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Project: U-2412A

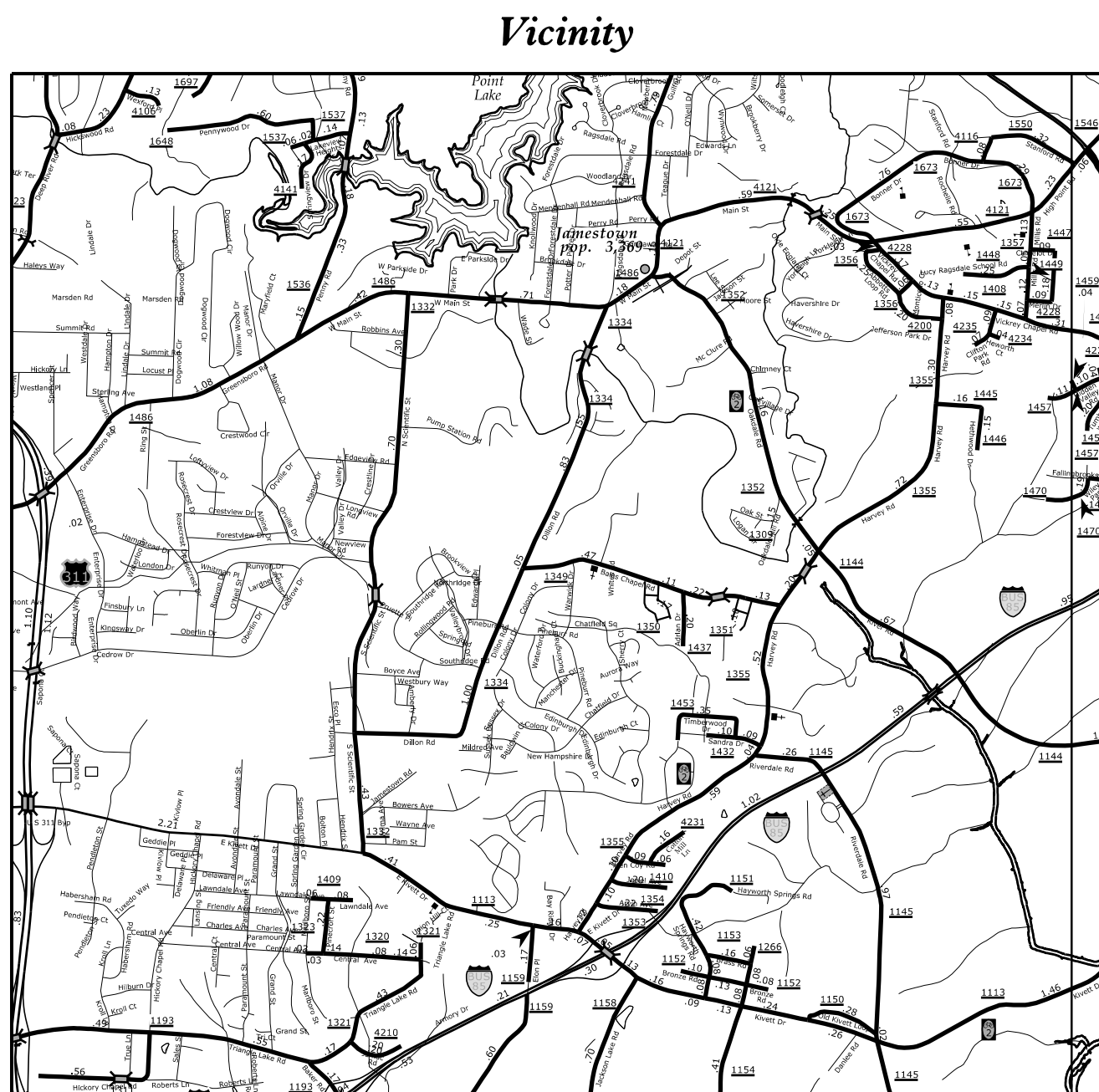
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Project No.	Sheet No.
U-2412A	Sig. 1.0

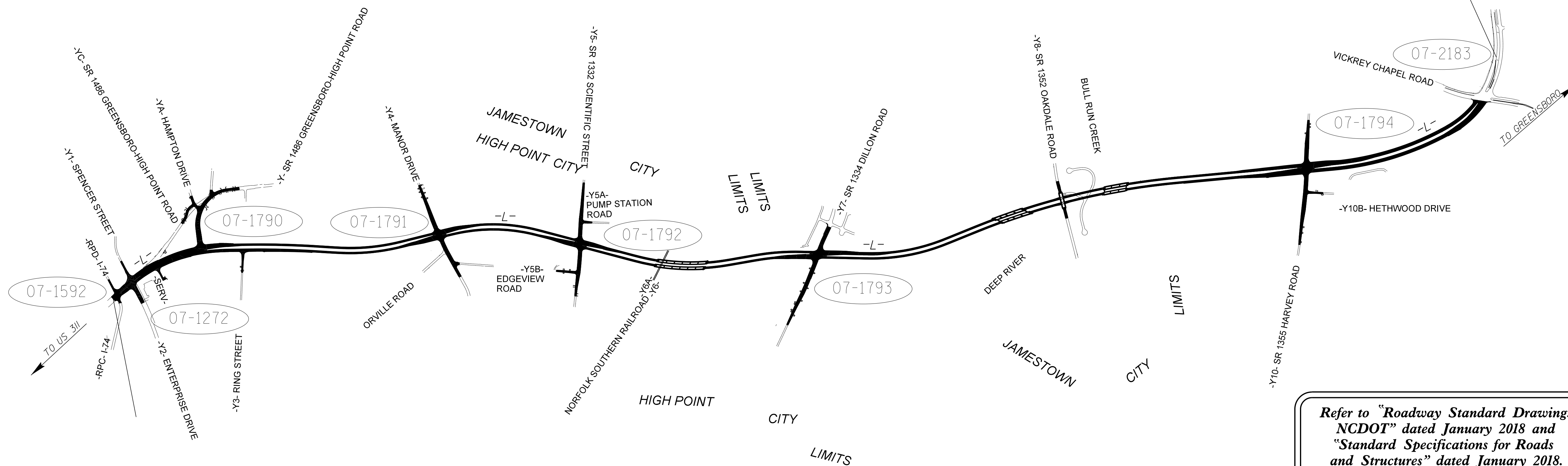
GUILFORD COUNTY

**LOCATION: SR 4121 (JAMESTOWN PARKWAY) FROM I-74/US 311
TO SR 4228 (VICKREY CHAPEL ROAD)**

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



END TIP PROJECT U-2412A
-L- STA 214+47.00



Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 2.0-3.4	07-1592	SR 1486 (Greensboro Rd) at I-74 WB/US 311 NB Ramp
Sig. 4.0-5.2	07-1272	SR 1486 (Greensboro Rd) at Enterprise Dr
Sig. 6.0-6.1	07-1790	SR 1486 (Greensboro Rd) at SR 4121 (Jamestown Pkwy)
Sig. 7.0-7.2	07-1791	SR 4121 (Jamestown Pkwy) at Manor Dr
Sig. 8.0-8.2	07-1792	SR 4121 (Jamestown Pkwy) at SR 1332 (Scientific St)
Sig. 9.0-9.2	07-1793	SR 4121 (Jamestown Pkwy) at SR 1334 (Dillon Rd)
Sig. 10.0-10.6	07-1794	SR 4121 (Jamestown Pkwy) at SR 1355 (Harvey Rd)
Sig. 11.0-12.1	07-2183	SR 4121 (Jamestown Pkwy) at SR 4228 (Vickrey Chapel Rd)
Sig. 13.0-13.2	-----	Standard Plate Sheets
M1-M8	-----	Metal Pole Sheets
SCP 1-10	-----	Signal Communication Plans

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INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:
Rob Ziemba, PE, CPM - Central Region Signals Engineer
Keith Mims, PE - Signal Equipment Design Engineer
I. Neil Avery - Signal Communication Project Engineer

Prepared for the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

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

(program controller as shown below)

- 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, 3, 4, AND 5.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF INPUT ASSIGNMENT #1 IS ON

↓

SCROLL DOWN

THEN:
SET INPUT ASSIGNMENT #64 OFF

PRESS '+'

NOTE: DETECTOR CONTACTS ARE CLOSED, SO NO CALL IS 'DETECTED'.

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF INPUT ASSIGNMENT #1 IS OFF

↓

SCROLL DOWN

THEN:
SET INPUT ASSIGNMENT #64 ON

NOTE: DETECTOR CONTACTS ARE OPEN, SO A CALL IS 'DETECTED'.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

- INPUT 1 = Detector Physical Input (Not Enabled)
- INPUT 64 = Dummy Detector Input (Detector 2)
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | XX
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
  
```

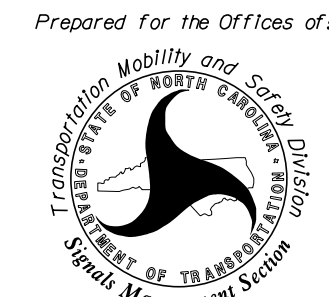
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1592
DESIGNED: February 2018
SEALED: 3/20/2018
REVISED: _____

Temporary Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1486 (Greensboro Road) at I-74 WB/US 311 NB Ramps	
Division 7	Guilford County High Point
PLAN DATE: February 2018	REVIEWED BY: T. Pate
PREPARED BY: B. Lehan	REVIEWED BY: R. Thompson
REVISIONS	INIT. DATE

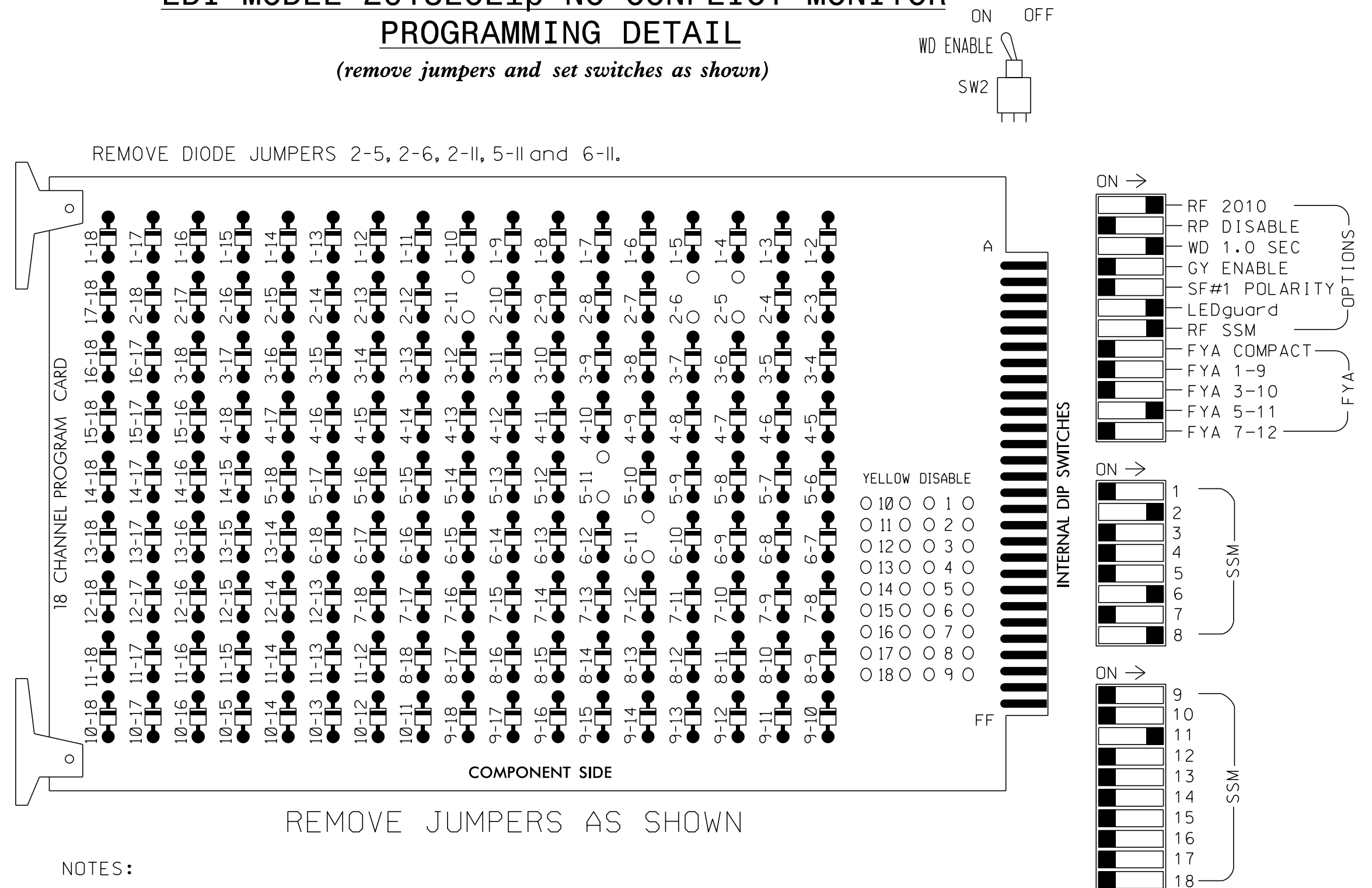
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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
BRENDAN A. LEHAN
045256
Brendan Lehan 3/20/2018
DATE
SIG. INVENTORY NO. 07-1592T

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EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- 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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the High Point 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	21,22	NU	NU	NU	NU	51*	61,62,63	NU	NU	81,82	NU	NU	NU	NU	51*	NU	NU	
RED		128						134			107								
YELLOW		129					*	135			108								
GREEN		130						136			109								
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								133											

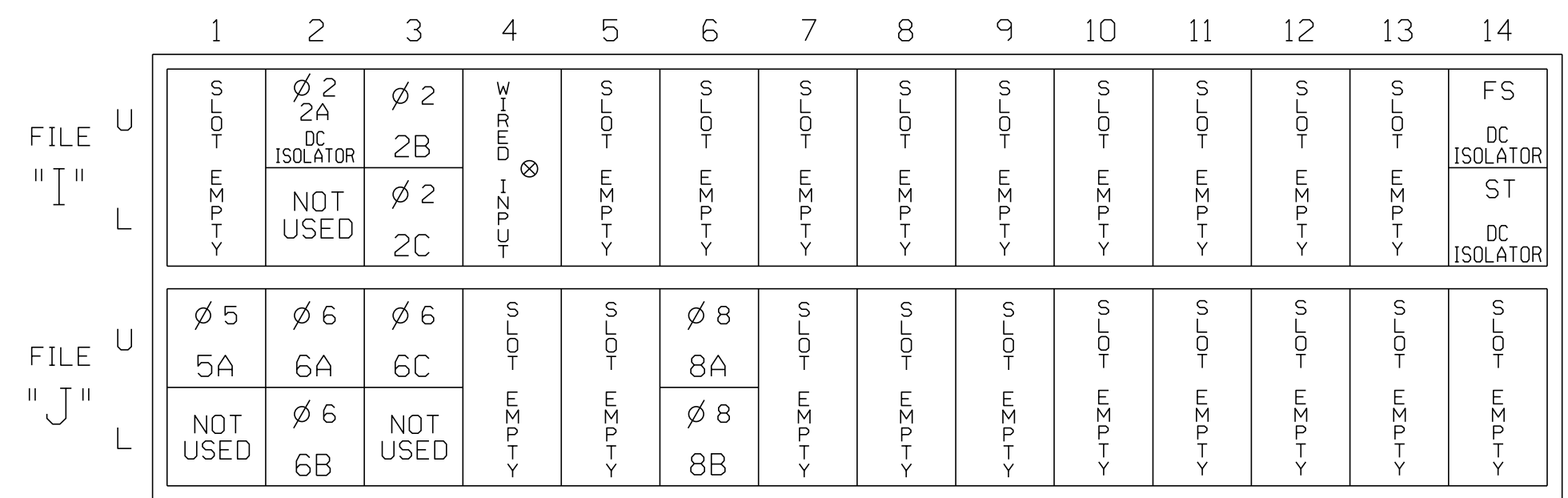
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

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,S7,S8,S11,AUX S4
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

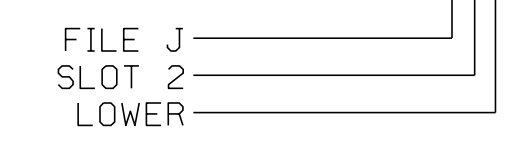
- Note: Install a model 242 DC isolator in slot 12 for use with microwave detector. See the Microwave Detector Wiring Details on sheet 3.
- IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB2-5 and TB2-6, and from TB2-7 and TB2-8.

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	-	1.0	---
2B	TB2-9,10	I3U	63	25	32	2	Y	Y	-	---	---
2C	TB2-11,12	I3L	76	38	42	2	Y	Y	-	---	---
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y	-	---	15
		I4U	47	9	22	2	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	-	---	---
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	---	---
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	-	---	---

¹Add jumper from J1-W to I4-W, on rear of input file.
 ★ Microwave pulse detector. See wiring and programming detail on sheet 3.

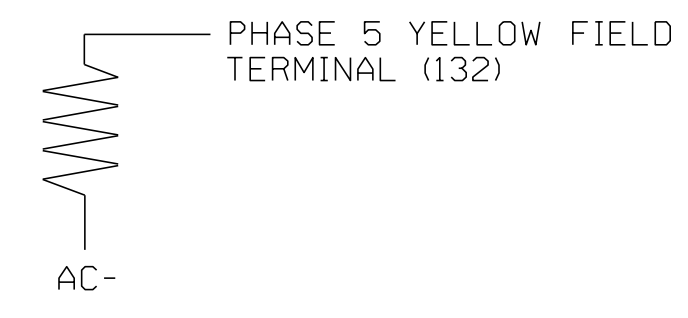
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

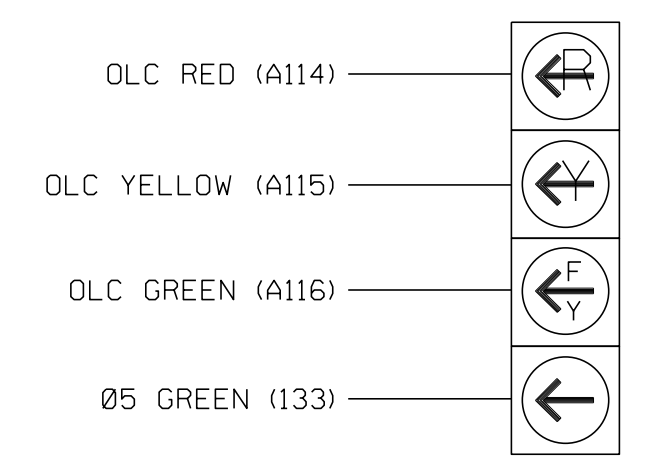
(install resistors as shown below)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



51

NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1592
 DESIGNED: February 2018
 SEALED:
 REVISED: _____

Electrical Detail - Sheet 1 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 1486 (Greensboro Road)
 at
 I-74 WB/US 311 NB Ramps
 Division 7 Guilford County High Point
 PLAN DATE: February 2018 REVIEWED BY: T. PATE
 PREPARED BY: B. LEHAN REVIEWED BY: R. THOMPSON

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 BRENDAN A. LEHAN
 SEAL 045256
 DocuSigned by:
 Brendan Lehan 3/20/2018
 DATE
 SIG. INVENTORY NO. 07-1592

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

(program controller as shown below)

- 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, 3, 4, AND 5.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF INPUT ASSIGNMENT #1 IS ON

↓

SCROLL DOWN

THEN:
SET INPUT ASSIGNMENT #64 OFF

PRESS '+'

NOTE: DETECTOR CONTACTS ARE CLOSED, SO NO CALL IS 'DETECTED'.

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF INPUT ASSIGNMENT #1 IS OFF

↓

SCROLL DOWN

THEN:
SET INPUT ASSIGNMENT #64 ON

NOTE: DETECTOR CONTACTS ARE OPEN, SO A CALL IS 'DETECTED'.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS

PHASE: 12345678910111213141516

VEH OVL PARENTS: XX

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

OUTPUT REFERENCE SCHEDULE

- INPUT 1 = Detector Physical Input (Not Enabled)
- INPUT 64 = Dummy Detector Input (Detector 2)
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1592
DESIGNED: February 2018
SEALED: 3/20/2018
REVISED: _____

Electrical Detail - Sheet 2 of 3

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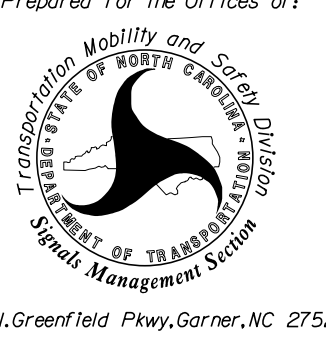
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

SR 1486 (Greensboro Road)
at
I-74 WB/US 311 NB Ramps

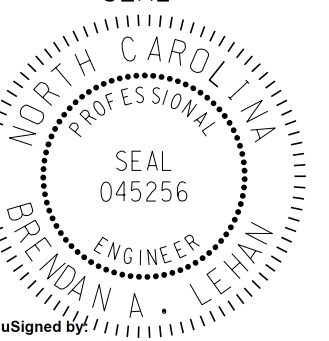
Division 7 Guilford County High Point

PLAN DATE: February 2018 REVIEWED BY: T. PATE

PREPARED BY: B. LEHAN REVIEWED BY: R. THOMPSON

REVISIONS	INIT.	DATE

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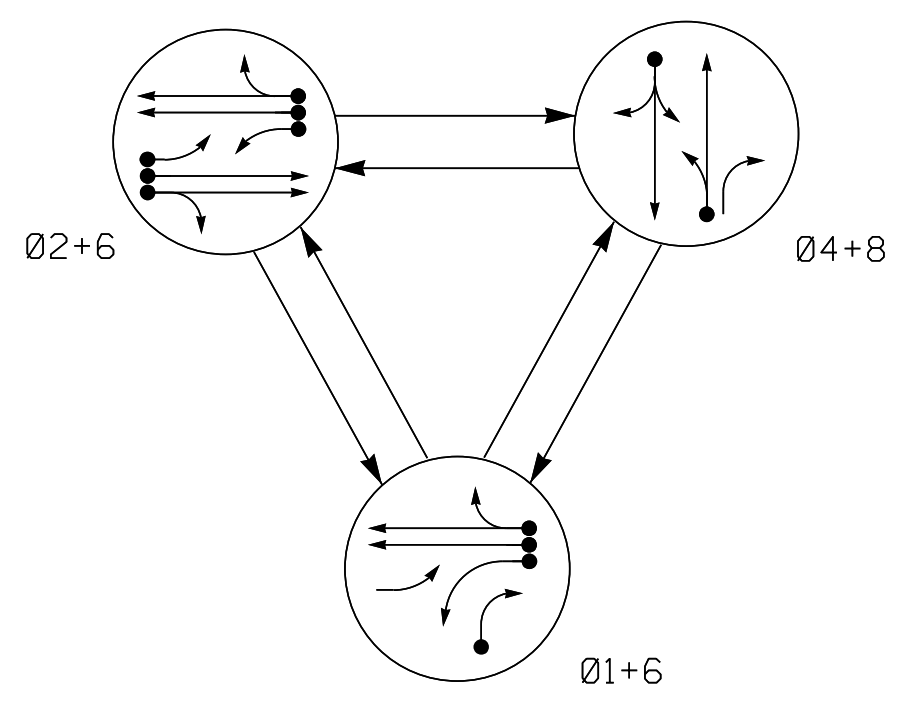


DocuSigned by:
Brendan Lehan 3/20/2018

SIG. INVENTORY NO. 07-1592

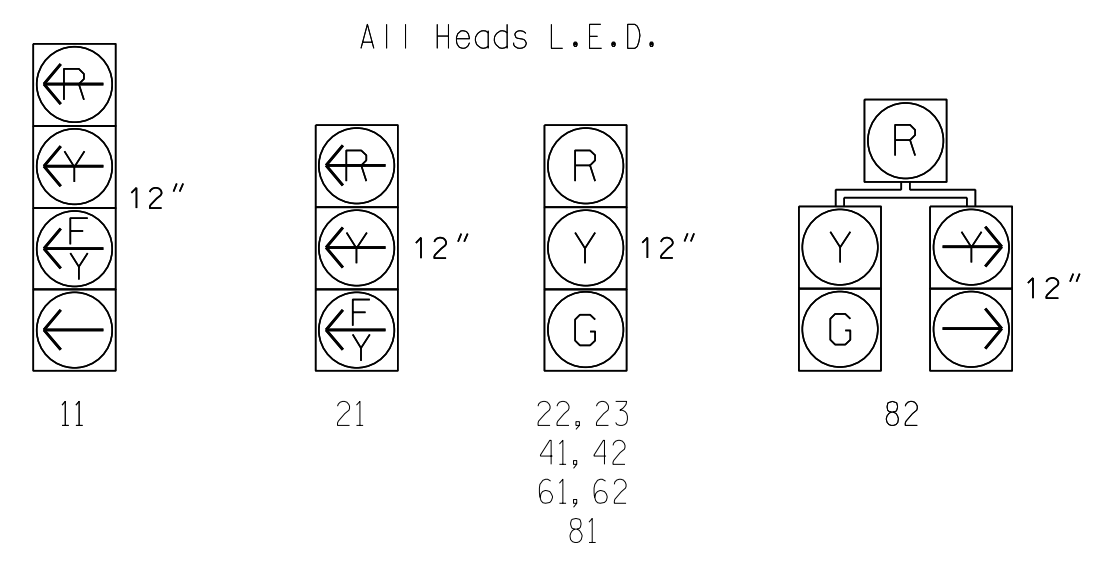
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PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	04+8	FLASH
11	←	←	←	←
21	←	←	←	←
22,23	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

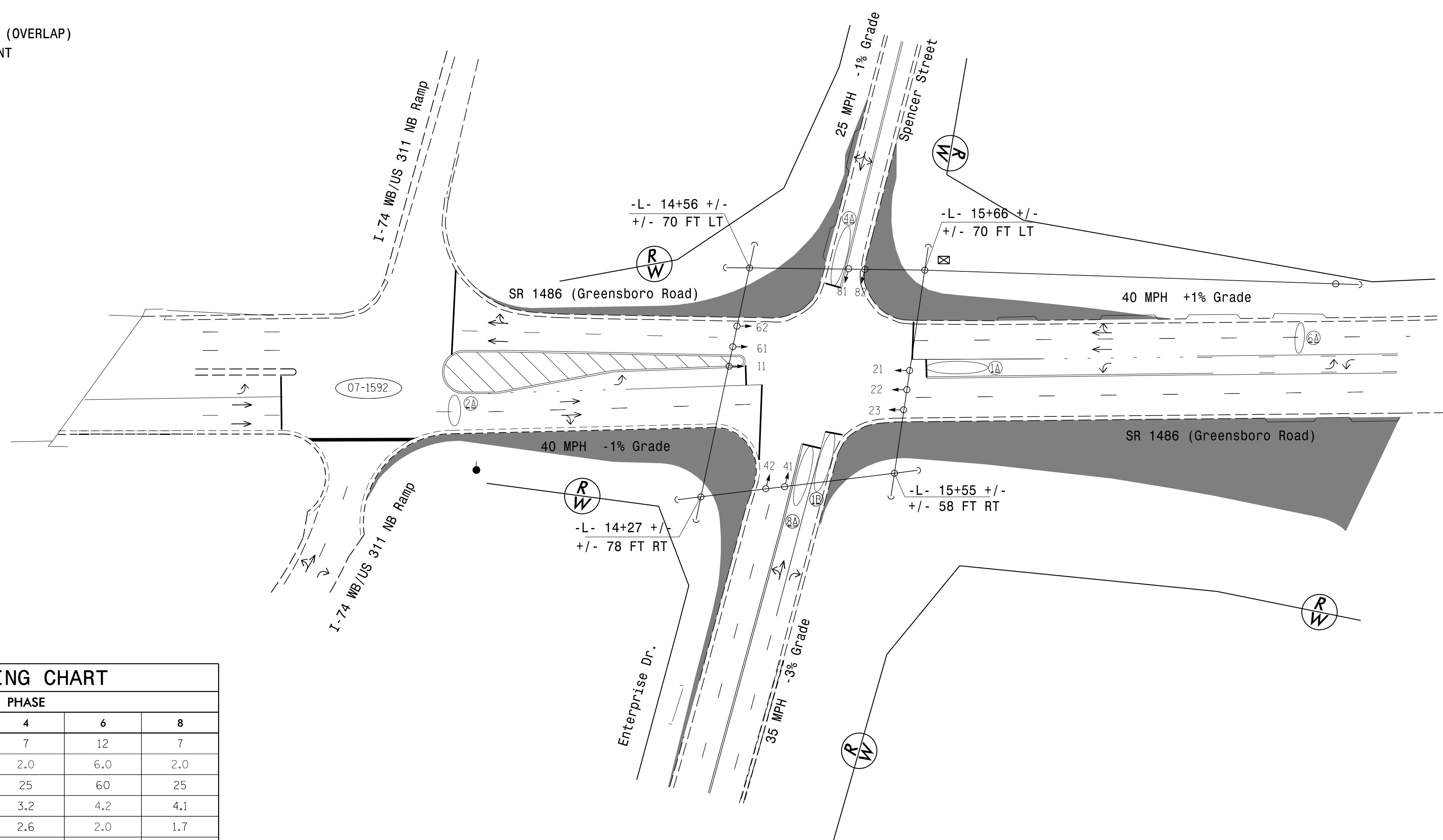
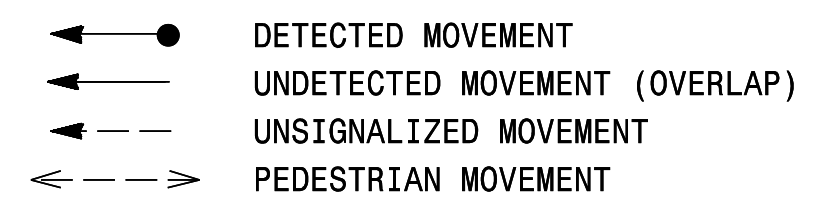
SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A *	*	0	*	-	1	Y	Y	-	-	15	-	*
1B *	*	0	*	-	6	Y	Y	Y	-	3	-	*
2A *	*	200	*	-	2	Y	Y	-	-	-	-	*
4A *	*	0	*	-	4	Y	Y	-	-	10	-	*
6A *	*	250	*	-	6	Y	Y	-	-	-	-	*
8A *	*	0	*	-	8	Y	Y	-	-	3	-	*

*Multi-Zone Microwave Detection

PHASING DIAGRAM DETECTION LEGEND



OASIS 2070 TIMING CHART					
FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	12	7	12	7
Extension 1 *	2.0	6.0	2.0	6.0	2.0
Max Green 1 *	20	60	25	60	25
Yellow Clearance	3.0	4.2	3.2	4.2	4.1
Red Clearance	3.1	2.0	2.6	2.0	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	1.5	-
Max Variable Initial *	-	24	-	29	-
Time Before Reduction *	-	15	-	15	-
Time To Reduce *	-	30	-	30	-
Minimum Gap	-	3.0	-	3.0	-
Recall Mode **	-	SOFT RECALL	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

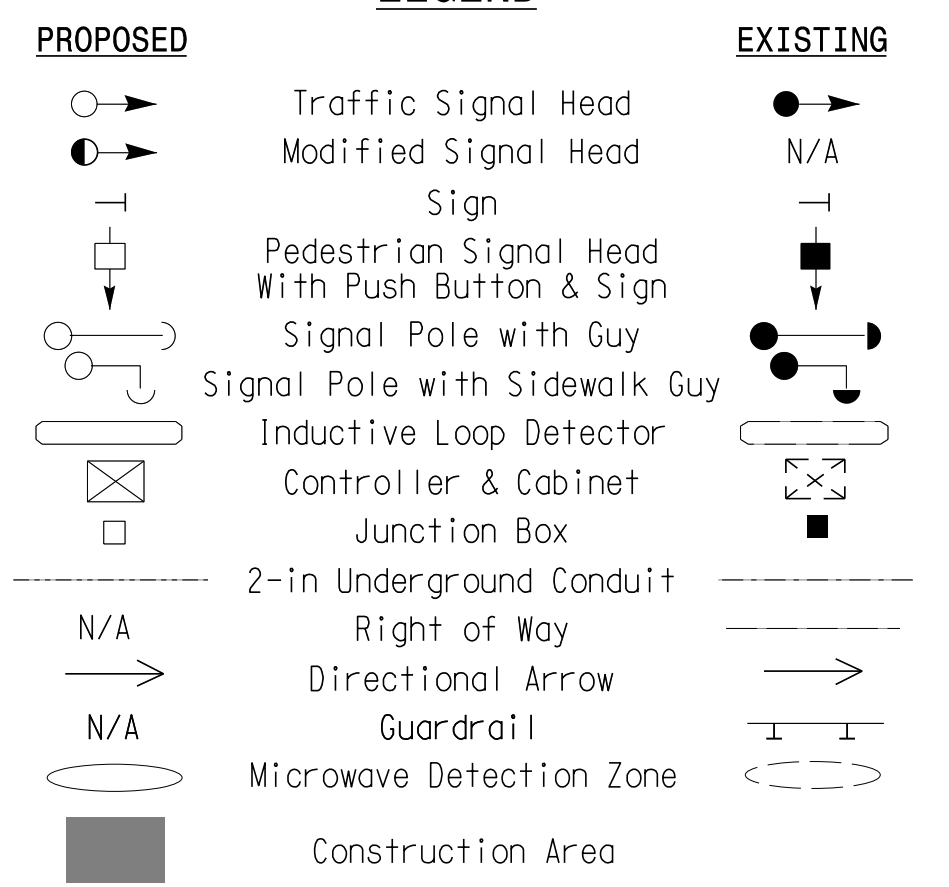
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
 ** May be changed to Min Recall by Time of Day at discretion of City Traffic Engineer.

3 Phase Fully Actuated (High Point Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND



Signal Upgrade- Temporary Design

M M
MOTT MACDONALD
 Prepared for the Offices of:
 Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529
 PO Box 700 Fuquay-Varina, NC 27526
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SCALE
 0 50
 1"=50'

SR 1486 (Greensboro Road) at Enterprise Dr./Spencer Street
 Division 7 Guilford County High Point
 PLAN DATE: February 2018 REVIEWED BY: T. Pate
 PREPARED BY: B. Lehan REVIEWED BY: R. Thompson

REVISIONS	INIT.	DATE

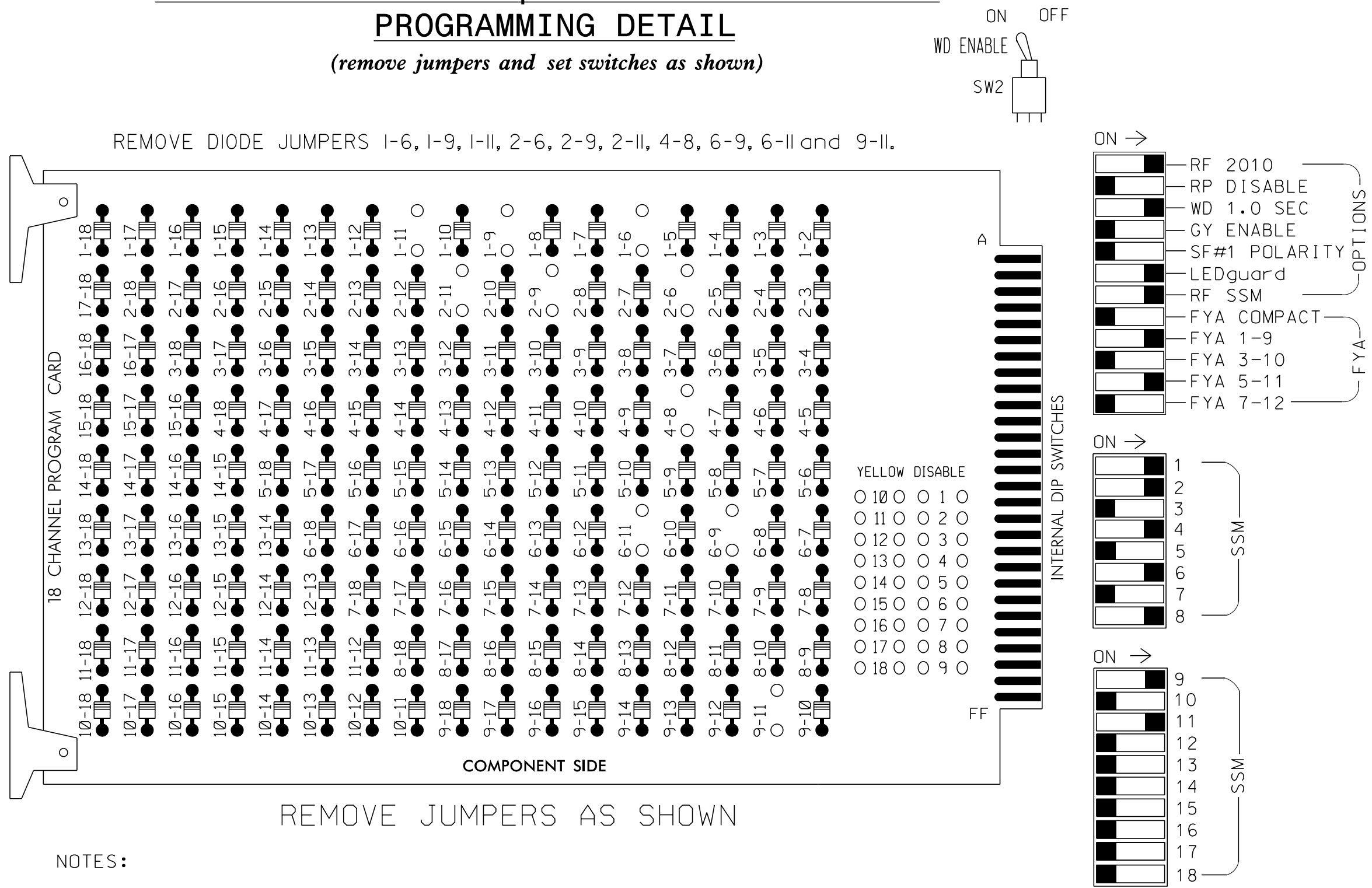
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SEAL
 BRENDAN A. LEHAN
 ENGINEER
 045256
 BRENDAN A. LEHAN
 3/20/2018
 DATE
 SIG. INVENTORY NO. 07-1272T

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EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- 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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the High Point Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 /W/ AUX
 SOFTWARE.....OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....6
 OVERLAP "D".....NOT USED

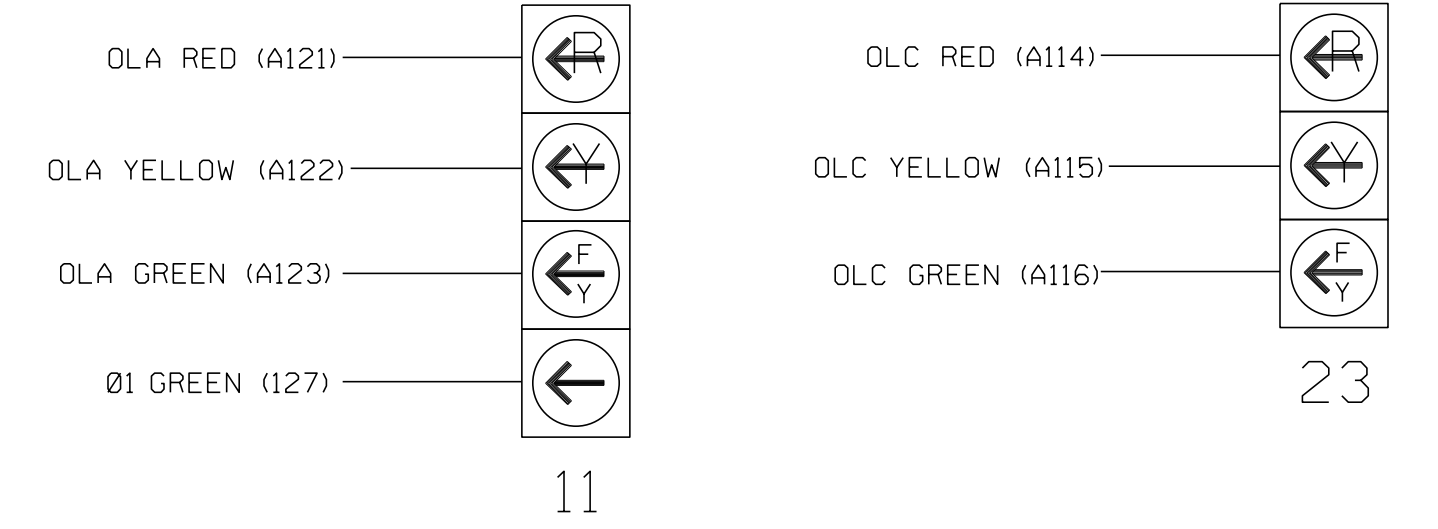
SIGNAL HEAD HOOK-UP CHART

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.	11	82	22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	11	NU	NU	21	NU
RED	*	128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121				A114	
YELLOW ARROW		126											A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127	127																

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

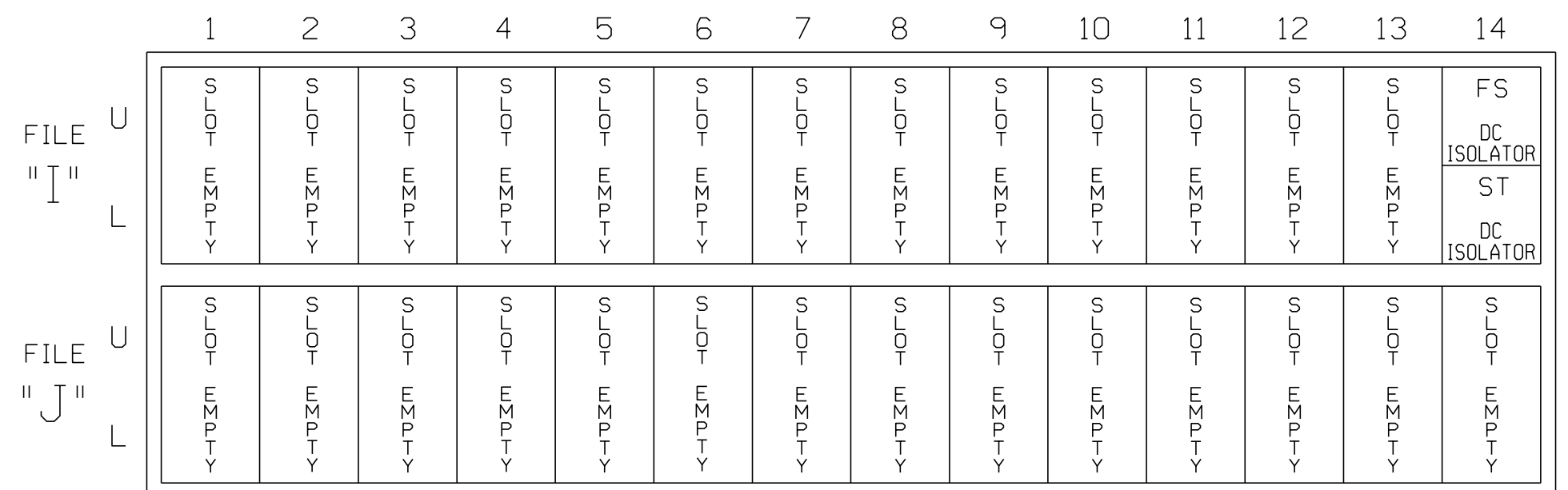


NOTE

- The sequence display for signal head 11 requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



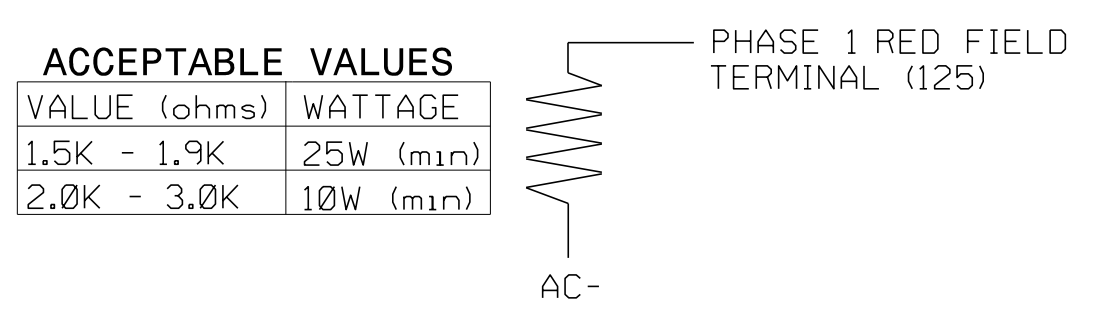
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

Install multi-zone microwave detection systems for vehicle detection. Perform installation according to the manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



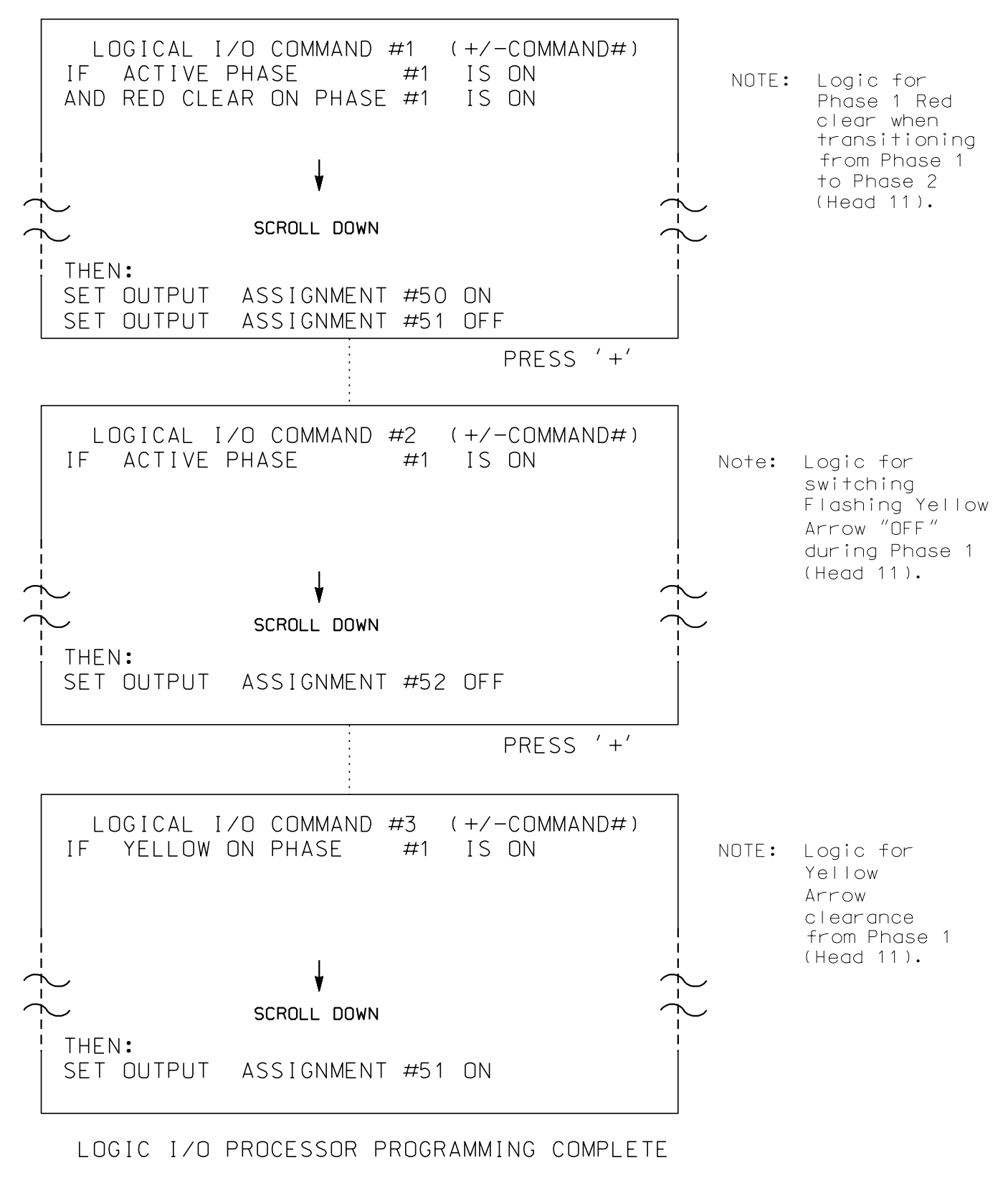
Temporary Design
 Electrical Detail - Sheet 1 of 2

 MOTT MACDONALD <small>PO Box 100 Fuquay-Varina, NC 27526 www.mottmac.com</small>	ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	SR 1486 (Greensboro Road) at Enterprise Dr./Spencer Street Division 7 Guilford County High Point	SEAL SEAL 045256 BRENDAN A. LEHAN ENGINEER
	PLAN DATE: February 2018 PREPARED BY: B. Lehan	REVIEWED BY: R. Thompson REVIEWED BY:	REVISIONS INIT. DATE

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

(program controller as shown below)

- 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.
- From Main Menu press '6' (OUTPUTS), then '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE
OUTPUT 50 = Overlap A Red OUTPUT 51 = Overlap A Yellow OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL (program controller as shown below)

From Main Menu press '8' (OVERLAPS), then '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: |12345678910111213141516
 VEH OVL PARENTS: |XX
 VEH OVL NOT VEH: |
 VEH OVL NOT PED: |
 VEH OVL GRN EXT: |
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN ← NOTICE GREEN FLASH
 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
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' 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 X GREEN ← NOTICE GREEN FLASH
 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
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 0Z=1272__
 DESIGNED: February 2018
 SEALED:
 REVISED: N/A_____

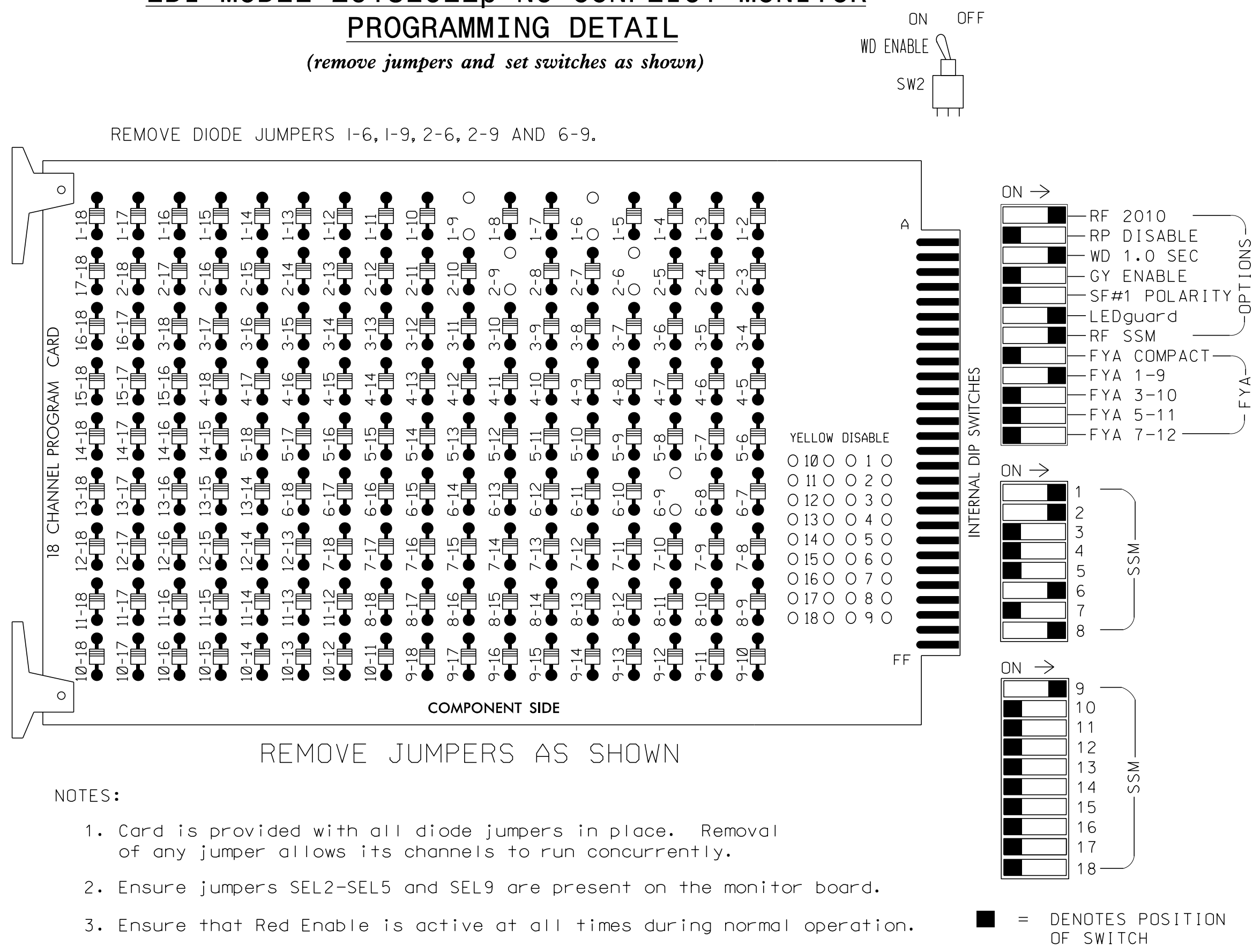
Temporary Design
Electrical Detail - Sheet 2 of 2

<p style="font-size: x-small;">PO Box 700 Fayetteville, NC 27526 www.mottmacdonald.com</p>	<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of: DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 1486 (Greensboro Road) at Enterprise Dr./Spencer Street</p> <p style="font-size: x-small;">Division 7 Guilford County High Point</p> <p style="font-size: x-small;">PLAN DATE: February 2018 REVIEWED BY: R. Thompson</p> <p style="font-size: x-small;">PREPARED BY: B. Lehan REVIEWED BY: T. Pate</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE							<p style="font-size: x-small;">SEAL NORTH CAROLINA PROFESSIONAL ENGINEER BRENDAN A. LEHAN 045256</p> <p style="font-size: x-small;">DocuSigned by: Brendan Lehan 3/20/2018 881708E2F7B54CD</p> <p style="font-size: x-small;">DATE SIG. INVENTORY NO. 07-1272T</p>
	REVISIONS	INIT.	DATE									
REVISIONS: _____ INIT.: _____ DATE: _____ _____												

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$\$\$\$\$\$DOCSIGN\$\$\$\$\$
\$\$\$\$\$LENAME\$\$\$\$\$

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- 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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the High Point 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.	11	82	21,22, 23	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11	NU	NU	NU	NU	
RED	*		128						134			107							
YELLOW			129						135			108							
GREEN			130						136			109							
RED ARROW																		A121	
YELLOW ARROW																			A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127	127																	

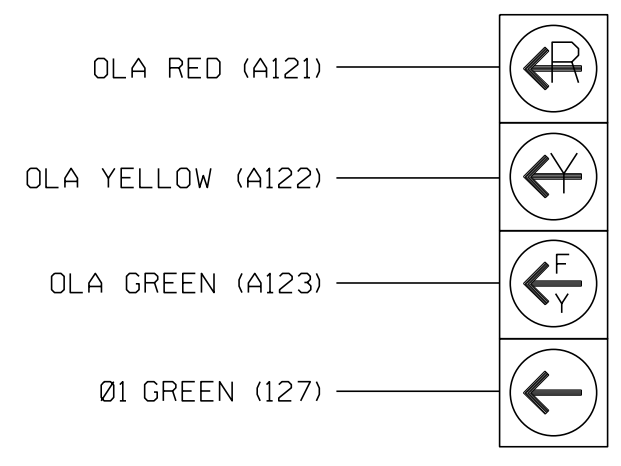
NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

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.....S1,S2,S8,S11,AUX S1
PHASES USED.....1,2,6,8
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

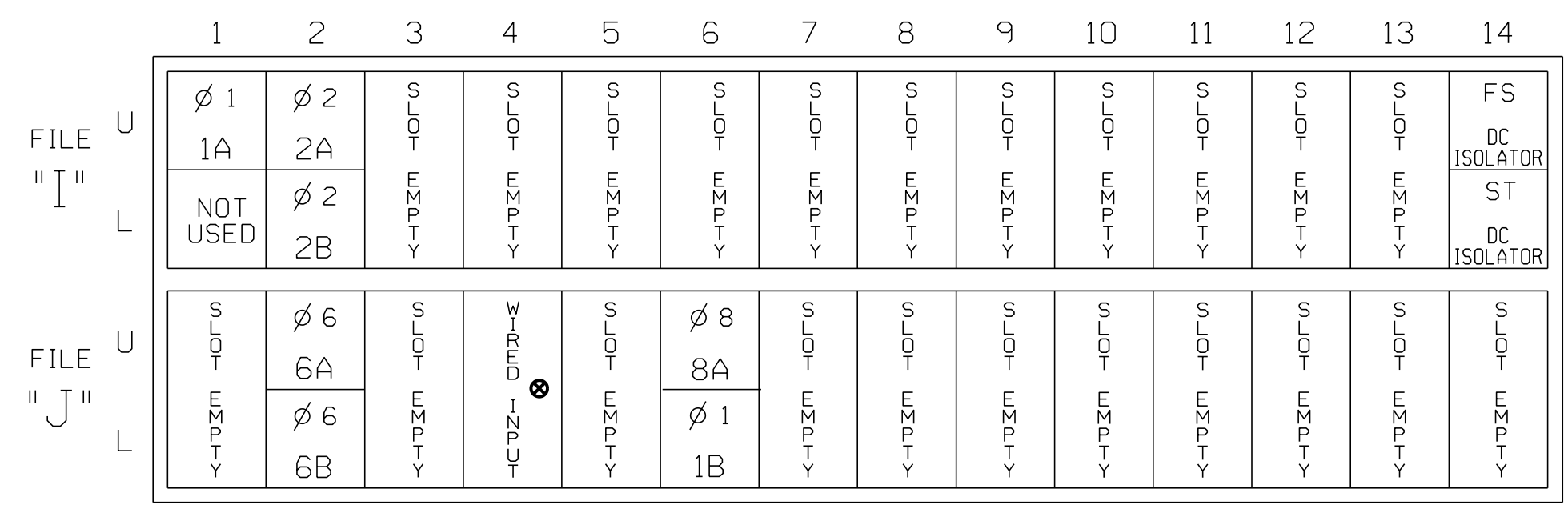


11

NOTE
The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



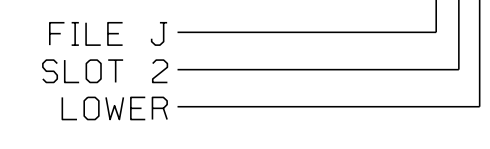
EX.: 1A, 2A, ETC. = LOOP NO.'S
FS = FLASH SENSE
ST = STOP TIME
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y	-	---	15
	-	J4U	48	10	26	6	Y	Y	Y	---	3
1B	TB5-11,12	J6L	46	8	18	1	Y	Y	-	---	15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	---	---
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	---	---
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	---	---
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	-	---	---
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	---	3

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

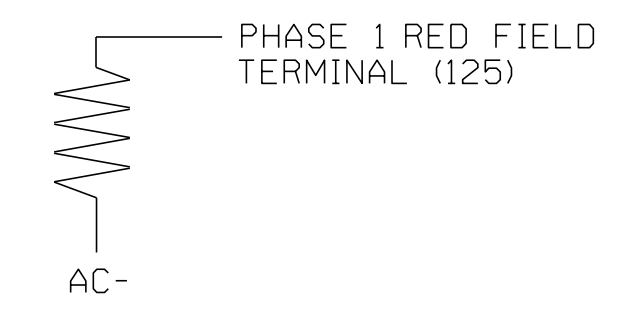
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Final Design
Electrical Detail - Sheet 1 of 2

M M
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
www.mottmac.com
License No. F-0669

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

SR 1486 (Greensboro Road)
at
Enterprise Dr./Spencer Street
Division 7 Guilford County High Point
PLAN DATE: February 2018 REVIEWED BY: T. PATE
PREPARED BY: B. LEHAN REVIEWED BY: R. THOMPSON

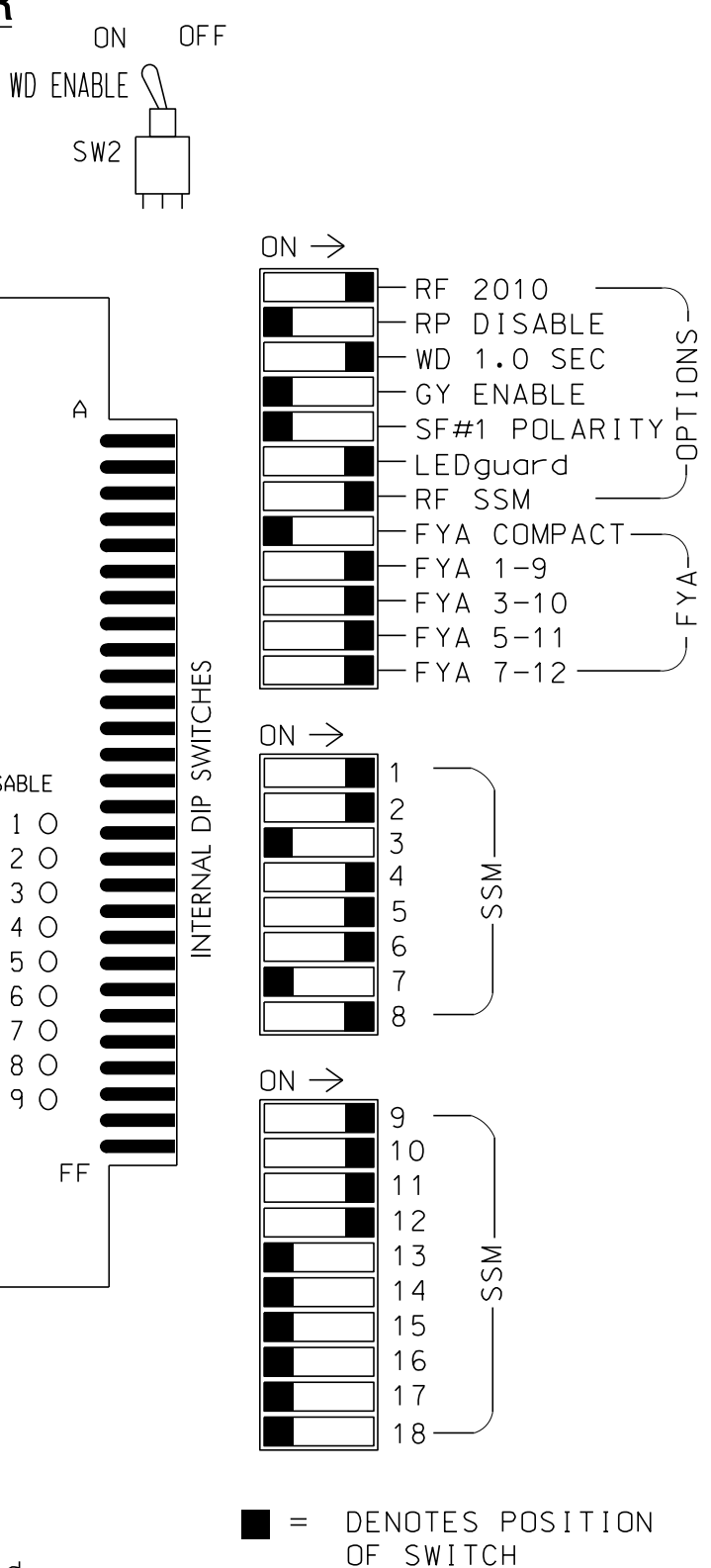
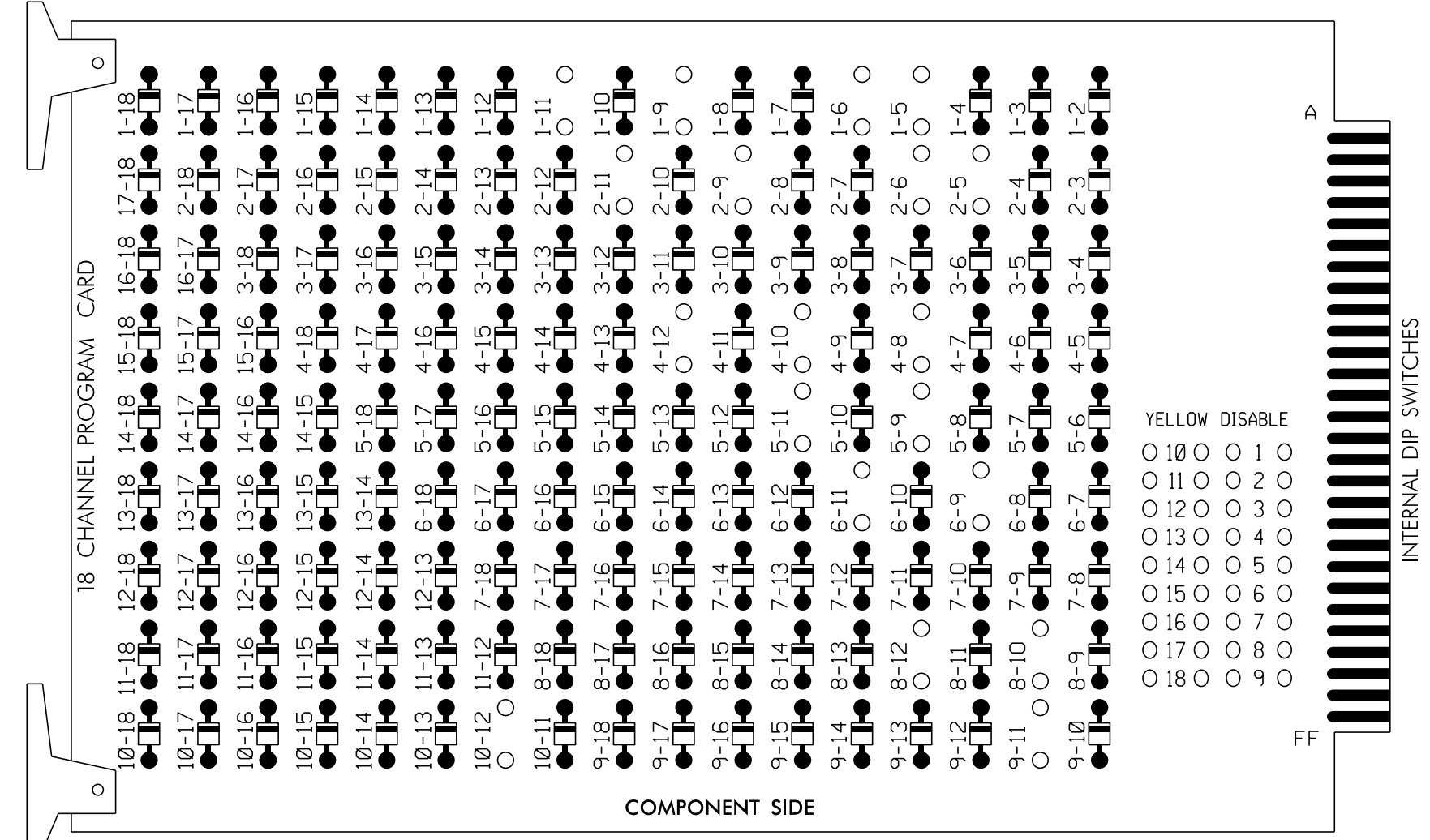
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
BRENDAN A. LEHAN
SEAL 045256
DocuSigned by:
Brendan Lehan 3/20/2018
884708E2F79E4C0D
DATE
SIG. INVENTORY NO. 07-1272

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$\$\$\$\$\$DOCSIGN\$\$\$\$\$
\$\$\$\$\$SYTIME\$\$\$\$\$

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
REMOVE DIODE JUMPERS: 1-5,I-6,I-9,I-II,2-5,2-6,2-9,2-II,4-8,4-10,4-12,5-9,5-II, 6-9,6-II,8-10,8-12,9-II, and 10-12



- 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.

REMOVE JUMPERS AS SHOWN

INPUT FILE POSITION LAYOUT (front view)

Table showing input file positions 1-14 with columns for FILE 'I' and FILE 'J' and rows for various detector and flash sense configurations.

EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown below)

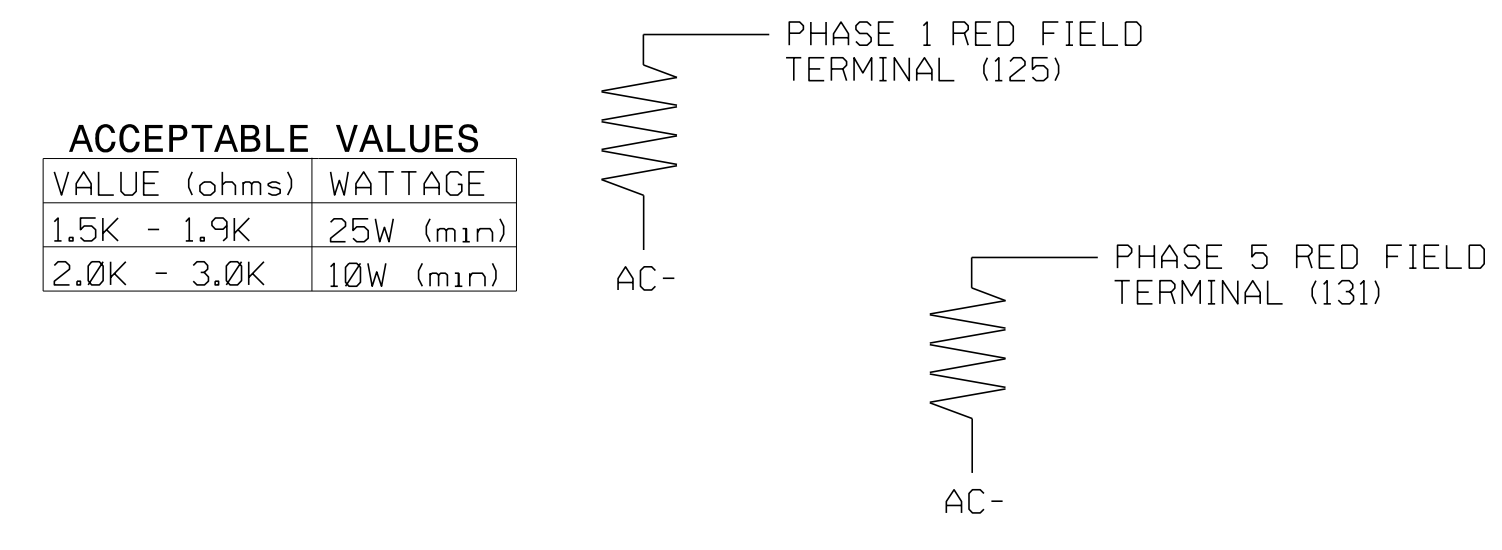


Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K (25W min), 2.0K - 3.0K (10W min).

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
7. The cabinet and controller are part of the High Point 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.....S1,S2,S5,S7,S8,
S11,AUX S1, AUX S2, AUX S4, AUX S5
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....1+2
OVERLAP "B".....4
OVERLAP "C".....5+6
OVERLAP "D".....8

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: 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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

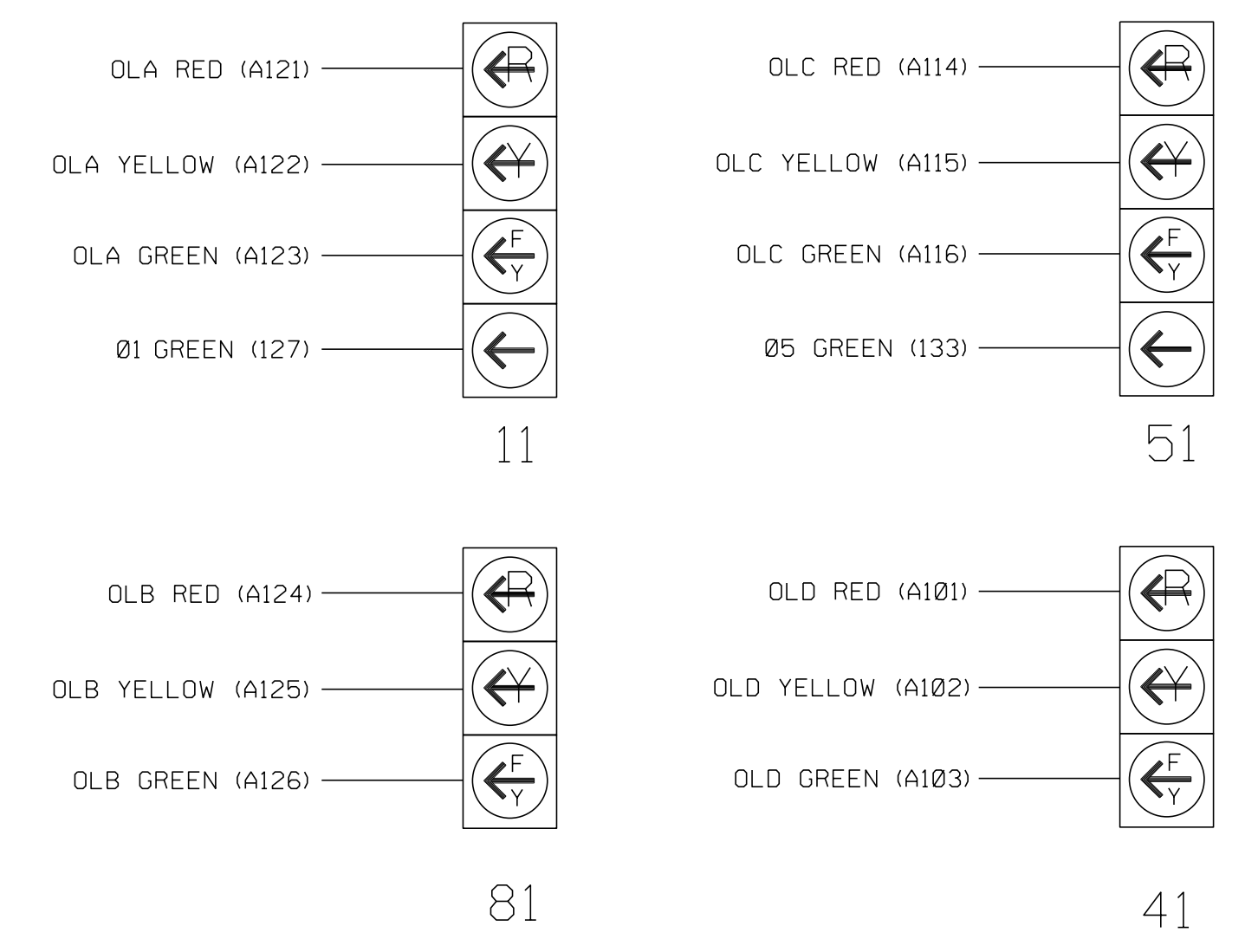
Table mapping Load Switch No. to Signal Head No. and various signal colors (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, GREEN ARROW).

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL (wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1792
DESIGNED: February 2018
SEALED: 3/20/2018
REVISED: _____

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MOTT MACDONALD logo and contact information: PO Box 700, Fuquay-Varina, NC 27526, www.mottmac.com, License No. F-0669

ELECTRICAL AND PROGRAMMING DETAILS FOR: 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

Project information: SR 4121 (JAMESTOWN PARKWAY) AT SR 1332 (SCIENTIFIC STREET), DIVISION 7 GUILFORD COUNTY HIGH POINT, PLAN DATE: February 2018, REVIEWED BY: T. Pate, PREPARED BY: B. LEHAN, REVIEWED BY: R. Thompson

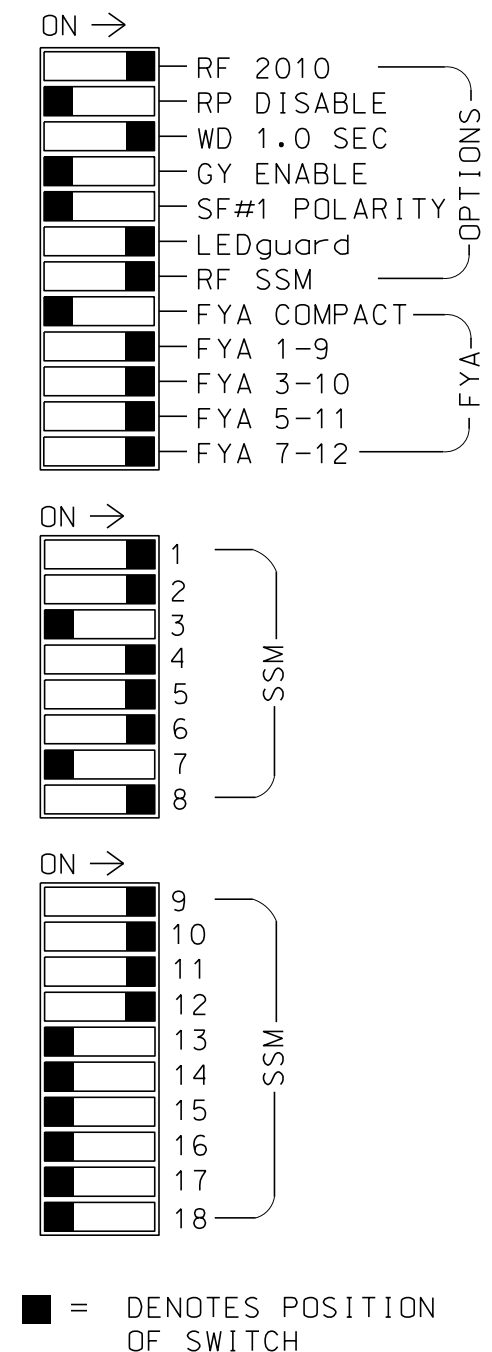
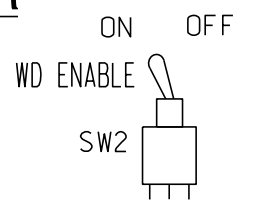
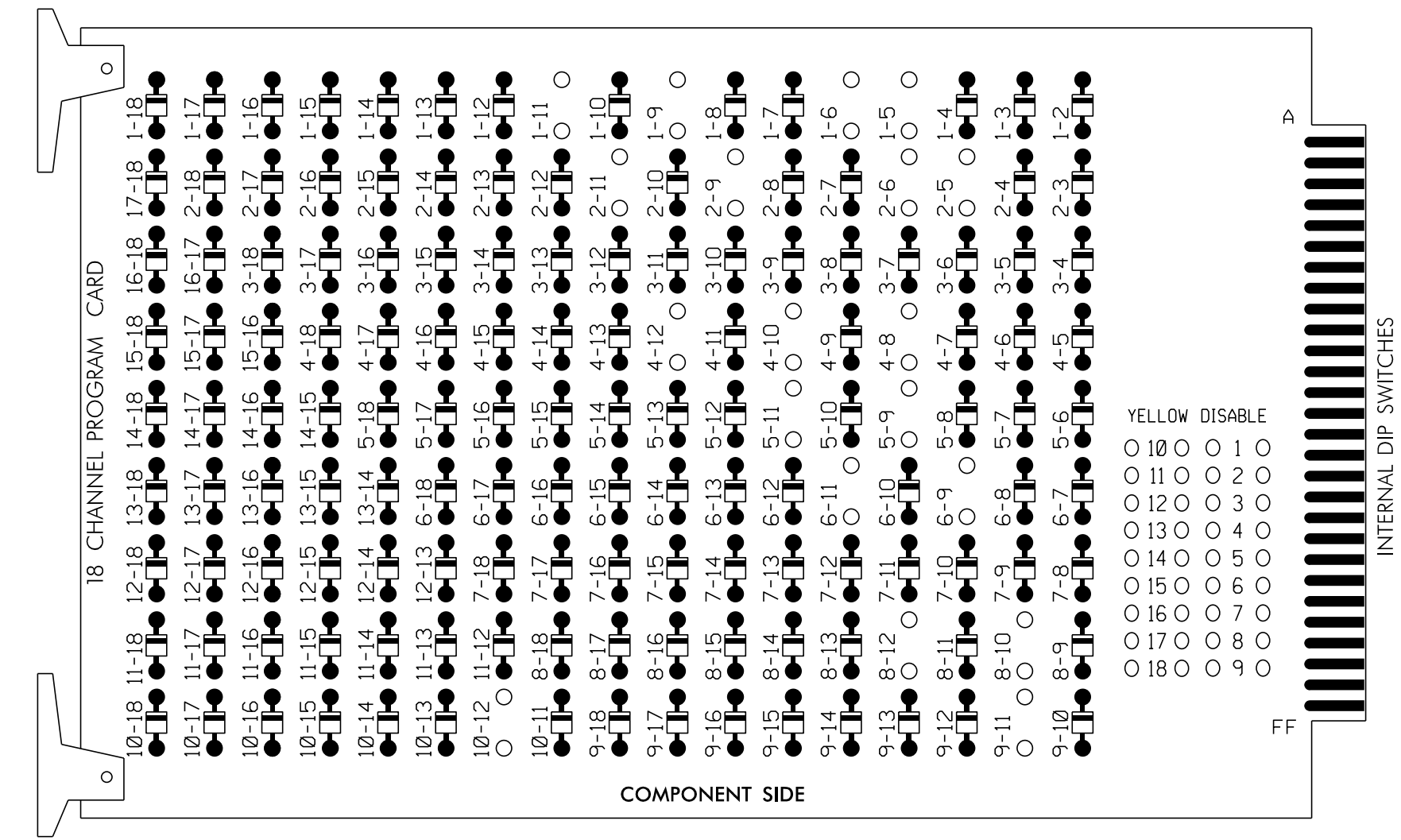
Professional Engineer seal for BRENDAN A. LEHAN, License No. 045256, dated 3/20/2018, and inventory number 07-1792.

Vertical barcode and reference numbers on the left margin.

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5,1-6,1-9,1-11,2-5,2-6,2-9,2-11,4-8,4-10,4-12,5-9,5-11, 6-9,6-11,8-10,8-12,9-11, and 10-12



NOTES:

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

NOTES

- 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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the High Point 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.	11	83	21,22	NU	NU	42,43	NU	51	43	61,62	NU	82,83	NU	11	81	NU	51	41	NU	
RED		*	128			101		*	134		107									
YELLOW			129			102			135		108									
GREEN			130			103			136		109									
RED ARROW																A121	A124		A114	A101
YELLOW ARROW			126						132							A122	A125		A115	A102
FLASHING YELLOW ARROW																A123	A126		A116	A103
GREEN ARROW	127	127						133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

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.....S1,S2,S5,S7,S8,
 S11,AUX S1, AUX S2, AUX S4, AUX S5
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....4
 OVERLAP "C".....5+6
 OVERLAP "D".....8

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	1A	2A	∅ 3	4A	5B	6A	7A	8A	9A	10A	11A	12A	13A	FS
U	NOT USED	∅ 2	∅ 3	∅ 4	NOT USED	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	DC ISOLATOR
L	2B	∅ 3	∅ 4	4B	NOT USED	6B	7B	8B	9B	10B	11B	12B	13B	ST
U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	DC ISOLATOR
L	5A	6A	∅ 7	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	∅ 18
U	NOT USED	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18
L	6B	∅ 7	∅ 8	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B	∅ 18

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

FS = FLASH SENSE
ST = STOP TIME

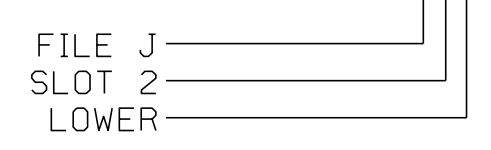
∅ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y	-	---	15
	-	J4U	48	10	26	6	Y	Y	Y	---	3
1B	TB7-1,2	J7U	66	28	38	1	Y	Y	-	---	15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	---	---
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	---	---
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	---	3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y	-	---	---
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y	-	---	15
	-	I4U	47	9	22	2	Y	Y	Y	---	3
5B	TB6-1,2	I7U	65	27	34	5	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	-	---	---
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	---	3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	-	---	---

¹Add jumper from I1-W to J4-W, on rear of input file.
²Add jumper from J1-W to I4-W, on rear of input file.

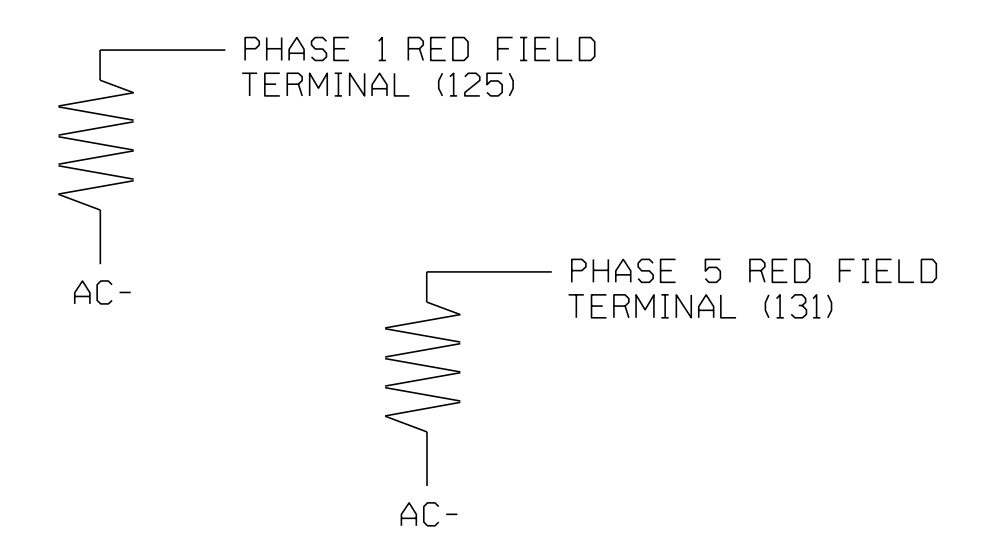
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

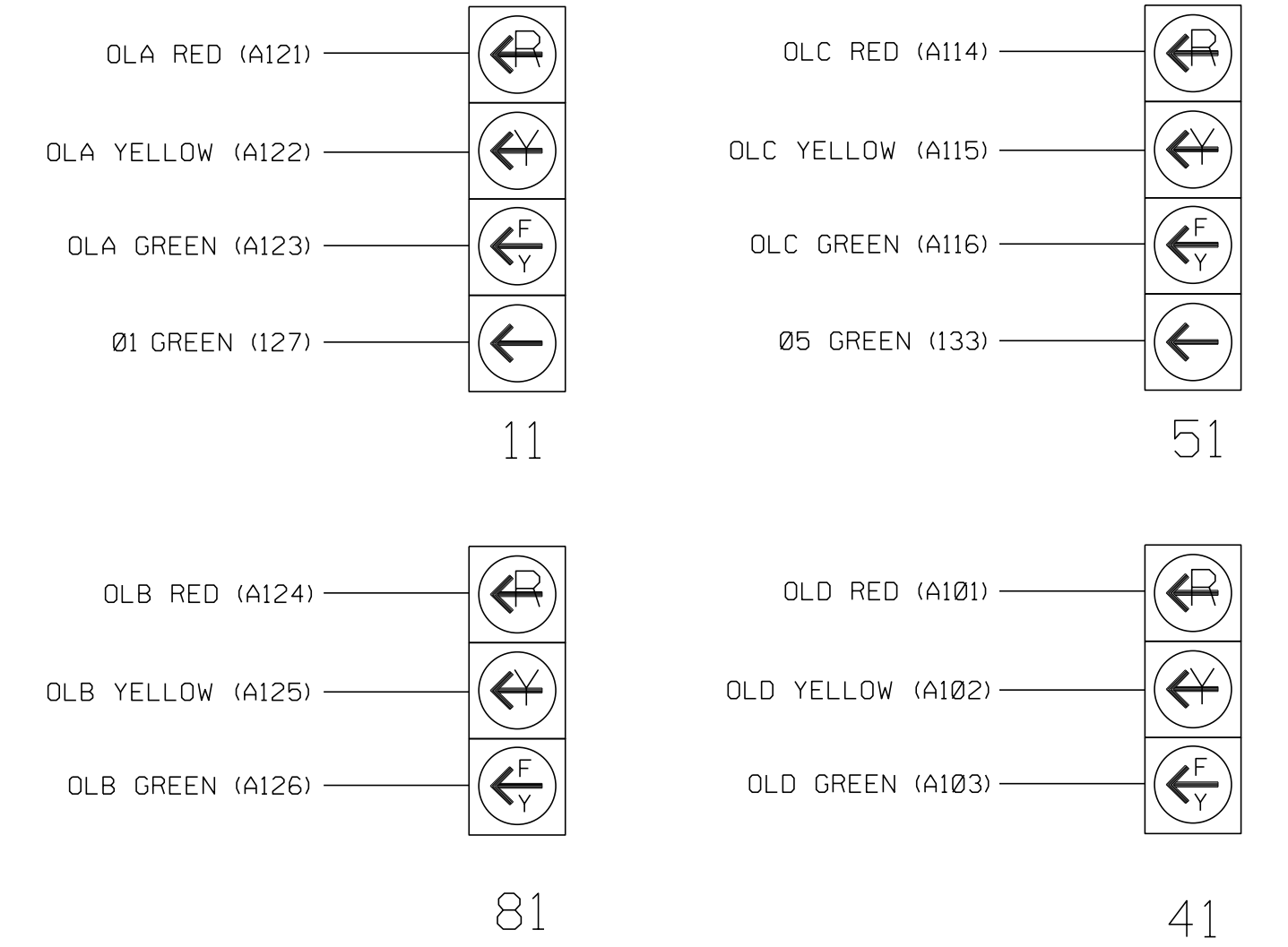
(install resistors as shown below)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1793
 DESIGNED: February 2018
 SEALED: 3/20/2018
 REVISED: _____

Electrical Detail - Sheet 1 of 2

M M
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ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared For the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 4121 (JAMESTOWN PARKWAY) AT SR 1334 (DILLON ROAD)
 DIVISION 7 GUILFORD COUNTY HIGH POINT
 PLAN DATE: February 2018 REVIEWED BY: T. Pate
 PREPARED BY: B. LEHAN REVIEWED BY: R. Thompson
 REVISIONS: _____ INIT. DATE _____

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 045256
 BRENDAN A. LEHAN
 DocuSigned by:
 Brendan Lehan 3/20/2018
 181708E2F784CD DATE
 SIG. INVENTORY NO. 07-1793

*****SYSTEMS*****
*****CONTRACT*****
*****DRAWING*****

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, 3, 4, 5, AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 112345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH: XX
VEH OVL NOT PED: XX
VEH OVL GRN EXT: XX
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)...0.0
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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 112345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH: X
VEH OVL NOT PED: X
VEH OVL GRN EXT: X
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)...0.0
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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 112345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH: XX
VEH OVL NOT PED: XX
VEH OVL GRN EXT: XX
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)...0.0
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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 112345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH: X
VEH OVL NOT PED: X
VEH OVL GRN EXT: X
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)...0.0
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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1793
DESIGNED: February 2018
SEALED: 3/20/2018
REVISED: _____

Electrical Detail - Sheet 2 of 2

M M

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for the Offices of:

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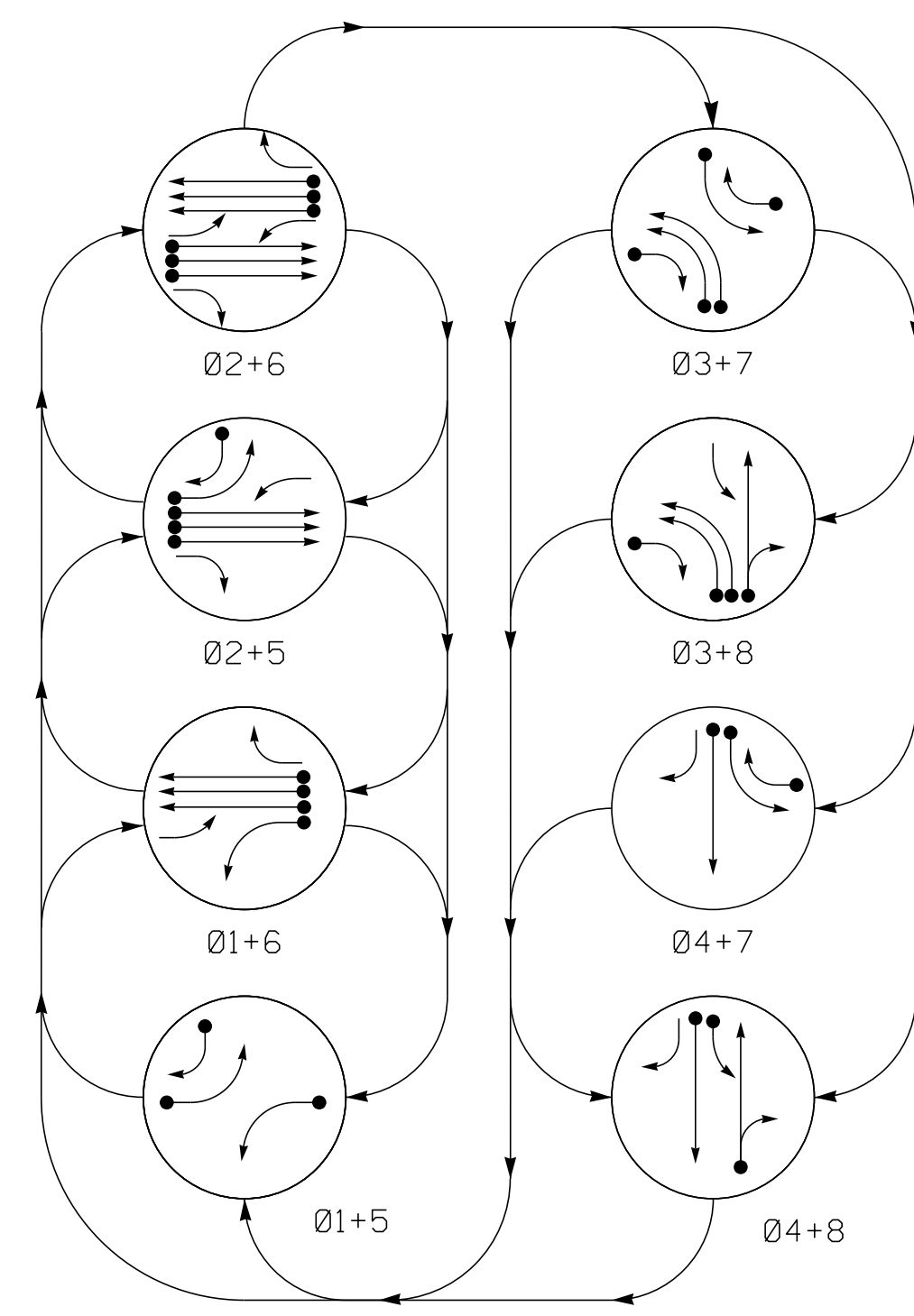
SR 4121 (JAMESTOWN PARKWAY) AT SR 1334 (DILLON ROAD)	
DIVISION 7	GUILFORD COUNTY HIGH POINT
PLAN DATE: February 2018	REVIEWED BY: T. Pate
PREPARED BY: B. LEHAN	REVIEWED BY: R. Thompson
REVISIONS	INIT. DATE

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SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
045256
BRENDAN A. LEHAN
Brendan Lehan 3/20/2018
DATE
SIG. INVENTORY NO. 07-1793

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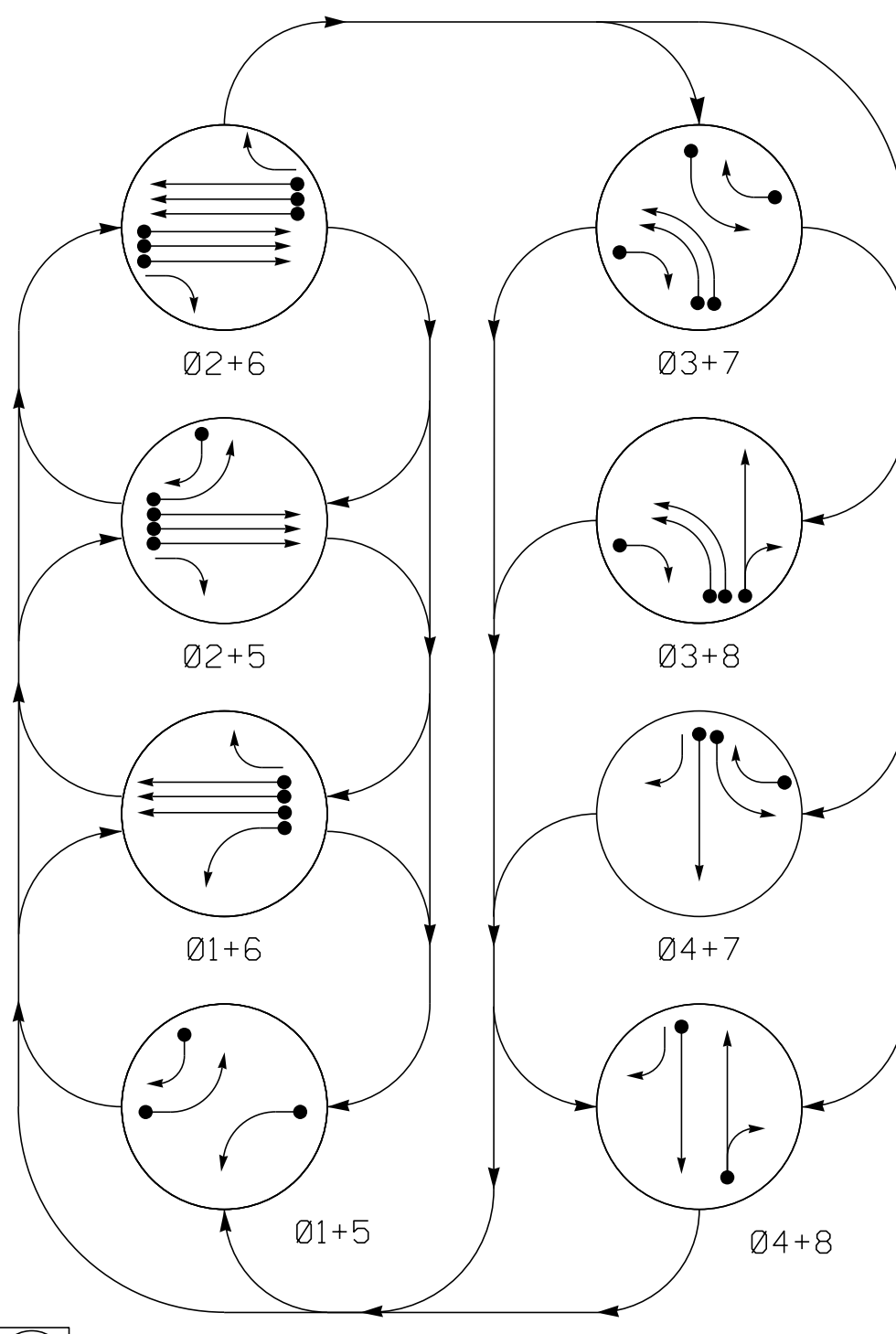
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	02+6	03+7	04+8	01+6	02+5	03+8	04+7
11	Y	Y	Y	Y	Y	Y	Y	Y
21,22	R	R	G	G	R	R	R	Y
23	R	R	G	G	R	R	R	Y
31,32	R	R	R	R	Y	Y	Y	Y
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	Y	Y	Y	Y	Y	Y	Y	Y
61,62	R	G	R	G	R	R	R	Y
63	R	G	R	G	R	R	R	Y
71	R	R	R	R	Y	Y	Y	Y
81,82	R	R	R	R	R	G	R	G

ALTERNATIVE PHASING DIAGRAM



ALTERNATIVE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	02+6	03+7	04+8	01+6	02+5	03+8	04+7
11	Y	Y	Y	Y	Y	Y	Y	Y
21,22	R	R	G	G	R	R	R	Y
23	R	R	G	G	R	R	R	Y
31,32	R	R	R	R	Y	Y	Y	Y
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	Y	Y	Y	Y	Y	Y	Y	Y
61,62	R	G	R	G	R	R	R	Y
63	R	G	R	G	R	R	R	Y
71	R	R	R	R	Y	Y	Y	Y
81,82	R	R	R	R	R	G	R	G

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

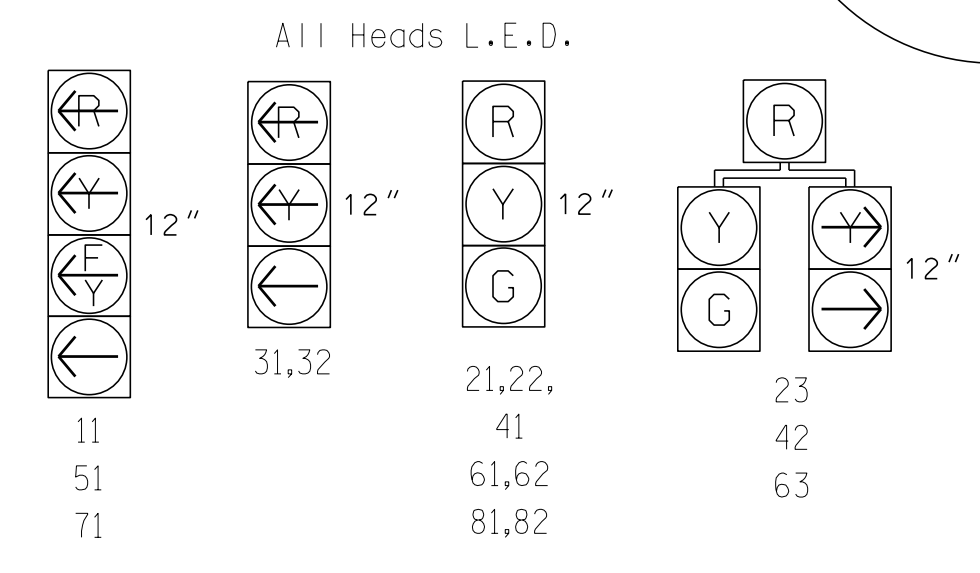
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15*	-
2A	6X6	420	5	Y	2	Y	Y	-	-	-
2B	6X6	420	5	Y	2	Y	Y	-	-	-
2C	6X6	420	5	Y	2	Y	Y	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	15*	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	15	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-
6B	6X6	420	5	Y	6	Y	Y	-	-	-
6C	6X6	420	5	Y	6	Y	Y	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	15*	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	5	-

* Disable Delay during Alternative Phasing operation.
 ** Disable phase calling during Alternative Phasing operations.

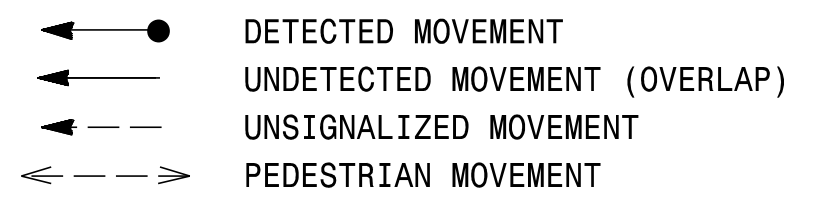
8 PHASE FULLY ACTUATED (HIGH POINT SIGNAL SYSTEM) NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

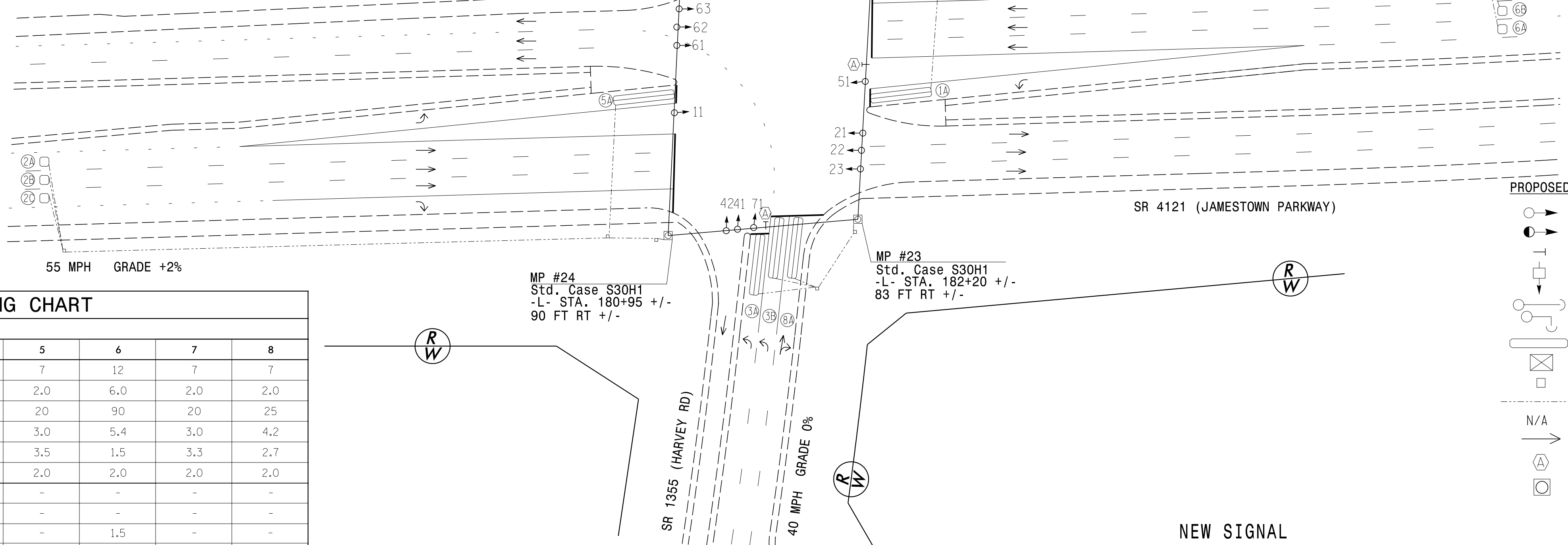
SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND



SR 4121 (JAMESTOWN PARKWAY)

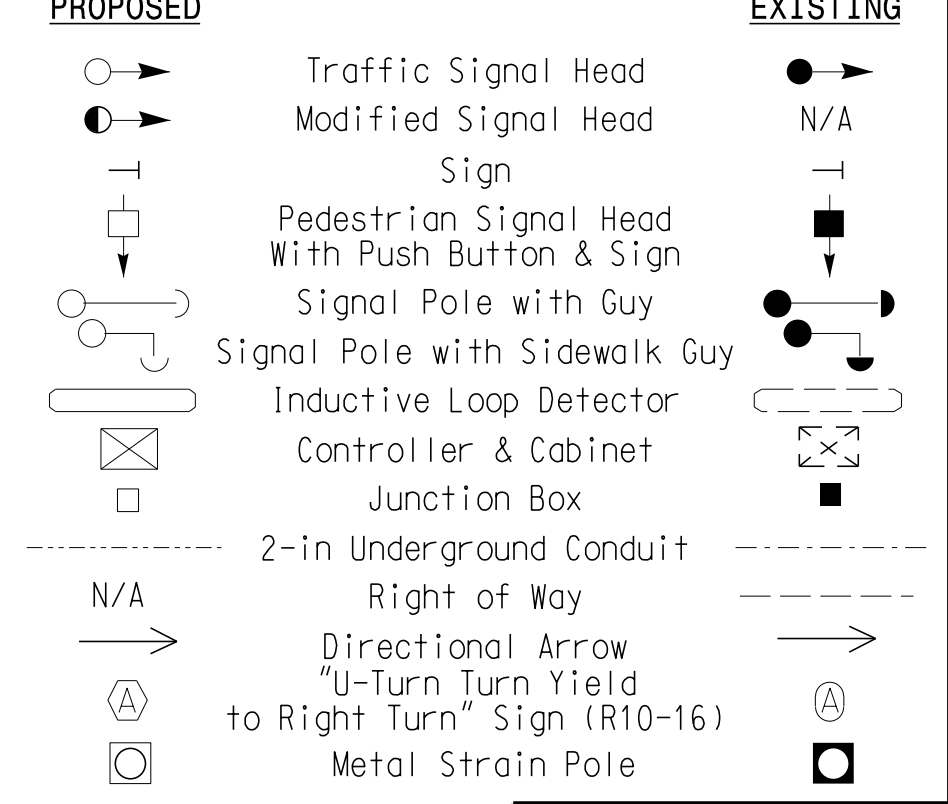


OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1*	20	90	20	25	20	90	20	25
Yellow Clearance	3.0	5.4	3.0	4.2	3.0	5.4	3.0	4.2
Red Clearance	3.5	1.5	3.4	2.7	3.5	1.5	3.3	2.7
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	-	1.5	-	-
Max Variable Initial*	-	46	-	-	-	46	-	-
Time Before Reduction*	-	15	-	-	-	15	-	-
Time To Reduce*	-	30	-	-	-	30	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

LEGEND



NEW SIGNAL

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License No. F-0669

Russell W. Thompson
Professional Engineer
032711

SR 4121 (JAMESTOWN PARKWAY) AT SR 1355 (HARVEY ROAD)

DIVISION 7 GUILFORD COUNTY HIGH POINT

PLAN DATE: February 2018 REVIEWED BY: T. PATE

PREPARED BY: B. LEHAN REVIEWED BY: R. THOMPSON

REVISIONS: _____ INITI: _____ DATE: _____

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SEAL

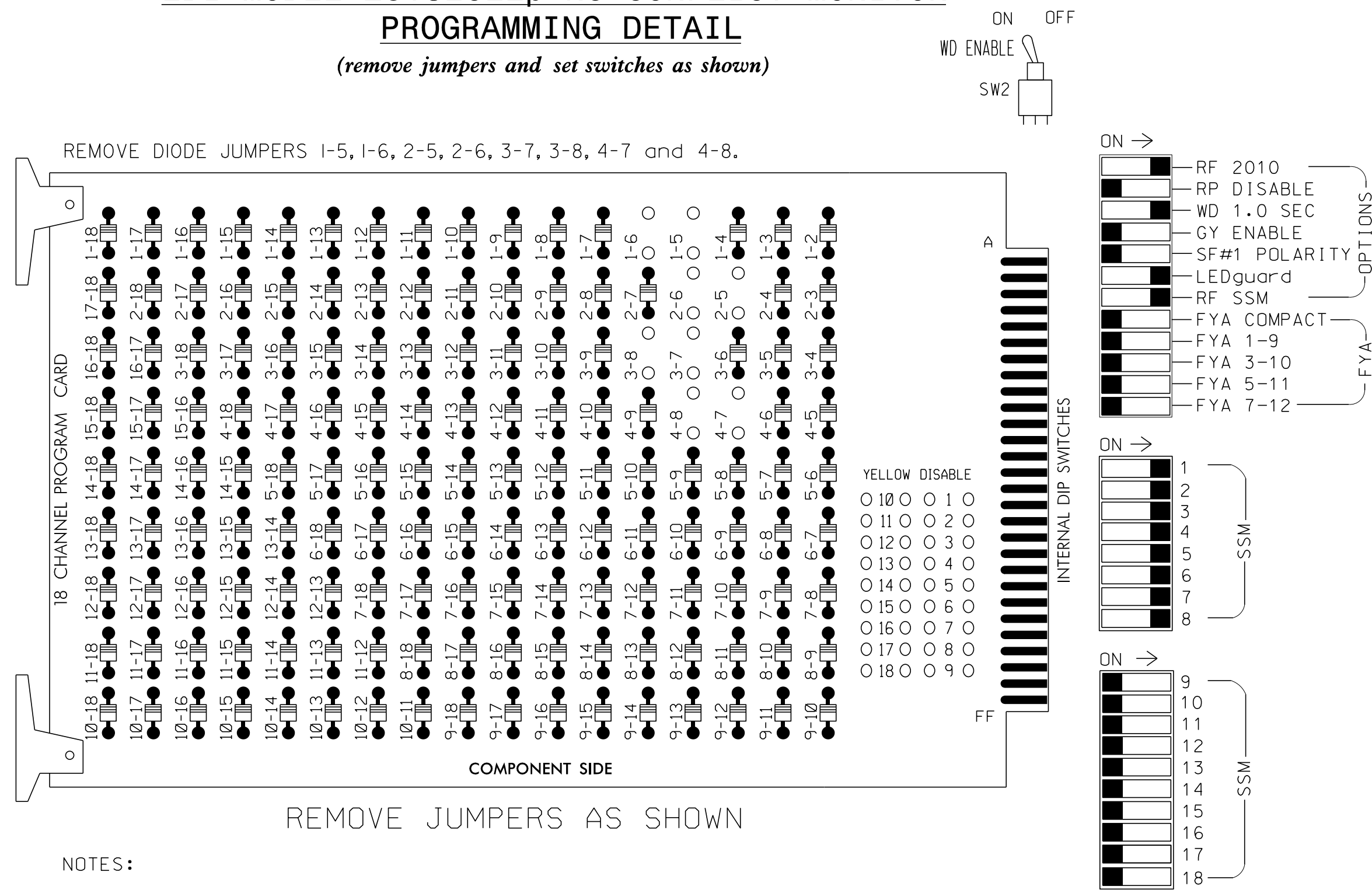
Russell W. Thompson
Professional Engineer
032711

DATE: 3/20/2018

SIG. INVENTORY NO. 07-1794

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- 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.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "init 2A" to MODE 5 (MM 1-8-9-3).
- Program phases 2 and 6 for Start Up In Green.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

```
FROM MAIN MENU->1->8->7 (I/O LOGIC)
Result Src.Fcn  } TimeOp Time
1208 = 01208    } DLY 1
```
- The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED		
SIGNAL HEAD NO.	11,12	21,22, 23,24	NU	31,32 33	63	41,42 43	NU	51	61,62 63,64	NU	71,72 73	23	81,82 83	NU
RED		128				101			134				107	
YELLOW		129				102			135				108	
GREEN		130				103			136				109	
RED ARROW	125			116				131		122				
YELLOW ARROW	126			117	117			132		123	123			
GREEN ARROW	127			118	118			133		124	124			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....NAZTEC APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAPS.....NONE

INPUT FILE CONNECTION & PROGRAMMING CHART

(front view)

FILE U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	∅ 1	∅ 2	∅ 2		∅ 3	∅ 4/SYS								FS
	1A	2A	2C		3A	4A/S3								DC ISOLATOR
"J"	∅ 1	∅ 2	NOT USED		∅ 3	∅ 4								ST
	1B	2B			3B	4B								DC ISOLATOR
"U"	∅ 5	∅ 7	∅ 6	∅ 6		∅ 8	∅ 8/SYS							
	5A	7A	6A	6C		8C	8A/S1							
"L"	NOT USED	∅ 7	∅ 6	NOT USED		∅ 8	∅ 8/SYS							
		7B	6B			8D	8B/S2							

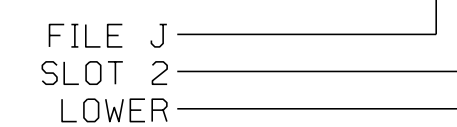
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-5,6	I2U	39	2	1		15		X	X	
1B	TB2-7,8	I2L	43	3	1		15		X	X	
2A	TB2-9,10	I3U	63	4	2				X	X	X
2B	TB2-11,12	I3L	76	5	2				X	X	X
2C	TB4-1,2	I4U	47	6	2				X	X	X
3A	TB4-9,10	I6U	41	8	3		15		X	X	
3B	TB4-11,12	I6L	45	9	3		15		X	X	
* 4A/S3	TB6-1,2	I7U	65	10	4			2.4		X	X
4B	TB6-3,4	I7L	78	11	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X
6B	TB3-11,12	J3L	77	19	6				X	X	X
6C	TB5-1,2	J4U	48	20	6				X	X	X
7A	TB3-5,6	J2U	40	16	7		15		X	X	
7B	TB3-7,8	J2L	44	17	7		15		X	X	
* 8A/S1	TB7-1,2	J7U	66	24	8			2.4		X	
* 8B/S2	TB7-3,4	J7L	79	25	8			2.4		X	
8C	TB5-9,10	J6U	42	22	8				X	X	
8D	TB5-11,12	J6L	46	23	8		10		X	X	

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L

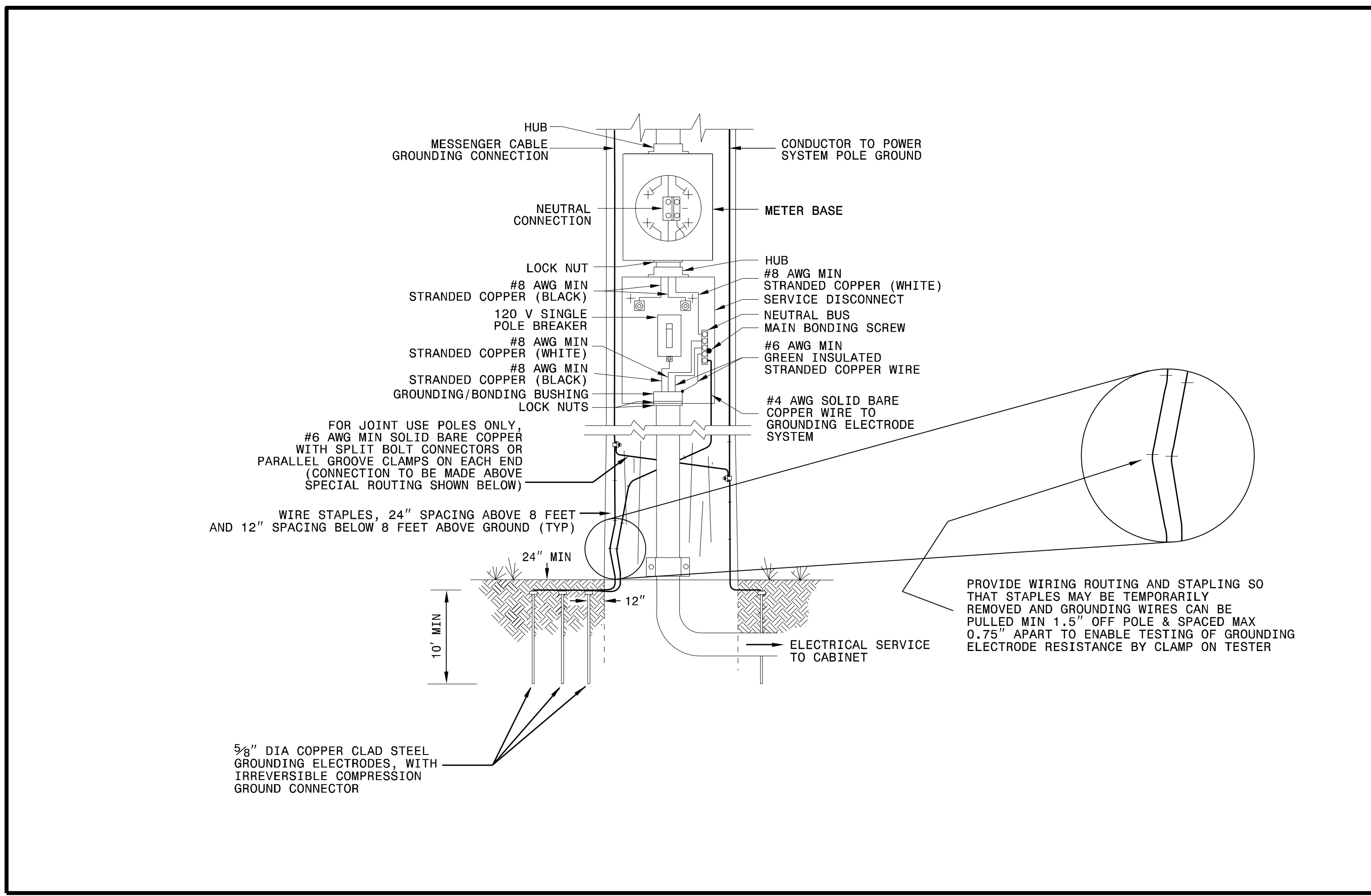


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2183
 DESIGNED: February 2018
 SEALED: 3/21/2018
 REVISED: _____

Final Design
 Electrical Detail

 PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com License No. F-0669	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 4121 (JAMESTOWN PARKWAY) AT SR 4228 (VICKREY CHAPEL ROAD)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Prepared for the Offices of: Transportation Mobility and Safety Division COUNTY OF TRANSPORTATION Signal Design Section	DIVISION 7 GUILFORD COUNTY HIGH POINT PLAN DATE: February 2018 REVIEWED BY: R. Thompson PREPARED BY: B. LEHAN REVIEWED BY: _____

\$\$\$\$\$SYTIME\$\$\$\$\$
 \$\$\$DUPLICATE\$\$\$
 \$\$\$DUPLICATE\$\$\$



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

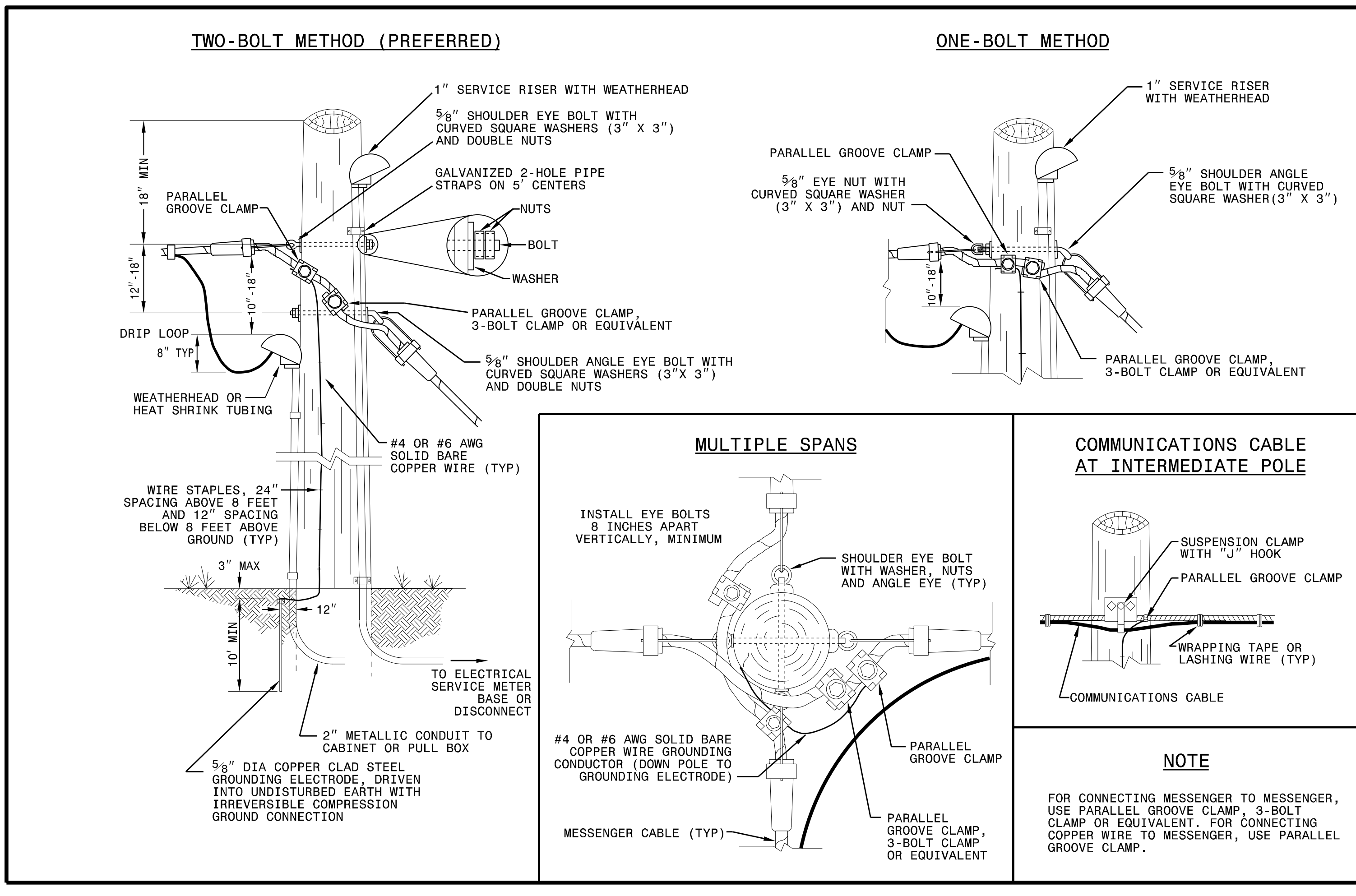
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

1720D01

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SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

SEAL

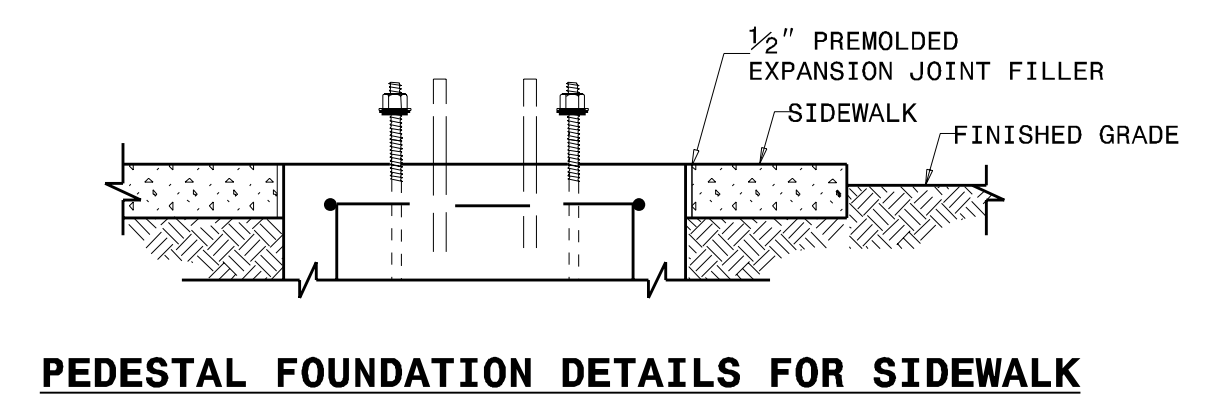
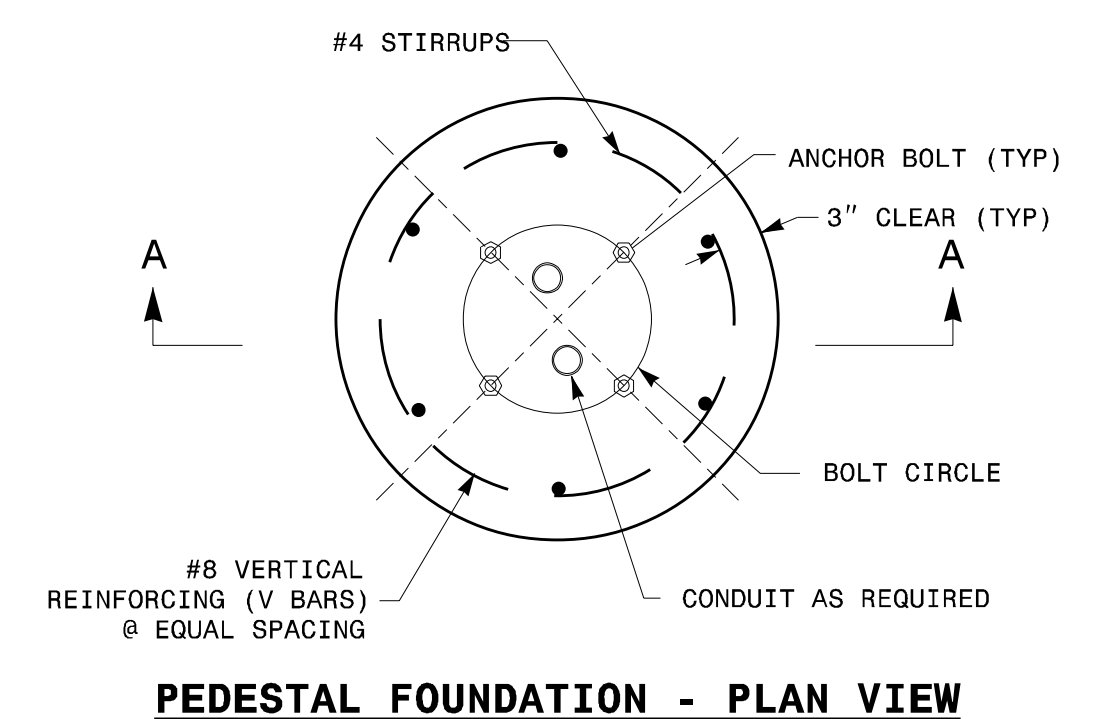
DocuSigned by:
Mohd Aslami

10/11/2017

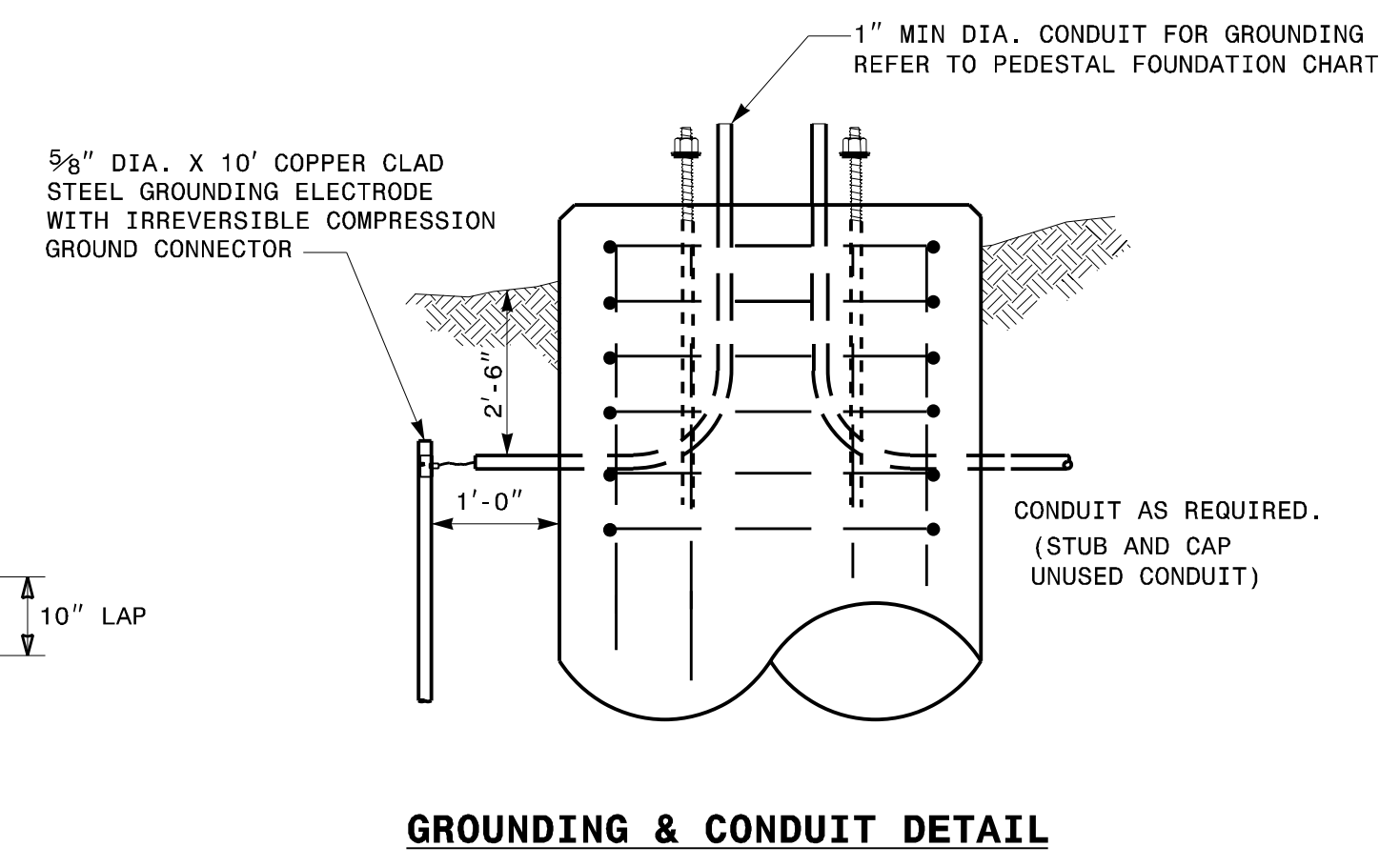
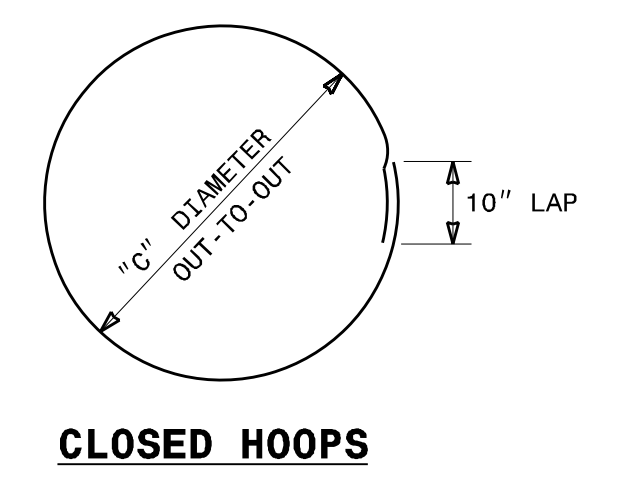
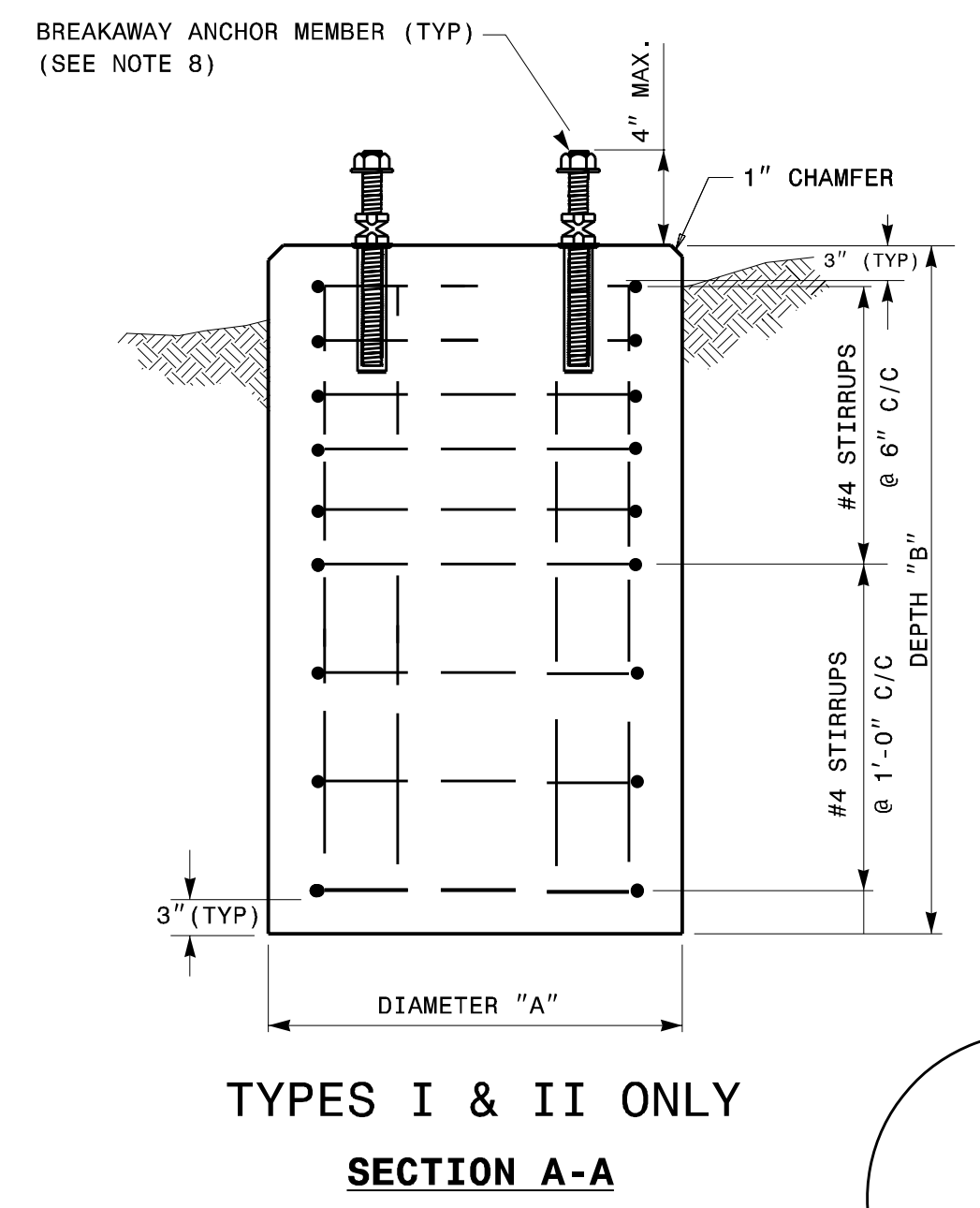
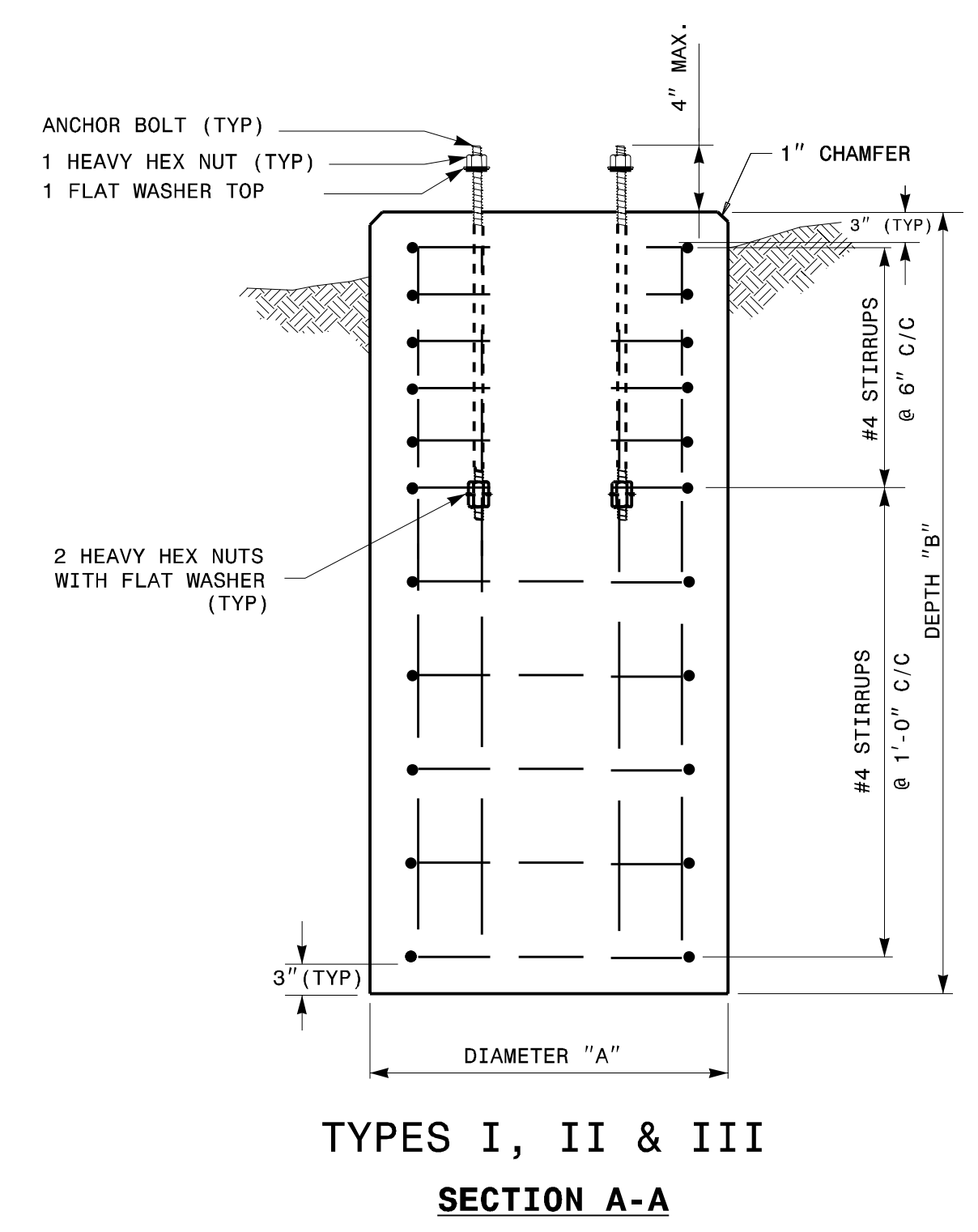
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750 N. Greenfield Parkway
Garner, NC 27529

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- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - A. SANDY TYPE SOIL
 - B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - C. WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
 - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
 - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
 - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS	
					ON 6" CENTERS	ON 12" CENTERS	TOTAL						
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

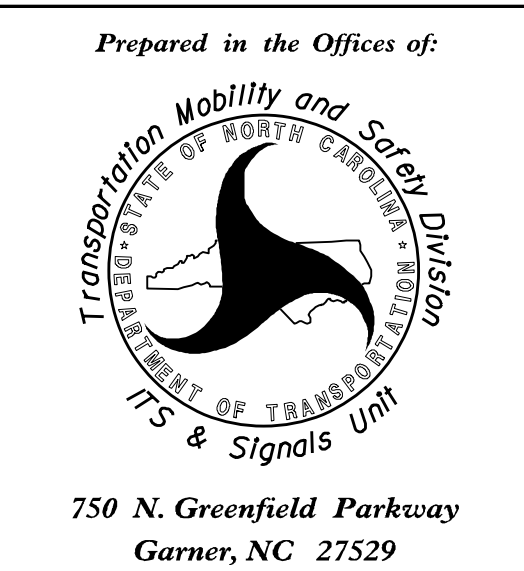
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

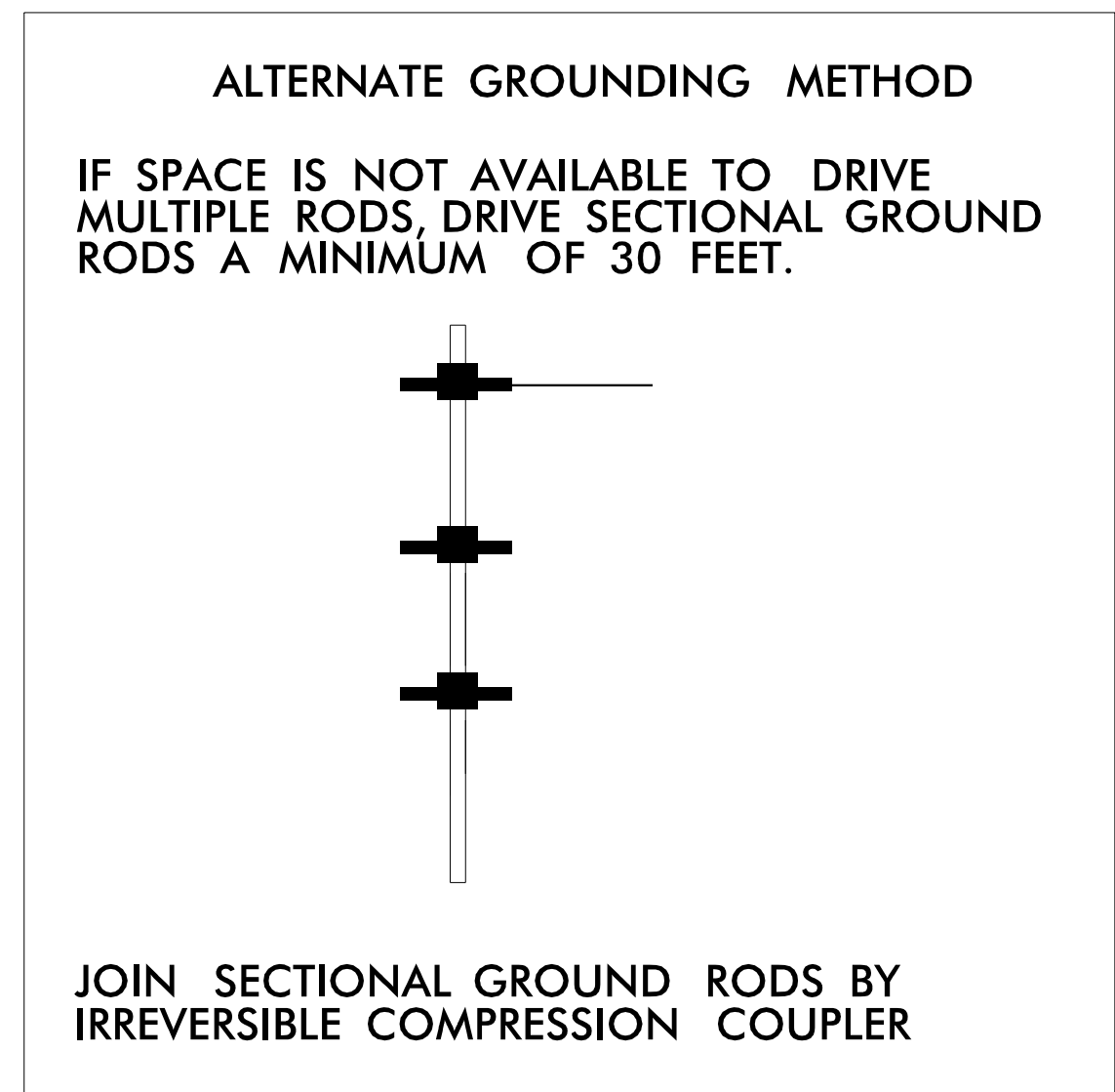
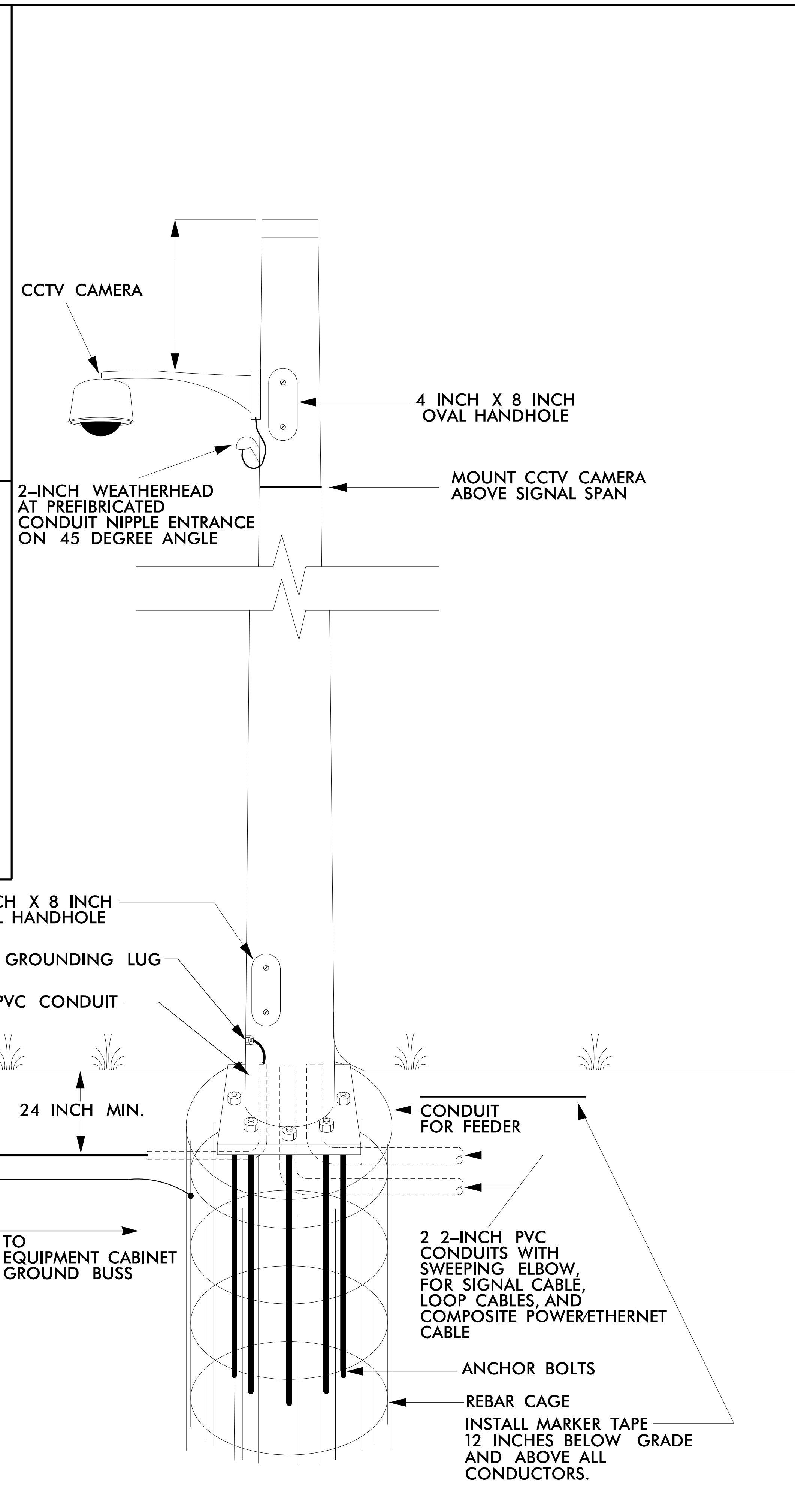
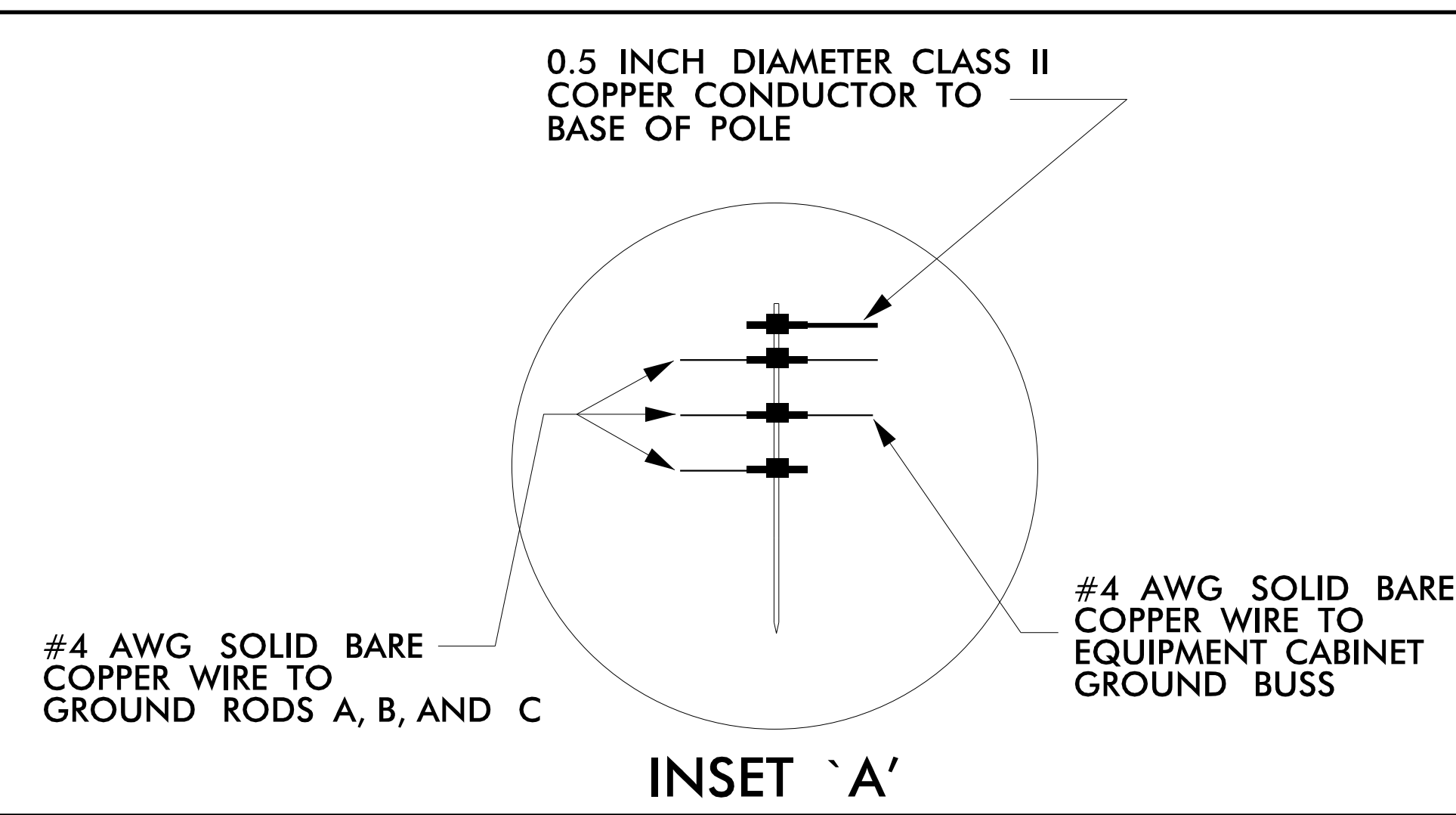
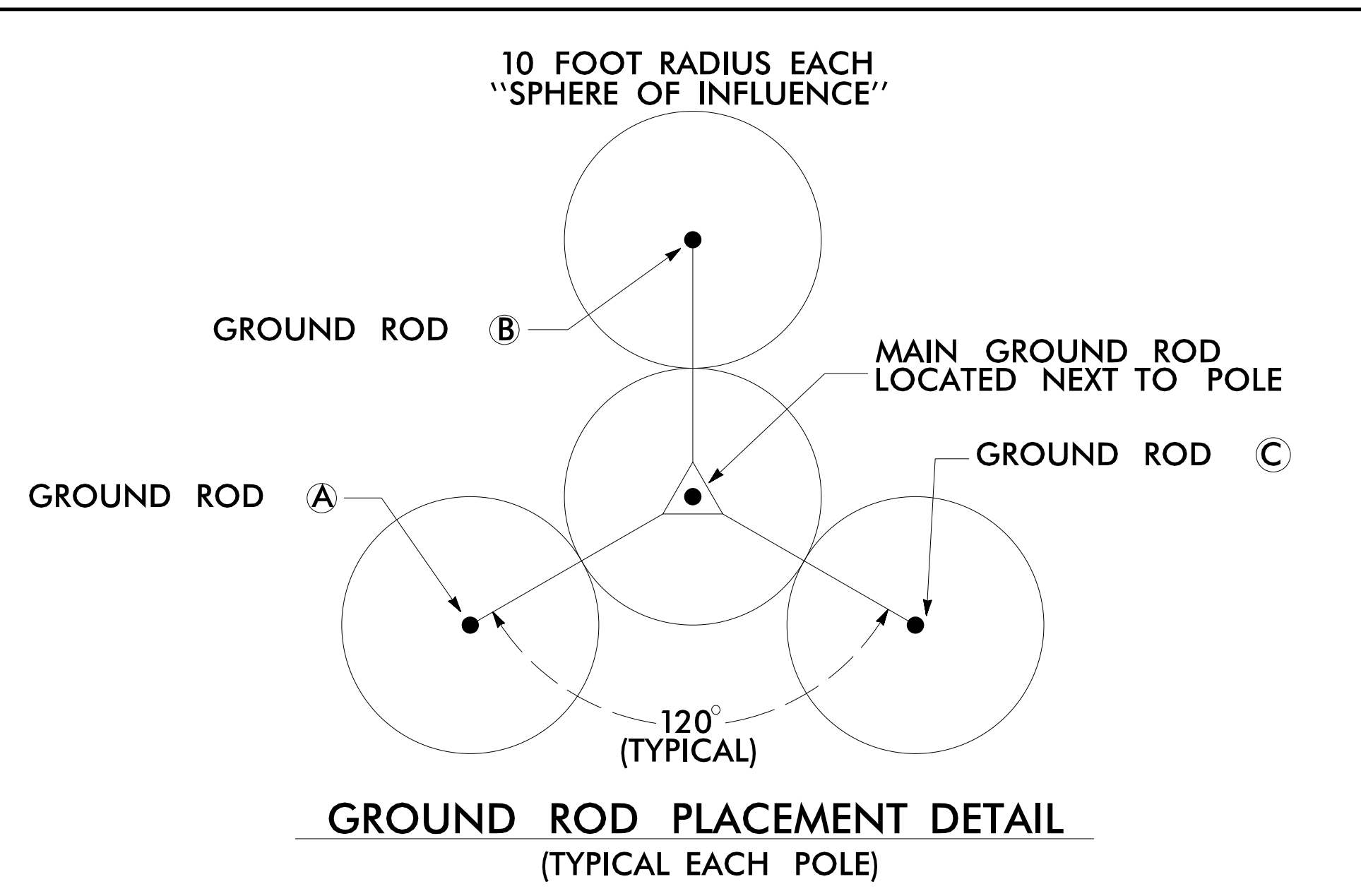
SHEET 1 OF 1
1743D01

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FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title





NOTES

1. BOND 0.5 INCH DIAMETER, 28 STRAND (MINIMUM) CLASS II COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP METHOD.
2. ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERSIBLE MECHANICAL CRIMP METHOD.
3. BOND #4 AWG SOLID BARE COPPER WIRE TO REBAR CAGE AND THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP.
4. ENSURE CAMERA HOUSING, CAMERA, AND PAN -TILT UNIT ARE BONDED TO POLE.
5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUSS AND NEUTRAL BUSS.
6. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30-FOOT SECTIONAL GROUND ROD WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3 - RADIAL GROUND RODS.
7. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.

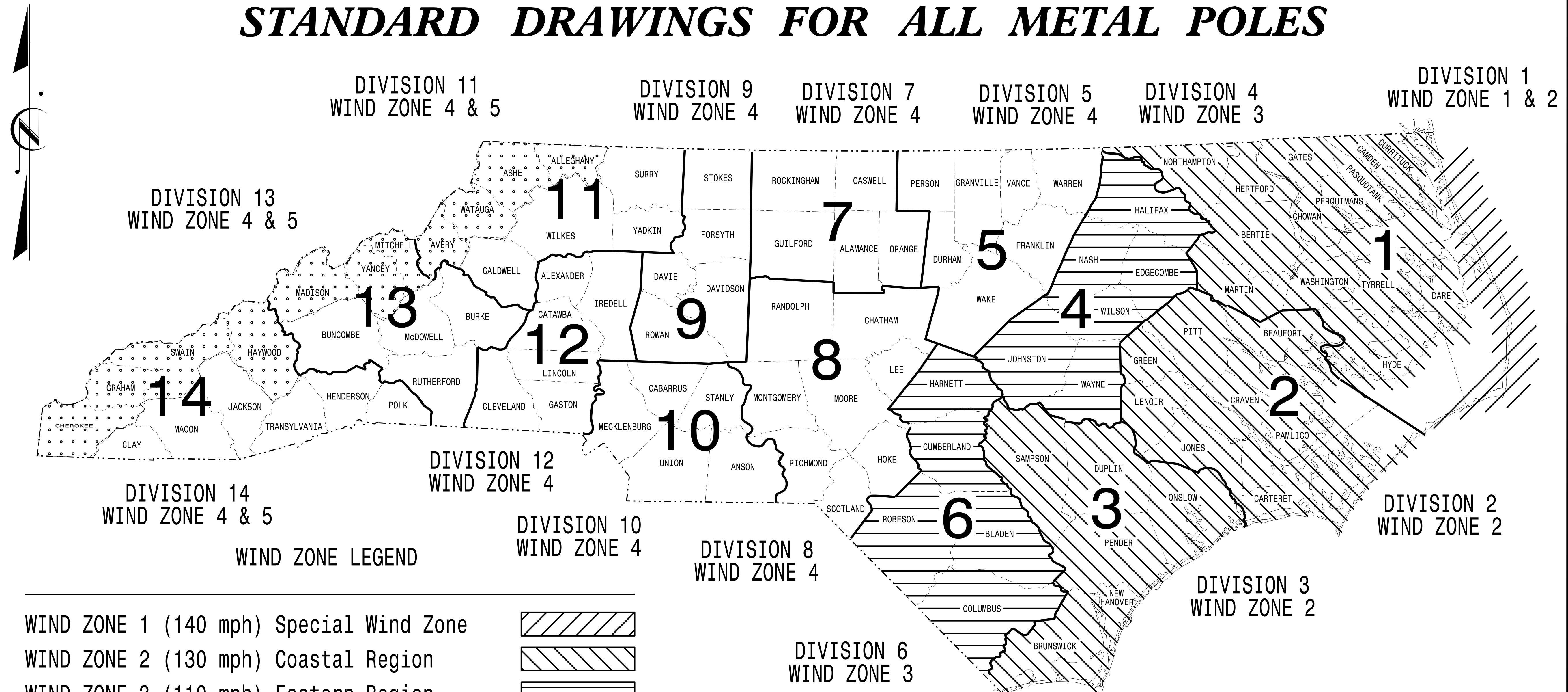
	CCTV CAMERA INSTALLATION FOR METAL SIGNAL POLE TYPICAL DETAIL	
	PLAN DATE: JANUARY 2018 PREPARED BY:	REVIEWED BY:
SCALE: 0	REVISIONS: 2018 STANDARD SPECIFICATIONS UPGRADE TO IRREVERSIBLE MECHANICAL CRIMP	INIT. DATE: A.J.S. 12/2017
750 N. Greenfield Pkwy., Garner, NC 27529		SEAL BRENDAN A. SEHAR ENGINEER 045256 3/21/2018

NC DOT METAL POLE STANDARDS

**STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS**

PROJECT I.D. NO. U-2412A	SHEET NO. Sig.M1
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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	
WIND ZONE 5 (120 mph) Special Wind Zone	

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013 **AASHTO** Standard Specifications 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

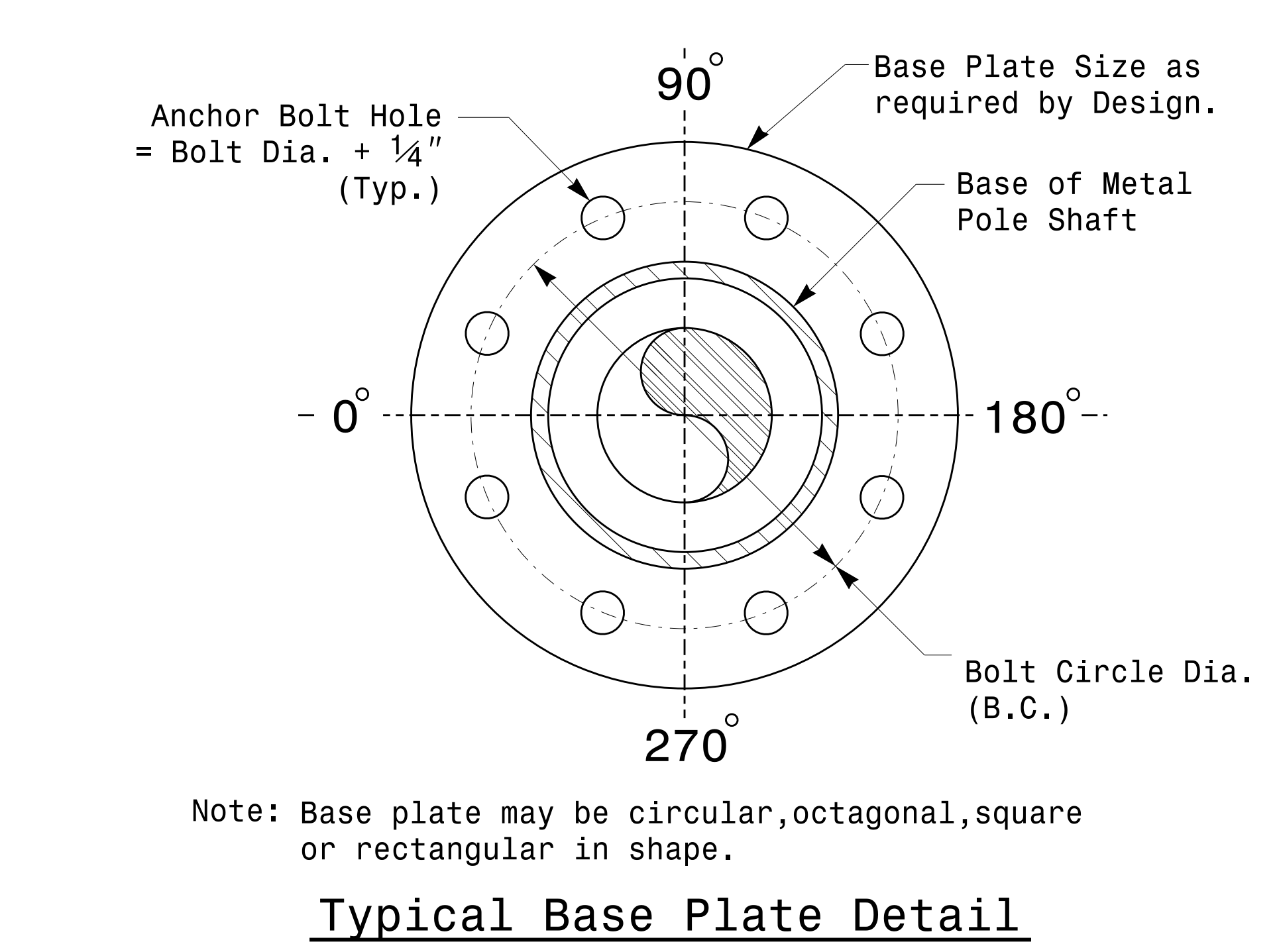
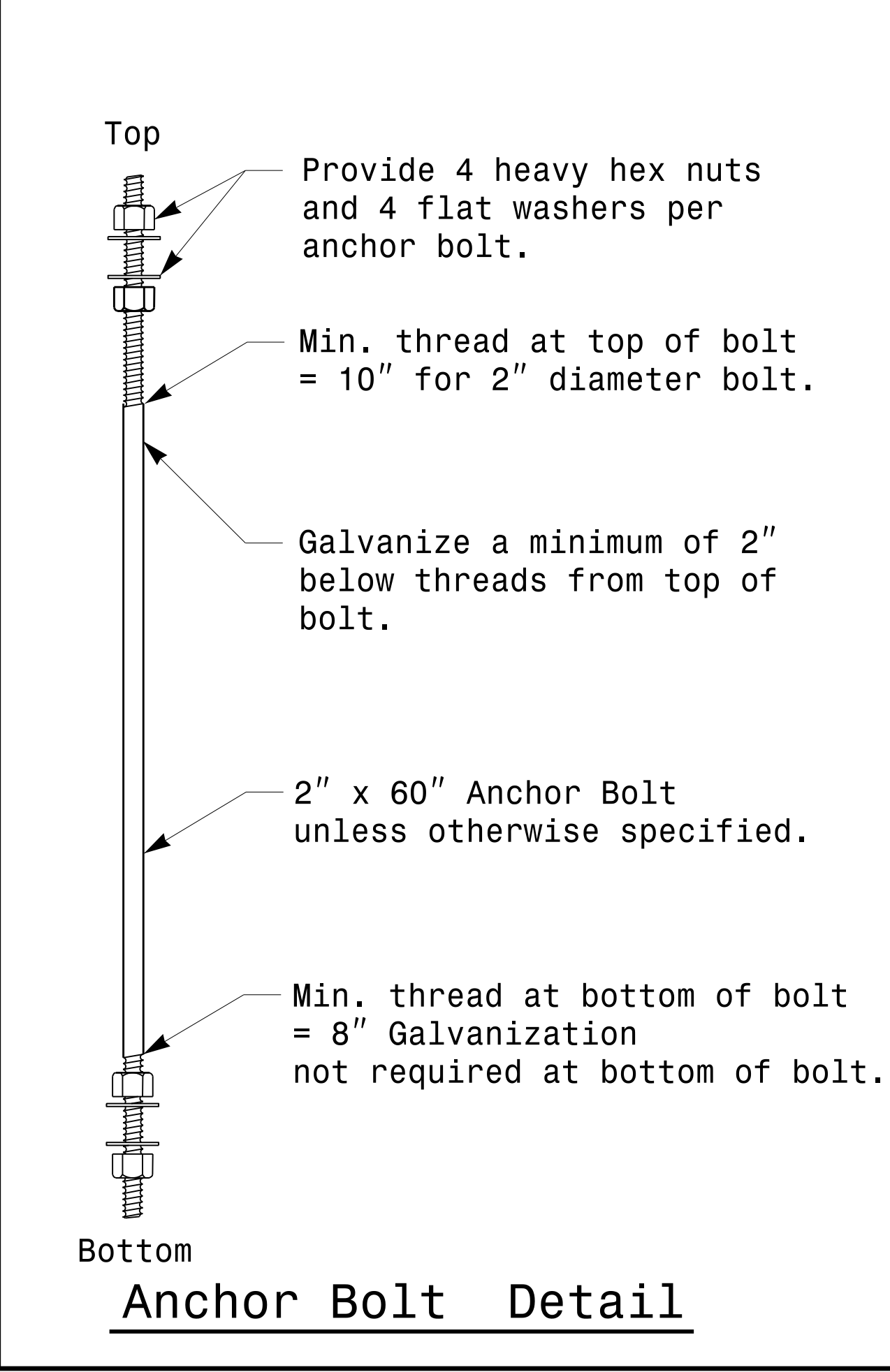
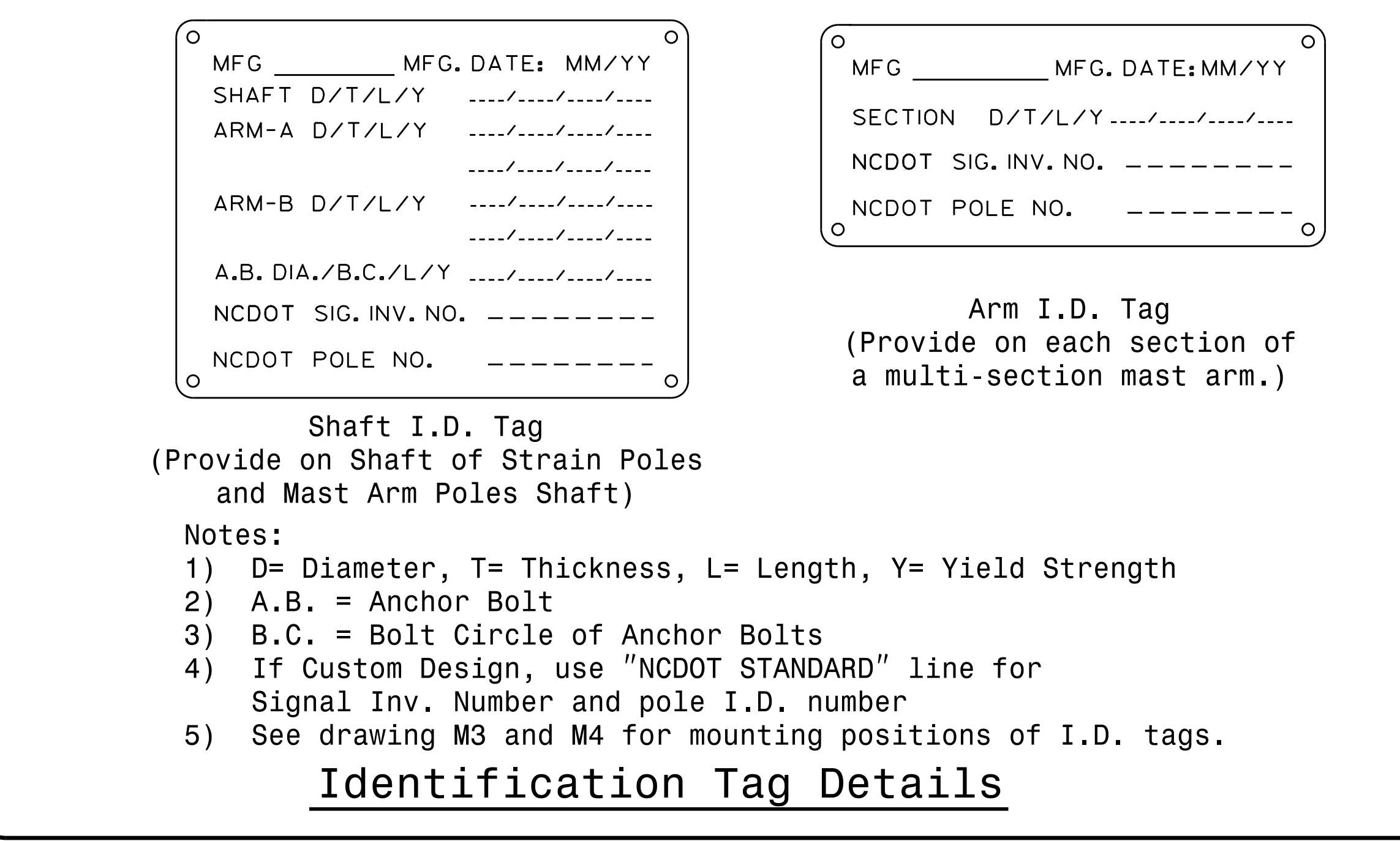
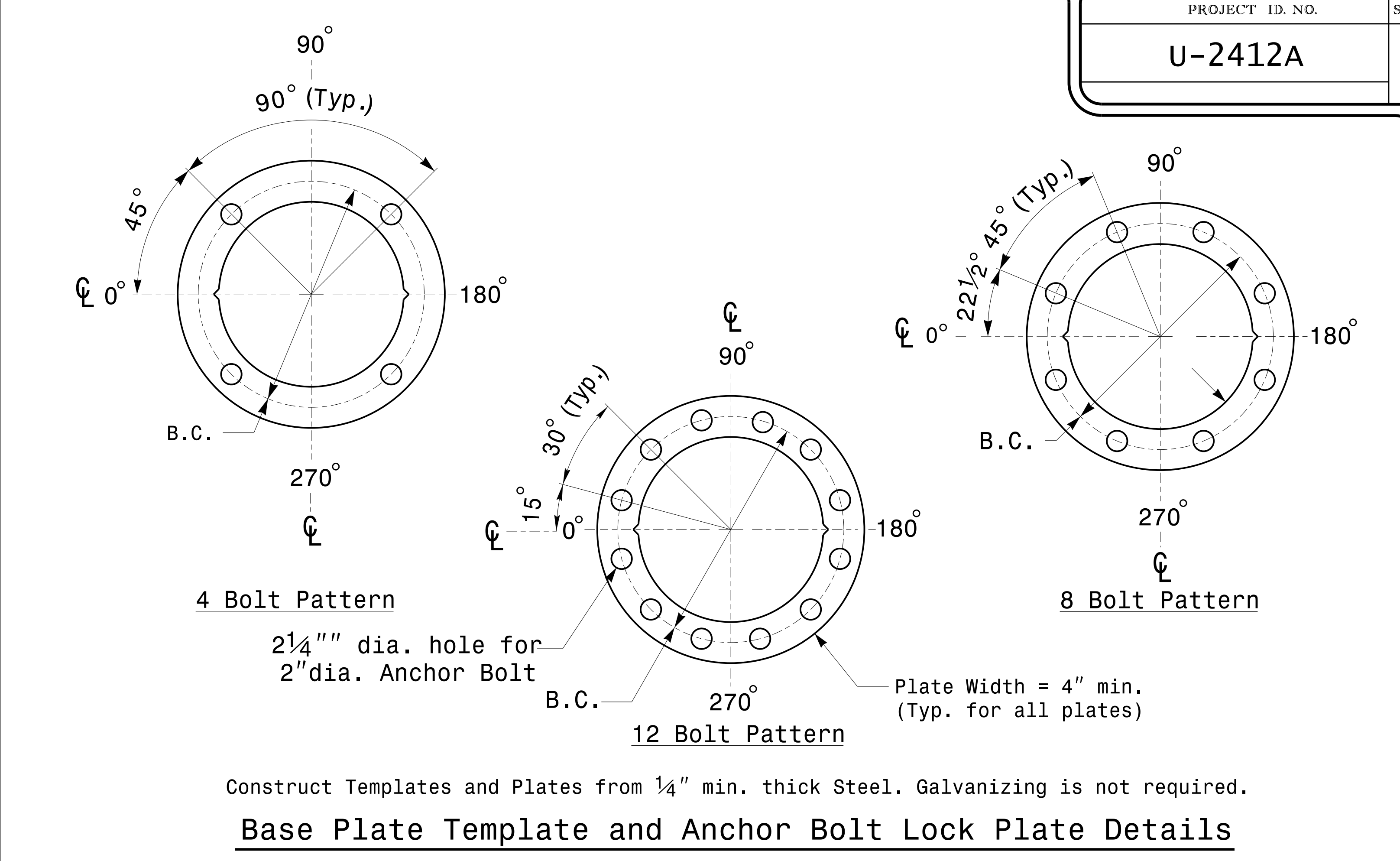
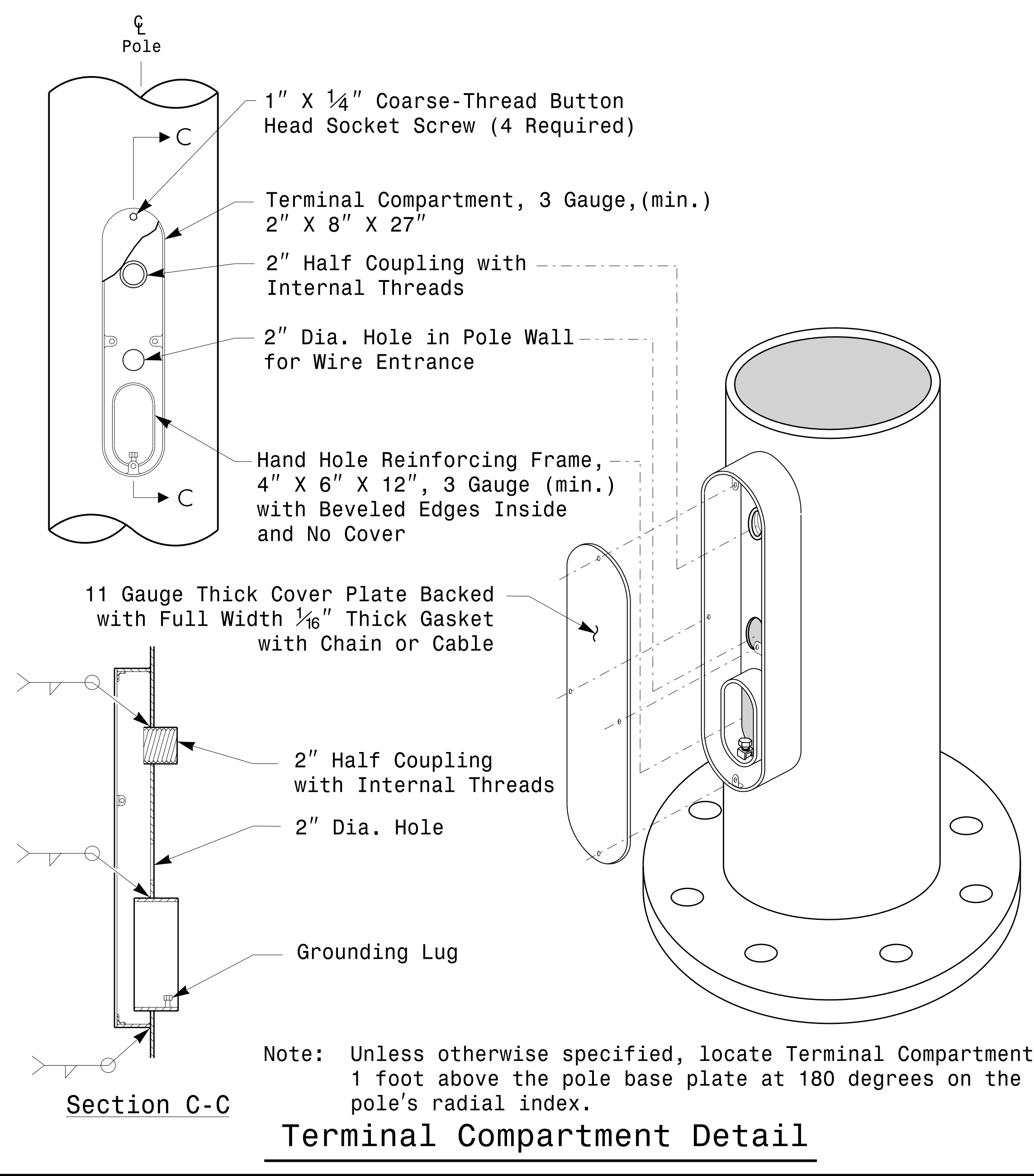
NC DOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER
 J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER
 D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

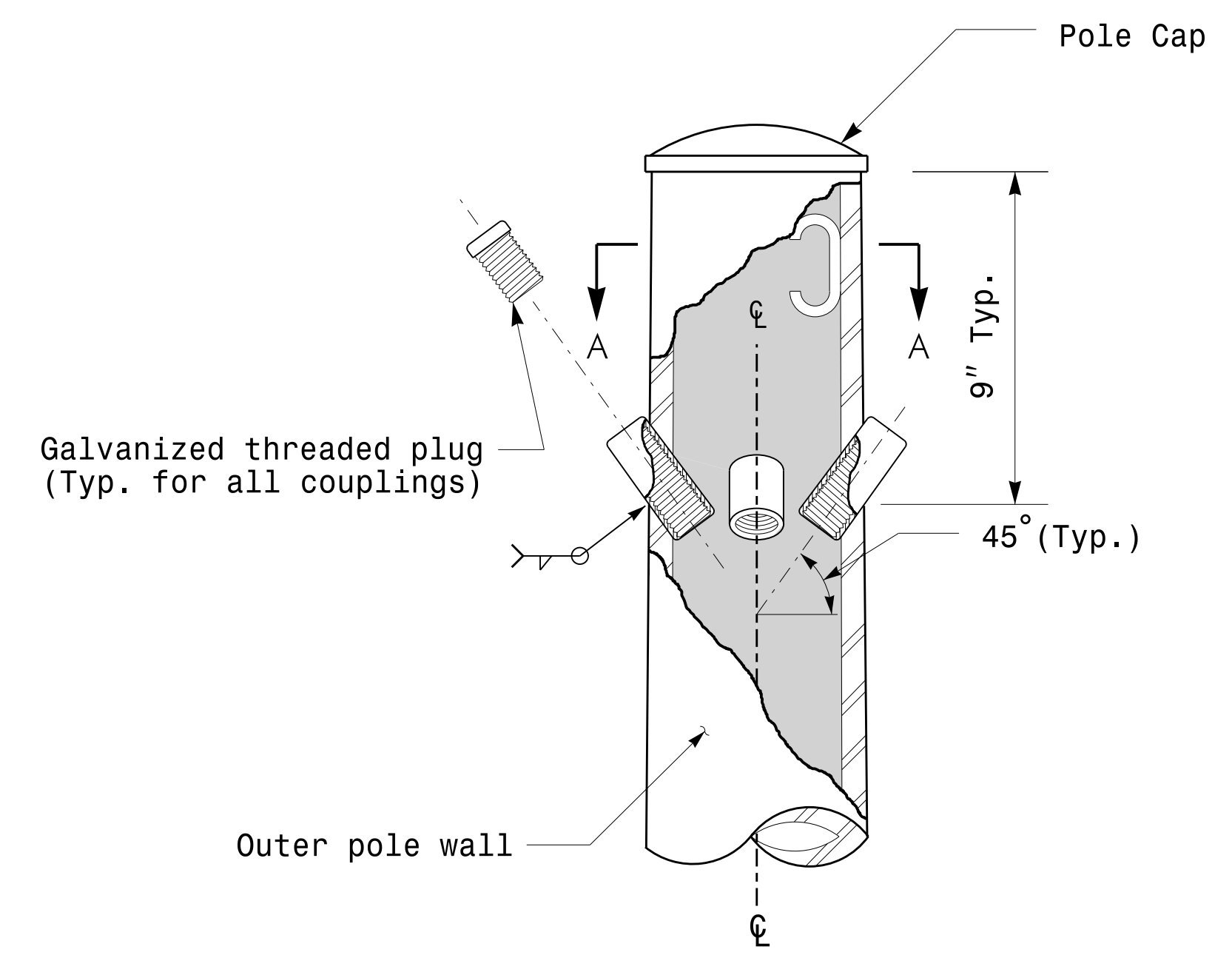
DocuSigned by:
Debesh C. Sarkar
DATE: 10/11/2017



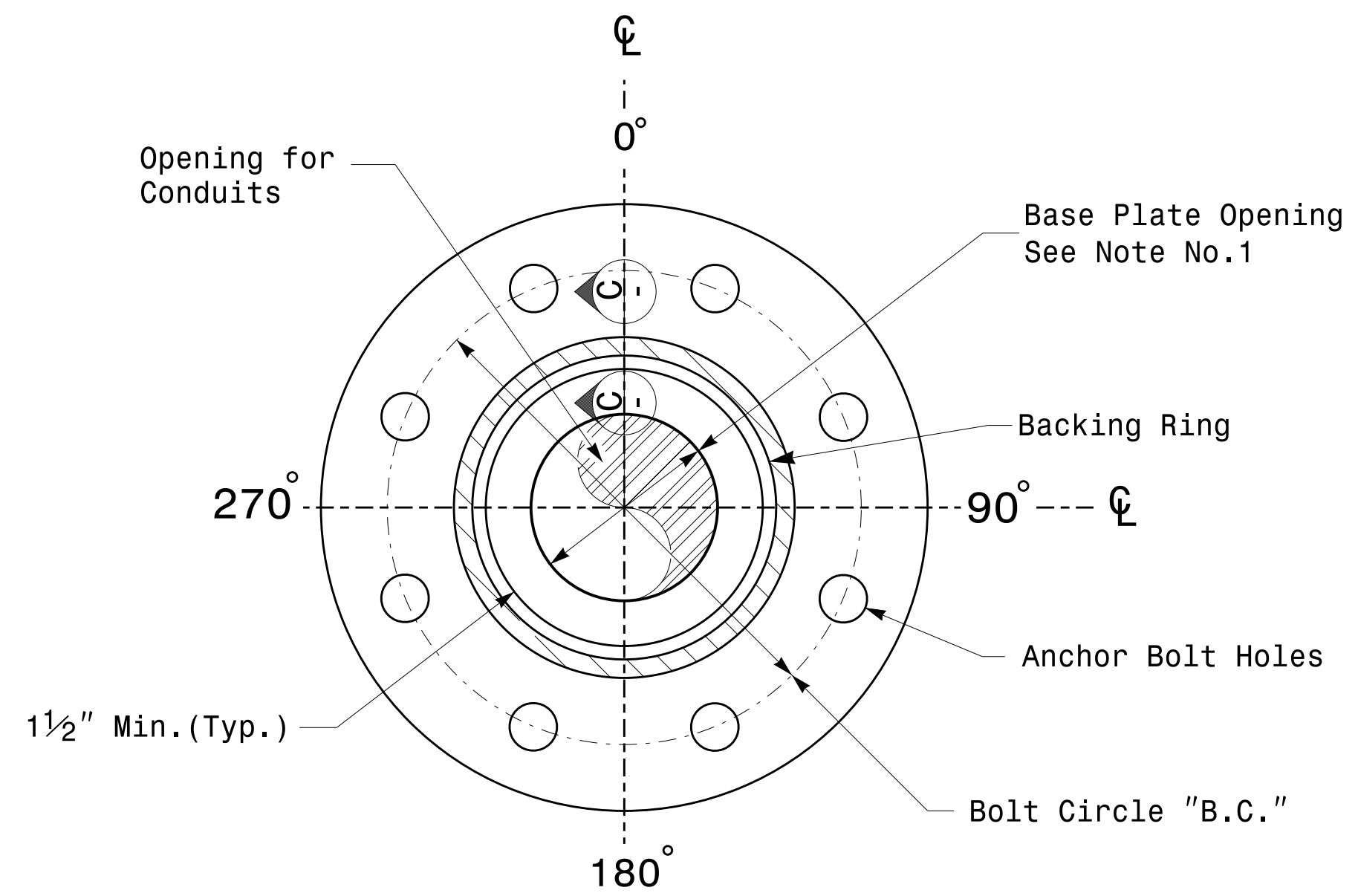
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For All Metal Poles</p>		<p>SEAL</p> <p>DocuSigned by: Dinesh C. Sarkar</p>
	<p>PLAN DATE: OCTOBER 2017</p> <p>DESIGNED BY: C.F. ANDREWS</p>	<p>PREPARED BY: N. BITTING</p> <p>REVIEWED BY: D.C. SARKAR</p>	
<p>SCALE: 0 NA NONE</p>	<p>10/11/2017 DATE</p>		

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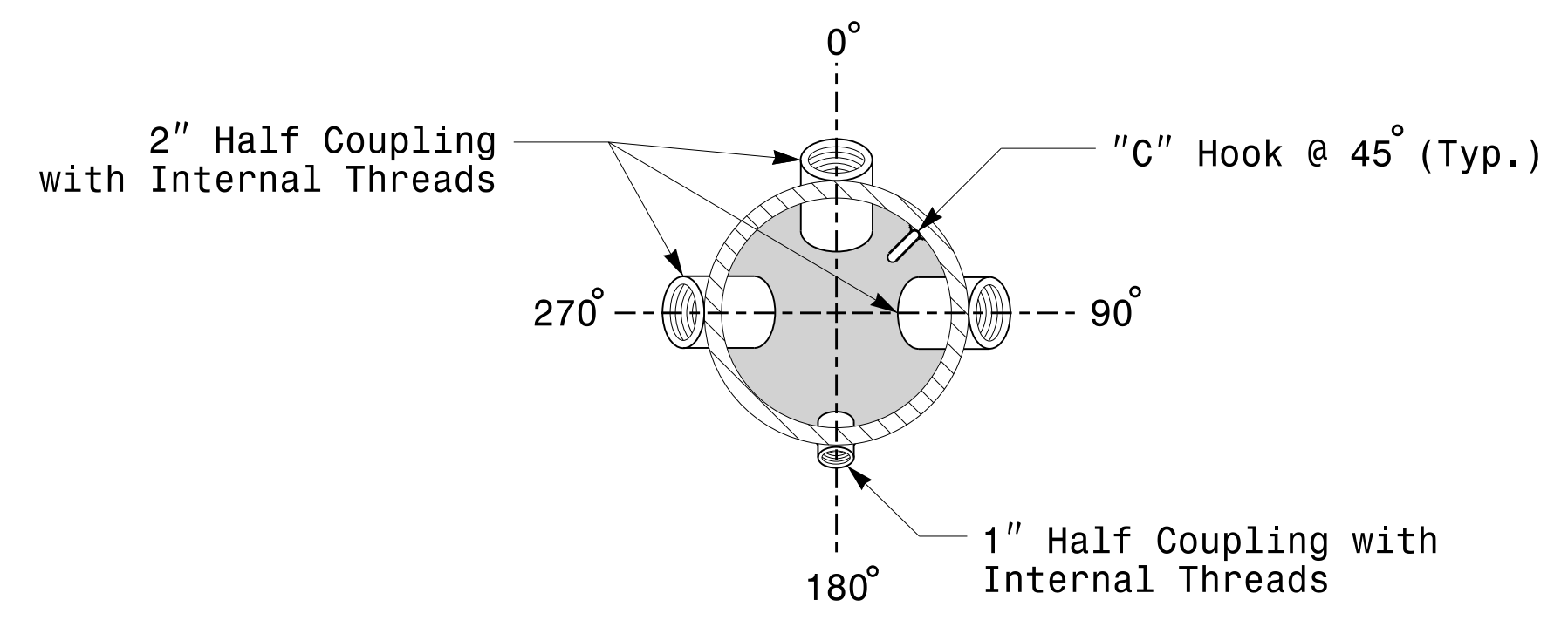
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



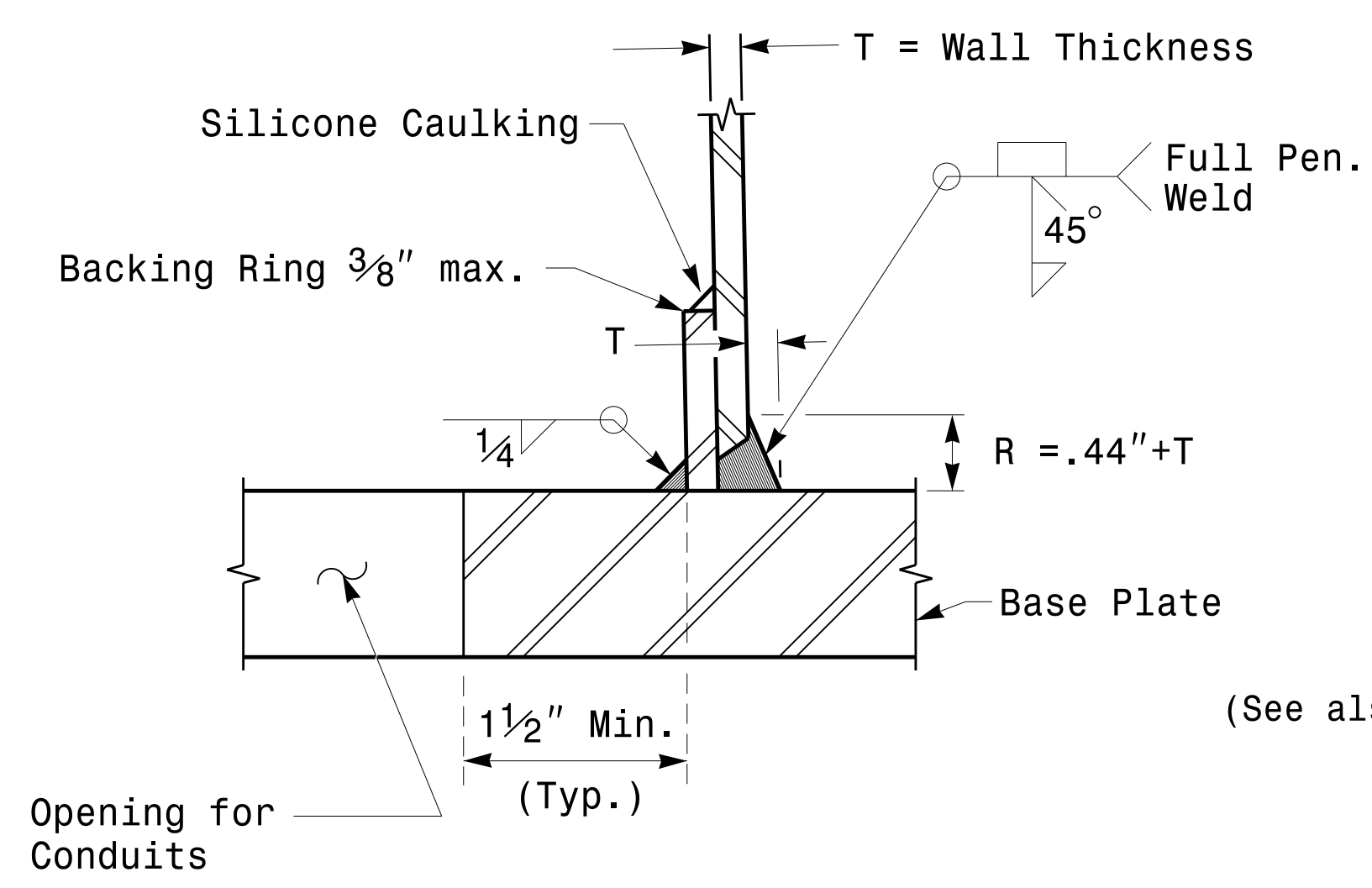
Cable Entrances at Top of Pole



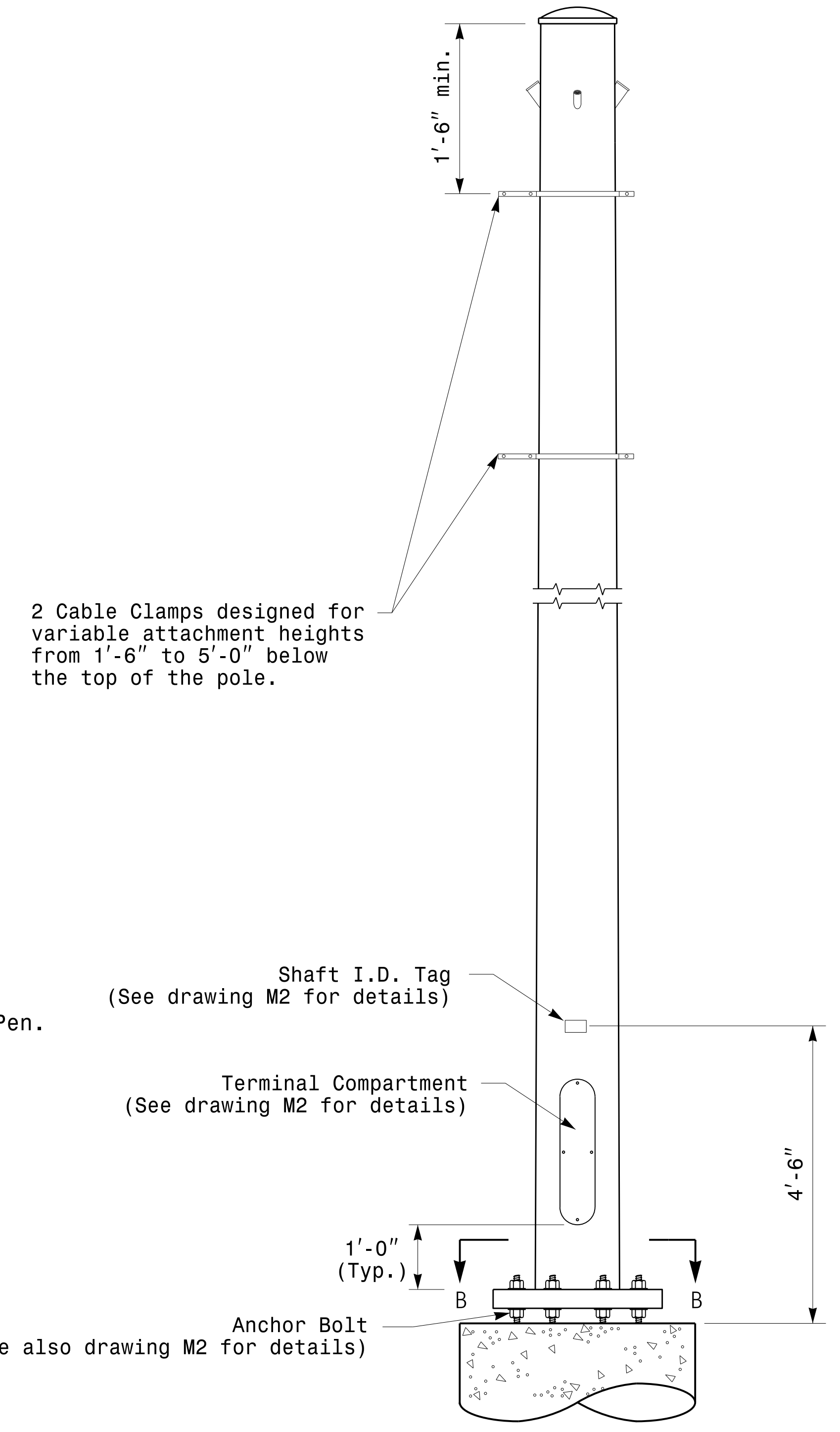
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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



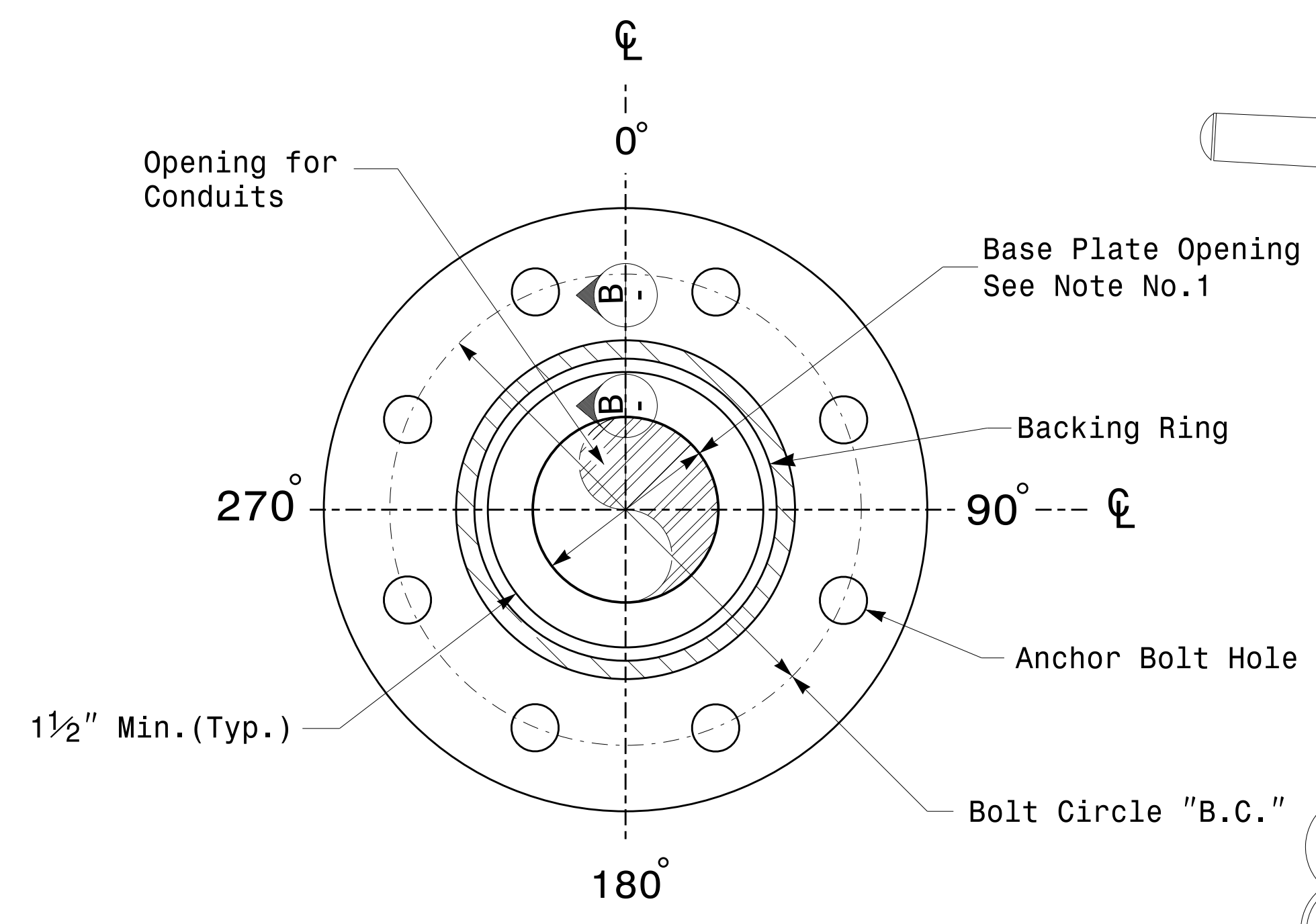
Monotube Strain Pole

<p>750 N. Greenleaf Pkwy, Garner, NC 27529</p>	Typical Fabrication Details For Strain Poles		
	PLAN DATE: OCTOBER 2017 DESIGNED BY: K.C. DURIGON	PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	
SCALE: NONE	REVISIONS:	INIT.:	DATE:
DocuSigned by: <i>Dibesh C. Sarkar</i>			10/11/2017

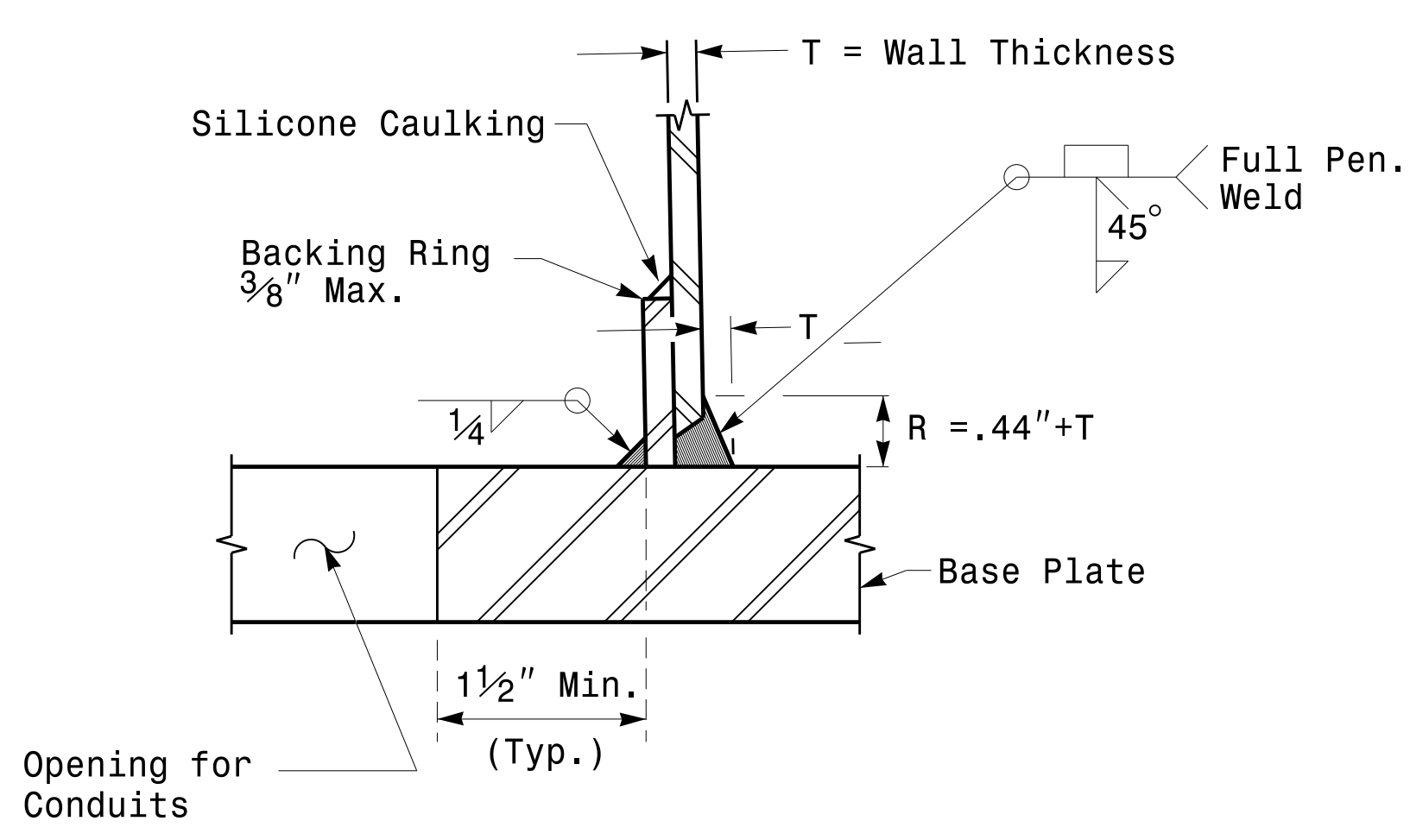
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Fabrication Details – Strain Poles

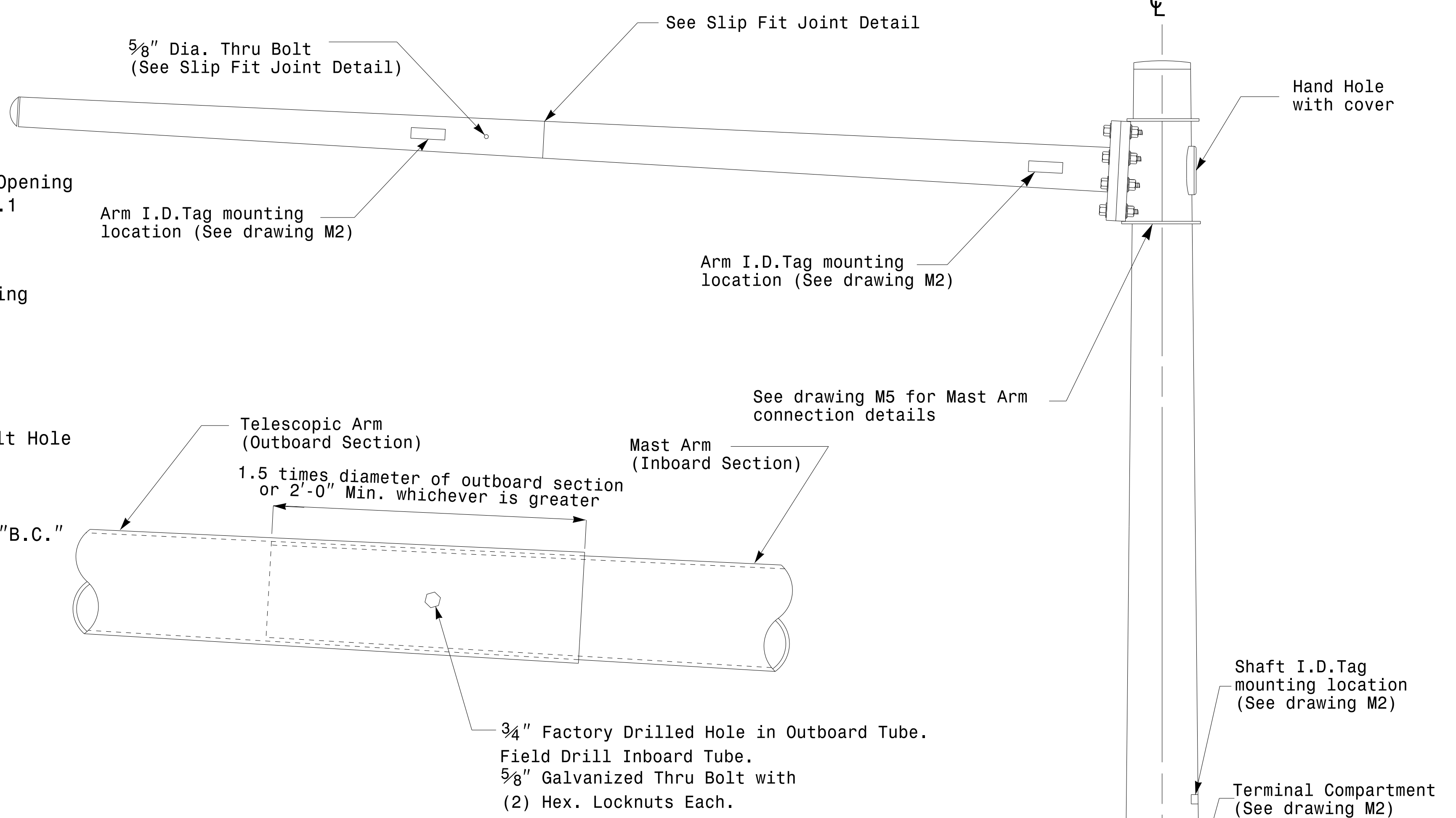
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



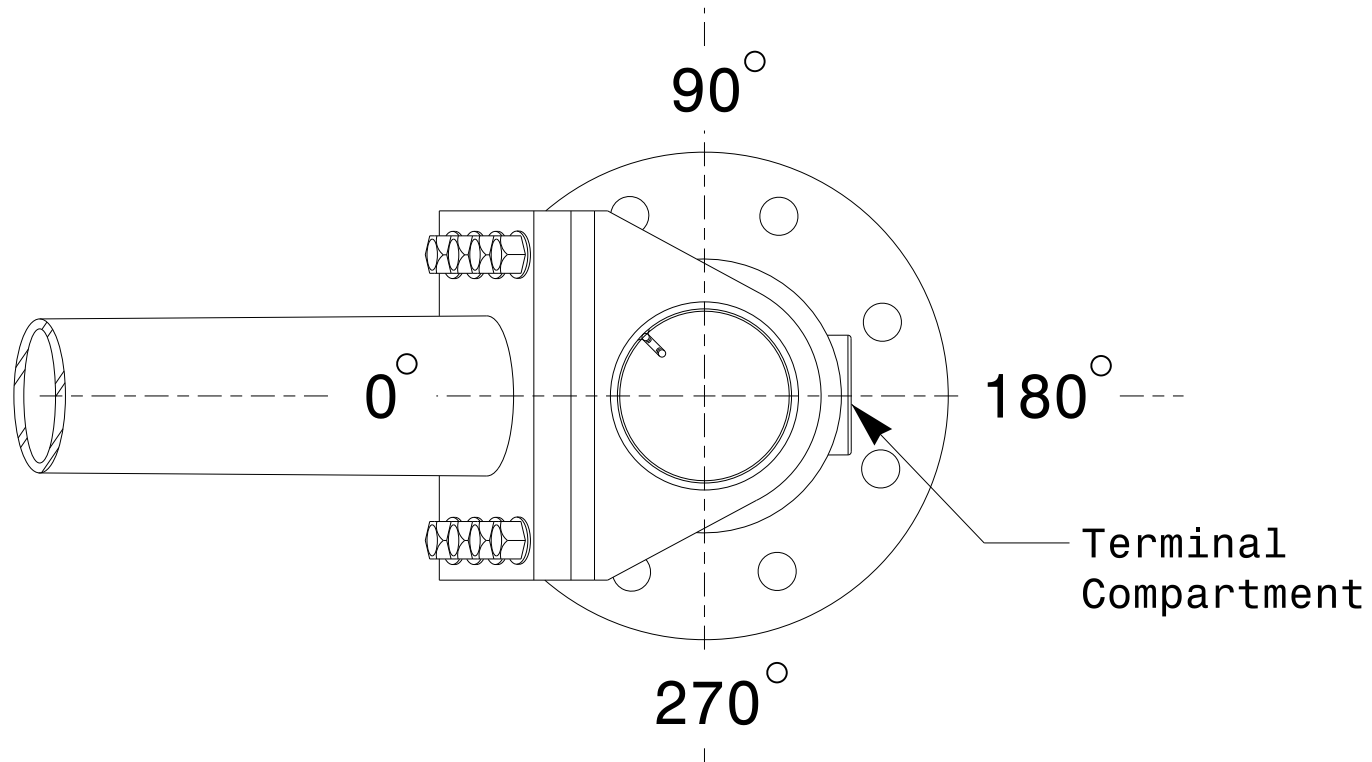
Section A-A
Pole Base Plate Details



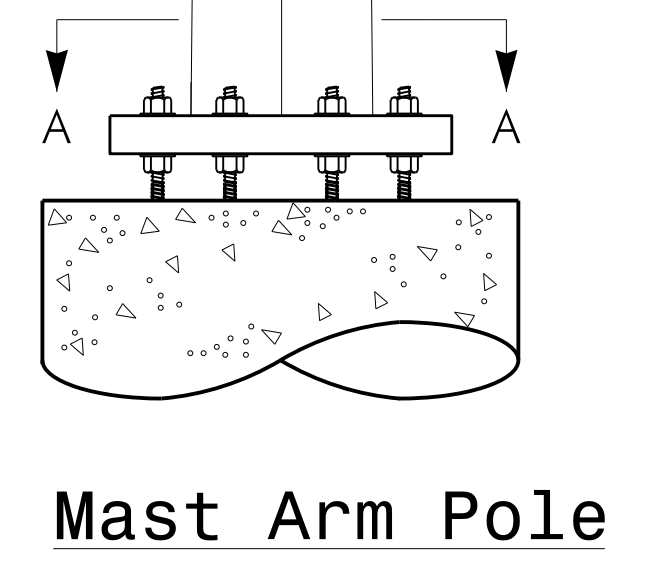
Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

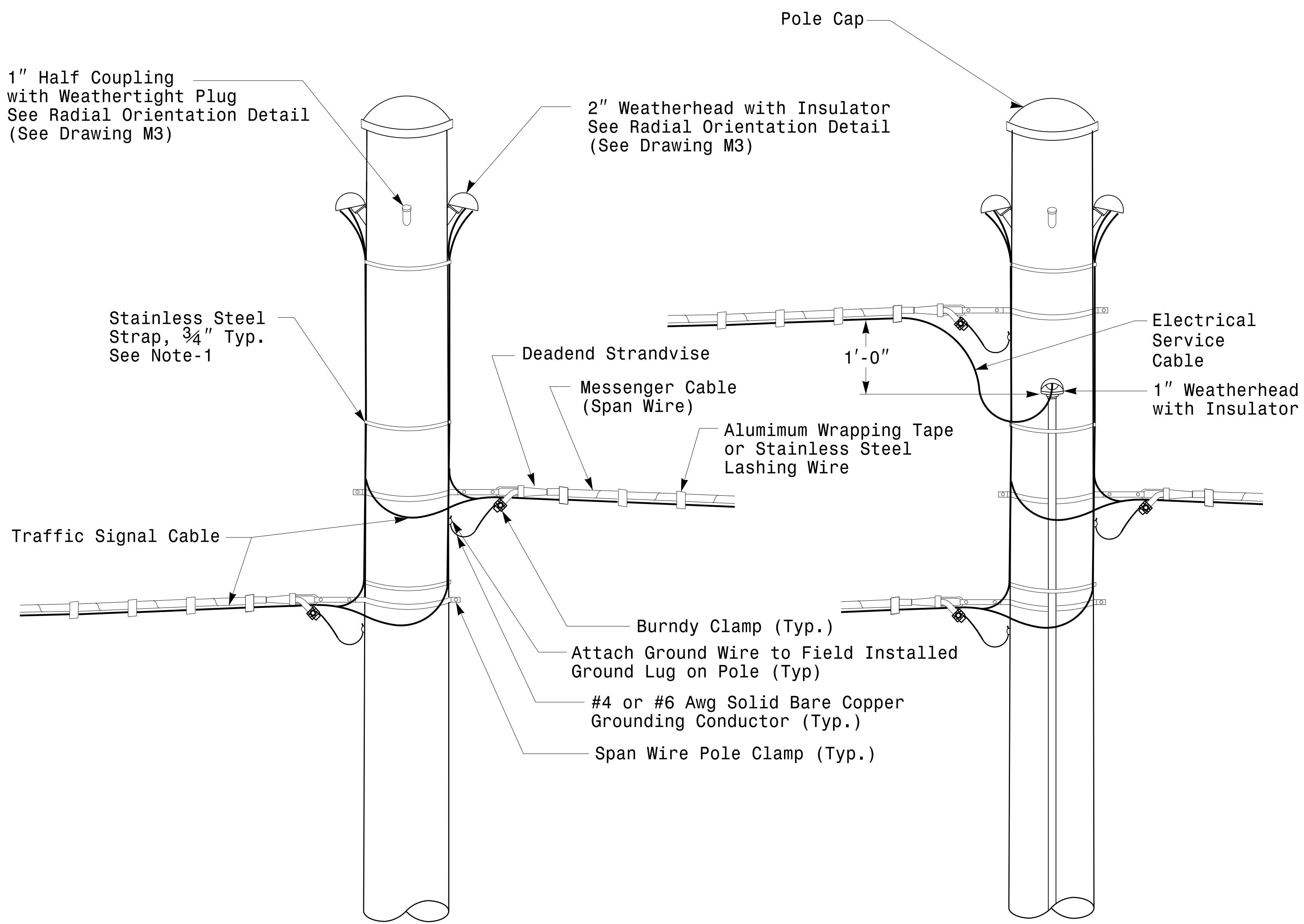


Mast Arm Pole

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 P1/2/2017

Fabrication Details - Mast Arm Poles

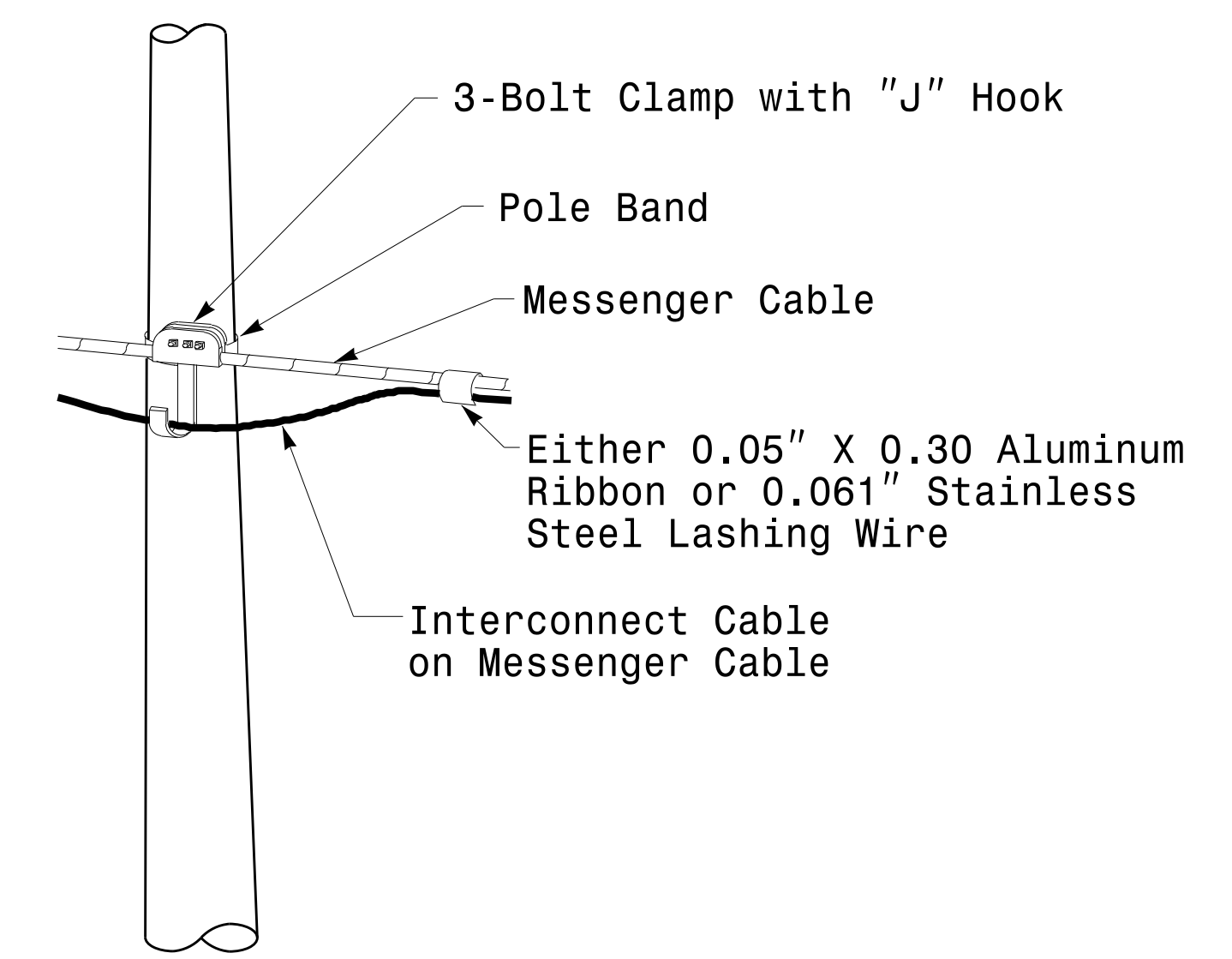
Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For Mast Arm Poles		SEAL D. C. SARKAR
	PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	DocuSigned by: DINESH C. SARKAR		10/11/2017 DATE



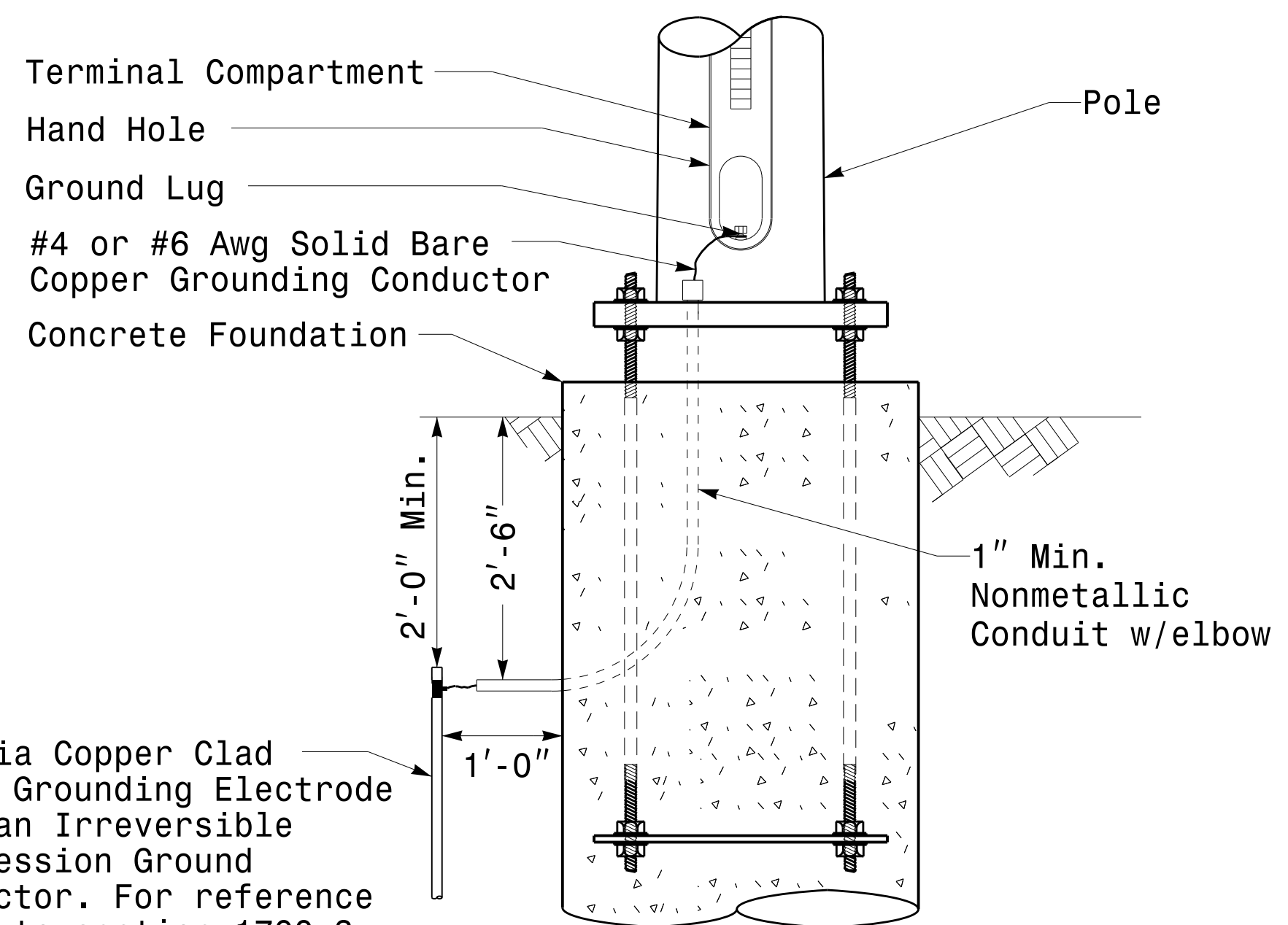
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" 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 2018.



Attachment of Cable to Intermediate Metal Pole



5/8" Dia Copper Clad Steel Grounding Electrode with an Irreversible Compression Ground Connector. For reference refer to section 1700-3 K and L for electrical grounding and bonding requirements, See Note 4.

Metal Pole Grounding Detail For Strain Pole and Mast Arm

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

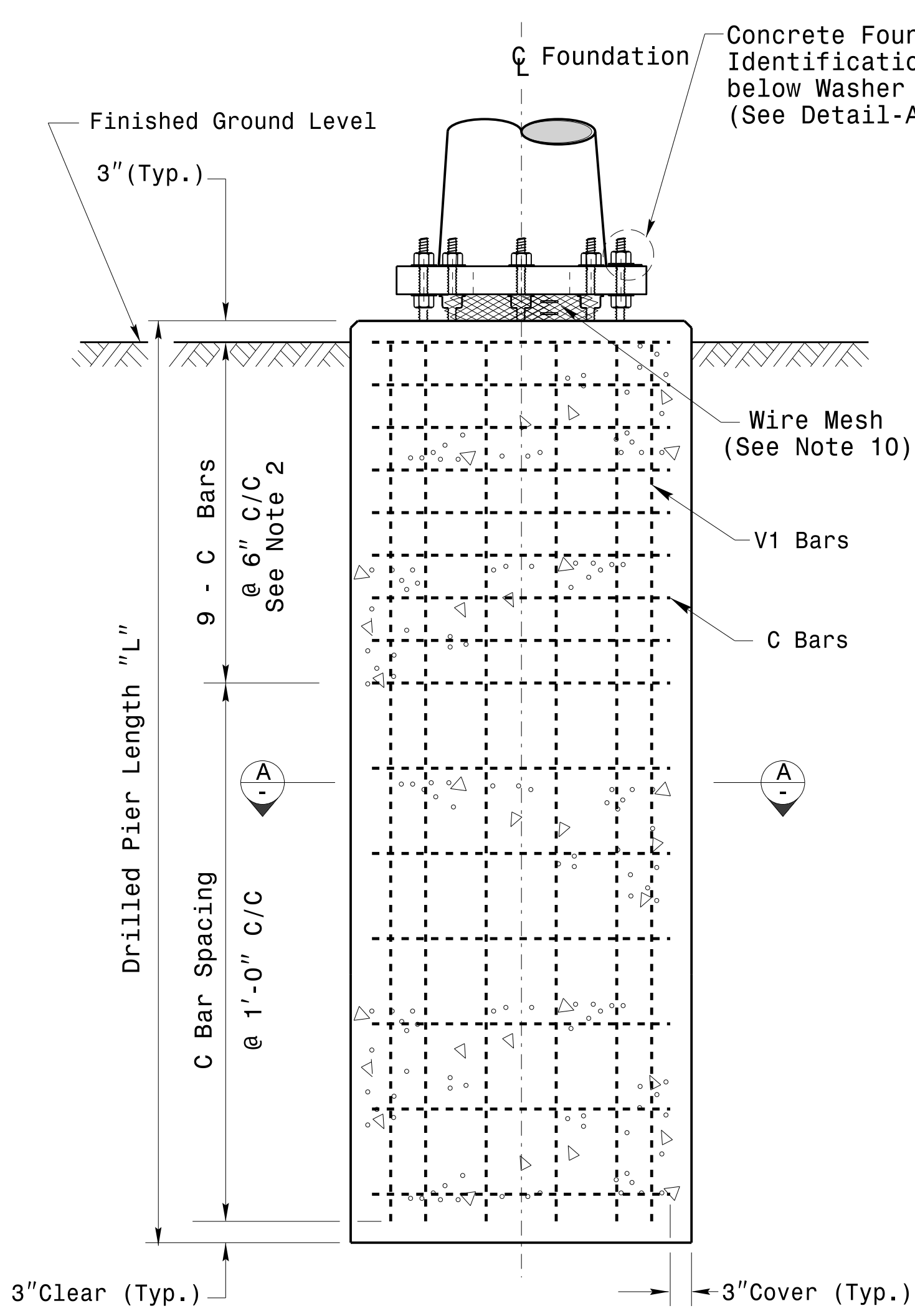
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Typical Fabrication Details For Strain Pole Attachments			
PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS		
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR		
REVISIONS	INIT.	DATE	

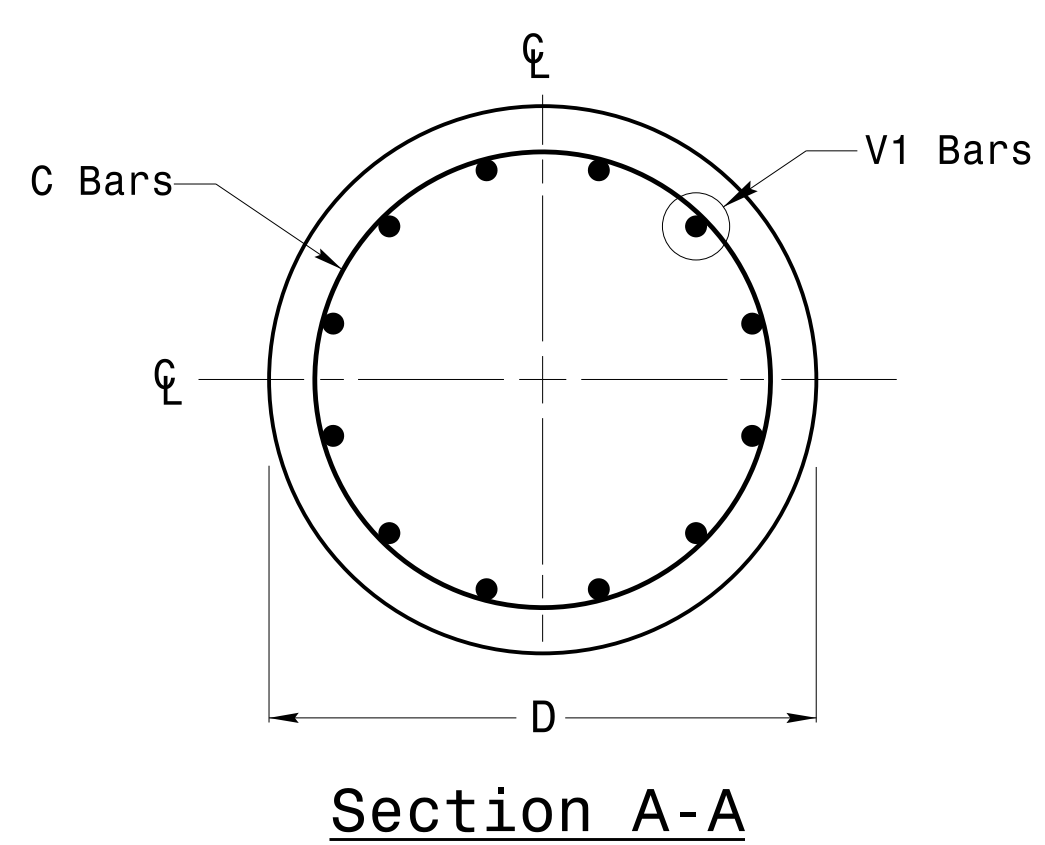
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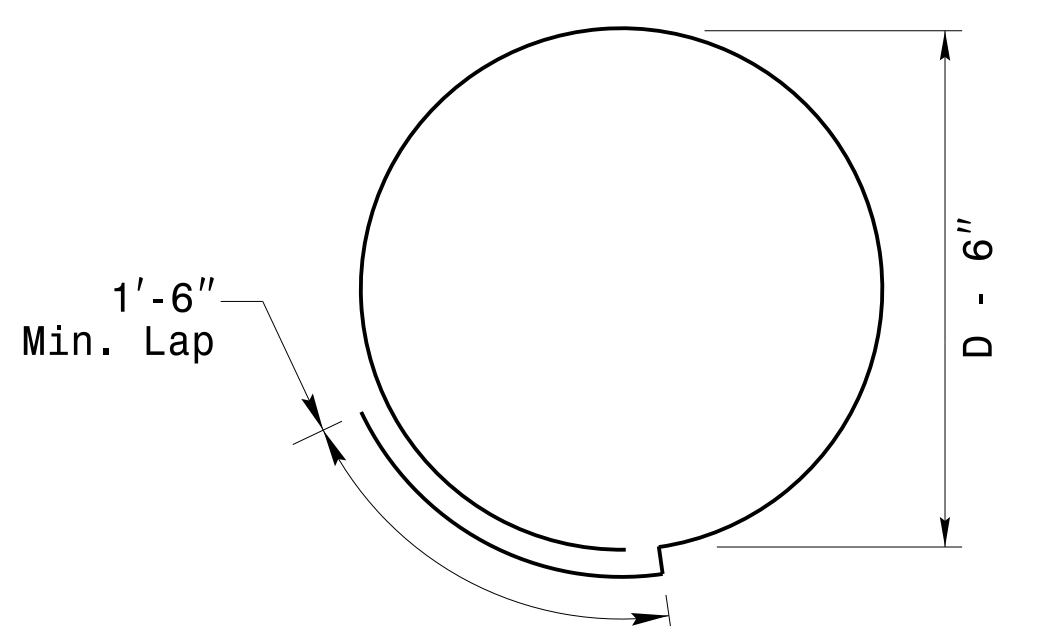
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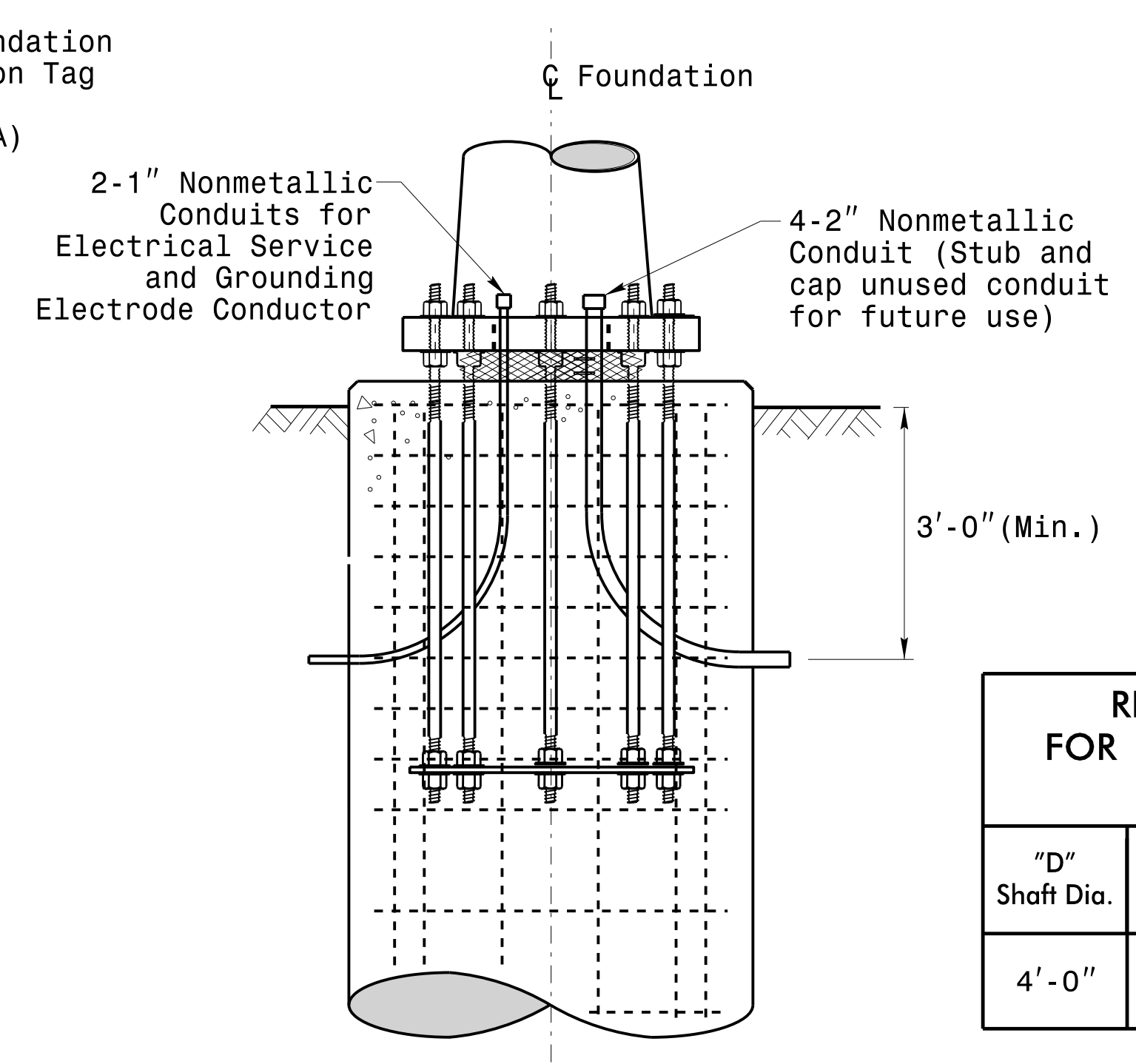
Concrete Shaft Elevation



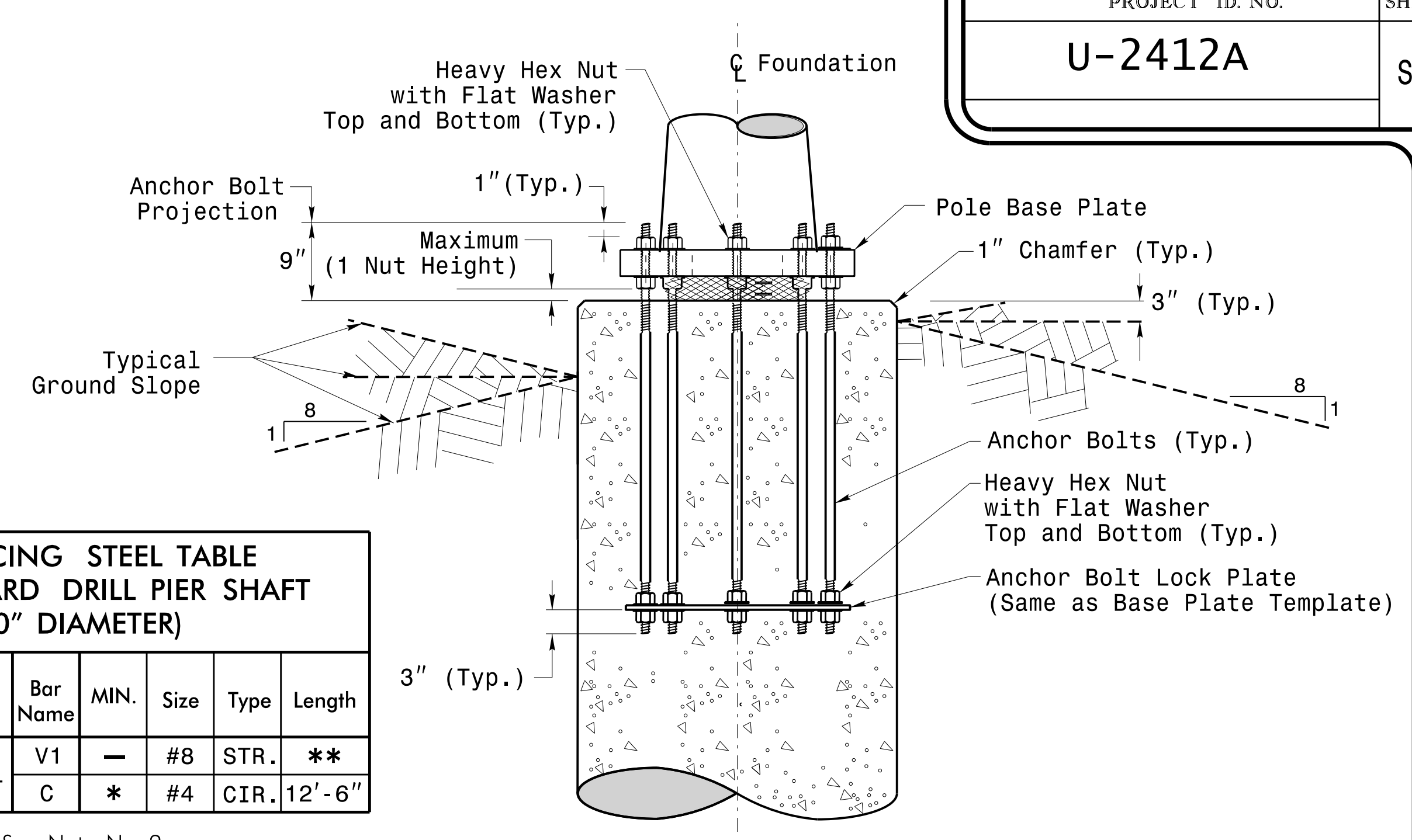
Section A-A



Typical "C" Bar Detail



Typical Foundation Conduit Details



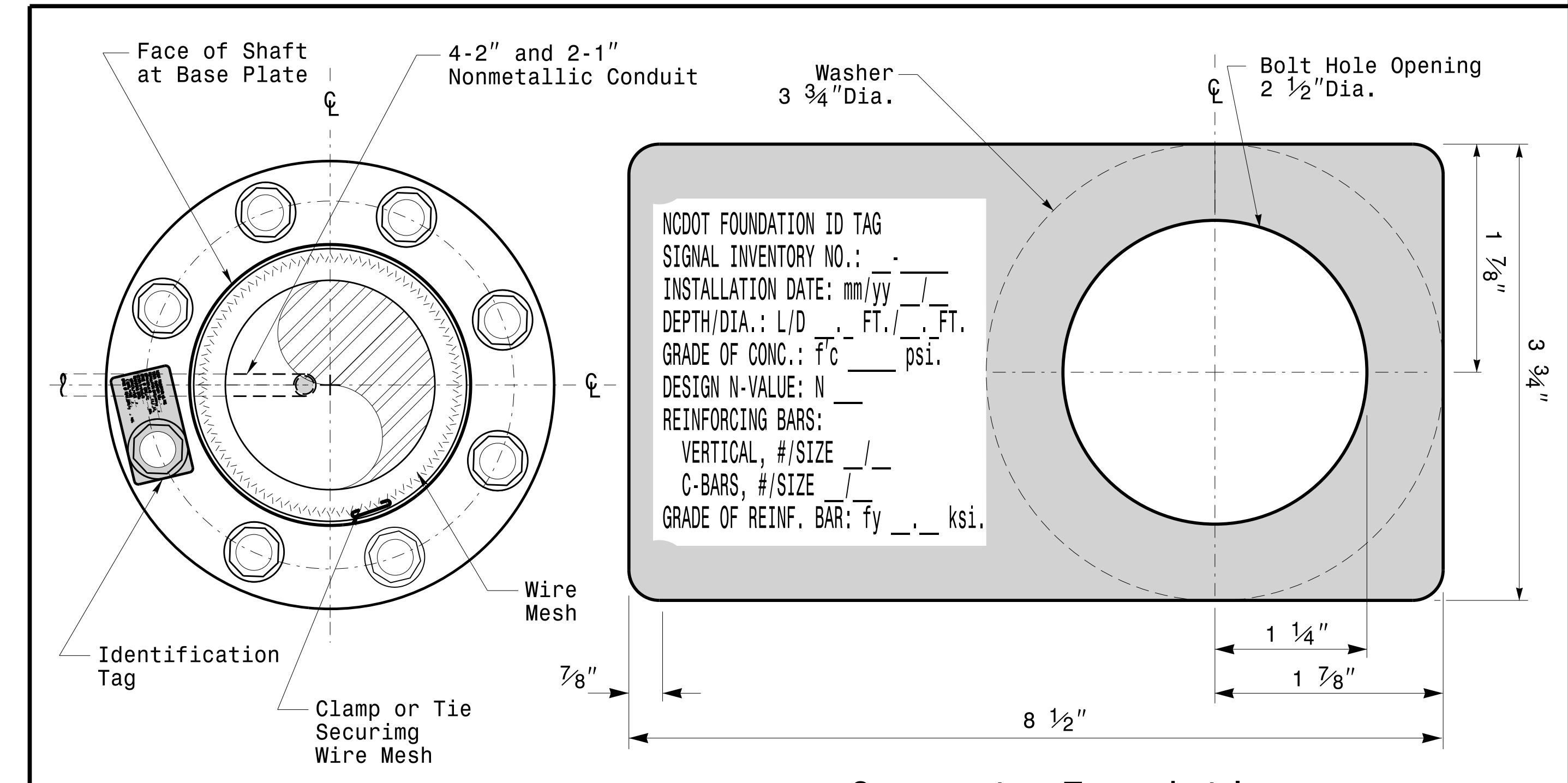
Typical Foundation Anchor Bolt Details
(Reinforcing Cage Not Shown for Clarity)

"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

General Notes:

- If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
- 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.
- 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.
- Provide 2" to 5" foundation projection above ground level depending on the ground slope.
- 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.
- Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 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](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
- Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
- Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
- 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.
- Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



Concrete Foundation Identification Tag Details

Detail-A

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

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Construction Details For Foundations</p>		
	<p>PLAN DATE: OCTOBER 2018</p> <p>DESIGNED BY: C.B. COGDILL</p> <p>PREPARED BY: N. BITTING</p> <p>REVIEWED BY: D.C. SARKAR</p>	<p>REV. NO.</p> <p>COMMENTS</p> <p>INIT.</p> <p>DATE</p>	

Construction Details - Foundations

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13560W115-Strain&sig Design Section Eastern Region\m\Sheets\2016\2014_Sig.M7_Shd_Construction_Detail\Is-Strain_Poles.dgn
PLOT

SOIL CONDITION

PROJECT ID. NO.	SHEET NO.
U-2412A	Sig.M8

		STANDARD STRAIN POLES					STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet							Reinforcement				
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
					Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	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
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		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
		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
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		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
		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
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		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
		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
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		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
		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
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		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
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

General Notes:

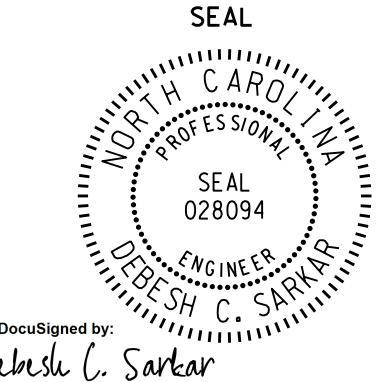
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

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

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



SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
028094
D. C. SARKAR

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: OCTOBER 2017 DESIGNED BY: C. B. COGDILL
 PREPARED BY: N. BITTING REVIEWED BY: D. C. SARKAR

REVISIONS: _____ DATE: _____
 Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn. N.B. 7/12/2015

SCALE: 0 NA NONE

DocuSigned by:
D. C. SARKAR

10/11/2017
DATE

11-007-2017-08-10
S:\112450415 Signal\Signal Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M8 Std. Strain Pole Found.-Saturated Soil Cond\11-007-2017-08-10.rvt

- 1 INSTALL COMPOSITE CCTV CABLE
- 2 INSTALL LOW VOLTAGE POWER CABLE (24VAC)
- 3 INSTALL COMPOSITE POWER/ETHERNET CABLE
- 4 INSTALL SMFO CABLE
- 5 NOT USED
- 6 INSTALL FIBER-OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 INSTALL CONDUIT UNDERGROUND
- 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
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- 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

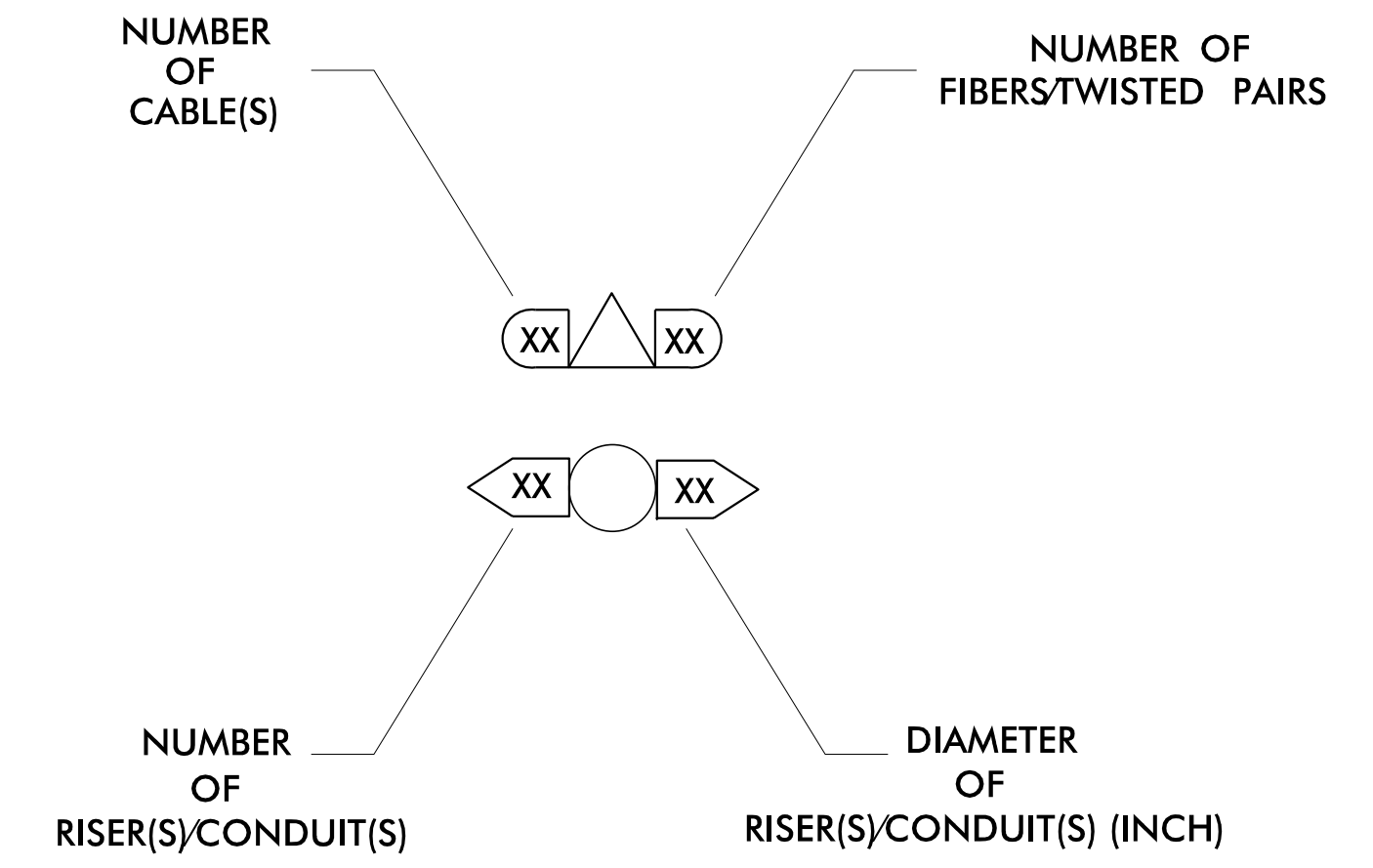
- 57 MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
- 58 INSTALL NEW ELECTRICAL SERVICE FOR CCTV
- 59 INSTALL NEW POLE MOUNTED CCTV CABINET (336)
- 60 INSTALL NEW BUILDING MOUNTED CCTV CABINET (336)
- 61 REMOVE EXISTING CCTV CAMERA ASSEMBLY
- 62 NEW CABINET ENTRANCE INTO NEW FOUNDATION
- 63 DRILL / CORE DRILL EXISTING FOUNDATION
- 64 INTERCEPT AND REROUTE EXISTING CONDUITS
- 65 BOND MESSENGER TO POLE GROUND
- 66 BOND RISER TO POLE GROUND
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- 70 INSTALL NEW POLE MOUNTED CCTV CABINET (NEMA TYPE 4)
- 71 HANDLASH AND INSTALL AERIAL CABLE PROTECTOR

LEGEND

	FO	NEW FIBER OPTIC COMMUNICATIONS CABLE
	TWIST PR	NEW TWISTED PAIR COMMUNICATIONS CABLE
	EXI	EXISTING COMMUNICATIONS CABLE
	REM	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
		NEW AERIAL GUY ASSEMBLY
		NEW CONDUIT
		EXISTING CONDUIT
	DD	NEW DIRECTIONAL DRILLED CONDUIT
	B&J	NEW BORED AND JACKED CONDUIT
		NEW JUNCTION BOX
		EXISTING JUNCTION BOX
		NEW WOOD POLE
		EXISTING WOOD POLE
		AERIAL SPLICE ENCLOSURE
		NEW METAL POLE
		EXISTING METAL POLE
		NEW CCTV ASSEMBLY
		NEW STANDARD GUY ASSEMBLY
		NEW SIDEWALK GUY ASSEMBLY
		NEW CABLE STORAGE RACKS (SNOW SHOES)
		EXISTING CABLE STORAGE RACK (SNOW SHOE)
		EXISTING CONTROLLER AND CABINET
		EXISTING SPLICE CABINET
		NEW SPLICE CABINET
		SIGNAL POLE
		SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

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



ATTACHMENT POINT:

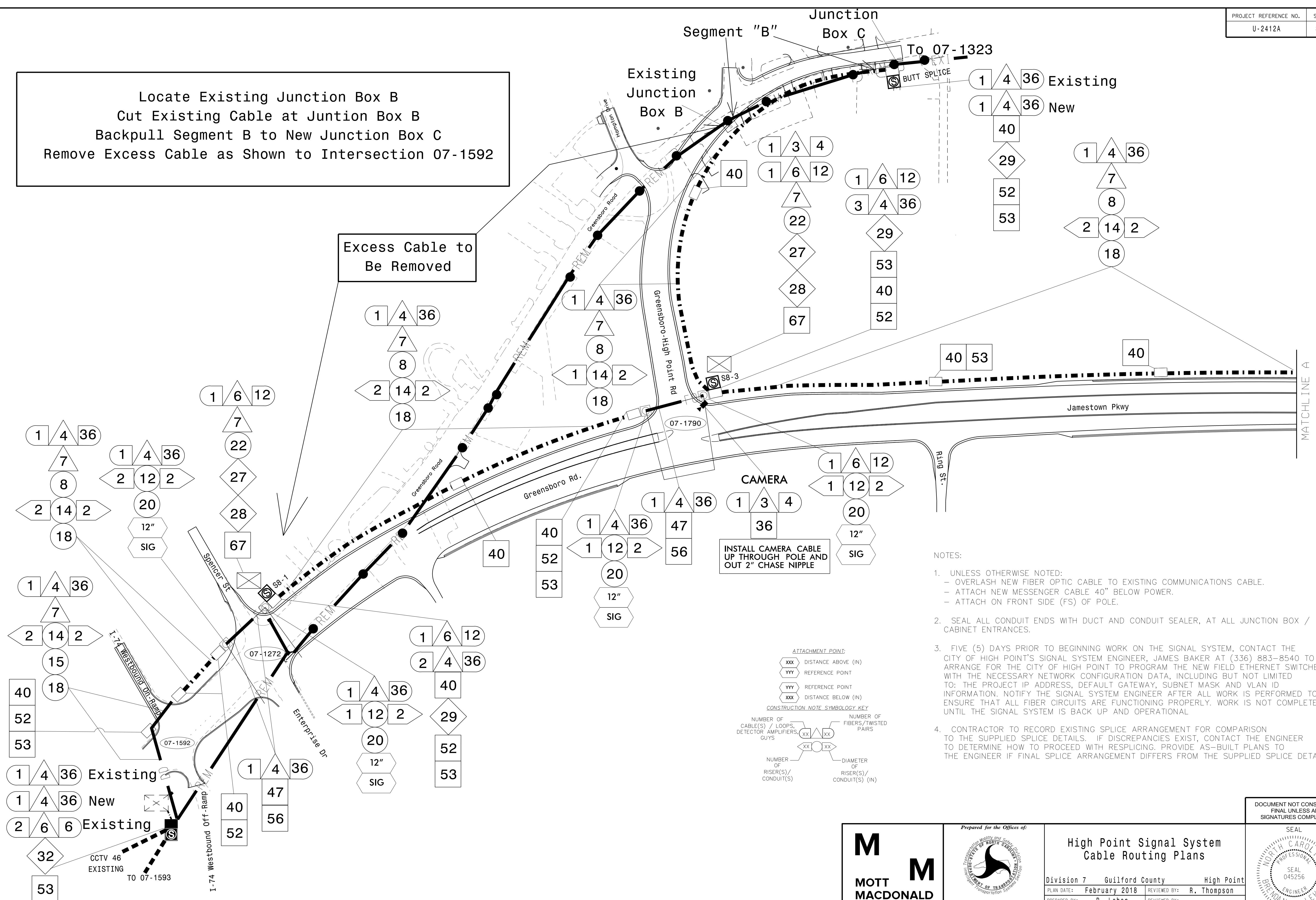
- DISTANCE ABOVE (IN)
- REFERENCE POINT
- REFERENCE POINT
- DISTANCE BELOW (IN)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 P.O. Box 700 Fuquay-Varina, NC 27526 www.mottmac.com License No. F-0669	Prepared for the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529	CONSTRUCTION NOTES		SEAL BRENDAN A. LEHAN PROFESSIONAL ENGINEER 045256 3/20/2018
		Division 7 Guilford County High Point PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON PREPARED BY: B. LEHAN	REVISIONS INIT. DATE	

Locate Existing Junction Box B
Cut Existing Cable at Junction Box B
Backpull Segment B to New Junction Box C
Remove Excess Cable as Shown to Intersection 07-1592

Excess Cable to Be Removed



CAMERA
INSTALL CAMERA CABLE UP THROUGH POLE AND OUT 2" CHASE NIPPLE

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.
- 3. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF HIGH POINT'S SIGNAL SYSTEM ENGINEER, JAMES BAKER AT (336) 883-8540 TO ARRANGE FOR THE CITY OF HIGH POINT TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE SIGNAL SYSTEM ENGINEER 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.
- 4. CONTRACTOR TO RECORD EXISTING 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 ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

ATTACHMENT POINT:
xxx DISTANCE ABOVE (IN)
yyy REFERENCE POINT
yyy REFERENCE POINT
xxx DISTANCE BELOW (IN)
CONSTRUCTION NOTE SYMBOLOLOGY KEY
NUMBER OF CABLE(S) / LOOPS, DETECTOR, AMPLIFIERS, GUY
NUMBER OF RISER(S) / CONDUIT(S)
NUMBER OF FIBERS / TWISTED PAIRS
DIAMETER OF RISER(S) / CONDUIT(S) (IN)

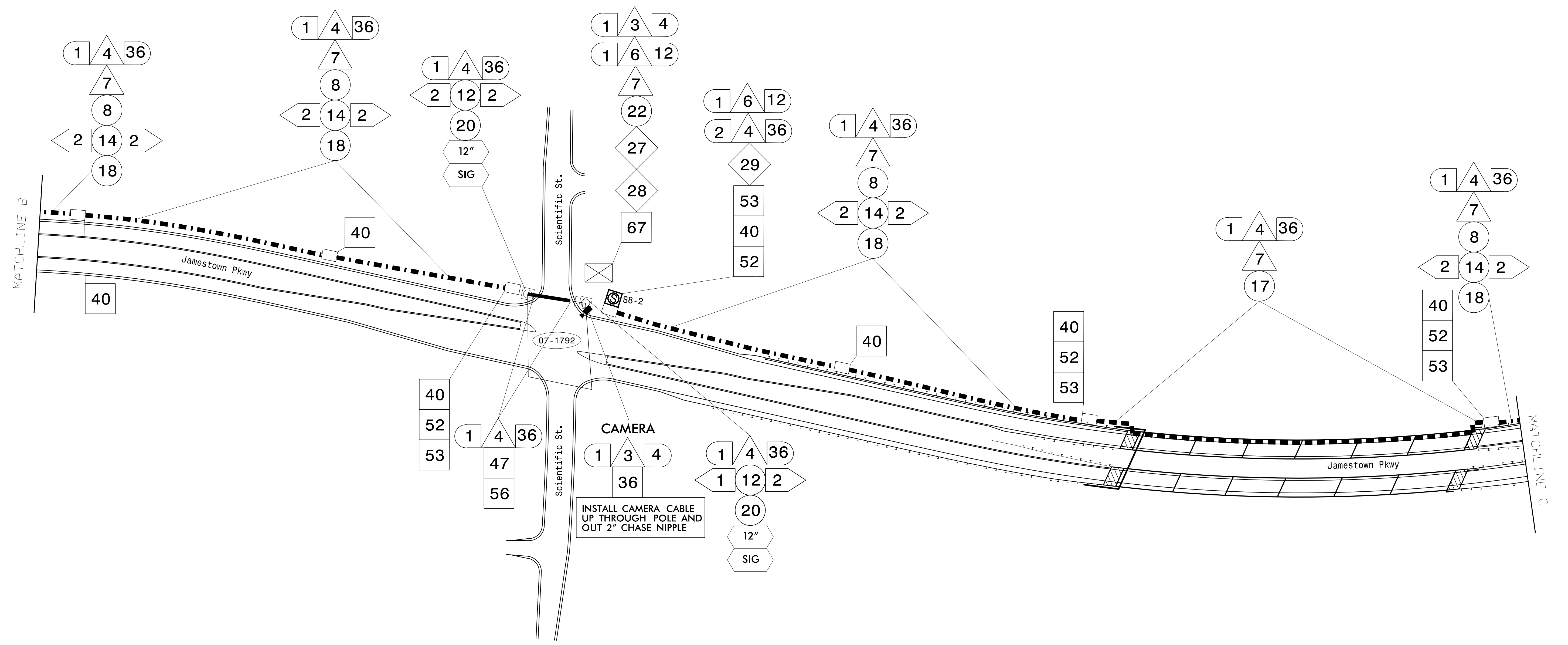
1 4 36 Existing
1 4 36 New
2 6 6 Existing
32
53
CCTV 46 EXISTING TO 07-1593

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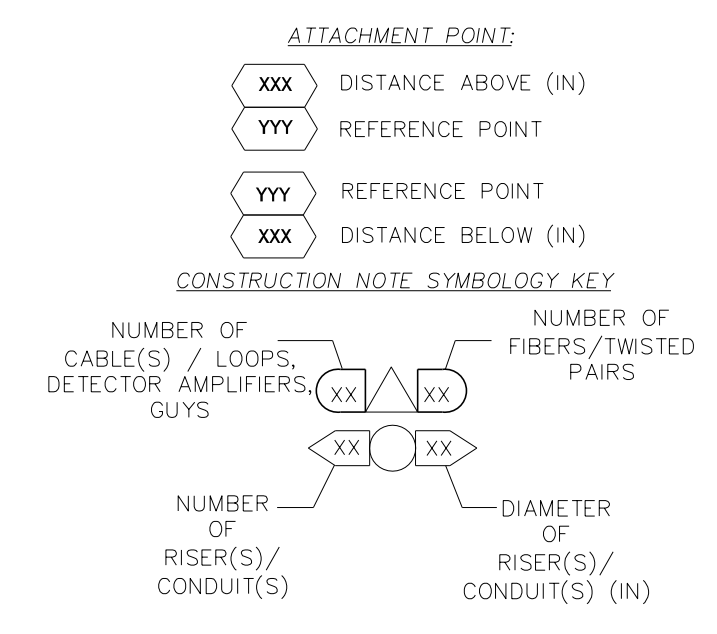
Prepared for the Offices of:
High Point Signal System Cable Routing Plans
750 N. Greenfield Pkwy., Garner, NC 27529
SCALE 0 100' 1"=100'

High Point Signal System Cable Routing Plans
Division 7 Guilford County High Point
PLAN DATE: February 2018 REVIEWED BY: R. Thompson
PREPARED BY: B. Lehan REVIEWED BY:
REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SEAL
BRENDAN A. LEHAN
PROFESSIONAL ENGINEER
SEAL 045256
3/20/2018
SIG. INVENTORY NO.



- | | | | | |
|---|---|---|--|---|
| 1. INSTALL COMPOSITE CCTV CABLE | 15. DIRECTIONAL DRILL CONDUIT | 29. INSTALL UNDERGROUND SPLICE ENCLOSURE | 43. REMOVE EXISTING WOOD POLE | 57. MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV |
| 2. INSTALL LOW VOLTAGE POWER CABLE (24VAC) | 16. BORE AND JACK CONDUIT | 30. INSTALL AERIAL SPLICE ENCLOSURE | 44. INSTALL AERIAL GUY ASSEMBLY | 58. INSTALL NEW ELECTRICAL SERVICE FOR CCTV |
| 3. INSTALL COMPOSITE POWER/ETHERNET CABLE | 17. INSTALL CABLE(S) IN EXISTING CONDUIT | 31. INSTALL SPLICE CABINET | 45. INSTALL STANDARD GUY ASSEMBLY | 59. INSTALL NEW POLE MOUNTED CCTV CABINET (336) |
| 4. INSTALL SMFO CABLE | 18. INSTALL CABLE(S) IN NEW CONDUIT | 32. MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER | 46. INSTALL SIDEWALK GUY ASSEMBLY | 60. INSTALL NEW BUILDING MOUNTED CCTV CABINET (336) |
| 5. NOT USED | 19. INSTALL CABLE(S) IN EXISTING RISER(S) | 33. REMOVE EXISTING SPLICE / HUB / CCTV CABINET | 47. INSTALL MESSENGER CABLE | 61. REMOVE EXISTING CCTV CAMERA ASSEMBLY |
| 6. INSTALL FIBER-OPTIC DROP CABLE | 20. INSTALL CABLE(S) IN NEW RISER(S) | 34. INSTALL CABINET FOUNDATION | 48. REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE | 62. NEW CABINET ENTRANCE INTO NEW FOUNDATION |
| 7. INSTALL TRACER WIRE | 21. INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE | 35. REMOVE EXISTING CABINET FOUNDATION | 49. REMOVE EXISTING COMMUNICATIONS CABLE | 63. DRILL / CORE DRILL EXISTING FOUNDATION |
| 8. INSTALL CONDUIT UNDERGROUND | 22. INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE) | 36. INSTALL CCTV CAMERA ASSEMBLY | 50. INSTALL WIRELESS DSL | 64. INTERCEPT AND REROUTE EXISTING CONDUITS |
| 9. INSTALL PVC CONDUIT | 23. INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE) | 37. INSTALL CCTV WOOD POLE | 51. INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE | 65. BOND MESSENGER TO POLE GROUND |
| 10. INSTALL RIGID, GALVANIZED STEEL CONDUIT | 24. INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET | 38. INSTALL STANDARD SIZE JUNCTION BOX | 52. INSTALL DELINEATOR MARKER | 66. BOND RISER TO POLE GROUND |
| 11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD | 25. INSTALL NEW RISER INTO POLE MOUNTED CABINET | 39. INSTALL SPECIAL-SIZED JUNCTION BOX | 53. STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE) | 67. BOND TRACER WIRE TO EQUIPMENT GROUND BUS |
| 12. INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING | 26. INSTALL DIGITAL VIDEO ENCODER | 40. INSTALL OVER-SIZED JUNCTION BOX | 54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE | 68. INSTALL NEW COVER ON OVER-SIZED JUNCTION BOX |
| 13. INSTALL HEAT SHRINK TUBING RETROFIT KIT | 27. INSTALL NEW ETHERNET EDGE SWITCH IN CABINET | 41. REMOVE EXISTING JUNCTION BOX | 55. LASH CABLE(S) TO EXISTING MESSENGER CABLE | 69. INSTALL NEW BASE MOUNTED CCTV CABINET (336-A) |
| 14. INSTALL HIGH DENSITY POLYETHYLENE CONDUIT | 28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET | 42. INSTALL WOOD POLE | 56. LASH CABLE(S) TO NEW MESSENGER CABLE | 70. INSTALL NEW POLE MOUNTED CCTV CABINET (NEMA TYPE 4) |
| | | | | 71. HANDLASH AND INSTALL AERIAL CABLE PROTECTOR |



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Prepared for the Offices of:

750 N. Greenfield Pkwy., Garner, NC 27529

High Point Signal System Cable Routing Plans

Division 7 Guilford County High Point

PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON

PREPARED BY: B. LEHAN REVIEWED BY:

REVISIONS	INIT.	DATE

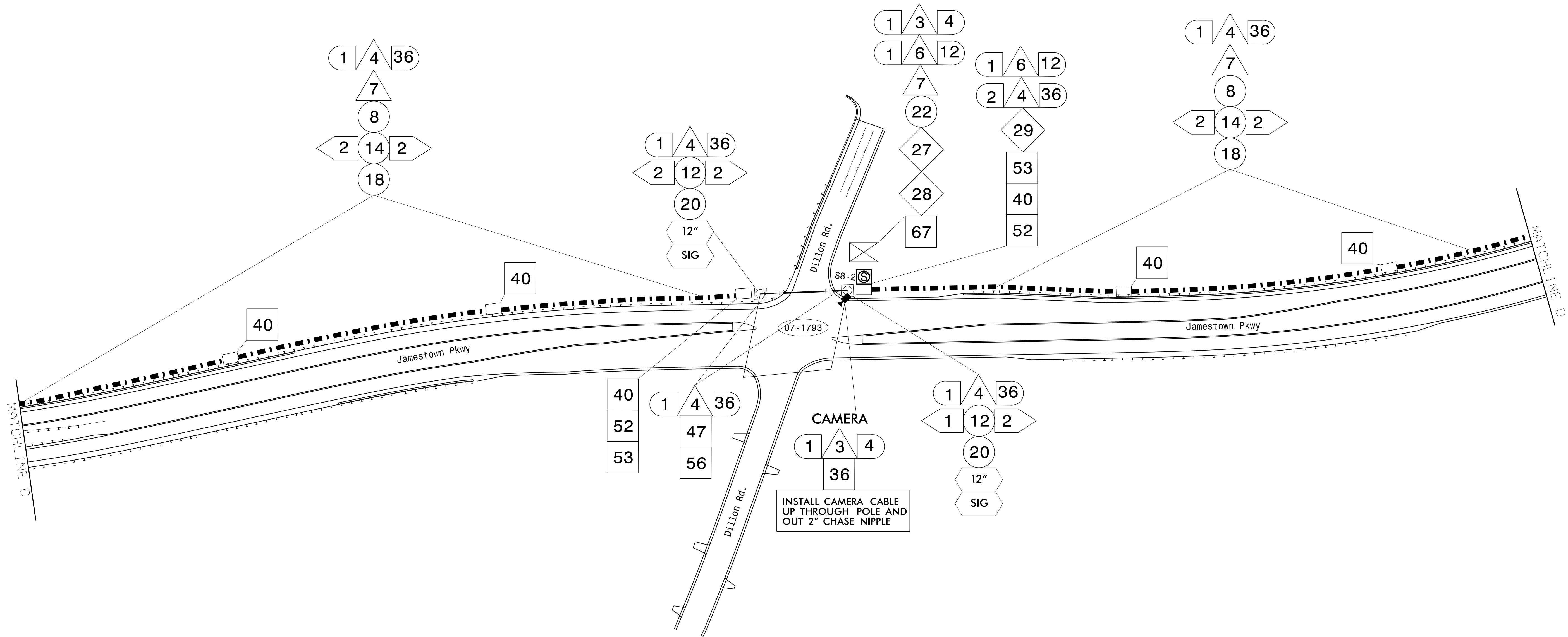
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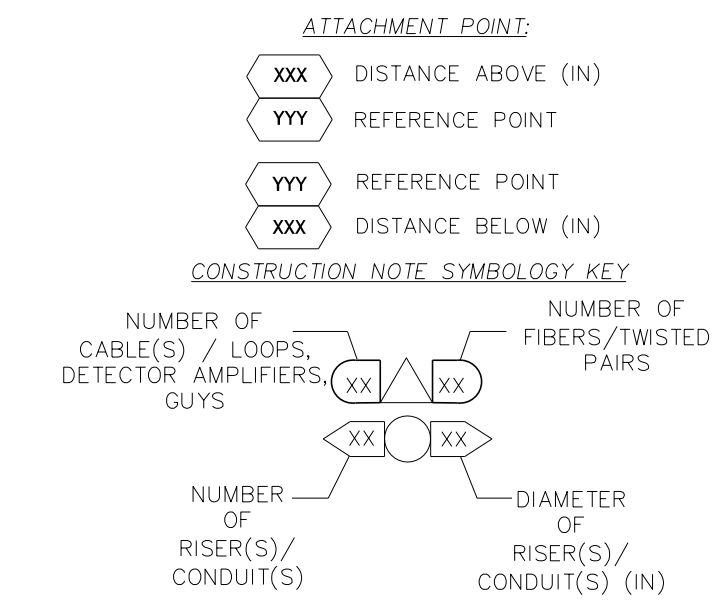
DocuSigned by: **Brendan Lehan** 3/20/2018

8817882785@GPE

SIG. INVENTORY NO. _____



1	INSTALL COMPOSITE CCTV CABLE	15	DIRECTIONAL DRILL CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE	43	REMOVE EXISTING WOOD POLE	57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
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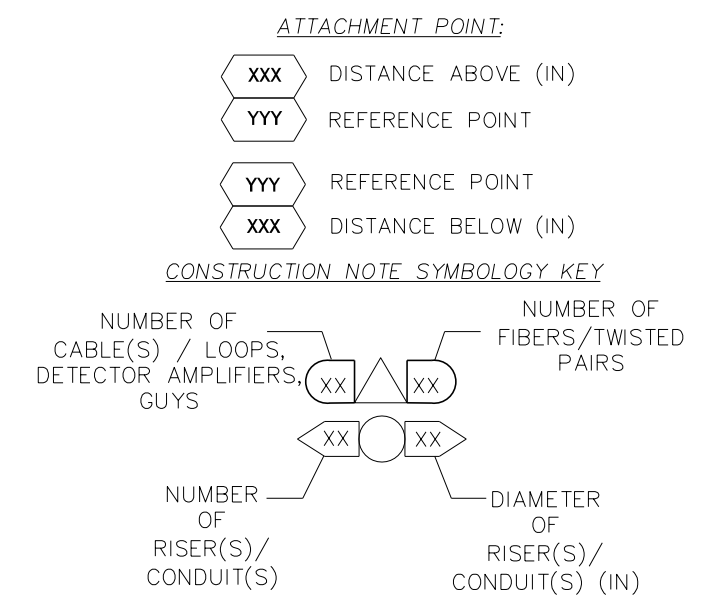
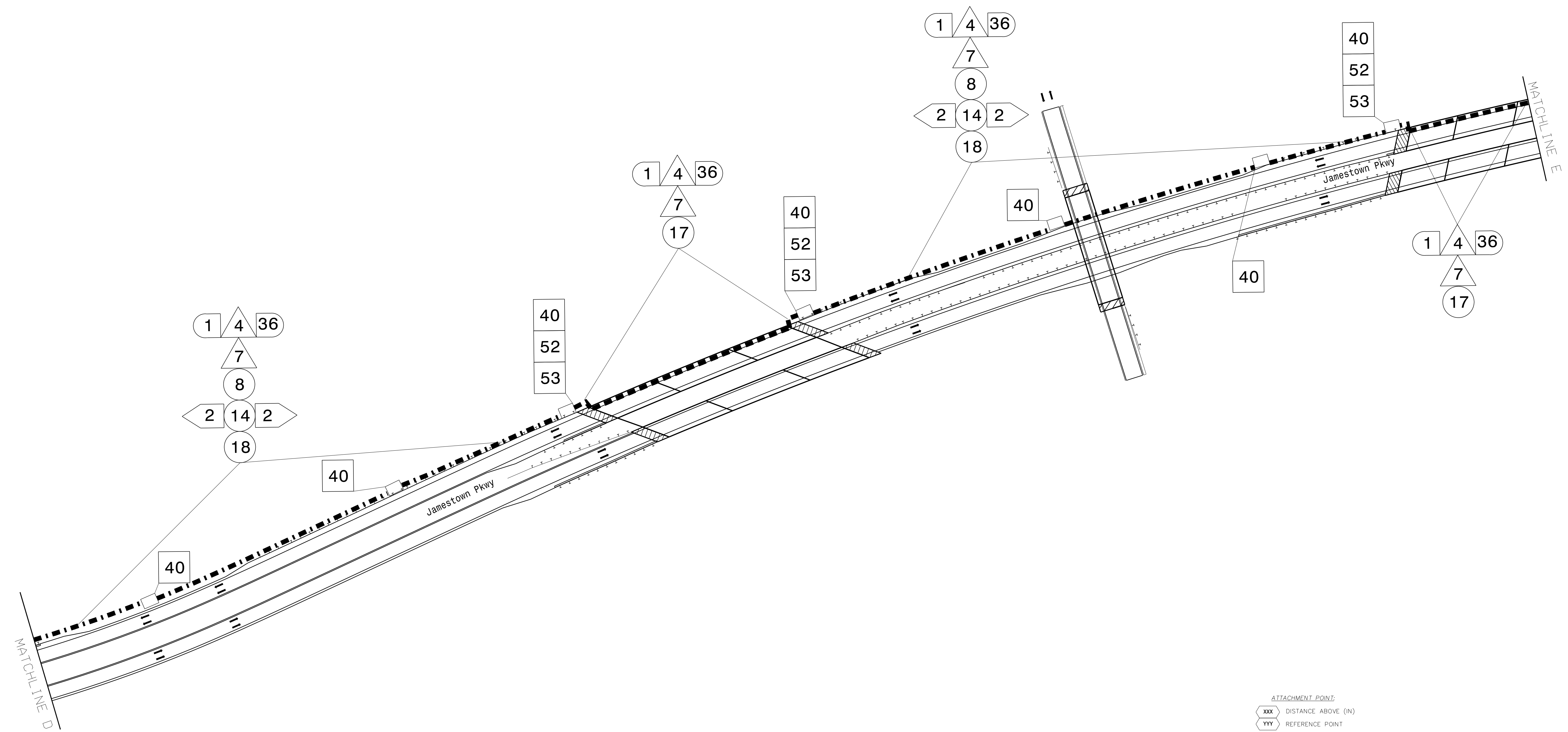
 59 N. Greenfield Pkwy., Garner, NC 27529
 SCALE: 0 100' 1"=100'

High Point Signal System Cable Routing Plans
 Division 7 Guilford County High Point
 PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON
 PREPARED BY: B. LEHAN REVIEWED BY: _____
 REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 BRENDAN A. LEHAN
 3/20/2018
 SIGNATURE DATE
 SIG. INVENTORY NO. _____



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4 INSTALL SMFO CABLE	18 INSTALL CABLE(S) IN NEW CONDUIT	32 MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	46 INSTALL SIDEWALK GUY ASSEMBLY	60 INSTALL NEW BUILDING MOUNTED CCTV CABINET (336)
5 NOT USED	19 INSTALL CABLE(S) IN EXISTING RISER(S)	33 REMOVE EXISTING SPLICE / HUB / CCTV CABINET	47 INSTALL MESSENGER CABLE	61 REMOVE EXISTING CCTV CAMERA ASSEMBLY
6 INSTALL FIBER-OPTIC DROP CABLE	20 INSTALL CABLE(S) IN NEW RISER(S)	34 INSTALL CABINET FOUNDATION	48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	62 NEW CABINET ENTRANCE INTO NEW FOUNDATION
7 INSTALL TRACER WIRE	21 INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE	35 REMOVE EXISTING CABINET FOUNDATION	49 REMOVE EXISTING COMMUNICATIONS CABLE	63 DRILL / CORE DRILL EXISTING FOUNDATION
8 INSTALL CONDUIT UNDERGROUND	22 INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	36 INSTALL CCTV CAMERA ASSEMBLY	50 INSTALL WIRELESS DSL	64 INTERCEPT AND REROUTE EXISTING CONDUITS
9 INSTALL PVC CONDUIT	23 INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	37 INSTALL CCTV WOOD POLE	51 INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE	65 BOND MESSENGER TO POLE GROUND
10 INSTALL RIGID, GALVANIZED STEEL CONDUIT	24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	38 INSTALL STANDARD SIZE JUNCTION BOX	52 INSTALL DELINEATOR MARKER	66 BOND RISER TO POLE GROUND
11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	25 INSTALL NEW RISER INTO POLE MOUNTED CABINET	39 INSTALL SPECIAL-SIZED JUNCTION BOX	53 STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)	67 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	26 INSTALL DIGITAL VIDEO ENCODER	40 INSTALL OVER-SIZED JUNCTION BOX	54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	68 INSTALL NEW COVER ON OVER-SIZED JUNCTION BOX
13 INSTALL HEAT SHRINK TUBING RETROFIT KIT	27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	41 REMOVE EXISTING JUNCTION BOX	55 LASH CABLE(S) TO EXISTING MESSENGER CABLE	69 INSTALL NEW BASE MOUNTED CCTV CABINET (336-A)
14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET	42 INSTALL WOOD POLE	56 LASH CABLE(S) TO NEW MESSENGER CABLE	70 INSTALL NEW POLE MOUNTED CCTV CABINET (NEMA TYPE 4)
				71 HANDLASH AND INSTALL AERIAL CABLE PROTECTOR

M M
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Prepared for the Offices of:

 750 N. Greenfield Pkwy., Garner, NC 27529

High Point Signal System Cable Routing Plans

Division 7 Guilford County High Point

PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON

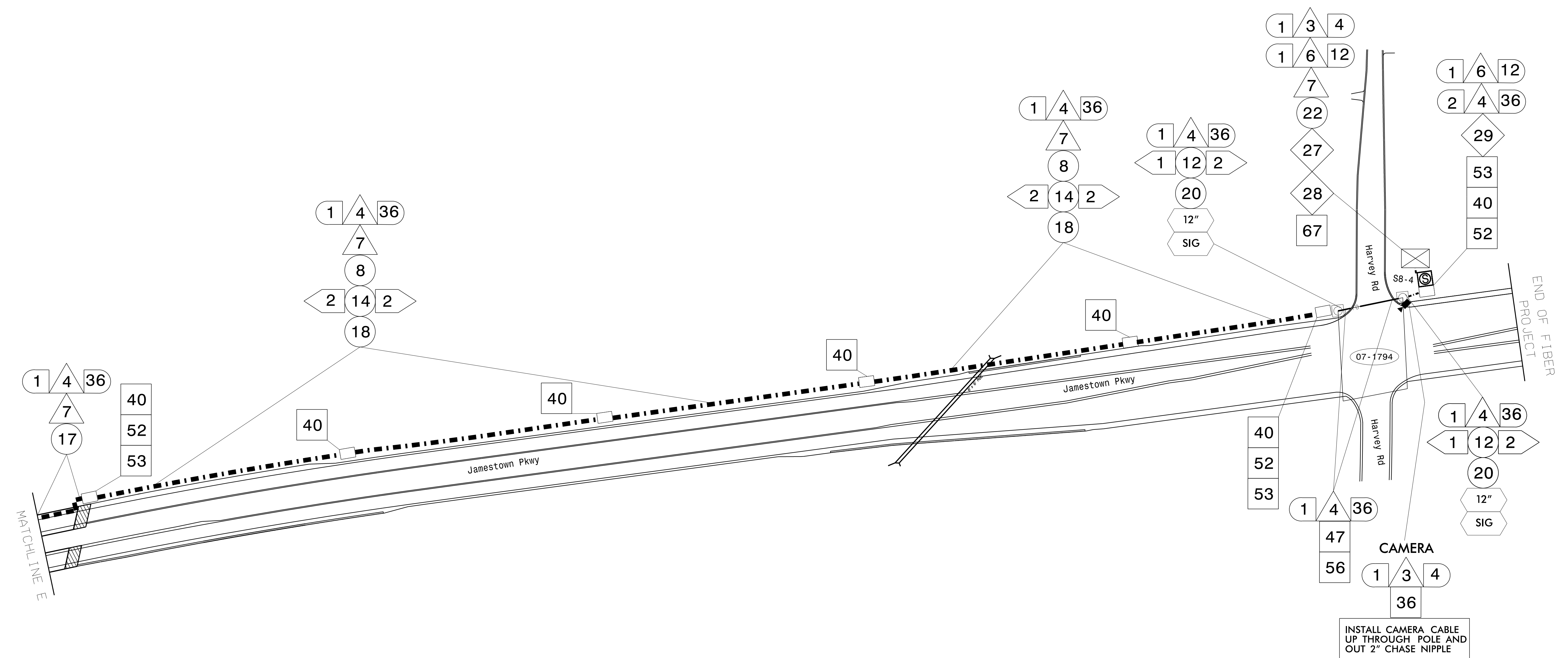
PREPARED BY: B. LEHAN REVIEWED BY:

REVISIONS	INIT.	DATE

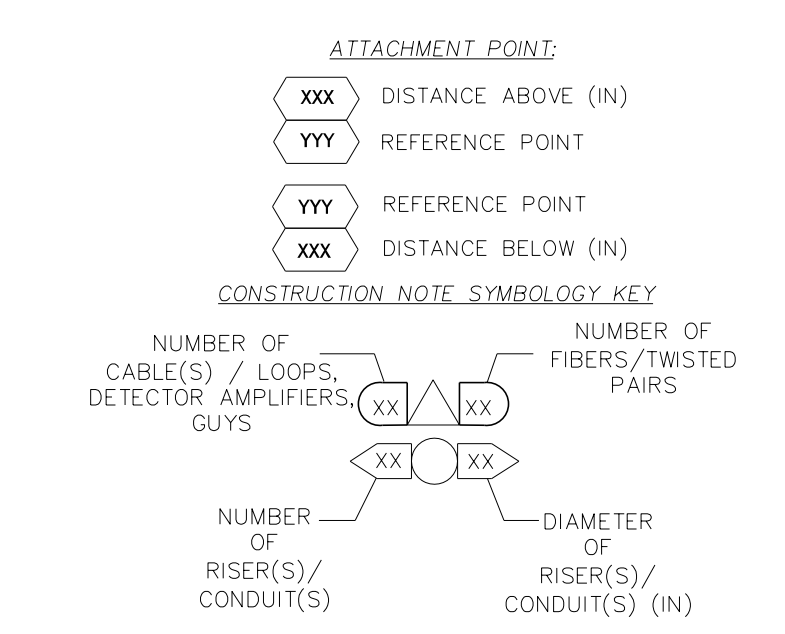
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 BRENDAN A. LEHAN
 ENGINEER
 3/20/2018
 DATE
 SIGNATURE
 DATE
 SIG. INVENTORY NO.



1	INSTALL COMPOSITE CCTV CABLE	15	DIRECTIONAL DRILL CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE	43	REMOVE EXISTING WOOD POLE	57	MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
2	INSTALL LOW VOLTAGE POWER CABLE (24VAC)	16	BORE AND JACK CONDUIT	30	INSTALL AERIAL SPLICE ENCLOSURE	44	INSTALL AERIAL GUY ASSEMBLY	58	INSTALL NEW ELECTRICAL SERVICE FOR CCTV
3	INSTALL COMPOSITE POWER/ETHERNET CABLE	17	INSTALL CABLE(S) IN EXISTING CONDUIT	31	INSTALL SPLICE CABINET	45	INSTALL STANDARD GUY ASSEMBLY	59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)
4	INSTALL SMFO CABLE	18	INSTALL CABLE(S) IN NEW CONDUIT	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	46	INSTALL SIDEWALK GUY ASSEMBLY	60	INSTALL NEW BUILDING MOUNTED CCTV CABINET (336)
5	NOT USED	19	INSTALL CABLE(S) IN EXISTING RISER(S)	33	REMOVE EXISTING SPLICE / HUB / CCTV CABINET	47	INSTALL MESSENGER CABLE	61	REMOVE EXISTING CCTV CAMERA ASSEMBLY
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Prepared for the Offices of:

SCALE: 0 100' 1"=100'

High Point Signal System Cable Routing Plans

Division 7 Guilford County High Point

PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON

PREPARED BY: B. LEHAN REVIEWED BY:

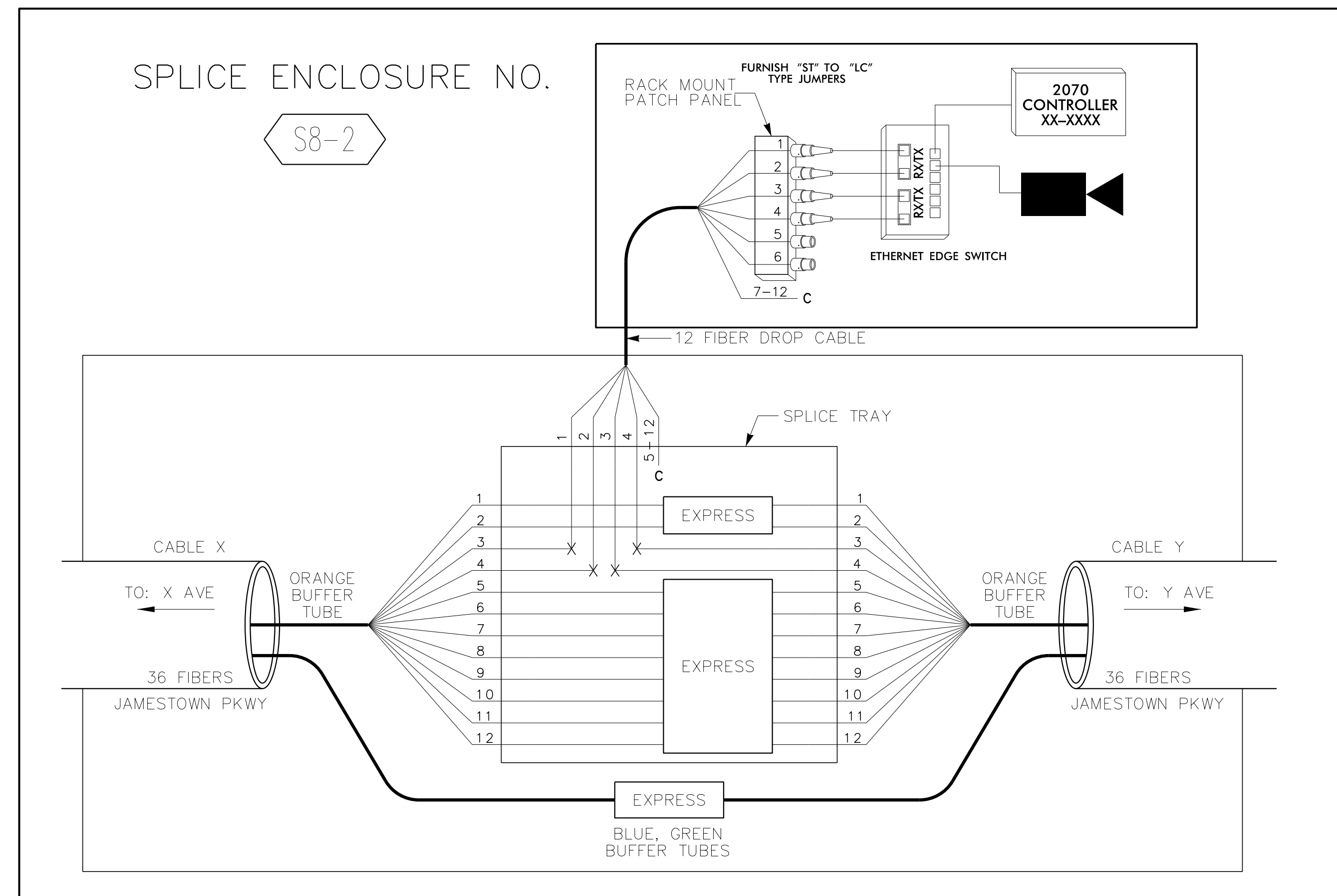
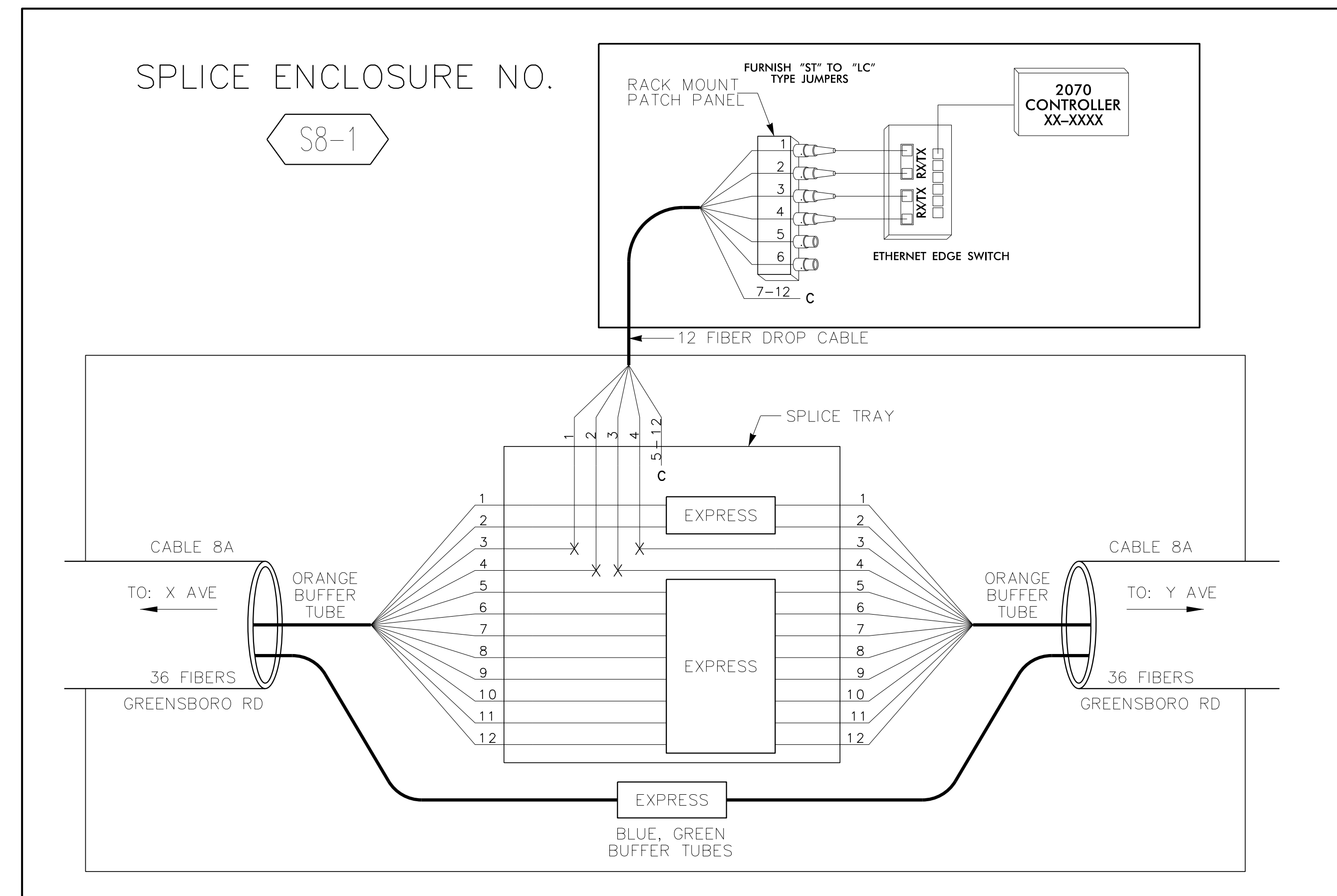
REVISIONS	INIT.	DATE

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SEAL

Brendan A. Lehan
ENGINEER
3/20/2018

SIG. INVENTORY NO. _____



SPLICE ENCLOSURE NO. S8-1							
DEVICE ID	CL SHEET	CABLE X			CABLE Y		
		CABLE NUMBER	ALONG ROUTE	TO	CABLE NUMBER	ALONG ROUTE	TO
07-1592	SCP-03	8A	GREENSBORO RD	I-74 EB RAMP	8A	GREENSBORO RD	ENTERPRISE DR
07-1272	SCP-03	8A	GREENSBORO RD	I-74 WB RAMPS	8A	JAMESTOWN PKWY	GREENSBORO RD

SPLICE ENCLOSURE NO. S8-1							
DEVICE ID	CL SHEET	CABLE X			CABLE Y		
		CABLE NUMBER	ALONG ROUTE	TO	CABLE NUMBER	ALONG ROUTE	TO
07-1791	SCP-05	8B	JAMESTOWN PKWY	GREENSBORO RD	8B	JAMESTOWN PKWY	SCIENTIFIC ST
07-1792	SCP-06	8B	JAMESTOWN PKWY	MANOR DR	8B	JAMESTOWN PKWY	DILLON RD
07-1793	SCP-08	8B	JAMESTOWN PKWY	SCIENTIFIC ST	8B	JAMESTOWN PKWY	HARVEY RD

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

LEGEND

- 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

- UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY
- UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE
- EDGE SWITCH CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.

- FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF HIGH POINT'S SIGNAL SYSTEM ENGINEER, JAMES BAKER AT (336) 883-8540 TO ARRANGE FOR THE CITY OF HIGH POINT TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE SIGNAL SYSTEM ENGINEER 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.
- CONTRACTOR TO RECORD EXISTING 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 ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.
- ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.
- INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:
REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- SPLICE LOCATION
 - DATE
 - COMPANY NAME
 - NAME OF INDIVIDUAL PERFORMING THE SPLICING
- PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTRD TEST RESULTS.

M M
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Prepared for the Offices of:

High Point Signal System Splicing Details

Division 7 Guilford County High Point

PLAN DATE: February 2018 REVIEWED BY: R. THOMPSON

PREPARED BY: B. LEHAN REVIEWED BY:

SCALE: _____ REVISIONS: _____ INIT. DATE: _____

NTS

DocuSigned by:
Brendan Lehan 3/20/2018

CADD Filename: \$FILENAME\$

