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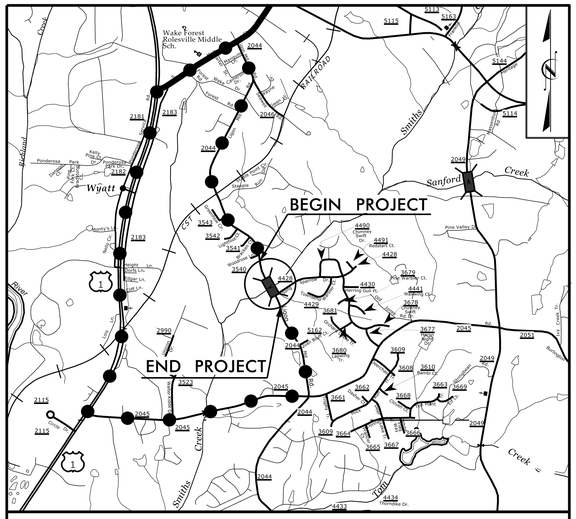
09/08/99

TIP PROJECT: B–5318

CONTRACT: C204554

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



VICINITY MAP

DENOTES OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

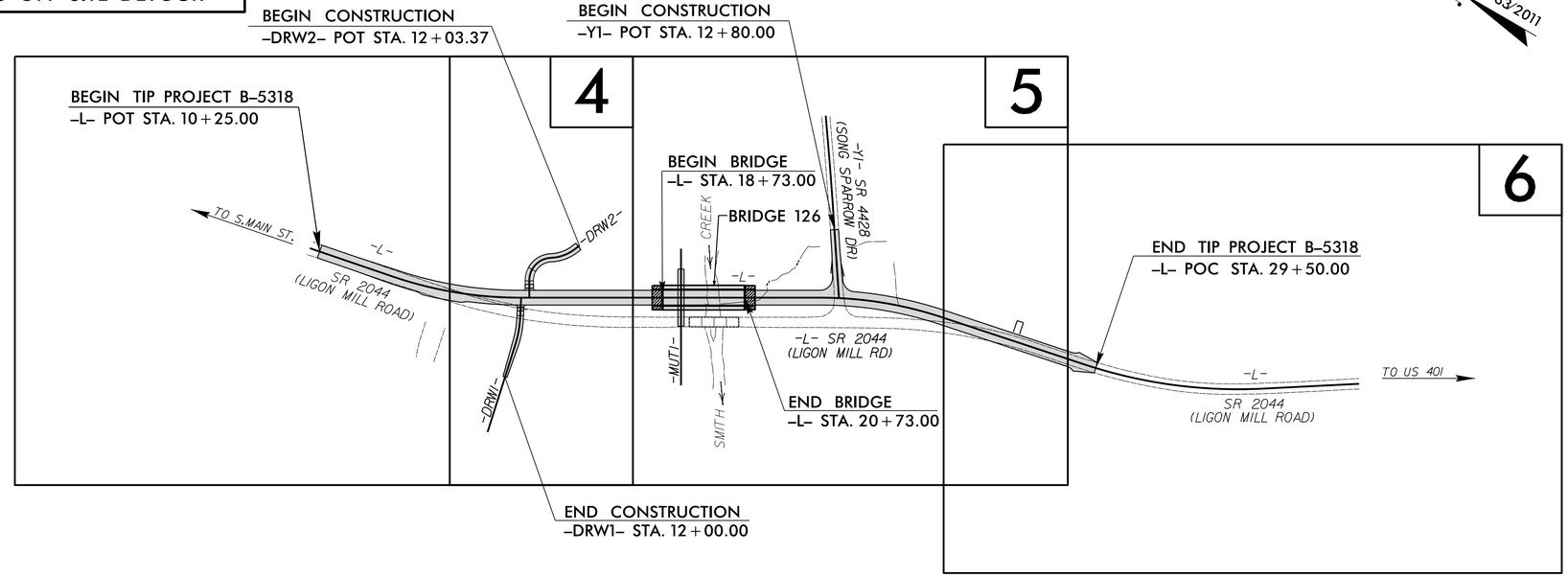
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–5318	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46032.1.1	BRZ–2044(4)	P.E.
46032.2.1		R/W
46032.2.2		UTILITIES
46032.3.2	BRZ–2044(4)	CONST.

LOCATION: REPLACE BRIDGE #126 OVER SMITH CREEK ON SR 2044 (LIGON MILL ROAD) IN WAKE FOREST

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: LISA BULLARD–GILCHRIST, EI

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 2022 = 9,070
ADT 2042 = 12,770
K = 10 %
D = 55 %
T = 2 % *
V = 50 MPH
* TTST = 1 DUAL 3
FUNC CLASS = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–5318	=	0.327 MILES
LENGTH STRUCTURE TIP PROJECT B–5318	=	0.038 MILES
TOTAL LENGTH TIP PROJECT B–5318	=	0.365 MILES

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F–0929

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 21, 2019

LETTING DATE:
NOVEMBER 15, 2022

BRYAN LAMBETH, P.E.
PROJECT ENGINEER

BEN STORMER, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREA S HAYDEN

DocuSigned by: Andrea Hayden
C4A93D325CF4490...
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S LAMBETH

DocuSigned by: Bryan Lambeth
D5EC0F7684EC4B6...
SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

9/14/2022 4:17:54 PM
...\Roadway\Proj\B5318_RDY_TSH.dgn
USER: blambeth

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. LAMBETH

DocuSigned by: Bryan Lambeth D5EC0F7684FC4B6...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TIP: B–5318 INDEX OF SHEETS

2018 ROADWAY ENGLISH STANDARD DRAWINGS — EFF. 01–16–2018 REV.

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch – N. C. Department of Transportation – Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.03	Method of Clearing – Method III
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 – MAJOR STRUCTURES	
422.01	Bridge Approach Fills – Type I Standard Approach Fill
422.03	Reinforced Bridge Approach Fills – Type A Alternate Approach Fill for Integral Abutment
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right–of–Way Marker
806.02	Granite Right–of–Way Marker
815.02	Subsurface Drain
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
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout – Radius Type
848.04	Street Turnout
848.05	Curb Ramp – Proposed Curb & Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail – B–77 and B–83 Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01–16–2018
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. 225.05 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.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS 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

CITY OF RALEIGH, DUKE ENERGY, WAKE EMC, CENTURYLINK/LUMEN

SPECTRUM/CHARTER, TING, DOMINION ENERGY

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 CONTRACT.

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.05 and/or 848.06.

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
B-5318	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 — 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
- 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 — 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
- Proposed Slope Stakes Fill
- 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
- 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
- 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)* — 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
- 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)* — T
- U/G Telephone Cable (SUE – LOS C)* — T
- U/G Telephone Cable (SUE – LOS D)* — T
- U/G Telephone Conduit (SUE – LOS B)* — TC
- U/G Telephone Conduit (SUE – LOS C)* — TC
- U/G Telephone Conduit (SUE – LOS D)* — TC
- U/G Fiber Optics Cable (SUE – LOS B)* — T FO
- U/G Fiber Optics Cable (SUE – LOS C)* — T FO
- U/G Fiber Optics Cable (SUE – LOS D)* — T FO

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO. B-5318 | SHEET NO. 2A-1

ROADWAY DESIGN ENGINEER — SEAL 038648 — Bryan S. Lambeth
PAVEMENT DESIGN ENGINEER — SEAL 022896 — Clark S. Morrison

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

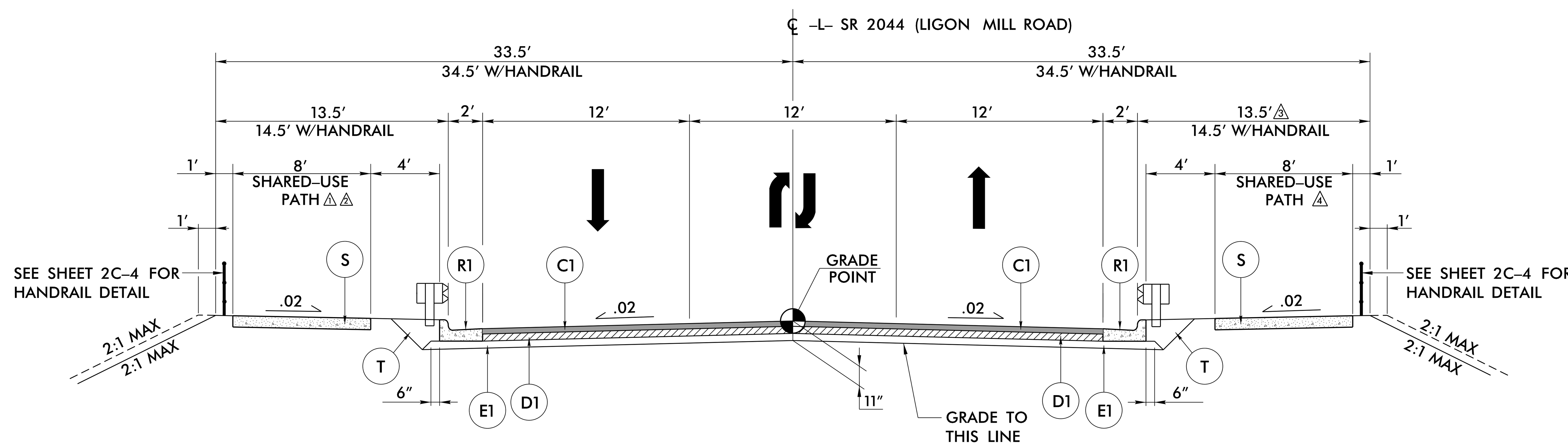
Dewberry — 2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929

NC DEPARTMENT OF TRANSPORTATION PAVEMENT MANAGEMENT UNIT 1593 MAIL SERVICE CENTER RALEIGH, NC 27699-1593

FINAL PAVEMENT SCHEDULE

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	4" JOINTED CONCRETE WITH WIRE MESH	D2	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4" IN DEPTH.	S	4" CONCRETE SIDEWALK
A2	6" JOINTED CONCRETE WITH WIRE MESH	E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.	T	EARTH MATERIAL
C1	PROP. APPROX. 3" ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" IN DEPTH.	U	EXISTING PAVEMENT
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.	J1	PROP. 6" AGGREGATE BASE COURSE	V1	INCIDENTAL MILLING (SEE MILLING DETAIL V1)
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.	R1	2'-6" CONCRETE CURB AND GUTTER		

NOTE: PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED.



⚠ 5' SIDEWALK LOCATION WITH 8.5' BERM:
STA. 10+25 TO STA. 12+50 LT

⚠ SHARED-USE PATH LOCATION:
STA. 12+50 TO STA. 18+48 LT
STA. 20+98 TO STA. 22+76 LT

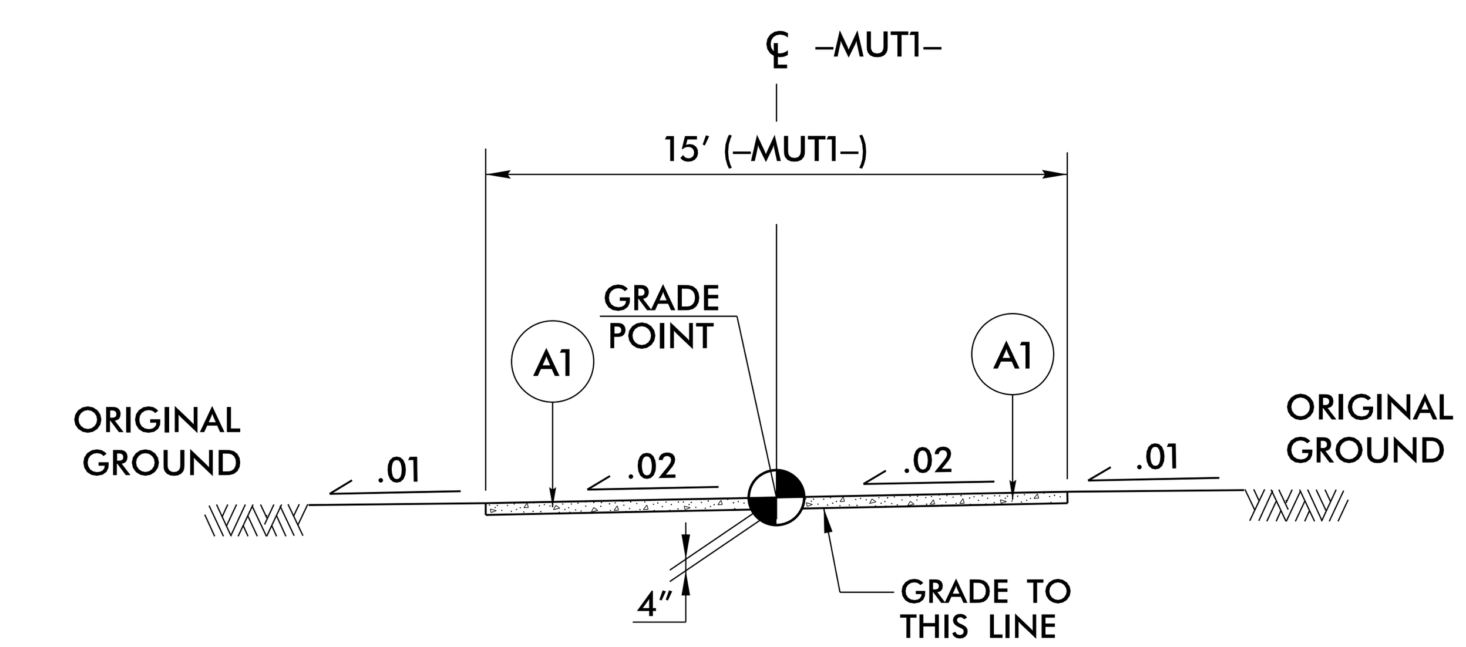
TYPICAL SECTION NO. 1

-L- STA. 10+25.00 TO STA. 18+73.00 (BEGIN BRIDGE)
-L- STA. 20+73.00 (END BRIDGE) TO STA. 29+50.00

TRANSITION TO APPROACH SLAB:
STA. 18+08 TO STA. 18+48
STA. 20+98 TO STA. 21+38

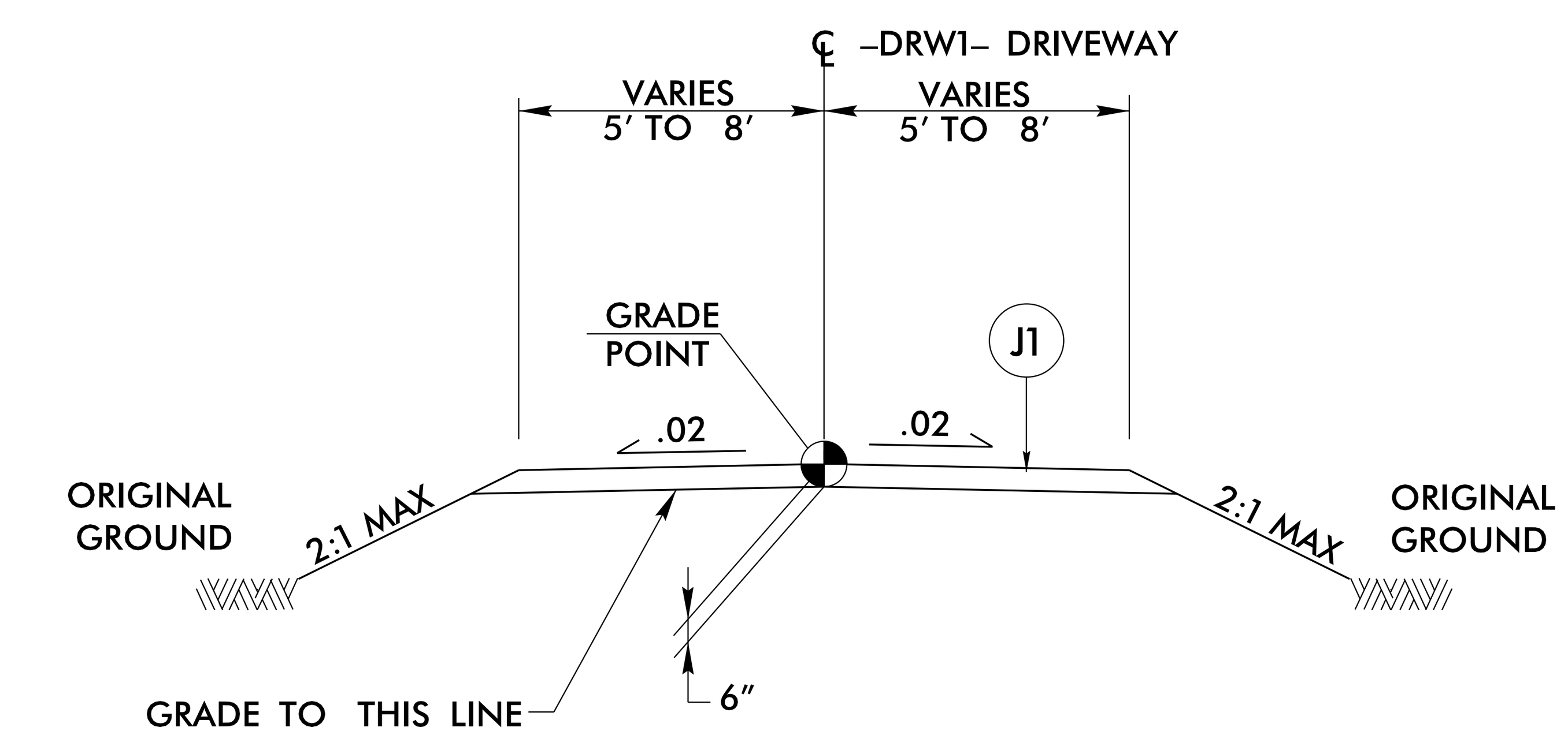
⚠ 4'-0" BERM WIDTH
STA. 10+25 TO 15+09 RT

⚠ SHARED-USE PATH LOCATION:
STA. 15+50 TO STA. 18+48 RT
STA. 20+98 TO STA. 29+50 RT



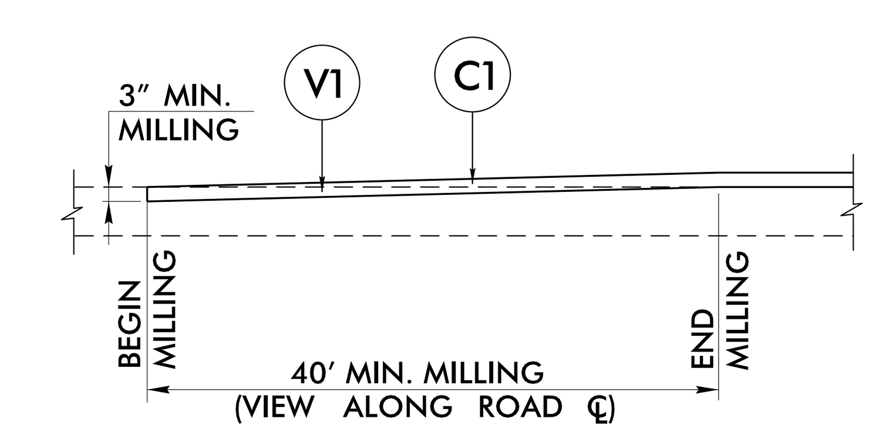
TYPICAL SECTION NO. 2

-MUT1- STA. 10+50.00 TO STA. 11+90.00



TYPICAL SECTION NO. 3

-DRW1- STA. 10+32.54 TO STA. 12+00.00



INCIDENTAL MILLING DETAIL - V1

-L- STA. 10+25.00 TO 10+65.00

6/2/99

FINAL PAVEMENT SCHEDULE

ITEM	DESCRIPTION
A1	4" JOINTED CONCRETE WITH WIRE MESH
A2	6" JOINTED CONCRETE WITH WIRE MESH
C1	PROP. APPROX. 3" ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.

ITEM	DESCRIPTION
D2	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE
R1	2'–6" CONCRETE CURB AND GUTTER

ITEM	DESCRIPTION
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING (SEE MILLING DETAIL V1)

NOTE: PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
B–5318	2A–2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. LAMBETH

Bryan Lambeth

DSEC0F78847C4B6...

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CLARK S. MORRISON

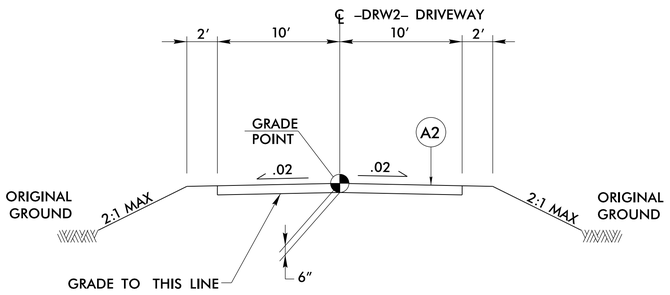
Clark Morrison

80A11CDD1E004C4...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

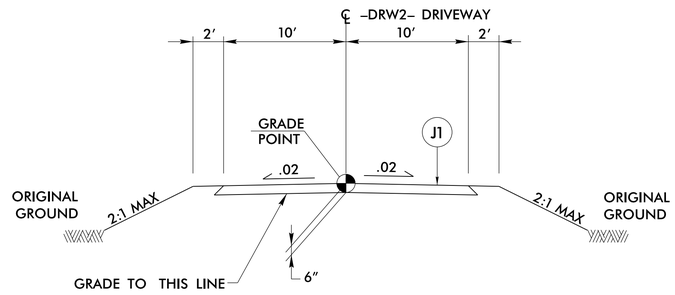
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



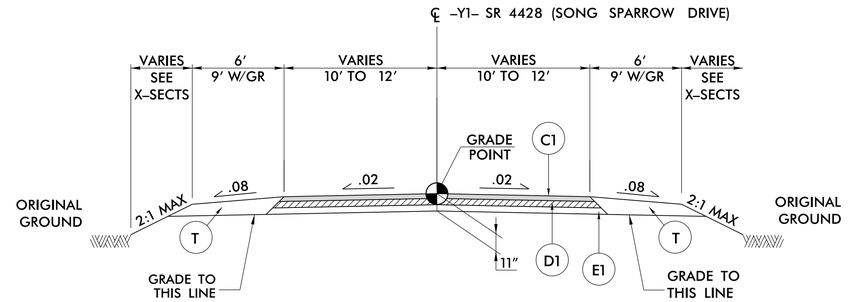
TYPICAL SECTION NO. 3A

–DRW2– STA. 10+32.50 TO STA. 10+70.00



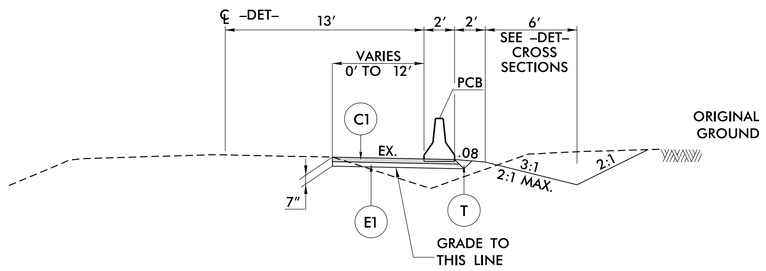
TYPICAL SECTION NO. 3B

–DRW2– STA. 10+70.00 TO STA. 12+00.00



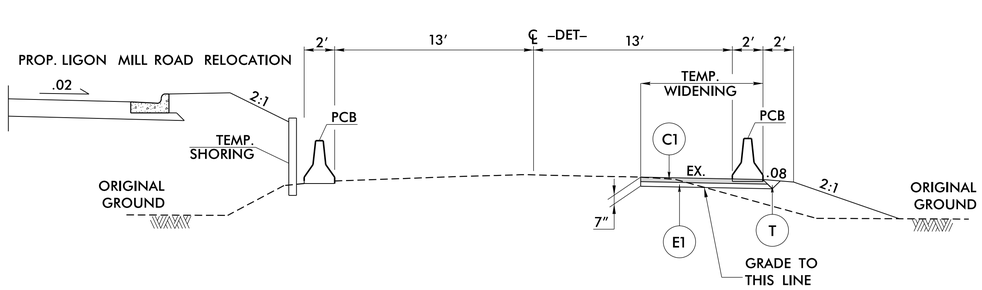
TYPICAL SECTION NO. 4

–Y1– STA. 12+80.00 TO STA. 14+29.72



TYPICAL SECTION NO. 5

TEMPORARY PAVEMENT WIDENING:
–DET– STA. 11+25.00 TO STA. 19+48.00 – RT
PORTABLE CONCRETE BARRIER:
–DET– STA. 13+54.00 TO STA. 19+48.00 – RT



TYPICAL SECTION NO. 5A

–DET– STA. 14+00.00 TO STA. 19+48.00
–DET– STA. 20+58.00 TO STA. 22+00.00
SEE TRAFFIC MANAGEMENT PLANS FOR LOCATION OF TEMPORARY SHORING AND PCB

9/22/2022 3:16:10 PM
i:\TPD\B5318_RDY_TYP_02A-2.dgn

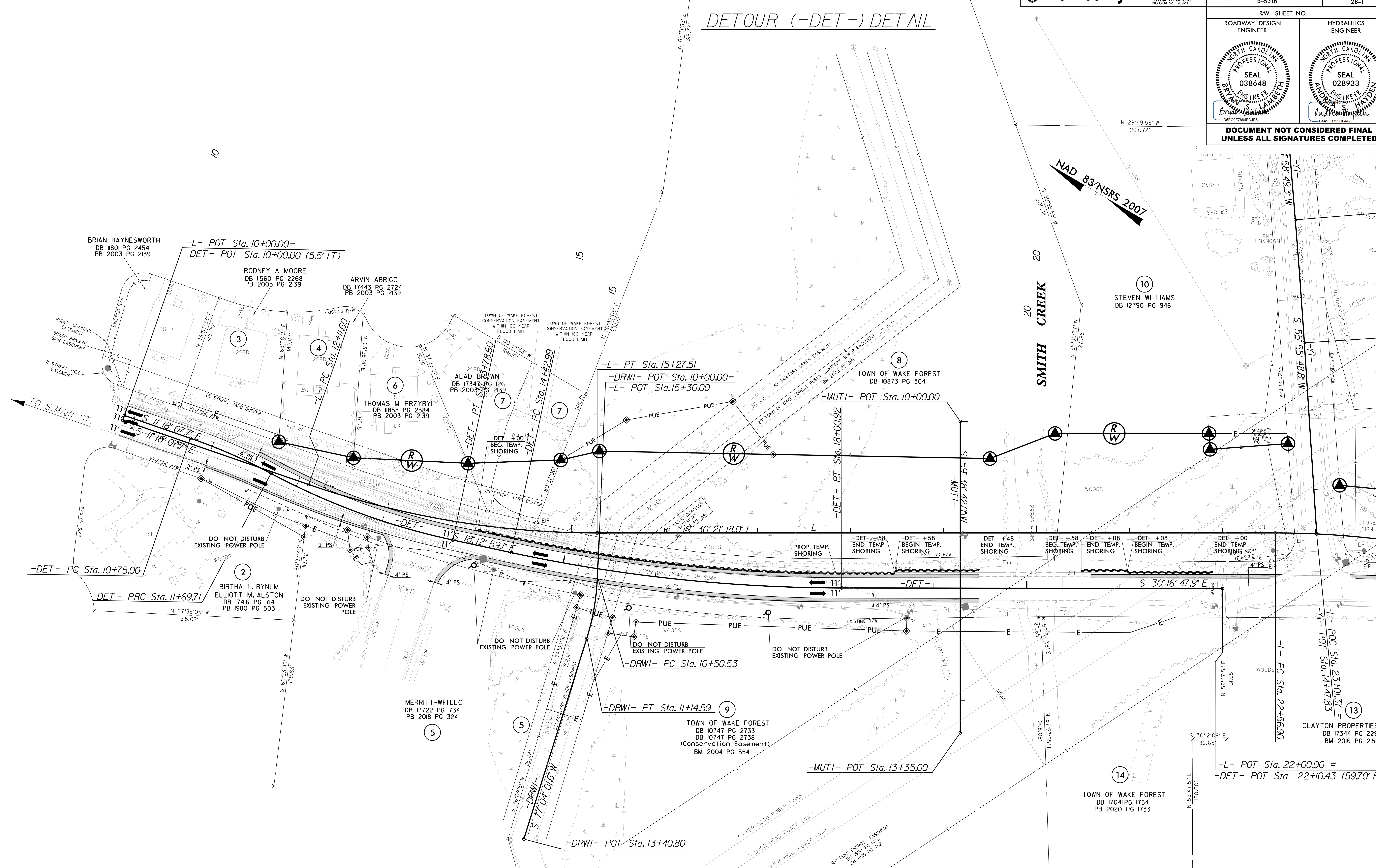
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2B-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. LAMBETH	NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREW S. HAYDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETOUR (-DET-) DETAIL



-DET-

PI Sta 11+22.45	PI Sta 12+74.84	PI Sta 16+22.62
Δ = 9° 02' 38.8" (RT)	Δ = 15° 57' 30.2" (LT)	Δ = 12° 03' 48.9" (LT)
D = 9° 32' 57.5"	D = 7° 38' 22.0"	D = 3° 22' 13.2"
L = 94.71'	L = 208.89'	L = 357.93'
T = 47.45'	T = 105.13'	T = 179.63'
R = 600.00'	R = 750.00'	R = 1,700.00'
Se = EXIST.	Se = EXIST.	Se = EXIST.

SEE SHEETS 2G-1 THRU 2G-4 FOR TEMPORARY SHORING DETAILS
SEE TMP SHEETS FOR PHASING OF TEMPORARY SHORING
SEE TMP SHEETS FOR PLACEMENT OF TRAFFIC CONTROL DEVICES

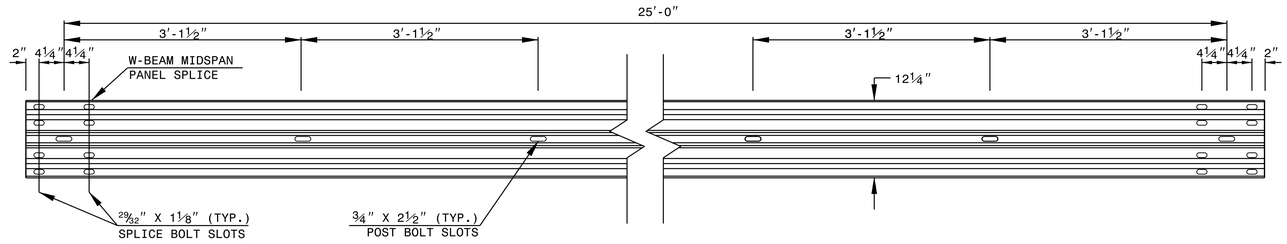
PROJECT REFERENCE NO.	SHEET NO.
B-5318	2C-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

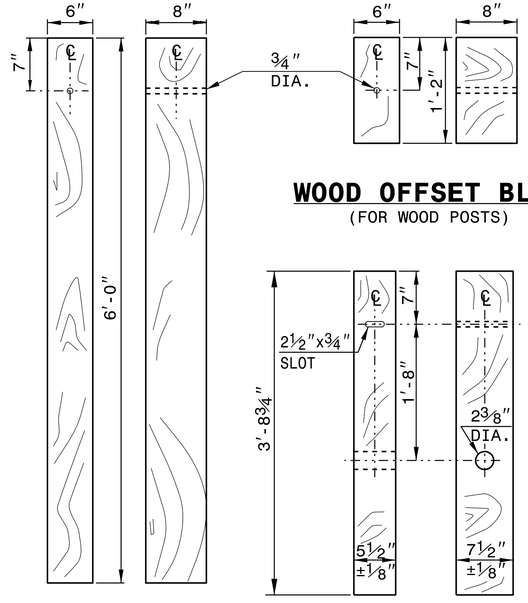
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



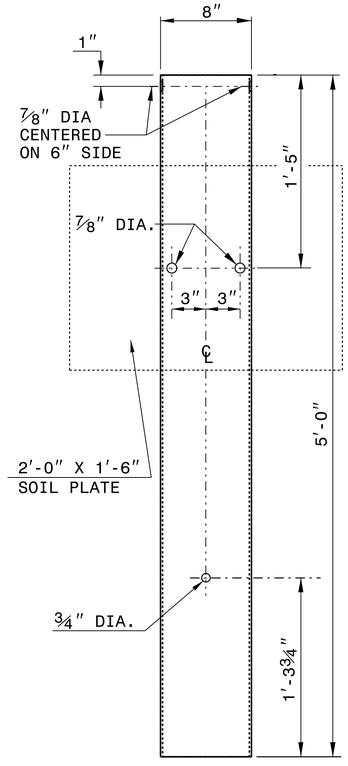
STANDARD W-BEAM GUARDRAIL



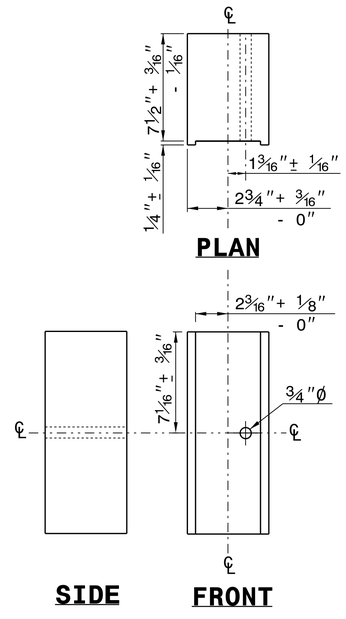
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



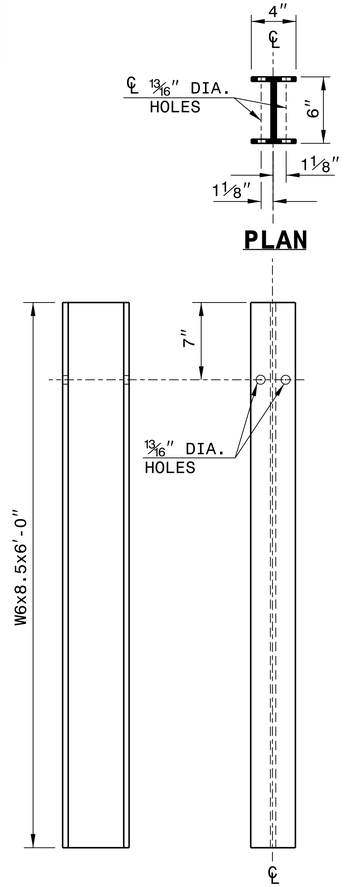
STEEL TUBE
TS 6"x8"x0.1875"



PLAN

SIDE **FRONT**

ROUTED OFFSET BLOCK



PLAN

SIDE **FRONT**

"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICHOLAS W. BACHER
5884323D34164C5...

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

SEE TITLE BLOCK

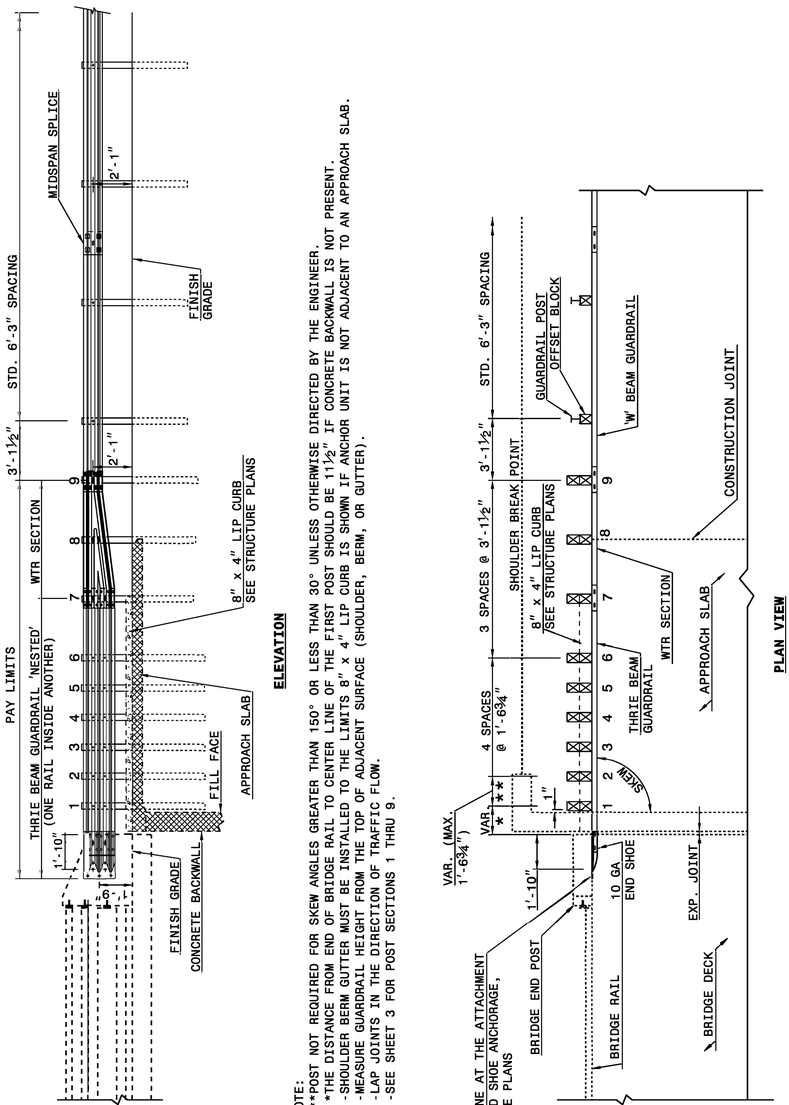
ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2C-2

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

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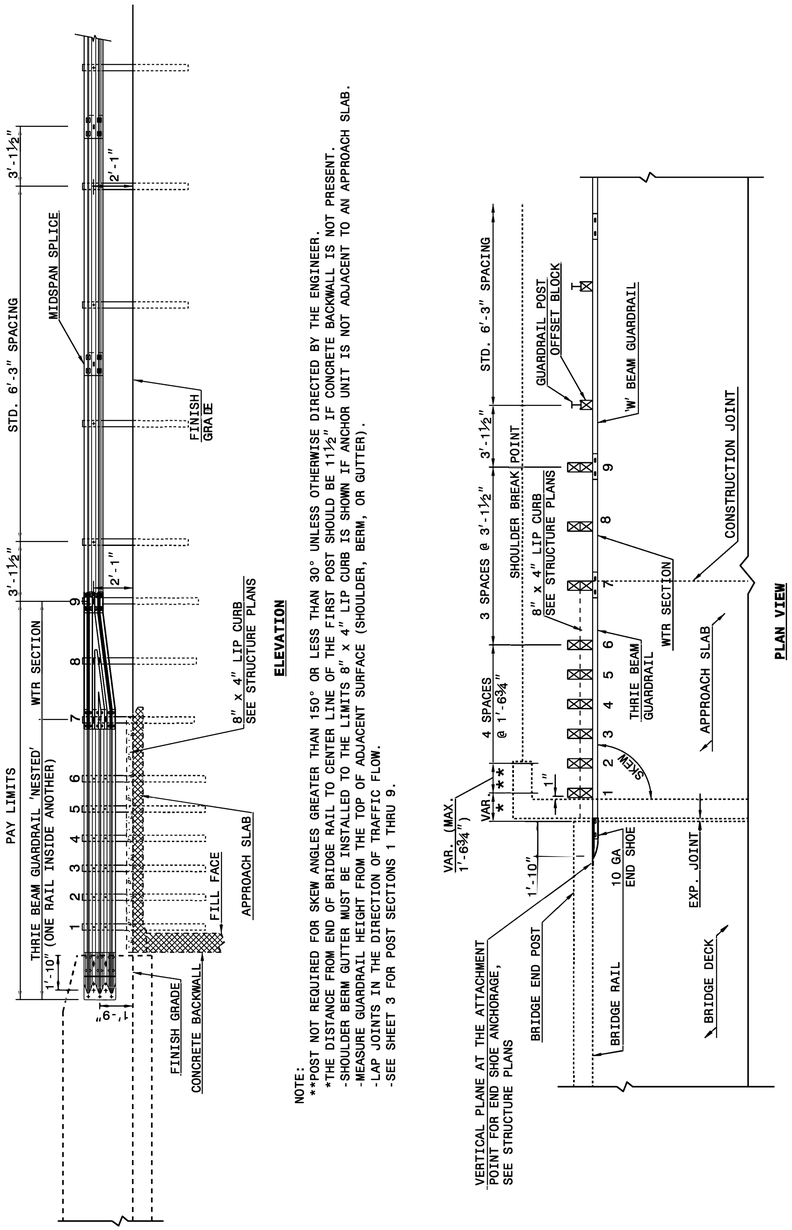
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03



NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

14-DEC-2017 10:36
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2018 Standard Drawings\Details in Lieu of Standards\Division 8\0862d0301.dgn
jhowerton AT CSD-2925595

SEAL 33144 ENGINEER JOSEPH M. HOWERTON NORTH CAROLINA PROFESSIONAL

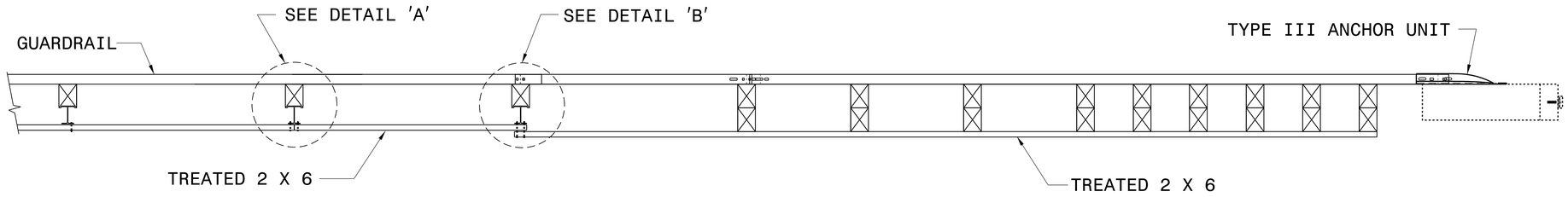
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

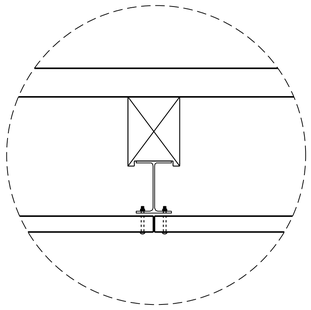
SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

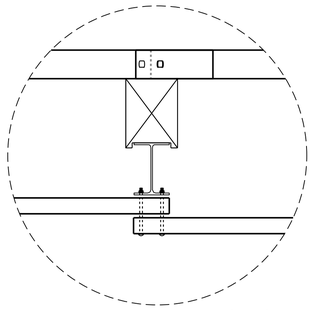
PROJECT REFERENCE NO.	SHEET NO.
B-5318	2C-3



PLAN

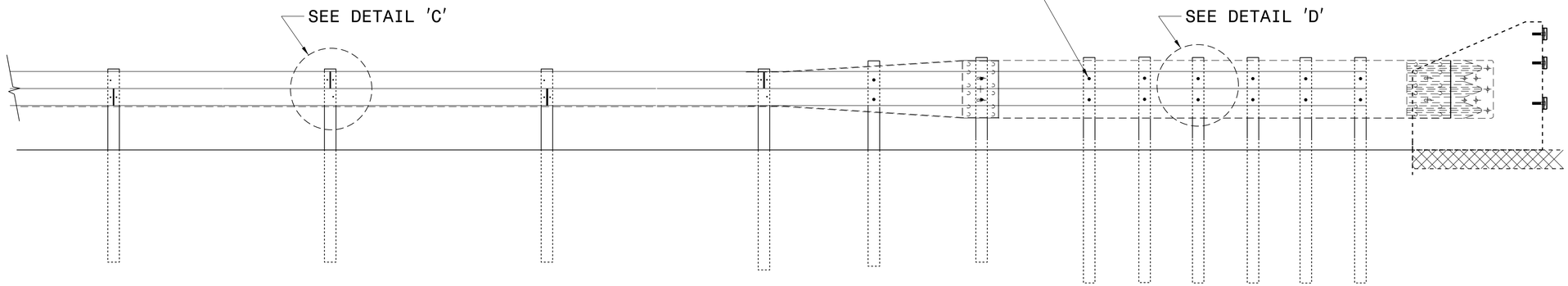


DETAIL 'A'

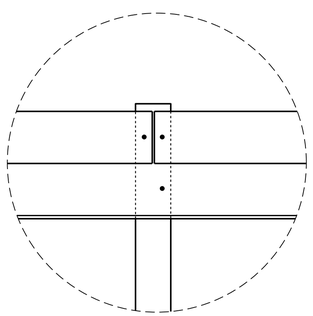


DETAIL 'B'

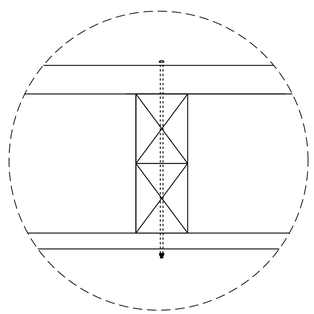
USE BOLTS AND NUTS FROM TYPE III ANCHOR UNIT TO FASTEN 2 X 6 WOOD RAILS TO THE WOOD POSTS - BOLTS MAY NEED TO BE LENGTHENED TO ACCOMMODATE FOR THE 2 X 6 WOOD RAILS.



ELEVATION



DETAIL 'C'



DETAIL 'D'

NOTES:

1. USE #2 SYP TREATED 2 X 6 FOR WOOD RAIL.
2. USE GUARDRAIL BOLTS TO FASTEN WOOD RAIL TO GUARDRAIL POSTS. SEE ROADWAY STD.NO.862.02.
3. THE MOUNTING HEIGHT OF THE WOOD RAIL TO BE DETERMINED IN THE FIELD.
4. PLACE THE TREATED 2 X 6 WOOD RAIL AS DIRECTED BY THE ENGINEER.
5. DO NOT PLACE WOOD RAIL WITHIN THE PAY LIMITS OF THE GREU.

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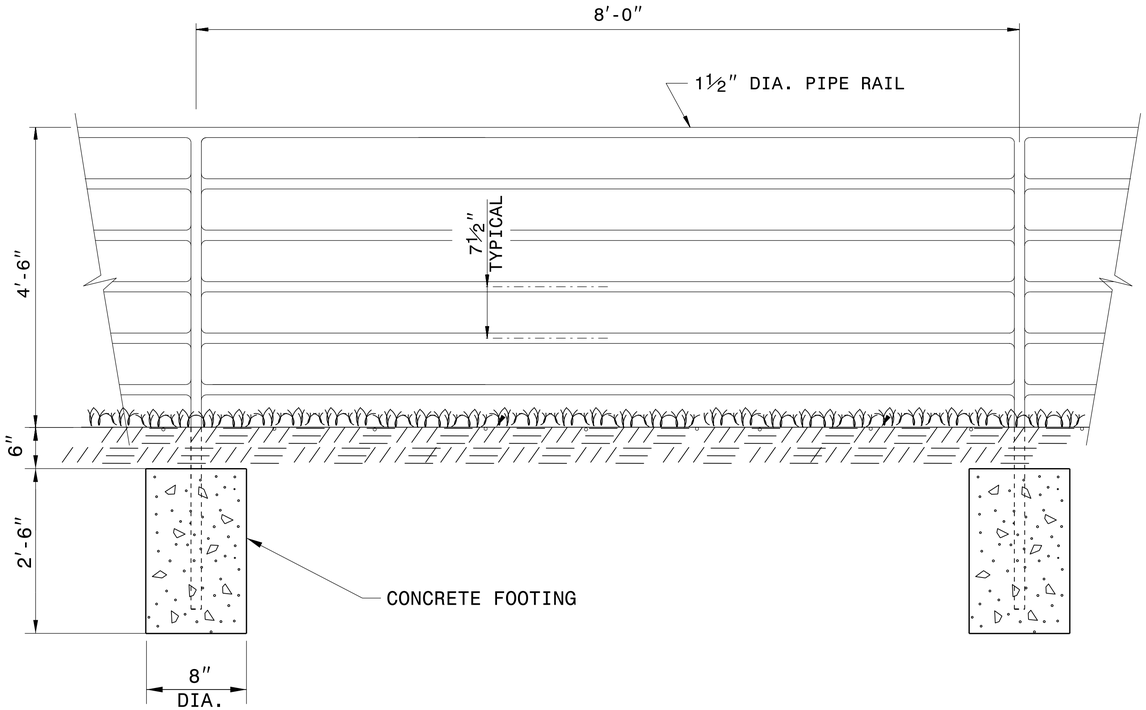
CONTRACT STANDARDS AND DEVELOPMENT UNIT
PLANS AND STANDARDS SECTION
Office 919-707-6950 FAX 919-250-4119

DETAIL OF WOOD RUB RAIL

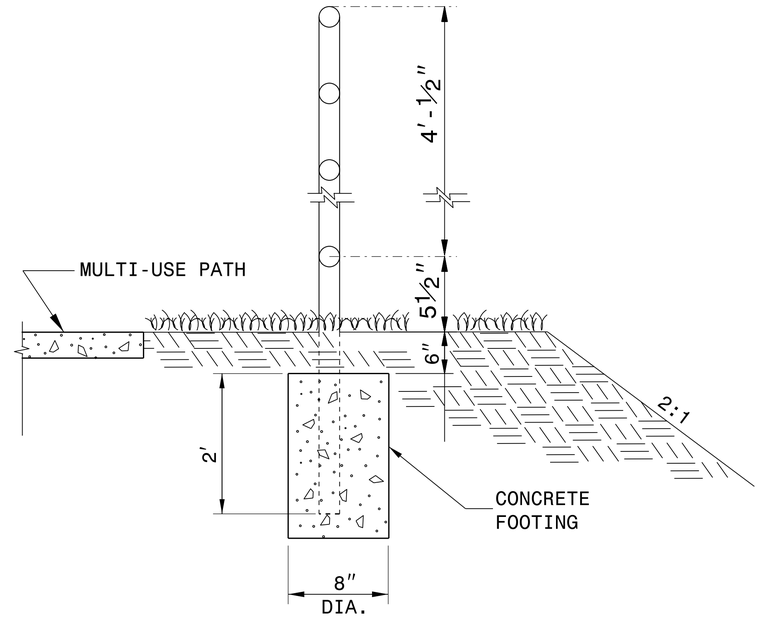
ORIGINAL BY: STD.862 DATE: 1-25-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton/Wood Rail on Back of Guardrail

23-AUG-2018 09:52
S:\Contracts\Contracts\Special Details\jhowerton\Wood Rail on the Back of Guardrail.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
	2C-4



ELEVATION OF HANDRAIL



INSET 'A'

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½″ DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.

PLACEMENT OF HANDRAIL IN RELATION TO SHOULDER BREAK POINT AND PATH MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. WALKER

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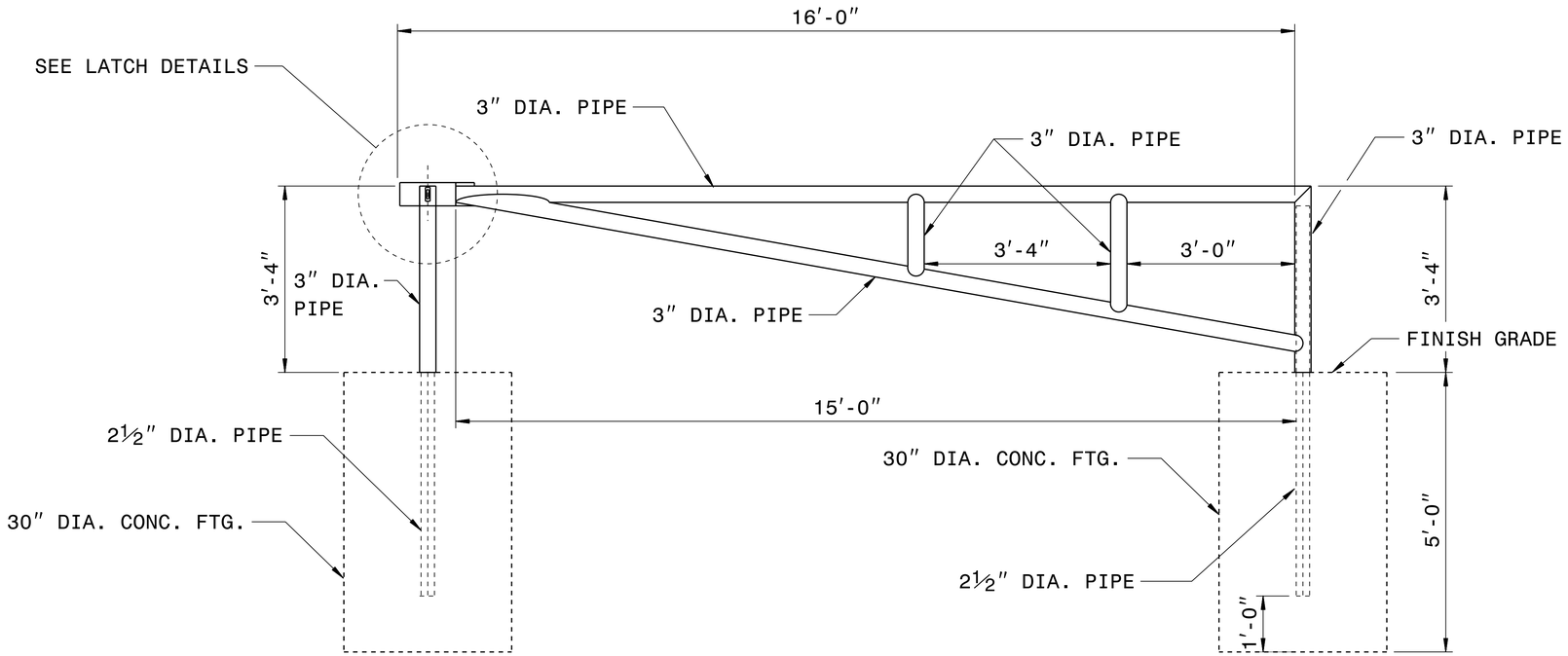
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

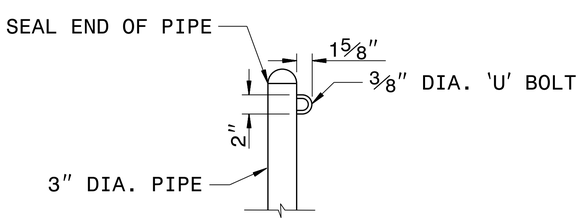
PROPOSED BIKE/PED SAFETY RAIL

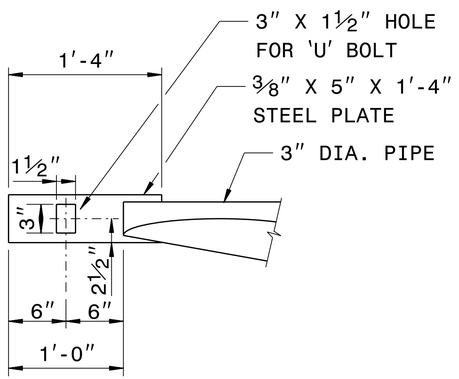
ORIGINAL BY: E.E. WARD DATE: 12-99
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: jhowerton/handrail adjacent to sidewalk.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2C-5



ELEVATION VIEW





LATCH DETAILS

GENERAL NOTES:
1- ALL STEEL SHALL BE ASTM A36 STEEL.
2-¼″ FILLET WELDS ON ALL CONNECTIONS.
3-CONCRETE SHALL BE MINIMUM CLASS 'B'.
4-GATE SHALL BE LOCATED AS DIRECTED BY THE ENGINEER.
5-ALL PIPE SIZES ARE O.D.
6-LUBRICATE 2½″ DIA. PIPE BEFORE INSTALLING GATE TO INSURE SMOOTH OPERATION.
7-GATE SHALL BE PAID FOR PER EACH INSTALLATION.

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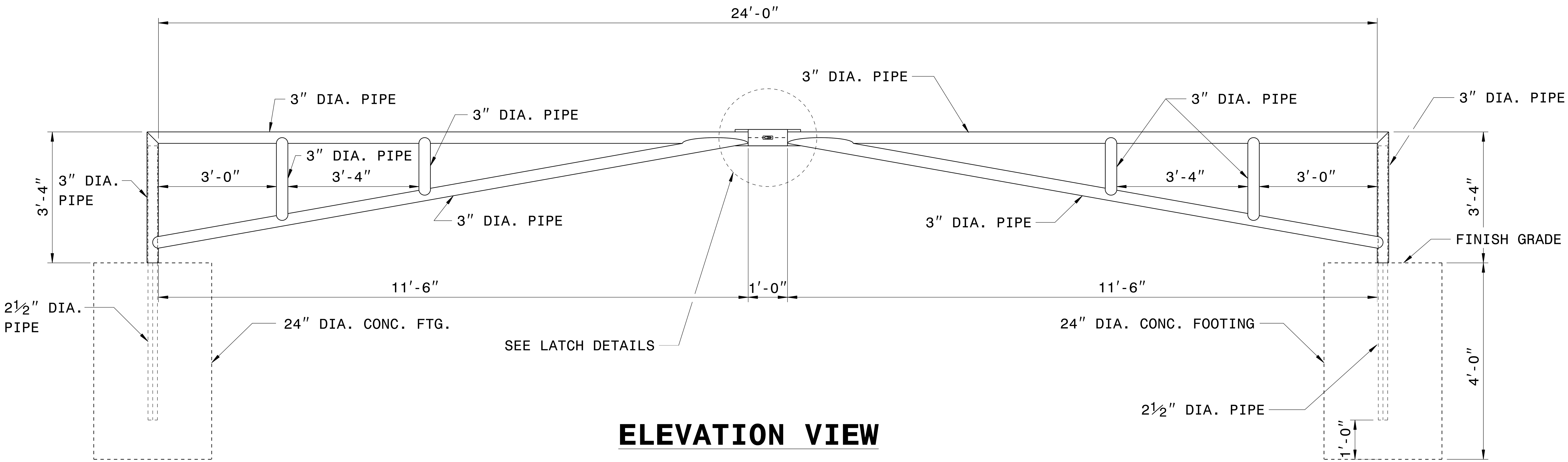
CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

DETAIL OF STEEL PIPE GATE

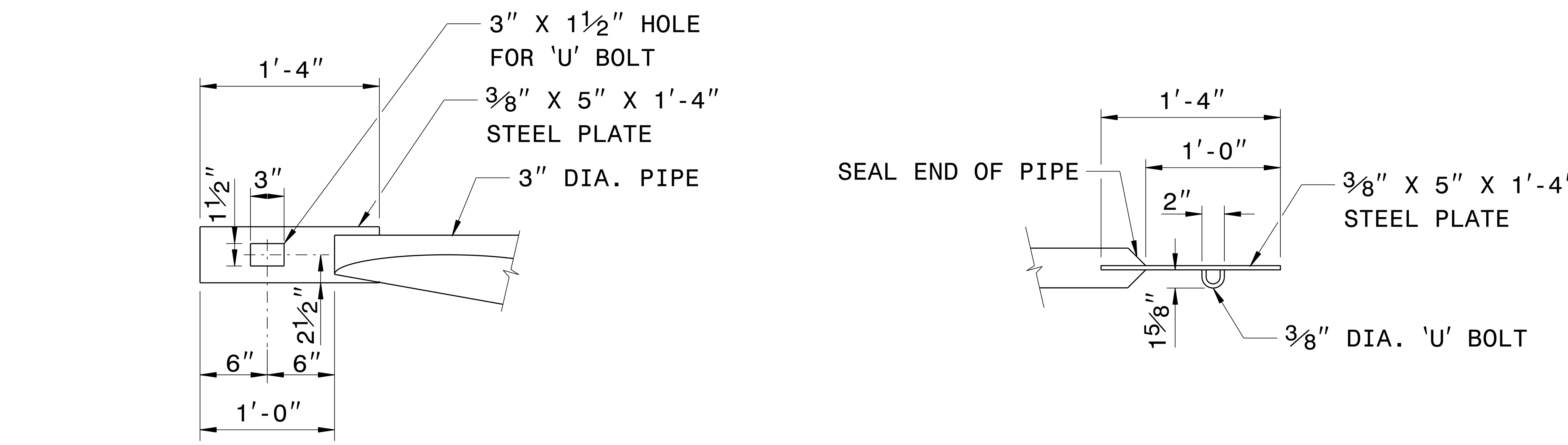
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 09-08-05
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/misc/steelpipegate.dgn

09-MAY-2019 14:43
S:\Contracts\Special Details\nbritt\english\misc\steel pipe gate.dgn
jhowerton
AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2C-6



ELEVATION VIEW



LATCH DETAILS

GENERAL NOTES:

1- USE ASTM A36 STEEL.
2- ¼" FILLET WELDS ON ALL CONNECTIONS.
3- USE CLASS 'B' CONCRETE.
4- LOCATE GATE AS DIRECTED BY THE ENGINEER.
5- ALL PIPE SIZES ARE O.D.
6- LUBRICATE 2½" DIA. PIPE BEFORE INSTALLING GATE TO INSURE SMOOTH OPERATION.

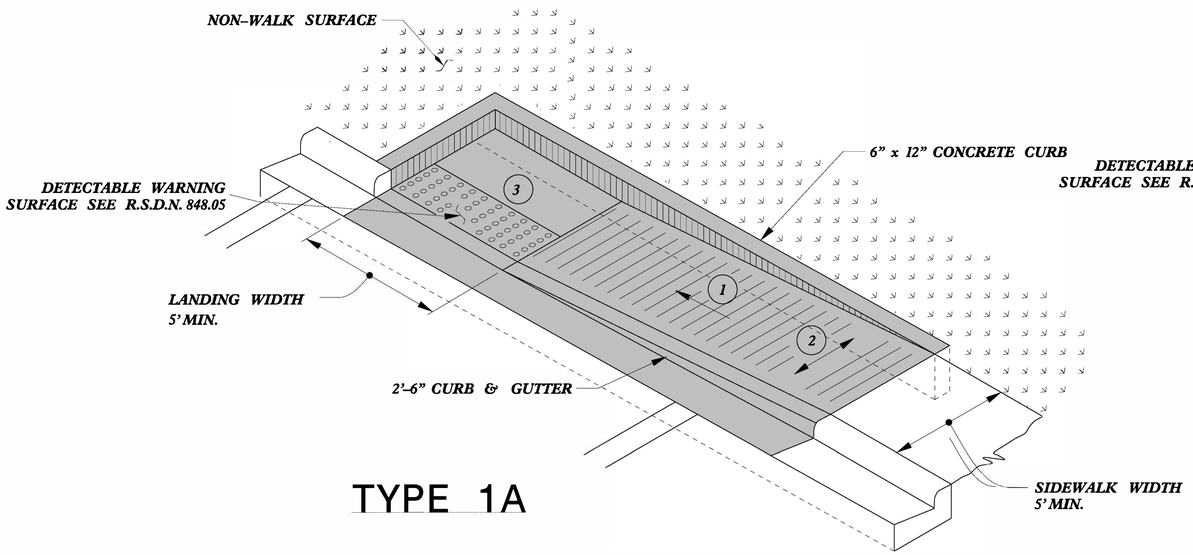
CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

DETAIL OF STEEL PIPE GATE

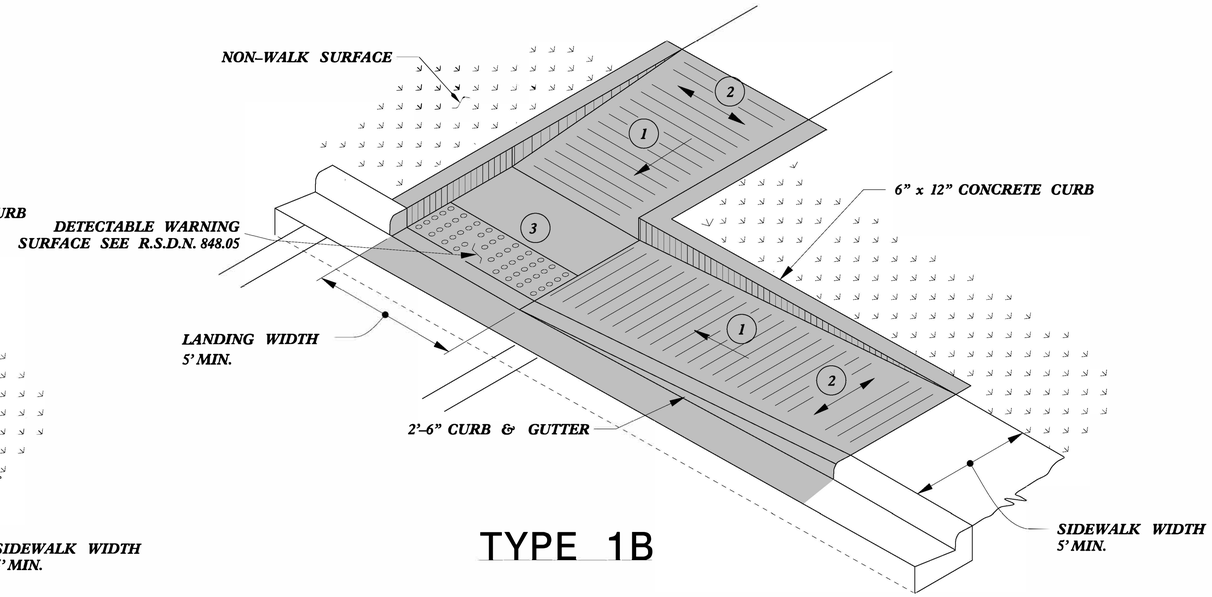
ORIGINAL BY: DATE:
MODIFIED BY: rnbritt DATE: 09-08-05
CHECKED BY: DATE:
FILE SPEC.: details/nbritt/misc/steelpipegate.dgn

5/14/99

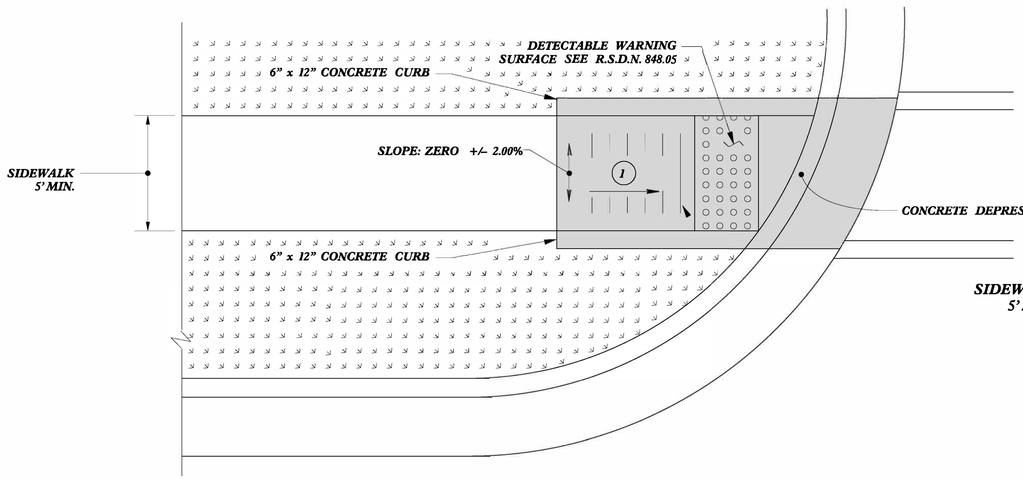
PROJECT REFERENCE NO.	SHEET NO.



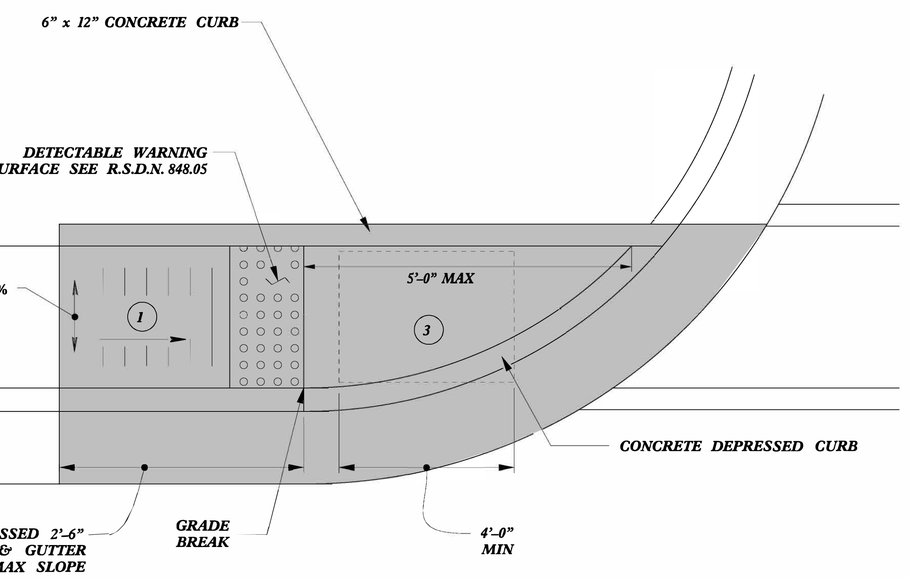
TYPE 1A



TYPE 1B



TYPE 1 Modified



TYPE 1

(1) *8.33% (12:1) MAX RAMP SLOPE*

(2) *CROSS SLOPE: 2.00%*

(3) *CURB RAMPS REQUIRE A (4'–0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.*

PAY LIMITS FOR 1 CURB RAMP

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER

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

CURB RAMPS

Directional Ramps

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC. :stds/2012CurbRamp/CurbRampDetails.dgn

$$SYSTEM$$
$$USERNAME$$

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 08/18/2022
F760CAEB96EC4D3...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

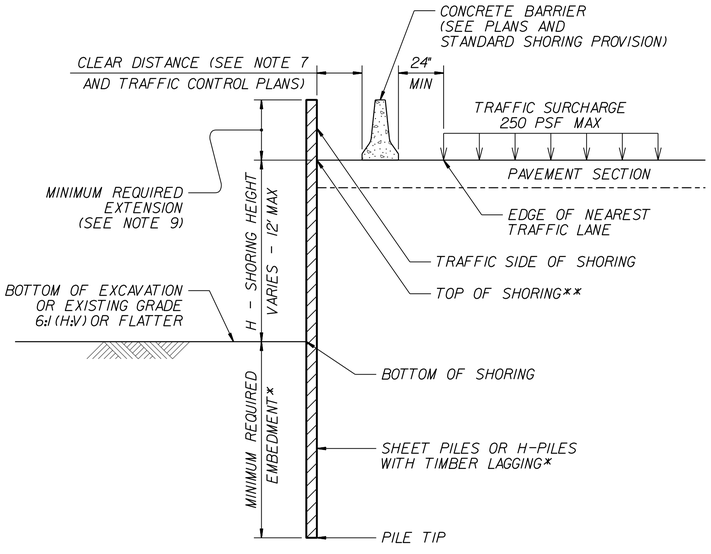
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (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 "--".

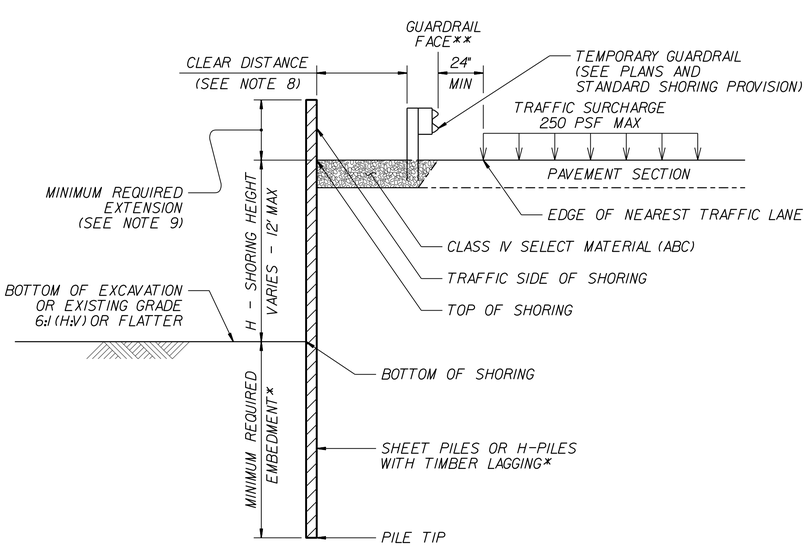
NOTES:

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.



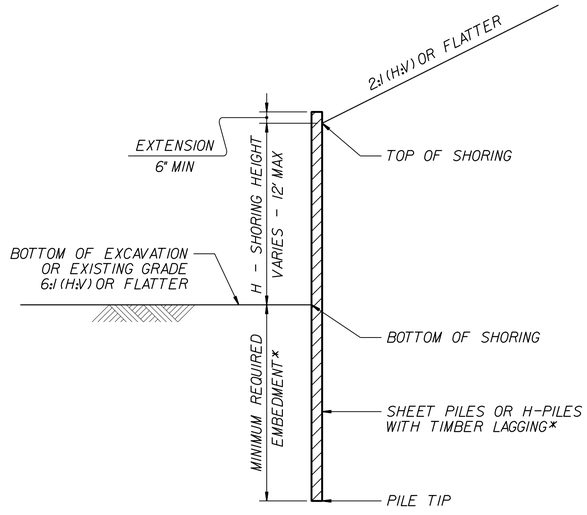
CONCRETE BARRIER

**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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden F760CAEB96FC4D3... 08/18/2022 SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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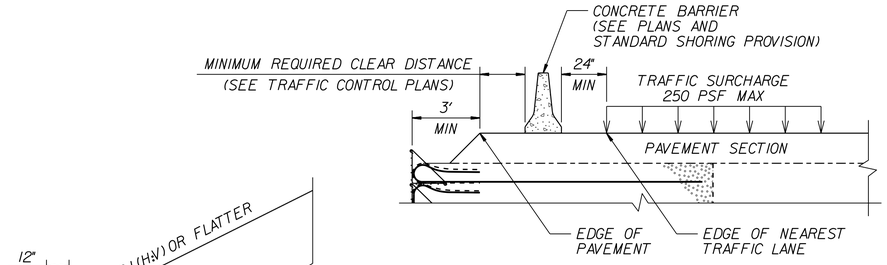
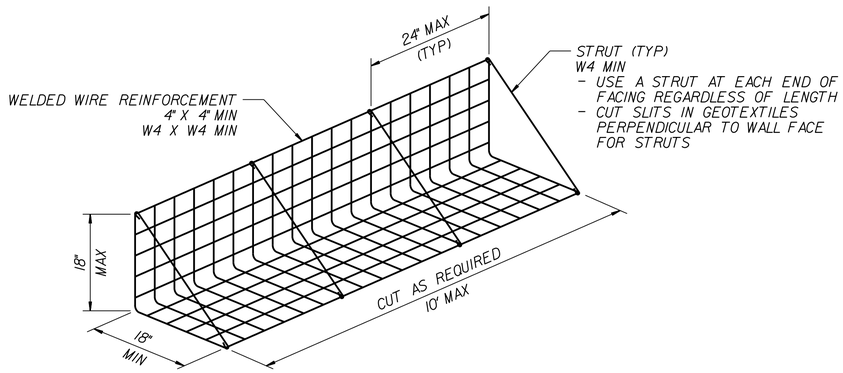
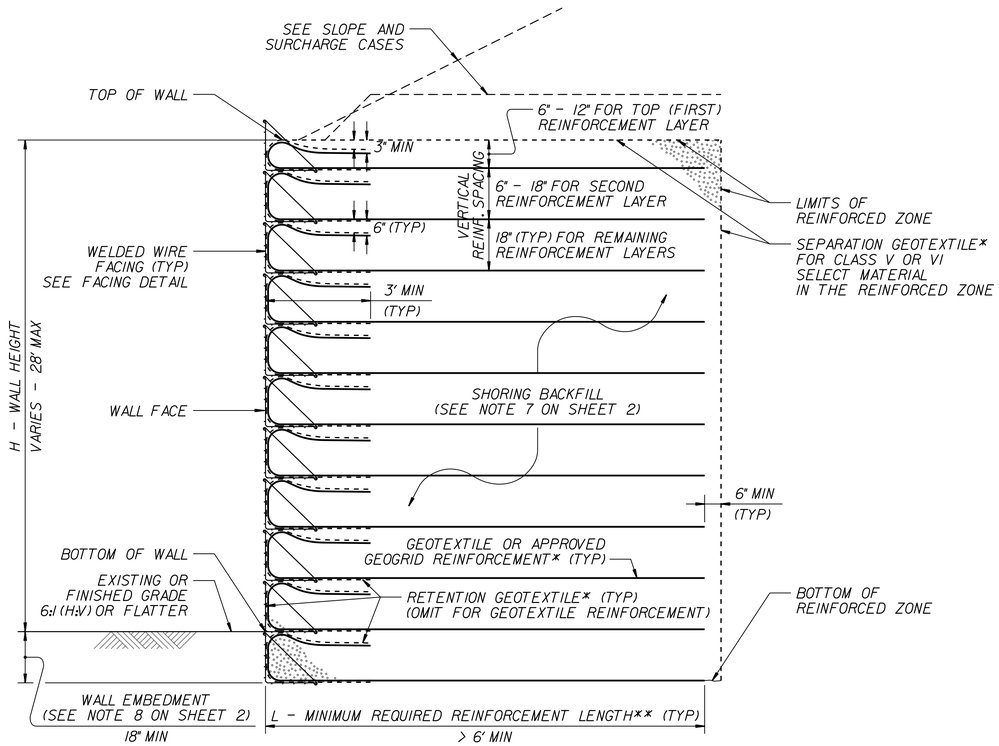


SURCHARGE CASE

SLOPE CASE

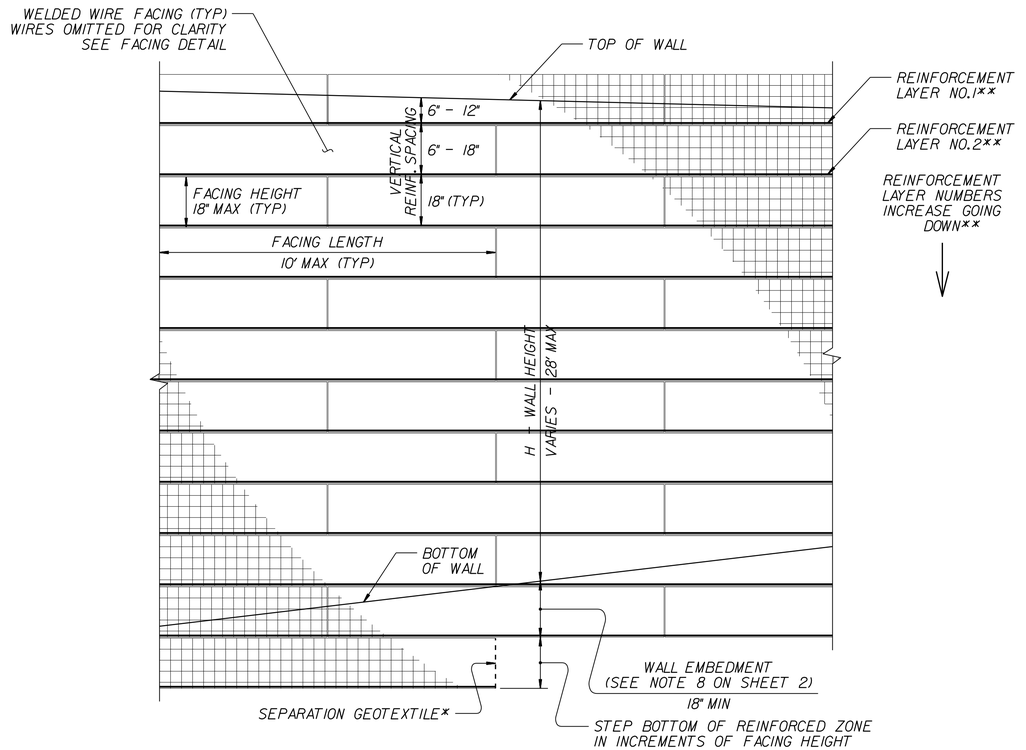


FACING DETAIL



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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 1 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2G-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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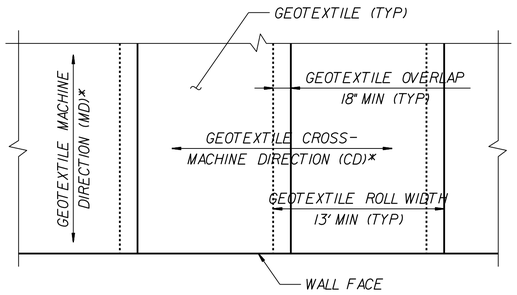
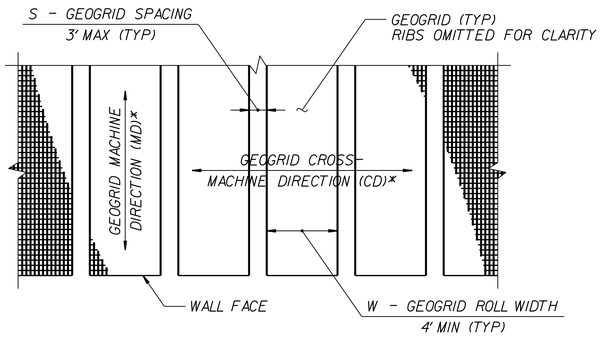


GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

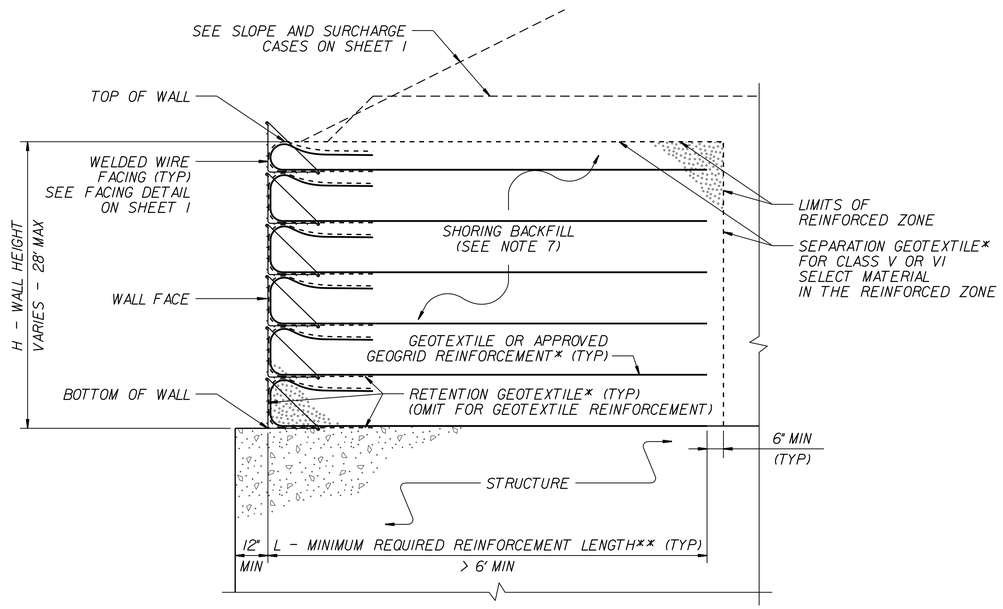


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S}$ x 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 I 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) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ 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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL SHEET 2 OF 3

DATE: 10-19-21

PROJECT REFERENCE NO.	SHEET NO.
B-5318	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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ENGINEER

SIGNATURE DATE

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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 I, 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 I 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)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I 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 I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I 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.)

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.

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

COMPUTED BY: BAS	DATE: 8/1/2022
CHECKED BY: BSL	DATE: 8/2/2022

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
B–5318	3B–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
–L– 10+25.00	–L– 18+73.00	199	25,883	25,684	0
–L– 20+73.00	–L– 29+50.00	4,735	7,405	2,670	0
–Y1– 12+80.00	–Y1– 14+29.72	31	203	172	0
–DRW1– 10+32.54	–DRW1– 12+00.00	5	668	663	0
–DRW2– 10+32.50	–DRW2– 12+00.00	10	2,410	2,400	0
–DET– 11+00.00	–DET– 15+50.00	35	198	163	0
–MUT1– 10+50.00	–MUT1– 11+90.00	647	0	0	647
TOTALS:		5,662	36,767	31,752	647
LOSS DUE TO CLEARING & GRUBBING		–50		50	
SHOULDER MATERIAL FOR CONSTRUCTION			72	72	
WASTE IN LIEU OF BORROW				–647	–647
PROJECT TOTALS		5,612	36,839	31,227	0
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				1,561	
GRAND TOTALS:		5,612	36,839	32,788	0
SAY:		6,000		33,000	

EST. DDE = 245 CY
UNDERCUT EXCAVATION = 1,500 CY CONTINGENCY
GEOTEXTILE FOR SOIL STABILIZATION = 1,700 SY CONTINGENCY
SHALLOW UNDERCUT = 100 CY CONTINGENCY
SELECT GRANULAR MATERIAL = 1,400 CY CONTINGENCY
CLASS IV SUBGRADE STABILIZATION = 200 TONS CONTINGENCY

Note: Earthwork quantities are calculated by the roadway designer. These earthwork quantities are based in part on subsurface data provided by Schnabel Engineering.

Note: Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, 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.

2'–6" CONCRETE CURB & GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH (FEET)
–L–	10+25.00	18+48.00	LT	792
–L–	20+98.00	22+55.81	LT	158
–L–	23+37.07	28+98.74	LT	568
–L–	10+25.00	12+92.73	RT	270
–L–	13+88.55	18+48.00	RT	442
–L–	20+98.00	28+98.73	RT	796
–Y1–	13+95.74	14+32.77	LT	50
–Y1–	13+86.57	14+23.86	RT	56
			TOTAL:	3,178
			SAY:	3,140

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
–L–	10+65	12+00	CL	490
–L–	14+54	18+70	RT	652
–L–	20+98	29+50	CL	2,499
–Y1–	12+80	13+25	CL	99
–DET–	11+01	12+02	RT	51
–DET–	13+37	15+37	RT	30
			TOTAL:	3,821
			SAY:	3,830

PAVEMENT BREAKING SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
–L–	12+00	18+65	CL	1,447
–L–	18+66	19+38	RT	190
–L–	20+58	20+98	RT	105
–Y1–	13+25	14+30	CL	241
–DET–	12+02	14+62	RT	216
			TOTAL:	2,199
			SAY:	2,200

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR			SINGLE FACED CONCRETE BARRIER	DOUBLE FACED CONC. BARRIER TYPE III	DOUBLE FACED CONC. BARRIER TYPE IV	REMOVE 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	EA	G	NG					
–L–	12+65.00	15+32.50	LT	267.5				12+90.00	2	BERM	50		1				1		1											
–L–	15+69.00	18+48.00	LT	279				12+90.00	2	BERM					1				1											
–L–	14+03.00	15+14.00	RT	111			14+00.00		2	BERM	50		1				1		1											
–L–	15+45.00	18+48.00	RT	303			14+00.00		2	BERM	50		1		1		1													
–L–	20+98.00	22+57.00	LT	159			22+50.00		2	BERM	50		1		1		1													
–L–	20+98.00	22+75.00	RT	177				22+50.00	2	BERM					1				1											
			TOTAL	1,296.5											4		4		4											
			DEDUCTIONS																											
			CAT–1 (4 @ 6.25 LF PER UNIT)	25																										
			TYPE III (4 @ 18.75 LF PER UNIT)	75																										
			GREU TL–3 (4 @ 50 LF PER UNIT)	200																										
			PROJECT TOTAL	996.5											4		4		4											
			SAY	1,000											4		4		4											
			ADDITIONAL GUARDRAIL POST	5																										

PF3ETGGK

COMPUTED BY: AH DATE: 8/3/22

CHECKED BY: BL DATE: 8/3/22

PROJECT NO.	SHEET NO.
B-5318	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".

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
L 12+00	20 LT	0401		226.1			
		0401	0402		222.0	215.7	
L 13+50	20 LT	0402		219.5			
		0402	0501		215.7	212.1	
L 10+20	24 RT	0403		239.0			
		0403	0404		236.4	229.3	0.9
L 11+00	20 RT	0404		232.5			
		0404	0405		229.3	218.5	0.9
L 12+25	32 RT	0405		223.1			
		0405	0406		218.5	216.7	
L 15+00	20 LT	0501		216.8			
		0501	0500		212.1	201.0	1.0
L 21+65	20 LT	0503		213.8			
		0503	0502		206.9	201.2	1.7
L 18+25	20 LT	0507		215.3			
		0507	0508		210.4	200.9	0.5
L 21+65	20 RT	0509		213.8			
		0509	0503		207.8	207.4	0.3
		0511	0509		208.4	207.8	
L 23+17	20 RT	0511		212.9			
L 24+51	20 RT	0512		215.0			
		0512	0511		211.1	209.1	
L 18+25	20 RT	0513		215.3			
		0513	0507		210.5	210.4	
L 21+57	20 LT	0514		213.8			
		0514	0503		208.0	207.9	
L 27+01	20 LT	0600		226.6			
		0600	0601		223.3	221.5	
L 27+01	20 RT	0601		226.6			
		0601	0512		221.5	211.1	
L 28+80	20 RT	0602		236.9			
		0602	0601		233.9	221.5	
L 29+10	23 RT	0603		237.0			
		0603	0602		236.9	233.9	
L 12+11	17 LT						
L 13+36	12 LT						
L 14+68	8 RT						
L 15+08	11 LT						

LINE & STATION	FROM	TO	Drainage Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 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	DO NOT USE PP PIPE
L 12+00	0401															
	0401	0402														
L 13+50	0402															
	0402	0501														
L 10+20	0403															
	0403	0404														
L 11+00	0404															
	0404	0405														
L 12+25	0405															
	0405	0406			17						x			x	x	x
L 15+00	0501															
	0501	0500														
L 21+65	0503															
	0503	0502														
L 18+25	0507															
	0507	0508														
L 21+65	0509															
	0509	0503														
	0511	0509														
L 23+17	0511															
L 24+51	0512															
	0512	0511														
L 18+25	0513															
	0513	0507														
L 21+57	0514															
	0514	0503														
L 27+01	0600															
	0600	0601														
L 27+01	0601															
	0601	0512														
L 28+80	0602															
	0602	0601														
L 29+10	0603															
	0603	0602														
L 12+11																
L 13+36																
L 14+68																
L 15+08																
SHEET TOTALS					17											
PROJECT TOTALS					17											

LINE & STATION	FROM	TO	C. S. PIPE 12 (.064)	15 (.064)	18 (.064)	24 (.064)	30 (.079)	36 (.079)	42 (.109)	48 (.109)	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
L 12+00	0401																									
	0401	0402												144												
L 13+50	0402																									
	0402	0501												144												
L 10+20	0403																									
	0403	0404											79													
L 11+00	0404																									
	0404	0405											168													
L 12+25	0405																									
	0405	0406																								
L 15+00	0501																									
	0501	0500				48																				
L 21+65	0503																									
	0503	0502			56																					
L 18+25	0507																									
	0507	0508		44																						
L 21+65	0509																									
	0509	0503																			40					
	0511	0509											148													
L 23+17	0511																									
L 24+51	0512																									
	0512	0511										128														
L 18+25	0513																									
	0513	0507																		40						
L 21+57	0514																									
	0514	0503										8														
L 27+01	0600																									
	0600	0601																		40						
L 27+01	0601																									
	0601	0512										248														
L 28+80	0602																									
	0602	0601										180														
L 29+10	0603																									
	0603	0602		32																						
L 12+11																										
L 13+36																										
L 14+68																										
L 15+08																										
SHEET TOTALS				76	56	48						564	395	288						80	40					
PROJECT TOTALS				76	56	48						564	395	288						80	40					

LINE & STATION	FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES 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
L 12+00	0401								1			1			1
	0401	0402													
L 13+50	0402								1			1			1
	0402	0501													
L 10+20	0403														
	0403	0404													
L 11+00	0404								1			1		1	
	0404	0405													
L 12+25	0405								1			1		1	
	0405	0406													
L 15+00	0501								1			1			1
	0501	0500													
L 21+65	0503								1	1.8		1			1
	0503	0502													
L 18+25	0507								1			1			1
	0507	0508													
L 21+65	0509								1	0.9		1		1	
	0509	0503													
	0511	0509													
L 23+17	0511								1			1	1		
L 24+51	0512								1			1			1
	0512	0511													
L 18+25	0513								1			1		1	
	0513	0507													
L 21+57	0514								1	0.8		1			1
	0514	0503													
L 27+01	0600								1			1		1	
	0600	0601													
L 27+01	0601								1	0.1		1			1
	0601	0512													
L 28+80	0602								1			1			1
	0602	0601													
L 29+10	0603														
	0603	0602													
L 12+11															
L 13+36															
L 14+68															
L 15+08															
SHEET TOTALS									15	3.6		15	1	5	9
PROJECT TOTALS									15	3.6		15	1	5	9

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

LINE & STATION	FROM	TO	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME 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	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 12+00	0401																											
	0401	0402																										
L 13+50	0402																											
	0402	0501																										
L 10+20	0403																											
	0403	0404																										
L 11+00	0404																											
	0404	0405																										
L 12+25	0405																											
	0405	0406																			2							
L 15+00	0501																											
	0501	0500																				2						
L 21+65	0503																											
	0503	0502																			2							
L 18+25	0507																											
	0507	0508																		2								
L 21+65	0509																											
	0509	0503																										
	0511	0509																										
L 23+17	0511																											
L 24+51	0512																											
	0512	0511																										
L 18+25	0513																											
	0513	0507																										
L 21+57	0514																											
	0514	0503																										
L 27+01	0600																											
	0600	0601																										
L 27+01	0601																											
	0601	0512																										
L 28+80	0602																											
	0602	0601																										
L 29+10	0603																											
	0603	0602																										
L 12+11																											24	
L 13+36																											216	
L 14+68																											50	
L 15+08																											57	
SHEET TOTALS																				2	4	2					347	
PROJECT TOTALS																				2	4	2					347	

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: __JKC_____ DATE: _7/20/2021___
CHECKED BY: ___JCW_____ DATE: _7/20/2021___

(12-17-19)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-5318	3G-1

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY					500
				TOTAL LF:	500

*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 Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY					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 Soil 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.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	DELETED
2	4	BIRTHA L. BYNUM & ELLIOTT M. ALSTON
3	4	RODNEY A MOORE
4	4	ARVIN ABRIGO
5	4,5	MERRITT-WFILLC
6	4	THOMAS M PRZYBYL
7	4,5	ALAD BROWN
8	5	TOWN OF WAKE FOREST
9	5	TOWN OF WAKE FOREST
10	5	STEVEN WILLIAMS
11	5	THOMAS DIAMOND
12	5,6	DAVID M THOMPSON
13	5,6	CLAYTON PROPERTIES GROUP
14	5	TOWN OF WAKE FOREST

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

8/17/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. P-0929

PROJECT REFERENCE NO.	SHEET NO.
B-5318	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. HAMBLETH

DocuSigned by: Bryan S. Hambleth
D5EC0F7684FC4B6...

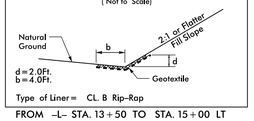
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREA S. HAYDEN

DocuSigned by: Andrea S. Hayden
C4A93D325CF4490...

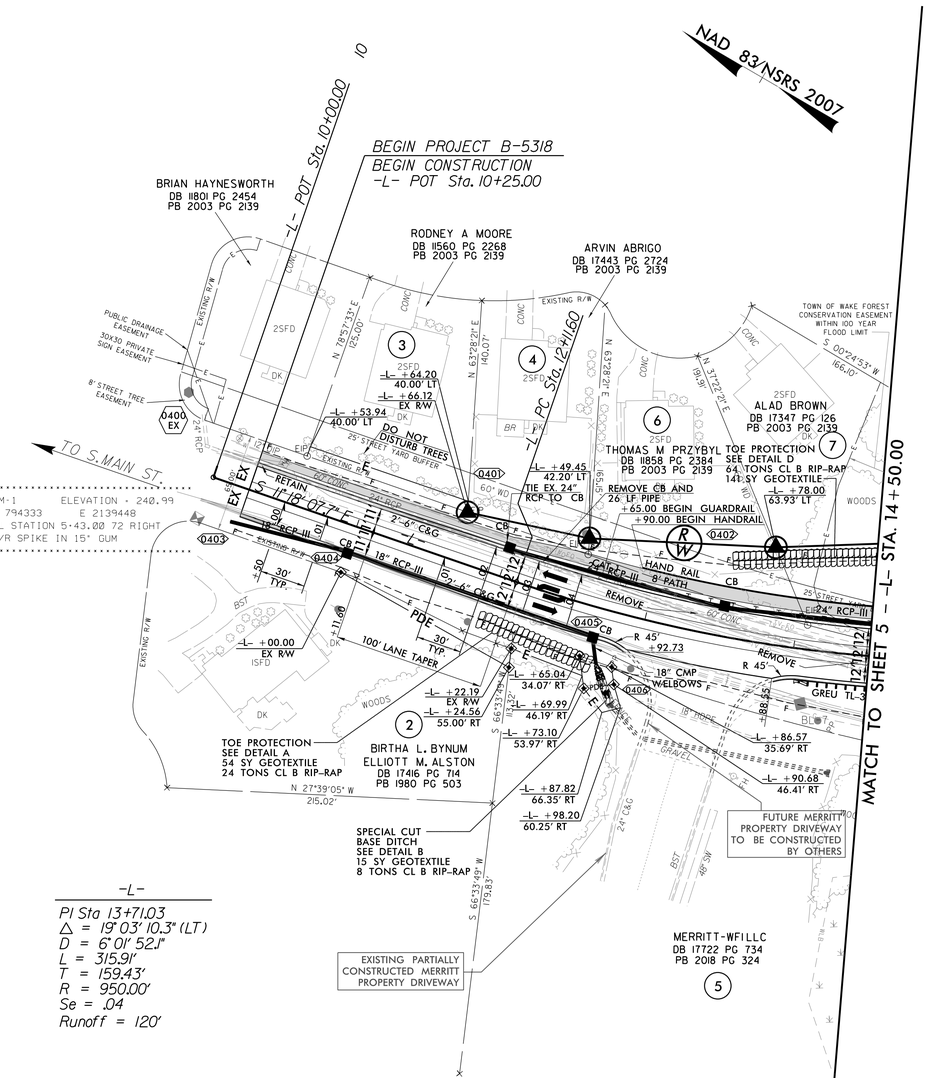
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL D
TOE PROTECTION
(Not to Scale)



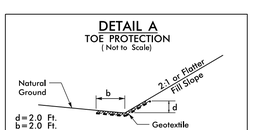
Type of Liner = CL. B Rip-Rap

FROM -L- STA. 13+50 TO STA. 15+00 LT



-L-
PI Sta 13+71.03
△ = 19°03'10.3" (LT)
D = 6°01'52.1"
L = 315.91'
T = 159.43'
R = 950.00'
Se = .04
Runoff = 120'

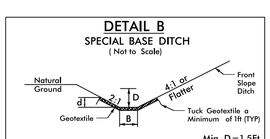
DETAIL A
TOE PROTECTION
(Not to Scale)



Type of Liner = CL B Rip-Rap

FROM -L- STA. 12+00 TO STA. 12+75 RT

DETAIL B
SPECIAL BASE DITCH
(Not to Scale)



Type of Liner = Class B Rip-Rap, Keyed-In B=2 Ft.

FROM STA. 12+76 TO STA. 12+91

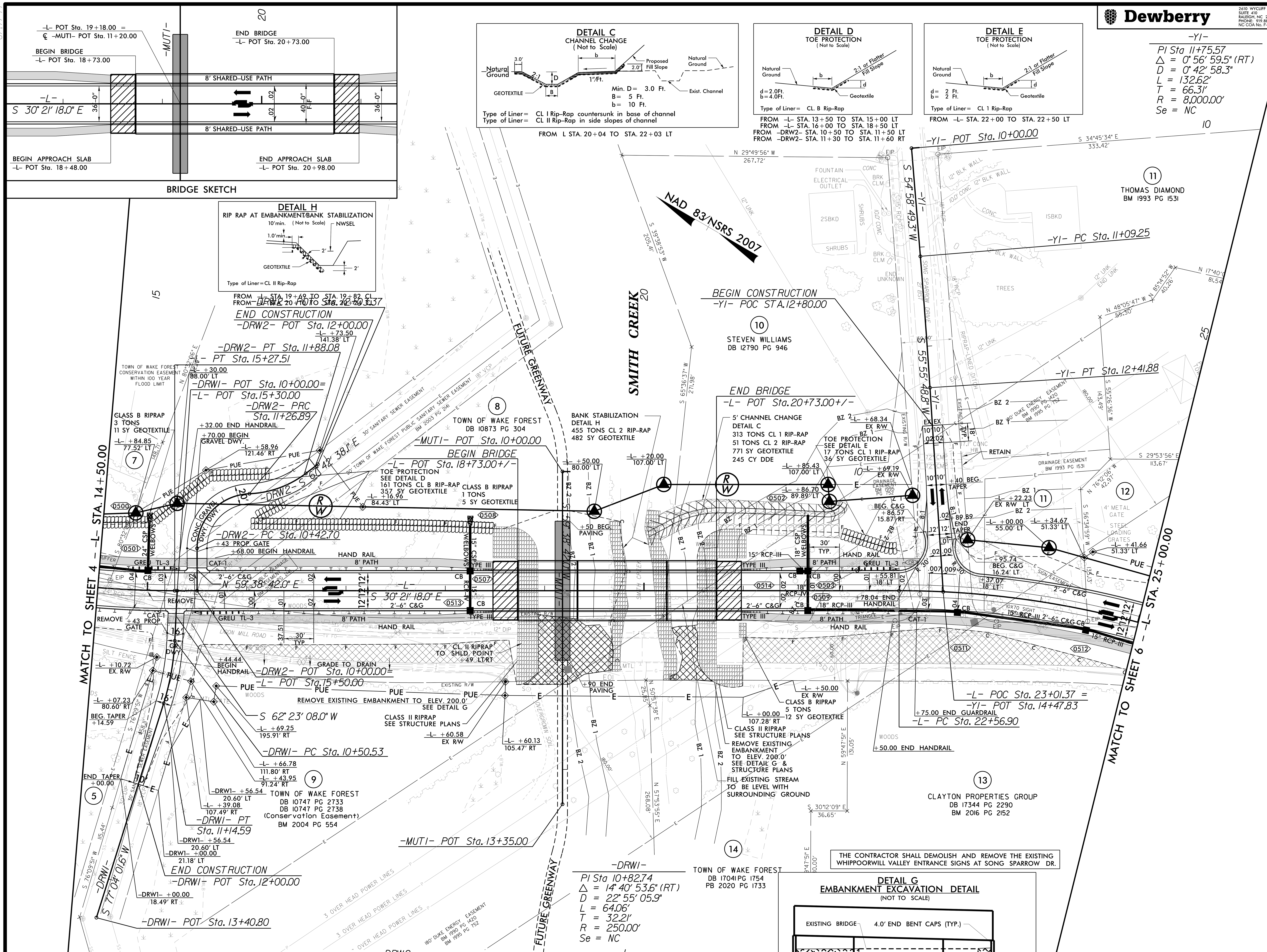
SEE SHEETS 7 & 8 FOR -L- PROFILE

8/3/2022 11:28:48 AM
USER: bstorner
\\Pr-oj\B5318_RDY_PSH04.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5318	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 038648	SEAL 028933

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Dewberry



-Y1-
PI Sta 11+75.57
Δ = 0° 56' 59.5" (RT)
D = 0° 42' 58.3"
L = 132.62'
T = 66.31'
R = 8,000.00'
Se = NC

-DRW2-		-L-	
PI Sta 10+95.54	PI Sta 11+58.47	PI Sta 13+71.03	PI Sta 24+07.43
Δ = 87° 42' 07.3" (RT)	Δ = 35° 03' 27.4" (LT)	Δ = 19° 03' 10.3" (LT)	Δ = 18° 28' 01.3" (RT)
D = 104° 10' 26.9"	D = 57° 17' 44.8"	D = 6° 01' 52.1"	D = 6° 11' 14.8"
L = 84.19'	L = 61.19'	L = 315.91'	L = 298.46
T = 52.84'	T = 31.59'	T = 159.43'	T = 150.54'
Se = NC	R = 100.00'	R = 950.00'	R = 926.00'
R = 55.00'	Se = NC	Se = .04	Se = .04
		Runoff = 120'	Runoff = 120'

-DRW1-
PI Sta 10+82.74
Δ = 14° 40' 53.6" (RT)
D = 22° 55' 05.9"
L = 64.06'
T = 32.21'
R = 250.00'
Se = NC

SEE SHEETS 7 & 8 FOR -L- PROFILE
SEE SHEET 9 FOR -Y1- PROFILE
SEE SHEET 9 FOR -MUT1- PROFILE
SEE SHEET 9 FOR -DRW1- PROFILE
SEE SHEET 9 FOR -DRW2- PROFILE
SEE SHEETS S-1 THRU S-41 FOR STRUCTURE DETAILS

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. P-0929

PROJECT REFERENCE NO.	SHEET NO.
B-5318	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRIAN S LAMBETH
BRIAN S LAMBETH
DS-ECOF7684FC4B6...

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREA SI HAGEN
ANDREA SI HAGEN
C4A93D325CF4490...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/17/99

-L-
PI Sta 24+07.43
△ = 18° 28' 01.3" (RT)
D = 6° 11' 14.8"
L = 298.46'
T = 150.54'
R = 926.00'
Se = .04
Runoff = 120'

PI Sta 31+43.41
△ = 21° 20' 47.1" (LT)
D = 4° 52' 34.5"
L = 437.76'
T = 221.45'
R = 1,175.00'
Se = .04
Runoff = 120'

NAD 83/NSRS 2007

MATCH TO SHEET 5 -L- STA. 25+00.00

-L- PT Sta 25+55.36

-L- PC Sta. 29+21.96

END PROJECT B-5318
END CONSTRUCTION
-L- POT Sta.29+50.00

-L- PT Sta. 33+59.73

-L- POT Sta. 35+94.55

TO US 401

(12) DAVID M THOMPSON
DB 8856 PG 1679

SUSAN S SCHILLING
DB 13917 PG 643
BM 1985 PG 39

ROLAND B MYRICK
DONNA J MYRICK
DB 3249 PG 379
BM 1999 PG 976

(13) CLAYTON PROPERTIES GROUP
DB 17344 PG 2290
BM 2016 PG 2152

THE PRESERVE AT KITCHEN FARMS PHASE 2B FUTURE BY OTHERS

LIGON MILL ROAD - SR 2048

S 49°58'09" E 648.72'
S 57°01'20" W 285.60'
S 27°24'06" E 209.71'
N 62°35'54" E 98.57'
S 62°35'54" W 30.00'
N 40°46'29" W 213.21'
S 57°01'20" W 258.29'
N 62°35'54" E 288.13'
S 62°37'38" W 320.83'
S 33°14'03" E
N 04°38'57" W 280.39'
S 57°25'16" W 132.46'
N 15°55'27" W 51.69'
S 60°17'11" W 560.77'
N 65°11'31" E 308.86'

-L- +02.41 62.89' LT
-L- +50.00 54.00' LT
-L- +00.00 48.00' LT
-L- +50.00 70.00' LT
-L- +32.70 EX R/W
-L- +50.00 EX R/W
-L- +50.00 60.00' RT
-L- +10.64 50.79' RT
-L- +17.87 52.73' RT
-L- +17.27 60.89' RT
-L- +26.98 61.64' RT
-L- +27.59 53.45' RT
-L- +50.00 EX R/W
-L- +50.00 45.00' RT
-L- +44.51 30.91' RT
-L- +43.56 46.51' RT

+63.15 BEG LANE TAPER LT. & RT.
END C&G +98.74 25.56' LT
END C&G +98.73 25.65' RT
82.69' END SIDEWALK

PUE
R/W
EXISTING R/W
EX. R/W
30' TYP.
16' GR. DWY.
2'-6" C&G
8' PATH
15" RCP-III
18" RCP
15" RCP
24" CMP
STONE WALL
WOODS
EIP
AXLE
BL-4
30' ACCESS EASEMENT
30' PRIVATE ROAD EASEMENT
10' CONC

SEE SHEETS 7 & 8 FOR -L- PROFILE

8/3/2022 JK 8:55 AM
J:\STIP Projects\B5318_RDY_PSH06.dgn

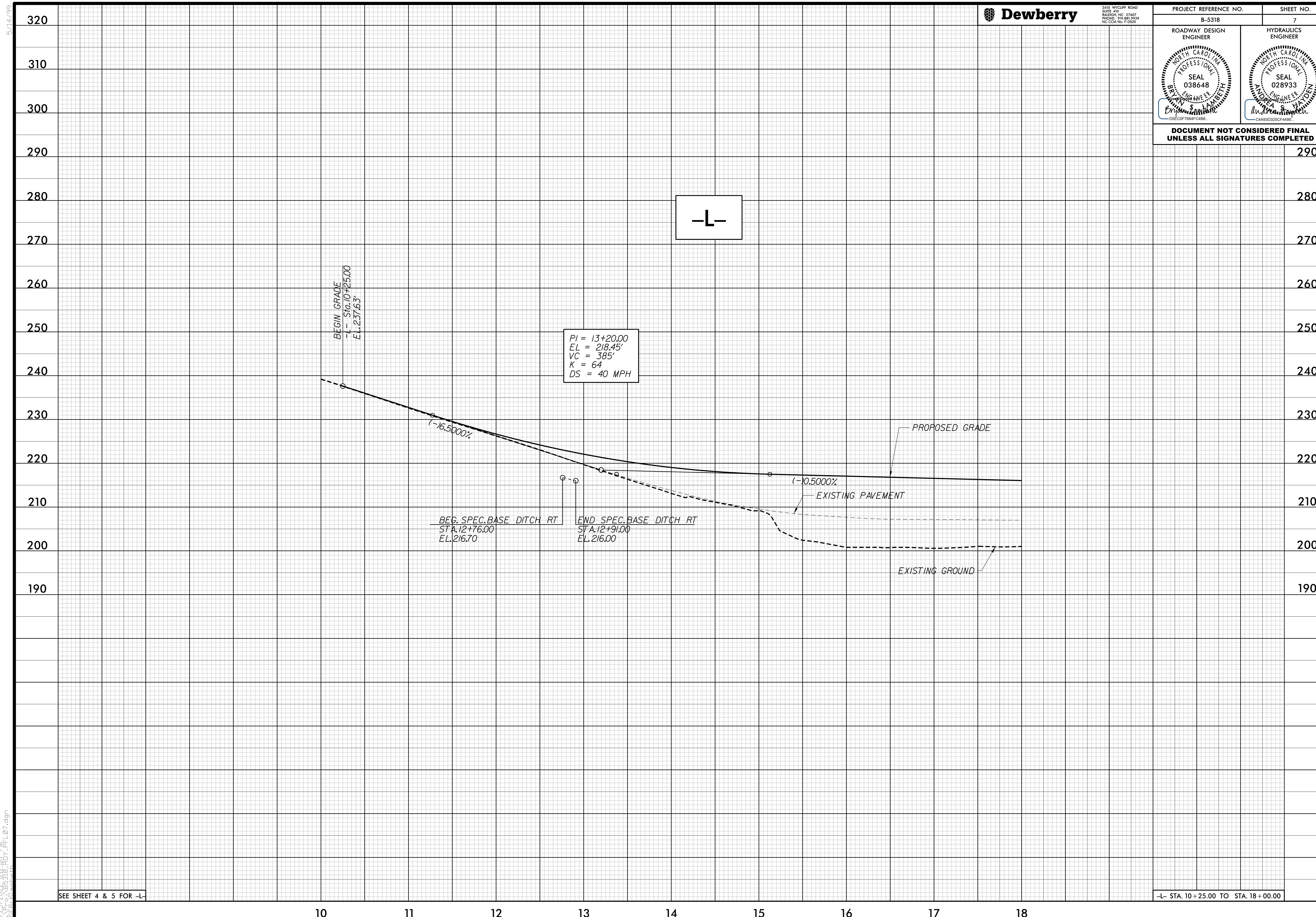
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
B–5318	7

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. LAMBETH DocuSigned by: Bryan Lambeth D5EC0F7684FC4B6...	NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREA S. HAYDEN DocuSigned by: Andrea Hayden C4A93D325CF4490...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
B-5318	8

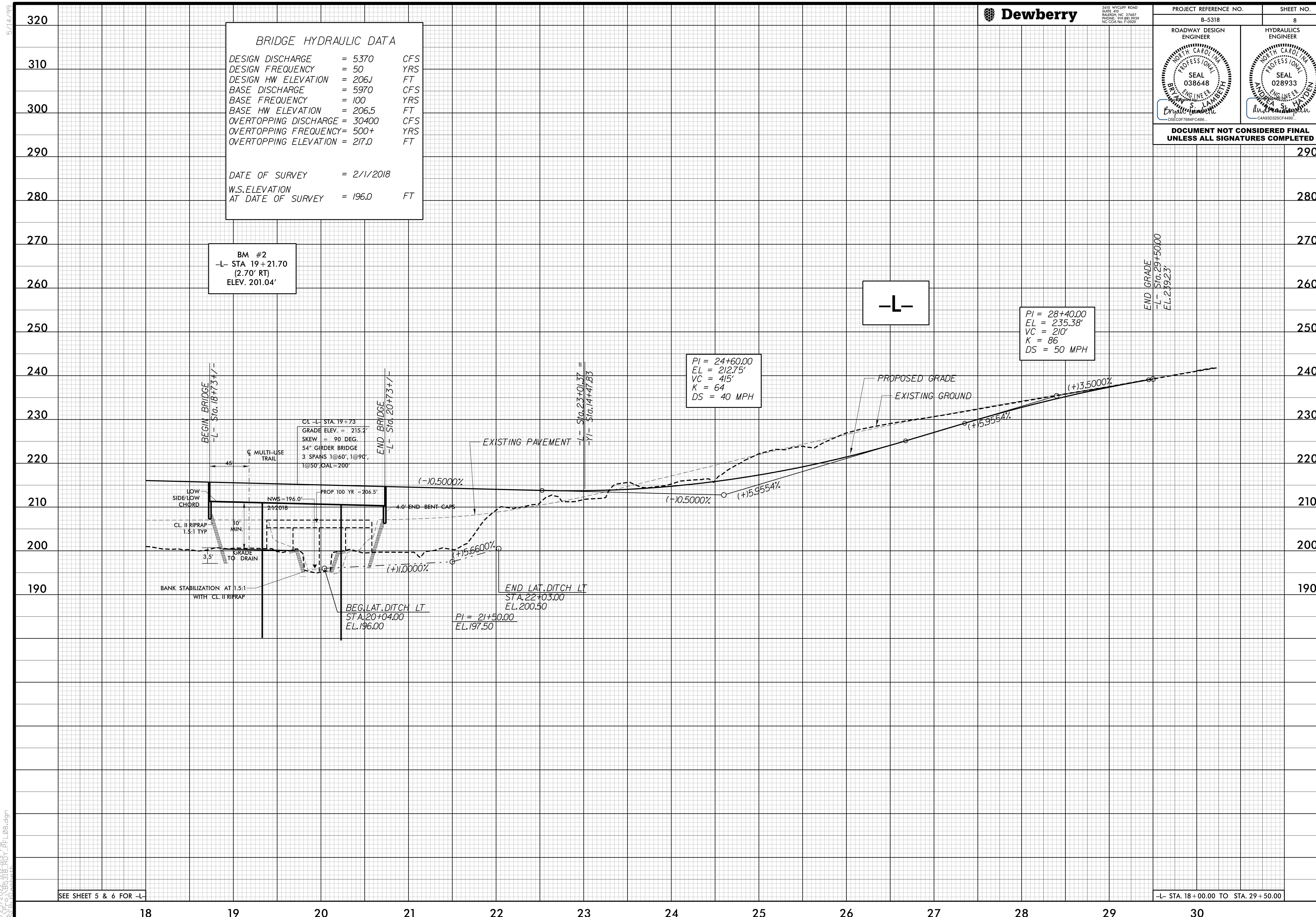
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038648 BRYAN S. LAMBETH — DocuSigned by: Bryan Lambeth D5EC0F7684FC4B6...

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028933 ANDREA S. HAYDEN — DocuSigned by: Andrea Hayden C4A93D325CF4490...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 5370	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 206.1	FT
BASE DISCHARGE	= 5970	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 206.5	FT
OVERTOPPING DISCHARGE	= 30400	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 217.0	FT
DATE OF SURVEY	= 2/1/2018	
W.S.ELEVATION AT DATE OF SURVEY	= 196.0	FT



5/14/99

Dewberry
2610 WYCLIFF ROAD
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PHONE: 919.881.9929
NC CoA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
B-5318	9

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038648 ENGINEER BRYAN S. LAMBETH
DSEC0F7684FC4B6...

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028933 ENGINEER ANDREW HAYDEN
C4A03D325CF4490...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

–Y1–

PI = 13+20.00
EL = 211.45'
VC = 80'
K = 13
DS = 15 MPH

PI = 13+90.00
EL = 213.74'
VC = 60'
K = 34
DS = 35 MPH

BEGIN GRADE
–Y1– Sta.12+80.00
EL 212.65'

END GRADE
–Y1– Sta.14+29.72
–L– Sta.22+99.37, 18' LT
EL = 214.34'

–Y1– Sta.14+47.83 =
–L– Sta.23+01.37
EL = 213.73'

PROPOSED GRADE
EXISTING GROUND
(+)1.5106%
(–)2.9868%
(+)0.2687%
(–)3.3683%
72" CMP
72" CMP
INV=201.06'
INV=201.04'

SEE SHEET 5 FOR –Y1–

–Y1– STA. 12+80.00 TO STA. 14+29.72

–DRW1–

PI = 10+24.53
EL = 218.18'

PI = 10+37.54
EL = 218.24'

PI = 10+32.54
EL = 218.34'

PI = 10+42.54
EL = 217.84'

–DRW1– Sta.10+00.00=
–L– Sta.15+30.00
BEGIN GRADE
EL 218.02'

–DRW1– Sta.10+20.52
EL 218.02'

+2.00%
(–8.00%)
(–2.00%)
(+4.00%)
(–)15.0000%
(–)11.2193%
PROPOSED GRADE
EXISTING GROUND

END GRADE
–DRW1– Sta.12+00.00
EL.201.44

PI = 11+48.00
EL = 202.02'
VC = 60'
K = 4
DS = 15 MPH

SEE SHEET 5 FOR –DRW1–

–DRW1– STA. 10+20.02 TO STA. 12+00.00

–MUT1–

BEGIN GRADE
–MUT1– Sta.10+50.00
EL.200.30

–MUT1– Sta.11+20.00=
–L– Sta.15+18.00
EL = 215.46

END GRADE
–MUT1– Sta.11+90.00
200.30'

10' MIN.
1%
1%
(+)0.0000%
EXISTING GROUND
PROPOSED GRADE

SEE SHEET 5 FOR –MUT1–

–MUT1– STA. 10+50.00 TO STA. 11+90.00

–DRW2–

PI = 10+24.50
EL = 217.17'

PI = 10+37.50
EL = 217.23'

PI = 10+32.50
EL = 217.33'

PI = 10+42.50
EL = 216.83'

–DRW2– Sta.10+00.00=
–L– Sta.15+50.00
BEGIN GRADE
EL 217.01'

–DRW2– Sta.10+20.50
EL 217.01'

+2.00%
(–8.00%)
(–2.00%)
(+4.00%)
(–)12.0000%
(–)12.0000%
PROPOSED GRADE
EXISTING GROUND

END GRADE
–DRW2– Sta.12+00.00
EL.200.83

PI = 11+71.00
EL = 201.41'
VC = 50'
K = 5
DS = 15 MPH

SEE SHEET 5 FOR –DRW2–

–DRW2– STA. 10+20.00 TO STA. 12+00.00

8/23/2022 10:33:23 PM
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User: bhaynes