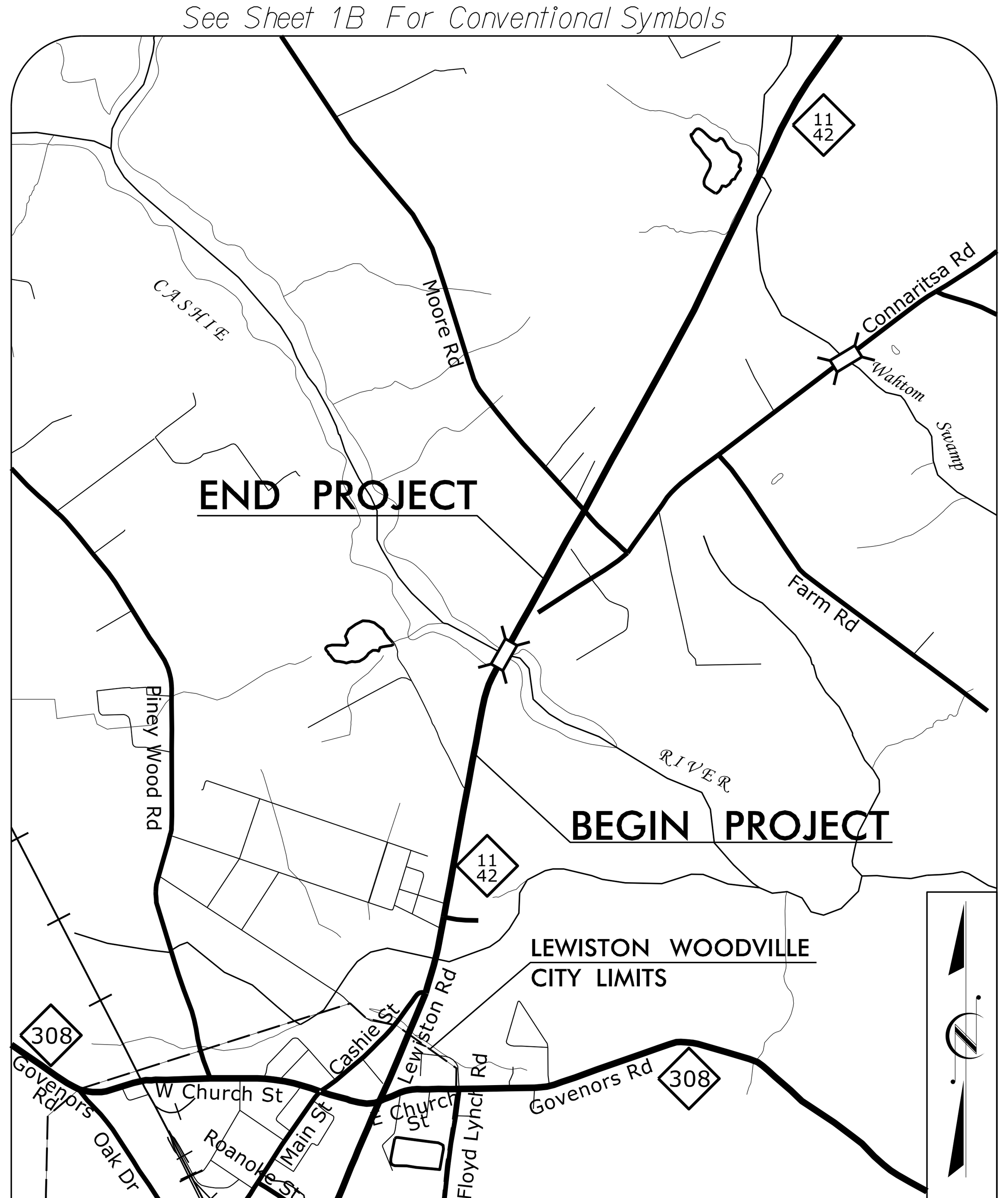
TIP PROJECT: BR-0153

CONTRACT: C205033

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



VICINITY MAP
NOT TO SCALE

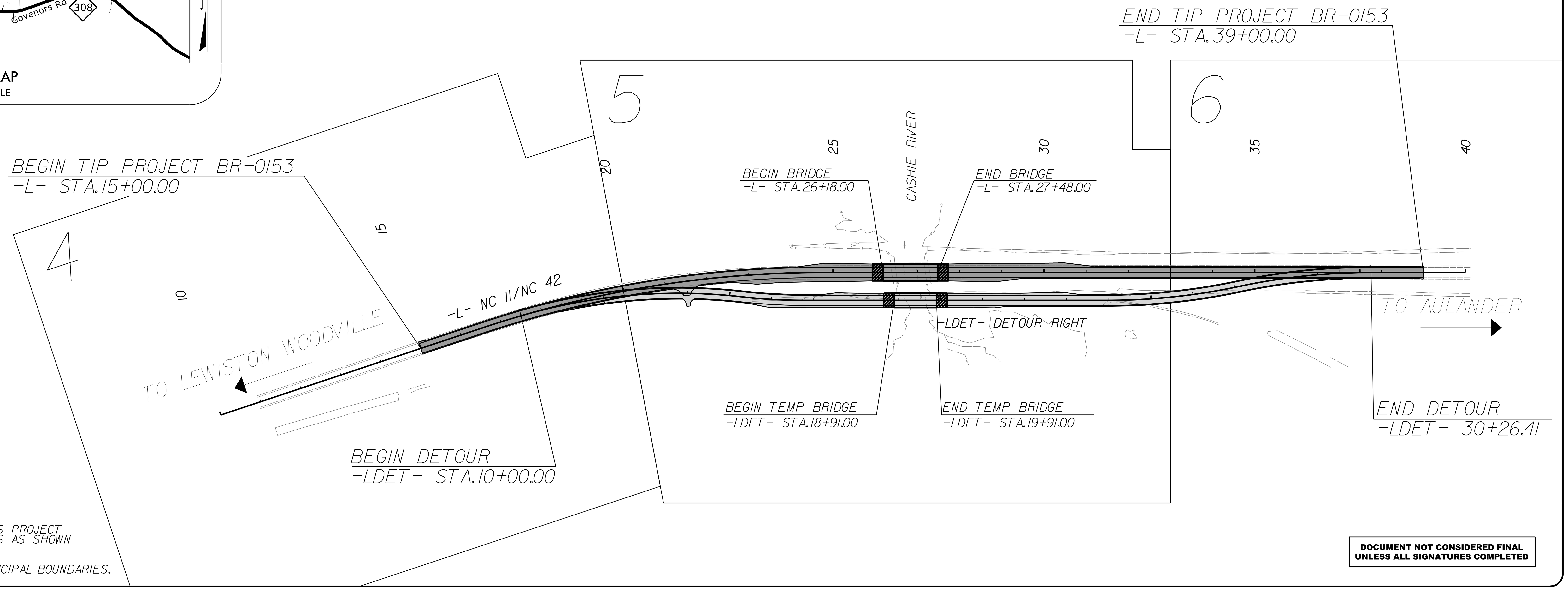
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BERTIE COUNTY

LOCATION: BRIDGE 24 ON NC 11 /NC 42 OVER CASHIE RIVER
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0153	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67153.1.1		PE
67153.2.1		ROW/UTILITIES
51831.3.1	5183101	CONSTRUCTION



THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 6,350
ADT 2045 = 6,900
K = 8 %
D = 55 %
T = 16 % *
V = 60 MPH
* TTST = 12 DUAL = 4
FUNC CLASS = MINOR ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0153	=	0.430 MI
LENGTH STRUCTURE TIP PROJECT BR-0153	=	0.025 MI
TOTAL LENGTH TIP PROJECT BR-0153	=	0.455 MI

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 15, 2024

LETTING DATE:
SEPTEMBER 16, 2025

LAURA C. FISHER, PE
PROJECT ENGINEER

ERIC D. SPALDING, PE
PROJECT DESIGN ENGINEER

DAVID S. STUTTS, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

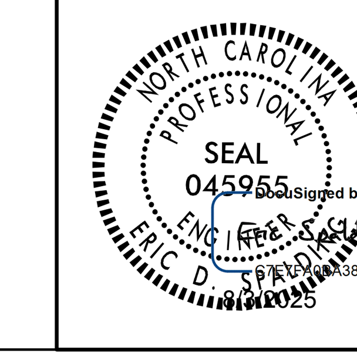
SEAL 045729
8/14/2025
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SEAL 045955
SIGNATURE: P.E.

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	1A

ROADWAY DESIGN ENGINEER



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-2	ROADWAY DETAILS
2C-1 THRU 2C-8	SPECIAL DETAILS
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 8	PLAN AND PROFILE SHEET
RW01 THRU RW06	SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENT AND PROPERTY TIES
TMP-1 THRU TMP-19	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-5	PAVEMENT MARKING PLANS
EC-1 THRU EC-11	EROSION CONTROL PLANS
UC-1 THRU UC-5	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-4	UTILITIES BY OTHERS PLANS
X-1A THRU X-1B	CROSS-SECTION INDEX AND SUMMARY SHEET
X-1 THRU X-20	CROSS-SECTIONS
S-1 THRU S-31	STRUCTURE PLANS

GENERAL NOTES:

2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADE LINE:
GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

SUBSURFACE DRAINS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

AT&T, Bertie County, BrightSpeed, Piedmont Natural Gas

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

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	
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
423.01	Bridge Approach Fills - Type 1 Approach Fill for Bridge Abutment
423.02	Bridge Approach Fills - Type 1A Alternate Approach Fill for Integral Bridge Abutment
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
665.01	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.04	Drop Inlet Installation in Shoulder Berm Gutter
846.01	Concrete Curb, Gutter and Curb & 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)
862.04	Anchoring End of Guardrail - for B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge

- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
SEAL 045955	SEAL 038176

benesch NC FIRM LICENSE No: F-1320 8000 REGENCY PARKWAY, STE 375 CARY, NC 27518 (984) 275-2490

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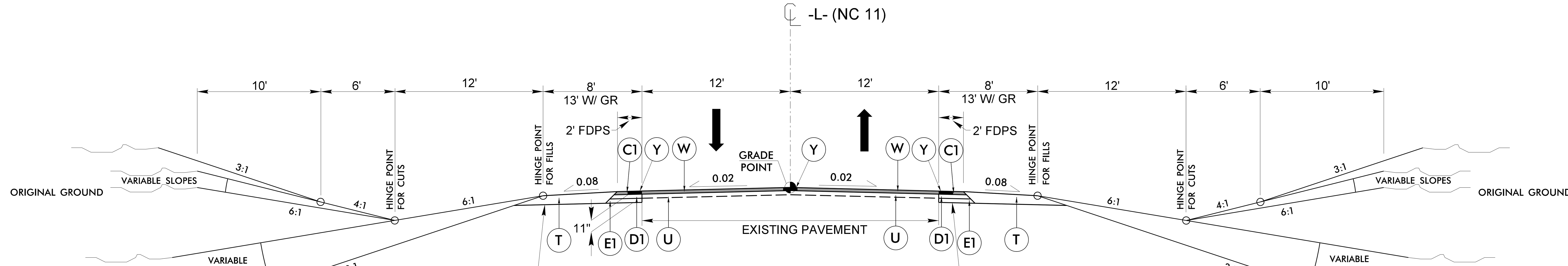
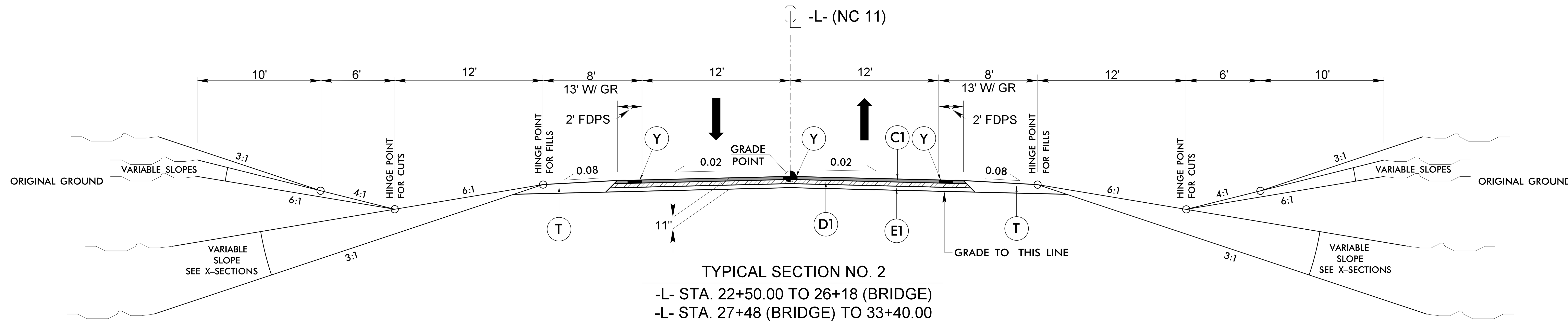


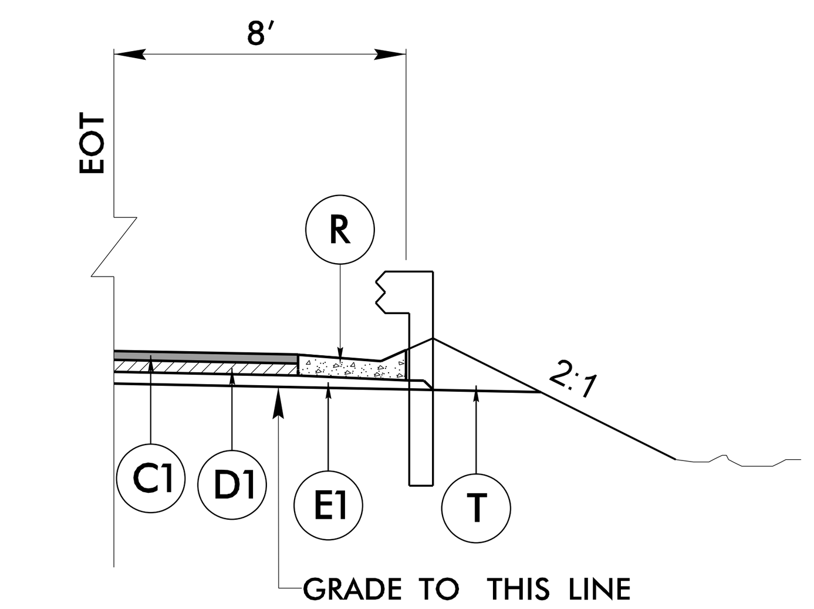
TYPICAL SECTION NO. 1

-L- STA. 15+00.00 TO 22+50.00
-L- STA. 33+40.00 TO 39+00.00



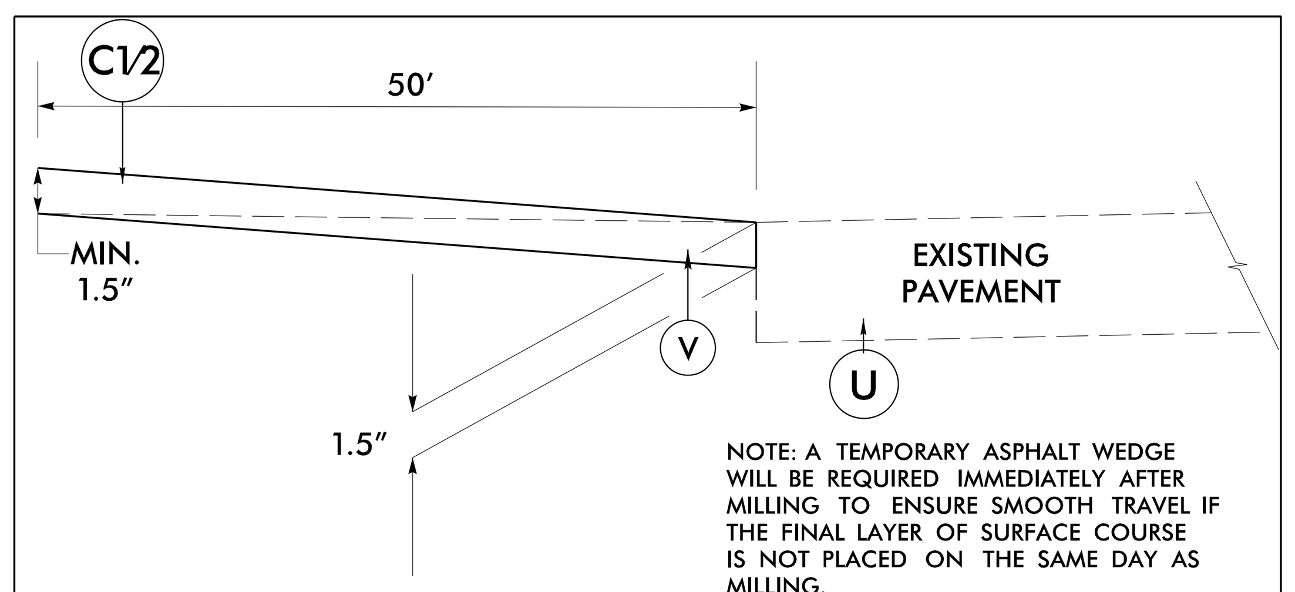
TYPICAL SECTION NO. 2

-L- STA. 22+50.00 TO 26+18 (BRIDGE)
-L- STA. 27+48 (BRIDGE) TO 33+40.00



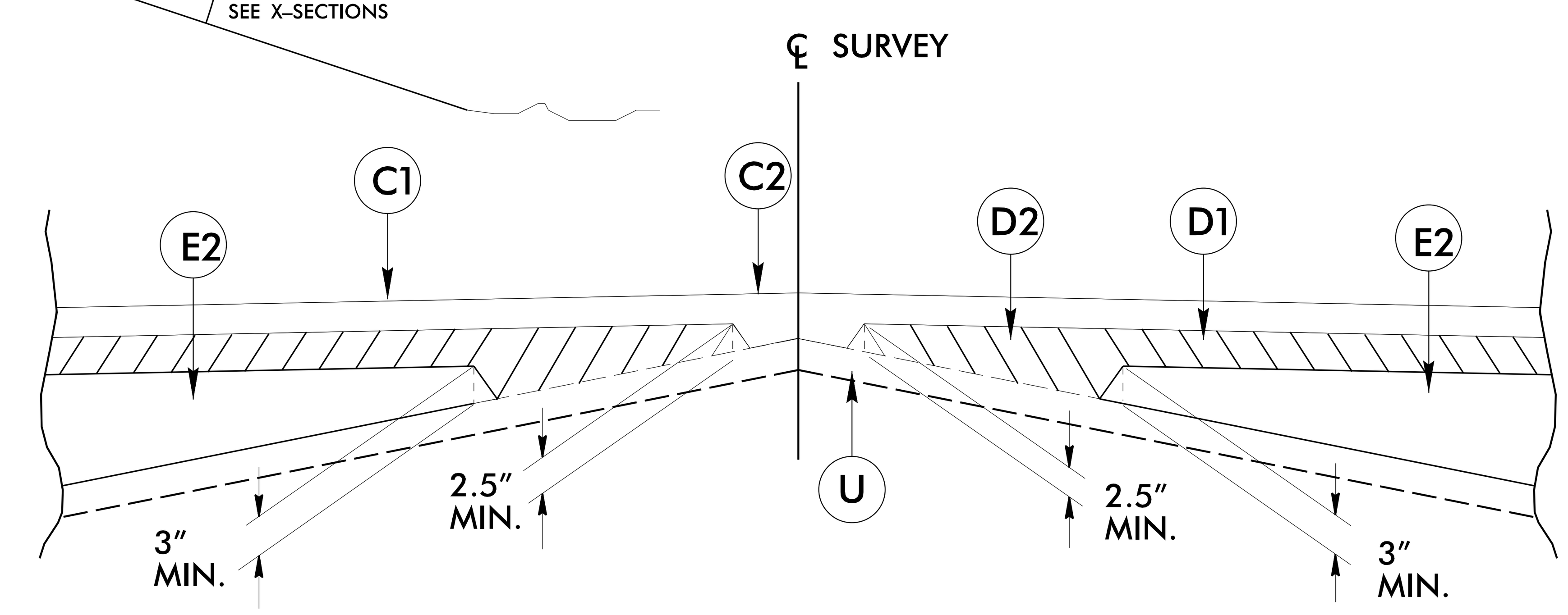
SHOULDER BERM GUTTER PARTIAL TYPICAL SECTION NO. 2A

–L– STA. 27+73 TO STA. 27+96 RT.
–L– STA. 27+73 TO STA. 27+96 LT. *
(* REVERSE TYPICAL FOR LEFT SIDE)



INCIDENTAL MILLING PAVEMENT KEY–IN DETAIL (TIE–IN)

–L– STA 15+00.00 TO 15+50.00
–L– STA 38+50.00 TO 39+00.00



Detail Showing Method of Wedging

FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C AT AN AVERAGE RATE OF 168 LBS PER SQ. YD. IN EACH OF TWO LAYERS
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER 1" DEPTH IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C AT AN AVERAGE RATE OF 456 LBS PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE I19.0C AT AVG. RATE OF 114 LBS PER SQ. YD. PER 1" DEPTH IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4.0" 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 B25.0C AT AN AVG. RATE OF 114 LBS PER SQ. YD. PER 1" DEPTH IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" IN DEPTH.
J	8" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YARD
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	INCIDENTAL MILLING
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)
Y	RUMBLE STRIPS

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2A-2

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045955 ERIC D. SPEEDLING 8/5/2025

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038176 SHIHAI ZHANG 8/5/2025

benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 375, CARY, NC 27518, (984) 275-2490

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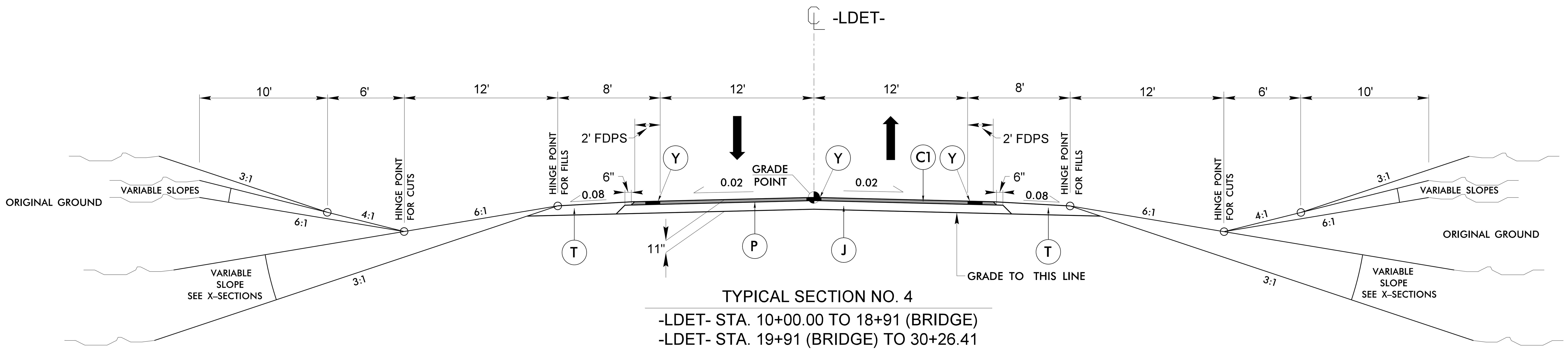
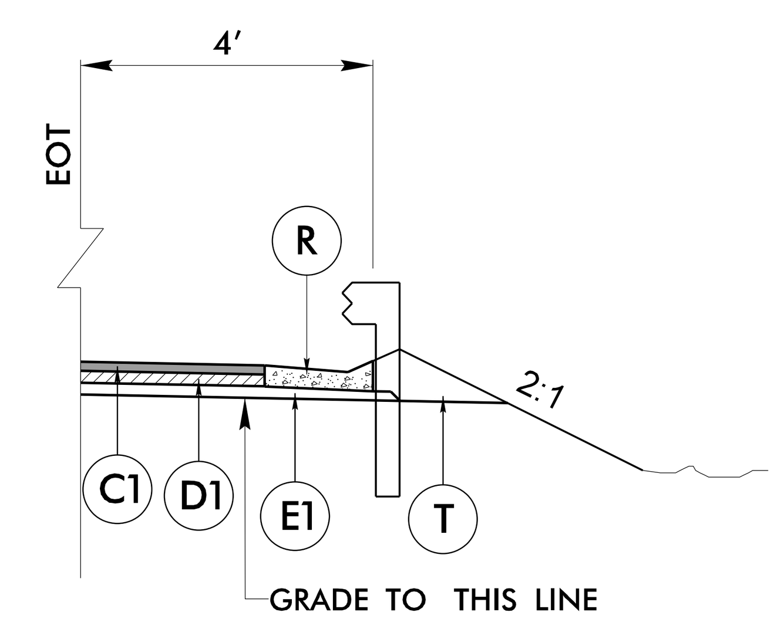


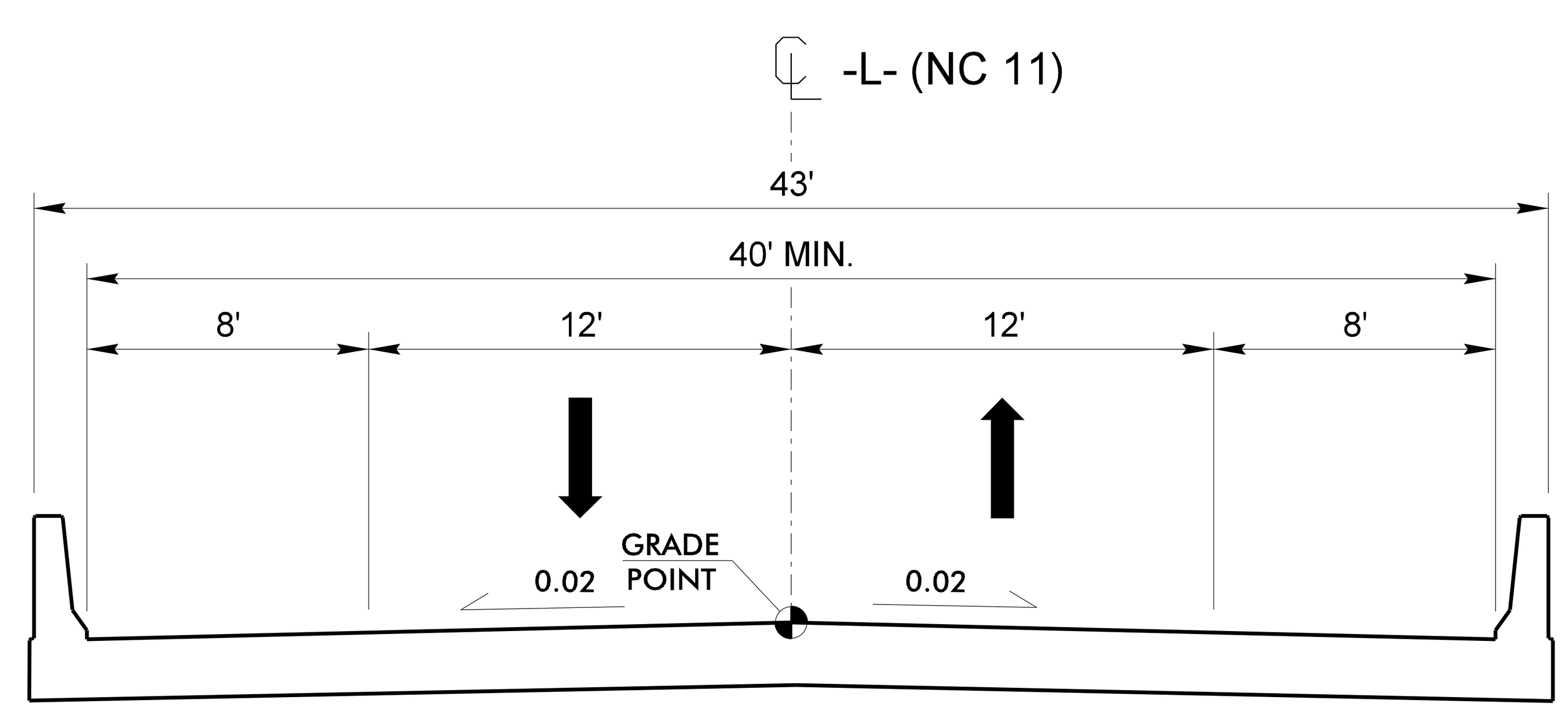
TYPICAL SECTION NO. 4

-LDET- STA. 10+00.00 TO 18+91 (BRIDGE)
-LDET- STA. 19+91 (BRIDGE) TO 30+26.41



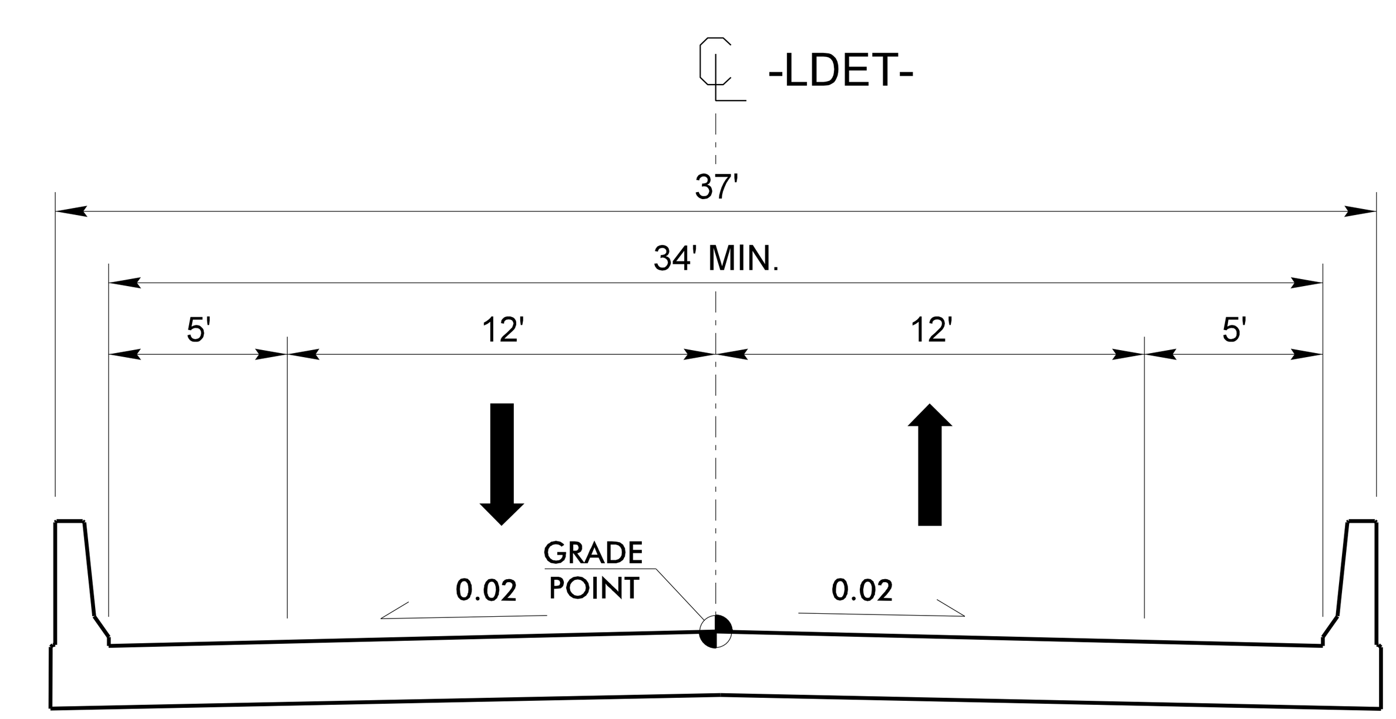
SHOULDER BERM GUTTER
PARTIAL TYPICAL SECTION NO. 4A

–LDET– STA. 20+16 TO STA. 20+34 RT.
–LDET– STA. 20+16 TO STA. 20+34 LT. *
(* REVERSE TYPICAL FOR LEFT SIDE)



TYPICAL SECTION NO. 3

-L- STA. 26+18 TO 27+48



TYPICAL SECTION NO. 5

-LDET- STA. 18+91 TO 19+91

FINAL PAVEMENT SCHEDULE

C1	3.0" S9.5C
C2	VAR S9.5C
D1	4.0" I19.0C
D2	VAR. I19.0C
E1	4.0" B25.0C
E2	VAR B25.0C
J	8" ABC
P	PRIME COAT
R	SBG
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	INCIDENTAL MILLING
W	VAR. (WEDGING)
Y	RUMBLE STRIPS

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

NOTE: SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS

5/14/99
$$$$$$SYSTIME$$$$ ...\BR-0153_rdy_typ.dgn

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2B-1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045955 ERIC D. SELLERS

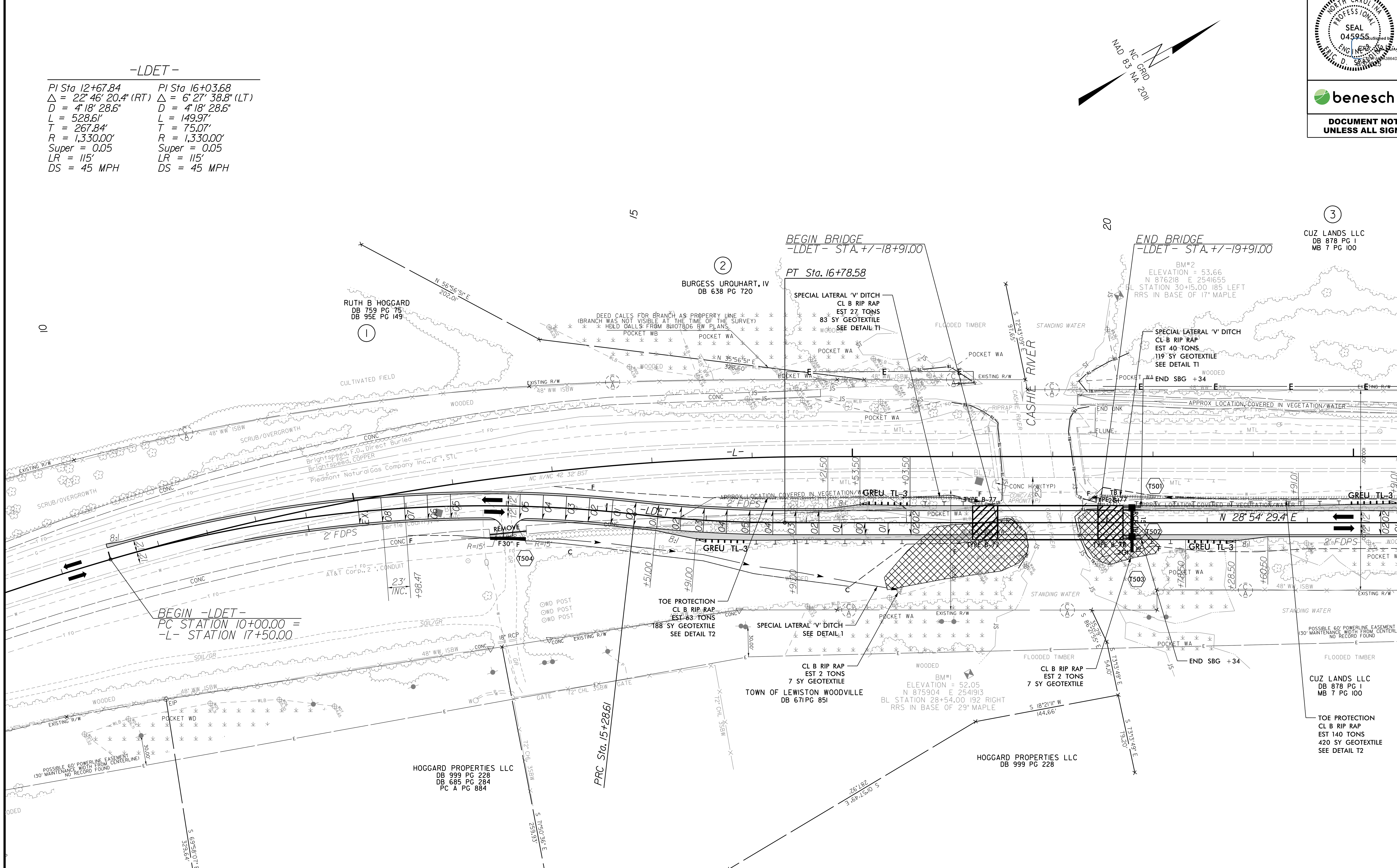
NORTH CAROLINA PROFESSIONAL SEAL — Signed by: Brian Koletin — 8/1/2025

benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 375, CARY, NC 27518, (984) 275-2490

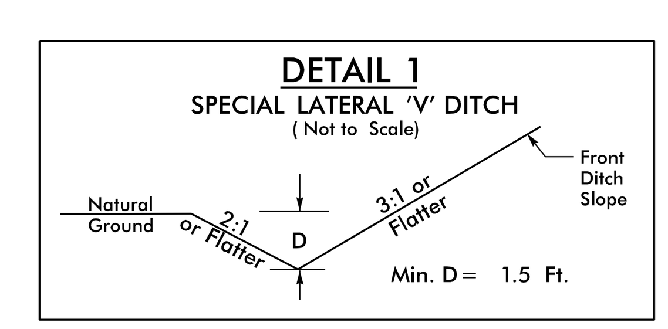
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-LDET-

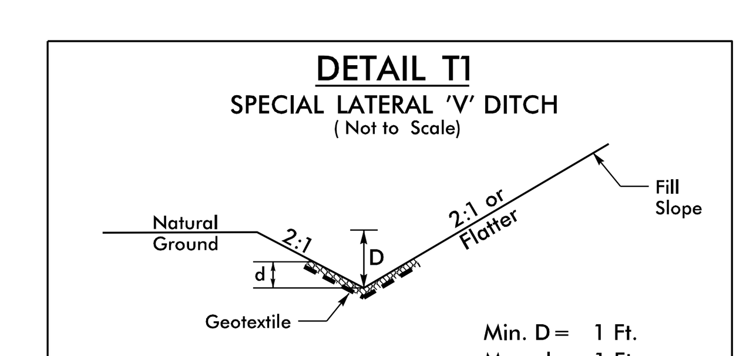
PI Sta 12+67.84	PI Sta 16+03.68
Δ = 22° 46' 20.4" (RT)	Δ = 6° 27' 38.8" (LT)
D = 4° 18' 28.6"	D = 4° 18' 28.6"
L = 528.61'	L = 149.97'
T = 267.84'	T = 75.07'
R = 1,330.00'	R = 1,330.00'
Super = 0.05	Super = 0.05
LR = 115'	LR = 115'
DS = 45 MPH	DS = 45 MPH



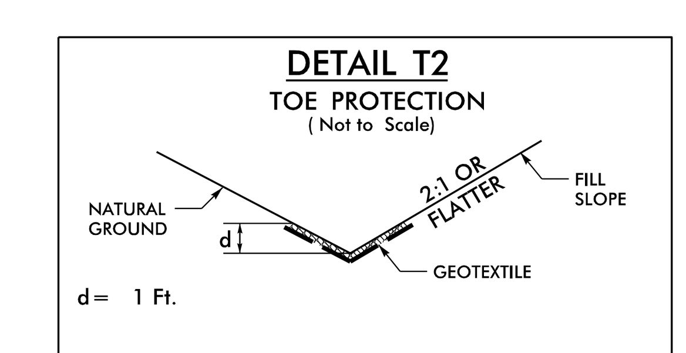
NC GRID NAD 83 NA 2011
RUTH B HOGGARD DB 759 PG 75 DB 95E PG 149
BURGESS URQUHART, IV DB 638 PG 720
CUZ LANDS LLC DB 878 PG 1 MB 7 PG 100
BEGIN BRIDGE -LDET- STA.+/-18+91.00
END BRIDGE -LDET- STA.+/-19+91.00
PT Sta. 16+78.58
SPECIAL LATERAL 'V' DITCH CL B RIP RAP EST 27 TONS 83 SY GEOTEXTILE SEE DETAIL T1
SPECIAL LATERAL 'V' DITCH CL B RIP RAP EST 40 TONS 119 SY GEOTEXTILE SEE DETAIL T1
END SBG +34
BM#2 ELEVATION = 53.66 N 876218 E 2541655 BL STATION 30+15.00 185 LEFT RRS IN BASE OF 17" MAPLE
DEED CALLS FOR BRANCH AS PROPERTY LINE (BRANCH WAS NOT VISIBLE AT THE TIME OF THE SURVEY) HELD CALLS FROM 8II07806 RW PLANS
CASHIE RIVER
APPROX LOCATION COVERED IN VEGETATION/WATER
N 28° 54' 29.4" E
GREU TL-3
2' FDPS
MATCH LINE -LDET- STA. 23+00 SEE SHEET 2B-2
BEGIN -LDET- PC STATION 10+00.00 = -L- STATION 17+50.00
TOE PROTECTION CL B RIP RAP EST 63 TONS 188 SY GEOTEXTILE SEE DETAIL T2
SPECIAL LATERAL 'V' DITCH SEE DETAIL 1
CL B RIP RAP EST 2 TONS 7 SY GEOTEXTILE
TOWN OF LEWISTON WOODVILLE DB 671 PG 851
BM#1 ELEVATION = 52.05 N 875904 E 2541913 BL STATION 28+54.00 192 RIGHT RRS IN BASE OF 29" MAPLE
CL B RIP RAP EST 2 TONS 7 SY GEOTEXTILE
END SBG +34
CUZ LANDS LLC DB 878 PG 1 MB 7 PG 100
TOE PROTECTION CL B RIP RAP EST 140 TONS 420 SY GEOTEXTILE SEE DETAIL T2
POSSIBLE 60' POWERLINE EASEMENT (30' MAINTENANCE WIDTH FROM CENTERLINE) NO RECORD FOUND
HOGGARD PROPERTIES LLC DB 999 PG 228 DB 685 PG 284 PC A PG 884
HOGGARD PROPERTIES LLC DB 999 PG 228
PRC Sta. 15+28.61
CULTIVATED FIELD
FLOODED TIMBER
STANDING WATER
WOODED



FROM STA. 13+50 TO STA. 17+96 -LDET- RT



FROM STA. 17+96 TO STA. 18+75 -LDET- LT
FROM STA. 19+82 TO STA. 20+96 -LDET- LT



FROM STA. 16+16 TO STA. 17+96 -LDET- LT
FROM STA. 20+96 TO STA. 24+98 -LDET- LT

FOR -LDET- PROFILE, SEE SHEET NO. 8

$$$$$SYSTIME$$$$$ ..\Proj\BR-0153_rdy_psh2B-1.dgn

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2B-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045955 — Signed by: Eric D. Stallings

NORTH CAROLINA PROFESSIONAL SEAL — Signed by: Brian Kelston — 8/1/2025

benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 375, CARY, NC 27518, (984) 275-2490

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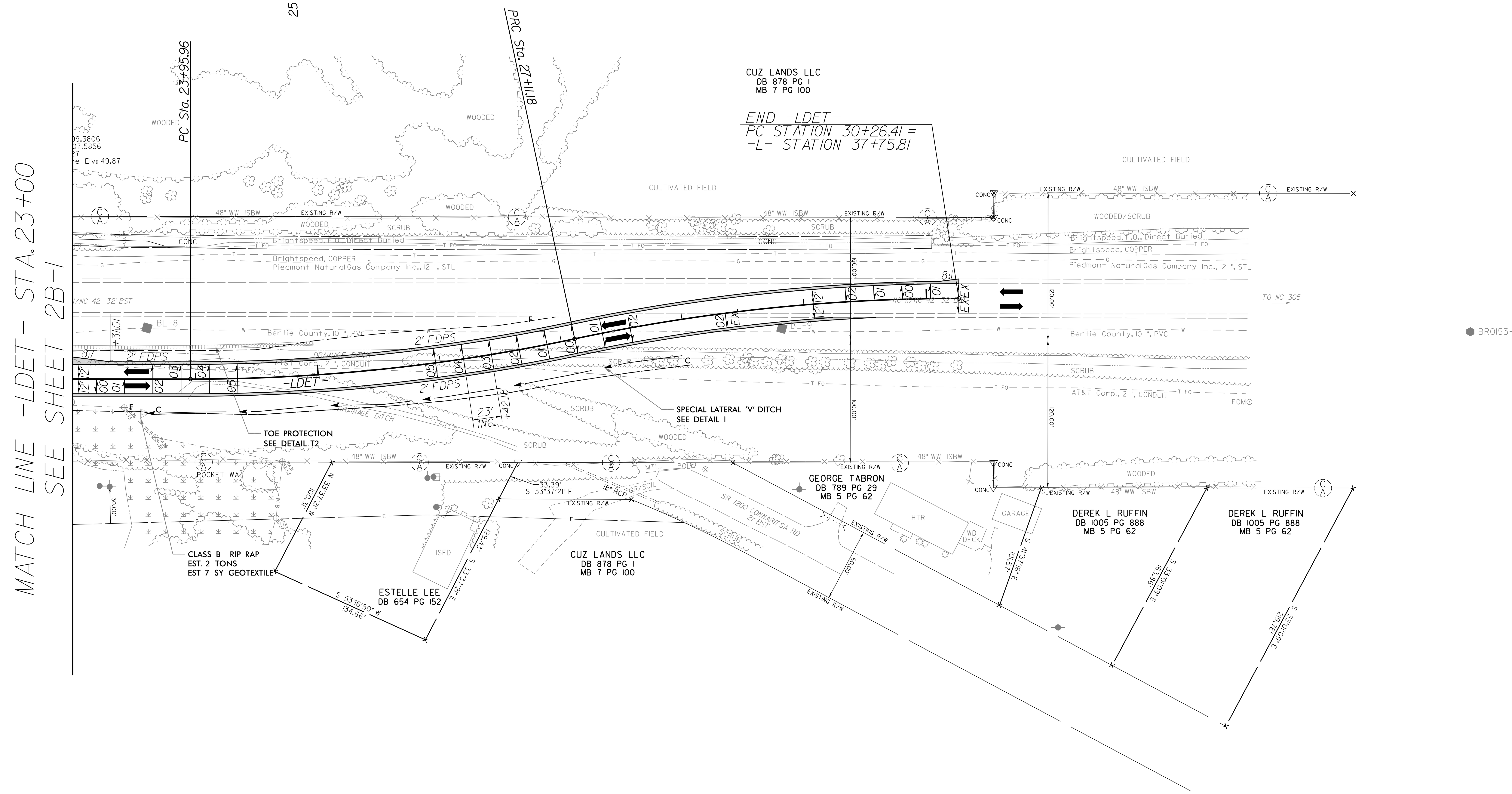
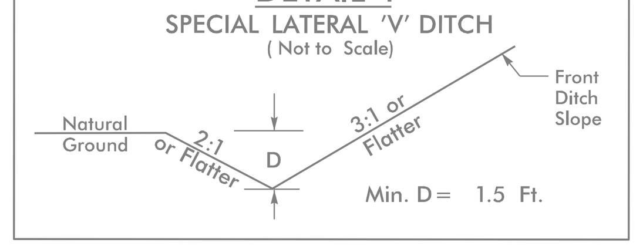
NC GRID NAD 83 NA 2011

-LDET-

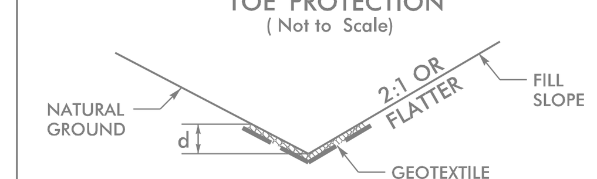
PI Sta 25+54.16	PI Sta 28+69.38
Δ = 12° 02' 26.2" (LT)	Δ = 12° 02' 26.2" (RT)
D = 3° 49' 11.0"	D = 3° 49' 11.0"
L = 315.22'	L = 315.22'
T = 158.19'	T = 158.19'
R = 1,500.00'	R = 1,500.00'
Super = 0.05	Super = 0.05
LR = 115'	LR = 115'
DS = 45 MPH	DS = 45 MPH





DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM STA. 13+50 TO STA. 17+96 -LDET- RT
FROM STA. 23+60 TO STA. 28+00 -LDET- RT



DETAIL T2
TOE PROTECTION
(Not to Scale)

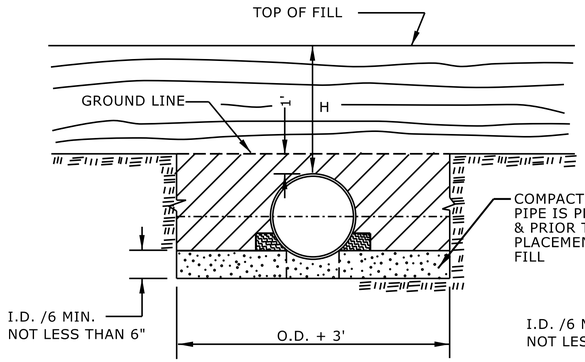
d= 1 Ft.

Type of Liner= EST 72 TONS CL B Rip-Rap
161 SY GEOTEXTILE

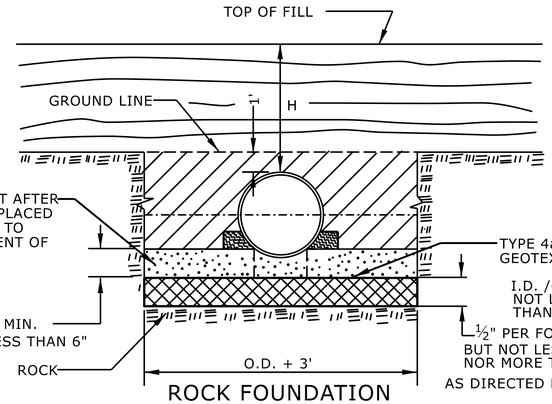
FROM STA. 16+16 TO STA. 17+96 -LDET- LT
FROM STA. 20+96 TO STA. 24+98 -LDET- LT

FOR -LDET2- PROFILE, SEE SHEET NO. 8

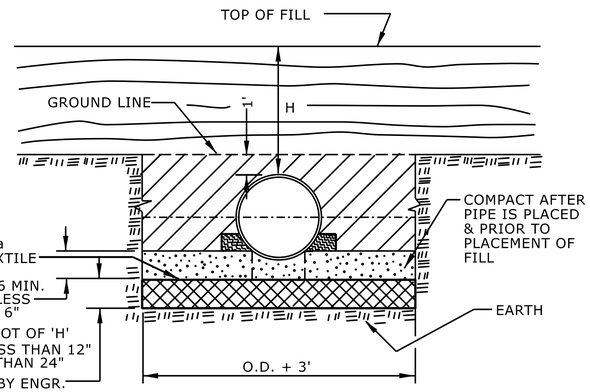
PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2C-1



NORMAL EARTH FOUNDATION

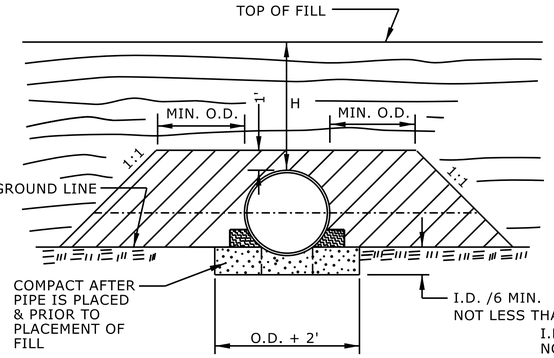


ROCK FOUNDATION

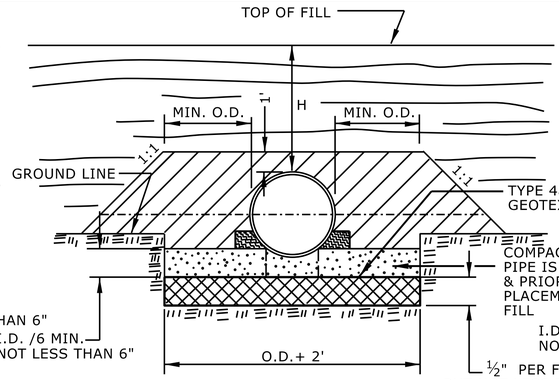


UNSUITABLE MATERIAL FOUNDATION

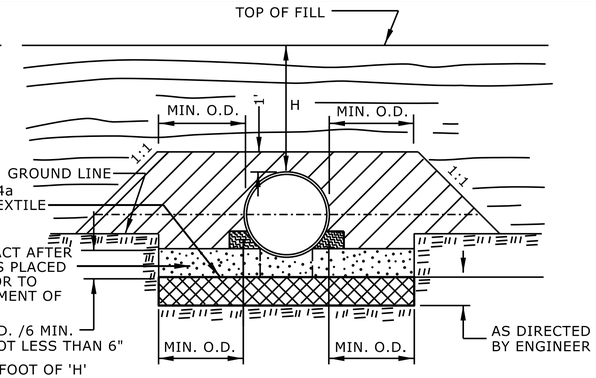
PIPE IN TRENCH



NORMAL EARTH FOUNDATION



ROCK FOUNDATION



UNSUITABLE MATERIAL FOUNDATION

PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

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

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HARKER 7/2024

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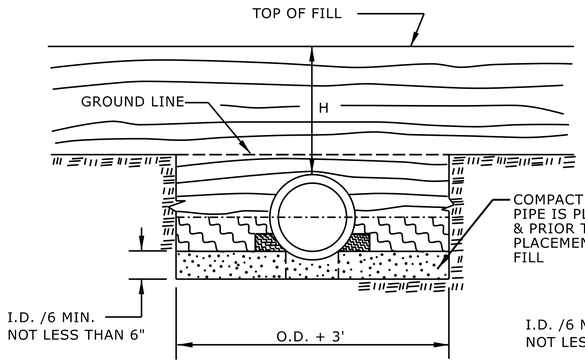
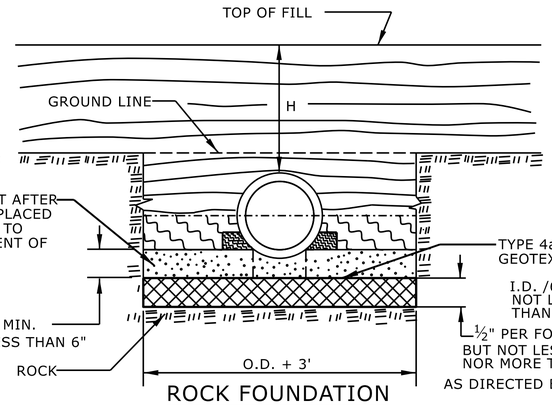
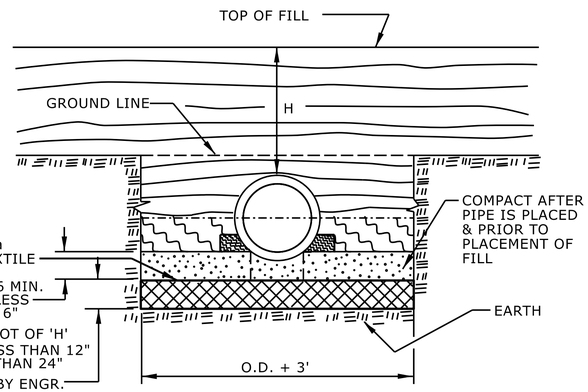


NORMAL EARTH FOUNDATION

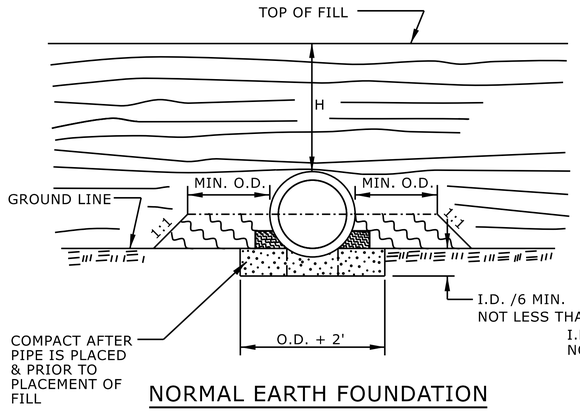


ROCK FOUNDATION

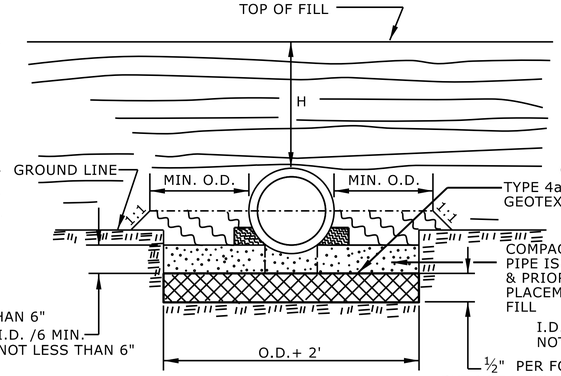


UNSUITABLE MATERIAL FOUNDATION

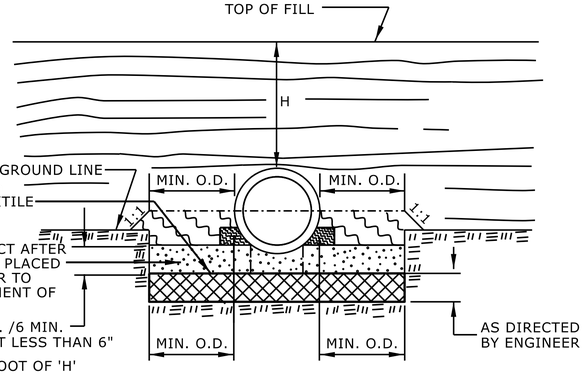
PIPE IN TRENCH



NORMAL EARTH FOUNDATION



ROCK FOUNDATION



UNSUITABLE MATERIAL FOUNDATION

PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

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

UNDISTURBED EARTH MATERIAL

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

STATE OF
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ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE MARIE KIER 11/2023

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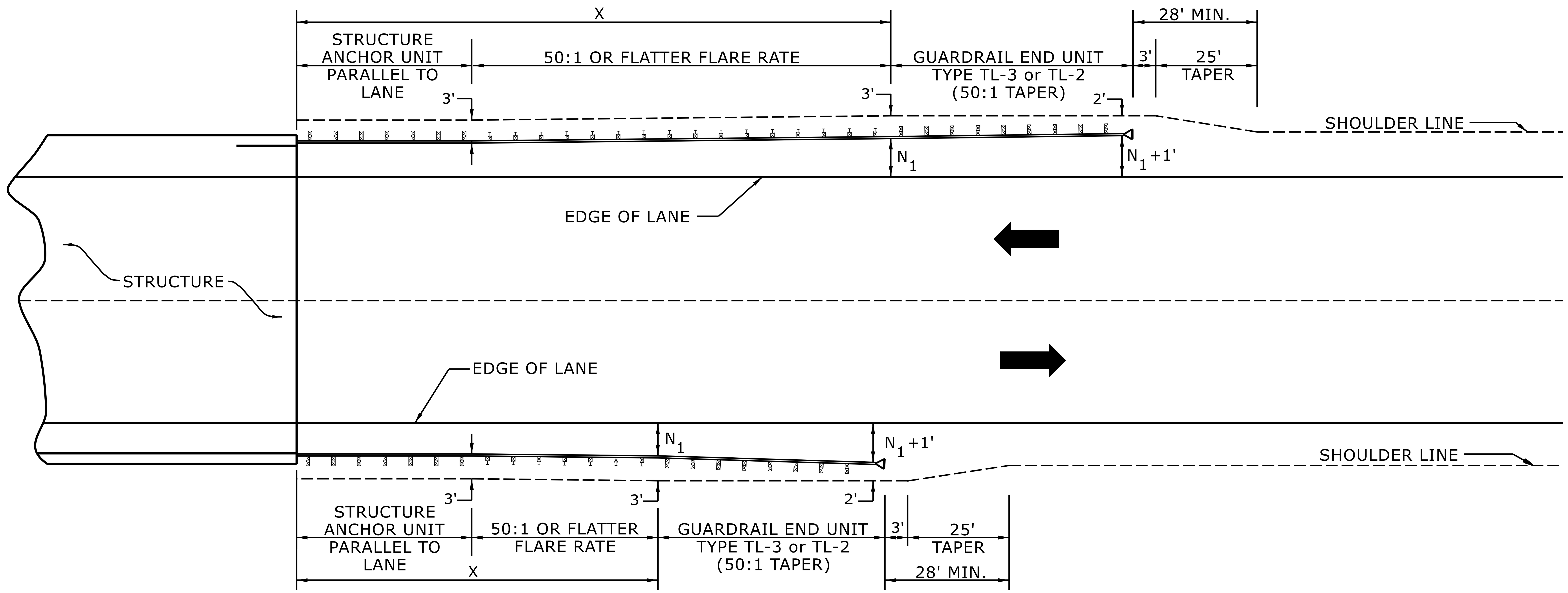

USE FLARE RATE AS THE CONTROL IF THE "N_1" DISTANCE IS NOT OBTAINED.
("N_1" IS BASED ON SHOULDER WIDTHS IN THE ROADWAY DESIGN MANUAL)

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

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15
862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE HACKLER

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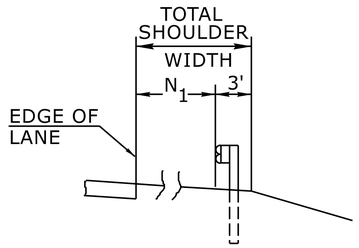
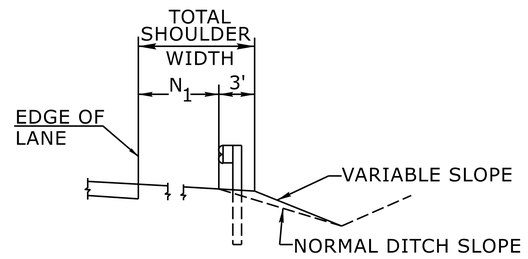
PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2C-4

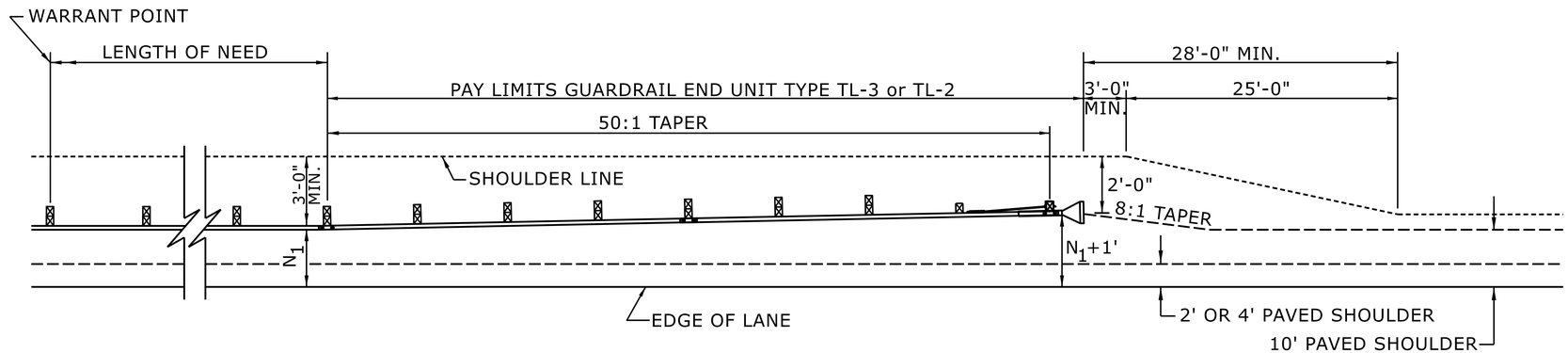


FILL SECTION



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

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE HACKER
Digitally signed by Nicole Hacker
DN: cn=Nicole Hacker, o=NCDOT, ou=Structure Design Unit, email=nhacker@ncdot.gov, c=US
Date: 2024.07.31

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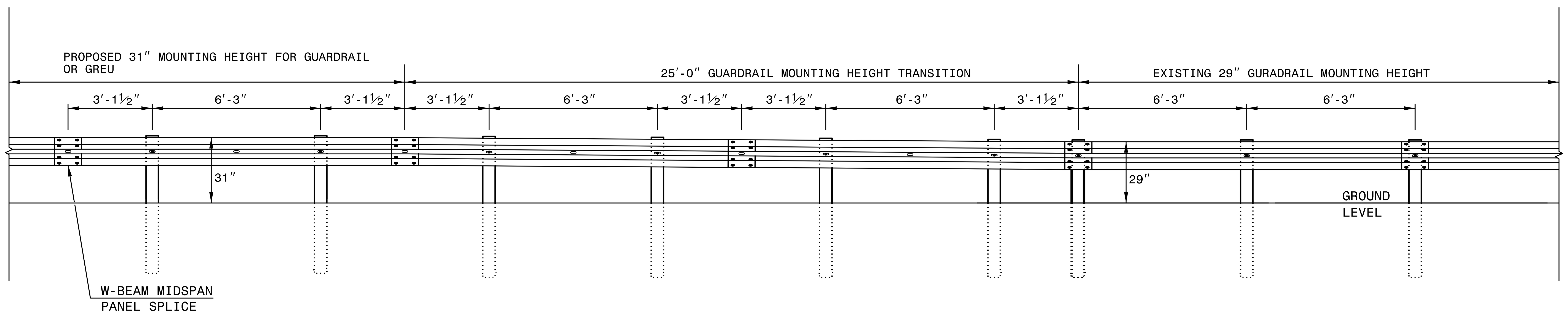
NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 29″, USE AN ADDITIONAL 12′-6″ LONG SECTION OF GUARDRAIL, FOR EVERY 1″ OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 31″ GUARDRAIL.



ELEVATION VIEW

TRANSITION FROM 29″ TO 31″ W-BEAM GUARDRAIL MOUNTING HEIGHT

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 9
862D02

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

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$$$$USERNAME$$$$

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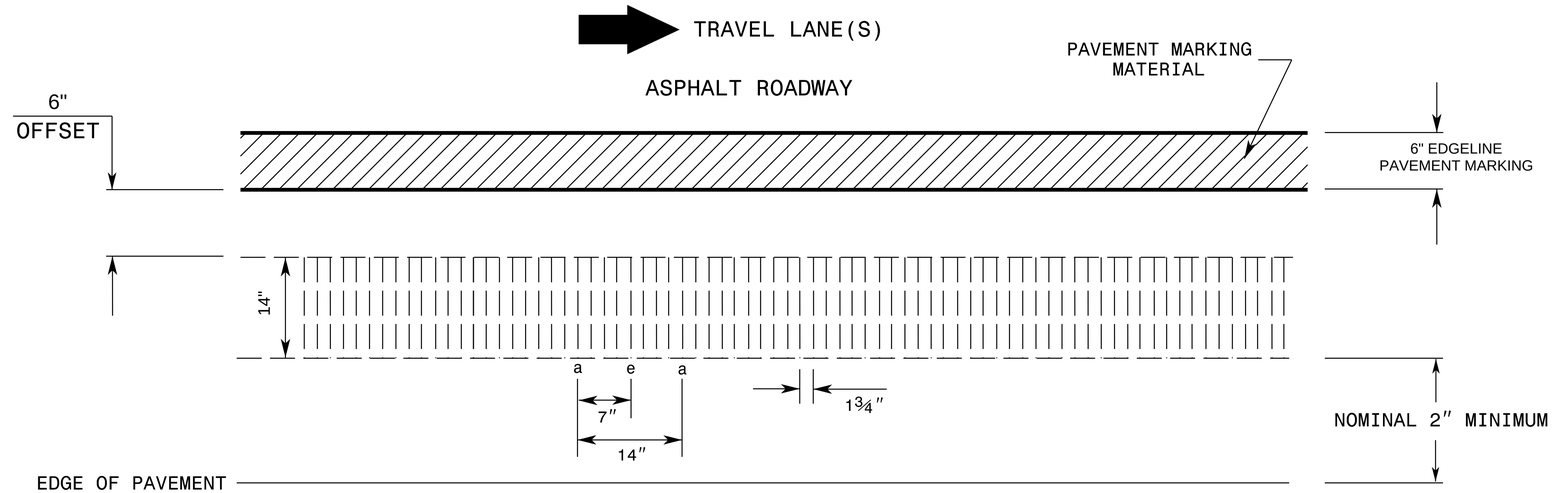
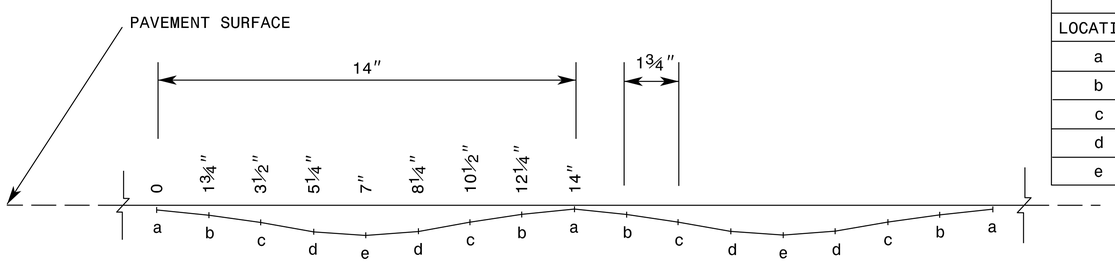
BR-0153	2C-6

See Table 1 within Rumble Strip Policy for Design Guidance

PLAN VIEW



PROFILE VIEW



	DEPTH	
LOCATION	MIL	INCHES
a	62.5	1/16"
b	125	1/8"
c	219	7/32"
d	344	11/32"
e	375	3/8"

REFERENCE DRAWING ID: Sin.Strip

NOTES:

1) Specification in table taken from MNDOT Research Project Final Report 2016-23: *Sinusoidal Rumble Strip Design Optimization Study By: Terhaar et. al, June 2016*

STATE OF
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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR

RUMBLE STRIPS / STRIPES

SINUSOIDAL SHOULDER RUMBLE STRIP

SHEET 2 OF 9

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045955 ERIC D. SEELEY Digitally signed by ERIC D. SEELEY

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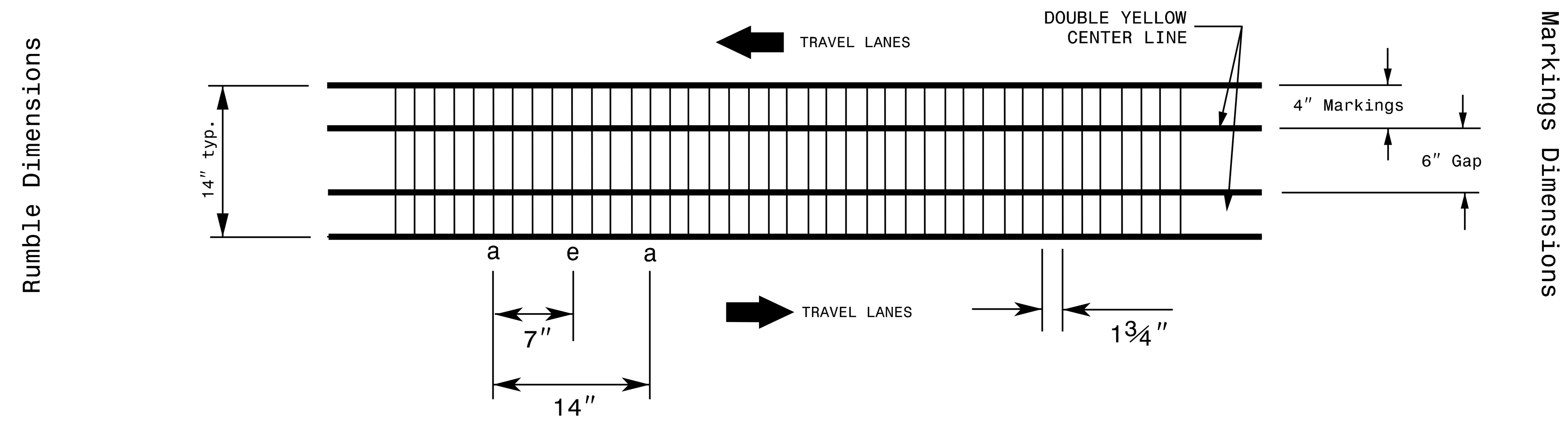
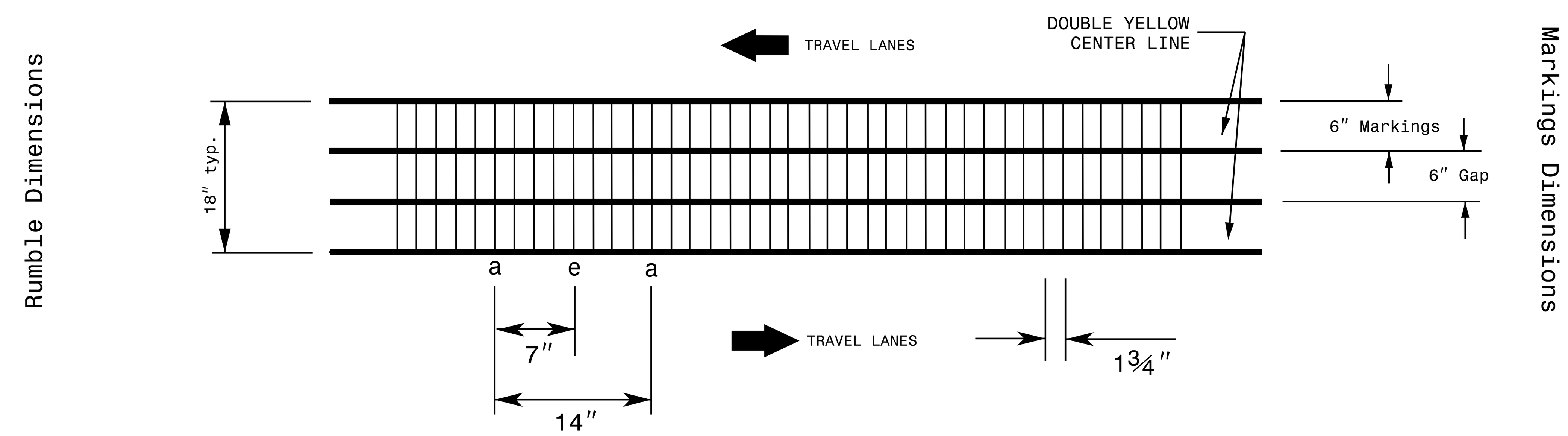
FILE SPEC.: _____

See Table 2 within Rumble Strip Policy for Design Guidance

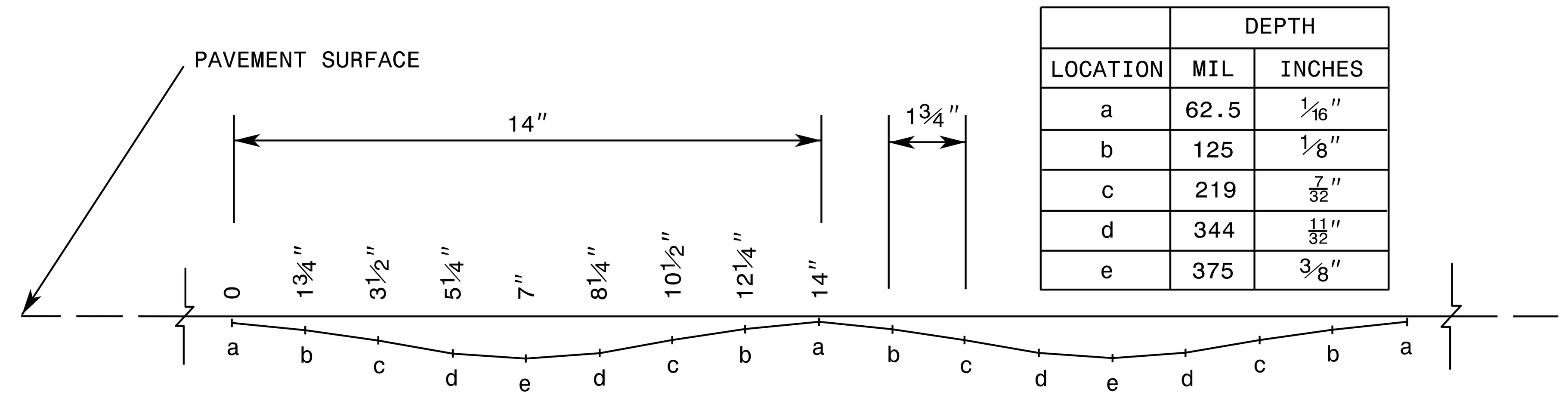
If 4" Markings will be used:



If 6" Markings will be used:



PROFILE:



	DEPTH	
LOCATION	MIL	INCHES
a	62.5	1/16"
b	125	1/8"
c	219	7/32"
d	344	11/32"
e	375	3/8"

REFERENCE DRAWING ID: Sin.CL

NOTES:

1) Specification in table taken from MNDOT Research Project Final Report 2016-23: *Sinusoidal Rumble Strip Design Optimization Study By: Terhaar et. al, June 2016*
2) USING A VACUUM, REMOVE ALL DEBRIS FROM THE MILLINGS JUST PRIOR TO PLACING ANY PAVEMENT MARKINGS.
3) ENSURE GLASS BEADS ARE SPREAD UNIFORMLY OVER THE ENTIRE SURFACE OF THE PAVEMENT MARKING MATERIAL.

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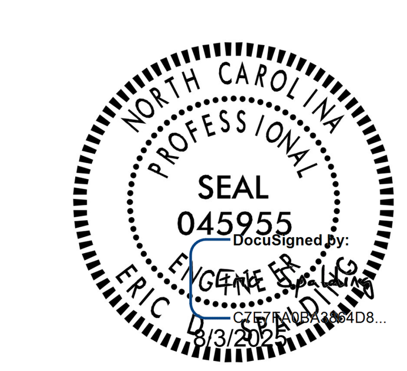
ROADWAY DETAIL DRAWING FOR
RUMBLE STRIPS / STRIPES
SINUSOIDAL CENTERLINE RUMBLE STRIPE



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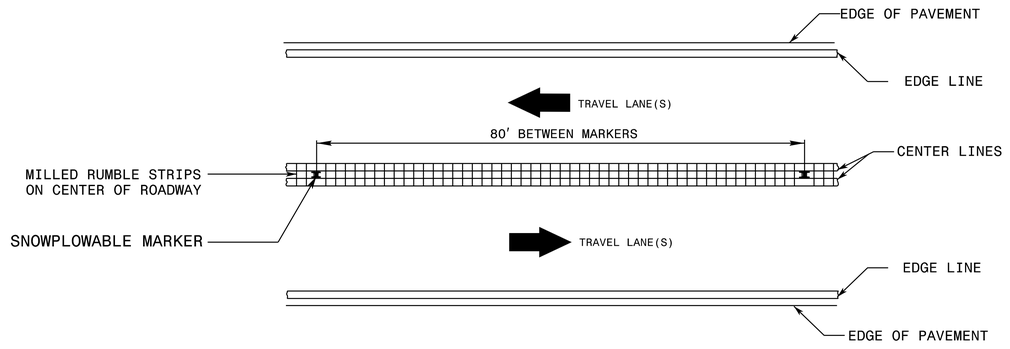
CHECKED BY: DATE:
FILE SPEC.:

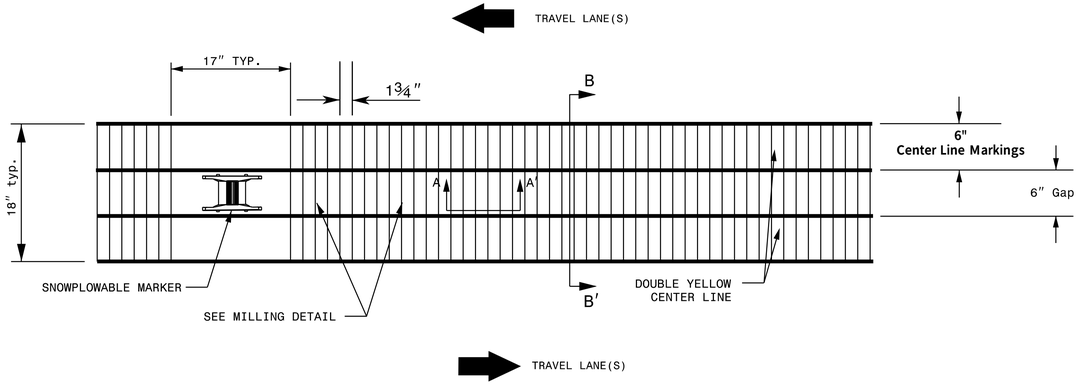
PROJECT REFERENCE NO.	SHEET NO.
BR-0153	2C-8

See Table 2 within Rumble Strip Policy for Design Guidance

LANE TREATMENT



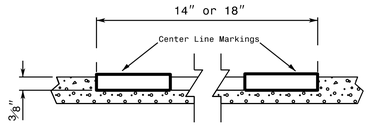
CENTER LINE



MILLING DETAIL

See Sheet 2C-7 for profile.

SECTION A-A′



SECTION B-B′

REFERENCE DRAWING ID: Sin.CL with Snowplowable Markers

NOTES:

1) USING A VACUUM, REMOVE ALL DEBRIS FROM THE MILLINGS JUST PRIOR TO PLACING ANY PAVEMENT MARKINGS.
2) ENSURE GLASS BEADS ARE SPREAD UNIFORMLY OVER THE ENTIRE SURFACE OF THE PAVEMENT MARKING MATERIAL.
3) INSTALL SNOWPLOWABLE MARKERS AT APPROXIMATELY 80′ INCREMENTS. DO NOT MILL RUMBLE STRIPS IN SECTION WHERE SNOWPLOWABLE MARKERS ARE INSTALLED.

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

ROADWAY DETAIL DRAWING FOR
RUMBLE STRIPS / STRIPES
SINUSOIDAL CENTERLINE RUMBLE STRIPE WITH SNOWPLOWABLE MARKERS

SHEET 8 OF 9

NORTH CAROLINA PROFESSIONAL SEAL 045955 ENGINEER
8/3/2025

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: C. SIMPSON DATE: 04-24-2025
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT NO.	SHEET NO.
BR-0153	3B-1

COMPUTED BY: ____JM__________ DATE: _04/17/24______
CHECKED BY: _________ES_______ DATE: _04/17/24______

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-LDET-	10+00	18+51	CL	1939.04			
-LDET-	20+01	30+26	CL	2699.14			
-L-	15+00	21+20	RT	89.03			
-L-	15+00	24+29	LT	299.43			
-L-	21+75	25+93	RT	10.24			
-L-	29+41	39+00	RT	129.82			
-L-	31+02	39+00	LT	189.79			
		TOTAL:		5356.51			
		SAY:		5360			

SHOULDER BERM GUTTER SUMMARY

IN LINEAR FEET

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	LENGTH			
-L-	27+73.00	27+96.46	LT	23.5			
-L-	27+73.00	27+96.46	RT	23.5			
-LDET-	20+16.00	20+34.00	LT	18			
-LDET-	20+16.00	20+34.00	RT	18			
		TOTAL:		83			
		SAY:		90			

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank.	Borrow	Waste
-LDET- STA. 12+49.97	-LDET- STA. 18+91.00	306	3,238	2,932	
-LDET- STA. 19+91.00	-LDET- STA. 27+99.73	193	2,158	1,965	
Phase I Subtotals:		499	5,395	4,896	0
-L- STA. 15+00.00	-L- STA. 26+18.00	511	3,581	3,070	
-L- STA. 27+48.00	-L- STA. 40+00.00	260	5,515	5,255	
Phase II Subtotals:		771	9,096	8,325	0
-L- STA. 15+00.00	-L- STA. 26+45.04	973	386	0	587
-L- STA. 27+45.04	-L- STA. 40+00.00	687	701	14	
ADDITIONAL DETOUR EXCAVATION (DETAIL 2)		767	6	0	761
Phase III Subtotals:		2,427	1,093	14	1,348
SUBTOTALS:		3,697	15,584	13,235	1,348
Material for Shoulder Construction			1275	1275	
Waste in Lieu of Borrow				-14	-14
Est. 5% To Replace Top Soil on Borrow Pit				725	
PROJECT TOTALS:		3,697	16,859	15,221	1,334
PROJECT TOTALS:		3,697	16,859	15,221	1,334
SAY:		**3,800**		**15,300**	

Note: Earthwork quantities are calculated by Benesch. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

UNDERCUT EXCAVATION (CONTINGENCY) = 300 CY
SELECT GRANULAR MATERIAL (CONTINGENCY) = 300 CY

COMPUTED BY: JM DATE: 4/9/2024
CHECKED BY: DATE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
GUARDRAIL SUMMARY

"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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH (LF)			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH (LF)		W	
				STRAIGHT	TEMP STRAIGHT	DOUBLE FACED	APPROACH END	TRAILING END			APPR. END	TRAILING END	APPR. END	TRAILING END
-L-	23+17.81	26+18.00	RT	312.50			26+18.00		10	13	100		2	
-L-	27+48.00	28+85.50	RT	137.50				27+48.00	9	12		112.5		2
-L-	24+80.50	26+18.00	LT	137.50				26+18.00	9	12		112.5		2
-L-	27+48.00	30+48.01	LT	312.50			27+48.00		10	13	100		2	
-LDET-	15+76.71	18+75.96	RT		300.00		18+75.96		5	8	100		2	
-LDET-	19+75.96	21+13.47	RT		150.00			19+75.96	5	8				
-LDET-	17+38.46	18+75.96	LT		137.50			18+75.96	5	8				
-LDET-	19+75.96	22+75.97	LT		125.00		19+75.96		5	8	100		2	
		TEMP SUB-TOTAL (FT)			712.50									
		PERMANENT SUB-TOTAL (FT)		900.00										
LESS ANCHOR DEDUCTIONS														
		TEMP GREU TL-3 @50'	4		200.00									
		PERMANENT GREU TL-3 @50'	4	200.00										
		TEMP B-77 SAU @ 22.875	4		91.50									
		PERMANENT B-77 SAU @ 22.875	4	91.50										
		Additional Guardrail Posts	5											
		Temporary Additional Guardrail Posts	5											
		TEMPORARY TOTAL			425.00									
		PERMANENT PROJECT TOTAL		612.50										

SURVEY LINE	END STA.	ANCHORS								IMPACT ATTENUATOR		SINGLE FACED CONCRETE BARRI	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
		Type III	B-77 SAU	GREU, TL-3	TEMP B-77 SAU	TEMP GREU,TL-3	AT-1			G	NG				
-L-	26+18.00		1	1									303.68		Permanent guardrail
-L-	28+85.50		1	1									141.57		Permanent guardrail
-L-	26+18.00		1	1									141.09		Permanent guardrail
-L-	30+48.01		1	1									303.50		Permanent guardrail
-LDET-	18+75.96				1	1									Temporary guardrail
-LDET-	21+13.47				1	1									Temporary guardrail
-LDET-	18+75.96				1	1									Temporary guardrail
-LDET-	22+75.97				1	1									Temporary guardrail
	TEMPORARY TOTAL				4	4									
	PERMANENT PROJECT TOTAL		4	4									889.8		
												SAY	890		

NCPA-20018

COMPUTED BY:	Joy Saddler, PE	DATE:	2/21/25
CHECKED BY:	D. Lowery	DATE:	2/21/25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
BR-0153	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 FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) SIZE: 12	15	18	24	30	36	42	48
L 27+86	19 RT	0501		61.2	57.2										
		0501	0502		57.2	54.6									
L 27+86	19 LT	0502		61.2	54.6										
		0502	0503		54.6	51.3									
L 21+48	56 RT	0504	0505		53.2	52.6						36			
LDET 14+00	33 RT	T504			53.2	52.6						36			
L DET 20+25	15 LT	T501		55.2	52.4										
		T501	T502		52.4	52.3									
L DET 20+25	14 RT	T502		55.1	52.3										
		T502	T503		52.3	52.3			20						
SHEET TOTALS									20				72		
PROJECT TOTALS									20				72		

Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) THICKNESS OR GAUGE: DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	DO NOT USE PP PIPE	C. S. PIPE THICKNESS OR GAUGE: 12 .064	15 .064	18 .064	24 .064	30 .079	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY EACH	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH	B: 5' THRU 10' LIN. FT.	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
												36									1							
																					1		1.6					
												36																
																					1							
												28																
																					1							

CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	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	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	MODIFIED CONC. FLUME	PREFORMED SCOUR HOLE (PER EACH)	ENERGY DISSIPATION BASIN	PIPE REMOVAL LIN. FT.	REMARKS
							1																					36	Shift 30" RCP for detour construction
																		1		1									
																												28	Remove 15" RCP
																		1		1									
																												20	Remove 15" side drain pipe
4	1.6						2											4	2									84	
4	1.6						2											4	2									84	

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

COMPUTED BY: Tyler C. Bottoms DATE: 12/18/23
CHECKED BY: Thein Tun Zan DATE: 12/20/2023

(2-3-23)

PROJECT NO.	SHEET NO.
BR-0153	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	5	RUTH B HOGGARD
2	5	BURGESS URQUHART, IV
3	5	CUZ LANDS LLC

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	4

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045955 ERIC D. SPAULDING

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045728 BRIAN A. RALSTON — 8/1/2025

benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 375, CARY, NC 27518, (984) 275-2490

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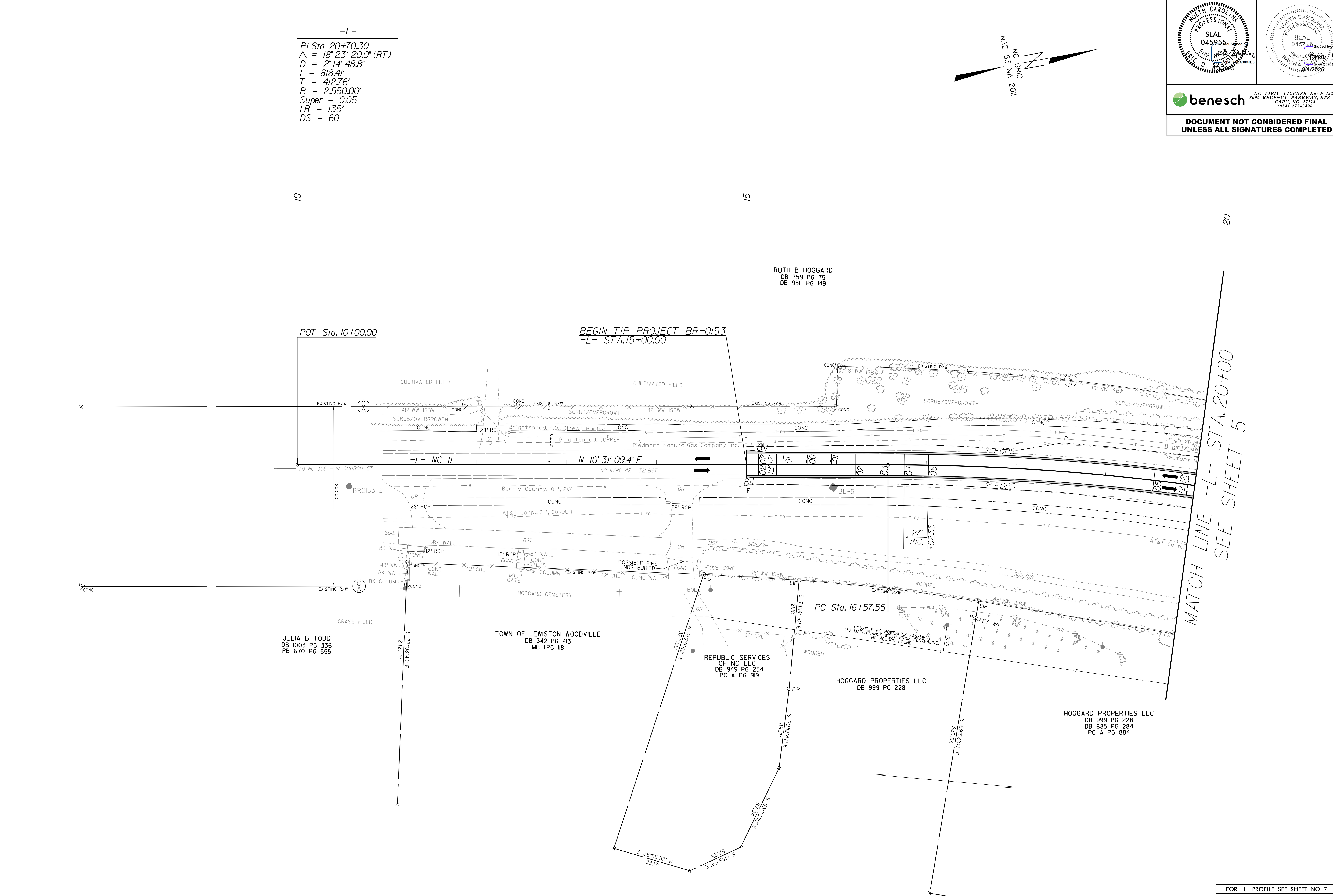

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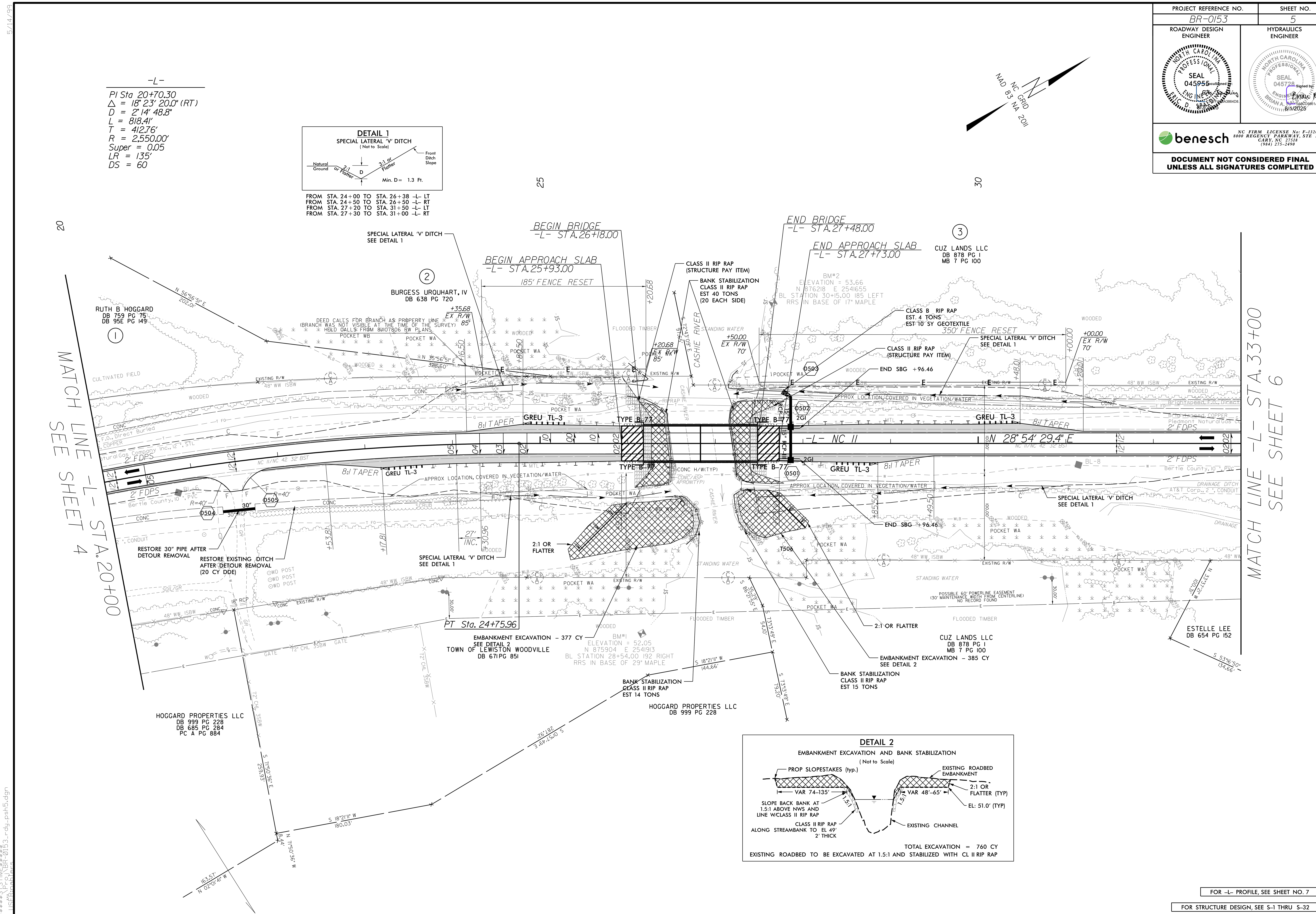

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	6

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 045955 ENGINEER ERIC D. SPALDING DocuSigned by: Eric Spalding C7E7FA0BA3864D8... 8/3/2025	NORTH CAROLINA PROFESSIONAL SEAL 045728 ENGINEER BRIAN A. RALSTIN Signed by: Brian Ralstin 54ACD9861A0340C... 8/1/2025

benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

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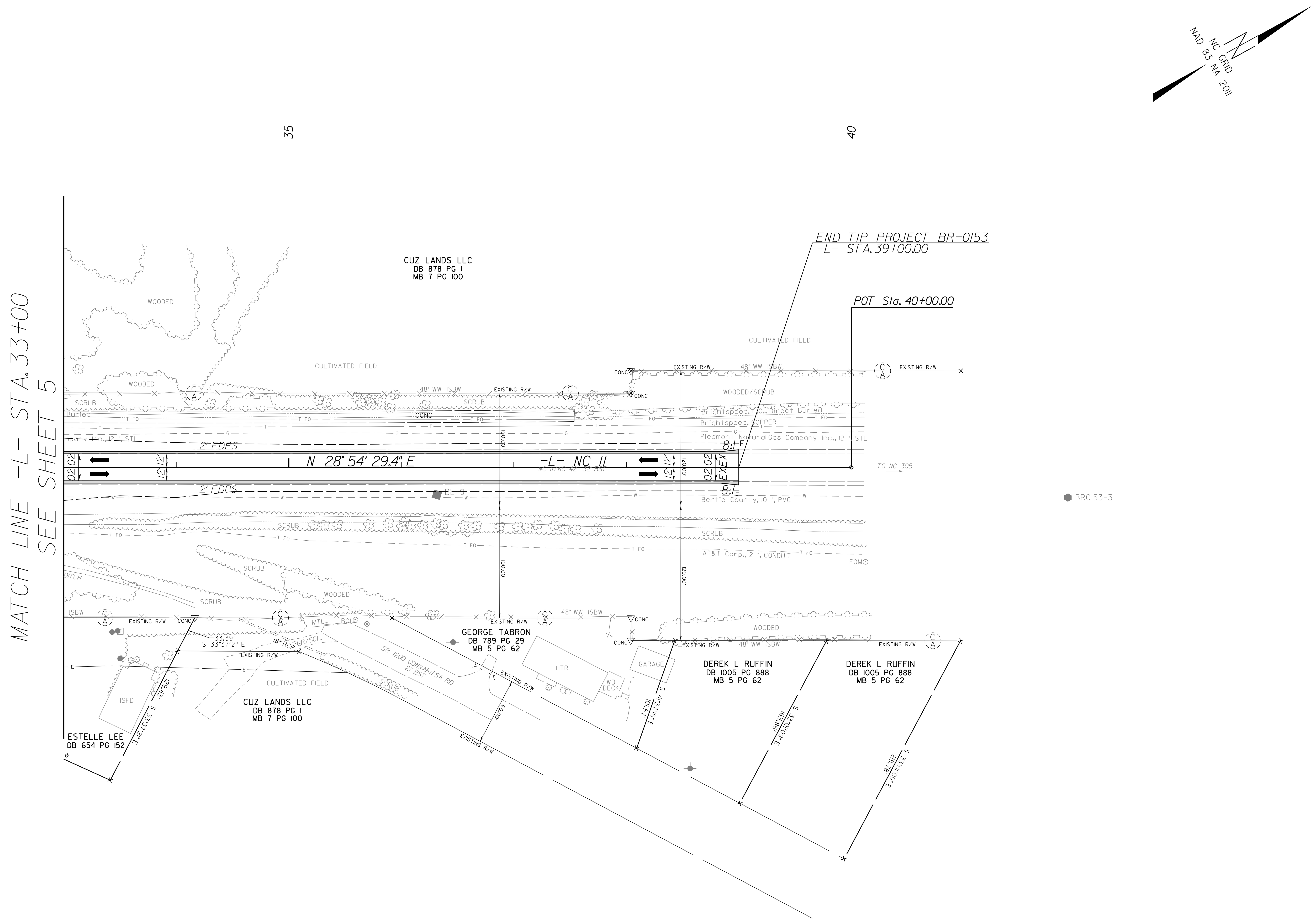

FOR -L- PROFILE, SEE SHEET NO. 7

PROJECT REFERENCE NO.	SHEET NO.
BR-0153	7

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 045955 ENGINEER ERIC D. SPALDING — DocuSigned by: Eric Spalding 8/1/2025	NORTH CAROLINA PROFESSIONAL SEAL 045728 ENGINEER BRIAN A. RALSTON — Signed by: Brian Ralston 8/1/2025

benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 175, CARY, NC 27518, (984) 275-2490

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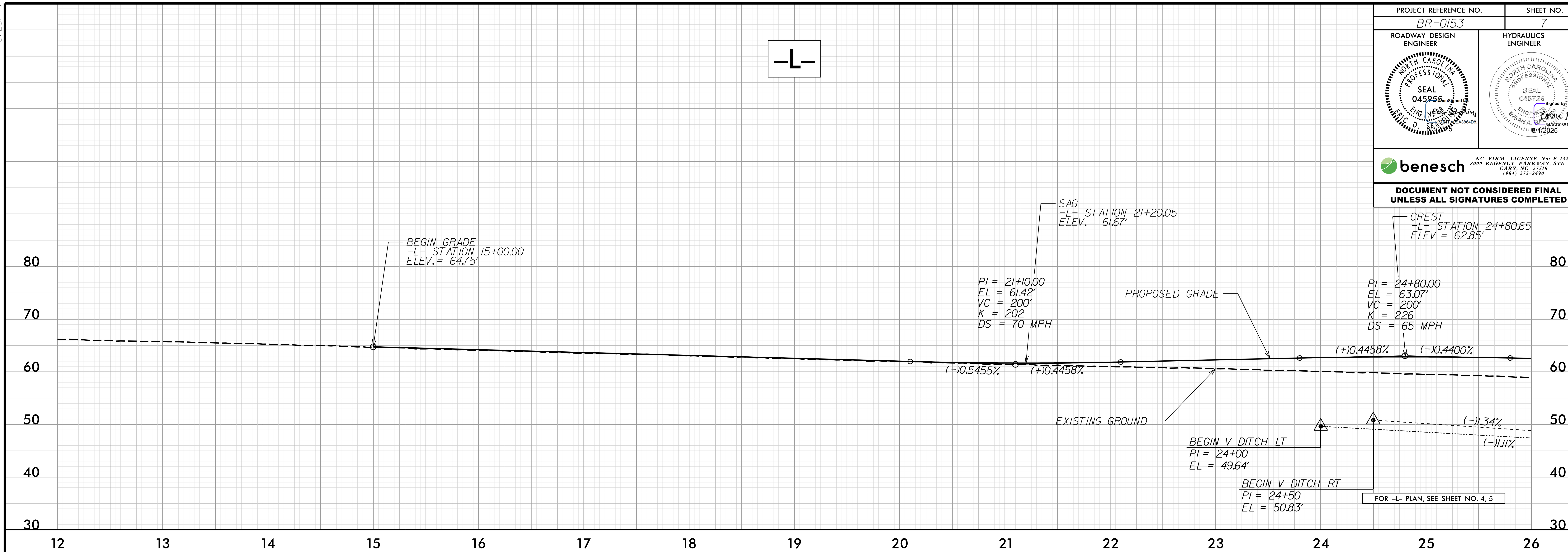

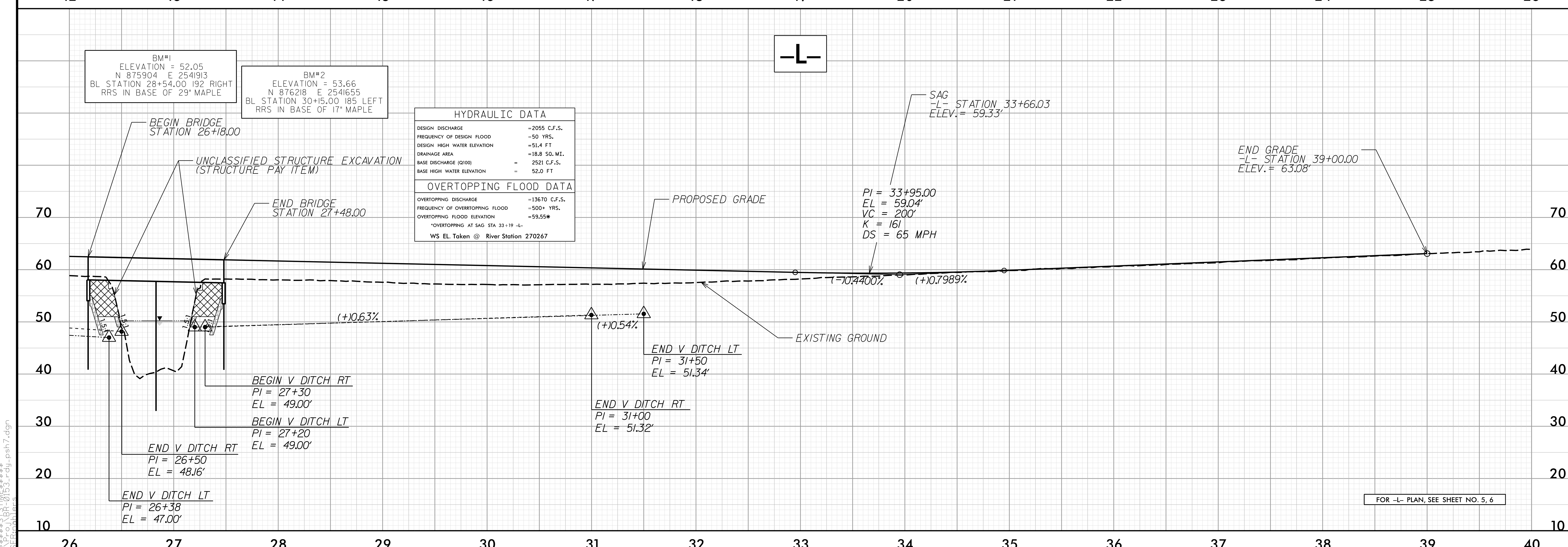

HYDRAULIC DATA	
DESIGN DISCHARGE	=2055 C.F.S.
FREQUENCY OF DESIGN FLOOD	=50 YRS.
DESIGN HIGH WATER ELEVATION	=51.4 FT
DRAINAGE AREA	=18.8 SQ. MI.
BASE DISCHARGE (Q100)	= 2521 C.F.S.
BASE HIGH WATER ELEVATION	= 52.0 FT

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	=13670 C.F.S.
FREQUENCY OF OVERRTOPPING FLOOD	=500+ YRS.
OVERTOPPING FLOOD ELEVATION	=59.55*

*OVERTOPPING AT SAG STA 33+19 -L-

WS EL. Taken @ River Station 270267

5/28/99

$$$$$$SYSTIME$$$$$ ...\Proj\BR-0153_rdy_psh7.dgn USER:nahlers

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PROJECT REFERENCE NO.	SHEET NO.
BR-0153	8

ROADWAY DESIGN ENGINEER — SEAL 045955, NORTH CAROLINA PROFESSIONAL ENGINEER, ERIC D. SPALDING — DocuSigned by: Eric Spalding 8/3/2025

HYDRAULICS ENGINEER — SEAL 045728, NORTH CAROLINA PROFESSIONAL ENGINEER, BRIAN A. RALSTON — Signed by: Brian Ralston 8/1/2025

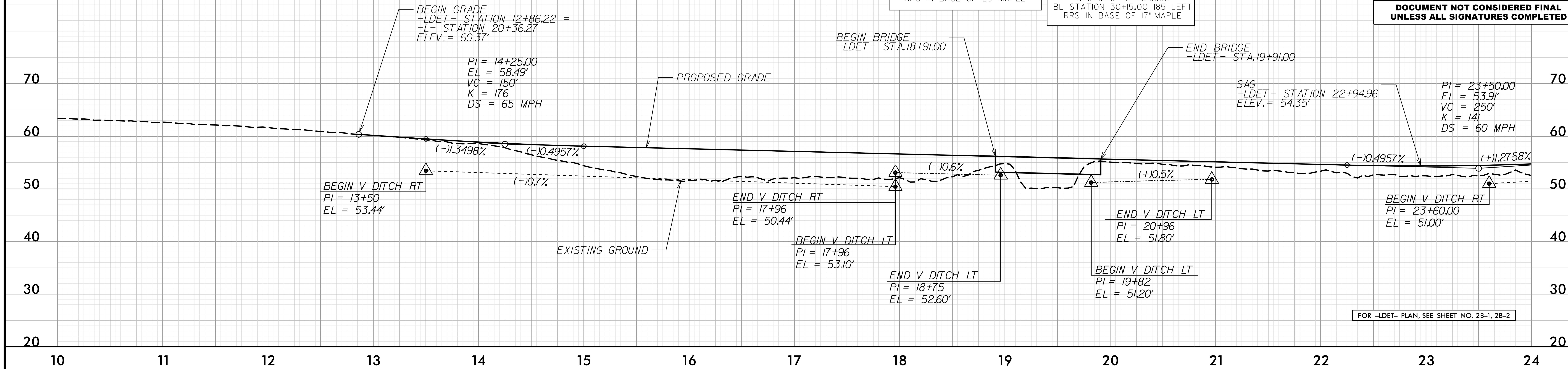
benesch — NC FIRM LICENSE No: F-1320, 8000 REGENCY PARKWAY, STE 175, CARY, NC 27518, (984) 275-2490

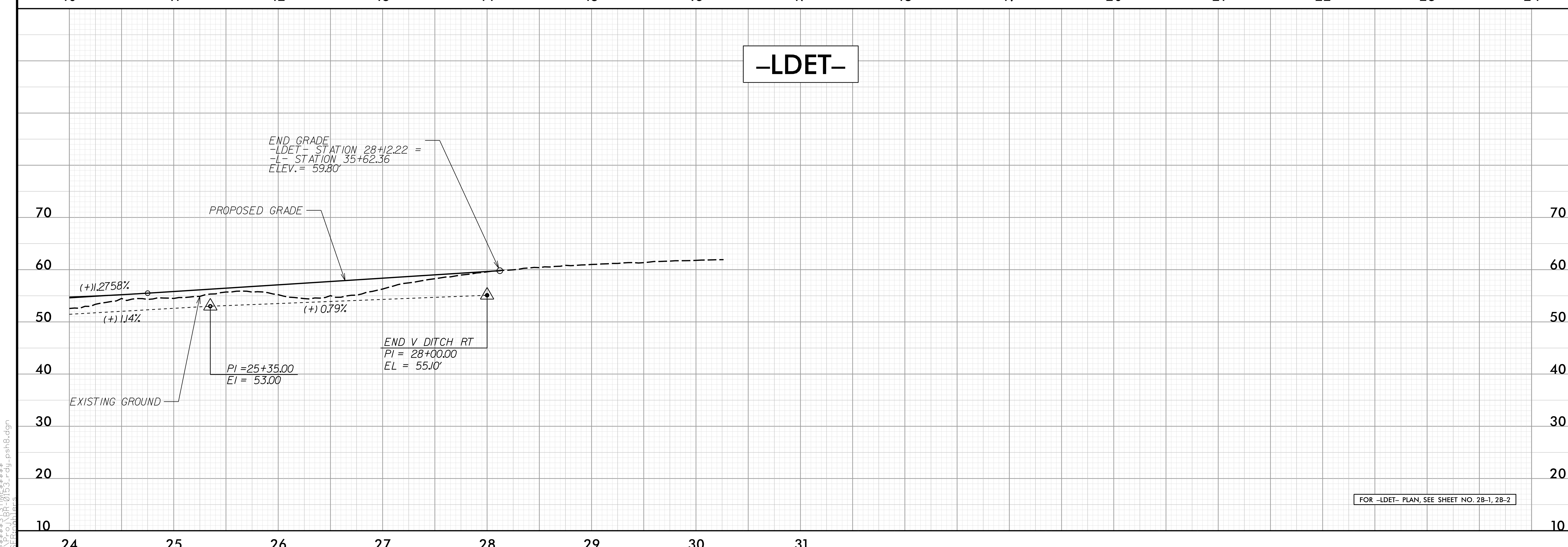
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HYDRAULIC DATA	
DESIGN DISCHARGE	=1171 C.F.S.
FREQUENCY OF DESIGN FLOOD	=10 YRS.
DESIGN HIGH WATER ELEVATION	=49.9 FT
DRAINAGE AREA	=18.8 SQ. MI.
BASE DISCHARGE (Q100)	= 2521 C.F.S.
BASE HIGH WATER ELEVATION	= 52.0 FT

BM#1
ELEVATION = 52.05
N 875904 E 2541913
BL STATION 28+54.00 192 RIGHT
RRS IN BASE OF 29" MAPLE

BM#2
ELEVATION = 53.66
N 876218 E 2541655
BL STATION 30+15.00 185 LEFT
RRS IN BASE OF 17" MAPLE





5/28/99

$$$$$$SYSTIME$$$$$
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