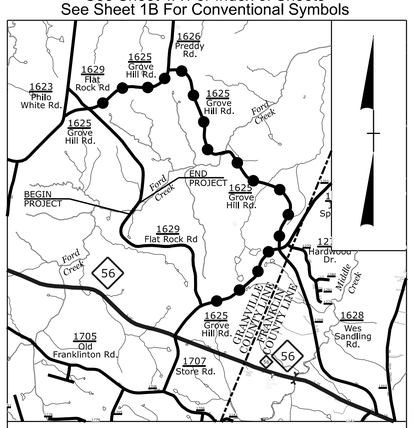
This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

01/16/24

CONTRACT: DE0424 STATE PROJECT: HB-0072

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



VICINITY MAP (NTS)

OFF-SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

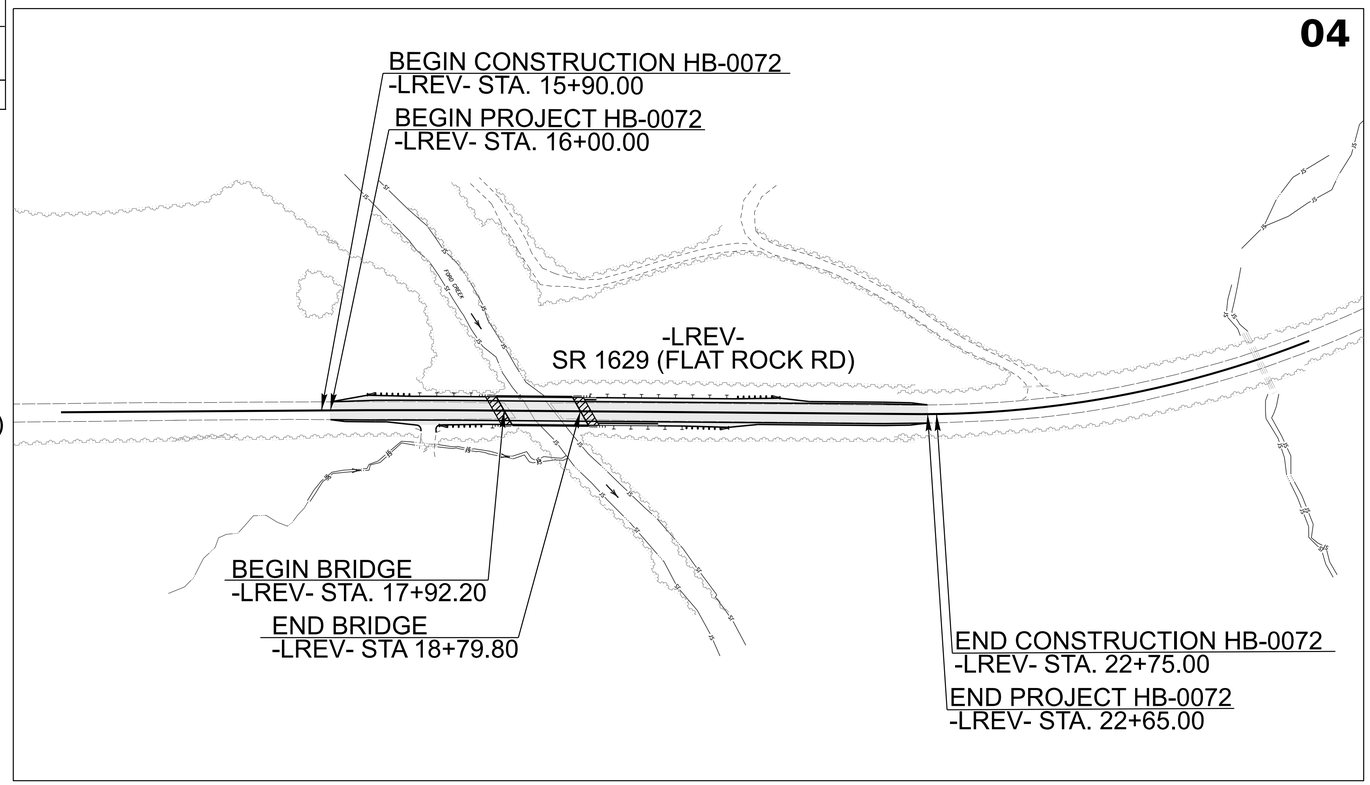
GRANVILLE COUNTY

LOCATION: *REPLACE BRIDGE No. 199 OVER FORD CREEK ON SR 1629 (FLAT ROCK RD)*

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

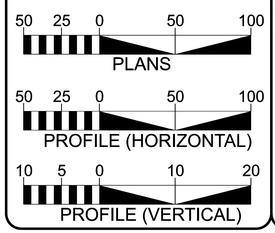
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0072	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP5.R080.1	N/A	PE
BP5.R080.2	N/A	RIGHT-OF-WAY
BP5.R080.2	N/A	UTILITY
51609.3.1	5160901	CONSTRUCTION



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2025 = 425 VPD
ADT 2045 = 525 VPD

V = 60 MPH*
*55 MPH STAT
FUNC CLASS =
LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY STATE PROJECT HB-0072 = 0.110 MILES

LENGTH OF STRUCTURE STATE PROJECT HB-0072 = 0.016 MILES

TOTAL LENGTH OF STATE PROJECT HB-0072 = 0.126 MILES

Prepared in the Offices of:

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

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

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 8, 2024

LETTING DATE:
DECEMBER 10, 2025

CHRISTINA FITZGERALD, PE
PROJECT ENGINEER

REID CROSSER, EI
PROJECT DESIGN ENGINEER

LISA BULLARD-GILCHRIST, EI
NCDOT CONTACT

HYDRAULICS ENGINEER

DocuSigned by: Eric Berger
SIGNATURE: P.E. 11/14/2025

NORTH CAROLINA PROFESSIONAL SEAL 052478 ENGINEER ERIC A. BERGER

ROADWAY DESIGN ENGINEER

Signed by: Christina Fitzgerald
SIGNATURE: P.E. 11/14/2025

NORTH CAROLINA PROFESSIONAL SEAL 048043 ENGINEER CHRISTINA Y. FITZGERALD

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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
2B-1	RIGHT-OF-WAY DETAIL SHEET
2C-1 THRU 2C-3	SPECIAL DETAILS
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARIES
4 THRU 5	PLAN AND PROFILE SHEET
RW2C-1 THRU RW2C-3	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
SIGN-1	SIGNING PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1	CROSS-SECTION SUMMARY SHEET
X-2 THRU X-8	CROSS-SECTIONS
S-1 THRU S-17	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 II.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

SUBSURFACE PLANS:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE COMMUNICATIONS - FRONTIER

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	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (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
806.02	Granite Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02	Guardrail Installation
862.03	Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
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

REVISIONS

HB-0072
1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN
Signed by: ENGINEER
Christina Fitzgerald
F82E4C...

11/14/2025

PREPARED BY
Lochner

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
9193 571-7111
NC LICENSE NUMBER P-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

05/20/24

HB-0072
18

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

Note: Not to Scale

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

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

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

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

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

ROADS AND RELATED FEATURES:
- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:
- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

EXISTING STRUCTURES:
MAJOR:
- Bridge, Tunnel or Box Culvert
- Bridge Wing Wall, Head Wall and End Wall

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

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

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

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

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

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

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

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

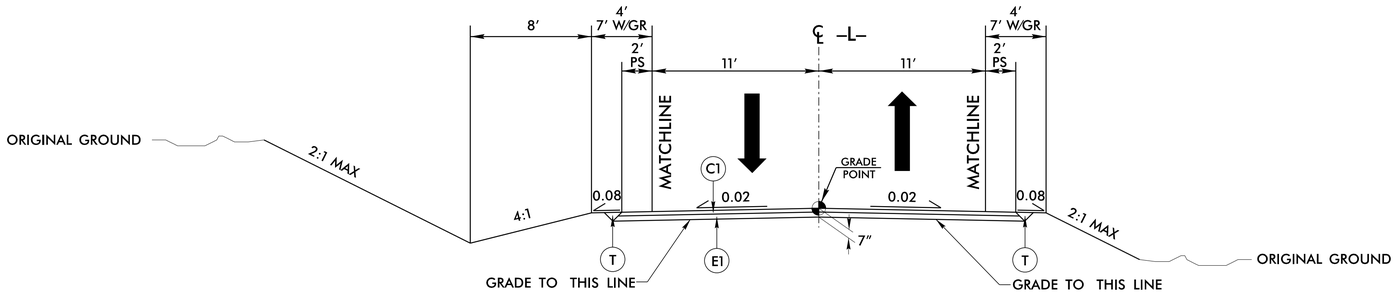
MISCELLANEOUS:
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box
- Utility Unknown U/G Line (SUE - LOS B)*
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc.
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility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

11/14/23

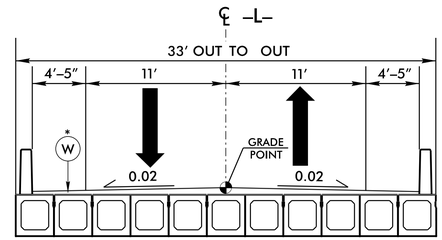
PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN 11/9/2023)

C1	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5″ IN DEPTH.
C3	PROP. APPROX. 1.5″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED TO BE PLACED IN LAYERS NOT GREATER THAN 5.5″ IN DEPTH OR LESS THAN 3″ IN DEPTH.
R1	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	MILLING BITUMINOUS PAVEMENT. 1.5″DEPTH.
W	SEE WEDGING DETAIL.

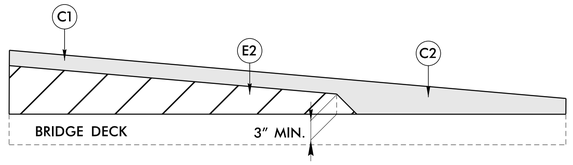
NOTE: PAVEMENT EDGE SLOPES ARE 1:1, UNLESS OTHERWISE SHOWN



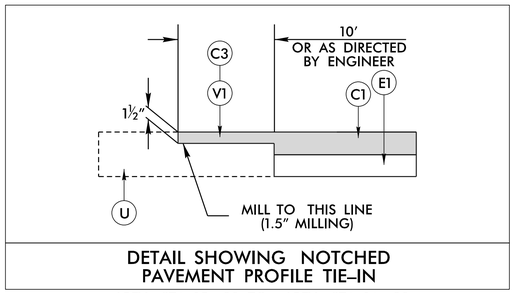
TYPICAL SECTION NO. 1
–LREV– STA. 16+00 TO –LREV– STA. 17+92.20
–LREV– STA. 18+79.80 TO –LREV– STA. 22+65



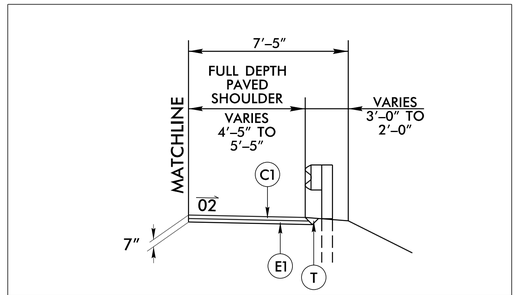
TYPICAL SECTION NO. 2
–LREV– STA. 17+92.20 TO –LREV– STA. 18+79.80
* VARIABLE DEPTH PAVEMENT. SEE STRUCTURE PLANS
NOTE: SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS



W: WEDGING DETAIL FOR STRUCTURE
Wedging Detail For Structure

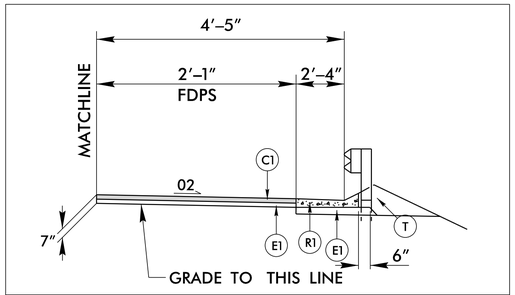


DETAIL SHOWING NOTCHED PAVEMENT PROFILE TIE–IN
–LREV– STA. 15+90 TO –LREV– STA. 16+00
–LREV– STA. 22+65 TO –LREV– STA. 22+75



DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL ON –LREV–

SEE PLANS FOR LOCATIONS



DETAIL SHOWING GUARDRAIL WITH SHOULDER BERM GUTTER

USE SHOULDER BERM GUTTER AT THE FOLLOWING LOCATIONS:
–LREV– STA. 18+81.50 TO –LREV– STA. 18+96.00 LT
–LREV– STA. 18+99.50 TO –LREV– STA. 19+65.00 RT

REVISIONS

HB-0072
2A-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
Signed by:
NORTH CAROLINA PROFESSIONAL SEAL 048043 ENGINEER CHRISTINA Y. FITZGERALD
11/14/2025

PREPARED BY
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

PAVEMENT ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 044590 ENGINEER ANDREW D. WARGO
11/14/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RIGHT-OF-WAY DETAIL SHEET

-L-		
PIc 17+34.49	PIc 20+36.87	PIc 26+06.64
Δc = 01°23'02.7" (RT)	Δc = 00°58'08.6" (LT)	Δc = 32°53'40.2" (LT)
D = 01°23'58.1"	D = 02°03'34.0"	D = 04°52'27.9"
Lc = 98.90	Lc = 47.05	Lc = 674.84
Tc = 49.45	Tc = 23.53	Tc = 347.00
R = 4,094.11	R = 2,782.09	R_e = 1,175.44
S_e = NC	S_e = NC	S = Exist.
Runoff = 25'	Runoff = 25'	

-LREV-	
PIc 16+78.59	PIc 26+02.22
Δc = 00°52'59.0" (RT)	Δc = 33°21'50.8" (LT)
D = 00°34'22.6"	D = 04°52'27.9"
Lc = 154.12	Lc = 684.47
Tc = 77.06	Tc = 352.25
R = 10,000	R = 1,175.44
SE = NC	SE = EXIST
	RO = EXIST

NAD 83
NA 2011

-L- 20

1
ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

-LREV- POB 13+00.00
-LREV- PT 17+55.65
-L- PT 17+83.94
-L- PC 16+85.04
-LREV- PC 16+01.53
-L- PC 20+13.35
-L- PT 20+60.40
-LREV- PC 22+49.98
-L- PC 22+59.63

-L- +85.00
50 (LT)
-L- +25.00
60 (LT)
-L- +13.35
50 (LT)
-L- +00.00
60 (LT)
-L- +60.40
30 (LT)
-L- +85.04
50 (LT)
-L- +83.94
50 (LT)
DO NOT PLACE
-L- +00.00
30 (LT)

3
GLENN JAMES PREDDY
DB 1541 - PG 414
DB 216 - PG 584

FORD CREEK

-LREV- 20
-LREV-
N36°17'00.5"E
-L-
N36°17'00.5"E
15
-LREV-
N37°09'59.5"E
-L-
N37°40'08.5"E
-L-
N36°41'54.9"E

-L- +85.04
30 (RT)
-L- +83.94
40 (RT)
-L- +13.35
40 (RT)
-L- +60.40
40 (RT)
-L- +25.00
30 (RT)

4
RODNEY A. PREDDY
DB 1334 - PG 290
DB 216 - PG 588

2
ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

HORIZONTAL GEOMETRY BASED OFF BP5.R80/HB0072 ROADWAY PLANS, PROVIDED BY STEWART, FEBRUARY 2025

SEE PLAN SHEET 4 FOR PLAN VIEW

HB-0072

2B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN
Signed by ENGINEER
Christina Fitzgerald
F82E4E...

NORTH CAROLINA PROFESSIONAL SEAL 048043 ENGINEER CHRISTINA Y. FITZGERALD

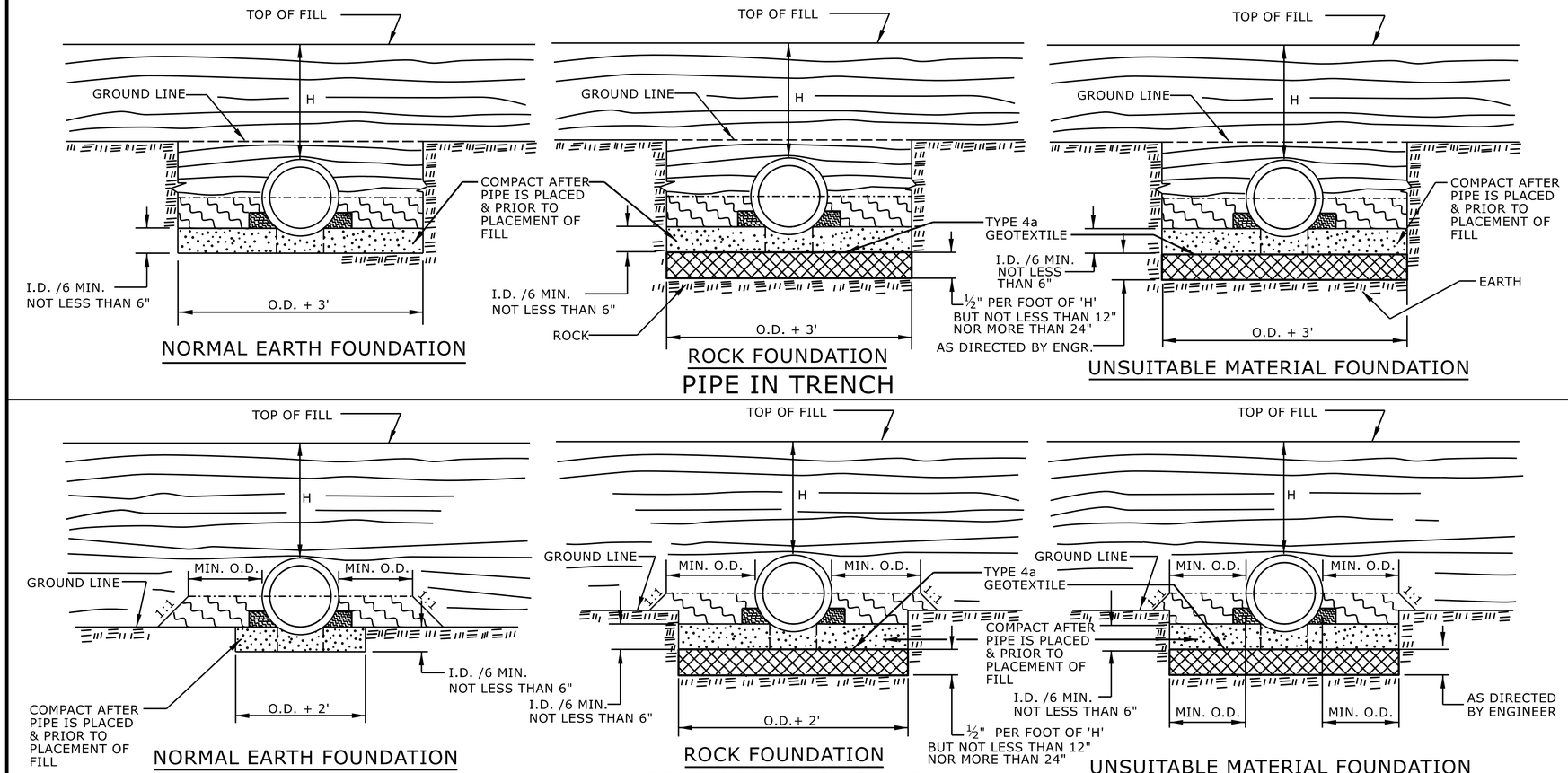
11/14/2025

PREPARED BY
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 577-7171
NC LICENSE NUMBER P-0158

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	2C-1



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

SHEET 2 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

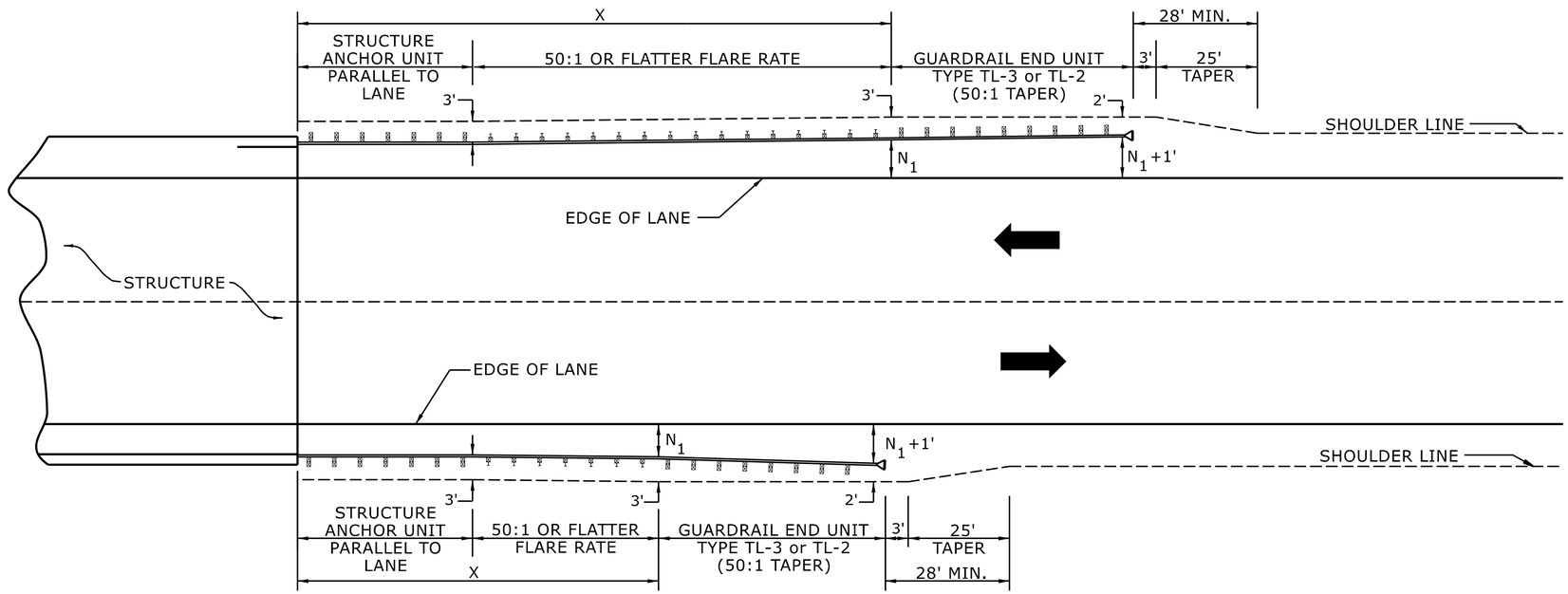
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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.: _____

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	2C-2



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 ≥ 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

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

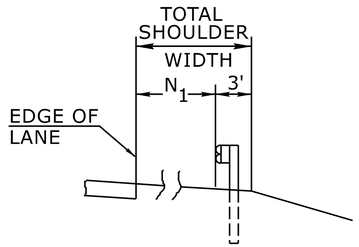
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

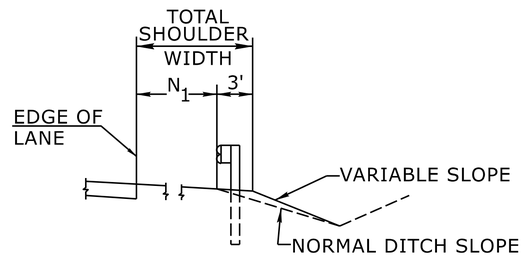
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	2C-3

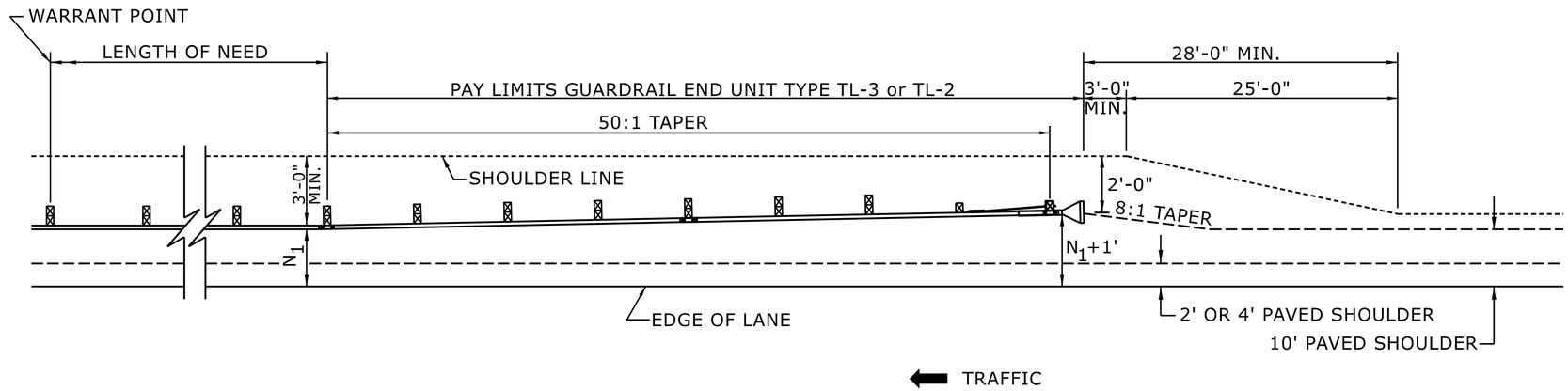


FILL SECTION



CUT SECTION

"N_1"= 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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER

SHEET 6 OF 15

862D01

DOCUMENT NOT CONSIDERED FINAL
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.:

11/14/23

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK IN CUBIC YARDS

LOCATION	EXCAVATION		EMBANKMENT	BORROW	WASTE
	TOTAL UNCLASS.	UNDERCUT	EMBANK. +%		TOTAL WASTE
SUMMARY					
-LREV- 16+00 TO 17+92.20 (BEGIN BRIDGE)	65	--	379	314	--
-LREV- 17+92.20 (BEGIN BRIDGE) TO 18+79.80 (END BRIDGE) LT	47	--	--	--	47
-LREV- 18+79.80 (END BRIDGE) TO 22+65	100	--	382	282	--
TOTAL SUMMARY					
TOTAL	212	--	761	596	47
MATERIAL FOR SHOULDER CONSTRUCTION	--	--	--	--	--
LOSS DUE TO CLEARING & GRUBBING	--	--	--	--	--
ADDITIONAL UNDERCUT	--	--	--	--	--
ROCK WASTE TO REPLACE BORROW	--	--	--	--	--
ADJUST FOR ROCK WASTE	--	--	--	--	--
WASTE IN LIEU OF BORROW	--	--	--	-47	--
EST.5% TO REPLACE TOP SOIL ON BORROW PIT	--	--	--	27	--
GRAND TOTAL	212	--	--	576	--
SAY	220			580	

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY LOCHNER.
THESE EARTHWORK QUANTITIES ARE BASED, IN PART, ON SUBSURFACE DATA PROVIDED BY NCDOT GEOTECHNICAL ENGINEERING UNIT

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

EST. DDE = 15 CUBIC YARDS

EST. UNDERCUT CONTINGENCY = 200 CY
PER GEOTECH RECOMMENDATIONS, 200 CUBIC YARDS OF UNDERCUT SHOULD BE USED AT THE DISCRETION OF THE RESIDENT ENGINEER

EST. SELECT GRANULAR MATERIAL = 200 CY

EST. GEOTEXTILE FOR SOIL STABILIZATION = 200 CY

SUMMARY OF REMOVAL EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-LREV-	16+00.00	18+06.26	CL	422.81
-LREV-	18+44.70	22+65.00	CL	902.77
			TOTAL:	1,325.57
			SAY:	1,330

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LOC LT/RT/CL	LENGTH
-LREV-	18+81.50	18+96.00	LT	14.5
-LREV-	18+99.50	19+65.00	RT	65.5
			TOTAL:	80.0
			SAY:	80

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TYPE III	B-77	GREU TL-3	GREU TL-2	CAT-1	AT-1	TYPE III SC	B-77 SC	IA-MASH TL-3	EA	G	NG				
-LREV-	16+41.01	17+84.58	LT	143.75'				17+69.33	4'-5"	7'-5"		50'		1	1		1												
-LREV-	17+21.10	18+02.40	RT	81.25'			BRIDGE		4'-5"	7'-5"	50'		1		1		1												
-LREV-	18+69.59	21+00.64	LT	231.25'			18+94.33		4'-5"	7'-5"	50'		1		1		1												
-LREV-	18+87.40	20+43.65	RT	156.25'				19+19.33	4'-5"	7'-5"		50'		1	1		1												
		SUBTOTAL		612.50'																									
		LESS ANCHOR DEDUCTIONS																											
		GREU TL-3 4 x 50.00' =		-200.0'																									
		TYPE III 4 x 18.75' =		-75.0'																									
		TOTAL		337.50'											4		4												
		SAY		350.00'											4		4												
		5 ADDITIONAL GUARDRAIL POSTS																											

HB-0072
3B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

PREPARED BY
Lochner

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0158

REVISIONS

Z10267

COMPUTED BY: GRAYSON BRANNAN, EI **DATE:** 6/23/2025

CHECKED BY: ERIC BERGER, PE **DATE:** 6/23/2025

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
HB-0072	3D-1

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

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

LINE & STATION	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC)									C. S. PIPE				R. C. PIPE CLASS III				R. C. PIPE CLASS IV					R. C. PIPE CLASS V				STRUCTURAL PLATE PIPE				
SIZE								12	15	18	24						12	15	18	24	12	15	18	24	12	15	18	24	30	12	15	18	24	60	66	72		
THICKNESS OR GAUGE		FROM	TO	FT.	FT.	FT.	%					DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	.064	.064	.064	.064																		
LREV 18+91	14 LT	0401		295.3																																		
		0401	0402		291.8	286.4			24																													
LREV 19+09	14 RT	0403		294.9																																		
		0403	0404		291.4	290.6																				52												
LREV 19+60	14 RT	0404		293.9																																		
		0404	0405		290.6	289.0			16																													
SHEET TOTALS									40																	52												
PROJECT TOTALS									40																	52												

LINE & STATION	FROM	TO	##" R.C. PIPE CULVERTS, CONTRACTOR DESIGN			15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37		15" SIDE DRAIN PIPE ELBOW	##" SIDE DRAIN PIPE ELBOW	##" SIDE DRAIN PIPE ELBOW	##" R.C. ELBOW			FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
LREV 18+91	0401												1													1						1														
	0401	0402																																		2										
LREV 19+09	0403												1													1						1														
	0403	0404																																												
LREV 19+60	0404												1													1						1														
	0404	0405																																		2										
SHEET TOTALS													3													3						3				4										
PROJECT TOTALS													3													3						3				4										

ABBREVIATIONS

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

-LREV-	
PIc 16+78.59	PIc 26+02.22
Δc = 00°52'59.0" (RT)	Δc = 33°21'50.8" (LT)
D = 00°34'22.6"	D = 04°52'27.9"
Lc = 154.12	Lc = 684.47
Tc = 77.06	Tc = 352.25
R = 10,000	R = 1,175.44
SE = NC	SE = EXIST
	RO = EXIST

DETAIL 1
SPECIAL BASE DITCH
(Not to Scale)

Type of Liner = Class B Rip-Rap, Keyed-In
FROM STA. 16+83 TO STA. 17+80 -LREV- LT

DETAIL 2
BANK STABILIZATION
(Not to Scale)

Type of Liner = Class II Rip-Rap, Keyed-In
AT STA. 18+18 -LREV-
AT STA. 18+78 -LREV-
EST 71 TONS
EST 120 SY GEOTEXTILE
EST DDE=15 CY

DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class II Rip-Rap, Keyed-In
FROM STA. 17+80 TO STA. 18+04 -LREV- LT
FROM STA. 18+14 TO STA. 18+41 -LREV- LT

DETAIL 4
SPECIAL BASE DITCH
(Not to Scale)

FROM STA. 18+23 TO STA. 19+50 -LREV- LT

NAD 83
NA 2011

1 ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

2 ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

3 GLENN JAMES PREDDY
DB 1541 - PG 414
DB 216 - PG 584

4 RODNEY A. PREDDY
DB 1334 - PG 290
DB 216 - PG 588

-LREV- POB 13+00.00

-LREV- PC 16+01.53

-LREV- N36°17'00.5"E

BEGIN CONSTRUCTION HB-0072
-LREV- STA. 15+90.00

BEGIN PROJECT HB-0072
-LREV- STA. 16+00.00

BEGIN BRIDGE
-LREV- STA. 17+92.20

BEGIN APPROACH SLAB
-LREV- STA. 17+81.50

-LREV- PT 17+55.65

SPECIAL BASE DITCH
W/ CLASS B RIP RAP
EST 50 TONS
EST 140 SY GEOTEXTILE
SEE DETAIL 1

RIP RAP AT EMBANKMENT
W/ CLASS II RIP RAP
EST 25 TONS
EST 55 SY GEOTEXTILE
SEE DETAIL 3

SPECIAL BASE DITCH
SEE DETAIL 4

CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

15" W/ ELBOWS
END SBG
+96

CLASS II
RIP RAP (TYP)
STR. PAY
ITEM

END SBG
+65
15" W/ ELBOWS
CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

END APPROACH SLAB
-LREV- STA. 18+90.50

END BRIDGE
-LREV- STA. 18+79.80

BANK STABILIZATION
W/ CLASS II RIP RAP
SEE DETAIL 2

-LREV- PC 22+49.98

-LREV- N37°09'59.5"E

END CONSTRUCTION HB-0072
-LREV- STA. 22+75.00

END PROJECT HB-0072
-LREV- STA. 22+65.00

24' INC. TYP.
+25.44
+64.10
50' TAPER
RETAIN
TBM #2
15" RCP IV
4'-5" PS
2' PS
GREU TL-3
TB 2GI
EXIST
EXISTING R/W
WOODS
RIPRAP
PROPERTY LINE = CENTER OF CREEK
Frontier Communications of America Inc., Unk. S/T

STRUCTURE EXCAVATION
PROP PAVED SHOULDER
FOR -LREV- PROFILE, SEE SHEET 05
SEE SHEET 2B-1 FOR RIGHT-OF-WAY DETAILS
FOR STRUCTURE PLANS, SEE SHEET S-1 THRU S-17
ALL DRIVEWAY RADII 5' UNLESS OTHERWISE NOTED

NOTE: ALL STRUCTURE ANCHOR UNITS ATTACHED TO THE BRIDGE RAILING WILL BE TYPE III UNITS

HB-0072
04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN
ENGINEER
Signed by:
Christina Fitzgerald
F82D9A4A4A4A4A4...
NORTH CAROLINA PROFESSIONAL SEAL 048043 ENGINEER CHRISTINA Y. FITZGERALD
11/14/2025

PREPARED BY
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
9919 571-7111
NC LICENSE NUMBER P-0158

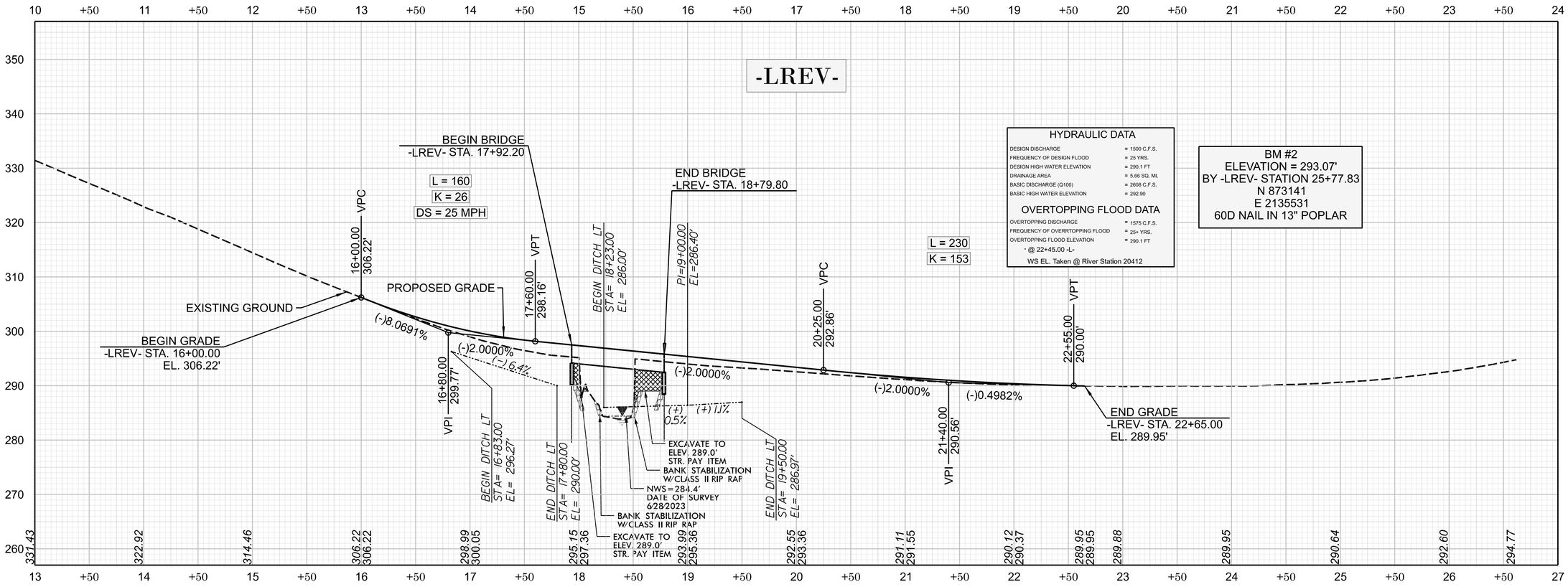
HYDRAULICS
ENGINEER
DocuSigned by:
Eric Berger
B0C0D0E0F0G0H0...
NORTH CAROLINA PROFESSIONAL SEAL 052478 ENGINEER ERIC A. BERGER
11/14/2025

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

REVISIONS

11/14/23



FOR -L- PLAN, SEE SHEET 04
FOR STRUCTURE PLANS, SEE SHEET S-1 THRU S-17

HB-0072

05

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

Signed by:
Christina Fitzgerald
F6A7C0B8E7E74F6...

NORTH CAROLINA PROFESSIONAL SEAL 048043 ENGINEER CHRISTINA Y. FITZGERALD

1/14/2025

PREPARED BY

Lochner

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 977-7171
NC LICENSE NUMBER P-0158

HYDRAULICS ENGINEER

DocuSigned by:
Eric Berger
B5BF5D7E8A5E4BE...

NORTH CAROLINA PROFESSIONAL SEAL 052478 ENGINEER ERIC A. BERGER

11/14/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

vhb

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

REVISIONS

6/2/99

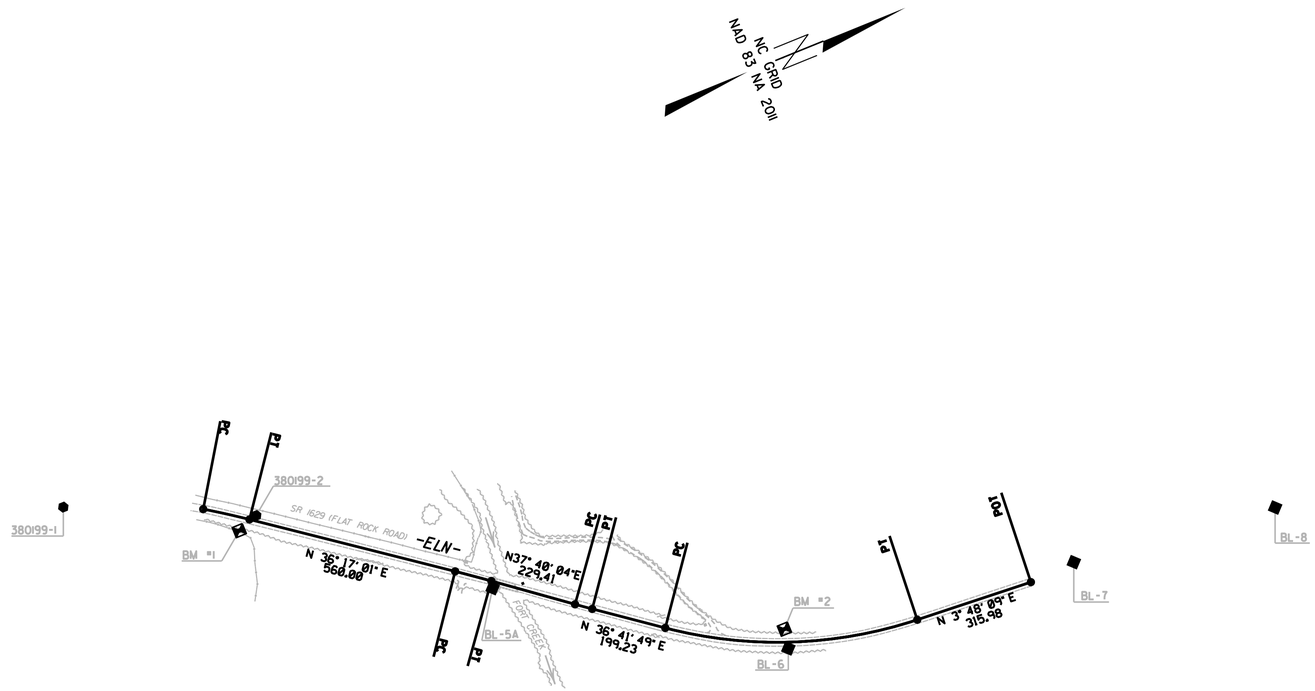
SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
380199	RW2C-1

Location and Surveys

ESP ASSOCIATES, INC
2200 GATEWAY CENTRE BLVD., SUITE 216
MORRISVILLE, NC 27560



SEE SHEET RW2C-2
FOR FURTHER
ALIGNMENT DETAILS

NOTES:

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

21-NOV-2018 09:22
S:\Projects\2018\EMS0259_380199-con-esp\Submit\11-21-18 Redlines\380199_ls_rw2c-1_181121.dgn
$$USER$$ $$DATE$$ $$TIME$$

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
380199	RW2C-2
Location and Surveys	

ESP ASSOCIATES, INC
2200 GATEWAY CENTRE BLVD., SUITE 216
MORRISVILLE, NC 27560

BLN

POINT	DESC.	NORTH	EAST	ELEVATION
1	380199-1	871498.9500	2134516.4880	363.80
2	380199-2	871962.4180	2134728.7200	344.07
A5	BL-5A	872468.4498	2135141.1553	294.72
6	BL-6	873131.8205	2135582.4460	292.85
7	BL-7	873915.8352	2135655.3060	332.60
8	BL-8	874462.5376	2135721.6650	356.55
3	380199-3	874962.3880	2135543.9220	373.15
4	380199-4	875568.1175	2134999.0380	386.54

1027 ELEVATION = 293.09
N 873141 E 2135531
TBM2 60D NAIL IN 13" POPLAR TREE

70002 ELEVATION = 348.67
N 871906 E 2134749
TBM1 60D NAIL IN 16" PINE TREE

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.

STIMSEL

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
380199	RW2C-3

Location and Surveys

ESP ASSOCIATES, INC
2200 GATEWAY CENTRE BLVD., SUITE 216
MORRISVILLE, NC 27560

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

ELN POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	871839.201	2134660.474							
CURVE			N 34°41'21.9" E	125.02	03°11'17.3"(RT)	02°32'59.1"	125.04	62.53	2247.11
PT	871941.999	2134731.627							
LINE			N 36°17'00.5" E	560.00					
PC	872393.417	2135063.025							
CURVE			N 36°58'37.1" E	98.90	01°23'02.7"(RT)	01°23'58.1"	98.90	49.45	4094.11
PT	872472.425	2135122.513							
LINE			N 37°40'03.5" E	229.41					
PC	872654.015	2135262.698							
CURVE			N 37°10'59.2" E	47.05	00°58'31.4"(LT)	02°04'22.4"	47.05	23.53	2764.06
PT	872691.503	2135291.135							
LINE			N 36°41'49.0" E	199.23					
PC	872851.250	2135410.194							
CURVE			N 20°14'58.8" E	665.61	32°53'40.3"(LT)	04°52'28.0"	674.84	347.00	1175.43
PT	873475.719	2135640.568							
LINE			N 03°48'08.7" E	315.98					
POT	873791.003	2135661.523							

NOTES:

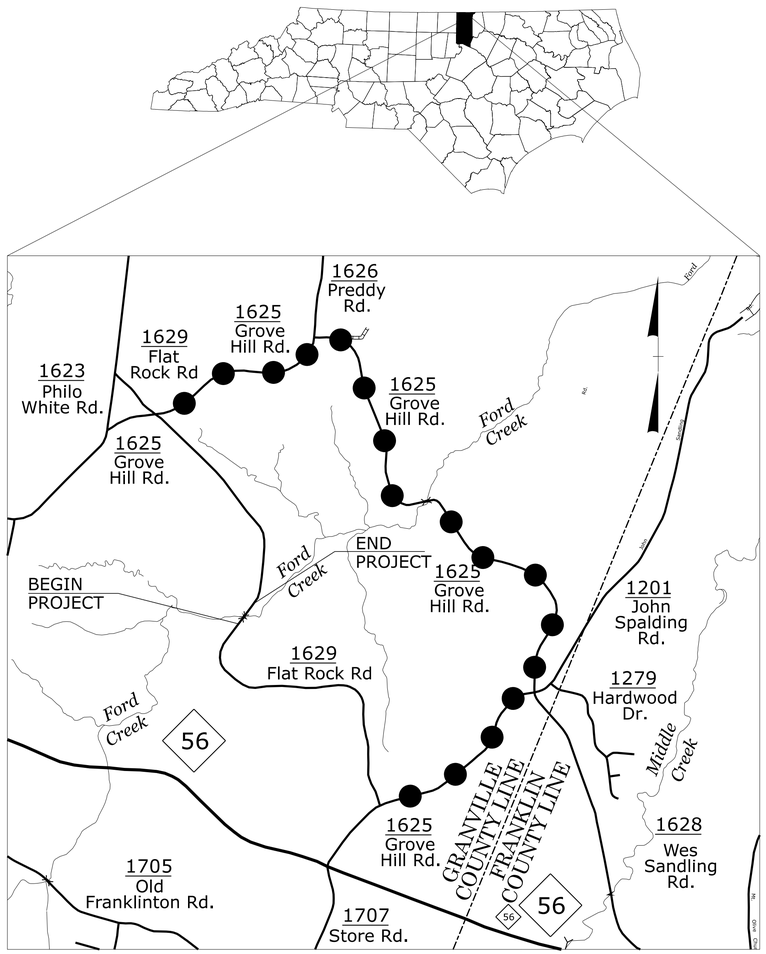
1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

GRANVILLE COUNTY



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, LOCAL NOTES, AND PHASING)
TMP-2	OFF-SITE DETOUR
TMP-3	SPECIAL SIGN DESIGN

SHEET NO.
TMP-1

CONTRACT: DE0424

PROJECT: HB-0072

PLANS PREPARED FOR NCDOT DIVISION 5

LISA B. GILCHRIST, E.I — NCDOT CONTACT

PLANS PREPARED BY:

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

JASON TALLEY, PE
PROJECT ENGINEER

REID CROSSER, EI
PROJECT DESIGN ENGINEER

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: Signed by: Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY

PROJ. REFERENCE NO.	SHEET NO.
HB-0072	TMP-1A

ROADWAY STANDARD DRAWINGS

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

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES

LEGEND

GENERAL

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

SIGNALS

EXISTING PROPOSED TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

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

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

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

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

APPROVED: Signed by: Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
HB-0072	TMP-1B

LOCAL NOTES

1. NOTIFY GRANVILLE COUNTY SCHOOLS 30 DAYS PRIOR TO ROAD CLOSURE AT (919) 693-6412. NOTIFY GRANVILLE COUNTY EMERGENCY MANAGEMENT SERVICES DIRECTOR 30 DAYS PRIOR TO ROAD CLOSURE AT (919) 603-1310. NOTIFY THE GRANVILLE COUNTY FIRE MARSHALL 30 DAYS PRIOR TO ROAD CLOSURE AT (919) 603-1310. NOTIFY BRASSFIELD VOLUNTEER FIRE DEPARTMENT 30 DAYS PRIOR TO ROAD CLOSURE AT (919) 528-2833.

GENERAL NOTES

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

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

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

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

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

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

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

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

TRAFFIC CONTROL DEVICES

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

MANAGEMENT STRATEGIES

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

RECOMMENDED STRATEGIES:

TRAFFIC MANAGEMENT STRATEGIES:
- FULL ROADWAY CLOSURES
- OFF-SITE DETOURS / USE OF ALTERNATIVE ROUTES

PHASING

STEP 1:

PROVIDE AND MAINTAIN CHANGEABLE MESSAGE SIGNS AT EACH END OF SR 1629 (FLAT ROCK RD.) FOR FOURTEEN (14) CALENDAR DAYS PRIOR TO ROAD CLOSURE, AS SHOWN ON SHEET TMP-3 OR AT LOCATIONS AS DIRECTED BY THE ENGINEER.

STEP 2:

INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9. INSTALL AND COVER DETOUR SIGNING AS SHOWN ON TMP-3.

STEP 3:

UNCOVER DETOUR SIGNING AND INSTALL TYPE III BARRACADES TO CLOSE SR 1629 (FLAT ROCK RD.) TO THROUGH TRAFFIC. RELOCATE CHANGEABLE MESSAGE SIGNS AS SHOWN ON TMP-3 OR AT LOCATIONS AS DIRECTED BY THE ENGINEER.

STEP 4:

PLACE TRAFFIC ONTO OFF-SITE DETOUR. REMOVE THE EXISTING STRUCTURE. CONSTRUCT THE PROPOSED STRUCTURE AND ROADWAY.

STEP 5:

PLACE FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLANS.

STEP 6:

REMOVE TYPE III BARRACADES FROM SR 1629 (FLAT ROCK RD.) AND REOPEN ROADWAY TO TRAFFIC. REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES AND DETOUR SIGNING. CONTRACTOR TO ALSO REMOVE 2 EXISTING "NARROW BRIDGE" WARNING SIGNS LOCATED ON SR 1629 (FLAT ROCK RD.)

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

APPROVED: Signed by: Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

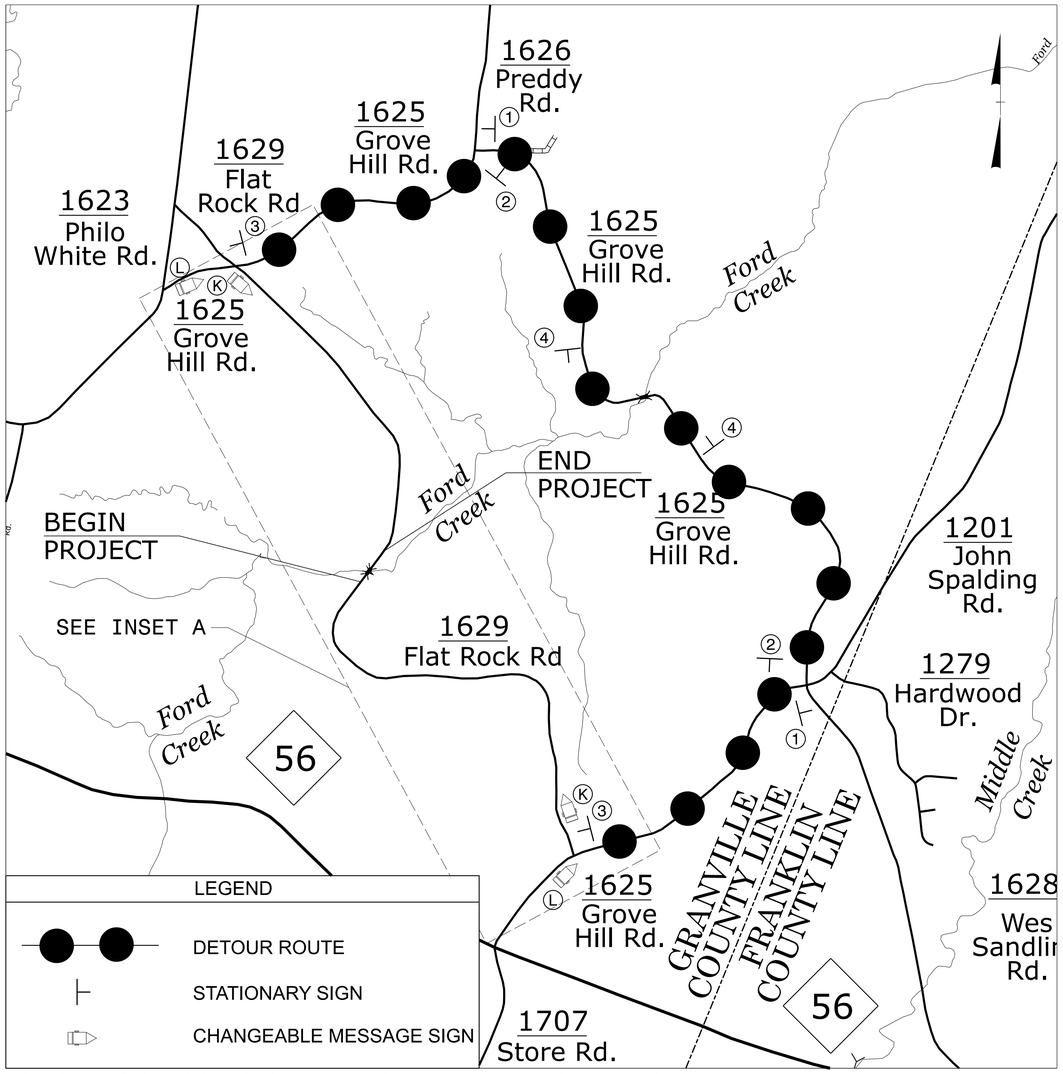
NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY

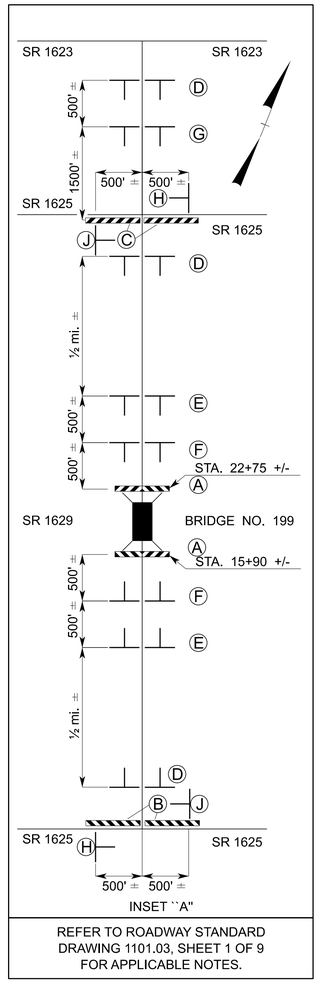
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TRANSPORTATION OPERATIONS PLAN

PROJ. REFERENCE NO.	SHEET NO.
HB-0072	TMP-2





REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.

NOTES: ALL SIGN LOCATIONS ARE APPROXIMATE, REFER TO (2024) NCDOT ROADWAY STANDARD DRAWING 1101.03 FOR SPACING REQUIREMENTS

* SEE SHEET TMP-3 FOR SPECIAL SIGN DESIGN

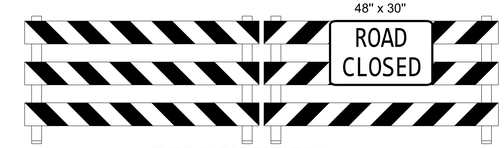
* * CHANGEABLE MESSAGE SIGN LOCATIONS AS DIRECTED BY THE ENGINEER

① *
FLAT ROCK ROAD — SP-01 36" x 24"
DETOUR — M4-8 24" x 12"
M6-1 21" x 15"

② *
FLAT ROCK ROAD — SP-01 36" x 24"
DETOUR — M4-8 24" x 12"
M6-1 21" x 15"

③ *
FLAT ROCK ROAD — SP-01 36" x 24"
END DETOUR — M4-8 A 24" x 18"

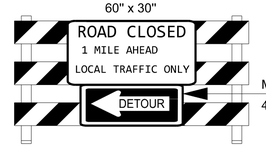
④ *
FLAT ROCK ROAD — SP-01 36" x 24"
DETOUR — M4-8 24" x 12"
M6-3 21" x 15"

Ⓐ


TYPE III BARRICADE(S)

Ⓑ

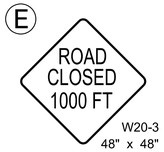

M4-10R 48" x 18"
TYPE III BARRICADE

Ⓒ


M4-10L 48" x 18"
TYPE III BARRICADE

Ⓓ


W20-3 48" x 48"

Ⓔ


W20-3 48" x 48"

Ⓕ


W20-3 48" x 48"

Ⓖ


W20-2 48" X 48"

Ⓗ


W20-3 48" x 48"
NEXT LEFT — SP- 4L 42" X 12"

Ⓙ


W20-3 48" x 48"
NEXT RIGHT — SP- 4R 42" X 12"

Ⓚ MESSAGE PRIOR TO CLOSURE: **

MESSAGE NO. 1	MESSAGE NO. 2
SR 1629 WILL BE CLOSED	STARTING (DAY) (TIME)

CHANGEABLE MESSAGE SIGN

Ⓛ MESSAGE DURING CLOSURE: **

MESSAGE NO. 1	MESSAGE NO. 2
SR 1629 CLOSED	FOLLOW POSTED DETOUR

CHANGEABLE MESSAGE SIGN

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

APPROVED: Digitally signed by Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

OFF-SITE DETOUR

PROJ. REFERENCE NO.	SHEET NO.
HB-0072	TMP-03

SIGN NUMBER: SP-01
TYPE: D
QUANTITY: SEE PLANS

SIGN WIDTH: 4′-0″
HEIGHT: 2′-6″
TOTAL AREA: 10.4 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

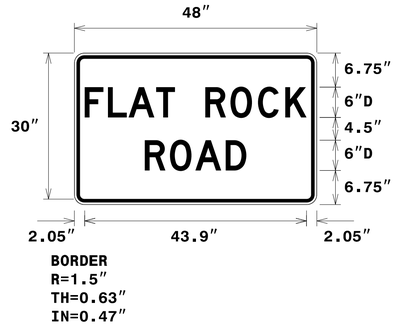
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: RUC
CHECKED BY: JT
Jun 25, 2025
PROJECT ID: HB-0072
LOCATION: GRANVILLE COUNTY
DIV: 5



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

																									Series/Size Text Length
	F	L	A	T		R	O	C	K																D 2000
	2	6.7	10.7	16.2	19.9	25.9	30.9	36.4	41.8																43.9
	R	O	A	D																					D 2000
	14	18.9	24	30																					20.1

FILENAME: BP5RO80_TC_TMP_02

NORTH CAROLINA D.O.T. SIGN DETAIL

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

APPROVED: Signed by: Jason Talley 552A07DA2E1F41B...
DATE: 11/14/2025
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SPECIAL SIGN DESIGN

PROJECT: HB-0072

CONTRACT: DE0424

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

TIP NO.	SHEET NO.
HB-0072	PMP-1

APPROVED: Signed by: Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

SEAL: SEAL 029473 JASON M. TALLEY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN

GRANVILLE COUNTY

LOCATION: REPLACE BRIDGE NO. 199 OVER FORD CREEK ON SR 1629 (FLAT ROCK RD.)

INDEX

SHEET NO.	DESCRIPTION
PMP-1	PAVEMENT MARKING PLAN TITLE AND SCHEDULE SHEET
PMP-2	PAVEMENT MARKING DETAIL

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
T1	THERMOPLASTIC WHITE EDGELINE (4", 90 MIL)
T13	THERMOPLASTIC YELLOW DOUBLE CENTER (4", 90 MIL)

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
-LREV- SR 1629 (FLAT ROCK RD)	THERMOPLASTIC	NONE

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

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

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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 & BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL & 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
REID CROSSER, EI	SIGNING & DELINEATION PROJECT DESIGN ENGINEER

Lochner

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

TIP NO.	SHEET NO.
HB-0072	PMP-2

APPROVED: Signed by: Jason Talley 552A07DA2E1F41B...

DATE: 11/14/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 029473 ENGINEER JASON M. TALLEY

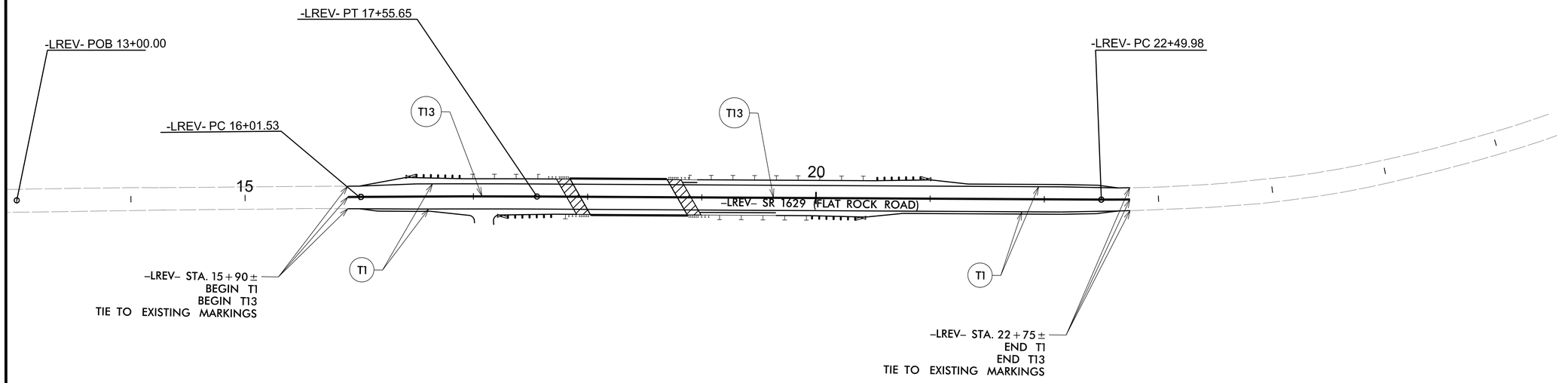
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
T1	THERMOPLASTIC WHITE EDGELINE (4", 90 MIL)
T13	THERMOPLASTIC YELLOW DOUBLE CENTER (4", 90 MIL)

NAD 83
NA 2011



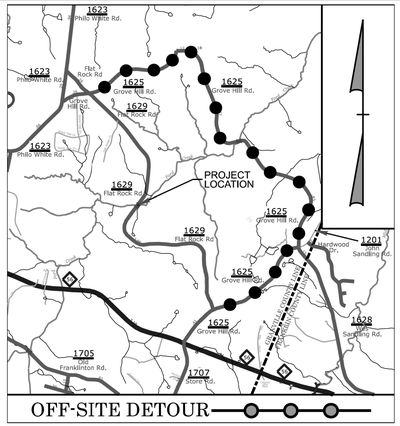
GRAPHIC SCALES

50 25 0 50 100
PLANS

PAVEMENT MARKING DETAIL

$$$$USERNAME$$$$ $$$$SYSTIME$$$$

TIP PROJECT: HB-0072



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

GRANVILLE COUNTY

LOCATION: *REPLACE BRIDGE No. 199 OVER FORD CREEK ON SR 1629 (FLAT ROCK RD)*
TYPE OF WORK: *DRAINAGE, GRADING, PAVING AND STRUCTURE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0072	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP5.R080.1	N/A	PE
BP5.R080.2	N/A	RW
BP5.R080.2	N/A	UTL
51609.3.1	5160901	CONST.

BEGIN CONSTRUCTION HB-0072
-LREV- STA. 15+90.00

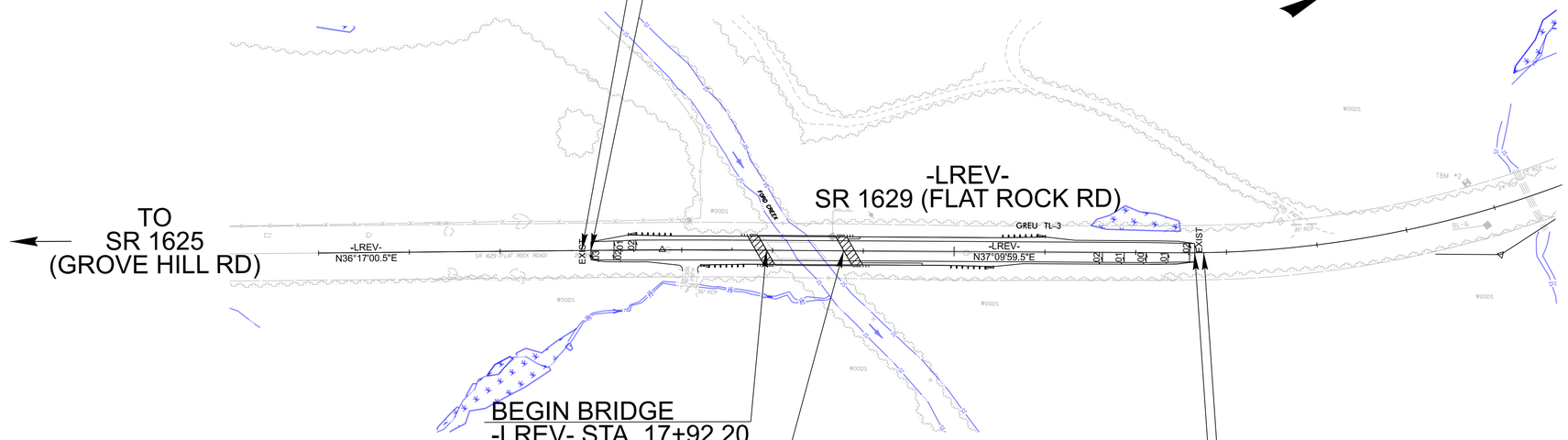
BEGIN PROJECT HB-0072
-LREV- STA. 16+00.00

NAD 83
NA 2011

TO
SR 1623
(PHILO WHITE RD)

-LREV-
SR 1629 (FLAT ROCK RD)

TO
SR 1625
(GROVE HILL RD)



BEGIN BRIDGE
-LREV- STA. 17+92.20

END BRIDGE
-LREV- STA 18+79.80

END CONSTRUCTION HB-0072
-LREV- STA. 22+75.00

END PROJECT HB-0072
-LREV- STA. 22+65.00

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

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

GRAPHIC SCALE

50 25 0 50 100
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL 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.

$$USERNAME$$ $$SYSTIME$$

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	EC-02

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

EROSION & SEDIMENT CONTROL LEGEND

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

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

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

EXCELSIOR MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-LREV-	18+23	19+50	LT	60
				SUBTOTAL	60
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					5685
				TOTAL	5745
				SAY	5745

EXCELSIOR MATTING FOR EROSION CONTROL

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

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	EC-3A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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

PROJECT REFERENCE NO.	SHEET NO.
HB-0072	EC-3B

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 and the Division Roadside Field Operations Engineer. If determined that project-related sedimentation is occurring beyond 400 meters, the United States Fish and Wildlife Service (USFWS) must be contacted immediately to discuss potential remediation.

HB-0072
EC-4/CONST.04

NC GRID
NAD 83 NA 2011

DURING CONSTRUCTION
CAUSEWAY MUST NOT
BLOCK MORE THAN 50% OF
THE CHANNEL AT ANY GIVEN TIME

-LREV- POB 13+00.00

-LREV- PT 17+55.65

-LREV- PC 16+01.53

-LREV- PC 22+49.98

-LREV-
N36°17'00.5"E

-LREV-
N37°09'59.5"E

SPECIAL BASE DITCH
W/ CLASS B RIP RAP
EST 50 TONS
EST 140 SY GEOTEXTILE
SEE DETAIL 1

RIP RAP AT EMBANKMENT
W/ CLASS II RIP RAP
EST 25 TONS
EST 55 SY GEOTEXTILE
SEE DETAIL 3

SPECIAL BASE DITCH
SEE DETAIL 4

CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

15" W/ ELBOWS
END SBG
+96

RETAIN

IMPERVIOUS DIKES

CLASS II
RIP RAP (TYP)
STR. PAY
ITEM

TEMPORARY CAUSEWAY
SEE DETAIL 5

END SBG
+65

15" W/ ELBOWS

CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

BANK STABILIZATION
W/ CLASS II RIP RAP
SEE DETAIL 2

DETAIL 1
SPECIAL BASE DITCH
(Not to Scale)

Type of Liner = Class B Rip-Rap, Keyed-In
Min. D = 1.5 Ft.
d = 1.0 Ft.
B = 2.0 Ft.

FROM STA. 16+83 TO STA. 17+80 -LREV- LT

DETAIL 2
BANK STABILIZATION
(Not to Scale)

Type of Liner = Class II Rip-Rap, Keyed-In
EST 71 TONS
EST 120 SY GEOTEXTILE
EST DDE=15 CY

AT STA. 18+18 -LREV-
AT STA. 18+78 -LREV-

DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class II Rip-Rap, Keyed-In

FROM STA. 17+80 TO STA. 18+04 -LREV- LT
FROM STA. 18+14 TO STA. 18+41 -LREV- LT

DETAIL 4
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.

FROM STA. 18+23 TO STA. 19+50 -LREV- LT

DETAIL 5
TEMPORARY CAUSEWAY
(NOT TO SCALE)

MIN ELEV = 286.4

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04

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

HB-0072
EC-5/CONST.04

NC GRID
NAD 83 NA 2011

DURING CONSTRUCTION
CAUSEWAY MUST NOT
BLOCK MORE THAN 50% OF
THE CHANNEL AT ANY GIVEN TIME

-LREV- POB 13+00.00

-LREV- PT 17+55.65

-LREV- PC 16+01.53

-LREV- PC 22+49.98

-LREV-
N36°17'00.5"E

-LREV-
N37°09'59.5"E

SPECIAL BASE DITCH
W/ CLASS B RIP RAP
EST 50 TONS
EST 140 SY GEOTEXTILE
SEE DETAIL 1

RIP RAP AT EMBANKMENT
W/ CLASS II RIP RAP
EST 25 TONS
EST 55 SY GEOTEXTILE
SEE DETAIL 3

SPECIAL BASE DITCH
SEE DETAIL 4

CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

15" W/ ELBOWS
END SBG
+96

RETAIN

END SBG
+65

15" W/ ELBOWS

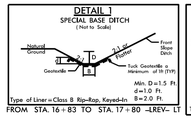
CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE

CLASS II
RIP RAP (TYP)
STR. PAY
ITEM

TEMPORARY CAUSEWAY
SEE DETAIL 5

BANK STABILIZATION
W/ CLASS II RIP RAP
SEE DETAIL 2

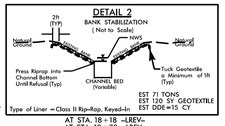
DETAIL 1
SPECIAL BASE DITCH
(Not to Scale)



Type of Liner = Class B Rip-Rap, Keyed-In

FROM STA. 16+83 TO STA. 17+80 -LREV- LT

DETAIL 2
BANK STABILIZATION
(Not to Scale)

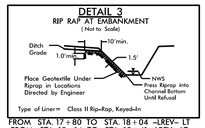


Type of Liner = Class II Rip-Rap, Keyed-In

EST 71 TONS
EST 120 SY GEOTEXTILE
EST DDE=15 CY

AT STA. 18+18 -LREV-
AT STA. 18+78 -LREV-

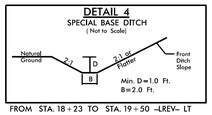
DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class II Rip-Rap, Keyed-In

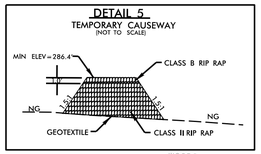
FROM STA. 17+80 TO STA. 18+04 -LREV- LT
FROM STA. 18+14 TO STA. 18+41 -LREV- LT

DETAIL 4
SPECIAL BASE DITCH
(Not to Scale)



FROM STA. 18+23 TO STA. 19+50 -LREV- LT

DETAIL 5
TEMPORARY CAUSEWAY
(NOT TO SCALE)



ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

GLENN JAMES PREDDY
DB 641 - PG 414
DB 216 - PG 584

SIDNEY A. PREDDY
DB 334 - PG 290
DB 216 - PG 588

Frontier Communications of America Inc., Unk. S/T

SR 1620 FLAT ROCK ROAD

$$$-USER NAME-$$$ - $$$-DATE-$$$

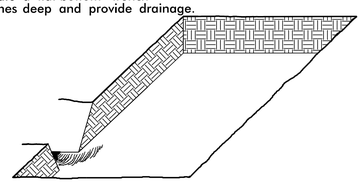
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB–0072	RF–1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

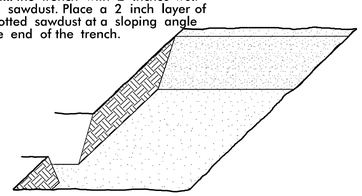
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

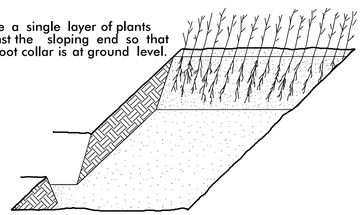
1. Locate a healing–in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



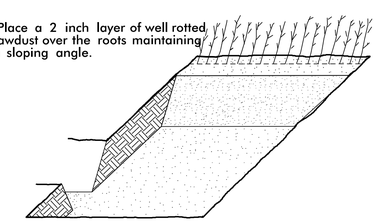
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

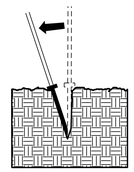


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

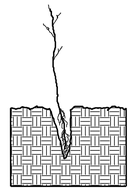


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

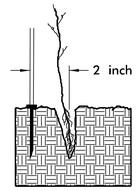
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



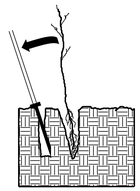
1. Insert planting bar as shown and pull handle toward planter.



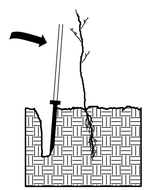
2. Remove planting bar and place seedling at correct depth.



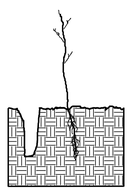
3. Insert planting bar 2 inches toward planter from seedling.



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



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

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

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

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

REFORESTATION

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

REFORESTATION

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

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

REFORESTATION DETAIL SHEET

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

PROJECT: HB-0072

CONTRACT: DE0424

TIP NO.	SHEET NO.
HB-0072	SIGN-1

APPROVED: Signed by: Jason Talley 552A97DA2E1F41B...

DATE: 11/14/2025

SEAL: SEAL 029473 JASON M. TALLEY

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
GRANVILLE COUNTY

LOCATION: REPLACE BRIDGE NO. 199 OVER FORD CREEK ON SR 1629 (FLAT ROCK RD.)

SUMMARY OF QUANTITIES

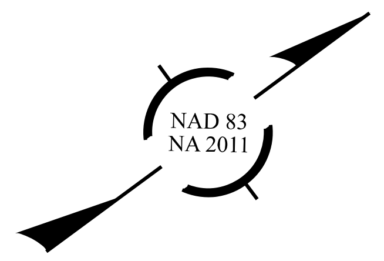
ITEM NO.		ITEM DESCRIPTION	QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	8	EA

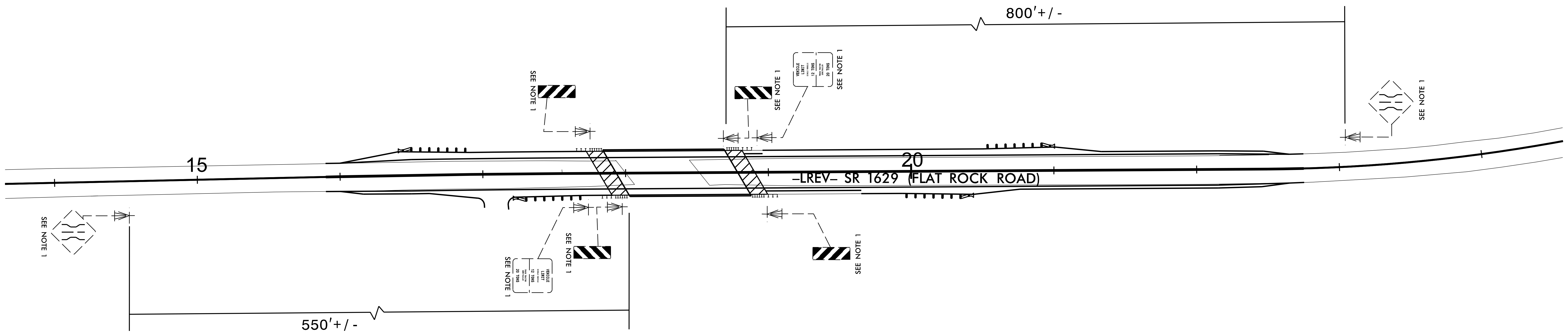
GENERAL NOTES

- . IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- . ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- . SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

PROJECT NOTES

1. DISPOSAL OF SIGN SIYSTEM, U CHANNEL





PLANS PREPARED FOR NCDOT DIVISION 5

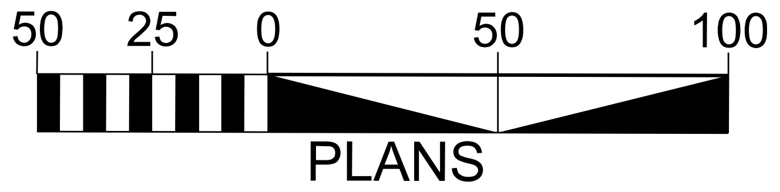
LISA B. GILCHRIST, E.I — NCDOT CONTACT

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

JASON TALLEY, P.E. — SIGNING & DELINEATION

REID CROSSER, EI — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

GRAPHIC SCALES



Lochner

H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

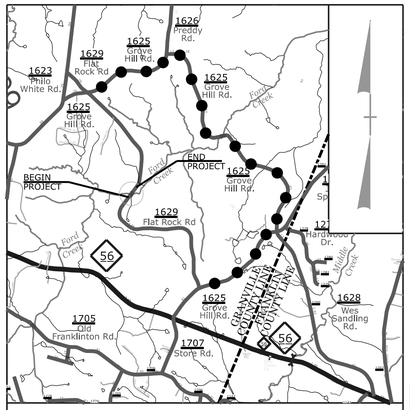
$$$$SYSTIME$$$$
$$$$USERNAME$$$$
$$$$DGN$$$$

10/28/24

TIP PROJECT: HB-0072

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

OFF-SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
HB–0072	UO–1

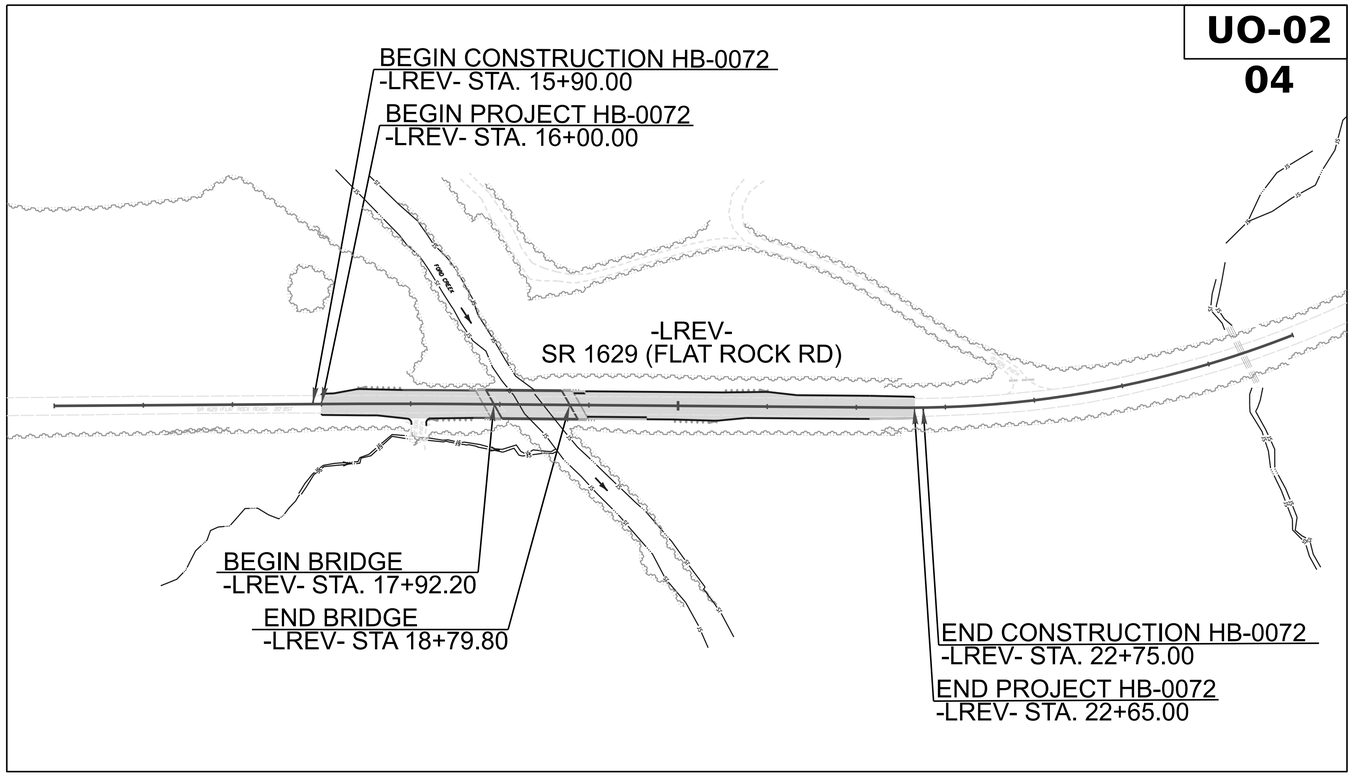
NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

UTILITIES BY OTHERS PLANS
GRANVILLE COUNTY

LOCATION: REPLACE BRIDGE NO. 199 OVER FORD CREEK ON SR 1629 (FLAT ROCK RD)

TYPE OF WORK: ABANDONMENT OF COMMUNICATION CABLE

UO-02
04



GRAPHIC SCALES

0 PLANS

0 PROFILE (HORIZONTAL)

0 PROFILE (VERTICAL)

INDEX OF SHEETS

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

UTILITY OWNERS WITH CONFLICTS

(A) COMMUNICATION – FRONTIER

PREPARED IN THE OFFICE OF

Wooten

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

DIVISION OF HIGHWAYS
UTILITIES UNIT
2612 DUKE STREET
DURHAM, NC 27704

WEBB WHITE — *UTILITY PROJECT MANAGER*
TOMMY MARTIN — *PROJECT UTILITY COORDINATOR*

LISA BULLARD–GILCHRIST — *BRIDGE PROGRAM MANAGER*

10/28/24

FRONTIER POLE AND PED REMOVED
FRONTIER ABANDONED CABLE

FRONTIER POLE REMOVED
FRONTIER ABANDONED CABLES

NAD 83
NA 2011

1
ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

2
ROBERT E. STROTHER, JR
DB 1114 - PG 816
DB 42 - PG 363
BM 5 - PG 114

3
GLENN JAMES PREDDY
DB 1541 - PG 414
DB 216 - PG 584

4
RODNEY A. PREDDY
DB 1334 - PG 290
DB 216 - PG 588

-LREV-
N36°17'00.5"E

-LREV-
N37°09'59.5"E

PROPERTY LINE + CENTER OF CREEK

FORD CREEK

WOODS

RIPRAP

EXISTING R/W

Frontier Communications of America Inc., Unk, S/T

HB-0072
RDY-04 | UO-02

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

UTILITY DESIGN UNIT

ALL PROPOSED 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.

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

11/14/23

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS–SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

STATION –LREV–	UNCLASSIFIED EXCAVATION (Cubic Yard)	EMBANKMENT (Cubic Yard)
16+00.00	12	0
16+50.00	18	3
17+00.00	21	39
17+50.00	28	105
17+92.20	0	7
STATION –LREV–	UNCLASSIFIED EXCAVATION (Cubic Yard)	EMBANKMENT (Cubic Yard)
18+50.00	27	0
18+79.80	1	1
19+00.00	17	259
19+50.00	17	110
20+00.00	0	74
20+50.00	1	49
21+00.00	6	20
21+50.00	12	3
22+00.00	16	2
22+50.00	22	2
22+65.00	4	0

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

HB-0072
X-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

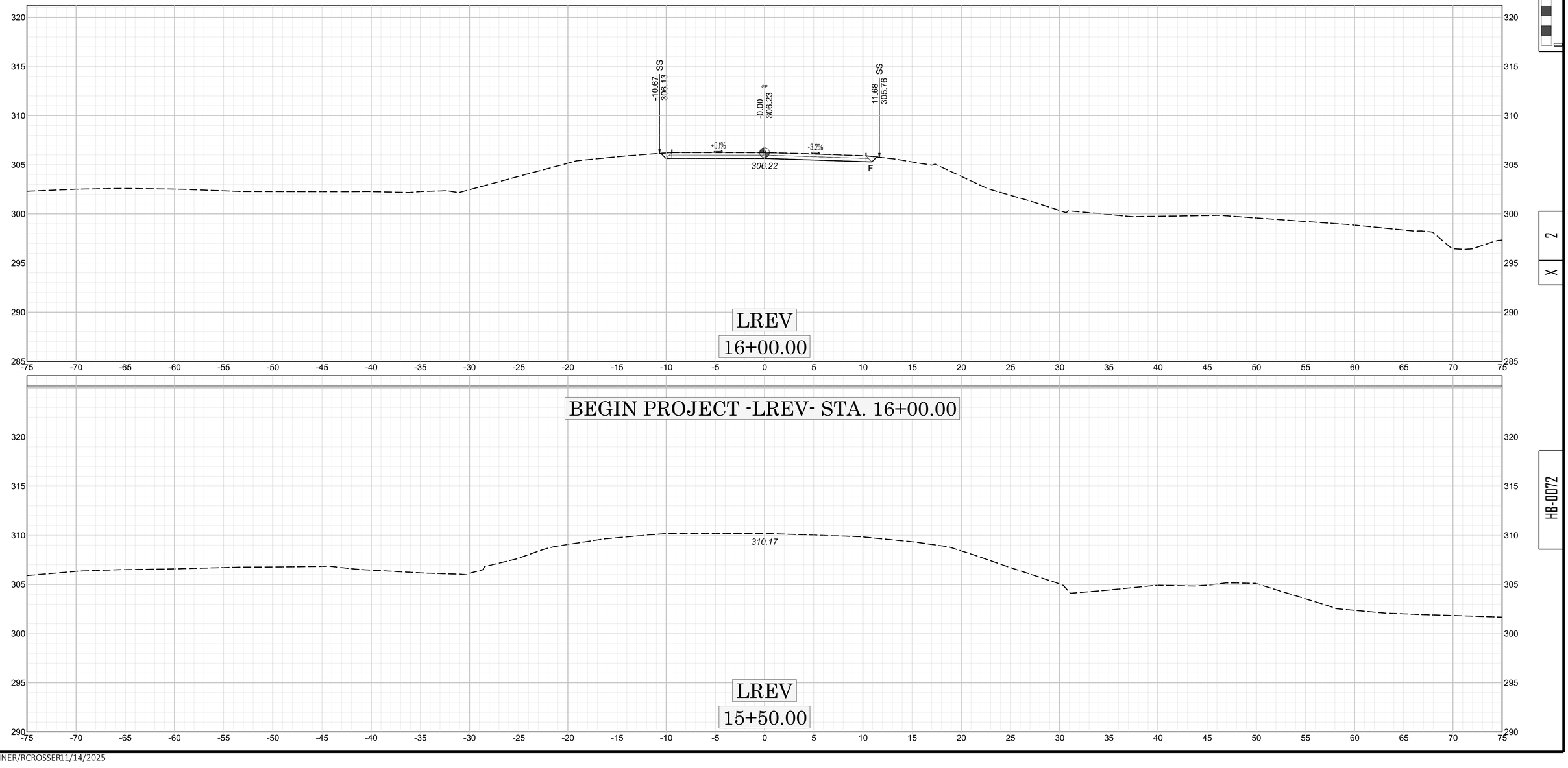
ROADWAY DESIGN UNIT

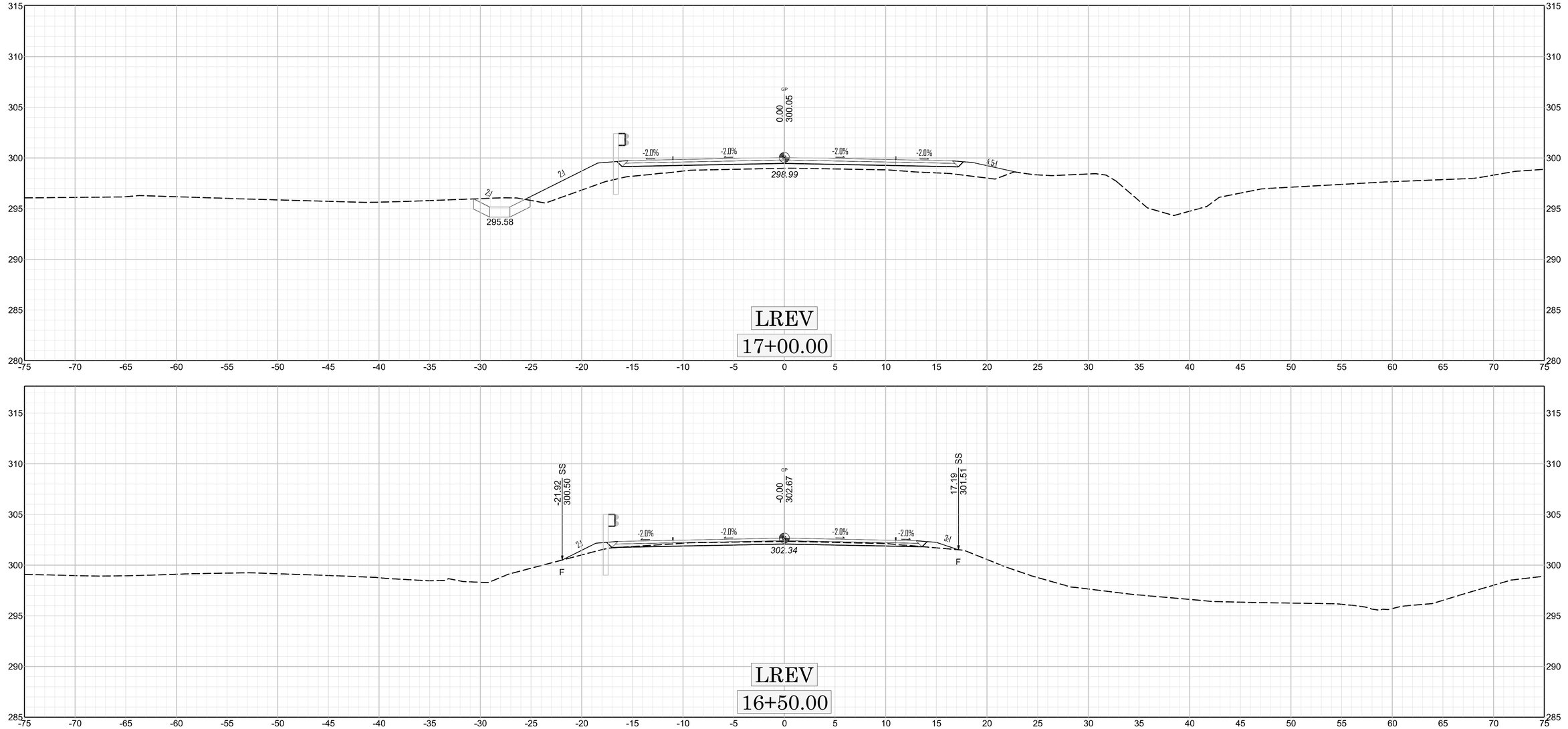
PREPARED BY

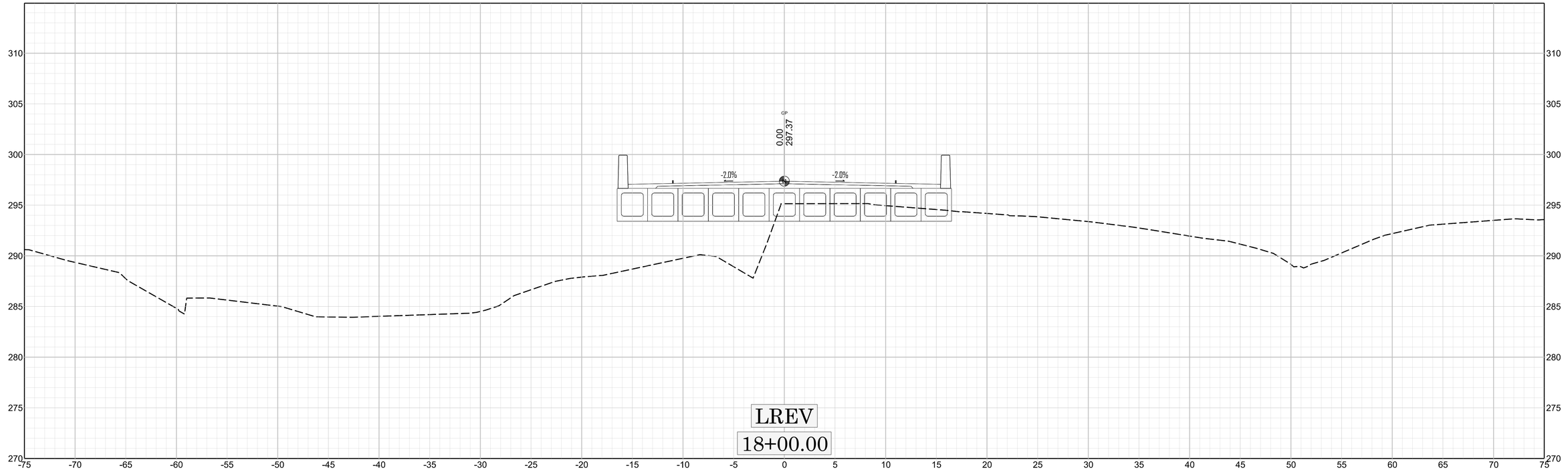
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

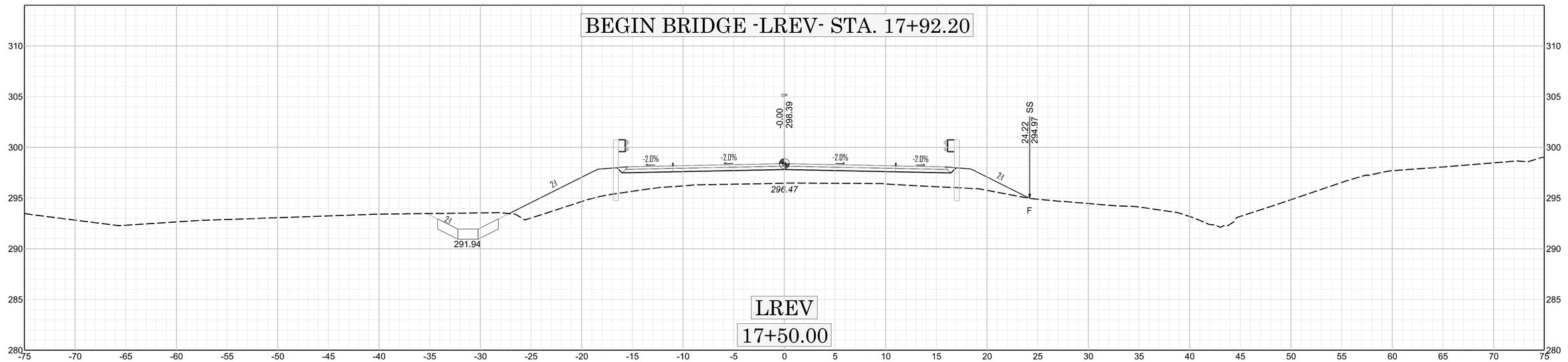
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

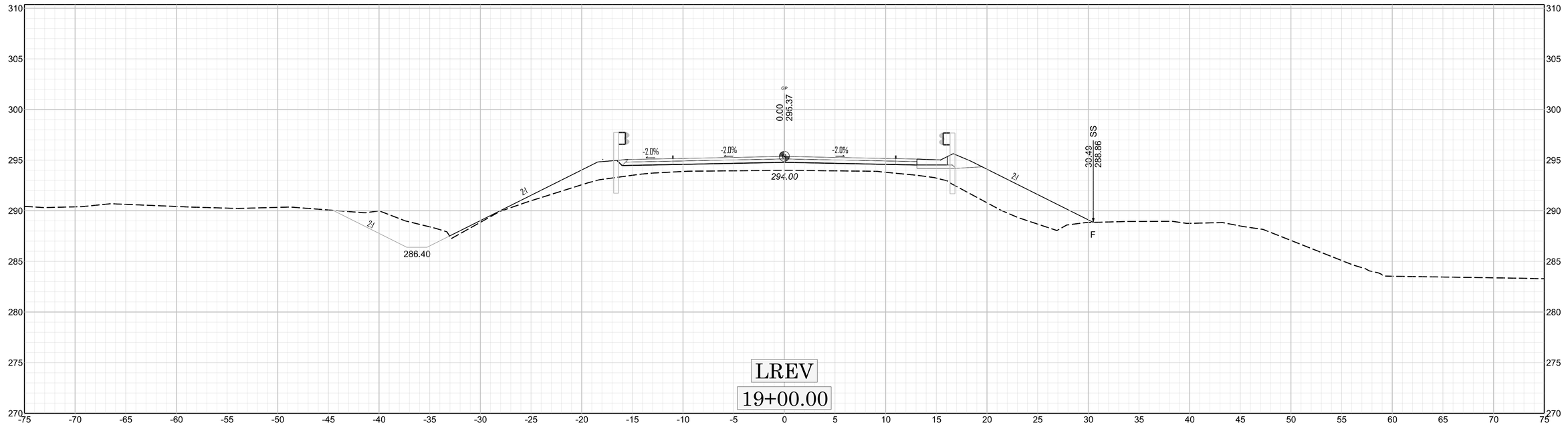
REVISIONS


-10.67
306.13
SS
-0.00
306.23
℄
11.68
305.76
SS
+0.1%
-3.2%
306.22
F
LREV
16+00.00
BEGIN PROJECT -LREV- STA. 16+00.00
310.17
LREV
15+50.00
320
315
310
305
300
295
290
285
-75
-70
-65
-60
-55
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75


315
310
305
300
295
290
285
280
-75 -70 -65 -60 -55 -50 -45 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
GP
0.00
300.05
-2.0%
-2.0%
-2.0%
-2.0%
2:1
2:1
4.5:1
298.99
295.58
LREV
17+00.00
-21.92
SS
300.50
GP
-0.00
302.67
17.19
SS
301.51
-2.0%
-2.0%
-2.0%
-2.0%
2:1
2:1
302.34
F
F
LREV
16+50.00


0.00
297.37
-2.0%
-2.0%
LREV
18+00.00

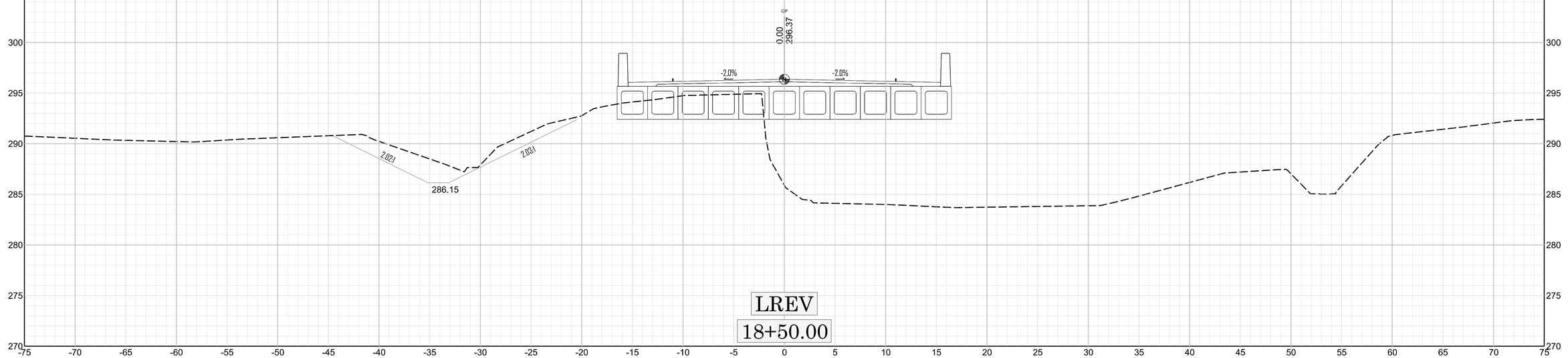

BEGIN BRIDGE -LREV- STA. 17+92.20
0.00
298.39
24.22
294.97
SS
-2.0%
-2.0%
-2.0%
-2.0%
2:1
2:1
2:1
296.47
291.94
F
LREV
17+50.00



LREV

19+00.00

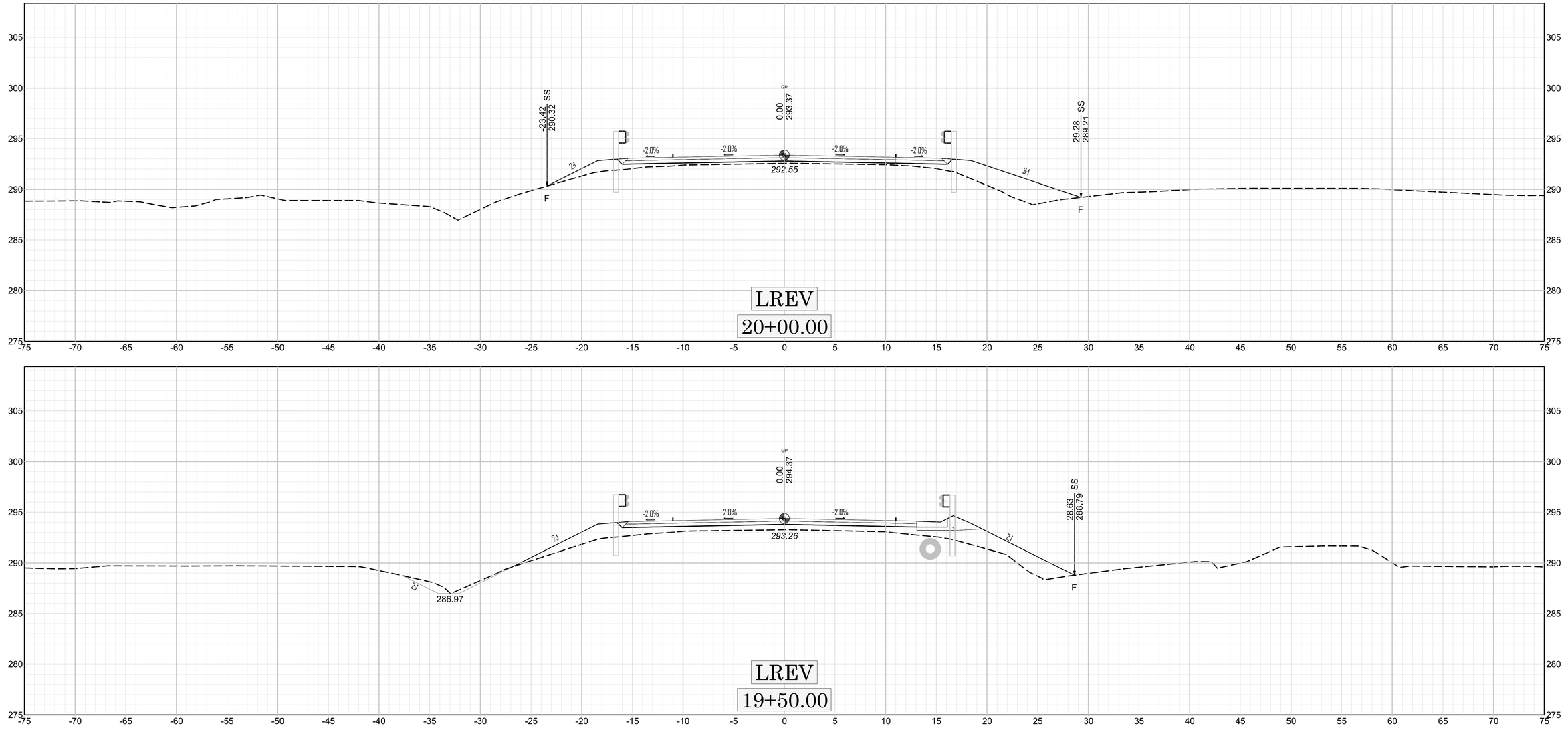
END BRIDGE -LREV- STA. 18+79.80

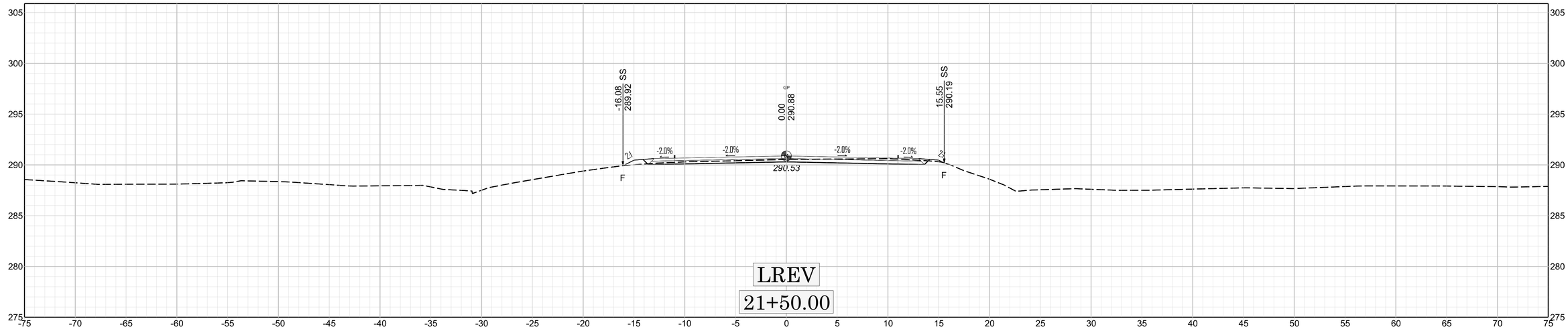


LREV

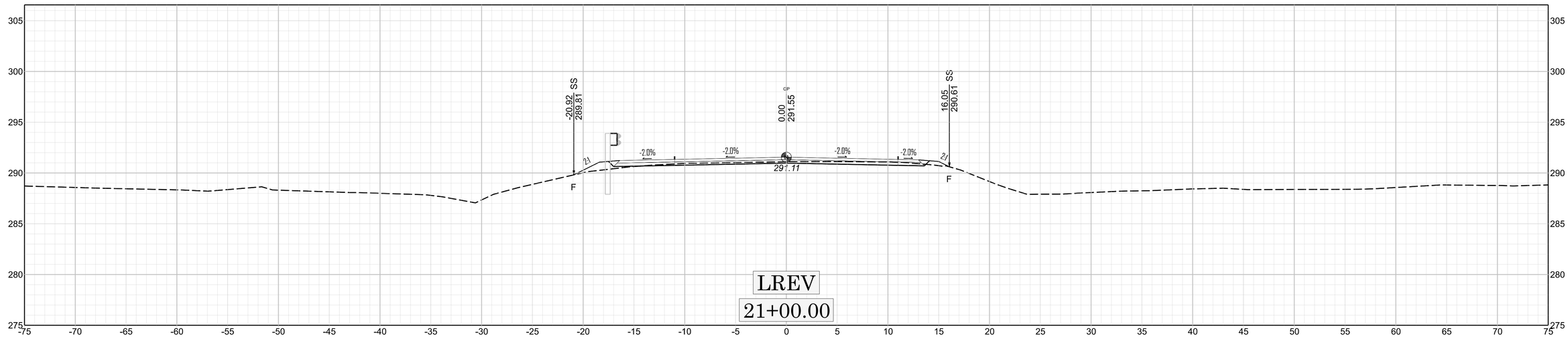
18+50.00

HB-0072

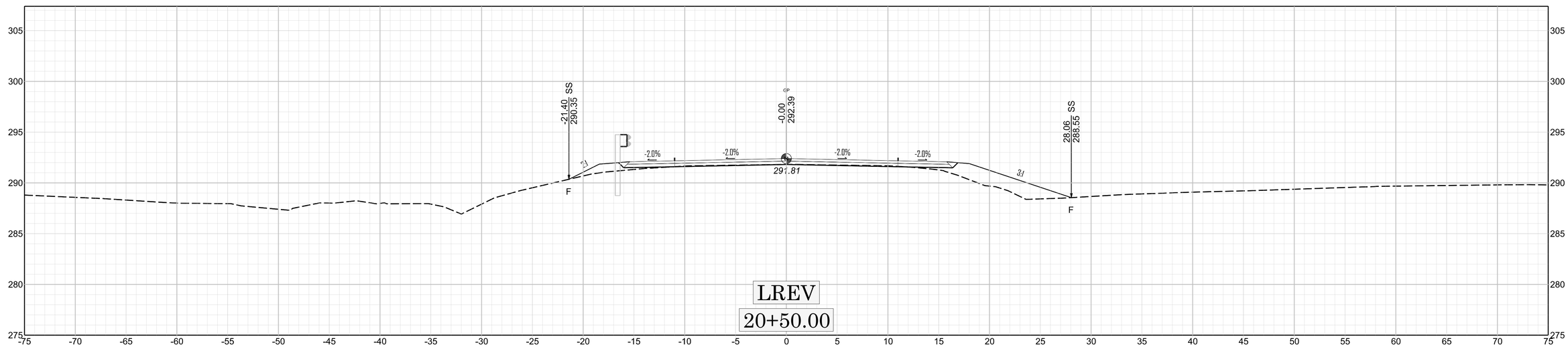

-23.42
290.32
SS
0.00
293.37
℄
29.28
289.21
SS
-2.0%
-2.0%
-2.0%
-2.0%
2:1
3:1
292.55
F
F
LREV
20+00.00
0.00
294.37
℄
28.63
288.79
SS
2:1
2:1
286.97
293.26
F
LREV
19+50.00
305
300
295
290
285
280
275
-75
-70
-65
-60
-55
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75



LREV
21+50.00

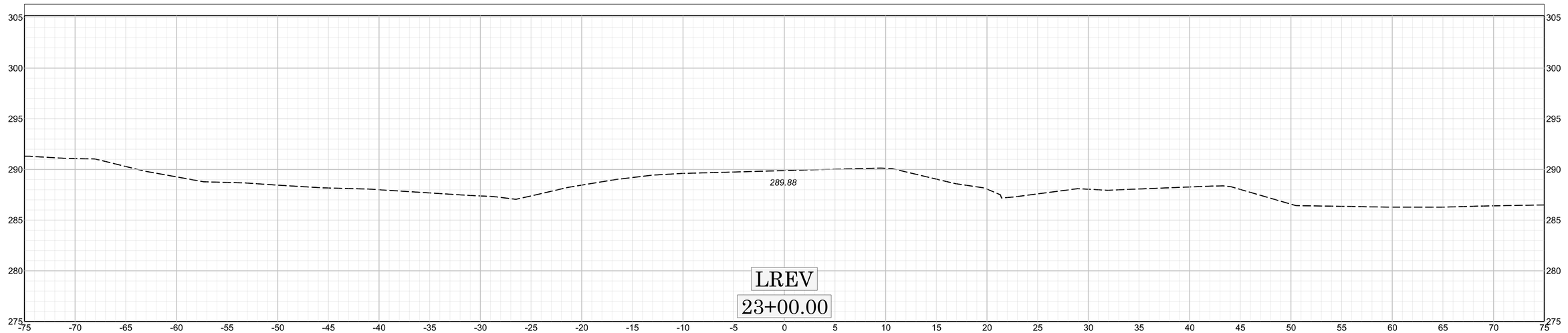


LREV
21+00.00

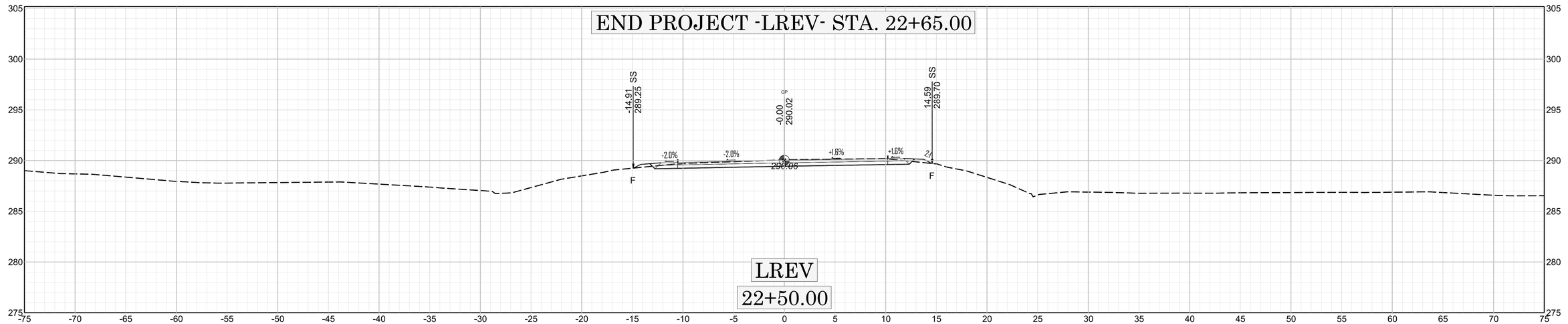


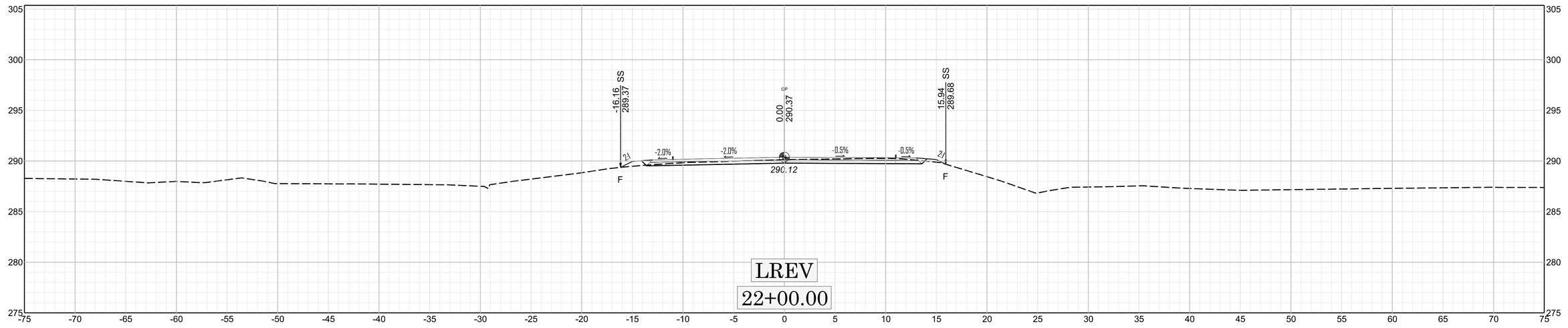
LREV
20+50.00

HB-0072



END PROJECT -LREV- STA. 22+65.00





HB-0072

01/16/24

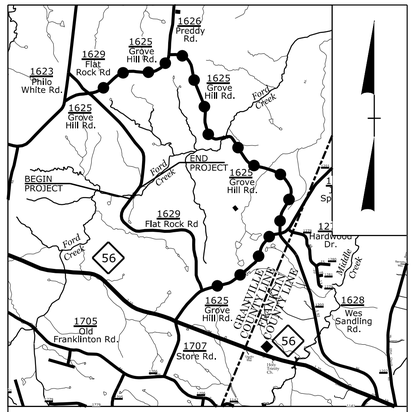
CONTRACT: DE0424 STATE PROJECT: HB-0072

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRANVILLE COUNTY

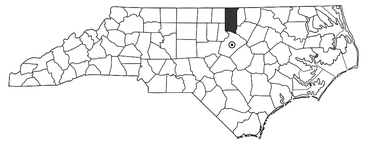
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0072		

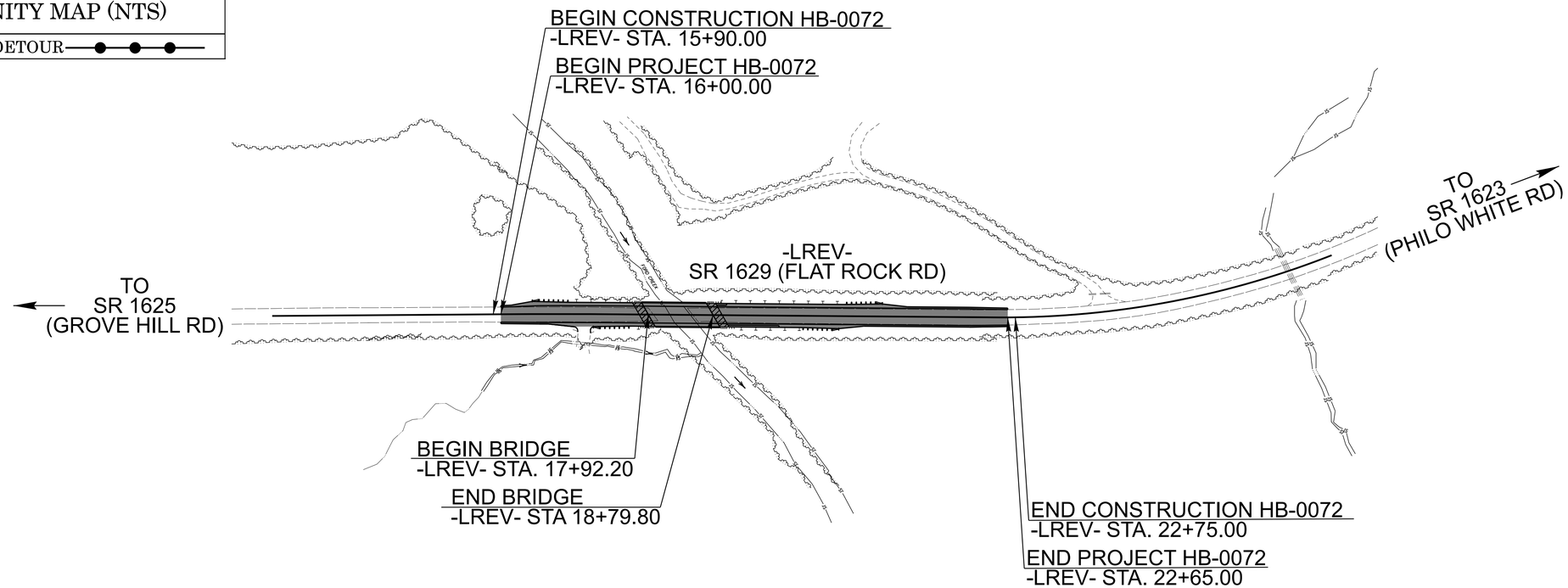
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP5.R080.1	N/A	PE
BP5.R080.2	N/A	RIGHT-OF-WAY
BP5.R080.2	N/A	UTILITY
51609.3.1	5160901	CONSTRUCTION



VICINITY MAP (NTS)

OFF-SITE DETOUR





STRUCTURES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2025 = 425 VPD
ADT 2045 = 525 VPD

V = 60 MPH*
*55 MPH STAT
FUNC CLASS =
LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY STATE PROJECT HB-0072 = 0.110 MILES

LENGTH OF STRUCTURE STATE PROJECT HB-0072 = 0.016 MILES

TOTAL LENGTH OF STATE PROJECT HB-0072 = 0.126 MILES

Prepared in the Offices of:
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 8, 2024

LETTING DATE:
DECEMBER 10, 2025

CHRISTINA FITZGERALD, PE
PROJECT ENGINEER

NICOLAS CUANY, PE
STRUCTURES DESIGN ENGINEER

LISA BULLARD-GILCHRIST, EI
NCDOT CONTACT

STRUCTURES DESIGN ENGINEER

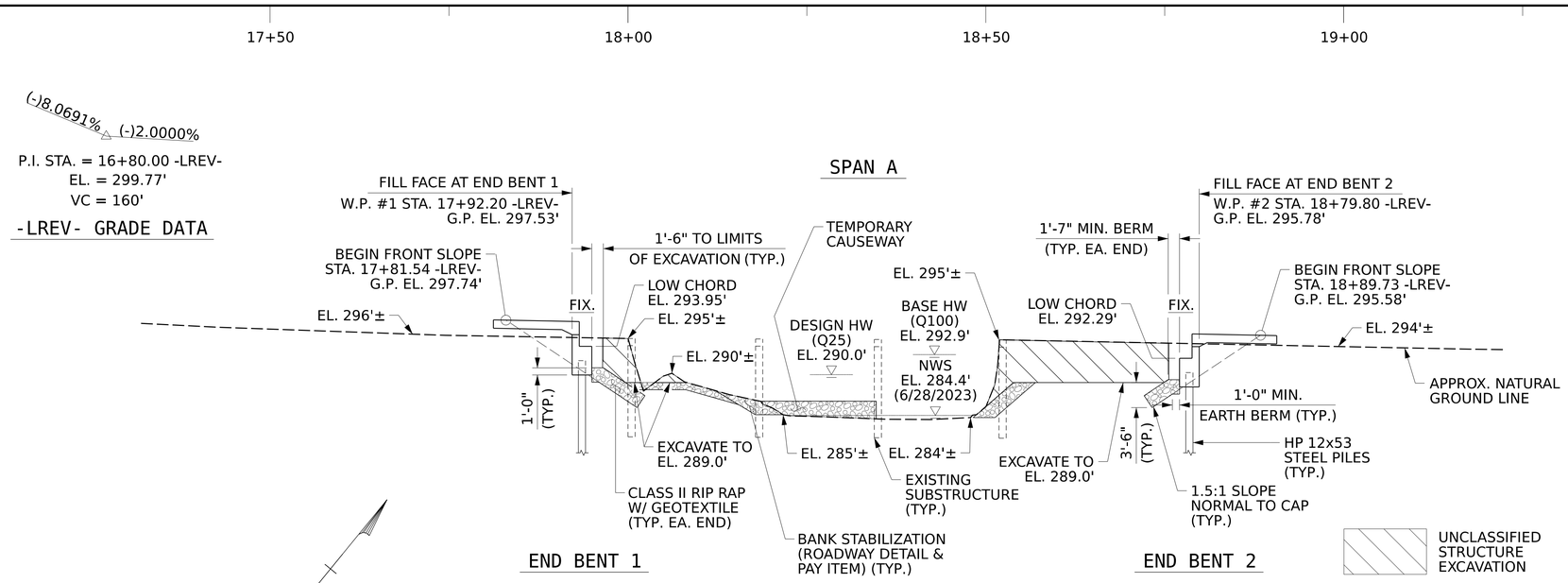
NORTH CAROLINA PROFESSIONAL SEAL 055595 ENGINEER NICOLAS S. CUANY

Signed by: Nicolas S. Cuany
F8CA0004E5984A...

SIGNATURE: *P.E.* 11/14/2025

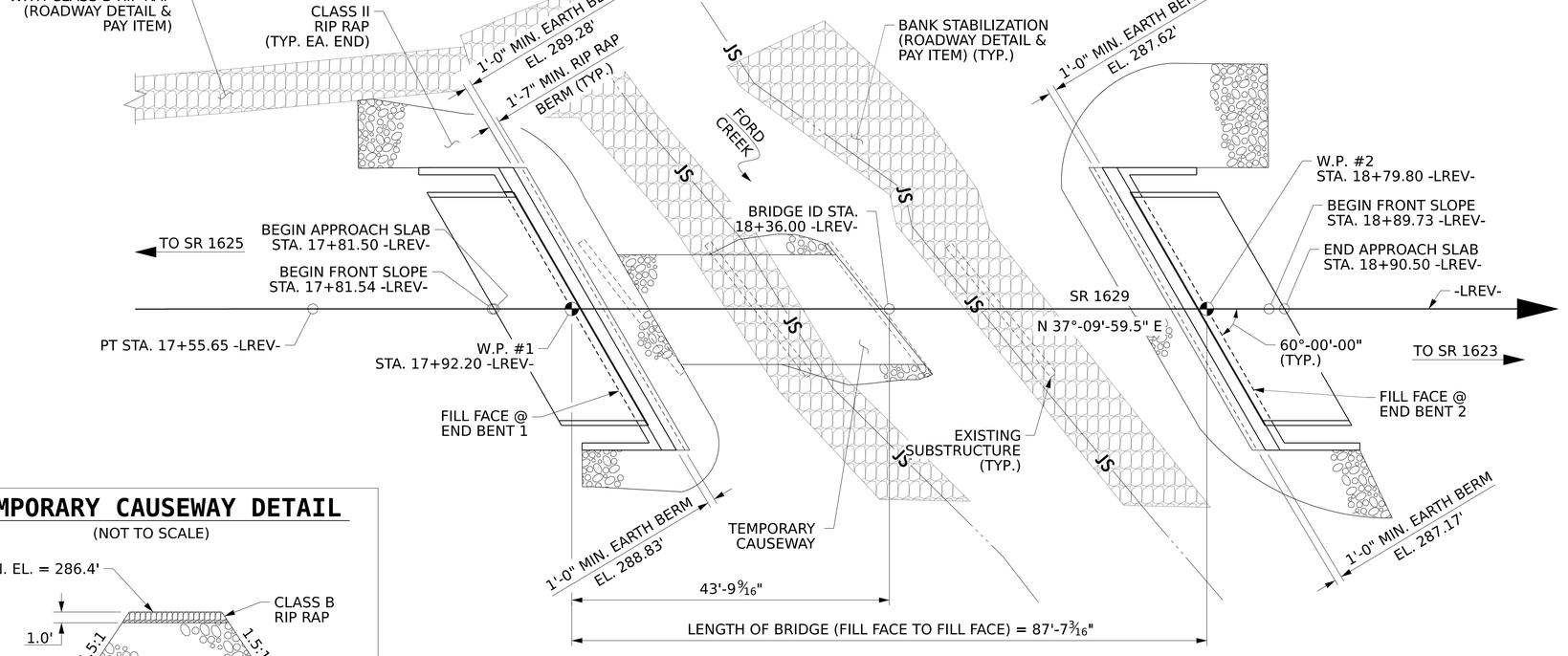
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

F.A. PROJECT: 5160901



SECTION ALONG -LREV-

SECTIONS AT END BENTS TAKEN AT RIGHT ANGLES

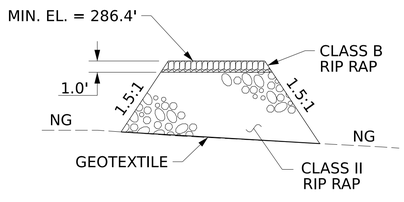


PLAN

PILES NOT SHOWN FOR CLARITY

TEMPORARY CAUSEWAY DETAIL

(NOT TO SCALE)



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

HYDRAULIC DATA	
DESIGN DISCHARGE	1,500 CFS
FREQUENCY OF DESIGN FLOOD	25 YR.
DESIGN HIGHWATER EL.	290.0 FT.
DRAINAGE AREA	5.66 SQ. MI.
BASE DISCHARGE (Q100)	2,608 CFS
BASE HIGHWATER EL.	292.90 FT

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	1,575 CFS
FREQUENCY OF OVERTOPPING FLOOD	25+ YR.
OVERTOPPING FLOOD EL.	290.1 FT.

* @ 22+45.00 -LREV-

WS EL. TAKEN @ RIVER STATION 20412

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 1 OF 4 REPLACES BRIDGE NO. 380199

DRAWN BY :	G. BOLEY
CHECKED BY :	N. CUANY
DESIGN ENGINEER OF RECORD:	N. CUANY
DATE :	05/2025
DATE :	06/2025
DATE :	11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_GD1_380199.dgn
gabriella.boley

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

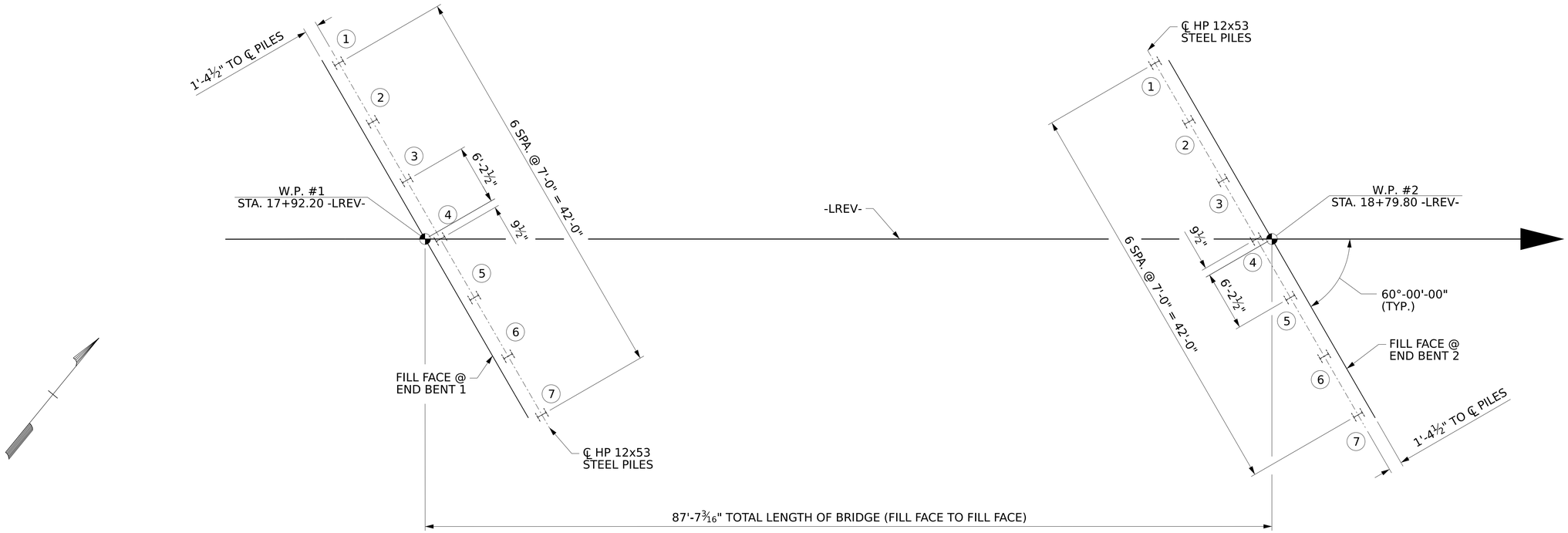
NORTH CAROLINA PE-0A350 SEAL 055595 ENGINEER NICHOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC.
8043 PLACA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
FORD CREEK
ON SR 1629 BETWEEN
SR 1625 AND SR 1623

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



END BENT 1

END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DO NOT DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2. PLACE PILES AT BOTTOM OF PILE EXCAVATION.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE OR GROUT.

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

DRAWN BY : G. BOLEY DATE : 05/2025

CHECKED BY : N. CUANY DATE : 06/2025

DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_FL1_380199.dgn
gabriella.boley

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S CUANY
11/14/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
FORD CREEK
ON SR 1629 BETWEEN
SR 1625 AND SR 1623

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

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 1-7	7	210	See Substructure Plans	15								280.00	6	4
End Bent No.2 Piles 1-7	7	210		15								278.00	5	5
TOTAL QUANTITY:													77	63

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

** 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	210					
End Bent No.2 Piles 1-7	210					

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

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Andrew Drda, #060350) on 07-25-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing and Pipe Pile Plates when necessary.

PROJECT NO. HB-0072

GRANVILLE COUNTY

STATION: 18+36.00 -LREV-

DRAWN BY : G. BOLEY DATE : 05/2025

CHECKED BY : N. CUANY DATE : 06/2025

DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_FDT_380199.dgn
gabriella.boley

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S. CUANY

11/14/2025

Lochner

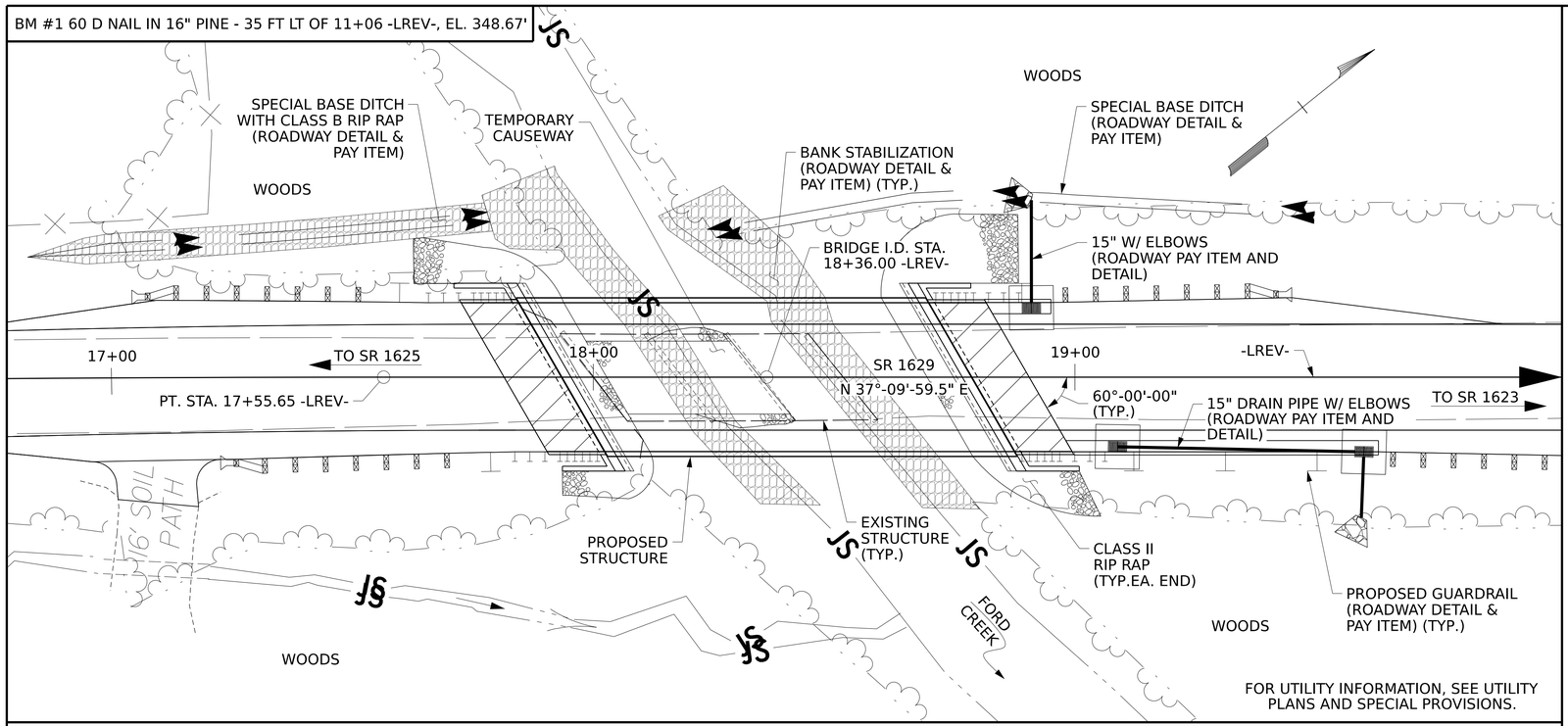
H.W. LOCHNER, INC.
8000 REGENCY PKWY, SUITE 202
RALEIGH, NC 27612
(919) 571-7111

NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

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



LOCATION SKETCH

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY ACCESS @ STA. 18+36.00 -LREV-	REMOVAL OF EXISTING STRUCTURE @ STA. 18+36.00 -LREV-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 18+36.00 -LREV-	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STA. 18+36.00 -LREV-	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	LF	LF	LUMP SUM	CY	LUMP SUM	LBS
SUPERSTRUCTURE									
END BENT 1				28	42		28.5		3,933
END BENT 2				35	35		28.5		3,933
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	63	77	LUMP SUM	57.0	LUMP SUM	7,866

TOTAL BILL OF MATERIAL (CONT'D)

	HP 12x53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 2'-9" PRESTRESSED CONCRETE BOX BEAM	
	No.	LF	LF	TON	SY	LUMP SUM	No.	LF
SUPERSTRUCTURE			170.0			LUMP SUM	11	935
END BENT 1	7	105		100	110			
END BENT 2	7	105		135	150			
TOTAL	14	210	170.0	235	260	LUMP SUM	11	935

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 4 SHALL BE EXCAVATED FOR A DISTANCE OF 29 FT LEFT AND 26 FT RIGHT AT END BENT 1 AND 34 FT LEFT AND 29 FT RIGHT AT END BENT 2 OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF THREE 17 FT. TIMBER JOIST SPANS; 19'-3" CLEAR ROADWAY WIDTH ON A TIMBER DECK ON TIMBER PILES AND TIMBER ABUTMENTS, INCLUDING CONCRETE REPAIRS AND CONCRETE MUDSILLS, AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED IN THEIR ENTIRETY. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

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

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 18+36.00 -LREV-.

DURING CONSTRUCTION TEMPORARY CAUSEWAY MUST NOT BLOCK MORE THAN 50% OF THE CHANNEL AT ANY GIVEN TIME.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

PROJECT NO. HB-0072
GRANVILLE COUNTY
STATION: 18+36.00 -LREV-

SHEET 4 OF 4

DRAWN BY : G. BOLEY DATE : 05/2025
CHECKED BY : N. CUANY DATE : 06/2025
DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_GD2_380199.dgn
gabriella.boley

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICHOLAS S. CUANY
11/14/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Lochner
H.W. LOCHNER, INC.
8000 REGENCY PKWY, SUITE 202
CARY, NC 27518
(919) 577-1111
NC LICENSE NUMBER P-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
FORD CREEK
ON SR 1629 BETWEEN
SR 1625 AND SR 1623

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

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⟨1⟩	1.117	--	1.75	0.247	1.93	85'	EL	41.634	0.625	1.12	85'	EL	8.327	0.80	0.247	1.56	85'	EL	41.634	
		HL-93 (OPERATING)	N/A		1.448	--	1.35	0.247	2.5	85'	EL	41.634	0.625	1.45	85'	EL	8.327	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.448	52.140	1.75	0.247	2.59	85'	EL	41.634	0.625	1.45	85'	EL	8.327	0.80	0.247	2.09	85'	EL	41.634	
		HS-20 (OPERATING)	36.000		1.877	67.589	1.35	0.247	3.35	85'	EL	41.634	0.625	1.88	85'	EL	8.327	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.378	59.102	1.4	0.247	7.48	85'	EL	41.634	0.625	4.38	85'	EL	8.327	0.80	0.247	4.84	85'	EL	41.634	
		SNGARBS2	20.000		3.091	61.822	1.4	0.247	5.50	85'	EL	41.634	0.625	3.09	85'	EL	8.327	0.80	0.247	3.56	85'	EL	41.634	
		SNAGRIS2	22.000		2.861	62.937	1.4	0.247	5.17	85'	EL	41.634	0.625	2.86	85'	EL	8.327	0.80	0.247	3.35	85'	EL	41.634	
		SNCOTTS3	27.250		2.183	59.498	1.4	0.247	3.72	85'	EL	41.634	0.625	2.18	85'	EL	8.327	0.80	0.247	2.41	85'	EL	41.634	
		SNAGGRS4	34.925		1.797	62.749	1.4	0.247	3.08	85'	EL	41.634	0.625	1.80	85'	EL	8.327	0.80	0.247	1.99	85'	EL	41.634	
		SNS5A	35.550		1.812	64.409	1.4	0.247	3.01	85'	EL	41.634	0.625	1.81	85'	EL	8.327	0.80	0.247	1.95	85'	EL	41.634	
		SNS6A	39.950		1.647	65.797	1.4	0.247	2.75	85'	EL	41.634	0.625	1.65	85'	EL	8.327	0.80	0.247	1.78	85'	EL	41.634	
		SNS7B	42.000		1.610	67.634	1.4	0.247	2.62	85'	EL	41.634	0.625	1.61	85'	EL	8.327	0.80	0.247	1.70	85'	EL	41.634	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.965	64.845	1.4	0.247	3.35	85'	EL	41.634	0.625	1.97	85'	EL	8.327	0.80	0.247	2.17	85'	EL	41.634	
		TNT4A	33.075		1.922	63.556	1.4	0.247	3.36	85'	EL	41.634	0.625	1.92	85'	EL	8.327	0.80	0.247	2.18	85'	EL	41.634	
		TNT6A	41.600		1.701	70.755	1.4	0.247	2.74	85'	EL	41.634	0.625	1.70	85'	EL	8.327	0.80	0.247	1.77	85'	EL	41.634	
		TNT7A	42.000		1.670	70.125	1.4	0.247	2.75	85'	EL	41.634	0.625	1.67	85'	EL	8.327	0.80	0.247	1.78	85'	EL	41.634	
		TNT7B	42.000		1.578	66.274	1.4	0.247	2.83	85'	EL	41.634	0.625	1.58	85'	EL	8.327	0.80	0.247	1.83	85'	EL	41.634	
		TNAGRIT4	43.000		1.530	65.773	1.4	0.247	2.70	85'	EL	41.634	0.625	1.53	85'	EL	8.327	0.80	0.247	1.75	85'	EL	41.634	
		TNAGT5A	45.000		1.511	68.008	1.4	0.247	2.55	85'	EL	41.634	0.625	1.51	85'	EL	8.327	0.80	0.247	1.65	85'	EL	41.634	
		TNAGT5B	45.000	⟨3⟩	1.456	65.508	1.4	0.247	2.52	85'	EL	41.634	0.625	1.46	85'	EL	8.327	0.80	0.247	1.63	85'	EL	41.634	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.193	63.063	1.3	0.247	4.19	85'	EL	41.634	0.625	2.19	85'	EL	8.327	0.80	0.247	3.10	85'	EL	41.634	
		EV3	43.000	⟨4⟩	1.477	63.496	1.3	0.247	2.75	85'	EL	41.634	0.625	1.48	85'	EL	8.327	0.80	0.247	2.03	85'	EL	41.634	

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

⟨1⟩
⟨2⟩
⟨3⟩
⟨4⟩

LRFR SUMMARY

FOR SPAN "A"

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S. CUANY
Nicolas S. Cuany
11/14/2025

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 85' BOX BEAM UNIT 60° SKEW

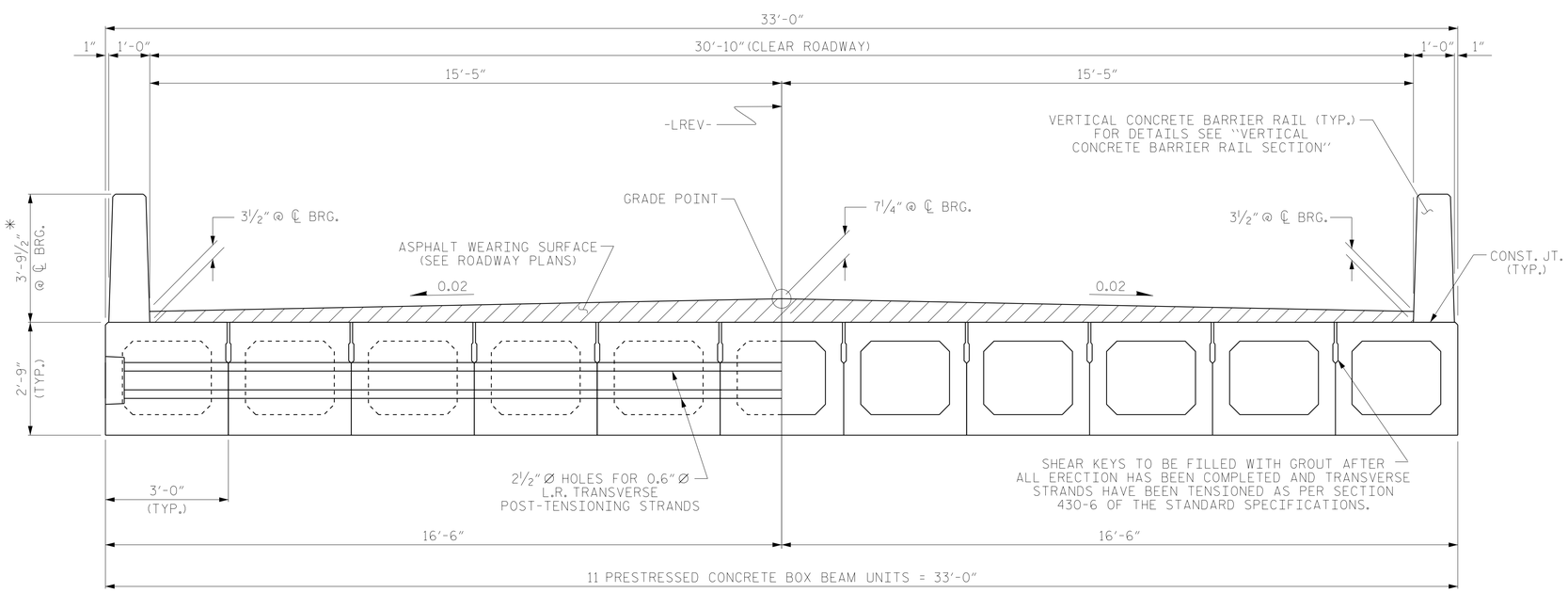
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			17

STD. NO. 33LRFR1_60&120S_85L

ASSEMBLED BY : G. BOLEY DATE : 05/2025
CHECKED BY : N. CUANY DATE : 06/2025
DRAWN BY : TMC II/II
CHECKED BY : AAC II/II
REV. 06/23 AKP/AAI

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_GD3_380199.dgn
gabriella.boley



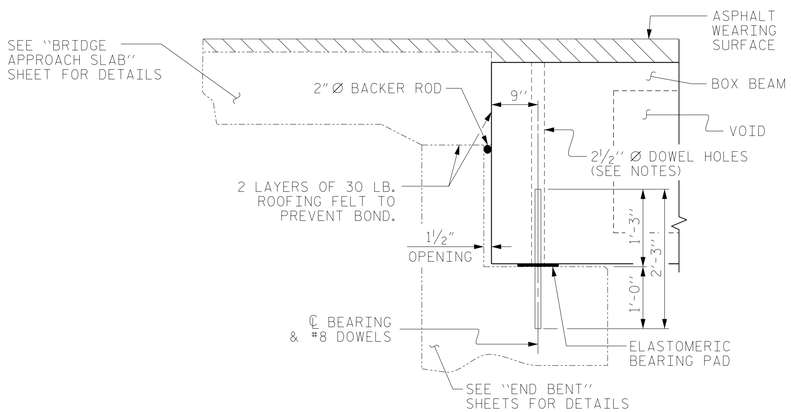
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

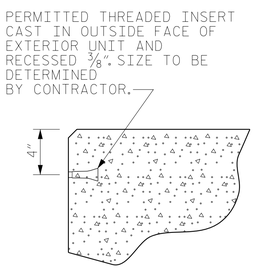
TYPICAL SECTION

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

FIXED END



SECTION AT END BENT



THREADED INSERT DETAIL

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 BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

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

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

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM 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.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL 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.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

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. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 1 OF 5

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : DGE 8/11	REV. 9/14 MAA/TMG
CHECKED BY : TMG 11/11	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICHOLAS S. CUANY
11/14/2025

Lochner
HDR, LOCHNER, INC.
2150 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

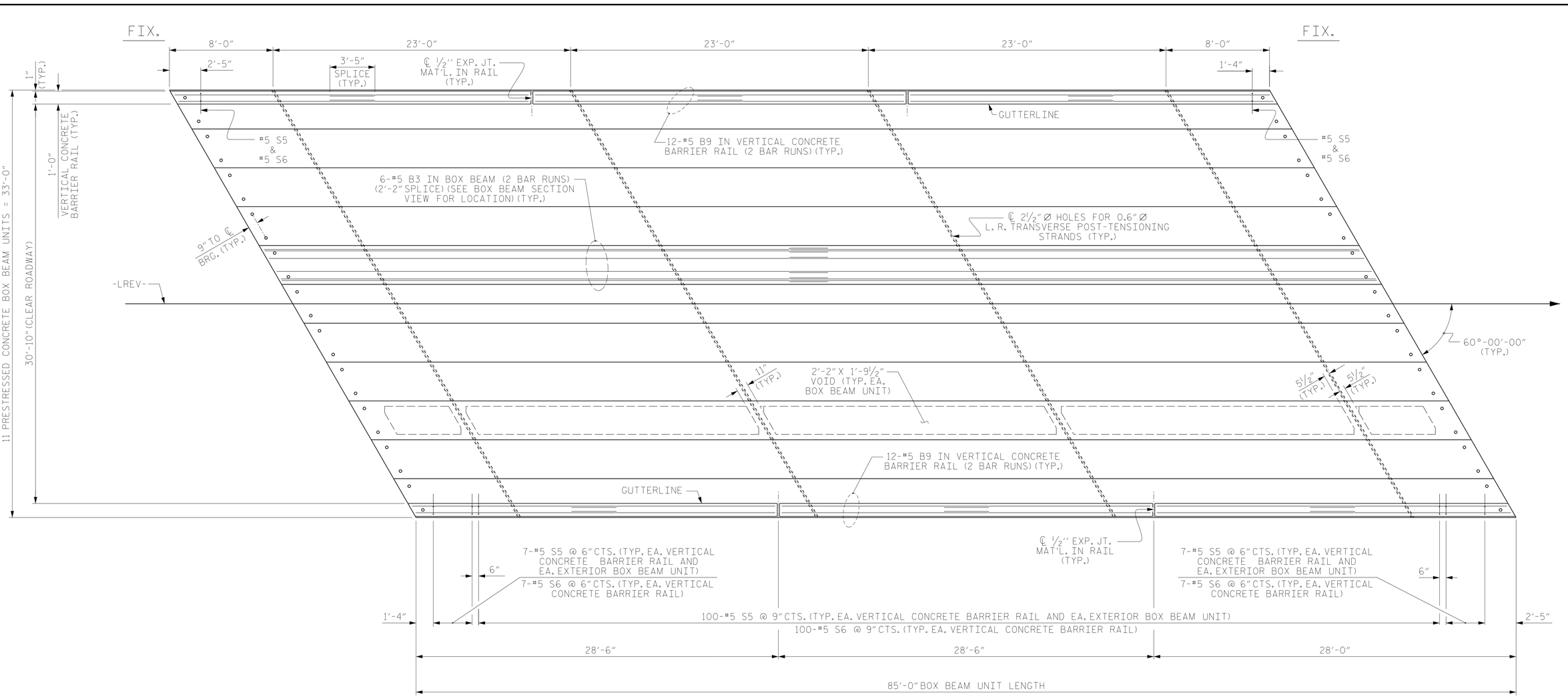
STANDARD

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

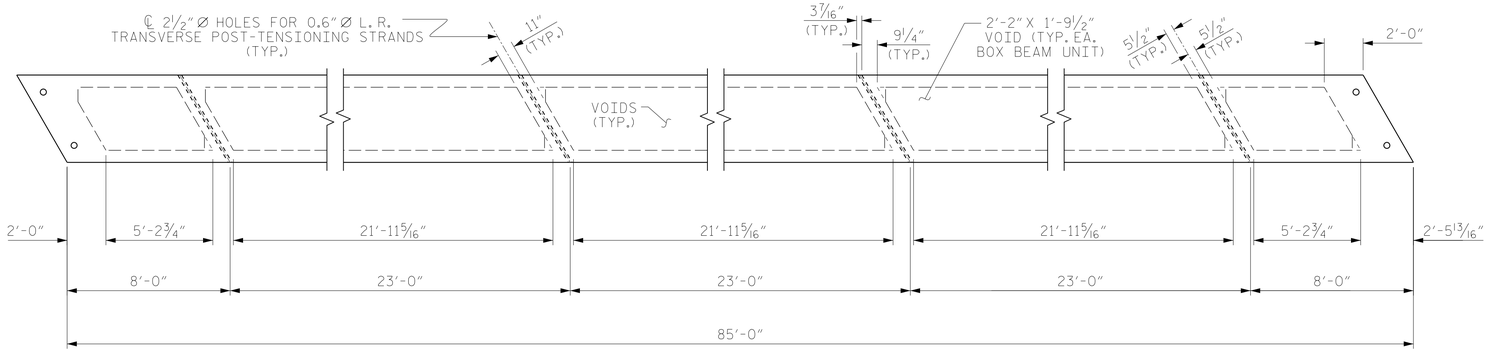
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			17

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_BB1_380199.dgn
gabriella.boley

STD. NO. STD.33PCBB_33_90S



PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 2 OF 5

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : DGE 8/11	REV. 8/14 MAA/TMG
CHECKED BY : TMG 11/11	

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 ENGINEER NICOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 (919) 571-7111
NC LICENSE NUMBER F-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

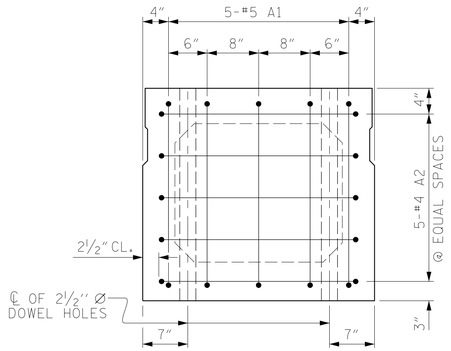
STANDARD

PLAN OF 85' UNIT 30'-10" CLEAR ROADWAY 60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			17

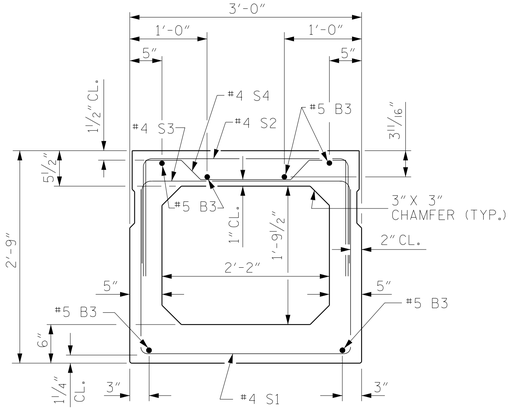
11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_BB2_380199.dgn
gabriella.boley

STD.NO.33PCBB_33_60S_85L



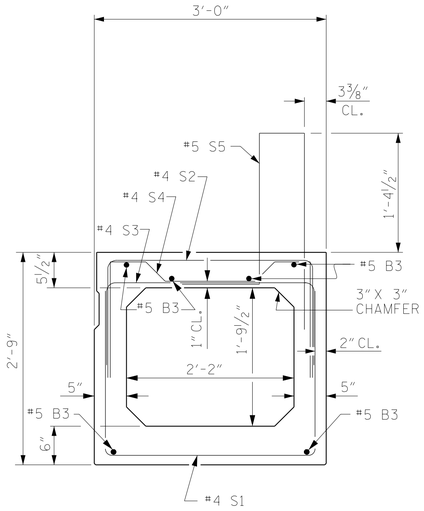
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION

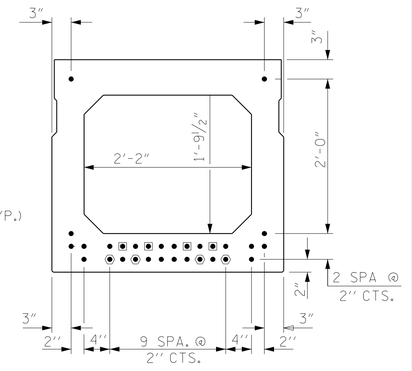
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(30 STRANDS REQUIRED)

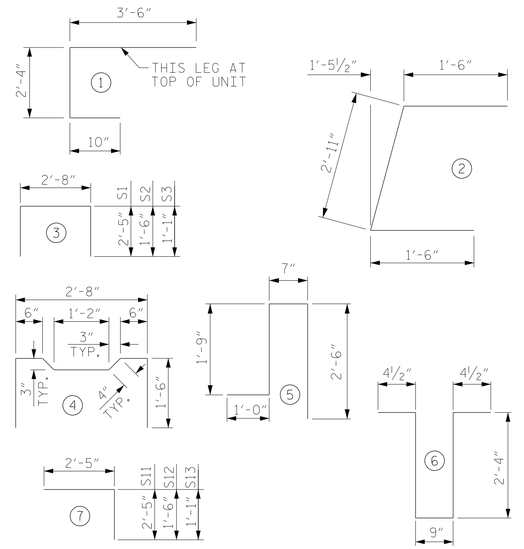
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◉ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⬢ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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

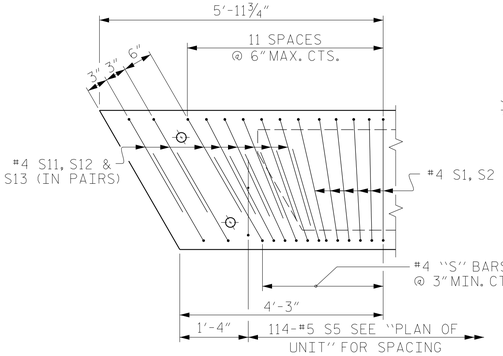
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

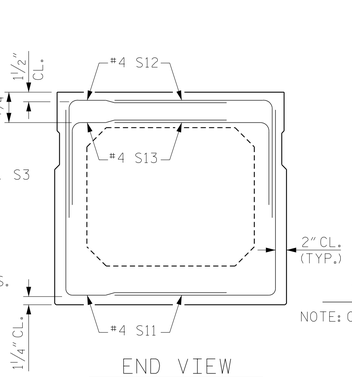
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	34	#4	2	5'-11"	134	5'-11"	134
B3	12	#5	STR	43'-5"	543	43'-5"	543
K1	12	#4	6	6'-2"	49	6'-2"	49
K2	8	#4	STR	2'-10"	15	2'-10"	15
S1	62	#4	3	7'-6"	311	7'-6"	311
S2	62	#4	3	5'-8"	235	5'-8"	235
S3	111	#4	3	4'-10"	358	4'-10"	358
S4	49	#4	4	5'-10"	191	5'-10"	191
S11	32	#4	7	4'-10"	103	4'-10"	103
S12	32	#4	7	3'-11"	84	3'-11"	84
S13	32	#4	7	3'-6"	75	3'-6"	75
✳ S5	114	#5	5	5'-10"	694	--	--
REINFORCING STEEL					2168 LBS.		2168 LBS.
✳ EPOXY COATED REINF. STEEL					694 LBS.		
8000 P.S.I. CONCRETE					15.2 CU. YDS.		15.0 CU. YDS.
0.6" Ø L.R. STRANDS					No. 30		No. 30



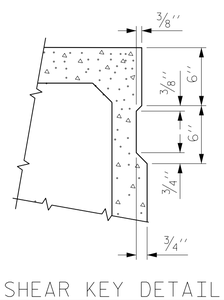
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



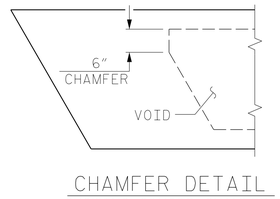
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



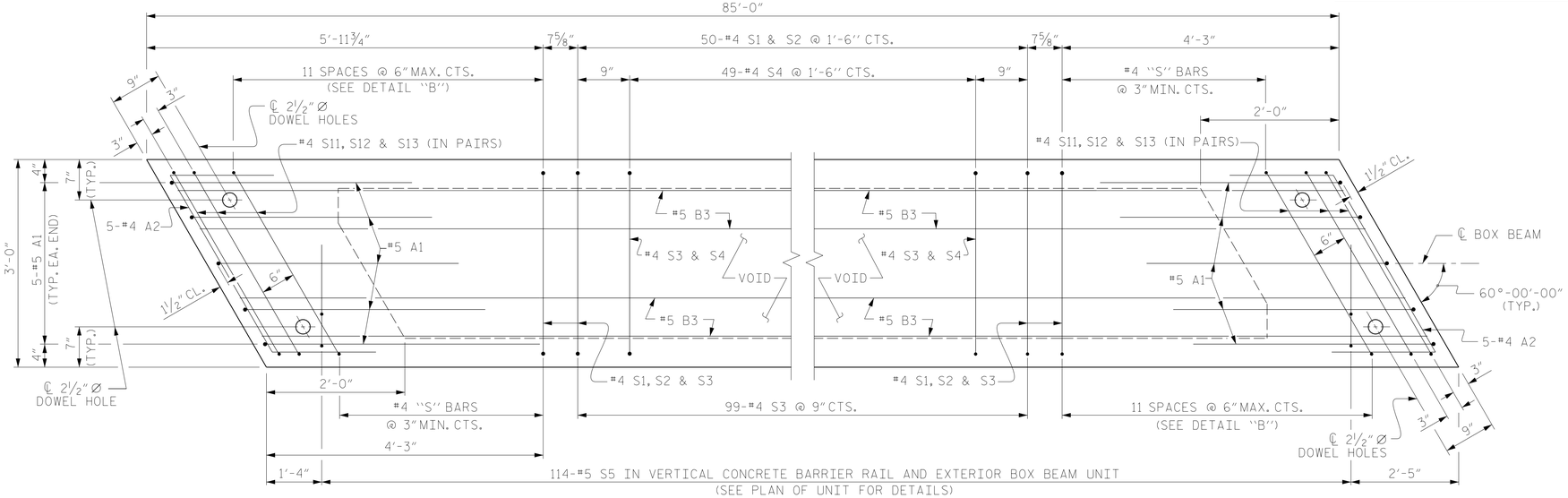
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



CHAMFER DETAIL

SHOWING 6" VOID CHAMFER



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 3 OF 5

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 ENGINEER NICOLAS S. CUANY

11/14/2025

Lochner

H.W. LOCHNER, INC. 5960 FAIRVIEW ROAD, SUITE 202 RALEIGH, NC 27612 (919) 571-7171

NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

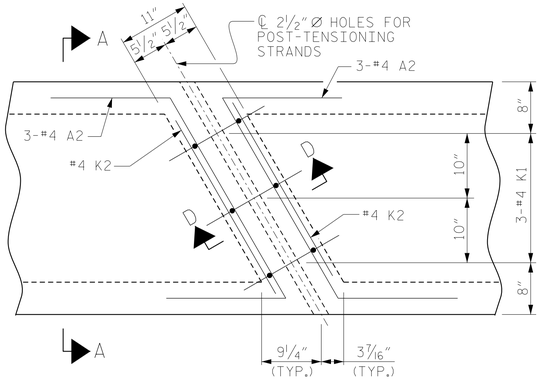
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			17

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : DGE II/II	REV. 4/15 MAA/TMG
CHECKED BY : TMG II/II	

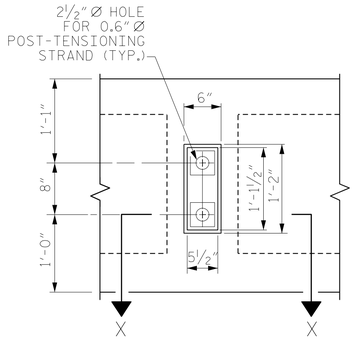
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_BB3_380199.dgn
gabriella.boley

STD. NO. 33PCBB4_60S_85L

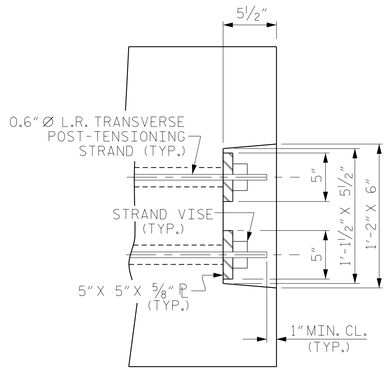


PLAN

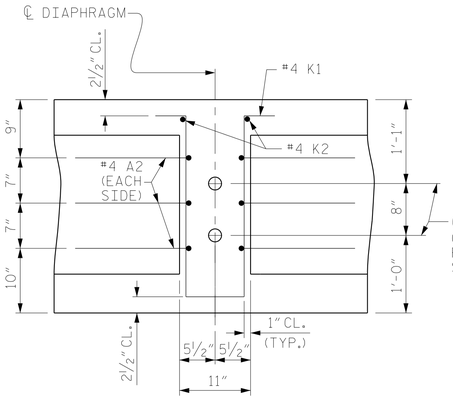


VIEW Y-Y

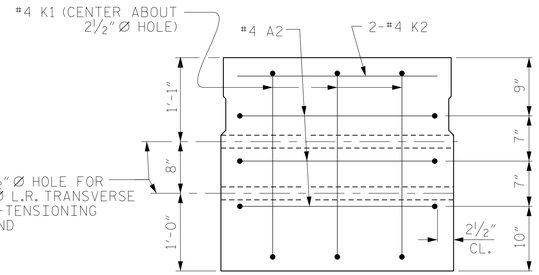
SHOWING ELEVATION VIEW OF GROUTED RECESS



DETAIL "C"

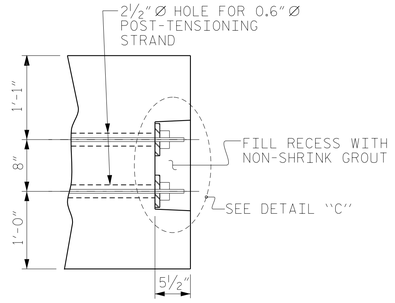


SECTION D-D

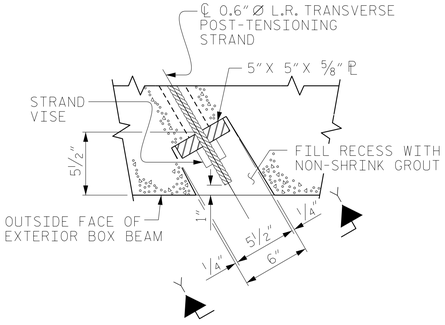


SECTION A-A

VOIDS NOT SHOWN



PART SECTION AT RECESS



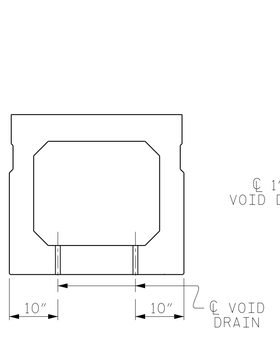
SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

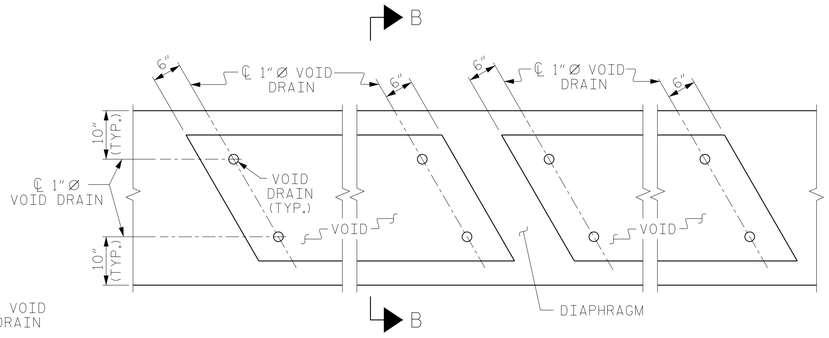
GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLE.



SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-9"
85' BOX BEAM UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¾" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↓
FINAL CAMBER	2" ↑

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 4 OF 5

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 ENGINEER NICHOLAS S. CUANY

11/14/2025

Lochner

H.W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 (919) 571-7111 NC LICENSE NUMBER F-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

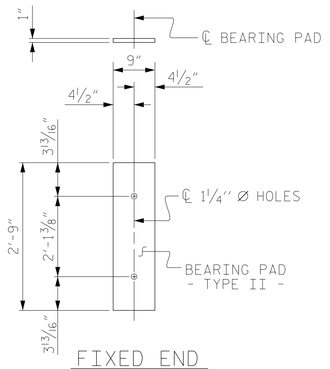
3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			17

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : DGE II/II	REV. 8/14 MAA/TMG
CHECKED BY : TMG II/II	

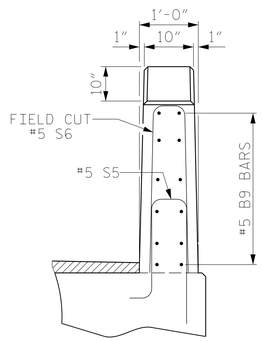
11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_BB4_380199.dgn
gabriella.boley

STD.NO.33PCBB5_60S

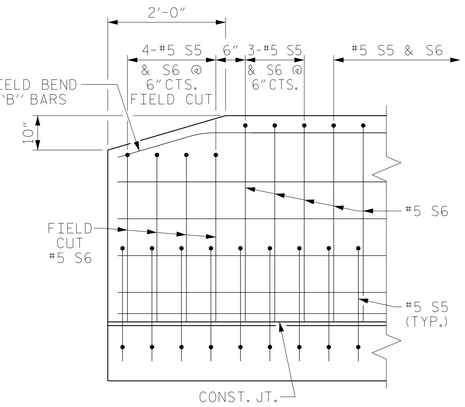


FIXED END

(TYPE II - 22 REQ'D)



END VIEW



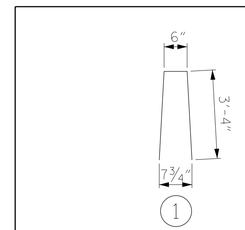
SIDE VIEW

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

END OF RAIL DETAILS

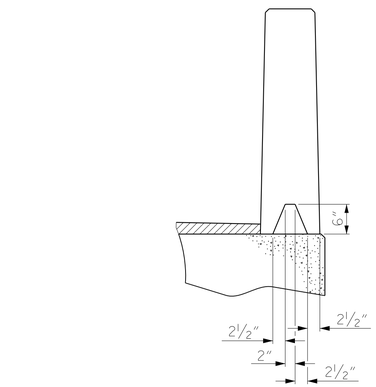
BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	85'-0"	170'-0"
INTERIOR B.B.	9	85'-0"	765'-0"
TOTAL	11	———	935'-0"



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

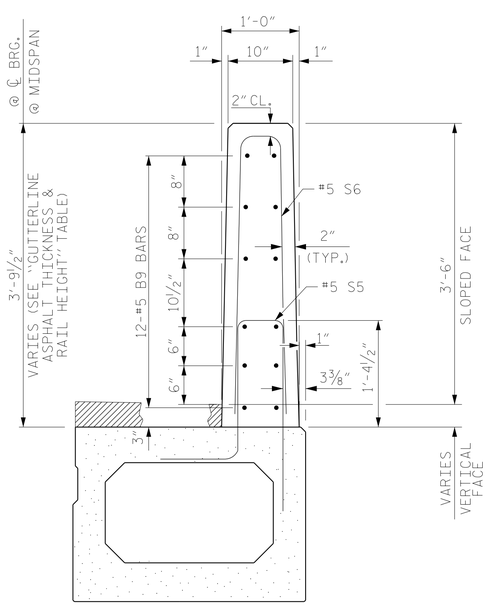
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	85' UNIT				
✳ B9	144	#5	STR	15'-11"	2391
✳ S6	228	#5	1	7'-2"	1704
✳ EPOXY COATED REINFORCING STEEL			LBS.		4095
CLASS AA CONCRETE			CU.YDS.		22.0
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN.FT.		170.0



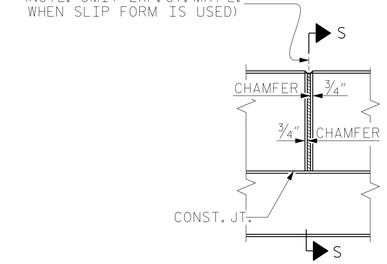
SECTION S-S

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

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
85' UNITS	1½"	3'-7½"



SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 5 OF 5

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICHOLAS S. CUANY

11/14/2025

Lochner

H.W. LOCHNER, INC.
5960 FAIRVIEW ROAD, SUITE 202
RALEIGH, NC 27612
(919) 571-7111

NC LICENSE NUMBER P-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

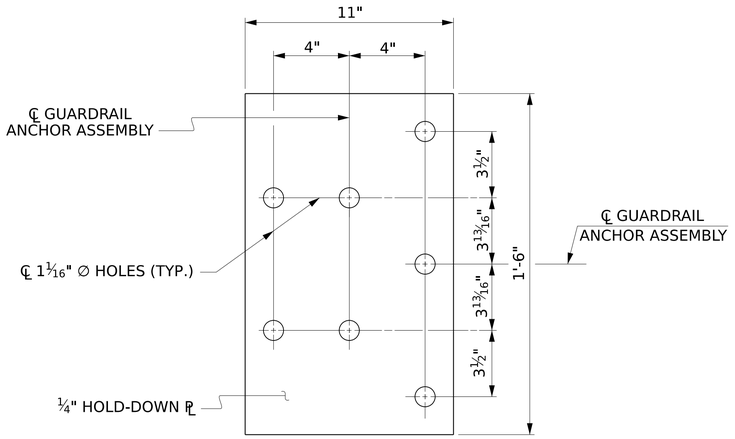
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			17

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

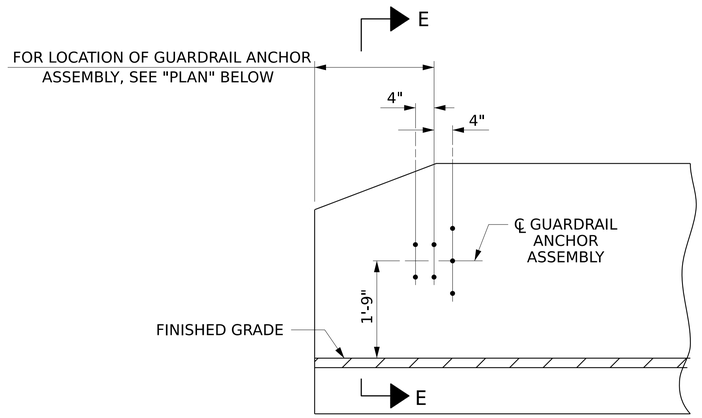
ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : DGE IO/II	REV. 5/18 MAA/THC
CHECKED BY : TMG II/II	

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_BB5_380199.dgn
gabriella.boley

STD. NO. 33PCBB8_60&120S



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' ∅ 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 ⅞'' ∅ 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.)

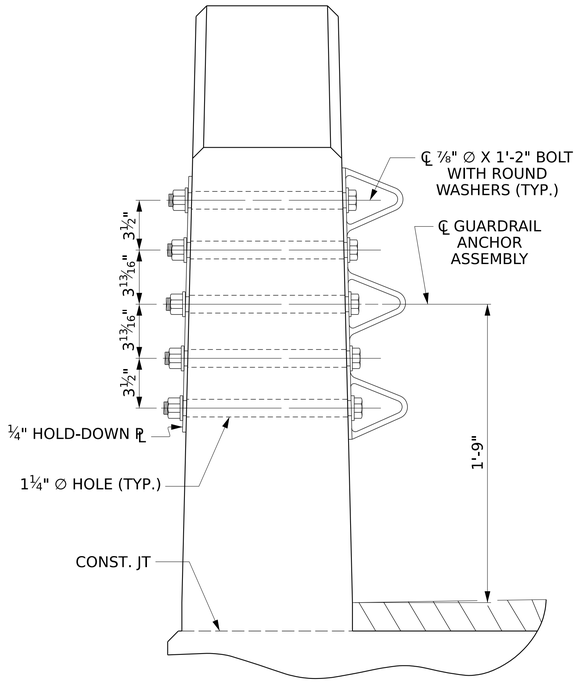
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

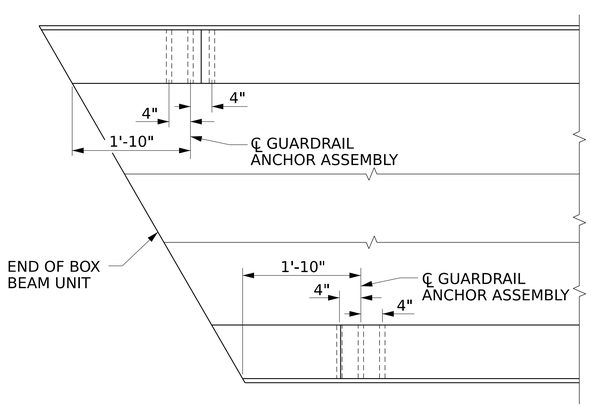
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1¼'' ∅ HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR

SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. HB-0072

GRANVILLE COUNTY

STATION: 18+36.00 -LREV-

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
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

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_GR_380199.dgn
gabriella.boley

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICHOLAS S. CUANY
11/14/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Lochner
H.W. LOCHNER, INC.
8043 PLACA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			17

STD. GRA3 Sht.1b

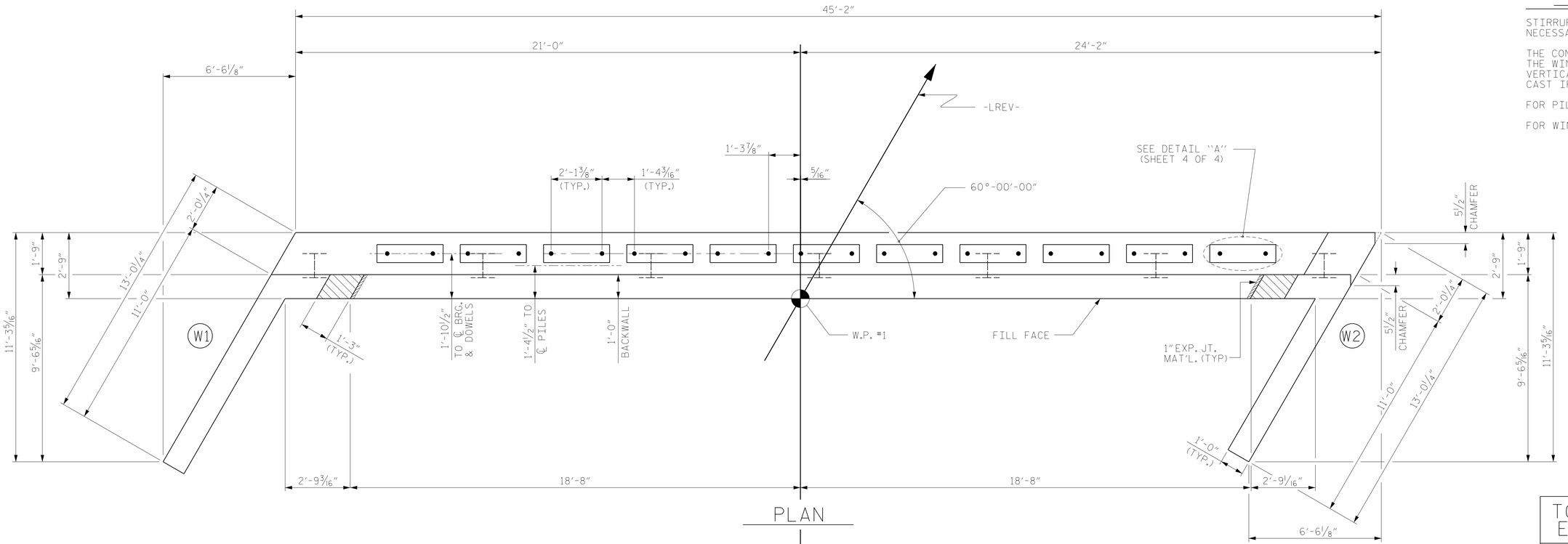
NOTES

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

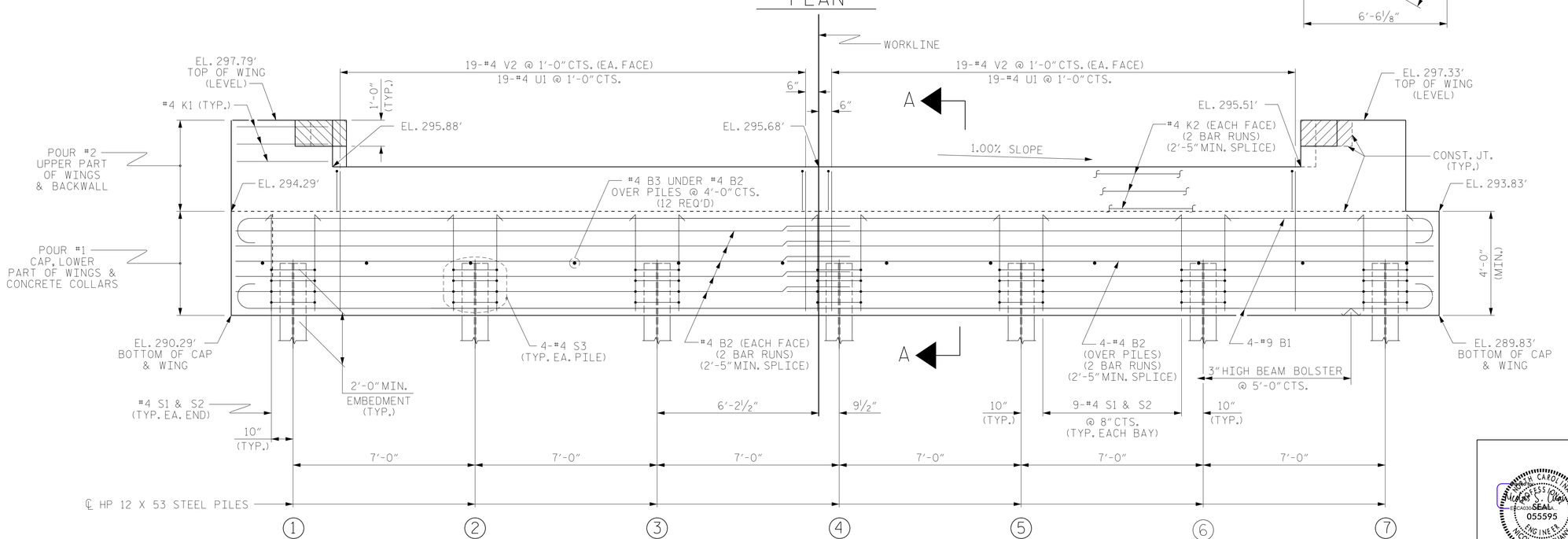
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

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.

TOP OF PILE ELEVATIONS

1	292.27'
2	292.20'
3	292.13'
4	292.06'
5	291.99'
6	291.92'
7	291.85'

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 ENGINEER NICOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			17

DRAWN BY : G. BOLEY DATE : 05/2025
CHECKED BY : N. CUANY DATE : 06/2025
DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_E1_380199.dgn
gabriella.boley

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

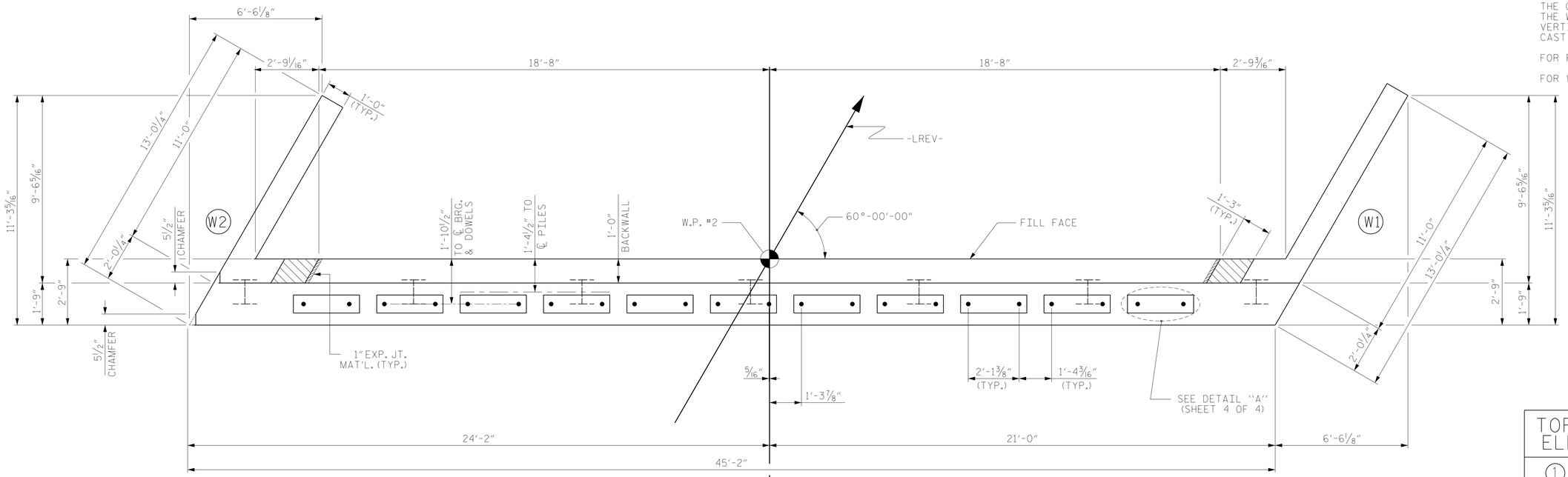
NOTES

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

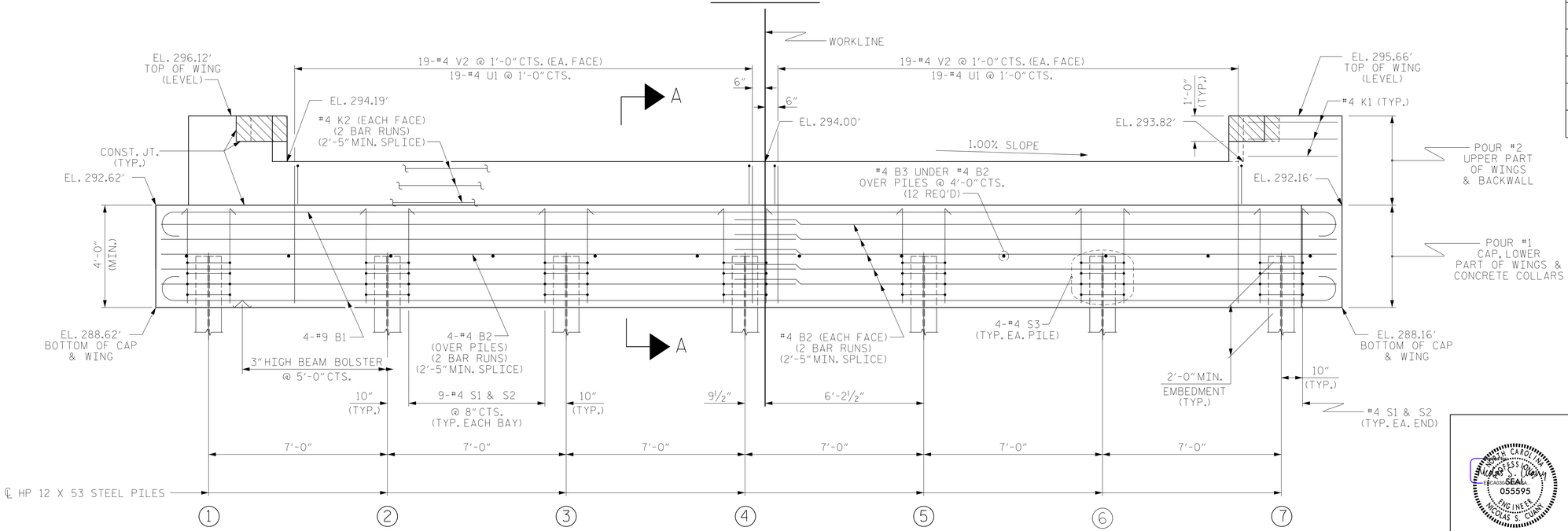
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

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.

TOP OF PILE ELEVATIONS

1	290.60′
2	290.53′
3	290.46′
4	290.39′
5	290.32′
6	290.25′
7	290.18′

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 2 OF 4

DRAWN BY : G. BOLEY DATE : 05/2025
CHECKED BY : N. CUANY DATE : 06/2025
DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_E2_380199.dgn
gabriella.boley

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 ENGINEER NICOLAS S. CUANY
11/14/2025

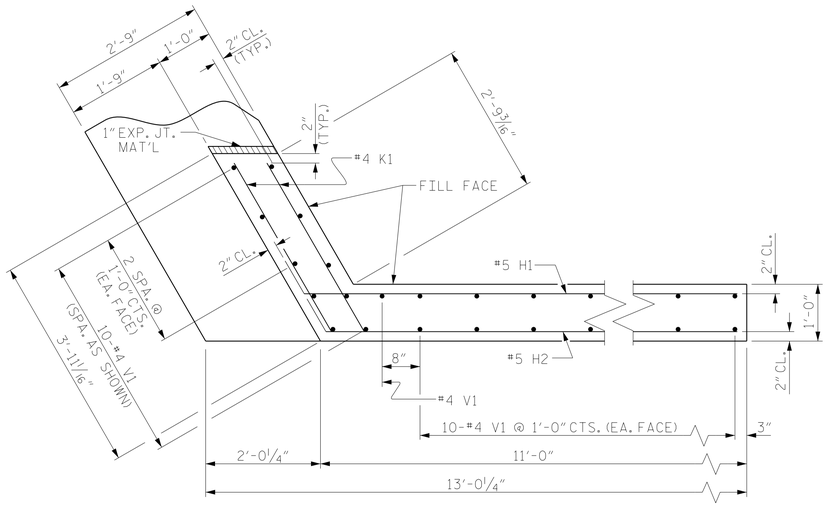
Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7171
NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

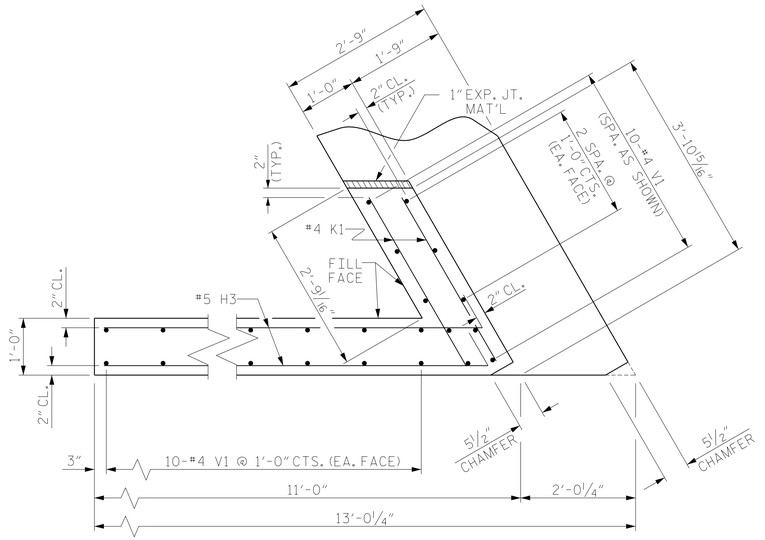
SUBSTRUCTURE

END BENT No. 2

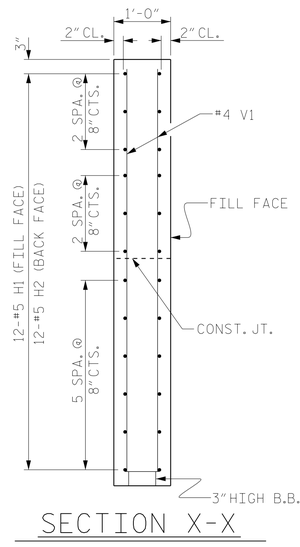
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			17



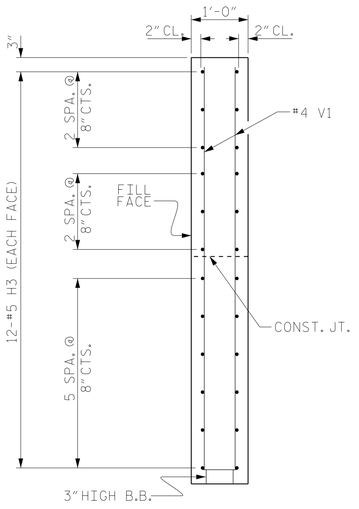
PLAN OF WING (W1)



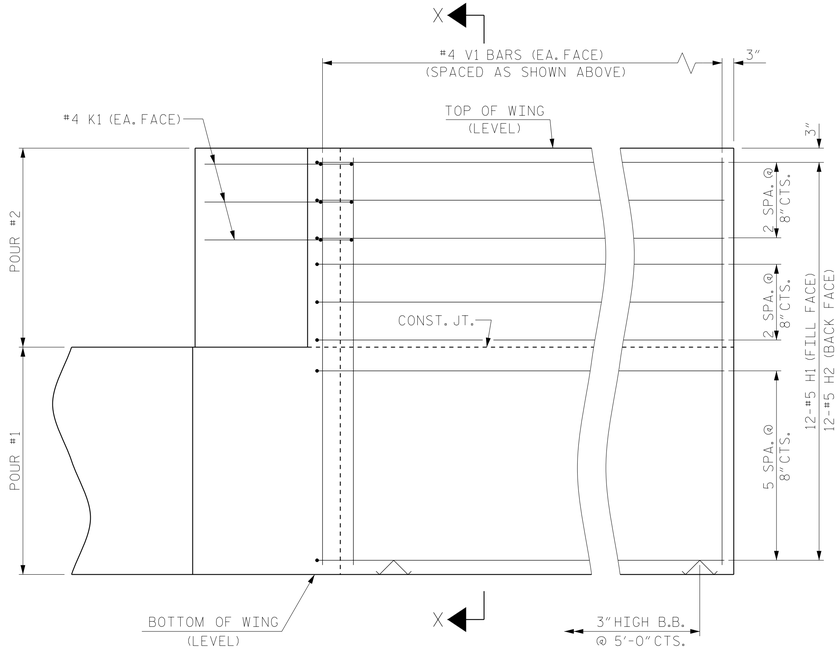
PLAN OF WING (W2)



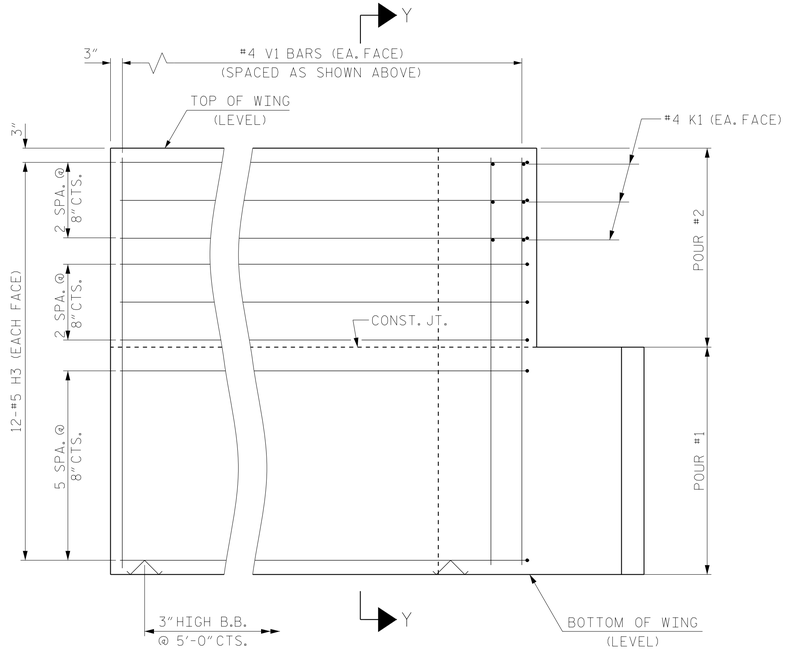
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 3 OF 4

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_E3_380199.dgn
gabriella.boley

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICHOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 (919) 571-7111
NC LICENSE NUMBER P-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

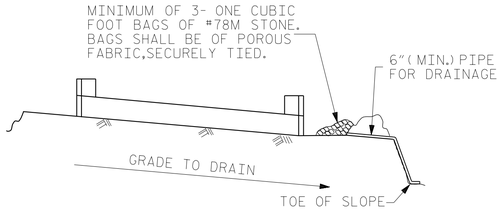
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			17

STD. NO. EB_33_60S4_33BB

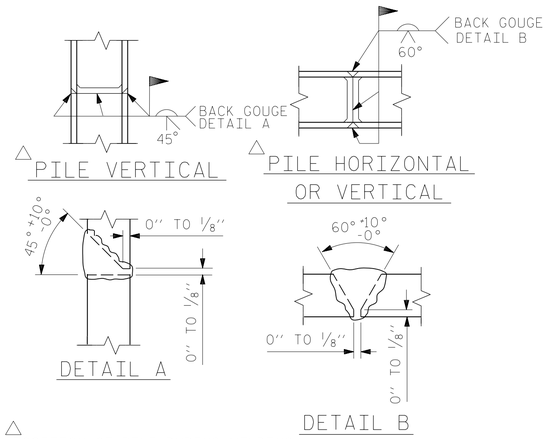


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

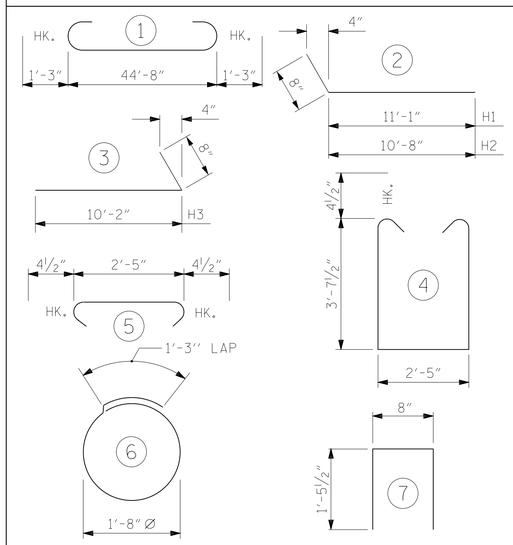
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	47'-2"	1283
B2	28	#4	STR	23'-8"	443
B3	12	#4	STR	2'-5"	19
D1	22	#8	STR	2'-3"	132
H1	12	#5	2	11'-9"	147
H2	12	#5	2	11'-4"	142
H3	24	#5	3	10'-10"	271
K1	12	#4	STR	3'-3"	26
K2	12	#4	STR	23'-8"	190
S1	56	#4	4	10'-5"	390
S2	56	#4	5	3'-2"	118
S3	28	#4	6	6'-6"	122
U1	38	#4	7	3'-7"	91
V1	61	#4	STR	7'-2"	292
V2	76	#4	STR	5'-3"	267

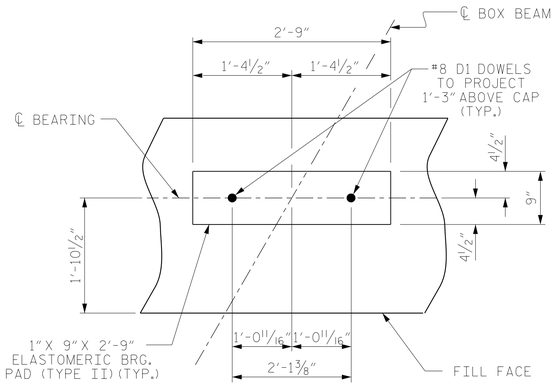
REINFORCING STEEL (FOR ONE END BENT) 3933 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 22.6 C.Y.

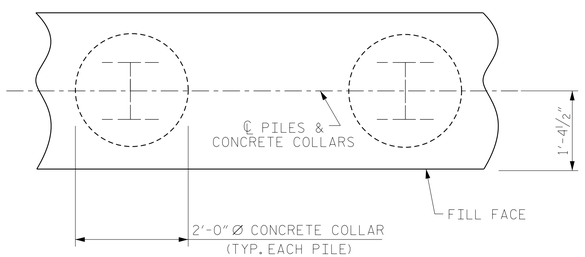
POUR #2 BACKWALL & UPPER PART OF WINGS 5.9 C.Y.

TOTAL CLASS A CONCRETE 28.5 C.Y.

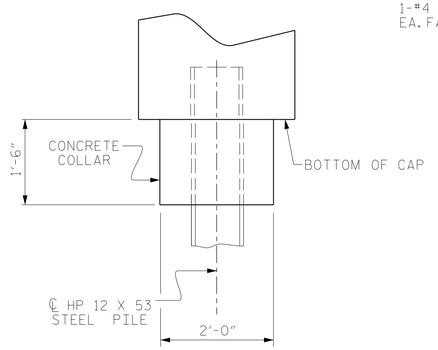


DETAIL "A"

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



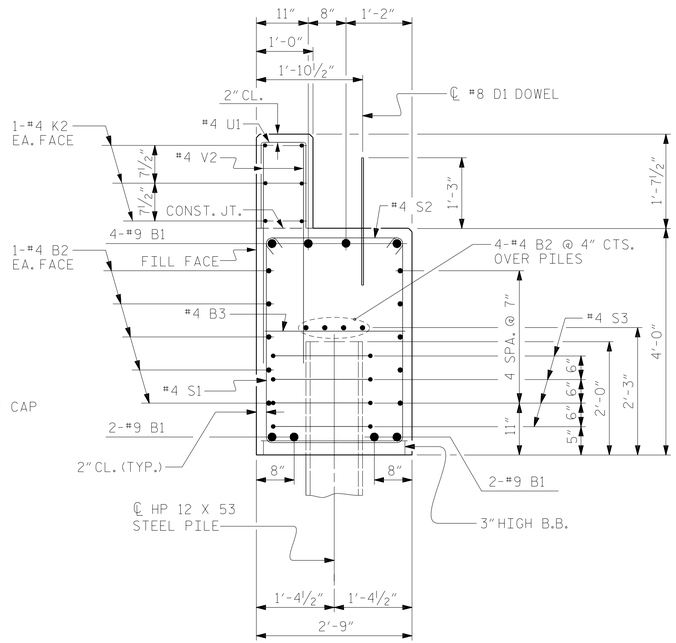
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



SECTION A-A

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

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER F-0159

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

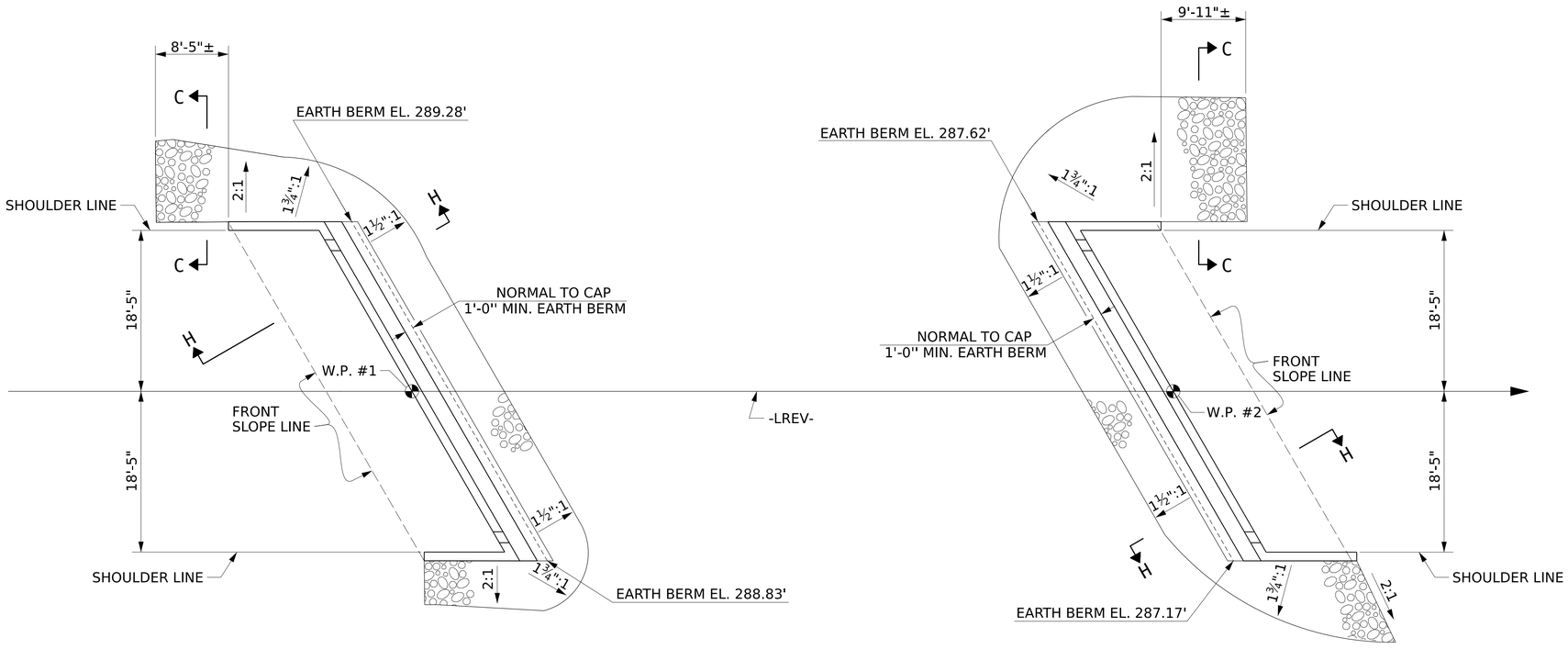
END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			17

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	G. BOLEY	DATE :	05/2025
CHECKED BY :	N. CUANY	DATE :	06/2025
DESIGN ENGINEER OF RECORD:	N. CUANY	DATE :	11/2025

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_E4_380199.dgn
gabriella.boley

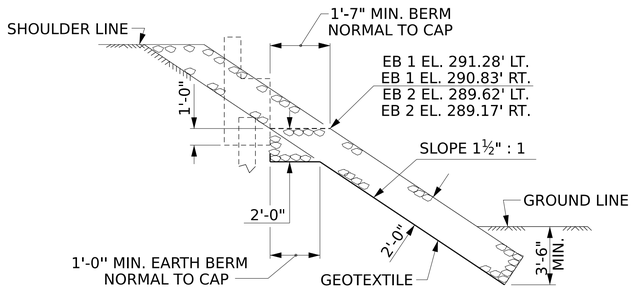


PLAN OF RIP RAP

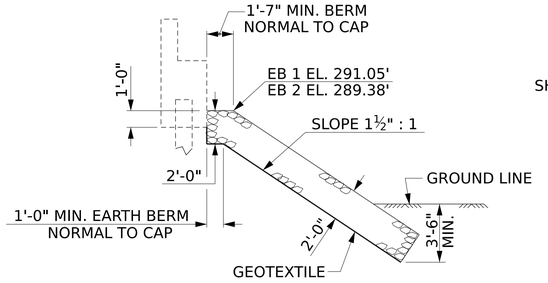
NOTE

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING SHEET 1 OF 4.

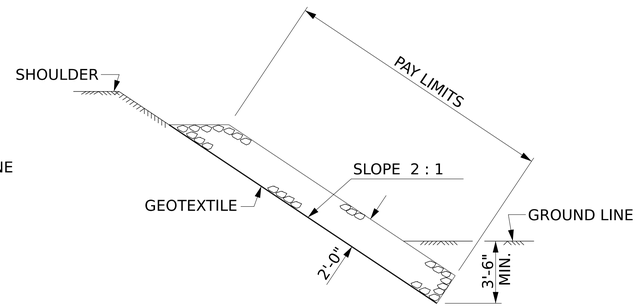
ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+36.00 -LREV-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	100	110
END BENT 2	135	150



SECTION H-H



℄ SECTION



SECTION C-C

BERM RIP RAPPED

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S. CUANY

11/14/2025

Lochner

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

NC LICENSE NUMBER F-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

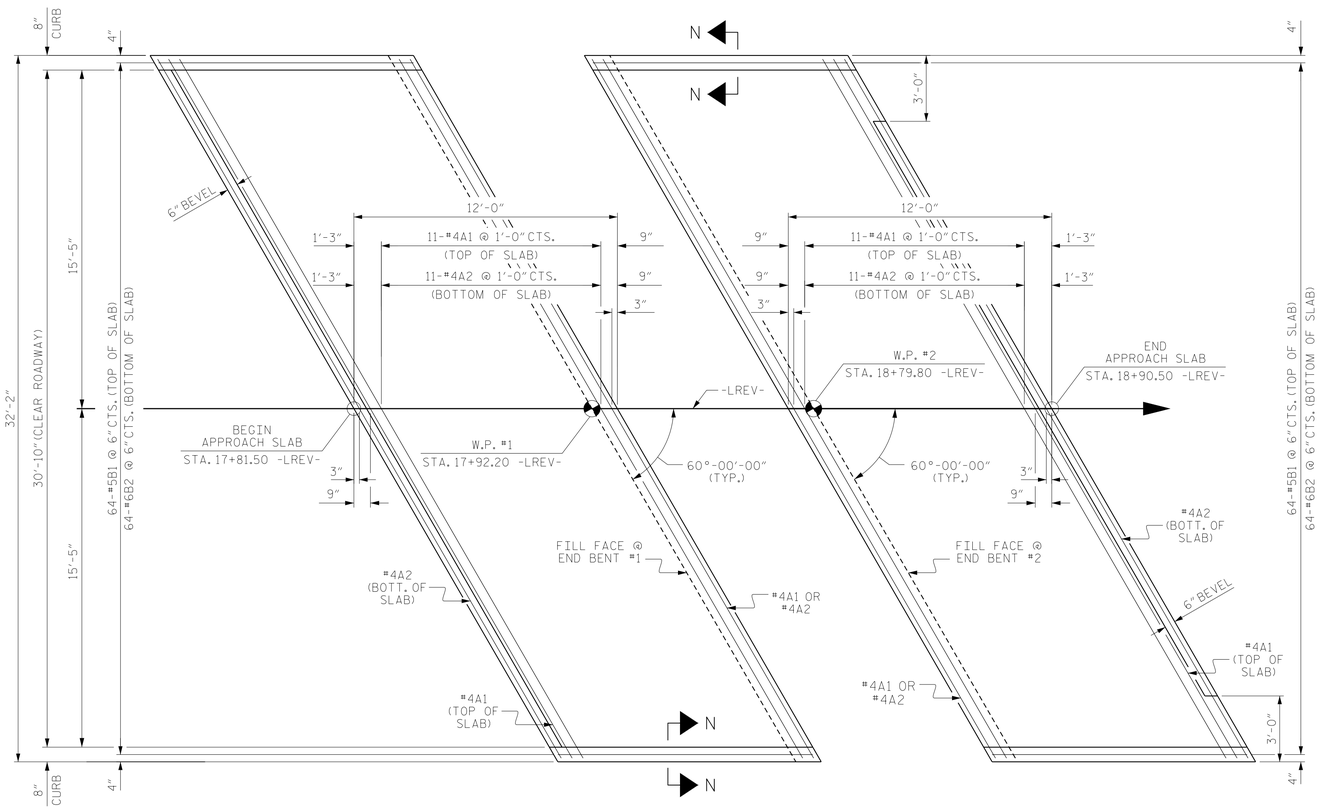
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			17

DRAWN BY : G. BOLEY DATE : 05/2025
CHECKED BY : N. CUANY DATE : 06/2025
DESIGN ENGINEER OF RECORD: N. CUANY DATE : 11/2025

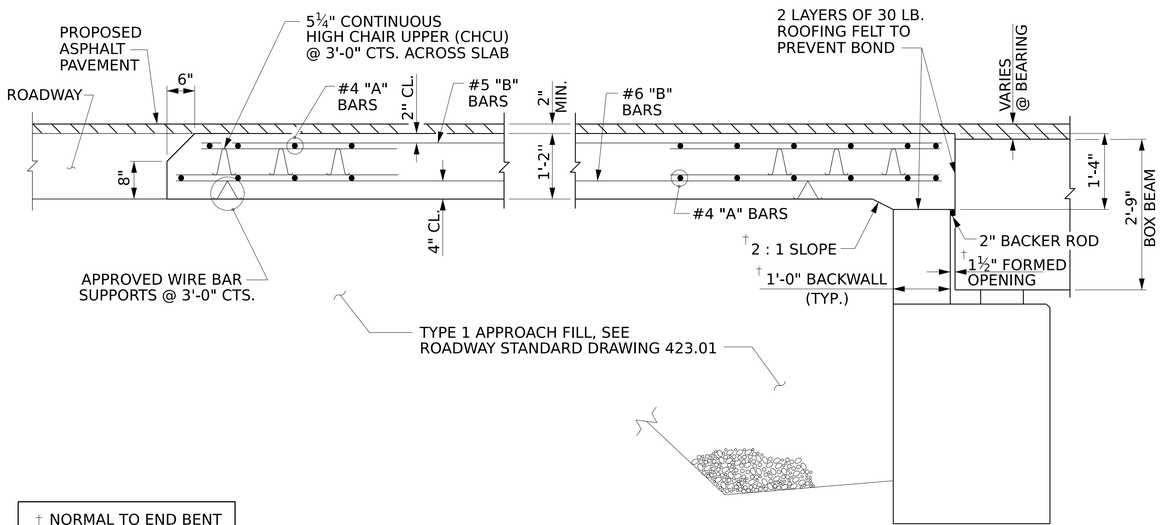
11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_RR_380199.dgn
gabriella.boley



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

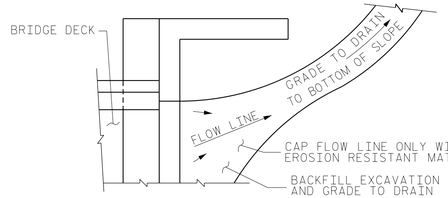
BILL OF MATERIAL

APPROACH SLAB AT EB NO. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	13	#4	STR	36'-8"	318
A2	13	#4	STR	36'-8"	318
✳ B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL				LBS.	1431
✳ EPOXY COATED REINFORCING STEEL				LBS.	1058
CLASS AA CONCRETE				C.Y.	17.0

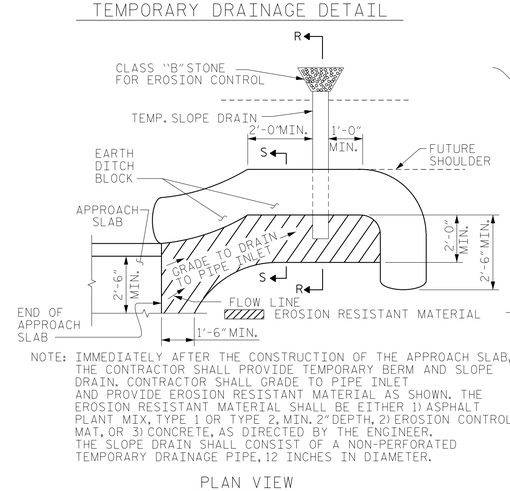
APPROACH SLAB AT EB NO. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	13	#4	STR	36'-8"	318
A2	13	#4	STR	36'-8"	318
✳ B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL				LBS.	1431
✳ EPOXY COATED REINFORCING STEEL				LBS.	1058
CLASS AA CONCRETE				C.Y.	17.0



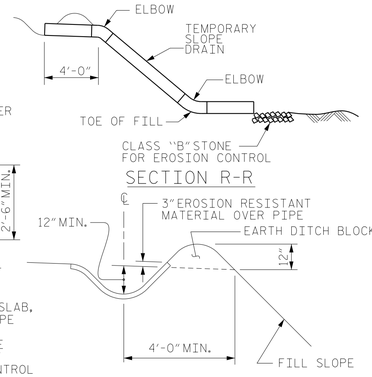
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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

PLAN VIEW

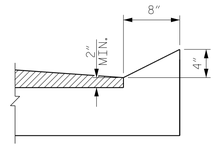


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

CURB DETAILS

SPLICE LENGTHS

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

PROJECT NO. **HB-0072**

GRANVILLE COUNTY

STATION: **18+36.00 -LREV-**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT (SUB-REGIONAL TIER) 60° SKEW

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055595 NICOLAS S. CUANY
11/14/2025

Lochner
H.W. LOCHNER, INC.
5960 FAIRVIEW ROAD, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC LICENSE NUMBER P-0159

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ASSEMBLED BY : G. BOLEY	DATE : 05/2025
CHECKED BY : N. CUANY	DATE : 06/2025
DRAWN BY : MAA 11/11	REV. 08-19 BNB/THC
CHECKED BY : AAC 11/11	REV. 01-25 HRS

11/14/2025
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\boley gabriella\d0141473\BP5.R080_SMU_AS1_380199.dgn
gabriella.boley

STD. NO. BAS_BB_33_60S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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