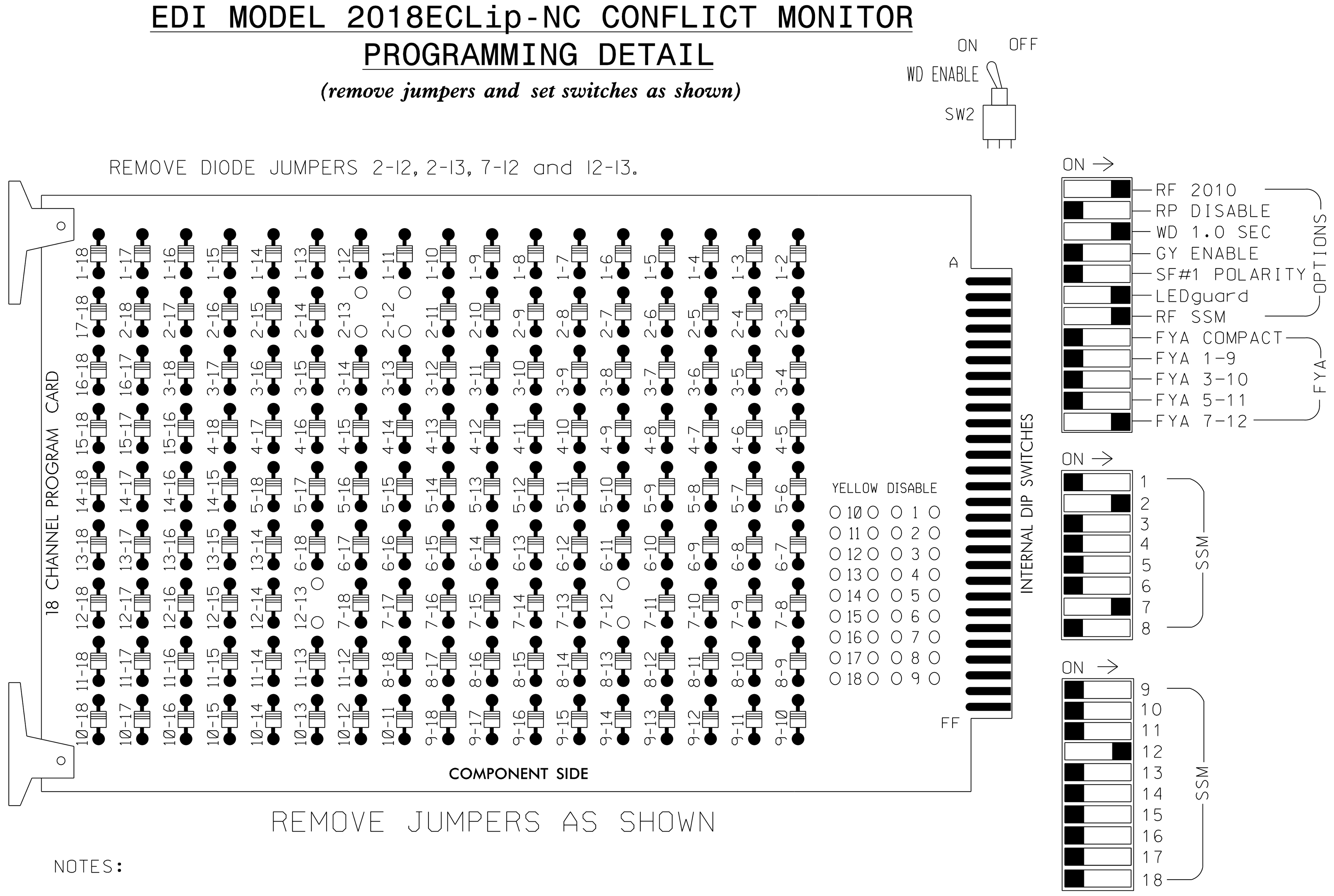
PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 12.1

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-12, 2-13, 7-12 and 12-13.



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. Enable Simultaneous Gap-Out for all phases.
3. Program phase 2 for Variable Initial and Gap Reduction.
4. Program phase 2 for Start Up In Green.
5. Program phase 2 for 'STARTUP PED CALL'.
6. Program phase 2 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............2070E
CABINET................332 W/ AUX
SOFTWARE...............ECONOLITE OASIS
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S2,S3,S10,AUX S5.
PHASES USED............2,2 PED,7.
OVERLAP "A"............NOT USED
OVERLAP "B"............NOT USED
OVERLAP "C"............NOT USED
OVERLAP "D"............2+7

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.	NU	21,22, 23,24	P21, P22	NU	NU	NU	NU	NU	NU	71★	72,73, 74	NU	NU	NU	NU	NU	NU	71★	NU
RED		128									122								
YELLOW		129																	
GREEN		130																	
RED ARROW																		A101	
YELLOW ARROW											123							A102	
FLASHING YELLOW ARROW																		A103	
GREEN ARROW										124	124								
(hand)			113																
(walking person)			115																

NU = Not Used

★ See pictorial of head wiring in detail below.

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.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	Ø2 2C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2PED DC ISOLATOR	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	SLOT	SLOT	SLOT	Ø7 7A	Ø7 7B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED	NOT USED	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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	J5U	57	19★	57	7	Y	Y			
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			15
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					

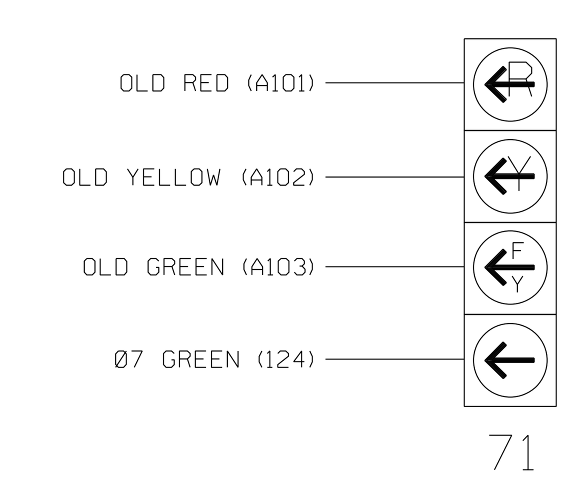
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12.

★ See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 71 requires special logic programming. See sheet 2 of 4 for programming instructions.

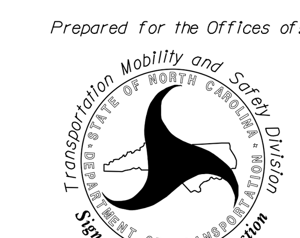
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1103
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 1 of 4)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:



750 N.Greenfield Pkwy,Garner,NC 27529

Northbound SR 1409 (Military Cutoff Road) at Lendire Road

Division 03 | New Hanover County | Wilmington

PLAN DATE: April 2017 | REVIEWED BY: MB Toth

PREPARED BY: AM Encarnacion | REVIEWED BY:

REVISIONS | INIT. | DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/6/2017

SIGNATURE | DATE

SIG. INVENTORY NO. 03-1103

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 12.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 1, 2, AND 3.

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

```
  LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF  ACTIVE PHASE        #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 2 (HEAD 71).

PRESS '+'

```
  LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF  ACTIVE PHASE        #7  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
  LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF  YELLOW ON PHASE     #7  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' 3 TIMES

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦ X    X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+' 3 TIMES

NOTICE PAGE 2

```
 PAGE 2: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦      X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1103
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 2 of 4)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888   NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Northbound SR 1409 (Military Cutoff Road) at Lendire Road

Division 03	New Hanover County	Wilmington

PLAN DATE:	April 2017	REVIEWED BY:	MB Toth
PREPARED BY:	LD Stouchko	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04A... SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1103

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 7A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 19 IS REACHED.

```
PAGE: 2 C1 PIN:57  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................19
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............7
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

→ ENTER '57' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT →

(LOOP 7A - PHASE 7)

```
PAGE: 2 C1 PIN:57  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................19
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............57
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 7A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #57.

```
VEHICLE DETECTOR #57  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................N
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

→ ENTER 'Y' FOR ENABLE DETECTOR →

ENTER '7' FOR PHASES ASSIGNED →

ENSURE DELAY IS '0' →

```
VEHICLE DETECTOR #57  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦      X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1103
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 3 of 4)

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

Northbound SR 1409 (Military Cutoff Road) at Lendire Road

Division 03 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: MB Toth
PREPARED BY: AM Encarnacion	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E05D04A1...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1103

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 71 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1103
DESIGNED: April 2017
SEALED:
REVISED:

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New Installation - Final Design (Electrical Detail Sheet 4 of 4)

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
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Northbound SR 1409
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PLAN DATE: April 2017	REVIEWED BY: MB Toth
PREPARED BY: AM Encarnacion	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

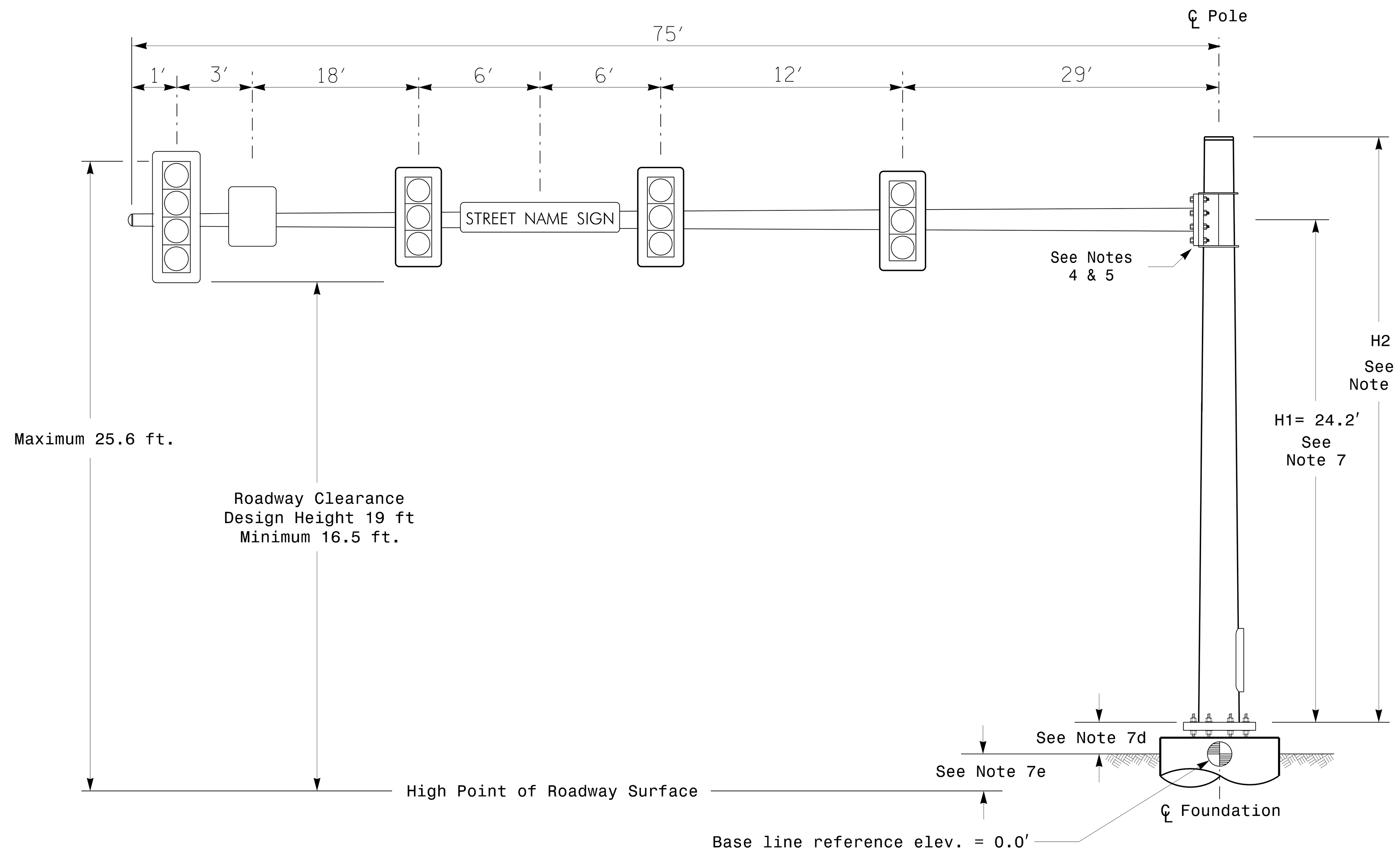
DocuSigned by: Melissa B. Toth
D86DCF8E5D04A...
SIGNATURE | DATE 6/6/2017

SIG. INVENTORY NO. 03-1103

METAL POLE No. 20 AND 23

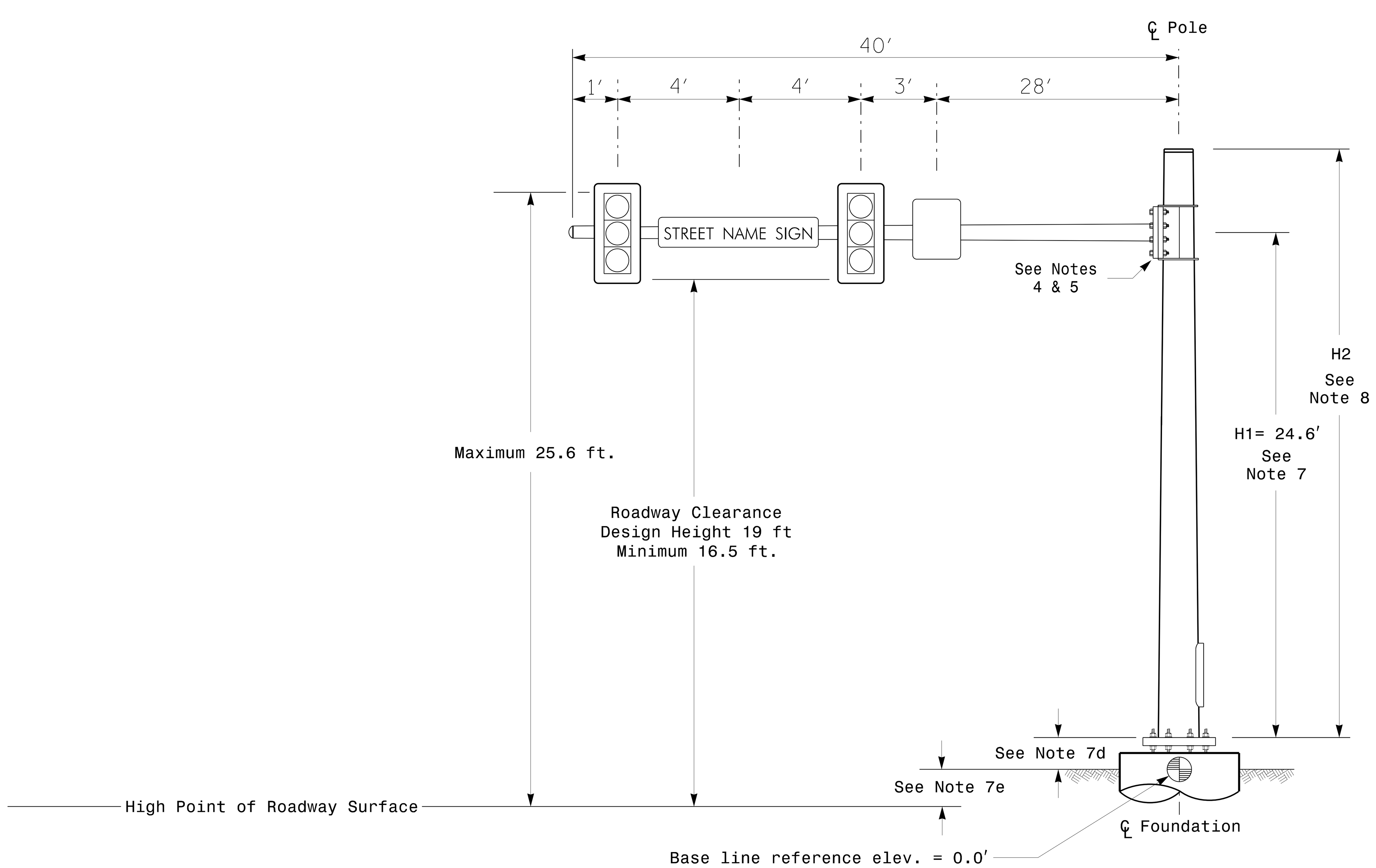
PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 12.5

Design Loading for METAL POLE NO. 20



Elevation View

Design Loading for METAL POLE NO. 23



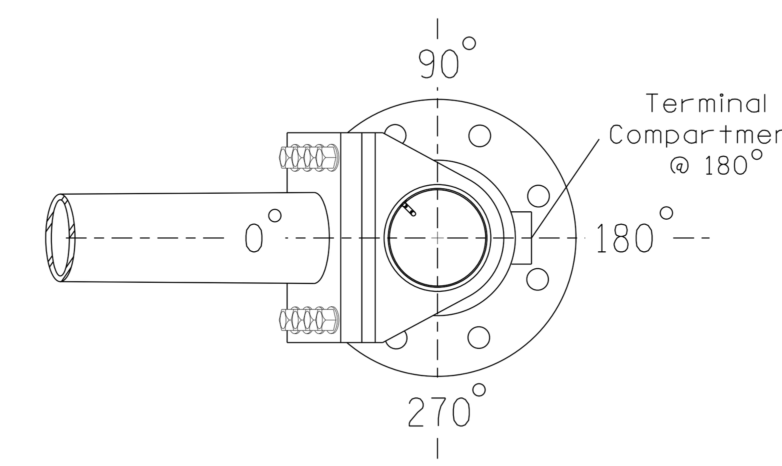
Elevation View

SPECIAL NOTE

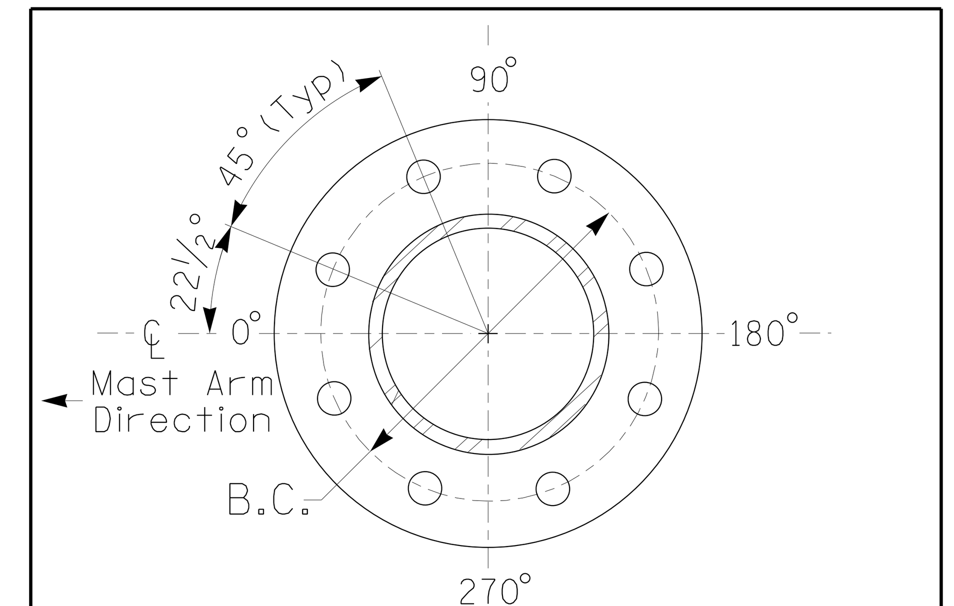
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 20	Pole 23
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3.2 ft.	+3.6 ft.
Elevation difference at Edge of travelway or face of curb	+1.1 ft.	+0.0 ft.

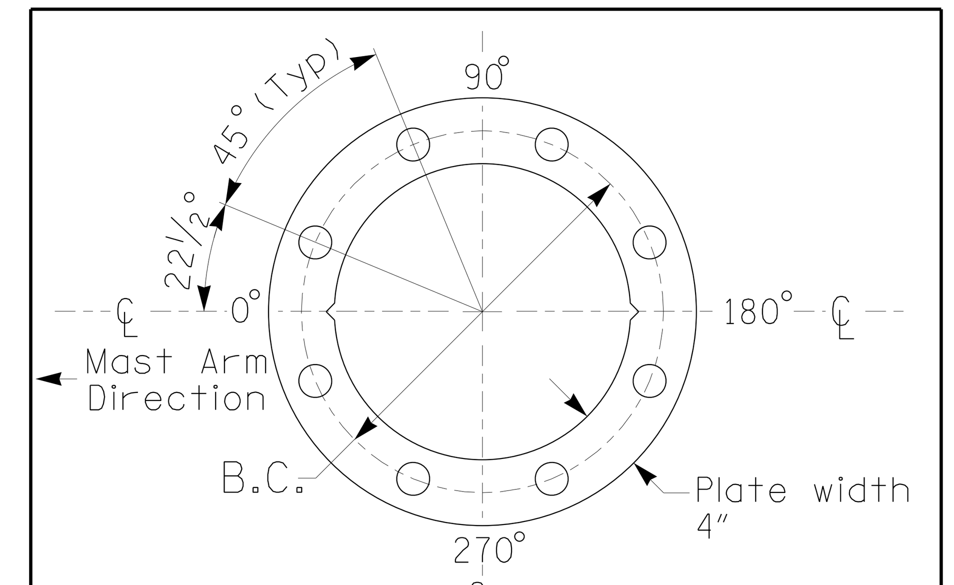


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0"W X 30.0"L	11 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT Wind Zone 2 (130 mph)

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

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

750 N.Greenfield Pkwy,Garner,NC 27529

Northbound SR 1409 (Military Cutoff Road) at Lendire Road

Division 03 New Hanover County Wilmington

PLAN DATE: April 2017 REVIEWED BY: MB Toth

PREPARED BY: AM Encarnacion REVIEWED BY:

SCALE 0 N/A

N/A

REVISIONS INIT. DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth

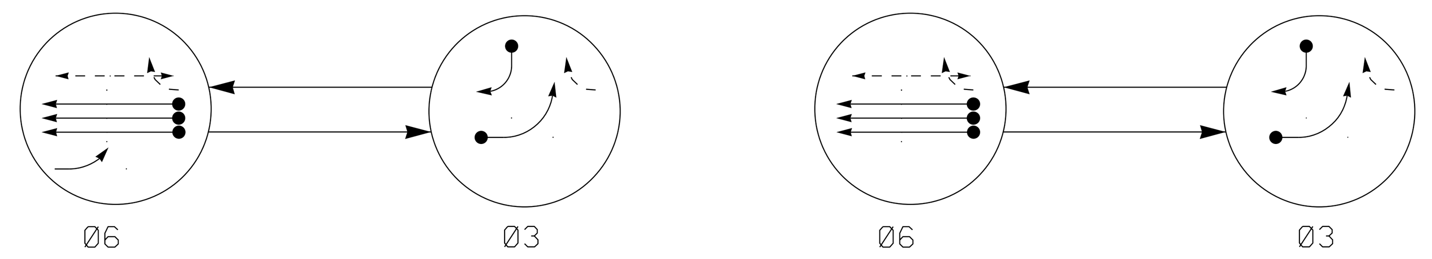
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1103

06-JUN-2017 13:49 O:\Transportation\Traffic\Curr\100053597 - U-4751 Military Cutoff\02-Signals\Metal Poles\Single Mast Arm_MP (23-24) - 031103.dgn encd5386 AT LUS29031

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31	←	←F Y	←Y
32, 33	→	R	R
61, 62, 63	R	G	Y
P61, P62	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31	←	←R	←Y
32, 33	→	R	R
61, 62, 63	R	G	Y
P61, P62	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

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
3A	6x40	0	2-4-2	Y	3	Y	Y	-	-	*15	-	Y
3B	6x40	0	2-4-2	Y	3	Y	Y	-	-	15	-	Y
6A	6x6	300	5	Y	6	Y	Y	-	-	-	-	Y
6B	6x6	300	5	Y	6	Y	Y	-	-	-	-	Y
6C	6x6	300	5	Y	6	Y	Y	-	-	-	-	Y

*Disable delay during alternate phasing operation.

SIGNAL FACE I.D.

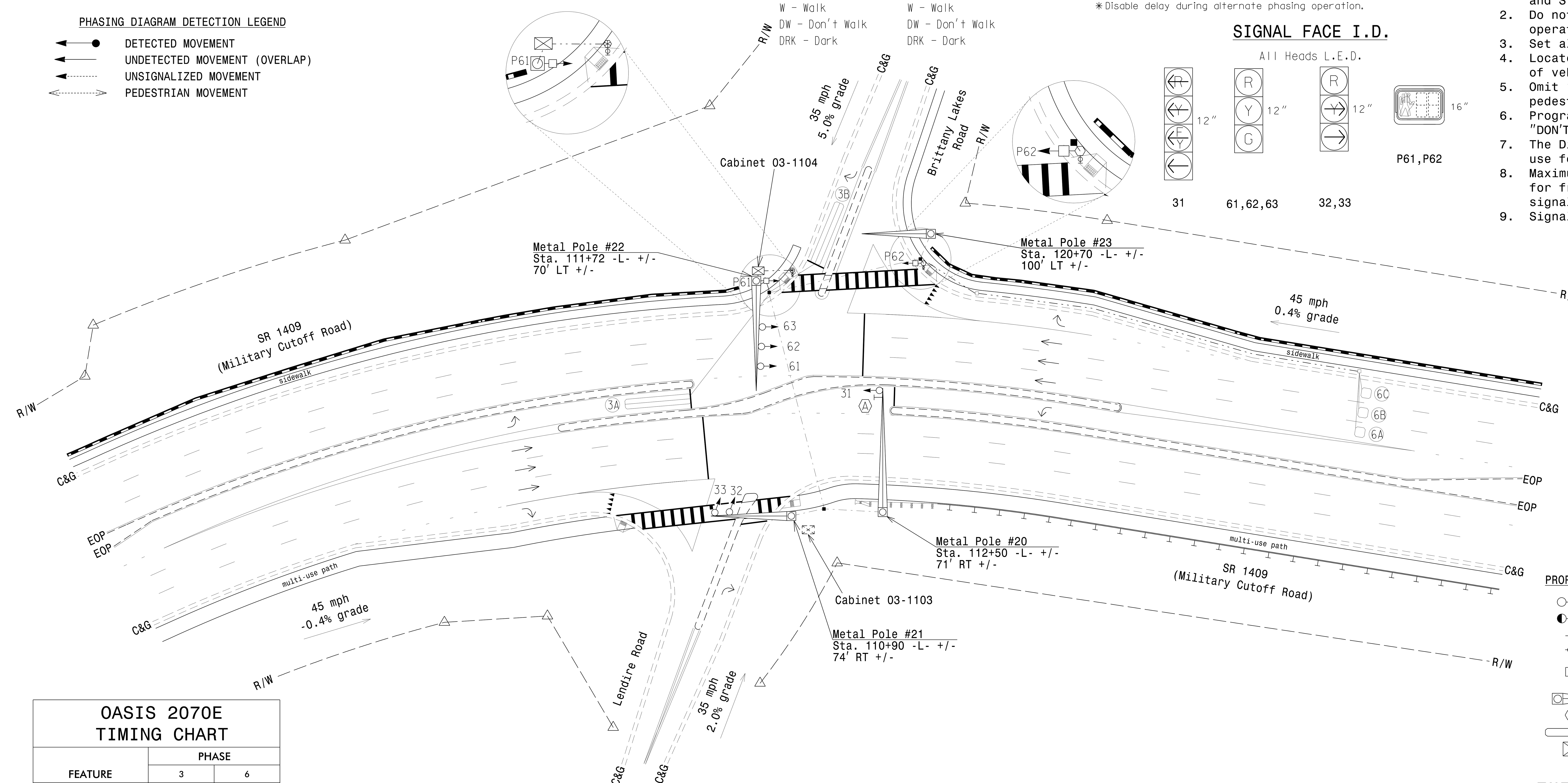
All Heads L.E.D.

31 | 61,62,63 | 32,33 | P61,P62

2 Phase
Fully Actuated
Wilmington Signal 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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicle turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing charts are for free-run operation only. Coordinated signal timing values supersede these values.
9. Signal system data: Controller Asset #1104.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Push Button & Sign	
	Pedestrian Signal Head	
	Metal Pole with Mastarm	
	Signal & Pedestrian Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
N/A	Concrete Barrier	
N/A	Noise Wall	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

OASIS 2070E TIMING CHART

FEATURE	PHASE 3	PHASE 6
Min Green 1 *	5	12
Extension 1 *	2.0	6.0
Max Green 1 *	30	100
Yellow Clearance	3.0	4.5
Red Clearance	3.5	1.2
Red Revert	2.0	2.0
Walk 1 *	-	4
Don't Walk 1	-	21
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	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.

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

New Installation - Final Design

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

Southbound SR 1409
(Military Cutoff Road)
at
Brittany Lakes Road

Division 03	New Hanover County	Wilmington
PLAN DATE: April 2017	REVIEWED BY: MB Toth	
PREPARED BY: AM Encarnacion	REVIEWED BY:	

SCALE 0 40
1"=40'

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth 6/6/2017
SIGNATURE DATE

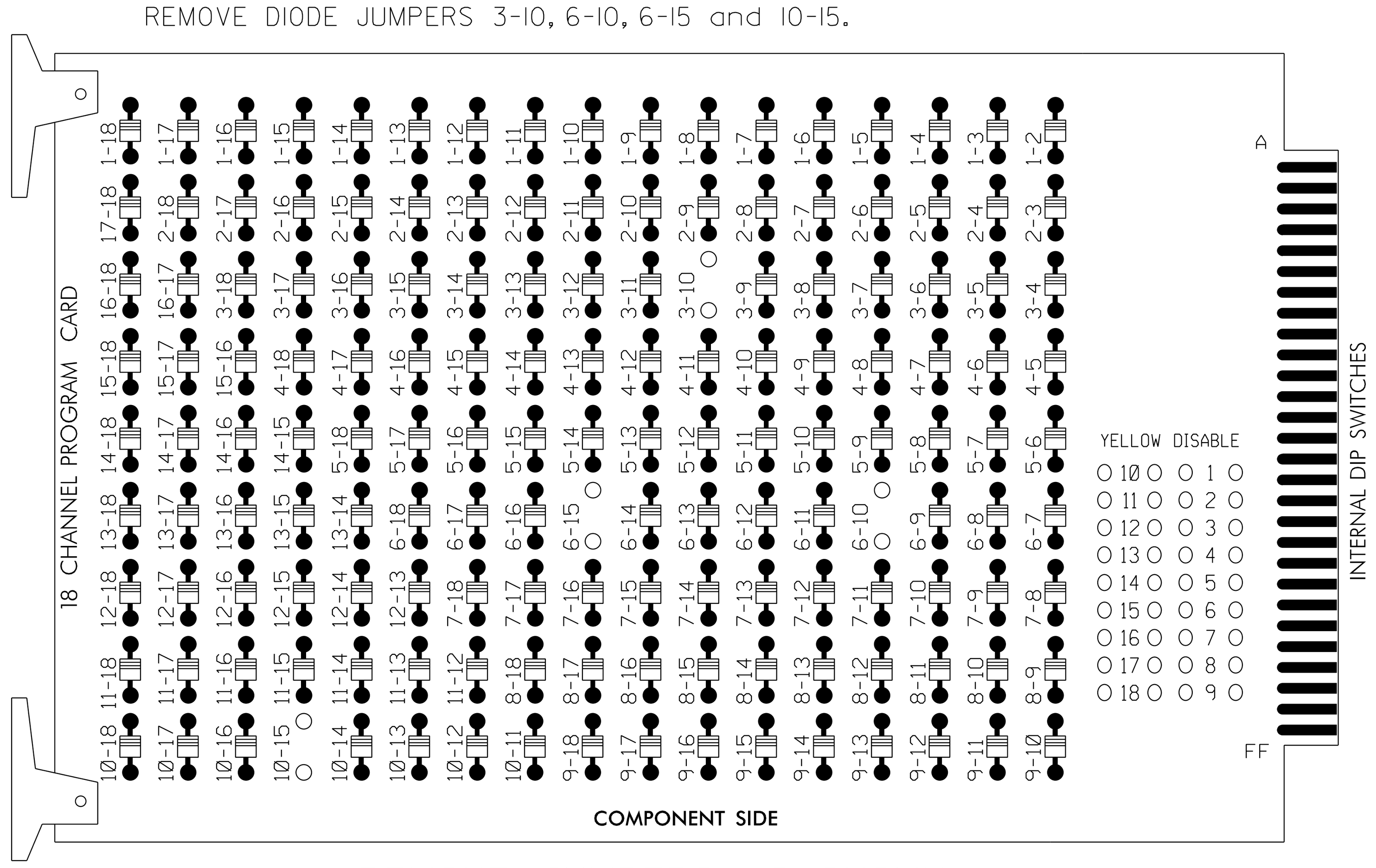
SIG. INVENTORY NO. 03-1104

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 13.1

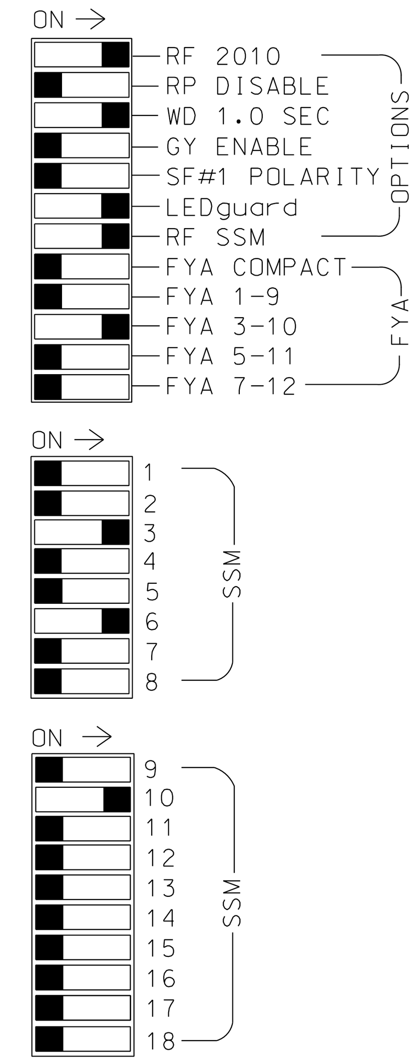
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-10, 6-10, 6-15 and 10-15.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phase 6 for Variable Initial and Gap Reduction.
4. Program phase 6 for Start Up In Green.
5. Program phase 6 for 'STARTUP PED CALL'.
6. Program phase 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............2070E
CABINET................332 W/ AUX
SOFTWARE...............ECONOLITE OASIS
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S4,S8,S9,AUX S2.
PHASES USED............3,6,6 PED.
OVERLAP "A"............NOT USED
OVERLAP "B"............3+6
OVERLAP "C"............NOT USED
OVERLAP "D"............NOT USED

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.	NU	NU	NU	31★	32,33	NU	NU	NU	61,62,63	P61,P62	NU	NU	NU	NU	31★	NU	NU	NU	NU
RED					116				134										
YELLOW									135										
GREEN									136										
RED ARROW															A124				
YELLOW ARROW					117										A125				
FLASHING YELLOW ARROW															A126				
GREEN ARROW				118	118														
✋										119									
🚶										121									

NU = Not Used

★ See pictorial of head wiring in detail below.

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.

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	Ø3 3A	Ø3 3B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L					NOT USED	NOT USED							NOT USED	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6B	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
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	I5U	58	20★	53	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			15
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			
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

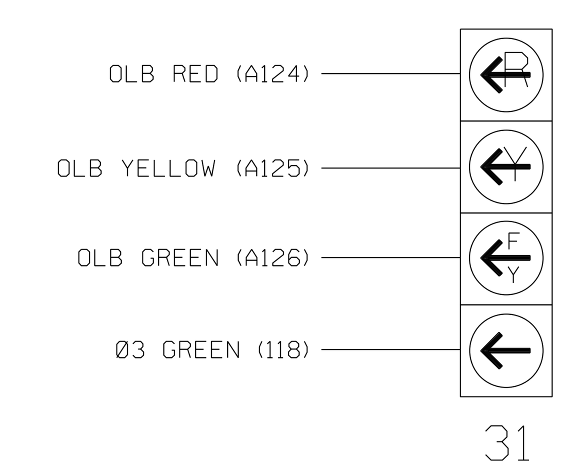
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

★ See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 31 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1104
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 1 of 4)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signals Management Section
750 N.Greenfield Pkwy, Garner, NC 27529

Southbound SR 1409
(Military Cutoff Road)
at
Brittany Lakes Road

Division 03 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: MB Toth
PREPARED BY: AM Encarnacion	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04AF...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1104

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 13.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 1, 2, AND 3.

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

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 6 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #3  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #3  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:            |12345678910111213141516
VEH OVL PARENTS:|   X  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+'

NOTICE PAGE 2

```
 PAGE 2: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:            |12345678910111213141516
VEH OVL PARENTS:|  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1104
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 2 of 4)

ATKINS
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RALEIGH, NORTH CAROLINA 27609
(919) 876-6888   NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04AA...
SIGNATURE   6/6/2017 DATE

SIG. INVENTORY NO. 03-1104

06-JUN-2017 13:49
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*02-Signals*Design*01 Wiring*03-1104E.dgn
enca5386 AT LUS290321

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 20 IS REACHED.

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................20
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64).............3
PEDESTRIAN DETECTOR (1-16)..........-
ALTERNATE PED DETECTOR (1-16).......-
PREEMPT (1-10)......................-
INVERTED PREEMPT (1-10).............-
STOP TIME (Y/N).....................-
FLASH SENSE (Y/N)...................-
DOOR OPEN (Y/N).....................-
MANUAL CONTROL ENABLE (Y/N).........-
MANUAL CONTROL ADVANCE (Y/N)........-
SPECIAL FUNCTION ALARM (1-8)........-
TOD HOUR SYCHRONIZATION (0-23)......-
FORCE OFF RING (1-4)................-
HOLD PHASES (1-16)..................-
PLAN (65=FLSH,66=FREE)..._  OFFSET#..-
CHANGE PHASE SEQUENCE PAGE (1-12)...-
CHANGE PHASE TIMING PAGE (1-4)......-
CHANGE PHASE CONTROL PAGE (1-4).....-
CHANGE OVERLAP CONTROL PAGE (1-4)...-
CHANGE INPUT PAGE (1-4).............-
CHANGE OUTPUT PAGE (1-4)............-
OVERRIDE PHASE CONTROL FUNCTION (Y).-
```

→ ENTER '53' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT →

(LOOP 3A - PHASE 3)

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................20
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64).............53
PEDESTRIAN DETECTOR (1-16)..........-
ALTERNATE PED DETECTOR (1-16).......-
PREEMPT (1-10)......................-
INVERTED PREEMPT (1-10).............-
STOP TIME (Y/N).....................-
FLASH SENSE (Y/N)...................-
DOOR OPEN (Y/N).....................-
MANUAL CONTROL ENABLE (Y/N).........-
MANUAL CONTROL ADVANCE (Y/N)........-
SPECIAL FUNCTION ALARM (1-8)........-
TOD HOUR SYCHRONIZATION (0-23)......-
FORCE OFF RING (1-4)................-
HOLD PHASES (1-16)..................-
PLAN (65=FLSH,66=FREE)..._  OFFSET#..-
CHANGE PHASE SEQUENCE PAGE (1-12)...-
CHANGE PHASE TIMING PAGE (1-4)......-
CHANGE PHASE CONTROL PAGE (1-4).....-
CHANGE OVERLAP CONTROL PAGE (1-4)...-
CHANGE INPUT PAGE (1-4).............-
CHANGE OUTPUT PAGE (1-4)............-
OVERRIDE PHASE CONTROL FUNCTION (Y).-
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 3A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #53.

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR.....................N
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

→ ENTER 'Y' FOR ENABLE DETECTOR →

ENTER '3' FOR PHASES ASSIGNED →

ENSURE DELAY IS '0' →

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦  X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1104
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888   NCBEES #F-0326

New Installation - Final Design (Electrical Detail Sheet 3 of 4)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

Southbound SR 1409
(Military Cutoff Road)
at
Brittany Lakes Road

Division 03 | New Hanover County | Wilmington

PLAN DATE: April 2017	REVIEWED BY: MB Toth
PREPARED BY: AM Encarnacion	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04A1...
SIGNATURE | DATE 6/6/2017

SIG. INVENTORY NO. 03-1104

06-JUN-2017 13:49
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*02-Signals*Design*01 Wiring*03-1104E.dgn
enca5386 AT LUS290321

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for head 31 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1104
DESIGNED: April 2017
SEALED:
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

New Installation - Final Design (Electrical Detail Sheet 4 of 4)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Southbound SR 1409
(Military Cutoff Road)
at
Brittany Lakes Road

Division 03 | New Hanover County | Wilmington

PLAN DATE: April 2017	REVIEWED BY: MB Toth
PREPARED BY: AM Encarnacion	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
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SIGNATURE | DATE 6/6/2017

SIG. INVENTORY NO. 03-1104

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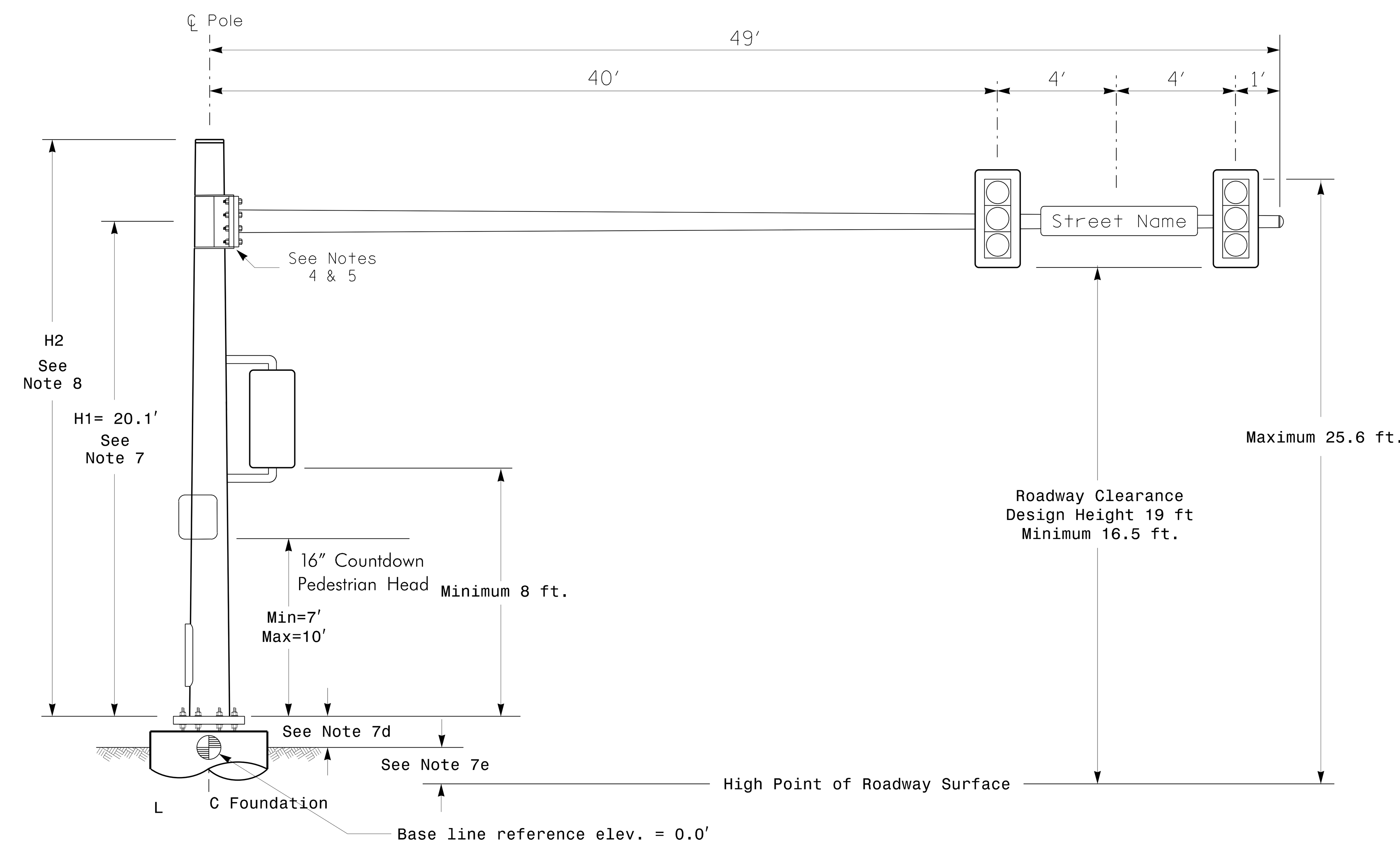
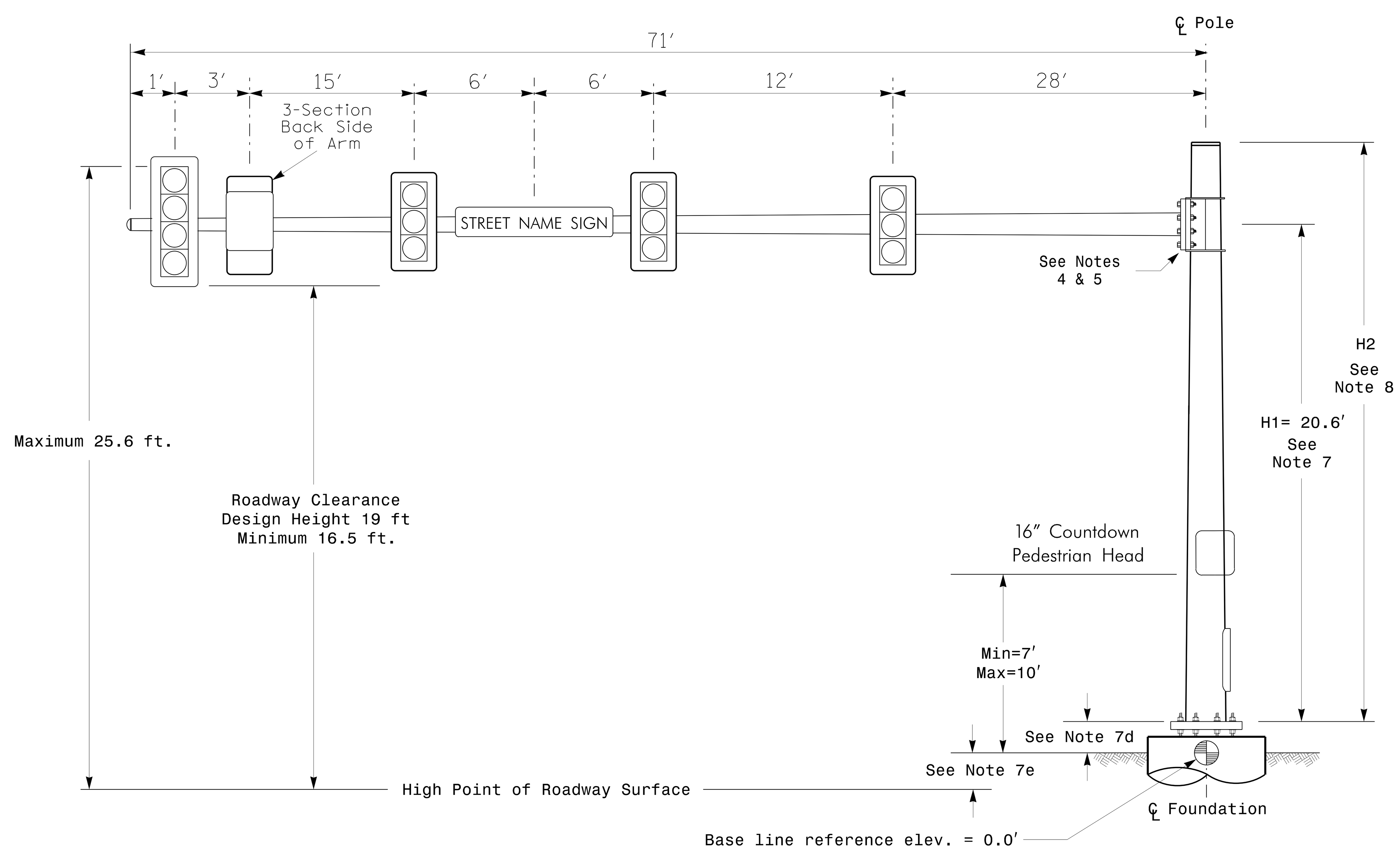
06-JUN-2017 13:49
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*02-Signals*Design*01 Wiring*03-1104E.dgn
enca5386 AT LUS290321

Design Loading for METAL POLE NO. 21



Elevation View

Design Loading for METAL POLE NO. 22



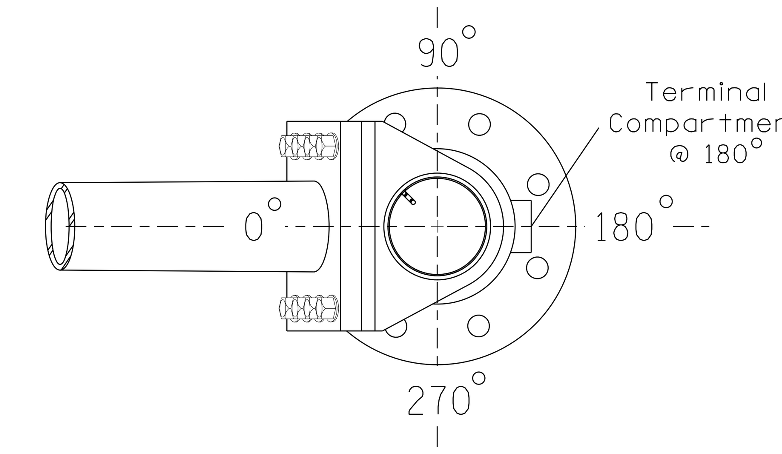
Elevation View

SPECIAL NOTE

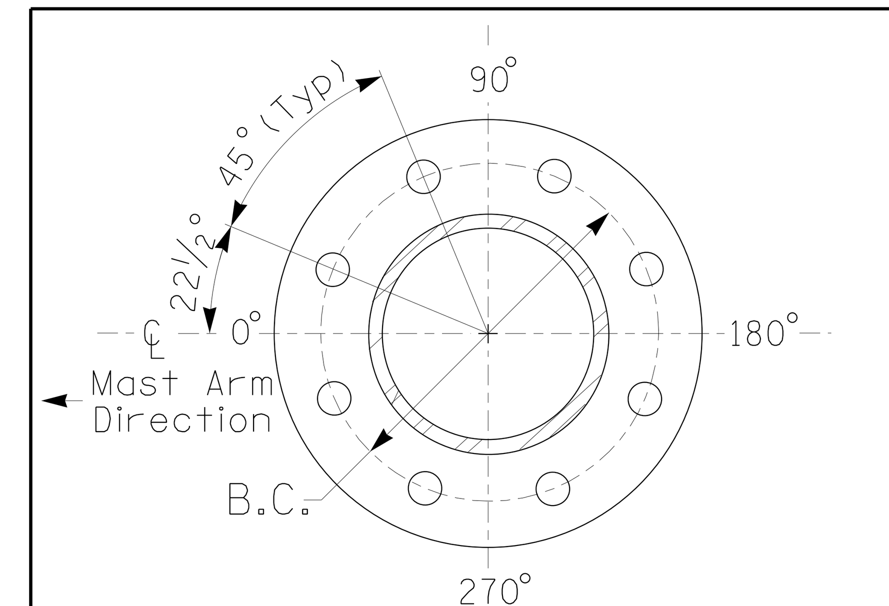
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 21	Pole 22
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.9 ft.	-0.4 ft.
Elevation difference at Edge of travelway or face of curb	-2.3 ft.	-0.2 ft.

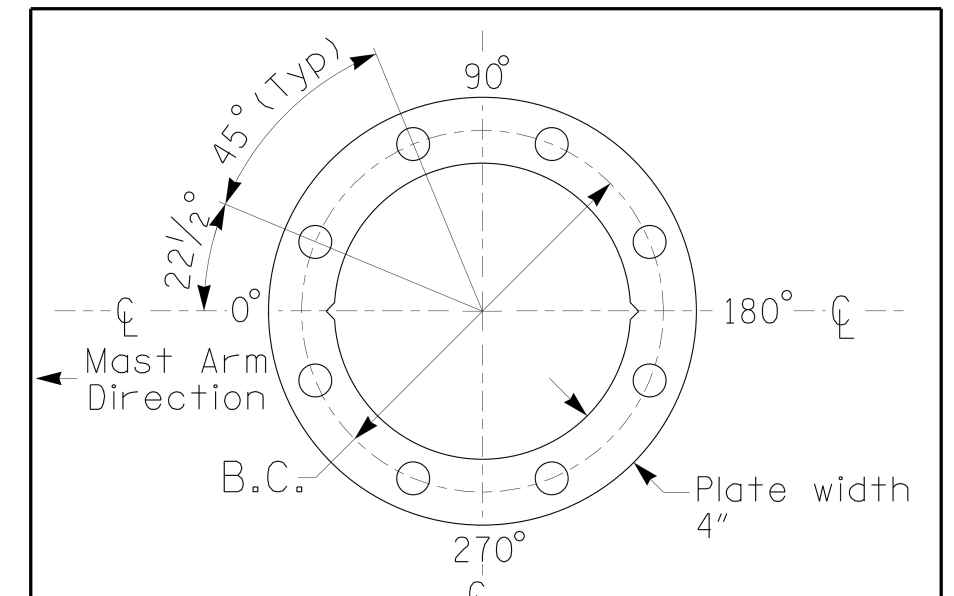


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0″W X 30.0″L	11 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

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NCDOT Wind Zone 2 (130 mph)

ATKINS
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RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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

Southbound SR 1409 (Military Cutoff Road) at Brittany Lakes Road

Division 03 New Hanover County Wilmington

PLAN DATE: April 2017 REVIEWED BY: MB Toth

PREPARED BY: AM Encarnacion REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS INIT. DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth 6/6/2017

SIGNATURE DATE

SIG. INVENTORY NO. 03-1104

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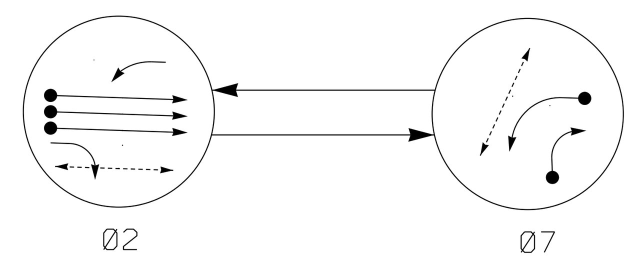
PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 14.0

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

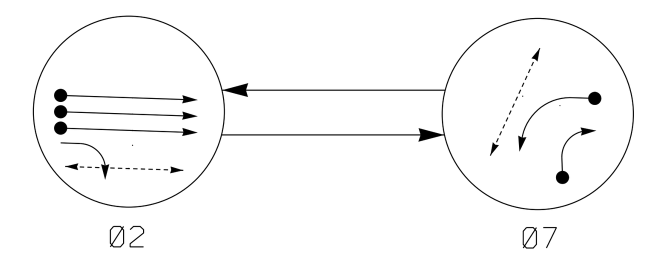
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	PHASE FLASH
21,22,23	G	R	Y
71	←FY	←	←Y
72,73	R	→	R
P21,P22	W	DW	DRK
P71,P72	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	PHASE FLASH
21,22,23	G	R	Y
71	←R	←	←Y
72,73	R	→	R
P21,P22	W	DW	DRK
P71,P72	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

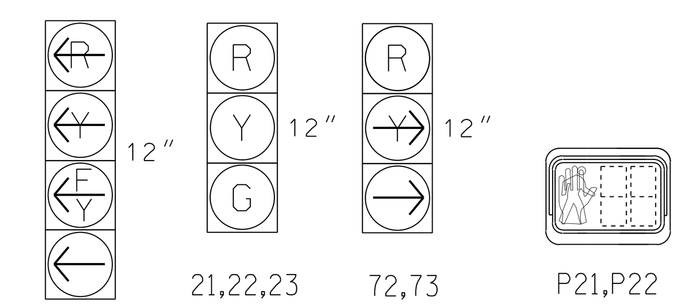
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	Y
2C	6X6	300	5	Y	2	Y	Y	-	-	-	-	Y
7A	6X40	+5	2-4-2	Y	7	Y	Y	-	-	*15	-	Y
7B	6X40	+3	2-4-2	Y	7	Y	Y	-	-	15	-	Y

* Disable delay during Alternate Phasing Operation

2 Phase
Fully Acutated
Wilmington Signal System

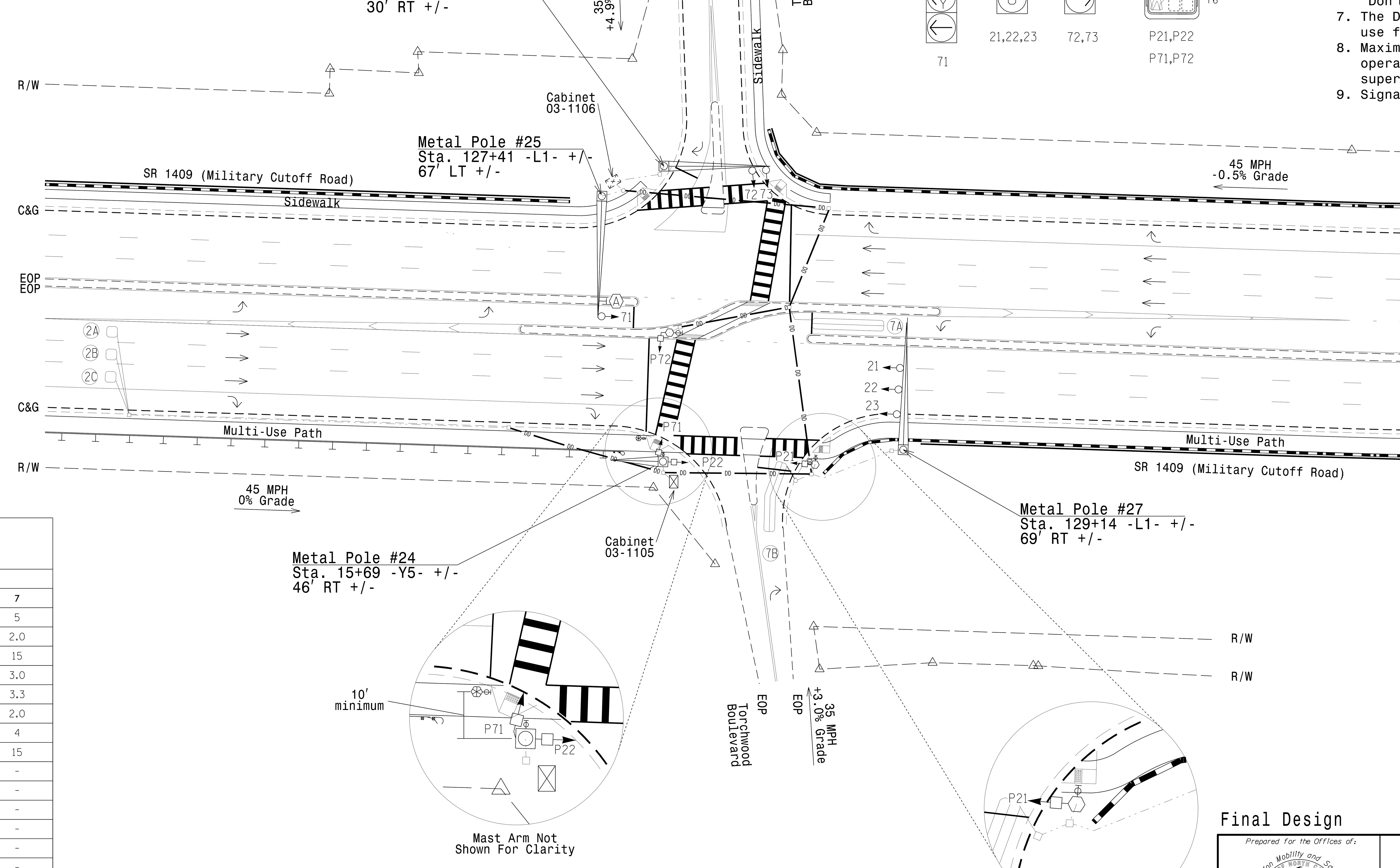
SIGNAL FACE I.D.

All Heads L.E.D.



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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicle turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to coutdown the flashing "Don't Walk" time only.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing charts are for free-run operation only. Coordinated signal timing values supersede these values.
9. Signal System data: controller asset #1105.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Push Button	
	Pedestrian Signal Head	
	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	
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	N/A
N/A	Guardrail	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	
N/A	Wheelchair Ramp	
N/A	Concrete Barrier	
N/A	Noise Wall	

OASIS 2070E TIMING CHART

FEATURE	PHASE 2	PHASE 7
Min Green 1 *	12	5
Extension 1 *	6.0	2.0
Max Green 1 *	100	15
Yellow Clearance	4.5	3.0
Red Clearance	1.4	3.3
Red Revert	2.0	2.0
Walk 1 *	6	4
Don't Walk 1	19	15
Seconds Per Actuation *	1.5	-
Max Variable Initial *	34	-
Time Before Reduction *	15	-
Time To Reduce *	30	-
Minimum Gap	3.0	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	-
Dual Entry	-	-
Simultaneous Gap	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.

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wncs386 AT LOS29321

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Final Design

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

Northbound SR 1409 (Military Cutoff Road) at Torchwood Boulevard

Divison 3	New Hanover County	Wilmington
PLAN DATE: April 2017	REVIEWED BY: M B Toth	
PREPARED BY: G B Spell	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

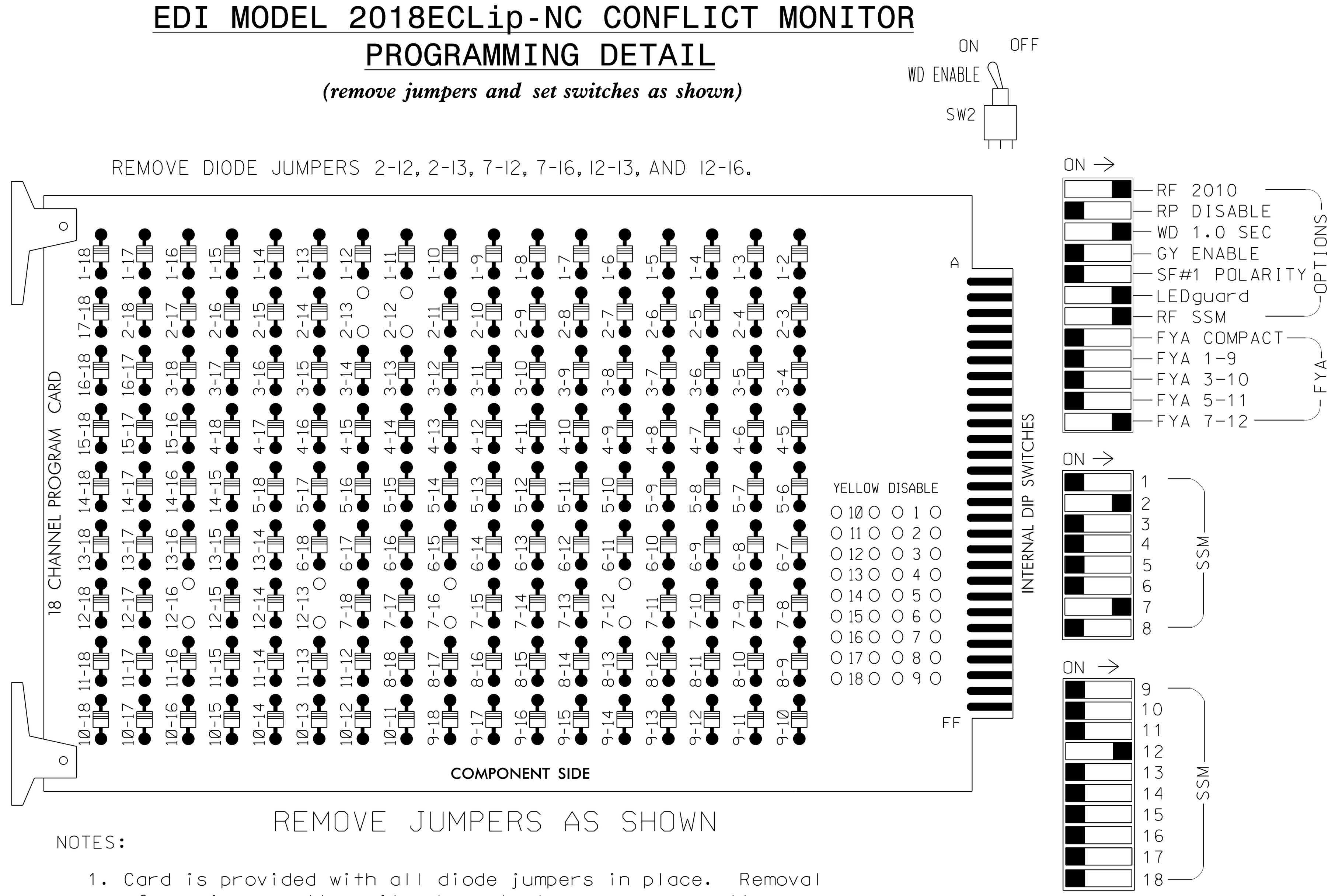
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/6/2017
SIGNATURE DATE

SIG. INVENTORY NO. 03-1105

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.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	Ø 2 2A	Ø 2 2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L		Ø 2 2B	NOT USED									NOT USED	Ø7 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	Ø 7 7B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L					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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	---	--
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	---	--
2C	TB2-9,10	I3U	63	25	32	2	Y	Y	-	---	--
7A	TB5-5,6	J5U	57	19	7	7	Y	Y	-	---	15
	-	J5U	57	19★	57	7	Y	Y	-	---	--
7B	TB5-9,10	J6U	42	4	8	7	Y	Y	-	---	15
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P71,P72	TB8-8,9	I13L	70	32	PED 8	7 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

★ See Input Page Assignment programming details on sheet 3.

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. Enable Simultaneous Gap-Out for all phases.
3. Program phase 2 for Variable Initial and Gap Reduction.
4. Program phase 2 for Start Up In Green.
5. Program phases 2 and 7 for 'STARTUP PED CALL'.
6. Program phase 2 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE

LOAD SWITCHES USED......S2,S3,S10,S12,AUX S5
PHASES USED.............2,2PED,7,7PED
OVERLAP "A".............NOT USED
OVERLAP "B".............NOT USED
OVERLAP "C".............NOT USED
OVERLAP "D".............2+7

PED 7 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
4. ENTER '7' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
8. REPEAT STEPS # 3 AND # 4.

CHANGING INPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 7

PROGRAMMING COMPLETE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	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	7 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22, 23	P21, P22	NU	NU	NU	NU	NU	NU	71★	72,73	NU	P71, P72	NU	NU	NU	NU	71★	NU
RED		128									122								
YELLOW		129																	
GREEN		130																	
RED ARROW																		A101	
YELLOW ARROW											123							A102	
FLASHING YELLOW ARROW																		A103	
GREEN ARROW										124	124								
✋			113										110						
🚶			115										112						

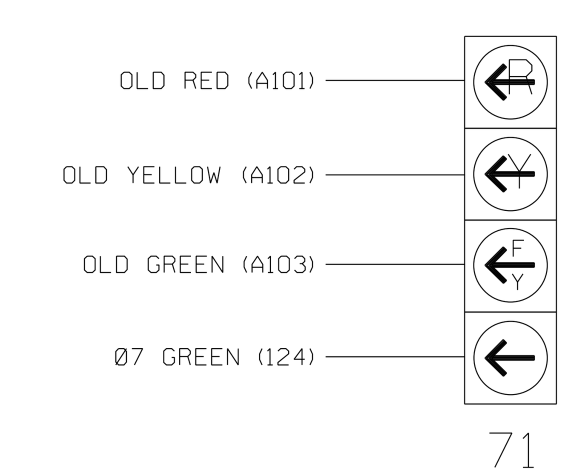
NU = Not Used
★ See pictorial of head wiring in detail below.

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.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 71 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1105
DESIGNED: April 2017
SEALED: ________
REVISED: ________

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Northbound SR 1409 (Military Cutoff Road) at Torchwood Boulevard

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2017	REVIEWED BY:	M B Toth
PREPARED BY:	G B Spell	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 025892
MELISSA B. TOTH

DocuSigned by:
Melissa B. Toth
D86DCF8E04D04AF...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1105

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 1, 2, AND 3.

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

```
 LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 2 (HEAD 71).

PRESS '+'

```
 LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
 LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' 3 TIMES

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:            ¦12345678910111213141516
VEH OVL PARENTS:   ¦ X    X
VEH OVL NOT VEH:   ¦
VEH OVL NOT PED:   ¦
VEH OVL GRN EXT:   ¦
STARTUP COLOR:  _ RED   _ YELLOW   _ GREEN
FLASH COLORS:   _ RED   _ YELLOW   X GREEN
-------------------------------------------
SELECT VEHICLE OVERLAP OPTIONS:     (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+' 3 TIMES

NOTICE PAGE 2

```
 PAGE 2: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:            ¦12345678910111213141516
VEH OVL PARENTS:   ¦      X
VEH OVL NOT VEH:   ¦
VEH OVL NOT PED:   ¦
VEH OVL GRN EXT:   ¦
STARTUP COLOR:  _ RED   _ YELLOW   _ GREEN
FLASH COLORS:   _ RED   _ YELLOW   _ GREEN
-------------------------------------------
SELECT VEHICLE OVERLAP OPTIONS:     (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1105
DESIGNED: April 2017
SEALED: ________
REVISED: ________

Electrical Detail - Sheet 2 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

Northbound SR 1409
(Military Cutoff Road)
at
Torchwood Boulevard

Division 3	New Hanover County	Wilmington	
PLAN DATE: April 2017		REVIEWED BY: M B Toth	
PREPARED BY: G B Spell		REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth D86DCF8E04D94AF...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1105

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 7A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 19 IS REACHED.

```
PAGE: 2 C1 PIN:57  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................19
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................._
VEHICLE DETECTOR (1-64).............7
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................._
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)......................_
FLASH SENSE (Y/N)...................._
DOOR OPEN (Y/N)......................_
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)..._
CHANGE PHASE TIMING PAGE (1-4)......_
CHANGE PHASE CONTROL PAGE (1-4)....._
CHANGE OVERLAP CONTROL PAGE (1-4)..._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

ENTER '57' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 7A - PHASE 7)

```
PAGE: 2 C1 PIN:57  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................19
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................._
VEHICLE DETECTOR (1-64).............57
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................._
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)......................_
FLASH SENSE (Y/N)...................._
DOOR OPEN (Y/N)......................_
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)..._
CHANGE PHASE TIMING PAGE (1-4)......_
CHANGE PHASE CONTROL PAGE (1-4)....._
CHANGE OVERLAP CONTROL PAGE (1-4)..._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 7A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #57.

```
VEHICLE DETECTOR #57  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................N
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '7' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #57  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |      X
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1105
DESIGNED: April 2017
SEALED: ________
REVISED: ________

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

Northbound SR 1409
(Military Cutoff Road)
at
Torchwood Boulevard

Division 3 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: G B Spell	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth D86DCF8E04D04AF... 6/6/2017
SIGNATURE DATE

SIG. INVENTORY NO. 03-1105

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for head 71 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1105
DESIGNED: April 2017
SEALED: ______
REVISED: ______

Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Transportation Mobility and Safety Division, Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Northbound SR 1409 (Military Cutoff Road) at Torchwood Boulevard

Division 3 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: G B Spell	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025892 MELISSA B. TOTH

Melissa B. Toth 6/6/2017
SIGNATURE DATE

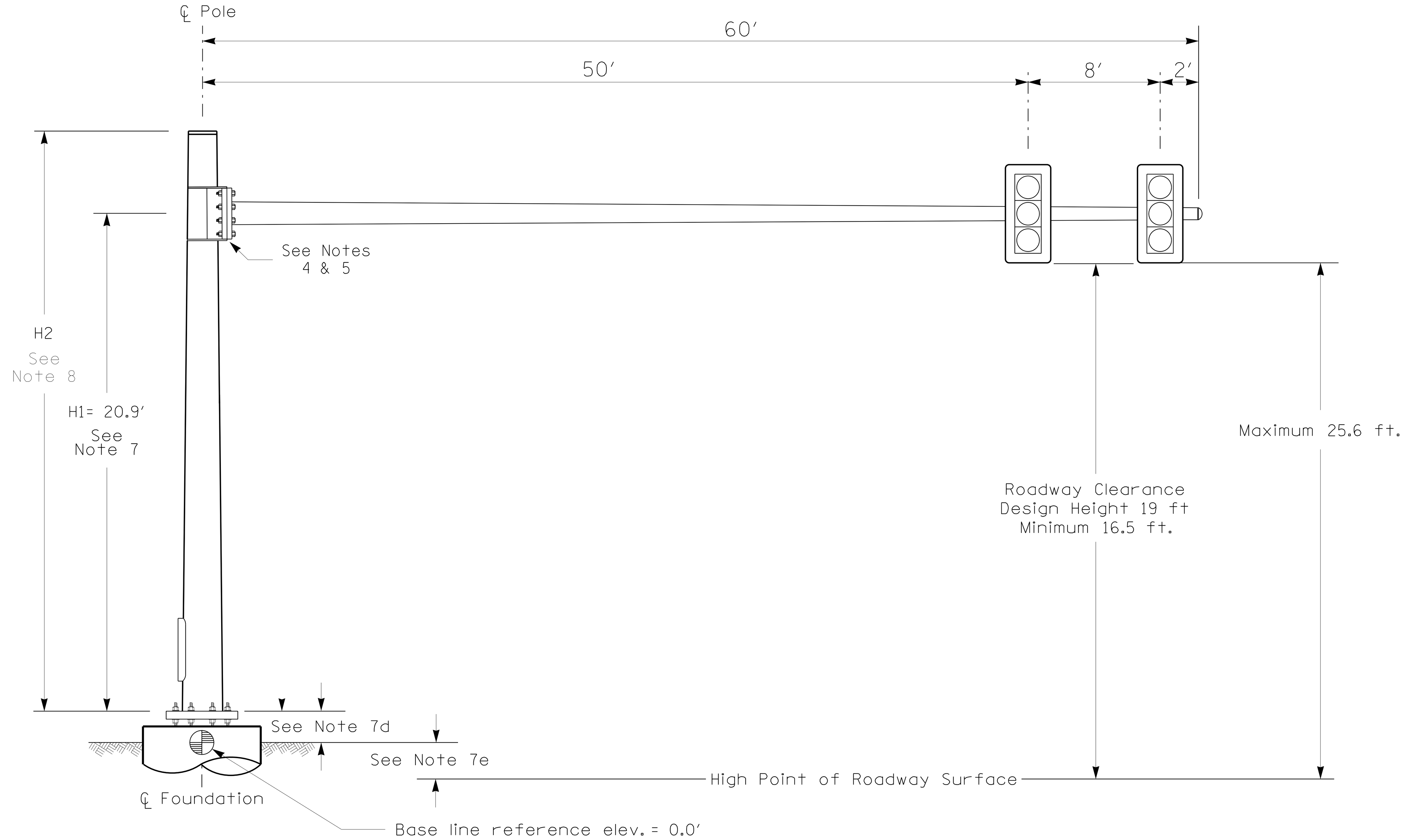
SIG. INVENTORY NO. 03-1105

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

METAL POLE No. 26 AND 27

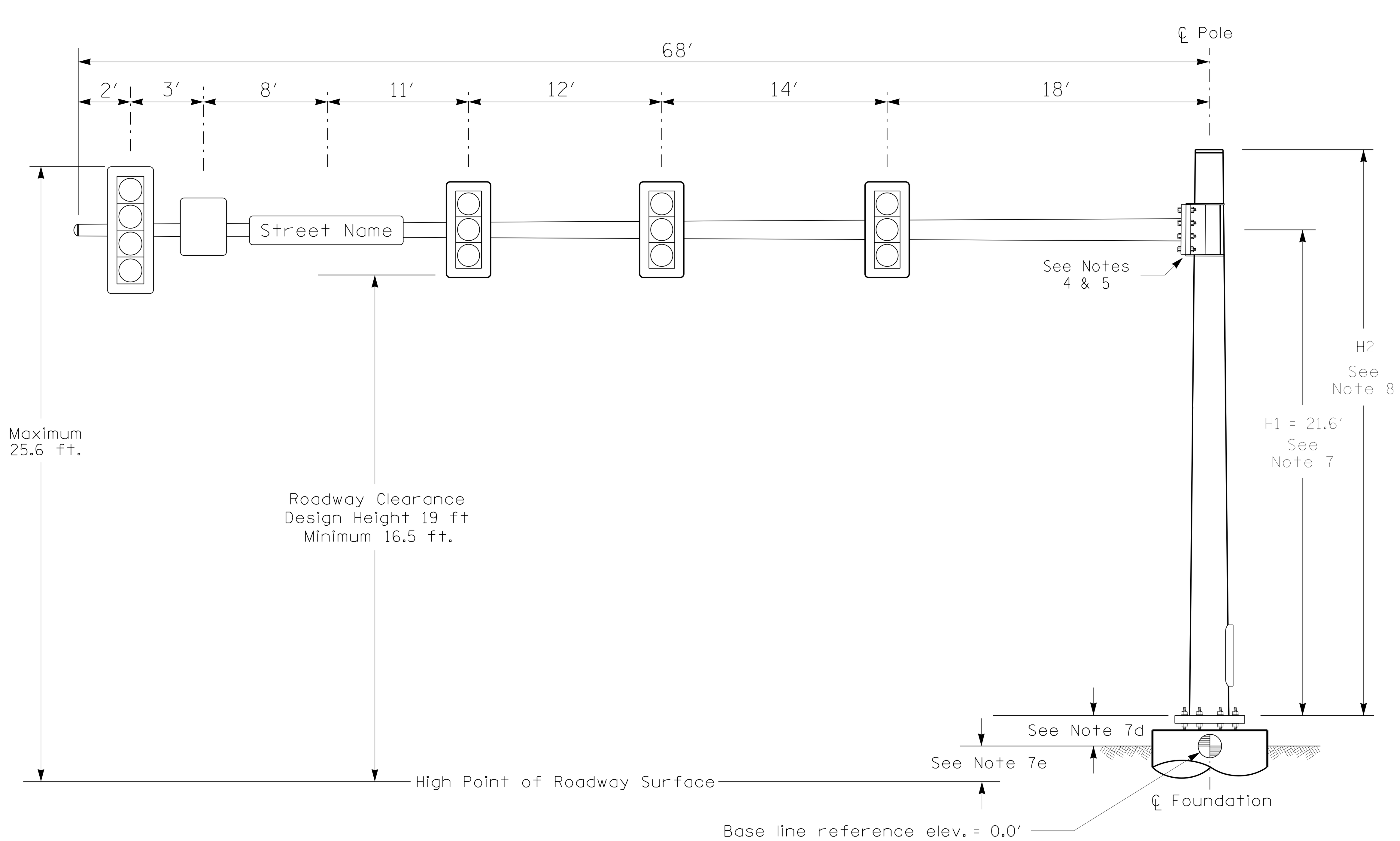
PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 14.5

Design Loading for METAL POLE NO. 26



Elevation View

Design Loading for METAL POLE NO.27



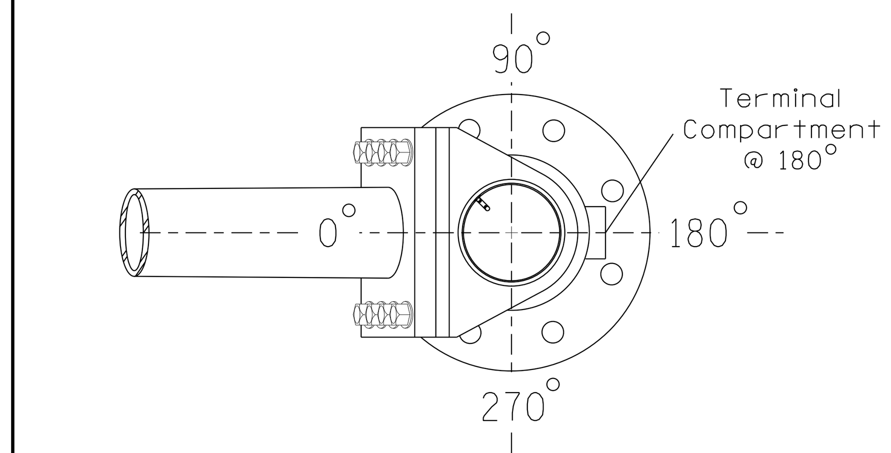
Elevation View

SPECIAL NOTE

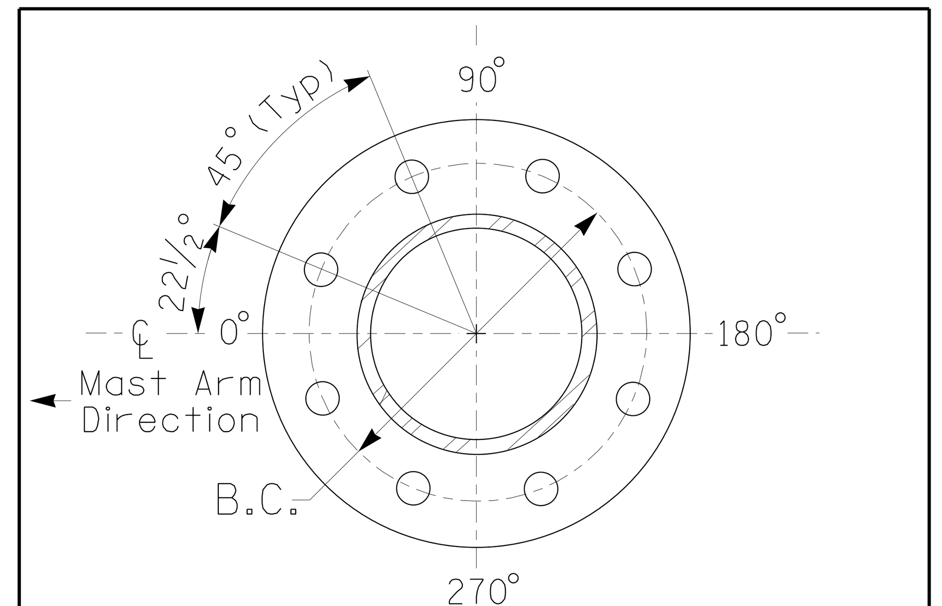
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 26	Pole 27
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.1 ft.	+0.6 ft.
Elevation difference at Edge of travelway or face of curb	-1.8 ft.	+0.6 ft.

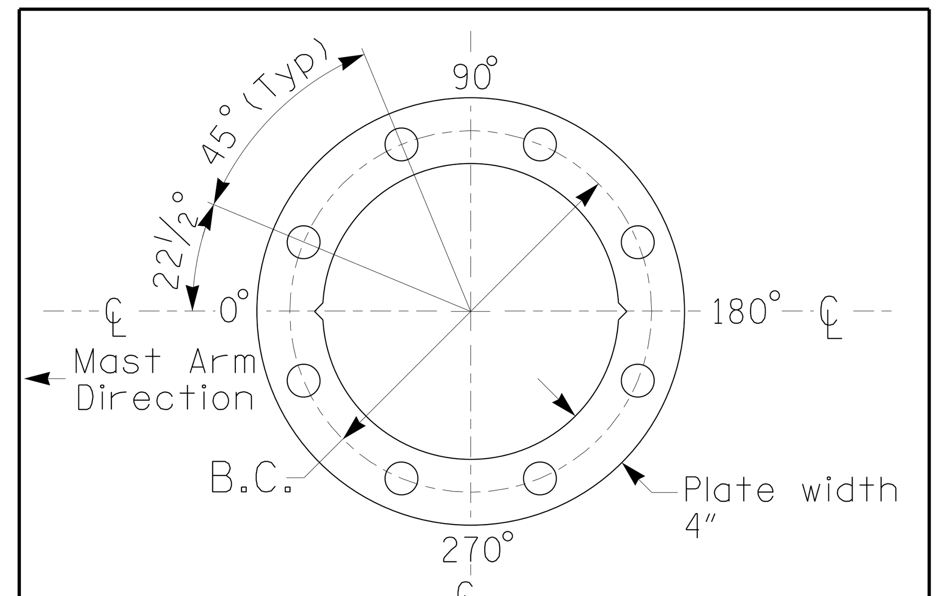


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0″W X 30.0″L	11 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT Wind Zone 2 (130 mph)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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

Northbound SR 1409 (Military Cutoff Rd) at Torchwood Boulevard

Division 03 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: G B Spell	REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS | INIT. | DATE

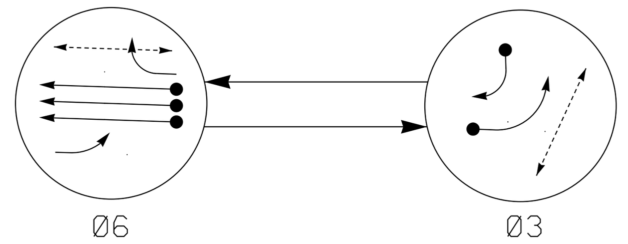
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth — SIGNATURE — 6/6/2017 DATE

SIG. INVENTORY NO. 03-1105

06-JUN-2017 13:49
O:\Transportation\Traffic\Curr\100053597 - U-4751 Military Cutoff\02-Signals\Metal Poles\Single Mast Arm_MP (26-27) - 031105.dgn
emcd5386 AT LUS290321

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

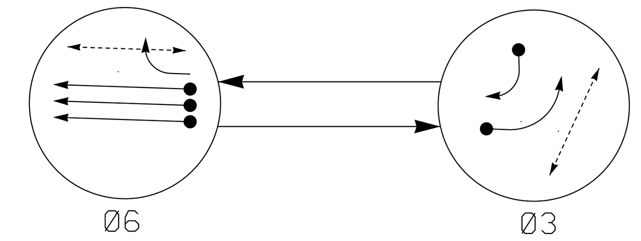
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31	←	FY	Y
32,33	→	R	R
61,62,63	R	G	Y
P31,P32	W	DW	DRK
P61,P62	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31	←	R	Y
32,33	→	R	R
61,62,63	R	G	Y
P31,P32	W	DW	DRK
P61,P62	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

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
3A	6X40	+5	2-4-2	Y	3	Y	Y	-	-	✱15	-	Y
3B	6X40	+3	2-4-2	Y	3	Y	Y	-	-	15	-	Y
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y
6C	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y

✱ Disable delay during Alternate Phasing Operation

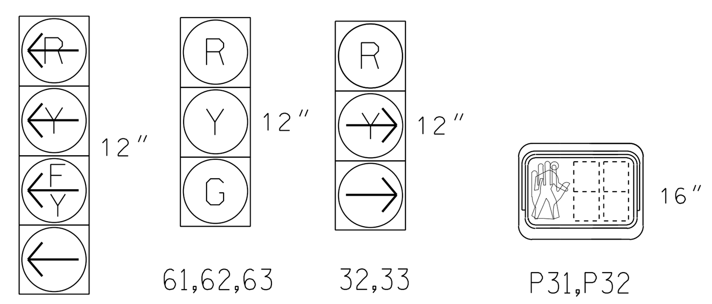
2 Phase
Fully Acutated
Wilmington Signal System

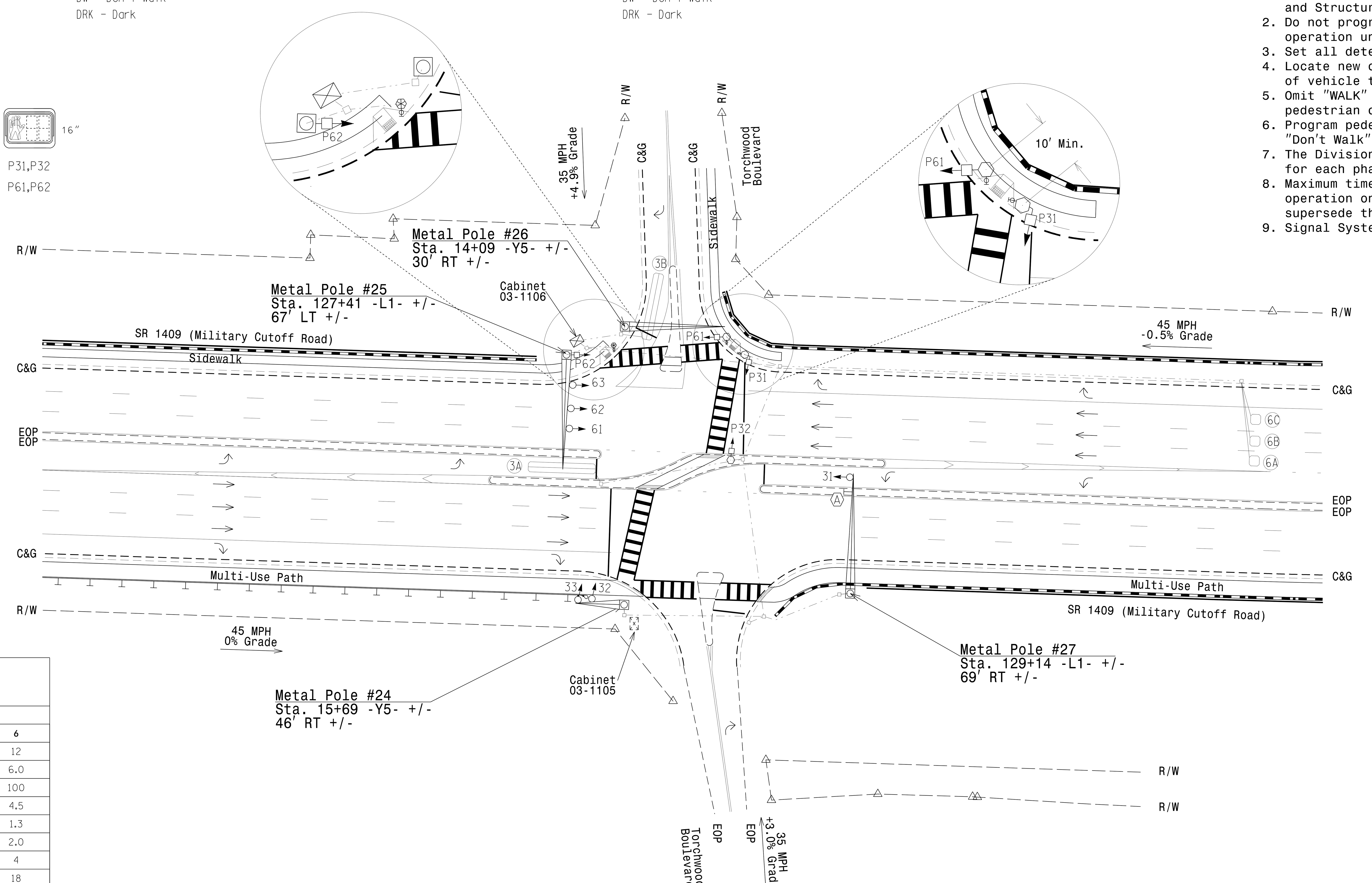
NOTES

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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicle turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to coutdown the flashing "Don't Walk" time only.
7. The Division Traffic Engineer will determine hours of use for each phasing plan.
8. Maximum times shown in timing charts are for free-run operation only. Coordinated signal timing values supersede these values.
9. Signal System data: controller asset #1106.

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Push Button	
	Pedestrian Signal Head	
	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	
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	N/A
N/A	Guardrail	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
N/A	Wheelchair Ramp	
N/A	Concrete Barrier	
N/A	Noise Wall	

OASIS 2070E TIMING CHART

FEATURE	PHASE 3	PHASE 6
Min Green 1 *	5	12
Extension 1 *	2.0	6.0
Max Green 1 *	15	100
Yellow Clearance	3.0	4.5
Red Clearance	3.3	1.3
Red Revert	2.0	2.0
Walk 1 *	4	4
Don't Walk 1	15	18
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	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.

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mncd5386 AT L052932

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

New Installation - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Southbound SR 1409 (Military Cutoff Road) at Torchwood Boulevard

Divison 3	New Hanover County	Wilmington
PLAN DATE: April 2017	REVIEWED BY: M B Toth	
PREPARED BY: G B Spell	REVIEWED BY:	

SCALE 0 40
1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 025892
MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
SIGNATURE 6/6/2017 DATE

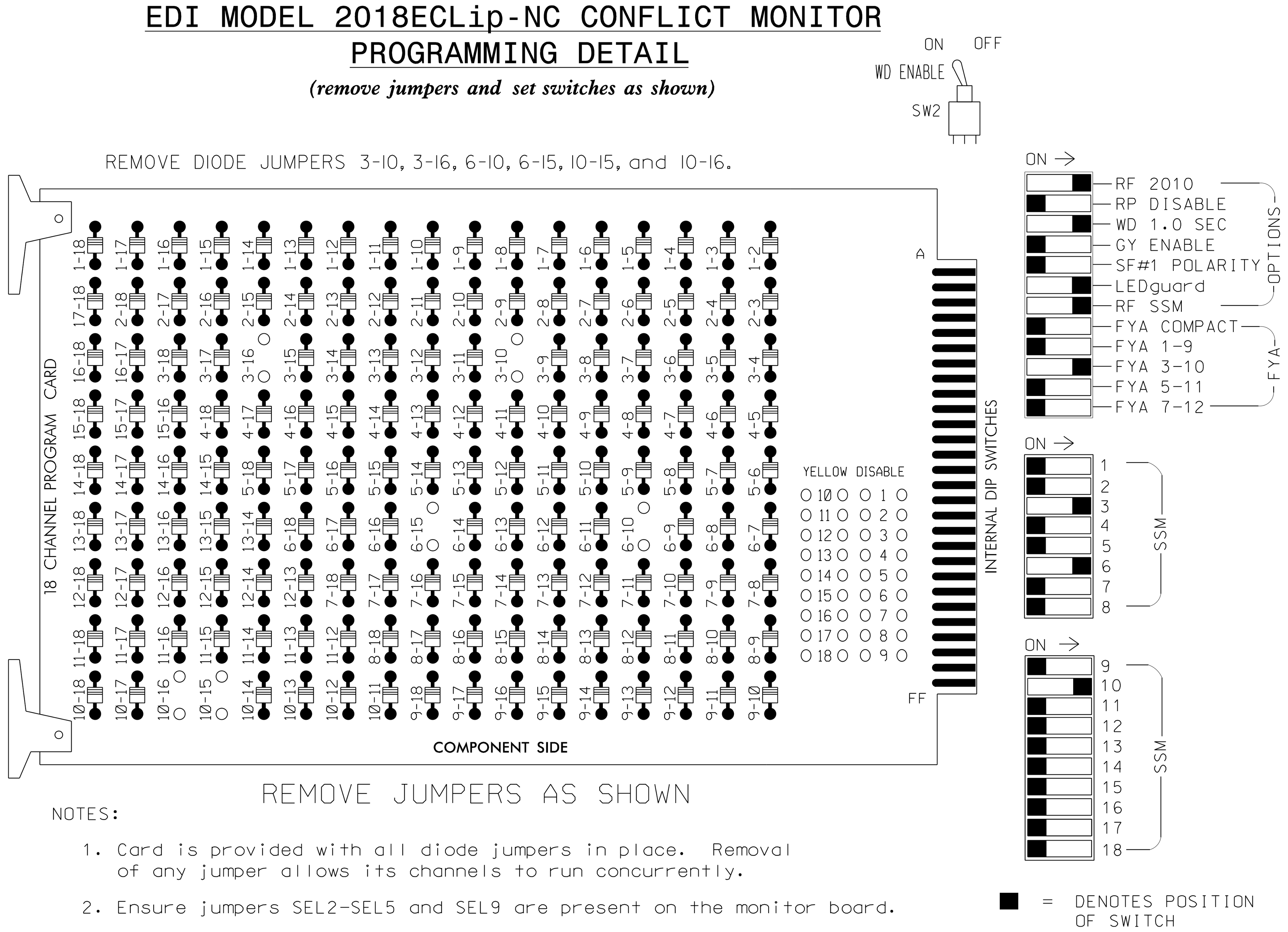
SIG. INVENTORY NO. 03-1106

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 15.1

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-10, 3-16, 6-10, 6-15, 10-15, and 10-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

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. Enable Simultaneous Gap-Out for all phases.
3. Program phase 6 for Variable Initial and Gap Reduction.
4. Program phase 6 for Start Up In Green.
5. Program phases 3 and 6 for 'STARTUP PED CALL'.
6. Program phase 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	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	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31★	32,33	NU	NU	NU	61,62 63	P61, P62	NU	NU	P31, P32	NU	31★	NU	NU	NU	NU
RED					116				134										
YELLOW									135										
GREEN									136										
RED ARROW															A124				
YELLOW ARROW					117										A125				
FLASHING YELLOW ARROW															A126				
GREEN ARROW				118	118														
✋										119			110						
🚶										121			112						

NU = Not Used
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S4,S8,S9,S12,AUX S2
PHASES USED.............3,3PED,6,6PED
OVERLAP "A".............NOT USED
OVERLAP "B".............3+6
OVERLAP "C".............NOT USED
OVERLAP "D".............NOT USED

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.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø3 3B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L					NOT USED	NOT USED							Ø3 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L		Ø6 6B	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
3A	TB4-5,6	I5U	58	20	3	3	Y	Y	_	___	15
	-	I5U	58	20★	53	3	Y	Y	_	___	__
3B	TB4-9,10	I6U	41	3	4	3	Y	Y	_	___	15
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	_	___	__
PED PUSH BUTTONS											
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

★ See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
4. ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
8. REPEAT STEPS # 3 AND # 4.

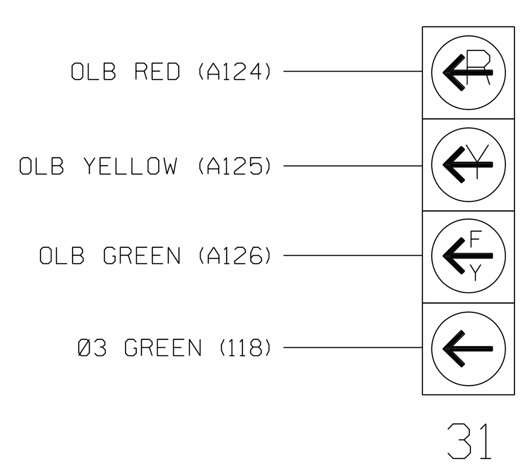
CHANGING INPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 31 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1106
DESIGNED: April 2017
SEALED: ________
REVISED: ________

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Details - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Southbound SR 1409 (Military Cutoff Road) at Torchwood Boulevard

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Division 3 New Hanover County Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: G B Spell	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04AF...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1106

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 1, 2, AND 3.

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

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 6 (HEAD 31).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:          |12345678910111213141516
VEH OVL PARENTS:|  X  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   X GREEN
------------------------------------------
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+'

NOTICE PAGE 2

```
 PAGE 2: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:          |12345678910111213141516
VEH OVL PARENTS:|  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
------------------------------------------
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1106
DESIGNED: April 2017
SEALED: ________
REVISED: ________

Electrical Details - Sheet 2 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888   NCBEES #F-0326

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

Southbound SR 1409
(Military Cutoff Road)
at
Torchwood Boulevard

Division 3	New Hanover County	Wilmington	
PLAN DATE: April 2017		REVIEWED BY: M B Toth	
PREPARED BY: G B Spell		REVIEWED BY: ________	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
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SIGNATURE   6/6/2017 DATE

SIG. INVENTORY NO. 03-1106

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enca5386 AT LUS290321

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 15.3

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 20 IS REACHED.

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................20
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64).............3
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)..._
CHANGE PHASE TIMING PAGE (1-4)......_
CHANGE PHASE CONTROL PAGE (1-4)....._
CHANGE OVERLAP CONTROL PAGE (1-4)..._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

ENTER '53' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 3A - PHASE 3)

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................20
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64).............53
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)..._
CHANGE PHASE TIMING PAGE (1-4)......_
CHANGE PHASE CONTROL PAGE (1-4)....._
CHANGE OVERLAP CONTROL PAGE (1-4)..._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 3A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #53.

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#         ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)...............0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '3' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#         ¦12345678910111213141516
PHASES ASSIGNED ¦  X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)...............0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1106
DESIGNED: April 2017
SEALED: ________
REVISED: ________

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888   NCBEES #F-0326

Electrical Details - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

Southbound SR 1409
(Military Cutoff Road)
at
Torchwood Boulevard

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: G B Spell	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
D86DCF8E04D04AF...
SIGNATURE | DATE 6/6/2017

SIG. INVENTORY NO. 03-1106

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for head 31 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1106
DESIGNED: April 2017
SEALED: ______
REVISED: ______

Electrical Details - Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Southbound SR 1409
(Military Cutoff Road)
at
Torchwood Boulevard

Division 3 New Hanover County Wilmington

PLAN DATE: April 2017 REVIEWED BY: M B Toth
PREPARED BY: G B Spell REVIEWED BY:

REVISIONS INIT. DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth
SIGNATURE 6/6/2017 DATE

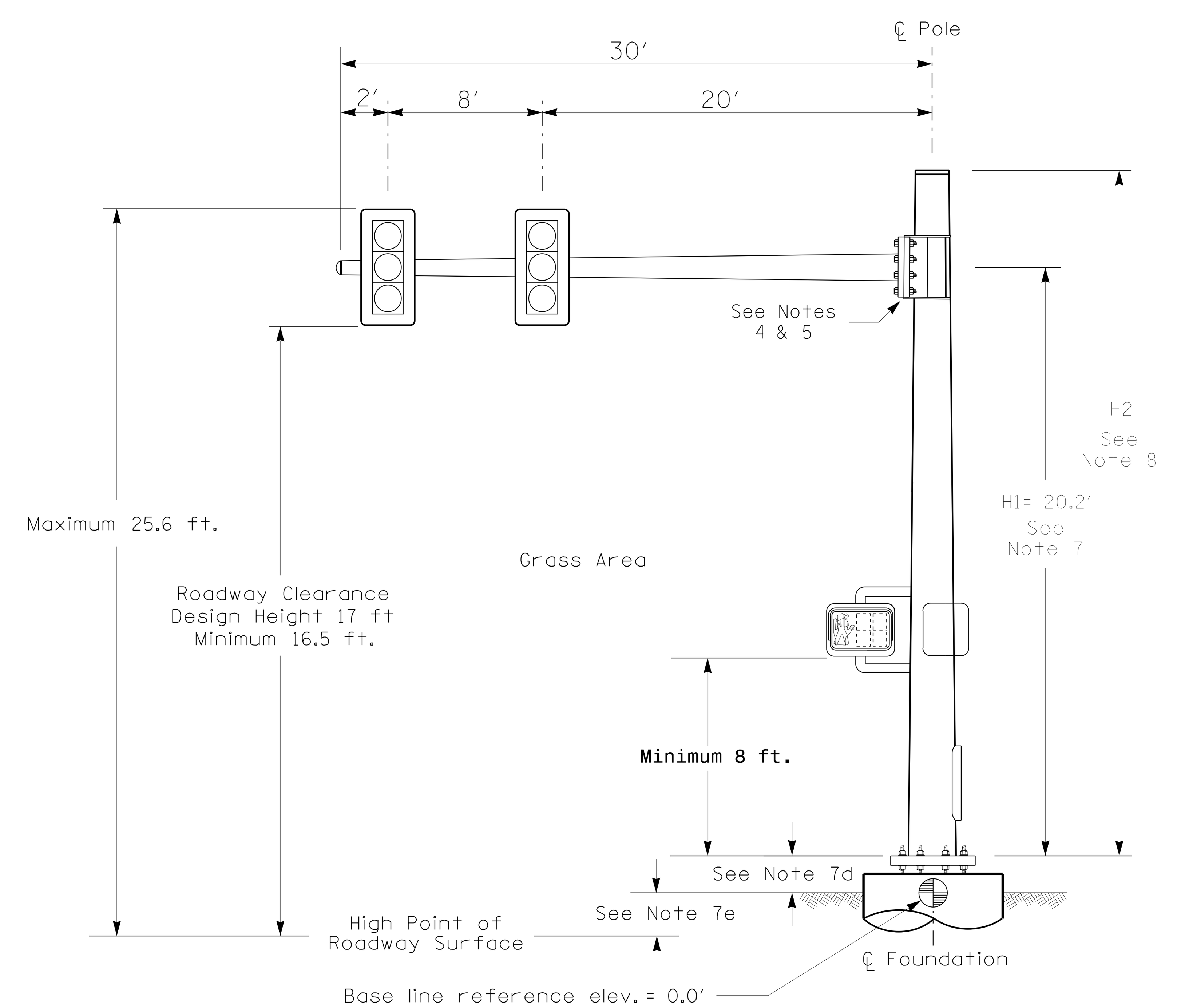
SIG. INVENTORY NO. 03-1106

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

METAL POLE No. 24 AND 25

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 15.5

Design Loading for METAL POLE NO. 24



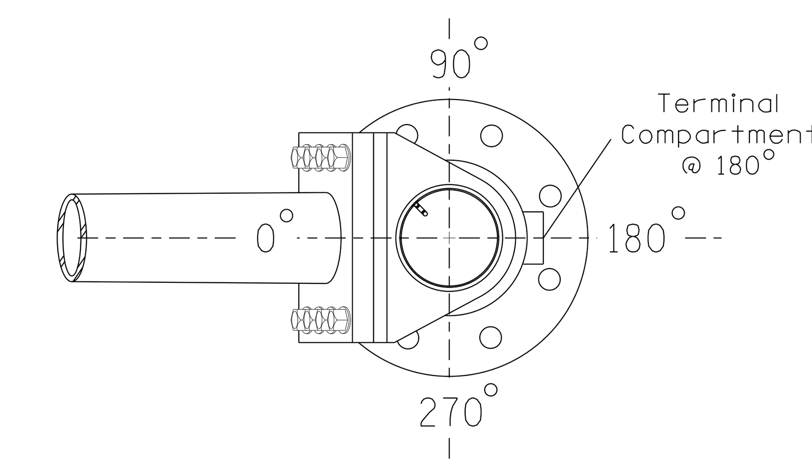
Elevation View

SPECIAL NOTE

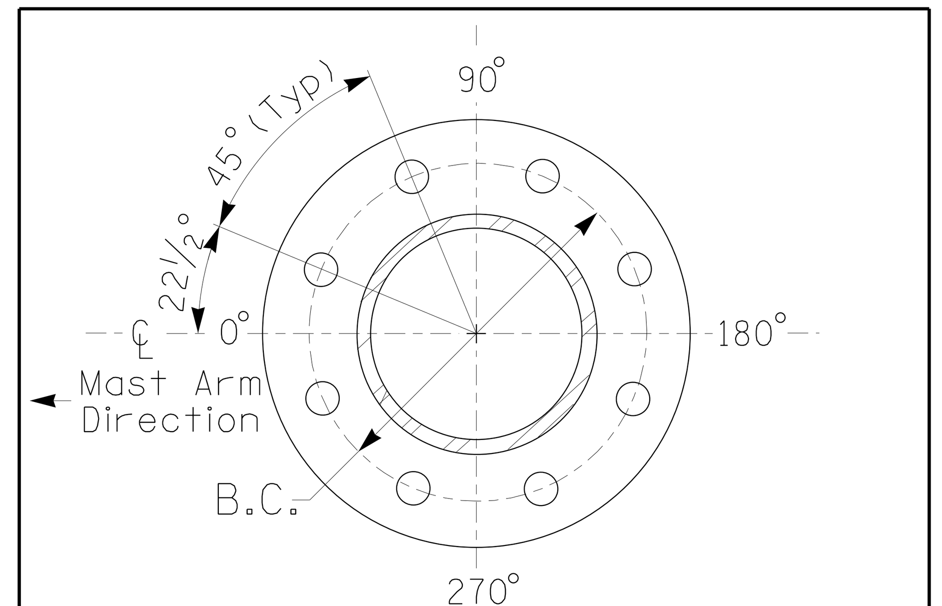
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 24	Pole 25
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.2 ft.	+1.1 ft.
Elevation difference at Edge of travelway or face of curb	+1.5 ft.	+1.7 ft.

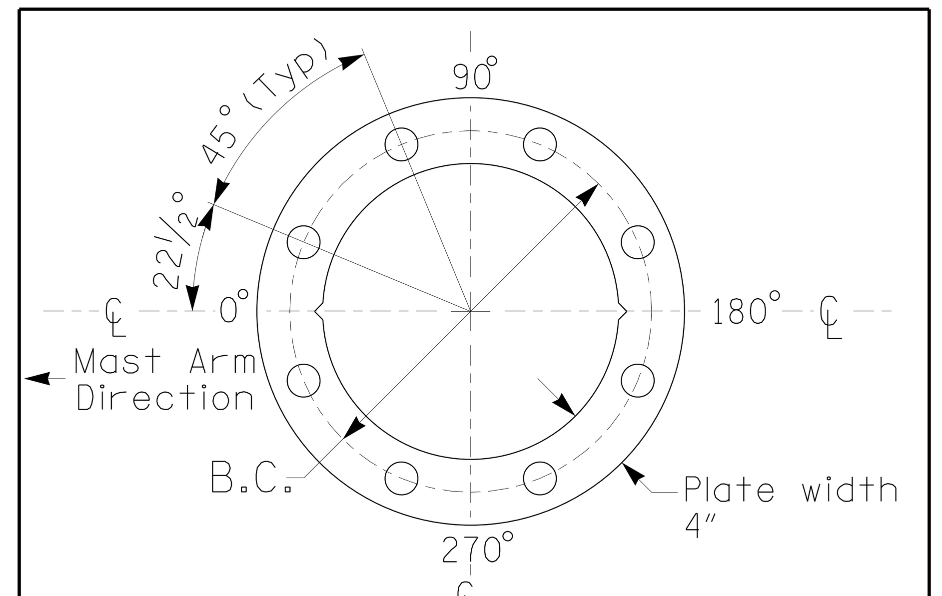


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0″W X 30.0″L	11 LBS

NOTES

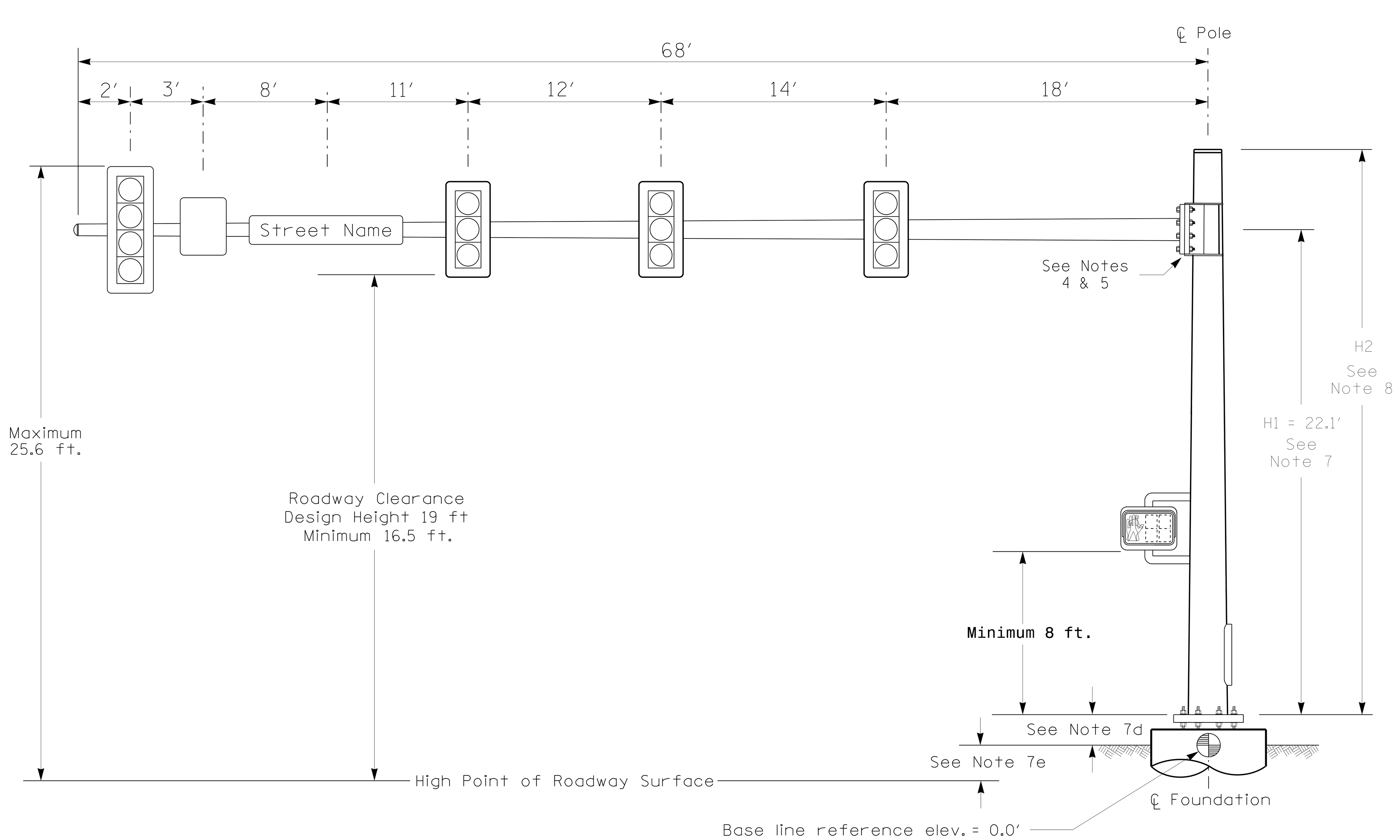
DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

Design Loading for METAL POLE NO.25



Elevation View

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT Wind Zone 2 (130 mph)

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

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

750 N.Greenfield Pkwy,Garner,NC 27529

Southbound SR 1409 (Military Cutoff Rd) at Torchwood Boulevard

Division 03	New Hanover County		Wilmington
PLAN DATE:	April 2017	REVIEWED BY:	M B Toth
PREPARED BY:	G B Spell	REVIEWED BY:	

SCALE 0 N/A

N/A

REVISIONS INIT. DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

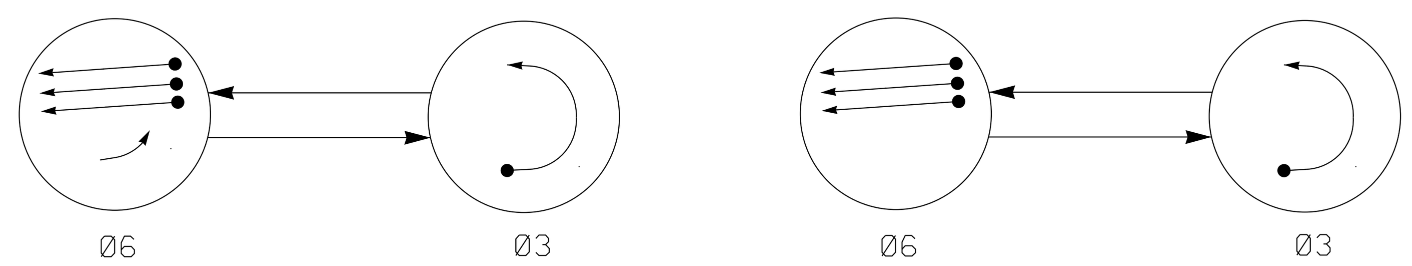
DocuSigned by: Melissa B. Toth 6/6/2017

SIGNATURE DATE

SIG. INVENTORY NO. 03-1106

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	PHASE FLASH
31,32			
61,62,63	R	G	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	PHASE FLASH
31,32			
61,62,63	R	G	Y

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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15*	-	Y
6A	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y
6C	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y

*Disable delay during Alternate Phasing Operation.

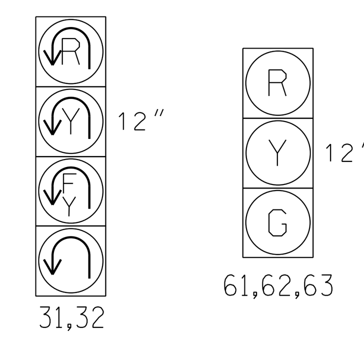
2 Phase
Fully Actuated
Wilmington Signal System

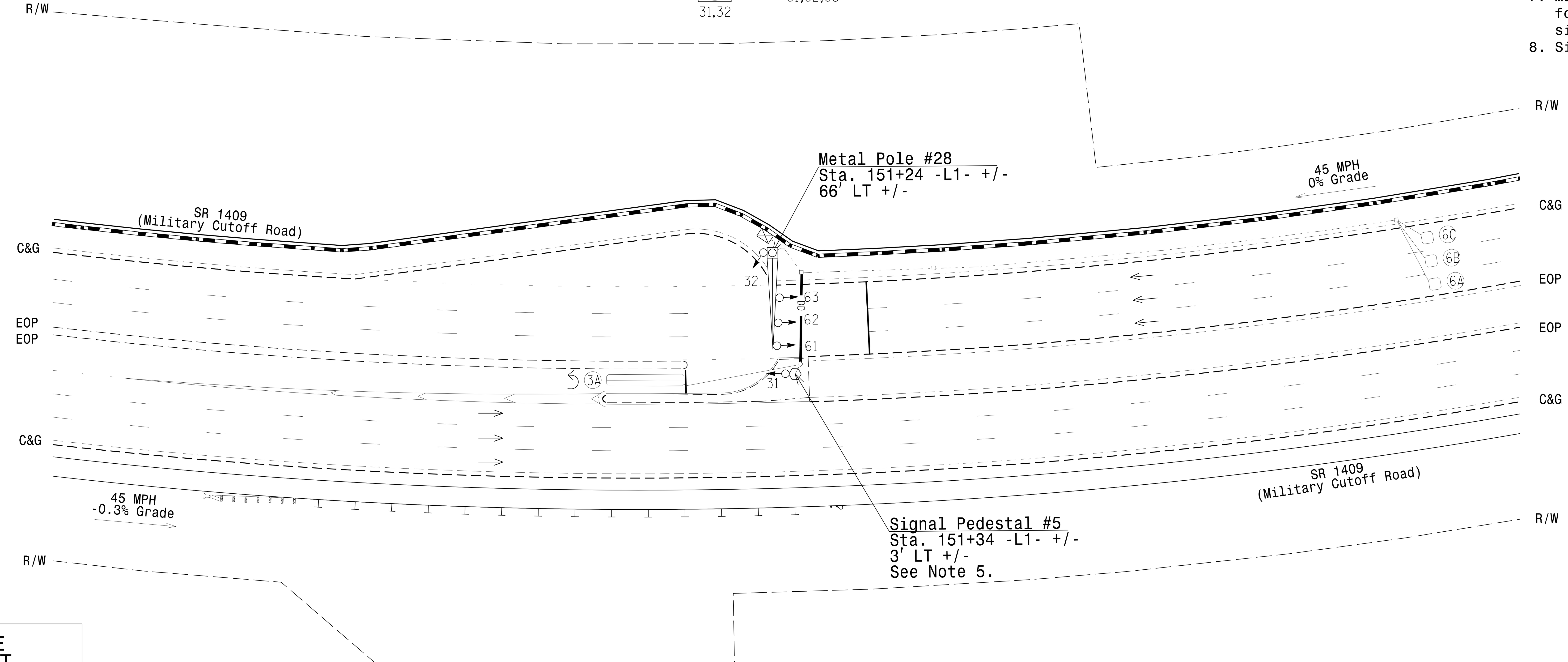
NOTES

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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicle turning right on red.
5. Pedestal mounted signal heads shall be mounted a minimum of 8' above the high point of the roadway surface elevation.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
7. Maximum times shown in timing charts are for free-run operation only. Coordinated signal timing values supersede these values.
8. Signal System data: Controller Asset #1107.

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
DD	Directional Drill	N/A
	Metal Pole with Mastarm	
N/A	Guardrail	
N/A	Concrete Barrier	
N/A	Noise Wall	

OASIS 2070E TIMING CHART

FEATURE	PHASE 3	PHASE 6
Min Green 1 *	5	12
Extension 1 *	2.0	6.0
Max Green 1 *	30	100
Yellow Clearance	3.0	4.5
Red Clearance	3.6	1.5
Red Revert	2.0	2.0
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	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.

New Installation - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 3	New Hanover County	Wilmington
PLAN DATE: April 2017	REVIEWED BY: M B Toth	
PREPARED BY: A M Quigley	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 025892
MELISSA B. TOTH

DocuSigned by: Melissa B. Toth 6/6/2017
SIGNATURE DATE

SIG. INVENTORY NO. 03-1107

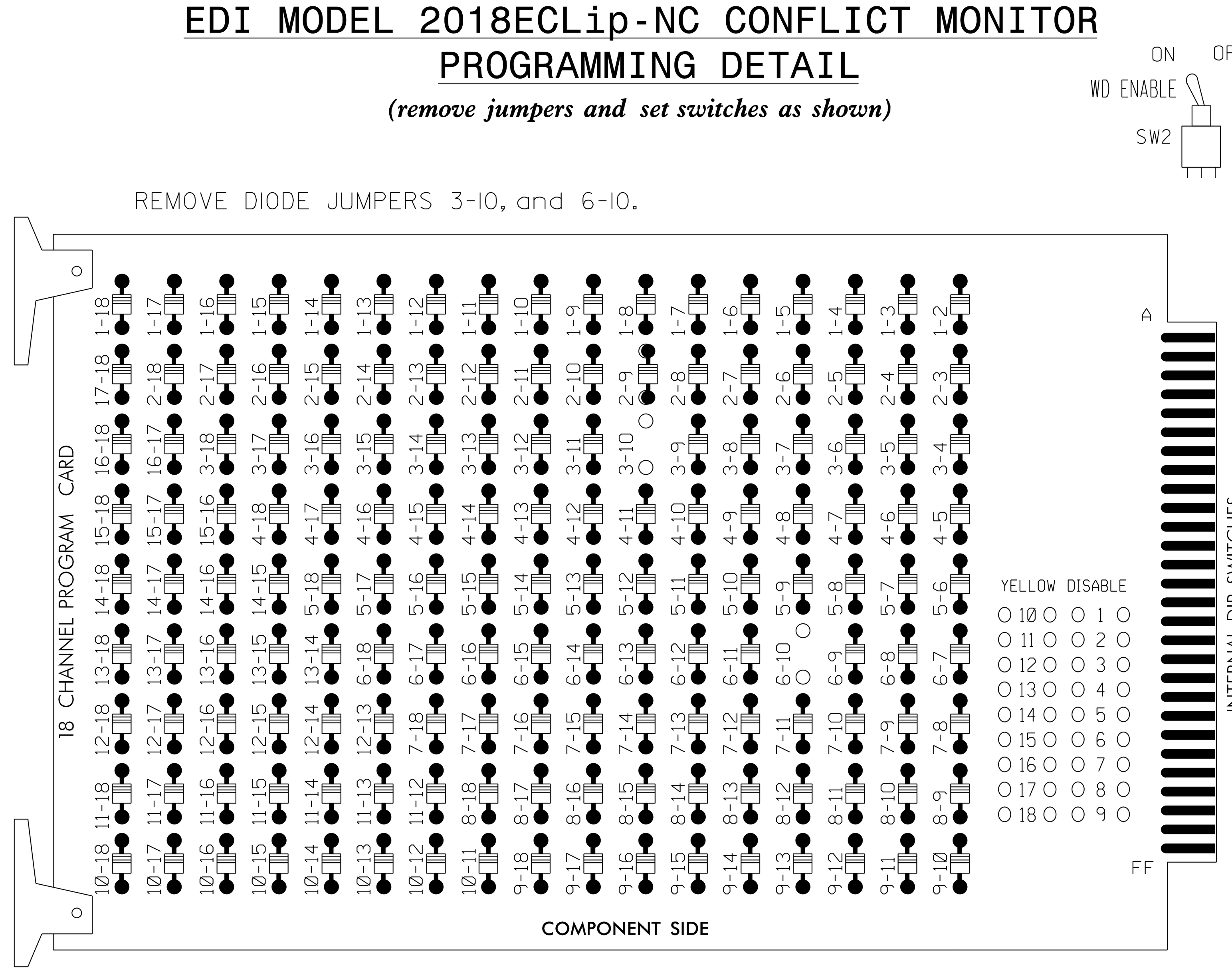
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 16.1

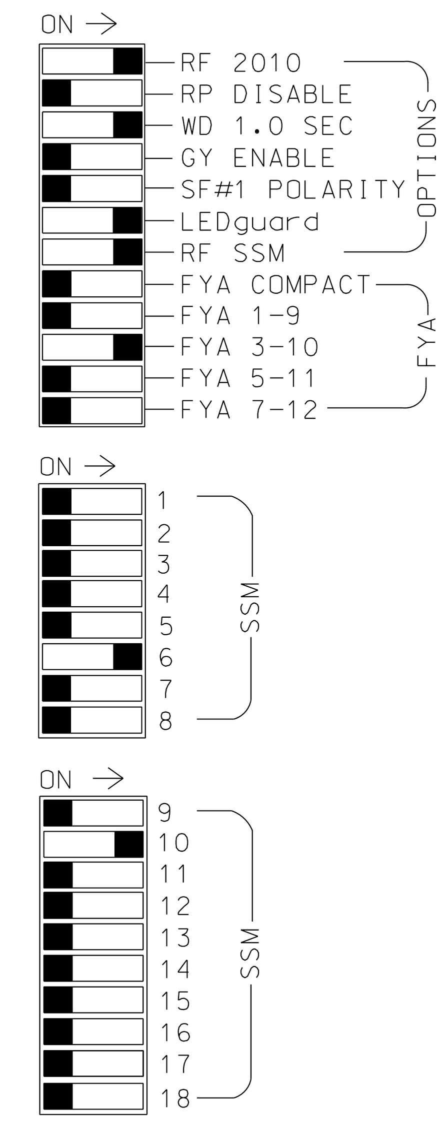
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-10, and 6-10.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phase 6 for Variable Initial and Gap Reduction.
4. Program phase 6 for Start Up In Green.
5. Program phase 6 for Yellow Flash.
6. The cabinet and controller are part of the Wilmington Signal System.

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.	NU	NU	NU	31,32	NU	NU	NU	61,62, 63	NU	NU	NU	NU	NU	31,32	NU	NU	NU	NU
RED								134										
YELLOW				✳				135										
GREEN								136										
RED ARROW														A124				
YELLOW ARROW														A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118														
✋																		
🚶																		

NU = Not Used

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

★ See pictorial of head wiring in detail below.

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	Ø 3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L					NOT USED									ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 6B	NOT USED											

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

FS = FLASH SENSE
ST = STOP TIME

EQUIPMENT INFORMATION

CONTROLLER.............2070E
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S4,S8,AUXS2
PHASES USED.............3,6
OVERLAP "A".............NOT USED
OVERLAP "B".............3+6
OVERLAP "C".............NOT USED
OVERLAP "D".............NOT USED

INPUT FILE CONNECTION & PROGRAMMING CHART

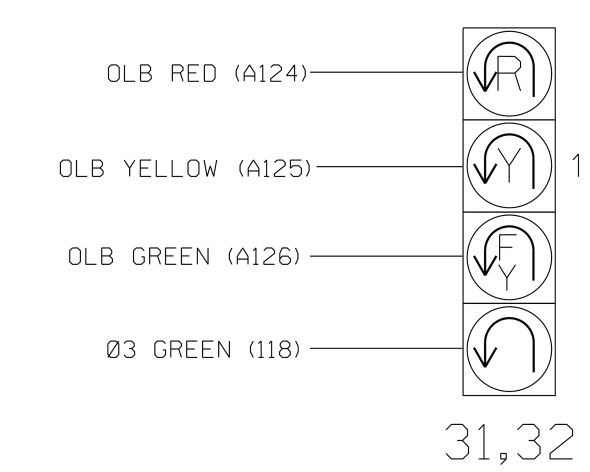
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	I5U	58	20 ★	53	3	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			

★ See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

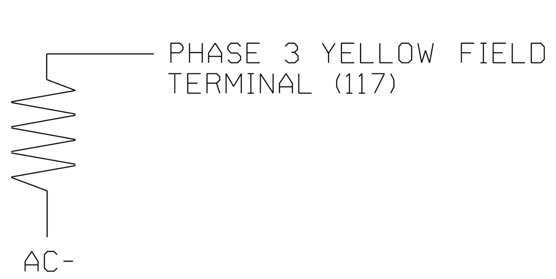
1. The sequence display for this signal requires special logic programming. See sheet 2 of 4 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1107
DESIGNED: April 2017
SEALED: ______
REVISED: ______

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



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ELECTRICAL DETAIL - SHEET 1 OF 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: A M Quigley	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by:
Melissa B. Toth
D86DCF8E04D04AF...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1107

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 1, 2, AND 3.

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

```
 LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 6 (HEAD 31 AND 32).

PRESS '+'

```
 LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31 AND 32).

PRESS '+'

```
 LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31 AND 32).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:           |12345678910111213141516
VEH OVL PARENTS:|  X  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW  _ GREEN
FLASH COLORS:  _ RED   _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+'

NOTICE PAGE 2

```
 PAGE 2: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:           |12345678910111213141516
VEH OVL PARENTS:|  X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW  _ GREEN
FLASH COLORS:  _ RED   _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1107
DESIGNED: APRIL 2017
SEALED: ________
REVISED: ________

ELECTRICAL DETAIL - SHEET 2 OF 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: A M Quigley	REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by:
Melissa B. Toth
D86DCF8E04D04...
SIGNATURE
6/6/2017
DATE

SIG. INVENTORY NO. 03-1107

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 20 IS REACHED.

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................20
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............3
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

ENTER '53' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 3A - PHASE 3)

```
PAGE: 2 C1 PIN:58  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................20
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............53
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE).._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 3A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #53.

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.......................N
ENABLE LOGGING........................N
ENABLE DIAGNOSTICS....................N
SPEED TRAP............................N
CALL DETECTOR.........................Y
EXTENSION DETECTOR....................Y
MODE 2 STOP BAR.......................N
SWITCHING DETECTOR....................N
DUPLICATING DETECTOR..................N
ENABLE FULL TIME DELAY................N
IF FAILED, SET MIN RECALL?............N
IF FAILED, SET MAX1 RECALL?...........N
IF FAILED, SET MAX2 RECALL?...........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)..................6
SPEED TRAP DISTANCE (0-255 FT)........0
STOP BAR TIME (0-255 SEC).............0
STRETCH (0-25.5 SEC)..................0.0
DELAY (0-255 SEC).....................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255)...0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)....0
QUEUE MAX OCCUPANCY TIME (0-255)......0
QUEUE GAP RESET TIME (0-25.5).........0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '3' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #53  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.......................Y
ENABLE LOGGING........................N
ENABLE DIAGNOSTICS....................N
SPEED TRAP............................N
CALL DETECTOR.........................Y
EXTENSION DETECTOR....................Y
MODE 2 STOP BAR.......................N
SWITCHING DETECTOR....................N
DUPLICATING DETECTOR..................N
ENABLE FULL TIME DELAY................N
IF FAILED, SET MIN RECALL?............N
IF FAILED, SET MAX1 RECALL?...........N
IF FAILED, SET MAX2 RECALL?...........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |  X
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)..................6
SPEED TRAP DISTANCE (0-255 FT)........0
STOP BAR TIME (0-255 SEC).............0
STRETCH (0-25.5 SEC)..................0.0
DELAY (0-255 SEC).....................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255)...0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)....0
QUEUE MAX OCCUPANCY TIME (0-255)......0
QUEUE GAP RESET TIME (0-25.5).........0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1107
DESIGNED: APRIL 2017
SEALED: ______
REVISED: ______

ELECTRICAL DETAIL - SHEET 3 OF 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2017 | REVIEWED BY: M B Toth
PREPARED BY: A M Quigley | REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth
SIGNATURE | 6/6/2017 DATE

SIG. INVENTORY NO. 03-1107

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 16.4

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 31 and 32 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: ________
DESIGNED: ________
SEALED: ________
REVISED: ________

06-JUN-2017 16:51
O:\Transportation\Traffic\Curr\100053597 - U-4751 Military Cutoff\02-Signals\Design\01 Wiring\03-1107E.dgn
mnco5386 AT LUS29032I

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

ELECTRICAL DETAIL - SHEET 4 OF 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 3 | New Hanover County | Wilmington

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: April 2017	REVIEWED BY: M B Toth
PREPARED BY: A M Quigley	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025892 MELISSA B. TOTH

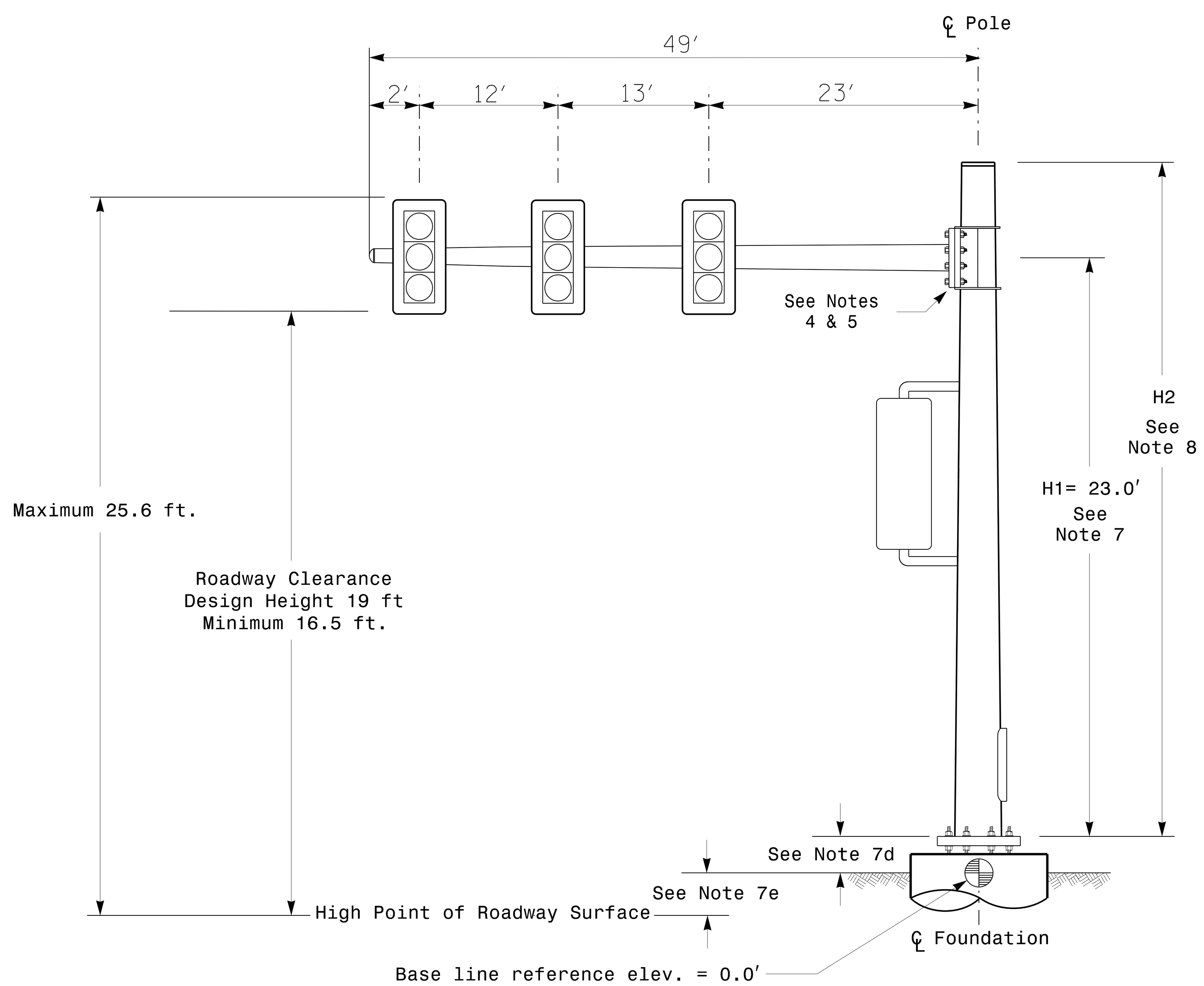
DocuSigned by: Melissa B. Toth
D86DCF8E04D04AP...
SIGNATURE 6/6/2017 DATE

SIG. INVENTORY NO. 03-1107

PROJECT REFERENCE NO.	SHEET NO.
U-4751	Sig. 16.5

METAL POLE No. 28

Design Loading for METAL POLE NO. 28



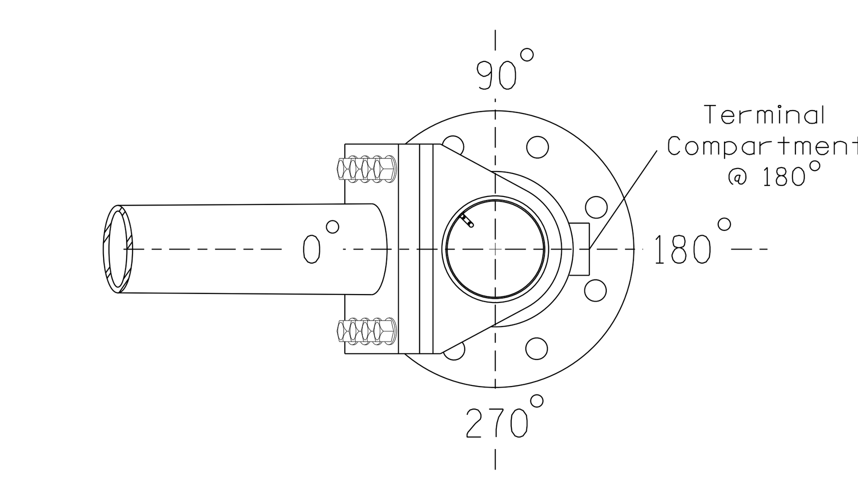
Elevation View

SPECIAL NOTE

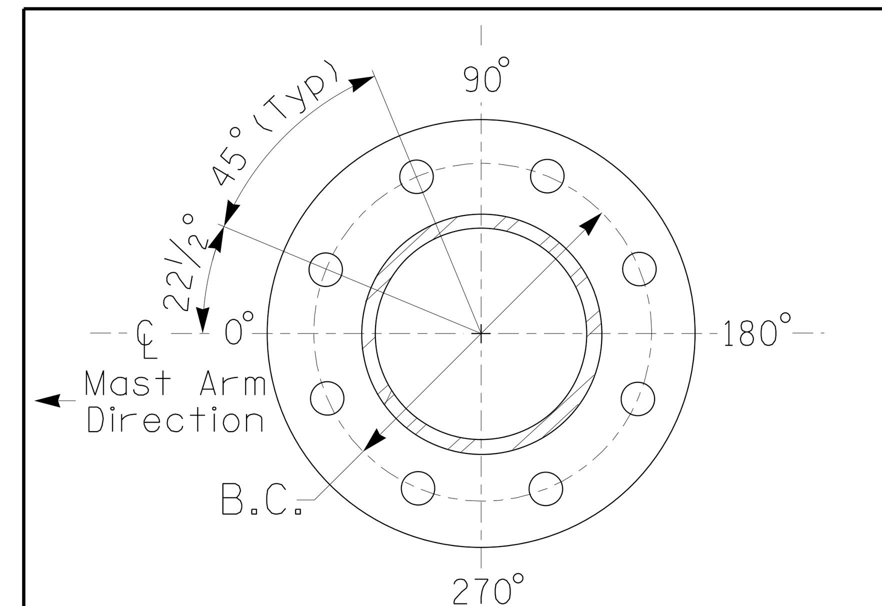
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 28	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+2.0 ft.	
Elevation difference at Edge of travelway or face of curb	-0.6 ft.	

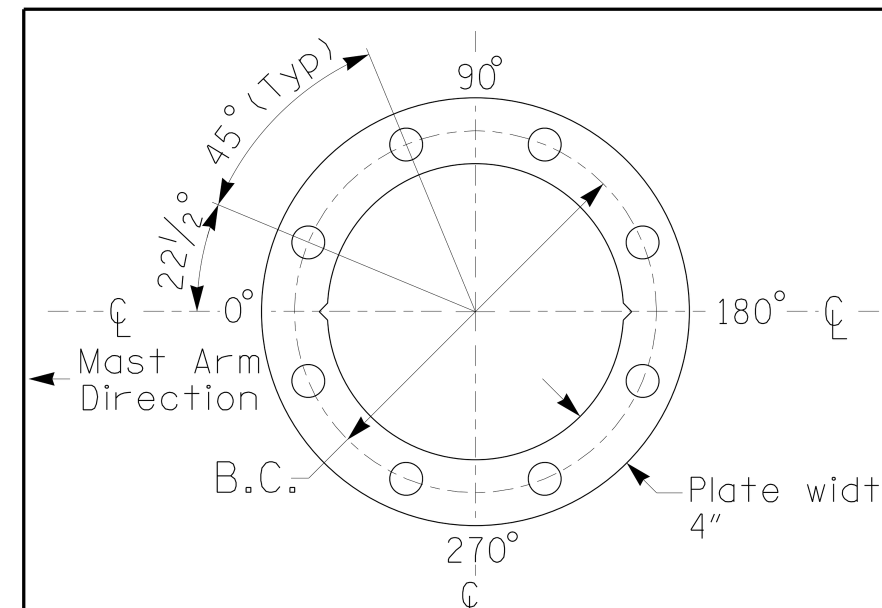


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT Wind Zone 2 (130 mph)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Prepared for 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

SR 1409 (Military Cutoff Road)
at
U-Turn North of Torchwood Boulevard

Division 03 New Hanover County Wilmington

PLAN DATE:	April 2017	REVIEWED BY:	M B Toth
PREPARED BY:	A M QUIGLEY	REVIEWED BY:	

SCALE
0 N/A
N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

DocuSigned by: Melissa B. Toth 6/6/2017
D86DCF8E... SIGNATURE DATE

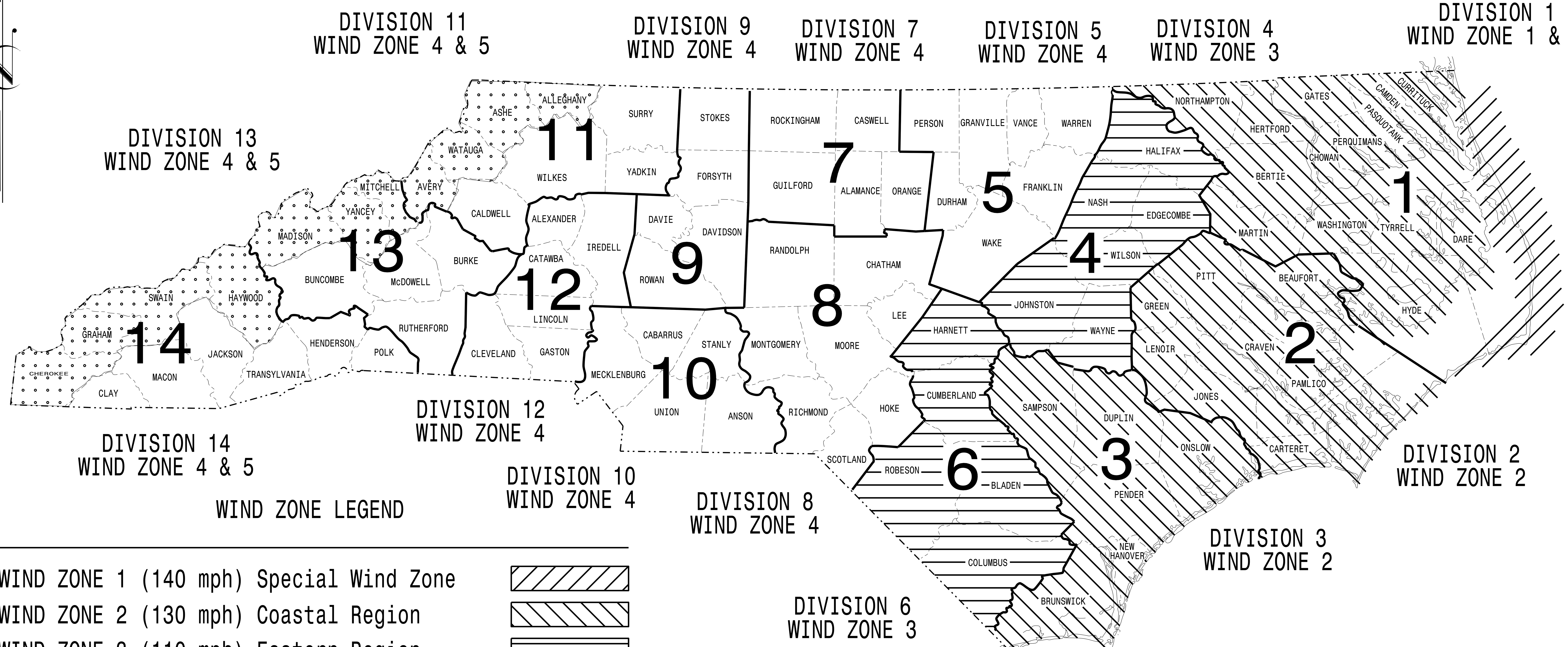
SIG. INVENTORY NO. 03-1107

NCDOT METAL POLE STANDARDS

PROJECT I.D. NO.	SHEET NO.
U-4751	Sig.M1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	//////
WIND ZONE 2 (130 mph) Coastal Region	\\\\\\
WIND ZONE 3 (110 mph) Eastern Region	══════
WIND ZONE 4 (90 mph) Central & Mtn. Region	(blank)
WIND ZONE 5 (120 mph) Special Wind Zone	(dotted)

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

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

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details–All Metal Poles
Sig. M 3	Typical Fabrication Details–Strain Poles
Sig. M 4	Typical Fabrication Details–Mast Arm Poles
Sig. M 5	Typical Fabrication Details–Mast Arm Connection
Sig. M 6	Typical Fabrication Details–Strain Pole Attachments
Sig. M 7	Construction Details–Foundations
Sig. M 8	Standard Strain Pole Foundation–All Soil Conditions

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION – ITS AND SIGNALS UNIT

G. A. FULLER, P.E. – STATE ITS AND SIGNALS ENGINEER

G. G. MURR, JR., P.E. – STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. – ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

C.F. ANDREWS – ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

SEAL

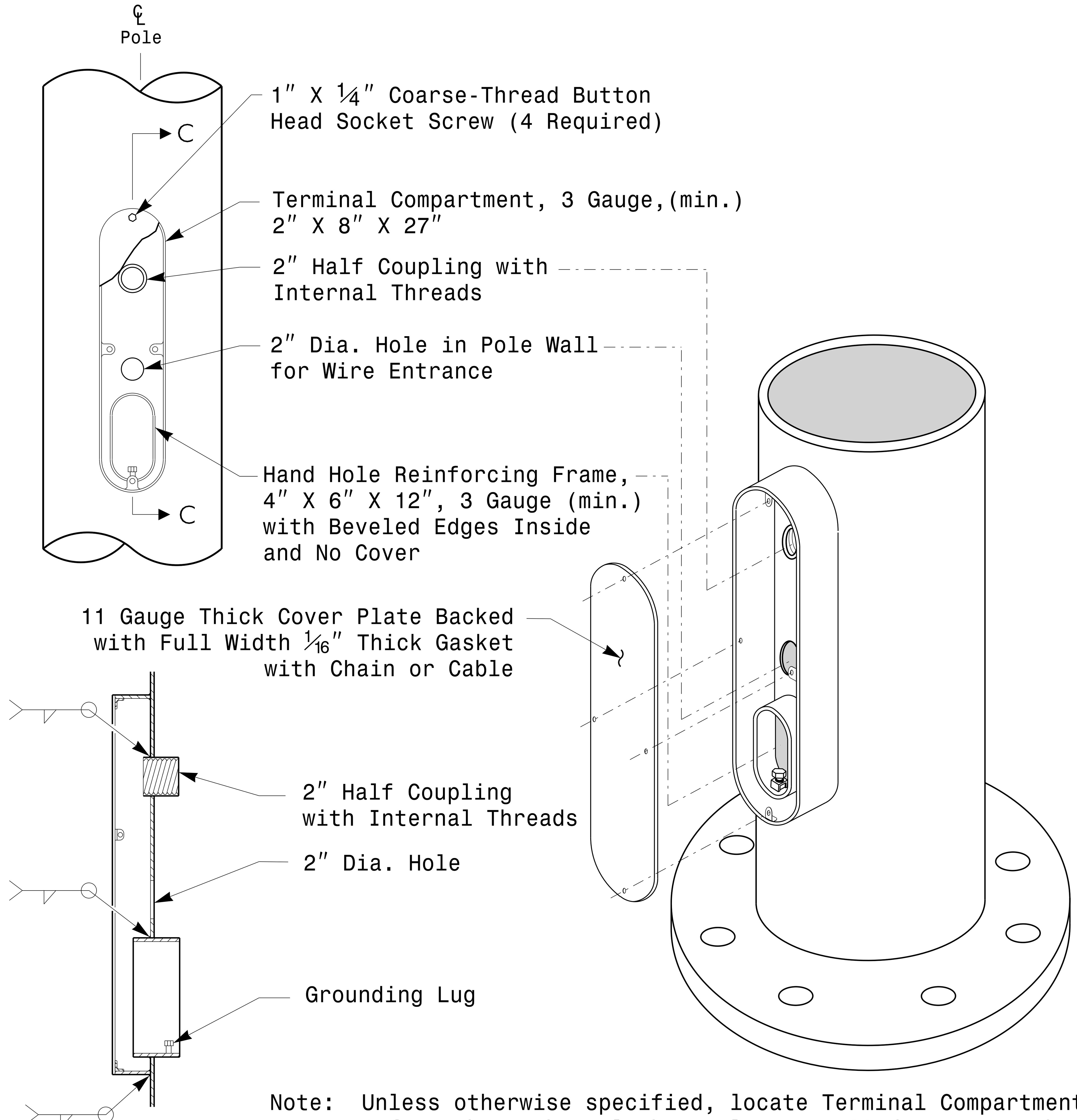
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
44E8E32E14E4C4...
SIGNATURE

2/17/2016
DATE

PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M2

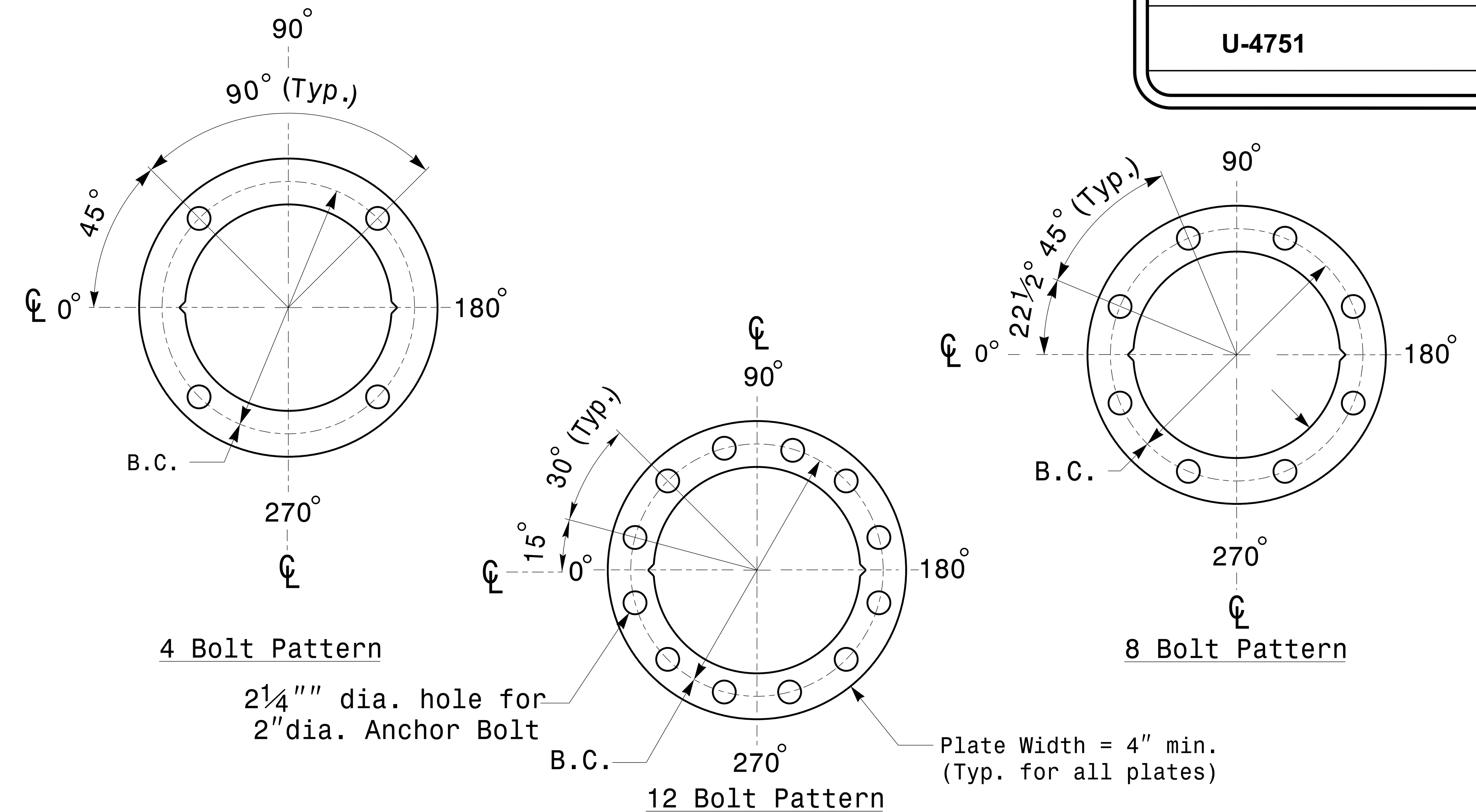
Fabrication Details – All Metal Poles



Section C-C

Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



Construct Templates and Plates from ¼″ min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details

MFG ________ MFG. DATE: MM/YY
SHAFT D/T/L/Y ____/____/____/____
ARM-A D/T/L/Y ____/____/____/____
____/____/____/____
ARM-B D/T/L/Y ____/____/____/____
____/____/____/____
A.B. DIA./B.C./L/Y ____/____/____/____
NCDOT SIG. INV. NO. _ _ _ _ _ _ _ _
NCDOT POLE NO. _ _ _ _ _ _ _ _

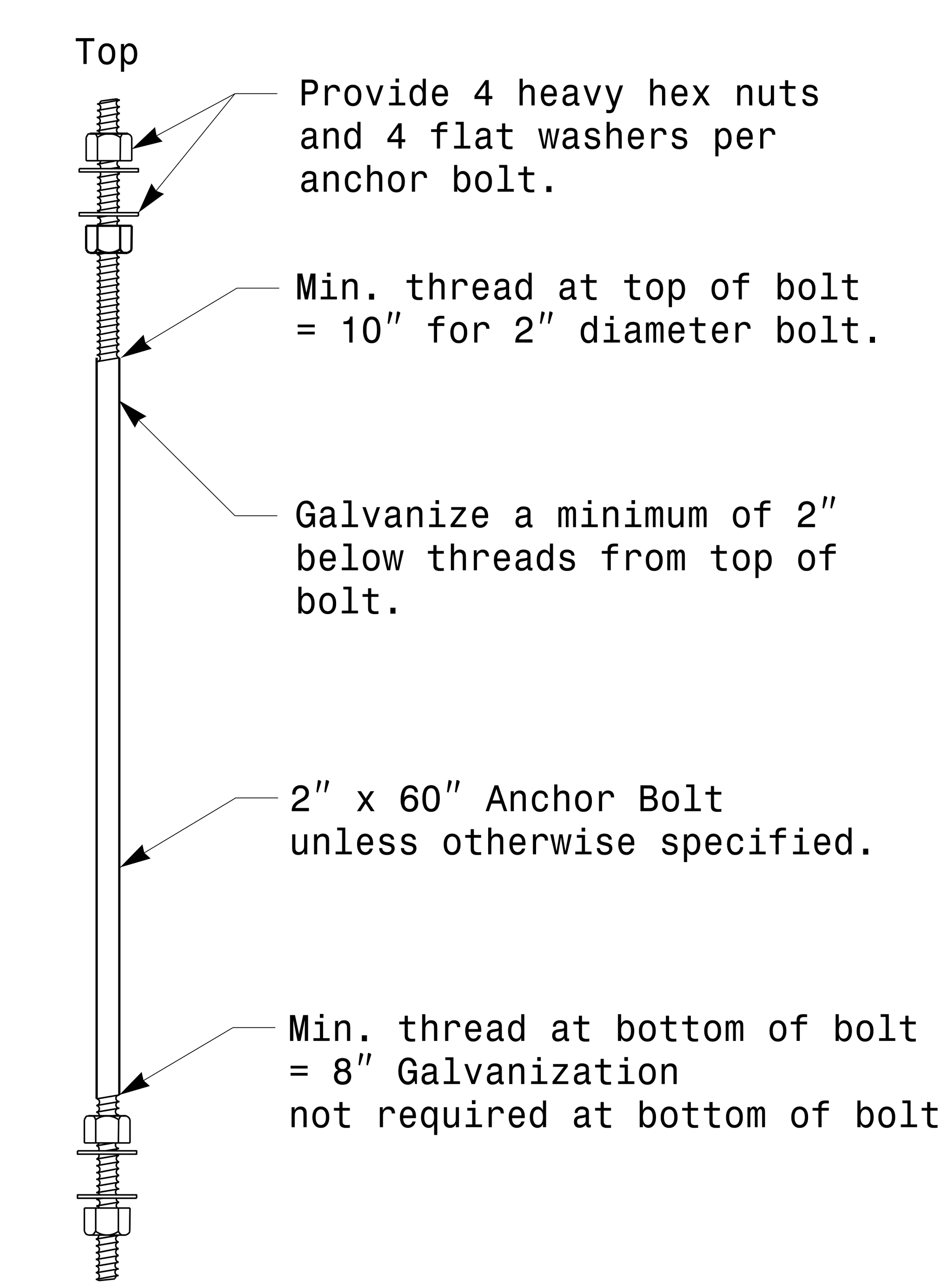
Shaft I.D. Tag
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

MFG ________ MFG. DATE:MM/YY
SECTION D/T/L/Y ____/____/____/____
NCDOT SIG. INV. NO. _ _ _ _ _ _ _ _
NCDOT POLE NO. _ _ _ _ _ _ _ _

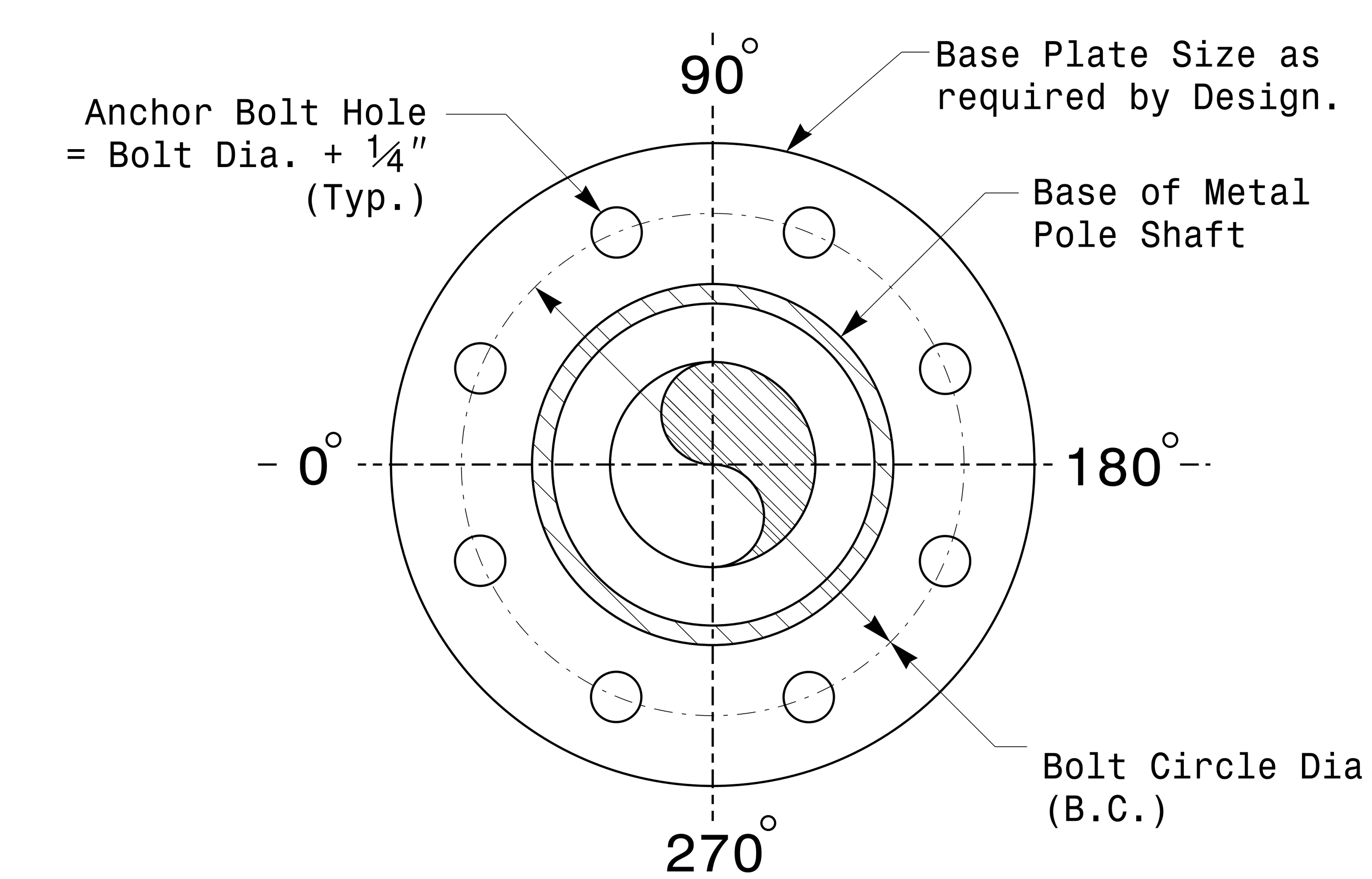
Arm I.D. Tag
(Provide on each section of a multi-section mast arm.)

Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail



Note: Base plate may be circular,octagonal,square or rectangular in shape.

Typical Base Plate Detail

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

Typical Fabrication Details
For
All Metal Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE
0 NA
NONE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
SIGNATURE
44E8E32E147E4C4...
2/17/2016
DATE

17-FEB-2016 16:02
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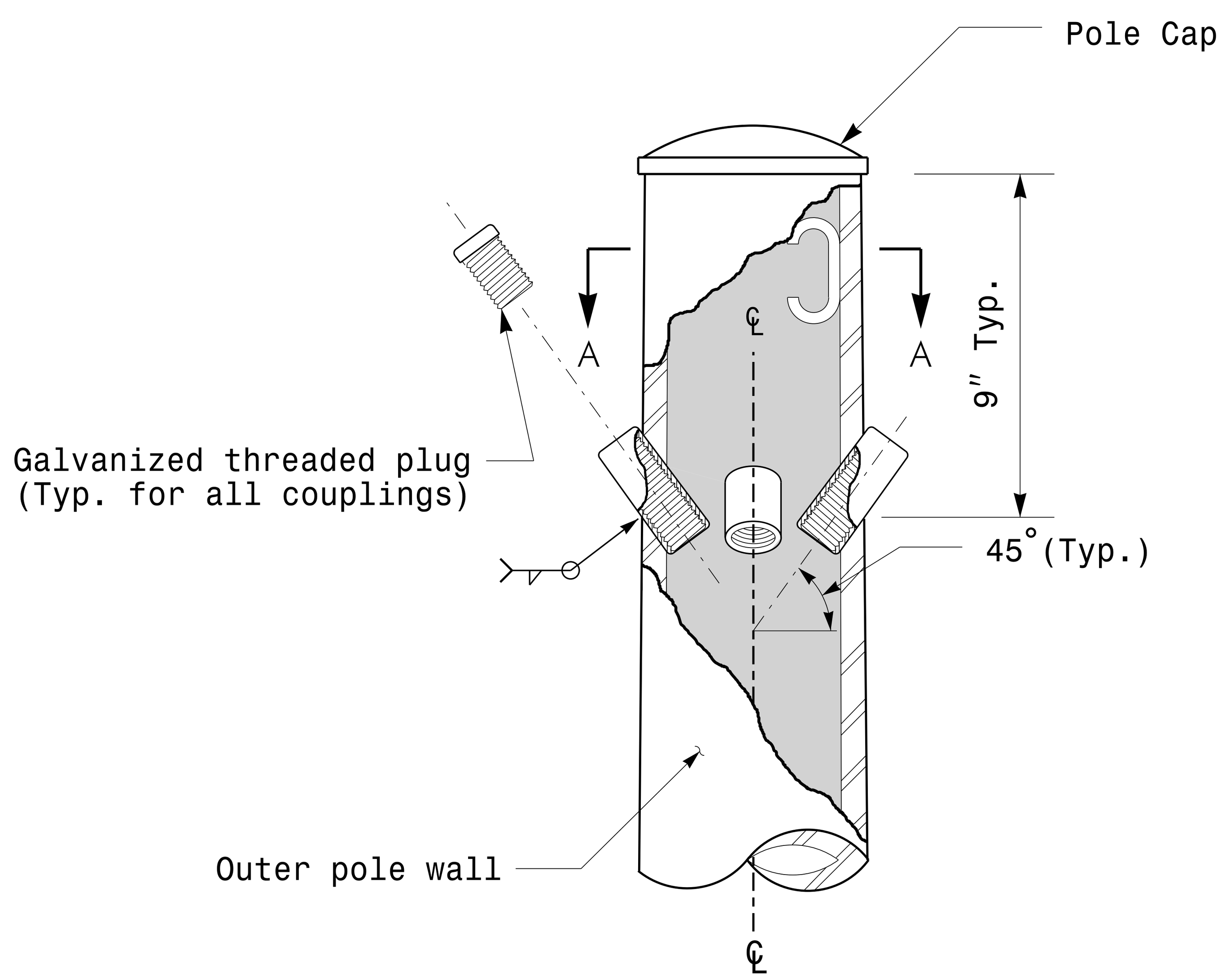
jgalloway

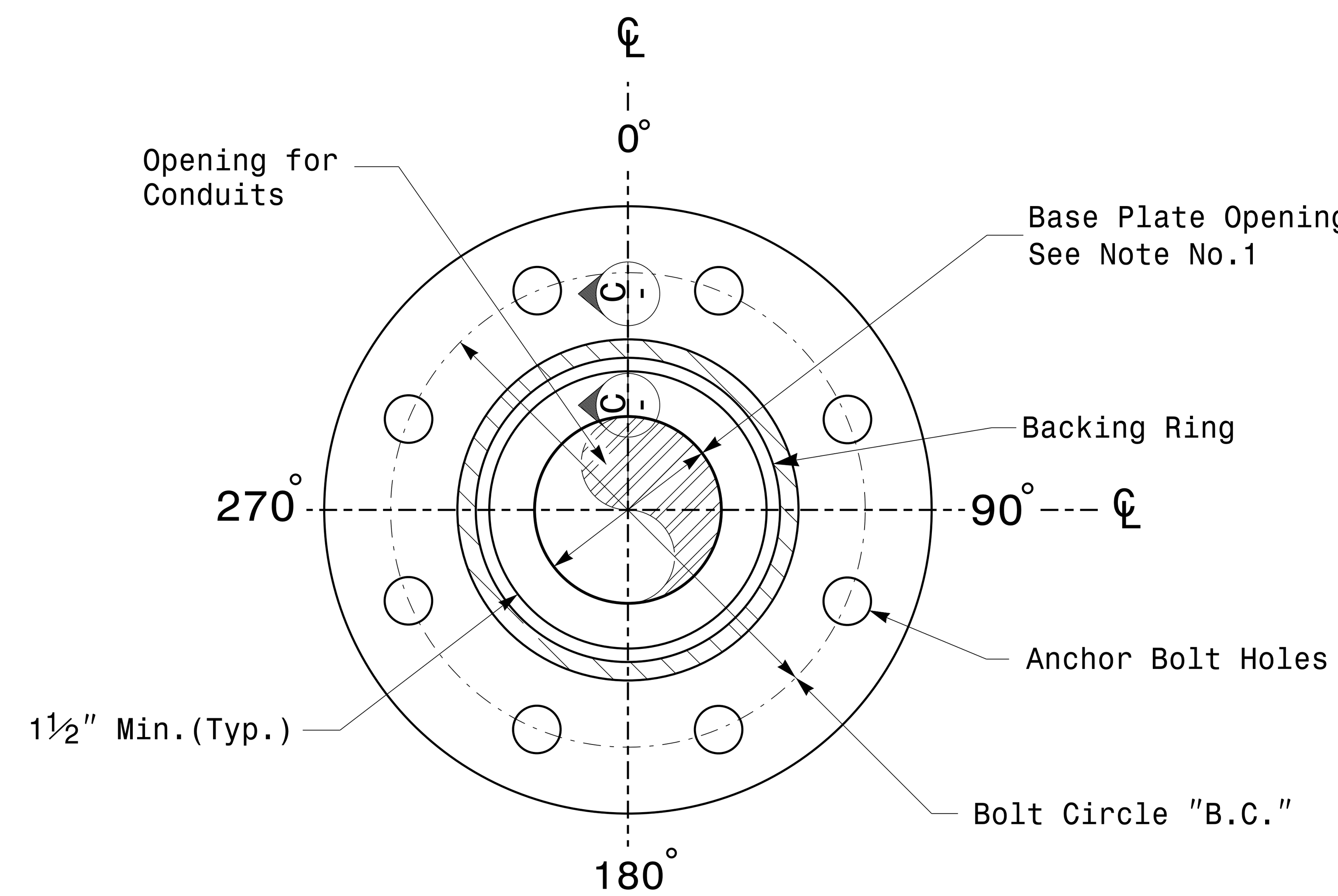
PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M3

Fabrication Details – Strain Poles

Note:
1.Opening in pole base plate shall be equal to pole base inside diameter minus 3½" but shall not be less than 8½".

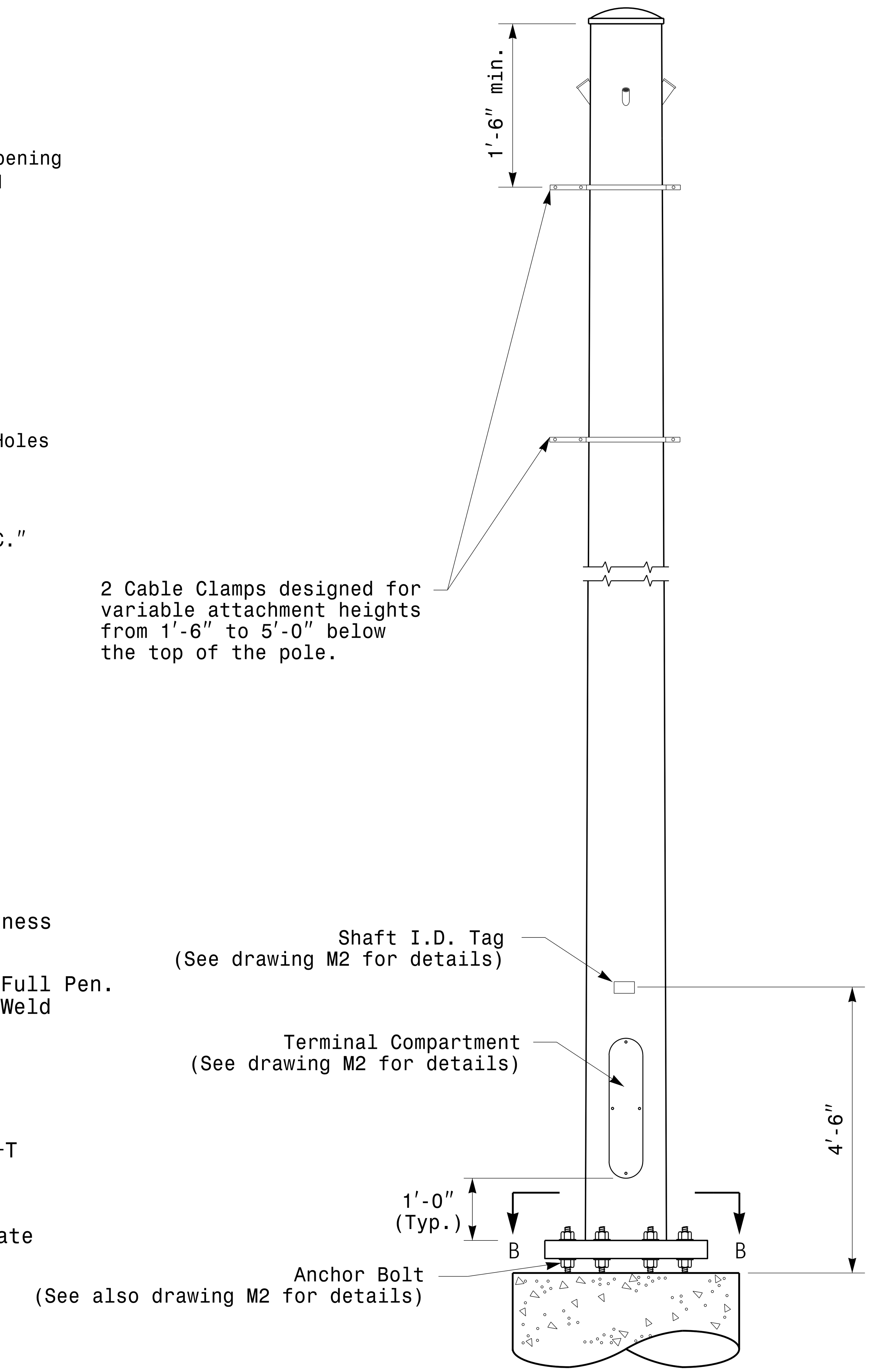


Cable Entrances at Top of Pole

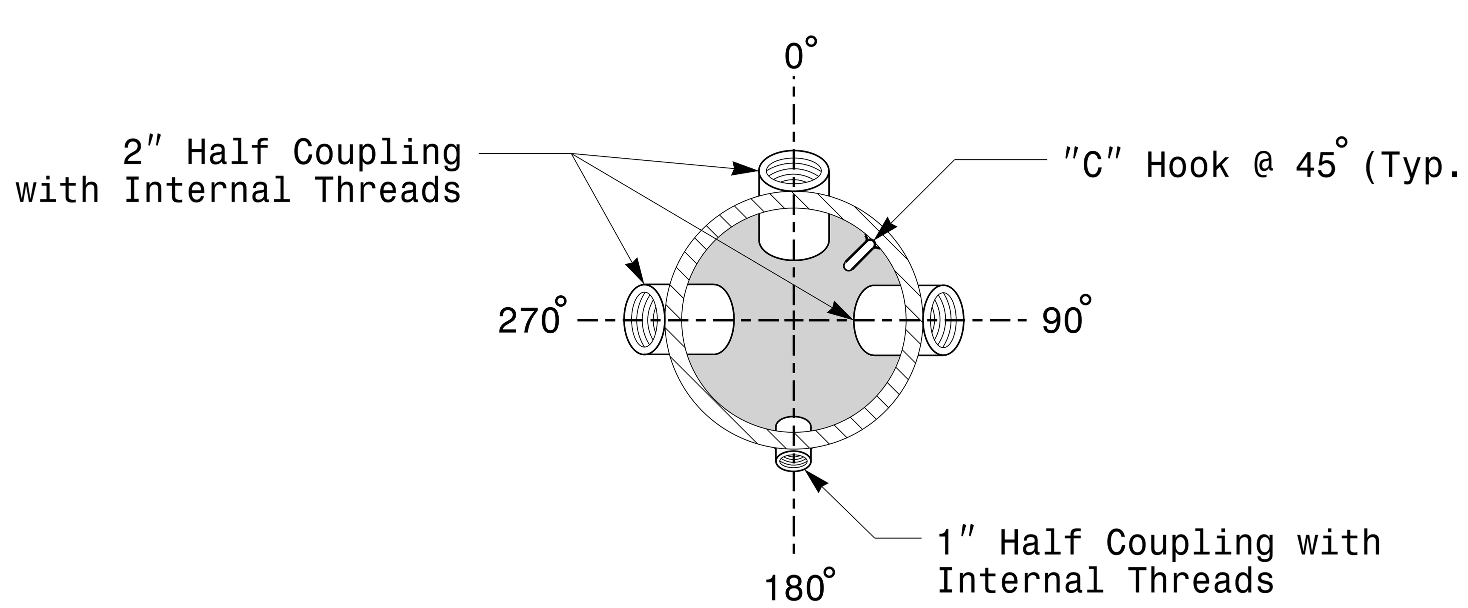


Section B-B

Pole Base Plate Details
(8 and 12 Bolt Pattern)

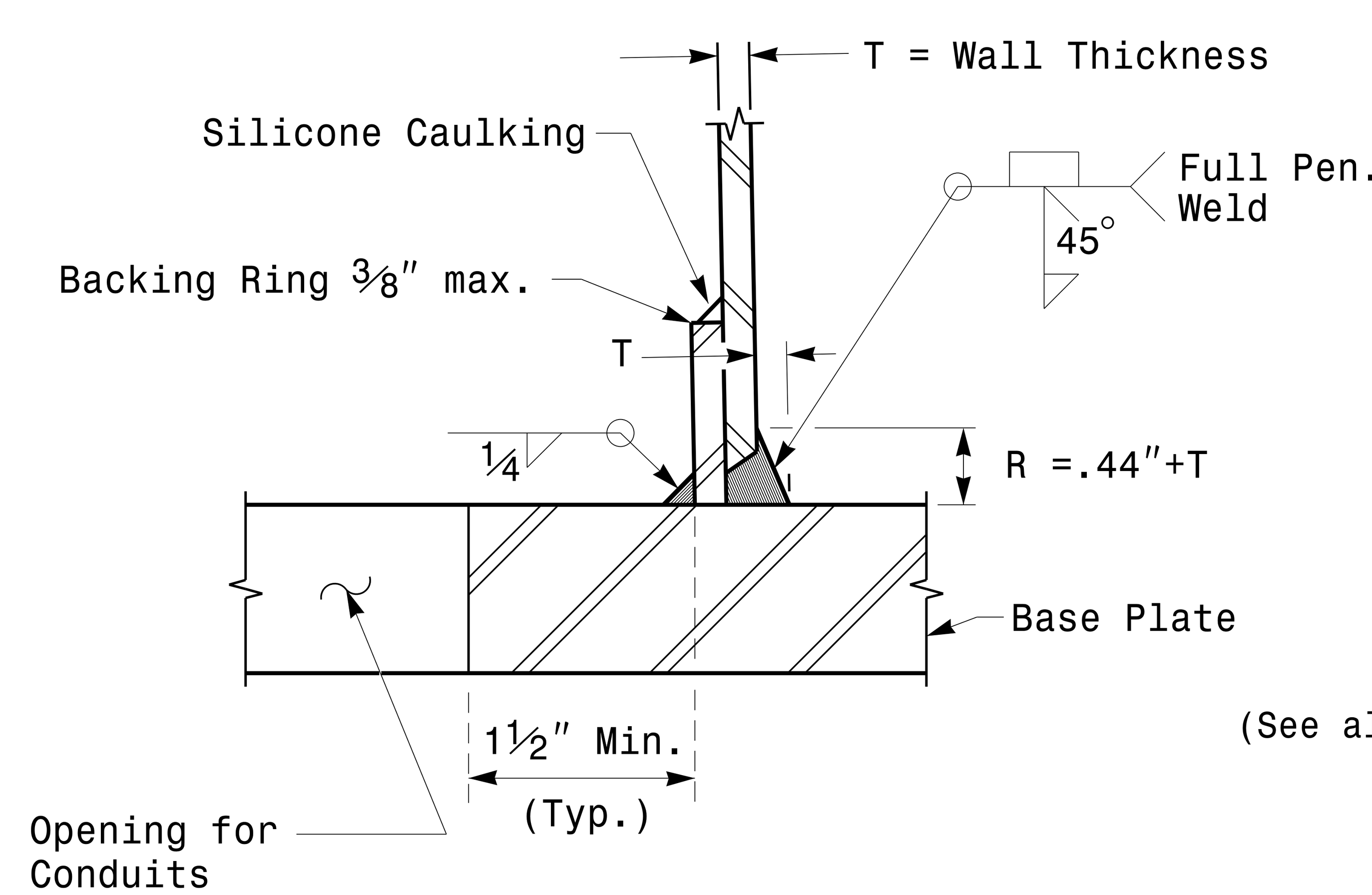


Monotube Strain Pole



Section A-A

Radial Orientation for Factory Installed
Accessories at Top of Pole



Section C-C
(Pole Attachment to Base Plate)

Full-Penetration
Groove Weld Detail

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

Typical Fabrication Details
For
Strain Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE
0 NA
NONE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
028094
ENGINEER
DEBESH C. SARKAR

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Debesh C. Sarkar
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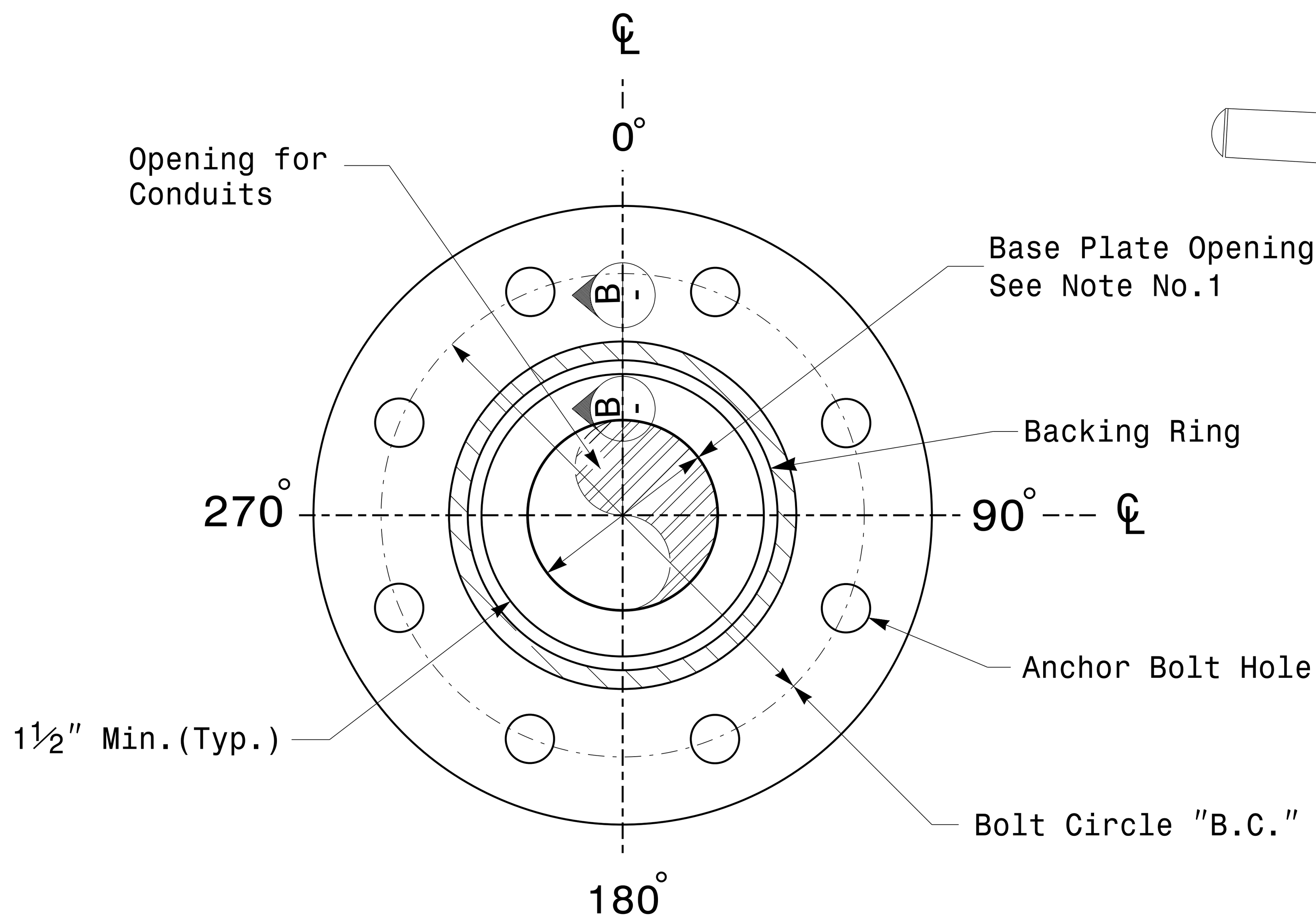
SIGNATURE
2/17/2016
DATE

17-FEB-2016 16:04
S:*ITS&SU*ITS Signals*Signal Design Section*Eastern Region*M Sheets*2016*2014 Sig.M3 Std. Fabrication Details-Strain Poles.dgn
jgalloway

PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M4

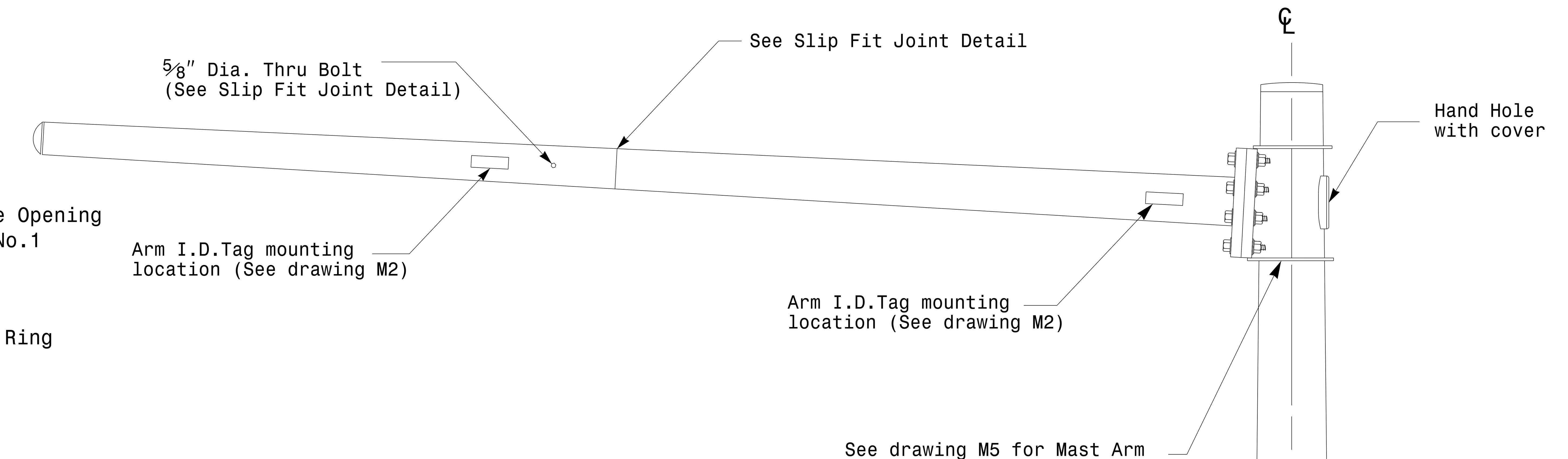
Fabrication Details – Mast Arm Poles

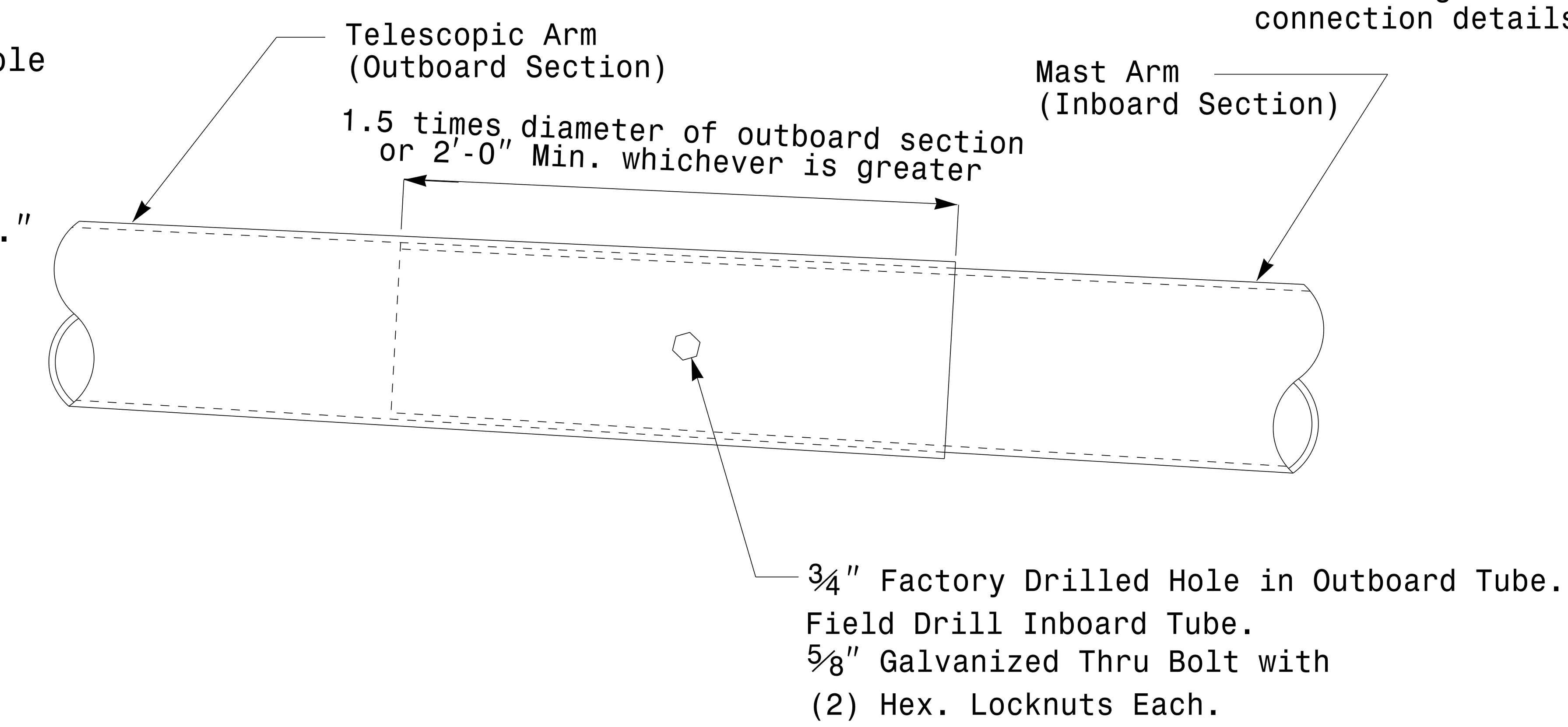
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½″ but shall not be less than 8½″.



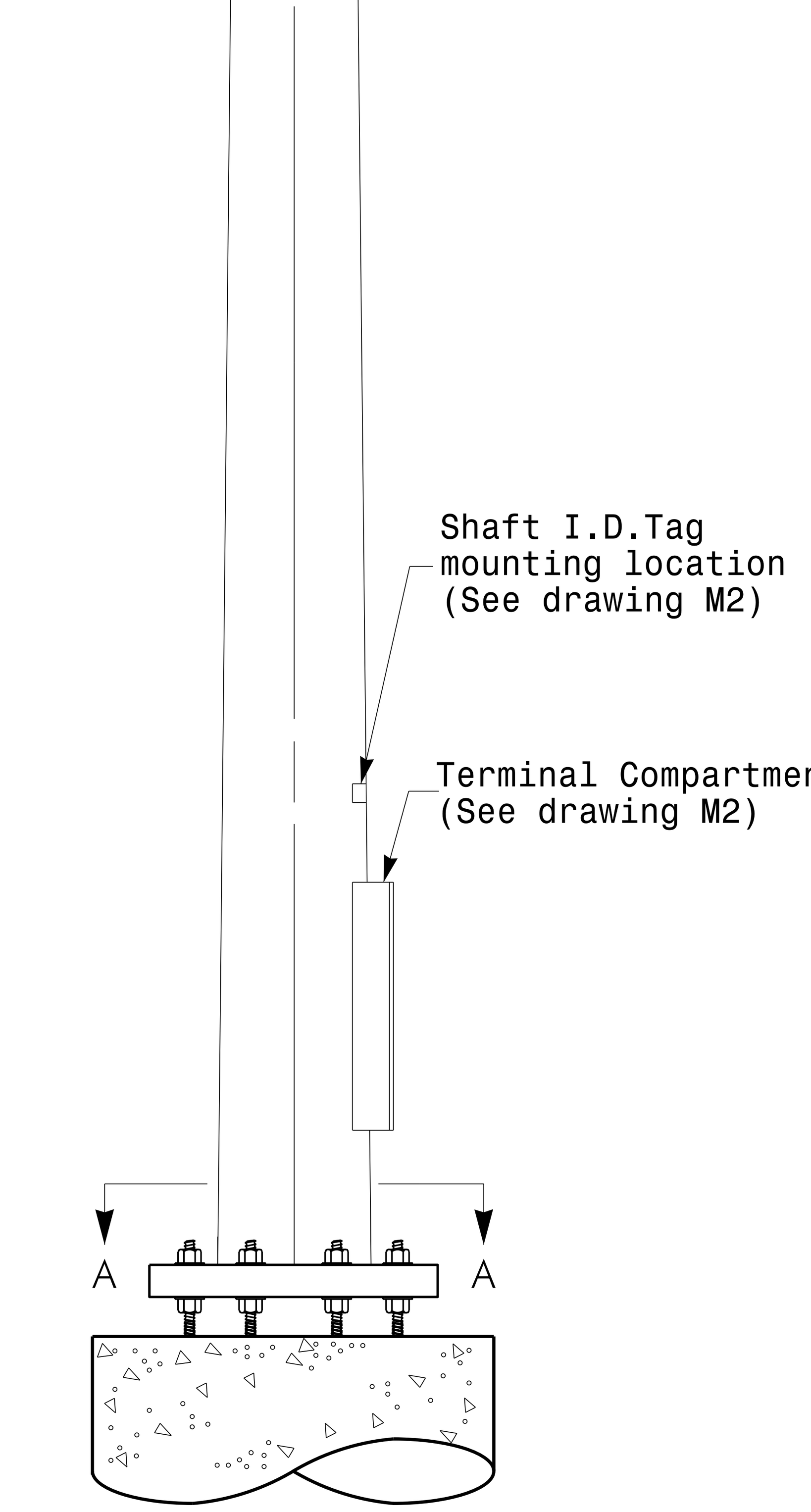
Section A-A

Pole Base Plate Details

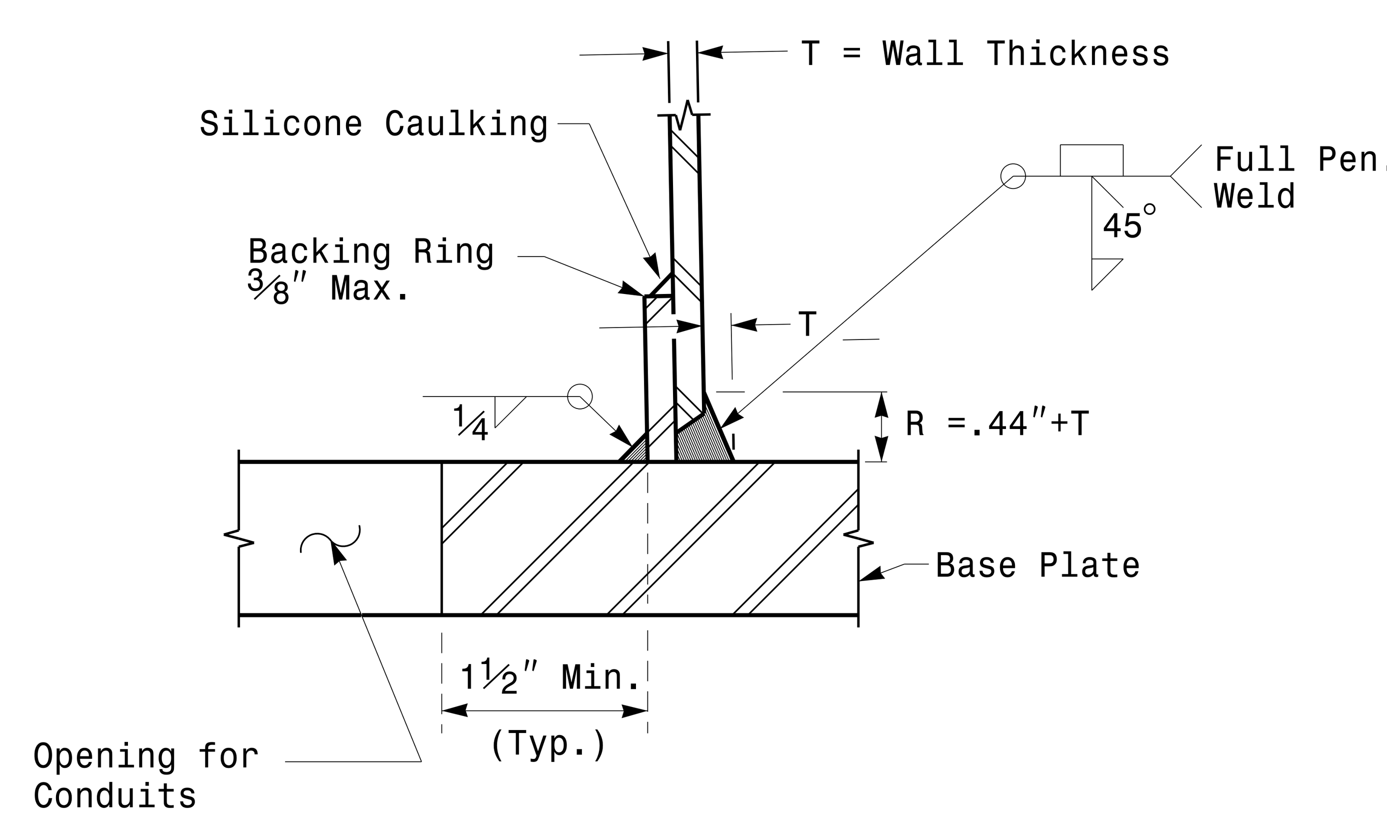




Slip Fit Joint Detail for Mast Arm



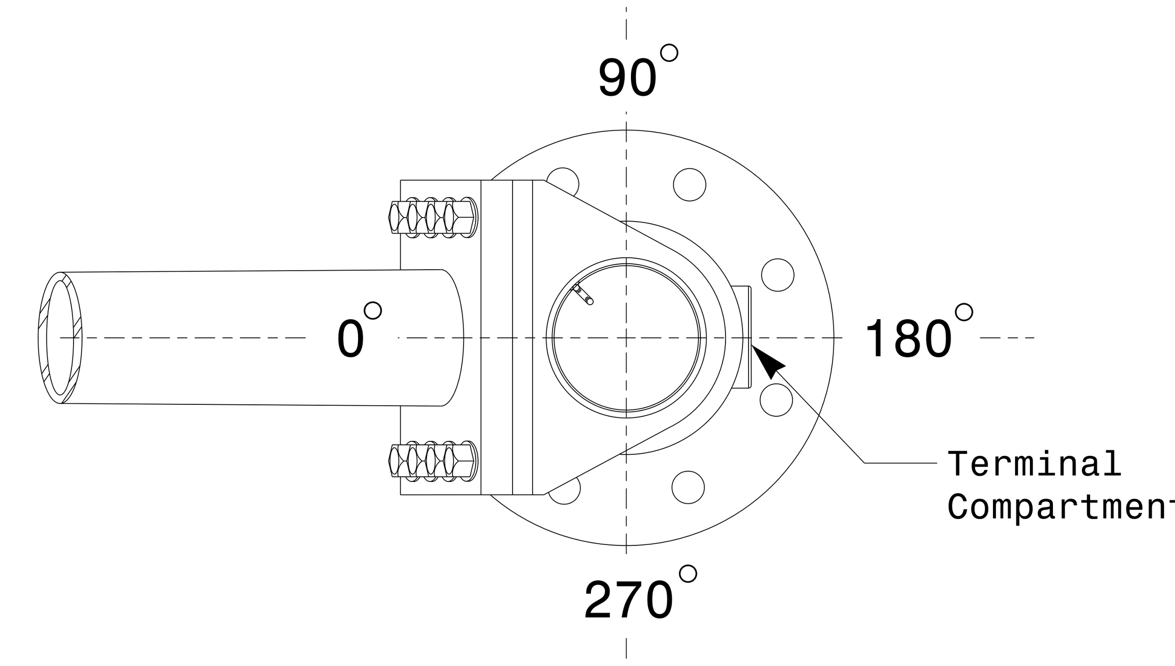
Mast Arm Pole



Section B-B

(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail



Mast Arm Radial Orientation

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

Typical Fabrication Details
For
Mast Arm Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE
0 NA
NONE

REVISIONS	INIT.	DATE

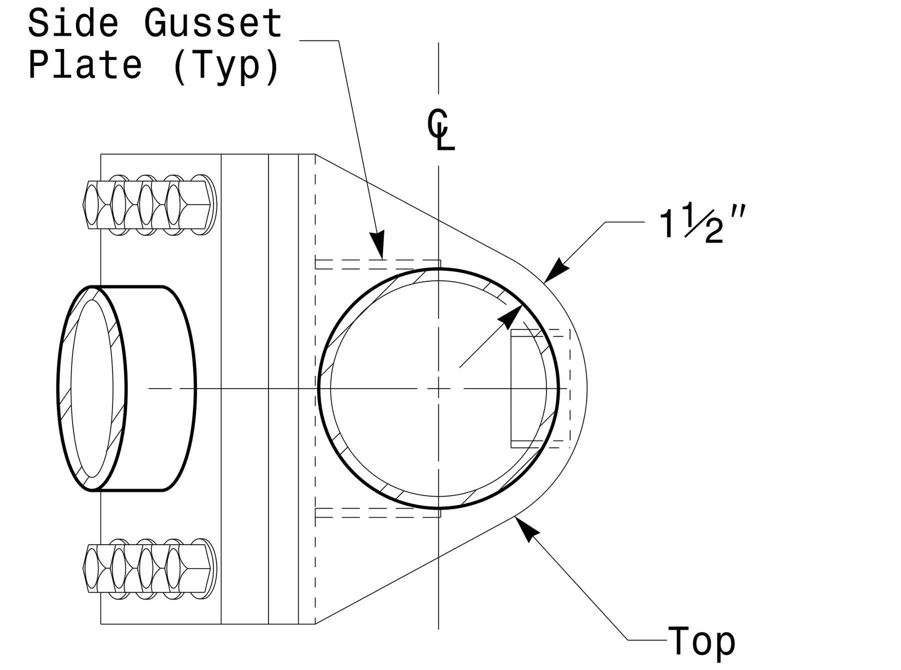
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
44E8E32E147E4C4...
SIGNATURE

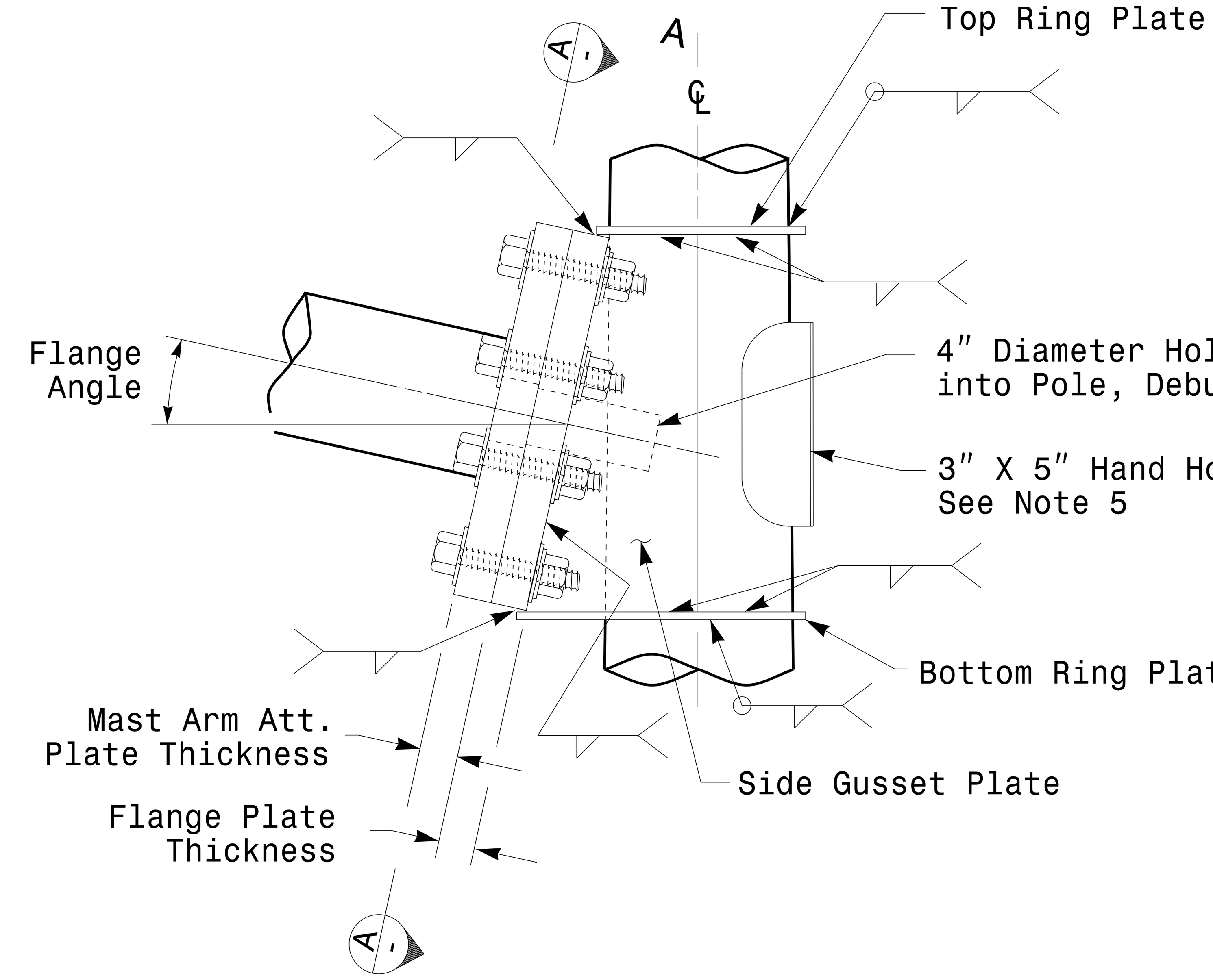
2/17/2016
DATE

Welded Ring Stiffened Mast Arm Connection

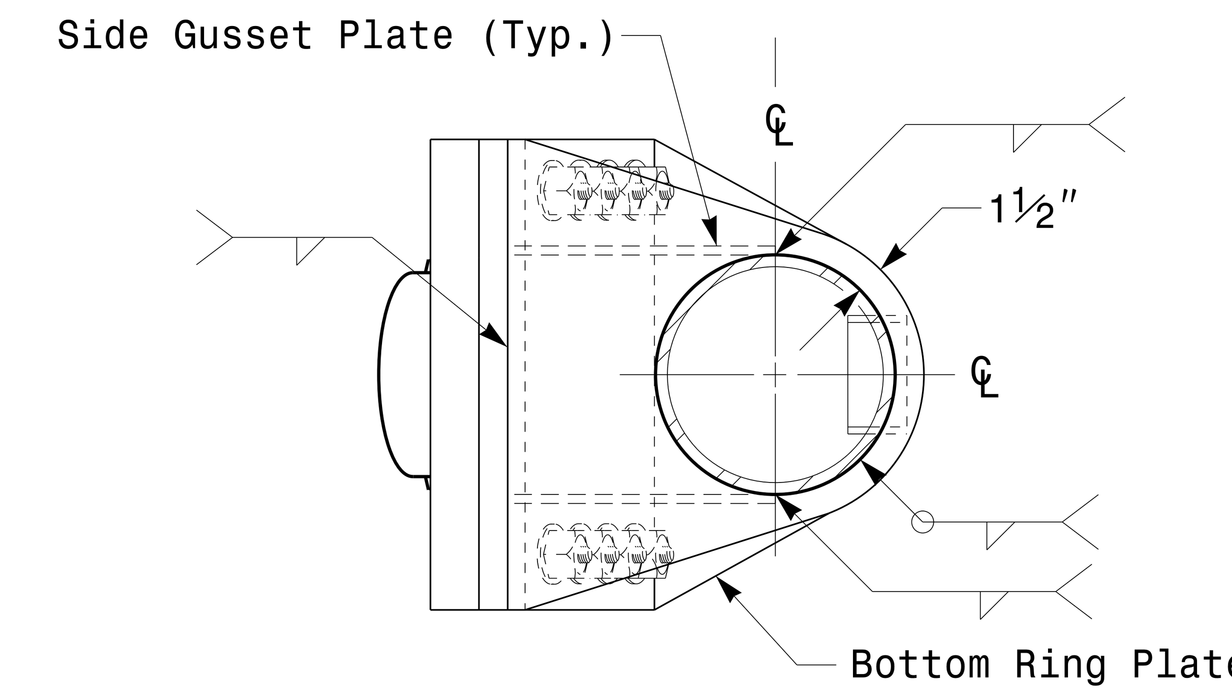
PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M5



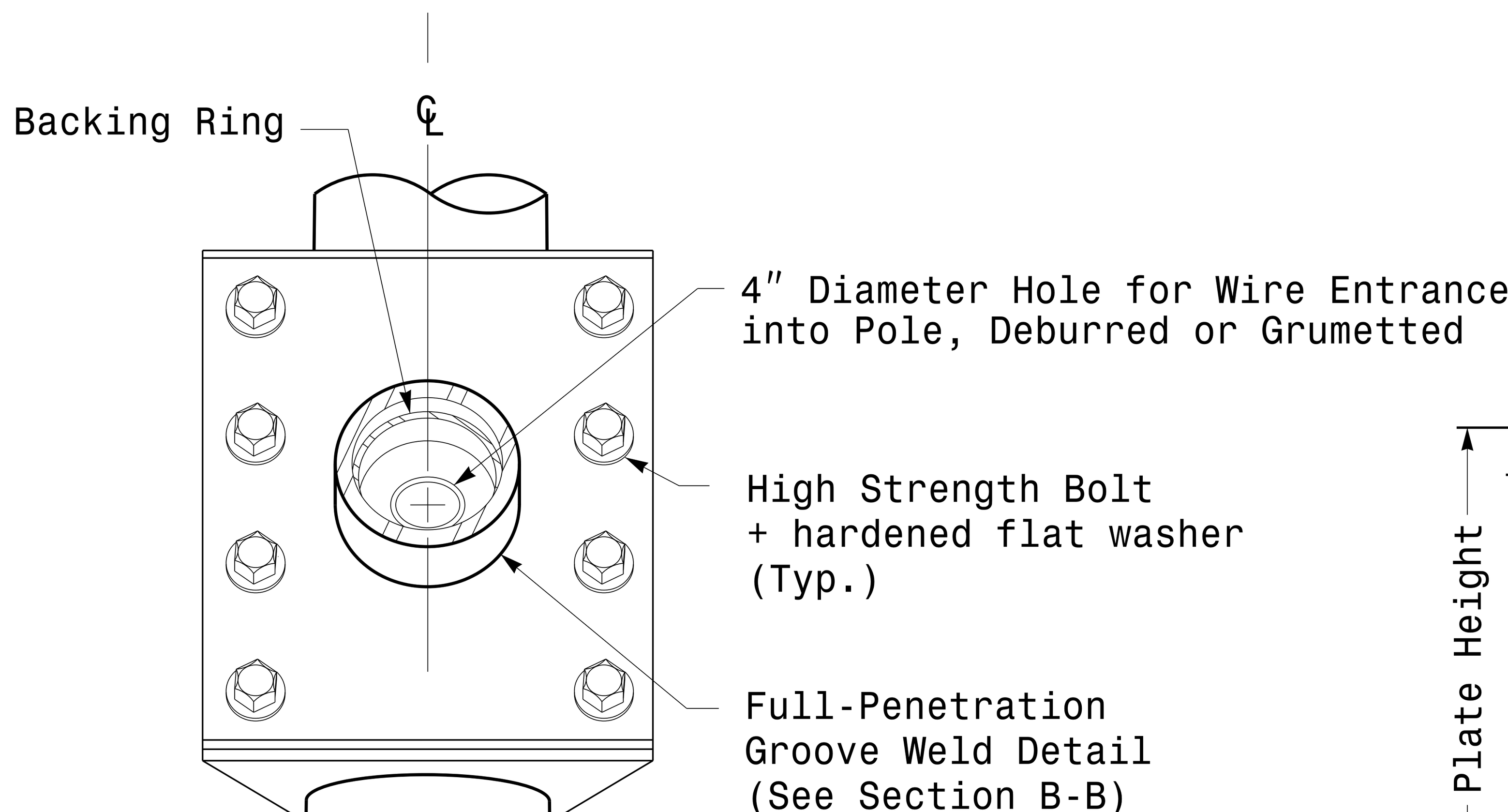
Plan View



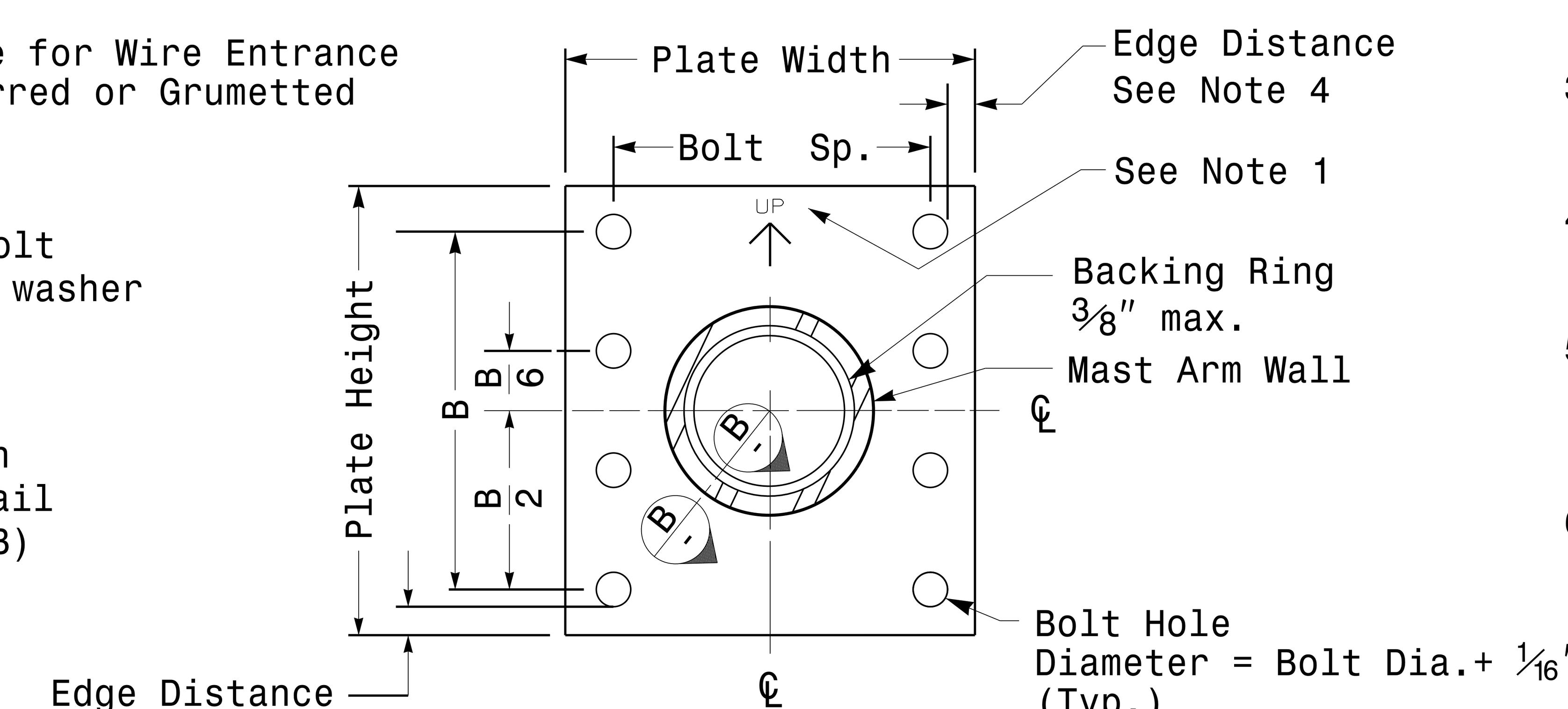
Side Elevation View



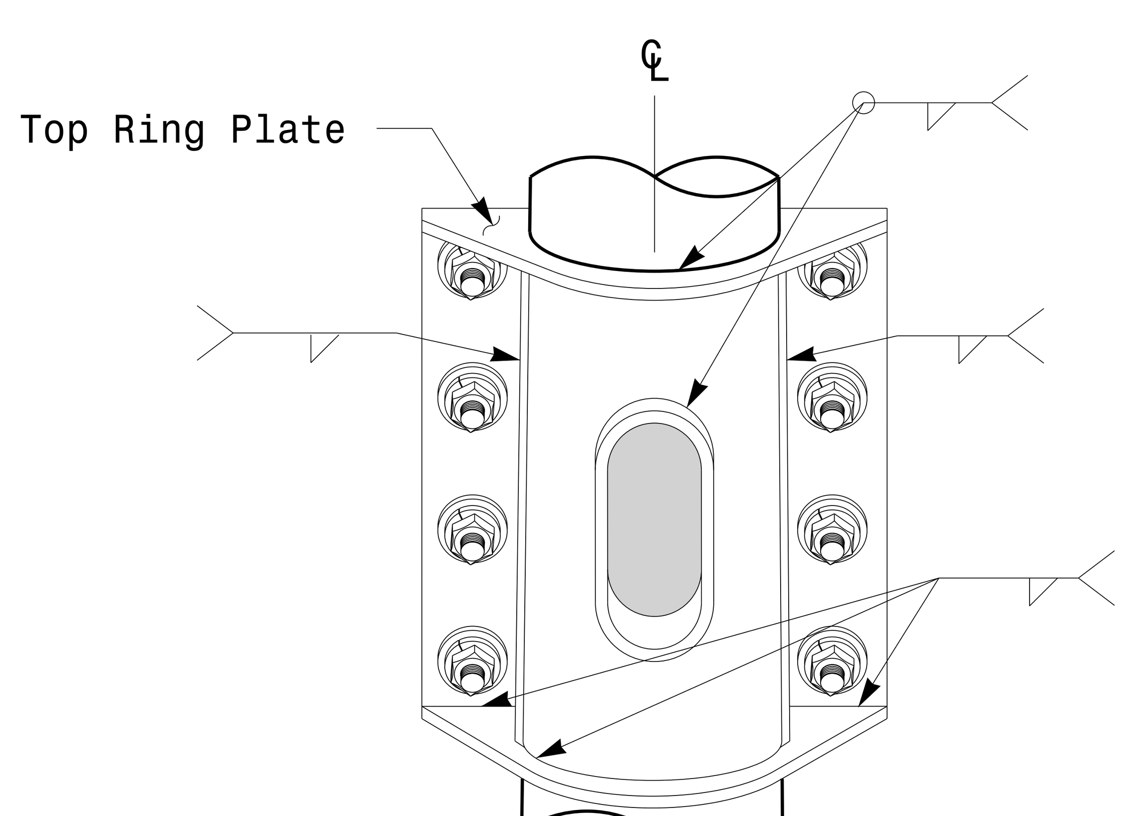
Bottom View



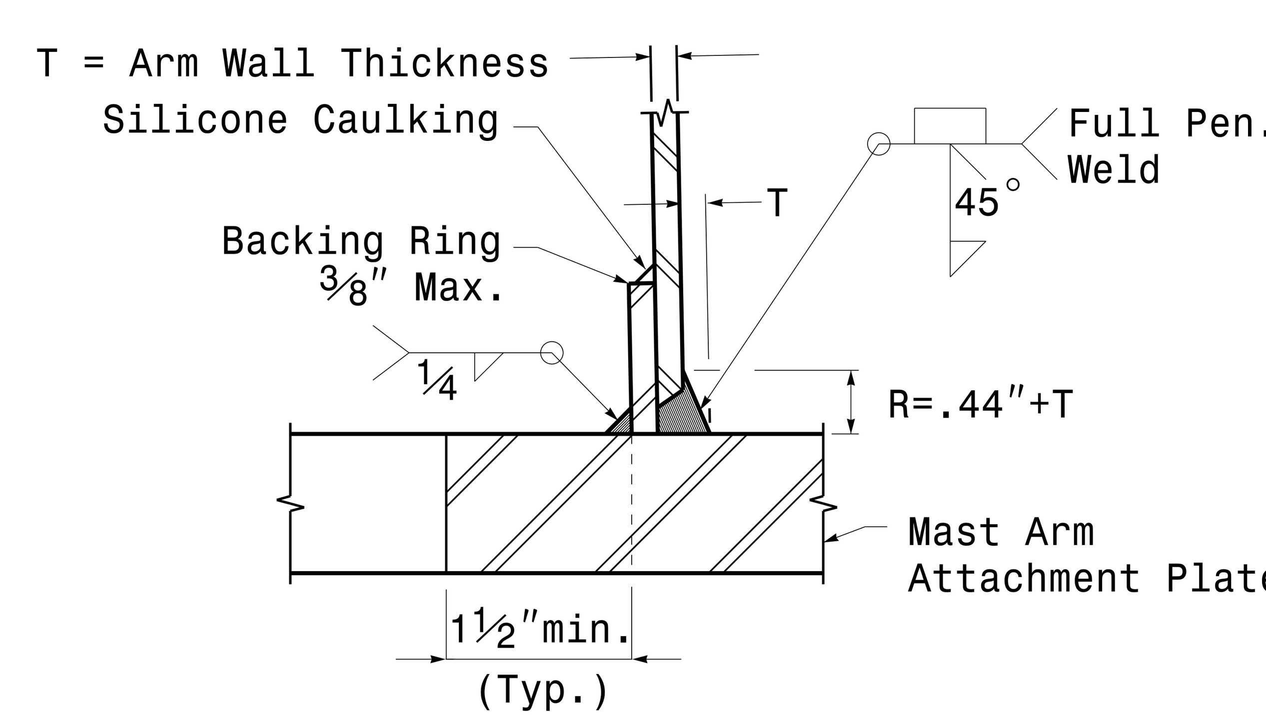
Front Elevation View



Section A-A
Mast Arm Attachment Plate



Back Elevation View



Section B-B
Full-Penetration Groove Weld Detail

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
5. Provide upper handhole as necessary when shaft extensions are reguired for luminaire arms or camera. For poles without luminaires/camera, wiring can be done through the top of pole.
6. Allowable range of flange tilt angle will vary from 0° to as required.

Fabrication Details – Mast Arm Connection

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

Typical Fabrication Details For Mast Arm Connection To Pole

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SCALE 0 NA
NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar
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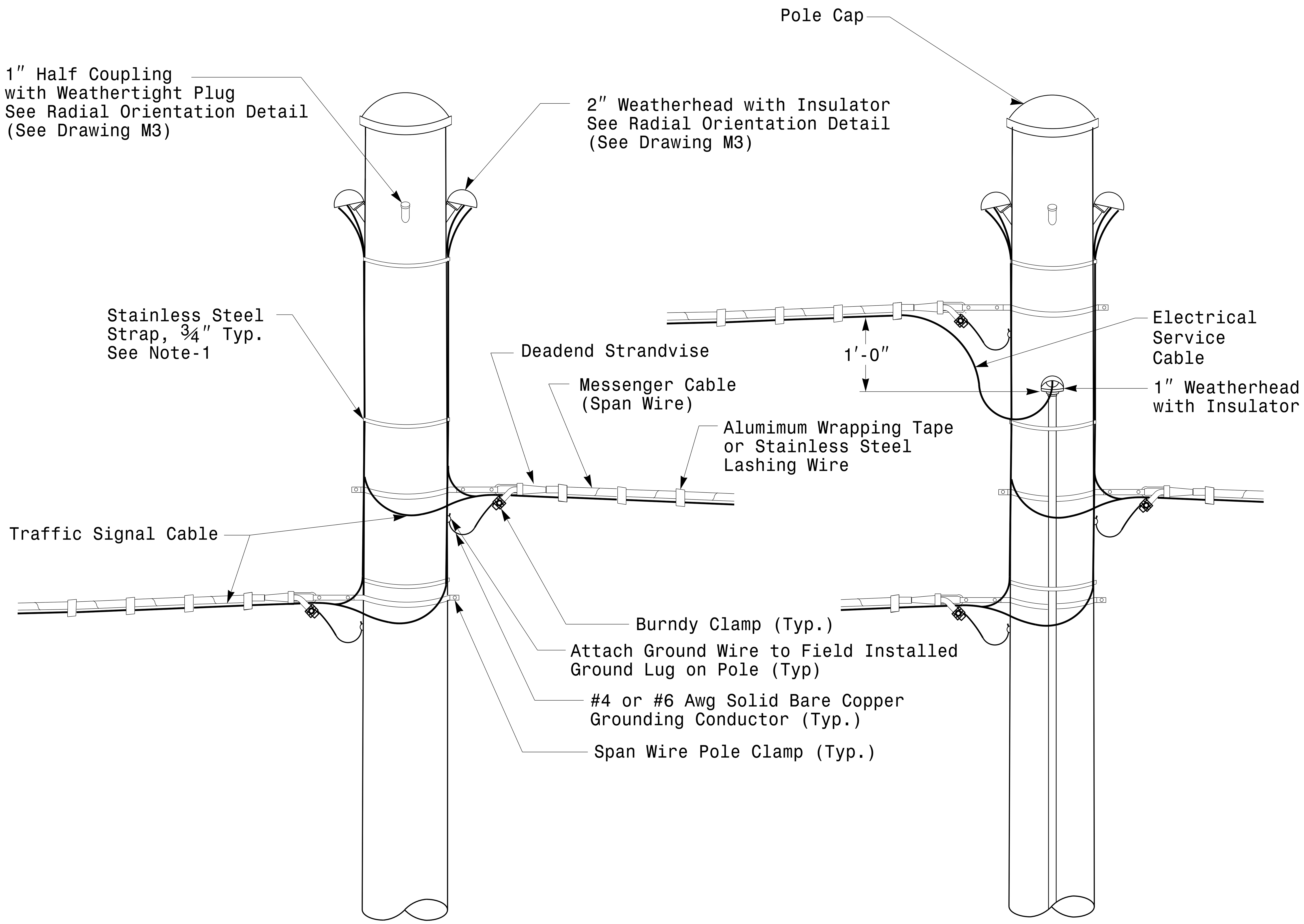
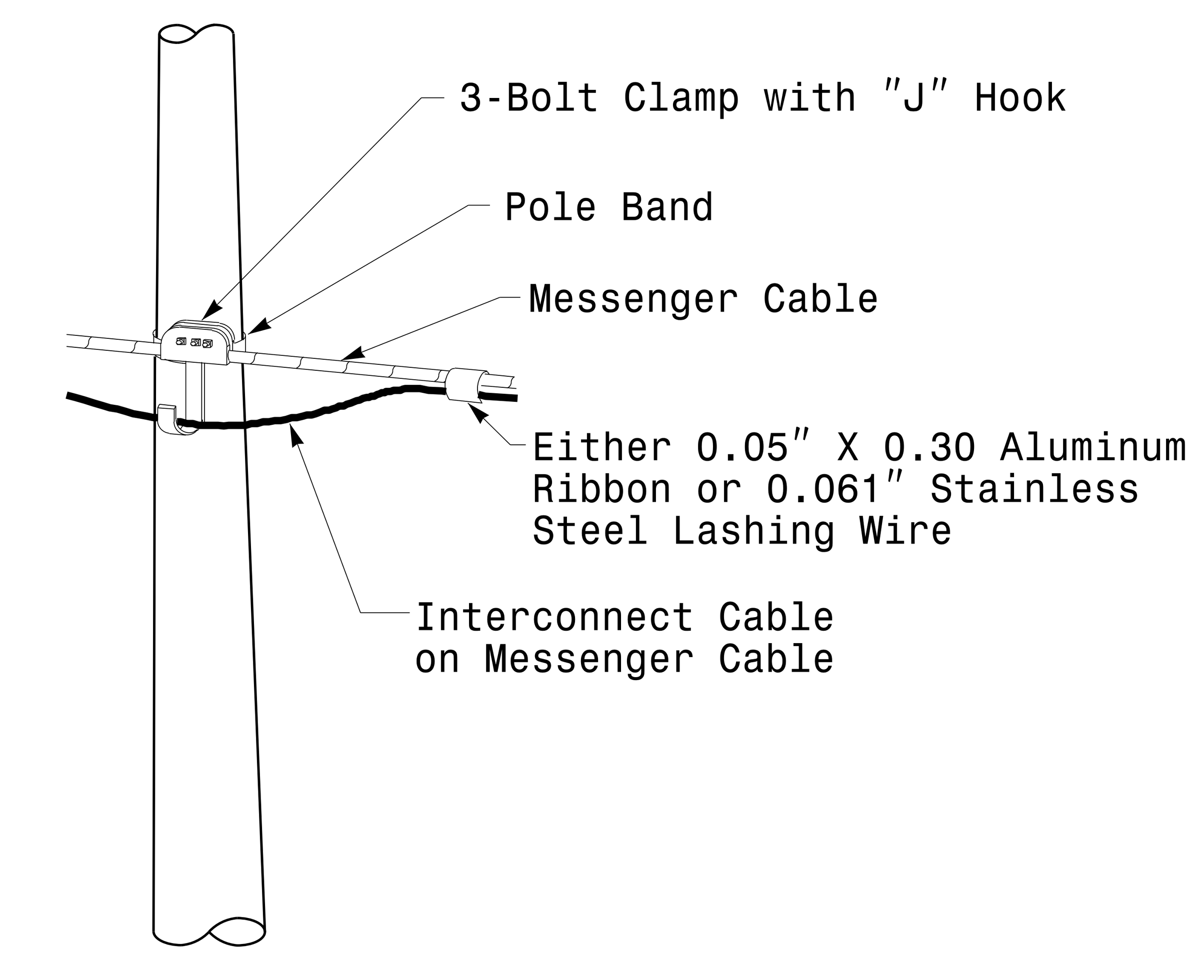
SIGNATURE 2/17/2016 DATE

PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M6

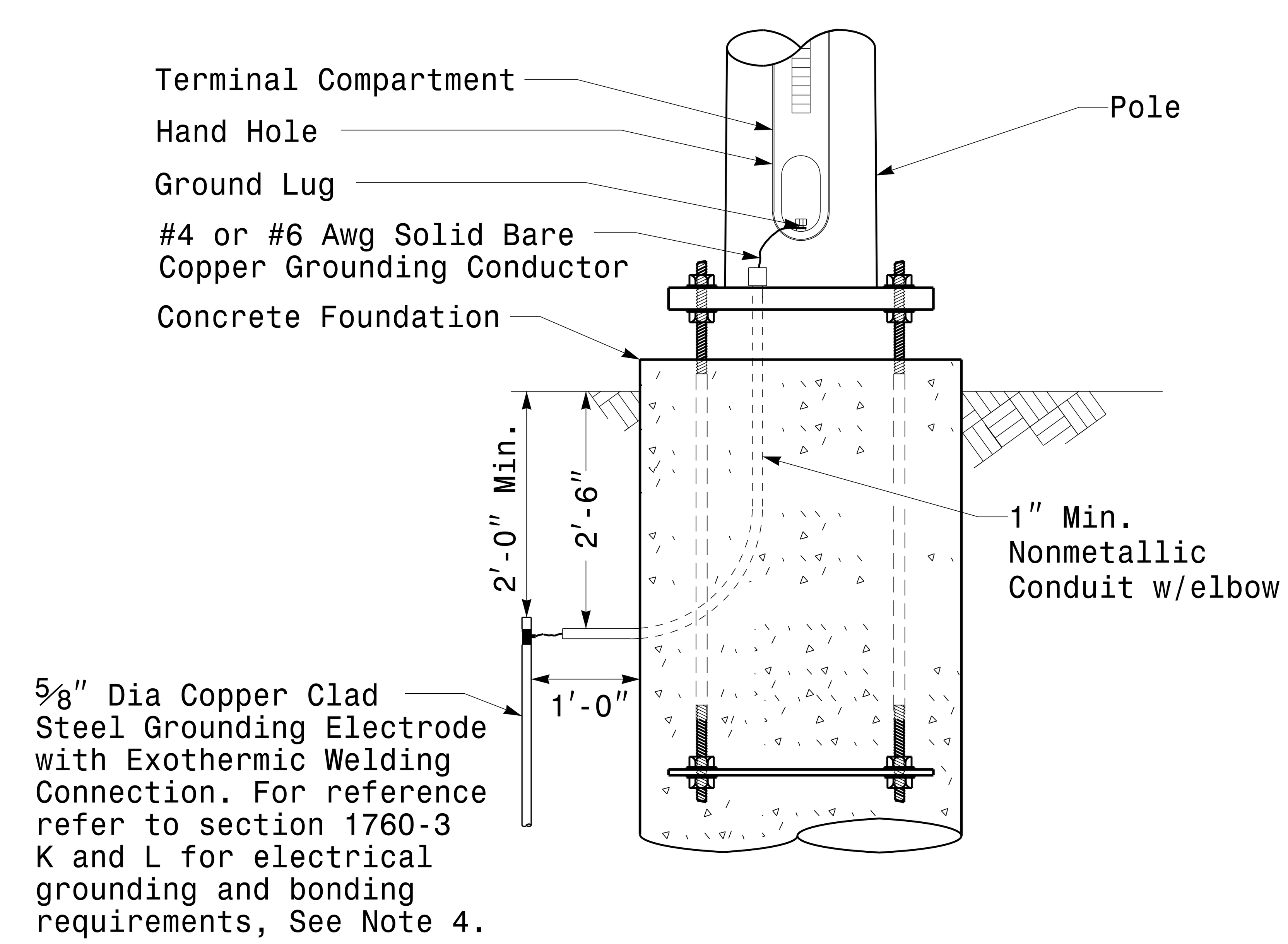
Fabrication Details – Strain Pole Attachments



Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail For Strain Pole and Mast Arm

NOTE:

1. Strap all signal cables to the side of the pole with ¾″ stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3′-0″.
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2012.

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR
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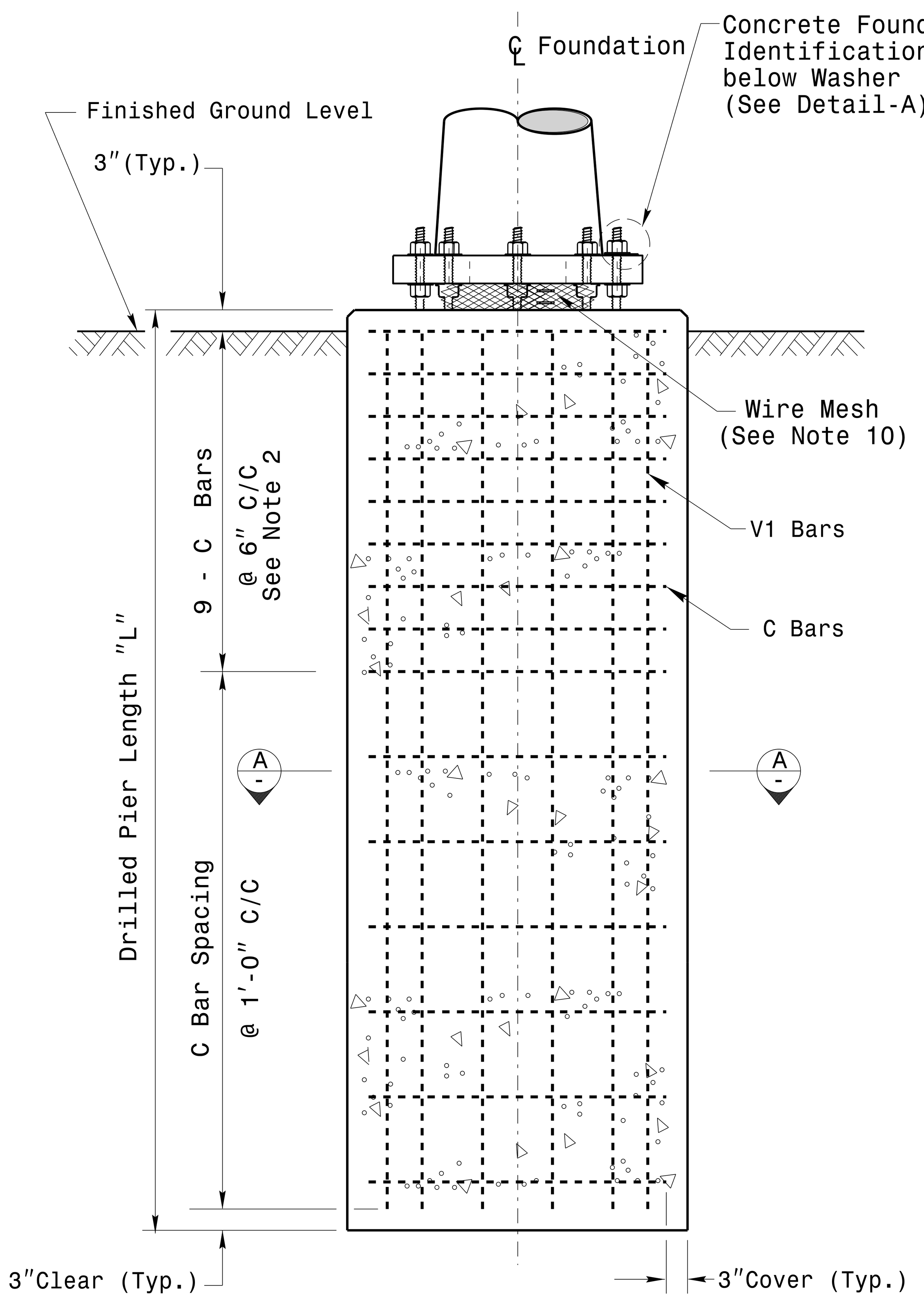
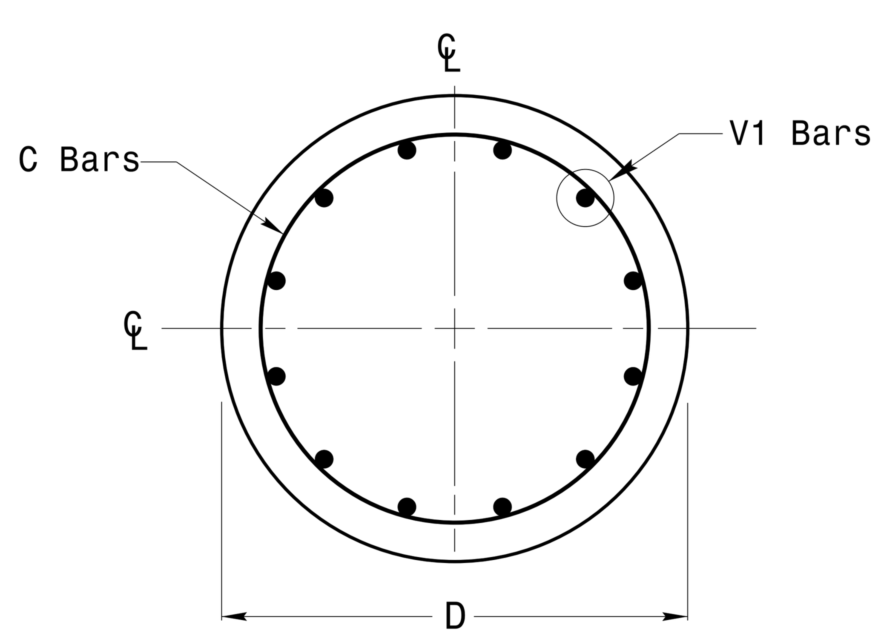
jgalloway

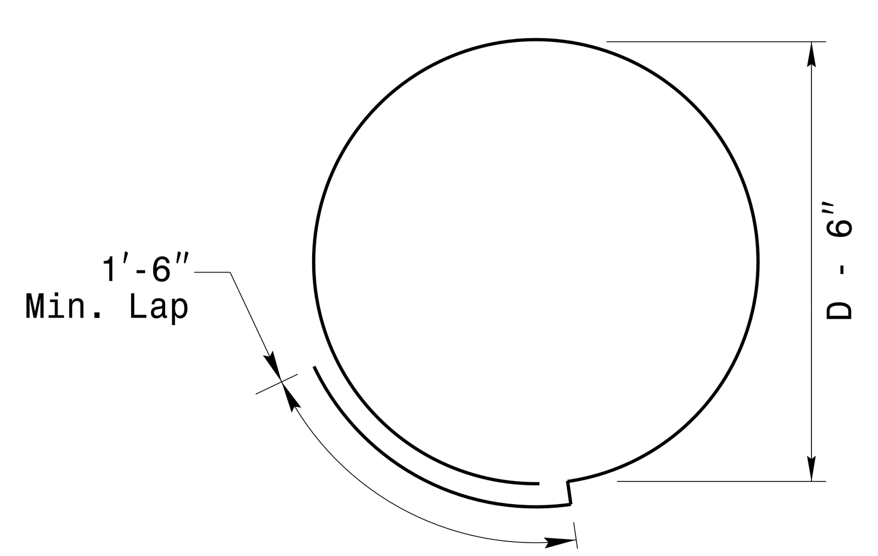
Construction Details – Foundations



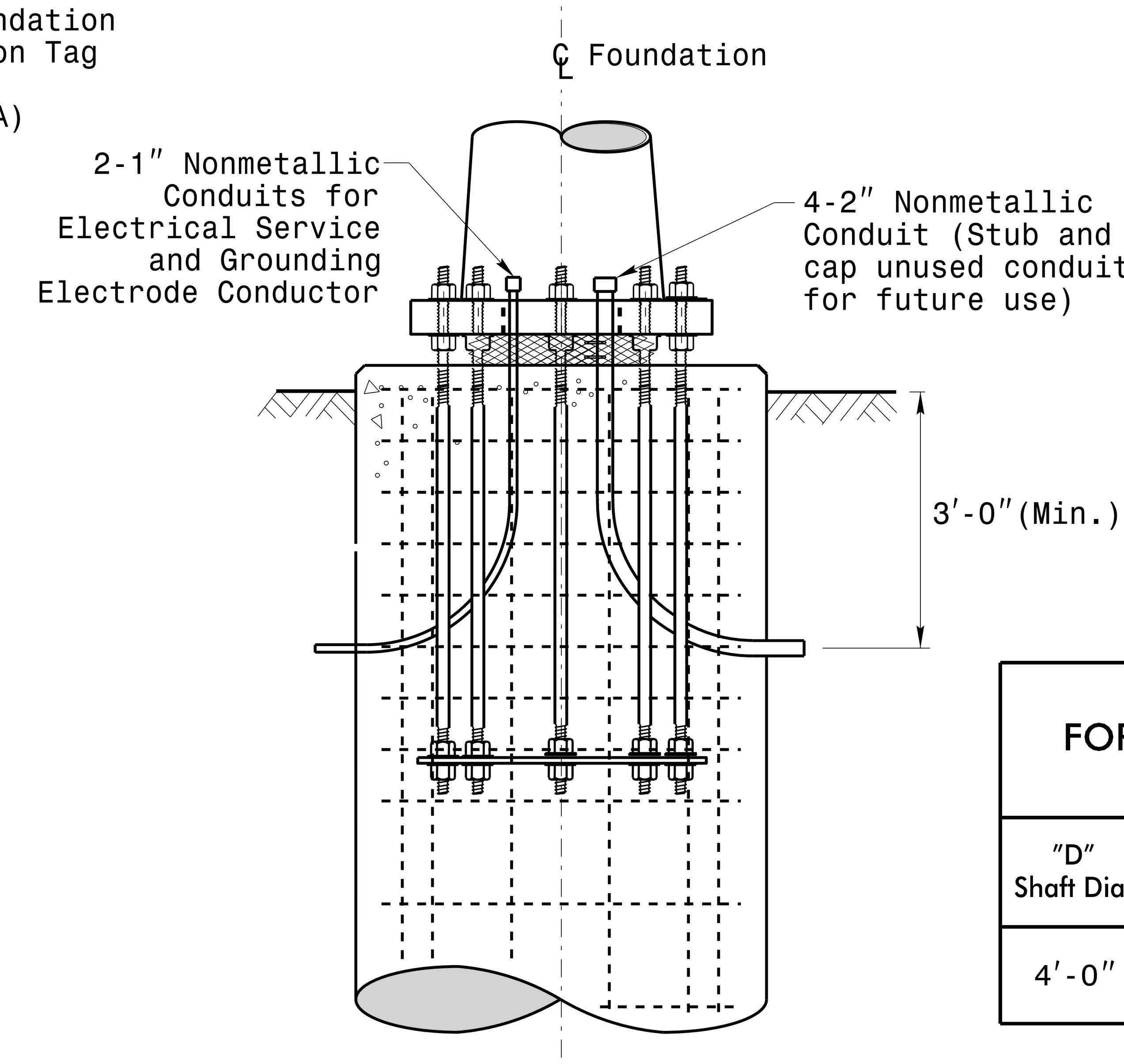
Concrete Shaft Elevation



Section A-A



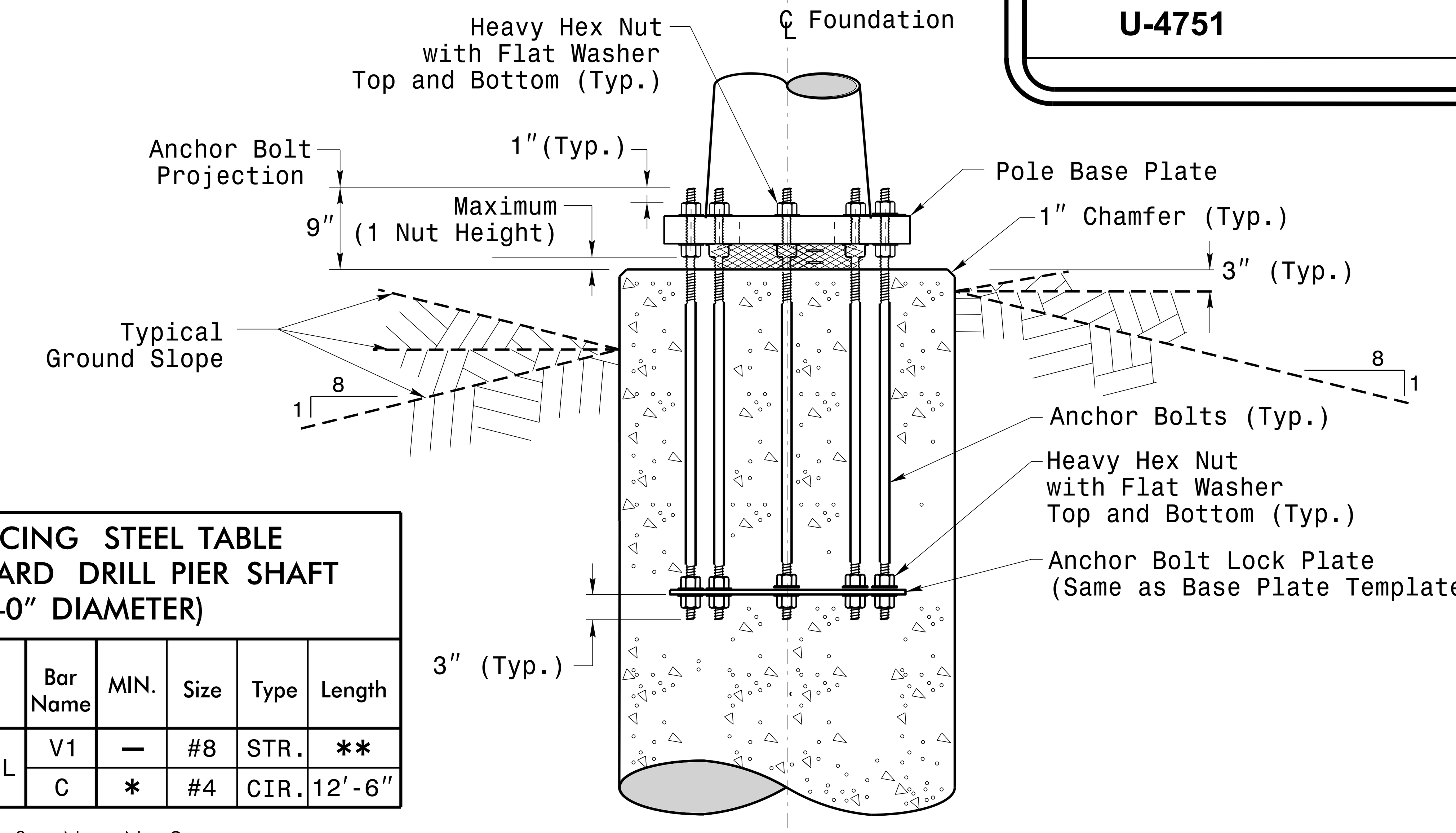
Typical "C" Bar Detail



Typical Foundation Conduit Details

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'–0″ DIAMETER)						
"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4'-0″	.465 x L	V1	—	#8	STR.	**
		C	*	#4	CIR.	12'-6″

* See Note No. 2
** See Note No. 3



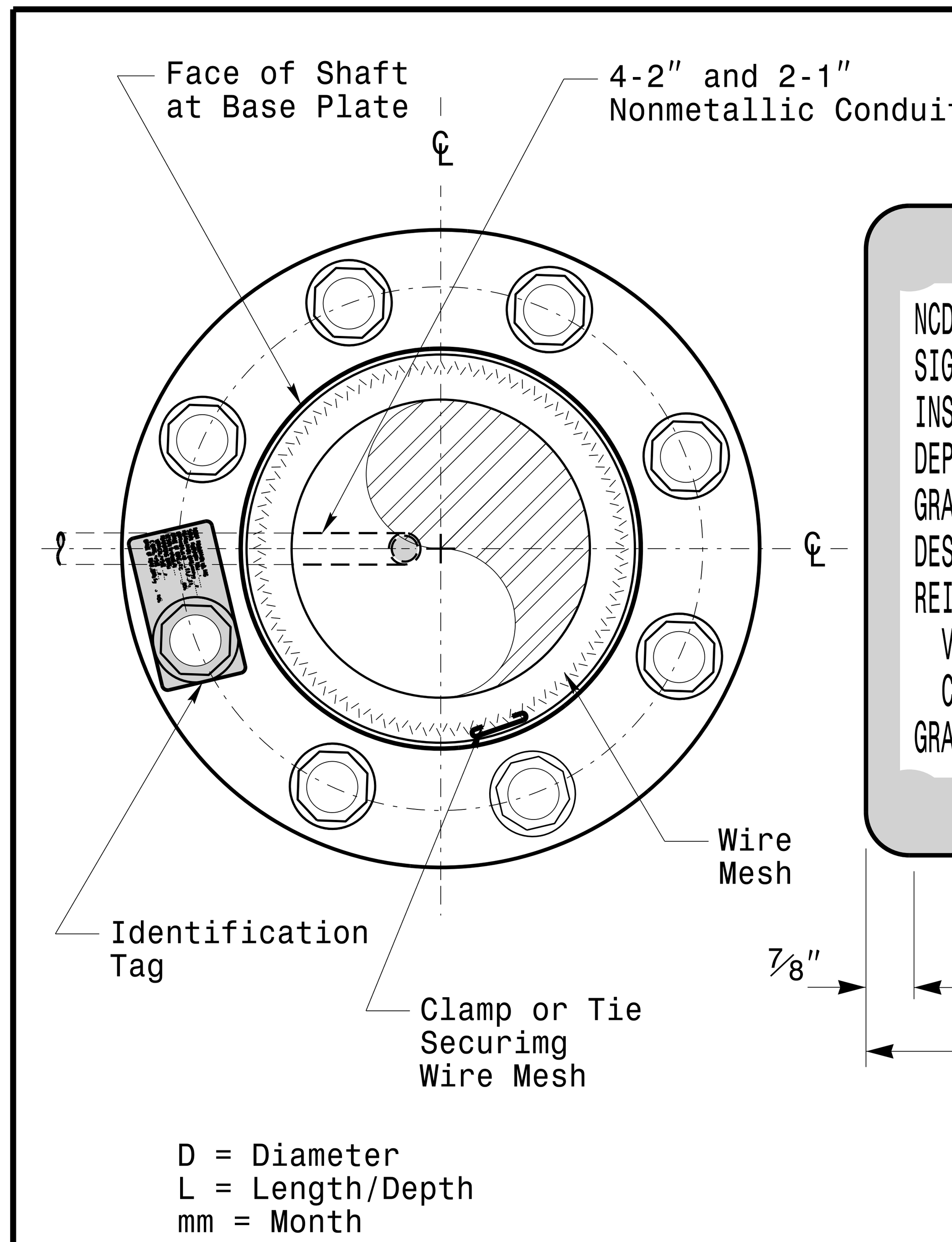
Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

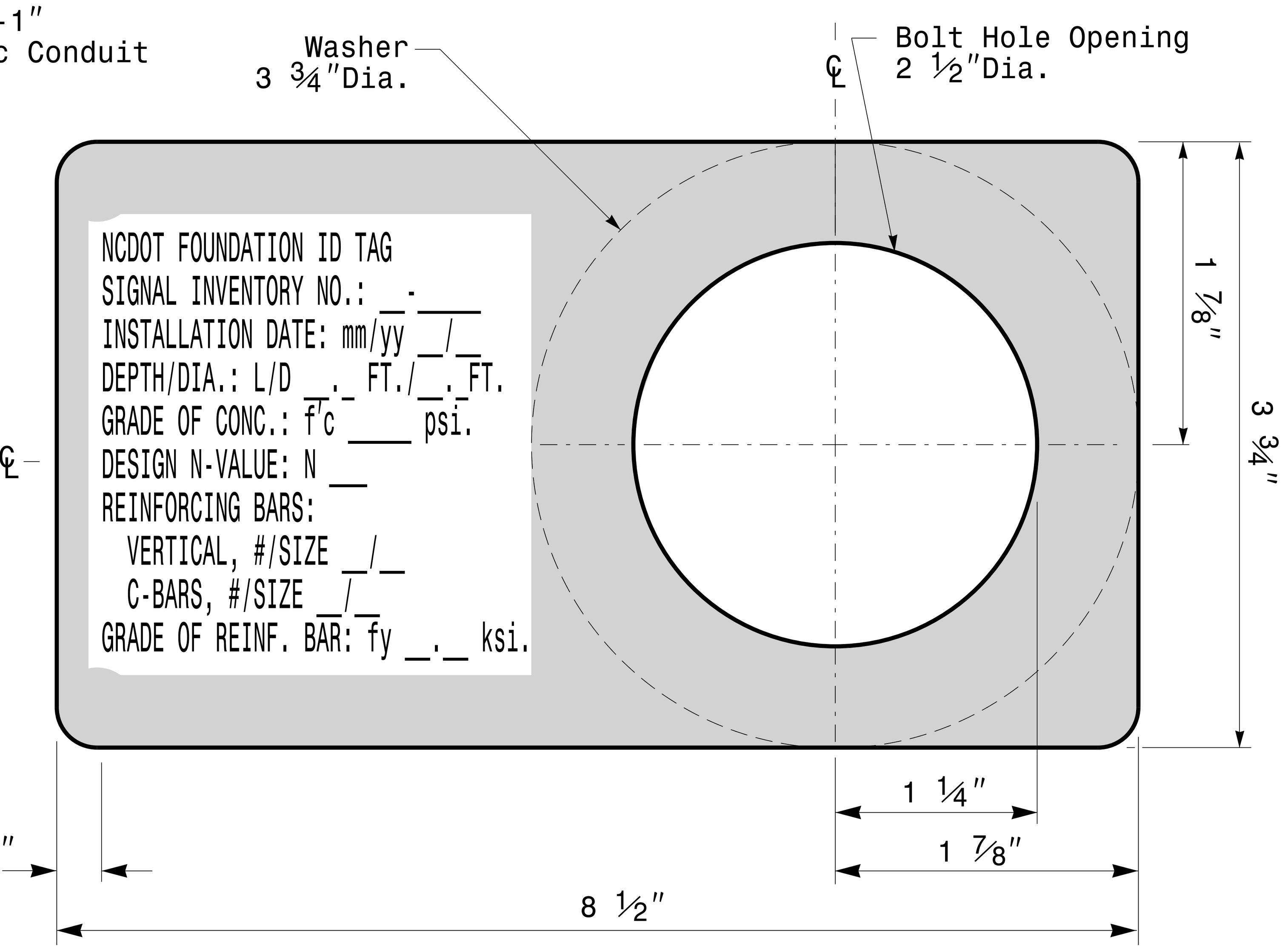
1. If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
2. Circular tie reinforcing rings may be vertically adjusted by +/-3″ at a depth between 2'-0″ and 3'-0″ to facilitate the installation of electrical conduit entering in the cage.
3. For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3″ to facilitate the installation of electrical conduit entering into the cage.
4. Provide 2″ to 5″ foundation projection above ground level depending on the ground slope.
5. Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
6. Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2012 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.

   https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx
7. Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3″ cover on all reinforcement.
9. Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
10. Provide two layers of galvanized welded 23 gauge (0.25) 6″ wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
11. Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



D = Diameter
L = Length/Depth
mm = Month
yy = Year

Detail-A



Concrete Foundation Identification Tag Details

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

Construction Details For Foundations

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.B.COGDELL
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE 0 NA NONE

REV. NO.	COMMENTS	INIT.	DATE
1	Revised Foundation Tag Details	N.B.	5/11/2015

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR
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SIGNATURE 2/17/2016 DATE

PROJECT ID. NO.	SHEET NO.
U-4751	Sig.M8

SOIL CONDITION

Wind Zone	Type	STANDARD STRAIN POLES: Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base: Axial (kip)	Shear (kip)	Moment (ft-kip)	STANDARD FOUNDATIONS 48″ Diameter Drilled Pier Length (L) – Feet: Clay: Medium N-Value 4-8	Clay: Stiff N-Value 9-15	Clay: Very Stiff N-Value 16-30	Clay: Hard N-Value >30	Sand: Loose N-Value 4-10	Sand: Medium N-Value 11-30	Sand: Dense N-Value >30	Reinforcement: Longitudinal: Bar Size (#)	Longitudinal: Quantity (ea.)	Stirrups: Bar Size (#)	Stirrups: Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
	LIGHT	S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
	LIGHT	S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
	HEAVY	S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
	LIGHT	S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
	LIGHT	S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
	HEAVY	S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
	LIGHT	S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
	LIGHT	S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
	HEAVY	S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
	LIGHT	S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
	LIGHT	S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
	HEAVY	S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
	LIGHT	S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
	LIGHT	S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
	HEAVY	S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

48″ Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

General Notes:

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

Standard Strain Pole Foundation–All Soil Condition

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

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.B. COGDELL
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE
Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Eqn.	N.B.	7/12/2016

SCALE: 0 NA — NONE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar
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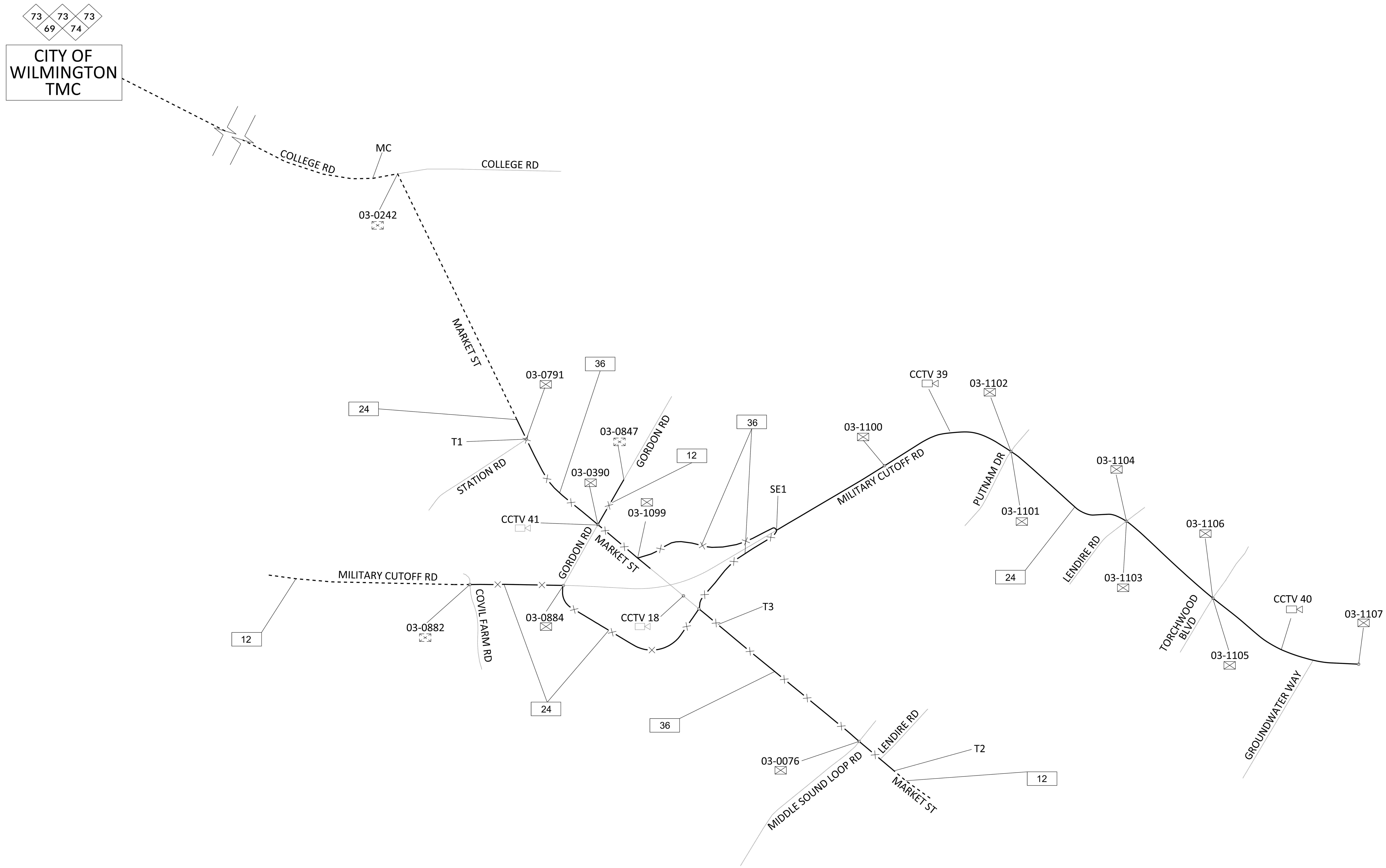
SIGNATURE 2/17/2016 DATE

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-01



LEGEND

- = EXISTING CONTROLLER CABINET
- = PROPOSED CONTROLLER CABINET
- = PROPOSED CCTV
- 69 = INSTALL ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
- 74 = INSTALL NEW CARD CAGE IN COMMUNICATIONS RACK
- = PROPOSED FIBER-OPTIC CABLE
- = EXISTING FIBER-OPTIC CABLE
- = FIBER-OPTIC CABLE INSTALLED IN ON-CALL PLANS
- 73 = INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
(704)-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
State of North Carolina Department of Transportation
Intelligent Transportation Systems
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Cable Schematic

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE
N.T.S.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 019962
HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III
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SIGNATURE 6/6/2017 DATE

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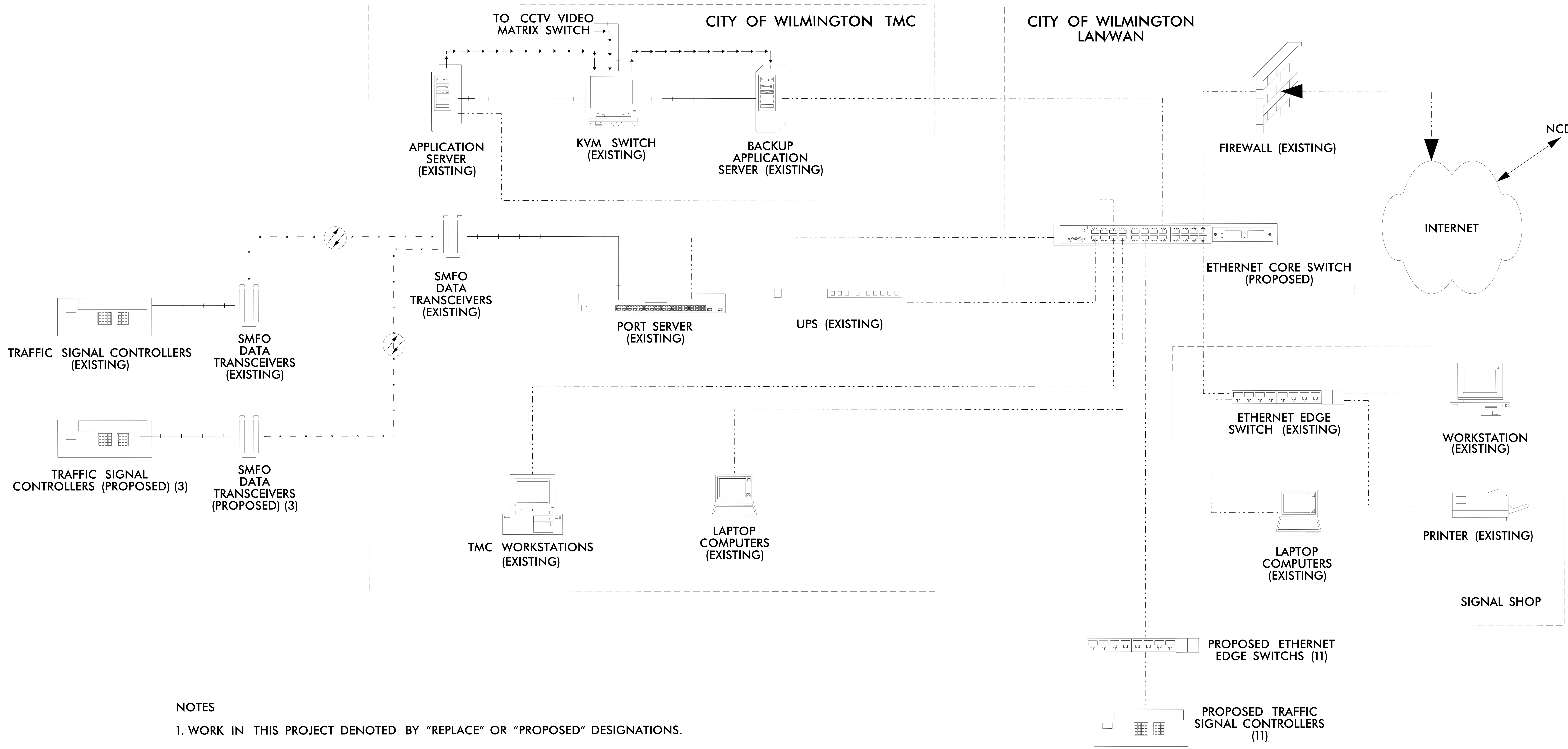

NOTES

1. WORK IN THIS PROJECT DENOTED BY "REPLACE" OR "PROPOSED" DESIGNATIONS.

CONNECTION LEGEND

- 100 BASE TX ETHERNET
- ANALOG VIDEO
- FIBER-OPTIC CABLE
- RS-232/422/485

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Intelligent Transportation Systems
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Block Diagram (1 of 2)

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE	REVISIONS	INIT.	DATE
N.T.S.			

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NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 019962
HENRY ALFRED BADGETT, III

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Henry Alfred Badgett III
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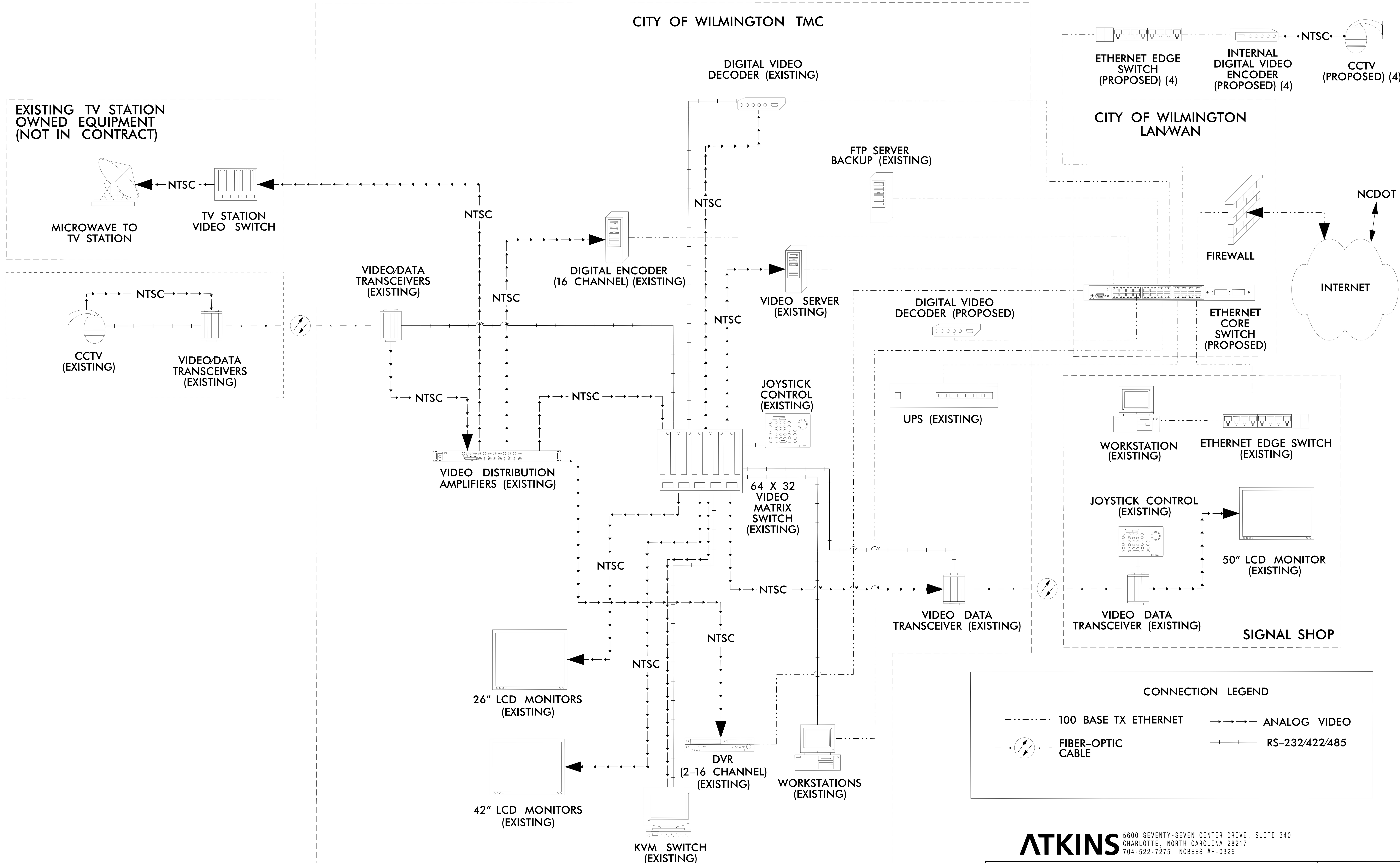

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5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Intelligent Transportation Systems
State of North Carolina Department of Transportation
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Block Diagram (2 of 2)

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE: N.T.S.

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

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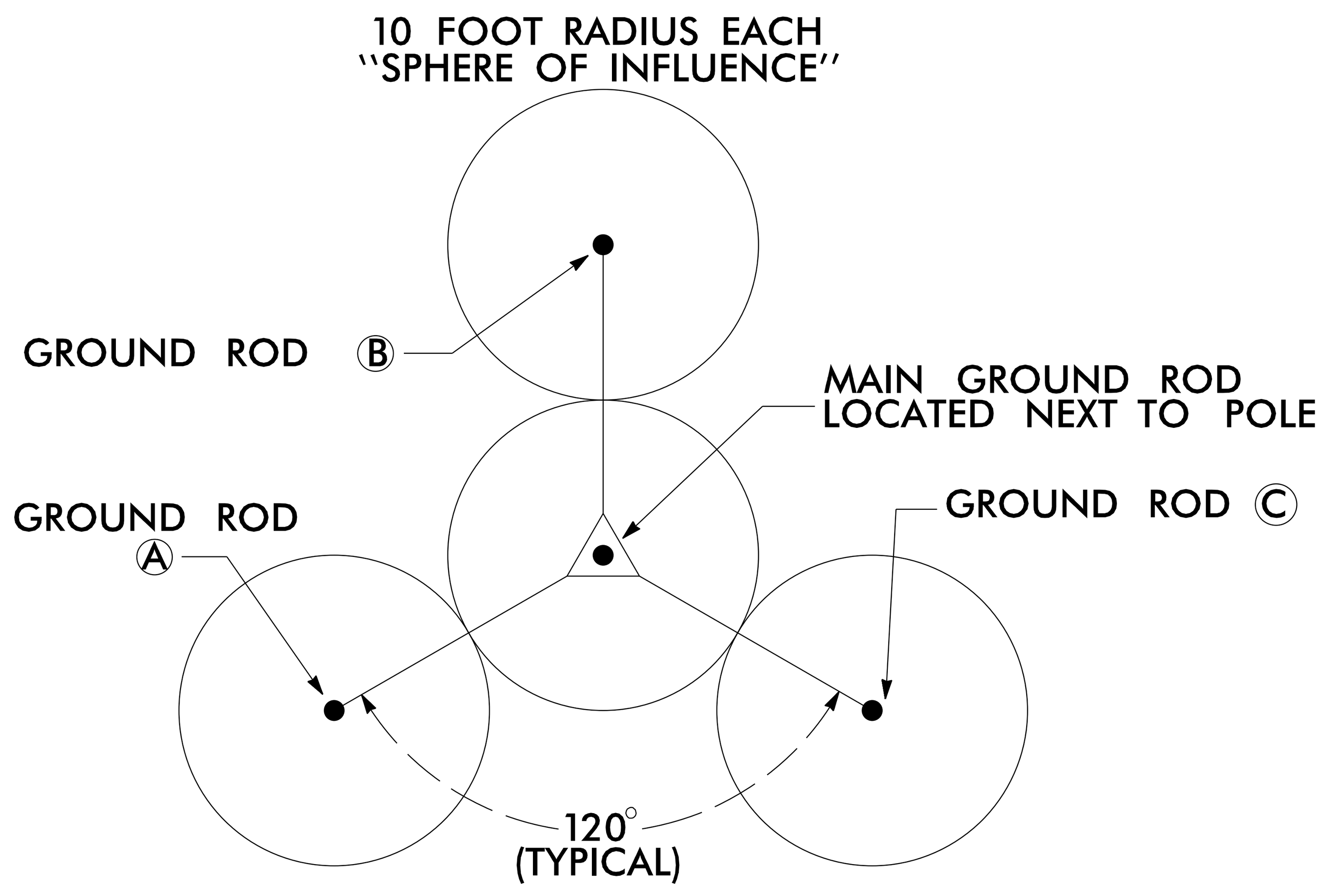
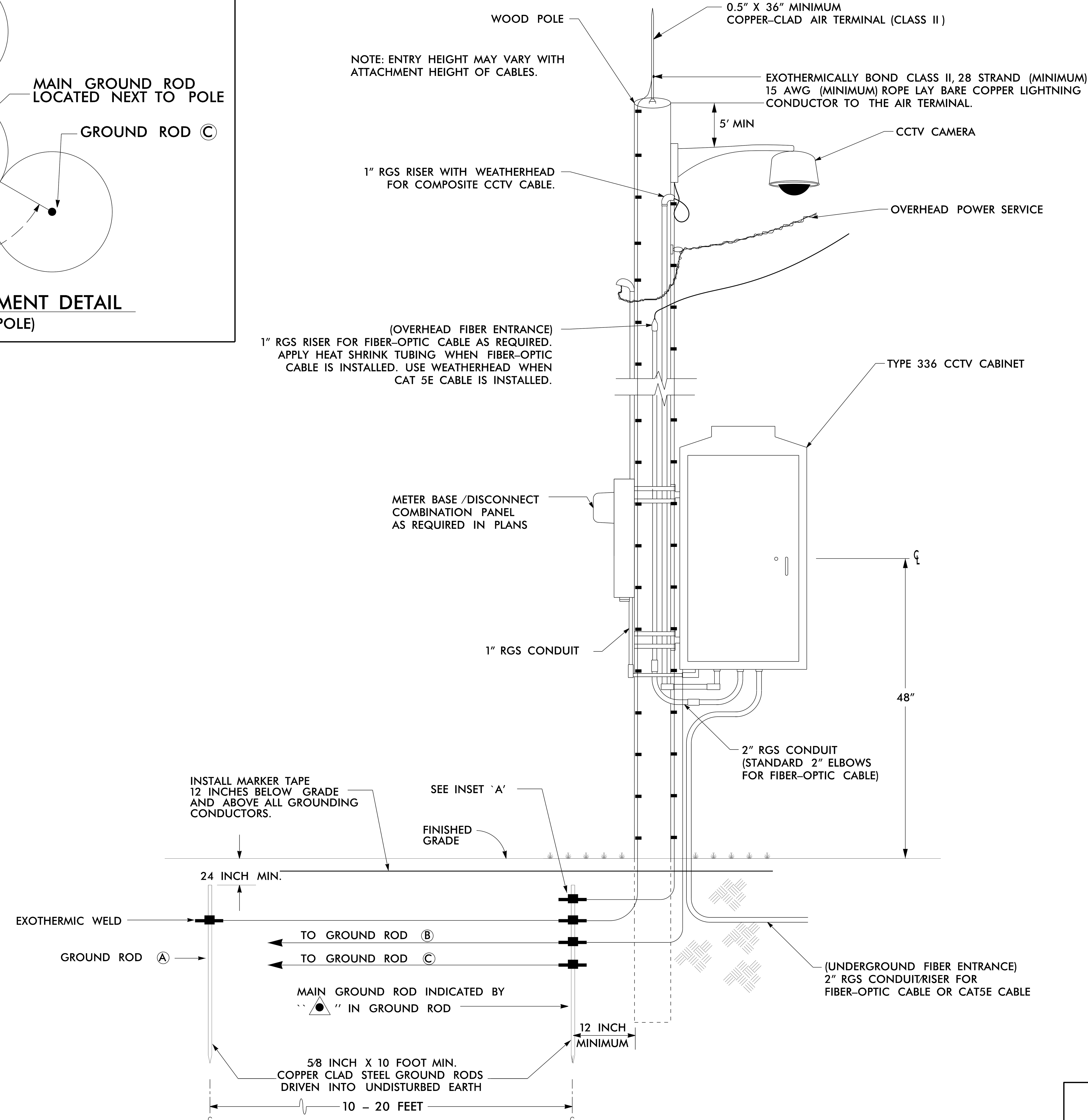
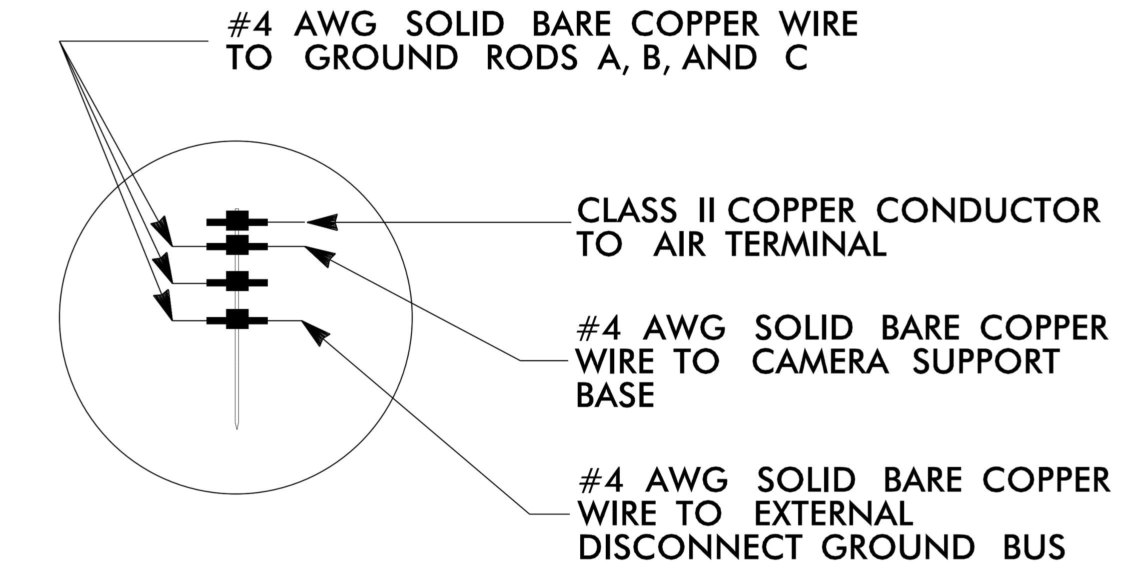
PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-04



GROUND ROD PLACEMENT DETAIL
(TYPICAL EACH POLE)

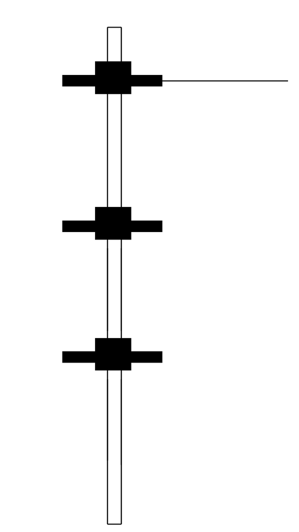


INSET `A'



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 EXOTHERMIC WELDING CONNECTION

NOTES

1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN EXOTHERMIC WELD METHOD. MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
2. EXOTHERMICALLY WELD ALL CONNECTIONS TO GROUND RODS.
3. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30' 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".
5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUS AND NEUTRAL BUS.

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

CCTV Camera Installation, Wood Poles O/H Elec. Service, O/H Comms. / U/G Comms.

Division 3	New Hanover County	Wilmington
PLAN DATE: May 2017	REVIEWED BY: HA Badgett	
PREPARED BY: JA Wiles	REVIEWED BY: BJ Slocum	

	REVISIONS	INIT.	DATE
NONE			

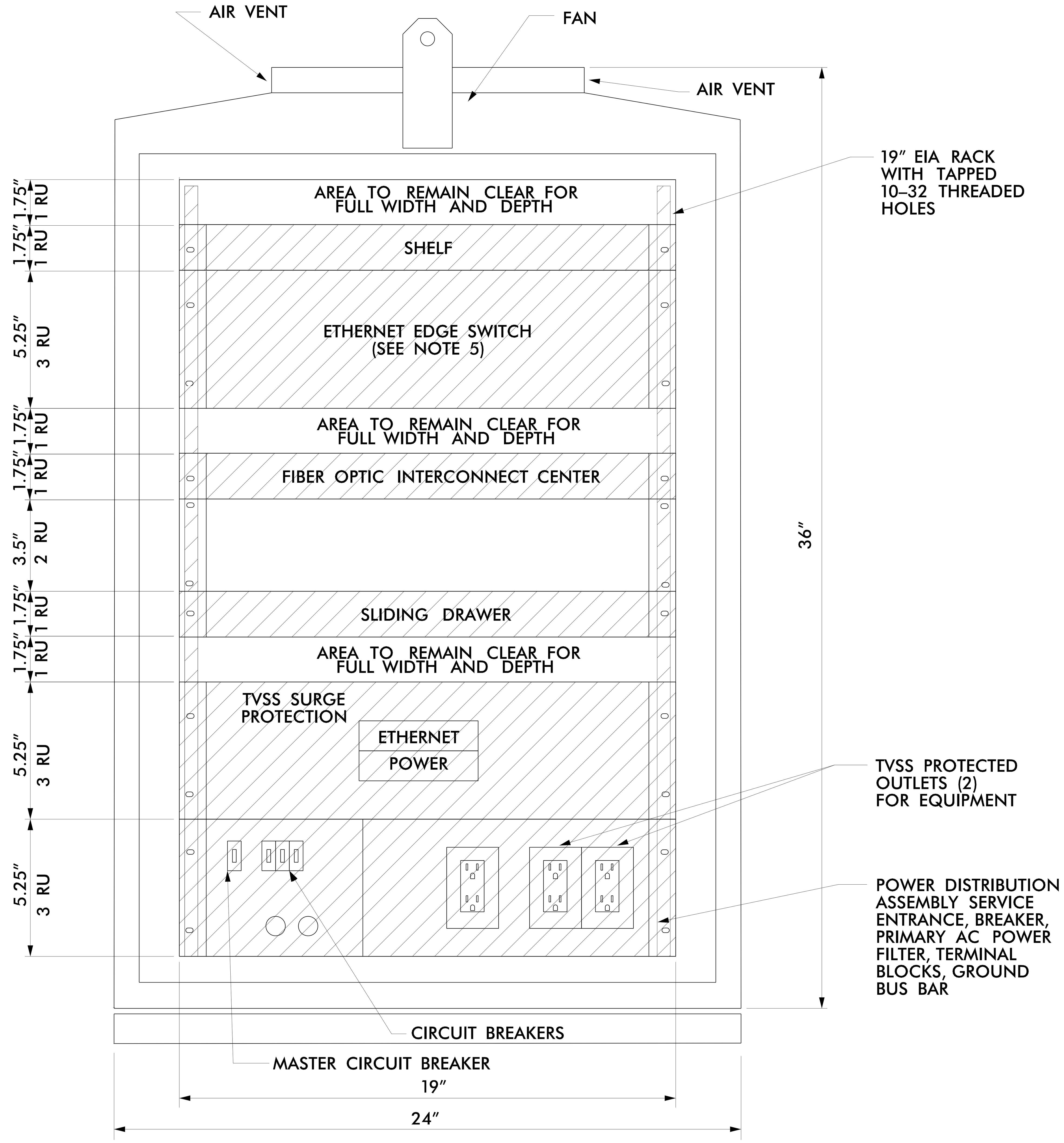
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6/6/2017
DATE

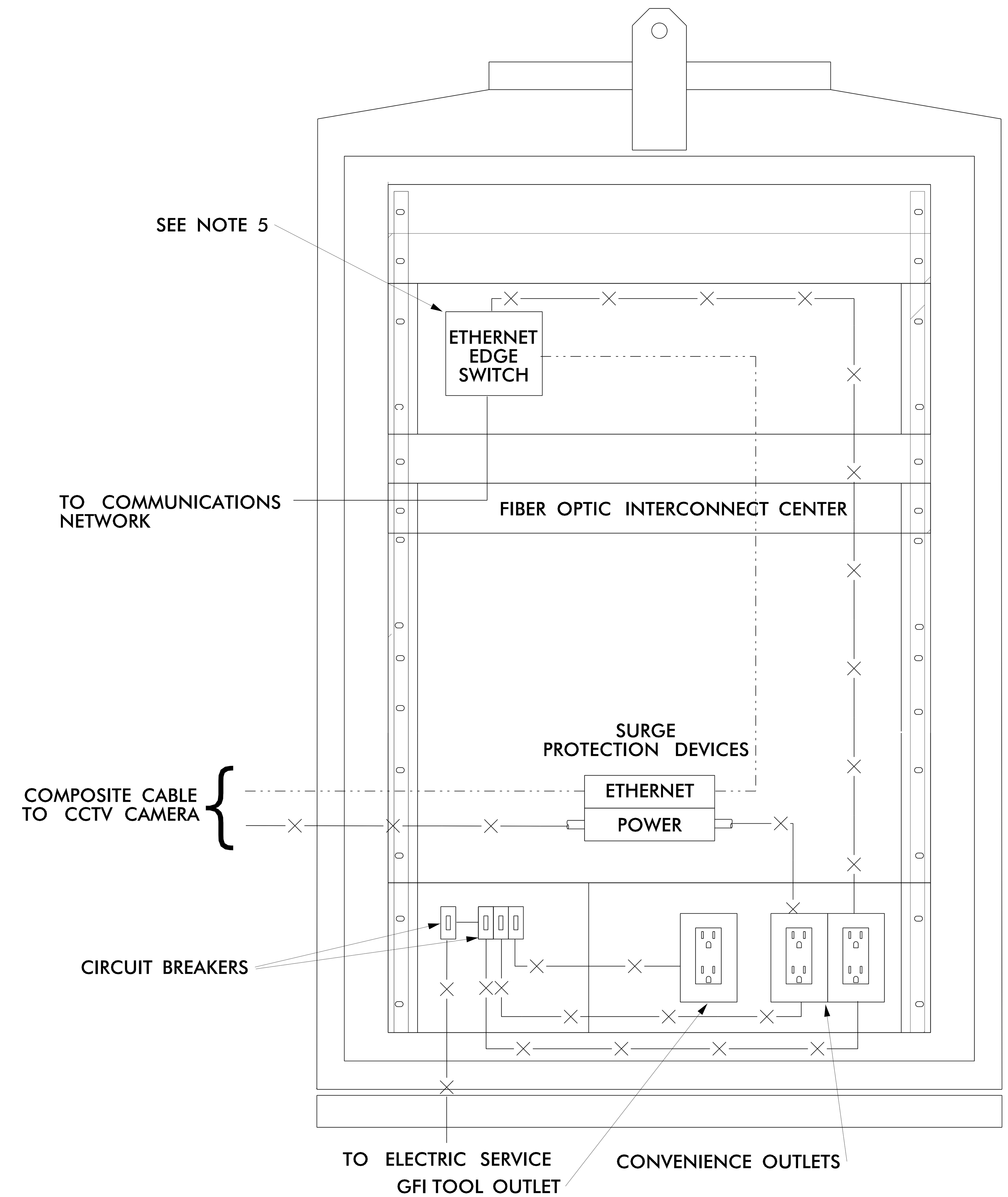
CADD Filename: SCP 04.dgn

25-MAY-2017 15:19
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*03B-CR*Special Details*SCP 04.dgn
BADG7500 AT LUS355273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-05



FRONT VIEW



CABINET WIRING VIEW

CONNECTION LEGEND

100 BASE TX ETHERNET

ANALOG VIDEO

ELECTRICAL POWER

RS–232/422/485

NOTES

1. ALL DIMENSIONS AND SCALE ARE APPROXIMATE.
2. CABINETS WILL BE CALTRANS TYPE 336A
3. CONDUIT ENTRANCES SHALL BE IN BOTTOM OF CABINET.
4. THERE WILL BE FRONT AND REAR DOORS. BOTH DOORS SHALL HAVE THE HINGE–SIDE NEXT TO THE POLE WHEN POLE MOUNTED.
5. INSTALL ETHERNET EDGE SWITCH WHEN SHOWN IN PLANS.

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

CCTV Cabinet Assembly Layout

Division 3 New Hanover County Wilmington

PLAN DATE: May 2017	REVIEWED BY: HA Badgett
PREPARED BY: JA Wiles	REVIEWED BY: BJ Slocum

REVISIONS	INIT.	DATE

NTS

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

Henry Alfred Badgett III 6/6/2017
DATE

CADD Filename: SCP 05.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-06

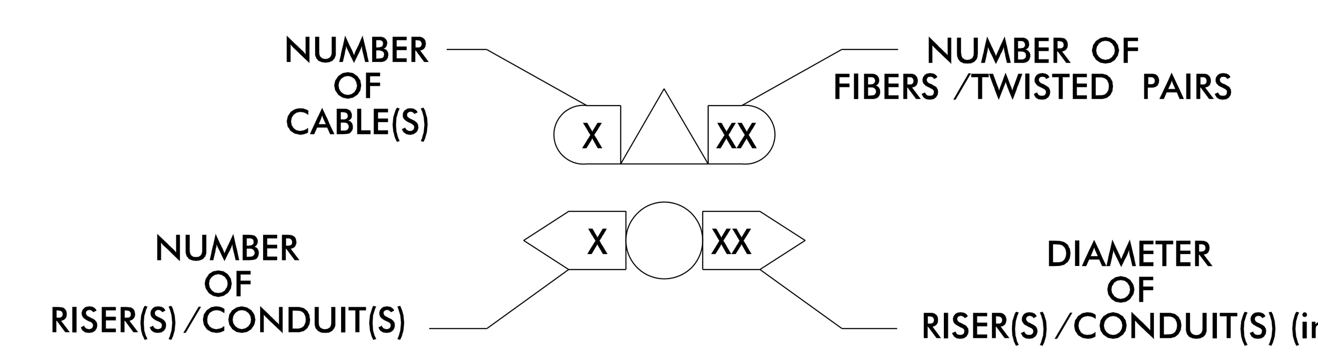
1 INSTALL COMPOSITE CCTV CABLE
2 INSTALL LOW VOLTAGE POWER CABLE (24VAC)
3 INSTALL CATEGORY 5E CABLE
4 INSTALL SMFO CABLE
5 BACK-PULL EXIST SMFO CABLE
6 INSTALL FIBER-OPTIC DROP CABLE
7 INSTALL TRACER WIRE
8 TRENCH CONDUIT
9 INSTALL PVC CONDUIT
10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
13 INSTALL HEAT SHRINK TUBING RETROFIT KIT
14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
15 DIRECTIONAL DRILL CONDUIT
16 BORE AND JACK CONDUIT
17 INSTALL CABLE(S) IN EXISTING CONDUIT
18 INSTALL CABLE(S) IN NEW CONDUIT
19 INSTALL CABLE(S) IN EXISTING RISER(S)
20 INSTALL CABLE(S) IN NEW RISER(S)
21 INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22 INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23 INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25 INSTALL NEW RISER INTO POLE MOUNTED CABINET
26 INSTALL DIGITAL VIDEO ENCODER
27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29 INSTALL UNDERGROUND SPLICE ENCLOSURE
30 INSTALL AERIAL SPLICE ENCLOSURE
31 INSTALL SPLICE CABINET
32 MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33 REMOVE EXISTING SPLICE /HUB /CCTV CABINET
34 INSTALL CABINET FOUNDATION
35 REMOVE EXISTING CABINET FOUNDATION
36 INSTALL CCTV CAMERA ASSEMBLY
37 INSTALL CCTV WOOD POLE
38 INSTALL STANDARD SIZE JUNCTION BOX
39 INSTALL SPECIAL-SIZED JUNCTION BOX
40 INSTALL OVER-SIZED JUNCTION BOX
41 REMOVE EXISTING JUNCTION BOX
42 INSTALL WOOD POLE
43 REMOVE EXISTING WOOD POLE
44 INSTALL AERIAL GUY ASSEMBLY
45 INSTALL STANDARD DOWN GUY ASSEMBLY
46 INSTALL SIDEWALK GUY ASSEMBLY
47 INSTALL MESSENGER CABLE
48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49 REMOVE EXISTING COMMUNICATIONS CABLE
50 INSTALL WIRELESS DSL
51 INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52 INSTALL DELINEATOR MARKER
53 STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
56 LASH CABLE(S) TO NEW MESSENGER CABLE
57 MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58 INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59 INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60 REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61 REMOVE EXISTING CCTV CAMERA ASSEMBLY
62 NEW CABINET ENTRANCE INTO NEW FOUNDATION
63 DRILL/CORE DRILL EXISTING FOUNDATION
64 INTERCEPT AND REROUTE EXISTING CONDUITS
65 BOND MESSENGER TO POLE GROUND
66 BOND RISER TO POLE GROUND
67 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68 BOND TRACER WIRE TO POLE GROUND
69 INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70 INSTALL CCTV METAL POLE AND FOUNDATION
71 RELOCATE FO TRANSCEIVER
72 INSTALL FO TRANSCEIVER
73 INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74 INSTALL CARD CAGE IN COMMUNICATIONS RACK
75 RELOCATE RADIO

LEGEND

PROPOSED		EXISTING
FO	OVERHEAD FIBER OPTIC CABLE	EXI
DD	DIRECTIONAL DRILLED CONDUIT	
	UNDERGROUND CONDUIT	
REM	OVERHEAD FIBER OPTIC CABLE REMOVAL	N/A
	WOOD POLE	
	METAL POLE	
	OVERSIZED /SPECIAL SIZED JUNCTION BOX	
	CCTV CAMERA ASSEMBLY	
	EQUIPMENT CABINET	
03-XXXX	SIGNAL INVENTORY NUMBER	03-XXXX
CCTV-X	CCTV CAMERA NUMBER	CCTV-X
S	AERIAL SPLICE ENCLOSURE	S
S	UNDERGROUND SPLICE ENCLOSURE	S
	CABLE STORAGE GUIDES (SNOW SHOES)	
	STANDARD GUY ASSEMBLY	
	SIDEWALK GUY ASSEMBLY	

CONSTRUCTION NOTE SYMBOLOGY KEY

X INDICATES NUMBER OF CABLES, LOOPS, ETC.
XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
X INDICATES NUMBER OF RISER(S)/CONDUIT(S)
XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (in)



ATTACHMENT POINT:

XXX / YYY DISTANCE ABOVE (IN) REFERENCE POINT
YYY / XXX REFERENCE POINT DISTANCE BELOW (IN)

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340 CHARLOTTE, NORTH CAROLINA 28217 704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Construction Notes and Legend

Division 3 New Hanover County Wilmington
PLAN DATE: May 2017 REVIEWED BY: HA Badgett
PREPARED BY: JA Wiles REVIEWED BY: BJ Slocum
REVISIONS INIT. DATE

NTS

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III
6/6/2017
DATE

CADD Filename: SCP 06.dgn

25-MAY-2017 15:19
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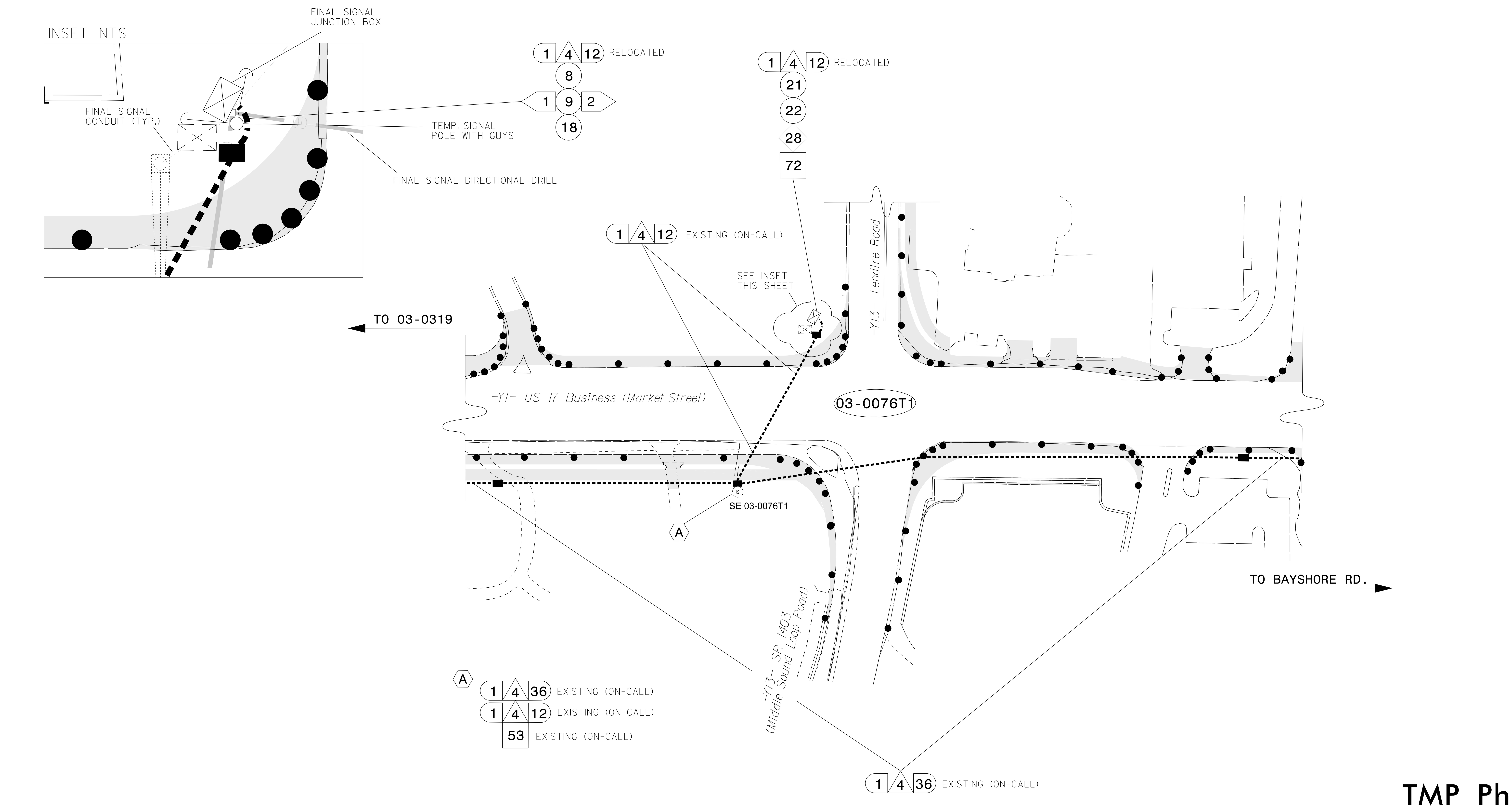
BADG7500 AT LUS35273

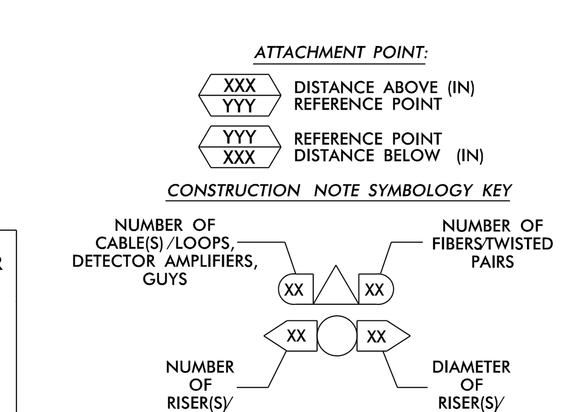
PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-07



TMP Phase II

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.



1	INSTALL COMPOSITE CCTV CABLE
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)
3	INSTALL CATEGORY 5E CABLE
4	INSTALL SMFO CABLE
5	BACK-PULL EXIST SMFO CABLE
6	INSTALL FIBER-OPTIC DROP CABLE
7	INSTALL TRACER WIRE
8	TRENCH CONDUIT
9	INSTALL PVC CONDUIT
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT
11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
13	INSTALL HEAT SHRINK TUBING RETROFIT KIT
14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
15	DIRECTIONAL DRILL CONDUIT
16	BORE AND JACK CONDUIT
17	INSTALL CABLE(S) IN EXISTING CONDUIT
18	INSTALL CABLE(S) IN NEW CONDUIT
19	INSTALL CABLE(S) IN EXISTING RISER(S)
20	INSTALL CABLE(S) IN NEW RISER(S)
21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25	INSTALL NEW RISER INTO POLE MOUNTED CABINET
26	INSTALL DIGITAL VIDEO ENCODER
27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29	INSTALL UNDERGROUND SPLICE ENCLOSURE
30	INSTALL AERIAL SPLICE ENCLOSURE
31	INSTALL SPLICE CABINET
32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET
34	INSTALL CABINET FOUNDATION
35	REMOVE EXISTING CABINET FOUNDATION
36	INSTALL CCTV CAMERA ASSEMBLY
37	INSTALL CCTV WOOD POLE
38	INSTALL STANDARD SIZE JUNCTION BOX
39	INSTALL SPECIAL-SIZED JUNCTION BOX
40	INSTALL OVER-SIZED JUNCTION BOX
41	REMOVE EXISTING JUNCTION BOX
42	INSTALL WOOD POLE
43	REMOVE EXISTING WOOD POLE
44	INSTALL AERIAL GUY ASSEMBLY
45	INSTALL STANDARD GUY ASSEMBLY
46	INSTALL SIDEWALK GUY ASSEMBLY
47	INSTALL MESSENGER CABLE
48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49	REMOVE EXISTING COMMUNICATIONS CABLE
50	INSTALL WIRELESS DSL
51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52	INSTALL DELINEATOR MARKER
53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55	LASH CABLE(S) TO EXISTING MESSENGER CABLE
56	LASH CABLE(S) TO NEW MESSENGER CABLE
57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61	REMOVE EXISTING CCTV CAMERA ASSEMBLY
62	NEW CABINET ENTRANCE INTO NEW FOUNDATION
63	DRILL/CORE DRILL EXISTING FOUNDATION
64	INTERCEPT AND REROUTE EXISTING CONDUITS
65	BOND MESSENGER TO POLE GROUND
66	BOND RISER TO POLE GROUND
67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68	BOND TRACER WIRE TO POLE GROUND
69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70	INSTALL CCTV METAL POLE & FOUNDATION
71	RELOCATE FO TRANSCEIVER
72	INSTALL FO TRANSCEIVER
73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
75	RELOCATE RADIO

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

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

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT, III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEF98C43F... 6/6/2017 DATE

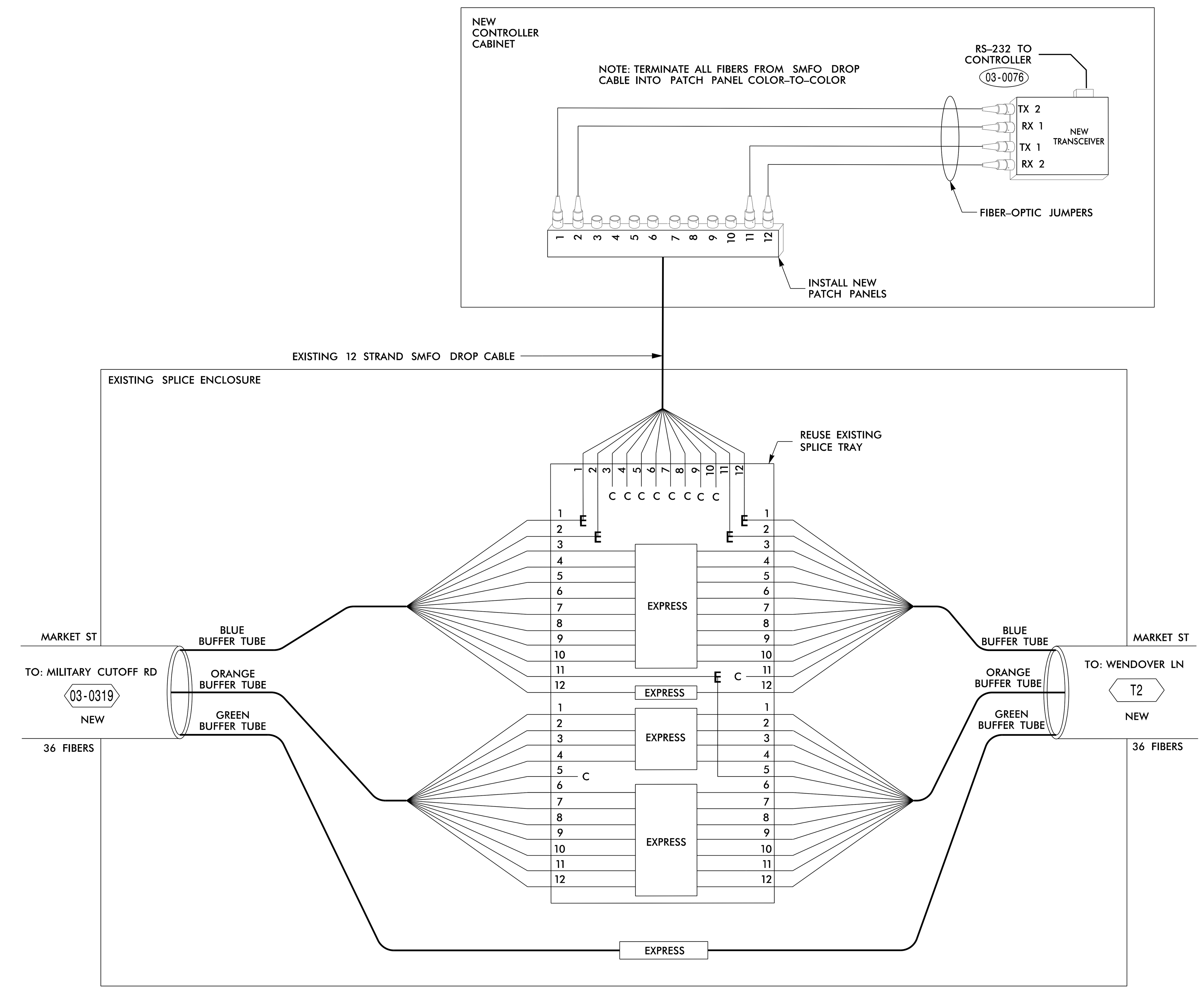
CADD Filename: Temp 03-0076T1.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-08

SPLICE ENCLOSURE NO.

03-0076T1

MARKET ST AT MIDDLE SOUND LOOP ROAD



TMP Phase II

LEGEND

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

E = EXIST. FUSION SPLICE INDIVIDUAL FIBER TO REMAIN

X = FUSION SPLICE INDIVIDUAL FIBER

C = CAP AND SEAL

EXPRESS = EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING

BUFFER SPLICE = SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY.
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE.
3. EDGE SWITCH CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.
4. TWO (2) WEEKS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF WILMINGTON SENIOR SIGNAL SYSTEM OPERATOR, DENYS VIELKANOWITZ, AT 910-341-4676 TO ARRANGE FOR THE CITY OF WILMINGTON TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NO LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE SENIOR SIGNAL SYSTEM OPERATOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
5. CONTRACTOR TO RECORD EXISTNG SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGED DIFFERS FROM THE SUPPLIED SPLICE DETAILS.
6. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING INFORMATION (SEE STANDARD SPECIFICATIONS ARTICLE 1731-3(A)):

a. SPLICE LOCATION
b. DATE
c. COMPANY NAME
d. NAME OF INDIVIDUAL PERFORMING THE SPLICE

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY, TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (ITEMS A-D) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
(704)-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

Traffic Engineering and Safety Systems Branch — State of North Carolina Department of Transportation — Intelligent Transportation Systems

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Fiber Optic Splicing Details

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE	REVISIONS	INIT.	DATE
N.T.S.			

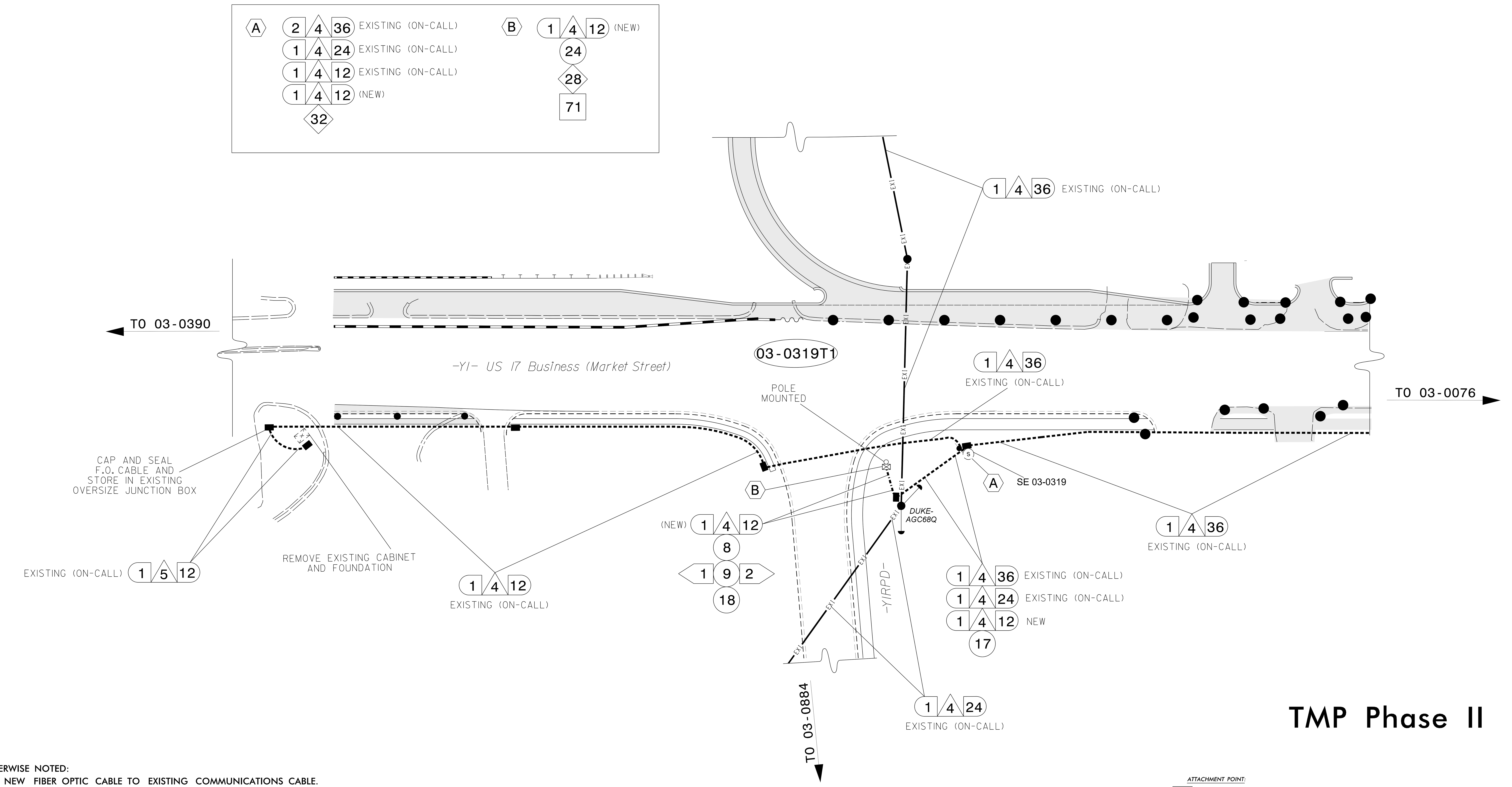
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6/6/2017

SIGNATURE DATE

CADD Filename: SE03-0076T1.dgn



TMP Phase II

NOTES:
1. UNLESS OTHERWISE NOTED:
   – OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   – ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   – ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

1 INSTALL COMPOSITE CCTV CABLE	13 INSTALL HEAT SHRINK TUBING RETROFIT KIT	25 INSTALL NEW RISER INTO POLE MOUNTED CABINET	37 INSTALL CCTV WOOD POLE	49 REMOVE EXISTING COMMUNICATIONS CABLE	61 REMOVE EXISTING CCTV CAMERA ASSEMBLY	73 INSTALL DIGITIAL VIDEO DECODER IN COMMUNICATIONS RACK
2 INSTALL LOW VOLTAGE POWER CABLE (24VAC)	14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	26 INSTALL DIGITAL VIDEO ENCODER	38 INSTALL STANDARD SIZE JUNCTION BOX	50 INSTALL WIRELESS DSL	62 NEW CABINET ENTRANCE INTO NEW FOUNDATION	74 INSTALL CARD CAGE IN COMMUNICATIONS RACK
3 INSTALL CATEGORY 5E CABLE	15 DIRECTIONAL DRILL CONDUIT	27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	39 INSTALL SPECIAL-SIZED JUNCTION BOX	51 INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	63 DRILL/CORE DRILL EXISTING FOUNDATION	75 RELOCATE RADIO
4 INSTALL SMFO CABLE	16 BORE AND JACK CONDUIT	28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET	40 INSTALL OVER-SIZED JUNCTION BOX	52 INSTALL DELINEATOR MARKER	64 INTERCEPT AND REROUTE EXISTING CONDUITS	
5 BACK-PULL EXIST SMFO CABLE	17 INSTALL CABLE(S) IN EXISTING CONDUIT	29 INSTALL UNDERGROUND SPLICE ENCLOSURE	41 REMOVE EXISTING JUNCTION BOX	53 STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)	65 BOND MESSENGER TO POLE GROUND	
6 INSTALL FIBER-OPTIC DROP CABLE	18 INSTALL CABLE(S) IN NEW CONDUIT	30 INSTALL AERIAL SPLICE ENCLOSURE	42 INSTALL WOOD POLE	54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66 BOND RISER TO POLE GROUND	
7 INSTALL TRACER WIRE	19 INSTALL CABLE(S) IN EXISTING RISER(S)	31 INSTALL SPLICE CABINET	43 REMOVE EXISTING WOOD POLE	55 LASH CABLE(S) TO EXISTING MESSENGER CABLE	67 BOND TRACER WIRE TO EQUIPMENT GROUND BUS	
8 TRENCH CONDUIT	20 INSTALL CABLE(S) IN NEW RISER(S)	32 MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	44 INSTALL AERIAL GUY ASSEMBLY	56 LASH CABLE(S) TO NEW MESSENGER CABLE	68 BOND TRACER WIRE TO POLE GROUND	
9 INSTALL PVC CONDUIT	21 INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE	33 REMOVE EXISTING SPLICE /HUB / CCTV CABINET	45 INSTALL STANDARD GUY ASSEMBLY	57 MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV	69 INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK	
10 INSTALL RIGID, GALVANIZED STEEL CONDUIT	22 INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	34 INSTALL CABINET FOUNDATION	46 INSTALL SIDEWALK GUY ASSEMBLY	58 INSTALL NEW ELECTRICAL SERVICE FOR CCTV	70 INSTALL CCTV METAL POLE & FOUNDATION	
11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	23 INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	35 REMOVE EXISTING CABINET FOUNDATION	47 INSTALL MESSENGER CABLE	59 INSTALL NEW POLE MOUNTED CCTV CABINET (336)	71 RELOCATE FO TRANSCEIVER	
12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	36 INSTALL CCTV CAMERA ASSEMBLY	48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	60 REMOVE EXISTING METAL CCTV POLE AND FOUNDATION	72 INSTALL FO TRANSCEIVER	

ATTACHMENT POINT:
XXX/YYY DISTANCE ABOVE (IN) REFERENCE POINT
YYY/XXX REFERENCE POINT DISTANCE BELOW (IN)

CONSTRUCTION NOTE SYMBOLOGY KEY
NUMBER OF CABLE(S)/LOOPS, DETECTOR AMPLIFIERS, GUYS
NUMBER OF FIBERS/TWISTED PAIRS
NUMBER OF RISER(S)/ CONDUIT(S)
DIAMETER OF RISER(S)/ CONDUIT(S) (IN)

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE: May 2017 REVIEWED BY: HA Badgett
PREPARED BY: JA Wiles REVIEWED BY: BJ Slocum

REVISIONS INIT. DATE

SCALE 0 50 1"=50'

SEAL 019962 NORTH CAROLINA PROFESSIONAL ENGINEER HENRY ALFRED BADGETT III

6/6/2017 DATE

CADD Filename: Temp 03-0319T2.dgn

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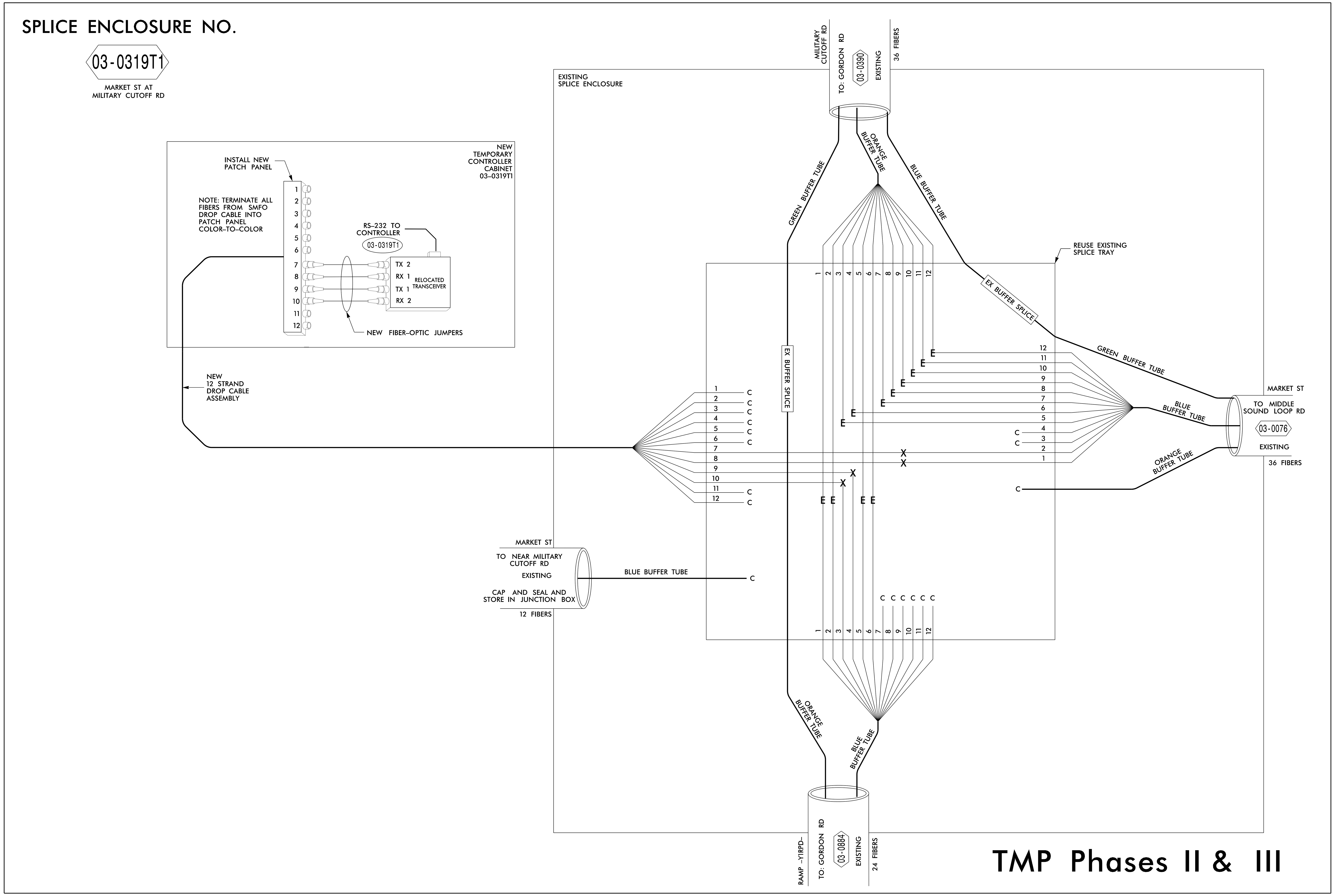
PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-10



LEGEND

E =	EXIST. FUSION SPLICE INDIVIDUAL FIBER TO REMAIN
X =	FUSION SPLICE INDIVIDUAL FIBER
C =	CAP AND SEAL
EXPRESS =	EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING
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COLOR CODE
TIA/EIA 598-B

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

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY.
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE.
3. EDGE SWITCH CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.
4. TWO (2) WEEKS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF WILMINGTON SENIOR SIGNAL SYSTEM OPERATOR, DENYS VIELKANOWITZ, AT 910-341-4676 TO ARRANGE FOR THE CITY OF WILMINGTON TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NO LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE SENIOR SIGNAL SYSTEM OPERATOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
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b. DATE
c. COMPANY NAME
d. NAME OF INDIVIDUAL PERFORMING THE SPLICE

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ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
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Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch — State of North Carolina Department of Transportation — Intelligent Transportation Systems
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Fiber Optic Splicing Details

Division 3	New Hanover County	Wilmington	
PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE: N.T.S.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEE98C43F
SIGNATURE 6/6/2017 DATE

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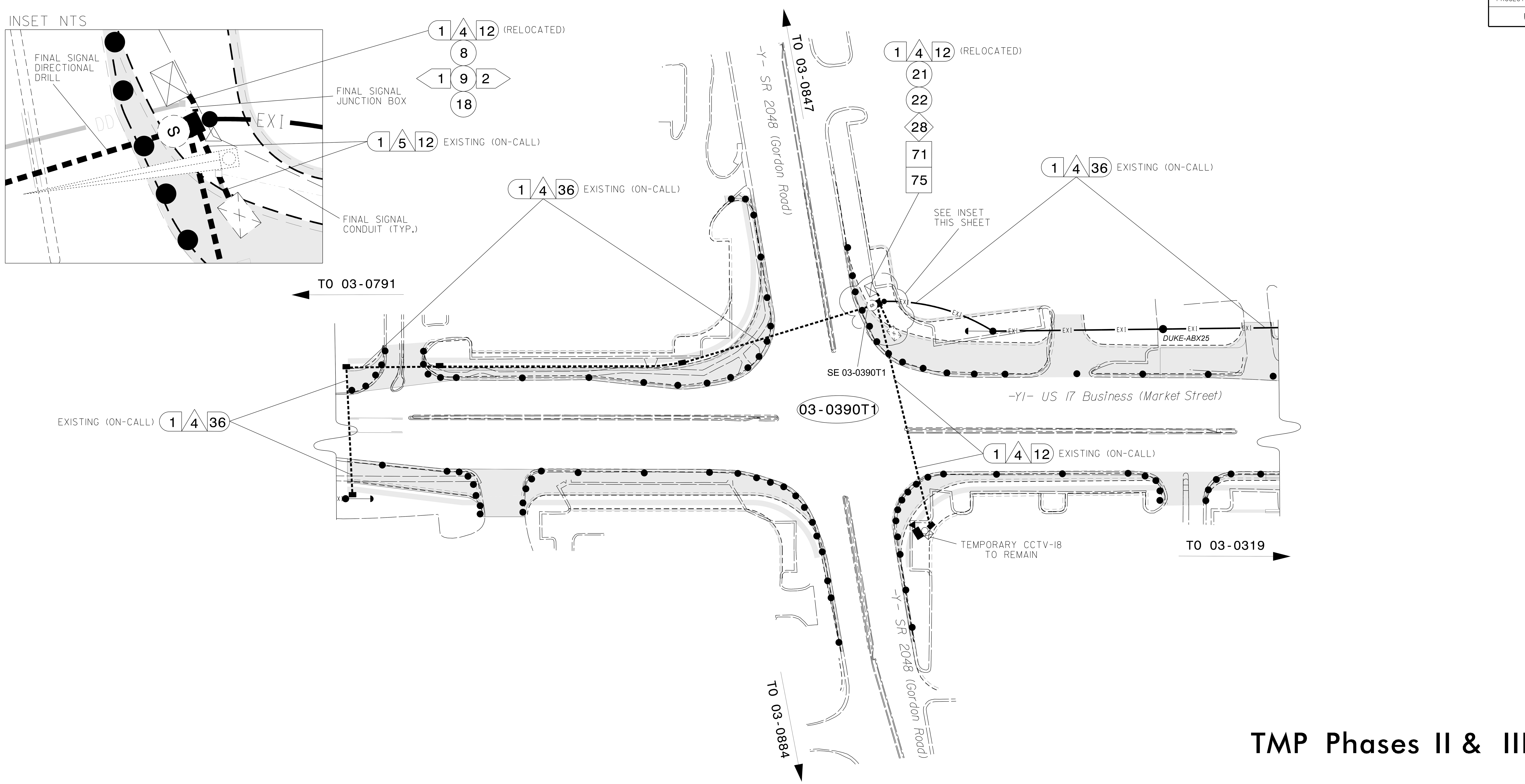
BADG7500 AT LUS35273

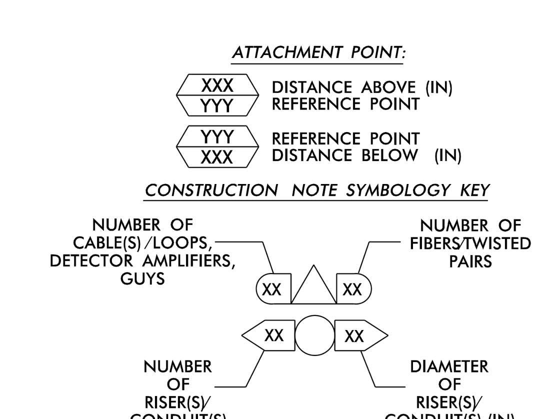
PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-11



TMP Phases II & III

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.



1	INSTALL COMPOSITE CCTV CABLE	13	INSTALL HEAT SHRINK TUBING RETROFIT KIT	25	INSTALL NEW RISER INTO POLE MOUNTED CABINET	37	INSTALL CCTV WOOD POLE	49	REMOVE EXISTING COMMUNICATIONS CABLE	61	REMOVE EXISTING CCTV CAMERA ASSEMBLY	73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)	14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	26	INSTALL DIGITAL VIDEO ENCODER	38	INSTALL STANDARD SIZE JUNCTION BOX	50	INSTALL WIRELESS DSL	62	NEW CABINET ENTRANCE INTO NEW FOUNDATION	74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
3	INSTALL CATEGORY 5E CABLE	15	DIRECTIONAL DRILL CONDUIT	27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	39	INSTALL SPECIAL-SIZED JUNCTION BOX	51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	63	DRILL/CORE DRILL EXISTING FOUNDATION	75	RELOCATE RADIO
4	INSTALL SMFO CABLE	16	BORE AND JACK CONDUIT	28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET	40	INSTALL OVER-SIZED JUNCTION BOX	52	INSTALL DELINEATOR MARKER	64	INTERCEPT AND REROUTE EXISTING CONDUITS		
5	BACK-PULL EXIST SMFO CABLE	17	INSTALL CABLE(S) IN EXISTING CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE	41	REMOVE EXISTING JUNCTION BOX	53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)	65	BOND MESSENGER TO POLE GROUND		
6	INSTALL FIBER-OPTIC DROP CABLE	18	INSTALL CABLE(S) IN NEW CONDUIT	30	INSTALL AERIAL SPLICE ENCLOSURE	42	INSTALL WOOD POLE	54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66	BOND RISER TO POLE GROUND		
7	INSTALL TRACER WIRE	19	INSTALL CABLE(S) IN EXISTING RISER(S)	31	INSTALL SPLICE CABINET	43	REMOVE EXISTING WOOD POLE	55	LASH CABLE(S) TO EXISTING MESSENGER CABLE	67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS		
8	TRENCH CONDUIT	20	INSTALL CABLE(S) IN NEW RISER(S)	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	44	INSTALL AERIAL GUY ASSEMBLY	56	LASH CABLE(S) TO NEW MESSENGER CABLE	68	BOND TRACER WIRE TO POLE GROUND		
9	INSTALL PVC CONDUIT	21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE	33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET	45	INSTALL STANDARD GUY ASSEMBLY	57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV	69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK		
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12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	36	INSTALL CCTV CAMERA ASSEMBLY	48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION	72	INSTALL FO TRANSCEIVER		

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
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704-522-7275 NCBEES #F-0326

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Prepared for the Offices of:

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

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT, III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEF98C43F...
6/6/2017
DATE

CADD Filename: Temp 03-0390T1.dgn

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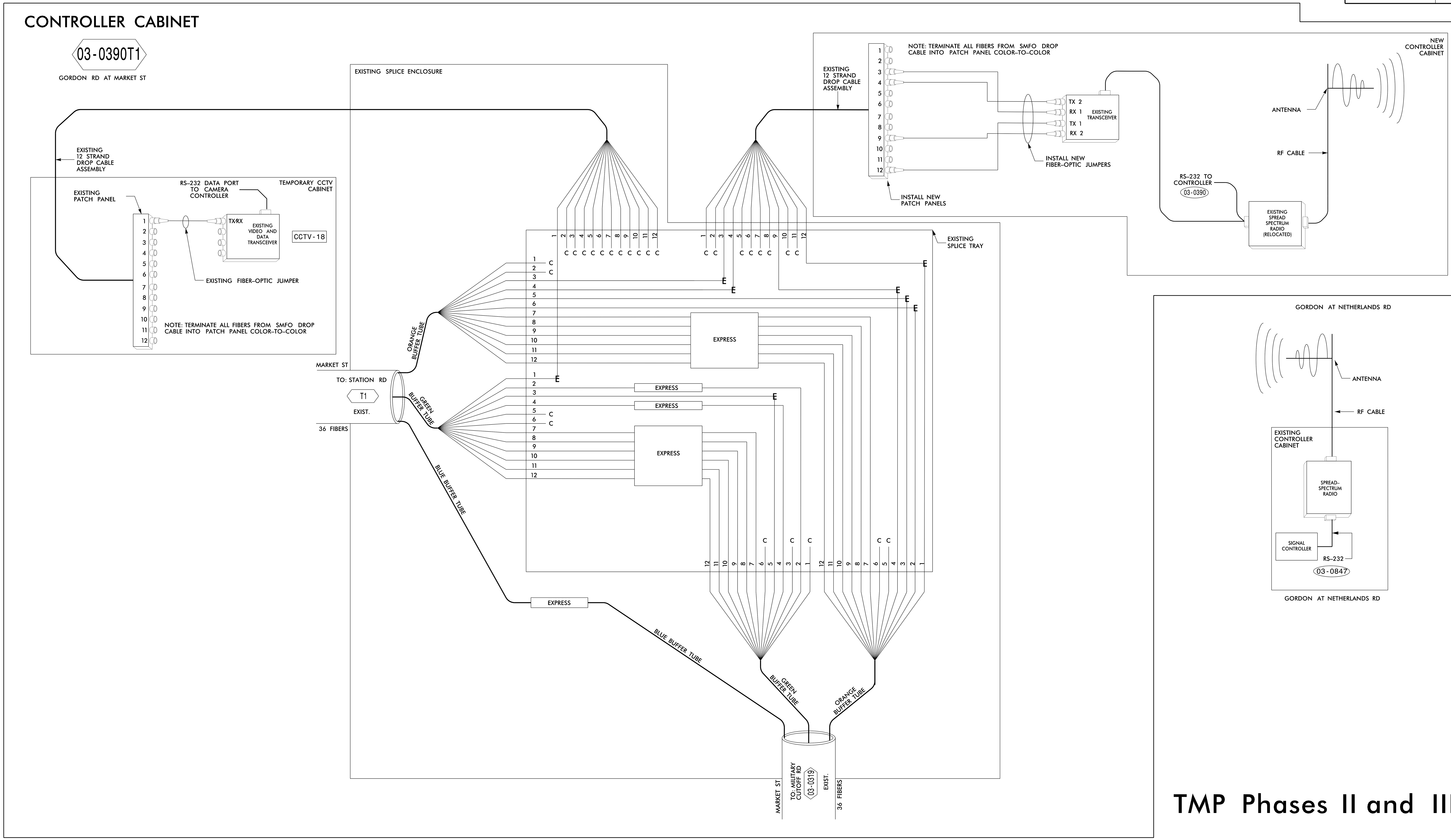
BADG7500 AT LUS355273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-12



TMP Phases II and III

LEGEND

COLOR CODE TIA/EIA 598-B	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
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E = EXIST. FUSION SPLICE INDIVIDUAL FIBER TO REMAIN

X = FUSION SPLICE INDIVIDUAL FIBER

C = CAP AND SEAL

EXPRESS = EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING

BUFFER SPLICE = SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY.
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE.
3. EDGE SWITCH CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.
4. TWO (2) WEEKS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF WILMINGTON SENIOR SIGNAL SYSTEM OPERATOR, DENYS VIELKANOWITZ, AT 910-341-4676 TO ARRANGE FOR THE CITY OF WILMINGTON TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NO LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE SENIOR SIGNAL SYSTEM OPERATOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
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6. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING INFORMATION (SEE STANDARD SPECIFICATIONS ARTICLE 1731-3(A)):

a. SPLICE LOCATION
b. DATE
c. COMPANY NAME
d. NAME OF INDIVIDUAL PERFORMING THE SPLICE

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY, TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (ITEMS A-D) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
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Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
State of North Carolina Department of Transportation
Intelligent Transportation Systems
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Fiber Optic Splicing Details

Division 3	New Hanover County	Wilmington	
PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

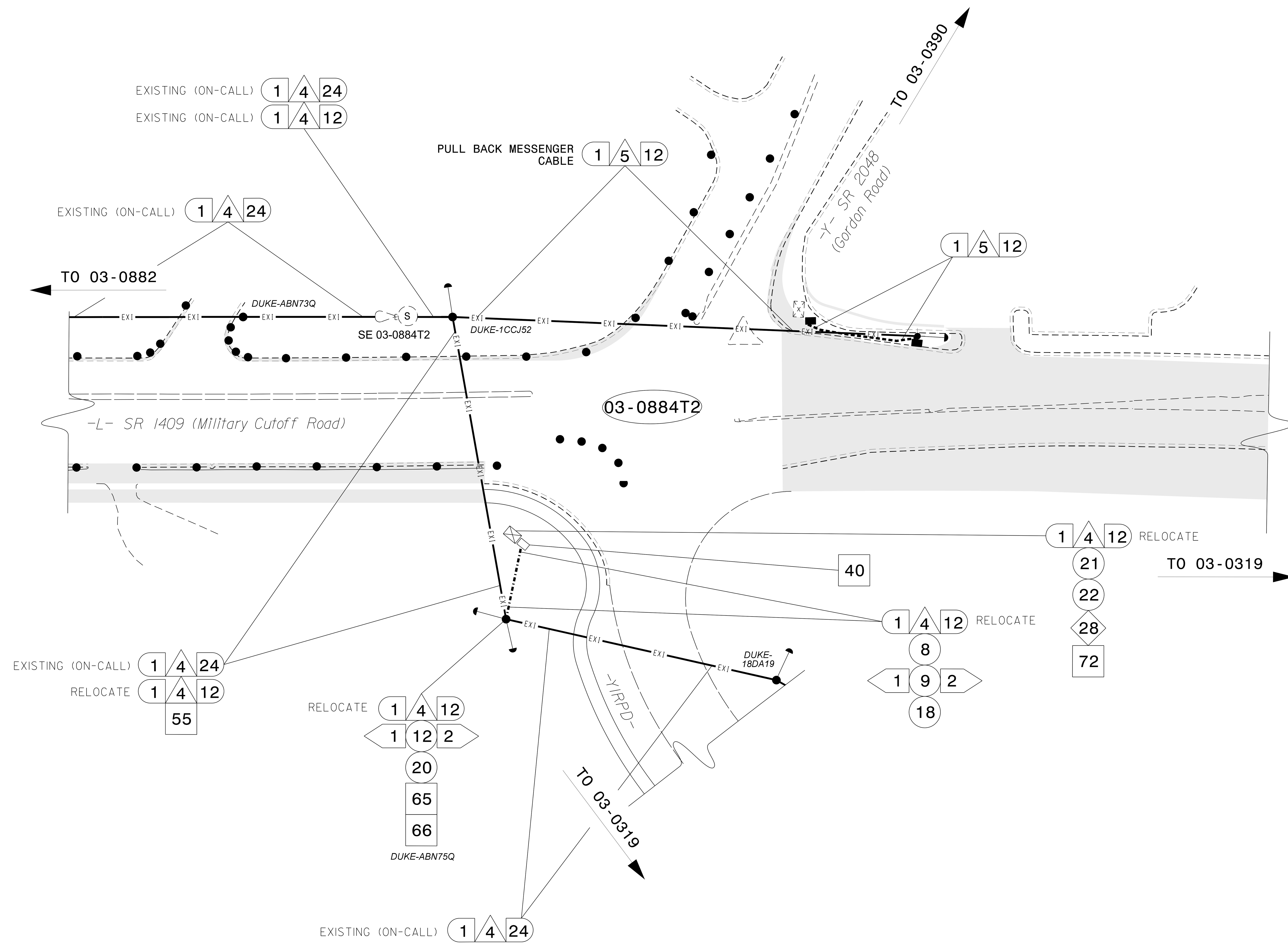
SCALE	REVISIONS	INIT.	DATE
N.T.S.			

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6/6/2017
SIGNATURE DATE

CADD Filename: SE03-0390T1.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-13



TMP Phases II & III

NOTES:

1. UNLESS OTHERWISE NOTED:
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   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

ATTACHMENT POINT:

- XXX / YYY — DISTANCE ABOVE (IN) REFERENCE POINT
- YYY / XXX — REFERENCE POINT DISTANCE BELOW (IN)

CONSTRUCTION NOTE SYMBOLOGY KEY

- NUMBER OF CABLE(S)/LOOPS, DETECTOR AMPLIFIERS, GUYS
- NUMBER OF FIBERS/TWISTED PAIRS
- NUMBER OF RISER(S)/ CONDUIT(S)
- DIAMETER OF RISER(S)/ CONDUIT(S) (IN)

No.	Description
1	INSTALL COMPOSITE CCTV CABLE
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)
3	INSTALL CATEGORY 5E CABLE
4	INSTALL SMFO CABLE
5	BACK-PULL EXIST SMFO CABLE
6	INSTALL FIBER-OPTIC DROP CABLE
7	INSTALL TRACER WIRE
8	TRENCH CONDUIT
9	INSTALL PVC CONDUIT
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT
11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
13	INSTALL HEAT SHRINK TUBING RETROFIT KIT
14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
15	DIRECTIONAL DRILL CONDUIT
16	BORE AND JACK CONDUIT
17	INSTALL CABLE(S) IN EXISTING CONDUIT
18	INSTALL CABLE(S) IN NEW CONDUIT
19	INSTALL CABLE(S) IN EXISTING RISER(S)
20	INSTALL CABLE(S) IN NEW RISER(S)
21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25	INSTALL NEW RISER INTO POLE MOUNTED CABINET
26	INSTALL DIGITAL VIDEO ENCODER
27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29	INSTALL UNDERGROUND SPLICE ENCLOSURE
30	INSTALL AERIAL SPLICE ENCLOSURE
31	INSTALL SPLICE CABINET
32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET
34	INSTALL CABINET FOUNDATION
35	REMOVE EXISTING CABINET FOUNDATION
36	INSTALL CCTV CAMERA ASSEMBLY
37	INSTALL CCTV WOOD POLE
38	INSTALL STANDARD SIZE JUNCTION BOX
39	INSTALL SPECIAL-SIZED JUNCTION BOX
40	INSTALL OVER-SIZED JUNCTION BOX
41	REMOVE EXISTING JUNCTION BOX
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43	REMOVE EXISTING WOOD POLE
44	INSTALL AERIAL GUY ASSEMBLY
45	INSTALL STANDARD GUY ASSEMBLY
46	INSTALL SIDEWALK GUY ASSEMBLY
47	INSTALL MESSENGER CABLE
48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49	REMOVE EXISTING COMMUNICATIONS CABLE
50	INSTALL WIRELESS DSL
51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52	INSTALL DELINEATOR MARKER
53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55	LASH CABLE(S) TO EXISTING MESSENGER CABLE
56	LASH CABLE(S) TO NEW MESSENGER CABLE
57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61	REMOVE EXISTING CCTV CAMERA ASSEMBLY
62	NEW CABINET ENTRANCE INTO NEW FOUNDATION
63	DRILL/CORE DRILL EXISTING FOUNDATION
64	INTERCEPT AND REROUTE EXISTING CONDUITS
65	BOND MESSENGER TO POLE GROUND
66	BOND RISER TO POLE GROUND
67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68	BOND TRACER WIRE TO POLE GROUND
69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70	INSTALL CCTV METAL POLE & FOUNDATION
71	RELOCATE FO TRANSCEIVER
72	INSTALL FO TRANSCEIVER
73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
75	RELOCATE RADIO

ATKINS
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Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 | New Hanover County | Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

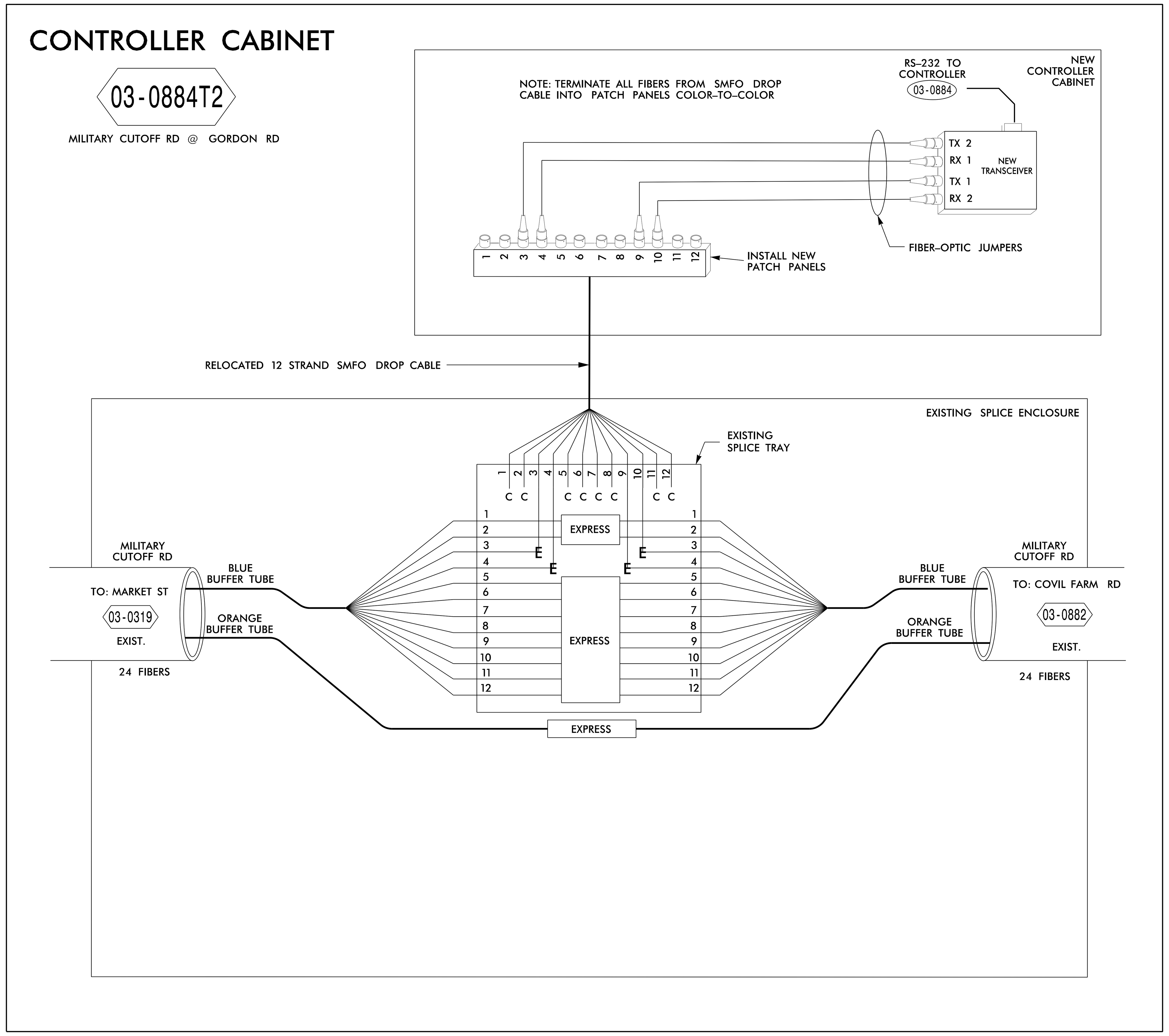
REVISIONS | INIT. | DATE

SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III
6/6/2017
DATE

CADD Filename: Temp 03-0884T2.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-14



TMP Phases II & III

LEGEND

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NOTES

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ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340 CHARLOTTE, NORTH CAROLINA 28217 (704)-522-7275 NCBEES #F-0326

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Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Fiber Optic Splicing Details

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	H A Badgett
PREPARED BY:	G B Spell	REVIEWED BY:	B J Slocum

SCALE N.T.S.

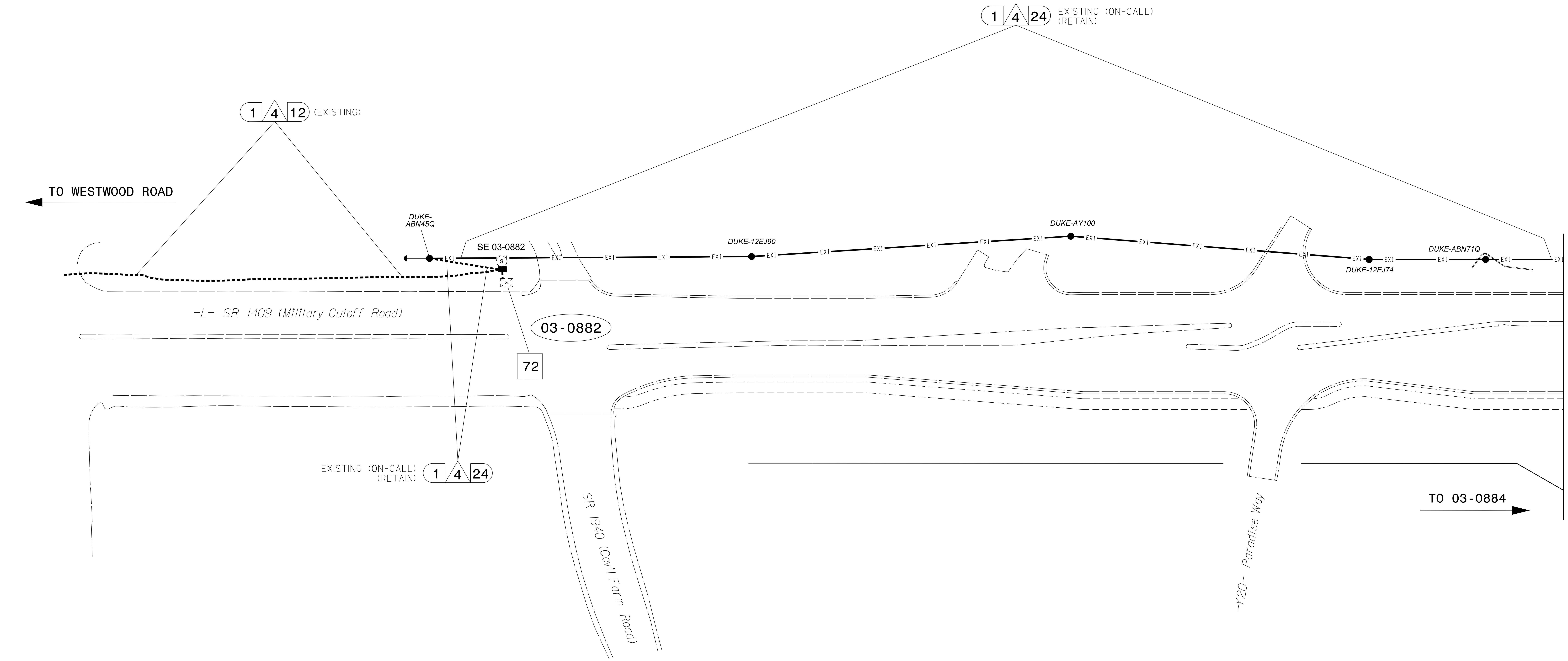
REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

Henry Alfred Badgett III 6/6/2017
SIGNATURE DATE

CADD Filename: SE03-0884T2.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-15



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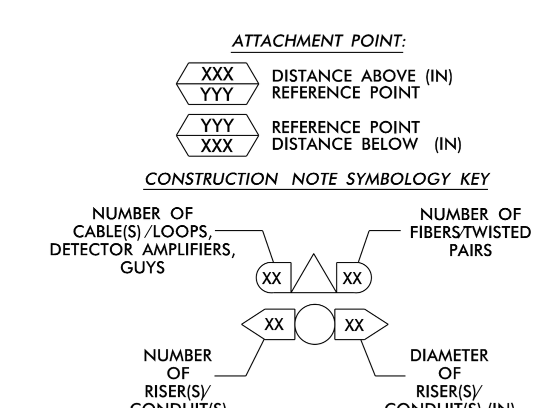

TMP FINAL

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ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

750 Greenfield Parkway, Garner, NC 27529

SCALE 0 50 1"=50'

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS INIT. DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

Henry Alfred Badgett III 6/6/2017

DATE

CADD Filename: SCP 01.dgn

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DIAMETER OF RISER(S)/ CONDUIT(S) (IN) — XX

TMP FINAL

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Prepared for the Offices of:

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

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS	INIT.	DATE

N

SCALE 0 50 1"=50'

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEF98C43F... 6/6/2017 DATE

CADD Filename: SCP 02.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-17

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Prepared for the Offices of:

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS INIT. DATE

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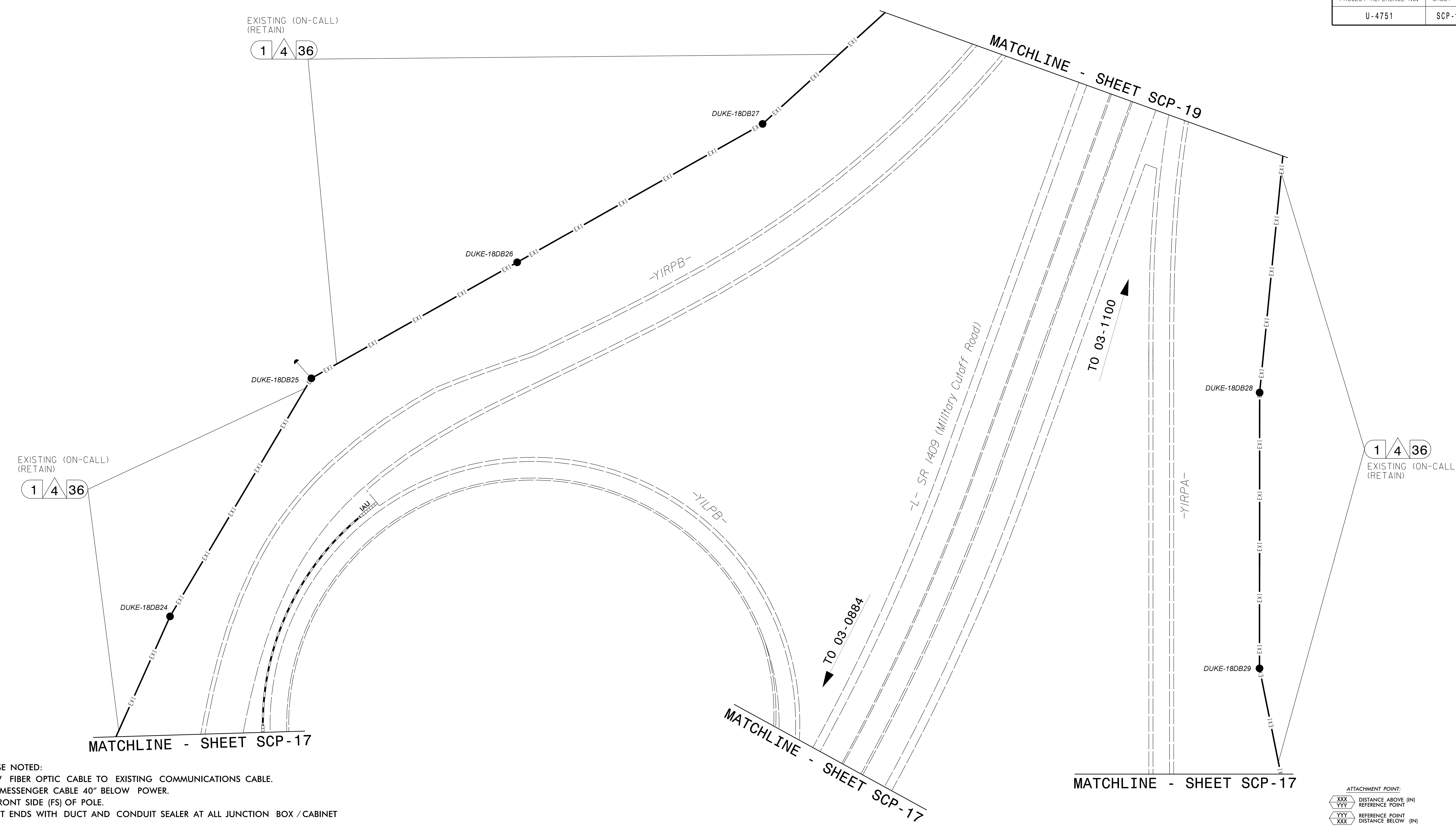

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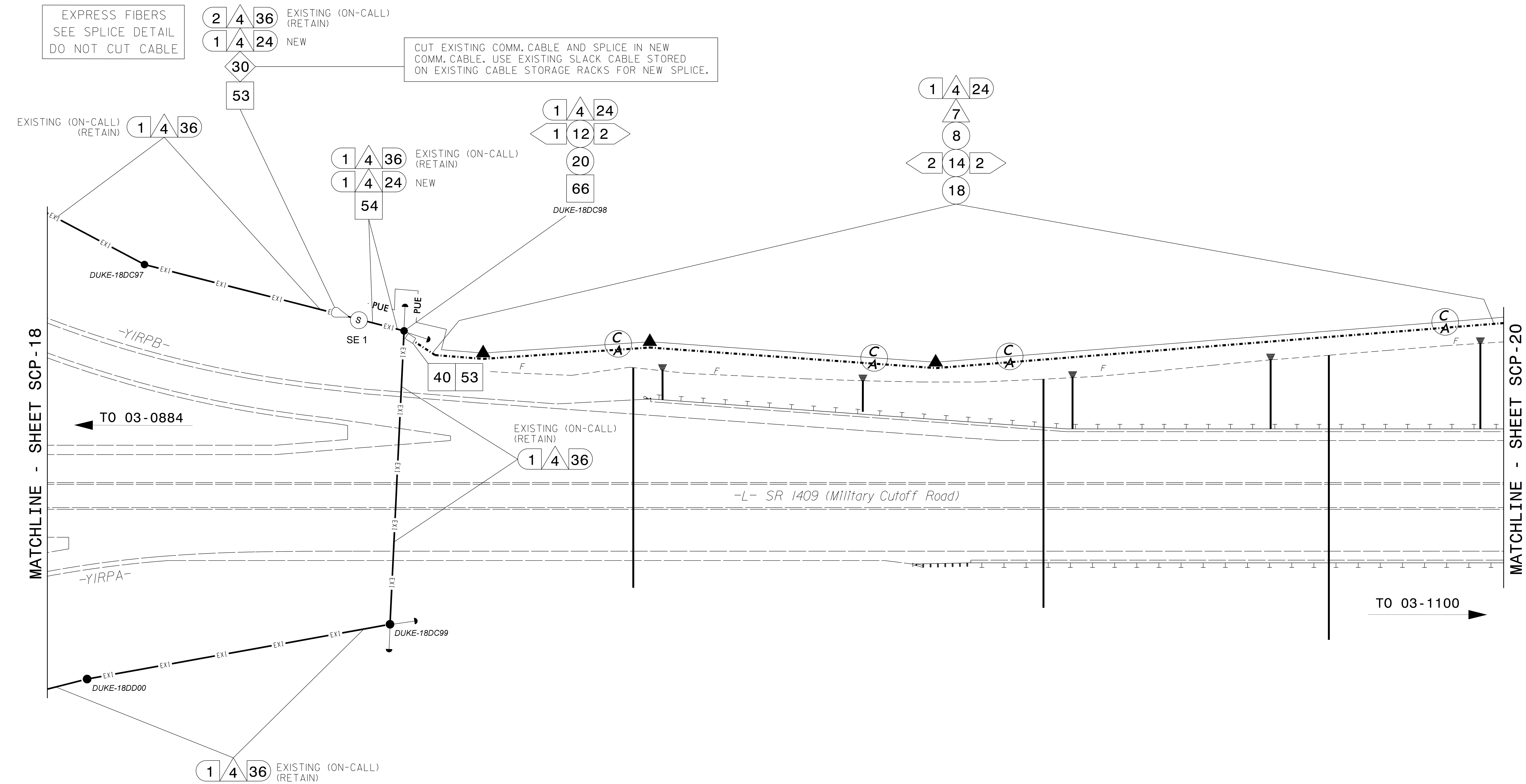
25-MAY-2017 15:21
D:\Transportation\Traffic\Curr\100053597 - U-4751 Military Cutoff\03B-CR\SCP 04.dgn
BADG7500 AT LUS35273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-19



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46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49. REMOVE EXISTING COMMUNICATIONS CABLE
50. INSTALL WIRELESS DSL
51. INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58. INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59. INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60. REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61. REMOVE EXISTING CCTV CAMERA ASSEMBLY
62. NEW CABINET ENTRANCE INTO NEW FOUNDATION
63. DRILL/CORE DRILL EXISTING FOUNDATION
64. INTERCEPT AND REROUTE EXISTING CONDUITS
65. BOND MESSENGER TO POLE GROUND
66. BOND RISER TO POLE GROUND
67. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68. BOND TRACER WIRE TO POLE GROUND
69. INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70. INSTALL CCTV METAL POLE & FOUNDATION
71. RELOCATE FO TRANSCEIVER
72. INSTALL FO TRANSCEIVER
73. INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74. INSTALL CARD CAGE IN COMMUNICATIONS RACK
75. RELOCATE RADIO

ATTACHMENT POINT:
XXX / YYY — DISTANCE ABOVE (IN) / REFERENCE POINT
YYY / XXX — REFERENCE POINT / DISTANCE BELOW (IN)

CONSTRUCTION NOTE SYMBOLOGY KEY
NUMBER OF CABLE(S)/LOOPS, DETECTOR AMPLIFIERS, GUYS — XX
NUMBER OF FIBERS/TWISTED PAIRS — XX
NUMBER OF RISER(S)/CONDUIT(S) — XX
DIAMETER OF RISER(S)/CONDUIT(S) (IN) — XX

TMP FINAL

ATKINS
5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
DEPARTMENT OF TRANSPORTATION — STATE OF NORTH CAROLINA
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Cable Routing Plans

Division 3 — New Hanover County — Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS	INIT.	DATE

SCALE 0 50
1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 019962
HENRY ALFRED BADGETT III
DocuSigned by: Henry Alfred Badgett III
6/6/2017
DATE

CADD Filename: SCP 05.dgn

25-MAY-2017 15:21
D:\Transportation\Traffic\Curr\100053597 - U-4751 Military Cutoff\03B-CR\SCP 05.dgn
BADG7500 AT LUS35273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-20

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

No.	Description
1	INSTALL COMPOSITE CCTV CABLE
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)
3	INSTALL CATEGORY 5E CABLE
4	INSTALL SMFO CABLE
5	BACK-PULL EXIST SMFO CABLE
6	INSTALL FIBER-OPTIC DROP CABLE
7	INSTALL TRACER WIRE
8	TRENCH CONDUIT
9	INSTALL PVC CONDUIT
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT
11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
13	INSTALL HEAT SHRINK TUBING RETROFIT KIT
14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
15	DIRECTIONAL DRILL CONDUIT
16	BORE AND JACK CONDUIT
17	INSTALL CABLE(S) IN EXISTING CONDUIT
18	INSTALL CABLE(S) IN NEW CONDUIT
19	INSTALL CABLE(S) IN EXISTING RISER(S)
20	INSTALL CABLE(S) IN NEW RISER(S)
21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25	INSTALL NEW RISER INTO POLE MOUNTED CABINET
26	INSTALL DIGITAL VIDEO ENCODER
27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29	INSTALL UNDERGROUND SPLICE ENCLOSURE
30	INSTALL AERIAL SPLICE ENCLOSURE
31	INSTALL SPLICE CABINET
32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET
34	INSTALL CABINET FOUNDATION
35	REMOVE EXISTING CABINET FOUNDATION
36	INSTALL CCTV CAMERA ASSEMBLY
37	INSTALL CCTV WOOD POLE
38	INSTALL STANDARD SIZE JUNCTION BOX
39	INSTALL SPECIAL-SIZED JUNCTION BOX
40	INSTALL OVER-SIZED JUNCTION BOX
41	REMOVE EXISTING JUNCTION BOX
42	INSTALL WOOD POLE
43	REMOVE EXISTING WOOD POLE
44	INSTALL AERIAL GUY ASSEMBLY
45	INSTALL STANDARD GUY ASSEMBLY
46	INSTALL SIDEWALK GUY ASSEMBLY
47	INSTALL MESSENGER CABLE
48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49	REMOVE EXISTING COMMUNICATIONS CABLE
50	INSTALL WIRELESS DSL
51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
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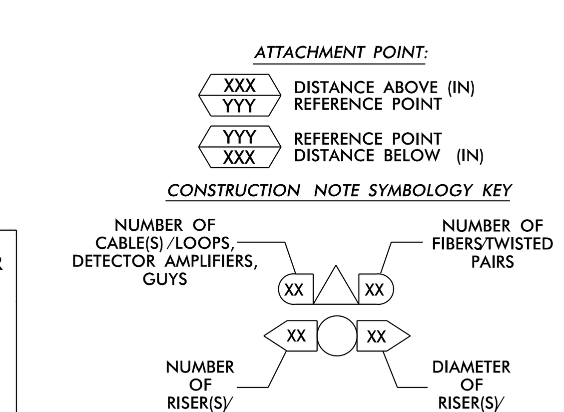
59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61	REMOVE EXISTING CCTV CAMERA ASSEMBLY
62	NEW CABINET ENTRANCE INTO NEW FOUNDATION
63	DRILL/CORE DRILL EXISTING FOUNDATION
64	INTERCEPT AND REROUTE EXISTING CONDUITS
65	BOND MESSENGER TO POLE GROUND
66	BOND RISER TO POLE GROUND
67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68	BOND TRACER WIRE TO POLE GROUND
69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70	INSTALL CCTV METAL POLE & FOUNDATION
71	RELOCATE FO TRANSCEIVER
72	INSTALL FO TRANSCEIVER
73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
75	RELOCATE RADIO



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SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III
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6/6/2017
DATE

CADD Filename: SCP 06.dgn

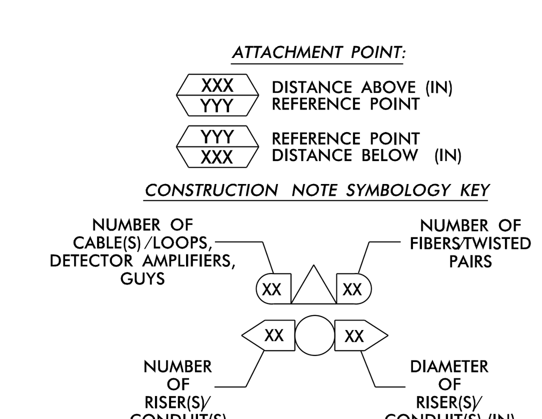
25-MAY-2017 15:21
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*03B-CR*SCP 06.dgn
BADG7500 AT LUS355273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-21

NOTES:
1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

1	INSTALL COMPOSITE CCTV CABLE	13	INSTALL HEAT SHRINK TUBING RETROFIT KIT	25	INSTALL NEW RISER INTO POLE MOUNTED CABINET
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)	14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	26	INSTALL DIGITAL VIDEO ENCODER
3	INSTALL CATEGORY 5E CABLE	15	DIRECTIONAL DRILL CONDUIT	27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
4	INSTALL SMFO CABLE	16	BORE AND JACK CONDUIT	28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
5	BACK-PULL EXIST SMFO CABLE	17	INSTALL CABLE(S) IN EXISTING CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE
6	INSTALL FIBER-OPTIC DROP CABLE	18	INSTALL CABLE(S) IN NEW CONDUIT	30	INSTALL AERIAL SPLICE ENCLOSURE
7	INSTALL TRACER WIRE	19	INSTALL CABLE(S) IN EXISTING RISER(S)	31	INSTALL SPLICE CABINET
8	TRENCH CONDUIT	20	INSTALL CABLE(S) IN NEW RISER(S)	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
9	INSTALL PVC CONDUIT	21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE	33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT	22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	34	INSTALL CABINET FOUNDATION
11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	35	REMOVE EXISTING CABINET FOUNDATION
12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	36	INSTALL CCTV CAMERA ASSEMBLY

37	INSTALL CCTV WOOD POLE	49	REMOVE EXISTING COMMUNICATIONS CABLE	61	REMOVE EXISTING CCTV CAMERA ASSEMBLY	73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
38	INSTALL STANDARD SIZE JUNCTION BOX	50	INSTALL WIRELESS DSL	62	NEW CABINET ENTRANCE INTO NEW FOUNDATION	74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
39	INSTALL SPECIAL-SIZED JUNCTION BOX	51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	63	DRILL/CORE DRILL EXISTING FOUNDATION	75	RELOCATE RADIO
40	INSTALL OVER-SIZED JUNCTION BOX	52	INSTALL DELINEATOR MARKER	64	INTERCEPT AND REROUTE EXISTING CONDUITS		
41	REMOVE EXISTING JUNCTION BOX	53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)	65	BOND MESSENGER TO POLE GROUND		
42	INSTALL WOOD POLE	54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66	BOND RISER TO POLE GROUND		
43	REMOVE EXISTING WOOD POLE	55	LASH CABLE(S) TO EXISTING MESSENGER CABLE	67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS		
44	INSTALL AERIAL GUY ASSEMBLY	56	LASH CABLE(S) TO NEW MESSENGER CABLE	68	BOND TRACER WIRE TO POLE GROUND		
45	INSTALL STANDARD GUY ASSEMBLY	57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV	69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK		
46	INSTALL SIDEWALK GUY ASSEMBLY	58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV	70	INSTALL CCTV METAL POLE & FOUNDATION		
47	INSTALL MESSENGER CABLE	59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)	71	RELOCATE FO TRANSCEIVER		
48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION	72	INSTALL FO TRANSCEIVER		



TMP FINAL

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

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Prepared for the Offices of:

750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III

Henry Alfred Badgett III 6/6/2017 DATE

CADD Filename: SCP 07.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-22

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

No.	Description
1	INSTALL COMPOSITE CCTV CABLE
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)
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4	INSTALL SMFO CABLE
5	BACK-PULL EXIST SMFO CABLE
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7	INSTALL TRACER WIRE
8	TRENCH CONDUIT
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11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
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13	INSTALL HEAT SHRINK TUBING RETROFIT KIT
14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
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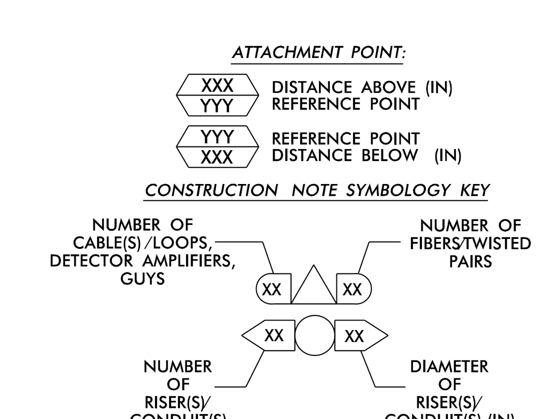
18	INSTALL CABLE(S) IN NEW CONDUIT
19	INSTALL CABLE(S) IN EXISTING RISER(S)
20	INSTALL CABLE(S) IN NEW RISER(S)
21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25	INSTALL NEW RISER INTO POLE MOUNTED CABINET
26	INSTALL DIGITAL VIDEO ENCODER
27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29	INSTALL UNDERGROUND SPLICE ENCLOSURE
30	INSTALL AERIAL SPLICE ENCLOSURE
31	INSTALL SPLICE CABINET
32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET
34	INSTALL CABINET FOUNDATION
35	REMOVE EXISTING CABINET FOUNDATION
36	INSTALL CCTV CAMERA ASSEMBLY
37	INSTALL CCTV WOOD POLE
38	INSTALL STANDARD SIZE JUNCTION BOX
39	INSTALL SPECIAL-SIZED JUNCTION BOX
40	INSTALL OVER-SIZED JUNCTION BOX
41	REMOVE EXISTING JUNCTION BOX
42	INSTALL WOOD POLE
43	REMOVE EXISTING WOOD POLE
44	INSTALL AERIAL GUY ASSEMBLY
45	INSTALL STANDARD GUY ASSEMBLY
46	INSTALL SIDEWALK GUY ASSEMBLY
47	INSTALL MESSENGER CABLE
48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49	REMOVE EXISTING COMMUNICATIONS CABLE
50	INSTALL WIRELESS DSL
51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52	INSTALL DELINEATOR MARKER
53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55	LASH CABLE(S) TO EXISTING MESSENGER CABLE
56	LASH CABLE(S) TO NEW MESSENGER CABLE
57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61	REMOVE EXISTING CCTV CAMERA ASSEMBLY
62	NEW CABINET ENTRANCE INTO NEW FOUNDATION
63	DRILL/CORE DRILL EXISTING FOUNDATION
64	INTERCEPT AND REROUTE EXISTING CONDUITS
65	BOND MESSENGER TO POLE GROUND
66	BOND RISER TO POLE GROUND
67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68	BOND TRACER WIRE TO POLE GROUND
69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70	INSTALL CCTV METAL POLE & FOUNDATION
71	RELOCATE FO TRANSCEIVER
72	INSTALL FO TRANSCEIVER
73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
75	RELOCATE RADIO



TMP FINAL

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Prepared for the Offices of:

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SR 1409 (Military Cutoff Road)

Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE: May 2017	REVIEWED BY: HA Badgett
PREPARED BY: JA Wiles	REVIEWED BY: BJ Slocum

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER ALFRED BADGETT III

Henry Alfred Badgett III 6/6/2017

DATE

CADD Filename: SCP 08.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-23

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
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2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

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2 INSTALL LOW VOLTAGE POWER CABLE (24VAC)	14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	26 INSTALL DIGITAL VIDEO ENCODER	38 INSTALL STANDARD SIZE JUNCTION BOX	50 INSTALL WIRELESS DSL	62 NEW CABINET ENTRANCE INTO NEW FOUNDATION
3 INSTALL CATEGORY 5E CABLE	15 DIRECTIONAL DRILL CONDUIT	27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	39 INSTALL SPECIAL-SIZED JUNCTION BOX	51 INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	63 DRILL/CORE DRILL EXISTING FOUNDATION
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6 INSTALL FIBER-OPTIC DROP CABLE	18 INSTALL CABLE(S) IN NEW CONDUIT	30 INSTALL AERIAL SPLICE ENCLOSURE	42 INSTALL WOOD POLE	54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66 BOND RISER TO POLE GROUND
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73 INSTALL DIGITIAL VIDEO DECODER IN COMMUNICATIONS RACK
74 INSTALL CARD CAGE IN COMMUNICATIONS RACK
75 RELOCATE RADIO

ATTACHMENT POINT:

XXX / YYY DISTANCE ABOVE (IN) REFERENCE POINT
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CONSTRUCTION NOTE SYMBOLOGY KEY

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SCALE 0 50 1"=50'

SR 1409 (Military Cutoff Road)
Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEF98C43F... 6/6/2017 DATE

CADD Filename: SCP 09.dgn

25-MAY-2017 15:21
O:*Transportation*Traffic*Curr*100053597 - U-4751 Military Cutoff*03B-CR*SCP 09.dgn
BADG7500 AT LUS355273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-24

NOTES:

1. UNLESS OTHERWISE NOTED:
   - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   - ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

ATTACHMENT POINT:
XXX / YYY DISTANCE ABOVE (IN) REFERENCE POINT
YYY / XXX REFERENCE POINT DISTANCE BELOW (IN)

CONSTRUCTION NOTE SYMBOLOGY KEY
NUMBER OF CABLE(S)/LOOPS, DETECTOR AMPLIFIERS, GUYS — NUMBER OF FIBERS/TWISTED PAIRS — NUMBER OF RISER(S)/ CONDUIT(S) — DIAMETER OF RISER(S)/ CONDUIT(S) (IN)

TMP FINAL

1. INSTALL COMPOSITE CCTV CABLE
2. INSTALL LOW VOLTAGE POWER CABLE (24VAC)
3. INSTALL CATEGORY 5E CABLE
4. INSTALL SMFO CABLE
5. BACK-PULL EXIST SMFO CABLE
6. INSTALL FIBER-OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH CONDUIT
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
13. INSTALL HEAT SHRINK TUBING RETROFIT KIT
14. INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER(S)
20. INSTALL CABLE(S) IN NEW RISER(S)
21. INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
22. INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
23. INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO POLE MOUNTED CABINET
26. INSTALL DIGITAL VIDEO ENCODER
27. INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL SPLICE CABINET
32. MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER
33. REMOVE EXISTING SPLICE /HUB / CCTV CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV WOOD POLE
38. INSTALL STANDARD SIZE JUNCTION BOX
39. INSTALL SPECIAL-SIZED JUNCTION BOX
40. INSTALL OVER-SIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49. REMOVE EXISTING COMMUNICATIONS CABLE
50. INSTALL WIRELESS DSL
51. INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
58. INSTALL NEW ELECTRICAL SERVICE FOR CCTV
59. INSTALL NEW POLE MOUNTED CCTV CABINET (336)
60. REMOVE EXISTING METAL CCTV POLE AND FOUNDATION
61. REMOVE EXISTING CCTV CAMERA ASSEMBLY
62. NEW CABINET ENTRANCE INTO NEW FOUNDATION
63. DRILL/CORE DRILL EXISTING FOUNDATION
64. INTERCEPT AND REROUTE EXISTING CONDUITS
65. BOND MESSENGER TO POLE GROUND
66. BOND RISER TO POLE GROUND
67. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
68. BOND TRACER WIRE TO POLE GROUND
69. INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK
70. INSTALL CCTV METAL POLE & FOUNDATION
71. RELOCATE FO TRANSCEIVER
72. INSTALL FO TRANSCEIVER
73. INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
74. INSTALL CARD CAGE IN COMMUNICATIONS RACK
75. RELOCATE RADIO

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340 CHARLOTTE, NORTH CAROLINA 28217 704-522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE: May 2017	REVIEWED BY: HA Badgett
PREPARED BY: JA Wiles	REVIEWED BY: BJ Slocum

REVISIONS | INIT. | DATE

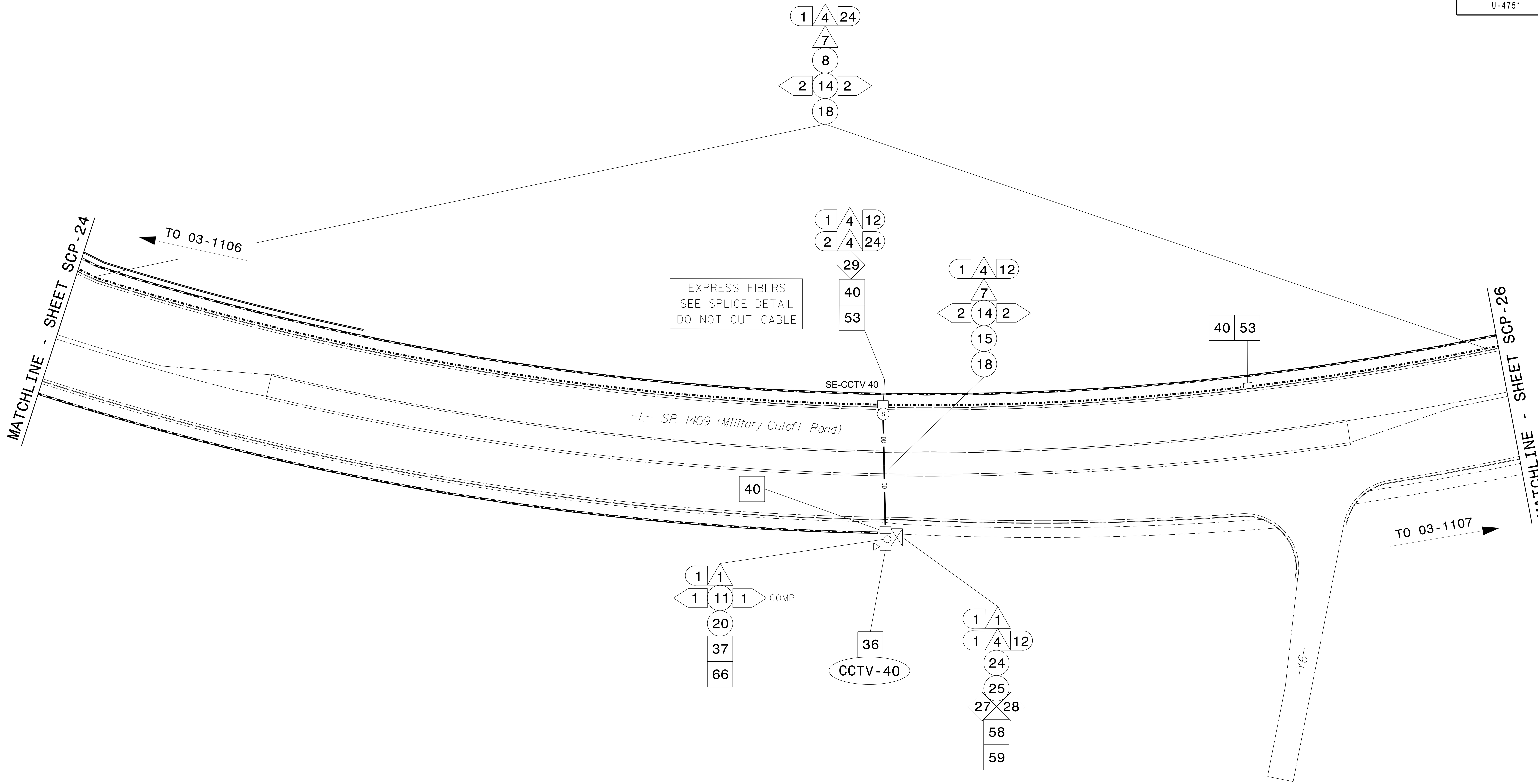
SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 HENRY ALFRED BADGETT III
Henry Alfred Badgett III 6/6/2017
DATE

CADD Filename: SCP 10.dgn

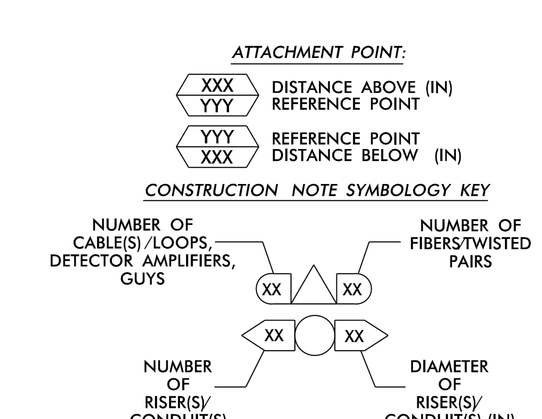
25-MAY-2017 15:22
BADG7500 AT LUS355273

PROJECT REFERENCE NO.	SHEET NO.
U-4751	SCP-25



NOTES:
1. UNLESS OTHERWISE NOTED:
   – OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
   – ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
   – ATTACH ON FRONT SIDE (FS) OF POLE.
2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

1	INSTALL COMPOSITE CCTV CABLE	13	INSTALL HEAT SHRINK TUBING RETROFIT KIT	25	INSTALL NEW RISER INTO POLE MOUNTED CABINET	37	INSTALL CCTV WOOD POLE	49	REMOVE EXISTING COMMUNICATIONS CABLE	61	REMOVE EXISTING CCTV CAMERA ASSEMBLY	73	INSTALL DIGITAL VIDEO DECODER IN COMMUNICATIONS RACK
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)	14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	26	INSTALL DIGITAL VIDEO ENCODER	38	INSTALL STANDARD SIZE JUNCTION BOX	50	INSTALL WIRELESS DSL	62	NEW CABINET ENTRANCE INTO NEW FOUNDATION	74	INSTALL CARD CAGE IN COMMUNICATIONS RACK
3	INSTALL CATEGORY 5E CABLE	15	DIRECTIONAL DRILL CONDUIT	27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	39	INSTALL SPECIAL–SIZED JUNCTION BOX	51	INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	63	DRILL/CORE DRILL EXISTING FOUNDATION	75	RELOCATE RADIO
4	INSTALL SMFO CABLE	16	BORE AND JACK CONDUIT	28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET	40	INSTALL OVER–SIZED JUNCTION BOX	52	INSTALL DELINEATOR MARKER	64	INTERCEPT AND REROUTE EXISTING CONDUITS		
5	BACK–PULL EXIST SMFO CABLE	17	INSTALL CABLE(S) IN EXISTING CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE	41	REMOVE EXISTING JUNCTION BOX	53	STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)	65	BOND MESSENGER TO POLE GROUND		
6	INSTALL FIBER–OPTIC DROP CABLE	18	INSTALL CABLE(S) IN NEW CONDUIT	30	INSTALL AERIAL SPLICE ENCLOSURE	42	INSTALL WOOD POLE	54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66	BOND RISER TO POLE GROUND		
7	INSTALL TRACER WIRE	19	INSTALL CABLE(S) IN EXISTING RISER(S)	31	INSTALL SPLICE CABINET	43	REMOVE EXISTING WOOD POLE	55	LASH CABLE(S) TO EXISTING MESSENGER CABLE	67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS		
8	TRENCH CONDUIT	20	INSTALL CABLE(S) IN NEW RISER(S)	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	44	INSTALL AERIAL GUY ASSEMBLY	56	LASH CABLE(S) TO NEW MESSENGER CABLE	68	BOND TRACER WIRE TO POLE GROUND		
9	INSTALL PVC CONDUIT	21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE	33	REMOVE EXISTING SPLICE /HUB / CCTV CABINET	45	INSTALL STANDARD GUY ASSEMBLY	57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV	69	INSTALL NEW ETHERNET CORE SWITCH IN COMMUNICATIONS RACK		
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT	22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	34	INSTALL CABINET FOUNDATION	46	INSTALL SIDEWALK GUY ASSEMBLY	58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV	70	INSTALL CCTV METAL POLE & FOUNDATION		
11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	35	REMOVE EXISTING CABINET FOUNDATION	47	INSTALL MESSENGER CABLE	59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)	71	RELOCATE FO TRANSCEIVER		
12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	36	INSTALL CCTV CAMERA ASSEMBLY	48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	60	REMOVE EXISTING METAL CCTV POLE AND FOUNDATION	72	INSTALL FO TRANSCEIVER		



TMP FINAL

ATKINS 5600 SEVENTY-SEVEN CENTER DRIVE, SUITE 340
CHARLOTTE, NORTH CAROLINA 28217
704-522-7275 NCBEES #F-0326

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Prepared for the Offices of:
Transportation Mobility and Safety Division · State of North Carolina · Department of Transportation · Intelligent Transportation Systems Section
750 Greenfield Parkway, Garner, NC 27529

SR 1409 (Military Cutoff Road)
Cable Routing Plans

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2017	REVIEWED BY:	HA Badgett
PREPARED BY:	JA Wiles	REVIEWED BY:	BJ Slocum

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER HENRY ALFRED BADGETT III

DocuSigned by: Henry Alfred Badgett III 6D2F42EEF98C43F... 6/6/2017
DATE

CADD Filename: SCP 11.dgn