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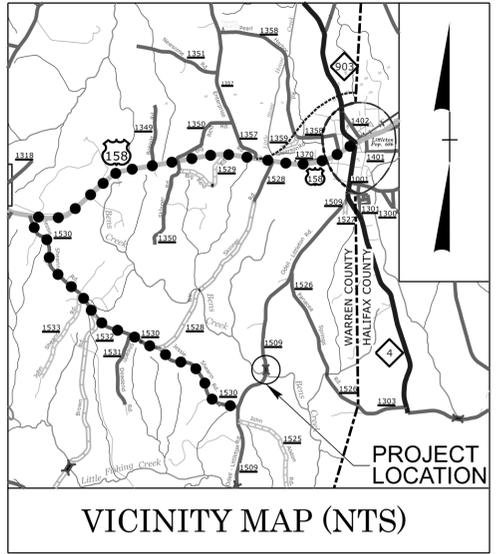
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with their signature on that page.**

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PROJECT: BP5.R075

CONTRACT: DE00417

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL SYMBOLS



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

WARREN COUNTY

LOCATION: *REPLACE BRIDGE NO. 16 OVER
BENS CREEK ON ODELL
LITTLETON ROAD (SR 1509)*
TYPE OF WORK: *GRADING, PAVING,
DRAINAGE, AND STRUCTURE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
BP5.R075.1	N/A	PE	
BP5.R075.2	N/A	R/W	
BP5.R075.3	N/A	CONST.	

100% Plan Set
Plans Developed with
OpenRoads (ORD)

OFF-SITE DETOUR

TO JESSIE SHEARIN RD
SR 1530

BEGIN PROJECT BP5.R075
-L- POC STA 11+40.00

BEGIN BRIDGE
-L- STA 15+67.50

END BRIDGE
-L- STA 16+42.50

END PROJECT BP5.R075
-L- POC STA 21+00.00

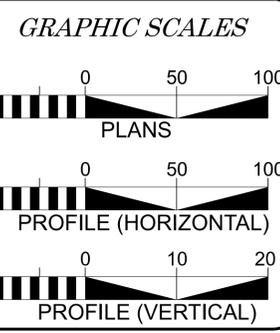
ODELL LITTLETON RD
SR 1509

TO LITTLETON

4

- NOTES:
1. THIS IS NOT A CONTROL OF ACCESS PROJECT
 2. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARY

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2025 = 300
ADT 2045 = 400

V = 50 MPH

FUNC CLASS =
LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP5.R075 = 0.168 MILES
LENGTH STRUCTURES PROJECT BP5.R075 = 0.014 MILES
TOTAL LENGTH PROJECT BP5.R075 = 0.182 MILES

Prepared in the Office of:

Lochner **vhb**

H.W. LOCHNER, INC.
2940 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111 NC LICENSE
NUMBER P-2159 VHB ENGINEERING, INC. P.C. (C-3705)
940 MAIN CAMPUS DRIVE, SUITE 500
RALEIGH, NC 27606

2024 STANDARD SPECIFICATIONS

CHRISTINA Y. FITZGERALD, PE
PROJECT ENGINEER

KEVIN KIM
PROJECT DESIGN ENGINEER

LISA B. GILCHRIST, EI
NCDOT CONTACT

RIGHT OF WAY DATE:
OCTOBER 15, 2024

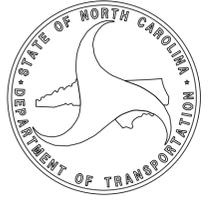
LETTING DATE:
OCTOBER 22, 2025

HYDRAULICS ENGINEER

Eric Burger
SIGNATURE: *Eric Burger* P.E. 9/26/2025

ROADWAY DESIGN ENGINEER

Christina Y. Fitzgerald
SIGNATURE: *Christina Y. Fitzgerald* P.E. 9/26/2025



INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1 THRU 2C-2	GUARDRAIL PLACEMENT
2C-3	METHOD OF PIPE INSTALLATION FLEXIBLE PIPE
2C-4	METHOD OF PIPE INSTALLATION RIGID PIPE
3B-1	GUARDRAIL, SHOULDER BERM GUTTER, PAVEMENT REMOVAL, AND EARTHWORK SUMMARY
3D-1	DRAINAGE SUMMARY
3G-1	AGGREGATE SUBGRADE / STABILIZATION AND SUBSURFACE DRAINAGE SUMMARY
4 THRU 5	PLAN AND PROFILE SHEET
RW02C-1 THRU RW02C-3	SURVEY CONTROL SHEET
TMP-1 THRU TMP-5	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1	CROSS-SECTION SUMMARY SHEET
X-2 THRU X-12	CROSS-SECTIONS
S-1 THRU S-14	STRUCTURE PLANS

GENERAL NOTES:

2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADE LINE:
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

SUBSURFACE DRAINS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE
BRIGHTSPEED / WARREN COUNTY WATER
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.

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

- STD.NO. TITLE
- DIVISION 2 - EARTHWORK
- 200.03 Method of Clearing - Method III
- 225.02 Guide for Grading Subgrade - Secondary and Local
- 225.04 Method of Obtaining Superelevation - Two Lane Pavement
- DIVISION 3 - PIPE CULVERTS
- 300.01 Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
- DIVISION 4 - MAJOR STRUCTURES
- 423.01 Bridge Approach Fills - Type 1 Approach Fill for Bridge Abutment
- DIVISION 5 - SUBGRADE, BASES AND SHOULDERS
- 560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I
- DIVISION 8 - INCIDENTALS
- 806.01 Concrete Right-of-Way Marker
- 815.02 Subsurface Drain
- 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
- 840.72 Pipe Collar
- 862.01 Guardrail Placement (Use Details in Lieu of Standards for Sheets 4 and 6)
- 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

SEAL
BPS.R075
3R01 | IA
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WARREN COUNTY

ROADWAY DESIGN
ENGINEER
Signed by: *Christina E. Bennett*
Professional Engineer
SEAL
048043
ENGINEER
CHRISTINA E. BENNETT
9/26/2025

9/26/2025

PREPARED BY
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE,
SUITE 200
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

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REVISIONS

Note: Not to Scale

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

BP5.R075
3R01 1B

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	□ +
Building	□
School	□
Church	□
Dam	□

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	---JS---
Buffer Zone 1	---BZ 1---
Buffer Zone 2	---BZ 2---
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	---WLB---
Proposed Lateral, Tail, Head Ditch	---FLW---
False Sump	◇

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY & PROJECT CONTROL:

Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Secondary Horiz and Vert Control Point	◆
Vertical Benchmark	⊠
Existing Right of Way Monument	△
Proposed Right of Way Monument (Rebar and Cap)	▲
Proposed Right of Way Monument (Concrete)	▲
Existing Permanent Easement Monument	◇
Proposed Permanent Easement Monument (Rebar and Cap)	◇
Existing C/A Monument	△
Proposed C/A Monument (Rebar and Cap)	▲
Proposed C/A Monument (Concrete)	▲
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
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	---C---
Proposed Slope Stakes Fill	---F---
Proposed Curb Ramp	CR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----
VEGETATION:	
Single Tree	☼
Single Shrub	☼
Hedge	-----

Woods Line	-----
Orchard	-----
Vineyard	-----

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	PH
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	PH
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	PH
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)*	-----

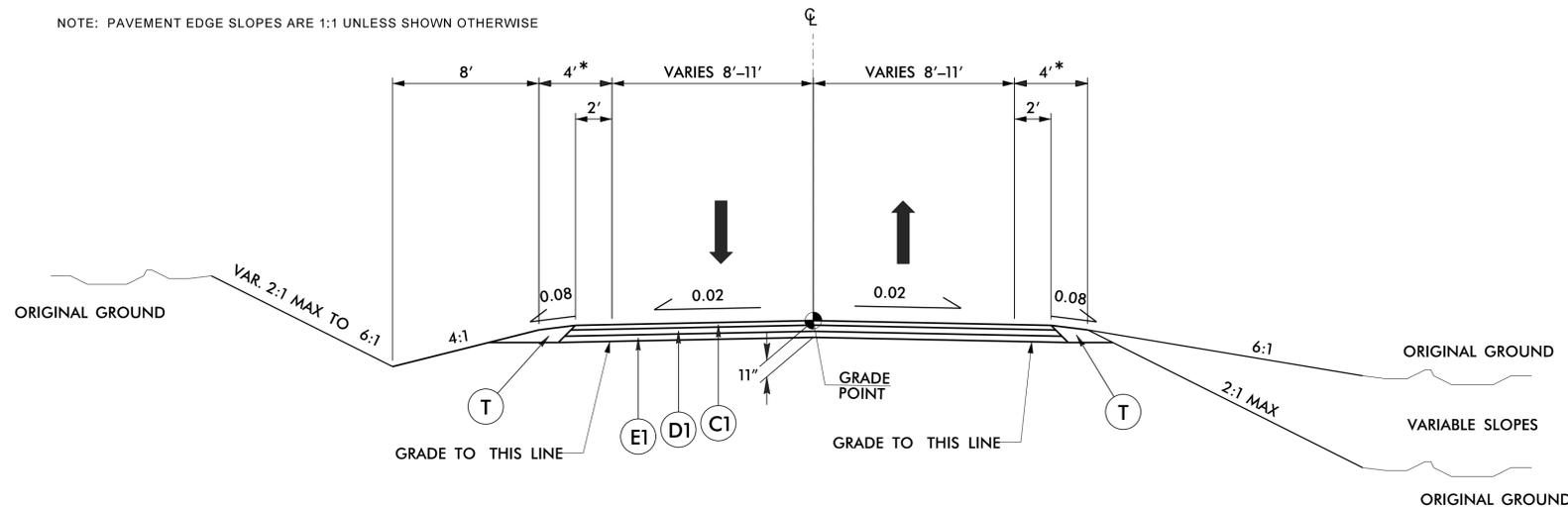
MISCELLANEOUS:

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.	UST
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)

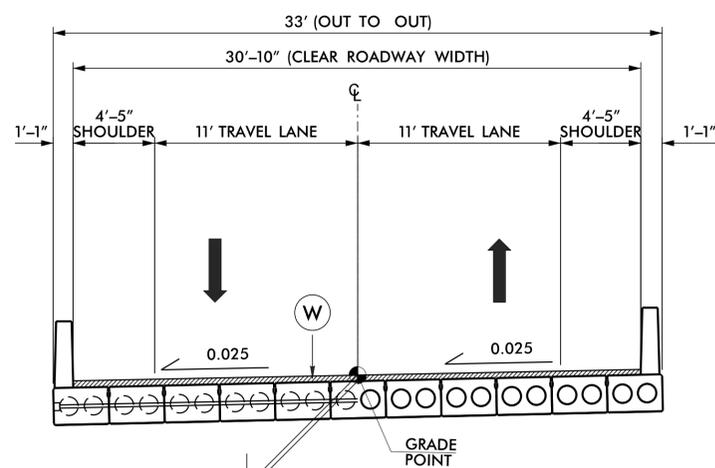
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF THE TWO LAYERS	E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110.0 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" OR TO EXCEED 1 1/2" IN DEPTH	R1	SHOULDER BERM GUTTER
C3	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.	T	EARTH MATERIAL.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	WEDGING (SEE DETAIL)
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I9.0C, AT AN AVERAGE RATE OF 114.0 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.		

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



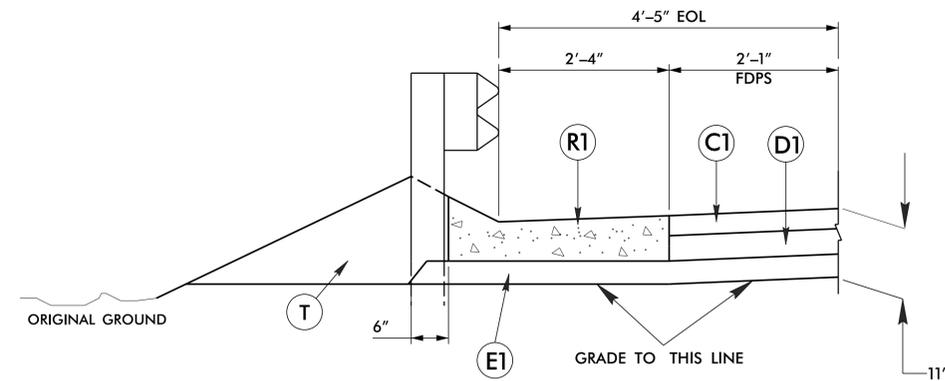
TYPICAL SECTION NO. 1

-L- STA. 11+40.00 TO STA. 15+67.50 (BEGIN BRIDGE)
(END BRIDGE) -L- STA. 16+42.50 TO STA. 21+00.00



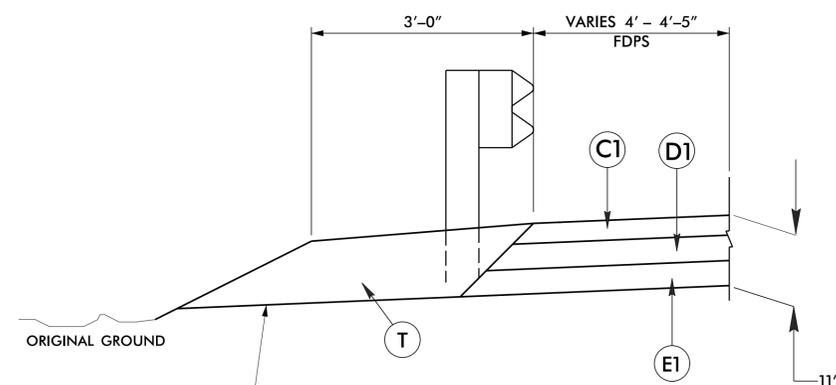
TYPICAL SECTION NO. 2

-L- STA. 15+67.50 (BEGIN BRIDGE) TO STA. 16+42.50 (END BRIDGE)



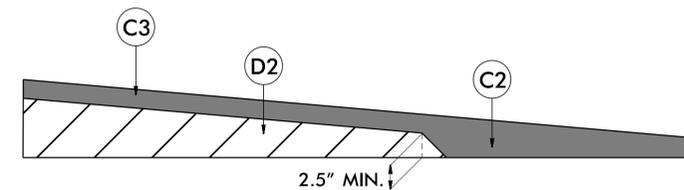
DETAIL SHOWING SHOULDER BERM GUTTER (SBG)

-L- STA. 15+00 TO -L- STA. 15+52 +/- (BEGIN APPROACH SLAB) (LT)



DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL

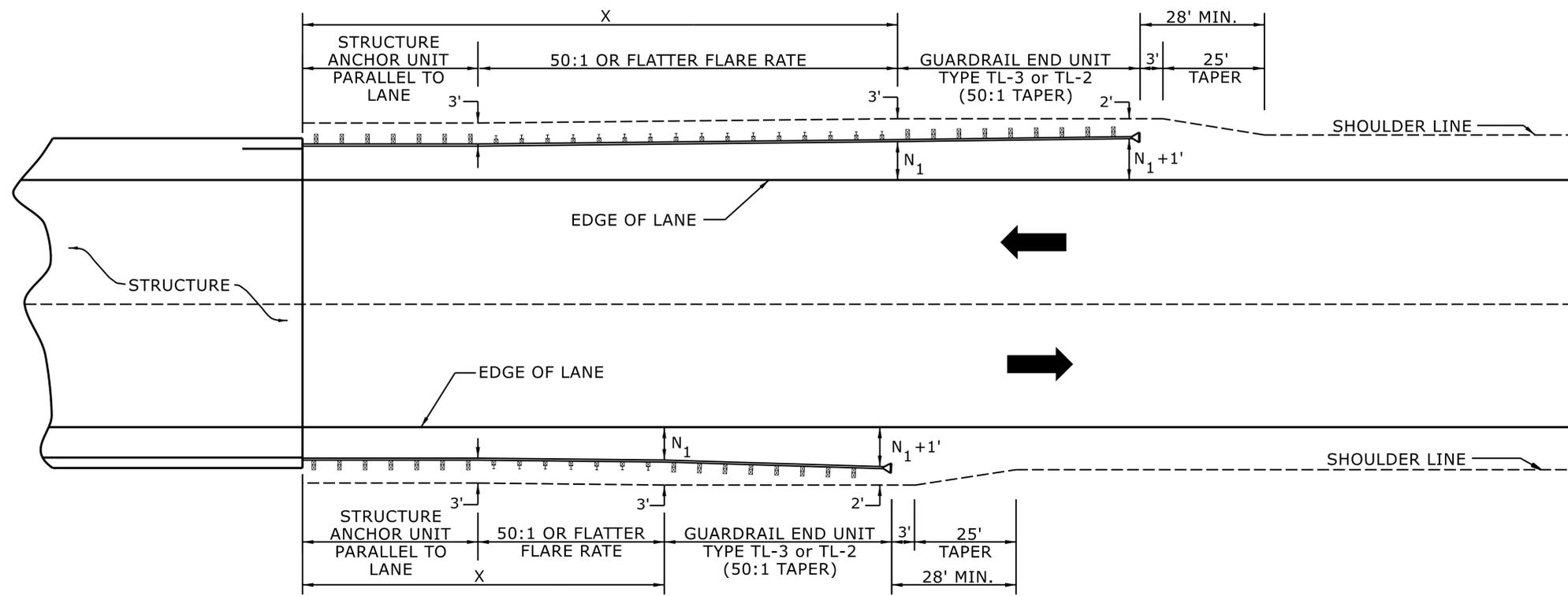
SEE PLANS FOR LOCATIONS



W: WEDGING DETAIL FOR STRUCTURE

Wedging Detail For Structure





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

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

FOR POSTED SPEEDS \geq 45MPH USE GREU TYPE TL-3
 FOR POSTED SPEEDS $<$ 45MPH USE GREU TYPE TL-2

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

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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT



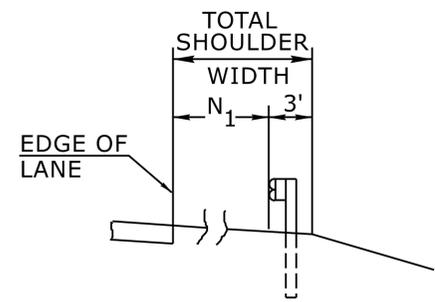
SHEET 4 OF 15
862D01

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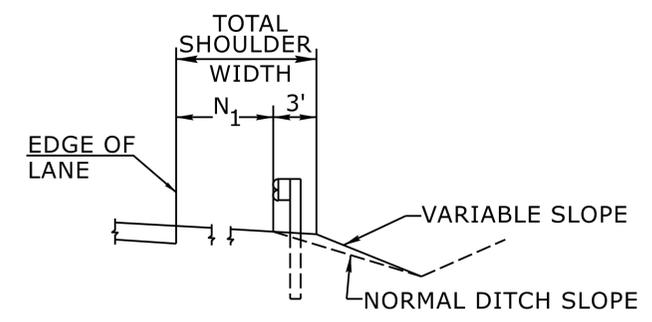
**CONTRACTS STANDARDS
 AND DEVELOPMENT UNIT**
 Office 919-707-6950 FAX 919-250-4119

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

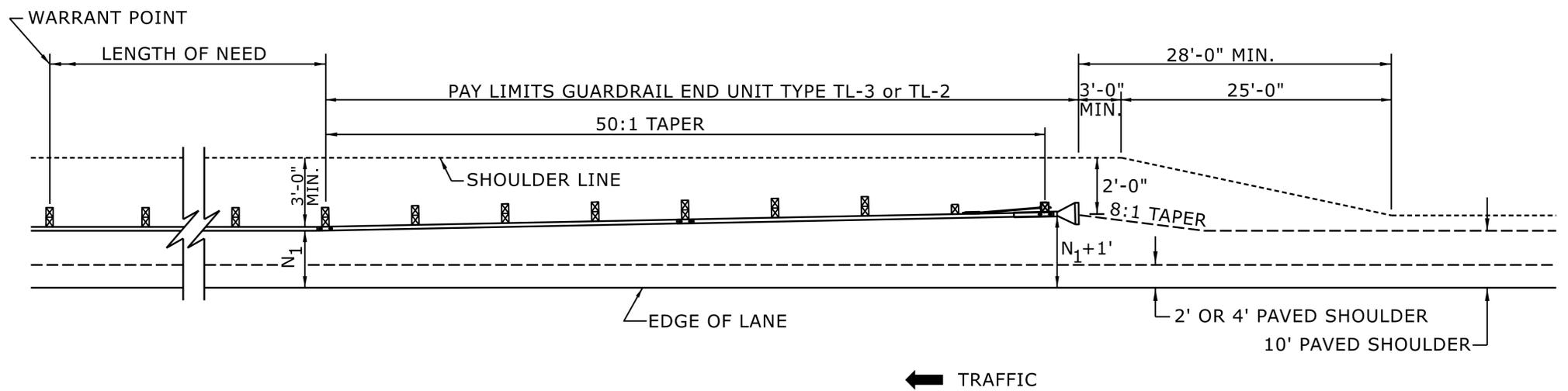


FILL SECTION



CUT SECTION

"N₁" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT



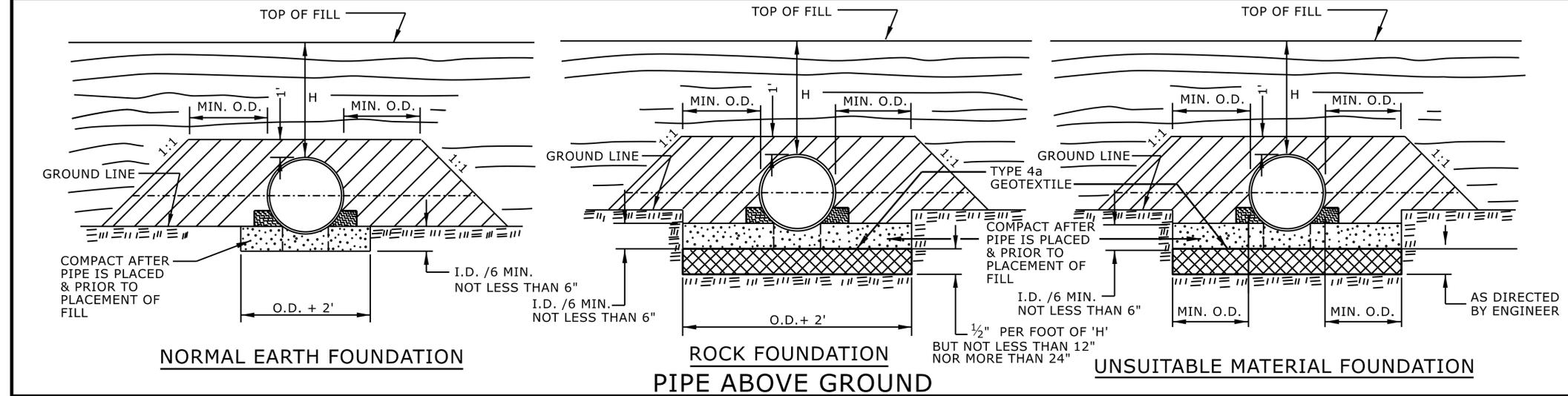
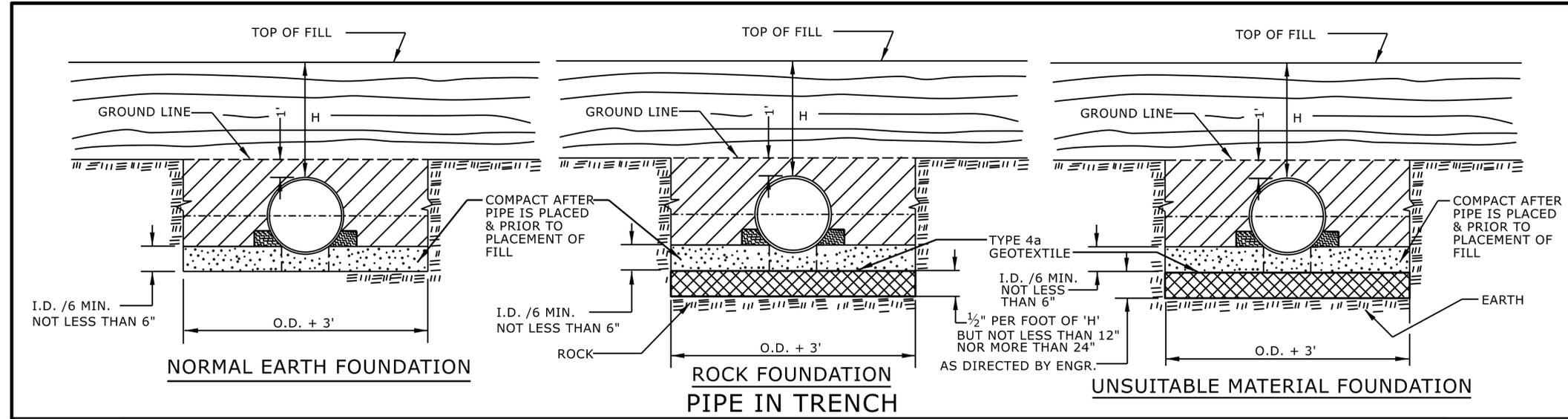
SHEET 6 OF 15
862D01

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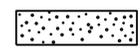
**CONTRACTS STANDARDS
AND DEVELOPMENT UNIT**
Office 919-707-6950 FAX 919-250-4119

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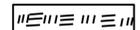


GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

 APPROVED SUITABLE LOCAL MATERIAL.
 TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

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

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

 SPRINGLINE OF PIPE
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
 UNDISTURBED EARTH MATERIAL
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE



Signed by:
 Nicole M. Hecker
 58833234164CS...
 9/26/2025

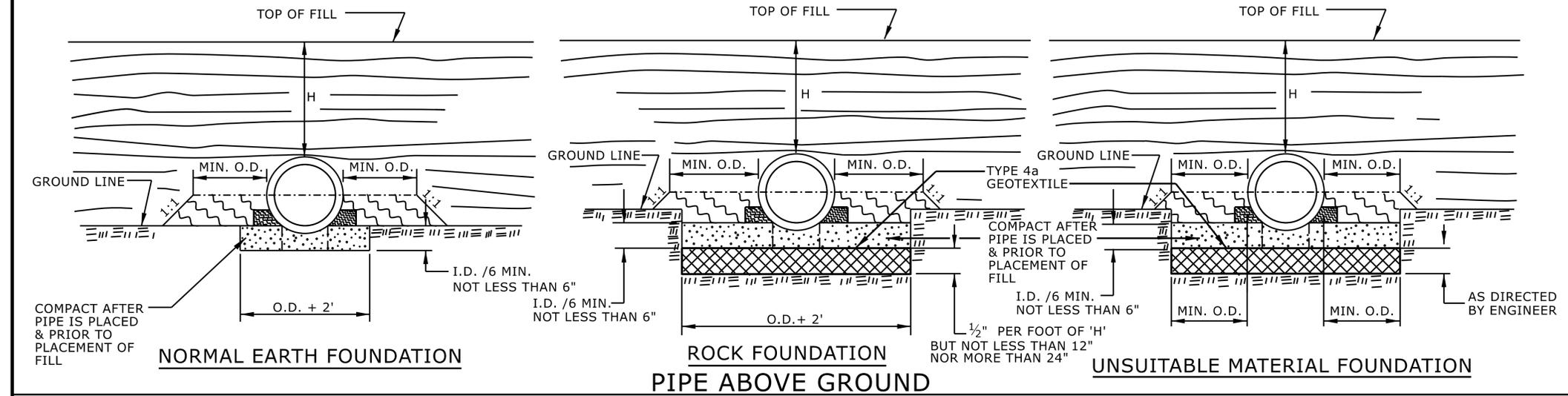
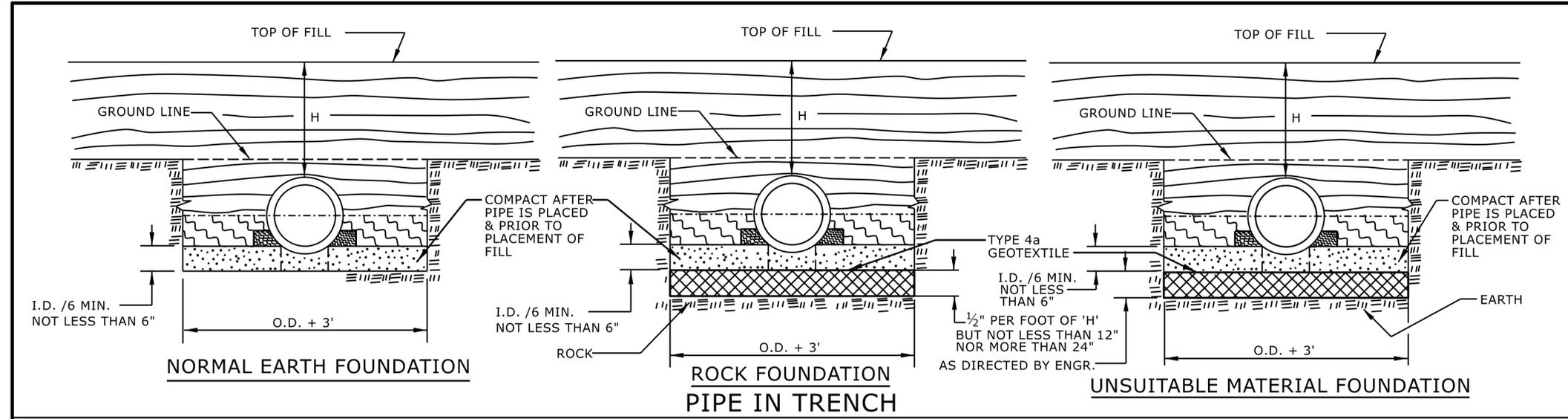
SHEET 1 OF 2
300.01

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 UNLESS ALL SIGNATURES COMPLETED

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

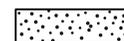
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ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: DATE:



GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

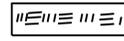
 APPROVED SUITABLE LOCAL MATERIAL.

 TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

-  SPRINGLINE OF PIPE
-  SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
-  UNDISTURBED EARTH MATERIAL
-  SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE



Signed by:
 Nicole M. Heckler
 033144
 9/26/2025

SHEET 2 OF 2
300.01

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 UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

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

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 Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
<i>CONTINGENCY</i>			<i>ASU(1)</i>	<i>12</i>	<i>100</i>	<i>200</i>	<i>300</i>		
			<i>TOTAL CY/TONS/SY</i>		<i>100</i>	<i>200**</i>	<i>300**</i>	<i>0</i>	<i>0</i>

*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 Subgrade 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 SUBSURFACE DRAINAGE

LINE	Station	Station	Location L/R/T/CL	Drain Type* UD/BD/SD	LF
-L-	13+50	15+67		SD	434
-L-	16+42	18+50		SD	416
<i>CONTINGENCY</i>					
				<i>TOTAL LF:</i>	<i>850</i>

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

PREPARED BY



H.W. LOCHNER, INC.
5840 PLAZA PLACE,
SUITE 202
RALEIGH, NC 27612
919 871-7111
NC LICENSE NUMBER F-0159

REVISIONS

08/07/2023



ROADWAY DESIGN UNIT
ROADWAY DESIGN
ENGINEER

Signed by:
Christina...
SEAL
048043
ENGINEER
LINDSEY Y. FITZGERALD

9/26/2025

HYDRAULICS
ENGINEER

DocuSigned by:
Eric...
SEAL
052478
ENGINEER
ERIC A. BEGER

9/26/2025

PREPARED BY
Lochner

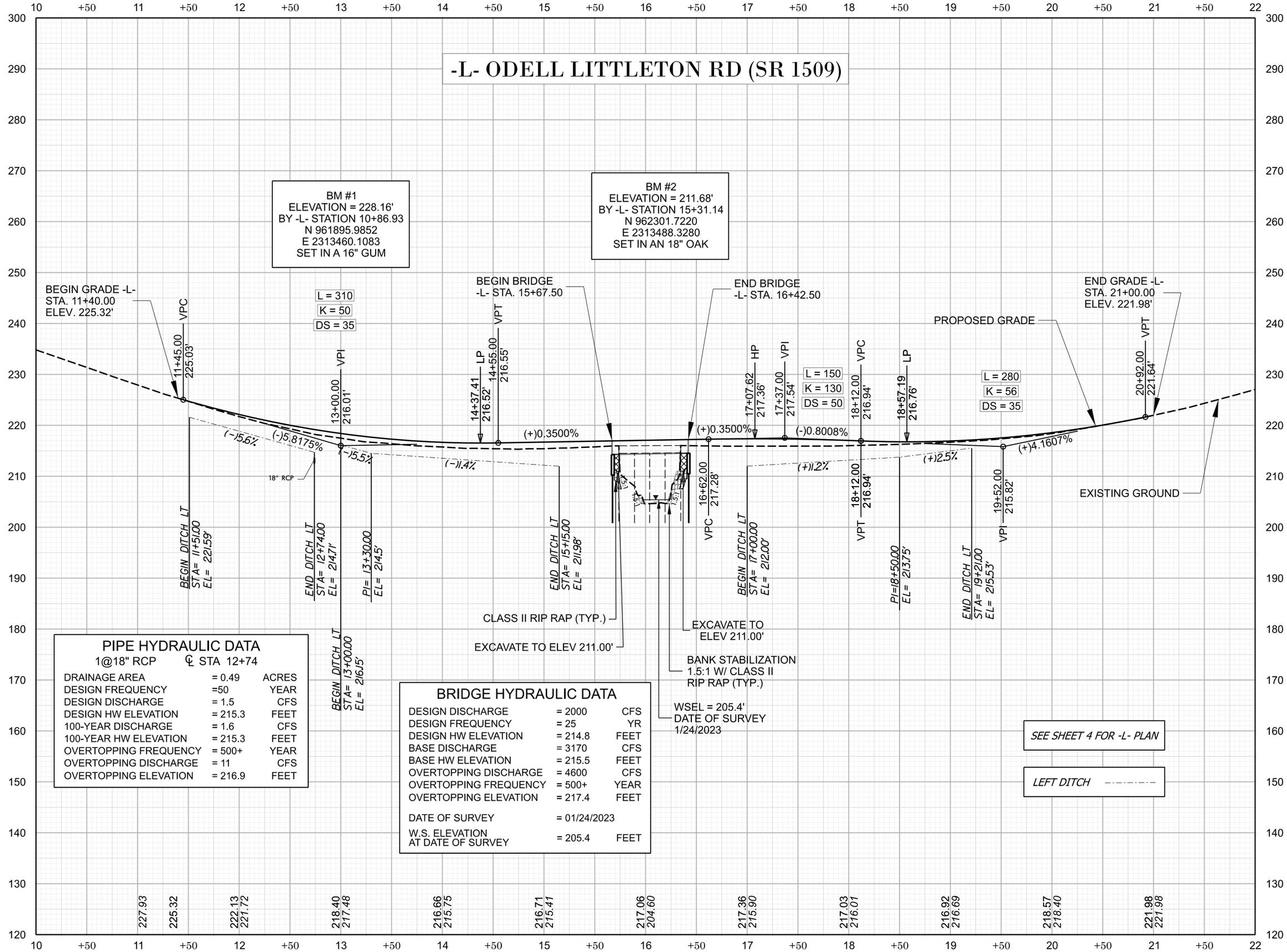
H.W. LOCHNER, INC.
2840 PLAZA PLACE,
SUITE 202
RALEIGH, NC 27612
919 871-7111
NC LICENSE NUMBER F-0159



vhb ENGINEERING, P.C. (C-3705)
940 MAN CAMPUS DRIVE, SUITE 500
RALEIGH, NC 27608

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REVISIONS



-L- ODELL LITTLETON RD (SR 1509)

BM #1
ELEVATION = 228.16'
BY -L- STATION 10+86.93
N 961895.9852
E 2313460.1083
SET IN A 16" GUM

BM #2
ELEVATION = 211.68'
BY -L- STATION 15+31.14
N 962301.7220
E 2313488.3280
SET IN AN 18" OAK

PIPE HYDRAULIC DATA
1@18" RCP CL STA 12+74

DRAINAGE AREA	= 0.49	ACRES
DESIGN FREQUENCY	= 50	YEAR
DESIGN DISCHARGE	= 1.5	CFS
DESIGN HW ELEVATION	= 215.3	FEET
100-YEAR DISCHARGE	= 1.6	CFS
100-YEAR HW ELEVATION	= 215.3	FEET
OVERTOPPING FREQUENCY	= 500+	YEAR
OVERTOPPING DISCHARGE	= 11	CFS
OVERTOPPING ELEVATION	= 216.9	FEET

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2000	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 214.8	FEET
BASE DISCHARGE	= 3170	CFS
BASE HW ELEVATION	= 215.5	FEET
OVERTOPPING DISCHARGE	= 4600	CFS
OVERTOPPING FREQUENCY	= 500+	YEAR
OVERTOPPING ELEVATION	= 217.4	FEET
DATE OF SURVEY	= 01/24/2023	
W.S. ELEVATION AT DATE OF SURVEY	= 205.4	FEET

WSEL = 205.4'
DATE OF SURVEY
1/24/2023

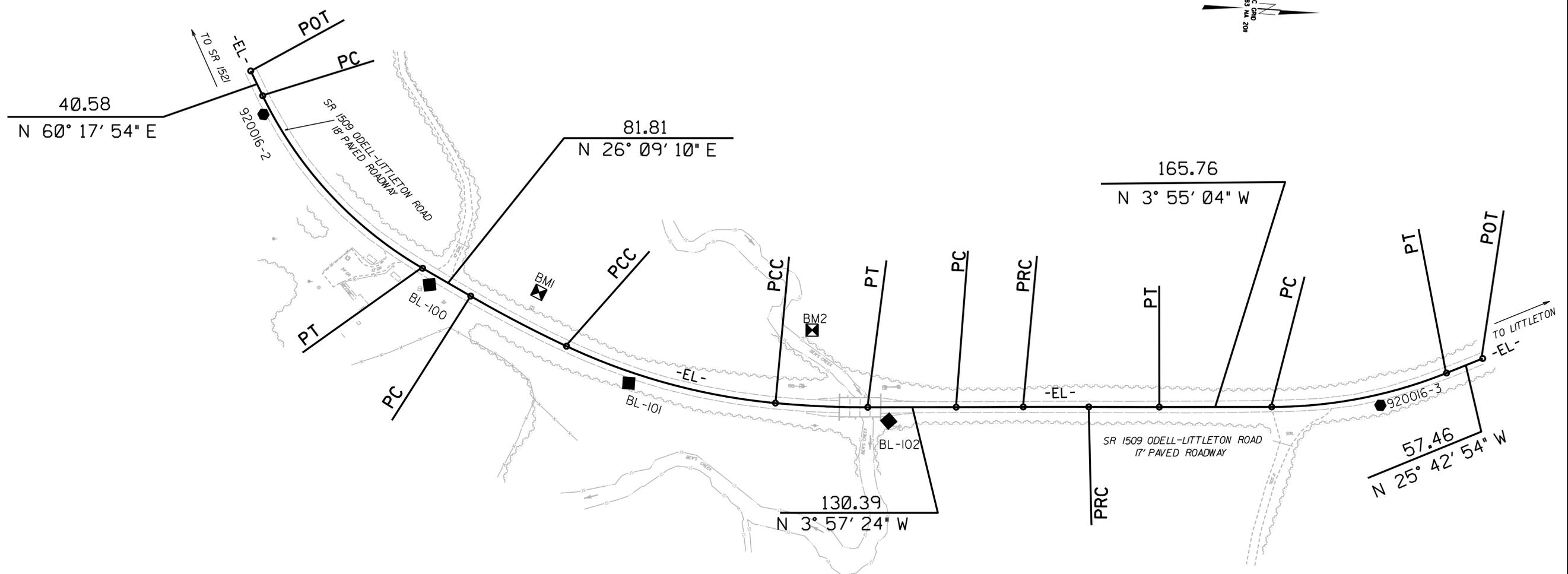
SEE SHEET 4 FOR -L- PLAN

LEFT DITCH

11+93	227.93
11+32	225.32
12+13	222.13
12+72	221.72
13+40	218.40
13+48	217.48
14+66	216.66
14+75	215.75
15+71	216.71
15+41	215.41
16+06	217.06
16+60	204.60
17+36	217.36
17+90	215.90
18+03	217.03
18+01	216.01
19+92	216.92
19+69	216.69
20+57	218.57
20+40	218.40
21+98	221.98
21+98	221.98

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



REVISIONS

SEE SHEET RW2C-3 FOR FURTHER ALIGNMENT DETAILS

NOTES:

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

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
92-0016	RW02C-2
Location and Surveys	
SEPI	1025 Wade Avenue Raleigh, NC 27605 Tel: 919-789-9977 Fax: 919-789-9591 License: C-2197
ENGINEERING & CONSTRUCTION	

REVISIONS

BL	POINT	DESC.	NORTH	EAST	ELEVATION
1		920016-1	961214.3900	2312505.6020	271.00
2		920016-2	961473.0070	2313226.2620	257.95
100		BL-100	961734.2540	2313459.7120	238.92
101		BL-101	962037.6410	2313585.2530	218.57
102		BL-102	962423.4360	2313614.1640	215.29
3		920016-3	963145.4280	2313542.2138	237.86

.....
 BM1 ELEVATION = 228.16
 N 961896 E 2313460
 BL STATION 17+65.00 61 LEFT
 RR SPIKE IN BASE OF 16" GUM

.....
 BM2 ELEVATION = 211.68
 N 962302 E 2313488
 BL STATION 22+00.00 116 LEFT
 RR SPIKE IN BASE OF 18" OAK

NOTES:

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

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
92-0016	RW02C-3
Location and Surveys	
SEPI	1025 Wade Avenue Raleigh, NC 27605 Tel: 919-789-9977 Fax: 919-789-9591 License: C-2197
ENGINEERING & CONSTRUCTION	

REVISIONS

EL		N	E	BEARING	DIST	DELTA	D	L	T	R
POT		961449.910	2313163.706							
LINE				N 60°17'53.7" E	40.58					
PC		961470.016	2313198.954							
CURVE				N 43°13'31.8" E	346.54	34°08'43.9"(L T)	09°42'29.4"	351.72	181.26	590.18
PT		961722.526	2313436.288							
LINE				N 26°09'09.8" E	81.81					
PC		961795.961	2313472.347							
CURVE				N 23°40'18.0" E	159.35	04°57'43.6"(L T)	03°06'46.8"	159.40	79.75	1840.53
PCC		961941.904	2313536.325							
CURVE				N 11°19'31.5" E	319.25	19°43'49.3"(L T)	06°08'58.9"	320.83	162.02	931.68
PCC		962254.938	2313599.021							
CURVE				N 01°14'53.5" W	136.34	05°25'00.8"(L T)	03°58'18.0"	136.39	68.24	1442.61
PT		962391.243	2313596.051							
LINE				N 03°57'23.9" W	130.39					
PC		962521.323	2313587.054							
CURVE				N 04°03'50.1" W	98.92	00°12'52.5"(L T)	00°13'00.9"	98.92	49.46	26414.83
PCC		962619.998	2313580.043							
CURVE				N 03°52'11.0" W	96.62	00°36'10.7"(RT)	00°37'26.6"	96.63	48.31	9181.36
PCC		962716.402	2313573.522							
CURVE				N 03°44'34.8" W	104.04	00°20'58.4"(L T)	00°20'09.6"	104.04	52.02	17052.32
PT		962820.217	2313566.730							
LINE				N 03°55'04.0" W	165.76					
PC		962985.593	2313555.404							
CURVE				N 14°48'58.9" W	262.65	21°47'49.8"(L T)	08°14'56.7"	264.24	133.74	694.57
PT		963239.506	2313488.240							
LINE				N 25°42'53.8" W	57.46					
POT		963291.275	2313463.309							

NOTES:

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

09/08/09

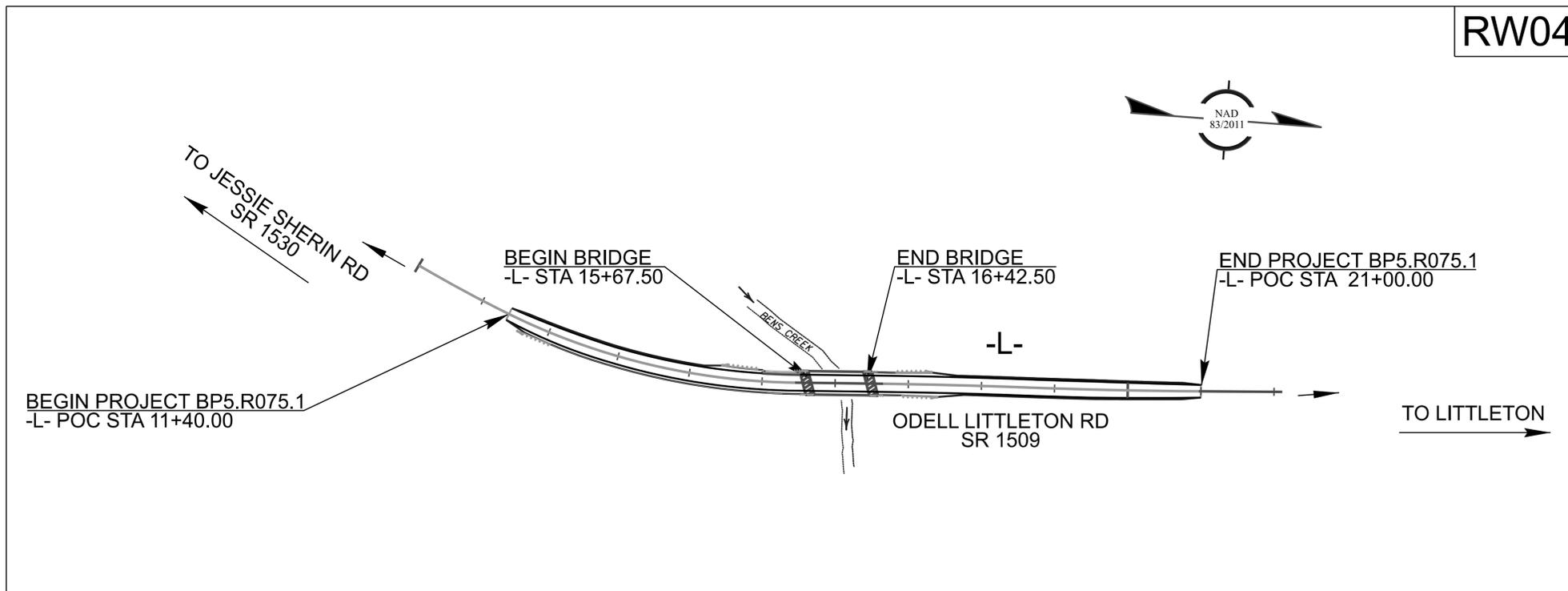
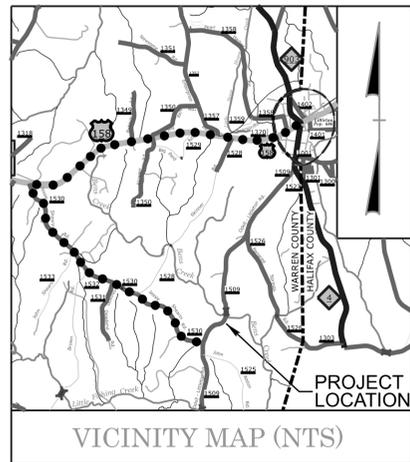
TIP PROJECT: BP5.R075

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE NO.	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075	RW01	7

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

WARREN COUNTY



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "920016-1" WITH NAD 1983/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 961,214.390 EASTING: 2,312,505.602 ELEVATION: 271.00'

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000062513

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

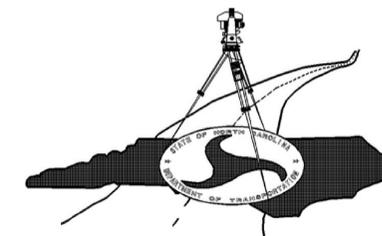
GEL SOLUTIONS
an Affiliate of THE GEL GROUP, INC.
2700 SUMNER BLVD.
SUITE 106
RALEIGH, NC 27616
(919) 544-1100
WWW.GEL-SOLUTIONS.COM

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 15 2024

LETTING DATE:
JULY 23 2025

PROFESSIONAL LAND
SURVEYOR



SIGNATURE:

DATE:

PROPOSED ALIGNMENT CONTROL SHEET

I, PARKS H. ICENHOUR JR., PLS, CERTIFY THAT THE DATA COMPILED CAME FROM AVAILABLE SURVEYS/MAPPING PERFORMED BY OTHERS AND PROVIDED TO ME BY NCDOT AND DO NOT CERTIFY TO THE ACCURACY OR QUALITY OF THE INDIVIDUAL DATA SOURCES.

THIS 6th DAY OF JANUARY, 2025.

PROFESSIONAL LAND SURVEYOR L-3996



BP5.R075

R/W 02D-4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



PROFESSIONAL LAND SURVEYOR



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: BP5.R075
County: WARREN

PROPOSED ALIGNMENT: L												
POINT	STATION	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
PC	10+00.00	961795.9613	2313472.3474	N23°58'25.0"E	139.966	04°21'29.5"	03°06'46.8"	140.000	70.034	1840.531		
PCC	11+40.00	961923.8531	2313529.2180	N09°07'20.2"E	401.893	25°20'40.2"	06°15'18.0"	405.188	205.963	916.000		
PT	15+45.19	962320.6627	2313592.9347	N03°32'59.9"W	120.480							
PC	16+65.67	962440.9116	2313585.4747	N02°51'24.2"W	190.443	01°23'11.4"	00°43'40.9"	190.447	95.228	7870.000		
PRC	18+56.12	962631.1175	2313575.9833	N03°02'26.3"W	240.959	01°45'15.5"	00°43'40.9"	240.968	120.494	7870.000		
PT	20+97.08	962871.7372	2313563.2019	N03°55'04.0"W	114.122							
END	22+11.21	962985.5929	2313555.4044									

NOTES:

1. 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.

PREPARED FOR



LOCATION AND SURVEYS UNIT

PREPARED BY

GEL SOLUTIONS
an Affiliate of THE GEL GROUP, INC.
2700 SUMNER BLVD.
SUITE 100
RALEIGH, NC 27616
(919) 544-1100
WWW.GEL-SOLUTIONS.COM

RIGHT OF WAY CONTROL SHEET

BP5.R075

R/W 03E-1

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION



PROFESSIONAL LAND
SURVEYOR



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL SIGNATURES
ARE COMPLETED

2024 STANDARD
SPECIFICATIONS

I, PARKS H. ICENHOUR JR., PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM DECEMBER 2024 TO JANUARY 2025, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

THIS 13th DAY OF JANUARY, 2025.



PROFESSIONAL LAND SURVEYOR L-3996

PERMANENT ROW MARKER IRON PIN AND CAP: L

STATION	OFFSET	NORTH	EAST
11+40.00	-35.00	961936.8478	2313496.7197
11+40.00	-30.00	961934.9914	2313501.3623
15+46.45	-35.00	962319.7571	2313557.9236
16+65.67	-35.00	962438.7444	2313550.5419
18+56.12	-35.00	962629.7962	2313541.0083
18+99.97	-28.02	962673.7188	2313546.2162
19+00.00	-35.00	962673.4498	2313539.2372

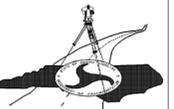
PERMANENT EASEMENT MARKER IRON PIN AND CAP: L

STATION	OFFSET	NORTH	EAST
12+60.00	31.26	962030.1547	2313596.6552
12+60.00	45.00	962026.7651	2313609.9643
12+90.00	45.00	962057.3871	2313617.2311
12+90.00	31.65	962060.2572	2313604.1898
14+00.00	-35.00	962179.0264	2313555.5895
15+15.00	-47.00	962289.1443	2313547.3269
15+70.00	45.00	962348.2134	2313636.3121
15+70.00	37.10	962347.7240	2313628.4230
15+80.00	-60.00	962351.6927	2313530.8943
16+00.00	-35.00	962373.2023	2313554.6080
16+00.00	-47.00	962372.4593	2313542.6310
16+50.00	45.00	962428.0599	2313631.3585
16+50.00	37.24	962427.5791	2313623.6091
16+65.67	-55.00	962437.5060	2313530.5802
16+95.00	-55.00	962466.9896	2313528.8063
16+95.01	-35.00	962468.1662	2313548.7716

NOT SET IN A TREE

TIP PROJECT: BP5.R075
County: WARREN

PREPARED FOR



LOCATION AND
SURVEYS UNIT

PREPARED BY

NOTES:

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

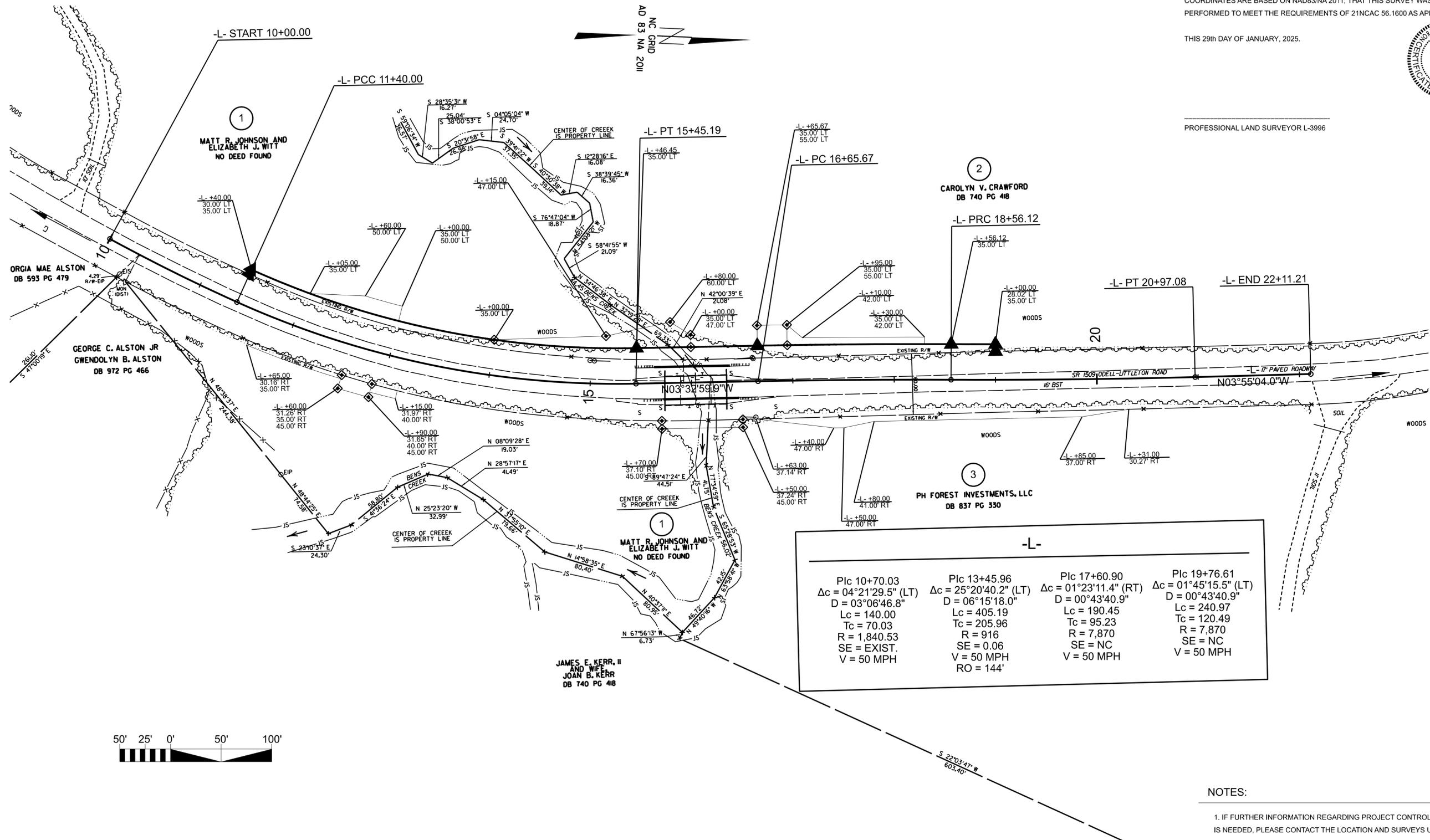
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SUITE 100
RALEIGH, NC 27616
(919) 544-1100
WWW.GEL-SOLUTIONS.COM



I, PARKS H. ICENHOUR JR., PLS. CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM DECEMBER 2024 TO JANUARY 2025, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

THIS 29th DAY OF JANUARY, 2025.

PROFESSIONAL LAND SURVEYOR L-3996



-L-			
Plc 10+70.03	Plc 13+45.96	Plc 17+60.90	Plc 19+76.61
$\Delta c = 04^{\circ}21'29.5''$ (LT)	$\Delta c = 25^{\circ}20'40.2''$ (LT)	$\Delta c = 01^{\circ}23'11.4''$ (RT)	$\Delta c = 01^{\circ}45'15.5''$ (LT)
D = 03°06'46.8"	D = 06°15'18.0"	D = 00°43'40.9"	D = 00°43'40.9"
Lc = 140.00	Lc = 405.19	Lc = 190.45	Lc = 240.97
Tc = 70.03	Tc = 205.96	Tc = 95.23	Tc = 120.49
R = 1,840.53	R = 916	R = 7,870	R = 7,870
SE = EXIST.	SE = 0.06	SE = NC	SE = NC
V = 50 MPH			
	RO = 144'		



TIP PROJECT: BP5.R075
County: WARREN

PREPARED FOR



LOCATION AND SURVEYS UNIT

PREPARED BY

GEL SOLUTIONS
an Affiliate of THE GEL GROUP, INC.
2700 SUMNER BLVD.
SUITE 106
RALEIGH, NC 27616
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NOTES:

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

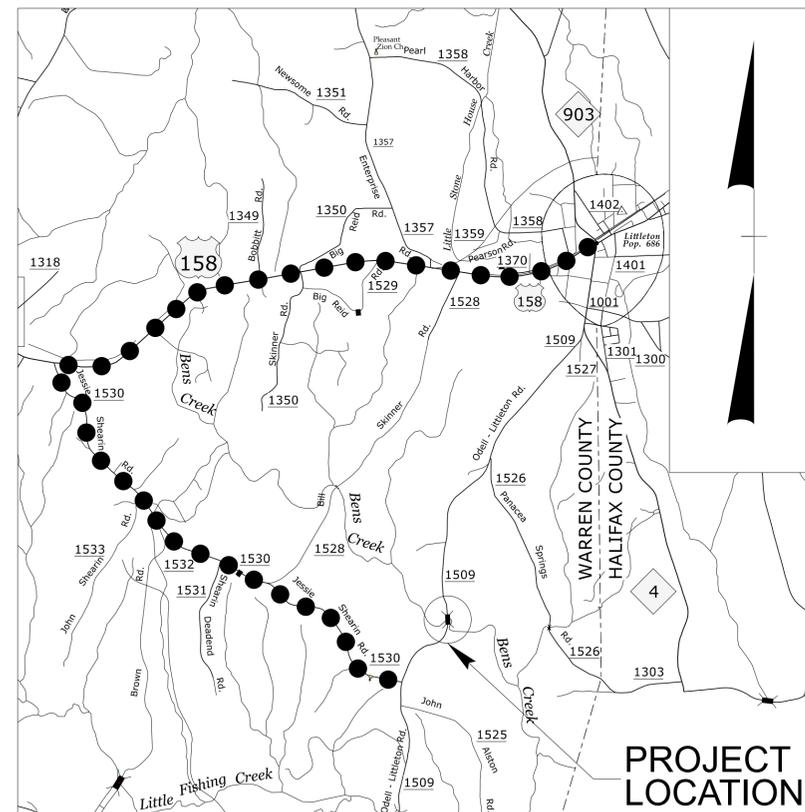
TRANSPORTATION MANAGEMENT PLAN

WARREN COUNTY



LOCATION: REPLACE BRIDGE NO. 16 OVER
BENS CREEK ON
ODELL LITTLETON ROAD
(SR 1509)

TYPE OF WORK: GRADING, PAVING,
DRAINAGE AND STRUCTURE



VICINITY MAP (NTS)

● ● ● ● ● OFF-SITE DETOUR

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-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, AND LOCAL NOTES) AND CONSTRUCTION PHASING
TMP-2	SPECIAL SIGN DESIGN
TMP-3	OFFSITE DETOUR PLAN SHEET
TMP-4	OFFSITE DETOUR INSET A PLAN SHEET
TMP-5	OFFSITE DETOUR GUIDE SIGNS

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$

Lochner
H.W LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111

NC License
Number F-0159

PLANS PREPARED BY:

JASON TALLEY, PE (LOCHNER)
PROJECT ENGINEER

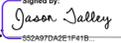
REID CROSSER, EI
DESIGN ENGINEER

NCDOT CONTACTS:

LISA B. GILCHRIST, EI
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

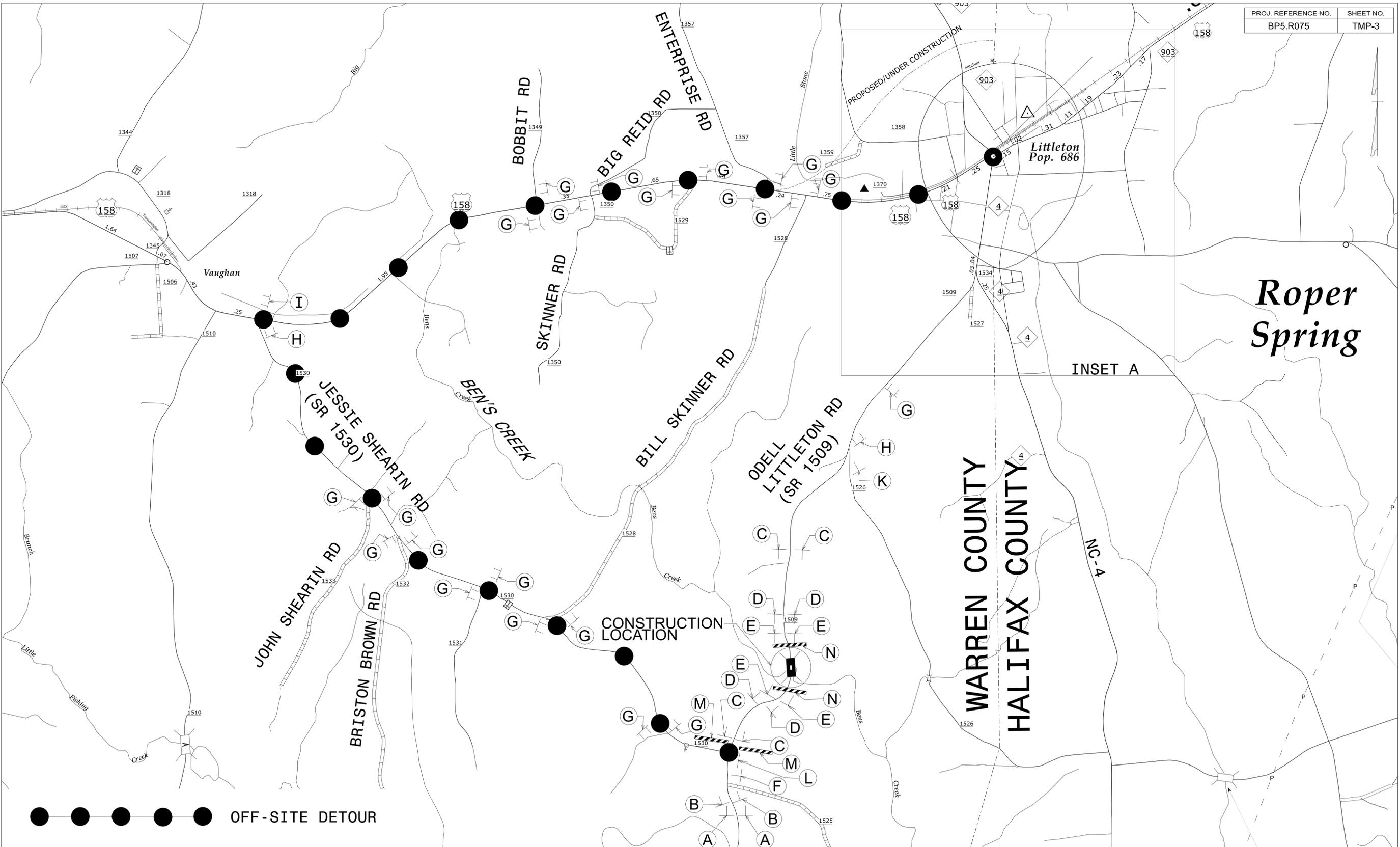
APPROVED: 

DATE: 9/26/2025

SEAL



PROJECT: BP5.R075

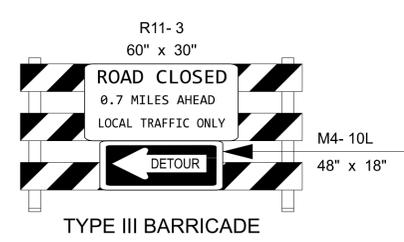
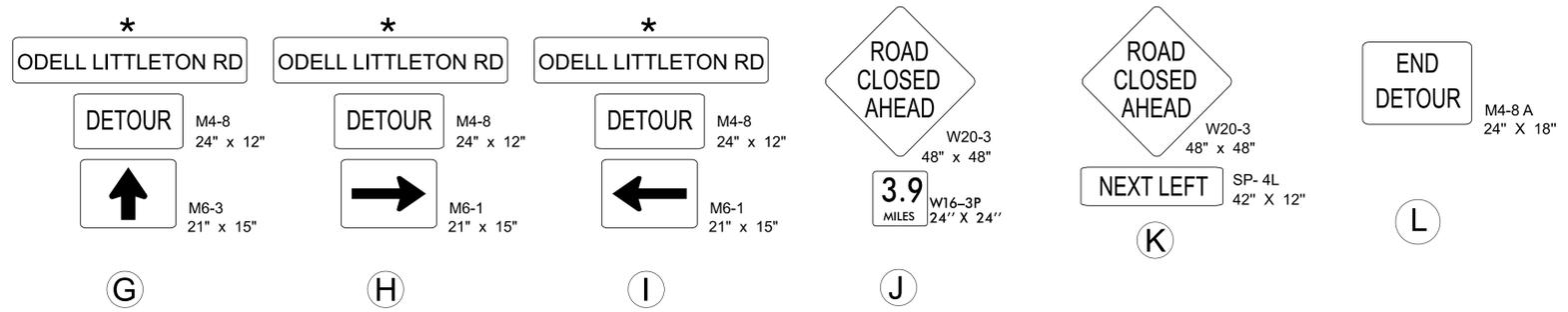
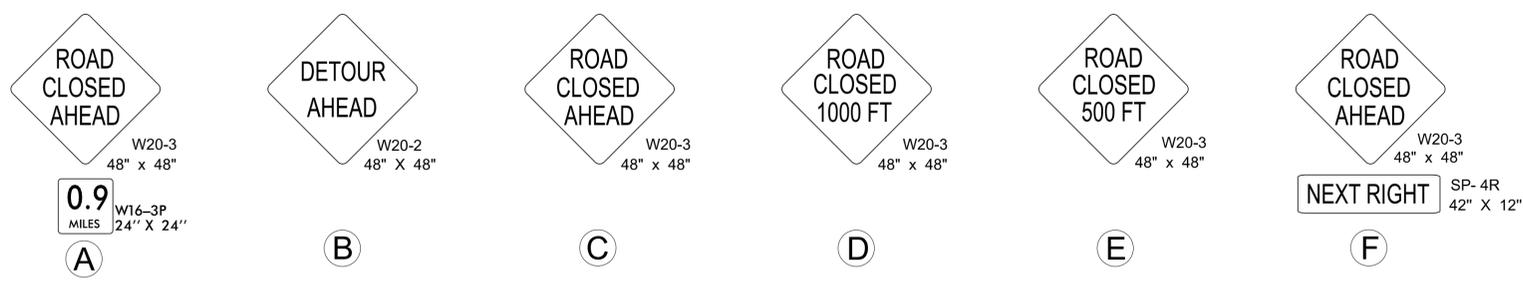


●●●●● OFF-SITE DETOUR

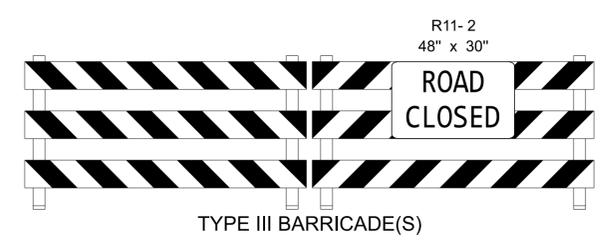
- NOTE: 1) OFF-SITE DETOUR IS APPROXIMATELY 9.04 MILES IN LENGTH.
- 2) ALL SIGN LOCATIONS ARE APPROXIMATE.
REFER TO RSD 1101.03 FOR SPACING REQUIREMENTS.
- 3) SEE TMP-6 FOR OFF-SITE DETOUR SIGNAGE.

<p>Lochner H.W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 (919) 571-7111</p>	<p>APPROVED: </p> <p>DATE: 9/28/2025</p>		<p>OFFSITE DETOUR</p>
	<p>NC License Number F-0159</p>		

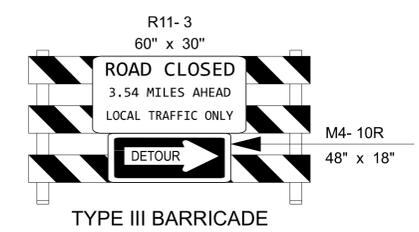
\$\$\$\$\$ SYSTEM TIME\$\$\$\$\$
\$\$\$\$\$ DATE\$\$\$\$\$
\$\$\$\$\$ USER NAME\$\$\$\$\$



M



N



O



P

* NOTE: SEE TMP-2 FOR SPECIAL SIGN DESIGN

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$


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 DATE: 9/26/2025
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OFFSITE DETOUR GUIDE SIGNS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PAVEMENT MARKING PLAN
WARREN COUNTY

LOCATION: BRIDGE NO. 16 OVER BENS CREEK ON ODELL LITTLETON ROAD (SR 1509)

INDEX

SHEET NO.	DESCRIPTION
PMP - 1	PAVEMENT MARKING PLAN TITLE, GENERAL NOTES, ROADWAY STANDARD DRAWINGS, AND INDEX
PMP - 2	PAVEMENT MARKING PLAN

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 ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKERS
-L- SR 1509 (ODELL LITTLETON RD)	THERMOPLASTIC	N/A

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

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

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

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

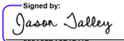
PLANS PREPARED FOR NCDOT DIVISION 5

LISA B. GILCHRIST, E.I. NCDOT CONTACT

PLANS PREPARED BY: H.W. LOCHNER, INC.

JASON TALLEY, P.E. SIGNING & DELINEATION

KEVIN KIM SIGNING & DELINEATION PROJECT DESIGN ENGINEER

APPROVED 

DATE 9/26/2025

SEAL 

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

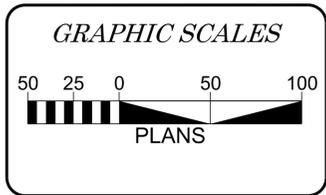
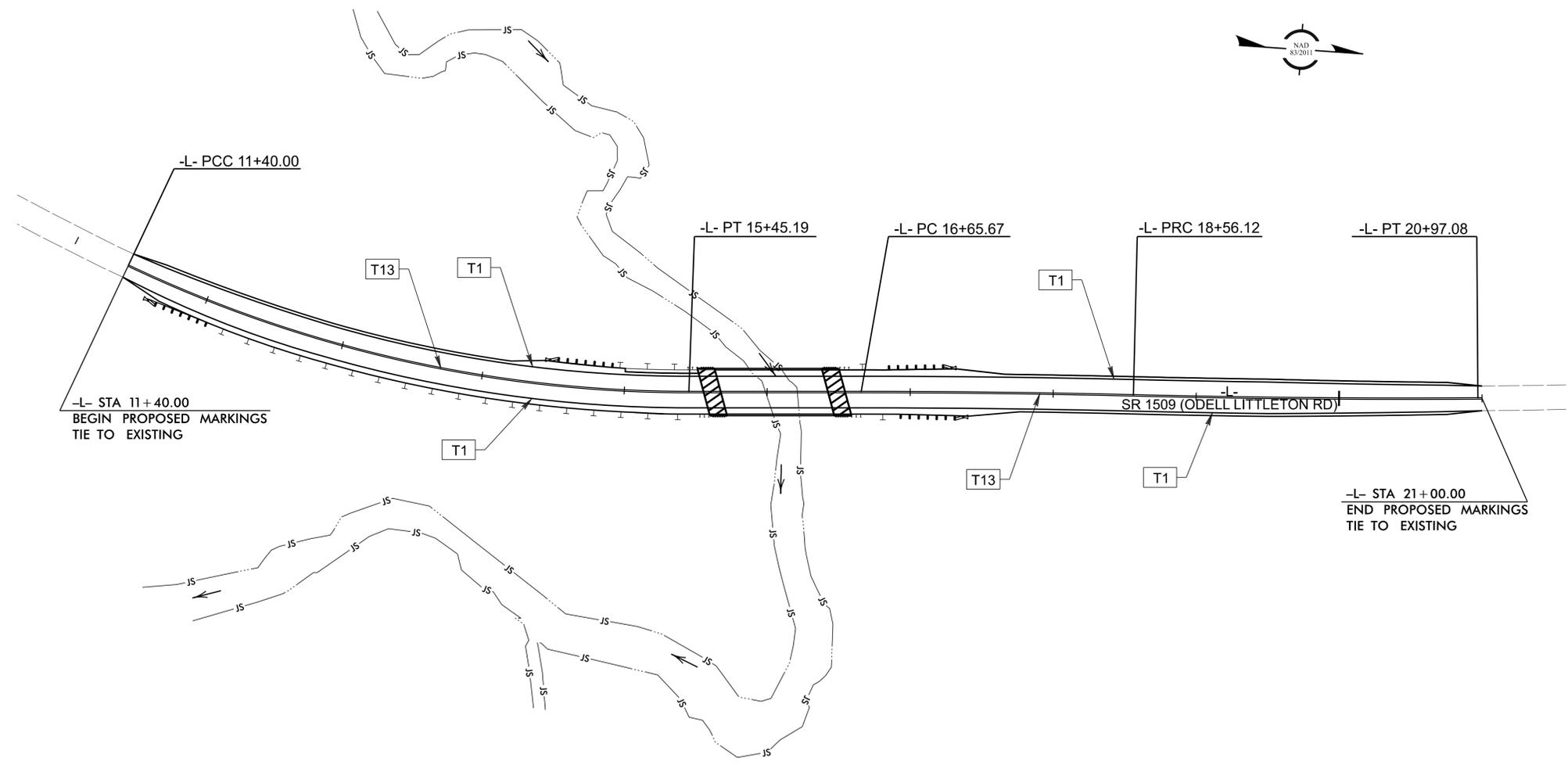


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NC LICENSE NUMBER F-0159

PAVEMENT MARKING SCHEDULE

- T1** THERMOPLASTIC 4" WHITE EDGELINE (90 MIL)
- T13** THERMOPLASTIC 4" YELLOW DOUBLE CENTER (90 MIL)

PAVEMENT MARKING PLAN

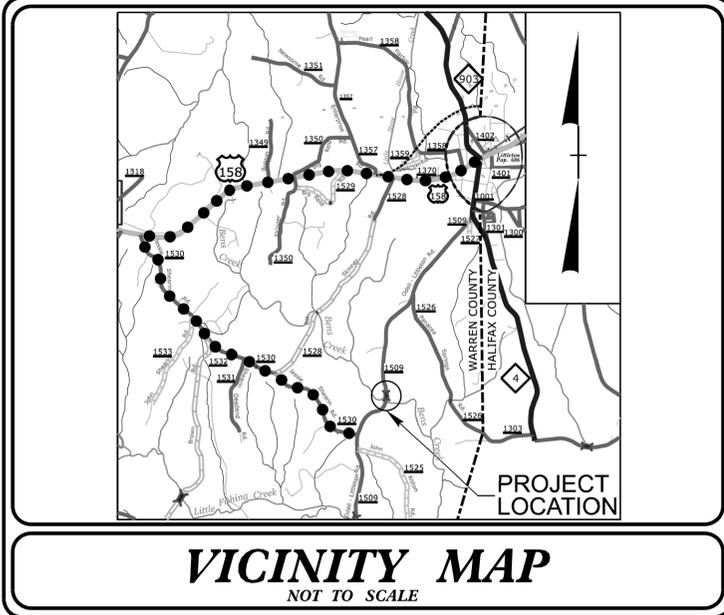


APPROVED *Jason Talley*
 DATE 9/26/2025
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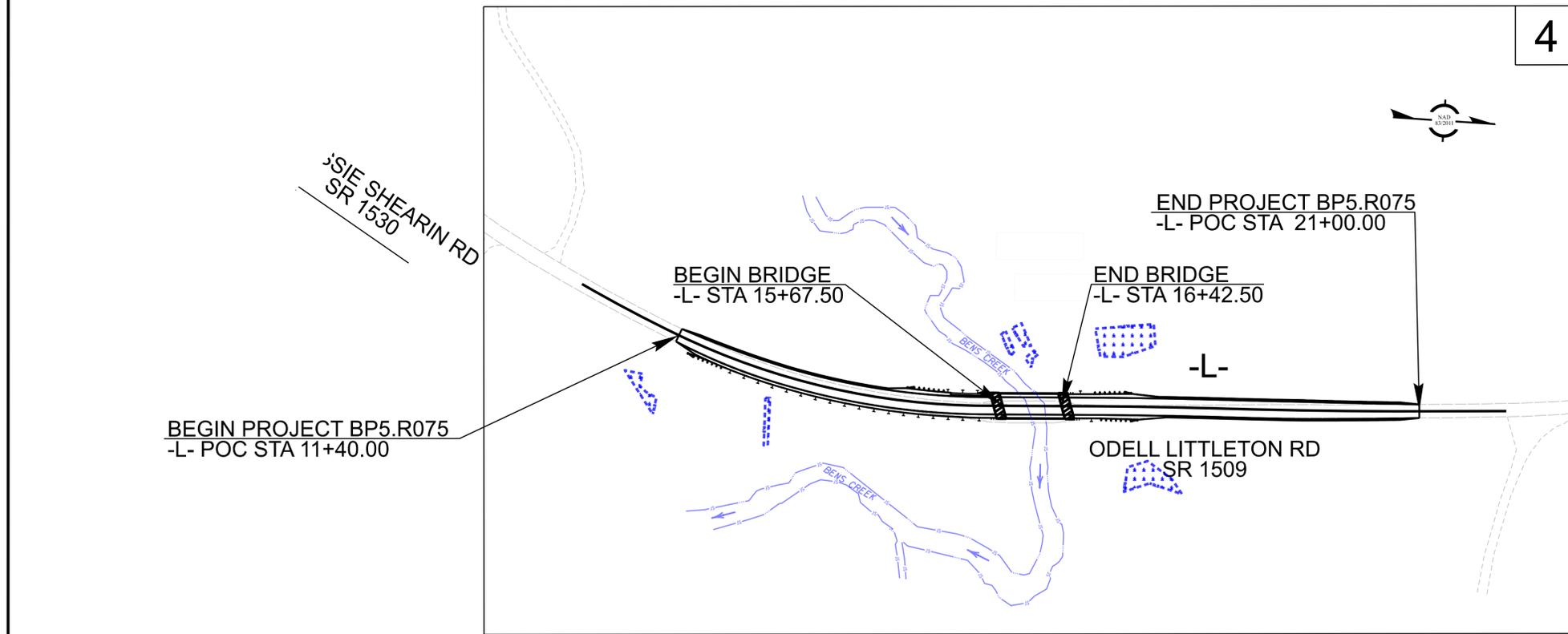
TIP PROJECT: BP5.R075



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

LOCATION: *REPLACE BRIDGE NO. 16 OVER
BENS CREEK ON ODELL
LITTLETON ROAD (SR 1509)*
TYPE OF WORK: *GRADING, PAVING,
DRAINAGE, AND STRUCTURE*

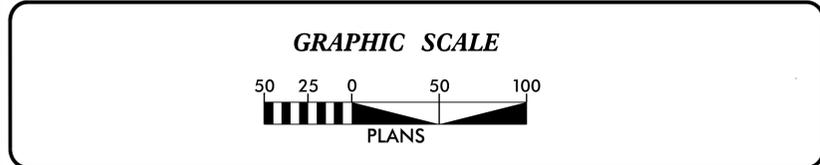
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
BP5.R075.1	N/A	PE	
BP5.R075.2	N/A	R/W	
BP5.R075.3	N/A	CONST.	



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.



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL STORMWATER CONSTRUCTION PERMIT ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENERGY, MINERAL AND LAND 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. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Designed by:

Reid Robol, PE 3409
NAME LEVEL III CERTIFICATION NO.

Roadway Standard Drawings

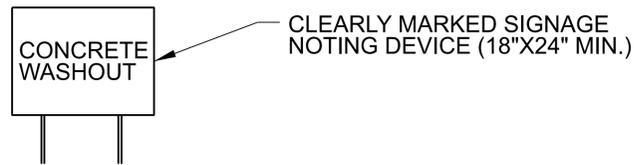
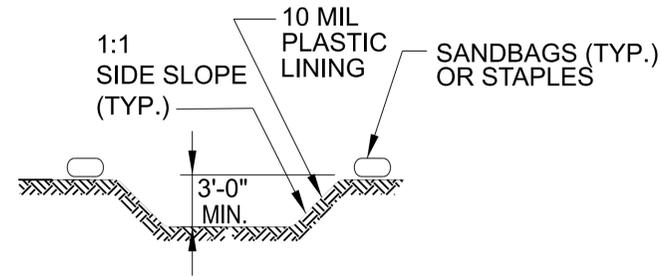
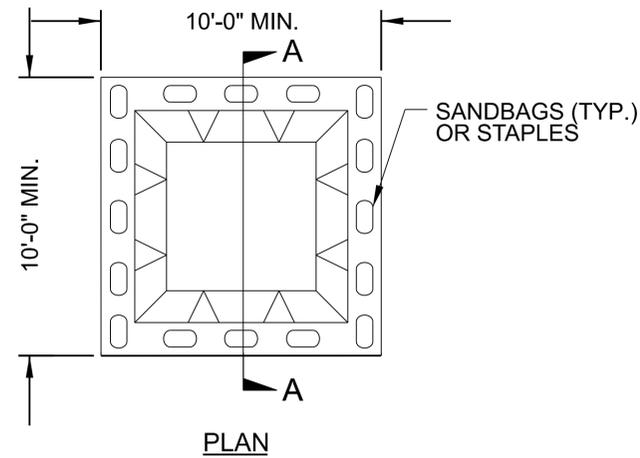
The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

EROSION & SEDIMENT CONTROL LEGEND

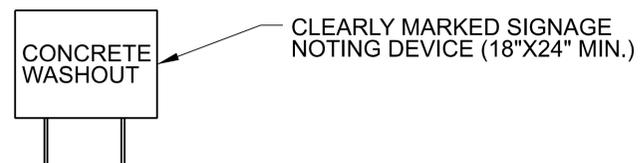
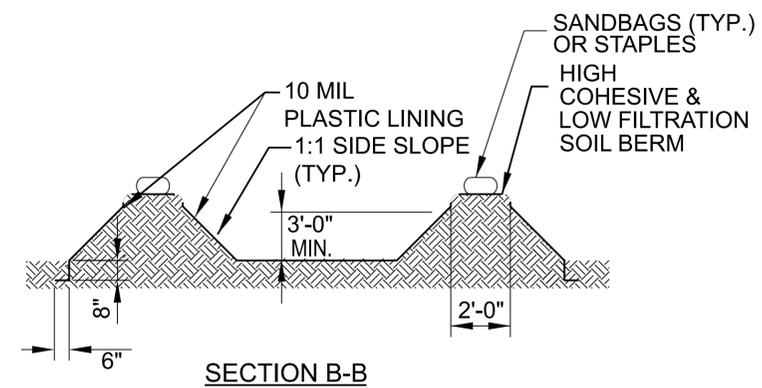
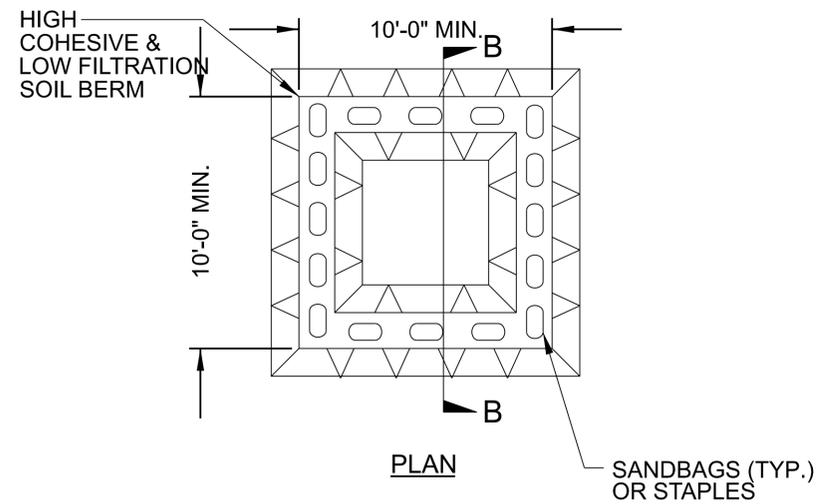
Std. #	Description	Symbol	Std. #	Description	Symbol
1605.01	Temporary Silt Fence		1633.01	Temporary Rock Silt Check Type A	
1606.01	Special Sediment Control Fence		1633.02	Temporary Rock Silt Check Type B	
1622.01	Temporary Berms and Slope Drains		1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1630.02	Silt Basin Type B		1634.01	Temporary Rock Sediment Dam Type A	
1630.03	Temporary Silt Ditch		1634.02	Temporary Rock Sediment Dam Type B	
1630.04	Stilling Basin		1635.01	Rock Pipe Inlet Sediment Trap Type A	
1630.05	Temporary Diversion		1635.02	Rock Pipe Inlet Sediment Trap Type B	
1630.06	Special Stilling Basin		1636.01	Excelsior Wattle Check	
1630.07	Skimmer Basin		1636.01	Excelsior Wattle Check with Flocculant	
1630.08	Tiered Skimmer Basin		1636.01	Coir Fiber Wattle Check	
1630.09	Earthen Dam with Skimmer		1636.01	Coir Fiber Wattle Check with Flocculant	
	Infiltration Basin		1636.02	Silt Fence Excelsior Wattle Break	
	Rock Inlet Sediment Trap:			Silt Fence Coir Fiber Wattle Break	
1632.01	Type A		1636.02	Silt Fence Excelsior Wattle Break	
1632.02	Type B			Silt Fence Coir Fiber Wattle Break	
1632.03	Type C		1636.03	Excelsior Wattle Barrier	
			1636.03	Coir Fiber Wattle Barrier	

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



BELOW GRADE WASHOUT STRUCTURE
NOT TO SCALE

- 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 CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.



ABOVE GRADE WASHOUT STRUCTURE
NOT TO SCALE

- 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 CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

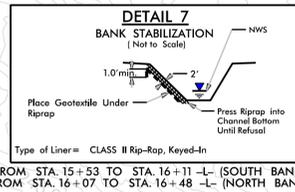
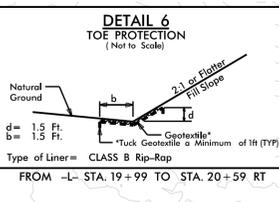
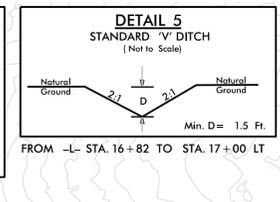
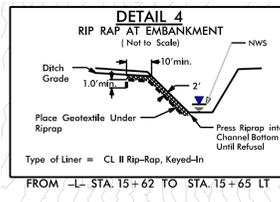
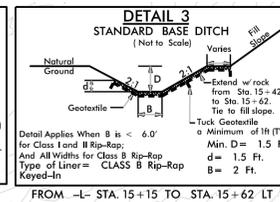
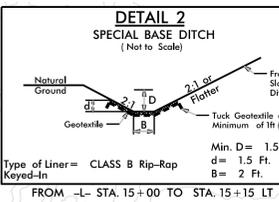
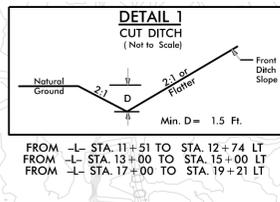
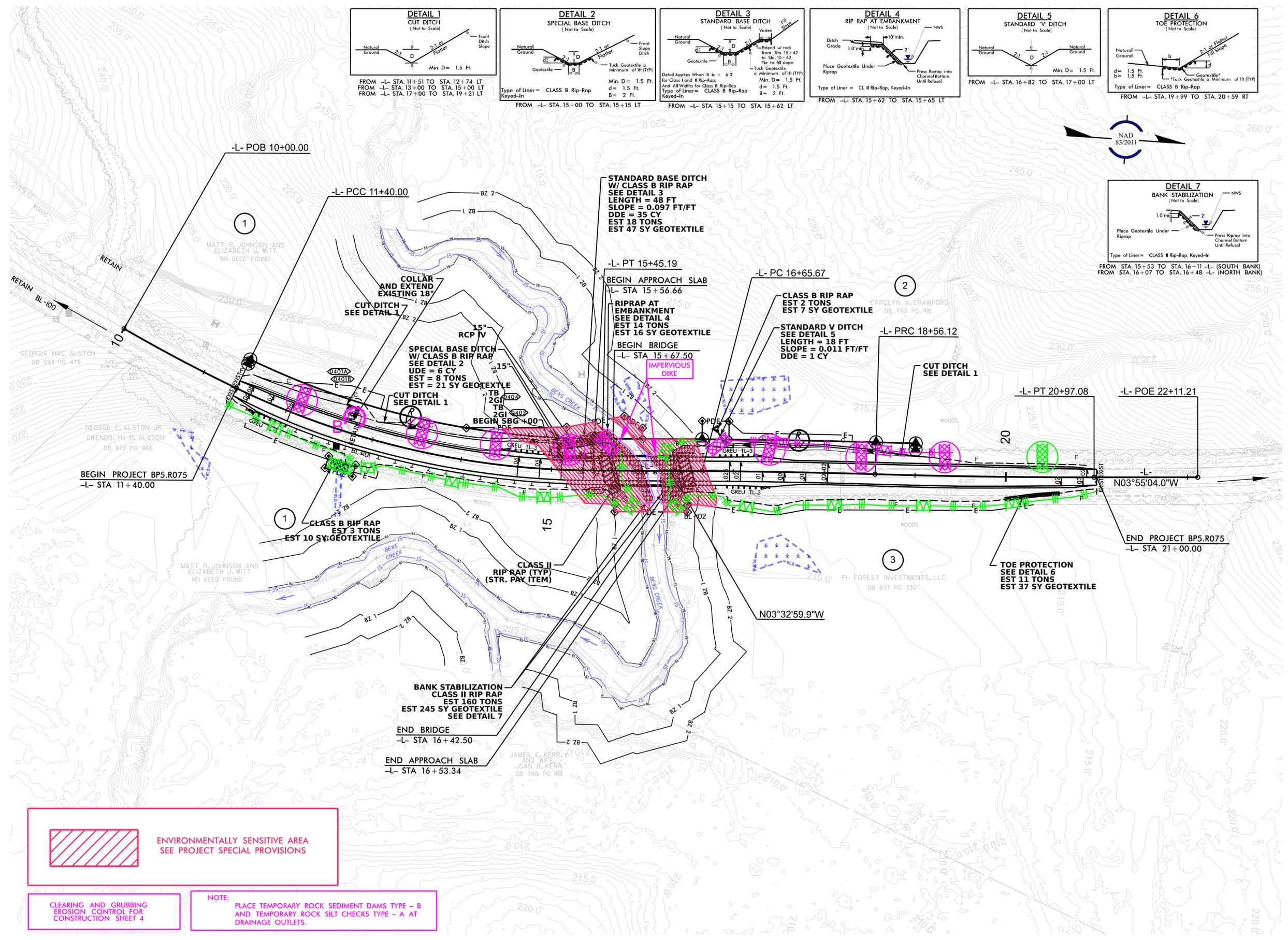
***CONSERVATION MEASURES
FOR AQUATIC SPECIES***

Embankment construction and grading shall be managed in such a manner as to prevent surface runoff/drainage from discharging untreated into the riparian buffer. All interim surfaces will be graded to drain to temporary erosion control devices. Temporary berms, ditches, etc. will be incorporated, as necessary, to treat runoff before discharging into the riparian buffer (as specified in NCDOT BMP manuals).

All sedimentation and erosion control measures will be appropriately maintained following NCDOT standards to ensure proper function of the measures. The NCDOT adheres to the permit conditions of General Permit NCG 010000 to Discharge Stormwater under the National Pollutant Discharge Elimination System for Construction Activities. NCDOT is required to “select, install, implement and maintain best management practices (BMPs) and control measures that minimize pollutants in the discharge to meet the requirements of this permit.” Among other conditions, the permit requires: 1) all erosion and sedimentation control measures must be inspected at least once every seven calendar days and 2) within 24 hours after any storm event of greater than 1.0 inch of rain per 24 hour period. It is understood that these requirements and implementation of other appropriate BMPs are monitored through multiple layers of oversight. At a minimum, the following personnel monitor erosion control measures:

- Contractor project manager
- NCDOT Division Environmental Officers and Environmental Specialists
- NCDOT Roadside Environmental Field Operations staff

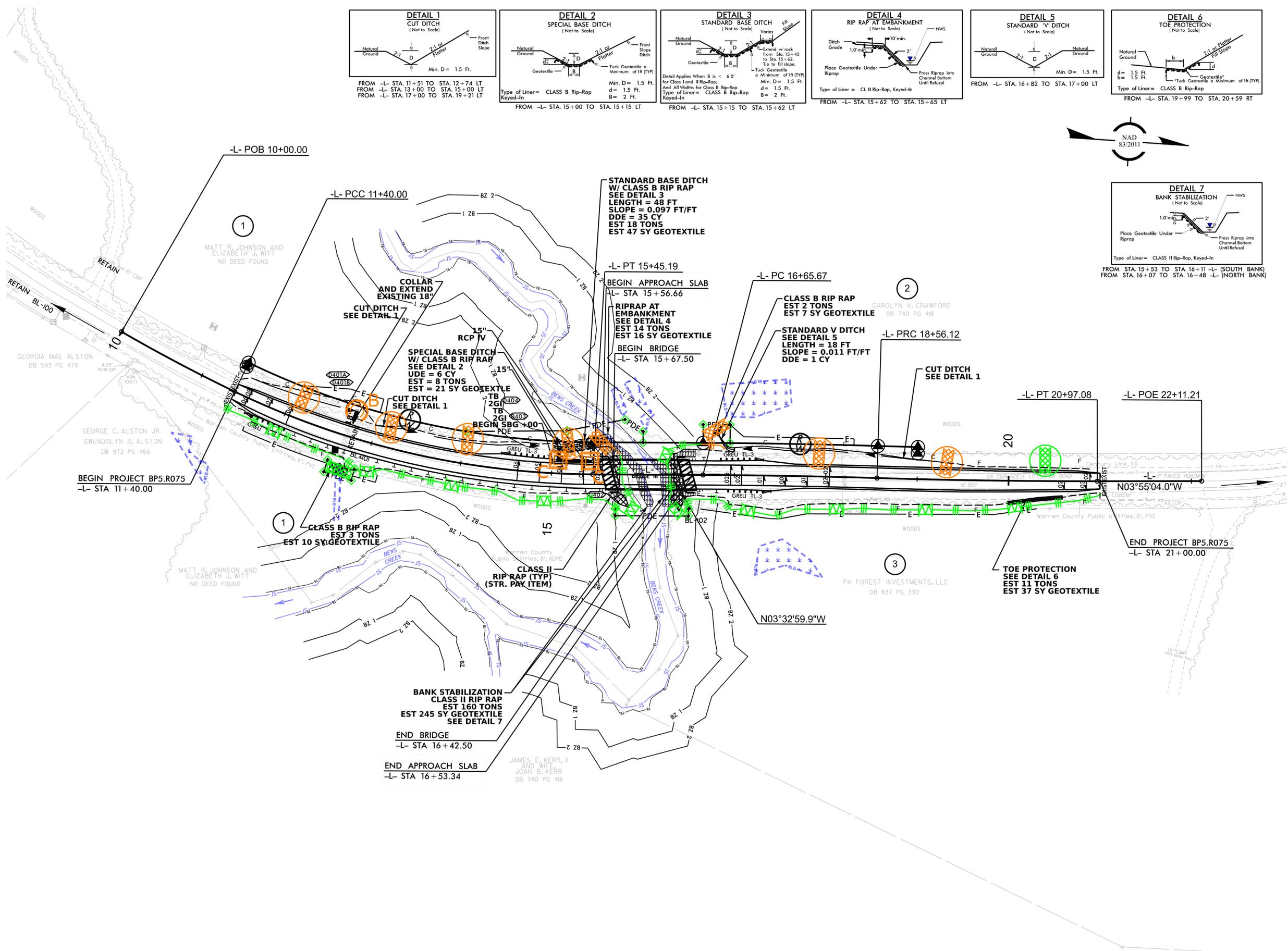
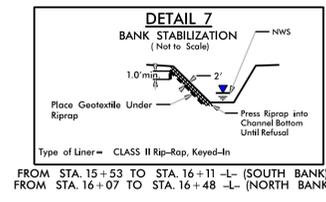
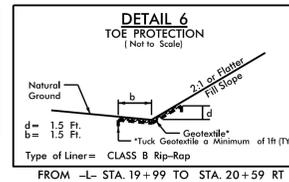
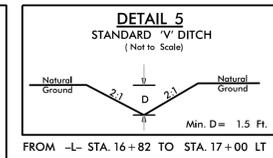
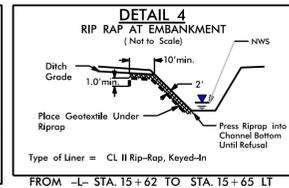
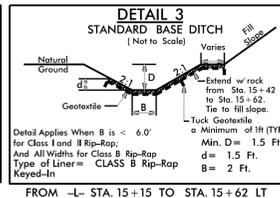
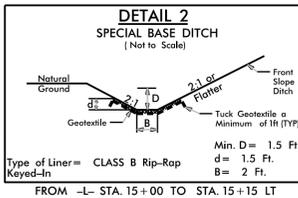
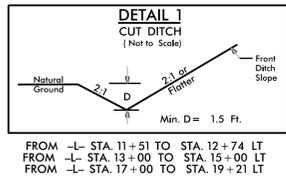
In the event of any visible sediment loss from any individual project site, a review of turbidity levels will be made upstream and downstream 400 meters (0.25 mile) to determine if sedimentation effects are occurring beyond 400 meters downstream. If visual observation of turbidity levels downstream appear to be elevated beyond upstream observations, the project inspector will contact the Division Environmental Officer. If determined that project-related sedimentation is occurring beyond 400 meters, the Service must be contacted immediately to discuss potential remediation.



 ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

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

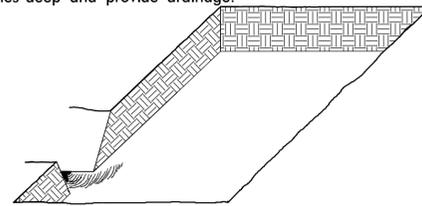


PLANTING DETAILS

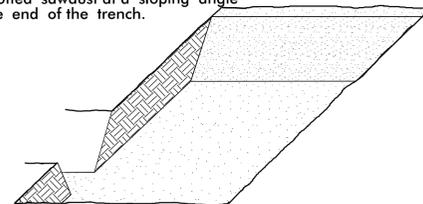
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

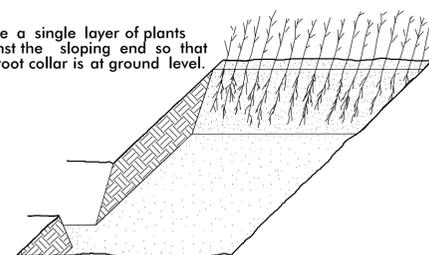
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



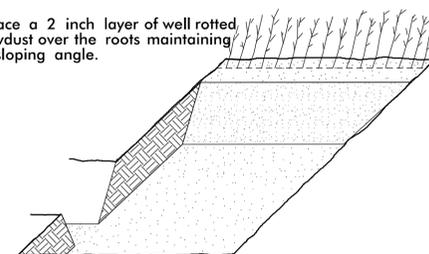
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

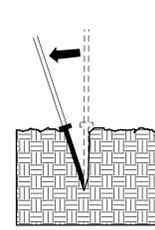


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

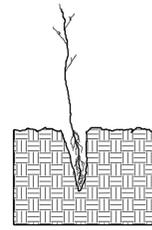


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

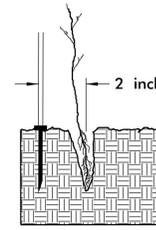
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



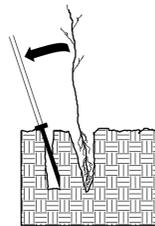
1. Insert planting bar as shown and pull handle toward planter.



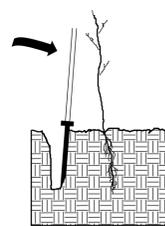
2. Remove planting bar and place seedling at correct depth.



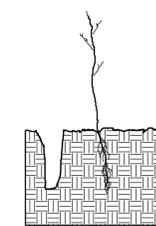
3. Insert planting bar 2 inches toward planter from seedling.



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

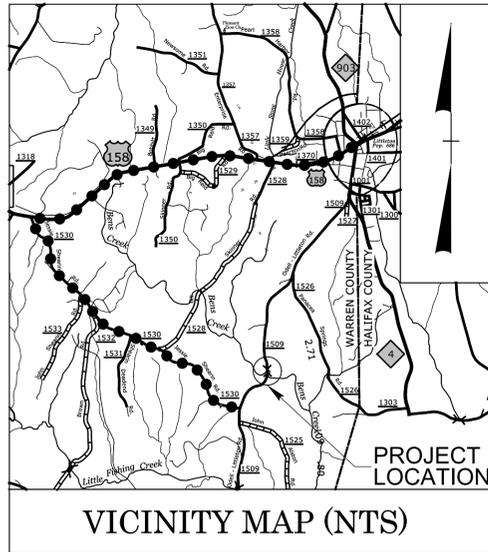
MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

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

TIP PROJECT: BP5.R075



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

**UTILITIES BY OTHERS PLANS
WARREN COUNTY**

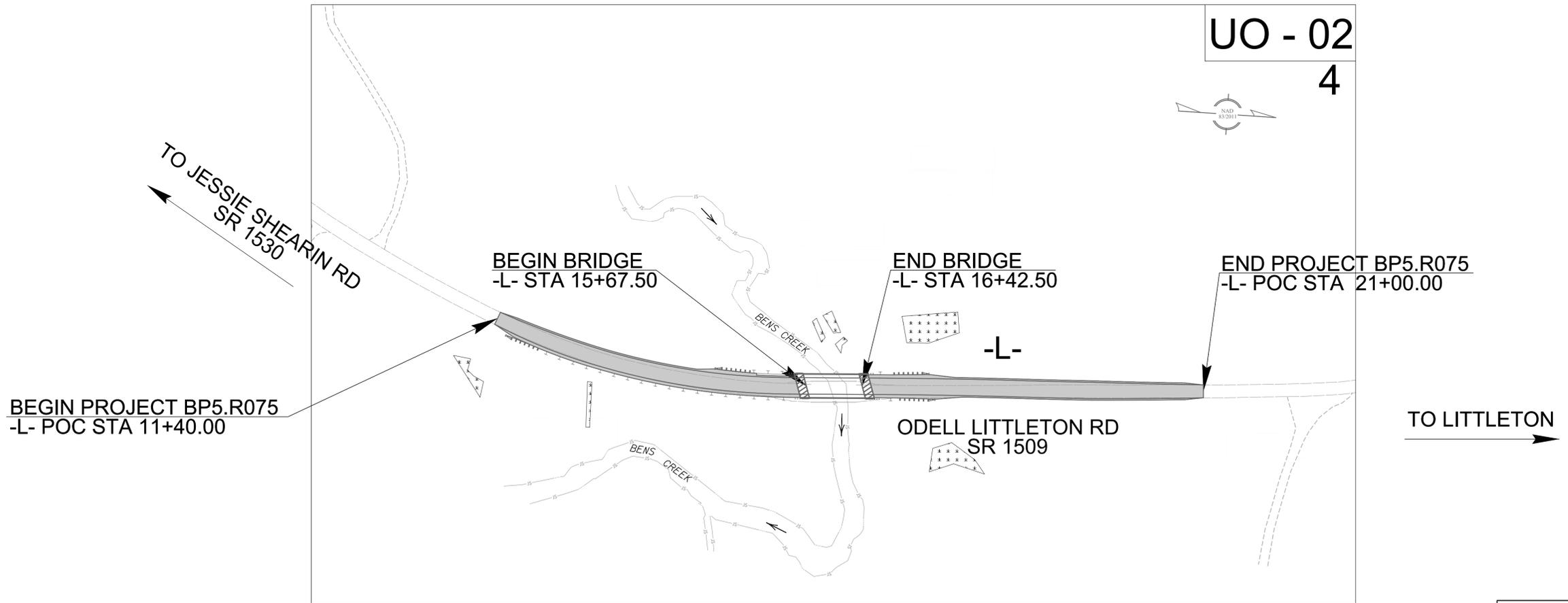
**LOCATION: REPLACE BRIDGE NO.16 OVER
BENS CREEK ON ODELL LITTLETON ROAD (SR 1509)**

TYPE OF WORK: RELOCATION OF COMMUNICATION CABLES

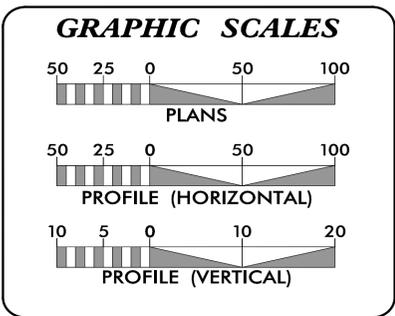
T.I.P. NO.	SHEET NO.
BP5.R075	UO-1

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.

●●●●● OFF-SITE DETOUR



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



INDEX OF SHEETS

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

UTILITY OWNERS WITH CONFLICTS

(A) PHONE - BRIGHTSPEED
(B) WATER - WARREN COUNTY

PREPARED IN THE OFFICE OF:

Wooten

120 North Boylan Avenue • Raleigh, NC 27603-1423
(919) 828-0531 • thewootencompany.com
License Number: F-0115

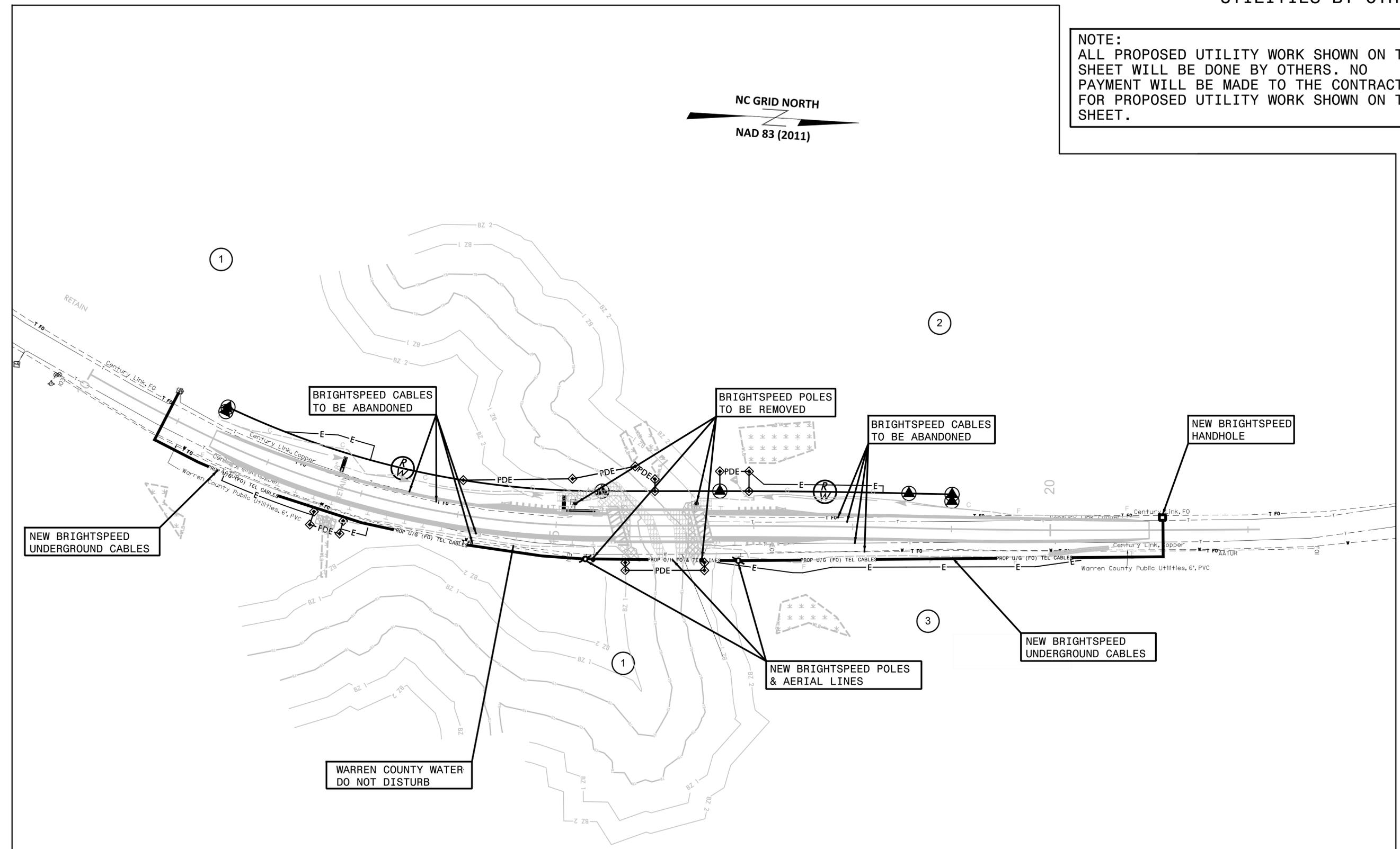
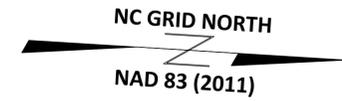
WEBB WHITE UTILITY PROJECT MANAGER
TOMMY MARTIN PROJECT UTILITY COORDINATOR

DIVISION OF HIGHWAYS
DIVISION 5
2612 N. DUKE STREET
DURHAM NC 27704

LISA GILCHRIST, EI BRIDGE PROGRAM MANAGER

UTILITIES BY OTHERS

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



NEW BRIGHTSPEED UNDERGROUND CABLES

BRIGHTSPEED CABLES TO BE ABANDONED

BRIGHTSPEED POLES TO BE REMOVED

BRIGHTSPEED CABLES TO BE ABANDONED

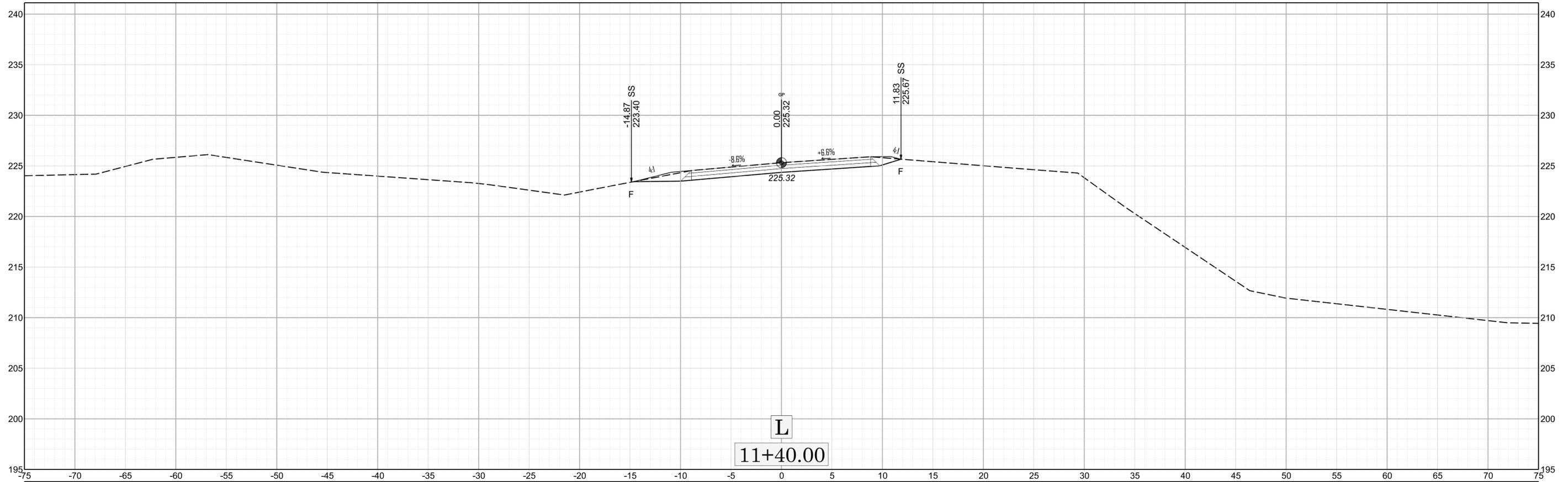
NEW BRIGHTSPEED HANDHOLE

NEW BRIGHTSPEED POLES & AERIAL LINES

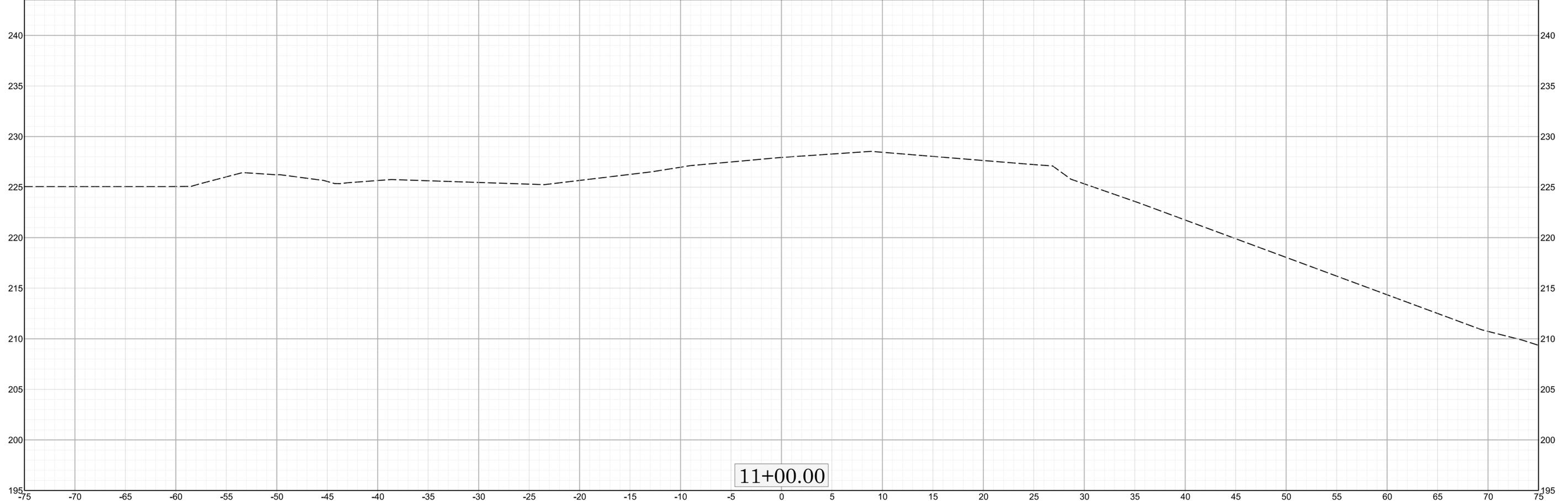
NEW BRIGHTSPEED UNDERGROUND CABLES

WARREN COUNTY WATER DO NOT DISTURB

CONTRACTORS ATTENTION IS DIRECTED TO THE LOCATION OF THE WARREN COUNTY WATER LINE. MEASURES SHOULD BE TAKEN TO LIMIT HEAVY EQUIPMENT USE ALONG THE COUNTY'S WATER LINE. CONTACT ERIC ST. SING AT (252) 257-3645, FROM WARREN COUNTY 30 DAYS PRIOR TO BEGINNING WORK ABOVE THEIR FACILITIES TO ALLOW A REPRESENTATIVE FROM THE COUNTY TO BE ON SITE AS NEEDED.

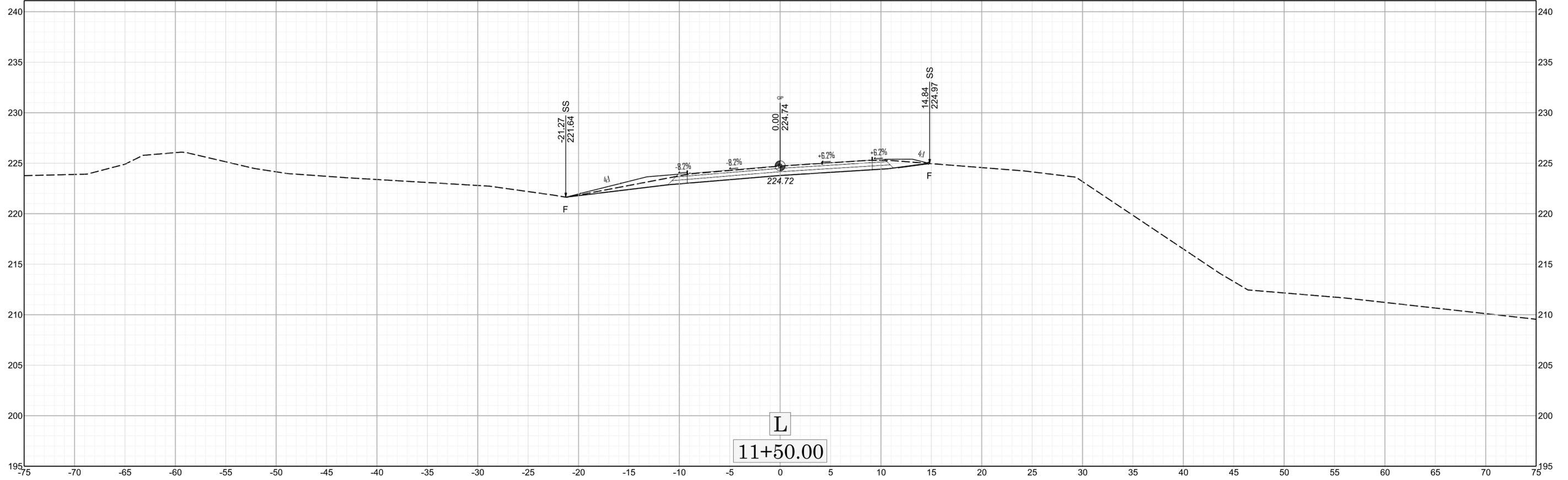
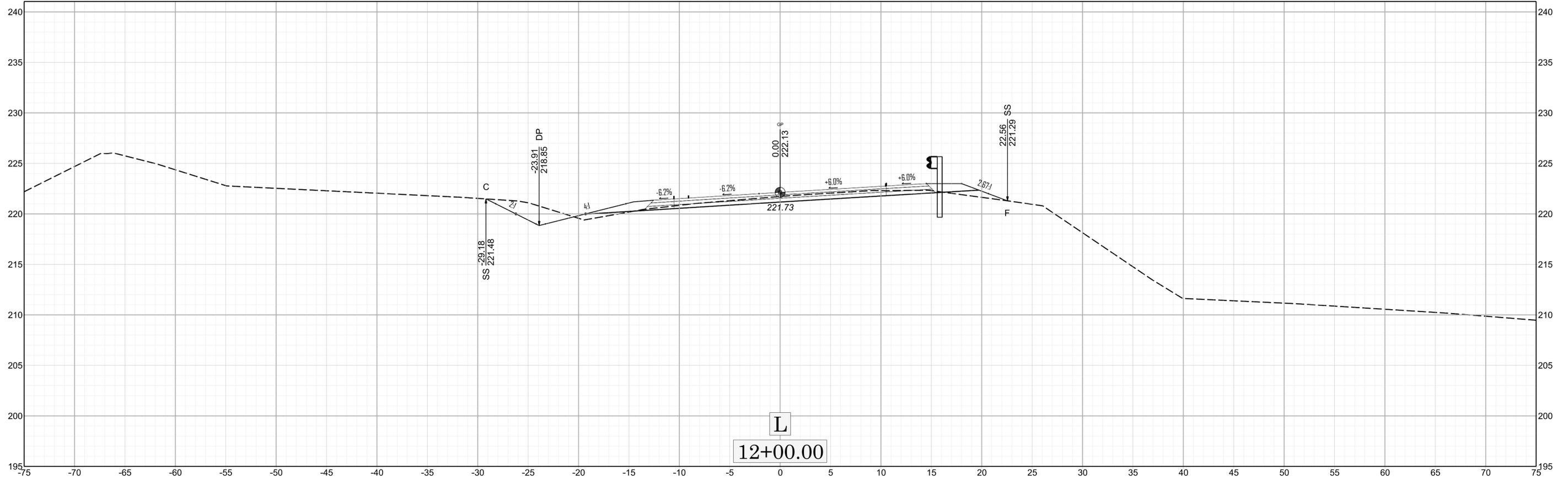


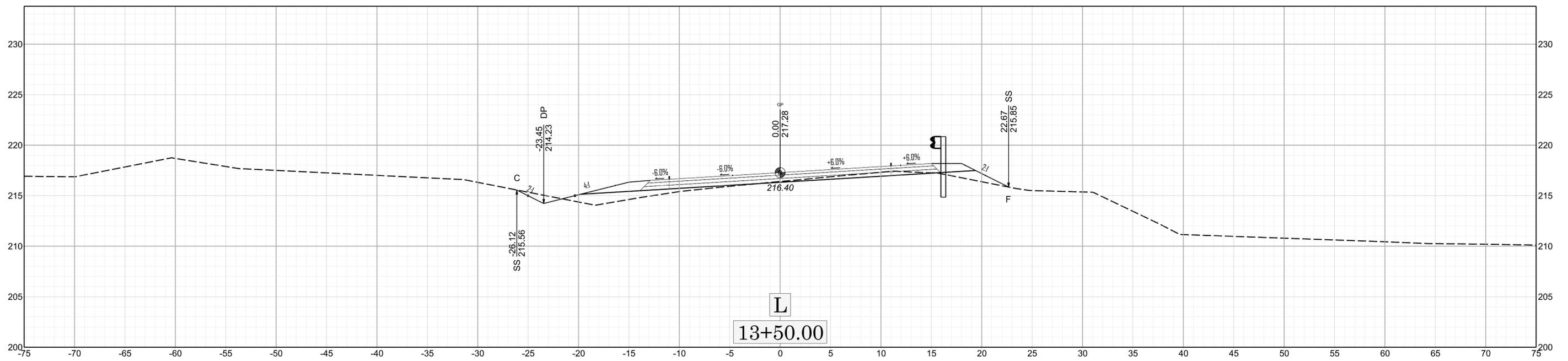
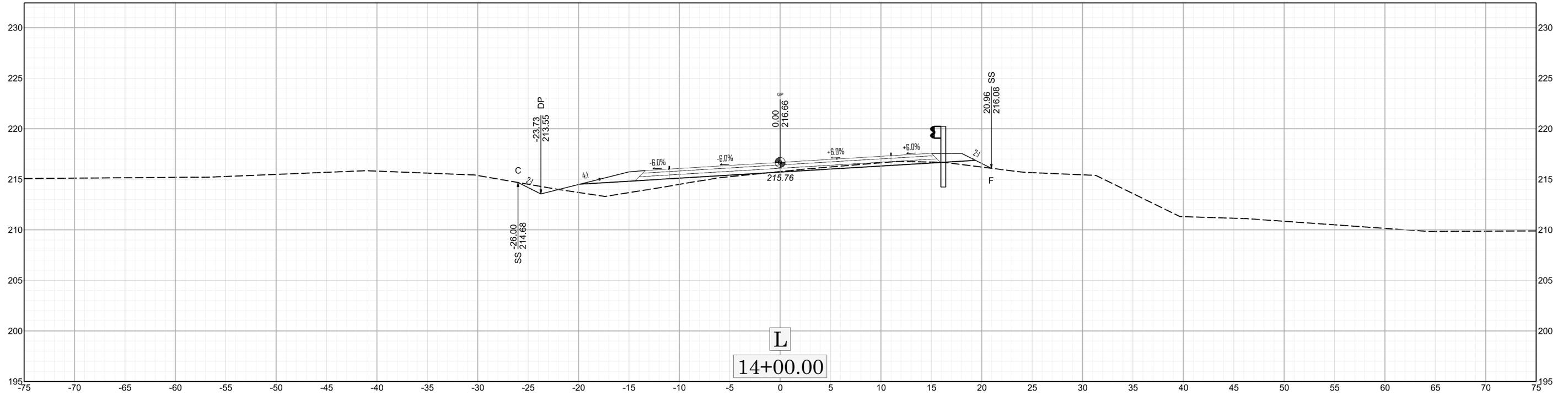
L
11+40.00

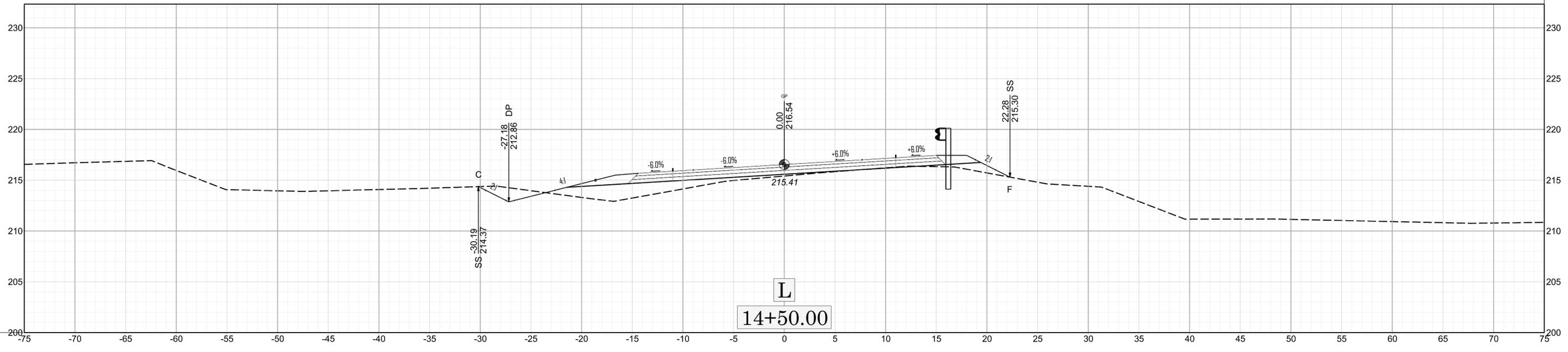
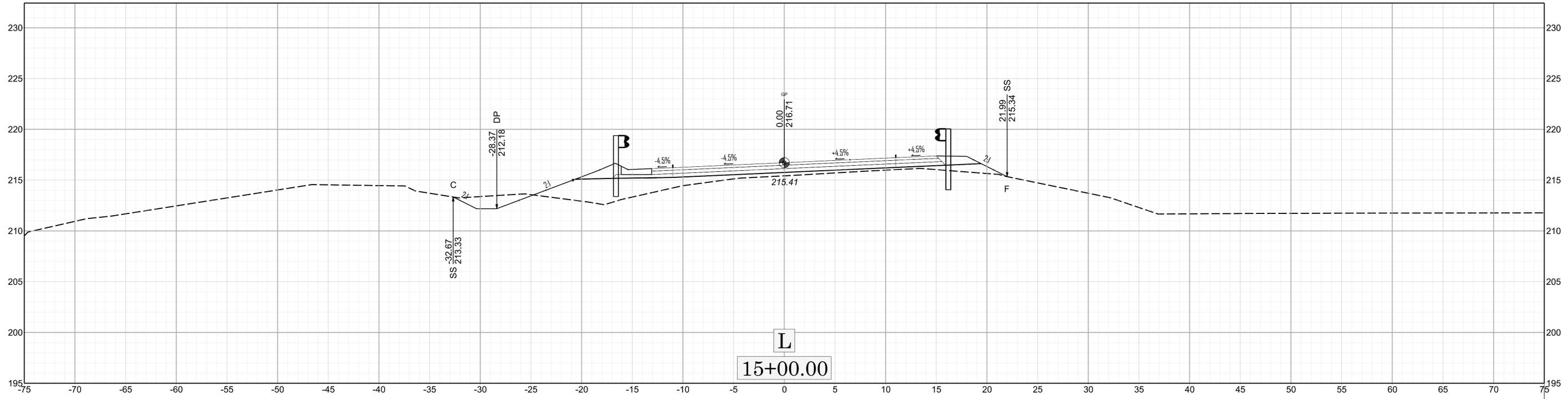


L
11+00.00

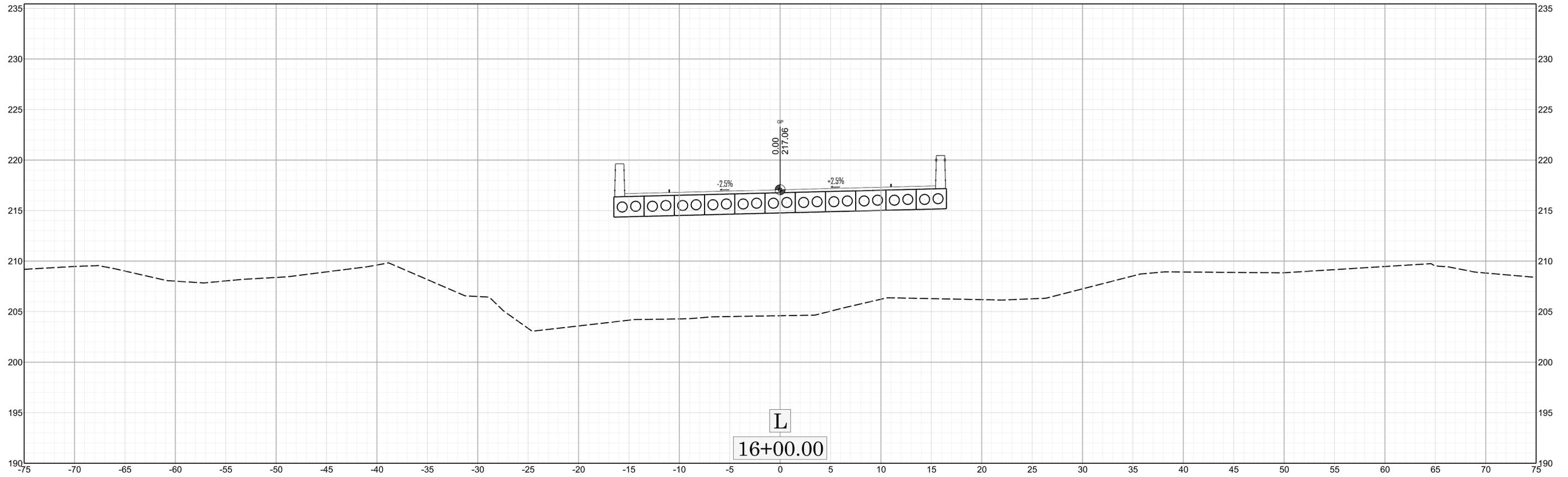
BEGIN PROJECT -L- STA. 11+40.00



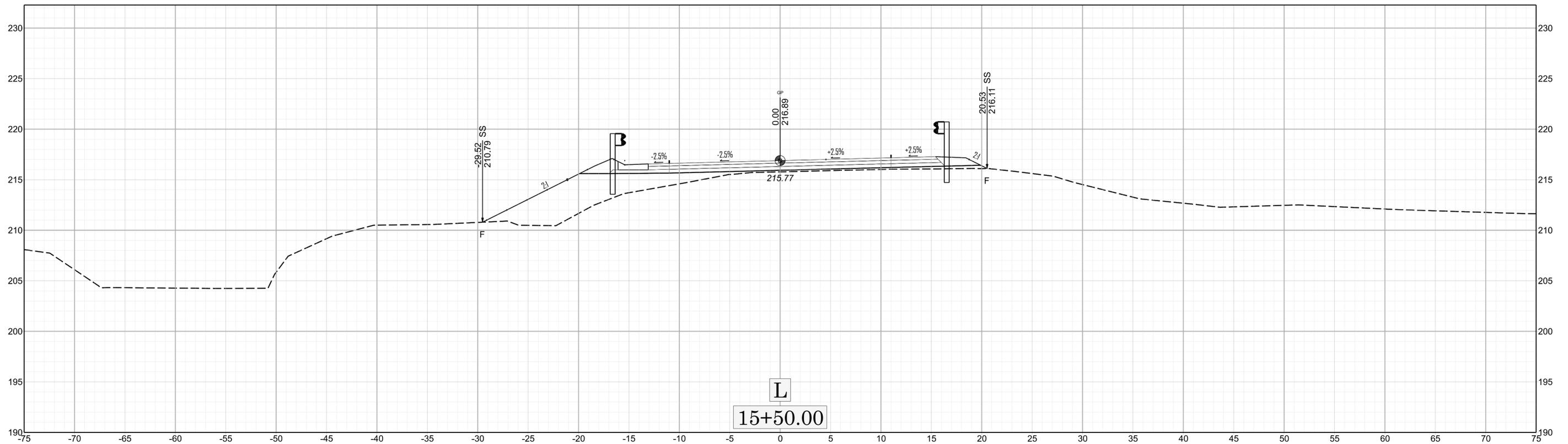


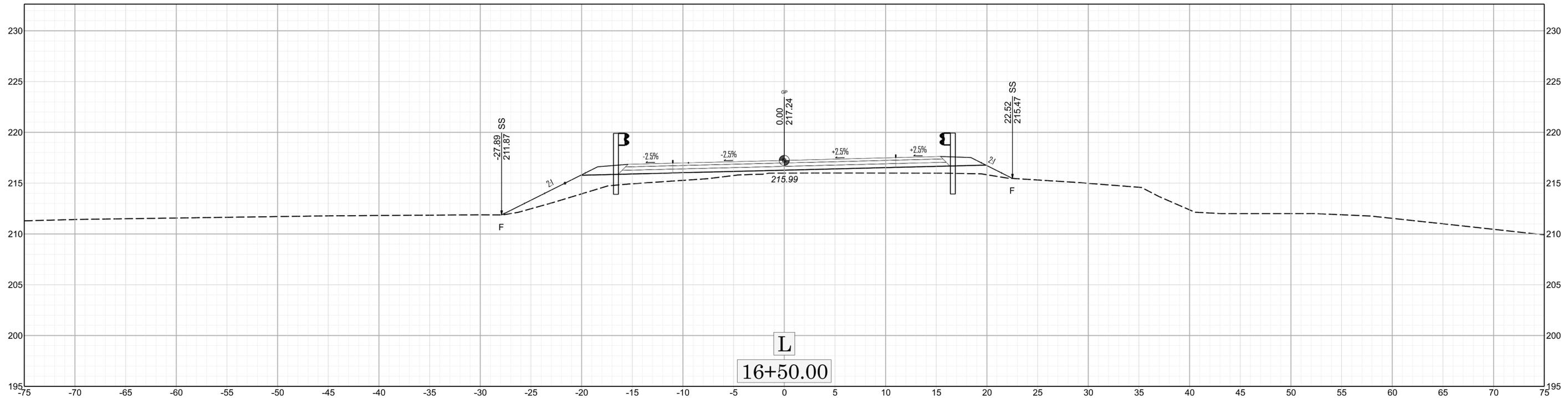
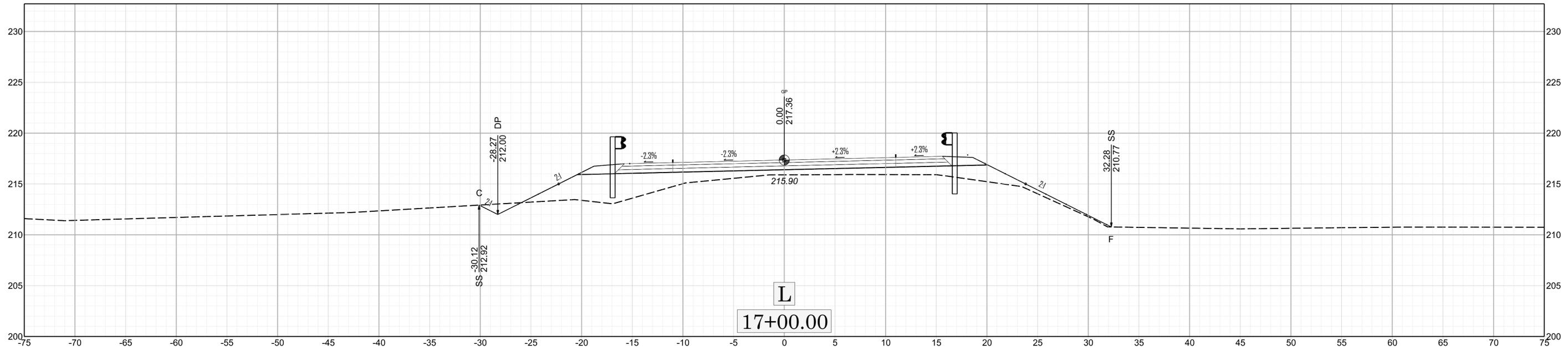


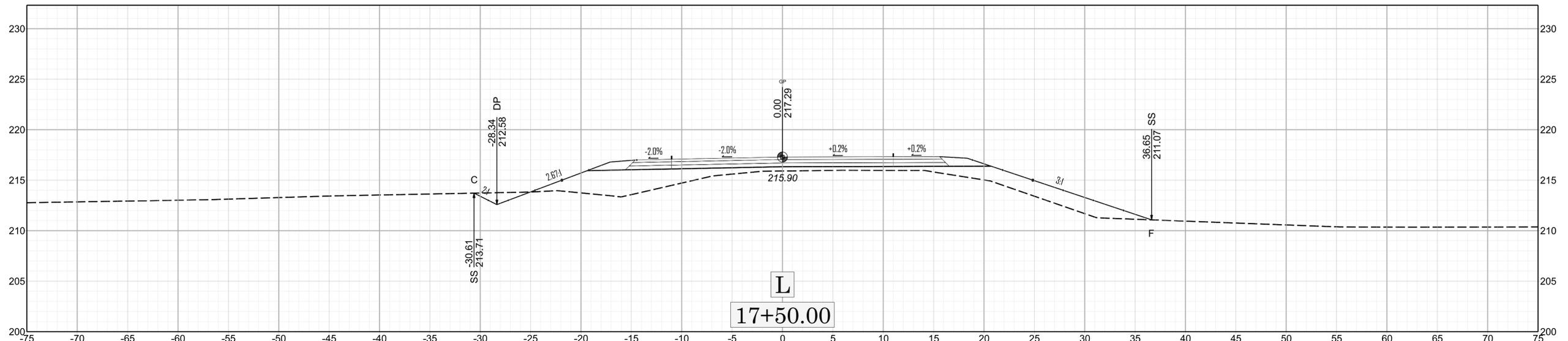
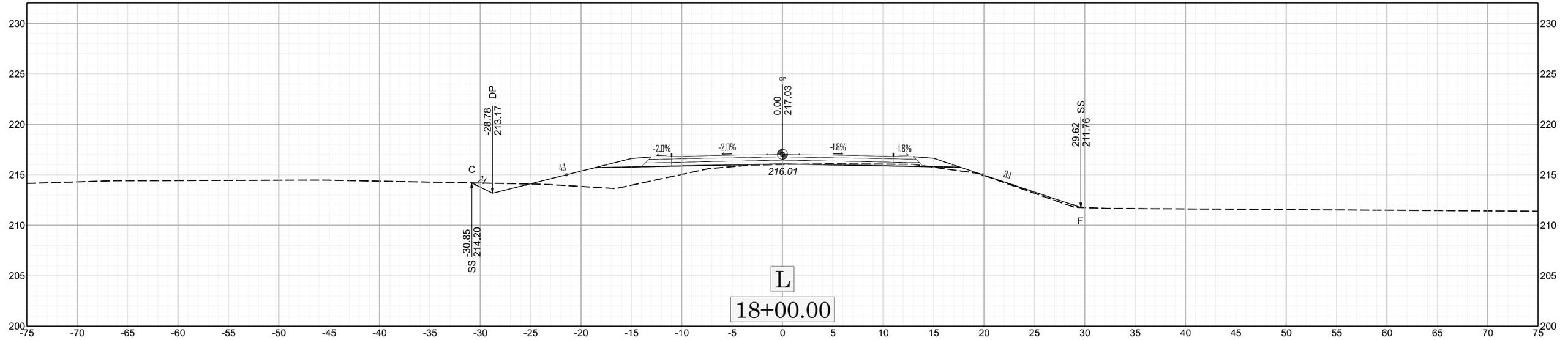
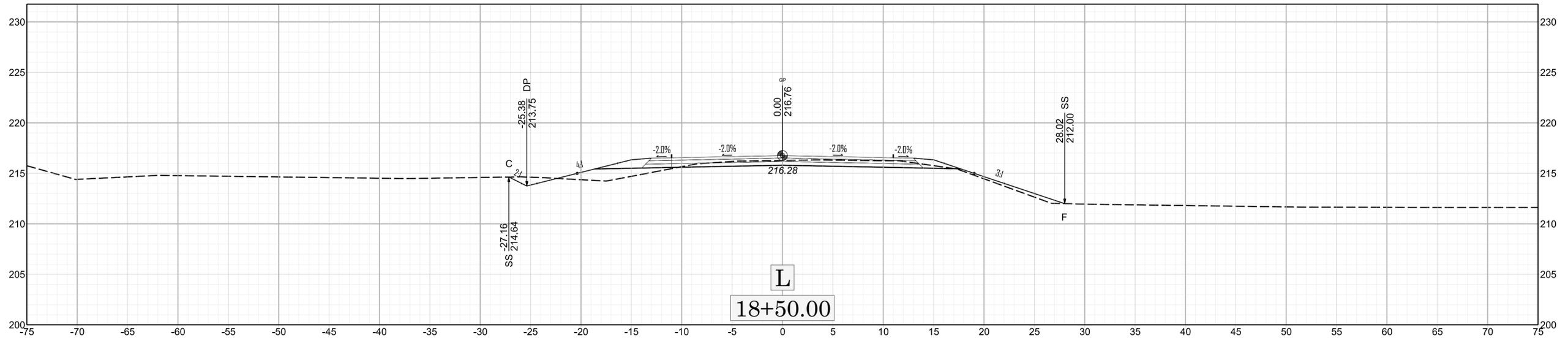
END BRIDGE -L- STA. 16+42 +/-

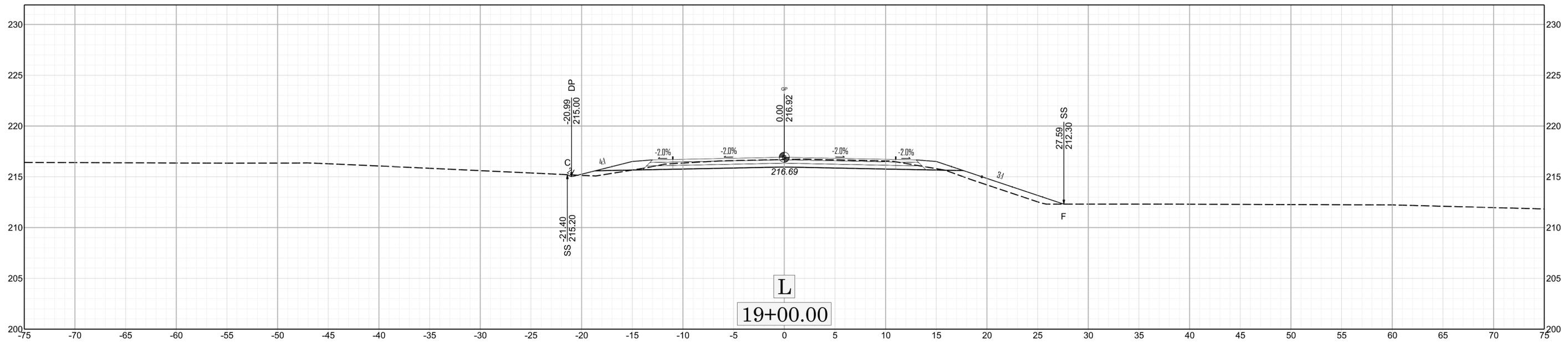
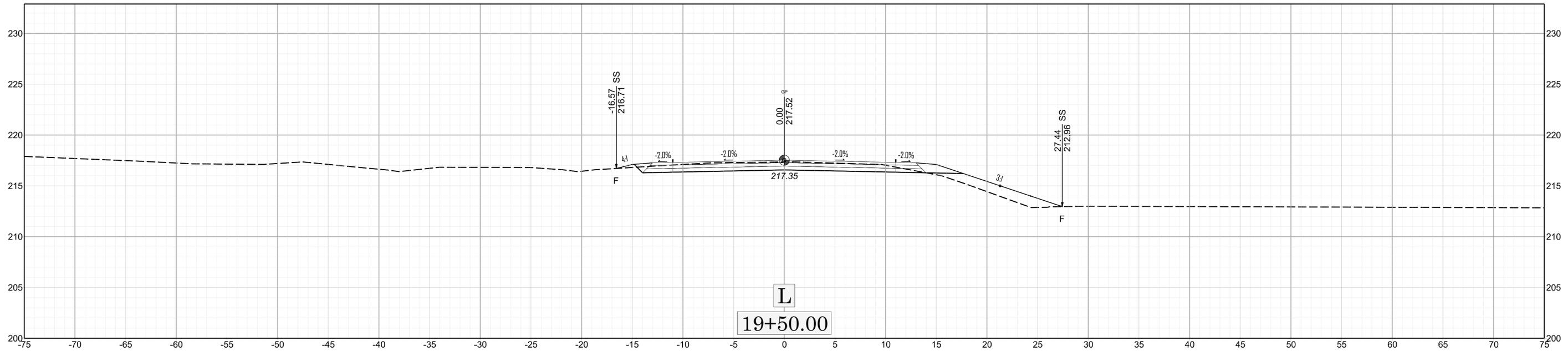


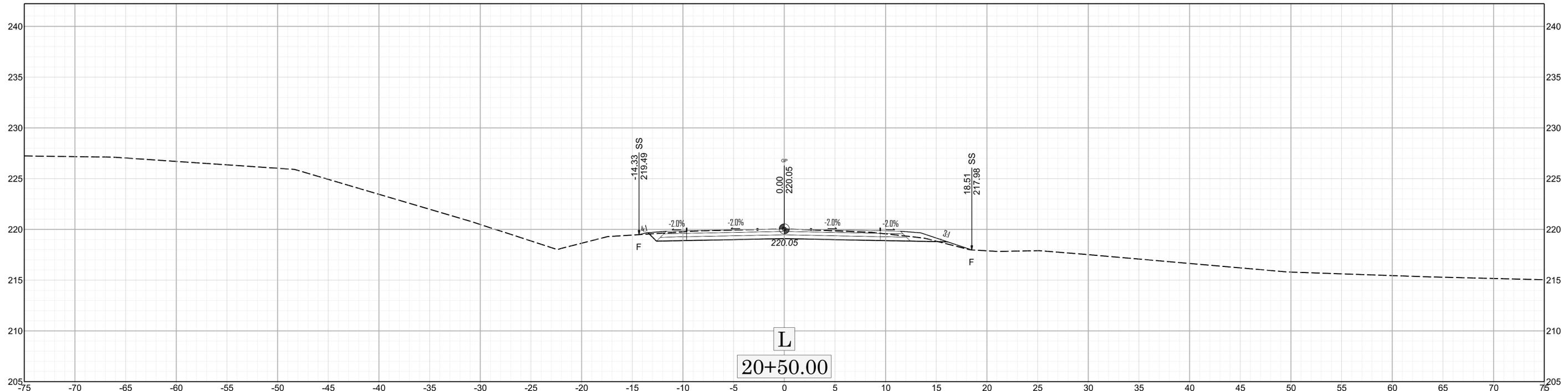
BEGIN BRIDGE -L- STA. 15+67 +/-



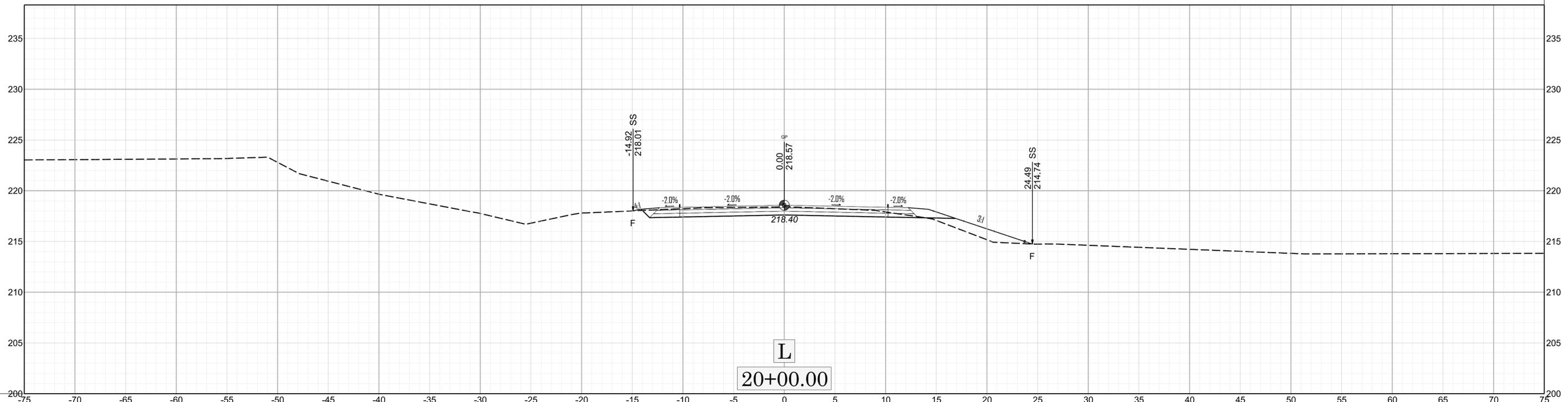




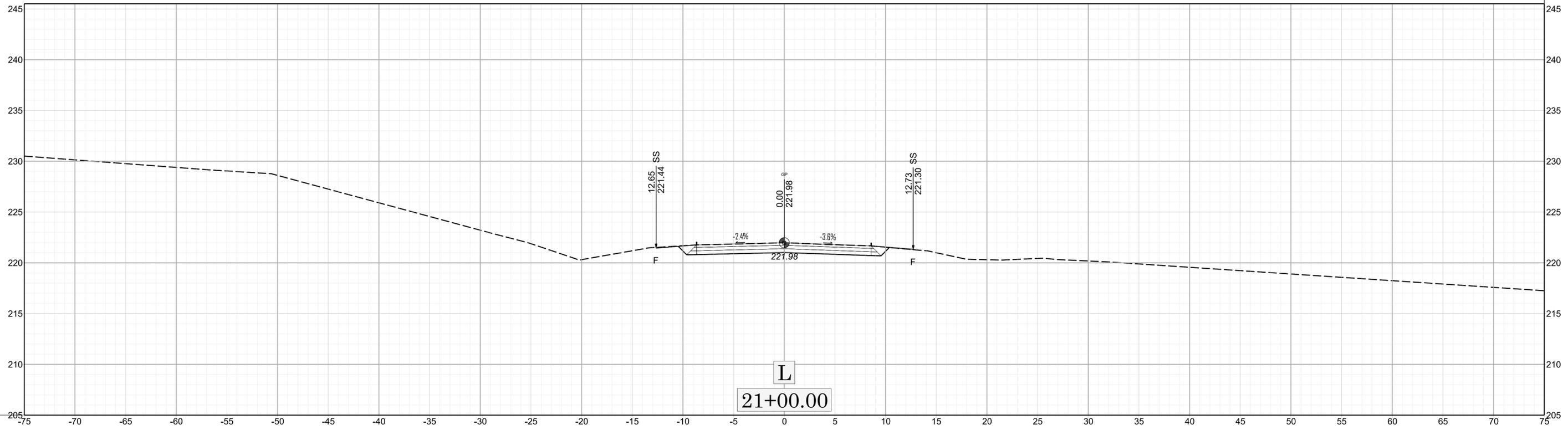
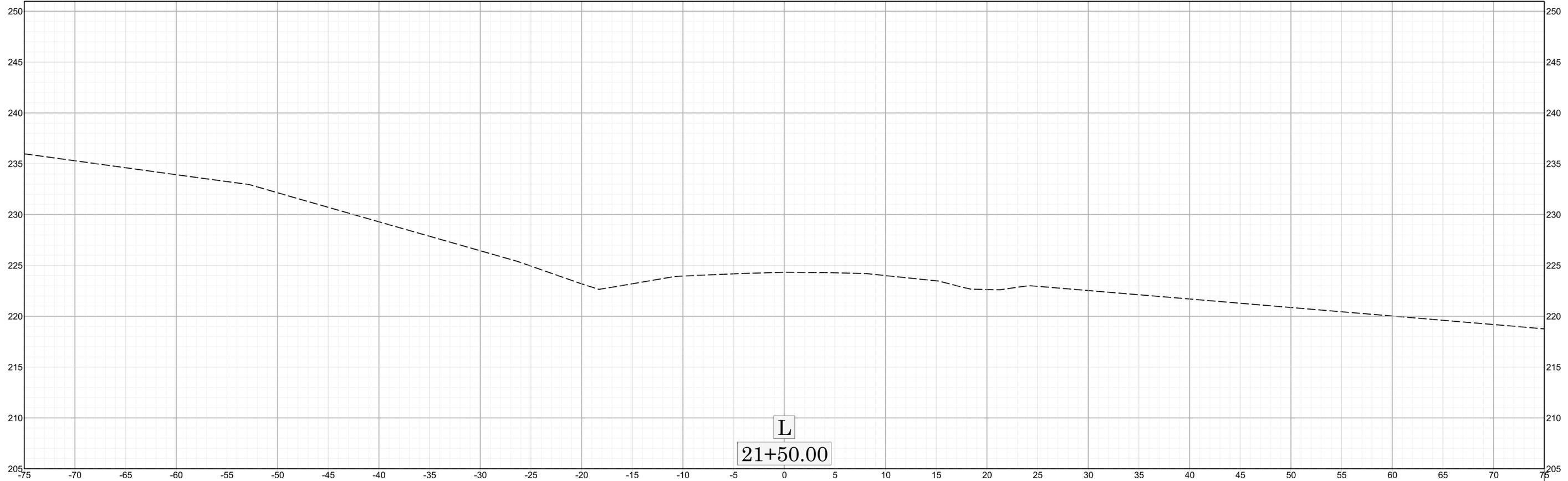




L
20+50.00



L
20+00.00



PROJECT: BP5.R075

CONTRACT: DE00417

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

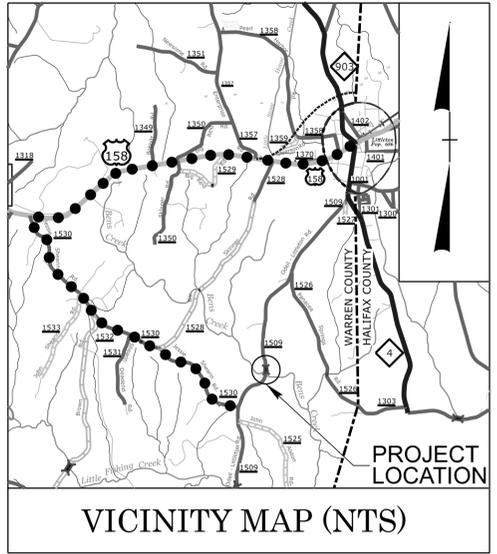
WARREN COUNTY

LOCATION: *REPLACE BRIDGE NO. 16 OVER
BENS CREEK ON ODELL
LITTLETON ROAD (SR 1509)*

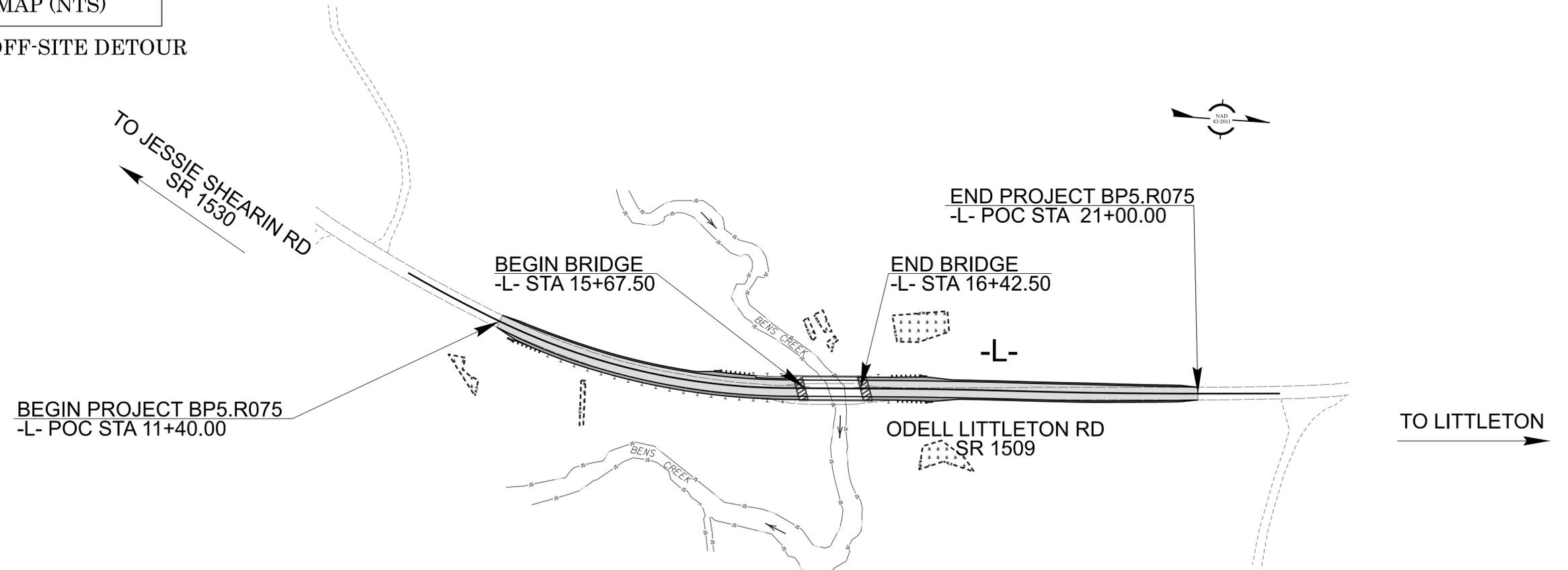
TYPE OF WORK: *GRADING, PAVING,
DRAINAGE, AND STRUCTURE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075		
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
BP5.R075.1	N/A	PE	
BP5.R075.2	N/A	R/W	
BP5.R075.3	N/A	CONST.	

100% Plan Set



●●●●● OFF-SITE DETOUR



STRUCTURES

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA
ADT 2025 = 300
ADT 2045 = 400
V = 50 MPH
FUNC CLASS = LOCAL SUBREGIONAL TIER

PROJECT LENGTH
LENGTH ROADWAY PROJECT BP5.R075 = 0.168 MILES
LENGTH STRUCTURES PROJECT BP5.R075 = 0.014 MILES
TOTAL LENGTH PROJECT BP5.R075 = 0.182 MILES

Prepared in the Office of:

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 271-7111

VHB ENGINEERING INC. P.C. (C-3705)
940 MAIN CAMPUS DRIVE, SUITE 500
RALEIGH, NC 27606

2024 STANDARD SPECIFICATIONS

CHRISTINA Y. FITZGERALD, PE
PROJECT ENGINEER

MARC A. LEBLANC, PE
STRUCTURES DESIGN ENGINEER

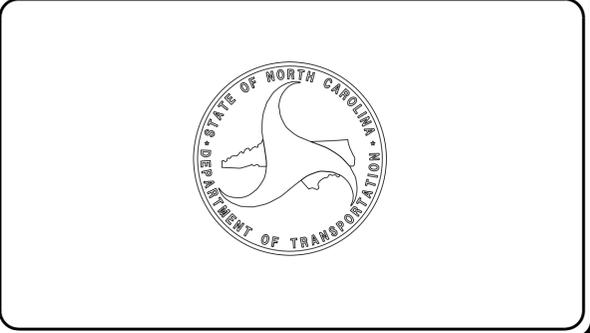
LISA B. GILCHRIST, EI
NCDOT CONTACT

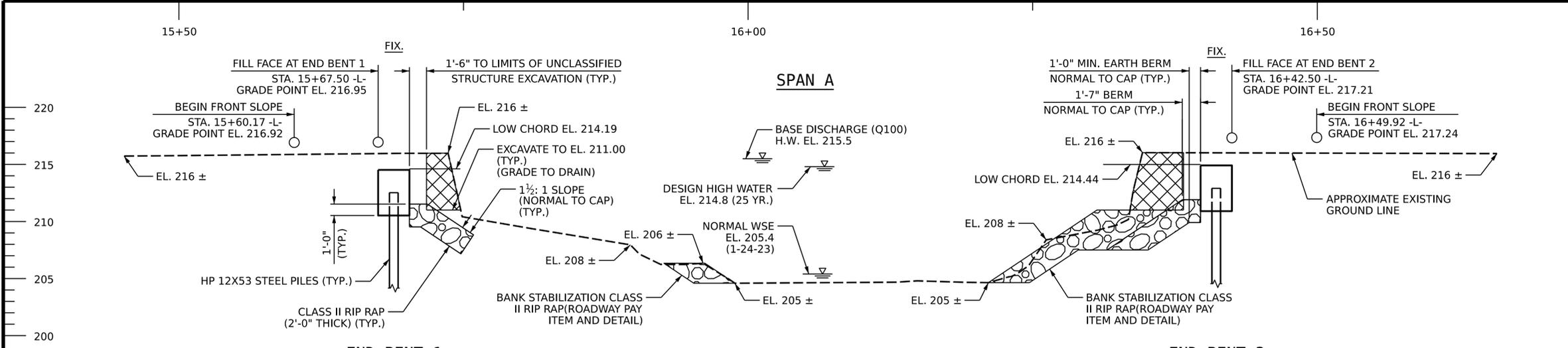
RIGHT OF WAY DATE:
OCTOBER 15, 2024

LETTING DATE:
OCTOBER 22, 2025

STRUCTURES DESIGN
ENGINEER

Signed by:
Marc A. LeBlanc 9/26/2025
P.E.

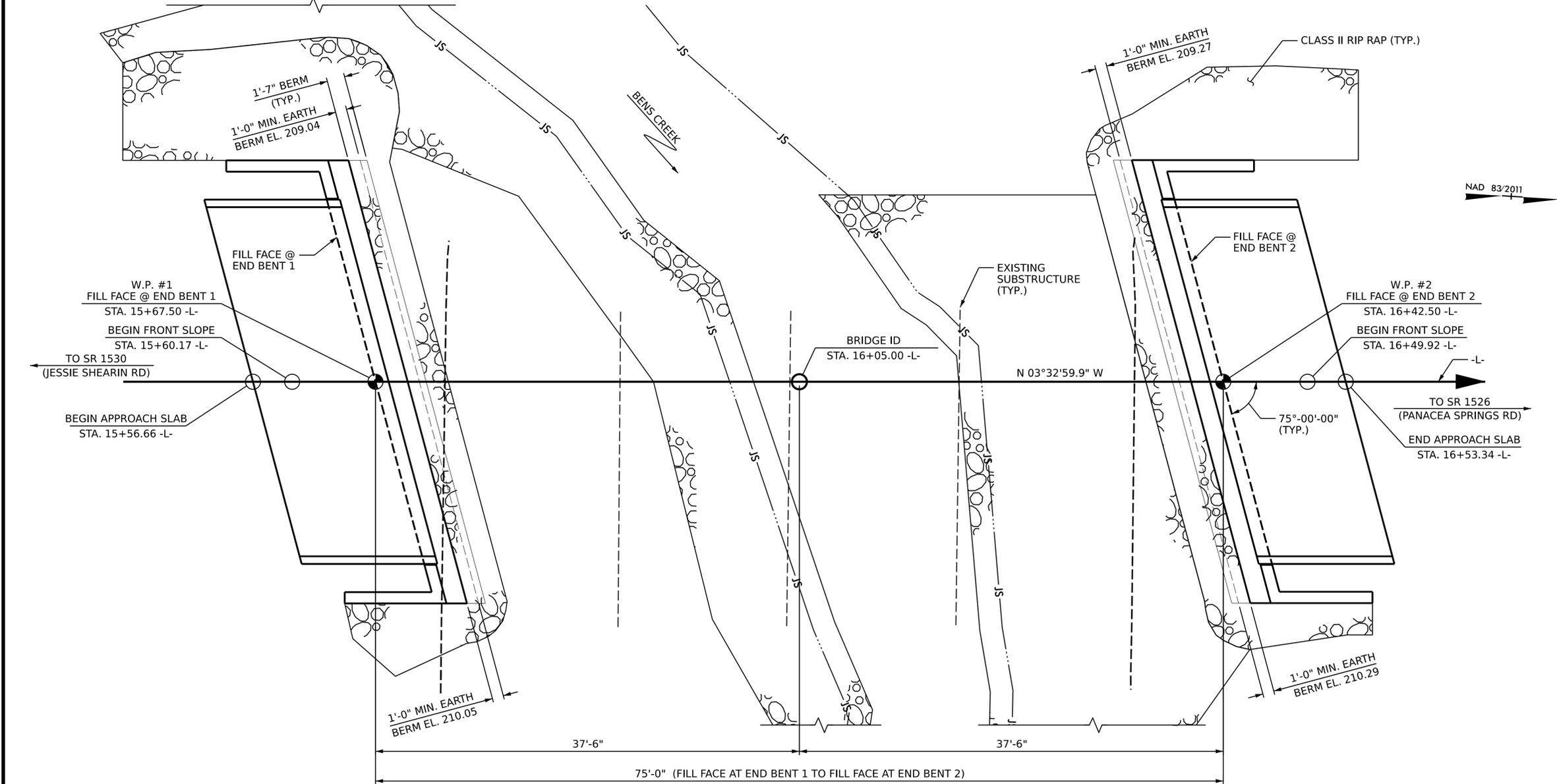




P.I. STA. = 17+37.00 -L-
 EL. = 217.54
 V.C. = 150 FT.
 (+)0.3500% Δ (-)0.8008%
-L- GRADE DATA

SECTION ALONG -L-

EXISTING SUBSTRUCTURE NOT SHOWN IN SECTION FOR CLARITY
 SECTIONS AT END BENTS ARE AT RIGHT ANGLES
 UNCLASSIFIED STRUCTURE EXCAVATION



I HEREBY CERTIFY THESE PLANS
 ARE THE AS-BUILT PLANS

NAD 83/2011

PROJECT NO. BP5.R075
WARREN COUNTY
 STATION: 16+05.00 -L-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 920016

DRAWN BY : M. LEBLANC DATE : 12/24
 CHECKED BY : M. O'CONNOR DATE : 12/24
 DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

PLAN
 PILES NOT SHOWN FOR CLARITY

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

Lochner
 H.W. LOCHNER, INC.
 2800 PLYMOUTH PLACE, SUITE 202
 RALEIGH, NC 27612
 (919) 571-7111
 NC LICENSE NUMBER P5159

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

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")	Number of Piles per Line	Factored Resistance per Pile KIPS	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		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1 (Piles 1-3)	3	180	212.24	15			240					200	7.2	2.8
End Bent No. 1 (Piles 4-7)	4	180	212.24	30			240							
End Bent No. 2 (Piles 1-3)	3	180	212.51	25			240							
End Bent No. 2 (Piles 4-7)	4	180	212.51	45			240							
TOTAL QUANTITY:													21.6	8.4

* $RDR = \frac{\text{Factored Resistance} + \text{Factored Drag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Drag Load Resistance} + \text{Nominal Resistance from Scourable Material}$

** 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.

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 KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent No. 1 (Piles 1-7)	180			0.75		
End Bent No. 2 (Piles 1-7)	180			0.75		
TOTAL QUANTITY:						

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

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent No. 1 (Piles 1-7)				7
TOTAL QUANTITY:				7

SUMMARY OF DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)			Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH	End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT
End Bent No. 1 (Piles 1-3)	20	1		
End Bent No. 1 (Piles 4-7)	35			
End Bent No. 1 (Piles 1-3)	30	1		
End Bent No. 2 (Piles 4-7)	50			
TOTAL QUANTITY:		2		

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

PROJECT NO. BP5.R075

WARREN COUNTY

STATION: -L- 16+05

SHEET 2 OF 3

NOTES:

- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (W. Scott Hunsberger, #036283) on 01/22/25. 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.
- The Engineer may adjust the quantity for DPT Testing and Pipe Pile Plates when necessary.

 Signed by: <u>Marc A. LeBlanc</u> <small>9/26/2025</small> SIGNATURE DATE	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH PILE FOUNDATION TABLES						SHEET NO. S-2 TOTAL SHEETS 14
	REVISIONS						
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																							
LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT							
						LIVE-LOAD FACTORS (γLL)	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 (γLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD	HL-93 (INVENTORY)	N/A	1	1.220	--	1.75	0.23	1.22	72.7	EL	35.82	0.60	1.72	72.7	EL	1.60	0.8	0.23	1.90	72.7'	EL	35.82	
	HL-93 (OPERATING)	N/A		1.580	--	1.35	0.23	1.58	72.7	EL	35.82	0.60	2.55	72.7	EL	1.60	N/A	--	--	72.7'	EL	35.82	
	HS-20 (INVENTORY)	36.000	2	1.590	57.240	1.35	0.23	1.59	72.7	EL	35.82	0.60	2.49	72.7	EL	1.60	0.8	0.23	2.48	72.7'	EL	35.82	
	HS-20 (OPERATING)	36.000		2.060	74.160	1.75	0.23	2.06	72.7	EL	35.82	0.60	3.26	72.7	EL	1.60	N/A	--	--	72.7'	EL	35.82	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH		4.480	60.480	1.4	0.23	4.48	72.7	EL	35.82	0.60	7.71	72.7	EL	1.60	0.8	0.23	5.57	72.7'	EL	35.82	
		SNGARBS2	20.000		3.340	66.800	1.4	0.23	3.34	72.7	EL	35.82	0.60	5.43	72.7	EL	1.60	0.8	0.23	4.16	72.7'	EL	35.82
		SNAGRIS2	22.000		3.170	69.740	1.4	0.23	3.17	72.7	EL	35.82	0.60	5.02	72.7	EL	1.60	0.8	0.23	3.94	72.7'	EL	35.82
		SNCOTTS3	27.250		2.230	60.768	1.4	0.23	2.23	72.7	EL	35.82	0.60	3.79	72.7	EL	1.60	0.8	0.23	2.77	72.7'	EL	35.82
		SNAGGRS4	34.925		1.860	64.961	1.4	0.23	1.86	72.7	EL	35.82	0.60	3.11	72.7	EL	1.60	0.8	0.23	2.32	72.7'	EL	35.82
		SNS5A	35.550		1.820	64.701	1.4	0.23	1.82	72.7	EL	35.82	0.60	3.14	72.7	EL	1.60	0.8	0.23	2.27	72.7'	EL	35.82
		SNS6A	39.950		1.670	66.717	1.4	0.23	1.67	72.7	EL	35.82	0.60	2.85	72.7	EL	1.60	0.8	0.23	2.08	72.7'	EL	35.82
	SNS7B	42.000		1.590	66.780	1.4	0.23	1.59	72.7	EL	35.82	0.60	2.79	72.7	EL	1.60	0.8	0.23	1.98	72.7'	EL	35.82	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.040	67.320	1.4	0.23	2.04	72.7	EL	35.82	0.60	3.42	72.7	EL	1.60	0.8	0.23	2.54	72.7'	EL	35.82
		TNT4A	33.075		2.050	67.804	1.4	0.23	2.05	72.7	EL	35.82	0.60	3.34	72.7	EL	1.60	0.8	0.23	2.55	72.7'	EL	35.82
		TNT6A	41.600		1.680	69.888	1.4	0.23	1.68	72.7	EL	35.82	0.60	2.97	72.7	EL	1.60	0.8	0.23	2.09	72.7'	EL	35.82
		TNT7A	42.000		1.690	70.980	1.4	0.23	1.69	72.7	EL	35.82	0.60	2.91	72.7	EL	1.60	0.8	0.23	2.10	72.7'	EL	35.82
		TNT7B	42.000		1.780	74.760	1.4	0.23	1.78	72.7	EL	35.82	0.60	2.75	72.7	EL	1.60	0.8	0.23	2.21	72.7'	EL	35.82
		TNAGRIT4	43.000		1.660	71.380	1.4	0.23	1.66	72.7	EL	35.82	0.60	2.64	72.7	EL	1.60	0.8	0.23	2.06	72.7'	EL	35.82
TNAGT5A		45.000		1.560	70.200	1.4	0.23	1.56	72.7	EL	35.82	0.60	2.62	72.7	EL	1.60	0.8	0.23	1.95	72.7'	EL	35.82	
TNAGT5B	45.000	3	1.540	69.300	1.4	0.23	1.54	72.7	EL	35.82	0.60	2.51	72.7	EL	1.60	0.8	0.23	1.92	72.7'	EL	35.82		
EMERGENCY VEHICLE (EV)	EV2	28.750		2.540	73.025	1.3	0.23	2.54	72.7	EL	35.82	0.60	4.07	72.7	EL	1.60	0.8	0.23	2.94	72.7'	EL	35.82	
	EV3	43.000	4	1.670	71.810	1.3	0.23	1.67	72.7	EL	35.82	0.60	2.70	72.7	EL	1.60	0.8	0.23	1.92	72.7'	EL	35.82	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

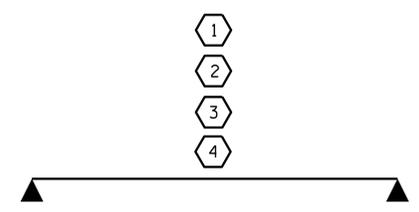
NOTES:

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.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER	
EL - EXTERIOR LEFT GIRDER	
ER - EXTERIOR RIGHT GIRDER	



LRFR SUMMARY
FOR SPAN " A "

PROJECT NO. BP5.R075
WARREN COUNTY
STATION: 16+05.00 -L-

DRAWN BY : M. LEBLANC DATE : 12/24
CHECKED BY : M. O'CONNOR DATE : 12/24
DESIGN ENGINEER OF RECORD: M. LEBLANC DATE : 01/25

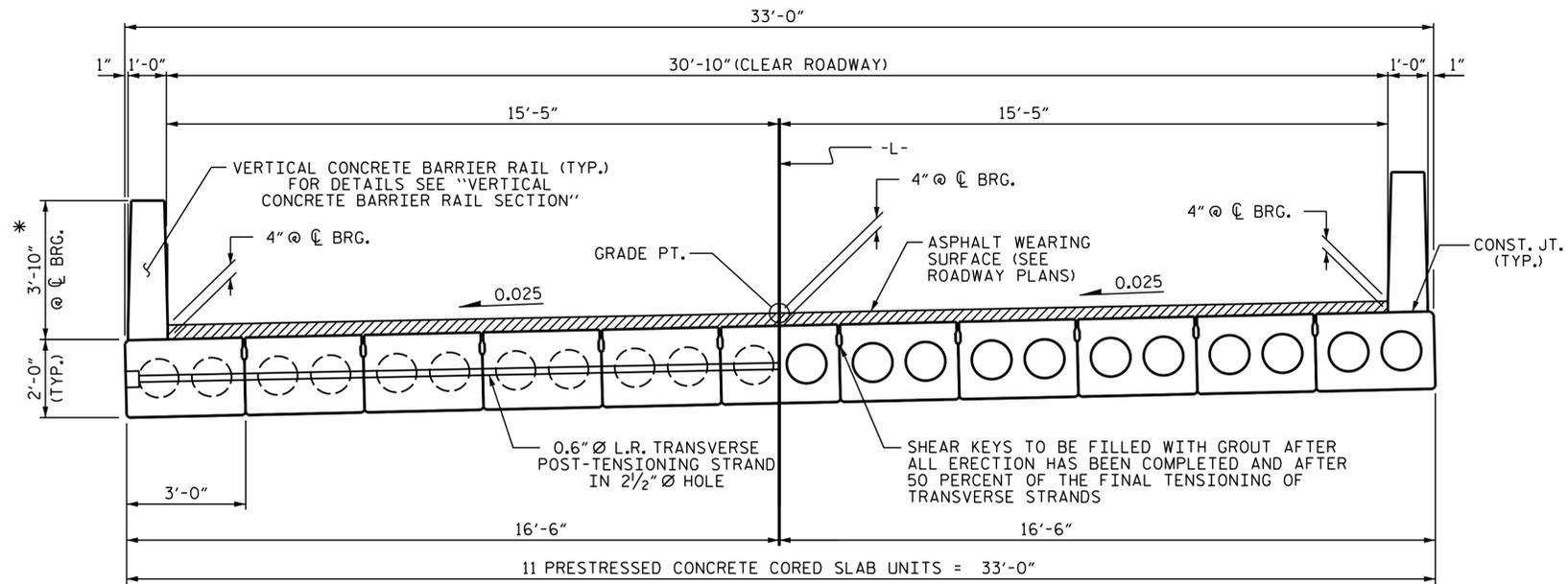
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FINAL UNLESS ALL
SIGNATURES COMPLETED

Seal of Marc A. LeBlanc, Professional Engineer, No. 043835, State of North Carolina. Signed 9/26/2025.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
**LRFR SUMMARY FOR
72' - 8" CORED SLAB UNIT
75° SKEW**
(NON-INTERSTATE TRAFFIC)

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

S-4
TOTAL SHEETS
14



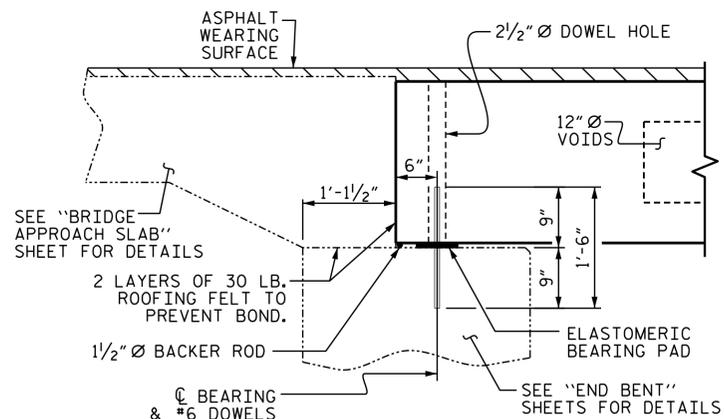
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

HALF SECTION
THROUGH VOIDS

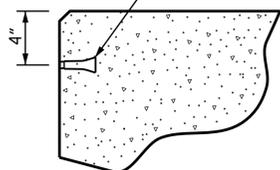
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END

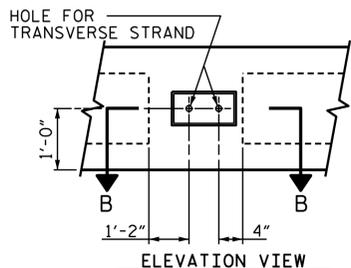


SECTION AT END BENT

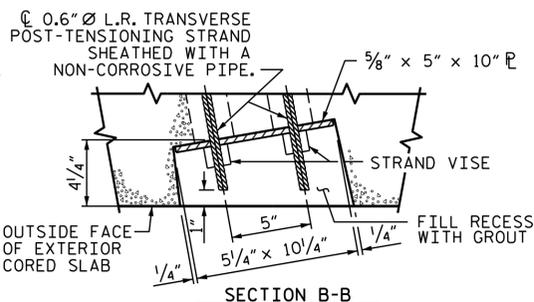
PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL

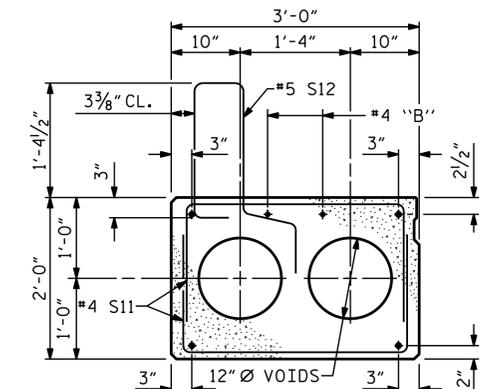


ELEVATION VIEW



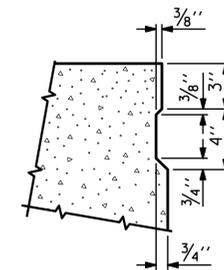
SECTION B-B

GRAUTED RECESS AT END OF
POST-TENSIONED STRAND CORED SLABS



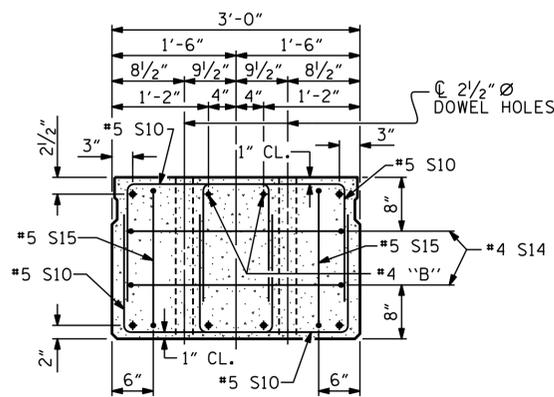
EXTERIOR SLAB SECTION

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



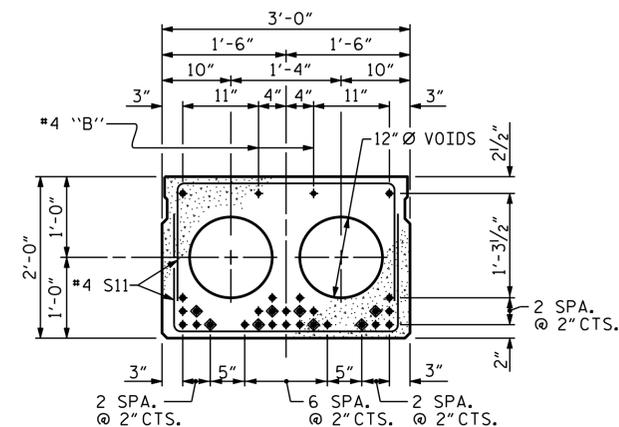
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR 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.



INTERIOR SLAB SECTION (72.67' UNIT)

(28 STRANDS REQUIRED)

0.6" Ø LOW
RELAXATION STRAND LAYOUT

- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PROJECT NO. BP5.R075

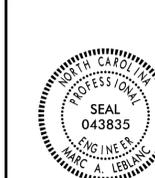
WARREN COUNTY

STATION: 16+05.00 -L-

SHEET 1 OF 3

DRAWN BY : M. LEBLANC DATE : 12/24
CHECKED BY : M. O'CONNOR DATE : 12/24
DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

9/23/2025
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nicolas.cuany



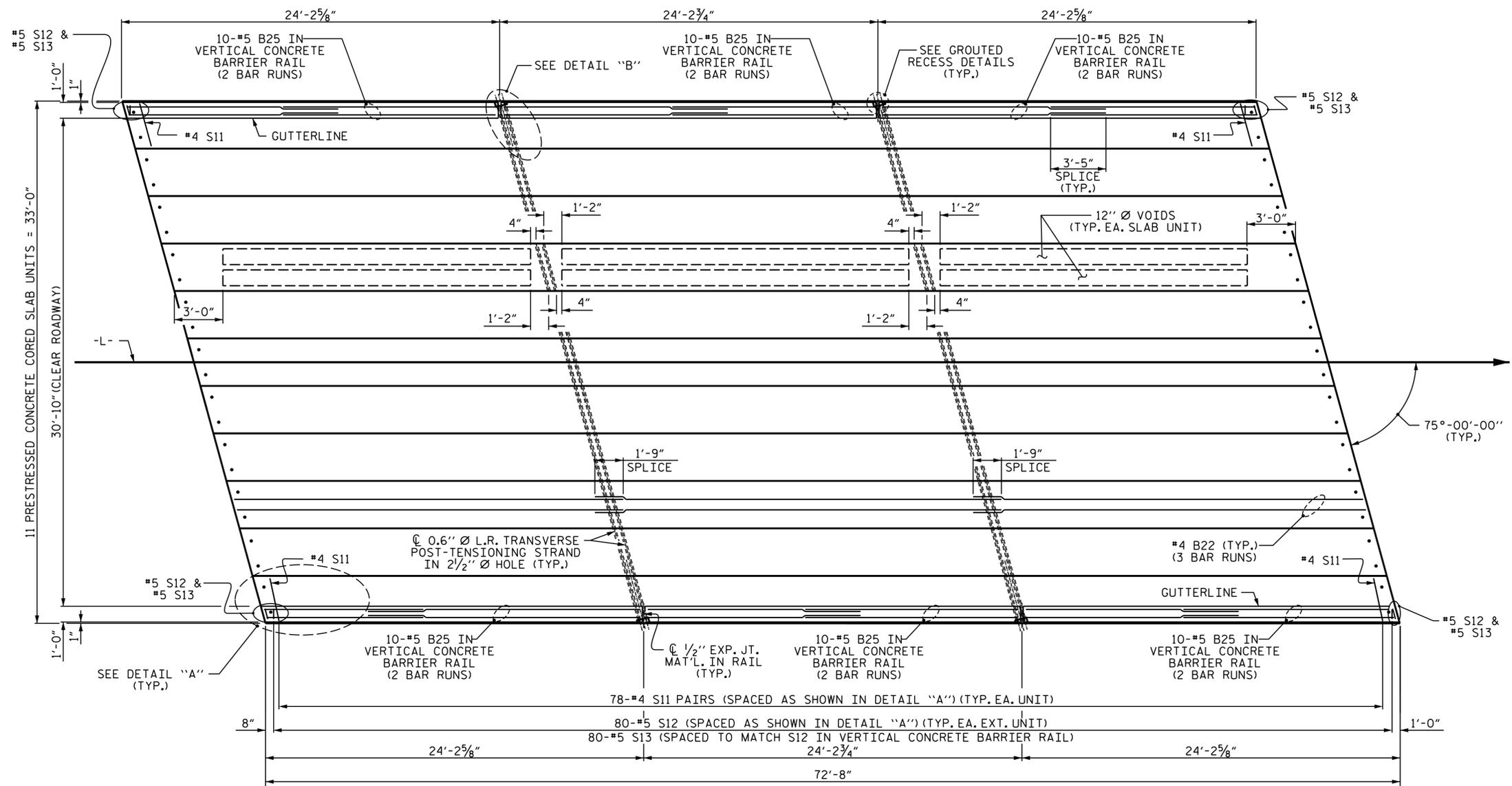
Signed by:
Marc A. LeBlanc
09/26/2025

Lochner

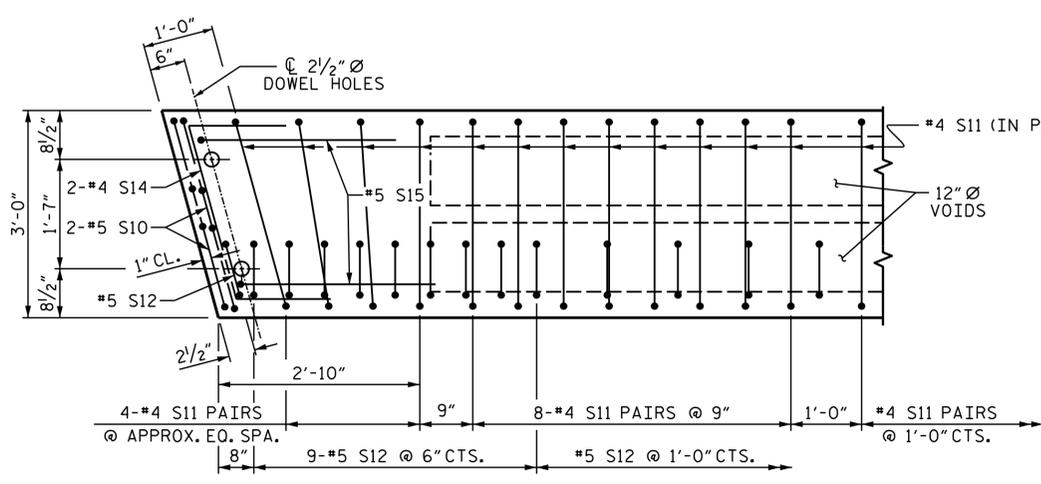
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
**3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT**

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

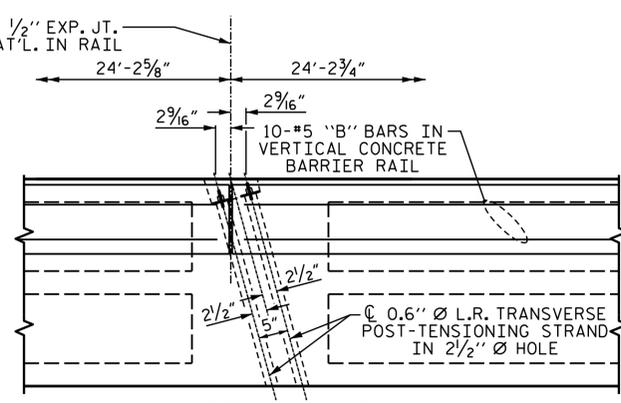
REVISIONS		SHEET NO.				
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5
2			4			14



PLAN OF UNIT



DETAIL "A"



DETAIL "B"

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

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. BP5.R075
WARREN COUNTY
STATION: 16+05.00 -L-
SHEET 2 OF 3



Signed by: Marc A. LeBlanc
9/26/2025

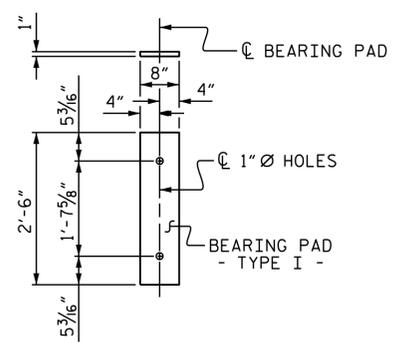
Lochner
H.W. LOCHNER, INC.
2800 PLYMOUTH PLACE, SUITE 202
RALEIGH, NC 27612
(919) 871-7111
NC LICENSE NUMBER P-5159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
**PLAN OF 72'-8" UNIT
30'-10" CLEAR ROADWAY
75° SKEW**

DRAWN BY : M. LEBLANC DATE : 12/24
CHECKED BY : M. O'CONNOR DATE : 12/24
DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

NO.		BY:		DATE:		NO.		BY:		DATE:		SHEET NO.	
1						3						S-6	
2						4						TOTAL SHEETS	14



FIXED END
(TYPE I - 22 REQ'D)

ELASTOMERIC BEARING DETAILS

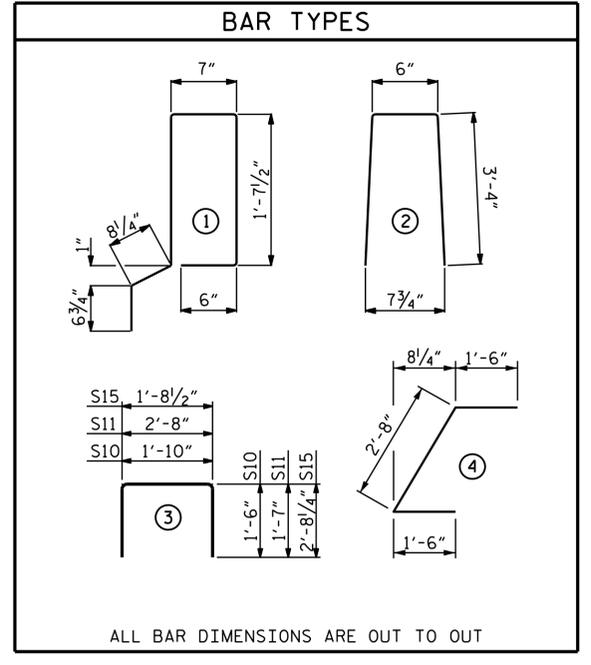
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

DEAD LOAD DEFLECTION AND CAMBER	
72.67' CORED SLAB UNIT	3'-0" x 2'-0" 0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2 3/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/4" ↓
FINAL CAMBER	1 7/16" ↑

** INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 72.67' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	25'-3"	101	25'-3"	101
S10	8	#5	3	4'-10"	40	4'-10"	40
S11	156	#4	3	5'-10"	608	5'-10"	608
*S12	82	#5	1	5'-7"	478		
S14	4	#4	4	5'-8"	15	5'-8"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	794		794
* EPOXY COATED REINFORCING STEEL				LBS.	478		
7000 P.S.I. CONCRETE				CU. YDS.	12.5		12.5
0.6" Ø L.R. STRANDS				No.	28		28

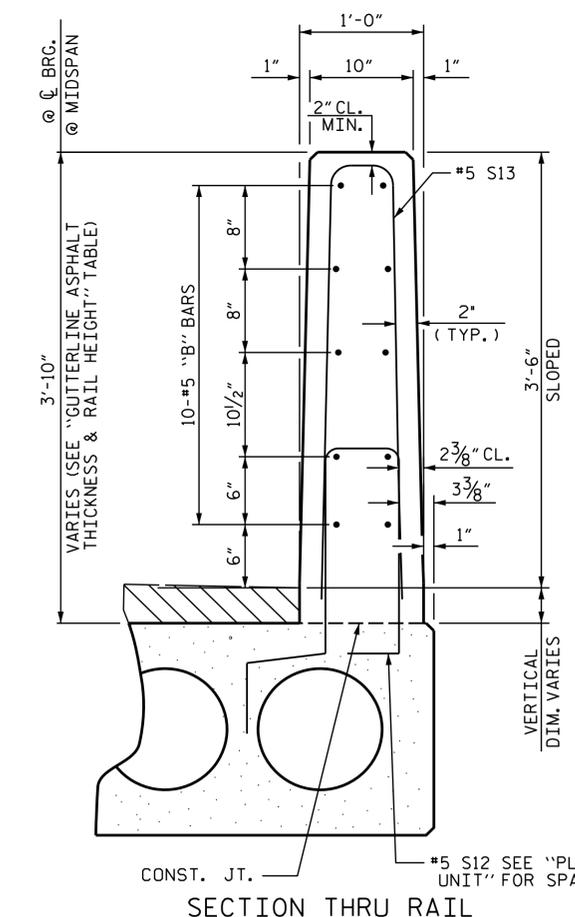
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
72.67' UNITS	2 9/16"	3'-8 9/16"



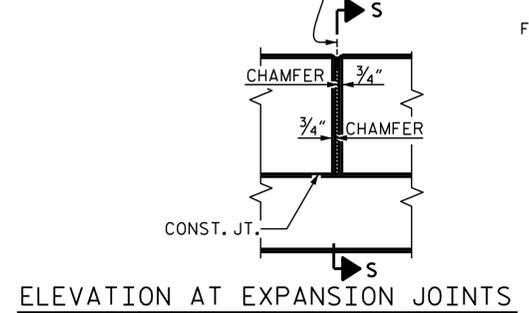
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
72.67' UNIT						
*B25	120	120	#5	STR	13'-8"	1711
*S13	164	164	#5	2	7'-2"	1226
* EPOXY COATED REINFORCING STEEL					LBS.	2937
CLASS AA CONCRETE					CU. YDS.	18.6
TOTAL VERTICAL CONCRETE BARRIER RAIL					LN. FT.	145.33

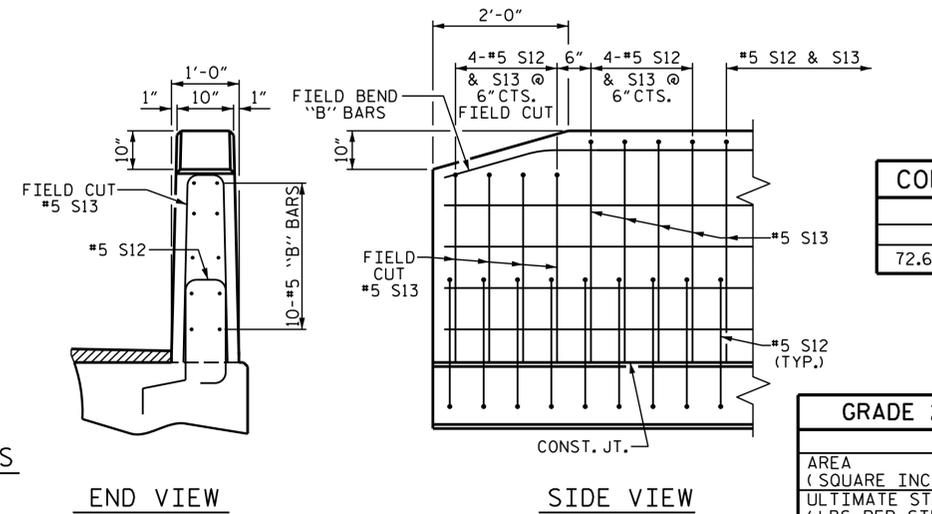
CORED SLABS REQUIRED			
72.67' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	72'-8"	145'-4"
INTERIOR C.S.	9	72'-8"	654'-0"
TOTAL	11		799'-4"



SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)
1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED)



VERTICAL CONCRETE BARRIER RAIL DETAILS



END VIEW

SIDE VIEW

END OF RAIL DETAILS

CONCRETE RELEASE STRENGTH	
UNIT	PSI
72.67' UNITS	5500

GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.6" Ø L.R.
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 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

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

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. 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, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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

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.

PROJECT NO. BP5.R075
WARREN COUNTY
STATION: 16+05.00 -L-
SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

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

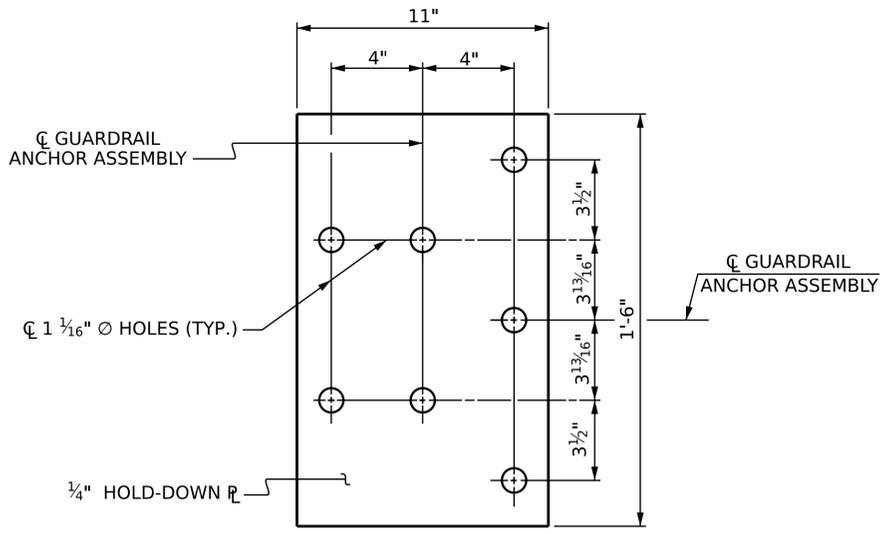
Lochner
9/26/2025

DRAWN BY :	M. LEBLANC	DATE :	12/24
CHECKED BY :	M. O'CONNOR	DATE :	12/24
DESIGN ENGINEER OF RECORD :	M. LEBLANC	DATE :	01/25

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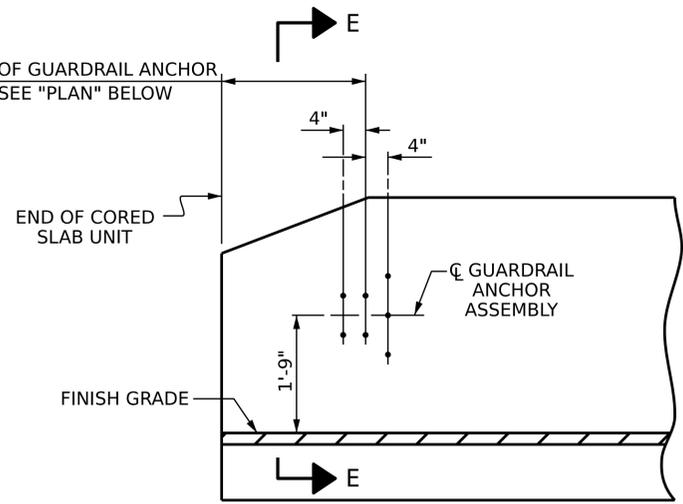
REVISONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS: 14

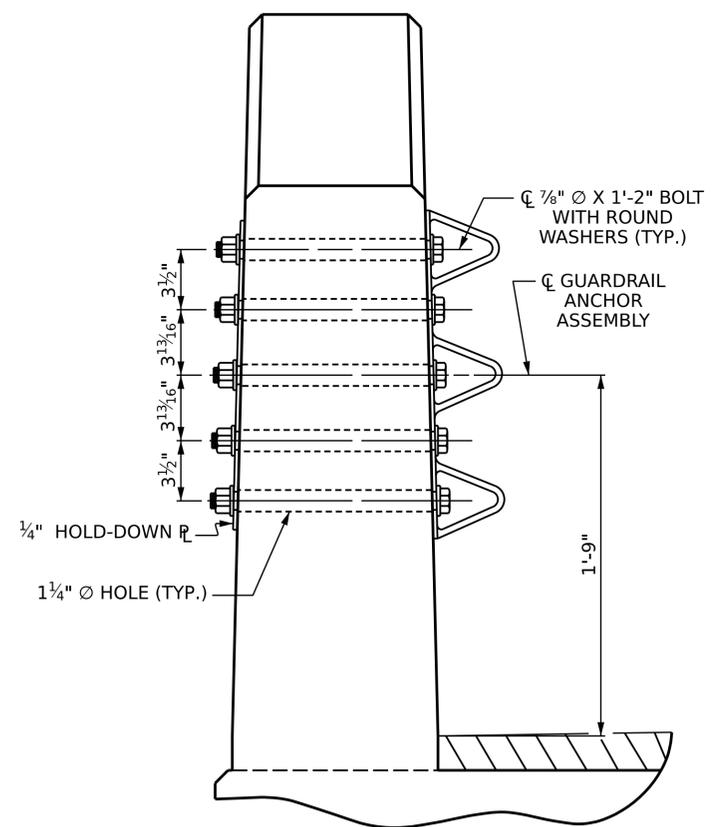


PLAN

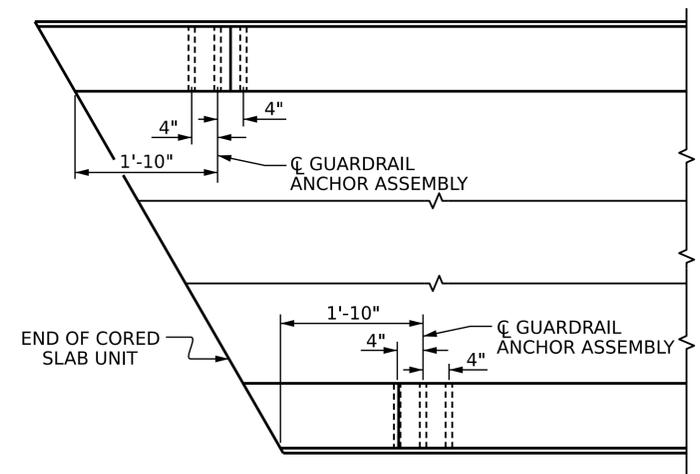
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION

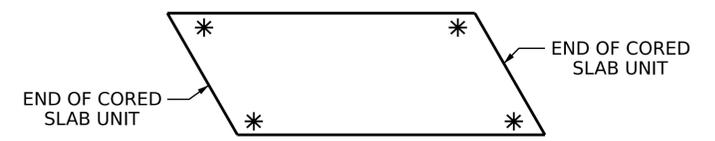


SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

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.

PROJECT NO. BP5.R075
WARREN COUNTY
 STATION: 16+05.00 -L-

ASSEMBLED BY : MAL	DATE : 12/24
CHECKED BY : MKO	DATE : 12/24
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

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

S-8
 TOTAL SHEETS 14

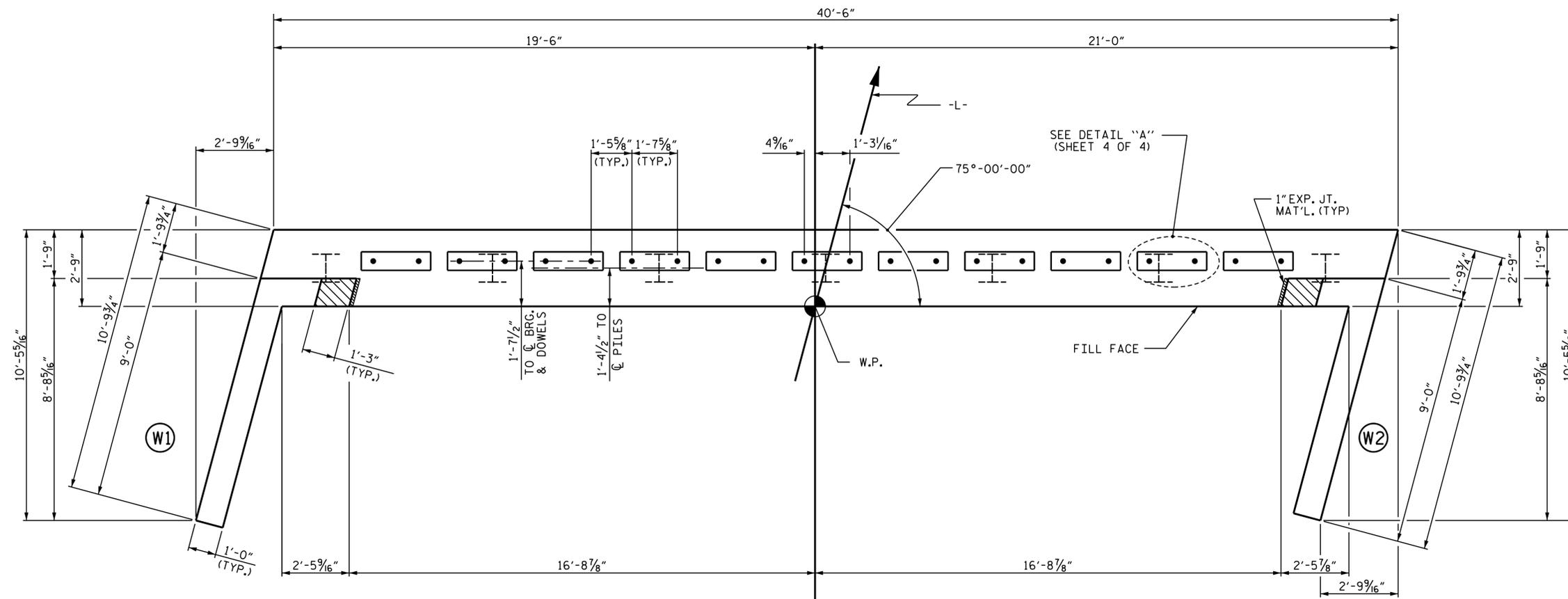
NOTES

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

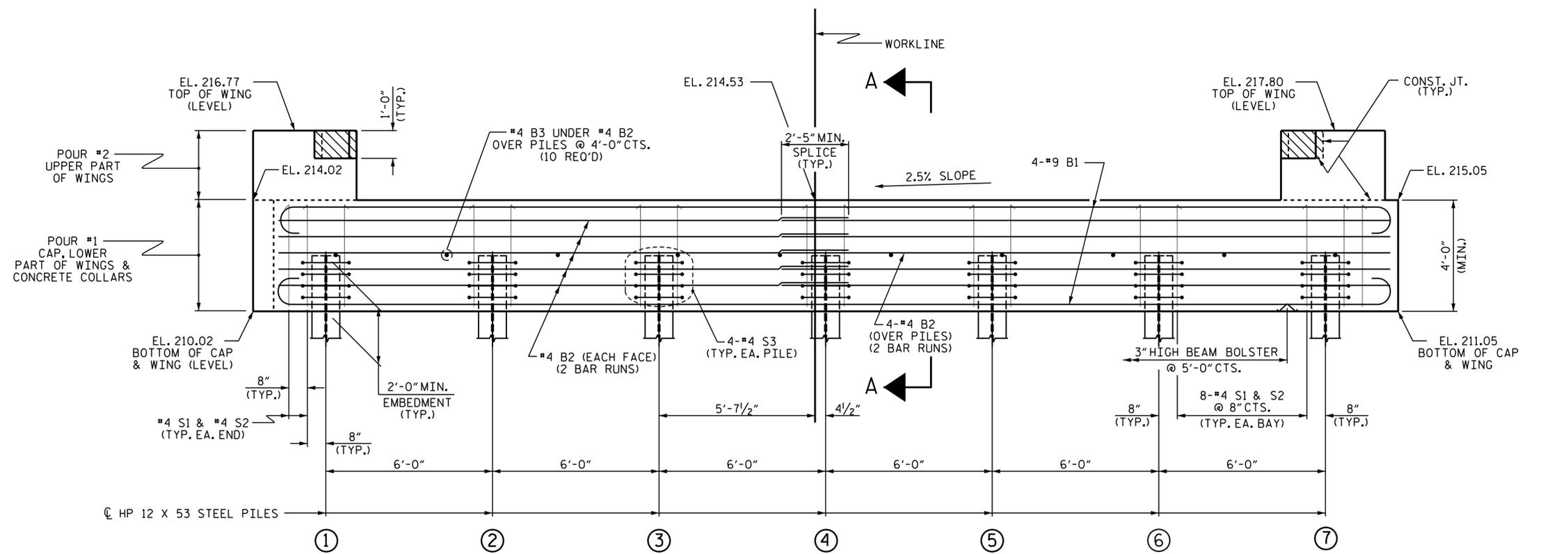
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	212.08
②	212.23
③	212.39
④	212.55
⑤	212.70
⑥	212.86
⑦	213.01

PROJECT NO. BP5.R075
WARREN COUNTY
 STATION: 16+05.00 -L-
 SHEET 1 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SUBSTRUCTURE
 END BENT 1**

DRAWN BY : M. O'CONNOR DATE : 12/24
 CHECKED BY : M. LEBLANC DATE : 12/24
 DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

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.

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

Lochner
 H.W. LOCHNER, INC.
 2800 PLYWOOD PLACE, SUITE 202
 RALEIGH, NC 27612
 (919) 877-7111
 NC LICENSE NUMBER 15159

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			14

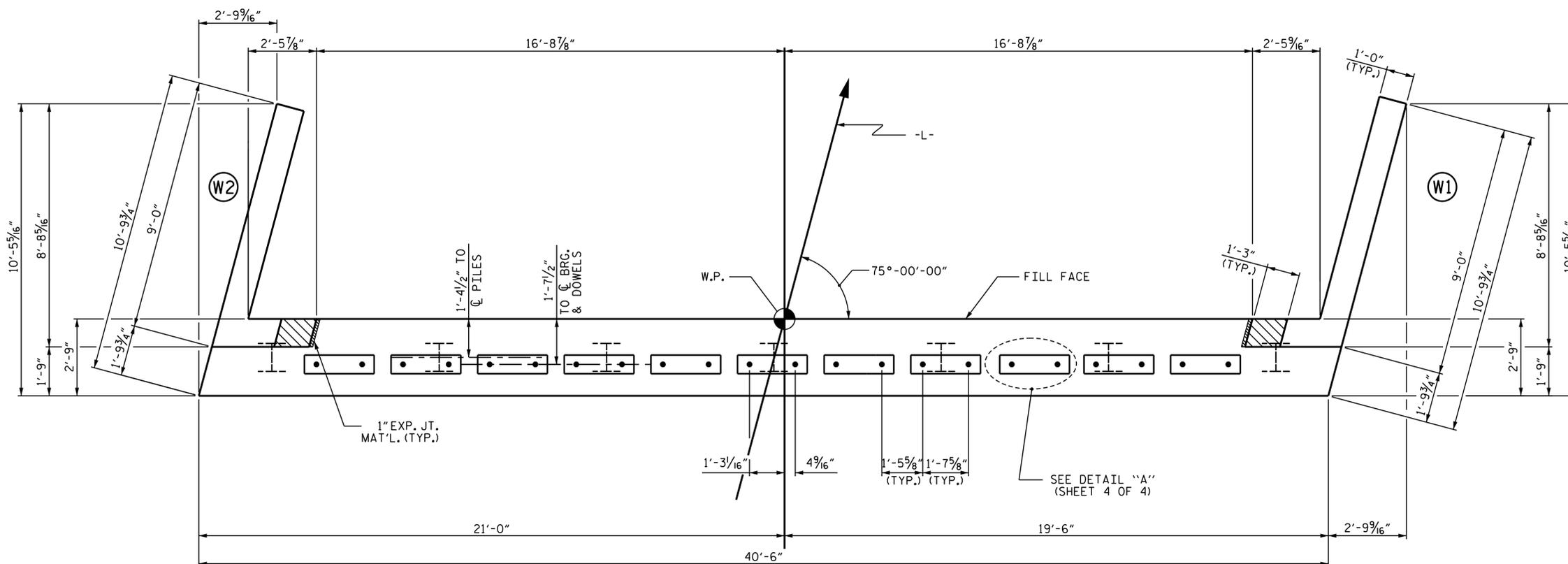
NOTES

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.

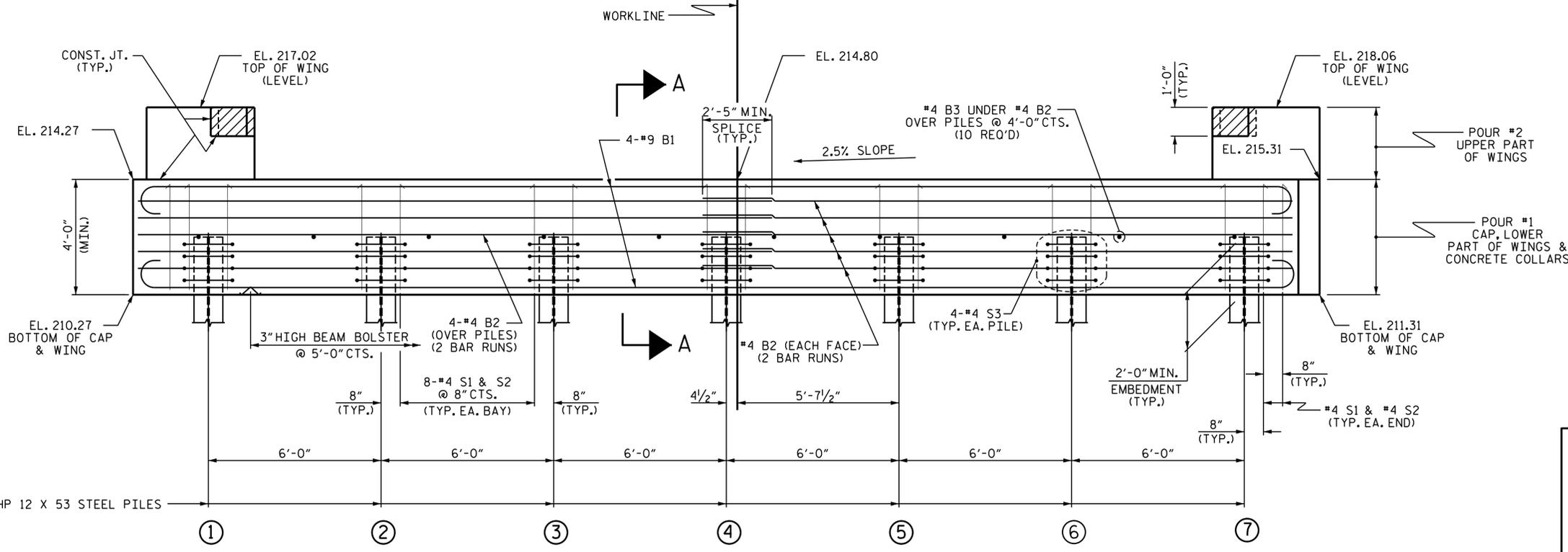
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN

TOP OF PILE ELEVATIONS	
①	212.34
②	212.49
③	212.64
④	212.79
⑤	212.94
⑥	213.09
⑦	213.24



ELEVATION

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

PROJECT NO. BP5.R075
WARREN COUNTY
 STATION: 16+05.00 -L-
 SHEET 2 OF 4



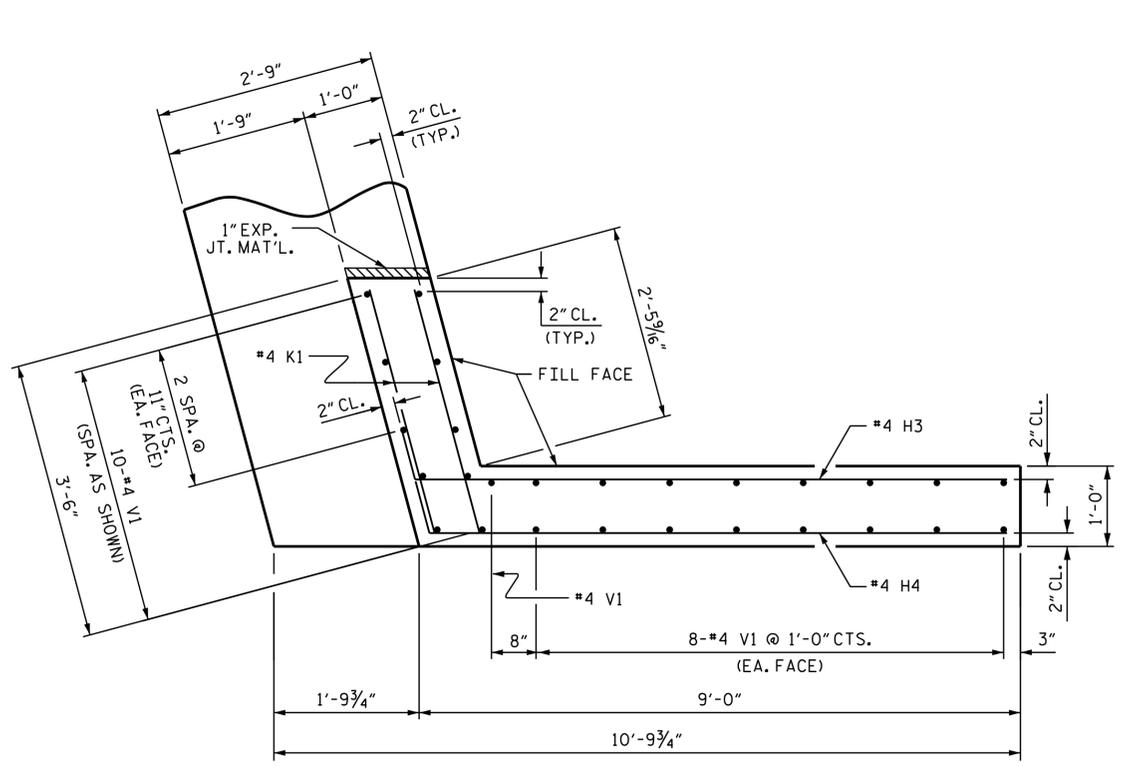
Signed by: **Marc A. LeBlanc**
 05FB39294294902 9/26/2025
Lochner
 H.W. LOCHNER, INC.
 2800 PLYWOOD PLACE, SUITE 202
 RALEIGH, NC 27612
 (919) 871-7111
 NC LICENSE NUMBER: 05159

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SUBSTRUCTURE
 END BENT 2**

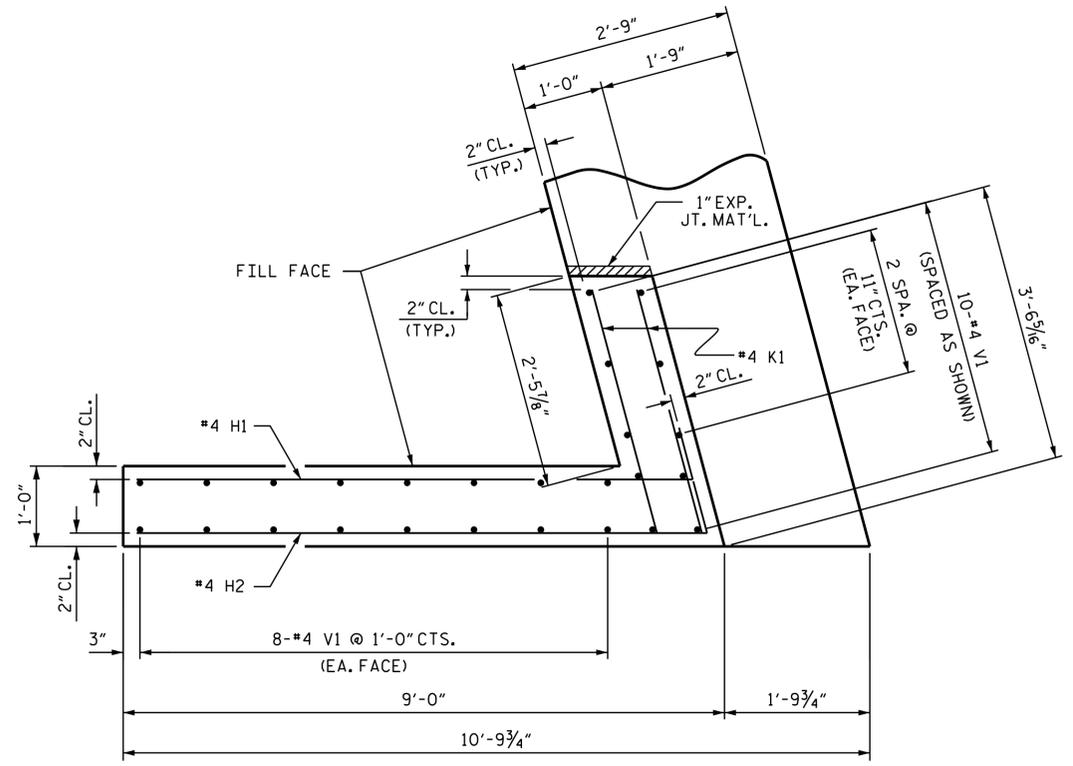
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			14

DRAWN BY : M. O'CONNOR DATE : 12/24
 CHECKED BY : M. LEBLANC DATE : 12/24
 DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

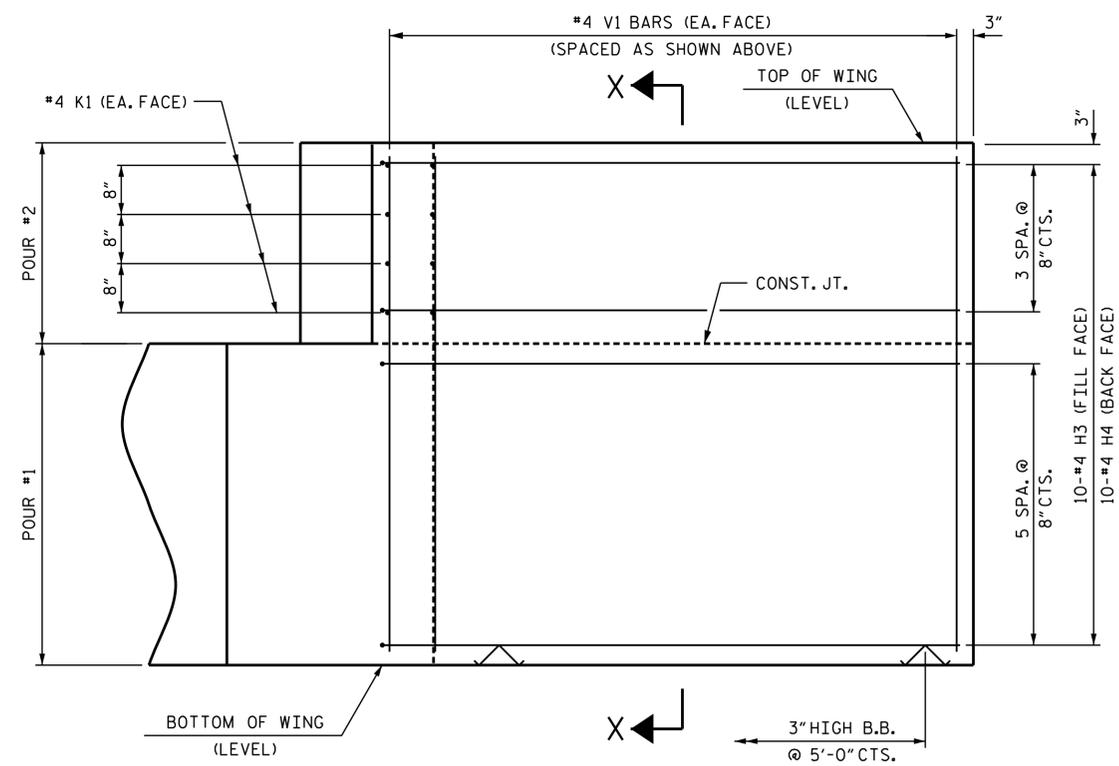
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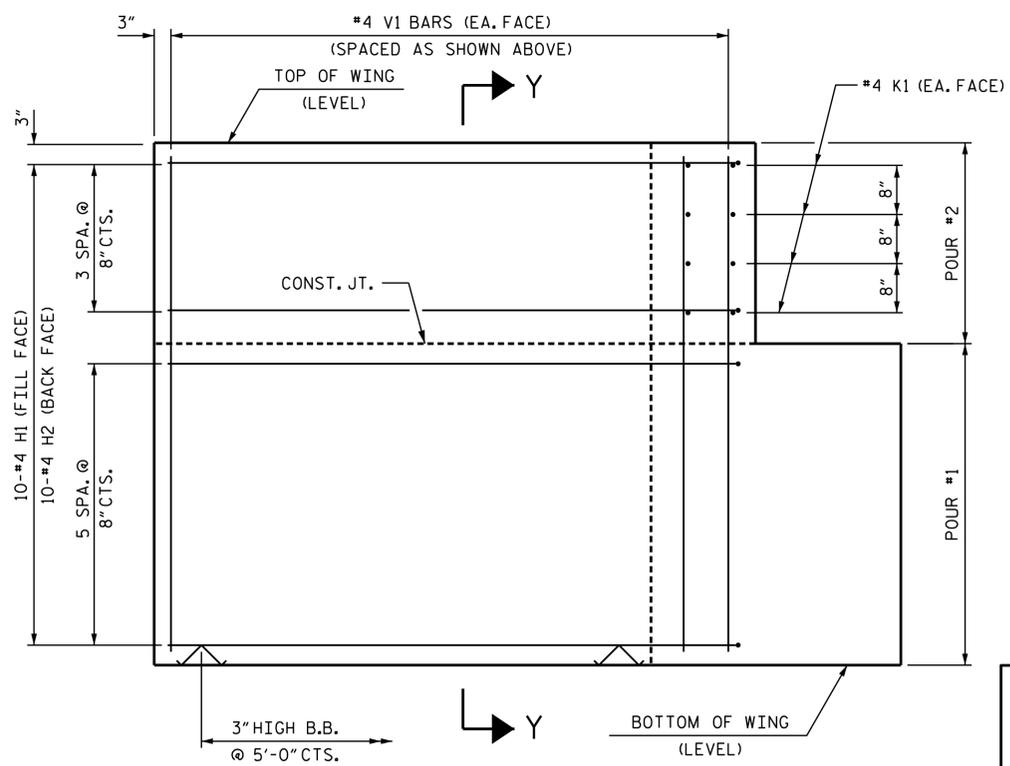
PLAN OF WING (W1)



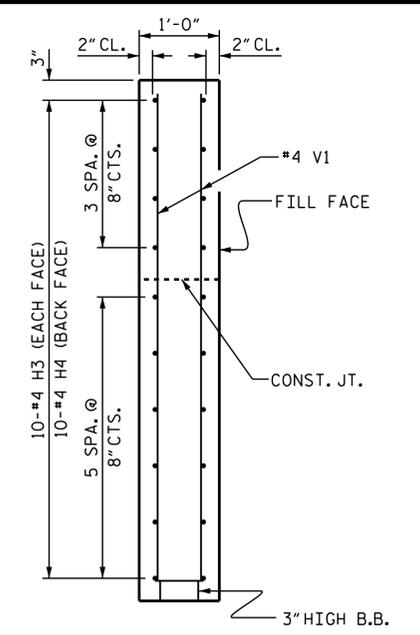
PLAN OF WING (W2)



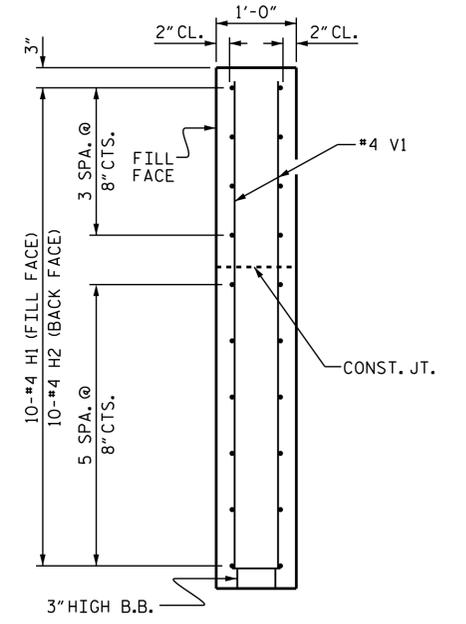
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

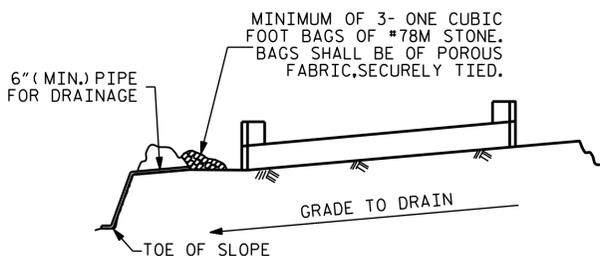
PROJECT NO. BP5.R075
WARREN COUNTY
 STATION: 16+05.00 -L-
 SHEET 3 OF 4

DRAWN BY : M. O'CONNOR DATE : 12/24
 CHECKED BY : M. LEBLANC DATE : 12/24
 DESIGN ENGINEER OF RECORD : M. LEBLANC DATE : 01/25

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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

Seal of Marc A. LeBlanc, Professional Engineer, No. 043835, State of North Carolina. Signed 9/26/2025.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-11 TOTAL SHEETS 14

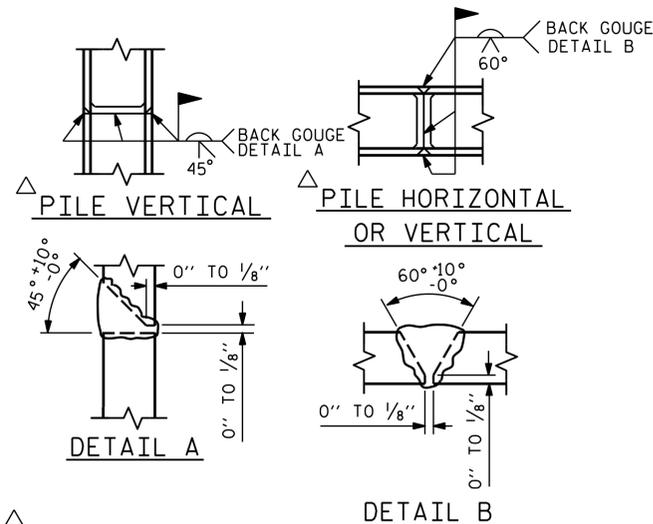


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

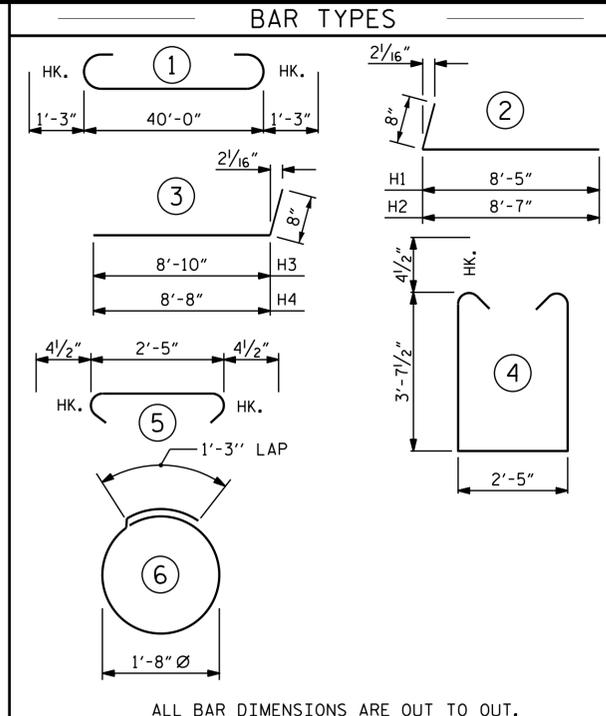
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

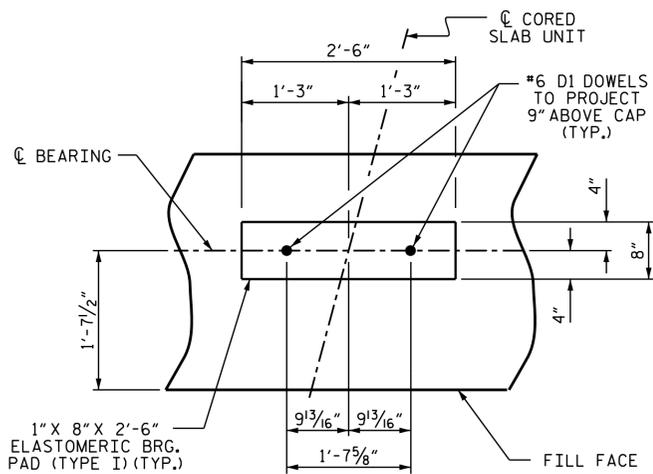
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

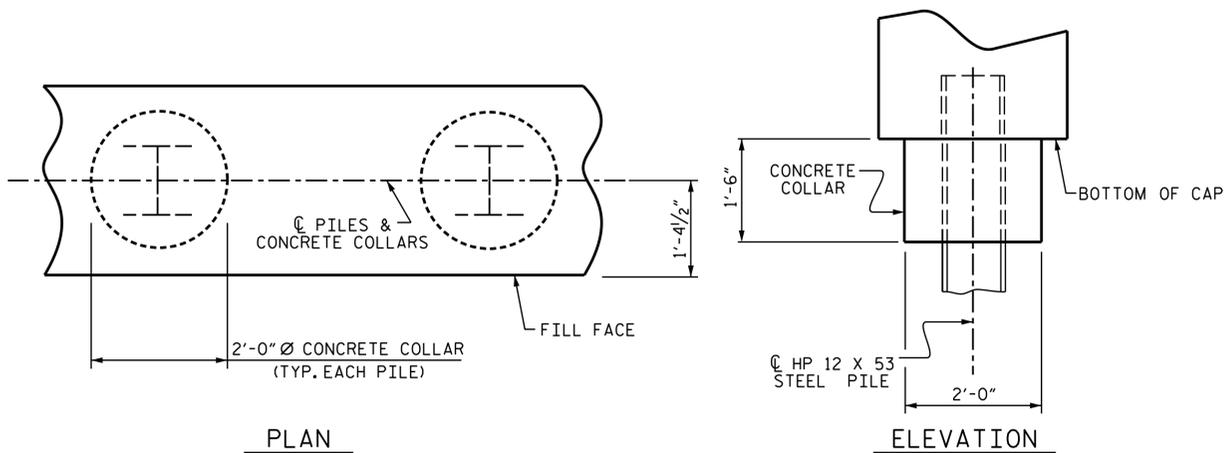


BILL OF MATERIAL					
FOR ONE END BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		42'-6"	1156
B2	28	#4	STR	21'-4"	399
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	10	#4	2	9'-1"	61
H2	10	#4	2	9'-3"	62
H3	10	#4	3	9'-6"	63
H4	10	#4	3	9'-4"	62
K1	16	#4	STR	3'-1"	33
S1	52	#4	4	10'-5"	362
S2	52	#4	5	3'-2"	110
S3	28	#4	6	6'-6"	122
V1	53	#4	STR	6'-2"	218
REINFORCING STEEL (FOR ONE END BENT)				2714 LBS.	
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1	CAP, LOWER PART OF WINGS & COLLARS			20.1 C.Y.	
POUR #2	UPPER PART OF WINGS			2.3 C.Y.	
TOTAL CLASS A CONCRETE				22.4 C.Y.	



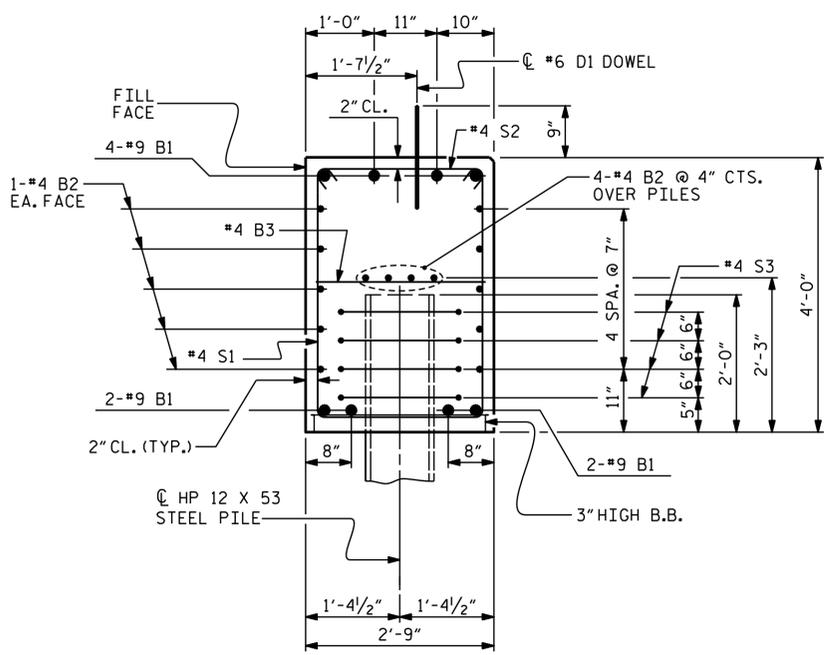
DETAIL "A"

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



CORROSION PROTECTION FOR STEEL PILES DETAIL

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



SECTION A-A

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

PROJECT NO. BP5.R075

WARREN COUNTY

STATION: 16+05.00 -L-

SHEET 4 OF 4

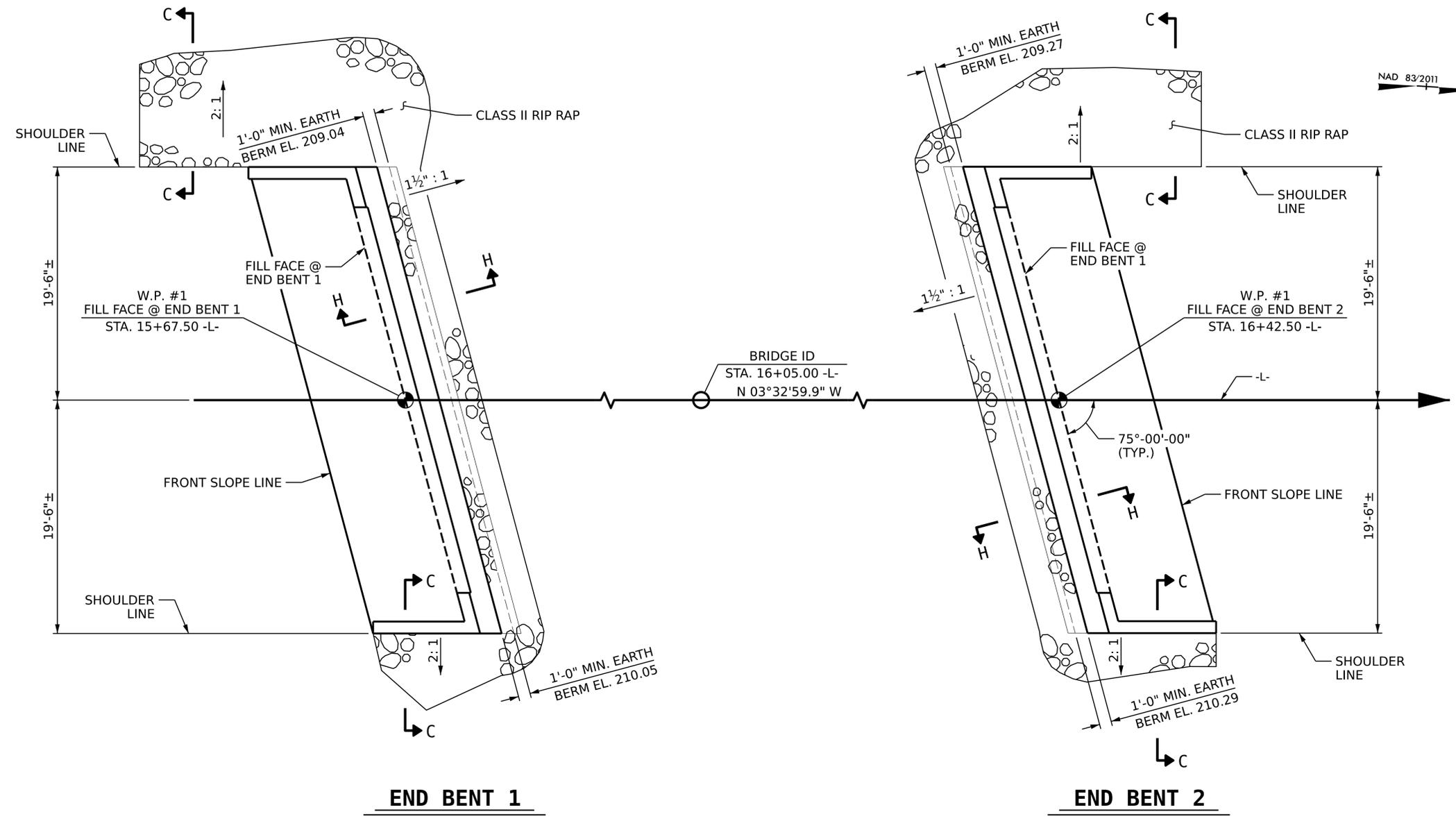


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			14

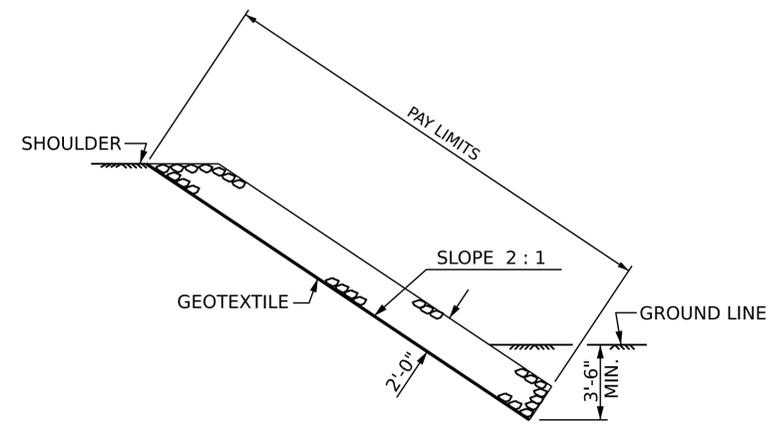
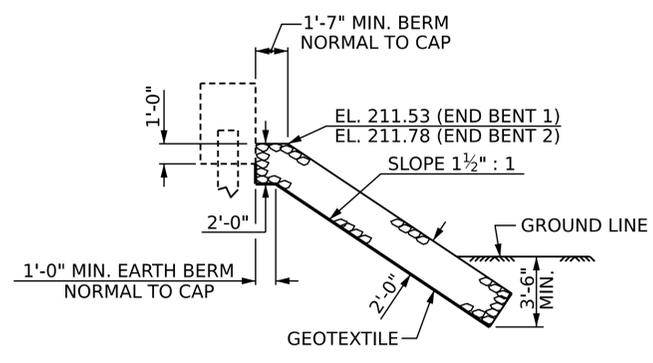
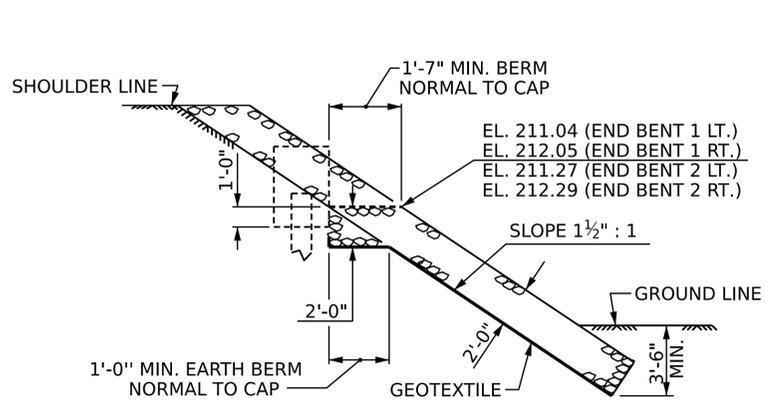
DRAWN BY :	M. O'CONNOR	DATE :	12/24
CHECKED BY :	M. LEBLANC	DATE :	12/24
DESIGN ENGINEER OF RECORD :	M. LEBLANC	DATE :	01/25

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+05.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	44	49
END BENT 2	37	41



PROJECT NO. BP5.R075
WARREN COUNTY
STATION: 16+05.00 -L-

DRAWN BY : M. O'CONNOR DATE : 12/24
CHECKED BY : M. LEBLANC DATE : 12/24
DESIGN ENGINEER OF RECORD: M. LEBLANC DATE : 01/25

9/23/2025
c:\workdir\ncdot-pw.bentley.com.ncdot-pw-01\cuony nic\vd0372402\401.025.17BP.5.R.75.5MU.RR.S1-13.dgn
nicolas.cuony

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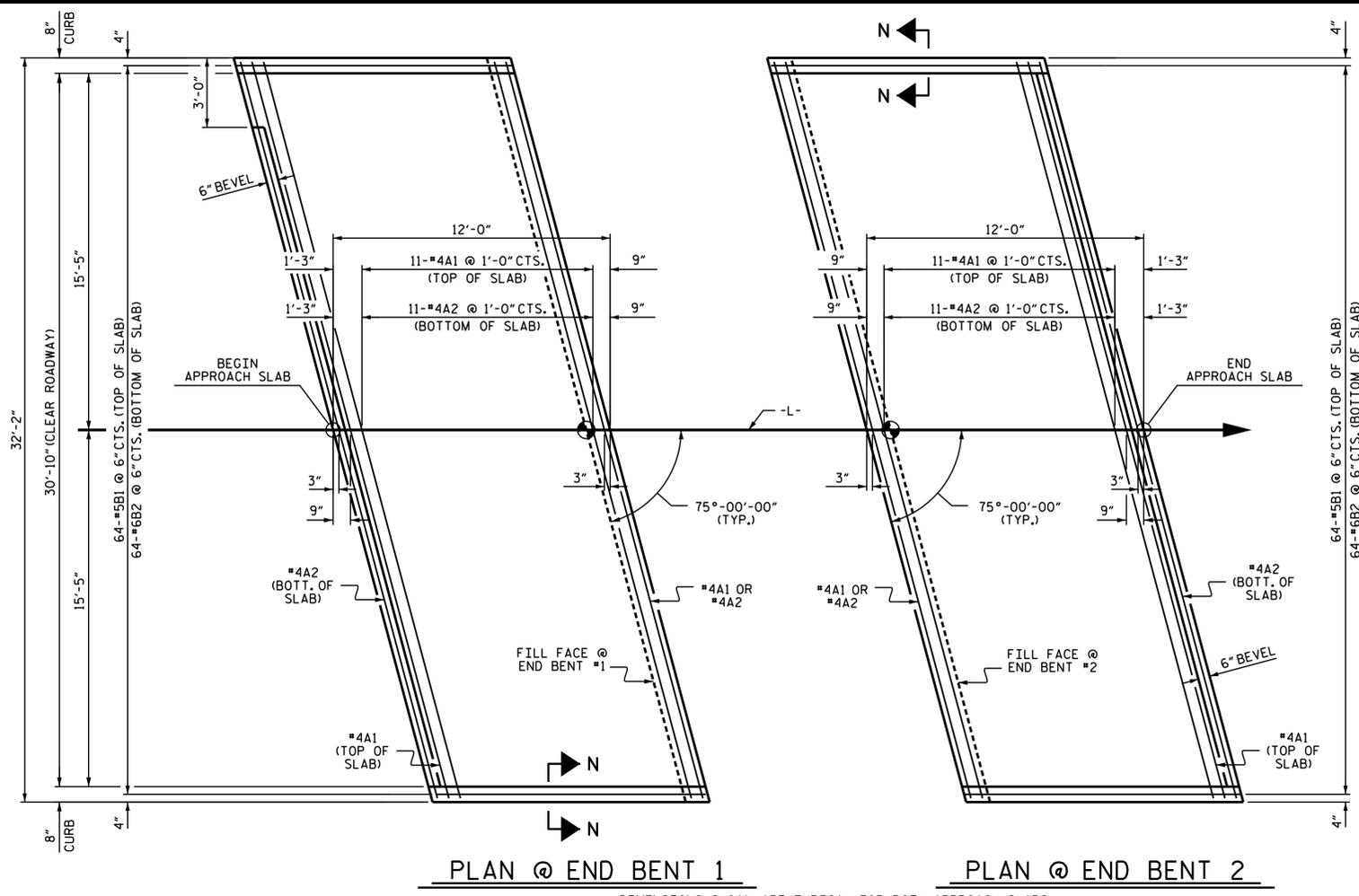
Signed by:
Marc A. LeBlanc
Professional Engineer
No. 043835
State of North Carolina
9/26/2025

Lochner
2840 PLYMOUTH PLACE, SUITE 202
RALEIGH, NC 27612
(919) 971-7111
NC LICENSE NUMBER: P-5159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

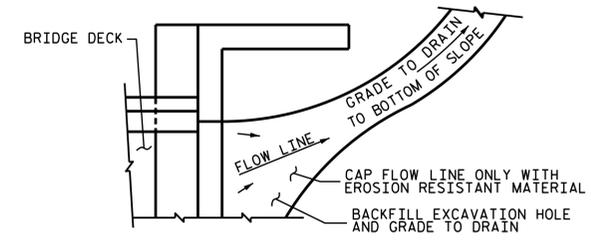
RIP RAP DETAILS

REVISIONS						SHEET NO. S-13 TOTAL SHEETS 14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



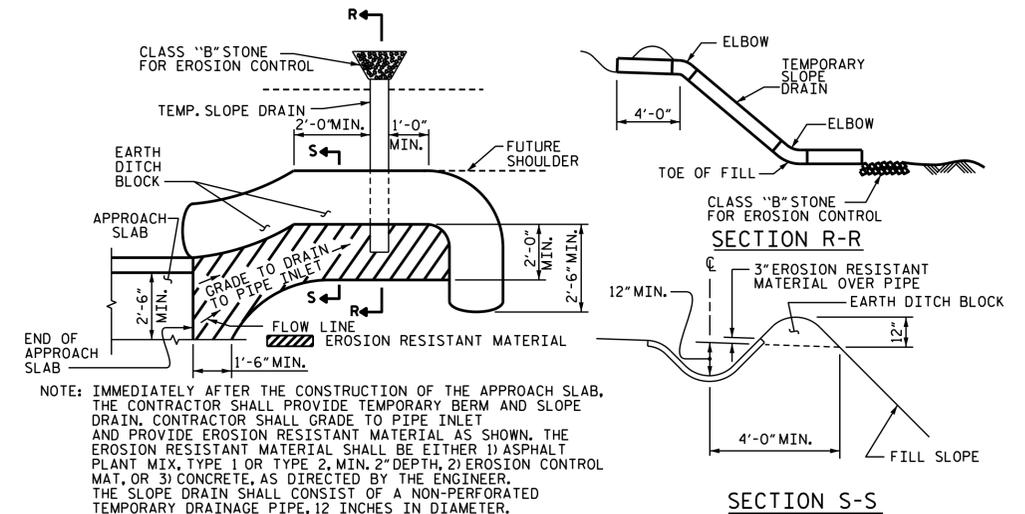
PLAN @ END BENT 1 PLAN @ END BENT 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES
FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
APPROACH SLAB GROOVING IS NOT REQUIRED.



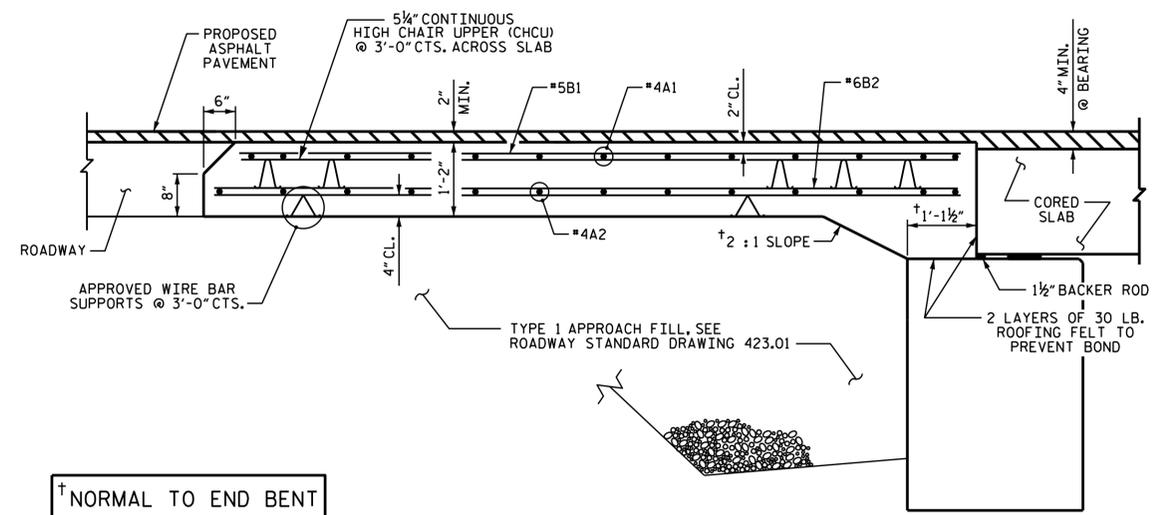
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

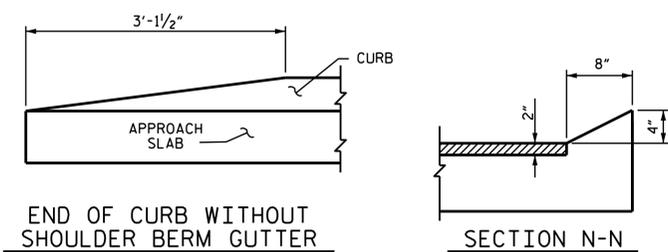


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION THRU SLAB



CURB DETAILS

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

BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	32'-11"	286	
A2	13	#4	STR	32'-11"	286	
*B1	64	#5	STR	11'-1"	740	
B2	64	#6	STR	11'-7"	1113	
REINFORCING STEEL					LBS.	1399
*EPOXY COATED REINFORCING STEEL					LBS.	1026
CLASS AA CONCRETE					C. Y.	19.5
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	32'-11"	286	
A2	13	#4	STR	32'-11"	286	
*B1	64	#5	STR	11'-1"	740	
B2	64	#6	STR	11'-7"	1113	
REINFORCING STEEL					LBS.	1399
*EPOXY COATED REINFORCING STEEL					LBS.	1026
CLASS AA CONCRETE					C. Y.	19.5

ASSEMBLED BY: MKO	DATE: 12/24
CHECKED BY: MAL	DATE: 12/24
DRAWN BY: KMM 3-08	REV. 06/19 MAA/THC
CHECKED BY: GM 3-08	REV. 08/19 GNS/THC
	REV. 07/23 BNB/SNM

Professional Engineer Seal for Marc A. LeBlanc, No. 043835, State of North Carolina. Signed by Marc A. LeBlanc on 9/26/2025.

PROJECT NO. BP5.R075
WARREN COUNTY
STATION: 16+05.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)

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

TOTAL SHEETS: 14

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