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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-5600K	1	40

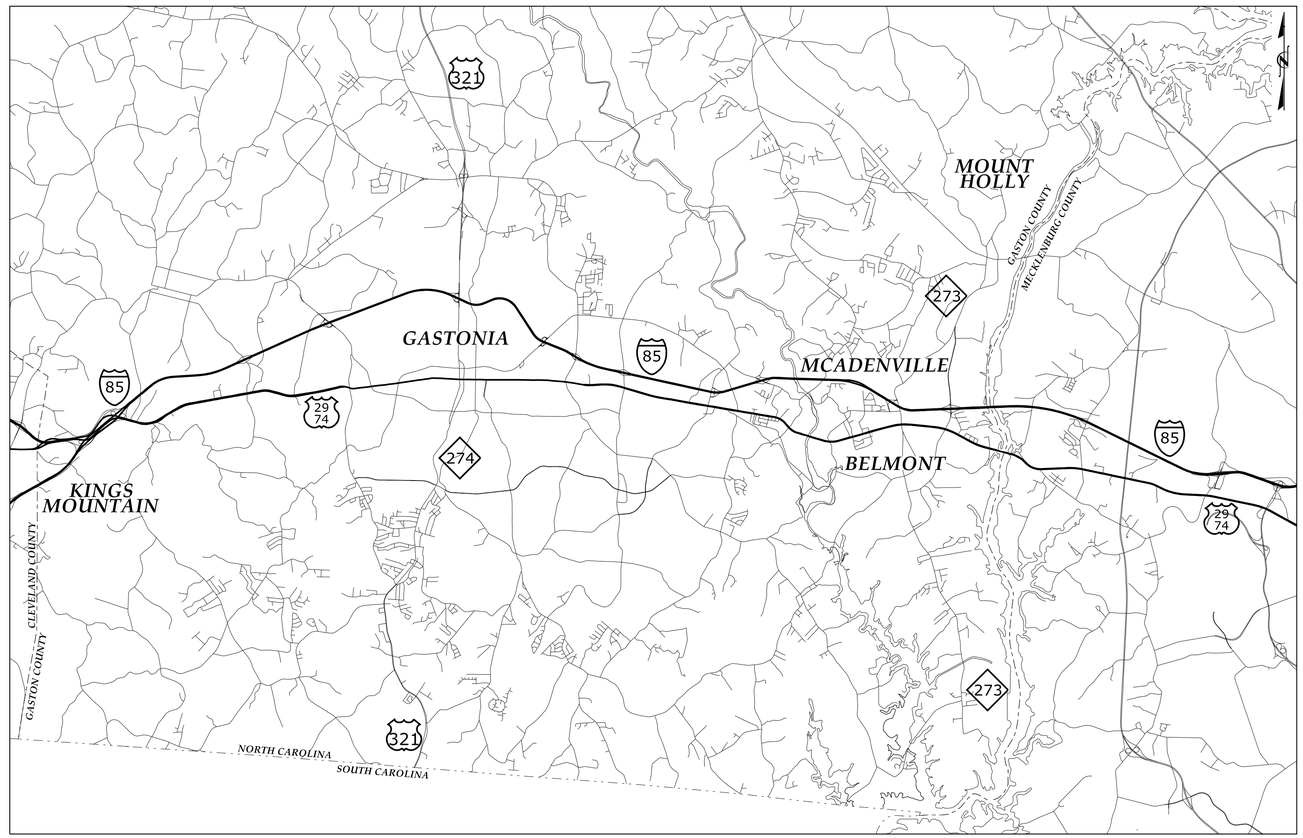
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
50061.1.12		PE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

TYPE OF WORK: INTEGRATION OF TRAFFIC MANAGEMENT SOFTWARE FOR FREEWAY AND ARTERIAL CORRIDORS; INSTALLATION OF CHANGEABLE TRAILBLAZER SIGNS; EXPANSION OF REGIONAL CCTV MONITORING AND DMS SYSTEMS



CONTRACT: TIP PROJECT: C-5600K

2018 STANDARD SPECIFICATIONS

LETTING DATE:

PROJECT LENGTH = 23 MILES

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section

750 Greenfield Pkwy., Garner, NC 27529

NCDOT CONTACTS:
TRANSPORTATION SAFETY AND MOBILITY
INTELLIGENT TRANSPORTATION SYSTEMS SECTION
MEREDITH MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

PLANS PREPARED BY: Kimley»Horn

NC License #F-0102
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Raleigh, NC 27636
Tel: (919) 677-2000
Fax: (919) 677-2050

KIMLEY-HORN CONTACTS: AMANDA GOOD - PROJECT MANAGER
KEVIN W. SMITH, P.E. - PROJECT ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
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SIGNATURE

3/26/2019

DATE

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INDEX OF SHEETS

1..... TITLE SHEET
2..... INDEX OF SHEETS, AND ROADWAY STANDARD DRAWINGS
3-4..... PLAN KEY
5..... JUNCTION BOX AND EQUIPMENT CABINET DETAILS
6-7..... DYNAMIC MESSAGE SIGN DETAILS
8-10..... CCTV CAMERA DETAILS
11..... CHANGEABLE TRAILBLAZER SIGN DETAIL
12..... BLOCK DIAGRAM
13-31..... SIGNING AND DEVICE PLANS
32-40..... SPLICE DETAILS

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS"- ROADWAY DESIGN UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
848.01	CONCRETE SIDEWALK
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1700.01	ELECTRICAL SERVICE OPTIONS
1700.02	ELECTRICAL SERVICE GROUNDING
1715.01	UNDERGROUND CONDUIT
1716.01	JUNCTION BOXES
1720.01	WOOD POLES
1730.01	FIBER OPTIC CABLE
1751.01	CONTROLLERS AND CABINETS

LEGEND

- EXI — EXI — EXISTING COMMUNICATIONS CABLE
- NEW CONDUIT
- DD — DD — NEW DIRECTIONAL DRILLED CONDUIT
- EXISTING RIGHT OF WAY
- EXISTING GUARDRAIL
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- EXISTING AERIAL SPLICE ENCLOSURE
- EXISTING BASE-MOUNTED CABINET
- NEW BASE-MOUNTED CABINET
- EXISTING POLE-MOUNTED CABINET
- NEW POLE-MOUNTED CABINET
- NEW CCTV ASSEMBLY
- EXISTING CCTV ASSEMBLY
- NEW DMS SIGN ASSEMBLY
- EXISTING GROUND-MOUNTED STATIC SIGN
- EXISTING OVERHEAD STATIC SIGN
- XX-XXXX — SIGNAL INVENTORY / DEVICE NUMBER

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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intermodal Transportation Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM
INDEX OF SHEETS AND ROADWAY STANDARD DRAWINGS

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
DocuSigned by: Kevin Smith
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SIGNATURE 3/26/2019 DATE

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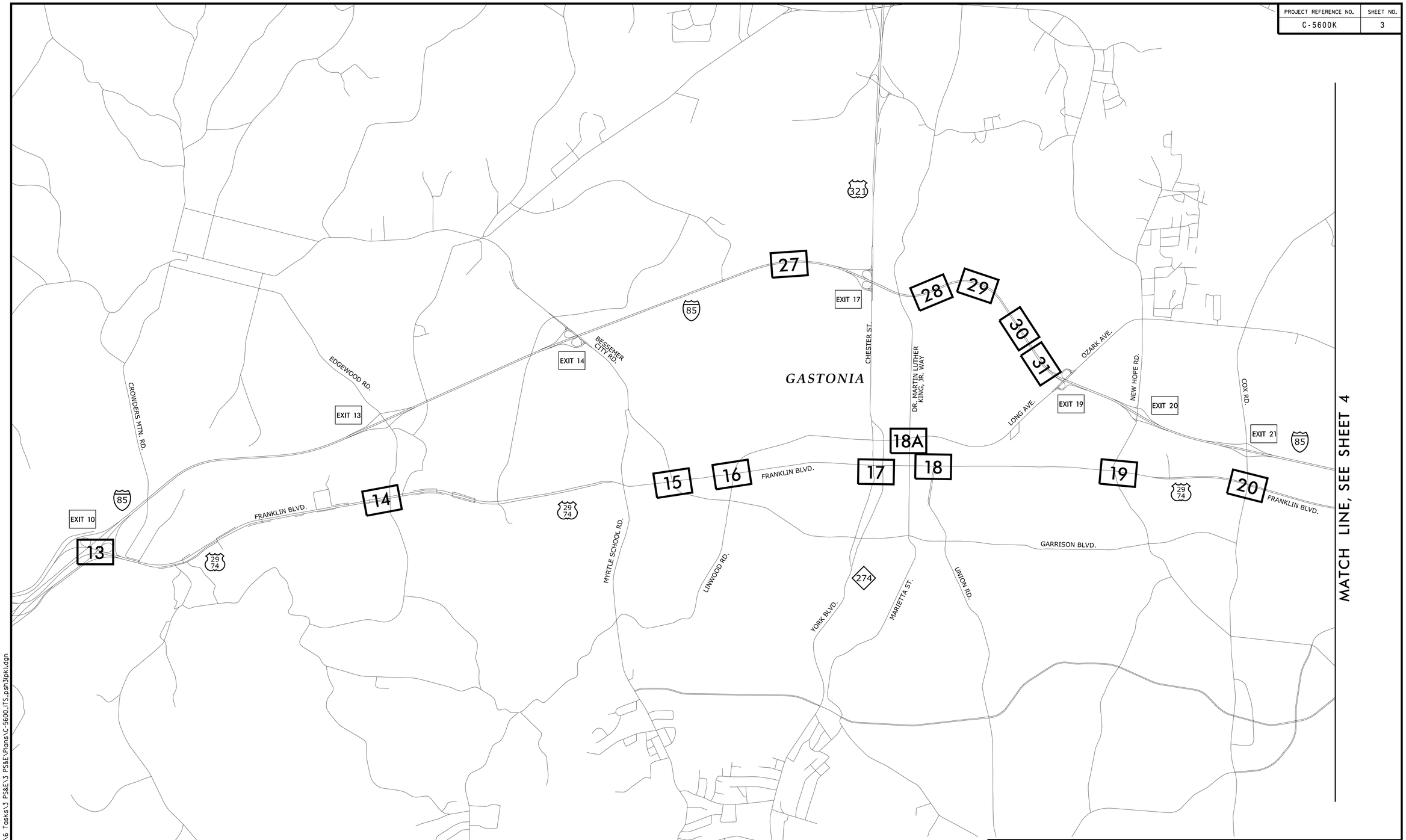

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Science Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

N

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

PLAN KEY

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

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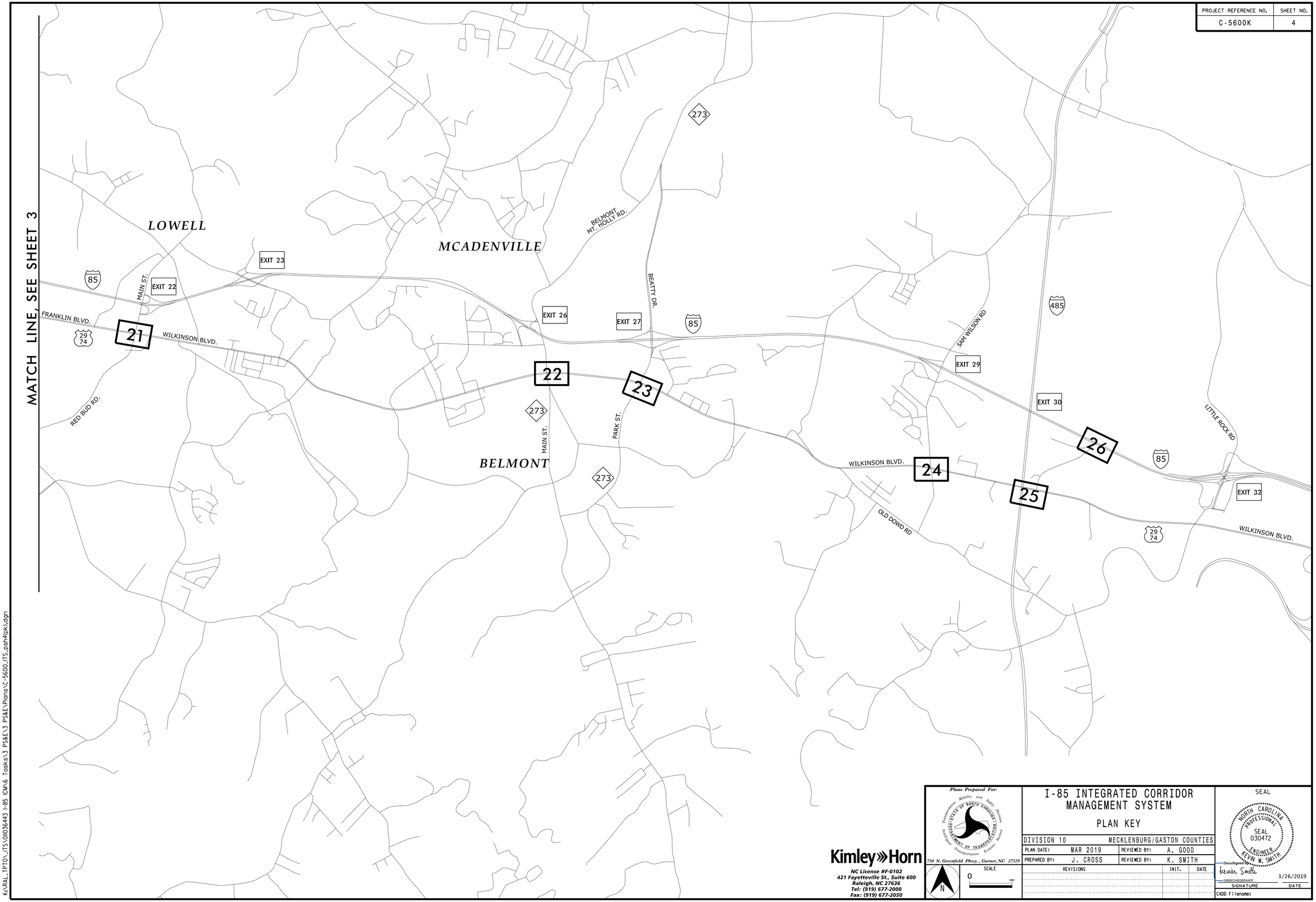

Plans Prepared For:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE

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I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

PLAN KEY

DIVISION 10 MECKLENBURG/GASTON COUNTIES

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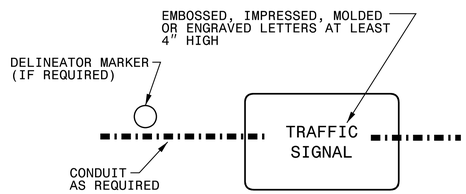
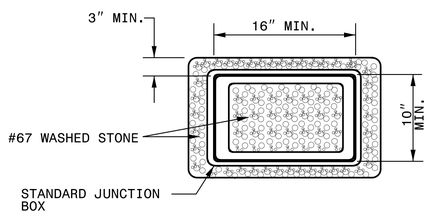


TOP VIEW OF COVER

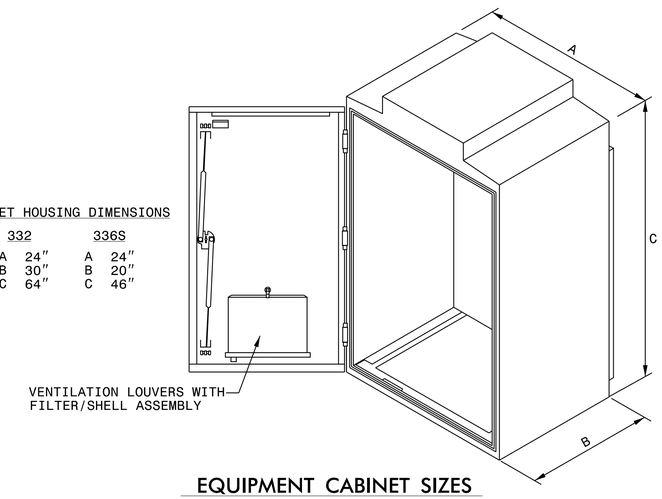


TOP VIEW WITHOUT COVER

STANDARD JUNCTION BOX TYPICAL DETAIL

CABINET HOUSING DIMENSIONS

332		336S	
A	24"	A	24"
B	30"	B	20"
C	64"	C	46"



EQUIPMENT CABINET SIZES

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Transportation Mobility and Safety Division
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM
JUNCTION BOX AND EQUIPMENT CABINET DETAILS

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

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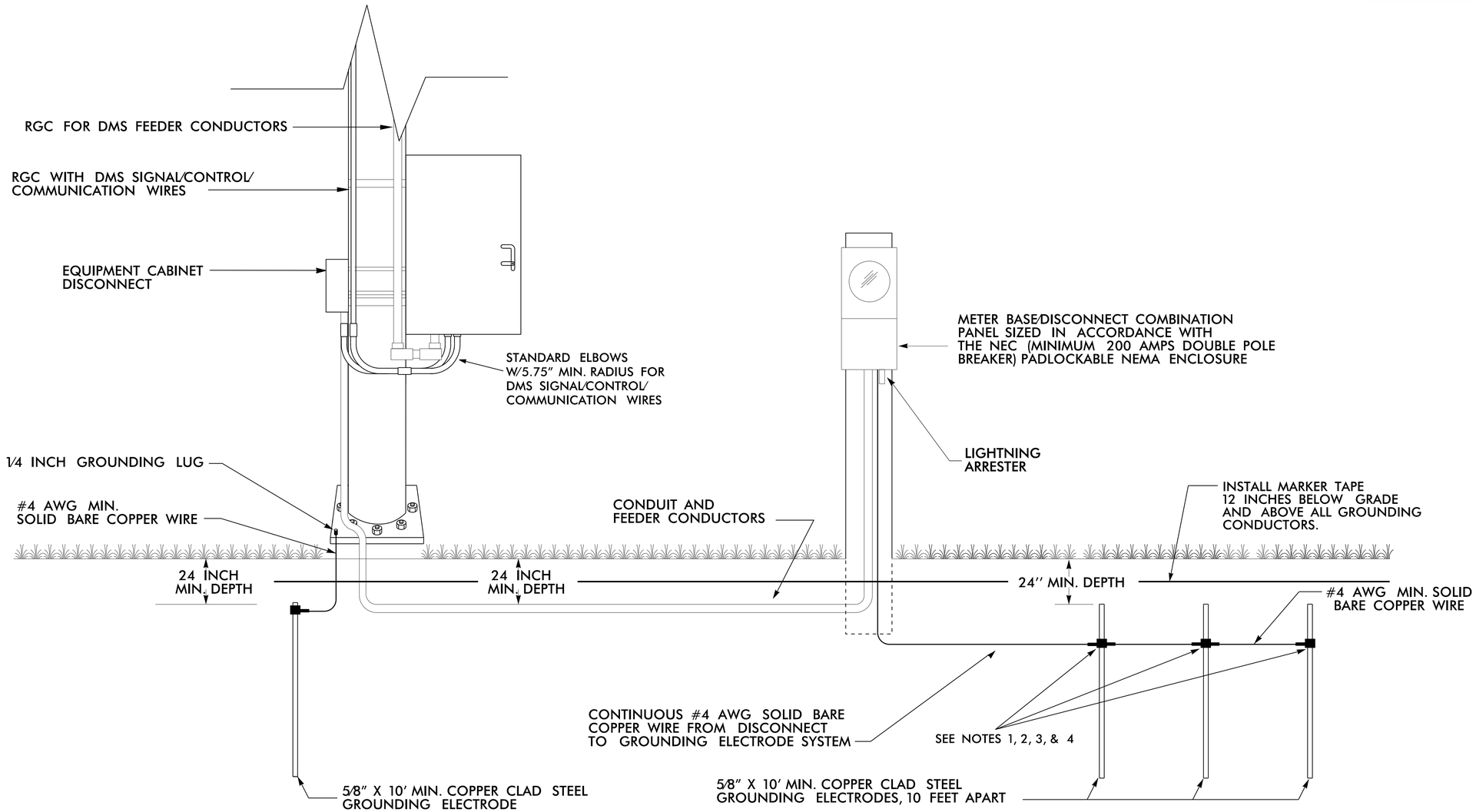

NOTES

1. INSTALL A MINIMUM OF THREE (3) GROUNDING ELECTRODES SPACED A MINIMUM OF 10 FEET APART. ENSURE THAT EXISTING UNDERGROUND FACILITIES ARE NOT DAMAGED DURING INSTALLATION.
2. TEST GROUNDING SYSTEM USING AN APPROVED METHOD. SYSTEM SHOULD MEASURE TWENTY (20) OHMS OR LESS. ADDITIONAL GROUNDING ELECTRODES SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
3. ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERIBLE MECHANICAL CRIMP METHOD.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.
5. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
6. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO "EQUIPMENT GROUND".
7. INSTALL CONDUIT BETWEEN DISCONNECT AND CABINET.
8. ENSURE EQUIPMENT GROUND IS ELECTRICALLY BONDED TO CABINET.

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Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

DYNAMIC MESSAGE SIGN WITH UNDERGROUND ELECTRICAL SERVICE

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
DOCUSIGNED IMAGE SIGNATURE DATE

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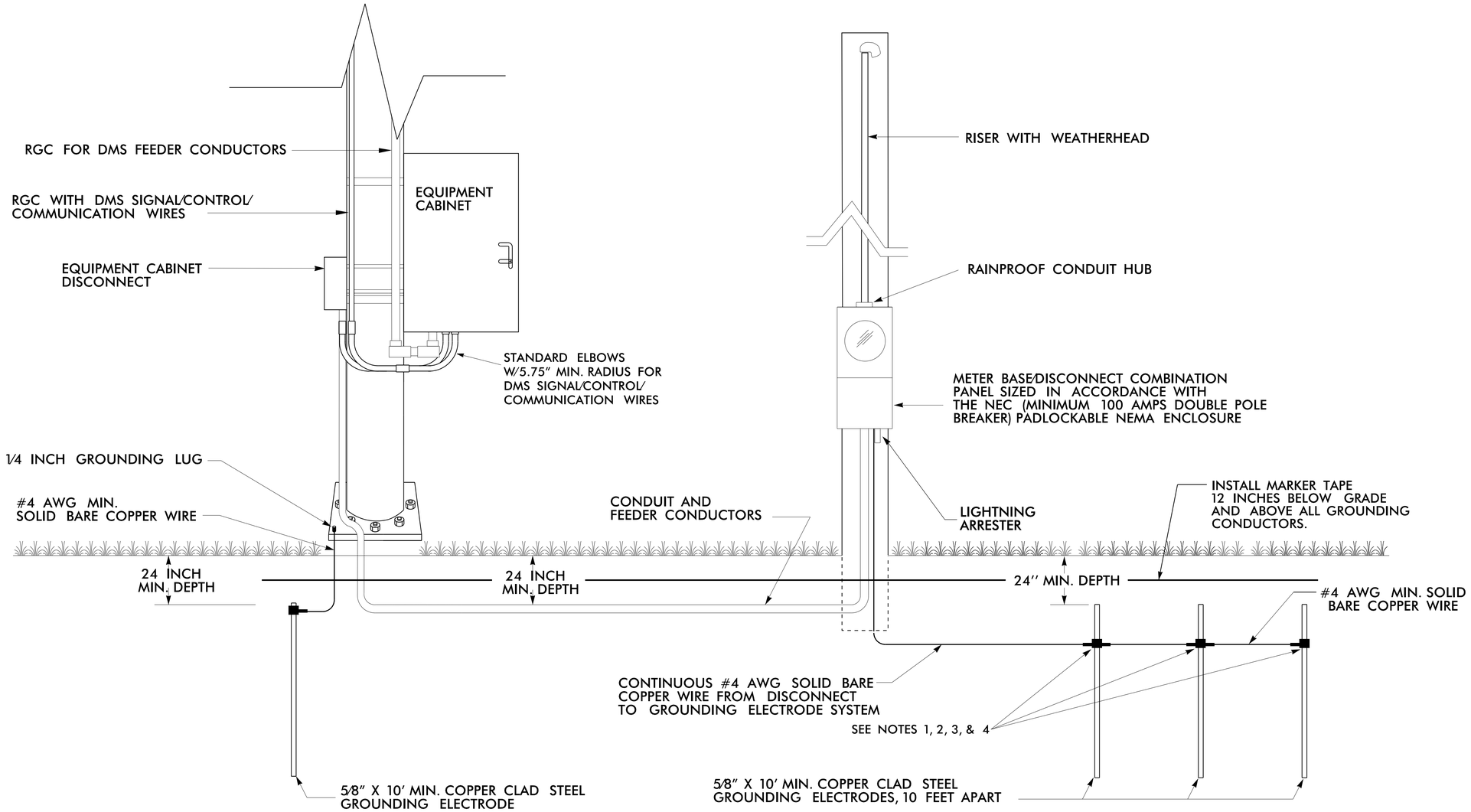

NOTES

1. INSTALL A MINIMUM OF THREE (3) GROUNDING ELECTRODES SPACED A MINIMUM OF 10 FEET APART. ENSURE THAT EXISTING UNDERGROUND FACILITIES ARE NOT DAMAGED DURING INSTALLATION.
2. TEST GROUNDING SYSTEM USING AN APPROVED METHOD. SYSTEM SHOULD MEASURE TWENTY (20) OHMS OR LESS. ADDITIONAL GROUNDING ELECTRODES SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
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6. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO "EQUIPMENT GROUND".
7. INSTALL CONDUIT BETWEEN DISCONNECT AND CABINET.
8. ENSURE EQUIPMENT GROUND IS ELECTRICALLY BONDED TO CABINET.

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Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

DYNAMIC MESSAGE SIGN WITH AERIAL ELECTRICAL SERVICE

DIVISION 10 — MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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SIGNATURE DATE

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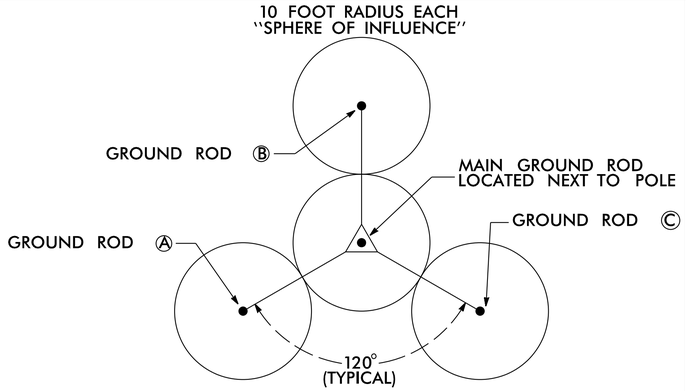
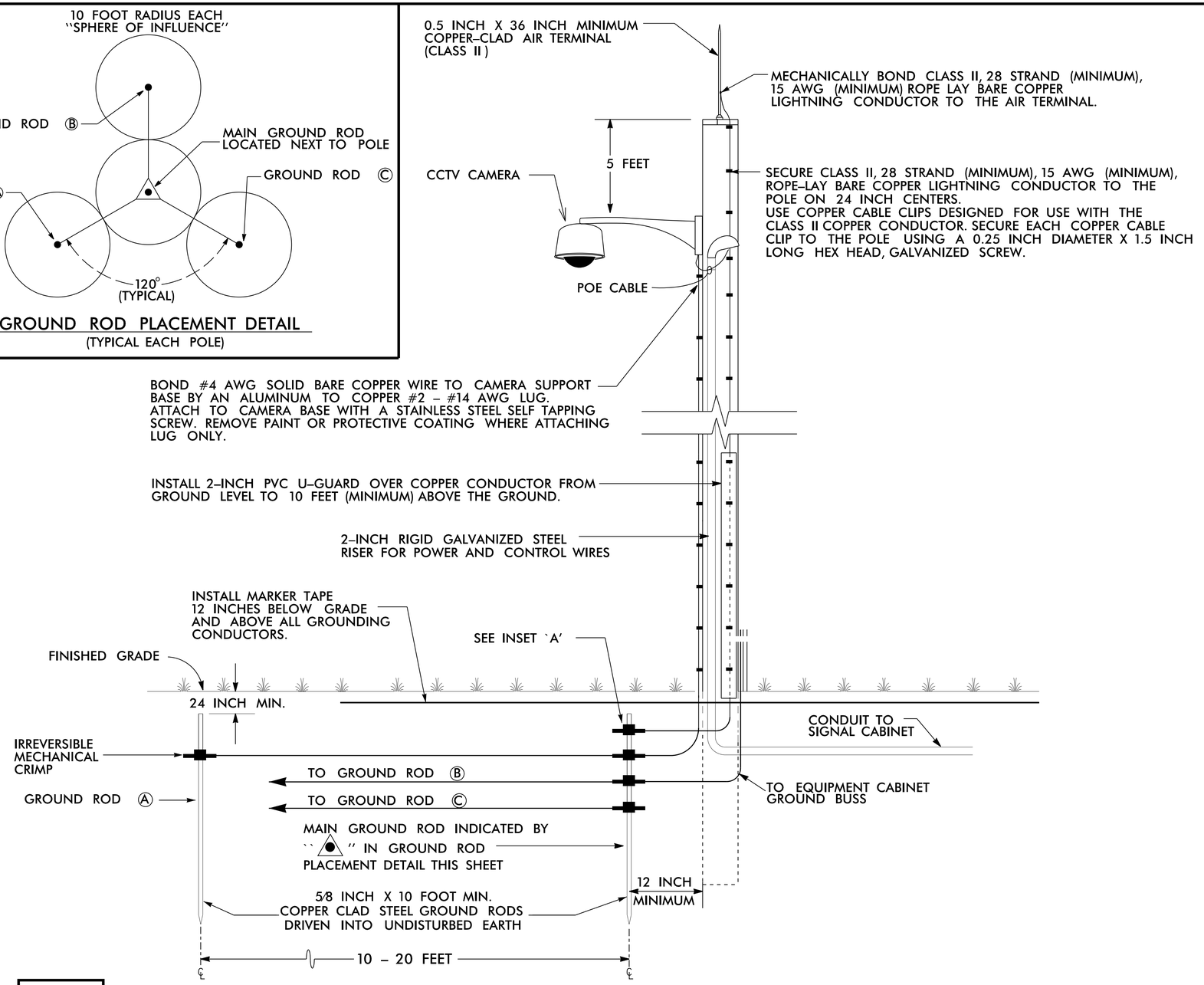


GROUND ROD PLACEMENT DETAIL

(TYPICAL EACH POLE)



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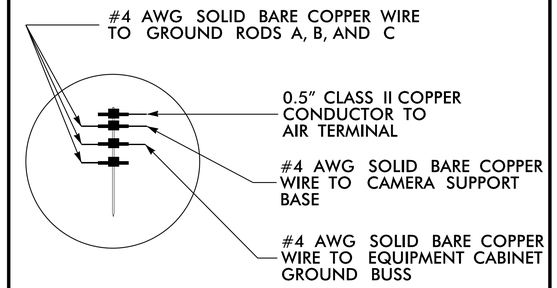
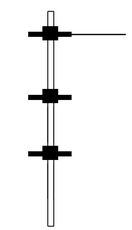


ALTERNATE GROUNDING METHOD

IF SPACE IS NOT AVAILABLE TO DRIVE MULTIPLE RODS, DRIVE SECTIONAL GROUND RODS A MINIMUM OF 30 FEET.



JOIN SECTIONAL GROUND RODS BY IRREVERSIBLE COMPRESSION COUPLER

NOTES

1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE–LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP METHOD MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
2. ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERSIBLE MECHANICAL CRIMP METHOD.
3. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30–FOOT SECTIONAL GROUND ROD FOR INSTANCES WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3 – RADIAL GROUND RODS.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.

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Plans Prepared For: Transportation Mobility and Safety Division · Intelligent Transportation Systems Section · STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

CCTV CAMERA INSTALLATION FOR WOOD POLES WITHOUT ELECTRICAL SERVICE

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

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SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0666F0AB39044DF... 3/26/2019
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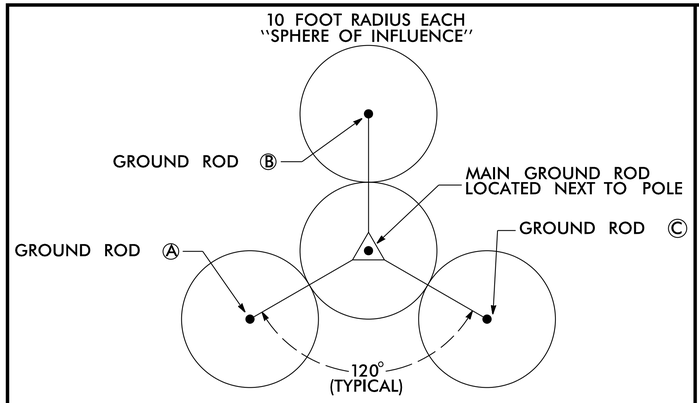
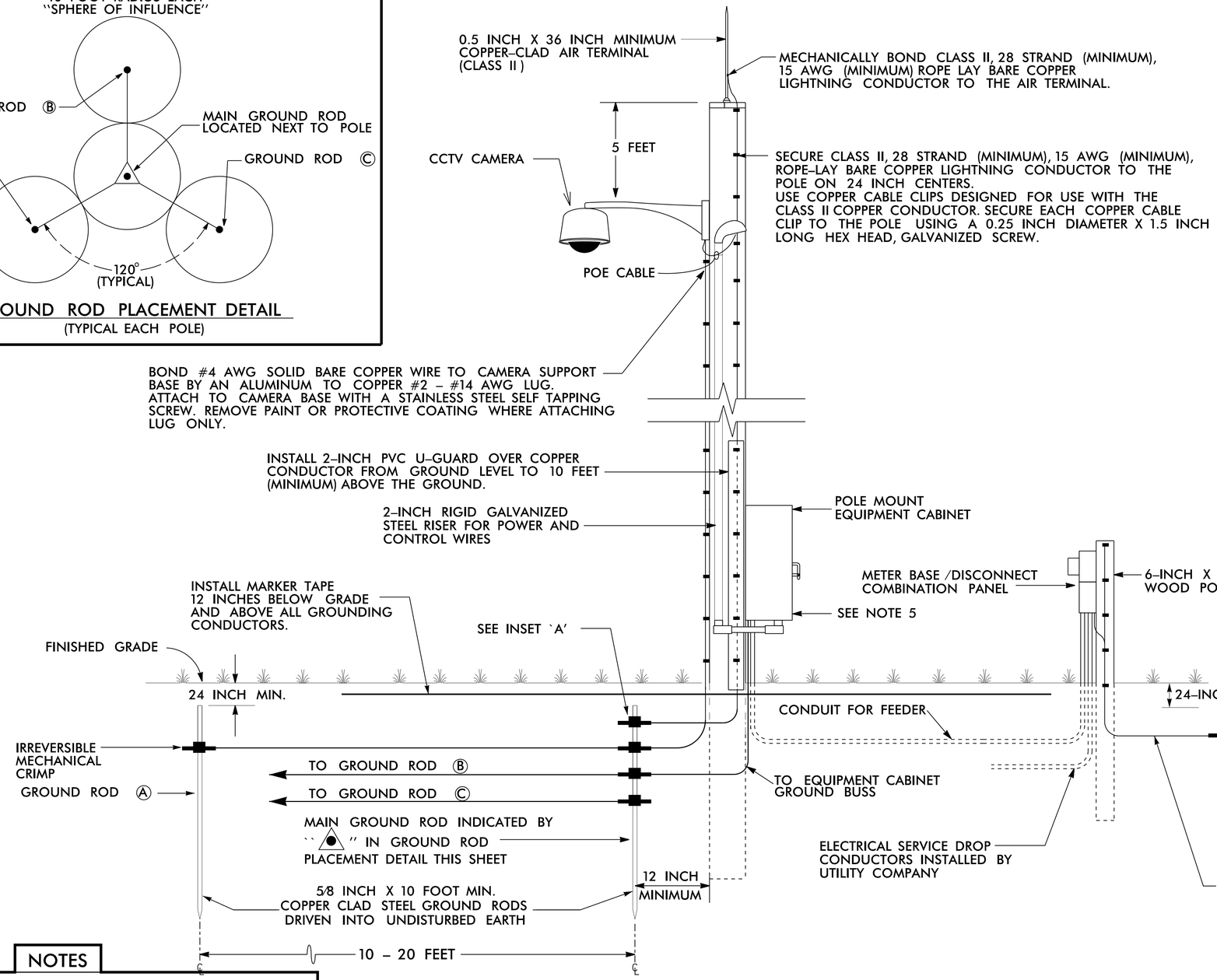


GROUND ROD PLACEMENT DETAIL
(TYPICAL EACH POLE)



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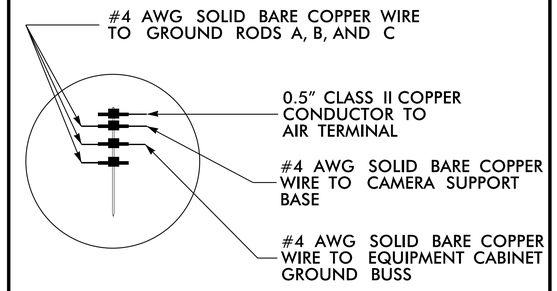
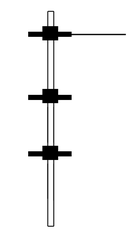


ALTERNATE GROUNDING METHOD

IF SPACE IS NOT AVAILABLE TO DRIVE MULTIPLE RODS, DRIVE SECTIONAL GROUND RODS A MINIMUM OF 30 FEET.



JOIN SECTIONAL GROUND RODS BY IRREVERSIBLE COMPRESSION COUPLER

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1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP METHOD MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
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4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.
5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUSS AND NEUTRAL BUSS.

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Plans Prepared For: Transportation Mobility and Safety Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Intelligent Transportation Systems
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

CCTV CAMERA INSTALLATION FOR WOOD POLES UNDERGROUND ELECTRICAL SERVICE

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
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PROJECT REFERENCE NO.	SHEET NO.
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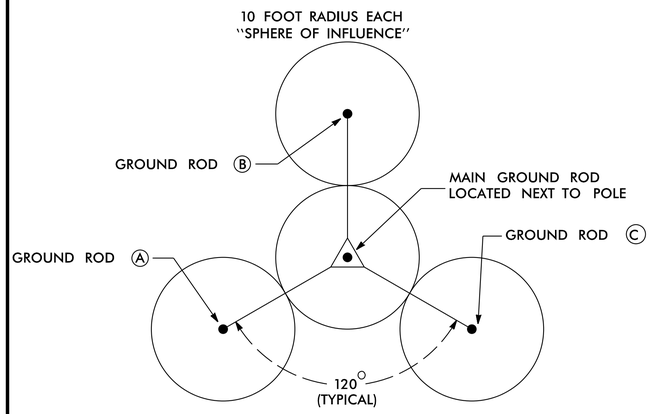
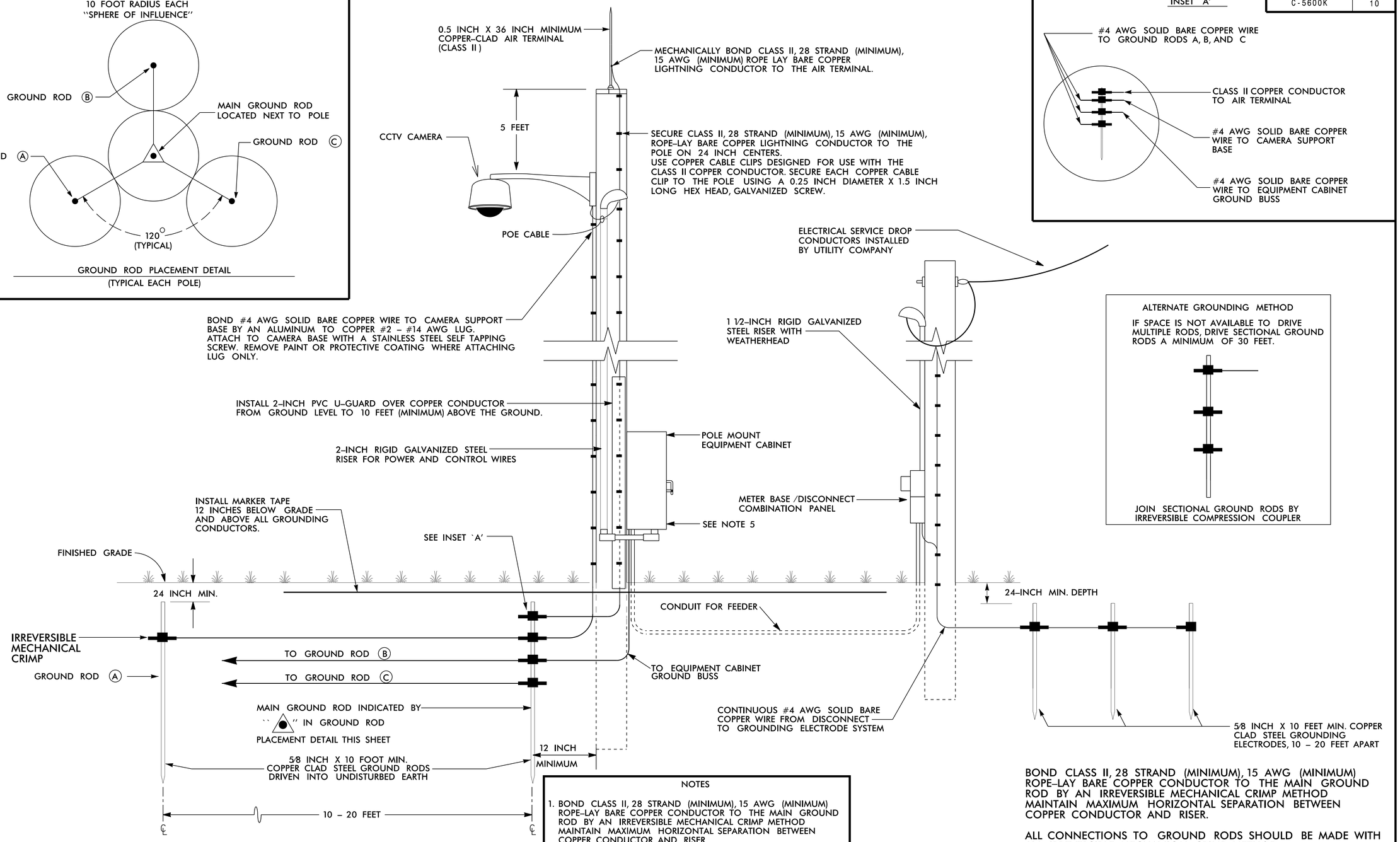


GROUND ROD PLACEMENT DETAIL
(TYPICAL EACH POLE)



NOTES

1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP METHOD MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
2. ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERSIBLE MECHANICAL CRIMP METHOD.
3. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30-FOOT SECTIONAL GROUND ROD FOR INSTANCES WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3 – RADIAL GROUND RODS.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.
5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUSS AND NEUTRAL BUSS.

BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP METHOD MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.

ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERSIBLE MECHANICAL CRIMP METHOD.

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Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Science Section
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

CCTV CAMERA INSTALLATION FOR WOOD POLES AERIAL ELECTRICAL SERVICE

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

SCALE 0

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
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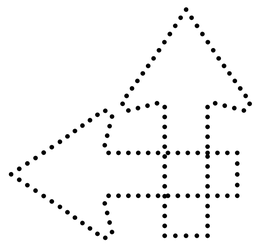
SIGNATURE 3/26/2019 DATE

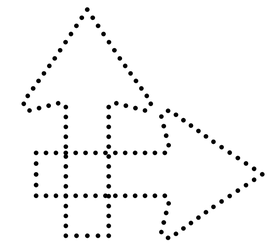
CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0110036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh10.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	11



TYPE 1A SIGN FACE



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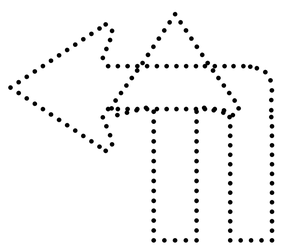

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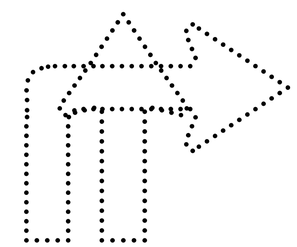

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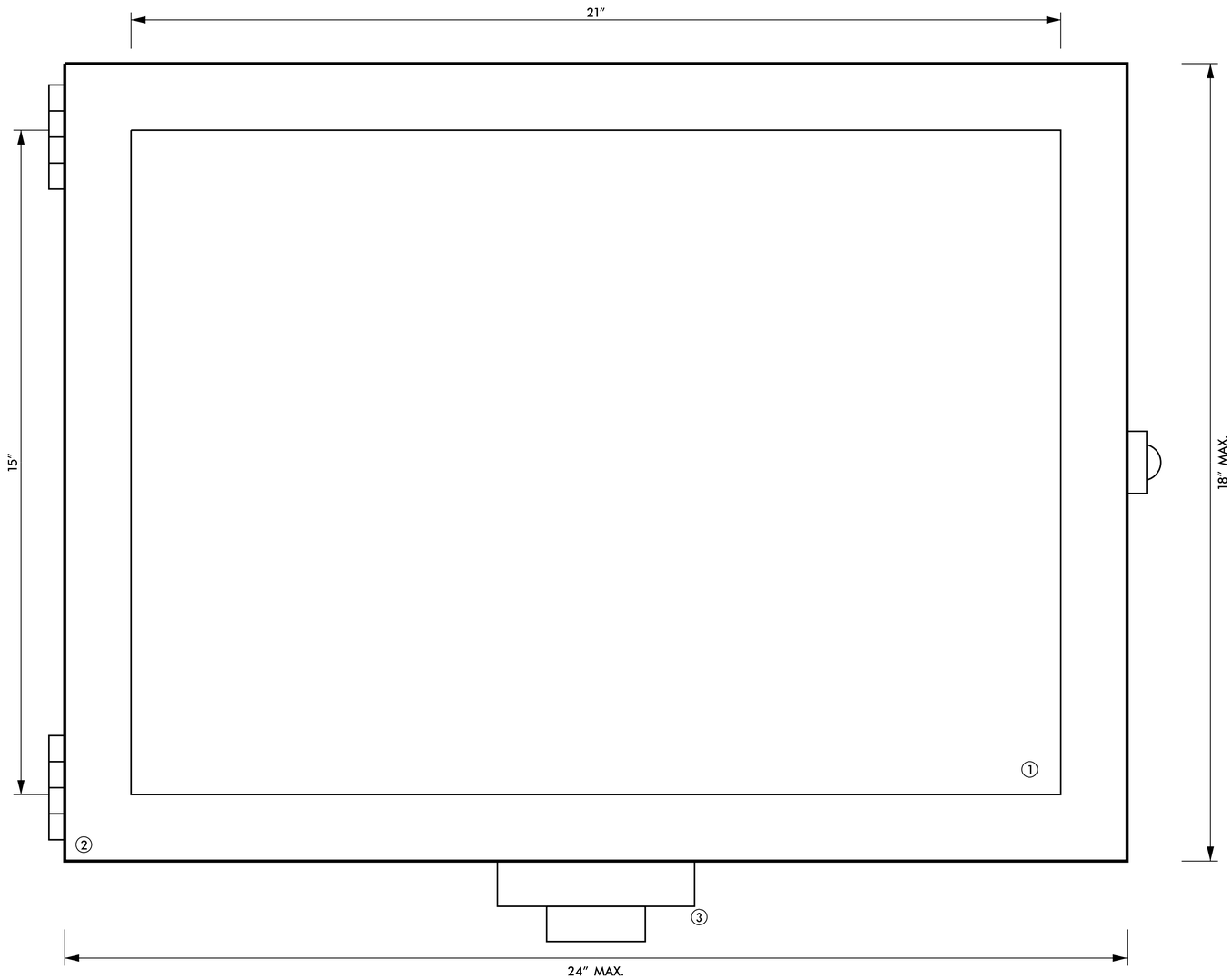

① LED SIGN FACE WITH PHOTOCELL SENSOR

② SIGN ENCLOSURE WITH LOCKABLE FRONT FACE DRAWER

③ OPENING FOR POWER CABLE

3/25/2019
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Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

CHANGEABLE TRAILBLAZER SIGN DETAIL

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by:
Kevin Smith
DESIGNER/ENGINEER SIGNATURE
3/26/2019
DATE

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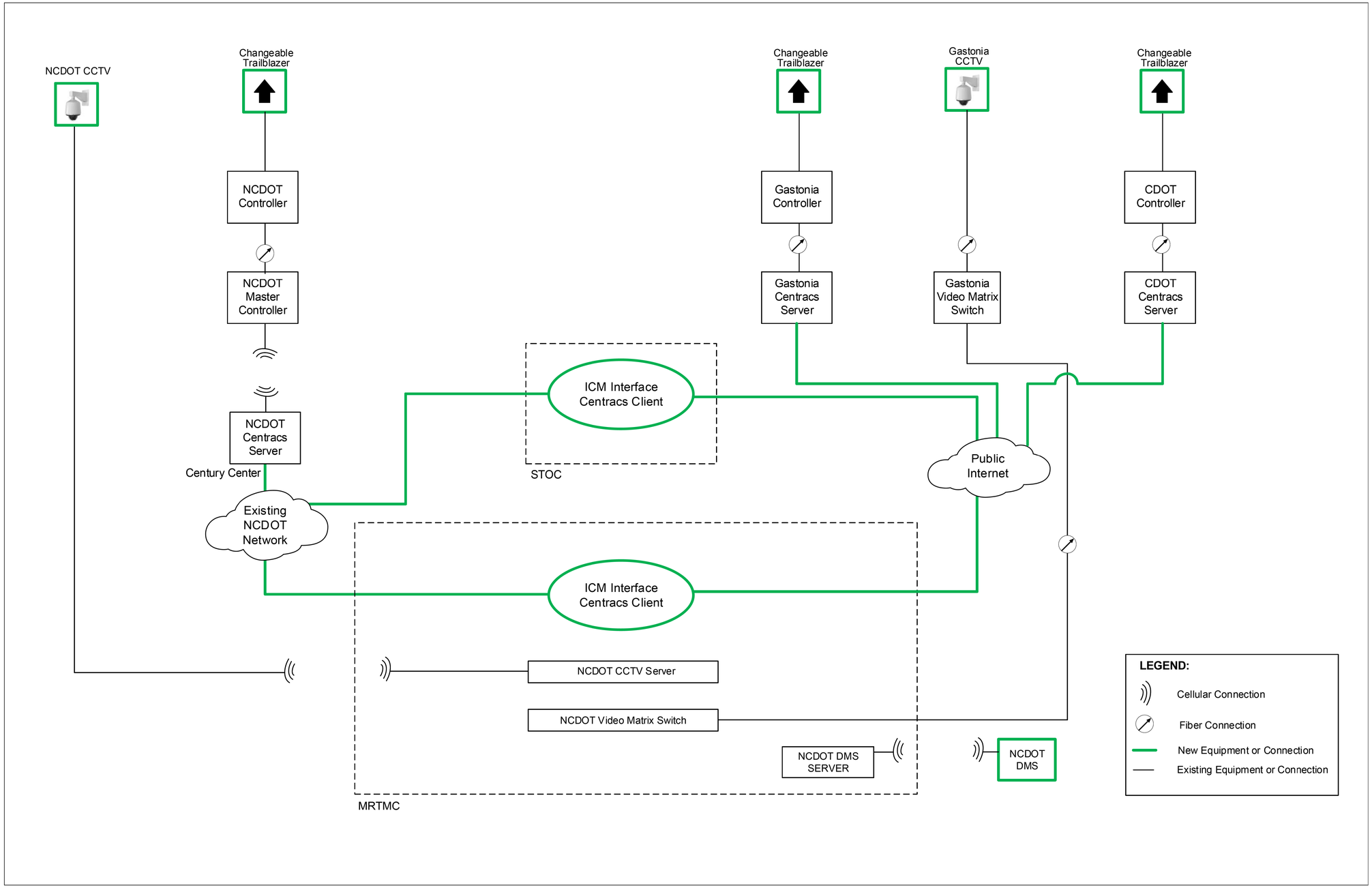
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	12



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

BLOCK DIAGRAM

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

SCALE 0

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
0686E04B380440F
SIGNATURE 3/26/2019 DATE

CADD Filename:

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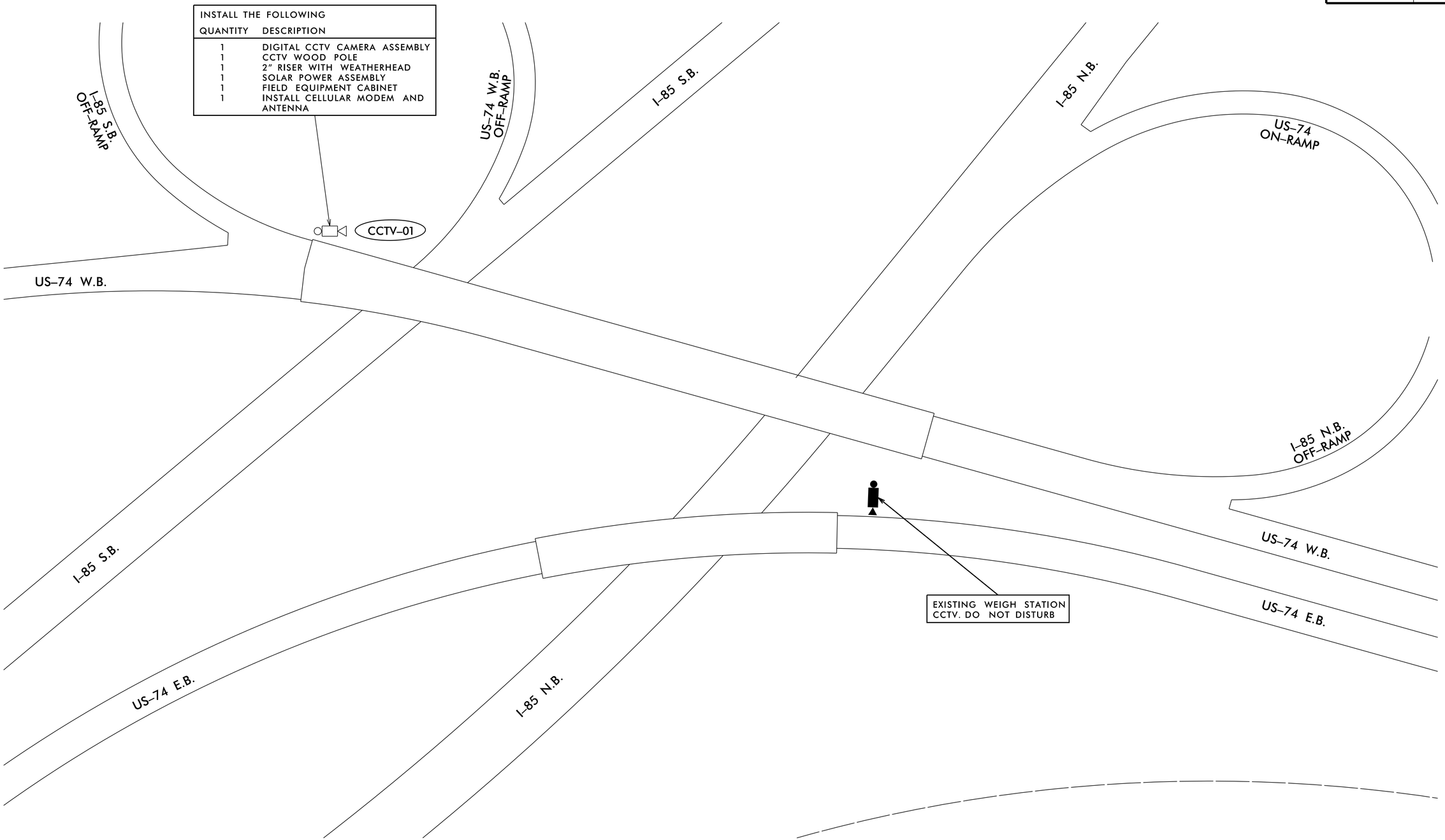
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	13



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	2" RISER WITH WEATHERHEAD
1	SOLAR POWER ASSEMBLY
1	FIELD EQUIPMENT CABINET
1	INSTALL CELLULAR MODEM AND ANTENNA

3/25/2019
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Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

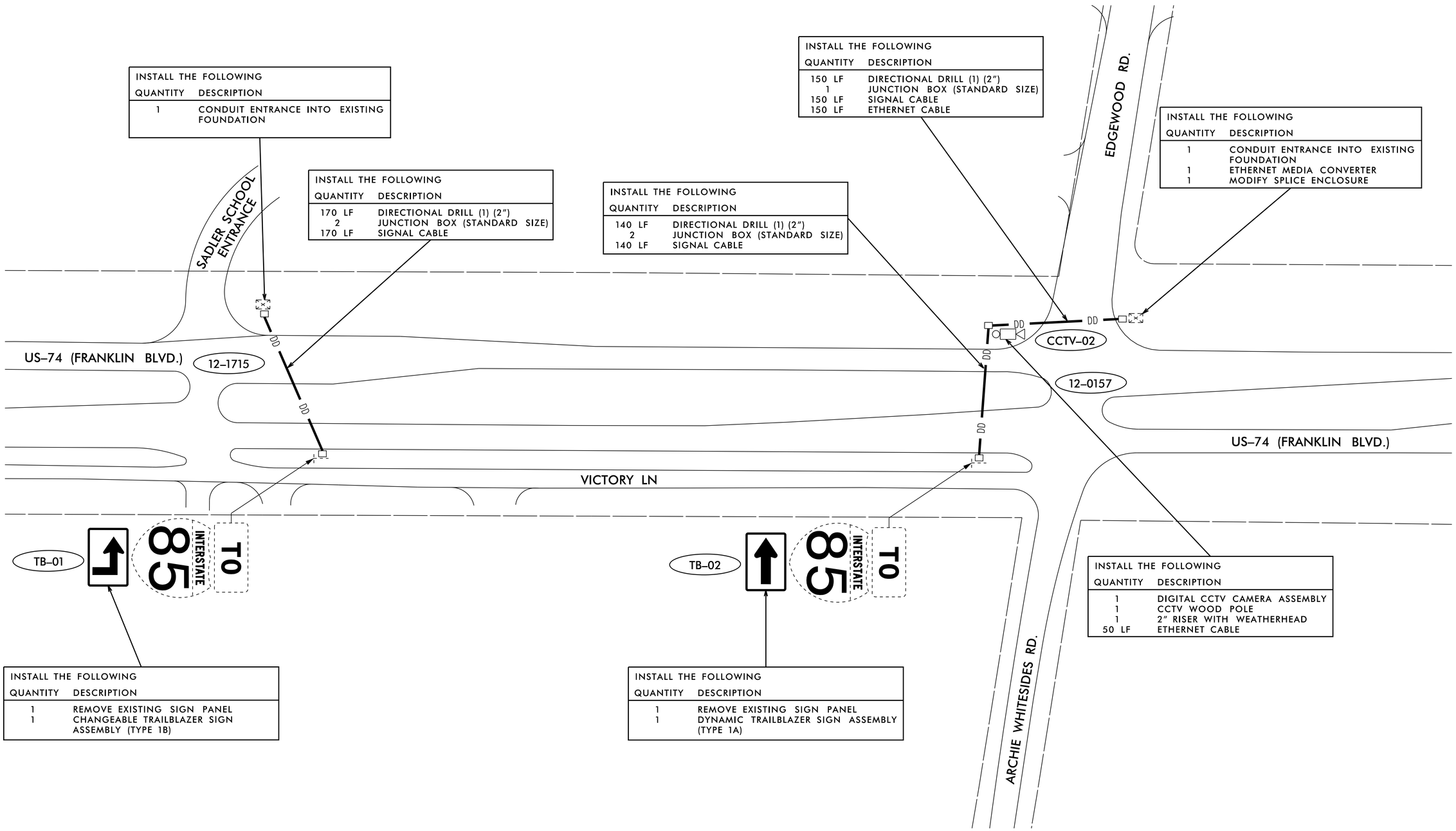
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by:
Kevin Smith
7B9BFDA9B9D4A0F...
3/26/2019
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	14



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
170 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
170 LF	SIGNAL CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
140 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
140 LF	SIGNAL CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
150 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
150 LF	SIGNAL CABLE
150 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
1	ETHERNET MEDIA CONVERTER
1	MODIFY SPLICE ENCLOSURE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	2" RISER WITH WEATHERHEAD
50 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	DYNAMIC TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
0686E0483804400
SIGNATURE DATE

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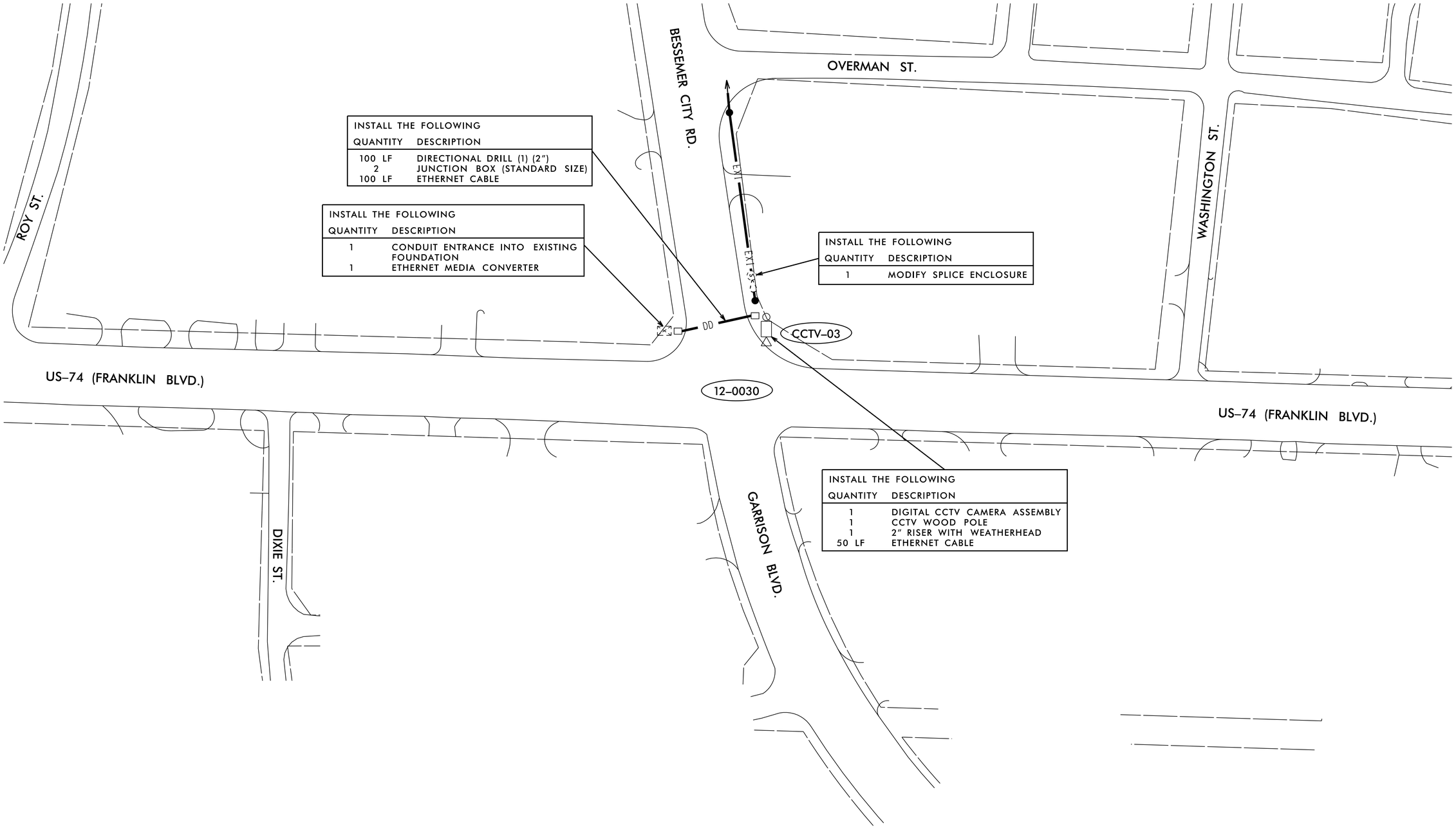

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
100 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
100 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
1	ETHERNET MEDIA CONVERTER

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	2" RISER WITH WEATHERHEAD
50 LF	ETHERNET CABLE

3/25/2019
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Mobility and Safety Division
Transportation Planning Division
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SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0666F0483D0A0F 3/26/2019
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PROJECT REFERENCE NO.	SHEET NO.
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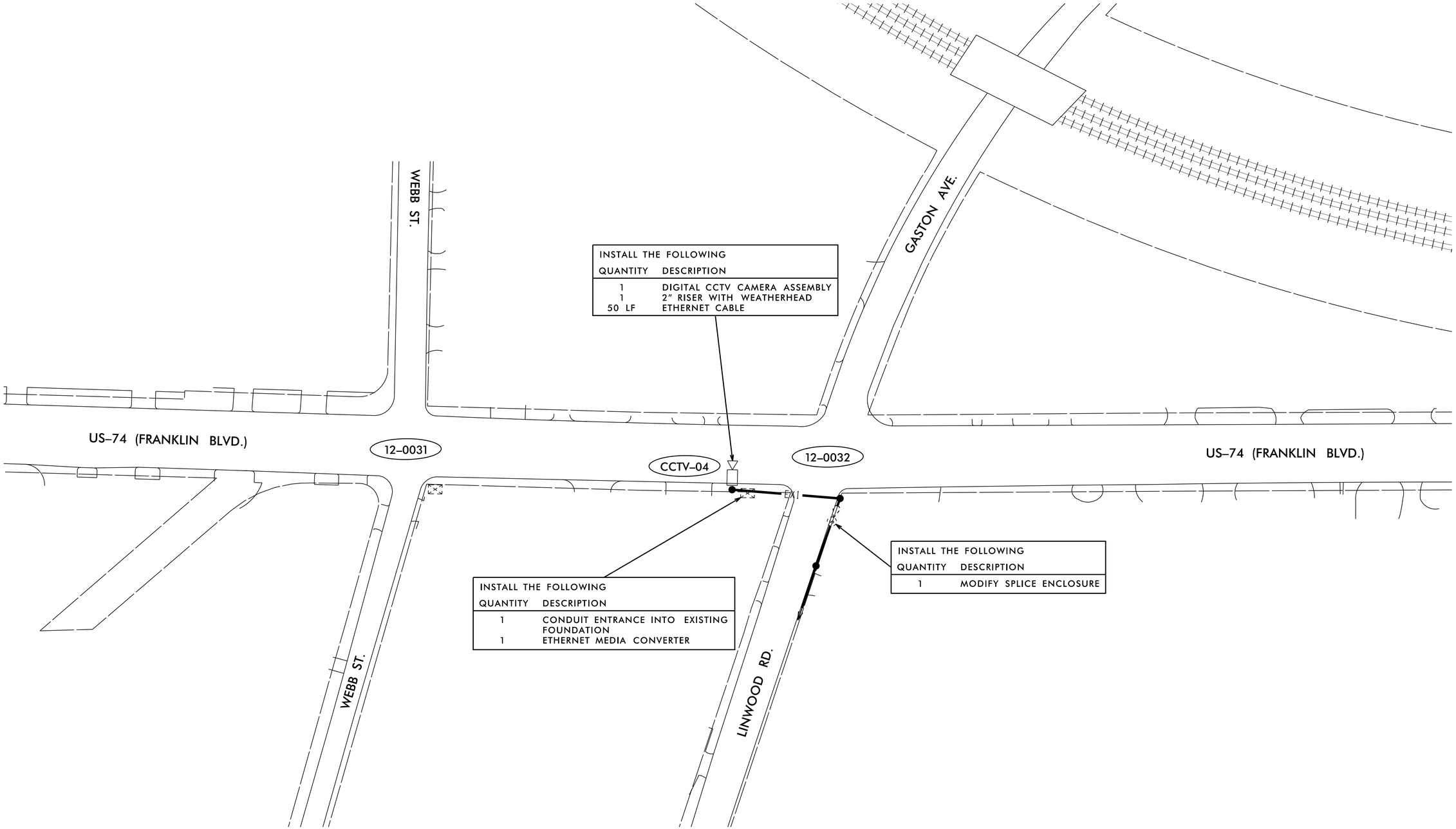

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	2" RISER WITH WEATHERHEAD
50 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
1	ETHERNET MEDIA CONVERTER

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0886E04B3B0440F... 3/26/2019
SIGNATURE DATE

CADD Filename:

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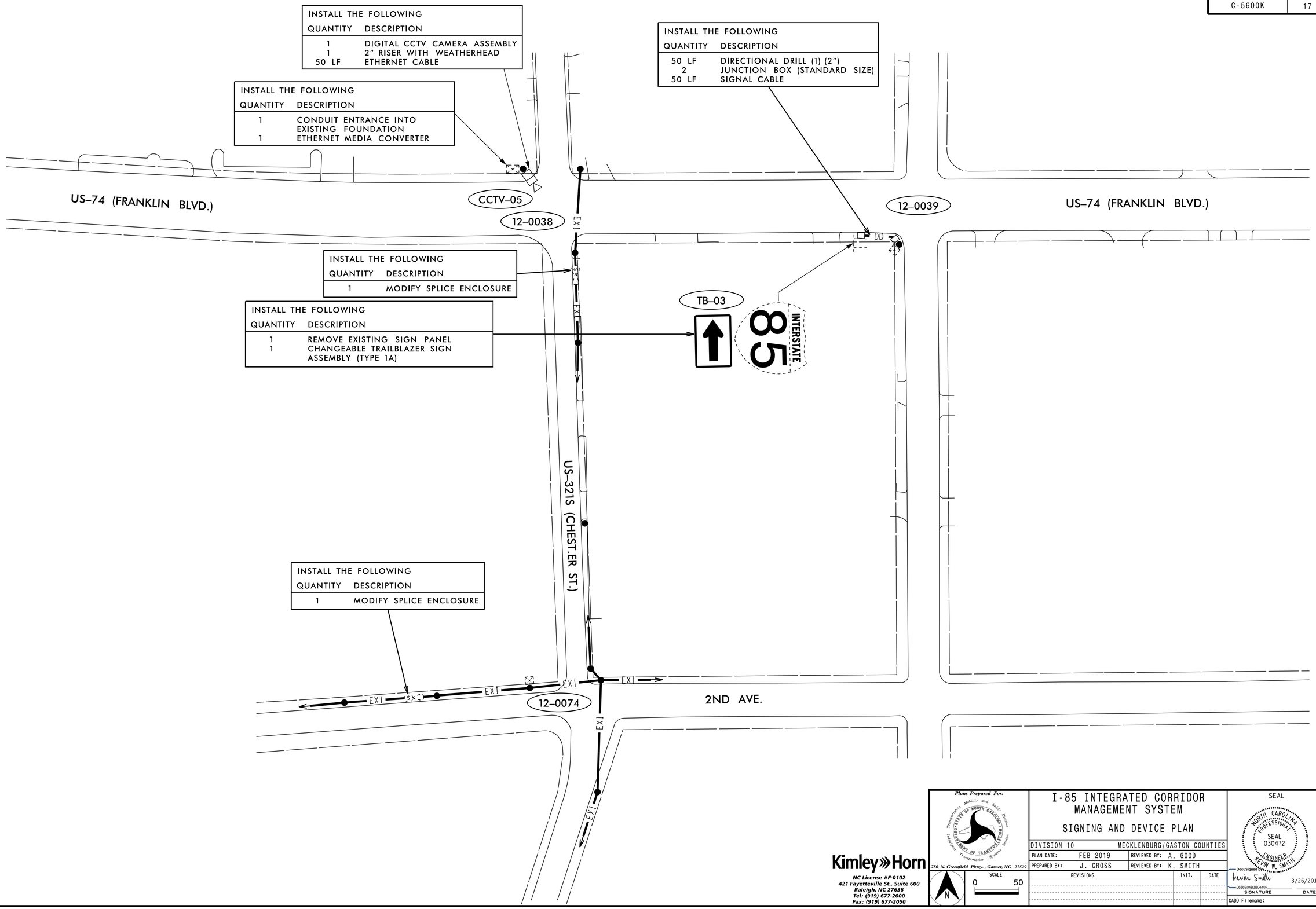
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	17



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	2" RISER WITH WEATHERHEAD
50 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
1	ETHERNET MEDIA CONVERTER

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
50 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
50 LF	SIGNAL CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

Plans Prepared For:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Science Section
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SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
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SIGNATURE 3/26/2019 DATE

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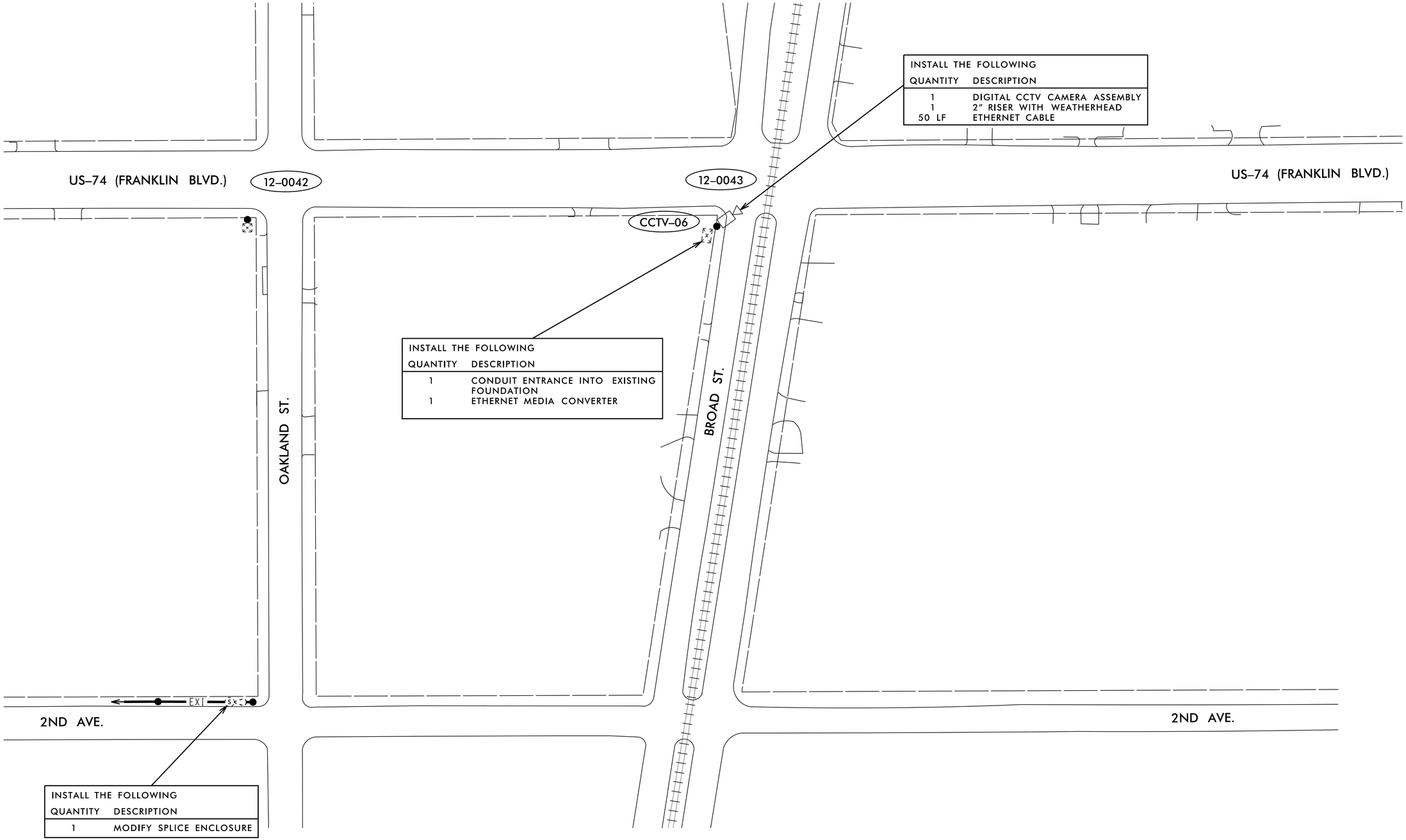

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	2" RISER WITH WEATHERHEAD
50 LF	ETHERNET CABLE

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
1	ETHERNET MEDIA CONVERTER

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

3/25/2019
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Intermodal Transportation Revenue Bonds
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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PROJECT REFERENCE NO.	SHEET NO.
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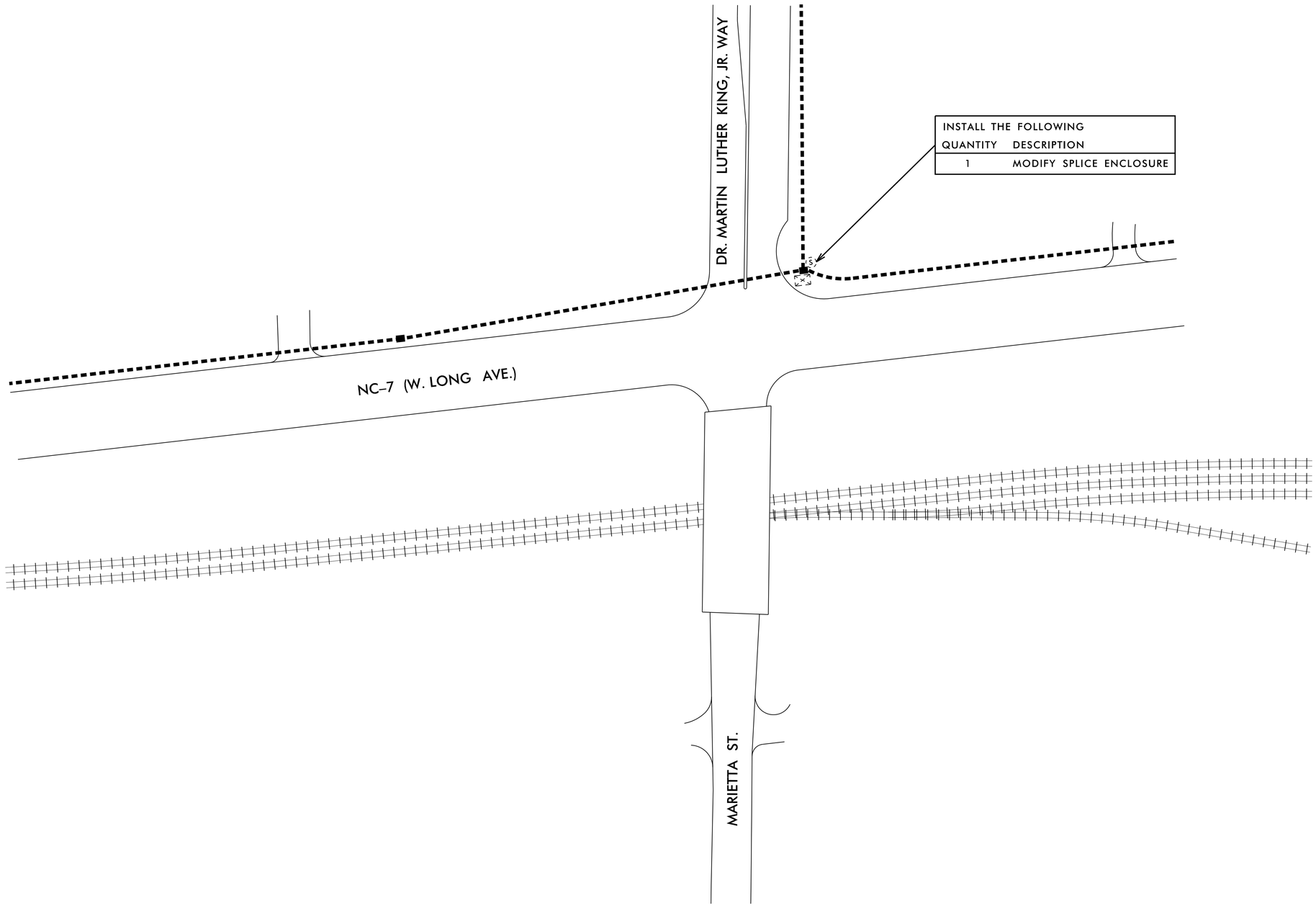

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	MODIFY SPLICE ENCLOSURE

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Plans Prepared For:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

N

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
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SIGNATURE 3/26/2019 DATE

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3/26/2019
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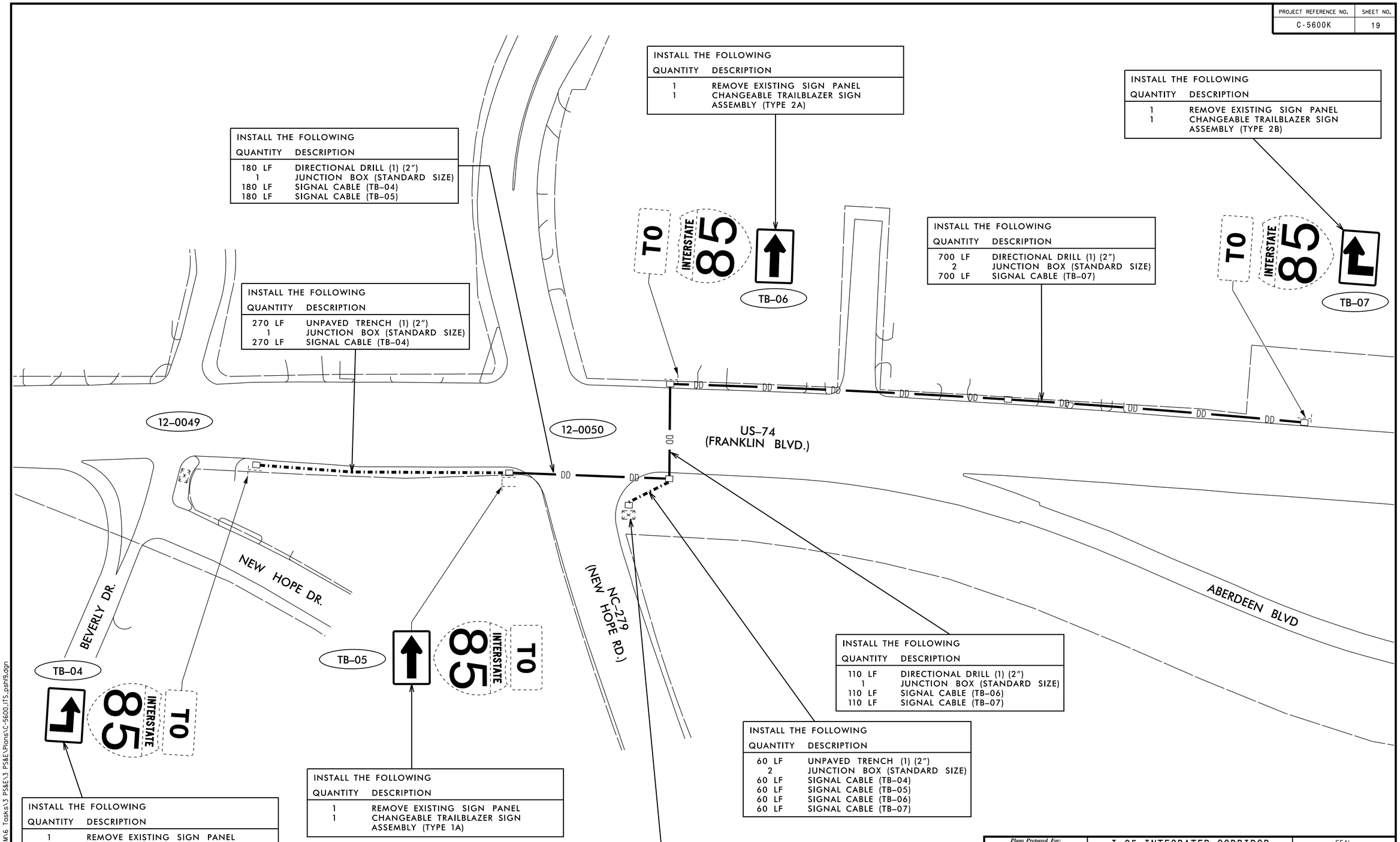
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	19



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
180 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
180 LF	SIGNAL CABLE (TB-04)
180 LF	SIGNAL CABLE (TB-05)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
270 LF	UNPAVED TRENCH (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
270 LF	SIGNAL CABLE (TB-04)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
700 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
700 LF	SIGNAL CABLE (TB-07)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
110 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
110 LF	SIGNAL CABLE (TB-06)
110 LF	SIGNAL CABLE (TB-07)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
60 LF	UNPAVED TRENCH (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
60 LF	SIGNAL CABLE (TB-04)
60 LF	SIGNAL CABLE (TB-05)
60 LF	SIGNAL CABLE (TB-06)
60 LF	SIGNAL CABLE (TB-07)

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Mobility and Safety Division
Intermodal Transportation Revenue Sharing
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

SCALE 0 50

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
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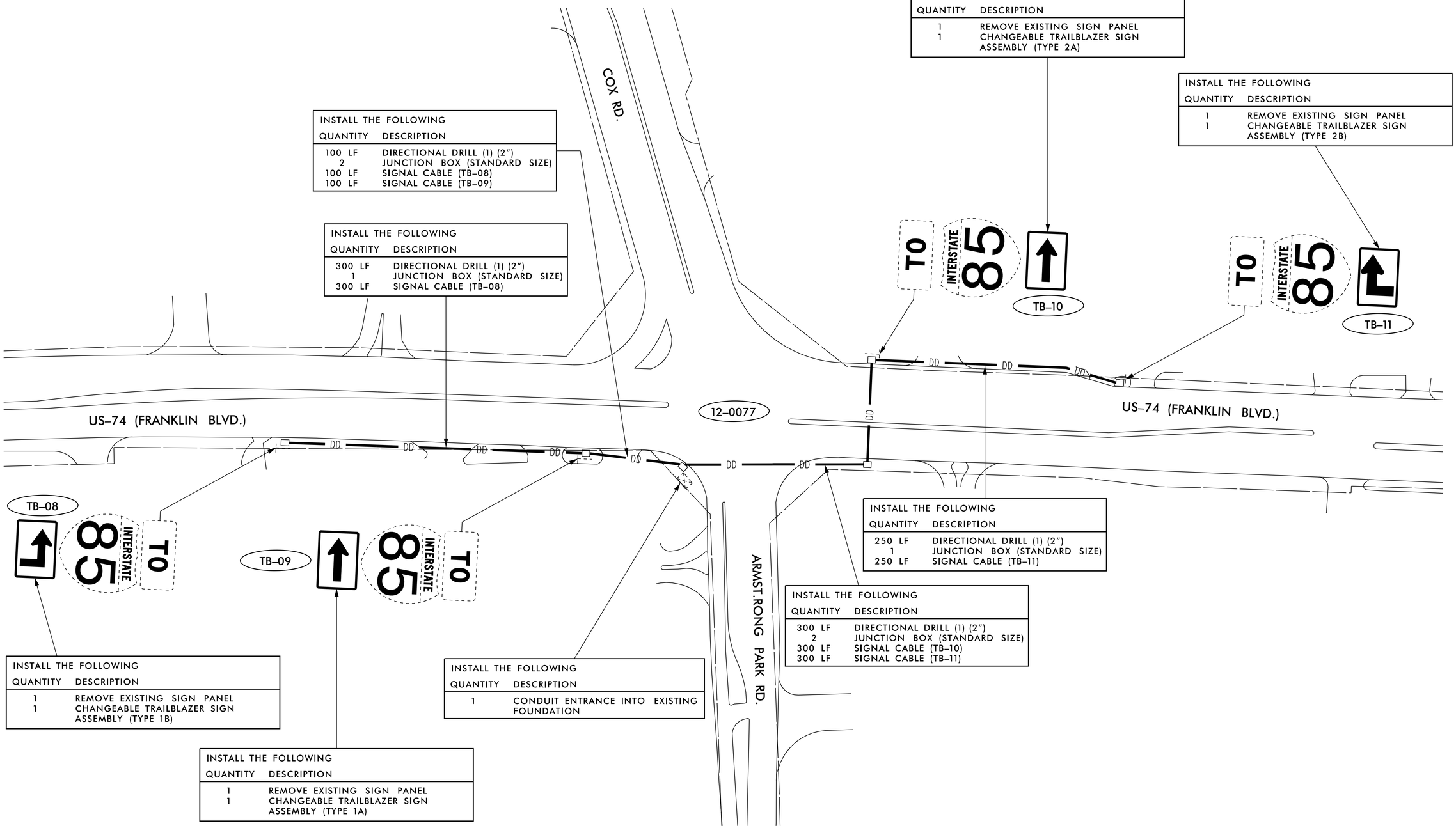
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	20



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
100 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
100 LF	SIGNAL CABLE (TB-08)
100 LF	SIGNAL CABLE (TB-09)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
300 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
300 LF	SIGNAL CABLE (TB-08)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
250 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
250 LF	SIGNAL CABLE (TB-11)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
300 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
300 LF	SIGNAL CABLE (TB-10)
300 LF	SIGNAL CABLE (TB-11)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE: FEB 2019	REVIEWED BY: A. GOOD		
PREPARED BY: J. CROSS	REVIEWED BY: K. SMITH		

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
DocuSigned by: Kevin Smith 3/26/2019
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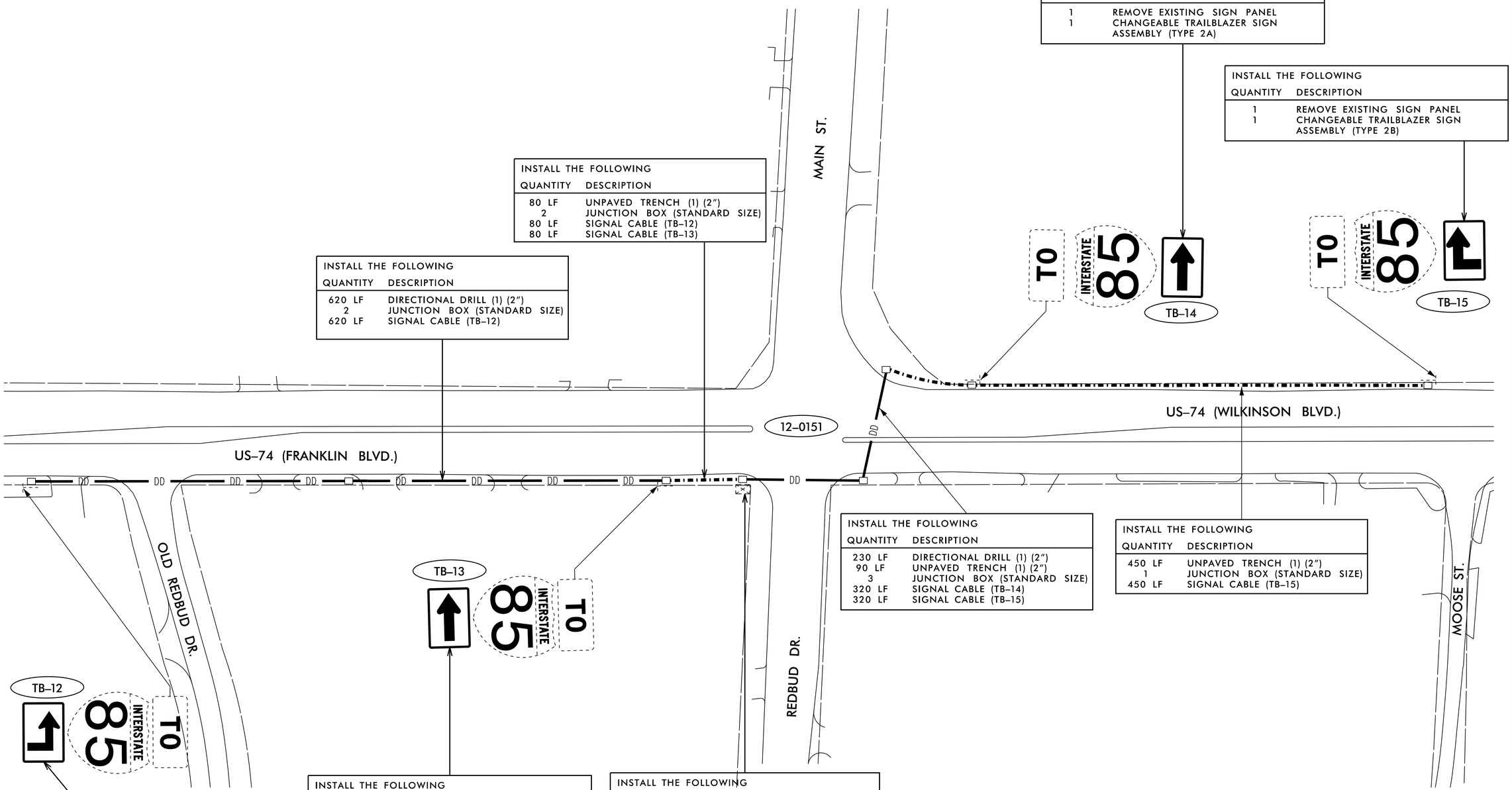
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	21



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
80 LF	UNPAVED TRENCH (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
80 LF	SIGNAL CABLE (TB-12)
80 LF	SIGNAL CABLE (TB-13)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
620 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
620 LF	SIGNAL CABLE (TB-12)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
230 LF	DIRECTIONAL DRILL (1) (2")
90 LF	UNPAVED TRENCH (1) (2")
3	JUNCTION BOX (STANDARD SIZE)
320 LF	SIGNAL CABLE (TB-14)
320 LF	SIGNAL CABLE (TB-15)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
450 LF	UNPAVED TRENCH (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
450 LF	SIGNAL CABLE (TB-15)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Mobility and Safety Division
Transportation Management Unit
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

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REVISIONS	INIT.	DATE

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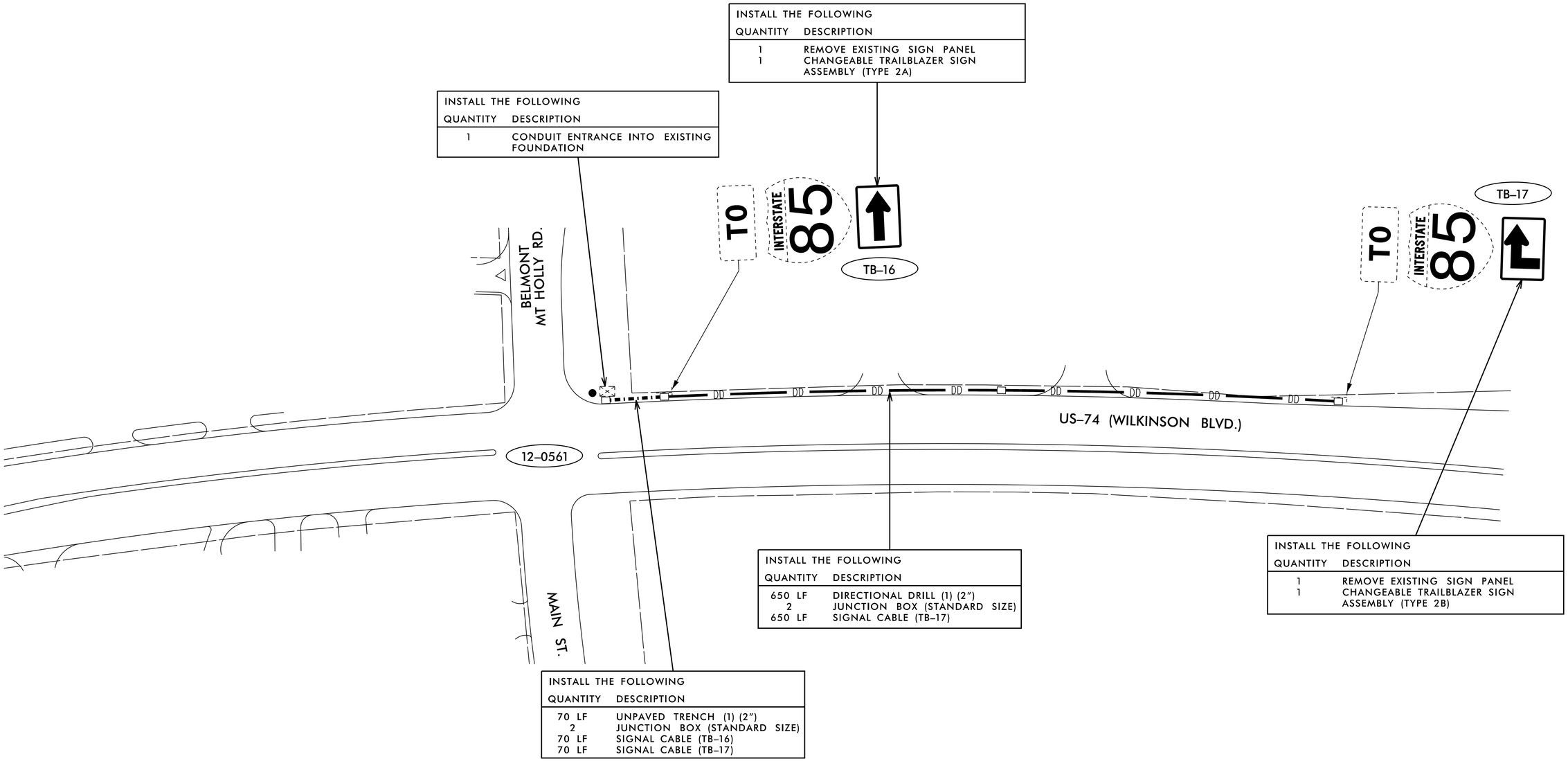
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	22



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Transportation Mobility and Safety Division
Intermodal Transportation Systems Section
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SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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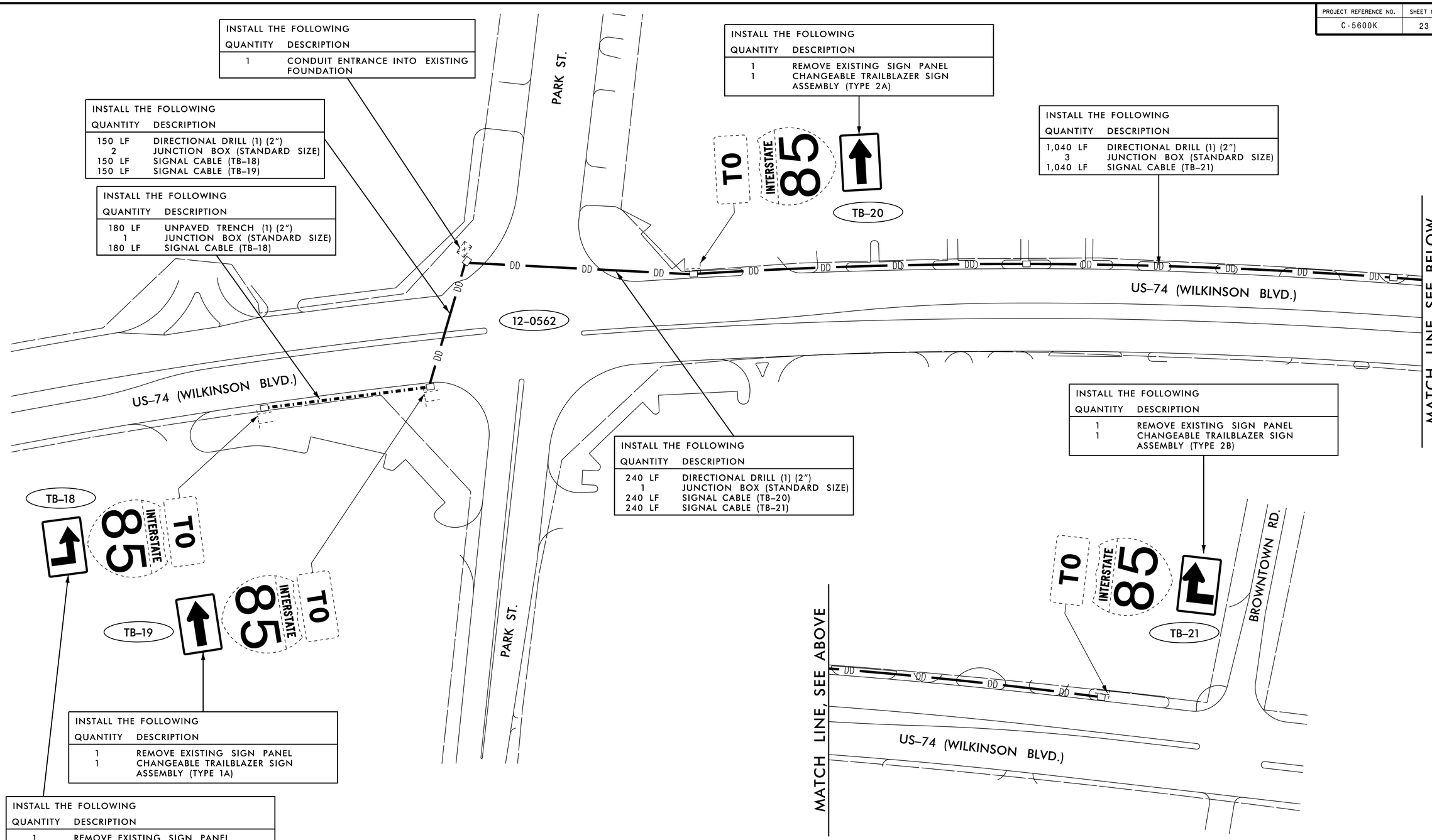
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	23



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
150 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
150 LF	SIGNAL CABLE (TB-18)
150 LF	SIGNAL CABLE (TB-19)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
180 LF	UNPAVED TRENCH (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
180 LF	SIGNAL CABLE (TB-18)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1,040 LF	DIRECTIONAL DRILL (1) (2")
3	JUNCTION BOX (STANDARD SIZE)
1,040 LF	SIGNAL CABLE (TB-21)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
240 LF	DIRECTIONAL DRILL (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
240 LF	SIGNAL CABLE (TB-20)
240 LF	SIGNAL CABLE (TB-21)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2B)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Science Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
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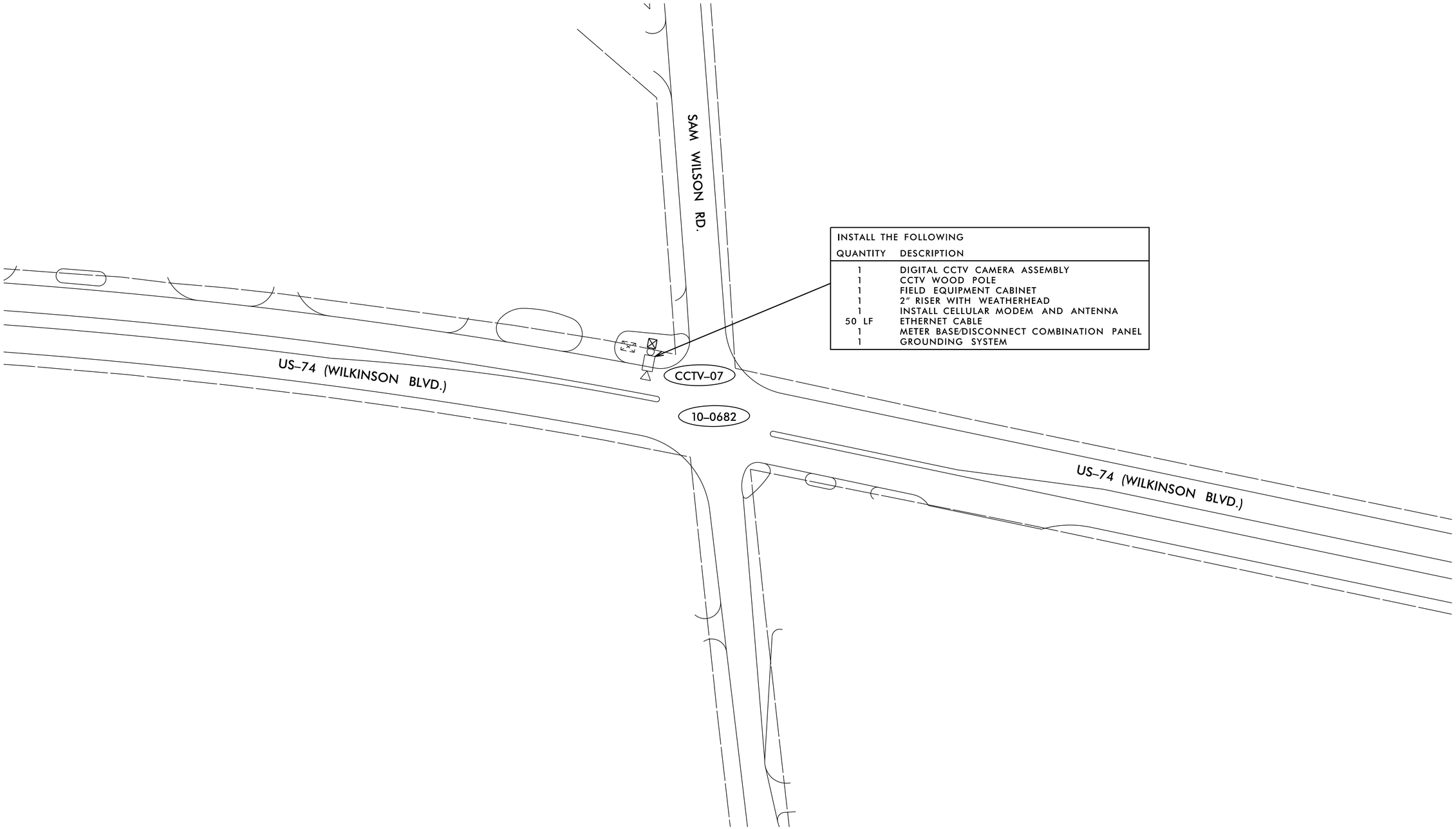
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	24



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	FIELD EQUIPMENT CABINET
1	2" RISER WITH WEATHERHEAD
1	INSTALL CELLULAR MODEM AND ANTENNA
50 LF	ETHERNET CABLE
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM

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750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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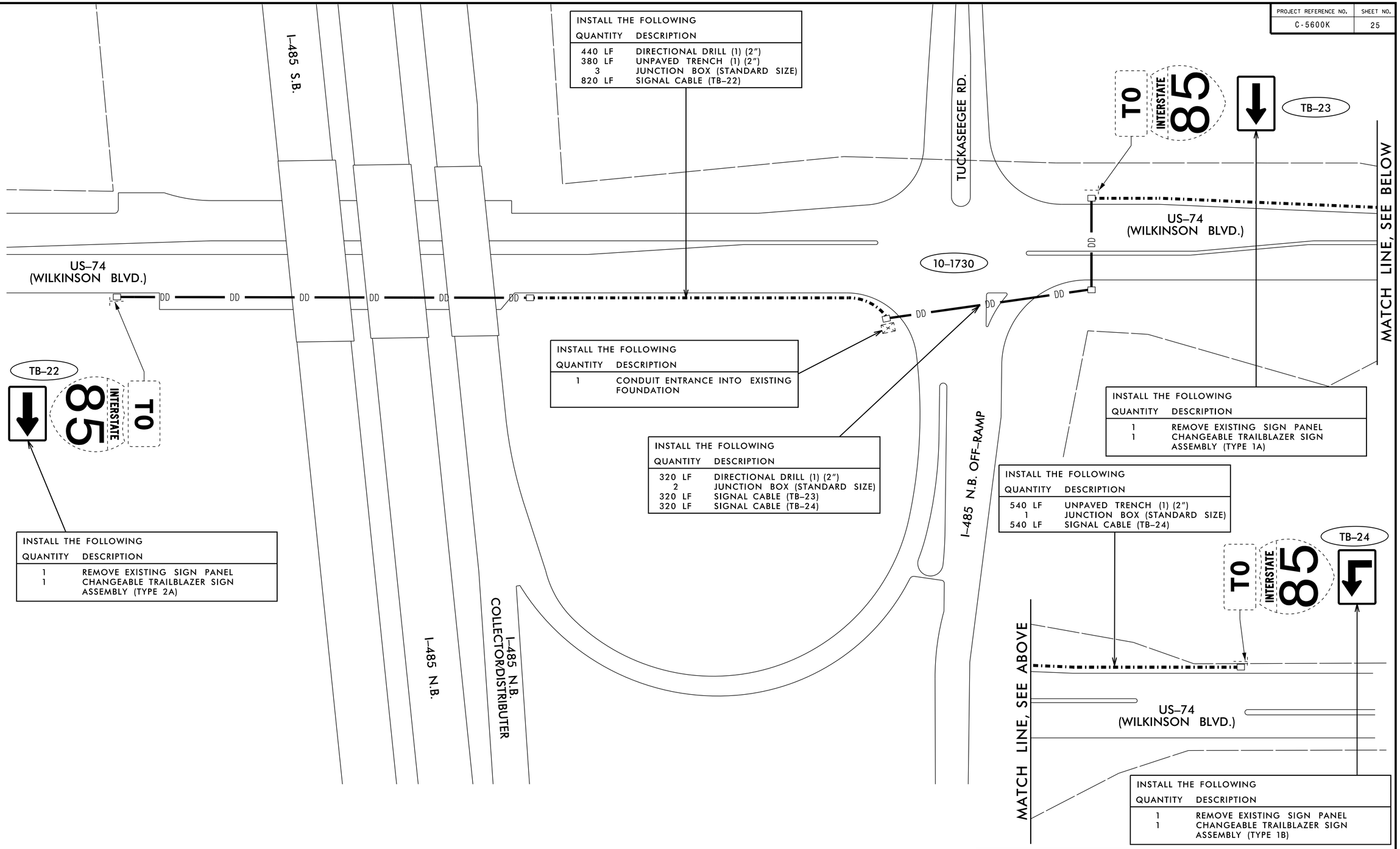
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	25



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
440 LF	DIRECTIONAL DRILL (1) (2")
380 LF	UNPAVED TRENCH (1) (2")
3	JUNCTION BOX (STANDARD SIZE)
820 LF	SIGNAL CABLE (TB-22)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	CONDUIT ENTRANCE INTO EXISTING FOUNDATION

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
320 LF	DIRECTIONAL DRILL (1) (2")
2	JUNCTION BOX (STANDARD SIZE)
320 LF	SIGNAL CABLE (TB-23)
320 LF	SIGNAL CABLE (TB-24)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
540 LF	UNPAVED TRENCH (1) (2")
1	JUNCTION BOX (STANDARD SIZE)
540 LF	SIGNAL CABLE (TB-24)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 2A)

INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	REMOVE EXISTING SIGN PANEL
1	CHANGEABLE TRAILBLAZER SIGN ASSEMBLY (TYPE 1B)

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Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10	MECKLENBURG/GASTON COUNTIES	
PLAN DATE: FEB 2019	REVIEWED BY: A. GOOD	
PREPARED BY: J. CROSS	REVIEWED BY: K. SMITH	

SCALE 0 50

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
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SIGNATURE 3/26/2019
DATE

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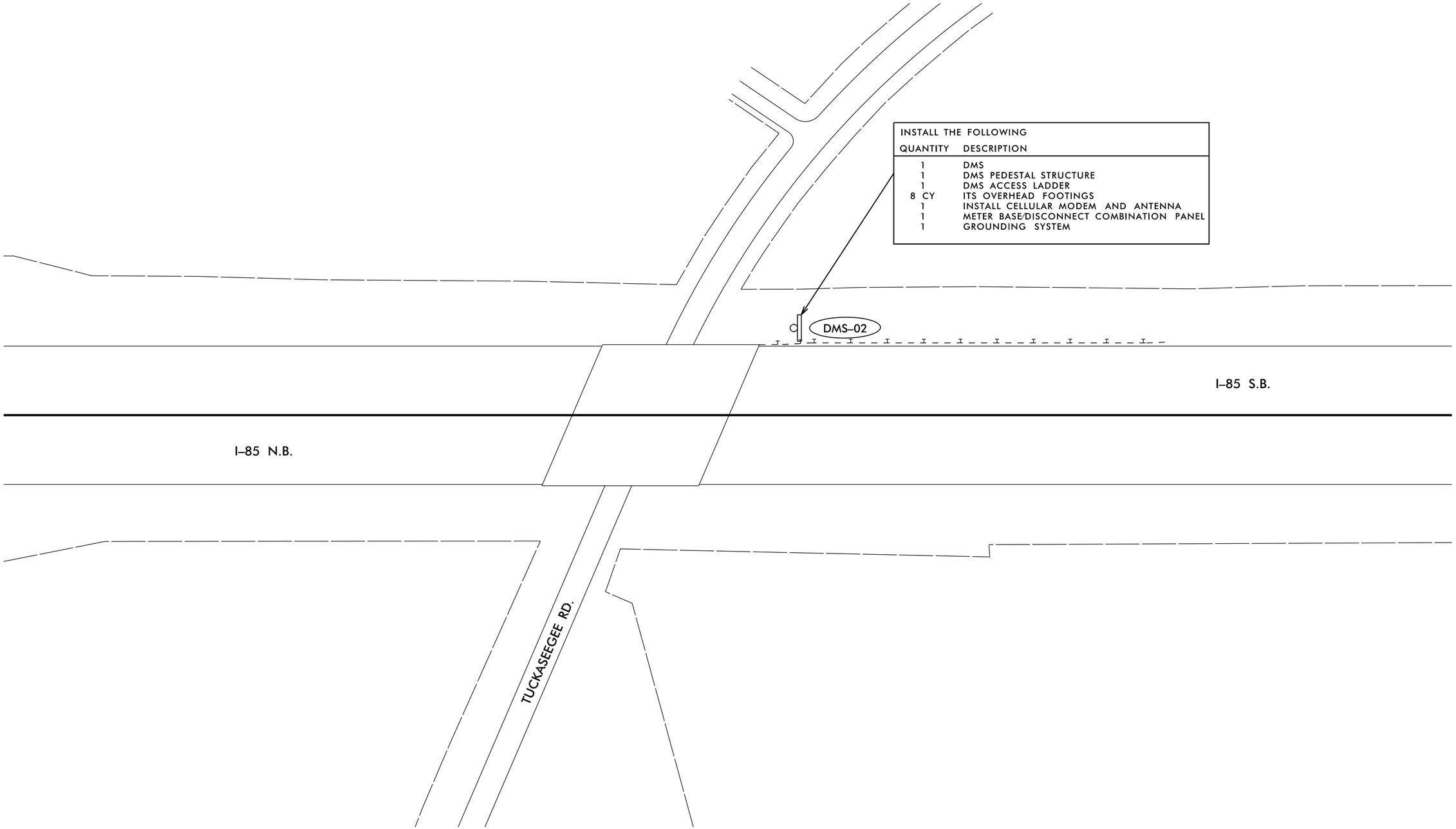
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	26



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DMS
1	DMS PEDESTAL STRUCTURE
1	DMS ACCESS LADDER
8 CY	ITS OVERHEAD FOOTINGS
1	INSTALL CELLULAR MODEM AND ANTENNA
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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Kevin Smith
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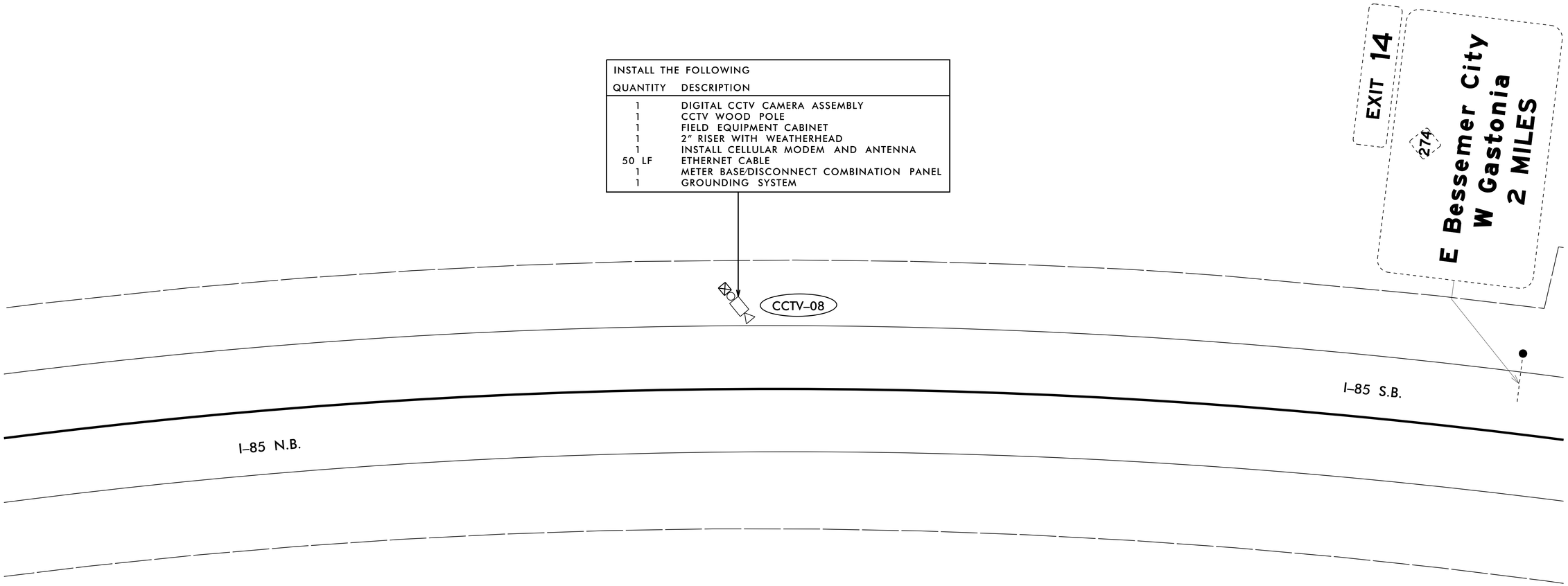
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	27

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	FIELD EQUIPMENT CABINET
1	2" RISER WITH WEATHERHEAD
1	INSTALL CELLULAR MODEM AND ANTENNA
50 LF	ETHERNET CABLE
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM



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Plans Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE:	FEB 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
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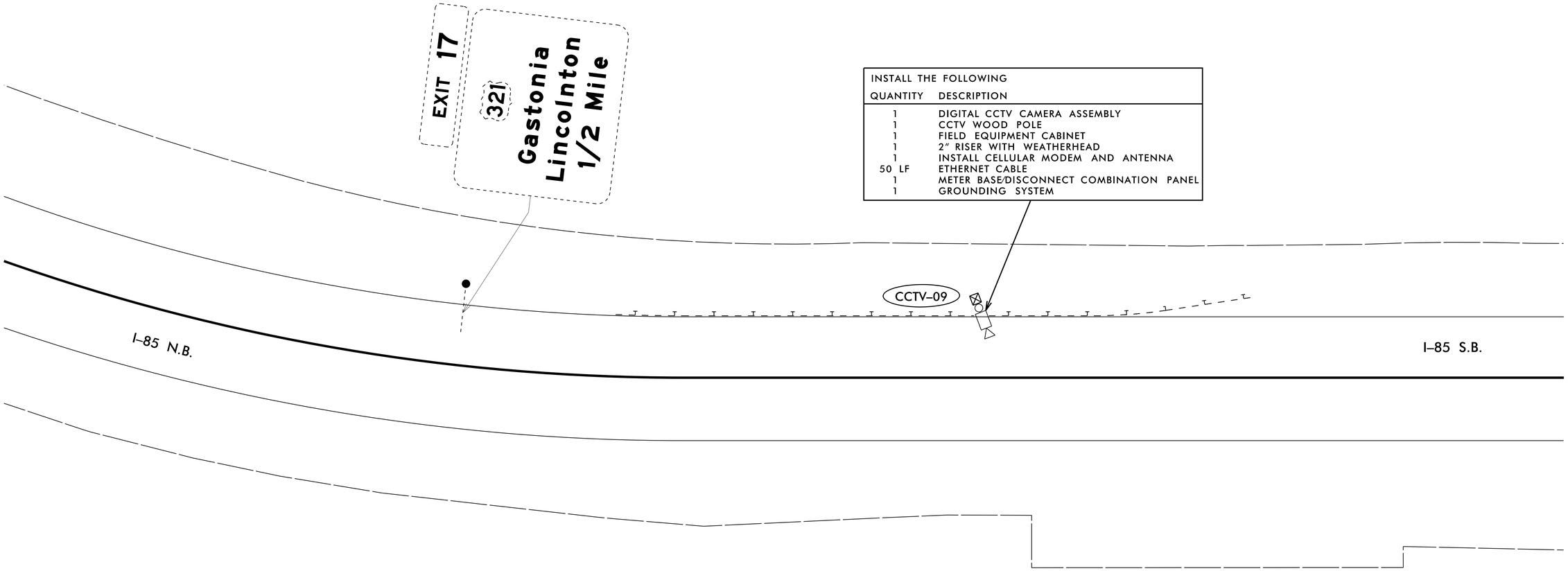
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	28



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	FIELD EQUIPMENT CABINET
1	2" RISER WITH WEATHERHEAD
1	INSTALL CELLULAR MODEM AND ANTENNA
50 LF	ETHERNET CABLE
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM

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Plans Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Revenue Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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SIGNATURE 3/26/2019 DATE

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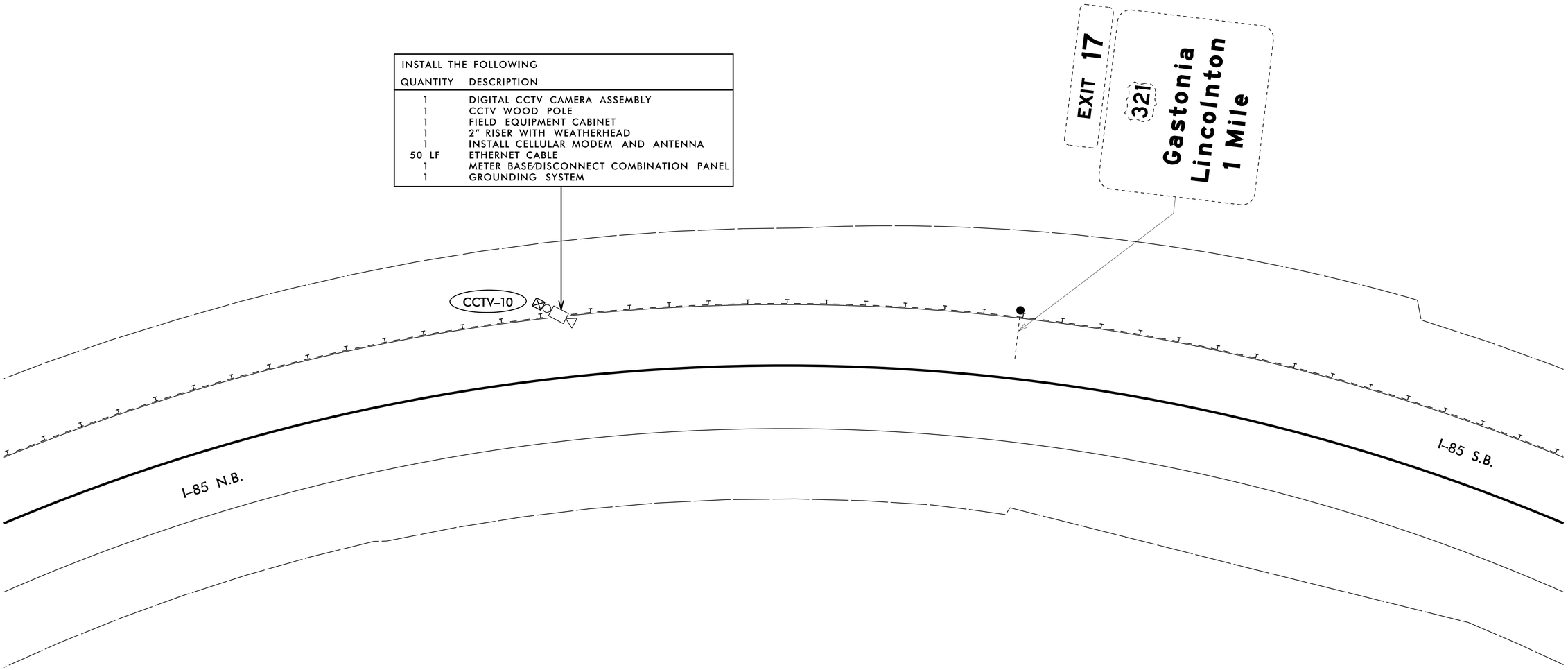
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	29

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	FIELD EQUIPMENT CABINET
1	2" RISER WITH WEATHERHEAD
1	INSTALL CELLULAR MODEM AND ANTENNA
50 LF	ETHERNET CABLE
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM



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Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
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SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

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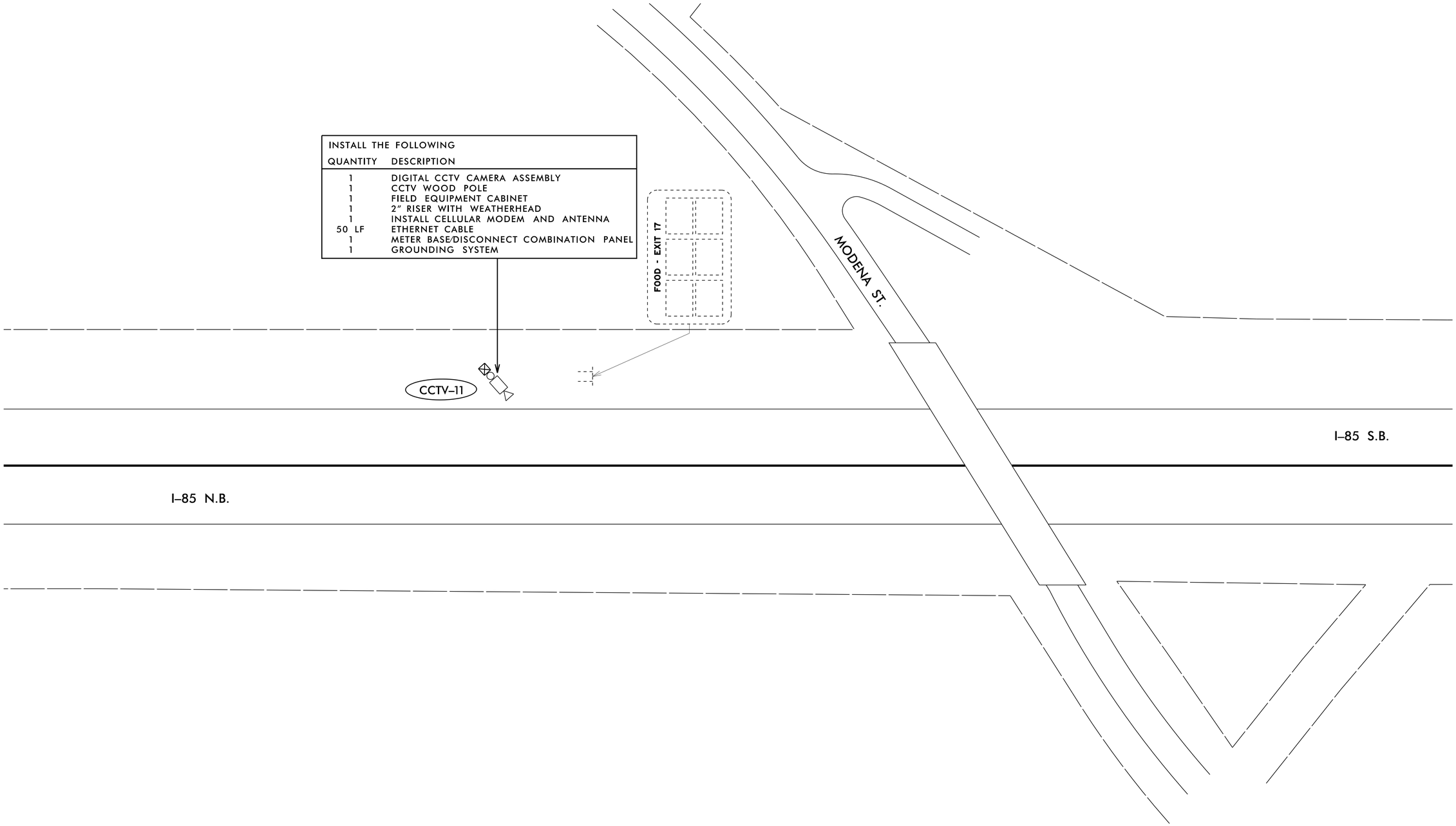
PROJECT REFERENCE NO.	SHEET NO.
C-5600K	30



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DIGITAL CCTV CAMERA ASSEMBLY
1	CCTV WOOD POLE
1	FIELD EQUIPMENT CABINET
1	2" RISER WITH WEATHERHEAD
1	INSTALL CELLULAR MODEM AND ANTENNA
50 LF	ETHERNET CABLE
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM

Kimley»Horn
NC License #F-0102
421 Fayetteville St., Suite 600
Raleigh, NC 27636
Tel: (919) 677-2000
Fax: (919) 677-2050

Plans Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

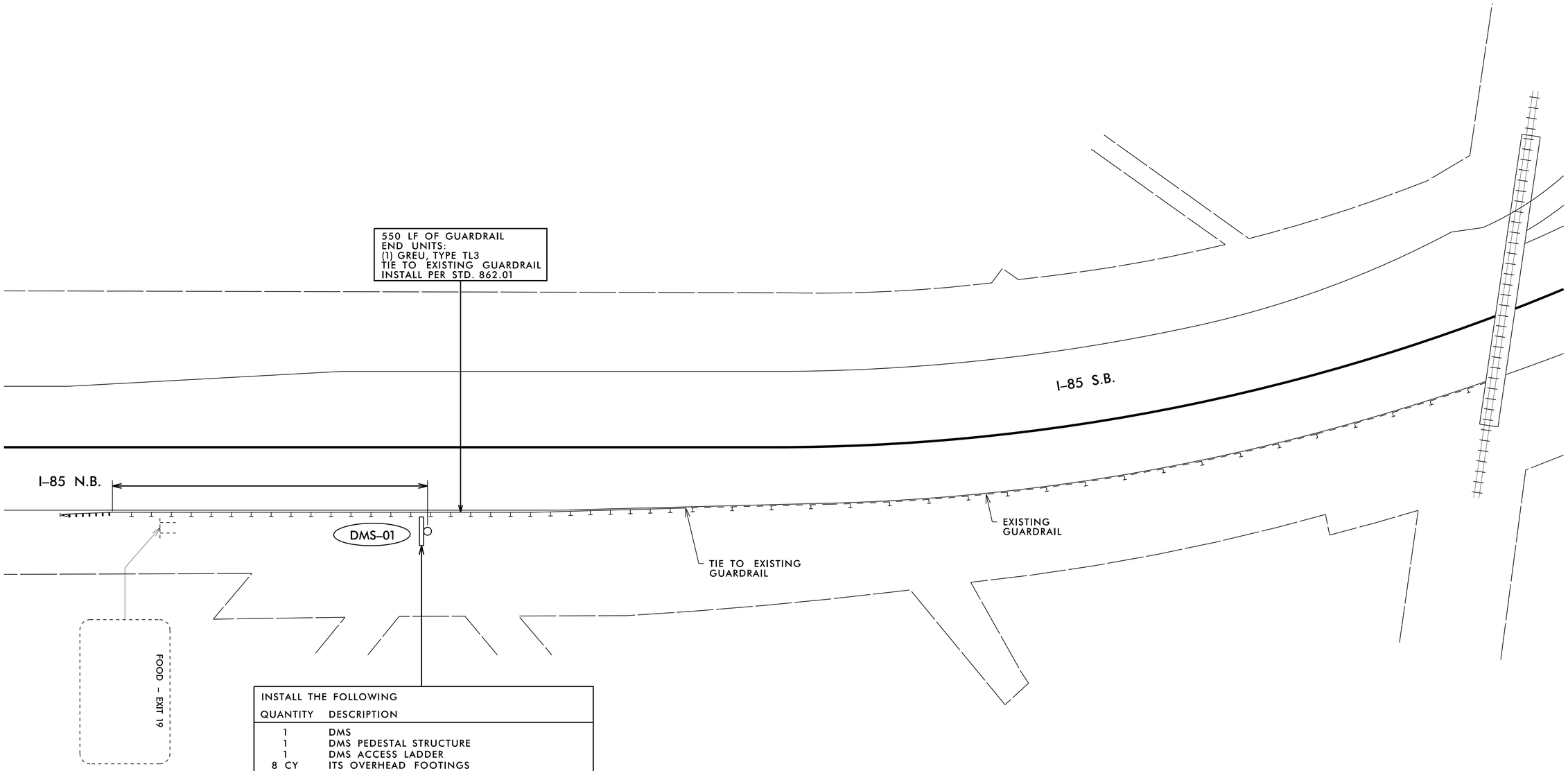
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
0996F5A6B3B04AE...
SIGNATURE 3/26/2019 DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\011036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh30.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	31



INSTALL THE FOLLOWING

QUANTITY	DESCRIPTION
1	DMS
1	DMS PEDESTAL STRUCTURE
1	DMS ACCESS LADDER
8 CY	ITS OVERHEAD FOOTINGS
1	INSTALL CELLULAR MODEM AND ANTENNA
1	METER BASE/DISCONNECT COMBINATION PANEL
1	GROUNDING SYSTEM

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Plans Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Science Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SIGNING AND DEVICE PLAN

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE: FEB 2019 REVIEWED BY: A. GOOD

PREPARED BY: J. CROSS REVIEWED BY: K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0I036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh3.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	32

12–0157
FRANKLIN BLVD AND EDGEWOOD RD
CHANNEL 1

COLOR CODE
TIA/EIA 598–C

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

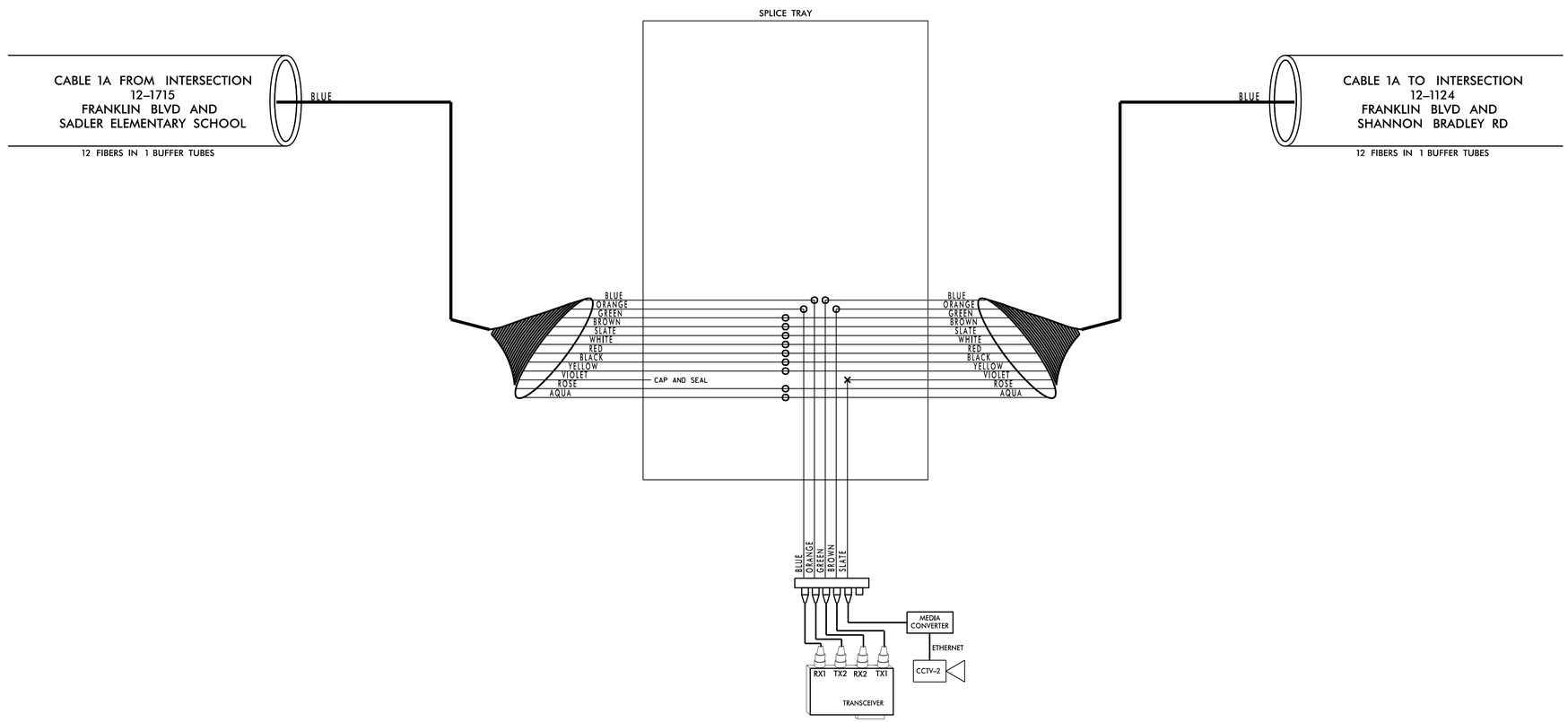
O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

NOTE:
CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING SPLICING. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER WHERE EXISTING SPLICING IS NOT AS EXPECTED.

NOTES:
1. FIBER INTERCONNECT CENTER RACKS ARE SCHEMATIC ONLY – ACTUAL EQUIPMENT FORM MAY VARY.



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Fax: (919) 677-2050

Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
0686E0A8D8D440F...
3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0\036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh32.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	33

12–0030
FRANKLIN BLVD AND GARRISON BLVD
CHANNEL 2

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

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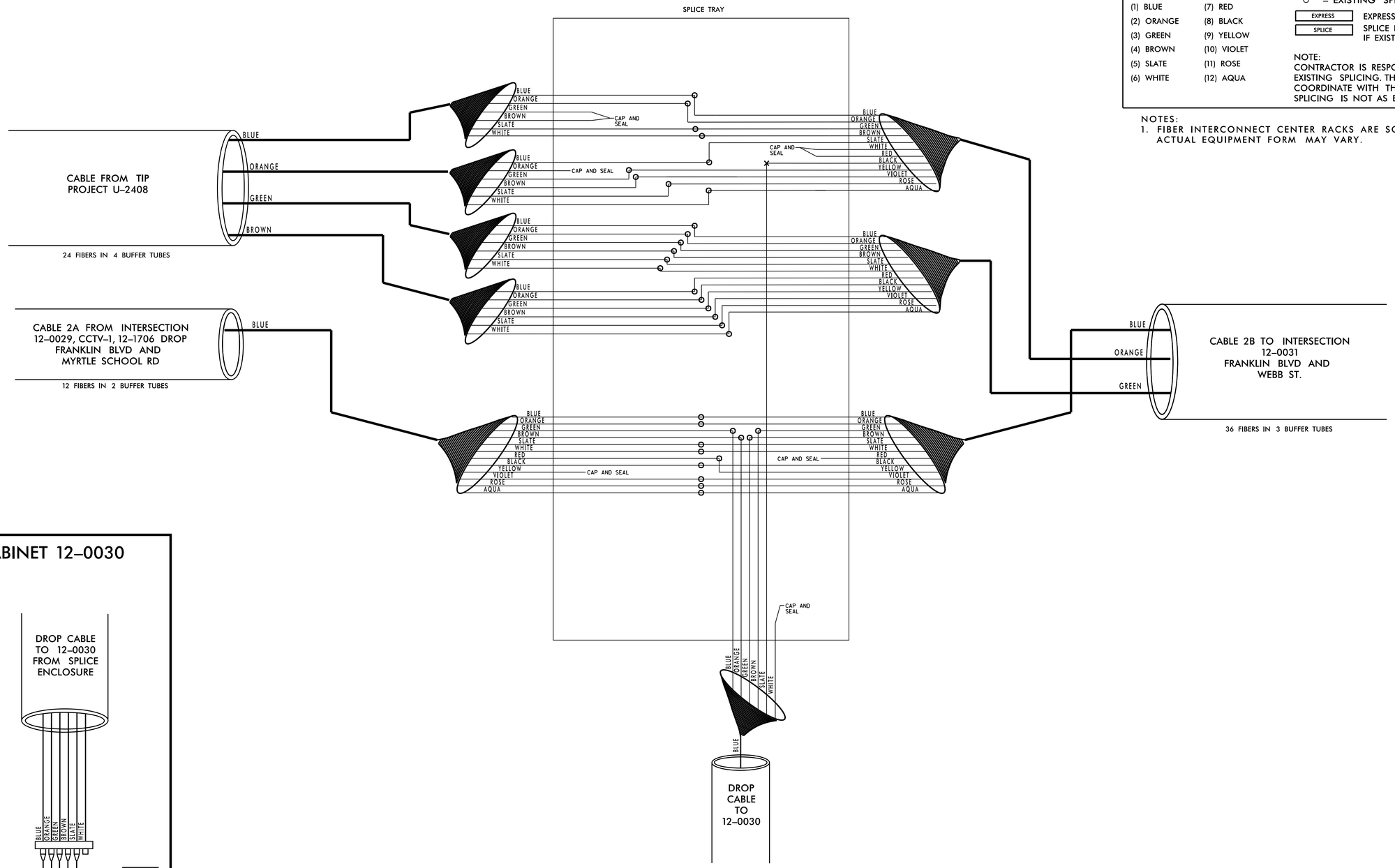
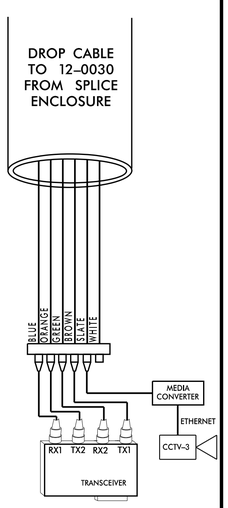


CABINET 12–0030



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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

SCALE 0

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0996E0A03B0A40F 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0110036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh33.dgn

12–0032
FRANKLIN BLVD AND LINWOOD RD
CHANNEL 3

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	34

COLOR CODE
TIA/EIA 598–C

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

NOTE:
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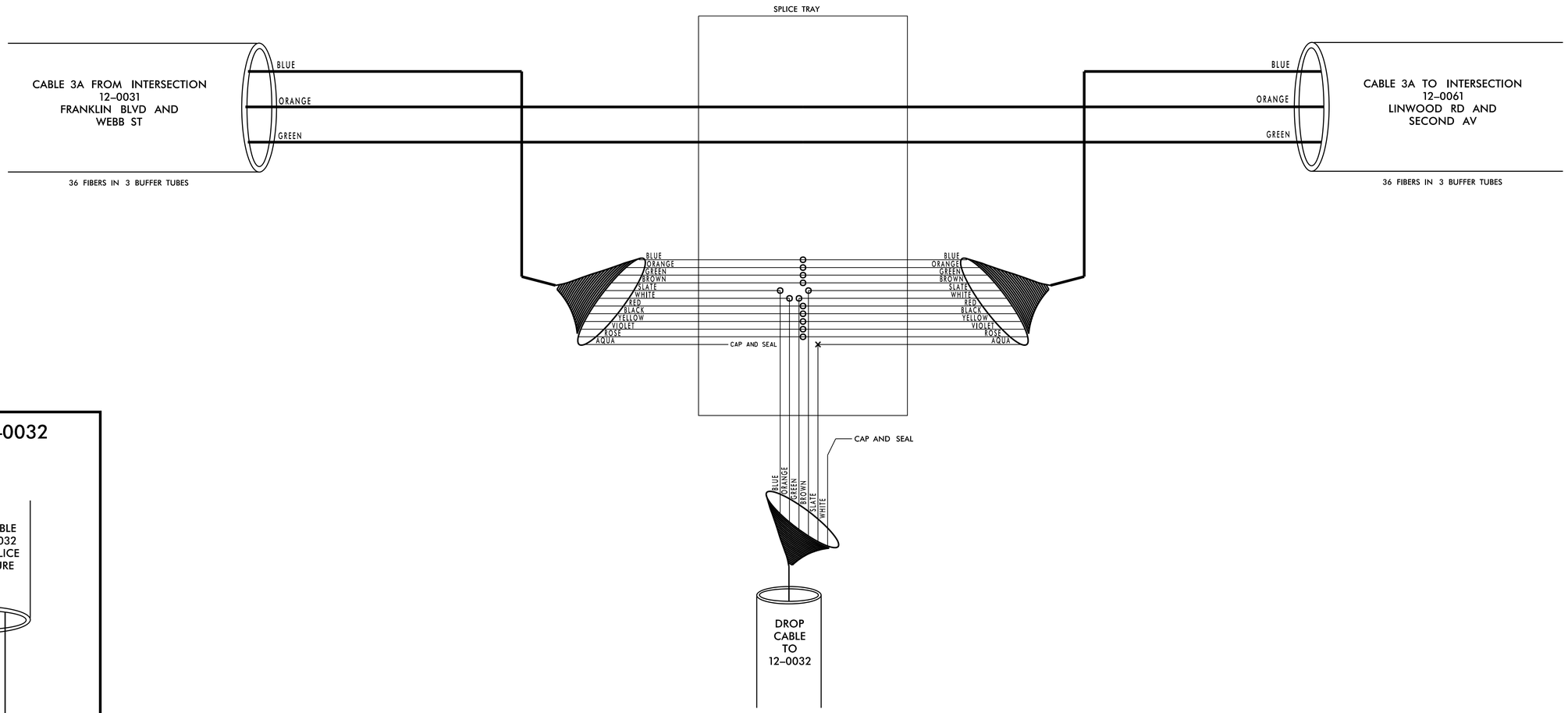
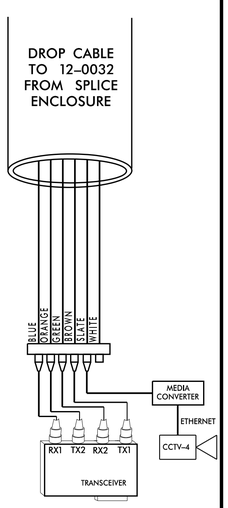


CABINET 12–0032



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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 1

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 — MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0686E0B3B0440F 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\011036443 I-85 ICMX6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh34.dgn

12–0038
FRANKLIN BLVD AND CHESTER ST
CHANNEL 9

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	35

COLOR CODE
TIA/EIA 598–C

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

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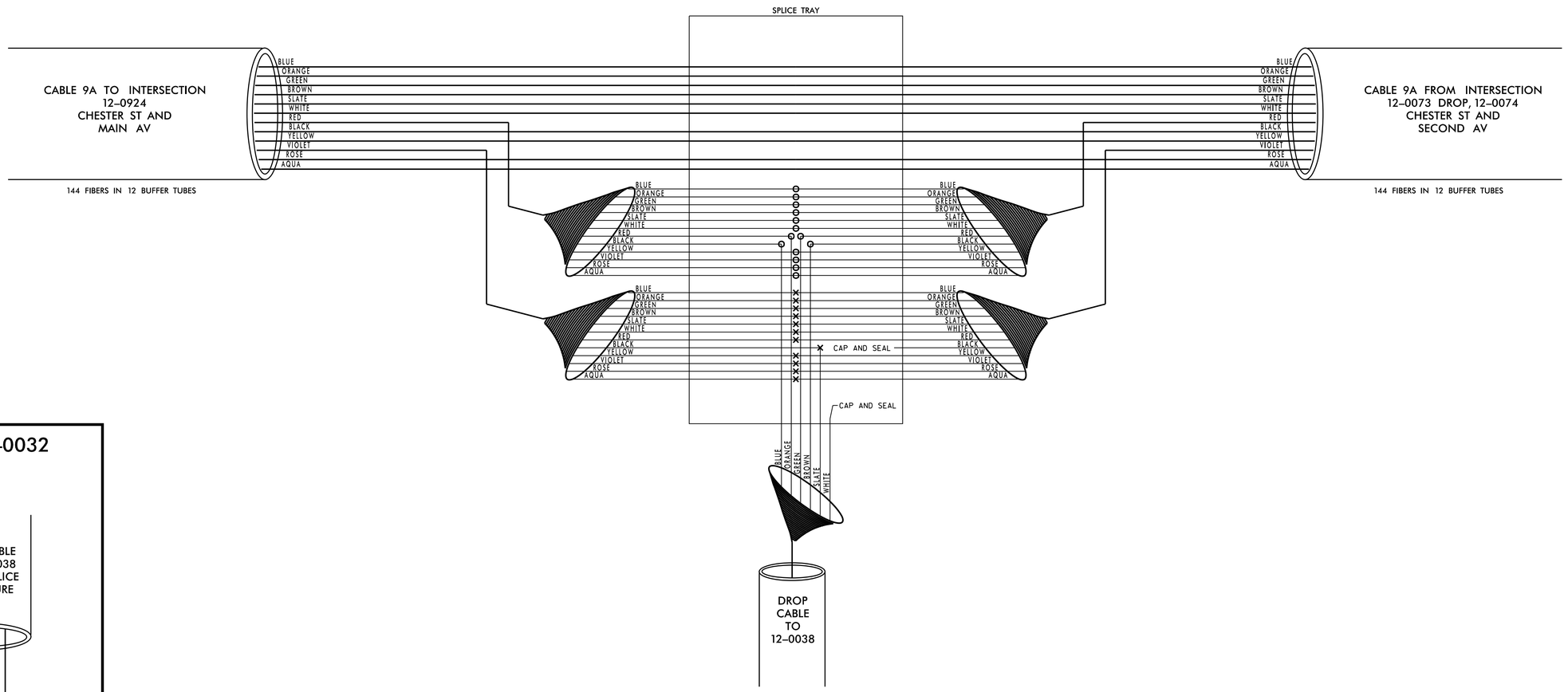
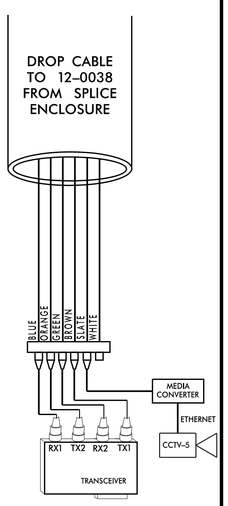


CABINET 12–0032



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Fax: (919) 677-2050

Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

SCALE 0

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0110036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh35.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	36

CITY 05, 12–0102 DROP, 12–0043 DROP
SECOND AVE AND OAKLAND ST
CHANNEL 12

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

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NOTES:
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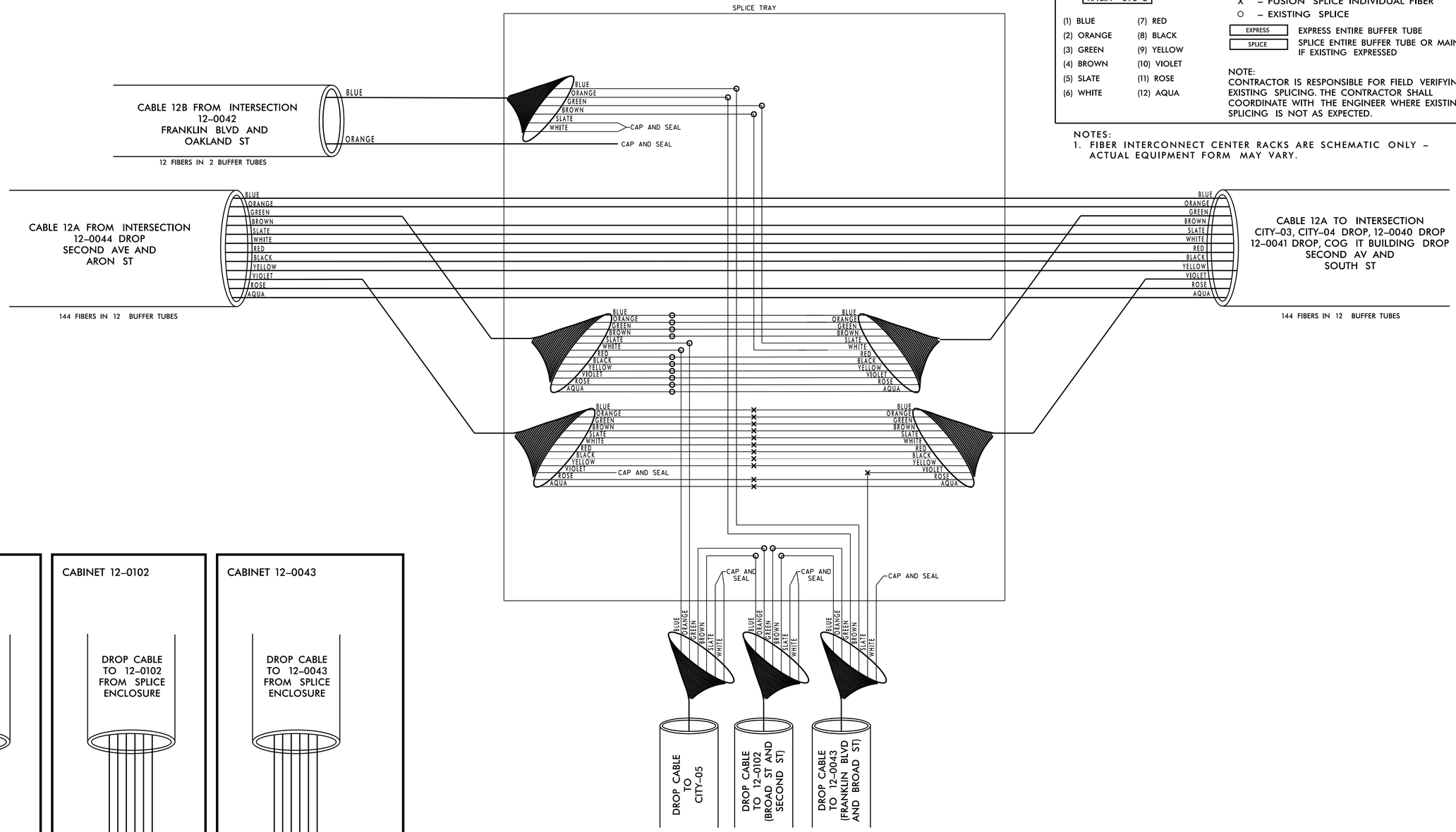
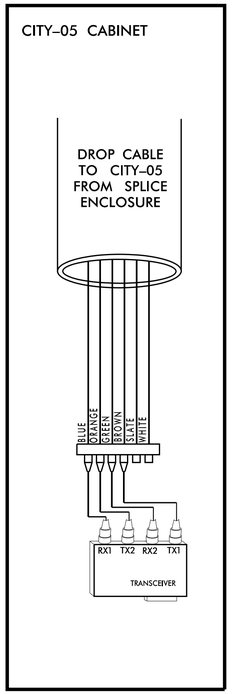
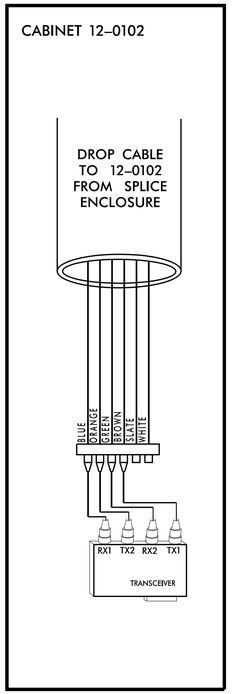


CITY–05 CABINET



CABINET 12–0102



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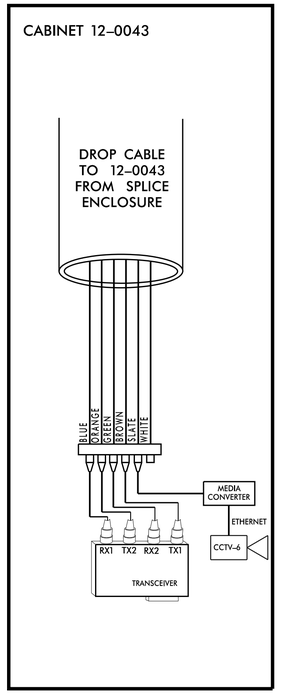

Kimley»Horn
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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 1

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10		MECKLENBURG/GASTON COUNTIES	
PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0666FC0A93B0A4CF... 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
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PROJECT REFERENCE NO.	SHEET NO.
C-5600K	37

12–0074, 12–0073 DROP
CHESTER ST AND SECOND AV
CHANNEL 9

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

O – EXISTING SPLICE

EXPRESS — EXPRESS ENTIRE BUFFER TUBE

SPLICE — SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

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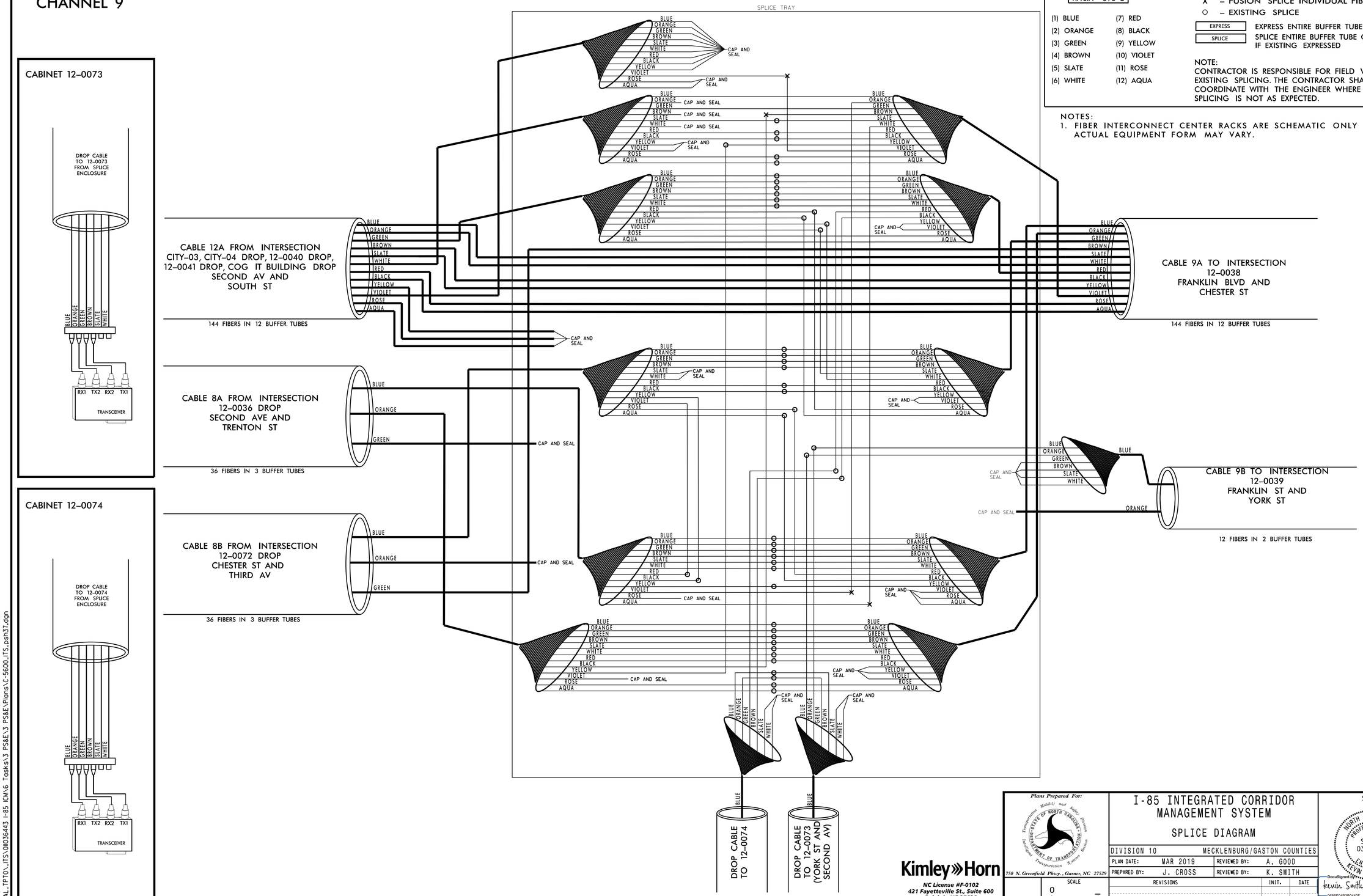

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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 1

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE: MAR 2019		REVIEWED BY:	A. GOOD
PREPARED BY: J. CROSS		REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0886E0AB3B0A40F... 3/26/2019
SIGNATURE DATE

CADD Filename:

3/25/2019
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PROJECT REFERENCE NO.	SHEET NO.
C-5600K	38

12–0929
LONG AV AND MARIETTA ST
CHANNEL 13

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
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LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

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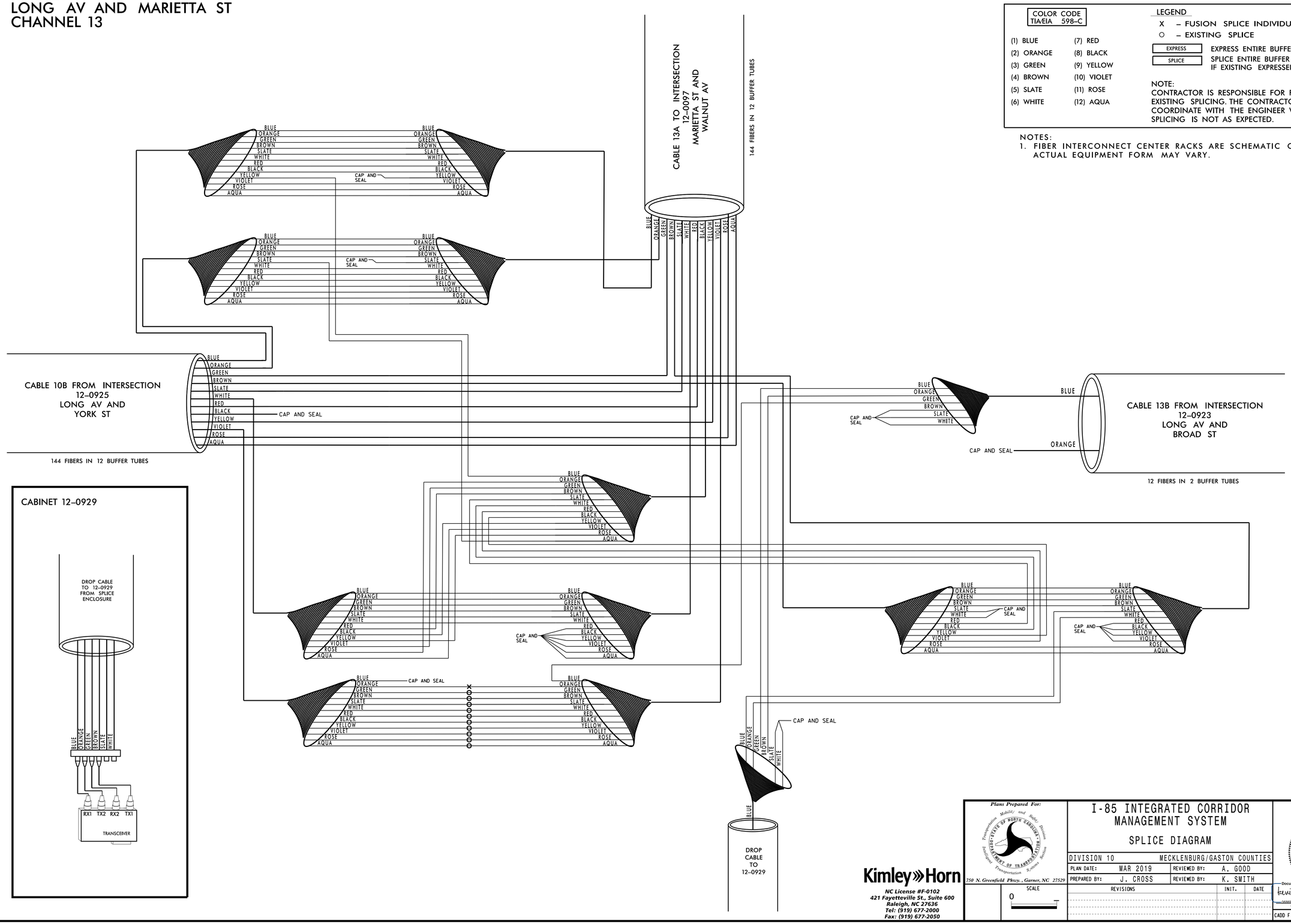

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421 Fayetteville St., Suite 600
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Tel: (919) 677-2000
Fax: (919) 677-2050

Plans Prepared For: Transportation Mobility and Safety Division — Intelligent Transportation Systems — STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 — MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith — 3/26/2019
SIGNATURE — DATE

CADD Filename:

3/26/2019
K:\RAL_TPTO_ITS\0\036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh38.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	39

12–0203
CHESTER ST AND AIRLINE/LONG AV
CHANNEL 10

THIS SHEET IS FOR REFERENCE ONLY. NO SPLICING WORK SHALL BE PERFORMED AT THIS LOCATION.

COLOR CODE
TIA/EIA 598–C

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
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LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER

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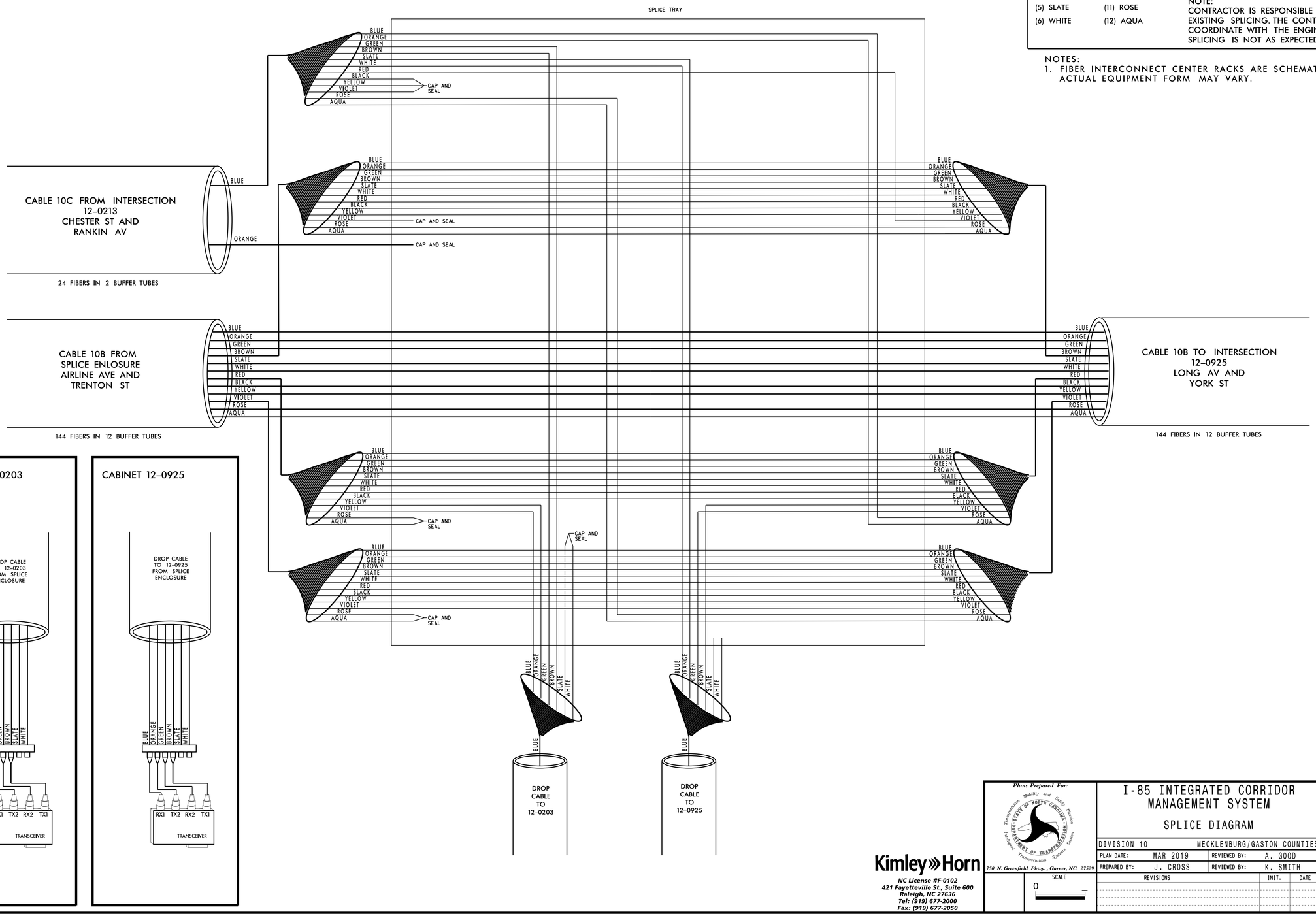

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Plans Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10	MECKLENBURG/GASTON COUNTIES		
PLAN DATE: MAR 2019		REVIEWED BY: A. GOOD	
PREPARED BY: J. CROSS		REVIEWED BY: K. SMITH	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
DOCUSIGNED BY:
SIGNATURE 3/26/2019 DATE

CADD Filename:

3/25/2019
K:\RAL_TPTO_ITS\0103643 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh39.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	40

TOC FIBER TERMINAL PANEL

CABLE 13D		BUFFER TUBE											
144 FIBERS		BLUE	ORANGE	GREEN	BROWN	SLATE	WHITE	RED	BLACK	YELLOW	VIOLET	ROSE	AQUA
FIBER	Blue												
	Orange										***CCTV-2***		
	Green												
	Brown										***CCTV-3***		
	Slate												
	White										***CCTV-4***		
	Red												
	Black										***CCTV-5***		
	Yellow												
	Violet										***CCTV-6***		
	Rose												
	Aqua												

3/26/2019
K:\RAL_TPTO_ITS\0\036443 I-85 ICM\6 Tasks\3 PS&E\3 PS&E\Plans\C-5600_ITS_psh40.dgn

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NC License #F-0102
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Tel: (919) 677-2000
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Plans Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0

I-85 INTEGRATED CORRIDOR MANAGEMENT SYSTEM

SPLICE DIAGRAM

DIVISION 10 — MECKLENBURG/GASTON COUNTIES

PLAN DATE:	MAR 2019	REVIEWED BY:	A. GOOD
PREPARED BY:	J. CROSS	REVIEWED BY:	K. SMITH

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 3/26/2019
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 1.0

PHASING DIAGRAM

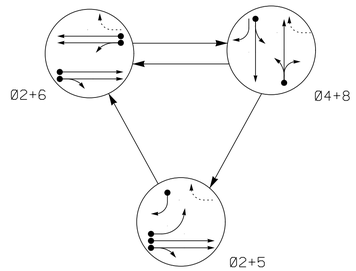


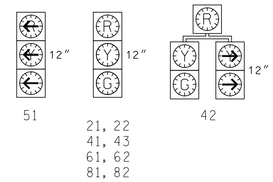
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4+8	FLASH
21, 22	G	G	R	Y
41, 43	R	R	G	R
42	R	R	G	R
51	←	←R	←R	←R
61, 62	R	G	R	Y
81, 82	R	R	G	R
SIGN 'F'	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

Denotes L.E.D.



2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
2A	EXISTING	EXISTING	EXISTING	Y	2	Y	Y	-	-	-	-	-
2B	EXISTING	EXISTING	EXISTING	Y	2	Y	Y	-	-	-	-	-
4A	EXISTING	EXISTING	EXISTING	Y	4	Y	Y	-	-	-	-	-
5A	EXISTING	EXISTING	EXISTING	Y	5	Y	Y	-	-	-	-	-
5B	EXISTING	EXISTING	EXISTING	Y	5	Y	Y	-	-	-	15	-
6A	EXISTING	EXISTING	EXISTING	Y	6	Y	Y	-	-	-	-	-
6B	EXISTING	EXISTING	EXISTING	Y	6	Y	Y	-	-	-	-	-
8A	EXISTING	EXISTING	EXISTING	Y	8	Y	Y	-	-	-	3	-
8B	EXISTING	EXISTING	EXISTING	Y	8	Y	Y	-	-	-	3	-
8C	EXISTING	EXISTING	EXISTING	Y	8	Y	Y	-	-	-	15	-

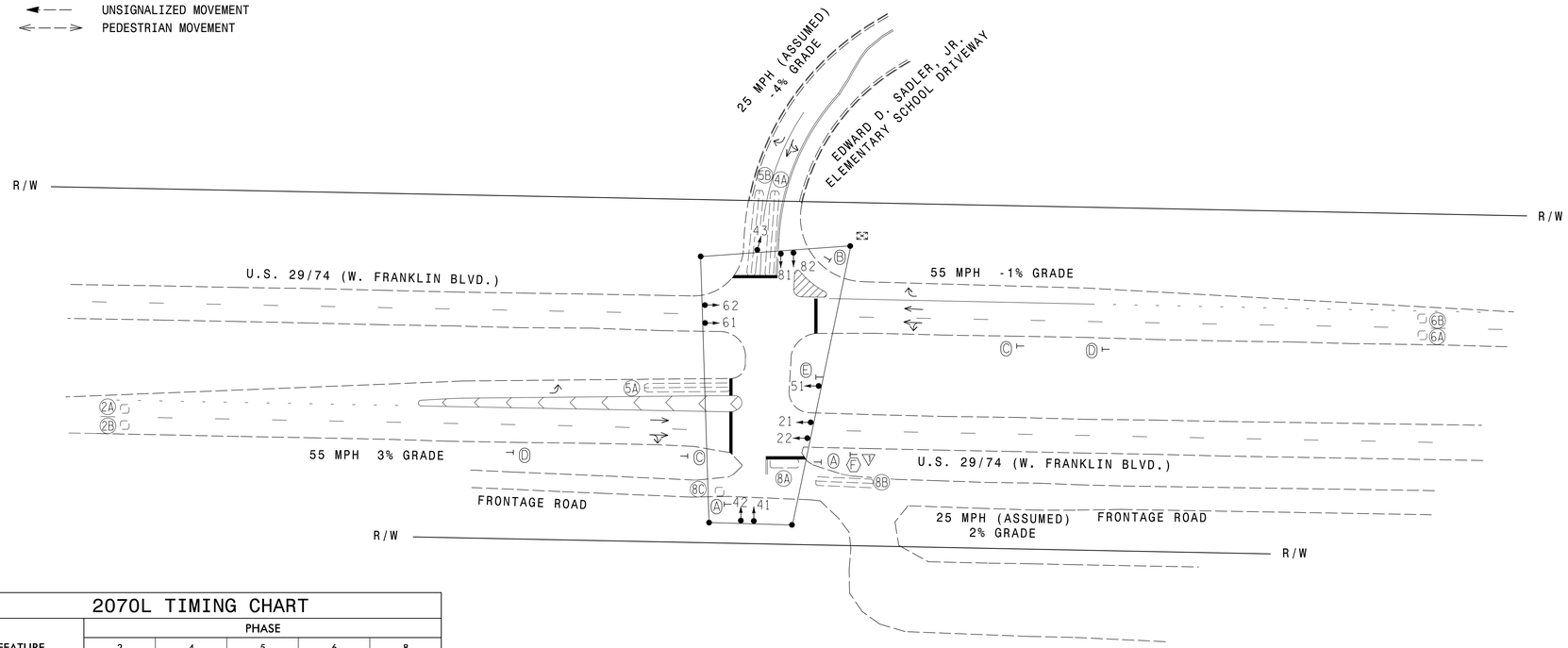
3 PHASE FULLY ACTUATED (Gastonia City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 5 during phase 6 on.
4. Program controller to clear from phase 2+6 to phase 2+5 by progressing through phase 4+8 (see Electrical Details).
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. City system data:
   Controller Asset # 1715.
10. A signal upgrade was done in 2004 under a different project. This plan is revised to be part of the city system and some minor changes in the Timing Chart.

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 With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
Ⓐ	"STOP" Sign (R1-1)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	"DO NOT ENTER" Sign (R5-1)	Ⓒ
Ⓓ	"WRONG WAY" Sign (R5-1A)	Ⓓ
Ⓔ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓔ
Ⓕ	Type 1B Changeable Trailblazer sign (See Figure 1)	Ⓕ

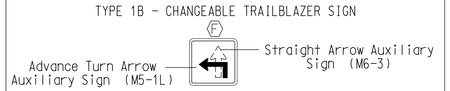
2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green 1 *	14	7	7	14	7
Extension 1 *	6.0	1.0	1.0	6.0	3.0
Max Green 1 *	90	30	20	90	30
Yellow Clearance	5.1	4.0	4.0	5.1	4.0
Red Clearance	2.5	3.1	2.7	2.5	3.1
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	1.8	-	-	1.8	-
Max Variable Initial *	46	-	-	46	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	45	-	-	45	-
Minimum Gap	3.4	-	-	3.4	-
Recall Mode	MIN. RECALL	-	-	MIN. RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* 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.

FIGURE 1

TYPE 1B - CHANGEABLE TRAILBLAZER SIGN



PLANS PREPARED IN THE OFFICE OF:
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(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: DC87A59ED60D437...
4/16/2019
SIGNATURE DATE

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50 1"=50'

SIGNAL UPGRADE

U.S. 29/74 (W. FRANKLIN BLVD.)
AT
EDWARD D. SADLER, JR. ELEMENTARY SCHOOL / FRONTAGE ROAD

DIVISION 12 GASTON COUNTY GASTONIA

PLAN DATE: February 2005	REVIEWED BY: D.Y. Ishak
PREPARED BY: L. Blount	REVIEWED BY:

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

SEAL
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This document is only certified as to the revisions.
SIGNATURE DATE

SIG. INVENTORY NO. 12-1715

K:\RAL_TPTO_SIGNALS\011036443 I-85 IGNLS4 - Signal Design\1.0 12-1715_2019.dgn

4/16/2019

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 1.1

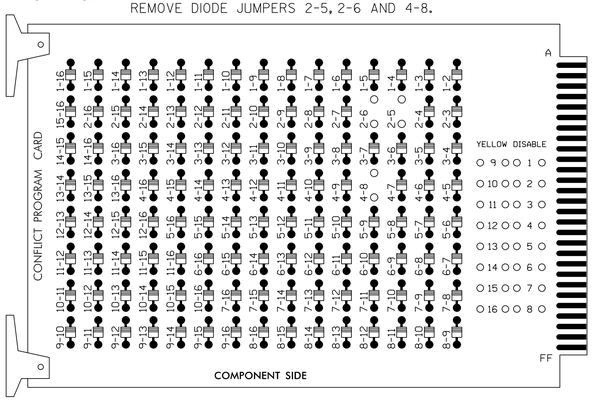
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

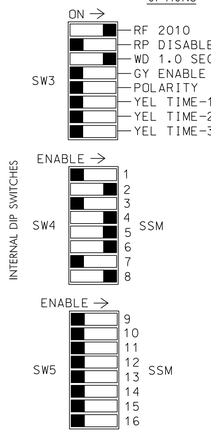
WD ENABLE

SW2 — OFF — ON

REMOVE DIODE JUMPERS 2-5, 2-6 AND 4-8.



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 SEL1-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Gastonia City System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L*
CABINET.....CONTRACTOR SUPPLIED 332*
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S5,S6,S8
PHASES USED.....2,4,5,6,8
OVERLAPS.....NONE

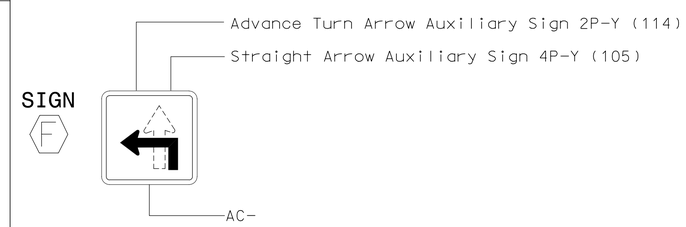
* Existing Equipment

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	SIGN F	NU	41, 42,43	SIGN F	42	51	61,62	NU	NU	81,82	NU
GREEN		130			103				136			109	
YELLOW		129			102				135			108	
RED		128			101				134			107	
RED ARROW								131					
YELLOW ARROW							132	132					
GREEN ARROW							133	133					
✋													
PED YELLOW			** 114			** 105							
🚶													

NU = Not Used
** Changeable Trailblazer Signs. See wiring and programming detail on this sheet.

CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY(114) and 4PY(105).

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	Ø5 5B	SLOT EMPTY	SLOT EMPTY	Ø8 8A	Ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B	NOT USED			Ø8 8B	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 ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
5B	TB3-9,10	J3U	64	26	36	5	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			3
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR          PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦     X
OMIT PHASES     ¦    X
CALL PHASES     ¦   X
```

BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1715
DESIGNED: February 2005
SEALED: 2/23/05
REVISED: 4/16/2019

Signal Upgrade Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: DC87A59ED60B437...
4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:
Transportation Mobility and Safety Division, State of North Carolina, Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29/74 (W. Franklin Blvd.)
at
Edward D. Sadler, Jr. Elementary School / Frontage Road

Division 12 Gaston County Gastonia
PLAN DATE: February 2005 REVIEWED BY: T. Joyce
PREPARED BY: William Hairston REVIEWED BY:

REVISIONS	INIT.	DATE

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SIGNATURE DATE
SIG. INVENTORY NO. 12-1715

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

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 1.2

▽1 LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGN

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #31

```
  LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #35  IS OFF
AND CURRENT PLAN      #37  IS OFF
AND CURRENT PLAN      #39  IS OFF
AND CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #61  IS OFF
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #35 OFF
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN       #35  IS ON
OR CURRENT PLAN        #37  IS ON
OR CURRENT PLAN        #39  IS ON
OR CURRENT PLAN        #41  IS ON
OR CURRENT PLAN        #43  IS ON
OR CURRENT PLAN        #45  IS ON
OR CURRENT PLAN        #61  IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #35 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1715
DESIGNED: February 2005
SEALED: 2/23/05
REVISED: 4/16/2019

Signal Upgrade Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
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Raleigh, NC 27601
(919) 677-2000

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: 0C87A59ED60B437...

4/16/2019

SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA
Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 29/74 (W. Franklin Blvd.) at Edward D. Sadler, Jr. Elementary School / Frontage Road

Division 12 | Gaston County | Gastonia

PLAN DATE: February 2005		REVIEWED BY:	T. Joyce
PREPARED BY: William Hairston		REVIEWED BY:	

REVISIONS	INIT.	DATE
▽1 ADD TRAILBLAZER SIGN PROGRAMMING	SLP	4/2019

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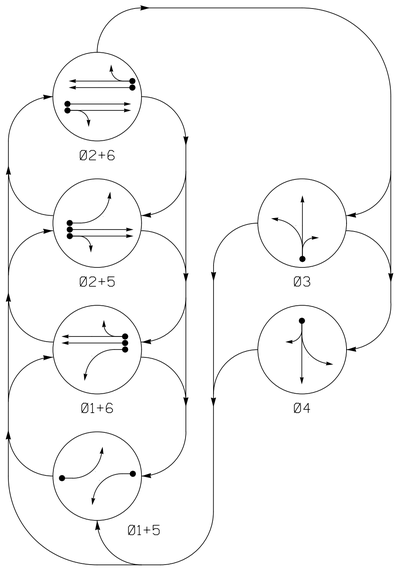
SIGNATURE DATE

SIG. INVENTORY NO. 12-1715

$$$$ SYSTEMS $$$$
$$$$ SYSTIME $$$$
$$$$ DGNFILE $$$$
$$$$ USERNAME $$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

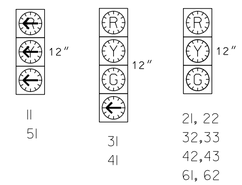
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	↓R	↓R	↓R	↓R	↓R
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32, 33	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42, 43	R	R	R	R	R	G	R
51	←	↓R	←	↓R	↓R	↓R	↓R
61, 62	R	G	R	G	R	R	Y
SIGN 'D'	*	*	*	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

Denotes L.E.D.



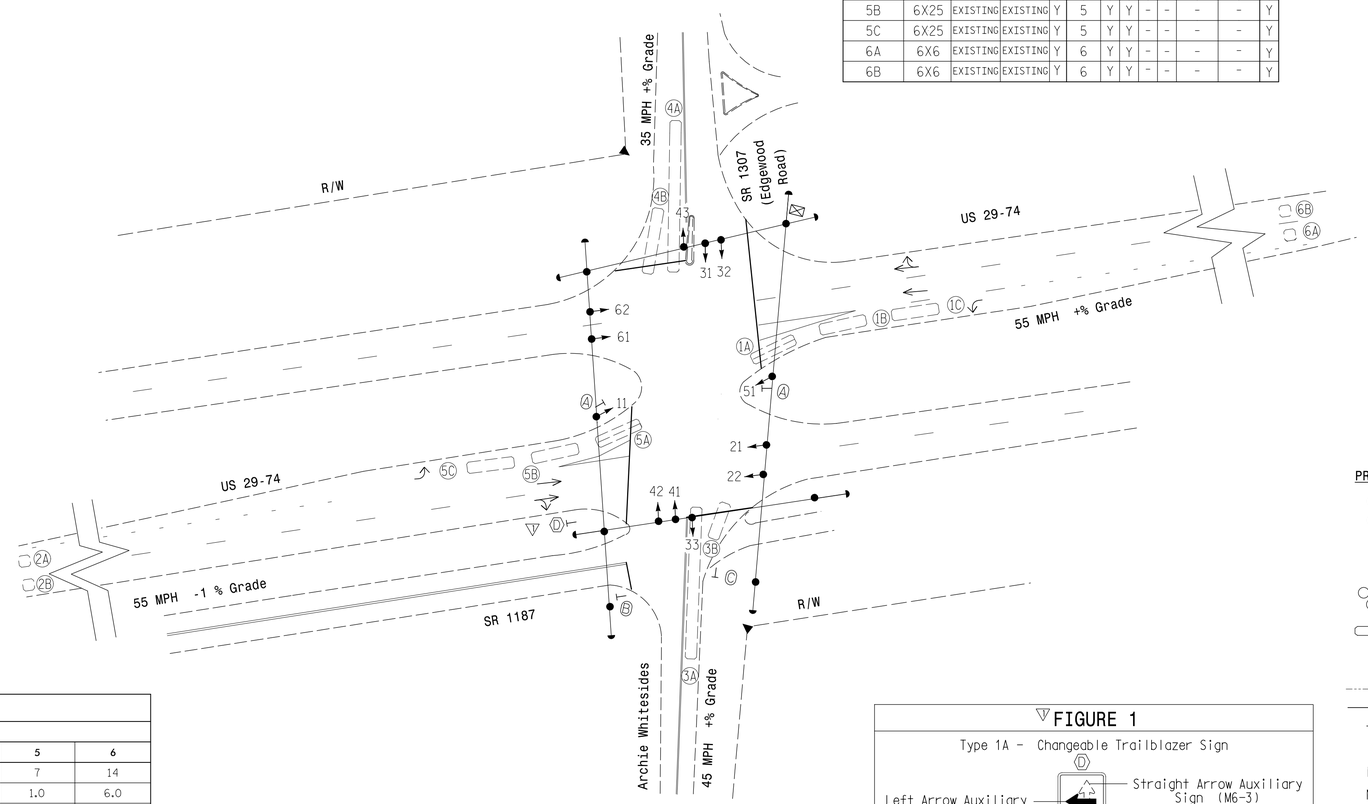
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	6X25	EXISTING	EXISTING	Y	1	Y	Y	-	-	-	-	Y
1B	6X25	EXISTING	EXISTING	Y	1	Y	Y	-	-	-	-	Y
1C	6X25	EXISTING	EXISTING	Y	1	Y	Y	-	-	-	-	Y
2A	6X6	EXISTING	EXISTING	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	EXISTING	EXISTING	Y	2	Y	Y	-	-	-	-	Y
3A	6X80	EXISTING	EXISTING	Y	3	Y	Y	-	-	-	15	Y
3B	6X20	EXISTING	EXISTING	Y	3	Y	Y	-	-	-	15	Y
4A	6X80	EXISTING	EXISTING	Y	4	Y	Y	-	-	-	15	Y
4B	6X35	EXISTING	EXISTING	Y	4	Y	Y	-	-	-	15	Y
5A	6X25	EXISTING	EXISTING	Y	5	Y	Y	-	-	-	-	Y
5B	6X25	EXISTING	EXISTING	Y	5	Y	Y	-	-	-	-	Y
5C	6X25	EXISTING	EXISTING	Y	5	Y	Y	-	-	-	-	Y
6A	6X6	EXISTING	EXISTING	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	EXISTING	EXISTING	Y	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Gastonia City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. City system data:
   Controller Asset #: 0157.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Pull Box	
	2-in Underground Conduit	
	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	
N/A	"LEFT TURN SIGNAL" Sign (R10-10L)	Ⓐ
N/A	"STOP" Sign (R1-1)	Ⓑ
N/A	"DO NOT BLOCK DRIVE" SIGN	Ⓒ
Ⓓ	Type 1A Changeable Trailblazer sign (See Figure 1)	Ⓓ

FIGURE 1

Type 1A - Changeable Trailblazer Sign

Ⓓ

Left Arrow Auxiliary Sign (M6-1L)

Straight Arrow Auxiliary Sign (M6-3)

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	14	7	7	7	14
Extension 1 *	1.0	6.0	1.0	1.0	1.0	6.0
Max Green 1 *	25	120	60	75	25	120
Yellow Clearance	3.0	5.3	4.5	3.8	3.0	5.2
Red Clearance	4.0	1.0	2.4	3.2	3.9	1.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	44	-	-	-	44
Time Before Reduction *	-	20	-	-	-	20
Time To Reduction *	-	40	-	-	-	40
Minimum Gap	-	2.5	-	-	-	2.5
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* 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.

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS
DocuSigned by: DCB7A59E0E0B437
4/16/2019
SIGNATURE DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 40 1"=40'

US 29-74
At
SR 1307 (Edgewood Road)/
(Archie Whitesides)

Division 12 Gaston County W. of Gastonia

PLAN DATE:	October 2004	REVIEWED BY:	Z.M. Little
PREPARED BY:	L. Blount	REVIEWED BY:	

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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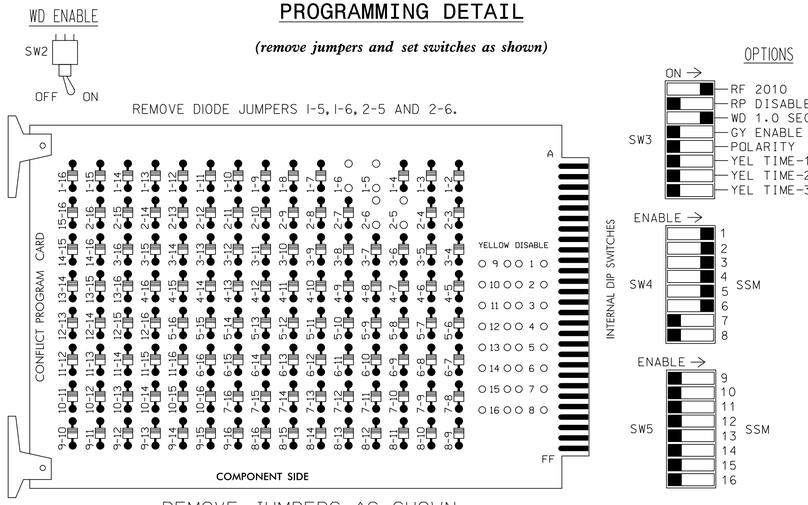
SIGNATURE DATE

SIG. INVENTORY NO. 12-0157

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 2.1

EDI MODEL 2010ECL 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 SEL1-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the Gastonia City System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4		S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	SIGN D	31	32,33	41	42,43	SIGN D	51	61,62	NU	NU	NU	NU
GREEN		130		118	118	103	103			136				
YELLOW		129		117	117	102	102			135				
RED		128		116	116	101	101			134				
RED ARROW	125								131					
YELLOW ARROW	126								132					
GREEN ARROW	127			118		103			133					
✋														
PED YELLOW			** 114					** 105						
🚶														

NU = Not Used
** Changeable Trailblazer Signs. See wiring and programming detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø1 1C	Ø2 2B			Ø3 3B	Ø4 4B							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	Ø6 6B											

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

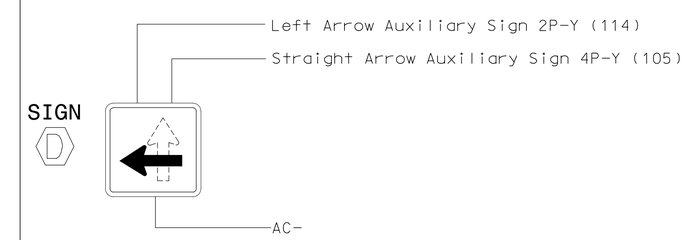
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			15
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			15
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			15
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			15
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY(114) and 4PY(105).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0157
DESIGNED: October 2004
SEALED: 2/7/05
REVISED: 4/16/2019

Signal Upgrade Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:
Transportation Mobility and Safety Division, STATE OF NORTH CAROLINA, DEPARTMENT OF TRANSPORTATION, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74
at
SR 1307 (Edgewood Road)/
(Archie Whitesides)

Division 12 Gaston County Gastonia
PLAN DATE: January 2005 REVIEWED BY: T. Joyce
PREPARED BY: William Hairston REVIEWED BY:

REVISIONS	INIT.	DATE
ADD TRAILBLAZER SIGN PROGRAMMING	SLP	4/2019

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SIGNATURE DATE
SIG. INVENTORY NO. 12-0157

$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 2.2

▽1 LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGN

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #31

```
  LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #35  IS OFF
AND CURRENT PLAN      #37  IS OFF
AND CURRENT PLAN      #39  IS OFF
AND CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #61  IS OFF
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #35 OFF
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN      #35  IS ON
OR CURRENT PLAN       #37  IS ON
OR CURRENT PLAN       #39  IS ON
OR CURRENT PLAN       #41  IS ON
OR CURRENT PLAN       #43  IS ON
OR CURRENT PLAN       #45  IS ON
OR CURRENT PLAN       #61  IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #35 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0157
DESIGNED: October 2004
SEALED: 2/7/05
REVISED: 4/16/2019

Signal Upgrade Sheet 2 of 2

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PLANS PREPARED IN THE OFFICE OF:
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Raleigh, NC 27601
(919) 677-2000

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NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: 0C87A50ED60B437...
4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:
Transportation Mobility and Safety Division
Department of Transportation State of North Carolina
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74
at
SR 1307 (Edgewood Road)/
(Archie Whitesides)

Division 12 Gaston County Gastonia

PLAN DATE: January 2005	REVIEWED BY: T. Joyce
PREPARED BY: William Hairston	REVIEWED BY:

REVISIONS	INIT.	DATE
▽1 ADD TRAILBLAZER SIGN PROGRAMMING	SLP	4/2019

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SIGNATURE DATE

SIG. INVENTORY NO. 12-0157

$$$$ SYSTEM$ $$$$
$$$$ SYSTIME $$$$
$$$$ SYSDOW $$$$
$$$$ USERNAME $$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG.3.0

PHASING DIAGRAM

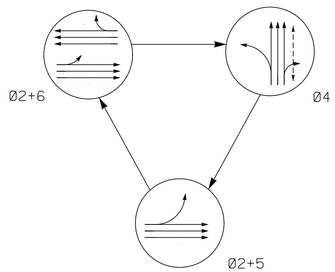


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21	G	G	R	Y
22	G	G	R	Y
41, 42	R	R	G	R
61, 62	R	G	R	Y
P41, P42	DW	DW	W	DW
▽SIGN 'C'	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

3 Phase
Pre-Timed
Gastonia City System

NOTES

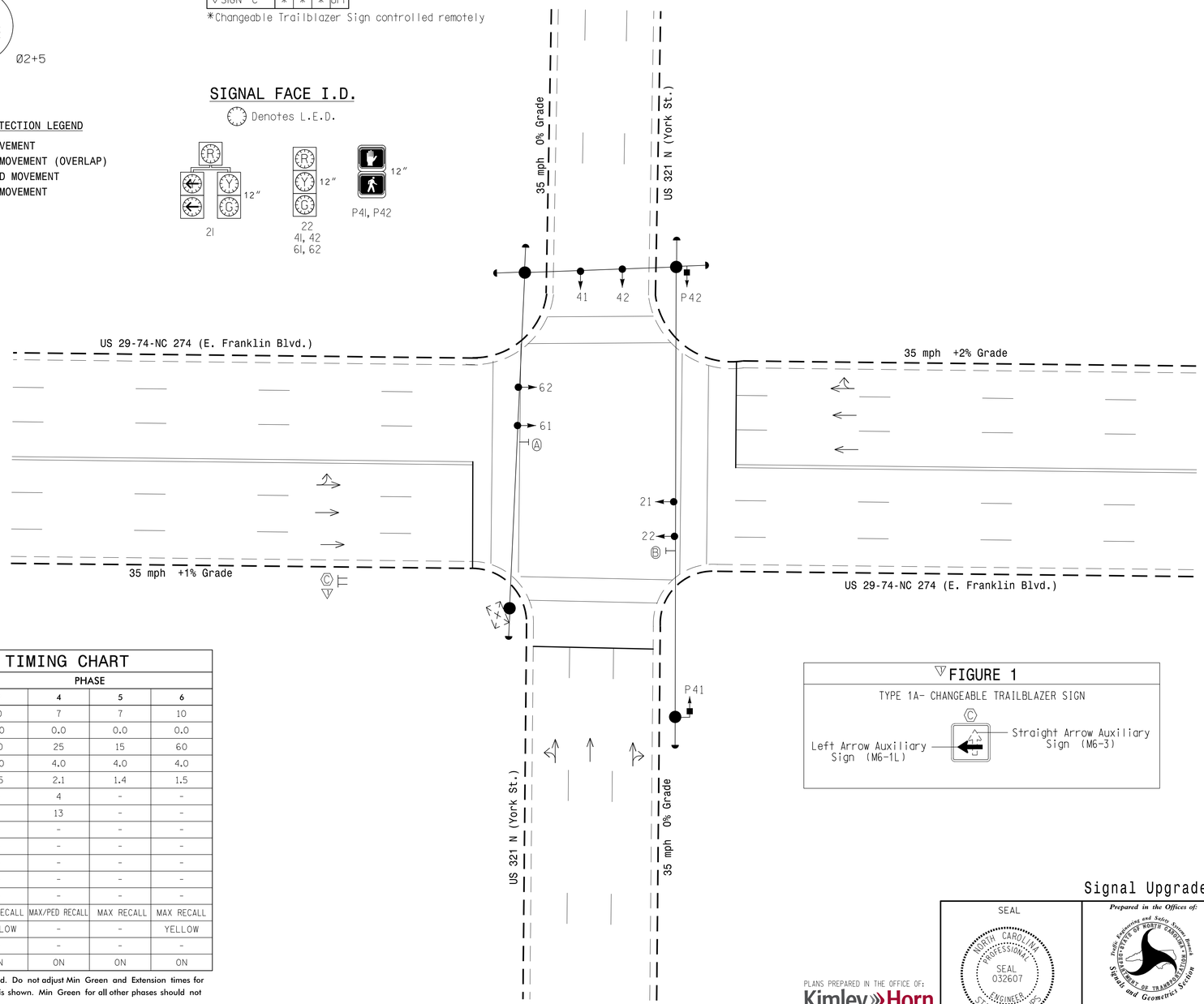
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. City system data: Controller Asset #0039.

SIGNAL FACE I.D.

Denotes L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	0.0	0.0	0.0	0.0
Max Green 1 *	60	25	15	60
Yellow Clearance	4.0	4.0	4.0	4.0
Red Clearance	1.5	2.1	1.4	1.5
Walk 1 *	-	4	-	-
Don't Walk 1	-	13	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	MAX/PED RECALL	MAX RECALL	MAX RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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.

▽FIGURE 1

TYPE 1A- CHANGEABLE TRAILBLAZER SIGN

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
A	No Left Turn Sign (R3-2)	A
B	No Right Turn Sign (R3-1)	B
▽C	Type 1A Changeable Trailblazer sign (See Figure 1)	C

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
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(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
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4/16/2019
SIGNATURE DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

N
SCALE 0 20
1"=20'

US 29-74-NC 274
(E. Franklin Boulevard)
at
US 321 N (York St.)

Division 12 Gaston County Gastonia

PLAN DATE:	January 2005	REVIEWED BY:	
PREPARED BY:	WS/TSB	REVIEWED BY:	

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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SIGNATURE DATE

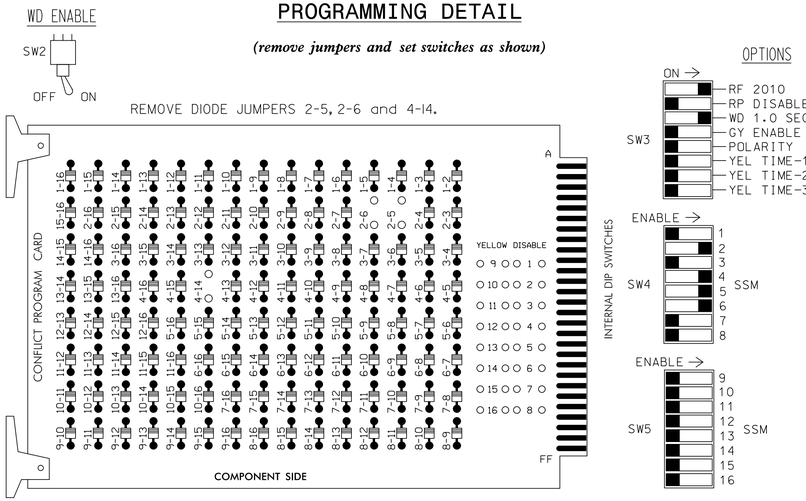
SIG. INVENTORY NO. 12-0039

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

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 3.1

EDI MODEL 2010ECL 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 SEL1-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 4 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Gastonia City System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,*S2P,S4,S4P,S5,S6
PHASES USED.....2,*2PED,4,4PED,5,6
OVERLAPS.....NONE
*Changeable Trailblazer Sign Only

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	SIGN C	NU	41,42	P41, P42	21	61,62	NU	NU	NU	NU
GREEN		130			103			136				
YELLOW		129			102			135				
RED		128			101		*	134				
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
🚶						106						
PED YELLOW			** 114			** 105						
✋						104						

NU = Not Used

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

** A Changeable Trailblazer Sign is wired to 2P-Y (2 PED YELLOW) and 4P-Y (4 PED YELLOW). See wiring and programming detail on this sheet.

INPUT FILE POSITION LAYOUT

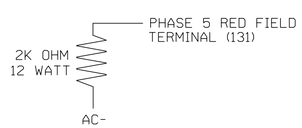
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

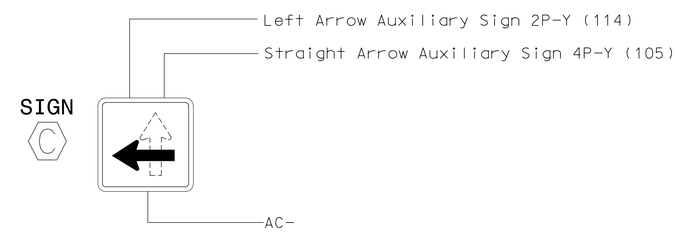
FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY(114) and 4PY(105).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0039
DESIGNED: January 2005
SEALED: 02-07-05
REVISED: 4/16/2019

Signal Upgrade Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 4/16/2019
DC87A59ED60B437...
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:
Transportation Mobility and Safety Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74-NC 274
(E. Franklin Boulevard)
at
US 321 N (York St.)

Division 12 Gaston County Gastonia
PLAN DATE: February 2005 REVIEWED BY: T. Joyce
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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SIGNATURE DATE
SIG. INVENTORY NO. 12-0039

$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 3.2

▽1 LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGN

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #31

```
  LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #35  IS OFF
AND CURRENT PLAN      #37  IS OFF
AND CURRENT PLAN      #39  IS OFF
AND CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #61  IS OFF
                  ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #35 OFF
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN      #35  IS ON
AND CURRENT PLAN      #37  IS ON
AND CURRENT PLAN      #39  IS ON
AND CURRENT PLAN      #41  IS ON
AND CURRENT PLAN      #43  IS ON
AND CURRENT PLAN      #45  IS ON
AND CURRENT PLAN      #61  IS ON
                  ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #35 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0039
DESIGNED: January 2005
SEALED: 02-07-05
REVISED: 4/16/2019

Signal Upgrade Sheet 2 of 2

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PLANS PREPARED IN THE OFFICE OF:
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Raleigh, NC 27601
(919) 677-2000

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: 0C87A59ED60B437...

4/16/2019

SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA
Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74-NC 274 (E. Franklin Boulevard) at US 321 N (York St.)

Division 12 Gaston County Gastonia

PLAN DATE: February 2005		REVIEWED BY:	T. Joyce
PREPARED BY: James Peterson		REVIEWED BY:	

REVISIONS	INIT.	DATE
▽1 ADD TRAILBLAZER SIGN PROGRAMMING	SLP	4/2019

SEAL

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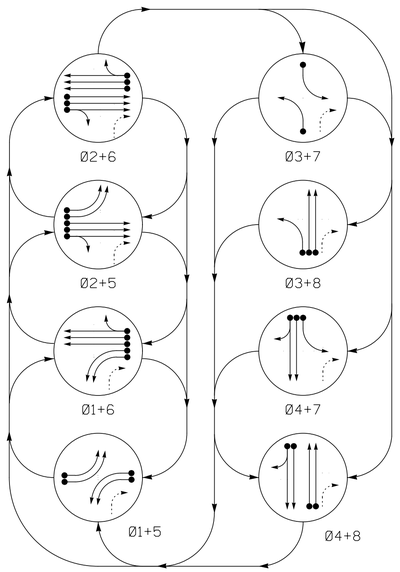
SIGNATURE DATE

SIG. INVENTORY NO. 12-0039

$$$$ SYSTEMNAME $$$$
$$$$ SYSTIME $$$$ $$$$DGNS $$$$
$$$$ USERNAME $$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 4.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

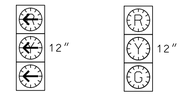
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11, 12	←-	←-	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←-	←-	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51, 52	←-	~~R~~	←-	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←-	~~R~~	←-	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
SIGN 'C'	*	*	*	*	*	*	*	*	OFF
SIGN 'D'	*	*	*	*	*	*	*	*	OFF
SIGN 'E'	*	*	*	*	*	*	*	*	OFF
SIGN 'F'	*	*	*	*	*	*	*	*	OFF

*Changeable Trailblazer Signs controlled remotely

SIGNAL FACE I.D.

Denotes L.E.D.



11, 12	21, 22
31	41, 42
51, 52	61, 62
71	81, 82

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	6x60	Existing	Existing	—	1	Y	Y	-	-	-	·	Y
1B	6x60	Existing	Existing	—	1	Y	Y	-	-	-	-	Y
2A	Existing	Existing	Existing	—	2	Y	Y	-	-	-	-	Y
3A	6x60	Existing	Existing	—	3	Y	Y	-	-	-	-	Y
4A	Existing	Existing	Existing	—	4	Y	Y	-	-	-	-	Y
5A	6x60	Existing	Existing	—	5	Y	Y	-	-	-	-	Y
5B	6x60	Existing	Existing	—	5	Y	Y	-	-	-	-	Y
6A	Existing	Existing	Existing	—	6	Y	Y	-	-	-	-	Y
7A	6x60	Existing	Existing	—	7	Y	Y	-	-	-	-	Y
8A	Existing	Existing	Existing	—	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Gastonia City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4 Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. City system data:
   Controller Asset #: 0050.

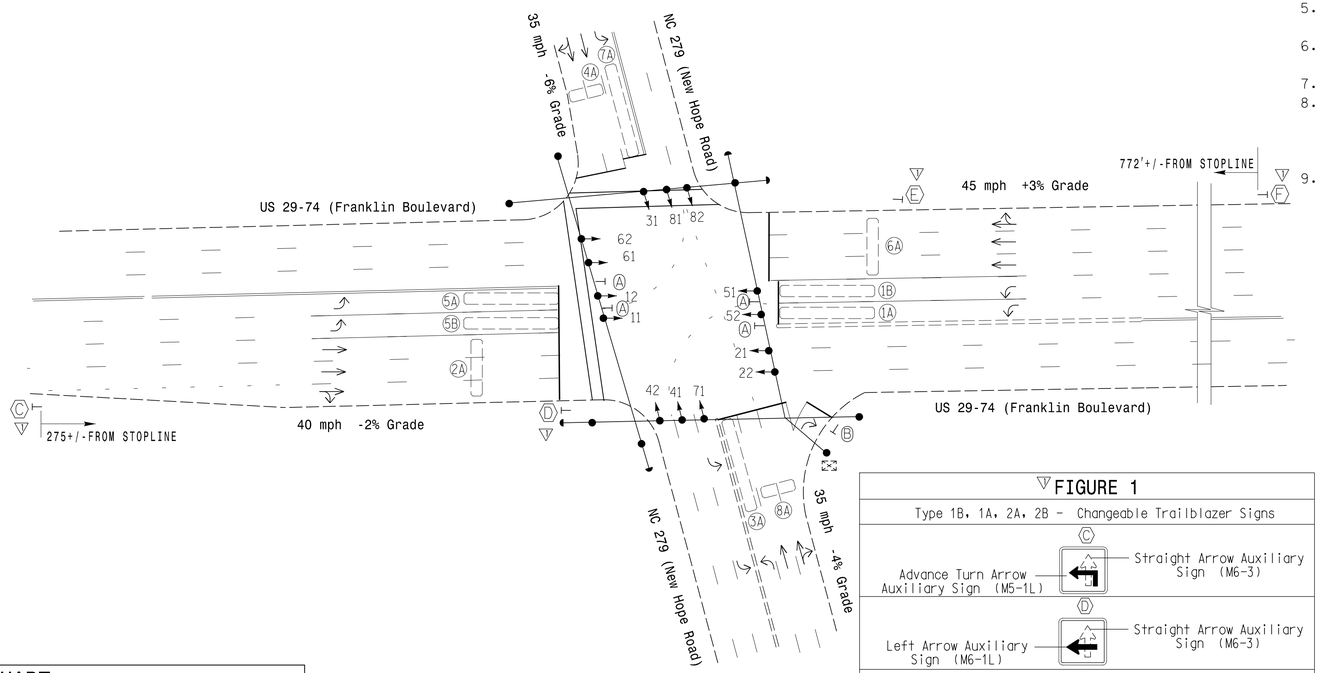
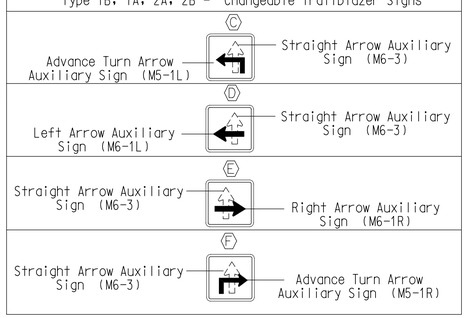


FIGURE 1

Type 1B, 1A, 2A, 2B - Changeable Trailblazer Signs



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	"YIELD" Sign (R1-2)	B
C	Type 1B Changeable Trailblazer sign (See Figure 1)	C
D	Type 1A Changeable Trailblazer sign (See Figure 1)	D
E	Type 2A Changeable Trailblazer sign (See Figure 1)	E
F	Type 2B Changeable Trailblazer sign (See Figure 1)	F

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
Max Green 1 *	20	60	20	30	20	60	20	30
Yellow Clearance	4.0	4.7	4.0	4.0	4.0	4.7	4.0	4.0
Red Clearance	2.0	2.0	3.0	3.2	2.5	2.0	3.8	3.2
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* 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.

$$$$$SYSTIME$$$$
$$$$$SYSDATE$$$$
$$$$$SYSTIME$$$$
$$$$$SYSDATE$$$$
$$$$$USERNAME$$$$

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 4/16/2019
0C87A59ED60B437...
SIGNATURE DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 40
1"=40'

US 29-74 (Franklin Boulevard)
at
NC 279 (New Hope Road)

Division 12 Gaston County Gastonia

PLAN DATE: April 2004 REVIEWED BY:
PREPARED BY: Hambright/Porter REVIEWED BY:

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

SEAL
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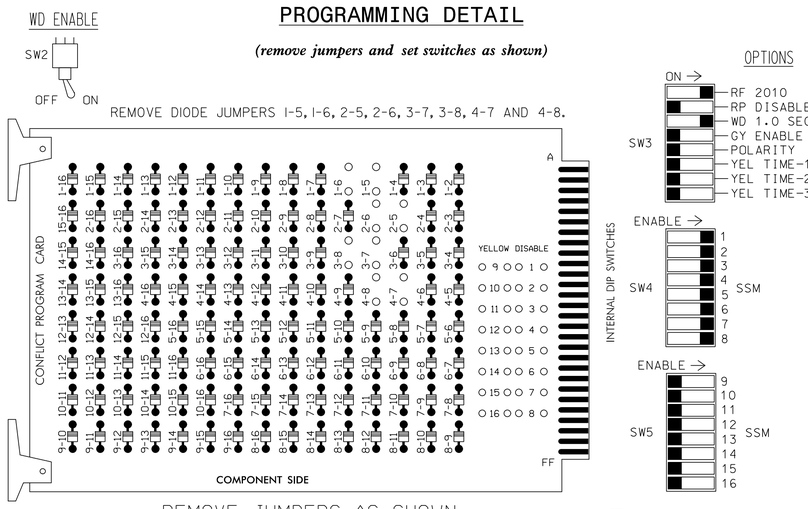
SIGNATURE DATE

SIG. INVENTORY NO. 12-0050

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 4.1

EDI MODEL 2010ECL 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 SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
5. THE CABINET AND CONTROLLER ARE PART OF GASTONIIA CITY SYSTEM.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

▽FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11,12	21,22	SIGN C/E	31	41,42	SIGN C	51,52	61,62	SIGN D	71	81,82	SIGN D/F
GREEN		130			103			136			109	
YELLOW		129			102			135			108	
RED		128			101			134			107	
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		
✋			** 113									** 110
PED YELLOW			** 114			** 105			** 120			** 111
🚶			** 115									** 112

NU = NOT USED

** Changeable Trailblazer Signs. See wiring and programming detail on sheet 2.

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 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	Ø 1 1B	NOT USED			NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	Ø 5 5B	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 ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-3,4	I1L	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0050
DESIGNED: APRIL 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 1 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS

DocuSigned by: 4/16/2019
0C87A59ED60B437...
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 29-74 (FRANKLIN BOULEVARD) AT NC 279 (NEW HOPE ROAD)

DIVISION 12 GASTON COUNTY GASTONIA

PLAN DATE: DECEMBER 2004	REVIEWED BY: T. JOYCE		
PREPARED BY: JAMES PETERSON	REVIEWED BY:		
REVISIONS		INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN		SLP	4/2019

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This document is only certified as to the revisions.
SIGNATURE DATE

SIG. INVENTORY NO. 12-0050

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

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 4.2

▽ CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL

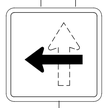
SIGN (C)

Advance Turn Arrow Auxiliary Sign 2P-Y (114)

Straight Arrow Auxiliary Sign 4P-Y (105)

AC-

SIGN (D)

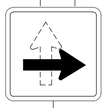


Left Arrow Auxiliary Sign 6P-Y (120)

Straight Arrow Auxiliary Sign 8P-Y (111)

AC-

SIGN (E)

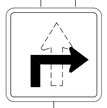


Right Arrow Auxiliary Sign 2P-R (113)

Straight Arrow Auxiliary Sign 2P-G (115)

AC-

SIGN (F)



Advance Turn Arrow Auxiliary Sign 8P-R (110)

Straight Arrow Auxiliary Sign 8P-G (112)

AC-

NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY (114), 4PY(105), 6PY (120), 8PY (111), 2PR (113), 2PG (115), 8PR (110), 8PG (112).

▽ LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGNS

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 29, 30, 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #29

```
  LOGICAL I/O COMMAND  #29  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS OFF
AND CURRENT PLAN      #59  IS OFF
AND CURRENT PLAN      #63  IS OFF
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT  #9 ON
SET OUTPUT  ASSIGNMENT #17 ON
SET OUTPUT  ASSIGNMENT #10 OFF
SET OUTPUT  ASSIGNMENT #18 OFF
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #30  (+/-COMMAND#)
IF  CURRENT PLAN      #39  IS OFF
AND CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #47  IS OFF
AND CURRENT PLAN      #49  IS OFF
AND CURRENT PLAN      #51  IS OFF
AND CURRENT PLAN      #61  IS OFF
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #34 ON
SET OUTPUT  ASSIGNMENT #35 OFF
SET OUTPUT  ASSIGNMENT #36 OFF
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS ON
OR  CURRENT PLAN      #59  IS ON
OR  CURRENT PLAN      #63  IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #9  OFF
SET OUTPUT  ASSIGNMENT #17 OFF
SET OUTPUT  ASSIGNMENT #10 ON
SET OUTPUT  ASSIGNMENT #18 ON
```

PRESS '+'

```
  LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN      #39  IS ON
OR CURRENT PLAN       #41  IS ON
OR CURRENT PLAN       #43  IS ON
OR CURRENT PLAN       #45  IS ON
OR CURRENT PLAN       #47  IS ON
OR CURRENT PLAN       #49  IS ON
OR CURRENT PLAN       #51  IS ON
OR CURRENT PLAN       #61  IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #34 OFF
SET OUTPUT  ASSIGNMENT #35 ON
SET OUTPUT  ASSIGNMENT #36 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0050
DESIGNED: APRIL 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 2 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

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SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, DEPARTMENT OF TRANSPORTATION, STATE OF NORTH CAROLINA

750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (FRANKLIN BOULEVARD) AT NC 279 (NEW HOPE ROAD)

DIVISION 12 GASTON COUNTY GASTONIA

PLAN DATE: DECEMBER 2004 REVIEWED BY: T. JOYCE

PREPARED BY: JAMES PETERSON REVIEWED BY:

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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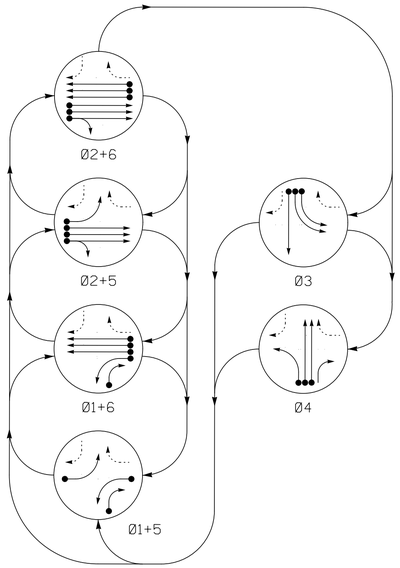
SIGNATURE DATE

SIG. INVENTORY NO. 12-0050

$$$$SYSTEM$$$$
$$$$STANDARDS$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 5.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

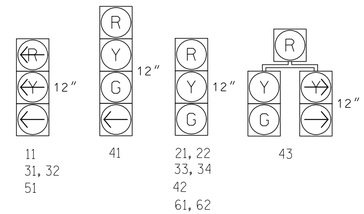
▽TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	↚	↚	̸R	̸R	̸R	̸R	̸R
21, 22	R	R	G	G	R	R	Y
31, 32	̸R	̸R	̸R	̸R	↚	̸R	̸R
33, 34	R	R	R	R	G	R	R
41	R	R	R	R	G ←	R	R
42	R	R	R	R	R	G	R
43	R/̸R	R/̸R	R	R	R	G	R
51	↚	̸R	↚	̸R	̸R	̸R	̸R
61, 62	R	G	R	G	R	R	Y
SIGN 'E'	*	*	*	*	*	*	OFF
SIGN 'F'	*	*	*	*	*	*	OFF
SIGN 'G'	*	*	*	*	*	*	OFF
SIGN 'H'	*	*	*	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

All Heads L.E.D.

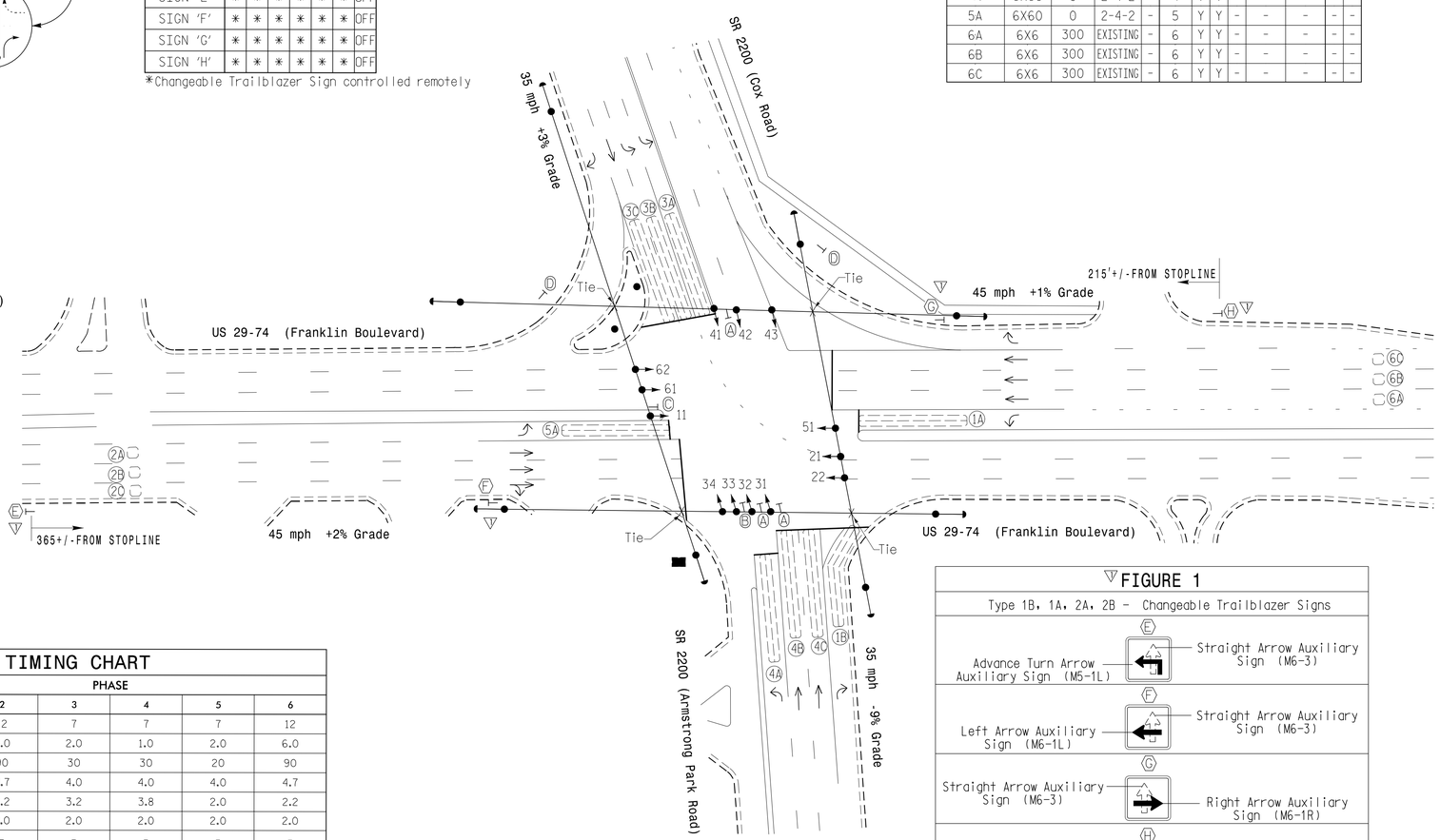


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	-
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	300	EXISTING	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	EXISTING	-	2	Y	Y	-	-	-	-	-
2C	6X6	300	EXISTING	-	2	Y	Y	-	-	-	-	-
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	-
3B	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	-
3C	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4C	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	-
6A	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	-
6C	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	-

6 Phase Fully Actuated Gastonia City System

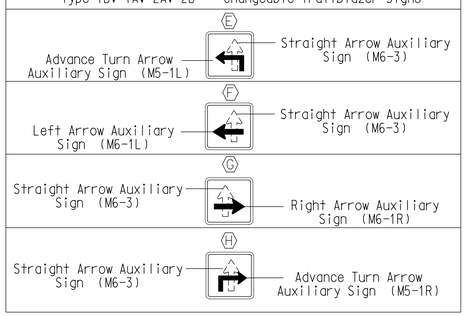
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #0077.



▽FIGURE 1

Type 1B, 1A, 2A, 2B - Changeable Trailblazer Signs



▽LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Through Arrow "ONLY" Sign (R3-5A)	Ⓑ
Ⓒ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓒ
Ⓓ	"YIELD" Sign (R1-2)	Ⓓ
Ⓔ	Type 1B Changeable Trailblazer sign (See Figure 1)	Ⓔ
Ⓕ	Type 1A Changeable Trailblazer sign (See Figure 1)	Ⓕ
Ⓖ	Type 2A Changeable Trailblazer sign (See Figure 1)	Ⓖ
Ⓗ	Type 2B Changeable Trailblazer sign (See Figure 1)	Ⓗ

2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	6.0	2.0	1.0	2.0	6.0
Max Green 1 *	20	90	30	30	20	90
Yellow Clearance	4.0	4.7	4.0	4.0	4.0	4.7
Red Clearance	3.7	2.2	3.2	3.8	2.0	2.2
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

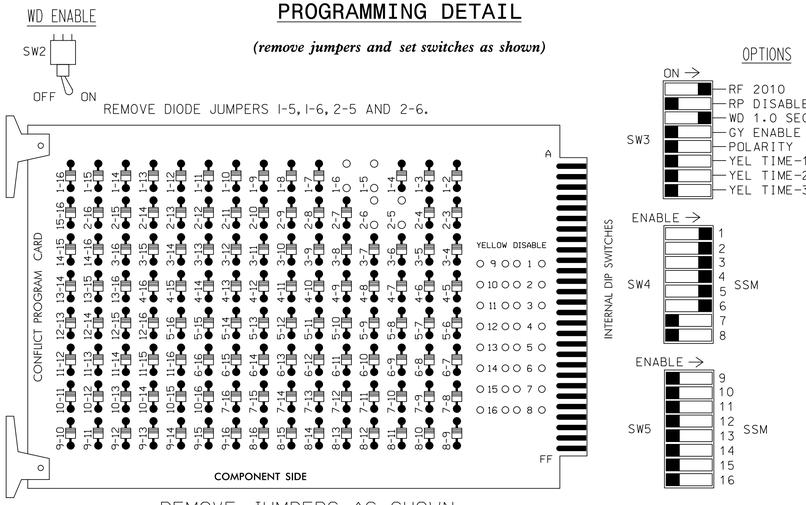
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$$$SYSTIME$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 5.1

EDI MODEL 2010ECL 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 SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 7,8,9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
5. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VARIABLE INITIAL AND GAP REDUCTION.
6. THE CABINET AND CONTROLLER ARE PART OF THE GASTONIA CITY SYSTEM.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

▽ FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3		S4		S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1		2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	43	21,22	SIGN E/G	31,32	33,34	41	42,43	SIGN E	51	61,62	SIGN F	NU	NU	SIGN F/H
GREEN			130			118	103	103			136				
YELLOW			129			117	102	102			135				
RED			128			116	101	101			134				
RED ARROW	125				116					131					
YELLOW ARROW	126	126			117					132					
GREEN ARROW	127	127			118		103			133					
✋				** 113											** 110
PED YELLOW				** 114					** 105			** 120			** 111
🚶				** 115											** 112

NU = NOT USED

** Changeable Trailblazer Signs. See wiring and programming detail on sheet 2.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø1 1A	Ø2 2A	Ø2 2C	Ø3 3A	Ø3 3B	Ø4 4A	Ø4 4C	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø1 1B	Ø2 2B	NOT USED	NOT USED	Ø3 3C	Ø4 4B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	Ø6 6C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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 ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
4C	TB6-5,6	I8U	49	11	24	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0077
DESIGNED: APRIL 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE Sheet 1 of 2

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PLANS PREPARED IN THE OFFICE OF:
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750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74(FRANKLIN BOULEVARD) AT SR 2200 (ARMSRTRONG PARK ROAD/ COX ROAD)

DIVISION 12 GASTON COUNTY GASTONIA
PLAN DATE: DECEMBER 2004 REVIEWED BY: T. JOYCE
PREPARED BY: JAMES PETERSON REVIEWED BY:

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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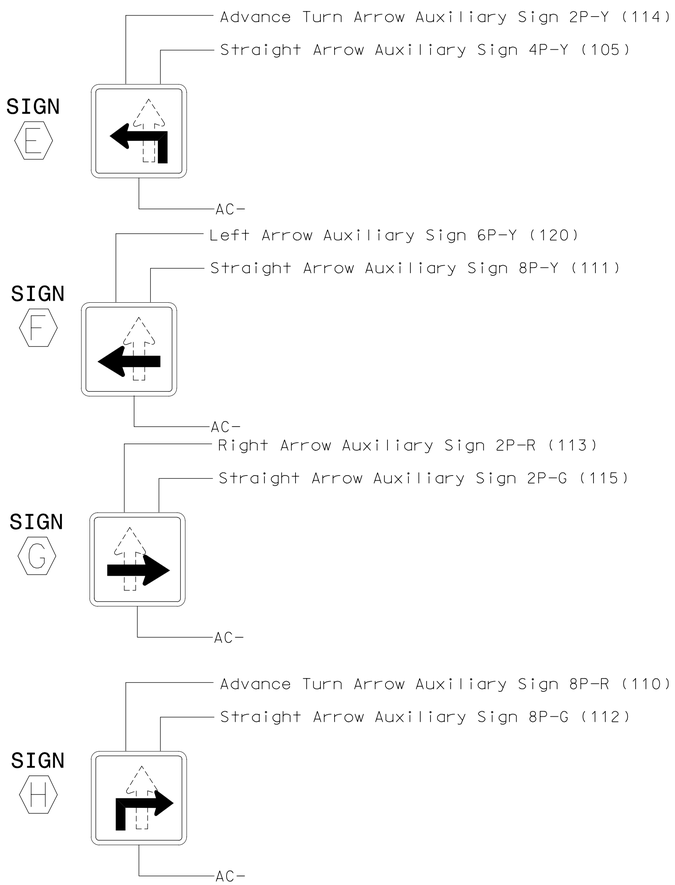
SIG. INVENTORY NO. 12-0077

$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 5.2

CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY (114), 4PY(105), 6PY (120), 8PY (111), 2PR (113), 2PG (115), 8PR (110), 8PG (112).

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGNS

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 29, 30, 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #29

```
LOGICAL I/O COMMAND  #29  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS OFF
AND CURRENT PLAN      #59  IS OFF
AND CURRENT PLAN      #63  IS OFF
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT  #9 ON
SET OUTPUT  ASSIGNMENT #17 ON
SET OUTPUT  ASSIGNMENT #10 OFF
SET OUTPUT  ASSIGNMENT #18 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND  #30  (+/-COMMAND#)
IF  CURRENT PLAN      #39  IS OFF
AND CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #47  IS OFF
AND CURRENT PLAN      #49  IS OFF
AND CURRENT PLAN      #51  IS OFF
AND CURRENT PLAN      #61  IS OFF
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #34 ON
SET OUTPUT  ASSIGNMENT #35 OFF
SET OUTPUT  ASSIGNMENT #36 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS ON
OR  CURRENT PLAN      #59  IS ON
OR  CURRENT PLAN      #63  IS ON
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #9  OFF
SET OUTPUT  ASSIGNMENT #17 OFF
SET OUTPUT  ASSIGNMENT #10 ON
SET OUTPUT  ASSIGNMENT #18 ON
```

PRESS '+'

```
LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN      #39  IS ON
OR CURRENT PLAN       #41  IS ON
OR CURRENT PLAN       #43  IS ON
OR CURRENT PLAN       #45  IS ON
OR CURRENT PLAN       #47  IS ON
OR CURRENT PLAN       #49  IS ON
OR CURRENT PLAN       #51  IS ON
OR CURRENT PLAN       #61  IS ON
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #34 OFF
SET OUTPUT  ASSIGNMENT #35 ON
SET OUTPUT  ASSIGNMENT #36 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0077
DESIGNED: APRIL 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE Sheet 2 of 2

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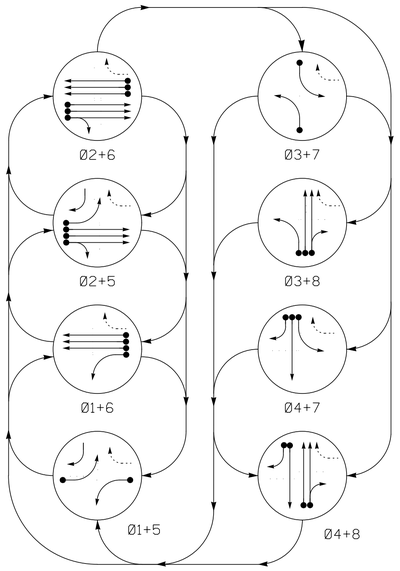
$$$$SYSTIME$$$$
$$$$SYSTIME$$$$
$$$$DGNNAME$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 6.0

8 Phase
Fully Actuated
(Gastonia City System))

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

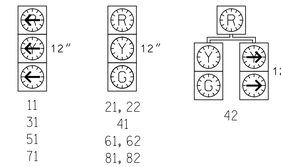
TABLE OF OPERATION

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, 22	R	R	G	G	R	R	R	R	Y
31	-R	-R	-R	-R	←-	←-	-R	-R	-R
41	R	R	R	R	R	R	G	G	R
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	Y
71	-R	-R	-R	-R	←-	-R	←-	-R	-R
81, 82	R	R	R	R	R	G	R	G	R
SIGN 'C'	*	*	*	*	*	*	*	*	OFF
SIGN 'D'	*	*	*	*	*	*	*	*	OFF
SIGN 'E'	*	*	*	*	*	*	*	*	OFF
SIGN 'F'	*	*	*	*	*	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

Denotes L.E.D.



2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	6x30	Existing	Existing	-	1	Y	Y	-	-	-	-	Y
1B	6x30	Existing	Existing	-	1	Y	Y	-	-	-	-	Y
1C	6x30	Existing	Existing	-	1	Y	Y	-	-	-	-	Y
2A	6x6	Existing	Existing	-	2	Y	Y	-	-	-	-	Y
2B	6x6	Existing	Existing	-	2	Y	Y	-	-	-	-	Y
2C	6x6	Existing	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6x60	Existing	Existing	-	3	Y	Y	-	-	-	-	Y
4A	6x60	Existing	Existing	-	4	Y	Y	-	-	-	-	Y
4B	6x40	Existing	Existing	-	4	Y	Y	-	-	-	10	Y
5A	6x30	Existing	Existing	-	5	Y	Y	-	-	-	-	Y
5B	6x30	Existing	Existing	-	5	Y	Y	-	-	-	-	Y
5C	6x30	Existing	Existing	-	5	Y	Y	-	-	-	-	Y
6A	6x6	Existing	Existing	-	6	Y	Y	-	-	-	-	Y
6B	6x6	Existing	Existing	-	6	Y	Y	-	-	-	-	Y
6C	6x6	Existing	Existing	-	6	Y	Y	-	-	-	-	Y
7A	6x60	Existing	Existing	-	7	Y	Y	-	-	-	-	Y
8A	6x60	Existing	Existing	-	8	Y	Y	-	-	-	-	Y
8B	6x60	Existing	Existing	-	8	Y	Y	-	-	-	10	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Remove existing "Left Turn Signal" sign(s)-(R10-10L) and/or existing "Right Turn Signal" sign(s)-(R10-10R).
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. City system data:
    Controller Asset #: 0151.

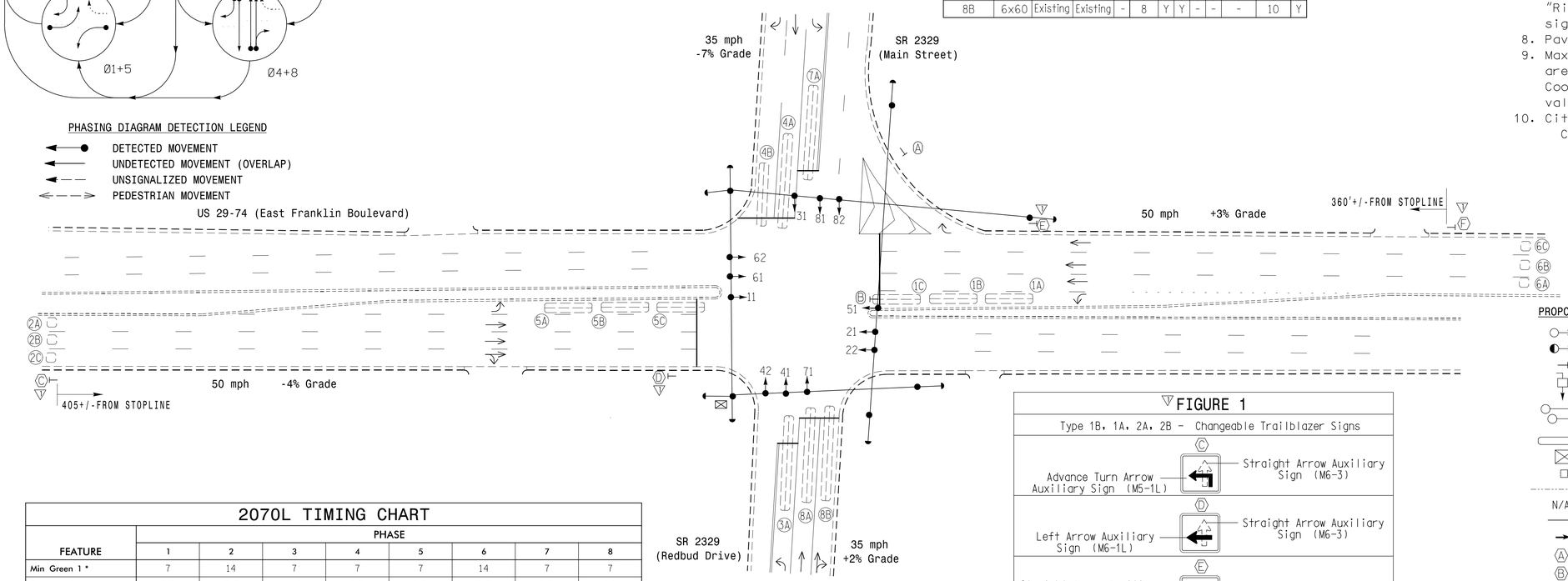


FIGURE 1

Type 1B, 1A, 2A, 2B - Changeable Trailblazer Signs

Advance Turn Arrow Auxiliary Sign (M5-1L)	C	Straight Arrow Auxiliary Sign (M6-3)
Left Arrow Auxiliary Sign (M6-1L)	D	Straight Arrow Auxiliary Sign (M6-3)
Straight Arrow Auxiliary Sign (M6-3)	E	Right Arrow Auxiliary Sign (M6-1R)
Straight Arrow Auxiliary Sign (M6-3)	F	Advance Turn Arrow Auxiliary Sign (M5-1R)

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
A	"YIELD" Sign (R1-2)	A
B	U-Turn "MUST YIELD" Sign (R3-27)	B
C	Type 1B Changeable Trailblazer sign (See Figure 1)	C
D	Type 1A Changeable Trailblazer sign (See Figure 1)	D
E	Type 2A Changeable Trailblazer sign (See Figure 1)	E
F	Type 2B Changeable Trailblazer sign (See Figure 1)	F

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	7	7	14	7	7
Extension 1 *	2.0	6.0	2.0	1.0	1.0	6.0	1.0	2.0
Max Green 1 *	20	90	20	30	20	90	20	30
Yellow Clearance	4.0	5.1	4.0	4.0	4.0	5.1	4.0	4.0
Red Clearance	2.0	1.7	2.7	2.7	2.6	1.7	2.9	2.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* 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.

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

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 0C87A59ED008437...
4/16/2019
SIGNATURE DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

N
SCALE 0 40
1"=40'

US 29-74 (Wilkinson Boulevard)
at
SR 2329 (Main Street/
Redbud Drive)

Division 12 Gaston County Gastonia

PLAN DATE: November 2004 REVIEWED BY:
PREPARED BY: AB Hambright REVIEWED BY:

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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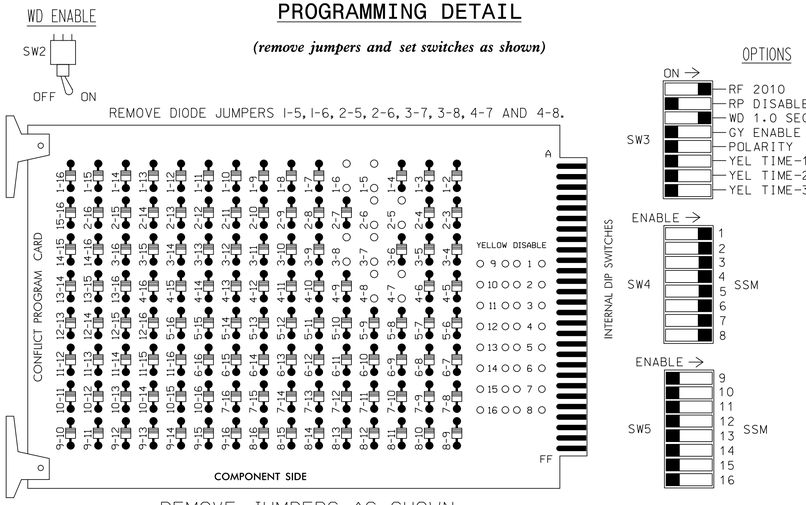
SIGNATURE DATE
SIG. INVENTORY NO. 12-0151

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 6.1

EDI MODEL 2010ECL 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 SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
5. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VARIABLE INITIAL AND GAP REDUCTION.
6. THE CABINET AND CONTROLLER ARE PART OF THE GASTONIA CITY SYSTEM.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

▽ FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	SIGN C/E	31	41,42	SIGN C	42	51	61,62	SIGN D/F	71	81,82	SIGN D
GREEN		130			103				136			109	
YELLOW		129			102				135			108	
RED		128			101				134			107	
RED ARROW	125			116				131			122		
YELLOW ARROW	126			117			132	132			123		
GREEN ARROW	127			118			133	133			124		
✋			** 113							** 119			
PED YELLOW			** 114			** 105				** 120			** 111
🚶			** 115							** 121			

NU = NOT USED
** Changeable Trailblazer Signs. See wiring and programming detail on sheet 2.

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 1A	Ø 1 1B	Ø 2 2A	Ø 2 2C	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 1 1C	Ø 2 2B	NOT USED	NOT USED	Ø 4 4B								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 5 5B	Ø 6 6A	Ø 6 6C	Ø 7 7A	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 5 5C	Ø 6 6B	NOT USED	NOT USED	Ø 8 8B								

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 ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
6C	TB5-1,2	J4U	48	10	26	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0151
DESIGNED: NOVEMBER 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 1 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 9C67A9ED6DB847...
4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (WILKINSON BOULEVARD)
AT
SR 2329 (MAIN STREET/ REDBUD DRIVE)

DIVISION 12 GASTON COUNTY GASTONIA
PLAN DATE: DECEMBER 2004 REVIEWED BY: T. JOYCE
PREPARED BY: JAMES PETERSON REVIEWED BY:

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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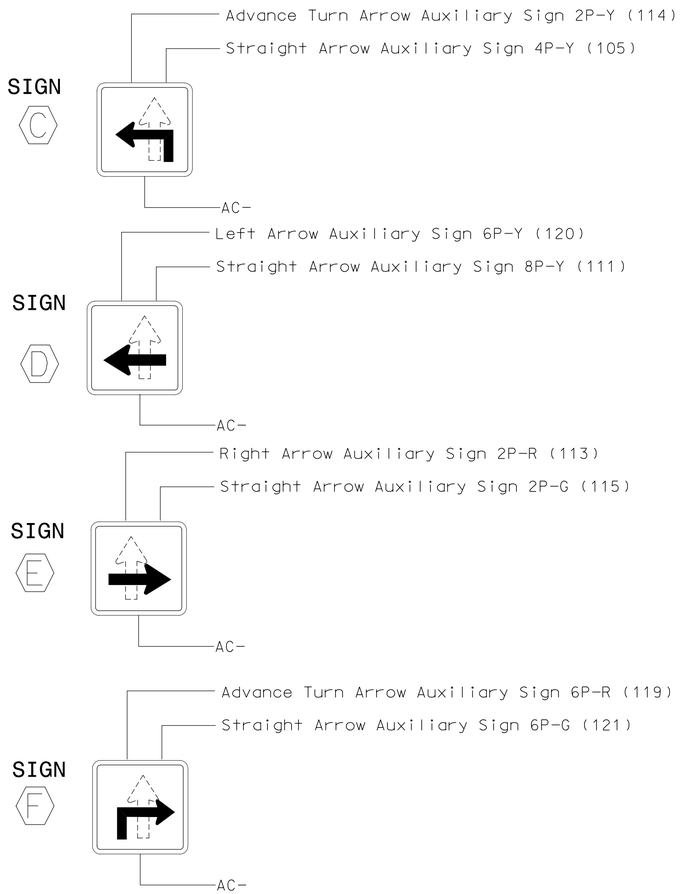
SIGNATURE DATE
SIG. INVENTORY NO. 12-0151

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

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 6.2

1 CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY(114), 4PY(105), 6PY (120), 8PY (111), 2PR (113), 2PG (115), 6PR (119), 6PG (121).

1 LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO CONTROL TRAILBLAZER SIGNS

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 29, 30, 31 AND 32.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

TOGGLE TO COMMAND #29

```
LOGICAL I/O COMMAND  #29  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS OFF
AND CURRENT PLAN      #59  IS OFF
AND CURRENT PLAN      #63  IS OFF
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT  #9 ON
SET OUTPUT  ASSIGNMENT #25 ON
SET OUTPUT  ASSIGNMENT #10 OFF
SET OUTPUT  ASSIGNMENT #26 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND  #30  (+/-COMMAND#)
IF  CURRENT PLAN      #41  IS OFF
AND CURRENT PLAN      #43  IS OFF
AND CURRENT PLAN      #45  IS OFF
AND CURRENT PLAN      #47  IS OFF
AND CURRENT PLAN      #49  IS OFF
AND CURRENT PLAN      #51  IS OFF
AND CURRENT PLAN      #61  IS OFF
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 ON
SET OUTPUT  ASSIGNMENT #34 ON
SET OUTPUT  ASSIGNMENT #35 OFF
SET OUTPUT  ASSIGNMENT #36 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND  #31  (+/-COMMAND#)
IF  CURRENT PLAN      #57  IS ON
OR  CURRENT PLAN      #59  IS ON
OR  CURRENT PLAN      #63  IS ON
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #9  OFF
SET OUTPUT  ASSIGNMENT #25 OFF
SET OUTPUT  ASSIGNMENT #10 ON
SET OUTPUT  ASSIGNMENT #26 ON
```

PRESS '+'

```
LOGICAL I/O COMMAND  #32  (+/-COMMAND#)
IF  CURRENT PLAN      #41  IS ON
OR CURRENT PLAN       #43  IS ON
OR CURRENT PLAN       #45  IS ON
OR CURRENT PLAN       #47  IS ON
OR CURRENT PLAN       #49  IS ON
OR CURRENT PLAN       #51  IS ON
OR CURRENT PLAN       #61  IS ON
                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
SET OUTPUT  ASSIGNMENT #34 OFF
SET OUTPUT  ASSIGNMENT #35 ON
SET OUTPUT  ASSIGNMENT #36 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0151
DESIGNED: NOVEMBER 2004
SEALED: 12-10-04
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 2 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: DC87A59ED60B437... 4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (WILKINSON BOULEVARD) AT SR 2329 (MAIN STREET/ REDBUD DRIVE)

DIVISION 12 GASTON COUNTY GASTONIA

PLAN DATE: DECEMBER 2004	REVIEWED BY: T. JOYCE		
PREPARED BY: JAMES PETERSON	REVIEWED BY:		
REVISIONS		INIT.	DATE
1 INSTALL CHANGEABLE TRAILBLAZER SIGN		SLP	4/2019

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SIGNATURE DATE

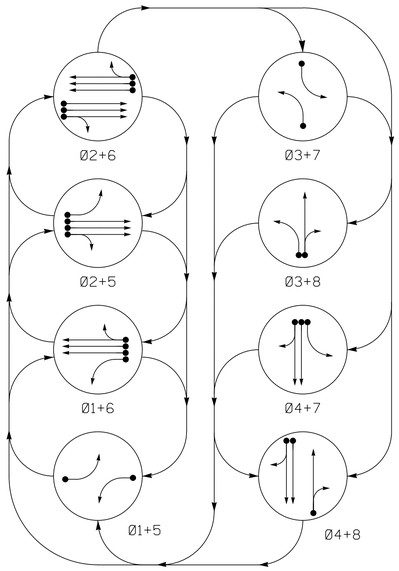
SIG. INVENTORY NO. 12-0151

$$$$SYSTIME$$$$
$$$$SYSTIME$$$$
$$$$DGNNAME$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 7.0

8 Phase Fully Actuated Belmont Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

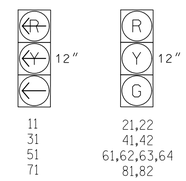
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←—	←—	↛R	↛R	↛R	↛R	↛R	↛R	↛R
21,22	R	R	G	G	R	R	R	R	Y
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
61,62,63,64	R	G	R	G	R	R	R	R	Y
71	↛R	↛R	↛R	↛R	←—	↛R	←—	↛R	↛R
81,82	R	R	R	R	R	G	R	G	R
SIGN 'C'	*	*	*	*	*	*	*	*	OFF
SIGN 'D'	*	*	*	*	*	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

All Heads L.E.D.

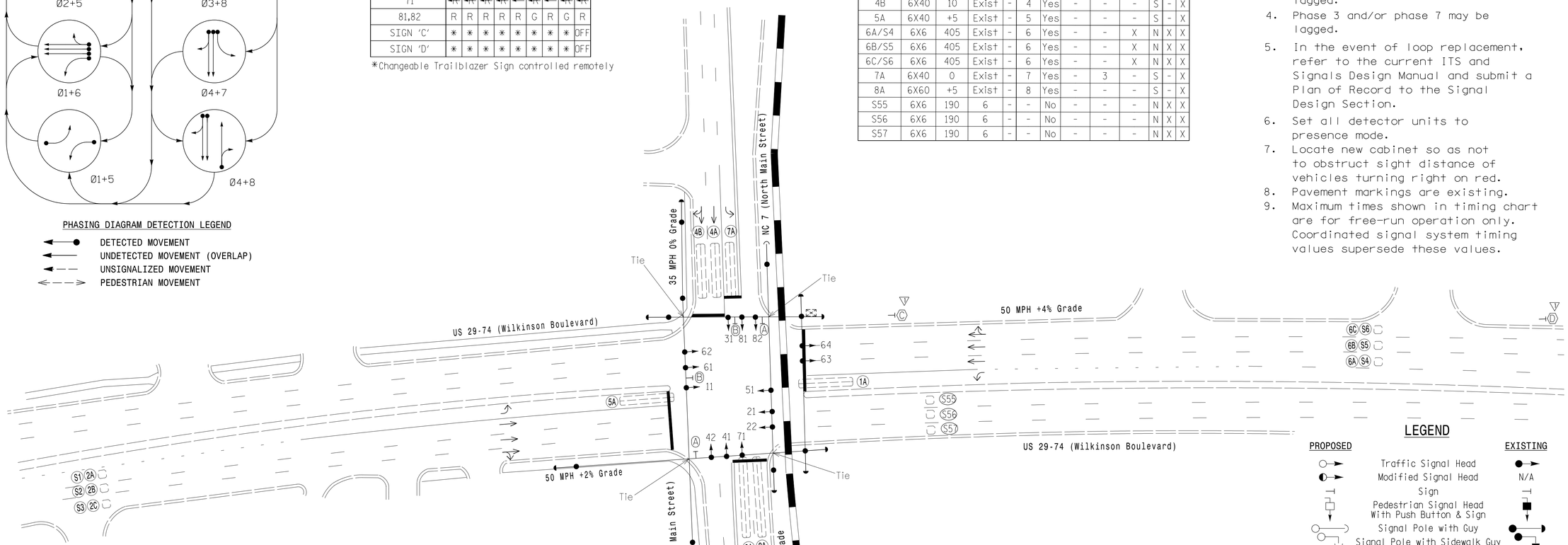


ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	+5	Exist	-	1	Yes	-	-	-	S	-	X
2A/S1	6X6	400	Exist	-	2	Yes	-	-	X	N	X	X
2B/S2	6X6	400	Exist	-	2	Yes	-	-	X	N	X	X
2C/S3	6X6	400	Exist	-	2	Yes	-	-	X	N	X	X
3A	6X60	+5	Exist	-	3	Yes	-	3	-	S	-	X
4A	6X40	10	Exist	-	4	Yes	-	-	-	S	-	X
4B	6X40	10	Exist	-	4	Yes	-	-	-	S	-	X
5A	6X40	+5	Exist	-	5	Yes	-	-	-	S	-	X
6A/S4	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
6B/S5	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
6C/S6	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
7A	6X40	0	Exist	-	7	Yes	-	3	-	S	-	X
8A	6X60	+5	Exist	-	8	Yes	-	-	-	S	-	X
S55	6X6	190	6	-	-	No	-	-	-	N	X	X
S56	6X6	190	6	-	-	No	-	-	-	N	X	X
S57	6X6	190	6	-	-	No	-	-	-	N	X	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
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. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
Ⓐ	"NO TURN ON RED" Sign (R10-11)	Ⓐ
Ⓑ	Street Name Sign	Ⓑ
Ⓒ	Type 2A Changeable Trailblazer sign (See Figure 1)	Ⓒ
Ⓓ	Type 2B Changeable Trailblazer sign (See Figure 1)	Ⓓ

FIGURE 1

Type 2A, 2B - Changeable Trailblazer Sign

Ⓒ

Straight Arrow Auxiliary Sign (M6-3) — Right Arrow Auxiliary Sign (M6-1R)

Ⓓ

Straight Arrow Auxiliary Sign (M6-3) — Advance Turn Arrow Auxiliary Sign (M5-1R)

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	14	7	7	7	14	7	7
Walk *	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0
Veh. Extension *	2.0	6.0	1.0	2.0	2.0	6.0	2.0	1.0
Max 1 *	25	90	25	45	25	90	25	45
Yellow	3.0	4.6	3.0	3.8	3.0	4.5	3.0	3.8
Red Clear	2.6	1.0	2.4	2.0	2.8	1.1	2.9	1.9
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	44	-	-	-	44	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.8	-	-	-	3.8	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
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.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER TACE L. PHILLIPS
DocuSigned by: DC87A59ED9DB437...
4/16/2019
SIGNATURE DATE

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

SCALE 0 40
1" = 40'

US 29-74 (Wilkinson Boulevard) at NC 7 (North Main Street)

Division 12 Gaston County Belmont

PLAN DATE:	December 2018	REVIEWED BY:	E. Sirgany
PREPARED BY:	M. Parker	REVIEWED BY:	

REVISIONS	INIT.	DATE
INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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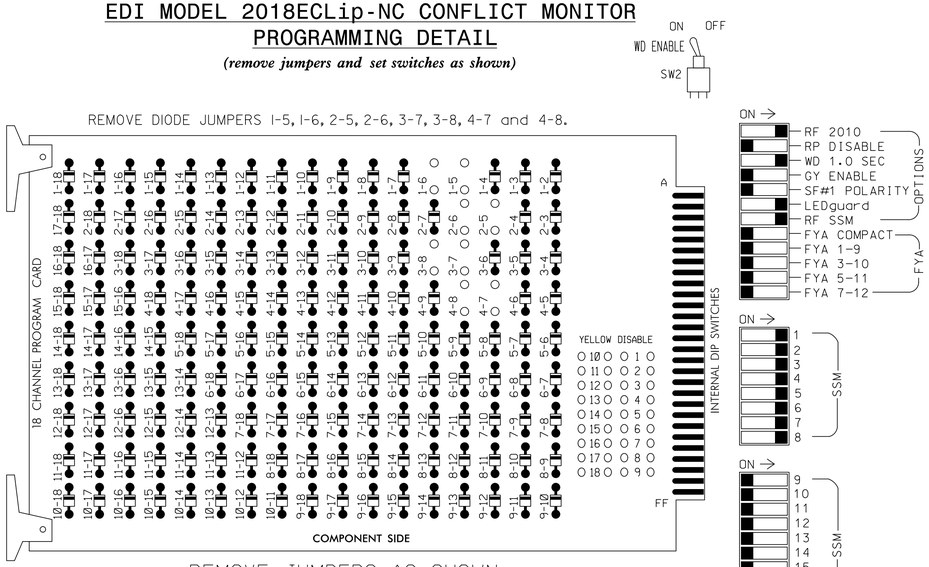
DATE

SIG. INVENTORY NO. 12-0561

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 7.1

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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 unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Belmont 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,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

▽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	SIGN C	31	41,42	SIGN C	51	61,62, 63,64	SIGN D	71	81,82	SIGN D	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126			117			132			123								
GREEN ARROW	127			118			133			124								
✋																		
PED YELLOW			** 114			** 105			** 120			** 111						
🚶																		

NU = Not Used

** Changeable Trailblazer Signs. See wiring and programming detail on this sheet.

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	Ø2/SYS	Ø2/SYS	SLOT	Ø 3	Ø 4	SLOT	SLOT	SYS. DET.	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A/S1	2C/S3	EMPTY	3A	4A	EMPTY	EMPTY	S55	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø2/SYS 2B/S2	NOT USED		NOT USED	Ø 4 4B			SYS. DET. S56					ST DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	Ø6/SYS	SLOT	Ø 7	Ø 8	SLOT	SLOT	SYS. DET.	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S4	6C/S6	EMPTY	7A	8A	EMPTY	EMPTY	S57	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø6/SYS 6B/S5	NOT USED		NOT USED	NOT USED			NOT USED					

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

FS = FLASH SENSE
ST = STOP TIME

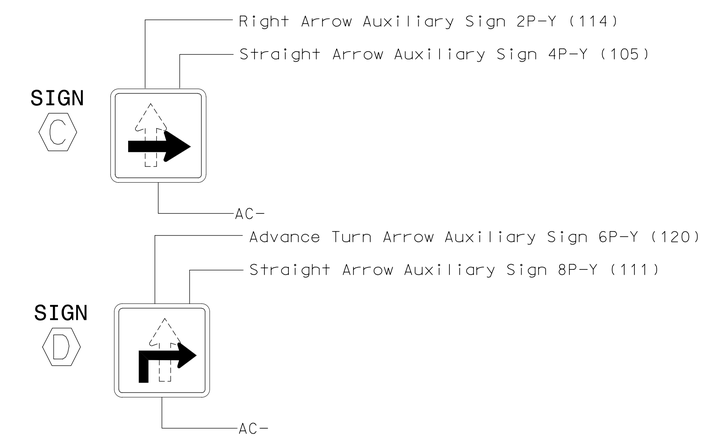
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES				S
2A/S1	TB2-5,6	I2U	39	2	2/SYS	YES			X	N
2B/S2	TB2-7,8	I2L	43	12	2/SYS	YES			X	N
2C/S3	TB2-9,10	I3U	63	32	2/SYS	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		3		S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES				S
*S55	TB6-9,10	I9U	60	11	SYS	NO				N
*S56	TB6-11,12	I9L	62	13	SYS	NO				N
5A	TB3-1,2	J1U	55	5	5	YES				S
6A/S4	TB3-5,6	J2U	40	6	6/SYS	YES			X	N
6B/S5	TB3-7,8	J2L	44	16	6/SYS	YES			X	N
6C/S6	TB3-9,10	J3U	64	36	6/SYS	YES			X	N
7A	TB5-5,6	J5U	57	7	7	YES		3		S
8A	TB5-9,10	J6U	42	8	8	YES				S
*S57	TB7-9,10	J9U	59	15	SYS	NO				N

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

▽CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY(114), 4PY(105), 6PY (120), 8PY (111)

Electrical Detai Sheet 1 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0561
DESIGNED: December 2018
SEALED: February 7, 2019
REVISED: 4/16/2019

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS
Docusigned by: SLP
DC67A59ED60B437...
4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (Wilkinson Boulevard)
at
NC 7 (North Main Street)

Division 12 Gaston County Belmont
PLAN DATE: December 2018 REVIEWED BY:
PREPARED BY: J. Smith REVIEWED BY: E. Sirgany

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

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DATE

SIG. INVENTORY NO. 12-0561

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 7.2

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR TRAILBLAZER SIGN(S)

(program controller as shown)

The following logic processor configuration sets sign(s) to the appropriate display by utilizing pedestrian load switches.

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

ENTER A "32" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   32  COPY FROM:   32  ACTIVE:  M   (T/F)

IF   COORD PLAN                  IS      55
OR   COORD PLAN                  IS      57
OR   COORD PLAN                  IS      59
OR   COORD PLAN                  IS      63


THEN  SIG SET PH PED CLR    4       ON
      SIG SET PH PED CLR    8       ON
      SIG SET PH PED CLR    2       OFF
      SIG SET PH PED CLR    6       OFF


ELSE  SIG SET PH PED CLR    4       OFF
      SIG SET PH PED CLR    8       OFF
      SIG SET PH PED CLR    2       ON
      SIG SET PH PED CLR    6       ON
```

4. From the LOGIC PROCESSOR Submenu select 1. LOGIC STATEMENT CONTROL

ENABLE LOGIC PROCESSOR STATEMENT 32 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
LP 1-15   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45  .  E  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0561
DESIGNED: December 2018
SEALED: February 7, 2019
REVISED: 4/16/2019

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
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(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS
DocuSigned by: 0C87A59ED608437... 4/16/2019
SIGNATURE DATE

Electrical Detail Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 29-74 (Wilkinson Boulevard)
at
NC 7 (North Main Street)

Division 12 Gaston County Belmont

PLAN DATE: December 2018	REVIEWED BY:		
PREPARED BY: J. Smith	REVIEWED BY: E. Sirgany		
REVISIONS		INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN		SLP	4/2019

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DATE

SIG. INVENTORY NO. 12-0561

$$$$$$SYSTIME$$$$
$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 8.0

PHASING DIAGRAM

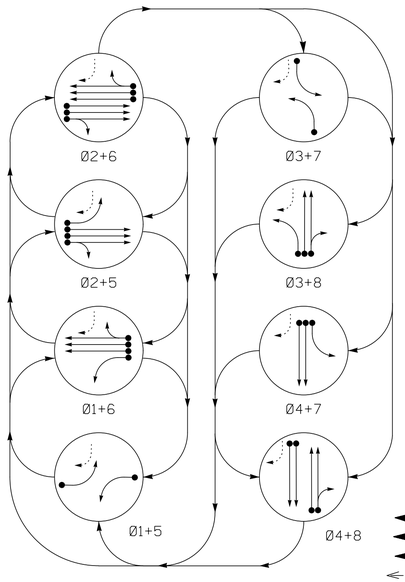


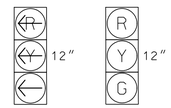
TABLE OF OPERATION

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~~
21,22,23	R	R	G	G	R	R	R	R	Y
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~~
61,62,63	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81,82	R	R	R	R	R	G	R	G	R
SIGN 'C'	*	*	*	*	*	*	*	*	OFF
SIGN 'D'	*	*	*	*	*	*	*	*	OFF
SIGN 'E'	*	*	*	*	*	*	*	*	OFF
SIGN 'F'	*	*	*	*	*	*	*	*	OFF

*Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

All Heads L.E.D.



11	21,22,23
31	41,42
51	61,62,63
71	81,82

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	Exist	-	1	Yes	-	-	-	S	-	X
2A/S19	6X6	405	Exist	-	2	Yes	-	-	X	N	X	X
2B/S20	6X6	405	Exist	-	2	Yes	-	-	X	N	X	X
2C/S21	6X6	405	Exist	-	2	Yes	-	-	X	N	X	X
3A	6X60	+5	Exist	-	3	Yes	-	-	-	S	-	X
4A/S27	6X6	300	Exist	-	4	No	3.1	-	-	N	X	X
4B/S28	6X6	300	Exist	-	4	No	3.1	-	-	N	X	X
4C	6X60	+5	Exist	-	4	Yes	-	-	-	S	-	X
4D	6X60	+5	Exist	-	4	Yes	-	3	-	S	-	X
5A	6X60	0	Exist	-	5	Yes	-	-	-	S	-	X
6A/S22	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
6B/S23	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
6C/S24	6X6	405	Exist	-	6	Yes	-	-	X	N	X	X
7A	6X60	+5	Exist	-	7	Yes	-	3	-	S	-	X
8A/S25	6X6	300	6	-	8	No	3.1	-	-	N	X	X
8B/S26	6X6	300	6	-	8	No	3.1	-	-	N	X	X
8C	6X60	+5	Exist	-	8	Yes	-	-	-	S	-	X
8D	6X60	+5	Exist	-	8	Yes	-	10	-	S	-	X
8E	6X20	0	2-4-2	-	8	Yes	-	10	-	S	-	X
S50	6X6	+180	6	-	-	No	-	-	-	N	X	X
S51	6X6	+180	6	-	-	No	-	-	-	N	X	X
S52	6X6	+200	6	-	-	No	-	-	-	N	X	X
S53	6X6	+200	6	-	-	No	-	-	-	N	X	X
S54	6X6	+200	6	-	-	No	-	-	-	N	X	X

8 Phase Fully Actuated Belmont Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
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. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

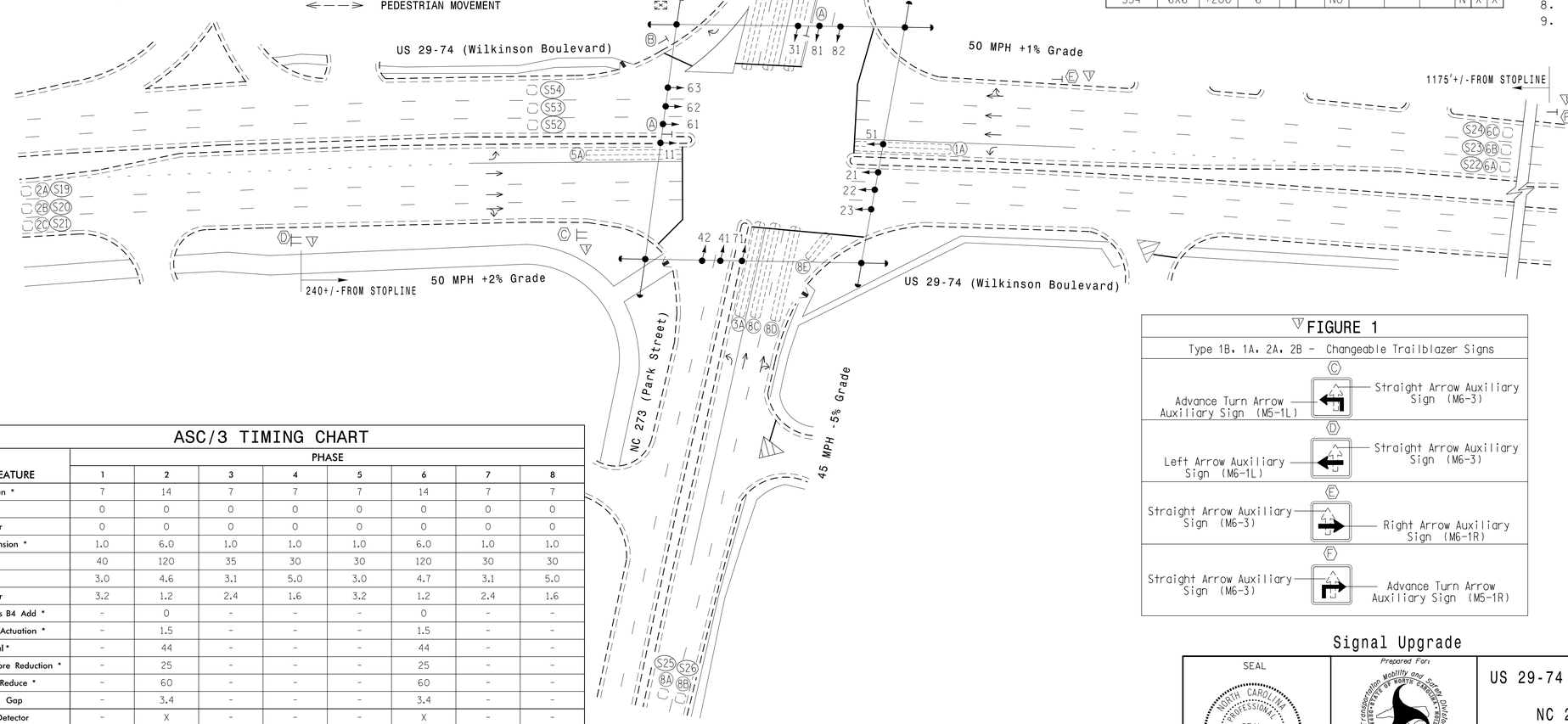


FIGURE 1

Type 1B, 1A, 2A, 2B - Changeable Trailblazer Signs

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	Street Name Sign	A
B	"YIELD" Sign (R1-2)	B
C	Type 1B Changeable Trailblazer sign (See Figure 1)	C
D	Type 1A Changeable Trailblazer sign (See Figure 1)	D
E	Type 2A Changeable Trailblazer sign (See Figure 1)	E
F	Type 2B Changeable Trailblazer sign (See Figure 1)	F

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	14	7	7	7	14	7	7
Walk *	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0
Veh. Extension *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max 1 *	40	120	35	30	30	120	30	30
Yellow	3.0	4.6	3.1	5.0	3.0	4.7	3.1	5.0
Red Clear	3.2	1.2	2.4	1.6	3.2	1.2	2.4	1.6
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	44	-	-	-	44	-	-
Time Before Reduction *	-	25	-	-	-	25	-	-
Time To Reduce *	-	60	-	-	-	60	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

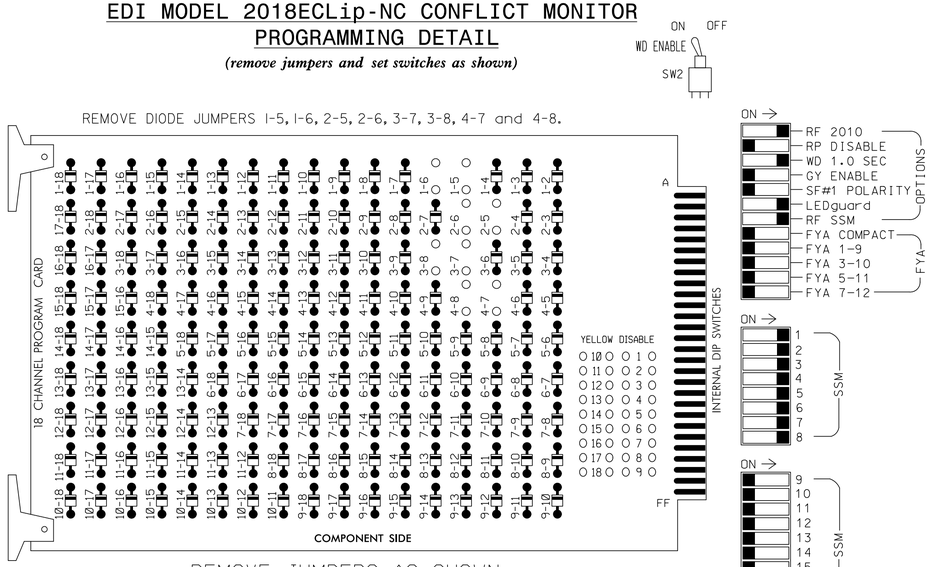
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$$$$SITEMS$$$$$
$$$$$$OPTIONS$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 8.1

EDI MODEL 2018ECLip-NC 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. 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 unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Belmont 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,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

▽ 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, 23	SIGN C/E	31	41,42	SIGN C	51	61,62, 63	SIGN D/E	71	81,82	SIGN D/F	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126			117			132			123								
GREEN ARROW	127			118			133			124								
✋									** 119			** 110						
PED YELLOW			** 114			** 105			** 120			** 111						
🚶									** 121			** 112						

NU = Not Used
** Changeable Trailblazer Signs. See wiring and programming detail on sheet 2.

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	Ø2/SYS	Ø2/SYS	SLOT	Ø 3	Ø4/SYS	Ø 4	SYS. DET.	SYS. DET.	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A/S19	2C/S21	EMPTY	3A	4A/S27	4C	S50	S51	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø2/SYS 2B/S20	NOT USED		NOT USED	Ø4/SYS 4B/S28	Ø 4 4D	NOT USED	SYS. DET. S52					ST DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	Ø6/SYS	SLOT	Ø 7	Ø8/SYS	Ø 8	Ø 8	SYS. DET.	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S22	6C/S24	EMPTY	7A	8A/S25	8C	8E	S53	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø6/SYS 6B/S23	NOT USED		NOT USED	Ø8/SYS 8B/S26	Ø 8 8D	NOT USED	SYS. DET. S54					

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.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES				S
2A/S19	TB2-5,6	I2U	39	2	2/SYS	YES			X	N
2B/S20	TB2-7,8	I2L	43	12	2/SYS	YES			X	N
2C/S21	TB2-9,10	I3U	63	32	2/SYS	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES				S
4A/S27	TB4-9,10	I6U	41	4	4/SYS	NO	3.1			N
4B/S28	TB4-11,12	I6L	45	14	4/SYS	NO	3.1			N
4C	TB6-1,2	I7U	65	34	4	YES				S
4D	TB6-3,4	I7L	78	44	4	YES		3		S
*S50	TB6-5,6	I8U	49	24	SYS	NO				N
*S51	TB6-9,10	I9U	60	11	SYS	NO				N
*S52	TB6-11,12	I9L	62	13	SYS	NO				N
5A	TB3-1,2	J1U	55	5	5	YES				S
6A/S22	TB3-5,6	J2U	40	6	6/SYS	YES			X	N
6B/S23	TB3-7,8	J2L	44	16	6/SYS	YES			X	N
6C/S24	TB3-9,10	J3U	64	36	6/SYS	YES			X	N
7A	TB5-5,6	J5U	57	7	7	YES		3		S
8A/S25	TB5-9,10	J6U	42	8	8/SYS	NO	3.1			N
8B/S26	TB5-11,12	J6L	46	18	8/SYS	NO	3.1			N
8C	TB7-1,2	J7U	66	38	8	YES				S
8D	TB7-3,4	J7L	79	48	8	YES		10		S
8E	TB7-5,6	J8U	50	28	8	YES		10		S
*S53	TB7-9,10	J9U	59	15	SYS	NO				N
*S54	TB7-11,12	J9L	61	17	SYS	NO				N

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0562
DESIGNED: October 2018
SEALED: February 7, 2019
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 1 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS

DocuSigned by: DC87A59ED60B437...
4/16/2019
SIGNATURE DATE

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

US 29-74 (Wilkinson Boulevard) at NC 273 (Park Street)

Division 12 Gaston County Belmont

PLAN DATE: October 2018 REVIEWED BY:
PREPARED BY: J. Smith REVIEWED BY: E. Sirgany

REVISIONS	INIT.	DATE
▽ INSTALL CHANGEABLE TRAILBLAZER SIGN	SLP	4/2019

SEAL
Not a certified document. This document originally issued and sealed by Edward W.Sirgany,PE #018174 on February 7,2019. This document shall not be considered a certified document.
DATE

SIG. INVENTORY NO. 12-0562

$$$$$SYSTIME$$$$
$$$$$$$$$$$$$$$$DGN$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5600K	SIG. 8.2

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR TRAILBLAZER SIGN(S)

(program controller as shown)

The following logic processor configuration sets sign(s) to the appropriate display by utilizing pedestrian load switches.

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

ENTER A "31" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:    31  COPY FROM:   31  ACTIVE:  M   (T/F)

IF    COORD PLAN                IS      55
OR    COORD PLAN                IS      63

THEN  SIG SET PHASE WALK     6      ON
      SIG SET PHASE WALK     8      ON
      SIG SET PH D WALK      6      OFF
      SIG SET PH D WALK      8      OFF

ELSE  SIG SET PHASE WALK     6      OFF
      SIG SET PHASE WALK     8      OFF
      SIG SET PH D WALK      6      ON
      SIG SET PH D WALK      8      ON
```

ENTER A "32" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:    32  COPY FROM:   32  ACTIVE:  M   (T/F)

IF    COORD PLAN                IS      47
OR    COORD PLAN                IS      49
OR    COORD PLAN                IS      51
OR    COORD PLAN                IS      61


THEN  SIG SET PH PED CLR     4      ON
      SIG SET PH PED CLR     8      ON
      SIG SET PH PED CLR     2      OFF
      SIG SET PH PED CLR     6      OFF


ELSE  SIG SET PH PED CLR     4      OFF
      SIG SET PH PED CLR     8      OFF
      SIG SET PH PED CLR     2      ON
      SIG SET PH PED CLR     6      ON
```

4. From the LOGIC PROCESSOR Submenu select **1. LOGIC STATEMENT CONTROL**

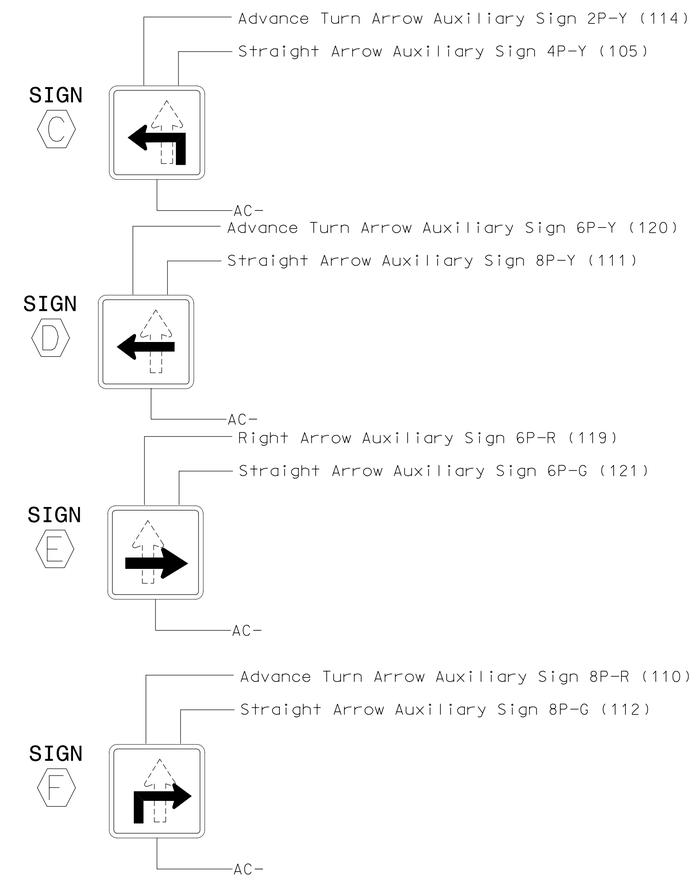
ENABLE LOGIC PROCESSOR STATEMENTS 31 AND 32 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL

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

END PROGRAMMING

1 CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY (114), 4PY (105), 6PY (120), 8PY (111), 6PR (119), 6PG (121), 8PR (110), 8PG (112).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0562
DESIGNED: October 2018
SEALED: February 7, 2019
REVISED: 4/16/2019

SIGNAL UPGRADE SHEET 2 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: 0C67A59E0D0B437... 4/16/2019
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (Wilkinson Boulevard) at NC 273 (Park Street)

Division 12 Gaston County Belmont

PLAN DATE: October 2018		REVIEWED BY:	
PREPARED BY: J. Smith		REVIEWED BY: E. Sirgany	
REVISIONS		INIT.	DATE
1 INSTALL CHANGEABLE TRAILBLAZER SIGN		SLP	4/2019

SEAL

Not a certified document. This document originally Issued and sealed by Edward W.Sirgany,PE #018174 on February 7,2019. This document shall not be considered a certified document.

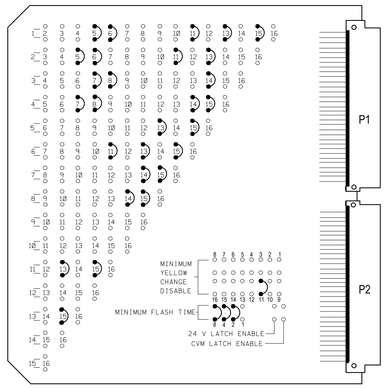
DATE

SIG. INVENTORY NO. 12-0562

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

EDI MODEL MMU2-16LEip MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and tables as shown)



MMU PROGRAMMING CARD

FIELD CHECK ENABLE DUAL IND ENABLE RED FAIL ENABLE	
CHANNEL NUMBER	ENABLE/ DISABLE
1	DISABLE
2	ENABLE
3	DISABLE
4	ENABLE
5	ENABLE
6	ENABLE
7	ENABLE
8	ENABLE
9	DISABLE
10	DISABLE
11	ENABLE
12	DISABLE
13	ENABLE
14	ENABLE
15	ENABLE
16	DISABLE

UNIT OPTIONS	
OPTION	SETTING
RECURRENT PULSE	ON
WALK DISABLE	OFF
LOG CVM FAULTS	ON
EXTERN WATCHDOG	OFF
24V-2=12VDC	OFF
PGM CARD MEMORY	ON
LEDguard	ON
FORCE TYPE 16	OFF
TYPE12-SDLC	OFF
VM 3x/Day Latch	ON

FLASHING YELLOW ARROW	
CONFIG MODE	B
ENABLE CHANNEL PAIR, FYA	
CH 1-13	ON
CH 3-14	ON
CH 5-15	OFF
CH 7-16	OFF
RED/YEL INPUT ENABLE	
CH 1	ON
CH 3	ON
CH 5	OFF
CH 7	OFF
FLASH RATE FAULT	OFF
FYA TRAP DETECT	OFF

MMU PROGRAMMING NOTE

ENSURE YELLOW CHANGE PLUS RED CLEARANCE MONITORING IS ENABLED FOR ALL CHANNELS.

NOTES

1. To prevent "flash-conflict" problems, wire all unused load switches to flash red. Verify that signal heads flash in accordance with the signal plans.
2. To prevent red failures on unused monitor channels, tie unused load switch red outputs 1, 3, 7, 8, 9, 10, 12 and 16 to load switch AC+ by inserting a jumper plug in the unused load switch socket from pin 1 (LS AC+) to pin 3 (RED out). Make sure all flash transfer relays are in place.
3. Program controller to start up in phase 2 Green and 6 Green.
4. Set power-up flash time to 10 seconds and implement on the Malfunction Management Unit. Set controller power-up flash time to 0 seconds.
5. Program detectors in accordance with the manufacturer's instructions to accomplish the detection schemes shown on the signal design plans.
6. Program detector call delay and extension timing on the controller, unless otherwise specified.
7. Set all detector card unit channles to "presence" mode.
8. The cabinet and controller are a part of the Charlotte Signal System.

SIGNAL HEAD HOOK-UP CHART

PHASE	1	2	3	4	5		6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	11,12	21,22 23,24	31	41,42 43	51,52 53	82a	61,62 63,64	71,72	81,82 83	SIGN K	SIGN K/M	P61,P62 SIGN L	SIGN L	11 *	31 *	13,14,15	NU
RED		2R		4R			6R		8R							15R	
YELLOW	*	2Y	*	4Y			6Y		8Y								
GREEN		2G		4G			6G		8G								
RED ARROW					5R			7R						13R	14R		
YELLOW ARROW					5Y	5Y		7Y						13Y	14Y	15Y	
FLASHING YELLOW ARROW														13G	14G		
GREEN ARROW	1G		3G		5G	5G		7G								15G	
✋											** 104	11R					
PED YELLOW										** 114	** 105	** 120	** 111				
🚶											** 106	11G					

* Denotes install load resistor. See load resistor installation detail this sheet 2.

* See pictorial of head wiring in detail this sheet.

** Changeable Trailblazer Signs. See wiring and programming detail on sheet 3.

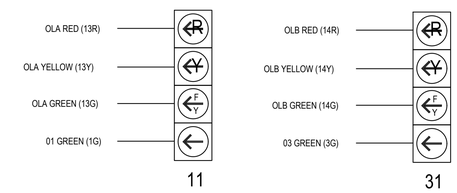
EQUIPMENT INFORMATION

CONTROLLER.....2070LNC-1C
CABINET TS-2
SOFTWARE .....ECONOLITE EOS
CABINET MOUNT.....BASE W/ RISER
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....1,2,3,4,5,6,7,8,11,13,14,15
PHASES USED.....1,2,3,4,5,6,6 PED,7,8
OLA.....*
OLB.....*
OLC.....*
OLD.....NOT USED

* See overlap programming detail on sheet 2

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



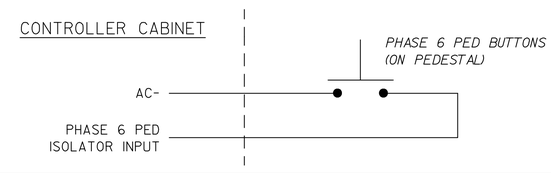
DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW.
PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

DET BIU #1	CH1	CH3	CH1	CH3	CH1	CH3	CH1	CH3	CH1	CH3	CH1	CH3	CH1	CH3	CH1	CH3	DET BIU #2
	L3	L1	L7	L5	L11	L9	L15	L13	L19	L17	L23	L21	L27	L25	L31	L29	
	Ø1	Ø1	Ø2	Ø1	Ø2	Ø2	Ø4	Ø3	Ø5	Ø5	Ø6	Ø6	Ø7	Ø6	NOT USED	Ø8	
	CH2	CH4	CH2	CH4	CH2	CH4	CH2	CH4	CH2	CH4	CH2	CH4	CH2	CH4	CH2	CH4	
	L4	L2	L8	L6	L12	L10	L16	L14	L20	L18	L24	L22	L28	L26	L32	L30	
	Ø1	Ø1	Ø2	Ø2	Ø3	Ø2	Ø5	Ø4	Ø6	Ø5	Ø6	Ø6	Ø7	Ø7	NOT USED	Ø8	

PEDESTRIAN PUSH BUTTON WIRING DETAIL

(wire push buttons as shown)



LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	Ø 1
2	Ø 2
3	Ø 3
4	Ø 4
5	Ø 5
6	Ø 6
7	Ø 7
8	Ø 8
9	Ø 2 PED
10	Ø 4 PED
11	Ø 6 PED
12	Ø 8 PED
13	OLA
14	OLB
15	OLC
16	OLD

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.

NOTE

BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS	CONTROLLER DETECTOR NO.	FUNCTION	TIMING FEATURE	TIMING TIME(SEC)
11	L1A,L1B	1	Ø 1	_____	__
12	L2A,L2B	2	Ø 1	_____	__
13	L3A,L3B	3	Ø 1	_____	__
14	L4A,L4B	4	Ø 1	_____	__
15	L5A,L5B	5	Ø 1	_____	__
21	L6A,L6B	6	Ø 2	_____	__
22	L7A,L7B	7	Ø 2	_____	__
23	L8A,L8B	8	Ø 2	_____	__
24	L9A,L9B	9	Ø 2	_____	__
25	L10A,L10B	10	Ø 2	_____	__
26	L11A,L11B	11	Ø 2	_____	__
31	L12A,L12B	12	Ø 3	_____	__
32	L13A,L13B	13	Ø 3	_____	__
41	L14A,L14B	14	Ø 4	_____	__
42	L15A,L15B	15	Ø 4	_____	__
51	L16A,L16B	16	Ø 5		__

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS	CONTROLLER DETECTOR NO.	FUNCTION	TIMING FEATURE	TIMING TIME(SEC)
52	L17A,L17B	17	Ø 5	_____	__
53	L18A,L18B	18	Ø 5	_____	__
54	L19A,L19B	19	Ø 5	_____	__
61	L20A,L20B	20	Ø 6	_____	__
62	L21A,L21B	21	Ø 6	_____	__
63	L22A,L22B	22	Ø 6	_____	__
64	L23A,L23B	23	Ø 6	_____	__
65	L24A,L24B	24	Ø 6	_____	__
66	L25A,L25B	25	Ø 6	_____	__
71	L26A,L26B	26	Ø 7	_____	__
72	L27A,L27B	27	Ø 7	_____	__
73	L28A,L28B	28	Ø 7	_____	__
81	L29A,L29B	29	Ø 8	_____	__
82	L30A,L30B	30	Ø 8	_____	__
_NU_	L31A,L31B	31		_____	__
_NU_	L32A,L32B	32		_____	__

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1730
DESIGNED: MARCH 2019
SEALED: 4/16/2019
REVISED: _____

ELECTRICAL DETAIL 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PARNELL

DocuSigned by: 0C87A59ED60B437... 4/16/2019

#	BY:	DATE:

CITY OF CHARLOTTE
DEPARTMENT OF TRANSPORTATION
600 E. 4TH ST. CHARLOTTE, NC 28202 704 336-4119 FAX: 704 336-4400

WILKINSON BOULEVARD AND I-485 NB RAMP/TODD ROAD

DESIGNED BY: SPP | DATE: 4/19 | APPROVED BY: SLP | NCDOT# 10-1730 | UNIT ID: 10666 | SIGNAL ID: 00943

ECONOLITE EOS-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

Select OVERLAP [A] and TYPE [PPLT/FYA]

```
OVERLAP.......[A] TYPE:  ....PPLT/FYA

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

FLASHING ARROW OUTPUT..........CH13 ISOLATE

PED PROTECTED ENABLE:..........NO
EARLY FYA ENABLE: .............YES
EVENT PLAN SF BIT DISABLE:.....0
```

TOOGLE ONCE

↓

OVERLAP B

Select OVERLAP [B] and TYPE [PPLT/FYA]

```
OVERLAP.......[B] TYPE:  ....PPLT/FYA

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

FLASHING ARROW OUTPUT..........CH14 ISOLATE

PED PROTECTED ENABLE:..........NO
EARLY FYA ENABLE: .............YES
EVENT PLAN SF BIT DISABLE:.....0
```

TOOGLE ONCE

↓

OVERLAP C

Select OVERLAP [C] and TYPE [OVERLAP]

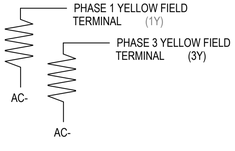
```
TMG VEH OVLP...[C] TYPE:OVERLAP
           PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED PHASE    1 . . 4 . . . . . . . . . . . .
PROTECTED  PHASE  . . . . . . . . . . . . . . . .
INHIBIT WITH PED  . . . . . . . . . . . . . . . .
INHIBIT WITH PHASE . . . . . . . . . . . . . . .
INHIBIT WITH GREEN . . . . . . . . . . . . . . .
TRAILING WHEN EXIT . . . . . . . . . . . . . . .
TRAILING WHEN NEXT . . . . . . . . . . . . . . .
GREEN WHEN NEXT   . . . . . . . . . . . . . . .

           PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
FLASH GRN         . . . . . . . . . . . . . . . .
```

END PROGRAMMING

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)

ECONOLITE EOS-2070 SPECIAL MMU PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [1. CABINET]
3. From PORT 1 (SDLC) Submenu select [4. MONITOR PROGRAMMING]

CAUTION!

Set intersection to Flash before attempting to enter or change any MMU programming data.

This programming and that of the MMU programming card must match exactly. If they do not, the intersection will be placed into Flash.

```
MMU PROGRAM [     MANUAL]

       CH  6 5 4 3 2 1 0 9 8 7 6 5 4 3 2
        1  . X . X . X . . . . X X . . .
        2  . . . X . X . . . . X X . .
        3  . . X . . . . . X X . . .
        4  . X X . . . . . X X . .
        5  . X . X . . . . . . .
        6  . X . X . X . . . .
        7  . X X . . . . . .
        8  . X X . . . . .
        9  . . . . . . .
       10  . . . . . .
       11  . X . X .
       12  . . . .
       13  . X .
       14  . .
       15  .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1730
DESIGNED: MARCH 2019
SEALED: 4/16/2019
REVISED: _____

ELECTRICAL DETAIL 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER S. L. PAUL PAPPAS

DocuSigned by: 0C87A59ED608437... 4/16/2019

#	BY:	DATE:	REVISION:

CITY OF CHARLOTTE
DEPARTMENT OF TRANSPORTATION
600 E. 4TH ST. CHARLOTTE, NC 28202 704 336-4119 FAX: 704 336-4400

WILKINSON BOULEVARD
AND
I-485 NB RAMP/TODD ROAD

DESIGNED BY: SPP | DATE: 4/19 | APPROVED BY: SLP | NCDOT# 10-1730 | UNIT ID: 10666 | SIGNAL ID: 00943

ECONOLITE EOS-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR TRAILBLAZER SIGNS

(program controller as shown)

The following logic processor configuration sets signs to the appropriate display by utilizing pedestrian load switches.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 5. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

ENTER A "31" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   31  COPY FROM:   31  ACTIVE:  M   (T/F)

IF   COORD PLAN                IS      51
OR   COORD PLAN                IS      61

THEN  SIG SET PH PED CLR     4       ON
      SIG SET PH PED CLR     2       OFF

ELSE  SIG SET PH PED CLR     4       OFF
      SIG SET PH PED CLR     2       ON
```

ENTER A "32" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   32  COPY FROM:   32  ACTIVE:  M   (T/F)

IF   COORD PLAN                IS      63

THEN  SIG SET PH PED CLR     8       ON
      SIG SET PHASE WALK     4       ON
      SIG SET PH PED CLR     6       OFF
      SIG SET PH D WALK      4       OFF

ELSE  SIG SET PH PED CLR     8       OFF
      SIG SET PHASE WALK     4       OFF
      SIG SET PH PED CLR     6       ON
      SIG SET PH D WALK      4       ON
```

4. From the LOGIC PROCESSOR Submenu select 1. LOGIC STATEMENT CONTROL

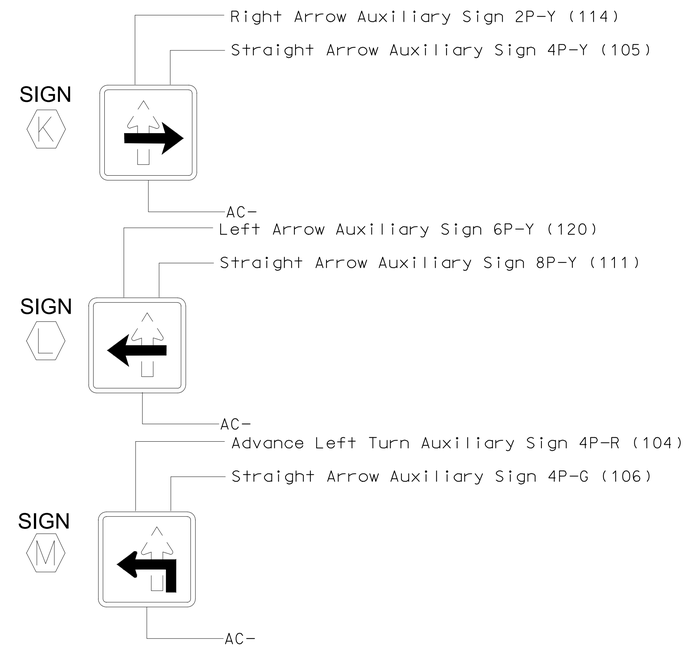
ENABLE LOGIC PROCESSOR STATEMENTS 31 AND 32 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL

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

END PROGRAMMING

CHANGEABLE TRAILBLAZER SIGN WIRING AND PROGRAMMING DETAIL



NOTE

Remove, tape, and label conflict monitor wire attached to rear of terminal 2PY (114), 4PY (105), 6PY (120), 8PY (111), 4PR (104), 4PG (106).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1730
DESIGNED: MARCH 2019
SEALED: 4/16/2019
REVISED: _____

ELECTRICAL DETAIL 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PARKER

DocuSigned by: 0C87A58ED6DB437...
4/16/2019

#	BY:	DATE:	

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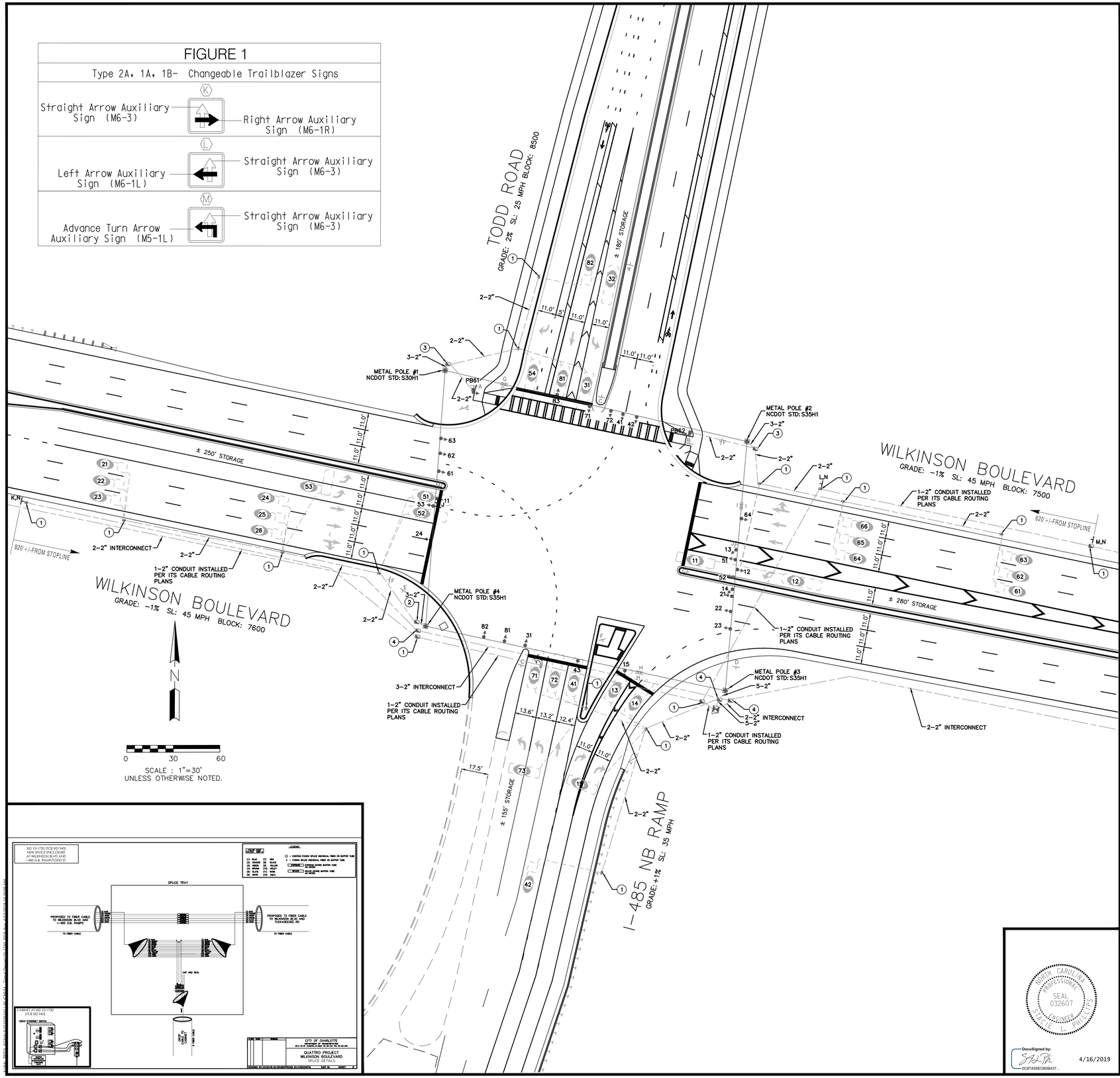
FIGURE 1

Type 2A, 1A, 1B- Changeable Trailblazer Signs

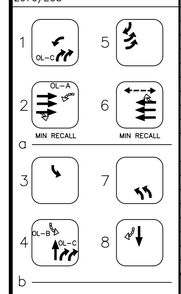
Straight Arrow Auxiliary Sign (M6-3)	K	Right Arrow Auxiliary Sign (M6-1R)
Left Arrow Auxiliary Sign (M6-1L)	L	Straight Arrow Auxiliary Sign (M6-3)
Advance Turn Arrow Auxiliary Sign (M5-1L)	M	Straight Arrow Auxiliary Sign (M6-3)



SIGNAL PHASING

Ring Configuration 1,2,3,4,b / 5,6,7,8,b

CONTROLLER TYPE: 2070/EOS



SIGNAL SEQUENCE

RING 1	PHASE 1		PHASE 2		PHASE 3		PHASE 4		
SIGNAL ID NUMBER	R/W	OTH	R/W	OTH	R/W	OTH	R/W	OTH	FLASH
11,12	◀	◁							✱
21,22,23,24			G	Y					✱
31					◀	◁			✱
41,42,43							G	Y	R

RING 2	PHASE 5		PHASE 6		PHASE 7		PHASE 8		
SIGNAL ID NUMBER	R/W	OTH	R/W	OTH	R/W	OTH	R/W	OTH	FLASH
51,52,53	◀	◁							✱
61,62,63,64			G	Y					✱
71,72					◀	◁			✱
81,83							G	Y	R
82a	▶	▷							--
PB61,PB62			W FDW	DW					DARK

OVERLAP-PHASE

OVERLAP - PHASE	OL-A/1+4 NORMAL		OL-B/3+4 FYA		OL-C/5+6 NORMAL		OL-D NORMAL		
SIGNAL ID NUMBER	R/W	OTH	R/W	OTH	R/W	OTH	R/W	OTH	FLASH
11a,12a	✳	◁							✱
13,14,15					▶	▷			R
31a			✳	◁					✱

✱ RED ARROW ◁ YELLOW ARROW
◀ GREEN ARROW ✳ FLASHING YELLOW ARROW

CLEARANCE INTERVALS

Phase	1	2	3	4	5	6	7	8
% Grade	-1.0%	-1.0%	2.0%	1.0%	-1.0%	-1.0%	1.0%	2.0%
Distance	105	180	170	155	130	130	130	135
Approach Speed (mph)	25	45	25	25	25	45	25	25
Yellow	**3.2**	**4.6**	**3.1**	**3.8**	**3.2**	**4.6**	**3.1**	**3.1**
All Red	**2.9**	**2.8**	**3.9**	**3.1**	**3.3**	**2.0**	**3.3**	**3.4**
Total Clearance	6.1	7.4	7.0	6.9	6.5	6.6	6.4	6.5

TRAFFIC VOLUMES

PULLBOX ID

	SIZE:	PULLBOX TYPE:
1	13"x24"x12"	LOOP
2	17"x30"x24"	FIBER OPTIC
3	24"x36"x30"	CONTROLLER / FIBER
4	24"x36"x30"	LOOP/FIBER
5	24"x24"x12"	CONTROLLER
6	36"x36"x12"	CONTROLLER

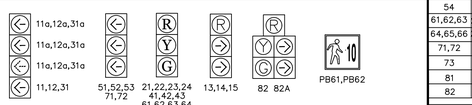
NOTE:
PULLBOX MATERIAL MUST MEET OR EXCEED THE 1998 CDOT TRAFFIC SIGNAL SPECIFICATIONS.

DETECTOR INFORMATION

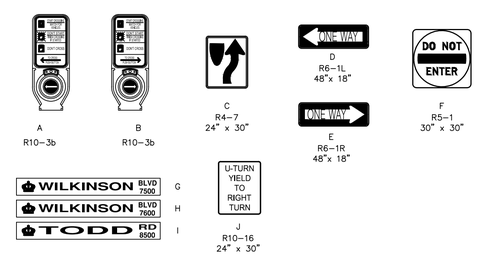
DETECTOR NUMBER	AMP. NO.	SIZE / ZONE	ø	AMP. TYPE	DELAY DISABLE ø	COMMENTS:
11	1	6x25	1	N		@SB (LT)
12	2	6x25	1	N		65' FROM SB (LT)
13,14	3,4	6x25	1	N		@SB (RT)
15	5	6x25	1	N		70' FROM SB (RT)
21,22,23	6,7,8	6x6	2	N		200' FROM SB (THRU/RT)
24,25,26	9,10,11	6x6	2	N		95' FROM SB (THRU/RT)
31	12	6x25	3	N		@SB (LT)
32	13	6X25	3	N		65' FROM SB (LT)
41	14	6x25	4	N		@SB (THRU)
42	15	6x6	4	N		130' FROM SB (THRU)
51,52	16,17	6x25	5	N		@SB (LT)
53	18	6x16	5	N		70' FROM SB (LT)
54	19	6x25	5	D		@SB (RT)
61,62,63	20,21,22	6x6	6	N		200' FROM SB (THRU/RT)
64,65,66	23,24,25	6x6	6	N		95' FROM SB (THRU/RT)
71,72	26,27	6x25	7	N		@SB (THRU/LT)
73	28	6X20	7	N		65' FROM SB (LT)
81	29	6x25	8	N		@SB (THRU)
82	30	6x6	8	N		75' FROM SB (THRU)

NOTE:
ALL STOPBAR LOOPS EXTEND 5' BEYOND THE STOPBAR UNLESS OTHERWISE NOTED.
ALL LOOPS RECEIVE THREE TURNS.

SIGNAL HEAD ID



SIGN ID



SIGNS INSTALLED AND MAINTAINED BY NCDOT

LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CONTROL BOX	
	METER PEDESTAL	
	PULL BOX	
	STEEL POLE	
	MAST ARM	
	PED PEDESTAL	
	UTILITY POLE	
	ANCHOR	
	SIGNAL HEAD	
	VIDEO CAMERA	
	OPTICOM	
	OBSERVATION CAM	
	DETECTOR	
	CONDUIT	
	INTERCONNECT	
	EDGE OF PVMT.	
	CURB & GUTTER	
	TUBULAR MARKER	
	GROUND SIGN	
	OVERHEAD SIGN	
	DOUBLE YELLOW	
	STOP BAR	
	WHITE SKIP	
	WHITE MINI	
	PAVEMENT ARROW	
	PROPERTY LINE	
	ROW	

PLAN NOTES

1. ALL PAVEMENT MARKING DIMENSIONS ARE APPROXIMATE.
2. SIGNAL WILL BE INSTALLED IN ACCORDANCE WITH THE MAY 1998 CDOT TRAFFIC SIGNAL SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS.
3. PED SIGNALS WITH PUSHBUTTONS WILL BE LABELED "PB" (FOR EXAMPLE PB21, PB22)
4. COUNTDOWN PEDESTRIAN SIGNALS SHALL COUNT DOWN FLASHING DON'T WALK ONLY.
5. FYA'S 11 AND 31 WILL INITIALLY OPERATE PROTECTED ONLY FROM 0600 – 2200 7 DAYS A WEEK AND PROTECTED/PERMITTED ALL OTHER TIMES.

NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STEPHEN L. PRITCHARD

DocuSigned by: DC87A59ED6DB437... 4/16/2019

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