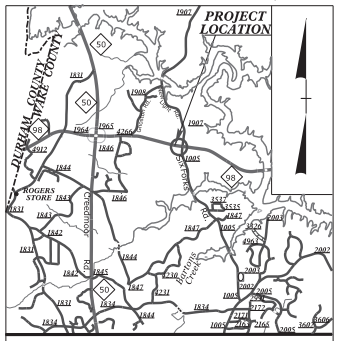
09/08/99

CONTRACT: DE00438 TIP PROJECT: SM-5705AG

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



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

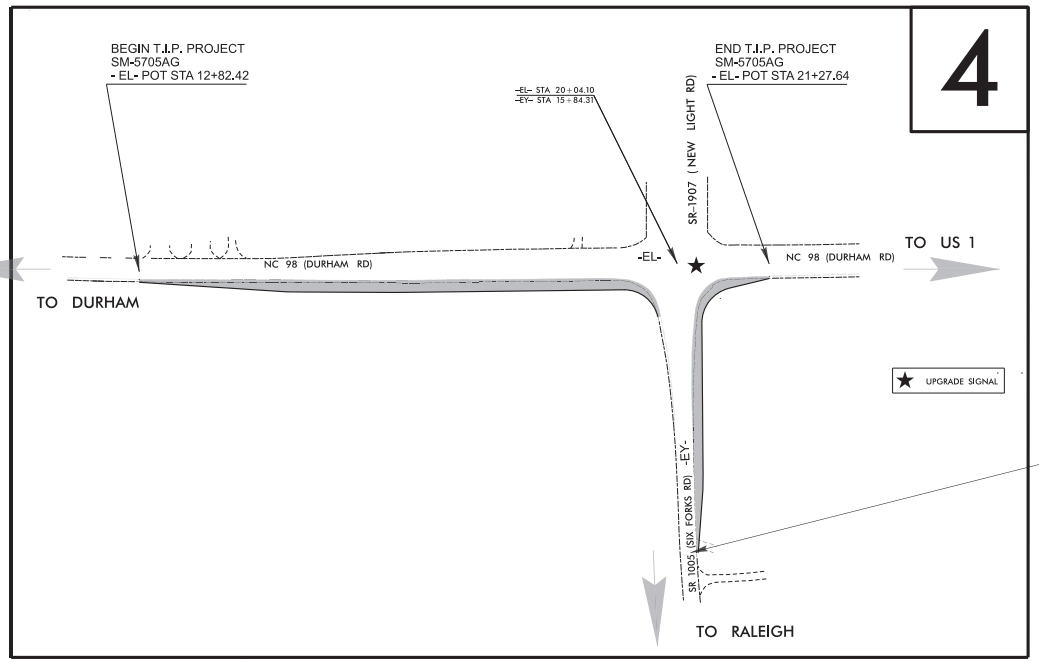
WAKE COUNTY

LOCATION: NC 98 (DURHAM RD.) AT SR1005 (SIX FORKS RD.)

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

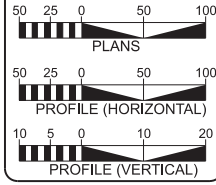
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-5705AG	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48903.1.1		PE
48903.2.1		R/W
48903.3.1		CONST.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

-EL-: ADT 2026 = 21,700
ADT 2046 = 32,600
T = 5 % *
V = 60 MPH
* TTST =4 DUAL= 1
FUNC CLASS = MINOR ARTERIAL

-EY-: ADT 2026 = 7,500
ADT 2046 = 10,900
V = 50 MPH
FUNC CLASS = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY PROJECT SM-5705AG = 0.160 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
2612 N. Duke St., Durham, NC, 27704

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 9, 2024

LETTING DATE: JUNE 10, 2026

MATTHEW J NOLFO, P.E.
PROJECT ENGINEER

SUNIL J. PATEL
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
04/16/2026
P.E
SIGNATURE:

ROADWAY DESIGN ENGINEER
04/16/2026
P.E
SIGNATURE:

STATE OF NORTH CAROLINA
FIFTH DIVISION
BECCA GALLAS, PE
DIVISION ENGINEER

5/26/20

SM-5705AG

1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

02/18/2026

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY LC

REVISIONS

INDEX OF SHEETS

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE AT&T (FIBER) AND

CHARTER/SPECTRUM (FIBER)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Standard has a detail in lieu)
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
816.04	Markers for Drainage Structure and Concrete Pad (Standard has a detail in lieu)
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.54	Manhole Frame and Cover
840.72	Pipe Collar
876.02	Guide for Rip Rap at Pipe Outlets

9/21/21

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

SM-5705AG | 1B

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

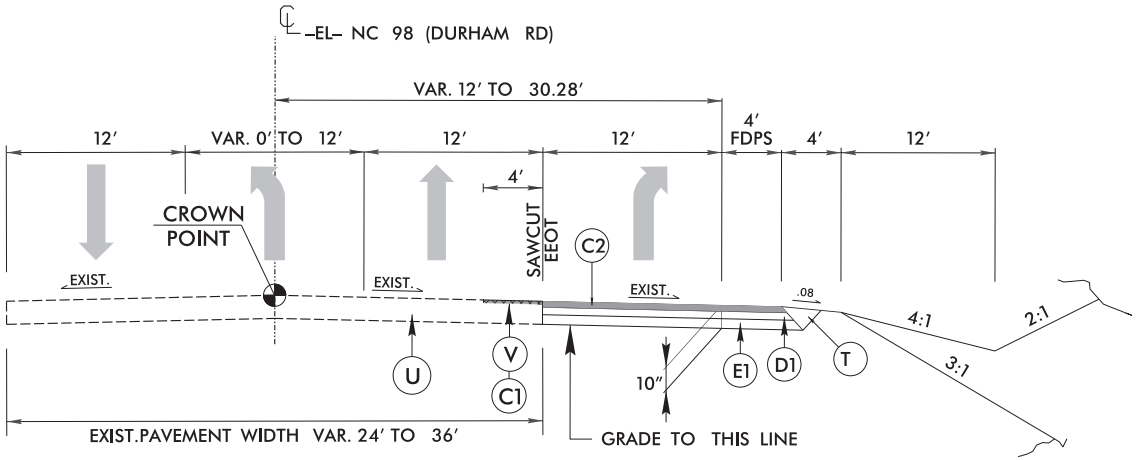
SANITARY SEWER:

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

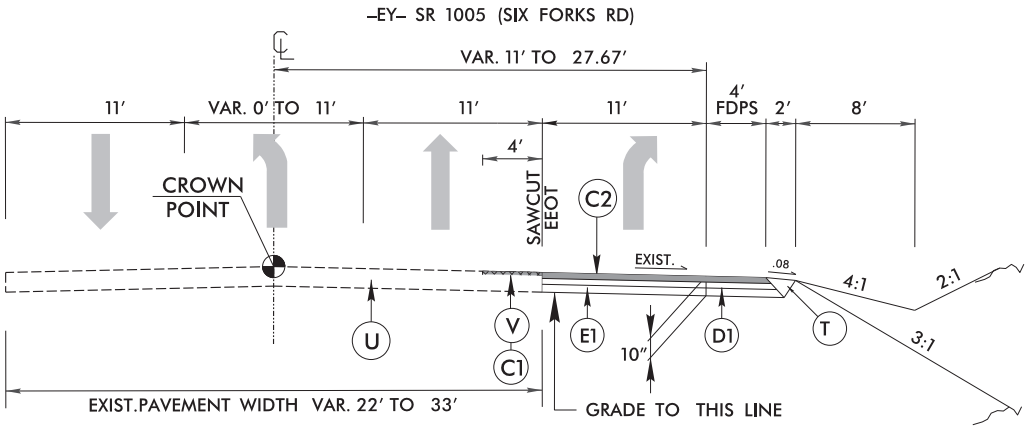
MISCELLANEOUS:

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

5/26/20



TYPICAL SECTION NO. 1
–EL– STA. 12+82.42 TO 19+32.11



TYPICAL SECTION NO. 2
–EY– STA. 11+95.86 TO 15+50.03

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5″ ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
D1	PROP. APPROX. 3″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 4″ ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	1.5″ MILLING.

NOTES:
1) THE PORTION OF EACH EXISTING PAVED SHOULDER THAT IS NOT FULL DEPTH IS TO BE REMOVED AND PAVED TO FULL DEPTH.
2) PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
3) SEE PLANS FOR LOCATIONS OF TURN LANES AND TAPERS.
4) SEE PLANS FOR RADII TURNOUTS AT INTERSECTIONS.

SM-5705AG
2A-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

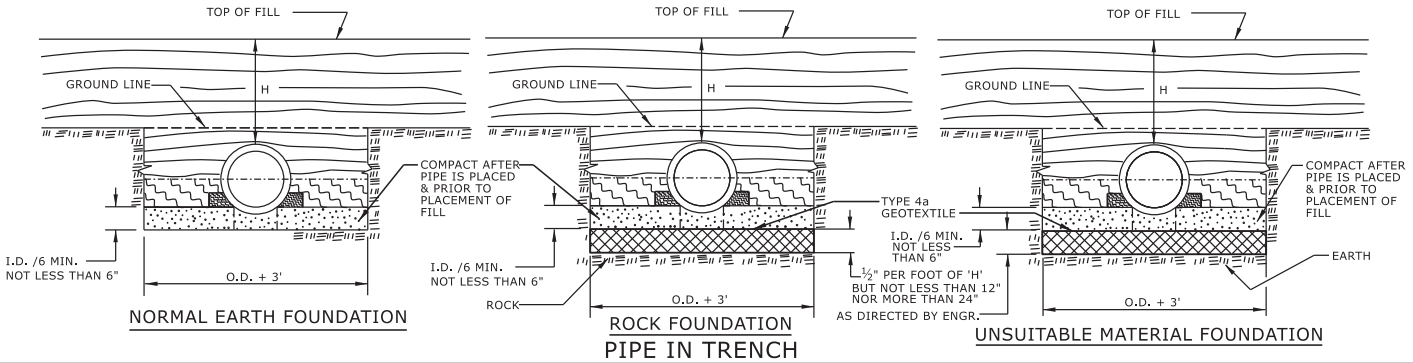
ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 058695 ENGINEER MATTHEW J NOLAN
02/18/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

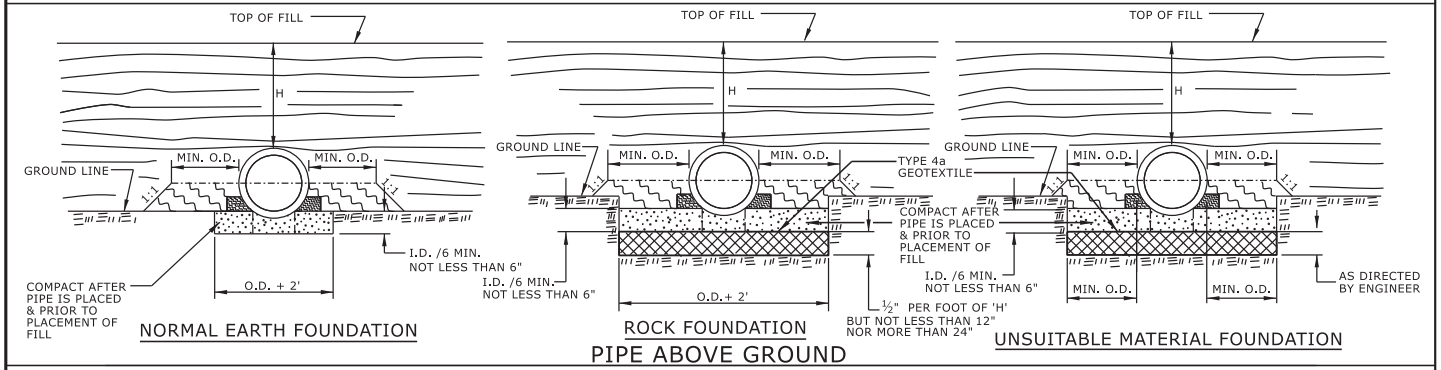
PREPARED BY LC

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	2C-1



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

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

UNDISTURBED EARTH MATERIAL

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

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

12/16/2025

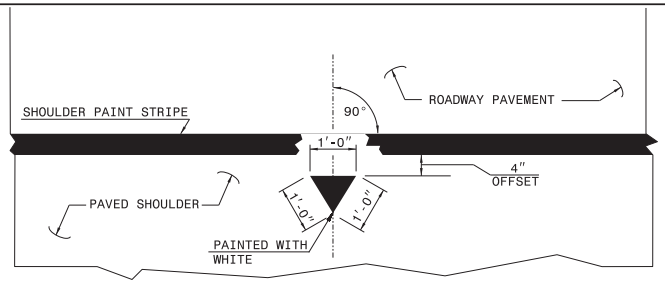
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

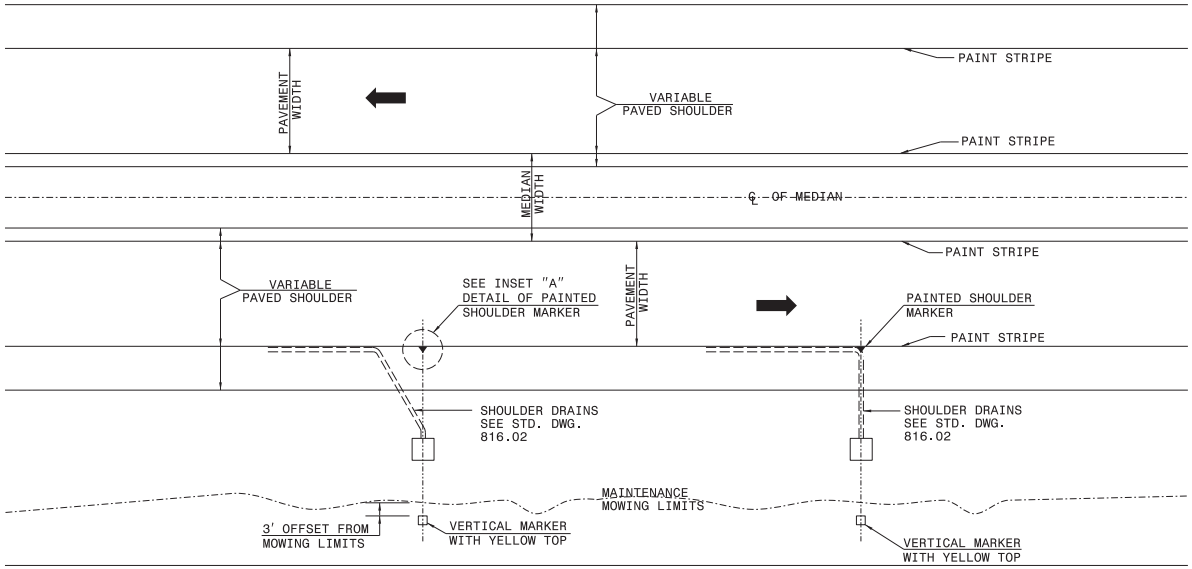
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	2C-2



INSET "A"



PAINTED SHOULDER AND VERTICAL MARKER

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

ROADWAY DETAIL DRAWING FOR

MARKERS FOR DRAINAGE STRUCTURE AND CONCRETE PAD

SHEET 1 OF 2

816D04

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M HACKLER

12/16/2025

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	2C-3

NOTES:

1. DESIGN CONFORMS WITH THE SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS - AASHTO.
2. USE MATERIALS, FABRICATE AND ERECT SIGNS AND SUPPORTS THAT CONFORM TO THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
3. USE HIGH STRENGTH BOLTS, NUTS AND WASHERS THAT CONFORM TO ASTM A-325 AND THAT ARE GALVANIZED IN ACCORDANCE WITH ASTM F2329 OR B695 CLASS 55.
4. USE BACKING PLATES, SLIP BASE PLATES, FRICTION PLATES, AND HINGE PLATES THAT CONFORM TO ASTM A-36 AND THAT ARE GALVANIZED IN ACCORDANCE WITH ASTM A-123 PRIOR TO GALVANIZING, GRIND SMOOTH ANY METAL PROJECTION BEYOND THE PLATE FACE. KEEPER PLATES SHALL BE MANUFACTURED FROM 28 GAUGE SHEET STEEL THAT CONFORMS TO ASTM A-36 AND IS GALVANIZED IN ACCORDANCE WITH ASTM A-123
5. ASSEMBLE HINGE CONNECTIONS IN THE SHOP. THE SHOP SHALL TIGHTEN BOLTS BY USE OF EITHER A CALIBRATED POWER WRENCH OR A MANUAL TORQUE WRENCH. TIGHTEN EACH HINGE CONNECTION BOLT TO 1/3 PAST SNUG.
6. BASE PLATES DETAILS ARE FOR INSTALLATIONS ON THE RIGHT SHOULDER AND IN GORE AREAS.
7. ASSEMBLE UPPER SUPPORT TO STUB AS SHOWN IN DETAIL. SLIP BASE PLATES SHALL BE FILLET WELDED ONTO SUPPORTS ALL AROUND THE STRUCTURAL SHAPE SO AS TO INSURE NO LOSS OF STRENGTH. ASSEMBLE IN EITHER SHOP OR FIELD. 28 GAUGE KEEPER PLATE IS PLACED BETWEEN SLIP BASE PLATES TO PREVENT BOLT SLIPPING. TIGHTEN BOLTS TO THE FOLLOWING PRESCRIBED TORQUE:

BOLT DIAMETER	TORQUE (LB. FT.)
1/2"	9
5/8"	22
3/4"	37
1"	48

COMPLETELY ASSEMBLE BREAKAWAY SUPPORTS PRIOR TO ERECTION. BREAKAWAY SUPPORT TO BE SET IN ONE PIECE. AFTER SUPPORT HAS BEEN ERECTED AND THE CONCRETE FOOTINGS HAS CURED AT LEAST 48 HOURS, CLEAN CONCRETE FROM BASE CONNECTION BOLTS THEN LOOSEN AND RE TIGHTEN EACH BOLT IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE. DO NOT OVER TIGHTEN. BURR ALL BOLT THREADS OF BASE CONNECTIONS TO PREVENT LOOSENING.

8. ELIMINATE HINGE CONNECTION FOR ALL SINGLE SUPPORT SIGNS.
9. DETAIL IS FOR ONE DIRECTION BREAKAWAY. WHEN PLANS REQUIRE A TWO DIRECTION BREAKAWAY, TWO FRICTION PLATES SHALL BE USED IN LIEU OF ONE FRICTION PLATE AND ONE HINGE PLATE.

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

ROADWAY DETAIL DRAWING FOR

GROUND MOUNTED SIGN SUPPORTS

SHEET 3 OF 3

903D1003

NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V. SPRINGER

12/16/2025

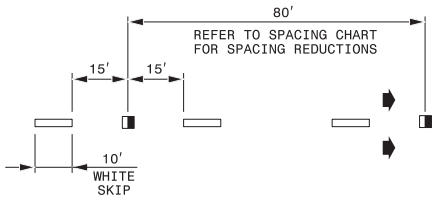
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

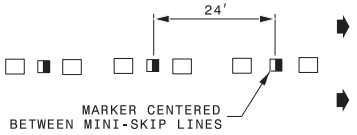
ORIGINAL BY: R.S. GALLO DATE: 05-22-2025
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	2C-4

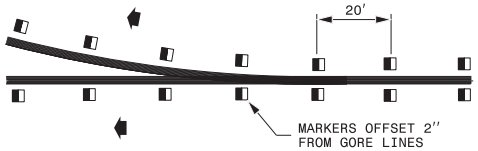
10′-30′/SP SKIP LINE



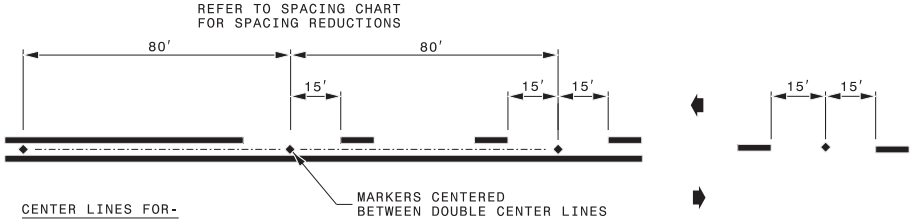
3′-9′/SP MINI-SKIP LINE



GORE LINES



YELLOW CENTER LINES

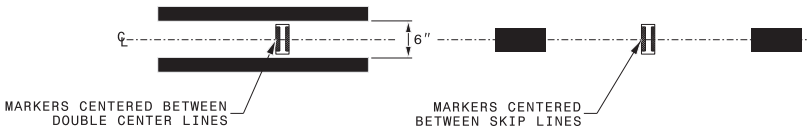


CENTER LINES FOR-

TWO-LANE, TWO-WAY ROADWAYS
UNDIVIDED ROADWAYS
TWO-WAY LEFT TURN LANES

DETAIL OF PAVEMENT MARKER PLACEMENT

RAISED REFLECTIVE PAVEMENT MARKERS



LEGEND

- CRYSTAL/RED PAVEMENT MARKER
- YELLOW/YELLOW PAVEMENT MARKER
- DIRECTION OF TRAFFIC FLOW

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

ROADWAY DETAIL DRAWING FOR

RAISED PAVEMENT MARKERS

INSTALLATION SPACING

SHEET 2 OF 3

1250D01

NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V SPRINGER

12/16/2025

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: M.V. SPRINGER DATE: 2-15-24
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

5/26/20

COMPUTED BY: LC DATE: 4/03/2024
CHECKED BY: THOMAS R MEADOWS DATE: 5/03/2024

SM-5705AG
38-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS *COUNTY: WAKE*

LOCATION STATION TO STATION	UNCLASSIFIED EXCAVATION	EMBT + 20%	BORROW	WASTE
–EL– 12 + 82.42 TO 19 + 80.99	615	401	0	214
SUBTOTALS No. 1	615	401	0	214
–EY– 11 + 95.86 TO –EL– 21 + 27.64	65	1,097	1,047	15
SUBTOTALS No. 2	65	1,097	1,047	15
PROJECT SUBTOTALS	680	1,498	1,047	229
WASTE IN LIEU OF BORROW	0	0	–229	0
PROJECT TOTALS			818	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT			41	–229
GRAND TOTALS	680	1,498	859	0
SAY	700		880	

SHALLOW UNDERCUT: 150 CY
CLASS IV STABILIZATION: 300 TONS

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

HY-329618L

COMPUTED BY:	SJM	DATE:	28May2024
CHECKED BY:		DATE:	

PROJECT NO.	SHEET NO.
SM-5705AG	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	54	60	66	72	78	84
-EY- 14+09	39 RT	0401	0499	358.2	351.5	349.9	6.1		28												
-EY- 14+13	31 RT	0405	0401				2.0		8												
-EY- 14+84	35 LF	0498		357.6	353.6	353.6															
-EY- 15+30	57 LF	0402	0498	357.4	354.4	353.6	1.5		52												
-EL- 17+66	50 RT	0403	0404	361.2	356.7		4.5				8										
-EL- 17+66	45 RT	0404																			
-EY- 12+00	22 RT								32												
SHEET TOTALS									120		8										
PROJECT TOTALS									120		8										

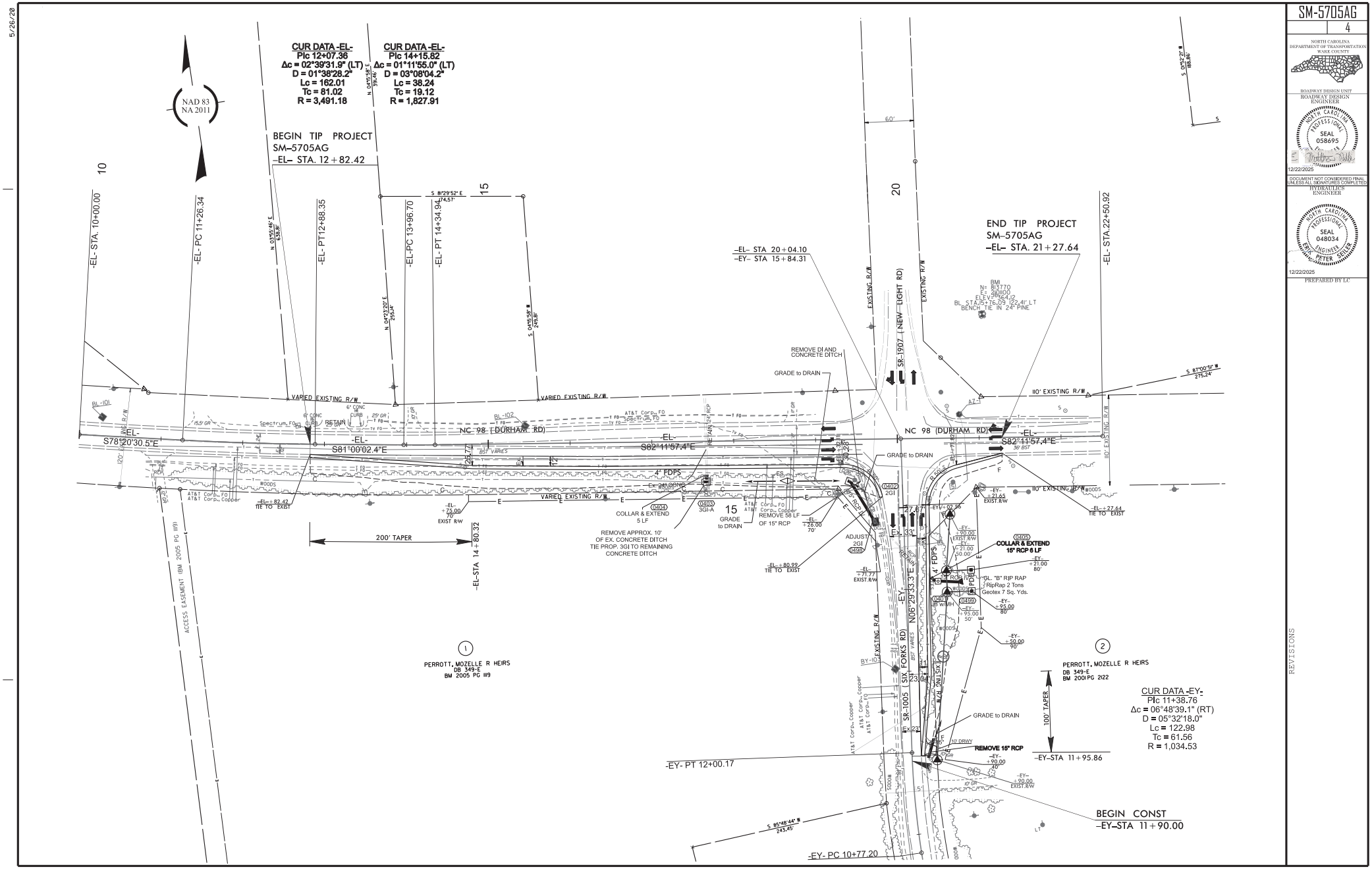
LINE & STATION	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 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	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28
-EY- 14+09				1	1.7										
-EY- 14+13															
-EY- 14+84															
-EY- 15+30				1										1	
-EL- 17+66				1									1		
-EL- 17+66															
-EY- 12+00															
SHEET TOTALS				3	1.7								1	1	
PROJECT TOTALS				3	1.7								1	1	

LINE & STATION	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36
-EY- 14+09											1				
-EY- 14+13															
-EY- 14+84															
-EY- 15+30				1											
-EL- 17+66				1											
-EL- 17+66															
-EY- 12+00															
SHEET TOTALS				2							1				
PROJECT TOTALS				2							1				

LINE & STATION	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	##" SPRING BOX PIPE	SPRING BOX STD. 840.41	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	ADJUST C.B.	ADJUST 2G.I.	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
-EY- 14+09						1							
-EY- 14+13										0.3990			
-EY- 14+84								1					
-EY- 15+30												58	replace existing DI and Pipe
-EL- 17+66													
-EL- 17+66										0.5526			
-EY- 12+00												21	Install and remove existing d/w pipe
SHEET TOTALS						1		1		0.9516		79	
PROJECT TOTALS						1		1		0.9516		79	

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



SM-5705AG

4

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058695

12/22/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 048034 ENGINEER PETER SELLER

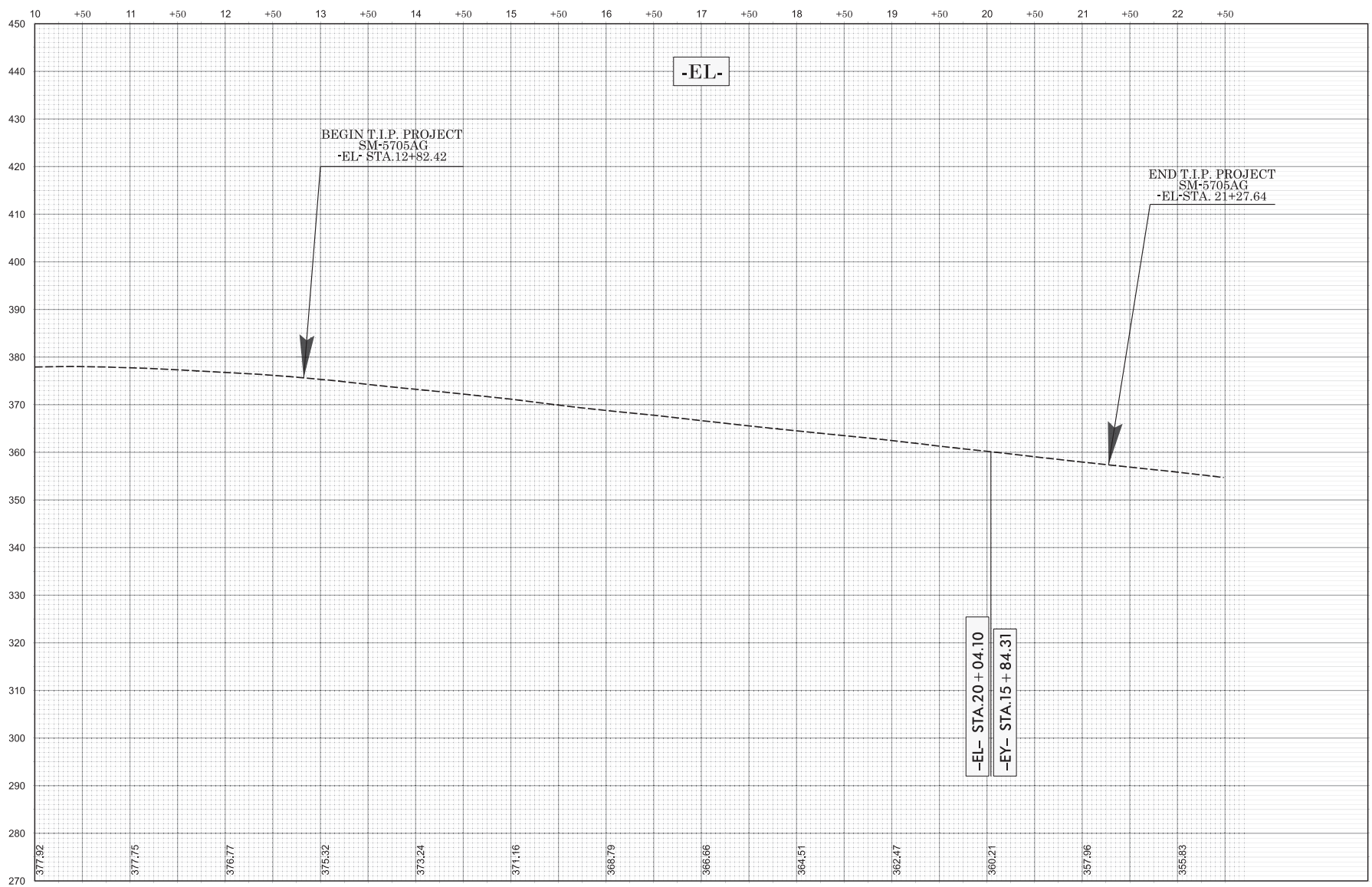
12/22/2025

PREPARED BY LC

REVISIONS

5/26/20

5/26/20



SM-5705AG

5

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058695 ENGINEER

12/22/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HYDRAULICS ENGINEER

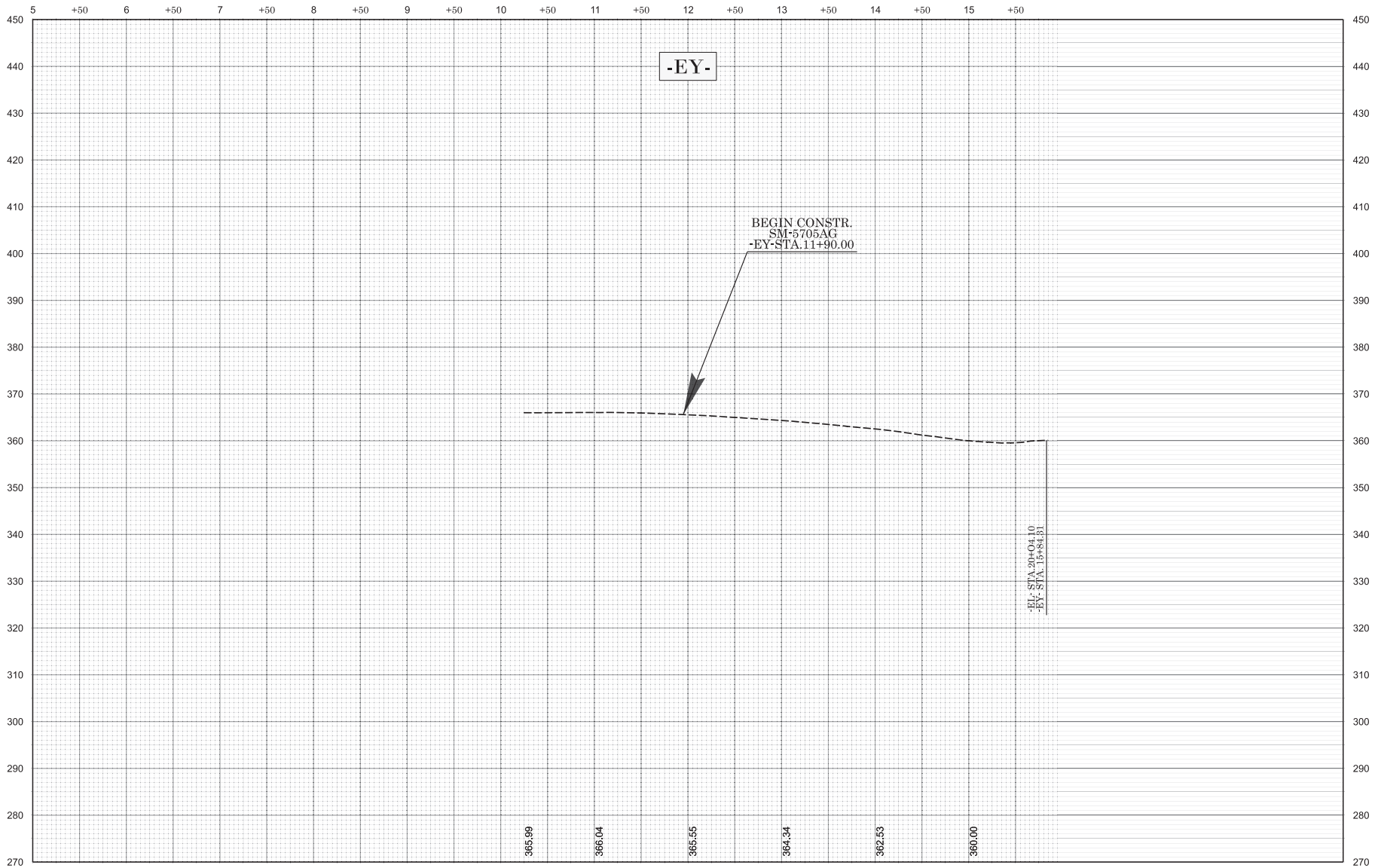
NORTH CAROLINA PROFESSIONAL SEAL 048034 ENGINEER MICHAEL PETER SEILER

12/22/2025

PREPARED BY LC

REVISIONS

5/26/20



SM-5705AG

6

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058695 ENGINEER

12/22/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 048034 ENGINEER PETER SEIER

12/22/2025

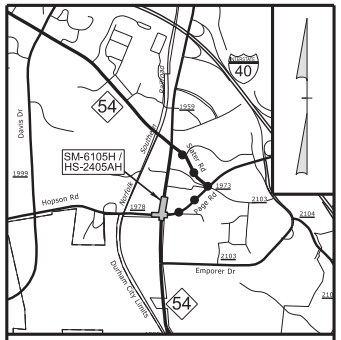
PREPARED BY LC

REVISIONS

11/14/23

CONTRACT: DE00438 TIP PROJECT: SM-6105H / HS-2405AH

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



VICINITY MAP (NTS)

● ● ● OFFSITE TRUCK DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

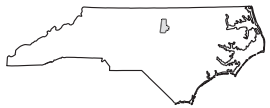
DURHAM COUNTY

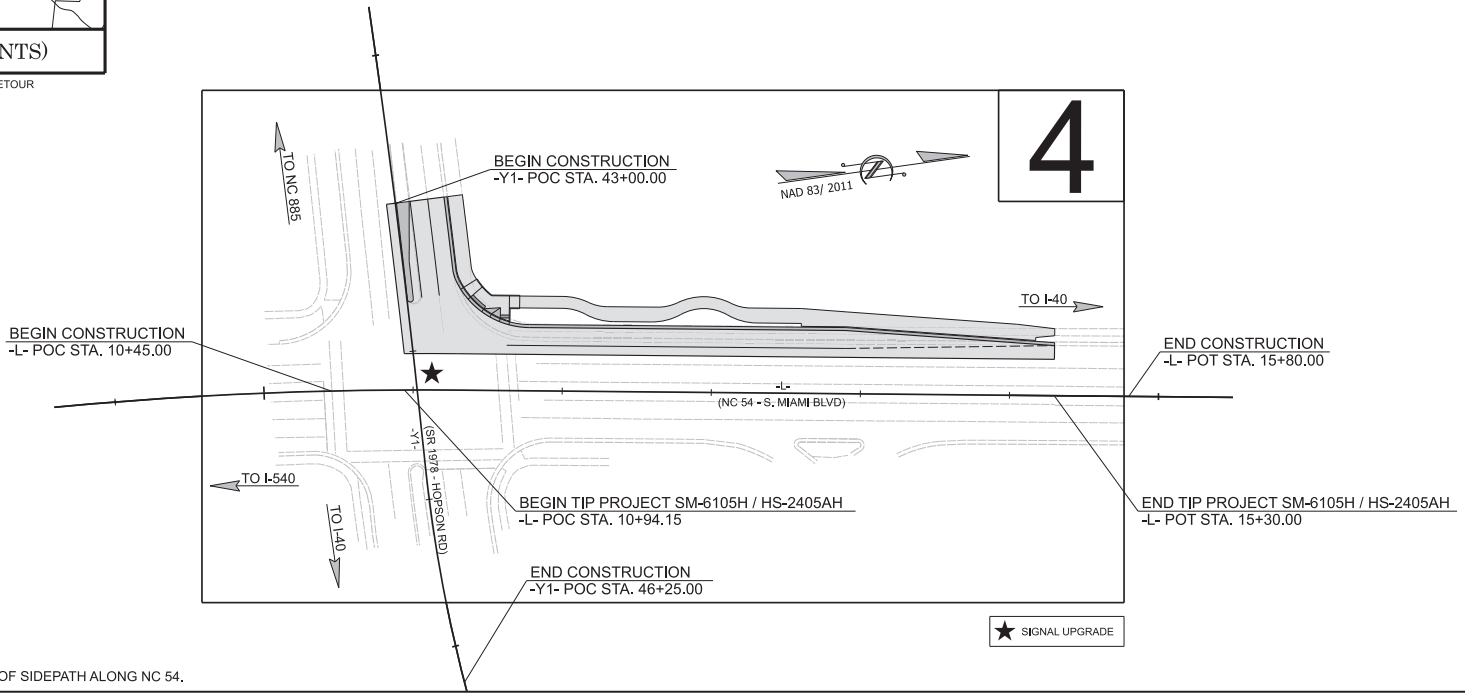
LOCATION: *NC 54 (S. MIAMI BLVD.) AT SR 1978 (HOPSON RD.) CONSTRUCT A SOUTHBOUND RIGHT TURN LANE ON NC 54*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, & WIDENING*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-6105H/HS-2405AH	1	73

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50694	N/A	PE, ROW, UTL, & CONST
50977.1.35	N/A	PE (HS-2405AH)
50977.3.35	N/A	CONST (HS-2405AH)

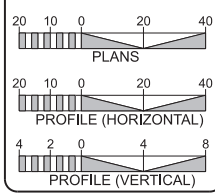




NOTES:
1. HS-2405AH TIP FOR CONSTRUCTION OF SIDEPATH ALONG NC 54.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2026 = 24,700
ADT 2046 = 36,700
K = N/A %
D = N/A %
T = N/A % *
V = 50 MPH
* TTST = 2% DUAL = N/A
FUNC CLASS =
MAJOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT SM-6105H / HS-2405AH = 0.083 MI
TOTAL LENGTH OF TIP PROJECT SM-6105H / HS-2405AH = 0.083 MI

Prepared for:
STATE OF NORTH CAROLINA
FIFTH DIVISION
BECCA GALLAS, PE
DIVISION ENGINEER

RIGHT OF WAY DATE:
DECEMBER 31, 2024

LETTING DATE:
JUNE 10, 2026

2024 STANDARD SPECIFICATIONS

NICK RAMIREZ, PE
PROJECT ENGINEER

MATTHEW DOUGLAS, PE
PROJECT DESIGN ENGINEER

MATTHEW NOLFO, PE
NCDOT CONTACT

HYDRAULICS ENGINEER
4/9/2026
SEAL 053425 NORTH CAROLINA PROFESSIONAL ENGINEER MATTHEW V. NOLFO
SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER
4/9/2026
SEAL 038940 PROFESSIONAL ENGINEER STEPHEN A. OCHSE
SIGNATURE: *P.E.*

Hydraulic Designs Prepared In the Office of:
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Roadway Designs Prepared In the Office of:
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

$$$-USER NAME-$$$ - $$$-DATE-$$$

5/26/20

INDEX OF SHEETS, LIST OF STANDARD DRAWINGS, & GENERAL NOTES

INDEX OF SHEETS

LIST OF STANDARD DRAWINGS

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
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
846.01	Concrete Curb, Gutter and Curb & Gutter
848.07	Concrete Sidepath / Shared Use Path / Greenway Construction
852.01	Concrete Islands

NOTE:

See special details in the plans for Method of Pipe Installation, Concrete Sidewalk, & Curb Ramps.

GENERAL NOTES

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE: AT&T, CHARTER
CITY OF DURHAM, CROWN CASTLE, DOMINION ENERGY, DUKE ENERGY, LUMEN, SEGRA
GOOGLE FIBER, FRONTIER, AND VERIZON

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS.
CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH SPECIAL DETAILS IN THE PLANS.

SM-6105H / HS-2405AH
4RDI | 1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
2/16/2026
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038481 MATTHEW A. DOCKERY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

REVISIONS

05/29/25

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

SM-6105H / HS-2405AH
4RD1 | 1B

Note: Not to Scale

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

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

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

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

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

ROADS AND RELATED FEATURES:
- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

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

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

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

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

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

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

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

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

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

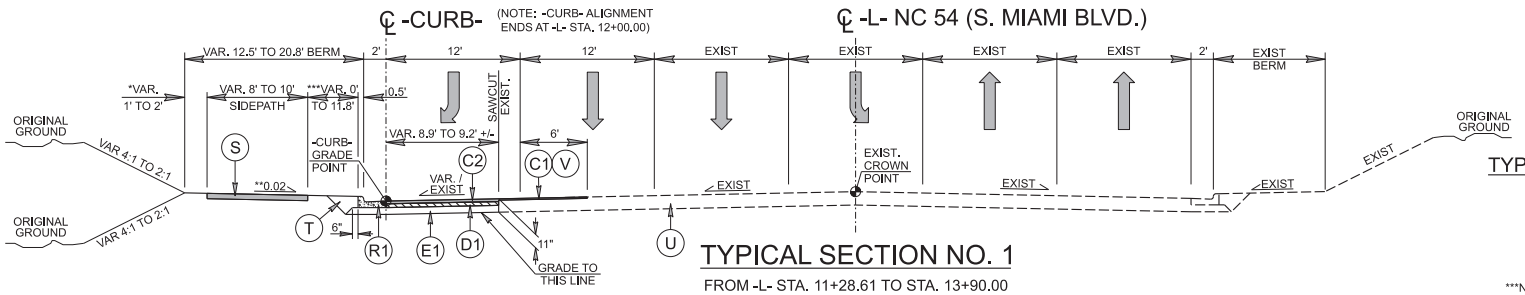
SANITARY SEWER:
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE - LOS A)*
- SS Force Main Line (SUE - LOS B)*
- SS Force Main Line (SUE - LOS C)*
- SS Force Main Line (SUE - LOS D)*

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

5/26/20

PAVEMENT SCHEDULE
(PROVIDED BY DIVISION)

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R1	PROPOSED 2'-6" CONCRETE CURB & GUTTER	T	EARTH MATERIAL
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	R2	PROPOSED 5" MONOLITHIC CONCRETE ISLAND (KEYED IN)	U	EXISTING PAVEMENT
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	S	PROPOSED SIDEPATH CONSTRUCTED OF 4" CONCRETE WITH WELDED WIRE MESH	V	1½" MILLING OF EXISTING PAVEMENT
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.			



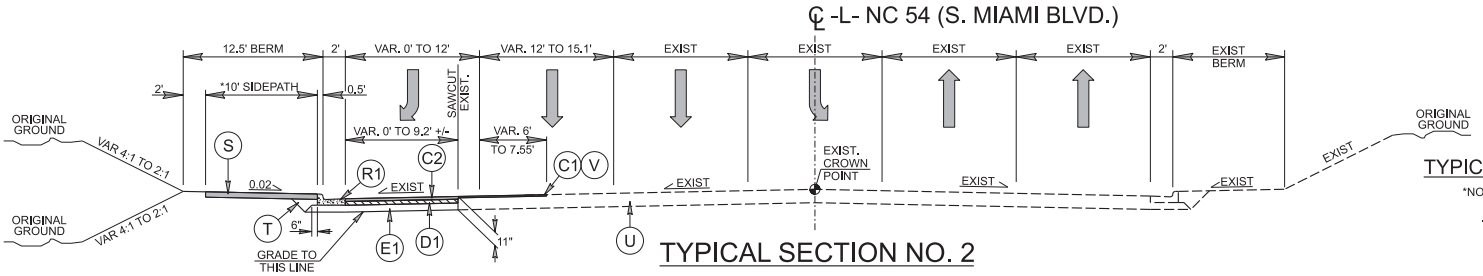
TYPICAL SECTION NO. 1
FROM -L- STA. 11+28.61 TO STA. 13+90.00

TYPICAL SECTION NO. 1 NOTES
*NOTE: UTILIZE 1' BEYOND SIDEPATH IN CONSTRAINED AREAS NEAR UTILITY POLES AND FENCES.

**NOTE: UTILIZE 0.01 BERM SLOPE FROM -L- STA. 11+64.06 TO STA. 12+15.00

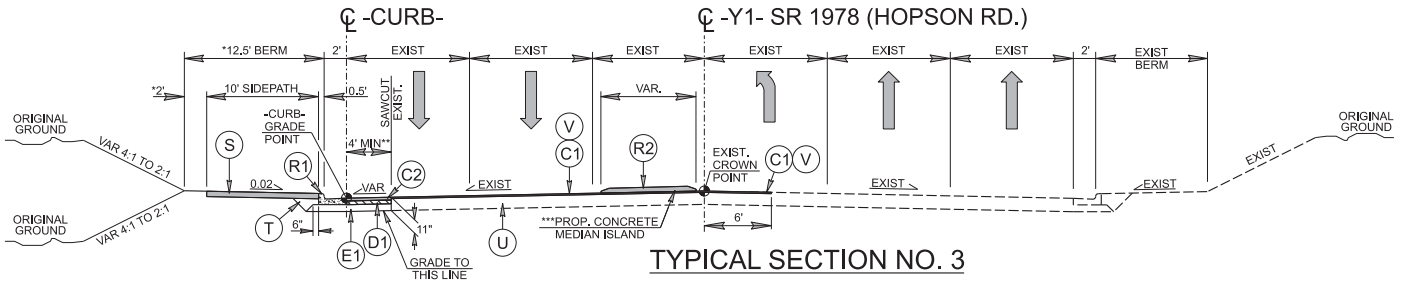
***NOTE: IF DISTANCE BETWEEN SIDEPATH AND BACK OF CURB IS LESS THAN 2', EXTEND SIDEPATH TO BACK OF CURB.

NOTE: SEE SHEET 2B-1 FOR LOCATION OF SAW CUT



TYPICAL SECTION NO. 2
FROM -L- STA. 13+90.00 TO STA. 15+30.00

TYPICAL SECTION NO. 2 NOTES
*NOTE: TRANSITION FROM 10' SIDEPATH TO EXISTING 5' SIDEWALK FROM -L- STA. 15+05.00 TO STA. 15+30.00



TYPICAL SECTION NO. 3
FROM -Y1- STA. 43+00.00 TO STA. 44+01.59

TYPICAL SECTION NO. 3 NOTES
*NOTE: UTILIZE 1' SHOULDER AND 11.5' BERM WIDTH -Y1- STA. 43+00.00 TO STA. 43+40.00

**NOTE: SEE SHEET 2B-1 FOR LOCATION OF SAW CUT

***SEE SHEET 2B-2 FOR LOCATION OF CONCRETE ISLAND (NOTE: MEDIAN ISLAND WORK ENDS AT STA. 43+70.00)

SM-6105H / HS-2405AH

4RD1	2A-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
2/16/2026
NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOCKERY

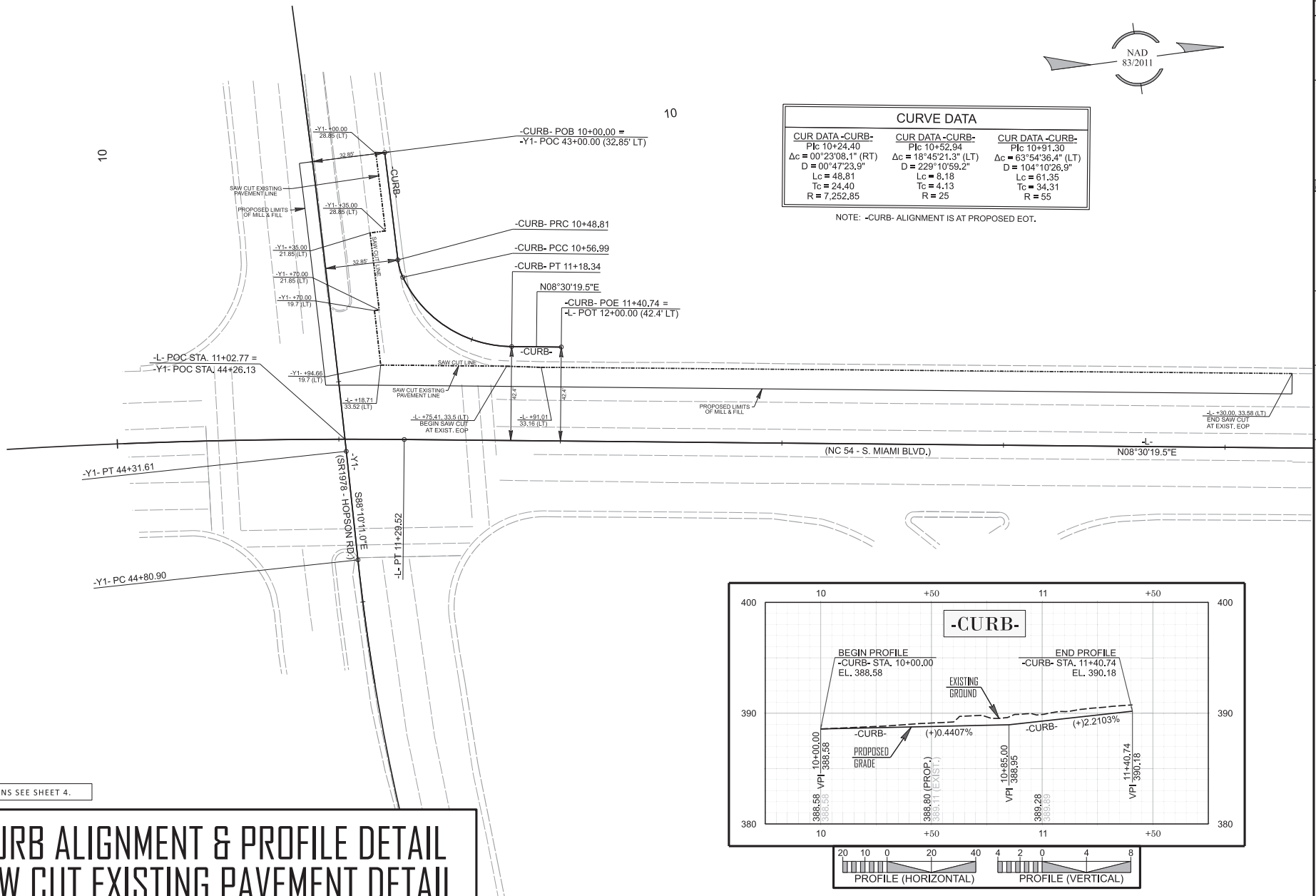
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT DESIGN ENGINEER
2/19/2026
NORTH CAROLINA PROFESSIONAL SEAL 058695 ENGINEER MATTHEW J NEUFER

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

REVISIONS

5/26/20



CURVE DATA

CUR DATA -CURB-	CUR DATA -CURB-	CUR DATA -CURB-
PIc 10+24.40	PIc 10+52.94	PIc 10+91.30
Δc = 00°23'08.1" (RT)	Δc = 18°45'21.3" (LT)	Δc = 63°54'36.4" (LT)
D = 00°47'23.9"	D = 229°10'59.2"	D = 104°10'26.9"
Lc = 48.81	Lc = 8.18	Lc = 61.35
Tc = 24.40	Tc = 4.13	Tc = 34.31
R = 7,252.85	R = 25	R = 55

NOTE: -CURB- ALIGNMENT IS AT PROPOSED EOT.

FOR DESIGNS SEE SHEET 4.

CURB ALIGNMENT & PROFILE DETAIL
SAW CUT EXISTING PAVEMENT DETAIL

SM-6105H / HS-2405AH

4RD1	2B-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

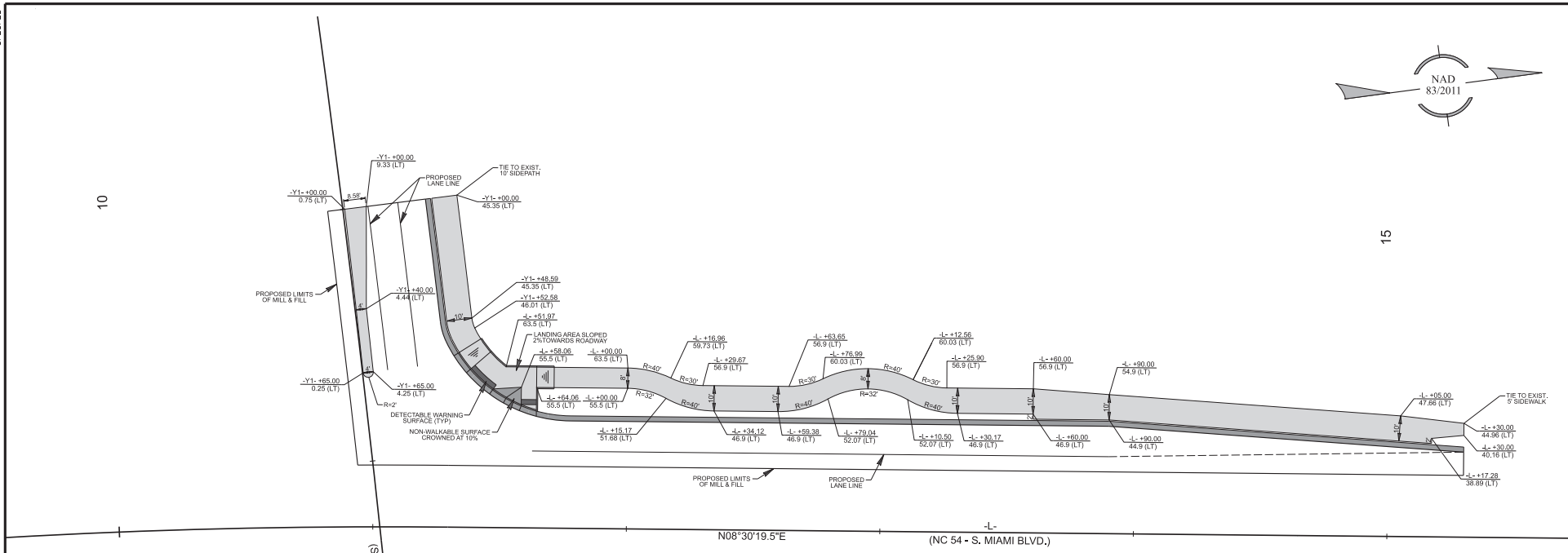
ROADWAY DESIGN ENGINEER
2/16/2026
NORTH CAROLINA PROFESS'ONAL SEAL 038649 ENGINEER MATTHEW A. DOOLEY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

REVISIONS

5/26/20



MEDIAN CONCRETE ISLAND & SIDEPATH DETAIL SHEET

FOR DESIGNS SEE SHEET 4.

SM-6105H / HS-2405AH

4RD1	2B-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

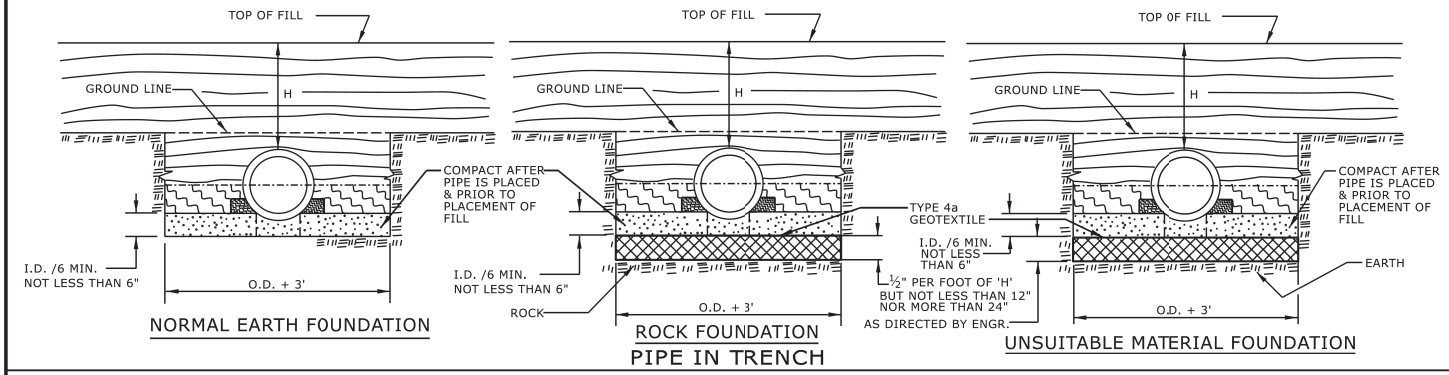
ROADWAY DESIGN ENGINEER
12/19/2025
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038649 MATTHEW A. DOUGLAS

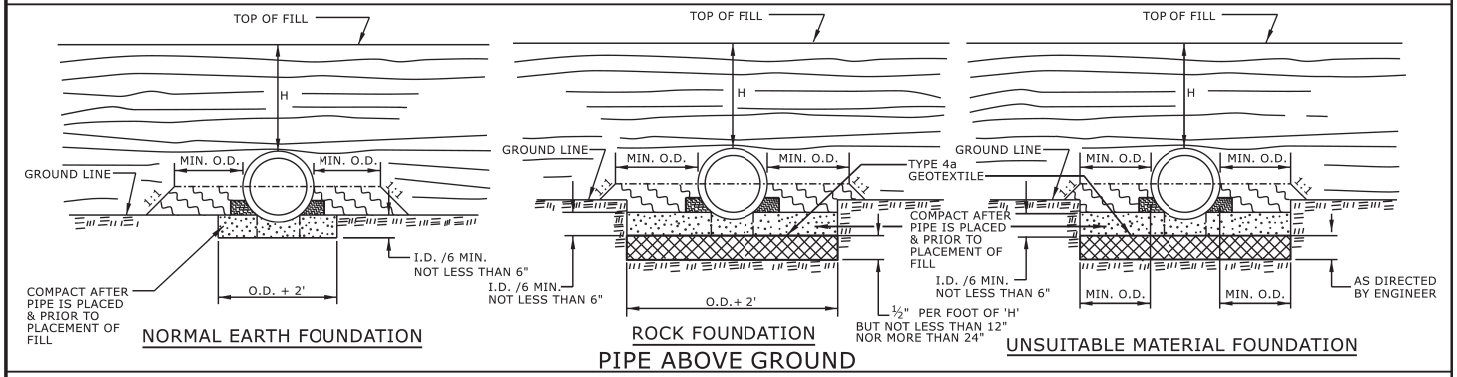
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

REVISIONS

11/14/23





GENERAL NOTES:

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

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

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

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

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

SPRINGLINE OF PIPE

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

UNDISTURBED EARTH MATERIAL

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

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

SM-6105H / HS-2405AH

4RD1	2C-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

12/19/2025

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

REVISIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACTS STANDARDS AND DEVELOPMENT UNIT

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

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-23-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

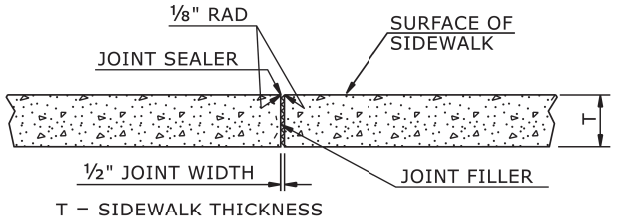
11/14/23

NOTES:

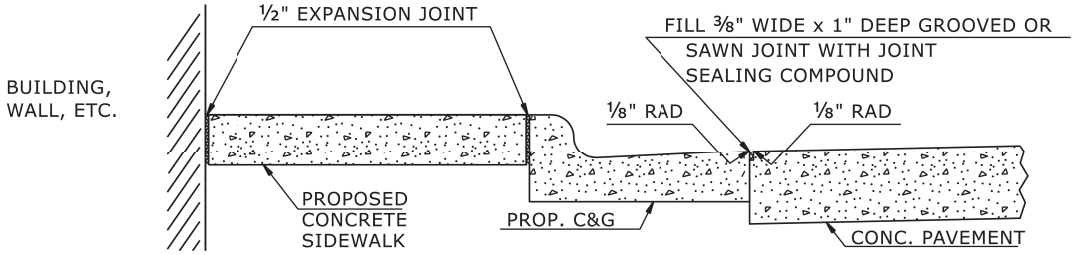
CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

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

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



TRANSVERSE EXPANSION JOINT IN SIDEWALK



DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK

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

ROADWAY DETAIL DRAWING FOR
CONCRETE SIDEWALK

SHEET 1 OF 1
848D01

SM-6105H / HS-2405AH

4RD1	2C-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

12/19/2025

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

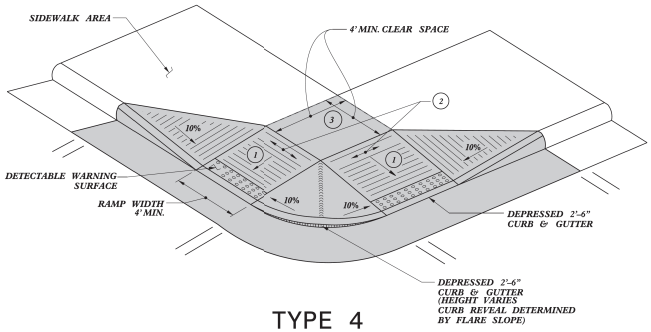
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

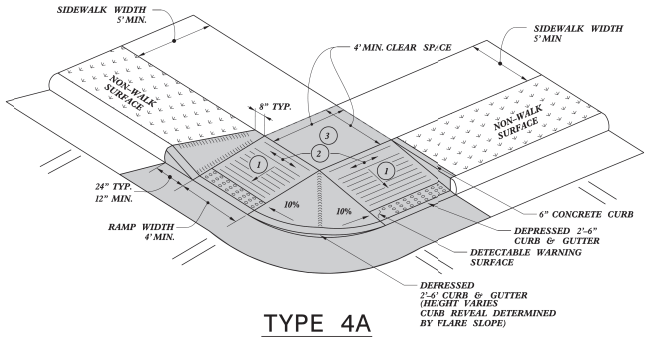
SEE TITLE BLOCK

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

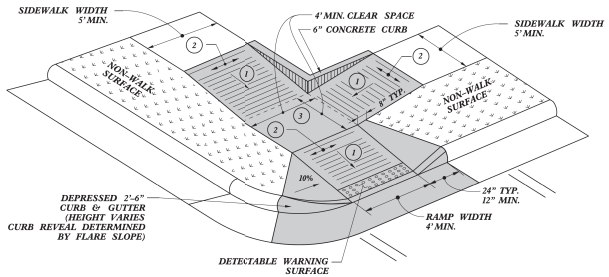
11/14/23



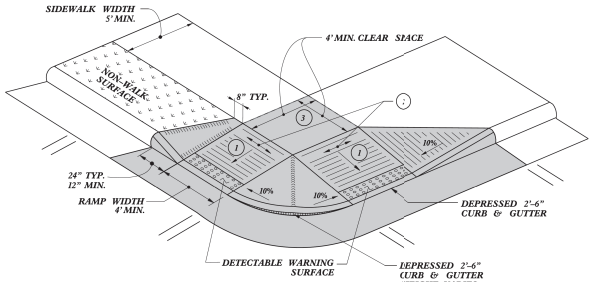
TYPE 4



TYPE 4A



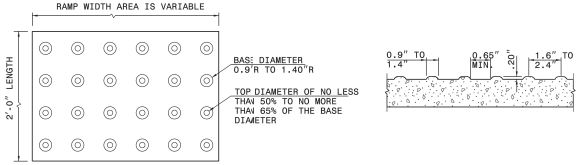
TYPE 4B



TYPE 4C

NOTES:
DETECTABLE WARNING SURFACE SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.

DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING SURFACE

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

(2) *CROSS SLOPE: 2.00%*

(3) *MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00%.*

PAY LIMITS FOR 1 OR 2 CURB RAMPS (CALCULATE BASED ON NUMBER OF SETS OF DETECTABLE WARNING SURFACES

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

ROADWAY DETAIL DRAWING FOR
CURB RAMP
SHARED LANDING

SHEET 10 OF 13
848D06

SM-6105H / HS-2405AH

4RDI	2C-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

12/19/2025

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER

REVISIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 12-22-2023
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: special details\nmhackler\848D0610.dgn

11/14/23

COMPUTED BY: M. DOUGLAS DATE: 10 / 28 / 2024
CHECKED BY: J. ADORNO DATE: 10 / 28 / 2024

STATE OF NORTH CAROLINA - DIVISION OF HIGHWAYS

EARTHWORK SUMMARY

STATION	STATION	EXCAVATION		EMBANKMENT	BORROW	TOTAL WASTE
		TOTAL UNCLASS.	UNDERCUT			
-L- 11+28.26	-L- 15+30.00	285		5		280
-Y1- 43+00.00	-Y1- 43+97.00	124		8		116
	SUBTOTAL	409		13		396
TOTAL		409		13		396
LOSS DUE TO CLEARING & GRUBBING						
WASTE IN LIEU OF BORROW						
PROJECT TOTAL		409		13		396
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT						
GRAND TOTAL						
SAY		425				400

UNDERCUT (CONTINGENCY) = 100 CY
SELECT GRANULAR MATERIAL (CONTINGENCY) = 100 CY
GEOTEXTILE FOR SOIL STABILIZATION (CONTINGENCY) = 100 SY
SHALLOW UNDERCUT (CONTINGENCY) = 100 CY
CLASS IV SUBGRADE STABILIZATION (CONTINGENCY) = 200 TON
GEOTEXTILE FOR SUBGRADE STABILIZATION (CONTINGENCY) = 300 SY

Note: Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for grading.

Note: Earthwork quantities are calculated by the roadway designer. No subsurface data is available for this project.

PAVEMENT REMOVAL - EXISTING ASPHALT

LINE	STATION	STATION	LOC	LENGTH OR AREA	WIDTH	SQUARE YARDS
-Y1-	43+00	43+98	LT	1,195.58		132.84
-L-	11+30	11+91	LT	61.28		6.81
					TOTAL	139.65
					SAY	140

PROPOSED 1.5" MILLING OF ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	LENGTH	AREA	SQUARE FEET
-L-	11+30	15+30	LT		3,449.90	3,449.90
-Y-	43+00	43+98	CL		3,283.59	3,283.59
					TOTAL IN FT^2	6,733.49
					TOTAL IN YD^2	748.17
					SAY	750

SM-6105H / HS-2405AH
4RDI | 38-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN PREPARED BY

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

REVISIONS

11/14/23

STATE OF NORTH CAROLINA - DIVISION OF HIGHWAYS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

COMPUTED BY: M. HARVEY DATE: 07 / 17 / 2024
CHECKED BY: K. ALFORD DATE: 07 / 19 / 2024

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

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

LINE & STATION SIZE THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Alternate Pipe (RCP, CSP, CAAP, HDPE, or PVC)								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PPP	DO NOT USE PVC	R. C. PIPE CLASS III								R. C. PIPE CLASS V								15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE
		FROM	TO	FT.	FT.	FT.	%	12	15	18	24	30	36	42	48							12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48			
L 13+87	44 LT	0402		392.4																																				
		0402	0403		388.9	387.4																									104									
L 12+84	44 LT	0403		391.1																																				
		0403	0404		387.4	385.9																									104									
L 11+78	44 LT	0404		389.9																																				
		0404	0405		385.9	385.4																									52									
Y1 43+60	38 LT	0405		388.6																																				
		0405	0406		385.4	385.3																									12									
Y1 43+47	35 LT	0406		388.5	385.3																																			
SHEET TOTALS (48" or Less)																															272									
PROJECT TOTALS (48" or Less)																															272									

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 GRATE TYPE			CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
	FROM	TO	CY	CY	MASONRY CY	0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.		E	F	G	D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																						CY	CY	CY	LIN. FT.	
L 13+87	0402					1			1		1																													
	0402	0403																																						
L 12+84	0403					1			1		1																													
	0403	0404																																						
L 11+78	0404					1			1		1																													
	0404	0405																																					68	2@15" RCP 6 LF & 62 LF
Y1 43+60	0405					1			1		1																													
	0405	0406																																						
Y1 43+47	0406					1			1		1																													
SHEET TOTALS (48" or Less)						5			5		5																												68	
PROJECT TOTALS (48" or Less)						5			5		5																												68	

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 POLY ETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLY VINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	**TRAFFIC BEARING DROP INLET**
T.B.J.B.	**TRAFFIC BEARING JUNCTION BOX**
W.S.	**WIDE SLOT**

SM-6105H / HS-2405AH
4RD1 | 3D-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

HYDRAULIC DESIGN
PREPARED BY

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

REVISIONS

11/14/23

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
GEOTECHNICAL QUANTITY SUMMARY SHEET

SUMMARY OF AGGREGATE SUBGRADE / STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1)	12"	100	200	300		
			TOTAL CY/TONS/SY:		100	200**	300**	0	0

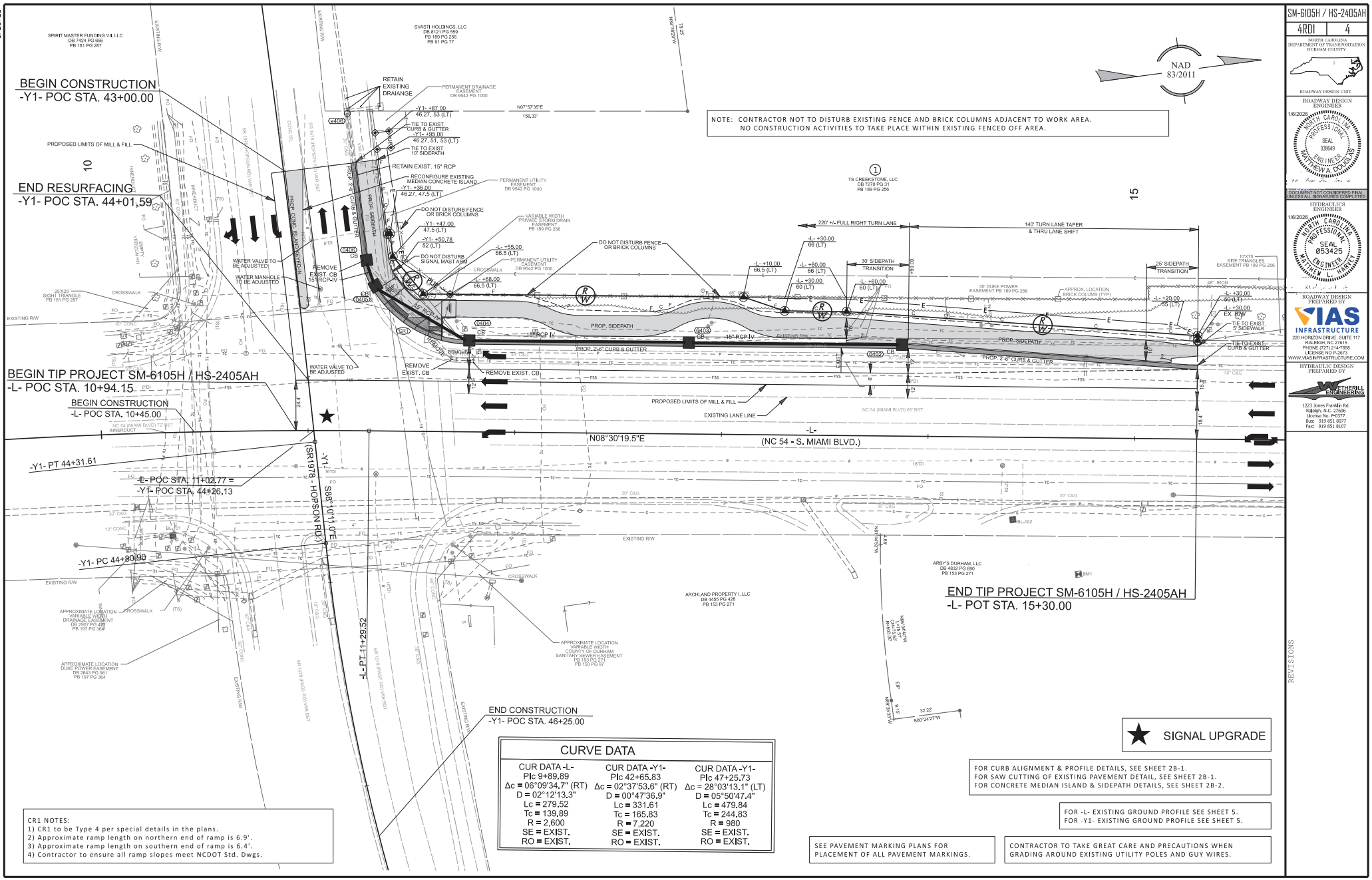
***ASU(1/2) = Aggregate Subgrade (Type 1 or 2)**

***AST = Aggregate Stabilization**

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

CALC. BY: NEIL T. ROBERSON DATE: 08/28/2024

CHECKED BY: JINYOUNG PARK DATE: 09/04/2024



CURVE DATA

CUR DATA -L-	CUR DATA -Y1-	CUR DATA -Y1-
PIc 9+89.89	PIc 42+65.83	PIc 47+25.73
Δc = 06°09'34.7" (RT)	Δc = 02°37'53.6" (RT)	Δc = 28°03'13.1" (LT)
D = 02°12'13.3"	D = 00°47'36.9"	D = 05°50'47.4"
Lc = 279.52	Lc = 331.61	Lc = 479.84
Tc = 139.89	Tc = 165.83	Tc = 244.83
R = 2,600	R = 7,220	R = 980
SE = EXIST.	SE = EXIST.	SE = EXIST.
RO = EXIST.	RO = EXIST.	RO = EXIST.

CR1 NOTES:
1) CR1 to be Type 4 per special details in the plans.
2) Approximate ramp length on northern end of ramp is 6.9'.
3) Approximate ramp length on southern end of ramp is 6.4'.
4) Contractor to ensure all ramp slopes meet NCDOT Std. Dwgs.

FOR CURB ALIGNMENT & PROFILE DETAILS, SEE SHEET 2B-1.
FOR SAW CUTTING OF EXISTING PAVEMENT DETAIL, SEE SHEET 2B-1.
FOR CONCRETE MEDIAN ISLAND & SIDEPATH DETAILS, SEE SHEET 2B-2.

FOR -L- EXISTING GROUND PROFILE SEE SHEET 5.
FOR -Y1- EXISTING GROUND PROFILE SEE SHEET 5.

SEE PAVEMENT MARKING PLANS FOR PLACEMENT OF ALL PAVEMENT MARKINGS.

CONTRACTOR TO TAKE GREAT CARE AND PRECAUTIONS WHEN GRADING AROUND EXISTING UTILITY POLES AND GUY WIRES.

SM-6105H / HS-2405AH
4RD1 | 4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY
ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
1/6/2026
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038649 MATTHEW A. CVIJANOVICH
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

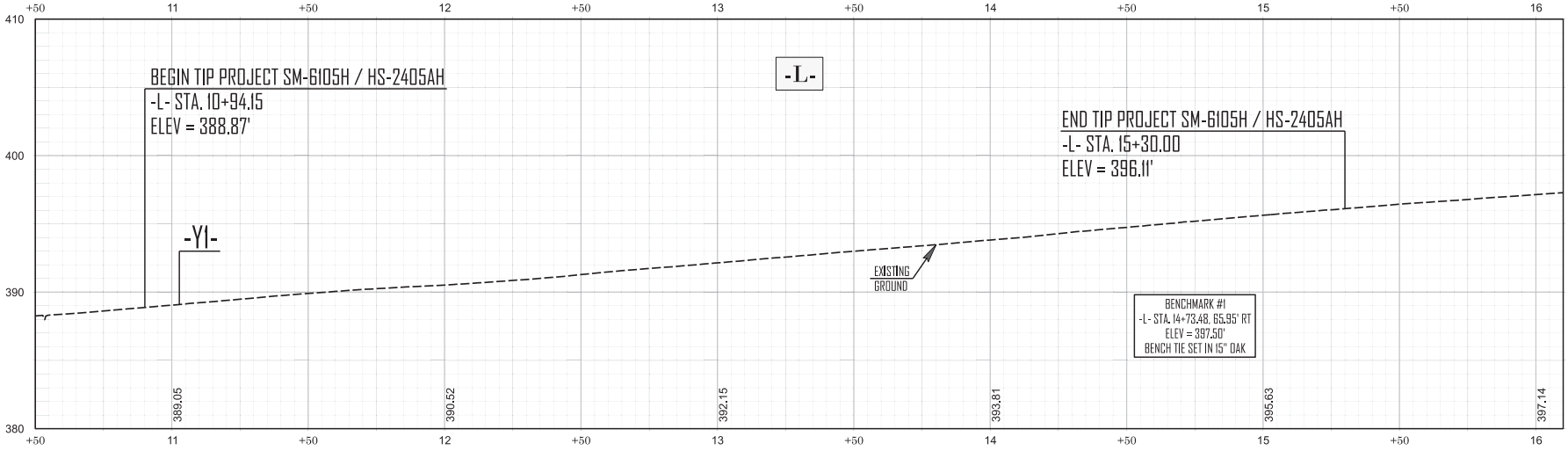
HYDRAULICS ENGINEER
1/6/2026
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053425 MATTHEW L. HARVEY

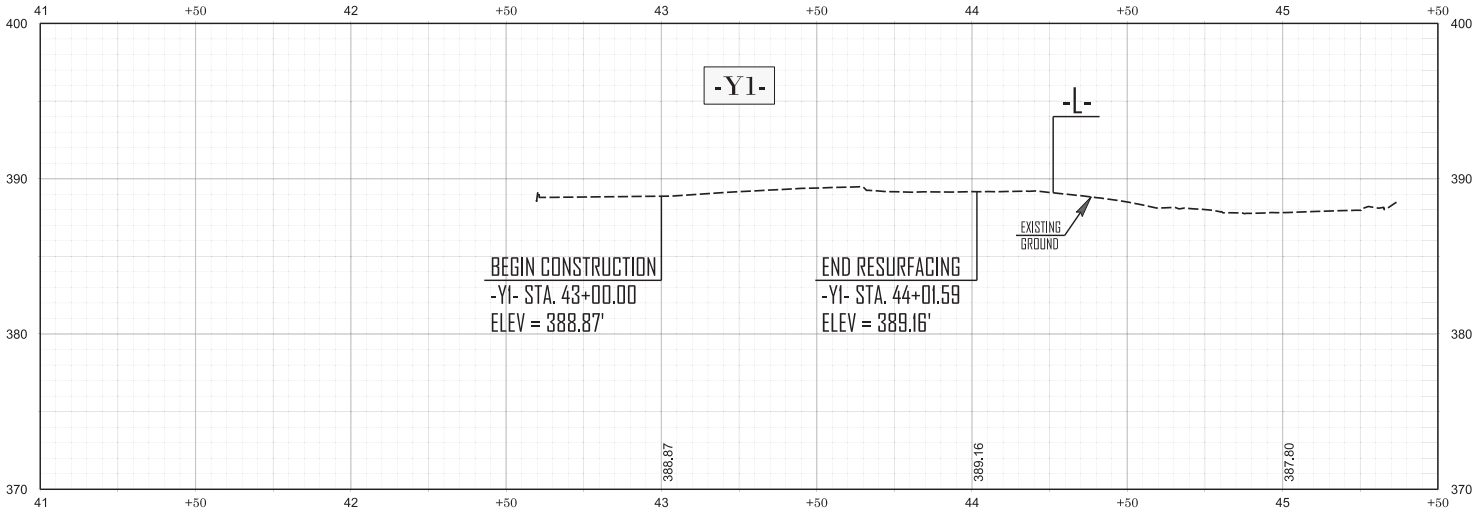
ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2873
WWW.VIASINFRASTRUCTURE.COM

HYDRAULIC DESIGN PREPARED BY
ETHERIDGE ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. P-0377
Bus: 919 851 8077
Fax: 919 851 8107

REVISIONS

11/14/23





FOR -L- PLAN SEE SHEET 4.
FOR -Y1- PLAN SEE SHEET 4.

SM-6105H / HS-2405AH

4RDI	5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
12/19/2023
NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOGGETT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HYDRAULICS ENGINEER
12/22/2023
NORTH CAROLINA PROFESSIONAL SEAL 053425 ENGINEER MATTHEW L. HARVEY

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

HYDRAULIC DESIGN PREPARED BY
WITHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919.851.8077
Fax: 919.851.8107

REVISIONS

09/08/99

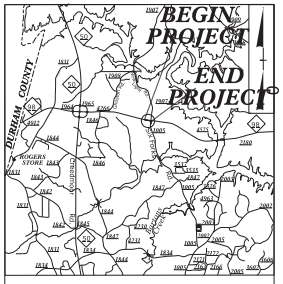
TIP PROJECT: SM-5705AG

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-5705AG	RW01	4

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

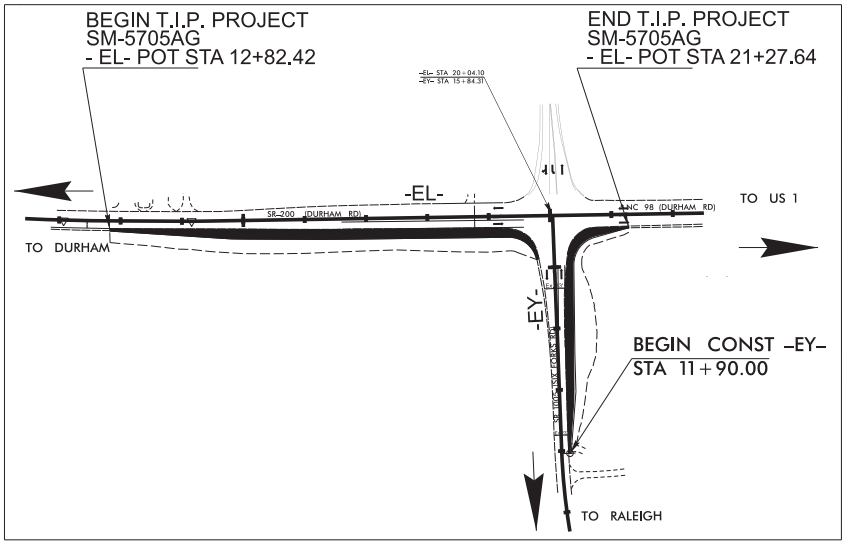
SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

WAKE COUNTY



VICINITY MAP (NTS)

RW04



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

100' 50' 0' 100' 200'

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "NCDOT AZ-2" WITH NAD83/2011 STATE PLANE GRID COORDINATES OF NORTHING: 813516.775 EASTING: 2102024.1191 ELEVATION: 348.65
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999426955
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

ESP
F-1407
ESP Associates, Inc.
2200 Gateway Centre Blvd Morrisville, NC 27560

2024 STANDARD SPECIFICATIONS

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3994 LAND SURVEYOR JEFFREY S. COATS

SIGNATURE 11/5/2025 *DATE*

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
SM5705AG	RW02C-1

Location and Surveys

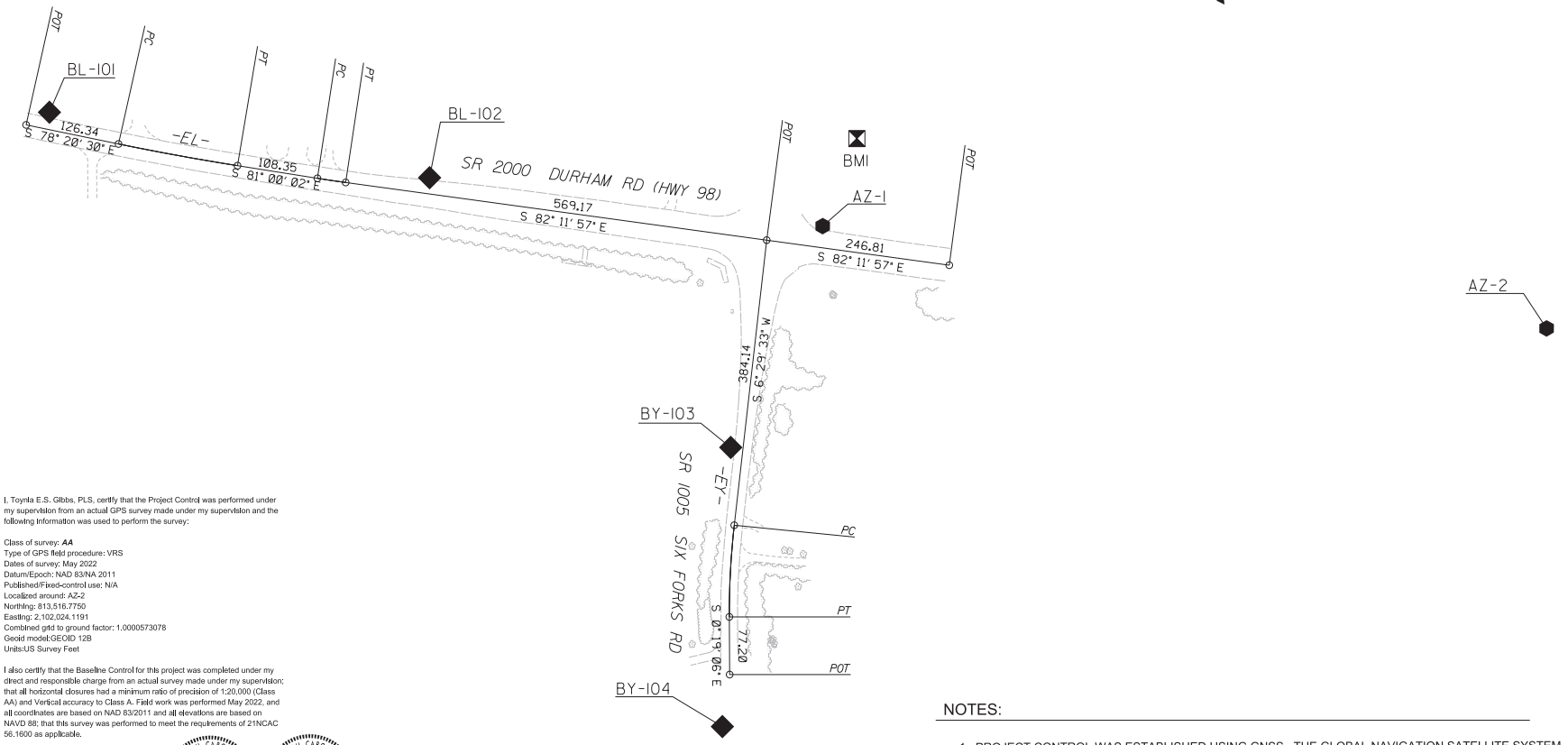
ESP ASSOCIATES, INC
2200 GATEWAY CENTRE BLVD.
SUITE 216
MORRISVILLE, NC 27560

PROJECT SURVEYOR:
TOYNIA E.S. GIBBS

LICENSE NO. F-1407

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC GRID
NAD 83 NA 2011



I, Toynia E.S. Gibbs, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: **AA**
Type of GPS field procedure: VRS
Dates of survey: May 2022
Datum/Epoch: NAD 83/NA 2011
Published/Fixed-control use: N/A
Localized around: AZ-2
Northing: 813,516.7750
Easting: 2,102,024.1191
Combined grid to ground factor: 1.0000573078
Geoid model:GEOID 12B
Units:US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed May 2022, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This day of 5/27/2022

Professional Land Surveyor L-3866

NORTH CAROLINA PROFESSIONAL SEAL L-3866 LAND SURVEYOR TOYNIA E.S. GIBBS 5/27/2022

NORTH CAROLINA LICENSE NO. F-1407 ESP ASSOCIATES, INC.

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

27-MAY-2022 08:20
S:\Projects_2022\SM5705AG\Location\Control Sheets\150.003.SM5705AG.ls.RW02C-1.dgn
ngreene
AT ESPSE1102218

PROJECT REFERENCE NO.	SHEET NO.
SM5705AG	RW02C-2

Location and Surveys

ESP ASSOCIATES, INC
2200 GATEWAY CENTRE BLVD.
SUITE 216
MORRISVILLE, NC 27560

PROJECT SURVEYOR:
TOYNIA E.S. GIBBS

ESP
LICENSE NO. F-1407

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BL

POINT	DESC.	NORTH	EAST	ELEVATION
101	BL-101	813806.1536	2100018.9162	376.51
102	BL-102	813718.5383	2100528.0344	369.10
1	AZ-1	813653.7750	2101054.6086	357.39
2	AZ-2	813516.7750	2102024.1191	348.65

BY

POINT	DESC.	NORTH	EAST	ELEVATION
103	BY-103	813357.3803	2100931.3703	363.80
104	BY-104	812983.6604	2100920.1812	365.81

BM1 ELEVATION = 364.12
N 813771 E 2101100
BM-1 - 24" PINE

I, Toynia E.S. Gibbs, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: VRS
Dates of survey: May 2022
Datum/Epoch: NAD 83/NA 2011
Published/Fixed-control use: N/A
Localized around: AZ-2
Northing: 813,516.7750
Easting: 2,102,024.1191
Combined grid to ground factor: 1.0000573078
Geoid model:GEOID 12B
Units:US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed May 2022, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This day of 5/27/2022.

Professional Land Surveyor L-3866

NORTH CAROLINA PROFESSIONAL SEAL L-3866 LAND SURVEYOR TOYNIA E.S. GIBBS 2022

NORTH CAROLINA LICENSE NO. F-1407 ESP ASSOCIATES, INC

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	813789.286	2099987.780							
LINE			S 78°20'30.5" E	126.34					
PC	813763.756	2100111.514							
CURVE			S 79°40'16.4" E	162.00	02°39'31.9"(LT)	01°38'28.2"	162.01	81.02	3491.18
PT	813734.711	2100270.886							
LINE			S 81°00'02.4" E	108.35					
PC	813717.762	2100377.900							
CURVE			S 81°35'59.9" E	38.24	01°11'55.0"(LT)	03°08'04.2"	38.24	19.12	1827.91
PT	813712.176	2100415.729							
LINE			S 82°11'57.4" E	569.17					
POT	813634.925	2100979.627							
LINE			S 82°11'57.4" E	246.81					
POT	813601.426	2101224.154							

EY

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	813634.925	2100979.627							
LINE			S 06°29'33.3" W	384.14					
PC	813253.251	2100936.191							
CURVE			S 03°05'13.7" W	122.90	06°48'39.1"(LT)	05°32'18.0"	122.98	61.56	1034.53
PT	813130.525	2100929.572							
LINE			S 00°19'05.8" E	77.20					
POT	813053.330	2100930.001							

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

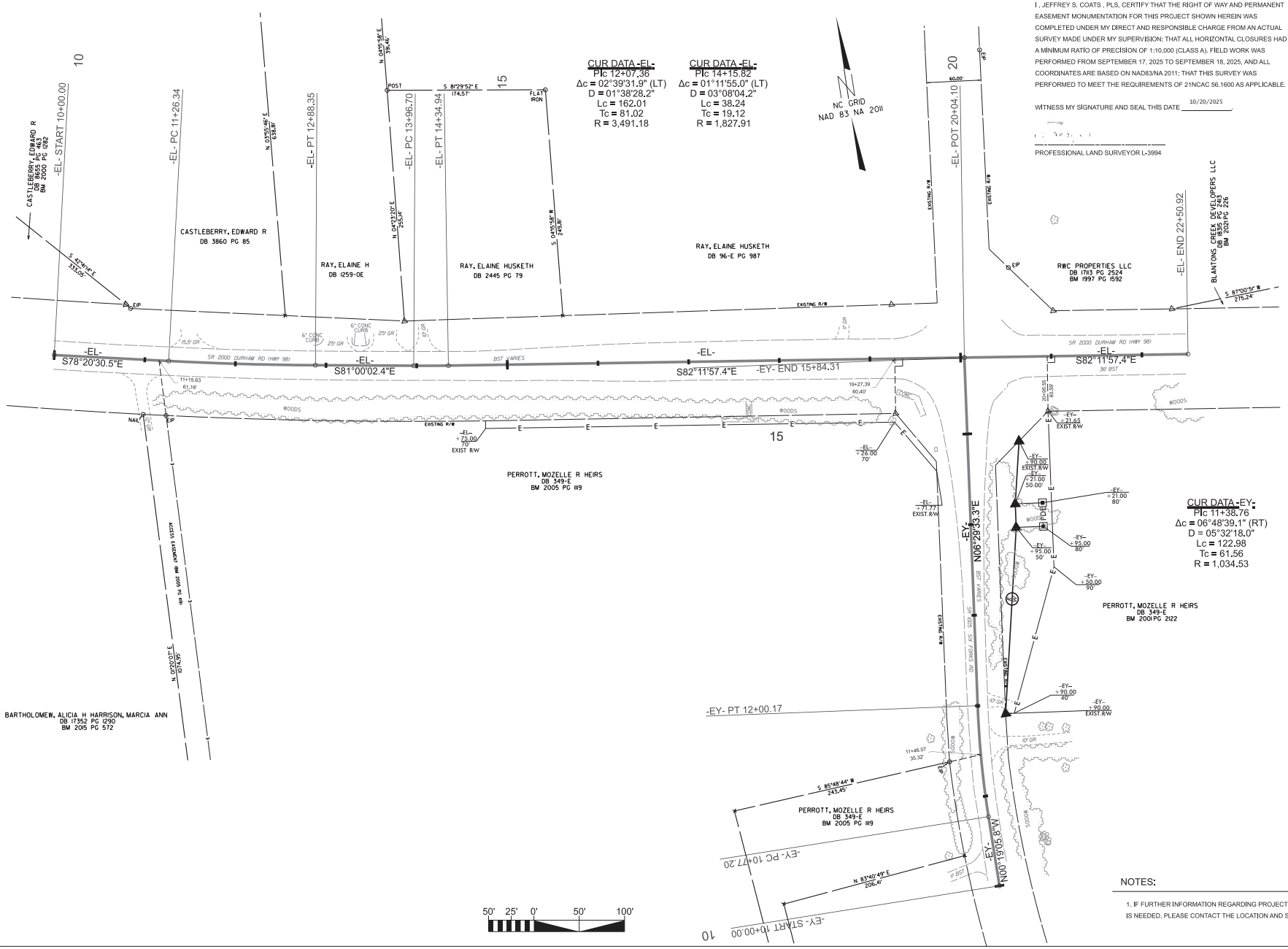
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

27-MAY-2022 08:22
S:\Projects_2022\RSE\JM01.085 SM5705AG_con.esp Full Surveys\Location\Control Sheets\150.006.SM5705AG.ls.RW02C-2.dgn
ngreene AT ESPSE\102218

5/26/20



I, JEFFREY S. COATS, PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM SEPTEMBER 17, 2025 TO SEPTEMBER 18, 2025, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

WITNESS MY SIGNATURE AND SEAL THIS DATE 10/20/2025

PROFESSIONAL LAND SURVEYOR L-3994

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM5705AG
R/W | 04

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR
SEAL L-3994

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: SM-5705AG
County: Wake

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

ESP Associates, Inc.
P-1107
2500 Gross Court Raleigh, NC 27560

5/26/20

PROPOSED ALIGNMENT CONTROL SHEET

I, JEFFREY S. COATS, PLS, CERTIFY THAT THE DATA COMPILED CAME FROM AVAILABLE SURVEYS/MAPPING PERFORMED BY OTHERS AND PROVIDED TO ME BY NCDOT AND DO NOT CERTIFY TO THE ACCURACY OR QUALITY OF THE INDIVIDUAL DATA SOURCES.

WITNESS MY SIGNATURE AND SEAL THIS DATE 10/13/2025.

PROFESSIONAL LAND SURVEYOR L-3994

PROPOSED ALIGNMENT: EL												
POINT	STATION	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
START	10+00.00	813789.2860	2099987.7800	S78°20'30.5"E	126.34'							
PC	11+26.34	813763.7561	2100111.5140	S79°40'16.4"E	162.00'	02°39'31.9"	01°38'28.2"	162.01'	81.02'	3491.18'		
PT	12+88.35	813734.7107	2100270.8860	S81°00'02.4"E	108.35'							
PC	13+96.70	813717.7624	2100377.9010	S81°35'59.9"E	38.24'	01°11'55.0"	03°08'04.2"	38.24'	19.12'	1827.91'		
PT	14+34.94	813712.1764	2100415.7290	S82°11'57.4"E	569.17'							
HPI	20+04.10	813634.9247	2100979.6270	S82°11'57.4"E	246.81'							
END	22+50.92	813601.4256	2101224.1540									

PROPOSED ALIGNMENT: EY												
POINT	STATION	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
START	10+00.00	813053.3301	2100930.0011	N00°19'05.8"W	77.20'							
PC	10+77.20	813130.5252	2100929.5722	N03°05'13.7"E	122.90'	06°48'39.1"	05°32'18.0"	122.98'	61.56'	1034.53'		
PT	12+00.17	813253.2511	2100936.1912	N06°29'33.3"E	384.14'							
END	15+84.31	813634.9247	2100979.6273									

NOTES:

1. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM5705AG

R/W | D2D-I

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

SEAL L-3994 JEFFREY S. COATS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: *SM-5705AG*

County: Wake

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

ESP Associates, Inc.
P-1407
3908 Glenwood Ave. Suite 300 Raleigh, NC 27612

5/26/20

RIGHT OF WAY CONTROL SHEET

I , JEFFREY S. COATS, PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM SEPTEMBER 17, 2025 TO SEPTEMBER 18, 2025, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

WITNESS MY SIGNATURE AND SEAL THIS DATE 10/13/2025

_____

PROFESSIONAL LAND SURVEYOR L-3994

ROW MARKER IRON PIN AND CAP: EY			
STATION	OFFSET	NORTH	EAST
11+89.89	30.63'	813239.8696	2100965.5412
13+94.85	50.00'	813441.0257	2101007.8852
14+20.85	50.00'	813466.8590	2101010.8251
14+89.85	56.80'	813534.6472	2101025.3864

PERMANENT EASEMENT MARKER IRON PIN AND CAP: EY			
STATION	OFFSET	NORTH	EAST
13+94.93	80.07'	813437.7044	2101037.7703
14+21.07	80.07'	813463.6782	2101040.7263

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM5705AG

R/W | 03E-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3994 LAND SURVEYOR JEFFREY S. COATS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: *SM-5705AG*

County: Wake

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

ESP Associates, Inc. P-1407

ESP Associates, Inc. 2868 Corners Center Blvd Monroeville, NC 27560

09/08/99

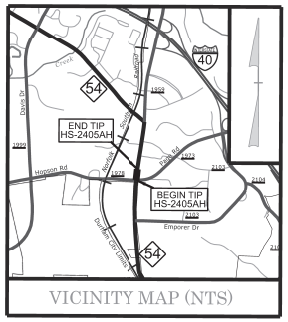
TIP PROJECT: *SM-6105H/HS-2405AH*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-6105H/HS-2405AH	RW01	7

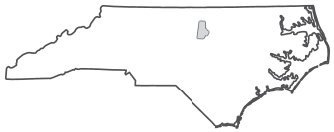
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

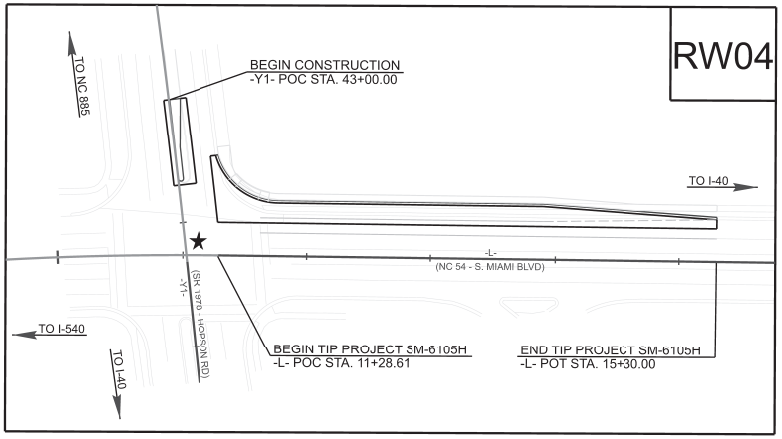
DURHAM COUNTY



VICINITY MAP (NTS)



NAD 83/ 2011



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50' 25' 0' 50' 100'

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT SM6105-2
WITH NAD83/2011 STATE PLANE GRID COORDINATES OF
NORTHING: 773672.1858 EASTING: 2044143.0633
ELEVATION: 379.44'
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999186069
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

wsp

GEOSPHERE LAND SURVEYING OF NC
128 TALBERT ROAD
MOORESVILLE NC 28117
FIRM C-5241

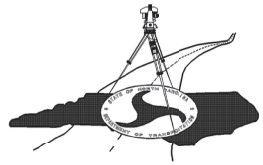
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: _____ *LETTING DATE:* _____

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5617 LAND SURVEYOR SARAH J. VINCENT

SIGNATURE: *DATE:* 11/25/2025



5/26/20

PROPOSED ALIGNMENT CONTROL SHEET

I, Sarah J. Vincent, PLS, CERTIFY THAT THE DATA COMRILED CANE FROM AVAILABLE SURVEYS/MAPPING PERFORMED BY 0THERS AND PROVIDED TO ME BY NCDOT AND DC NOT CEFTIFY TO THE ACCURACY OR QUALITY OF THE INDVIDUAL DATA SOURCES.

THIS 25TH DAY OF NOVEMBER, 2025.

PRCFESSIONAL LAND SURVEYOR L-5617

PROPOSED ALIGNMENT: L												
POINT	STATION	NORTHING	EAS¯ING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
PC	8+50.00	773938.7817	2044120.2620	N05°25'32.2"E	279.38	06°09'34.7"	02°12'13.3"	279.52	139.89	2600.00		
PT	11+29.52	774216.9115	2044146.6784	N08°30'19.5"E	670.48							
END	18+00.00	774880.0214	2044245.8451									

PROPOSED ALIGNMENT: Y1												
POINT	STATION	NORTHING	EAS¯ING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
PC	41+00.00	774193.2394	2043816.7689	S89°29'07.8"E	331.58	02°37'53.6"	00°47'36.9"	331.61	165.83	7220.00		
PT	44+31.61	774190.2618	2044148.3350	S88°10'11.0"E	98.39							
END	45+30.00	774187.1194	2044246.6741									

NOTES:

1. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT

SM-6105H/HS-2405AH

R/W | 02D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

SEAL L- 5617

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: *SM-6105H/HS-2405AH*

County: Durham

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

GEOSCIENCE LAND SURVEYING OF NC
128 TALBERT ROAD
MOORESVILLE NC 28117
FIRM C-5241

5/26/20

RIGHT OF WAY CONTROL SHEET

I, Sarah J. Vincent, PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUMRATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED ON 10/21/2025, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THEREQUIREMENTS OF 21NCAC 56.1600 AS APPLICAELE.

THIS 25TH DAY OF NOVEMBER, 2025.

PROFESSIONAL LAND SURVEYOR L-5617

PERMANENT ROW MARKER IRON PIN AND CAP: L				
STATION	OFFSET	NORTHING	EASTING	
11+55.00	-66.50	774251.9507	2044084.6789	
13+10.00	-66.50	774405.2460	2044107.6039	POINT FALLS UNDER FENCE - NAIL SET
13+30.00	-60.00	774424.0646	2044116.9905	
13+60.00	-60.00	774453.7347	2044121.4276	POINT FALLS IN BUSH - NAIL SET
15+30.00	-50.00	774620.3860	2044156.4611	
15+30.00	-47.72	774620.0481	2044158.7202	

PERMANENT ROW MARKER IRON PIN AND CAP: Y1			
STATION	OFFSET	NORTHING	EASTING
43+36.00	-46.27	774238.9414	2044053.6229
43+36.00	-47.50	774240.1744	2044053.6460
43+47.00	-47.50	774239.9588	2044064.7163

PERMANENT EASEMENT MARKER IRON PIN AND CAP: L				
STATION	OFFSET	NORTHING	EASTING	
11+68.00	-66.50	774264.8077	2044086.6017	POINT FALLS IN CONCRETE - NAIL SET

PERMANENT EASEMENT MARKER IRON PIN AND CAP: Y1				
STATION	OFFSET	NORTHING	EASTING	
42+87.00	-46.27	774239.6993	2044004.3148	
42+87.00	-53.00	774246.4291	2044004.3950	POINT FALLS IN BRICK WALL - OFFSET SET
42+95.00	-53.00	774246.3286	2044012.4531	
42+95.00	-46.27	774239.5984	2044012.3655	

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM-6105H/HS-2405AH

R/W | 03E-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5617 LAND SURVEYOR SARAH J. VINCENT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: *SM-6105H/HS-2405AH*

County: Durham

PREPARED FOR

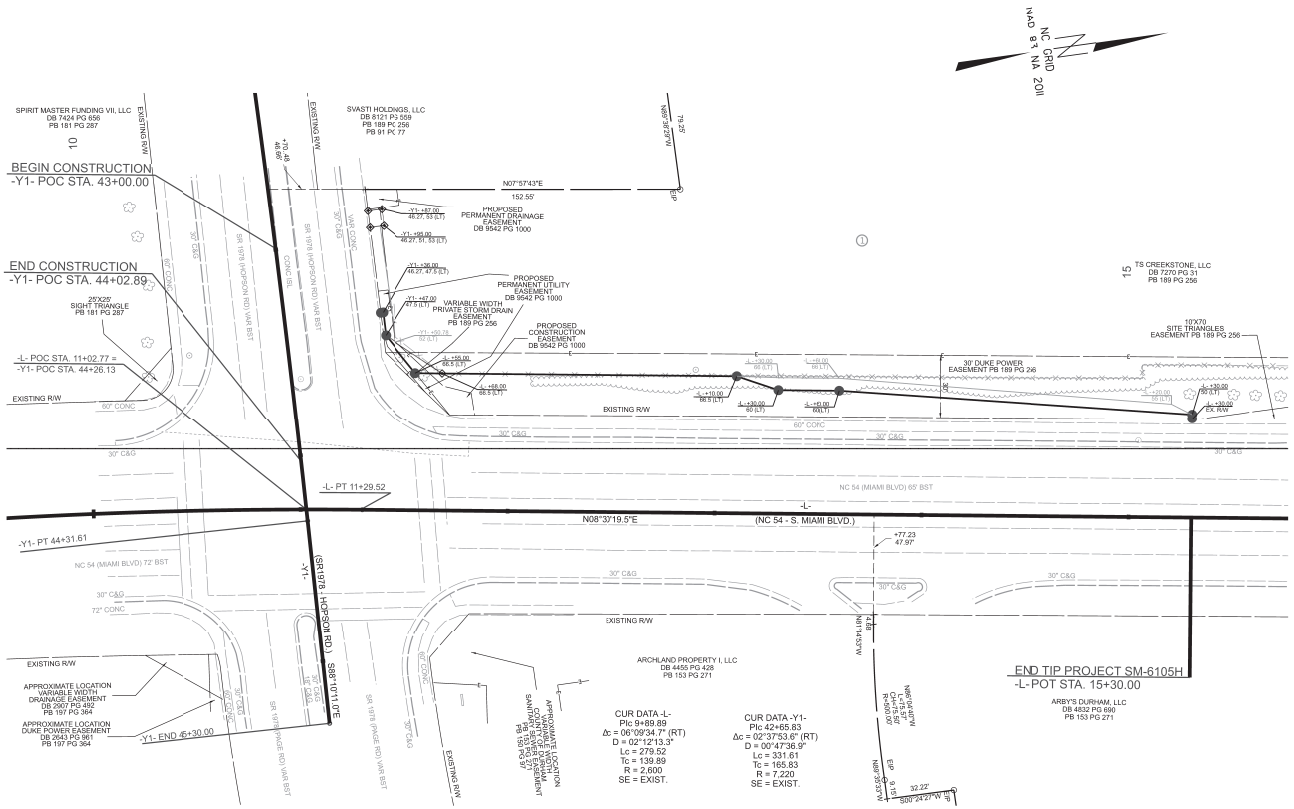
LOCATION AND SURVEYS UNIT

PREPARED BY

wsp

GEOSPHERE LAND SURVEYING OF NC
PRECINCT LAND
MOORESVILLE NC 28117
FIRM C-5241

5/26/20



I , Sarah J. Vincent , PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A); FIELD WORK WAS PERFORMED ON 10/20/2025 AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

THIS 25TH DAY OF NOVEMBER, 2025.

PROFESSIONAL LAND SURVEYOR L-5617

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM-6105H/HS-2405AH

R/W | RW04

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

SEAL L- 5617

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: *SM-6105H/HS-2405AH*

County: Durham

PREPARED FOR

LOCATION AND SURVEYS UNIT

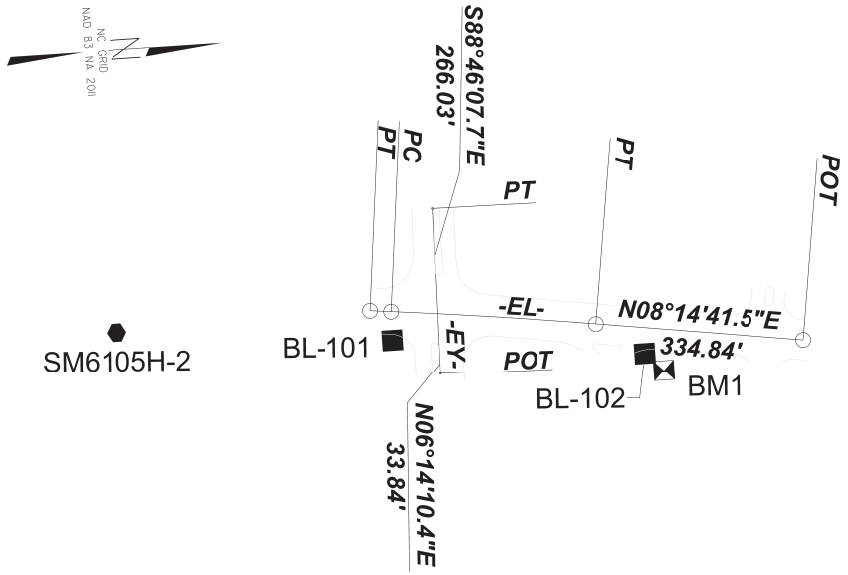
PREPARED BY

GEOSPHERE LAND SURVEYING OF NC
125 OLDSMITT DRIVE
MOORESVILLE NC 28117
FIRM C-5241

5/26/20

SURVEY CONTROL SHEET

W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



I, Sarah J. Vincent, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: AA
Type of GPS field procedure: RTN
Dates of survey: 11/07/2023 - 1/09/2024
Datum/Epoch: NAD83/2011
Published/Fixed-control use: N/A
Localized around: SM6105-2
Northing: 773672.1858
Easting: 2044143.0633
Combined grid factor: 0.9999186069
Geoid model: 18
Units: US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 11/07/2023 to 1/09/2024 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 25th day of November, 2025.

Digitally signed by
Sarah J. Vincent, PLS
DN: cn=Sarah J. Vincent, PLS, o=WSP USA Inc., ou=Location and Surveys Unit, email=sarah.vincent@wsp.com, c=US
Date: 2025.11.25 08:56:55 -05'00'

Professional Land Surveyor L-5617

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM-6105H/HS-2405AH
R/W 0201

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5617 LAND SURVEYOR SARAH J. VINCENT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

TIP PROJECT: *SM-6105H/HS-2405AH*
County: Durham

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

wsp

WSP USA INC.
1961 DEERE LAND SURVEYING OF NC
CSX MOREHEAD
MOORESVILLE NC 28117
FIRM C-5241

5/26/20

SURVEY CONTROL SHEET
W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BL				
POINT	DESC	NORTH	EAST	ELEVATION
1	SM6105H-1	772932.6805	2044159.8057	367.92
2	SM6105H-2	773672.1858	2044143.0633	379.44
101	BL-101	774115.8893	2044183.6818	387.55
102	BL-102	774519.4843	2044232.1753	394.59

BENCHMARKS				
	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	774547	2044263	397.50	BENCH TIE SET IN 15" OAK

I, Sarah J. Vincent, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: AA
Type of GPS field procedure: RTN
Dates of survey: 11/07/2023 - 1/09/2024
Datum/Epoch: NAD83/2011
Published/Fixed-control use: N/A
Localized around: SM6105-2
Northing: 773672.1858
Easting: 2044143.0633
Combined grid factor: 0.9999186069
Geoid model: 18
Units: US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 11/07/2023 to 1/09/2024 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 25th day of November, 2025.

Digitally signed by
Sarah Vincent

Professional Land Surveyor L-5617

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM-6105H/HS-2405AH

R/W | 02C2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5617 LAND SURVEYOR SARAH J. VINCENT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

TIP PROJECT: *SM-6105H/HS-2405AH*

County: Durham

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

wsp

GEOSPHERE LAND SURVEYING OF NC
135 GILBERT ROAD
MOORESVILLE NC 28117
FIRM C-5241

5/26/20

SURVEY CONTROL SHEET
W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

EXISTING ALIGNMENT NAME:EL									
POINT	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R
START	774083.159	2044134.003							
LINE			N06°14'10.4"E	33.84					
PC	774116.799	2044137.679							
CURVE					02°00'31.1" (RT)	00°36'31.9"	329.90	164.97	9410.36
PT	774444.052	2044179.256							
LINE			N08°14'41.5"E	334.84					
END	774775.434	2044227.274							

EXISTING ALIGNMENT NAME:EY									
POINT	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R
START	774193.60	2043978.108							
LINE			S88°46'07.7"E	266.03					
END	774187.814	2044244.076							

I, Sarah J. Vincent, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: AA
Type of GPS field procedure: RTN
Dates of survey: 11/07/2023 - 1/09/2024
Datum/Epoch: NAD83/2011
Published/Fixed-control use: N/A
Localized around: SM6105-2
Northing: 773672.1858
Easting: 2044143.0633
Combined grid factor: 0.9999186069
Geoid model: 18
Units: US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 11/07/2023 to 1/09/2024 , and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 25th day of November, 2025.

Professional Land Surveyor L-5617

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SM-6105H/HS-2405AH

R/W | 02C3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5060 LAND SURVEYOR RICHARD A MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

TIP PROJECT: *SM-6105H/HS-2405AH*

County: Durham

PREPARED FOR

LOCATION AND SURVEYS UNIT

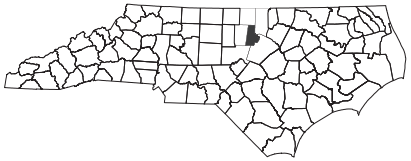
PREPARED BY

GEOSPHERE LAND SURVEYING OF NC
139 TALBERT ROAD
MOORESVILLE, NC 28117
FIRM C-5241

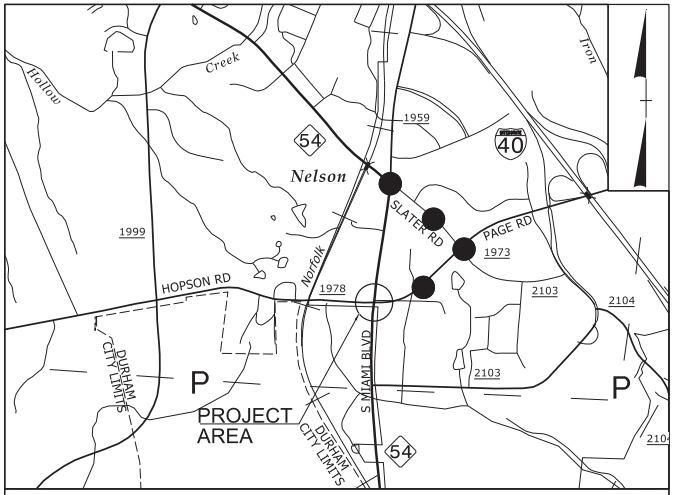
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

DURHAM COUNTY



LOCATION: CONSTRUCT A SOUTHBOUND TURN LANE ON
NC 54 (S. MIAMI BLVD) AT SR 1978 (HOPSON RD)



VICINITY MAP

TRUCK DETOUR ROUTE ● ● ● N. T. S.

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B THRU TMP-1C	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, AND PHASING)
TMP-2	OFF-SITE TRUCK DETOUR
TMP-2A	SPECIAL SIGN DESIGN
TMP-3	TEMPORARY TRAFFIC CONTROL PHASE II, STEPS 1, 2, AND 3 DETAIL
TMP-4	TEMPORARY TRAFFIC CONTROL PHASE II, STEP 4 DETAIL
TMP-5	TEMPORARY TRAFFIC CONTROL PHASE III, STEPS 1 & 2 DETAIL
TMP-6	TEMPORARY TRAFFIC CONTROL PEDESTRIAN DETOUR

SHEET NO.
TMP-1

TIP PROJECT: SM-6105H / HS-2405AH

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

PLANS PREPARED BY:

NICK RAMIREZ, P.E.
PROJECT ENGINEER

MATTHEW DOUGLAS, P.E.
PROJECT DESIGN ENGINEER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:

DATE: 12/17/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 039649 ENGINEER MATTHEW A. DOUGLAS

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1135.01	CONES
1180.01	SKINNY DRUMS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- WEDGE AND/OR WIDEN (USING FLAGGERS)
- TEMPORARY PAVEMENT

SIGNALS

EXISTING | PROPOSED | TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM / SKINNY DRUM / TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN
- VMS VARIABLE MESSAGE SIGN
- PORTABLE CONCRETE BARRIER

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

TEMPORARY PAVEMENT MARKING

PAVEMENT MARKING - PAINT (4")

P1	WHITE EDGELINE
P2	WHITE SOLID LANE LINE
P4	3 FT/ 9FT WHITE MINISKIP
P10	YELLOW EDGELINE

PAVEMENT MARKING - PAINT (8")

P42	YELLOW DIAGONAL

PAVEMENT MARKING SYMBOL - PAINT

P71	RIGHT TURN ARROW

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED: _____

DATE: 2/14/2026

NORTH CAROLINA PROFESSIONAL SEAL 039649 ENGINEER MATTHEW A CRUGER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP - 1B

MANAGEMENT STRATEGIES

THE FOLLOWING LISTED WORK ZONE STRATEGIES ARE RECOMMENDED FOR INCLUSION WITHIN THIS TRANSPORTATION MANAGEMENT PLAN (TMP).

- LANE SHIFTS OR CLOSURES
- WEEKEND WORK
- WORK HOUR RESTRICTIONS FOR PEAK TRAVEL
- PEDESTRIAN/BICYCLE ACCOMMODATIONS
- OFF SITE DETOURS/USE OF ALTERNATIVE ROUTES
- LOCAL DETOUR ROUTES

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME:	DAY AND TIME RESTRICTIONS
ANY ROAD	MONDAY THRU FRIDAY 9:00 AM TO 7:00 PM

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME:

ANY ROAD

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 4:00 P.M. DECEMBER 31ST TO 9:00 A.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 9:00 A.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 4:00 P.M. THURSDAY AND 9:00 A.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 4:00 P.M. FRIDAY TO 9:00 A.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 4:00 P.M. THE DAY BEFORE INDEPENDENCE DAY AND 9:00 A.M. THE DAY AFTER INDEPENDENCE DAY.

   IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 4:00 P.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 9:00 A.M. THE TUESDAY AFTER INDEPENDENCE DAY.
6. FOR LABOR DAY, BETWEEN THE HOURS OF 4:00 P.M. FRIDAY AND 9:00 A.M. TUESDAY.
7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 4:00 P.M. TUESDAY TO 9:00 A.M. MONDAY.
8. FOR CHRISTMAS, BETWEEN THE HOURS OF 4:00 P.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 9:00 A.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

C) DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

D) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

G) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

H) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

I) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

J) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

K) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

L) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

M) PROVIDE SIGNING AND DEVICES REQUIRED FOR THE TRUCK OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

N) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

O) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 500' IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES

P) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

PAVEMENT MARKINGS AND MARKERS

Q) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
-L- NC 54 (S. MIAMI BLVD)	PAINT	N/A
-Y1- SR 1978 (HOPSON ROAD)	PAINT	N/A

R) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

S) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

T) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

U) TRACE THE EXISTING MONOLITHIC ISLAND LOCATIONS WITH PROPER COLOR PAVEMENT MARKINGS PRIOR TO REMOVAL PLACE DRUMS TO DELINEATE ANY EXISTING MONOLITHIC ISLANDS AFTER REMOVAL.

V) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER

W) ALL CURB RAMP LOCATIONS SHALL BE DERIVED FROM STATIONING SHOWN ON PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER IN COORDINATION WITH THE SIGNING AND DELINEATION UNIT.

X) IN THE EVENT A TIE-IN CANNOT BE MADE IN ONE DAY'S TIME, BRING THE TIE-IN AREA TO AN APPROPRIATE ROADWAY ELEVATION AS DETERMINED BY THE ENGINEER. PLACE BLACK ON ORANGE "LOOSE GRAVEL" SIGNS (W8-7) AND BLACK ON ORANGE "PAVEMENT ENDS" SIGNS (W8-3) 350' AND 350' RESPECTIVELY IN ADVANCE OF THE UNEVEN AREAS. USE DRUMS TO DELINEATE THE EDGE OF ROADWAY ALONG UNPAVED AREAS.

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:

DATE: 4/9/2026

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP - 1C

PHASING

PHASE I

STEP 1 INSTALL WORK ZONE SIGNING ALONG ALL APPROACH ROADWAYS USING ROADWAY STANDARD DRAWING (RSD) 1101.01 SHEET 3 OF 3. INSTALL PEDESTRIAN DETOUR (SEE TMP-6) . PEDESTRIAN DETOUR WILL UTILIZE THE EAST SIDE OF NC 54 WITH CROSSINGS AT SLATER ROAD AND SOUTHERN SIDE OF HOPSON ROAD, BOTH OF WHICH CURRENTLY HAVE SIGNALIZED PEDESTRIAN CROSSINGS.

STEP 2 USING TMP-2 INSTALL THE TRUCK OFF-SITE DETOUR TO REMAIN FOR ENTIRE DURATION OF PROJECT.

STEP 3 ESTABLISH PRELIMINARY EROSION CONTROL MEASURES AND THEN CLEAR AND GRUB PROJECT LIMITS.

PHASE II

USING TEMPORARY LANE CLOSURES (RSD 1101.02 SHEET 3 OF 19) , TEMPORARY SIGNAL PHASE MODIFICATIONS, TIME RESTRICTIONS, AND TMP-3 THRU TMP-4 , CONSTRUCT THE FOLLOWING:

STEP 1 REMOVE MEDIAN CONCRETE ISLAND ALONG -Y1- (HOPSON RD) FROM -Y1- STA 43+00± TO -Y1- STA 43+67±. REPLACE WITH DRUMS AS SHOWN ON TMP-3.

STEP 2 ONCE ISLAND REMOVAL IS COMPLETED, REMOVE EXISTING THRU/RIGHT MARKINGS ON -Y1- SR 1978 (HOPSON ROAD) AND REPLACE WITH TEMPORARY PAVEMENT MARKINGS. INCLUDE SIGN R3-7 "RIGHT LANE MUST TURN RIGHT", AS SHOWN ON TMP-3.

STEP 3 REDUCE EXISTING LANE WIDTHS TO 11 FEET ON -L- (S MIAMI BLVD) AS SHOWN ON TMP-3.

STEP 4 CONSTRUCT THE PROPOSED PAVEMENT REMOVAL AND ROAD RECONSTRUCTION ON ALL OF -Y1- AS SHOWN ON TMP-4, INCLUDING CURB AND GUTTER, DRAINAGE, CURB RAMP AND SIDEPATH.

PHASE III

STEP 1 USING RSD 1101.04 (SHEET 1 OF 2), TEMPORARY SIGNAL PHASE MODIFICATIONS (AS SHOWN ON SIGNAL PLANS), AND TMP-5, AWAY FROM TRAFFIC CONSTRUCT THE PROPOSED WIDENING FROM -L- STA 11+34±TO -L- 15+30± INCLUDING CURB AND GUTTER, SIDEPATH, AND DRAINAGE. USE RSD 1101.02 (SHEET 3 OF 19) FOR ANY WIDENING DONE WITHIN 5 FT OF OPEN TRAVEL WAY.

STEP 2 USING RSD 1101.02 (SHEET 3 OF 19) AND SHEET TMP-5, TEMPORARILY CLOSE LANE TO CONSTRUCT THE PROPOSED MILL AND FILL FROM -L- STA 11+34± TO -L- STA 15+30±.

STEP 3 USING RSD 1101.02 (SHEET 3 OF 19) AND TEMPORARY SIGNAL, INSTALL NEW ISLAND ON -Y1-.

PHASE IV

STEP 1 INSTALL FINAL LIFT OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS, INCLUDING RE-STRIPING -Y1- SR 1978 (HOPSON ROAD) R IGHT TURN LANE BACK TO A THRU-RIGHT MOVEMENT, EXISTING THRU-RIGHT MOVEMENT FROM -L- (NC 54) TO THRU ONLY AND CROSSWALKS. REVISE SIGNAL PHASES TO FINAL MODIFICATIONS.

STEP 2 REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES.

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED: _____

DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

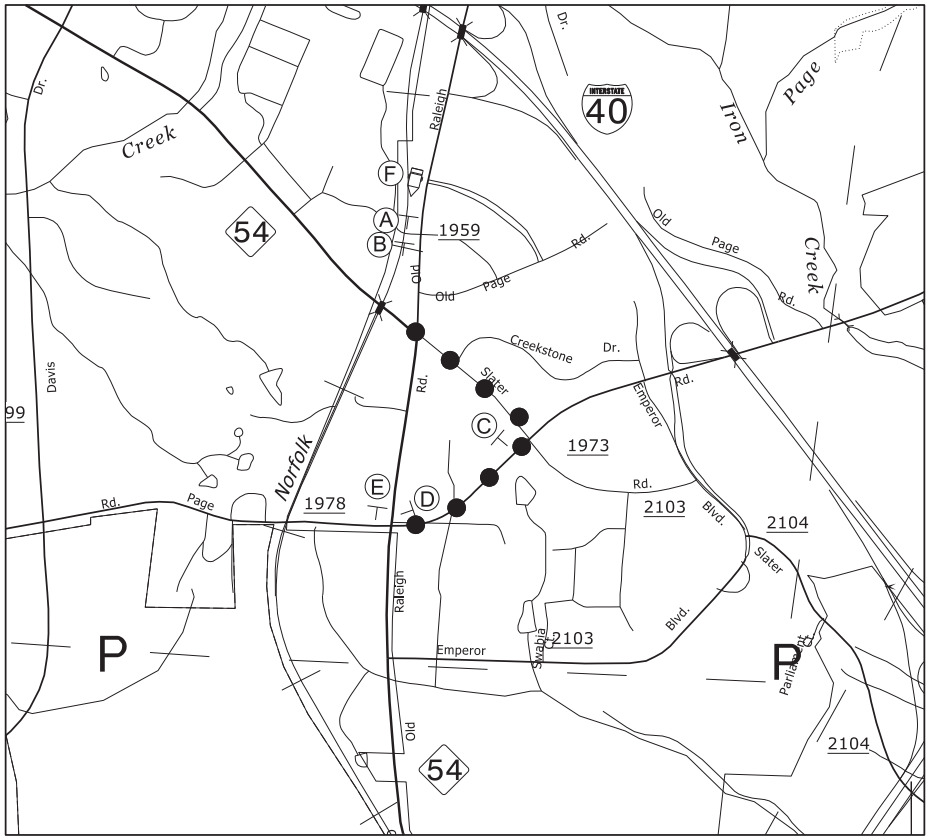
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

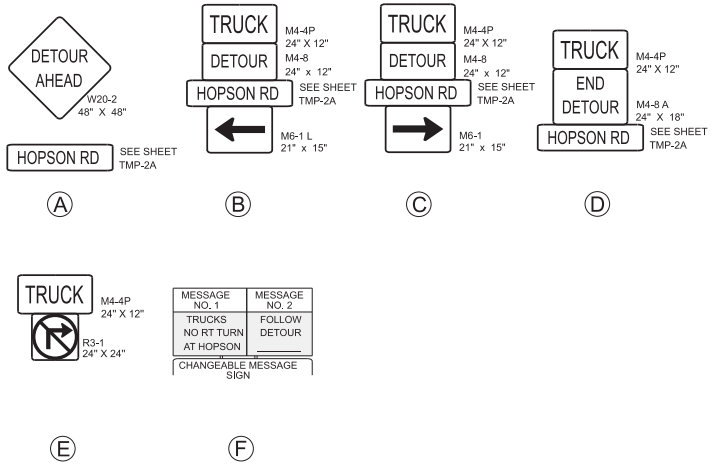
TRANSPORTATION OPERATIONS PLAN

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP01.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-2



● ● ● OFF-SITE TRUCK DETOUR ROUTE



VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED: _____

DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

OFF-SITE TRUCK DETOUR

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP02.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-2A

SIGN NUMBER: SP-1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3'-6"
HEIGHT: 1'-0"
TOTAL AREA: 3.5 SQ.FT.

BORDER TYPE: INSET
RECESS: 0.38"
WIDTH: 0.63"
RADII: 1.5"

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: BLACK

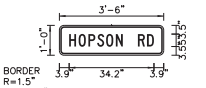
SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: JA
PROJECT ID: ID
CHECKED BY: MAD
LOCATION: DURHAM
SEP 05, 2024
DIV: 5



Panel Style: Traffic Control.ssi
M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

LETTER LOCATIONS ARE PANEL EDGE TO LOWER LEFT CORNER

	H	O	P	S	O	N		R	D	Series/Size Text Length
	3.93	7.73	11.68	15.23	18.78	22.73	26.08	31.63	35.28	C 2000 34.15

FILENAME:

NORTH CAROLINA D.O.T. SIGN DETAIL

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:
DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

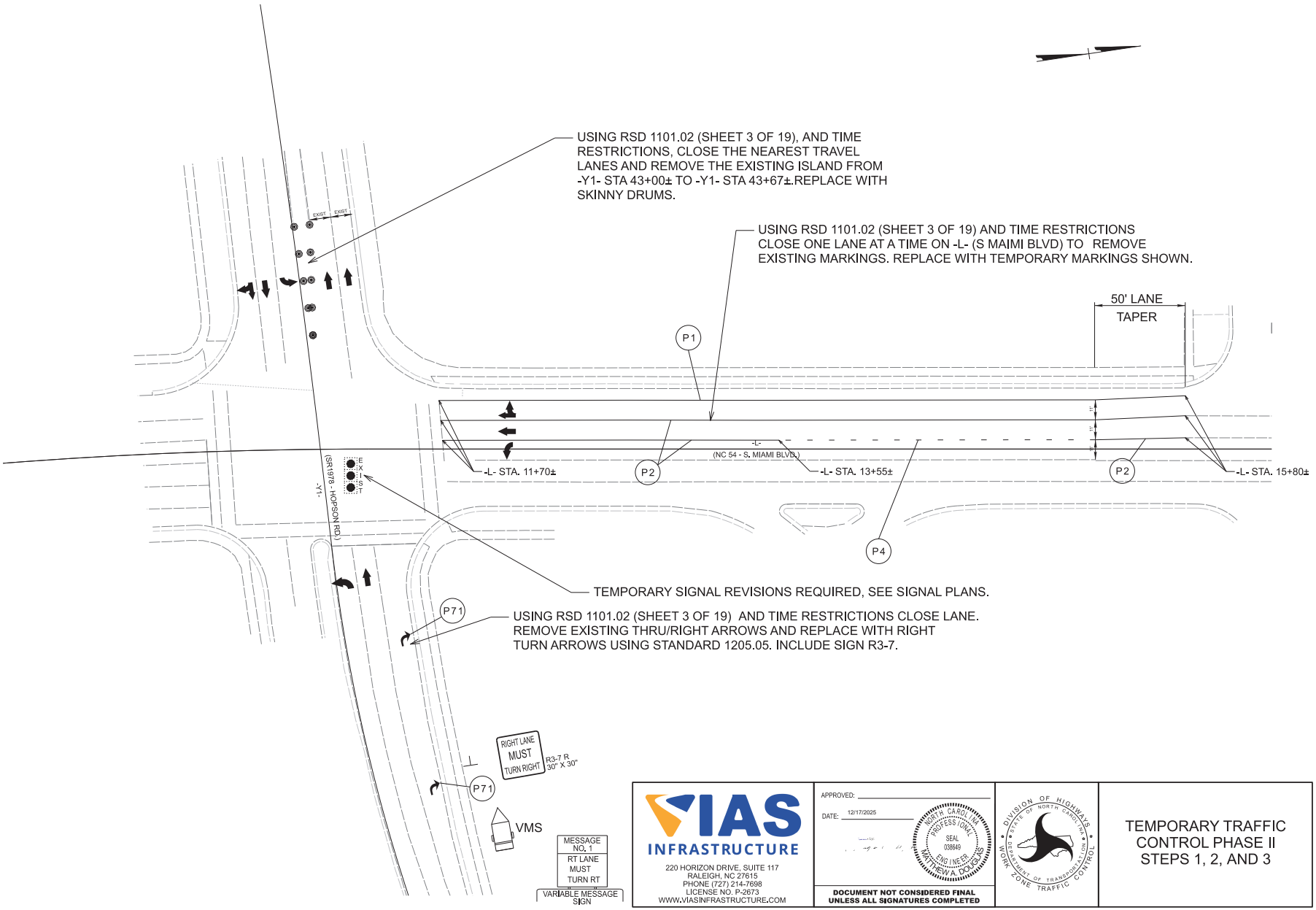
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_Sign Design.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-03



VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:

DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

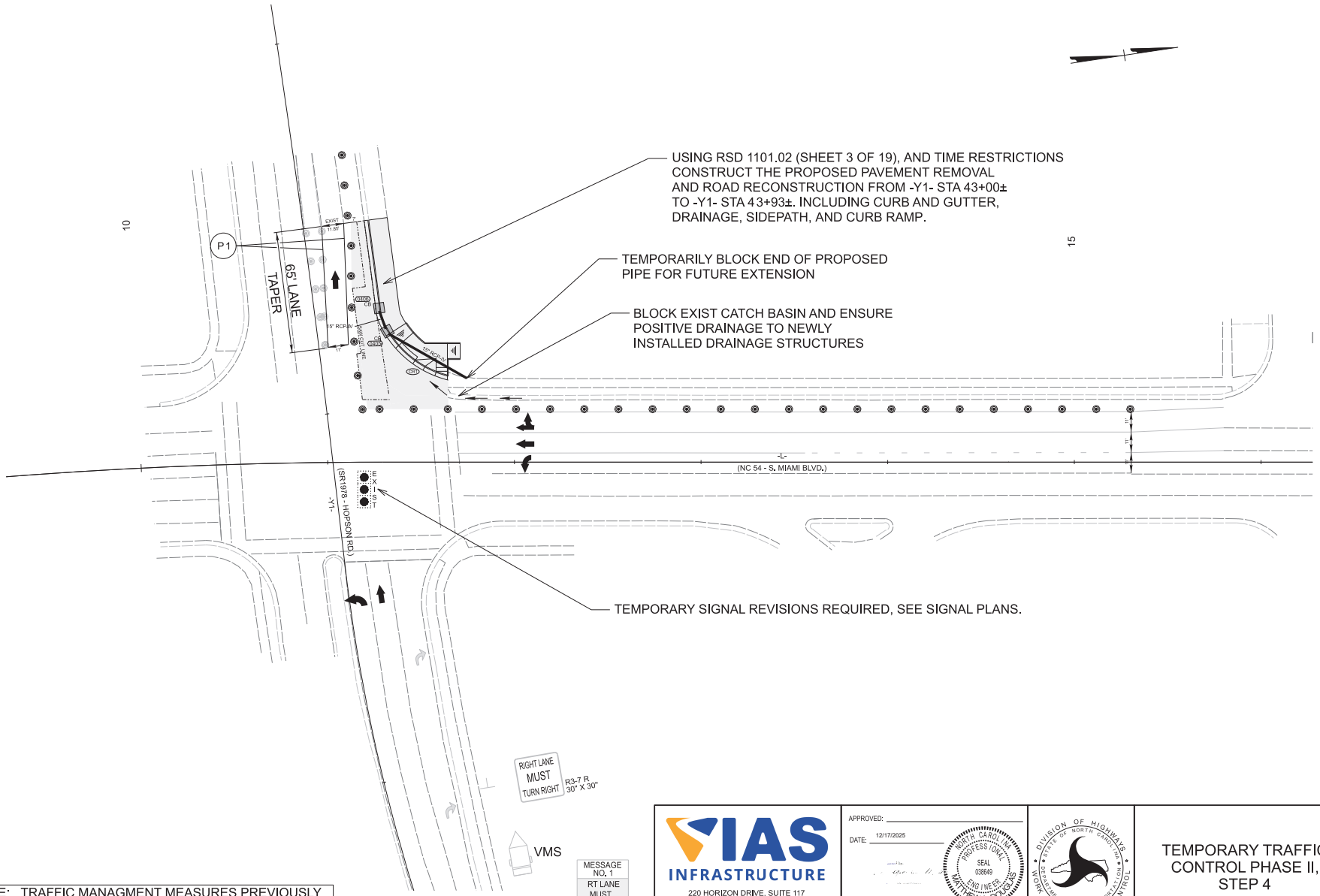
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

TEMPORARY TRAFFIC CONTROL PHASE II STEPS 1, 2, AND 3

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP03.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-04



USING RSD 1101.02 (SHEET 3 OF 19), AND TIME RESTRICTIONS CONSTRUCT THE PROPOSED PAVEMENT REMOVAL AND ROAD RECONSTRUCTION FROM -Y1- STA 43+00± TO -Y1- STA 43+93±. INCLUDING CURB AND GUTTER, DRAINAGE, SIDEPATH, AND CURB RAMP.

TEMPORARILY BLOCK END OF PROPOSED PIPE FOR FUTURE EXTENSION

BLOCK EXIST CATCH BASIN AND ENSURE POSITIVE DRAINAGE TO NEWLY INSTALLED DRAINAGE STRUCTURES

TEMPORARY SIGNAL REVISIONS REQUIRED, SEE SIGNAL PLANS.

NOTE: TRAFFIC MANAGMENT MEASURES PREVIOUSLY INSTALLED AND TO BE MAINTAINED ARE SHOWN SHADED BACK.

INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:

DATE: 12/17/2025

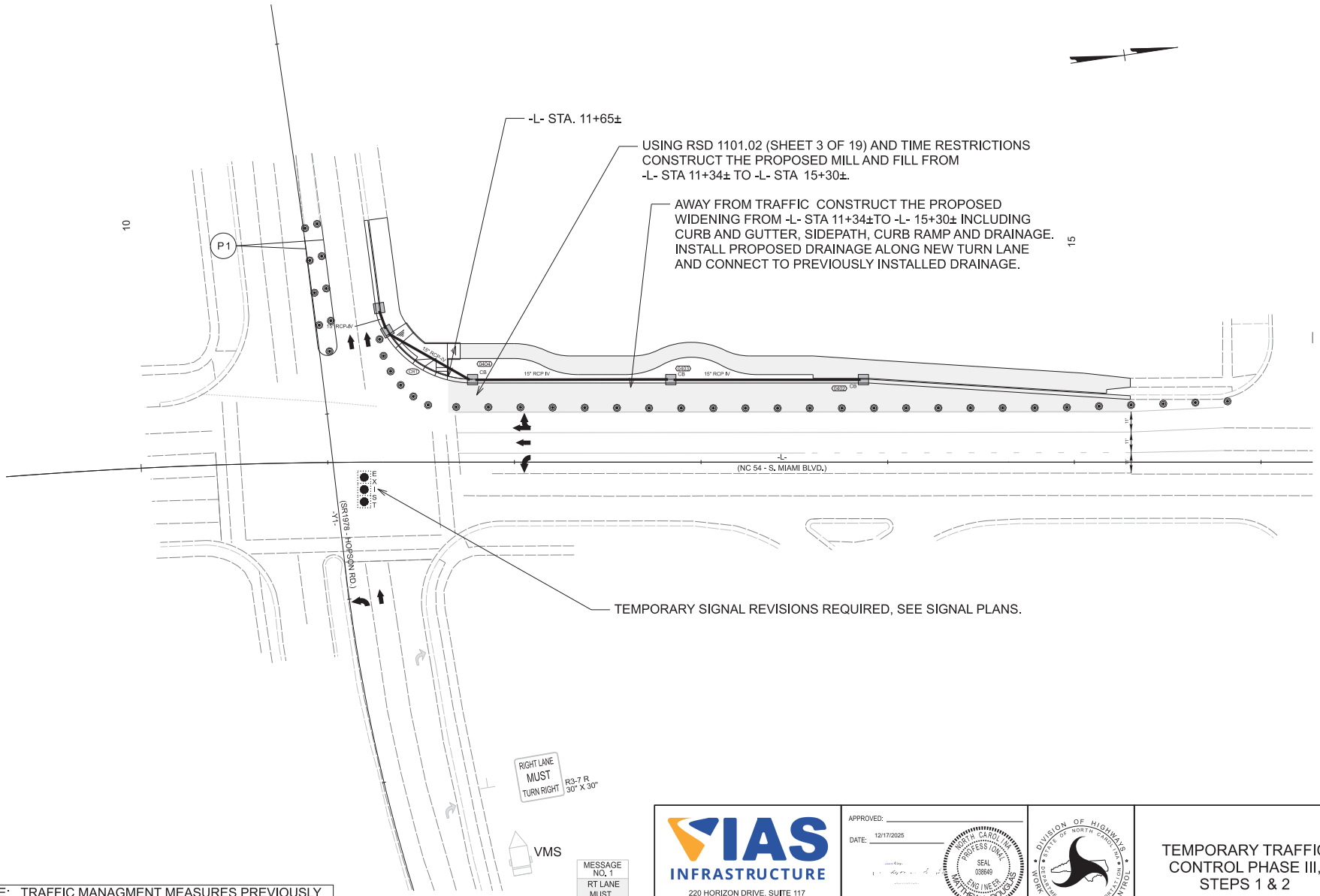
SEAL 038649
MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TEMPORARY TRAFFIC CONTROL PHASE II, STEP 4

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NCD5_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP04.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-05



NOTE: TRAFFIC MANAGMENT MEASURES PREVIOUSLY INSTALLED AND TO BE MAINTAINED ARE SHOWN SHADED BACK.

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED:

DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038649 MATTHEW A. DOUGLAS

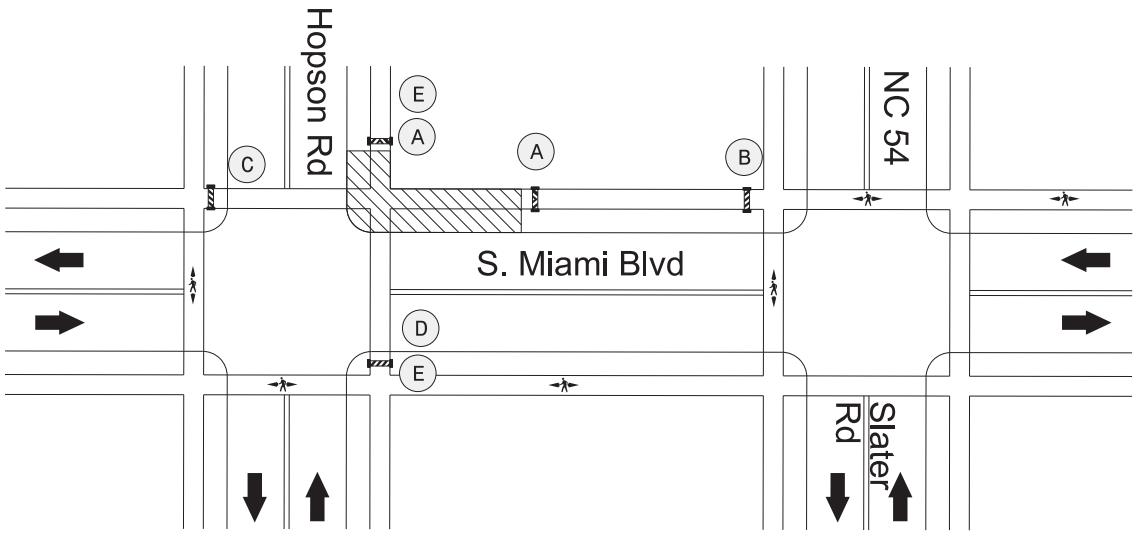
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TEMPORARY TRAFFIC CONTROL PHASE III, STEPS 1 & 2

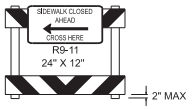
12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP05.dgn
User:MatthewDouglas

PROJ. REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	TMP-06



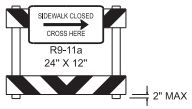
PEDESTRIAN BARRICADE
MUST BE ADA-COMPLIANT

A



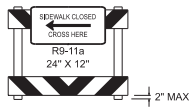
PEDESTRIAN BARRICADE
MUST BE ADA-COMPLIANT

B



PEDESTRIAN BARRICADE
MUST BE ADA-COMPLIANT

C



PEDESTRIAN BARRICADE
MUST BE ADA-COMPLIANT

D

E NOTE: CONTRACTOR TO INCLUDE PEDESTRIAN TRANSPORT SERVICE QR CODE FOR PEDESTRIANS TO RECIEVE RIDES TRAVELING WEST THROUGH HOPSON SIDEWALK CLOSURE.

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

APPROVED: _____

DATE: 12/17/2025

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TEMPORARY TRAFFIC CONTROL PEDESTRIAN DETOUR

12/17/2025
C:\Vias\VIAS Infrastructure\Engineering - Documents\03 Projects\PRJ23008M-NC05_SM-6105H\04-Design\SM-6105H\Work Zone Traffic Control\SM-6105H_TTC_TMP06.dgn
User:MatthewDouglas

CONTRACT: DE00438 T.I.P.: SM-6105H / HS-2405AH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
DURHAM COUNTY

TIP NO.	SHEET NO.
SM-6105H / HS-2405AH	PMP-1

APPROVED: _____

DATE: _____

SEAL
4/9/2026
NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
NC 54 (S. MIAMI BLVD.) -L-	THERMOPLASTIC	SNOWPLOWABLE
SR 1978 (HOPSON RD.) -Y1-	THERMOPLASTIC	SNOWPLOWABLE

D) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

E) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

F) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.

G) USE NO TRACK MARKINGS FOR CROSSWALKS AS SHOWN IN ROADWAY STANDARD DRAWING 1205.07 (SHEET 2 OF 2)

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

MITCH EATON, PE — SIGNING & DELINEATION REGIONAL ENGINEER

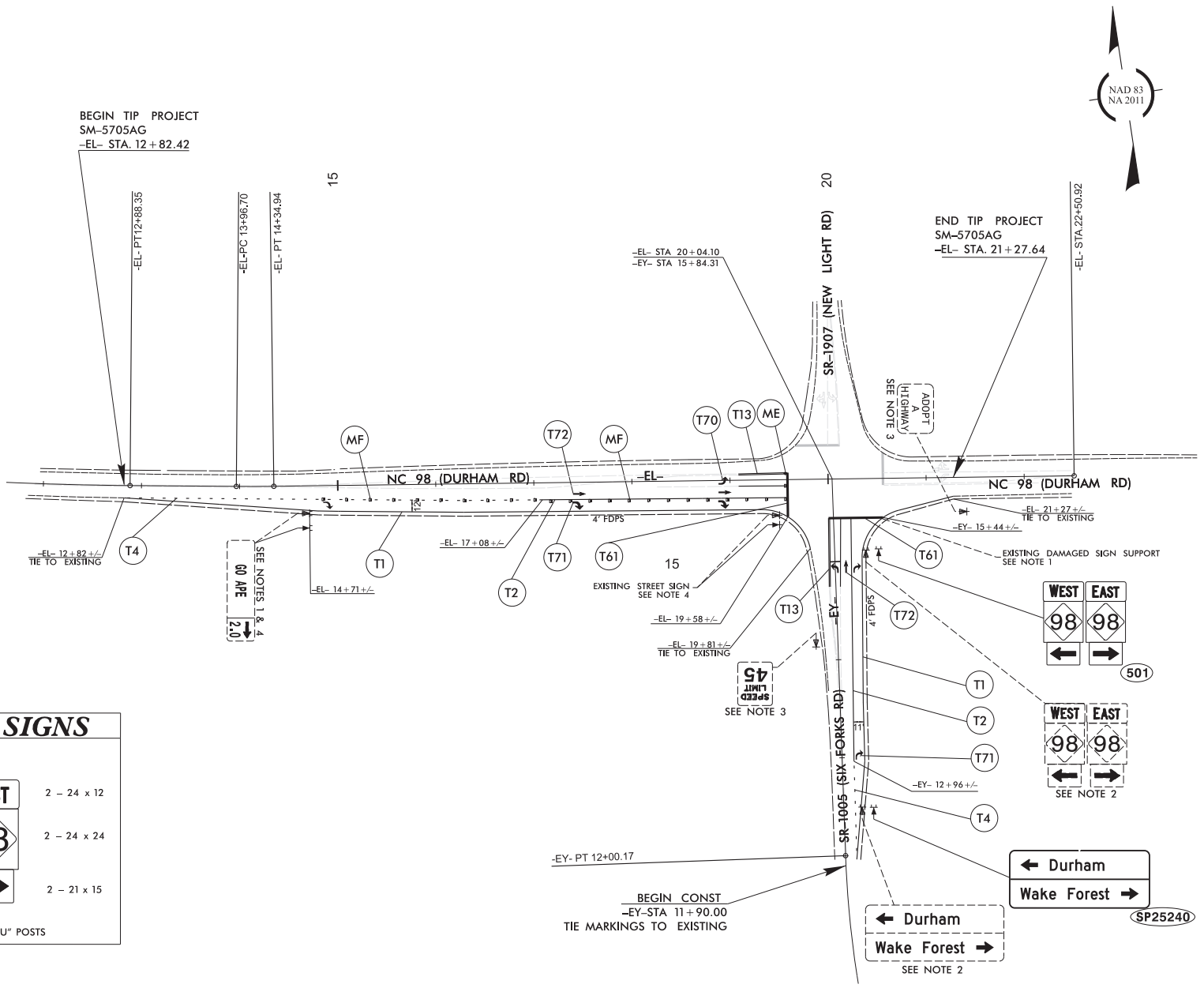
DERRICK H. BEARD — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

PLAN PREPARED BY: VIAS INFRASTRUCTURE

NICK RAMIREZ, PE — PROJECT MANAGER

MATTHEW DOUGLAS, PE — PROJECT DESIGN ENGINEER

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM



TYPE "F" SIGNS

501

WEST	EAST	
98	98	2 – 24 x 12
		2 – 24 x 24
←	→	2 – 21 x 15

MOUNTED ON TWO "U" POSTS

SM-5705AG
PMP-2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058695 ENGINEER MATTHEW J. NOLD

02/18/2026

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY LC

REVISIONS

5/26/20

5/26/20

SIGN NUMBER: SP25240
TYPE: D
QUANTITY: 1

SIGN WIDTH: 6'-0"
HEIGHT: 2'-6"
TOTAL AREA: 15 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0-3/4"
RADII: 3"

NO. Z BARS:
LENGTH:

BACKG COLOR: Green / Green
COPY COLOR: White

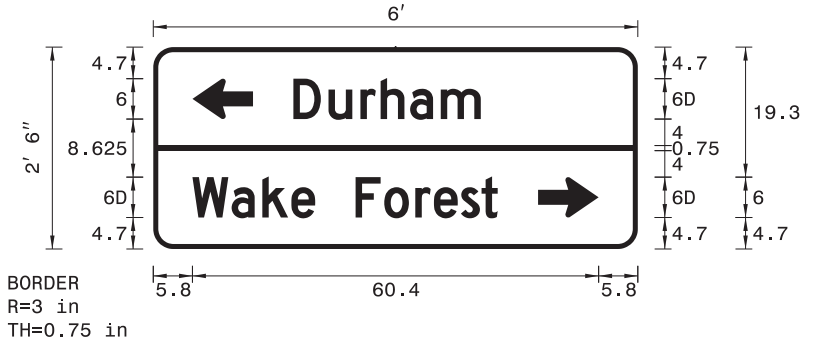
SYMBOL	X	Y	WID	HT
AR_Type D	5.8	19.3	6	9
AR_Type D	57.2	4.7	6	9

MAT'L: 0.125" (3.2 mm) ALUMINUM

USE NOTES:

1. Legend and border(except those that are colored black) shall be direct applied Grade C sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: A.SCOTT
CHECKED BY: M.EATON
Jul 14, 2025
PROJECT ID: SM-5705AG
LOCATION: NC 98 (DURHAM RD.) AT SR 1005 (SIX FORKS RD.)
DIV: 5



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter																											Series/Size Text Length
	D	u	r	h	a	m																					D 2000
20.8	5.2	4.75	3	4.375	4.6	6	23.3																				27.8
	W	a	k	e		F	o	r	e	s	t																D 2000
5.8	5.8	4.6	4.3	3.5	6	4.25	4.625	2.8	4	3.1	2.4	20.8															45.4

English_2D

NORTH CAROLINA D.O.T. SIGN DETAIL

SM-5705AG
PMP 3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

APPROVED:

DATE: 12/17/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043780 ENGINEER DAVID M. EATON

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

CONTRACT: DE00419 T.I.P.: SM-6105H / HS-2405AH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
DURHAM COUNTY

TIP NO.	SHEET NO.
SM-6105H / HS-2405AH	PMP-1

APPROVED: _____

DATE: _____

SEAL
3/2/2026

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
NC 54 (S. MIAMI BLVD.) -L-	THERMOPLASTIC	SNOWPLOWABLE
SR 1978 (HOPSON RD.) -Y1-	THERMOPLASTIC	SNOWPLOWABLE

D) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

E) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

F) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.

G) USE NO TRACK MARKINGS FOR CROSSWALKS AS SHOWN IN ROADWAY STANDARD DRAWING 1205.07 (SHEET 2 OF 2)

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

MITCH EATON, PE — SIGNING & DELINEATION REGIONAL ENGINEER

DERRICK H. BEARD — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: VIAS INFRASTRUCTURE

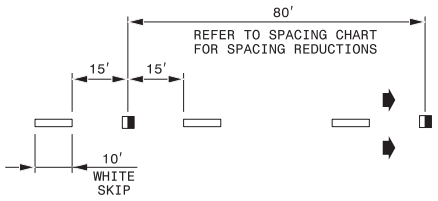
NICK RAMIREZ, PE — PROJECT MANAGER

MATTHEW DOUGLAS, PE — PROJECT DESIGN ENGINEER

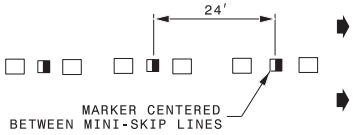
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H / HS-2405AH	PMP-1B

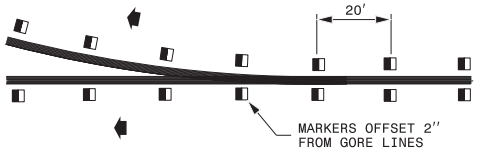
10′-30′/SP SKIP LINE



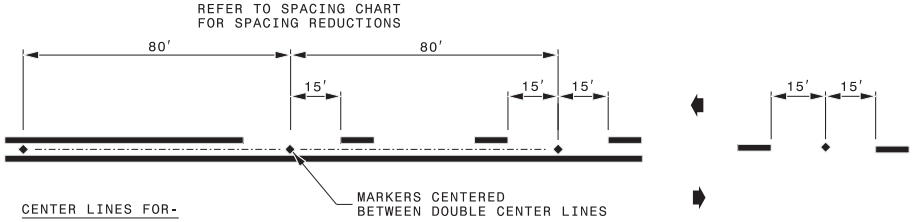
3′-9′/SP MINI-SKIP LINE



GORE LINES



YELLOW CENTER LINES

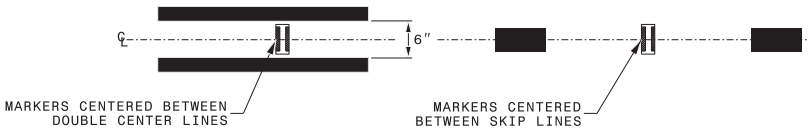


CENTER LINES FOR-

TWO-LANE, TWO-WAY ROADWAYS
UNDIVIDED ROADWAYS
TWO-WAY LEFT TURN LANES

DETAIL OF PAVEMENT MARKER PLACEMENT

RAISED REFLECTIVE PAVEMENT MARKERS



LEGEND

- CRYSTAL/RED PAVEMENT MARKER
- YELLOW/YELLOW PAVEMENT MARKER
- DIRECTION OF TRAFFIC FLOW

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

ROADWAY DETAIL DRAWING FOR

RAISED PAVEMENT MARKERS

INSTALLATION SPACING

SHEET 2 OF 3

1250D01

12/22/2025
NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V SPRINGER

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: M.V. SPRINGER DATE: 2-15-24
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

TIP NO.	SHEET NO.
SM-6105H /HS-2405AH	PMP-2

APPROVED: _____

DATE: _____

SEAL
2/14/2026

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038649 MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

PAVEMENT MARKING SCHEDULE

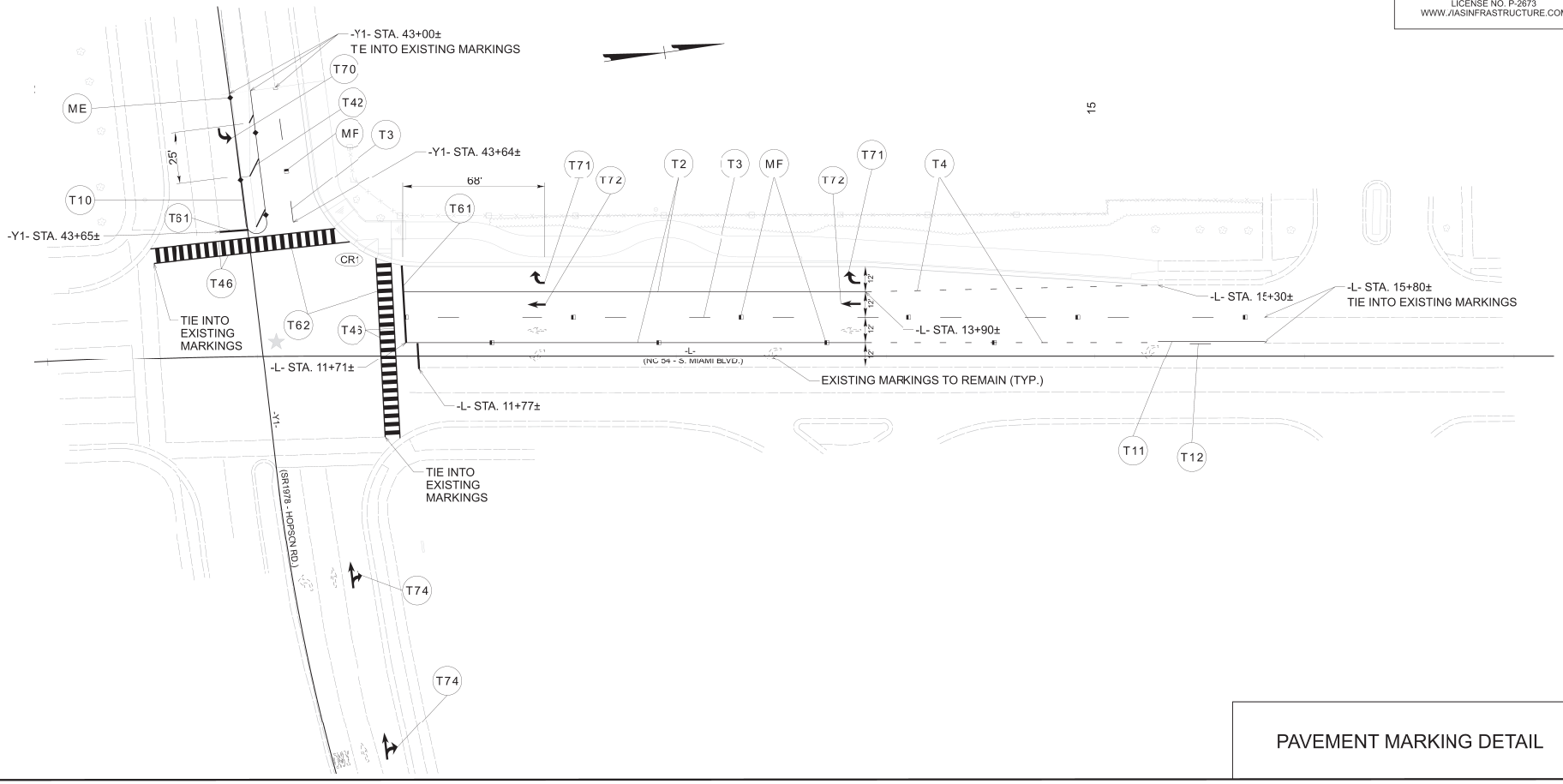
SYMBOL	DESCRIPTION
THERMOPLASTIC (4", 90 MILS)	
T2	WHITE SOLID LANE LINE
T3	10 FT WHITE SKIP
T4	3 FT. - 9 FT./SP WHITE MINISKIP
T10	YELLOW EDGELINE
T11	YELLOW SINGLE CENTER
T12	10 FT YELLOW SKIP
THERMOPLASTIC (8", 90 MILS)	
T42	YELLOW DIAGONAL
T46	WHITE CROSSWALK LINE
THERMOPLASTIC (24", 90 MILS)	
T61	WHITE STOP BAR
T62	WHITE CROSSWALK
THERMOPLASTIC (90 MILS)	
T70	LEFT TURN ARROW
T71	RIGHT TURN ARROW
T72	STRAIGHT ARROW
T74	COMBO RIGHT/STRAIGHT ARROW
SNOWPLOWABLE PAVEMENT MARKERS	
ME	YELLOW & YELLOW
MF	CRYSTAL & RED

NOTE: USE NO TRACK MARKINGS FOR CROSSWALKS AS SHOWN IN ROADWAY STANDARD DRAWING 1205.7 SHEET 2 OF 2.

CURB RAMP TABLE

CURB RAMP	ALIGNMENT	STATION	OFFSET	RAMP TYPE	STD. DWG.
CR1	-L-	11+53	58' LT	4	848.06 SHEET 10 *

* SEE SPECIAL DETAIL IN ROADWAY PLANS IN LIEU OF STANDARD DRAWING

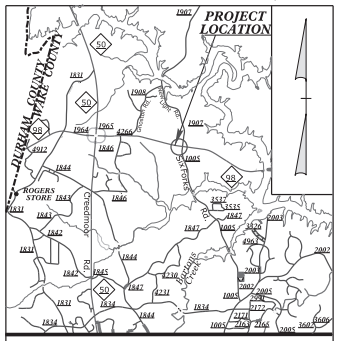


PAVEMENT MARKING DETAIL

09/08/99

TIP PROJECT: SM-5705AG

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



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

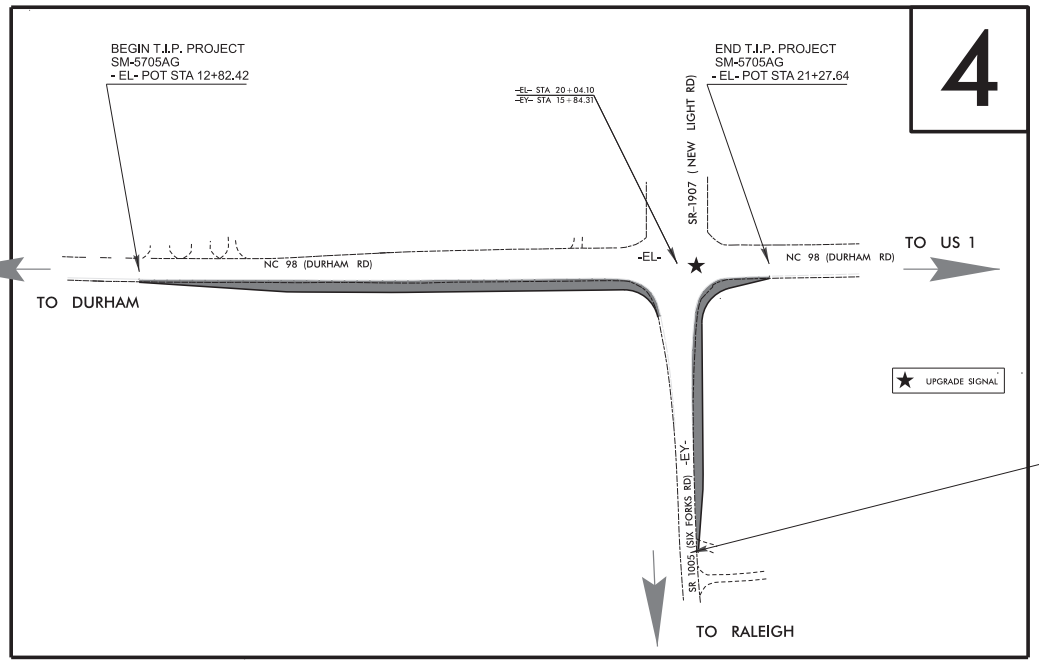
EROSION CONTROL PLANS

LOCATION: NC 98 (DURHAM RD.) AT SR1005 (SIX FORKS RD.)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-5705AG	EC-1	4

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48903.1.1		PE
48903.2.1		R/W
48903.3.1		CONST.



NC GRID
NAD 83 NA 2011

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

D W DAVIS
LEVEL IIIA NAME

3553
LEVEL IIIA CERTIFICATION NO.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 25 0 5 10
PROFILE (VERTICAL)

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES

Prepared In the Office of:
DIVISION OF HIGHWAYS
2612 N. Duke St., Durham, NC, 27704

2024 STANDARD SPECIFICATIONS

MATTHEW J NOLFO, P.E.
PROJECT ENGINEER

SUNIL J. PATEL
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA
FIFTH DIVISION
BECCA GALLAS, PE
DIVISION ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	EC-02
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

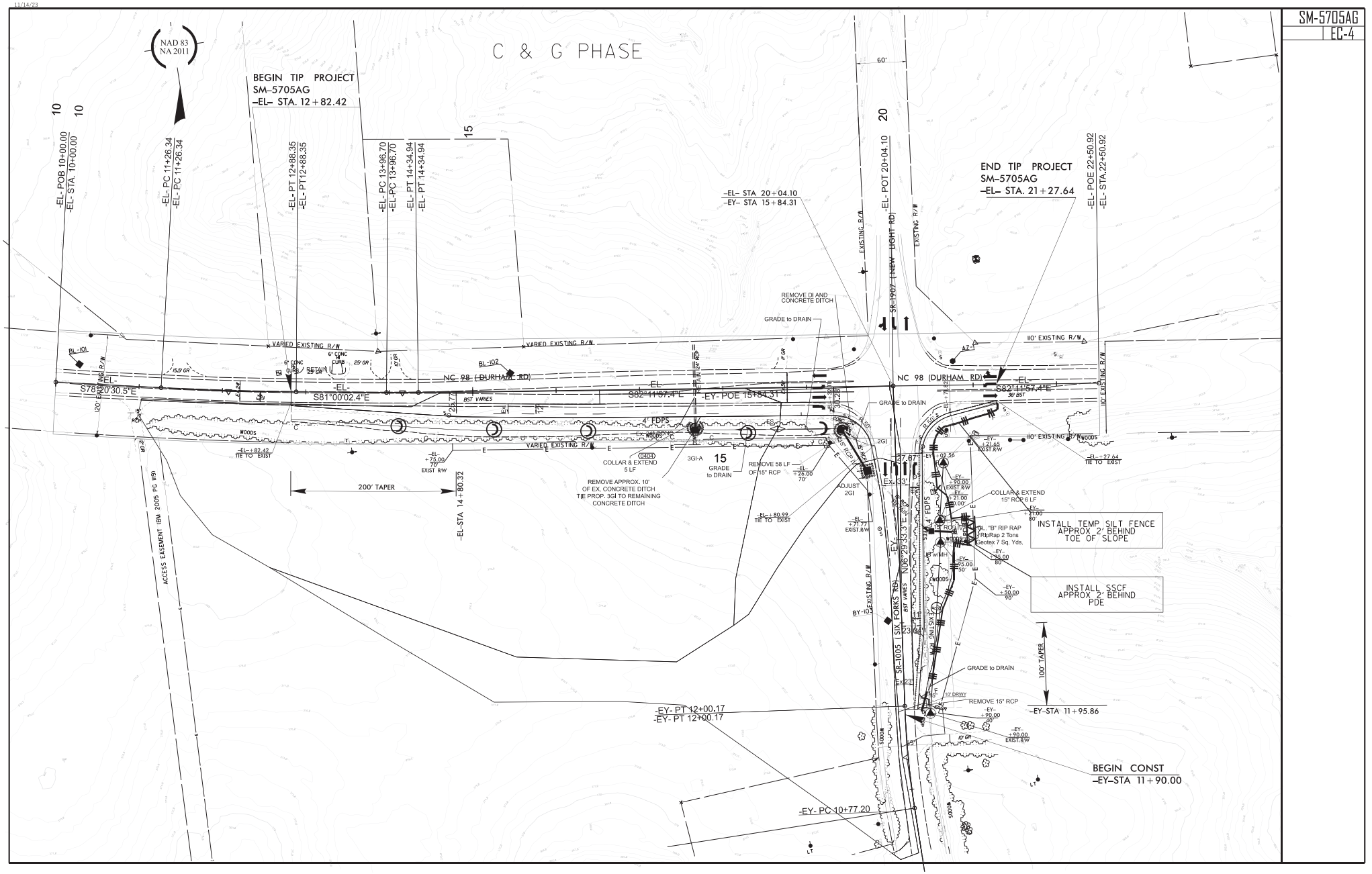
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	—EW—EW—EW—
1636.03	Coir Fiber Wattle Barrier	—CFW—CFW—CFW—

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	EC-3B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

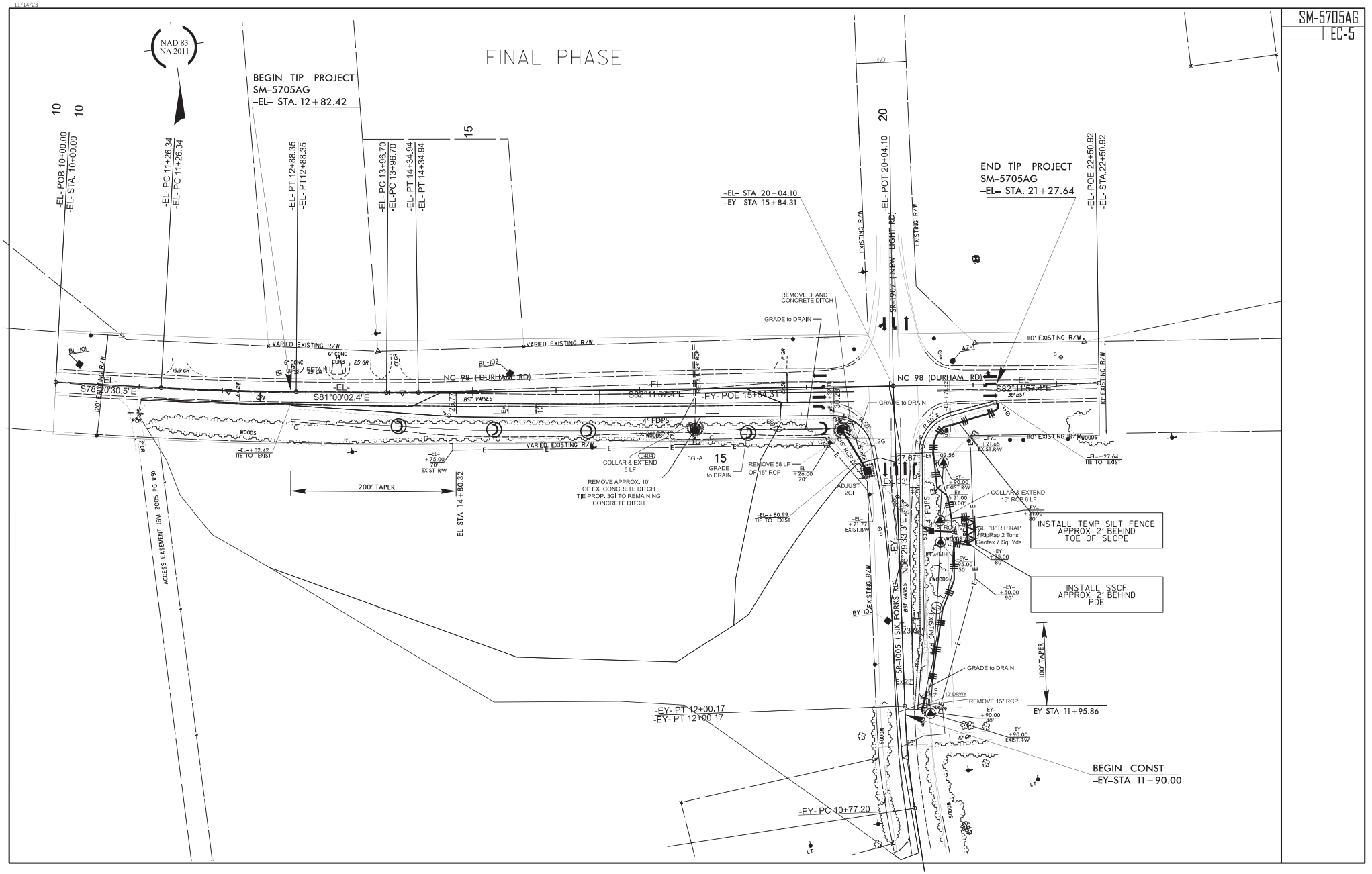
SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.


C & G PHASE
NAD 83
NA 2011
BEGIN TIP PROJECT
SM-5705AG
-EL- STA. 12+82.42
END TIP PROJECT
SM-5705AG
-EL- STA. 21+27.64
-EL- POB 10+00.00
-EL- STA. 10+00.00
-EL- PC 11+26.34
-EL- PT 12+88.35
-EL- PC 13+96.70
-EL- PT 14+34.94
-EL- STA 20+04.10
-EY- STA 15+84.31
-EL- POT 20+04.10
-EL- POE 22+50.92
-EL- STA.22+50.92
NC 98 (DURHAM RD)
SR 1907 (NEW LIGHT RD)
SR 1005 (SIX FORKS RD)
VARIED EXISTING R/W
110' EXISTING R/W
EXISTING R/W
GRADE to DRAIN
REMOVE DI AND CONCRETE DITCH
4' FDPS
2GI
3GI-A
15
COLLAR & EXTEND 5 LF
REMOVE 58 LF OF 15" RCP
REMOVE APPROX. 10' OF EX. CONCRETE DITCH TIE PROP. 3GI TO REMAINING CONCRETE DITCH
ADJUST 2GI
COLLAR & EXTEND 15" RCP 6 LF
INSTALL TEMP SILT FENCE APPROX 2' BEHIND TOE OF SLOPE
INSTALL SSCF APPROX 2' BEHIND PDE
EL. "B" RIP RAP
Rip Rap 2 Tons
Geotex 7 Sq. Yds.
200' TAPER
100' TAPER
-EL-STA 14+80.32
-EY-STA 11+95.86
-EY- PT 12+00.17
-EY- PC 10+77.20
BEGIN CONST
-EY-STA 11+90.00
ACCESS EASEMENT (BM 2005 PG 113)
REMOVE 15" RCP
10' DRWY
WOODS
S81°00'02.4"E
S82°41'57.4"E
S78°20'30.5"E
N06°29'33.3"E

13/14/23

SM-5705AG
EC-5



TIP PROJECT: SM-6105H/ HS-2405AH

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM-6105H/ HS-2405AH	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION

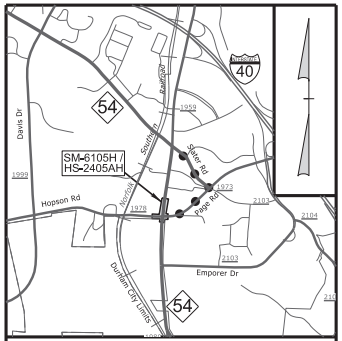
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

DURHAM COUNTY

LOCATION: *NC 54 (S. MIAMI BLVD.) AT SR 1978 (HOPSON RD.) CONSTRUCT A SOUTHBOUND RIGHT TURN LANE ON NC 54*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, & WIDENING*

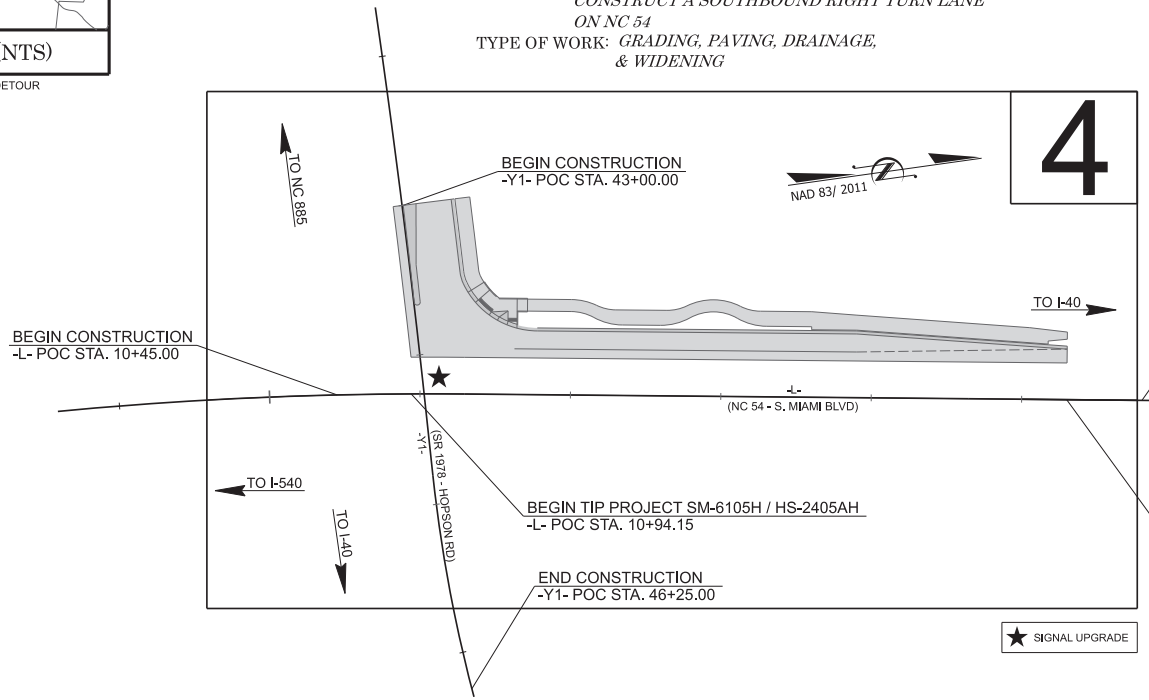


VICINITY MAP (NTS)

● ● ● OFFSITE TRUCK DETOUR

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.



GRAPHIC SCALE

20 10 0 20 40

PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG 010000 GENERAL STORMWATER CONSTRUCTION PERMIT ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES.

WETHERILL ENGINEERING

1223 JONES FRANKLIN ROAD
Raleigh, N.C. 27606
License No. P-0277
Bus: 919 851 9077
Fax: 919 851 8917

Prepared In the Office of:

WETHERILL ENGINEERING, INC.

1223 JONES FRANKLIN ROAD
RALEIGH, NC 27606

Designed by:

KATIE ESTEP — *4485*

NAME — *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N, C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H/ HS-2405AH	EC-02

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

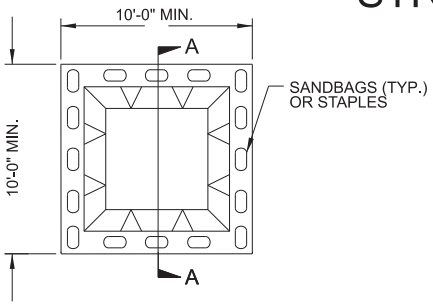
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

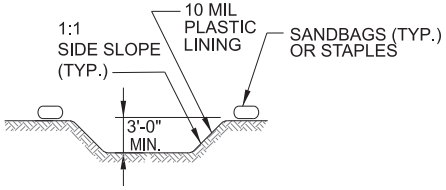
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	—EW—EW—EW—
1636.03	Coir Fiber Wattle Barrier	—CFW—CFW—CFW—

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H/ HS-2405AH	EC-2A
R/W SHEET NO.	

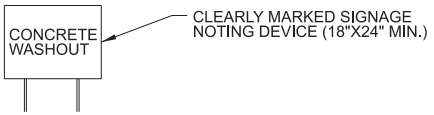
ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A



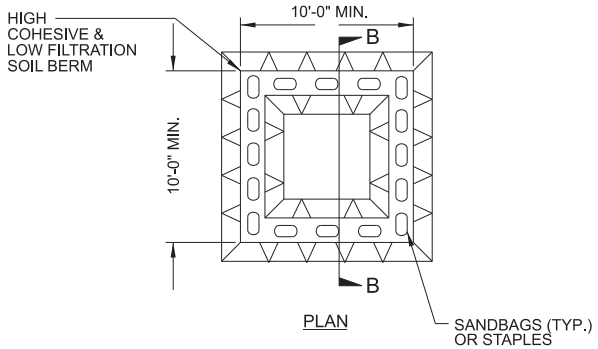
NOTES;
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

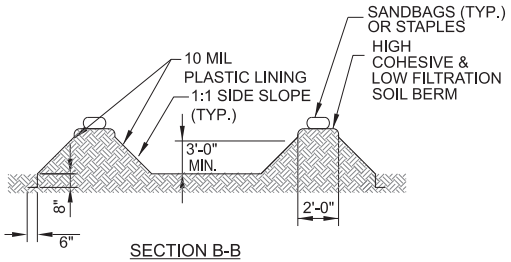
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES;
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

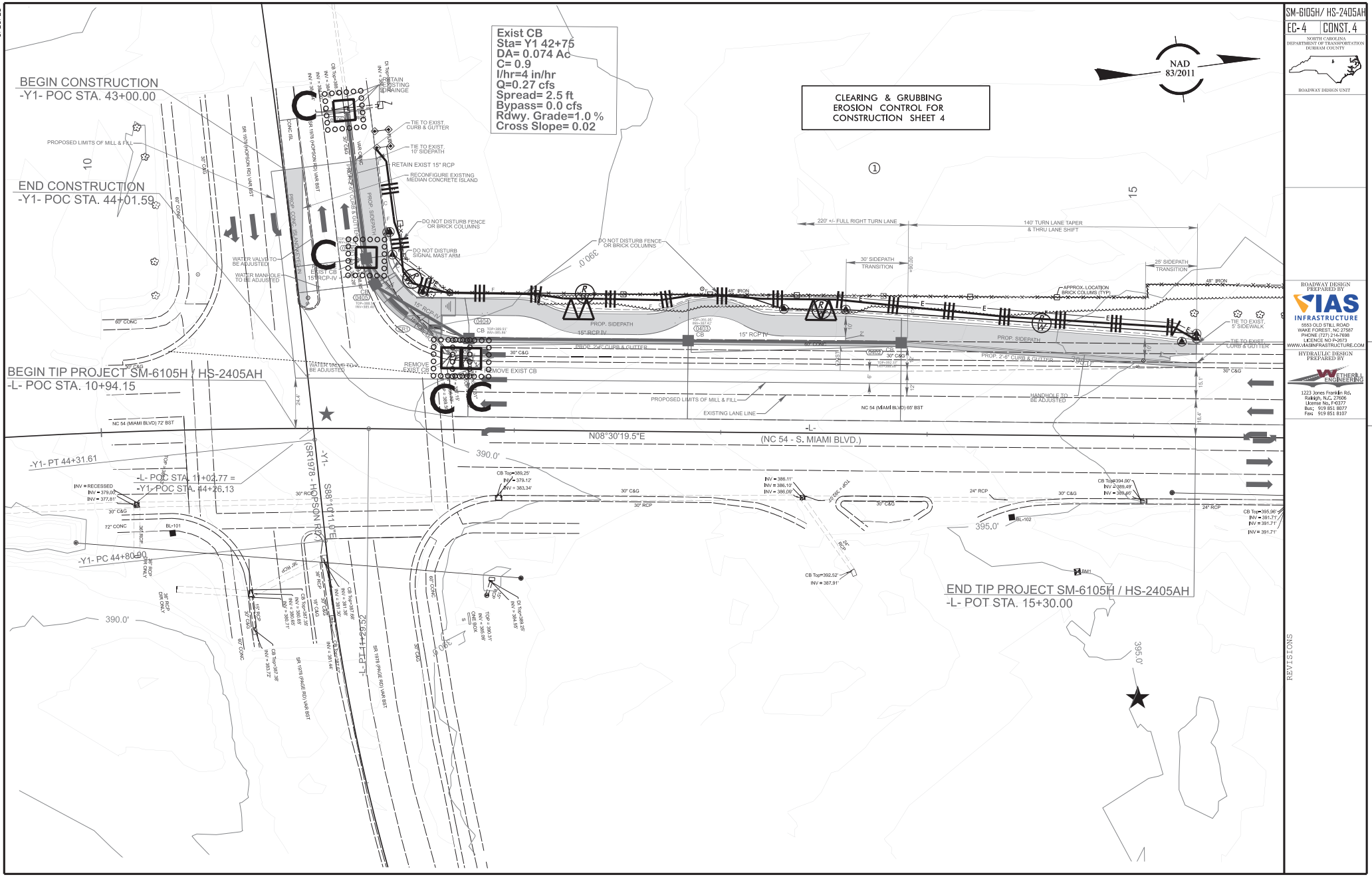
NOT TO SCALE

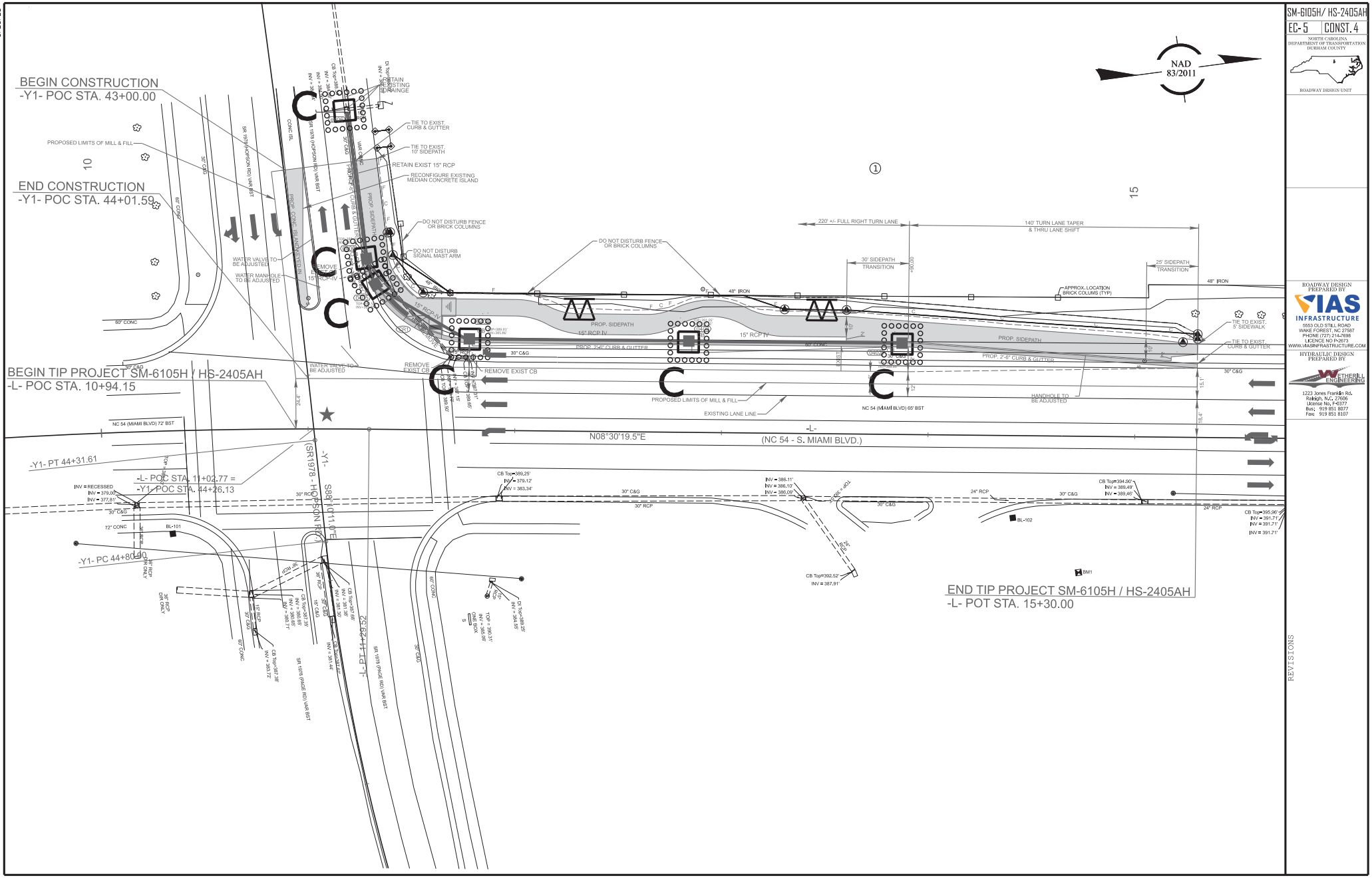
PROJECT REFERENCE NO.	SHEET NO.
SM-6105H/ HS-2405AH	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES


Exist CB
Sta= Y1 42+75
DA= 0.074 Ac
C= 0.9
I/hr=4 in/hr
Q=0.27 cfs
Spread= 2.5 ft
Bypass= 0.0 cfs
Rdwy. Grade=1.0 %
Cross Slope= 0.02
CLEARING & GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4
NAD 83/2011
BEGIN CONSTRUCTION
-Y1- POC STA. 43+00.00
END CONSTRUCTION
-Y1- POC STA. 44+01.59
BEGIN TIP PROJECT SM-6105H / HS-2405AH
-L- POC STA. 10+94.15
END TIP PROJECT SM-6105H / HS-2405AH
-L- POT STA. 15+30.00
-L- POC STA. 11+02.77 =
-Y1- POC STA. 44+26.13
-Y1- PT 44+31.61
-Y1- PC 44+80.90
-L- PT 11+52.62
N08°30'19.5"E
S88°10'11.0"E
(NC 54 - S. MIAMI BLVD.)
(SR1978 - HOPSON RD)
PROPOSED LIMITS OF MILL & FILL
EXISTING LANE LINE
RETAIN EXISTING DRAINAGE
TIE TO EXIST. CURB & GUTTER
TIE TO EXIST. 10' SIDEPATH
RETAIN EXIST 15" RCP
RECONFIGURE EXISTING MEDIAN CONCRETE ISLAND
DO NOT DISTURB FENCE OR BRICK COLUMNS
DO NOT DISTURB SIGNAL MAST ARM
WATER VALVE TO BE ADJUSTED
WATER MANHOLE TO BE ADJUSTED
EXIST CB 15 RCP-IV
REMOVE EXIST CB
220' +/- FULL RIGHT TURN LANE
140' TURN LANE TAPER & THRU LANE SHIFT
30' SIDEPATH TRANSITION
25' SIDEPATH TRANSITION
APPROX. LOCATION BRICK COLUMS (TYP)
PROP. SIDEPATH
PROP. 2'-6" CURB & GUTTER
15" RCP IV
18" RCP IV
30" RCP
24" RCP
30" C&G
60" CONC
72" CONC
48" IRON
HANDHOLE TO BE ADJUSTED
TIE TO EXIST. 5' SIDEWALK
NC 54 (MIAMI BLVD) 72' BST
NC 54 (MIAMI BLVD) 65' BST
SR 1978 (HOPSON RD) VAR BST
SR 1978 (PAGE RD) VAR BST
390.0'
395.0'
220.0'
390.0'
SM-6105H/ HS-2405AH
EC-4 | CONST. 4
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DURHAM COUNTY
ROADWAY DESIGN UNIT
ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
5553 OLD STILL ROAD
WAKE FOREST, NC 27587
PHONE (727) 214-7698
LICENCE NO P-2973
WWW.VIASINFRASTRUCTURE.COM
HYDRAULIC DESIGN PREPARED BY
ETHERIDGE ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
REVISIONS
5/26/20



5/26/20

SM-6105H/ HS-2405AH

EC-5 | CONST. 4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN PREPARED BY

VIAS INFRASTRUCTURE
5553 OLD STILL ROAD
WAKE FOREST, NC 27587
PHONE (727) 214-7698
LICENCE NO P-2973
WWW.VIASINFRASTRUCTURE.COM

HYDRAULIC DESIGN PREPARED BY

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

REVISIONS

CONTRACT: DE00438 T.I.P.: SM-6105H / HS-2405AH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
DURHAM COUNTY

LOCATION: *CONSTRUCT A SOUTHBOUND RIGHT TURN LANE ON NC 54 (S. MIAMI BLVD.) AT SR 1978 (HOPSON RD.)*

TIP NO.	SHEET NO.
SM-6105H / HS-2405AH	SIGN-1

APPROVED: _____

DATE: _____

SEAL

4/9/2026

NORTH CAROLINA PROFESSIONAL SEAL 038649 ENGINEER MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D','E', AND 'F' SIGNS ON 'U' CHANNEL SUPPORTS

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER

B) ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE HANDLED WITH CARE AND RELOCATED TO AVOID CONFLICT WITH PROPOSED IMPROVEMENTS.

C) CONTRACTOR TO RELOCATE EXISTING SIGNS WITH CARE. DAMAGED SIGNS TO BE REPLACED.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4025000000	901	CONTRACTOR FURNISHED, TYPE E SIGN	7.25	S.F.
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	15	L.F.
4102000000	904	SIGN ERECTION, TYPE E	2	EA.
4116100000	904	SIGN ERECTION, RELOCATE SIGN TYPE E	1	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	1	EA.

INDEX

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

MITCH EATON, PE — SIGNING & DELINEATION REGIONAL ENGINEER

DERRICK H. BEARD — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY:

NICK RAMIREZ, PE — PROJECT MANAGER

MATTHEW DOUGLAS, PE — PROJECT DESIGN ENGINEER

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE: (727) 214-7658
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

401 QUANTITY REQ'D _1_

24" X 30"
R4-7

ONE "U" POST PER SIGN

402 QUANTITY REQ'D _1_

18" X 18"
OM1-3

MOUNT BELOW SIGN 401

TIP NO.	SHEET NO.
SM-6105H / HS-2405AH	SIGN-2

APPROVED: _____

DATE: 12/17/2025

SEAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

TYPE "E" SIGNS

TIP NO.	SHEET NO.
SM-6105H /HS-2405AH	SIGN-3

APPROVED: _____

DATE: _____

SEAL

2/14/2026

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038649 MATTHEW A. DOUGLAS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

NOTE 2
STA. 43+60 –Y1–

401

402

SEE NOTE 1

-L-
(NC 54 - S. MIAMI BLVD.)

-Y1-
(SR1979 - HOPSON RD.)

PROJECT NOTES

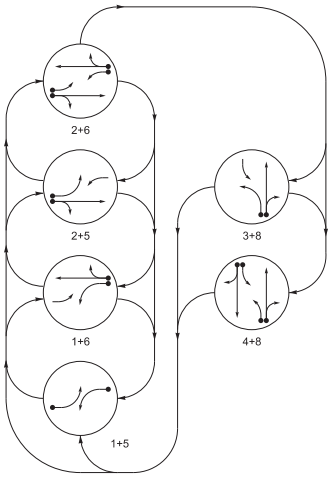
1. DISPOSAL OF SIGN SYSTEM, U–CHANNEL & ERECTION, RELOCATE SIGN E (PLACE EXISTING SIGN PANELS ON NEW U–CHANNEL SUPPORT)

2. DISPOSAL OF SIGN SYSTEM, U–CHANNEL & SIGN ERECTION, TYPE E

SIGNING DETAIL

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig 1,0

DEFAULT PHASING DIAGRAM

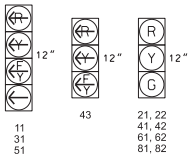


DEFAULT PHASING TABLE OF OPERATION

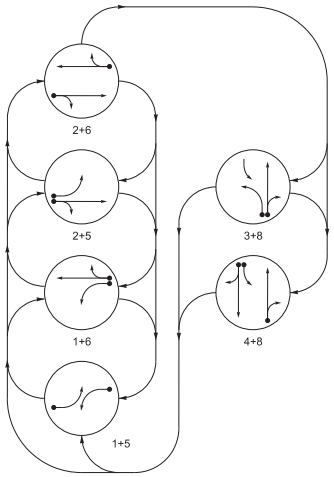
SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+8	4+8	FLASH
11	—	—	F/Y	F/Y	R	R	R
21, 22	R	R	G	G	R	R	R
31	R	R	R	R	—	F/Y	R
41, 42	R	R	R	R	G	R	R
43	R	R	R	R	F/Y	F/Y	R
51	—	F/Y	—	F/Y	R	R	R
61, 62	R	G	R	G	R	R	R
81, 82	R	R	R	R	G	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+8	4+8	FLASH
11	—	—	R	R	R	R	R
21, 22	R	R	G	G	R	R	R
31	R	R	R	R	—	R	R
41, 42	R	R	R	R	R	G	R
43	R	R	R	R	F/Y	F/Y	R
51	—	R	—	R	R	R	R
61, 62	R	G	R	G	R	R	R
81, 82	R	R	R	R	G	G	R

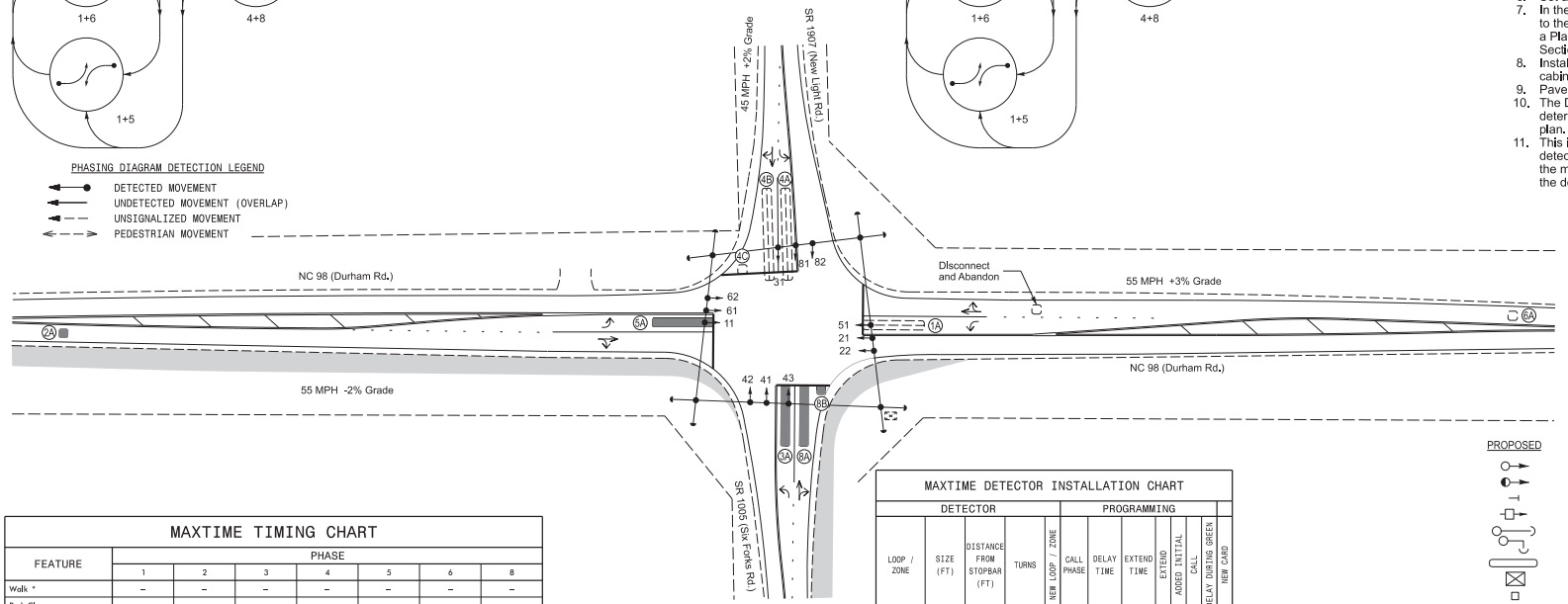
6 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Disconnect and abandon existing loop 6B.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current TSMO Design Manual and submit a Plan of Record to the Signal Design Section.
8. Install new controller in existing cabinet.
9. Pavement markings are existing.
10. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
	Non-Intrusive Detection Zone	

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	8
Walk *	–	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–	–
Min Green *	7	14	7	7	7	14	7
Passage *	2.0	6.0	1.0	1.0	2.0	6.0	1.0
Max 1 *	20	75	25	25	20	75	25
Yellow Change	3.0	5.4	3.0	4.8	3.0	5.4	4.8
Red Clear	2.3	1.0	2.1	1.0	2.1	1.0	1.0
Added Initial *	–	2.5	–	–	–	2.5	–
Maximum Initial *	–	46	–	–	–	46	–
Time Before Reduction *	–	15	–	–	–	15	–
Time To Reduce *	–	30	–	–	–	30	–
Minimum Gap	–	3.4	–	–	–	3.4	–
Advance Walk	–	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–
Dual Entry	–	–	–	X	–	–	X

* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP / ZONE	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	EXTEND CALL	EXTEND DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15.0*	-	X	-	X	-	-
					6#	3.0	-	X	-	X	X	-
2A	6X6	420	**	X	2	-	-	X	X	X	-	**
3A	6X60	0	**	X	3	15.0*	-	X	-	X	-	**
					8#	3.0	-	X	-	X	-	**
4A	6X60	+5	2-4-2	-	4	3.0	-	X	-	X	-	-
4B	6X60	+5	2-4-2	-	4	10.0	-	X	-	X	-	-
4C	6X6	0	EXIST	-	4	15.0	-	X	-	X	-	-
5A	6X40	0	**	X	5	15.0*	-	X	-	X	-	**
					2#	3.0	-	X	-	X	X	**
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
6B	6X6	110	EXIST	-	DISCONNECT AND ABANDON							
8A	6X60	0	**	X	8	10.0	-	X	-	X	-	**
8B	6X6	0	**	X	8	15.0	-	X	-	X	-	**

* Reduce Delay to 3 seconds during Alternate Phasing Operation.
\# Disable phase call for loop during Alternate Phasing Operation.
** Non-intrusive detection zone.

Signal Upgrade - Temporary Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: March 2025 | REVIEWED BY:
PREPARED BY: J.A. Lohr | REVIEWED BY:

SCALE: 1"=40' (0 40)

REVISIONS	INT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 026486
ENGINEER
ROBERT J. ZIEMBA

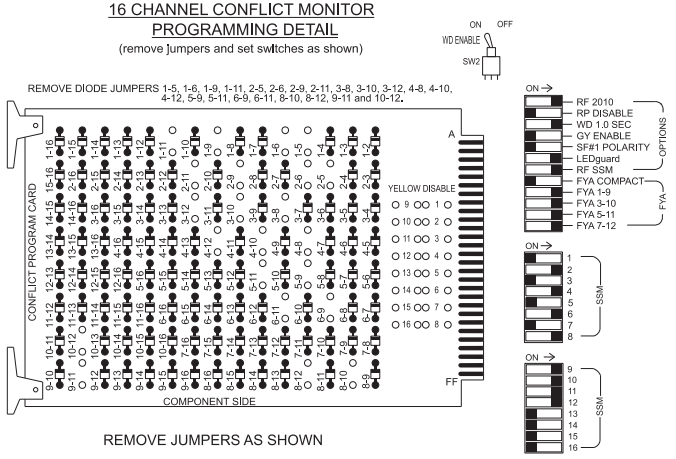
05/01/2025
DATE

SIG. INVENTORY NO. 05-1331T

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig.1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3, S4, S5, S6, S8, S9, S10, S12, S13
Phases Used.....1, 2, 3, 4, 5, 6, 8
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	31 ★	41,42	NU	51 ★	61,62	NU	NU	81,82	NU	11 ★	31 ★	NU	51 ★	43 ★	NU
RED		128			101			134			107							
YELLOW	*	129		*	102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127			118			133											

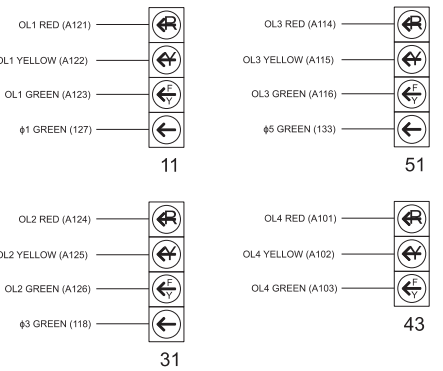
NU = Not Used

★Denotes install load resistor. See load resistor installation detail this sheet.

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø 1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø 3	ø 4	ø 4	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
		1A				3A	4A	4C							
	L	NOT USED				NOT USED	ø 4 4B	NOT USED							ST DC ISOLATOR
FILE "J"	U	ø 5	ø 6	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
		5A	6A												
	L	NOT USED	NOT USED												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

! If present, remove jumpers from I1-W to J4-W, I5-W to J8-W, and J1-W to I4-W on rear of Input file.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
				-	29 ★	6	3.0		X		X	X
3A	TB4-5,6	I5U	58	20	7 ★	3	15.0		X		X	
				-	30 ★	8	3.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10.0		X		X	
4C	TB6-1,2	I7U	65	31	10	4	15.0		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	

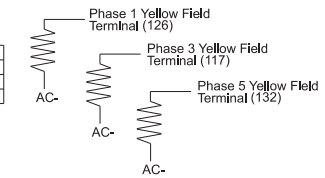
★ For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



SPECIAL DETECTOR NOTE

Install a non-intrusive detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For detection zones 3A and 5A, detector card placements are typical for a NCDOT installation. Inputs associated with these slots are compatible with the time of day instructions located on sheet 2 of this electrical detail.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1331T
DESIGNED: March 2025
SEALED: 05/01/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

Traffic Engineering Branch, Traffic Engineering Unit, Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: April 2025 | REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

05/01/2025
DATE

SIG.INVENTORY NO. 05-1331T

1-MAY-2025 13:14
pw://rndcon-pw.bentley.com:rndcon1-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division.05/05-1331/Signals Management/0513311T_ae.ele.20250501.dgn
pw://rndcon-pw.bentley.com:rndcon1-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division.05/05-1331/Signals Management/0513311T_ae.ele.20250501.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig.1.2

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11, 31 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channel Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1331T
DESIGNED: March 2025
SEALED: 05/01/2025
REVISED: N/A

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-	-	8 ← NOTICE INCLUDED PHASE
Modifier Phases	1	3	5	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

1A

Detector	Call Phase	Delay
1	1	3.0
29	0	3.0

3A

Detector	Call Phase	Delay
7	3	3.0
30	0	3.0

5A

Detector	Call Phase	Delay
15	5	3.0
31	0	3.0

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: April 2025 | REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

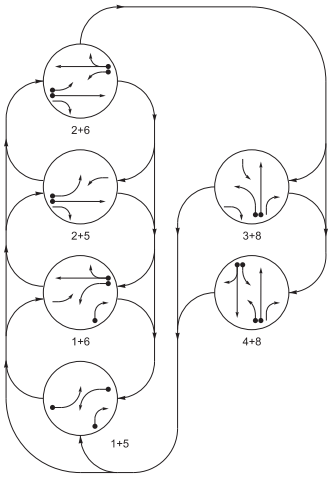
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
05/01/2025
DATE
SIG.INVENTORY NO. 05-1331T

1-MAY-2025 13:14
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-1331\Signals Management\051331T_ane.ita.20250501.dgn
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-1331\Signals Management\051331T_ane.ita.20250501.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig 2.0

DEFAULT PHASING DIAGRAM

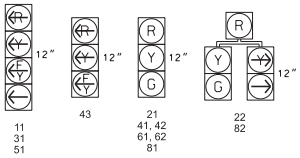


DEFAULT PHASING TABLE OF OPERATION

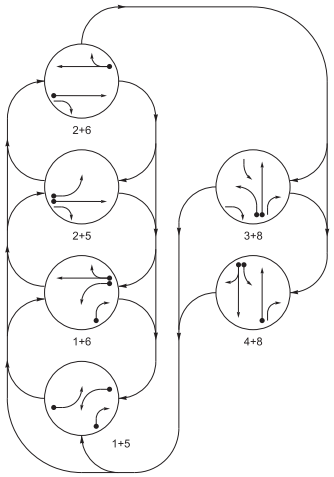
SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+8	4+8	FLASH
11	—	—	Ey	Ey	R	R	R
21	R	R	G	G	R	R	R
22	R	R	G	G	R/	R	R
31	R	R	R	R	—	Ey	R
41, 42	R	R	R	R	R	G	R
43	R	R	R	R	Ey	Ey	R
51	—	Ey	—	Ey	R	R	R
61, 62	R	G	R	G	R	R	R
81	R	R	R	R	G	G	R
82	R/	R/	R	R	G	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+8	4+8	FLASH
11	—	—	R	R	R	R	R
21	R	R	G	G	R	R	R
22	R	R	G	G	R/	R	R
31	R	R	R	R	—	R	R
41, 42	R	R	R	R	R	G	R
43	R	R	R	R	Ey	Ey	R
51	—	R	—	R	R	R	R
61, 62	R	G	R	G	R	R	R
81	R	R	R	R	G	G	R
82	R/	R/	R	R	G	G	R

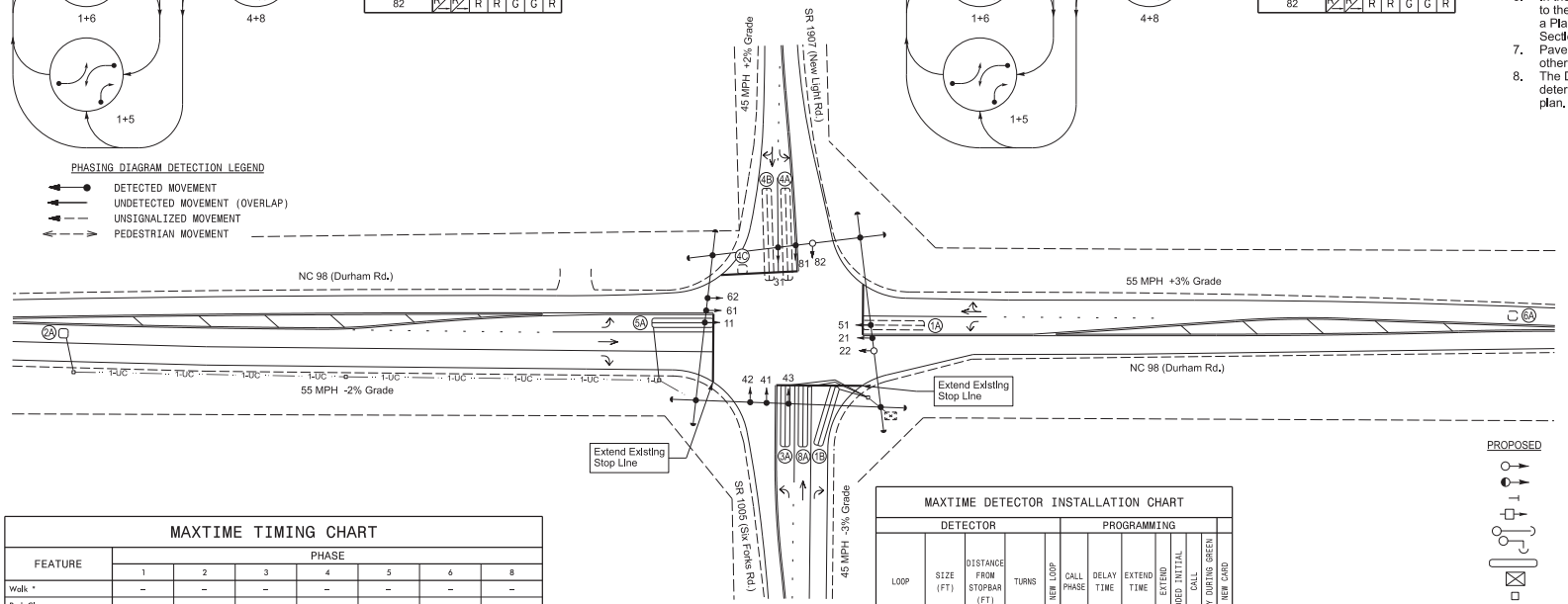
6 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current TSMO Design Manual and submit a Plan of Record to the Signal Design Section.
7. Pavement markings are existing unless otherwise shown.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
	Directional Arrow	

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	8
Walk *	–	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–	–
Min Green *	7	14	7	7	7	14	7
Passage *	2.0	6.0	1.0	1.0	2.0	6.0	1.0
Max 1 *	20	75	25	25	20	75	25
Yellow Change	3.0	5.4	3.0	4.8	3.0	5.4	4.8
Red Clear	2.4	1.0	2.1	1.0	2.1	1.0	1.0
Added Initial *	–	2.5	–	–	–	2.5	–
Maximum Initial *	–	46	–	–	–	46	–
Time Before Reduction *	–	15	–	–	–	15	–
Time To Reduce *	–	30	–	–	–	30	–
Minimum Gap	–	3.4	–	–	–	3.4	–
Advance Walk	–	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–
Dual Entry	–	–	–	X	–	–	X

* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15.0*	-	X	-	X	-	-
					6#	3.0	-	X	-	X	X	-
1B	6X40	0	2-4-2	X	1	15.0	-	X	-	X	-	-
2A	6X6	420	5	X	2	-	-	X	X	X	-	-
3A	6X60	0	2-4-2	X	3	15.0*	-	X	-	X	-	-
					8#	3.0	-	X	-	X	-	-
4A	6X60	+5	2-4-2	-	4	3.0	-	X	-	X	-	-
4B	6X60	+5	2-4-2	-	4	10.0	-	X	-	X	-	-
4C	6X6	0	EXIST	-	4	15.0	-	X	-	X	-	-
5A	6X40	0	2-4-2	X	5	15.0*	-	X	-	X	-	-
					2#	3.0	-	X	-	X	X	-
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
8A	6X60	0	2-4-2	X	8	10.0	-	X	-	X	-	-

* Reduce Delay to 3 seconds during Alternate Phasing Operation.
\# Disable phase call for loop during Alternate Phasing Operation.

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: March 2025 | REVIEWED BY:
PREPARED BY: J.A. Lohr | REVIEWED BY:

SCALE 1"=40' (0 40)

REVISIONS	INT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

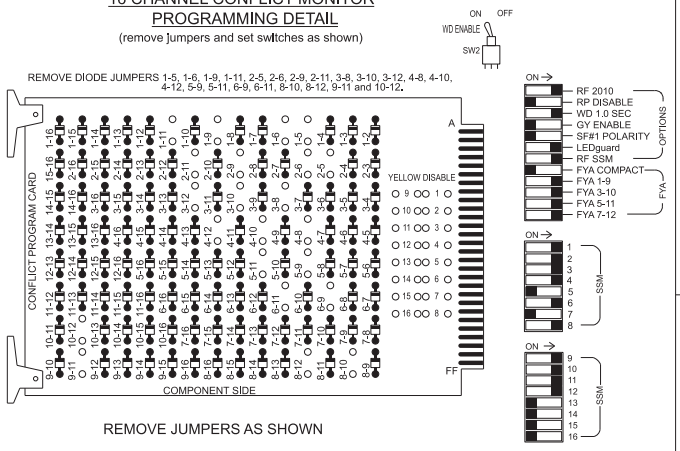
DATE: 05/01/2025

SIG. INVENTORY NO. 05-1331

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig.2.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S3, S4, S5, S6, S8, S9, S10, S12, S13
Phases Used	1, 2, 3, 4, 5, 6, 8
Overlap "1"	*
Overlap "2"	*
Overlap "3"	*
Overlap "4"	*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3		S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11 ★	82	21,22	NU	31 ★	22	41,42	NU	51 ★	61,62	NU	NU	81,82	NU	11 ★	31 ★	NU	51 ★	43 ★	NU
RED	★		128		★		101			134			107							
YELLOW			129				102		★	135			108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW		126				117									A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133											

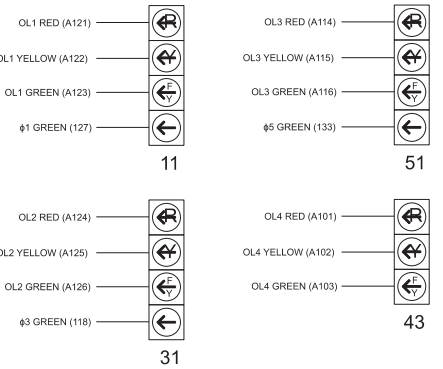
NU = Not Used

★ Denotes Install load resistor. See load resistor Installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ϕ 1	ϕ 2	SLOT	SLOT	ϕ 3	ϕ 4	ϕ 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A	EMPTY	EMPTY	3A	4A	4C	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	ϕ 1			NOT USED	ϕ 4	NOT USED							ST
			1B				4B								DC ISOLATOR
FILE "J"	U	ϕ 5	ϕ 6	SLOT	SLOT	SLOT	ϕ 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A	EMPTY	EMPTY	EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
				-	29 ★	6	3.0		X		X	X
1B	TB2-7,8	I2L	43	5	3	1	15.0		X		X	
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7 ★	3	15.0		X		X	
				-	30 ★	8	3.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10.0		X		X	
4C	TB6-1,2	I7U	65	31	10	4	15.0		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	10,0		X		X	

★ For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.

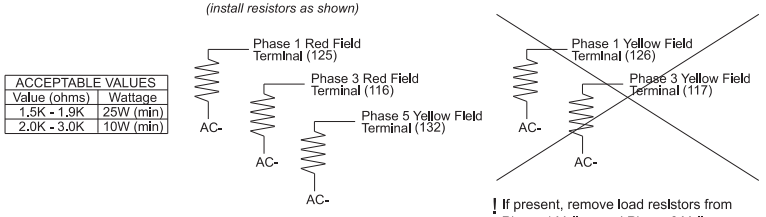
INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



! If present, remove load resistors from Phase 1 Yellow and Phase 3 Yellow.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1331
DESIGNED: March 2025
SEALED: 05/01/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared In the Offices of:

Transportation Mobility and Safety Division
TRAFFIC ENGINEERING BRANCH
ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: April 2025 | REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

05/01/2025
DATE

SIG.INVENTORY NO. 05-1331

1-MAY-2025 13:23
pw://rncdot-pw.bentley.com:rncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division.05/05-1331/Signals Management/051331_sm_ele_20250501.dgn
pw://rncdot-pw.bentley.com:rncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division.05/05-1331/Signals Management/051331_sm_ele_20250501.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	Sig.2.2

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap Included phases for heads 11, 31 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channel Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1331
DESIGNED: March 2025
SEALED: 05/01/2025
REVISED: N/A

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	-	-	8	← NOTICE INCLUDED PHASE
Modifier Phases	1	3	5	-	
Modifier Overlaps	-	-	-	-	
Trail Green	0	0	0	0	
Trail Yellow	0.0	0.0	0.0	0.0	
Trail Red	0.0	0.0	0.0	0.0	

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

1A

Detector	Call Phase	Delay
1	1	3.0
29	0	3.0

3A

Detector	Call Phase	Delay
7	3	3.0
30	0	3.0

5A

Detector	Call Phase	Delay
15	5	3.0
31	0	3.0

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 98 (Durham Road)
at
SR 1005 (Six Forks Road) and
SR 1907 (New Light Road)

Division 5 | Wake County | Wake Forest

PLAN DATE: April 2025 | REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

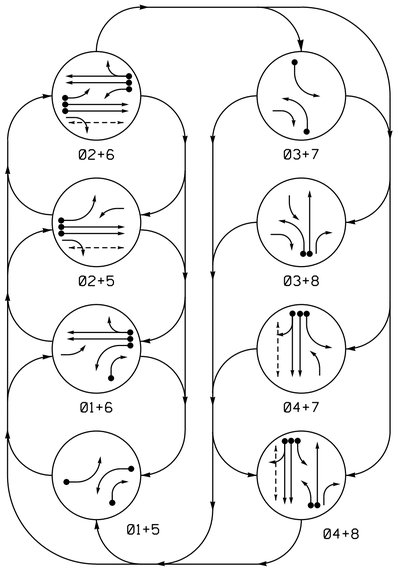
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
05/01/2025
DATE
SIG.INVENTORY NO. 05-1331

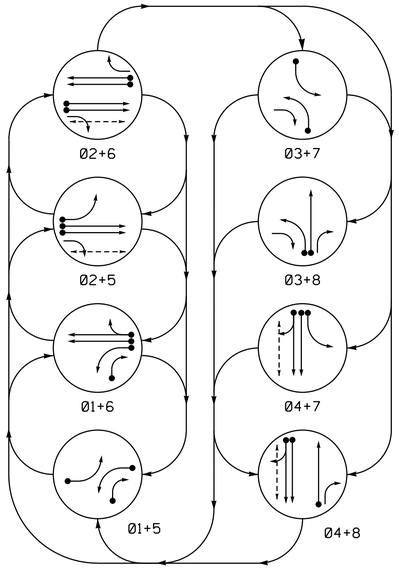
1-MAY-2025 13:24
pw://rncdot-pw.bentley.com:rncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section\Division_05\05-1331\Signals Management\051331_sm_ele_20250501.dgn
pw_report_dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R/~~R~~	R/~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	F Y	F Y	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←	F Y	←	F Y	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/~~R~~	R/~~R~~	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R/~~R~~	R/~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/~~R~~	R/~~R~~	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

8 Phase
Fully Actuated
(Durham Signal System)

NOTES

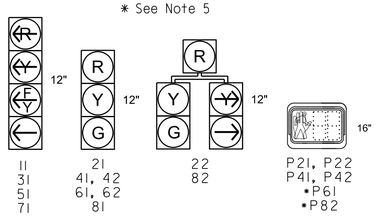
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Existing pedestrian signal heads P61 and P82 are bagged.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
11. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

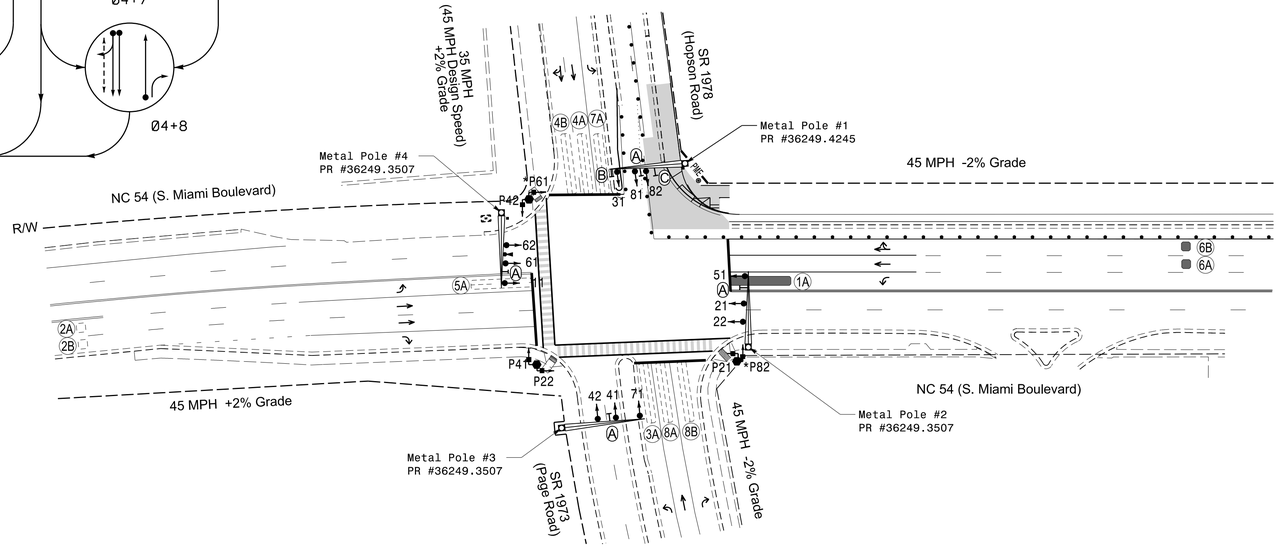
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.
* See Note 5





ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Delayed Green	-	7	-	7	-	-	-	-
Walk *	-	14	-	14	-	-	-	-
Ped Clear	-	28	-	24	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	40	20	90	20	40
Yellow	3.0	4.7	3.0	4.7	3.0	4.7	3.0	4.7
Red Clear	3.1	1.9	3.1	1.8	2.8	1.9	3.3	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR: LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A##	6X40	0	##	X	1	Yes	-	15.0**	-	S	-	-
					6#	Yes	-	3.0	-	G	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	10.0*	-	S	-	-
					8#	Yes	-	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	10.0	-	S	-	-
5A	6X40	0	2-4-2	-	5	Yes	-	15.0**	-	S	-	-
					2#	Yes	-	3.0	-	G	-	-
6A##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
6B##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	10.0*	-	S	-	-
					4#	Yes	-	-	-	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-
8B	6X40	0	2-4-2	-	1	Yes	-	15.0	-	S	-	-

* Disable Delay during Alternate Phasing operation.
** Reduce Delay to 3 seconds during Alternate Phasing operation.
# Disable Phase call for loop during Alternate Phasing operation.
Non-Intrusive Detection Zone

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□→	Pedestrian Signal Head	■→
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
→	Directional Arrow	→
● ●	Construction Zone Drums	● ●
▩	Construction Zone	▩
◁	Metal Pole with Mastarm	◁
⊛	Type I Pushbutton Post	⊛
⬡	Type II Signal Pedestal	⬢
⊂	Out of Pavement Detector	⊂
▬	Non-Intrusive Detection Zone	▬
N/A	Permanent Construction Easement	PME
N/A	Curb Ramp	
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ

Signal Upgrade - Temporary Design 2 (TMP Phase II, Step 4)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: June 2025 | REVIEWED BY:
PREPARED BY: C.E. Carter | REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
Signed by:
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008 T2

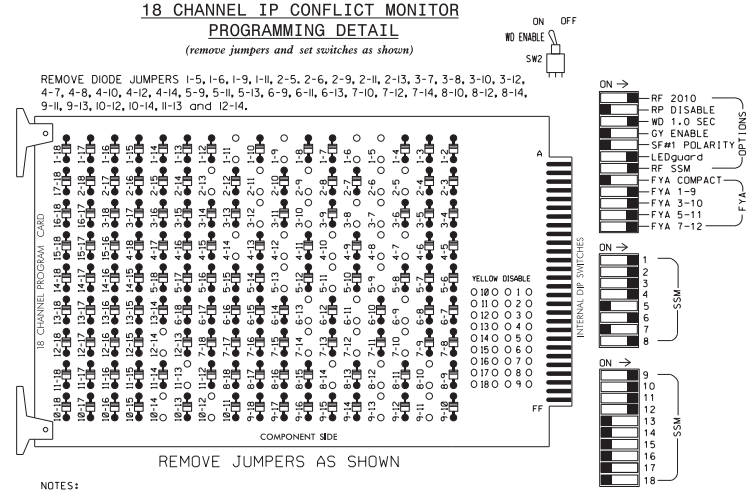
20:MAY:2025 16:57
J:\Traffic\Projects\Traffic.com\cdot\pw\01\Documents\NCDOT Units\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signal Design\SM-6105H\05200872_sig_des_20250811.dgn
ziembarj
December2

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 1.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 9-11, 9-13, 10-12, 10-14, 11-13 and 12-14.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Durham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S10, S11,AUX S1,AUX S2,AUX S4, AUX S5
PHASES USED.....1,2,2PED,3,4,4PED,5,6,7,8
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....*
OVERLAP D.....*

* See overlap programming detail on sheet 3

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 1A, 6A and 6B. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For detection zone 1A the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	22	31★	41,42	P41, P42	51★	61,62	NU	71★	81,82	NU	11★	31★	NU	51★	71★	NU
RED	✳		128		✳		101			134			107							
YELLOW			129				102		✳	135		✳	108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW		126			117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133			124								
✋				113			104													
🚶				115			106													

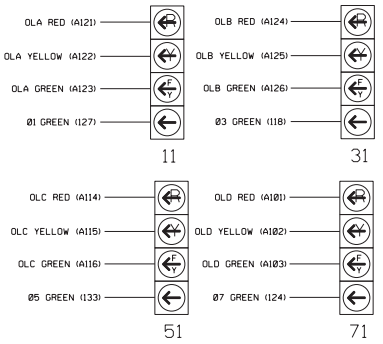
NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

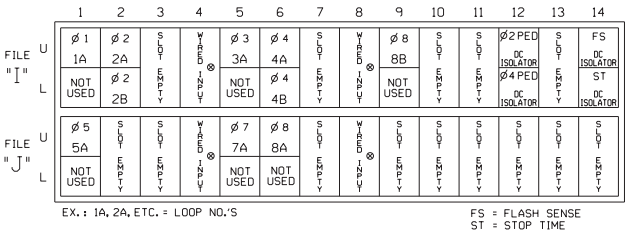
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A[1]	T82-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
2A	T82-5,6	I2U	39	2	2	YES			X	N
2B	T82-7,8	I2L	43	12	2	YES			X	N
3A[2]	T84-5,6	I5U	58	3 ★	3	YES		10		S
	-	J8U	50	28★	8	YES				S
4A	T84-9,10	I6U	41	4	4	YES				S
4B	T84-11,12	I6L	45	14	4	YES		10		S
5A[3]	T83-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
7A[4]	T85-5,6	J5U	57	7 ★	7	YES		10		S
	-	I8U	49	24★	4	YES				S
8A	T85-9,10	J6U	42	8	8	YES				S
8B	T86-9,10	I9U	60	11	1	YES		15		S
PED PUSH BUTTONS										
P21,P22	T88-4,6	I12U	67	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from I5-W to J8-W, on rear of input file.

[3] Add jumper from J1-W to I4-W, on rear of input file.

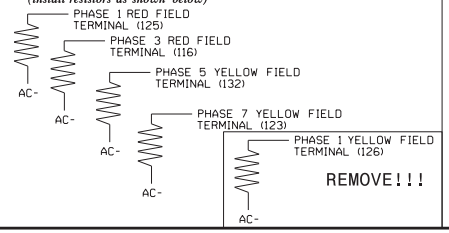
[4] Add jumper from J5-W to I8-W, on rear of input file.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T1
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard) at SR 1978 (Hopson Road)/ SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
North Carolina Department of Transportation, Mobility and Safety Division, Traffic Engineering Branch, Traffic Signal Management Section

750 N.Greenfield Pkwy.,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T1

11-AUG-2025 11:22
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200811.ae.ete.20250811.dgn
05200811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SW-6105H	Sig. 1.2

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A, 3A, 7A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```
COPY / CLEAR UTILITY
        FROM                TO
PHASE TIMING.... . > PHASE TIMING.... .
TIMING PLAN..... . > TIMING PLAN..... .
PH DET OPT PLAN. . > PH DET OPT PLAN. .
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
  TOGGLE TO SELECT A "FROM" AND A "TO"
            THEN PRESS ENTER
```

4. From Main Menu select [6. DETECTORS]
5. From DETECTOR Submenu select [2. VEHICLE DETECTOR SETUP]
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".
- Set delay time to "3".

```
VEH DETECTOR [ 1]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 1  1   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "26".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" ->

```
VEH DETECTOR [26]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 26 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "3".

```
VEH DETECTOR [ 5]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 5  5   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" ->

```
VEH DETECTOR [22]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "3".
- Set delay time to "0".

```
VEH DETECTOR [ 3]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 3  3   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "28".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" ->

```
VEH DETECTOR [28]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 28 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "7".
- Set delay time to "0".

```
VEH DETECTOR [ 7]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 7  7   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "24".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" ->

```
VEH DETECTOR [24]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 24 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T1
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signal Management Section
750 N.Greenfield Pkwy.,Garner,NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE:	July 2025	REVIEWED BY:	
PREPARED BY:	S.Kirkpatrick	REVIEWED BY:	

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T1

PROJECT REFERENCE NO.	SHEET NO.
SW-6105H	Sig. 1.3

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    1
OPPOSING THROUGH.......   PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 1   <- NOTICE ACTION PLAN SF BIT "1"
```

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 3   <- NOTICE ACTION PLAN SF BIT "3"
```

Toggle Once

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    5
OPPOSING THROUGH.......   PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 5   <- NOTICE ACTION PLAN SF BIT "5"
```

Toggle Once

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 7   <- NOTICE ACTION PLAN SF BIT "7"
```

END PROGRAMMING

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD. PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF     PED ON PH WALK        2     IS   ON
AND    VEH GREEN ON PH       2     IS   OFF

THEN   SIG SET OLP RED       1          ON
       SIG SET OLP YELLOW    1          OFF
       SIG SET OVLP GREEN    1          OFF

ELSE
```

HOLD SIGNAL HEAD 51 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```
LOGIC STATEMENT CONTROL
            1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E . . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . . .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T1
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025 | REVIEWED BY:

PREPARED BY: S.Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
"Integrity and Quality Management Solutions"

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T1

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 1.4

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> NO     Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

NOTE: Do not use programmed (controller) flash when MUTCD is set to "NO".

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T1
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 4 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
Mobility and Safety Division
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T1

11-AUG-2025 11:23
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\05200811_smete_20250811.dgn
05_Page1.pdf

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 1.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	2	1, 3, 5, 7

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1, 3, 5, AND 7 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,3,5,7: Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select [5. TIME BASE]
2. From TIME BASE Submenu select [2. ACTION PLAN]

```
ACTION PLAN...[  1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH.....  --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE..  NO   PRIORITY RETURN. NO
PED PR RETURN..   NO   QUEUE DELAY..... NO
PMT COND DELAY    NO
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  X  .  X  .  X  .  X  .  (1-8)
AUX FCT  .  .  .  (1-3)
         1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100.  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

NOTE: Action Plan [1] is shown as a reference only. The actual Action Plan number(s) will be determined by the Town Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T1
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:
PREPARED BY: S.Kirkpatrick REVIEWED BY:

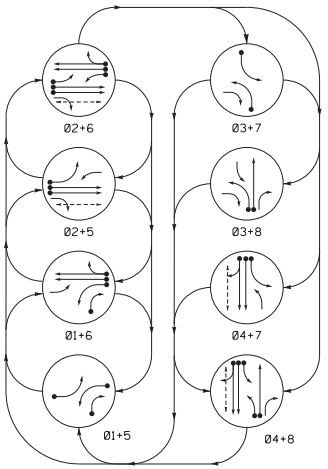
REVISIONS	INIT.	DATE

Prepared For:
NCDOT Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
"Integrity, Honesty, Commitment, Dedication, Professionalism"
750 N.Greenfield Pkwy.,Garner,NC 27529

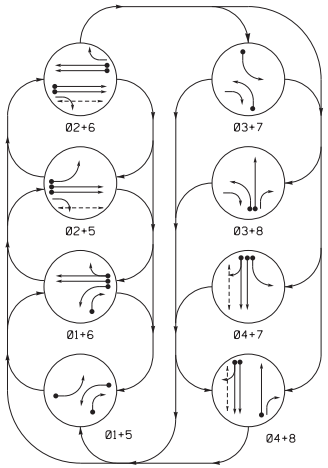
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE
SIG. INVENTORY NO. 05-2008T1

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	~~—~~	~~—~~	~~FY~~	~~FY~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	~~R~~/R	~~R~~/R	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	~~—~~	~~—~~	~~FY~~	~~FY~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	~~—~~	~~FY~~	~~—~~	~~FY~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	~~—~~	~~FY~~	~~—~~	~~FY~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	~~R~~/R	~~R~~/R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	~~—~~	~~—~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	~~R~~/R	~~R~~/R	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	~~—~~	~~—~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	~~—~~	~~R~~	~~—~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	~~—~~	~~—~~	~~R~~	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	~~R~~/R	~~R~~/R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

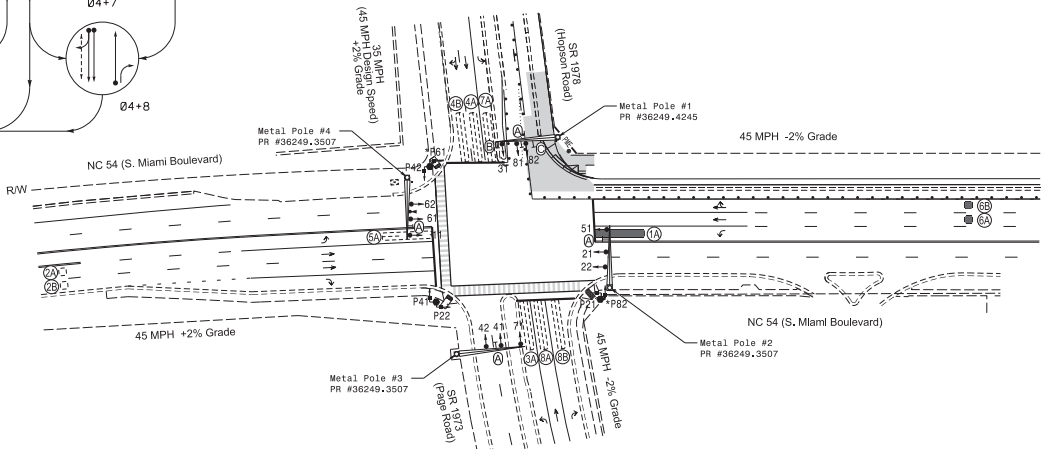
8 Phase
Fully Actuated
(Durham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Existing pedestrian signal heads P61 and P82 are bagged.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
11. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

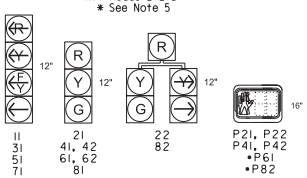
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



SIGNAL FACE I.D.

All Heads L.E.D.
* See Note 5



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
X-UC	24in Underground Conduit	UC
N/A	Right of Way	
	Directional Arrow	
	Construction Zone Drums	
	Construction Zone	
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Out of Pavement Detector	
	Non-Intrusive Detection Zone	
N/A	Permanent Construction Easement	PINE
N/A	Curb Ramp	
(A)	Street Name Sign (D3-1)	(A)
(B)	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	(B)
(C)	Right Arrow "ONLY" Sign (R3-5R)	(C)

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Delayed Green	-	7	-	7	-	-	-	-
Walk *	-	14	-	14	-	-	-	-
Ped Clear	-	28	-	24	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	40	20	90	20	40
Yellow	3.0	4.7	3.0	4.7	3.0	4.7	3.0	4.7
Red Clear	3.1	1.9	3.1	1.8	2.8	1.9	3.3	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A##	6X40	0	##	X	1	Yes	-	15.0**	-	S	-	-
					6#	Yes	-	3.0	-	G	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	10.0*	-	S	-	-
					8#	Yes	-	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	10.0	-	S	-	-
5A	6X40	0	2-4-2	-	5	Yes	-	15.0**	-	S	-	-
					2#	Yes	-	3.0	-	G	-	-
6A##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
6B##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	10.0*	-	S	-	-
					4#	Yes	-	-	-	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-
8B	6X40	0	2-4-2	-	1	Yes	-	15.0	-	S	-	-

* Disable Delay during Alternate Phasing operation.
** Reduce Delay to 3 seconds during Alternate Phasing operation.
# Disable Phase call for loop during Alternate Phasing operation.
Non-Intrusive Detection Zone

Signal Upgrade - Temporary Design 2 (TMP Phase II, Step 4)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: June 2025 | REVIEWED BY:
PREPARED BY: C.E. Carter | REVIEWED BY:

SCALE 1"=50' (0 50)

REVISIONS | INT. | DATE

SEAL 026486 — NORTH CAROLINA — PROFESSIONAL ENGINEER — ROBERT J. ZIEMBA

08/11/2025
DATE

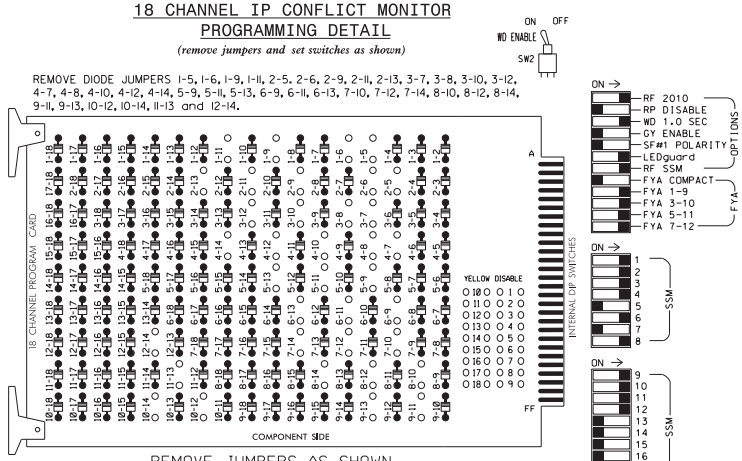
SIG. INVENTORY NO. 05-2008 T2

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 2.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 9-11, 9-13, 10-12, 10-14, 11-13 and 12-14.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Durham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S10, S11,AUX S1,AUX S2,AUX S4, AUX S5
PHASES USED.....1,2,2PED,3,4,4PED,5,6,7,8
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....*
OVERLAP D.....*

* See overlap programming detail on sheet 3

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 1A, 6A and 6B. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For detection zone 1A the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

SIGNAL HEAD HOOK-UP CHART

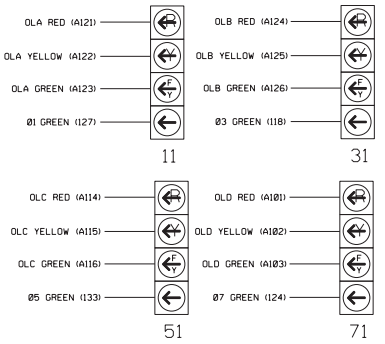
LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	22	31★	41,42	P41, P42	51★	61,62	NU	71★	81,82	NU	11★	31★	NU	51★	71★	NU
RED	✳		128		✳		101			134			107							
YELLOW			129				102		✳	135		✳	108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW		126			117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133			124								
✋				113				104												
🚶				115				106												

NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

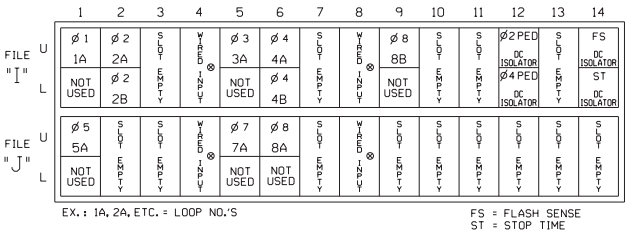
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A[1]	T82-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
2A	T82-5,6	I2U	39	2	2	YES			X	N
2B	T82-7,8	I2L	43	12	2	YES			X	N
3A[2]	T84-5,6	I5U	58	3 ★	3	YES		10		S
	-	J8U	50	28★	8	YES				S
4A	T84-9,10	I6U	41	4	4	YES				S
4B	T84-11,12	I6L	45	14	4	YES		10		S
5A[3]	T83-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
7A[4]	T85-5,6	J5U	57	7 ★	7	YES		10		S
	-	I8U	49	24★	4	YES				S
8A	T85-9,10	J6U	42	8	8	YES				S
8B	T86-9,10	I9U	60	11	1	YES		15		S
PED PUSH BUTTONS										
P21,P22	T88-4,6	I12U	67	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from I5-W to J8-W, on rear of input file.
[3] Add jumper from J1-W to I4-W, on rear of input file.
[4] Add jumper from J5-W to I8-W, on rear of input file.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

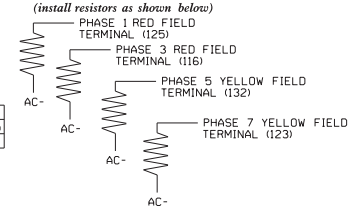
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T2
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard) at SR 1978 (Hopson Road)/ SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
ITS & Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T2

11-AUG-2025 11:29
pw://rodot-pw.bentley.com:rodot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200812.am.ete.20250811.dgn
pw://rodot-pw.bentley.com:rodot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200812.am.ete.20250811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SW-6105H	Sig. 2.2

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A, 3A, 7A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```
COPY / CLEAR UTILITY
        FROM                TO
PHASE TIMING.... . > PHASE TIMING.... .
TIMING PLAN..... . > TIMING PLAN..... .
PH DET OPT PLAN. . > PH DET OPT PLAN. .
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
  TOGGLE TO SELECT A "FROM" AND A "TO"
            THEN PRESS ENTER
```

4. From Main Menu select [6. DETECTORS]
5. From DETECTOR Submenu select [2. VEHICLE DETECTOR SETUP]
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".
- Set delay time to "3".

```
VEH DETECTOR [ 1]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 1  1   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "26".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [26]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 26 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "3".

```
VEH DETECTOR [ 5]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 5  5   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [22]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "3".
- Set delay time to "0".

```
VEH DETECTOR [ 3]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 3  3   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "28".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [28]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 28 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "7".
- Set delay time to "0".

```
VEH DETECTOR [ 7]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 7  7   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "24".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [24]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 24 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T2
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard) at SR 1978 (Hopson Road)/ SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For: NCDOT Transportation Mobility and Safety Division, Traffic Engineering Branch

750 N.Greenfield Pkwy.,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T2

PROJECT REFERENCE NO.	SHEET NO.
SW-6105H	Sig. 2.3

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    1
OPPOSING THROUGH.......   PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 1
```

← NOTICE ACTION PLAN SF BIT "1"

Toggle Once

↓

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 3
```

← NOTICE ACTION PLAN SF BIT "3"

Toggle Once

↓

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    5
OPPOSING THROUGH.......   PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 5
```

← NOTICE ACTION PLAN SF BIT "5"

Toggle Once

↓

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 7
```

← NOTICE ACTION PLAN SF BIT "7"

END PROGRAMMING

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD. PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF     PED ON PH WALK        2     IS   ON
AND    VEH GREEN ON PH       2     IS   OFF

THEN   SIG SET OLP RED       1          ON
       SIG SET OLP YELLOW    1          OFF
       SIG SET OVLP GREEN    1          OFF

ELSE
```

HOLD SIGNAL HEAD 51 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```
LOGIC STATEMENT CONTROL
            1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T2
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025 | REVIEWED BY:

PREPARED BY: S.Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
North Carolina Department of Transportation
Mobility and Safety Division
ITS & Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T2

11-AUG-2025 11:30
pw://rdcorp-pw.bentley.com:rdcot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200872_ame.e.20250811.dgn
pw://rdcorp-pw.bentley.com:rdcot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200872_ame.e.20250811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 2.4

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> NO     Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

NOTE: Do not use programmed (controller) flash when MUTCD is set to "NO".

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T2
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 4 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025 | REVIEWED BY:

PREPARED BY: S.Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
IT's Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T2

11-AUG-2025 11:30
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\05200812_ame.ate.20250811.opn
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\05200812_ame.ate.20250811.opn

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 2.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	2	1, 3, 5, 7

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1, 3, 5, AND 7 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,3,5,7: Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```
ACTION PLAN...[  1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH.....  --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE..  NO   PRIORITY RETURN. NO
PED PR RETURN..   NO   QUEUE DELAY..... NO
PMT COND DELAY    NO
  PHASE  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PED RCL  . . . . . . . . . . . . . . . .
WALK 2   . . . . . . . . . . . . . . . .
VEX 2    . . . . . . . . . . . . . . . .
VEH RCL  . . . . . . . . . . . . . . . .
MAX RCL  . . . . . . . . . . . . . . . .
MAX 2    . . . . . . . . . . . . . . . .
  PHASE  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
MAX 3    . . . . . . . . . . . . . . . .
CS INH   . . . . . . . . . . . . . . . .
OMIT     . . . . . . . . . . . . . . . .
SPC FCT  X . X . X . X . (1-8)
AUX FCT  . . . (1-3)
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
LP 1-15  . . . . . . . . . . . . . . .
LP 16-30 . . . . . . . . . . . . . . .
LP 31-45 . . . . . . . . . . . . . . .
LP 46-60 . . . . . . . . . . . . . . .
LP 61-75 . . . . . . . . . . . . . . .
LP 76-90 . . . . . . . . . . . . . . .
LP 91-100. . . . . . . . . . . . . . .
```

NOTE: Action Plan [1] is shown as a reference only. The actual Action Plan number(s) will be determined by the Town Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T2
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:
PREPARED BY: S.Kirkpatrick REVIEWED BY:

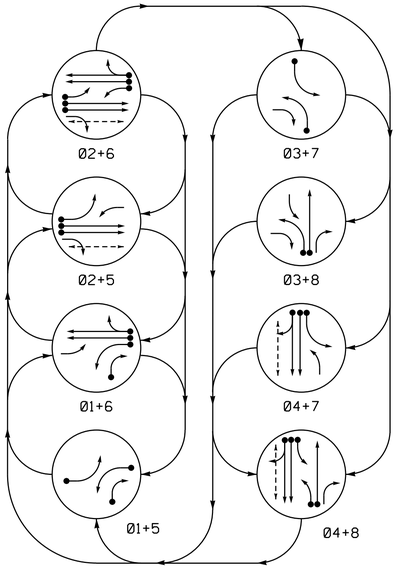
REVISIONS	INIT.	DATE

Prepared For:
NCDOT Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
"Integrity, Honesty, Commitment, Dedication, Professionalism"
750 N.Greenfield Pkwy.,Garner,NC 27529

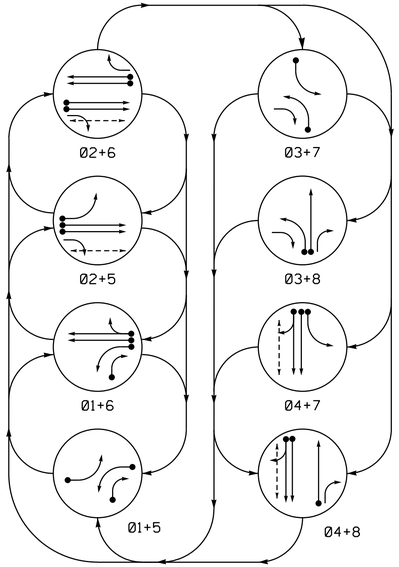
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE
SIG. INVENTORY NO. 05-2008T2

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 3.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R/~~R~~	R/~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	F Y	F Y	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←	F Y	←	F Y	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/~~R~~	R/~~R~~	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R/~~R~~	R/~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/~~R~~	R/~~R~~	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK	
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

8 Phase
Fully Actuated
(Durham Signal System)

NOTES

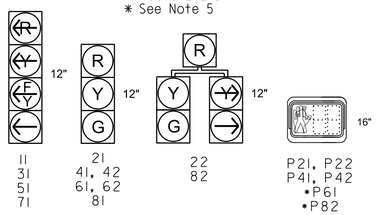
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Existing pedestrian signal heads P61 and P82 are bagged.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
11. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

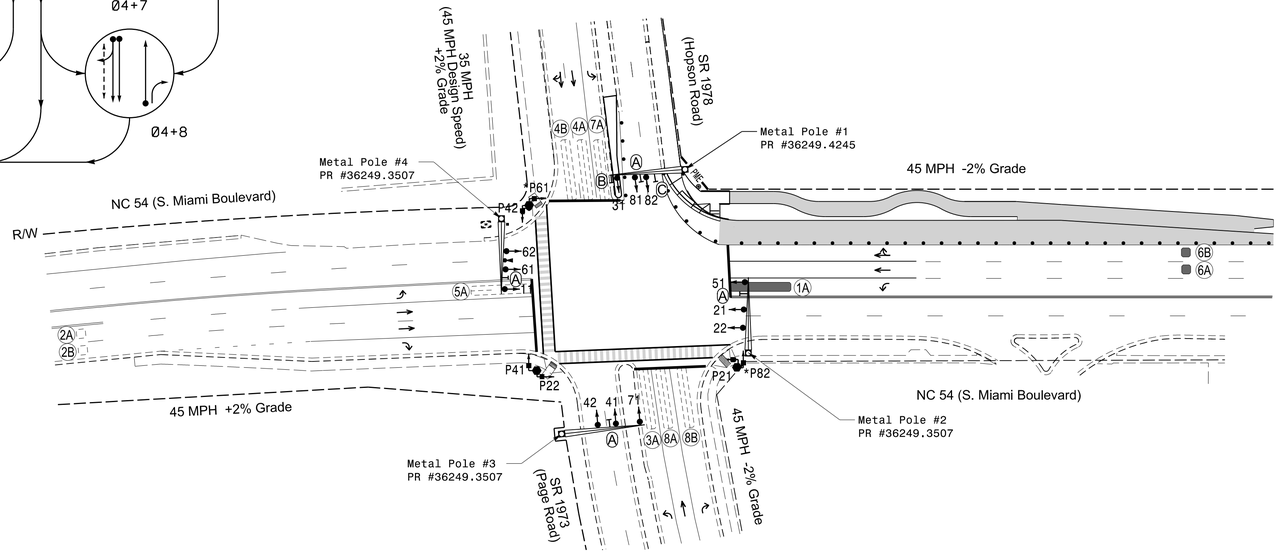
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.
* See Note 5





ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Delayed Green	-	7	-	7	-	-	-	-
Walk *	-	14	-	14	-	-	-	-
Ped Clear	-	28	-	24	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	40	20	90	20	40
Yellow	3.0	4.7	3.0	4.7	3.0	4.7	3.0	4.7
Red Clear	3.1	1.9	3.1	1.8	2.9	1.9	3.1	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A##	6X40	0	##	X	1	Yes	-	15.0**	-	S	-	-
					6#	Yes	-	3.0	-	C	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	10.0*	-	S	-	-
					8#	Yes	-	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	10.0	-	S	-	-
5A	6X40	0	2-4-2	-	5	Yes	-	15.0**	-	S	-	-
					2#	Yes	-	3.0	-	C	-	-
6A##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
6B##	6X6	300	##	X	6	Yes	-	-	X	N	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	10.0*	-	S	-	-
					4#	Yes	-	-	-	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-
8B	6X40	0	2-4-2	-	1	Yes	-	15.0	-	S	-	-

* Disable Delay during Alternate Phasing operation.
** Reduce Delay to 3 seconds during Alternate Phasing operation.
# Disable Phase call for loop during Alternate Phasing operation.
Non-Intrusive Detection Zone

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣□→	Pedestrian Signal Head	■→
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
→	Directional Arrow	→
● ●	Construction Zone Drums	● ●
▭	Construction Zone	▭
◁	Metal Pole with Mastarm	◁
⊛	Type I Pushbutton Post	⊛
⬡	Type II Signal Pedestal	⬡
◁	Out of Pavement Detector	◁
▬	Non-Intrusive Detection Zone	▬
N/A	Permanent Construction Easement	PME
N/A	Curb Ramp	
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ

Signal Upgrade - Temporary Design 3 (TMP Phase III, Steps 1 & 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: June 2025 | REVIEWED BY:

PREPARED BY: C.E. Carter | REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

Signed by: Robert J. Ziemba 08/11/2025
ROBERT J. ZIEMBA DATE

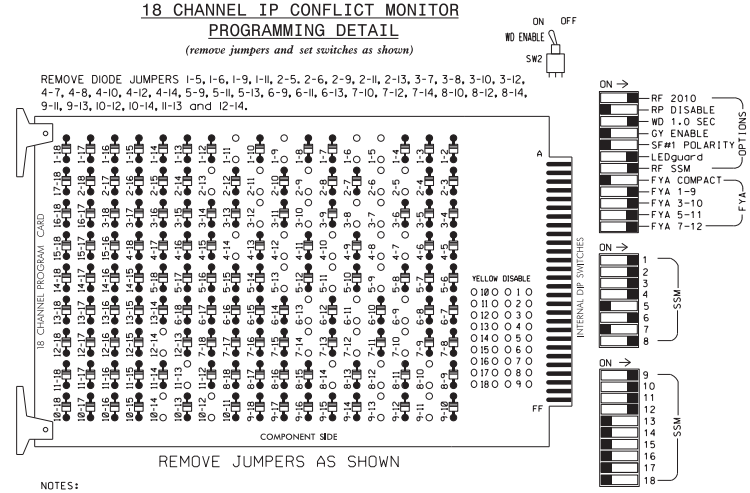
SIG. INVENTORY NO. 05-2008 T3

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 3.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 9-11, 9-13, 10-12, 10-14, 11-13 and 12-14.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Durham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S10, S11,AUX S1,AUX S2,AUX S4, AUX S5
PHASES USED.....1,2,2PED,3,4,4PED,5,6,7,8
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....*
OVERLAP D.....*

* See overlap programming detail on sheet 3

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 1A, 6A and 6B. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For detection zone 1A the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	22	31★	41,42	P41, P42	51★	61,62	NU	71★	81,82	NU	11★	31★	NU	51★	71★	NU
RED	✳		128		✳		101			134			107							
YELLOW			129				102		✳	135		✳	108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW		126			117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133			124								
✋				113			104													
🚶				115			106													

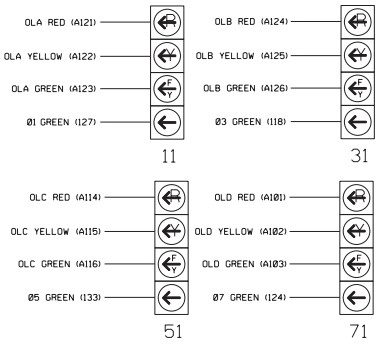
NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

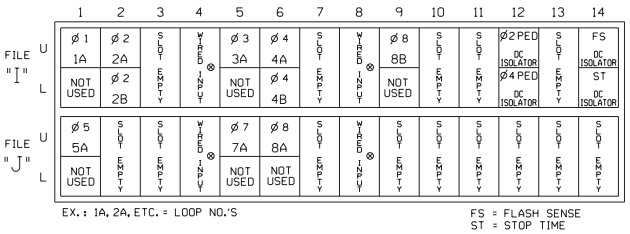
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A[1]	TB2-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
3A[2]	TB4-5,6	I5U	58	3 ★	3	YES		10		S
	-	J8U	50	28★	8	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
5A[3]	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
7A[4]	TB5-5,6	J5U	57	7 ★	7	YES		10		S
	-	I8U	49	24★	4	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB6-9,10	I9U	60	11	1	YES		15		S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from I5-W to J8-W, on rear of input file.

[3] Add jumper from J1-W to I4-W, on rear of input file.

[4] Add jumper from J5-W to I8-W, on rear of input file.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

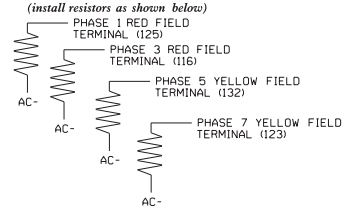
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T3
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard) at SR 1978 (Hopson Road)/ SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Signal Management Section

750 N.Greenfield Pkwy.,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T3

11-AUG-2025 11:36
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\05200813_sm_ete_20250811.dgn
User:rkirkpatrick

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 3.2

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A, 3A, 7A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```
COPY / CLEAR UTILITY
        FROM                TO
PHASE TIMING.... . > PHASE TIMING.... .
TIMING PLAN..... . > TIMING PLAN..... .
PH DET OPT PLAN. . > PH DET OPT PLAN. .
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
  TOGGLE TO SELECT A "FROM" AND A "TO"
            THEN PRESS ENTER
```

4. From Main Menu select [6. DETECTORS]
5. From DETECTOR Submenu select [2. VEHICLE DETECTOR SETUP]
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".
- Set delay time to "3".

```
VEH DETECTOR [ 1]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 1  1   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "26".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [26]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 26 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "3".

```
VEH DETECTOR [ 5]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 5  5   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [22]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "3".
- Set delay time to "0".

```
VEH DETECTOR [ 3]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 3  3   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "28".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [28]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 28 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "7".
- Set delay time to "0".

```
VEH DETECTOR [ 7]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 7  7   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "24".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [24]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 24 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T3
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
Transportation Mobility and Safety Division
NCDEPARTMENT OF TRANSPORTATION
ITS & Signal Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE:	July 2025	REVIEWED BY:	
PREPARED BY:	S.Kirkpatrick	REVIEWED BY:	

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T3

11-AUG-2025 11:37
pw://rdcorp-pw.bentley.com:rdcot-pw-01/Documents/NCDOT TSMO/Signal Design Section\Division_05\05-2008\Signals Management\05200813_sm_ele_20250811.dgn
pw://rdcot-pw.bentley.com:rdcot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/05200813_sm_ele_20250811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SW-6105H	Sig. 3.3

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    1
OPPOSING THROUGH.......   PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 1
```

← NOTICE ACTION PLAN SF BIT "1"

Toggle Once

↓

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 3
```

← NOTICE ACTION PLAN SF BIT "3"

Toggle Once

↓

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    5
OPPOSING THROUGH.......   PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 5
```

← NOTICE ACTION PLAN SF BIT "5"

Toggle Once

↓

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 7
```

← NOTICE ACTION PLAN SF BIT "7"

END PROGRAMMING

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD. PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF     PED ON PH WALK        2     IS   ON
AND    VEH GREEN ON PH       2     IS   OFF

THEN   SIG SET OLP RED       1          ON
       SIG SET OLP YELLOW    1          OFF
       SIG SET OVLP GREEN    1          OFF

ELSE
```

HOLD SIGNAL HEAD S1 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```
LOGIC STATEMENT CONTROL
            1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E . . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . . .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008T3
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025 | REVIEWED BY:

PREPARED BY: S.Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
"It's Always Time Well Spent"

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T3

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 3.4

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> NO     Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

NOTE: Do not use programmed (controller) flash when MUTCD is set to "NO".

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T3
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025	REVIEWED BY:
PREPARED BY: S.Kirkpatrick	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008T3

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 3.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	2	1, 3, 5, 7

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1, 3, 5, AND 7 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,3,5,7: Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select [5. TIME BASE]
2. From TIME BASE Submenu select [2. ACTION PLAN]

```
ACTION PLAN...[  1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE.....  0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH.....   --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE..   NO   PRIORITY RETURN. NO
PED PR RETURN..    NO   QUEUE DELAY..... NO
PMT COND DELAY     NO
  PHASE   1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE   1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT      .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT   X  .  X  .  X  .  X  .  (1-8)
AUX FCT   .  .  .  (1-3)
          1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

NOTE: Action Plan [1] is shown as a reference only. The actual Action Plan number(s) will be determined by the Town Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008T3
DESIGN: June 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

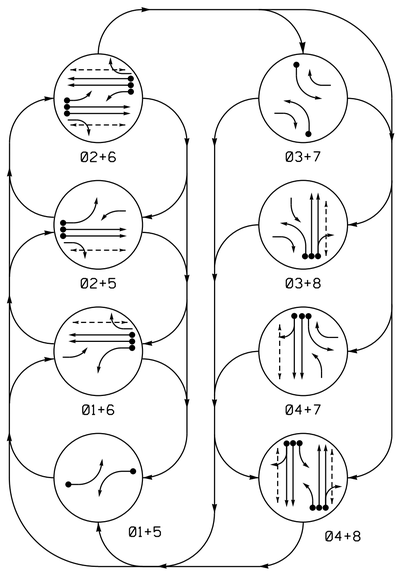
Prepared For:
NCDOT Mobility and Safety Division
Transportation Mobility & Safety Division
750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

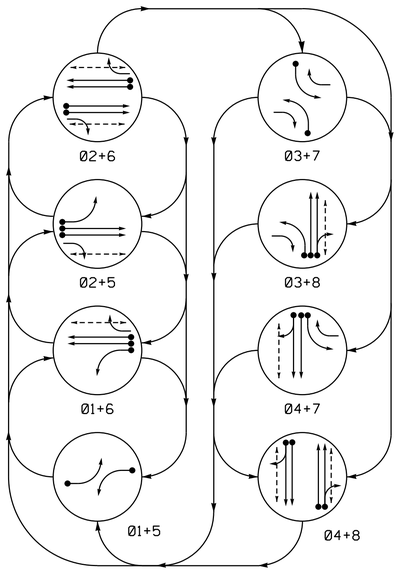
SIG. INVENTORY NO. 05-2008T3

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←●	←●	F Y	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R / ~~R~~	R / ~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←●	←●	F Y	F Y	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←●	F Y	←●	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	R	R	R
62	R	G	R	G	R / ~~R~~	R	R / ~~R~~	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←●	F Y	←●	F Y	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←●	←●	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	R
22	R	R	G	G	R / ~~R~~	R / ~~R~~	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←●	←●	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←●	~~R~~	←●	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	R	R	R
62	R	G	R	G	R / ~~R~~	R	R / ~~R~~	R	R
71	~~R~~	~~R~~	~~R~~	~~R~~	←●	~~R~~	←●	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	15.0**	-	S	-	-
					6#	Yes	-	3.0	-	G	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	10.0*	-	S	-	-
					8#	Yes	-	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	10.0	-	S	-	-
5A	6X40	0	2-4-2	-	5	Yes	-	15.0**	-	S	-	-
					2#	Yes	-	3.0	-	G	-	-
6A	6X6	300	5	X	6	Yes	-	-	X	N	-	-
6B	6X6	300	5	X	6	Yes	-	-	X	N	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	10.0*	-	S	-	-
					4#	Yes	-	-	-	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-
8B	6X40	0	2-4-2	-	8	Yes	-	10.0	-	S	-	-

* Disable Delay during Alternate Phasing operation.
** Reduce Delay to 3 seconds during Alternate Phasing operation.
\# Disable Phase call for loop during Alternate Phasing operation.

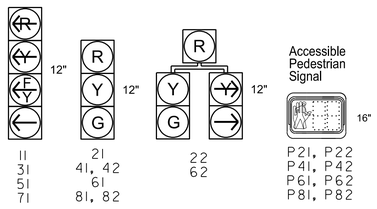
8 Phase
Fully Actuated
(Durham Signal System)

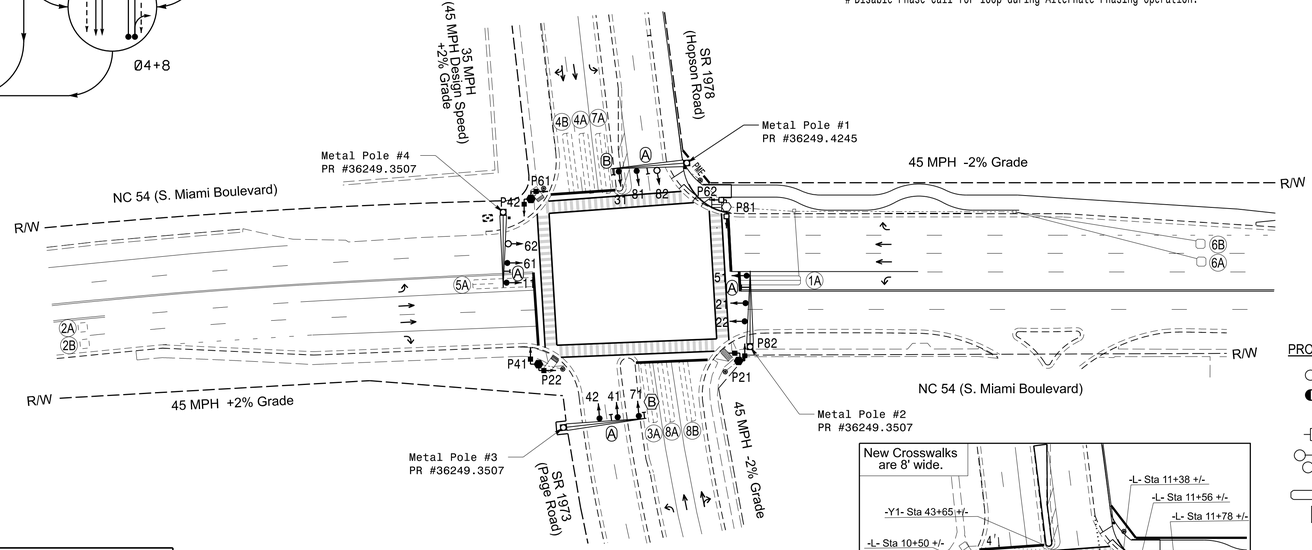
NOTES

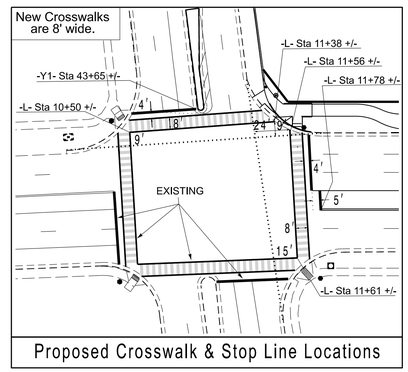
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal head numbered 81.
6. Unbag and reconnect existing pedestrian signal heads P61 and P82.
7. Set all detector units to presence mode.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Replace existing pushbuttons with APS Pushbuttons.
11. This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
12. Remove existing Right Arrow "ONLY" sign (R3-5R).
13. Pavement markings are existing unless otherwise shown.
14. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
15. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.







Proposed Crosswalk & Stop Line Locations

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□→	Pedestrian Signal Head	■→
○ ○	Signal Pole with Guy	● ●
○ ○	Signal Pole with Sidewalk Guy	● ●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
→	Directional Arrow	→
○	Metal Pole with Mastarm	○
⊛	Type I Pushbutton Post	⊛
⬡	Type II Signal Pedestal	⬢
N/A	Permanent Construction Easement	PME
N/A	Curb Ramp	
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Delayed Green	-	7	-	7	-	7	-	7
Walk *	-	7	-	7	-	7	-	7
Ped Clear	-	28	-	24	-	24	-	22
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	40	20	90	20	40
Yellow	3.0	4.7	3.0	4.7	3.0	4.7	3.0	4.7
Red Clear	3.2	1.9	3.1	2.0	3.1	1.9	3.3	2.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Page.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Page.
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Miami.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Miami.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Hopson.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Hopson.
P81	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Miami.
P82	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Wait. Wait to cross Miami.

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: April 2025 | REVIEWED BY:
PREPARED BY: C.E. Carter | REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

Signed by: 08/11/2025
DEANSFR168A468 DATE

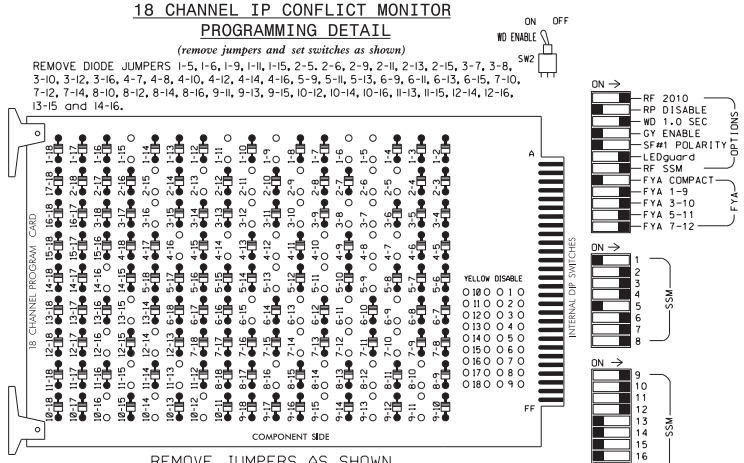
SIG. INVENTORY NO. 05-2008

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, I-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-10, 3-12, 3-16, 4-7, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15 and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Durham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9, S10,S11,S12,AUX S1,AUX S2, AUX S4,AUX S5
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....*
OVERLAP D.....*

* See overlap programming detail on sheet 3

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	22	31★	41,42	P41, P42	51★	61,62	P61, P62	71★	62	81,82	P81, P82	11★	31★	NU	51★	71★	NU
RED		128		✳		101			134		✳		107							
YELLOW	✳	129				102		✳	135				108							
GREEN		130				103			136				109							
RED ARROW														A121	A124		A114	A101		
YELLOW ARROW				117							123			A122	A125		A115	A102		
FLASHING YELLOW ARROW														A123	A126		A116	A103		
GREEN ARROW	127			118	118			133			124	124								
✋			113			104			119				110							
🚶			115			106			121				112							

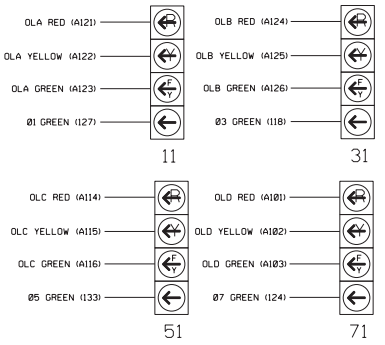
NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT EMPTY	WIRED INPUT ⊗	Ø3	Ø4	SLOT EMPTY	WIRED INPUT ⊗	Ø8	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
		1A	2A			3A	4A			8B			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
	L	NOT USED	Ø2 2B			NOT USED	Ø4 4B			NOT USED					
FILE "J"	U	Ø5	Ø6	SLOT EMPTY	WIRED INPUT ⊗	Ø7	Ø8	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
		5A	6A			7A	8A								
	L	NOT USED	Ø6 6B			NOT USED	NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A[1]	TB2-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
3A[2]	TB4-5,6	I5U	58	3 ★	3	YES		10		S
	-	J8U	50	28★	8	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
5A[3]	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
7A[4]	TB5-5,6	J5U	57	7 ★	7	YES		10		S
	-	I8U	49	24★	4	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB6-9,10	I9U	60	11	8	YES		15		S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

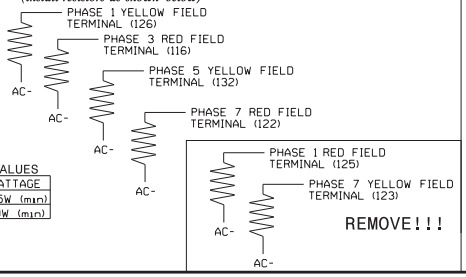
[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from I5-W to J8-W, on rear of input file.
[3] Add jumper from J1-W to I4-W, on rear of input file.
[4] Add jumper from J5-W to I8-W, on rear of input file.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008
DESIGN: April 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard) at SR 1978 (Hopson Road)/ SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
NCDOT Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section

750 N.Greenfield Pkwy.,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008

11-AUG-2025 11:44
pw:\\ncdot-pw.bentley.com:ncdot-pw01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\052008_sm.ele_20250811.dgn
pw:\\ncdot-pw.bentley.com:ncdot-pw01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\052008_sm.ele_20250811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.2

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A, 3A, 7A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```
COPY / CLEAR UTILITY
        FROM                TO
PHASE TIMING.... . > PHASE TIMING.... .
TIMING PLAN..... . > TIMING PLAN..... .
PH DET OPT PLAN. . > PH DET OPT PLAN. .
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
  TOGGLE TO SELECT A "FROM" AND A "TO"
            THEN PRESS ENTER
```

4. From Main Menu select [6. DETECTORS]
5. From DETECTOR Submenu select [2. VEHICLE DETECTOR SETUP]
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".
- Set delay time to "3".

```
VEH DETECTOR [ 1]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 1  1   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "26".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [26]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 26 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "3".

```
VEH DETECTOR [ 5]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 5  5   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0   <- ENSURE DELAY IS SET TO '3'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [22]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    3.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "3".
- Set delay time to "0".

```
VEH DETECTOR [ 3]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 3  3   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "28".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [28]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 28 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "7".
- Set delay time to "0".

```
VEH DETECTOR [ 7]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 7  7   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0   <- ENSURE DELAY IS SET TO '0'
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

- Place cursor in VEH DETECTOR [ ] position and enter "24".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [24]   VEH DET PLAN [ 2]      <- NOTICE VEH DET PLAN 2
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 24 0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...    0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008
DESIGN: April 2025
SEALED: 08/11/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy.,Garner,NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE:	July 2025	REVIEWED BY:	
PREPARED BY:	S.Kirkpatrick	REVIEWED BY:	

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

08/11/2025
DATE

SIG. INVENTORY NO. 05-2008

11-AUG-2025 11:45
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section\Division_05\05-2008\Signals Management\052008_sm_ele_20250811.dgn
pwadmin

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.3

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    1
OPPOSING THROUGH.......   PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 1   <- NOTICE ACTION PLAN SF BIT "1"
```

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 3   <- NOTICE ACTION PLAN SF BIT "3"
```

Toggle Once

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    5
OPPOSING THROUGH.......   PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 5   <- NOTICE ACTION PLAN SF BIT "5"
```

Toggle Once

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.......... 7   <- NOTICE ACTION PLAN SF BIT "7"
```

END PROGRAMMING

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD. PRESS 'ENTER'. AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF    PED ON PH WALK        2      IS   ON
AND   VEH GREEN ON PH       2      IS   OFF

THEN  SIG SET OLP RED       1           ON
      SIG SET OLP YELLOW    1           OFF
      SIG SET OVLP GREEN    1           OFF

ELSE
```

HOLD SIGNAL HEAD 51 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

ENTER A "2" IN THE LP# FIELD. PRESS 'ENTER'. AND PROGRAM AS SHOWN.

```
LP#:   2  COPY FROM:   2  ACTIVE:  M   (T/F)
IF    PED ON PH WALK        6      IS   ON
AND   VEH GREEN ON PH       6      IS   OFF

THEN  SIG SET OLP RED       3           ON
      SIG SET OLP YELLOW    3           OFF
      SIG SET OVLP GREEN    3           OFF

ELSE
```

HOLD SIGNAL HEAD 51 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENTS 1-2 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```
LOGIC STATEMENT CONTROL
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E E . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . . .
```

END PROGRAMMING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008
DESIGN: April 2025
SEALED: 08/11/2025
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
NCDOT Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section

750 N.Greenfield Pkwy.Garner.NC 27529

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE: July 2025 | REVIEWED BY:
PREPARED BY: S.Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.4

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP----------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ NO     Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

NOTE: Do not use programmed (controller) flash when MUTCD is set to "NO".

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2008
DESIGN: April 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 | Durham County | Durham

PLAN DATE:	July 2025	REVIEWED BY:	
PREPARED BY:	S. Kirkpatrick	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared For:
North Carolina Department of Transportation, Mobility and Safety Division, Traffic Engineering Branch, Traffic Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008

11-AUG-2025 11:46
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/052008_sm_ele_20250811.dgn
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_05/05-2008/Signals Management/052008_sm_ele_20250811.dgn

PROJECT REFERENCE NO.	SHEET NO.
SM-6105H	Sig. 4.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	2	1, 3, 5, 7

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1, 3, 5, AND 7 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,3,5,7: Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select [5. TIME BASE]
2. From TIME BASE Submenu select [2. ACTION PLAN]

```
ACTION PLAN...[  1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH.....  --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE..  NO   PRIORITY RETURN. NO
PED PR RETURN..   NO   QUEUE DELAY..... NO
PMT COND DELAY    NO
  PHASE  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PED RCL  . . . . . . . . . . . . . . . .
WALK 2   . . . . . . . . . . . . . . . .
VEX 2    . . . . . . . . . . . . . . . .
VEH RCL  . . . . . . . . . . . . . . . .
MAX RCL  . . . . . . . . . . . . . . . .
MAX 2    . . . . . . . . . . . . . . . .
  PHASE  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
MAX 3    . . . . . . . . . . . . . . . .
CS INH   . . . . . . . . . . . . . . . .
OMIT     . . . . . . . . . . . . . . . .
SPC FCT  X . X . X . X . (1-8)
AUX FCT  . . . (1-3)
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
LP 1-15  . . . . . . . . . . . . . . .
LP 16-30 . . . . . . . . . . . . . . .
LP 31-45 . . . . . . . . . . . . . . .
LP 46-60 . . . . . . . . . . . . . . .
LP 61-75 . . . . . . . . . . . . . . .
LP 76-90 . . . . . . . . . . . . . . .
LP 91-100. . . . . . . . . . . . . . .
```

NOTE: Action Plan [1] is shown as a reference only. The actual Action Plan number(s) will be determined by the Town Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2008
DESIGN: April 2025
SEALED: 08/11/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (S. Miami Boulevard)
at
SR 1978 (Hopson Road)/
SR 1973 (Page Road)

Division 5 Durham County Durham

PLAN DATE: July 2025 REVIEWED BY:
PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared For:
North Carolina Department of Transportation
Transportation Mobility and Safety Division
Traffic Engineering Branch
Traffic Signals Management Section

750 N.Greenfield Pkwy.,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
08/11/2025
DATE

SIG. INVENTORY NO. 05-2008

11-AUG-2025 11:46
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\NCDOT TSMO\Signal Design Section\Division_05\05-2008\Signals Management\052008_sm_ele_20250811.dgn
default

09/08/99

CONTRACT:

TIP PROJECT: SM-5705AG

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

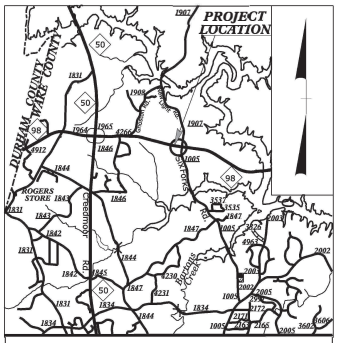
WAKE COUNTY

UTILITIES BY OTHERS PLANS

LOCATION: NC 98 (DURHAM RD.) AT SR1005 (SIX FORKS RD.)
TYPE OF WORK: COMMUNICATIONS RELOCATION

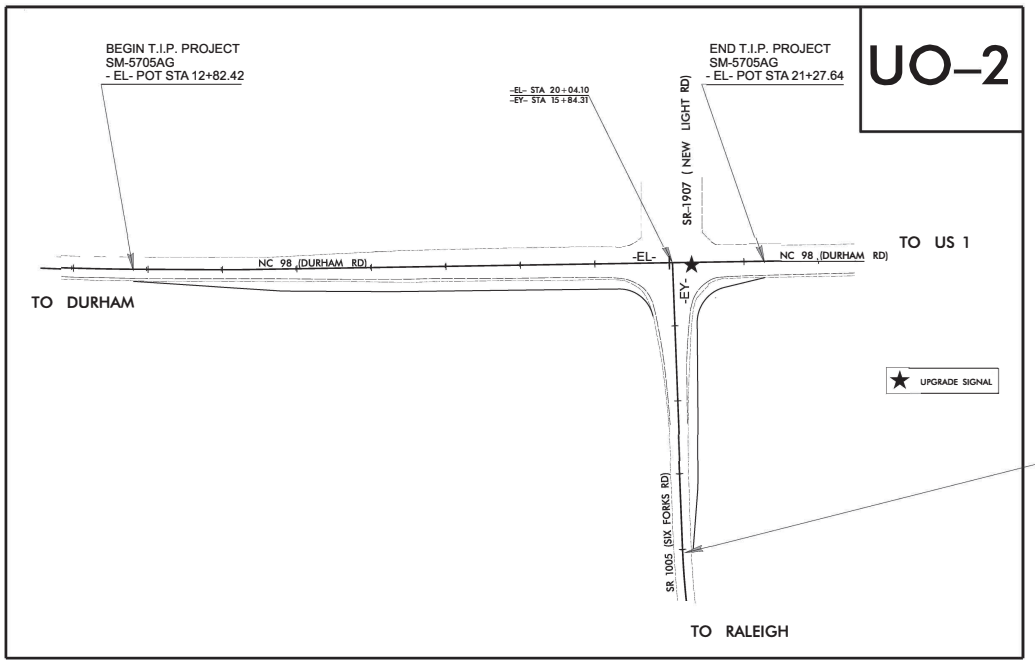
T.I.P. NO.	SHEET NO.
SM–5705AG	UO–1

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



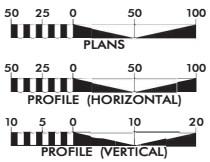
VICINITY MAP (NTS)

UO–2



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

GRAPHIC SCALES



INDEX OF SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) COMMUNICATIONS- CHARTER/SPECTRUM
(B) COMMUNICATIONS - AT&T DISTRIBUTION

PREPARED IN THE OFFICE OF:

Pennoni

PENNONI ASSOCIATES INC.
5430 WADE PARK BLVD., SUITE 106,
RALEIGH, NC 27607 PHONE: 919.929.1173
FAX: 919.493.6548 NC LICENSE #F-1267

BRIAN WILES, PE	UTILITY PROJECT MANAGER
ERIC TWEED, PE	PROJECT UTILITY COORDINATOR
LEVI SMITH	PROJECT UTILITY COORDINATOR

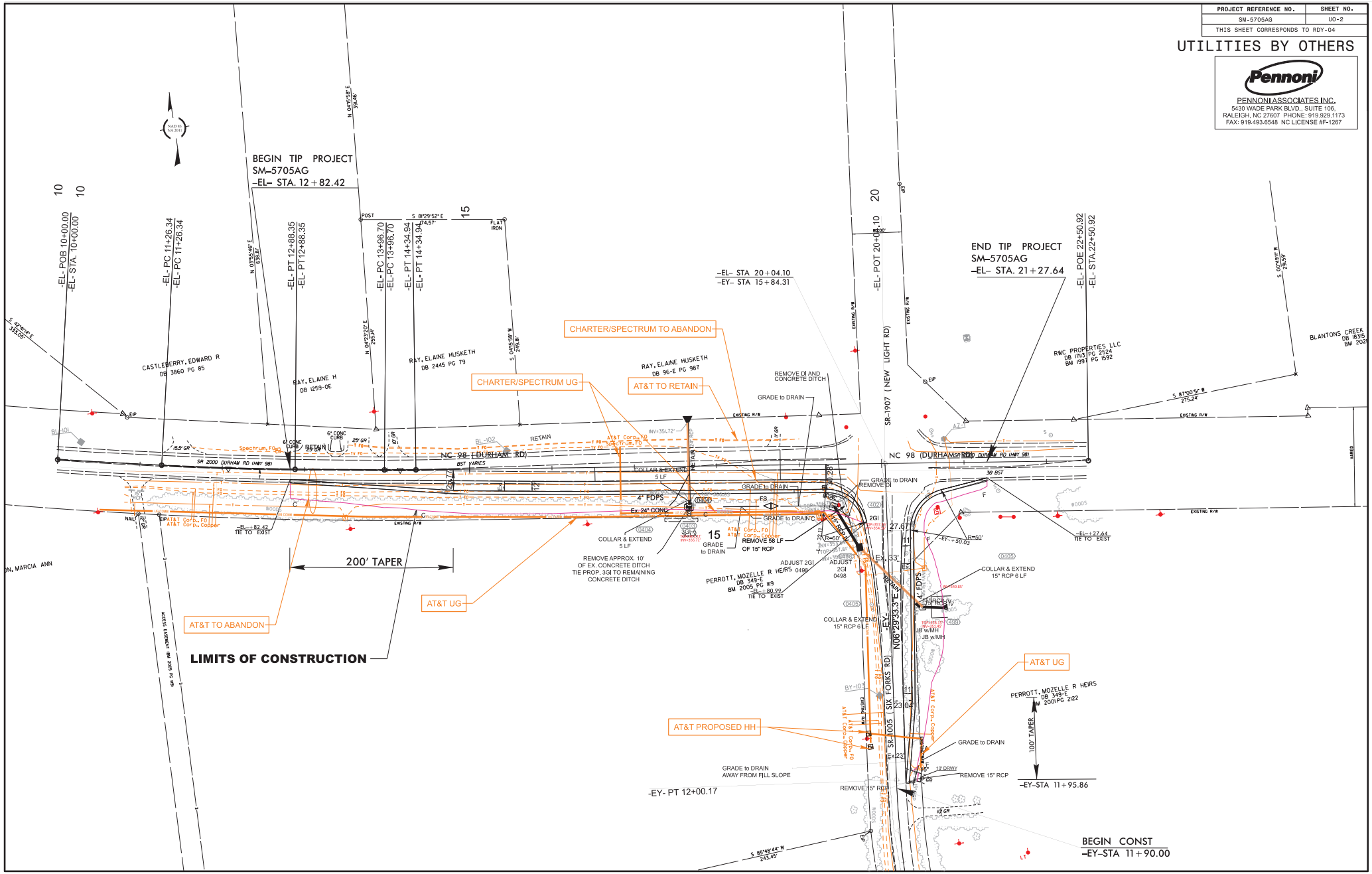
DIVISION OF HIGHWAYS
DIVISION 5
PROJECT DEVELOPMENT UNIT
2612 N. DUKE STREET
DURHAM, NC 27704
PHONE (919) 317-4700
FAX (919) 317-4710

SUSAN LANCASTER, PE	TEAM LEAD
MATTHEW NOLFO, PE	PROJECT MANAGER
DON W. PROPER	DIVISION UTILITIES ENGINEER
JAMES SWINSON	UTILITES ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
SM-5705AG	UO-2
THIS SHEET CORRESPONDS TO RDY-04	

UTILITIES BY OTHERS

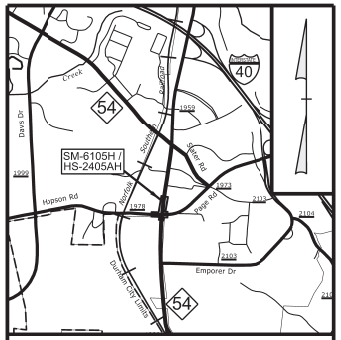
PENNONI ASSOCIATES INC.
5430 WADE PARK BLVD., SUITE 106
RALEIGH, NC 27607 PHONE: 919.929.1173
FAX: 919.493.6548 NC LICENSE #F-1267



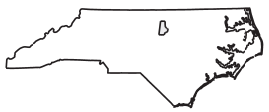
11/14/23

CONTRACT: DE00438 TIP PROJECT: SM-6105H / HS-2405AH

See Sheet UO-2 For Conventional Symbols



VICINITY MAP (NTS)



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

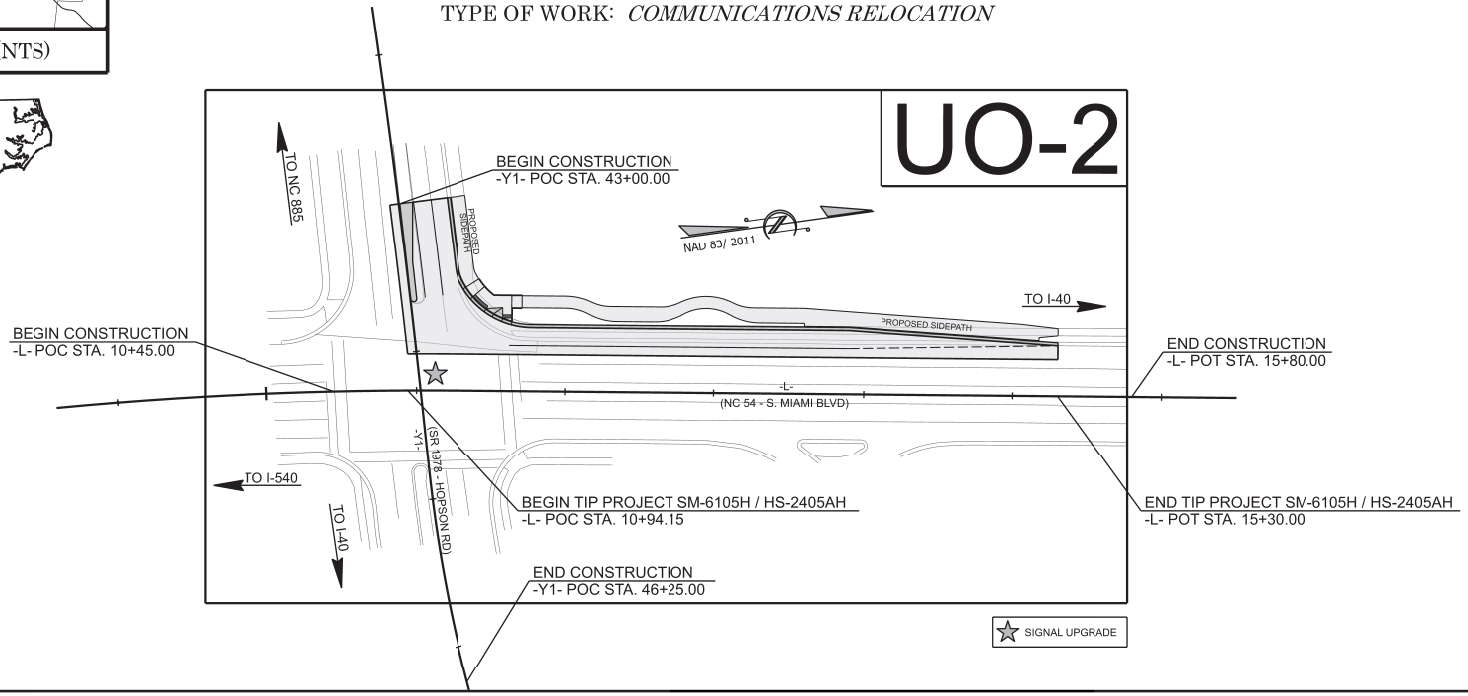
UTILITIES BY OTHERS PLANS
DURHAM COUNTY

T.I.P. NO.	SHEET NO.
SM–6105H / HS–2405AH	UO–1

NOTE:
ALL UTILITY WORK SHOWN ON THESE SHEETS WILL BE DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THESE SHEETS.

LOCATION: *NC 54 (S. MIAMI BLVD.) AT SR 1978 (HOPSON RD.)*
CONSTRUCT A SOUTHBOUND RIGHT TURN LANE
ON NC 54

TYPE OF WORK: *COMMUNICATIONS RELOCATION*



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 20 10 0 20 40

PROFILE (HORIZONTAL): 20 10 0 20 40

PROFILE (VERTICAL): 10 5 0 10 20

INDEX OF SHEETS

SHEET NO.:	*DESCRIPTION:*
UO–1	*TITLE SHEET*
UO–2	*UTILITIES BY OTHERS PLAN SHEET*

2024 STANDARD SPECIFICATIONS

UTILITY OWNERS WITH CONFLICTS

A) VERIZON

B) SPECTRUM

Plans Prepared in the Office of:

VIAS INFRASTRUCTURE

220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO. P-2673
WWW.VIASINFRASTRUCTURE.COM

CONSULTANT CONTACT #1 *MATTHEW DOUGLAS, PE*

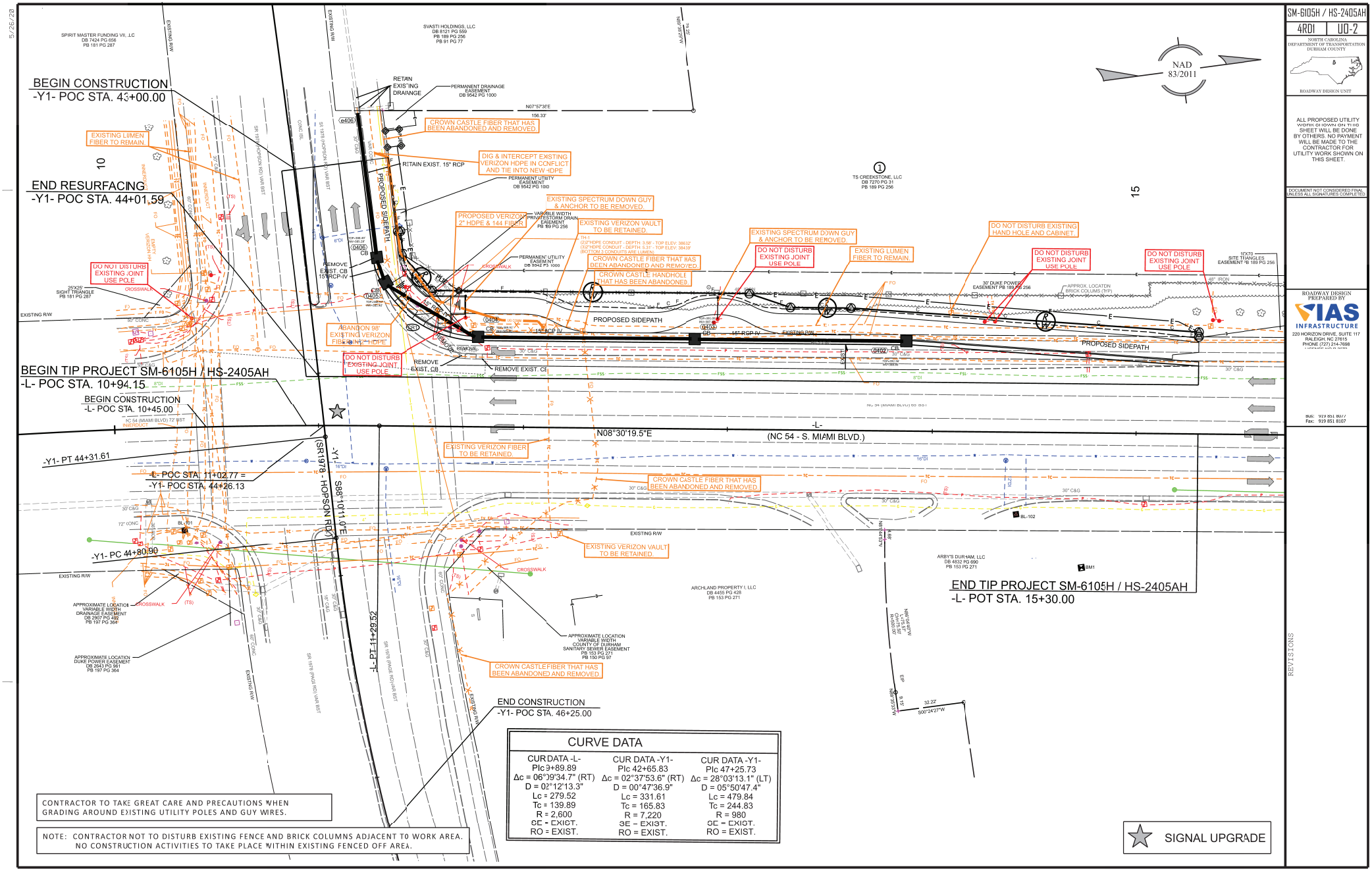
CONSULTANT CONTACT #2 *NICK RAMIREZ, PE*

Prepared for:

DIVISION OF HIGHWAYS
DIVISION 5
PROJECT DEVELOPMENT UNIT
2612 NORTH DUKE STREET
DURHAM, NC 27704
PHONE (919) 317-4700
FAX (919) 317-4710

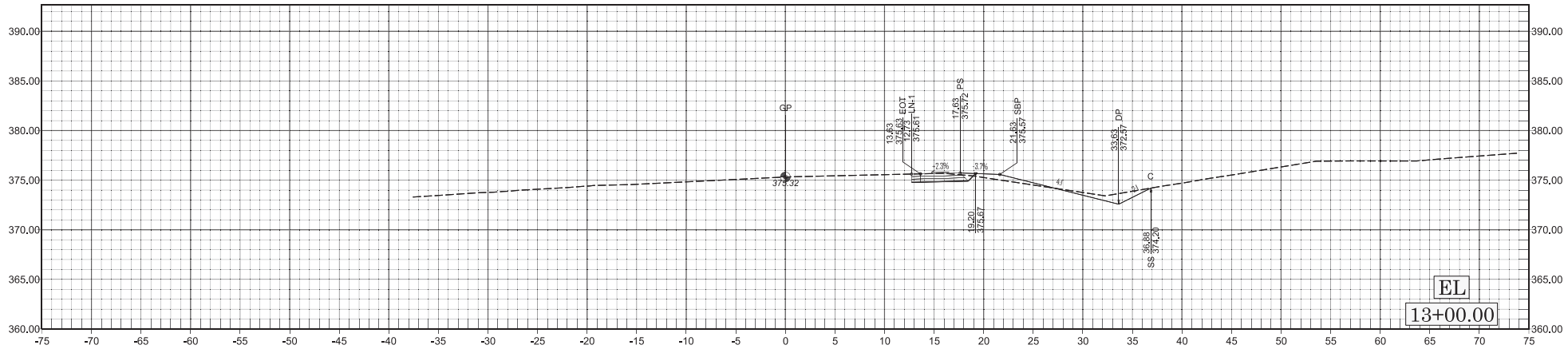
SUSAN LANCASTER, PE	*DIVISION 5 TEAM LEAD*
MATTHEW NOLFO, PE	*DIVISION 5 PROJECT MANAGER*
DONALD W. PROPER	*DIVISION 5 UTILITIES ENGINEER*
JAMES SWINSON	*UTILITIES ENGINEER*

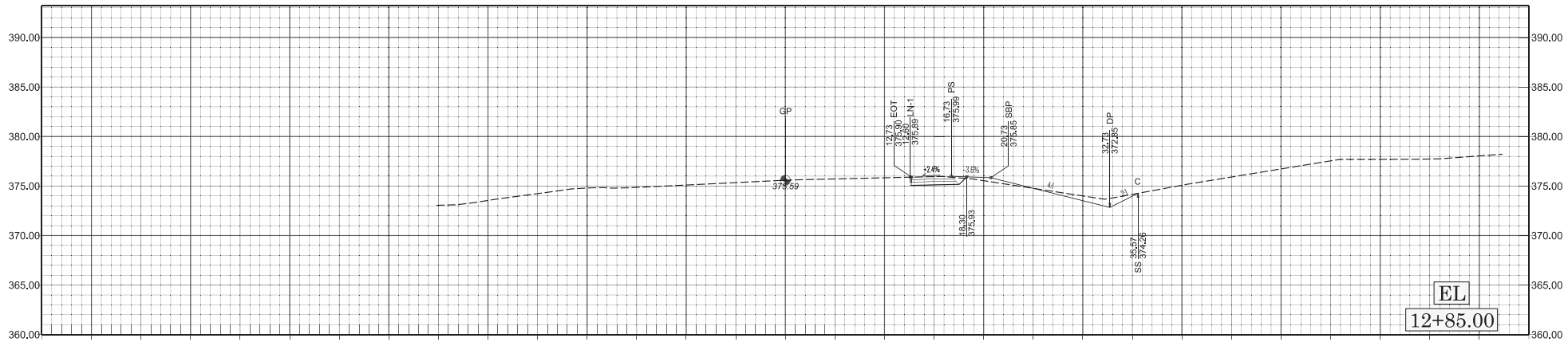
SSS-USER NAME-SSS - SSS-DATE-SSS

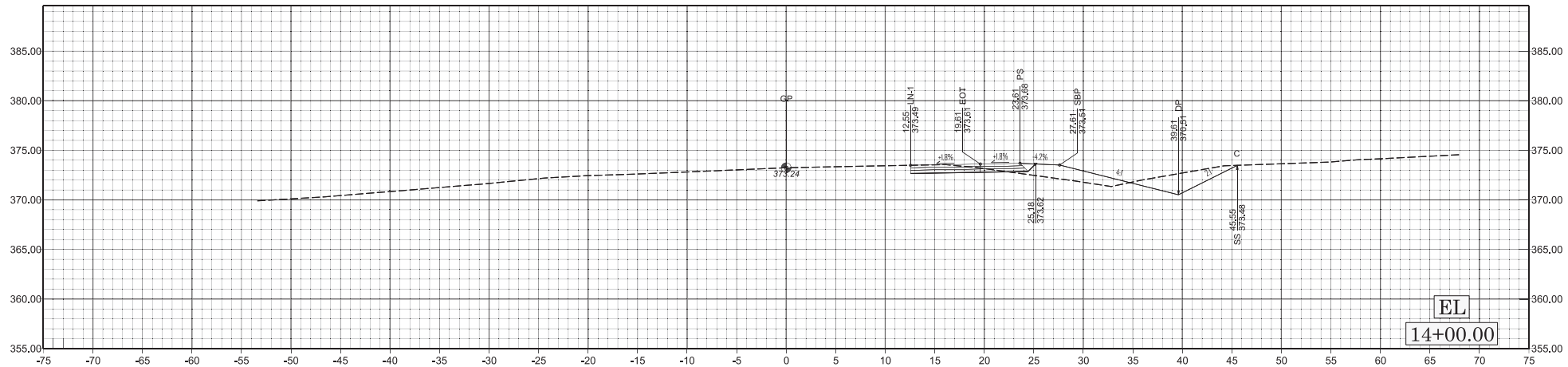

BEGIN CONSTRUCTION
-Y1- POC STA. 43+00.00
END RESURFACING
-Y1- POC STA. 44+01.59
BEGIN TIP PROJECT SM-6105H / HS-2405AH
-L- POC STA. 10+94.15
BEGIN CONSTRUCTION
-L- POC STA. 10+45.00
-Y1- PT 44+31.61
-L- POC STA. 11+02.77 =
-Y1- POC STA. 44+26.13
-Y1- PC 44+80.90
-L- PT 11+29.52
END CONSTRUCTION
-Y1- POC STA. 46+25.00
END TIP PROJECT SM-6105H / HS-2405AH
-L- POT STA. 15+30.00
-L-
(NC 54 - S. MIAMI BLVD.)
N08°30'19.5"E
S88°10'11.0"E
(SR 1978 - HOPSON RD)
NAD 83/2011
EXISTING LUMEN FIBER TO REMAIN.
CROWN CASTLE FIBER THAT HAS BEEN ABANDONED AND REMOVED.
DIG & INTERCEPT EXISTING VERIZON HDPE IN CONFLICT AND TIE INTO NEW HDPE
RETAIN EXIST. 15" RCP
PROPOSED VERIZON 2" HDPE & 144 FIBER
EXISTING SPECTRUM DOWN GUY & ANCHOR TO BE REMOVED.
EXISTING VERIZON VAULT TO BE RETAINED.
CROWN CASTLE HANDHOLE THAT HAS BEEN ABANDONED.
DO NOT DISTURB EXISTING JOINT USE POLE
DO NOT DISTURB EXISTING HAND HOLE AND CABINET.
ABANDON 98' EXISTING VERIZON FIBER IN 2" HDPE
REMOVE EXIST. CB
REMOVE EXIST. 15" RCP IV
PROPOSED SIDEPATH
EXISTING VERIZON FIBER TO BE RETAINED.
CROWN CASTLE FIBER THAT HAS BEEN ABANDONED AND REMOVED.
EXISTING VERIZON VAULT TO BE RETAINED.
CROWN CASTLEFIBER THAT HAS BEEN ABANDONED AND REMOVED.
CONTRACTOR TO TAKE GREAT CARE AND PRECAUTIONS WHEN GRADING AROUND EXISTING UTILITY POLES AND GUY WIRES.
NOTE: CONTRACTOR NOT TO DISTURB EXISTING FENCE AND BRICK COLUMNS ADJACENT TO WORK AREA. NO CONSTRUCTION ACTIVITIES TO TAKE PLACE WITHIN EXISTING FENCED OFF AREA.
SIGNAL UPGRADE
SPIRIT MASTER FUNDING VII, LLC DB 7424 PG 656 PB 181 PG 287
SVASTI HOLDINGS, LLC DB 8121 PG 559 PB 189 PG 256 PB 91 PG 77
PERMANENT DRAINAGE EASEMENT DB 9542 PG 1000
PERMANENT UTILITY EASEMENT DB 9542 PG 1000
TS CREEKSTONE, LLC DB 7270 PG 31 PB 189 PG 256
30' DUKE POWER EASEMENT PB 189 PG 256
SITE TRIANGLES EASEMENT "B" 189 PG 256
ARBY'S DURHAM, LLC DB 4632 PG 690 PB 153 PG 271
ARCHLAND PROPERTY I, LLC DB 4455 PG 428 PB 153 PG 271
APPROXIMATE LOCATION VARIABLE WIDTH COUNTY OF DURHAM SANITARY SEWER EASEMENT PB 153 PG 271 PB 150 PG 97
APPROXIMATE LOCATION VARIABLE WIDTH DRAINAGE EASEMENT DB 2907 PG 492 PB 197 PG 364
APPROXIMATE LOCATION DUKE POWER EASEMENT DB 2643 PG 961 PB 197 PG 364
CURVE DATA
CUR DATA -L- PIc 9+89.89 Δc = 06°09'34.7" (RT) D = 02°12'13.3" Lc = 279.52 Tc = 139.89 R = 2,600 SE - EXIST. RO = EXIST.
CUR DATA -Y1- PIc 42+65.83 Δc = 02°37'53.6" (RT) D = 00°47'36.9" Lc = 331.61 Tc = 165.83 R = 7,220 SE - EXIST. RO = EXIST.
CUR DATA -Y1- PIc 47+25.73 Δc = 28°03'13.1" (LT) D = 05°50'47.4" Lc = 479.84 Tc = 244.83 R = 980 SE - EXIST. RO = EXIST.
SM-6105H / HS-2405AH
4RD1
U0-2
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DURHAM COUNTY
ROADWAY DESIGN UNIT
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
REVISIONS
5/26/20

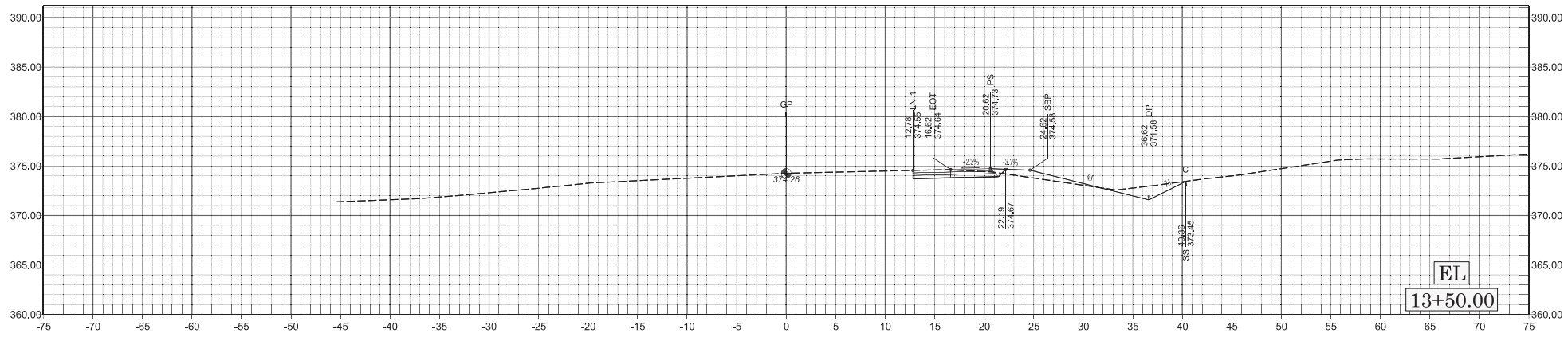
5/26/20

SM-5705AG



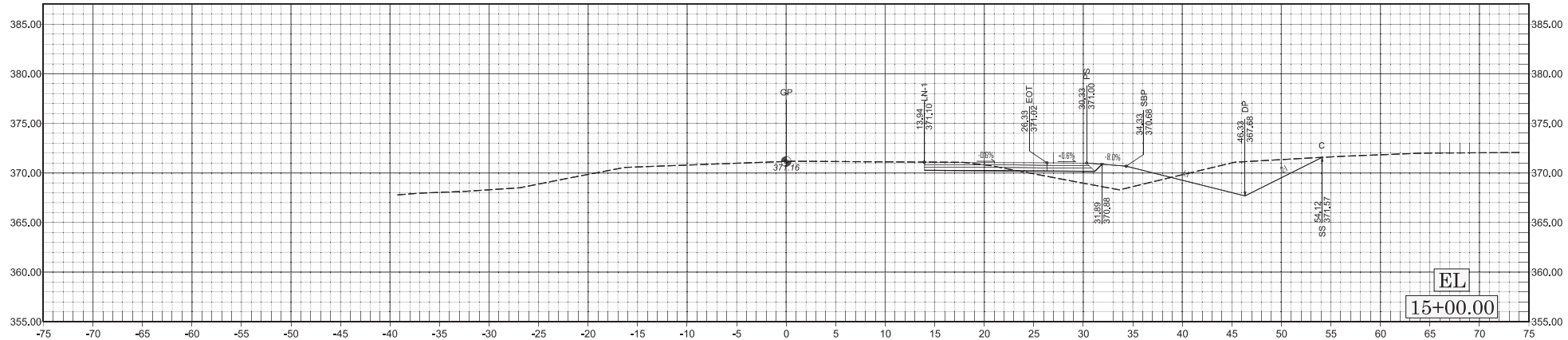


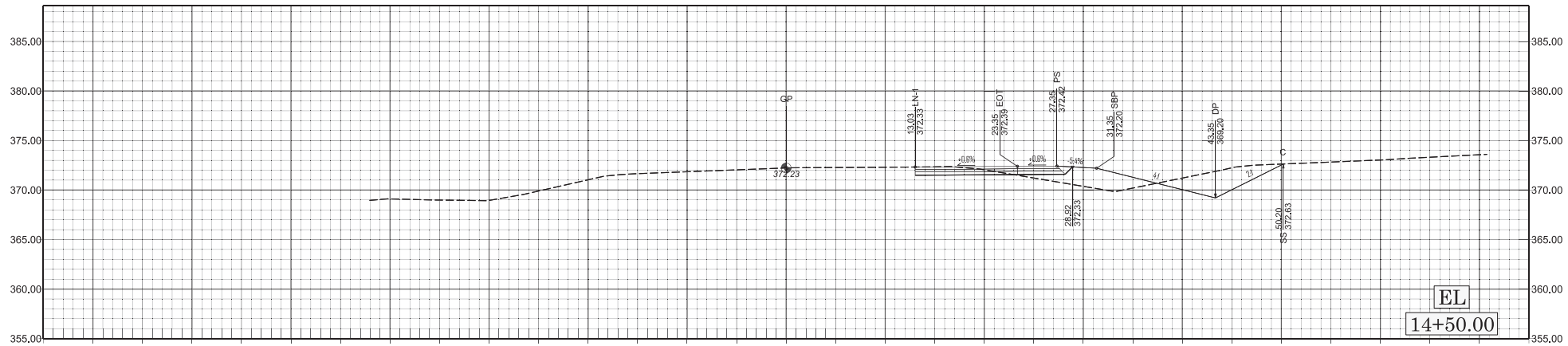

GP
373.24
12.55
373.49
LIN-1
19.81
374.61
EOT
23.61
374.68
PS
27.61
374.61
SBP
39.67
376.51
DP
C
25.18
373.62
SS 45.55
373.48
4:1
2%
EL
14+00.00

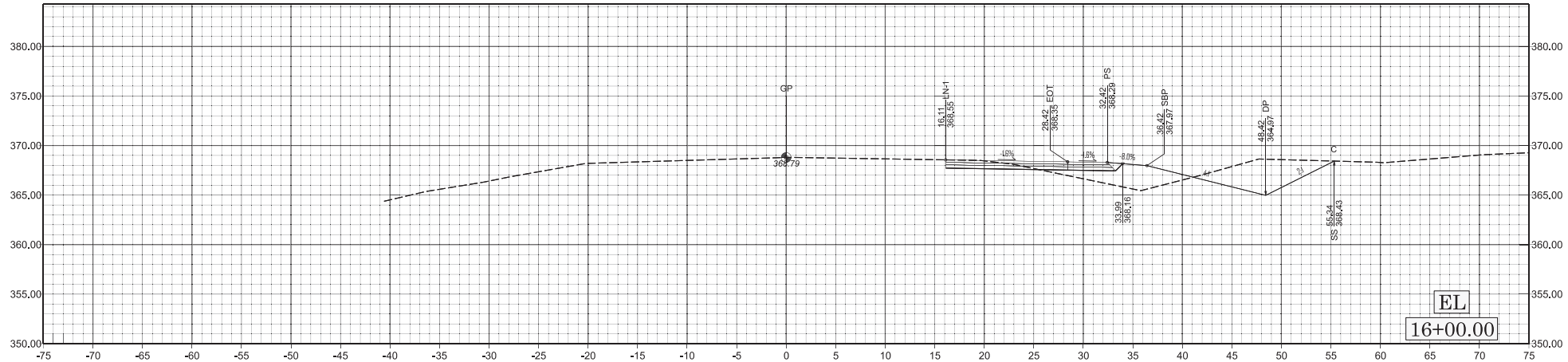

GP
374.26
12.78
374.35
LIN-1
16.62
374.64
EOT
20.62
374.73
PS
24.62
374.58
SBP
36.62
371.58
PP
C
22.19
374.67
40.36
SS 376.45
4:1
2%
EL
13+50.00

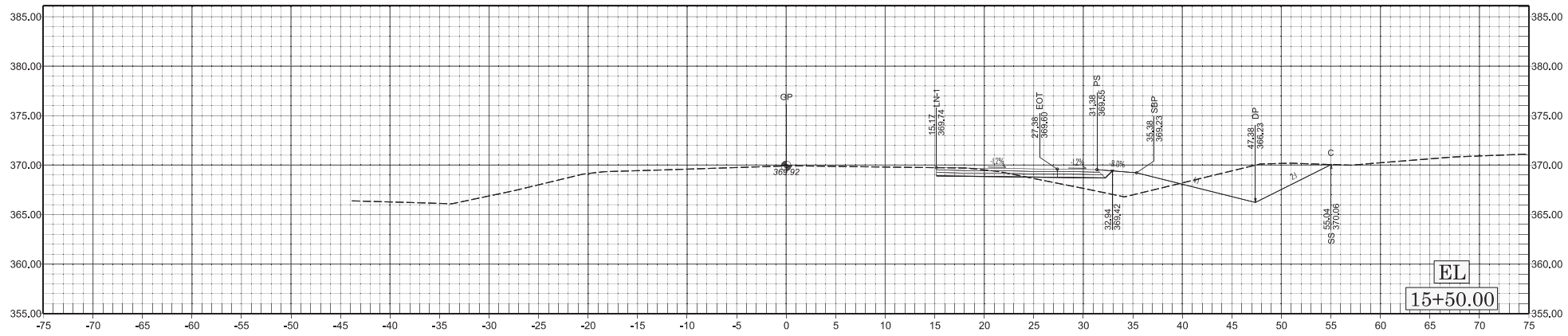
5/26/20

SM-5705AG
X | 3



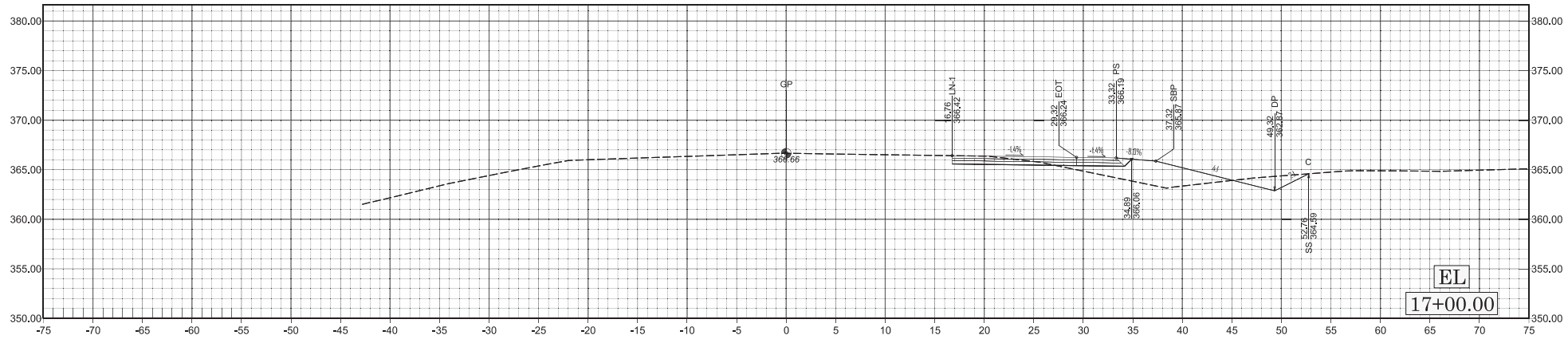


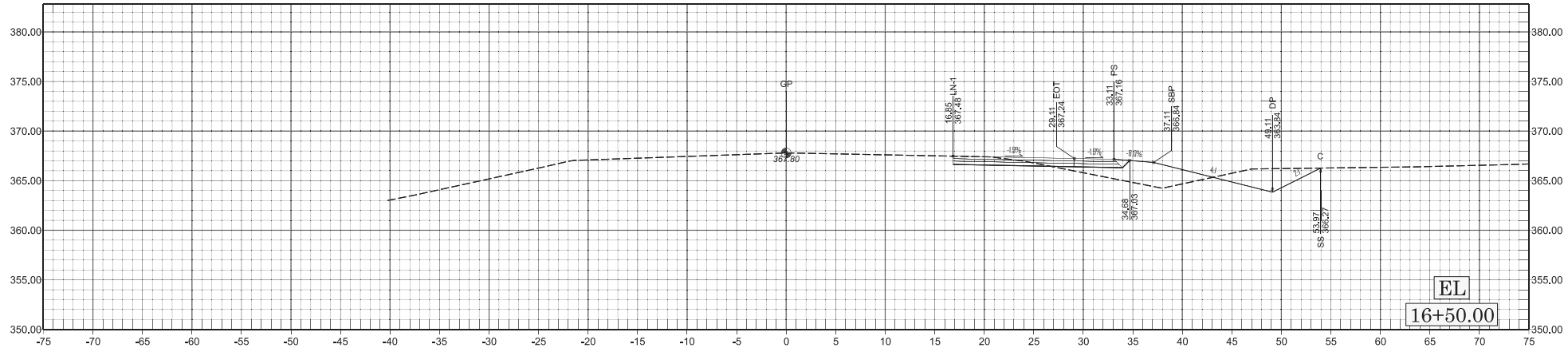

GP
368.79
16.11 LN-1
369.55
28.42 EOT
368.35
32.42 PS
368.29
36.42 SBP
367.97
48.42 DP
364.67
C
33.99
366.16
55.04
SS
368.43
EL
16+00.00


GP
369.92
15.17 LN-1
369.74
27.38 EOT
369.60
31.38 PS
369.55
35.38 SBP
369.23
47.38 DP
368.29
C
32.04
369.42
55.04
SS
370.06
EL
15+50.00

5/26/20

SM-5705AG
X | 5





5/26/20

SM-6105H / HS-2405AH - RIGHT TURN LANE ON NC 54 IN DURHAM COUNTY

CROSS SECTION INDEX

ALIGNMENT	SHEETS
-L-	X-1 THRU X-8
-Y1-	X-9 THRU X-10

Note: Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for Grading.

SM-6105H / HS-2405AH

4RD1 | X-0

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN
PREPARED BY

VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENSE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

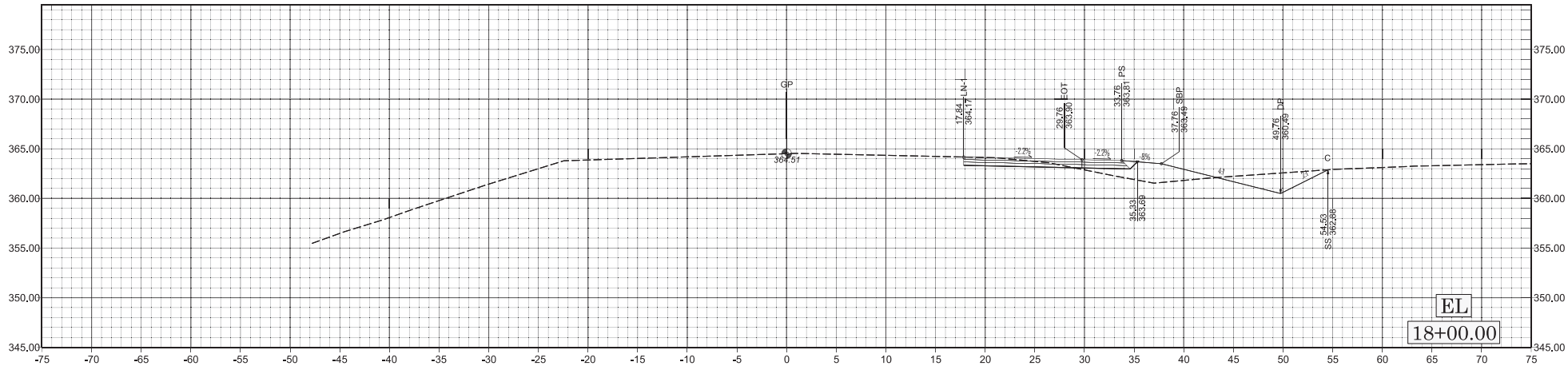
HYDRAULIC DESIGN
PREPARED BY

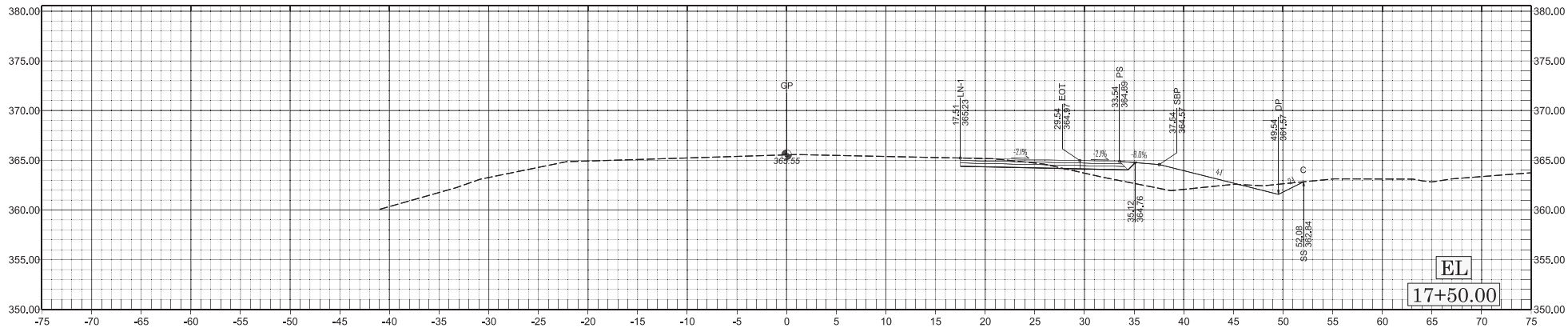
ETHERIDGE ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. P-0377
Bus: 919 851 8077
Fax: 919 851 8107

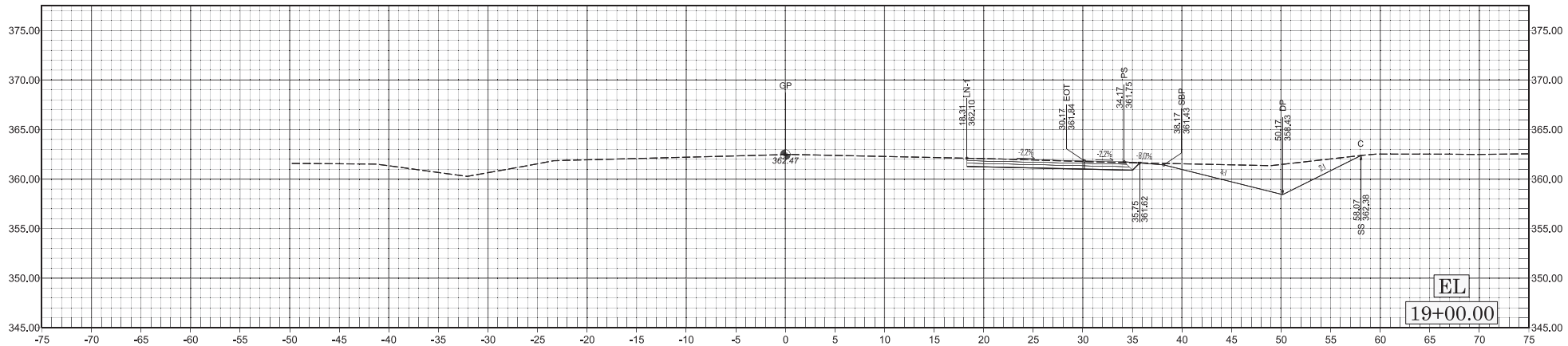
REVISIONS

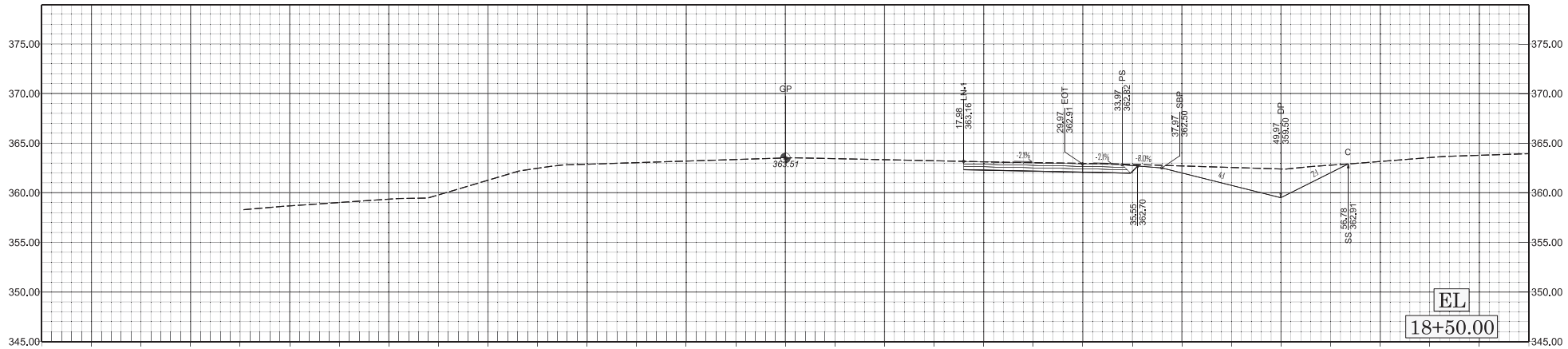
5/26/20

SM-5705AG



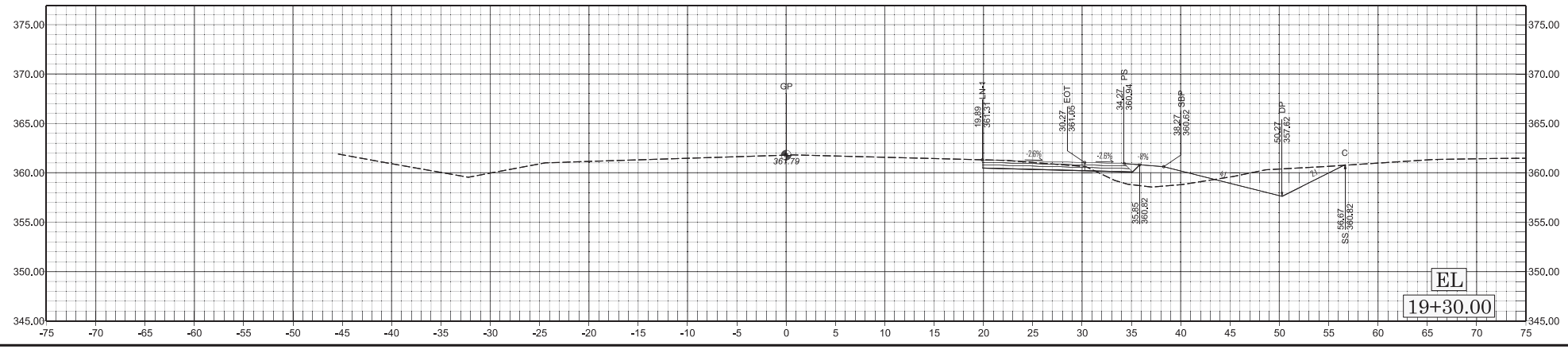



GP
362.47
18.31 LN-1
362.10
30.17 EOT
361.84
34.17 PS
361.75
38.17 SBP
361.43
50.17 DP
358.43
35.75
361.62
58.07
SS 362.38
C
EL
19+00.00


GP
363.51
17.98 LN-1
363.16
29.97 EOT
362.91
33.97 PS
362.82
37.97 SBP
362.50
49.97 DP
359.50
35.55
362.70
56.78
SS 362.91
C
EL
18+50.00

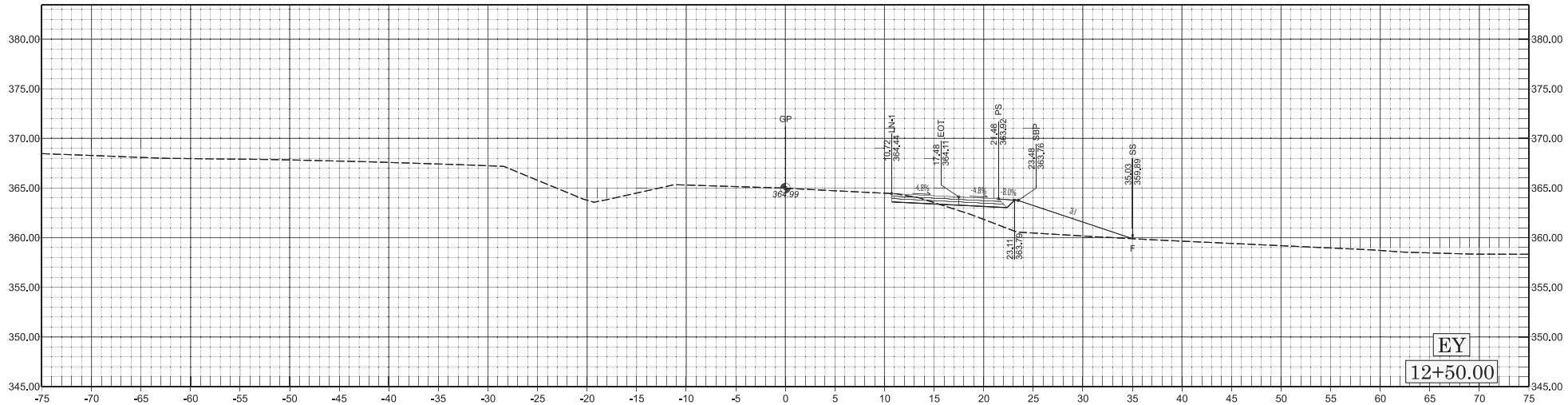
5/26/20

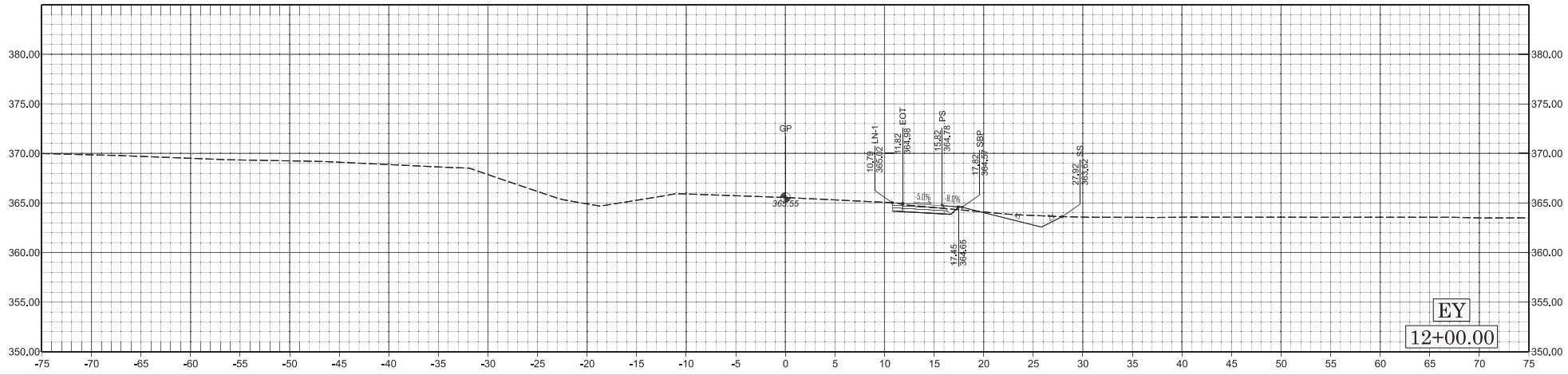
SM-5705AG



5/26/20

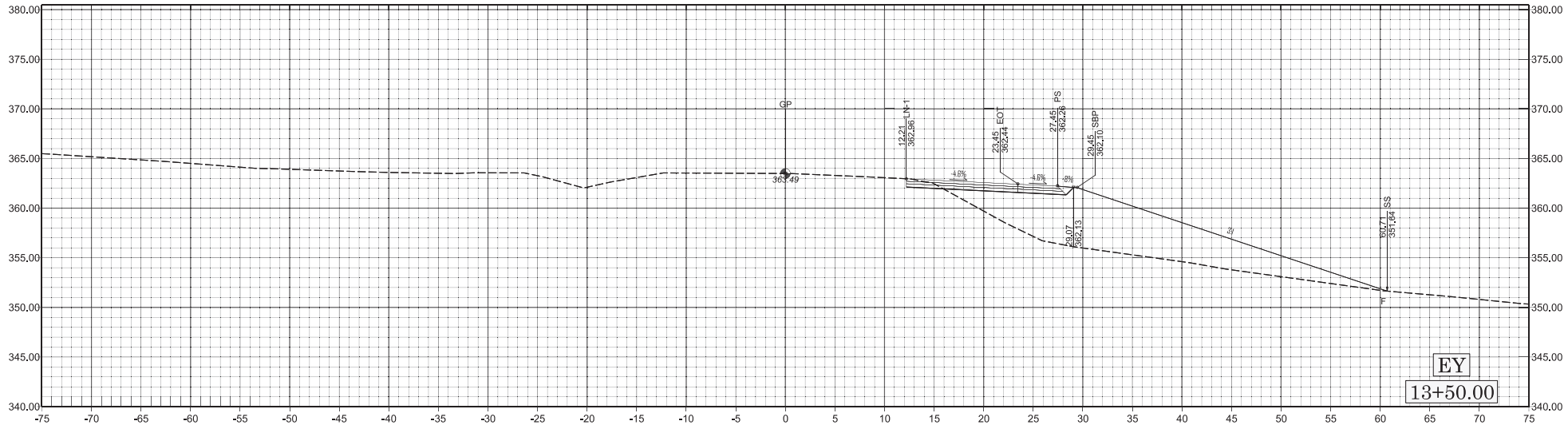
SM-5705AG

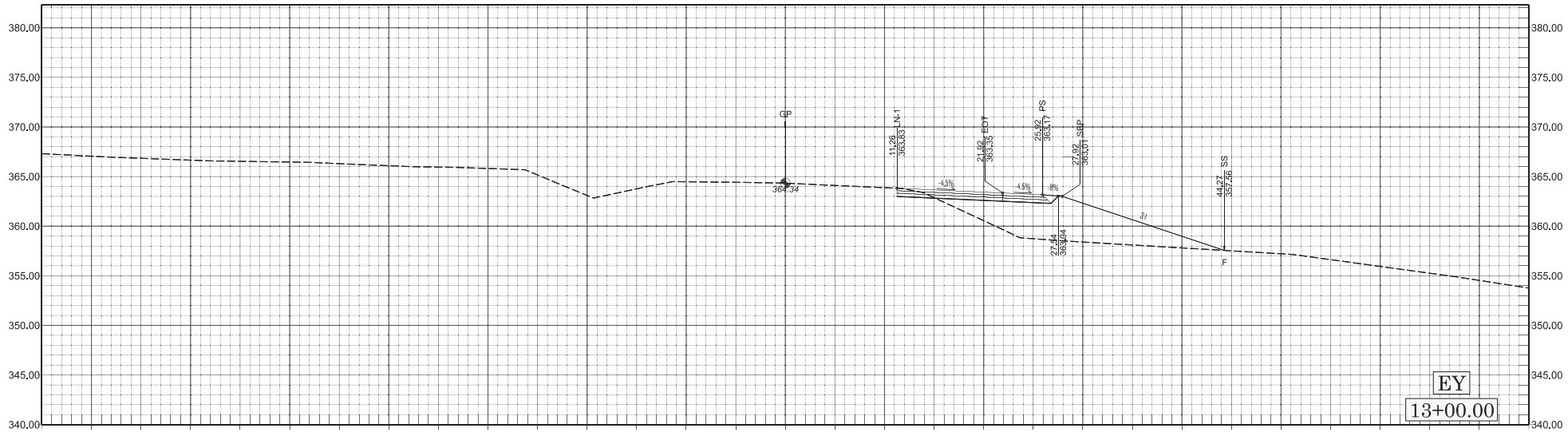




5/26/20

SM-5705AG





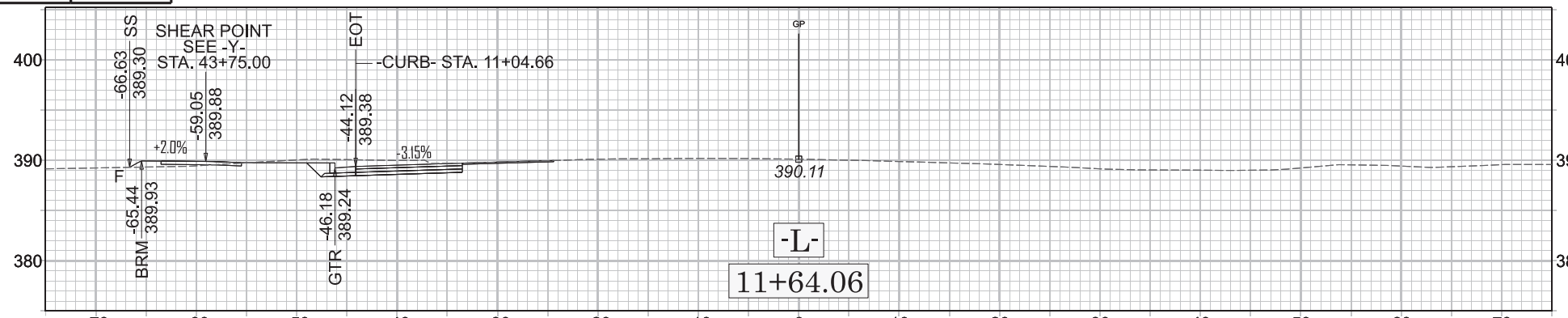
5/26/20

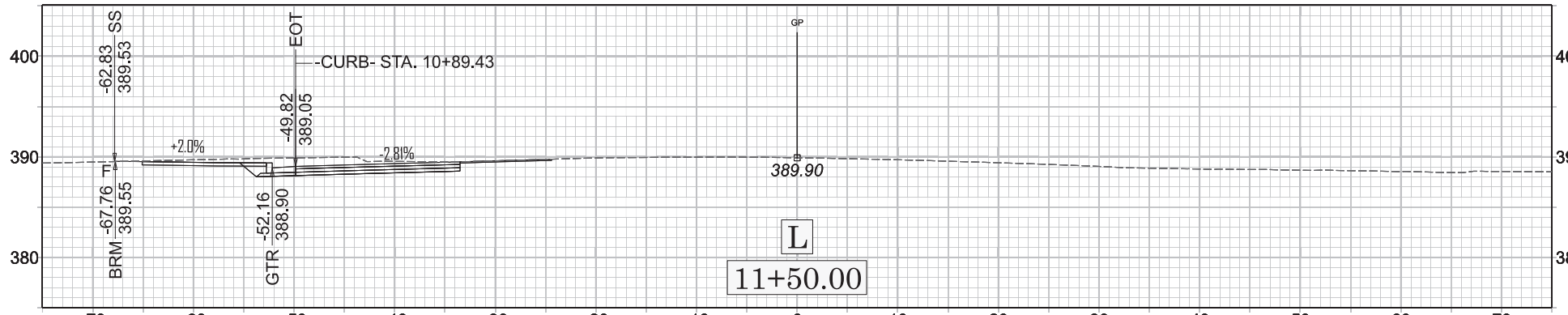
PREPARED BY
IAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7688
WWW.IASINFRASTRUCTURE.COM

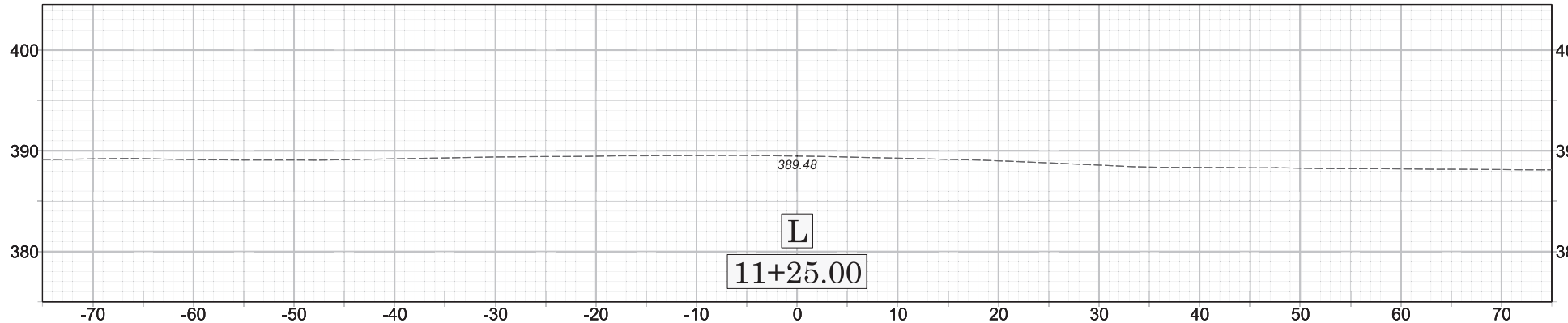
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY
ROADWAY DESIGN UNIT

0 5 10

SM-6105H / HS-2405AH
X-1 | 11+25

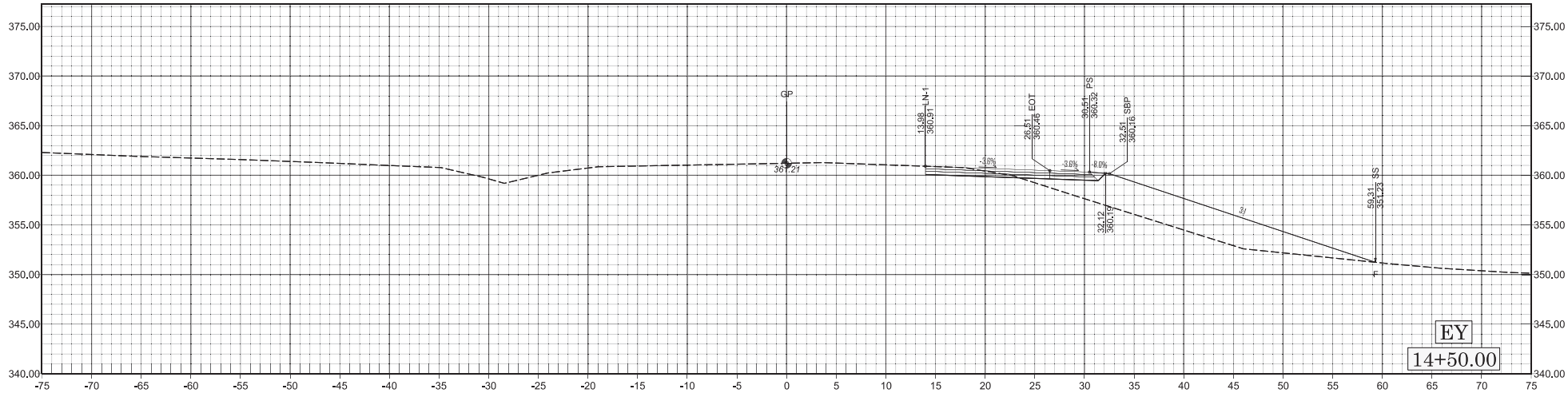


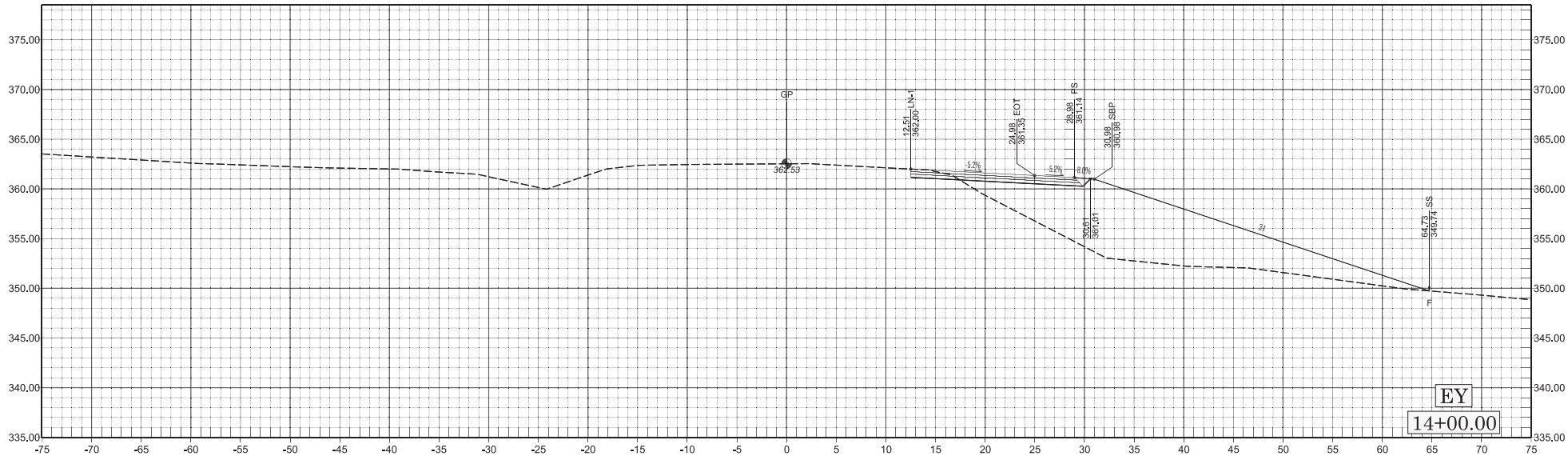




5/26/20

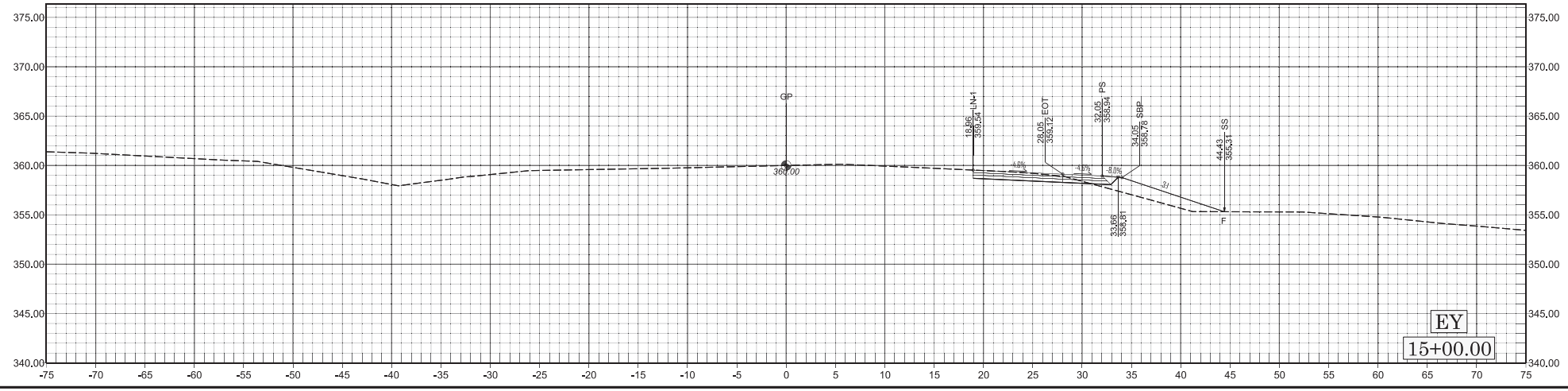
SM-5705AG





5/26/20

SM-5705AG



5/26/20

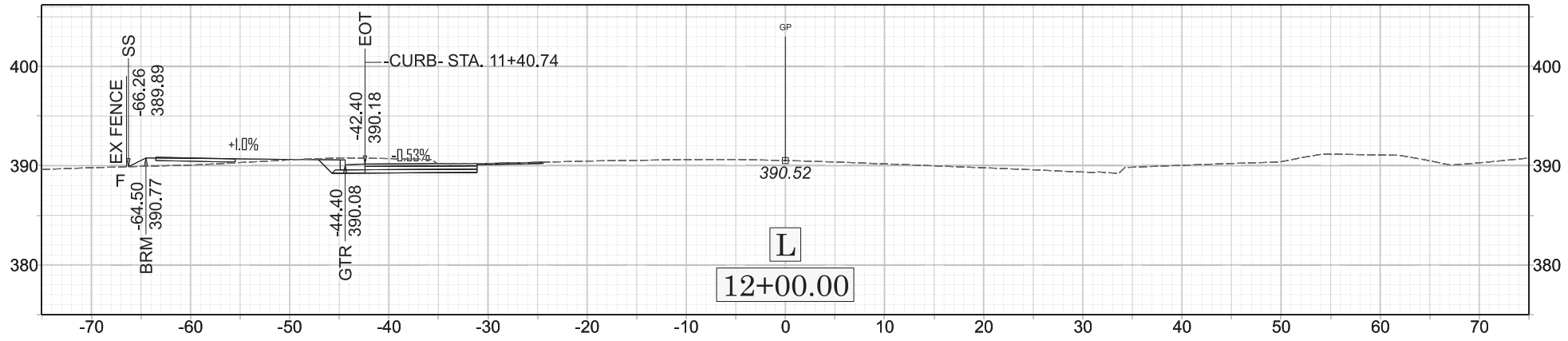
PREPARED BY
IAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7688
WWW.IASINFRASTRUCTURE.COM

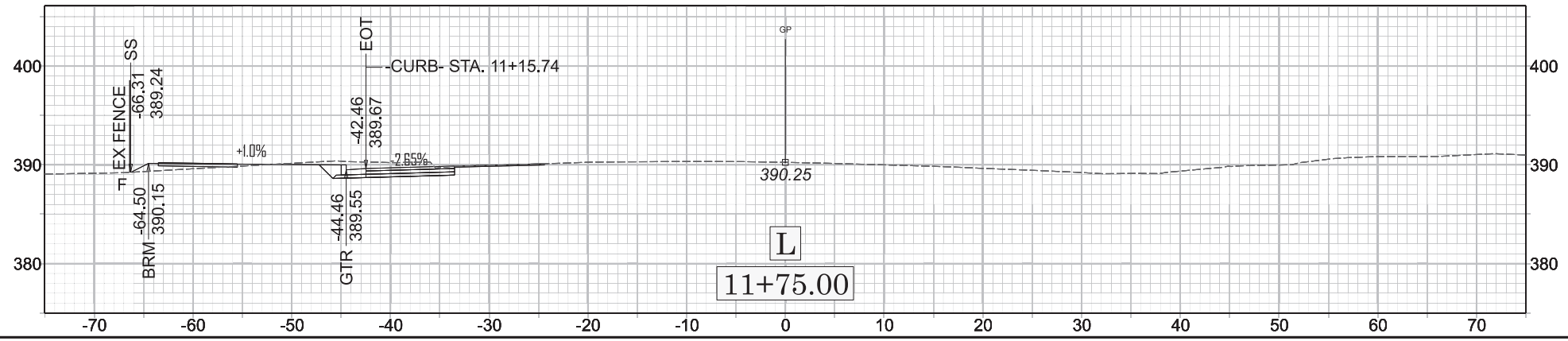
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

0 5 10

SM-6105H / HS-2405AH
X-2 | 11+75





PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7666
WWW.VIASINFRASTRUCTURE.COM

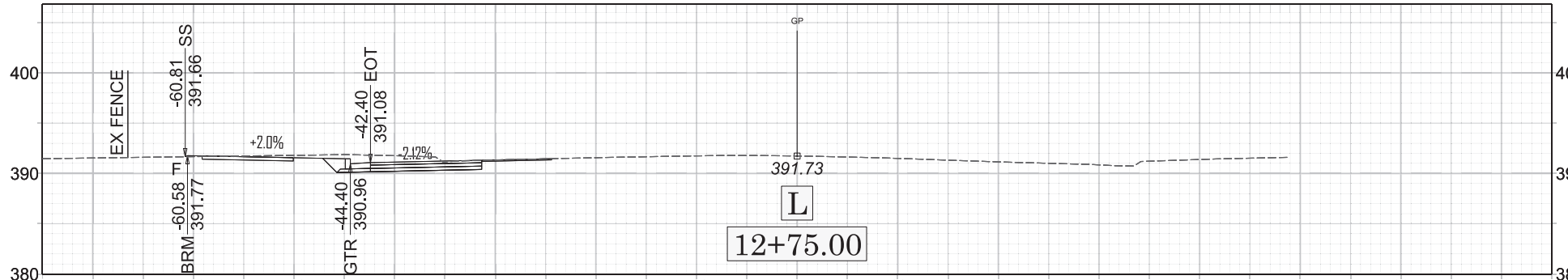
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

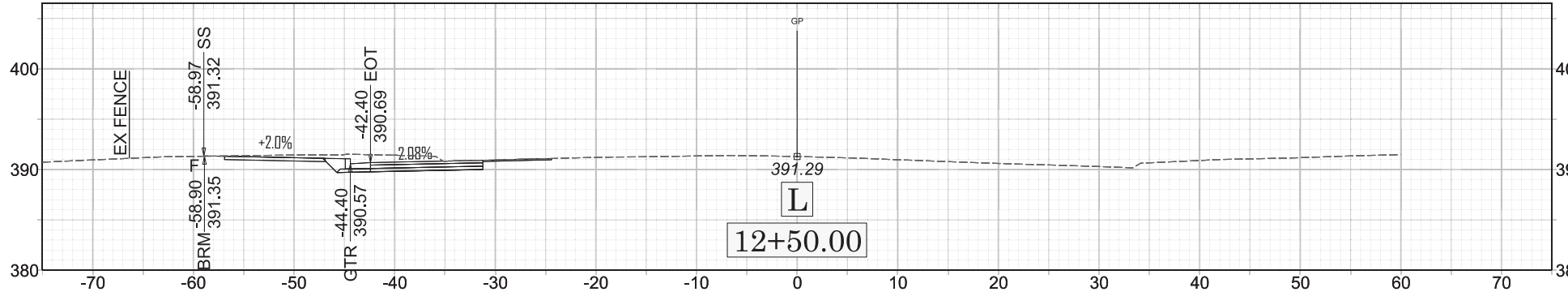
ROADWAY DESIGN UNIT

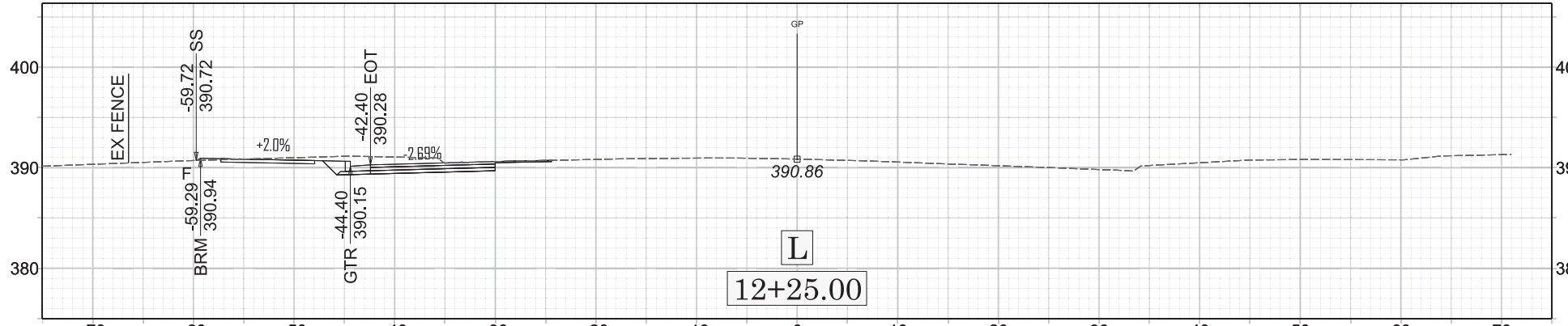
5/26/20

0 5 10

SM-6105H / HS-2405AH
X-3 | 12+25







PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7666
WWW.VIASINFRASTRUCTURE.COM

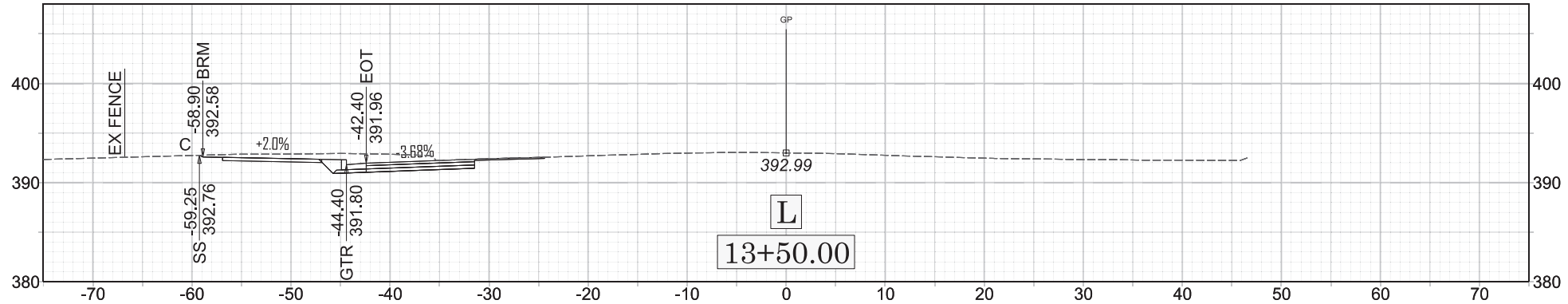
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

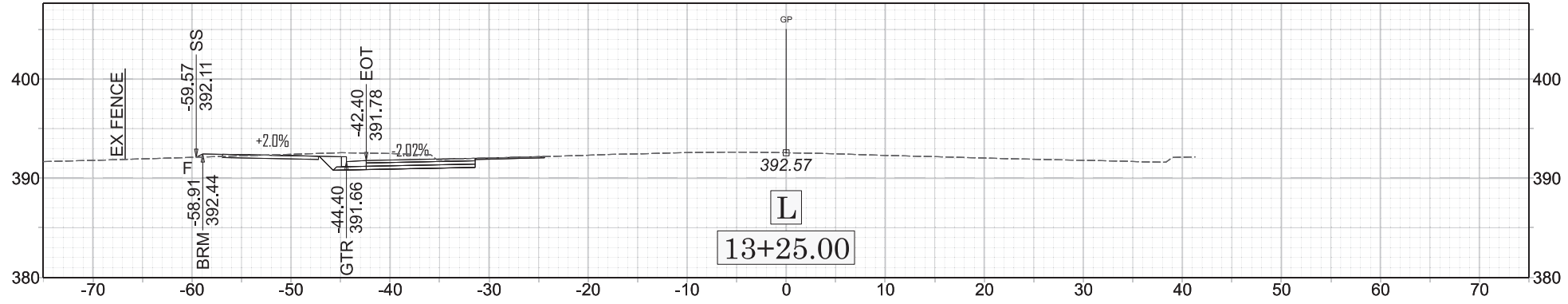
ROADWAY DESIGN UNIT

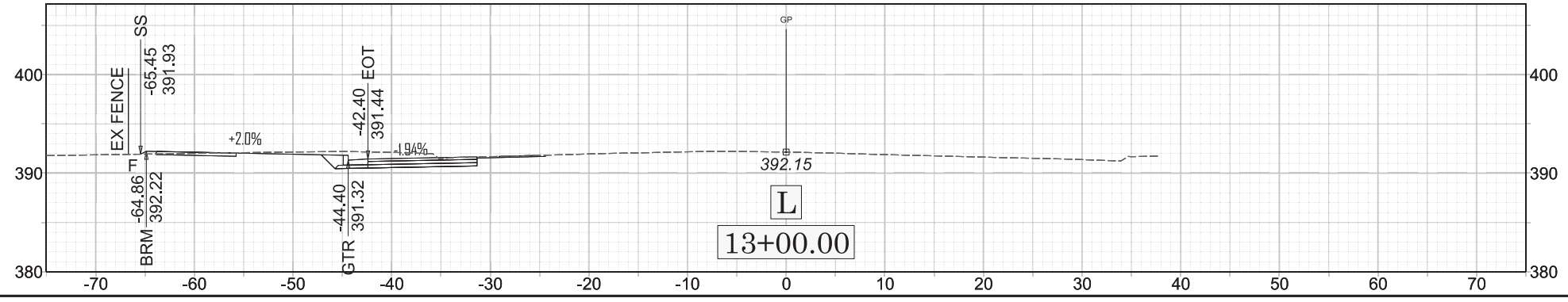
5/26/20

0 5 10

SM-6105H / HS-2405AH
X-4 | 13+00







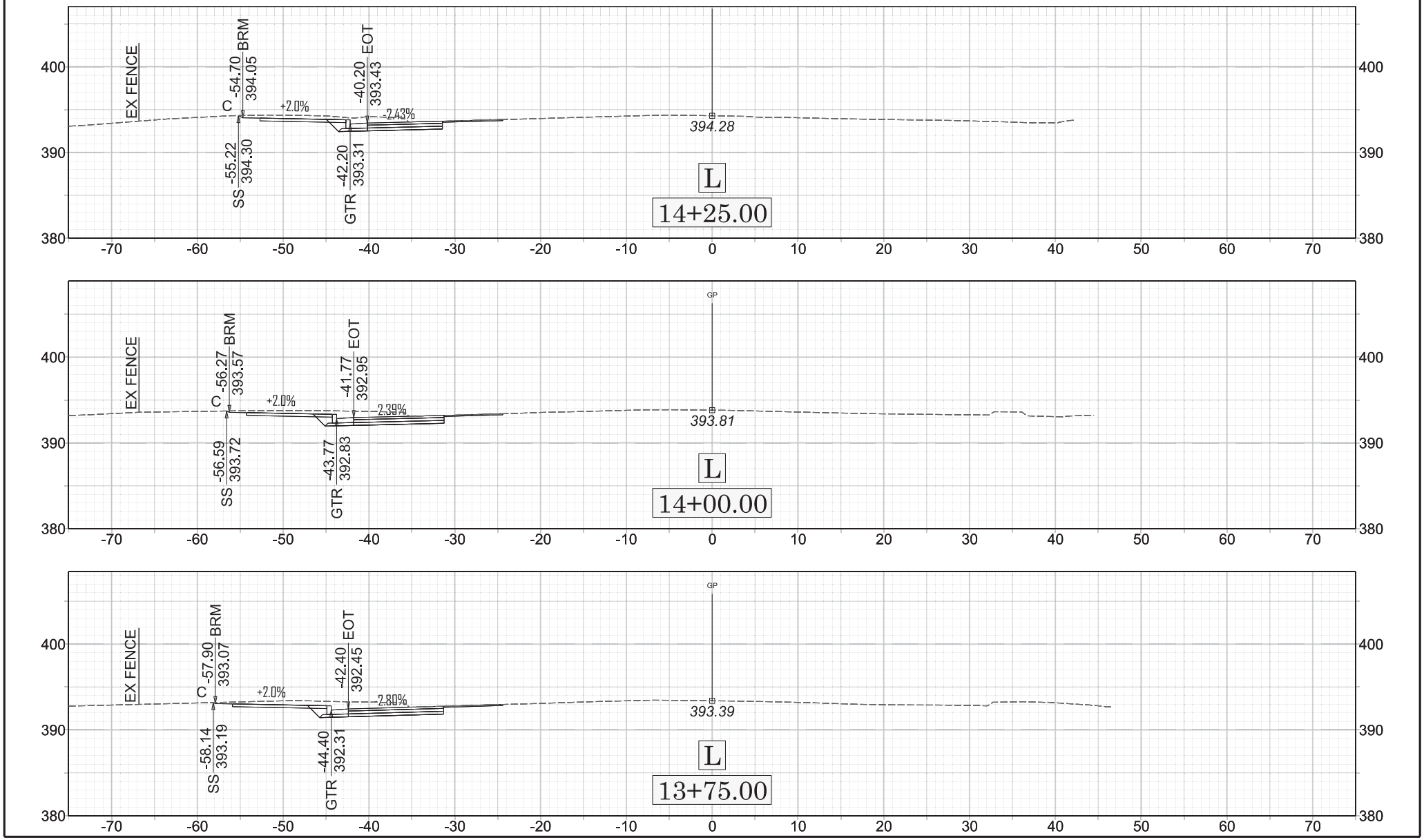
PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7686
WWW.VIASINFRASTRUCTURE.COM

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

5/26/20

SM-6105H / HS-2405AH
X-5 | 13+75



PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7666
WWW.VIASINFRASTRUCTURE.COM

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

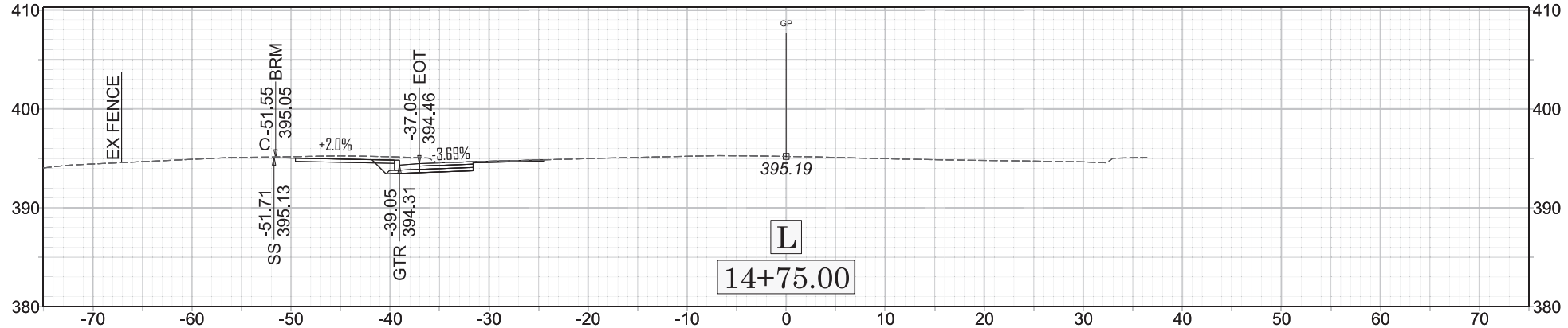
ROADWAY DESIGN UNIT

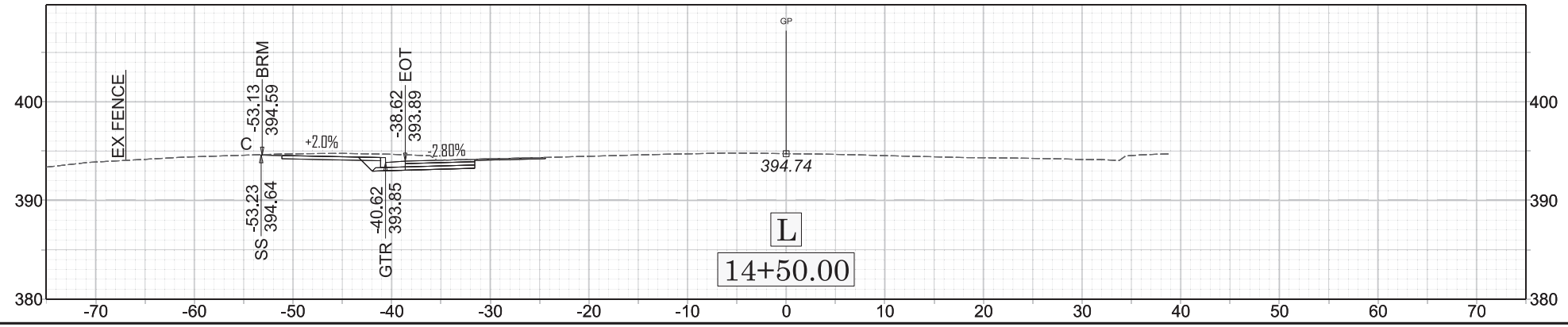
5/26/20

0 5 10

SM-6105H / HS-2405AH

X-6 | 14+50





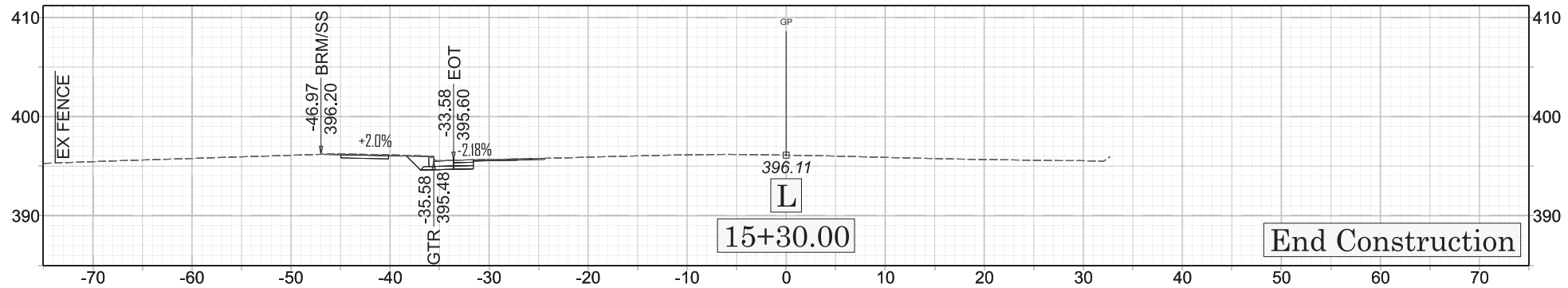
5/26/20

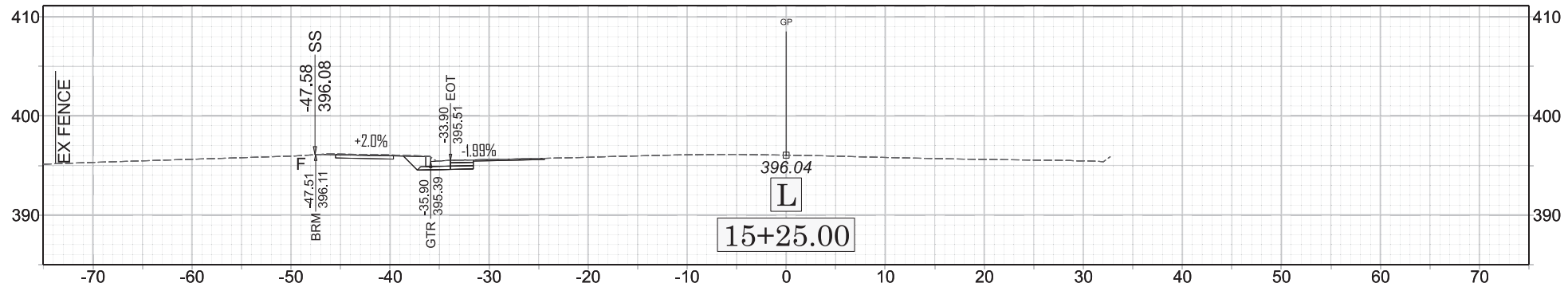
PREPARED BY
IAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7688
WWW.IASINFRASTRUCTURE.COM

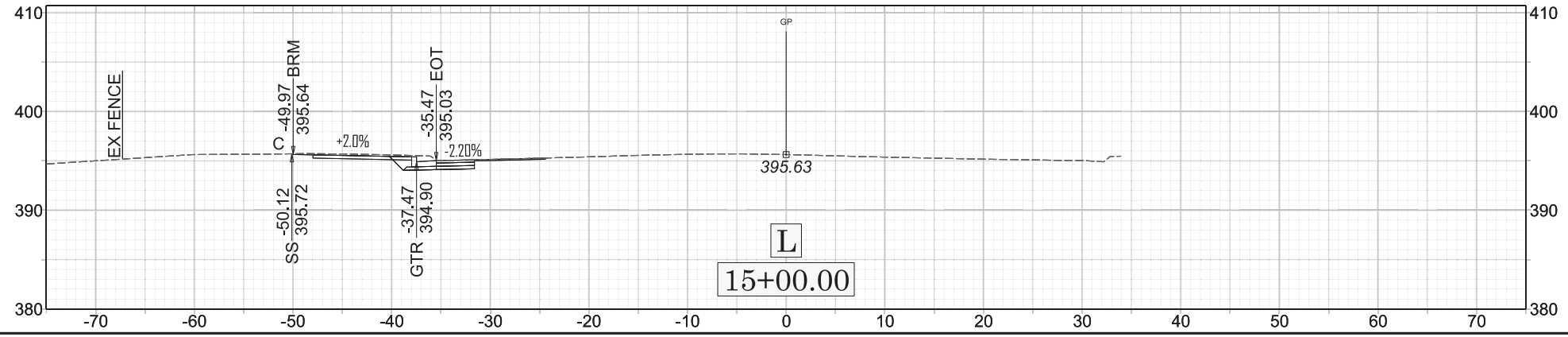
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY
ROADWAY DESIGN UNIT

0 5 10

SM-6105H / HS-2405AH
X-7 | 15+00







5/26/20

PREPARED BY
IAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7666
WWW.IASINFRASTRUCTURE.COM

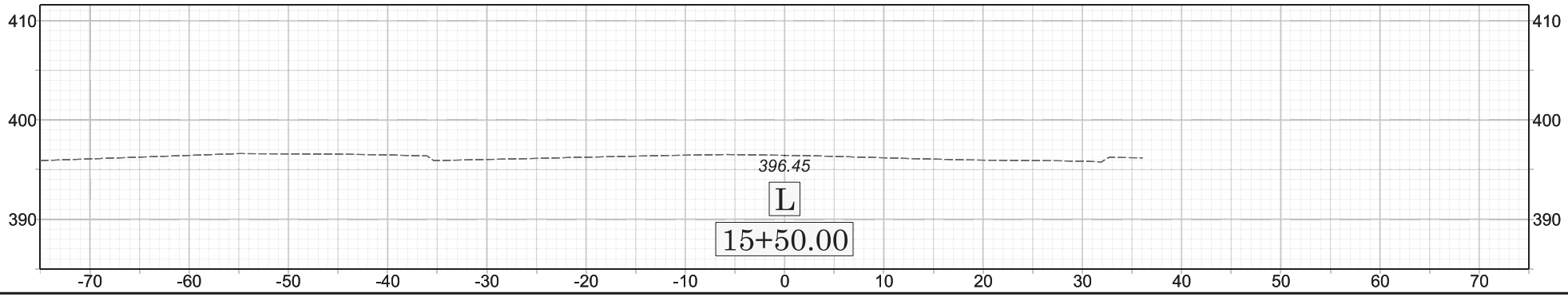
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

0 5 10

SM-6105H / HS-2405AH

X-8 | 15+50



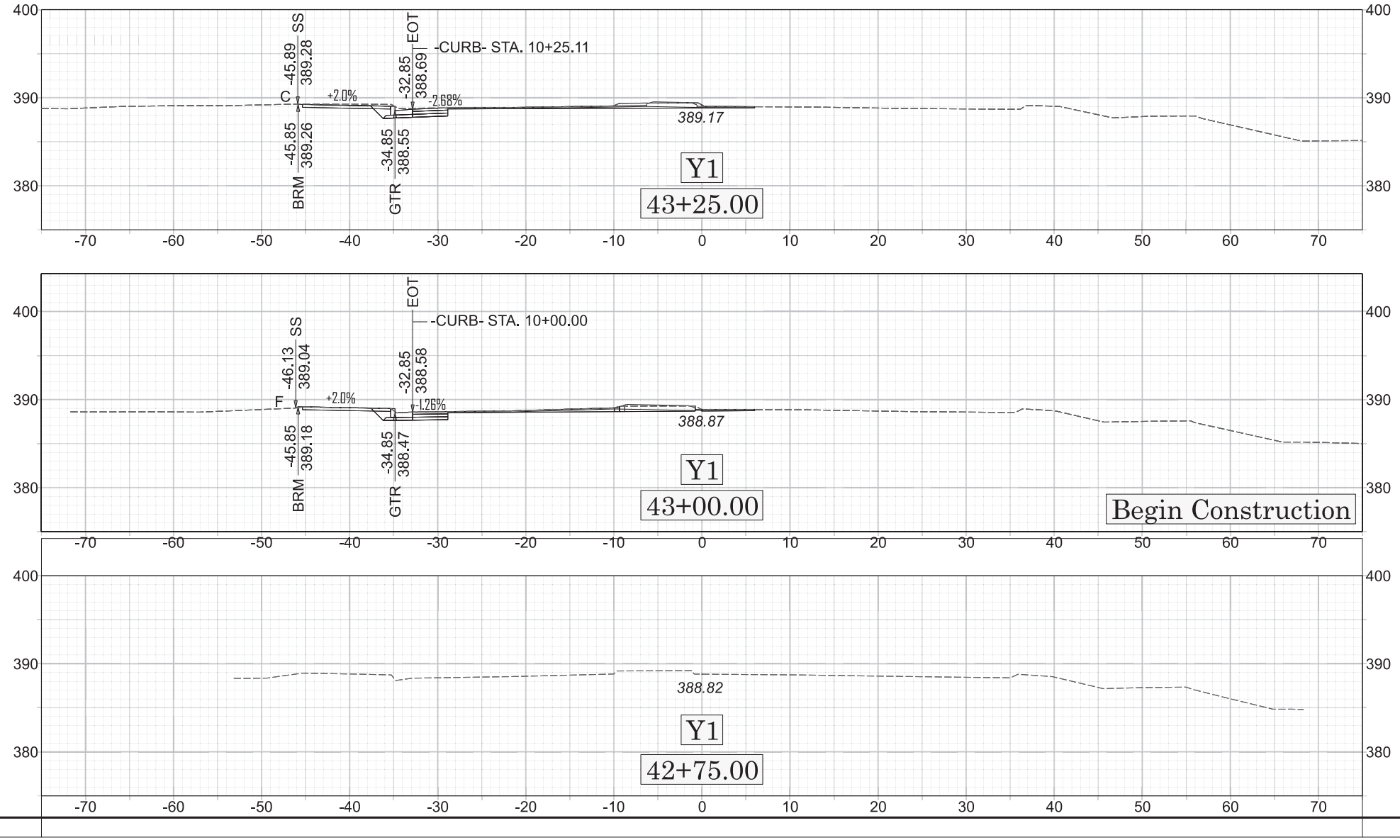
PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7688
WWW.VIASINFRASTRUCTURE.COM

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

5/26/20

SM-6105H / HS-2405AH
X-9 | 42+75



PREPARED BY
IAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7688
WWW.IASINFRASTRUCTURE.COM

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DURHAM COUNTY

ROADWAY DESIGN UNIT

5/26/20

0 5 10

SM-6105H / HS-2405AH

X-10 | 43+50