PROJECT: BP7-R001

CONTRACT: C205186

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP7-R001	1	

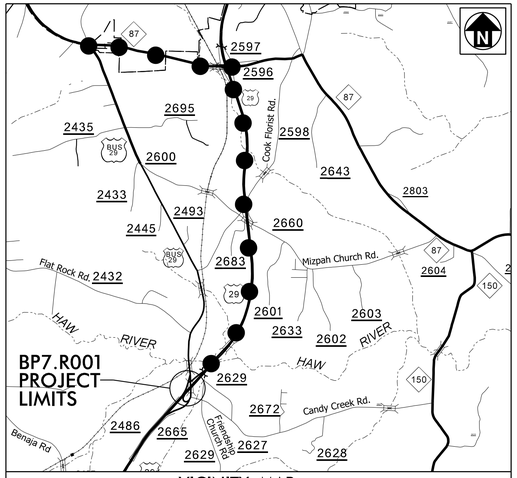
STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION
BP7.R001.1		PE
BP7.R001.2		ROW
BP7.R001.3		CONSTR.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROCKINGHAM COUNTY

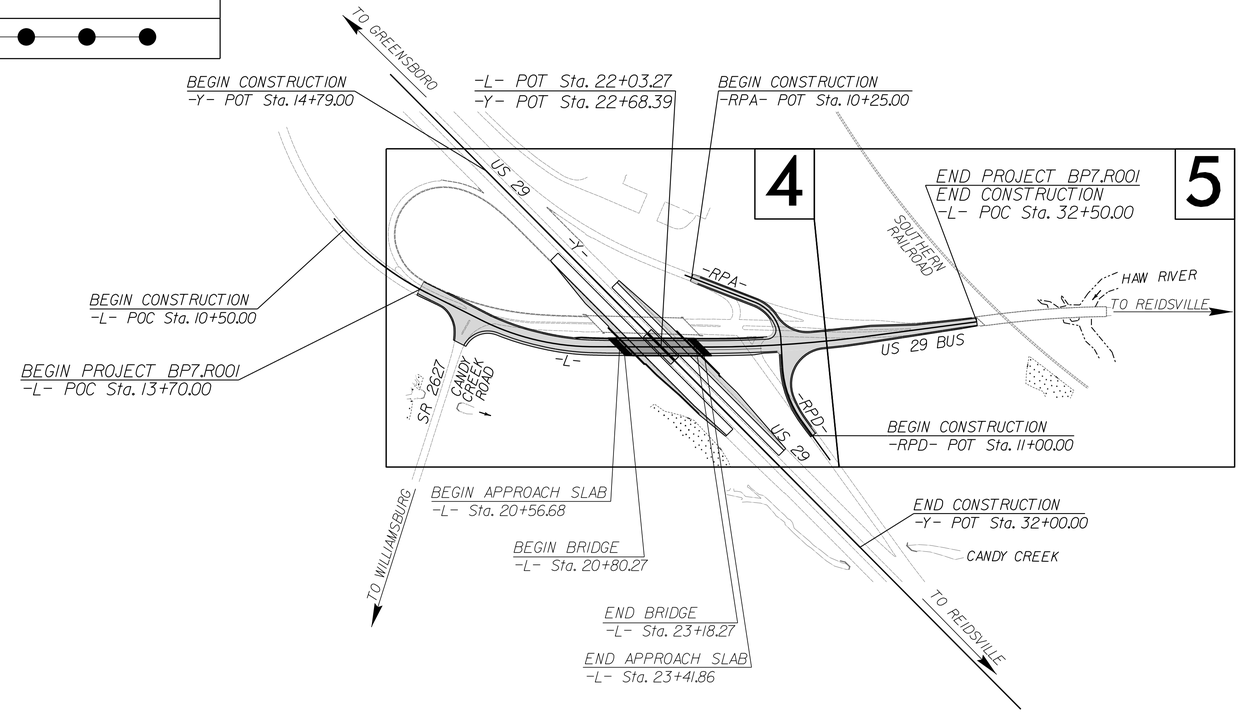
LOCATION: BRIDGE #780023 OVER US 29 ON US 29 BUSINESS

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURE AND RETAINING WALLS



VICINITY MAP
(NOT TO SCALE)

OFF-SITE DETOUR



NAD 83/NA 2011

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

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 = 9,720

ADT 2040 = 14,250

V = 45 MPH

SUB REGIONAL TIER
MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.311 MILES

LENGTH STRUCTURE PROJECT = 0.045 MILES

TOTAL LENGTH PROJECT = 0.356 MILES

Prepared in the Office of Mott MacDonald for

DIVISION 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 17, 2025

LETTING DATE: JUNE 16, 2026

TIM JORDAN, PE
PROJECT ENGINEER

TRENTON J. CORMIER, PE
HYDRAULICS ENGINEER

NCDOT CONTACT: DANIEL DAGENHART, MS
DIVISION BRIDGE PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JAMES JORDAN

Signed by: James Timothy Jordan
09-Mar-2026
SIGNATURE: P.E.

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENTON J CORMIER

Signed by: Trent Cormier
09-Mar-2026
SIGNATURE: P.E.

PLANS PREPARED BY:

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

LICENSE NO. F-0669

tomo ENGINEERING
Tomo Engineering, PLLC
2319 Cardinal Drive, Durham, N.C. 27707
N.C.B.E.L.S. License Number: P-2066

3/9/2026
6:09:58 AM
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ISO_D_jor.dgn

GENERAL NOTES

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

SUBSURFACE DRAINS:

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

SHOULDER DRAINS:

SHOULDER DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 816.02 AND DETAILS IN PLANS 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.

RIGHT–OF–WAY MARKERS:

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

LIST OF ROADWAY STANDARD DRAWINGS

2024 ROADWAY ENGLISH STANDARD DRAWINGS
EFF. 08–11–2025
REV. 11–26–2025

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Method II
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation (Use Detail in Lieu of Standard 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 Intergral Bridge Abutment with MSE Wall
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
610.04	Guide for Paving Shoulder Under Bridges – Method IV (Use Details in Lieu of Standards for Sheet 1 of 1)
665.01	Asphalt Shoulders – Milled Rumble Strips
665.02	Limits for Asphalt Shoulders – Milled Rumble Strips
DIVISION 8 – INCIDENTALS	
806.03	Concrete Control of Acess Marker
815.02	Subsurface Drain
816.01	Concrete Pads – for Shoulder Drain Installation (Use Detail in Lieu of Standard for Sheet 1 of 2)
816.02	Aggregate Shoulder Drain
816.04	Markers for Drainage Structure and Concrete Pad
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
838.80	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
840.17	Concrete Grated Drop Inlet Type 'A' – 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide 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
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.04	Street Turnout
850.01	Concrete Paved Ditches
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
854.06	Median Hazard Protection
857.01	Precast Reinforced Concrete Barrier – 41" Single Faced
862.01	Guardrail Placement (Use Detail in Lieu of Standard for Sheets 4, 6, 11, 12, and 14 of 15)
862.02	Guardrail Installation (Use Detail in Lieu of Standard for Sheet 5 of 9)
862.03	Structure Anchor Units (Use Detail in Lieu of Standard for Sheets 6 and 8 of 9)
862.04	Anchoring End of Guardrail – for B–77 and B–83 Anchor Units
865.01	Cable Guiderail
866.02	Woven Wire Fence – with Wood Post
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets

PROJECT REFERENCE	SHEET NO.
BP7.R001	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JORDAN
Signed by:
09–Mar–2026

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

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Prepared in the Office of:
MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
(919) 552–2253
www.mottmac.com

INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A–1 THRU 2A–4	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B–1	ISLAND DETAILS
2B–2	STRUCTURE AND RETAINING WALL DETAIL
2B–3	MILLING DETAIL
2C–1 THRU 2C–2	METHOD OF PIPE INSTALLATION DETAILS
2C–3	GUIDE FOR PAVING SHOULDER UNDER BRIDGES DETAIL
2C–4	MARKERS FOR DRAINAGE STRUCTURE AND CONCRETE PAD DETAIL
2C–5 THRU 2C–7	GUARDRAIL PLACEMENT DETAILS
2C–8	CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT)
2D–1	DRAINAGE DETAILS
2G–1 THRU 2G–3	GEOTECHNICAL DETAILS (WALLS)
3B–1	EARTHWORK, SHOULDER BERM GUTTER, WOVEN WIRE FENCE, SHOULDER DRAIN & PAVEMENT REMOVAL SUMMARIES
3B–2	GUARDRAIL, CABLE GUIDE RAIL AND CONCRETE BARRIER SUMMARIES
3D–1 THRU 3D–2	DRAINAGE SUMMARY
3G–1	GEOTECHNICAL SUMMARY
3P–1	PARCEL INDEX
4 THRU 5	PLAN SHEET
6 THRU 7	PROFILE SHEETS
RW01 THRU RW05	SURVEY CONTROL SHEETS
TMP–1 THRU TMP–12	TRAFFIC MANAGEMENT PLANS
PMP–1 THRU PMP–3	PAVEMENT MARKING PLANS
EC–1 THRU EC–7	EROSION CONTROL PLANS
SIGN–1 THRU SIGN–5A	SIGNING PLANS
X–1	CROSS–SECTION INDEX
X–1A	CROSS–SECTION SUMMARY
X–2 THRU X–26	CROSS–SECTIONS
ST	STRUCTURE TITLE SHEET
S–1 THRU S–41	STRUCTURE PLANS
SN	STRUCTURE NOTES
W–1 THRU W–4	WALL PLANS

9/10/2021

PROJECT REFERENCE	SHEET NO.
BP7.R001	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE	SHEET NO.
BP7.R001	2A-1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER

17-Apr-2026

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

NORTH CAROLINA PROFESSIONAL SEAL 044590 ENGINEER

17-Apr-2026

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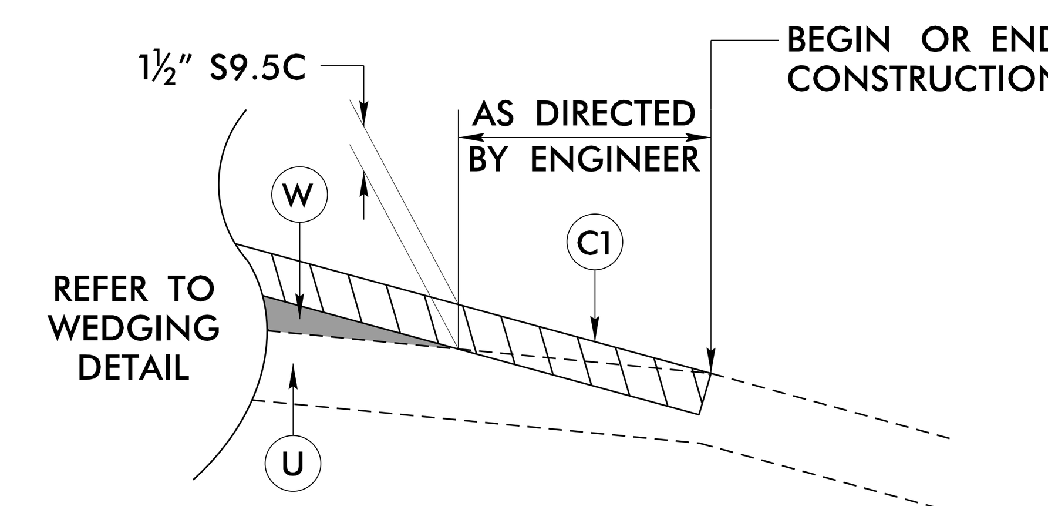
Prepared in the Office of: MOTT MACDONALD 930 Main Campus Drive, Suite 200 Raleigh, NC 27606 (919) 552-2253 www.mottmac.com

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN DATED: 01-27-2026)

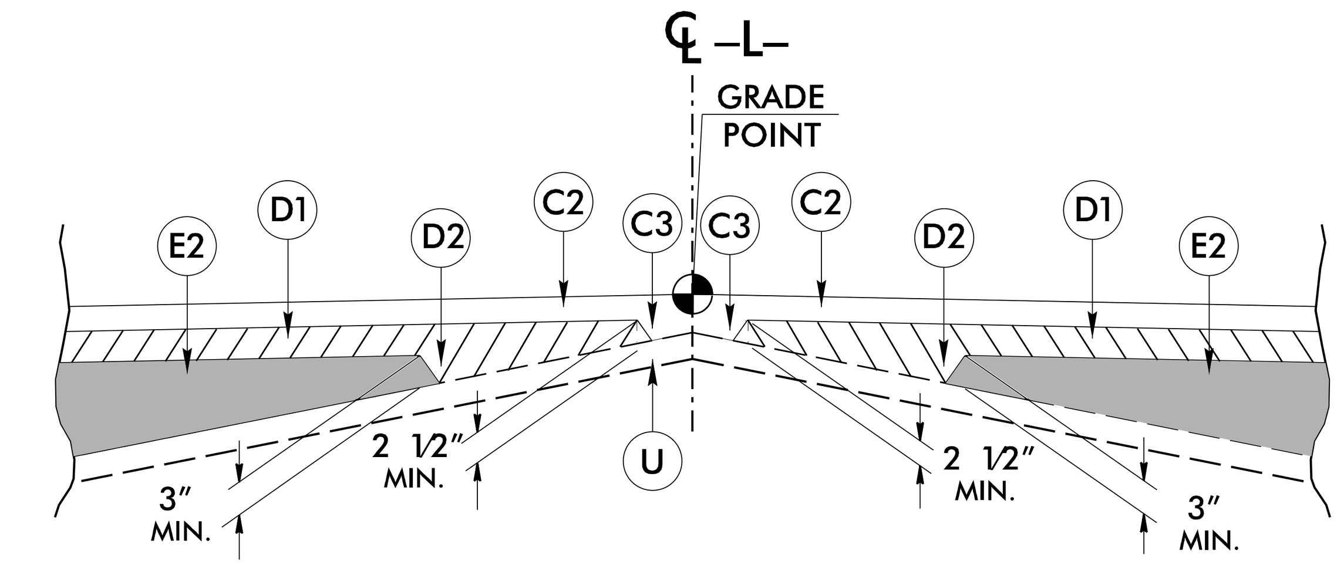
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, 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.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, 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.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
F1	⅝" ULTRA-THIN BONDED WEARING COURSE (UBWC)
J1	10" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R1	2'-6" CURB AND GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
R3	PRECAST CONCRETE BARRIER, SINGLE FACED
R4	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	FINE MILLING (⅝")
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).
Y1	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)

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

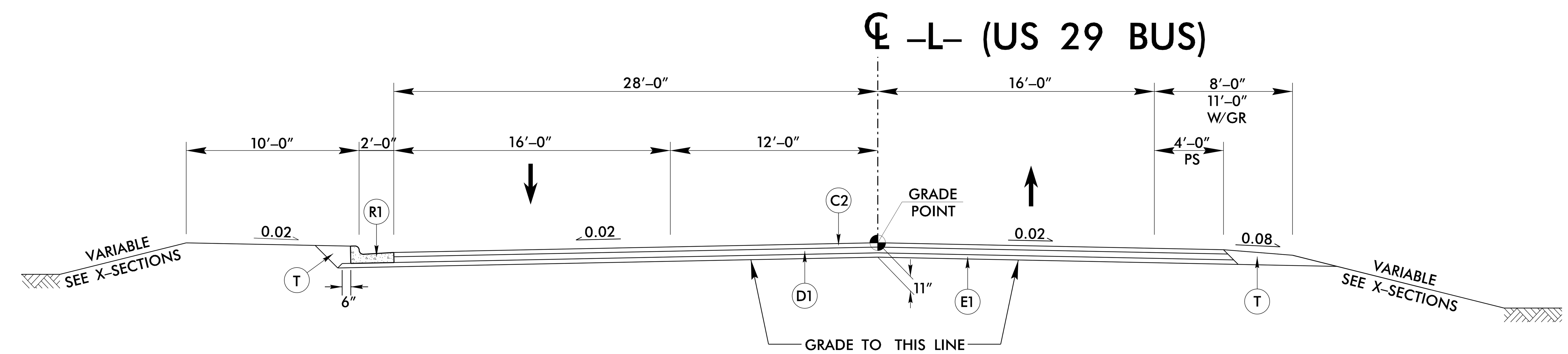


INCIDENTAL MILLING DETAIL

DETAIL SHOWING PROFILE VIEW



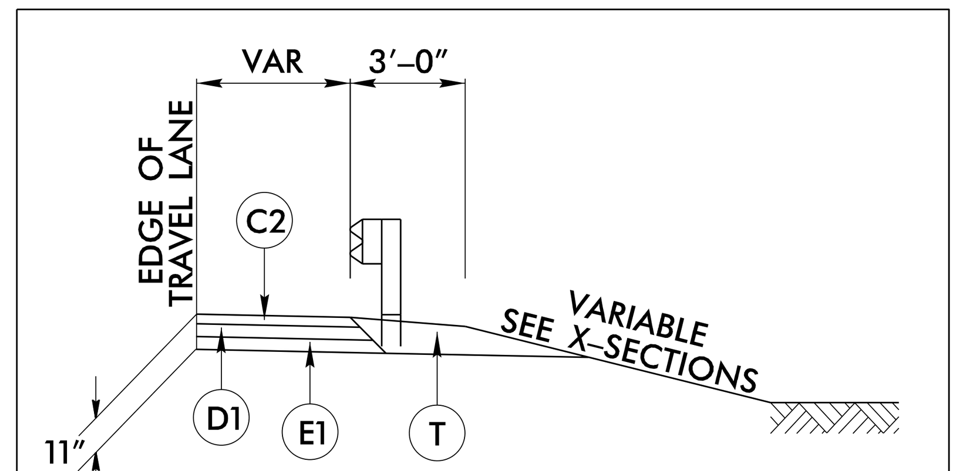
DETAIL SHOWING METHOD OF WEDGING



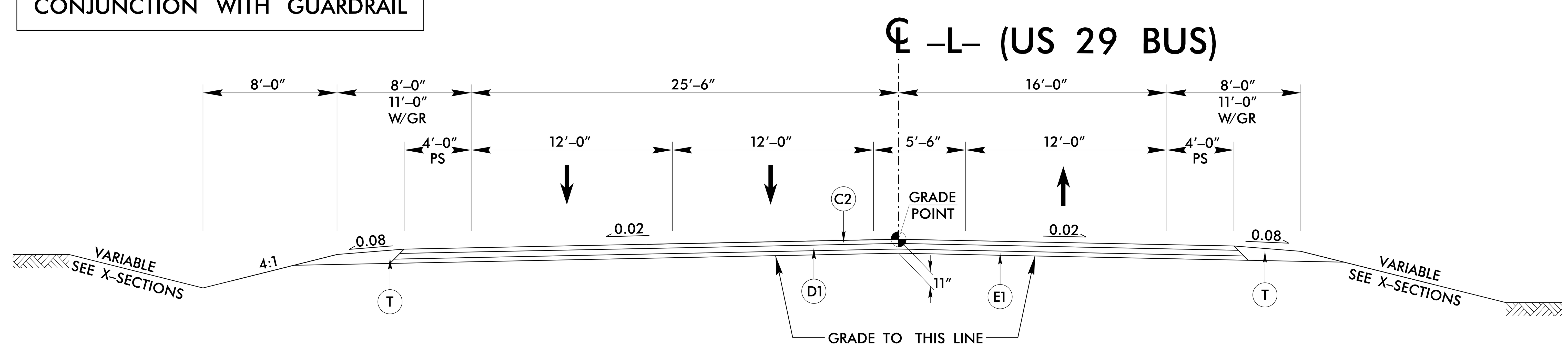
TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
-L- STA 13+70.00 TO 14+20.00

TRANSITION FROM TYPICAL SECTION NO. 1 TO TYPICAL SECTION NO. 2:
-L- STA 14+20.00 TO 16+25.00



DETAIL FOR FULL DEPTH PAVED SHOULDER IN CONJUNCTION WITH GUARDRAIL



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2:
-L- STA 16+25.00 TO 18+00.00

TRANSITION FROM TYPICAL SECTION NO. 2 TO TYPICAL SECTION NO. 3:
-L- STA 18+00.00 TO 20+25.00

4/16/2026 3:29:00 PM
c:\pwworking\hmm\rail_transit\jor66165\d0180146\780023_rdy_typ.dgn
so-p.jordan

PROJECT REFERENCE	SHEET NO.
BP7.R001	2A-2

ROADWAY DESIGN ENGINEER

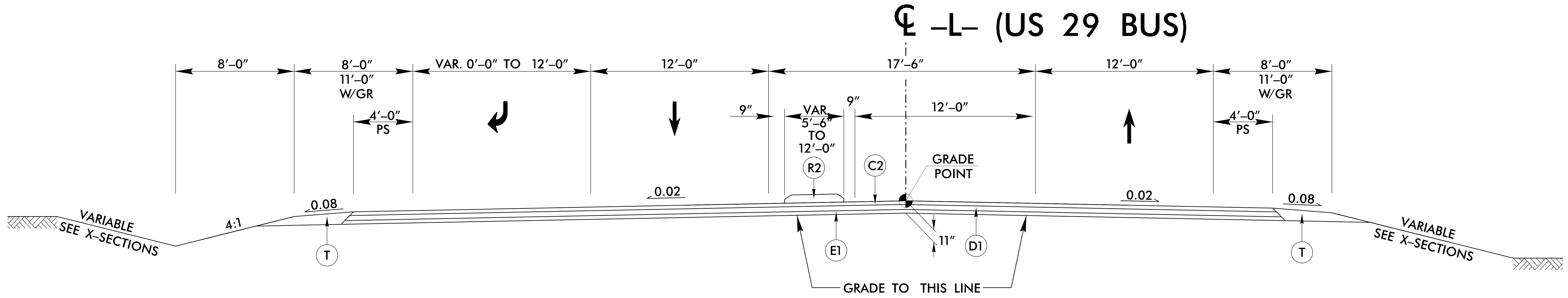
SEAL 21102

SEAL 044590

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

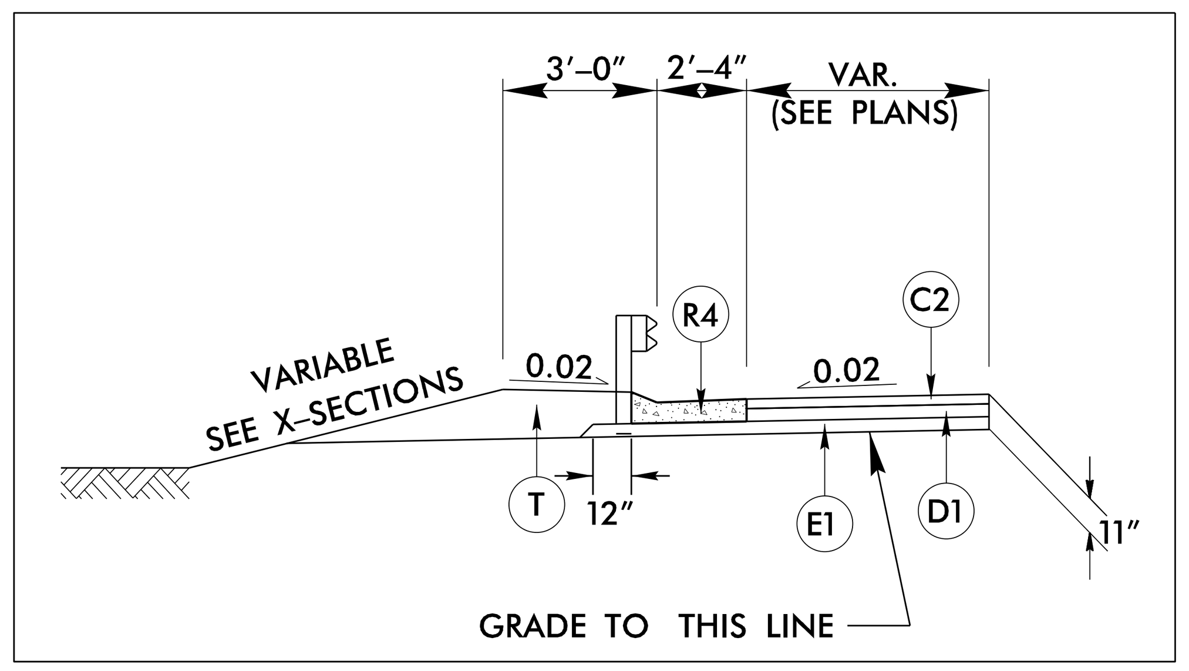
Prepared in the Office of: MOTT MACDONALD 930 Main Campus Drive, Suite 200 Raleigh, NC 27606 (919) 552-2253 www.mottmac.com



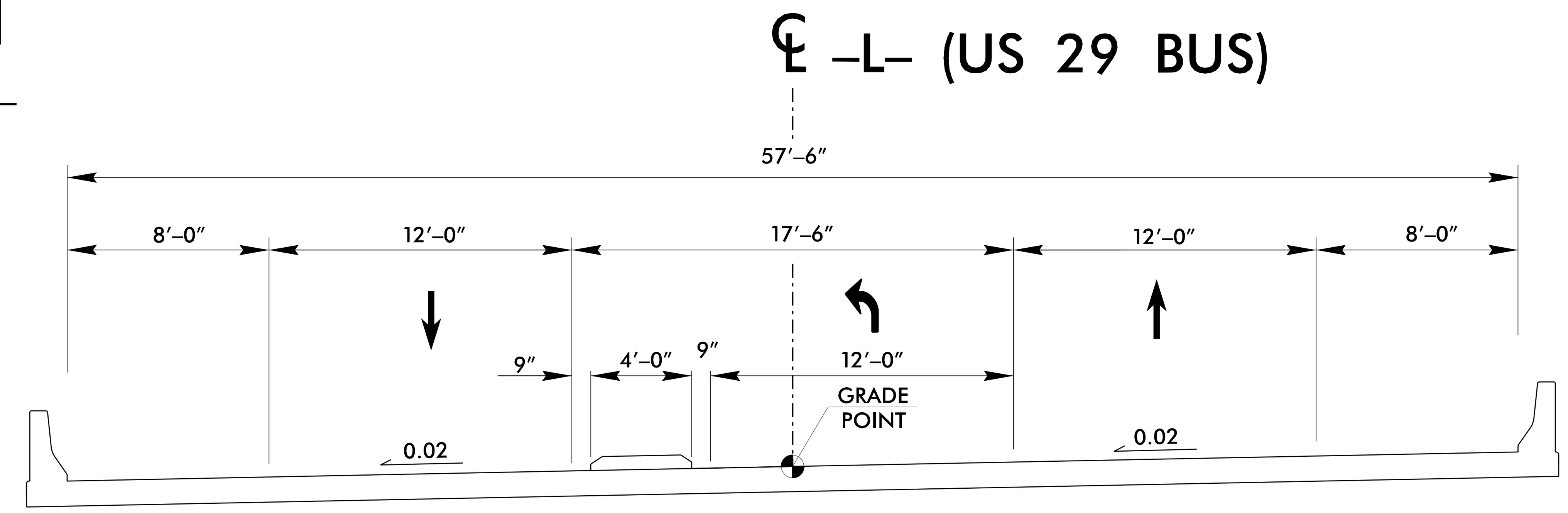
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3:
-L- STA 20+25.00 TO 20+80.27 (BEGIN BRIDGE)
-L- STA 23+18.27 (END BRIDGE) TO 28+00.00

TRANSITION FROM TYPICAL SECTION NO. 3 TO TYPICAL SECTION NO. 5:
-L- STA 28+00.00 TO 32+00.00

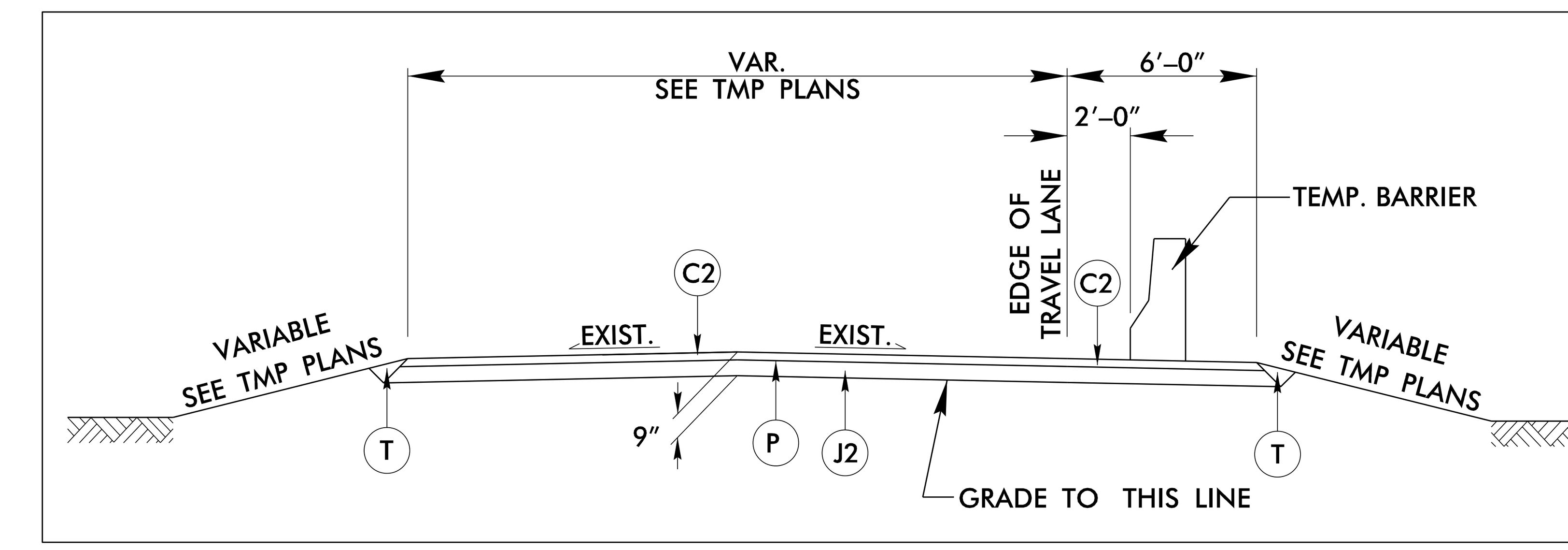


*DETAIL FOR SHOULDER BERM GUTTER IN CONJUNCTION WITH GUARDRAIL ON -L-
-L- STA 19+20.00 TO 20+27.94 LT
-L- STA 23+13.11 TO 25+39.00 LT



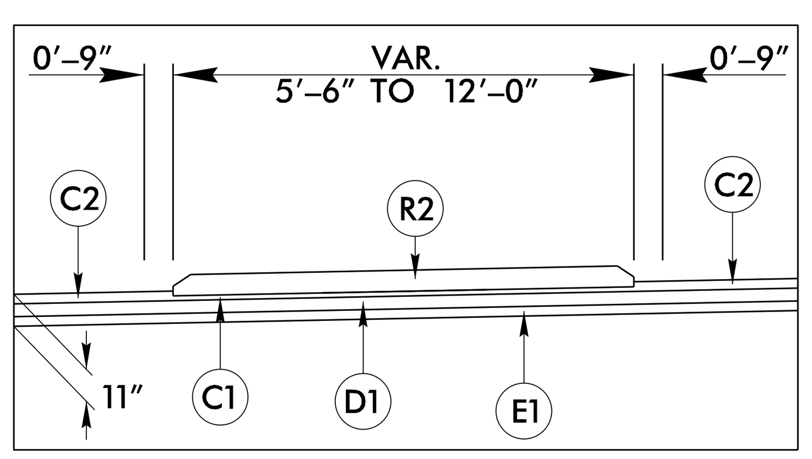
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4:
-L- STA 20+80.27 (BEGIN BRIDGE) TO 23+18.27 (END BRIDGE)
SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS



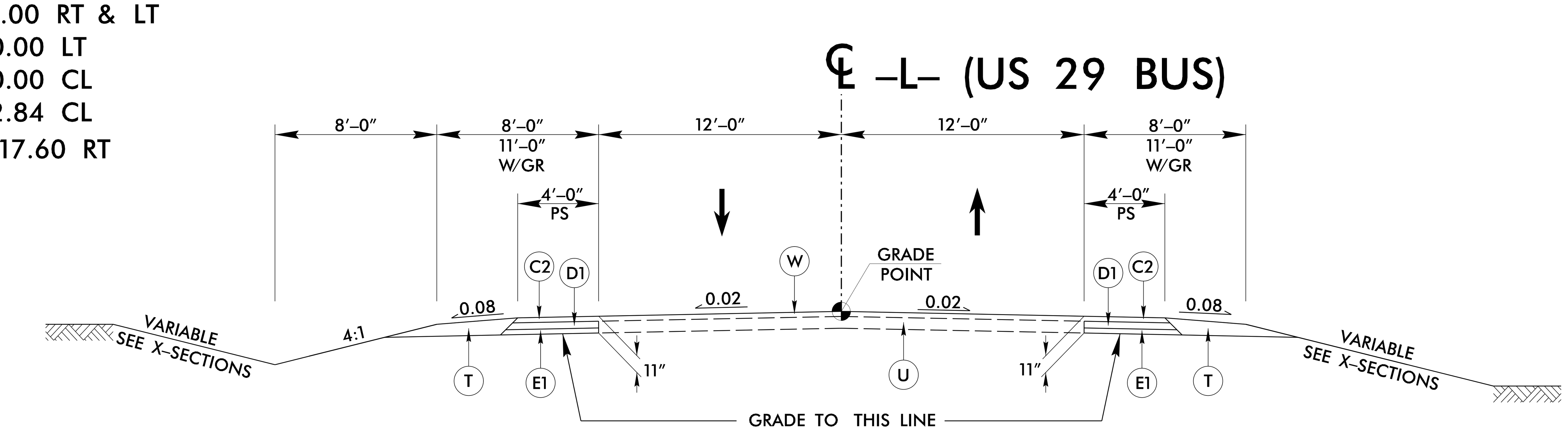
DETAIL FOR TEMPORARY PAVEMENT

USE IN CONJUNCTION WITH
TYPICAL SECTIONS NO. 1, 2, 3, 8 & 9
(SEE TMP PLANS)
-L- STA 13+70.00 TO 18+50.00
-L- STA 24+25.00 TO 32+00.00
-RPA- STA 10+25.00 TO 14+04.50
-RPD- STA 11+00.00 TO 14+04.50



MONOLITHIC ISLAND DETAIL

USE IN CONJUCTION WITH
TYPICAL SECTIONS NO. 1, NO. 2 & NO. 3
-L- STA 13+70.00 TO 15+00 LT
-L- STA 16+25.00 TO 20+45.00 RT & LT
-L- STA 23+50.00 TO 24+40.00 LT
-L- STA 25+35.00 TO 29+00.00 CL
-L- STA 29+00.00 TO 29+82.84 CL
-RPD- STA 13+83.85 TO 14+17.60 RT



TYPICAL SECTION NO. 5

TRANSITION FROM TYPICAL SECTION NO. 5 TO EXISTING:
-L- STA 32+00.00 TO 32+50.00

PAVEMENT SCHEDULE	
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
J2	6" ABC
P	PRIME COAT
R2	5' MONOLITHIC ISLAND
R4	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

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

PROJECT REFERENCE	SHEET NO.
BP7.R001	2A-3

ROADWAY DESIGN ENGINEER

SEAL 21102 — 17-Apr-2026

SEAL 044590 — 17-Apr-2026

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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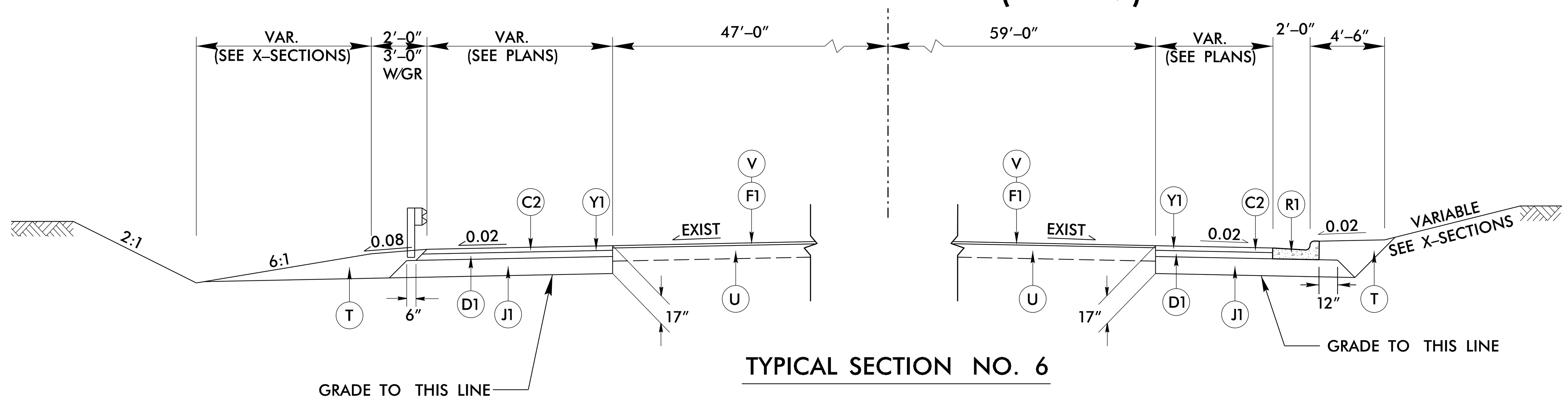
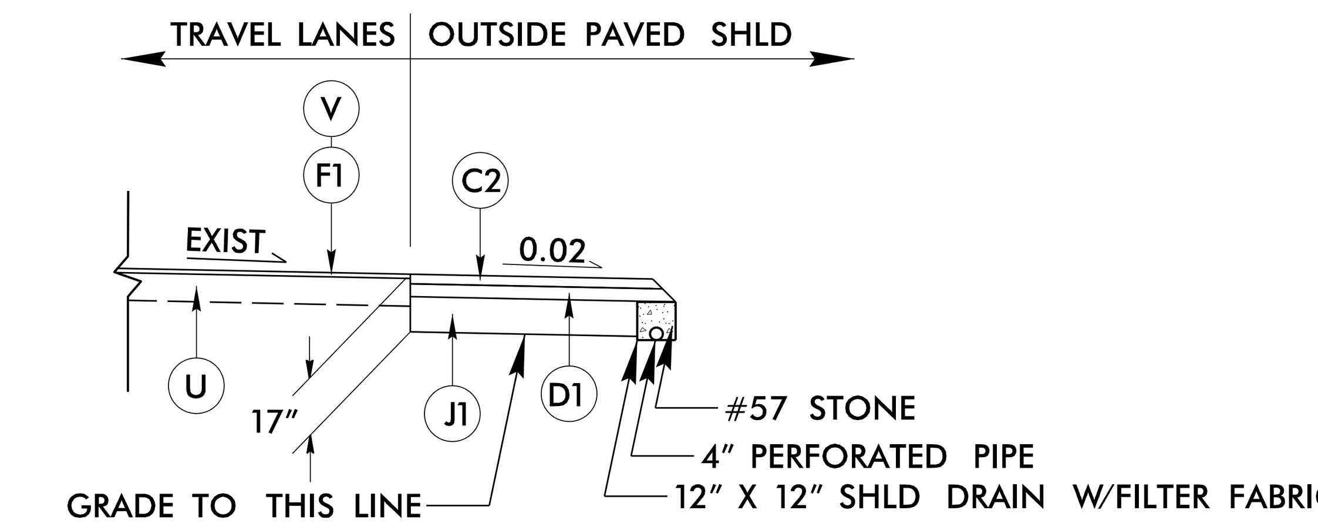


TYPICAL SECTION NO. 6

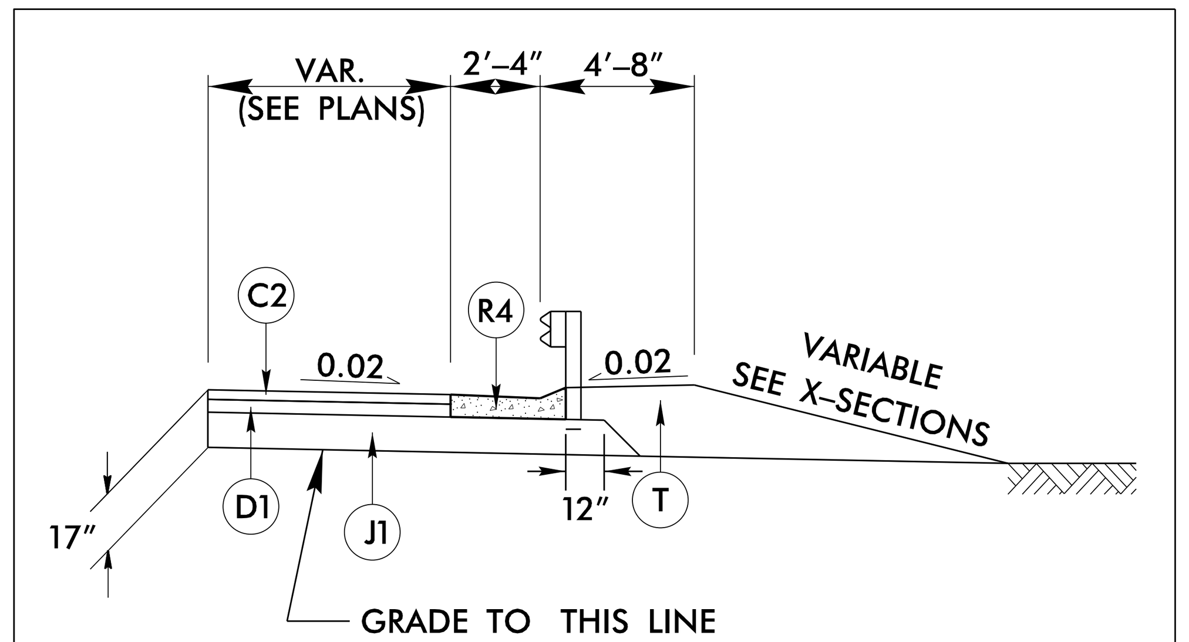
USE TYPICAL SECTION NO. 6:

-Y- STA 18+09.03 TO 20+80.00 RT
-Y- STA 20+14.98 TO 22+40.00 LT
-Y- STA 23+00.00 TO 25+13.00 RT
-Y- STA 24+55.00 TO 27+96.50 LT
-Y- STA 25+13.00 TO 26+27.99 RT



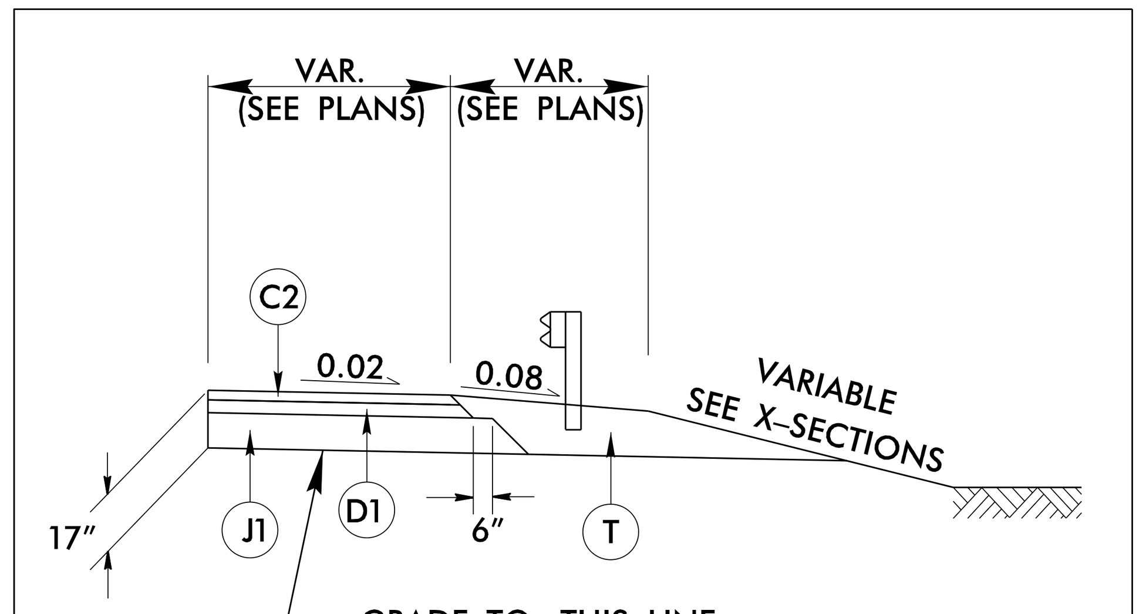
LINE	STATION	OUTLETS
-Y- RT	18+09.00 TO 26+28.00	20+84 (0426 CB); 22+41 (0436 2GI); 25+08 (0435 2GI); 26+28 (CONC. PAD)
-Y- LT	20+15.00 TO 24+70.00	22+41 (0431 2GI); 24+70 (0433 2GI)

DETAIL FOR SHOULDER DRAIN

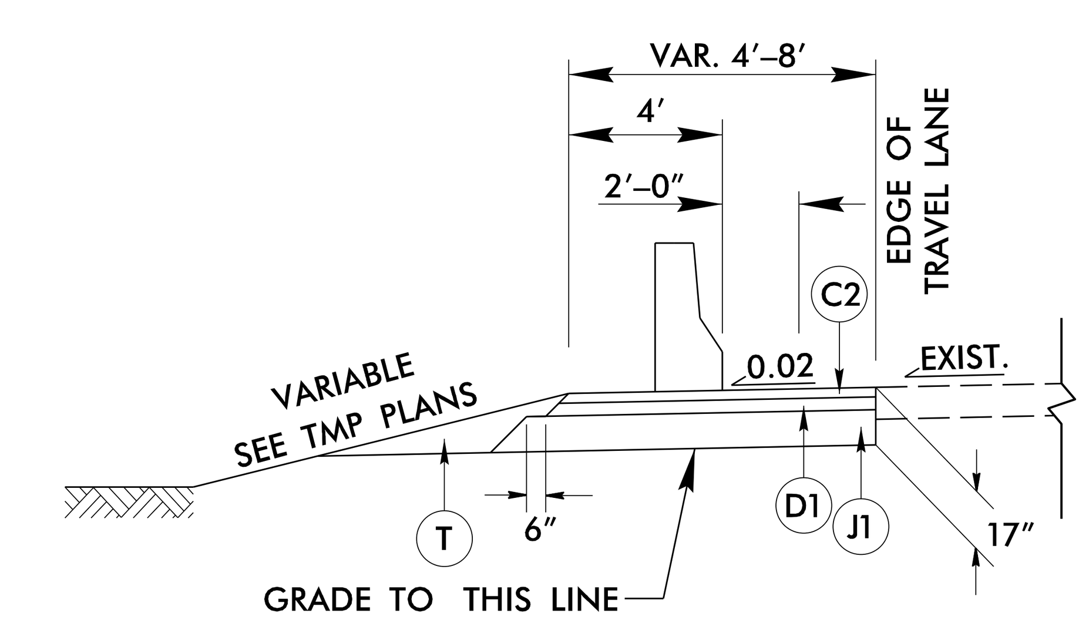


*DETAIL FOR SHOULDER BERM GUTTER IN CONJUNCTION WITH GUARDRAIL ON -Y-

-Y- STA 22+71.23 TO 25+13.18 RT
-Y- STA 24+68.40 TO 24+77.87 LT



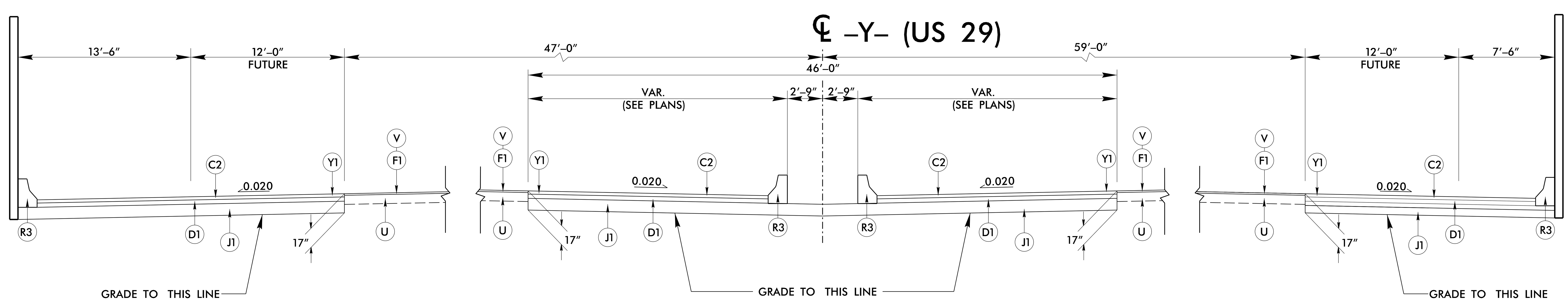
**DETAIL FOR FULL DEPTH PAVED SHOULDER IN CONJUNCTION WITH GUARDRAIL ON -Y-



TEMPORARY PAVEMENT DETAIL UNDER TEMPORARY BARRIER

USE IN CONJUCTION WITH TYPICAL SECTIONS NO. 6 & 7 (SEE TMP PLANS)

-Y- STA 14+79.00 TO 29+58.00 RT MED
-Y- STA 16+15.00 TO 32+00.00 LT MED



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7:

-Y- STA 20+80.00 TO 23+00.00 RT
-Y- STA 22+40.00 TO 24+55.00 LT

PAVEMENT SCHEDULE	
C2	3" S9.5C
D1	4" I19.0C
F1	5/8" UBWC
J1	10" ABC
R1	2'-6" CURB AND GUTTER
R3	PRECAST CONCRETE BARRIER, SINGLE FACED
R4	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	FINE MILLING (5/8")
Y1	MILLED RUMBLE STRIPS

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

4/16/2026 3:29:01 PM
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ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102
10-Mar-2026
MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669
NORTH CAROLINA PROFESSIONAL SEAL 044590
10-Mar-2026

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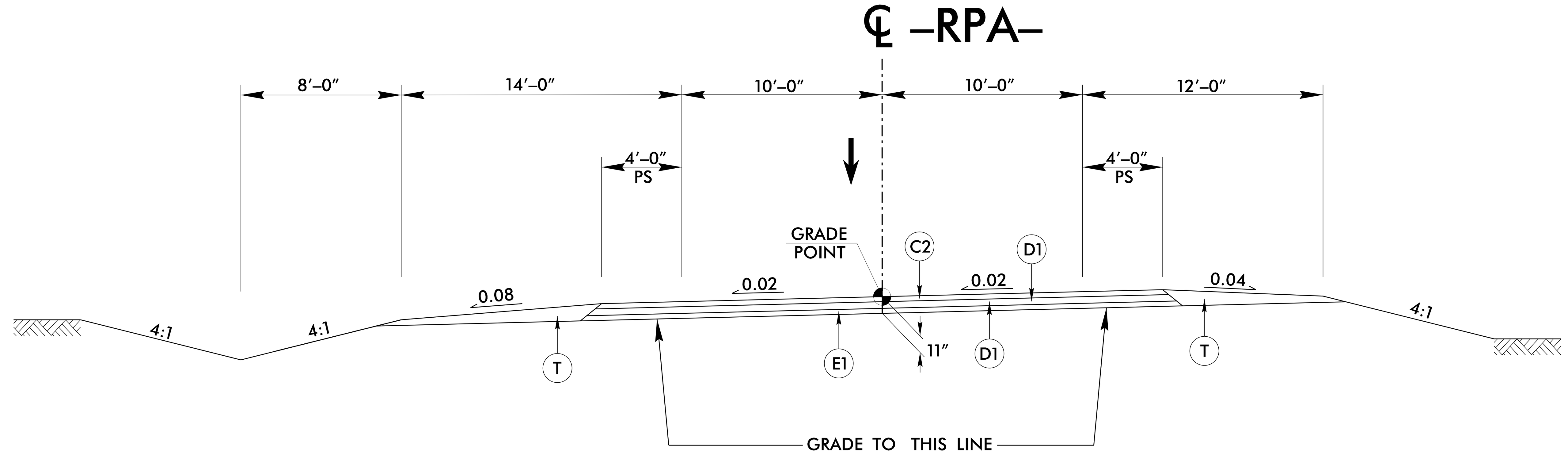
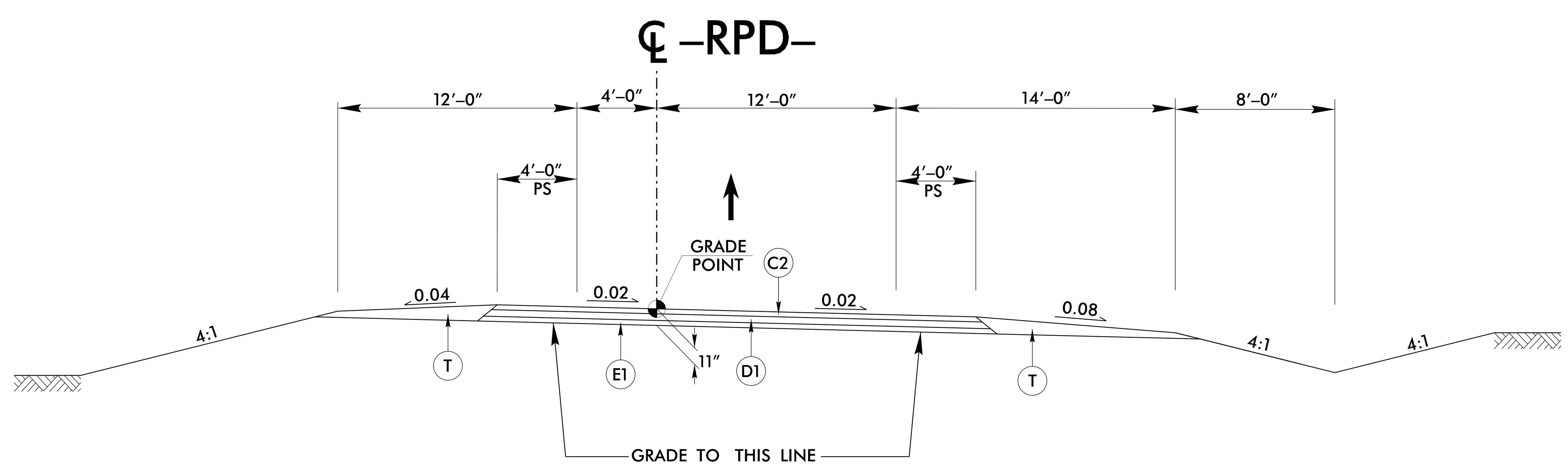


TYPICAL SECTION NO. 8

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 8:
-RPA- STA 10+25.00 TO 10+50.00

USE TYPICAL SECTION NO. 8:
-RPA- STA 10+50.00 TO 14+04.50



TYPICAL SECTION NO. 9

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 9:
-RPD- STA 11+00.00 TO 11+25.00

USE TYPICAL SECTION NO. 9:
-RPD- STA 11+25.00 TO 14+04.50

PAVEMENT SCHEDULE	
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
T	EARTH MATERIAL

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

PROJECT REFERENCE	SHEET NO.
BP7.R001	2B-1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JOHN MOTT

Signed by: Timothy John Mott
09-Mar-2026

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

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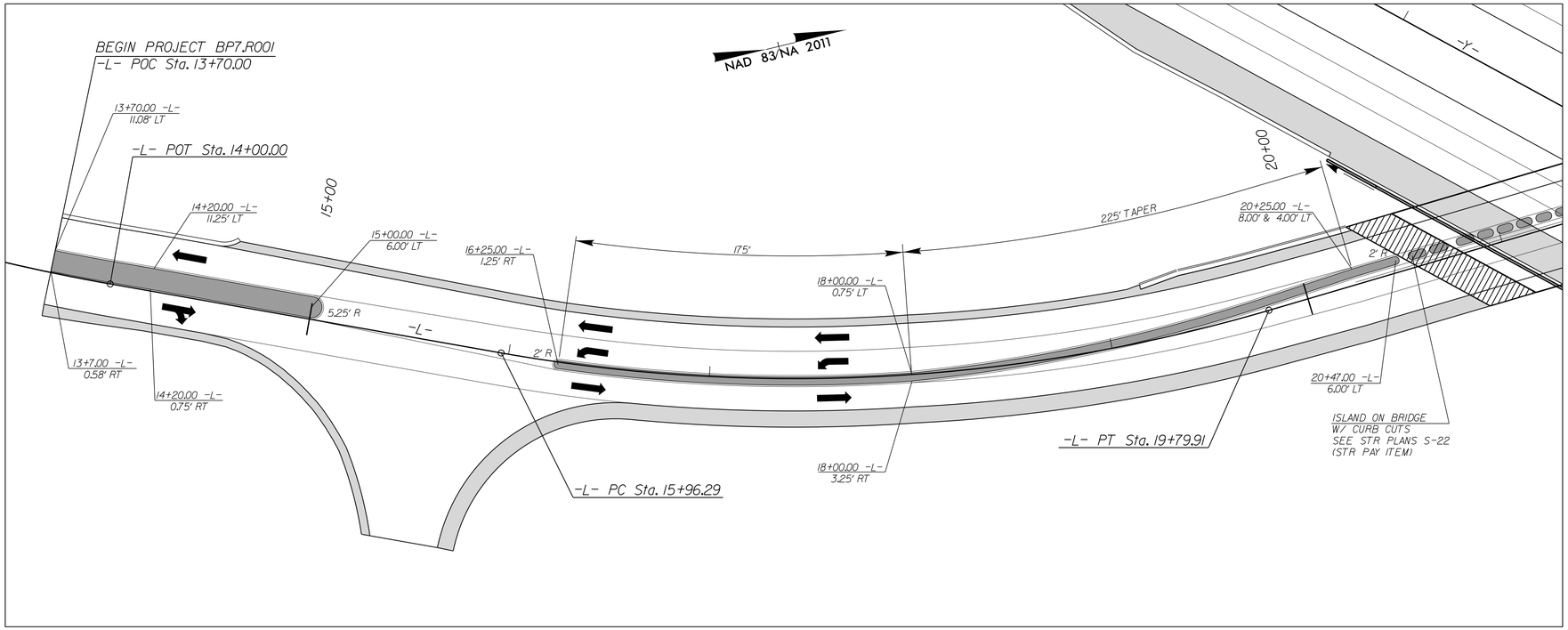
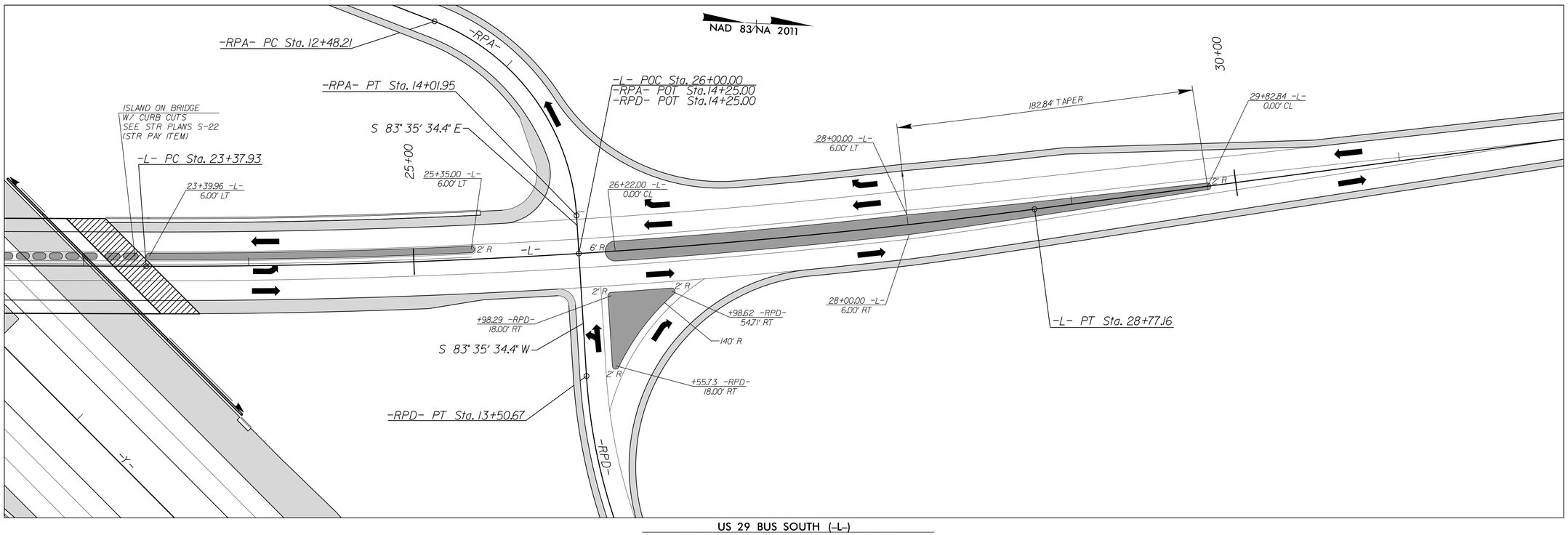
ISLAND DETAILS

50 25 0 50 100
SCALE

MONOLITHIC ISLAND
PAVED SHOULDER



US 29 BUS SOUTH (-L-)
SEE PLAN SHEET 4 FOR PLAN VIEW



US 29 BUS SOUTH (-L-)
SEE PLAN SHEET 4 & 5 FOR PLAN VIEW

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2B-2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102

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

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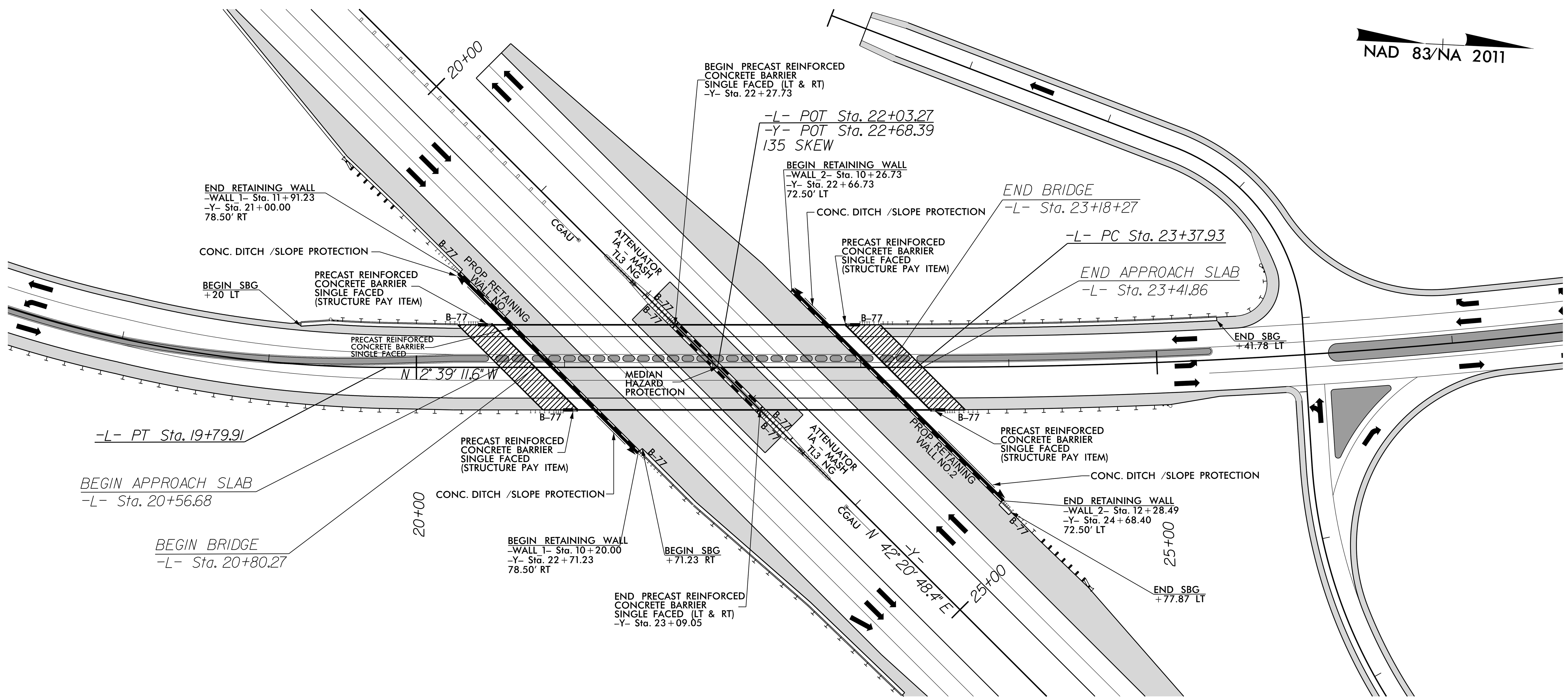
STRUCTURE /RETAINING WALL DETAIL

FOR PLAN SEE SHEET NO. 4

50 25 0 50 100
SCALE



FOR STRUCTURE PLANS SEE SHEETS S-1 THRU S-41
FOR WALL PLANS SEE SHEETS W-1 THRU W-4

PROJECT REFERENCE	SHEET NO.
BP7.R001	2B-3

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

09-Mar

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

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Raleigh, NC 27606
(919) 552-2253
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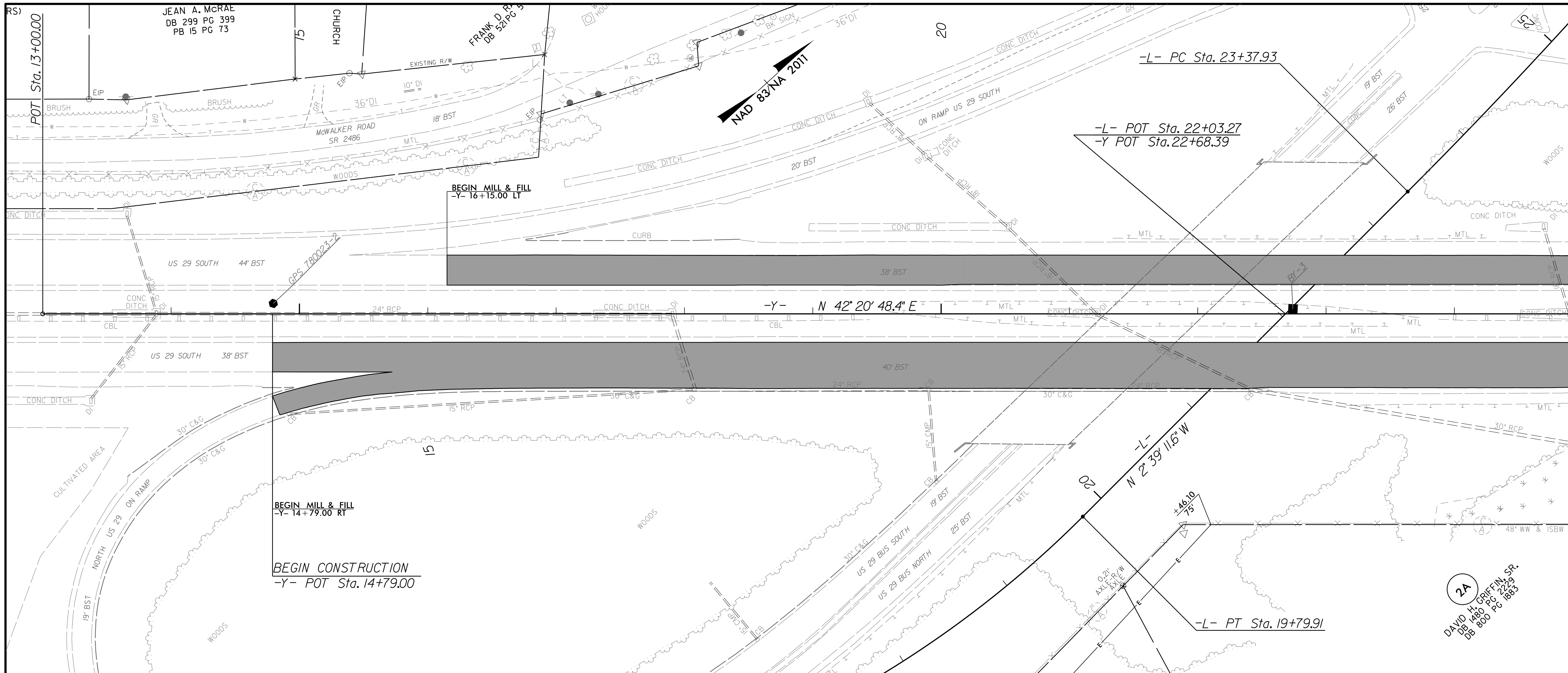
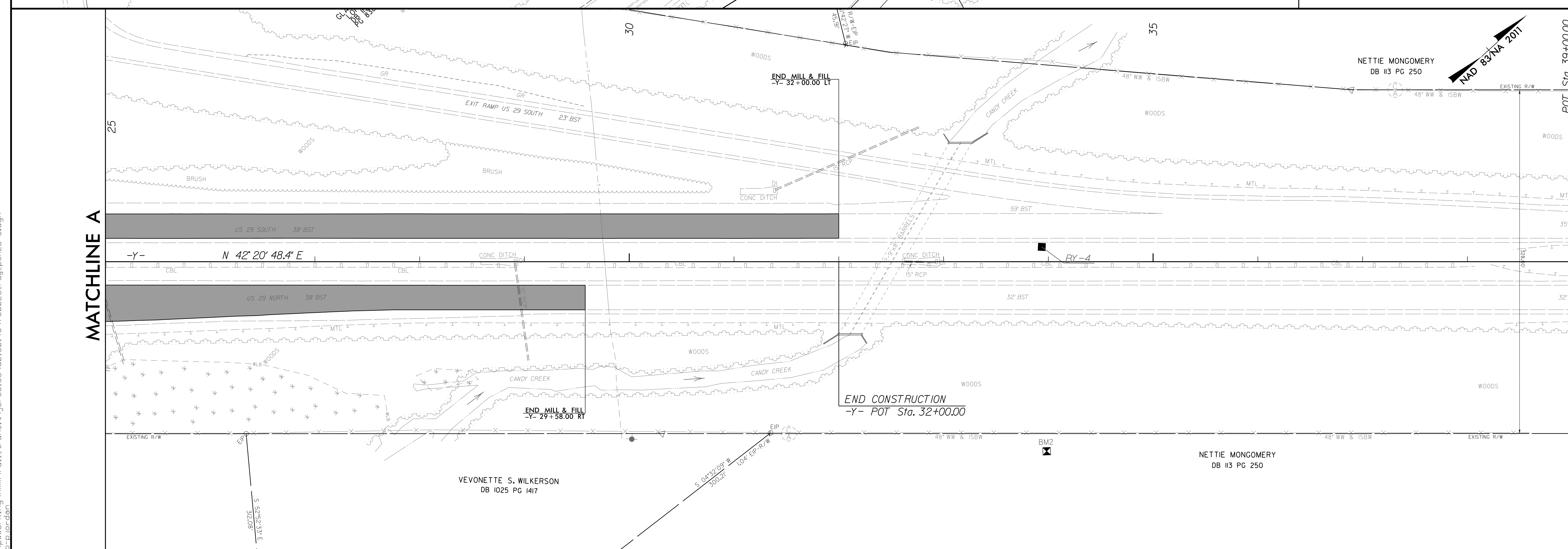
MILLING DETAIL

SCALE: 50 25 0 50 100

MILL & FILL W/ UBWC





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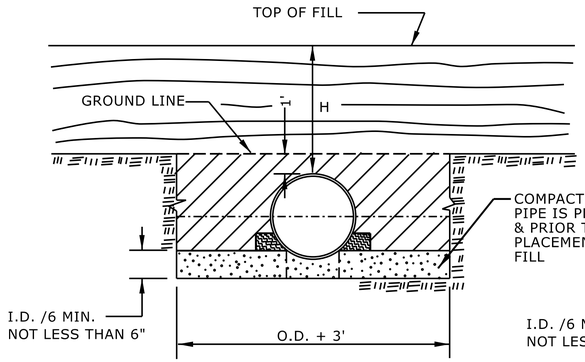
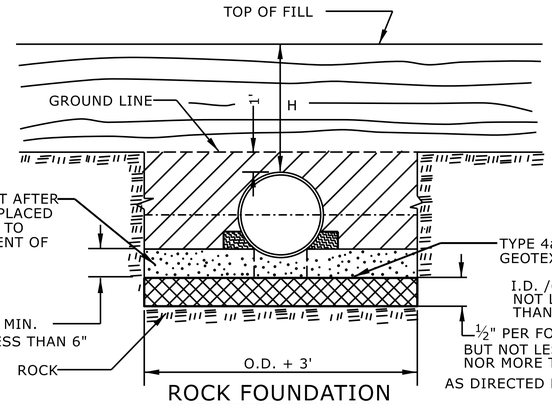
joe.p.jordan

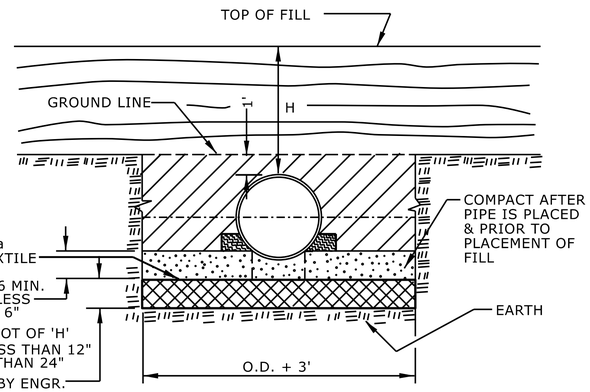
PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-1



NORMAL EARTH FOUNDATION

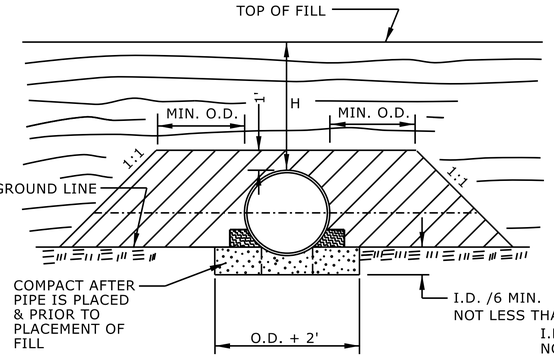


ROCK FOUNDATION

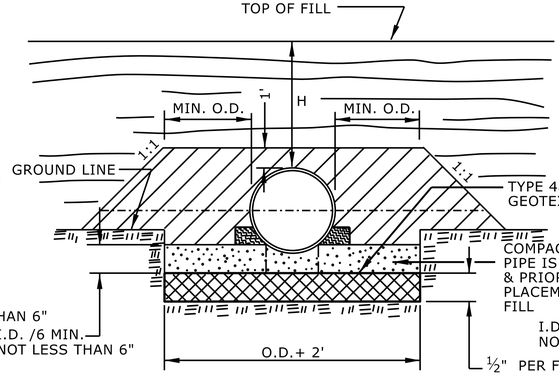


UNSUITABLE MATERIAL FOUNDATION

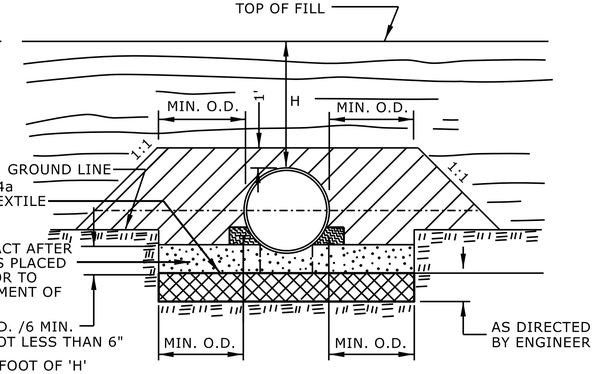
PIPE IN TRENCH



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
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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

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKER
Signature: Nicole M Hacker
5884323024
09-Mar-2026

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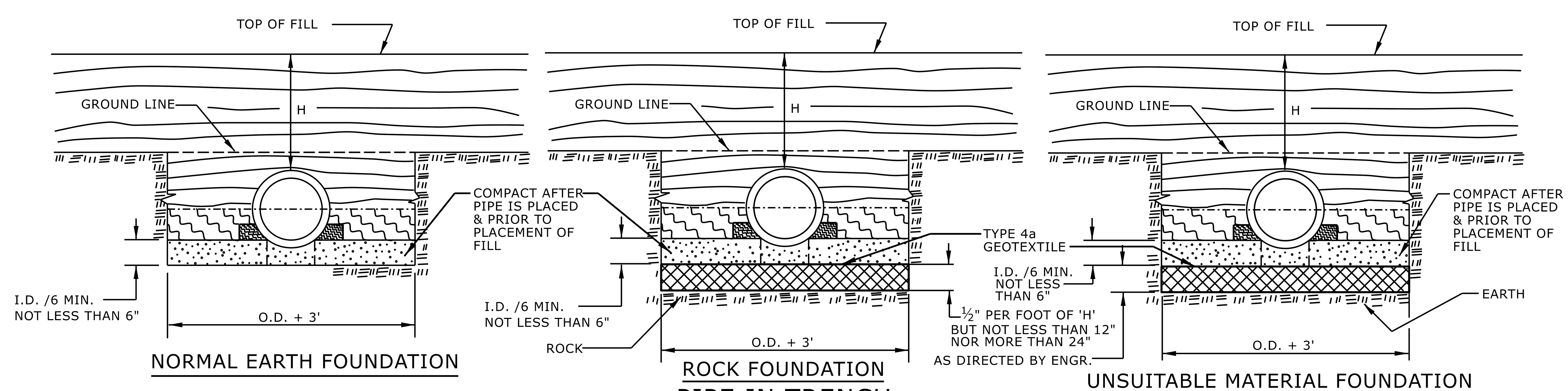
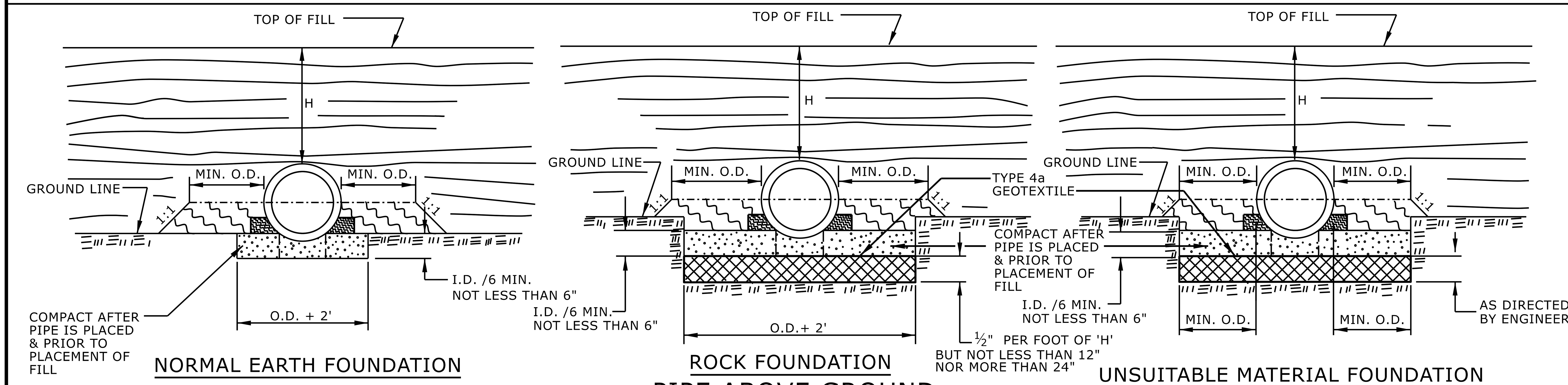
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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



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

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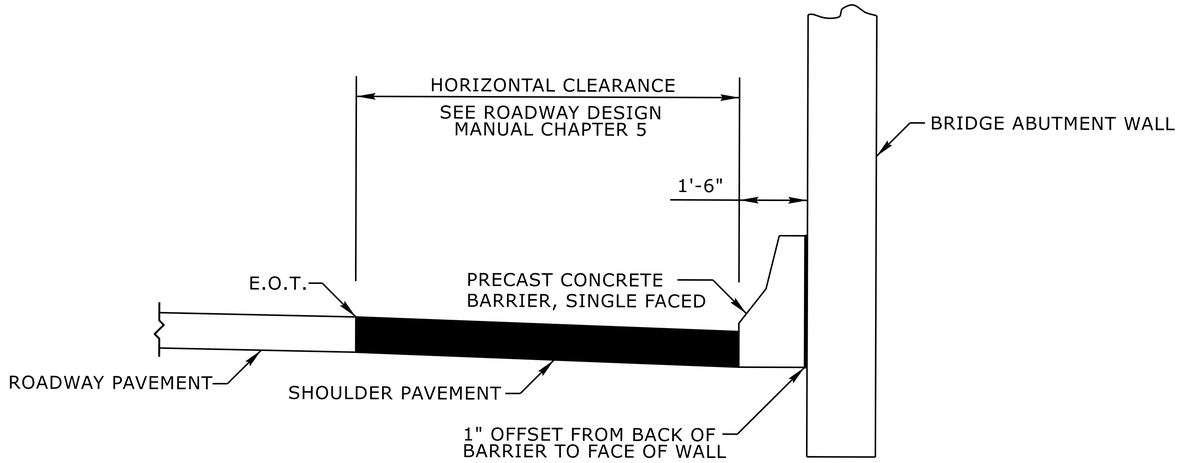
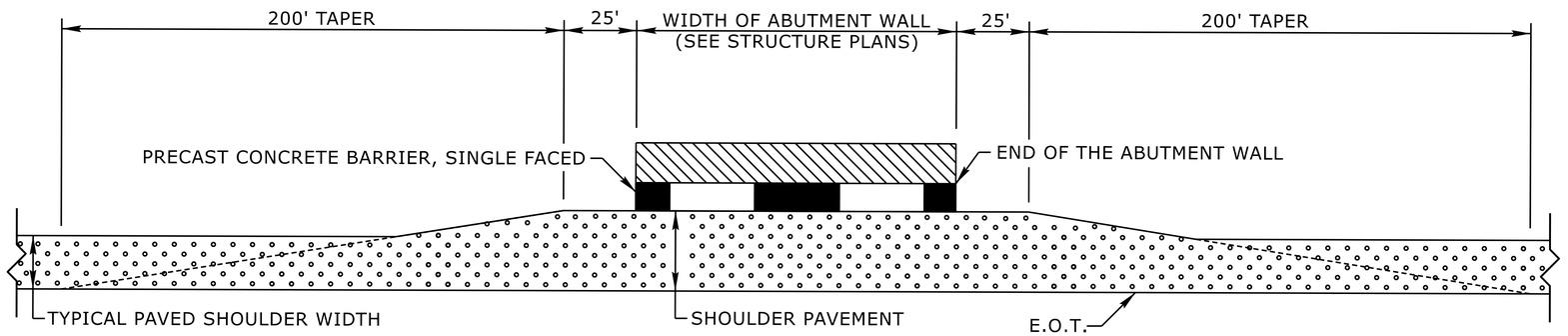
ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-3



ELEVATION



PLAN

NOTE:
1. SHOULDER PAVEMENT SHOULD BE CONSTRUCTED AS SHOWN IN THE PLANS WITH THE SAME PAVEMENT DESIGN USED ON THE PAVED SHOULDER APPROACHING THE STRUCTURE UNDERPASS.

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

ROADWAY DETAIL DRAWING FOR

GUIDE FOR PAVING SHOULDERS UNDER BRIDGES

METHOD IV

SHEET 1 OF 1

610D04

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. MACKLER
09-Mar-2026

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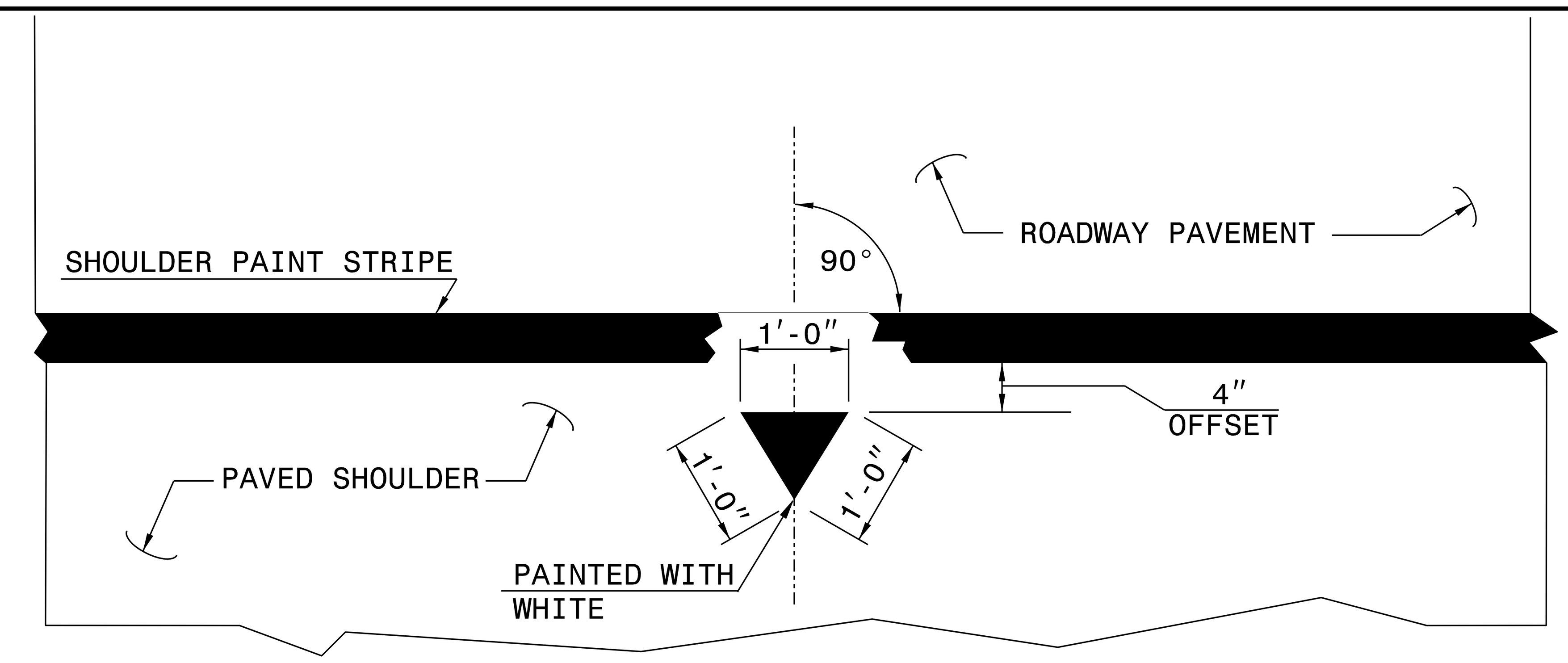
Office 919-707-6950 FAX 919-250-4119

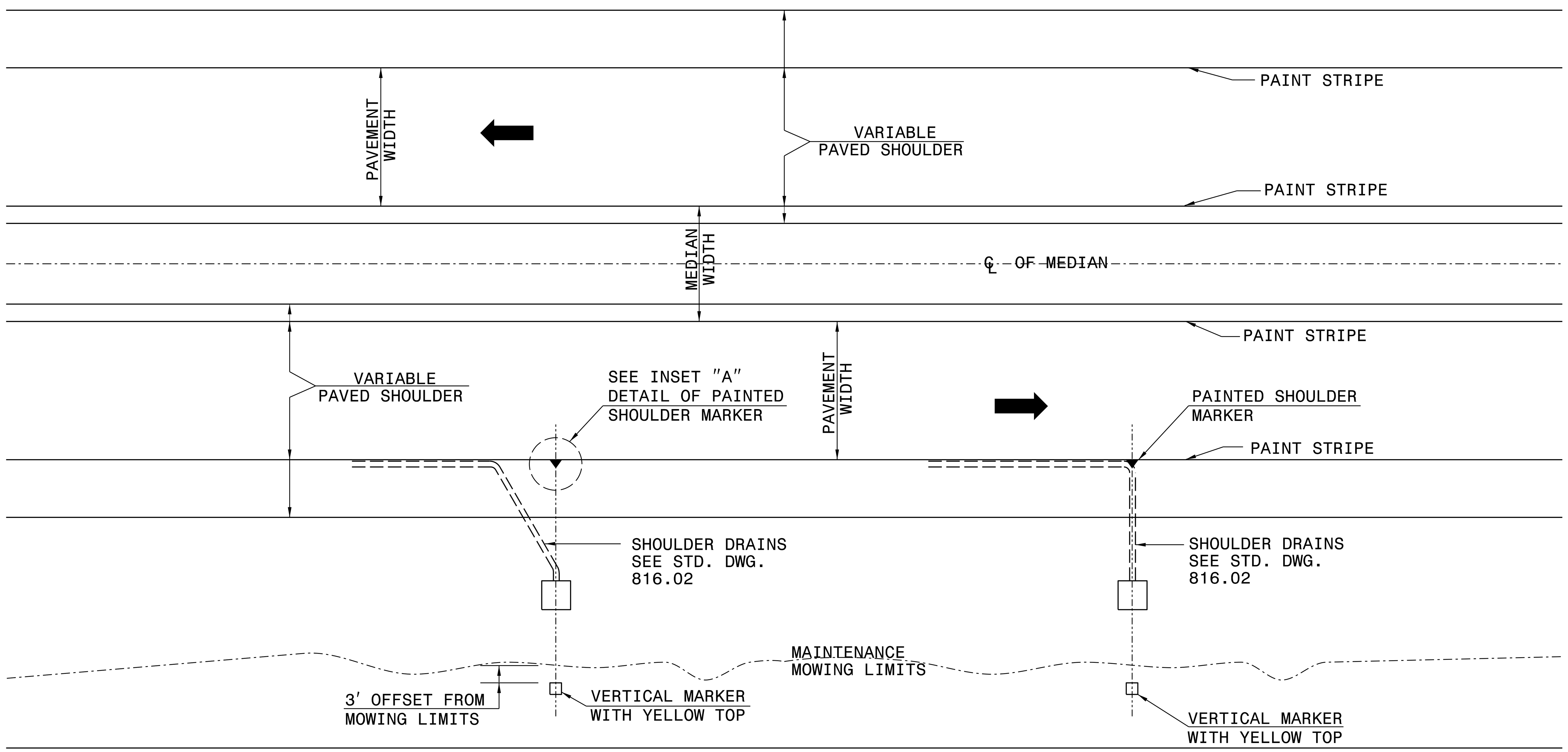
SEE TITLE BLOCK

ORIGINAL BY: L.SMITH DATE: 9-17-2025
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-4



INSET "A"



PAINTED SHOULDER AND VERTICAL MARKER

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

ROADWAY DETAIL DRAWING FOR
MARKERS FOR DRAINAGE STRUCTURE AND CONCRETE PAD

SHEET 1 OF 2
816D04

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER
09-Mar-2026

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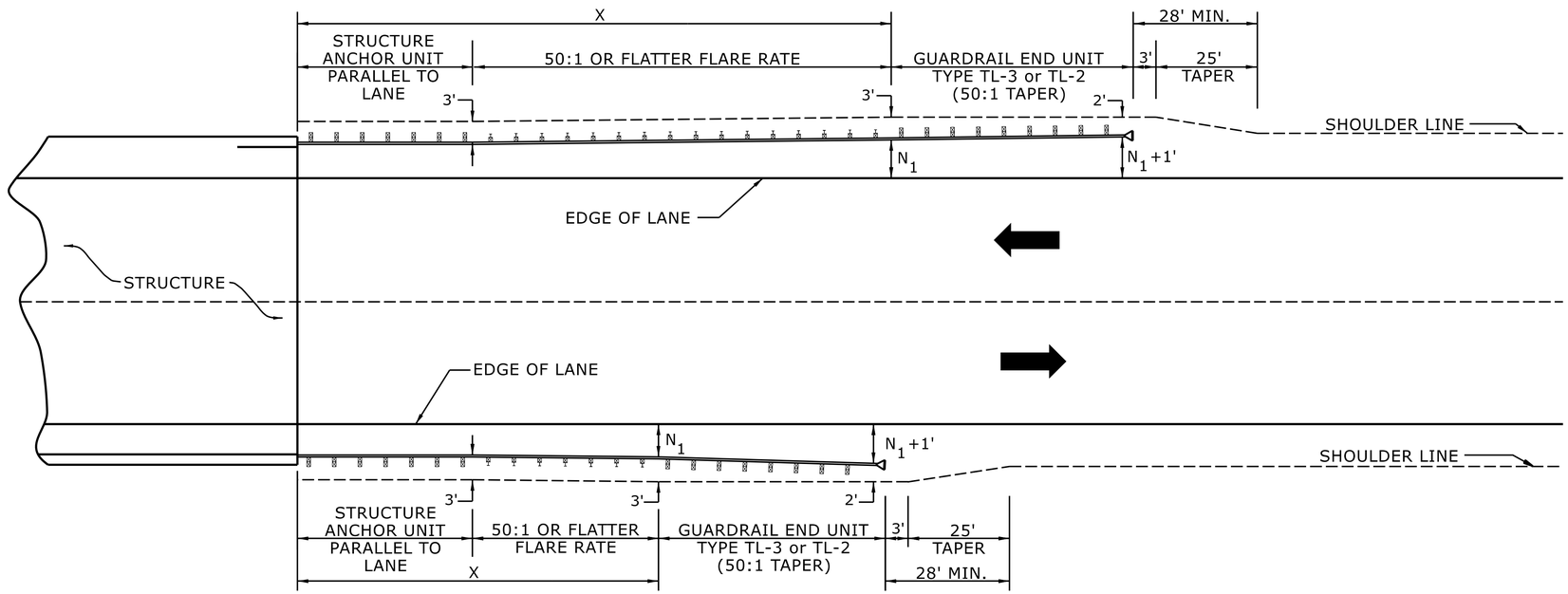
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: K. Aldridge DATE: 06-02-2025
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-5



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

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

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

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

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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M JACKLER
Nicole M Jackler
09-Mar-2026

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CONTRACTS STANDARDS
AND DEVELOPMENT UNIT
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ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: DATE:
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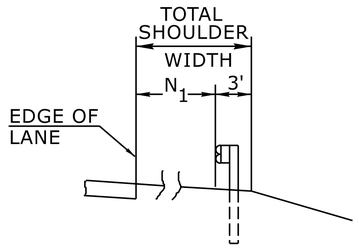
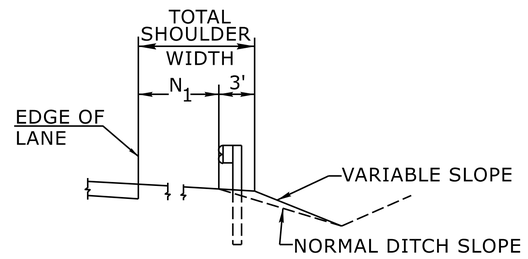
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-6

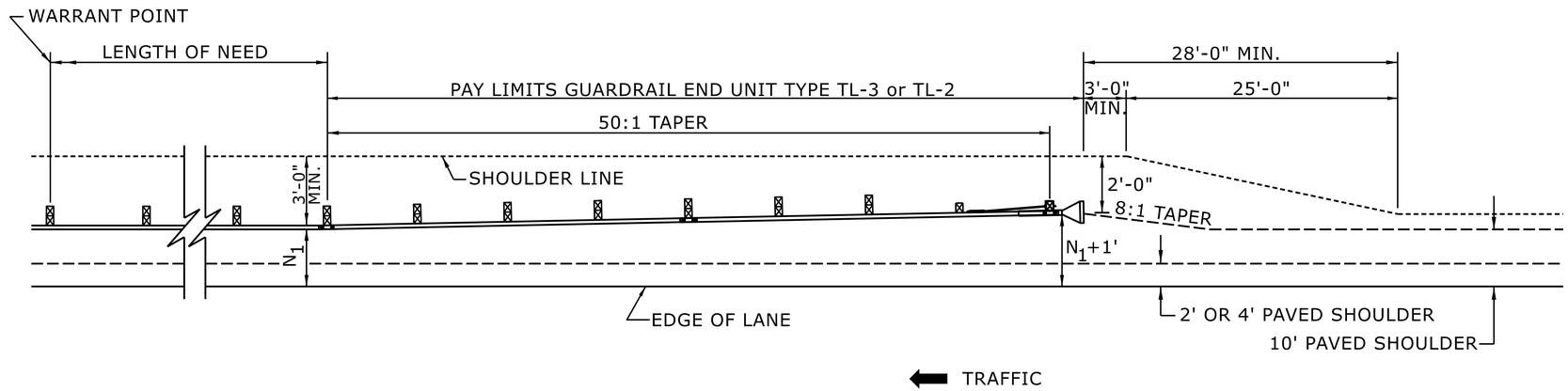


FILL SECTION



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
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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
09-Mar-2026

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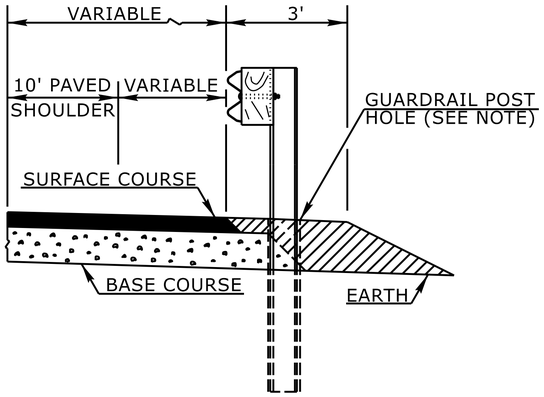
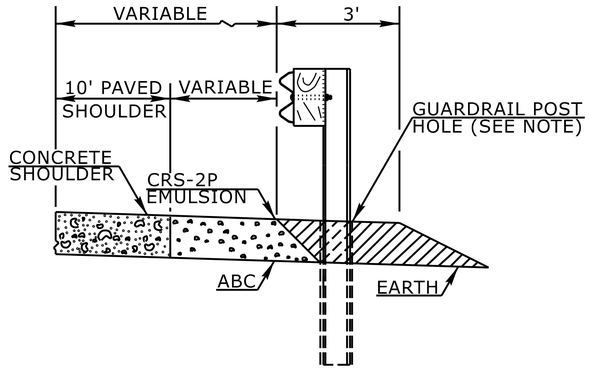
FILE SPEC.:

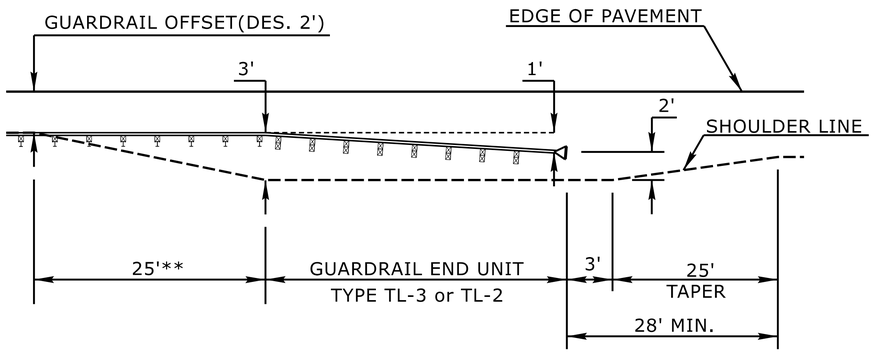
PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-7



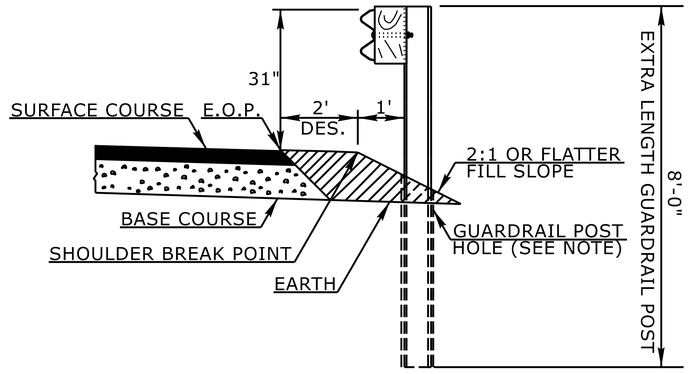
FLEXIBLE PAVED SHOULDER



CONCRETE PAVED SHOULDER



8' GUARDRAIL POST ON 2:1 SLOPE-END UNIT TRANSITION*
PLAN VIEW



8' GUARDRAIL POST ON 2:1 SLOPE*

* THE 8' GUARDRAIL POST ON 2:1 SLOPE DETAIL IS INTENDED FOR USE ONLY IN SEVERELY CONSTRAINED AREAS WITH A POSTED SPEED ≤ 60 MPH. GUARDRAIL END UNITS MAY NOT BE PLACED ON THE 2:1 SLOPE AND MUST TRANSITION TO THE SHOULDER.
** 8' GUARDRAIL POST SHOULD BE USED IN THIS RANGE

NOTE:
WHEN WOODEN GUARDRAIL POSTS ARE USED, DRILL HOLES THROUGH EARTH MATERIAL AND BASE COURSE.THE POST MAY THEN BE DRIVEN TO THE PROPER DEPTH. DRILL THE HOLE OF SUFFICIENT SIZE TO ACCOMMODATE THE PARTICULAR POST BEING USED. BACKFILL AND TAMP HOLES USING THE EXCAVATED MATERIAL.

STATE OF
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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 11OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE MACKLER
09-Mar-2026

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ORIGINAL BY: L.SMITH DATE: 10-14-2025
MODIFIED BY: DATE:
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FILE SPEC.:

24-APR-2019 07:24
S:\Contracts\Contracts\Special Details\jhowerton\840d04 3 or 4 side OTCB.dgn
jhowerton AT CSD-292595

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2C-8

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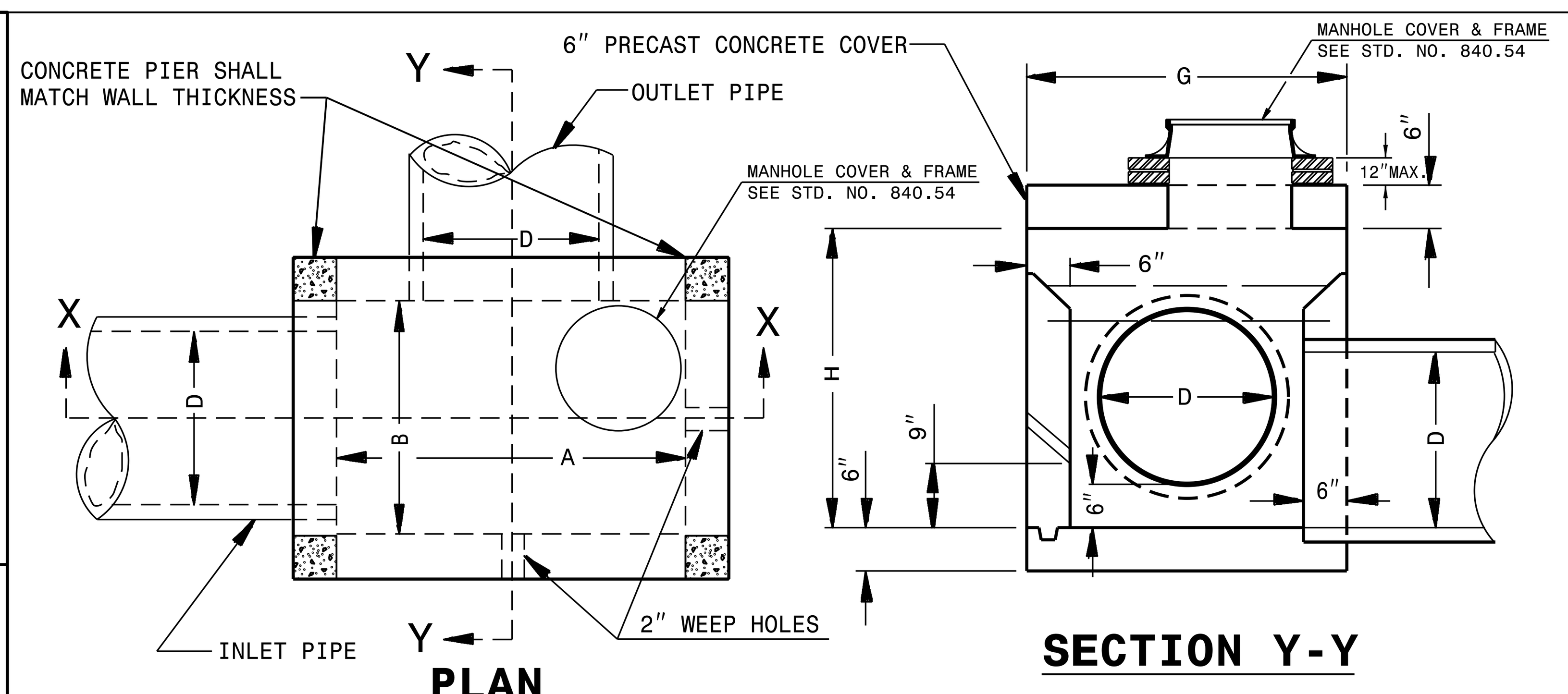
DIVISION OF HIGHWAYS
RALEIGH, N.C.

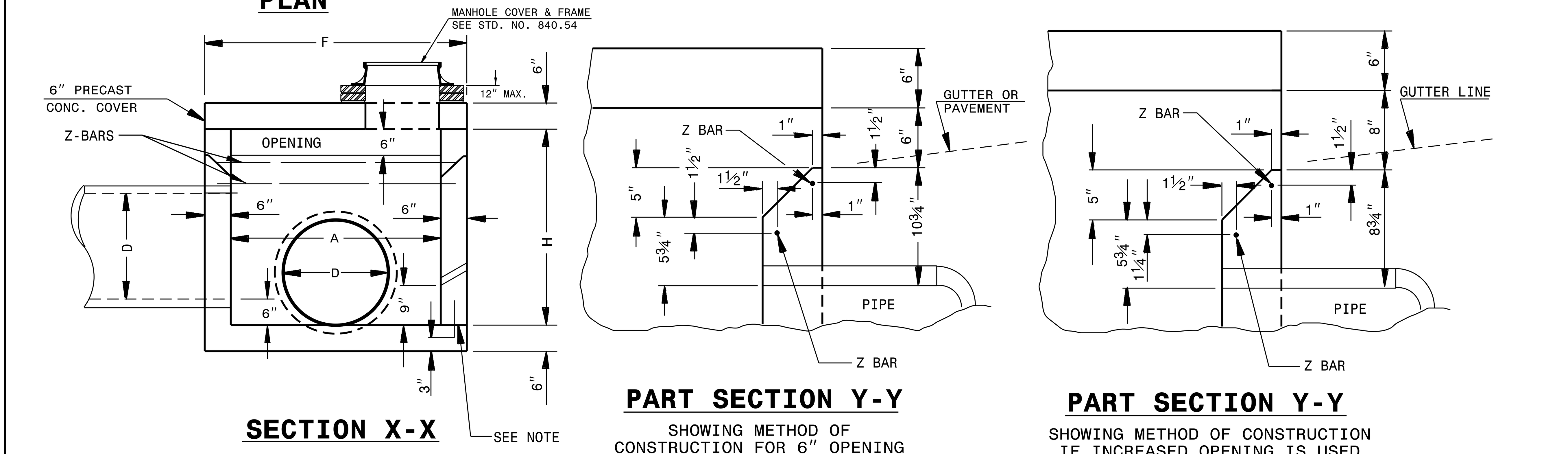
ENGLISH DETAIL DRAWING FOR CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT) (MANHOLE OPTIONAL)

SHEET 1 OF 2
840D04



GENERAL NOTES:

ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 12" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 840.66.
ALL EXPOSED CORNERS TO BE CHAMFERED 1".
CLASS "B" CONCRETE TO BE USED THROUGHOUT.
2" PIPE WEEPHOLES TO BE PLACED AS DIRECTED BY ENGINEER.
THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAXIMUM IF DEEMED TO BE NECESSARY BY THE ENGINEER.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #5 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. DWG. 840.00.
A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NO. 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
FOR 8" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. QUANTITIES TO BE ADJUSTED ACCORDINGLY.
DIMENSIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.



MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)

DIM'S OF BOX & PIPE				REINFORCING						TOP & BOT. SLAB DIMENSIONS		CU. YDS. CONC. IN BOX			TOTAL QUANTITIES BOX & SLABS		DEDUCTION ONE PIPE		DED. ONE 6" THROAT OPENING
PIPE	SPAN	WIDTH	HEIGHT	BARS - X		BARS - Y		BARS - Z											
D	A	B	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	F	G	TOP SLAB	BOT. SLAB	WALL/FT. HT.	LBS. REINF.	YD³ (MIN H)	C.S.	R.C.	YD³
12"	3'-6"	2'-3"	1'-10"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.046	0.015	0.032	0.046
15"	3'-6"	2'-3"	2'-1"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.108	0.023	0.036	0.046
18"	4'-0"	2'-8"	2'-4"	5	3'-5"	7	4'-9"	2	4'-9"	5'-0"	3'-8"	0.226	0.340	0.284	35	1.379	0.033	0.049	0.053
24"	4'-0"	2'-8"	2'-10"	5	3'-5"	7	4'-9"	2	4'-9"	5'-0"	3'-8"	0.226	0.340	0.284	35	1.521	0.059	0.085	0.053
30"	4'-0"	3'-6"	3'-4"	5	4'-3"	9	4'-9"	2	4'-9"	5'-0"	4'-6"	0.278	0.417	0.315	43	1.916	0.092	0.127	0.053
36"	4'-6"	4'-0"	3'-10"	5	4'-9"	10	5'-3"	2	5'-3"	5'-6"	5'-0"	0.340	0.510	0.352	51	2.390	0.132	0.178	0.059
42"	5'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	2	5'-9"	6'-0"	5'-6"	0.407	0.611	0.389	64	2.914	0.180	0.243	0.066
48"	5'-0"	5'-0"	4'-10"	5	5'-9"	13	5'-9"	2	5'-9"	6'-0"	6'-0"	0.444	0.666	0.407	68	3.298	0.235	0.317	0.066

STATE OF
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT) (MANHOLE OPTIONAL)

SHEET 1 OF 2
840D04

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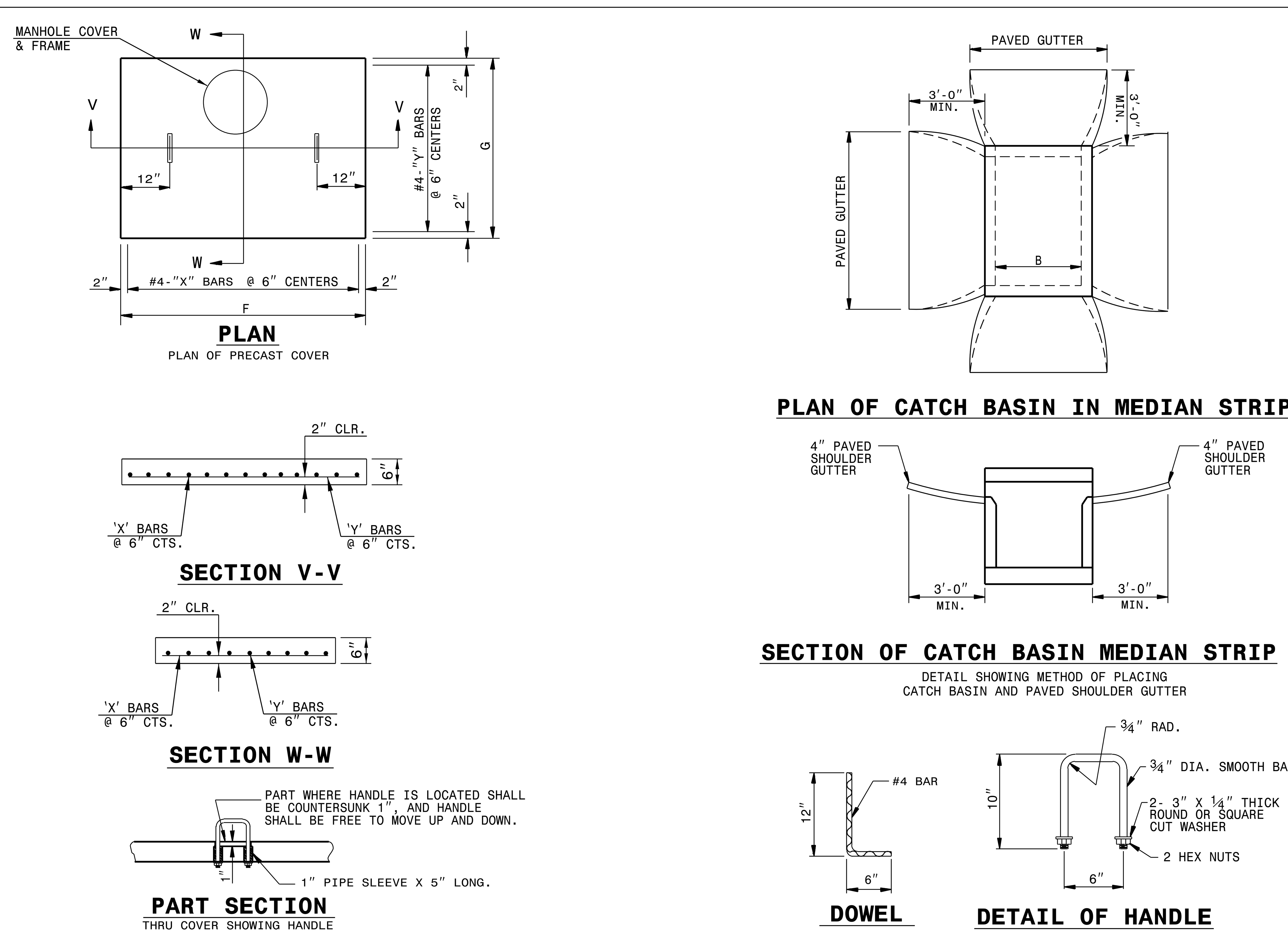
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT) (MANHOLE OPTIONAL)

SHEET 2 OF 2
840D04



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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT) (MANHOLE OPTIONAL)

SHEET 2 OF 2
840D04

SEAL 33144 NICOLE WHITE HACKLER, NORTH CAROLINA PROFESSIONAL ENGINEER
09-Mar-2026

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ORIGINAL BY: ______ DATE: ______
MODIFIED BY: rnbritt DATE: 07-03-2014
CHECKED BY: ______ DATE: ______
FILE SPEC.: details/nbritt/english/hydro/840d04.dgn

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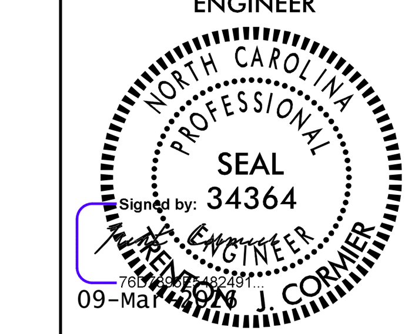
PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	2D-1

HYDRAULICS ENGINEER



TOMO ENGINEERING, PLLC
LICENSE NO. P-2066

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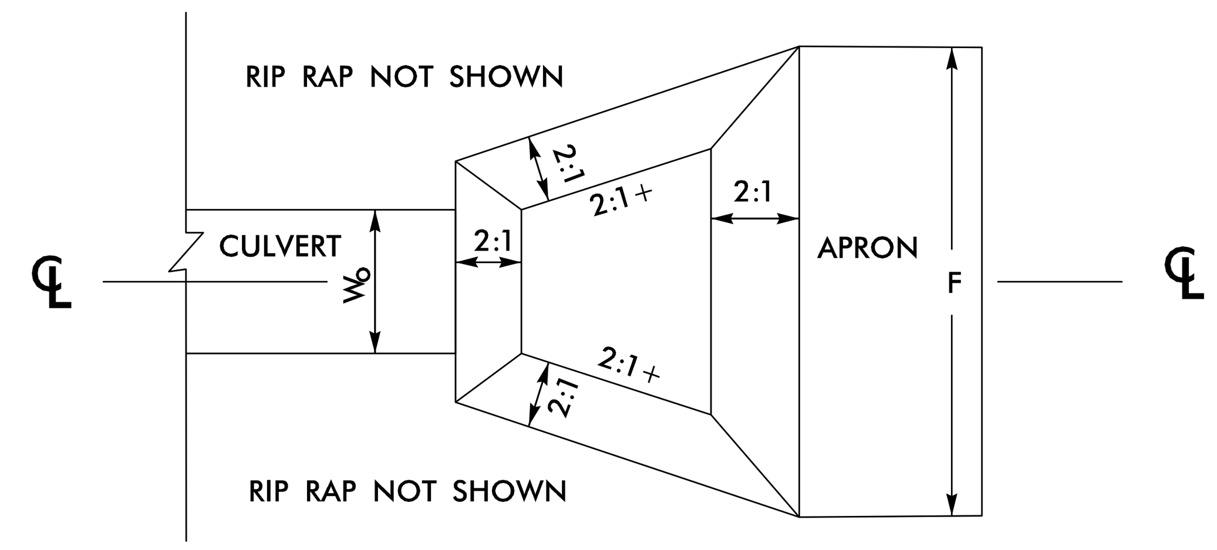
Prepared in the Office of:

Tomo Engineering, PLLC
2319 Cardinal Drive, Durham, N.C. 27707
N.C.B.E.L.S. License Number: P-2066

DETAIL 1
CLASS I RIP-RAPPED ENERGY DISSIPATOR BASIN

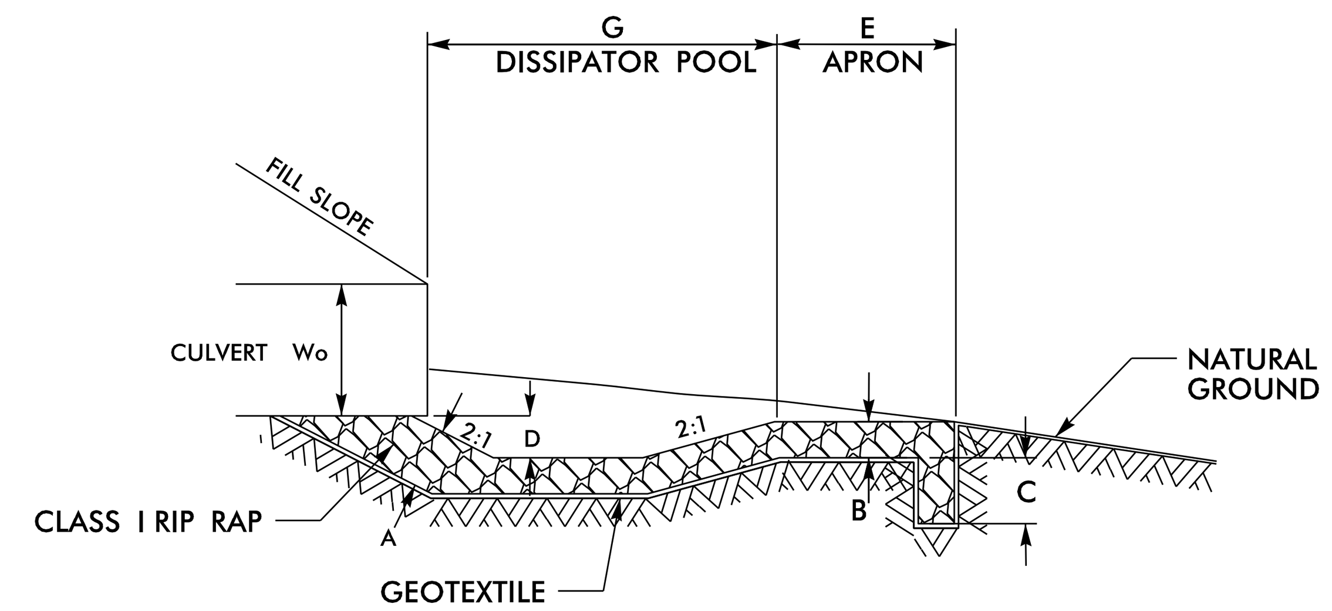
DIM. (ft)	RIP RAP BASIN # 1		
A	3		
B	1.5		
C	1		
D	2		
E	10		
F	48		
G	30		

ALL DIMENSIONS APPROXIMATE



PLAN

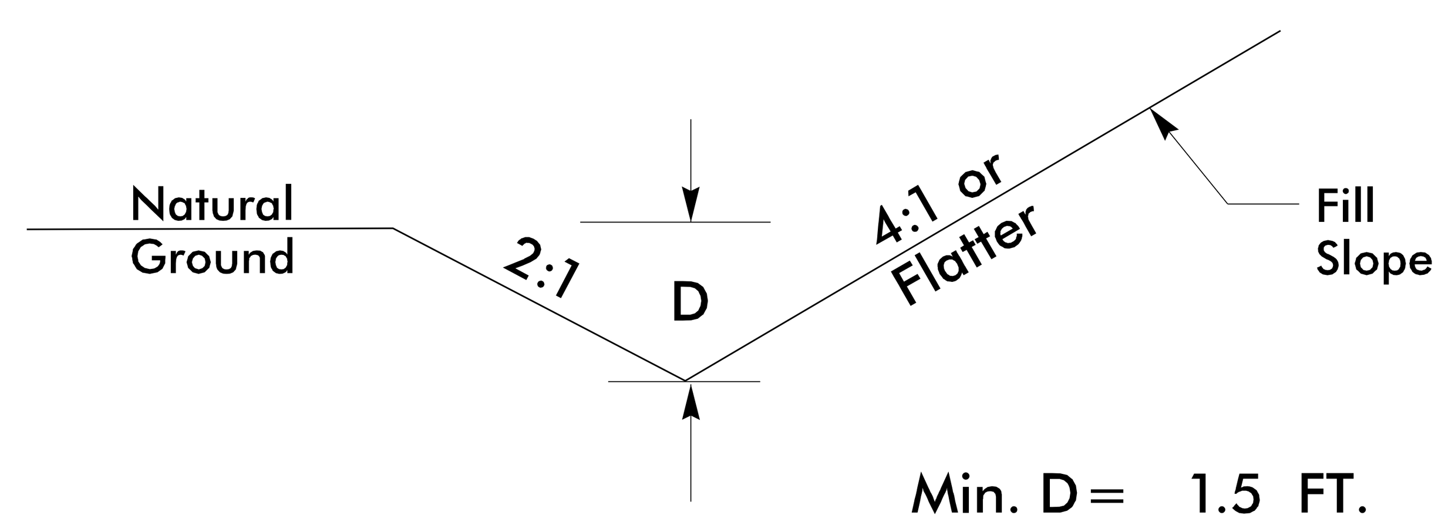
BASIN #	LOCATION (AT OUTLET)
1	0422



℄ SECTION

-L- STA. 13+90 RT

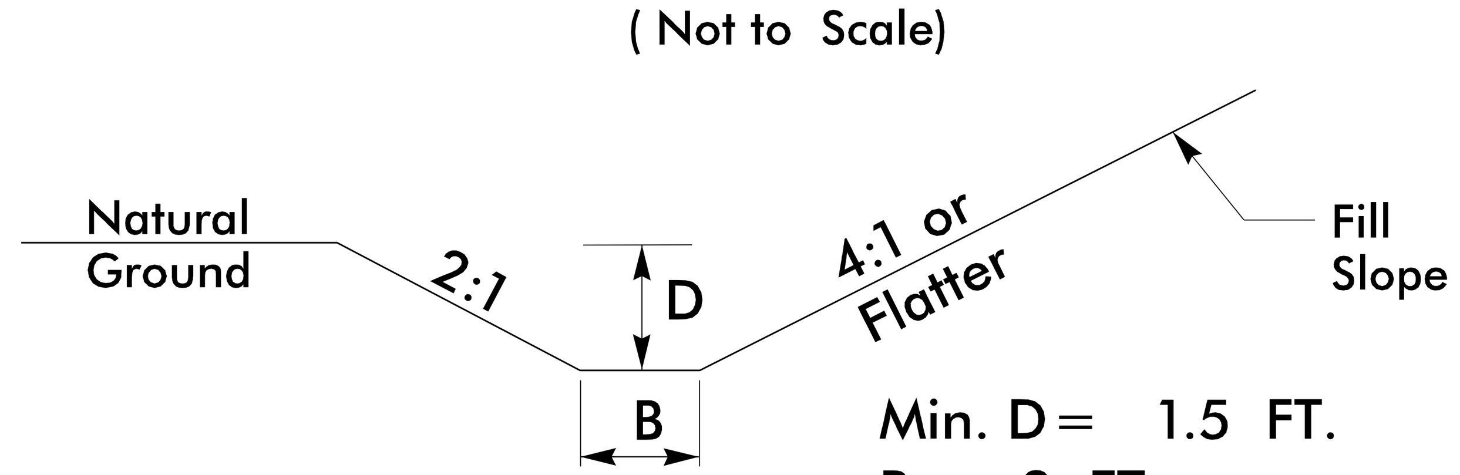
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.5 FT.

-L- STA. 27+00 TO 29+00 RT

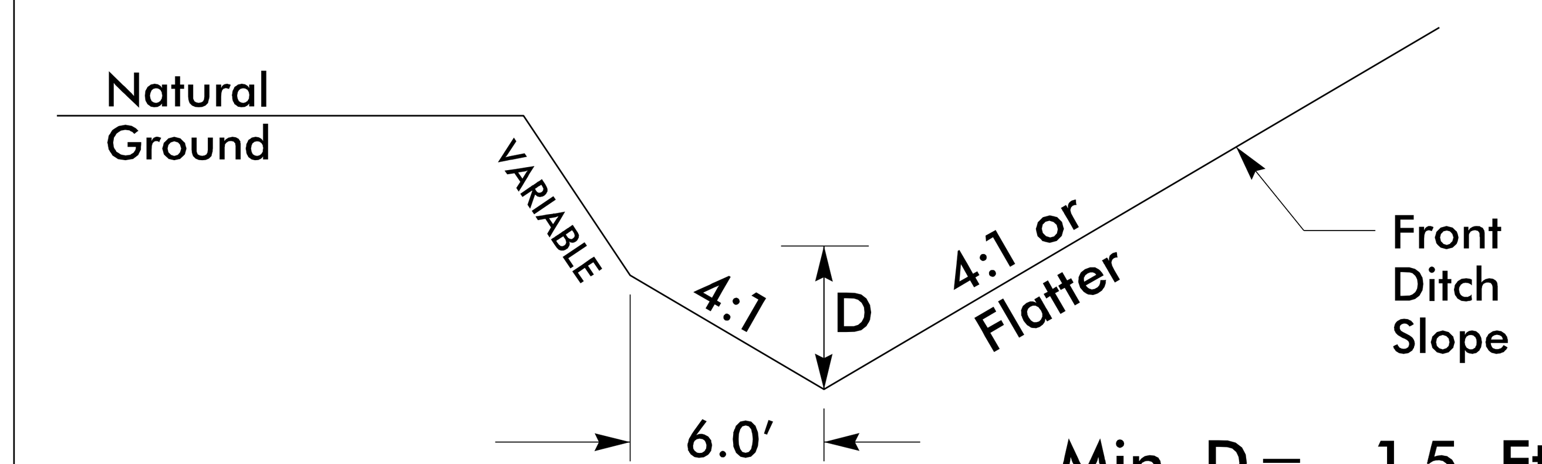
DETAIL 3
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.5 FT.
B= 2 FT.

-RPD- STA. 11+00 TO 13+70 RT

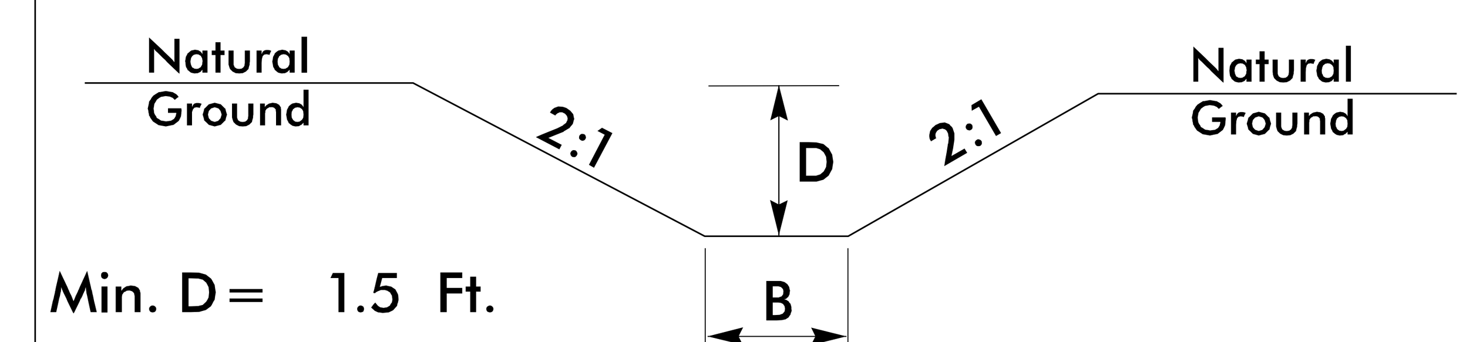
DETAIL 4
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



Min. D= 1.5 Ft.

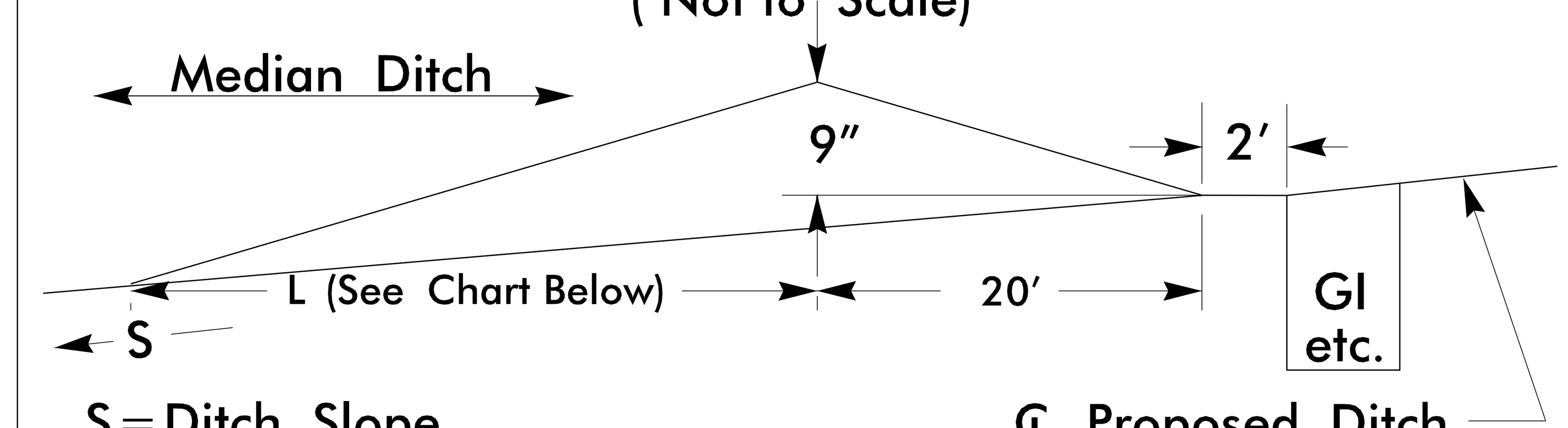
-Y- STA. 26+00 TO 28+00 LT

DETAIL 5
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
B= 2 Ft.

DETAIL 6
FALSE SUMP
(Not to Scale)



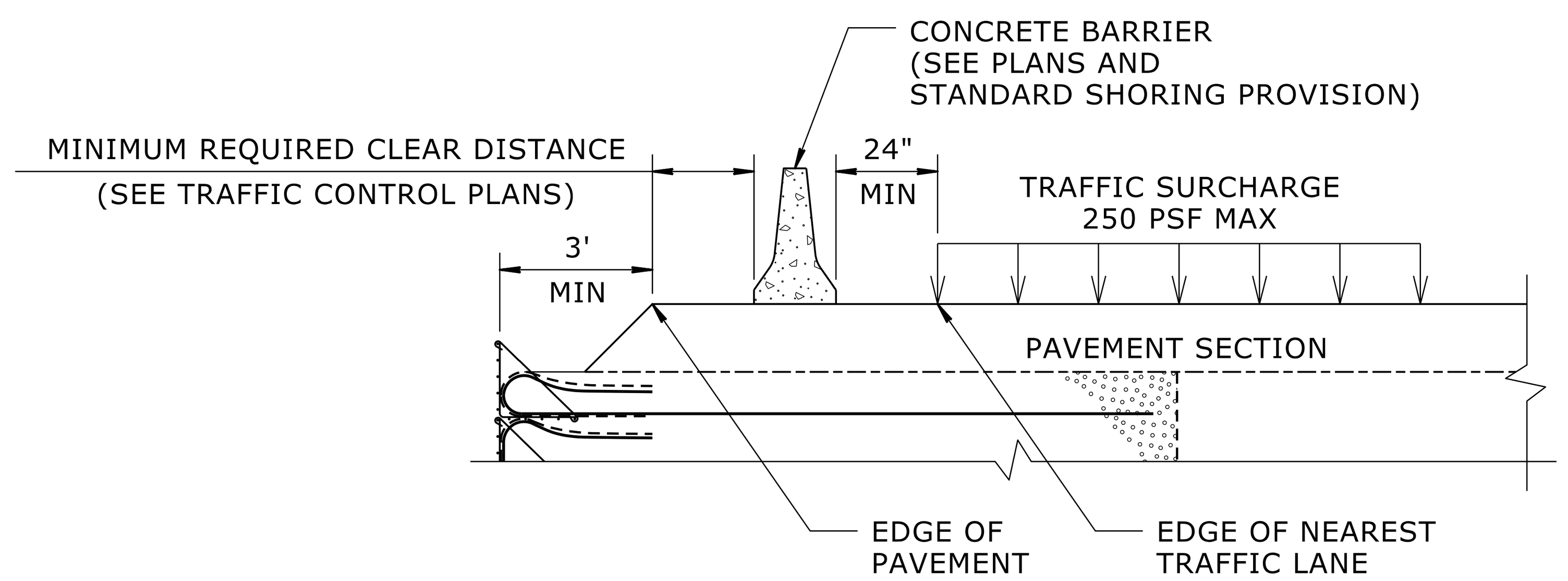
S=Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

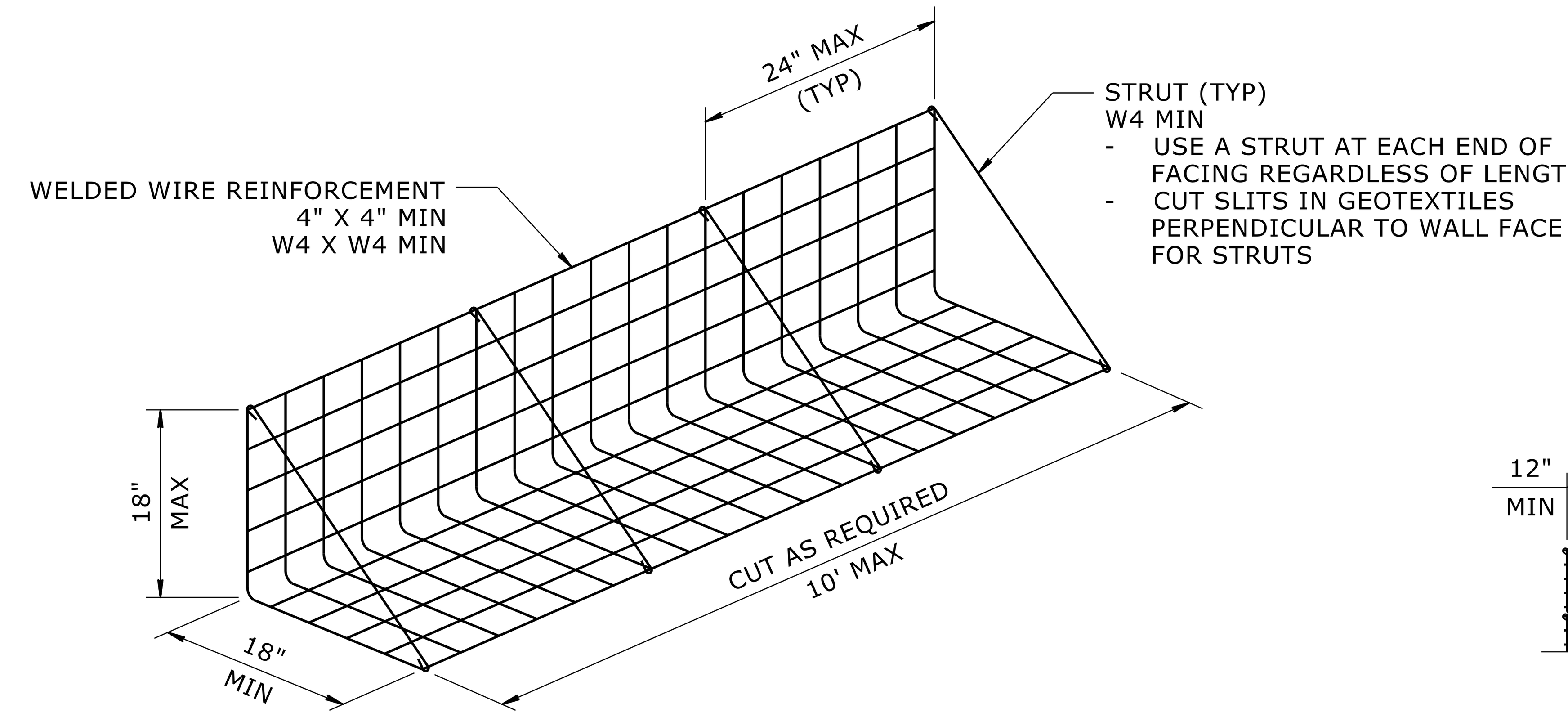
FROM -Y- STA. 21+23 TO STA. 21+53 MED

8/17/99

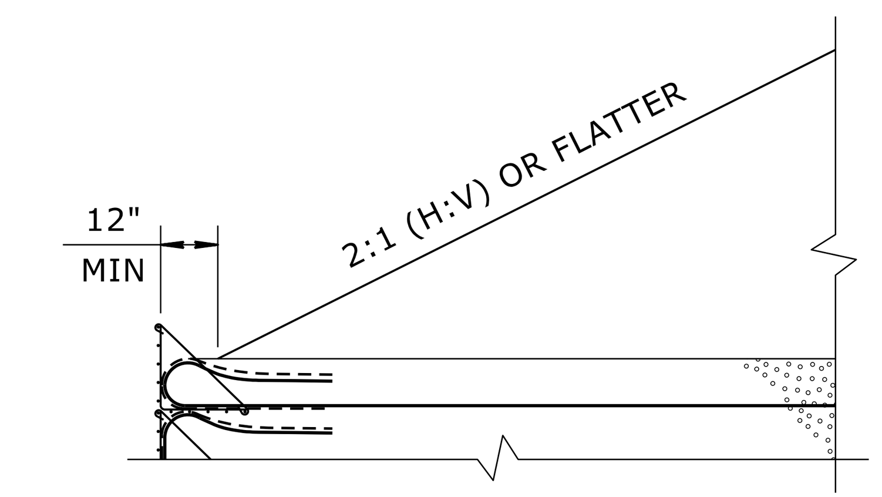
6:11:26 AM
c:\pwworking\hmm\rail_transit\jor66165\d0180146\780023_rdy_psh2D-1_hyd_details.dgn



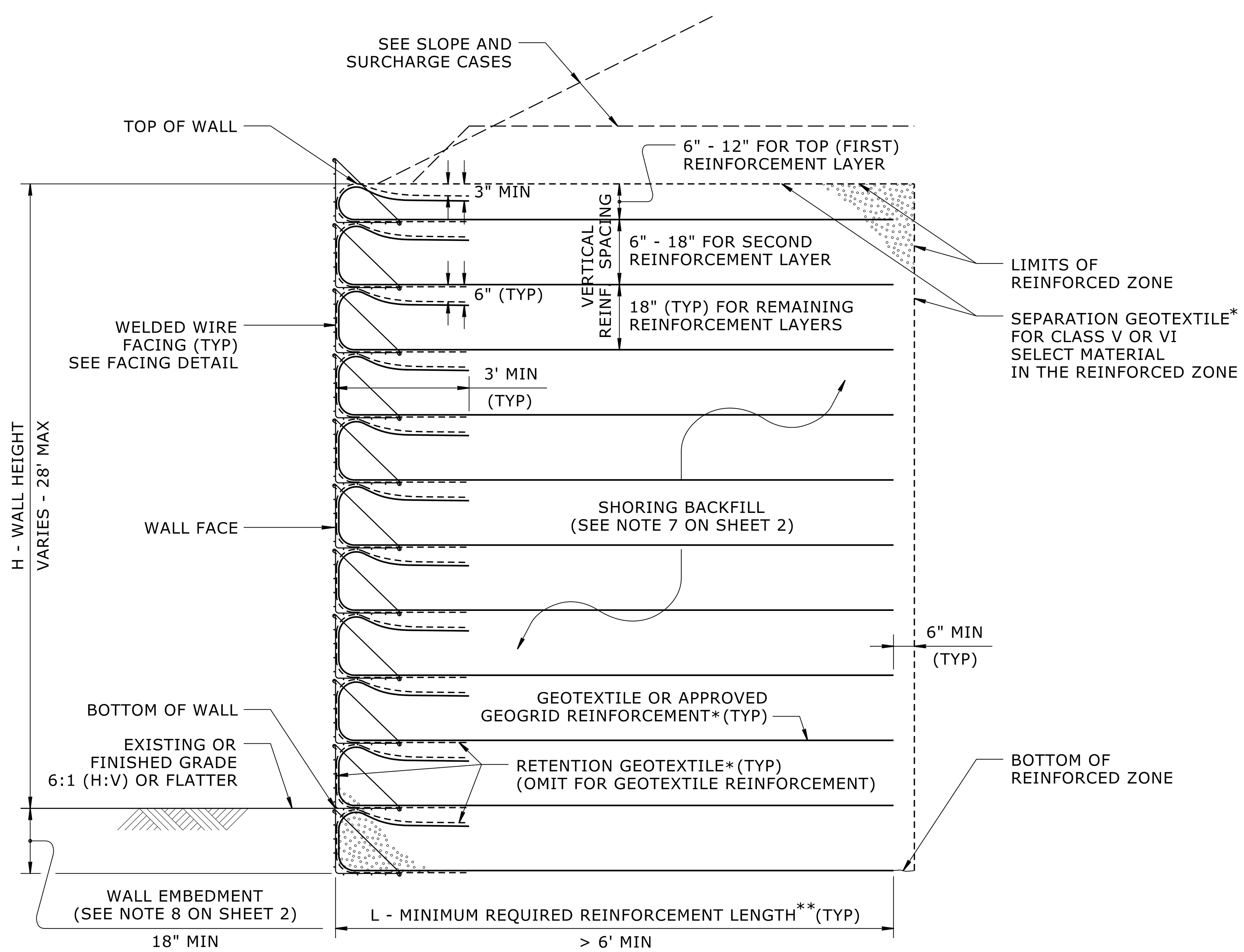
SURCHARGE CASE



FACING DETAIL

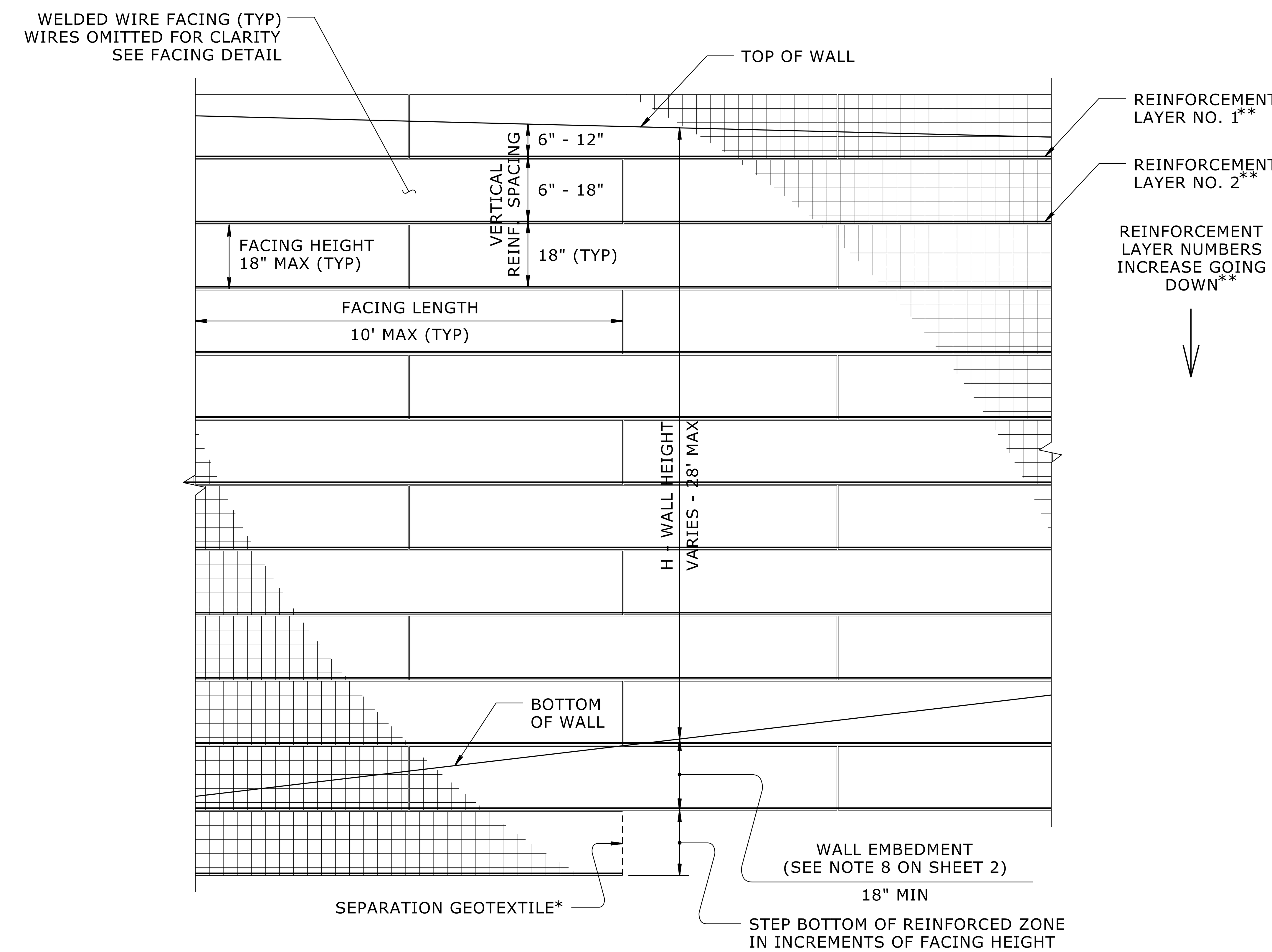


SLOPE CASE



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.

BP7.R001

R/W	2G-1

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

GEOTECHNICAL
ENGINEERING UNIT

GEOTECHNICAL
ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039779 ENGINEER JEREMY R HAMM

1/30/2026

DocuSigned by: Jeremy Hamm

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STANDARD
DETAIL NO. 1801.02

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

DATE: 02-18-2025

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039779 ENGINEER JEREMY R HAMM

1/30/2026

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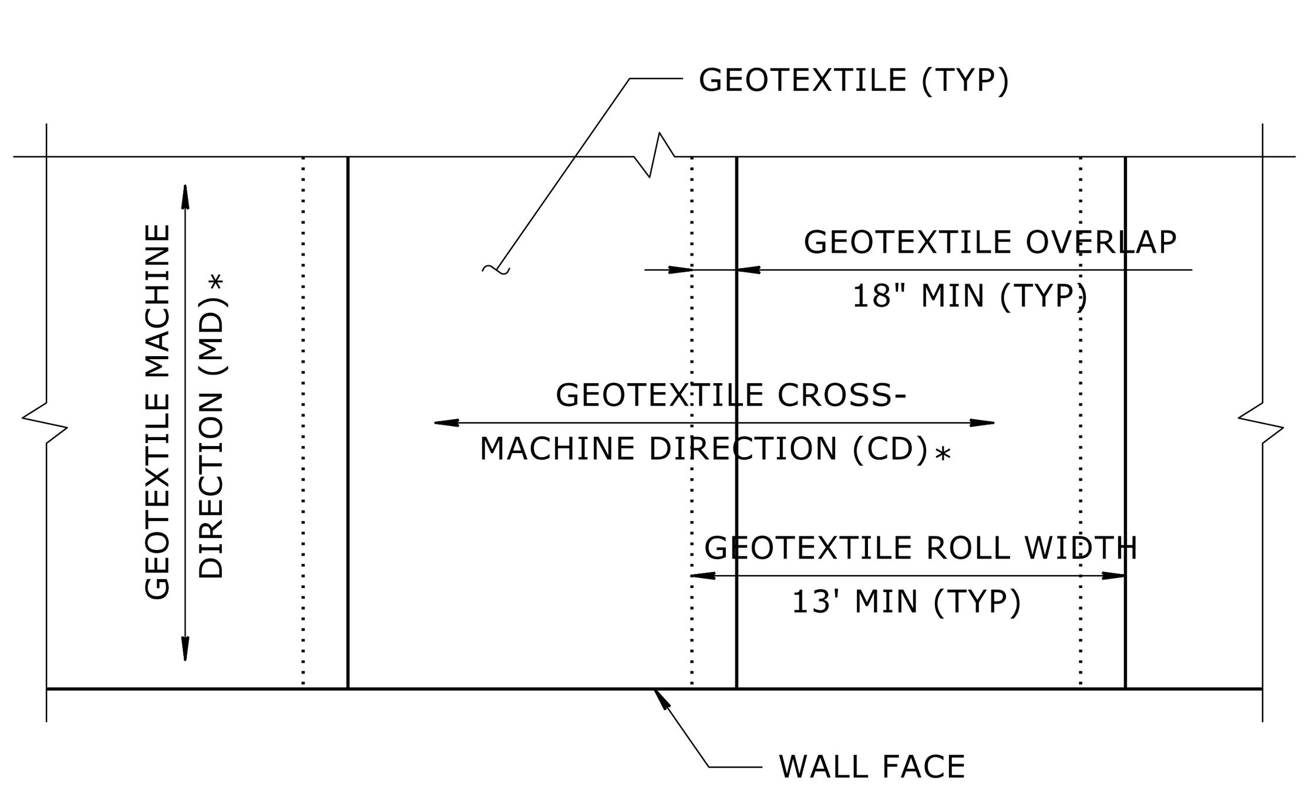
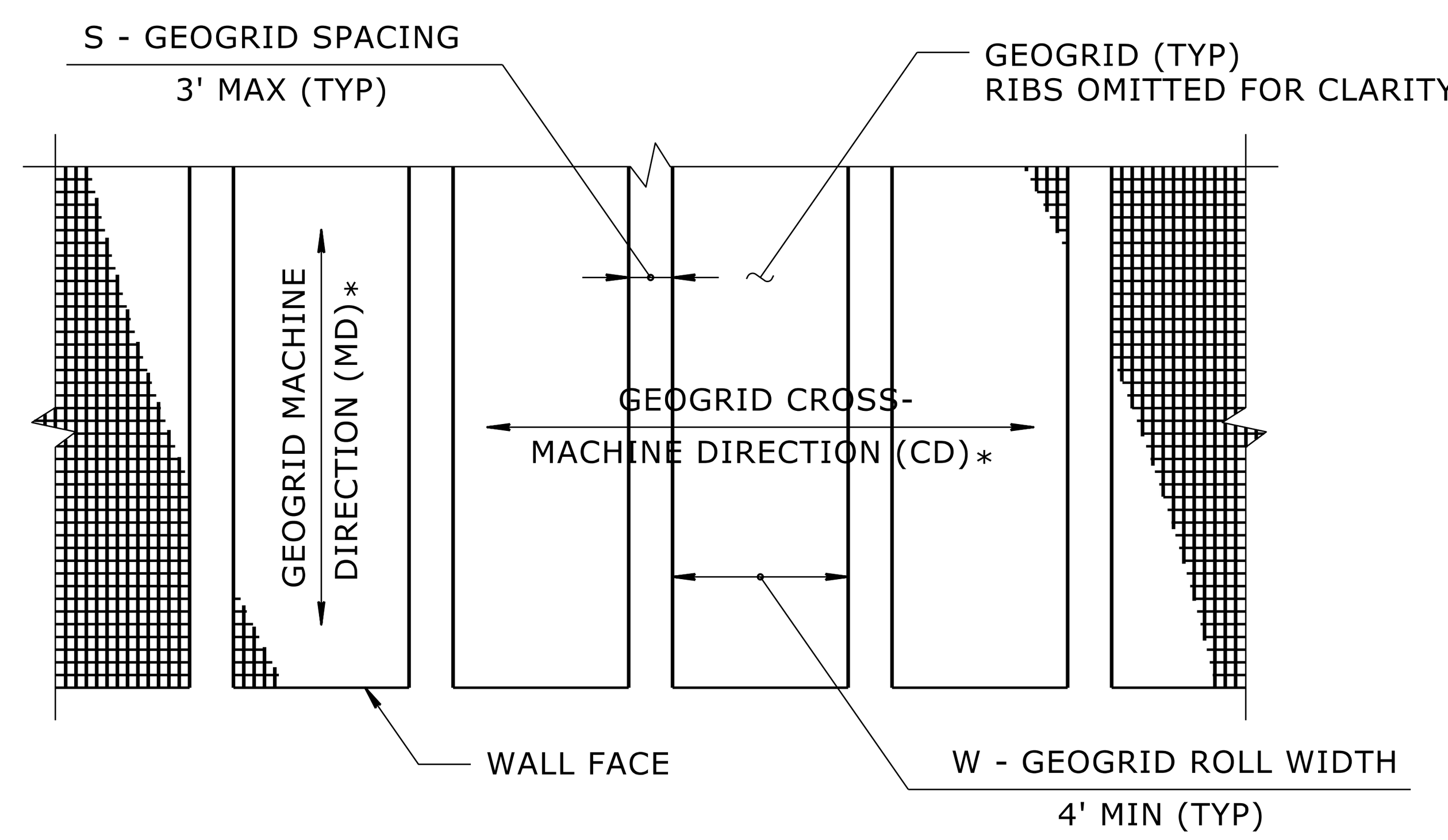
STANDARD DETAIL NO. 1801.02

GEOTECHNICAL STANDARD DETAIL FOR TEMPORARY WALL (SHEET 2 OF 3)



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

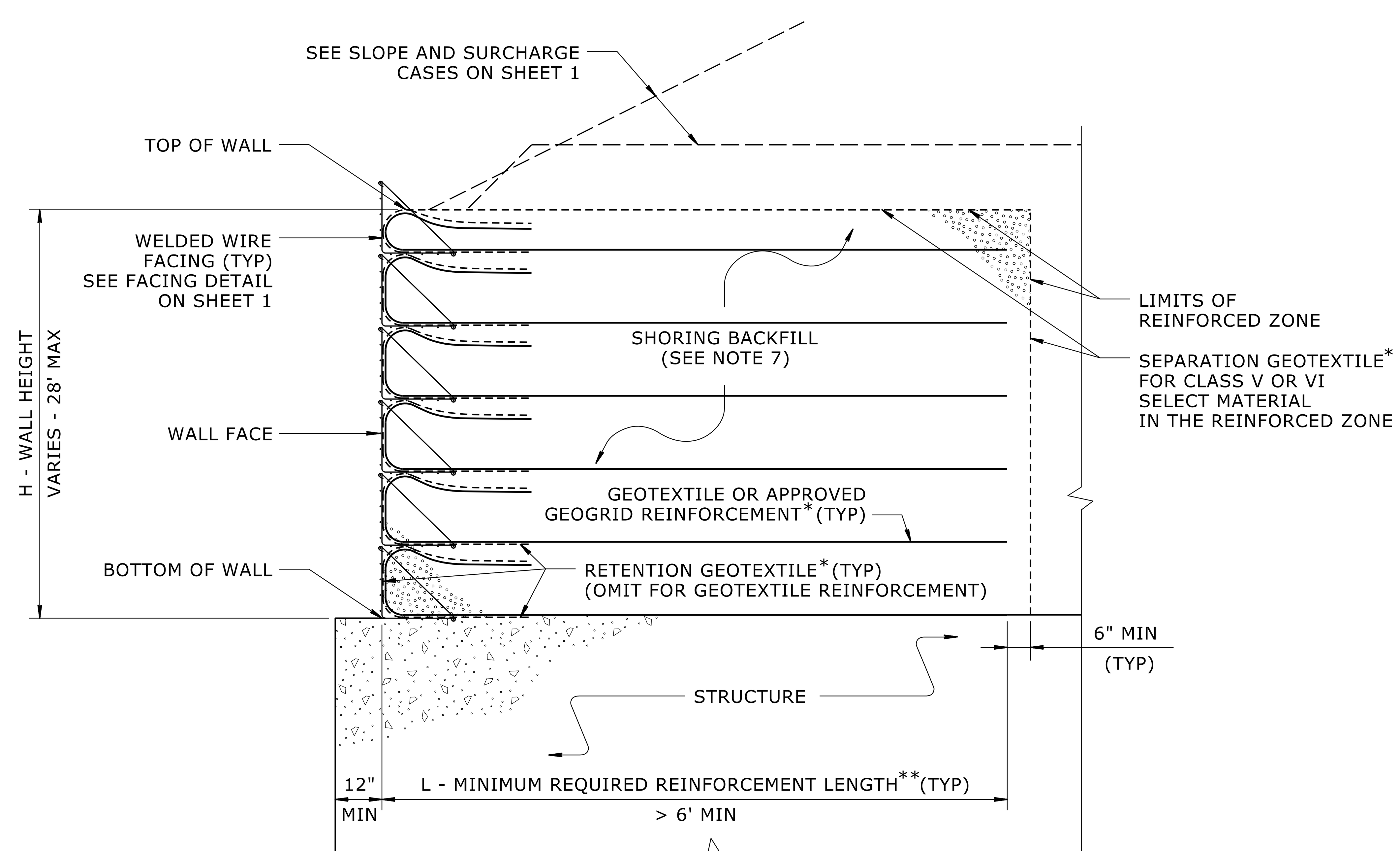


GEOGRID PLACEMENT

(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.

DATE: 02-18-2025

5/26/20

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.

BP7.R001
R/W 2G-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039779 ENGINEER JEREMY R HAMM

1/30/2026

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

12/06/07

COMPUTED BY: PJ DATE: 1-28-2026
CHECKED BY: TJ DATE: 1-28-2026

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	3B-1

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- RT 15+80.00	-L- RT 20+80.27	291	24,823	24,523	
-L- RT 23+18.27	-L- RT 24+62.00		4,818	4,818	
-L- RT 25+50.00	-L- RT 32+50.00	179	1,566	1,387	
-Y- RT 18+09.03	-Y- RT 26+27.99	2,520	745		1,775
-Y- LT 20+14.98	-Y- LT 27+96.50	1,906	1,250		656
-RPD- 12+90.00	-RPD- 14+00.00	41	1,241	1,200	
SUBTOTAL		4,937	34,443	31,937	2,431
-Y- RT MED 22+04.86	-Y- RT MED 23+32.92	96			96
SUBTOTAL		96			96
-L- RT 13+70.00	-L- RT 15+80.00	343	138		205
-L- LT 13+70.00	-L- LT 20+80.27	475	2.280	1,805	
-L- RT 24+62.00	-L- RT 25+50.00		920	920	
-L- LT 23+18.27	-L- LT 32+50.00	334	47		287
-RPA- 10+25.00	-RPA- 14+00.00	843	128		715
-RPD- 11+00.00	-RPD- 12+90.00	136	514	378	
SUBTOTAL		2,131	4,027	3,103	1,207
PROJECT TOTAL		7,164	38,470	35,040	3,734
LOSS DUE TO CLEARING & GRUBBING:		-100		100	
WASTE TO REPLACE BORROW:				-3,734	-3,734
PROJECT TOTALS:		7,064	38,470	31,406	
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT:				1,570	
GRAND TOTALS:		7,064	38,470	32,976	
SAY:		7,500		34,700	

EST. DDE = 595 CY

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

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQ. YD.
-L-	32+00.00	32+50.00	RT	12.77
-L-	32+00.00	32+50.00	LT	9.69
-Y-	18+09.03	26+27.99	RT	200.37
-Y-	20+14.98	27+96.50	LT	783.28
TEMPORARY PAVEMENT (-L- 13+70.00 - 18+50.00)				2,863.89
TEMPORARY PAVEMENT (-L- 24+25.00 - 32+00.00)				4,404.00
TEMPORARY PAVEMENT (-RPA- 10+25.00 - 14+04.50)				1,178.33
TEMPORARY PAVEMENT (-RPD- 11+00.00 - 14+04.50)				972.22
TEMPORARY PAVEMENT (-Y- MED RT & LT)				555.56
TEMPORARY PAVEMENT (-Y- MED RT & LT)				688.89
			TOTAL:	11,668.99
			SAY:	12,255

SUMMARY OF EXISTING CONCRETE PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQ. YD.
-L-	13+70.00	20+07.00	CL	4,003.50
-L-	22+79.00	32+00.00	CL	4,886.01
-RPA-	10+25.00	14+04.00	CL	1,523.72
-RPD-	11+00.00	14+04.00	CL	1,279.79
			TOTAL:	11,693.03
			SAY:	12,280

SUMMARY OF WOVEN WIRE FENCE, 47" FABRIC W/1 STRAND BARBED WIRE

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	A FABRIC L.F.	B END BRACE EA.	C CORNER BRACE EA.	D LINE BRACE EA.	E LINE POSTS EA.	F TERMINAL POSTS EA.
-L-	13+75	14+35	RT	110.54'	2	2		2	10
			TOTAL:	110.54'				2	10
			SAY:	115'				5	10

SUMMARY OF SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION	LENGTH
-L-	19+20.00	20+27.94	LT	107.94'
-L-	23+13.11	25+41.78	LT	225.89'
-Y-	22+71.23	25+13.18	RT	241.95'
-Y-	24+68.40	24+77.87	LT	9.47'
			TOTAL	585.25'
			SAY	600'

SUMMARY OF 4" SHOULDER DRAINS

SURVEY LINE	STATION	STATION	SHOULDER DRAIN PIPE LF	SHOULDER DRAINS LF	OUTLET PIPE LF	CONC. PADS EA
-Y- RT	18+09	26+28	819	819	14	1
-Y- LT	20+15	24+70	455	455		
			TOTAL	1,274	1,274	14	1
			SAY	1,280	1,280	15	1

COMPUTED BY:	PJ	DATE:	1-28-2026
CHECKED BY:	TJ	DATE:	1-28-2026

12/06/07

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
BP7.R001	3B-2

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR IA - MASH TL3
NG = NON-GATING IMPACT ATTENUATOR IA - MASH TL-3

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IA - MASH TL3 ATTENUATOR			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	EXTRA LENGTH POSTS	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-2	GREU TL-3	TYPE III	B-77	CAT-1	AT-1	TES	EA	G	NG				
-L-	13+70.00	15+38.79	RT	91.45'	84.29'				VAR. SEE PLANS	VAR. SEE PLANS																		206.30'	52	TIE TO EXIST GUARDRAIL AT BOTH ENDS - USE 8' STEEL POSTS
-L-	15+89.96	20+99.02	RT	446.135'	119.74			20+99.02 (BARRIER)	8'	11'										1								480.81'		TIE TO EXISTING GUARDRAIL
-L-	19+40.89	20+41.52	LT	100.635'				20+41.52 (BARRIER)	8'	11'										1	1									
-L-	23+56.88	25+08.72	RT	153.175'				23+56.88 (BARRIER)	8'	11'										1	1									
-L-/-RPA-	22+99.52	13+54.35	LT/RT	244.865'	41.37'		22+99.52 (BARRIER)		8'	11'										1		1						105.05'		
-L-	30+63.61	32+50.00	RT	212.62'			32+50.00 (BRIDGE)		VAR. SEE PLANS	VAR. SEE PLANS	50'		1					1	1									216.17'		TIE TO EXISTING BRIDGE
-L-	30+92.91	32+49.11	LT	111.31'				32+49.11 (BRIDGE)	VAR. SEE PLANS	VAR. SEE PLANS		50'		1				1	1									165.87'		TIE TO EXISTING BRIDGE
-Y-	19+89.63	21+00.00	RT	110.375'			21+00.00 (BARRIER)		18'	21'	50'		1					1		1										
-Y-	22+71.23	25+50.00	RT	279.05'			22+71.23 (BARRIER)		VAR. SEE PLANS	VAR. SEE PLANS										1								235.39'		TIE TO EXISTING GUARDRAIL
-Y-	24+68.40	25+53.77	LT	85.375'			24+68.40 (BARRIER)		24'	27'	50		1					1		1								291.26'		
-Y-	21+61.36	22+27.73	CL/RT	66.425'			22+27.73 (BARRIER)		20.25'	23'										1						1		390.32'		
-Y-	21+61.36	22+27.73	CL/LT	66.425'				22+27.73 (BARRIER)	20.25'	23'										1										
-Y-	23+09.05	23+75.42	CL/RT	66.425'			23+09.05 (BARRIER)		20.25'	23'										1						1		390.04'		
-Y-	23+09.05	23+75.42	CL/LT	66.425'				23+09.05 (BARRIER)	20.25'	23'										1										
			TOTAL	2,100.69'	245.40'																									
		LESS DEDUCTION FOR ANCHOR UNITS																												
		GREU TL-3	4 X 50' =	-200.00'																										
		TYPE III	2 X 18.75' =	-37.50																										
		B-77	11 X 22.875' =	-251.625'																										
		CAT-1	2 X 6.25' =	-12.50'																										
		AT-1	1 X 6.25' =	-6.25'																										
		ATTENUATOR	2 X 21.00' =	-42.00'																										
			GRAND TOTAL	1,550.815'	245.40'													4	2	11	2	1				2		2,481.21'	52	
			SAY	1,562.50'	250.00'													4	2	11	2	1				2		2,500,00'	52	10 ADDITIONAL GUARDRAIL POSTS

PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF
-Y-	21+00.00	22+71.23	RT	171
-Y-	22+66.73	24+68.40	LT	202
			TOTAL:	373
			SAY:	395

CABLE GUIDERAIL SUMMARY

SURVEY LINE	STATION	STATION	LENGTH	END ANCHOR UNIT	INTERMEDIATE ANCHOR UNIT	REMOVE EXISTING GUIDERAIL	COMMENTS
-Y-	18+88.54	21+41.36	254'	1	1	56'	TIE TO EXISTING
-Y-	18+88.54	21+41.36	25'	1		33'	TIE TO EXISTING
		SUBTOTAL:	279'	2	1	89'	
LESS TERMINAL ANCHOR UNITS		2 @ 25'	-50'				
		GRAND TOTALS:	229'	2	1	89'	
		SAY:	230'	2	1	90'	5 ADDITIONAL GUIDERAIL POSTS

MEDIAN HAZARD PROTECTION SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF
-Y-	22+27.73	23+09.05	MED	81
			TOTAL:	81
			SAY:	85

COMPUTED BY: AMH DATE: 2026-01-20

CHECKED BY: TJC DATE: 2026-02-12

PROJECT NO.	SHEET NO.
BP7.R001	3D-1

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".

DESKTOP-0S3UD2R

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

STATION / SIZE / THICKNESS OR GAUGE

STATION	LOCATION (LT, RT, OR CL)' OFFSET	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
14+73 -L-	3' LT	401		706.0	701.3															
		401	402		701.3	698.8														
14+53 -L-	30' LT	402		703.5	698.8															
		402	403		698.8	697.9														
13+75 -L-	30' LT	403		703.9	697.9															
		403	404		697.9	686.1				68						X				X
20+25 -L-	29' LT	405		705.5	700.8															
		405	406		700.8	700.6														
20+15 -L-	29' LT	406		705.3	700.6															
		406	408		700.6	698.9														
19+24 -L-	41.5' LT	407		700.9	697.9															
		407	410		697.9	679.1				88						X				X
19+24 -L-	29' LT	408		703.9	698.9															
		408	407		698.9	697.9														
19+24 -L-	3' LT	409		705.3	700.6															
		409	408		700.6	698.9														
20+46 -Y-	77' RT	410		684.3	678.6															
		410	426		678.6	675.7														
23+38 -L-	29' LT	411		705.3	702.3															
		411	412		702.3	702.1														
23+48 -L-	29' LT	412		705.1	702.1															
		412	414		702.1	700.6														
24+38 -L-	6' LT	413		704.3	701.3															
		413	414		701.3	700.6														
24+38 -L-	29' LT	414		703.6	700.6															
		414	415		700.6	699.4														
25+34 -L-	29' LT	415		702.4	699.4															
		415	416		699.4	699.3	X													
25+34 -L-	6' LT	416		703.1	699.3															
		416	417		699.3	698.7	X													
26+81 -L-	4' RT	417		702.7	698.7															
		417	419		698.7	698.2	X													
26+81 -L-	47' LT	418			699.1															
		418	417		699.1	698.7	X													
13+95 -L-	CL	421			686.0															
		421	422		686.0	670.3														
10+50 'L-	106' LT	423		695.0	687.5															
		423	424		687.5	686.5	X													
19+50 -Y-	74' RT	425		687.3	681.6															
		425	410		681.6	678.6														
21+20 -Y-	76.5' RT	426		683.5	675.2															
		426	427		675.2	674.2														
21+90 -Y-	76.5' RT	427		680.5	674.2															
		427	428		674.2	672.8														
22+41 -Y-	76.5' RT	428		679.1	672.8															
		428	429		672.8	671.3														
23+00 -Y-	76.5' RT	429		677.6	671.3															
		429	430		671.3	667.4														
24+00 -Y-	71.5' RT	430		675.4	667.4															
		430	434		667.4	661.5														
SHEET TOTALS										156										

FROM	TO	R.C. PIPE CLASS III 12"	III 15"	III 18"	III 24"	III 30"	III 36"	III 42"	III 48"	R.C. PIPE CLASS IV 12"	IV 15"	IV 18"	IV 24"	IV 30"	IV 36"	IV 42"	IV 48"	R.C. PIPE CLASS V 12"	V 15"	V 18"	V 24"	V 30"	V 36"	V 42"	V 48"
401	402			32																					
402	403			76																					
405	406			8																					
406	408			88																					
408	407			16																					
409	408			24																					
410	426				72																				
411	412																			8					
412	414																			88					
413	414																			20					
414	415																			92					
415	416																			24					
416	417											144													
417	419											72													
418	417											52													
425	410				96																				
426	427					68																			
427	428					48																			
428	429					56																			
429	430					100																			
430	434					108																			
SHEET TOTALS				244	168	380						268								232					

FROM	TO	24" WELDED STEEL PIPE 0.250" THICK, GRADE B, IN SOIL	24" WELDED STEEL PIPE 0.250" THICK, GRADE B, NOT IN SOIL	30" WELDED STEEL PIPE 0.375" THICK, GRADE B, IN SOIL	30" WELDED STEEL PIPE 0.375" THICK, GRADE B, NOT IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B, IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B, NOT IN SOIL	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
401										1							1	
402										1			1		1			
403										1	1		1		1			
405										1								
406										1								
407										1								
408										1								
409										1							1	
410										1	0.7		1		1			
411										1								
412										1								
413										1							1	
414										1								
415										1								
416										1							1	
417										1							1	
421								3.4										
421	422					96	96											
423										1	2.5							
423	424			100	100													
425										1	0.7		1		1			
426										1	3.3							
427										1	1.3							
428										1	1.3							
429										1	1.3							
430										1	3.0							
SHEET TOTALS				100	100	96	96	3.4		23	15.1		4		4		5	

FROM	TO	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	18" DRAINAGE PIPE ELBOW	24" DRAINGE PIPE ELBOW	30" DRAINAGE PIPE ELBOW			FLOWABLE FILL CY	PIPE CLEANOUT CY	CONCRETE AND BRICK PIPE PLUGS STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
401									1						1																	
403	404																						2									
405							1		1																							
406							1		1																							
407							1			1																						
407	410																						2									
408							1		1																							
409									1						1																	
411							1		1																							
412							1		1																							
413									1						1																	
414							1		1																							
415							1		1																							
415	416																															MIN. REQ'D PIPE GRADE = 0.50%
416									1						1																	
416	417																															MIN. REQ'D PIPE GRADE = 0.40%
417									1						1																	
417	419																															MIN. REQ'D PIPE GRADE = 0.50%
418																																OPEN ENDED PIPE
418	417																															MIN. REQ'D PIPE GRADE = 0.50%
423		1																	1													
423	424																															MIN. REQ'D PIPE GRADE = 0.50%
426						1			1																							
427						1			1																							
428						1			1																							
429						1			1																							
430						1			1																							
SHEET TOTALS		1				5	8		17	1					5				1				4									SHEET TOTALS

ABBREVIATIONS

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

COMPUTED BY:	AMH	DATE:	2026-01-20
CHECKED BY:	TJC	DATE:	2026-02-12

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
BP7.R001	3D-2

TOMOTHINKPAD2

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)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)' OFFSET	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
22+70 -Y-	70.5' LT	431		678.5	673.3															
		431	432		673.3	671.4														
23+50 -Y-	70.5' LT	432		676.6	671.6															
		432	433		671.6	668.5														
24+70 -Y-	70.5' LT	433		673.9	668.5															
25+08 -Y-	68.5' RT	434		673.0	661.0															
		434	435		661.0	659.7							62							
18+07.5 -Y-	60' RT	456		691.9	685.6															
		456	425		685.6	681.6														
21+21 -Y-	CL	460		680.9	676.2															
		460	427		676.2	674.2														
12+64 -L-	CL																			
13+86 -L-	CL																			
21+82 -Y-	30' RT																			
16+97 -L-	99' LT																			
19+35 -L-	126' LT																			
23+74 -Y-	82' RT																			
25+13 -Y-	82' RT																			
30+38 -L-	39 RT																			
SHEET TOTALS													62							
PROJ. TOTALS										156			62							
SAY																				

STATION	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"	R.C. PIPE CLASS V 12"	15"	18"	24"	30"	36"	42"	48"
22+70 -Y-																								
			80																					
23+50 -Y-																								
			120																					
24+70 -Y-																								
25+08 -Y-																								
18+07.5 -Y-																								
				144																				
21+21 -Y-																								
12+64 -L-																								
13+86 -L-																								
21+82 -Y-																								
16+97 -L-																								
19+35 -L-																								
23+74 -Y-																								
25+13 -Y-																								
30+38 -L-																								
SHEET TOTALS			200	144																				
PROJ. TOTALS			444	312	380						268								232					
SAY																								

STATION	24" WELDED STEEL PIPE 0.250" THICK, GRADE B, IN SOIL	24" WELDED STEEL PIPE 0.250" THICK, GRADE B, NOT IN SOIL	30" WELDED STEEL PIPE 0.375" THICK, GRADE B, IN SOIL	30" WELDED STEEL PIPE 0.375" THICK, GRADE B, NOT IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B, IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B, NOT IN SOIL	ENDWALLS 838.01 OR STD. 838.11 STD. (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
22+70 -Y-									1	0.2							
23+50 -Y-									1	0.2							
24+70 -Y-									1	0.5							
25+08 -Y-									1	5.0	2.0						
18+07.5 -Y-									1	1.3		1		1			
21+21 -Y-									1								
	52	52															
12+64 -L-																	
13+86 -L-																	
21+82 -Y-																	
16+97 -L-																	
19+35 -L-																	
23+74 -Y-																	
25+13 -Y-																	
30+38 -L-																	
SHEET TOTALS	52	52							6	7.2	2	1		1			
PROJ. TOTALS	52	52	100	100	96	96	3.4		29	22.3	2	5		5		5	
SAY							4		25								

STATION	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	18" DRAINAGE PIPE ELBOW	24" DRAINAGE PIPE ELBOW	30" DRAINGE PIPE ELBOW		
22+70 -Y-						1		1																		
23+50 -Y-						1		1																		
24+70 -Y-						1		1																		
25+08 -Y-					1			1																		
18+07.5 -Y-																										
21+21 -Y-						1			1																	
12+64 -L-																										
13+86 -L-																										
21+82 -Y-																										
16+97 -L-																										
19+35 -L-																										
23+74 -Y-																										
25+13 -Y-																										
30+38 -L-																										
SHEET TOTALS					1	4		4	1																	
PROJ. TOTALS	1				6	12		21	2					5				1			3	4				
SAY																										

STATION	FLOWABLE FILL CY	PIPE CLEANOUT EA		PIPE REMOVAL LIN. FT.	REMARKS
22+70 -Y-					
23+50 -Y-					
24+70 -Y-					
25+08 -Y-					
18+07.5 -Y-					
21+21 -Y-					
12+64 -L-	25.7				PLUG AND FLOW FILL EXISTING 18" CMP
13+86 -L-	8.0				PLUG AND FLOW FILL EXISTING 15" CMP
21+82 -Y-	8.7				PLUG AND FLOW FILL EXISTING 18" RCP
16+97 -L-				58	REMOVE EXISTING 15" CMP
19+35 -L-				71	REMOVE EXISTING 15" CMP
23+74 -Y-				266	REMOVE EXISTING 30" RCP
25+13 -Y-				32	REMOVE 32 LF OF EXISTING 18" RCP
30+38 -L-		2			CLEAN OUT EXISTING 12" CMP
SHEET TOTALS	42.4	2		427	TOTALS
PROJ. TOTALS	42.4	2		427	PROJ. TOTALS
SAY	45	1.2	0.2	430	SAY

ABBREVIATIONS

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

COMPUTED BY: Hunsberger, W. S. DATE: 1/29/26
CHECKED BY: Crockett, S. C. DATE: 01/29/26

(9-17-24)

PROJECT NO.	SHEET NO.
BP7.R.001	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			ASU(1)		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.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PARCEL INDEX SHEET

PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAME
1	4	CHRISTIE L. HARRISON
2	4	DAVID H. GRIFFIN SR.
2A	4	DAVID H. GRIFFIN SR.

PROJECT REFERENCE	SHEET NO.
BP7.R001	4

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 — JAMES TIMOTHY JORDAN — 09-Mar — MOTT MACDONALD I& E, LLC LICENSE NO. F-0669

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34364 — J. CORMIER — 09-Mar — TOMO ENGINEERING, PLLC LICENSE NO. P-2066

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: MOTT MACDONALD, 930 Main Campus Drive, Suite 200, Raleigh, NC 27606, (919) 552-2253, www.mottmac.com

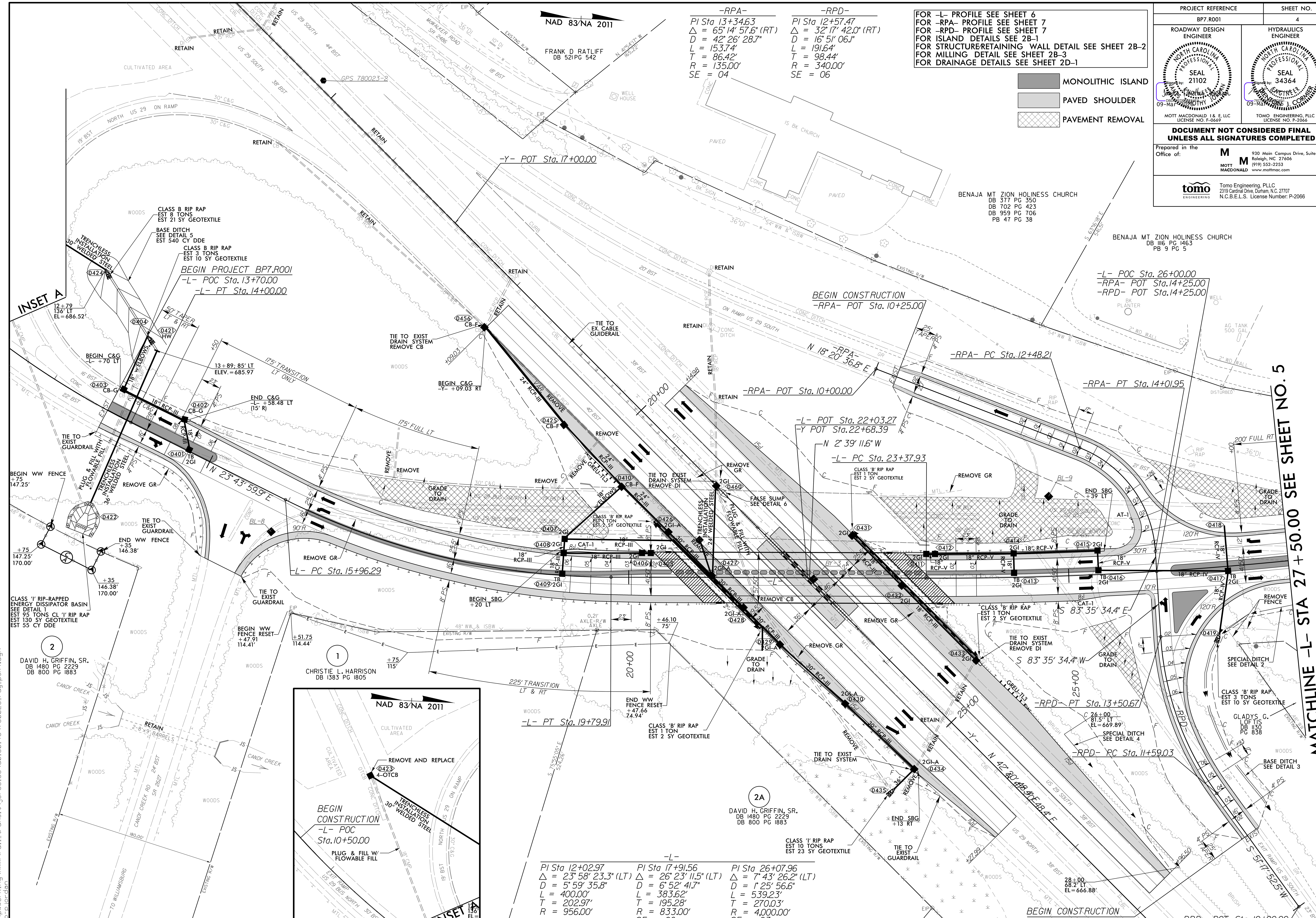
tomo ENGINEERING — Tomo Engineering, PLLC, 2319 Cardinal Drive, Durham, N.C. 27707, N.C.B.E.L.S. License Number: P-2066

FOR -L- PROFILE SEE SHEET 6
FOR -RPA- PROFILE SEE SHEET 7
FOR -RPD- PROFILE SEE SHEET 7
FOR ISLAND DETAILS SEE SHEET 2B-1
FOR STRUCTURE/RETAINING WALL DETAIL SEE SHEET 2B-2
FOR MILLING DETAIL SEE SHEET 2B-3
FOR DRAINAGE DETAILS SEE SHEET 2D-1

- MONOLITHIC ISLAND
- PAVED SHOULDER
- PAVEMENT REMOVAL

-RPA-
PI Sta 13+34.63
Δ = 65° 14' 57.6" (RT)
D = 42° 26' 28.7"
L = 153.74'
T = 86.42'
R = 135.00'
SE = .04

-RPD-
PI Sta 12+57.47
Δ = 32° 17' 42.0" (RT)
D = 16° 51' 06.1"
L = 191.64'
T = 98.44'
R = 340.00'
SE = .06



-L-

PI Sta 12+02.97	PI Sta 17+91.56	PI Sta 26+07.96
Δ = 23° 58' 23.3" (LT)	Δ = 26° 23' 11.5" (LT)	Δ = 7° 43' 26.2" (LT)
D = 5° 59' 35.8"	D = 6° 52' 41.7"	D = 1° 25' 56.6"
L = 400.00'	L = 383.62'	L = 539.23'
T = 202.97'	T = 195.28'	T = 270.03'
R = 956.00'	R = 833.00'	R = 4,000.00'
	SE = .06	SE = .03

3/9/2026 6:12:09 AM
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PROJECT REFERENCE	SHEET NO.
BP7.R001	5

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 — JAMES TIMOTHY JORDAN — 09-Mar — MOTT MACDONALD I& E, LLC LICENSE NO. F-0669

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34364 — J. CORMIER — 09-Mar — TOMO ENGINEERING, PLLC LICENSE NO. P-2066

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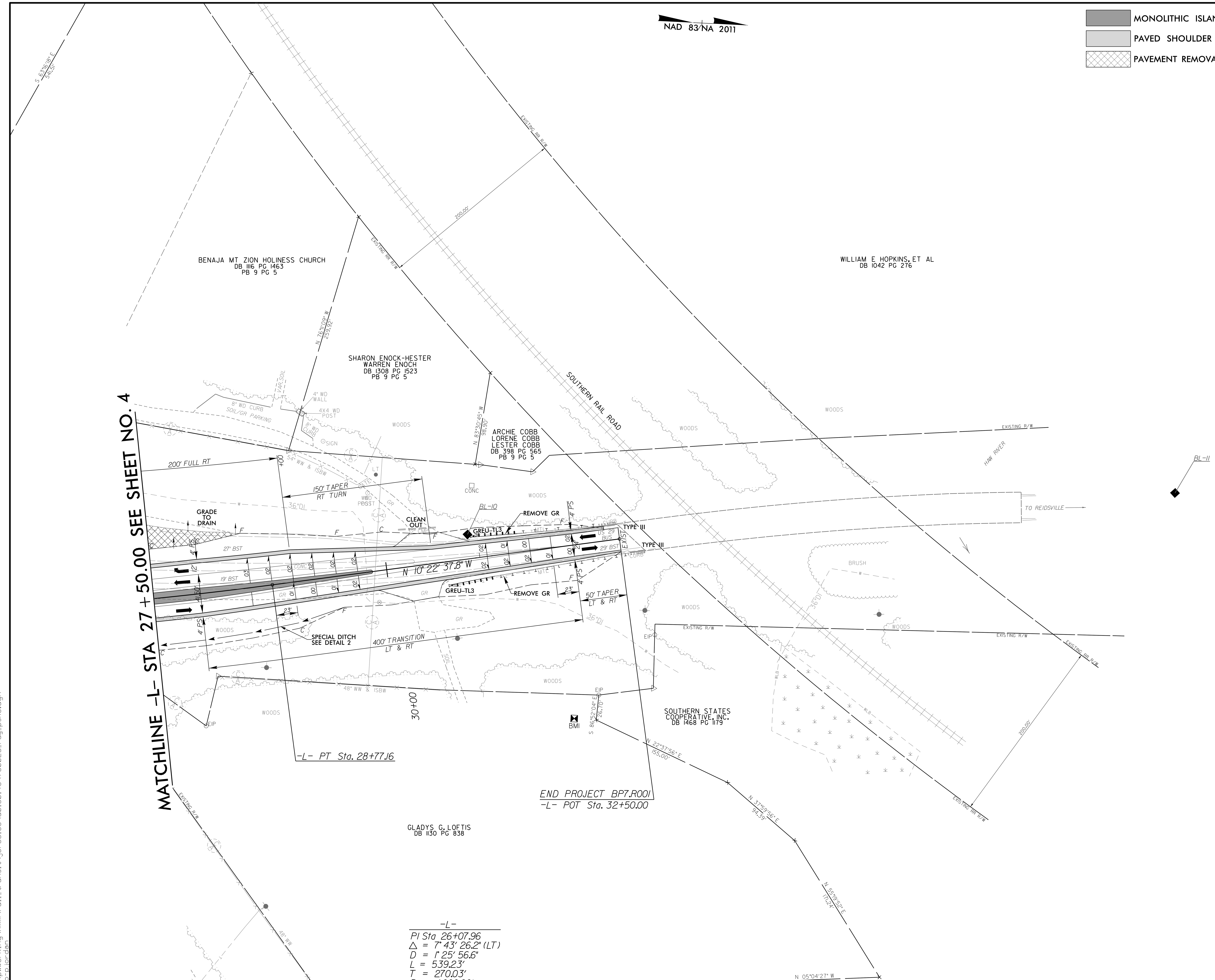
tomo ENGINEERING — Tomo Engineering, PLLC, 2319 Cardinal Drive, Durham, N.C. 27707, N.C.B.E.L.S. License Number: P-2066

FOR -L- PROFILE SEE SHEET 6
FOR MILLING DETAIL SEE SHEET 2B-3
FOR DRAINAGE DETAILS SEE SHEET 2D-1



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-L-

BEGIN GRADE
STA. 13+70.00
EL = 706.71'

PI = 15+00.00
EL = 706.05'
VC = 120'
K = 81

PI = 17+00.00
EL = 707.98'
VC = 160'
K = 63

PI = 19+00.00
EL = 704.80'
VC = 220'
K = 85

PI = 22+00.00
EL = 707.84'
VC = 300'
K = 124

(−)0.5077%
(+)0.9650%
(−)1.5900%
(+)1.0133%
(−)1.4000%

PROPOSED GRADE
EXISTING GRADE

EX. 18" RCP (PLUG & FLOWABLE FILL)
36" WSP

PIPE HYDRAULIC DATA

36" WSP -L- Sta. 13+95

DRAINAGE AREA	= 10.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 39	CFS
DESIGN HW ELEVATION	= 689.4	FT
100 YEAR DISCHARGE	= 40	CFS
100 YEAR HW ELEVATION	= 689.5	FT
OVERTOPPING FREQUENCY	= 500 +	YRS
OVERTOPPING DISCHARGE	= ≥ 44	CFS
OVERTOPPING ELEVATION	= 695	FT

FOR -L- PLAN SEE SHEET 4

PROJECT REFERENCE	SHEET NO.
BP7.R001	6

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JOSEPH THOMAS JORDAN

Signed by: JOSEPH THOMAS JORDAN
09-Mar-2026

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

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TAMERON J CORNER

Signed by: TAMERON J CORNER
09-Mar-2026

TOMO ENGINEERING, PLLC
LICENSE NO. P-2066

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Prepared in the Office of:
MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
(919) 552-2253
www.mottmac.com

tomo ENGINEERING
Tomo Engineering, PLLC
2319 Cardinal Drive, Durham, N.C. 27707
N.C.B.E.L.S. License Number: P-2066

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

-L-

PI = 26+00.00
EL = 702.24'
VC = 250'
K = 147

PI = 30+50.00
EL = 703.59'
VC = 300'
K = 85

END PROJECT
STA. 32+50.00

END GRADE
STA. 32+00.00
EL = 698.73'

(−)1.4000%
(+)0.3000%
(−)3.2400%
(+)0.6300%

PROPOSED GRADE
EXISTING GRADE

MILL TO EXIST

BEGIN SP DITCH -L- STA. 27+00 ELEV. = 697.59'

END SP DITCH -L- STA. 29+83 ELEV. = 698.85'

BM1 EL=697.35
N 915706 E 1807950
-L- STA 31+77.00 183.29' RT
RR SPIKE IN 12" POPLAR

FOR -L- PLAN SEE SHEET 4 & 5

3/9/2026 6:12:33 AM
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jse.pjordan

PROJECT REFERENCE	SHEET NO.
BP7.R001	7

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN Signed by: James Timothy Jordan DBD87EDB56F64FA... 09-Mar-2026	NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENT J. CORMIER Signed by: Trent Cormier 76B7396E5482491... 09-Mar-2026
MOTT MACDONALD I & E, LLC LICENSE NO. F–0669	TOMO ENGINEERING, PLLC LICENSE NO. P–2066

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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Raleigh, NC 27606
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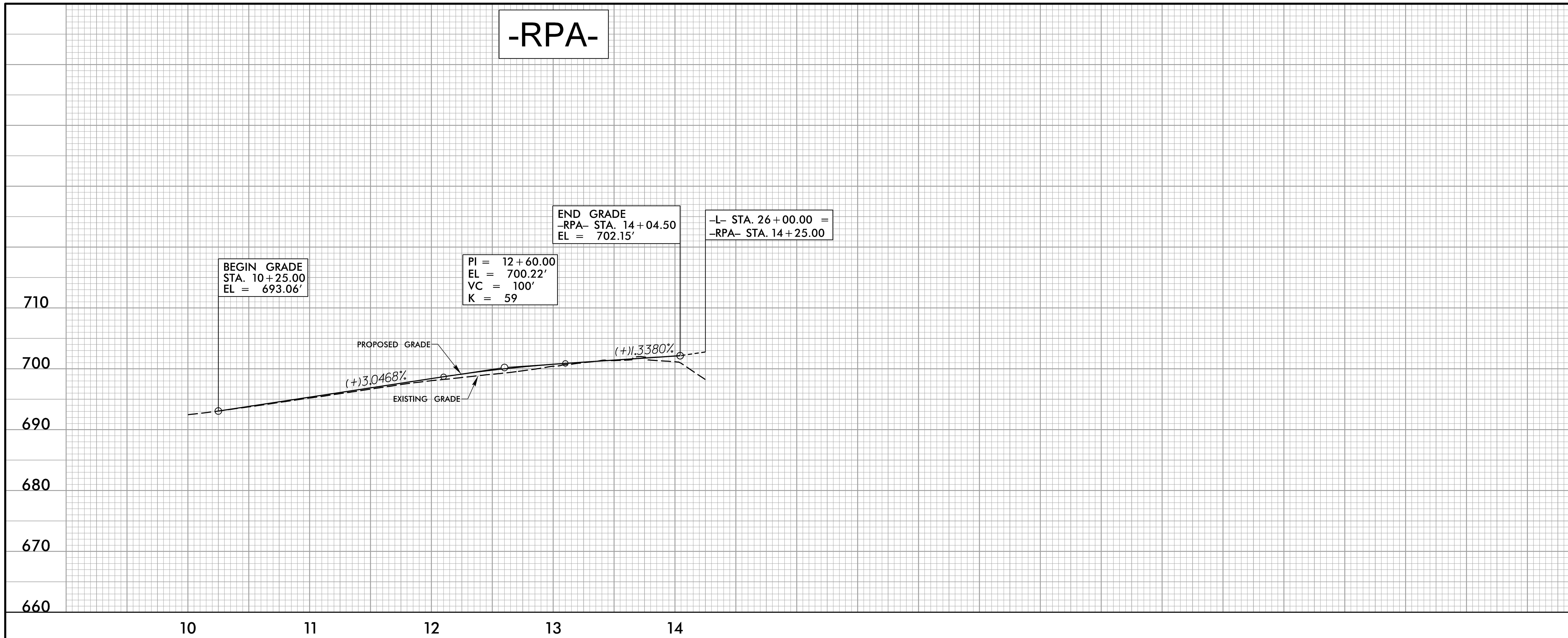
www.mottmac.com

tomo ENGINEERING
Tomo Engineering, PLLC
2319 Cardinal Drive, Durham, N.C. 27707
N.C.B.E.L.S. License Number: P-2066

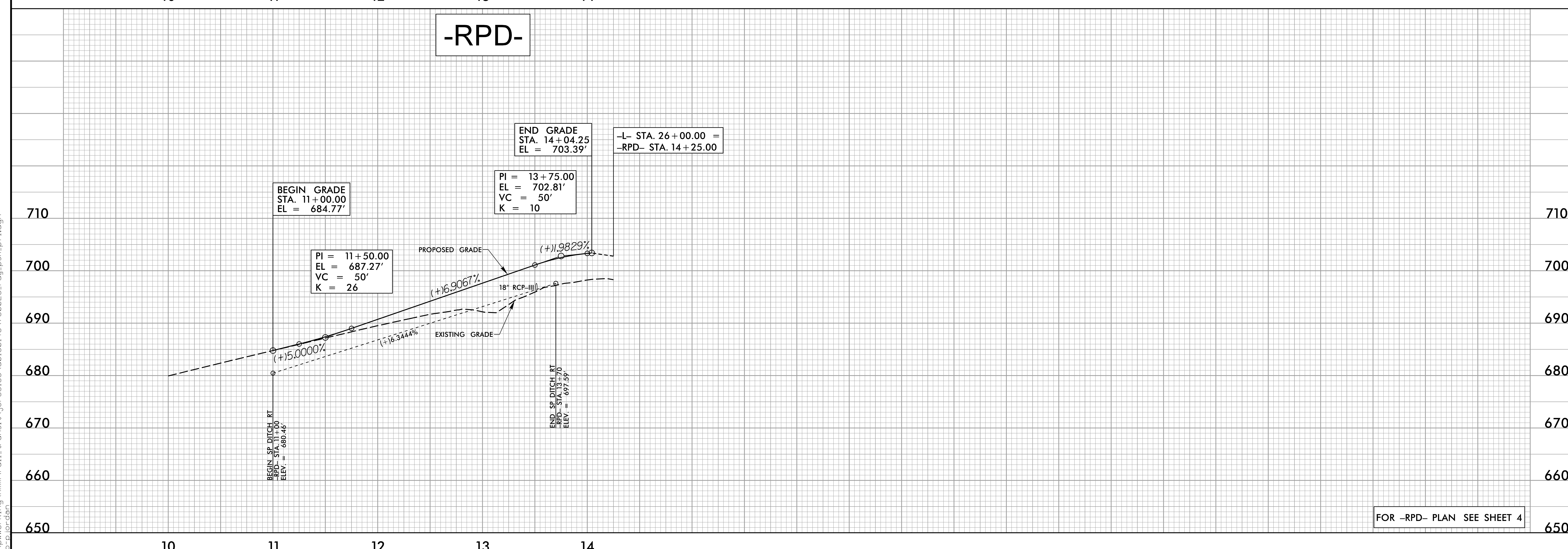
VERTICAL SCALE: 5′ 0 5′ 10′
HORIZONTAL SCALE: 25′ 0 25′ 50′

-RPA-



FOR –RPA– PLAN SEE SHEET 4

-RPD-



FOR –RPD– PLAN SEE SHEET 4