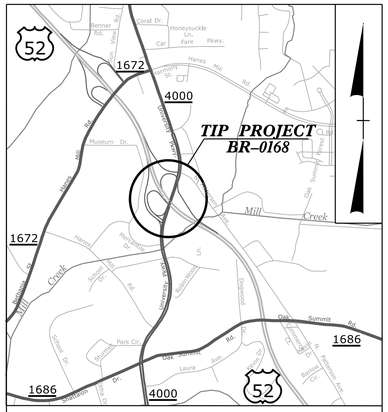
09/08/99

TIP PROJECT: BR-0168

CONTRACT: C205160

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



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

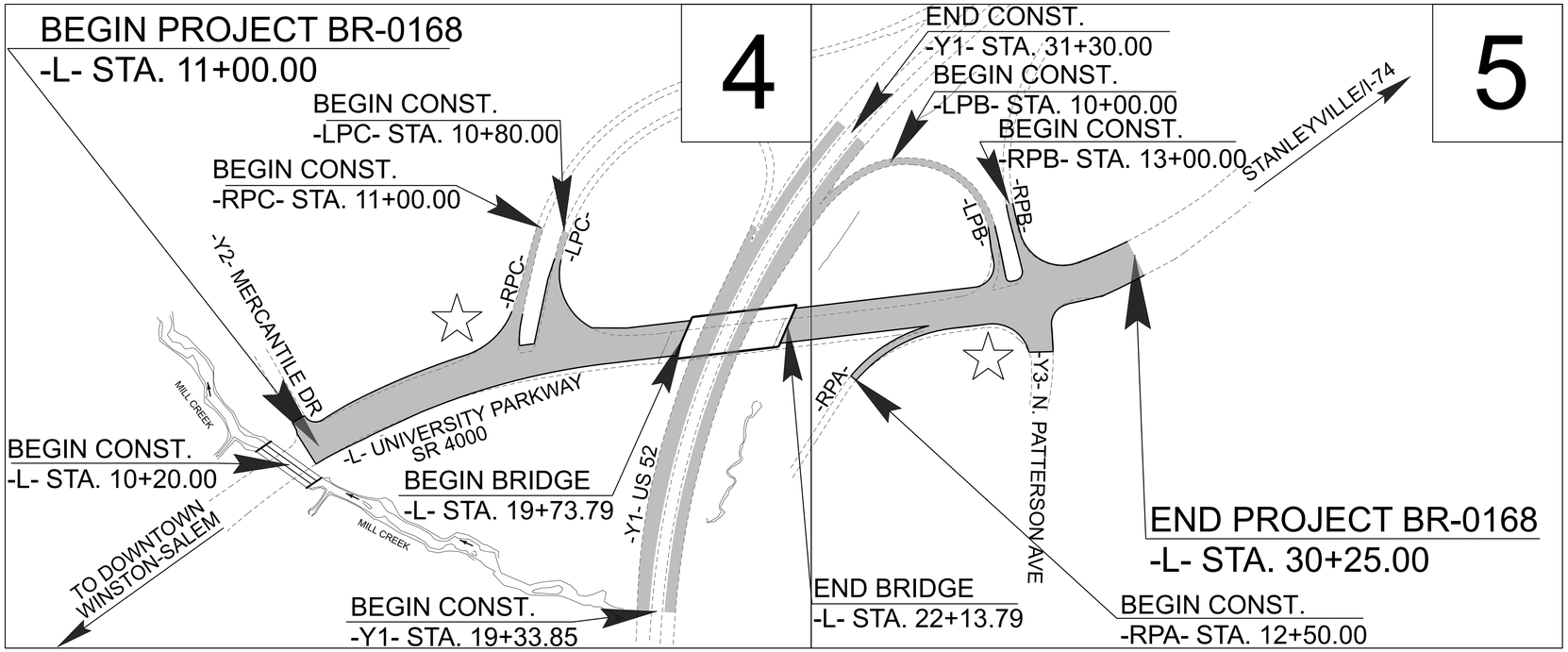
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0168	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67168.1.1		P.E.
67168.2.1		ROW
67168.2.2		UTILITIES
67168.3.1		CONST.

LOCATION: *REPLACE BRIDGE 330289 ON SR 4000 (UNIVERSITY PARKWAY) OVER US 52*

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

NAD 83/95



☆ REVISED SIGNAL

THIS PROJECT HAS FULL CONTROLLED ACCESS THROUGH THE INTERCHANGE.

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 2026 = 32800
ADT 2046 = 31550
K = 9 %
D = 65 %
T = 4 % *
V = 50 MPH
* TTST =1% DUAL 3%
FUNC CLASS =
PRINCIPAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BR-0168	= 0.320 MILES
LENGTH OF STRUCTURE TIP PROJECT BR-0168	= 0.045 MILES
TOTAL LENGTH OF TIP PROJECT BR-0168	= 0.365 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 22, 2024

LETTING DATE:
JUNE 16, 2026

JOEL P. PERLIN
PROJECT MANAGER

PIOTR J. STOJDA
PROJECT TEAM LEAD

BRYAN E. HOUGH, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

Signed by: Matthew York
E0B27B30696141D...
SIGNATURE:
NORTH CAROLINA PROFESSIONAL SEAL 043912 ENGINEER Matthew J York
P.E.
05/19/2026

ROADWAY DESIGN ENGINEER

Signed by: Bryan Hough
3D10B87FB93142C...
SIGNATURE:
NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E Hough
P.E.
05/19/2026

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

5/26/20

INDEX OF SHEETS

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.02

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.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

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

TEMPORARY SHORING:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY,

SEGRA COMMUNICATION, CITY OF WINSTON SALEM, VERIZON COMMUNICATION,

NCDOT ITS

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

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS.
CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.06.

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
235.01	Embankment Monitoring
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
423.03	Bridge Approach Fills - Type 2 Approach Fill for Bridge Abutment with MSE Wall
423.04	Bridge Approach Fills - Type 2A Alternate Approach Fill for Integral Bridge Abutment with MSE Wall
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.63	Reinforced Brick Endwall - for Single 66" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk (Use Detail in Lieu of Standard for Sheet 1 of 1)
848.04	Street Turnout
848.06	Curb Ramp (Use Details in Lieu of Standards for Sheets 9 and 10 of 13)
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
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

BR-0168
FP | 1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

05/29/25

BR-0168
FP | IB

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
- Permanent Construction Easement — PE
- 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

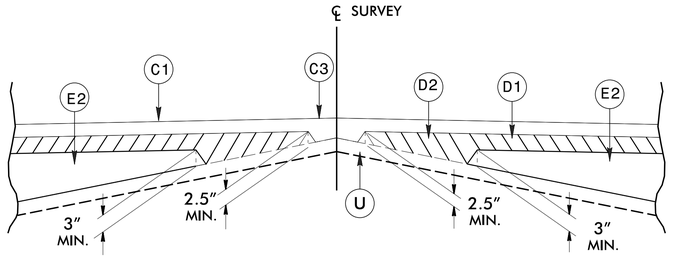
MISCELLANEOUS:
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE - LOS B)* — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned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

11/14/23

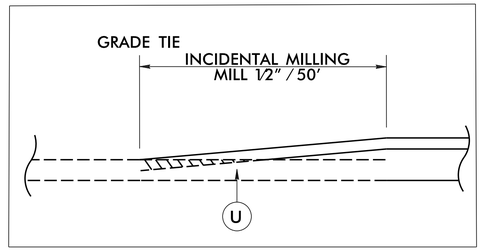
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R1	2'-6" CURB AND GUTTER
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R2	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.	S	4" CONCRETE SIDEWALK
C4	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.	T	EARTH MATERIAL
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	U	EXISTING PAVEMENT
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	V1	5/8" FINE MILLING
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	V2	1.5" FINE MILLING
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
N	PROP. APPROX.5/8"ULTRATHIN HOT MIX BONDED WEARING SURFACE COURSE, TYPE B, AT AN AVERAGE RATE OF 70 LBS. PER SQ.YD.		

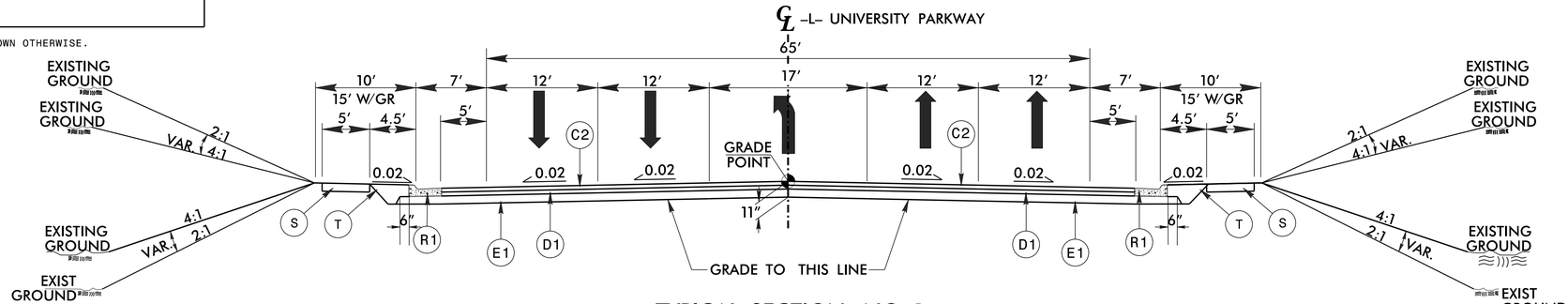
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



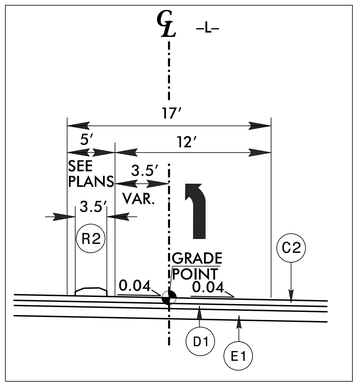
Detail Showing Method of Wedging



PROFILE TIE–IN DETAIL

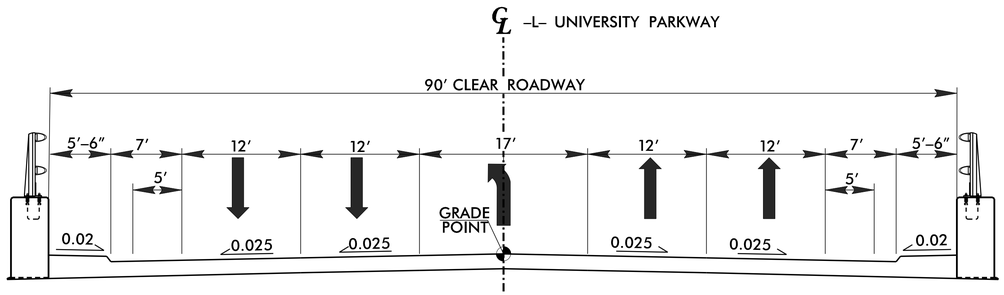


TYPICAL SECTION NO. 1



USE INSET A WITH TYPICAL SECTION NO. 1

–L– STA. 11+22.00 TO STA. 15+83.00



TYPICAL SECTION NO. 2

(SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS)

USE TYPICAL ON STRUCTURE

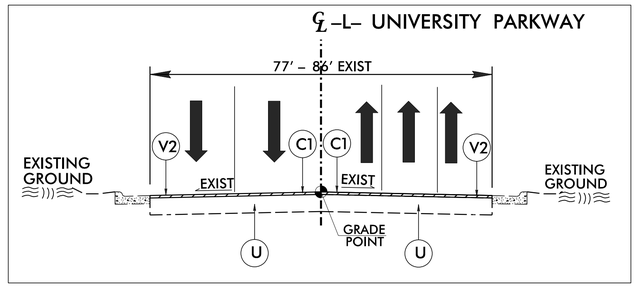
–L– STA. 19+73.79 (BEGIN BRIDGE)
TO 22+13.79 (END BRIDGE)

USE TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPCIAL NO. 1
FROM –L– STA. 11+00.00 TO STA. 12+00.00

–L– STA. 12+00.00 TO STA. 19+73.79 (BEGIN BRIDGE)
22+13.79 (END BRIDGE) TO –L– STA. 28+50.00

TRANSITION FROM TYPICAL NO. 1 TO EXISTING
FROM –L– STA. 28+50.00 TO STA. 30+25.00



INSET B

FOR 650'± OUTSIDE OF CONSTRUCTION LIMITS
(SEE SHEET 5 AND TMP PLANS FOR DETAILS)

BR-0168

FP | 2A-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E. Houpe
03/03/2026

PAVEMENT ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T HOLLAND
03/05/2026

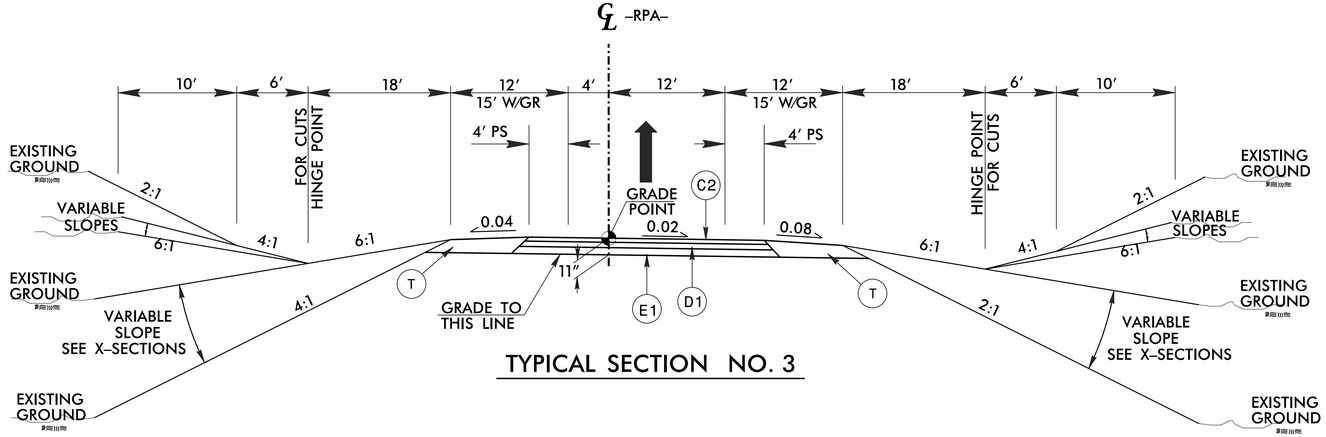
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

11/14/23

FINAL PAVEMENT SCHEDULE	
C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

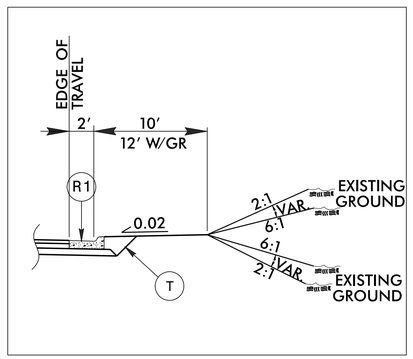
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

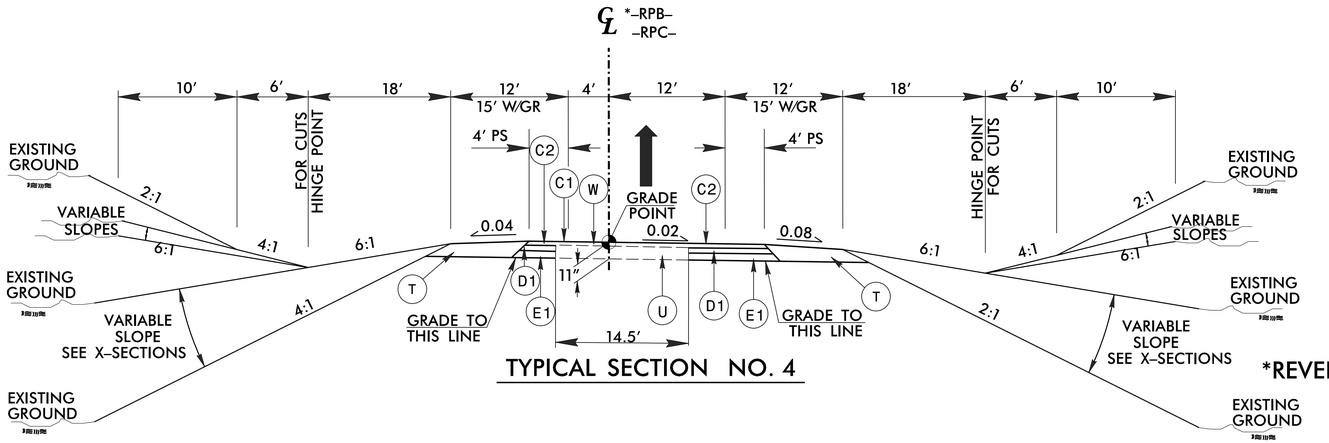


TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

–RPA– STA. 12+50.00 TO STA. 15+14.96





TYPICAL SECTION NO. 4

*REVERSE OF TYPICAL

USE INSET C WITH TYPICAL SECTIONS NO. 3, NO. 4, NO. 5, AND NO. 6

–RPA– STA. 13+35.00 TO STA. 15+14.96 LT & RT
–RPB– STA. 13+70.49 TO STA. 14+74.02 LT
–LPB– STA. 13+78.20 TO STA. 14+31.37 LT
–RPC– STA. 13+00.00 TO STA. 13+74.94 LT & RT
–LPC– STA. 12+55.00 TO STA. 13+38.00 RT
–LPCA– STA. 10+78.33 TO STA. 11+97.60 RT

USE TYPICAL SECTION NO. 4

*–RPB– STA. 13+00.00 TO STA. 14+74.02
–RPC– STA. 13+00.00 TO STA. 13+74.94

BR-0168

FP | 2A-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E. Hough

Signed by: Bryan Hough
7D3D8B7E8931BC...

03/03/2026

PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T HOLLAND

Signed by: Joe Holland
71C8E0B75ED44E...

03/05/2026

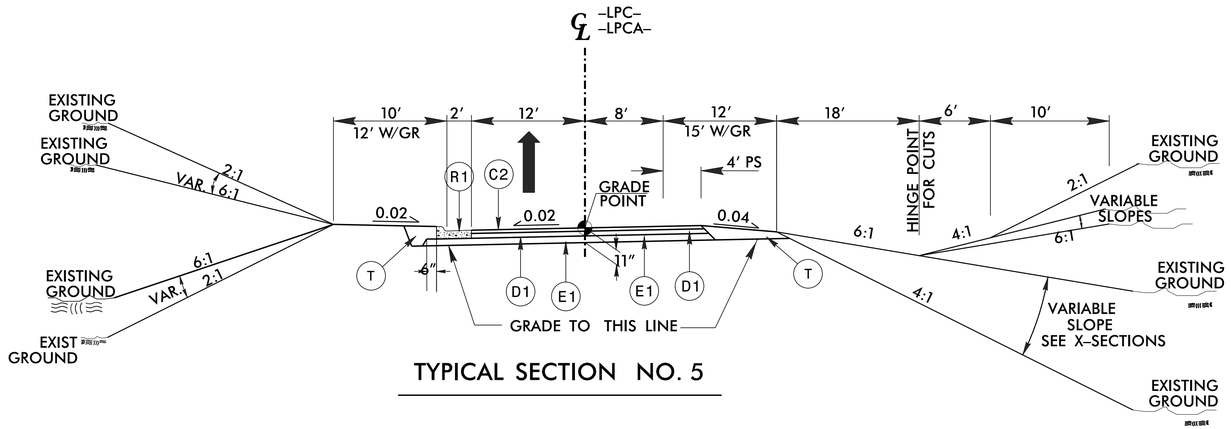
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

11/14/23

FINAL PAVEMENT SCHEDULE	
C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

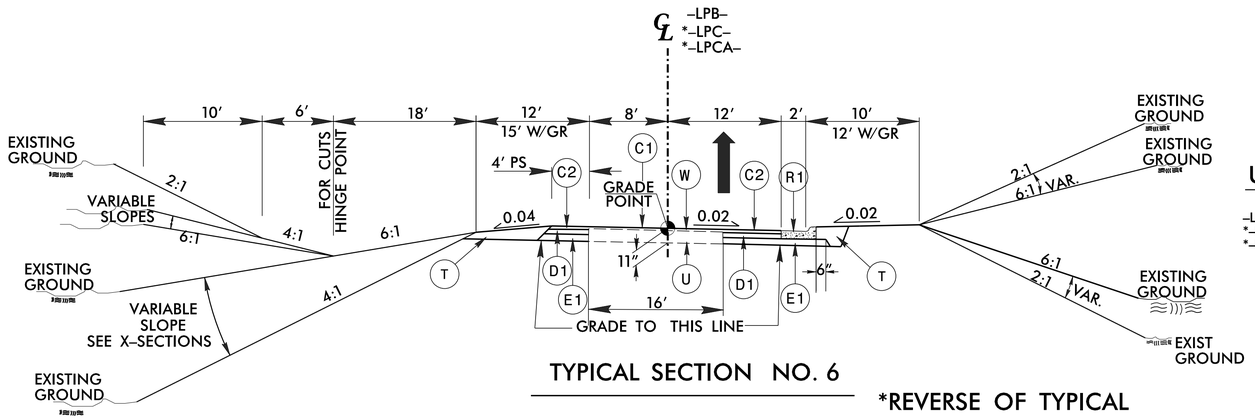
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

–LPC– STA. 12+75.00 TO STA. 13+38.00
–LPCA– STA. 10+80.00 TO STA. 11+96.13



TYPICAL SECTION NO. 6

*REVERSE OF TYPICAL

USE TYPICAL SECTION NO. 6

–LPB– STA. 13+00.00 TO STA. 14+31.37
*–LPC– STA. 11+45.00 TO STA. 12+75.00
*–LPCA– STA. 10+69.61 TO STA. 10+80.00

REVISIONS

BR-0168

FP | 2A-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E. Hough

Signed by: Bryan Hough
SEAL
036853
ENGINEER
Bryan E. Hough
DocuSigned by: 7F5E0A195ED34E...

03/03/2026

PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T HOLLAND

Signed by: Joe Holland
SEAL
024964
ENGINEER
JOSEPH T HOLLAND
DocuSigned by: 7F5E0A195ED34E...

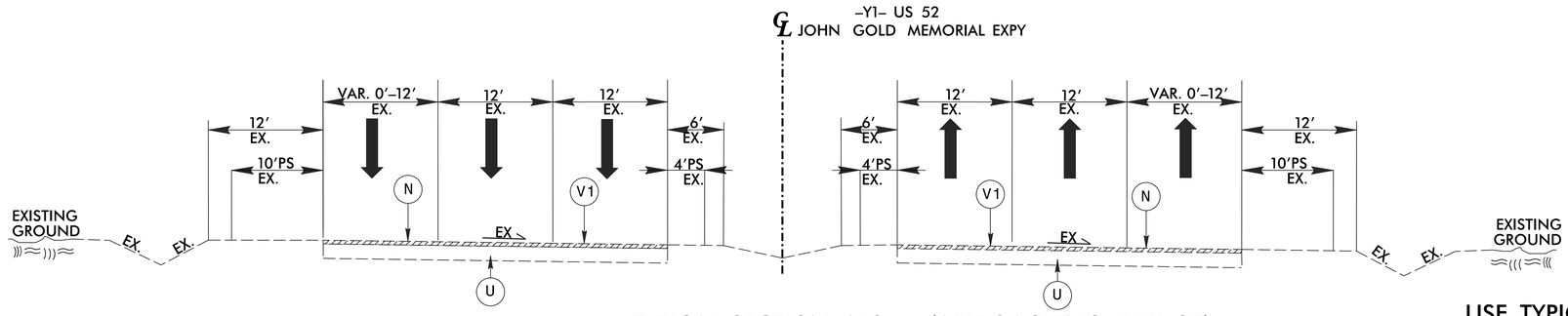
03/05/2026

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

11/14/23

FINAL PAVEMENT SCHEDULE	
C2	3" S9.5C
C4	2" S9.5C
D1	4" I19.0C
E1	4" B25.0C
N	5/8" UTBWC, TYPE B
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	5/8" FINE MILLING

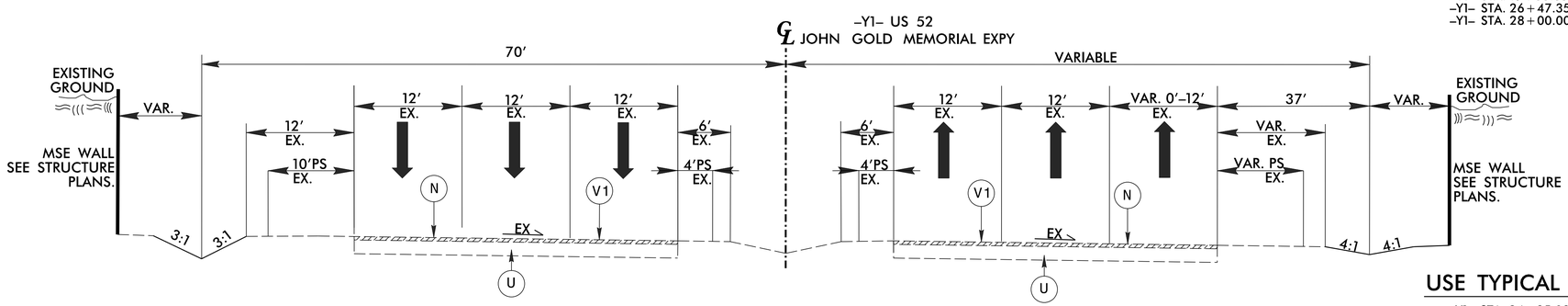
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 7 (APPROACHING BRIDGE)

USE TYPICAL SECTION NO.7

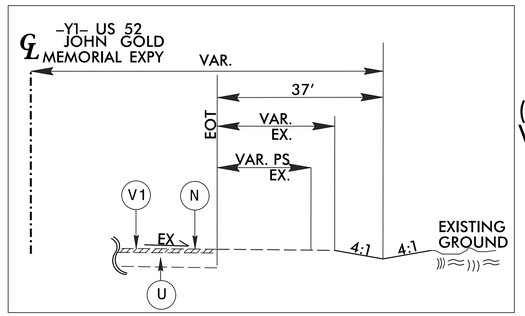
–Y1– STA. 19+33.85 TO STA. 24+35.09 (LT)
–Y1– STA. 19+33.85 TO STA. 25+00.00 (RT)
–Y1– STA. 26+47.35 TO STA. 31+30.00 (LT)
–Y1– STA. 28+00.00 TO STA. 31+30.00 (RT)



TYPICAL SECTION NO. 8 (UNDER THE BRIDGE)

USE TYPICAL SECTION NO.8

–Y1– STA. 24+35.09 TO STA. 26+47.35 (LT)
–Y1– STA. 25+00.00 TO STA. 28+00.00 (RT)

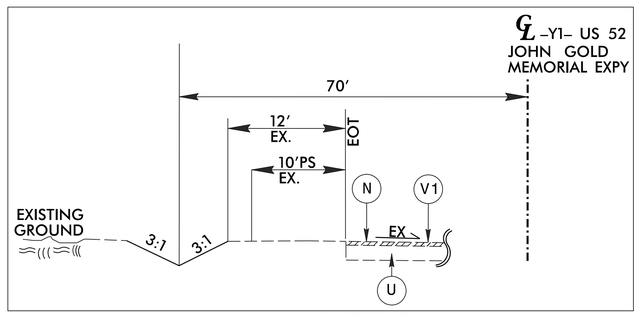


INSET E
(USE WITH TYPICAL SECTIONS NO. 7 & 8 WHERE MSE WALL IS NOT PRESENT)

TRANSITION FROM EXISTING TO INSET E
FROM –Y1– STA. 25+00.00 TO STA. 25+50.00 (RT)

–Y1– STA. 25+50.00 TO STA. 27+35.00 (RT)

TRANSITION FROM INSET E TO EXISTING
FROM –Y1– STA. 27+35.00 TO 28+25.00 (RT)

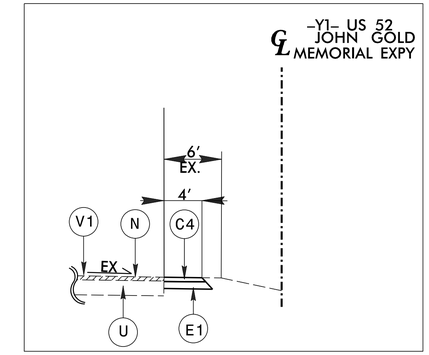


INSET D
(USE WITH TYPICAL SECTIONS NO. 7 & 8 WHERE MSE WALL IS NOT PRESENT)

TRANSITION FROM EXISTING TO INSET D
FROM –Y1– STA. 24+25.00 TO STA. 24+75.00 (LT)

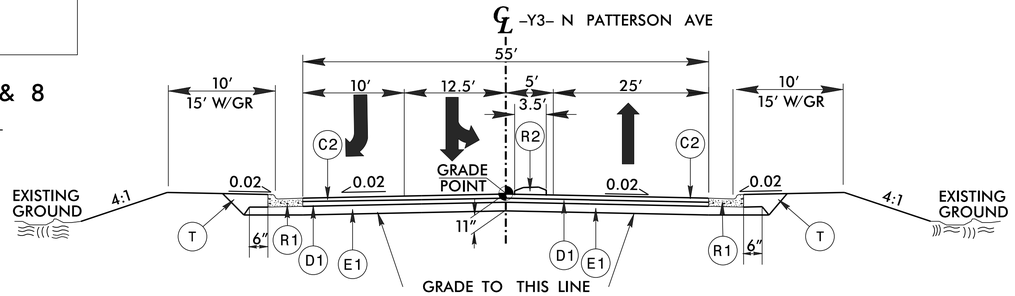
–Y1– STA. 24+75.00 TO STA. 26+00.00 (LT)

TRANSITION FROM INSET D TO EXISTING
FROM –Y1– STA. 26+00.00 TO 26+50.00 (LT)



INSET F
(TEMPORARY PAVEMENT WIDENING)

USE INSET F WITH TYPICAL SECTIONS NO. 7 AND NO. 8
–Y1– STA. 23+80 TO STA. 27+75 (LT)
*–Y1– STA. 23+89 TO STA. 27+75 (RT)
*REVERSE OF TYPICAL SEE TMP PLANS



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

–Y3– STA. 10+46.57 TO –Y3– STA. 11+35.00

BR-0168
FP | 2A-4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

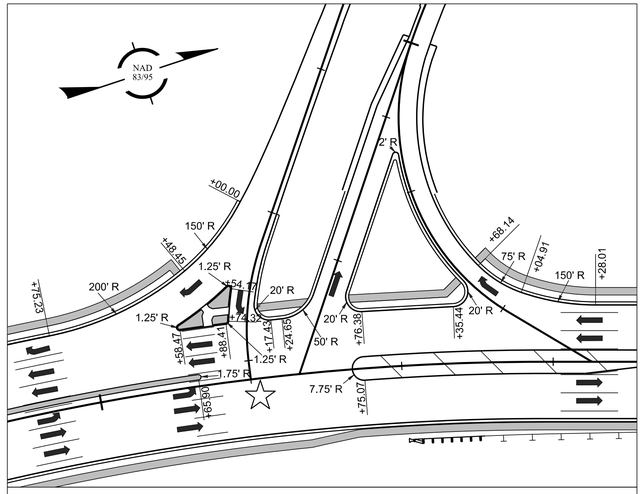
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E. Hough
Signed by: Bryan Hough
03/03/2026

PAVEMENT ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T HOLLAND
Signed by: Joseph T Holland
03/05/2026

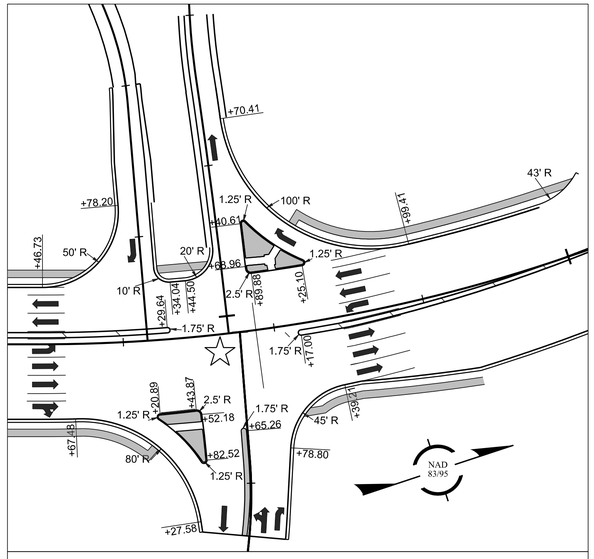
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

11/14/23



INTERSECTION DETAIL
-L- AND -RPC-, -LPC-, -LPCA-



INTERSECTION DETAIL
-L- AND -RPB-, -LPB-, -Y3-

50 25 0 50 100
PLANS

BR-0168
FP | 2B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

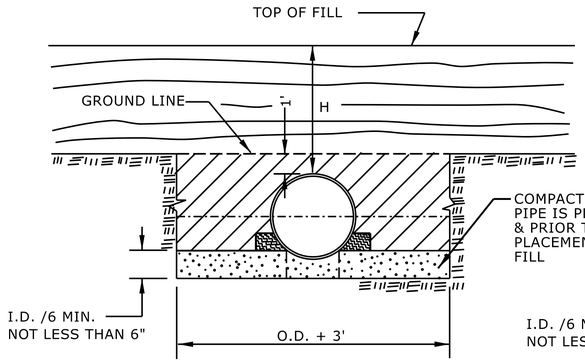
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036853 ENGINEER Bryan E. Hougen
Bryan Hougen
3D5E1E893142...
03/03/2026

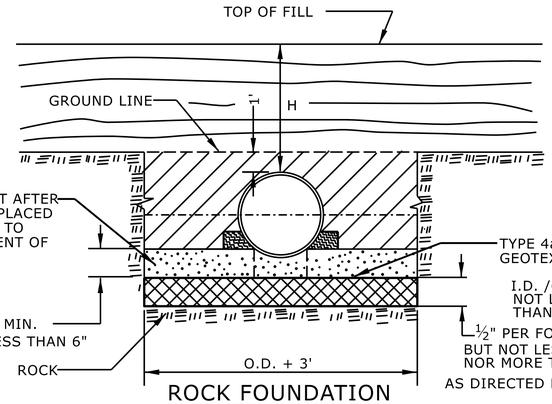
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

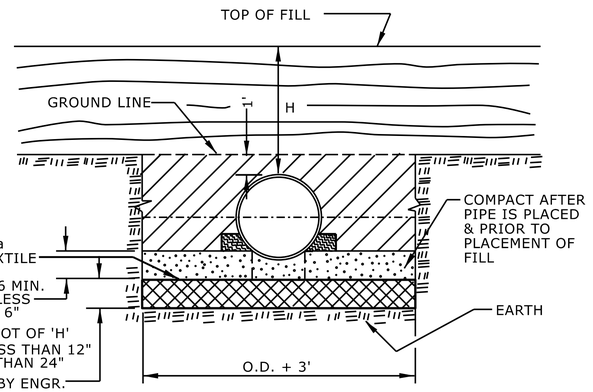
PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-1



NORMAL EARTH FOUNDATION

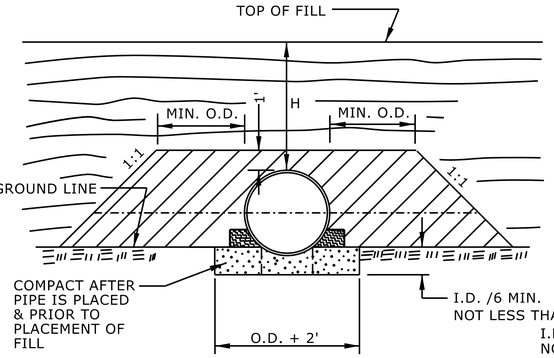


ROCK FOUNDATION

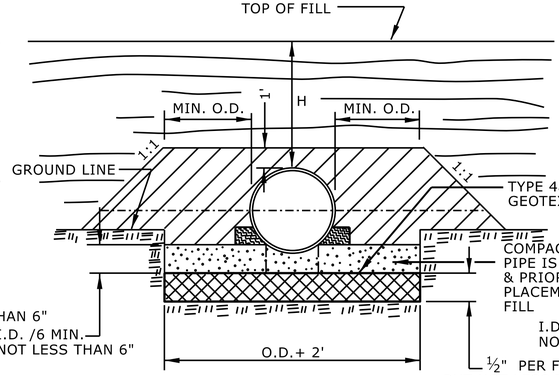


UNSUITABLE MATERIAL FOUNDATION

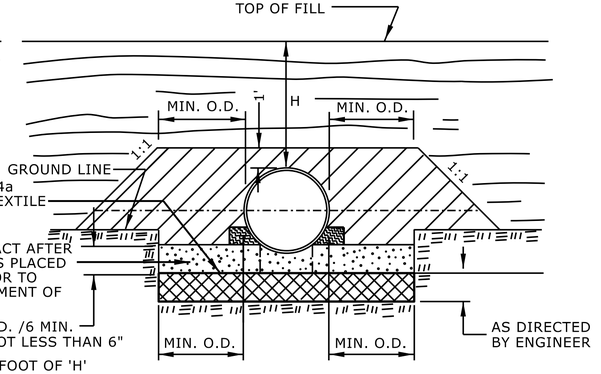
PIPE IN TRENCH



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.

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

Sealed by
NORTH CAROLINA
PROFESSIONAL
588E3E34164C45...
SEAL
033144
ENGINEER
NICOLE M. HARKER

03/03/2026

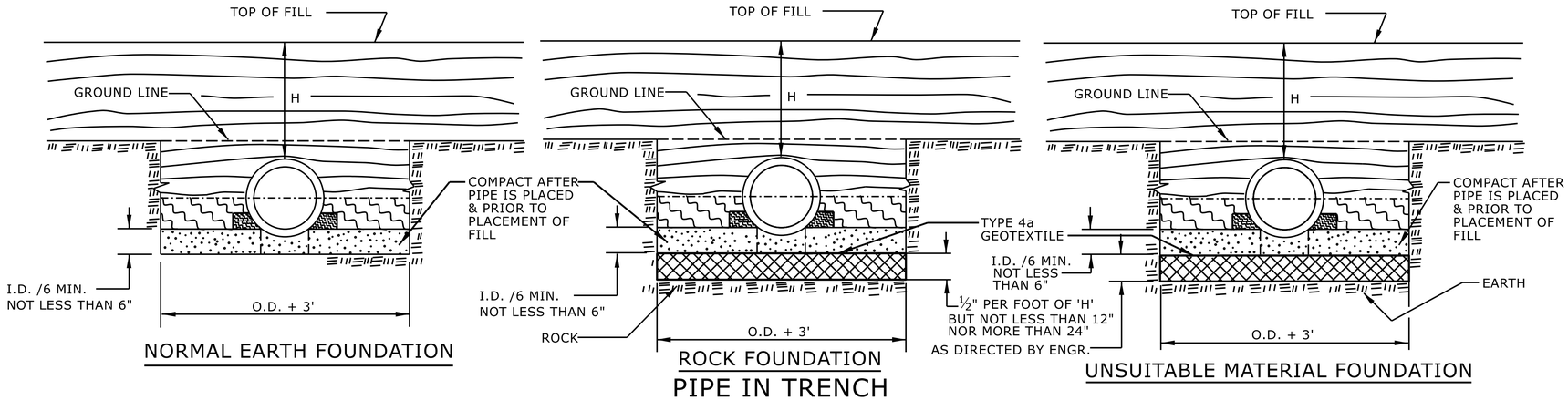
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

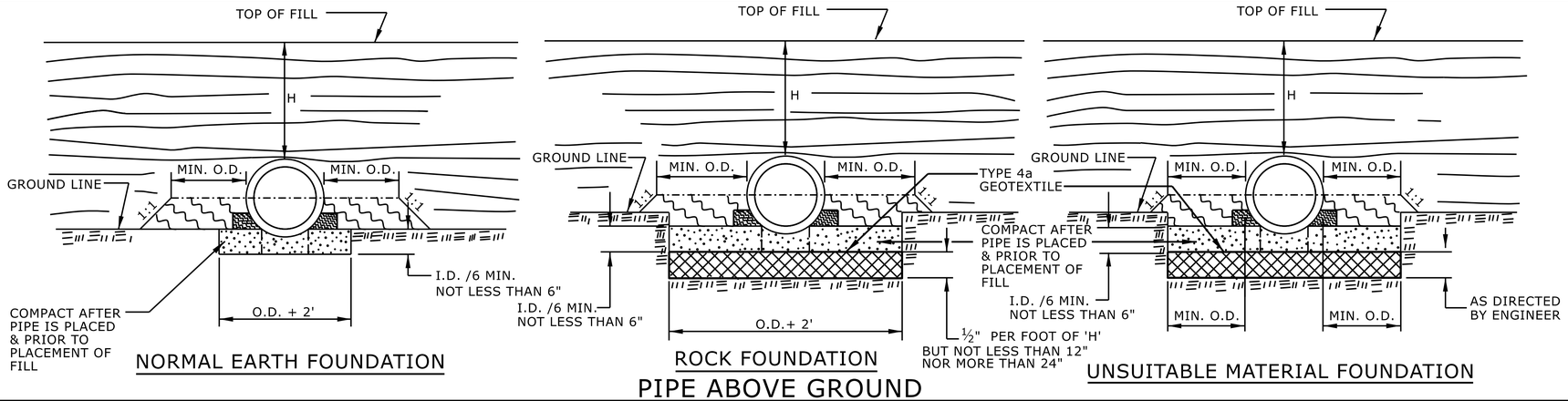
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-2



PIPE IN TRENCH



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
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 ENGINEER SEAL 033144 NICOLE M. HACKLER
Signed by: Nicole M. Hackler
5B9D6C8934164C8...
03/03/2026

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.: _____

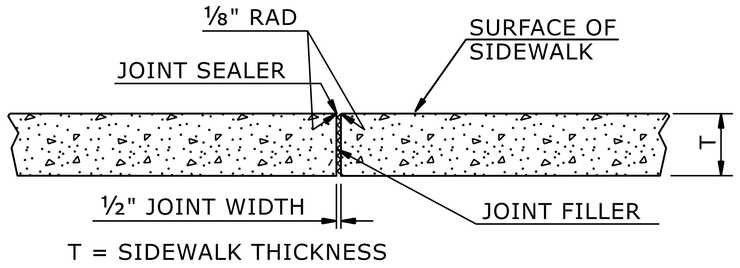
PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-3

NOTES:

CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

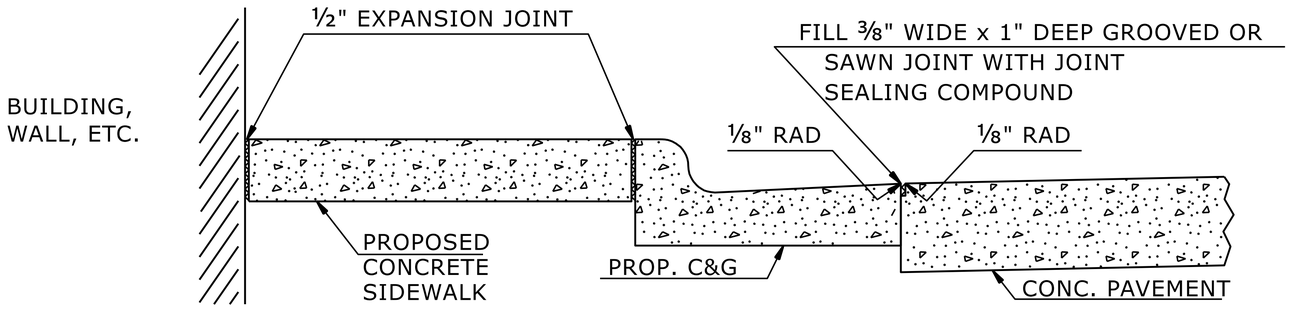
PLACE A GROOVE JOINT 1" DEEP WITH ⅛" RADII IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE ½" EXPANSION JOINT WILL BE REQUIRED AT 50' INTERVALS. A ½" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

SEE STD. DWG. 848.06 FOR CURB RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.



T = SIDEWALK THICKNESS

TRANSVERSE EXPANSION JOINT IN SIDEWALK



DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK

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

ROADWAY DETAIL DRAWING FOR

CONCRETE SIDEWALK

SHEET 1 OF 1

848D01

Signed by:
Nicole M. Hackler
588439303416ACC...
SEAL
033144
NORTH CAROLINA
ENGINEER
NICOLE M. HACKLER
03/03/2026

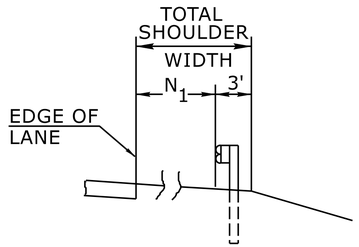
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

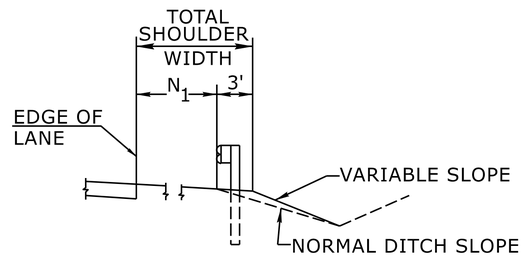
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-4

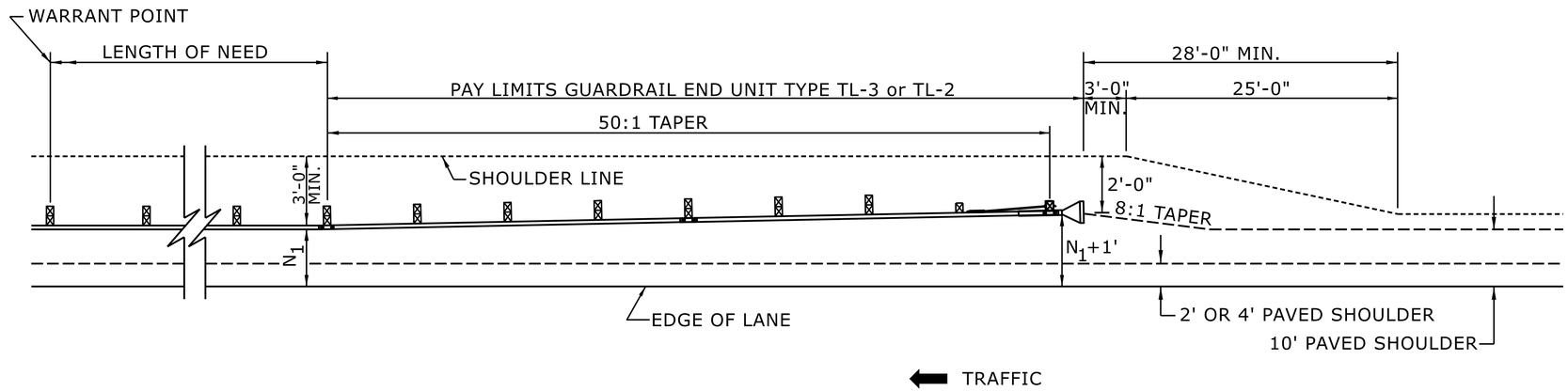


FILL SECTION



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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER
Signed by: Nicole M. Hackler
588C4E164C5...
03/03/2026

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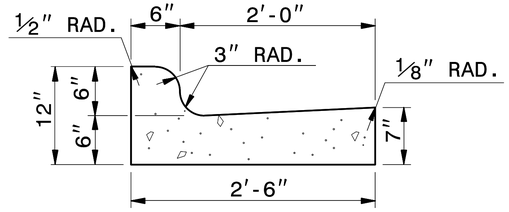
CONTRACTS STANDARDS
AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

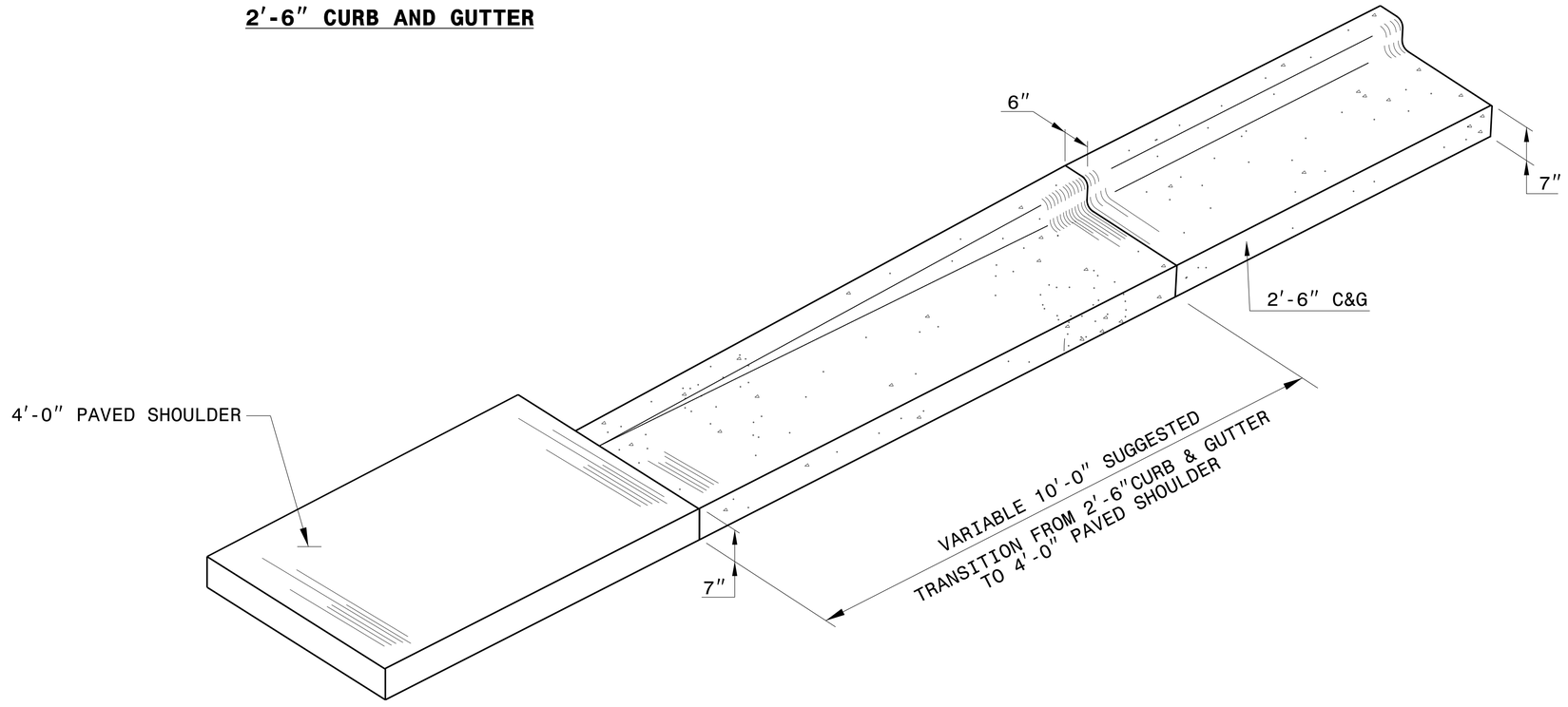
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-5



2'-6" CURB AND GUTTER

*NOTE: SEE STD. DWG. 846.01
FOR GENERAL NOTES



ISOMETRIC VIEW OF TRANSITION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. NICKLER
3884341425
03/03/2026

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

**DETAIL OF 10' TRANSITION
FROM 2'-6"CURB & GUTTER
TO 4'-0" PAVED SHOULDER**

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 04-13-2016
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/misc/c&g transition sections.dgn

10-MAR-2020 14:25
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jhowerton

PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-6

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

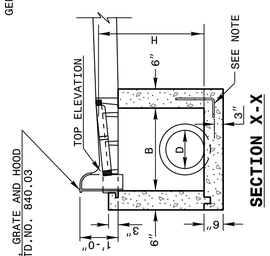
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

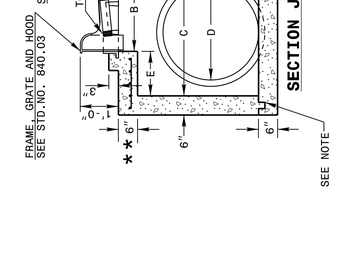
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

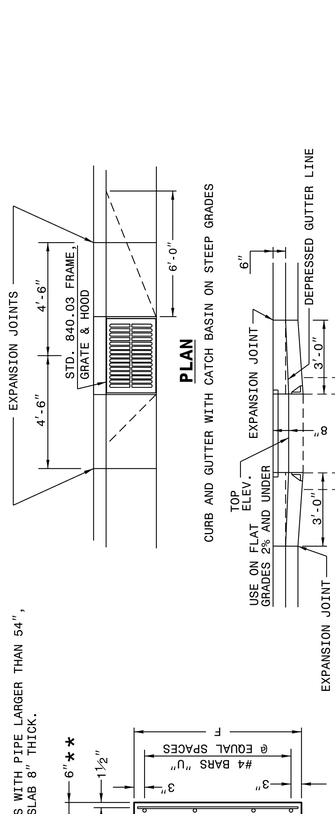
CHAMFER ALL EXPOSED CORNERS 1".

** FOR STRUCTURES WITH PIPE LARGER THAN 54", MAKE THE TOP SLAB 8" THICK.





STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **MINIMUM DEPTH CONCRETE CATCH BASIN** 12" THRU 84" PIPE	SHEET 1 OF 2 **840D02**



* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

PIPE D	DIMENSIONS OF BOX AND PIPE SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	COVER DIMENSION E	COVER DIMENSION F	BARS-U NO.	BARS-U LENGTH	BARS-V NO.	BARS-V LENGTH	BARS-W NO.	BARS-W LENGTH	TOTAL LBS.	CU.YDS. CONC. IN BOX TOP SLAB	CU.YDS. CONC. IN BOX BOTTOM SLAB	CU.YDS. CONC. IN BOX TOT. CONC. FOR MINIMUM HEIGHT H	DEDUCTIONS ONE PIPE C.M.	DEDUCTIONS ONE PIPE R.C.
12"	3'-0"	2'-2"	--	--	2'-0"	--	--	4	1'-6"	2	4'-1"	3	4'-1"	39	0.123	0.347	1.433	0.092	0.127
15"	3'-0"	2'-2"			2'-3"			4	1'-9"	3	4'-7"	3	4'-7"	43	0.161	0.432	1.714	0.132	0.178
18"	3'-0"	2'-2"			2'-6"			4	1'-10"	4	5'-2"	3	5'-2"	47	0.200	0.543	1.738	0.160	0.243
24"	3'-0"	2'-2"			3'-1"			5	2'-2"	4	5'-9"	3	5'-9"	51	0.235	0.667	2.052	0.235	0.317
30"	3'-0"	2'-2"	3'-4"	3'-4"	3'-10"	1'-2"	4'-4"	5	2'-5"	5	6'-4"	3	6'-4"	56	0.289	0.802	2.387	0.297	0.401
36"	3'-0"	2'-2"	3'-10"	3'-10"	4'-6"	1'-8"	4'-10"	6	2'-8"	6	7'-0"	3	7'-0"	66	0.391	1.160	3.057	0.440	0.655
42"	3'-0"	2'-2"	4'-5"	4'-5"	4'-11"	2'-2"	5'-5"	6	3'-0"	7	7'-6"	3	7'-6"	72	0.442	1.340	3.392	0.524	0.774
48"	3'-0"	2'-2"	5'-0"	5'-0"	5'-6"	2'-10"	6'-0"	5	3'-1"	7	8'-1"	3	8'-1"	78	0.493	1.530	3.727	0.615	0.893
54"	3'-0"	2'-2"	5'-7"	5'-7"	6'-0"	3'-5"	6'-7"	6	3'-8"	8	8'-10"	3	8'-10"	84	0.544	1.760	4.062	0.713	1.010
60"	3'-0"	2'-2"	6'-3"	6'-3"	6'-6"	4'-1"	7'-3"	6	4'-4"	9	9'-6"	3	9'-6"	91	0.595	1.970	4.722	0.811	1.127
66"	3'-0"	2'-2"	6'-11"	6'-11"	7'-0"	4'-8"	7'-11"	7	5'-0"	10	10'-2"	3	10'-2"	98	0.646	2.180	5.382	0.910	1.244
72"	3'-0"	2'-2"	7'-6"	7'-6"	7'-6"	5'-3"	8'-6"	7	5'-6"	11	10'-10"	3	10'-10"	104	0.697	2.390	6.042	1.008	1.361
78"	3'-0"	2'-2"	8'-1"	8'-1"	8'-0"	5'-11"	9'-1"	8	6'-2"	12	11'-6"	3	11'-6"	111	0.748	2.600	6.702	1.107	1.478
84"	3'-0"	2'-2"	8'-9"	8'-9"	8'-6"	6'-7"	9'-9"	8	6'-10"	13	12'-2"	3	12'-2"	117	0.799	2.810	7.362	1.205	1.595

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 HACKLER
Jessica M. Hackler
03/04/2026

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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **MINIMUM DEPTH CONCRETE CATCH BASIN** 12" THRU 84" PIPE	SHEET 2 OF 2 **840D02**

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 Std.840.01 DATE:
MODIFIED BY: E.E. WARD DATE: 3-1-02
CHECKED BY: DATE:
FILE SPEC.: s:Special Details/jhowerton/840d02.dgn

10-AUG-2017 10:11
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jhowerton
AT CSD-292595

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-7

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

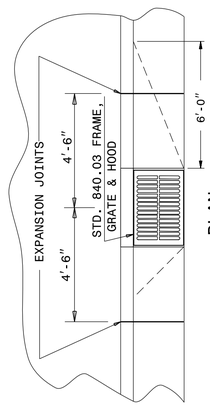
ENGLISH DETAIL DRAWING FOR

MINIMUM DEPTH CONCRETE CATCH BASIN

12" THRU 24" PIPE

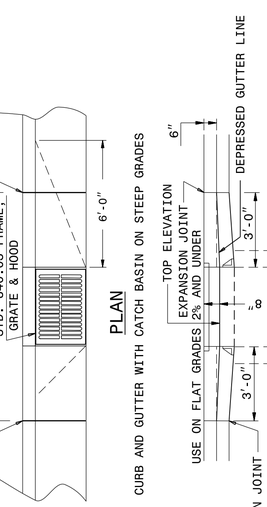
SHEET 1 OF 1 — 840D02

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.



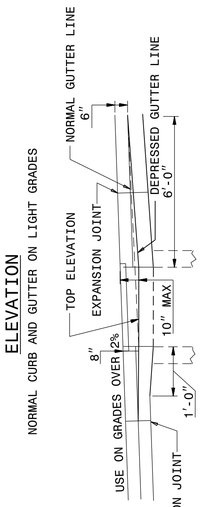
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES



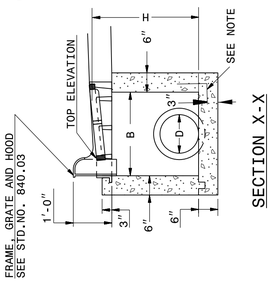
ELEVATION

NORMAL CURB AND GUTTER ON LIGHT GRADES

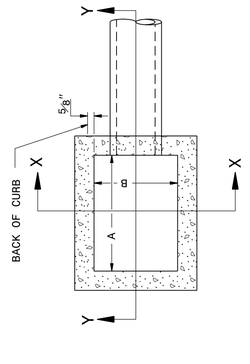


ELEVATION

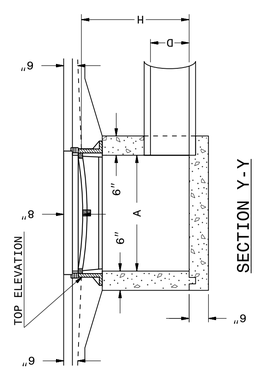
NORMAL CURB AND GUTTER ON STEEP GRADES



SECTION X-X



PLAN



SECTION Y-Y

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN

DIMENSIONS OF BOX AND PIPE				CU. YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE D	SPAN A	WIDTH B	MIN. HEIGHT H	BOTTOM SLAB	CONCRETE IN WALLS	TOTAL CONC.	C.M.	R.C.
12"	3'-0"	2'-2"	2'-0"	0.235	0.343	0.578	0.015	0.026
15"	3'-0"	2'-2"	2'-3"	0.235	0.400	0.635	0.023	0.036
18"	3'-0"	2'-2"	2'-6"	0.235	0.457	0.692	0.033	0.049
24"	3'-0"	2'-2"	3'-1"	0.235	0.590	0.825	0.059	0.085

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

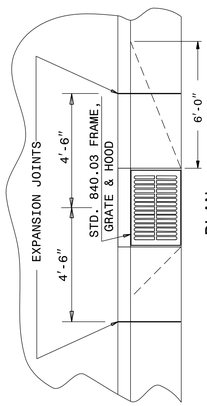
ENGLISH DETAIL DRAWING FOR

MINIMUM DEPTH BRICK CATCH BASIN

12" THRU 24" PIPE

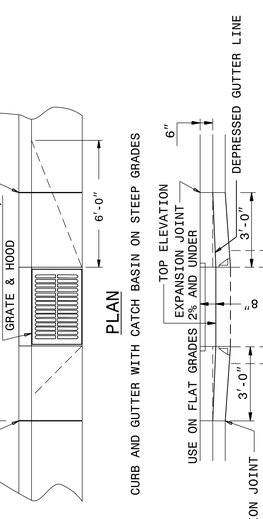
SHEET 1 OF 1 — 840D01

GENERAL NOTES:
MORTAR JOINTS ½" TO ⅛" THICK.
USE CLASS "B" CONCRETE THROUGHOUT.
USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.



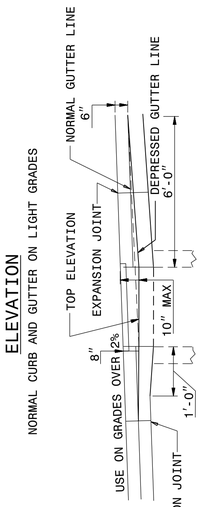
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES



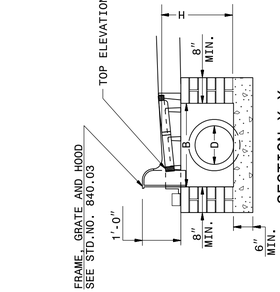
ELEVATION

NORMAL CURB AND GUTTER ON LIGHT GRADES

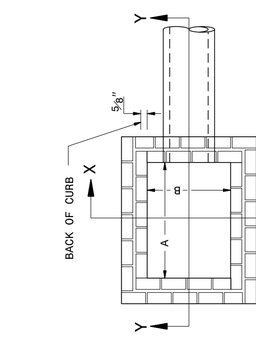


ELEVATION

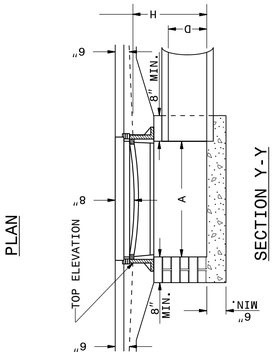
NORMAL CURB AND GUTTER ON STEEP GRADES



SECTION X-X



PLAN



SECTION Y-Y

MINIMUM DIMENSIONS AND QUANTITIES FOR BRICK CATCH BASIN

DIMENSIONS OF BOX AND PIPE				CU. YDS. CONC. IN BOX	BRICK MASONRY		DEDUCTIONS ONE PIPE	
PIPE D	SPAN A	WIDTH B	MIN. HEIGHT H	BOTTOM SLAB	TOTAL CONC.	BRICK MSNR. IN WALLS	TOTAL BRICK AND CONCRETE	C.M.	R.C.
12"	3'-0"	2'-2"	2'-0"	0.281	0.281	0.481	0.762	0.020	0.042
15"	3'-0"	2'-2"	2'-3"	0.281	0.281	0.562	0.843	0.031	0.047
18"	3'-0"	2'-2"	2'-6"	0.281	0.281	0.642	0.923	0.044	0.065
24"	3'-0"	2'-2"	3'-1"	0.281	0.281	0.828	1.109	0.078	0.121

CONTRACT STANDARDS AND DEVELOPMENT UNIT
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SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD. 840.01 DATE:
MODIFIED BY: E.E. WARD DATE: 3-1-02
CHECKED BY: DATE:
FILE SPEC.: s:details/stand/840d01.dgn

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PROJECT REFERENCE NO.	SHEET NO.
BR-0168	2C-8

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

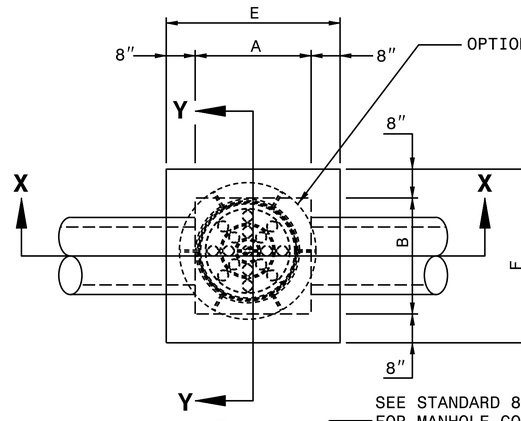
ROADWAY DETAIL DRAWING FOR

CONCRETE JUNCTION BOX

(WITH OPTIONAL MANHOLE)
UP TO 30′ IN HEIGHT

SHEET 1 OF 1

840D31



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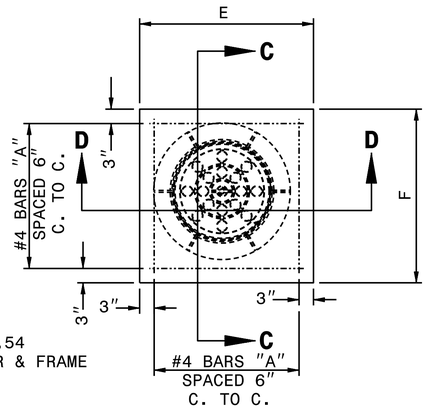
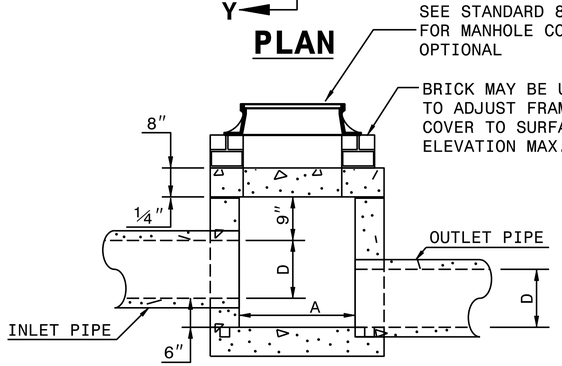
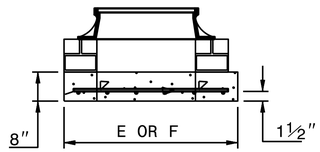
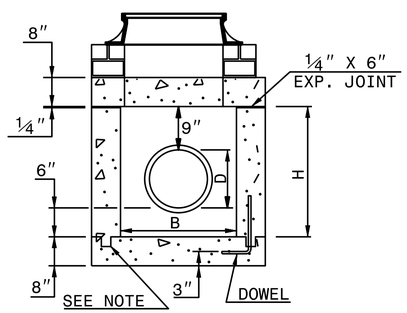




SECTION X-X



SECTION C-C OR D-D



SECTION Y-Y

GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1″.

USE CLASS "B" CONCRETE THROUGHOUT.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2″ KEYWAY, OR #4 BAR DOWELS AT 12″ CENTERS AS DIRECTED BY THE ENGINEER.

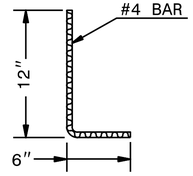
USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.

PROVIDE ALL JUNCTION BOXES OVER 3′-6″ IN DEPTH WITH STEPS 12″ ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.

ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)

MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 25 FEET.



DOWEL

DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS "A"		TOP SLAB DIMENSIONS		CUBIC YARDS IN BOX			TOTAL QUANTITIES BOX AND SLABS		DEDUCTIONS FOR ONE PIPE CU.YDS.	
PIPE	SPAN	WIDTH	HEIGHT					TOP SLAB	BOTTOM SLAB	WALL/ FT. OF HT.	LBS. REINF	CU. YDS. MIN. "H"	C.S.	R.C.
D	A	B	H	NO.	LENGTH	E	F							
12″	2′-0″	2′-0″	2′-3″	12	2′-9″	3′-0″	3′-0″	0.222	0.222	0.246	22	0.998	0.015	0.024
15″	2′-3″	2′-3″	2′-6″	12	3′-0″	3′-3″	3′-3″	0.261	0.261	0.271	24	1.200	0.023	0.036
18″	2′-6″	2′-6″	2′-9″	14	3′-3″	3′-6″	3′-6″	0.302	0.302	0.295	30	1.416	0.033	0.049
24″	3′-0″	3′-0″	3′-3″	16	3′-9″	4′-0″	4′-0″	0.394	0.394	0.344	40	1.907	0.059	0.085
30″	3′-6″	3′-6″	3′-9″	18	4′-3″	4′-6″	4′-6″	0.499	0.499	0.394	51	2.474	0.092	0.127
36″	4′-0″	4′-0″	4′-3″	20	4′-9″	5′-0″	5′-0″	0.616	0.616	0.443	64	3.114	0.132	0.178
42″	4′-6″	4′-6″	4′-9″	22	5′-3″	5′-6″	5′-6″	0.745	0.745	0.492	77	3.828	0.180	0.243
48″	5′-4″	5′-4″	5′-3″	26	6′-3″	6′-4″	6′-4″	0.988	0.988	0.541	111	4.819	0.235	0.317
54″	5′-10″	5′-10″	5′-9″	28	6′-7″	6′-10″	6′-10″	1.150	1.150	0.591	126	5.696	0.297	0.401
60″	6′-6″	6′-6″	6′-3″	30	7′-3″	7′-6″	7′-6″	1.386	1.386	0.640	145	6.770	0.367	0.495
66″	7′-1″	7′-1″	6′-9″	32	7′-10″	8′-1″	8′-1″	1.609	1.609	0.689	169	7.870	0.444	0.589

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

ROADWAY DETAIL DRAWING FOR

CONCRETE JUNCTION BOX

(WITH OPTIONAL MANHOLE)
UP TO 30′ IN HEIGHT

SHEET 1 OF 1

840D31

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. HACKLER
Digitally signed by Nicole M. Hackler
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03/04/2026

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE PLATE FOR TITLE

ORIGINAL BY: J. HOWERTON DATE: 12/30/19
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: jhowerton/840d31 up to 30ft of fill.dgn

$$$$SYSTIME$$$$
$$$$USERNAME$$$$ $$$$DGNFILE$$$$

5/26/20

DETAIL A
TOE PROTECTION
(Not to Scale)

d = 1 Ft.

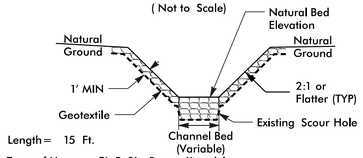
Type of Liner = CLASS B Rip–Rap

FROM –LPCA– STA. 10+40 LT TO –L– STA. 19+00 LT
EST. 100 TONS CLASS B RIP RAP
EST. 222 SY GEOTEXTILE

FROM –RPC– STA. 13+00 RT TO –RPC– STA. 13+60 RT
EST. 38.5 TONS CLASS B RIP RAP
EST. 86 SY GEOTEXTILE

FROM –RPB– STA. 14+00 LT TO –RPB– STA. 14+45 LT
EST. 40 TONS CLASS B RIP RAP
EST. 90 SY GEOTEXTILE

DETAIL C
BANK & SCOUR HOLE STABILIZATION
(Not to Scale)

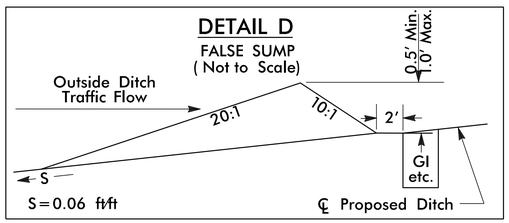


Length = 15 Ft.

Type of Liner = CL B Rip–Rap – Keyed–In

FROM –Y1– STA. 21+65 RT TO
–Y1– STA. 21+80 RT
EST. 100 TONS CLASS B RIP RAP
EST. 225 SY GEOTEXTILE

DETAIL D
FALSE SUMP
(Not to Scale)

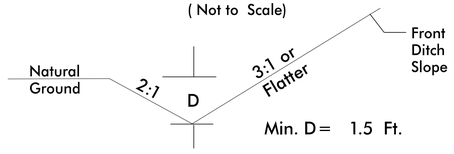


S = 0.06 ft/ft

℄ Proposed Ditch

FROM –LPB– STA. 9+35 RT TO –LPB– STA. 9+50 RT

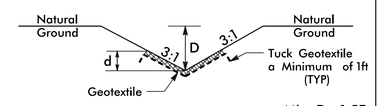
DETAIL E
SPECIAL 'V' CUT DITCH
(Not to Scale)



Min. D = 1.5 Ft.

FROM –RPB– STA. 13+50 LT TO
–RPB– STA. 14+10 LT

DETAIL F
STANDARD 'V' DITCH
(Not to Scale)



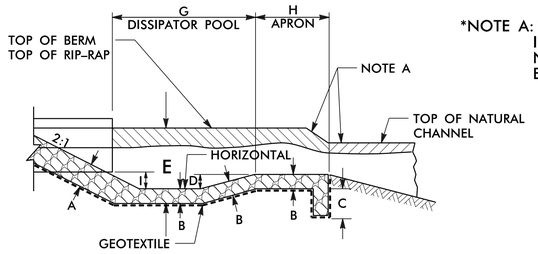
Min. D=1.5Ft.

Type of Liner=CL B Rip–Rap, Keyed–In d=1.5Ft.

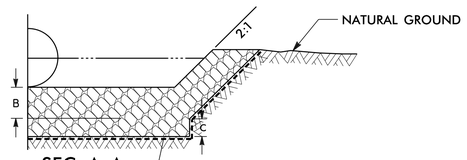
FROM –Y1– STA. 24+25 LT TO
–Y1– STA. 26+50 LT
EST. 102 TONS CLASS B RIP RAP
EST. 225 SY GEOTEXTILE

DETAIL B
RIP–RAPPED ENERGY DISSIPATOR BASIN

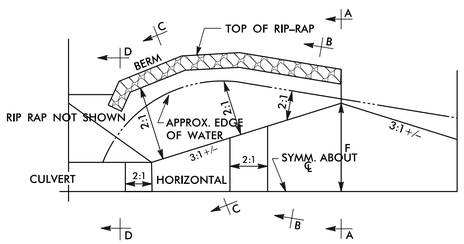
℄ SECTION

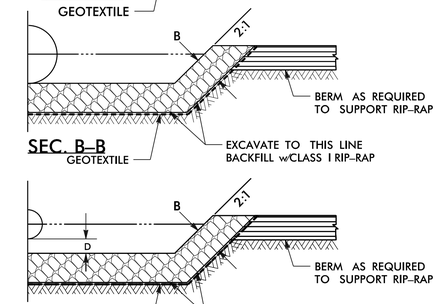


*NOTE A: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP–RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



HALF PLAN





NOTE:
Wo = 66″

DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	3.0'							
B	2.3'							
C	1.0'							
D	2.4'							
E	13.6'							
F	15.0'							
G	24.0'							
H	12.0'							
I	3.3'							

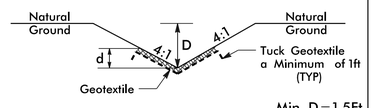
*ALL DIMENSIONS APPROXIMATE IN FT

BASIN #	LOCATION (AT OUTLET)
1	10+87 -RPA-
2	
3	
4	
5	
6	
7	
8	

5/05

FROM –RPA– STA. 10+50 LT TO –RPA– STA. 10+90 LT

DETAIL G
STANDARD 'V' DITCH
(Not to Scale)

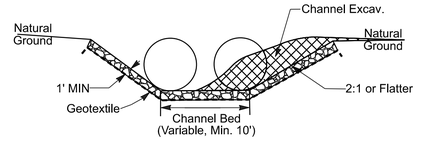


Min. D=1.5Ft.

Type of Line=CL B Rip–Rap, Keyed–In d=1.5Ft.

FROM –Y1– STA. 25+00 RT TO
–Y1– STA. 28+25 RT
EST. 195 TONS CLASS B RIP RAP
EST. 434 SY GEOTEXTILE

DETAIL H
INLET/OUTLET CHANNEL IMPROVEMENTS LOOKING UPSTREAM
(Not to Scale)

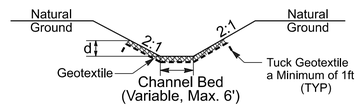


Type of Liner= CL I Rip-Rap - Keyed-In

-Y1- STA. 21+55 OFFSET 82' RT
EST. 25 TONS CLASS I RIP RAP
EST. 52 SY GEOTEXTILE
EST. 24 CY EXCAVATION

-Y1- STA. 19+50 OFFSET 107' LT
EST. 34 TONS CLASS I RIP RAP
EST. 72 SY GEOTEXTILE
EST. 13 CY EXCAVATION

DETAIL I
PIPE INLET CHANNEL IMPROVEMENTS
(Not to Scale)



d= 4 Ft.

Type of Liner= CL. I Rip-Rap, Keyed-In

-Y1- STA. 28+ 40 OFFSET 115' RT
EST. 15 TONS CLASS I RIP RAP
EST. 25 SY GEOTEXTILE
EST. 20 CY EXCAVATION

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL E0[illegible]6961410 043912 ENGINEER Matthew J. York

03/03/2026

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REVISIONS

5/26/20

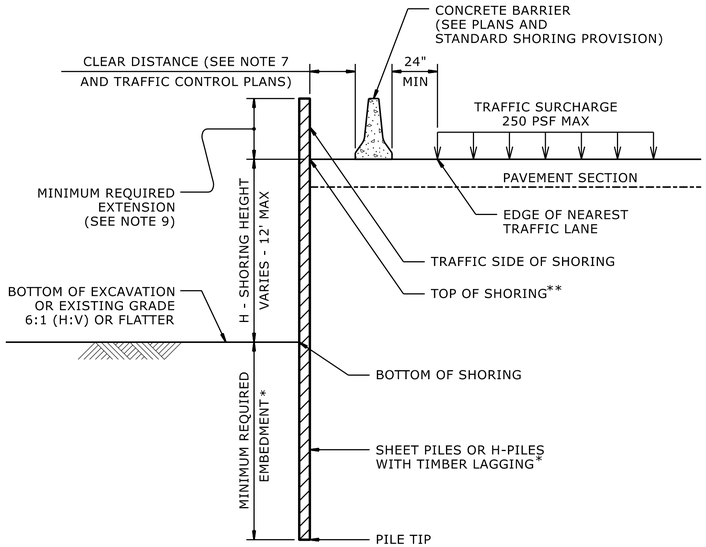
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

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

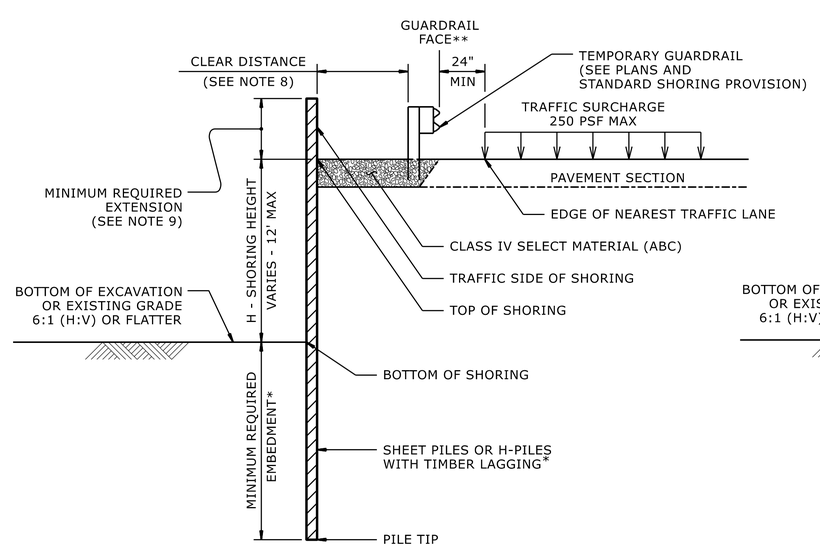
NOTES:

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



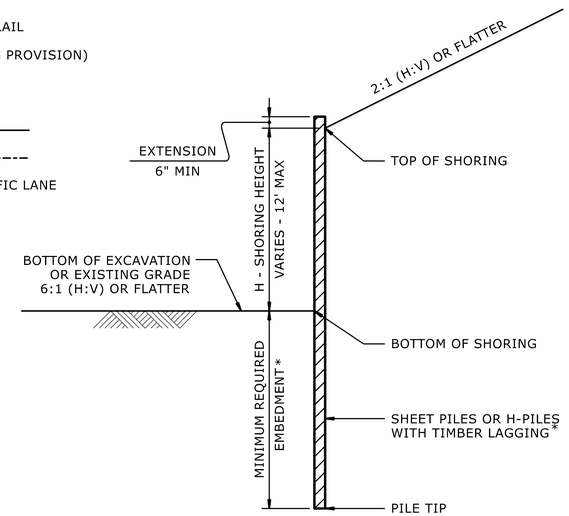
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

BR-0168

2G-1 | -

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

DocuSigned by: Scott A. Hidden 03/05/2026

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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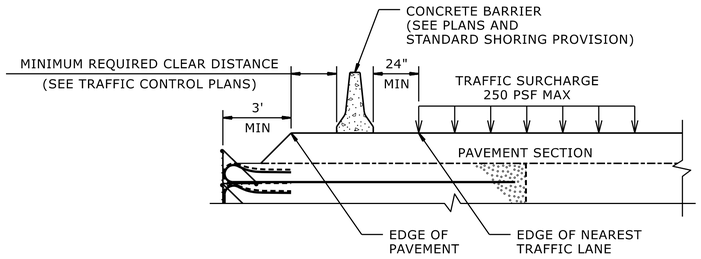
STANDARD DETAIL NO. 1801.01

GEOTECHNICAL STANDARD DETAIL FOR

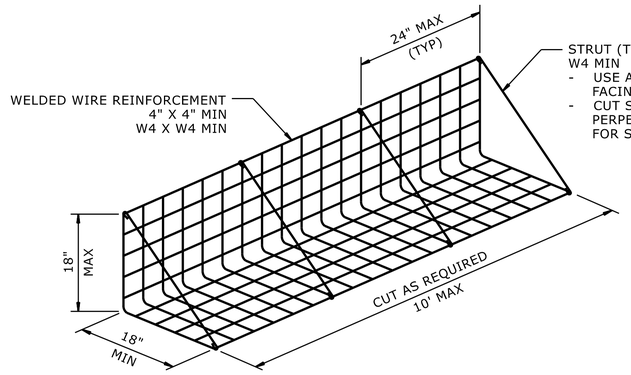
TEMPORARY SHORING

DATE: 02-18-2025

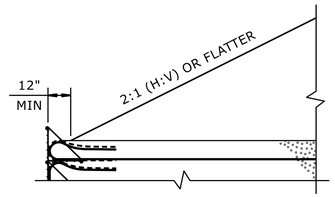
5/26/20



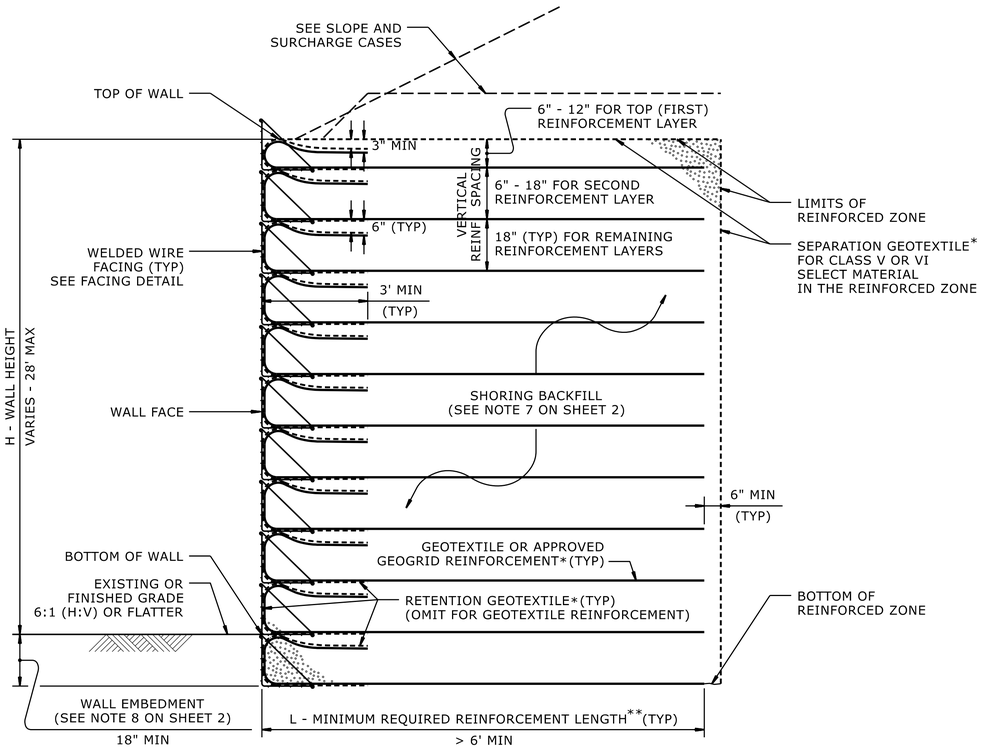
SURCHARGE CASE



FACING DETAIL

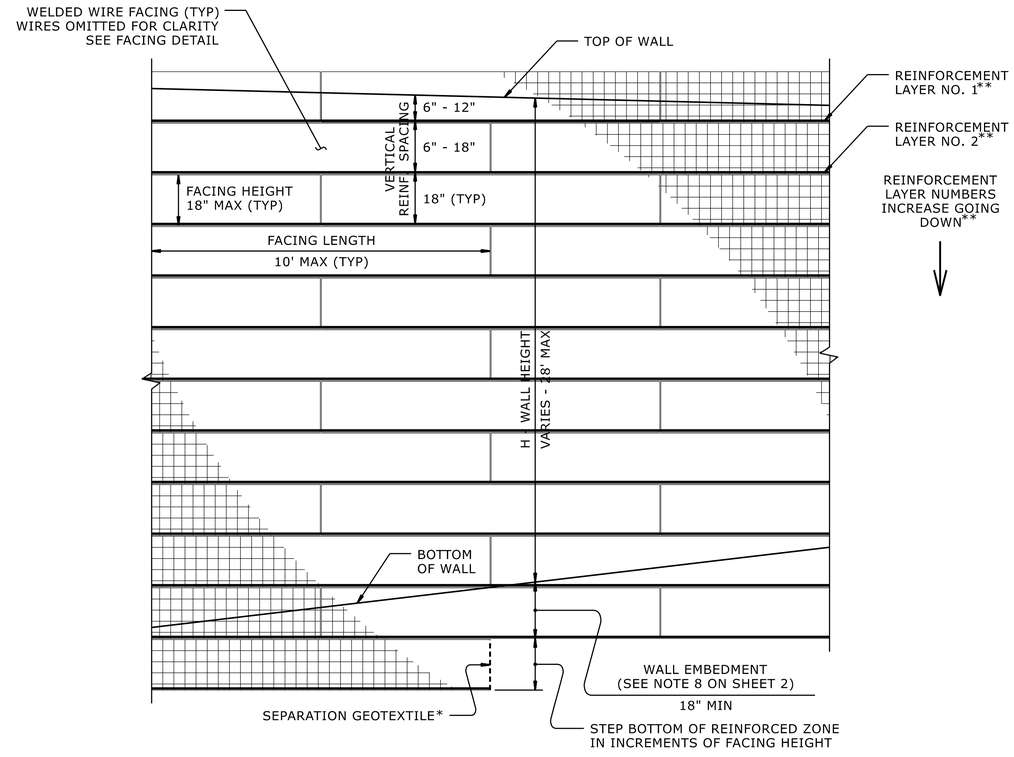


SLOPE CASE



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES,
SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL - PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

BR-0168

2G-2 | -

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

GEOTECHNICAL
ENGINEERING UNIT

GEOTECHNICAL
ENGINEER

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02/02/2026

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SEAL
022246
ENGINEER
SCOTT A. HIDDEN

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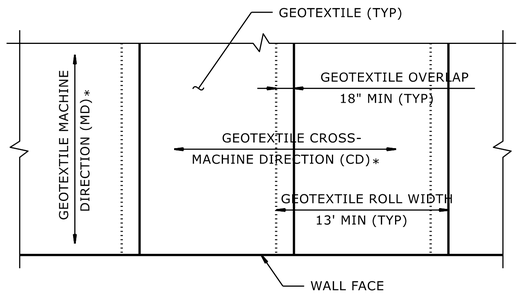
STANDARD
DETAIL NO. 1801.02

GEOTECHNICAL STANDARD DETAIL FOR TEMPORARY WALL (SHEET 1 OF 3)

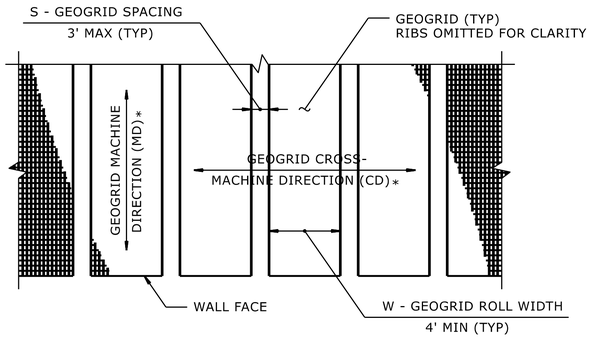
DATE: 02-18-2025

5/26/20



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

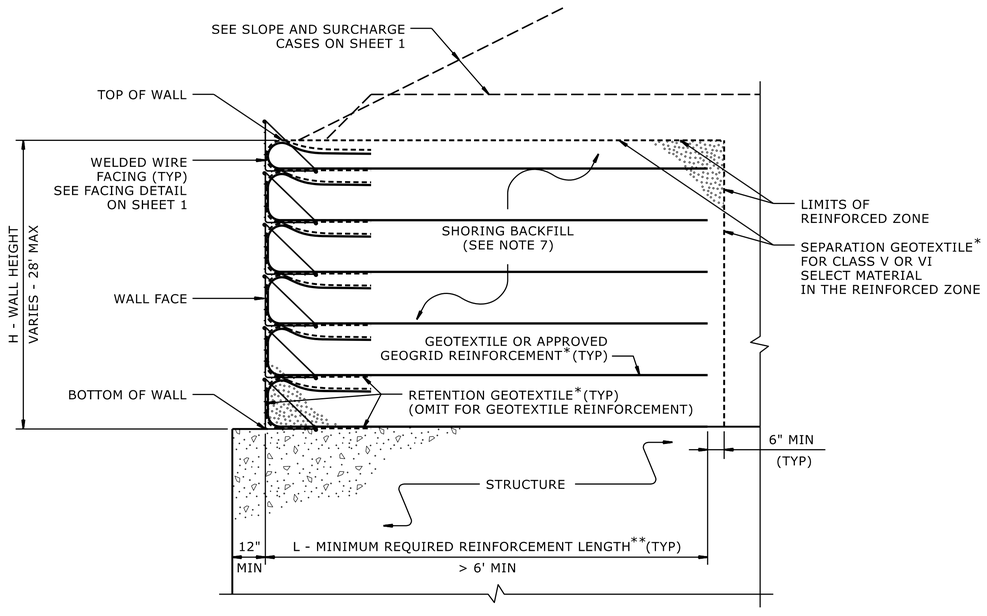


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT - $\frac{W}{W+S} \times 100 \geq 80\%$, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, φ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER OR FLOOD ELEVATION IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. WALL EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS FOR GEOGRID REINFORCEMENT ARE APPROVED FOR SHORT TERM DESIGN STRENGTHS (3-YEAR DESIGN LIFE) IN THE MD AND CD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) > (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD > MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

BR-0168
2G-3 | -

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

DocuSigned by:
Scott A. Hidden 02/02/2026
F760C0B8E1E1...

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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STANDARD DETAIL NO. 1801.02

TEMPORARY WALL (SHEET 2 OF 3)

GEOTECHNICAL STANDARD DETAIL FOR

DATE: 02-18-2025

5/26/20

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II, TYPE 1, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H > 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20' > 10 FOR H > 20'	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + WALL EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER *	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT SHORT-TERM DESIGN STRENGTH (LB/FT)

(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.

BR-0168

2G-4 | -

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

DocuSigned by: Scott Hidden 02/02/2026

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STANDARD DETAIL NO. 1801.02

GEOTECHNICAL STANDARD DETAIL FOR

TEMPORARY WALL (SHEET 3 OF 3)

DATE: 02-18-2025

COMPUTED BY: _____CB_____ DATE: ___12/15/2025_____
CHECKED BY: ___BE_____ DATE: __2/2/2026__

PROJECT NO.	SHEET NO.
BR-0168	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
STAGE 1					
SUMMARY 1					
L (LT) STA 11+50.00	L (LT) STA 20+50.00	713	4884	4171	
RPC,LPC,LPCA (LT)		155	1958	1803	
SUMMARY 1 TOTAL		868	6842	5974	
SUMMARY 2					
L (LT) STA 22+50.00	L (LT) STA 30+50.00	289	4390	4101	
RPB (LT) STA 13+00.00	RPB (LT) STA 15+00.00	165	110		55
LPB (LT) STA 13+00.00	LPB (LT) STA 14+50.00	53	170	117	
SUMMARY 2 TOTAL		507	4670	4218	55
	SUBTOTAL	1375	11512	10192	55
STAGE 2					
SUMMARY 3					
L (RT) STA 11+50.00	L (RT) STA 20+50.00	478	5030.4	4552	
SUMMARY 3 TOTAL		478	5030	4552	
SUMMARY 4					
L (RT) STA 22+00.00	L (RT) STA 30+50.00	692	2459	1767	
RPA 13+00.00	RPA 15+50.00	244	145		99
SUMMARY 4 TOTAL		936	2604	1766	99
	SUBTOTAL	1414	7634	6318	99
TOTAL		2789	19146	16510	153
	LOSS DUE TO CLEARING & GRUBBING	-900		900	
	MATERIAL FOR SHOULDER CONSTRUCTION		132	132	
	WASTE IN LIEU OF BORROW			-153	
	PROJECT TOTALS:	1889	19278	17389	
	EST. 5% TO REPLACE TOP SOIL ON BORROW PIT			869	
	GRAND TOTALS:	1889	19278	8258	
	SAY:	**2000**		**18300**	

Note: Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, and Removal of Existing Pavement will be paid for at the contract lump sum price for grading.

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP	Comments
-L-	16+50.00	19+39.61			2246.71			
-L-	22+01.22	25+00.00			1774.67			
-L-	10+72.71	16+50.00		5436.02				
-L-	25+00.00	30+25.00		4494.78				
-RPA-	12+50.00	15+14.97		488.22				
-Y3-	10+46.57	11+35.00		814.69				
-LPC-	12+75.00	13+00.00		54.44				
-LPCA-	10+80.16	11+11.13		43.33				
-Y1-	23+89	27+75		170.34				Temp. Pavement
-Y1-	23+80	27+75		176.80				Temp. Pavement
-L-	15+28	15+95		104.44				Temp. Pavement
-L-	11+20	15+85		499.56				Temp. Pavement
		TOTAL:		12,283	4,021			
		SAY:		12,290	4,030			

"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

GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

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		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & 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	TEMP CAT-1	TEMP GREU, TL-3	G	NG				
L	11+00.00	12+40.81	Right	137.1493'			APPROACH		10.5209'	13.5209'	137.15'		7.97'							1								134.6025		
L	17+02.21	19+47.59	Right	242.5564'			APPROACH		11'	14'	223.81'		3.72'		1		1											202.8127'		
L	22+39.99	24+83.74	Left	243.7950'			APPROACH		11'	14'	225.04'		4.5'		1		1											127.1988'		
Y1	23+55.00		Left																					1						
Y1	24+30.25		Left																					1						
Y1	28+00.00		Median																				1							
		Project Totals		623.50																								464.614		
		Anchor Deductions																												
		2 GREU TL-3@50' Each		-100																										
		2 Type III@18.75' Each		-37.5																										
		1 AT-1@6.25' Each		-6.25																										
		Grand Total		479.75																										
		SAY		500											2		2			1			1	2				465		

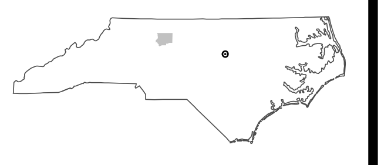
Steel Beam guardrail quantity ≤ 1,000 LF ADDITIONAL GUARDRAIL POSTS = 5

11/14/23

BR-0168

FP 3D-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY



ROADWAY DESIGN UNIT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Alternate Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PPP	DO NOT USE PVC	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	##" x ##" C.S. PIPE ARCH CULVERTS, ##" THICK	##" x ##" C.S. STRUCTURAL PLATE PIPE ARCH, ## GAUGE	48" WELDED STEEL PIPE 0.625" THICK, GRADE B IN SOIL	48" WELDED STEEL PIPE 0.625" THICK, GRADE B NOT IN SOIL	##" WELDED STEEL PIPE ##" THICK, GRADE B (UNDER RR)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS 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	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	C.B. MIN DEPTH STD. (SPECIAL DETAIL)	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	J.B. STD. 840.31 OR STD. 840.32	FLOWABLE FILL CY	PIPE REMOVAL LIN. FT.	REMARKS
LPB 10+00	26 RT	0501		815.8																																									1	1.8																									1			
LPB 10+79	23 RT	0503		822.1																																									1	0.8													1						1								
		0503	0501		816.4	811.0																													84																																								
LPB 13+72	43 RT	0504		825.0																																									1																1								1				
		0504	0522		823.1	822.8																									32																																												
LPB 13+05	11 RT	0505		827.8																																									1	1.8		1		1																							
		0505	0508		820.9	817.7																													108																																								
Y3 11+28	34 RT	0506		833.3																																									1					1					1																		
		0506	0507		831.0	830.5																									28																																												
LPB 11+84	23 RT	0508		823.5																																									1	0.8													1						1								
		0508	0503		817.7	816.4																													92																																								
RPB 14+12	48 LT	0509		832.5																																							3.400																																
		0509	0510		824.8	824.7																													24																																								
RPB 14+12	24 LT	0510		830.7																																									1	1.0		1		1																							
		0510	0522		824.7	824.3																													88																																								
RPB 13+76	14 LT	0511		829.9																																									1			1		1																							
		0511	0510		826.9	826.5																									36																																												
L 22+70	39 LT	0431		836.1																																									1			1			1																						
		0431	0518		833.1	830.4																									188																																												
L 22+23	39 RT	0432		836.7																																									1			1		1																							
		0432	0514		833.7	830.6																									236																																												
L 24+59	39 RT	0514		833.6																																									1			1		1																							
		0514	0518		830.6	830.4																									76																																												
L 25+52	39 LT	0515		832.7																																									1			1			1																						
		0515	0516		829.7	829.4																									64																																												
L 26+18	40 LT	0516		832.5																																									1			1			1																						
		0516	0504		829.4	823.1																									72																																												
L 29+08	39 LT	0517		834.7																																									1					1					1																		
		0517	0519		832.4	832.3																									24																																												
L 24+60	39 LT	0518		833.6																																									1			1			1																						
		0518	0515		830.4	829.7																									92																																												
RPA 13+42	14 RT	0520		832.5																																									1	0.5		1			1																						
		0520	0521		827.0	823.5																									48																																												
LPB 13+71	14 RT	0522		829.8																																									1	3.6		1			1																						
		0522	0505		821.3	820.9																													64																																								
L 19+80	431 RT	0435		796.3																																							8.000																																
		0435	0436		790.8	787.4																																			139	139																																		
L 26+18	52 RT	0529		833.7																																									1			1			1																						
		0529	0530		830.7	830.2																									104																																												
RPA 14+38	14 RT	0530		833.3																																									1			1			1																						
		0530	0520		830.2	827.0																									92																																												
L 30+00	39 LT	0531		835.9																																									1			1		1																							
		0531	0517		832.9	832.4																									88																																												
L 18+84	39 RT	403		834.6																																									1			1			1																						
		0403	0405		831.6	824.6																									204																																												
L 17+02	39 LT	404		830.7																																									1			1		1																							
		0404	0414		827.7	825.3																									32																																												
L 16+75	39 RT	405		827.6																																									1			1			1																						
		0405	0406		824.6	817.6																									164																																												
L 15+06	39 RT	406		820.6																																									1			1			1																						
		0406	0407		817.6	811.0																									156																																												
L 13+42	39 RT	407		815.0																																									1			1			1																						
		0407	0408		811.0	809.3																24																																																									
L 13+42	63 RT	408		812.0																																									1															1							1						
SHEET TOTALS (48" or Less)																							24								1736				460					139	139		11		26	10		19		9	12				2				2	1	1				2		1		1	1			

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.	POLY VINYL 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

REVISIONS

11/14/23

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

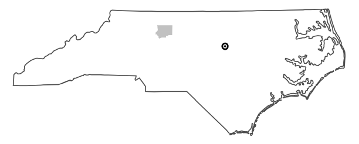
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

LINE & STATION SIZE THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Alternate Pipe (RCP, CSP, CAAP, HDPE, or PVC)														R. C. PIPE CLASS III								R. C. PIPE CLASS IV								##" x ##" C.S. PIPE ARCH CULVERTS, ##" THICK	##" x ##" C.S. STRUCTURAL PLATE PIPE ARCH, ## GAUGE	48" WELDED STEEL PIPE 0.625" THICK, GRADE B IN SOIL	48" WELDED STEEL PIPE 0.625" THICK, GRADE B NOT IN SOIL	##" WELDED STEEL PIPE ##" THICK, GRADE B (UNDER RR)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE			CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	C.B. MIN DEPTH STD. (SPECIAL DETAIL)	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	J.B. STD. 840.31 OR STD. 840.32	FLOWABLE FILL	PIPE REMOVAL	REMARKS
		FROM	TO	FT.	FT.	FT.	%	12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PPP	DO NOT USE PVC	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48						CY	CY	0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.		E	F	G	D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																		CY	LIN. FT.	
		0408	0429		807.5	803.0																									83																																										
L 19+29	39 LT	410		835.6																																									1			1		1																								
		0410	0411		832.6	830.6																									96																																									
L 18+30	39 LT	411		833.6																																									1			1		1																								
		0411	0404		830.6	827.7																									128																																									
LPCA 10+82	34 LT	412		825.6																																									1															1					1								
		0412	0413		822.9	822.7																									56																																									
LPCA 11+28	4 RT	413		830.1																																									1	2.4		1			1																						
		0413	0414		822.7	822.6																									20																																									
LPC 12+85	39 LT	414		828.3																																									1	0.7														1							1						
		0414	0416		822.6	822.1																									76																																									
RPC 11+29	30 LT	415		827.1																																									1														1								1						
		0415	0416		822.4	821.3																			208																																															
RPC 13+40	22 LT	416		827.3																																									1	1.0													1								1						
		0416	0424		821.3	820.1																											40																																							
L 15+12	77 LT	417		823.6																																									1														1								1						
		0417	0428		818.8	818.6																			21																																															
L 13+24	72 LT	418		816.7																																									1														1								1						
		0418	0419		812.0	805.9																			196																																															
L 11+35	71 LT	419		810.7																																									1	3.0													1								1						
		0419	0423		802.7	791.7																											108																																							
L 13+38	7 LT	420		816.8																																									1												1	1																
		0420	0421		813.6	807.5																									204																																									
L 11+33	7 LT	421		810.7																																									1												1	1																
		0421	0422		807.5	807.3																									40																																									
L 11+34	49 LT	422		810.8																																									1			1		1																								
		0422	0419		807.3	806.7																									20																																									
L 15+91	52 LT	424		827.5																																									1	2.4											1	1																
		0424	0417		820.1	819.4																											88																																							
RPC 11+08	32 RT	425		830.6																																									1															1						1							
		0425	0415		827.9	822.4																									64																																									
RPC 11+03	85 LT	426		826.0																																									1															1						1							
		0426	0415		823.3	822.4																									56																																									
RPC 10+00	94 LT	427		830.4																																									1														1							1							
		0427	0415		827.6	822.4																	204																																																		
L 14+83	0 RT																																																																						7		
L 12+26	53 LT																																																																								397	
L 15+23	55 LT																																																																							218	
LPCA 11+31	5 LT																																																																								52	
L12+80	66 RT																																																																								79	
L 11+02	34 RT	0401		807.6																																									1	2.1		1			1																						
		0401	0402		800.5	791.6			50																																																																	
RPA 10+00	26 LT																																																																						20		
L 22+27	0 RT																																																																						118		
L 25+11	0 RT																																																																						40		
L 13+27	64 RT																																																																							19	
LPC 13+06	0 RT																																																																							67	
LPC 10+00	13 RT																																																																							204	
LPC 11+08	5 LT																																																																							56	
RPC 11+20	6 RT																																																																							63	
LPC 12+23	24 RT																																																																							199	
LPB 10+10	40 RT																																																																							200	
RPB 14+12	24 RT																																																																							141	
L 14+91	68 LT	0428		823.6																																									1														1								1						
		0428	0418		818.6	812.0															171																																																			
SHEET TOTALS (48" or Less)									50														204		596						843		236												19	12		5		3	2						3	3	7	4					1	3	7				185	1694	

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

BR-0168
FP 3D-2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY



ROADWAY DESIGN UNIT

REVISIONS

11/14/23

BR-0168

FP | 3D-3

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
L 12+53	73 RT	0429		811.0			
		0429	0409		803.0	798.3	
SHEET TOTALS (48" or Less)							
PROJECT TOTALS (48" or Less)							

STRUCTURE NUMBER FROM	TO	Alternate Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48		DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PPP	DO NOT USE PVC
0429																
0429	0409															
SHEET TOTALS (48" or Less)																
PROJECT TOTALS (48" or Less)			50													

STRUCTURE NUMBER FROM	TO	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
0429																	
0429	0409		52														
SHEET TOTALS (48" or Less)			52														
PROJECT TOTALS (48" or Less)			280		596						2579		236		460		

STRUCTURE NUMBER FROM	TO		##" x ##" C.S. PIPE ARCH CULVERTS, ##" THICK	##" x ##" C.S. STRUCTURAL PLATE PIPE ARCH, ## GAUGE	48" WELDED STEEL PIPE 0.625" THICK, GRADE B IN SOIL	48" WELDED STEEL PIPE 0.625" THICK, GRADE B NOT IN SOIL	##" WELDED STEEL PIPE ##" THICK, GRADE B (UNDER RR)			ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY
0429											
0429	0409										
SHEET TOTALS (48" or Less)											
PROJECT TOTALS (48" or Less)					139	139				11	

QUANTITIES FOR DRAINAGE STRUCTURES — NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)

STRUCTURE NUMBER FROM	TO	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	
0429		1	3.0		1		1		
0429	0409								
SHEET TOTALS (48" or Less)		1	3		1		1		
PROJECT TOTALS (48" or Less)		46	25		25		13	14	

STRUCTURE NUMBER FROM	TO	CONCRETE TRANSITIONAL SECTION: D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION: C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	C.B. MIN DEPTH STD. (SPECIAL DETAIL)	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
0429											
0429	0409										
SHEET TOTALS (48" or Less)											
PROJECT TOTALS (48" or Less)					2		3	3	9	5	1

STRUCTURE NUMBER FROM	TO	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	J.B. STD. 840.31 OR STD. 840.32			FLOWABLE FILL CY		PIPE REMOVAL LIN. FT.	REMARKS
0429																
0429	0409															
SHEET TOTALS (48" or Less)																
PROJECT TOTALS (48" or Less)					3	3	8		1	1			185		1694	

C.A.A.	CORRUGATED ALUMINUM 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**

REVISIONS

11/14/23

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54 INCHES & GREATER)

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	54	60	66	72	78	84	90	
LPB 10+45	49 LT	0502		823.0																			
		0502	0501		815.6	809.0											92						
L 23+12	124 LT	0523		813.4																			
		0523	0430		805.4	804.1												48					
L 22+94	75 LT	0430		821.2																			
		0430	0433		804.1	797.9																	
L 21+87	115 RT	0433		817.2																			
		0433	0434		797.9	795.7												77					
LPB 10+10	26 RT	0501	0532		809.0	808.7											48						
LPB 10+00	78 RT	0532		816.4																			
		0532	0500		808.7	808.4											51						
LPB 10+00	26 RT	0501		815.8																			
SHEET TOTALS (54" or More)																	191	125					
PROJECT TOTALS (54" or More)																	191	125					

LINE & STATION	FROM	TO					##" x ##" C.S. PIPE ARCH CULVERTS, ##" THICK	##" x ##" C.S. STRUCTURAL PLATE PIPE ARCH, ## GAUGE	66" WELDED STEEL PIPE 0.875" THICK, GRADE B IN SOIL	66" WELDED STEEL PIPE 0.875" THICK, GRADE B NOT IN SOIL	##" WELDED STEEL PIPE ##" THICK, GRADE B (UNDER RR)			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	
LPB 10+45	0502														5.600									
	0502	0501																						
L 23+12	0523														6.300									
	0523	0430																						
L 22+94	0430															13.000								
	0430	0433							109	109														
L 21+87	0433															15.000								
	0433	0434																						
LPB 10+10	0501	0532																						
LPB 10+00	0532															5.180								
	0532	0500																						
LPB 10+00	0501															4.090								
SHEET TOTALS (54" or More)									109	109					12	37								
PROJECT TOTALS (54" or More)									109	109					12	37								

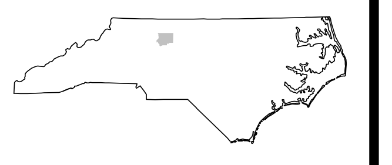
LINE & STATION	FROM	TO	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	C.B. MIN DEPTH STD. (SPECIAL DETAIL)	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54		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
LPB 10+45	0502																																		
	0502	0501																																	
L 23+12	0523																																		
	0523	0430																																	
L 22+94	0430																						1						1						
	0430	0433																																	
L 21+87	0433																						1						1						
	0433	0434																																	
LPB 10+10	0501	0532																																	
LPB 10+00	0532									1						1																			
	0532	0500																																	
LPB 10+00	0501																																		
SHEET TOTALS (54" or More)										1						1							2						2						
PROJECT TOTALS (54" or More)										1						1							2						2						

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**

BR-0168

FP | 3D-4

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY



ROADWAY DESIGN UNIT

REVISIONS

COMPUTED BY: Hratch A. Agopian, DATE: 07/31/2024
CHECKED BY: Matthew M. Lattin, DATE: 07/31/2024

(2-3-23)

PROJECT NO.	SHEET NO.
67168.1.1 (BR-0168)	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

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU1	6	100	200	300		
			TOTAL CY/TONS/SY:		100	200**	300**	0	0

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

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge No. 289	1	2
Bridge No. 289	2	2

PROJ. REFERENCE NO.	SHEET NO.
BR-0168	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	5790 UNIVERSITY HOTEL LLC
2	4	MODERN INVESTMENTS LLC

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

5/26/20

-L-	-RPC-
CUR DATA -L- PI Sta 10+45.88 Δc = 02°37'42.6" (RT) D = 02°51'53.2" Lc = 91.75 Tc = 45.88 R = 2,000 SE = SEE PLANS	CUR DATA -RPC- PI Sta 10+82.94 Δc = 17°57'14.4" (LT) D = 10°54'48.5" Lc = 164.51 Tc = 82.94 R = 525 SE = SEE PLANS
CUR DATA -L- PI Sta 14+48.87 Δc = 24°56'16.2" (RT) D = 03°32'51.8" Lc = 702.92 Tc = 357.12 R = 1,615 SE = 0.040	CUR DATA -RPC- PI Sta 13+61.72 Δc = 25°52'15.3" (LT) D = 32°44'25.6" Lc = 79.02 Tc = 40.19 R = 175 SE = 0.031

-LPC- & -LPCA-	
CUR DATA -LPC- PI Sta 10+76.96 Δc = 18°13'04.3" (LT) D = 11°56'11.8" Lc = 152.62 Tc = 76.96 R = 480 SE = SEE PLANS	CUR DATA -LPCA- PI Sta 11+22.30 Δc = 78°23'05.4" (LT) D = 38°11'49.9" Lc = 205.21 Tc = 122.30 R = 150 SE = SEE PLANS

-RPC- POC 10+00.00
BEGIN CONSTRUCTION/OVERLAY
-RPC- STA 11+00.00

-LPC- POC 10+00.00
BEGIN CONSTRUCTION/OVERLAY
-LPC- STA 10+80.00

BEGIN GRADE
-LPC- STA 11+45.00
-LPCA- POC 10+00.00
-LPC-STA.11+48.42

-RPC- PT 11+64.51
BEGIN GRADE
-RPC- STA 13+00.00

-LPC- PT 11+52.62
-LPC-S52°43'50.6"E
-Y1- PCC 27+39.61
-Y1- PCC 28+74.74

-RPC- PC 13+21.52
END C&G
-RPC- +00.00
END C&G
-LPC- +55.00
-LPCA- PT 12+05.21
-RPC- PT 14+00.54
-RPC-S78°15'55.6"E
-RPC- POT 14+12.53
-L- STA. 16+00.00
-LPCA-N49°23'10.9"E
BEGIN BRIDGE
-L- STA. 19+73.79
-L- POT 20+73.79
-Y1- POC 25+90.42
MSE WALL EB1
SEE STRUC. PLANS
-Y1- PCC 26+52.70
N18°38'28.1"E
120°12'42.3"
-L- PCC 10+91.75
RELOCATE BUS STOP SHELTER
-L- POB 10+00.00
BEGIN APPR. SLAB
-L- STA. 19+49.94
END APPR. SLAB
-L- STA. 22+37.63
END BRIDGE
-L- STA. 22+13.79
-LPC- POT 13+79.07
-L- STA. 16+32.26
-L- PT 17+94.68
-LPCA- POT 12+68.46
-L- STA. 18+25.62
BEGIN CONSTRUCTION
-L- STA 10+20.00
BEGIN TIP BR-0168
-L- STA 11+00.00
-Y1- PCC 23+35.31
-RPA- POC 10+00.00
-RPA- N32°13'58.8"W
-Y1- PCC 21+14.09
-Y1- +25.28
131.07 (LT)
-Y1- +75.00
149 (LT)
128.46 (LT)
-Y1- +32.66
148 (LT)
127.21 (LT)
BEGIN CONSTRUCTION
-Y1- STA. 19+33.85
-L- +20.33
92 (RT)
80.28 (RT)
-L- +30.00
98 (RT)
83.31 (RT)
-L- +98.25
98 (RT)
95 (RT)
88.40 (RT)

MATCHLINE -L- STA 23+00.00 SEE SHEET 5

REVISED SIGNAL
FOR DRAINAGE DETAILS, SEE SHEET 2D–1.
FOR –L– PROFILE, SEE SHEET 6.
FOR –Y1– PROFILE, SEE SHEET 7.
FOR –RPC–, –LPC–, –LPCA– PROFILES, SEE SHEET 8.
FOR INTERSECTION DETAILS, SEE SHEET 2B–1.
FOR BRIDGE PLANS, SEE S–1 TO S–53
FOR WALL PLANS, SEE W–1 TO W–5

-Y1-	
CUR DATA -Y1- PI Sta 19+99.53 Δc = 05°58'21.4" (RT) D = 02°36'15.7" Lc = 229.33 Tc = 114.77 R = 2,200 SE= EXIST	CUR DATA -Y1- PI Sta 22+24.85 Δc = 07°14'33.4" (RT) D = 03°16'26.6" Lc = 221.21 Tc = 110.75 R = 1,750 SE= EXIST

-Y1-		
CUR DATA -Y1- PI Sta 24+94.30 Δc = 08°39'34.5" (RT) D = 02°43'42.1" Lc = 317.39 Tc = 159.00 R = 2,100 SE= EXIST	CUR DATA -Y1- PI Sta 26+96.17 Δc = 03°49'49.8" (RT) D = 04°24'26.5" Lc = 86.91 Tc = 43.47 R = 1,300 SE= EXIST	CUR DATA -Y1- PI Sta 28+07.19 Δc = 02°55'18.4" (RT) D = 02°09'43.6" Lc = 135.14 Tc = 67.58 R = 2,650 SE= EXIST

–RPC– AND –LPC–

–L– UNIVERSITY PRKWY	–L– UNIVERSITY PRKWY
85 / 75	
60 / 50	30 / 30
320 / 295	290 / 275

2026 ADT
2046 ADT

BR-0168	
FP	4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
Signed by: Bryan Hough
SEAL 036853
ENGINEER
Bryan E. Hough
03/03/2026

HYDRAULICS ENGINEER
Signed by: Matthew York
SEAL 043912
ENGINEER
Matthew J. York
03/03/2026

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REVISIONS

5/26/20

END CONSTRUCTION
-Y1- STA. 31+30.00

-Y1- PCC 30+70.52

BEGIN CONSTRUCTION/OVERLAY
-LPB- STA 10+00.00

-RPB- POC 10+00.00

BEGIN CONSTRUCTION
-RPB- STA 13+00.00

-RPB- PRC 13+42.34

-RPB- PT 14+68.96

-RPB- S77°59'16.9"E

-RPB- POT 15+11.52
-L- STA. 27+69.88

-LPB- POB 10+00.00

-LPB- PT 13+11.26

BEGIN GRADE
-LPB- STA 13+00.00

END C&G
-RPB- +70.49

-LPB- S76°10'18.3"E

-L- PCC 30+04.76

-L-POE 33+24.02

END C&G
-LPB- +78.20

-L- PC 26+44.92

-RPA- POT 15+14.97

END C&G
-RPA- +35.00

-LPB- POT 14+68.87
-L- STA. 27+16.11

END C&G
-Y3- +35.00

BEGIN CONSTRUCTION
-RPA- STA 12+50.00

-RPA- PC 12+04.20

-Y3- POC 10+00.00
-L- STA. 27+77.23

-Y3- S75°50'31.9"E

-Y3- PC 10+84.24

END C&G
-Y3- +35.00

-Y3- PCC 11+33.53

-Y3- PCC 12+30.92

END CONSTRUCTION
-Y3- STA 11+35.00

END TIP BR-0168
-L- STA 30+25.00

MATCHLINE -L- STA 23+00.00 SEE SHEET 4

-L-		-LPB-	-RPA-
CUR DATA -L- PIc 28+26.53 Δc = 19°05'24.6" (LT) D = 05°18'18.6" Lc = 359.84 Tc = 181.60 R = 1,080 SE = 0.040	CUR DATA -L- PIc 31+65.14 Δc = 13°32'59.3" (LT) D = 04°14'38.9" Lc = 319.26 Tc = 160.38 R = 1,350 SE = SEE PLANS	CUR DATA -LPB- PIc 11+97.13 Δc = 89°10'13.6" (RT) D = 28°38'52.4" Lc = 311.26 Tc = 197.13 R = 200 SE = SEE PLANS	CUR DATA -RPA- PIc 13+70.67 Δc = 50°52'26.9" (RT) D = 16°22'12.8" Lc = 310.77 Tc = 166.47 R = 350 SE = SEE PLANS
-RPB-		**-Y3-**	
CUR DATA -RPB- PIc 11+79.34 Δc = 42°10'53.7" (LT) D = 12°19'18.0" Lc = 342.34 Tc = 179.34 R = 465 SE = SEE PLANS	CUR DATA -RPB- PIc 14+05.66 Δc = 01°48'49.7" (RT) D = 01°25'56.6" Lc = 126.63 Tc = 63.32 R = 4,000 SE = SEE PLANS	CUR DATA -Y3- PIc 11+08.94 Δc = 09°24'43.8" (RT) D = 19°05'54.9" Lc = 49.28 Tc = 24.70 R = 300 SE = SEE PLANS	CUR DATA -Y3- PIc 11+82.31 Δc = 08°35'04.7" (RT) D = 08°48'53.0" Lc = 97.39 Tc = 48.79 R = 650 SE = SEE PLANS
		-Y1-	
CUR DATA -Y1- PIc 29+72.73 Δc = 06°24'35.1" (RT) D = 03°16'26.6" Lc = 195.77 Tc = 97.99 R = 1,750 SE= EXIST	CUR DATA -Y1- PIc 32+49.93 Δc = 10°15'06.7" (RT) D = 02°51'53.2" Lc = 357.86 Tc = 179.41 R = 2,000 SE= EXIST		

–LPB– AND –RPB–

–L– UNIVERSITY PRKWY		–L– UNIVERSITY PRKWY
330/315	45/40	290/280
	30/35	
	55/50	10/5
	35/35	
	70/60	
	70/75	
–RPA–	–Y3– N PATTERSON AVE	2026 ADT / 2046 ADT

☆ REVISED SIGNAL

FOR DRAINAGE DETAILS, SEE SHEET 2D–1.
FOR –L– PROFILE, SEE SHEET 6.
FOR –Y1– PROFILE, SEE SHEET 7.
FOR –RPA–, –LPB–, –RPB–, –Y3– PROFILES, SEE SHEET 8.
FOR INTERSECTION DETAILS, SEE SHEET 2B–1.

BR-0168
FP 5

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036853 ENGINEER Bryan E. Hough
Bryan Hough
36F0CFEB9314C...
03/03/2026

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043912 ENGINEER Matthew J. York
Matthew York
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03/03/2026

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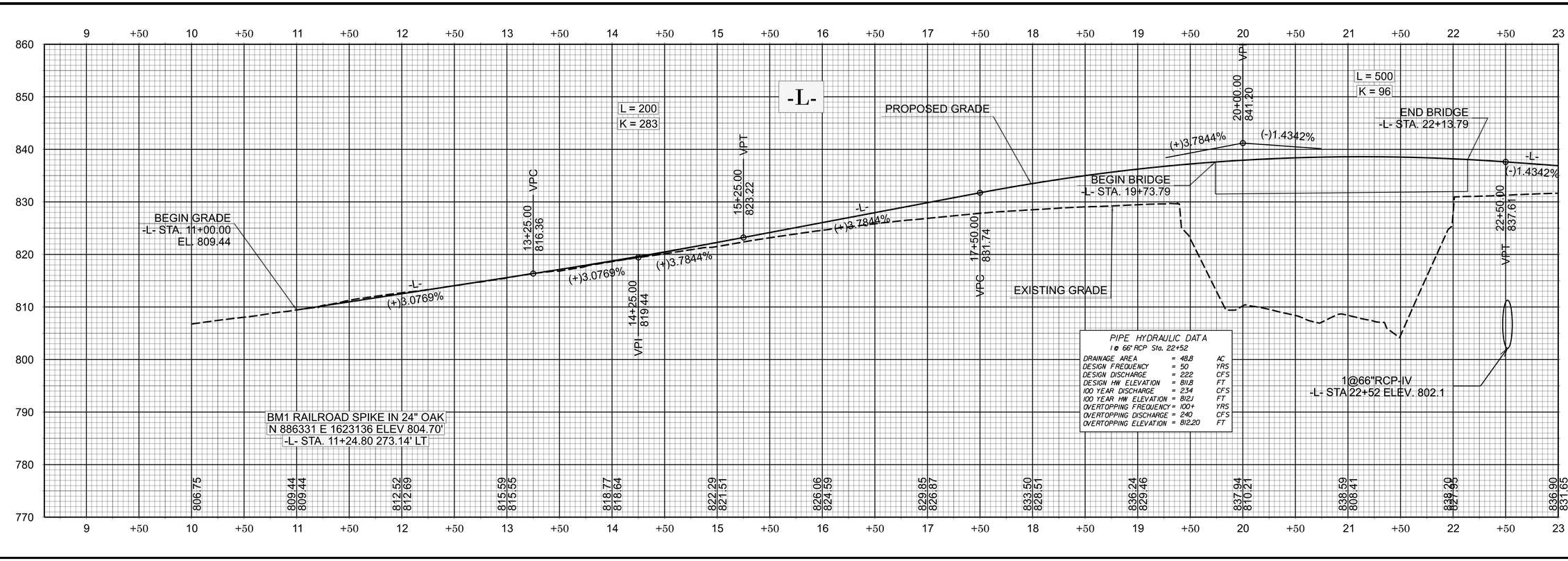
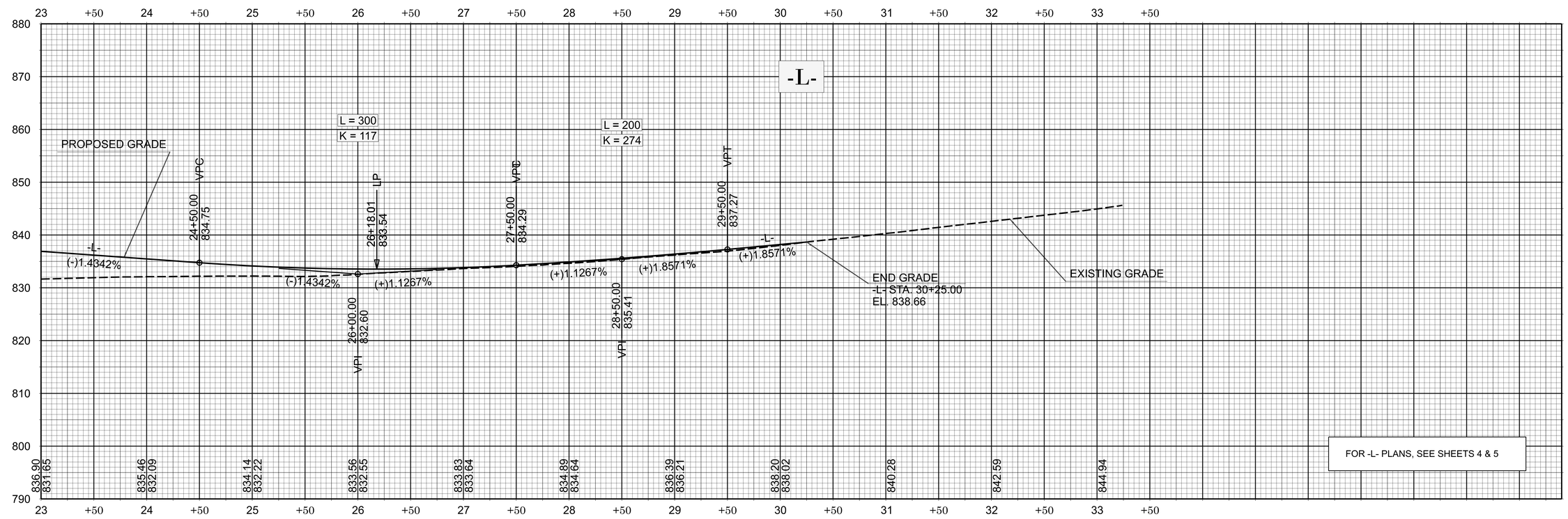
REVISIONS

5/26/20





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FP 6

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036853 ENGINEER Bryan E. Hough
Signed by: Bryan Hough
3D2E6AFE8931BC...
03/03/2026

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043912 ENGINEER Matthew J. York
DocuSigned by: Matthew York
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03/03/2026

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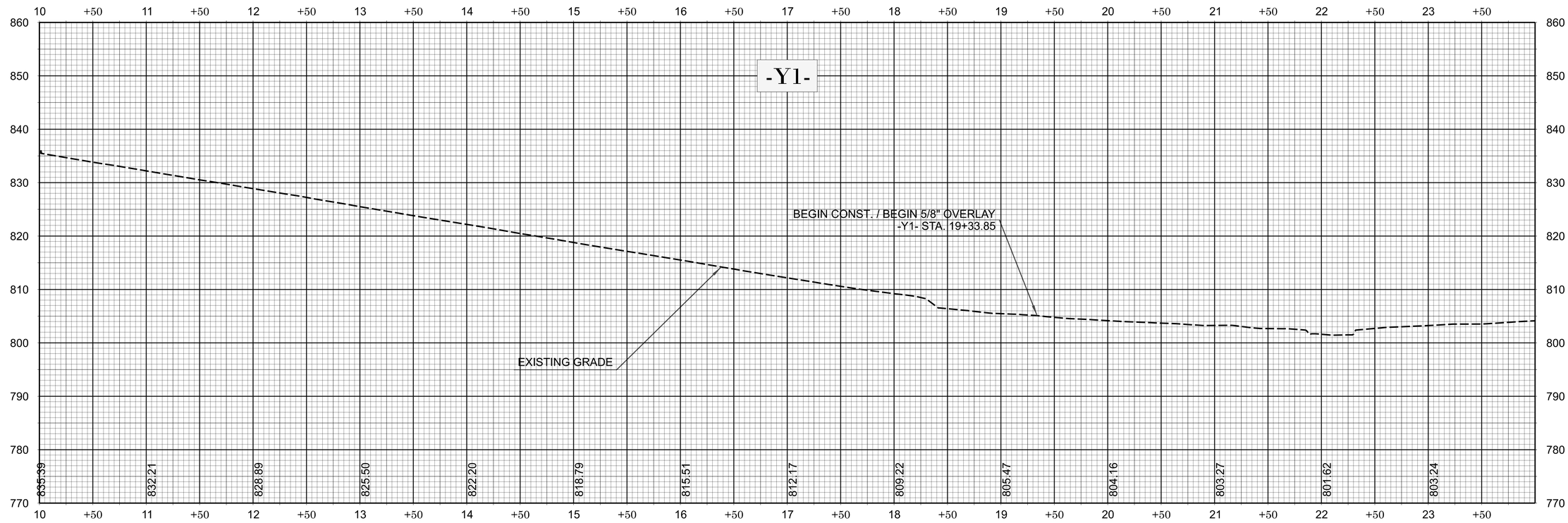
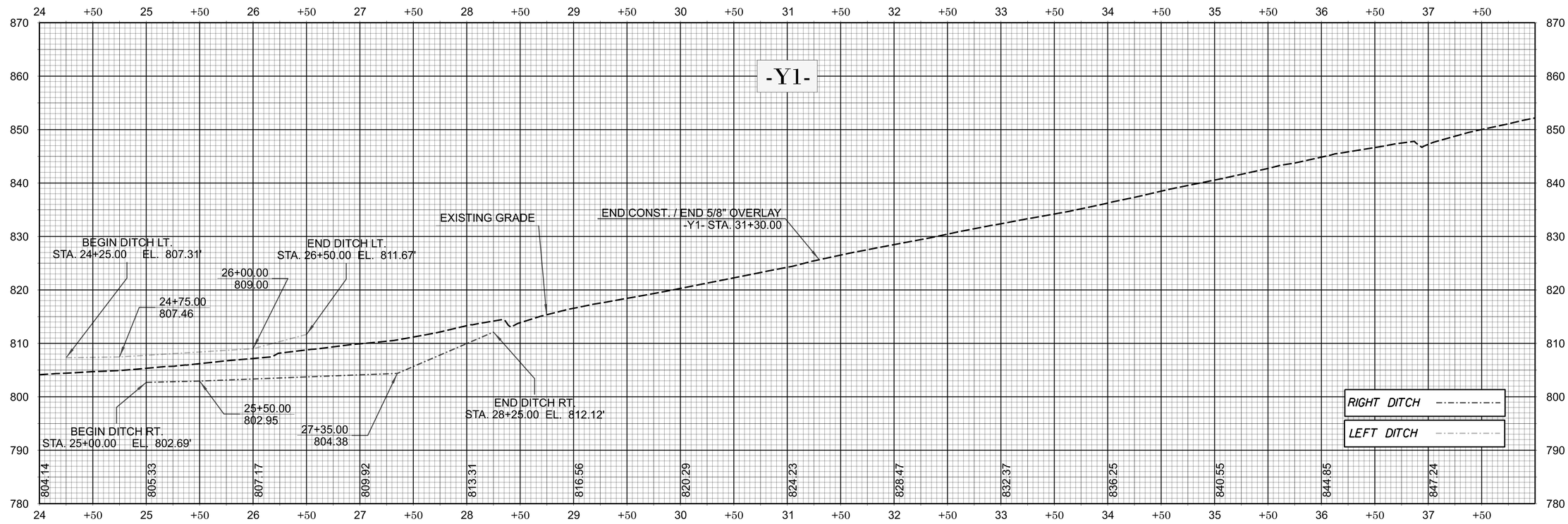
REVISIONS

5/26/20





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FP | 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER Bryan E Houpe

Digitally signed by Bryan E Houpe
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03/03/2026

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043912 ENGINEER Matthew J York

Digitally signed by Matthew J York
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03/03/2026

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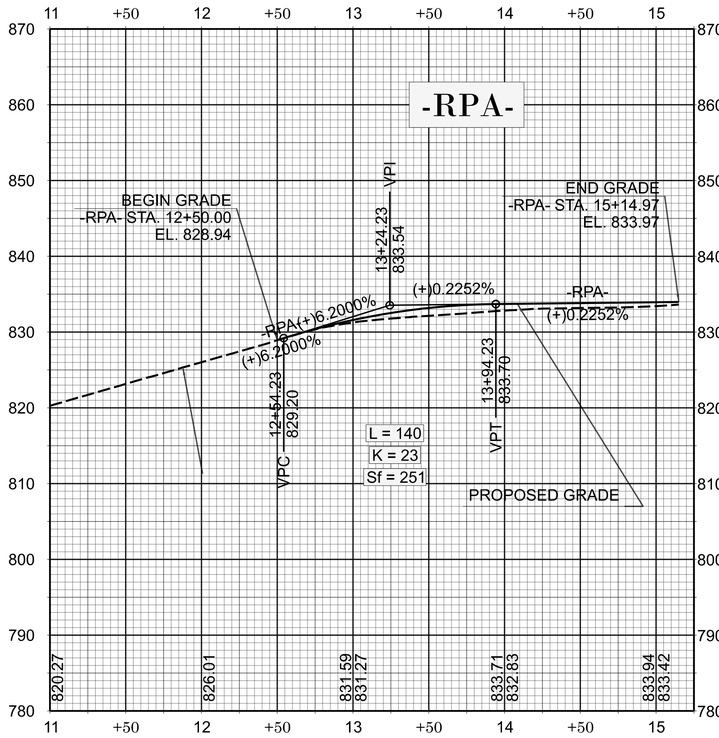
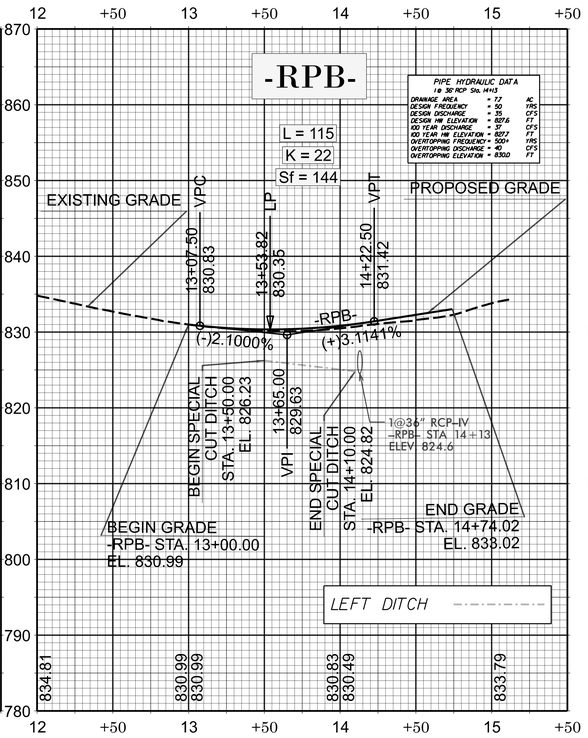
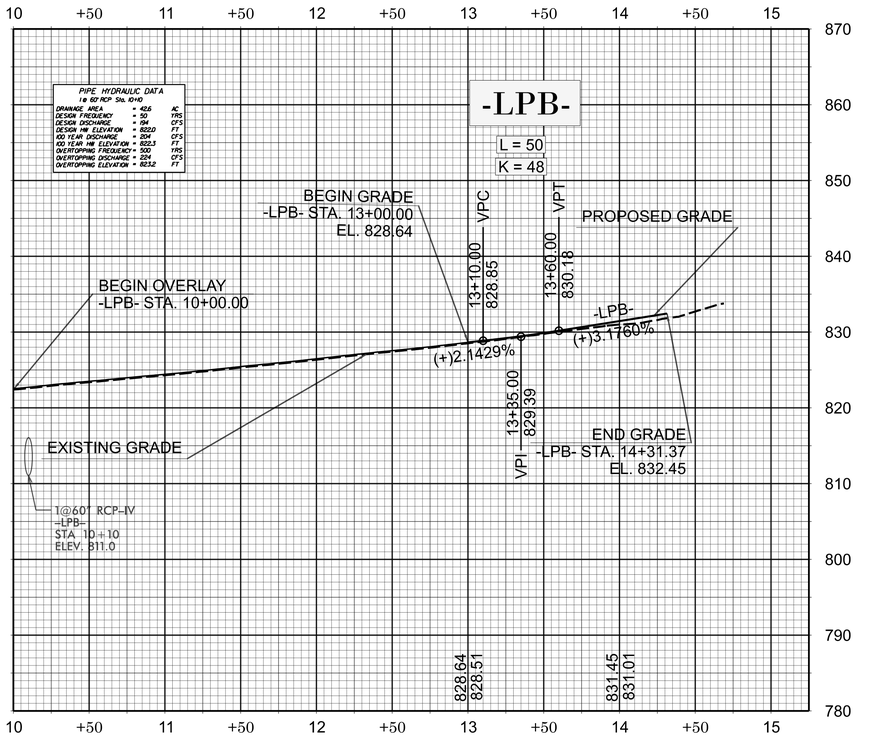
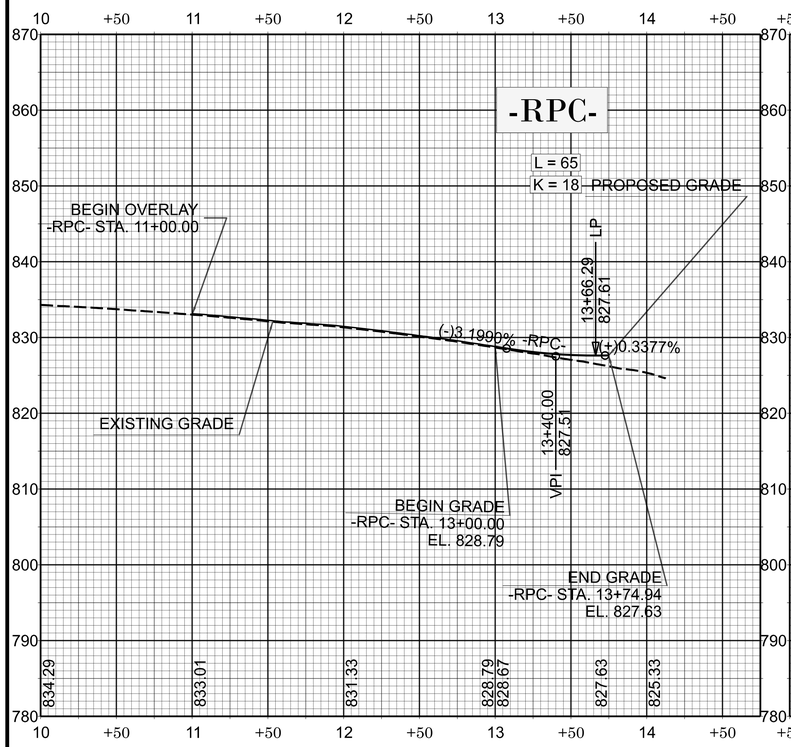
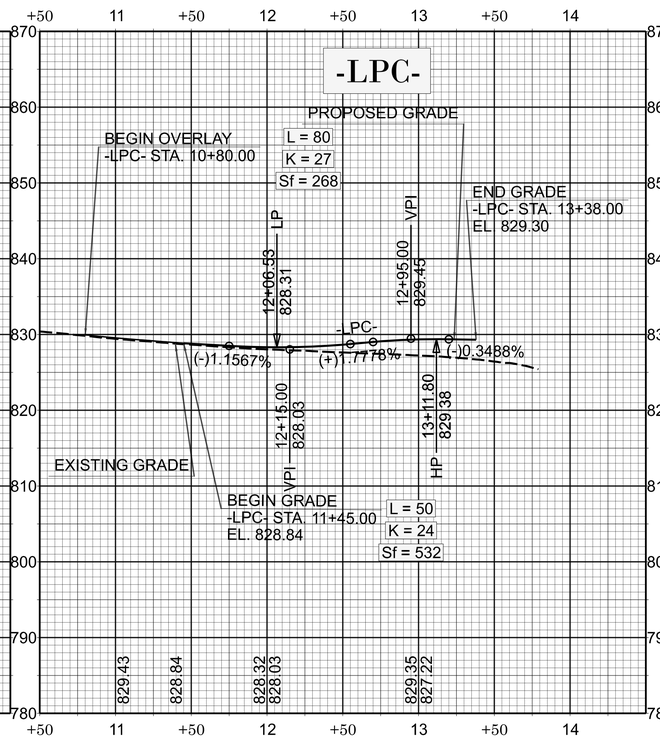
5/26/20

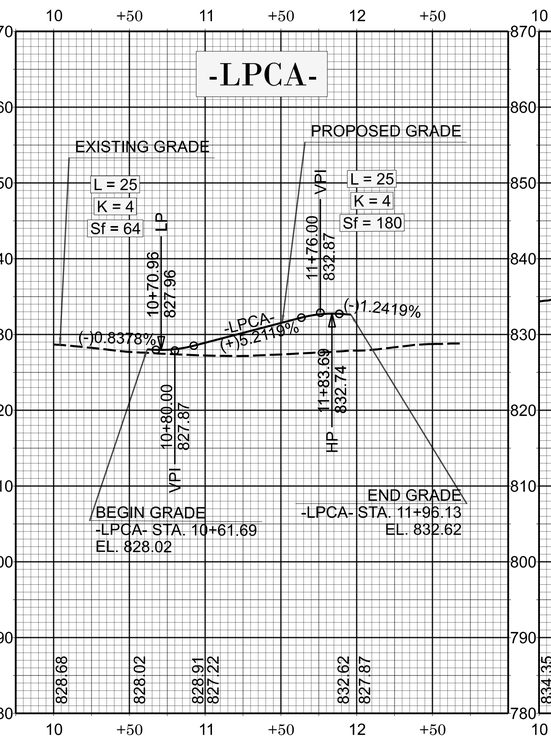


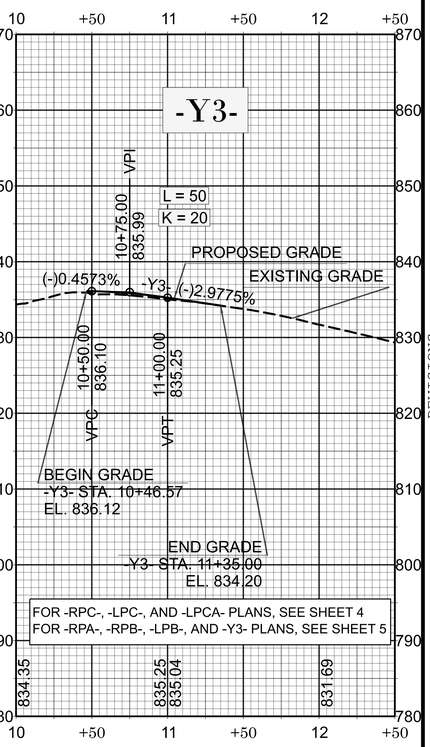












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FP | 8

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036853 ENGINEER Bryan E Houpe

Bryan Houpe
3D7A6BF8B9314...

03/03/2026

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043912 ENGINEER Matthew J York

Matthew York
E0E5A0696145...

03/03/2026

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