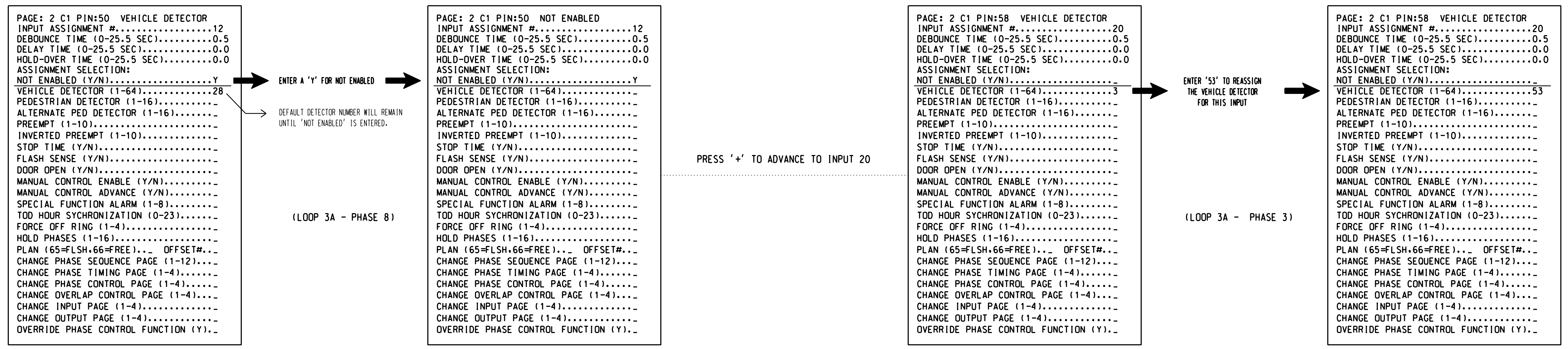


INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #12 (DETECTOR 28) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 8 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 3 SECONDS.

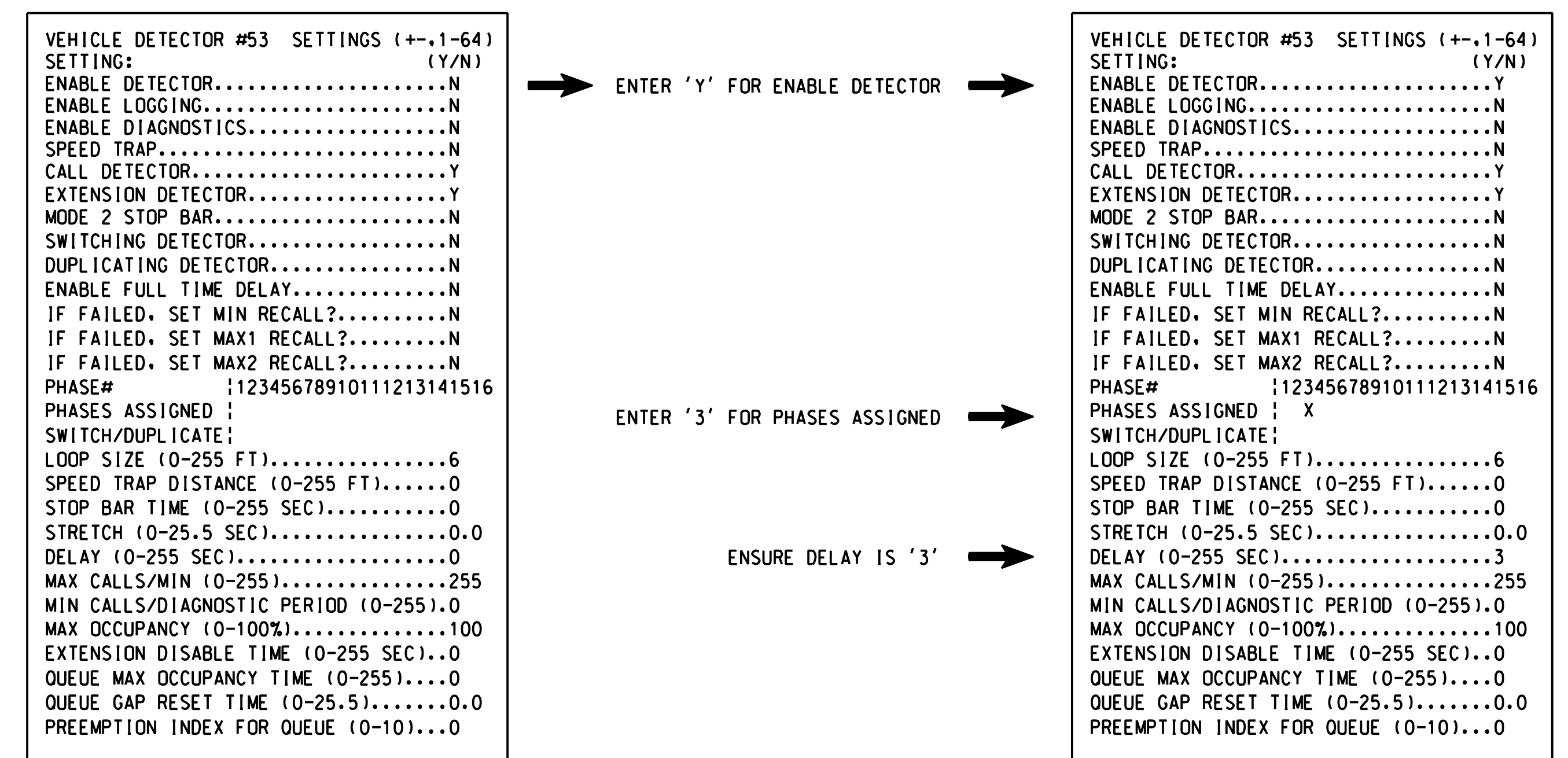
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 12 IS REACHED.



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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T5
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 5 of 8
Signal Upgrade
Temporary Design 5

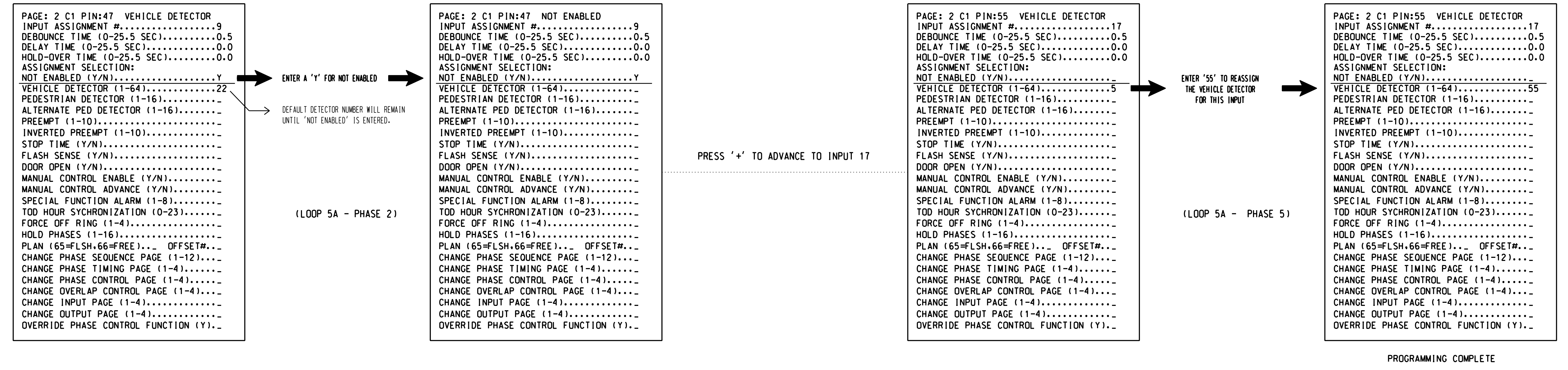
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	Prepared for: 		NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive)	SEAL
	750 N. Greenfield Pkwy, Corner, NC 27529 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC license No: C-1554 (919) 546-8997		Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	9/10/2021 SIGNATURE DATE SIG. INVENTORY NO. 03-0215T5

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A (program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

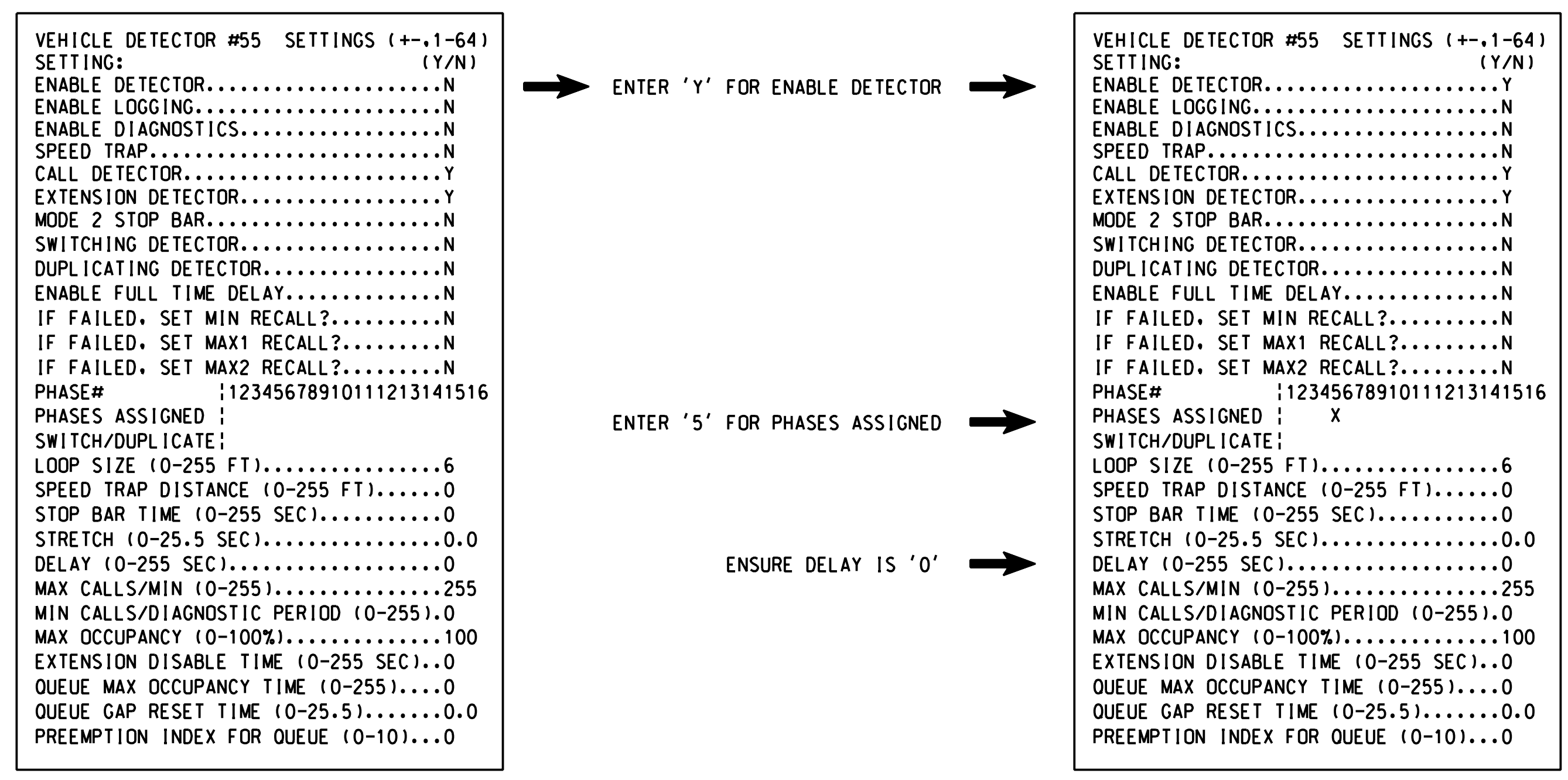
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.



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

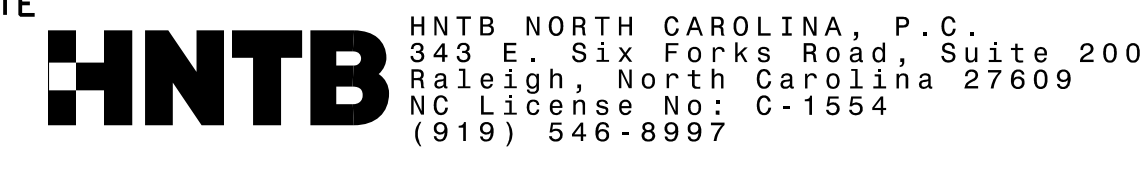
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T5 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 6 of 8 Signal Upgrade Temporary Design 5

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Project information including address (NC 211 Howe Street, SR 1852 Robert Ruark Drive), dates (June 2017), and signatures (A.H. Thornburg, N.R. Simmons, Natasha Simmons) with a professional seal.

DETECTOR PROGRAMMING COMPLETE

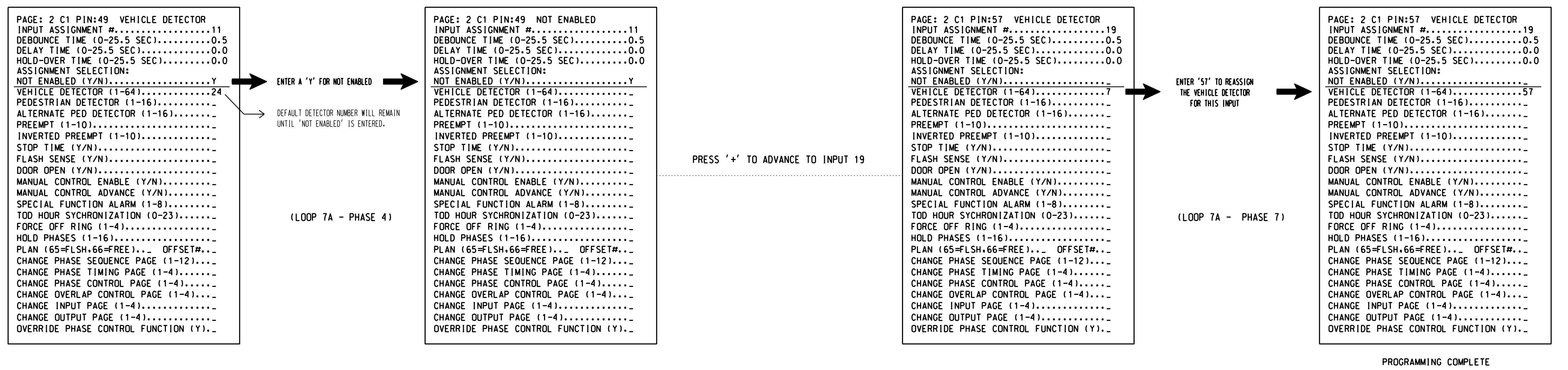


INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 7A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #11 (DETECTOR 24) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 4 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

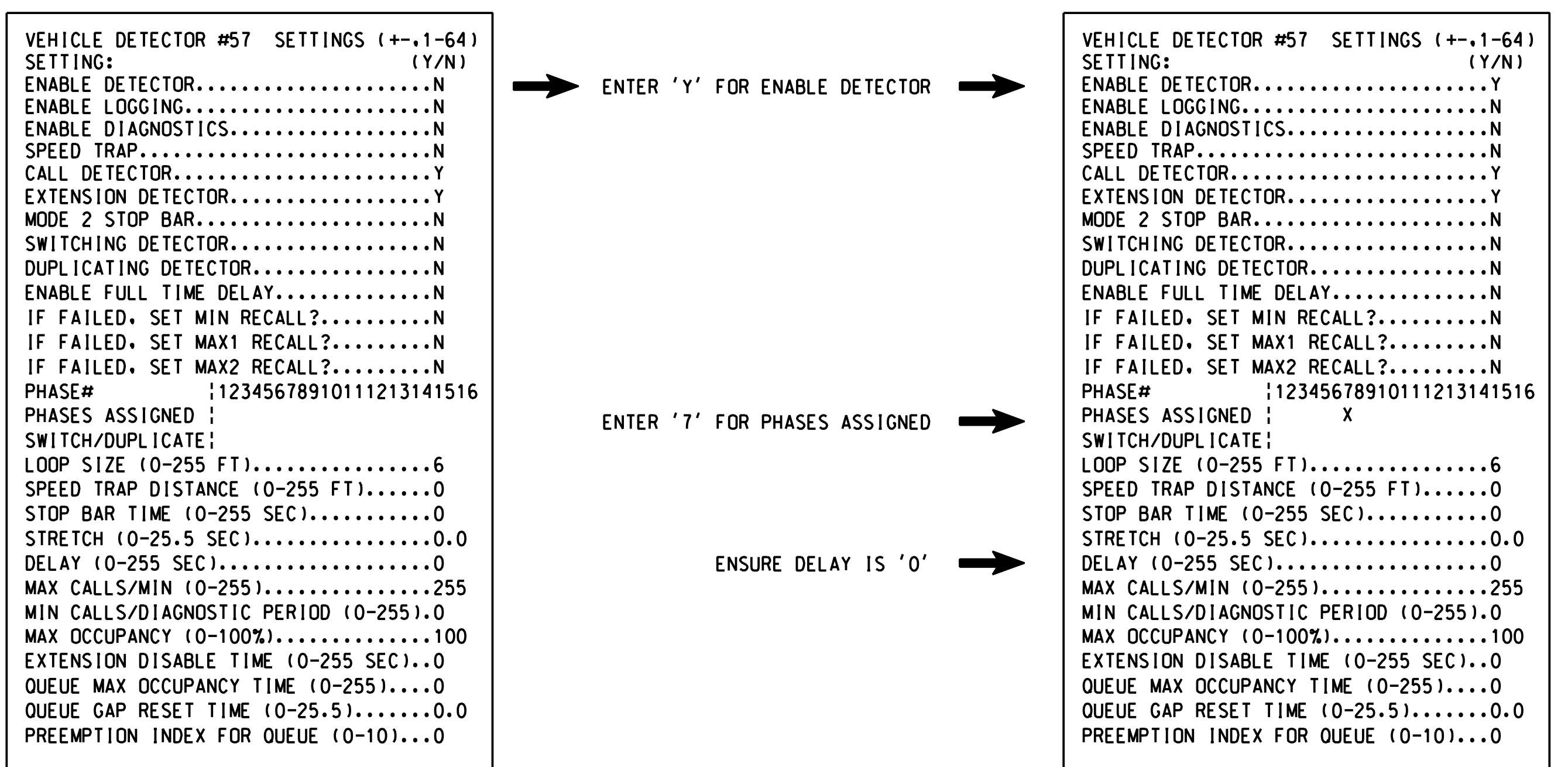
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 11 IS REACHED.



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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T5
DESIGNED: June 2017
SEALED: 9/10/2021
REVISED: N/A

Electrical Detail - Sheet 7 of 8
Signal Upgrade
Temporary Design 5

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	Prepared for: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport		
	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	

750 N. Greenfield Pkwy, Corner, NC 27529

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Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

SIG. INVENTORY NO. 03-0215T5

ALTERNATE PHASING ACTIVATION DETAIL

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

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

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

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

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

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


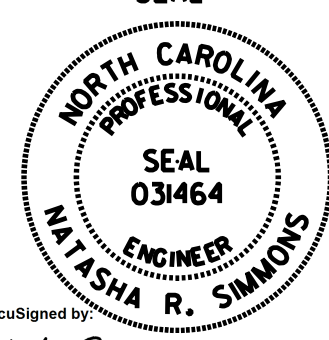
- OVERLAPS PAGE 2:** Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.
- INPUTS PAGE 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.
- Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.
- Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.
- Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T5
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 8 of 8
 Signal Upgrade
 Temporary Design 5

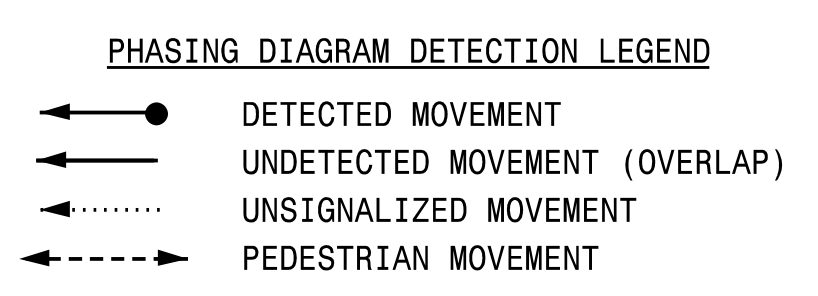
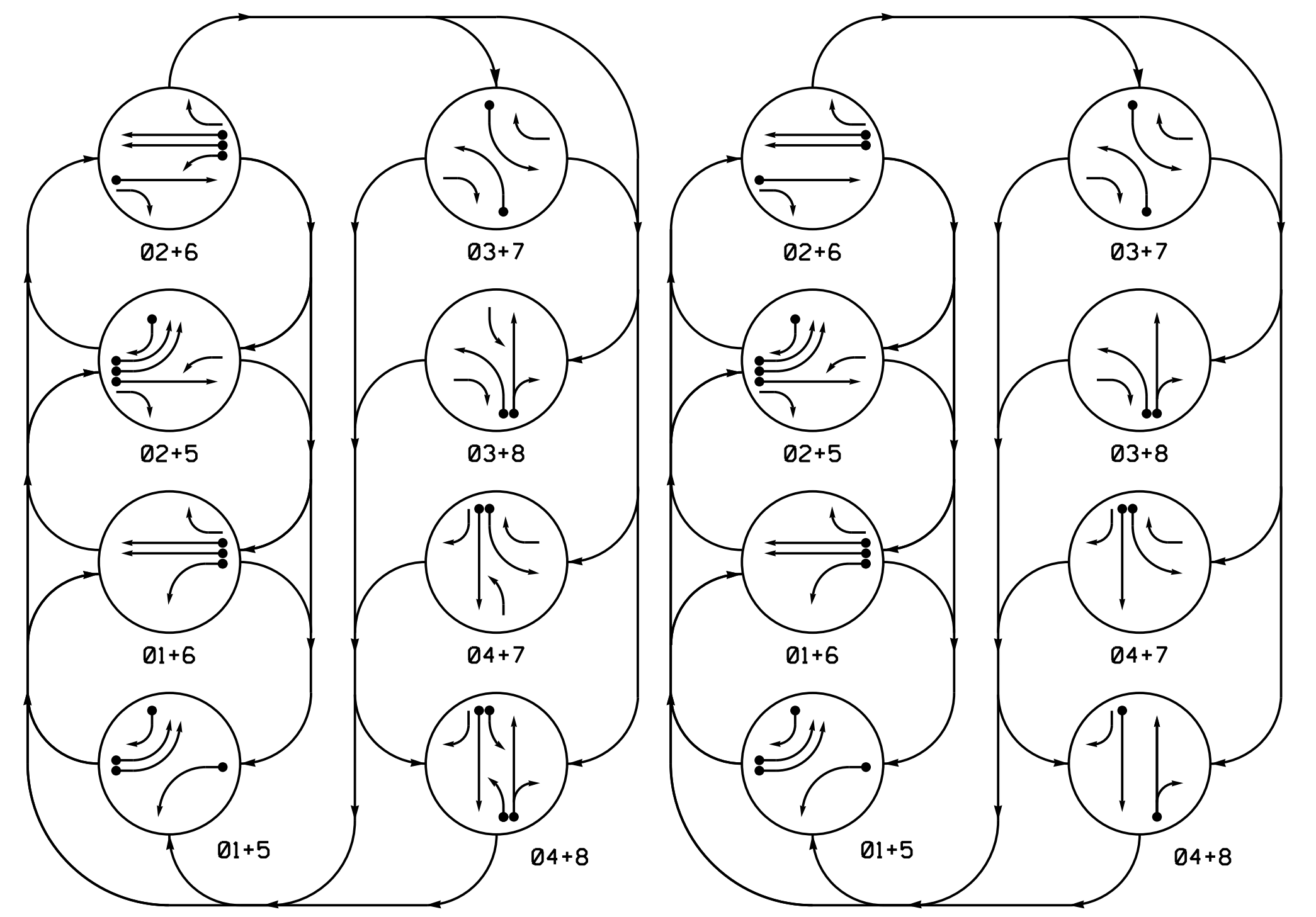
**DOCUMENT NOT CONSIDERED FINAL
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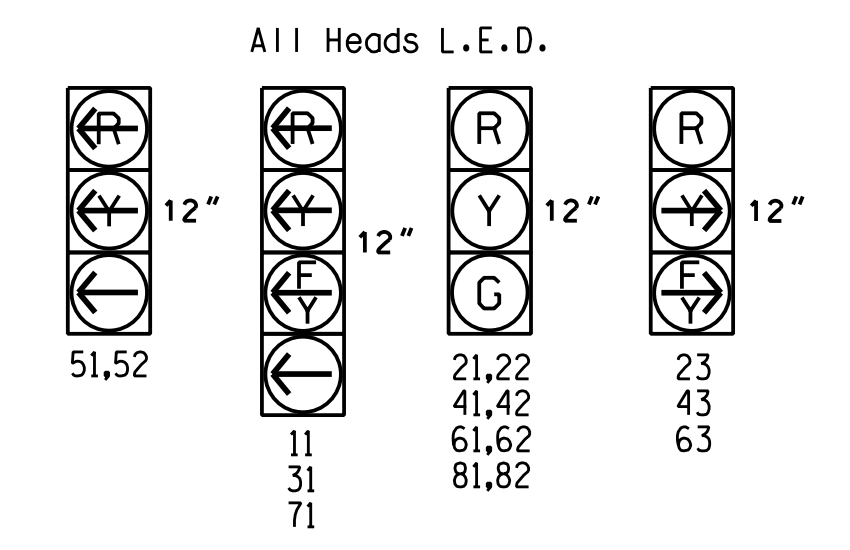
<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <div style="text-align: center;">  </div> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport</p> <p style="font-size: x-small;">PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons</p>	<p style="text-align: center;">SEAL</p> <div style="text-align: center;">  </div> <p style="font-size: x-small;">9/10/2021</p>
<p style="font-size: x-small;">REVISIONS INIT. DATE</p>		<p style="font-size: x-small;">SIGNATURE DATE</p>
		<p style="font-size: x-small;">SIG. INVENTORY NO. 03-0215T5</p>

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	—	—	F	F	R	R	R	Y
21,22	R	R	G	G	R	R	R	Y
23	R	R	F	F	F	F	R	Y
31	R	R	R	R	—	—	F	R
41,42	R	R	R	R	R	R	G	R
43	F	F	F	F	R	R	F	R
51,52	—	—	—	—	R	R	R	R
61,62	R	G	R	G	R	R	R	Y
63	R	F	R	F	F	R	F	Y
71	R	R	R	R	—	—	F	R
81,82	R	R	R	R	R	G	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	—	—	R	R	R	R	R	Y
21,22	R	R	G	G	R	R	R	Y
23	R	R	F	F	F	F	R	Y
31	R	R	R	R	—	—	R	R
41,42	R	R	R	R	R	R	G	R
43	F	F	F	F	R	R	F	R
51,52	—	—	—	—	R	R	R	R
61,62	R	G	R	G	R	R	R	Y
63	R	F	R	F	F	R	F	Y
71	R	R	R	R	—	—	R	R
81,82	R	R	R	R	R	G	R	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

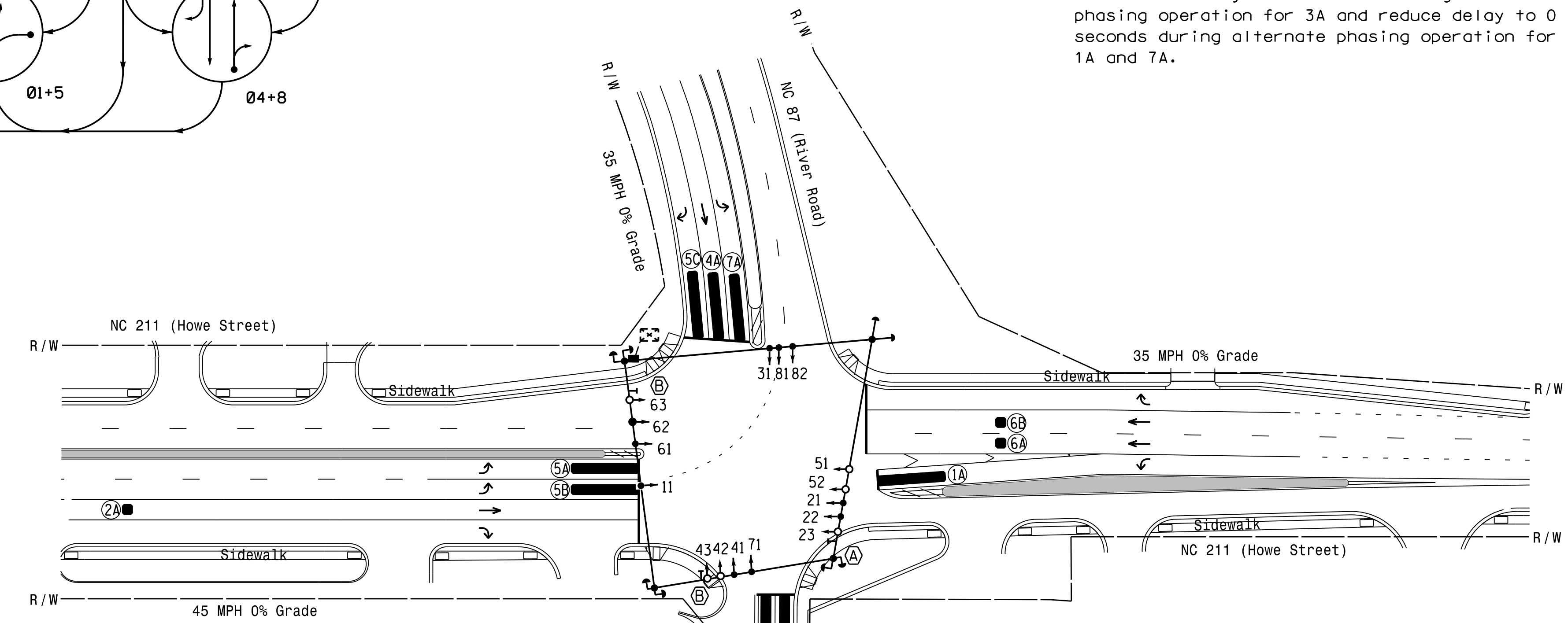
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	*	*	1	Y	Y	-	***15	-
2A	6X6	300	*	*	2	Y	Y	-	-	-
3A	6X40	0	*	*	3	Y	Y	-	***15	-
4A	6X40	0	*	*	4	Y	Y	-	-	-
5A	6X40	0	*	*	5	Y	Y	-	-	-
5B	6X40	0	*	*	5	Y	Y	-	-	-
5C	6X40	0	*	*	5	Y	Y	-	-	-
6A	6X6	70	*	*	6	Y	Y	-	-	-
6B	6X6	70	*	*	6	Y	Y	-	-	-
7A	6X40	0	*	*	7	Y	Y	-	***15	-
8A	6X40	0	*	*	8	Y	Y	-	-	-

* Multizone Microwave Detection.
 ** Disable phase 4,6, and 8 call for 1A,3A, and 7A during alternate phasing operation.
 *** Reduce delay to 3 seconds during alternate phasing operation for 3A and reduce delay to 0 seconds during alternate phasing operation for 1A and 7A.

8 Phase Fully Actuated (NC 133 Closed Loop System)

NOTES

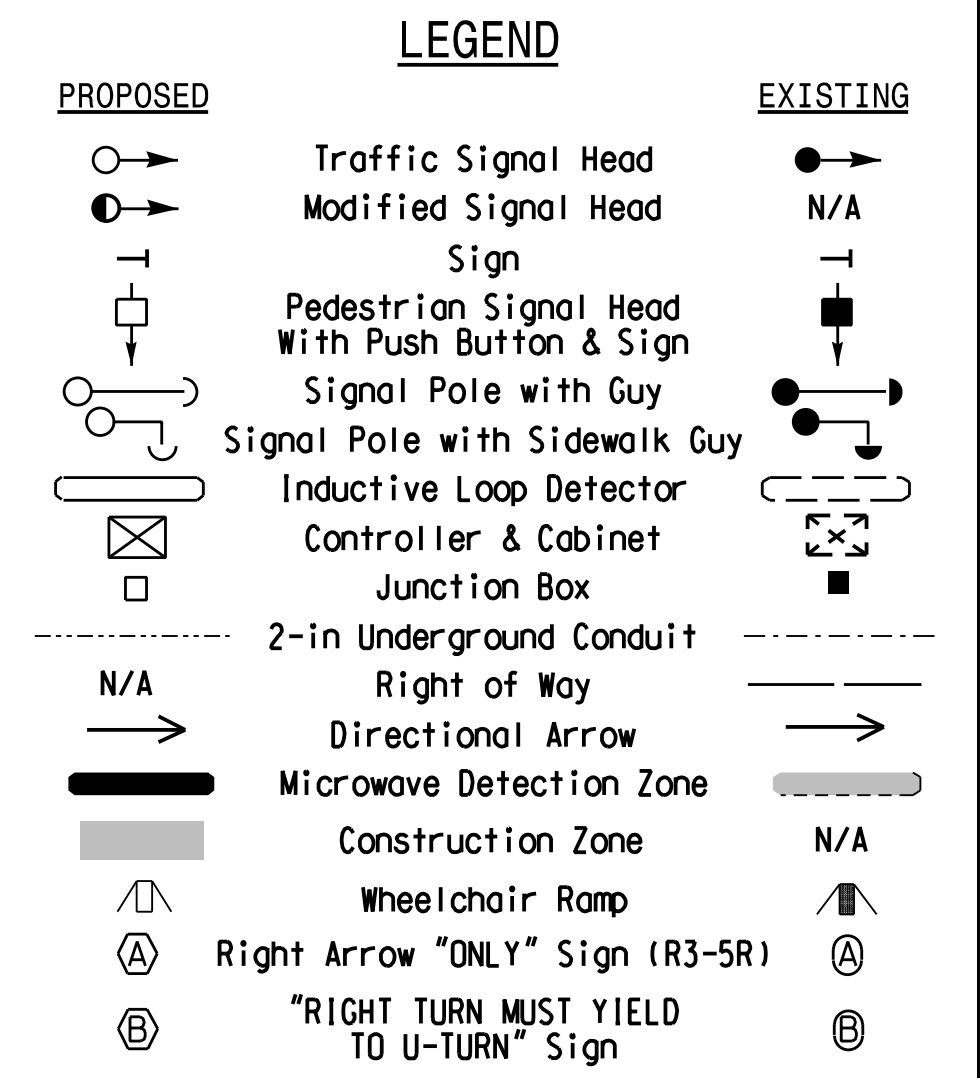
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Reposition existing signal heads numbered 11,21,22,41,61,62,and 71. Set all detector units to presence mode.
- Set all detector units to presence mode.
- Incorporate Microwave Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Microwave Detection locations and mounting heights to obtain detection zones as shown.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 0215.



OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	10	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	20	60	20	30	20	60	20	30
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	2.9	2.1	3.3	2.5	3.4	2.1	3.3	2.5
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 *	-	2.5	-	-	-	-	-	-
Max Variable Initial *	-	34	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	-	-	-
Time To Reduce *	-	30	-	-	-	-	-	-
Minimum Gap	-	3.0	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	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.



Signal Upgrade
 Temporary Design 6
 Construction Phase 2,3

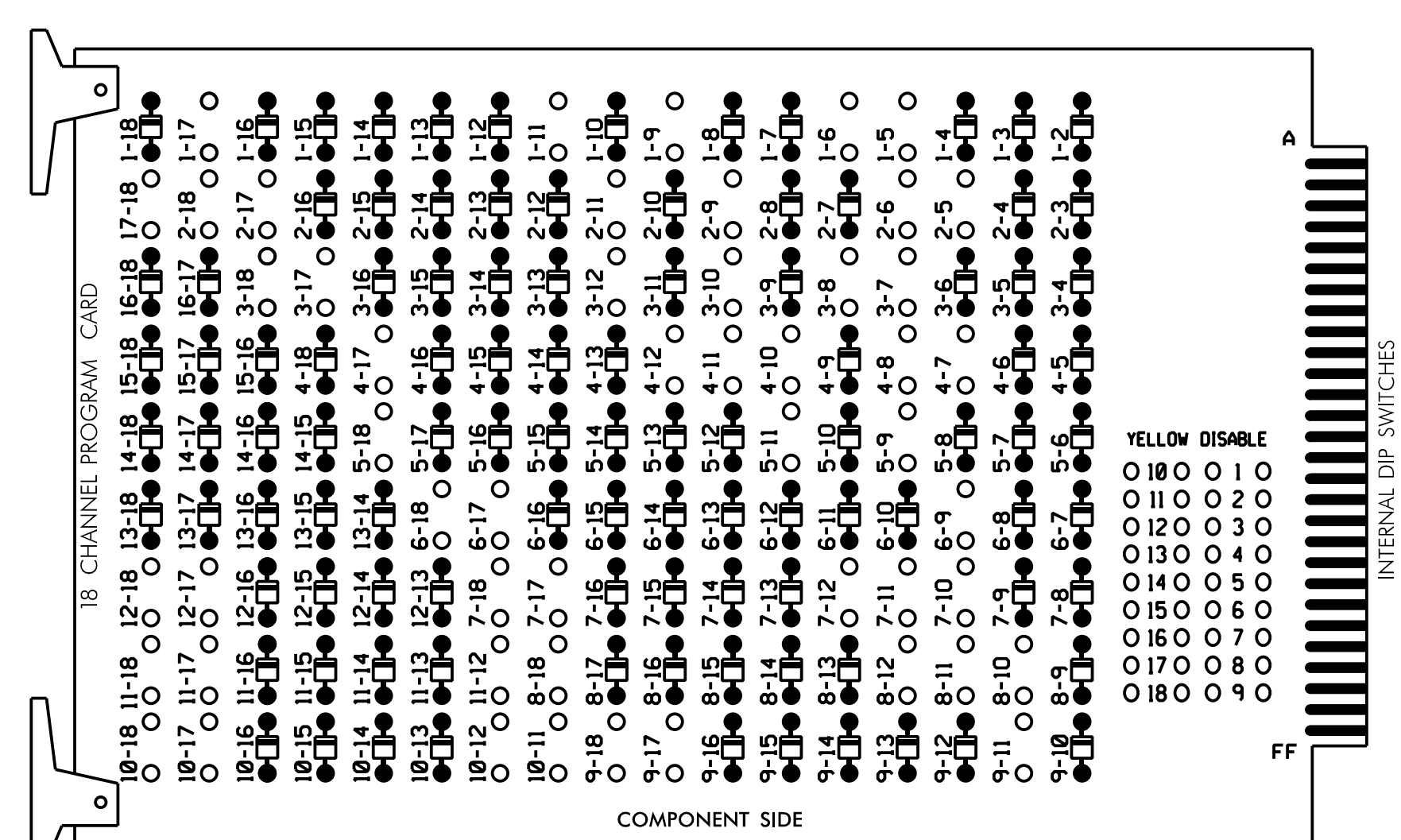
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	Prepared For: TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION	NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SEAL SEAL 031464 ENGINEER NATASHA R. SIMMONS
	SCALE 0 50 1"=50'	REVISIONS INITI. DATE SIGNATURE DATE 9/10/2021 SIG. INVENTORY NO. 03-0215T6	

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

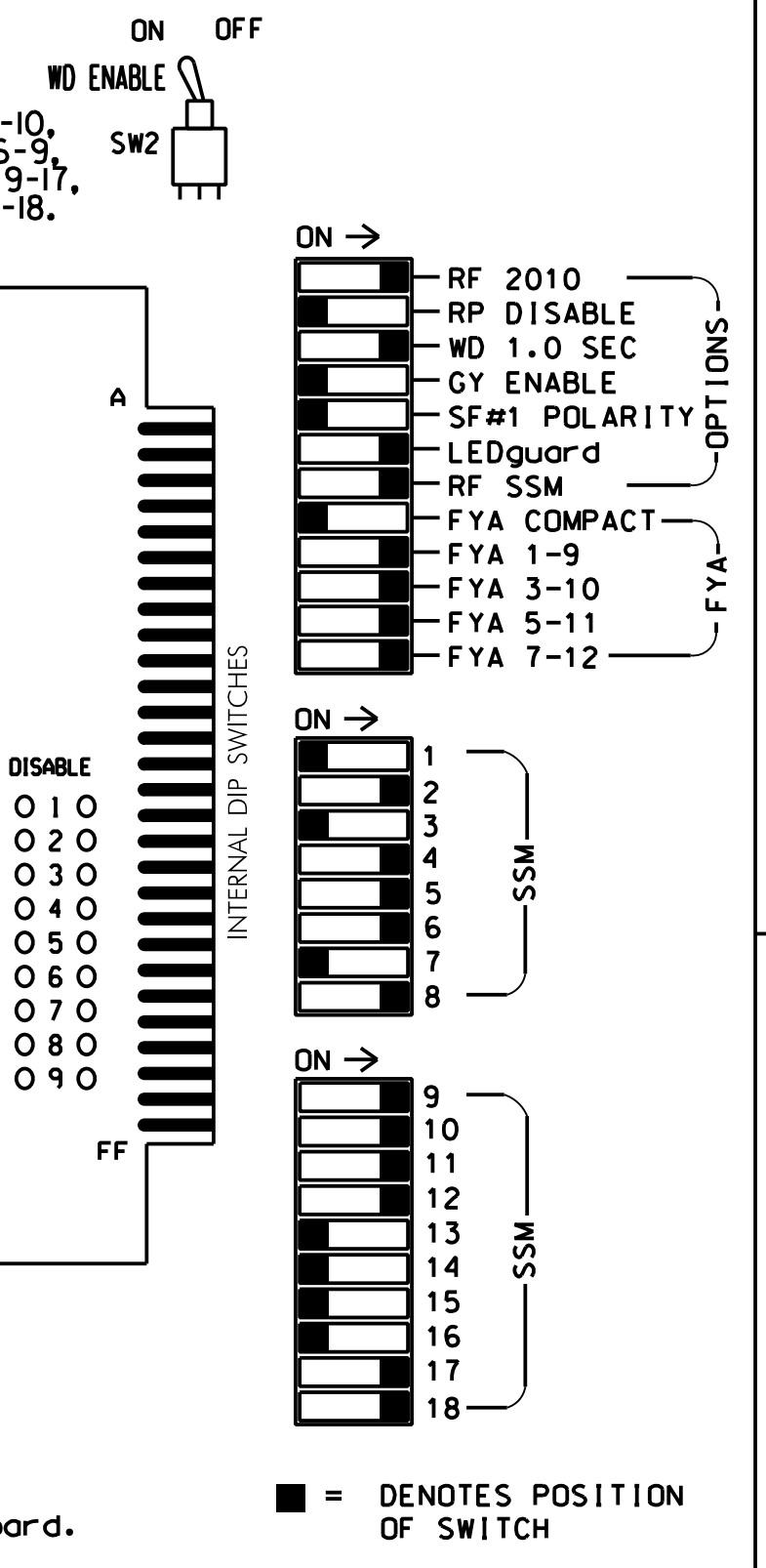
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-17, 2-5, 2-6, 2-9, 2-11, 2-17, 2-18, 3-7, 3-8, 3-10, 3-12, 3-17, 3-18, 4-7, 4-8, 4-10, 4-11, 4-12, 4-17, 5-9, 5-11, 5-18, 6-9, 6-17, 6-18, 7-10, 7-11, 7-12, 7-17, 7-18, 8-10, 8-11, 8-12, 8-18, 9-11, 9-17, 9-18, 10-11, 10-12, 10-17, 10-18, 11-12, 11-17, 11-18, 12-17, 12-18, and 17-18.



REMOVE JUMPERS 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.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



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 phase 2 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.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 133 Closed Loop 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,S4,S5,S7,S8,S10,S11,AUX S1,
 AUX S2,AUX S3,AUX S4,AUX S5,AUX S6

PHASES USED.....1,2,3,4,5,6,7,8

OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....4+5
 OVERLAP "D".....7+8
 OVERLAP "E".....6+7
 OVERLAP "F".....2+3

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	OLF
SIGNAL HEAD NO.	11	21,22	NU	31	41,42	NU	51,52	61,62	NU	71	81,82	NU	11	31	63	43	71	23
RED		128		101		134		107							A111	A114		A104
YELLOW	*	129		* 102		135		* 108										
GREEN		130		103		136		109										
RED ARROW							131						A121	A124				A101
YELLOW ARROW							132						A122	A125	A112	A115	A102	A105
FLASHING YELLOW ARROW													A123	A126	A113	A116	A103	A106
GREEN ARROW	127			118		133				124								

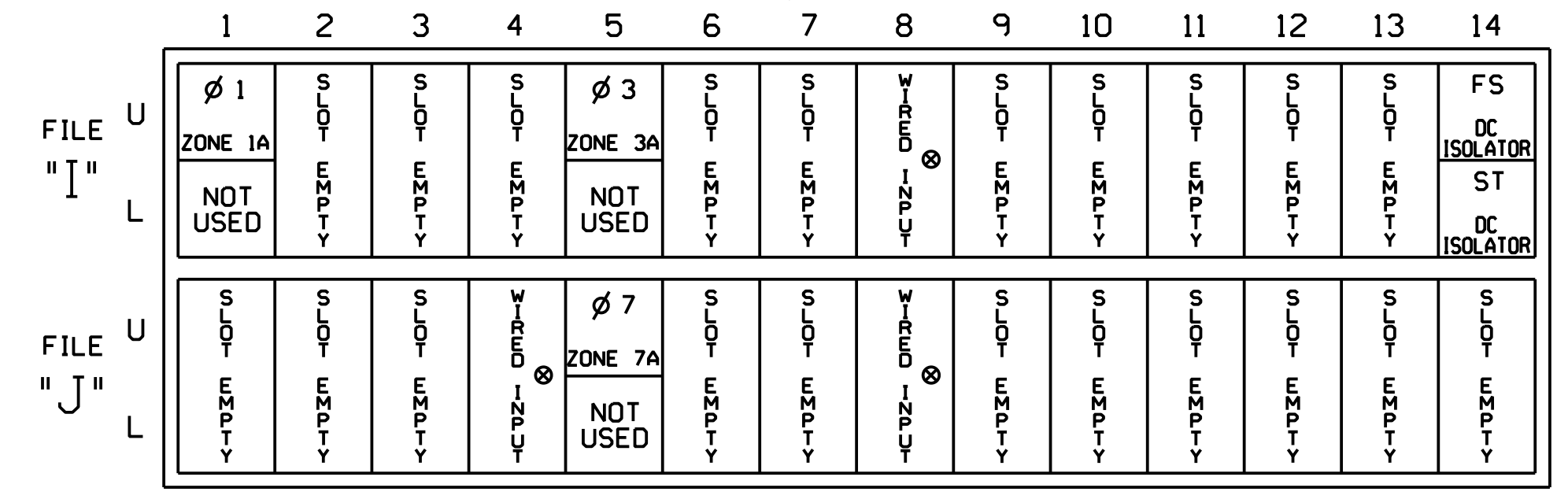
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE

ST = STOP TIME

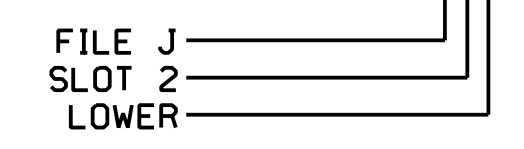
⊗ Wired Input - Do not populate slot with detector card

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
ZONE 1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10★	26	6	Y	Y			
	-	I1U	56	18★	51	1	Y	Y			
ZONE 3A ²	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12★	28	8	Y	Y			3
	-	I5U	58	20★	53	3	Y	Y			3
ZONE 7A ³	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11★	24	4	Y	Y			
	-	J5U	57	19★	57	7	Y	Y			

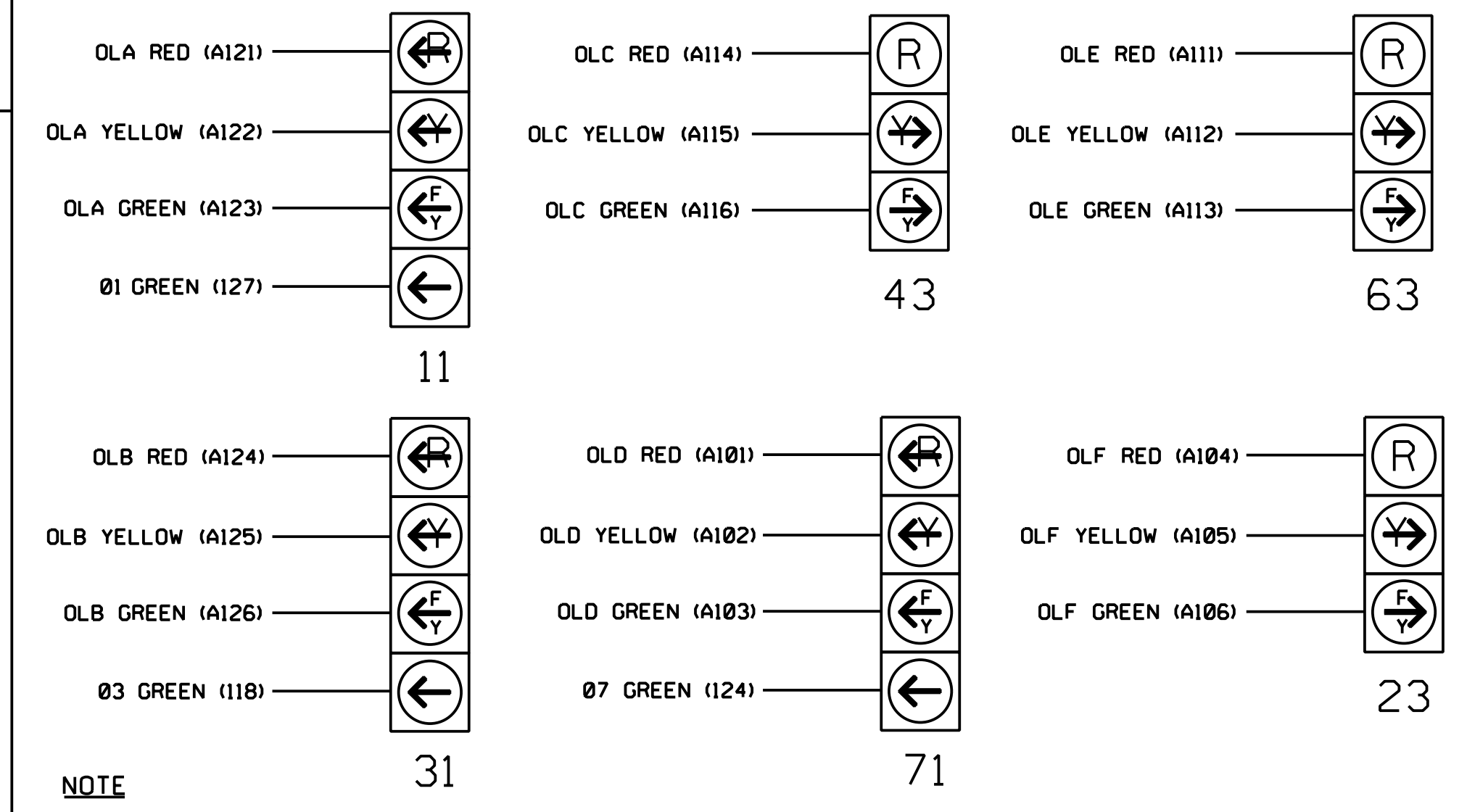
- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from I5-W to J8-W, on rear of input file.
 - Add jumper from J5-W to I8-W, on rear of input file.
- * See Input Page Assignment programming details on sheets 4, 5, and 6.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



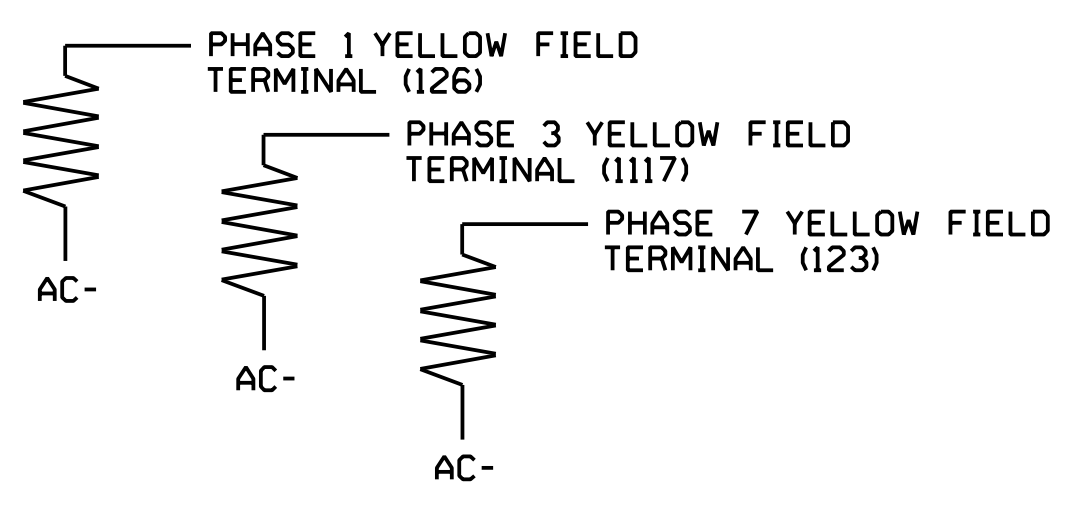
NOTE

The sequence display for signal heads 11, 31, and 71 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



! IMPORTANT: REMOVE RESISTOR FROM PHASE 5 RED FIELD TERMINAL, IF PRESENT.

SPECIAL DETECTOR NOTE

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

For loops 1A, 3A, and 7A, detector card placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheets 4, 5, 6, and 7 of this electrical detail.



HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1564
 (919) 546-8997

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 1 of 9
 Signal Upgrade
 Temporary Design 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC 211 (Howe Street)
 at
 NC 87 (River Road)/
 SR 1852 (Robert Ruark Drive)
 Division 03 Brunswick Co. Southport

Prepared for:

PLAN DATE: June 2017 REVIEWED BY: A.D. Klinskiak
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: _____ INITI. _____ DATE _____

Signature:

9/10/2021

SIG. INVENTORY NO. 03-0215T6

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, 5, 6, 10, 11, AND 12. **DISABLE ACT LOGIC COMMANDS 7, 8, AND 9.**
- 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 #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

SCROLL DOWN

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

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

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

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

SCROLL DOWN

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

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Overlap D Red
OUTPUT 40	= Overlap D Yellow
OUTPUT 41	= Overlap D Green
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green
OUTPUT 50	= Overlap A Red
OUTPUT 51	= Overlap A Yellow
OUTPUT 52	= Overlap A Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(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

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

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' 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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

NOTICE GREEN FLASH

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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'D' 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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'E' 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

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'F' 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

PRESS '+'

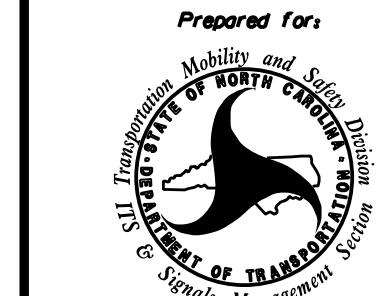
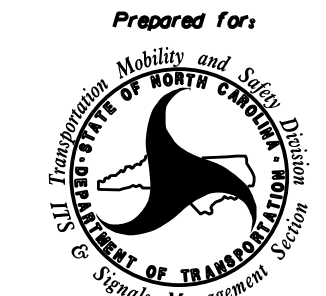
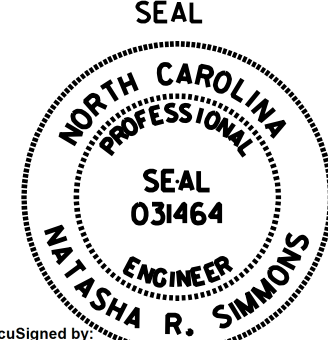
NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6
DESIGNED: June 2017
SEALED: 9/10/2021
REVISED: N/A

Electrical Detail - Sheet 2 of 9
Signal Upgrade
Temporary Design 6

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

	Prepared for: 		NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport		
	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		Prepared by: A.H. Thornburg Reviewed by: N.R. Simmons Date: 9/10/2021		

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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

NOTICE PAGE 2 →

```

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

PRESS '+'

NOTICE PAGE 2 →

```

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

PRESS '+'

NOTICE PAGE 2 →

```

PAGE 2: 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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

PRESS '+'

← NOTICE GREEN FLASH

NOTICE PAGE 2 →

```

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

PRESS '+'

NOTICE PAGE 2 →

```

PAGE 2: VEHICLE OVERLAP 'E' 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
  
```

PRESS '+'

← NOTICE GREEN FLASH

NOTICE PAGE 2 →

```

PAGE 2: VEHICLE OVERLAP 'F' 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
  
```

PRESS '+'

← 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:

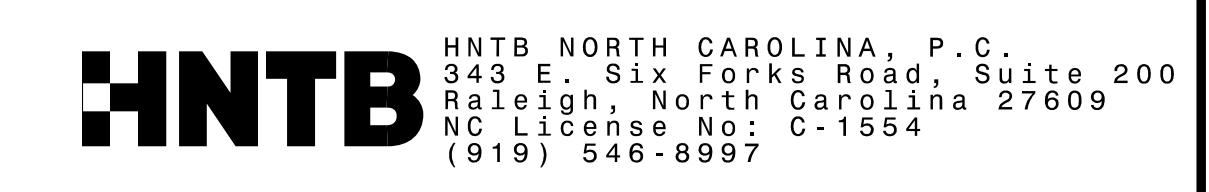
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 3 of 9
 Signal Upgrade
 Temporary Design 6

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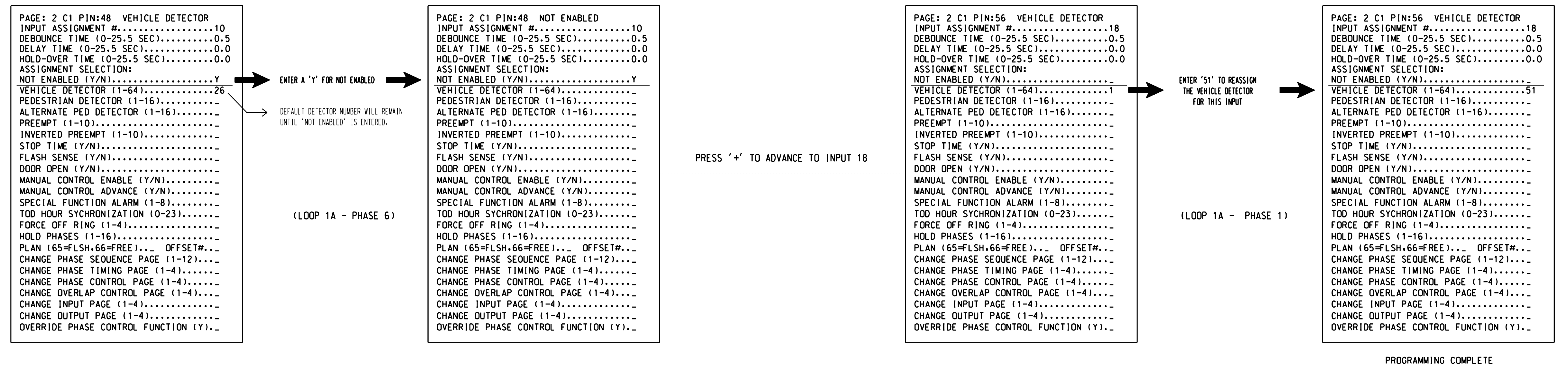
ELECTRICAL AND PROGRAMMING DETAILS FOR: 	NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive)		SEAL
	Prepared for: Division 03 Brunswick Co. Southport	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg	
REVISIONS		INIT. DATE	DocuSigned by: Natasha Simmons 9/10/2021 SIGNATURE DATE SIG. INVENTORY NO. 03-0215T6

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

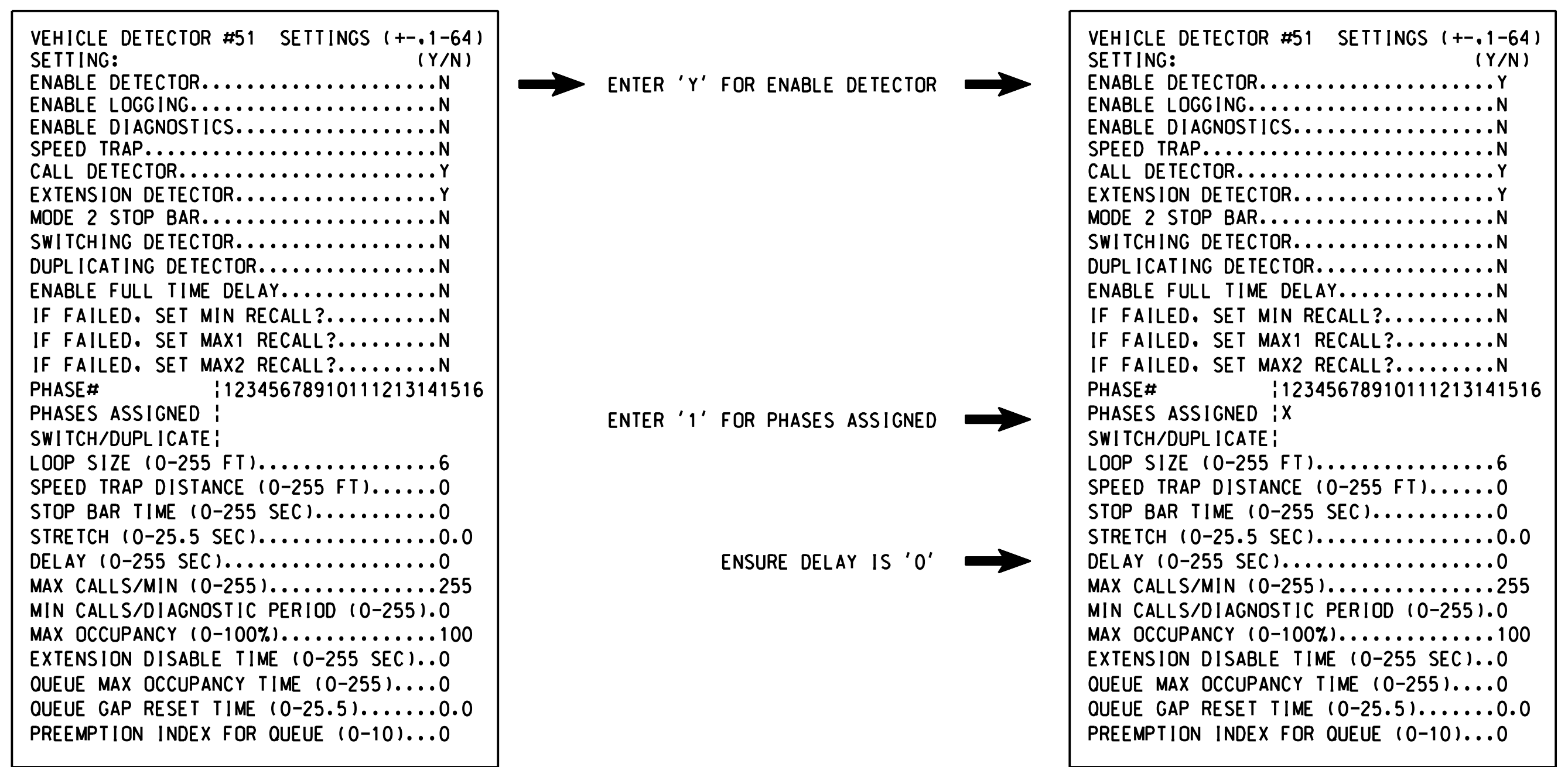
FROM MAIN MENU PRESS '5' (INPUTS). THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS). THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 4 of 9 Signal Upgrade Temporary Design 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

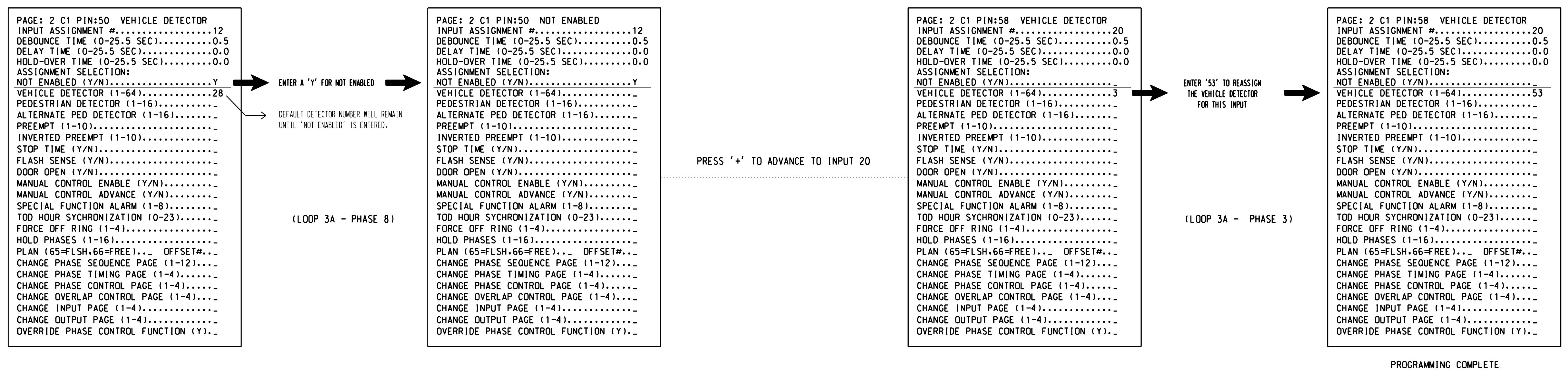
Professional Engineer Seal for Natasha R. Simmons, State of North Carolina, License No. 031464. Includes project address (NC 211 Howe Street, SR 1852 Robert Ruark Drive), date (June 2017), and signature lines for A.H. Thornburg and N.R. Simmons.

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #12 (DETECTOR 28) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 8 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 3 SECONDS.

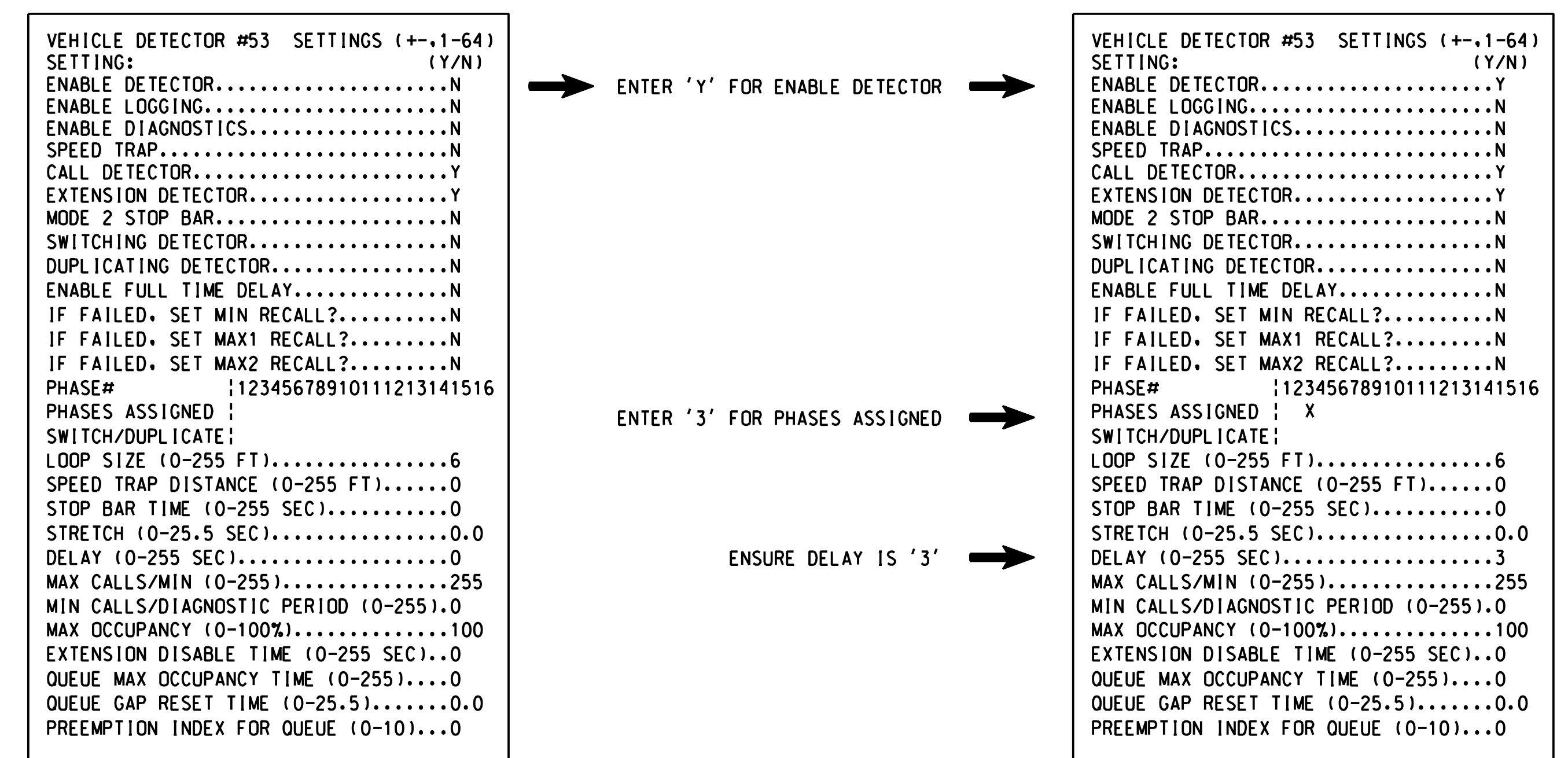
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 12 IS REACHED.



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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 5 of 9 Signal Upgrade Temporary Design 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer Seal for Natasha R. Simmons, State of North Carolina, License No. 031464. Includes project details for NC 211 (Howe Street) at NC 87 (River Road) / SR 1852 (Robert Ruark Drive), Brunswick Co., Southport. Prepared by A.H. Thornburg, reviewed by A.D. Klinksiek and N.R. Simmons. Date: 9/10/2021.

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #11 (DETECTOR 24) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 4 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 11 IS REACHED.

PAGE: 2 C1 PIN:49 VEHICLE DETECTOR INPUT ASSIGNMENT #.....11 DEBOUNCE TIME (0-25.5 SEC).....0.5 DELAY TIME (0-25.5 SEC).....0.0 HOLD-OVER TIME (0-25.5 SEC).....0.0 ASSIGNMENT SELECTION: NOT ENABLED (Y/N).....Y VEHICLE DETECTOR (1-64).....24 PEDESTRIAN DETECTOR (1-16)..... ALTERNATE PED DETECTOR (1-16)..... PREEMPT (1-10)..... INVERTED PREEMPT (1-10)..... STOP TIME (Y/N)..... FLASH SENSE (Y/N)..... DOOR OPEN (Y/N)..... MANUAL CONTROL ENABLE (Y/N)..... MANUAL CONTROL ADVANCE (Y/N)..... SPECIAL FUNCTION ALARM (1-8)..... TOD HOUR SYNCHRONIZATION (0-23)..... FORCE OFF RING (1-4)..... HOLD PHASES (1-16)..... PLAN (65=FLSH.66=FREE)..... OFFSET#..... CHANGE PHASE SEQUENCE PAGE (1-12)..... CHANGE PHASE TIMING PAGE (1-4)..... CHANGE PHASE CONTROL PAGE (1-4)..... CHANGE OVERLAP CONTROL PAGE (1-4)..... CHANGE INPUT PAGE (1-4)..... CHANGE OUTPUT PAGE (1-4)..... OVERRIDE PHASE CONTROL FUNCTION (Y).....

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 7A - PHASE 4)

PAGE: 2 C1 PIN:49 NOT ENABLED INPUT ASSIGNMENT #.....11 DEBOUNCE TIME (0-25.5 SEC).....0.5 DELAY TIME (0-25.5 SEC).....0.0 HOLD-OVER TIME (0-25.5 SEC).....0.0 ASSIGNMENT SELECTION: NOT ENABLED (Y/N).....Y VEHICLE DETECTOR (1-64)..... PEDESTRIAN DETECTOR (1-16)..... ALTERNATE PED DETECTOR (1-16)..... PREEMPT (1-10)..... INVERTED PREEMPT (1-10)..... STOP TIME (Y/N)..... FLASH SENSE (Y/N)..... DOOR OPEN (Y/N)..... MANUAL CONTROL ENABLE (Y/N)..... MANUAL CONTROL ADVANCE (Y/N)..... SPECIAL FUNCTION ALARM (1-8)..... TOD HOUR SYNCHRONIZATION (0-23)..... FORCE OFF RING (1-4)..... HOLD PHASES (1-16)..... PLAN (65=FLSH.66=FREE)..... OFFSET#..... CHANGE PHASE SEQUENCE PAGE (1-12)..... CHANGE PHASE TIMING PAGE (1-4)..... CHANGE PHASE CONTROL PAGE (1-4)..... CHANGE OVERLAP CONTROL PAGE (1-4)..... CHANGE INPUT PAGE (1-4)..... CHANGE OUTPUT PAGE (1-4)..... OVERRIDE PHASE CONTROL FUNCTION (Y).....

PRESS '+' TO ADVANCE TO INPUT 19

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

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

(LOOP 7A - PHASE 7)

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

PROGRAMMING COMPLETE

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

(program controller as shown below)

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

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '7' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

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

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 6 of 9 Signal Upgrade Temporary Design 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive). Includes fields for PLAN DATE, REVIEWED BY, PREPARED BY, and a signature block for Natasha R. Simmons, dated 9/10/2021.

ALTERNATE PHASING ACTIVATION DETAIL

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

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

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

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

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

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

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11, 31, and 71 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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

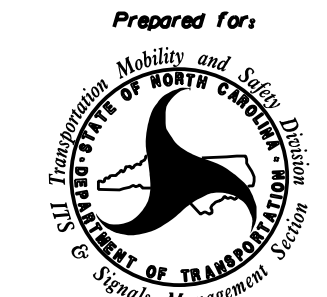
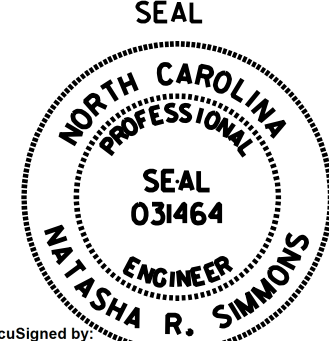
Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 7 of 9
Signal Upgrade
Temporary Design 6

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 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

 Prepared for: Department of Transportation Mobility and Safety Division STATE OF NORTH CAROLINA Office of Signal Management	NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport	 SEAL 031464 NATASHA R. SIMMONS ENGINEER
	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	
750 N. Greenfield Pkwy, Corner, NC 27529		Documented by: Natasha Simmons 9/10/2021 SIGNATURE DATE _____ _____ SIG. INVENTORY NO. 03-0215T6

OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL TO ASSIGN LOADSWITCH AUX S3 TO OVERLAP 'E' (FOR SIGNAL HEAD 63) (program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "45"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:91 NOT ENABLED OUTPUT ASSIGNMENT #.....45 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" RED

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:91 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PAGE:1 C1 PIN:91 VEHICLE OVERLAP OUTPUT ASSIGNMENT #.....45 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

PRESS '+' KEY FOR OUTPUT 46

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:93 NOT ENABLED OUTPUT ASSIGNMENT #.....46 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" GREEN

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:93 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PRESS '+' KEY FOR OUTPUT 54

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:101 CONTROLLER FLASH OUTPUT ASSIGNMENT #.....54 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH.....Y RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" YELLOW

ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:101 CONTROLLER FLASH SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

THE OUTPUT IS SET AS CONTROLLER FLASH BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215T6 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 8 of 9 Signal Upgrade Temporary Design 6

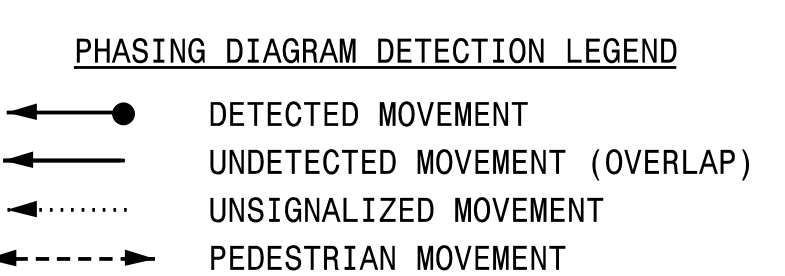
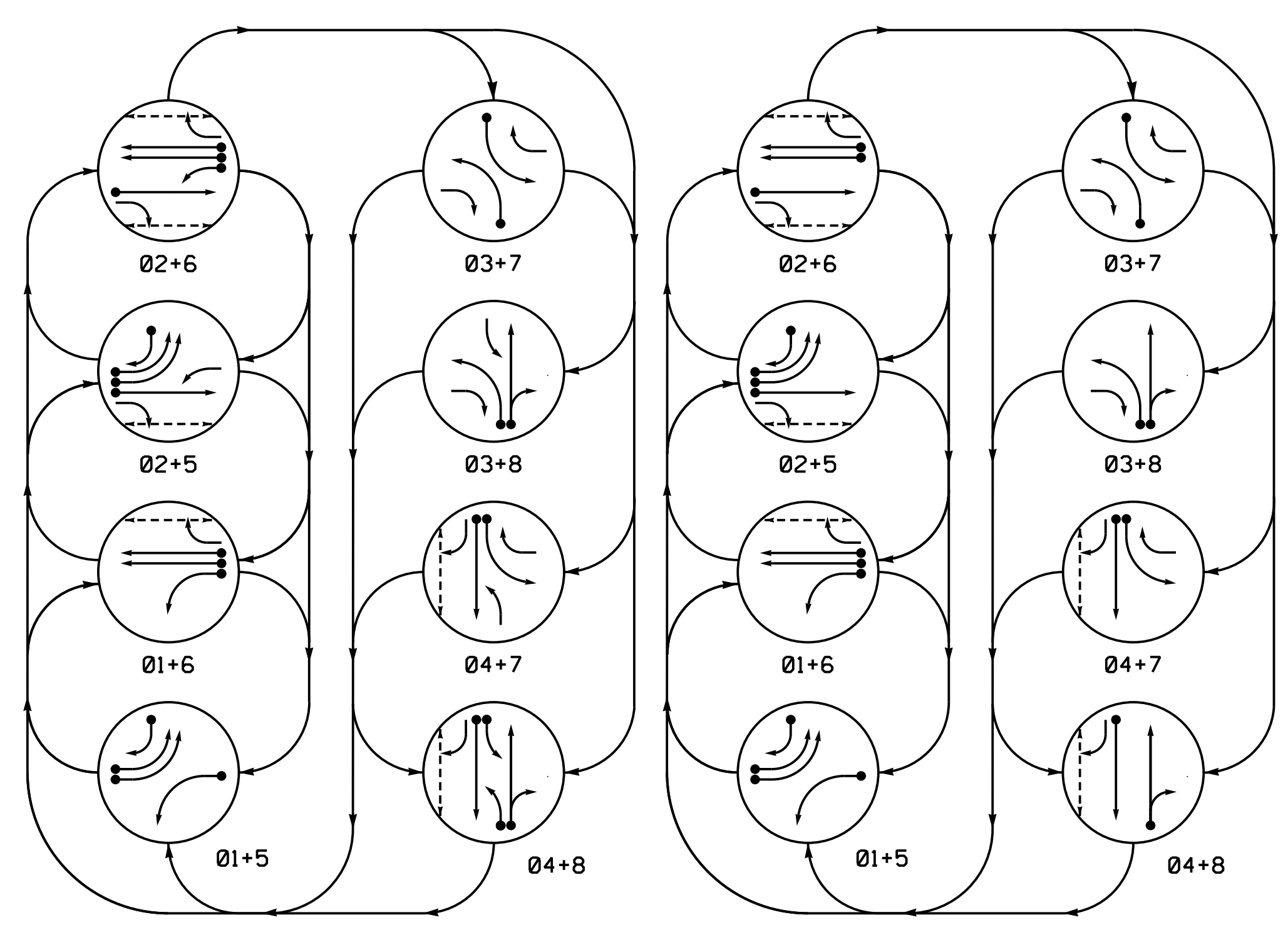
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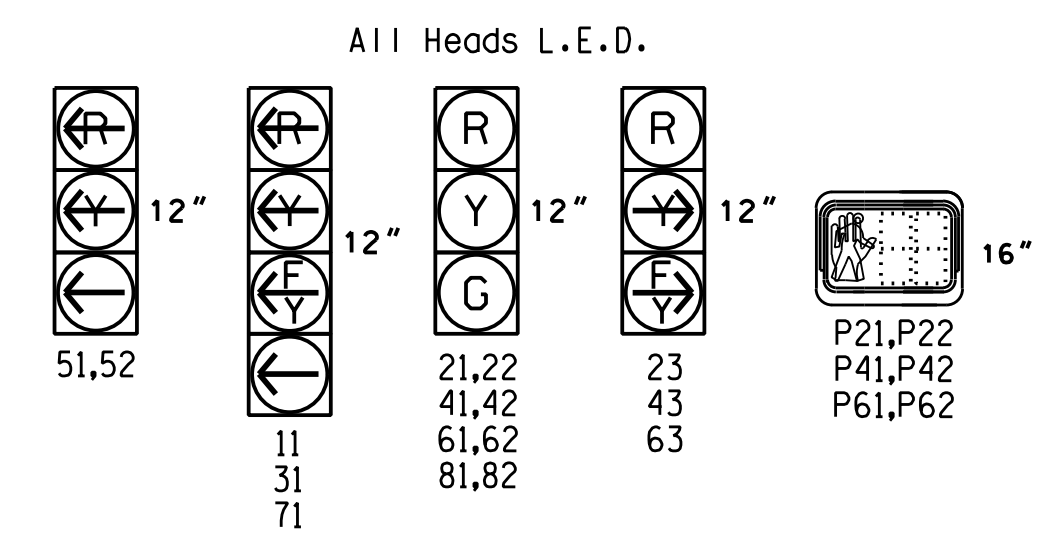
Table with project details: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive). Includes signature of Natasha R. Simmons, dated 9/10/2021, and a seal for the North Carolina Professional Engineer.

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	---	---	---	---	---	---	---	---
21,22	R	R	G	G	R	R	R	R
23	R	R	F	F	F	F	R	R
31	---	---	---	---	---	---	---	---
41,42	R	R	R	R	R	R	G	G
43	F	F	F	F	R	R	F	F
51,52	---	---	---	---	---	---	---	---
61,62	R	G	R	G	R	R	R	R
63	R	F	R	F	F	R	F	R
71	---	---	---	---	---	---	---	---
81,82	R	R	R	R	R	G	R	G
P21,P22	DW	DW	W	W	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	---	---	---	---	---	---	---	---
21,22	R	R	G	G	R	R	R	R
23	R	R	F	F	F	F	R	R
31	---	---	---	---	---	---	---	---
41,42	R	R	R	R	R	R	G	G
43	F	F	F	F	R	R	F	F
51,52	---	---	---	---	---	---	---	---
61,62	R	G	R	G	R	R	R	R
63	R	F	R	F	F	R	F	R
71	---	---	---	---	---	---	---	---
81,82	R	R	R	R	R	G	R	G
P21,P22	DW	DW	W	W	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

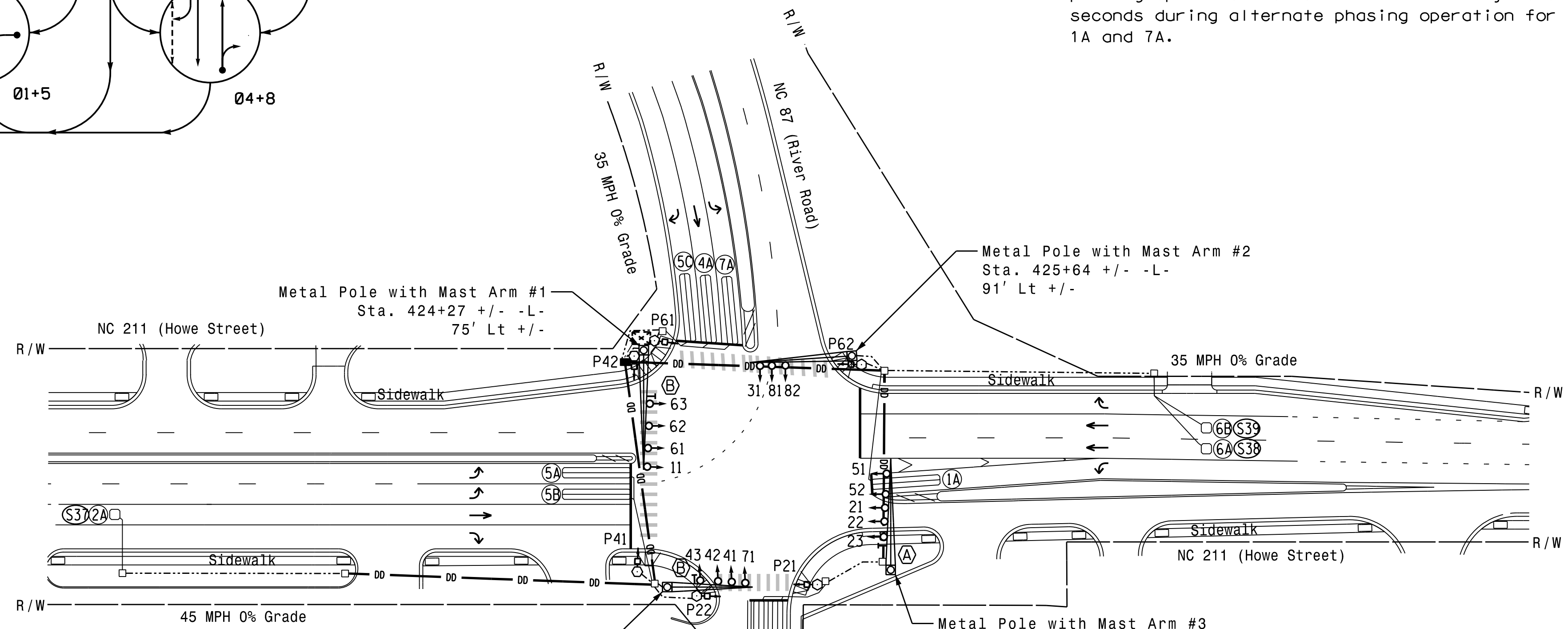
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	**15	-
2A/S37	6X6	300	5	Y	2	Y	Y	-	-	Y
3A	6X40	0	2-4-2	Y	3	Y	Y	-	**15	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-
5C	6X40	0	2-4-2	Y	5	Y	Y	-	**15	-
6A/S38	6X6	200	5	Y	6	Y	Y	-	-	Y
6B/S39	6X6	200	5	Y	6	Y	Y	-	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	**15	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	10	-

* Disable phase 4,6, and 8 call for 1A,3A, and 7A during alternate phasing operation.
 ** Reduce delay to 3 seconds during alternate phasing operation for 3A and reduce delay to 0 seconds during alternate phasing operation for 1A and 7A.

8 Phase Fully Actuated (NC 133 Closed Loop System)

NOTES

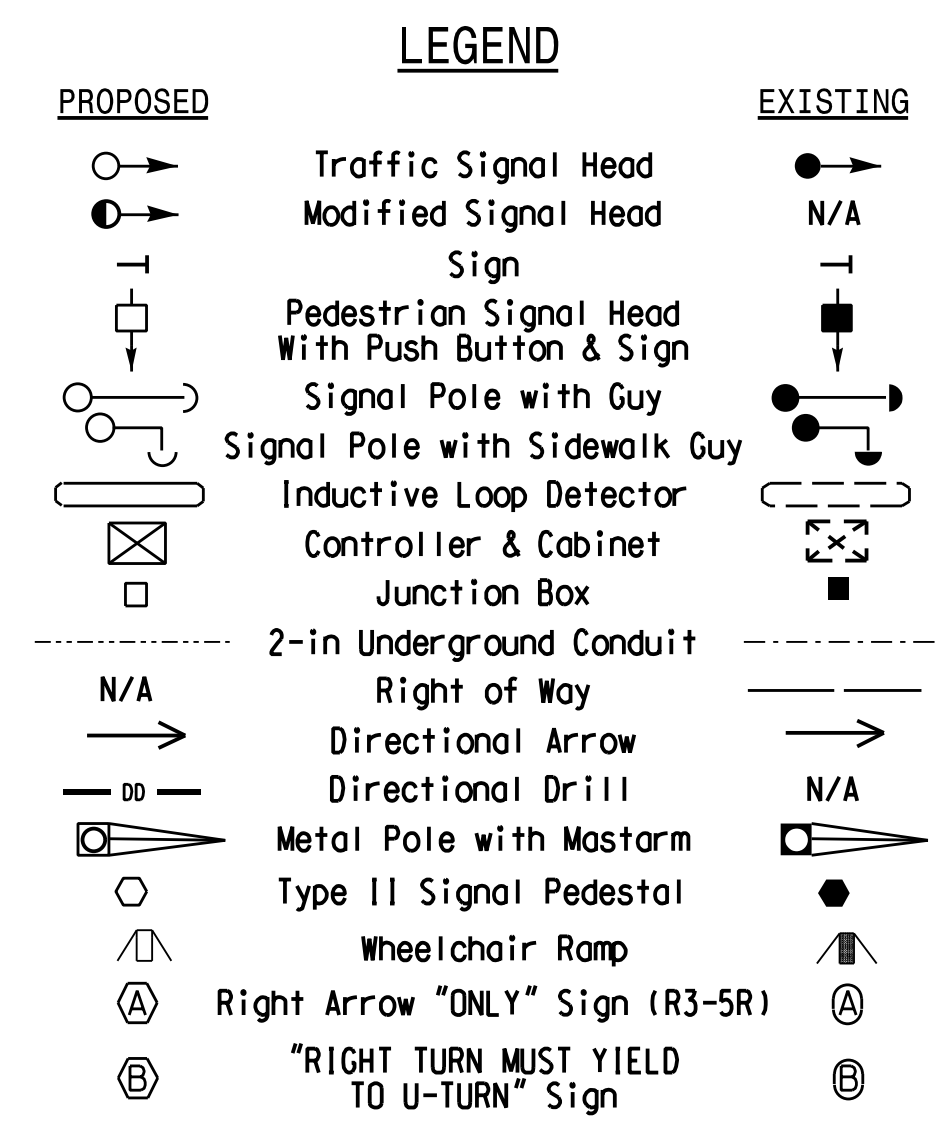
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 0215.



OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	10	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1*	20	60	20	30	20	60	20	30
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	3.2	2.4	3.4	2.8	3.5	2.4	3.3	2.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1*	-	7	-	7	-	7	-	-
Don't Walk 1	-	10	-	27	-	26	-	-
Seconds Per Actuation*	-	2.5	-	-	-	2.0	-	-
Max Variable Initial*	-	34	-	-	-	24	-	-
Time Before Reduction*	-	15	-	-	-	15	-	-
Time To Reduce*	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	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.



Signal Upgrade - Final Design

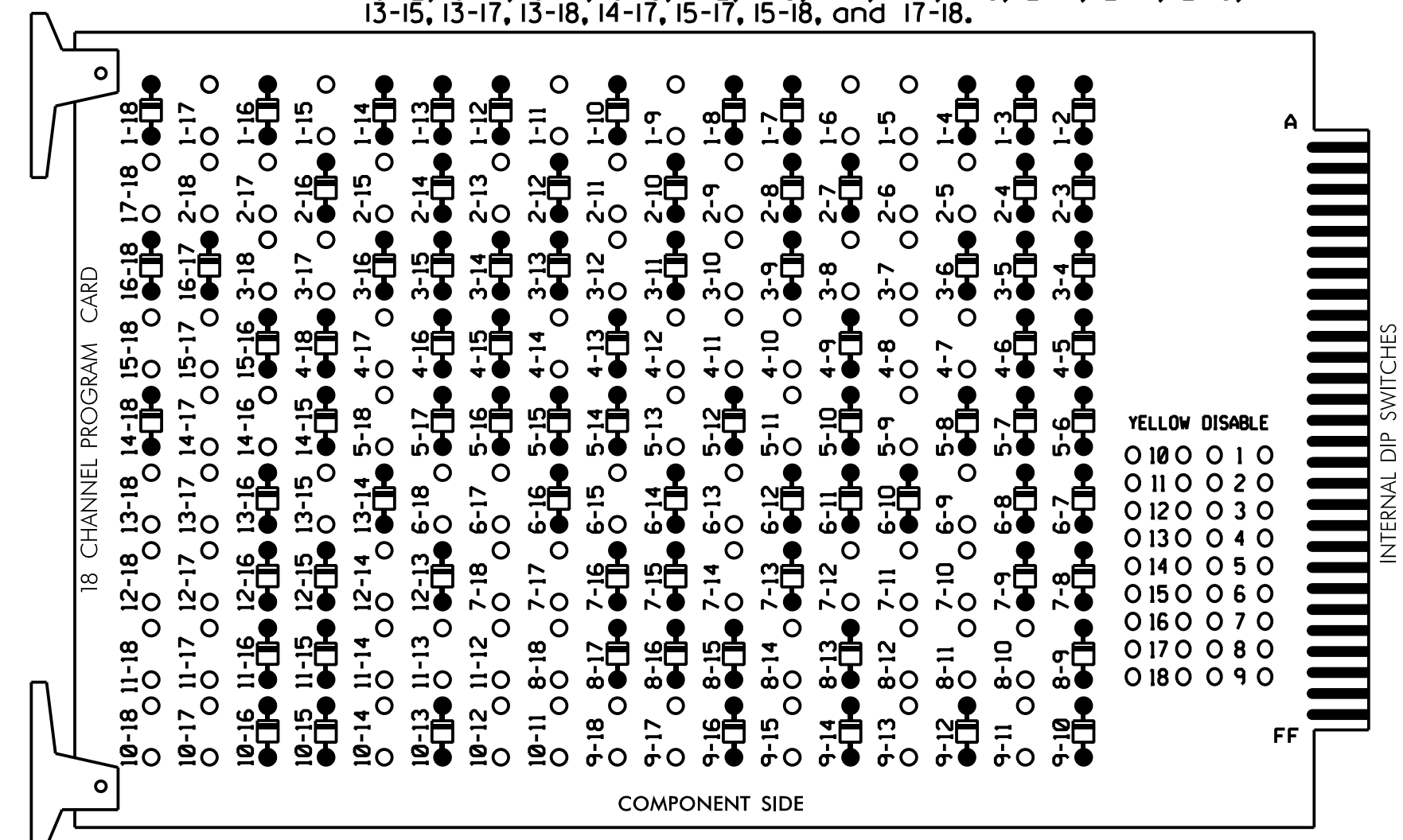
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	Prepared For: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive)		SEAL
	Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinskiak PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons		
SCALE 0 50 1"=50'		REVISIONS INIT. DATE SIGNATURE DATE 9/10/2021 SIG. INVENTORY NO. 03-0215	

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

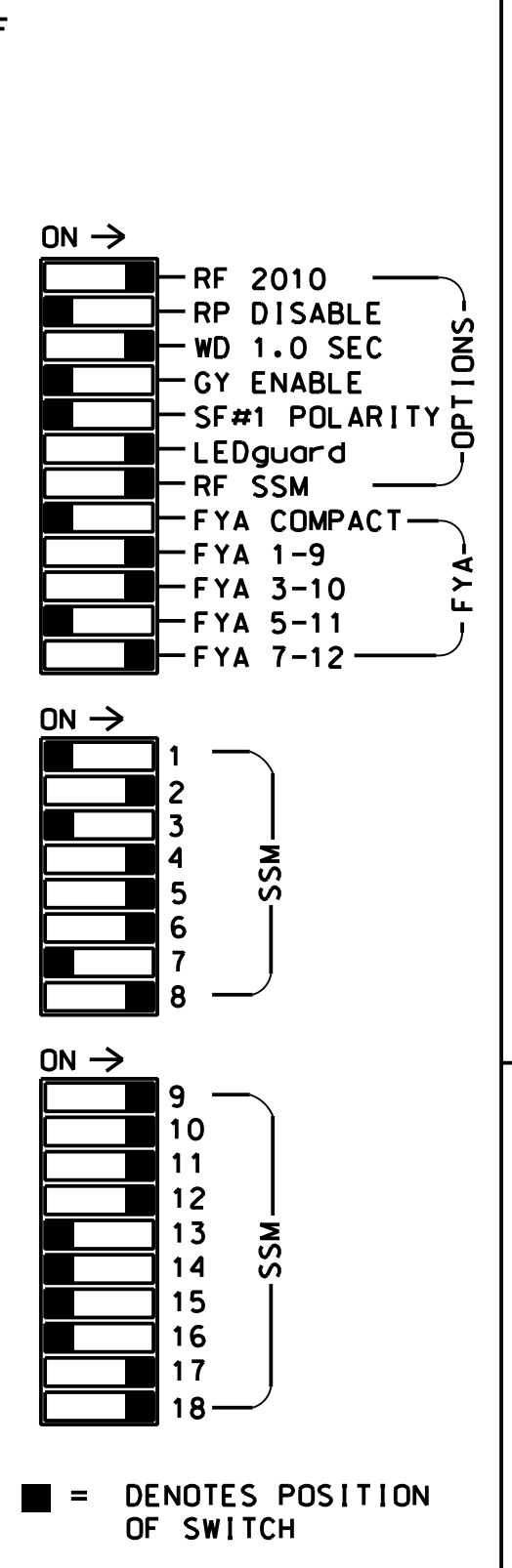
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 1-17, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 2-17, 2-18, 3-7, 3-8, 3-10, 3-12, 3-17, 3-18, 4-7, 4-8, 4-10, 4-11, 4-12, 4-14, 4-17, 5-9, 5-11, 5-13, 5-18, 6-9, 6-13, 6-15, 6-17, 6-18, 7-10, 7-11, 7-12, 7-14, 7-17, 7-18, 8-10, 8-11, 8-12, 8-14, 8-18, 9-11, 9-13, 9-15, 9-17, 9-18, 10-11, 10-12, 10-14, 10-17, 10-18, 11-12, 11-13, 11-14, 11-17, 11-18, 12-14, 12-17, 12-18, 13-15, 13-17, 13-18, 14-17, 15-17, 15-18, and 17-18.



REMOVE JUMPERS 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.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



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, 4, and 6 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 133 Closed Loop 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,S3,S4,S5,S6,S7,S8,S9,S10,S11,
 AUX S1,AUX S2,AUX S3,AUX S4,AUX S5,
 AUX S6
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,8
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....4+5
 OVERLAP "D".....7+8
 OVERLAP "E".....6+7
 OVERLAP "F".....2+3

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	OLF
SIGNAL HEAD NO.	11	21,22	P21, P22	31	41,42	P41, P42	51,52	61,62	P61, P62	71	81,82	NU	11	31	63	43	71	23
RED		128		101			134			107					A111	A114		A104
YELLOW	*	129		* 102			135		*	108								
GREEN		130		103			136			109								
RED ARROW							131						A121	A124			A101	
YELLOW ARROW							132						A122	A125	A112	A115	A102	A105
FLASHING YELLOW ARROW													A123	A126	A113	A116	A103	A106
GREEN ARROW	127			118			133			124								
Hand				113			104			119								
Walking Person				115			106			121								

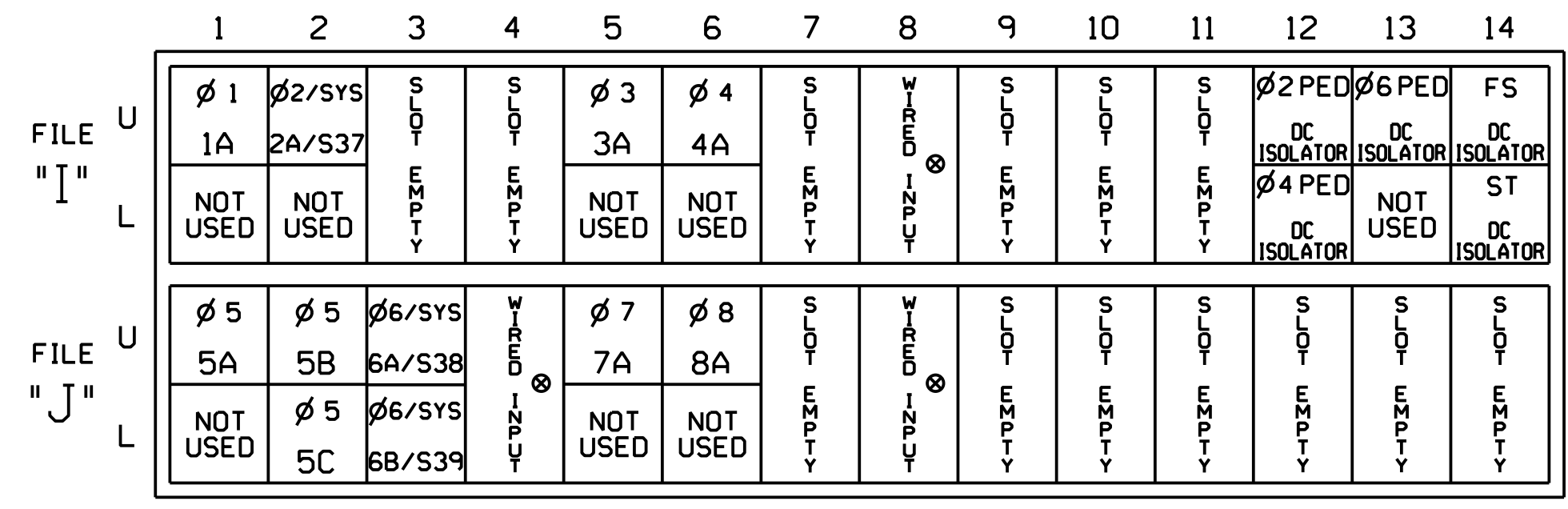
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



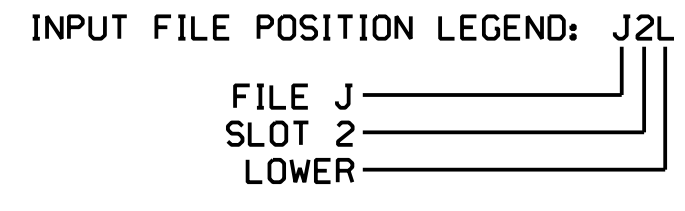
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card

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			
	-	I1U	56	18*	51	1	Y	Y			
2A/S37	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
	-	I5U	58	20*	3	3	Y	Y			15
3A ²	TB4-5,6	I5U	58	20*	3	3	Y	Y			15
	-	J8U	50	12*	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A/S38	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S39	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
7A ³	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11*	24	4	Y	Y			
	-	J5U	57	19*	57	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

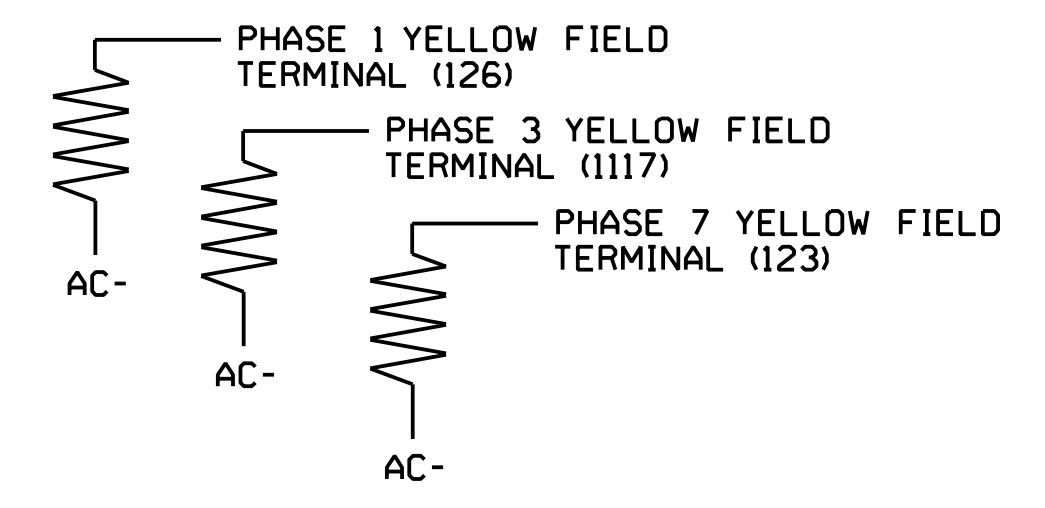
- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from I5-W to J8-W, on rear of input file.
 - Add jumper from J5-W to I8-W, on rear of input file.
- * See vehicle detector setup programming detail for alternate phasing on sheets 4, 5, and 6.



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 1 of 9
 Signal Upgrade
 Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for:

NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive)
 Division 03 Brunswick Co. Southport

PLAN DATE: June 2017 REVIEWED BY: A.D. Klinskiak
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: _____ INITI. _____ DATE _____

Signature: 9/10/2021
 SIGNATURE DATE
 SIG. INVENTORY NO. 03-0215

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, 5, 6, 10, 11, and 12. **DISABLE ACT LOGIC COMMANDS 7, 8, AND 9.**
- 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 #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

SCROLL DOWN

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

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+' FOUR TIMES

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

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

SCROLL DOWN

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

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Overlap D Red
OUTPUT 40	= Overlap D Yellow
OUTPUT 41	= Overlap D Green
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green
OUTPUT 50	= Overlap A Red
OUTPUT 51	= Overlap A Yellow
OUTPUT 52	= Overlap A Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(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
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

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' 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

PRESS '+'

NOTICE GREEN FLASH

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

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'D' 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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'E' 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

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'F' 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

PRESS '+'

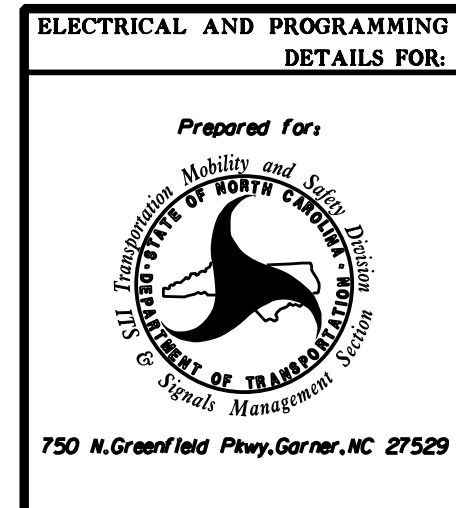

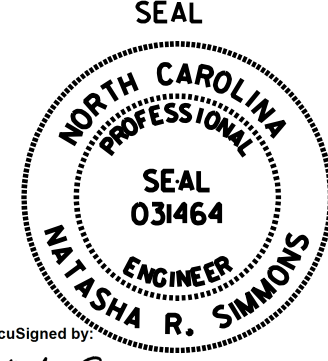
NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215
DESIGNED: June 2017
SEALED: 9/10/2021
REVISED: N/A

Electrical Detail - Sheet 2 of 9
Signal Upgrade
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

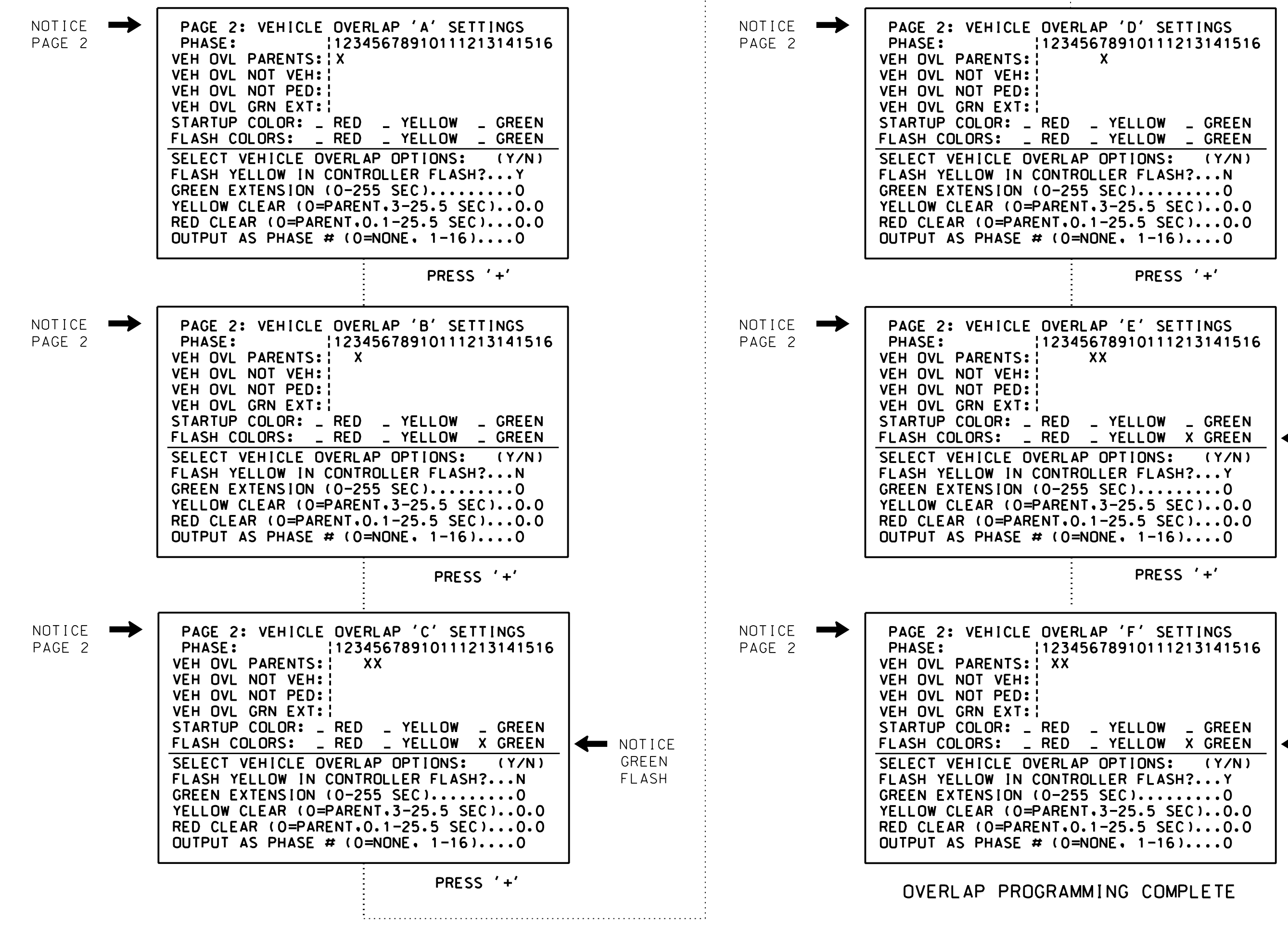
	Prepared for: 		NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport		
	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		Prepared by: A.H. Thornburg Reviewed by: N.R. Simmons Date: 9/10/2021		

SIG. INVENTORY NO. 03-0215

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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



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: 03-0215
DESIGNED: June 2017
SEALED: 9/10/2021
REVISED: N/A

Electrical Detail - Sheet 3 of 9
Signal Upgrade
Final Design

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HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

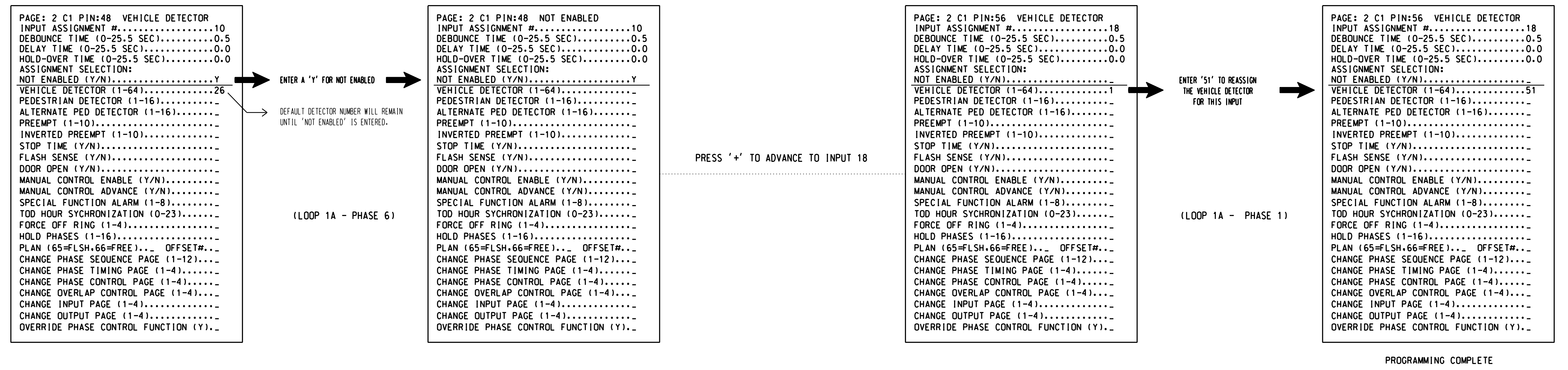
<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p>	<p>NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport</p>	<p style="font-size: small;">SEAL</p>									
<p>Prepared for:</p>	<p>PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek</p> <p>PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons</p>	<p>DocuSigned by: <i>Natasha Simmons</i> 9/10/2021</p>									
<p>750 N. Greenfield Pkwy, Corner, NC 27529</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 25%;">INIT.</th> <th style="width: 25%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							<p>SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 03-0215</p>
REVISIONS	INIT.	DATE									

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

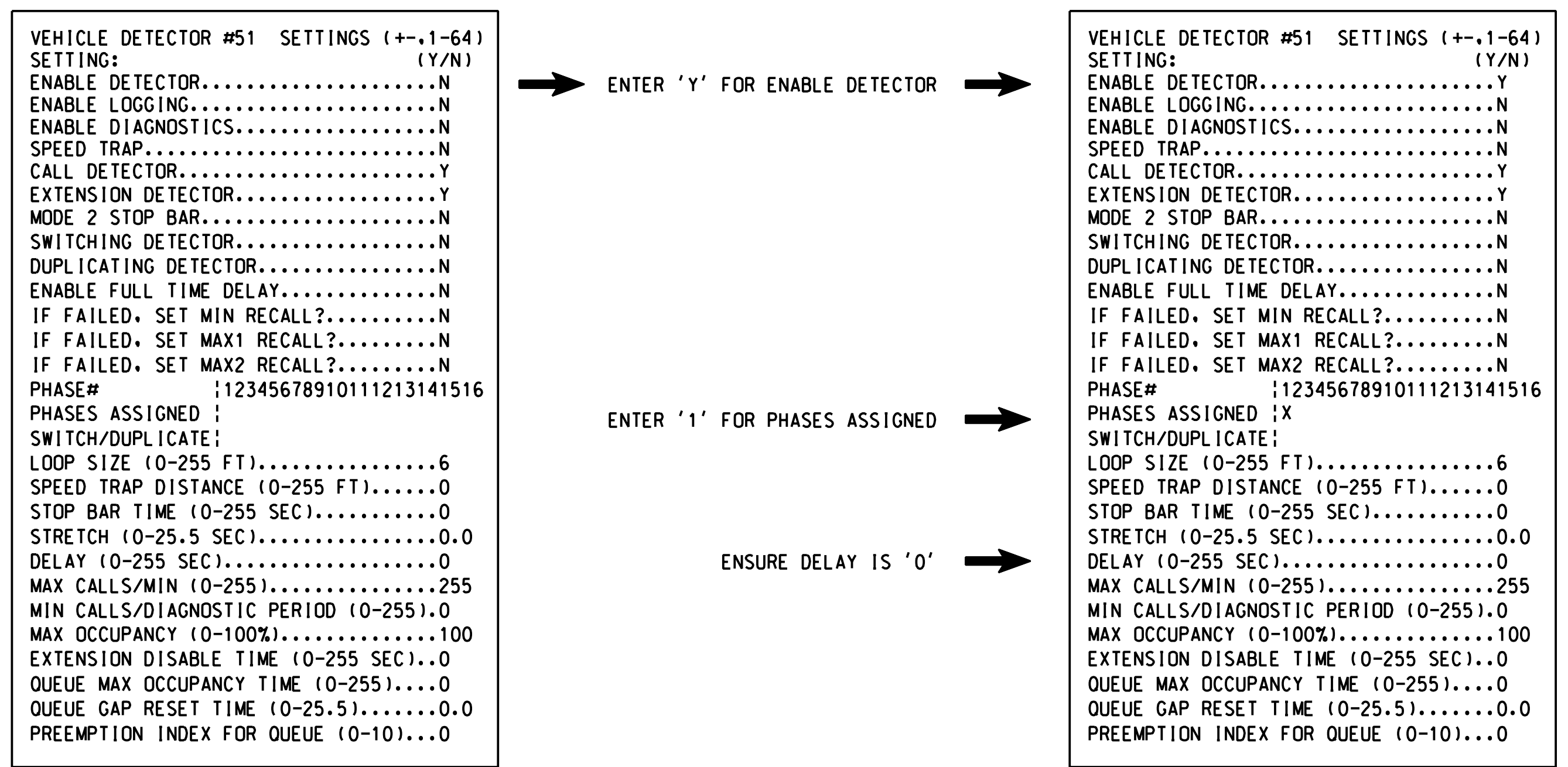
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 4 of 9 Signal Upgrade Final Design

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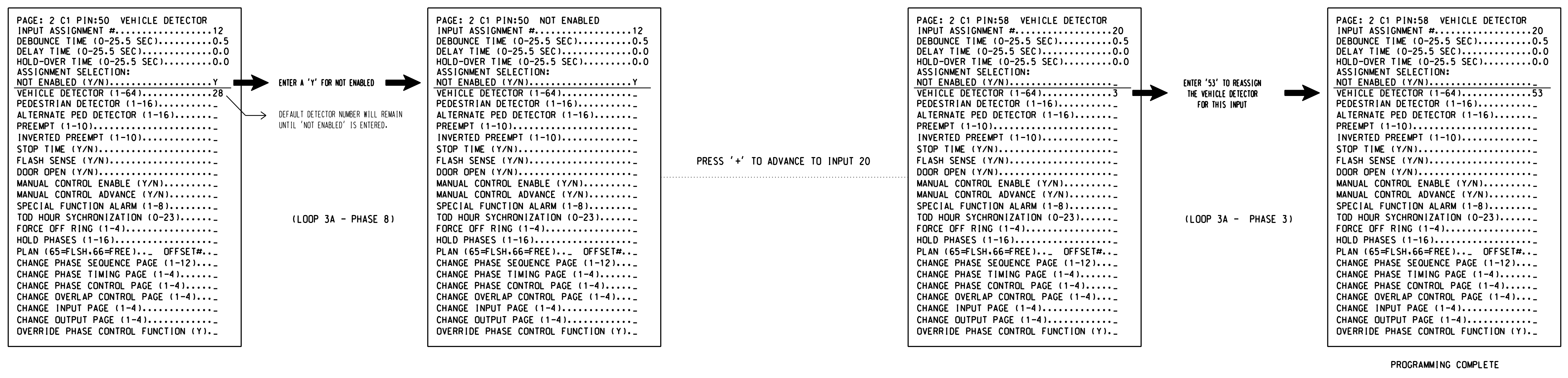
Professional Engineer seal for Natasha R. Simmons, NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive). Includes project details, dates, and signatures.

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #12 (DETECTOR 28) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 8 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 15 SECONDS TO 3 SECONDS.

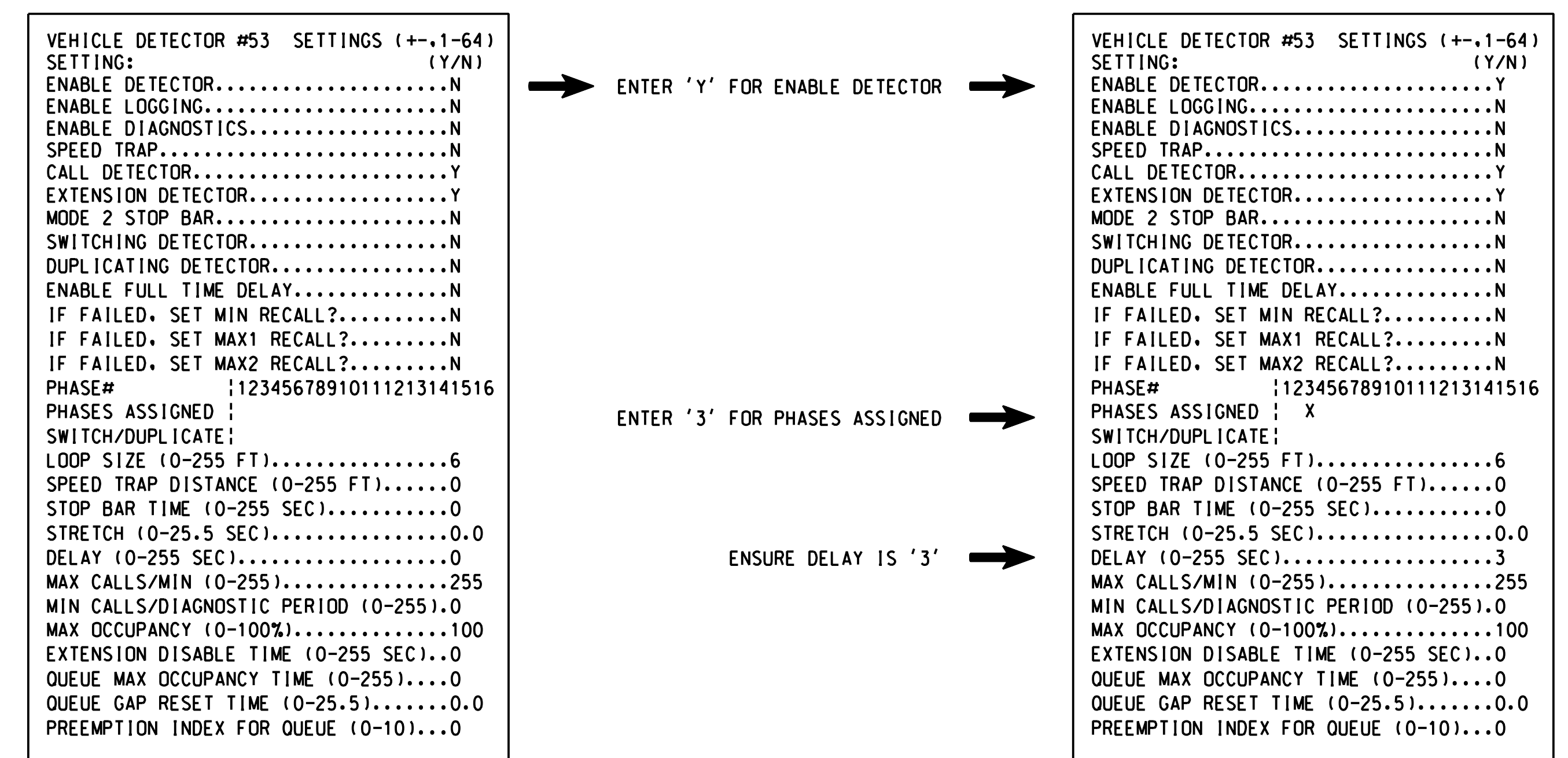
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 12 IS REACHED.



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

(program controller as shown below)

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

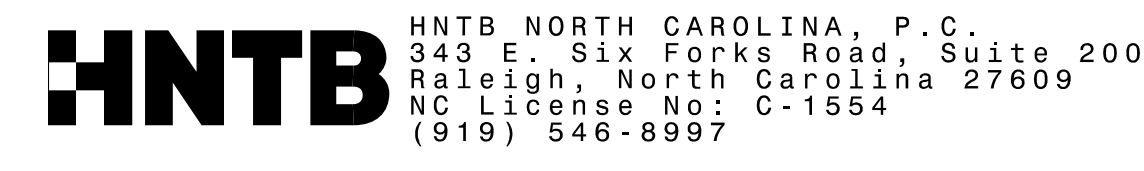


NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 5 of 9 Signal Upgrade Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Project information and signature block. Includes address: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive), Division 03 Brunswick Co. Southport. Prepared by: A.H. Thornburg, Reviewed by: N.R. Simmons. Includes a professional seal for Natasha R. Simmons, Engineer, Seal 031464, dated 9/10/2021.

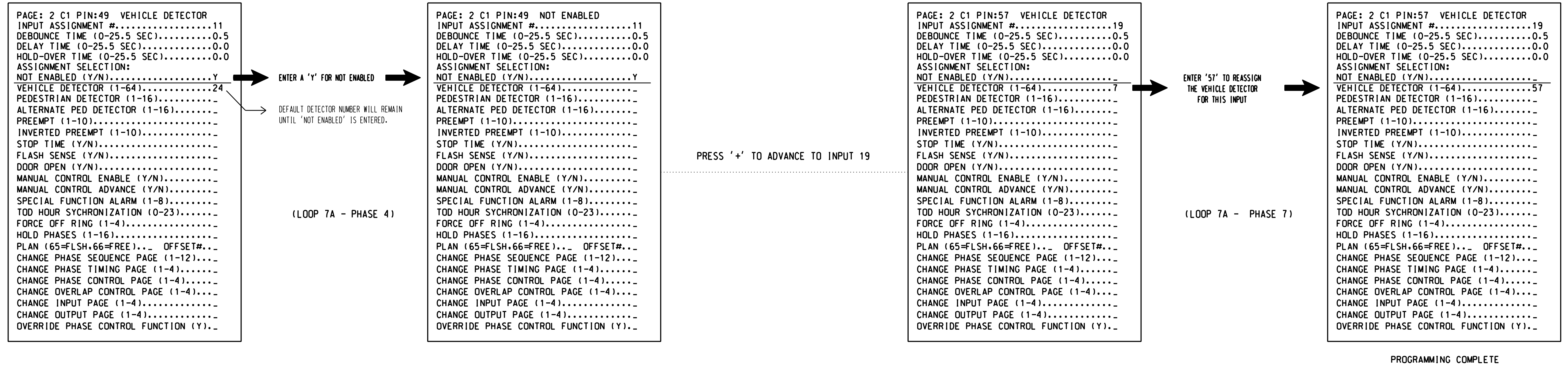
INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 7A

(program controller as shown below)

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

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #11 (DETECTOR 24) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 4 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

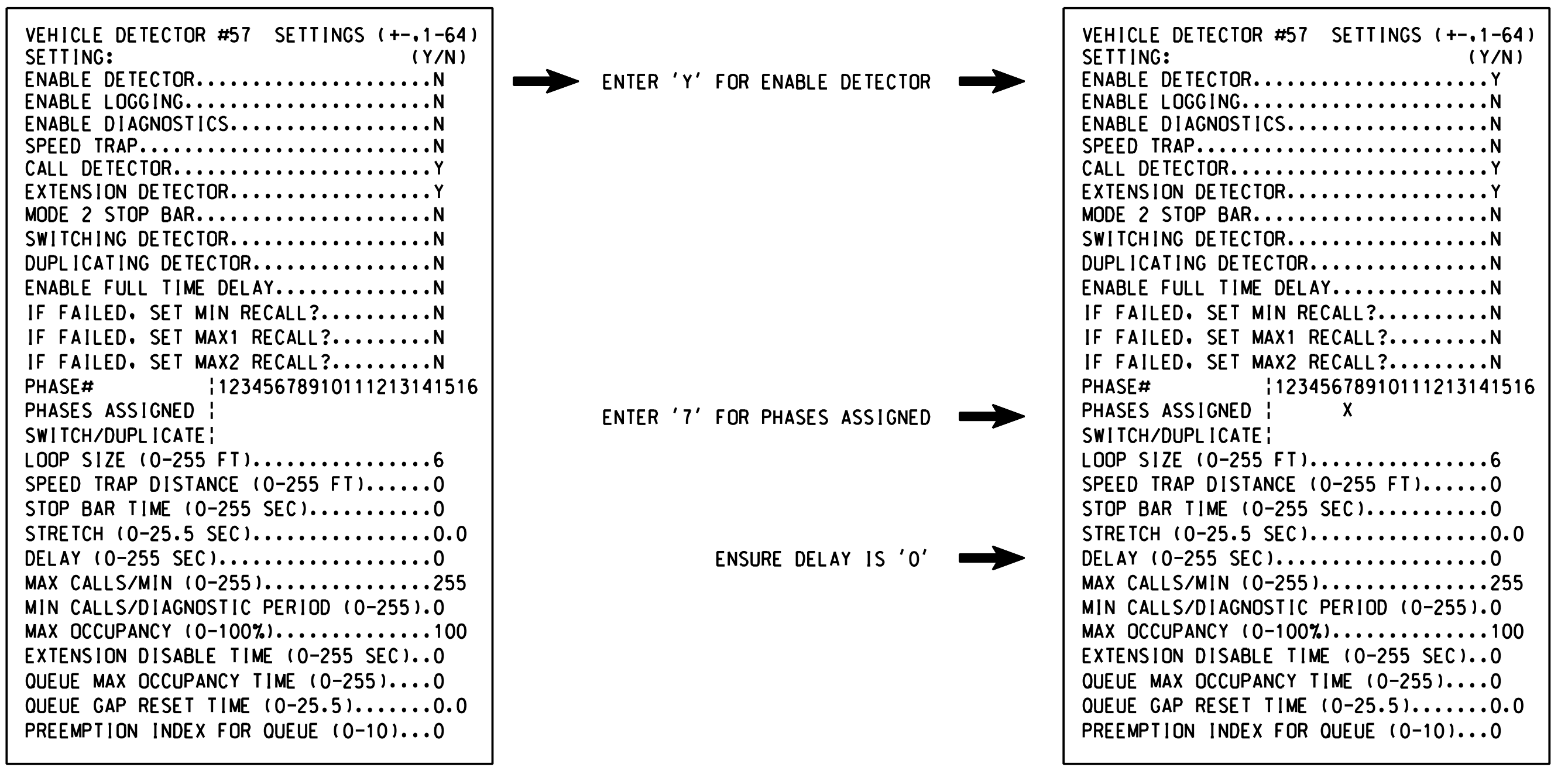
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 11 IS REACHED.



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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215
DESIGNED: June 2017
SEALED: 9/10/2021
REVISED: N/A

Electrical Detail - Sheet 6 of 9
Signal Upgrade
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: NC 211 (Howe Street) at NC 87 (River Road)/SR 1852 (Robert Ruark Drive). Includes fields for PLAN DATE (June 2017), REVIEWED BY (A.D. Klinskies), PREPARED BY (A.H. Thornburg), and REVIEWED BY (N.R. Simmons). Contains a signature block for Natasha Simmons dated 9/10/2021 and a professional seal for Natasha R. Simmons, Engineer, No. 031464.

ALTERNATE PHASING ACTIVATION DETAIL

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

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

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

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

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

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

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11, 31, and 71 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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

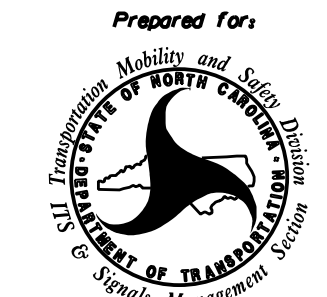
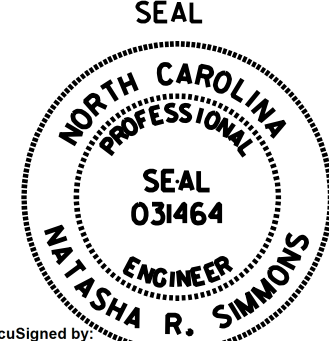
Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0215
 DESIGNED: June 2017
 SEALED: 9/10/2021
 REVISED: N/A

Electrical Detail - Sheet 7 of 9
Signal Upgrade
Final Design

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

HNTB HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR: 	Prepared for: NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport	SEAL  SEAL 031464 ENGINEER NATASHA R. SIMMONS
	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	

OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL TO ASSIGN LOADSWITCH AUX S3 TO OVERLAP 'E' (FOR SIGNAL HEAD 63) (program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "45"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:91 NOT ENABLED OUTPUT ASSIGNMENT #.....45 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" RED

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:91 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PAGE:1 C1 PIN:91 VEHICLE OVERLAP OUTPUT ASSIGNMENT #.....45 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

PRESS '+' KEY FOR OUTPUT 46

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:93 NOT ENABLED OUTPUT ASSIGNMENT #.....46 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" GREEN

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:93 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PRESS '+' KEY FOR OUTPUT 54

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:101 CONTROLLER FLASH OUTPUT ASSIGNMENT #.....54 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH.....Y RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "E" YELLOW

ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:101 CONTROLLER FLASH SELECT VEHICLE OVERLAP (A=1,P=16)...5 SELECT COLOR(0=RED,1=YEL,2=GRN)...1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

THE OUTPUT IS SET AS CONTROLLER FLASH BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

Electrical Detail - Sheet 8 of 9 Signal Upgrade Final Design

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HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 License No: C-1564 (919) 546-8997

Professional Engineer Seal for Natasha R. Simmons, License No. 031464, State of North Carolina. Includes project details for NC 211 (Howe Street) at NC 87 (River Road) / SR 1852 (Robert Ruark Drive) in Brunswick Co., Southport. Prepared by A.H. Thornburg, reviewed by A.D. Klinksiek and N.R. Simmons. Date: 9/10/2021. Inventory No. 03-0215.

OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL TO ASSIGN LOADSWITCH AUX S6 TO OVERLAP 'F' (FOR SIGNAL HEAD 23) (program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "37"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:83 NOT ENABLED OUTPUT ASSIGNMENT #.....37 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "F" RED

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:83 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...6 SELECT COLOR(0=RED,1=YEL,2=GRN)...0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PRESS '+' KEY FOR OUTPUT 38

PAGE:1 C1 PIN:83 VEHICLE OVERLAP OUTPUT ASSIGNMENT #.....37 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

PAGE:1 C1 PIN:84 NOT ENABLED OUTPUT ASSIGNMENT #.....38 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "F" GREEN

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:84 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...6 SELECT COLOR(0=RED,1=YEL,2=GRN)...2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

PRESS '+' KEY FOR OUTPUT 53

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:84 VEHICLE OVERLAP OUTPUT ASSIGNMENT #.....38 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

PAGE:1 C1 PIN:100 NOT ENABLED OUTPUT ASSIGNMENT #.....53 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

OVERLAP "F" YELLOW

THE OUTPUT IS SET AS NOT ENABLED BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:100 NOT ENABLED SELECT VEHICLE OVERLAP (A=1,P=16)...6 SELECT COLOR(0=RED,1=YEL,2=GRN)...1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER AFTER INPUTING DATA, THEN 'ESC'.

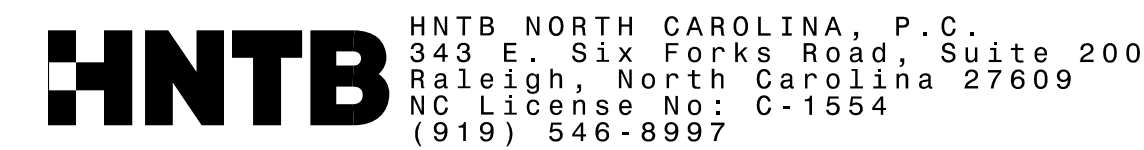
DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:100 VEHICLE OVERLAP OUTPUT ASSIGNMENT #.....53 FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0 DUTY CYCLE (0=DEFAULT) (0 - 100%)...0 MODE (0=SOLID,1=FLASH)...0 SELECT ASSIGNMENT: NOT ENABLED.....Y VEHICLE PHASE..... PEDESTRIAN PHASE..... VEHICLE OVERLAP.....Y PEDESTRIAN OVERLAP..... WATCHDOG..... DETECTOR RESET..... ADVANCE BEACON..... OUT OF PHASE FLASHER..... CONTROLLER FLASH..... RUN FREE..... RESERVED..... PREEMPT..... SOFT PREEMPT..... ANY PREEMPT..... COORDINATION PLAN..... OFFSET..... PHASE CHECK..... PHASE ON..... PHASE NEXT.....

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0215 DESIGNED: June 2017 SEALED: 9/10/2021 REVISED: N/A

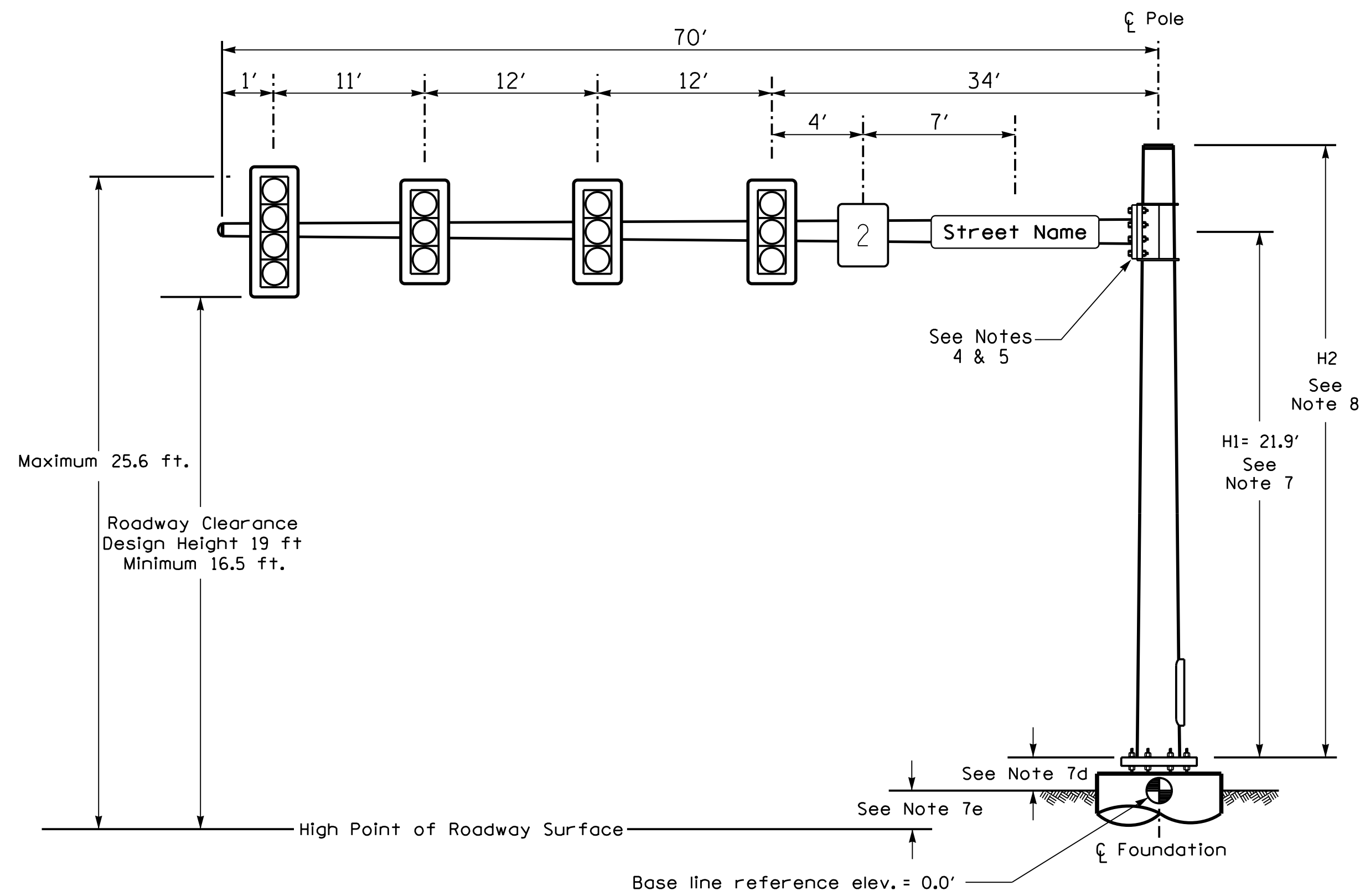
Electrical Detail - Sheet 9 of 9 Signal Upgrade Final Design

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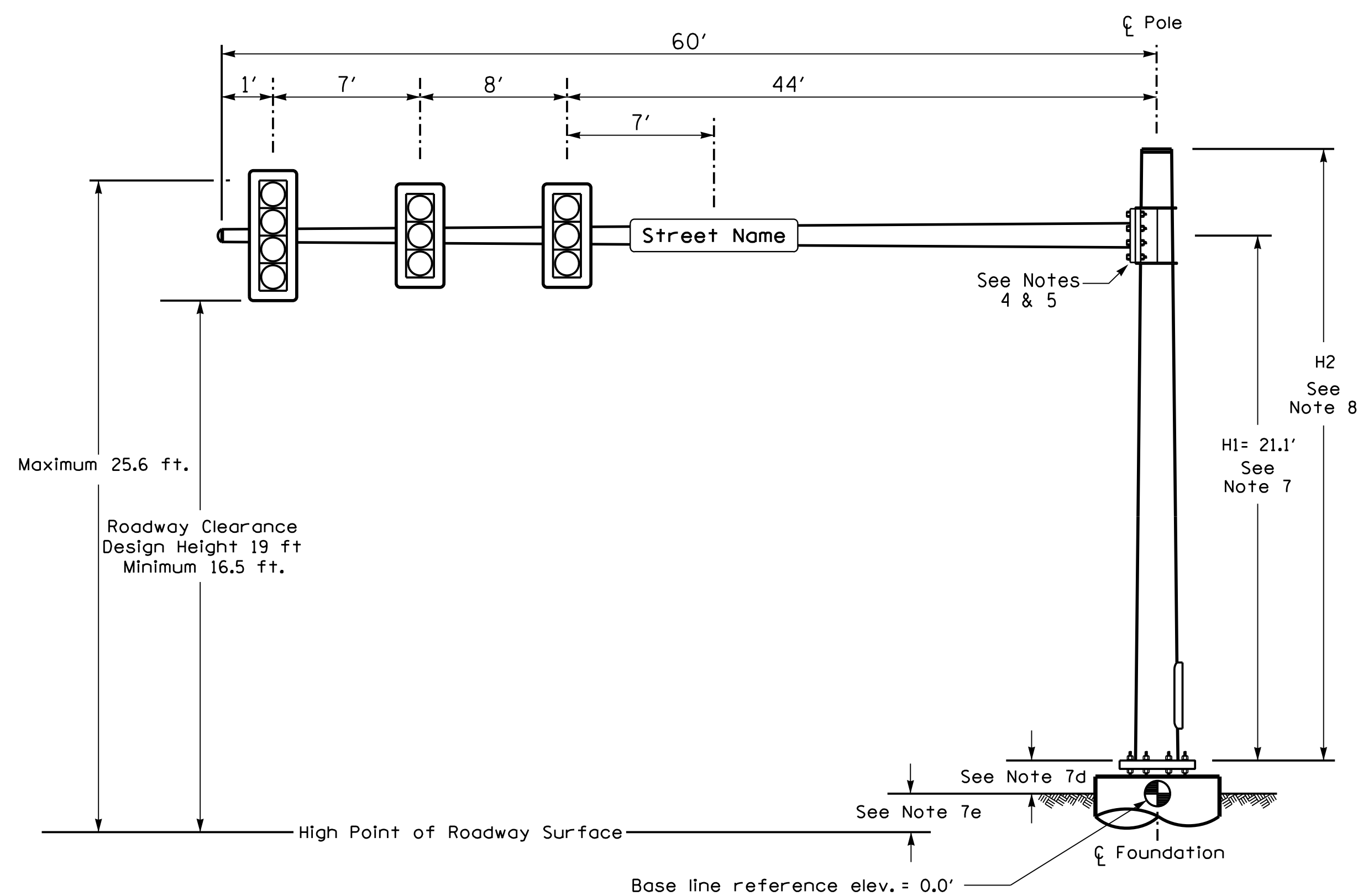
Professional Engineer seal for Natasha R. Simmons, State of North Carolina, License No. 031464. Includes project details for NC 211 (Howe Street) at NC 87 (River Road) / SR 1852 (Robert Ruark Drive) in Brunswick Co., Southport. Prepared by A.H. Thornburg, reviewed by A.D. Klinksiek and N.R. Simmons. Date: 9/10/2021. Inventory No. 03-0215.

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



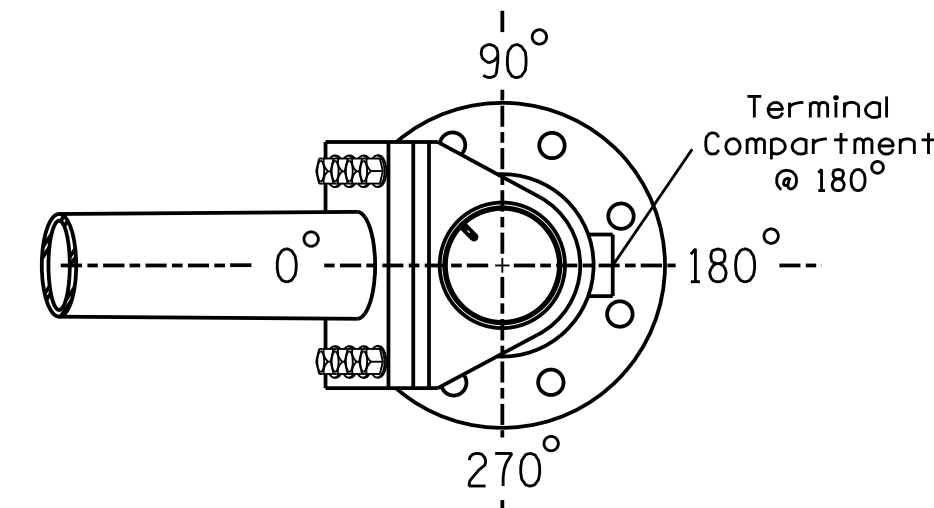
Elevation View

SPECIAL NOTE

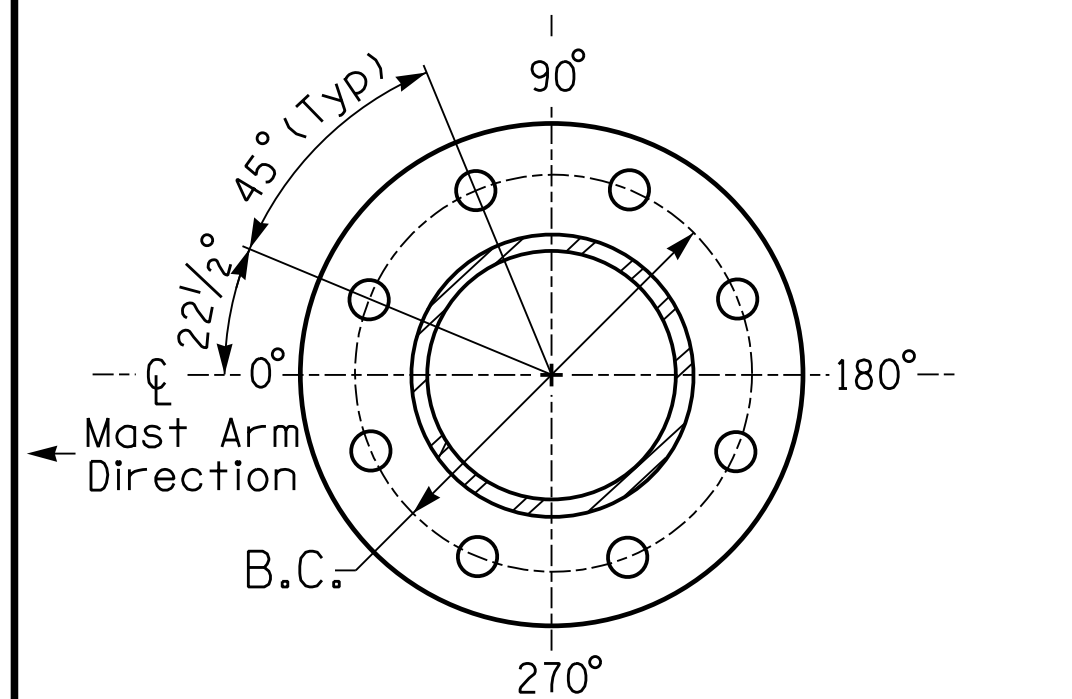
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

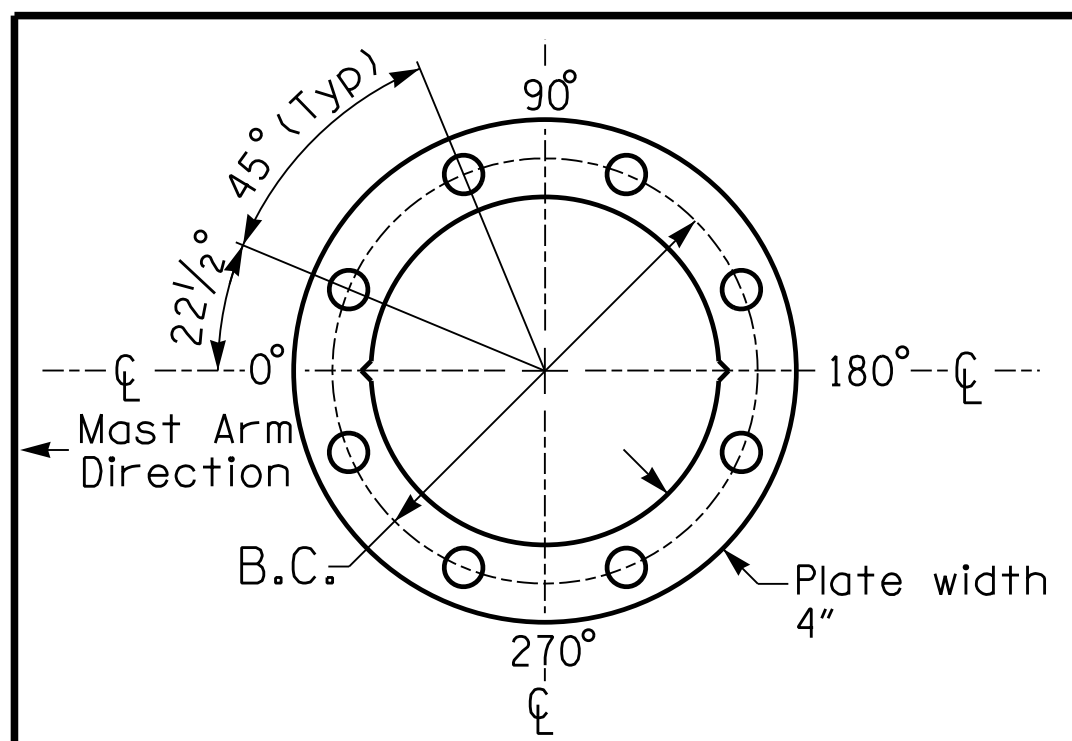
Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.90 ft.	+0.14 ft.
Elevation difference at Edge of travelway or face of curb	-0.56 ft.	+0.07 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

METAL POLE No. 1,2

PROJECT REFERENCE NO.	SHEET NO.
R-5021	Fig. 45.10

MAST ARM LOADING SCHEDULE

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

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

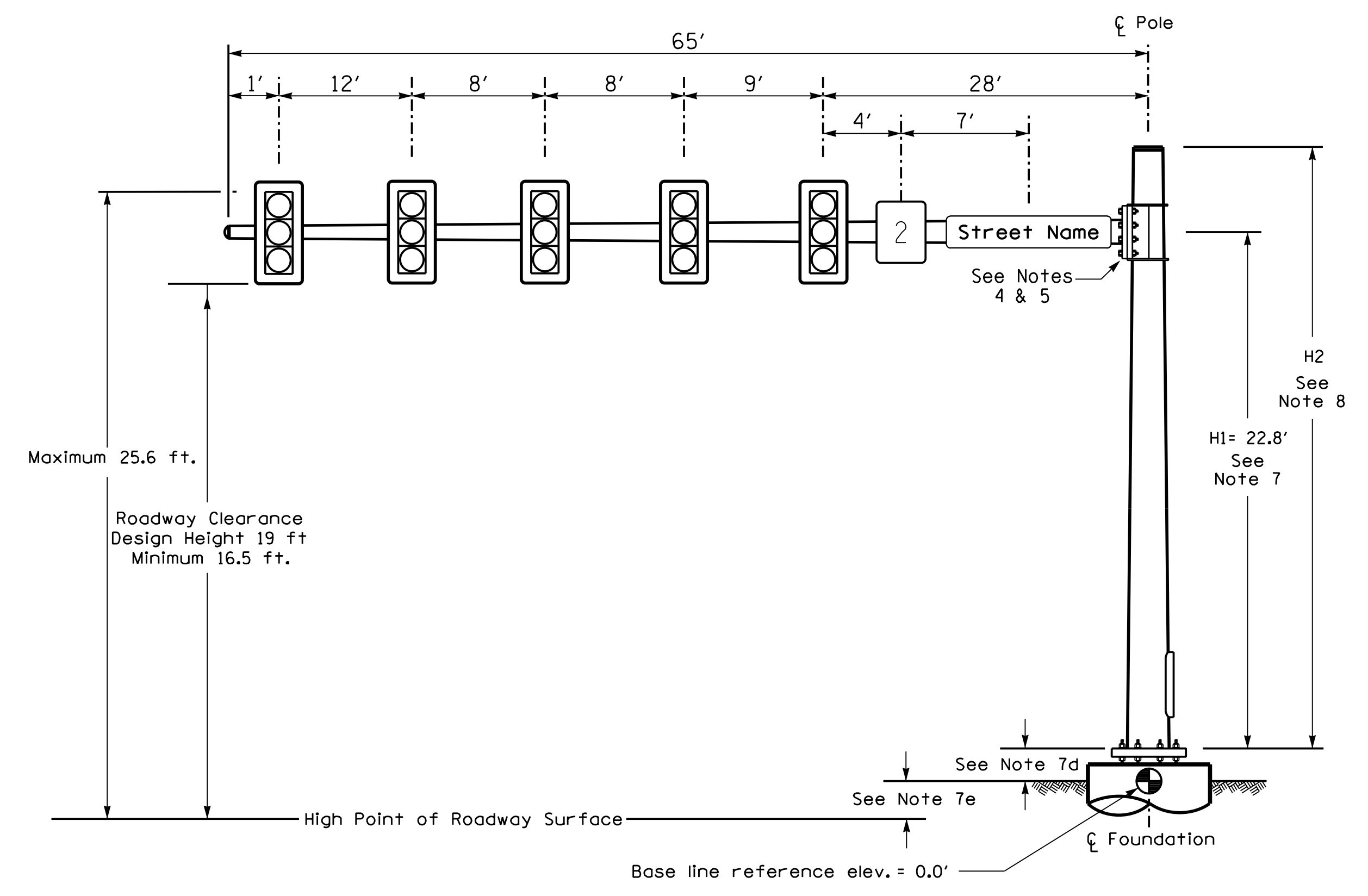
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

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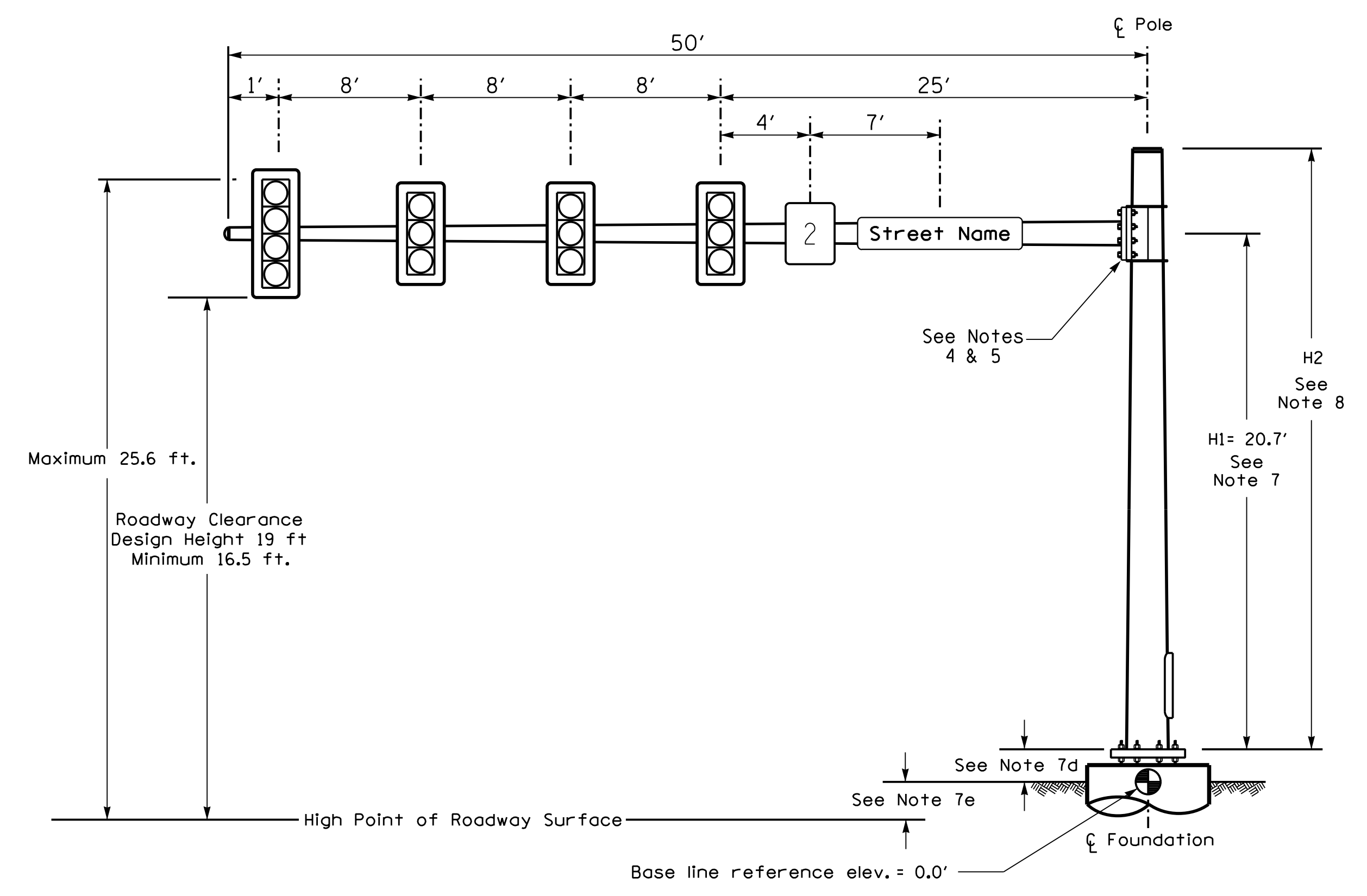
 Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport	SEAL N.T. SIMMONS ENGINEER 03464
	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg SCALE: 0 N/A REVIEWED BY: A.D. Klinskiak REVIEWED BY: N.R. Simmons DATE: 9/10/2021 SIG. INVENTORY NO. 03-0215	

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4

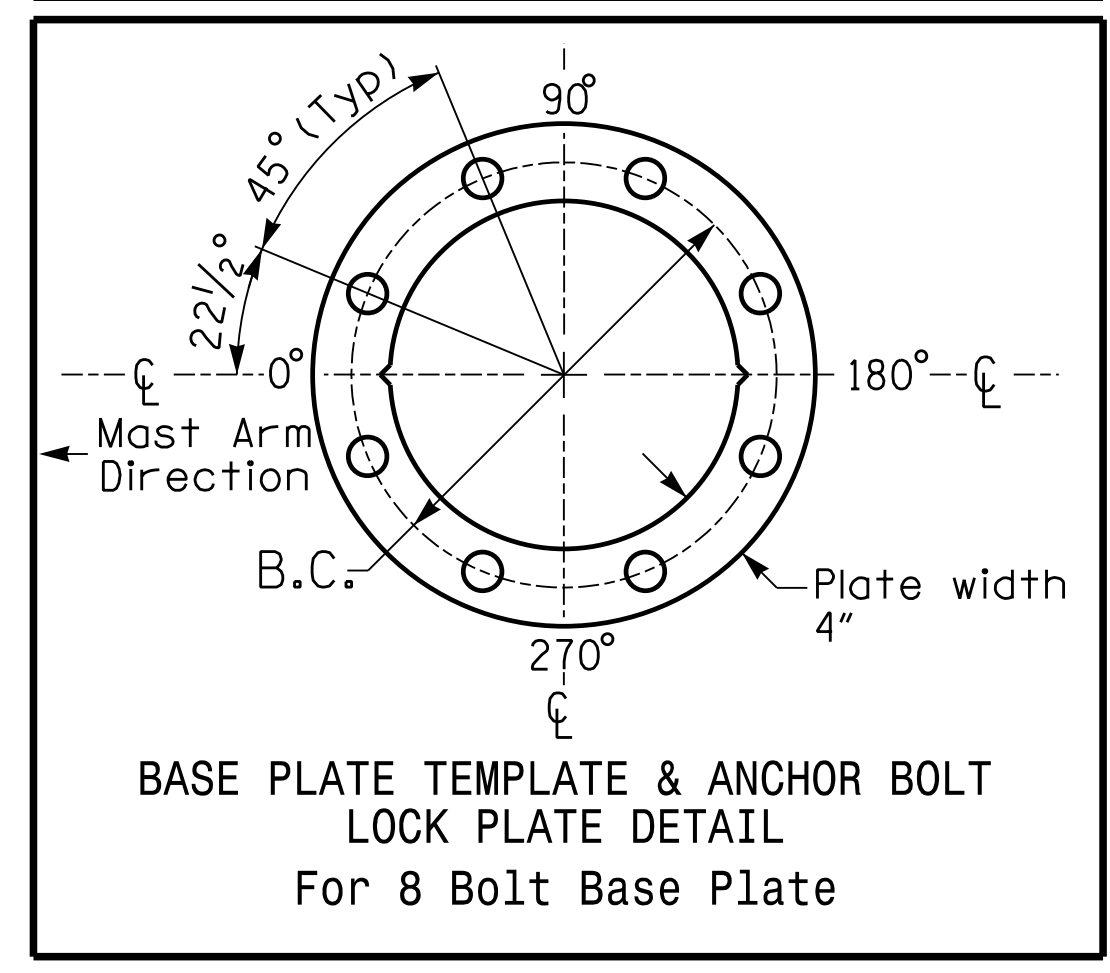
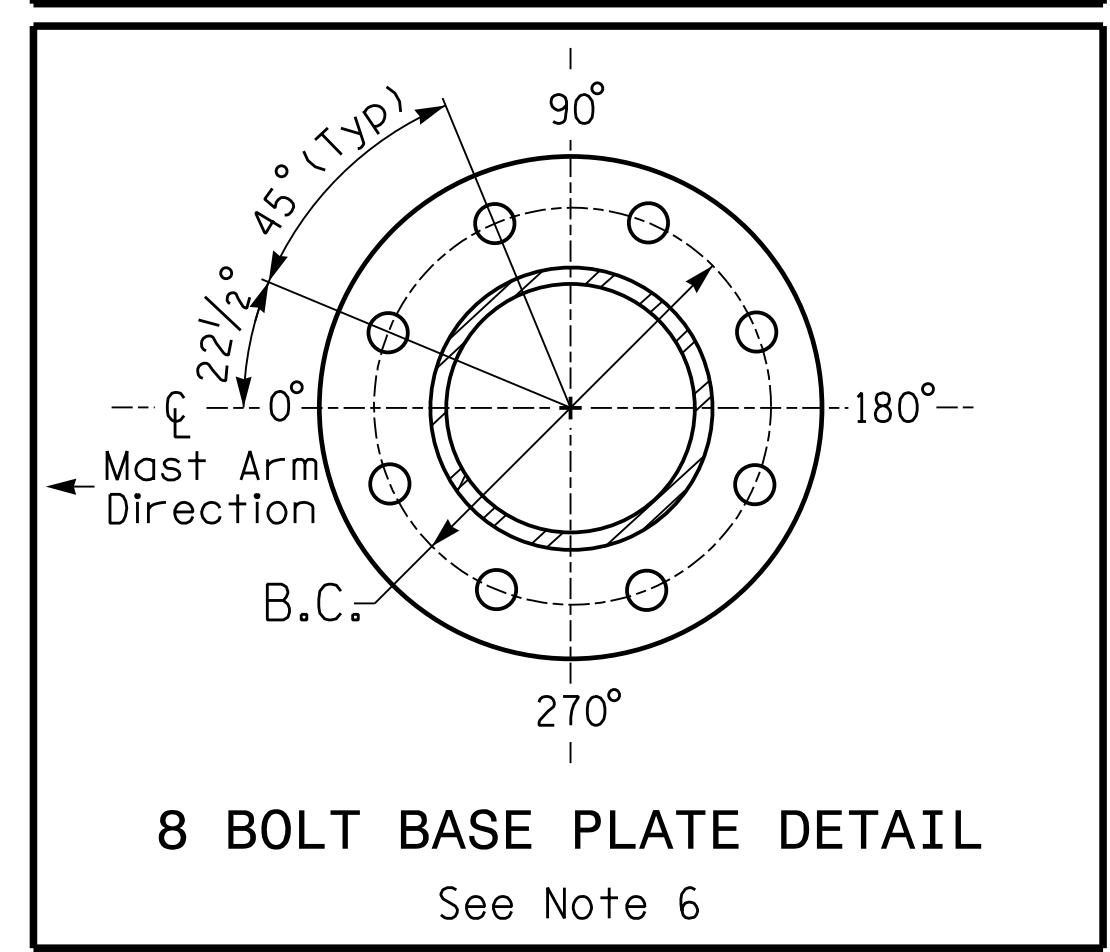
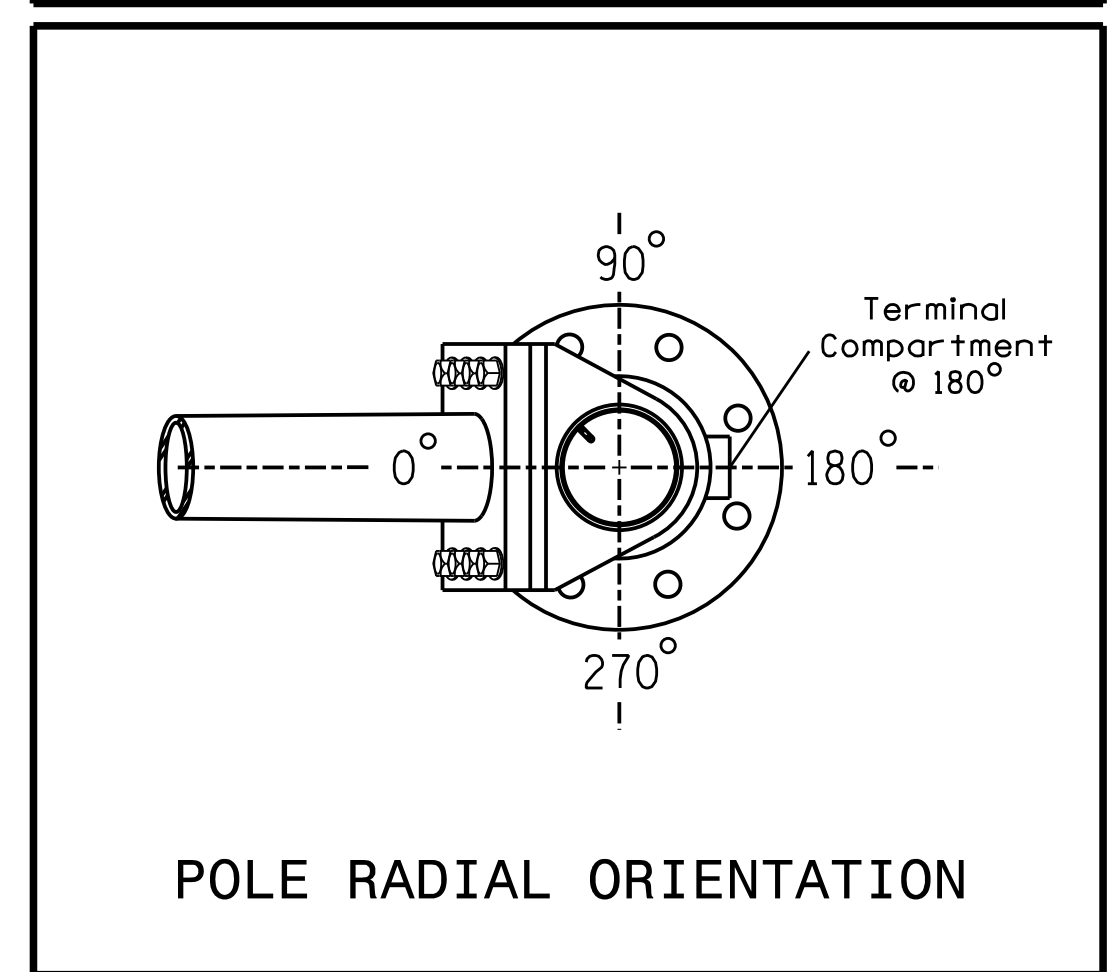


Elevation View

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.83 ft.	-0.34 ft.
Elevation difference at Edge of travelway or face of curb	+0.97 ft.	-0.59 ft.



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 HNTB NORTH CAROLINA, P.C.
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MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
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	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

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- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
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 - The traffic signal project plans and special provisions.
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DESIGN REQUIREMENTS

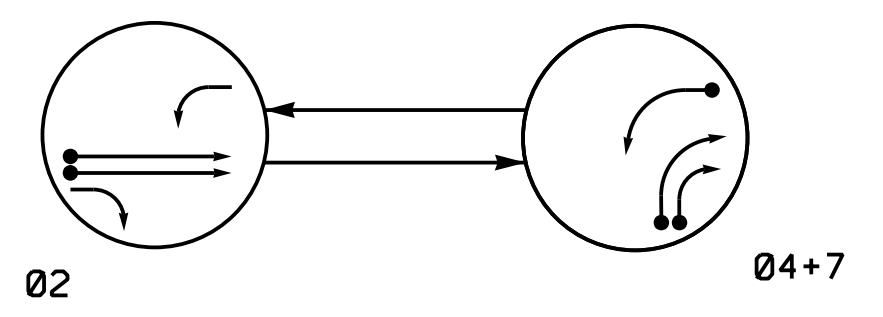
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- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
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- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

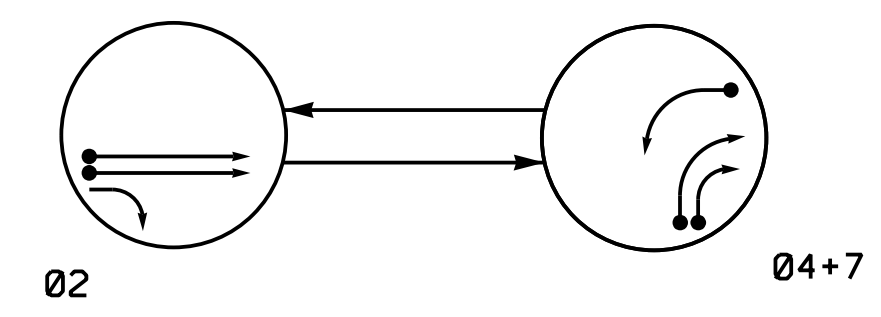
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	NC 211 (Howe Street) at NC 87 (River Road)/ SR 1852 (Robert Ruark Drive) Division 03 Brunswick Co. Southport	
	PLAN DATE: June 2017 PREPARED BY: A.H. Thornburg REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	
SCALE: 0 N/A N/A	REVISIONS: _____ INITI: _____ DATE: _____	9/10/2021 SIGNATURE: _____ DATE: _____ SIG. INVENTORY NO. 03-0215

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	04+7	FLASH
21,22	G	R	Y
41,42	R	—	R
71,72	F	—	—

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	04+7	FLASH
21,22	G	R	Y
41,42	R	—	R
71,72	R	—	—

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

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

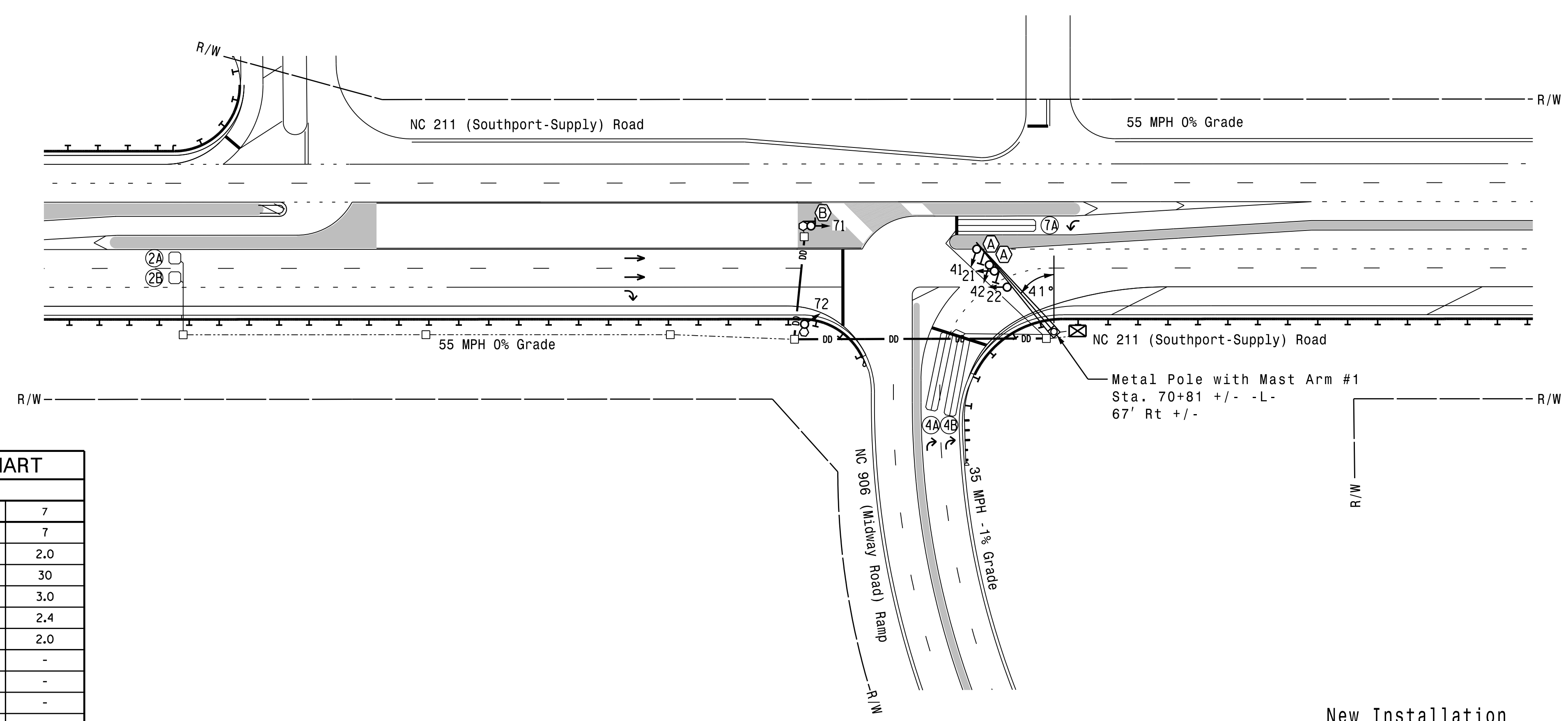
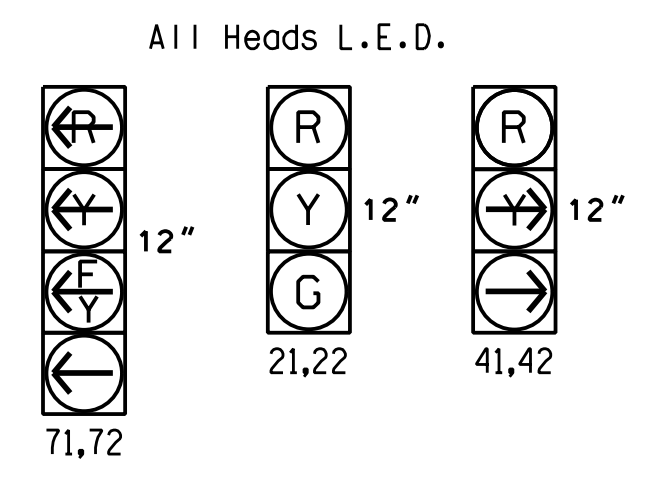
* Reduce delay to 0 seconds during alternate phasing operation.

2 Phase Fully Actuated (NC 133 Closed Loop System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1177.

SIGNAL FACE I.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE		
	2	4	7
Min Green 1 *	14	7	7
Extension 1 *	6.0	2.0	2.0
Max Green 1 *	90	30	30
Yellow Clearance	5.2	3.0	3.0
Red Clearance	1.2	2.4	2.4
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.5	-	-
Max Variable Initial *	46	-	-
Time Before Reduction *	15	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.4	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	ON	ON

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

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ N/A
⊥ Signal Pole with Guy	⊥ N/A
⊥ Signal Pole with Sidewalk Guy	⊥ N/A
⊠ Inductive Loop Detector	⊠ N/A
⊠ Controller & Cabinet	⊠ N/A
⊠ Junction Box	⊠ N/A
— 2-in Underground Conduit	— N/A
→ Right of Way	→ N/A
→ Directional Arrow	→ N/A
→ Directional Drill	→ N/A
⊠ Metal Pole with Mastarm	⊠ N/A
○ Type III Signal Pedestal	○ N/A
Ⓐ Right Arrow "ONLY" Sign (R3-SR)	Ⓐ N/A
Ⓑ "U-TURN MUST YIELD TO RIGHT TURN" Sign	Ⓑ N/A

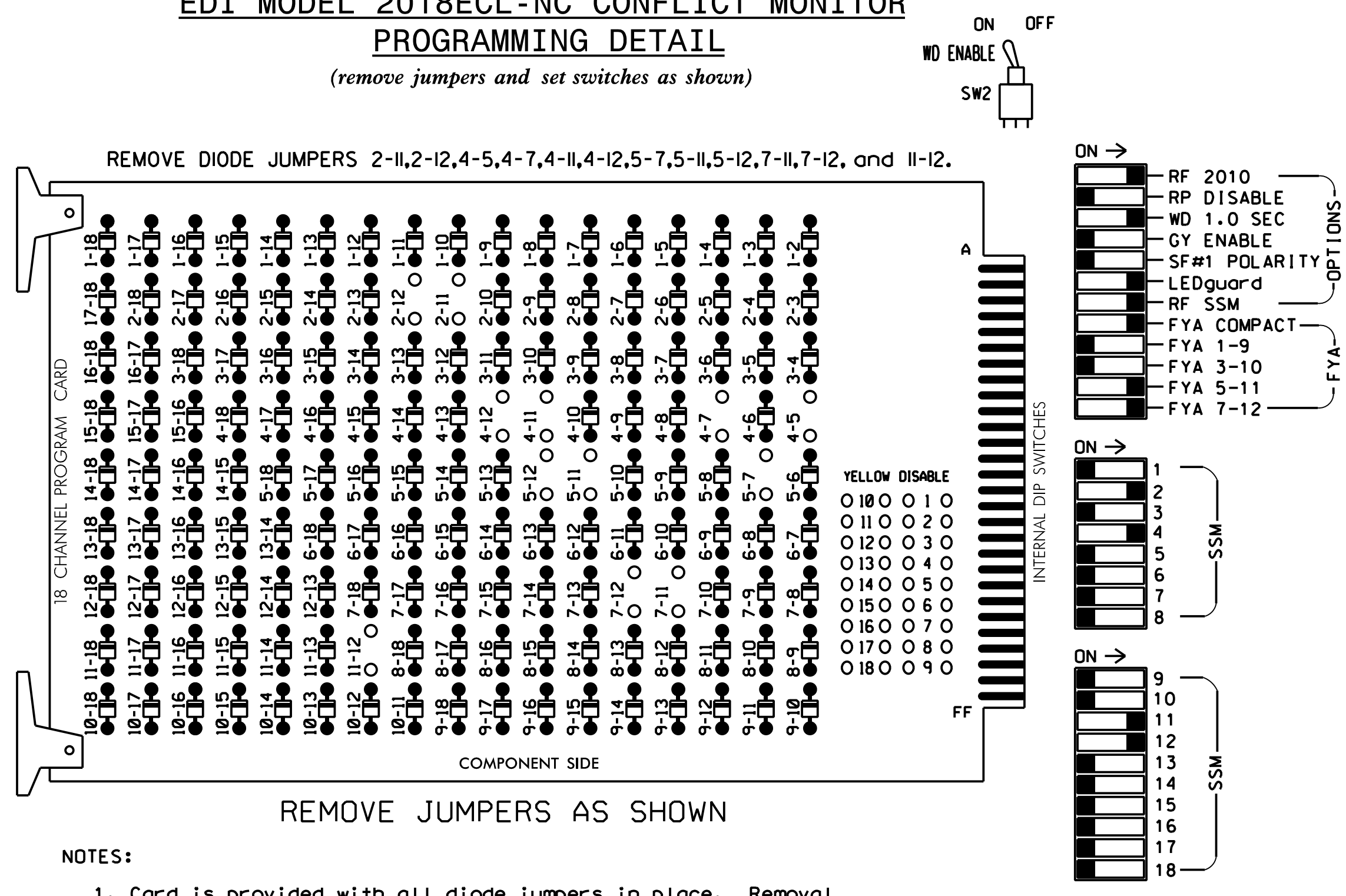
New Installation Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp		
	Division 03 Brunswick Co. Southport	PLAN DATE: June 2017	
PREPARED BY: N.K. Vlanich	REVIEWED BY: N.R. Simmons	REVISIONS	DATE
SCALE 1"=50'	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SIGNATURE	DATE

EDI MODEL 2018ECL-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.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 7 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 2 for Variable Initial and Gap Reduction.
- Program phase 2 for Startup In Green.
- Program phase 2 for Yellow Flash.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 133 Closed Loop 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	* OLG	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	72	NU	NU	71	NU	NU	NU	NU	NU	72	71	NU
RED		128			101													
YELLOW		129					*			*								
GREEN		130																
RED ARROW																A114	A101	
YELLOW ARROW						102										A115	A102	
FLASHING YELLOW ARROW																A116	A103	
GREEN ARROW						103	133			124								

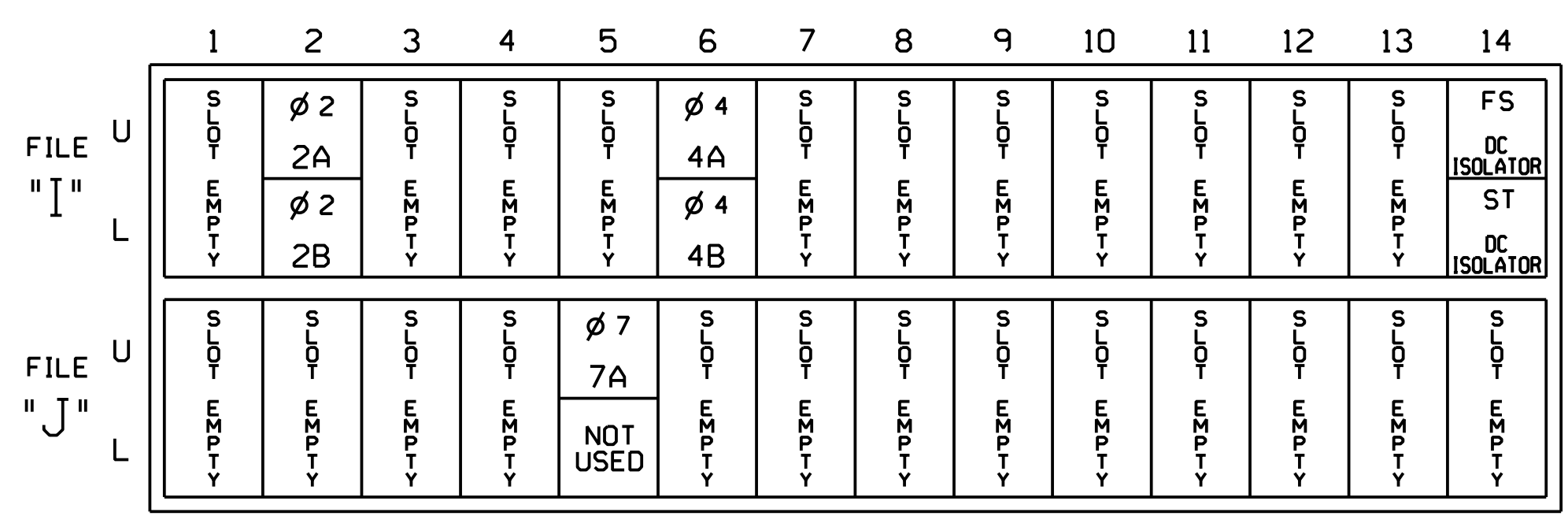
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.
 ** Requires special programming and output remapping. See sheets 2 and 3.

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,S5,S7,S10,AUX S4,AUX S5
 PHASES USED.....2,4,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....2+7
 OVERLAP "D".....2+7
 OVERLAP "G".....7

INPUT FILE POSITION LAYOUT

(front view)

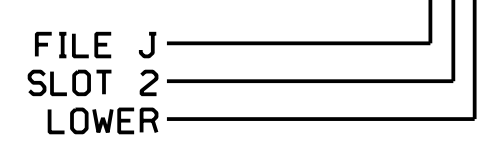


EX. : 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

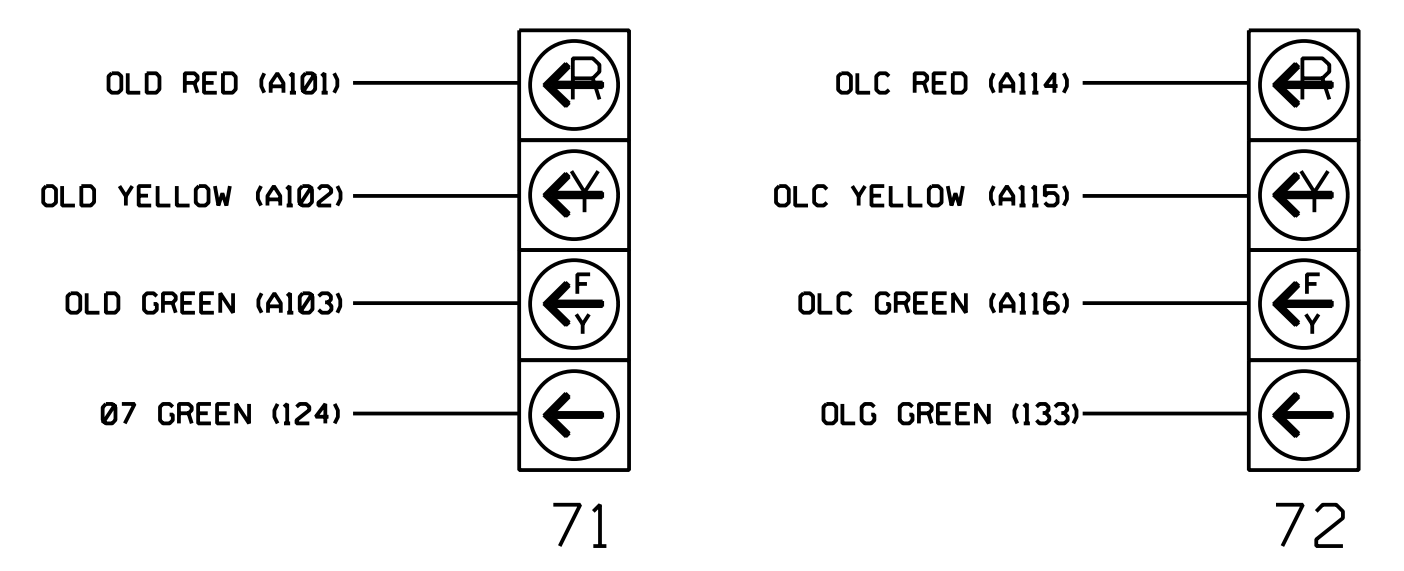
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			15
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			15
		J5U	57	19*	57	7	Y	Y			

* See Input Page Assignment programming details on sheet 3.
 INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

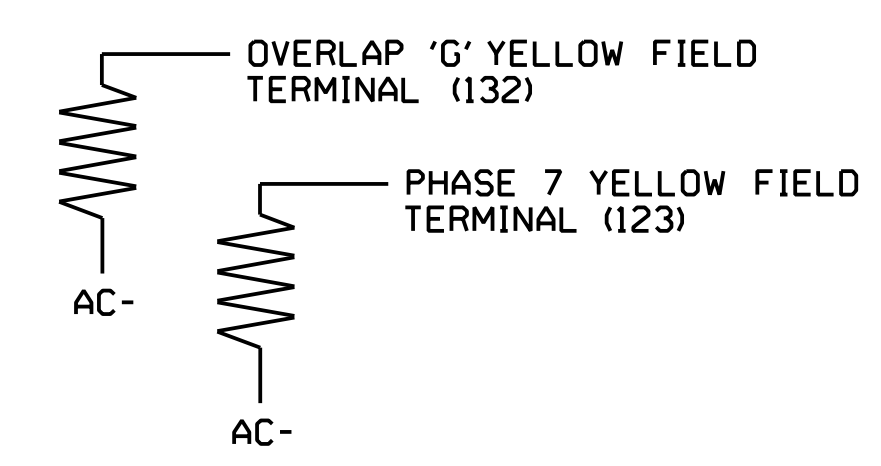


NOTE
 The sequence display for signal heads 71,72 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

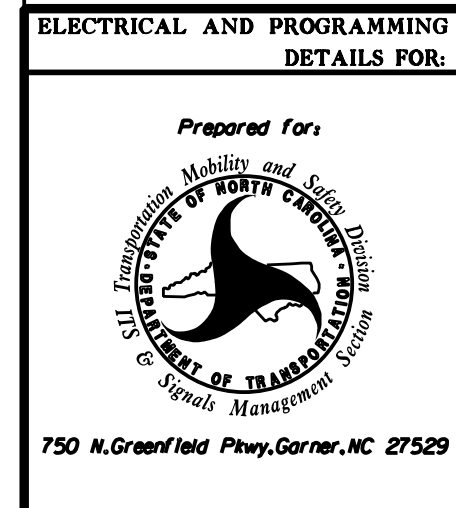
(install resistor as shown below)

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

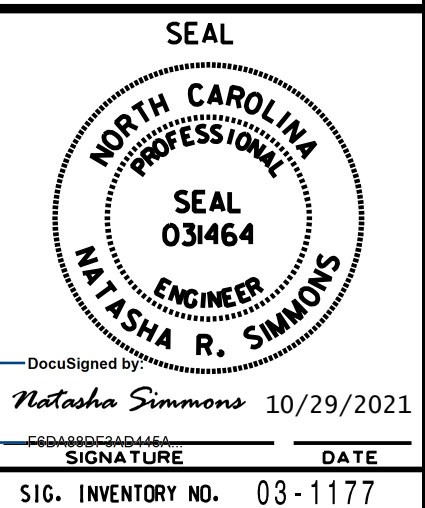


Electrical Detail - Sheet 1 of 5
 New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Prepared for:		NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp	
Division 03	Brunswick Co.	Southport	
PLAN DATE: June 2017	REVIEWED BY: A.D. Klinksiek		
PREPARED BY: N.K. Vlanich	REVIEWED BY: N.R. Simmons		
REVISIONS	INIT.	DATE	



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 HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
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 (919) 546-8997

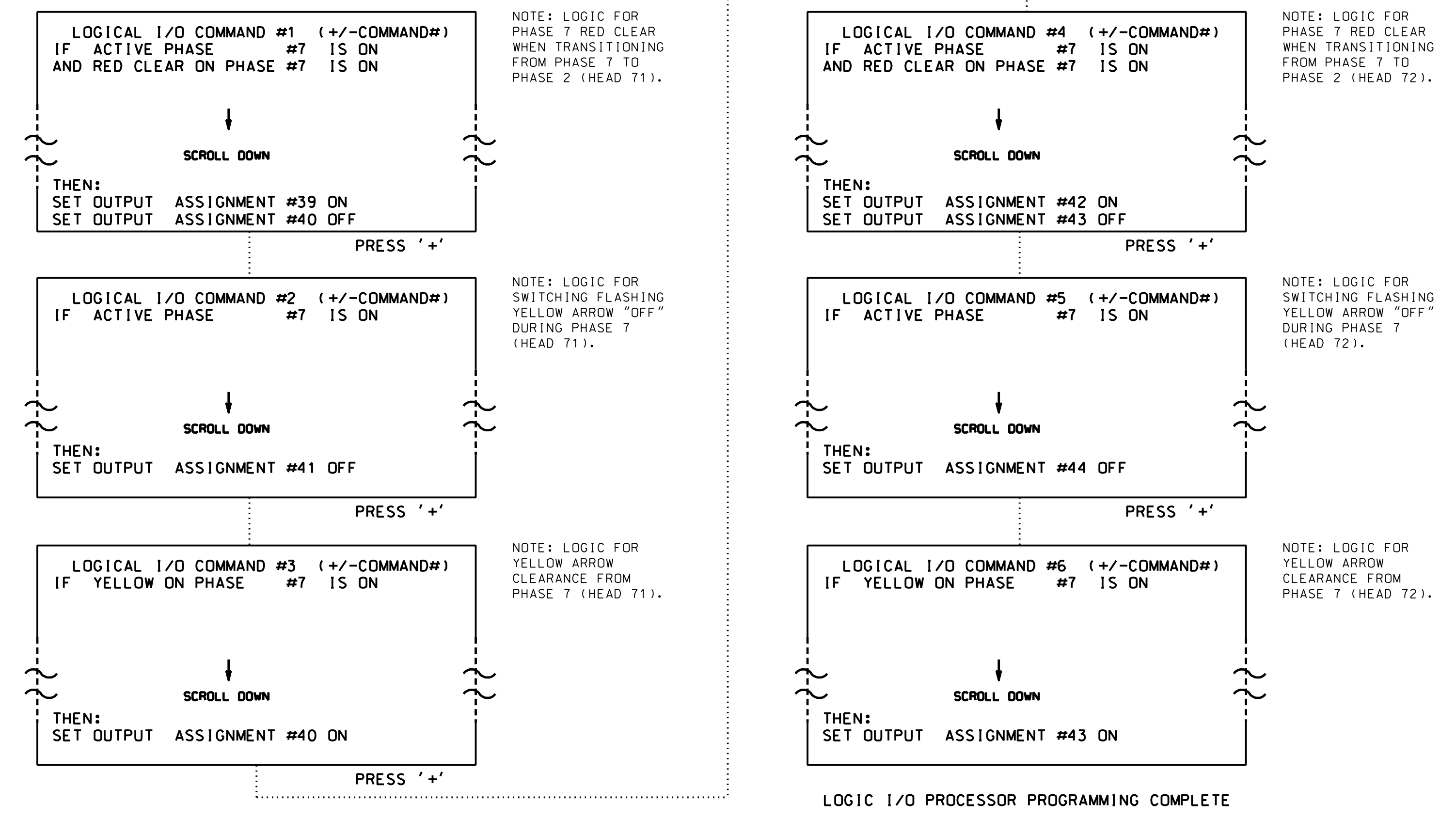
750 N. Greenfield Pkwy, Corner, NC 27529

DocuSigned by:
 Natasha Simmons 10/29/2021
 SIGNATURE DATE
 SIG. INVENTORY NO. 03-1177

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

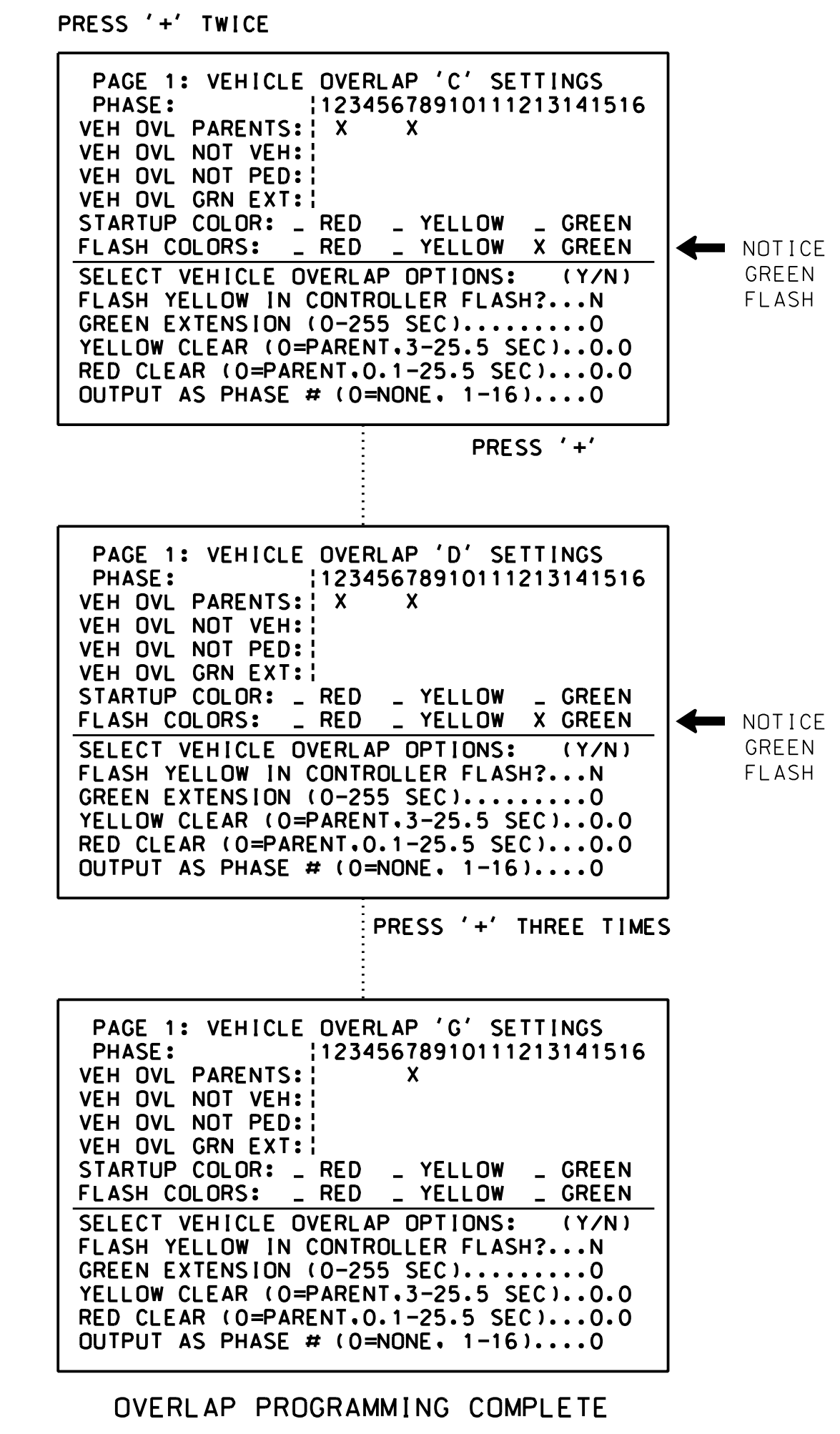


OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Over lap D Red
OUTPUT 40	= Over lap D Yellow
OUTPUT 41	= Over lap D Green
OUTPUT 42	= Over lap C Red
OUTPUT 43	= Over lap C Yellow
OUTPUT 44	= Over lap C Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

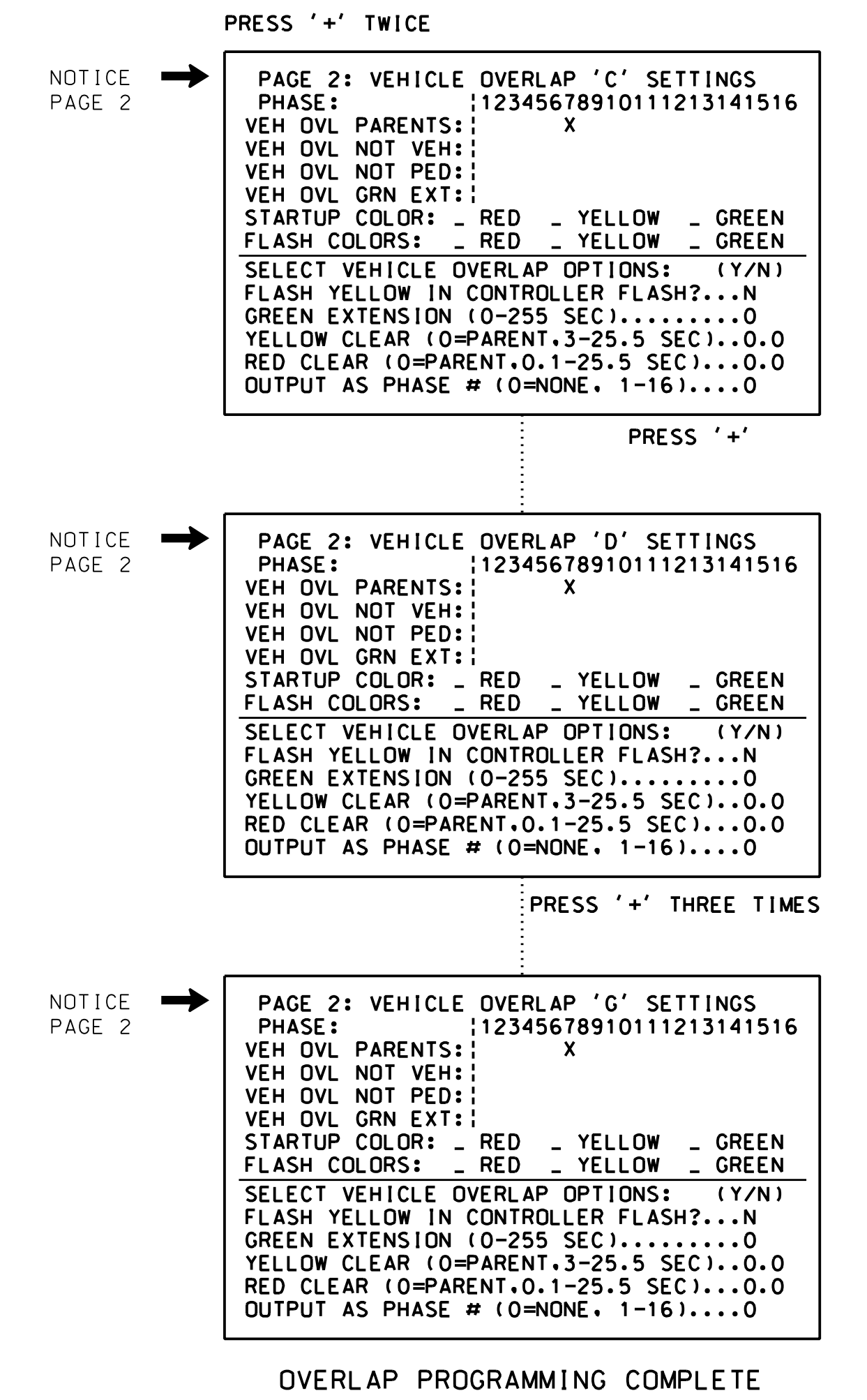
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).



OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

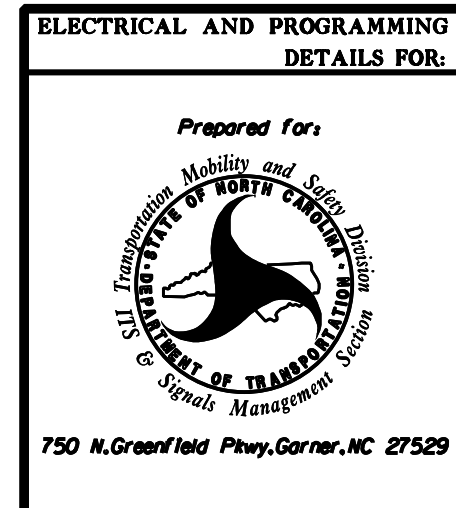
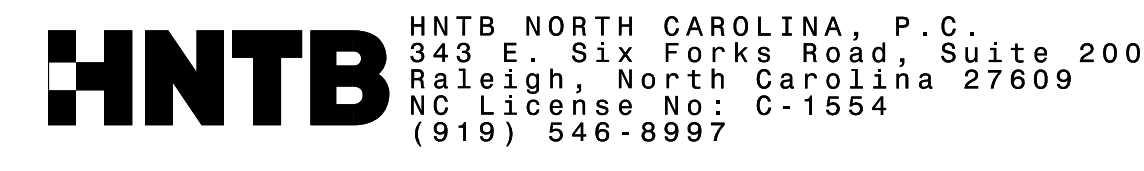
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS), PRESS 'NEXT' TO ADVANCE TO PAGE 2.



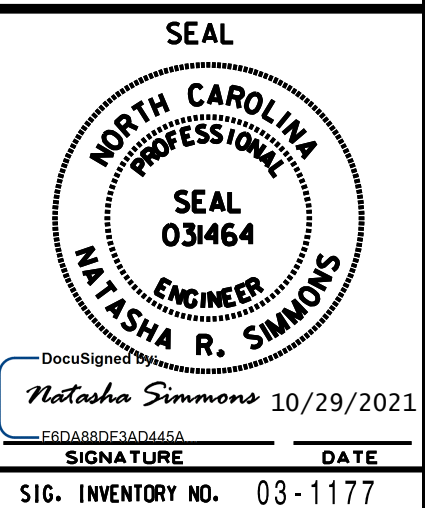
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1177
DESIGNED: June 2017
SEALED: 10/29/2021
REVISED: N/A

Electrical Detail - Sheet 2 of 5
New Installation

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



Prepared for: N.C. Department of Transportation Division 03		NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp	
PLAN DATE: June 2017	REVIEWED BY: A.D. Klinksiek	Division 03	Brunswick Co. Southport
PREPARED BY: N.K. Vlanich	REVIEWED BY: N.R. SIMMONS		
REVISIONS	INIT.	DATE	



DocuSign
10/29/2021
SIGNATURE DATE
SIG. INVENTORY NO. 03-1177

OUTPUT ASSIGNMENT PROGRAMMING DETAIL OVERLAP "G" TO LOADSWITCH "S7"

- FROM MAIN MENU PRESS '6' (PHASE CONTROL), THEN '1' (OUTPUT ASSIGNMENTS).
- WITH CURSOR IN "OUTPUT ASSIGNMENT #" FIELD, USE + KEY TO FIND THE OUTPUT ASSIGNMENT NUMBER 30, AS SHOWN BELOW.
- PROGRAM CONTROLLER AS SHOWN:

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....0

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 31

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....1

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 32

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

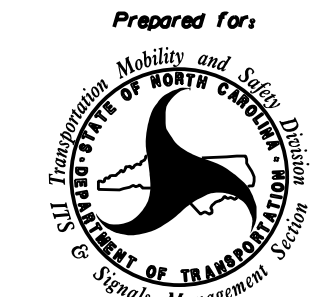
OUTPUT PROGRAMMING COMPLETE

HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No. C-1554
(919) 546-8997

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1177
DESIGNED: June 2017
SEALED: 10/29/2021
REVISED: N/A

Electrical Detail - Sheet 3 of 5
New Installation

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

Prepared for:

1750 N. Greenfield Pkwy, Corner, NC 27529

NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp		
Division 03	Brunswick Co. Southport	
PLAN DATE: June 2017	REVIEWED BY: A.D. Klinksiek	
PREPARED BY: N.K. Vlanich	REVIEWED BY: N.R. Simmons	
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 031464
NATASHA R. SIMMONS
10/29/2021
SIGNATURE DATE
SIG. INVENTORY NO. 03-1177

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION. 2. THIS PROGRAMMING REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

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

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

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

(LOOP 7A - PHASE 7)

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

PROGRAMMING COMPLETE

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

(program controller as shown below)

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

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '7' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

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

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1177 DESIGNED: June 2017 SEALED: 10/29/2021 REVISED: N/A

Electrical Detail - Sheet 4 of 5 New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

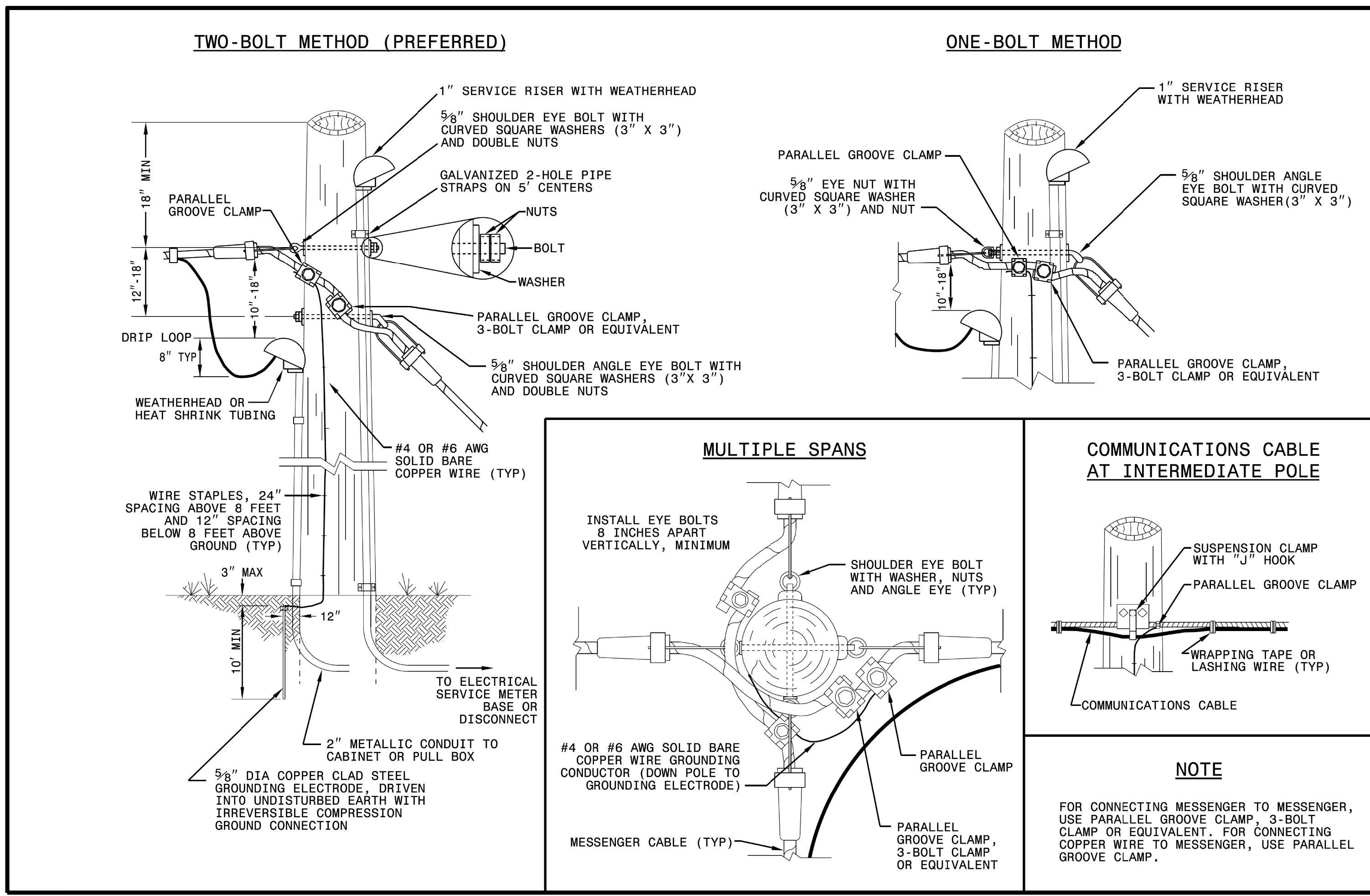
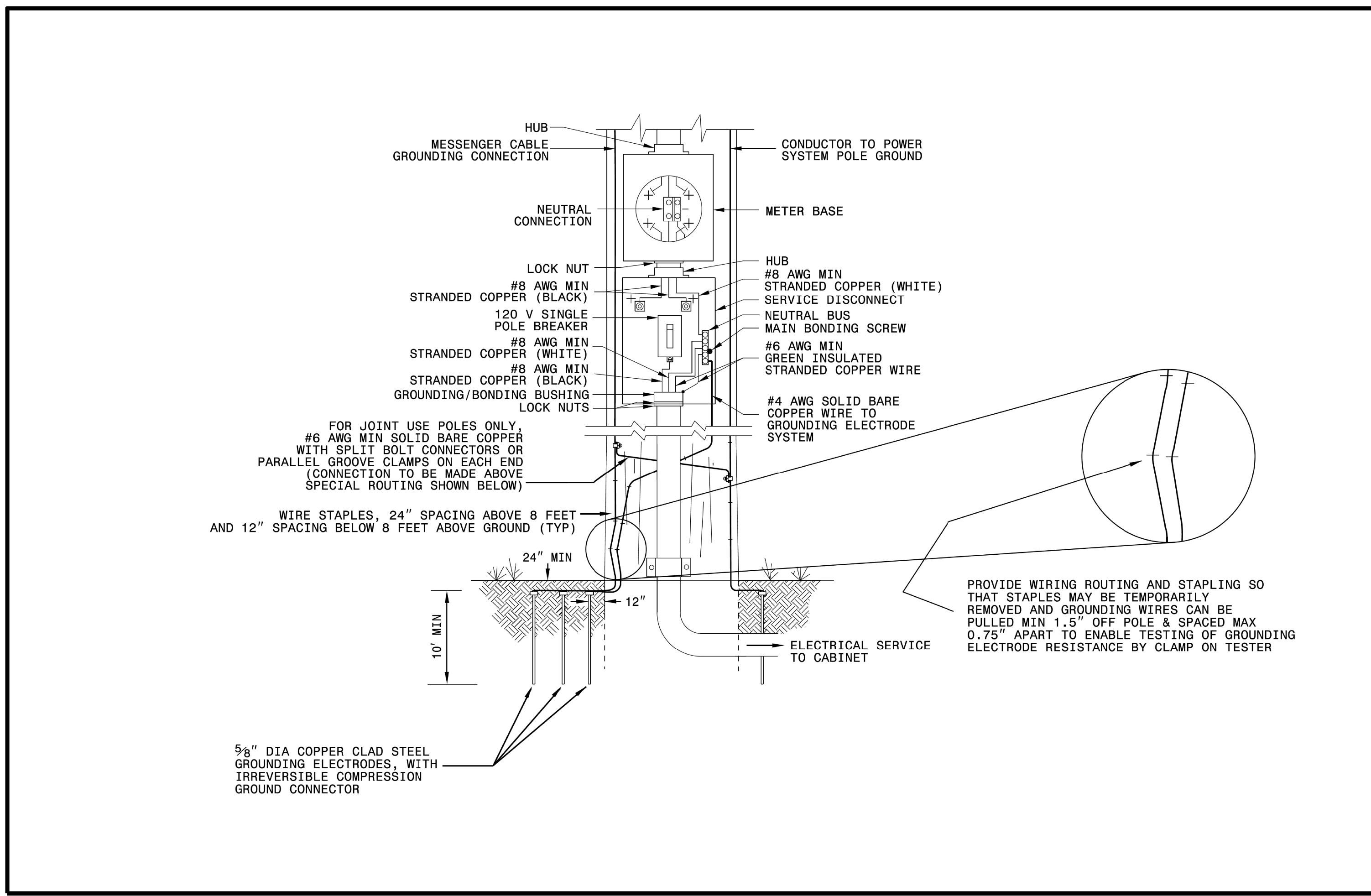
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for: HNTB logo

NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 N.TASHA R. SIMMONS

HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1564 (919) 546-8997

DocuSign Signature: Natasha Simmons 10/29/2021 SIGNATURE DATE SIG. INVENTORY NO. 03-1177



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See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

DocuSigned by:
Mohd Aslami
10/11/2017
DATE

11-2017-2017_08-56
11-2018 314 Drawings/Plate Sheets/2018_Plate Sheet -dgn
r.wrough

ALTERNATE PHASING ACTIVATION DETAIL

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

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

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

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

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

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

OVERLAPS PAGE 2: Modifies overlap parent phase for heads 71.72 to run protected turn only.

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


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1177
 DESIGNED: June 2017
 SEALED: 10/29/2021
 REVISED: N/A

Electrical Detail - Sheet 5 of 5
New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

Prepared for:



750 N. Greenfield Pkwy, Corner, NC 27529

NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp

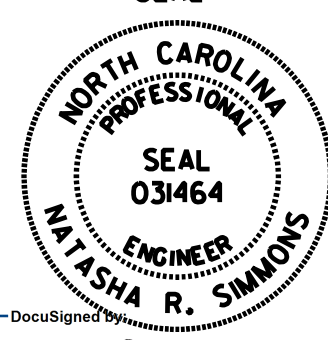
Division 03 Brunswick Co. Southport

PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek

PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

SEAL

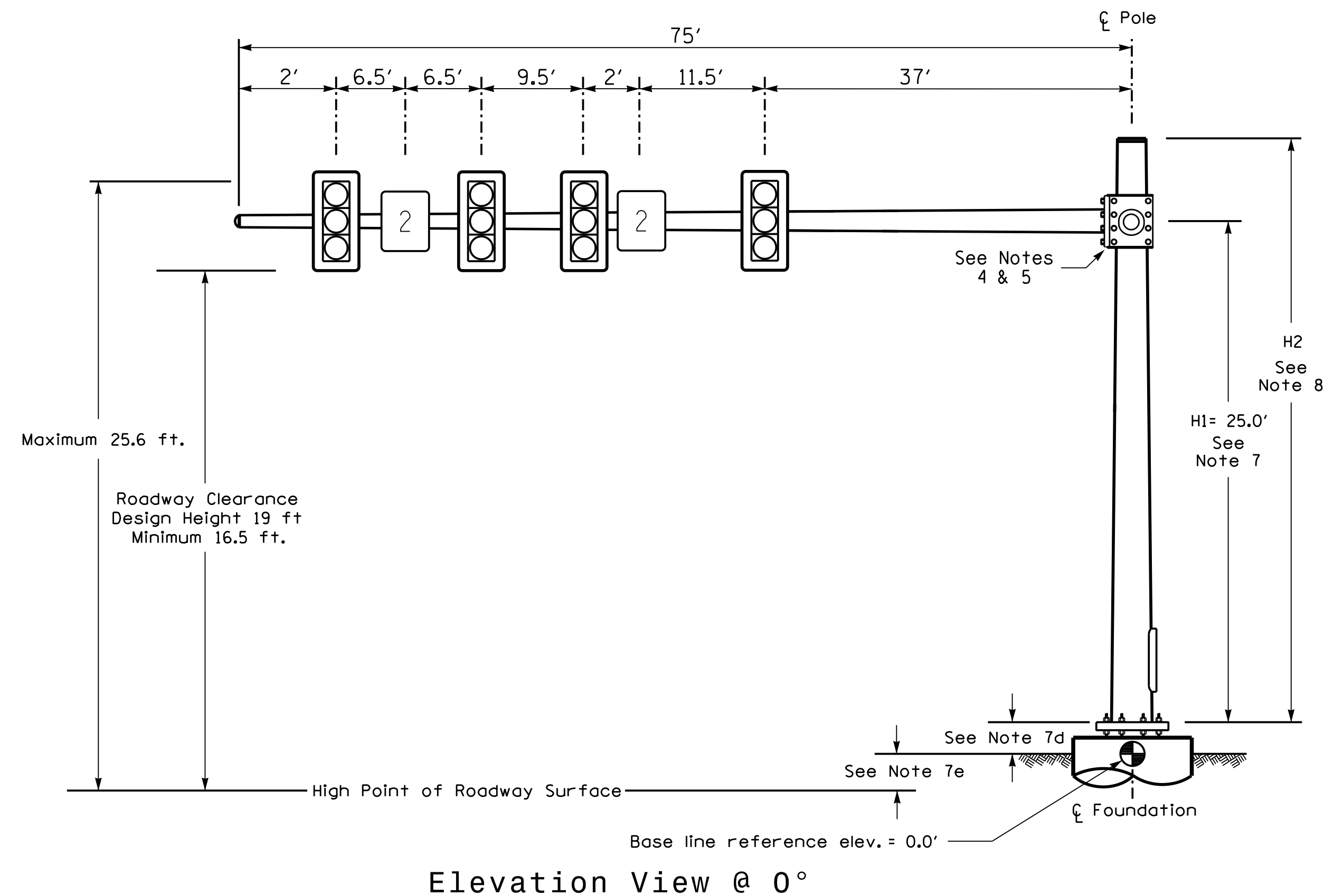


DocuSigned by: *Natasha Simmons* 10/29/2021

SIGNATURE DATE

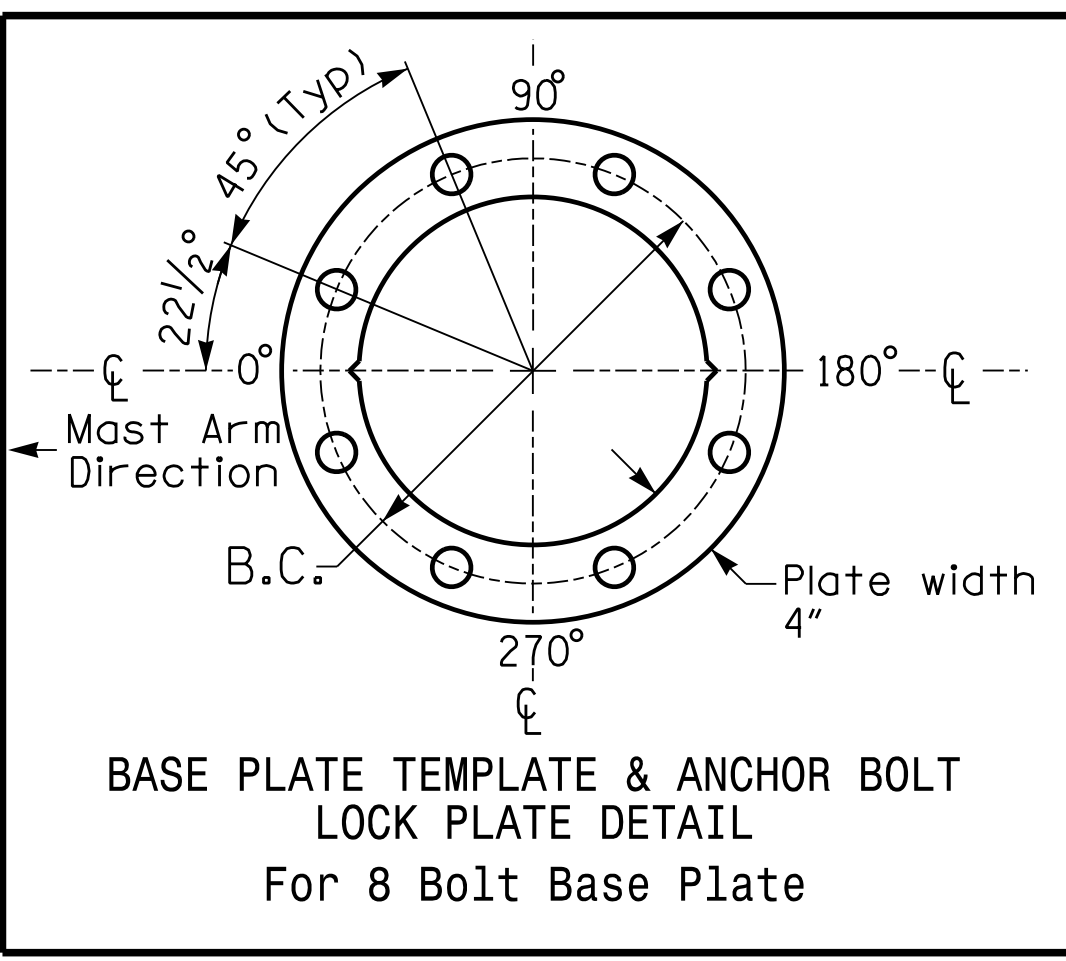
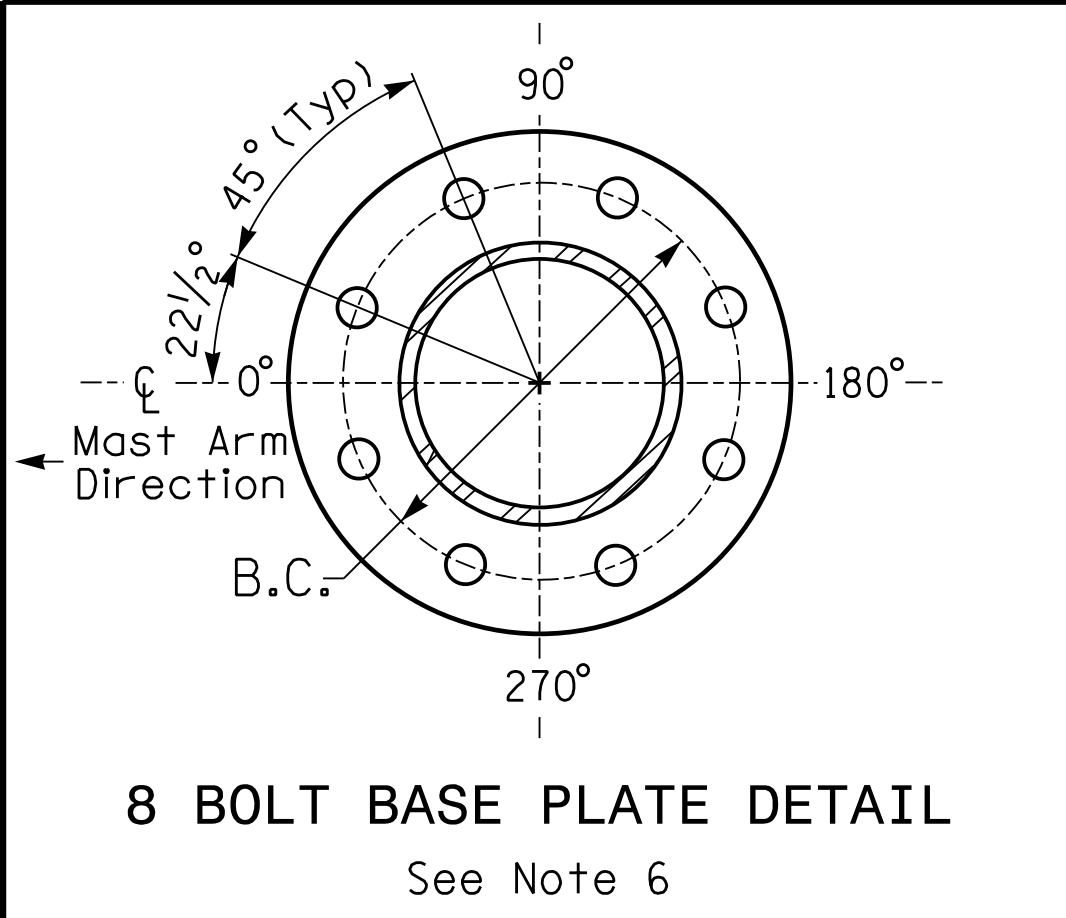
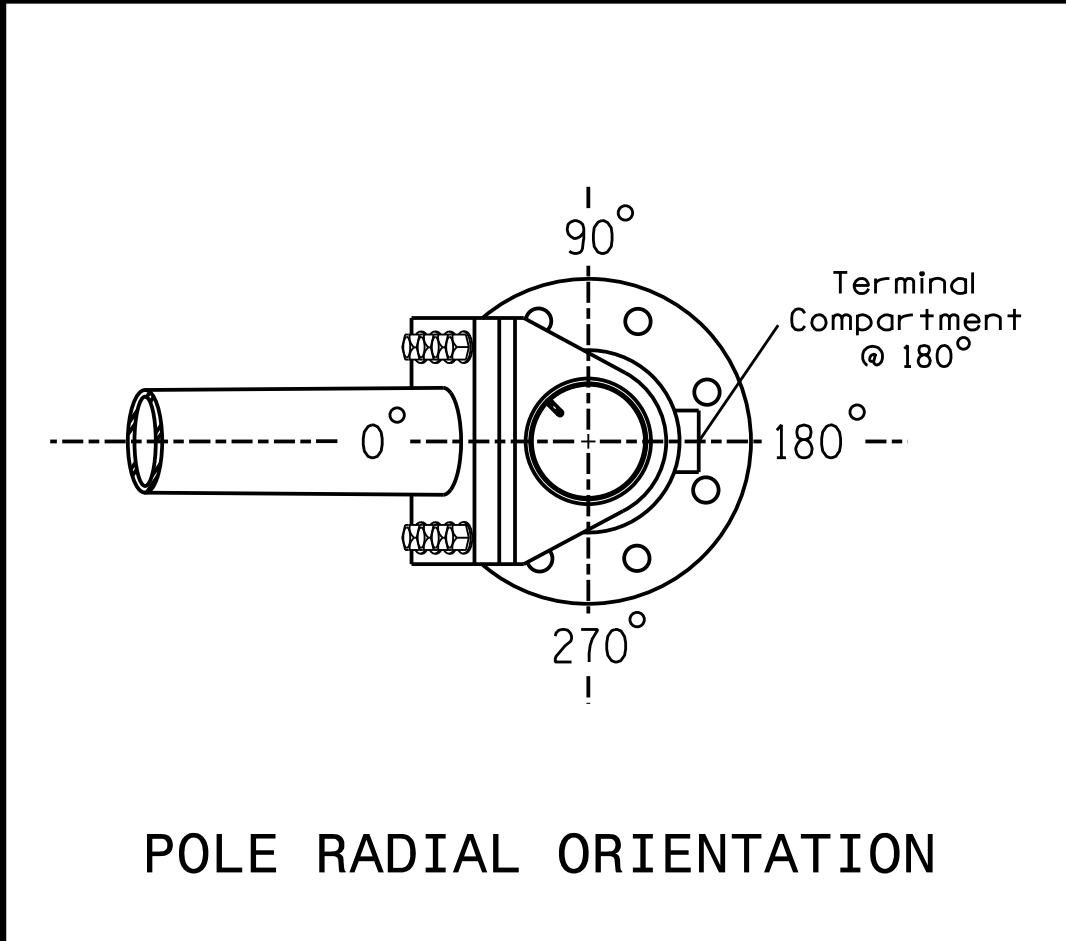
SIG. INVENTORY NO. 03-1177

Design Loading for METAL POLE NO. 1



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

Elevation Data for Mast Arm Attachment (H1)	
Elevation Differences for:	Pole 1
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+4.56 ft.
Elevation difference at Edge of travelway or face of curb	+3.31 ft.



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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5021	Fig. 46.6

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

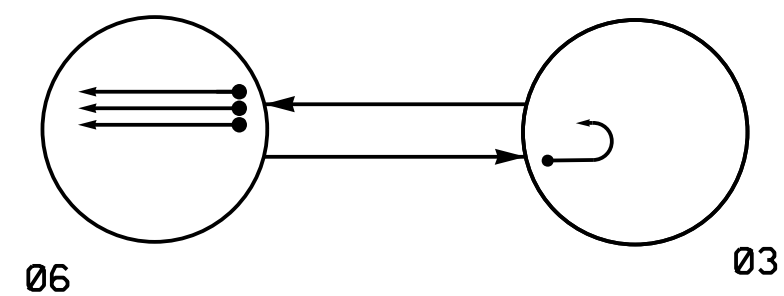
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 Prepared For: TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	NC 211 (Southport-Supply Road) at NC 906 (Midway Road) Ramp		SEAL N.A.S.H.A. R. SIMMONS ENGINEER SEAL 03464
	Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinskiesk PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE	

PHASING DIAGRAM

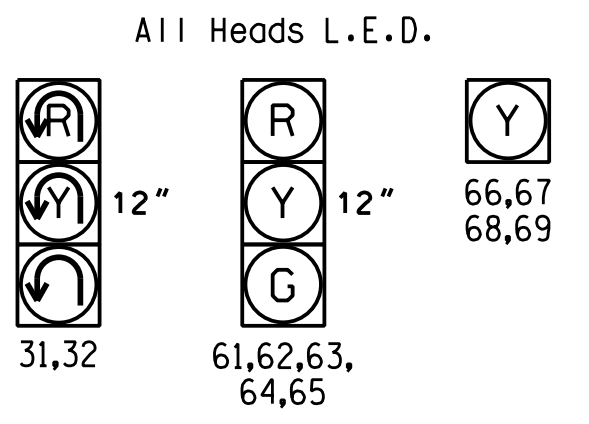


PHASING DIAGRAM DETECTION LEGEND
 ←● DETECTED MOVEMENT
 ← UNDETECTED MOVEMENT (OVERLAP)
 ←..... UNSIGNALIZED MOVEMENT
 ←--- PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	Ø 6	Ø 3	FLASH
31,32	R	Y	R
61,62,63,64,65	G	R	Y

SIGNAL FACE	INTERVAL	
	1	2
66,68	ON	OFF
67,69	OFF	ON

SIGNAL FACE I.D.

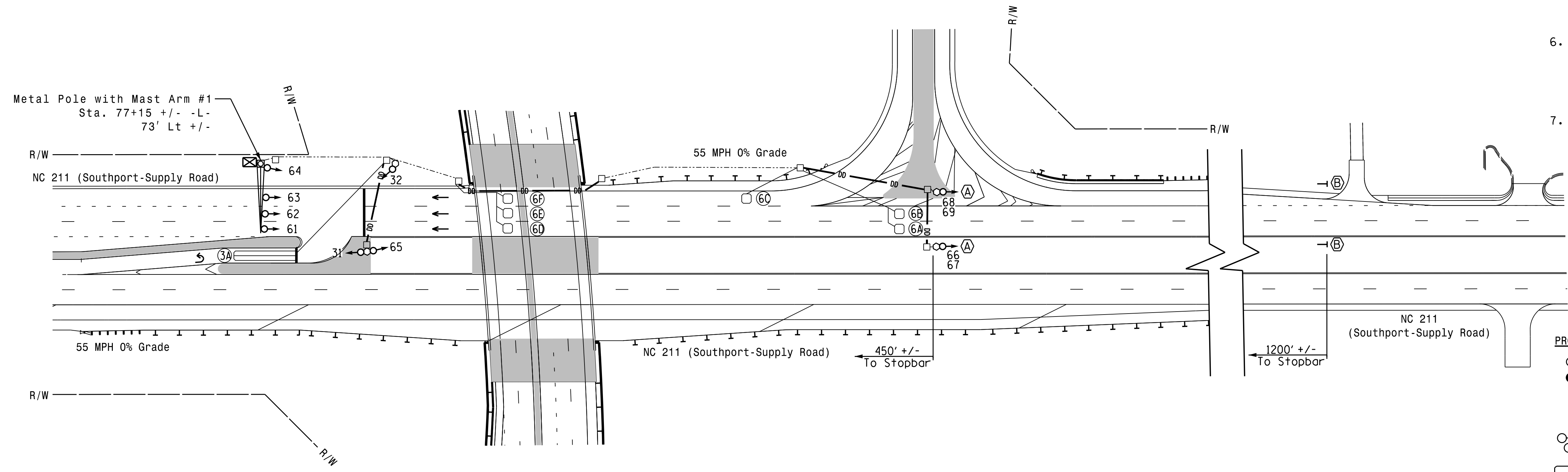


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME		
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	Y
6A	6X6	420	5	Y	6	Y	Y	-	2.2	-	Y
6B	6X6	420	5	Y	6	Y	Y	-	2.2	-	Y
6C	6X6	300	5	Y	6	Y	Y	-	2.2	-	Y
6D	6X6	110	3	Y	6	Y	Y	-	-	-	Y
6E	6X6	110	3	Y	6	Y	Y	-	-	-	Y
6F	6X6	110	3	Y	6	Y	Y	-	-	-	Y

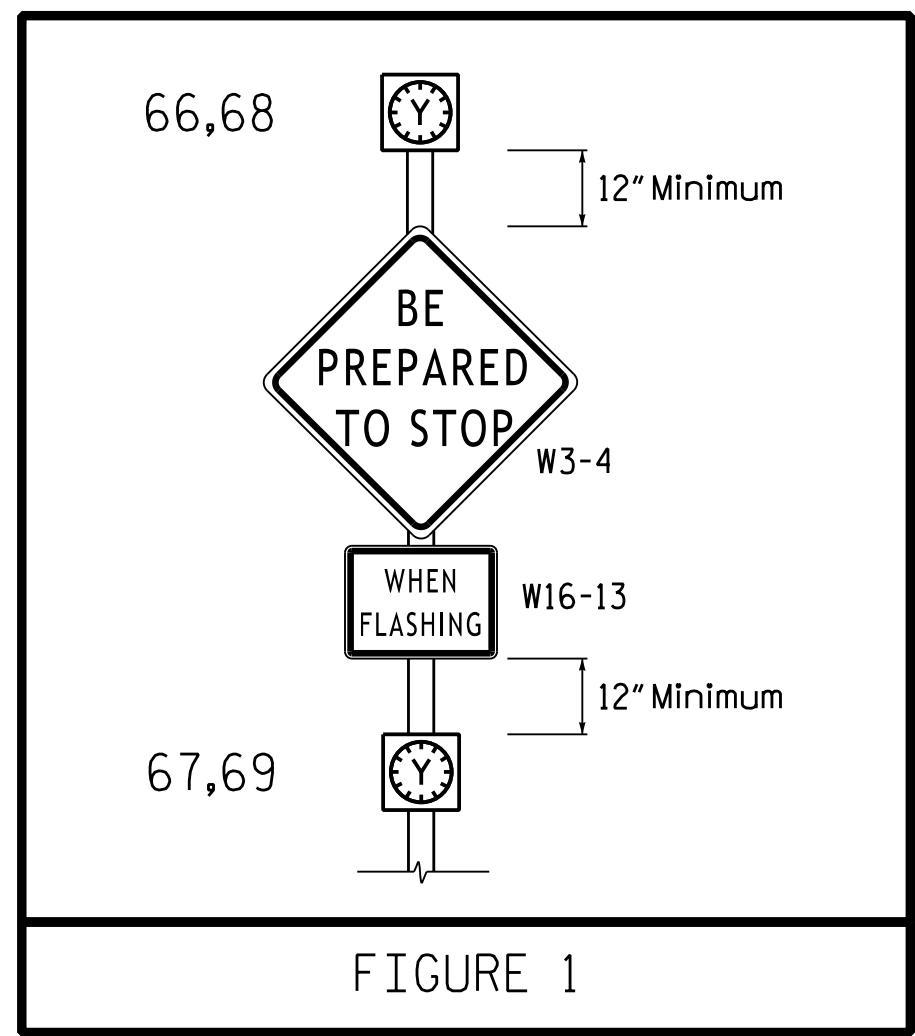
2 Phase Fully Actuated (NC 133 Closed Loop System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right no red.
- Flash beacons numbered 66,67,68, and 69 three seconds prior to the end of phase 6.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1178.



FEATURE	PHASE	
	3	6
Min Green 1 *	7	14
Extension 1 *	2.0	2.0
Max Green 1 *	30	90
Yellow Clearance	3.0	5.2
Red Clearance	3.3	1.0
Red Revert	2.0	2.0
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	ON	ON



LEGEND		
PROPOSED		EXISTING
○	Traffic Signal Head	●
○	Modified Signal Head	N/A
○	Sign	-
○	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	○
○	Signal Pole with Sidewalk Guy	○
○	Inductive Loop Detector	○
○	Controller & Cabinet	○
○	Junction Box	■
○	2-in Underground Conduit	---
N/A	Right of Way	---
→	Directional Arrow	→
→	Directional Drill	N/A
○	Metal Pole with Mastarm	○
○	Type III Signal Pedestal	●
Ⓐ	"BE PREPARED TO STOP WHEN FLASHING" Sign (See Figure 1)	Ⓐ
Ⓑ	"SIGNAL AHEAD" Sign (W3-3)	Ⓑ

New Installation Final Design

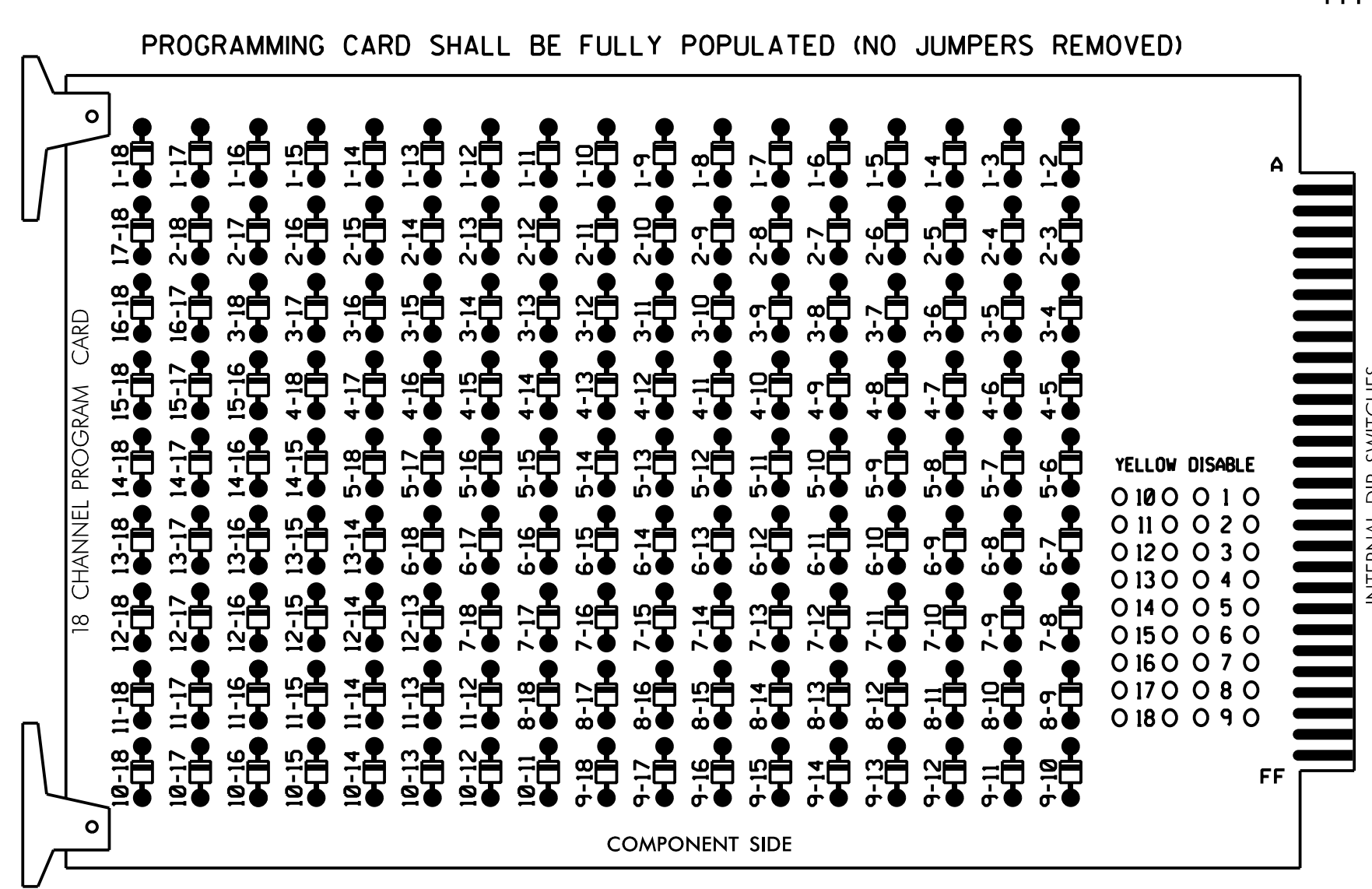
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	NC 211 (Southport-Supply Road) at U-Turn East of NC 906 Ramp		
	Division 03 Brunswick Co. Southport	PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek	
SCALE 0 50 1"=50'	REVISIONS	INIT. DATE	SIGNATURE DATE
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997			SEAL 031464 ENGINEER NATASHA R. SIMMONS

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

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

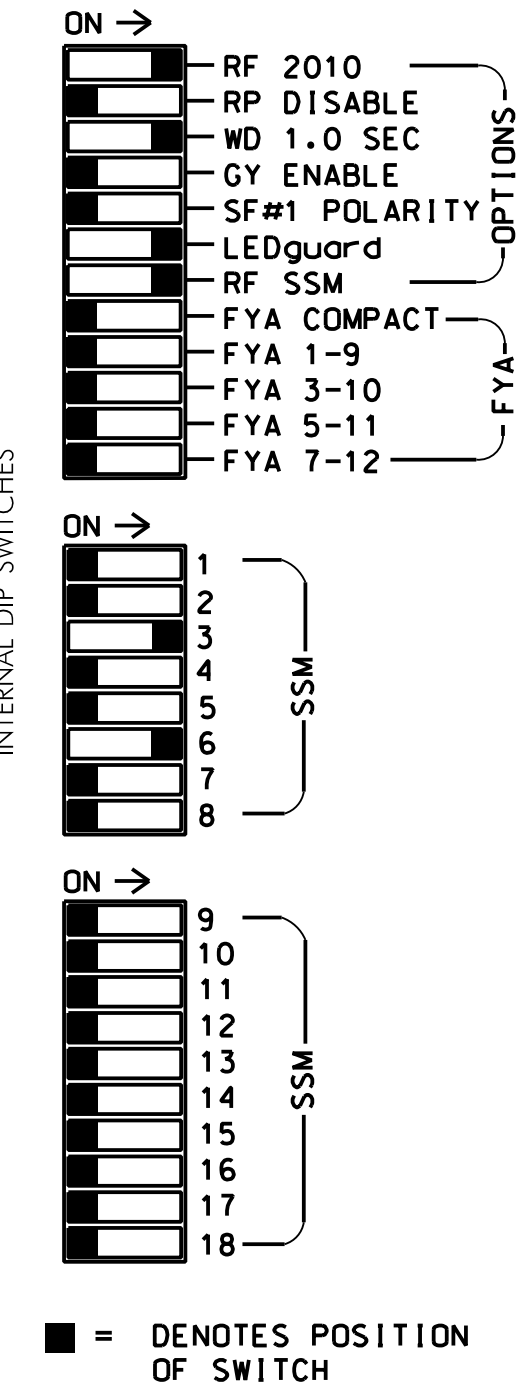
(remove jumpers and set switches as shown)



REMOVE JUMPERS 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.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



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 phase 6 for Startup In Green.
- Program phase 6 for Yellow Flash.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 133 Closed Loop 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.....*S3,S4,S8,*S9
 PHASES USED.....3,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED
 * USED FOR ADVANCE BEACON

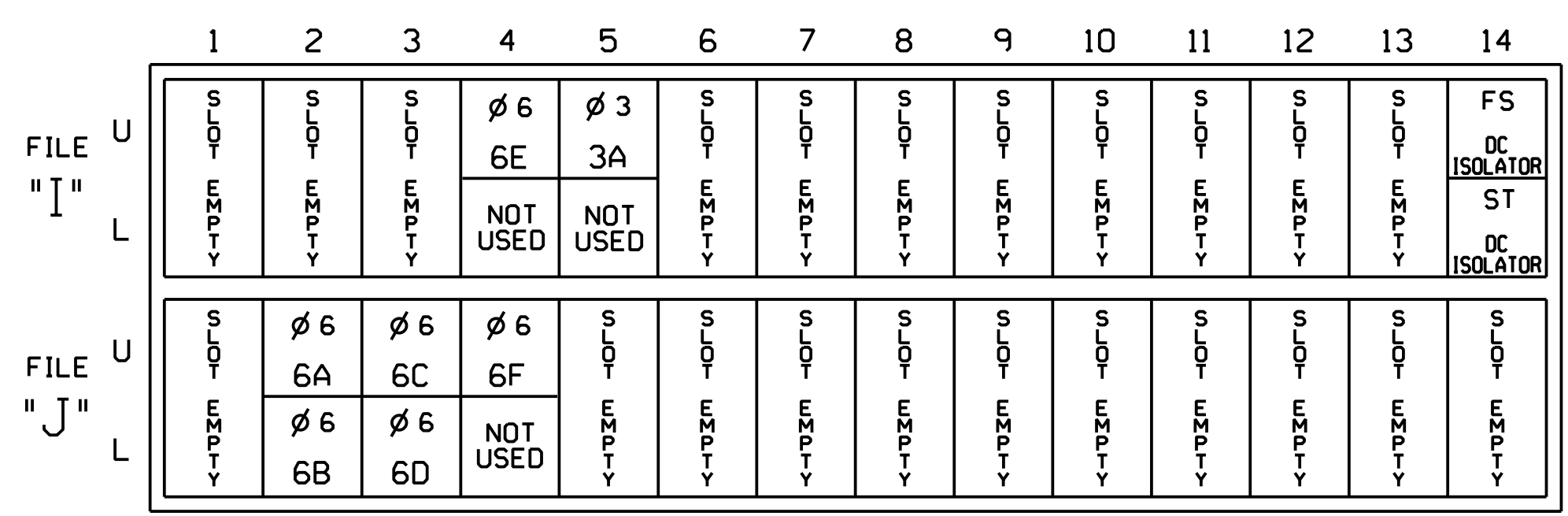
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	66,68	31,32	NU	NU	NU	61,62,63,64,65	67,69	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED								134										
YELLOW								135										
GREEN								136										
RED ARROW				116														
YELLOW ARROW				117														
FLASHING YELLOW ARROW																		
GREEN ARROW				118														
YELLOW PED																		

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ** A Special Advanced Beacon will be wired to S3P-Y and S9P-Y. See wiring and programming detail on Sheet 2 of this electrical detail.

INPUT FILE POSITION LAYOUT

(front view)



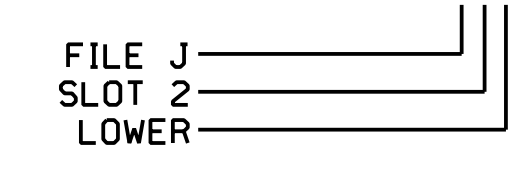
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y		2.2	
6B	TB3-7,8	J2L	44	6	16	6	Y	Y		2.2	
6C	TB3-9,10	J3U	64	26	36	6	Y	Y		2.2	
6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
6E	TB4-1,2	I4U	47	9	22	6	Y	Y			
6F	TB5-1,2	J4U	48	10	26	6	Y	Y			

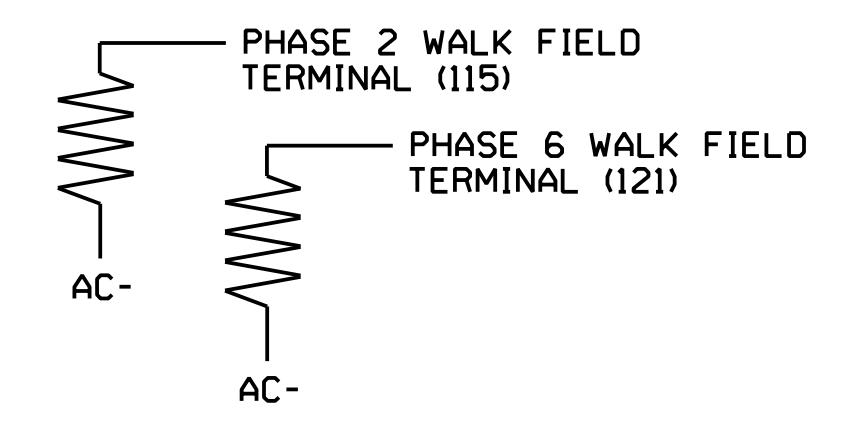
INPUT FILE POSITION LEGEND:



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

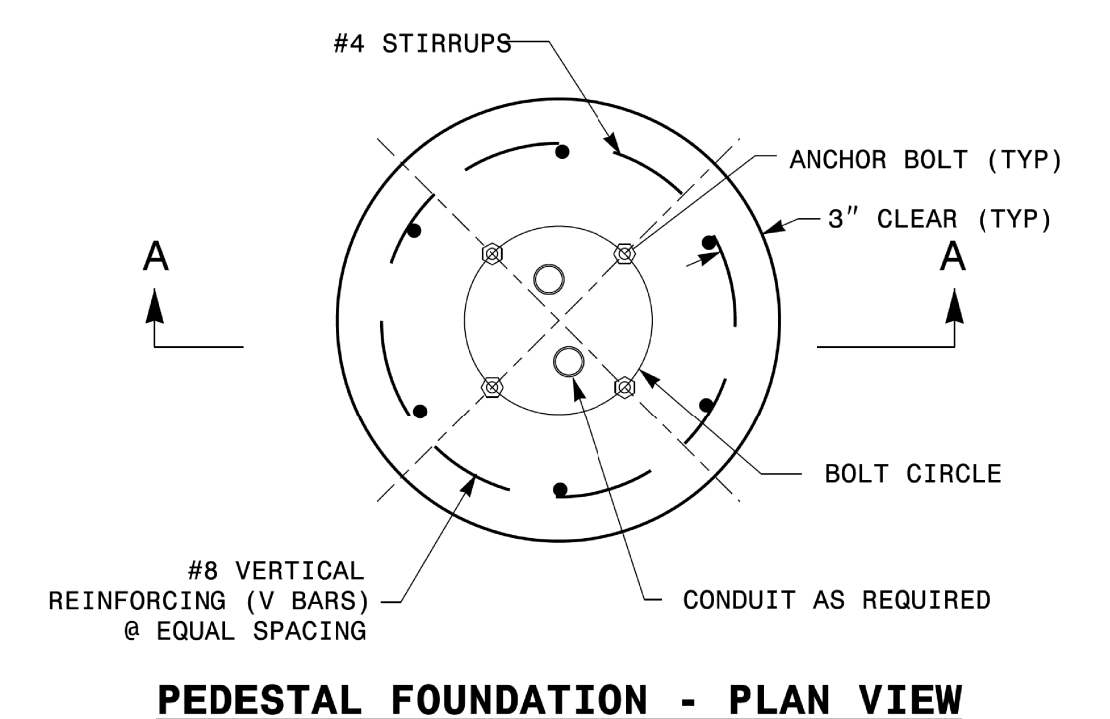
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



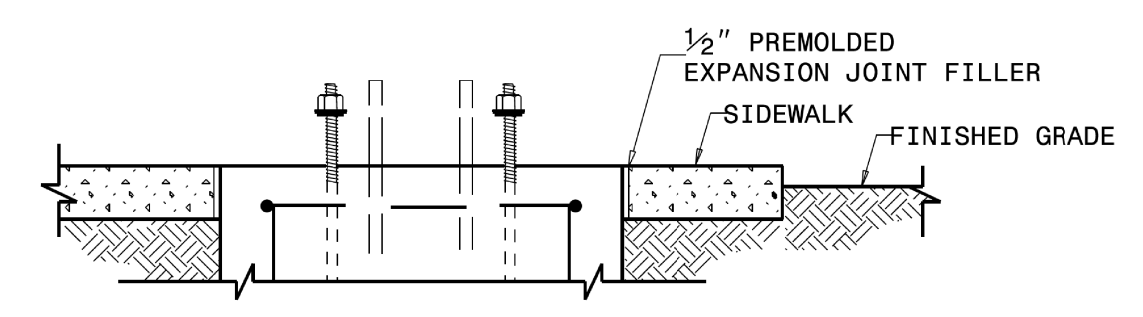
Electrical Detail - Sheet 1 of 2
 New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	Prepared for: UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE Department of Transportation Signal Management	NC 211 (Southport-Supply Road) at U-Turn East of NC 906 Ramp Division 03 Brunswick Co. Southport PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: N.K. Vianich REVIEWED BY: N.R. Simmons	SEAL SEAL 031464 ENGINEER NATASHA R. SIMMONS Date: 10/29/2021 Signature: _____ Date: _____ Sig. Inventory No. 03-1178
	REVISIONS INIT. DATE	REVISIONS INIT. DATE	REVISIONS INIT. DATE



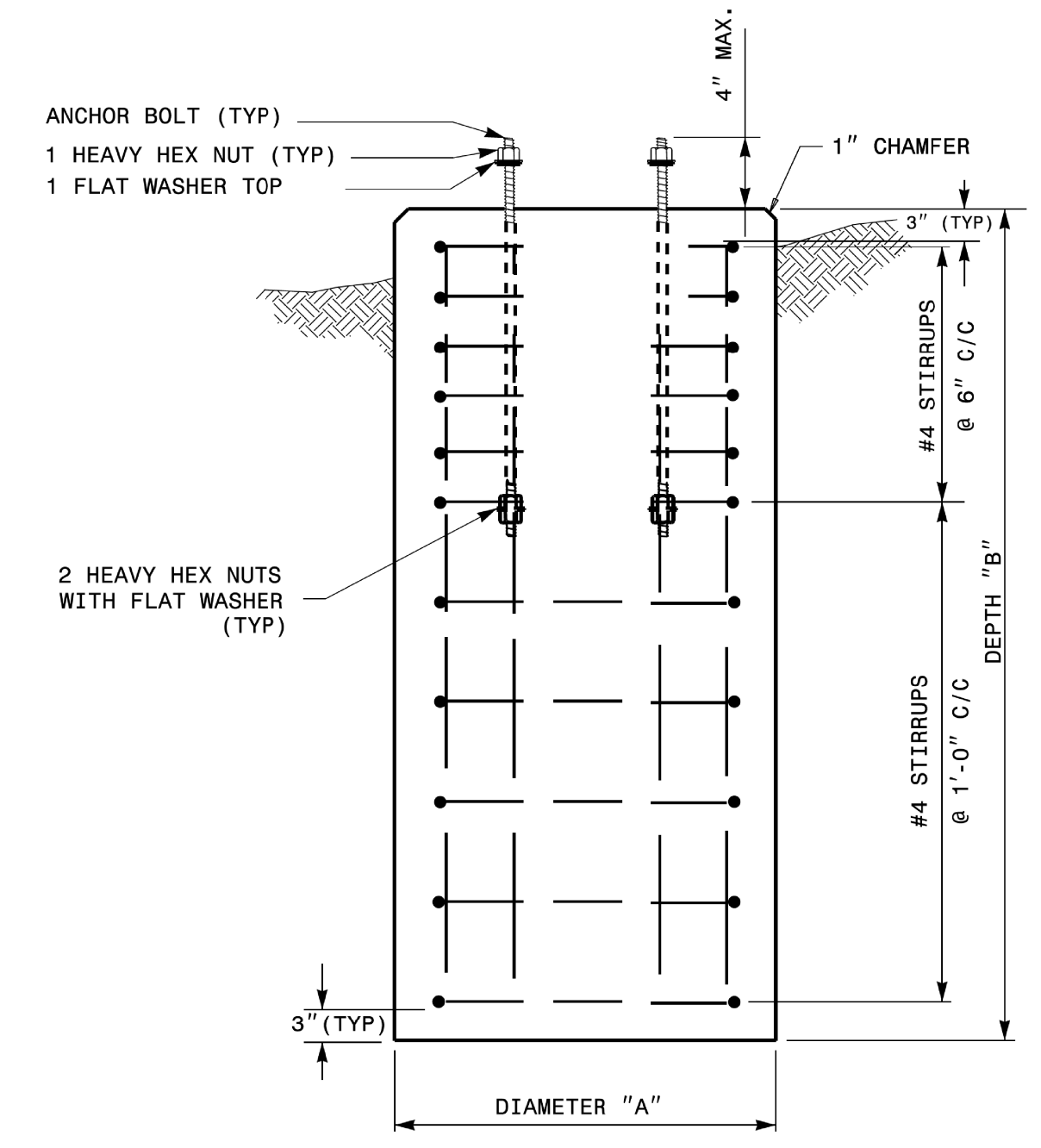
PEDESTAL FOUNDATION - PLAN VIEW



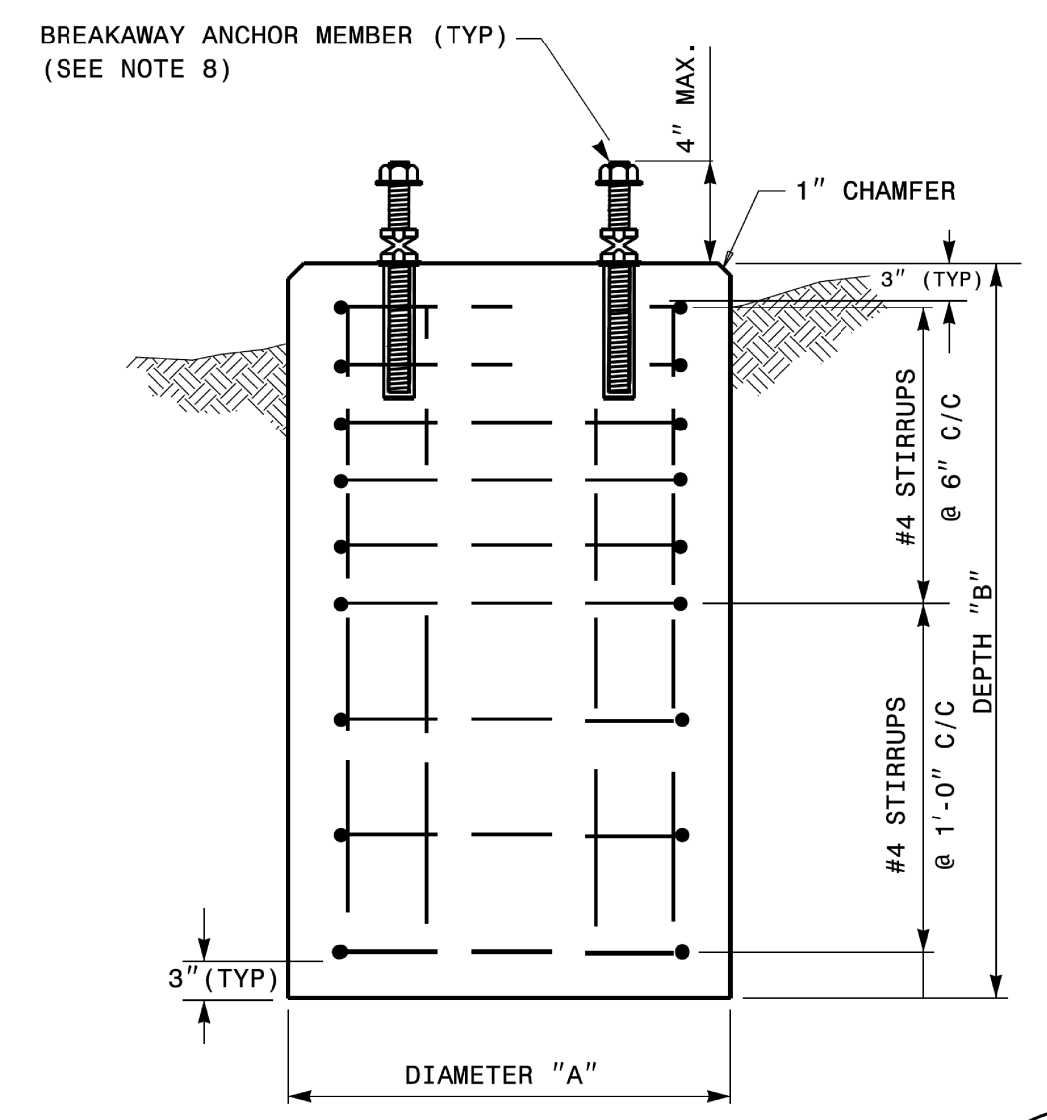
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK

NOTES:

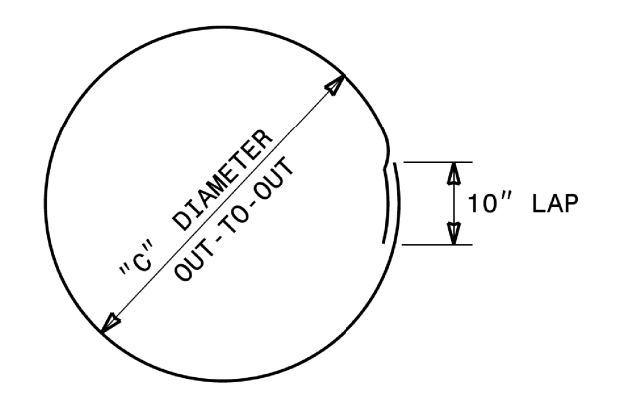
1. CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
2. COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
3. USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
4. USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
5. 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.
6. MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
7. ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
8. 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.



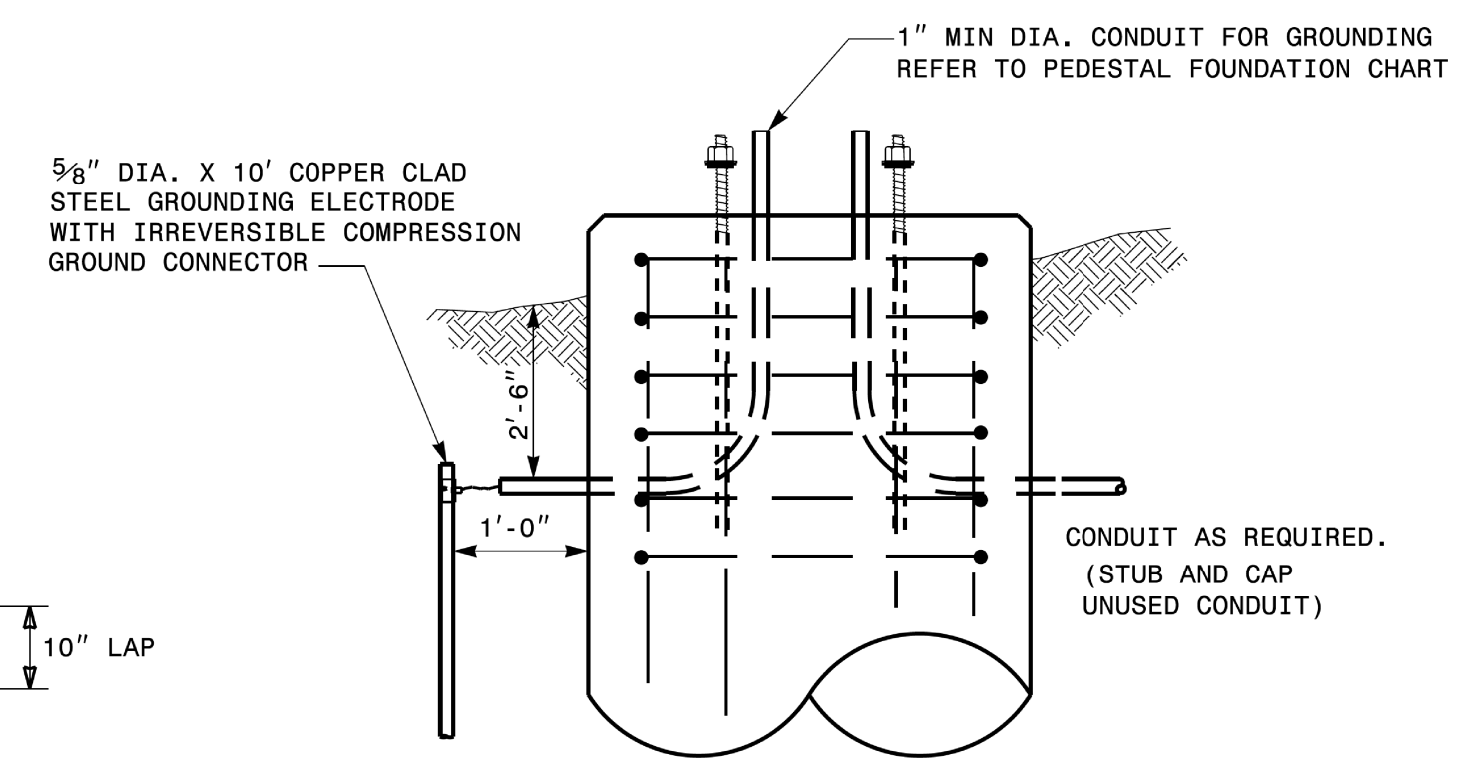
**TYPES I, II & III
SECTION A-A**



**TYPES I & II ONLY
SECTION A-A**



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

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	SIZE #	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.

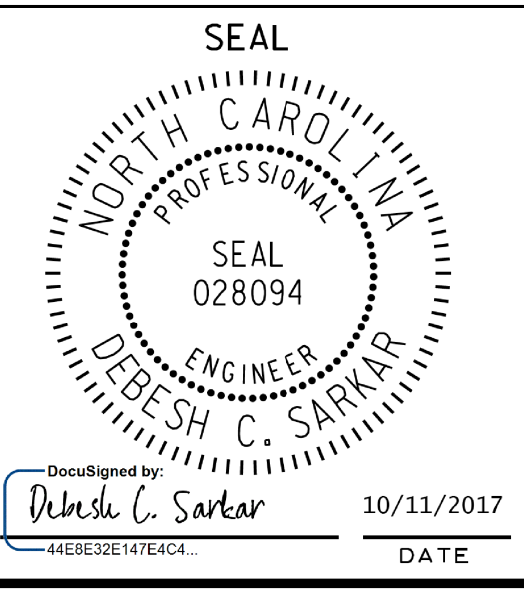
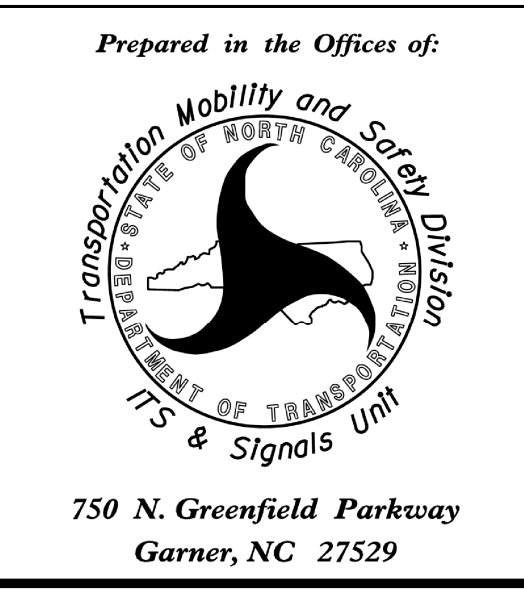
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
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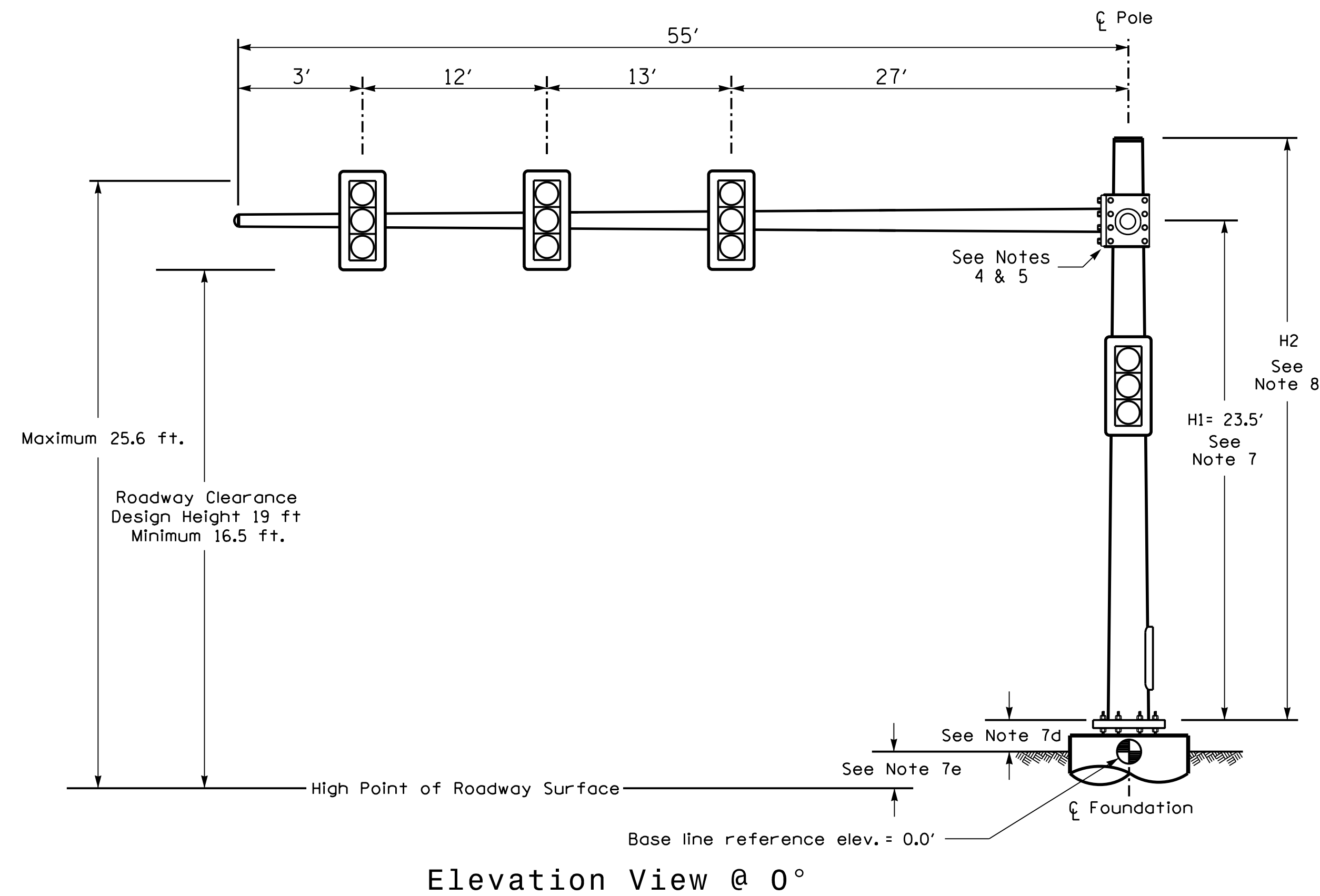
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 SIGNATURES COMPLETED

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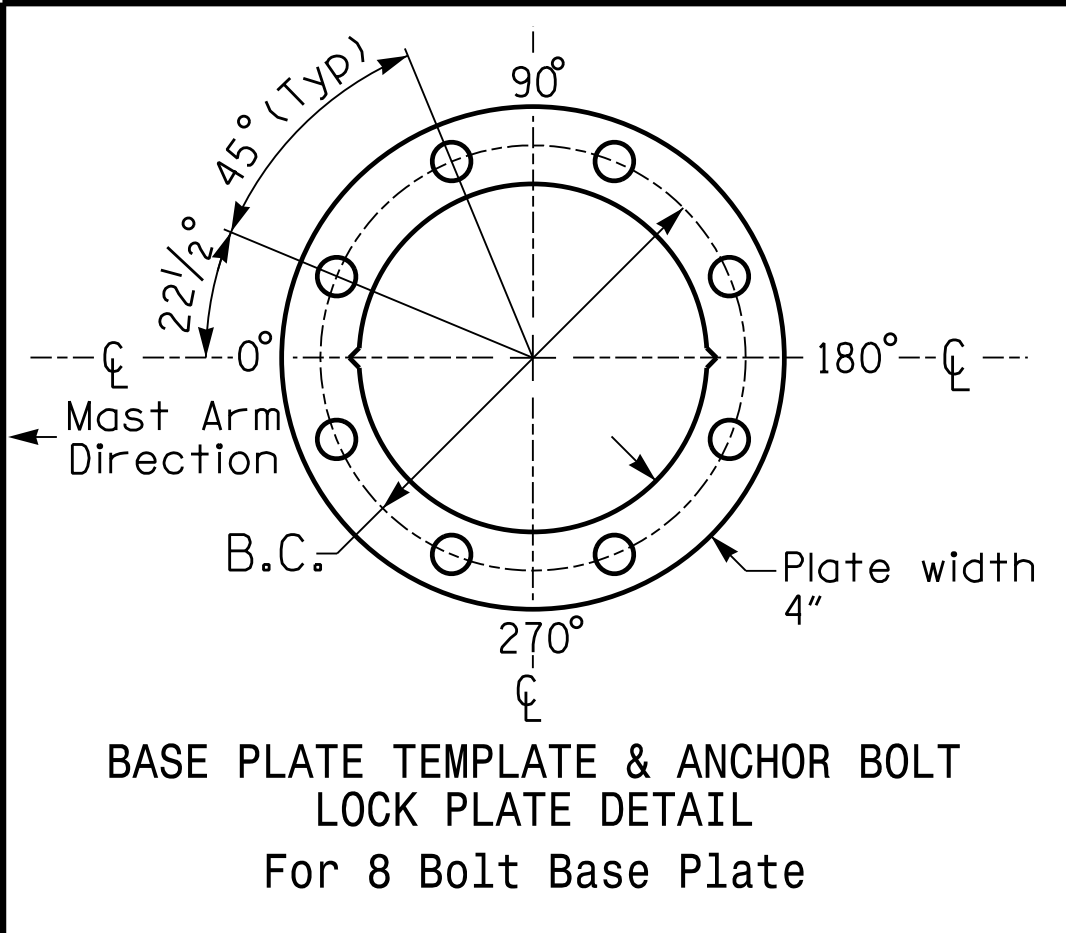
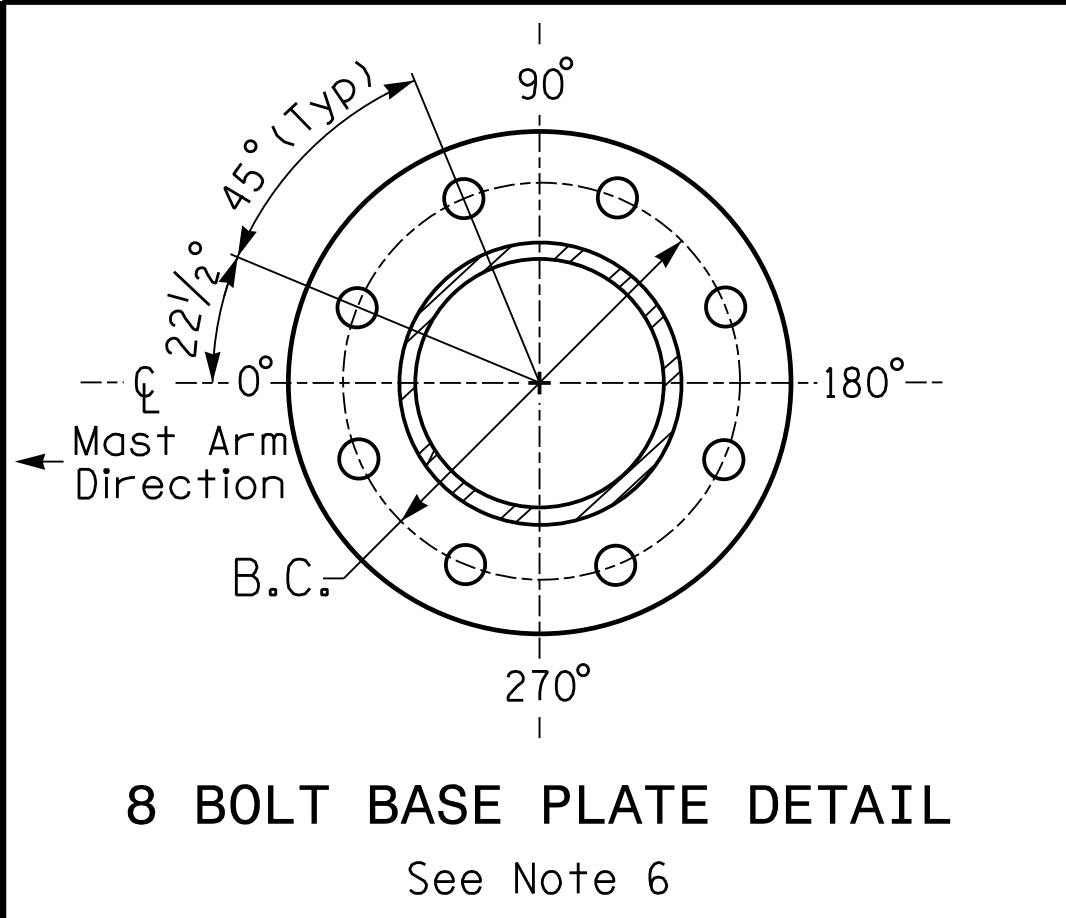
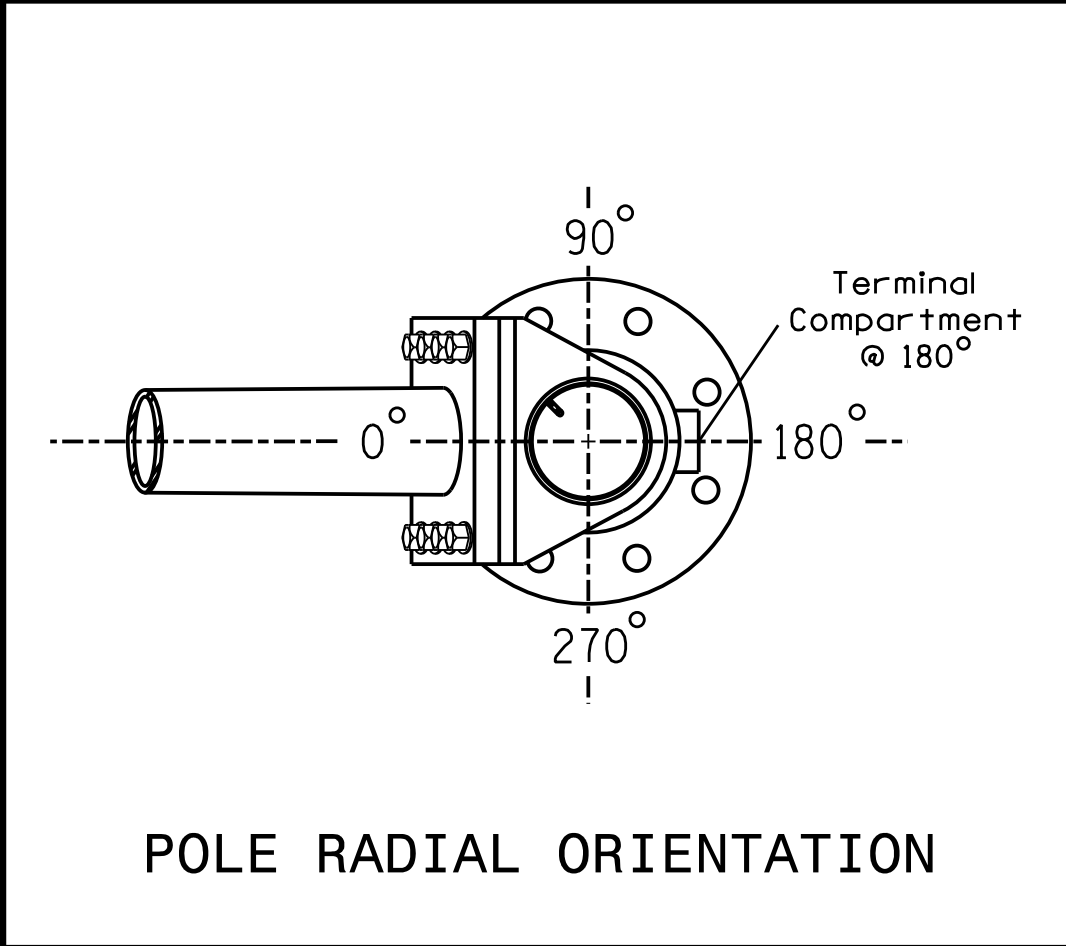
Design Loading for METAL POLE NO. 1



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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+3.02 ft.
Elevation difference at Edge of travelway or face of curb	+1.92 ft.



HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5021	Fig. 47.3

MAST ARM LOADING SCHEDULE

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

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

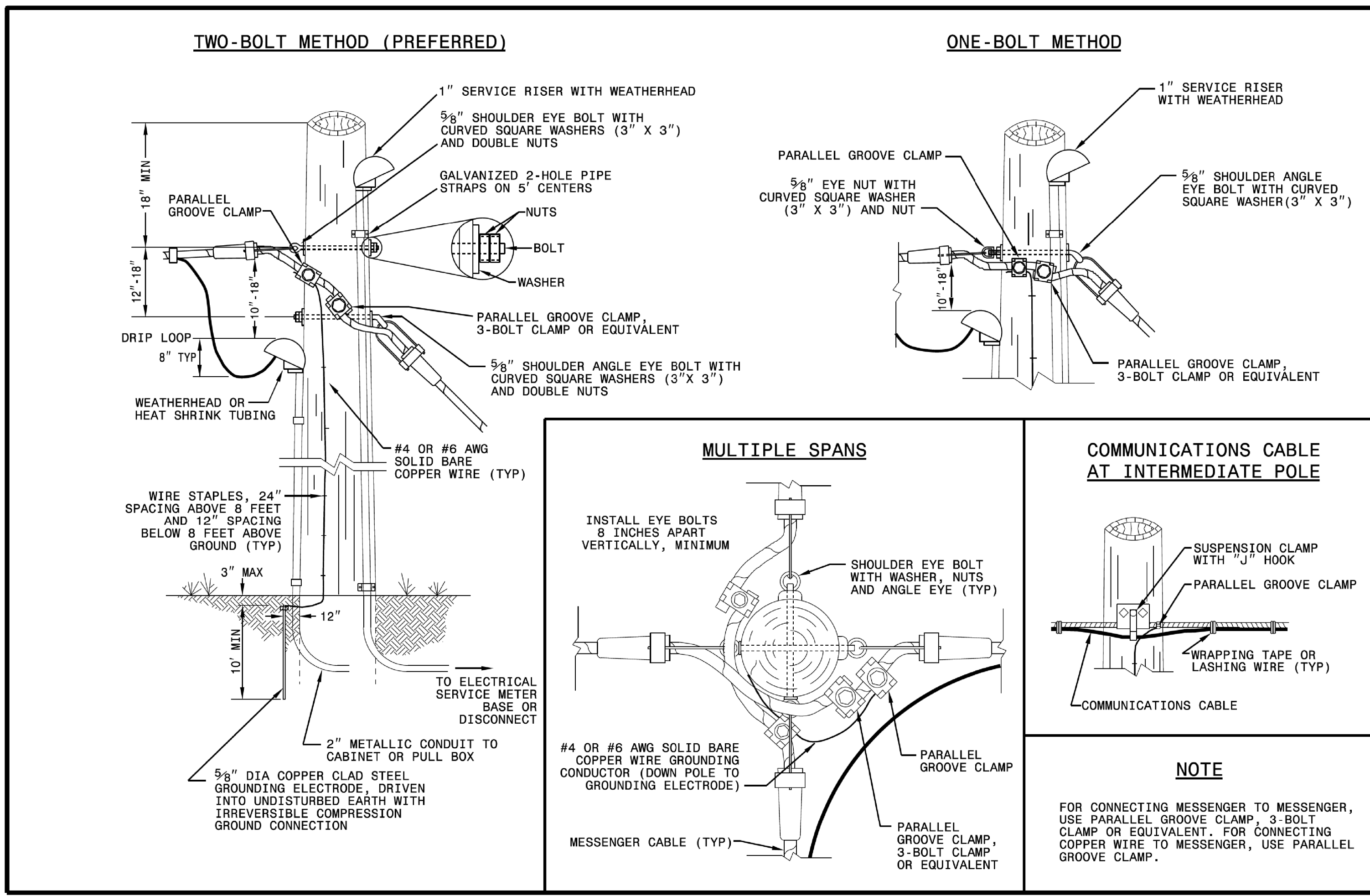
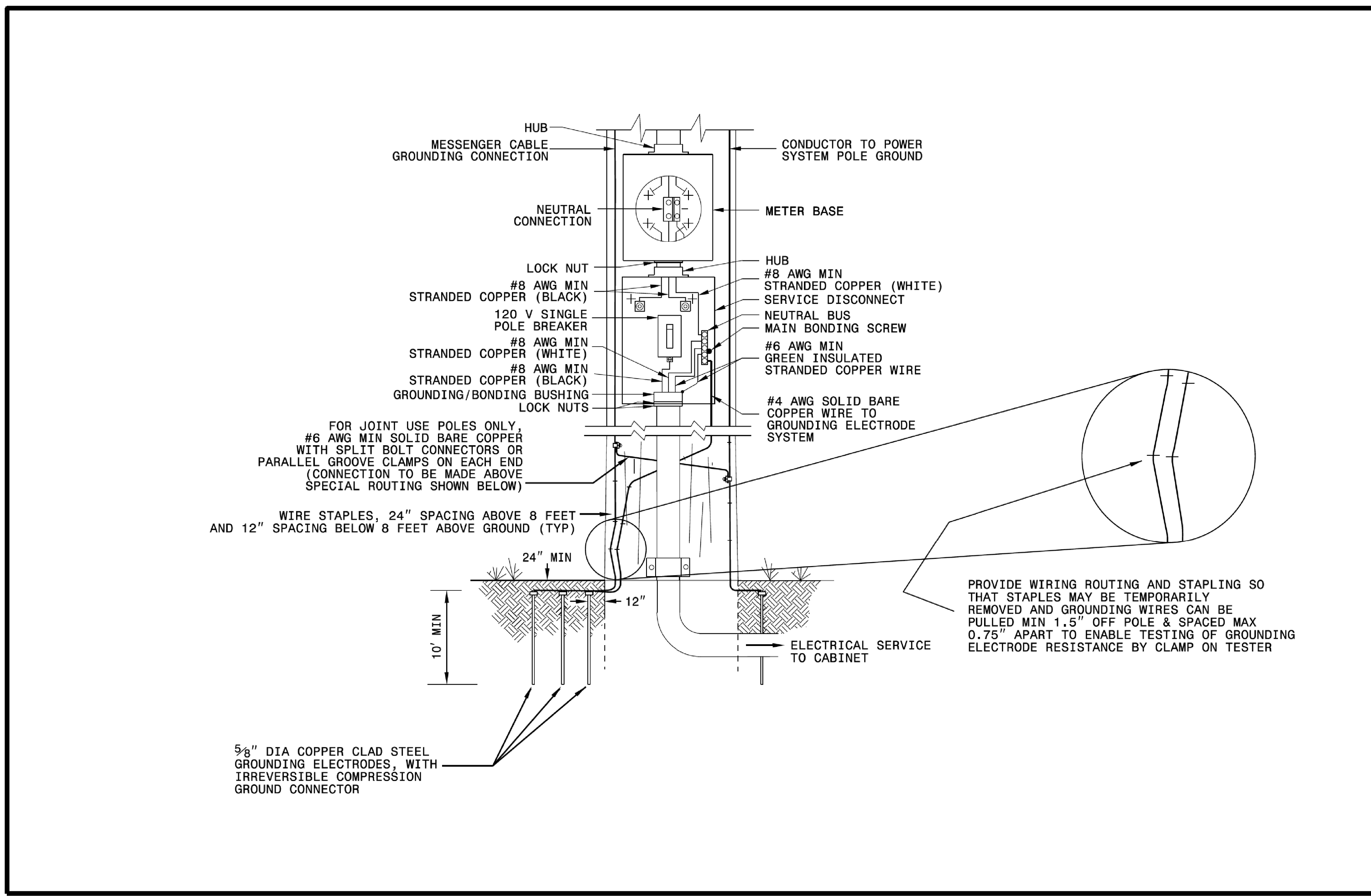
DESIGN REQUIREMENTS

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	NC 211 (Southport-Supply Road) at U-Turn East of NC 906 Ramp		
	Division 03 Brunswick Co. Southport	PLAN DATE: June 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	
SCALE: 0 N/A N/A	REVISIONS:	INITI.:	DATE:
SIGNATURE:			DATE:
SIG. INVENTORY NO.			03-1178



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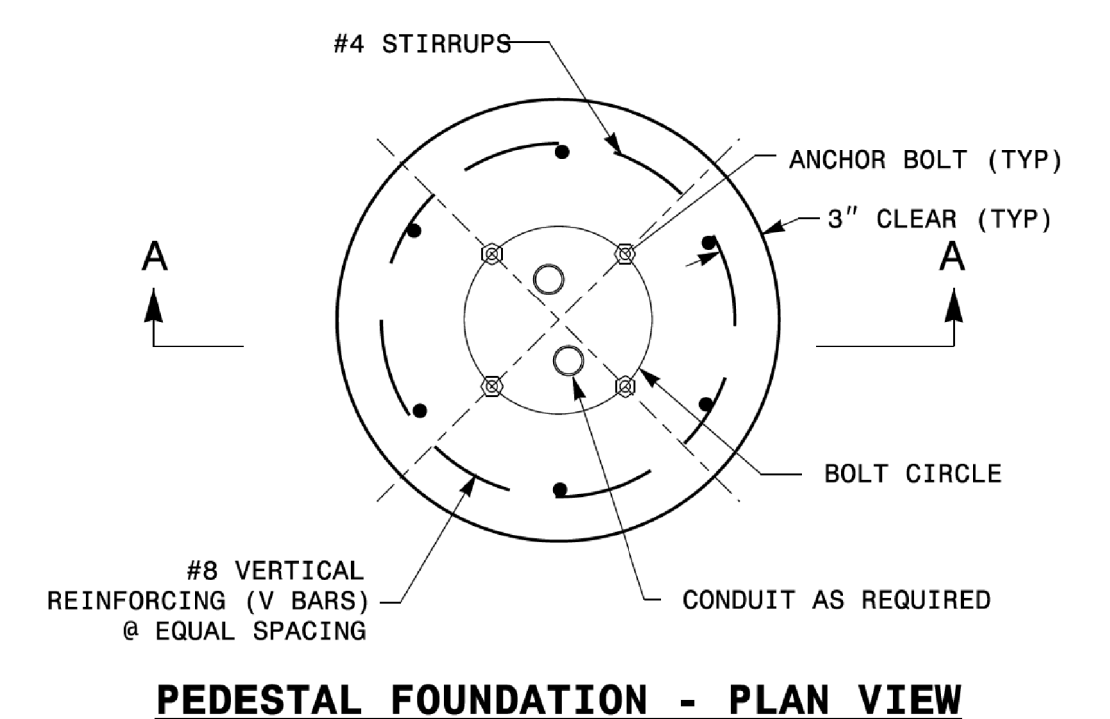
750 N. Greenfield Parkway
Garner, NC 27529

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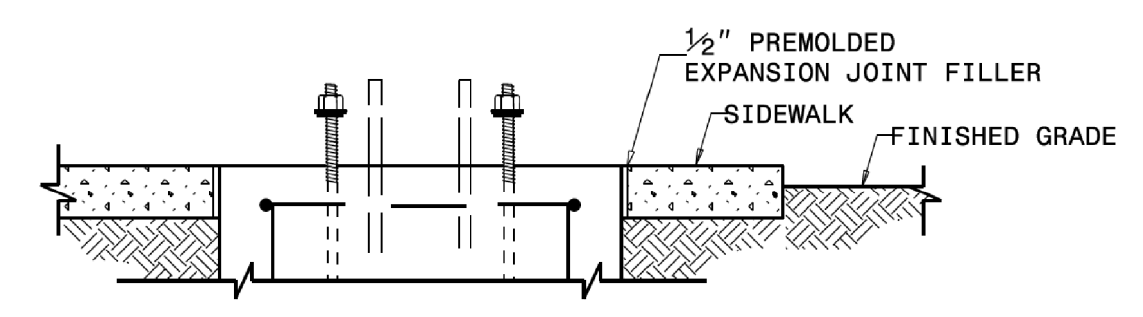
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Mohd Aslami

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DATE

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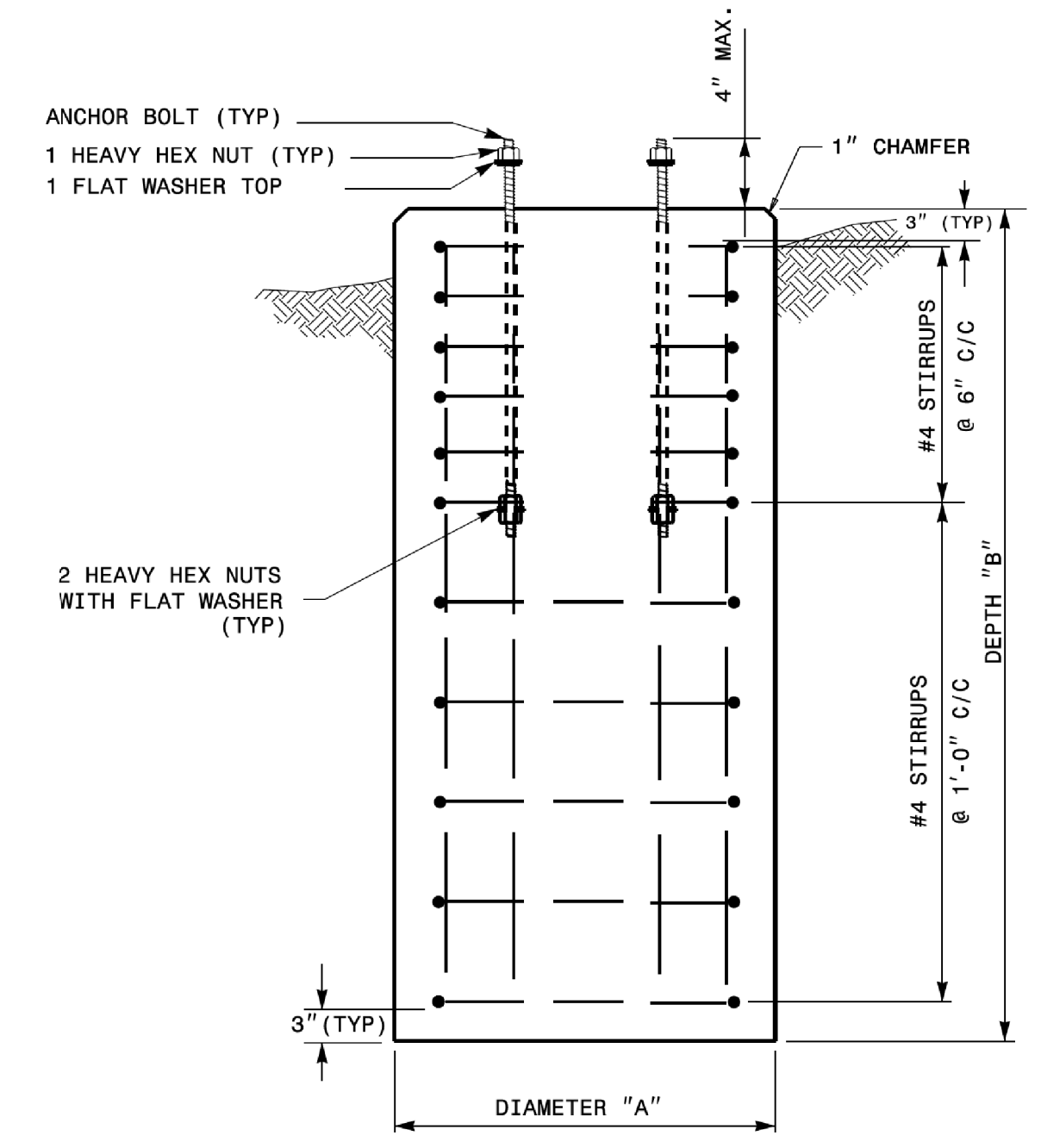
PEDESTAL FOUNDATION - PLAN VIEW



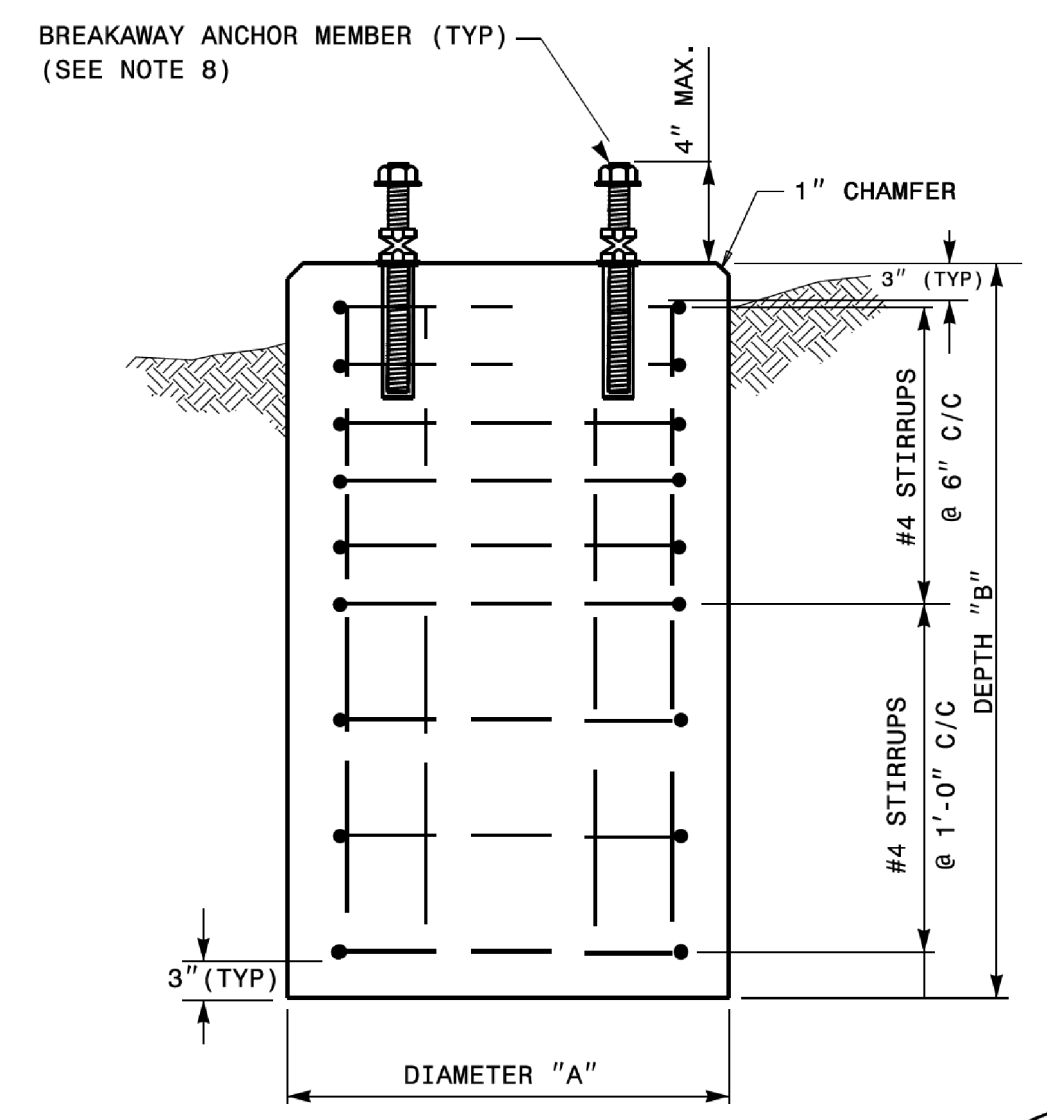
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK

NOTES:

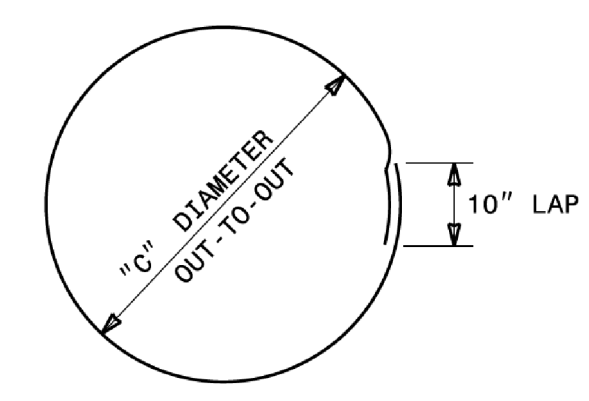
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
- COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
- USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
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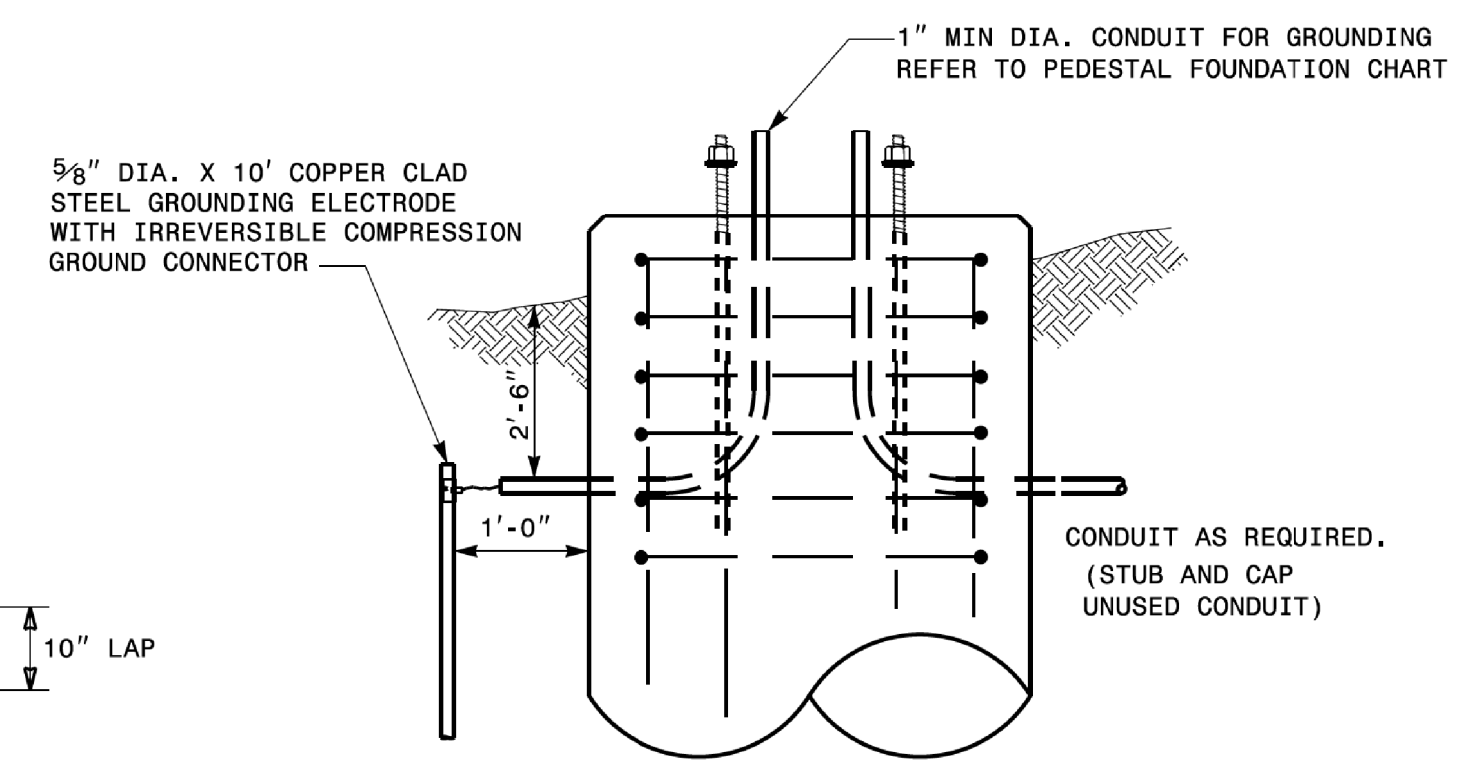
TYPES I, II & III SECTION A-A



TYPES I & II ONLY SECTION A-A



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

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	SIZE #	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.

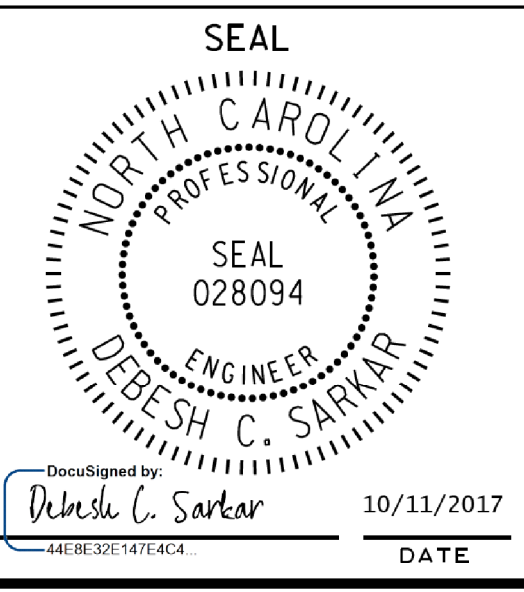
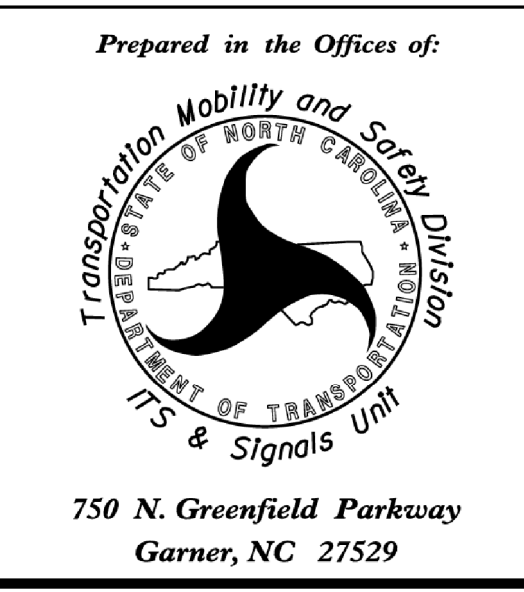
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
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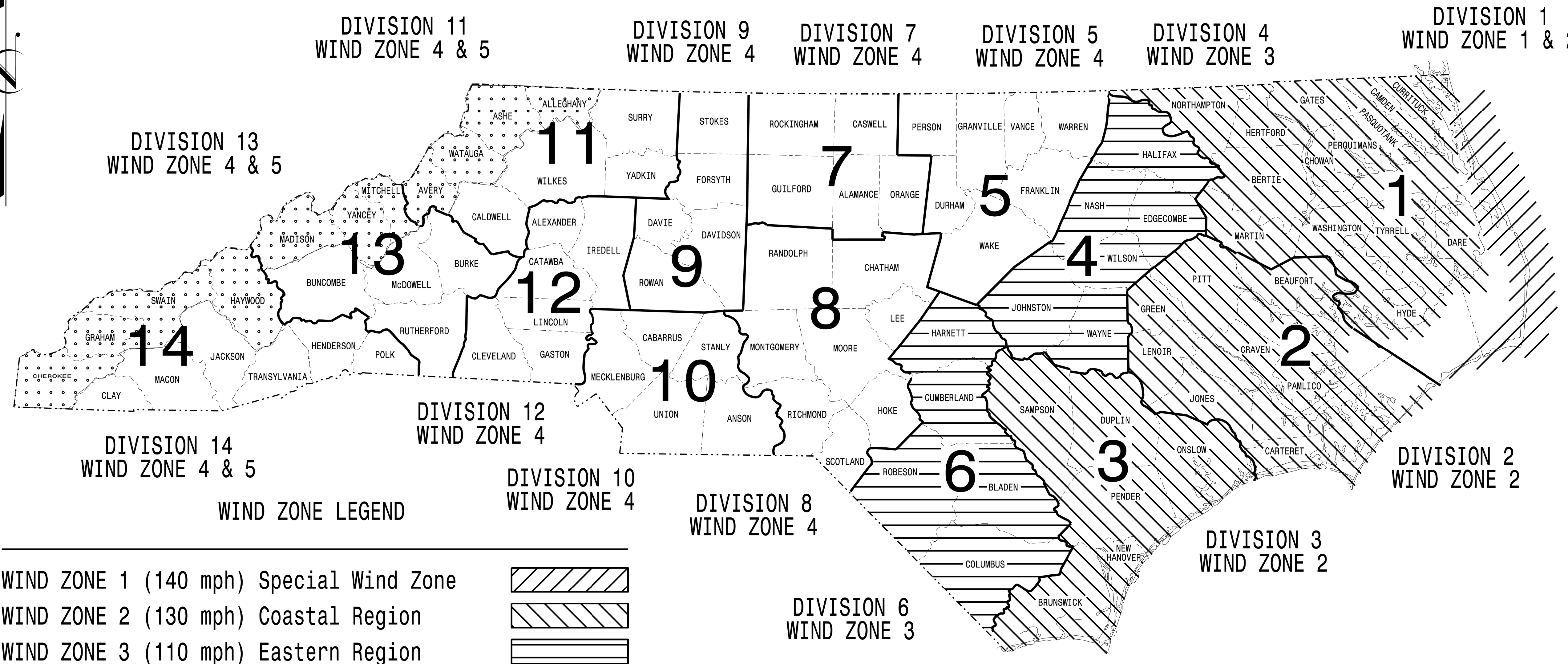


NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. R - 5021	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 Structural Supports for Highway Signs, Luminaires, and Traffic Signals

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

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

J. P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

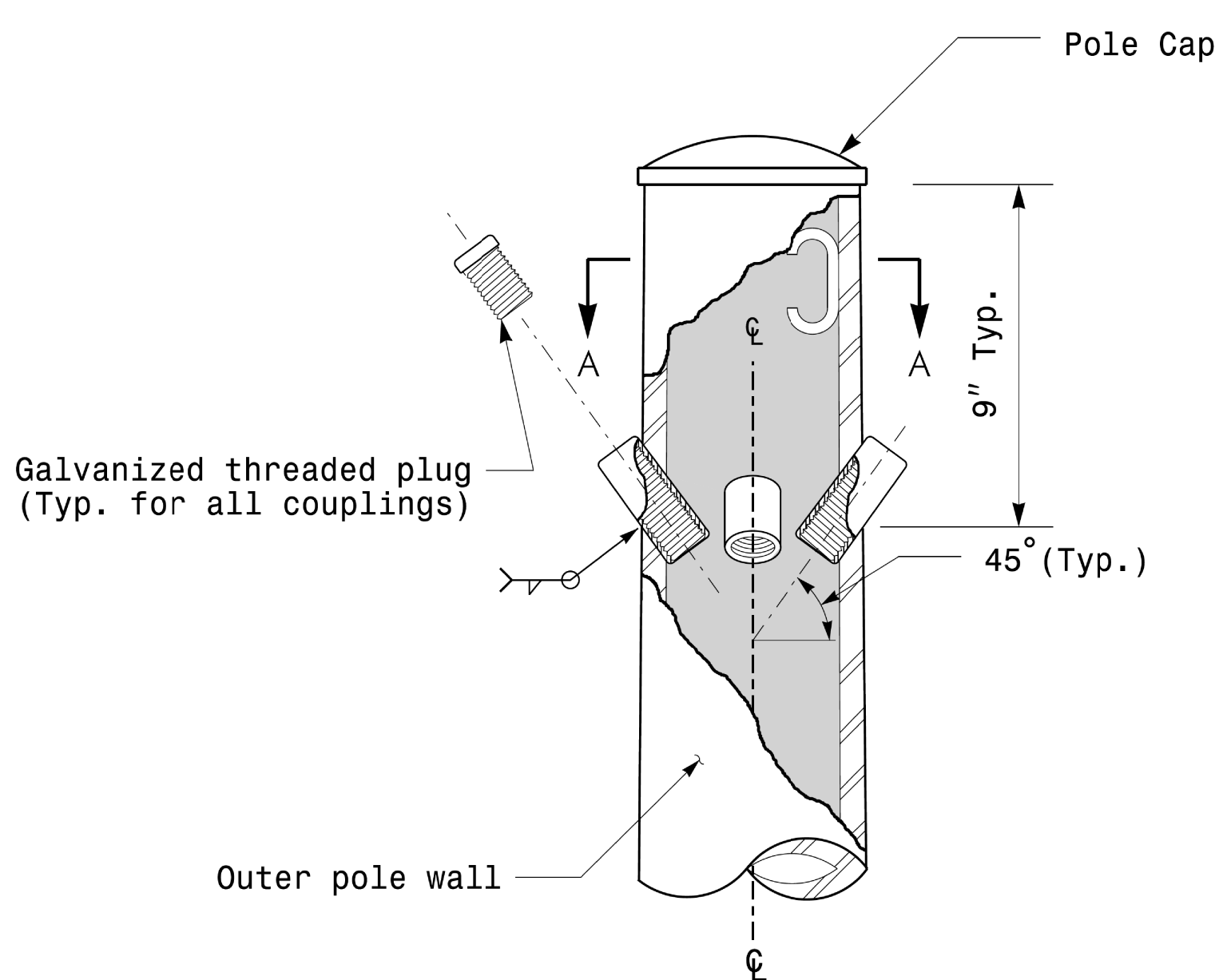
D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

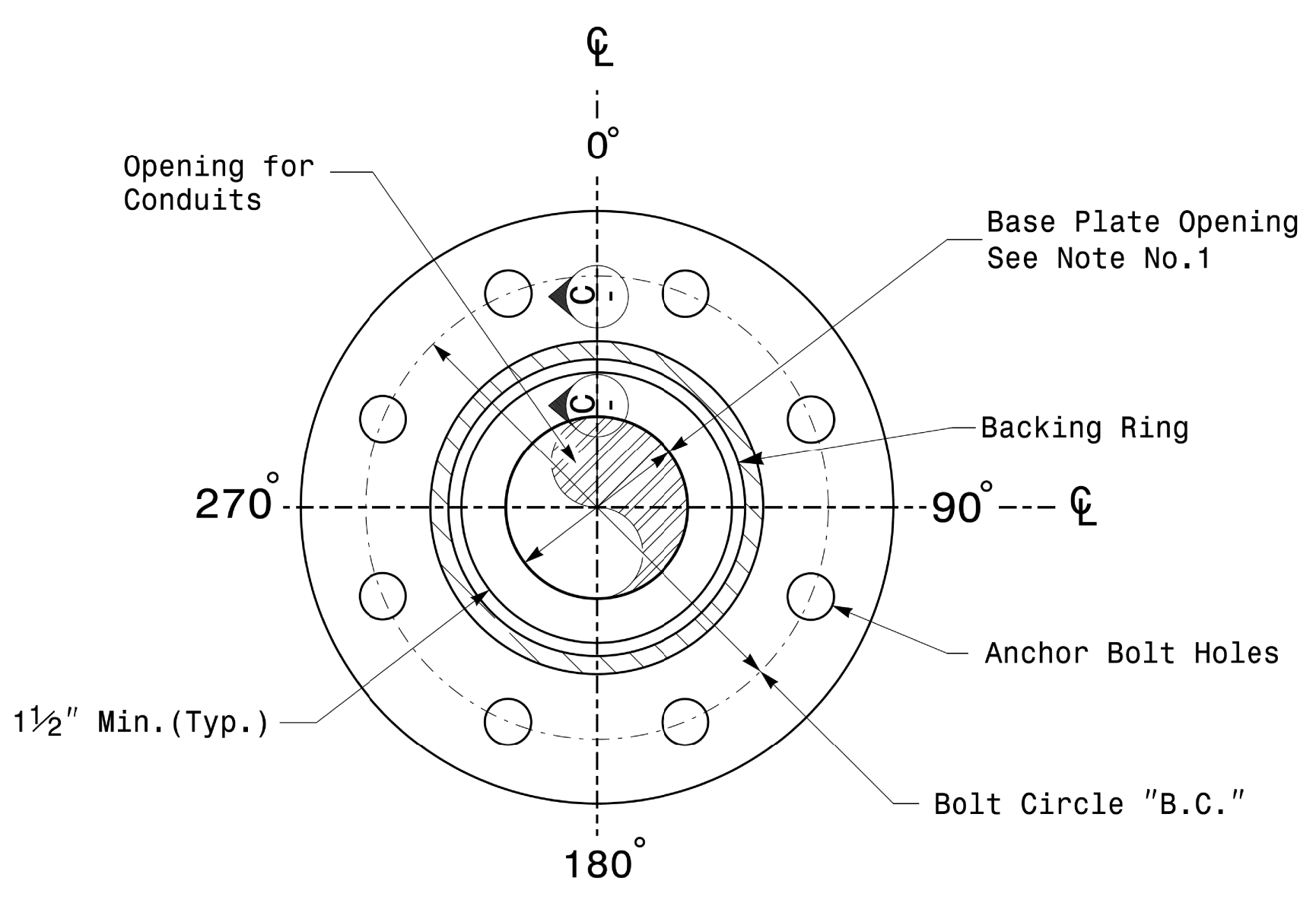
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DATE

PROJECT ID. NO.	SHEET NO.
R - 5021	Sig.M3

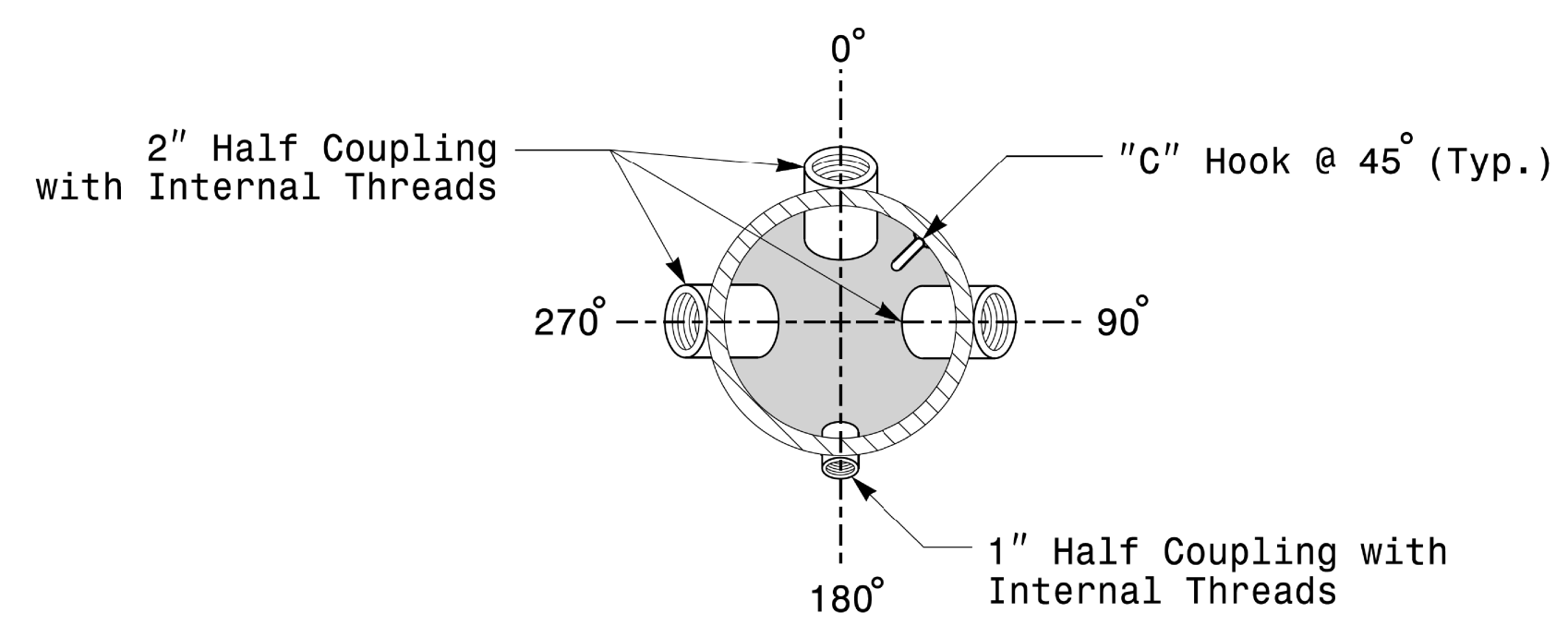
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



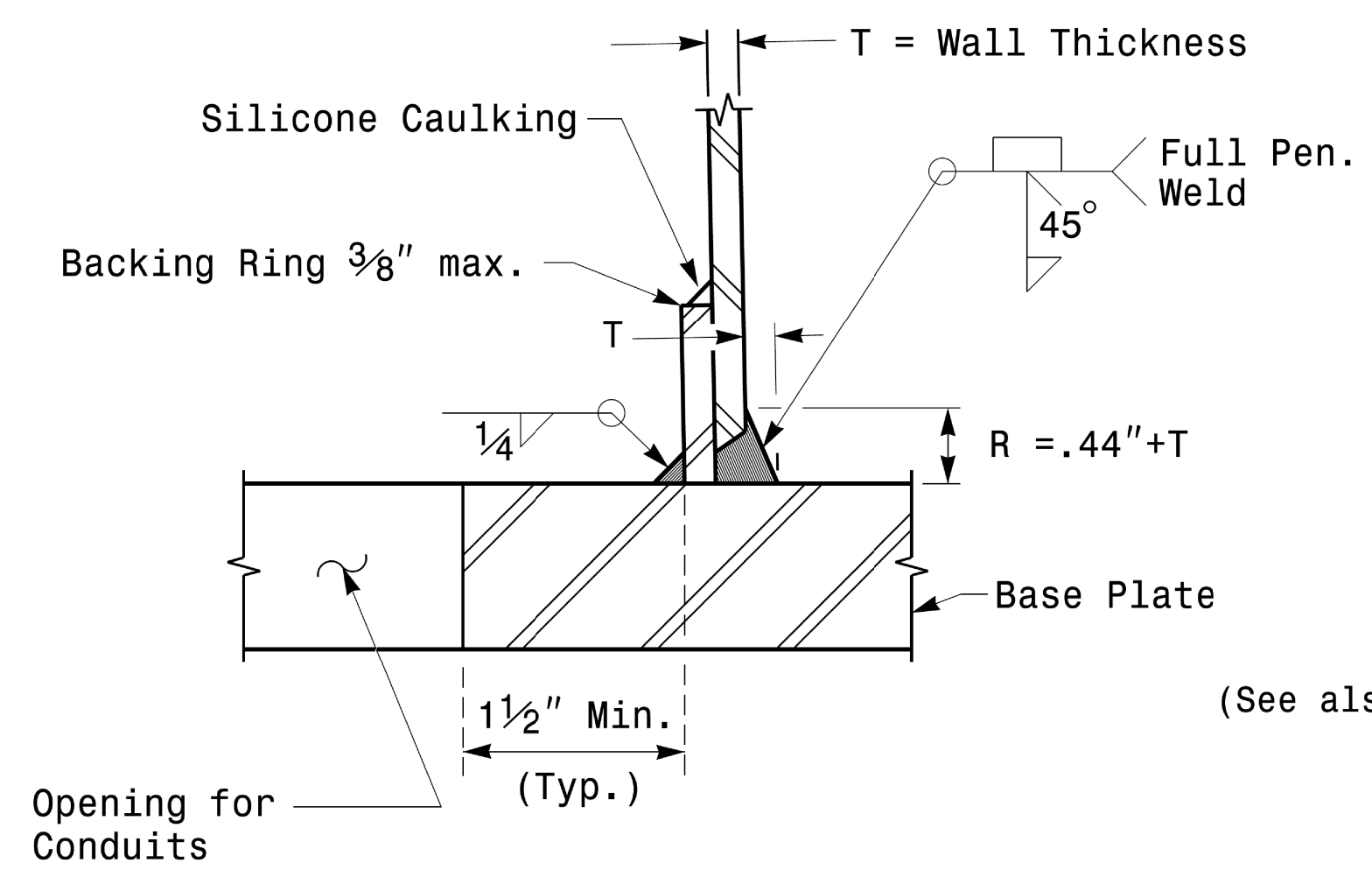
Cable Entrances at Top of Pole



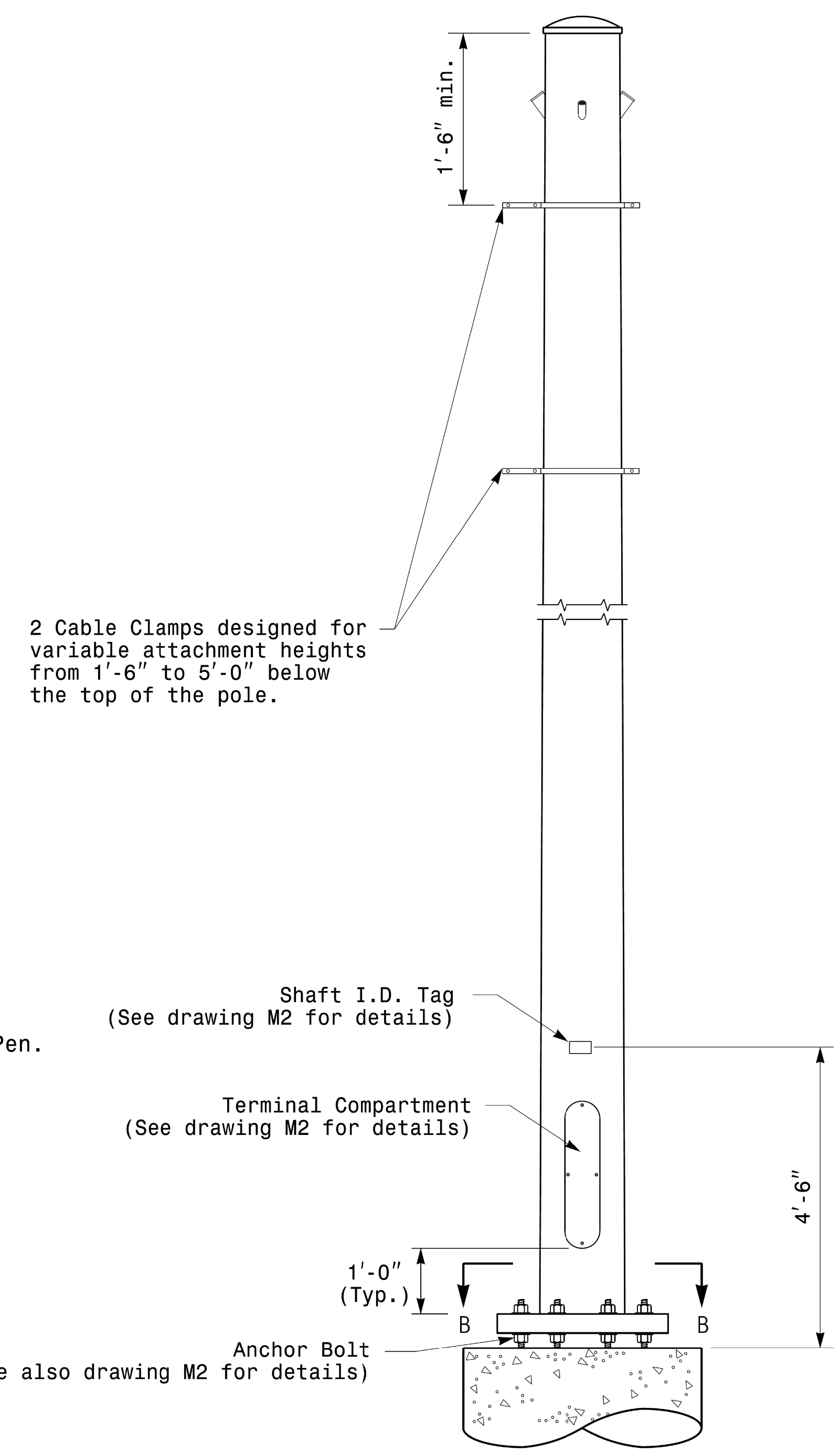
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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

Fabrication Details – Strain Poles

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<p>750 N. Greenfield 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	REVISIONS INIT. DATE	