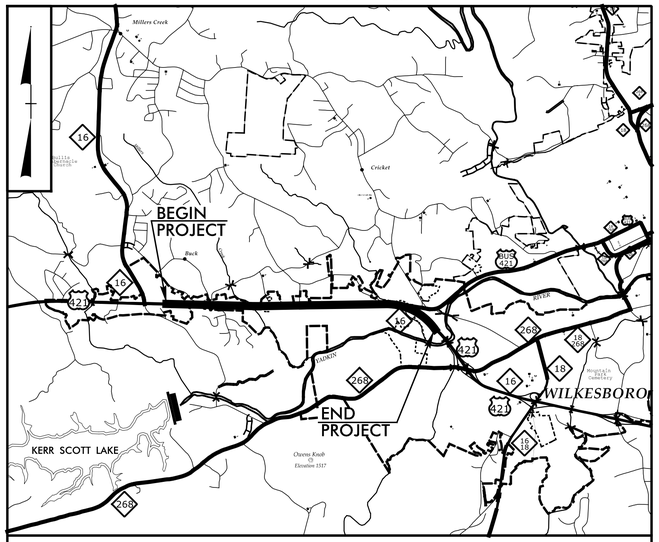
09/08/99

TIP PROJECT: U-5312

CONTRACT: C204471

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

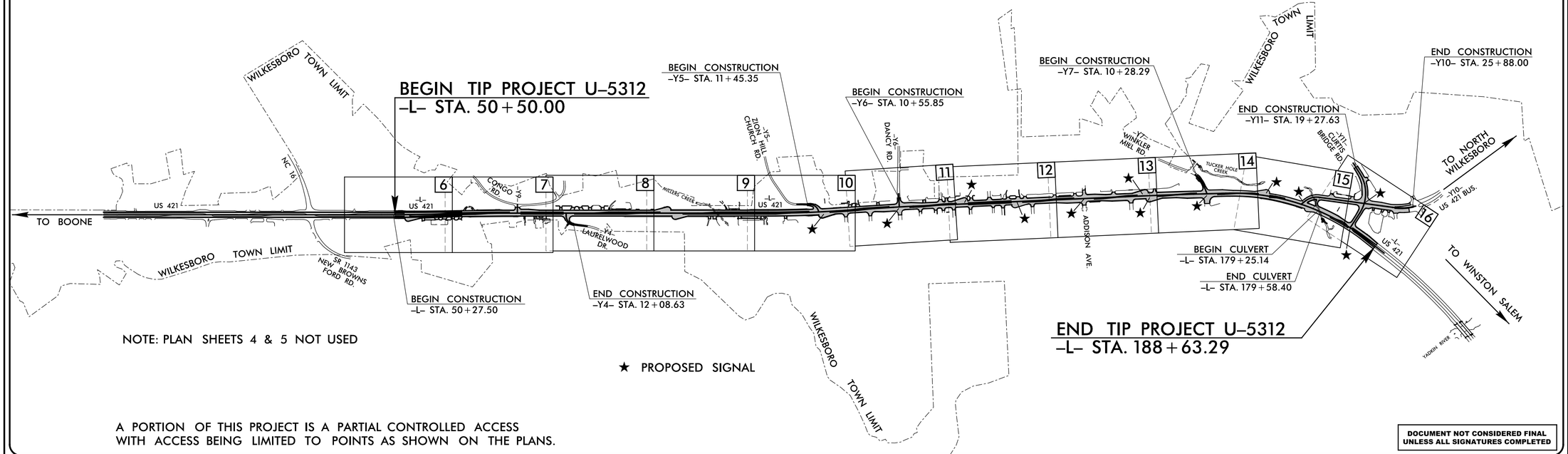
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	
N.C.	U-5312	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45446.1.1	NHS-0421(072)	PE
45446.2.1	NHS-0421(072)	R/W
45446.2.U1	NHS-0421(072)	UTILITY
45446.3.1	NHS-0421(072)	CONST.

LOCATION: *US 421 FROM EAST OF NC 16 TO US 421 BUSINESS IN WILKESBORO*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNALS, AND ITS*

NAD 83/
NSRS 2007



NOTE: PLAN SHEETS 4 & 5 NOT USED

★ PROPOSED SIGNAL

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2023 = 37,700
ADT 2040 = 41,900
K = 8 %
D = 55 %
T = 5 % *
V = 50 MPH
* TTST = 2% DUAL 3%
FUNC CLASS = ARTERIAL

STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-5312 = 2.610 MILES
LENGTH OF STRUCTURE TIP PROJECT U-5312 = 0.006 MILES
TOTAL LENGTH OF TIP PROJECT U-5312 = 2.616 MILES

Prepared for the North Carolina Department of Transportation in the office of:

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.
300 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-460

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: FEBRUARY 26, 2018

LETTING DATE: NOVEMBER 21, 2023

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

JERRY JAVELLANA, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT: RAMIE SHAW, PE
Division Project Development Engineer

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

DocuSigned by: Josh Dalton 10B9AD8C14594C3... P.E.

SIGNATURE: 10/2/2023

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER Stafford Goodnight

DocuSigned by: Jimmy Goodnight 6AC8D4C43AEE4ER... P.E.

SIGNATURE: 10/2/2023

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

10/2/2023
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8/17/99

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
U-5312	1A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER Stephen Goodnight

8/14/2023

Jimmy Goodnight
64CB24C43AFE4E8...

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
- 200.02 METHOD OF CLEARING - METHOD II
- 225.01 GUIDE FOR GRADING SUBGRADE - INTERSTATE AND FREEWAY
- 225.02 GUIDE FOR GRADING SUBGRADE - SECONDARY AND LOCAL
- 225.04 METHOD OF OBTAINING SUPERELEVATION - TWO LANE PAVEMENT
- 225.05 METHOD OF OBTAINING SUPERELEVATION - DIVIDED HIGHWAYS
- 225.06 METHOD OF GRADING SIGHT DISTANCE AT INTERSECTIONS
- 240.01 GUIDE FOR BERM DITCH CONSTRUCTION
- 275.01 ROCK PLATING (USE SPECIAL DETAIL)

DIVISION 3 - PIPE CULVERTS
- 300.01 METHOD OF PIPE INSTALLATION
- 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 6 - ASPHALT BASES AND PAVEMENTS
- 654.01 PAVEMENT REPAIRS

DIVISION 8 - INCIDENTALS
- 815.03 PIPE UNDERDRAIN AND BLIND DRAIN
- 838.01 CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS - 15" THRU 48" PIPE 90 SKEW
- 838.11 BRICK ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS - 15" THRU 48" PIPE 90 SKEW
- 838.21 REINFORCED CONCRETE ENDWALL - FOR SINGLE 54" PIPE 90 SKEW
- 838.27 REINFORCED CONCRETE ENDWALL - FOR SINGLE 60" PIPE 90 SKEW
- 838.39 REINFORCED CONCRETE ENDWALL - FOR SINGLE 72" PIPE 90 SKEW
- 838.40 REINFORCED CONCRETE ENDWALL - FOR DOUBLE AND TRIPLE 72" PIPES 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
- 838.57 REINFORCED BRICK ENDWALL - FOR SINGLE 60" PIPE 90 SKEW
- 838.69 REINFORCED BRICK ENDWALL - FOR SINGLE 72" PIPE 90 SKEW
- 838.75 NOTES FOR REINFORCED BRICK ENDWALL - STD. DWG 838.51 THRU 838.70
- 838.80 PRECAST ENDWALLS - 12" THRU 72" PIPE 90 SKEW
- 840.00 CONCRETE BASE PAD FOR DRAINAGE STRUCTURES
- 840.01 BRICK CATCH BASIN - 12" THRU 54" PIPE
- 840.02 CONCRETE CATCH BASIN - 12" THRU 54" PIPE
- 840.03 FRAME, GRATES AND HOOD - FOR USE ON STANDARD CATCH BASIN
- 840.04 CONCRETE OPEN THROAT CATCH BASIN - 12" THRU 48" PIPE
- 840.05 BRICK OPEN THROAT CATCH BASIN - 12" THRU 48" PIPE
- 840.14 CONCRETE DROP INLET - 12" THRU 30" PIPE
- 840.15 BRICK DROP INLET - 12" THRU 30" PIPE
- 840.16 DROP INLET FRAME AND GRATES - FOR USE WITH STD. DWG 840.14 AND 840.15
- 840.17 CONCRETE GRATED DROP INLET TYPE 'A' - 12" THRU 72" PIPE
- 840.18 CONCRETE GRATED DROP INLET TYPE 'B' - 12" THRU 36" PIPE
- 840.24 FRAMES AND NARROW SLOT SAG GRATES
- 840.25 ANCHORAGE FOR FRAMES - BRICK OR CONCRETE OR PRECAST
- 840.26 BRICK GRATED DROP INLET TYPE 'A' - 12" THRU 72" PIPE
- 840.27 BRICK GRATED DROP INLET TYPE 'B' - 12" THRU 36" PIPE
- 840.29 FRAMES AND NARROW SLOT FLAT GRATES
- 840.31 CONCRETE JUNCTION BOX - 12" THRU 66" PIPE
- 840.32 BRICK JUNCTION BOX - 12" THRU 66" PIPE
- 840.35 TRAFFIC BEARING GRATED DROP INLET - FOR CAST IRON DOUBLE FRAME AND GRATES
- 840.45 PRECAST DRAINAGE STRUCTURE
- 840.46 TRAFFIC BEARING PRECAST DRAINAGE STRUCTURE
- 840.54 MANHOLE FRAME AND COVER
- 840.66 DRAINAGE STRUCTURE STEPS
- 840.71 CONCRETE AND BRICK PIPE PLUG
- 846.01 CONCRETE CURB, GUTTER AND CURB & GUTTER
- 846.02 DROP INLET INSTALLATION IN EXPRESSWAY GUTTER
- 846.04 DROP INLET INSTALLATION IN SHOULDER BERM GUTTER
- 848.01 CONCRETE SIDEWALK
- 848.04 STREET TURNOUT
- 848.05 CURB RAMP - PROPOSED CURB & GUTTER
- 848.06 CURB RAMP - EXISTING CURB & GUTTER
- 850.01 CONCRETE PAVED DITCHES
- 850.10 GUIDE FOR BERM DRAINAGE OUTLET - 15" AND 18" PIPE
- 852.01 CONCRETE ISLANDS
- 852.06 METHOD FOR PLACEMENT OF DROP INLETS IN CONCRETE ISLANDS
- 857.01 PRECAST REINFORCED CONCRETE BARRIER - 41" SINGLE FACED
- 862.01 GUARDRAIL PLACEMENT
- 862.02 GUARDRAIL INSTALLATION
- 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 II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NOS. 225.04 & 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. 560.01

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.

BERM DITCHES:

BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CHARTER, DUKE NET, CENTURY LINK & WILKES TELECOMMUNICATIONS - COMMUNICATIONS; FRONTIER - NATURAL GAS; WEST WILKES & TOWN OF WILKESBORO - WATER/SEWER

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

RIGHT-OF-WAY MARKERS:

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

CURB RAMPS

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

8/14/2023
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9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
U-5312	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge

- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2A-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr.
DocuSigned by: Jimmy Goodnight 7/12/2023
PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039779 JEREMY R. HAMM
DocuSigned by: Jeremy Hamm 7/13/2023

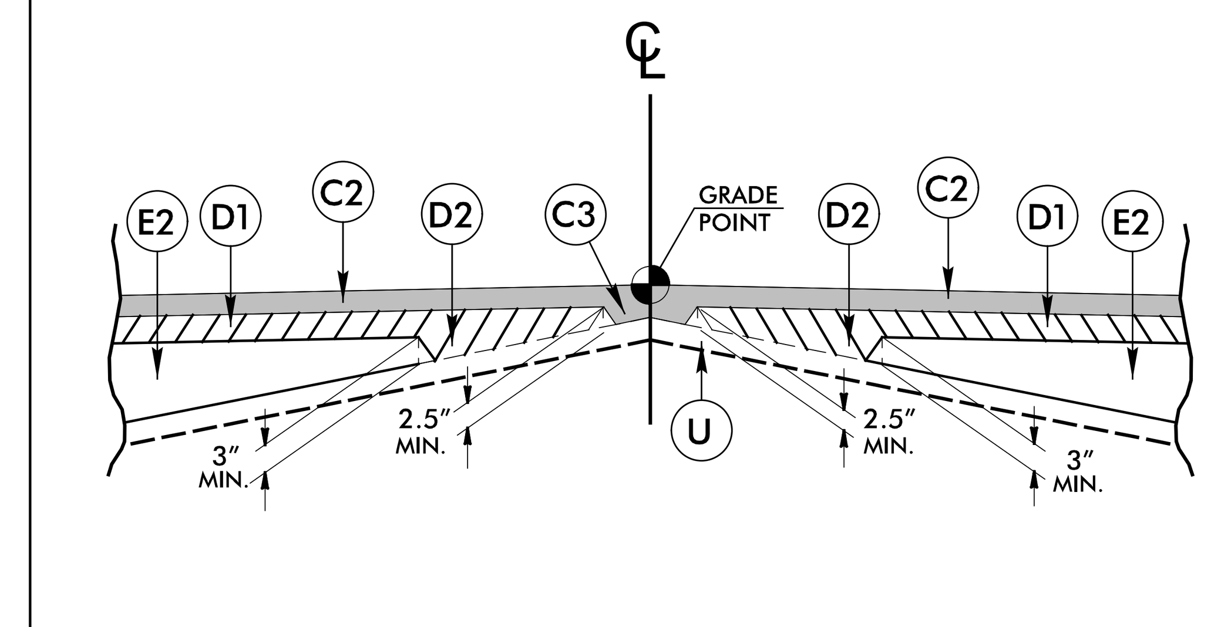
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared by
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R4	CONCRETE EXPRESSWAY GUTTER
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R5	SHOULDER BERM GUTTER
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	R6	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	S	4" CONCRETE SIDEWALK.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	T	EARTH MATERIAL.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	U	EXISTING PAVEMENT.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.	V	INCIDENTAL MILLING
J	PROP. 6" AGGREGATE BASE COURSE	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.		
R1	1'-6" CONCRETE CURB AND GUTTER.		
R2	2'-6" CONCRETE CURB AND GUTTER.		
R3	2'-9" CONCRETE CURB AND GUTTER.		

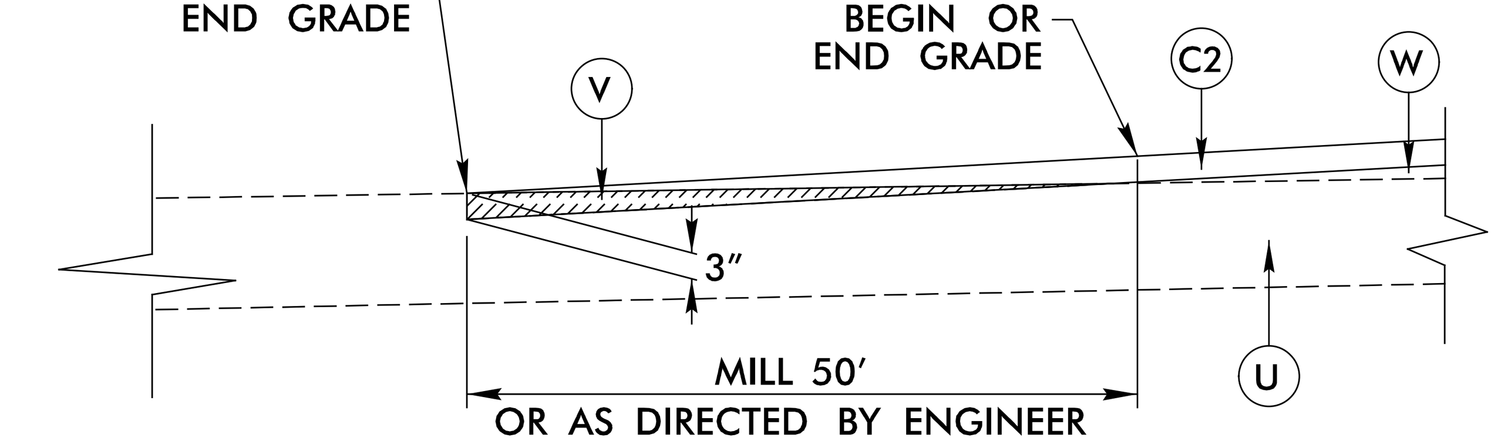
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



DETAIL SHOWING METHOD OF WEDGING

TIE-IN MILLING DETAIL

-L- & -Y- LINES

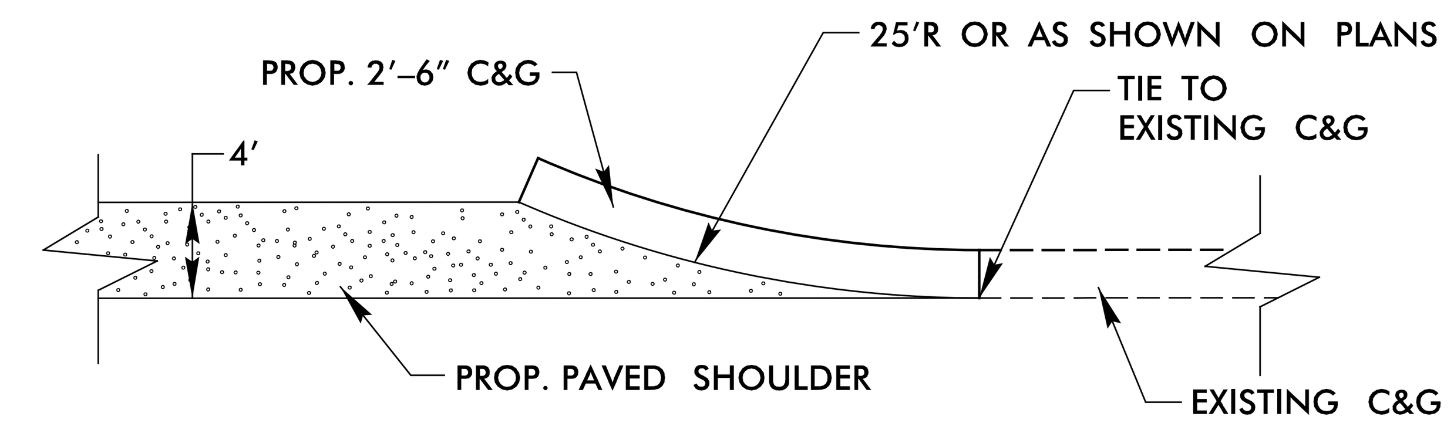


NOTES TO CONTRACTOR

For surface mixes over 1" in thickness, mill the existing pavement in accordance with the following sketch as directed by the Engineer.

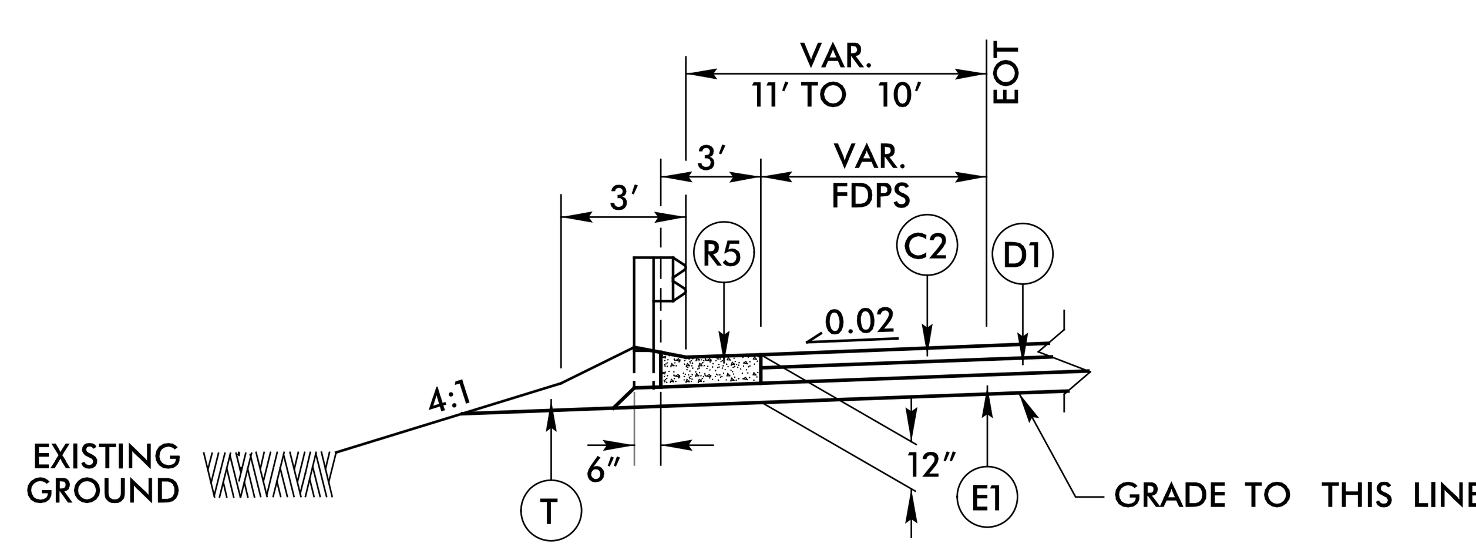
Locations shall include ties into existing concrete pavement, at bridge approaches where the bridge will not be resurfaced, and at the beginning and ending point of each resurfacing map.

Perform the work in accordance with Section 607 of the January 2018 North Carolina Department of Transportation Standard Specifications for Roads and Structures. Resurfacing will be accomplished at the same time as the milling operation.



DETAIL FOR FLARING CURB AND GUTTER

APPLY TO ALL DRIVEWAY TIE-INS (SEE PLANS)

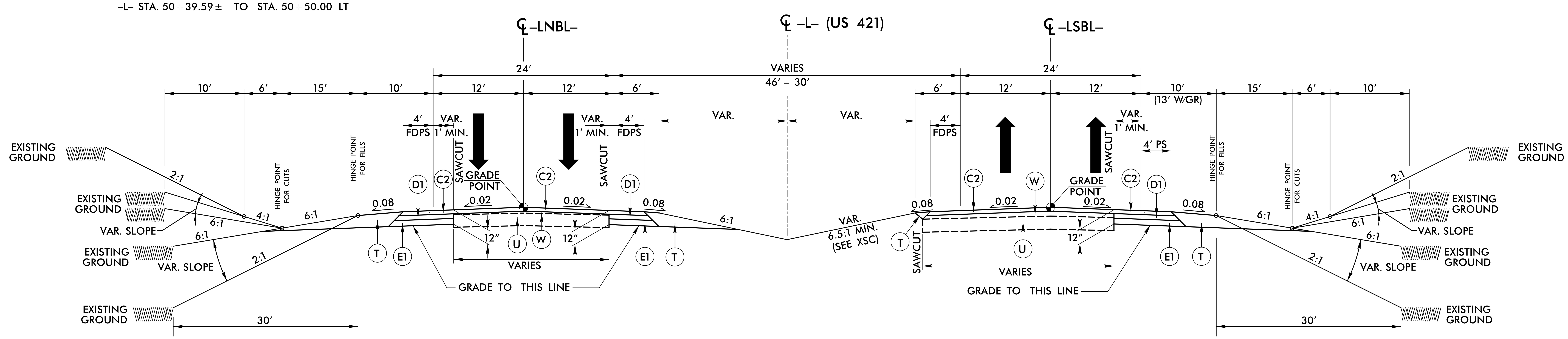


TYPICAL SECTION NO. 1A

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1

-L- STA. 50+50.00 TO STA. 51+00.00 LT

PROVIDE TRANSITION FROM EXISTING:
-L- STA. 50+39.59± TO STA. 50+50.00 LT



TYPICAL SECTION NO. 1

-L- STA. 50+50.00 TO STA. 59+75.00

NOTE: SEE PLANS FOR LOCATION OF AUXILIARY LANES

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5/26/2023
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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2A-2

ROADWAY DESIGN ENGINEER — SEAL 014493 — James Stafford Goodnight, Jr. — Jimmy Goodnight 7/12/2023

PAVEMENT DESIGN ENGINEER — SEAL 039779 — Jeremy R. Hamm — Jeremy Hamm 7/13/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared by

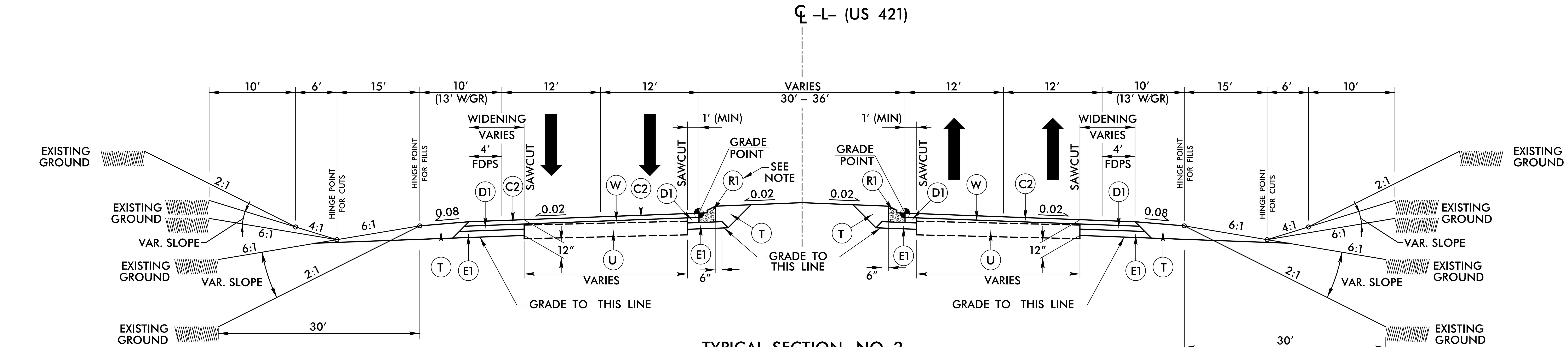
vhb — VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.

PAVEMENT SCHEDULE

C2	3" S9.5C
D1	4" I19.0C
E1	5" B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	2'-9" C&G
R4	EXPRESSWAY GUTTER
R5	SHOULDER BERM GUTTER
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

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

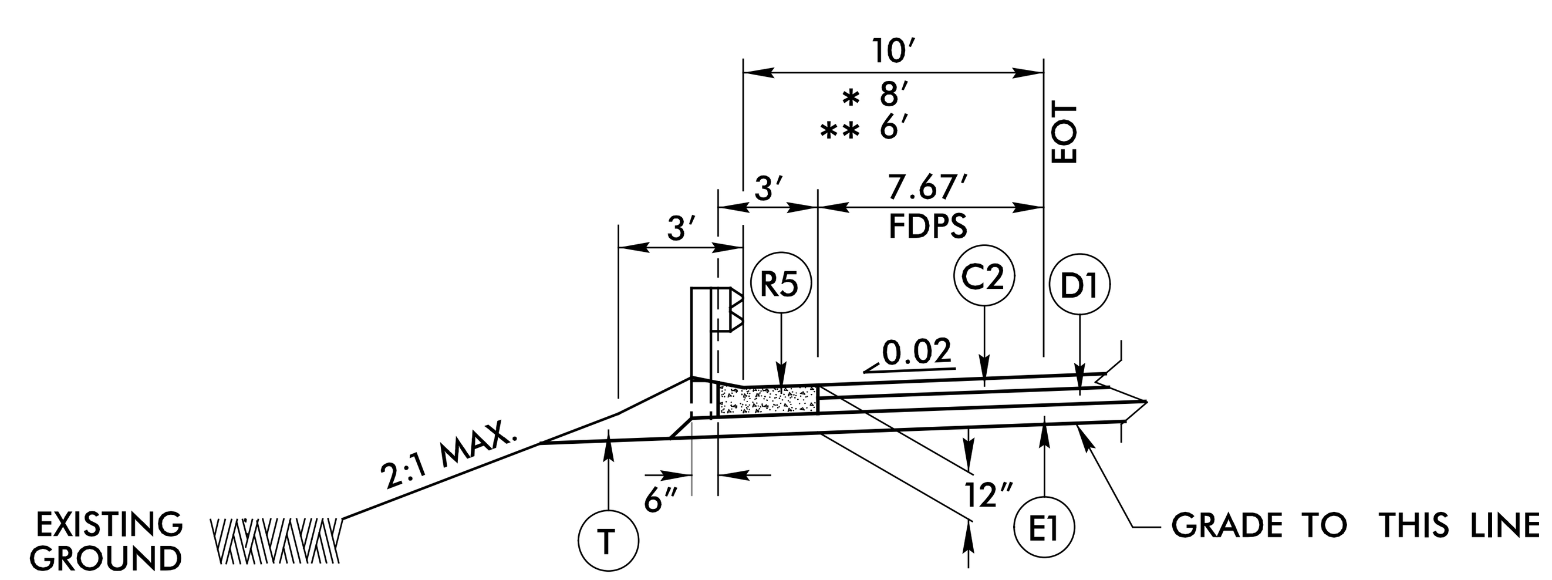


NOTE: USE (R3) AT THE LOW SIDE OF A SUPERELEVATED SECTIONS
-L- STA. 164+95.71 TO STA. 170+60.00
-L- STA. 172+20.00 TO STA. 174+30.76
-L- STA. 181+20.00 TO STA. 184+02.69

TYPICAL SECTION NO. 2

-L- STA. 59+75.00 TO STA. 184+54.84

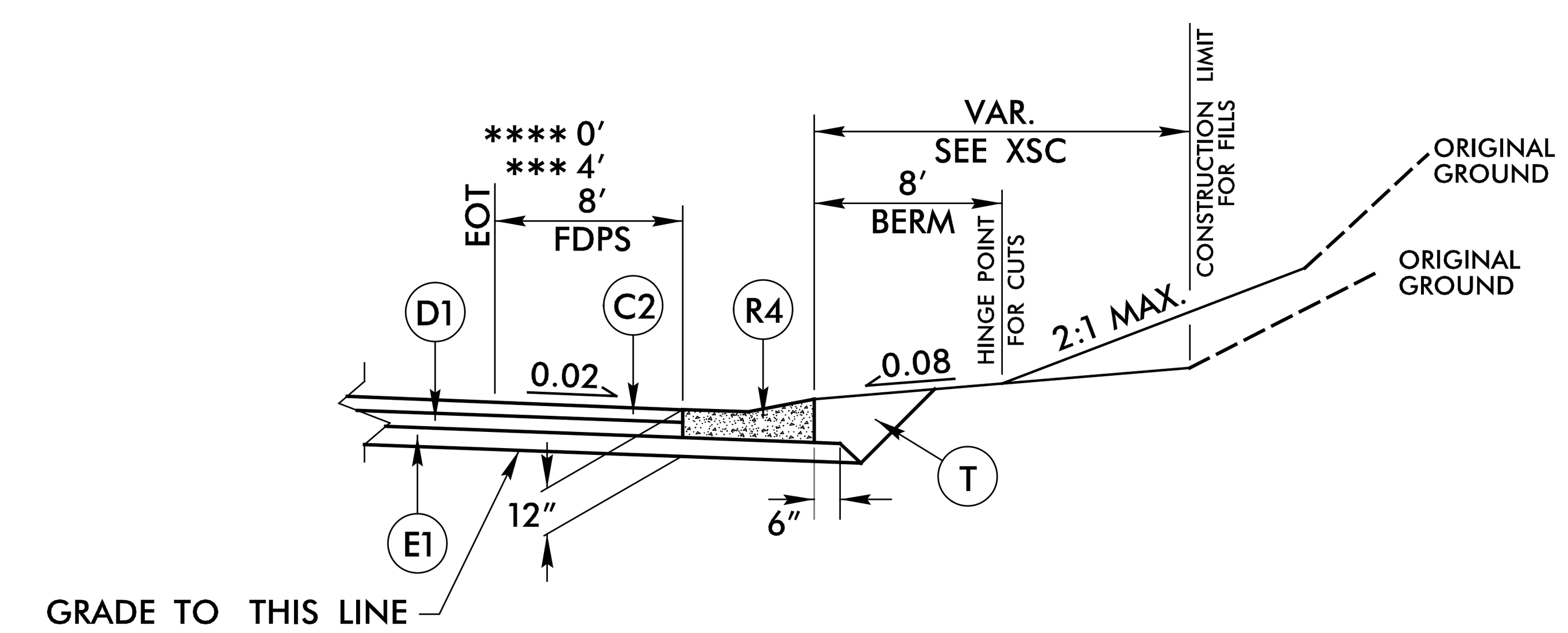
NOTE: SEE SHEETS 2B-1 & 2B-2 FOR SIDEWALK ALIGNMENT AND LOCATION



TYPICAL SECTION NO. 2A

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

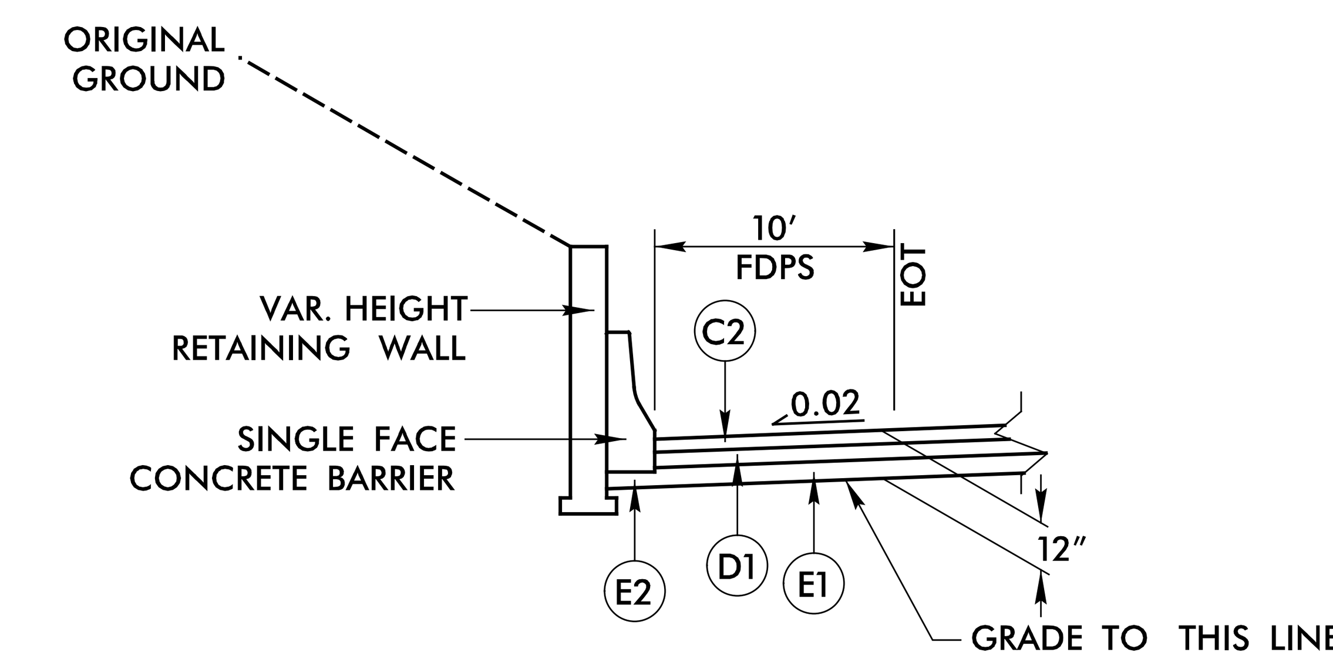
-L- STA. 62+00.00 TO STA. 64+50.00 LT
-L- STA. 61+00.00 TO STA. 67+00.00 RT (MIRROR)
* -L- STA. 88+00.00 TO STA. 88+91.47 LT
-L- STA. 88+91.47 TO STA. 95+50.00 LT
-L- STA. 95+30.70 TO STA. 97+65.00 RT (MIRROR)
-L- STA. 108+50.00 TO STA. 109+37.07 RT (MIRROR)
** -L- STA. 109+50.00 TO STA. 111+50.00 LT
* -L- STA. 109+37.07 TO STA. 111+50.00 RT (MIRROR)
-L- STA. 177+00.88 TO STA. 184+54.84 RT (MIRROR)



TYPICAL SECTION NO. 2B

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

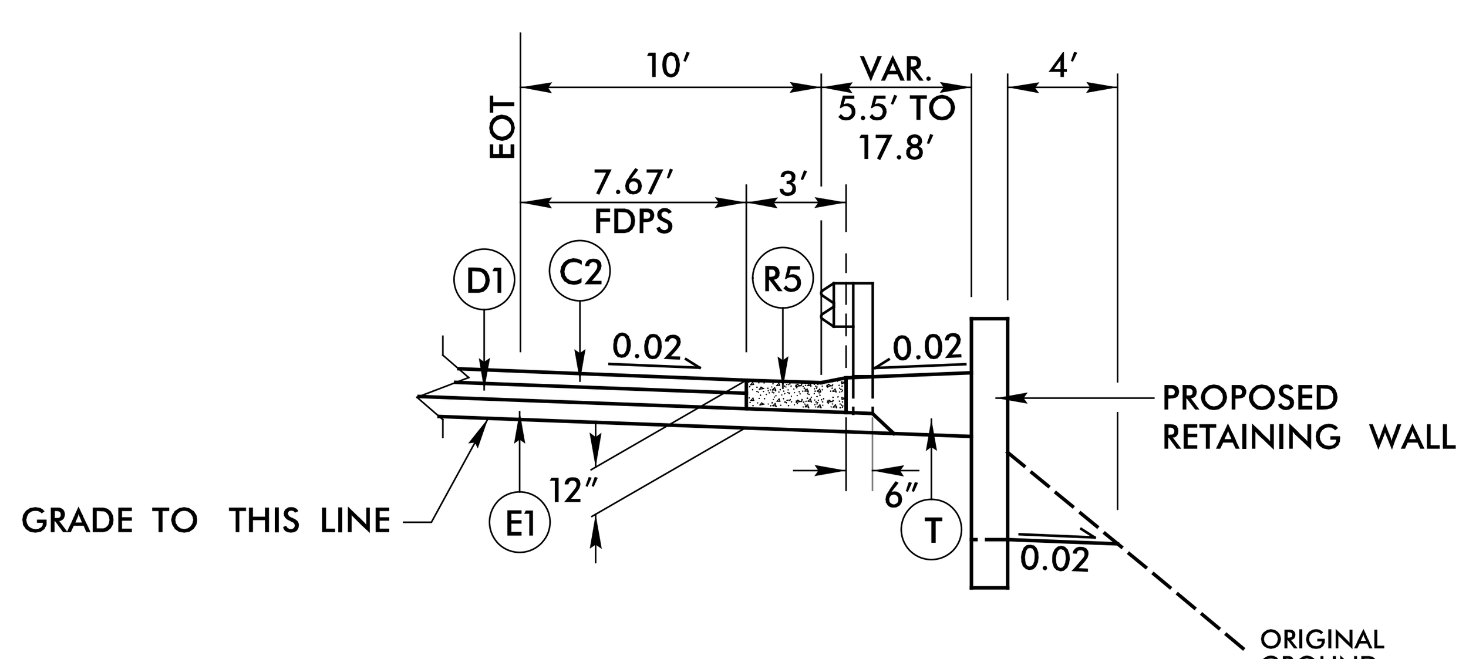
-L- STA. 82+50.00 TO STA. 88+98.22 RT
*** -L- STA. 88+98.22 TO STA. 91+12.97 RT
-L- STA. 91+12.97 TO STA. 93+81.00 RT
**** -L- STA. 136+35.00 TO STA. 138+40.00 RT
-L- STA. 171+09.00 TO STA. 176+22.00 RT



TYPICAL SECTION NO. 2C

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

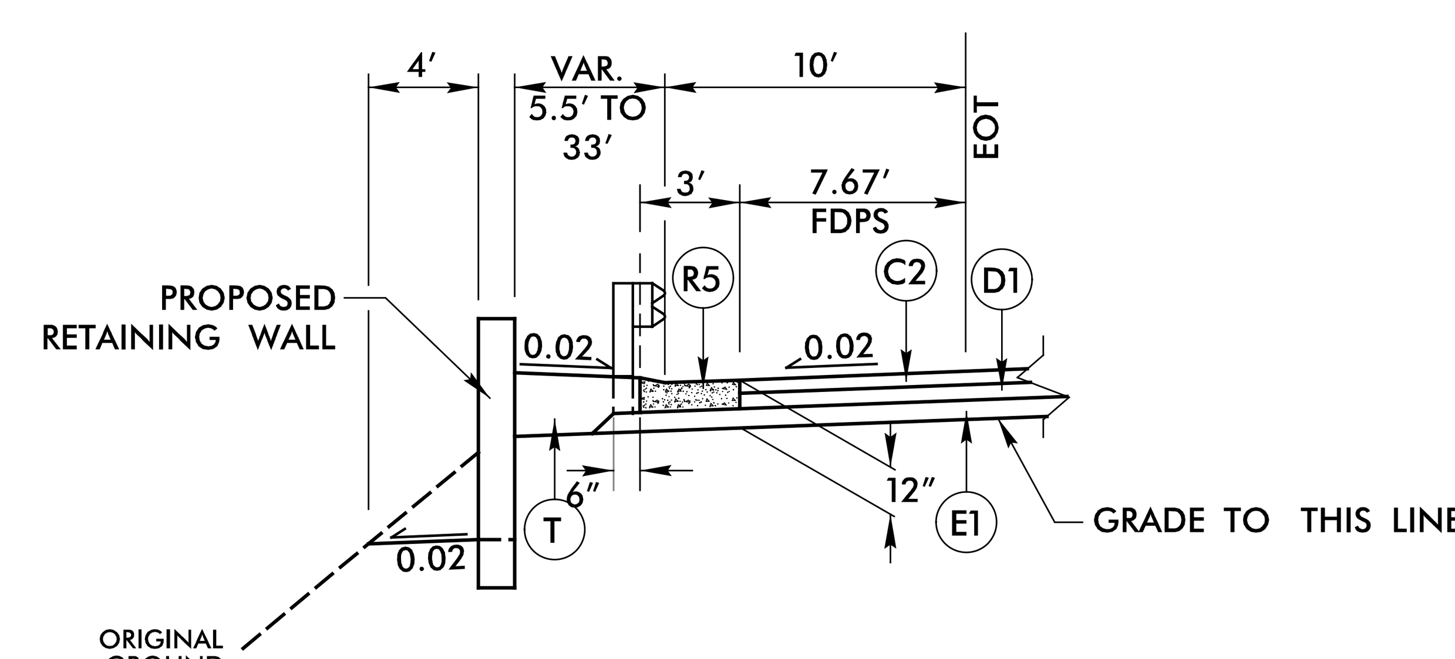
-L- STA. 100+00.00 TO STA. 107+50.00 RT



TYPICAL SECTION NO. 2D

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

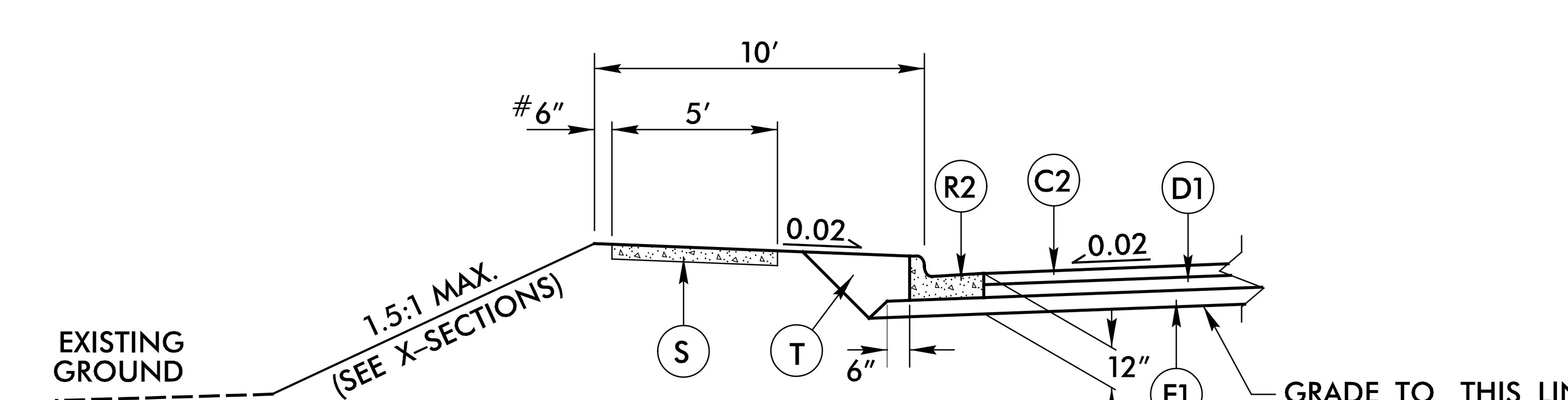
-L- STA. 95+50.00 TO STA. 97+70.00 RT



TYPICAL SECTION NO. 2E

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

-L- STA. 91+50.00 TO STA. 95+00.00 LT



TYPICAL SECTION NO. 2F

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

-L- STA. 163+87.13 TO STA. 176+42.77 LT

1.5' - WITH 3-BAR HANDRAIL -L- STA. 170+00.00 TO STA. 172+20.00 LT
(SEE SHEET 2C-1 FOR DETAIL)

5/23/2023
R:\Roadway\Proj\U5312_rdy_typ.dgn
lhovell

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2A-3

ROADWAY DESIGN ENGINEER — SEAL 014493 — Jimmy Stafford Goodnight, Jr. — 7/12/2023

PAVEMENT DESIGN ENGINEER — SEAL 039779 — Jeremy R. Hamm — 7/13/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared by

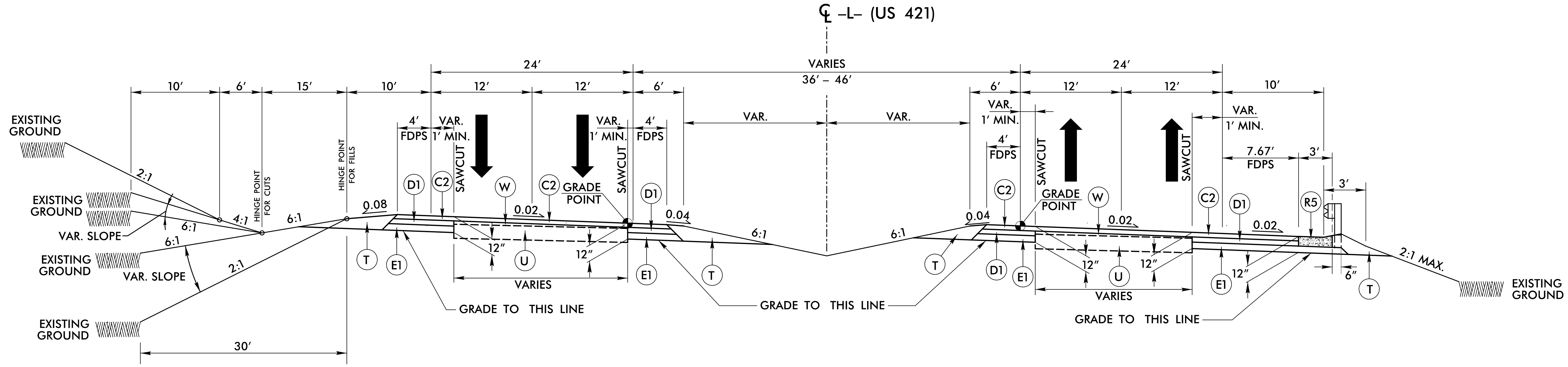
VHB Engineering NC, P.C. (C-3705)

SUNGATE DESIGN GROUP, P.A.

PAVEMENT SCHEDULE

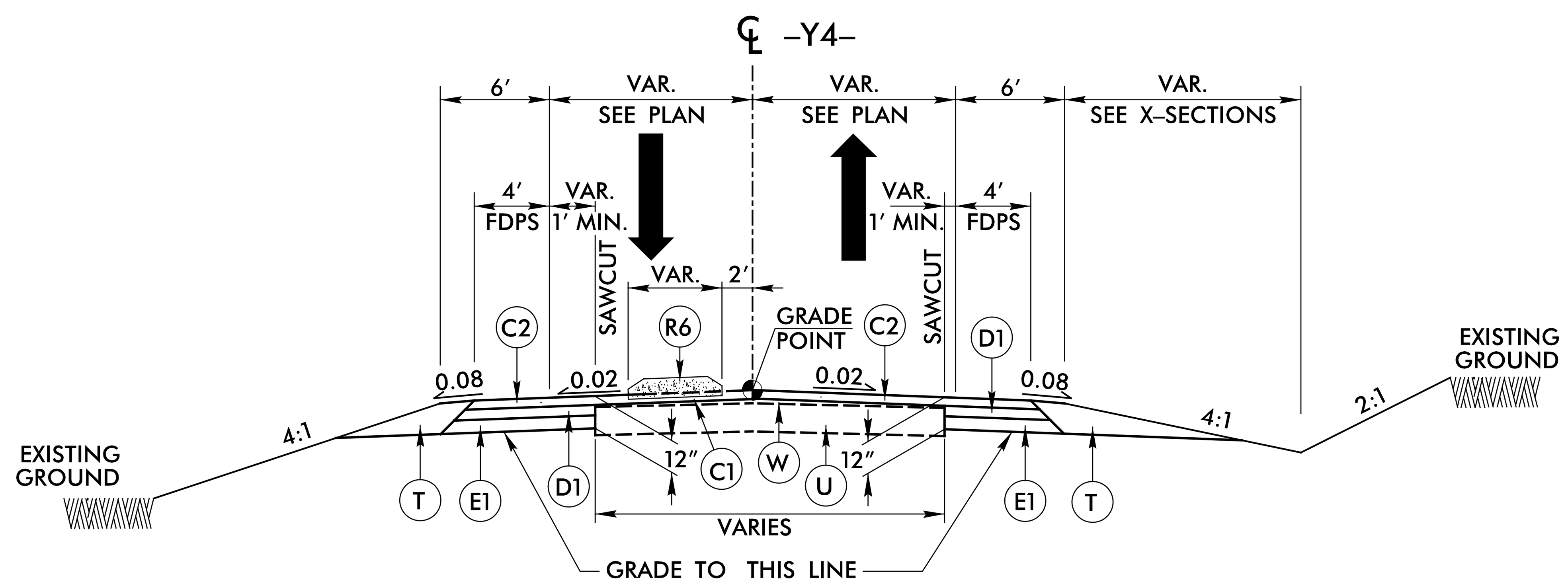
C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	5" B25.0C
R5	SHOULDER BERM GUTTER
R6	5" CONC. ISLAND (KEYED IN)
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

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



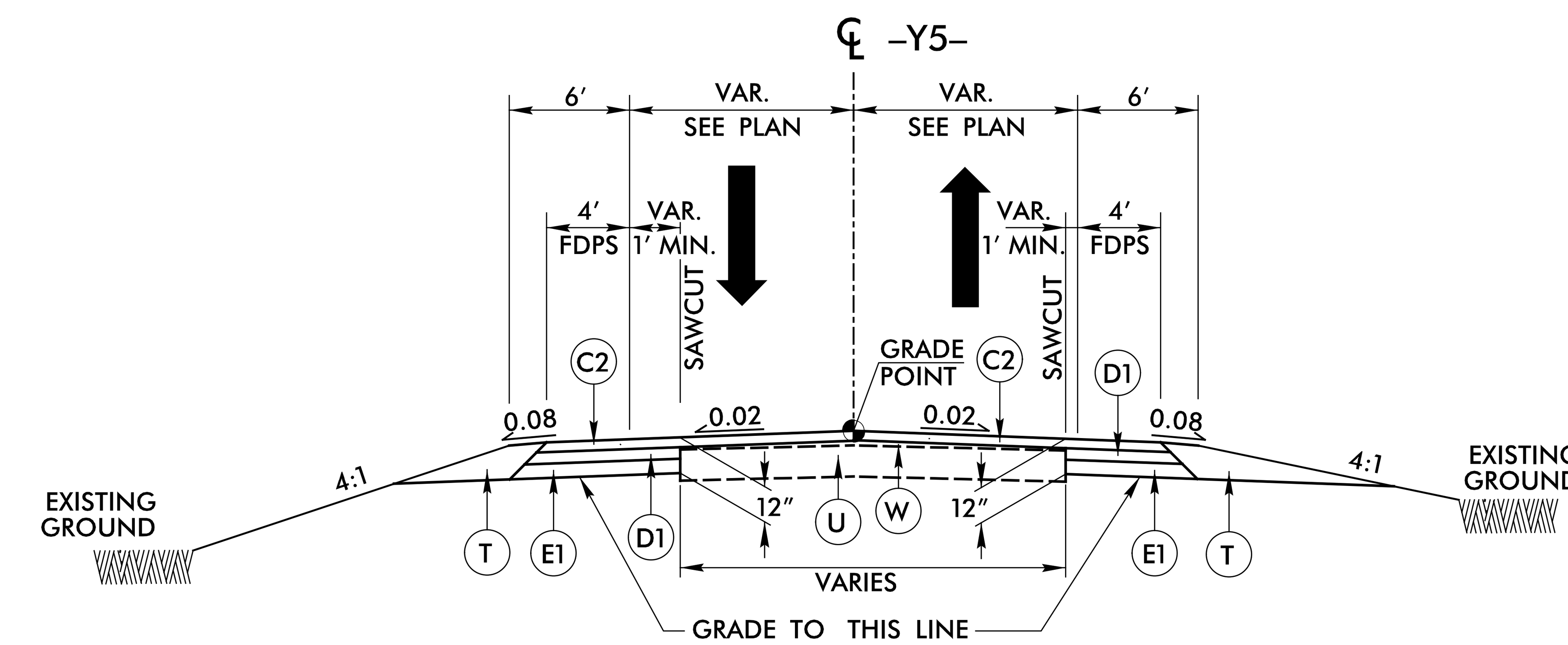
TYPICAL SECTION NO. 3

-L- STA. 184+54.84 TO STA. 188+63.29



TYPICAL SECTION NO. 4

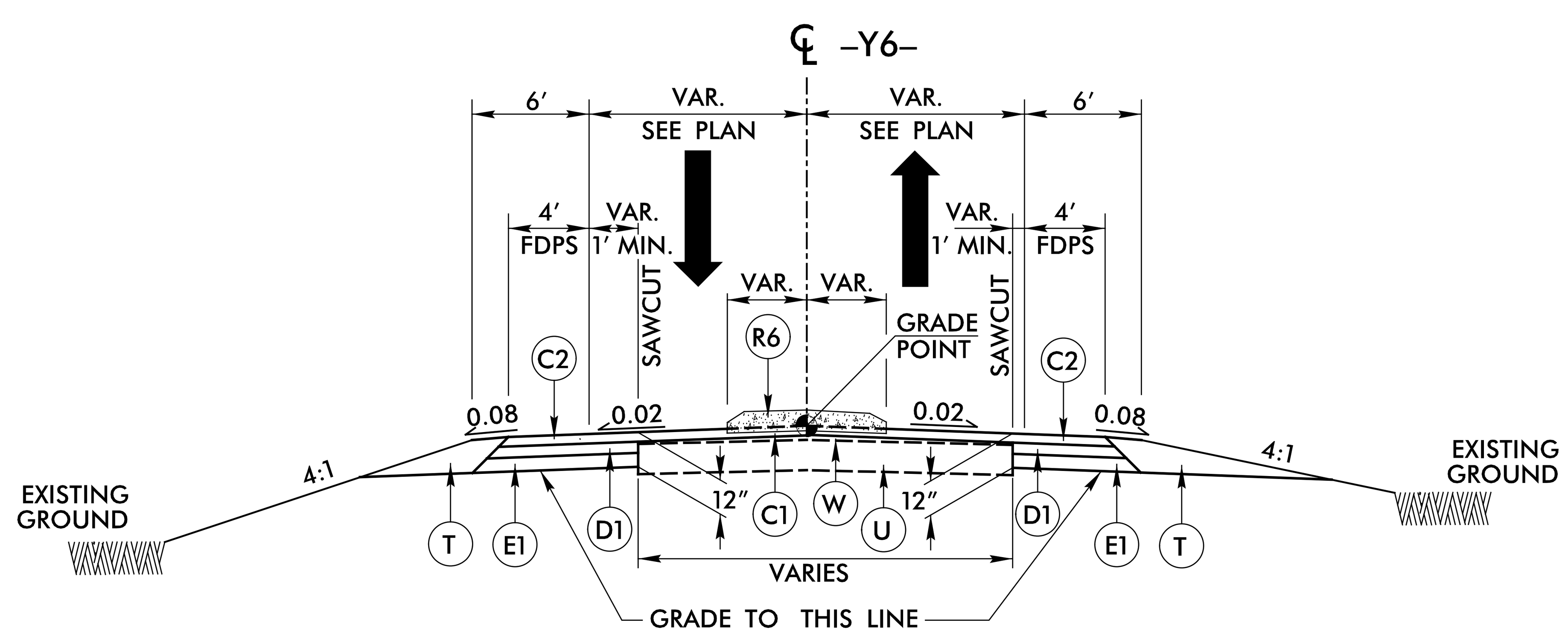
-Y4- STA. 10+39.00 TO STA. 12+08.63



TYPICAL SECTION NO. 5

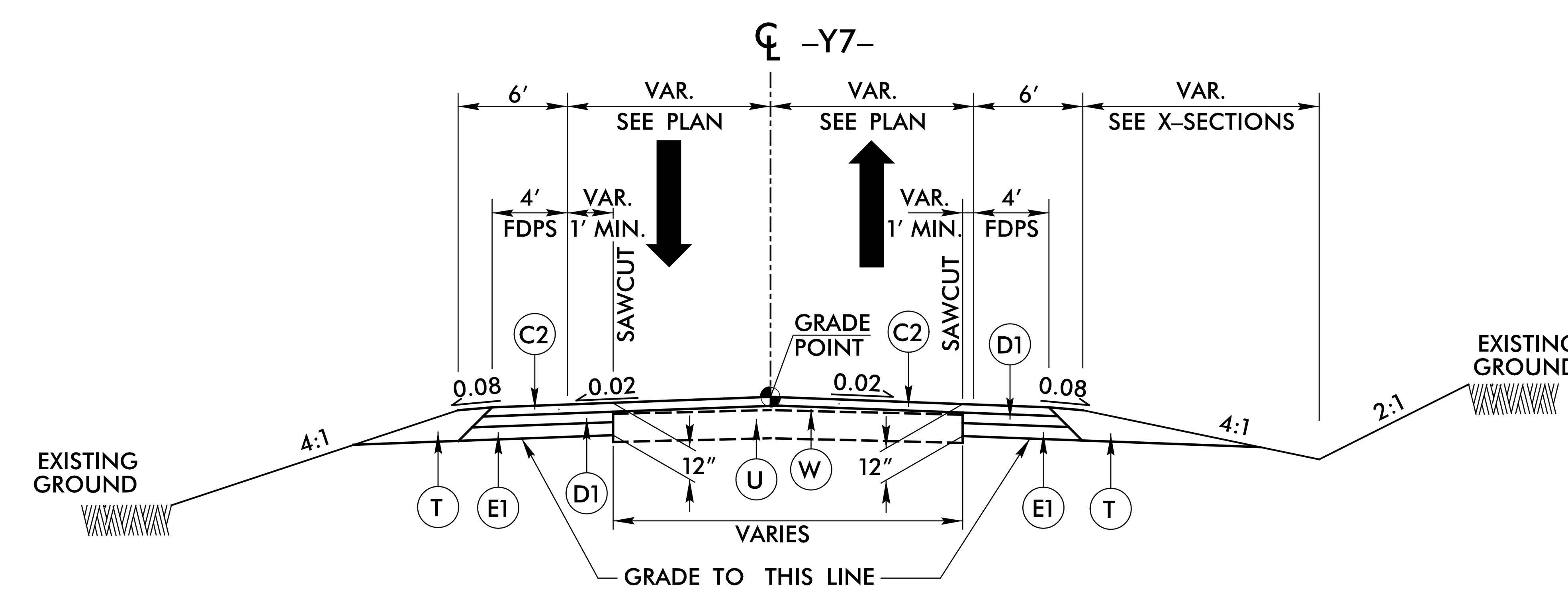
-Y5- STA. 11+45.35 TO STA. 13+11.31

NOTE: SEE PLANS FOR LIMITS OF CONC. ISLAND



TYPICAL SECTION NO. 6

-Y6- STA. 10+55.85 TO STA. 11+42.82



TYPICAL SECTION NO. 7

-Y7- STA. 10+28.29 TO STA. 12+75.39

NOTE: SEE PLANS FOR LIMITS OF CONC. ISLAND

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2A-4

ROADWAY DESIGN ENGINEER — SEAL 014493, James Stafford Goodnight, Jr. — Jimmy Goodnight 7/12/2023

PAVEMENT DESIGN ENGINEER — SEAL 039779, Jeremy R. Hamm — Jeremy Hamm 7/13/2023

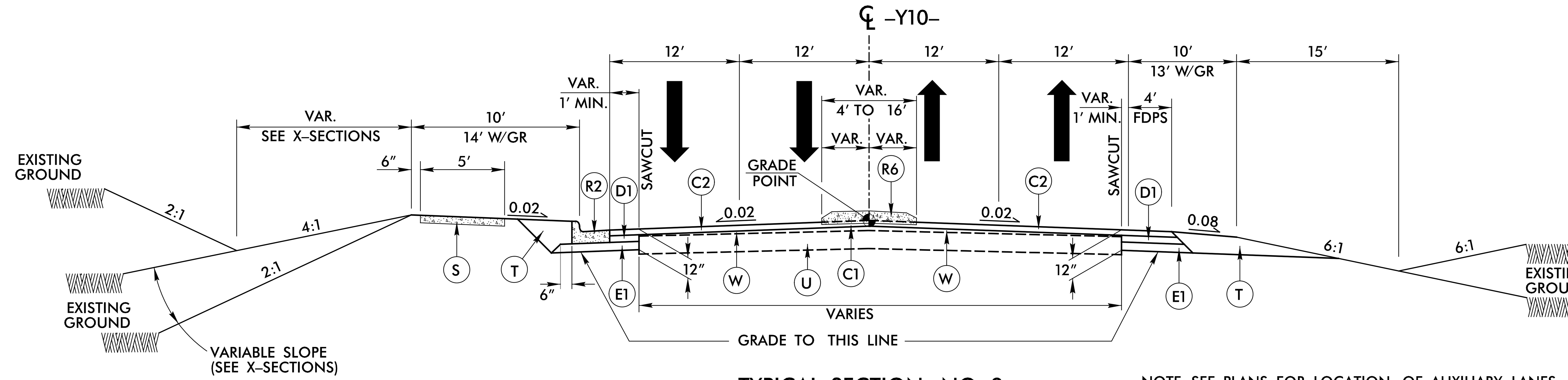
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared by: VHB Engineering NC, P.C. (C-3705), 940 Main Campus Drive, Suite 500, Raleigh, NC 27606; SUNGATE DESIGN GROUP, P.A.

PAVEMENT SCHEDULE

C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	5" B25.0C
R2	2'-6" C&G
R6	5" CONC. ISLAND (KEYED IN)
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

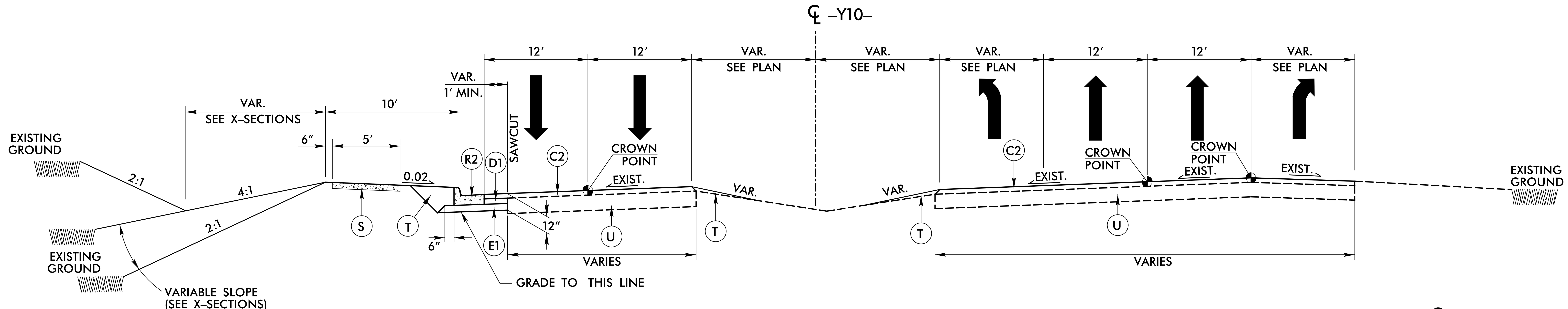
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 8

-Y10- STA. 10+51.00 TO STA. 23+43.94

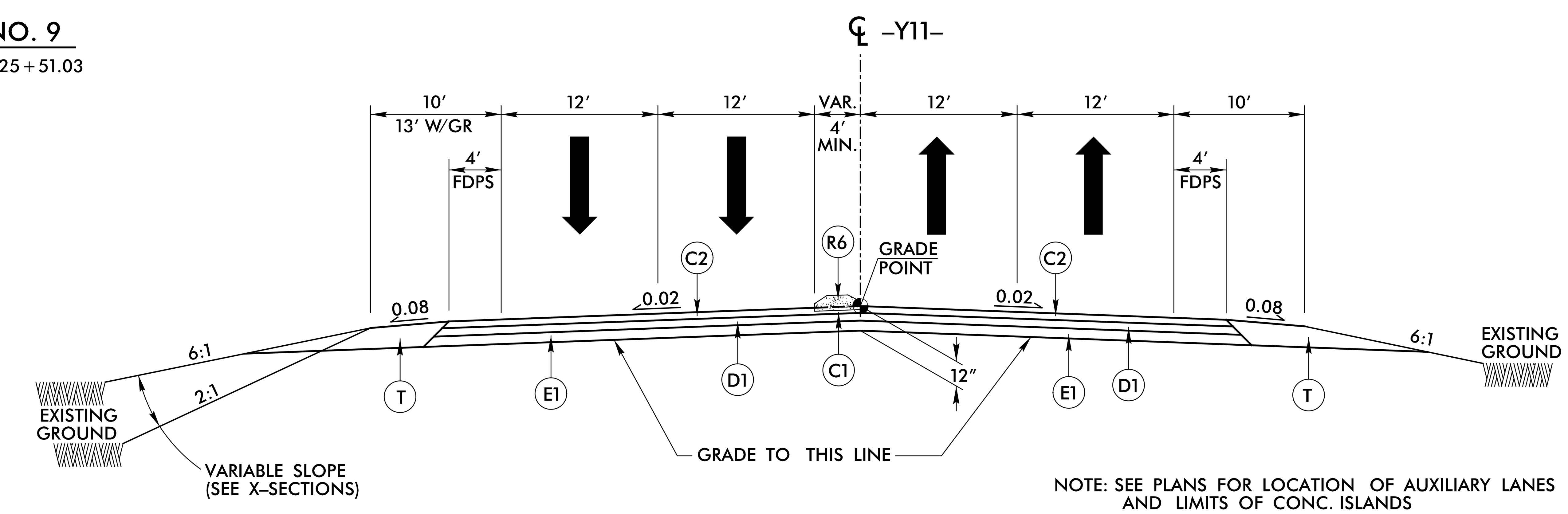
NOTE: SEE PLANS FOR LOCATION OF AUXILIARY LANES AND LIMITS OF CONC. ISLANDS



NOTE: SEE PLANS FOR LOCATION OF AUXILIARY LANES

TYPICAL SECTION NO. 9

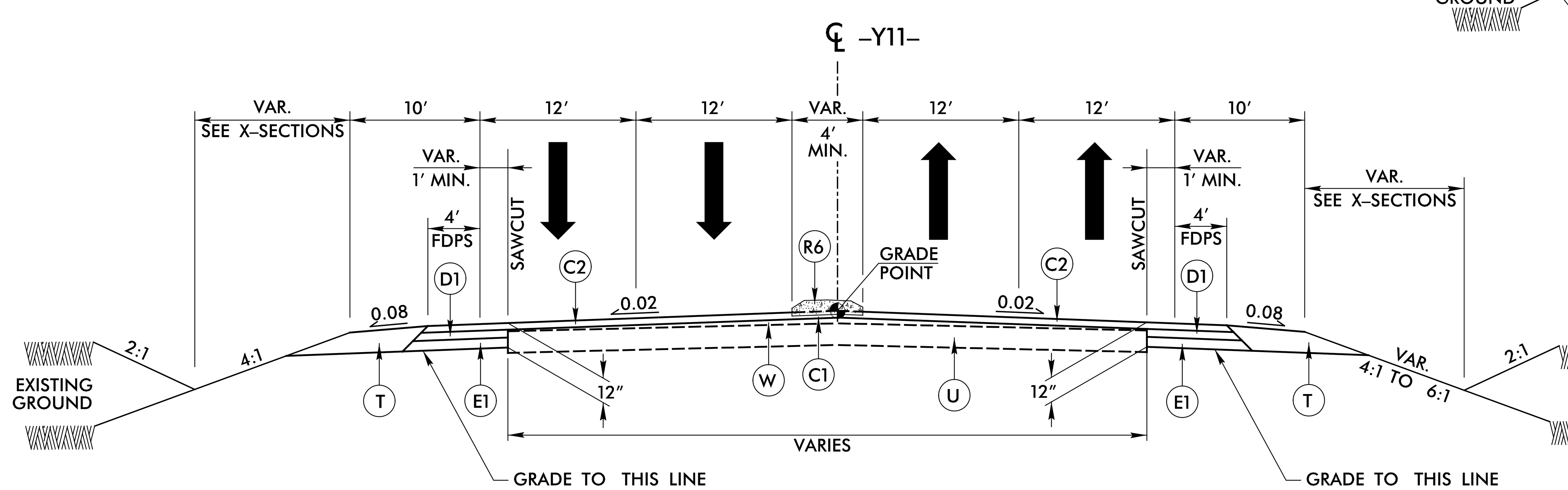
-Y10- STA. 23+43.94 TO STA. 25+51.03



NOTE: SEE PLANS FOR LOCATION OF AUXILIARY LANES AND LIMITS OF CONC. ISLANDS

TYPICAL SECTION NO. 10

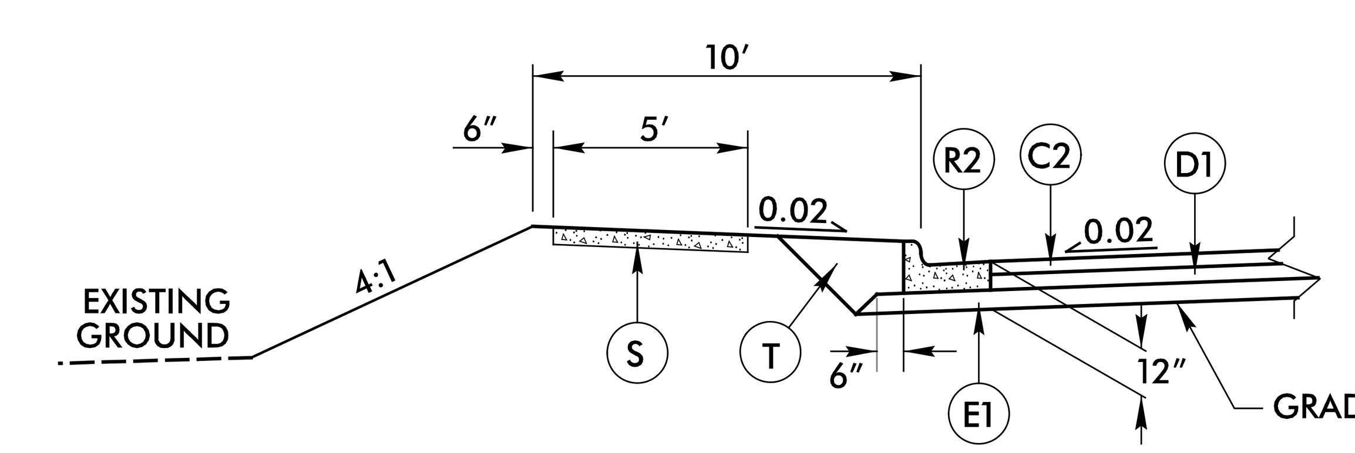
-Y11- STA. 10+42.00 TO STA. 13+53.59



NOTE: SEE PLANS FOR LOCATION OF AUXILIARY LANES AND LIMITS OF CONC. ISLANDS

TYPICAL SECTION NO. 11

-Y11- STA. 14+34.74 TO STA. 19+27.63



TYPICAL SECTION NO. 11A

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 11

-Y11- STA. 14+34.74 TO STA. 15+11.21 LT
-Y11- STA. 14+34.74 TO STA. 15+06.55 RT (MIRROR)

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2A-5
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
SEAL 014493 — James Stafford Goodnight, Jr. — Jimmy Goodnight 8/10/2023	SEAL 039779 — Jeremy R. Hamm — Jeremy Hamm 8/9/2023

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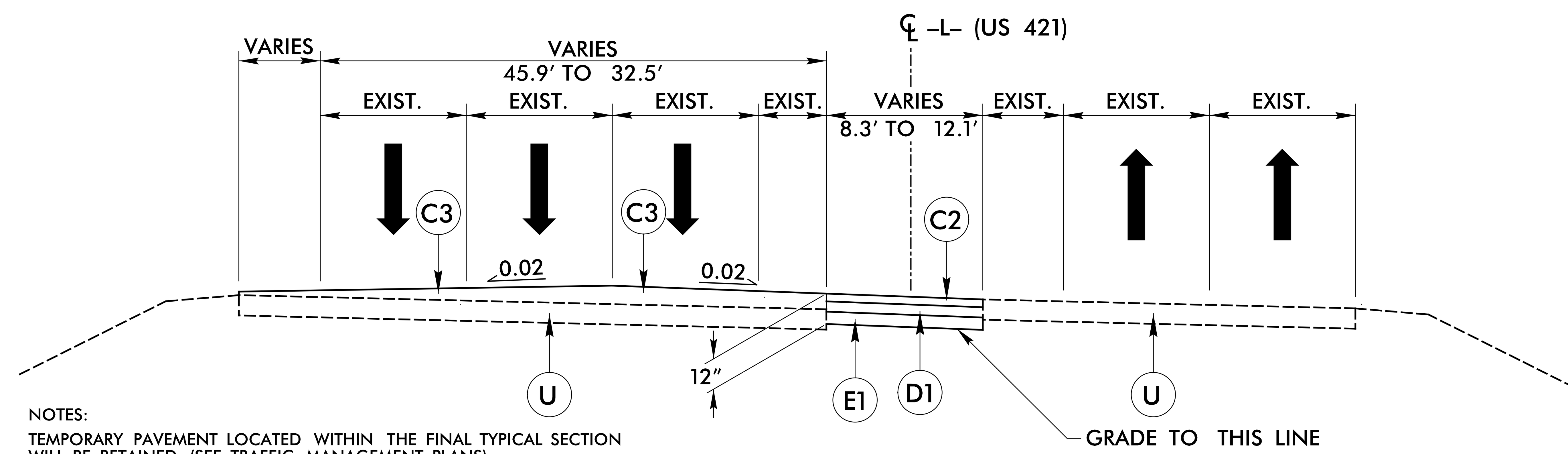
Prepared by

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.



NOTES:

TEMPORARY PAVEMENT LOCATED WITHIN THE FINAL TYPICAL SECTION WILL BE RETAINED (SEE TRAFFIC MANAGEMENT PLANS)

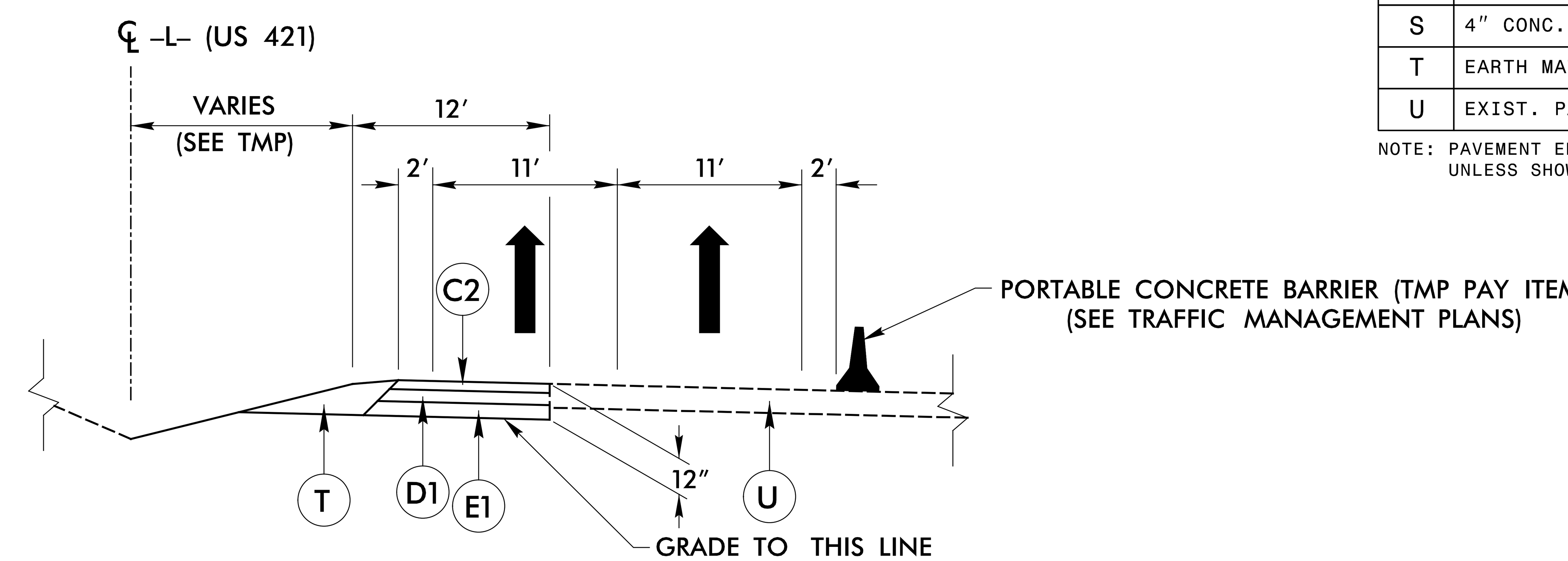
REMOVE TEMPORARY PAVEMENT IN THE FOLLOWING LOCATIONS PRIOR TO FINAL PHASE CONSTRUCTION (SEE TRAFFIC MANAGEMENT PLANS)

- -L- STA. 169+10.00 TO STA. 170+60.00 LT
- -L- STA. 167+11.00 TO STA. 171+01.00 LT
- -L- STA. 171+95.70 TO STA. 176+42.00 LT
- -L- STA. 172+20.00 TO STA. 173+95.00 MED

TYPICAL SECTION NO. 12A

TEMPORARY PAVEMENT

-L- STA. 167+11.00 TO STA. 176+42.00



TYPICAL SECTION NO. 12B

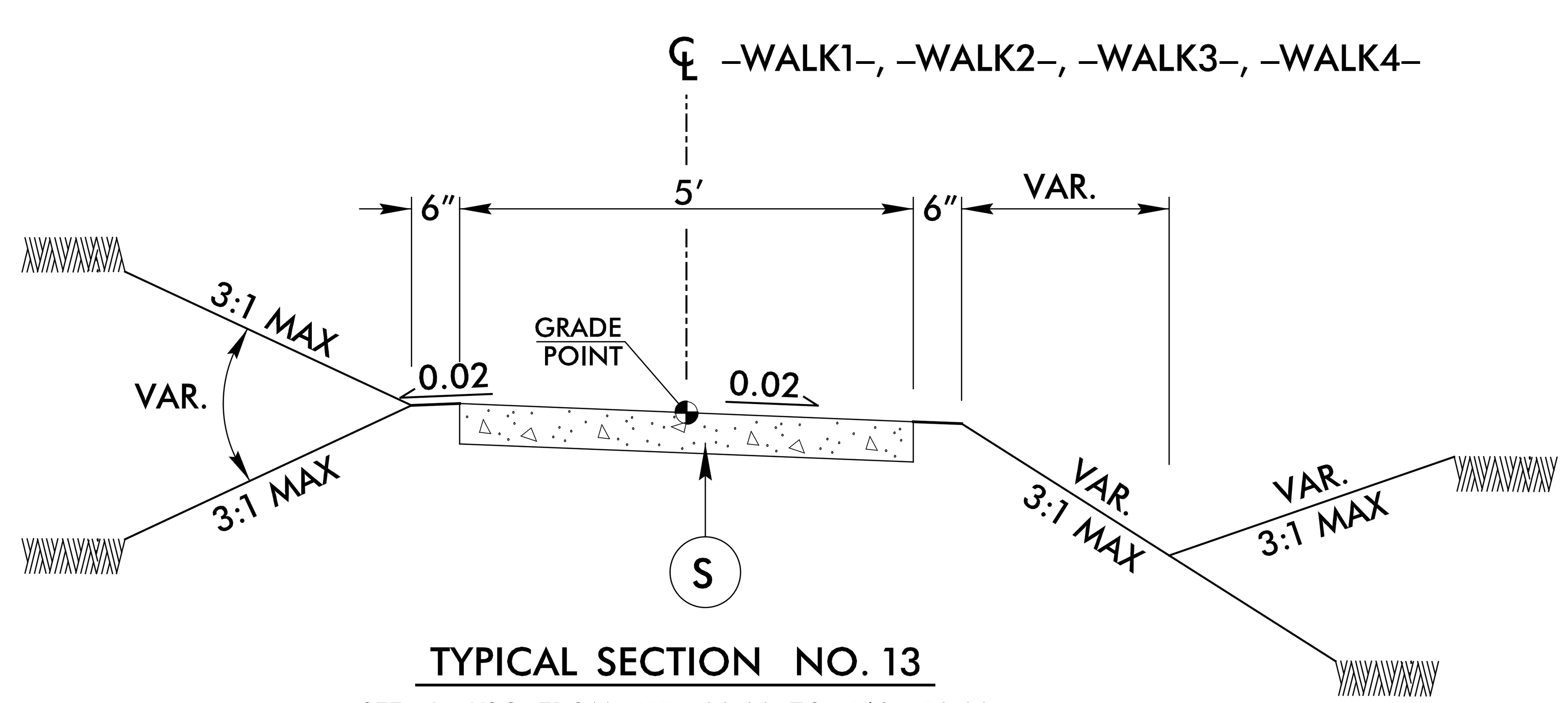
TEMPORARY PAVEMENT

-L- STA. 177+61.00 TO STA. 191+50.43 RT

PAVEMENT SCHEDULE

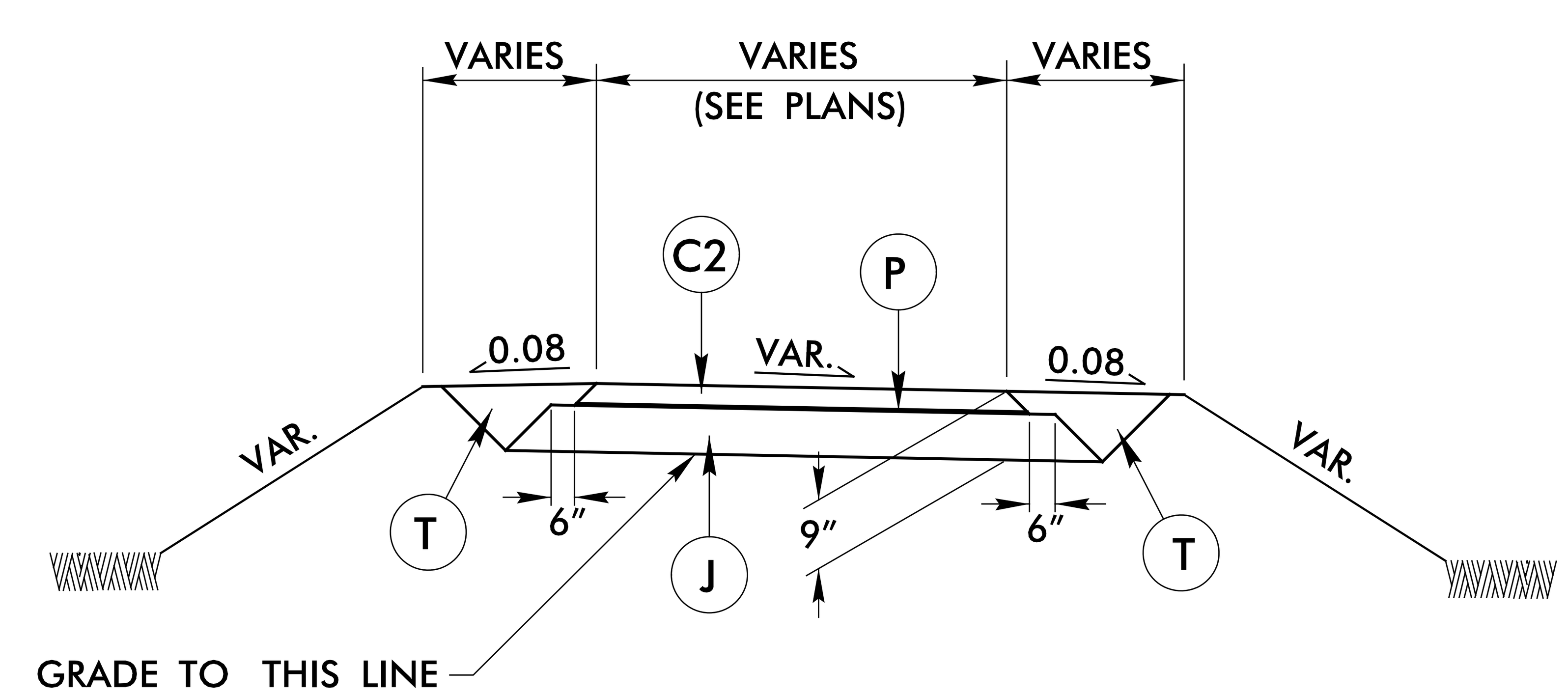
C2	3" S9.5C
C3	VAR. DEPTH S9.5C
D1	4" I19.0C
E1	5" B25.0C
J	6" ABC
P	PRIME COAT
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT

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



TYPICAL SECTION NO. 13

SEE -L- XSC FROM 117+00.00 TO 162+50.00



TYPICAL SECTION NO. 14

USE TYPICAL SECTION NO. 14 TO ALL DRIVEWAYS

6/2/99

8/8/2023 R:\Roadway\Proj\U5312_rdy_typ.dgn

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-1

Prepared by: vhb — VHB Engineering NC, P.C. (C-3705), 940 Main Campus Drive, Suite 500, Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER James Stafford Goodnight, Jr.
DocuSigned by: Jimmy Goodnight 3/12/2023

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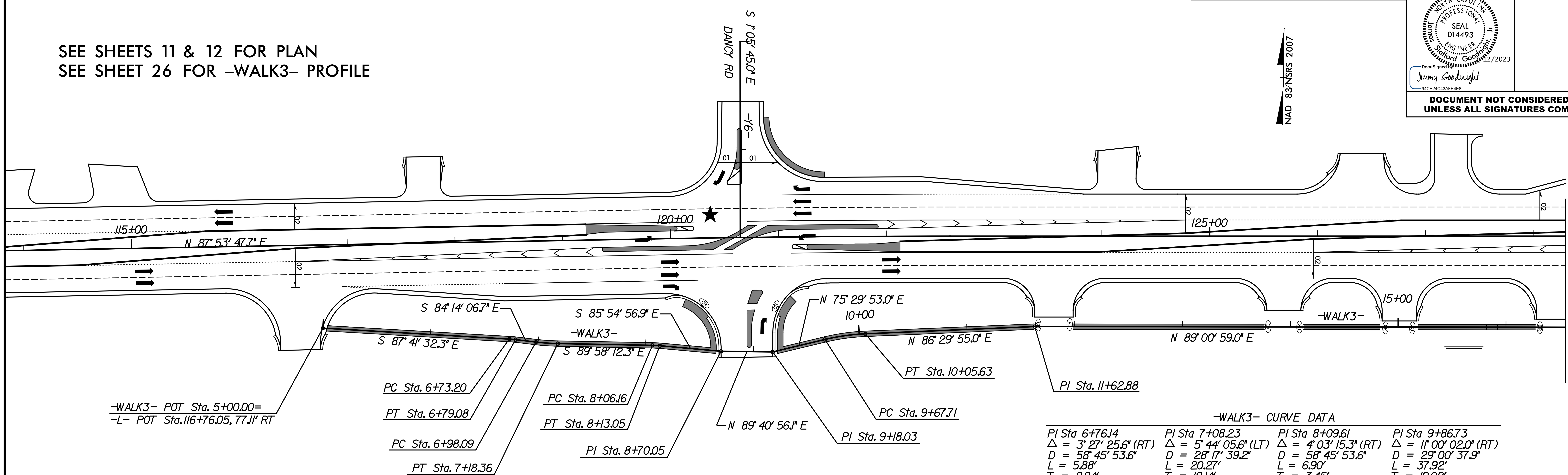
SIDEWALK ALIGNMENT DETAIL

SEE SHEETS 11 & 12 FOR PLAN
SEE SHEET 26 FOR -WALK3- PROFILE



-WALK3- CURVE DATA

PI Sta 6+76.14	PI Sta 7+08.23	PI Sta 8+09.61	PI Sta 9+86.73
Δ = 3° 27' 25.6" (RT)	Δ = 5° 44' 05.6" (LT)	Δ = 4° 03' 15.3" (RT)	Δ = 11° 00' 02.0" (RT)
D = 58° 45' 53.6"	D = 28° 17' 39.2"	D = 58° 45' 53.6"	D = 29° 00' 37.9"
L = 5.88'	L = 20.27'	L = 6.90'	L = 37.92'
T = 2.94'	T = 10.14'	T = 3.45'	T = 19.02'
R = 97.50'	R = 202.50'	R = 97.50'	R = 197.50'

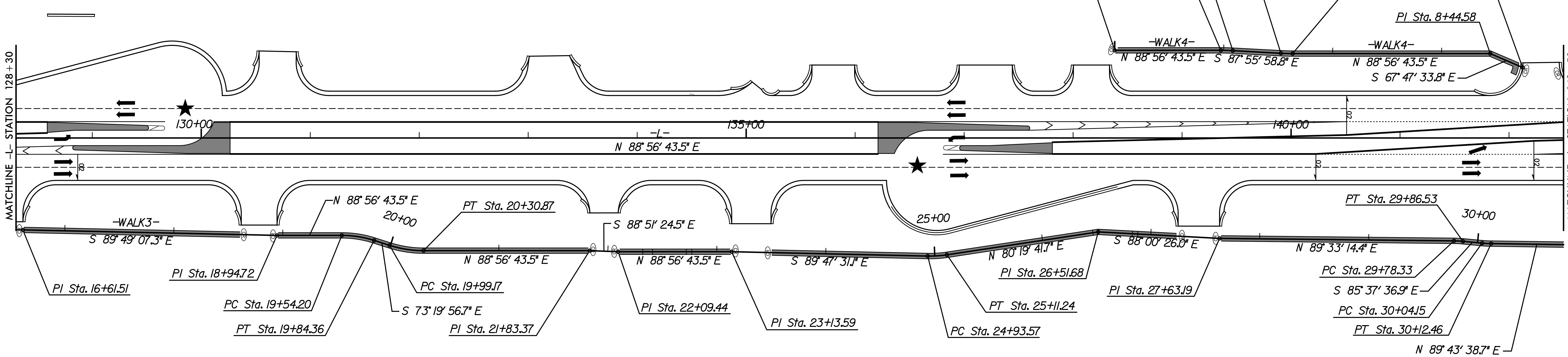
SEE SHEETS 12 & 13 FOR PLAN
SEE SHEET 26 FOR -WALK3- PROFILE
SEE SHEET 27 FOR -WALK4- PROFILE

-WALK3- CURVE DATA

PI Sta 19+69.40	PI Sta 20+15.15	PI Sta 25+02.43	PI Sta 29+82.43	PI Sta 30+08.31
Δ = 17° 43' 19.8" (RT)	Δ = 17° 43' 19.8" (LT)	Δ = 9° 52' 47.2" (LT)	Δ = 4° 49' 08.7" (RT)	Δ = 4° 38' 44.5" (LT)
D = 58° 45' 53.6"	D = 55° 53' 54.0"	D = 55° 53' 54.0"	D = 58° 45' 53.6"	D = 55° 53' 54.0"
L = 30.16'	L = 31.70'	L = 17.67'	L = 8.20'	L = 8.31'
T = 15.20'	T = 15.98'	T = 8.86'	T = 4.10'	T = 4.16'
R = 97.50'	R = 102.50'	R = 102.50'	R = 97.50'	R = 102.50'

-WALK4- CURVE DATA

PI Sta 6+02.81	PI Sta 6+57.90
Δ = 3° 07' 17.7" (RT)	Δ = 3° 07' 17.7" (LT)
D = 28° 17' 39.2"	D = 29° 00' 37.9"
L = 11.03'	L = 10.76'
T = 5.52'	T = 5.38'
R = 202.50'	R = 197.50'



3/11/2023
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8/17/99

Prepared by
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr

DocuSigned by: Jimmy Goodnight 7/12/2023

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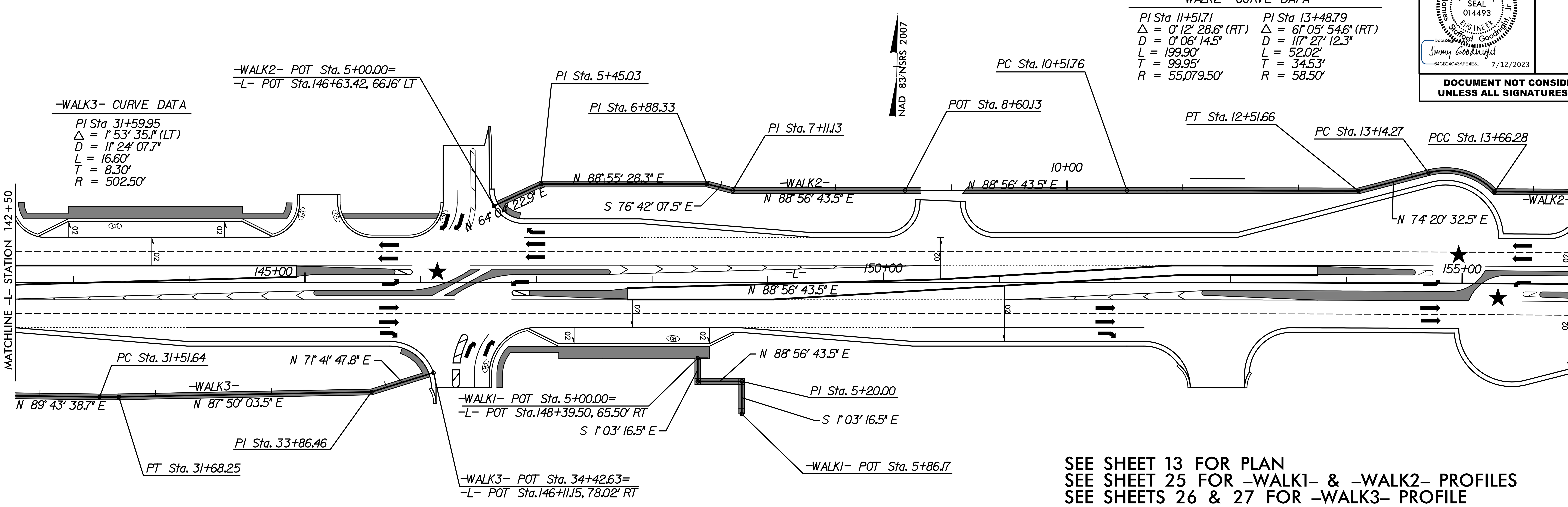
SIDEWALK ALIGNMENT DETAIL

-WALK3- CURVE DATA
PI Sta 31+59.95
△ = 1° 53' 35.1" (LT)
D = 11° 24' 07.7"
L = 16.60'
T = 8.30'
R = 502.50'

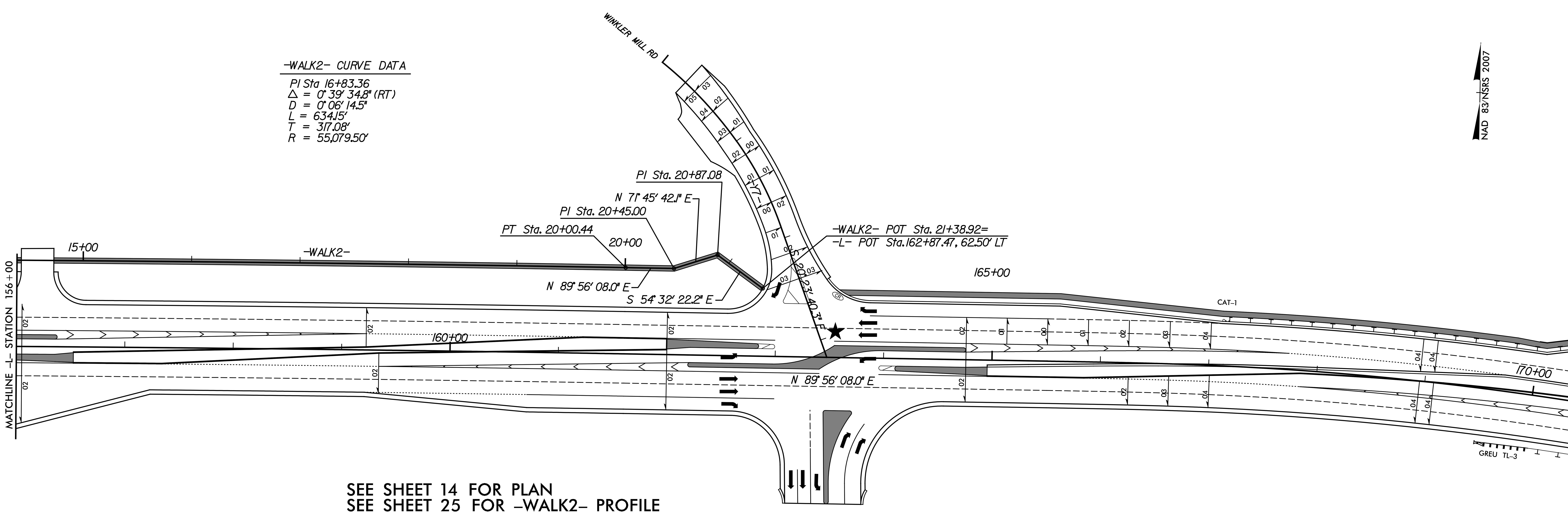
-WALK2- CURVE DATA

PI Sta 11+51.71	PI Sta 13+48.79
△ = 0° 12' 28.6" (RT)	△ = 61° 05' 54.6" (RT)
D = 0° 06' 14.5"	D = 117° 27' 12.3"
L = 199.90'	L = 52.02'
T = 99.95'	T = 34.53'
R = 55,079.50'	R = 58.50'



SEE SHEET 13 FOR PLAN
SEE SHEET 25 FOR -WALK1- & -WALK2- PROFILES
SEE SHEETS 26 & 27 FOR -WALK3- PROFILE

-WALK2- CURVE DATA
PI Sta 16+83.36
△ = 0° 39' 34.8" (RT)
D = 0° 06' 14.5"
L = 634.15'
T = 317.08'
R = 55,079.50'



SEE SHEET 14 FOR PLAN
SEE SHEET 25 FOR -WALK2- PROFILE

3/11/2023
U5312_rdy_det_2B-1.dgn

5/14/99

Prepared by
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-3

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr.
7/12/2023

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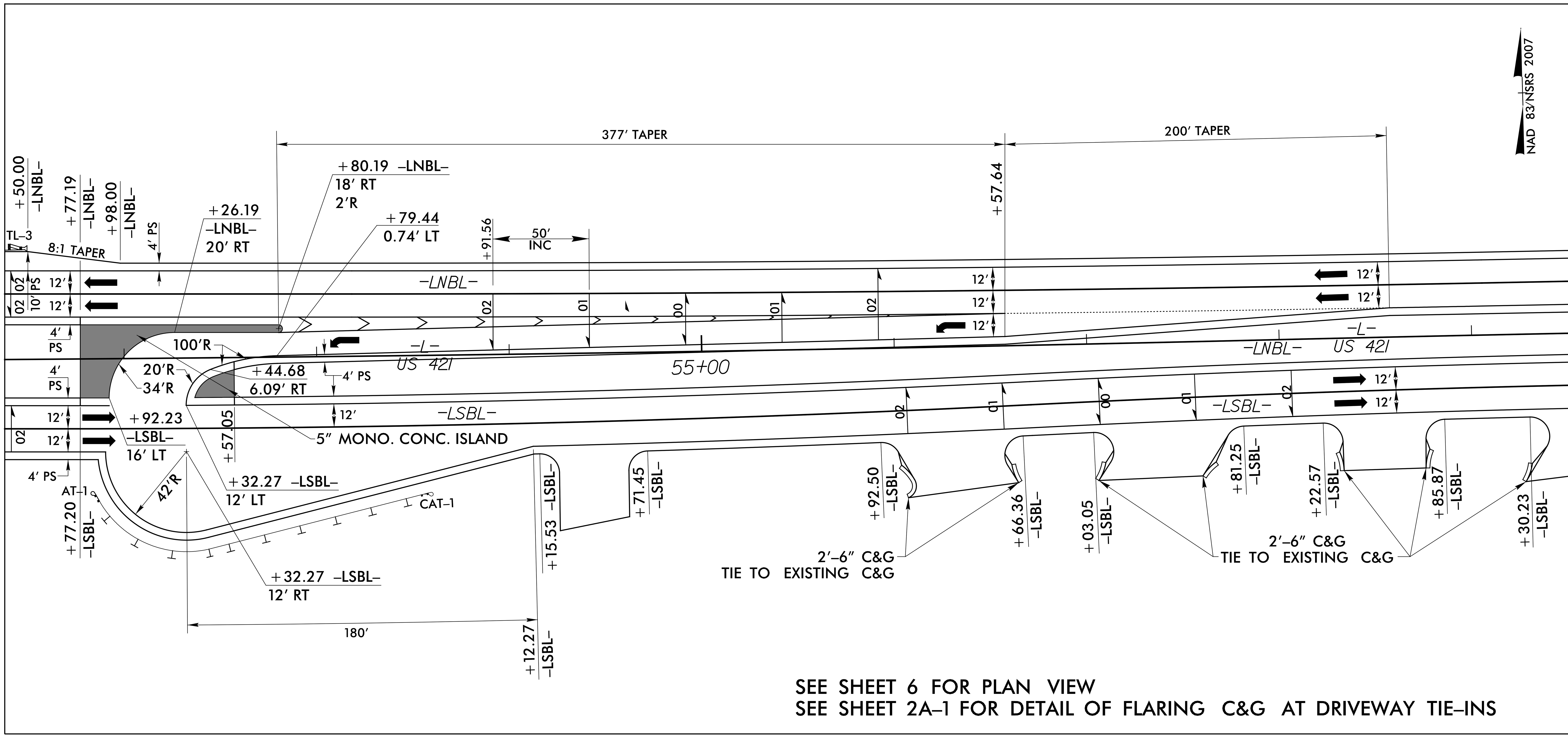
INTERSECTION DETAILS



DETAIL 1

-L- STA. 51+38.00 TO 59+58.00

NOTES:

- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

3/11/2023
U5312_rdy_det_2B-3.dgn

5/14/99

Prepared by
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-4

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr.

Jimmy Goodnight 7/12/2023

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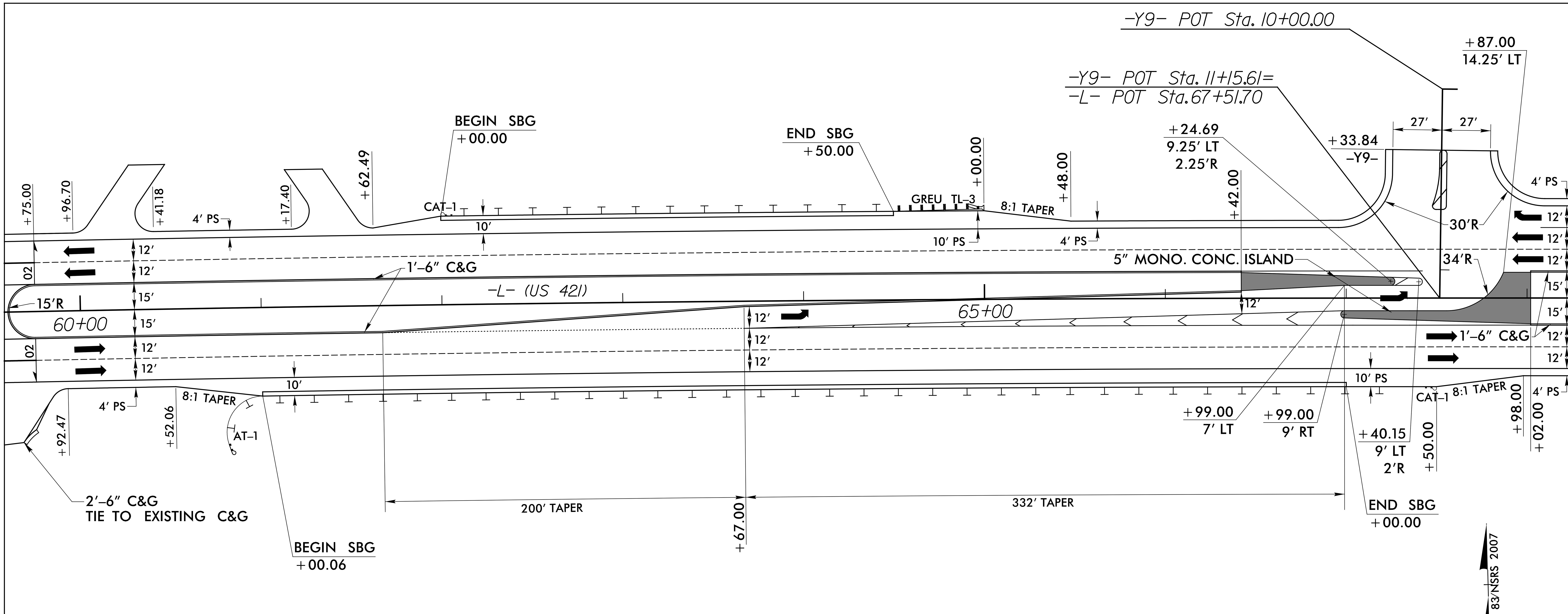
INTERSECTION DETAILS



SEE SHEET 7 FOR PLAN VIEW

SEE SHEET 2A-1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE-INS

DETAIL 2

-L- STA. 59+58.00 TO 68+30.00

NOTES:

- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

3/11/2023
U5312_rdy_det_2B-4.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-5

ROADWAY DESIGN ENGINEER

SEAL 014493 James Stafford Goodnight, Jr. 7/12/2023

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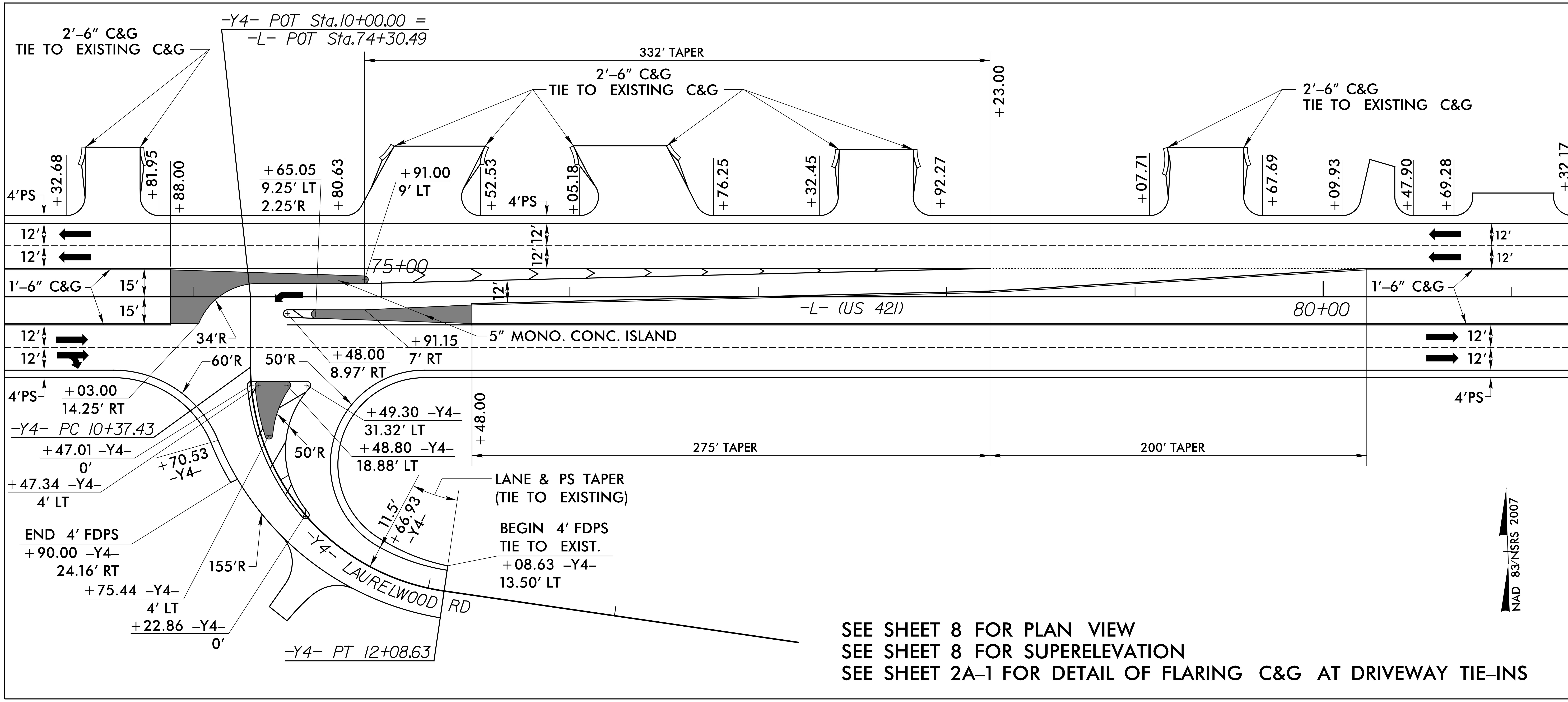
Prepared by VHB Engineering NC, P.C. (C-3705) — SUNGATE DESIGN GROUP, P.A.

INTERSECTION DETAILS



SEE SHEET 8 FOR PLAN VIEW
SEE SHEET 8 FOR SUPERELEVATION
SEE SHEET 2A-1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE-INS

DETAIL 3
-L- STA. 73+00.00 TO 81+38.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60 SCALE

Prepared by VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

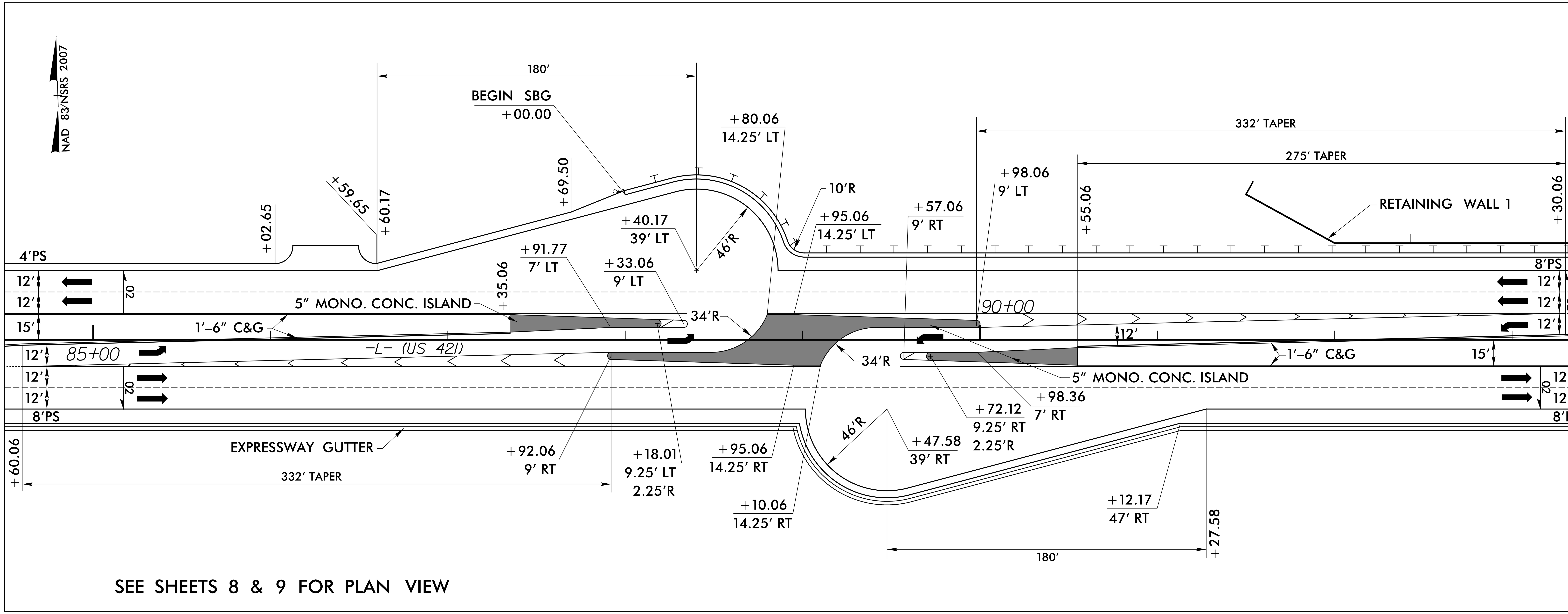
PROJECT REFERENCE NO. U-5312 | SHEET NO. 2B-6

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER James Stafford Goodnight, Jr.
Jimmy Goodnight 7/12/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INTERSECTION DETAILS



DETAIL 4
-L- STA. 84+50.00 TO 93+40.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-7

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr.

Jimmy Goodnight 7/12/2023

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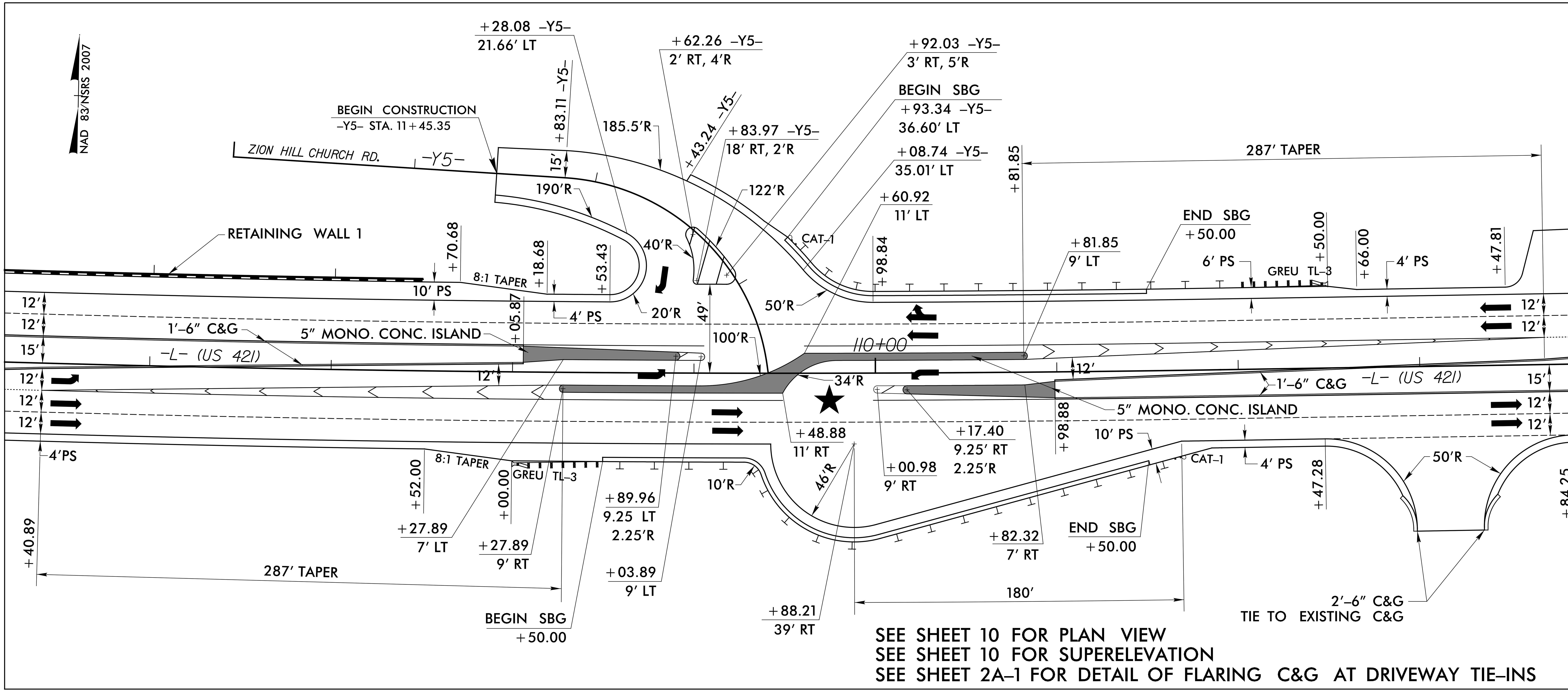
INTERSECTION DETAILS



★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 5

-L- STA. 105+20.00 TO 113+90.00

NOTES:

- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60 SCALE

3/11/2023 U5312_rdy_det_2B-7.dgn

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VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-8

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER James Stafford Goodnight, Jr.
Jimmy Goodnight 7/12/2023

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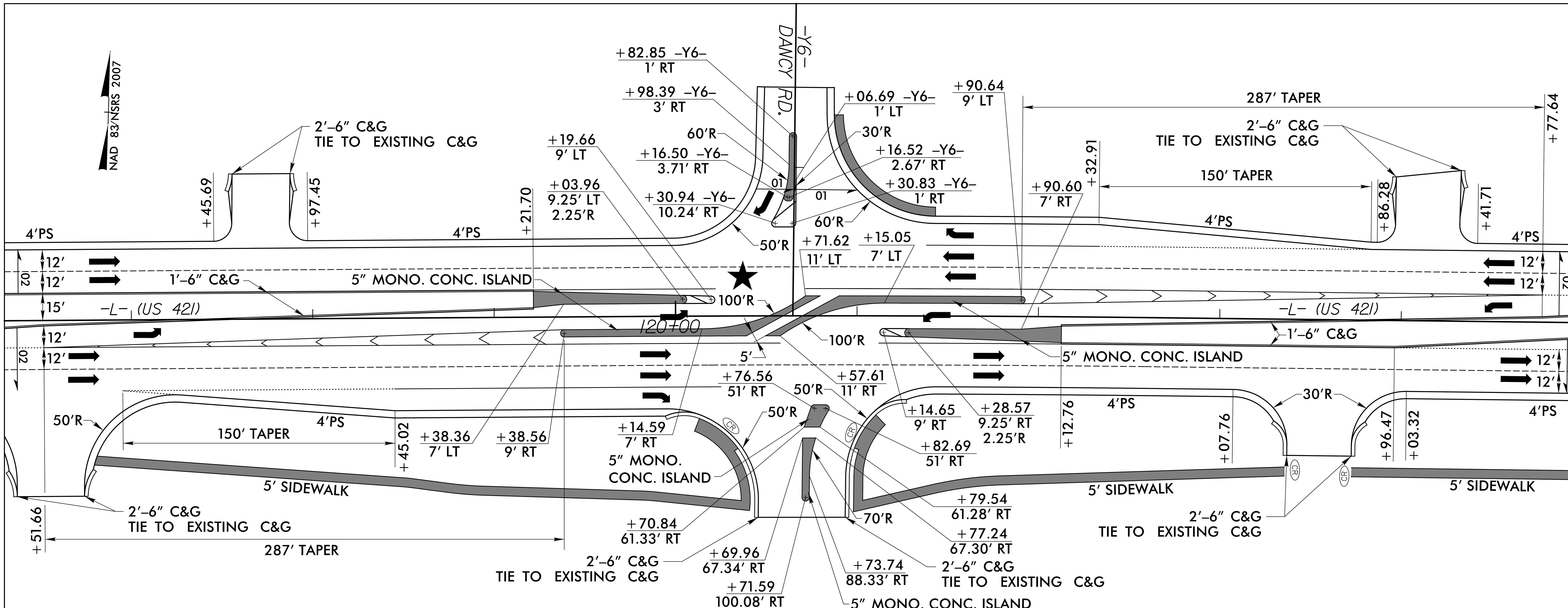
INTERSECTION DETAILS



SEE SHEET 11 FOR PLAN VIEW
SEE PAVEMENT MARKING PLANS FOR CURB RAMP AND CROSSWALK LOCATIONS
SEE SHEET 2A-1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE-INS

★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 6

-L- STA. 116+30.00 TO 125+00.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

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PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-9

ROADWAY DESIGN ENGINEER
SEAL 014493
James Stafford Goodnight, Jr.
7/12/2023

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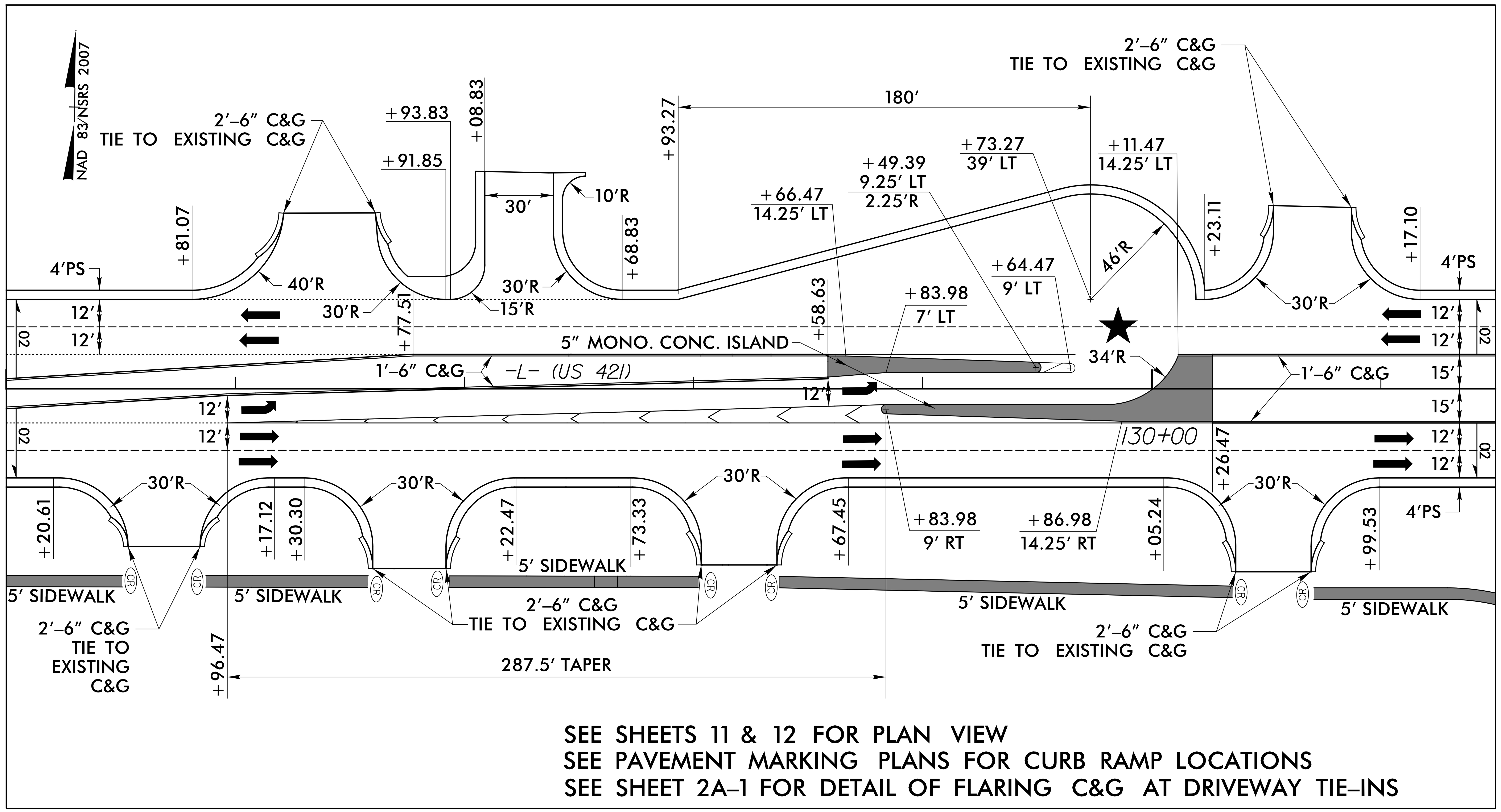
INTERSECTION DETAILS

★ DENOTES PROPOSED SIGNALIZED INTERSECTION



DETAIL 7
-L- STA. 125+00.00 TO 131+50.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

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3/11/2023 U5312_rdy_det_2B-9.dgn

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight Jr.
Jimmy Goodnight 7/12/2023

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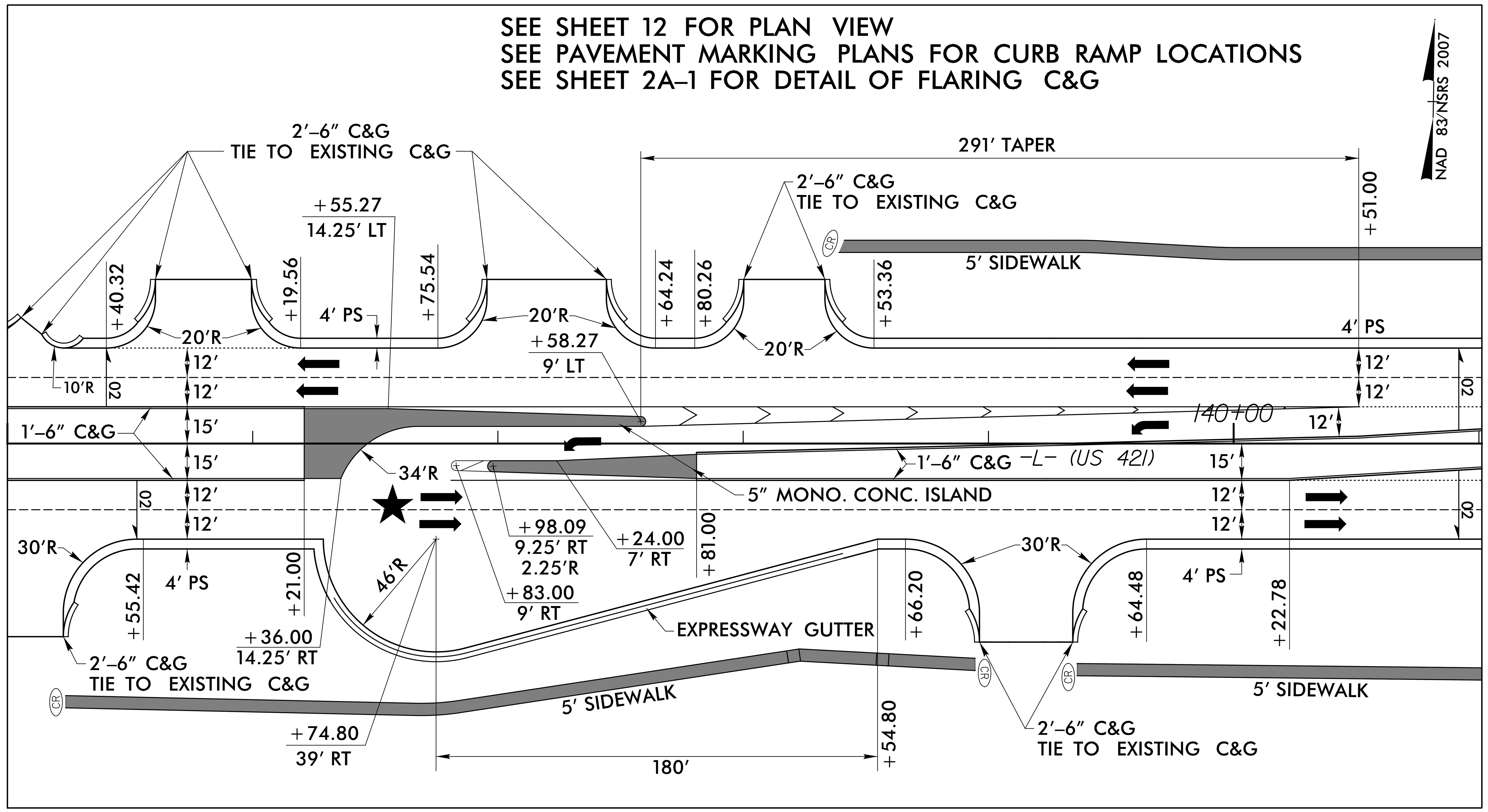
INTERSECTION DETAILS



★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 8

-L- STA. 135+00.00 TO 141+00.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

SCALE 30 15 0 30 60

5/14/99

Prepared by

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

SUNGATE DESIGN GROUP, P.A.
900 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
(919) 319-9993
FIRM LICENSE NO. C-990

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-11

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 Stephen Goodnight

Docusigned by: Jimmy Goodnight
64CB24C43AFE4E8... 7/12/2023

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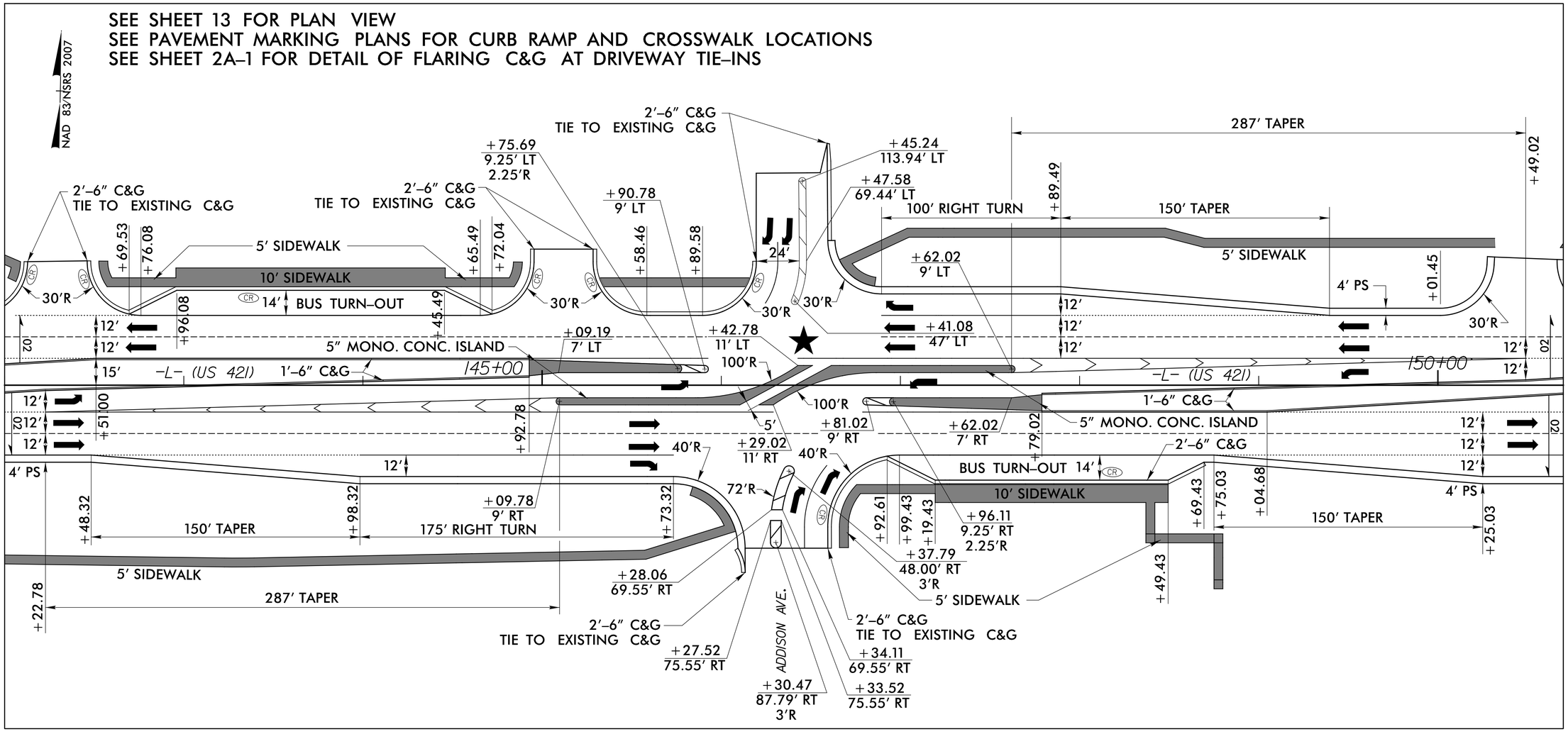
INTERSECTION DETAILS

SEE SHEET 13 FOR PLAN VIEW
SEE PAVEMENT MARKING PLANS FOR CURB RAMP AND CROSSWALK LOCATIONS
SEE SHEET 2A–1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE–INS



★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 9

–L– STA. 142+00.00 TO 150+70.00

NOTES:
– ALL DIMENSIONS ARE BASED OFF OF –L– ALIGNMENT UNLESS OTHERWISE NOTED.
– 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

3/10/2023
U-5312_rdy_det_2B-11.dgn
jlovelace

5/14/99

Prepared by
vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-12

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight Jr

Jimmy Goodnight 7/12/2023

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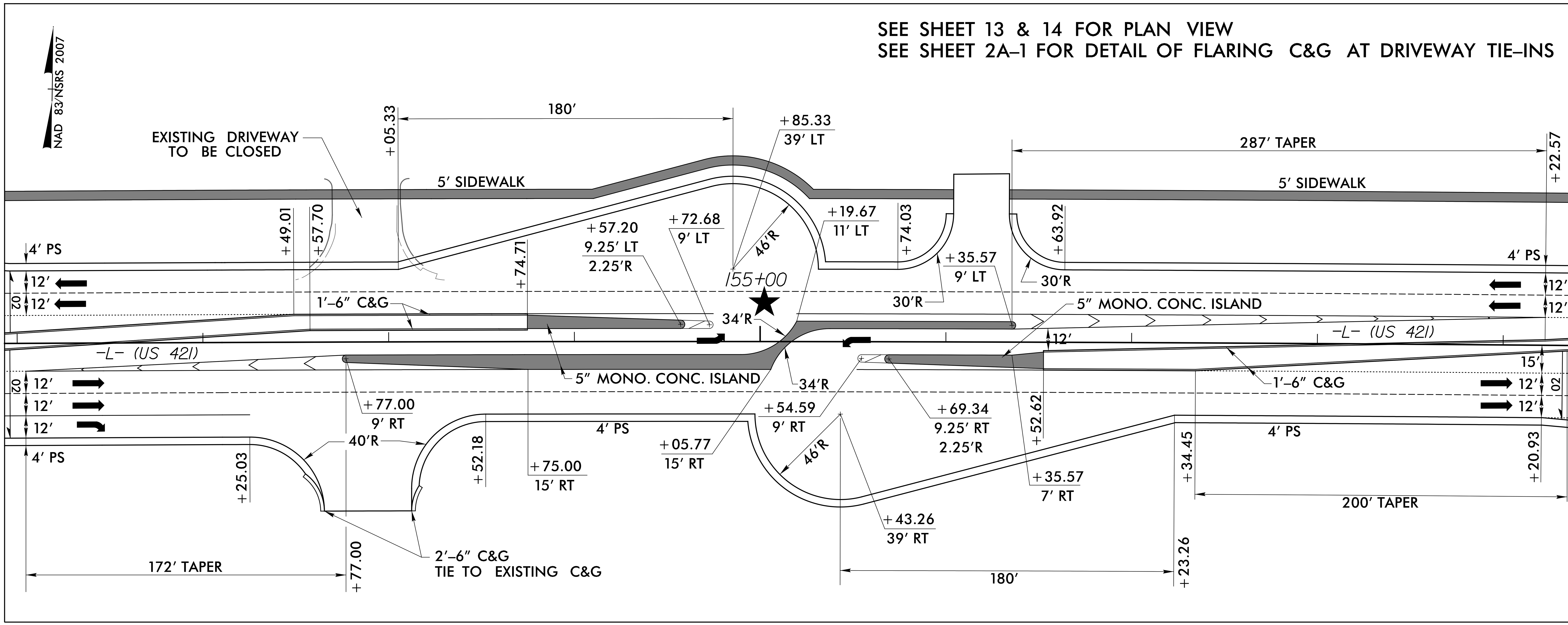
INTERSECTION DETAILS



★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 10

-L- STA. 151+00.00 TO 159+35.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

3/11/2023 U5312_rdy_det_2B-12.dgn

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VHB Engineering NC, P.C. (C-3705)
SUNGATE DESIGN GROUP, P.A.
PROJECT REFERENCE NO. U-5312
SHEET NO. 2B-13
ROADWAY DESIGN ENGINEER
SEAL 014493
7/12/2023
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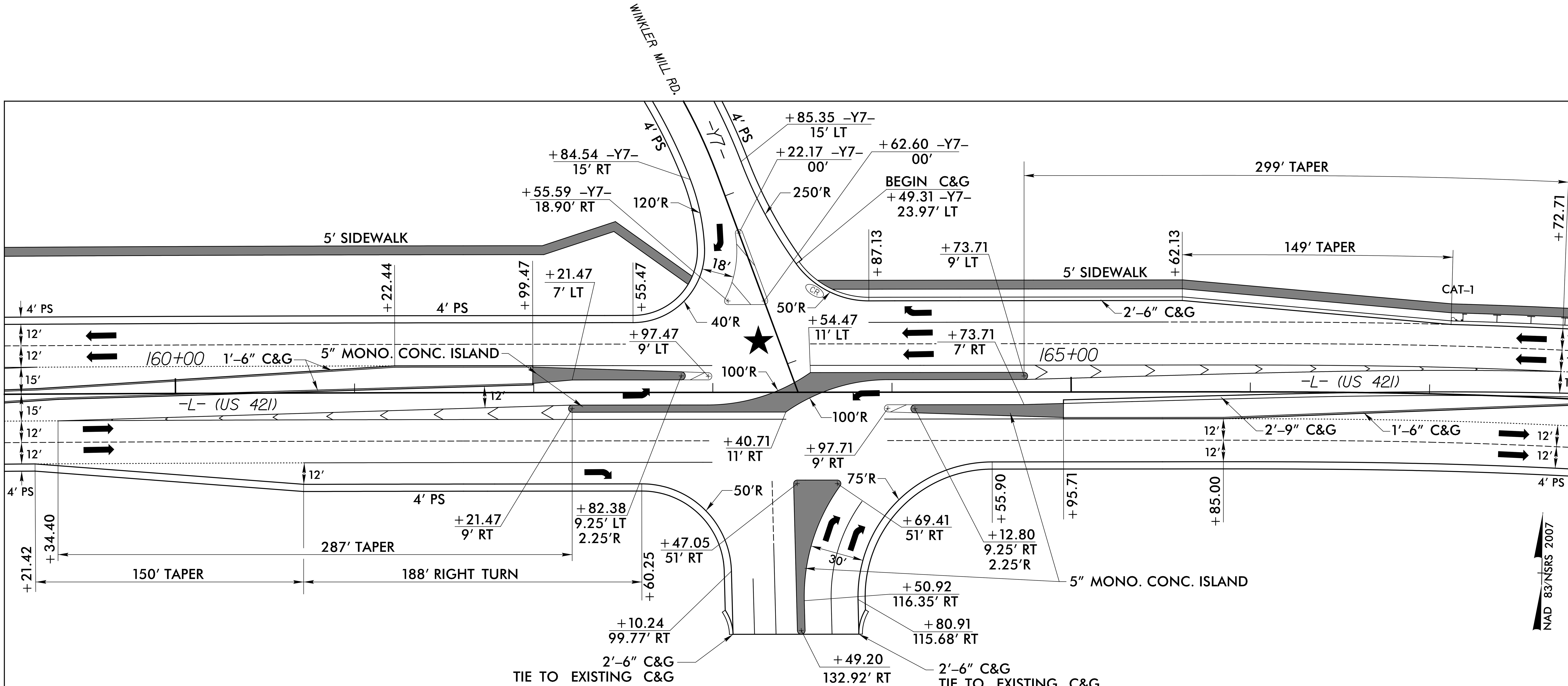
INTERSECTION DETAILS



SEE SHEET 14 FOR PLAN VIEW
SEE SHEET 14 FOR SUPERELEVATION
SEE PAVEMENT MARKING PLANS FOR CURB RAMP AND CROSSWALK LOCATIONS
SEE SHEET 2A-1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE-INS

★ DENOTES PROPOSED SIGNALIZED INTERSECTION

DETAIL 11

-L- STA. 159+20.00 TO 167+73.00

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

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PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-14

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SUNGATE DESIGN GROUP, P.A.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 014493 ENGINEER James Stafford Goodnight, Jr.

DocuSigned by: Jimmy Goodnight 7/12/2023

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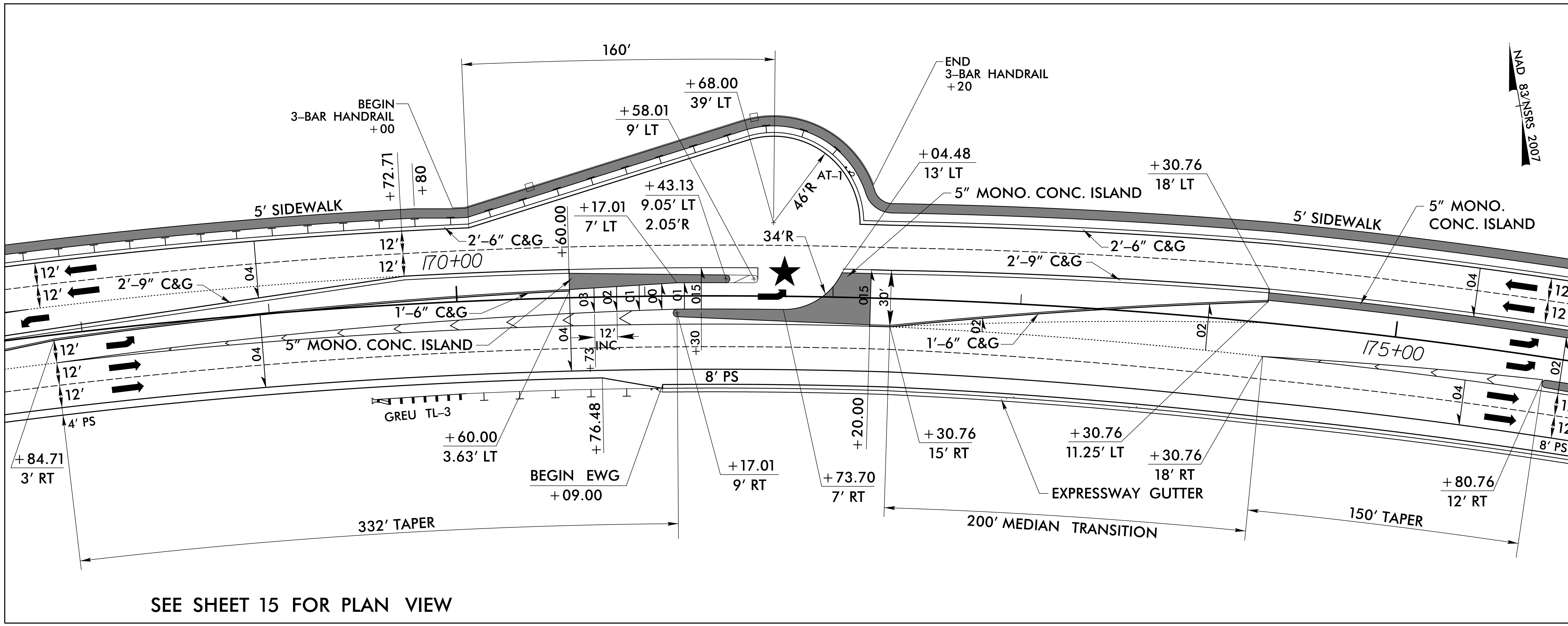
INTERSECTION DETAILS



DETAIL 12

–L– STA. 167+80.00 TO 175+90.00

★ DENOTES PROPOSED SIGNALIZED INTERSECTION

NOTES:

- ALL DIMENSIONS ARE BASED OFF OF –L– ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60 SCALE

5/14/99

3/11/2023 U5312_rdy_det_2B-14.dgn

Prepared by
VHB Engineering NC, P.C. (C-3705)
SUNGATE DESIGN GROUP, P.A.

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-15

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 014493 James Stafford Goodnight, Jr.
Jimmy Goodnight 7/12/2023

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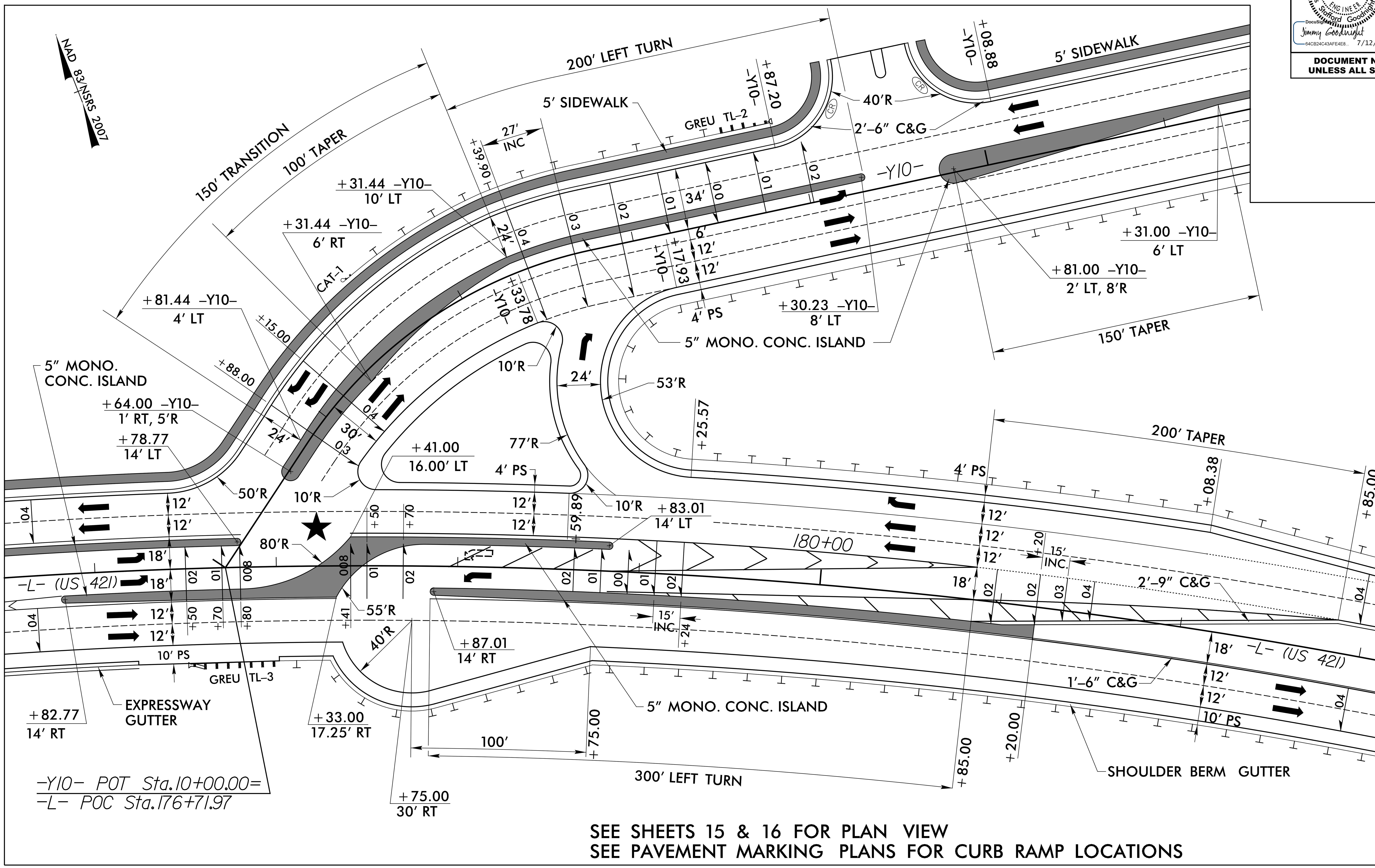
INTERSECTION DETAILS



DETAIL 13

-L- STA. 175+50.00 TO 183+00.00

★ DENOTES PROPOSED SIGNALIZED INTERSECTION

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF -L- ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

30 15 0 30 60
SCALE

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2B-16

ROADWAY DESIGN ENGINEER

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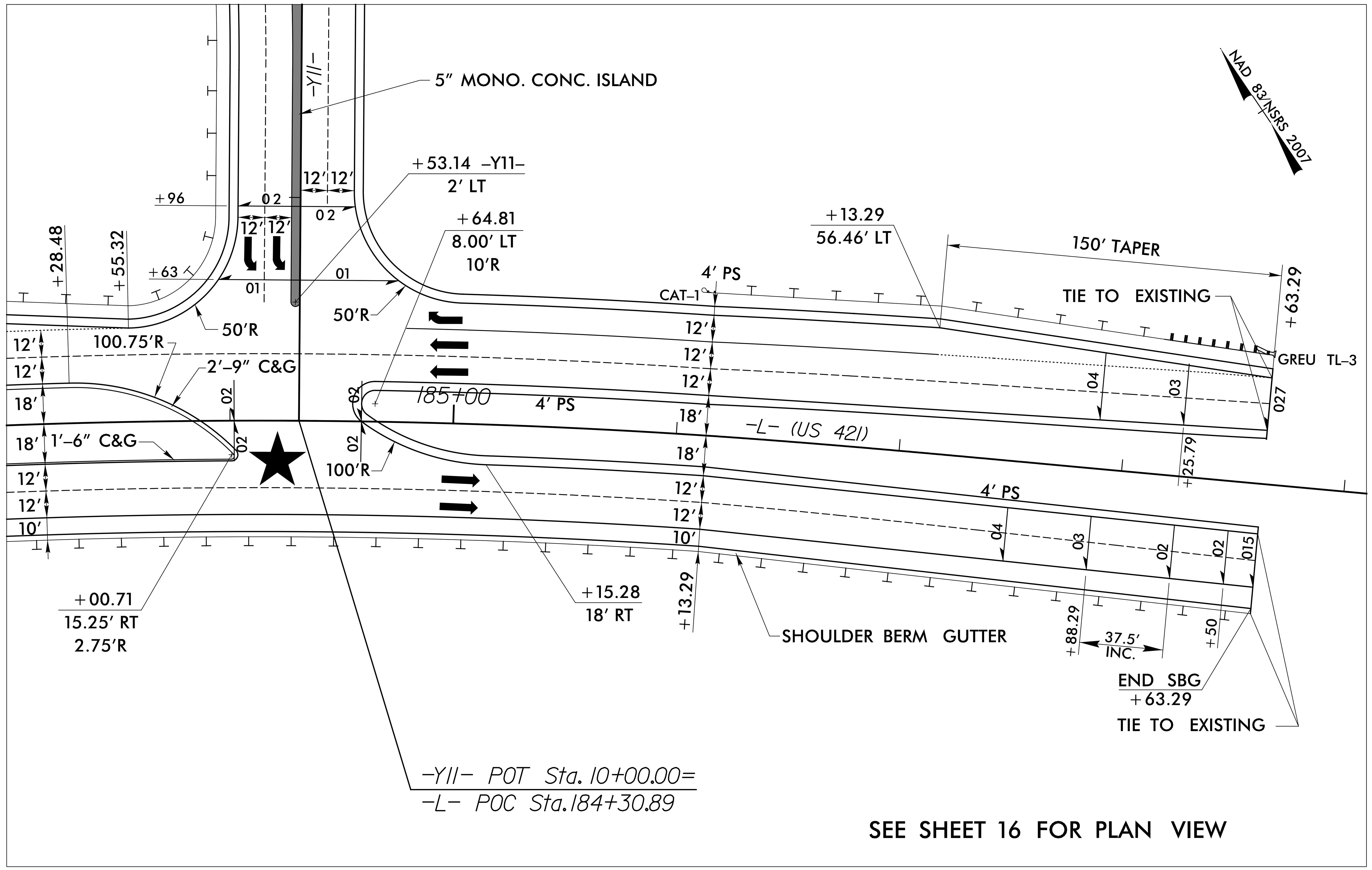
INTERSECTION DETAILS



DETAIL 14

–L– STA. 183+00.00 TO 189+00.00

★ DENOTES PROPOSED SIGNALIZED INTERSECTION

NOTES:
- ALL DIMENSIONS ARE BASED OFF OF –L– ALIGNMENT UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

Prepared by
VHB Engineering NC, P.C. (C-3705)
SUNGATE DESIGN GROUP, P.A.
PROJECT REFERENCE NO. U-5312
SHEET NO. 2B-17
ROADWAY DESIGN ENGINEER
SEAL 014493
7/12/2023
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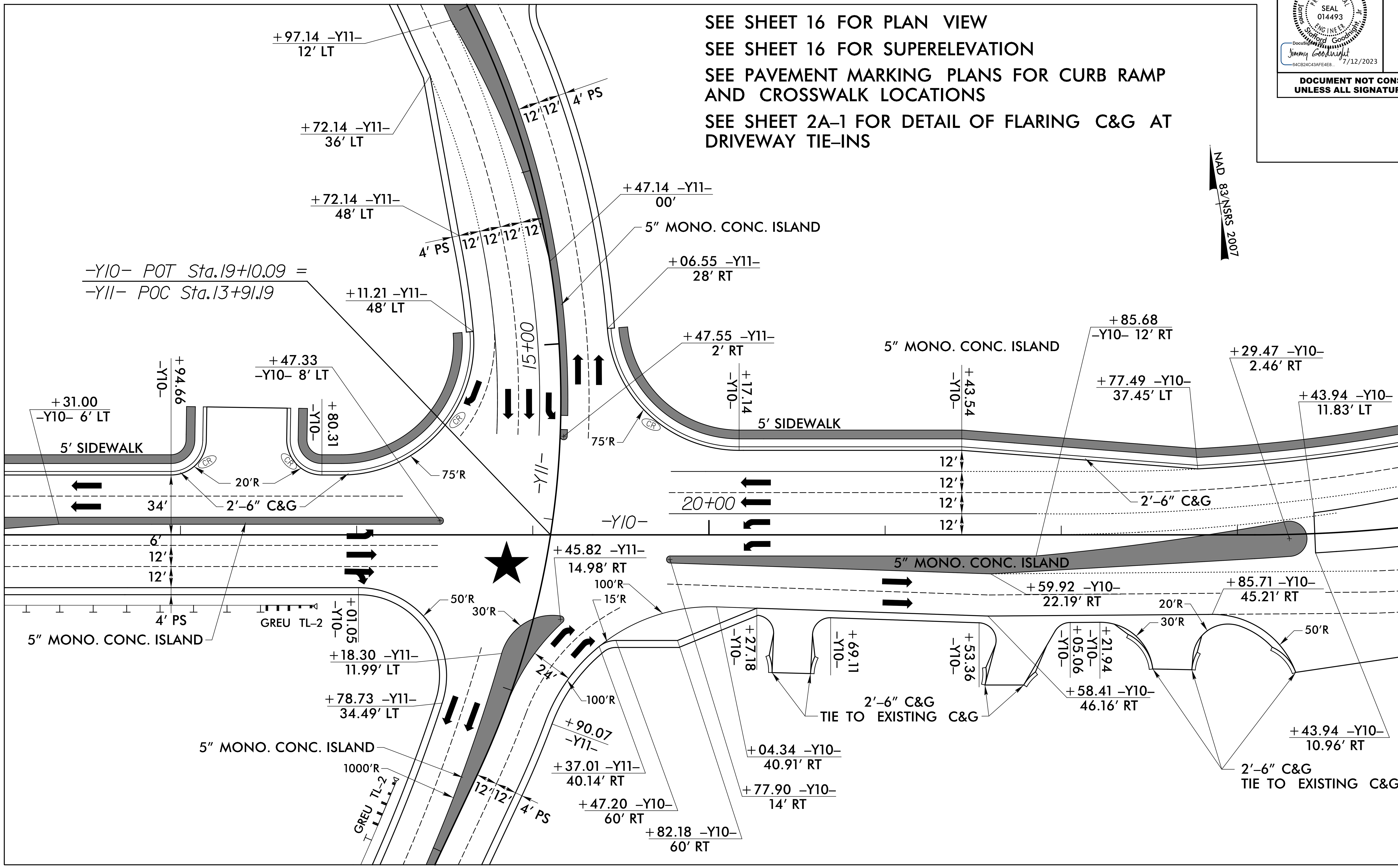
INTERSECTION DETAILS

SEE SHEET 16 FOR PLAN VIEW

SEE SHEET 16 FOR SUPERELEVATION

SEE PAVEMENT MARKING PLANS FOR CURB RAMP AND CROSSWALK LOCATIONS

SEE SHEET 2A-1 FOR DETAIL OF FLARING C&G AT DRIVEWAY TIE-INS



DETAIL 15

-Y10- STA. 16+00.00 TO 23+50.00

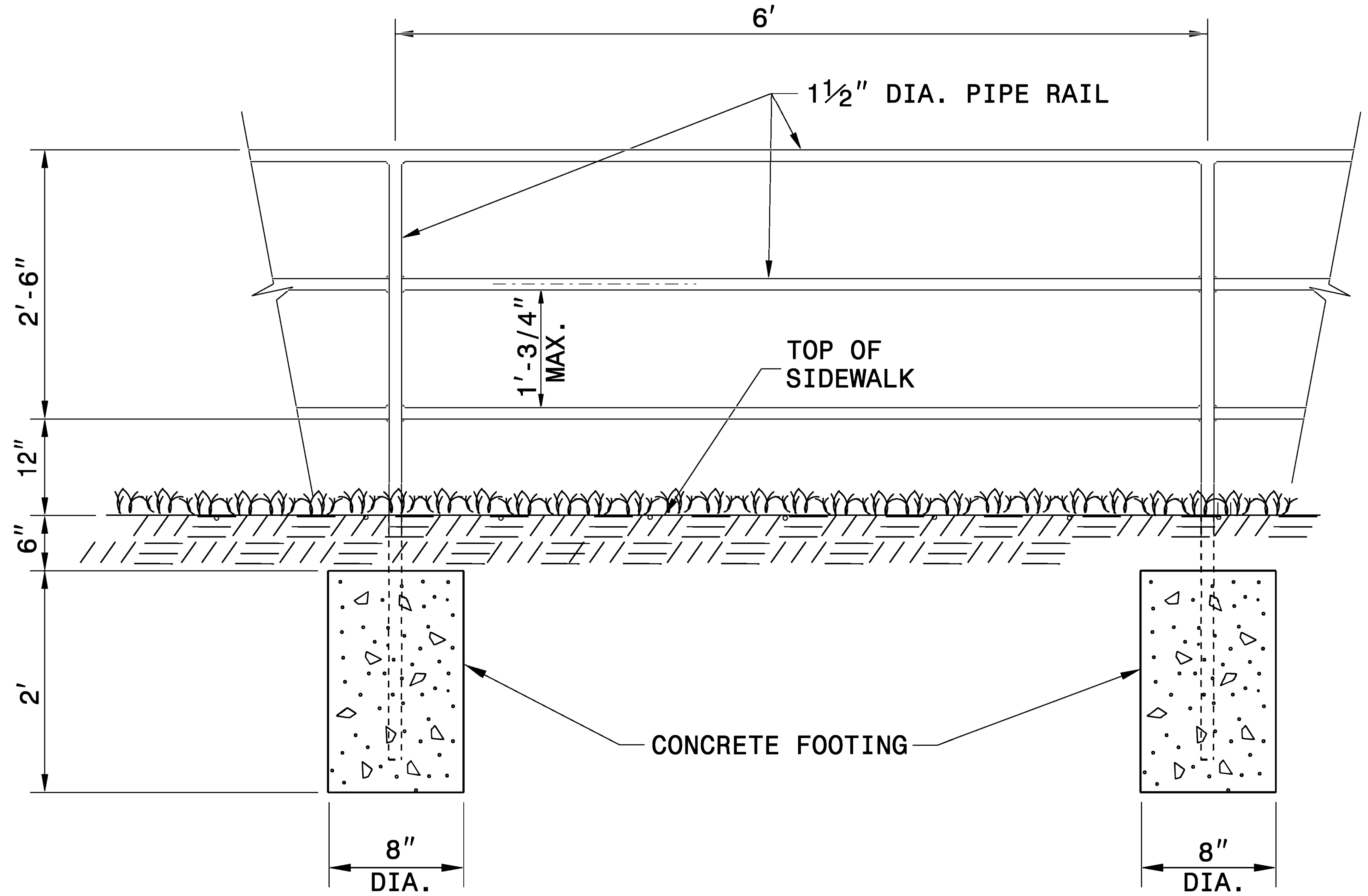
★ DENOTES PROPOSED SIGNALIZED INTERSECTION

NOTES:

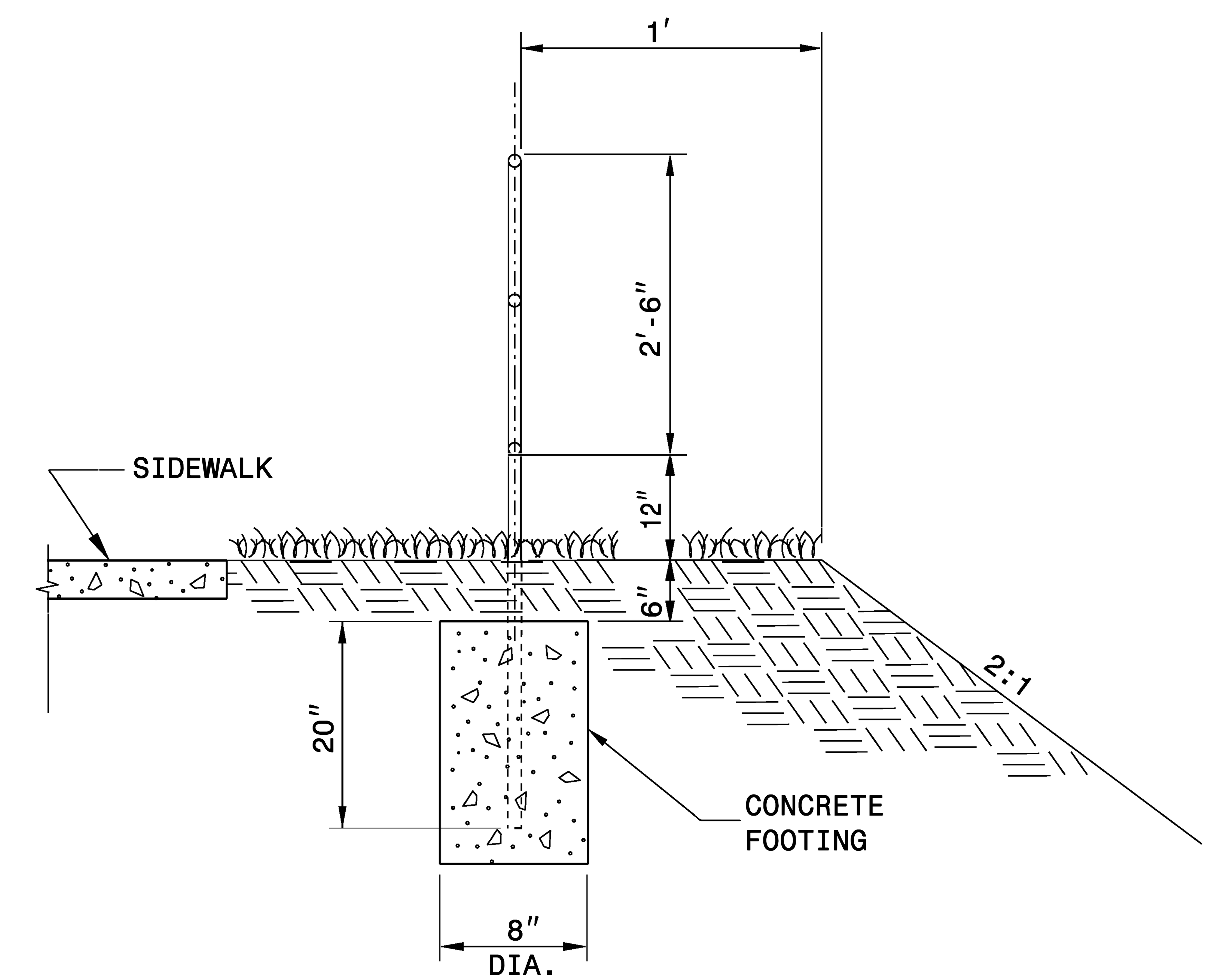
- 10' RADII FOR ALL DRIVEWAYS UNLESS OTHERWISE NOTED.
- 2' RADII FOR ALL CONCRETE ISLANDS UNLESS OTHERWISE NOTED.

SCALE 30 15 0 30 60

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-1



ELEVATION OF PROPOSED PEDESTRIAN HANDRAIL



SECTION VIEW

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 1072-20 OF THE STANDARD SPECIFICATIONS.

USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. HACKLER
7/12/2023

DocuSigned by: Nicole M. Hackler

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

PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY: E.E.WARD DATE: 12-99
MODIFIED BY: T.S.Spell DATE: 1-4-05
CHECKED BY: DATE:
FILE SPEC.: w:details/stand/metric/retainwall_handrails.dgn

29-MAR-2018 07:55
S:\Contracts\Contracts\Special Details\jhowerton\handrail.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-2
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STATE OF
NORTH CAROLINA
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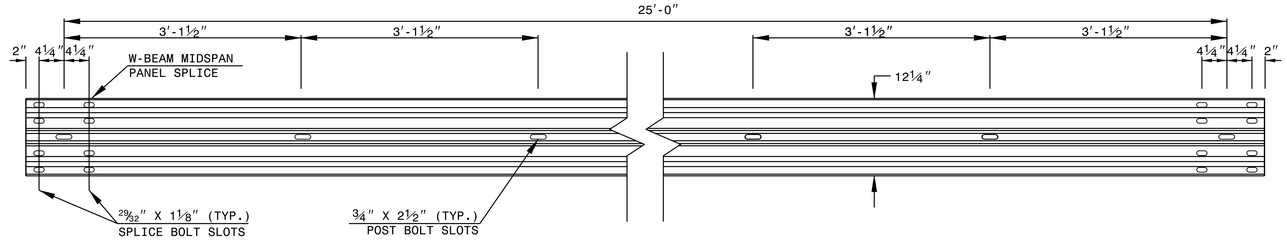
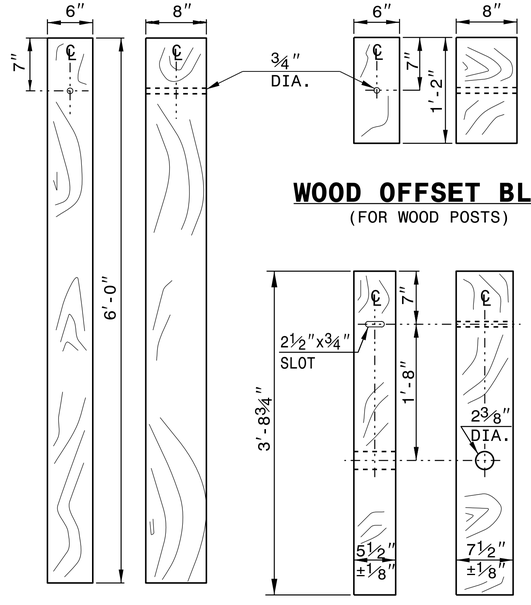
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



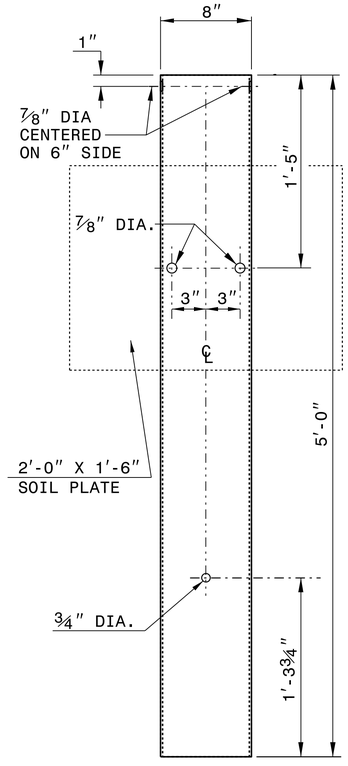
STANDARD W-BEAM GUARDRAIL



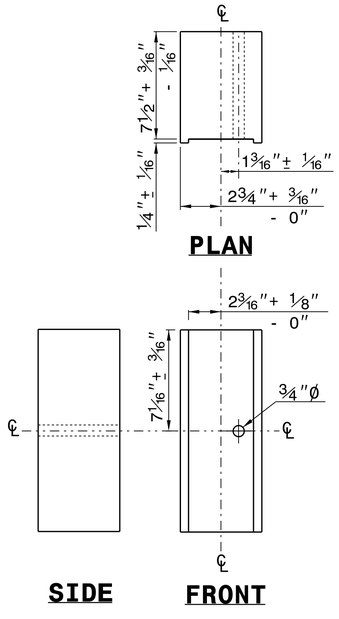
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



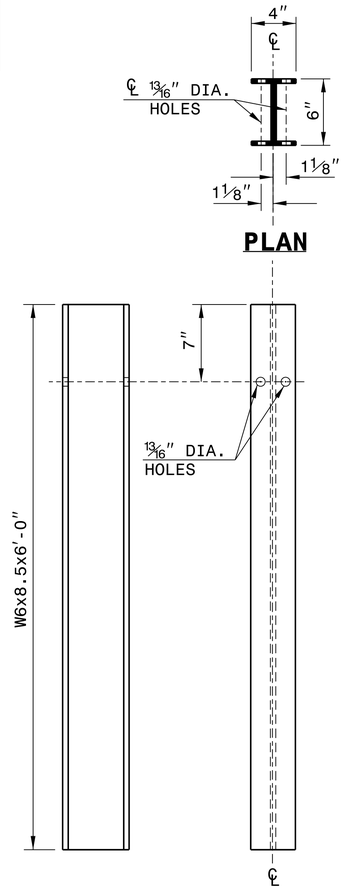
STEEL TUBE
TS 6"x8"x0.1875"



PLAN

SIDE **FRONT**

ROUTED OFFSET BLOCK



"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. HUCHLER
7/12/2023
DocuSigned by: Nicole M. Huchler 588432303416405...

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

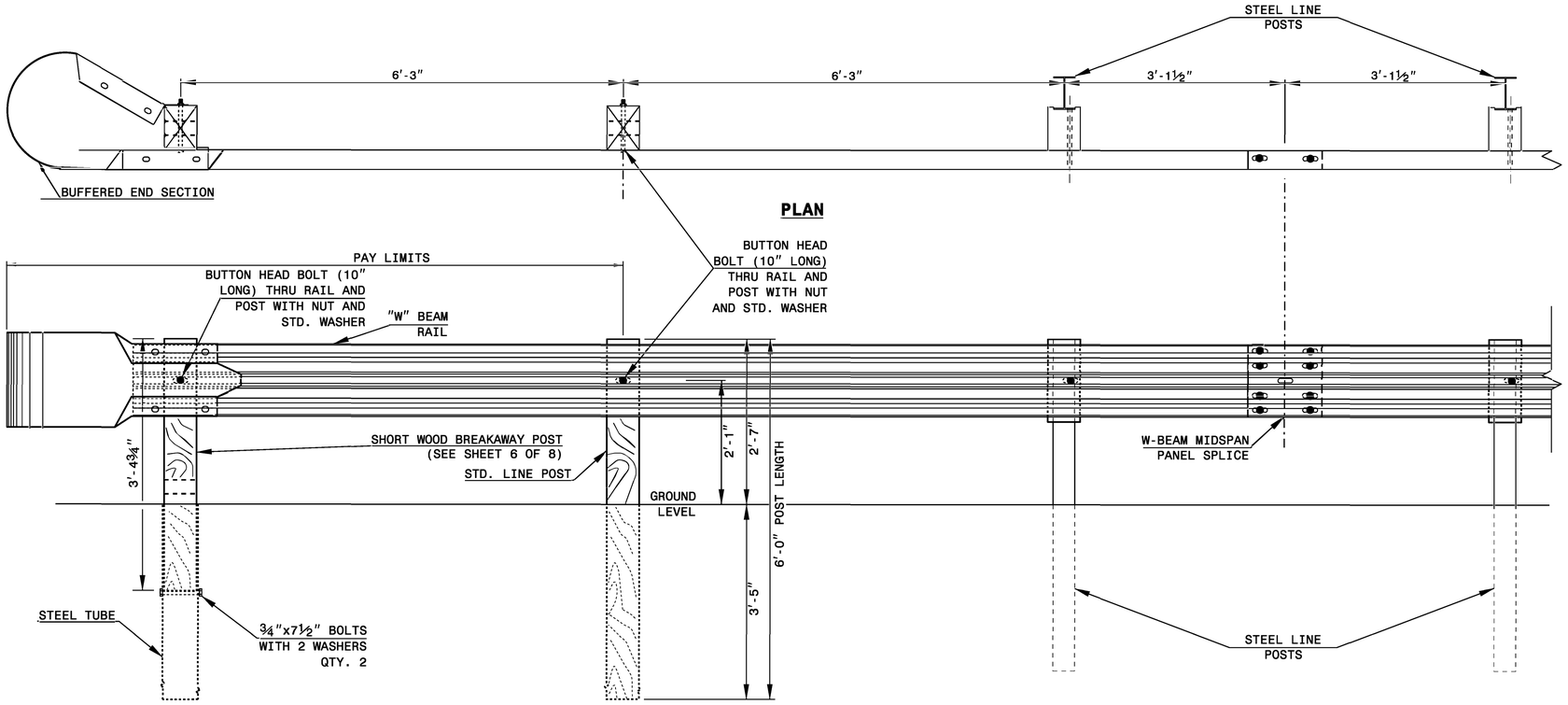
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-3

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



TRAILING END UNIT ASSEMBLY

A.T.-1 SYSTEM

SHEET OF

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M HACKLER
7/12/2023
DocuSigned by: Nicole M. Hackler
5884323D34164C5...

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

A.T.-1 SYSTEM

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CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-4

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

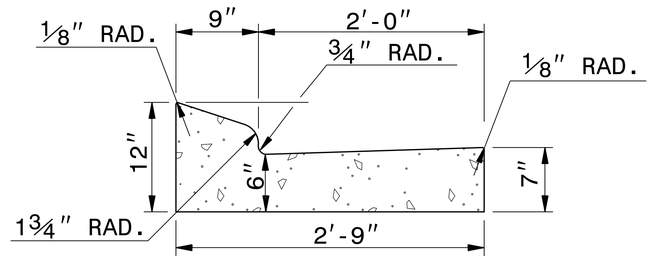
ENGLISH DETAIL DRAWING FOR

2′-9″ CONCRETE CURB & GUTTER

SHEET 1 OF 1

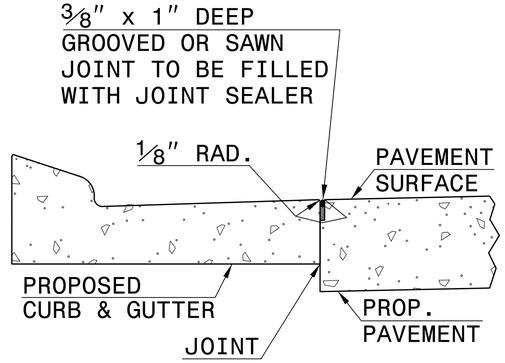
846D01

GENERAL NOTES:
- -PLACE CONTRACTION JOINTS AT 10′ INTERVALS, EXCEPT THAT A 15′ SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10′ INTERVALS.
- -JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- -CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. MAKE NON-TEMPLATE FORMED JOINTS A MIN. OF 1½″ DEEP.
- -FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
- -SPACE EXPANSION JOINTS AT 90′ INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.
- -SEE RDWY. STD. DWG. NO. 846.01, SHEET 2 OF 3 FOR PLACEMENT IN SUPERELEVATIONS. (USE 2′-6″ CURB AND GUTTER RATES)

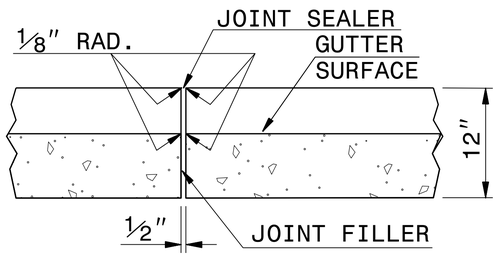


2′-9″ CURB AND GUTTER

SECTION VIEW OF CURB AND GUTTER



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

SECTION VIEW OF JOINTS

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

2′-9″ CONCRETE CURB & GUTTER

SHEET 1 OF 1

846D01

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jhowerton AT CSD-292595

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. HUCHLER
7/12/2023
DocuSigned by: Nicole M. Huchler
588432303416C5...

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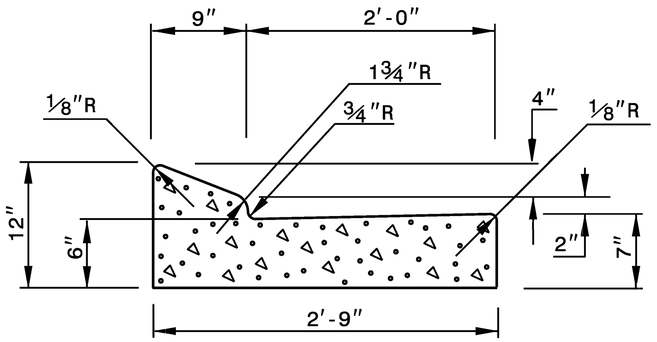
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

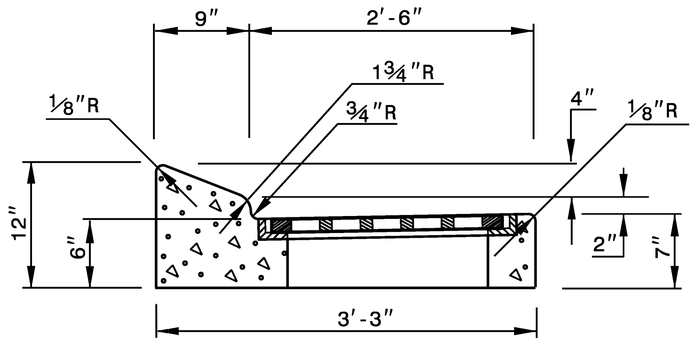
ORIGINAL BY: STD. 846.01 DATE:
MODIFIED BY: E.E. WARD DATE: 8-15-00
CHECKED BY: DATE:
FILE SPEC.: /usr/details/stand/c&g2'-9".dgn

5/14/99

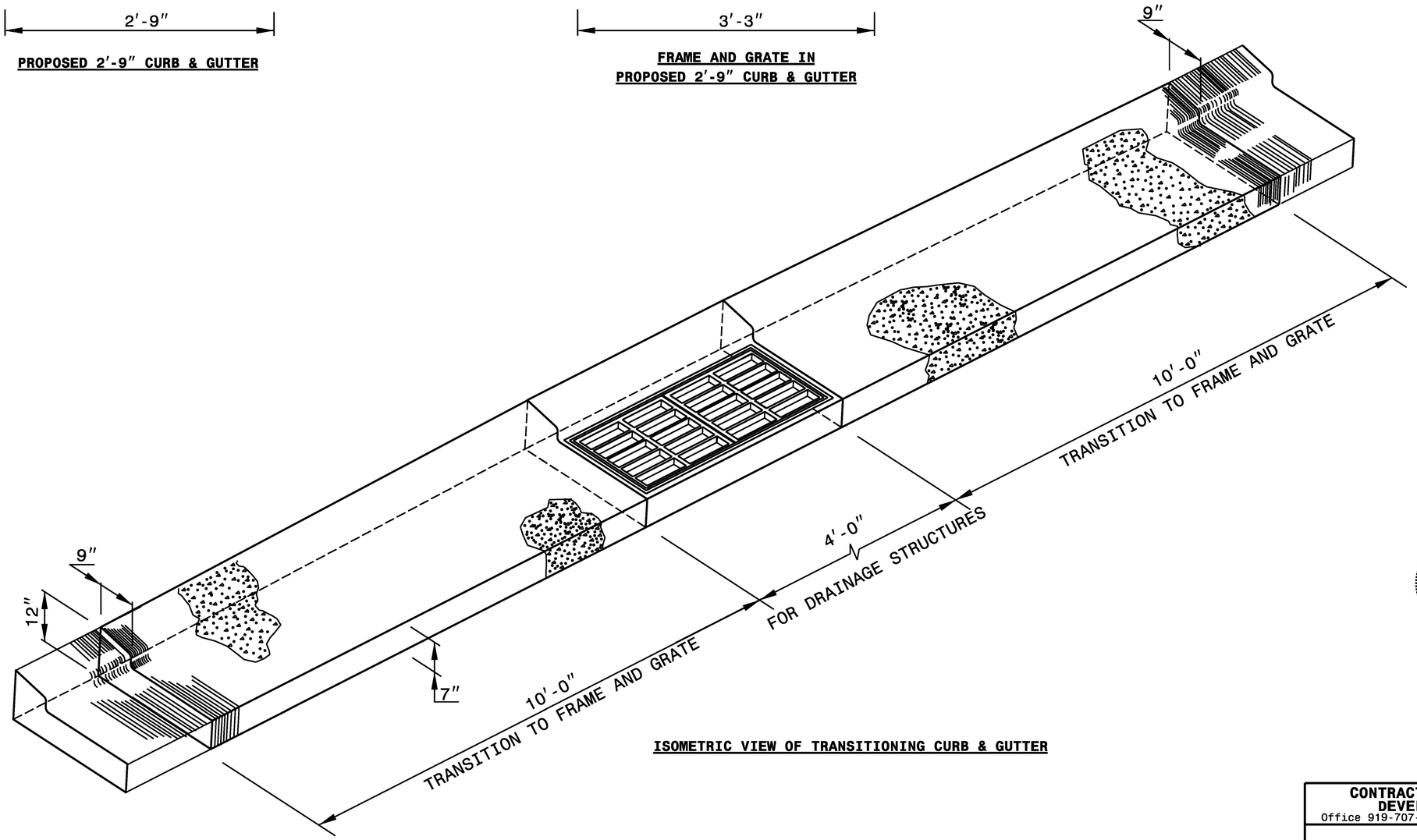
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-5



PROPOSED 2′-9″ CURB & GUTTER



FRAME AND GRATE IN PROPOSED 2′-9″ CURB & GUTTER



ISOMETRIC VIEW OF TRANSITIONING CURB & GUTTER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33144 NICOLE M. HYECHKA

7/12/2023

DocuSigned by:
Nicole M. Hyechka
5884323D34164C5...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DETAIL OF 2′-9″ TO FRAME AND GRATE

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: kkempf/english/curb gutter transition.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-6

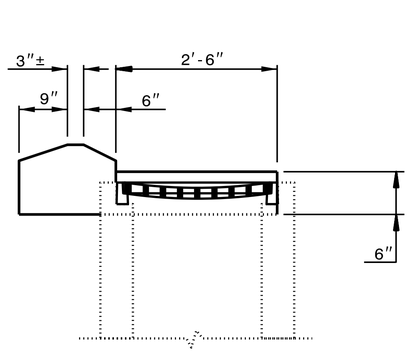
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

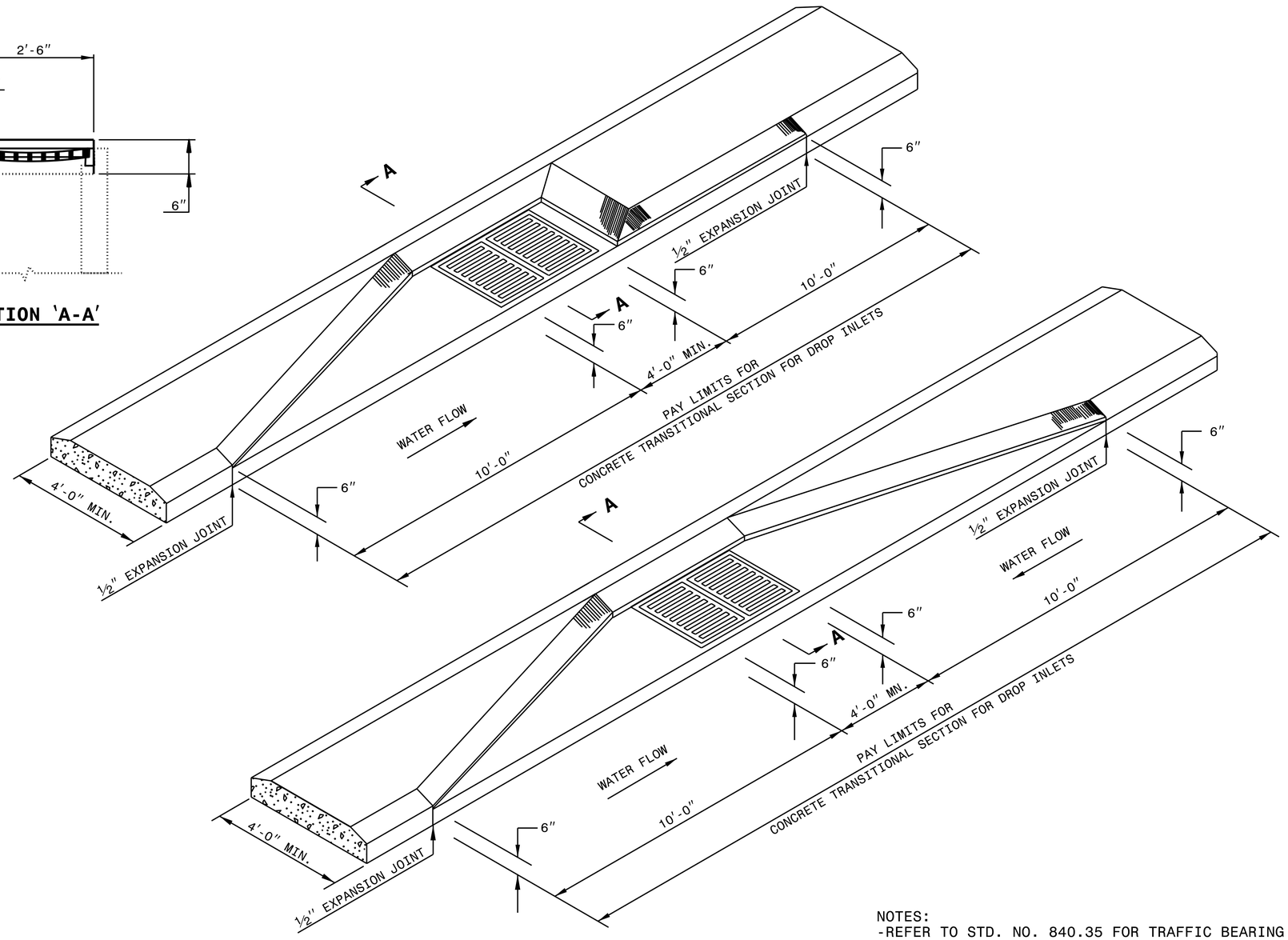
METHOD FOR PLACEMENT OF DROP INLETS IN CONCRETE ISLANDS

SHEET 1 OF 1

852D06



SECTION 'A-A'



NOTES:
-REFER TO STD. NO. 840.35 FOR TRAFFIC BEARING DRAINAGE STRUCTURE.
-REFER TO STD. NO. 840.20 or 840.29 FOR GRATE AND FRAME.

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

ENGLISH DETAIL DRAWING FOR

METHOD FOR PLACEMENT OF DROP INLETS IN CONCRETE ISLANDS

SHEET 1 OF 1

852D06

$$$$SYSTIME$$$$
$$$$USERNAME$$$$ $$$$DGN$$$$

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M HACKLER
7/12/2023
DocuSigned by: Nicole M. Hackler

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE PLATE

ORIGINAL BY: KKEMPF DATE: 8/2/10
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: KKEMPF\ENGLISH\852D0601.DGN

5/14/99

Prepared by
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

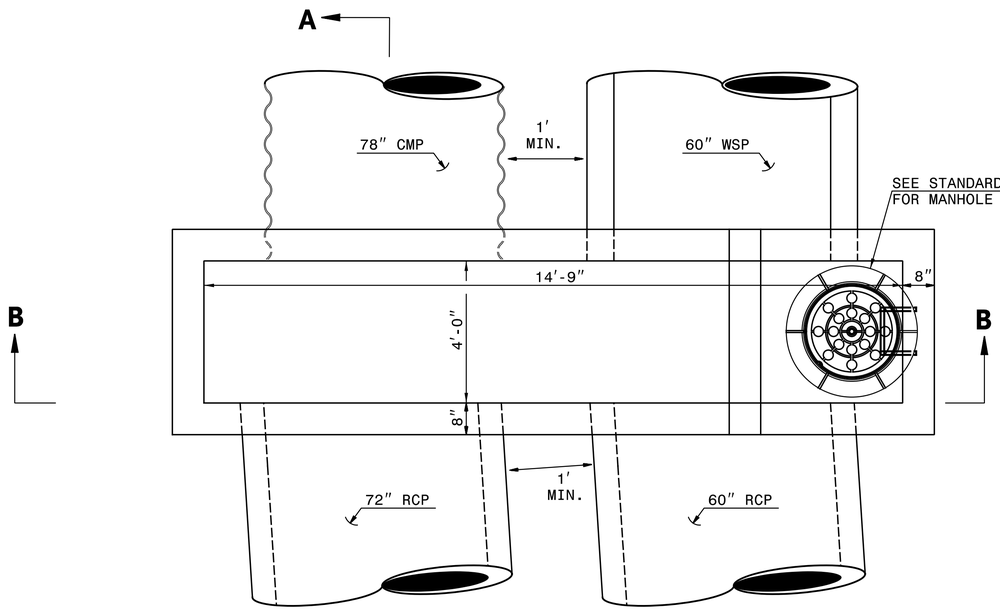
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-7

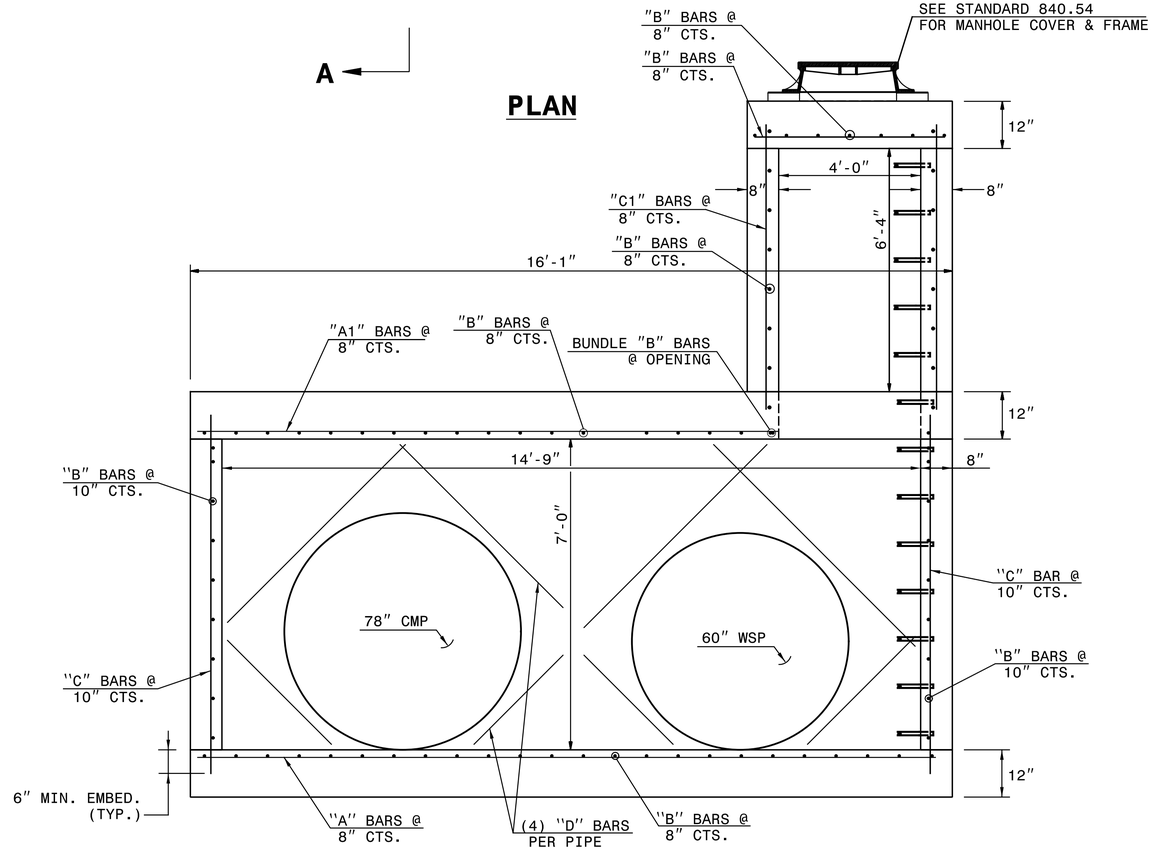
STRUCTURAL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052391 ENGINEER KYLE F. SMIACH

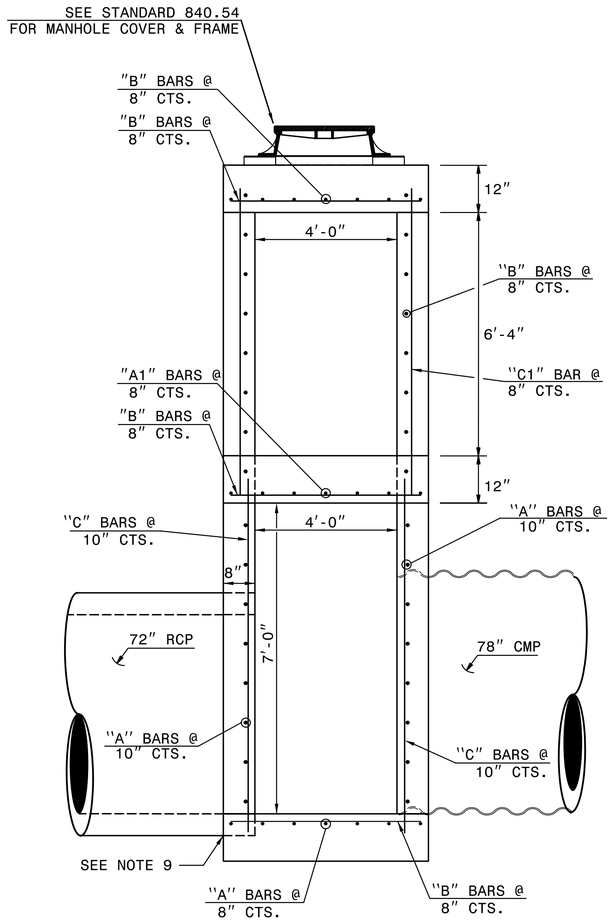
Kyle Smiach

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





SECTION B-B



SECTION A-A

GENERAL NOTES:

1. USE CLASS "B" CONCRETE THROUGHOUT.
2. CONSTRUCT CONCRETE BOX IN ACCORDANCE WITH SECTION 825 OF THE STANDARD SPECIFICATIONS.
3. USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
4. ADJUST LENGTH OF STEEL BARS AS NEEDED TO COMPENSATE FOR PIPES AND FRAME AND GRATE OPENINGS.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60.
6. CUT OR BEND STEEL BARS AS NEEDED TO PROVIDE 2″ CLEARANCE.
7. HEIGHT OF JUNCTION BOX MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.
8. PROVIDE ALL CATCH BASINS OVER 3′-6″ IN DEPTH WITH STEPS 12″ ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
9. IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
10. ALL REINFORCING SHALL HAVE 2″ MINIMUM COVER UNLESS OTHERWISE NOTED.
11. BUNDLE THE FIRST "C" BARS ON BOTH SIDES OF ANY PIPE OPENING.
12. SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-S-21A, AASHTO M-198, TYPE B - BUTYL RUBBER.

BILL OF MATERIALS

BAR	QTY	SIZE	LENGTH	WEIGHT
A	27	#5	15′-9″	444
B	119	#5	5′-0″	621
C	58	#5	8′-0″	484
A1	9	#5	11′-1″	105
C1	28	#5	7′-4″	215
TOTAL REINF. STEEL (lbs.)				1970
TOTAL CONC. CU. YDS.				16.6

NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES.

NOTE: MANHOLE RISER NOT IN THIS SECTION BUT SHOWN FOR INFORMATION PURPOSES.

STRUCTURE #735
NOT TO SCALE

3/21/2023
U-5312_Hyd_JBs.dgn
ksmiach

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-8

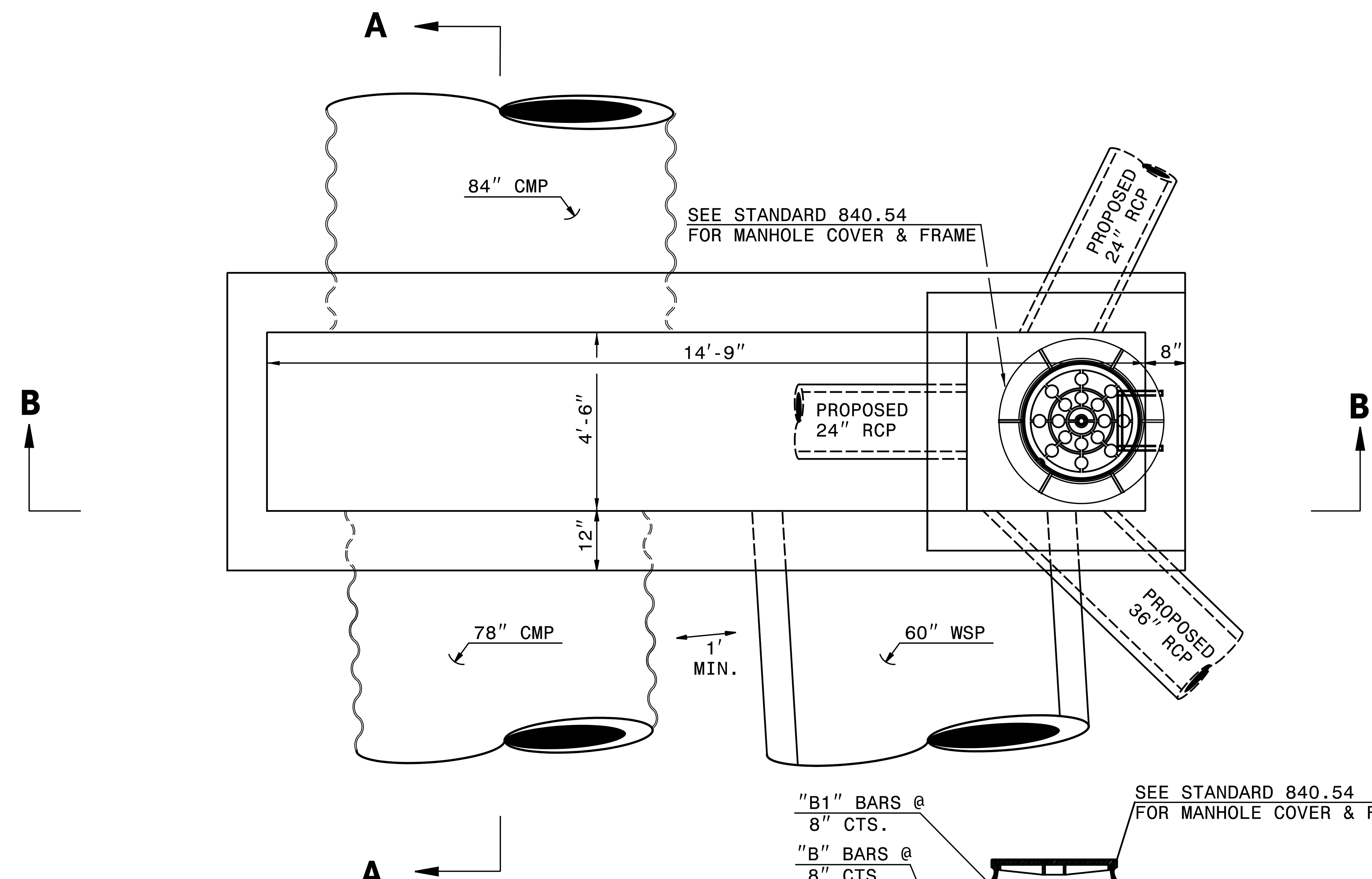
Prepared by vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

STRUCTURAL DESIGN ENGINEER

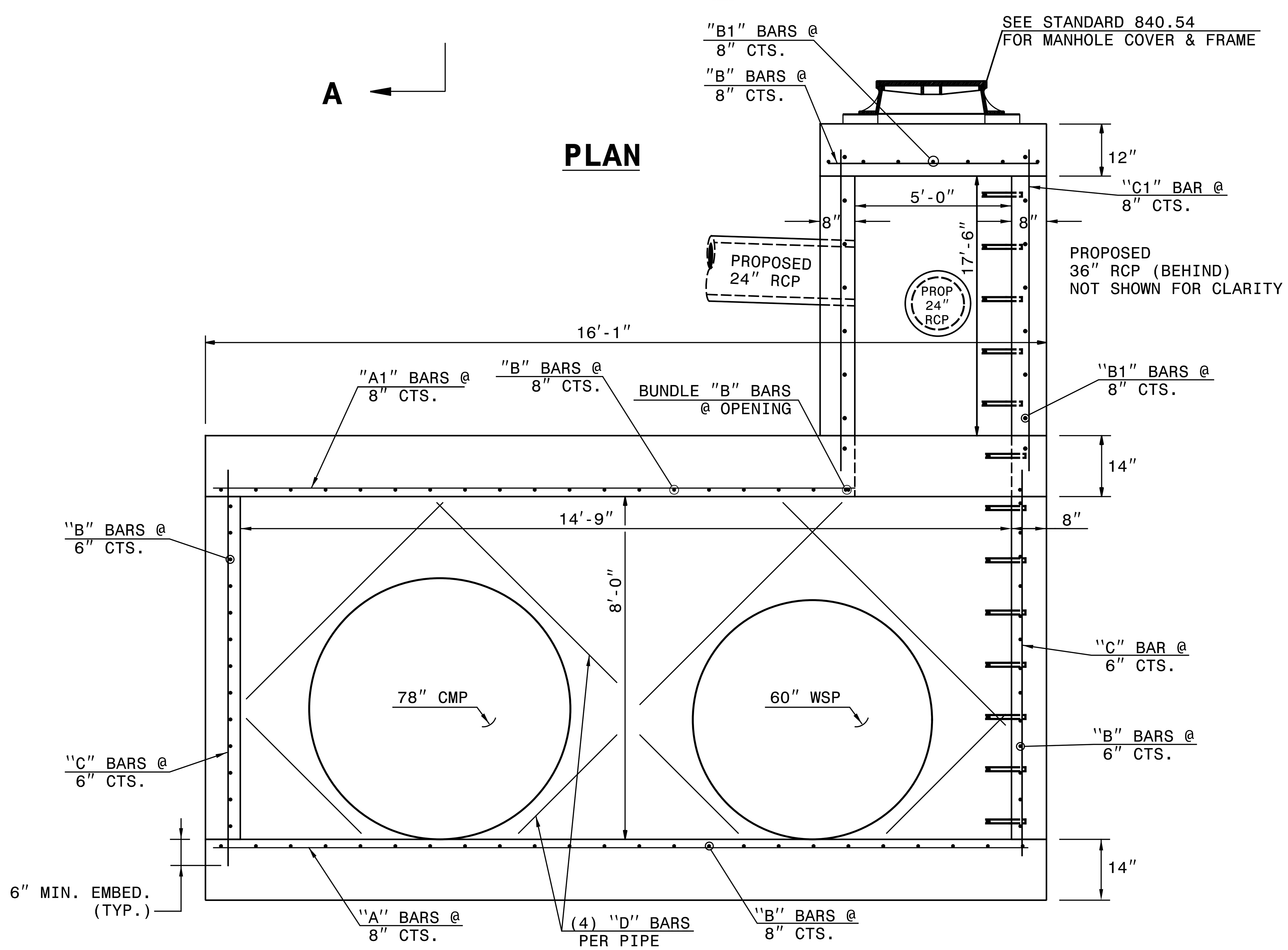
NORTH CAROLINA PROFESSIONAL SEAL 052391 ENGINEER KYLE F. SMIACH

Kyle Smiach

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



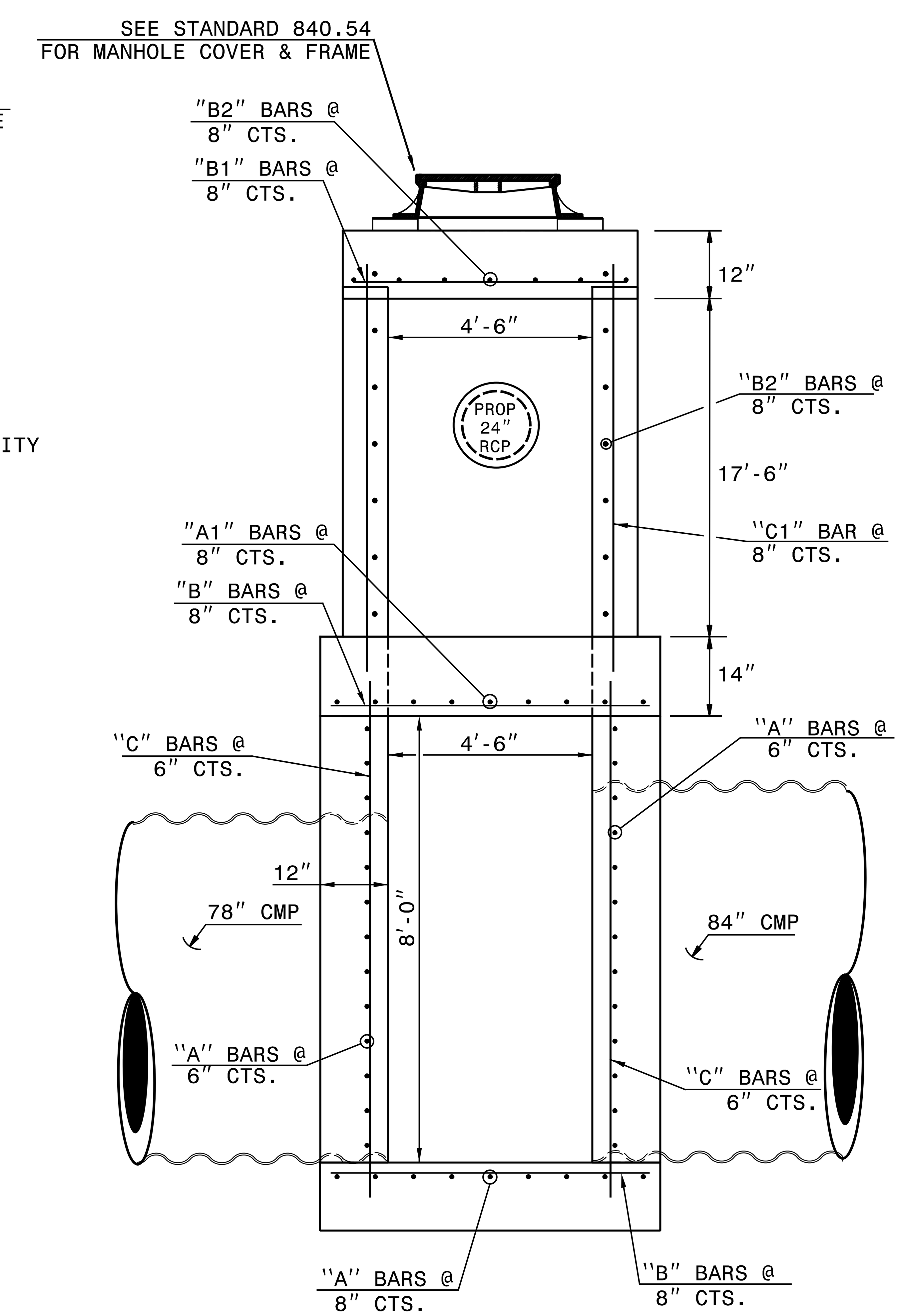
PLAN



SECTION B-B

GENERAL NOTES:

1. USE CLASS "AA" CONCRETE THROUGHOUT.
2. CONSTRUCT CONCRETE BOX IN ACCORDANCE WITH SECTION 825 OF THE STANDARD SPECIFICATIONS.
3. USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
4. ADJUST LENGTH OF STEEL BARS AS NEEDED TO COMPENSATE FOR PIPES AND FRAME AND GRATE OPENINGS.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60.
6. CUT OR BEND STEEL BARS AS NEEDED TO PROVIDE 2" CLEARANCE.
7. HEIGHT OF JUNCTION BOX MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.
8. PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
9. IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
10. ALL REINFORCING SHALL HAVE 2" MINIMUM COVER UNLESS OTHERWISE NOTED.
11. BUNDLE THE FIRST "C" BARS ON BOTH SIDES OF ANY PIPE OPENING.
12. SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-S-21A, AASHTO M-198, TYPE B - BUTYL RUBBER.



SECTION A-A

BILL OF MATERIALS

BAR	QTY	SIZE	LENGTH	WEIGHT
A	39	#5	15'-9"	641
B	72	#5	6'-2"	464
C	90	#6	9'-0"	1217
D	12	#5	6'-0"	76
A1	9	#5	10'-3"	97
B1	63	#5	5'-6"	362
B2	62	#5	6'-0"	388
C1	34	#5	18'-6"	657
TOTAL REINF. STEEL (lbs.)				3902
TOTAL CONC. CU. YDS.				30.1

NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES.

NOTE: MANHOLE RISER NOT IN THIS SECTION BUT SHOWN FOR INFORMATION PURPOSES.

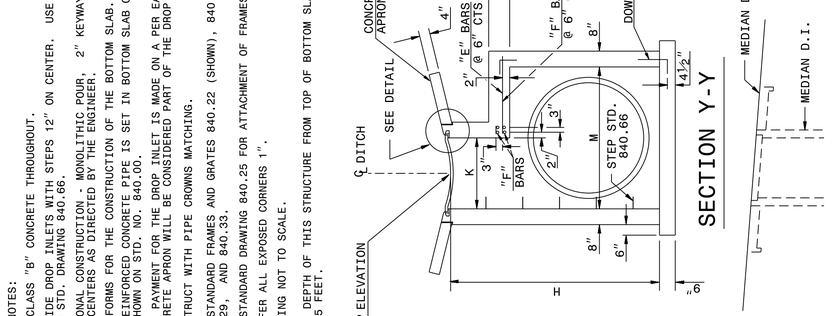
STRUCTURE #739
NOT TO SCALE

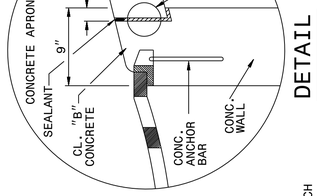
5/14/99

3/21/2023 U-5312_Hyd_JBs.dgn ksmiach

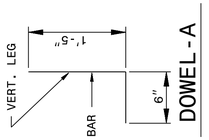
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-9

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE DROP INLETS WITH STEPS 12″ ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2″ KEYWAY, OR #4 BAR DOWELS AT 12″ CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
WHEN PAYMENT FOR THE DROP INLET IS MADE ON A PER EACH BASIS, THE CONCRETE APRON WILL BE CONSIDERED PART OF THE DROP INLET.
CONSTRUCT WITH PIPE CROWNS MATCHING.
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24(SHOWN), 840.20, 840.29, AND 840.33.
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES NOT SHOWN.
CHAMFER ALL EXPOSED CORNERS 1″.
DRAWING NOT TO SCALE.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 25 FEET.

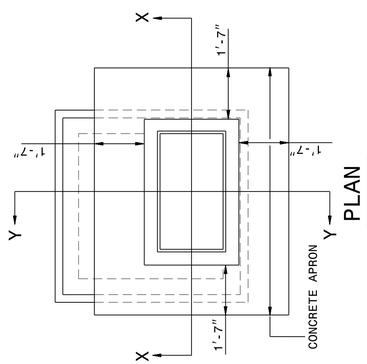


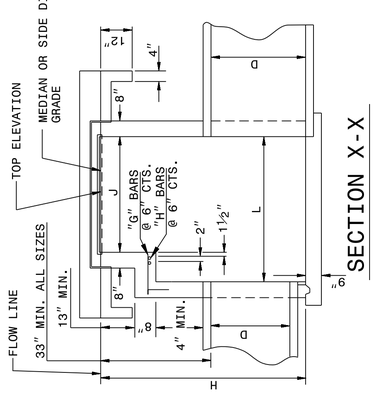


DETAIL
(APRON SUPPORT NOTCH)



DOWEL-A





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

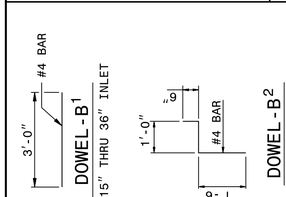
ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12′ TO 25′
12″ THRU 72″ PIPE

SHEET 1 OF 2 **840D17**

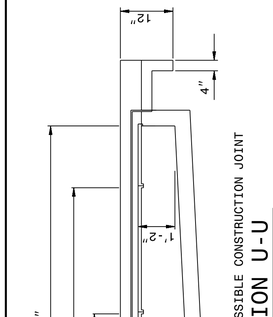
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

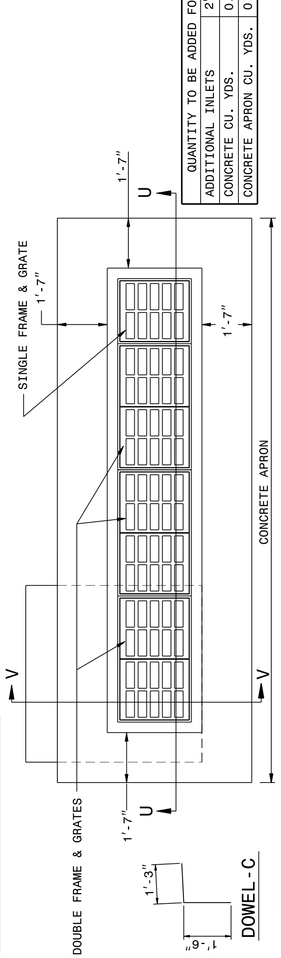
ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12′ TO 25′
12″ THRU 72″ PIPE

SHEET 2 OF 2 **840D17**



QUANTITY TO BE ADDED FOR EACH 2′ INCREMENT INLET OPENING				
ADDITIONAL INLETS	2′-0″	4′-0″	6′-0″	8′-0″	10′-0″	12′-0″
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444





MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX AND PIPE						REINFORCING STEEL - NO. 4 BARS									CU YDS CONC. IN BOX			DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	SPAN	WIDTH	HEIGHT	BARS E		BARS F		BARS G		BARS H		TOTAL LBS.	BOTTOM SLAB	H TOTAL	H PER FT HT	APRON	TOTAL	C.S.	R.C.
	J	K	L	M	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH								
D	3′-8″	2′-0″	3′-8″	2′-0″	3′-9″	—	—	—	—	—	—	—	—	—	0.362	0.926	0.247	0.395	1.683	0.015	0.024
12″	3′-8″	2′-0″	3′-8″	2′-0″	4′-0″	—	—	—	—	—	—	—	—	—	0.362	0.988	0.247	0.395	1.745	0.023	0.036
15″	3′-8″	2′-0″	3′-8″	2′-0″	4′-3″	—	—	—	—	—	—	—	—	—	0.362	1.050	0.247		1.807	0.033	0.049
18″						8	1′-5″	6	4′-9″	—	—	—	—	27	0.444	1.362	0.278		2.201	0.059	0.085
24″				2′-10″	4′-9″	8	2′-0″	7	4′-9″	—	—	—	—	33	0.502	1.644	0.288		2.541	0.092	0.127
30″			3′-8″	3′-5″	5′-3″	8	2′-5″	8	4′-11″	4	0′-9″	2	4′-11″	47	0.560	1.931	0.321		2.920	0.132	0.178
36″			4′-0″	4′-0″	5′-9″	9	3′-1″	9	5′-7″	1	1′-5″	3	5′-7″	67	0.704	2.500	0.370		3.677	0.180	0.243
42″			4′-10″	4′-10″	6′-3″	10	3′-7″	10	6′-1″	4	1′-11″	4	6′-1″	87	0.823	3.013	0.407		4.315	0.235	0.317
48″			5′-4″	5′-4″	6′-9″	11	4′-1″	11	6′-7″	5	2′-5″	5	6′-7″	107	0.951	3.589	0.444		5.072	0.297	0.401
54″			6′-0″	6′-0″	7′-3″	12	4′-9″	12	7′-3″	6	3′-1″	6	7′-3″	135	1.311	4.539	0.494		6.170	0.367	0.495
60″			6′-6″	6′-6″	7′-9″	13	4′-9″	12	7′-3″	6	3′-7″	7	7′-10″	168	1.136	5.061	0.537		6.901	0.444	0.599
66″			7′-2″	7′-2″	8′-3″	14	5′-4″	14	7′-10″	4	4′-3″	8	8′-5″	199	1.500	5.860	0.580	0.395	7.868	0.528	0.713
72″	3′-8″	2′-0″	7′-8″	7′-8″	8′-9″	15	5′-11″	15	8′-5″	4	4′-3″	8	8′-5″								

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

ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12′ TO 25′
12″ THRU 72″ PIPE

SHEET 2 OF 2 **840D17**

SEAL 33144 NORTH CAROLINA PROFESSIONAL ENGINEER NICOLE M. HUCKLER
7/12/2023
DocuSigned by: Nicole M. Huckler 5884320304164C5...
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD.840.17 DATE:
MODIFIED BY: K.A. KEMPF DATE: 07-06-09
CHECKED BY: DATE:
FILE SPEC.: /stand/840d17 Extra Depth 2GI.dgn

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jhowerton AT CSD-292595

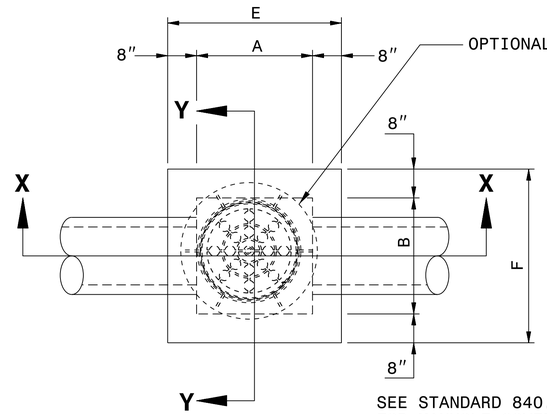
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-10

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

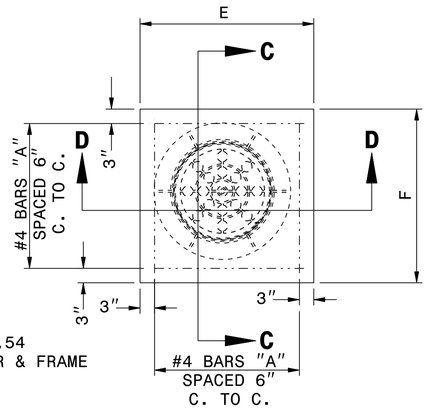
ROADWAY DETAIL DRAWING FOR
CONCRETE JUNCTION BOX
(WITH OPTIONAL MANHOLE)
UP TO 30′ OF FILL

SHEET 1 OF 1

840D31



PLAN



GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1″.

USE CLASS "B" CONCRETE THROUGHOUT.

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

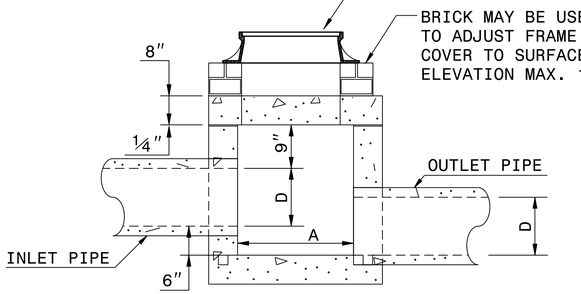
USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

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

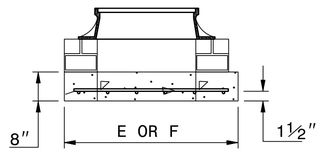
PROVIDE ALL JUNCTION BOXES OVER 3′-6″ IN DEPTH WITH STEPS 12″ ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.

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

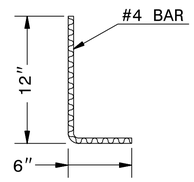
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 25 FEET.



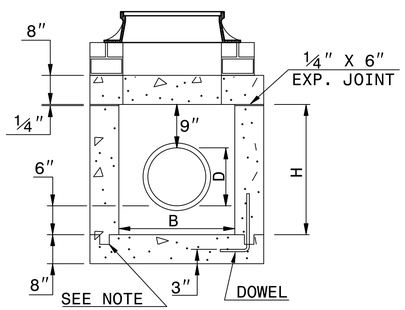
SECTION X-X



SECTION C-C OR D-D



DOWEL



SECTION Y-Y

DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

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

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

ROADWAY DETAIL DRAWING FOR
CONCRETE JUNCTION BOX
(WITH OPTIONAL MANHOLE)
UP TO 30′ OF FILL

SHEET 1 OF 1

840D31

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. HACKLER

7/12/2023

Digitally signed by: Nicole M. Hackler
5884323034164C8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE PLATE FOR TITLE

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

30-DEC-2019 09:00
S:\Contracts\Contracts\Special Details\jhowerton\840d31 Special JB up to 30ft of Fill.dgn
jhowerton AT CSD-320965

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-11

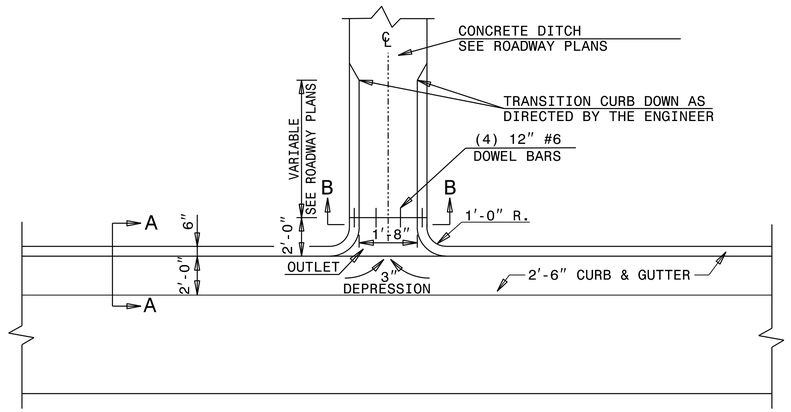
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

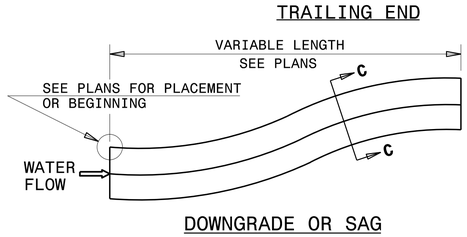
DRAINAGE INSTALLATION IN 2′-6″ CURB AND GUTTER

SHEET 1 OF 1

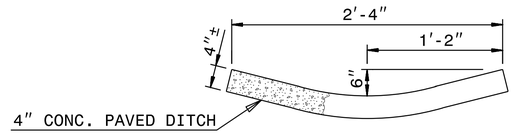
C&GDTCH



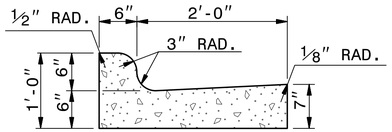
PLAN VIEW



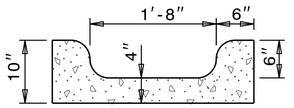
DOWNGRADE OR SAG



SECTION C-C



2′-6″ CURB AND GUTTER
SECTION A-A



SECTION B-B

NOTES:

- CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
- CONCRETE DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18″ PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
- MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

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

ENGLISH DETAIL DRAWING FOR

DRAINAGE INSTALLATION IN 2′-6″ CURB AND GUTTER

SHEET 1 OF 1

C&GDTCH

7/12/2023

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER

DocuSigned by:
Nicole M. Hechler
58843230341640...

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

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. Ward DATE: 3-12-02
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: w:details\stand\modifiedflume.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-12

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

ROADWAY DETAIL DRAWING FOR

ROCK PLATING

SHEET 1 OF 1

275D01

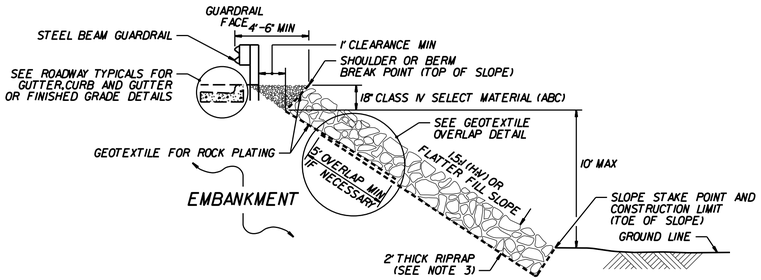
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR

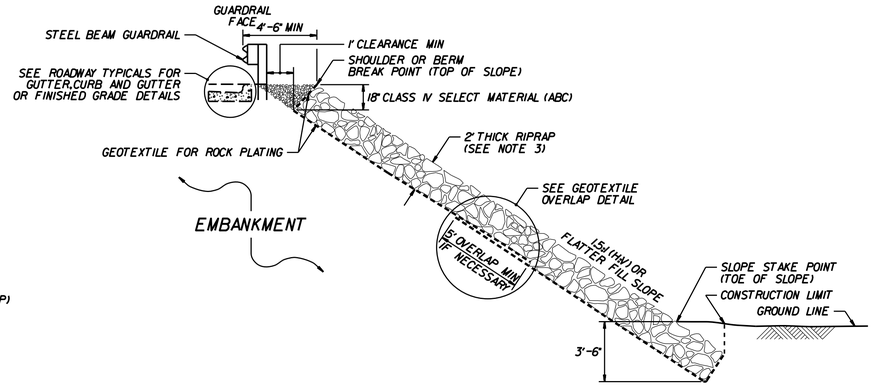
ROCK PLATING

SHEET 1 OF 1

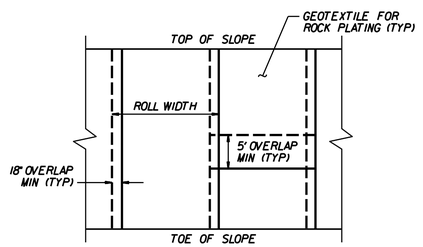
275D01



ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION

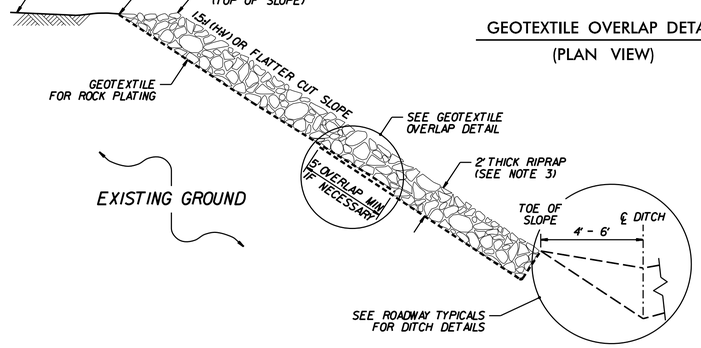


ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION

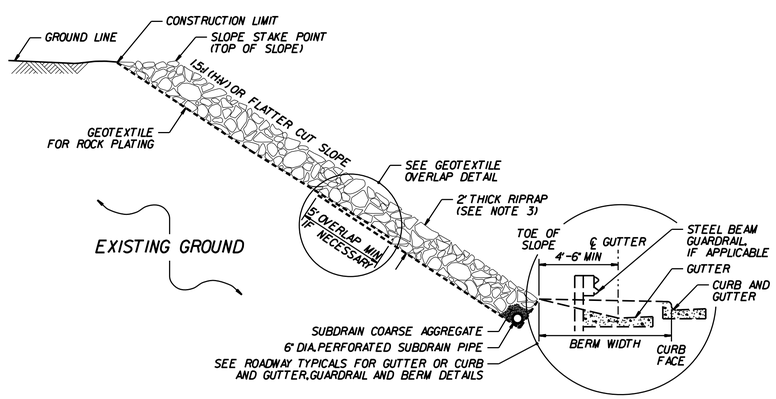


GEOTEXTILE OVERLAP DETAIL

(PLAN VIEW)



ROCK PLATING DETAIL NO. 3 – TYPICAL SECTION



ROCK PLATING DETAIL NO. 4 – TYPICAL SECTION

NOTES:

1. SEE ROADWAY PLANS AND SUMMARY SHEETS FOR ROCK PLATING LOCATIONS.
2. FOR ROCK PLATING,SEE SECTION 275 OF THE STANDARD SPECIFICATIONS.
3. USE CLASS 1,2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

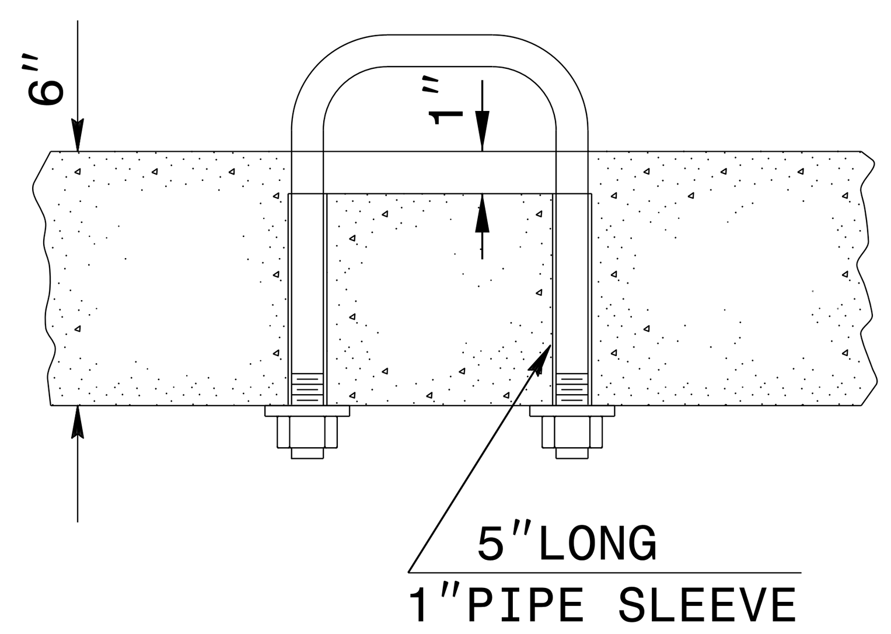
SEAL 33144
NICOLE M. HACKLER
7/12/2023
DocuSigned by:
Nicole M. Hackler
5884323D34164C5...

CONTRACT STANDARDS
AND DEVELOPMENT UNIT
Office 919-707-6900 FAX 919-250-4119

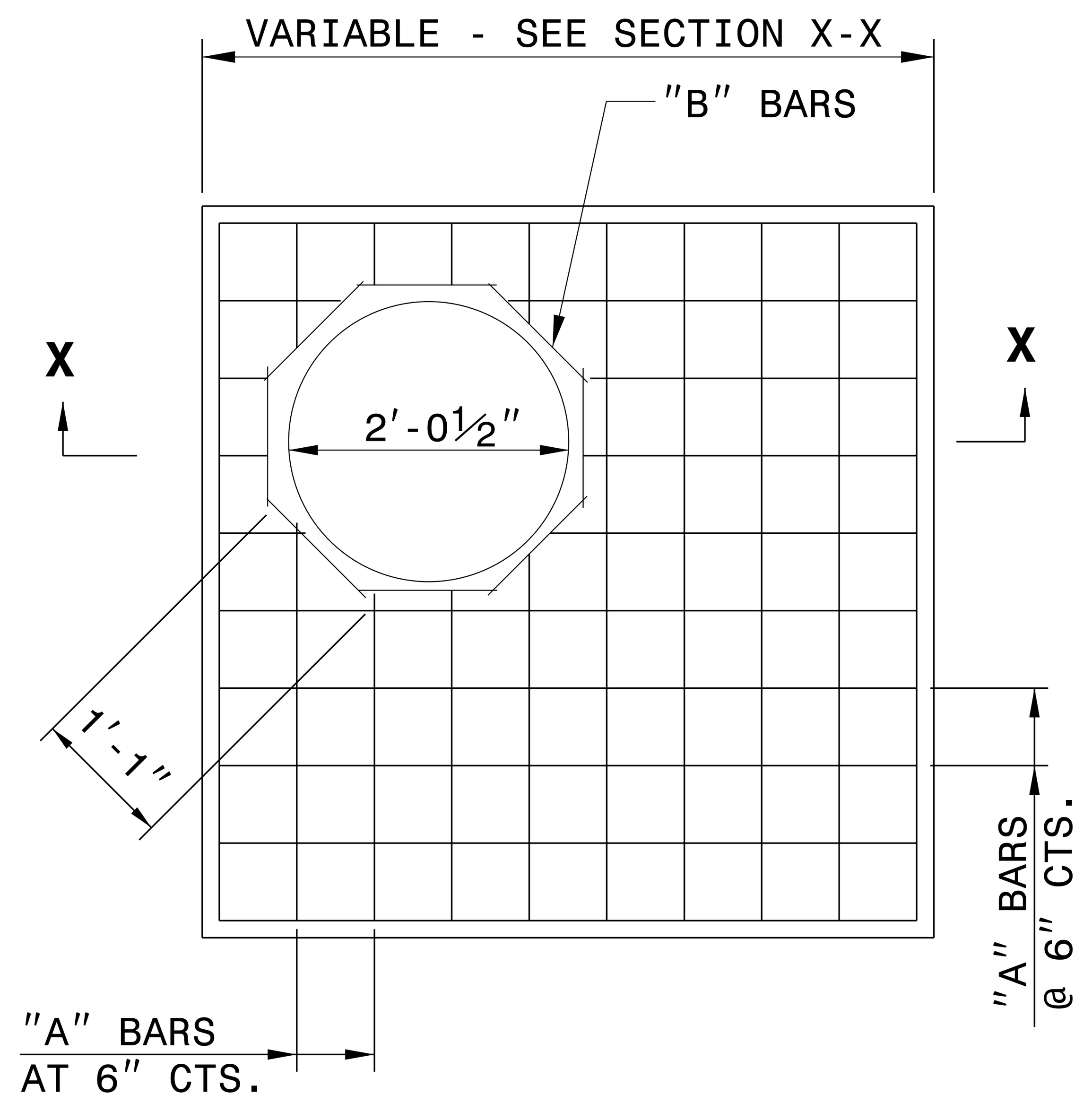
SEE TITLE BLOCK

ORIGINAL BY: S. HIDDEN DATE: 03-11-22
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

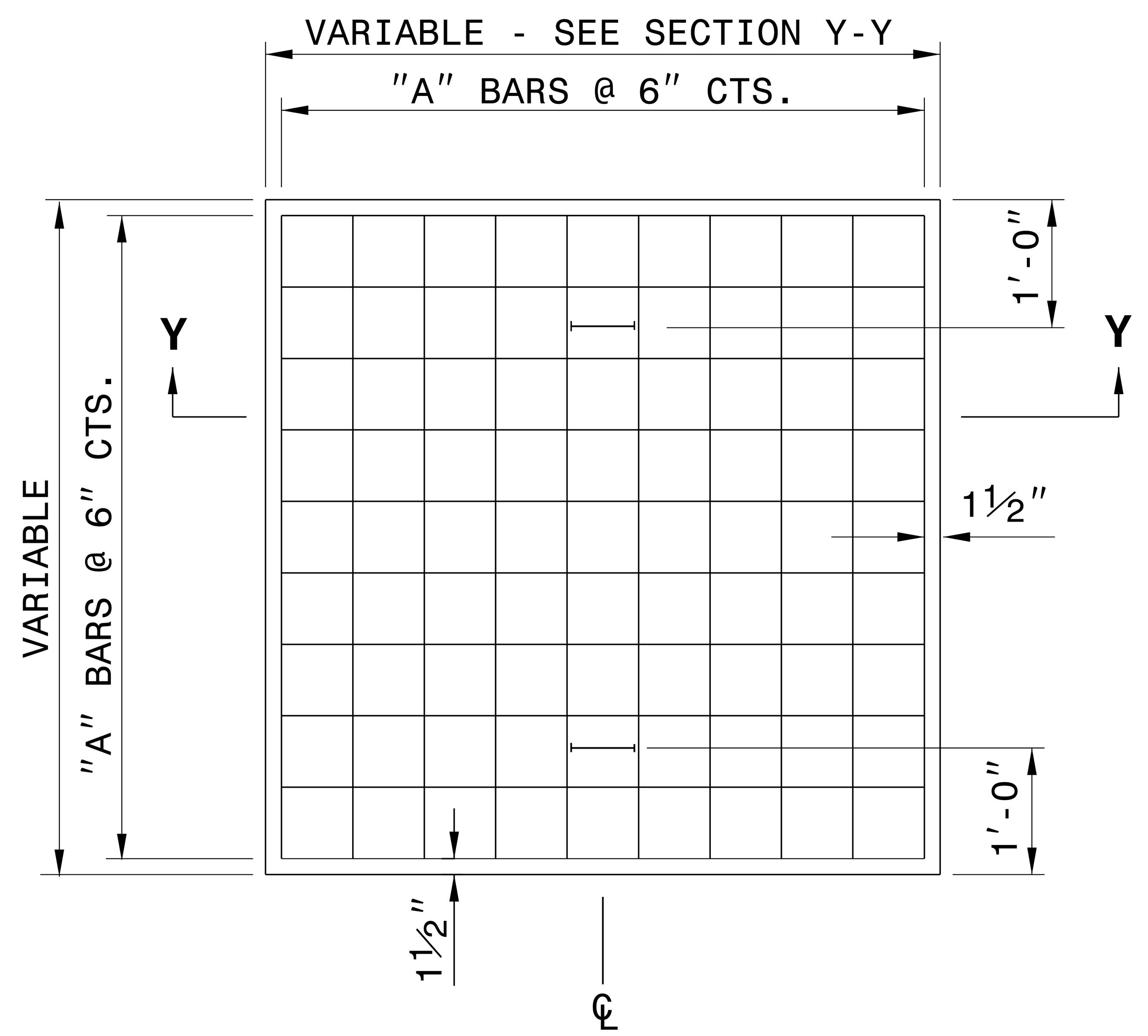
$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

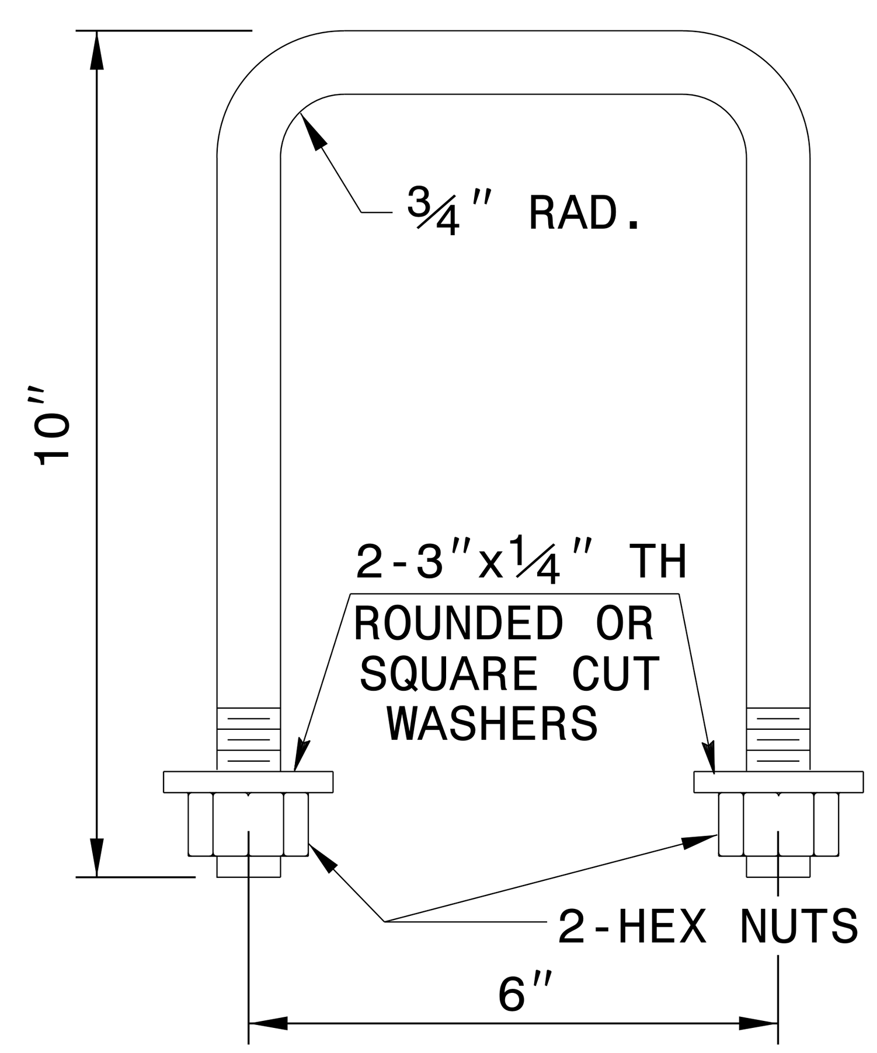
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

BILL OF MATERIALS

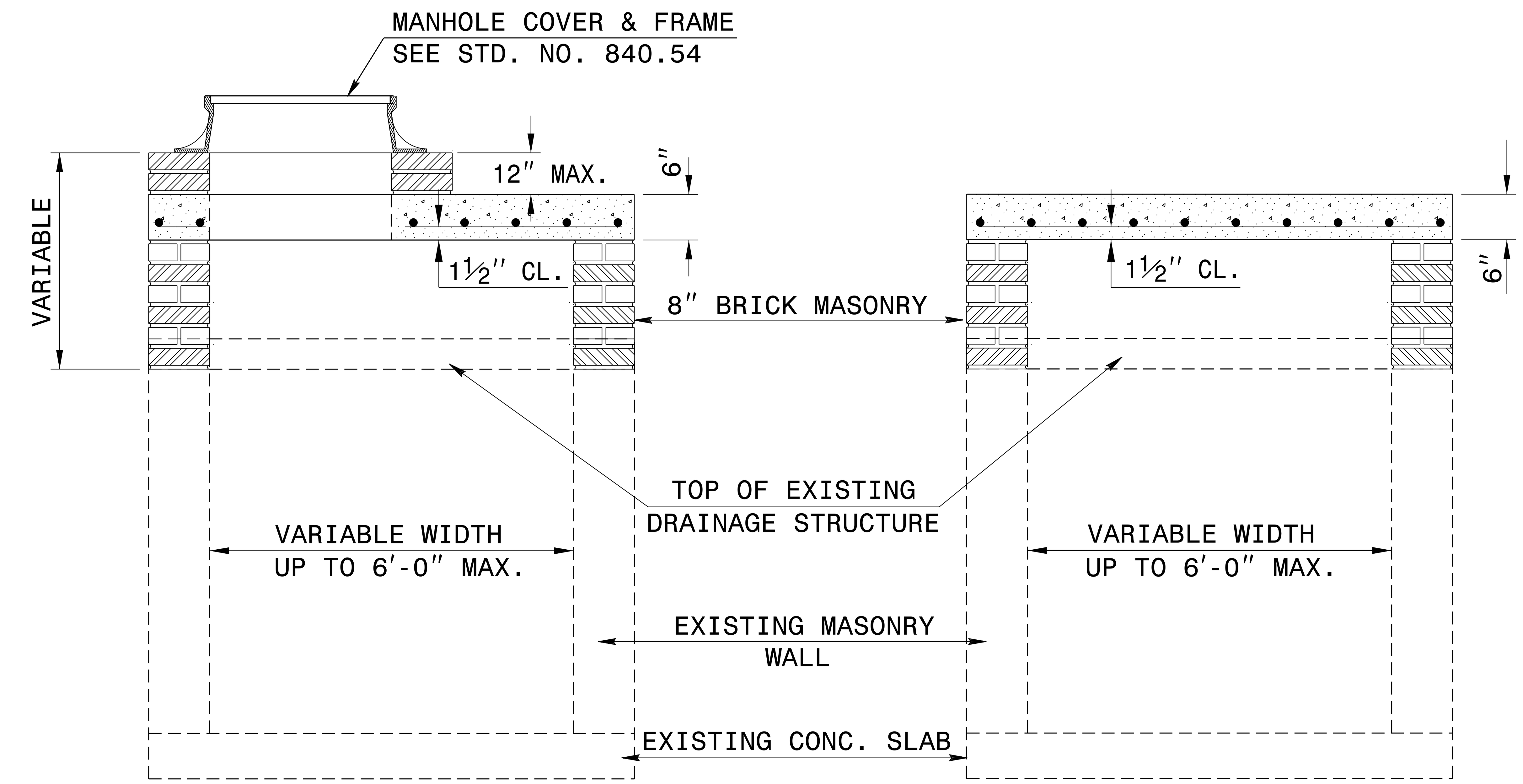
REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *

MASONRY	CU YDS
TOP SLAB CONCRETE CLASS "B"	.4326 *
BRICK MASONRY PER FT HT (MIN)	.4111

* NOTE:
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.



DETAIL OF HANDLE



SECTION X-X **SECTION Y-Y**

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. HACKLER 7/12/2023

DocuSigned by: Nicole M. Hackler 5B84323D34164C5...

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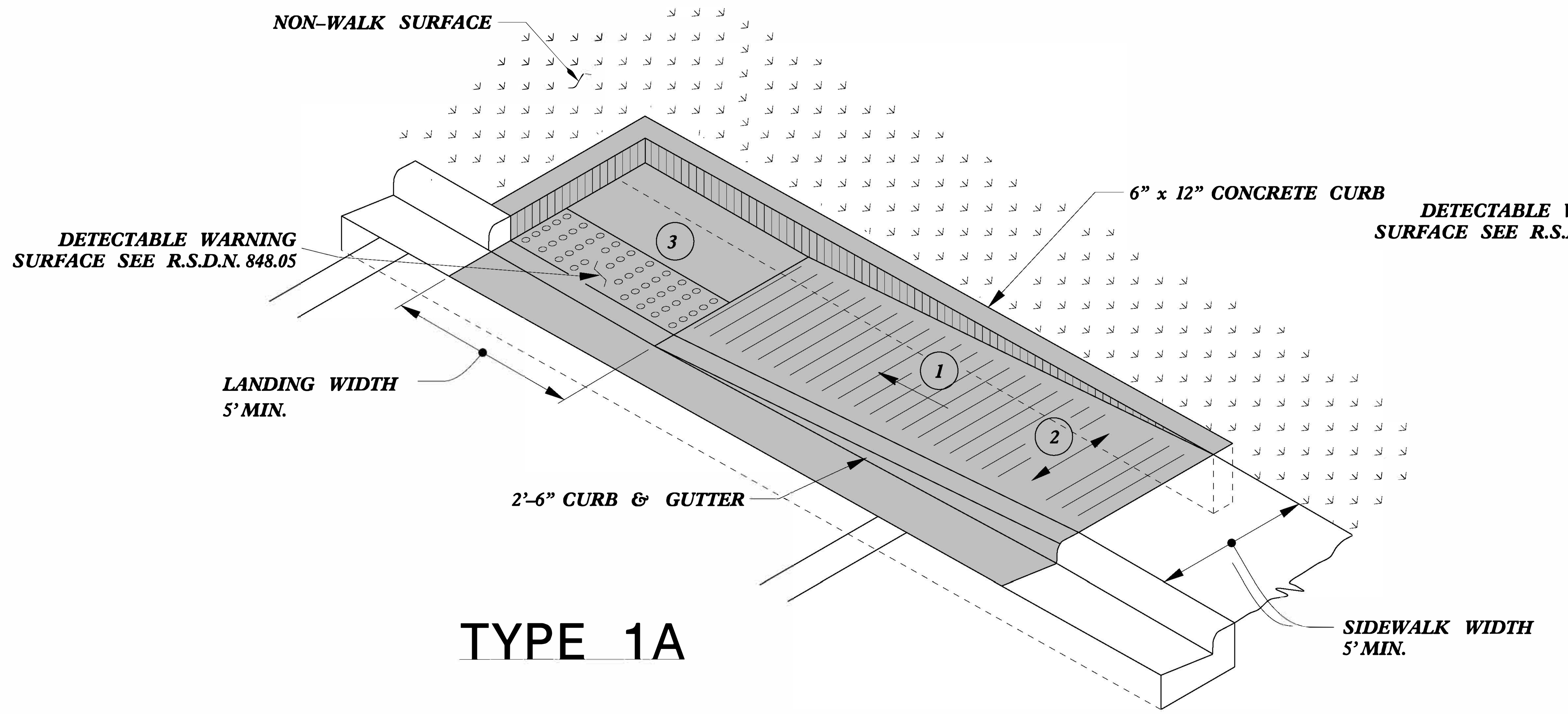
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

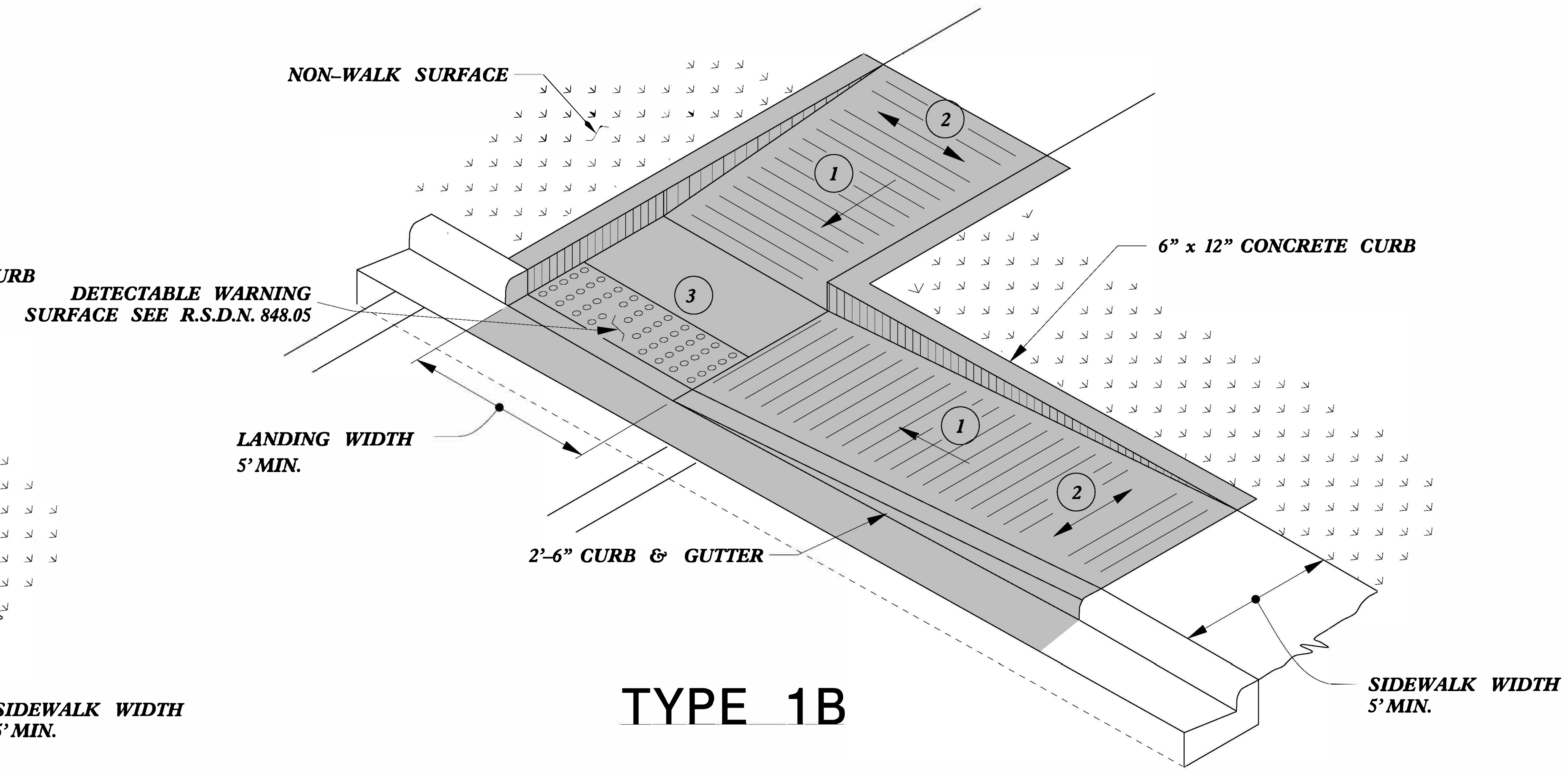
DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)

ORIGINAL BY: T.S.S. DATE: NOV.1997
MODIFIED BY: T.S.S. DATE: FEB.2000
CHECKED BY: DATE:
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn

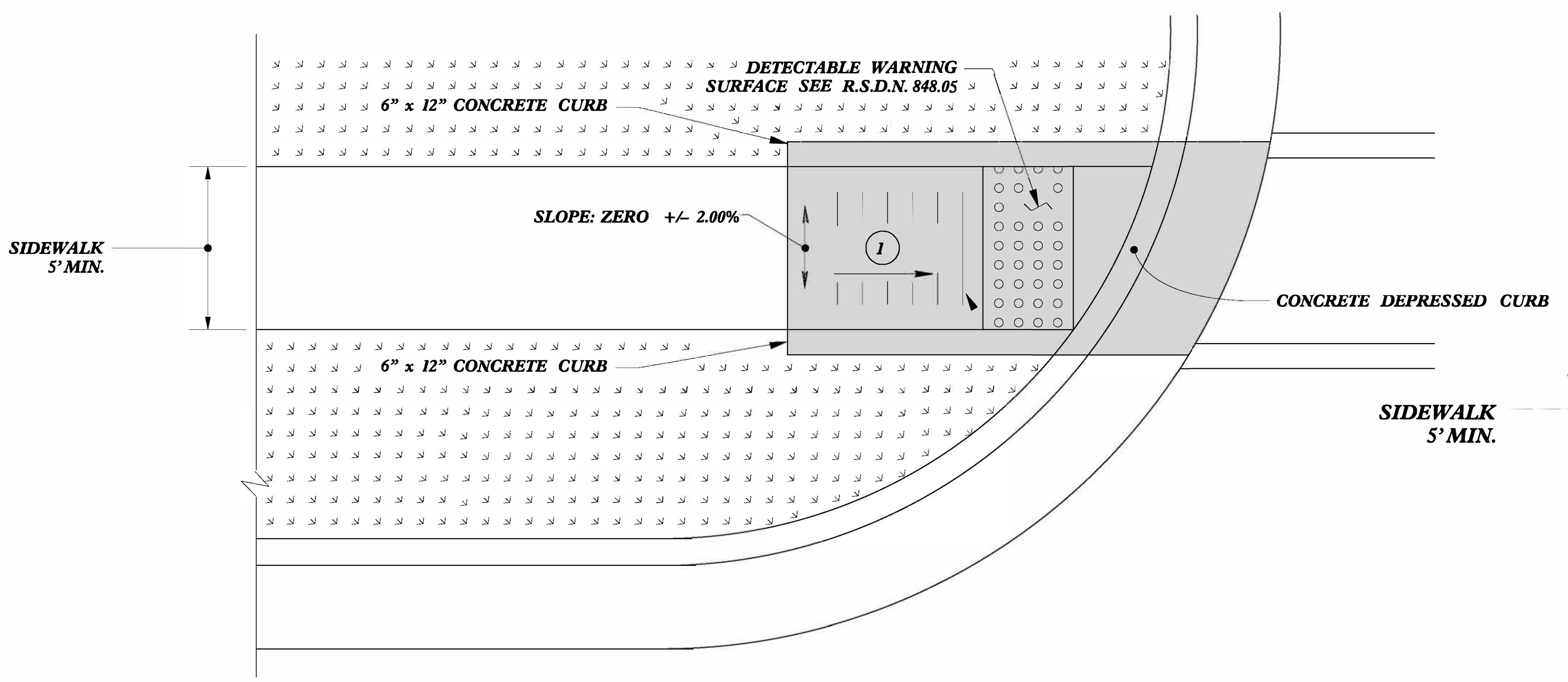
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-14



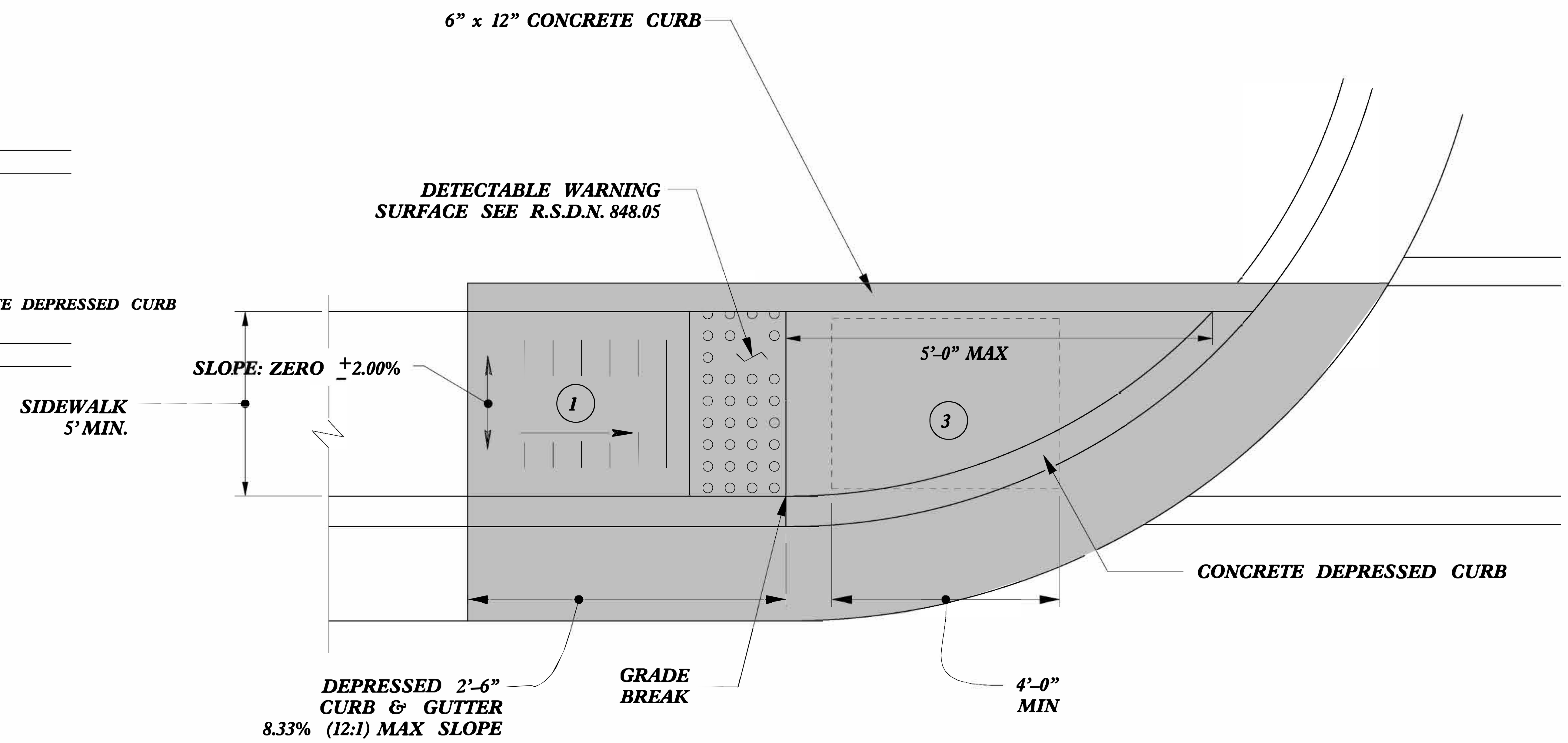
TYPE 1A



TYPE 1B



TYPE 1 Modified

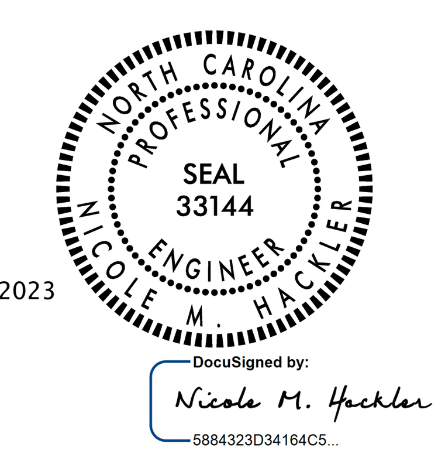


TYPE 1

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



7/12/2023

DocuSigned by: Nicole M. Hackler

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

CURB RAMPS

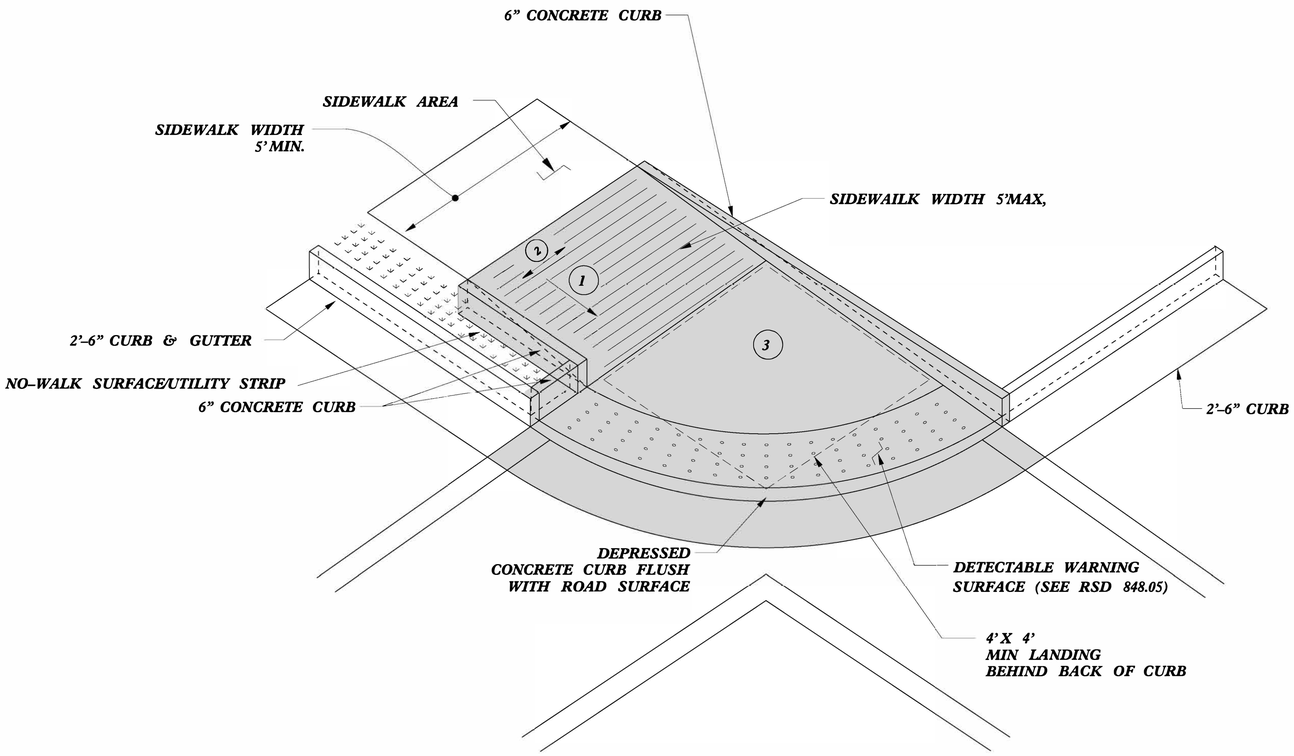
Directional Ramps

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

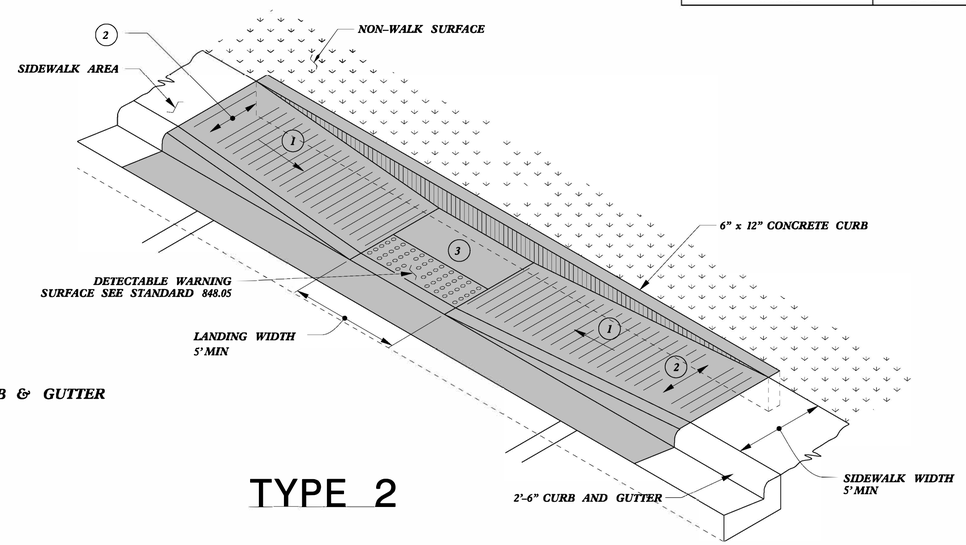
5/14/99
$$$$SYSTIME$$$$ $$$$USERNAME$$$$ $$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$

5/14/99

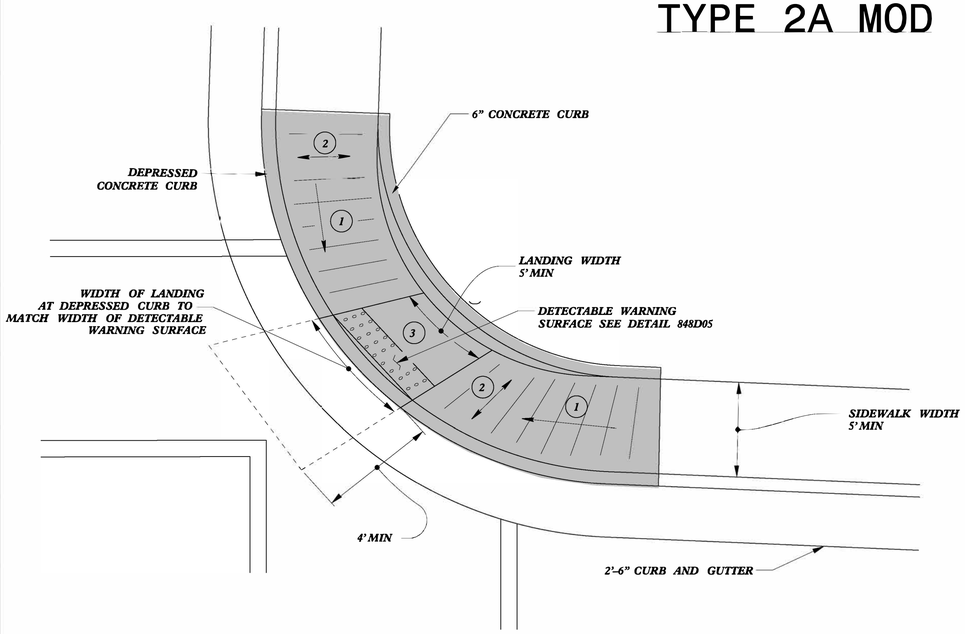
PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-15



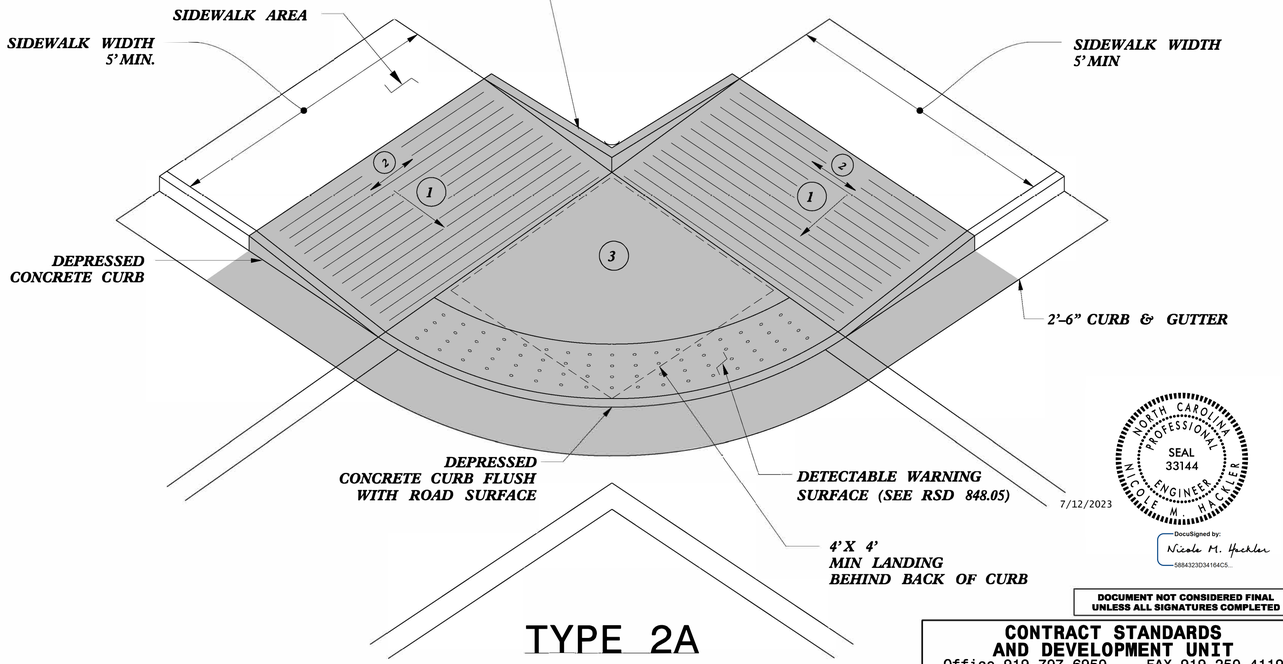
TYPE 2A MOD



TYPE 2



TYPE 2B



TYPE 2A

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

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M HACKLER

7/12/2023

DocuSigned by: Nicole M. Hackler 5884323D34164C5...

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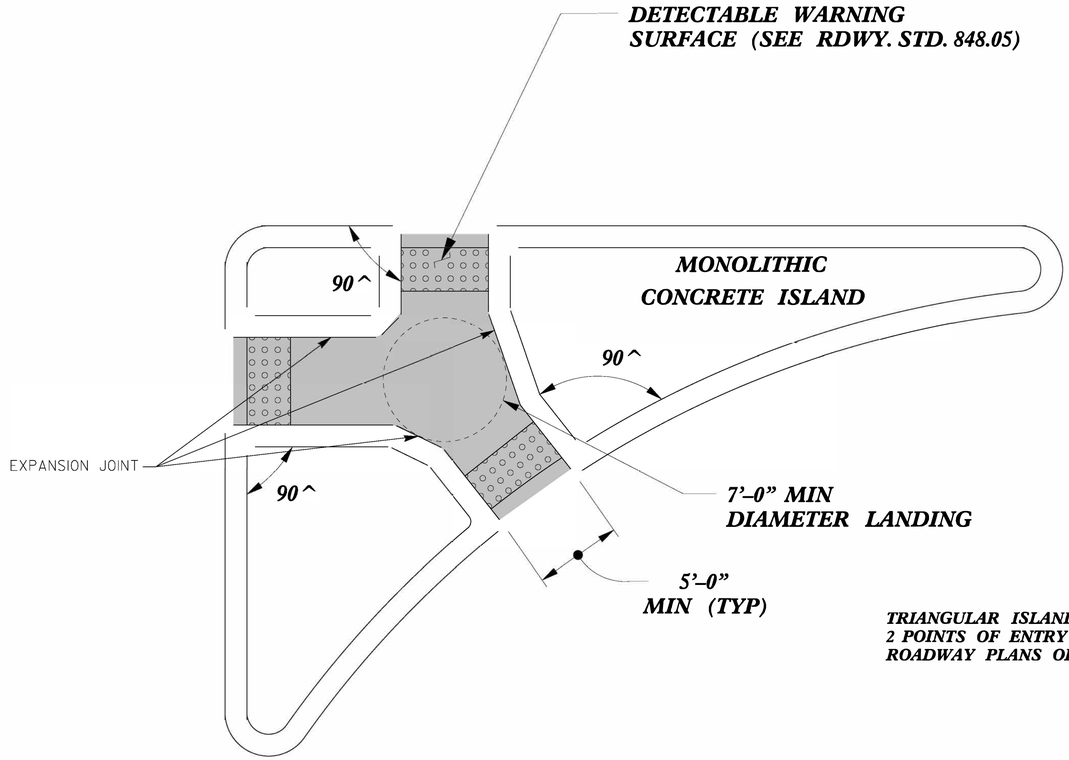
Office 919-707-6950 FAX 919-250-4119

CURB RAMPS

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

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-16

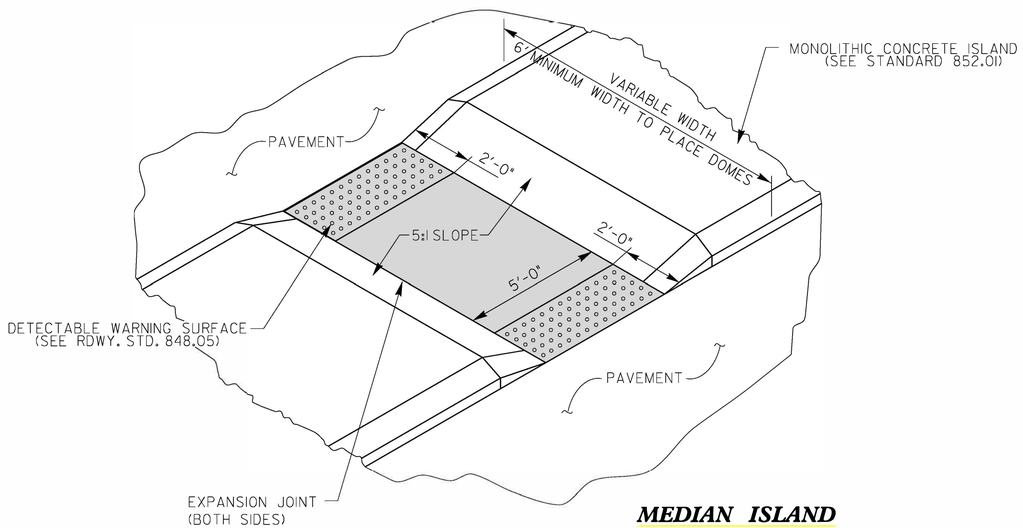


PAY LIMITS FOR 2 OR 3 CURB RAMPS (CALCULATE BASED ON NUMBER OF SETS OF TRUNCATED DOMES)

TRIANGULAR ISLANDS MAY BE CONSTRUCTED WITH ONLY 2 POINTS OF ENTRY AND EXIT AS SHOWN IN THE ROADWAY PLANS OR AS DIRECTED BY THE ENGINEER.

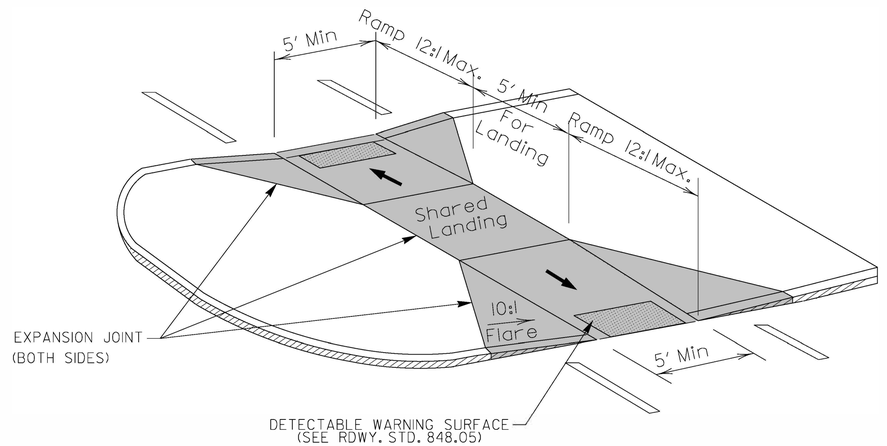
TRIANGULAR ISLAND WITH CUT THROUGH

TYPE 6



MEDIAN ISLAND WITH CUT THROUGH

TYPE 7



MEDIAN ISLAND CURB RAMPS

TYPE 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M HACKLER

7/12/2023

DocuSigned by: Nicole M. Hackler 5884323D34164C5...

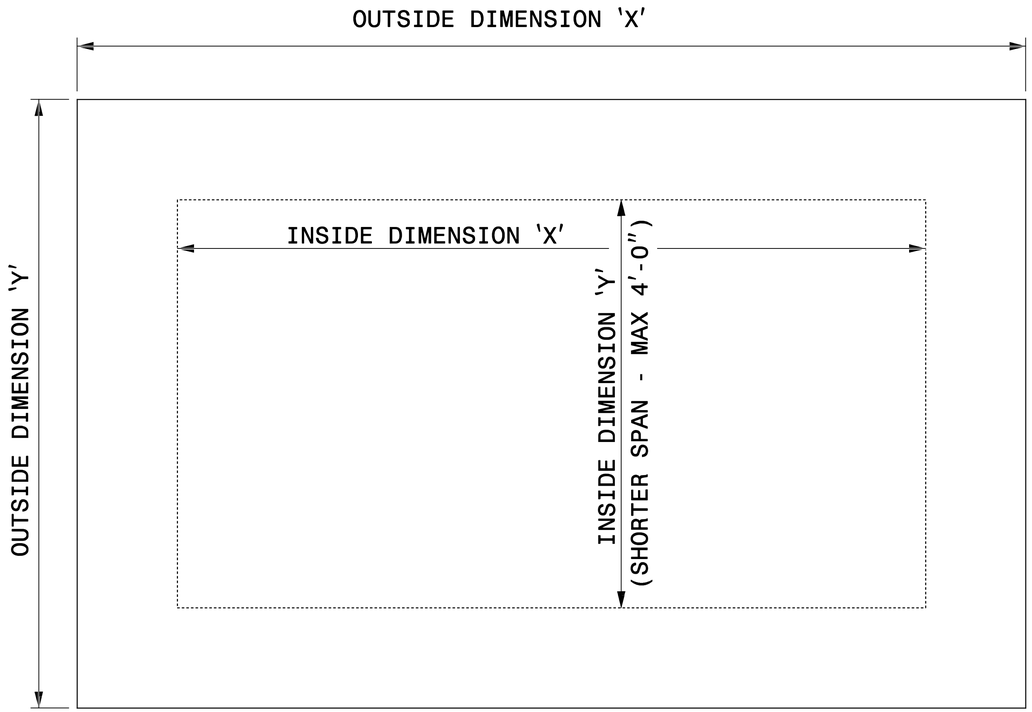
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

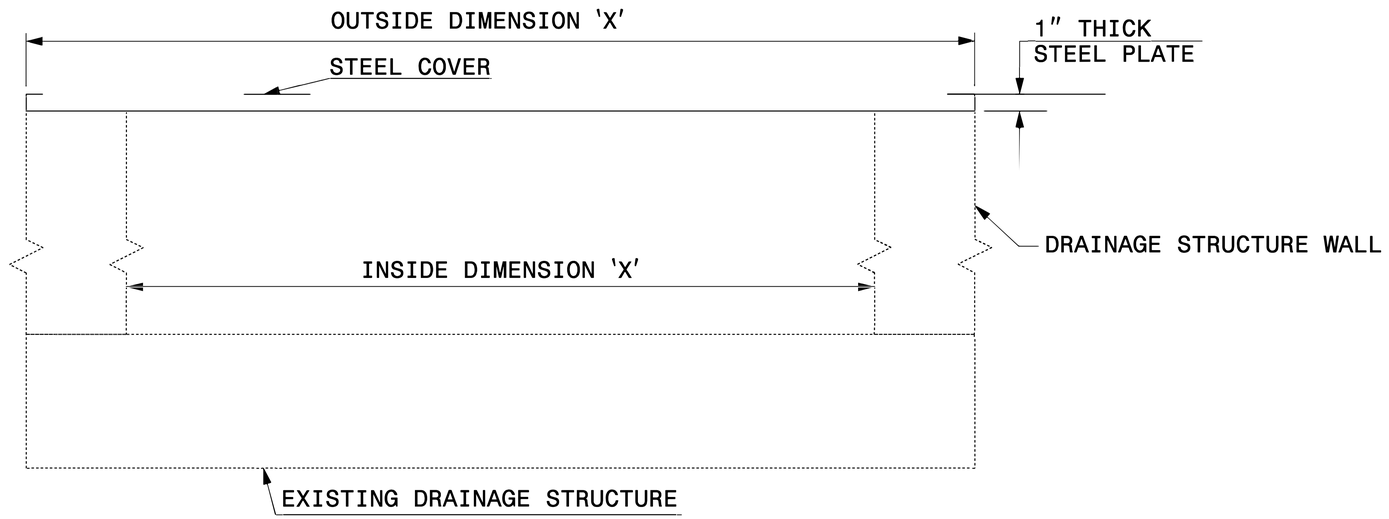
CURB RAMPS

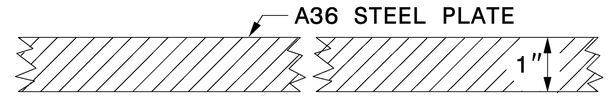
Median or Turn Lane Islands

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

$$$$USERNAME $$$$ $$$$SYSTIME $$$$







PROJECT REFERENCE NO.	SHEET NO.
U-5312	2C-17

PLAN VIEWS

GENERAL NOTES:

-USE GRADE A36 STEEL
-STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
-FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
-SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
-QUANTITES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.

SECTION VIEW OF STEEL TOP PLATE

ELEVATION VIEWS

NICOLE M. HACKLER
SEAL
33144
8/14/2023

DocuSigned by:
Nicole M. Hackler
5884323D34164C5...

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UNLESS ALL SIGNATURES COMPLETED

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

DETAIL OF TEMPORARY
1" STEEL COVER
OVER DRAINAGE STRUCTURE

ORIGINAL BY: E.E. WARD DATE: 2-2-98
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
IN CUBIC YARDS

STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT +%	BORROW	WASTE
-L- LT 50+50.00	80+00.00	22,845		2,954		19,891
-L- RT 50+50.00	80+00.00	3,460		12,733	9,273	
-L- MED 50+50.00	80+00.00	376		1,772	1,396	
-Y4- 10+39.00	12+08.63	66		48		18
	SUBTOTAL	**26,747**		**17,507**	**10,669**	**19,909**
-L- LT 80+00.00	110+00.00	1,385		3,751	2,366	
-L- RT 80+00.00	110+00.00	7,794		8,331	537	
-L- MED 80+00.00	110+00.00	330		1,681	1,351	
-Y5- 11+45.35	13+11.31	21		56	35	
	SUBTOTAL	**9,530**		**13,819**	**4,289**	
-L- LT 110+00.00	140+00.00	4,001		2,780		1,221
-L- RT 110+00.00	140+00.00	2,428		9,404	6,976	
-L- MED 110+00.00	140+00.00	192		1,665	1,473	
-Y6- 10+55.85	11+42.82	21		1		20
	SUBTOTAL	**6,642**		**13,850**	**8,449**	**1,241**
-L- LT 140+00.00	170+00.00	2,533		4,394	1,861	
-L- RT 140+00.00	170+00.00	13,455		2,469		10,986
-L- MED 140+00.00	170+00.00	62		1,111	1,049	
-Y7- 10+28.29	12+75.39	89		116	27	
	SUBTOTAL	**16,139**		**8,090**	**2,937**	**10,986**
-L- LT 170+00.00	188+63.29	220		10,020	9,800	
-L- RT 170+00.00	188+63.29	329		9,482	9,153	
-L- MED 170+00.00	188+63.29	222		1,740	1,518	
-Y10- 10+51.00	25+50.00	1,153		2,757	1,604	
-Y11- 10+42.00	13+53.59	7		7,616	7,609	
-Y11- 14+34.74	19+27.63	731		693		38
	SUBTOTAL	**2,662**		**32,308**	**29,684**	**38**
	TOTAL	**61,720**		**85,574**	**56,028**	**32,174**
MATERIAL FOR SHOULDER CONSTRUCTION				5,060	5,060	
LOSS DUE TO CLEARING & GRUBBING		-20,000			20,000	
UNSUITABLE MATERIAL		1,700				1,700
WASTE IN LIEU OF BORROW					-32,174	-32,174
PROJECT TOTAL		**43,420**		**90,634**	**48,914**	**1,700**
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					2,446	
GRAND TOTAL		**43,420**			**51,360**	
SAY		**43,500**			**51,500**	

EST. DDE = **2,078 CY**

EST. **1,700 CY** OF UNCLASSIFIED EXCAVATION UNSUITABLE WASTE PER GEOTECH RECOMMENDATION

EST. **3,500 CY** AS CONTINGENCY OF UNDERCUT PER GEOTECH RECOMMENDATION

EST. **3,500 CY** OF SELECT GRANULAR MATERIAL TO REPLACE UNDERCUT PER GEOTECH RECOMMENDATION

EST. **1,900 CY** AS CONTINGENCY OF SHALLOW UNDERCUT PER GEOTECH RECOMMENDATION

EST. **3,800 TONS** OF CLASS IV SUBGRADE STABILIZATION TO REPLACE SHALLOW UNDERCUT PER GEOTECH RECOMMENDATIONS

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

SUMMARY OF REMOVAL EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	SQUARE YARDS
L	59+62.42	66+42.00	MED	1,261.48
L	68+02.00	73+88.00	MED	1,638.59
L	75+48.00	87+35.06	MED	2,116.30
L	90+55.06	108+05.87	MED	3,678.85
L	110+98.88	119+21.70	MED	1,092.26
L	122+12.76	128+58.65	MED	619.08
L	130+26.47	136+21.00	MED	1,662.43
L	137+80.98	144+92.78	MED	790.95
L	147+79.02	153+74.69	MED	367.19
L	156+52.59	161+99.47	MED	326.74
L	164+95.71	170+05.19	MED	227.77
L	172+20.00	174+30.76	MED	179.51
L	178+29.87	178+65.21	LT	123.64
L	182+60.24	183+59.70	MED	41.67
L	172+48.22	177+16.86	LT	1,159.70
Y10	19+60.45	21+73.06	LT	870.76
L	177+61.00	191+50.43	RT	371.11
	TEMPORARY PAVEMENT REMOVAL			
L	169+10.00	170+60.00	LT	116.10
L	172+20.00	173+95.00	LT/RT	194.81
L	167+11.00	171+01.00	LT	510.60
L	171+95.70	176+42.00	LT	905.41
			TOTAL	18,254.93
			SAY	**18,260**

SUMMARY OF SHOULDER BERM GUTTER

LINE	STATION	STATION	SIDE	LENGTH
L	50+39.67	50+99.86	LT	60.17
L	61+00.00	67+00.00	RT	599.18
L	62+00.00	64+50.00	LT	250.31
L	87+99.41	95+50.00	LT	771.06
L	95+30.70	97+65.00	RT	234.30
L	108+50.00	111+50.58	RT	326.57
L	109+51.63	111+50.00	LT	208.65
L	177+00.88	188+63.29	RT	1,160.63
			TOTAL (FT)	3,610.87
			SAY	**3,620**

COMPUTED BY: FM DATE: 08-25-2022
CHECKED BY: JBJ DATE: 01-03-2023

5/9/06

PROJECT REFERENCE NO.	SHEET NO.
U-5312	3B-2

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

GUARDRAIL SUMMARY

Z7323

"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 BEGIN

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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH (FT)			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS				IMPACT ATTENUATOR TYPE TL-3		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-2	GREU TL-3	AT-1	CAT-1	G	NG				
-L-	50+50.00	51+50.00	LT	100.00			50+50.00		10	13	50.00		1			1						18		TIE TO EXISTING AT TRAILING END
-L-	51+84.00	53+58.00	RT	125.00	75.00		51+84.00	53+53.33	10	13							1	1						
-L-	60+82.00	67+50.00	RT	662.50	50.00		62+00.00	67+43.75	10	13							1	1				640		
-L-	62+00.00	65+00.00	LT	306.25			66+00.00	62+06.24	10	13	50.00		1			1		1				510		
-L-	87+94.00	96+00.00	LT	743.75	100.00		95+00.00	87+99.41	10	13	50.00		1			1		1				499		
-L-	95+20.00	98+05.00	RT	300.00	25.00		95+50.00	97+70.00	10	13							1	1				289		
-L-	108+00.00	111+69.00	RT	318.75	100.00		107+00.00	111+64.16	10	13	50.00		1			1		1				427		
-L-	109+52.00	112+50.00	LT	281.25	50.00		111+50.00	109+56.07	6	9	50.00		1			1		1				364		
-L-	167+12.00	172+08.00	LT	462.50	62.50		173+08.00	167+17.21	2	N/A							1	1						AT FACE OF CURB
-L-	169+52.00	171+08.00	RT	156.25			168+52.00	171+02.63	10	13	50.00		1			1		1				364		
-L-	176+50.00	188+63.29	RT	1062.50	75.00		177+50.00		10	13	50.00		1			1						1254		TIE TO EXISTING AT TRAILING END
-L-	178+84.00	183+95.00	LT	450.00	187.50																	1150		
-L-	186+08.00	188+63.29	LT	268.75			187+63.29	186+13.29	10	13	50.00		1			1		1						
-Y10-	11+55.00	13+88.00	LT	256.25			13+88.00	11+60.00	14	N/A					1			1						
-Y10-	13+18.00	17+78.00	RT	462.50				17+78.00	10	13					1									
-Y11-	10+91.00	12+27.00	LT	137.50			11+27.00		10	13	25.00		1		1									
-L-	100+00.00	107+50.00	LT																	1	750			
DEDUCTION FOR ANCHORS:																								
TYPE		QTY	LT/EA																					
GREU TL-3		8.00	50.00	-400.00																				
GREU TL-2		3.00	25.00	-75.00																				
CAT-1		11.00	6.25	-68.75																				
AT-1		4.00	6.25	-25.00																				
			PROJECT TOTAL	**5525.00**	**725.00**										**3**	**8**	**4**	**11**		**1**	**750**	**5515**		
			SAY	**5,550**	**750**																			
			ADDITIONAL GUARDRAIL POSTS	10	EA																			

JSTANOVICH

COMPUTED BY: DJS DATE: 05/24/2023

CHECKED BY: JGD DATE: 05/24/2023

PROJECT NO.	SHEET NO.
U-5312	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		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE)													C. S. PIPE							R. C. PIPE CLASS III								R. C. PIPE CLASS IV								R. C. PIPE CLASS V		36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)
SIZE								15	18	24	30	36	42	48							15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15		
THICKNESS OR GAUGE		FROM	TO	FT.	FT.	FT.	%								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	.064	.064	.064	.079	.079	.109	.109																				
L 50+28	97 LT	0603		1206.6																																											
		0603	0608		1203.6	1178.6	0.9																																							388	
L 50+34	74 RT	0604		1222.0																																											
		0604	0615		1217.2	1212.2	0.9																68																								
L 51+00	0 CL	0605		1220.6																																											
		0605	0615		1215.4	1212.2	0.7																								92																
LNBL 52+77	17 RT	0606		1216.6																																											
		0606	0607		1213.5	1213.1																															60										
L 53+16	162 RT	0608		1189.0																																											
L 55+95	70 RT	0610		1203.0																																											
		0610	0611		1200.3	1195.7																							100																		
L 56+95	67 RT	0611		1198.4																																											
		0611	0701		1195.7	1190.1																							124																		
L 51+00	91 RT	0615		1223.0																																											
		0615	0608		1212.2	1178.6	1.8																	228																							
LNBL 51+00	21 LT	0618		1222.9																																											
		0618	0605		1220.1	1216.5																													56										
L 51+60	0 CL	0619		1218.4																																											
		0619	0605		1215.6	1214.5																							60																		
L 58+20	65 RT	0701		1192.8																																											
		0701	0702		1190.1	1186.1																							96																		
L 59+20	64 RT	0702		1188.8																																											
		0702	0705		1186.1	1183.2	0.4																						76																		
L 71+50	64 LT	0703		1170.4																																											
		0703	0718		1167.4	1164.5	0.4																							224																	
LNBL 59+20	27 RT	0704		1190.6																																											
		0704	0702		1187.8	1186.1																													64										
L 60+00	68 RT	0705		1186.0																																											
		0705	0706		1183.2	1137.0	0.6													212																											
L 62+50	95 LT	0713		1163.8																																											
		0713	0739		1160.7	1160.5						12																																			
L 65+50	48 RT	0714		1172.3																																											
		0714	0715		1169.5	1165.2																													144										
L 66+98	48 RT	0715		1170.7																																											
		0715	0730		1165.2	1150.7														48																											
L 68+00	70 LT	0717		1169.0																																											
		0717	0716		1163.1	1162.6																																100							
L 69+22	71 LT	0718		1168.8																																											
		0718	0717		1163.5	1163.1																										120															
L 69+22	92 LT	0719		1177.0																																											
		0719	0718		1166.7	1164.5	1.5		20								X	X	X	X																											
L 60+00	71 LT	0723	0724		1185.0	1177.5	1.2																							112																	
L 61+12	64 LT	0724		1181.7																																											
		0724	0725		1177.0	1158.9				92							X	X	X	X																											
L 61+95	108 LT	0725		1163.7																																											
		0725	0739		1158.9	1158.7	0.4			16							x	X	X	X																											
L 67+03	8 RT	0727		1171.6																																											
		0727	0715		1168.0	1165.2																													40										
L 67+03	8 LT	0728		1171.6																																											
		0728	0727		1168.4	1168.0																													16										
						SHEET TOTALS			20	108		12									260		68	228					456	336	92	120					380			100						388	

LINE & STATION	STRUCTURE NUMBER		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS	DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
	FROM	TO			MASONRY	0' THRU 5'	5' THRU 10' A	10' AND ABOVE B		E	F	G		D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																										
			CY	CY	CY	EACH	LIN. FT.	LIN. FT.																													CY	CY	CY	LIN. FT.	
L 50+28	0603		3.400																																						
	0603	0608																																							
L 50+34	0604					1													1		1	1																			
	0604	0615																												2											
L 51+00	0605					1	0.2													1		1																			
	0605	0615																																							
LNBL 52+77	0606					1								1			1	1																							
	0606	0607																																							
L 53+16	0608					1	5.0	0.4								1																									
L 55+95	0610					1														1		1																			
	0610	0611																																							
L 56+95	0611					1														1		1																			
	0611	0701																																							
L 51+00	0615					1	5.0	0.8																1		1															
	0615	0608																													2										
LNBL 51+00	0618					1														1			1																		
	0618	0605																																							
L 51+60	0619					1														1		1																			
	0619	0605																																							
L 58+20	0701					1														1		1																			
	0701	0702																																							
L 59+20	0702					1														1		1																			
	0702	0705																																							
L 71+50	0703					1														1		1																			
	0703	0718																																							
LNBL 59+20	0704					1														1		1																			
	0704	0702																																							
L 60+00	0705					1														1		1																			
	0705	0706																											2												
L 62+50	0713		3.400																																						
	0713	0739																																							
L 65+50	0714					1														1			1																		
	0714	0715																																							
L 66+98	0715					1	0.6													1			1																		
	0715	0730																											2												
L 68+00	0717					1	1.0												1			1																			
	0717	0716																																							
L 69+22	0718					1	0.3												1			1																			
	0718	0717																																							
L 69+22	0719					1	5.0	0.3																1																	
	0719	0718																																							
L 60+00	0723	0724																																							
L 61+12	0724					1													1			1																			
	0724	0725																																							
L 61+95	0725					1													1			1																			
	0725	0739																																							
L 67+03	0727					1								1			1	1																							
	0727	0715																																							
L 67+03	0728					1								1			1	1																							
	0728	0727																																							
SHEET TOTALS			6.800			23	17.1	1.5						3		1	3	3	5	12	1	14	3	2		1		4		2	2										

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

JSTANOVICH

COMPUTED BY:	DJS	DATE:	05/24/2023
CHECKED BY:	JGD	DATE:	05/24/2023

PROJECT NO.	SHEET NO.
U-5312	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 48 INCHES & UNDER)

LINE & STATION	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE)													C. S. PIPE							R. C. PIPE CLASS III								R. C. PIPE CLASS IV								R. C. PIPE CLASS V		36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS	DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
SIZE		FROM	TO					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	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15					MASONRY	0' THRU 5'	A 5' THRU 10'	B 10' AND ABOVE		GRATE TYPE				D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																										
THICKNESS OR GAUGE				FT.	FT.	FT.	%														.064	.064	.064	.079	.079	.109	.109																					CY	CY	CY	EACH	LIN. FT.	LIN. FT.		E	F	G																									CY	CY	CY	LIN. FT.	
L 67+54	8 RT	0729		1171.4																																															1								1			1	1																								
		0729	0727		1168.2	1168.0																															48																																																	
L 64+40	48 LT	0731		1174.0																																															1														1			1																			
		0731	0732		1171.2	1171.1																															8																																																
L 64+48	48 LT	0732		1173.8																																															1														1			1																			
		0732	0733		1171.1	1161.6														32																																																					2													
L 64+00	48 RT	0734		1175.2																																															1														1			1																			
		0734	0714		1172.4	1169.5																															148																																																
L 63+74	186 LT	0737		1163.4																																															1	4.1										1	1																								
		0737	0739		1154.3	1153.6				168							X	X	X	X																																																																		
Y4 11+75	30 RT	0801	0802		1176.0	1172.5	1.1																															60																																															
Y4 11+69	29 LT	0802		1177.4																																															1														1		1																				
		0802	0803		1172.5	1171.6	1.2		64								X	X	X	X																																																																			
L 73+85	64 LT	0804		1172.7																																															1														1		1																				
		0804	0703		1169.7	1167.4																								232																																																										
L 77+11	64 LT	0805		1175.0																																															1	5.0	3.0											1			1																					Special Detail STD. 840d17 (See PSH 2C-9)
L 82+00	64 RT	0811	0812		1169.0	1167.1	1.0																								56																																																										
L 82+54	48 RT	0812		1171.9																																															1													1				1																			
		0812	0813		1167.1	1162.2	1.0																																200																																																
L 84+56	48 RT	0813		1167.9																																															1	0.7												1				1																			
		0813	0901		1162.2	1155.1	1.5																																280																																																
L 84+56	56 RT	0814		1168.5																																																																				1	1														Special Detail Convert to JB (See PSH 2C-13)
		0814	0813		1163.4	1162.2																							8																																																												
L 74+72	8 RT	0816		1176.7																																															1								1			1	1																								
		0816	0817		1173.4	1173.3																															24																																																
L 74+54	8 LT	0817		1176.9																																															1								1			1	1																								
		0817	0804		1173.3	1170.0																															88																																																
L 76+00	64 LT	0818	0805		1173.8	1162.3																															112																																																
L 79+39	64 LT	0819																																			60																																																
L 87+37	48 RT	0901		1160.4																																															1	0.3												1				1																			
		0901	0904		1155.1	1147.5	2.3																														212																																																
L 87+37	56 RT	0902		1161.2																																																																				1	1														Special Detail Convert to JB (See PSH 2C-13)
		0902	0901		1156.0	1155.9	0.5																						8																																																											
L 89+48	90 RT	0904		1152.4																																															1													1				1																			
		0904	0905		1147.5	1139.6	1.7																																200																																																
L 91+45	48 RT	0905		1145.4																																															1	0.8												1				1																			
		0905	0932		1139.6	1132.4	0.5																																	180																																														
L 91+45	56 RT	0906		1146.3																																																																				1	1														Special Detail Convert to JB (See PSH 2C-13)
		0906	0905		1140.5	1140.4	0.4																						8																																																												
L 93+77	48 RT	0908		1135.6																																															1													1				1																			
		0908	0924		1130.3	1126.7	2.4																									20																																																									
L 94+60	64 RT	0909		1130.2																																															1	0.8												1			1																				
		0909	0910		1124.4	1123.4	0.7																									68																																																										
L 95+30	65 RT	0910		1133.0																																															1	4.6																	1		1																	
		0910	0911		1123.4	1076.3	0.8																	144																																																					2											
L 98+00	64 RT	0913		1127.7																																															1														1		1																				
		0913	0912		1122.7	1072.0	0.9															140																																																					2												
L 98+80	64 RT	0914		1128.5																																															1														1		1																				
		0914	0913		1125.5	1122.7	0.6																							76																																																										
L 95+18	109 LT	0916		1122.9																																															1													1			1																				
SHEET TOTALS									64	168											32	140		144					24	308	56	88					700	60	680	180											21	16.3	3.0						3			4	4	9	7		7	9	1		4	3	2	2		2										

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

JSTANOVICH

COMPUTED BY:	DJS	DATE:	05/24/2023
CHECKED BY:	JGD	DATE:	05/24/2023

PROJECT NO.	SHEET NO.
U-5312	3D-3

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 %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 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	C. S. PIPE 15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109
		0916	0915		1118.2	1087.0	0.4																100				
L 96+40	64 LT	0917		1126.8																							
		0917	0916		1122.1	1118.2	0.4																				
L 96+84	51 LT	0918		1129.2																							
		0918	0917		1122.7	1122.1	0.4																				
L 98+50	64 LT	0919		1128.1																							
		0919	0918		1123.3	1122.7	0.3																				
L 88+15	8 LT	0920		1158.7																							
		0920	0921		1155.5	1154.4																					
L 88+49	8 RT	0921		1157.6																							
		0921	0923		1154.4	1149.2																					
L 89+90	8 LT	0922		1153.6																							
		0922	0923		1150.4	1150.4																					
L 89+90	8 RT	0923		1153.6																							
		0923	0904		1150.4	1148.4																					
L 93+90	64 RT	0924		1132.0																							
		0924	0909		1126.7	1124.9	0.6																				
L 89+03	48 LT	0925		1154.8																							
		0925	0926		1152.1	1138.1																					
L 92+50	48 LT	0926		1140.9																							
		0926	0927		1138.1	1128.0																					
L 95+18	48 LT	0927		1131.4																							
		0927	0916		1128.0	1118.9																					
L 95+48	48 LT	0928		1130.8																							
		0928	0927		1128.1	1128.0																					
L 97+63	48 RT	0929		1129.8																							
		0929	0913		1127.1	1122.9																					
L 93+25	48 RT	0932		1137.7																							
		0932	0908		1132.4	1130.3	0.6																				
L 88+40	92 LT	0933		1156.1																							
		0933	0925		1153.4	1152.1																					
L 101+50	64 RT	1001		1132.3																							
		1001	0914		1129.3	1125.5																					
L 102+15	64 RT	1002		1133.1																							
		1002	1001		1130.1	1129.3																					
L 105+15	64 RT	1003		1137.4																							
		1003	1002		1134.4	1130.1																					
L 100+04	48 LT	1004		1133.1																							
		1004	0919		1128.4	1123.3																					
L 101+50	48 LT	1005		1135.2																							
		1005	1004		1129.8	1128.4																					
L 101+50	91 LT	1006		1168.9																							
		1006	1029		1167.4	1136.3																	40					
L 104+00	48 LT	1007		1138.7																							
		1007	1031		1135.7	1131.0	0.5																				
L 104+00	90 LT	1008		1168.0																							
		1008	1030		1166.5	1140.2																	40					
L 108+50	67 LT	1009		1142.2																							
		1009	1033		1137.4	1137.0																					
L 112+00	64 LT	1013		1147.0																							
SHEET TOTALS																							80	100				

STRUCTURE NUMBER FROM	TO	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	R. C. PIPE CLASS V 12	15	36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02
0916	0915																											
0917																									1			
0917	0916				128																							
0918																									1	1.5		
0918	0917				44																							
0919																									1			
0919	0918				164																							
0920																									1			
0920	0921										24																	
0921																									1			
0921	0923										112																	
0922																									1			
0922	0923										16																	
0923																									1			
0923	0904										84																	
0924																									1	0.3		
0924	0909					68																						
0925																									1			
0925	0926										344																	
0926																									1			
0926	0927										268																	
0927																									1			
0927	0916		60																									
0928																									1			
0928	0927										28																	
0929																									1			
0929	0913		40																									
0932																									1	0.3		
0932	0908													48														
0933																									1			
0933	0925										76																	
1001																									1			
1001	0914			268																								
1002																									1			
1002	1001			64																								
1003																									1			
1003	1002			300																								
1004																									1			
1004	0919				152																							
1005																									1	0.4		
1005	1004												144															
1006																												
1006	1029																											
1007																									1			
1007	1031											236																
1008																												
1008	1030																											
1009																									1			
1009	1033											52																
1013																									1	2.9		
SHEET TOTALS			100	632	488	68					952	288	144	48											23	5.4		

STRUCTURE NUMBER FROM	TO	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	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		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
0916	0915																					2											
0917											1			1																			
0917	0916																																
0918											1			1																			
0918	0917																																
0919											1			1																			
0919	0918																																
0920						1			1	1																							
0920	0921																																
0921						1			1	1																							
0921	0923																																
0922						1			1	1																							
0922	0923																																
0923						1			1	1																							
0923	0904																																
0924						1					1			1																			
0924	0909																																
0925						1						1			1																		
0925	0926																																
0926						1						1			1																		
0926	0927																																
0927												1			1																		
0927	0916																																
0928												1			1																		
0928	0927																																
0929												1			1																		
0929	0913																																
0932											1				1																		
0932	0908																																
0933						1						1			1																		
0933	0925																																
1001												1		1																			
1001	0914																																
1002												1		1																			
1002	1001																																
1003												1		1																			
1003	1002																																
1004											1				1																		
1004	0919																																
1005											1				1																		
1005	1004																																
1006																										11							
1006	1029																					2												
1007												1			1																		
1007	1031																																
1008																										11							
1008	1030																					2												
1009												1		1																			
1009	1033																																
1013											1			1																			
SHEET TOTALS						8			4	4	8	11		9	10						4	2				22							

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

JSTANOVICH

COMPUTED BY:	DJS	DATE:	05/24/2023
CHECKED BY:	JGD	DATE:	05/24/2023

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-5312	3D-4

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

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE)													C. S. PIPE							R. C. PIPE CLASS III								R. C. PIPE CLASS IV								R. C. PIPE CLASS V	
SIZE								15	18	24	30	36	42	48							15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15
THICKNESS OR GAUGE															DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	DO NOT USE PP PIPE	.064	.064	.064	.079	.079	.109	.109																		
		1013	1011		1139.1	1094.9	0.4																172																						
L 108+32	8 LT	1017		1145.6																																									
		1017	1009		1141.9	1137.6																															60								
L 108+32	8 RT	1018		1145.6																																									
		1018	1017		1142.0	1142.0																															16								
L 110+00	8 LT	1019		1147.9																																									
		1019	1017		1144.2	1141.9																															148								
L 110+20	8 RT	1020		1148.2																																									
		1020	1019		1144.8	1144.2																															28								
L 108+52	48 RT	1021		1145.0																																									
		1021	1018		1142.2	1142.0																															44								
L 109+25	48 RT	1022		1146.0																																									
		1022	1021		1142.9	1142.2																															72								
L 109+88	92 RT	1023		1146.0																																									
		1023	1022		1143.2	1142.9																															76								
L 110+00	44 LT	1027		1147.1																																									
		1027	1019		1144.4	1144.2																															40								
WALL3 10+04	2 LT	1028		1135.3																																									
		1028	1004		1130.8	1129.1																									4																
WALL3 11+50	2 LT	1029		1139.7																																									
		1029	1005		1131.9	1130.3																										4															
WALL3 14+00	2 LT	1030		1143.6																																									
		1030	1007		1137.3	1135.7	0.3																									4															
L 101+62	48 LT	1031		1135.3																																									
		1031	1005		1131.0	1130.3	0.6																																12								
Y5 12+95	36 LT	1033		1146.6																																									
		1033	1011		1137.0	1094.9																92																							
L 114+20	64 LT	1101		1149.3																																									
		1101	1013		1144.5	1139.1																											216														
L 115+25	64 LT	1102		1150.1																																									
		1102	1101		1145.2	1144.6																											104														
L 118+00	64 LT	1103		1151.0																																									
		1103	1102		1146.2	1145.1																											272														
L 120+00	64 LT	1104		1150.7																																									
		1104	1103		1147.6	1146.2																										196															
Y6 10+70	29 RT	1105		1154.0																																									
		1105	1104		1151.0	1147.7																										60															
L 117+00	84 RT	1106						28									X	X	X	X																									
L 123+00	64 RT	1107		1148.8																																									
		1107	1127		1144.0	1137.8	0.7																																	104							
L 125+25	64 RT	1108		1146.3																																									
		1108	1109		1143.5	1141.7																															112								
L 126+40	64 RT	1109		1144.5																																									
		1109	1110		1141.7	1139.2																															144								
L 127+85	64 RT	1110		1142.0																																									
		1110	1211		1139.2	1134.7	0.3																														212								
L 121+49	90 LT	1111	1112		1153.0	1147.0	0.4																										20														
L 121+57	71 LT	1112		1150.5																																									
		1112	1121		1147.0	1146.6	0.5																																	68							
L 123+78	62 LT	1113		1148.9																																									
SHEET TOTALS								28														92	172								4	264	612						952	12	172						

LINE & STATION	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		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	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		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
	1013	1011																														2											
L 108+32	1017							1								1			1	1																							
	1017	1009																																									
L 108+32	1018							1								1			1	1																							
	1018	1017																																									
L 110+00	1019							1								1			1	1																							
	1019	1017																																									
L 110+20	1020							1								1			1	1																							
	1020	1019																																									
L 108+52	1021							1														1			1																		
	1021	1018																																									
L 109+25	1022							1														1			1																		
	1022	1021																																									
L 109+88	1023							1														1			1																		
	1023	1022																																									
L 110+00	1027							1														1			1																		
	1027	1019																																									
WALL3 10+04	1028							1											1	1																							
	1028	1004																																									
WALL3 11+50	1029							1	2.8										1	1																							
	1029	1005																																									
WALL3 14+00	1030							1	1.3										1	1																							
	1030	1007																																									
L 101+62	1031							1														1			1																		
	1031	1005																																									
Y5 12+95	1033							1	4.6													1			1																		
	1033	1011																													2												
L 114+20	1101							1													1			1																			
	1101	1013																																									
L 115+25	1102							1													1			1																			
	1102	1101																																									
L 118+00	1103							1													1		1	1																			
	1103	1102																																									
L 120+00	1104							1														1		1																			
	1104	1103																																									
Y6 10+70	1105							1														1		1																			
	1105	1104																																									
L 117+00	1106																																										
L 123+00	1107							1													1			1																			
	1107	1127																																									
L 125+25	1108							1														1		1																			
	1108	1109																																									
L 126+40	1109							1														1		1																			
	1109	1110																																									
L 127+85	1110							1														1		1																			
	1110	1211																																									
L 121+49	1111	1112																																									
L 121+57	1112							1														1		1																			
	1112	1121																																									
L 123+78	1113							1													1		1	1																			
SHEET TOTALS								24	8.7							4			7	7	5	12	2	11	6						2	2											

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

JSTANOVICH

COMPUTED BY: DJS DATE: 05/24/2023

CHECKED BY: JGD DATE: 05/24/2023

PROJECT NO.	SHEET NO.
U-5312	3D-5

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		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE)													C. S. PIPE							R. C. PIPE CLASS III								R. C. PIPE CLASS IV								R. C. PIPE CLASS V		36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS
SIZE									15	18	24	30	36	42	48							15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15				
THICKNESS OR GAUGE			FROM	TO	FT.	FT.	FT.	%								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	.064	.064	.064	.079	.079	.109	.109																					CY	CY
			1113	1114		1144.6	1140.9	0.6																																		220											
L 126+00	64	LT	1114		1145.2																																													
			1114	1116		1139.9	1139.6																																				72									
L 125+78	93	LT	1115		1154.8																																													
			1115	1114		1144.0	1140.9	0.4																						36																			
L 126+72	82	LT	1116		1150.3																																													
			1116	1117		1139.6	1138.5	0.3																								20																	
L 126+85	64	LT	1117		1143.8																																													
			1117	1201		1138.5	1136.0	0.3																																			164									
L 120+00	8	LT	1119		1154.4																																													
			1119	1120		1151.2	1151.1																																16												
L 120+00	8	RT	1120		1154.4																																													
			1120	1122		1151.1	1147.2																																184												
L 121+87	8	LT	1121		1153.4																																													
			1121	1122		1146.6	1146.5	0.5																																	16										
L 121+87	8	RT	1122		1153.4																																													
			1122	1126		1146.5	1144.8	0.5																																	56										
L 122+00	64	RT	1126		1149.6																																													
			1126	1107		1144.8	1144.0	0.5																							96																		
L 124+06	71	RT	1127		1146.7																																													
L 121+57	71	LT	1129																																															
L 123+00	93	RT	1130		1150.1																																													
			1130	1107		1147.3	1144.7																																28												
L 125+25	93	RT	1131		1146.4																																													
			1131	1108		1143.6	1143.5																																28												
L 128+50	74	LT	1201		1141.3																																													
			1201	1202		1136.0	1132.7	0.4																								124																	
L 129+73	99	LT	1202		1138.0																																													
			1202	1203		1132.7	1132.2	0.4																								68																	
L 130+35	64	LT	1203		1137.5																																													
			1203	1204		1132.2	1125.1	0.4																																			236									
L 132+75	64	LT	1204		1130.4																																													
			1204	1205		1125.1	1119.7	0.5																																			184									
L 134+60	64	LT	1205		1125.0																																													
			1205	1207		1119.7	1117.0	0.6																																			80									
L 135+30	86	LT	1206		1126.6																																													
			1206	1207		1120.5	1118.3																					24																				
L 135+40	64	LT	1207		1122.6																																													
			1207	1208		1117.0	1113.1	0.7																																			132									
L 136+75	64	LT	1208		1118.6																																													
			1208	1209		1113.1	1109.9	0.7																																			104									
L 137+80	64	LT	1209		1115.5																																													
			1209	1210		1109.9	1098.3	0.7																																			400									
L 141+80	64	LT	1210		1103.6																																													
			1210	1318		1098.3	1092.2	0.9																																			300									
L 130+00	64	RT	1211		1137.5																																													
			1211	1212		1134.5	1124.2																																	340											
L 133+40	64	RT	1212		1128.5																																													
			1212	1213		1124.2	1120.5	0.7																																	124											
L 134+65	64	RT	1213		1124.8																																													
SHEET TOTALS																														24	36	96	212					256	684	72	1672									

FROM	TO	DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
		MASONRY	0' THRU 5'	A 5' THRU 10'	B 10' AND ABOVE		GRATE TYPE E	F	G		D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																										
		CY	EACH	LIN. FT.	LIN. FT.																													CY	CY	CY	LIN. FT.	
1113	1114																																					
1114			1	0.3												1			1																			
1114	1116																																					
1115			1	5.0	0.8	1	1																															
1115	1114																																					
1116			1	5.0	0.7																1		1															
1116	1117																																					
1117			1	0.3												1			1																			
1117	1201																																					
1119			1								1			1	1																							
1119	1120																																					
1120			1								1			1	1																							
1120	1122																																					
1121			1	1.8							1			1	1																							
1121	1122																																					
1122			1	1.9							1			1	1																							
1122	1126																																					
1126			1													1			1																			
1126	1107																																					
1127			1	3.9												1			1																			
1129																																1						Special Detail MCF (See PSH 2C-11)
1130			1														1		1																			
1130	1107																																					
1131			1														1		1																			
1131	1108																																					
1201			1	0.3												1			1																			
1201	1202																																					
1202			1	0.3												1			1																			
1202	1203																																					
1203			1	0.3												1			1																			
1203	1204																																					
1204			1	0.3												1			1																			
1204	1205																																					
1205			1	0.3												1			1																			
1205	1207																																					
1206			1	1.1																	1		1															
1206	1207																																					
1207			1	0.6												1			1																			
1207	1208																																					
1208			1	0.5												1			1																			
1208	1209																																					
1209			1	0.6												1			1																			
1209	1210																																					
1210			1	0.3												1			1																			
1210	1318																																					
1211			1														1		1																			
1211	1212																																					
1212			1														1		1																			
1212	1213																																					
1213			1														1		1																			
SHEET TOTALS			25	22.8	1.5	1	1				4			4	4	13	5		18		2		2									1						

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

JSTANOVICH

COMPUTED BY: DJS DATE: 05/24/2023
CHECKED BY: JGD DATE: 05/24/2023

PROJECT NO.	SHEET NO.
U-5312	3D-6

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 %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 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	C. S. PIPE 15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109
		1213	1221		1120.5	1117.8	1.1																				
L 138+55	109 RT	1214		1122.8																							
		1214	1215		1117.1	1109.1	0.6															44					
L 138+50	65 RT	1215		1113.4																							
		1215	1301		1108.1	1097.5																					
L 129+45	8 LT	1217		1142.5																							
		1217	1218		1139.2	1139.1																					
L 129+45	8 RT	1218		1142.5																							
		1218	1211		1139.1	1134.7																					
L 137+55	8 LT	1219		1119.9																							
		1219	1209		1116.6	1111.4																					
L 137+55	7 RT	1220		1119.9																							
		1220	1219		1116.7	1116.6																					
L 136+00	64 RT	1221		1120.8																							
		1221	1222		1116.0	1115.7																					
L 136+75	86 RT	1222		1120.6																							
		1222	1227		1115.7	1111.9	0.3																				
L 132+54	78 LT	1223																									
L 133+40	115 RT	1224		1131.2																							
		1224	1212		1128.4	1124.5																					
L 134+65	113 RT	1225		1126.3																							
		1225	1213		1122.3	1120.8																					
L 136+82	117 RT	1226		1124.3																							
		1226	1222		1120.2	1116.8																					
L 138+36	45 RT	1227		1116.7																							
		1227	1215		1110.3	1108.1																					
L 142+06	68 RT	1301		1102.8																							
		1301	1303		1097.0	1093.7																					
L 144+02	122 RT	1302		1108.5																							
		1302	1303		1104.7	1095.2																48					
L 144+00	73 RT	1303		1099.5																							
		1303	1305		1093.7	1090.7																					
L 145+80	121 RT	1304		1103.6																							
		1304	1305		1098.6	1092.2			48								X	X	X	X							
L 145+70	74 RT	1305		1096.5																							
		1305	1307		1090.7	1090.1																					
L 146+78	48 RT	1306		1096.8																							
		1306	1307		1093.7	1091.9																					
L 147+04	64 RT	1307		1098.0																							
		1307	1310		1090.1	1087.7	0.3																				
L 148+10	55 RT	1308		1096.0																							
		1308	1310		1091.9	1089.5																					
L 148+46	55 RT	1309		1095.7																							
		1309	1308		1092.6	1092.3																					
L 148+17	81 RT	1310		1093.5																							
		1310	1313		1087.7	1086.4	0.4																				
L 148+27	128 RT	1311		1103.9																							
		1311	1310		1100.9	1089.5																48						
L 149+38	117 RT	1312		1101.4																							
		1312	1313		1098.1	1087.9																	48				
							SHEET TOTALS		48												48	140					

FROM	TO	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	R. C. PIPE CLASS V 12	15	36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.
1213	1221											132															
1214																									1	0.7	
1214	1215																										
1215																									1	0.3	
1215	1301													356													
1217																									1		
1217	1218										16																
1218																									1		
1218	1211										80																
1219																									1		
1219	1209										60																
1220																									1		
1220	1219										16																
1221																									1		
1221	1222												76														
1222																									1		
1222	1227												164														
1223																											
1224																									1		
1224	1212		52																								
1225																									1		
1225	1213		48																								
1226																									1		
1226	1222		32																								
1227																									1	1.4	
1227	1215													24													
1301																									1	0.8	
1301	1303						192																				
1302																									1		
1302	1303																										
1303																									1	0.8	
1303	1305						168																				
1304																									1		
1304	1305																										
1305																									1	0.8	
1305	1307														132												
1306																									1		
1306	1307										32																
1307																											
1307	1310						112																				
1308																									1		
1308	1310		28																								
1309																									1		
1309	1308										36																
1310																									1	0.8	
1310	1313						132																				
1311																									1		
1311	1310																										
1312																									1		
1312	1313																										
SHEET TOTALS			160				604				240	132	240	380	132										23	5.6	

FROM	TO	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		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
1213	1221																																	
1214																	1		1															
1214	1215																					2												
1215												1			1																			
1215	1301																																	
1217							1			1	1																							
1217	1218																																	
1218							1			1	1																							
1218	1211																																	
1219							1			1	1																							
1219	1209																																	
1220							1			1	1																							
1220	1219																																	
1221												1			1																			
1221	1222																																	
1222												1				1																		
1222	1227																																	
1223																												1						Special Detail MCF (See PSH 2C-11)
1224													1		1																			
1224	1212																																	
1225													1		1																			
1225	1213																																	
1226													1		1																			
1226	1222																																	
1227												1				1																		
1227	1215																																	
1301												1			1																			
1301	1303																																	
1302		1	1																															
1302	1303																					2												
1303												1			1																			
1303	1305																																	
1304										1	1																							
1304	1305																																	
1305												1			1																			
1305	1307																																	
1306		1	1																															
1306	1307																																	
1307																			1	1														Special Detail Convert to JB (See PSH 2C-13)
1307	1310																																	
1308		1		1																														
1308	1310																																	
1309		1		1																														
1309	1308																																	
1310												1			1																			
1310	1313																																	
1311		1	1																															
1311	1310																				2													
1312		1	1																															
1312	1313																					2												
SHEET TOTALS		6	4	2			4			5	5	8	3		9	2	1		2	1	2	6						1						

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

JSTANOVICH

COMPUTED BY:	DJS	DATE:	05/24/2023
CHECKED BY:	JGD	DATE:	05/24/2023

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-5312	3D-7

**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 %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 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	C. S. PIPE 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	R. C. PIPE CLASS V 12	15	36" WELDED STEEL PIPE 0.532" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK, GRADE B (50% IN SOIL, 50% NOT IN SOIL)	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		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	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. (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/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING D.I. TO J.B.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	36" C.S. ELBOW	42" C.S. ELBOW	BERM DRAINAGE OUTLET STD. 850.10(4" CONCRETE	MODIFIED CONC. FLUME		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 149+50	70 RT	1313		1092.2																																															1	0.8												1			1																			
		1313	1314		1086.4	1082.7	0.4																										288																																																										
L 152+40	74 RT	1314		1088.5																																															1	0.8												1			1																			
		1314	1315		1082.7	1078.1	0.5																																				208																																																				
L 154+50	64 RT	1315		1084.8																																															1	1.7												1			1																			
		1315	1316		1078.1	1075.8	0.4																										108																																																										
L 155+50	110 RT	1316		1081.6																																															1	0.8												1			1																			
		1316	1403		1075.8	1062.6	0.4																										400																																																										
L 144+42	55 LT	1317		1101.0																																															1			1			1																																	
		1317	1318		1097.2	1093.5																							44																																																															
L 144+80	74 LT	1318		1097.5																																															1	0.8												1			1																			
		1318	1319		1091.7	1091.0	0.4																																				120																																																			
L 146+00	72 LT	1319		1096.8																																															1	0.8												1			1																			
		1319	1320		1091.0	1086.1	0.4																																				400																																																				
L 150+00	64 LT	1320		1091.9																																															1	0.8												1			1																			
		1320	1321		1086.1	1081.9	0.4																																				348																																																				
L 153+50	64 LT	1321		1087.7																																															1	0.8												1			1																			
		1321	1328		1081.9	1075.6	0.5																																				224																																																				
L 145+70	8 LT	1322		1100.1																																															1								1			1	1																									
		1322	1323		1096.9	1096.8																															16																																																								
L 145+70	8 RT	1323		1100.1																																															1								1			1	1																									
		1323	1305		1096.8	1092.5																															64																																																								
L 147+58	8 LT	1324		1097.7																																															1								1			1	1																									
		1324	1325		1094.4	1094.3																															16																																																								
L 147+58	8 RT	1325		1097.7																																															1								1			1	1																									
		1325	1308		1094.3	1092.3																															68																																																							
L 154+50	8 LT	1326		1088.5																																															1	3.4							1			1	1																									
		1326	1327		1080.1	1080.0																															16																																																							
L 154+50	8 RT	1327		1088.5																																															1	3.5							1			1	1																									
		1327	1315		1080.0	1079.8																															56																																																							
L 155+75	67 LT	1328		1081.4																																															1	0.8												1			1																			
		1328	1416		1075.6	1061.5	0.5																																				228																																																				
L 156+32	8 LT	1401		1084.2																																															1								1			1	1																									
		1401	1326		1080.9	1080.1																															180																																																								
L 156+32	8 RT	1402		1084.2																																															1								1			1	1																									
		1402	1401		1081.0	1080.9																															16																																																							
L 159+50	82 RT	1403		1068.4																																															1	0.8							1					1			1																			
		1403	1404		1062.6	1052.7	0.4																										316																																																									
L 162+70	85 RT	1404		1058.5																																															1	0.8							1					1			1																			
		1404	1415		1052.7	1038.1	0.4																																				280																																																				
L 162+75	8 LT	1405		1062.4																																															1								1			1	1																									
		1405	1407		1059.2	1050.4																															192																																																								
L 162+75	8 RT	1406		1062.4																																															1								1			1	1																									
		1406	1405		1059.2	1059.2																															16																																																							
L 164+70	8 LT	1407		1053.8																																															1								1			1	1																									
		1407	1409		1050.4	1048.8																															52																																																							
L 164+70	8 RT	1408		1053.8																																															1								1			1	1																									
		1408	1407		1050.5	1050.4																															16																																																							
L 164+95	53 LT	1409		1051.9																																															1			1			1																																	
		1409	1410		1048.8	1040.5																															188																																																							
SHEET TOTALS																													44				1112				896				1808										25	16.6		2			2		14			12	12	11			11																			

ABBREVIATIONS	
C.A.A.	CORRUGATED ALUMINIUM ALLOY
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D.I.	DROP INLET
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