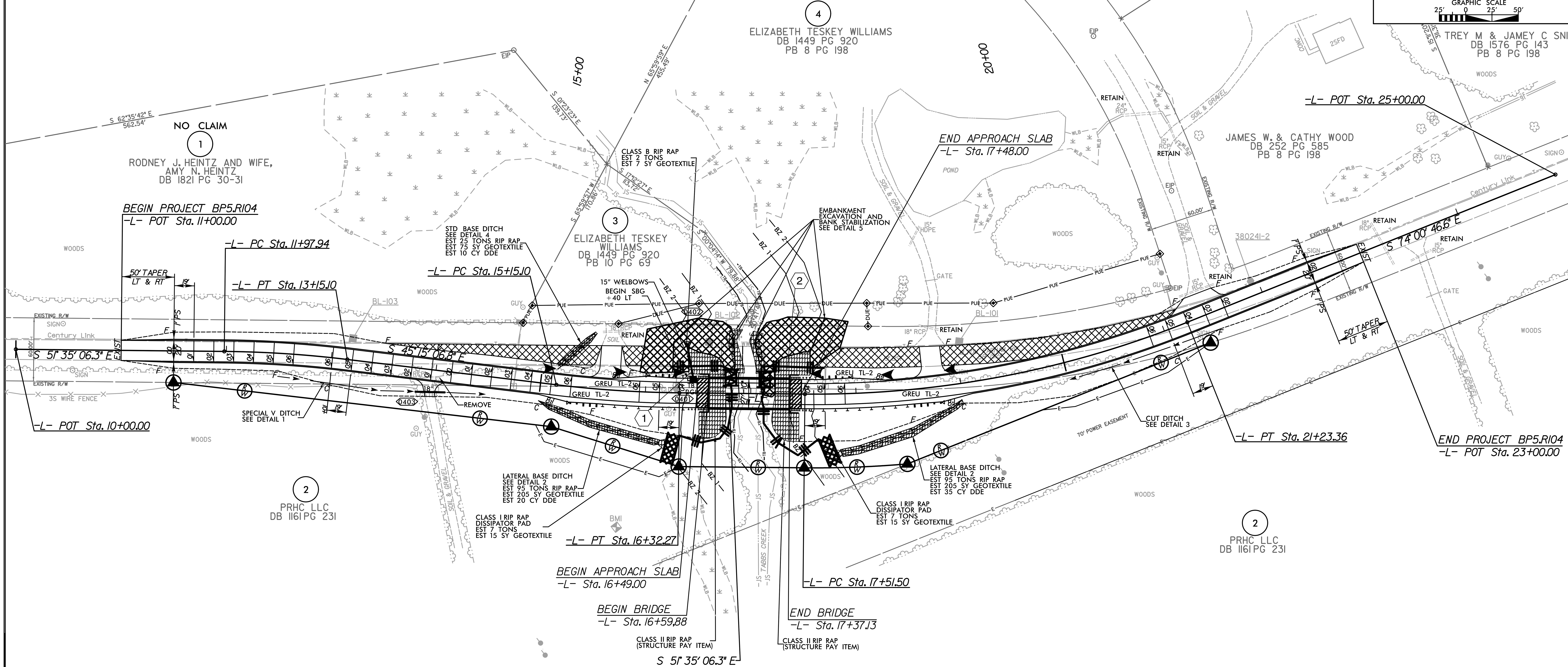
VHB Engineering NC, P.C. (C-3705), 940 Main Campus Drive, Suite 500, Raleigh, NC 27606

NOTE:
THE CONTRACTOR SHALL COMPLETELY REMOVE THE EXISTING TIMBER VERTICAL ABUTMENTS, EXISTING BRIDGE PILES SHALL BE COMPLETELY REMOVED OR CUT OFF 1.0 FT BELOW THE MUDLINE

EC FOR INTERMEDIATE PHASE



DETAIL 1
SPECIAL 'V' DITCH
-L- STA 12+50 TO 14+50 RT
DETAIL 3
CUT DITCH
-L- STA 20+00 TO 21+50 RT
DETAIL 2
LATERAL BASE DITCH
Type of Liner=CLASS I RIPRAP, Keyed-In
-L- STA 15+00 TO 16+14 RT
-L- STA 17+85 TO 19+00 RT
DETAIL 4
STANDARD BASE DITCH
Type of Liner=CLASS B RIP RAP, Keyed-In
-L- STA +/-15+30 LT
DETAIL 5
EMBANKMENT EXCAVATION AND BANK STABILIZATION
EST 80 TONS CL. II RIP RAP
EST 75 SY GEOTEXTILE
TOTAL EXCAVATION=2,600 CY



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-L- PC Sta. 11+97.94
-L- PT Sta. 13+15.10
-L- PC Sta. 15+15.10
-L- PT Sta. 16+32.27
BEGIN APPROACH SLAB
-L- Sta. 16+49.00
BEGIN BRIDGE
-L- Sta. 16+59.88
END BRIDGE
-L- Sta. 17+37.13
END APPROACH SLAB
-L- Sta. 17+48.00
-L- PC Sta. 17+51.50
-L- PT Sta. 21+23.36
END PROJECT BP5.R104
-L- POT Sta. 23+00.00
-L- POT Sta. 25+00.00
RODNEY J. HEINTZ AND WIFE, AMY N. HEINTZ
DB 1821 PG 30-31
ELIZABETH TESKEY WILLIAMS
DB 1449 PG 920
PB 10 PG 69
ELIZABETH TESKEY WILLIAMS
DB 1449 PG 920
PB 8 PG 198
JAMES W. & CATHY WOOD
DB 252 PG 585
PB 8 PG 198
TREY M & JAMEY C SNIDE
DB 1576 PG 143
PB 8 PG 198
PRHC LLC
DB 1161 PG 231
NAD 83/NA 2011
S 51° 35' 06.3" E
S 74° 00' 46.6" E

	-L-	
PI Sta 12+56.58	PI Sta 15+73.75	PI Sta 19+39.84
Δ = 6° 19' 59.5" (RT)	Δ = 6° 19' 59.5" (LT)	Δ = 22° 25' 40.3" (LT)
D = 5° 24' 18.9"	D = 5° 24' 18.9"	D = 6° 01' 52.1"
L = 117.17'	L = 117.17'	L = 371.87'
T = 58.64'	T = 58.64'	T = 188.35'
R = 1,060.00'	R = 1,060.00'	R = 950.00'

NOTE:
TYPE III ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.
ALL DRIVEWAYS SHALL BE REPLACED WITH GRAVEL WITHIN THE LIMITS SHOWN.

(#) TEMP. SHORING (SEE TMP PLANS)

FOR -L- PROFILE SEE SHEET 5

tculpepper
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PROJECT REFERENCE	SHEET NO.
BP5.R104 – GRANVILLE 241	EC-06/CONST.04

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

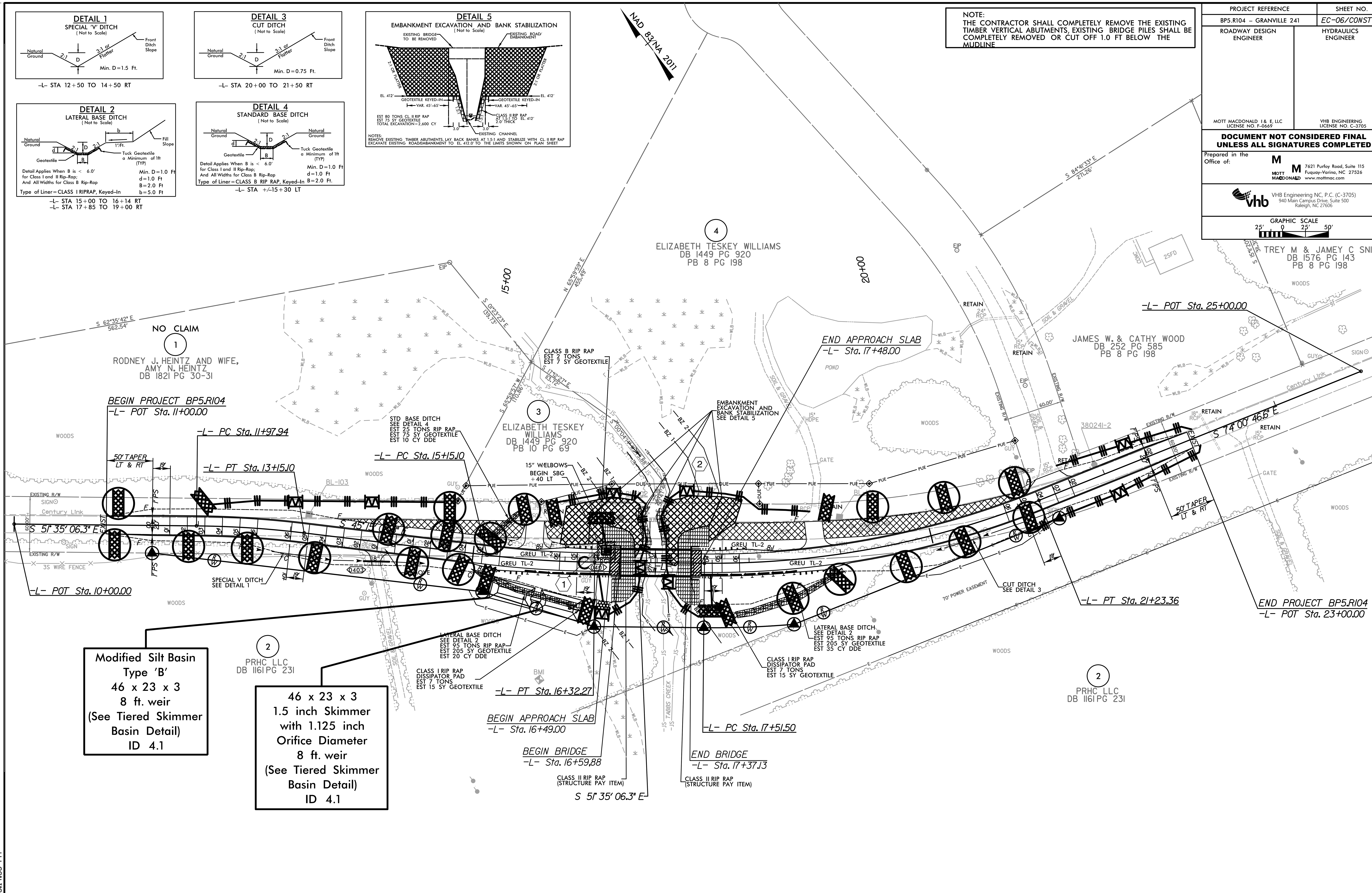
MOTT MACDONALD I& E, LLC LICENSE NO. F-0669 — VHB ENGINEERING LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: MOTT MACDONALD, 7621 Purfoy Road, Suite 115, Fuquay-Varina, NC 27526, www.mottmac.com

VHB Engineering NC, P.C. (C-3705), 940 Main Campus Drive, Suite 500, Raleigh, NC 27606

NOTE:
THE CONTRACTOR SHALL COMPLETELY REMOVE THE EXISTING TIMBER VERTICAL ABUTMENTS, EXISTING BRIDGE PILES SHALL BE COMPLETELY REMOVED OR CUT OFF 1.0 FT BELOW THE MUDLINE



DETAIL 1
SPECIAL 'V' DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
3:1 or Flatter
Min. D=1.5 Ft.
-L- STA 12+50 TO 14+50 RT
DETAIL 3
CUT DITCH
(Not to Scale)
Min. D=0.75 Ft.
-L- STA 20+00 TO 21+50 RT
DETAIL 2
LATERAL BASE DITCH
(Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D=1.0 Ft
d=1.0 Ft
B=2.0 Ft
b=5.0 Ft
Type of Liner=CLASS I RIPRAP, Keyed-In
-L- STA 15+00 TO 16+14 RT
-L- STA 17+85 TO 19+00 RT
DETAIL 4
STANDARD BASE DITCH
(Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D=1.0 Ft
d=1.0 Ft
B=2.0 Ft.
Type of Liner=CLASS B RIP RAP, Keyed-In
-L- STA +/-15+30 LT
DETAIL 5
EMBANKMENT EXCAVATION AND BANK STABILIZATION
(Not to Scale)
EXISTING BRIDGE TO BE REMOVED
EXISTING ROAD/ EMBANKMENT
GEOTEXTILE KEYED-IN
EL. 412'
EST 80 TONS CL. II RIP RAP
EST 75 SY GEOTEXTILE
TOTAL EXCAVATION=2,600 CY
EXISTING CHANNEL
NOTES: REMOVE EXISTING TIMBER ABUTMENTS, LAY BACK BANKS AT 1.5:1 AND STABILIZE WITH CL II RIP RAP
EXCAVATE EXISTING ROAD/EMBANKMENT TO EL 412.0' TO THE LIMITS SHOWN ON PLAN SHEET
NAD 83/NA 2011
GRAPHIC SCALE 25' 0 25' 50'
NO CLAIM
RODNEY J. HEINTZ AND WIFE, AMY N. HEINTZ DB 1821 PG 30-31
ELIZABETH TESKEY WILLIAMS DB 1449 PG 920 PB 8 PG 198
ELIZABETH TESKEY WILLIAMS DB 1449 PG 920 PB 10 PG 69
TREY M & JAMEY C SNIDE DB 1576 PG 143 PB 8 PG 198
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PRHC LLC DB 1161 PG 231
BEGIN PROJECT BP5.R104 -L- POT Sta. 11+00.00
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-L- PC Sta. 11+97.94
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END BRIDGE -L- Sta. 17+37.13
END APPROACH SLAB -L- Sta. 17+48.00
-L- PC Sta. 17+51.50
-L- PT Sta. 21+23.36
END PROJECT BP5.R104 -L- POT Sta. 23+00.00
-L- POT Sta. 25+00.00
S 51° 35' 06.3" E
S 74° 00' 46.6" E
50' TAPER LT & RT
SPECIAL V DITCH SEE DETAIL 1
STD BASE DITCH SEE DETAIL 4 EST 25 TONS RIP RAP EST 75 SY GEOTEXTILE EST 10 CY DDE
CLASS B RIP RAP EST 2 TONS EST 7 SY GEOTEXTILE
EMBANKMENT EXCAVATION AND BANK STABILIZATION SEE DETAIL 5
15" W/ELBOWS BEGIN SBG +40 LT
LATERAL BASE DITCH SEE DETAIL 2 EST 95 TONS RIP RAP EST 205 SY GEOTEXTILE EST 20 CY DDE
CLASS I RIP RAP DISSIPATOR PAD EST 7 TONS EST 15 SY GEOTEXTILE
LATERAL BASE DITCH SEE DETAIL 2 EST 95 TONS RIP RAP EST 205 SY GEOTEXTILE EST 35 CY DDE
CUT DITCH SEE DETAIL 3
CLASS II RIP RAP (STRUCTURE PAY ITEM)
Modified Silt Basin Type 'B' 46 x 23 x 3 8 ft. weir (See Tiered Skimmer Basin Detail) ID 4.1
46 x 23 x 3 1.5 inch Skimmer with 1.125 inch Orifice Diameter 8 ft. weir (See Tiered Skimmer Basin Detail) ID 4.1
GREU TL-2
WOODS
POND
TABBS CREEK

-L-

PI Sta 12+56.58	PI Sta 15+73.75	PI Sta 19+39.84
Δ = 6° 19' 59.5" (RT)	Δ = 6° 19' 59.5" (LT)	Δ = 22° 25' 40.3" (LT)
D = 5° 24' 18.9"	D = 5° 24' 18.9"	D = 6° 01' 52.1"
L = 117.17'	L = 117.17'	L = 371.87'
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NOTE:
TYPE III ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.
ALL DRIVEWAYS SHALL BE REPLACED WITH GRAVEL WITHIN THE LIMITS SHOWN.

(#) TEMP. SHORING (SEE TMP PLANS)

FOR -L- PROFILE SEE SHEET 5

tculpepper
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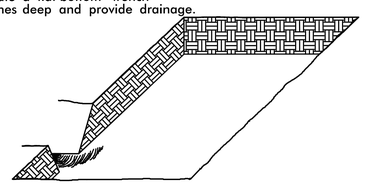
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R104	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

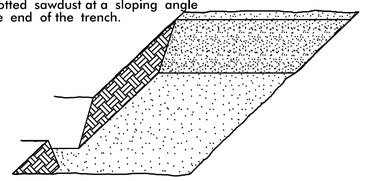
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

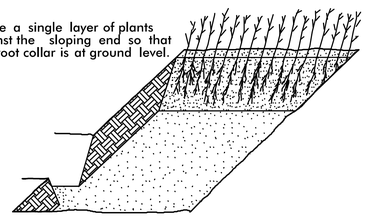
1. Locate a healing–in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



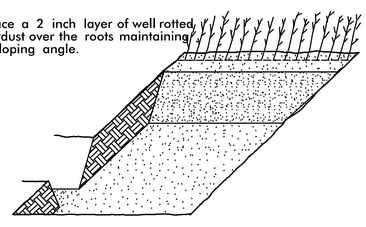
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

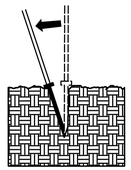


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

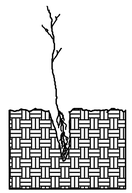


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

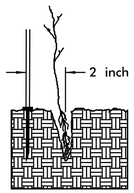
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



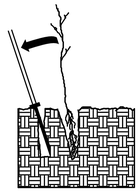
1. Insert planting bar as shown and pull handle toward planter.



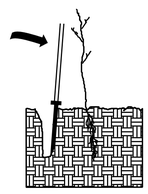
2. Remove planting bar and place seedling at correct depth.



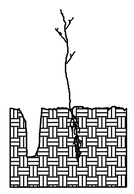
3. Insert planting bar 2 inches toward planter from seedling.



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:

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

REFORESTATION DETAIL SHEET

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

PROJECT: BP5.R104

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
GRANVILLE COUNTY
LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

PROJECT NO.	SHEET NO.
BP5.R104	SIGN-1

APPROVED: Michael T. Rzepka

DATE: 7/25/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUMMARY OF QUANTITIES

ITEM NO.		ITEM DESCRIPTION	QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	13	L.F.
4102000000	904	SIGN ERECTION, TYPE E	1	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	3	EA.

INDEX

ROADWAY STANDARD DRAWING

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

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

GENERAL NOTES

- SIGNS FURNISHED BY STATE.
- CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

PLAN REVIEWED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

RENEE ROACH, P.E. — SIGNING & DELINEATION STATE ENGINEER

MITCH EATON, P.E. — SIGNING & DELINEATION REGIONAL ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: HDR ENGINEERING, INC. OF THE CAROLINAS

MIKE RZEPKA, P.E. — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

CHRIS HARNDEN — SIGNING & DELINEATION PROJECT DESIGN TECHNICIAN

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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(401) QUANTITY REQ'D 1

18" X 24"
R2-1

ONE "U" POST PER SIGN

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT NO.	SHEET NO.
BP5.R104	SIGN-2

APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TYPE "E" SIGNS

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT NO.	SHEET NO.
BP5.R104	SIGN-3

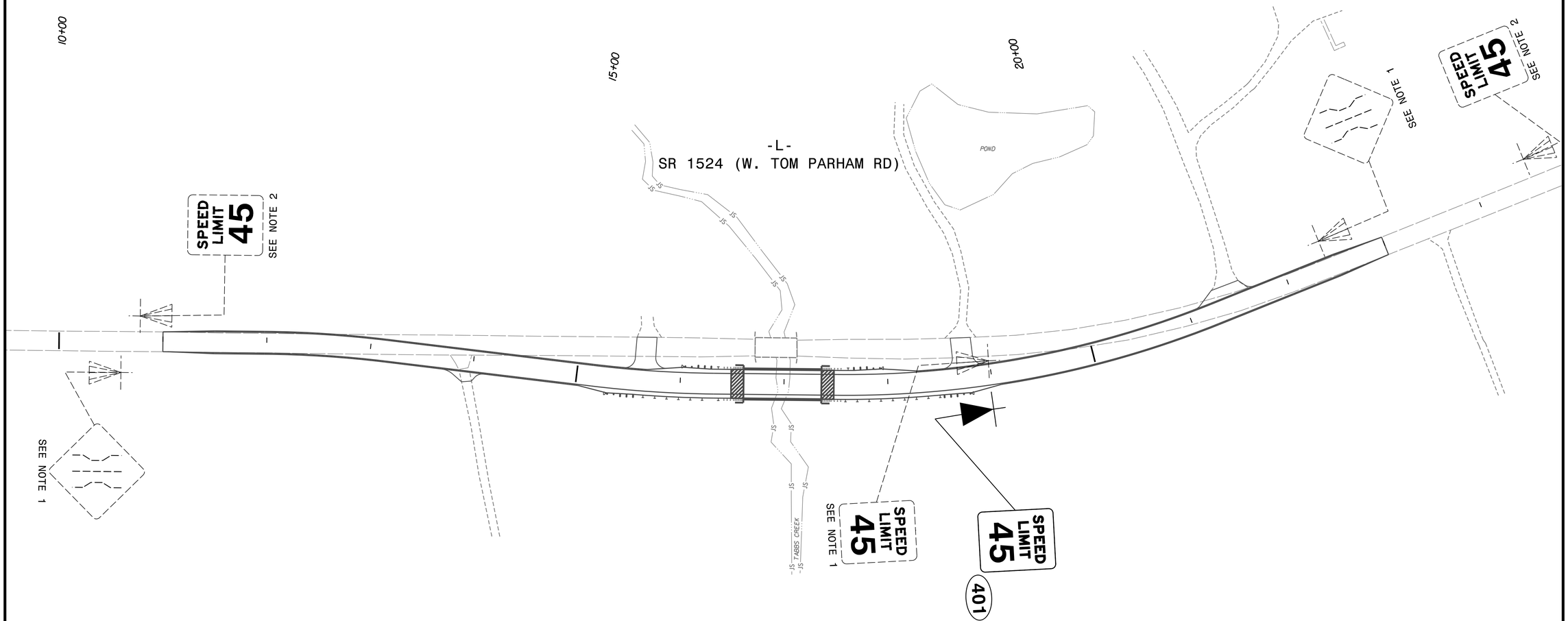
APPROVED: Michael T. Rzepka

DATE: 3/19/2024

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NOTES

1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2 SIGN SYSTEM TO REMAIN

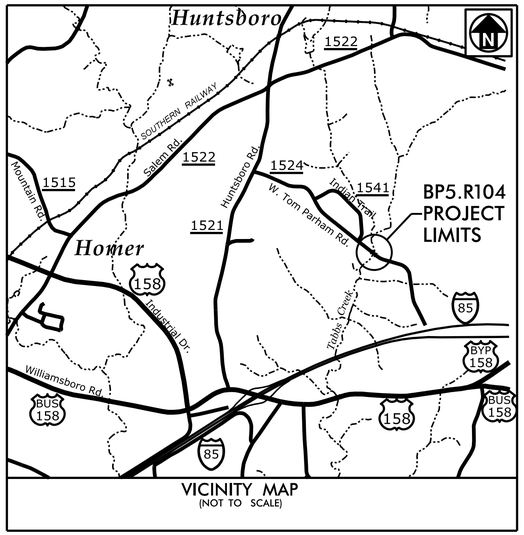
EXISTING AND PROPOSED SIGNS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_Signing.tbl
USER: CHARNDEN DATE: 3/19/2024 TIME: 11:33:57 AM
FILE: pw:\\pwhdruseas01:HDR_US_East_01\Documents\5705\10165067\6.0_CAD_BIM\6.2_WIP\BP5.R104_Granville 241\Traffic\Signing\CADD\Signing Layout Plans\380241_SIGN_S03.dgn

09/08/99

PROJECT: BP5.R104

CONTRACT:



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

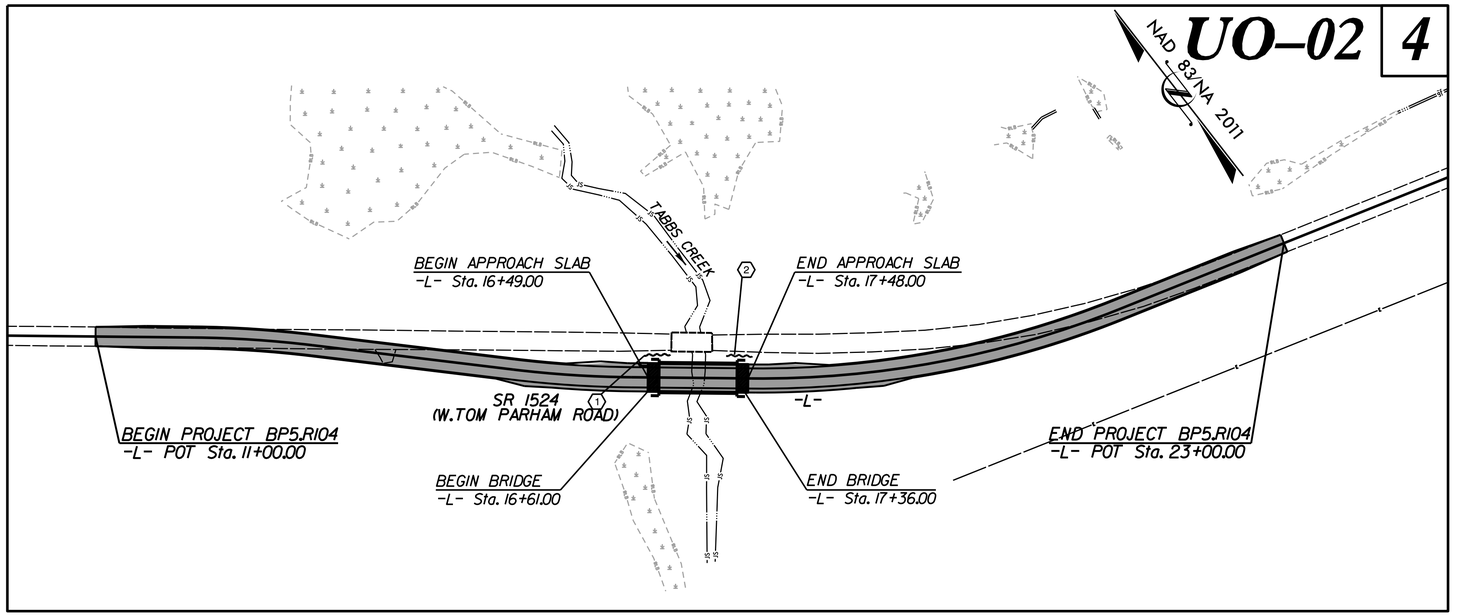
UTILITIES BY OTHERS PLANS
GRANVILLE COUNTY

LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

TYPE OF WORK: POWER (DISTRIBUTION) AND COMMUNICATIONS

T.I.P. NO.	SHEET NO.
BP5.R104	UO–1

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



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.:	*DESCRIPTION:*
UO–1	*TITLE SHEET*
UO–02	*UBO PLAN SHEET*

UTILITY OWNERS WITH CONFLICTS

(A) POWER – DUKE
(B) COMMUNICATIONS – CENTURYLINK

PREPARED IN THE OFFICE OF:

SAM™
2641 Sumner Boulevard
Suite 116
Raleigh, NC 27616
(919) 878–7466

Freddie Bunn — *UTILITY PROJECT MANAGER*
Brian Long — *PROJECT UTILITY COORDINATOR*

DIVISION OF HIGHWAYS
DIVISION 05

DIV ADDRESS
2612 N. Duke Street
Durham, NC 27704

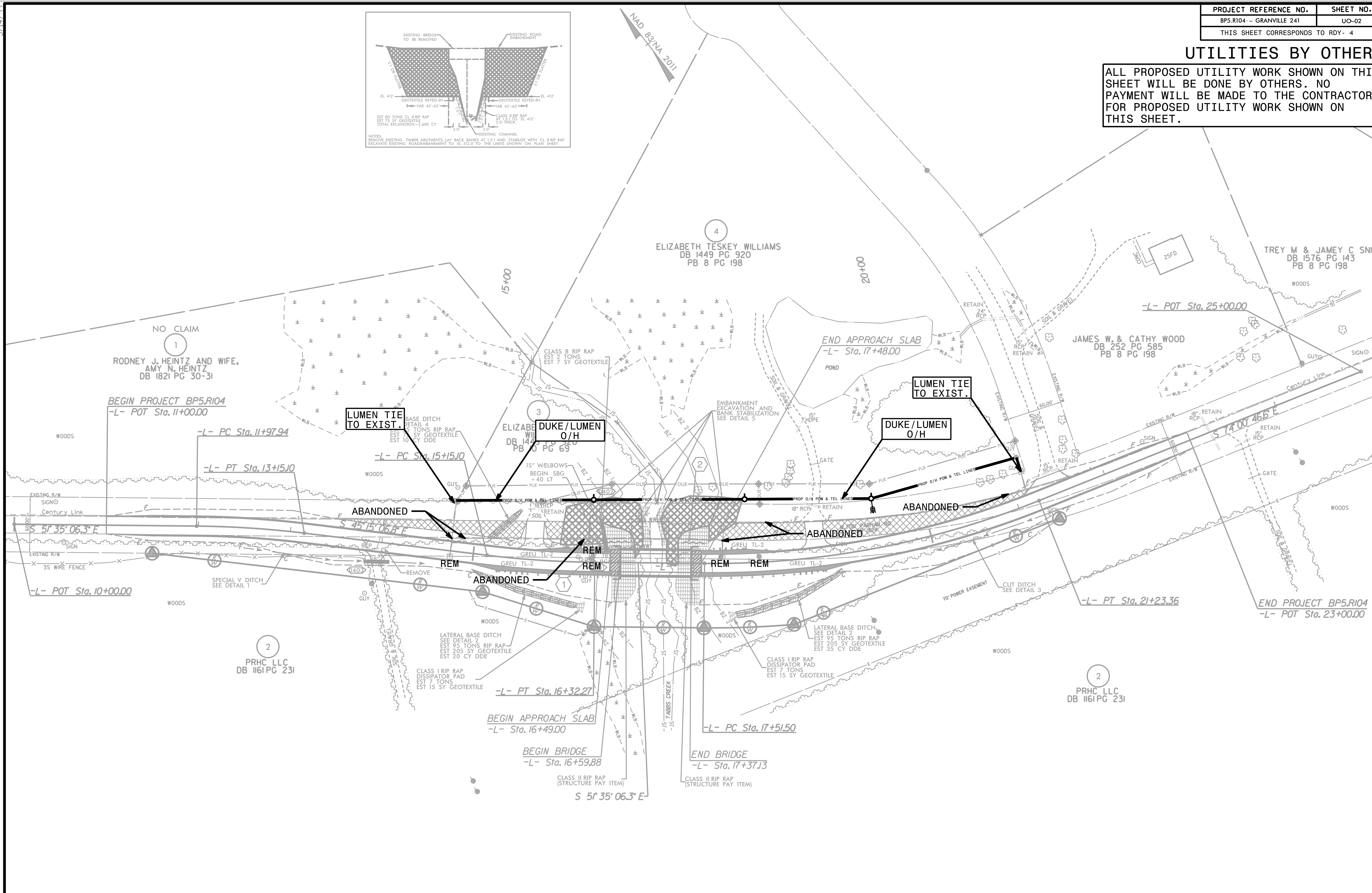
Lisa Gilchrist — *Division Bridge Program Manager*

6/7/2023
...\Working\38024I_rdy_tsh.dgn
3:21:25 PM

PROJECT REFERENCE NO.	SHEET NO.
BP5.R104 - GRANVILLE 241	UO-02
THIS SHEET CORRESPONDS TO RDY- 4	

UTILITIES BY OTHERS

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



NAD 83/NA 2011
EXISTING BRIDGE TO BE REMOVED
EXISTING ROAD/ EMBANKMENT
EST 80 TONS CL. II RIP RAP
EST 75 SY GEOTEXTILE
TOTAL EXCAVATION=2,600 CY
NOTES: REMOVE EXISTING TIMBER ABUTMENTS, LAY BACK BANKS AT 1.5:1 AND STABILIZE WITH CL. II RIP RAP
EXCAVATE EXISTING ROADEMBANKMENT TO EL. 412.0' TO THE LIMITS SHOWN ON PLAN SHEET
NO CLAIM
1
RODNEY J. HEINTZ AND WIFE, AMY N. HEINTZ
DB 1821 PG 30-31
BEGIN PROJECT BP5.R104
-L- POT Sta. 11+00.00
-L- PC Sta. 11+97.94
-L- PT Sta. 13+15.10
-L- PC Sta. 15+15.10
-L- POT Sta. 10+00.00
S 51° 35' 06.3" E
S 45° 15' 06.5" E
SPECIAL V DITCH SEE DETAIL 1
2
PRHC LLC
DB 1161 PG 231
LUMEN TIE TO EXIST.
DUKE/LUMEN O/H
ABANDONED
REM
15+00
3
CLASS B RIP RAP EST 2 TONS EST 7 SY GEOTEXTILE
4
ELIZABETH TESKEY WILLIAMS
DB 1449 PG 920
PB 8 PG 198
EMBANKMENT EXCAVATION AND BANK STABILIZATION SEE DETAIL 5
20+00
END APPROACH SLAB
-L- Sta. 17+48.00
POND
GATE
LATERAL BASE DITCH SEE DETAIL 2 EST 95 TONS RIP RAP EST 205 SY GEOTEXTILE EST 20 CY DDE
CLASS I RIP RAP DISSIPATOR PAD EST 7 TONS EST 15 SY GEOTEXTILE
-L- PT Sta. 16+32.27
BEGIN APPROACH SLAB
-L- Sta. 16+49.00
BEGIN BRIDGE
-L- Sta. 16+59.88
CLASS II RIP RAP (STRUCTURE PAY ITEM)
S 51° 35' 06.3" E
TABBS CREEK
-L- PC Sta. 17+51.50
END BRIDGE
-L- Sta. 17+37.13
LATERAL BASE DITCH SEE DETAIL 2 EST 95 TONS RIP RAP EST 205 SY GEOTEXTILE EST 35 CY DDE
CUT DITCH SEE DETAIL 3
TREY M & JAMEY C SNIDE
DB 1576 PG 143
PB 8 PG 198
JAMES W. & CATHY WOOD
DB 252 PG 585
PB 8 PG 198
-L- POT Sta. 25+00.00
S 74° 00' 46.6" E
-L- PT Sta. 21+23.36
END PROJECT BP5.R104
-L- POT Sta. 23+00.00
PRHC LLC
DB 1161 PG 231
WOODS

TEMP. SHORING (SEE TMP PLANS)

NOTE:
TYPE III ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.
ALL DRIVEWAYS SHALL BE REPLACED WITH GRAVEL WITHIN THE LIMITS SHOWN.

5/14/99
6/7/2023

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X-1

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

460 450 440 430

EXIST. R/W EXIST. R/W

VAR 0.000 0.000 VAR

EOP 442.56 EOP

11+50.00

460 450 440 430

EXIST. R/W EXIST. R/W

EXIST EXIST

EOP 444.93 EOP

11+00.00

BEGIN PROJECT 11+00.00

460 450 440 430

EXIST. R/W EXIST. R/W

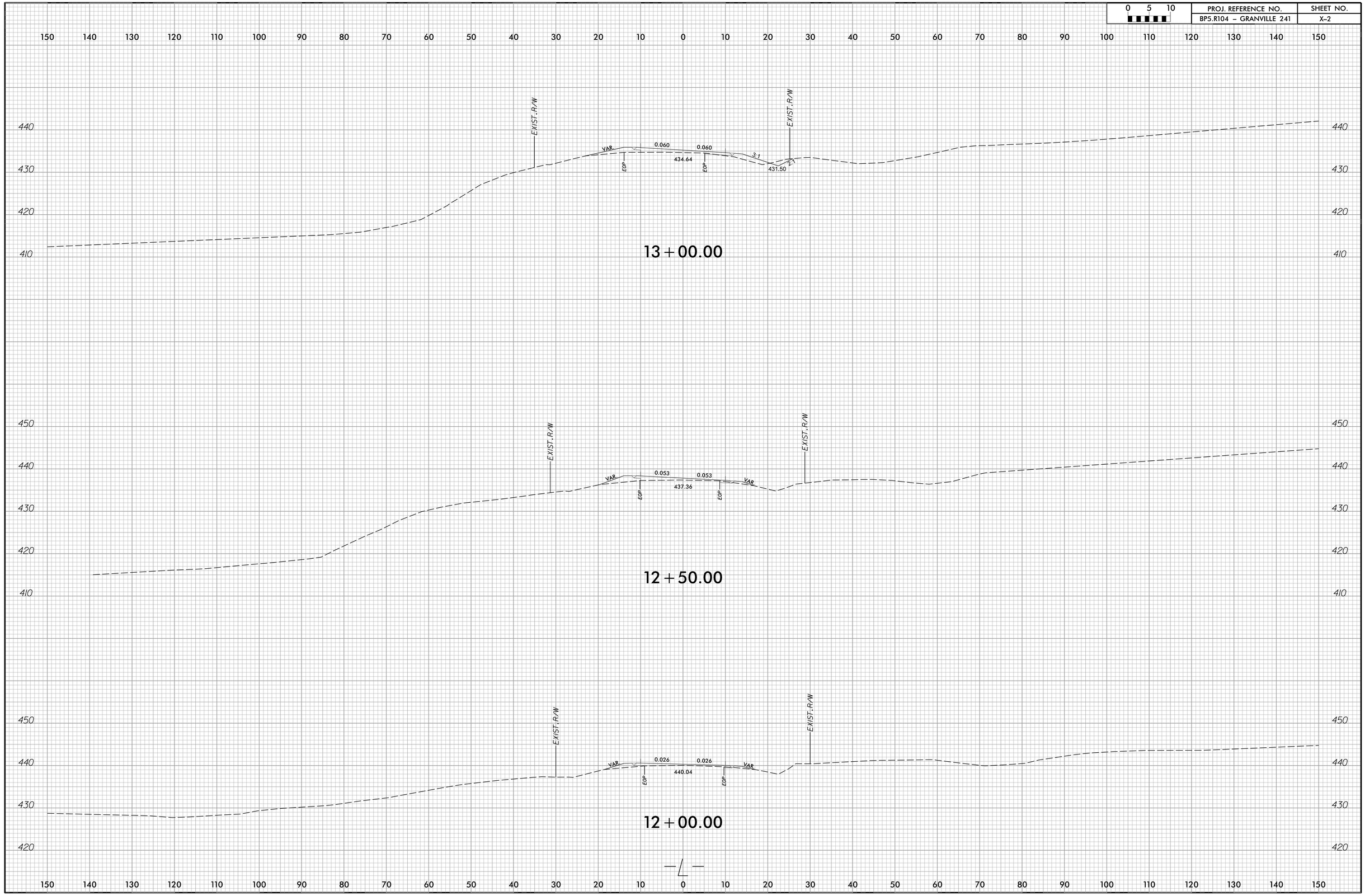
EOP 446.91 EOP

10+50.00

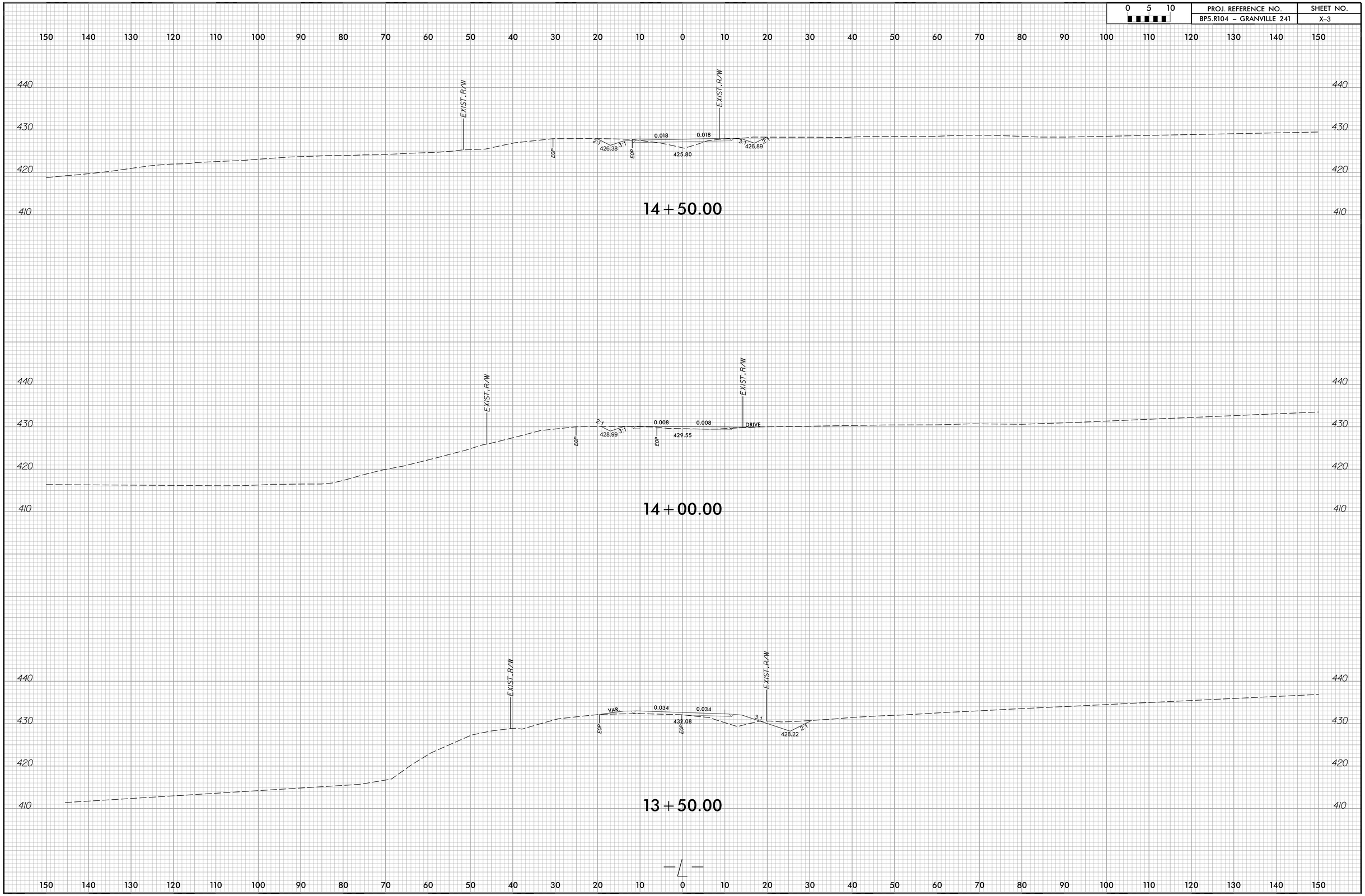
NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

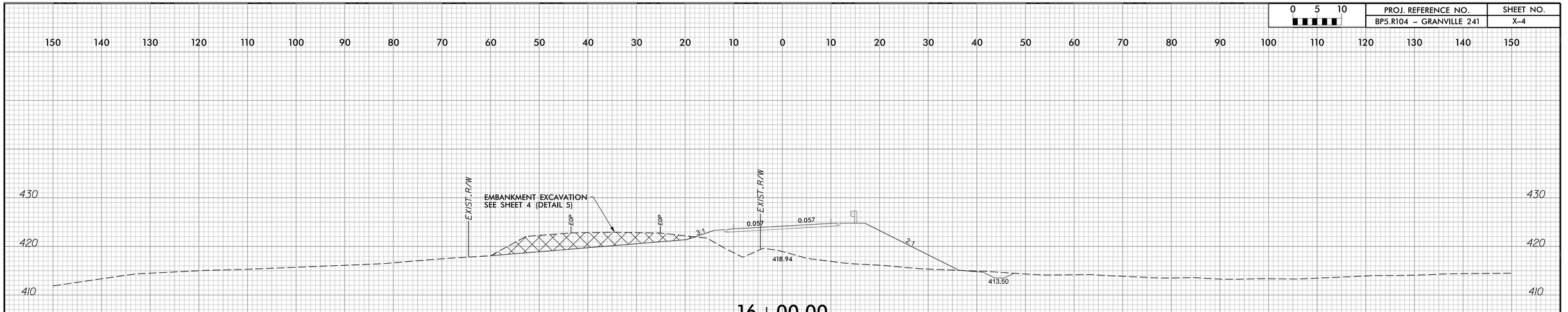
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–2



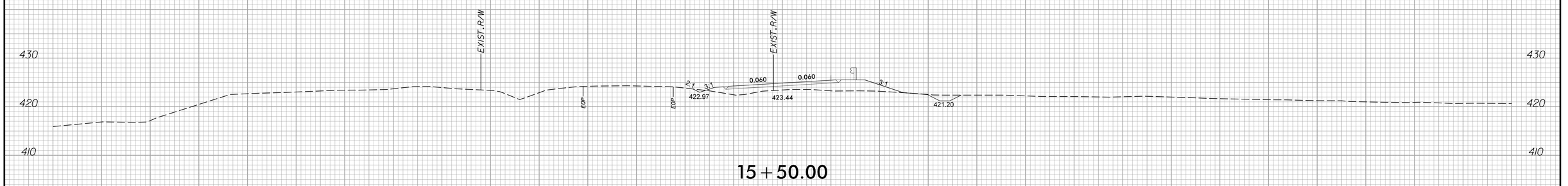
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X-3



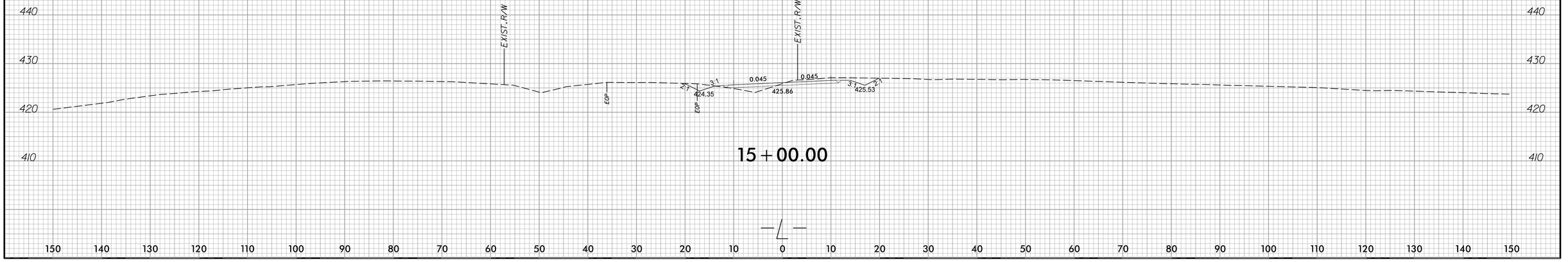
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–4



16+00.00

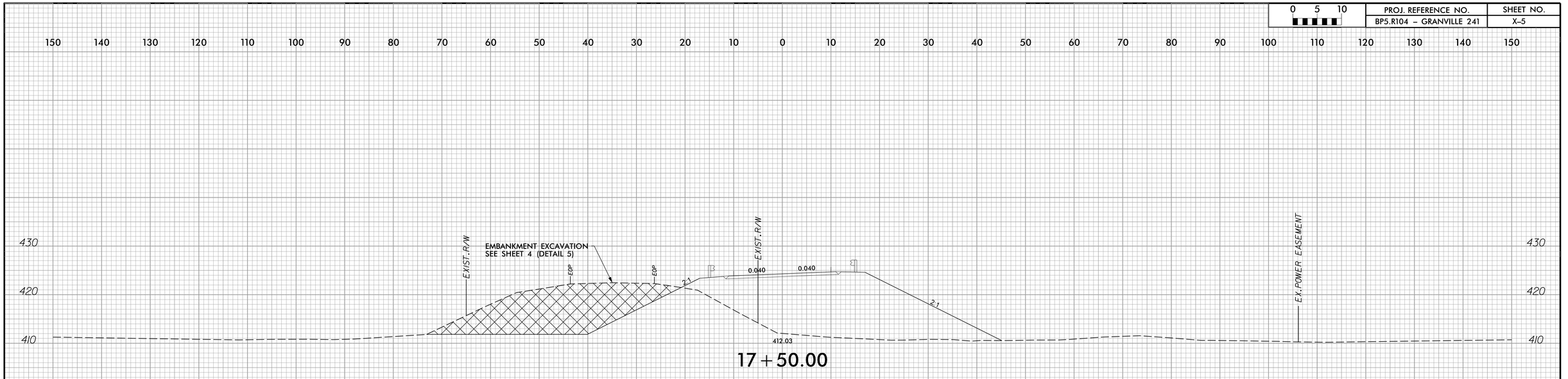


15+50.00



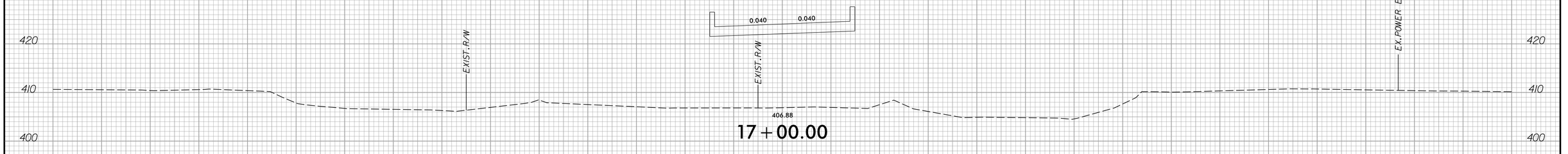
15+00.00

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–5



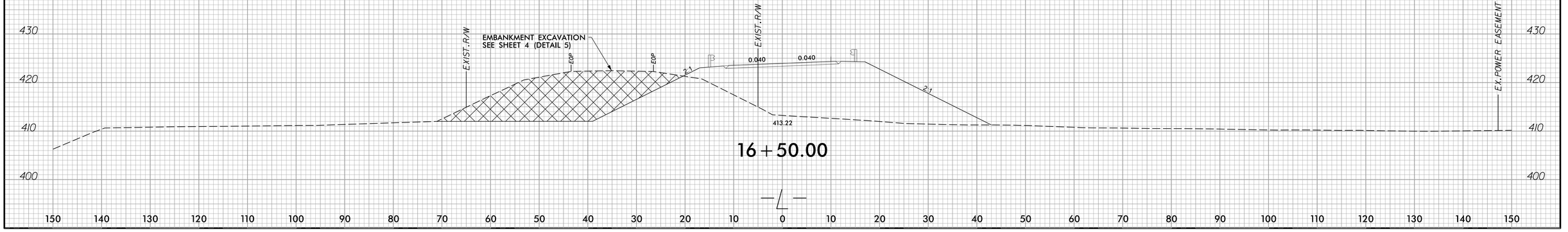
17 + 50.00

END BRIDGE 17 + 37.13



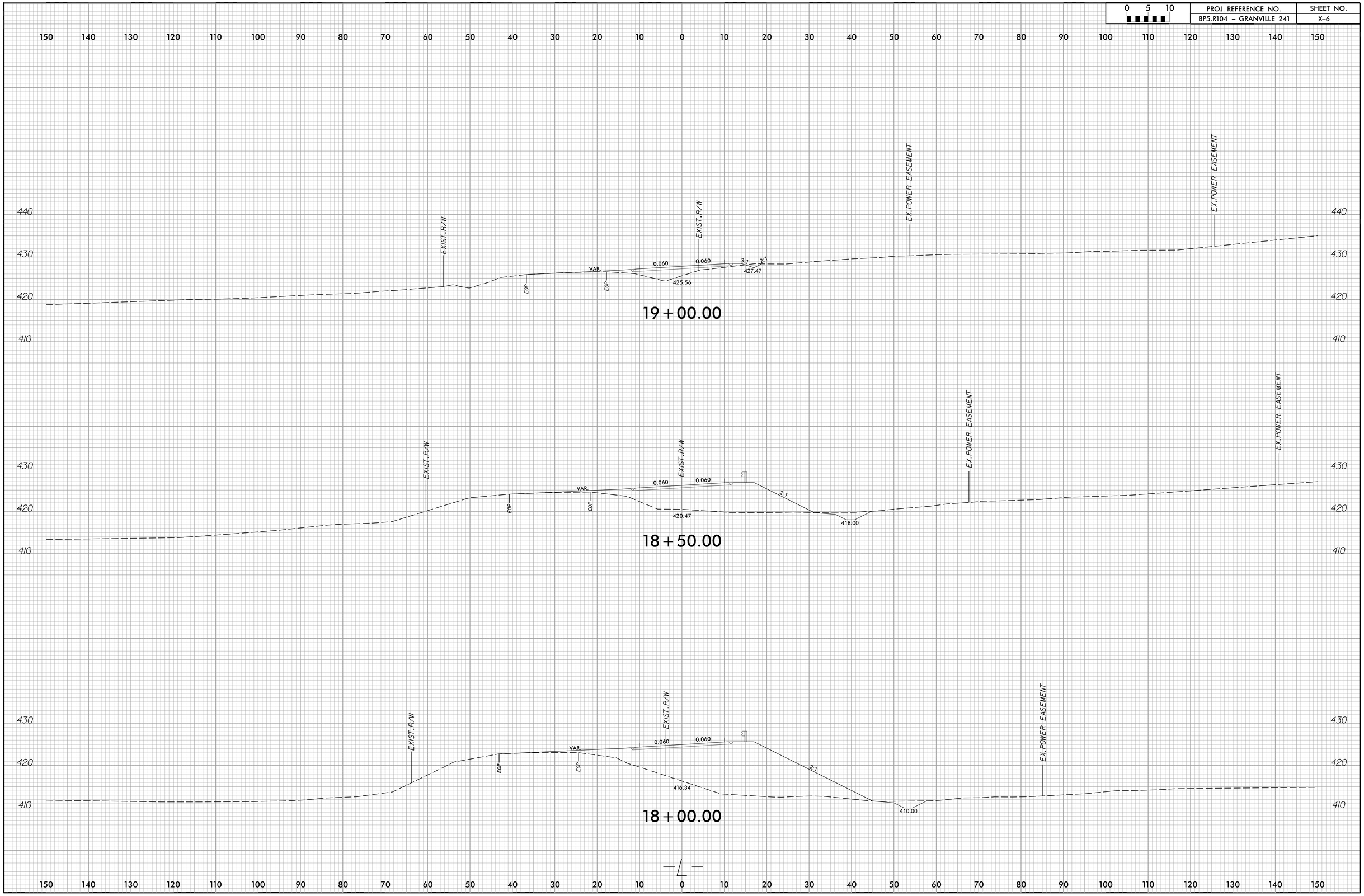
17 + 00.00

BEGIN BRIDGE 16 + 59.88

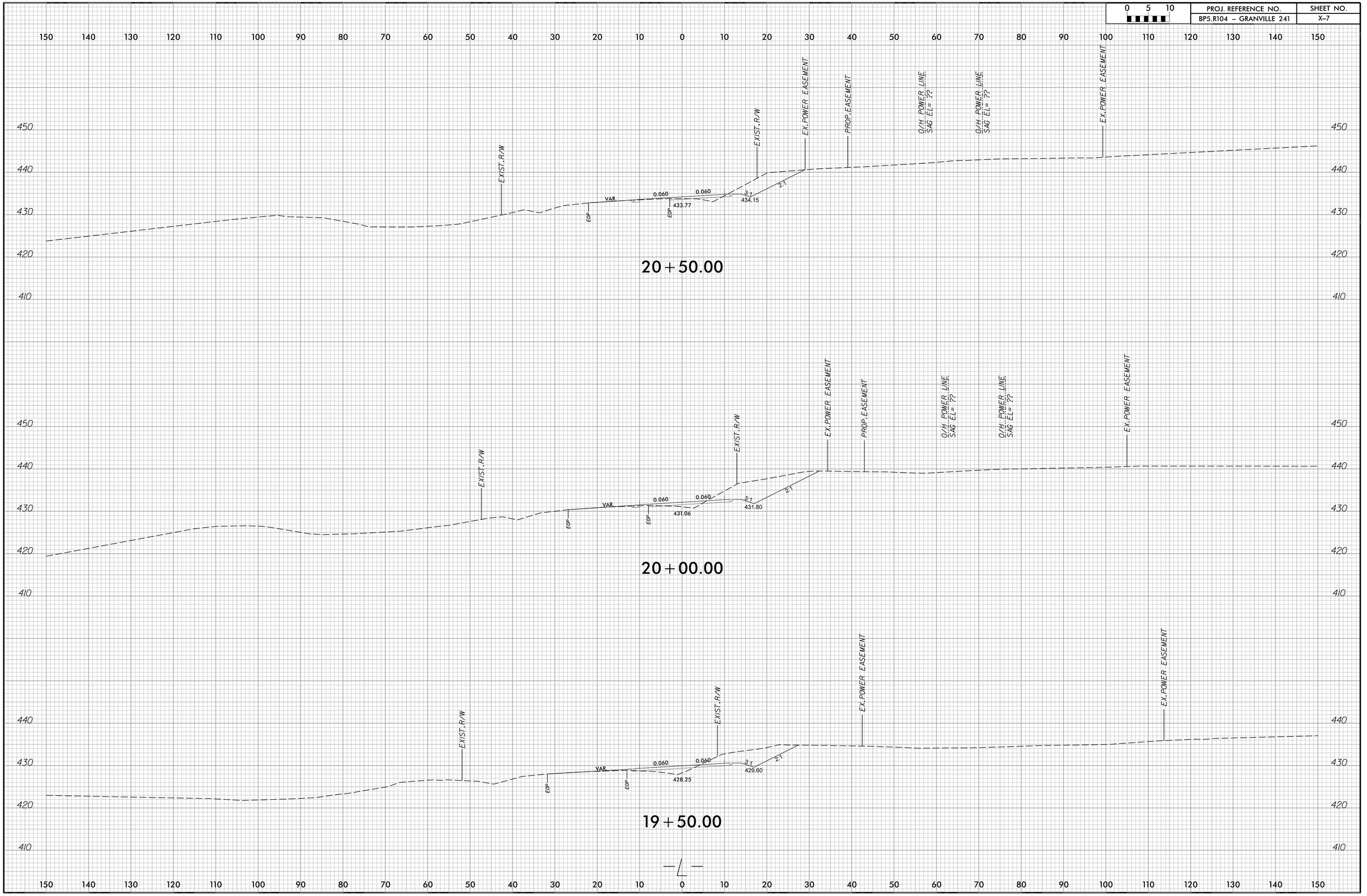


16 + 50.00

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–6



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X-7



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–8

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

450 440 430 420

EXIST. R/W

VAR 0.020 437.77 0.020 VAR

EOP EOP

EXIST. R/W
EX. POWER EASEMENT

EX. POWER EASEMENT

22+00.00

450 440 430 420

EXIST. R/W
EX. POWER EASEMENT

EX. POWER EASEMENT

VAR 0.026 436.95 0.026 VAR

EOP EOP

21+50.00

450 440 430 420 410

EXIST. R/W

VAR 0.052 435.73 0.052 3:1 2:1 435.73

EOP EOP

EXIST. R/W
EX. POWER EASEMENT
PROP. EASEMENT

O/H POWER LINE
SAG EL= ??

O/H POWER LINE
SAG EL= ??

EX. POWER EASEMENT

21+00.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BP5.R104 – GRANVILLE 241	X–9

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

450 440 430 420

EXIST. R/W

EOP 439.08 EOP

EXIST. R/W
EX. POWER EASEMENT

EX. POWER EASEMENT

23+50.00

END PROJECT 23+00.00

450 440 430 420

EXIST. R/W

EXIST EXIST
EOP 438.66 EOP

EXIST. R/W
EX. POWER EASEMENT

EX. POWER EASEMENT

23+00.00

450 440 430 420

EXIST. R/W

VAR. 0.020 0.020 VAR.
EOP 438.22 EOP

EXIST. R/W
EX. POWER EASEMENT

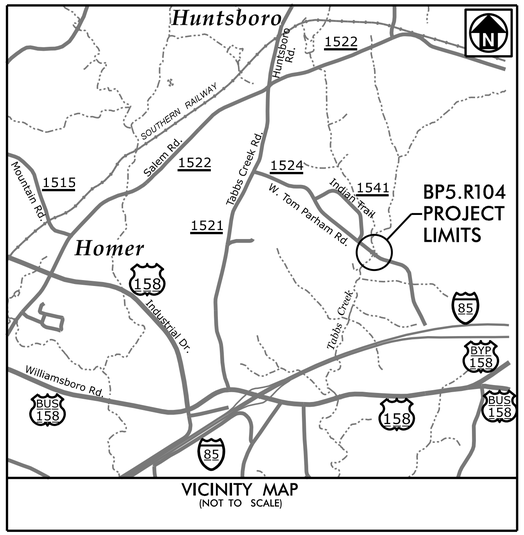
EX. POWER EASEMENT

22+50.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

09/08/99

PROJECT: BP5.R104



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRANVILLE COUNTY

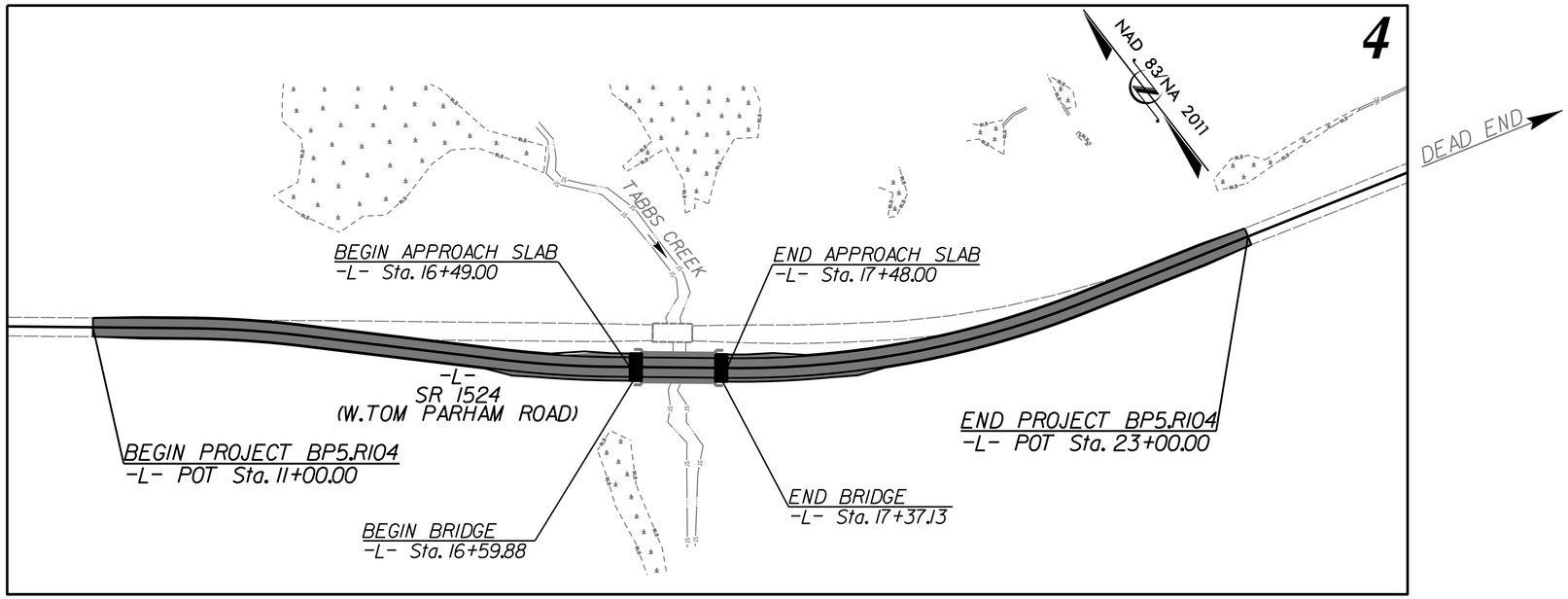
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R104		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP5.R104.1		PE
BP5.R104.2		ROW
BP5.R104.3		CONSTRUCTION

LOCATION: BRIDGE NO. 241 OVER TABBS CREEK ON SR 1524 (W. TOM PARHAM ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STRUCTURE PLANS



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

CONTRACT:

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 (2019) = 200
ADT (2025) = 400

V = 45 MPH

FUNC CLASS =
LOCAL – RURAL

SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT = 0.213 MILES

LENGTH STRUCTURE TIP PROJECT = 0.014 MILES

TOTAL LENGTH TIP PROJECT = 0.227 MILES

Prepared in the Office of WGI for
DIVISION 5
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 21, 2022

LETTING DATE: SEPTEMBER 11, 2024

DAVID SIMPSON, PE
PROJECT ENGINEER

MIRANDA SALZLER, PE
HYDRAULIC ENGINEER

NCDOT CONTACT: LISA B. GILCHRIST, EI
DIVISION BRIDGE PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS

3/11/2024 | 5:20 AM PDT

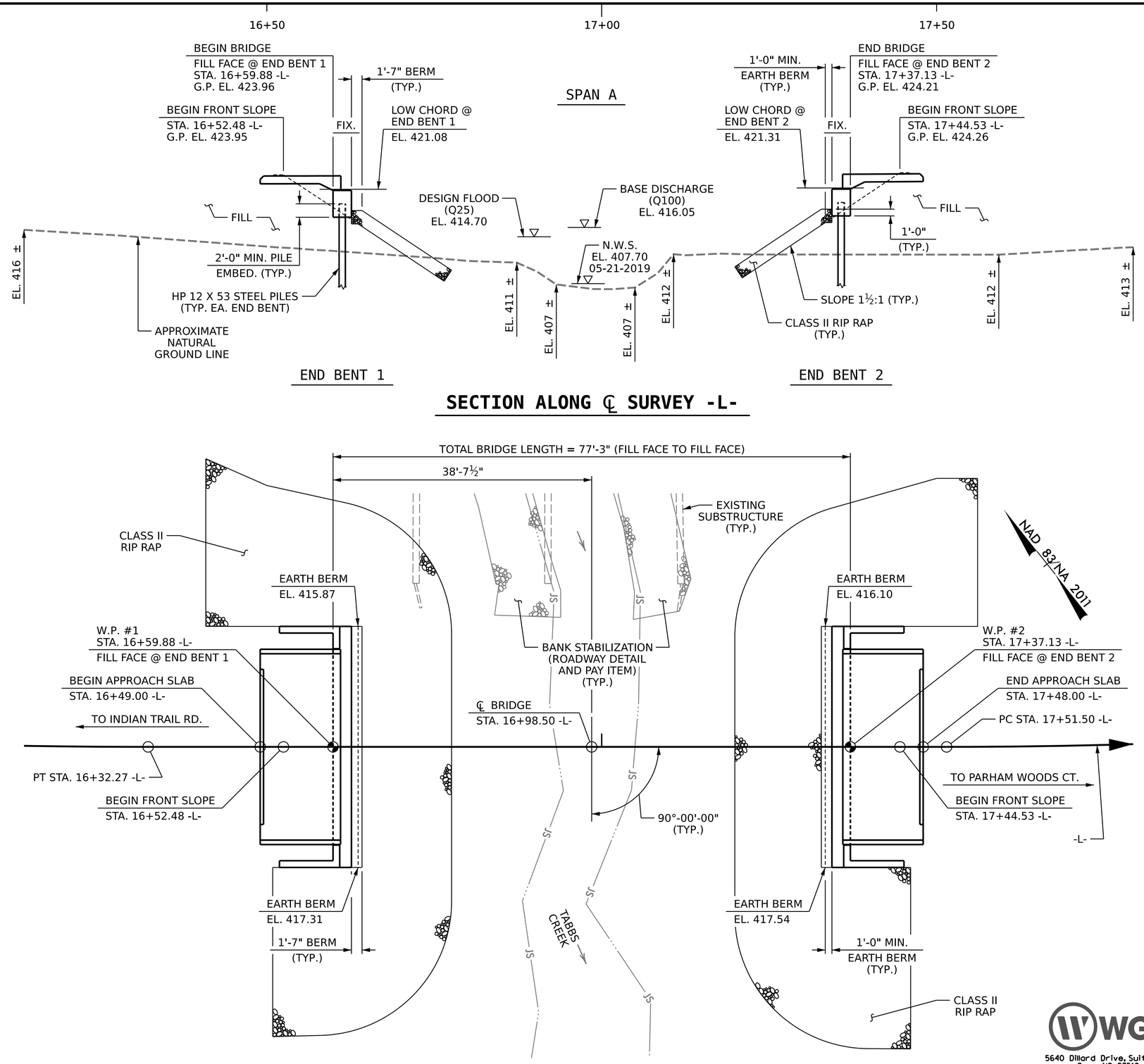
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518

LICENSURE NO. C-4434

2/29/2024
P:\Raleigh\Projects\2018\Division 5 (SEA\BP5R104_Granville 24L_Tom Parham\Structures\Drawings\Final\BP5R104_SMU_TSH_38024l.dgn
Thomas.Bankovich



SECTION ALONG ℄ SURVEY -L-

PLAN

(PILES NOT SHOWN IN PLAN VIEW)

(-) 5.1873% (+) 0.3000%

PVI STA. 15+25.00
EL. = 423.56
VC = 270'

(+) 0.3000% (+) 4.3862%

PVI STA. 18+25.00
EL. = 424.46
VC = 200'

GRADE DATA -L-

HYDRAULIC DATA:

DESIGN DISCHARGE	= 1035 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 414.7
DRAINAGE AREA	= 2.9 SQ. MI.
BASE DISCHARGE (Q 100)	= 1477 CFS
BASE HIGH WATER ELEVATION	= 416.05

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 4184 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 424.4 * *

* * OVERTOPPING OCCURS AT RIGHT EDGE OF PAVEMENT AT STA. 16+45.00 -L-

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE #380241

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1524
(W TOM PARHAM RD.)
OVER TABBS CREEK BETWEEN
INDIAN TRAIL RD. AND
PARHAM WOODS CT.

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

DRAWN BY : T. BANKOVICH DATE : 9-22
CHECKED BY : J.Z. BLINSON DATE : 9-22
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518

LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS

3/11/2024 | 5:20 AM PM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-5	100	See Structure Plans	30		400.0	167					*		
End Bent 2, Piles 1-5	100	See Structure Plans	25		400.0	167	-						

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

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

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing				Pile Order Lengths	
End Bent/ Bent No	Dynamic Pile Testing Required? YES or MAYBE	Dynamic Pile Testing Test Pile Length FT	Total Dynamic Pile Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1	MAYBE	30	1		
End Bent 2	MAYBE	25			

*EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths from dynamic pile testing. For groups of end bents/bents with pile order lengths based on dynamic pile testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the dynamic pile testing.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-5	96	0	0	0.60	0	0	1.00
End Bent 2, Piles 1-5	96	0	0	0.60	0	0	1.00

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

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Kenneth R. Bussey, Jr. PE 038206) on 09-21-2022.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for Dynamic Pile Testing when Dynamic Pile Testing may be required.

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18056 JOHN A. BATTS

3/11/2024 | 5:20 AM PDT

SIGNATURE DATE

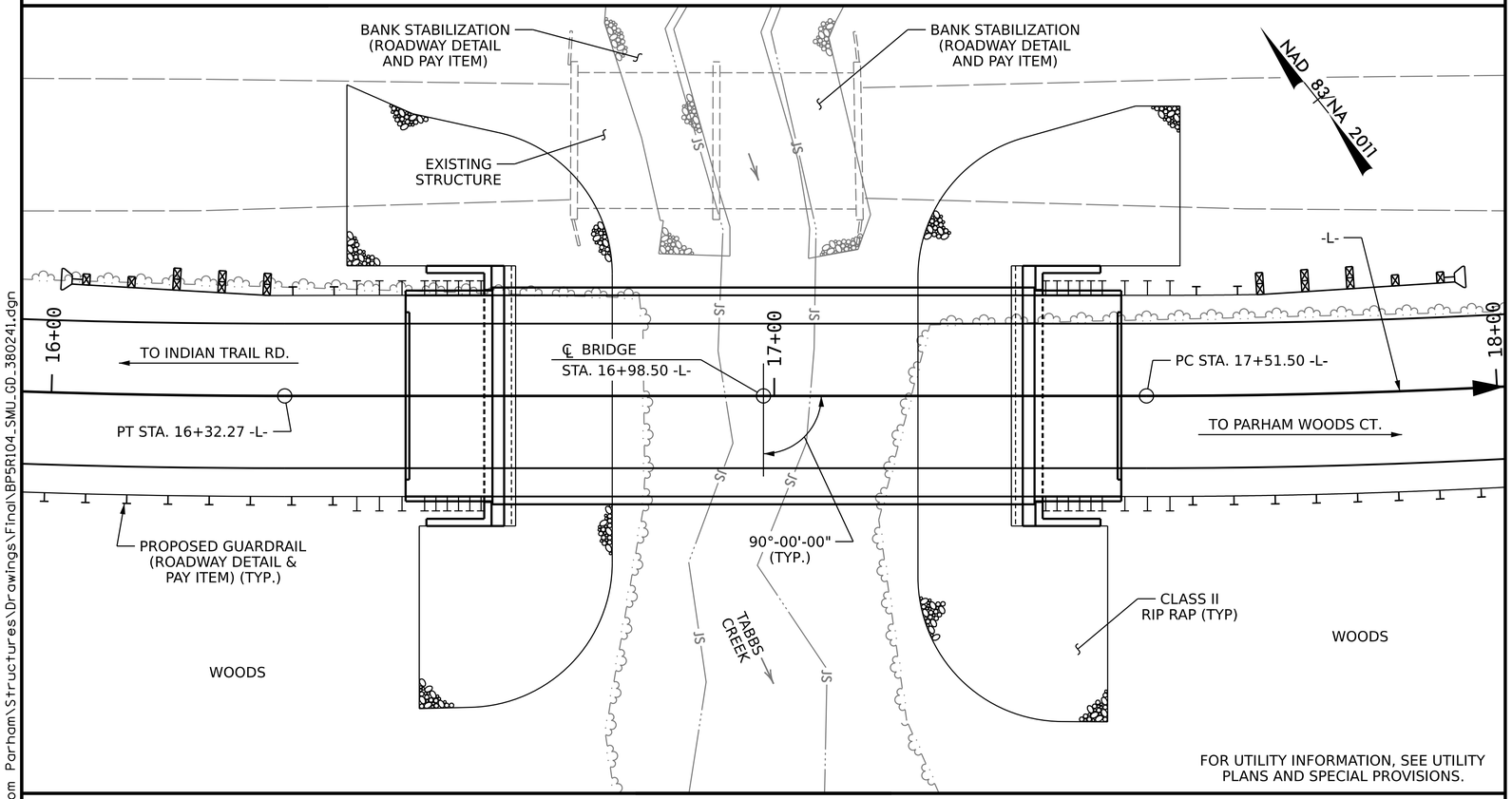
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

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

BM #1 BENCH TIE IN 30" HARDWOOD, STA. 15+79.96 -L-, 129.57' RT., EL. 419.41



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE MATERIAL IN THE VICINITY OF THE EXISTING BRIDGE SHALL BE EXCAVATED AS DIRECTED BY THE ENGINEER. SEE ROADWAY PLANS FOR DETAIL AND PAY ITEM.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTS OF 2 SPANS @ 20'-4". THE SUPERSTRUCTURE HAS A CLEAR ROADWAY WIDTH OF 19'-1" AND HAS A TIMBER DECK ON CONTINUOUS STEEL I-BEAMS. THE END BENTS AND INTERIOR BENTS ARE TIMBER CAPS ON TIMBER PILES. AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING BRIDGE WHICH IS LOCATED 35' UPSTREAM OF THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.''

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.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR ``REMOVAL OF EXISTING STRUCTURE AT STATION 16+98.50 -L-.''

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

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	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		DYNAMIC PILE TESTING	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS	
	LS	LS	CY	LS	LB	EA	NO.	LF	EA	LF	TON	SY	LS	NO.	LF
SUPERSTRUCTURE				LS						150.00			LS	10	750.00
END BENT 1			20.2		2,458	5	5	150			215	240			
END BENT 2			20.2		2,458	5	5	125			215	240			
TOTAL	LS	LS	40.4	LS	4,916	10	10	275	1	150.00	430	480	LS	10	750.00

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 20 TO 30 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENTS 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D) (2) OF THE STANDARD SPECIFICATIONS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BEND CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF STANDARD SPECIFICATIONS.

DRAWN BY : T. BANKOVICH DATE : 9-22
CHECKED BY : J.Z. BLINSON DATE : 9-22
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18056 JOHN A. BATTS
3/11/2024 | 5:20 AM EDT

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PROJECT NO. BP5.R104
GRANVILLE COUNTY
STATION: 16+98.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1524
(W TOM PARHAM RD.)
OVER TABBS CREEK BETWEEN
INDIAN TRAIL RD. AND
PARHAM WOODS CT.

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

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

LOAD TYPE		VEHICLE	WEIGHT (TONS) (W)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVE - LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE - LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⟨1⟩	1.23	--	1.75	0.275	1.23	75'	EL	37.5	0.506	2.18	75'	EL	7.9	0.80	0.275	1.43	75'	EL	37.5	
		HL-93 (OPERATING)	N/A		1.60	--	1.35	0.275	1.60	75'	EL	37.5	0.506	2.88	75'	EL	7.9	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.62	58.3	1.75	0.275	1.62	75'	EL	37.5	0.506	2.79	75'	EL	7.9	0.80	0.275	1.88	75'	EL	37.5	
		HS-20 OPERATING	36.000		2.10	75.6	1.35	0.275	2.10	75'	EL	37.5	0.506	3.68	75'	EL	7.9	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.27	57.6	1.40	0.275	4.58	75'	EL	37.5	0.506	8.74	75'	EL	7.9	0.80	0.275	4.27	75'	EL	37.5	
		SNGARBS2	20.000		3.17	63.4	1.40	0.275	3.41	75'	EL	37.5	0.506	6.15	75'	EL	7.9	0.80	0.275	3.17	75'	EL	37.5	
		SNAGRIS2	22.000		3.00	66.0	1.40	0.275	3.22	75'	EL	37.5	0.506	5.69	75'	EL	7.9	0.80	0.275	3.00	75'	EL	37.5	
		SNCOTTS3	27.250		2.12	57.8	1.40	0.275	2.28	75'	EL	37.5	0.506	4.24	75'	EL	7.9	0.80	0.275	2.12	75'	EL	37.5	
		SNAGGRS4	34.925		1.77	61.8	1.40	0.275	1.90	75'	EL	37.5	0.506	3.49	75'	EL	7.9	0.80	0.275	1.77	75'	EL	37.5	
		SNS5A	35.550		1.73	61.5	1.40	0.275	1.86	75'	EL	37.5	0.506	3.54	75'	EL	7.9	0.80	0.275	1.73	75'	EL	37.5	
		SNS6A	39.950		1.59	63.5	1.40	0.275	1.71	75'	EL	37.5	0.506	3.21	75'	EL	7.9	0.80	0.275	1.59	75'	EL	37.5	
		SNS7B	42.000		1.51	63.4	1.40	0.275	1.62	75'	EL	37.5	0.506	3.15	75'	EL	7.9	0.80	0.275	1.51	75'	EL	37.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.94	64.0	1.40	0.275	2.08	75'	EL	37.5	0.506	3.86	75'	EL	7.9	0.80	0.275	1.94	75'	EL	37.5	
		TNT4A	33.075		1.94	64.2	1.40	0.275	2.09	75'	EL	37.5	0.506	3.76	75'	EL	7.9	0.80	0.275	1.94	75'	EL	37.5	
		TNT6A	41.600		1.59	66.1	1.40	0.275	1.71	75'	EL	37.5	0.506	3.33	75'	EL	7.9	0.80	0.275	1.59	75'	EL	37.5	
		TNT7A	42.000		1.60	67.2	1.40	0.275	1.72	75'	EL	37.5	0.506	3.29	75'	EL	7.9	0.80	0.275	1.60	75'	EL	37.5	
		TNT7B	42.000		1.65	69.3	1.40	0.275	1.77	75'	EL	37.5	0.506	3.07	75'	EL	7.9	0.80	0.275	1.65	75'	EL	37.5	
		TNAGRIT4	43.000		1.57	67.5	1.40	0.275	1.69	75'	EL	37.5	0.506	2.97	75'	EL	7.9	0.80	0.275	1.57	75'	EL	37.5	
		TNAGT5A	45.000		1.48	66.6	1.40	0.275	1.59	75'	EL	37.5	0.506	2.94	75'	EL	7.9	0.80	0.275	1.48	75'	EL	37.5	
		TNAGT5B	45.000	⟨3⟩	1.46	65.7	1.40	0.275	1.57	75'	EL	37.5	0.506	2.81	75'	EL	7.9	0.80	0.275	1.46	75'	EL	37.5	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.24	64.4	1.30	0.275	2.59	75'	EL	37.5	0.506	4.58	75'	EL	7.9	0.80	0.275	2.24	75'	EL	37.5	
		EV3	43.000	⟨4⟩	1.47	63.2	1.30	0.275	1.70	75'	EL	37.5	0.506	3.02	75'	EL	7.9	0.80	0.275	1.47	75'	EL	37.5	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	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.

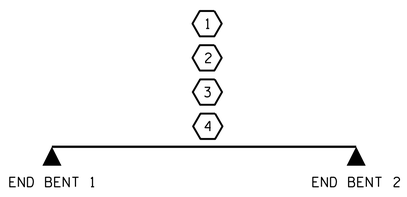
COMMENTS:

1.

2.

3.

4.



LRFR SUMMARY

FOR SPAN A

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING * *

⟨4⟩ EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER - EXTERIOR RIGHT GIRDER

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS

3/11/2024 | 5:20 AM P

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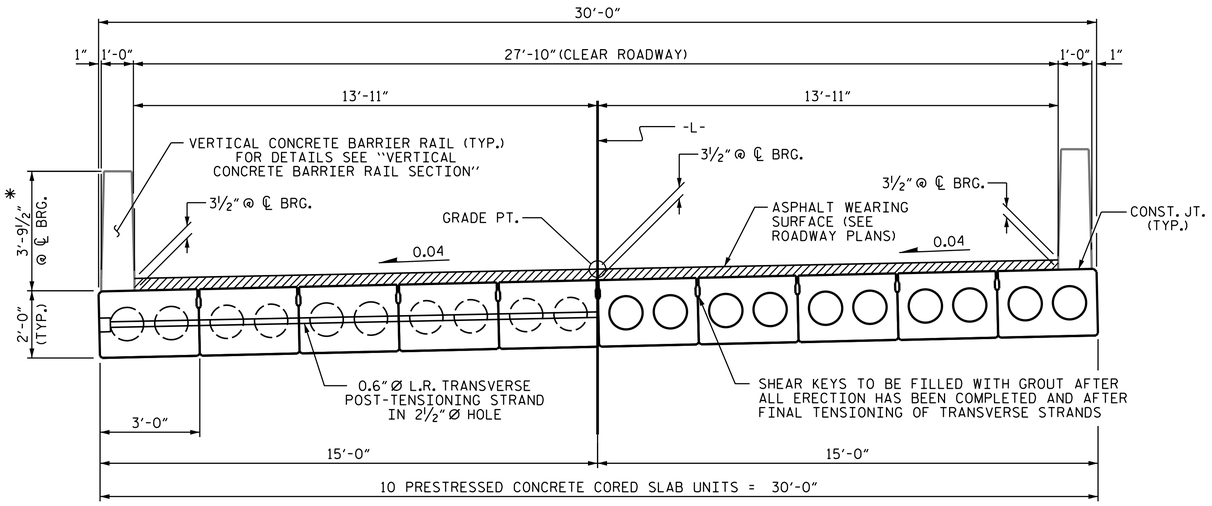
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 75' 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			15

DRAWN BY : T. BANKOVICH DATE : 9-22
CHECKED BY : J.Z. BLINSON DATE : 9-22
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

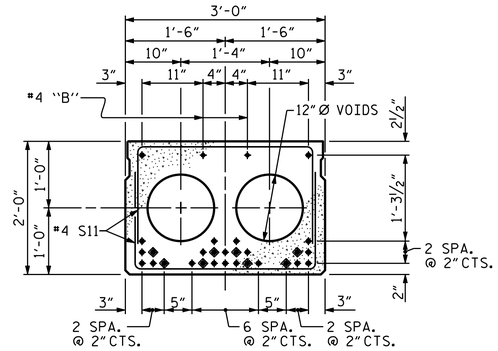


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

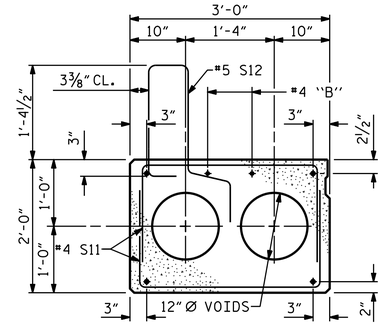
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

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



INTERIOR SLAB SECTION (75' UNIT)
(28 STRANDS REQUIRED)
0.6" Ø LOW RELAXATION STRAND LAYOUT

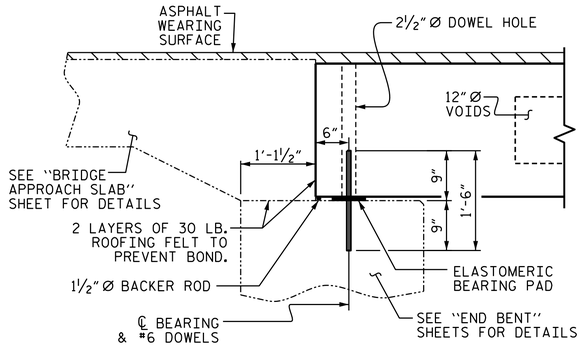


EXTERIOR SLAB SECTION
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

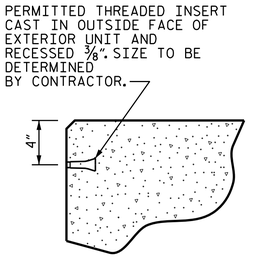
◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

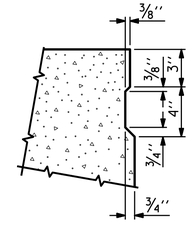
FIXED END



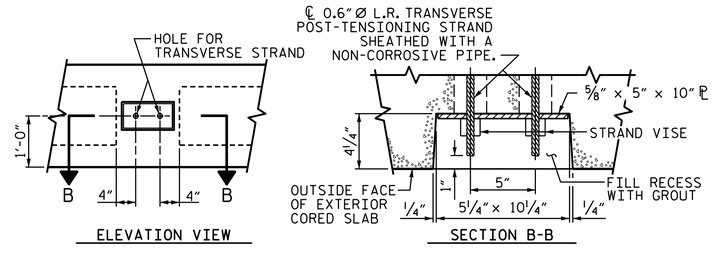
SECTION AT END BENT



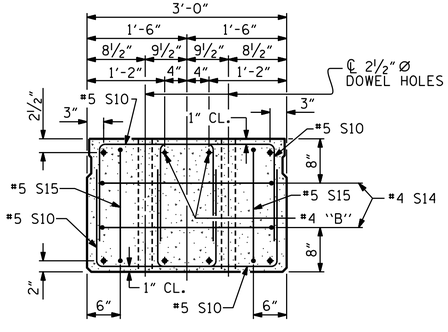
THREADED INSERT DETAIL



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



GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



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

PROJECT NO. BP5.R104
GRANVILLE COUNTY
STATION: 16+98.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

3'-0" x 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18056 JOHN A. BATTS

3/11/2024 | 5:20 AM

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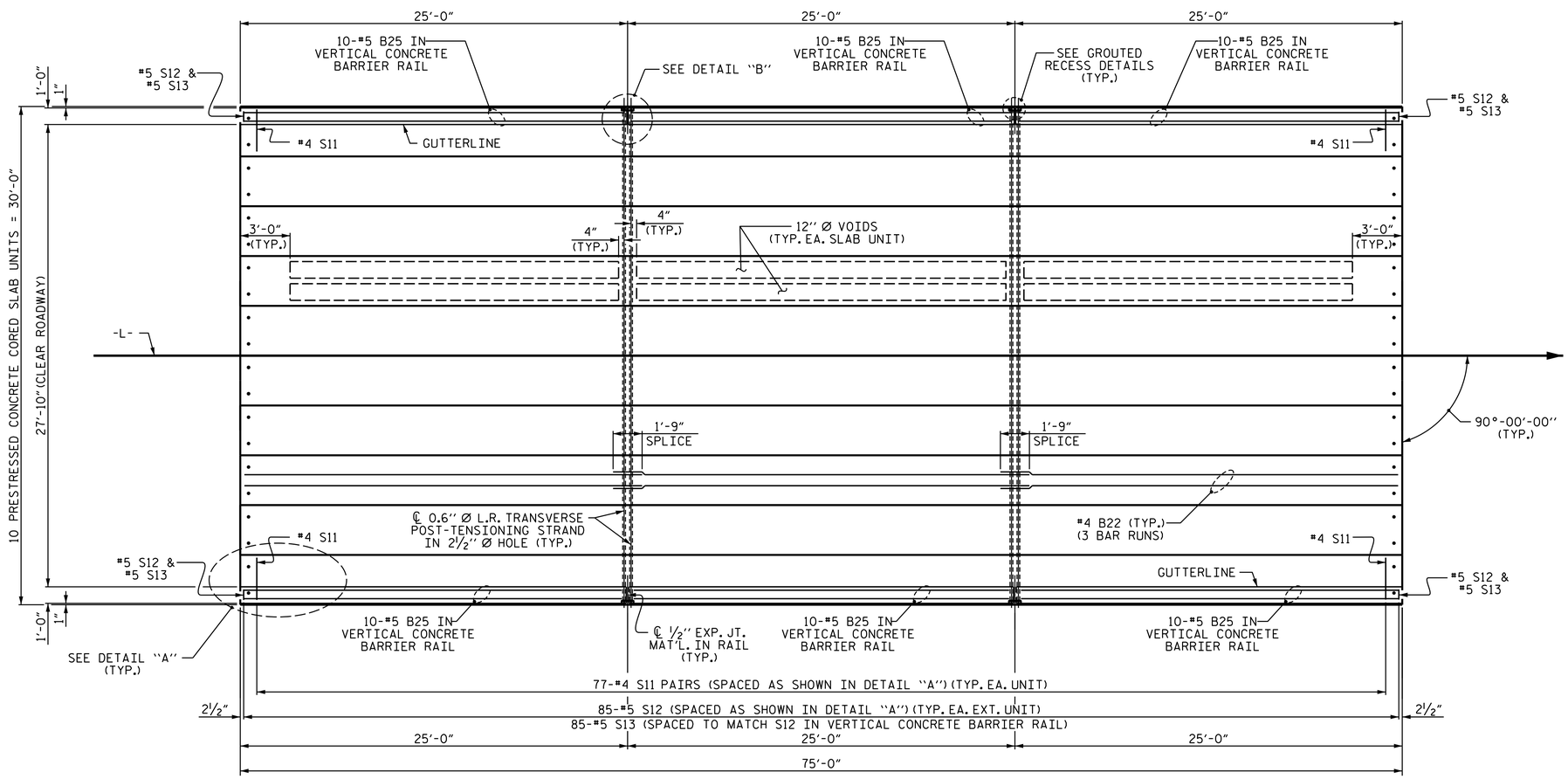
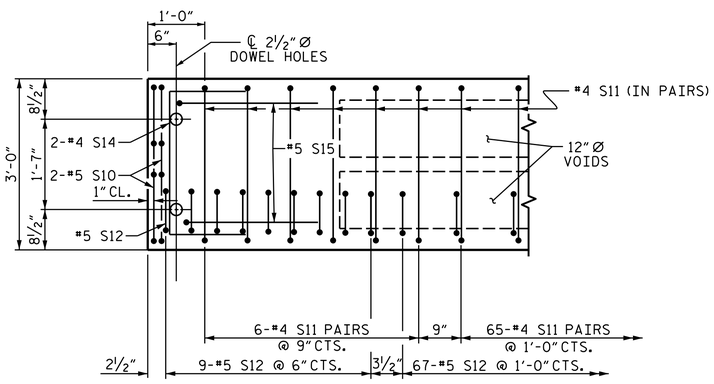
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			15

DRAWN BY :	T. BANKOVICH	DATE :	9-22
CHECKED BY :	J.Z. BLINSON	DATE :	9-22
DESIGN ENGINEER OF RECORD:	J.A. BATTS	DATE :	9-22

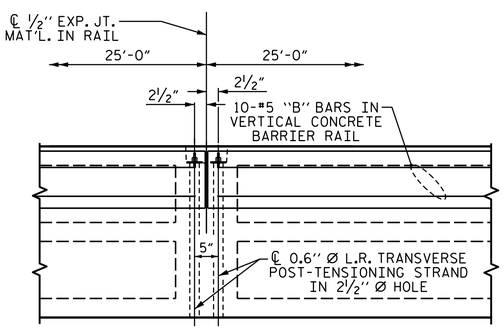


PLAN OF SPAN A



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

DRAWN BY :	T. BANKOVICH	DATE :	9-22
CHECKED BY :	J.Z. BLINSON	DATE :	9-22
DESIGN ENGINEER OF RECORD:	J.A. BATTS	DATE :	9-22

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3/11/2024 | 5:20 AM PDT

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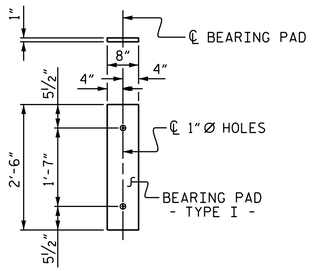
PROJECT NO. BP5.R104
GRANVILLE COUNTY
STATION: 16+98.50 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A (75'-0" UNIT) 27'-10' CLEAR ROADWAY

90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			15



FIXED END
(TYPE I - 20 REQ'D)

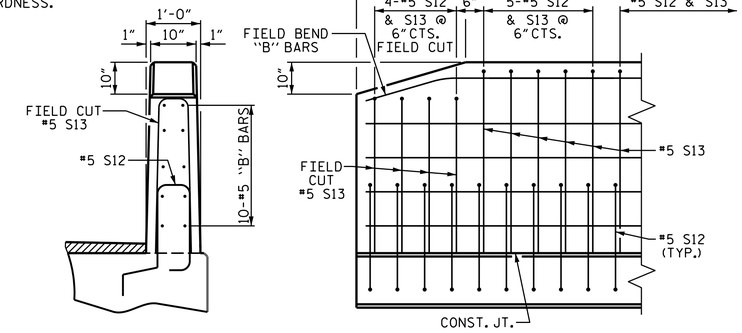
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
75' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	15/16" ↓
FINAL CAMBER	1 1/16" ↑

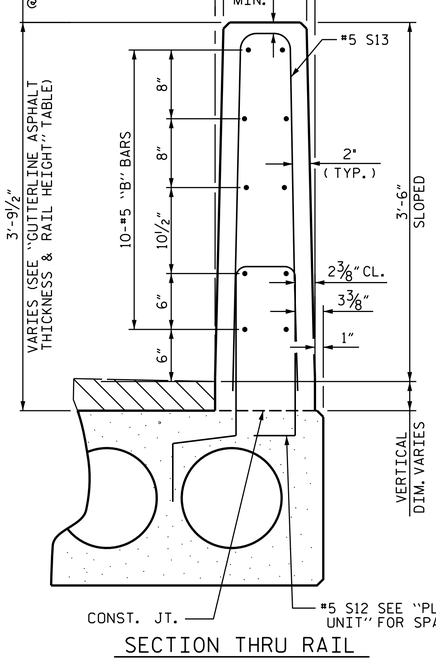
** INCLUDES FUTURE WEARING SURFACE

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
75' UNITS	2 7/16"	3'-8 7/16"

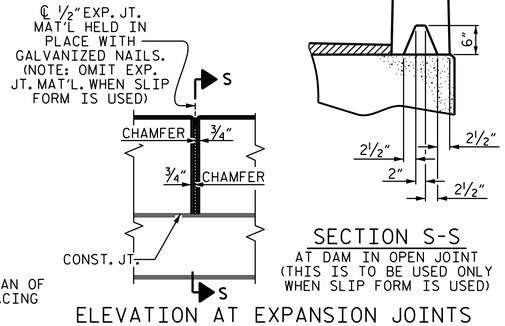


END VIEW SIDE VIEW

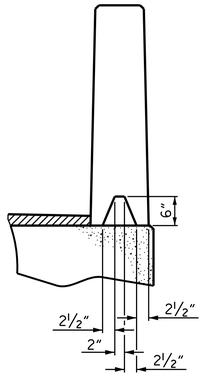
END OF RAIL DETAILS



SECTION THRU RAIL



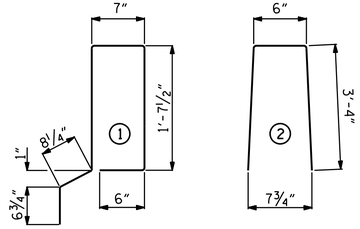
ELEVATION AT EXPANSION JOINTS

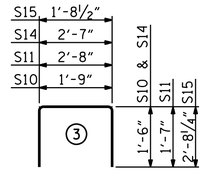


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

VERTICAL CONCRETE BARRIER RAIL DETAILS

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
75' UNIT			
EXTERIOR C.S.	2	75'-0"	150'-0"
INTERIOR C.S.	8	75'-0"	600'-0"
TOTAL	10		750'-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

NOTES

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

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

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

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

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

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

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

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

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

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	75' UNIT					
*B25	60	60	#5	STR	24'-7"	1538
*S13	170	170	#5	2	7'-2"	1271
*EPOXY COATED REINFORCING STEEL				LBS.		2809
CLASS AA CONCRETE				CU.YDS.		19.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		150.00

BILL OF MATERIAL FOR ONE 75' CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	26'-2"	105	26'-2"	105
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	154	#4	3	5'-10"	600	5'-10"	600
*S12	85	#5	1	5'-7"	495		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		790		790
*EPOXY COATED REINFORCING STEEL			LBS.		495		
8000 P.S.I. CONCRETE			CU. YDS.		12.6		12.6
0.6"Ø L.R. STRANDS			No.		28		28

CONCRETE RELEASE STRENGTH	
UNIT	PSI
75' UNITS	6000

PROJECT NO. BP5.R104
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SHEET 3 OF 3

STATE OF NORTH CAROLINA
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3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : T. BANKOVICH DATE : 9-22
CHECKED BY : J.Z. BLINSON DATE : 9-22
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

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5640 Dillard Drive, Suite 200
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LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18056 JOHN A. BATTS
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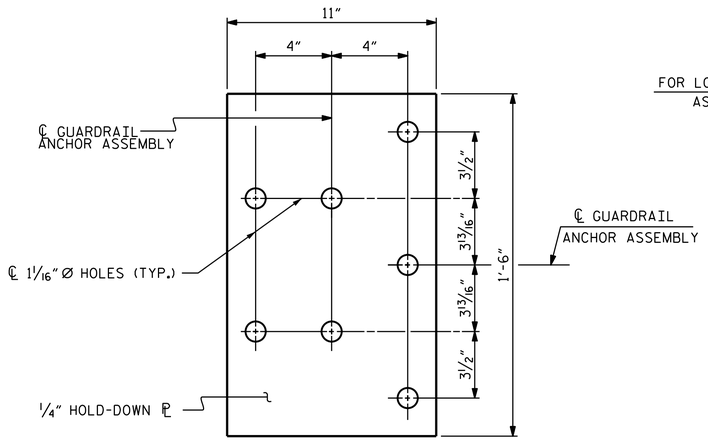
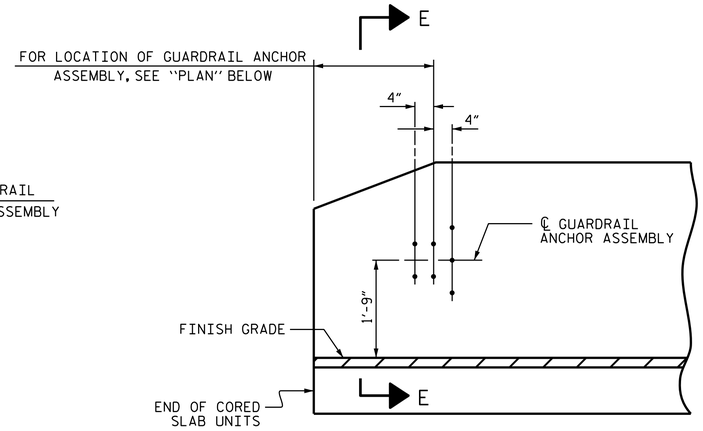


PLAN



ELEVATION

NOTES

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

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

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

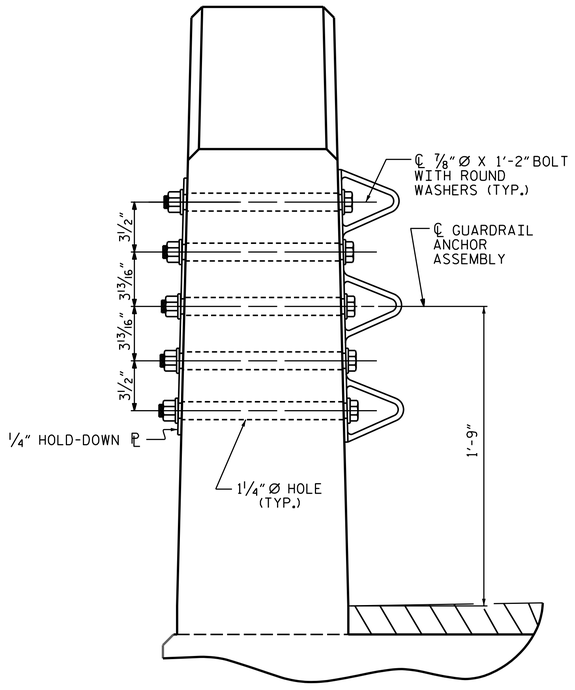
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

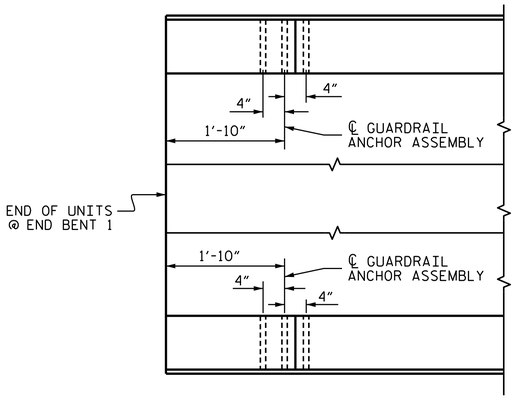
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BP5.R104

GRANVILLE COUNTY

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GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

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1			3			TOTAL SHEETS
2			4			15

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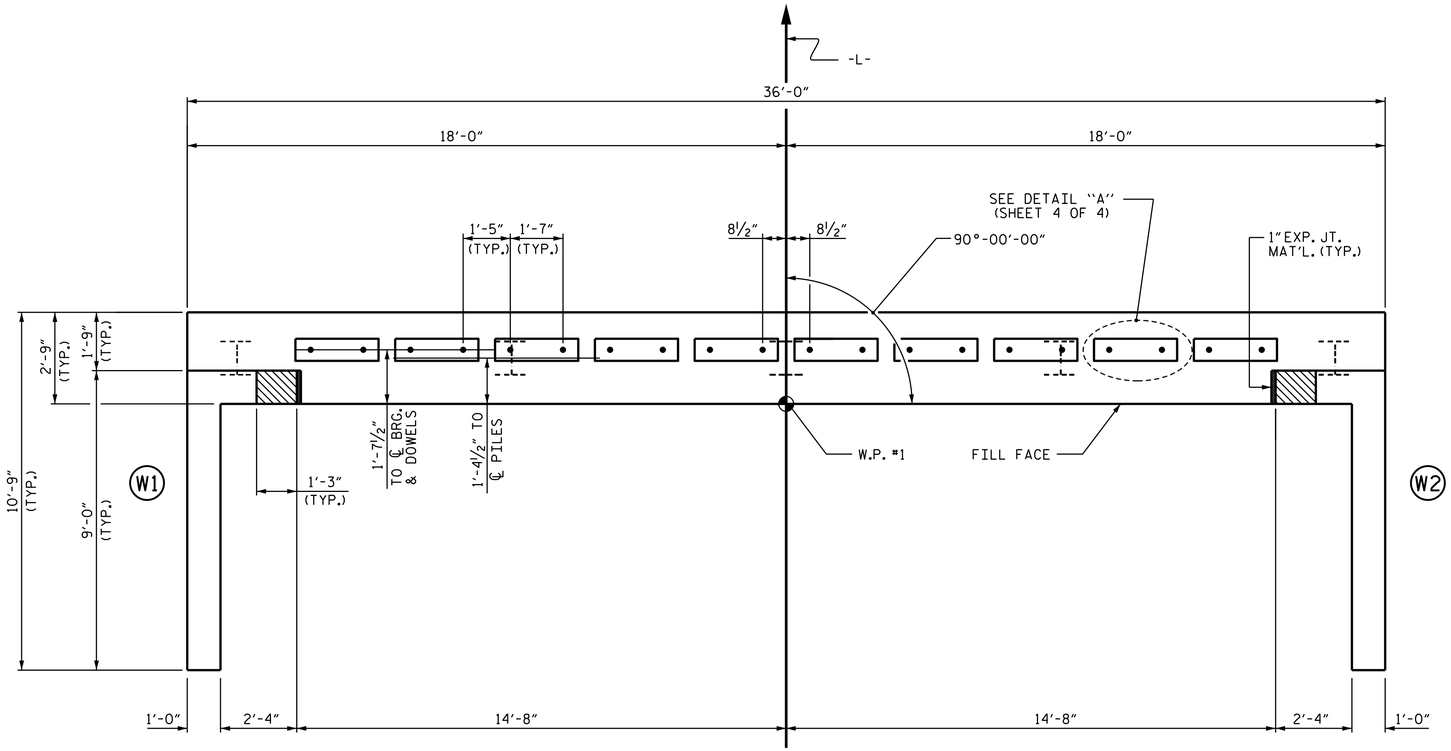
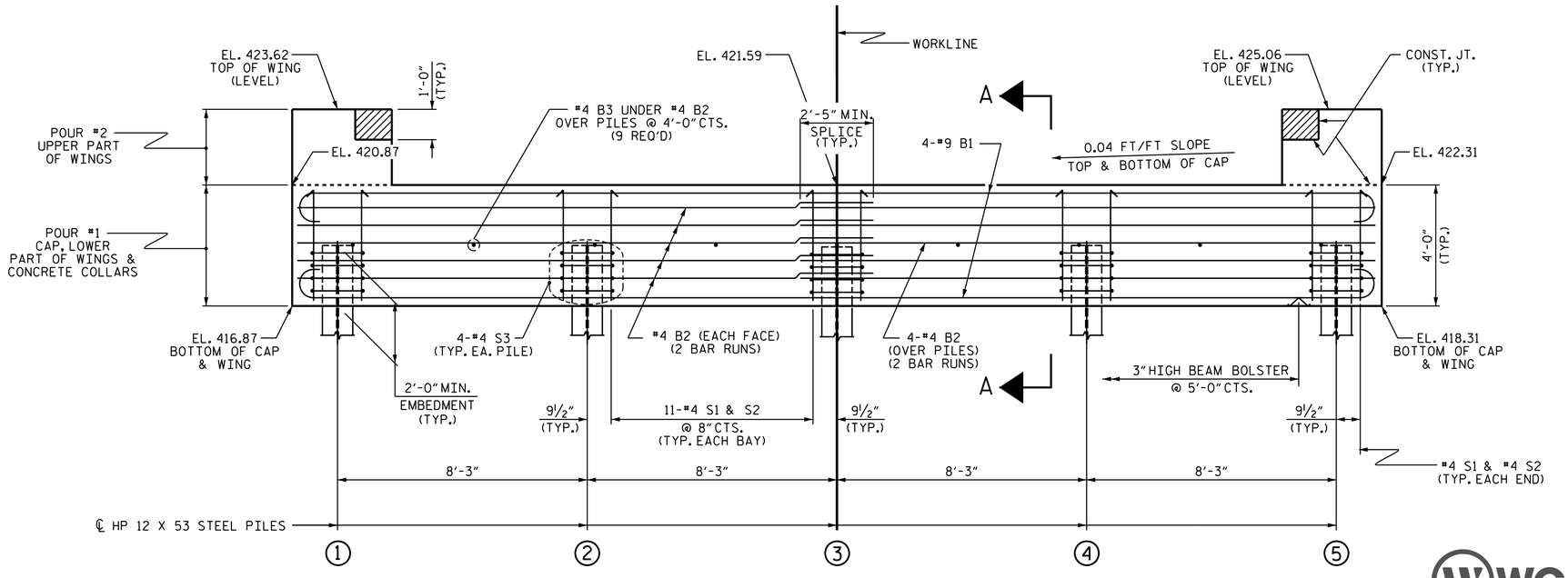


PLAN



ELEVATION

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

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

1	418.95
2	419.28
3	419.61
4	419.94
5	420.27

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STATION: 16+98.50 -L-

SHEET 1 OF 4

DRAWN BY : T. BANKOVICH DATE : 9-22
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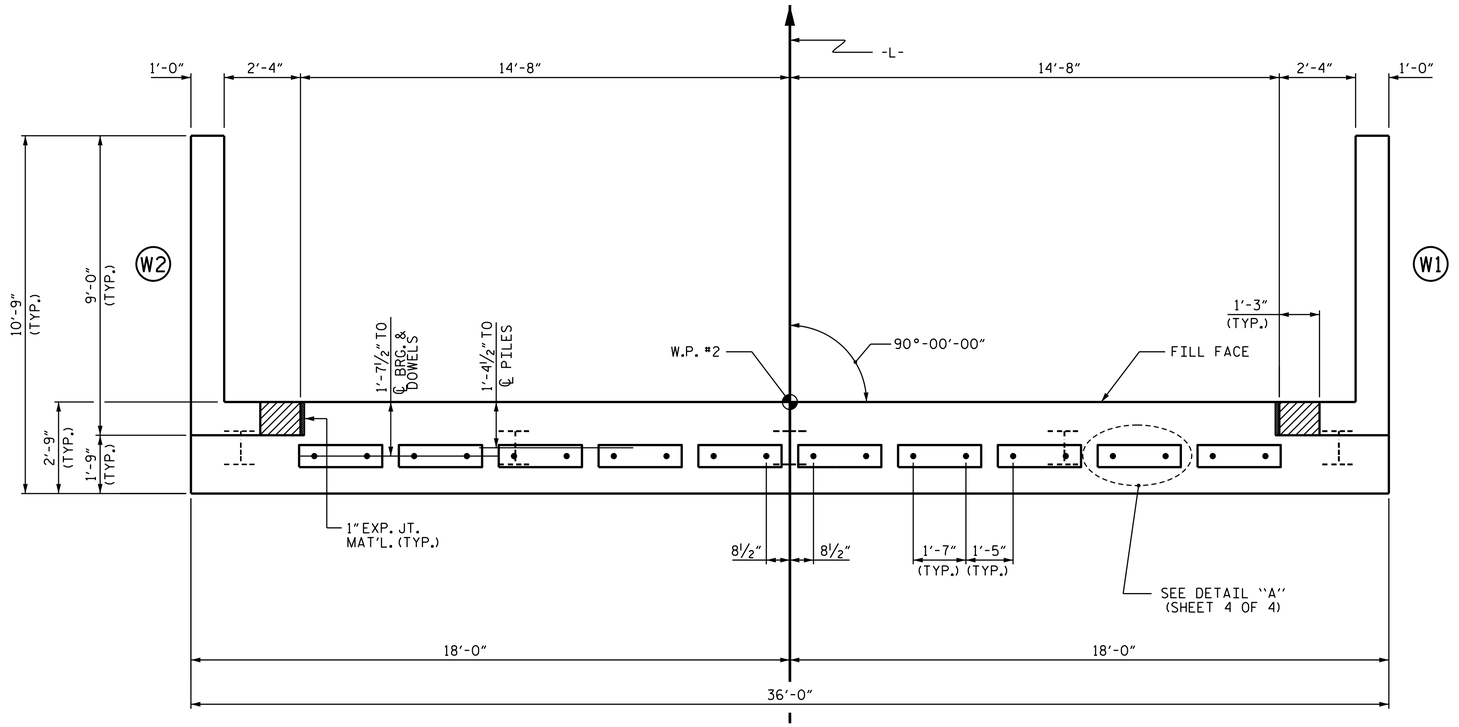
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			15



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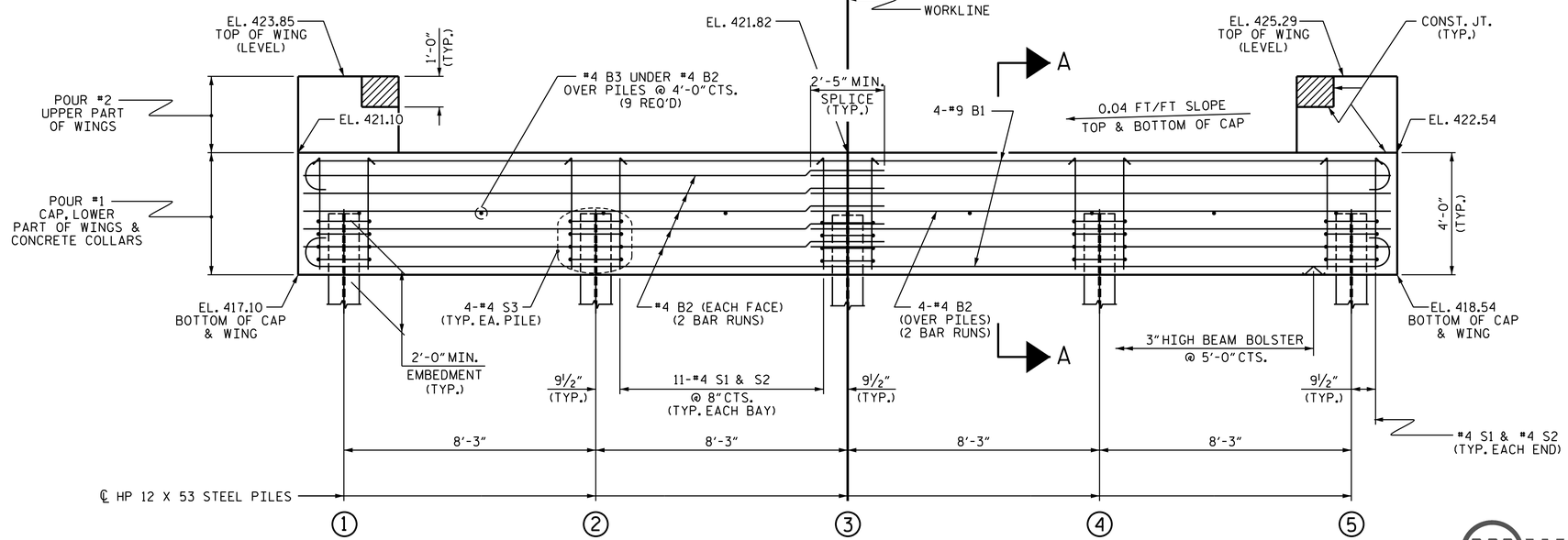

ELEVATION

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS	
①	419.18
②	419.51
③	419.84
④	420.17
⑤	420.50

PROJECT NO. BP5.R104
GRANVILLE COUNTY
STATION: 16+98.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUBSTRUCTURE

END BENT 2

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
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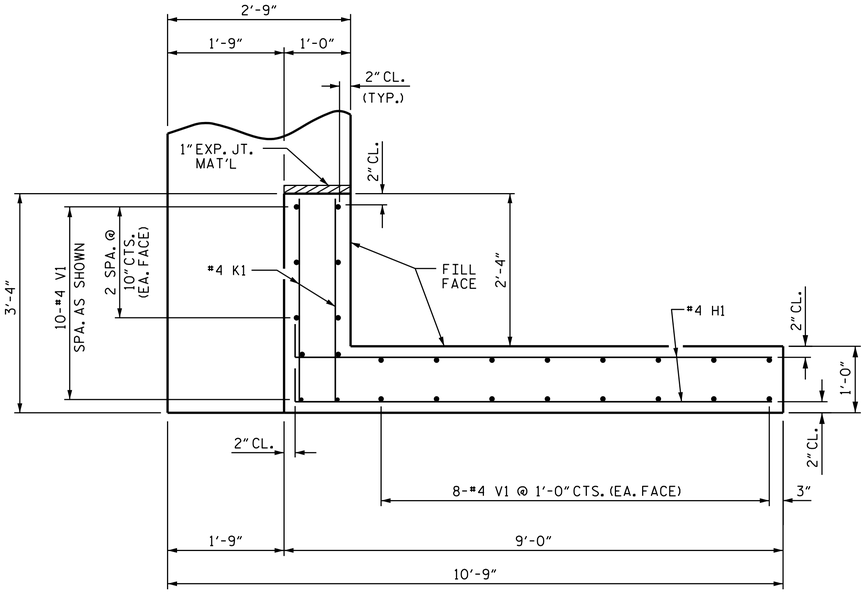
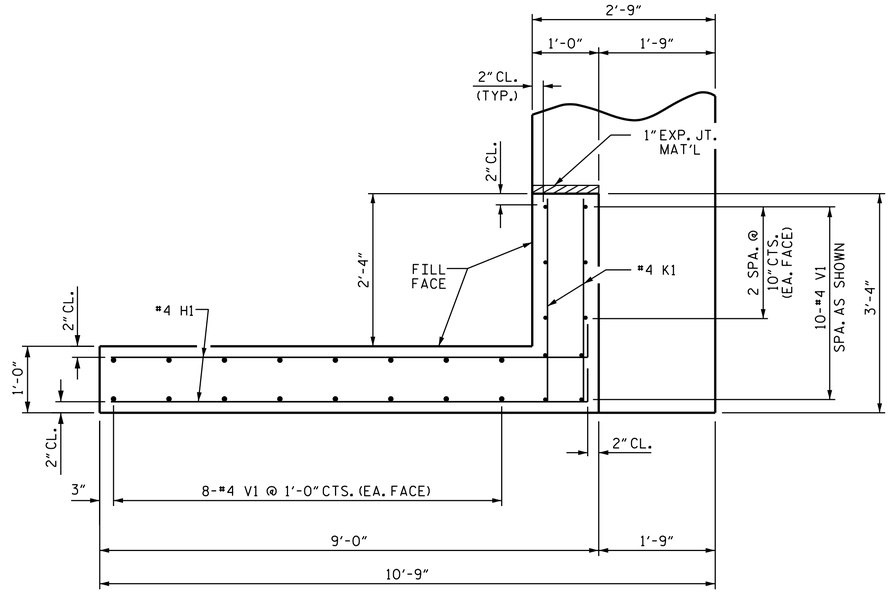
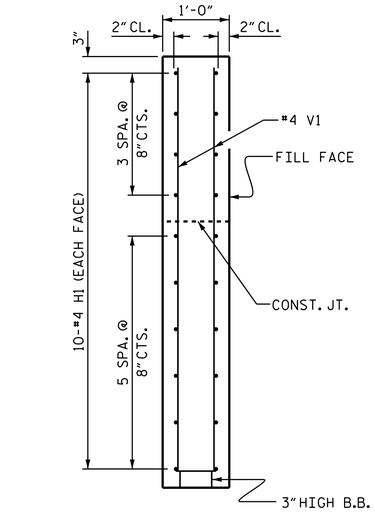
2			4			15



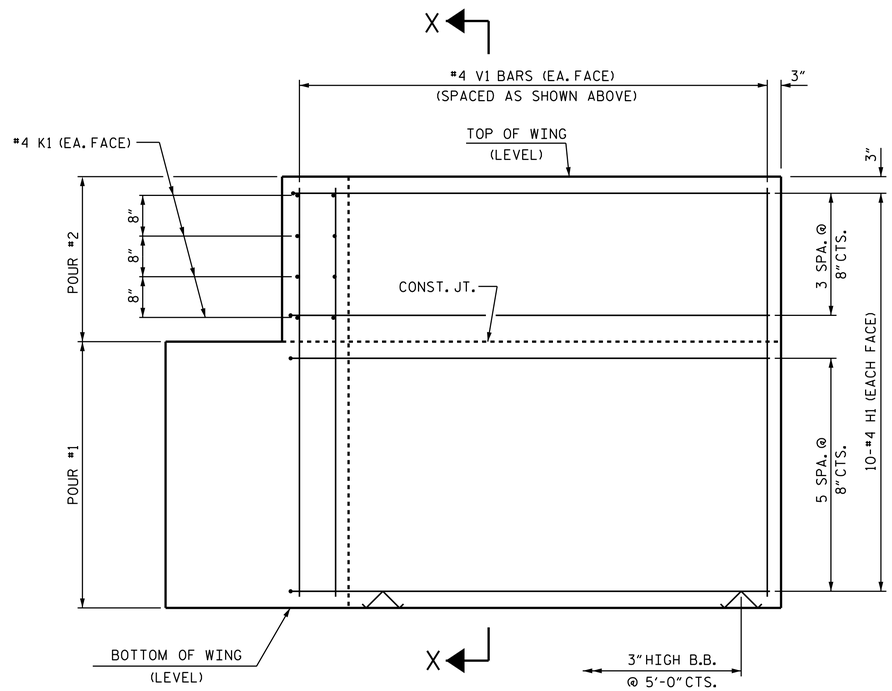
PLAN OF WING (W1)



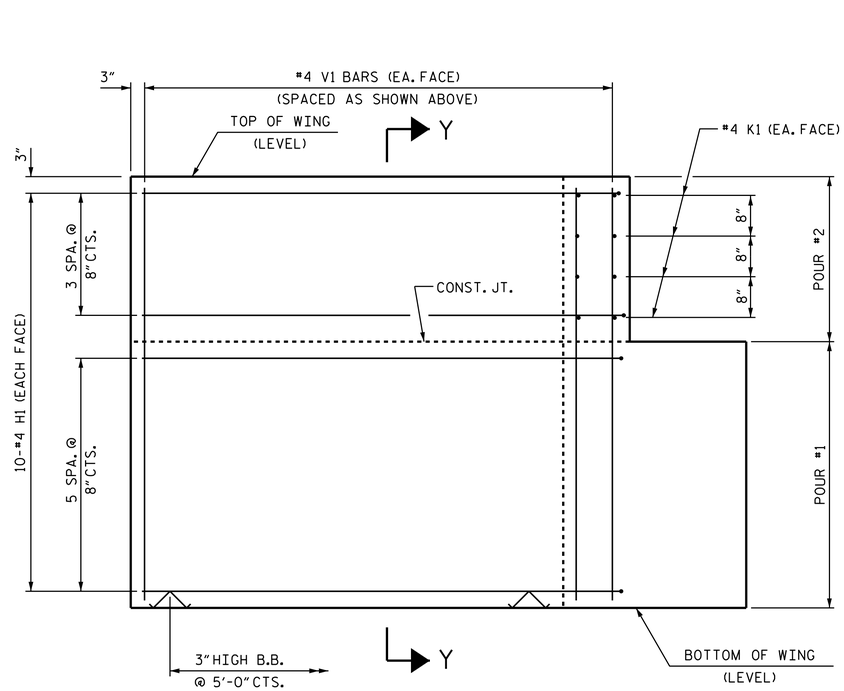
PLAN OF WING (W2)



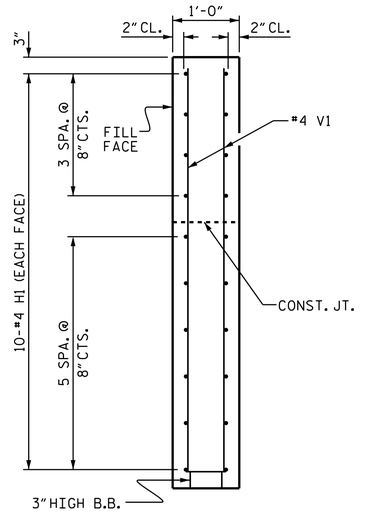
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

SHEET 3 OF 4

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DESIGN ENGINEER OF RECORD:	J.A. BATTS	DATE :	9-22

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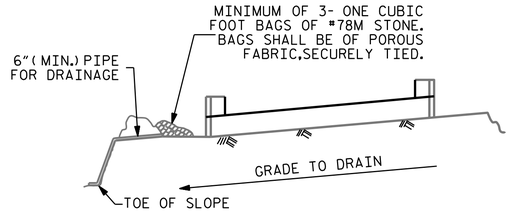
END BENT WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			15

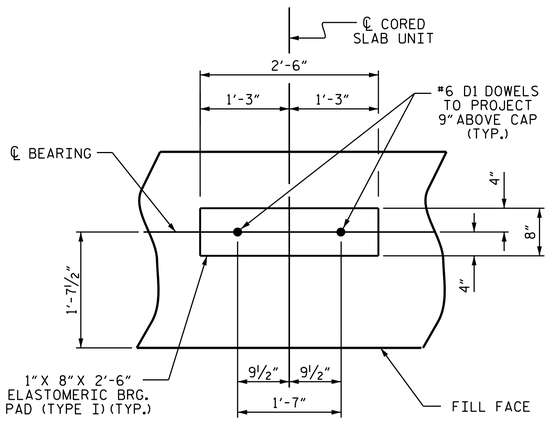


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

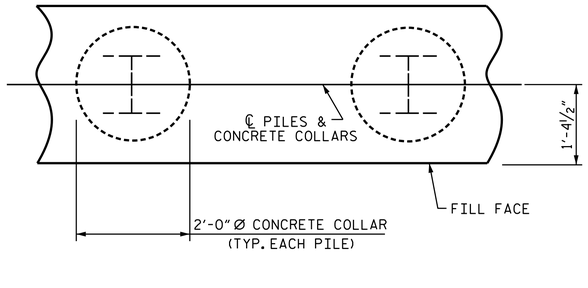
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

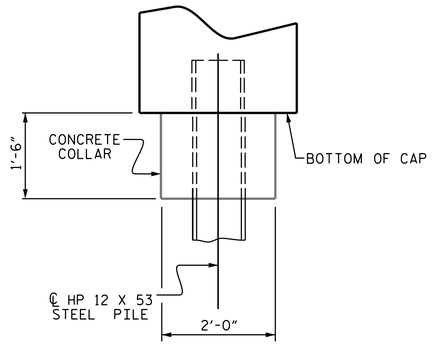


DETAIL "A"

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



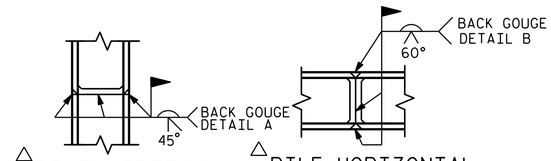
PLAN



ELEVATION

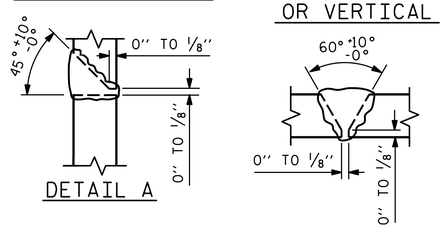
CORROSION PROTECTION FOR STEEL PILES DETAIL

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



△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



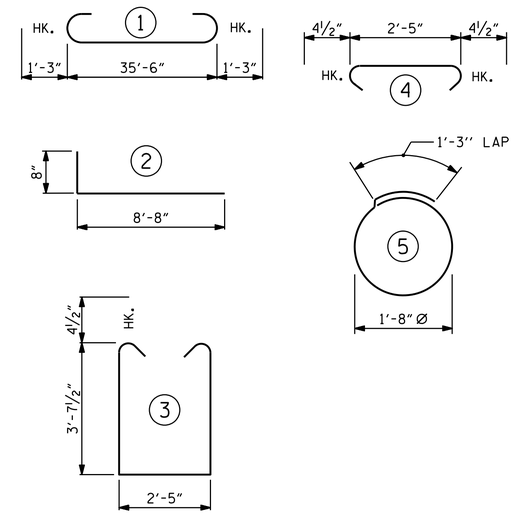
DETAIL A

DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

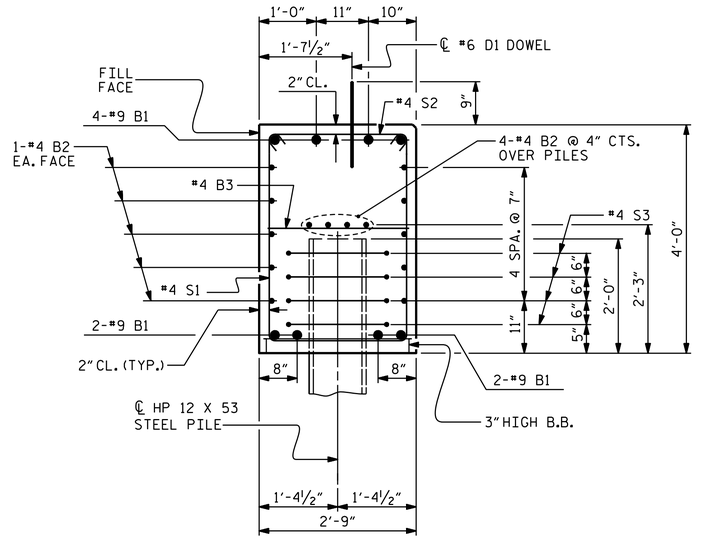
FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	38'-0"	1034
B2	28	#4	STR	19'-1"	357
B3	9	#4	STR	2'-5"	15
D1	20	#6	STR	1'-6"	45
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	46	#4	3	10'-5"	320
S2	46	#4	4	3'-2"	97
S3	20	#4	5	6'-6"	87
V1	52	#4	STR	6'-5"	223

REINFORCING STEEL (FOR ONE END BENT) 2458 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	17.9 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
TOTAL CLASS A CONCRETE		20.2 C.Y.



SECTION A-A

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

PROJECT NO. BP5.R104

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SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : T. BANKOVICH DATE : 9-22
CHECKED BY : J.Z. BLINSON DATE : 9-22
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS
3/11/2024 | 5:20 AM

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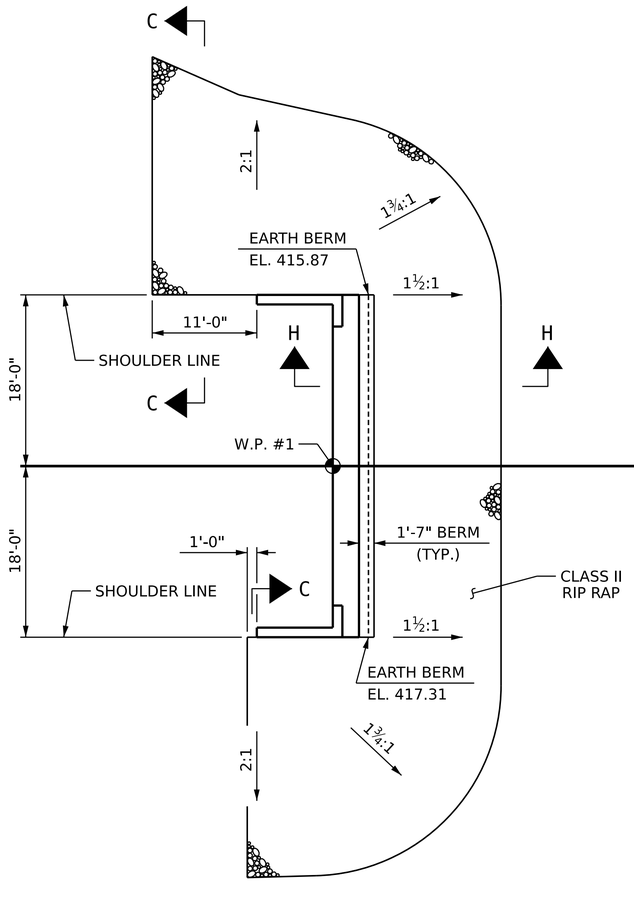

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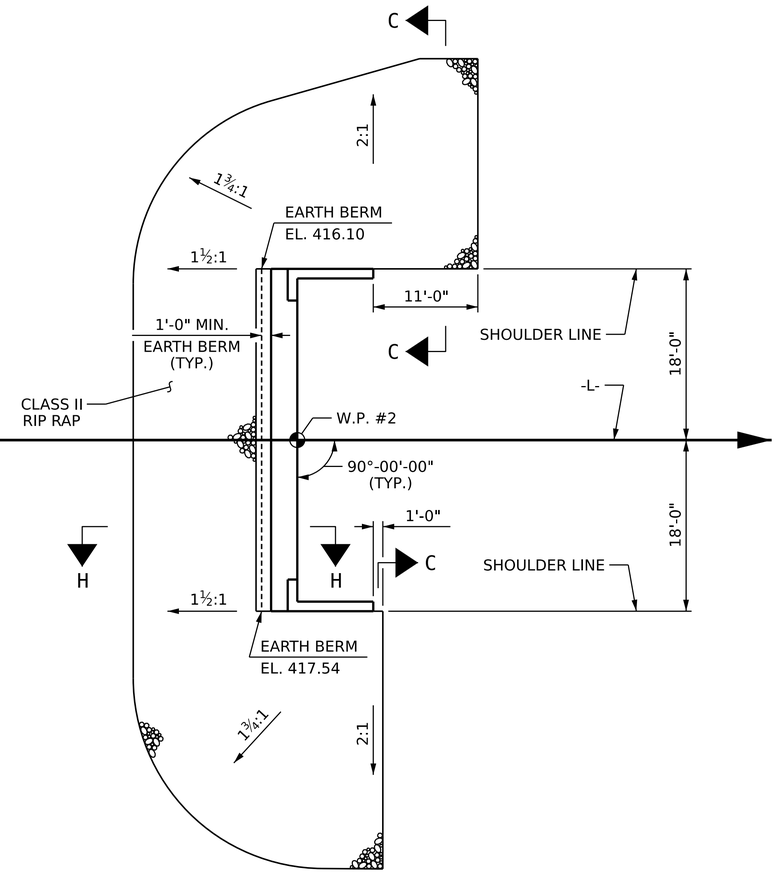
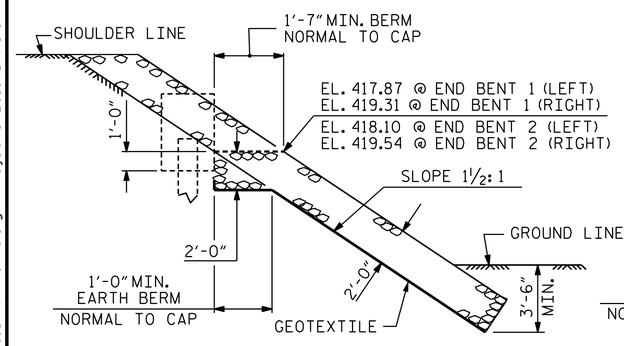


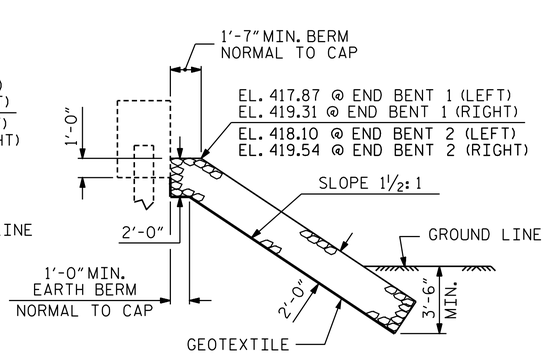
@ END BENT 2

PLAN OF RIP RAP

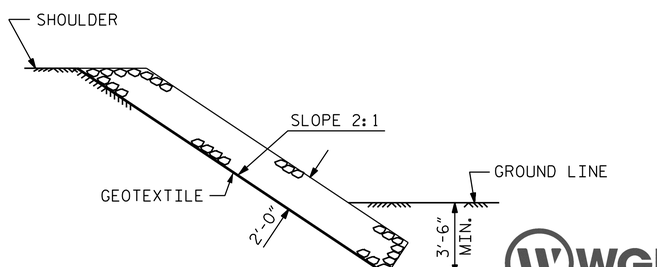
ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+98.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	215	240
END BENT 2	215	240



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. BP5.R104
GRANVILLE COUNTY
STATION: 16+98.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

DRAWN BY :	T. BANKOVICH	DATE :	9-22
CHECKED BY :	J.Z. BLINSON	DATE :	9-22
DESIGN ENGINEER OF RECORD:	J.A. BATTS	DATE :	9-22

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5640 Dillard Drive, Suite 200
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NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS

3/11/2024 | 5:20 AM PST

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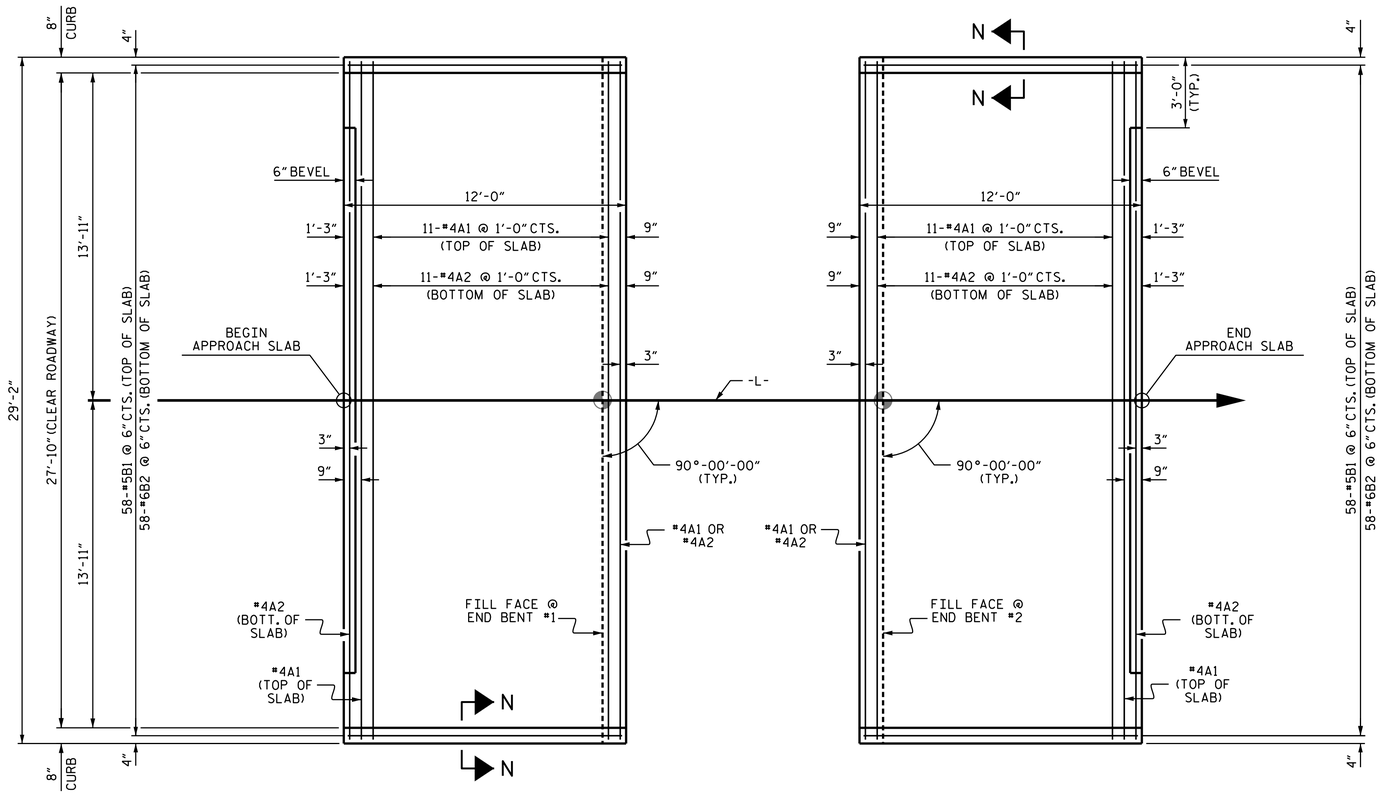
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

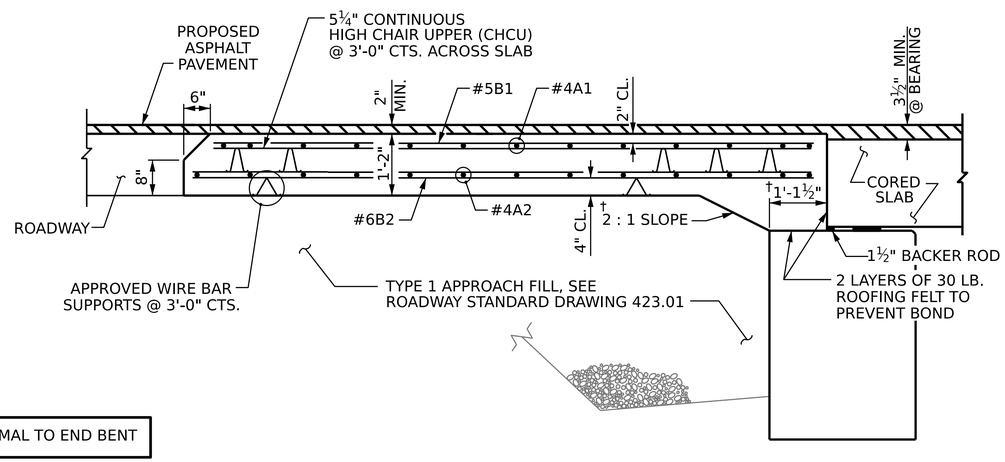
SHEET NO. S-13
TOTAL SHEETS 15



PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

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

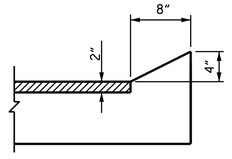
BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
✱ B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
✱ EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C. Y.	17.7

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
✱ B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
✱ EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C. Y.	17.7



SECTION N-N

CURB DETAILS

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT

(SUB-REGION TIER) - 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			15

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5640 Dillard Drive, Suite 200
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LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS
6/12/2024 | 6:47 AM EDT

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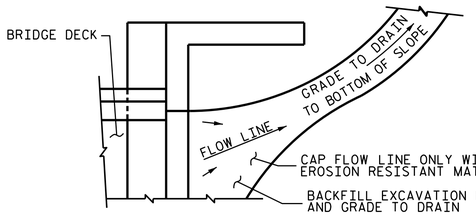
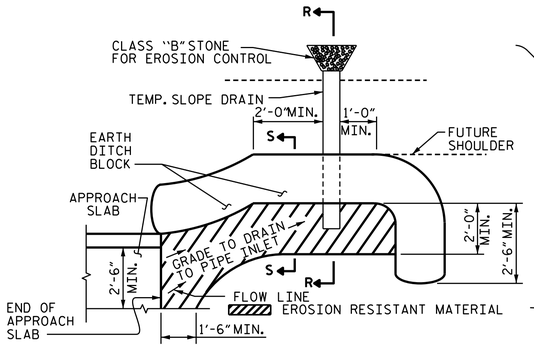
DRAWN BY :	T. BANKOVICH	DATE :	9-22
CHECKED BY :	J.Z. BLINSON	DATE :	9-22
DESIGN ENGINEER OF RECORD:	J.A. BATTS	DATE :	9-22



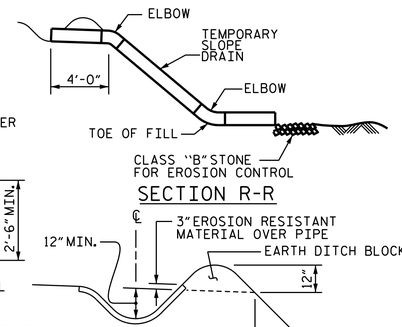
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

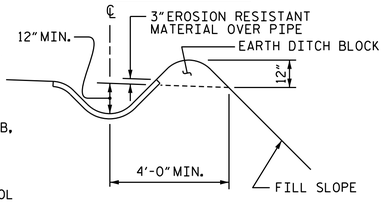


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE I OR TYPE 2, MIN. 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)

PROJECT NO. BP5.R104

GRANVILLE COUNTY

STATION: 16+98.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT

(SUB-REGION TIER) - 90° SKEW

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

DRAWN BY : T. BANKOVICH DATE : 9-22
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DESIGN ENGINEER OF RECORD: J.A. BATTS DATE : 9-22

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18056 JOHN A. BATTS

3/11/2024 | 5:20 AM PDT

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$" ∅ SHEAR STUDS FOR THE $\frac{3}{4}$" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$" ∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$" ∅ STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$" ∅ STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$"∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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