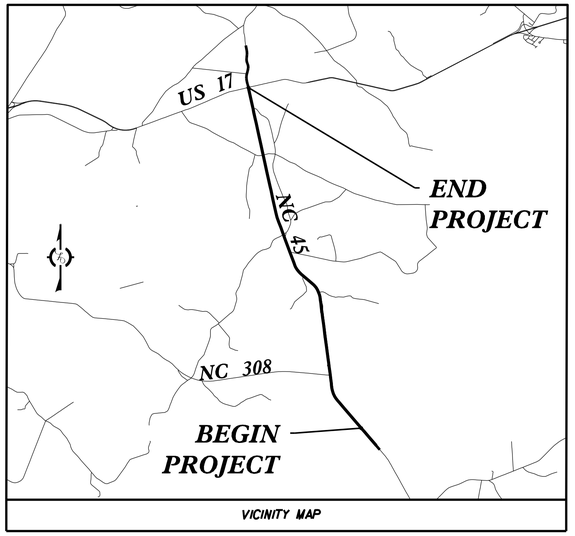
09/08/99

TIP PROJECT: R-5809A

CONTRACT: C204835

6/23/2023

SEE SHEET 1A FOR INDEX OF SHEETS AND SHEET 1B FOR SYMBOLOGY SHEET



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BERTIE COUNTY

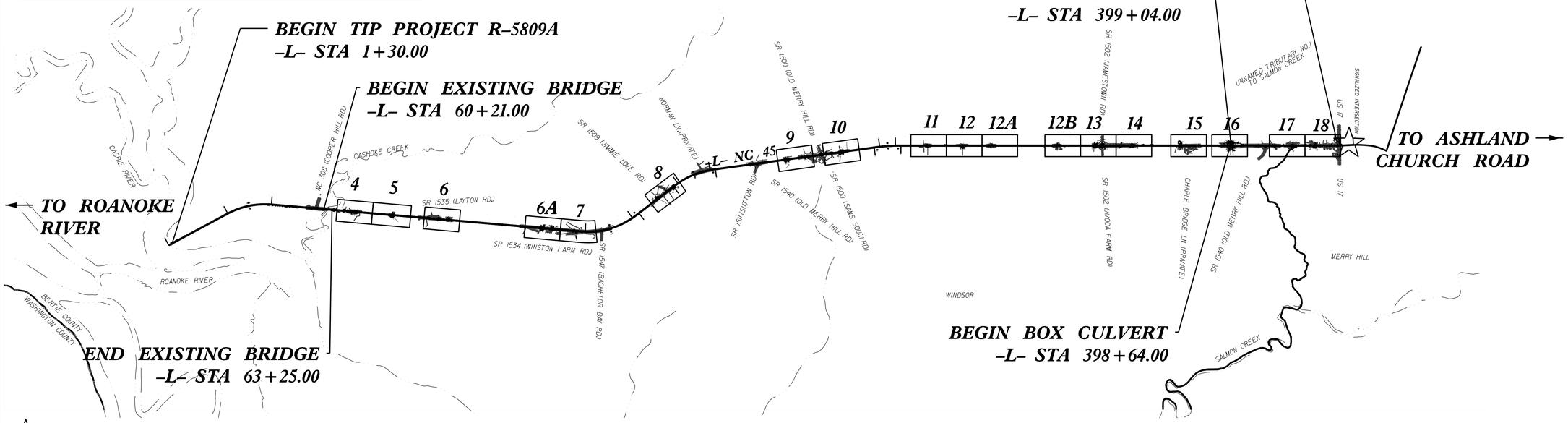
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5809A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46976.1.2		PE
46976.2.2		RW
46976.2.5		UTIL
46976.3.2	4697601	CONSTR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: *NC 45 0.98 MI. NORTH OF WASHINGTON COUNTY LINE TO 0.13 MI. SOUTH OF US 17 AT MIDWAY*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, AND BOX CULVERT*



DENOTES EXISTING TRAFFIC SIGNAL

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	=	3,200
ADT 2044	=	4,100
K	=	8%
D	=	52%
T	=	22%
V	=	60 MPH

CLASSIFICATION:
MAJOR COLLECTOR
* 17% TTST 5% DUAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5809A	=	8.088 MILES
LENGTH OF STRUCTURE TIP PROJECT R-5809A	=	.008 MILES
TOTAL LENGTH TIP PROJECT R-5809A	=	8.096 MILES

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 23, 2023

LETTING DATE:
JANUARY 21, 2025

Prepared in the Office of:
Kimley»Horn
NC LICENSE #P-0102
FAYETTEVILLE STREET, SUITE 600
RALEIGH, NORTH CAROLINA 27601
PHONE: (919) 677-2000

VINCENT RICCIO, PE
PROJECT ENGINEER

KEVIN PUNINSKE
PROJECT DESIGN ENGINEER

ROGER BULLOCK
PROJECT MANAGER
NCDOT HIGHWAY DIVISION

HYDRAULICS ENGINEER
10/30/2024
SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER
10/30/2024
SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	1A

Kimley»Horn
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

ROADWAY DESIGN ENGINEER
SEAL 055728
VINCENT E. RICCIO
10/30/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

INDEX OF SHEETS

GENERAL NOTES: 2024 SPECIFICATIONS

EFFECTIVE: 01-16-2024
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

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

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".

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE

Dominion Energy, Brightspeed, Mediacom, MCNC, Bertie Water, Roanoke Electric

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

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.05	Concrete 'L' Endwall for Single Pipe Culverts - 15" thru 48" Pipe
838.11	Brick Endwall for Single and Double Pipe Culverts
838.21	Reinforced Concrete Endwall - for Single 54" Pipe 90 Skew
838.22	Reinforced Concrete Endwall - for Double and Triple 54" Pipes 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.51	Reinforced Brick Endwall - for Single 54" Pipe 90 Skew
838.52	Reinforced Brick Endwall - for Double and Triple 54" Pipe 90 Skew
838.63	Reinforced Brick Endwall - for Single 66" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
848.04	Street Turnout
862.01	Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12 and 14 of 15)
862.02	Guardrail Installation
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

10/10/2023

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	1B

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

REVISIONS

10/10/2023

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

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

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

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

UTILITIES:

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

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

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

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

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

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

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

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

5/14/99

REVISIONS

FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ.YD IN EACH OF TWO LAYERS
J1	PROP. 8" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF 0.35 GAL.PER SQ.YD
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	1.5" MILLING

NOTE: PAVEMENT SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	2A-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 ENGINEER VINCENT E. RICCIO
10/31/2024

PAVEMENT DESIGN ENGINEER
Docusigned by: Andrew Ward
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044590 ENGINEER ANDREW D. WARD
10/31/2024

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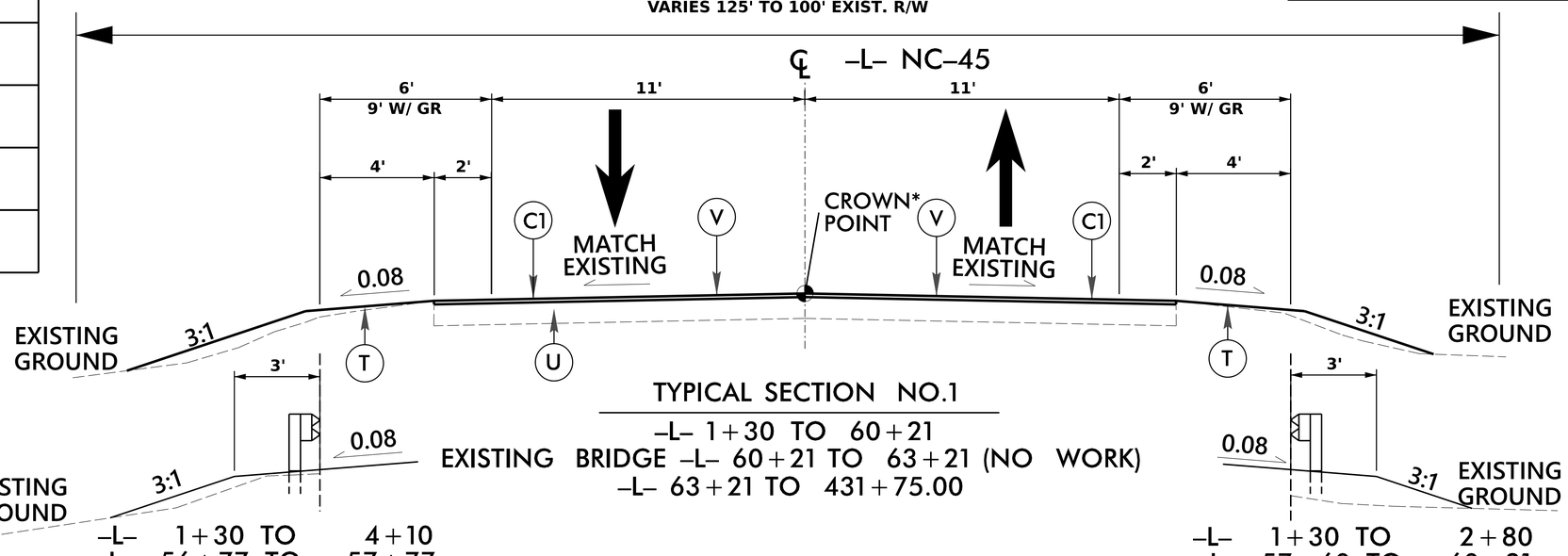
* IN AREAS WHERE PROPOSED GRADE HAS BEEN ESTABLISHED, THIS POINT IS CONSIDERED TO BE THE GRADE POINT. REFER TO PROFILE SHEETS 17 AND 18 TO SEE WHERE PROPOSED GRADE HAS BEEN ESTABLISHED.



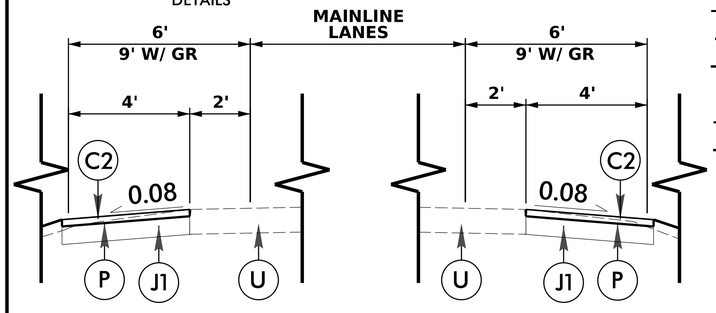
TYPICAL SECTION NO.1

–L– 1+30 TO 60+21
EXISTING BRIDGE –L– 60+21 TO 63+21 (NO WORK)
–L– 63+21 TO 431+75.00

–L–	1+30 TO 4+10
–L–	56+77 TO 57+77
–L–	57+60 TO 60+21
–L–	63+21 TO 72+73
–L–	234+72 TO 238+31
–L–	255+20 TO 258+90
–L–	299+32 TO 302+97
–L–	396+79 TO 401+42

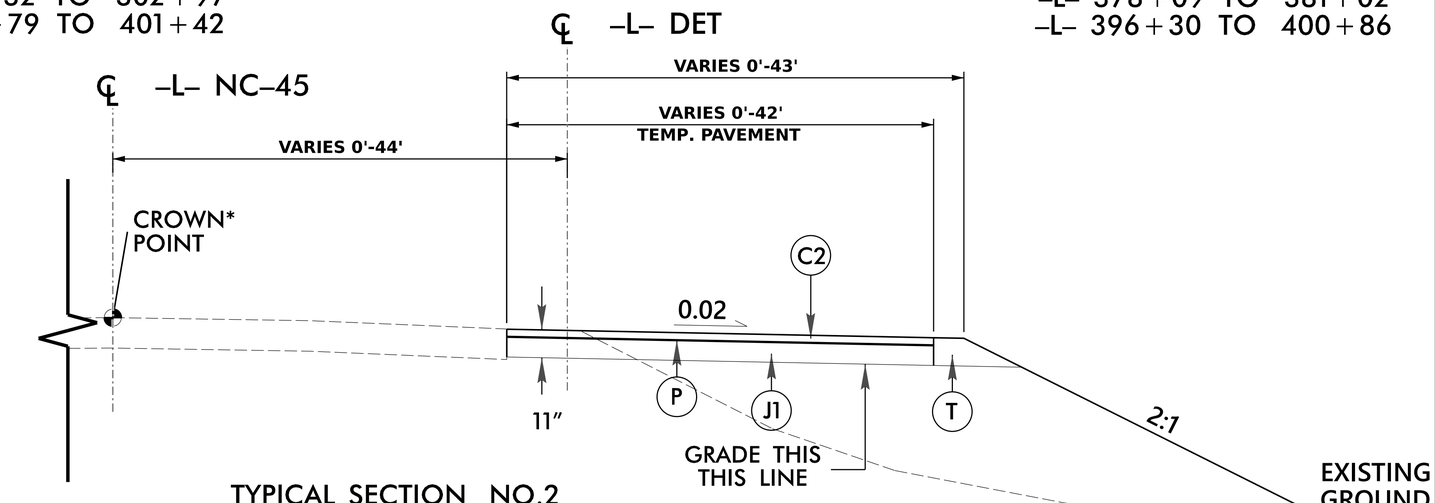
–L–	1+30 TO 2+80
–L–	57+60 TO 60+21
–L–	63+21 TO 72+65
–L–	183+80 TO 187+92
–L–	347+34 TO 340+97
–L–	356+46 TO 360+46
–L–	378+09 TO 381+02
–L–	396+30 TO 400+86

NOTE: SEE TMP PLAN SHEET 1D FOR MORE DETAILS



TEMPORARY PAVEMENT DETAIL

–L–	64+41 TO 77+81
–L–	79+21 TO 91+21
–L–	96+06 TO 112+01
–L–	134+23 TO 158+26
–L–	179+08 TO 199+31
–L–	230+25 TO 262+63
–L–	282+15 TO 294+15
–L–	294+89 TO 317+48
–L–	329+31 TO 368+87
–L–	374+37 TO 386+37
–L–	409+11 TO 435+62



TYPICAL SECTION NO.2

–L– DET 00+00 TO 24+85

NOTE: SEE TMP–2A TO TMP–2C FOR TEMPORARY PAVEMENT WIDENING DETAILS.

10/10/2023

5/14/99

REVISIONS

Kimley»Horn

4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	2B-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/30/2024	SEAL 053547 DAVID L HURSEY 10/30/2024

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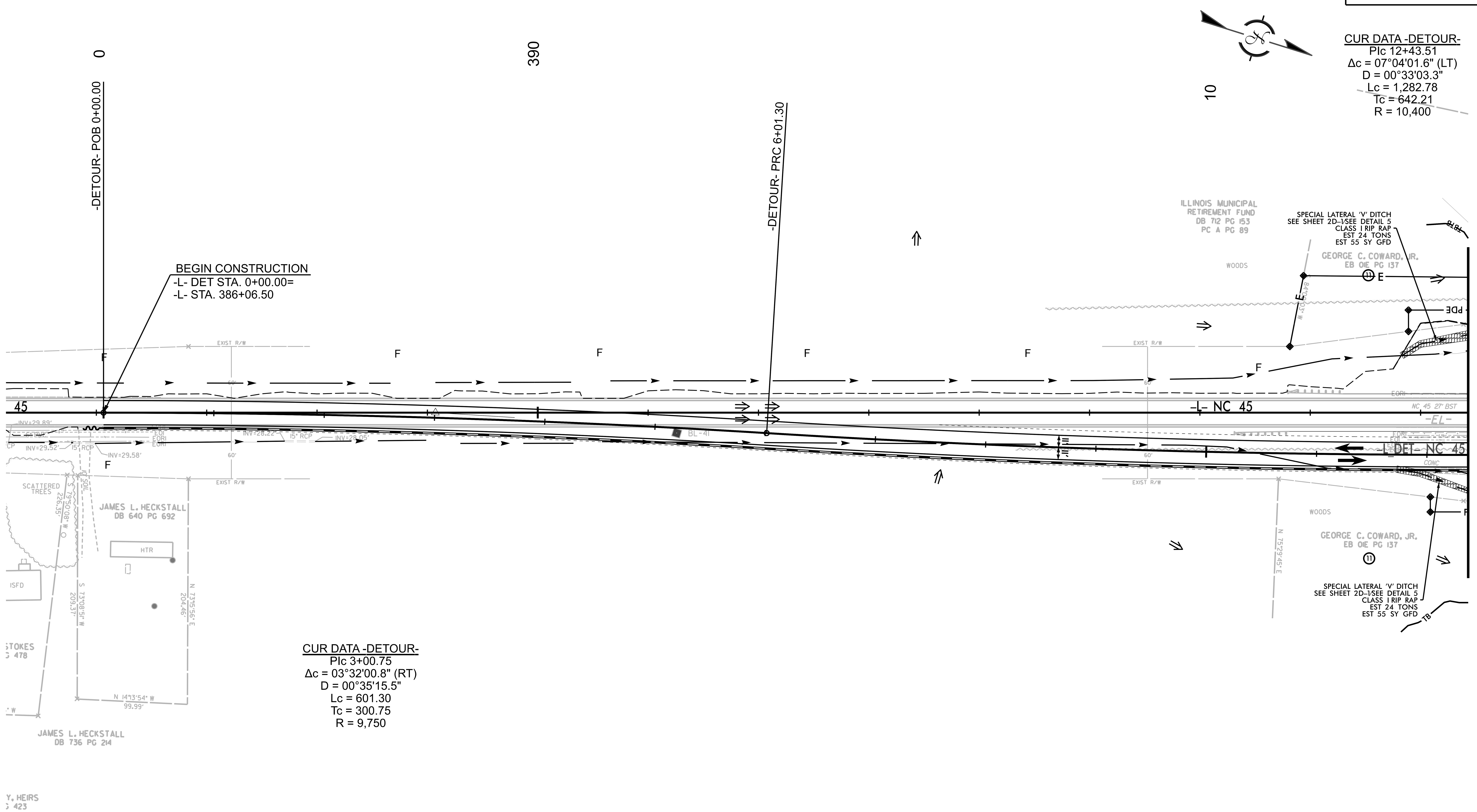

10/10/2023

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	2B-2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 ENGINEER VINCENT E. RICCIO
10/30/2024

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053547 ENGINEER DAVID L HURSEY
10/30/2024

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5/14/99

REVISIONS

10/10/2023

MATCHLINE -L-DET STA 12+37.44
SEE SHEET 2B-1

400

20

410

INLET CHANNEL IMPROVEMENTS
SEE SHEET 2D-1SEE DETAIL 6
CLASS II RIP RAP
EST 32 TONS
EST 38 SY GFD

INLET CHANNEL IMPROVEMENTS
SEE SHEET 2D-1SEE DETAIL 6
CLASS II RIP RAP
EST 32 TONS
EST 38 SY GFD

WILLIAM T. JAMES
DB 702 PG 894
PC B PG 55

SPECIAL LATERAL 'V' DITCH
SEE SHEET 2D-1SEE DETAIL 5
CLASS I RIP RAP
EST 18 TONS
EST 40 SY GFD

REMOVE

3@12'X11' RCBC (BURIED 1 FT)

-L- DET- NC 45

SPECIAL LATERAL 'V' DITCH
SEE SHEET 2D-1SEE DETAIL 5
CLASS I RIP RAP
EST 16 TONS
EST 35 SY GFD

WILLIAM T. JAMES
DB 702 PG 894
PC B PG 55

OUTLET CHANNEL IMPROVEMENTS
SEE SHEET 2D-1SEE DETAIL 6
CLASS II RIP RAP
EST 48 TONS
EST 54 SY GFD

OUTLET CHANNEL IMPROVEMENTS
SEE SHEET 2D-1SEE DETAIL 6
CLASS II RIP RAP
EST 48 TONS
EST 54 SY GFD

-DETOUR- PRC 18+84.08

-DETOUR- POE 24+85.39

END CONSTRUCTION
-L- DET STA. 24+85.39=
-L- STA. 410+90.31

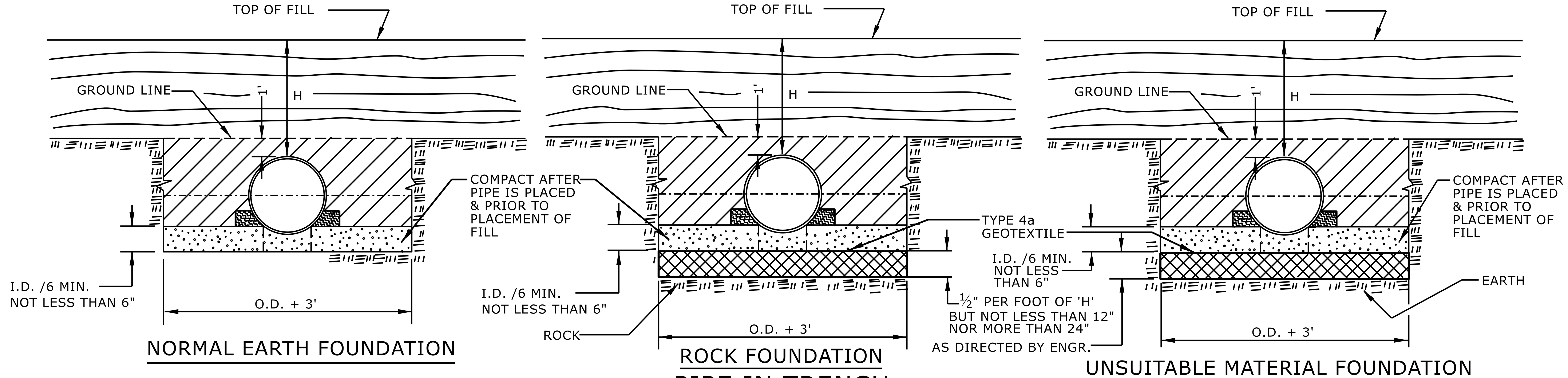
-L- NC 45

WOODS

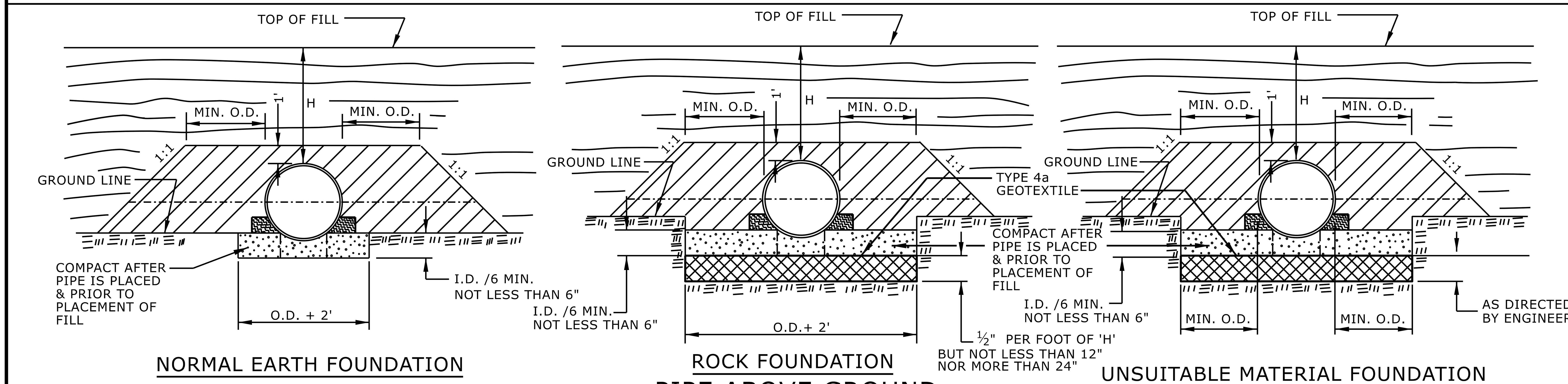
WILLIAM T. JAMES
DB 702 PG 894

CUR DATA -DETOUR-
PIc 21+84.83
Δc = 03°32'00.8" (RT)
D = 00°35'15.5"
Lc = 601.30
Tc = 300.75
R = 9,750

PROJECT REFERENCE NO.	SHEET NO.
R-5809A	2C-1



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, TYPE 1 ABOVE AND BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

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

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

Signed by: Nicole M. Hackler
588432...164C5
NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER
12/11/2024

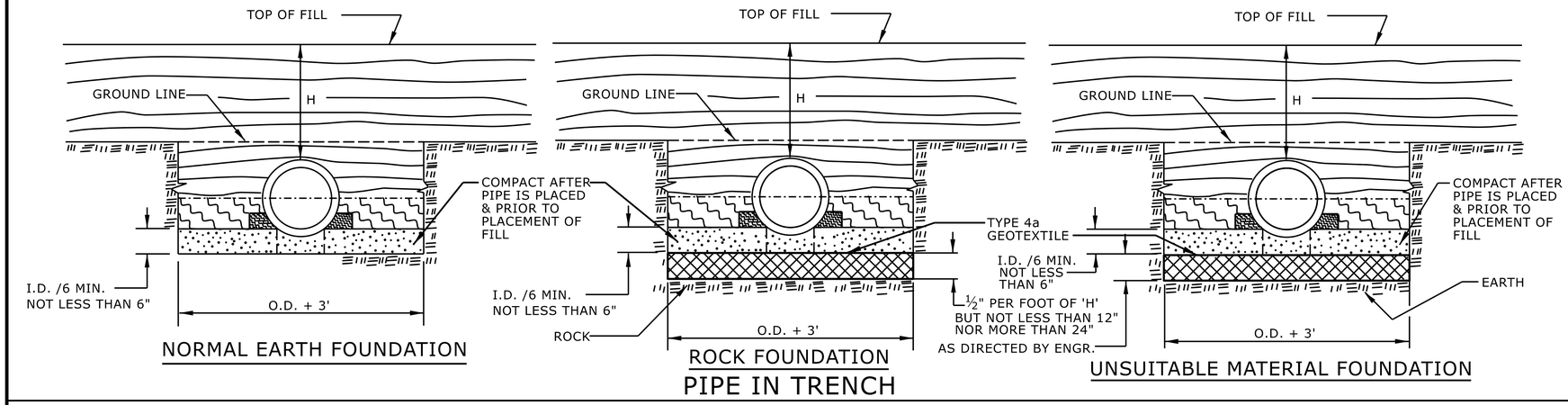
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

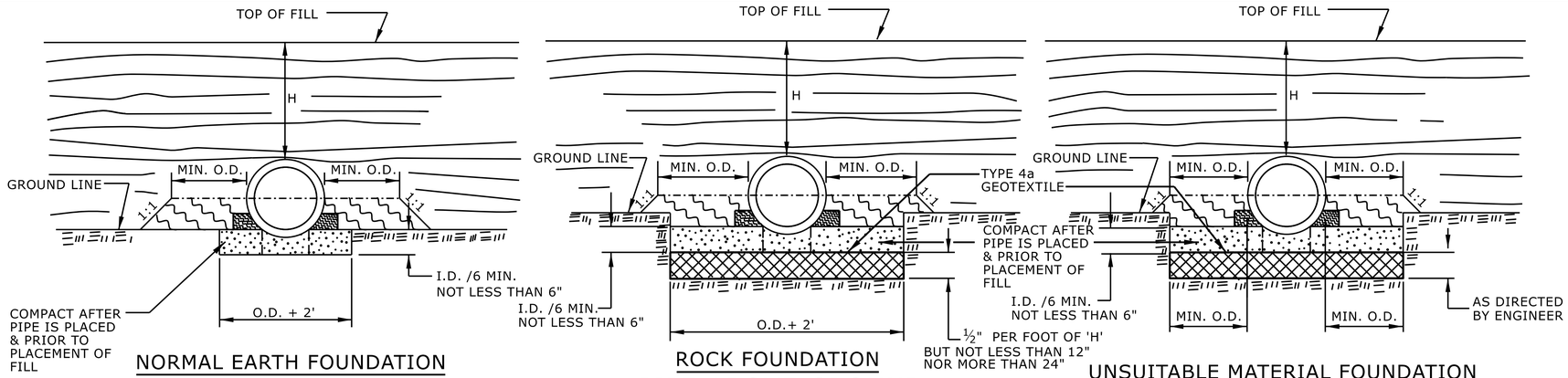
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
R-5809A	2C-2



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

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

UNDISTURBED EARTH MATERIAL

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

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ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

Signed by: Nicole M. Hackler

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

12/11/2024

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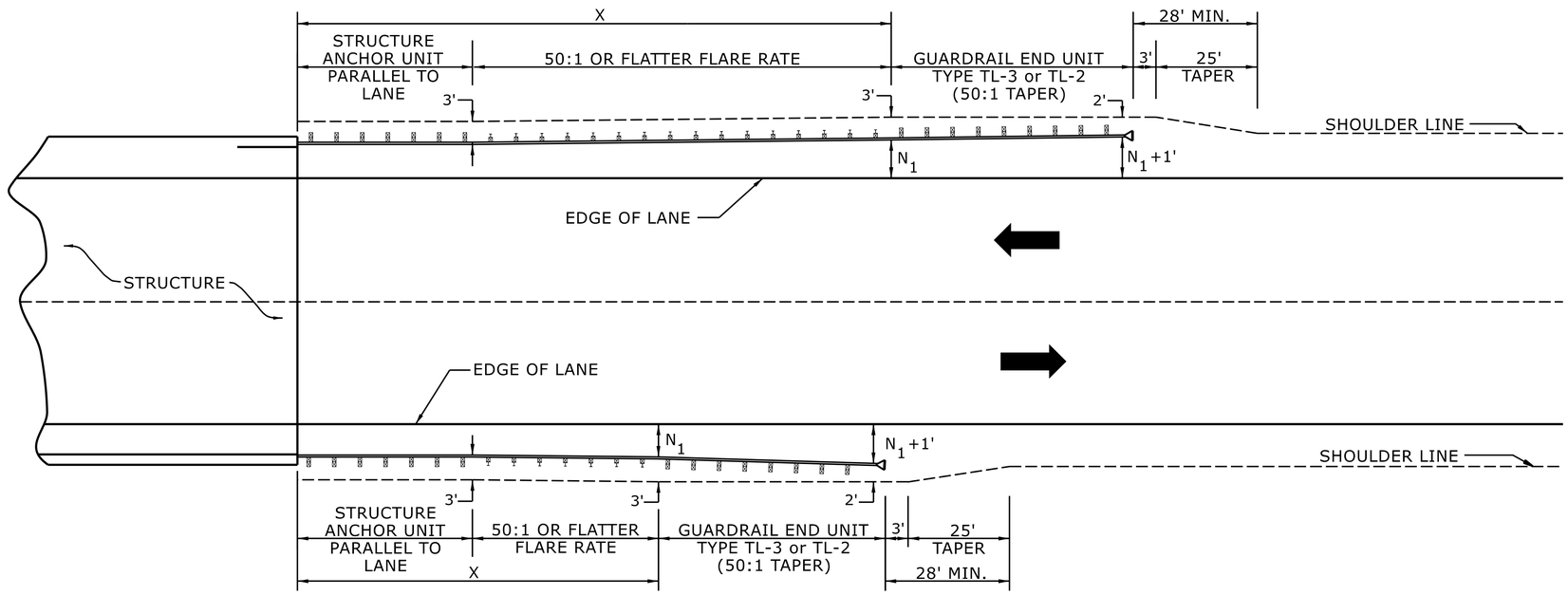
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
R-5809A	2C-3



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

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

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

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

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

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

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NORTH CAROLINA PROFESSIONAL ENGINEER
NICOLE M. HACKLER
12/11/2024

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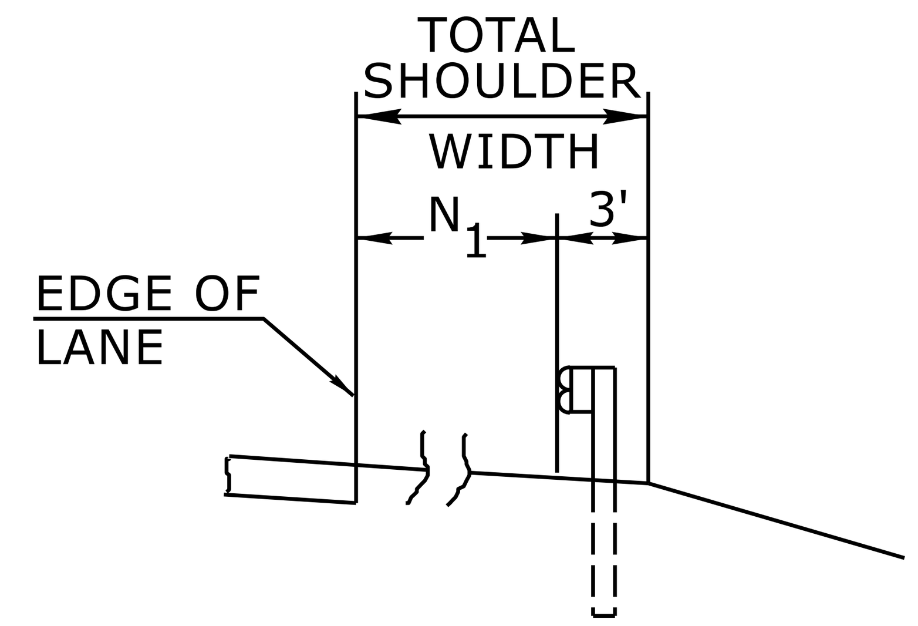
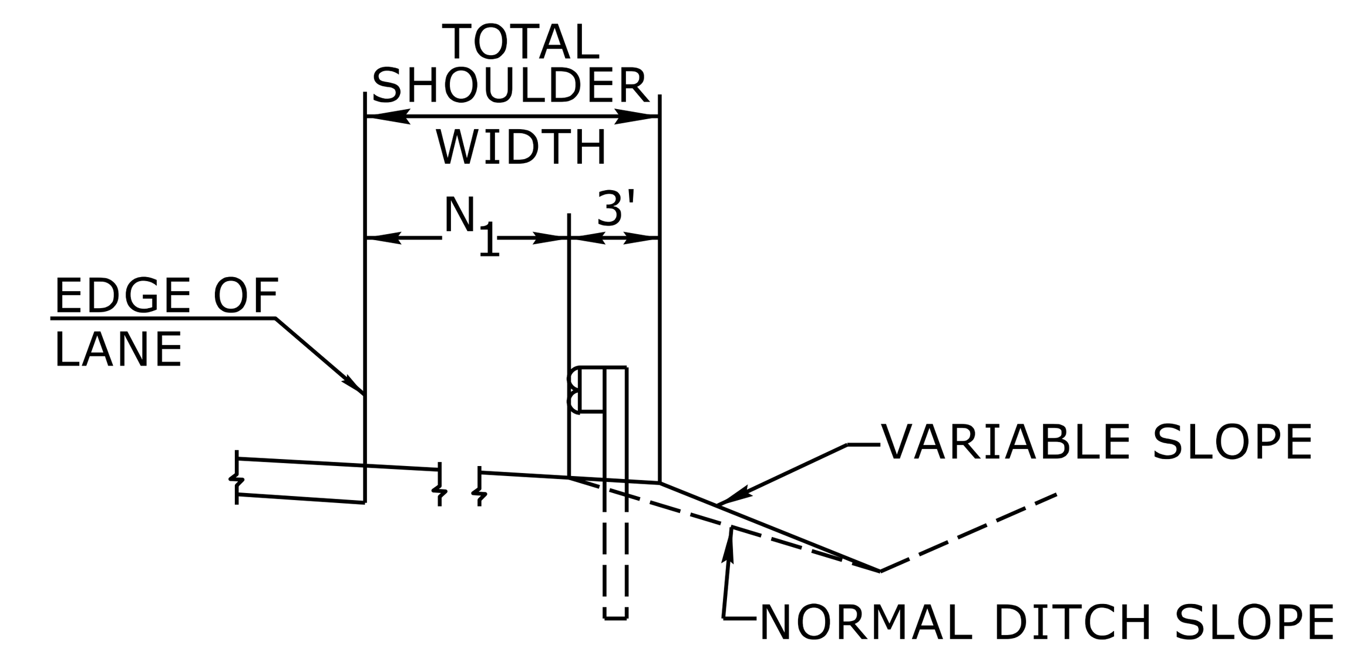
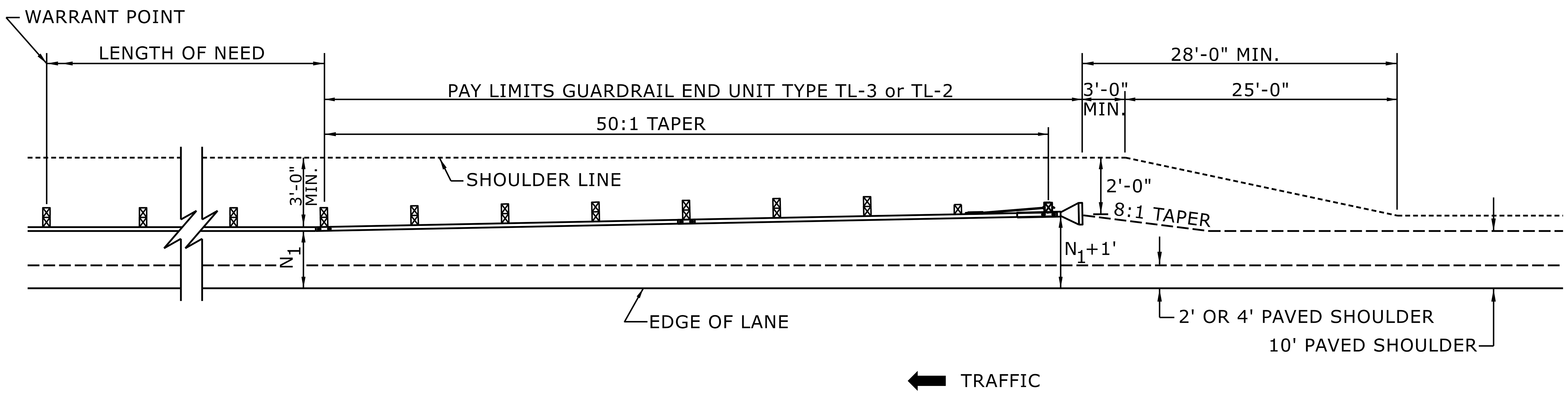


FILL SECTION



CUT SECTION

"N_1"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



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

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15
862D01

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5884325D24164C5...
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REVISIONS

10/10/2023

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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	2D-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
PROFESSIONAL ENGINEER — VINCENT E. RICCIO — SEAL 055728 — ENGINEER — 10/30/2024

HYDRAULICS ENGINEER
PROFESSIONAL ENGINEER — DAVID L. HURST — SEAL 053547 — ENGINEER — 10/30/2024

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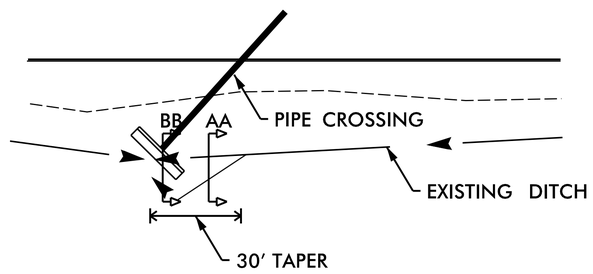
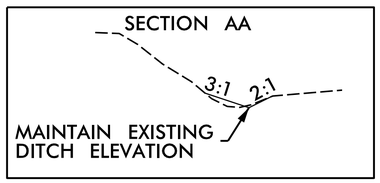
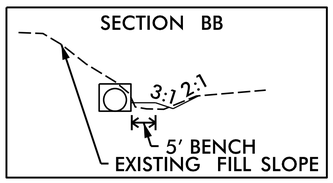
DETAIL 1 – DITCH FLARE OUT

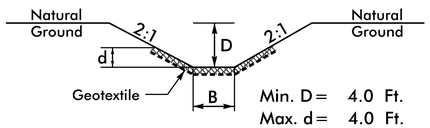






FROM STA. 256+54 TO STA. 256+84 –L– LT
FROM STA. 380+15 TO STA. 380+45 –L– RT

DETAIL 2
STANDARD BASE DITCH
(Not to Scale)

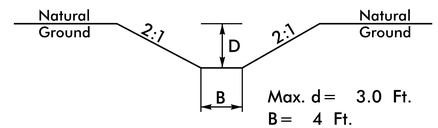


Min. D = 4.0 Ft.
Max. d = 4.0 Ft.
B = 7.0 Ft.

Type of Liner = CL. 1 Rip–Rap

AT STA. 349+47 LT

DETAIL 3
STANDARD BASE DITCH
(Not to Scale)

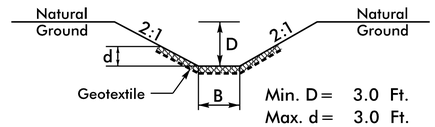


Max. d = 3.0 Ft.
B = 4 Ft.

Type of Liner = GRASS

AT STA. 358+71 LT

DETAIL 4
STANDARD BASE DITCH
(Not to Scale)

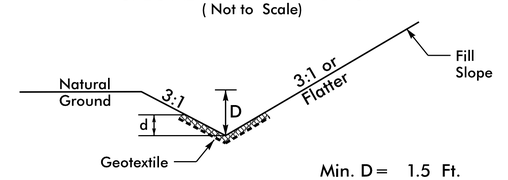


Min. D = 3.0 Ft.
Max. d = 3.0 Ft.
B = 2.0 Ft.

Type of Liner = CL. 1 Rip–Rap

AT STA. 380+37 LT

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

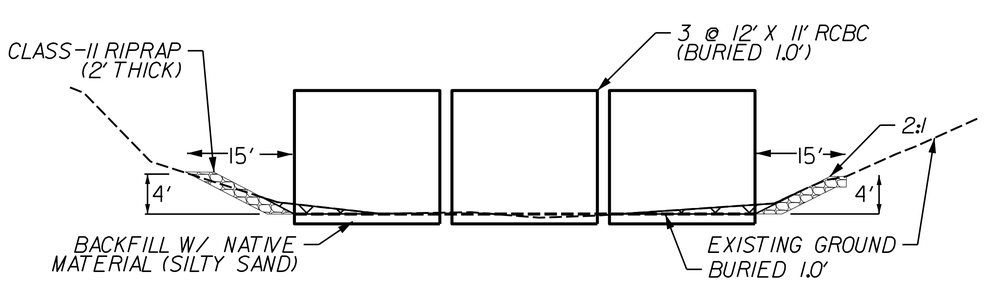


Min. D = 1.5 Ft.
Max. d = 1.0 Ft.

Type of Liner = CL. I Rip–Rap

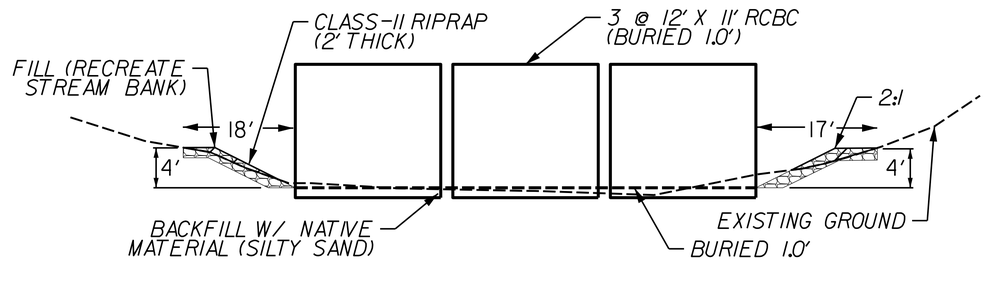
FROM STA. 397+75 TO STA. 398+48 RT
FROM STA. 397+83 TO STA. 398+48 LT
FROM STA. 399+23 TO STA. 399+75 RT
FROM STA. 399+20 TO STA. 399+75 LT

DETAIL 6 TYPICAL – INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM
(NOT TO SCALE)



AT STA. 398+84 LT

DETAIL 7 TYPICAL – OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM
(NOT TO SCALE)



AT STA. 398+84 RT

PROJECT REFERENCE NO.	SHEET NO.
R-5809A	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034020 ENGINEER

Docusigned by: Yinhua Liu 8/7/2024
673A8A76BCF14BE... DATE

ENGINEER

SIGNATURE DATE

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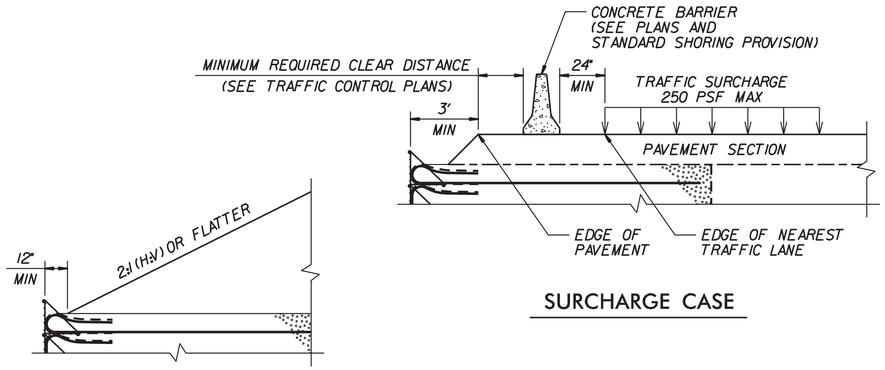
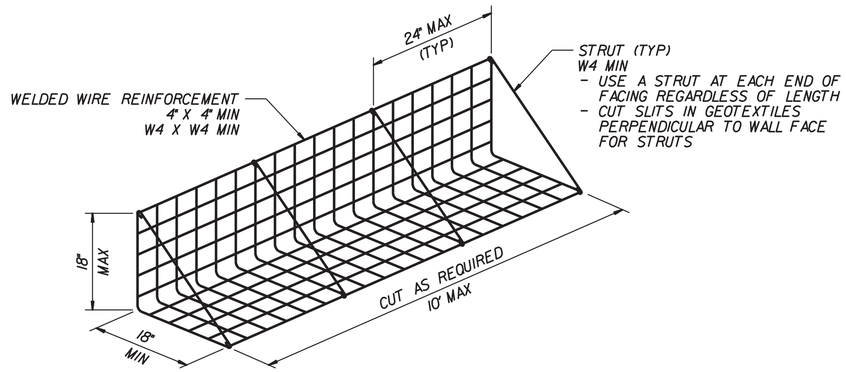
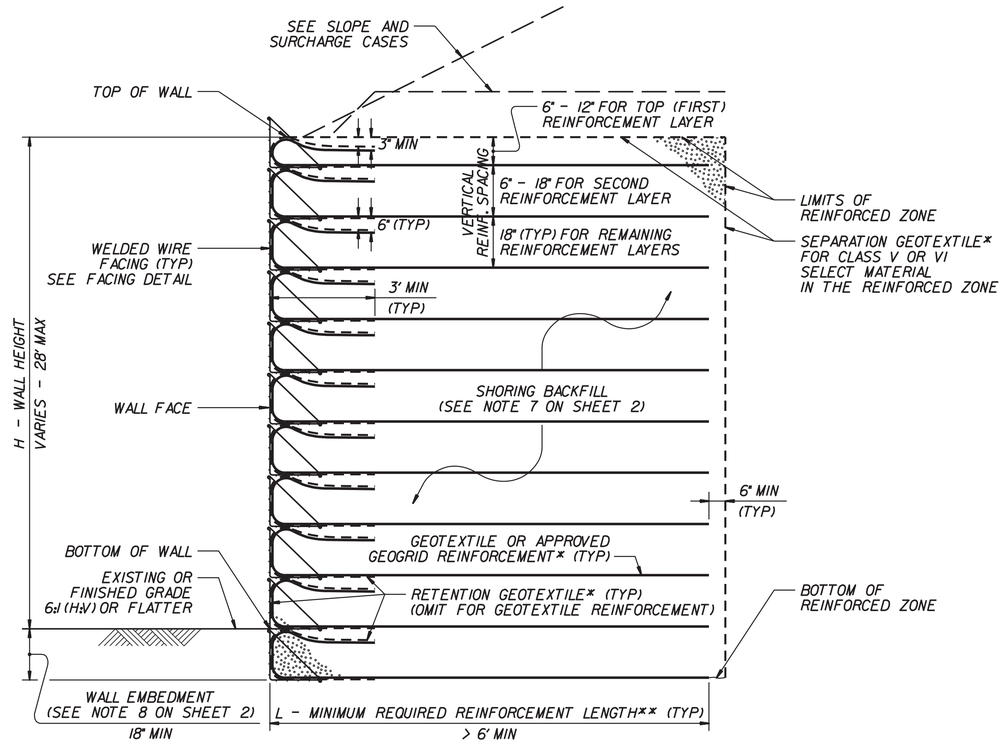


SURCHARGE CASE

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

GEOTECHNICAL ENGINEER — SEAL 034020 — DocuSigned by: Yinhui Liu 8/13/2024 — 673A8A76BCF14BE...

ENGINEER

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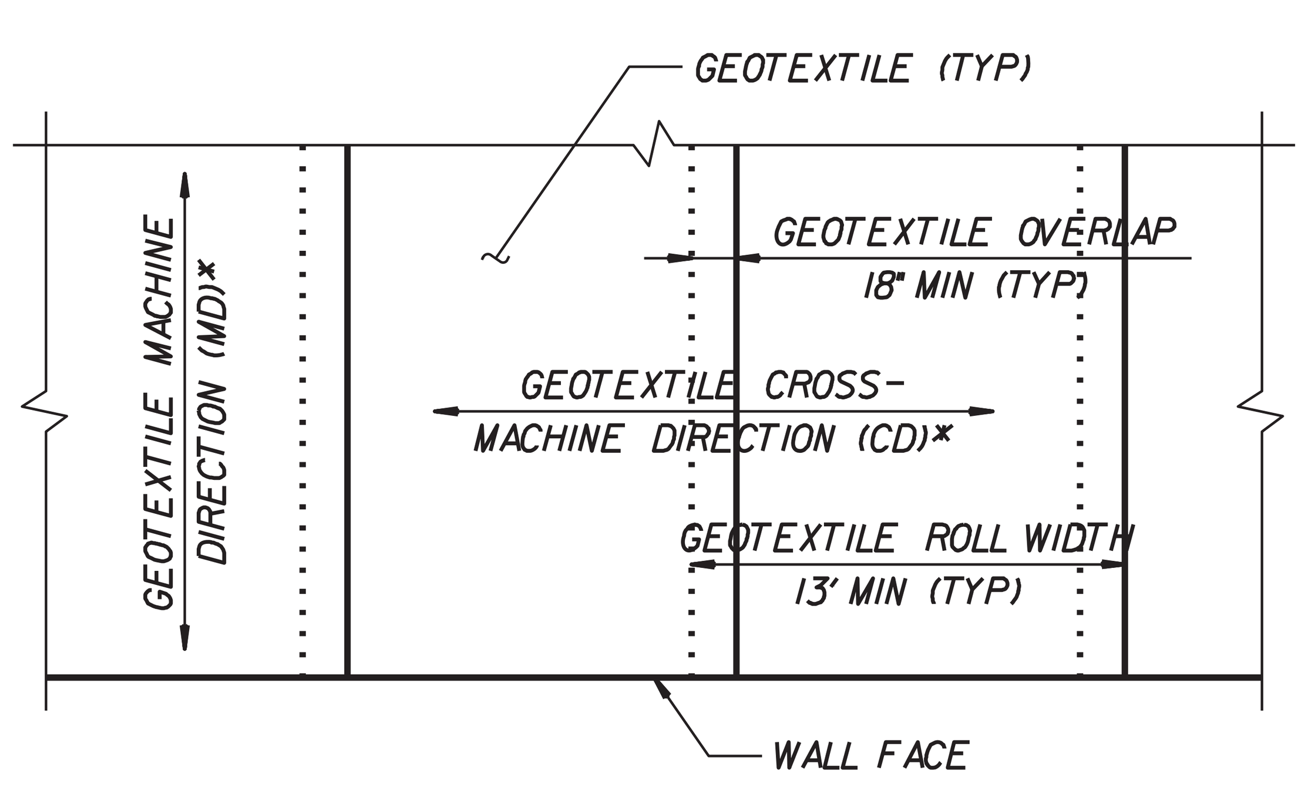
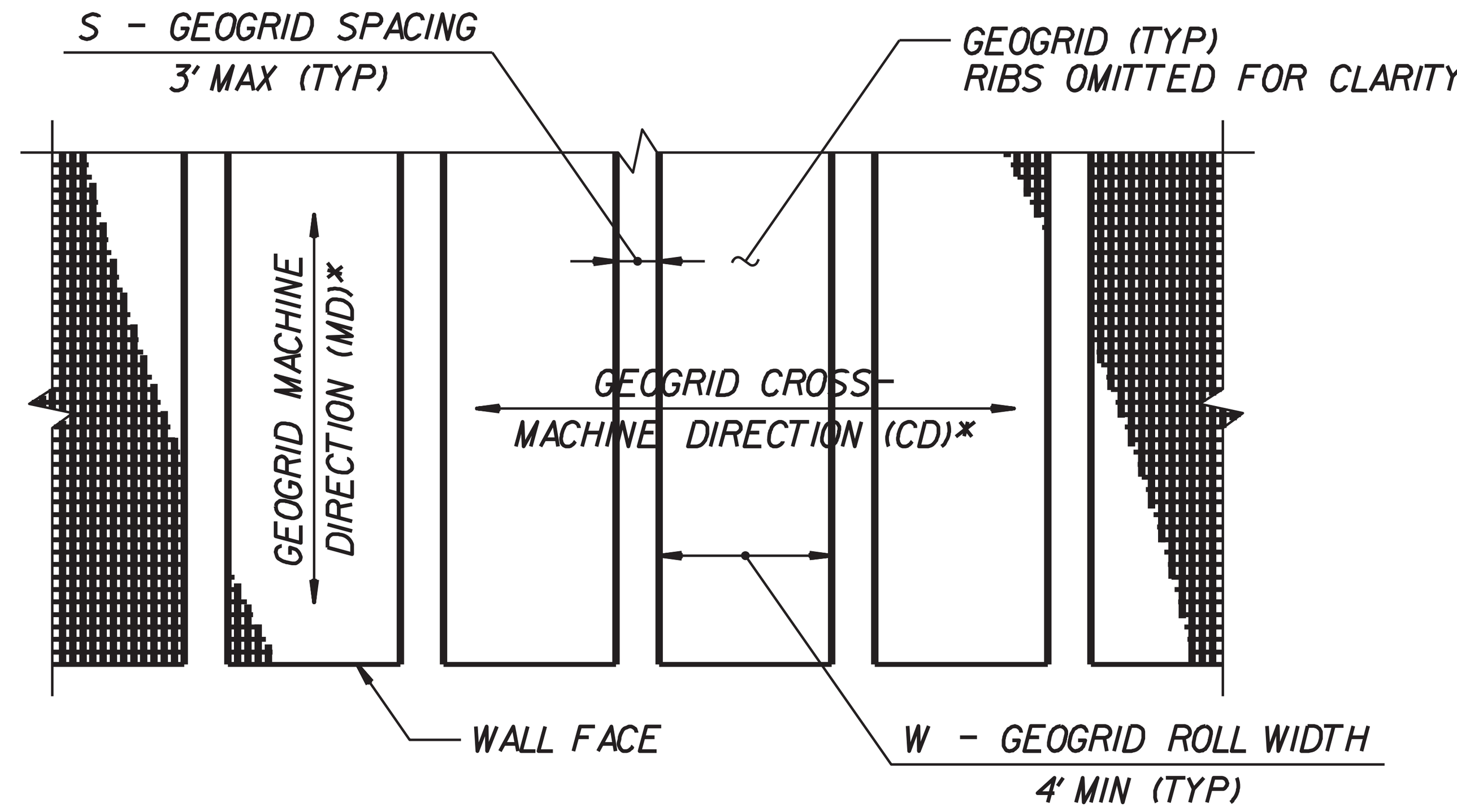


GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

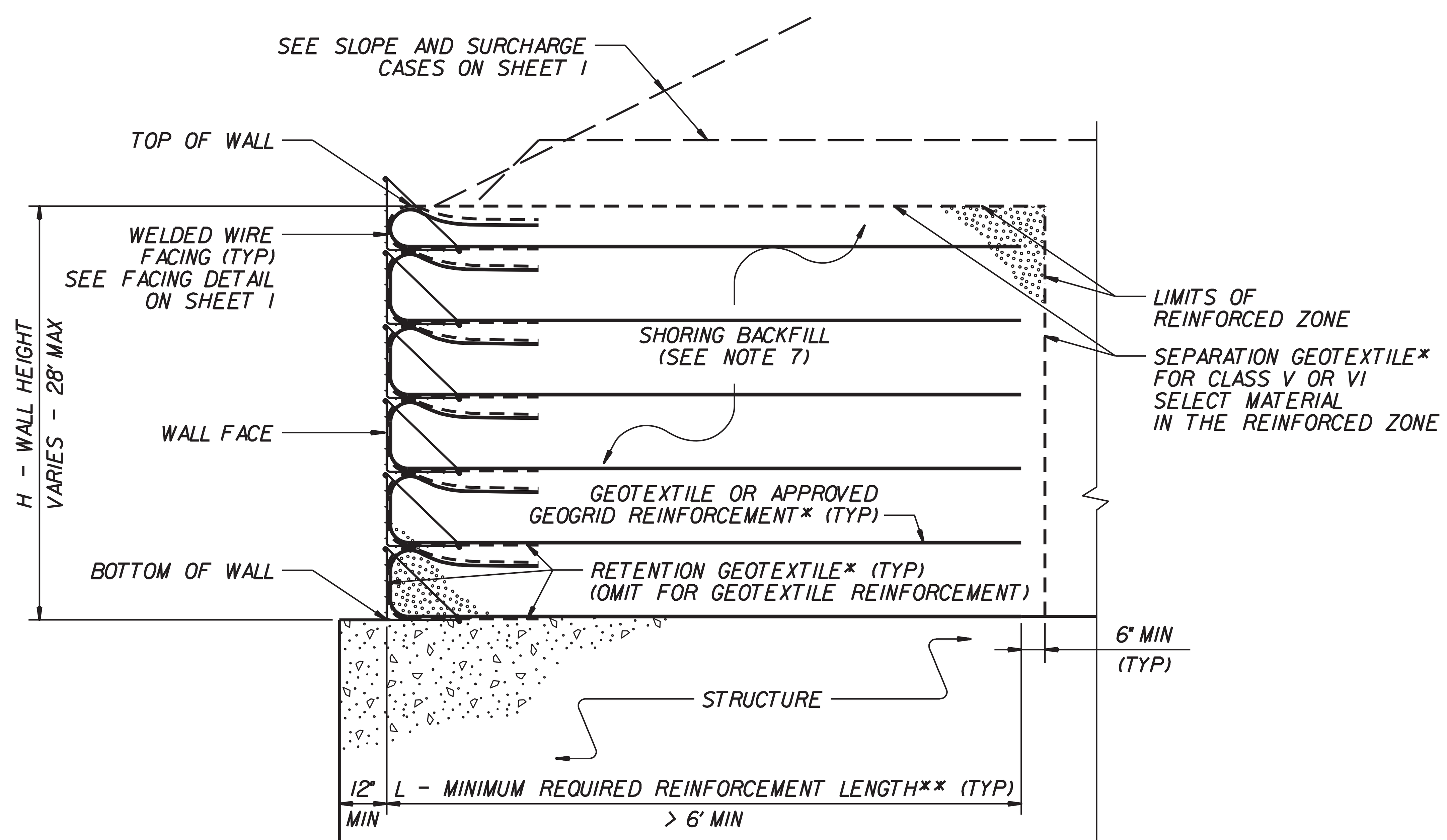


GEOGRID PLACEMENT

(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.

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.
R-5809A	2G-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034020 ENGINEER

DocuSigned by: Yinhua Liu 8/1/2024
673A8A76BCF14BE... DATE

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

Kimley»Horn ©2021
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT EXCAVATION	EMBT + %	BORROW	WASTE
–L– 1+50 TO 31+50	159		166	6	
–L– 32+00 TO 61+50	46		769	723	
–L– 62+00 to 91+50	24		1,988	1,964	
–L– 92+00 to 121+50	6		211	206	
–L– 122+00 to 151+50	4		530	526	
–L– 152+00 to 181+50	23		147	124	
–L– 182+00 to 211+50	10		571	560	
–L– 212+00 to 241+50	7		226	220	
–L– 242+00 to 271+50	18		106	88	
–L– 272+00 to 301+50	12		70	58	
–L– 302+00 to 331+50	17		66	49	
–L– 332+00 to 361+50	17		159	142	
–L– 362+00 to 391+50	55		92	37	
–L– 392+00 to 421+50	160		754	594	
–L– 422+00 to 431+50	4		26	23	
SUBTOTAL	562		5,882	5,320	
TEMPORARY DET. (–LDET–)	652		3,898	3,246	
DETOUR REMOVAL (–LDET–)	3,118				3,118
SUBTOTAL	3,770		3,898	3,246	3,118
TOTAL	4,332		9,780	8,566	3,118
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				428	
GRAND TOTAL	4,332		9,780	8,994	3,118
SAY	4,400			9,000	

NOTES:
1. EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGNER. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

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

10/10/2023

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	3B-2

Kimley»Horn ©2021
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

"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 TL-3
NG = NON-GATING IMPACT ATTENUATOR TYPE TL-3

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE TL-3			TERMINAL SECTIONS	REMOVE EXISTING GUARDRAIL	REMOVE AND RESET EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	CAT-1	AT-1	TYPE III	GREU TL-2	GREU TL-3	EA	G	NG				
-L-	1+30	2+80	RT	150′					6′	9′	50′						1		1					150′		ROANOKE/MIDDLE/CASHIE RIVERS
-L-	1+30	4+10	LT	280′					6′	9′		50′					1		1					280′		ROANOKE/MIDDLE/CASHIE RIVERS
-L-	57+60	60+21	RT	261′					6′	9′	50′						1		1					261′		COOPER HILL
-L-	56+77	57+77	LT	100′					6′	9′	50′								1					100′		COOPER HILL
-L-	57+60	60+21	LT	261′					6′	9′							1							261′		COOPER HILL
-L-	63+21	72+73	LT	952′					6′	9′	50′						1		1					952′		CASHOKE CREEK
-L-	63+21	72+65	RT	944′					6′	9′		50′					1		1					944′		CASHOKE CREEK
-L-	183+80	187+92	RT	412′					6′	9′	50′	50′							2					400′		
-L-	234+72	238+31	LT	359′					6′	9′	50′	50′							2					400′		
-L-	255+20	258+90	LT	370′					6′	9′	50′	50′							2							
-L-	299+32	302+97	LT	365′					6′	9′	50′	50′							2							
-L-	347+34	350+97	RT	363′					6′	9′	50′	50′							2							
-L-	356+46	360+46	RT	400′					6′	9′	50′	50′							2							
-L-	378+09	381+02	RT	293′					6′	9′	50′	50′							2							
-L-	396+79	401+42	LT	463′					6′	9′	50′	50′							2							
-L-	396+30	400+86	RT	456′					6′	9′	50′	50′							2							
			SUBTOTAL	6429′													6		24					3748′		
	LESS ANCHOR DEDUCTIONS																									
	GREU TL-3 24 @ 50.00′		=	-1200																						
			PROJ. TOTAL	5229′													6		24					3748′		
			SAY	5250′													6		24					3800′		
	ADDITIONAL GUARDRAIL POSTS – 15 EA.																									

REMOVAL OF EXISTING ASPHALT PAVEMENT			
LINE	STATION TO STATION	LOCATION	SQ. YDS.
	TMP	RT	6377.78
-L-	64+41 TO 77+81	LT	595.56
-L-	64+41 TO 77+81	RT	595.56
-L-	79+21 TO 91+21	LT	533.33
-L-	79+21 TO 91+21	RT	533.33
-L-	96+06 TO 112+01	LT	708.89
-L-	96+06 TO 112+01	RT	708.89
-L-	134+23 TO 158+26	LT	1068.00
-L-	134+23 TO 158+26	RT	1068.00
-L-	179+08 TO 199+31	LT	899.11
-L-	179+08 TO 199+31	RT	899.11
-L-	230+25 TO 262+63	LT	1439.11
-L-	230+25 TO 262+63	RT	1439.11
-L-	282+15 TO 294+15	LT	533.33
-L-	282+15 TO 294+15	RT	533.33
-L-	294+89 TO 317+48	LT	1004.00
-L-	294+89 TO 317+48	RT	1004.00
-L-	329+31 TO 368+87	LT	1758.22
-L-	329+31 TO 368+87	RT	1758.22
-L-	374+37 TO 386+37	LT	533.33
-L-	374+37 TO 386+37	RT	533.33
-L-	409+11 TO 435+62	LT	1178.22
-L-	409+11 TO 435+62	RT	1178.22
TOTAL			26,880.00
SAY			26,880

REVISIONS

10/10/2023

LL0000000-VK8YN

COMPUTED BY:	NSA	DATE:	5/24/2024
CHECKED BY:	DLH	DATE:	5/24/2024

PROJECT NO.	SHEET NO.
R-5809A	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 / SIZE / THICKNESS OR GAUGE	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	R. C. PIPE CLASS V 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY
70 + 42	0	CL	0403	0402		5.1	0.3					92													
71 + 82	0	CL	0401	0400		6.0	3.0					100													
85 + 21	0	CL	0501	0500		23.7	23.7													60					
102 + 06	0	CL	0601	0600		28.6	28.5												60						
106 + 01	0	CL	0603	0602		27.8	27.4												60						
140 + 23	0	CL	0605	0604		22.6	21.5				104														
143 + 91	0	CL	0607	0606		23.5	22.2					84													
152 + 25	0	CL	0701	0700		28.0	27.7						68												
193 + 32	0	CL	0803	0802		27.1	26.9						80												
236 + 23	0	CL	0901	0900		27.2	25.2						64												3.100
236 + 26	0	CL	0903	0902		27.2	25.2						64												
243 + 01	0	CL	0905	0904		27.7	27.6				64														
288 + 16	0	CL	1101	1100		29.9	29.4						68												
300 + 90	0	CL	1201	1200		30.3	29.2								64										4.500
311 + 48	0	CL	1203	1202		30.6	30.4					76													
335 + 31	0	CL	1205	1204		27.7	26.8															60			3.400
351 + 41	0	CL	1303	1302		23.0	22.9				76														
352 + 36	0	CL	1305	1304		22.7	22.6														84				
358 + 71	0	CL	1403	1402		20.1	19.8							76											3.400
362 + 88	0	CL	1401	1400		22.7	20.3					124													
380 + 38	0	CL	1501	1500		26.1	25.8							84											3.400
415 + 11	0	CL	1701	1700		28.5	28.4												52						
421 + 44	0	CL	1703	1702		23.5	22.8					88													
429 + 62	0	CL	1801	1800		32.1	30.9					72													
SHEET TOTALS											244	636	344	160	64				172	60	84	60			17.800
PROJECT TOTALS											244	636	344	160	64				172	60	84	60			17.800

Other columns (no entries on this sheet):

Side Drain 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	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.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	TEMP STEEL PLATE COVER MASONRY DRAINAGE	SPRING BOX STD. 840.41		M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54			FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS

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

LL22173

COMPUTED BY: NSA DATE: 5/24/2024

CHECKED BY: DLH DATE: 5/24/2024

PROJECT NO.	SHEET NO.
R-5809A	3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 54	60	66	72	78	84		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	R. C. PIPE CLASS IV 54	60	66	72	78	84		R. C. PIPE CLASS V 54	60	66	72	78	84		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY
186+10	0 CL	0801	0800		20.9	19.9															80															5.000
256+61	0 CL	1001	1000		25.3	25.0															72															6.900
256+66	0 CL	1003	1002		25.3	25.0															72															
349+47	0 CL	1301	1300		19.4	19.2																								56						6.300
SHEET TOTALS																					224									56						18.200
PROJECT TOTALS																					224									56						18.200

LINE & STATION	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.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	TEMP STEEL PLATE COVER MASONRY DRAINAGE	SPRING BOX STD. 840.41		M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54			FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
186+10																																																
256+61																																																
256+66																																																
349+47																																																

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: L. Stone, PG DATE: 03/28/23
CHECKED BY: Y.Liu, PE DATE: 03/28/23

(2-3-23)

PROJECT NO.	SHEET NO.
R-5809A	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	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 Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU (1)	12"	500	950	1500		
			TOTAL CY/TONS/SY:		500	950**	1500**	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.

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	3P-1

Kimley»Horn ©2021
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

REVISIONS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
21	6A	KEITH JENKINS
23	6A	SUE R. FAIRLESS
24	6A	WEYERHAEUSER CO.
18	8	W.D. BYRUM LOGGING INC.
1	8	RICHARD P. HUGHES
2	9	DONALD W. SNYDER
3	10	DORIS H. CORFIELD
4	12	ANTWANE HECKSTALL
5	13	WILLIAM T. JAMES
8	15	WINDSOR METHODIST CHURCH
9	15	HERMAN M. WHITE
10	15	TARHEEL COTTON CO., INC.
11	16	GEORGE C. COWARD, JR
12	16	WILLIAM T. JAMES
15	17	DONAL N. LITTLE
16	18	DONALD R. CARTER
17	18	BRIAN M. CONNER

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

10/10/2023

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
10/30/2024

HYDRAULICS ENGINEER
10/30/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/14/99

REVISIONS

10/10/2023

NAD 83 NC GRID NA 2011

70

BEGIN TIP PROJECT R-5809A
-L- STA. 1+30.00

TO ROANOKE RIVER

RICHARD P. HUGHS
DB 867 PG 233

WILLIAM D. MCNEILL, JR.
DB 963 PG 345

TIE EXISTING DITCHES INTO PROPOSED 24" RCP

REMOVE EXIST. GUARDRAIL

2' PAVED SHOULDER

GREU TL-3

R 50'

-L- N.C. 45

REMOVE

N12°01'00.1"W

24"RCP-IV

CL. B RIPRAP
EST. 3 TONS
11 SQ. YD. GEOTEXTILE

WOODS

MATCHLINE -L- STA 78+00.00
SEE PLAN SHEET 5

SEE SHEET NO. 19 FOR 'L' PROFILE

Kimley»Horn

4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

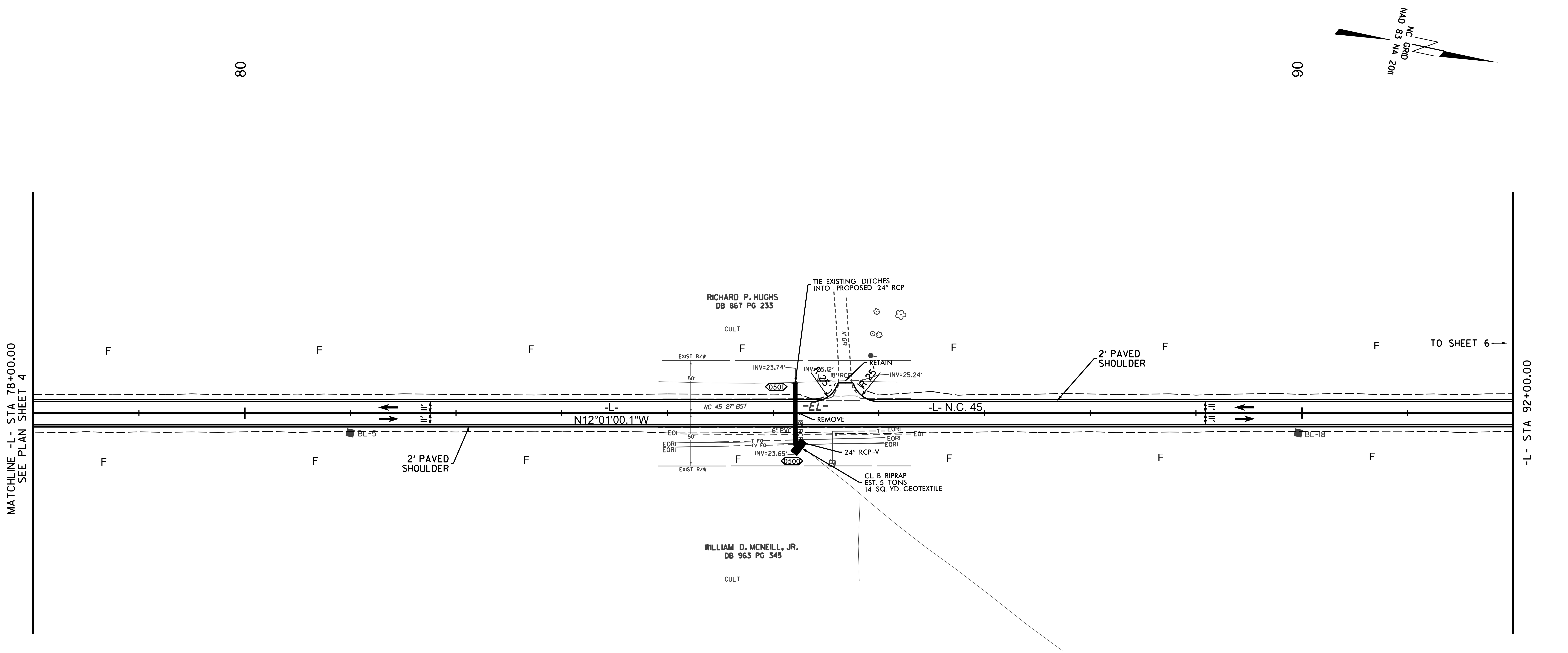
PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO ENGINEER 10/11/2024	SEAL DAVID L HURSEY ENGINEER 10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

5/14/99



SEE SHEET NO. 19 FOR 'L' PROFILE

10/10/2023

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© 2022
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 VINCENT E. RICCIO
10/11/2024

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053341 DAVID L HURSEY
10/14/2024

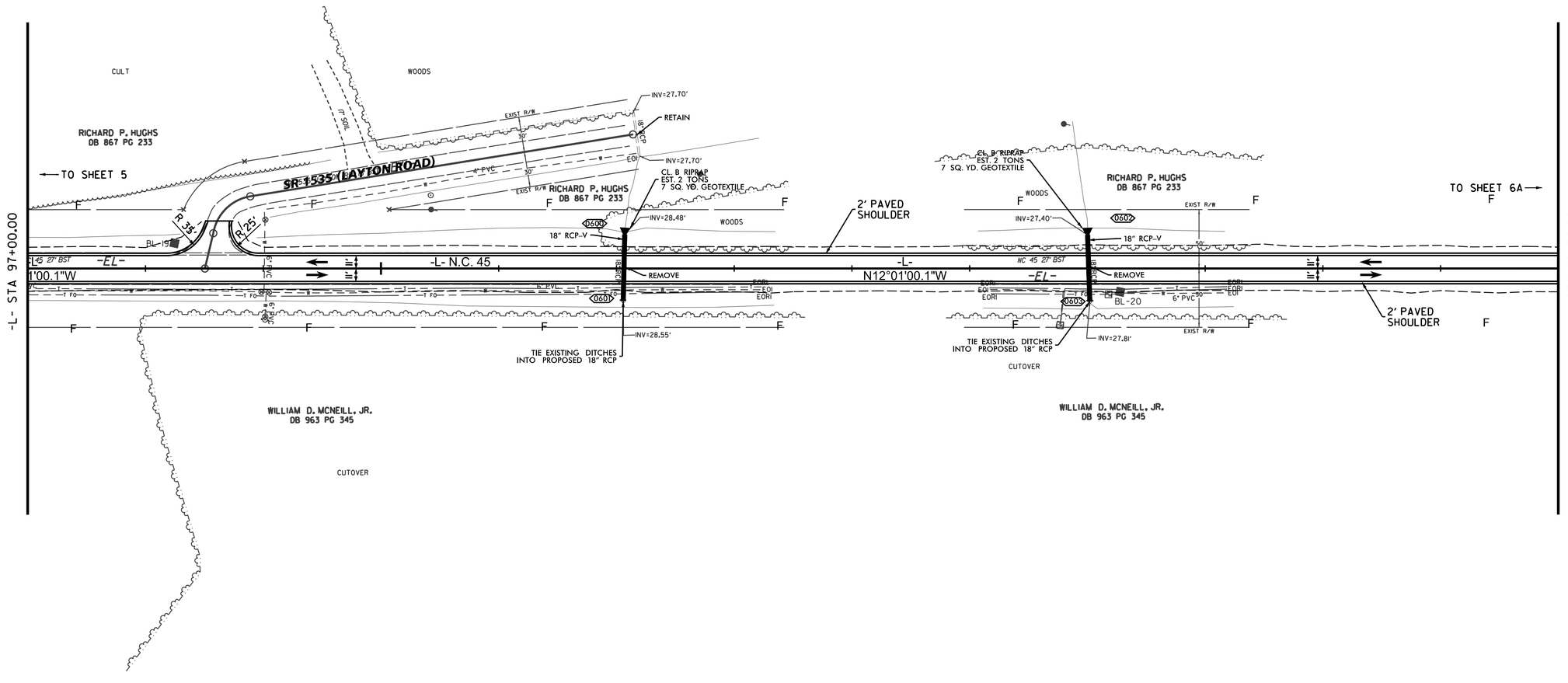
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS
5/14/99

NAD 83 NC GRID 2011

100

110



SEE SHEET NO. 19 FOR 'L' PROFILE

10/10/2023

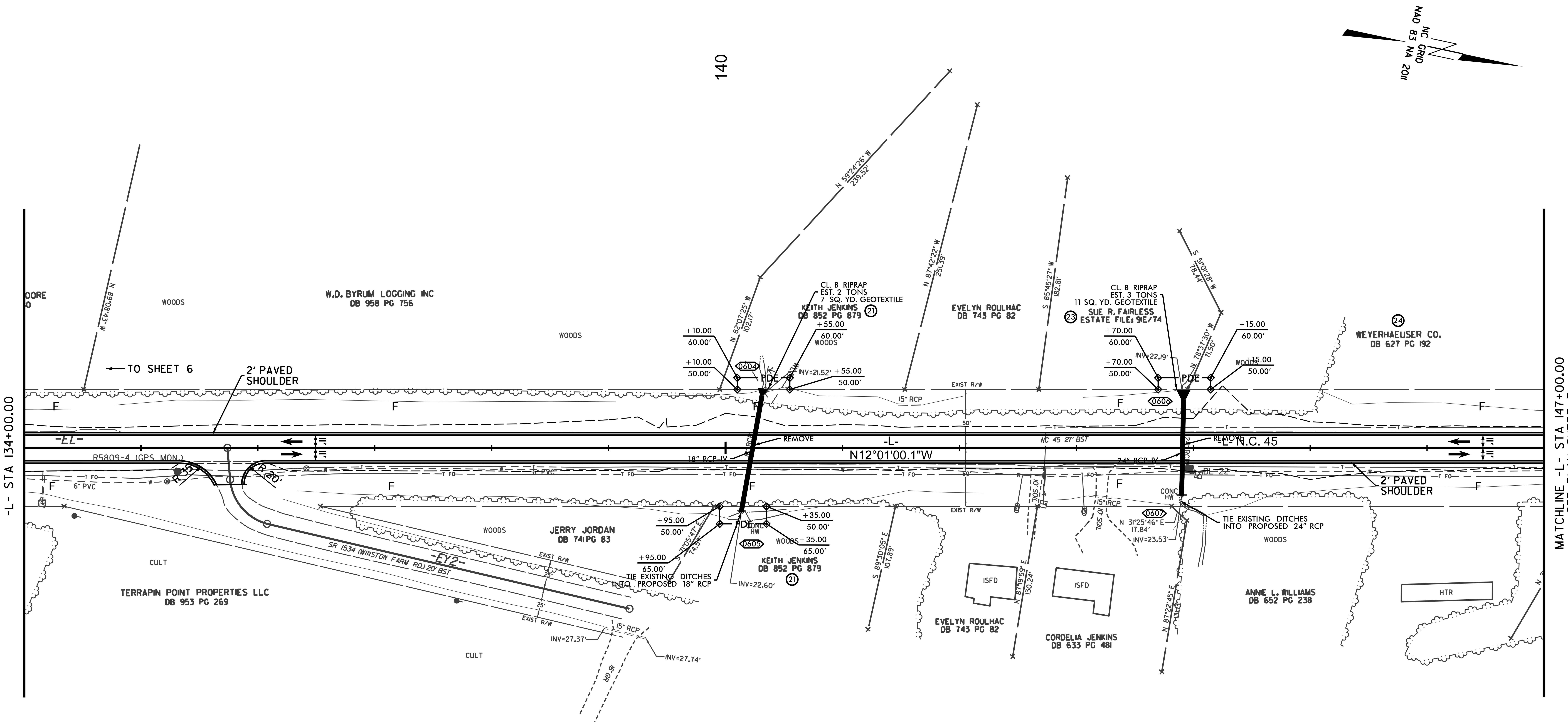
5/14/99

REVISIONS

Kimley»Horn
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	6A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L HURSEY 10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
10/11/2024

HYDRAULICS ENGINEER
10/14/2024

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REVISIONS

10/10/2023

NAD 83 NC GRID NA 2011

150

-L- SC 156+12.21

SPI DATA -L-
PIs 155+12.24
θs = 03°00'00.0"
Ls = 300
LT = 200.03
ST = 100.03

TO SHEET 8

-L- STA 160+00.00

MATCHLINE -L- STA 147+00.00
SEE PLAN SHEET 6A

2' PAVED SHOULDER

CL. B RIPRAP
EST. 5 TONS
16 SQ. YD. GEOTEXTILE

WEYERHAEUSER CO.
DB 627 PG 192

-L- N.C. 45

-ELE-
N12°01'00.1"W

18" RCP

30" RCP-IV

INV=27.68'

REMOVE

NC 45 27' BST

INV=28.02'

INV=27.92'

INV=27.96'

24" RCP

RETAIN

TIE EXISTING DITCHES
INTO PROPOSED 30" RCP

ELVA W. BEMBURY
DB 653 PG 364

SR 1534 (WINSTON FARM ROAD) 20' BST

SR 1534 (WINSTON FARM ROAD)

INV=28.45'

TERRAPIN POINT PROPERTIES LLC
DB 953 PG 269

WOODS

CULT

TERRAPIN PO
DB

-L- TS 153+12.21

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REVISIONS

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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 VINCENT E. RICCIO

10/11/2024

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053341 DAVID L HURSEY

10/14/2024

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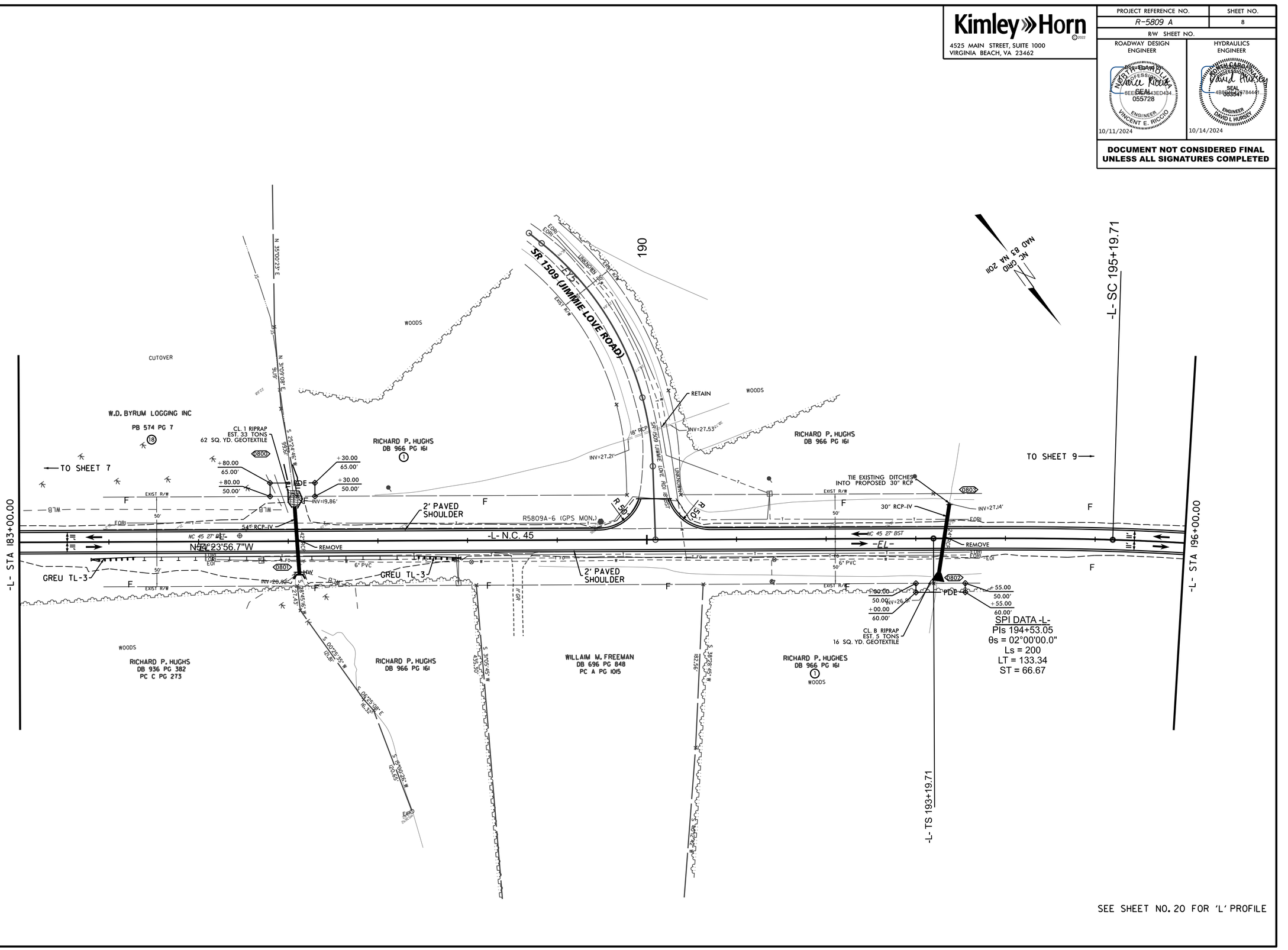

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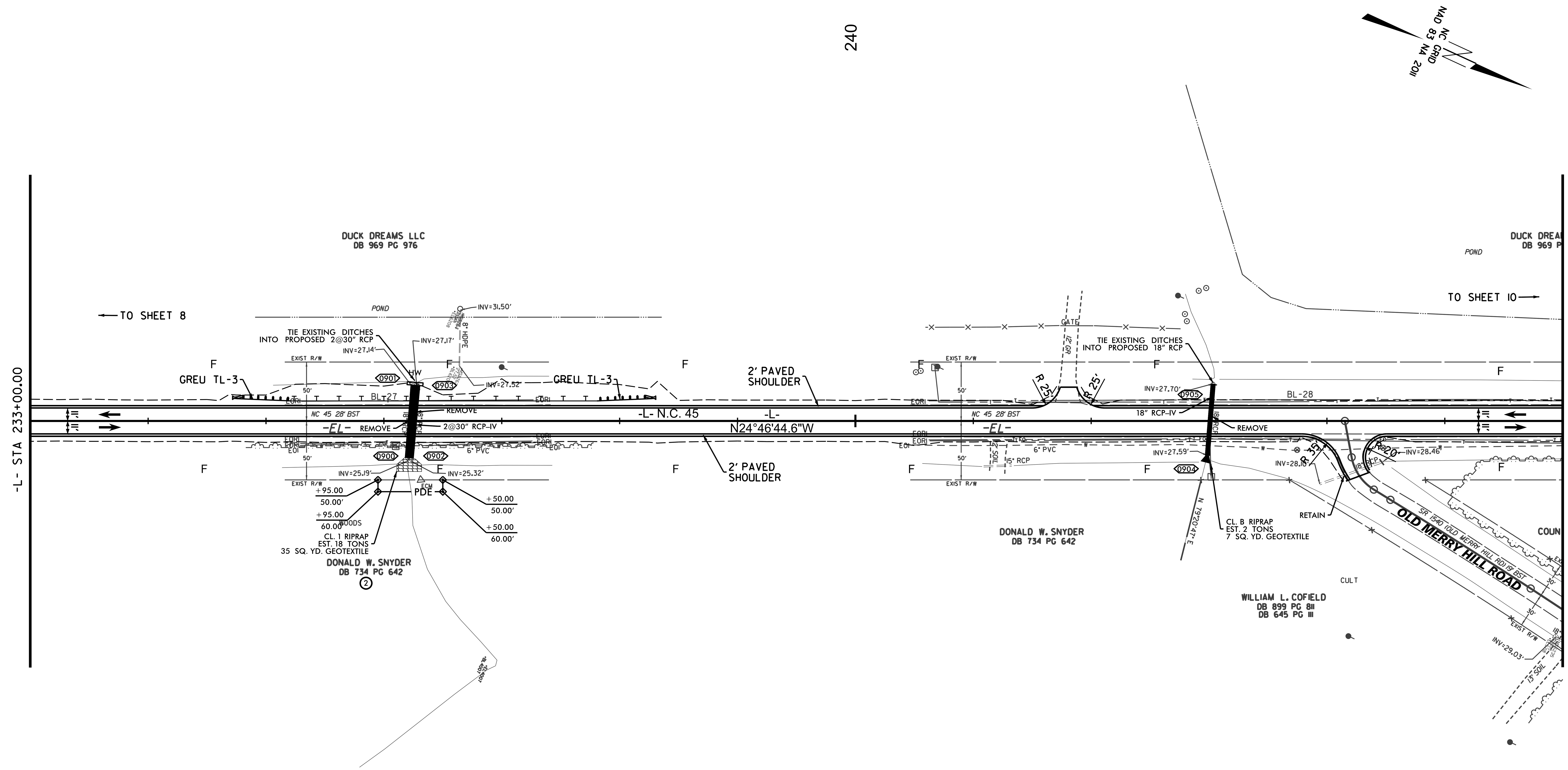
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L HURSEY 10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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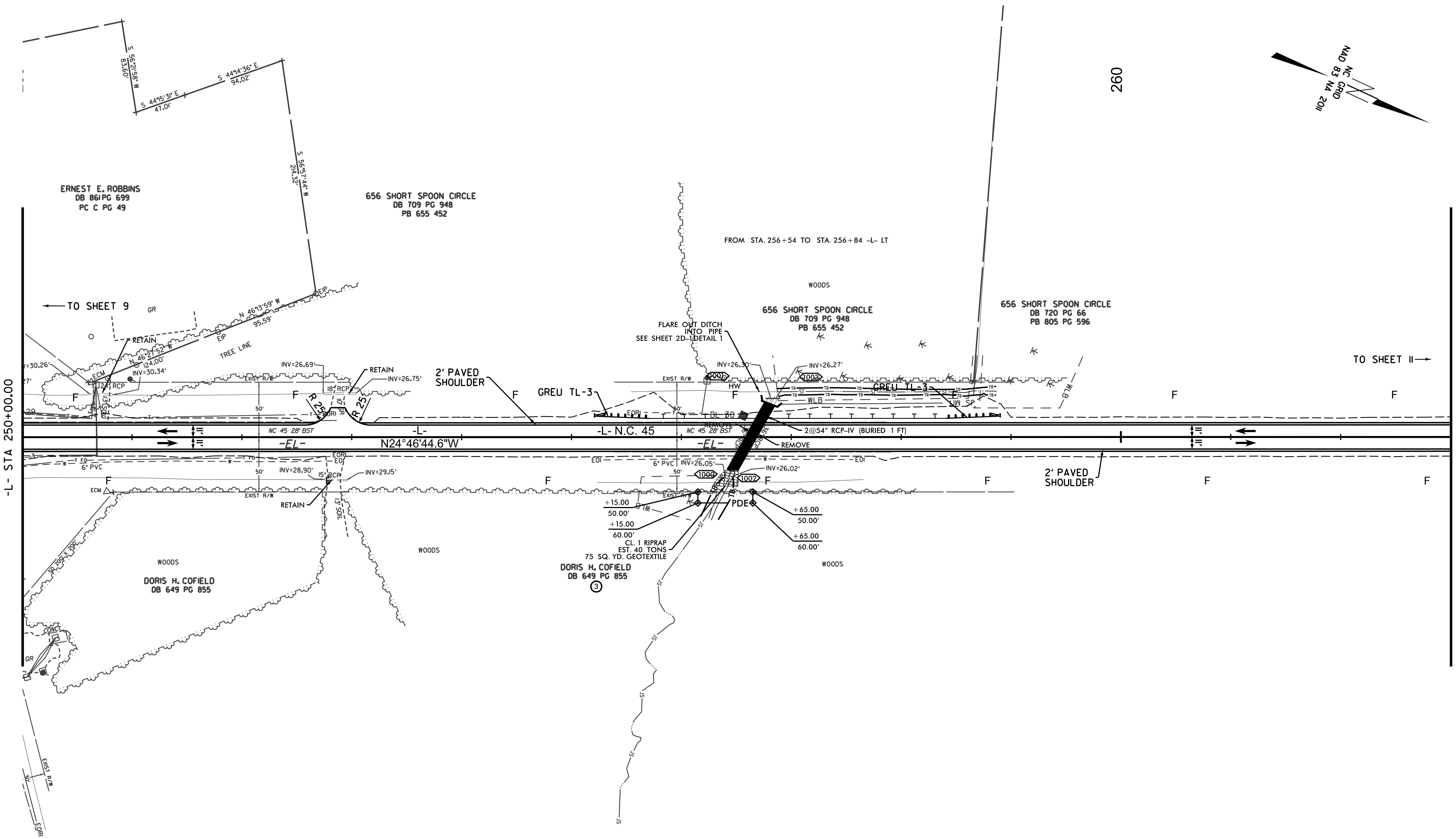
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L HURSEY 10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 VINCENT E. RICCIO
10/11/2024

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053347 DAVID L HURSEY
10/14/2024

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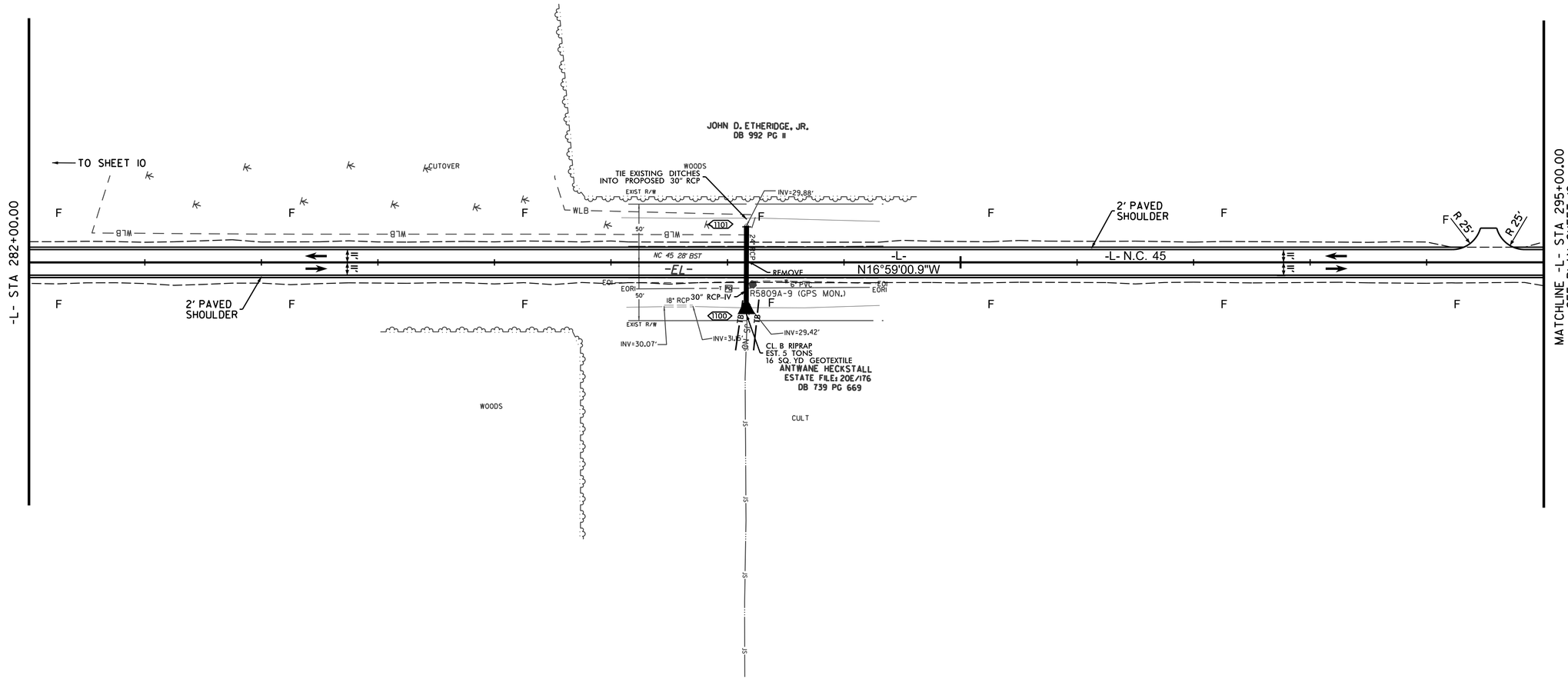
REVISIONS 5/14/99

NAD 83 NA GRID 2011

290



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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO ENGINEER 10/11/2024	SEAL DAVID L HURSEY ENGINEER 10/14/2024

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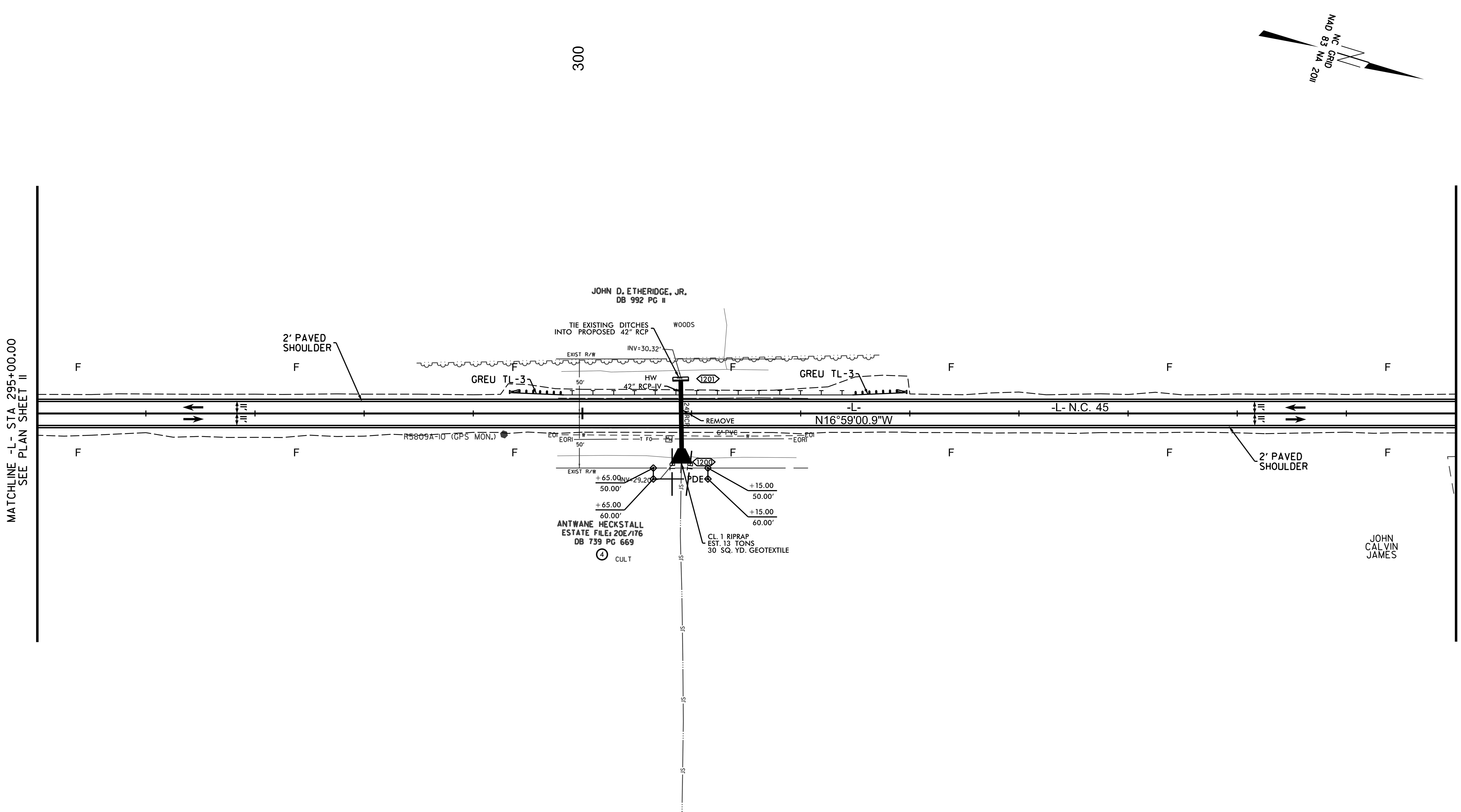

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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	12A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	DAVID L HURSEY 10/14/2024

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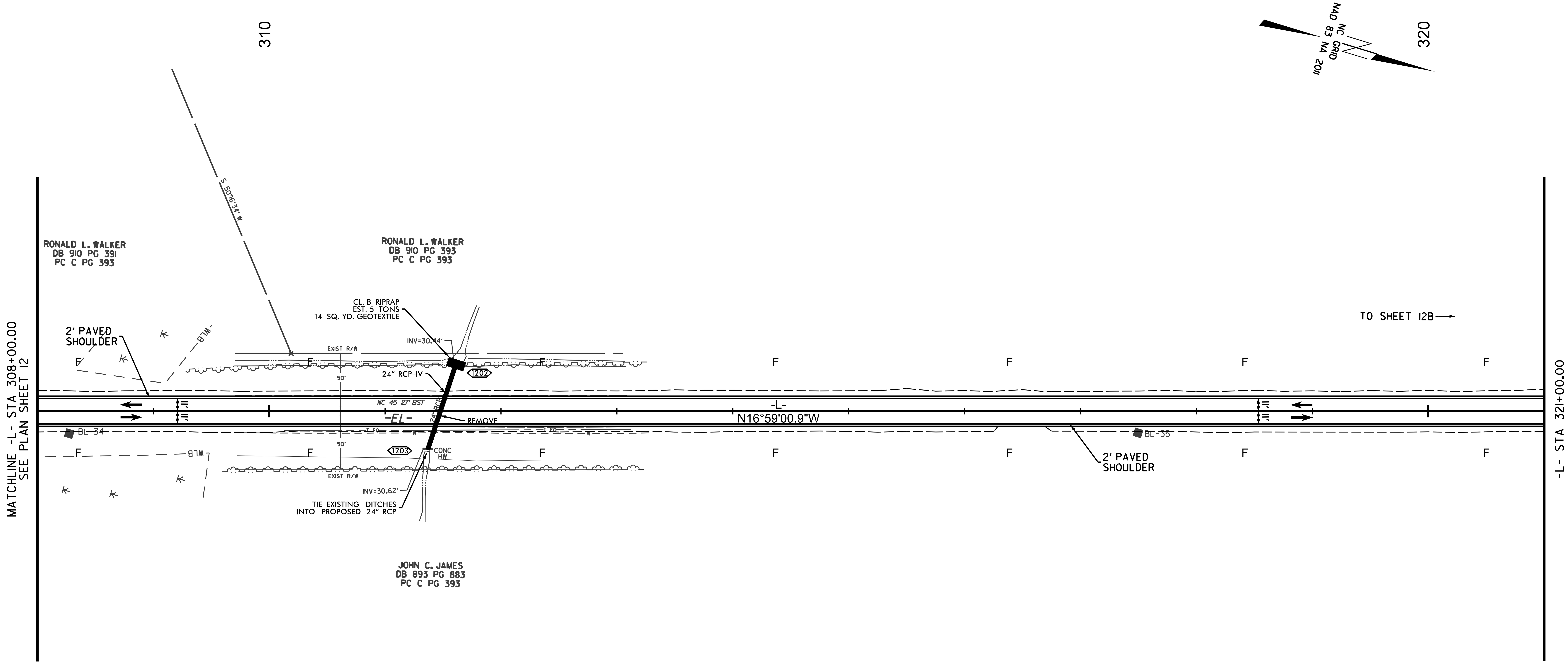

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	12B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L. HURSEY 10/14/2024

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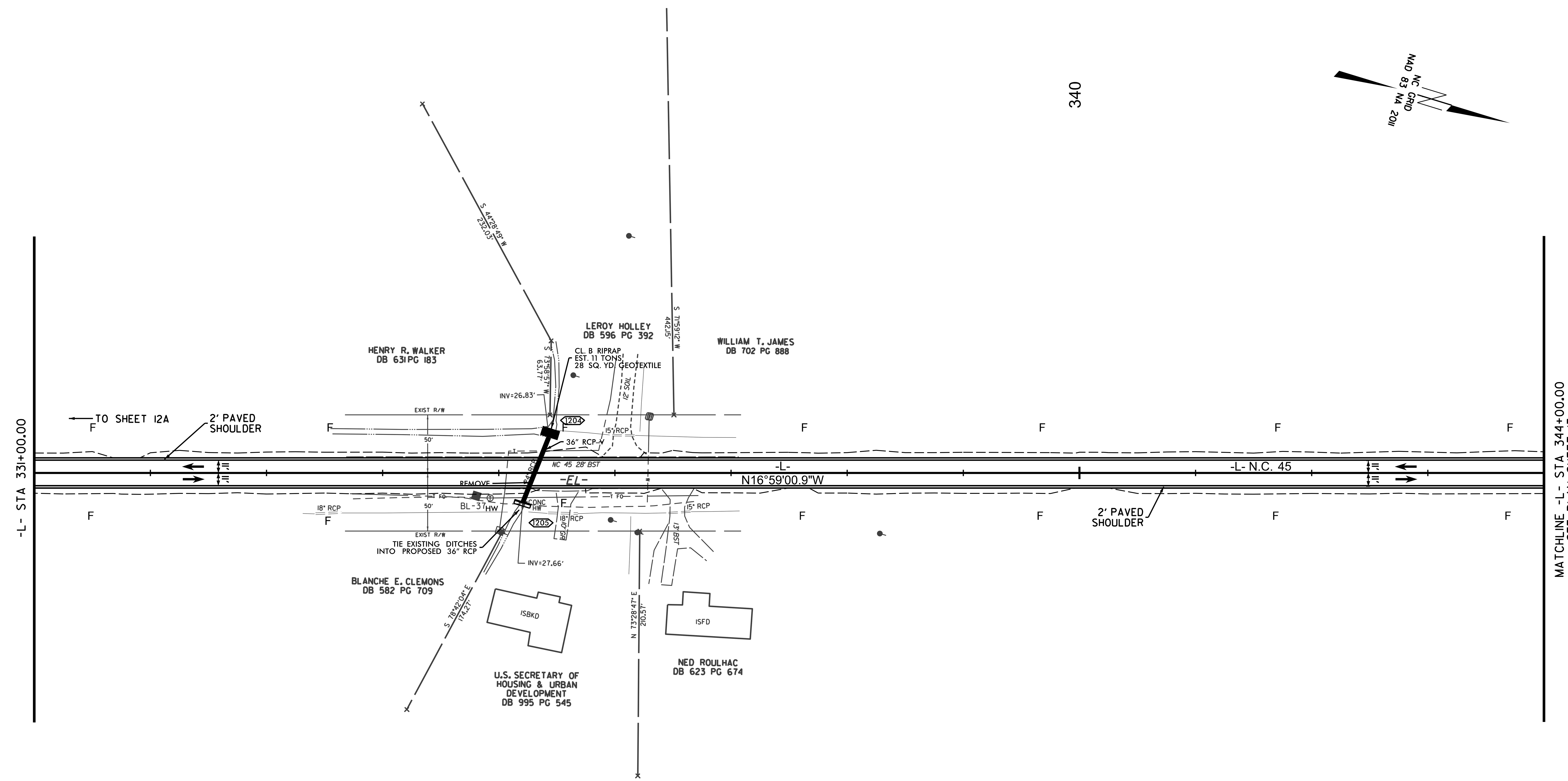

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5/14/99

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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/31/2024	SEAL 053547 DAVID L HURSEY 10/31/2024

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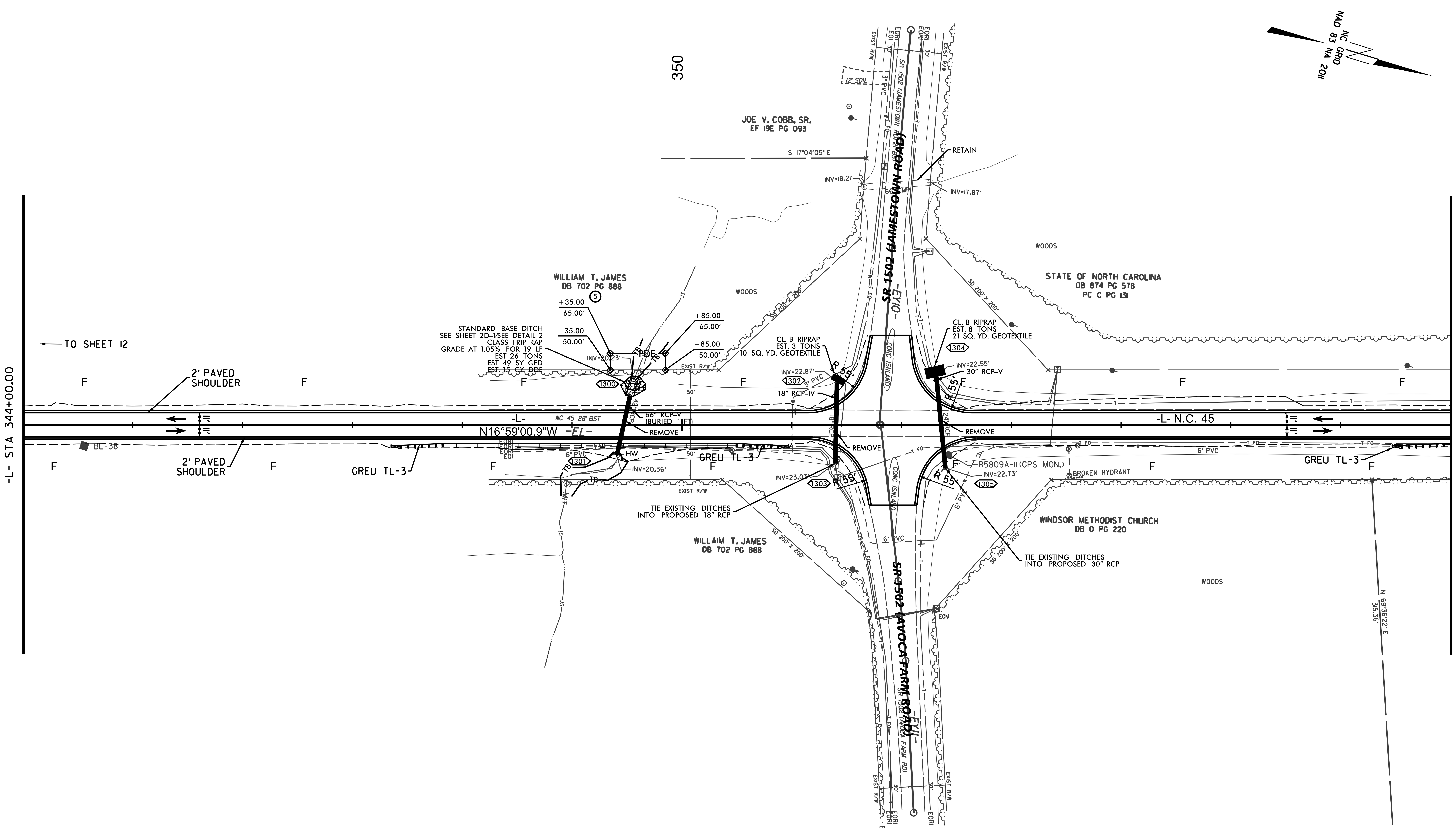

SEE SHEET NO. 21 FOR 'L' PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055728 ENGINEER VINCENT E. RICCIO
10/31/2024

HYDRAULICS ENGINEER
VIRGINIA PROFESSIONAL ENGINEER SEAL 053547 ENGINEER DAVID L HURSEY
10/31/2024

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REVISIONS

360

370

NAD 83 NC GRID 2011

MATCHLINE -L- STA 357+00.00
SEE PLAN SHEET 13

STANDARD BASE DITCH
SEE SHEET 2D-1SEE DETAIL 3
GRADE AT 0.87% FOR 6 LF
EST. 3 CY DDE

STATE OF NORTH CAROLINA
DB 874 PG 578
PC C PG 131

WOODS

INV=19.79'

EXIST R/W

1402

30" RCP

REMOVE

36" RCP-IV

NC 45 28' BST -L-

N16°59'00.9"W

GREU TL-3

CONC HW

INV=20.11'

TIE EXISTING DITCHES INTO PROPOSED 36" RCP

STATE OF NORTH CAROLINA
DB 874 PG 578
PC C PG 131

INV=20.34'

CONC

24" RCP

1400

REMOVE

NC 45 28' BST -L-

1401

24" RCP-IV

EOR

EOI

INV=22.70'

TIE EXISTING DITCHES INTO PROPOSED 24" RCP

STATE OF NORTH CAROLINA
DB 874 PG 578
PC C PG 131

-L- N.C. 45

R5809A-12 (GPS MON.)

R 25'

R 25'

2' PAVED SHOULDER

2' PAVED SHOULDER

R 30'

TO SHEET 15

-L- STA 370+00.00

SEE SHEET NO. 21 FOR 'L' PROFILE

10/10/2023

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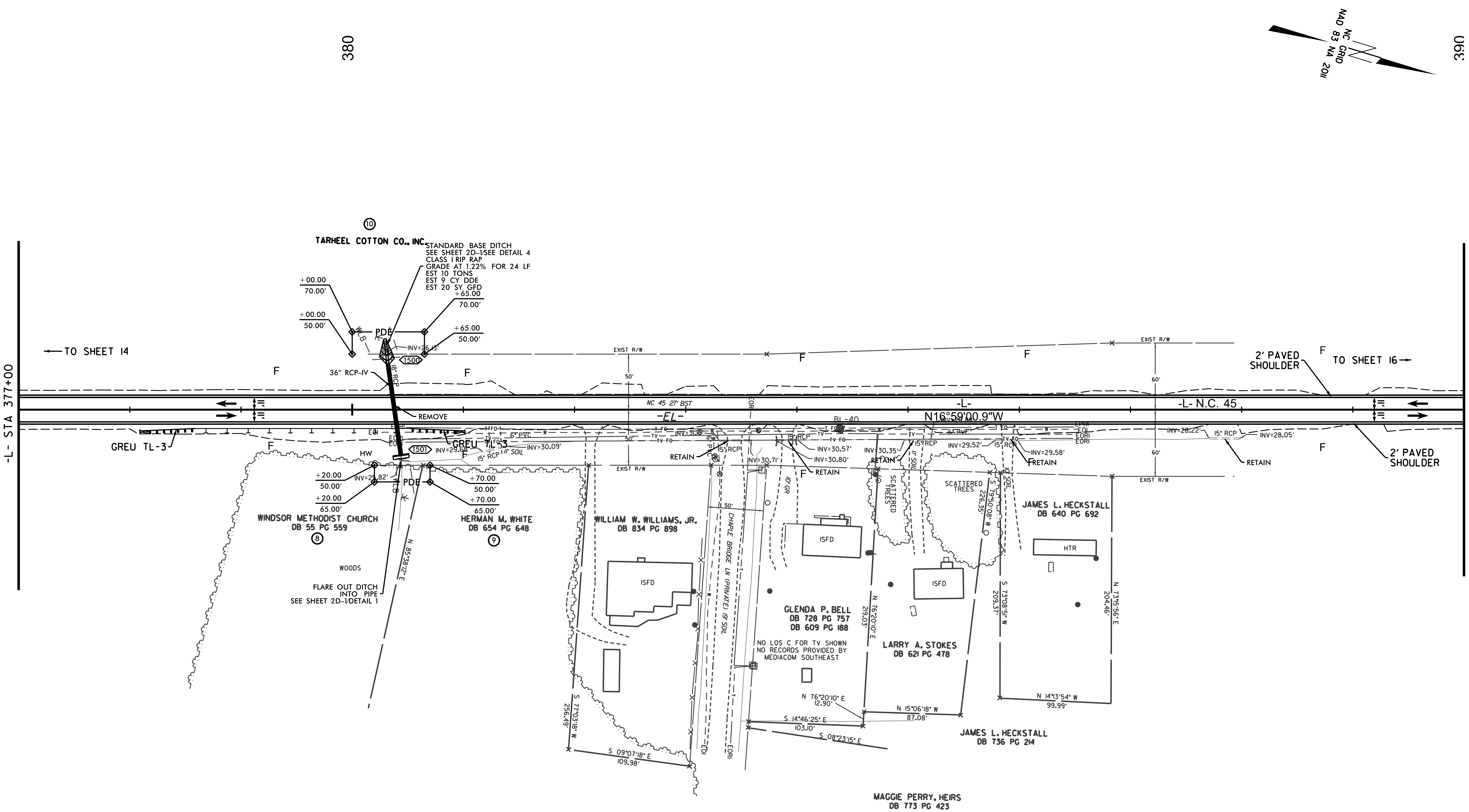
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/31/2024	SEAL 053547 DAVID L HURSEY 10/31/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED


NAD 83 NA 2011
NC GRID
380
390
TARHEEL COTTON CO., INC.
STANDARD BASE DITCH
SEE SHEET 2D-1/SEE DETAIL 4
CLASS I RIP RAP
GRADE AT 1.22% FOR 24 LF
EST 10 TONS
EST 9 CY DDE
EST 20 SY GFD
TO SHEET 14
TO SHEET 16
-L- STA 377+00
-L- STA 390+00
36" RCP-IV
REMOVE
GREU TL-3
EXIST R/W
NC 45 27' BST
-EL-
-L-
-L- N.C. 45
N16°59'00.9"W
BL-40
2' PAVED SHOULDER
RETAIN
WINDSOR METHODIST CHURCH
DB 55 PG 559
HERMAN M. WHITE
DB 654 PG 648
WOODS
FLARE OUT DITCH
INTO PIPE
SEE SHEET 2D-1/DETAIL 1
WILLIAM W. WILLIAMS, JR.
DB 834 PG 898
CHAPLE BRIDGE LN (PRIVATE) 19' SOIL
GLENDA P. BELL
DB 728 PG 757
DB 609 PG 188
NO LOS C FOR TV SHOWN
NO RECORDS PROVIDED BY
MEDIACOM SOUTHEAST
LARRY A. STOKES
DB 621 PG 478
JAMES L. HECKSTALL
DB 640 PG 692
JAMES L. HECKSTALL
DB 736 PG 214
MAGGIE PERRY, HEIRS
DB 773 PG 423
SCATTERED TREES
ISFD
HTR

SEE SHEET NO. 21 FOR 'L' PROFILE

10/10/2023

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	16
R/W SHEET NO.	

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4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

ROADWAY DESIGN ENGINEER — VINCENT E. RICCIO, SEAL 055728, 10/11/2024

HYDRAULICS ENGINEER — DAVID L HURSEY, 10/14/2024

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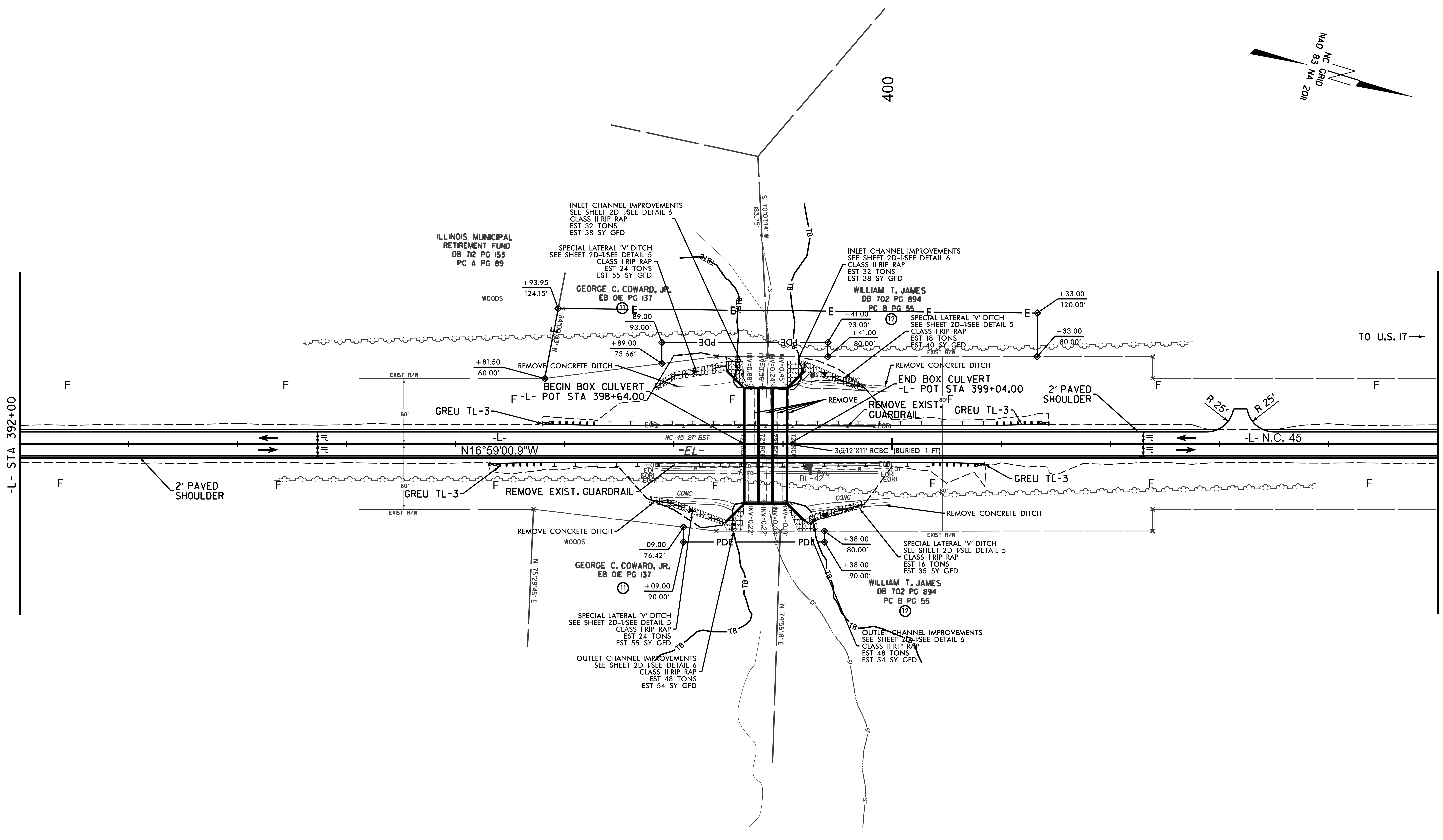

SEE SHEET NO. 21 FOR 'L' PROFILE

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10/10/2023

5/14/99

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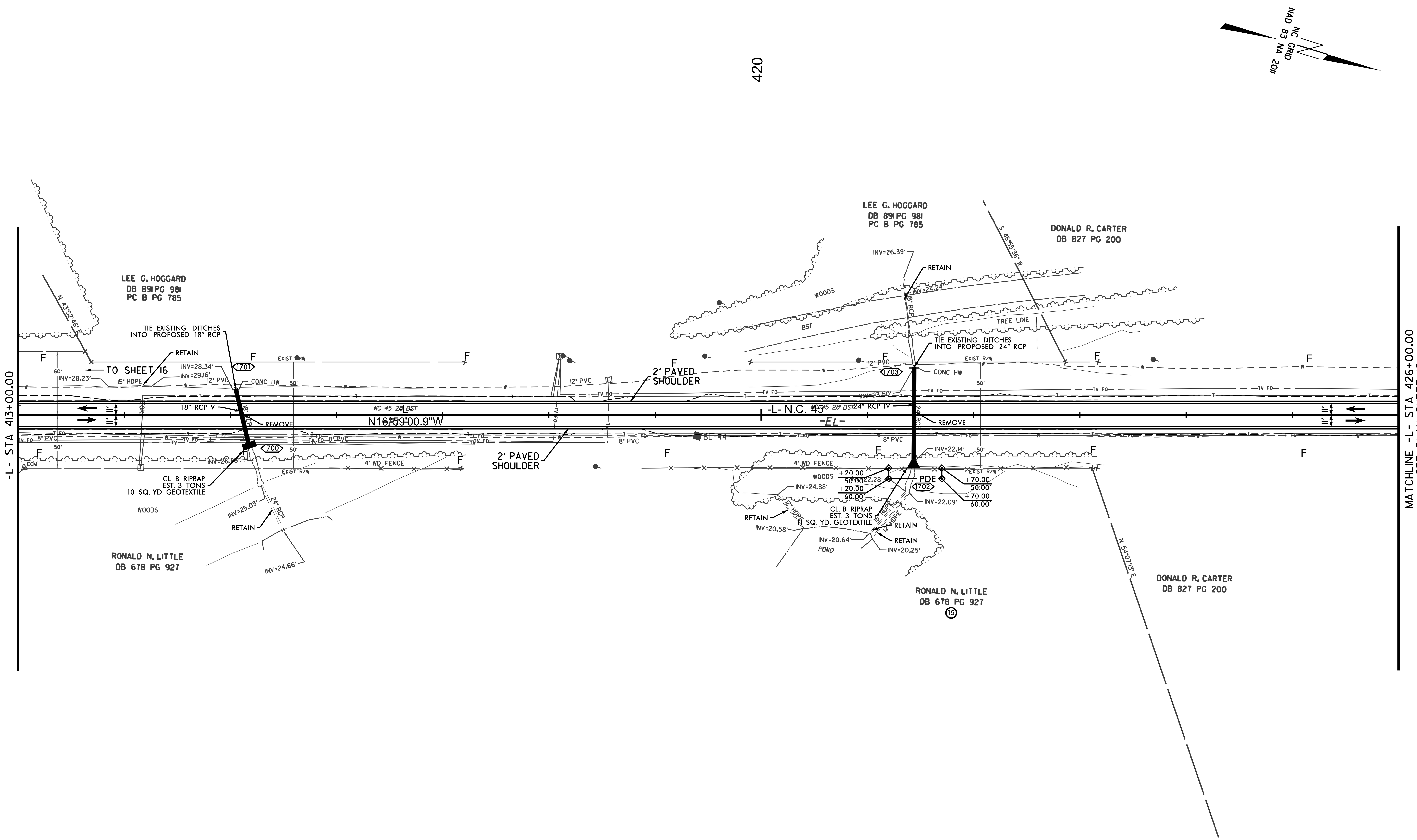
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L HURSEY 10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 055728 VINCENT E. RICCIO 10/11/2024	SEAL DAVID L HURSEY 10/14/2024

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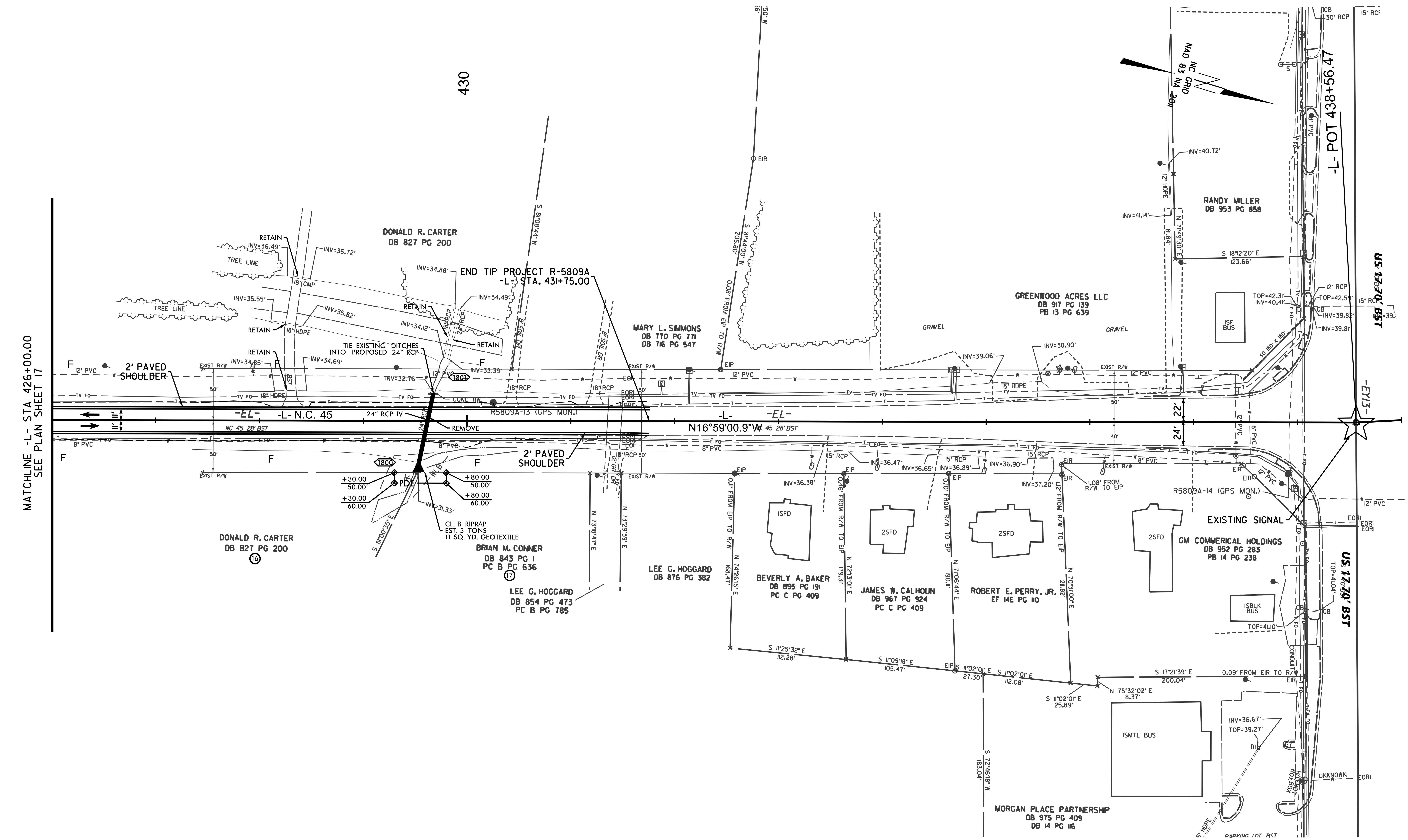

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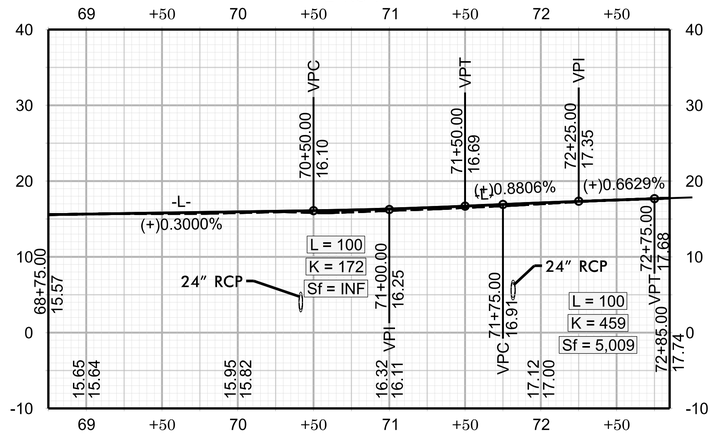
REVISIONS

SEE SHEET NO. 4 FOR 'L' PLAN
-L- NC 45



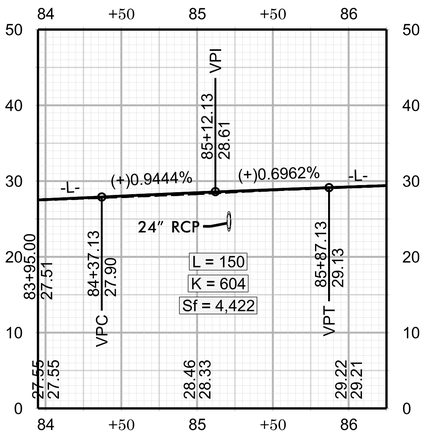
PIPE HYDRAULIC DATA
1@ 24" RCP
STA 70+41 -L-

DESIGN DISCHARGE	= 112 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 5.60 FT
BASE DISCHARGE	= 122 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 5.62 FT
OVERTOPPING DISCHARGE	= 48.27 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 15.30 FT

PIPE HYDRAULIC DATA
1@ 24" RCP
STA 71+81 -L-

DESIGN DISCHARGE	= 67.3 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 7.28 FT
BASE DISCHARGE	= 7.26 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 7.34 FT
OVERTOPPING DISCHARGE	= 53.30 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 16.88 FT

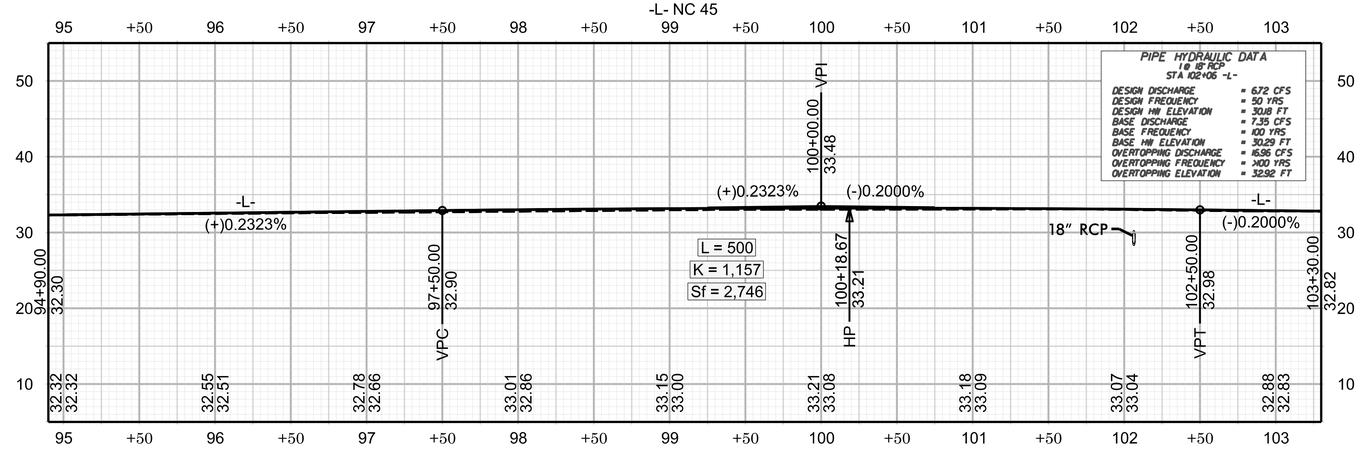
SEE SHEET NO. 5 FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA
1@ 24" RCP
STA 85+21 -L-

DESIGN DISCHARGE	= 8.38 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 25.30 FT
BASE DISCHARGE	= 9.16 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 25.38 FT
OVERTOPPING DISCHARGE	= 31.59 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 28.45 FT

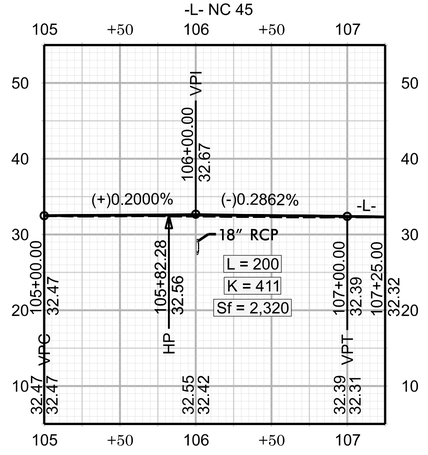
SEE SHEET NO. 6 FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA
1@ 18" RCP
STA 102+06 -L-

DESIGN DISCHARGE	= 6.72 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 30.18 FT
BASE DISCHARGE	= 7.35 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 30.29 FT
OVERTOPPING DISCHARGE	= 16.96 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 32.92 FT

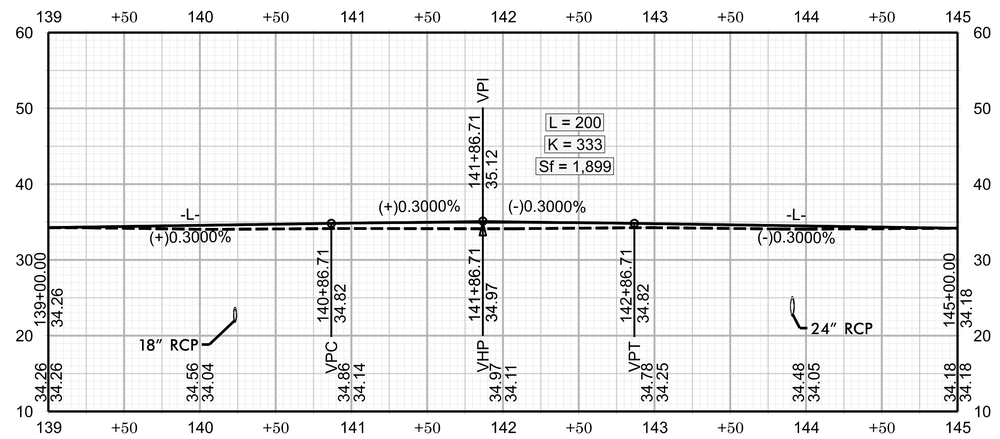
SEE SHEET NO. 6 FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA
1@ 18" RCP
STA 106+01 -L-

DESIGN DISCHARGE	= 5.62 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 29.13 FT
BASE DISCHARGE	= 6.15 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 29.21 FT
OVERTOPPING DISCHARGE	= 18.15 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 32.30 FT

SEE SHEET NO. 6A FOR 'L' PLAN
-L- NC 45



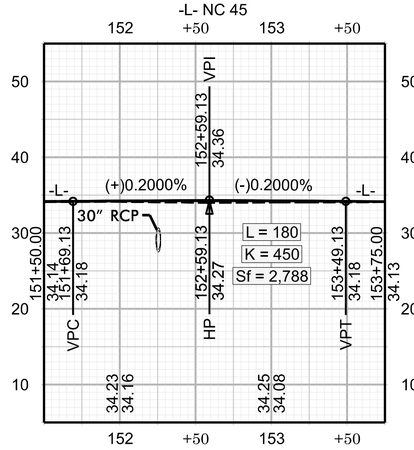
PIPE HYDRAULIC DATA
1@ 18" RCP
STA 140+23 -L-

DESIGN DISCHARGE	= 5.57 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 23.86 FT
BASE DISCHARGE	= 6.08 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 23.99 FT
OVERTOPPING DISCHARGE	= 28.87 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 33.47 FT

PIPE HYDRAULIC DATA
1@ 24" RCP
STA 143+59 -L-

DESIGN DISCHARGE	= 15.91 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 25.71 FT
BASE DISCHARGE	= 17.56 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 25.89 FT
OVERTOPPING DISCHARGE	= 53.48 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 33.31 FT

SEE SHEET NO. 7 FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA
1@ 30" RCP
STA 152+26 -L-

DESIGN DISCHARGE	= 23.81 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 30.48 FT
BASE DISCHARGE	= 26.29 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 30.72 FT
OVERTOPPING DISCHARGE	= 56.73 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 33.96 FT

10/10/2023

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VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	19
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
10/11/2024

HYDRAULICS ENGINEER
10/14/2024

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VIRGINIA BEACH, VA 23462

ROADWAY DESIGN ENGINEER — SEAL 055728 — VINCENT E. RICCIO — 10/11/2024

HYDRAULICS ENGINEER — SEAL — DAVID L HURST — 10/14/2024

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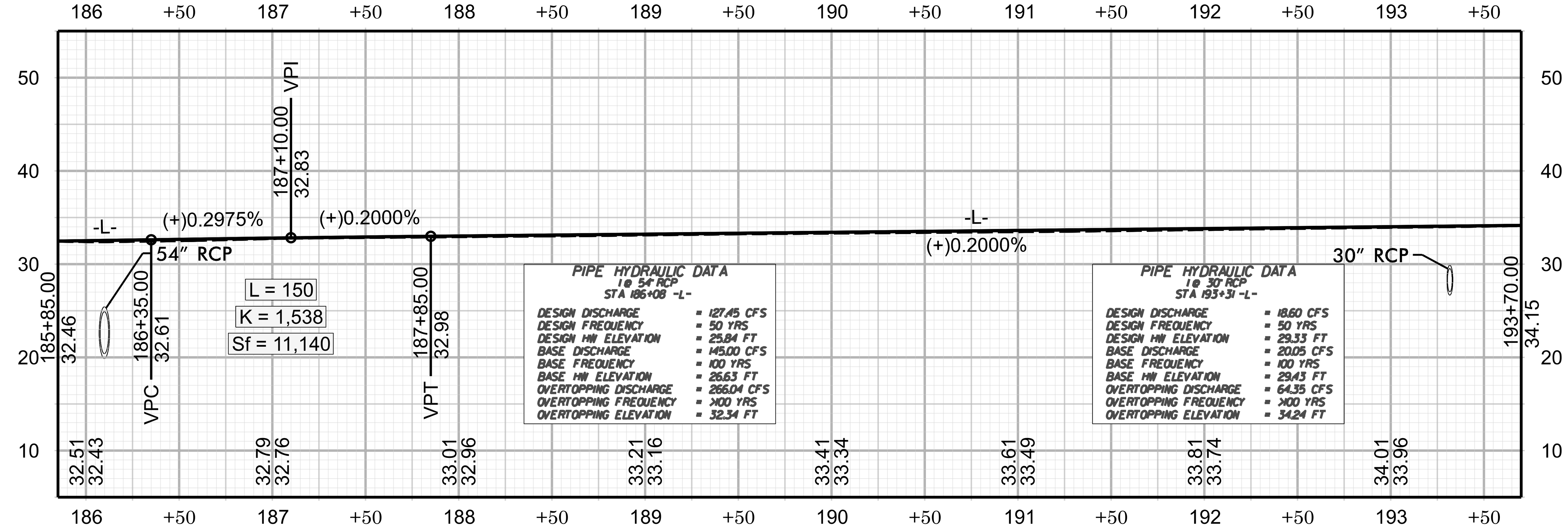
REVISIONS

5/14/99

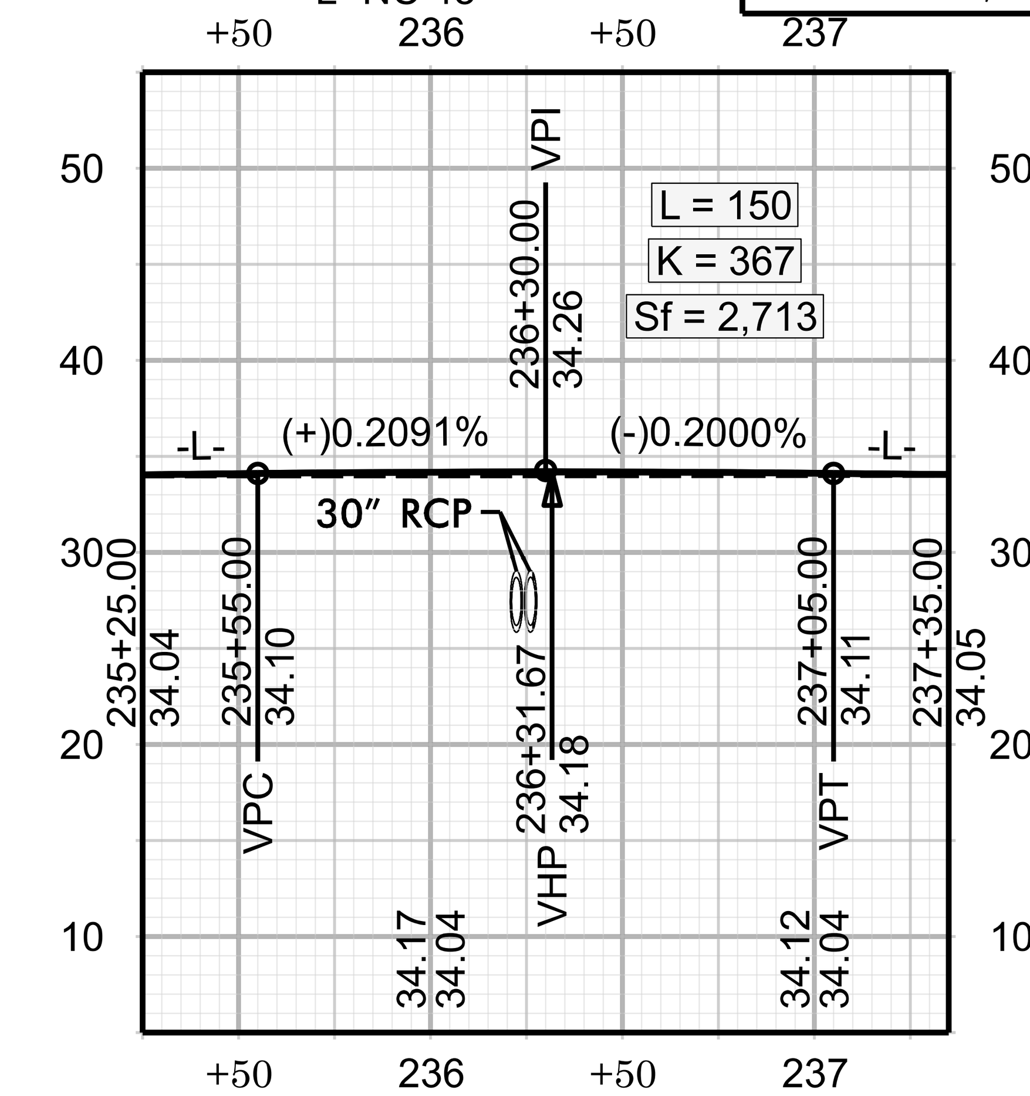
SEE SHEET NO. 8 FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA 1 @ 54" RCP STA 186+08 -L-	
DESIGN DISCHARGE	= 127.45 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 25.84 FT
BASE DISCHARGE	= 145.00 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 26.63 FT
OVERTOPPING DISCHARGE	= 266.04 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 32.34 FT

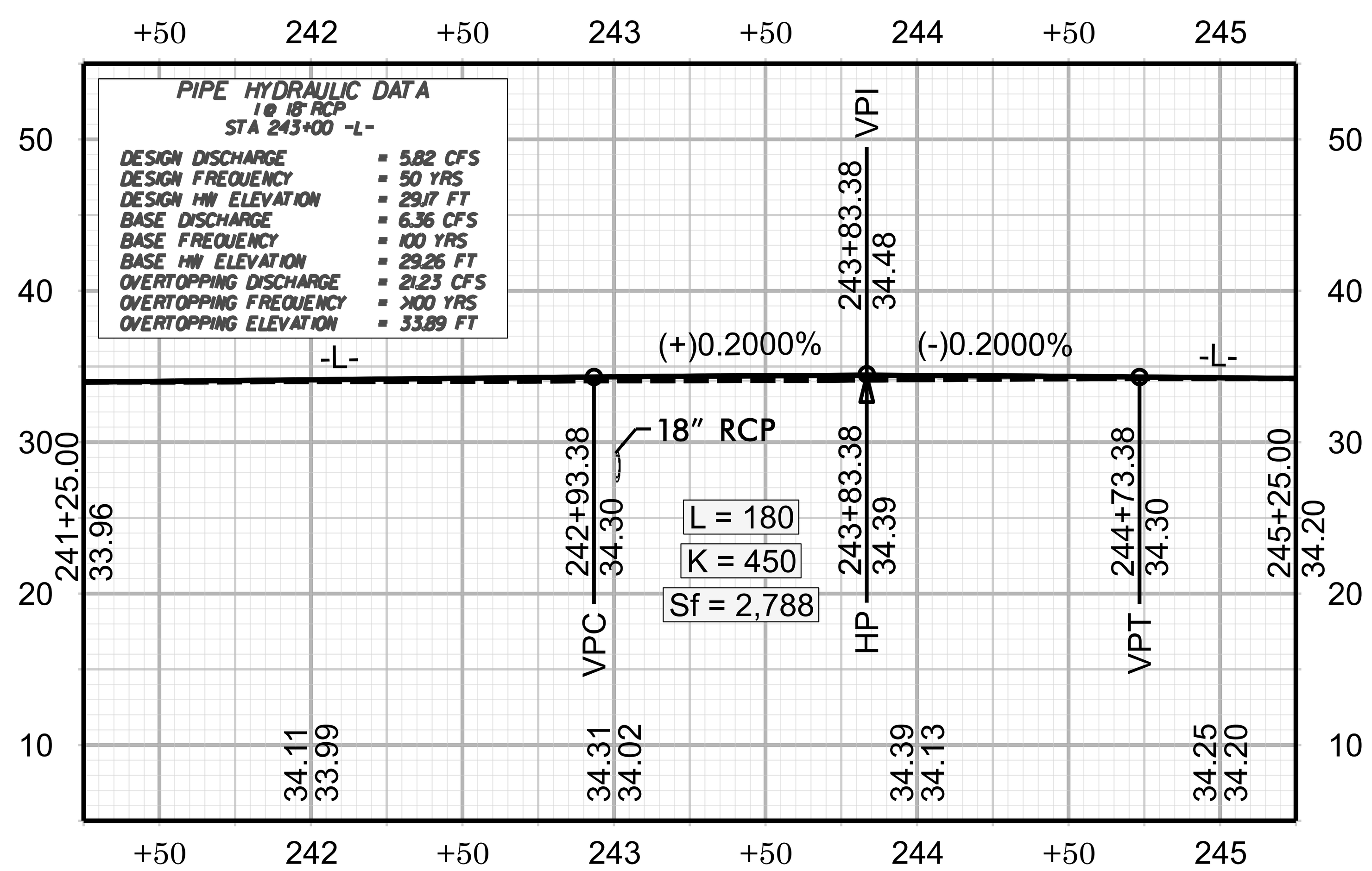
PIPE HYDRAULIC DATA 1 @ 30" RCP STA 193+31 -L-	
DESIGN DISCHARGE	= 18.60 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 29.33 FT
BASE DISCHARGE	= 20.05 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 29.43 FT
OVERTOPPING DISCHARGE	= 64.35 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 34.24 FT

SEE SHEET NO. 9 FOR 'L' PLAN
-L- NC 45



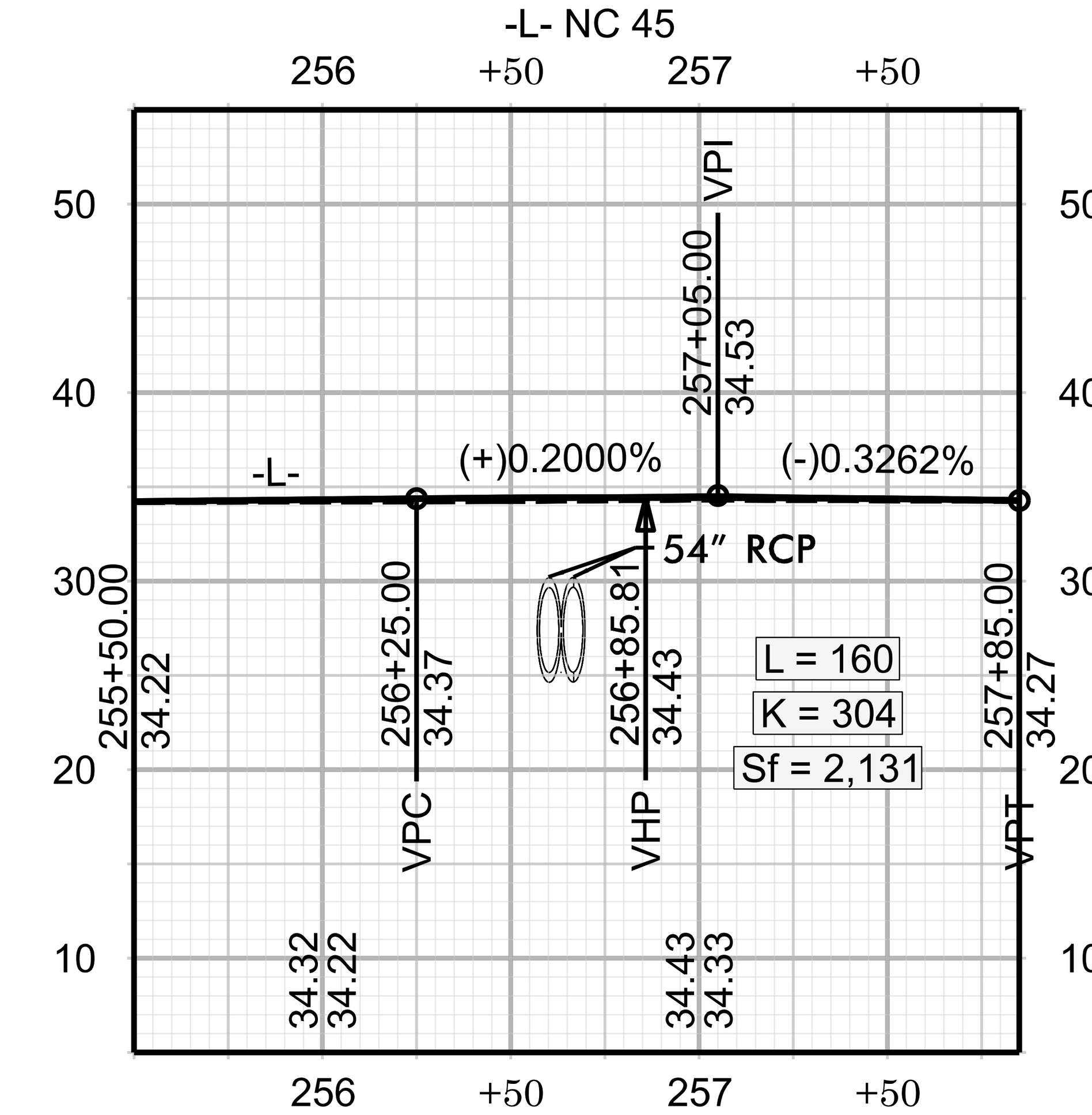
PIPE HYDRAULIC DATA 2 @ 30" RCP STA 236+24 -L-	
DESIGN DISCHARGE	= 47.37 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 29.57 FT
BASE DISCHARGE	= 56.04 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 29.88 FT
OVERTOPPING DISCHARGE	= 128.52 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 33.91 FT

SEE SHEET NO. 9 FOR 'L' PLAN
-L- NC 45



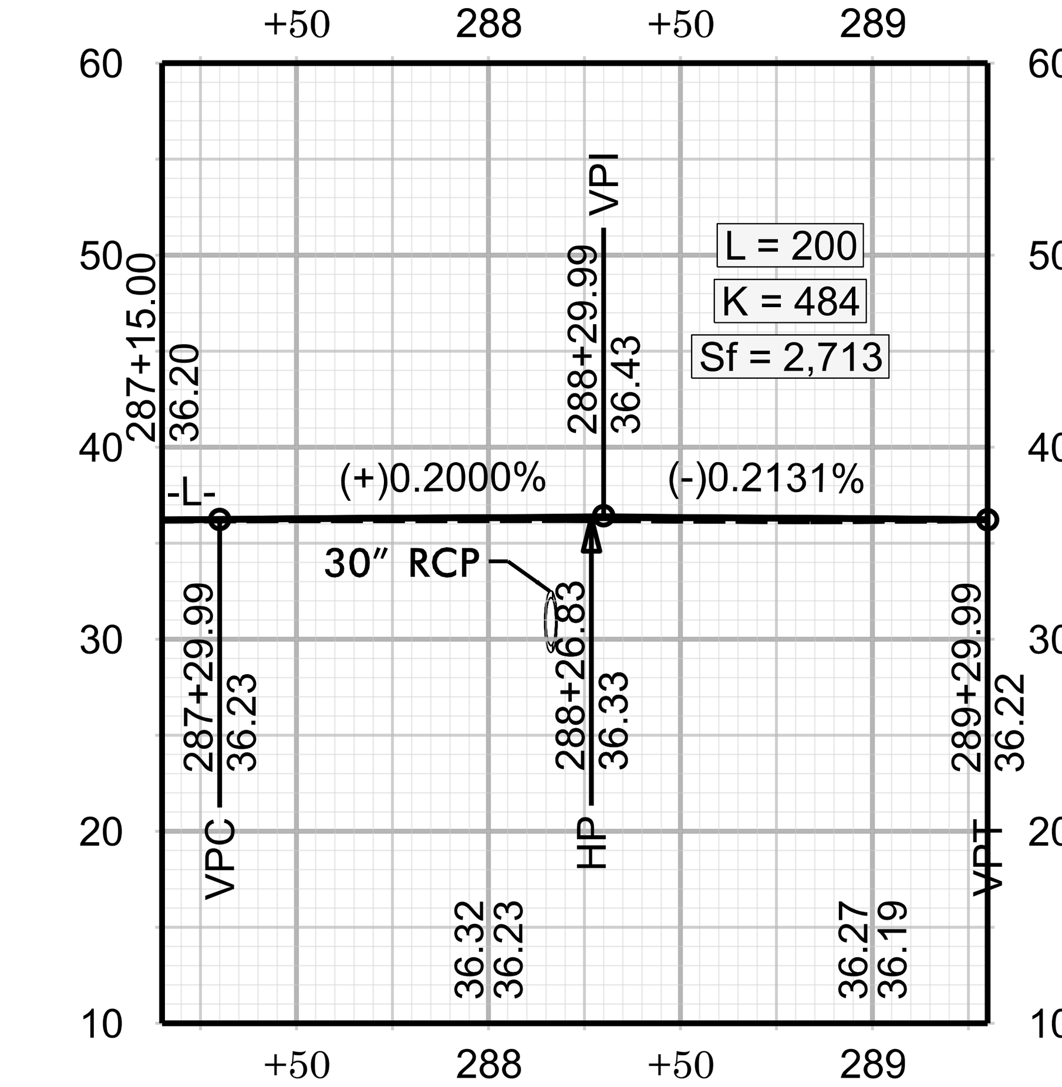
PIPE HYDRAULIC DATA 1 @ 18" RCP STA 243+00 -L-	
DESIGN DISCHARGE	= 5.82 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 29.17 FT
BASE DISCHARGE	= 6.36 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 29.26 FT
OVERTOPPING DISCHARGE	= 21.23 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 33.89 FT

SEE SHEET NO. 10 FOR 'L' PLAN
-L- NC 45



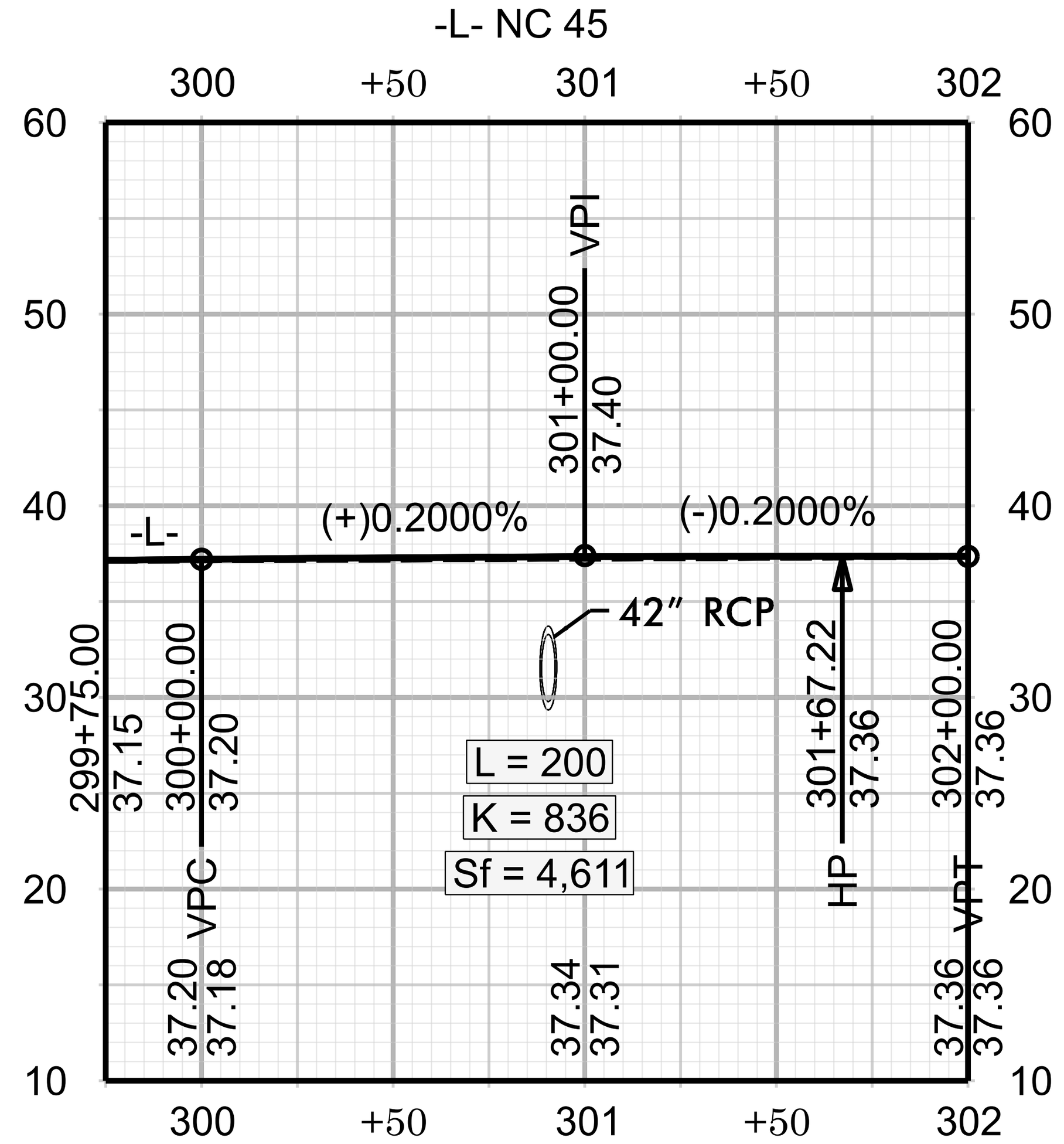
PIPE HYDRAULIC DATA 2 @ 54" RCP (BURIED 1FT) STA 256+63 -L-	
DESIGN DISCHARGE	= 211.00 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 30.64 FT
BASE DISCHARGE	= 254.00 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.81 FT
OVERTOPPING DISCHARGE	= 310.63 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 34.09 FT

SEE SHEET NO. 11 FOR 'L' PLAN
-L- NC 45



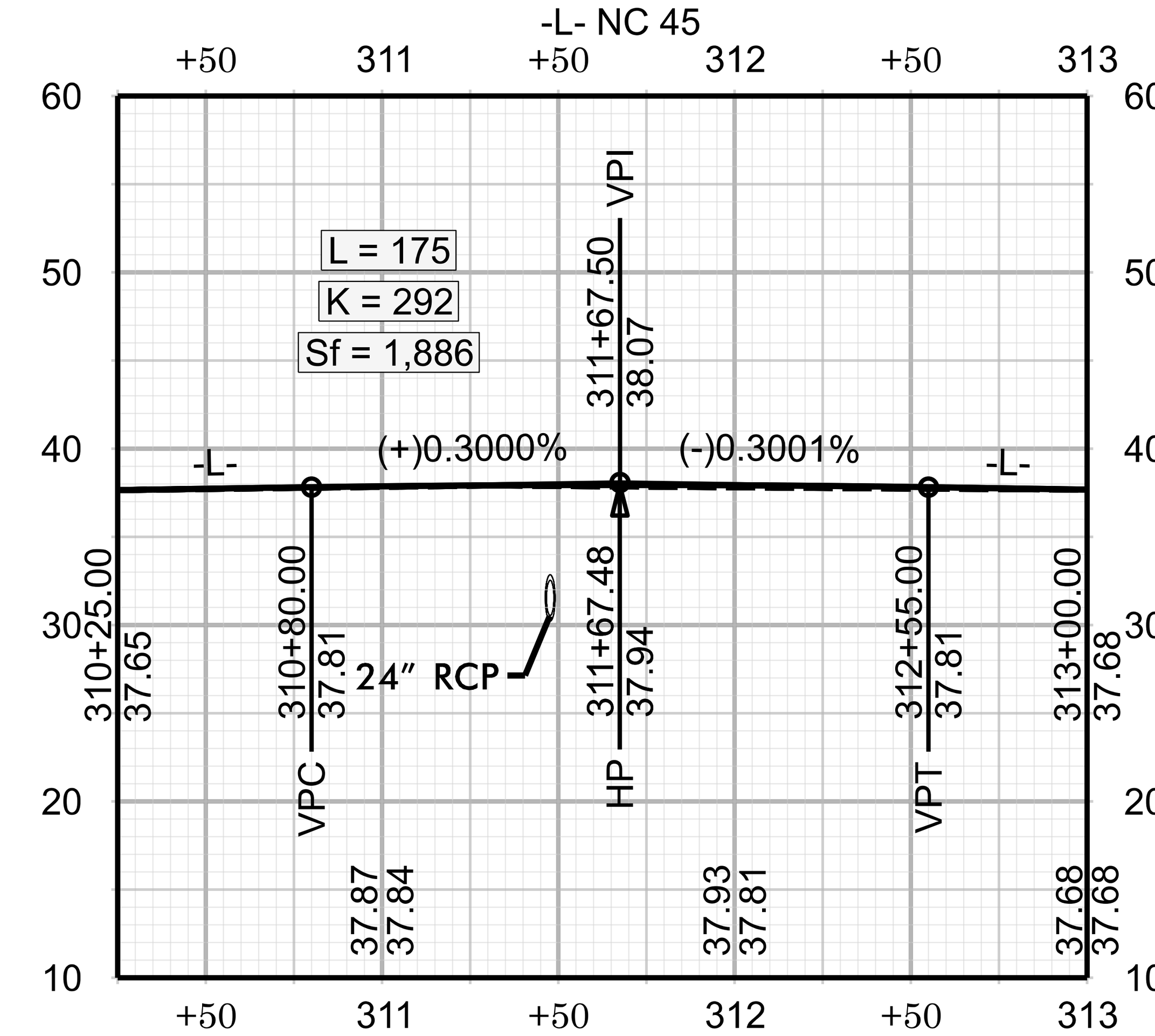
PIPE HYDRAULIC DATA 1 @ 30" RCP STA 288+15 -L-	
DESIGN DISCHARGE	= 26.78 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 32.53 FT
BASE DISCHARGE	= 29.22 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 32.70 FT
OVERTOPPING DISCHARGE	= 59.83 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 36.10 FT

SEE SHEET NO. 12 FOR 'L' PLAN
-L- NC 45



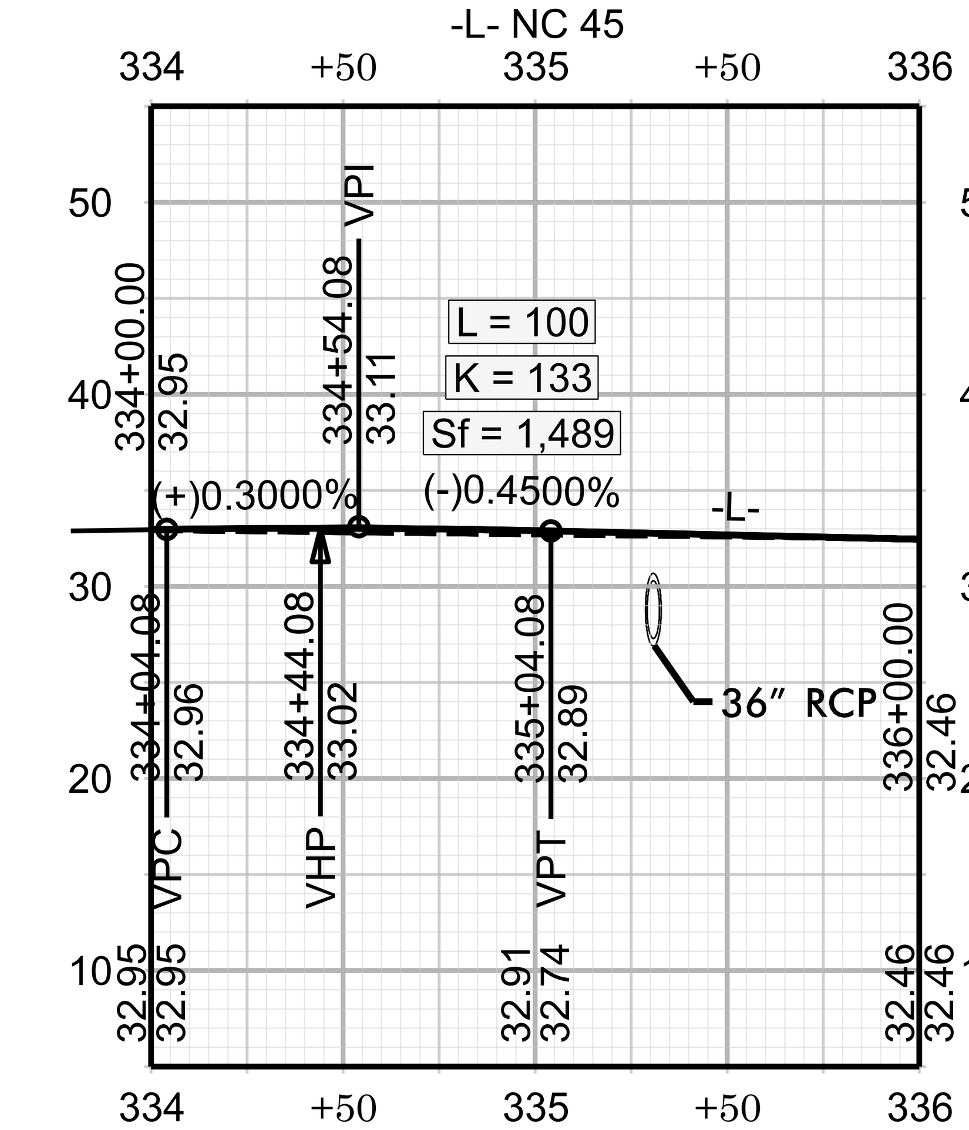
PIPE HYDRAULIC DATA 1 @ 42" RCP STA 300+89 -L-	
DESIGN DISCHARGE	= 55.42 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 33.73 FT
BASE DISCHARGE	= 61.19 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 33.97 FT
OVERTOPPING DISCHARGE	= 115.81 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 37.10 FT

SEE SHEET NO. 12A FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA 1 @ 24" RCP STA 311+48 -L-	
DESIGN DISCHARGE	= 16.16 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 32.97 FT
BASE DISCHARGE	= 17.84 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 33.17 FT
OVERTOPPING DISCHARGE	= 41.51 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 37.37 FT

SEE SHEET NO. 12B FOR 'L' PLAN
-L- NC 45



PIPE HYDRAULIC DATA 1 @ 36" RCP STA 335+31 -L-	
DESIGN DISCHARGE	= 43.37 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 30.91 FT
BASE DISCHARGE	= 47.31 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.13 FT
OVERTOPPING DISCHARGE	= 69.59 CFS
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= 32.28 FT

10/10/2023

Kimley»Horn
4525 MAIN STREET, SUITE 1000
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5809 A	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
10/11/2024

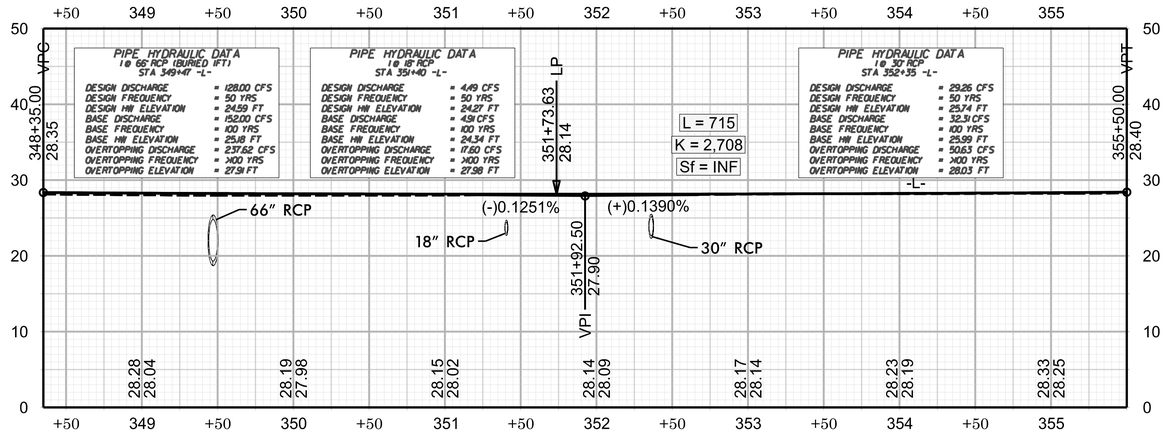
HYDRAULICS ENGINEER
10/14/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS 5/14/99

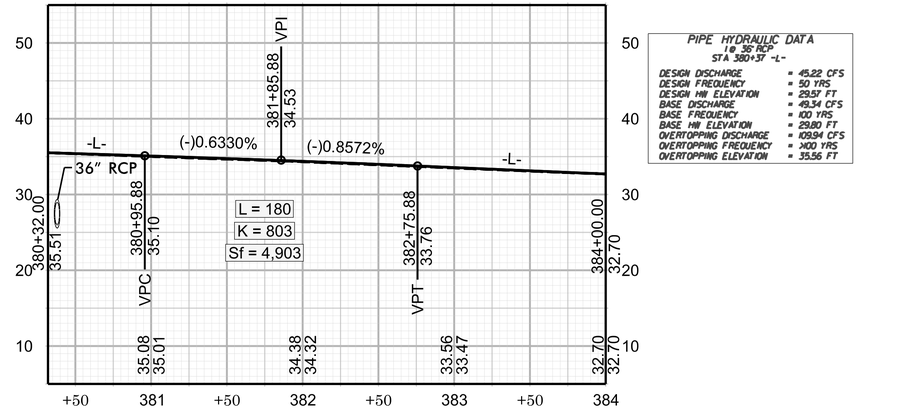
10/10/2023

SEE SHEET NO. 13 FOR 'L' PLAN
-L- NC 45

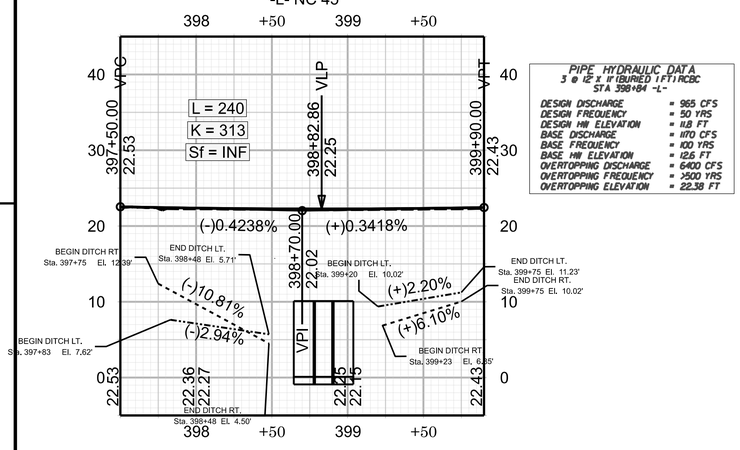


SEE SHEET NO. 14 FOR 'L' PLAN
-L- NC 45

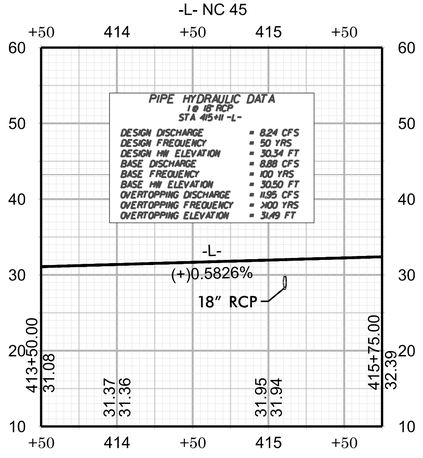
SEE SHEET NO. 15 FOR 'L' PLAN
-L- NC 45



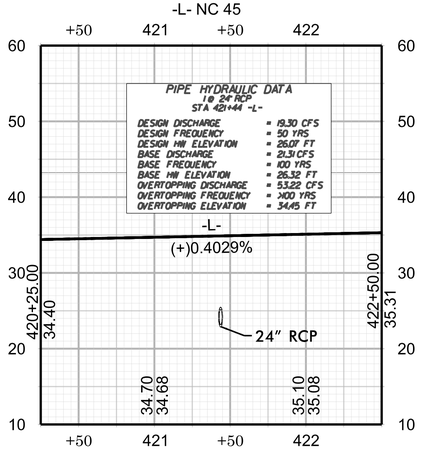
SEE SHEET NO. 16 FOR 'L' PLAN
-L- NC 45



SEE SHEET NO. 17 FOR 'L' PLAN
-L- NC 45



SEE SHEET NO. 17 FOR 'L' PLAN
-L- NC 45



SEE SHEET NO. 18 FOR 'L' PLAN
-L- NC 45