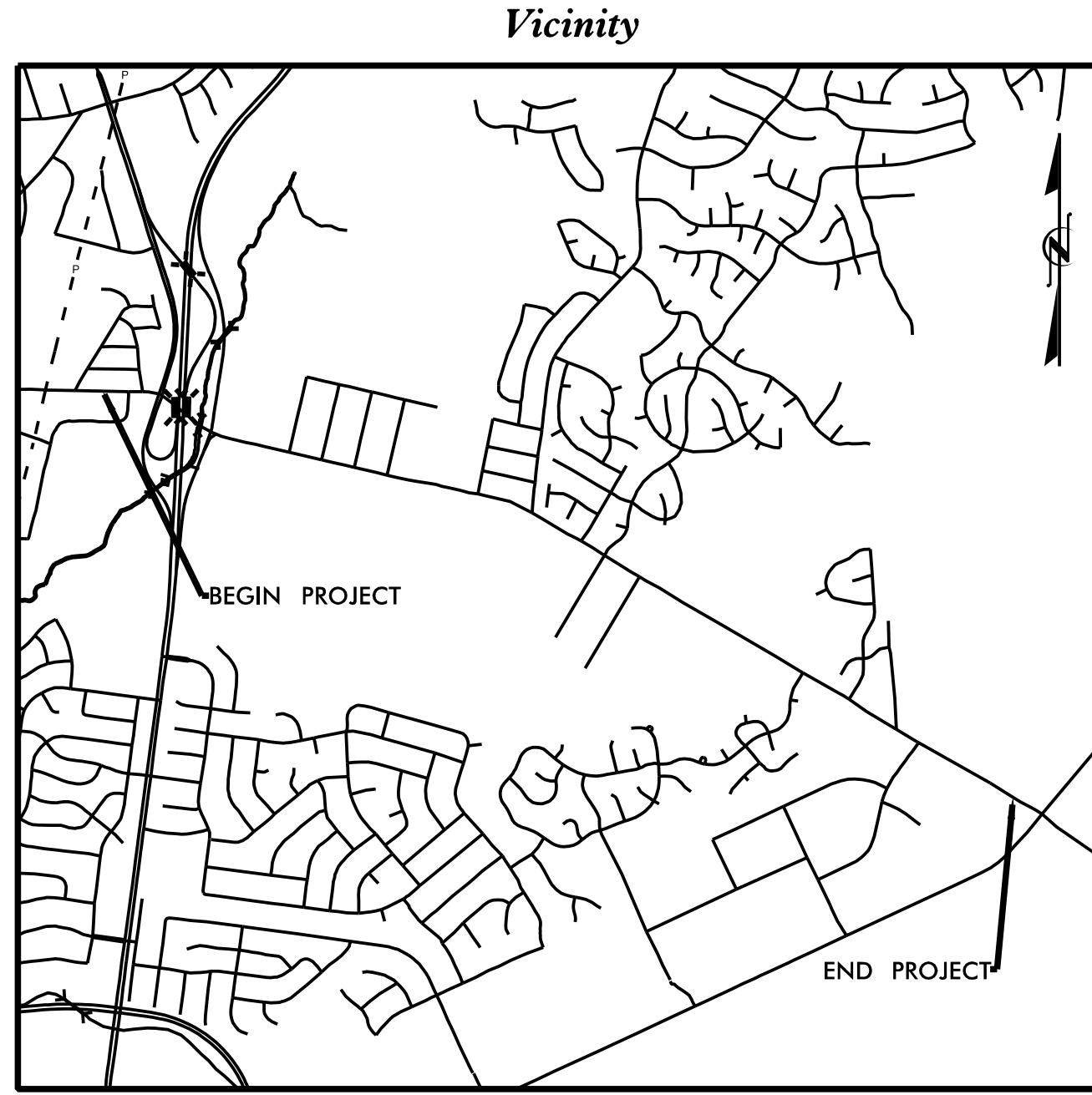


Project: U-6202

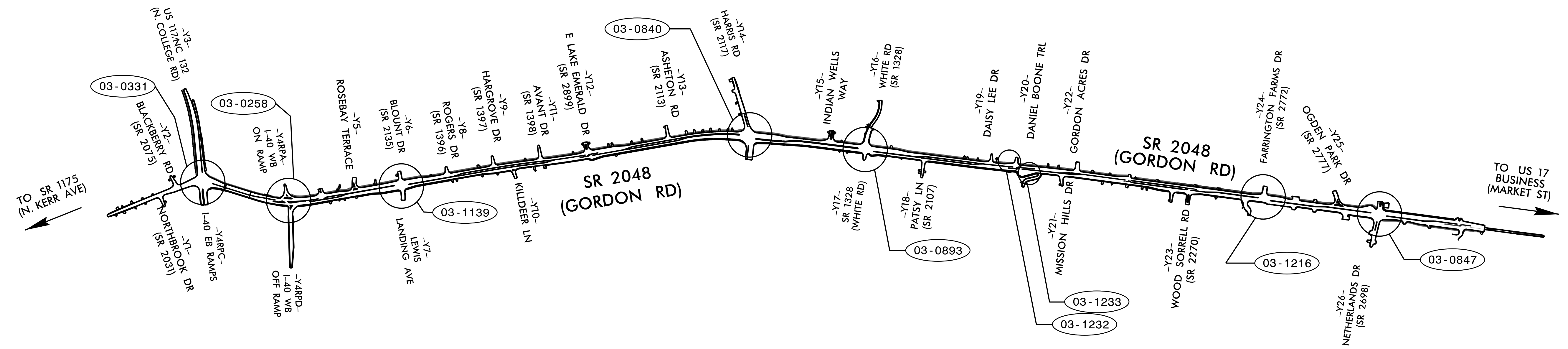


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# NEW HANOVER COUNTY

**LOCATION: SR 2048 (GORDON ROAD) FROM  
WEST OF INTERSTATE-40 TO  
WEST OF US 17 BUS (MARKET STREET)**

**TYPE OF WORK: SIGNALS AND SIGNAL COMMUNICATIONS**



Contract: C204942

**PLANS PREPARED BY:**

**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

- Natasha R. Simmons, P.E., PTOE - Project Engineer
- J. Andrew Wagner, P.E. - Design Engineer
- Nicole K. Vlanich, P.E. - Design Engineer
- Emily E. Tiller - Design Engineer
- Garrett D. Berry - Design Technician

Sheet #	Reference #	Location/Description
Sig. 1.0		Title Sheet
Sig. 2.0-5.9	03-0331	SR 2048 (Gordon Rd) at US 117/NC 132 (N. College Rd)/I-40 EB Ramps
Sig. 6.0-8.6	03-0258	SR 2048 (Gordon Rd) at I-40 WB Ramps
Sig. 9.0-11.9	03-1139	SR 2048 (Gordon Rd) at SR 2135 (Blount Dr)/Lewis Landing Ave
Sig. 12.0-15.8	03-0840	SR 2048 (Gordon Rd) at SR 2117 (Harris Rd)
Sig. 16.0-19.8	03-0893	SR 2048 (Gordon Rd) at SR 1328 (White Rd)
Sig. 20.0-20.6	03-1232	SR 2048 (Gordon Rd) Westbound at Daniel Boone Trl
Sig. 21.0-21.4	03-1233	SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn
Sig. 22.0-24.8	03-1216	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)
Sig. 25.0-27.8	03-0847	SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/Eaton Elementary School)
Sig. M1A-M9		Standard Drawings for Metal Poles
SCP. 1-31		Signal Communication Plans

**LEGEND**

03-#### SIGNAL INVENTORY NUMBER

**TRANSPORTATION SYSTEMS  
MANAGEMENT & OPERATIONS**

Contacts:

- Zachary Little, PE - Eastern Region Signals Engineer
- Todd Joyce, PE - Signal Equipment Design Engineer
- Gregg Green - Signal Communications Project Engineer

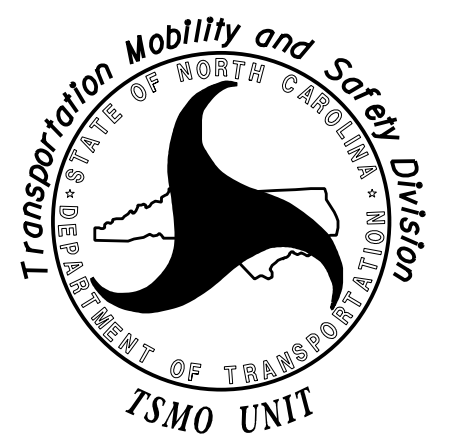
NCDOT - DIVISION 3

Contacts:

- Stonewall (Stoney) D. Mathis, PE - Division Traffic Engineer
- R. Coke Gray III, PE - Regional Traffic Engineer

Refer to "Roadway Standard Drawings  
NCDOT" dated January 2024 and  
"Standard Specifications for Roads  
and Structures" dated January 2024.

Prepared In the Office of:  
DIVISION OF HIGHWAYS  
TRANSPORTATION MOBILITY & SAFETY DIVISION



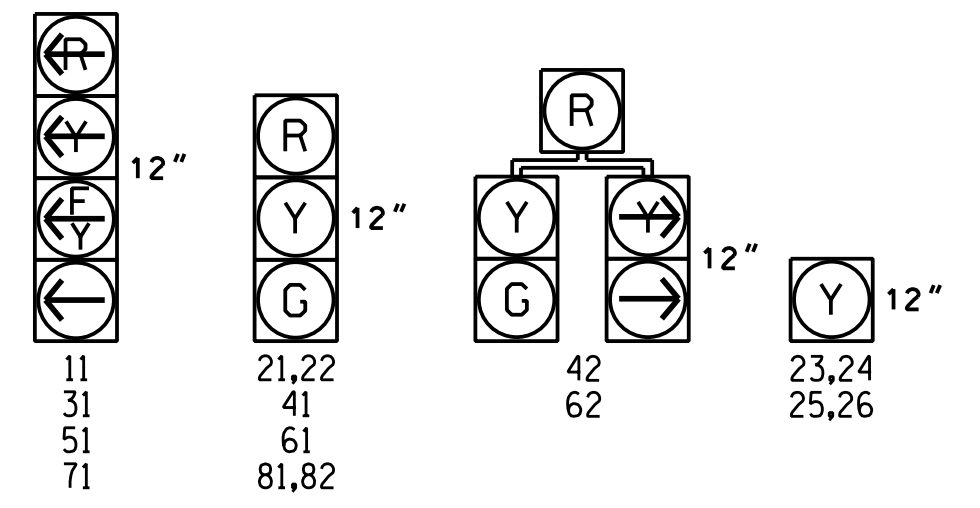
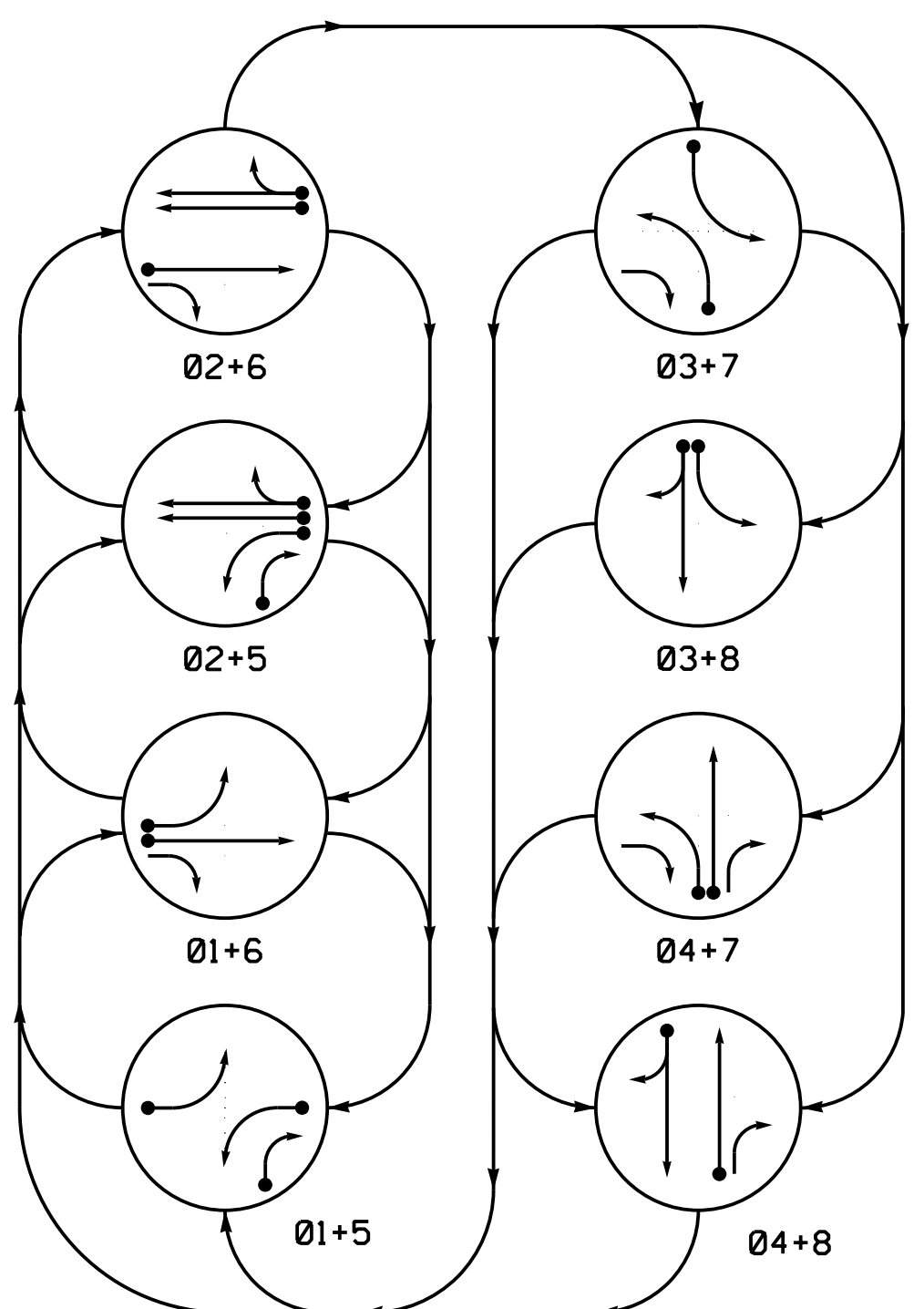
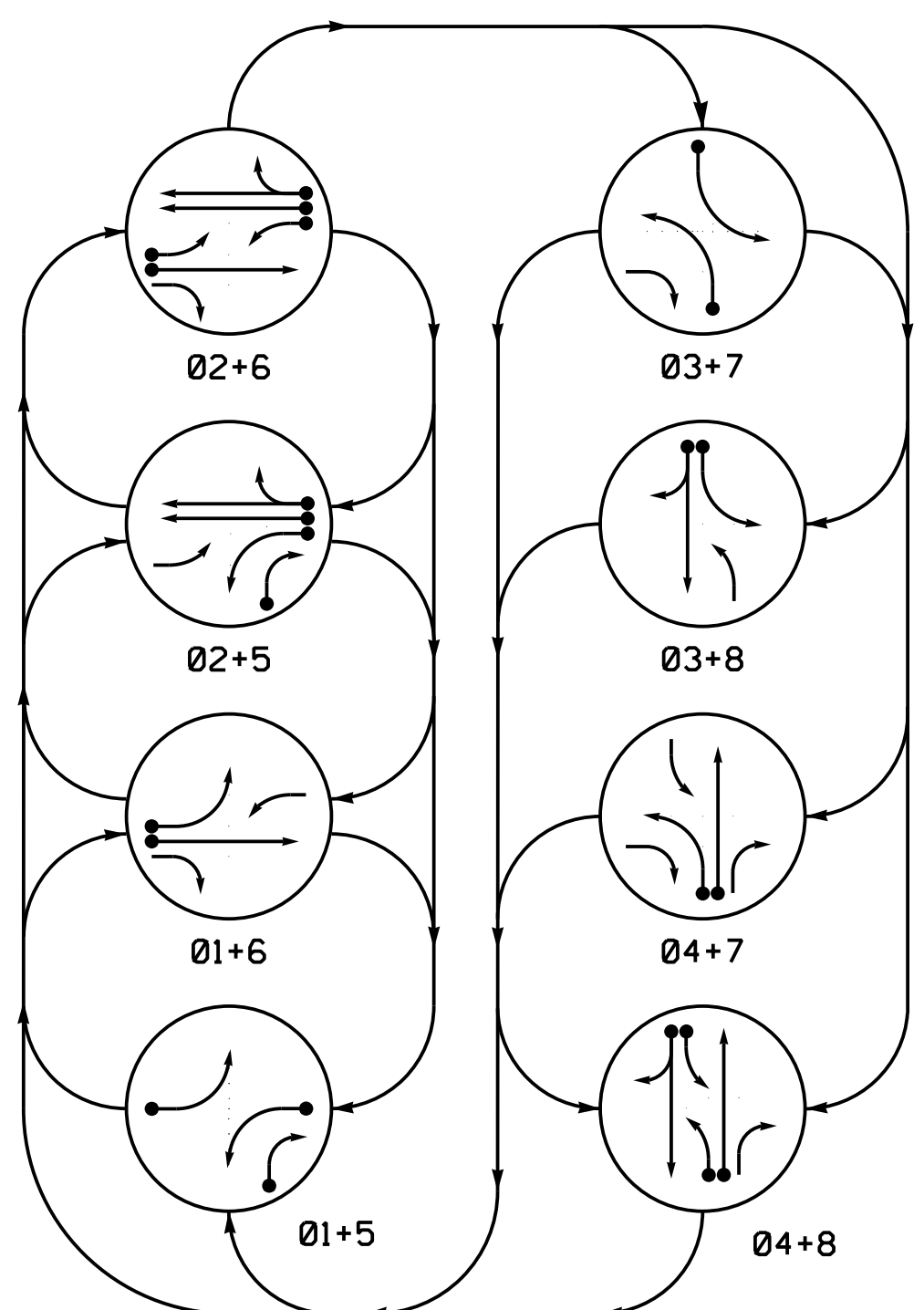


DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART table with columns for Zone, Size, Distance, Turns, New Loop, Phase, Calling, Extension, Full Time Delay, Stretch Time, Delay Time, System Loop, New Card.

\* Multizone Microwave Detection
\*\* Reduce delay to 3 seconds during alternate phasing.
\*\*\* Disable Delay during Alternate Phasing Operation.
# Disable phase call for loop(s) during alternate phasing.

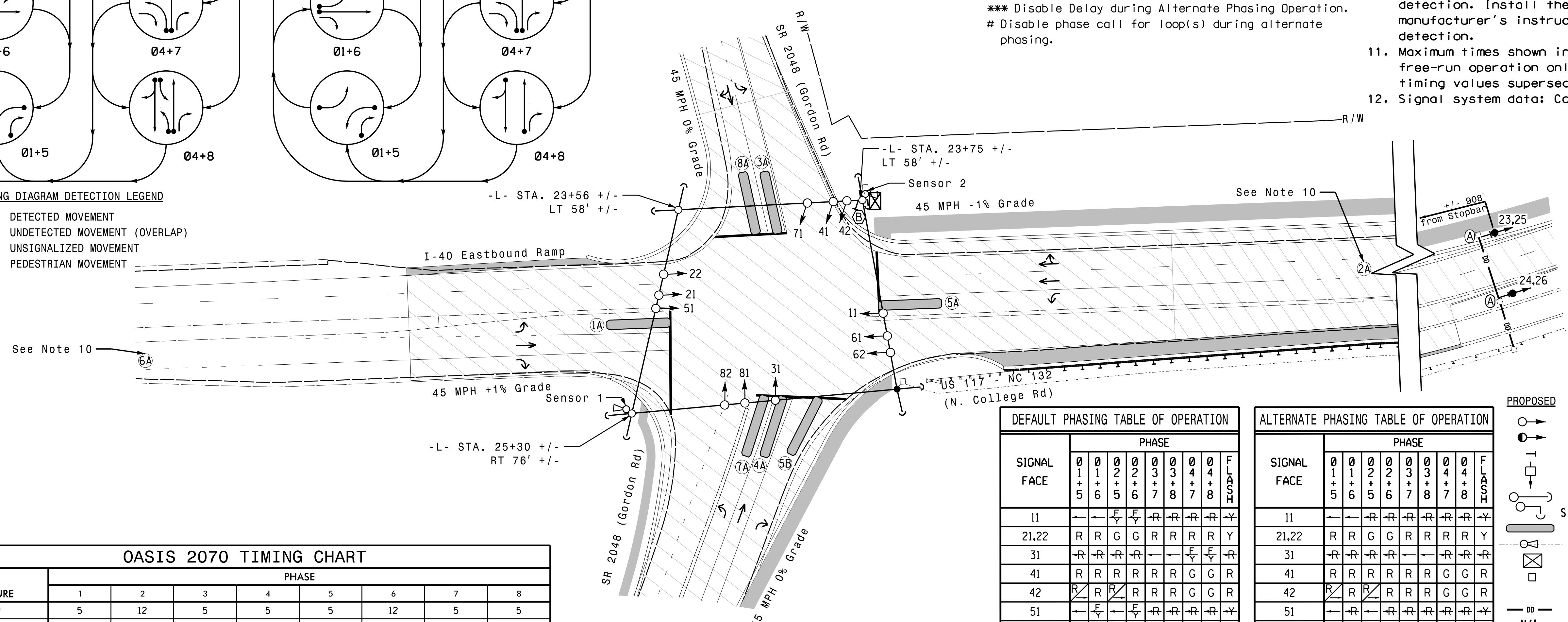
8 Phase Fully Actuated Wilmington Signal System

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Flash vertically mounted beacons alternatively.
8. Flash beacons 23,24,25 and 26 at the end of phase 2 green.
9. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
10. This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Signal system data: Controller Asset #0331.

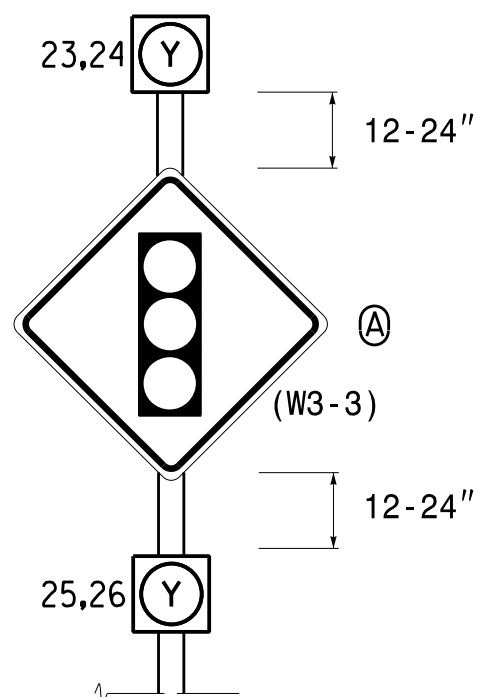
PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART table with columns for Feature and Phase (1-8) and rows for Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Red Revert, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, Dual Entry, Simultaneous Gap.

Figure 1



FLASH TABLE OF OPERATION table with columns for Signal Face and Interval (1, 2) and rows for 23,24 and 25,26.

RADAR DETECTION SYSTEM table with columns for Function, Sensor 1, Sensor 2 and rows for Channel, Phase, Direction of Travel, Detection Zone, Enable Speed, Speed Range, Enable Estimated Time of Arrival, Estimated Time of Arrival.

DEFAULT PHASING TABLE OF OPERATION table with columns for Signal Face and Phase (0-8, FLASH) and rows for 11, 21,22, 31, 41, 42, 51, 61, 62, 71, 81,82.

ALTERNATE PHASING TABLE OF OPERATION table with columns for Signal Face and Phase (0-8, FLASH) and rows for 11, 21,22, 31, 41, 42, 51, 61, 62, 71, 81,82.

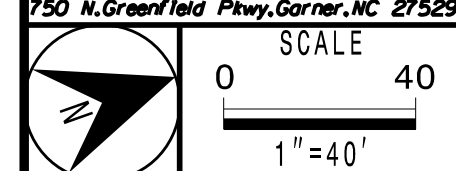
LEGEND section with PROPOSED and EXISTING symbols for Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Microwave Detection Zone, Out of Pavement Detector, Controller & Cabinet Junction Box, 2-in Underground Conduit, Directional Drill, Right of Way, Directional Arrow, Construction Zone, Wedge/Widen, Curb Ramp, Signal Ahead Sign, Right Arrow ONLY Sign.

Signal Upgrade - Temporary Design 1 (Construction Phase 1)

Project information block including HNTB logo, project name (I-40 EB Ramp / US 117 - NC 132 at SR 2048), location (Wilmington, NC), dates (May 2022), and signatures of N.K. Vlanich and N.R. Simmons.

\* 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.

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



Professional Engineer seal for N. K. Vlanich, License No. 031464, State of North Carolina.

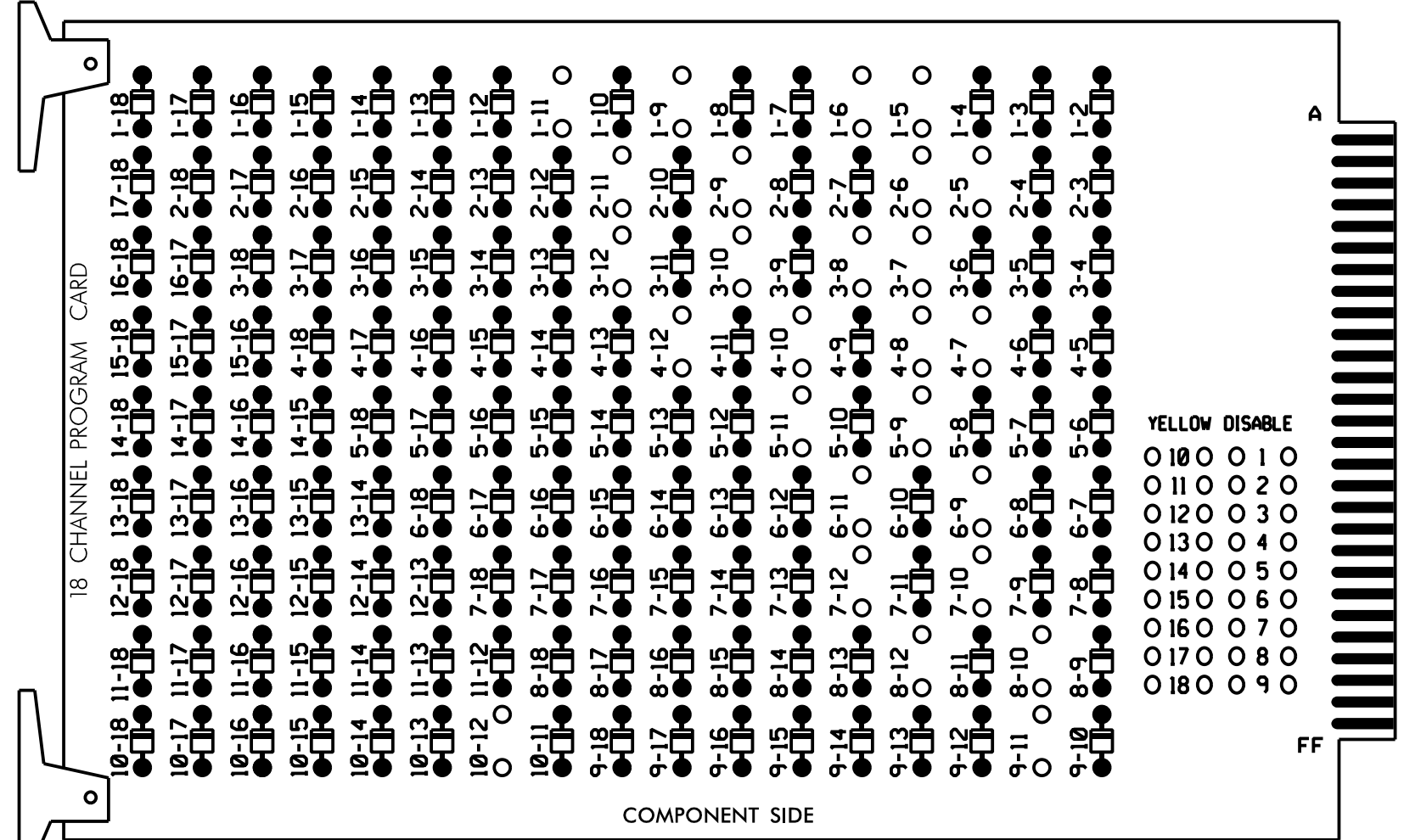
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

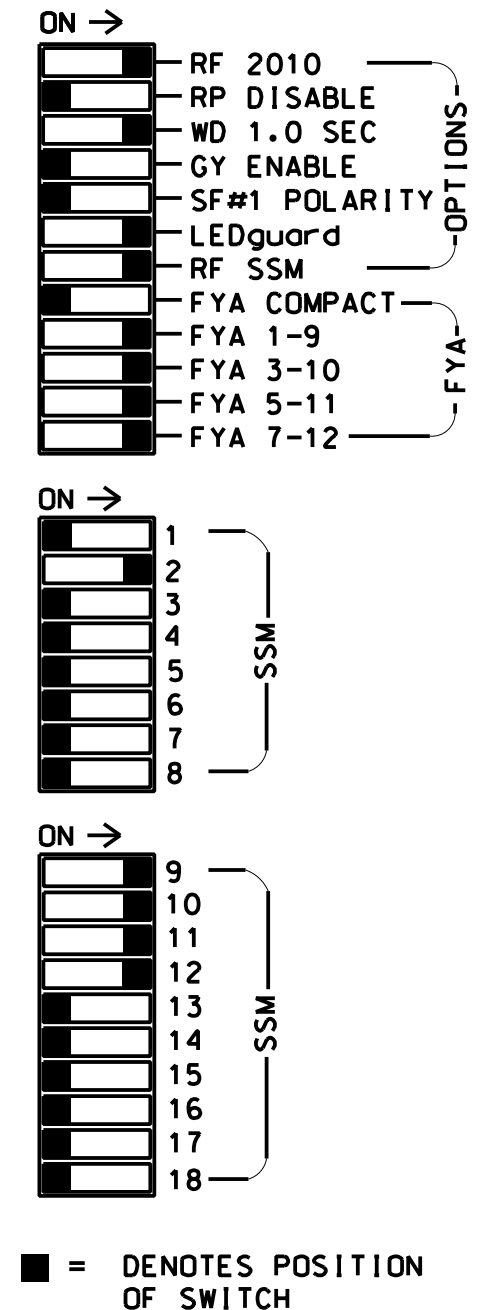
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, AND 10-12.



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 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 Startup in Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 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,S7,S8,\*S9,S10,  
 S11,AUX S1,AUX S2,AUX S4,AUX S5  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....3+4  
 OVERLAP "C".....5+6  
 OVERLAP "D".....7+8

\* Used for Advanced Beacons

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	23,24	31	41,42	NU	42	51	61,62	25,26	62	71	81,82	NU	11	31	NU	51	71
RED		128			101		*		134		*		107						
YELLOW	*	129		*	102				135				108						
GREEN		130			103				136				109						
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW							132			123			A122	A125		A115	A102		
FLASHING YELLOW ARROW													A123	A126		A116	A103		
GREEN ARROW	127			118			133	133		124	124								
PED YELLOW													** 114						
													** 120						

NU = Not Used

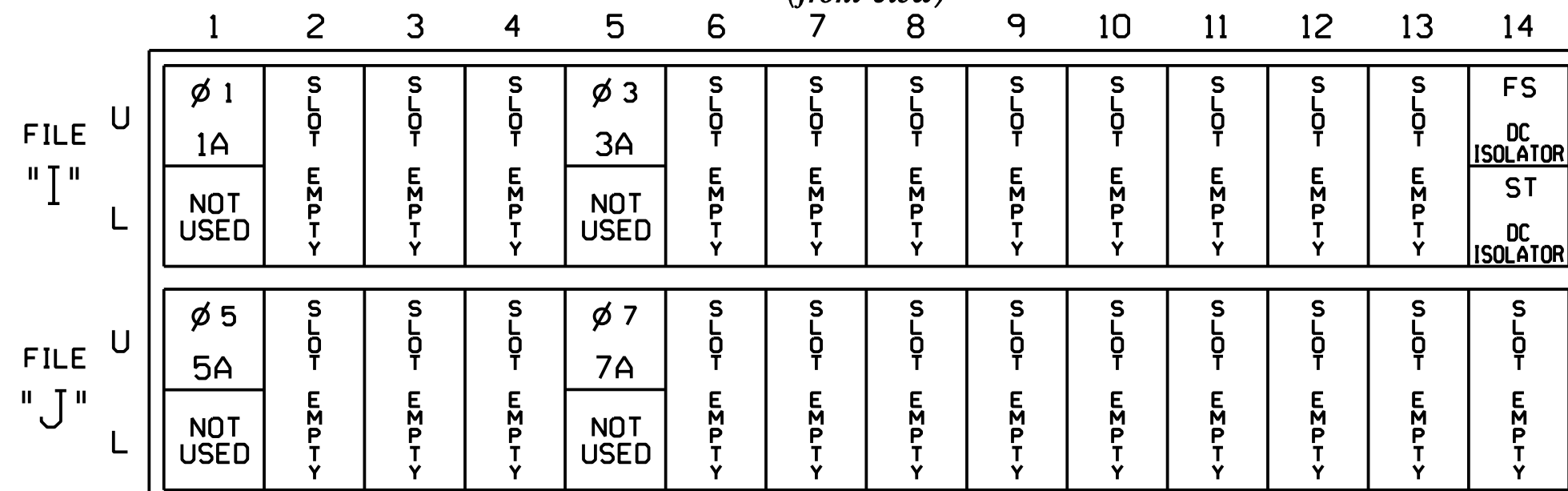
\* Denotes install load resistor. See load resistor installation detail this sheet.

\*\* Advance Beacons will be wired to S2P-Y and S6P-Y. See wiring and programming detail on sheet 2.

\* 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

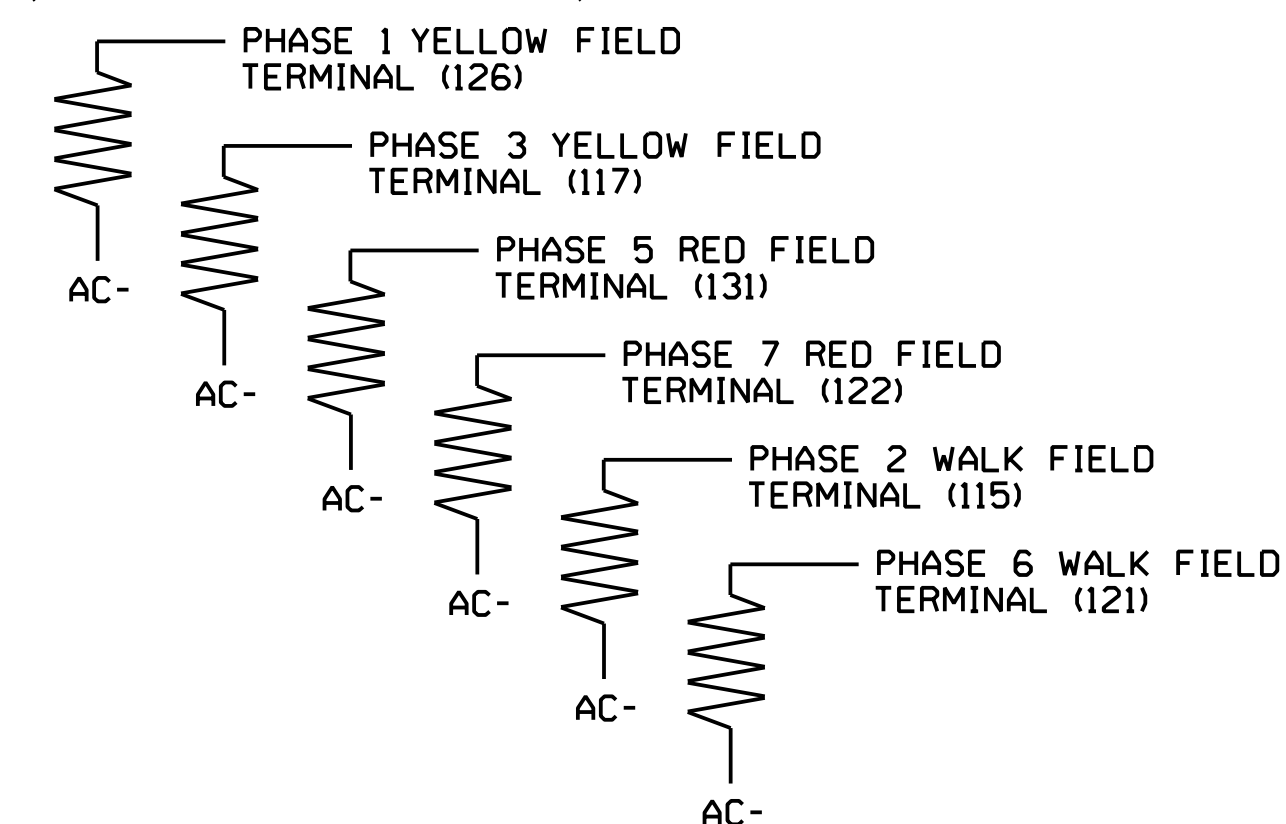
### SPECIAL DETECTOR NOTE

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

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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

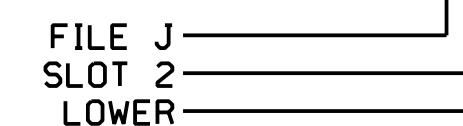


### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10*	26	6	Y	Y			
	-	I1U	56	18*	51	1	Y	Y			
3A	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
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9*	22	2	Y	Y			
	-	J1U	55	17*	55	5	Y	Y			15
7A	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			15

\* See Input Page Assignment programming details on sheets 4, 5, 6, and 7.

INPUT FILE POSITION LEGEND: J2L



This plan supersedes the plan signed and sealed on 5/17/2024.

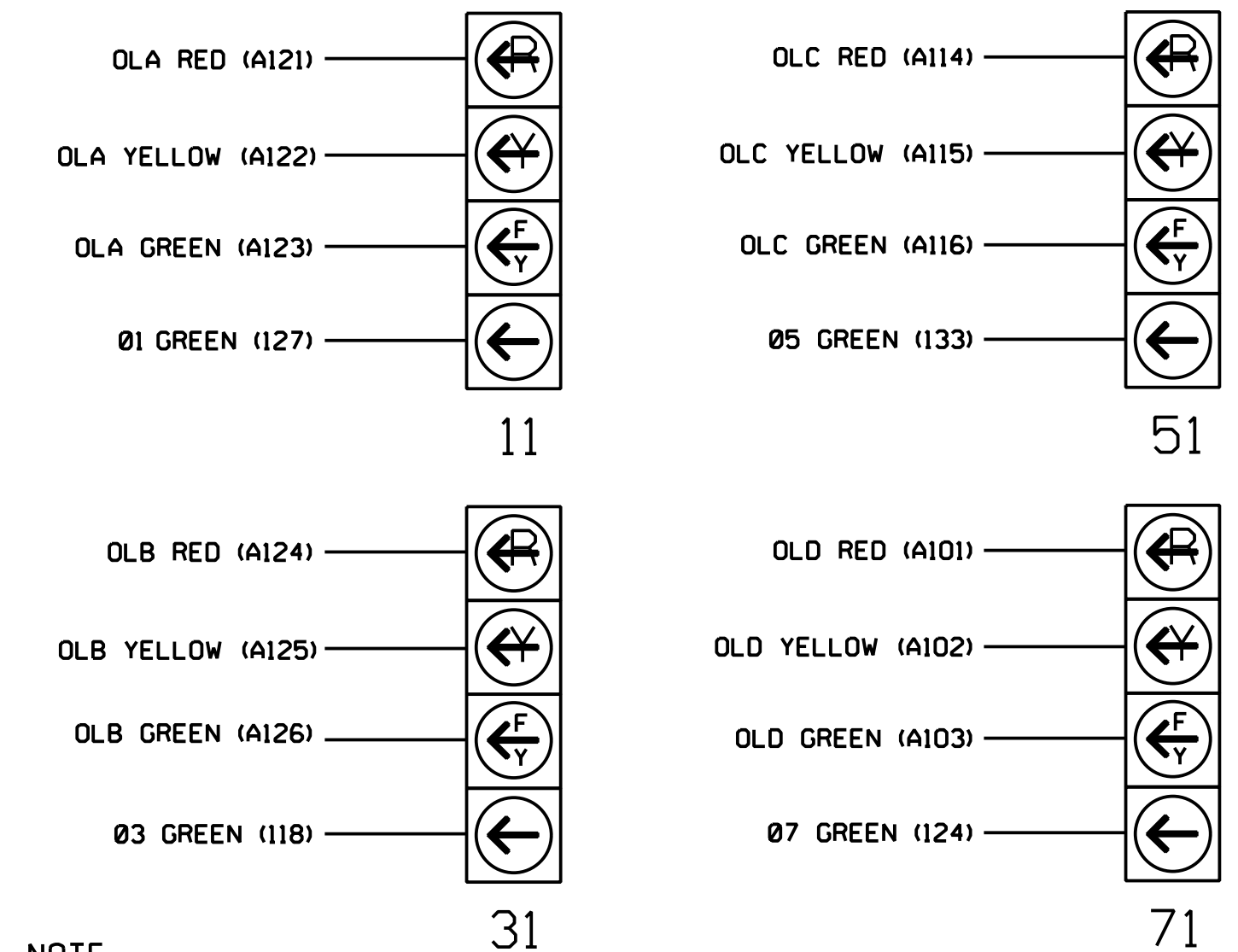
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:



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

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



#### NOTE

The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 3 for programming instructions.

Signal Upgrade-  
Electrical Detail - Sheet 1 of 8  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER NATASHA R. SIMMONS No. 031464
	Division 3 New Hanover County Wilmington PLAN DATE: August 2023 PREPARED BY: E.E. Tiller	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	



### OUTPUT ASSIGNMENT PROGRAMMING DETAIL FOR PHASE 2 ADVANCE BEACON APPROACH

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS '+' UNTIL OUTPUT #33 (PIN 35) IS REACHED.

(program controller as shown below)

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'ADVANCE BEACON' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:35 NOT ENABLED
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...1.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...50
MODE (0=SOLID,1=FLASH).....1
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE FIRST THREE PROGRAMMING ROWS DEFINE THE OUTPUT TO FLASH, ALONG WITH THE RATE IN WHICH IT WILL FLASH.  
THE NOT ENABLED 'Y' WILL REMAIN UNTIL THE FUNCTION OF THIS OUTOUT IS CHANGED. DO NOT ENTER AN 'N'.

```

PAGE:1 C1 PIN:35 NOT ENABLED
SELECT BEACON INDEX (1-4).....1

```

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

```

PAGE:1 C1 PIN:35 ADVANCE BEACON
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...1.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...50
MODE (0=SOLID,1=FLASH).....1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS '+' UNTIL OUTPUT #34 (PIN 36) IS REACHED.

```

PAGE:1 C1 PIN:36 NOT ENABLED
OUTPUT ASSIGNMENT #.....34
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.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE NOT ENABLED 'Y' WILL REMAIN UNTIL THE FUNCTION OF THIS OUTOUT IS CHANGED. DO NOT ENTER AN 'N'.

```

PAGE:1 C1 PIN:36 NOT ENABLED
SELECT BEACON INDEX (1-64).....33

```

WHEN A 'Y' IS ENTERED FOR 'ADVANCE BEACON' 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 'ADVANCE BEACON' AS SHOWN BELOW.

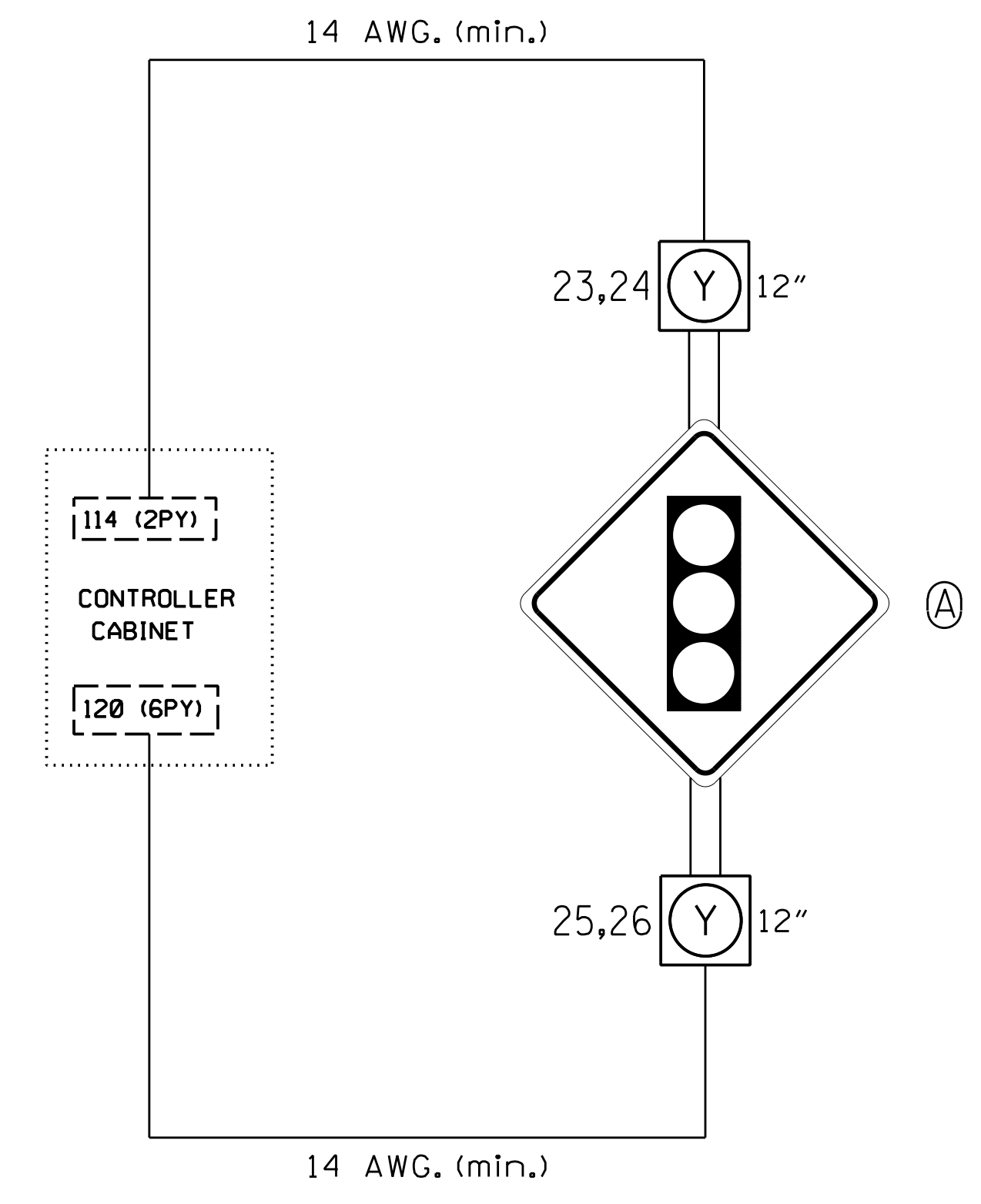
```

PAGE:1 C1 PIN:36 ADVANCE BEACON
OUTPUT ASSIGNMENT #.....34
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.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

### ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



### IMPORTANT

1. INSTALL LOADSWITCHES IN OUTPUT FILE SLOTS S2P AND S6P.
2. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
3. TO ACTIVATE ADVANCE BEACON OPERATION AS INDICATED ON THE SIGNAL PLAN, RE-ASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

### ADVANCE BEACON PROGRAMMING DETAIL FOR PHASE 2 APPROACH

(program controller as shown below)

1. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '2' (OUTPUT BEACON SETTINGS)

```

          OUTPUT BEACON SETTINGS
TRIGGER PHASES:12345678910111213141516
BEACON #1 OFF : X
BEACON #2 OFF :
BEACON #3 OFF :
BEACON #4 OFF :
          BEACON :
OFF DELAY TIME (0-255):
ON DELAY TIME (0-255):
STOP-TIME HOLD (0-255):

```

SCROLL DOWN TO VIEW ALL DATA

ADVANCE BEACON PROGRAMMING COMPLETE

NOTE: AN OUTPUT HAS TO BE ASSIGNED AS AN ADVANCE BEACON IN ORDER FOR PROPER OPERATION TO OCCUR. SEE OUTPUT ASSIGNMENT PROGRAMMING DETAIL FOR PHASE 2 ADVANCE BEACON APPROACH ON THIS SHEET.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 2 of 8  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Prepared in the Office of:		Division 3 New Hanover County Wilmington		
PLAN DATE: August 2023		REVIEWED BY: N.K. Vlanich		SEAL	
PREPARED BY: E.E. Tiller		REVIEWED BY: N.R. Simmons		DATE	
REVISIONS		INIT.		DATE	
				5/17/2024	
750 N. Greenfield Pkwy, Garner, 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		SIG. INVENTORY NO. 03-0331T1	



### 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, 7, 8, 9, 10, 11, AND 12.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

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

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

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

LOGICAL I/O COMMAND #7 (+/-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 #8 (+/-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 #9 (+/-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

### 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: XX  
VEH OVL NOT PED: XX  
VEH OVL GRN EXT: XX  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
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: XX  
VEH OVL NOT PED: XX  
VEH OVL GRN EXT: XX  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...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: XX  
VEH OVL NOT PED: XX  
VEH OVL GRN EXT: XX  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
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: XX  
VEH OVL NOT PED: XX  
VEH OVL GRN EXT: XX  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...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

OVERLAP PROGRAMMING COMPLETE

### OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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

NOTICE PAGE 2

PAGE 2: VEHICLE OVERLAP 'A' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: X  
VEH OVL NOT VEH: X  
VEH OVL NOT PED: X  
VEH OVL GRN EXT: X  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW - 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 'C' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: X  
VEH OVL NOT VEH: X  
VEH OVL NOT PED: X  
VEH OVL GRN EXT: X  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW - 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: X  
VEH OVL NOT PED: X  
VEH OVL GRN EXT: X  
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 'D' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: X  
VEH OVL NOT VEH: X  
VEH OVL NOT PED: X  
VEH OVL GRN EXT: X  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW - 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 '+'

OVERLAP 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 42	=	Overlap C Red
OUTPUT 43	=	Overlap C Yellow
OUTPUT 44	=	Overlap C 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

Signal Upgrade-  
Electrical Detail - Sheet 3 of 8  
(Construction Phase 1)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)

Division 3 New Hanover County Wilmington

PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich  
PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simons

REVISIONS: INIT. DATE

Prepared in the Office of:  
North Carolina Department of Transportation  
Signal Management

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 031464  
NATASHA R. SIMMONS  
DocuSigned by: Natasha R. Simmons 5/17/2024  
SIGNATURE DATE  
SIG. INVENTORY NO. 03-0331T1



### 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.

```

PAGE: 2 C1 PIN:48 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....10
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).....26
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 1A - PHASE 6)

```

PAGE: 2 C1 PIN:48 NOT ENABLED
INPUT ASSIGNMENT #.....10
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 18

```

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....18
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).....1
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 '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

```

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....18
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).....51
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 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.

```

VEHICLE DETECTOR #51 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 '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

VEHICLE DETECTOR #51 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

```

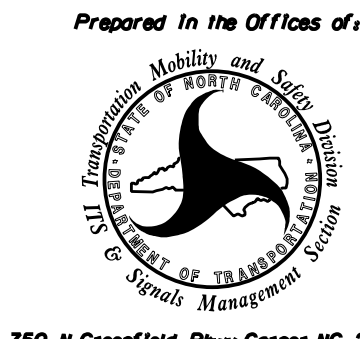
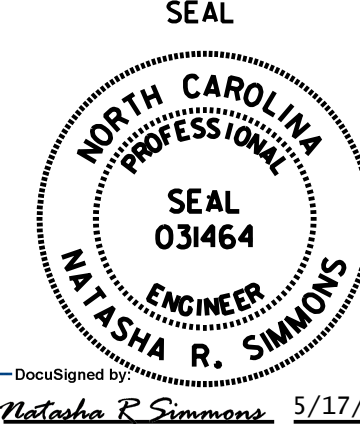
DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 4 of 8  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Division 3 New Hanover County Wilmington	PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich	
REVISIONS		INIT. DATE	DocuSigned by: <i>Natasha R. Simmons</i> 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-0331T1

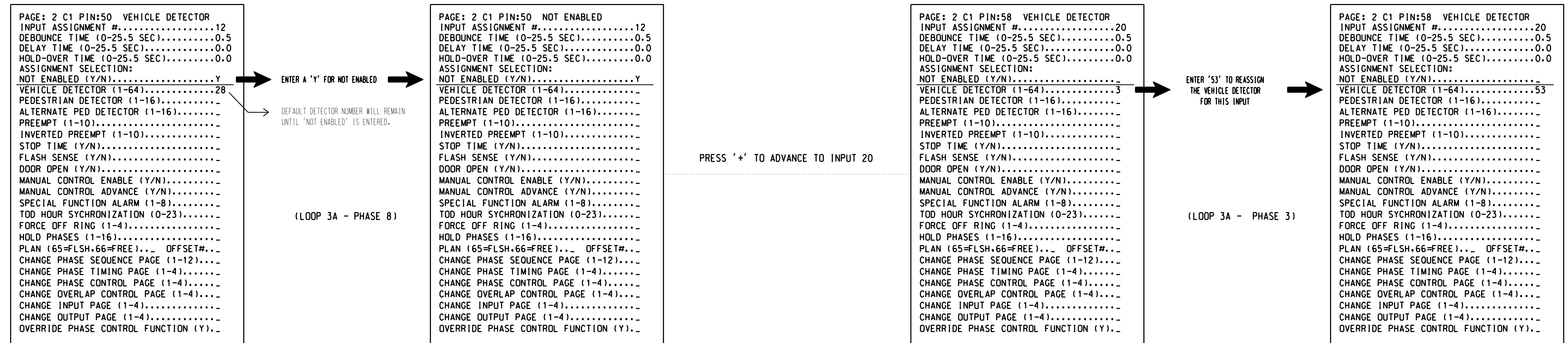


### INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(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.

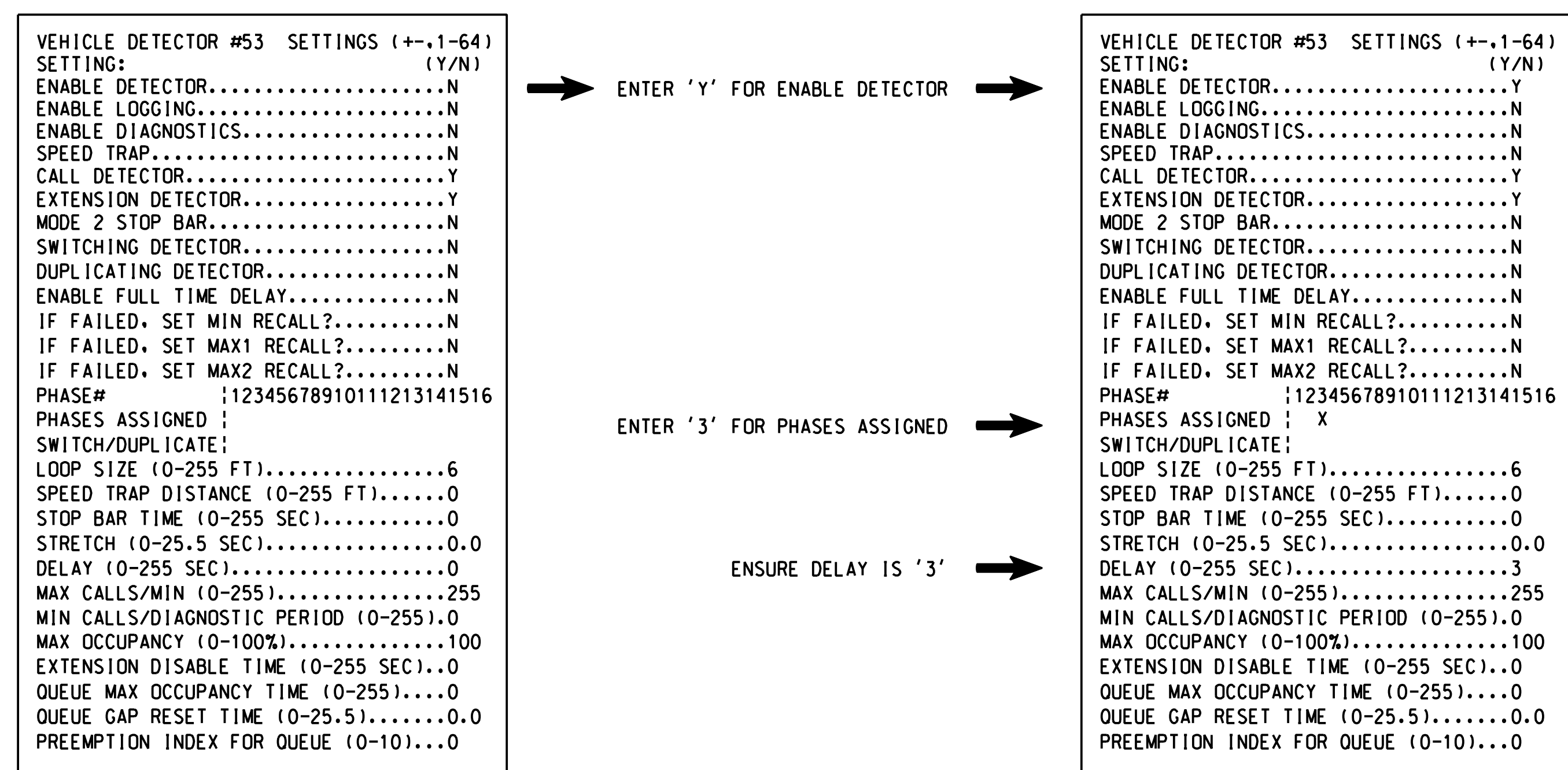


PROGRAMMING COMPLETE

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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 5 of 8  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI: _____ DATE: _____ _____ _____	

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.

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

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

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).....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).....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: 03-0331T1 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 7 of 8 (Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns for PLAN DATE, PREPARED BY, REVISIONS, and SIGNATURE. Includes HNTB logo and project details for I-40 EB Ramp / US 117 - NC 132.



## 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 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.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

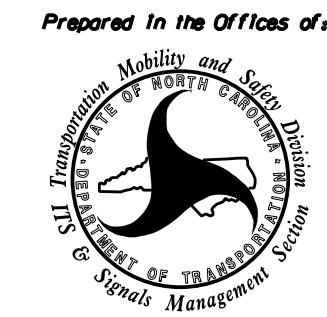
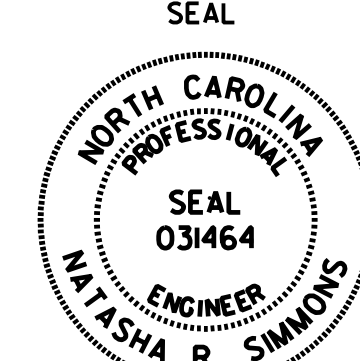
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

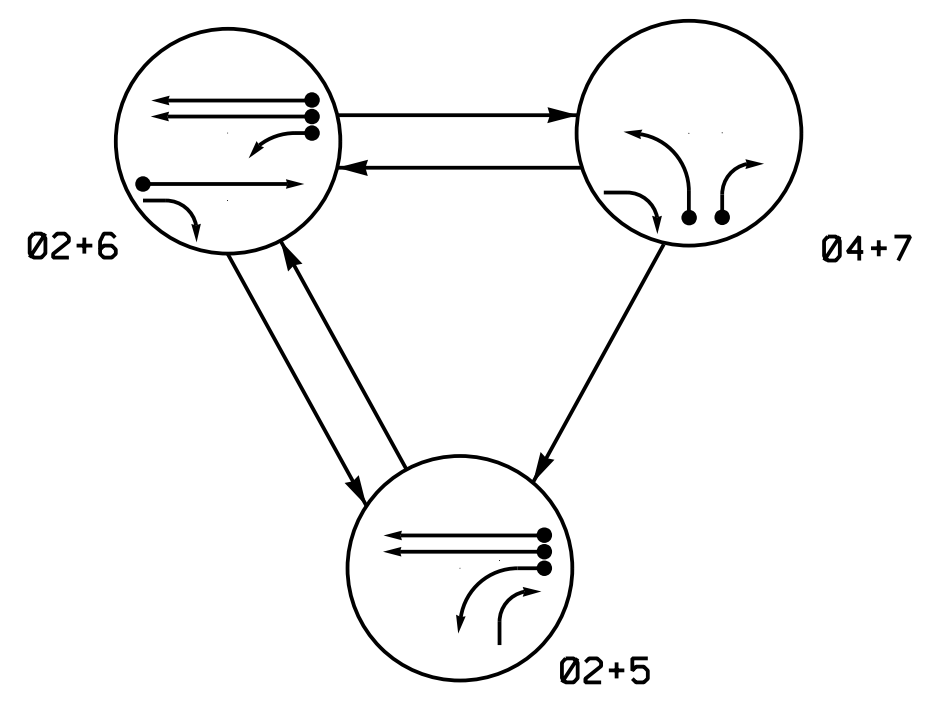
Signal Upgrade-  
Electrical Detail - Sheet 8 of 8  
(Construction Phase 1)

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

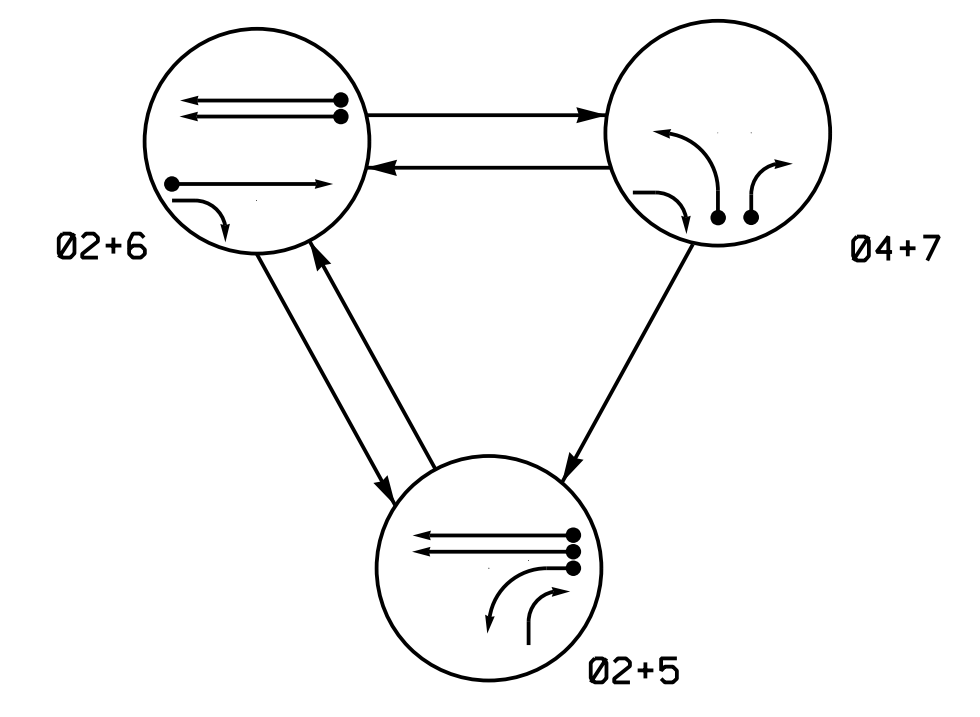
<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="text-align: center;"><i>Prepared in the Offices of:</i></p>  <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)</p> <p>Division 3    New Hanover County    Wilmington</p> <p>PLAN DATE: August 2023    REVIEWED BY: N.K. Vlanich</p> <p>PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>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 style="text-align: center;">SEAL</p>  <p style="text-align: center;">NATASHA R. SIMMONS</p> <p style="font-size: 8px;">DocuSigned by: Natasha R. Simmons    5/17/2024</p> <p style="font-size: 8px;">SIGNATURE    DATE</p> <p style="font-size: 8px;">SIG. INVENTORY NO. 03-0331T1</p>
REVISIONS	INIT.	DATE									



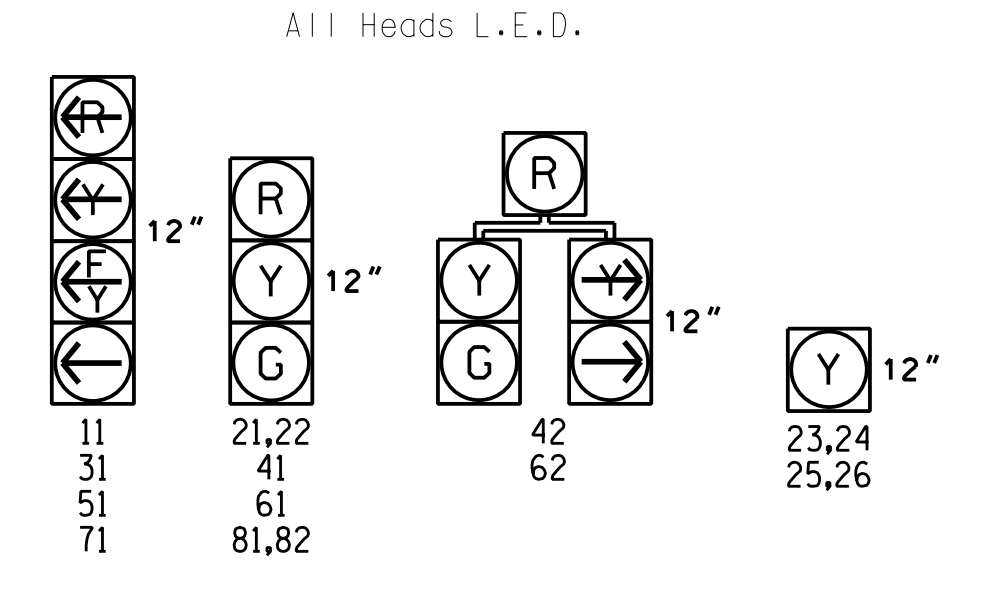
DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART table with columns for Zone, Size, Distance, Turns, New Loop, Phase, Calling, Extension, Full Time Delay, Stretch Time, Delay Time, System Loop, and New Card.

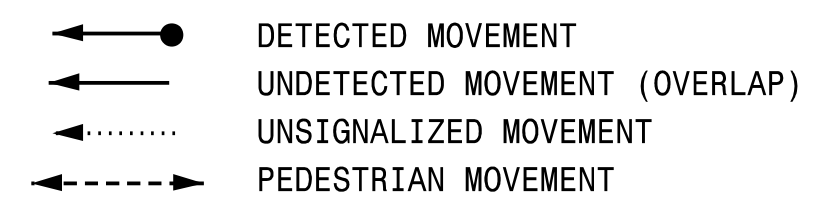
\* Multizone Microwave Detection
\*\* Disable Delay During Alternate Phasing Operation.
# Disable phase call for loop(s) during alternate phasing.
' Change the phase back to Phase 5 after this temp.

3 Phase Fully Actuated Wilmington Signal System

NOTES

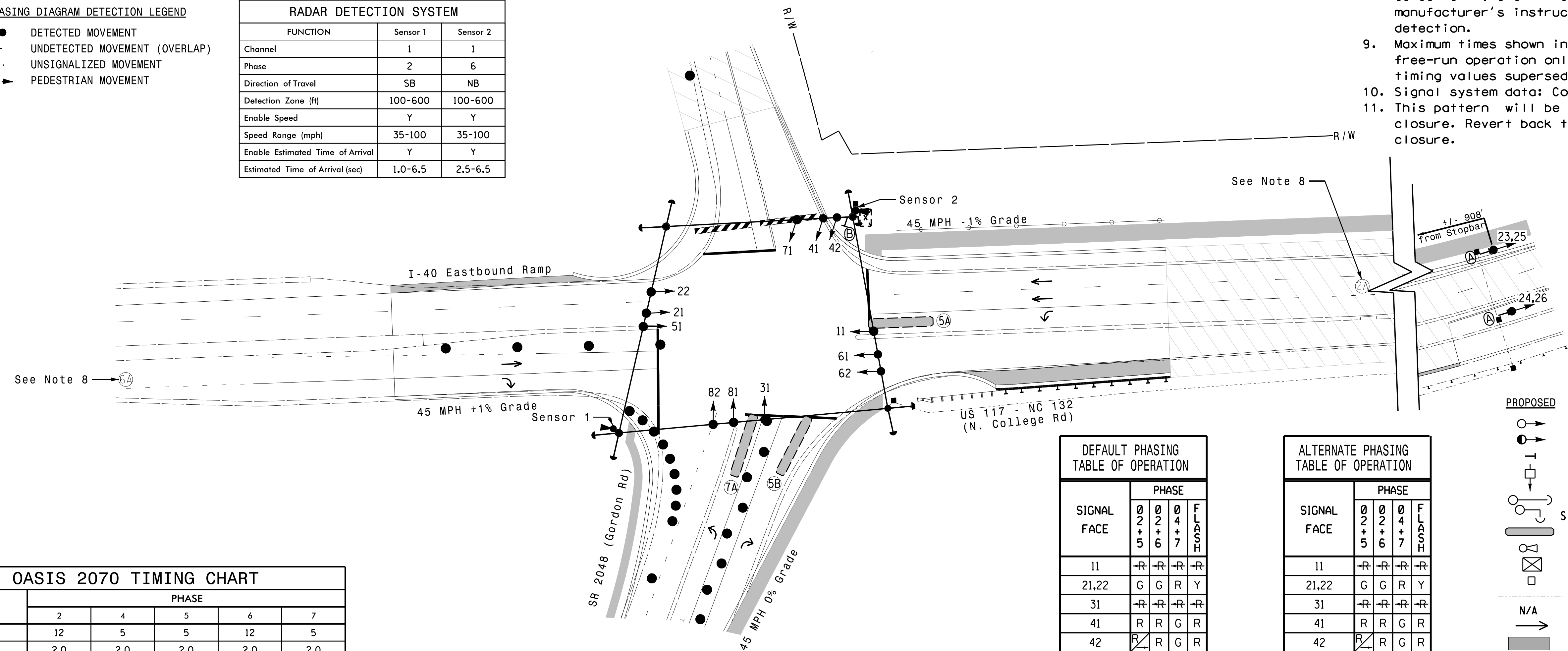
- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be logged.
4. Set all detector units to presence mode.
5. Flash vertically mounted beacons alternatively.
6. Flash beacons 23,24,25 and 26 at the end of phase 2 green.
7. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
8. This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data: Controller Asset #0331.
11. This pattern will be in place for a weekend closure. Revert back to Phase 1 temp after weekend closure.

PHASING DIAGRAM DETECTION LEGEND

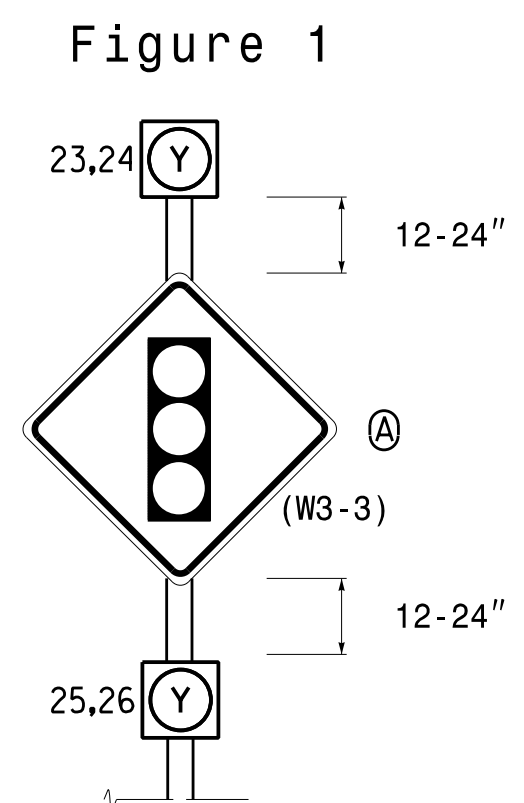


RADAR DETECTION SYSTEM

Table with columns for Function, Sensor 1, and Sensor 2, detailing Channel, Phase, Direction of Travel, Detection Zone, Enable Speed, Speed Range, Enable Estimated Time of Arrival, and Estimated Time of Arrival.



OASIS 2070 TIMING CHART table with columns for Feature and Phase (2, 4, 5, 6, 7), listing timing parameters like Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Red Revert, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, Dual Entry, and Simultaneous Gap.

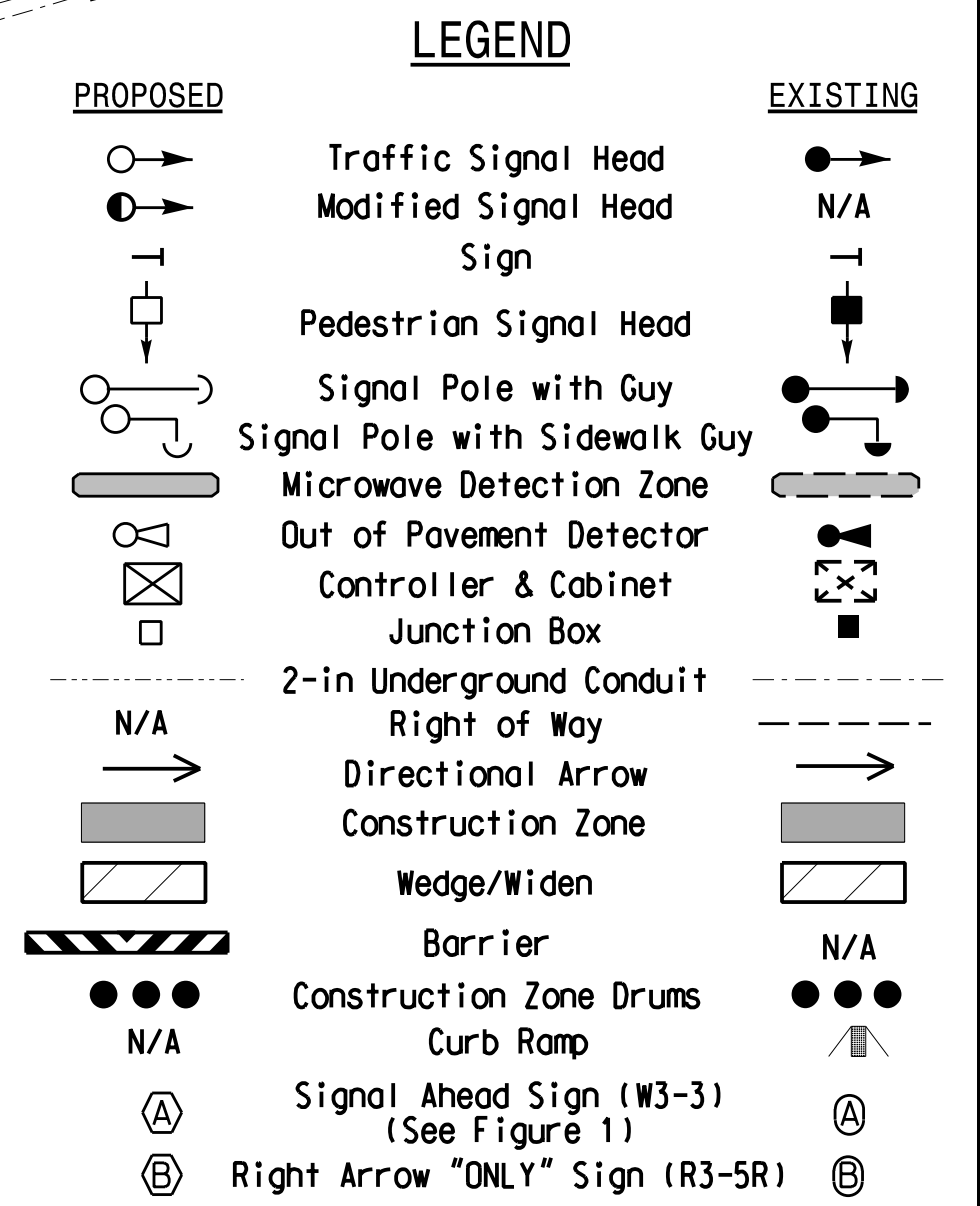


FLASH TABLE OF OPERATION table with columns for Signal Face, Interval, and values for 1 and 2 intervals.

RADAR DETECTION SYSTEM table with columns for Function, Sensor 1, and Sensor 2, detailing Channel, Phase, Direction of Travel, Detection Zone, Enable Speed, Speed Range, Enable Estimated Time of Arrival, and Estimated Time of Arrival.

DEFAULT PHASING TABLE OF OPERATION table with columns for Signal Face and Phase (0, 2, 4, 7, 5, 6, 1, 3, 2, 1, 4, 5, 6, 7, 1, 3, 2, 1, 4, 5, 6, 7).

ALTERNATE PHASING TABLE OF OPERATION table with columns for Signal Face and Phase (0, 2, 4, 7, 5, 6, 1, 3, 2, 1, 4, 5, 6, 7, 1, 3, 2, 1, 4, 5, 6, 7).



Signal Upgrade - Temporary Design 2 (Construction Phase 1, Step 2D)

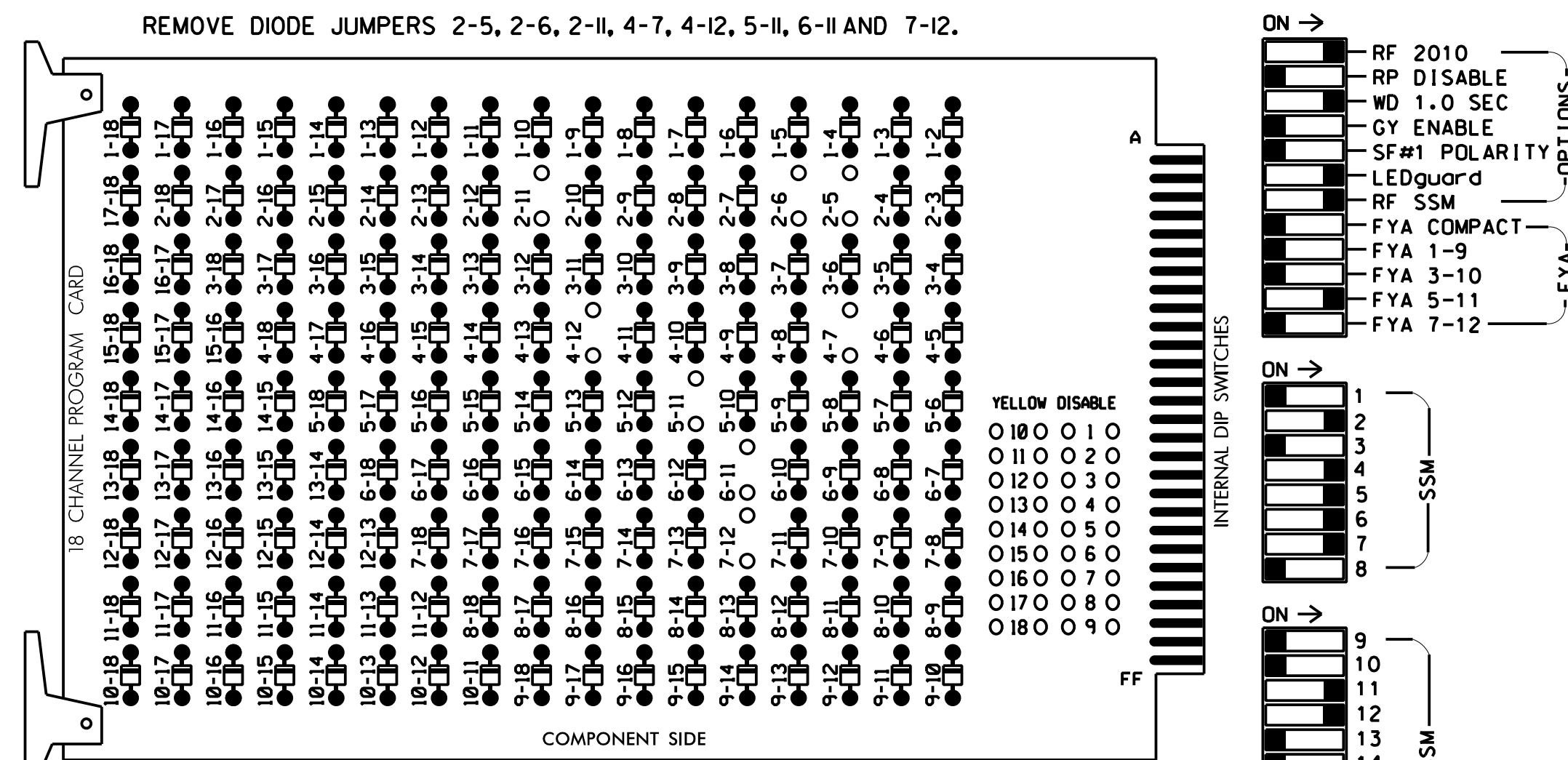
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer seal for N. Carolina, project information for I-40 EB Ramp / US 117 - NC 132 at SR 2048 (Gordon Rd), and signature lines for N. K. Vlanich and N. R. Simmons.



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup in Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 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,S7,S8,\*S9,S10,S11,AUX S1,AUX S2,AUX S4,AUX S5  
 PHASES USED.....2,4,5,6,7  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....7

\* Used for Advanced Beacons

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	23,24	31	41,42	NU	42	51	61,62	25,26	62	71	81,82	NU	11	31	NU	51	71
RED		128			101		*		134		*		107						
YELLOW	*	129		*	102				135				108						
GREEN		130			103				136				109						
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW							132			123			A122	A125		A115	A102		
FLASHING YELLOW ARROW													A123	A126		A116	A103		
GREEN ARROW	127			118			133	133		124	124								
PED YELLOW													** 114						
														** 120					

NU = Not Used

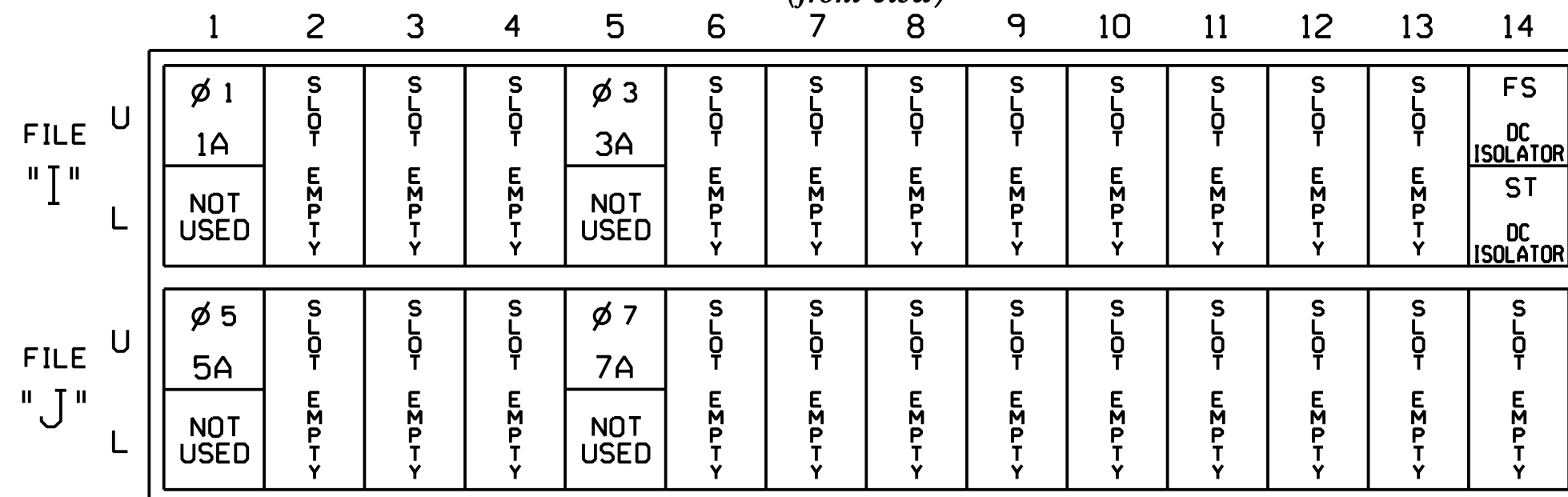
\* Denotes install load resistor. See load resistor installation detail this sheet.

\*\* Advance Beacons will be wired to S2P-Y and S6P-Y. See wiring and programming detail on sheet 2.

\* 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

### SPECIAL DETECTOR NOTE

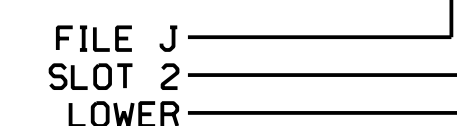
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish detection schemes shown on the Signal Design Plans.

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10*	26	6	Y	Y			
	-	I1U	56	18*	51	1	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12*	28	8	Y	Y			
	-	I5U	58	20*	53	3	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9*	22	2	Y	Y			
	-	J1U	55	17*	55	5	Y	Y			
7A	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			

\* See Input Page Assignment programming details on sheets 4, 5, 6, and 7.

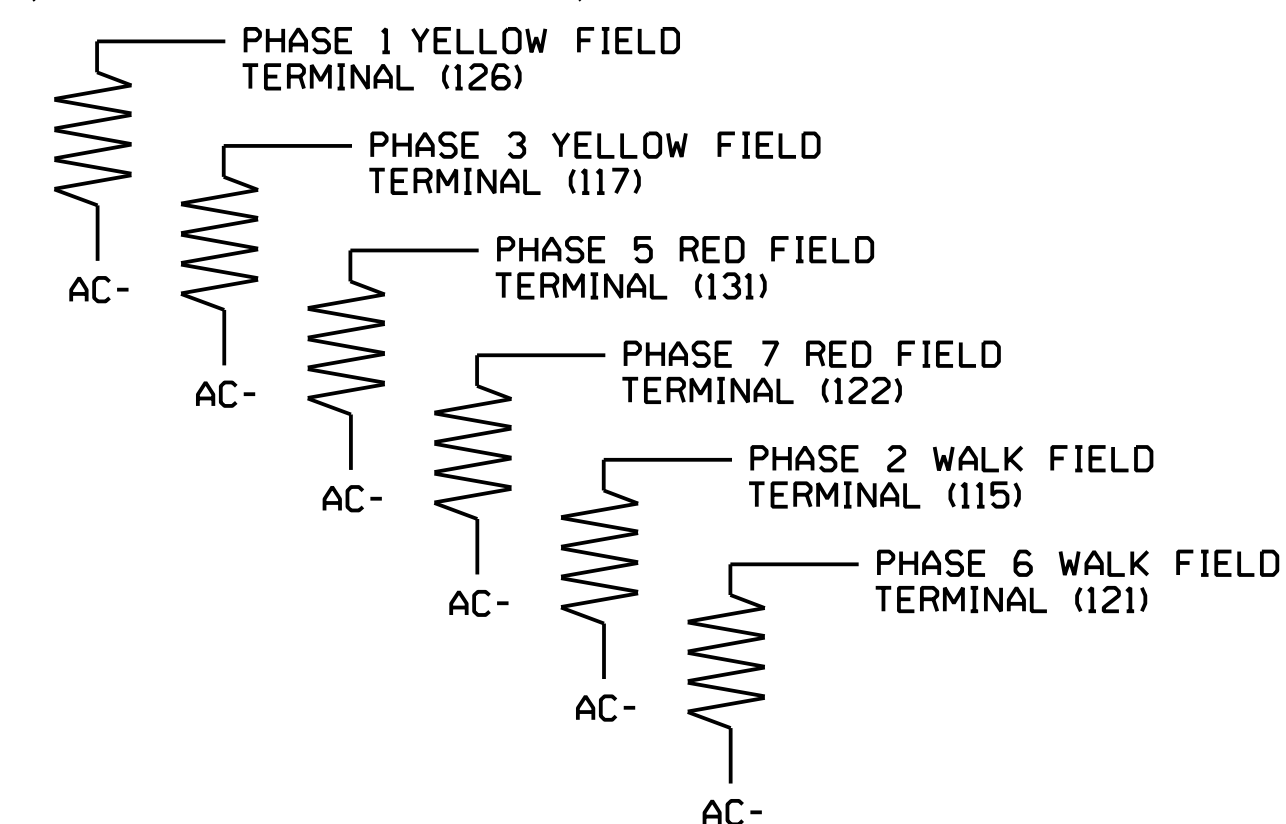
### INPUT FILE POSITION LEGEND: J2L



### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T2  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

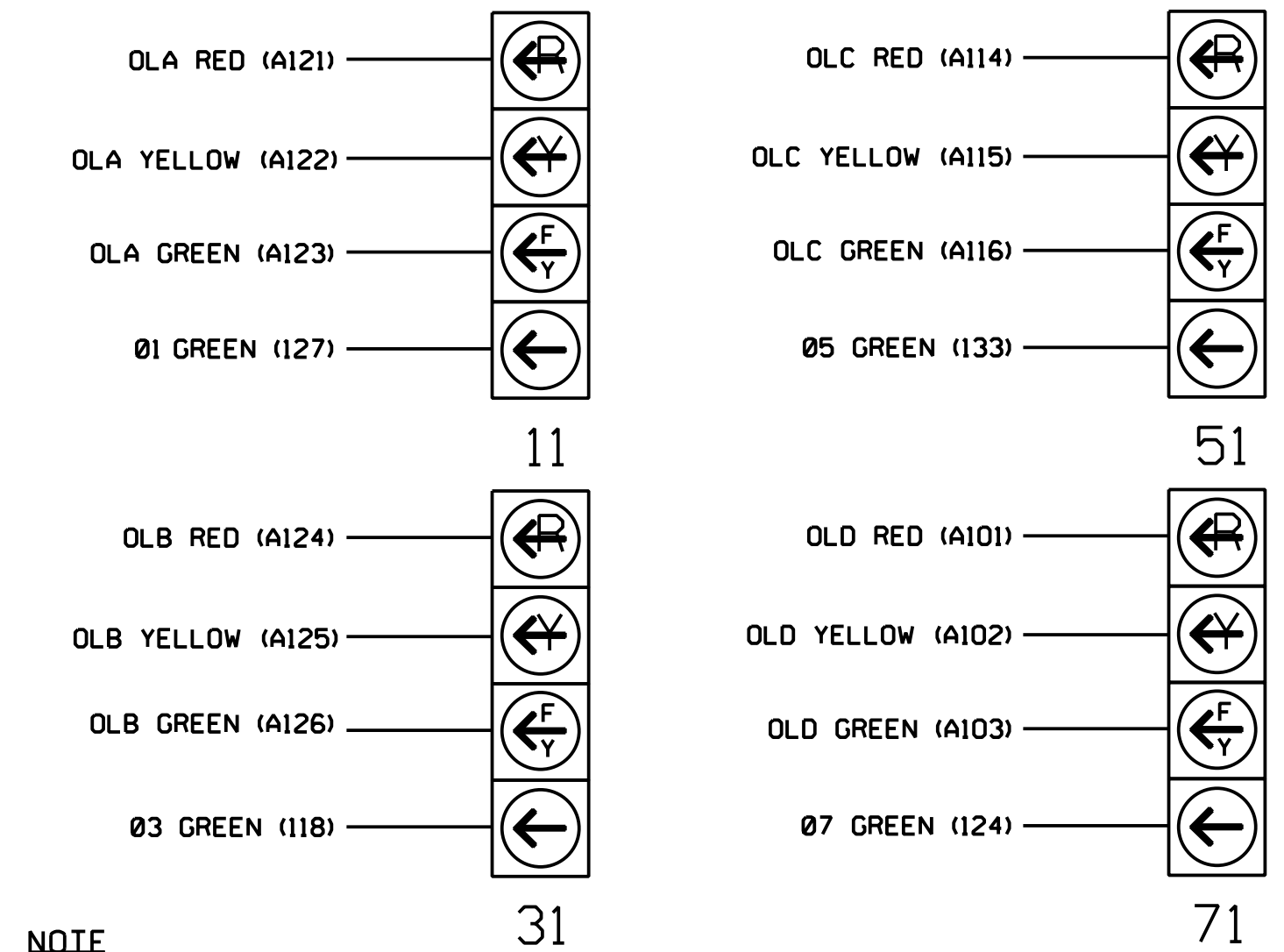
This plan supersedes the plan signed and sealed on 5/17/2024.



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

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 3 for programming instructions.

Signal Upgrade-  
 Electrical Detail - Sheet 1 of 5  
 (Construction Phase 1, Step 2D)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER NATASHA R. SIMMONS
	Prepared in the Office of: 	Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	

DocuSign  
 Natasha R. Simmons 11/8/2024  
 DATE  
 SIG. INVENTORY NO. 03-0331T2







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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

↓  
SCROLL DOWN

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

PRESS '+'

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

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

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

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

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

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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

### OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

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

PRESS '+' TWICE

```

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

NOTICE GREEN FLASH

PRESS '+'

```

PAGE 1: 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 X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

NOTICE

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

### OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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

PRESS '+' TWICE

NOTICE PAGE 2

```

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

NOTICE PAGE 2

```

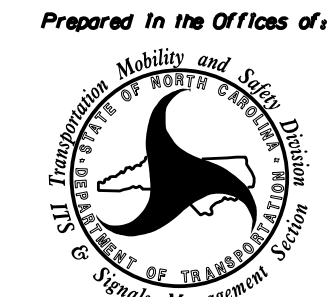
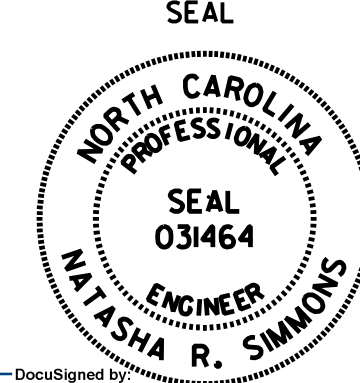
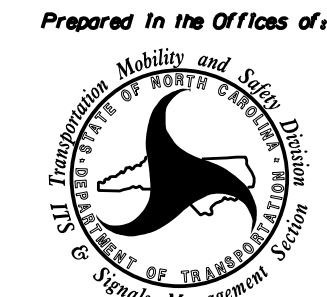
PAGE 2: VEHICLE OVERLAP 'D' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN 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
    
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade -  
Electrical Detail - Sheet 3 of 5  
(Construction Phase 1, Step 2D)

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

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Prepared in the Office of: 	Division 3 New Hanover County Wilmington	
PLAN DATE: August 2023		REVIEWED BY: N.K. Vlanich	DocuSigned by: Natasha R. Simmons 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-0331T2
PREPARED BY: E.E. Tiller		REVIEWED BY: N.R. Simmons	
REVISIONS		INIT. DATE	



### 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.

```

PAGE: 2 C1 PIN:47 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....9
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).....22
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 5A - PHASE 2)

```

PAGE: 2 C1 PIN:47 NOT ENABLED
INPUT ASSIGNMENT #.....9
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 17

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
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).....5
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 '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
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).....55
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 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.

```

VEHICLE DETECTOR #55 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).....0.0
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 '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

VEHICLE DETECTOR #55 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).....0.0
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

```

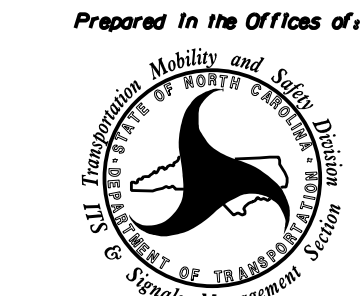
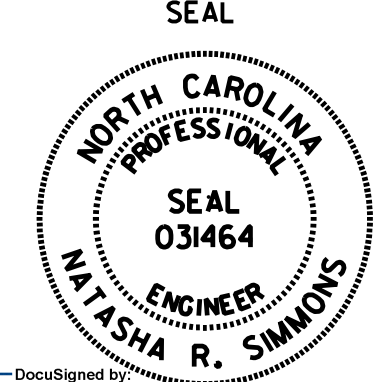

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 4 of 5  
(Construction Phase 1, Step 2D)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)								
	Division 3	New Hanover County		Wilmington					
Prepared In the Office of:	PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich	DocuSigned by:  5/17/2024 DATE SIG. INVENTORY NO. 03-0331T2						
750 N. Greenfield Pkwy, Garner, NC 27529	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons							
<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE					
REVISIONS	INIT.	DATE							



## 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 phases for head 51 to run protected turns only.

INPUTS PAGE 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

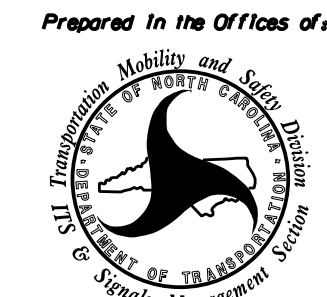

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

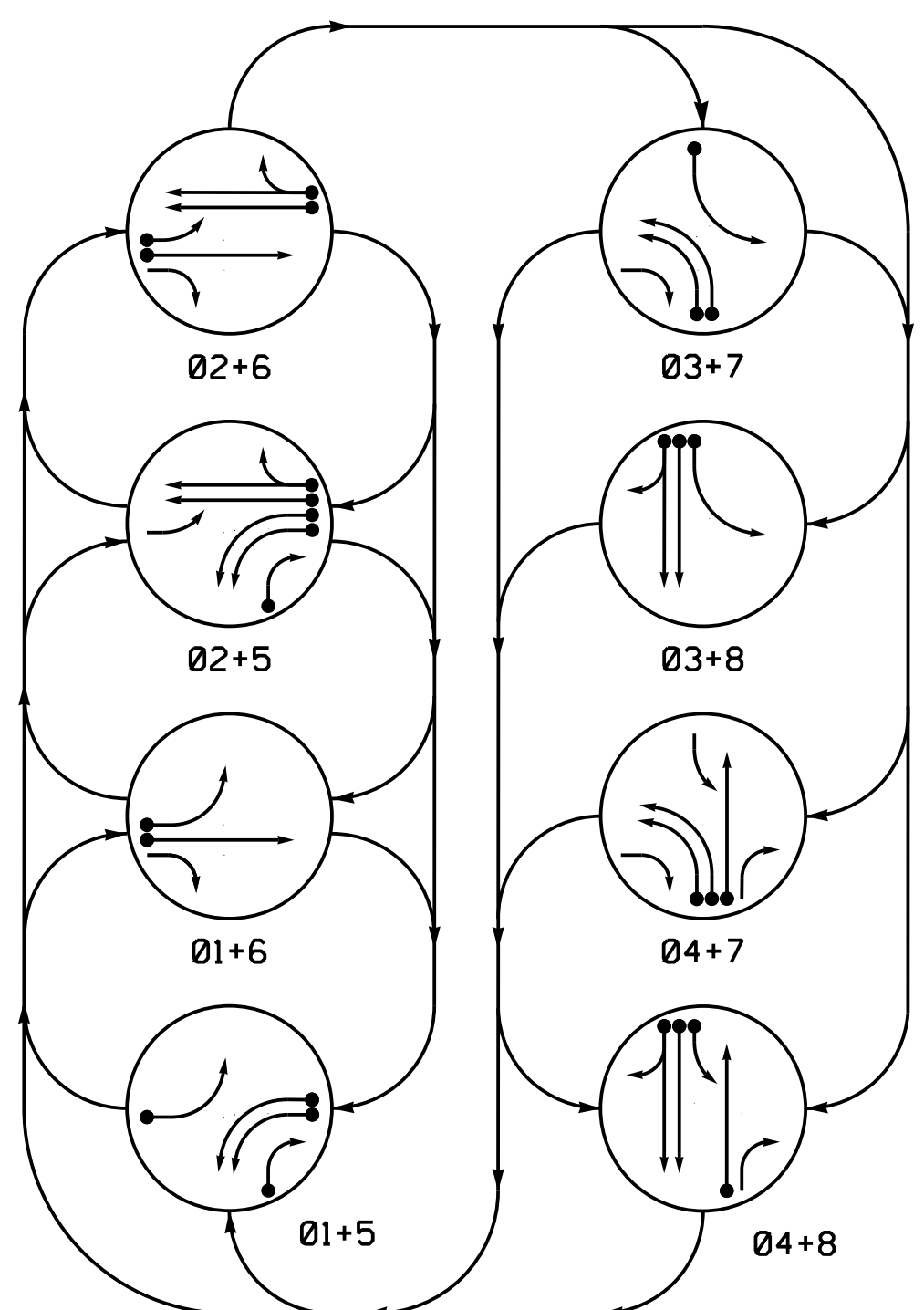
Signal Upgrade-  
Electrical Detail - Sheet 5 of 5  
(Construction Phase 1, Step 2D)

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

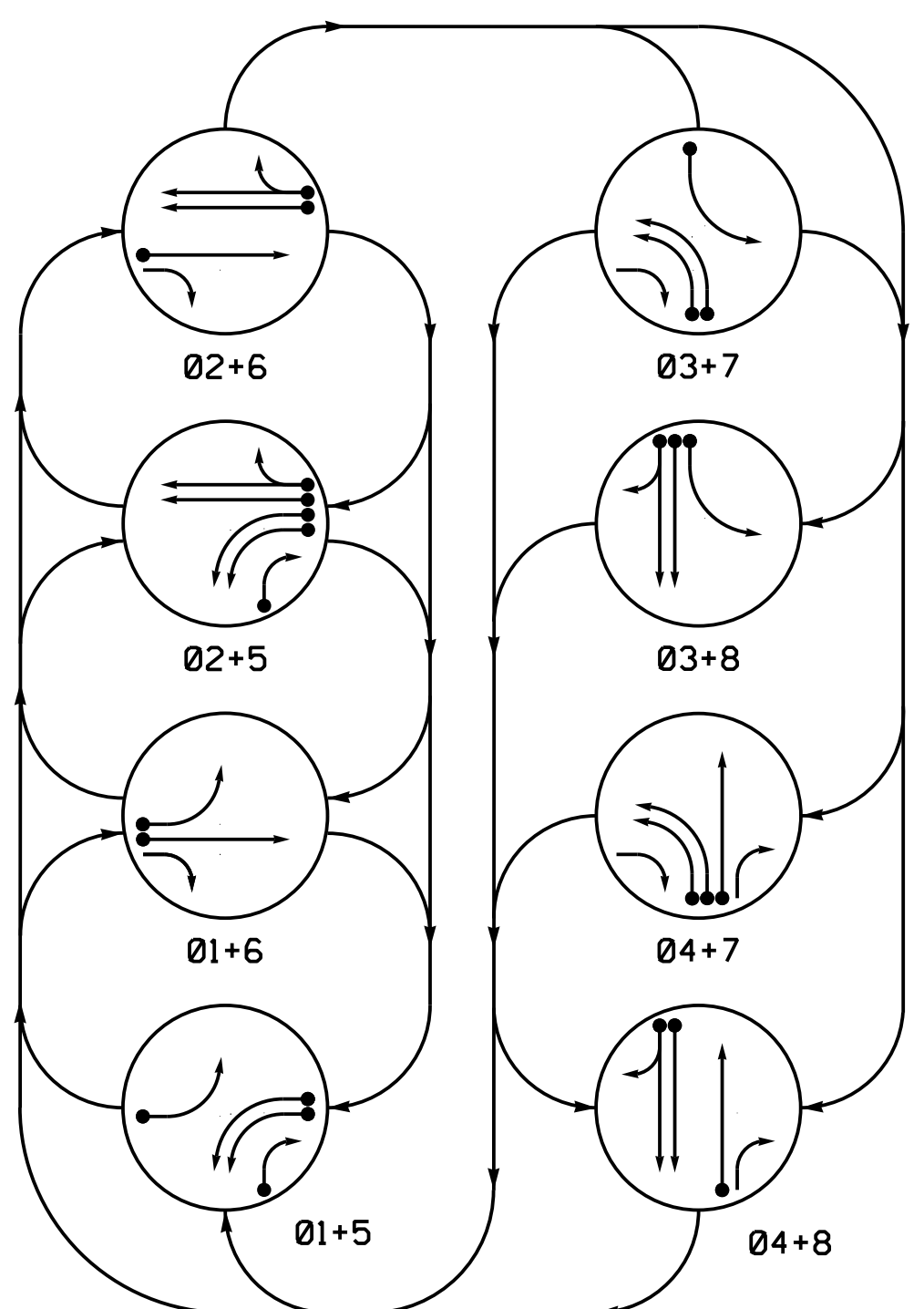
ELECTRICAL AND PROGRAMMING DETAILS FOR:	I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NASHA R. SIMMONS
Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Division 3    New Hanover County    Wilmington PLAN DATE: August 2023    REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons	DocuSigned by:  5/17/2024 SIG. INVENTORY NO. 03-0331T2
REVISIONS    INIT.    DATE		
_____		



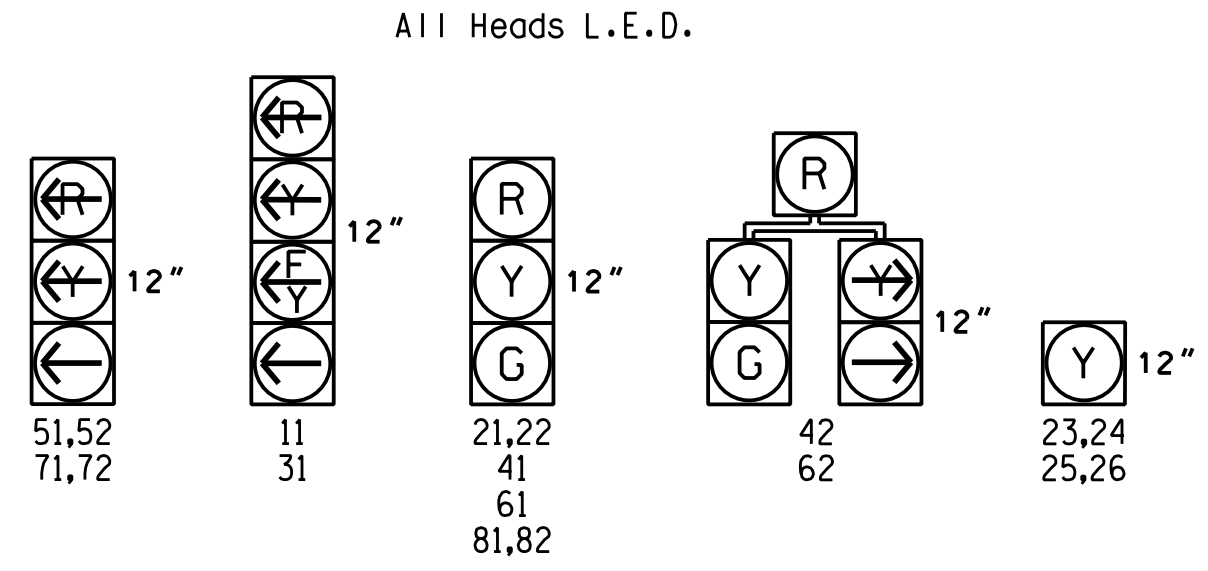
**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**SIGNAL FACE I.D.**



ZONE	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***	-
					6#	Y	Y	-	-	-
3A	6X40	0	*	*	3	Y	Y	-	15**	-
					8#	Y	Y	-	3	-
4A	6X40	0	*	*	4	Y	Y	-	-	-
5A	6X40	0	*	*	5	Y	Y	-	-	-
5B	6X40	0	*	*	5	Y	Y	-	-	-
5C	6X40	0	*	*	5	Y	Y	-	15	-
7A	6X40	0	*	*	7	Y	Y	-	-	-
7B	6X40	0	*	*	7	Y	Y	-	-	-
8A	6X40	0	*	*	8	Y	Y	-	-	-
8B	6X40	0	*	*	8	Y	Y	-	10	-

\* Multizone Microwave Detection  
 \*\* Reduce delay to 3 seconds during alternate phasing.  
 \*\*\* Disable Delay During Alternate Phasing Operation.  
 # Disable phase call for loop(s) during alternate phasing.

**8 Phase Fully Actuated Wilmington Signal System**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 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 21 and 22.
- Set all detector units to presence mode.
- Flash vertically mounted beacons alternatively.
- Flash beacons 23,24,25 and 26 at the end of phase 2 green.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data: Controller Asset #0331.

**PHASING DIAGRAM DETECTION LEGEND**

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

See Note 10

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	5	12	5	5	5	12	5	5
Extension 1*	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1*	15	90	20	35	20	90	20	35
Yellow Clearance	3.0	4.6	3.0	4.4	3.0	4.6	3.0	4.4
Red Clearance	3.5	2.2	3.2	1.8	3.5	2.2	3.5	1.8
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*	-	-	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
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.

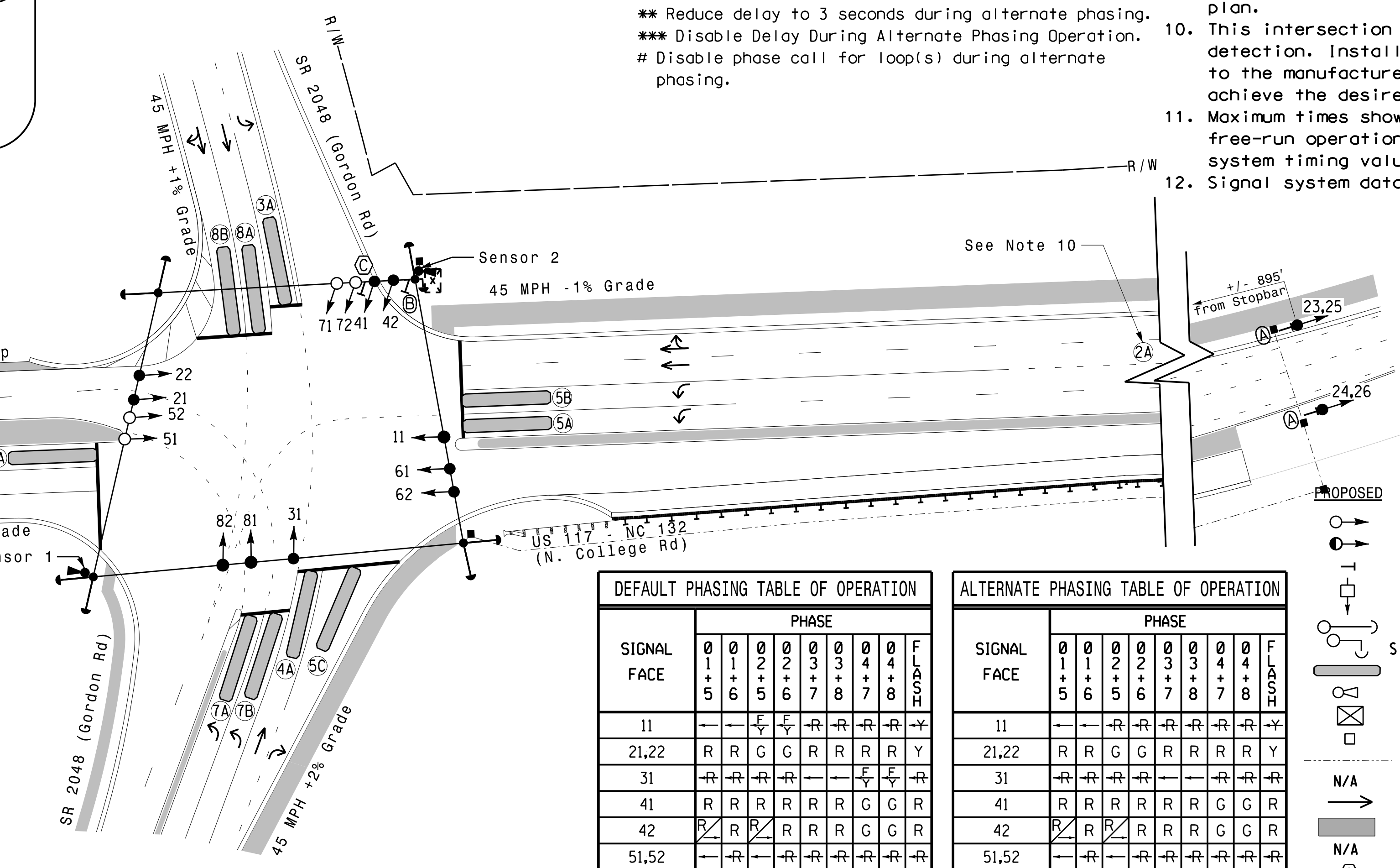
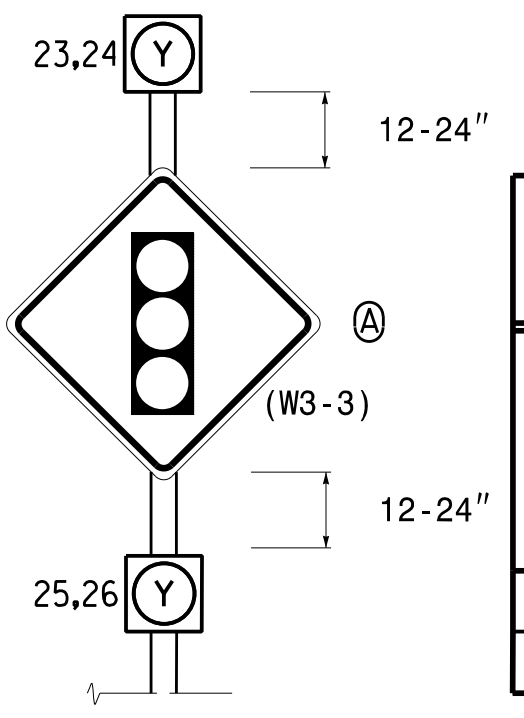


Figure 1

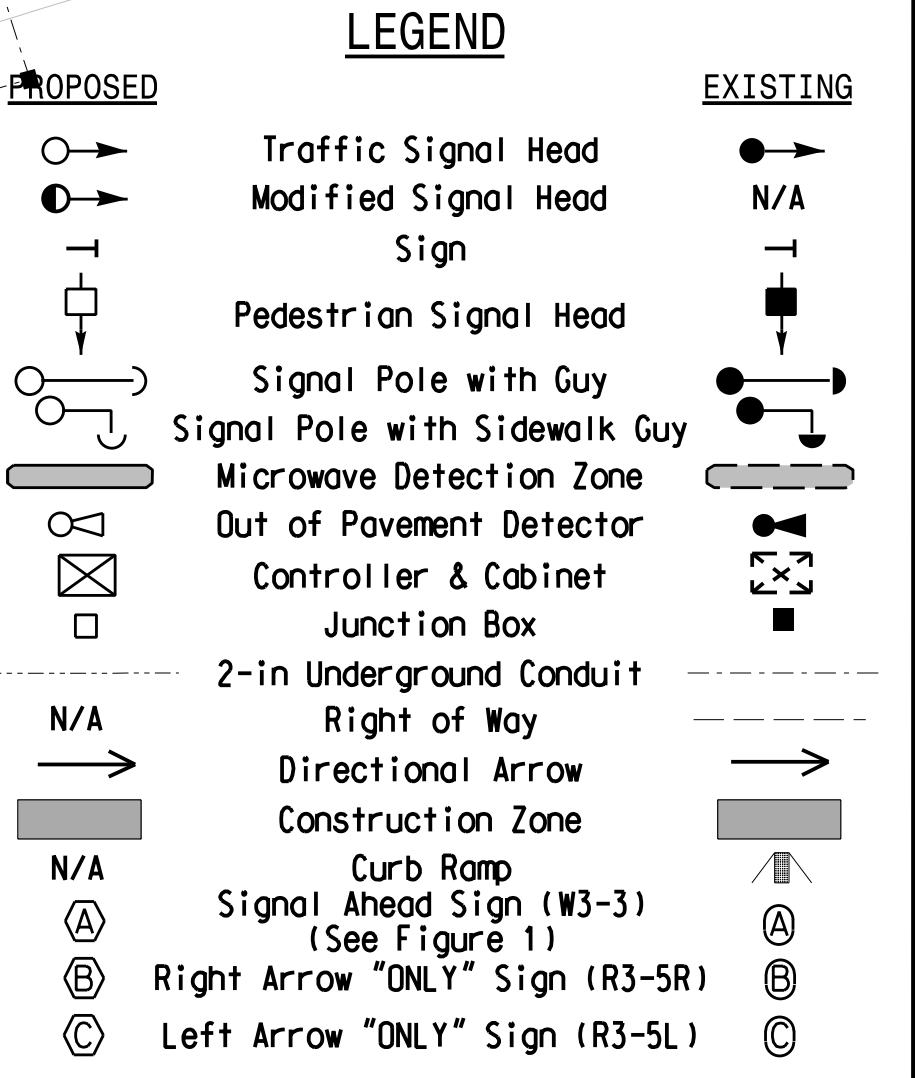


SIGNAL FACE	INTERVAL	
	1	2
23,24	ON	OFF
25,26	OFF	ON

FUNCTION	Sensor 1	Sensor 2
Channel	1	1
Phase	2	6
Direction of Travel	SB	NB
Detection Zone (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	1.0-6.5	2.5-6.5

SIGNAL FACE	PHASE								FLASH	
	0	1	2	3	4	5	6	7		
11	-	-	-	-	-	-	-	-	-	-
21,22	R	R	G	G	R	R	R	R	Y	-
31	-	-	-	-	-	-	-	-	-	-
41	R	R	R	R	R	R	G	G	R	-
42	R	R	R	R	R	R	G	G	R	-
51,52	-	-	-	-	-	-	-	-	-	-
61	R	G	R	G	R	R	R	R	Y	-
62	R	G	R	G	R	R	R	R	Y	-
71,72	-	-	-	-	-	-	-	-	-	-
81,82	R	R	R	R	R	G	R	G	R	-

SIGNAL FACE	PHASE								FLASH	
	0	1	2	3	4	5	6	7		
11	-	-	-	-	-	-	-	-	-	-
21,22	R	R	G	G	R	R	R	R	Y	-
31	-	-	-	-	-	-	-	-	-	-
41	R	R	R	R	R	R	G	G	R	-
42	R	R	R	R	R	R	G	G	R	-
51,52	-	-	-	-	-	-	-	-	-	-
61	R	G	R	G	R	R	R	R	Y	-
62	R	G	R	G	R	R	R	R	Y	-
71,72	-	-	-	-	-	-	-	-	-	-
81,82	R	R	R	R	R	G	R	G	R	-



Signal Upgrade - Temporary Design 3 (Construction Phase 2)

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

I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)

Division 3 New Hanover County Wilmington

PLAN DATE: May 2022 REVIEWED BY: N.K. Vlanich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

SCALE: 1"=40'

REVISIONS: INIT. DATE

Signature: *Nelasha R. Simmons* 5/17/2024

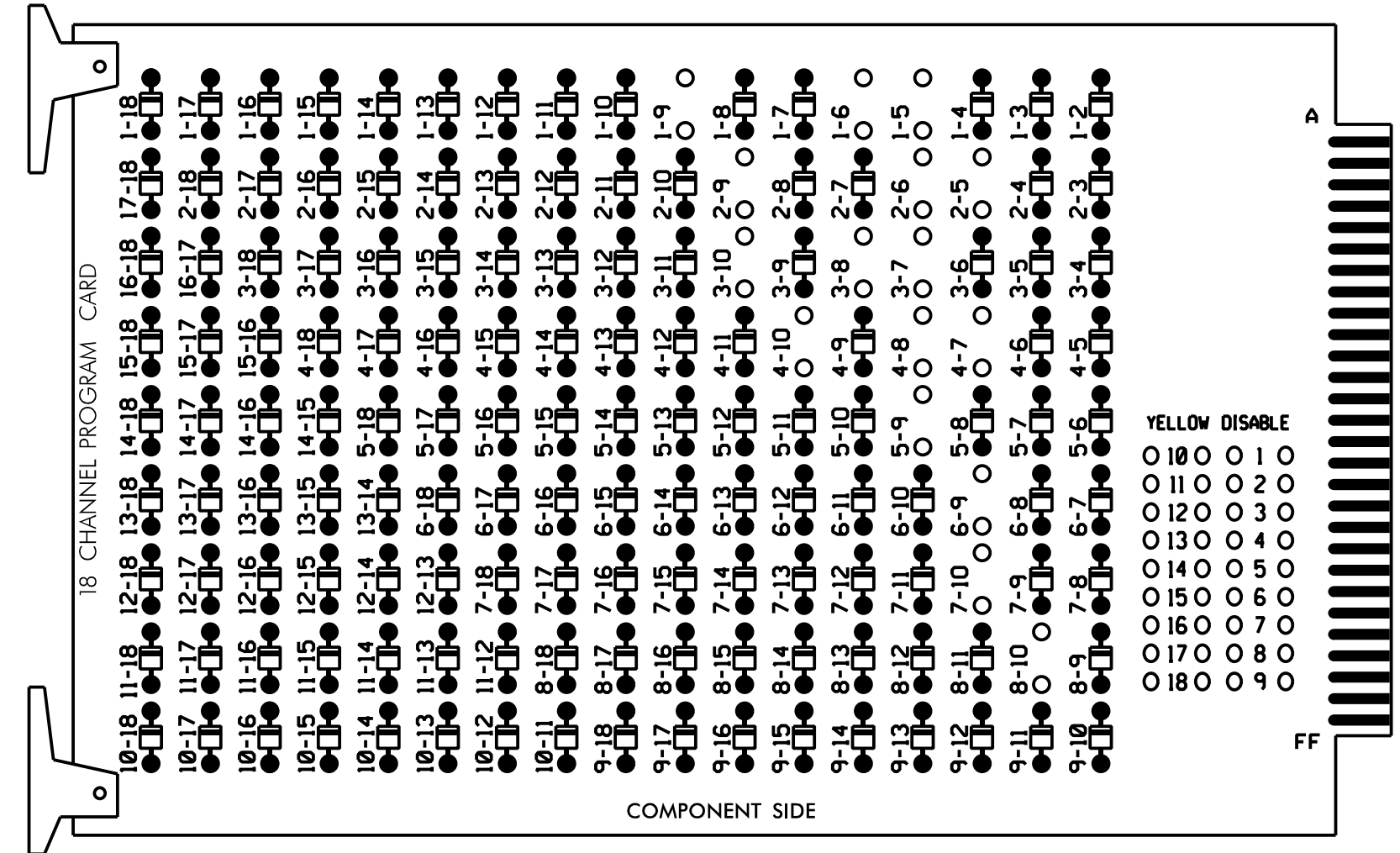
SIG. INVENTORY NO. 03-0331T3



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

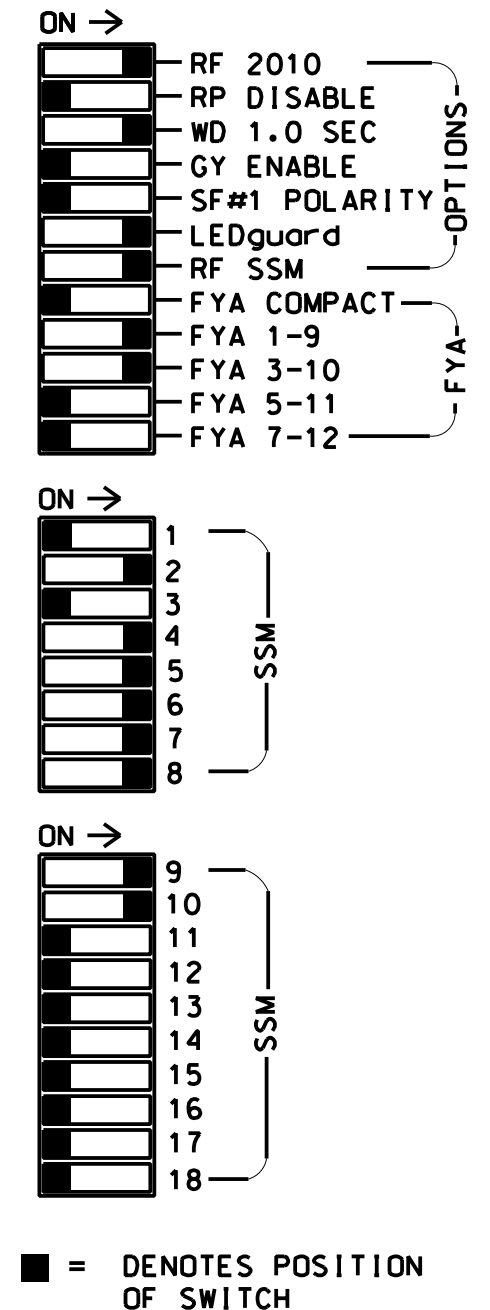
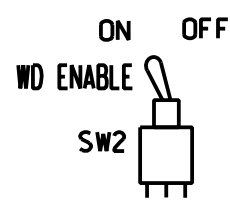
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 2-5, 2-6, 2-9, 3-7, 3-8, 3-10, 4-7, 4-8, 4-10, 5-9, 6-9, 7-10, AND 8-10.



REMOVE JUMPERS AS SHOWN

NOTES:

- 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



### NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Startup in Green.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
7. The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070
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,S7,S8,\*S9,S10,S11,AUX S1,AUX S2
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....1+2
OVERLAP "B".....3+4
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
\* Used for Advanced Beacons

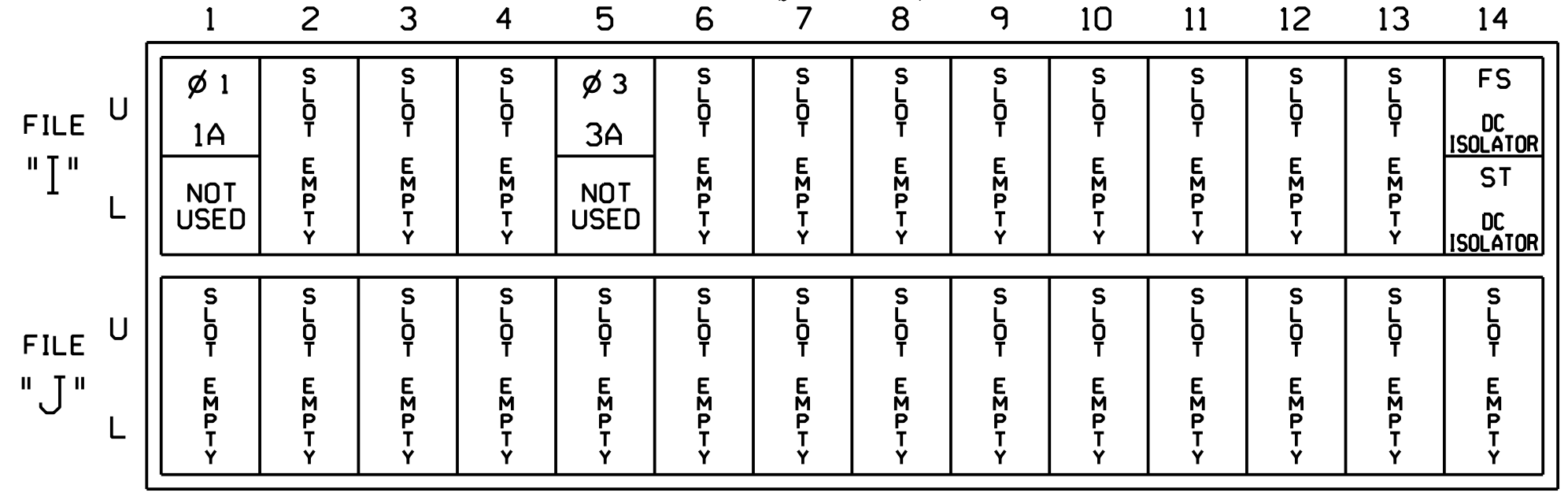
### SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., CMU Channel No., Phase, Signal Head No., and various signal colors (Red, Yellow, Green, Red Arrow, Yellow Arrow, Flashing Yellow Arrow, Green Arrow, Ped Yellow). Rows correspond to signal head numbers 11 and 31.

NU = Not Used
\* Denotes install load resistor. See load resistor installation detail this sheet.
\*\* Advance Beacons will be wired to S2P-Y and S6P-Y. See wiring and programming detail on sheet 2.
\* 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

### SPECIAL DETECTOR NOTE

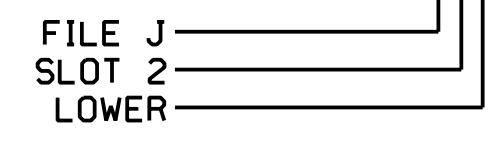
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish detection schemes shown on the Signal Design Plans.

### INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., INPUT ASSIGNMENT NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND, FULL TIME DELAY, STRETCH TIME, DELAY TIME. Includes rows for loops 1A and 3A.

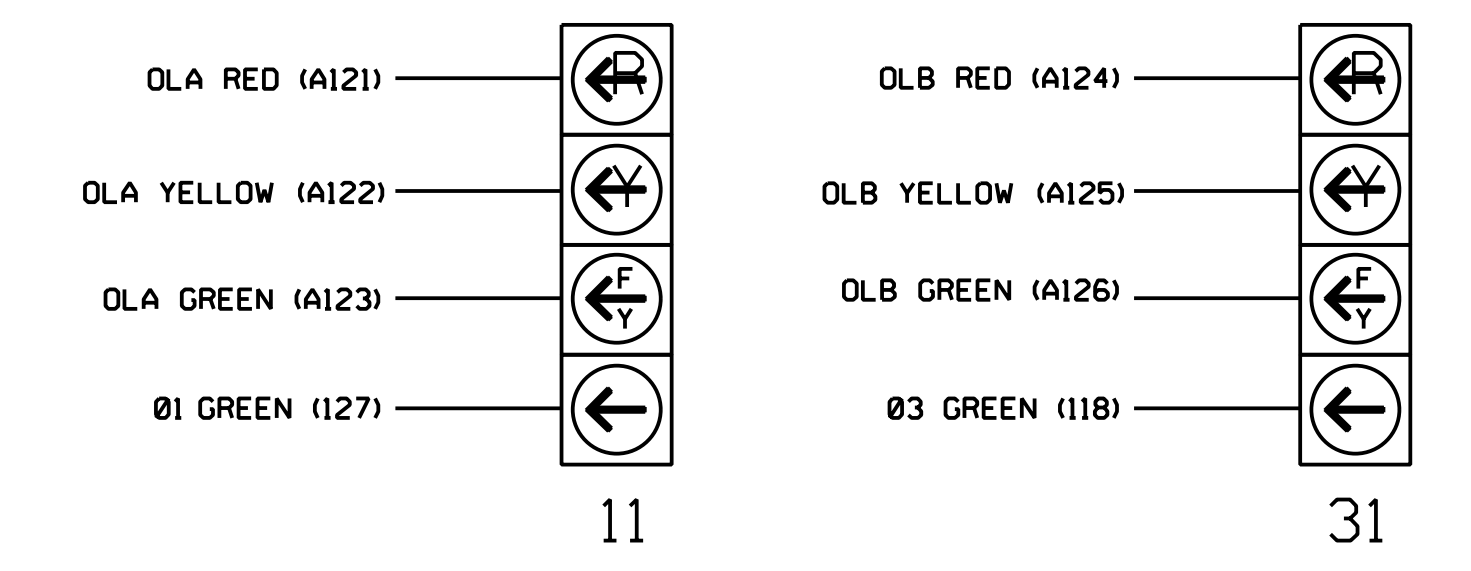
\* See Input Page Assignment programming details on sheets 4 and 5.

### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



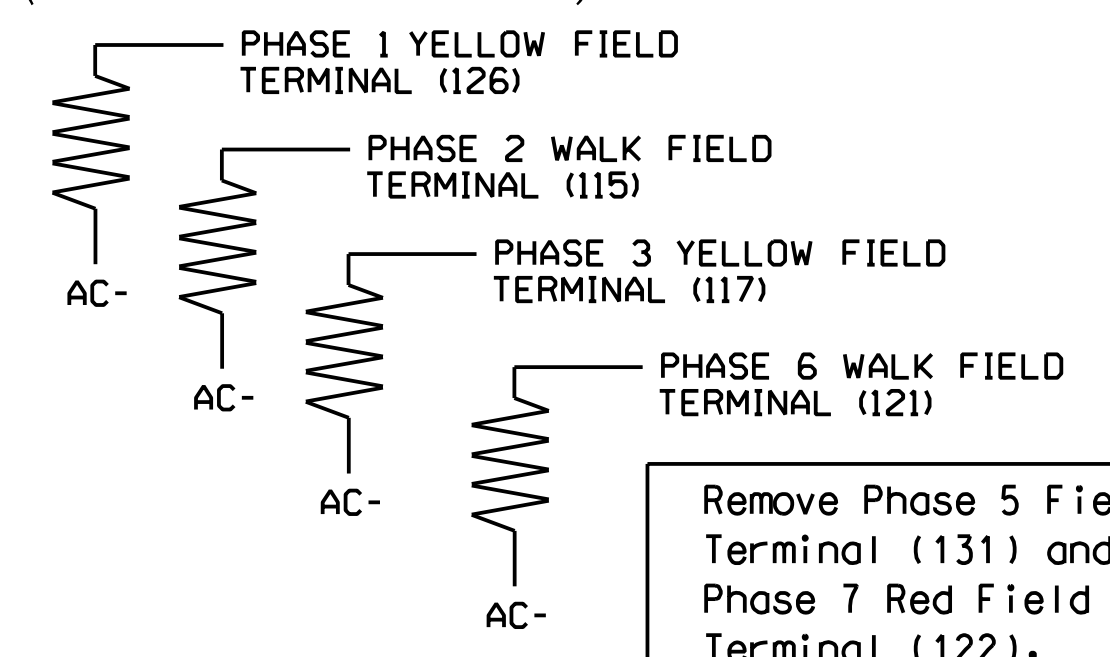
### NOTE

The sequence display for signal heads 11 and 31 require special logic programming. See sheet 3 for programming instructions.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Remove Phase 5 Field Terminal (131) and Phase 7 Red Field Terminal (122), if present

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T3
DESIGNED: May 2022
SEALED: 5/17/2024
REVISED:

This plan supersedes the plan signed and sealed on 5/17/2024.



HNTB NORTH CAROLINA, P.C.
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Signal Upgrade-
Electrical Detail - Sheet 1 of 6
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer seal for Natasha R. Simmons, North Carolina Professional Engineer, License No. 031464. Includes project details for I-40 EB Ramp / US 117 - NC 132.







### 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).

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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

### 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

← NOTICE GREEN FLASH

PRESS '+'

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

### OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

**OUTPUT REFERENCE SCHEDULE**

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 47 = Overlap B Red  
OUTPUT 48 = Overlap B Yellow  
OUTPUT 49 = Overlap B Green  
OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T3  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 3 of 6  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)

Division 3 New Hanover County Wilmington

PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich  
PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NASHA R. SIMMONS

DocuSigned by: *Natasha R. Simmons* 5/17/2024

SIG. INVENTORY NO. 03-0331T3



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.

PAGE: 2 C1 PIN:48 VEHICLE DETECTOR INPUT ASSIGNMENT #.....10 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).....26 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 1A - PHASE 6)

PAGE: 2 C1 PIN:48 NOT ENABLED INPUT ASSIGNMENT #.....10 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 18

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....1 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 '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....51 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 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.

VEHICLE DETECTOR #51 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 '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

VEHICLE DETECTOR #51 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

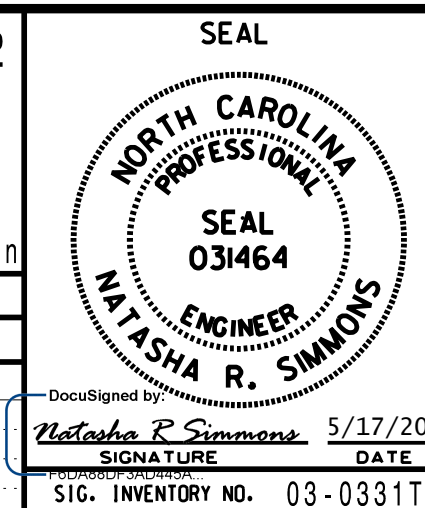
NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T3 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 4 of 6 (Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns: ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd) Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons



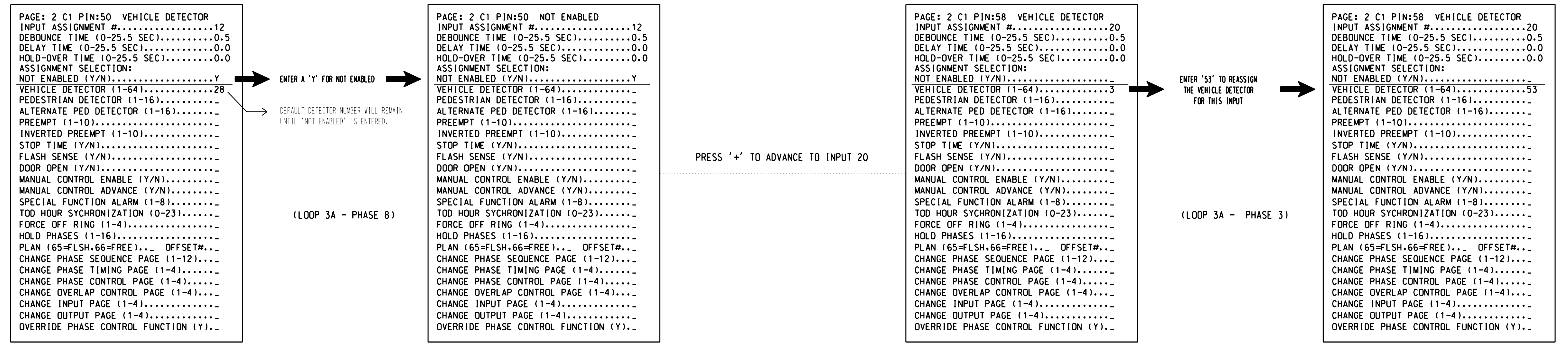


### INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(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.

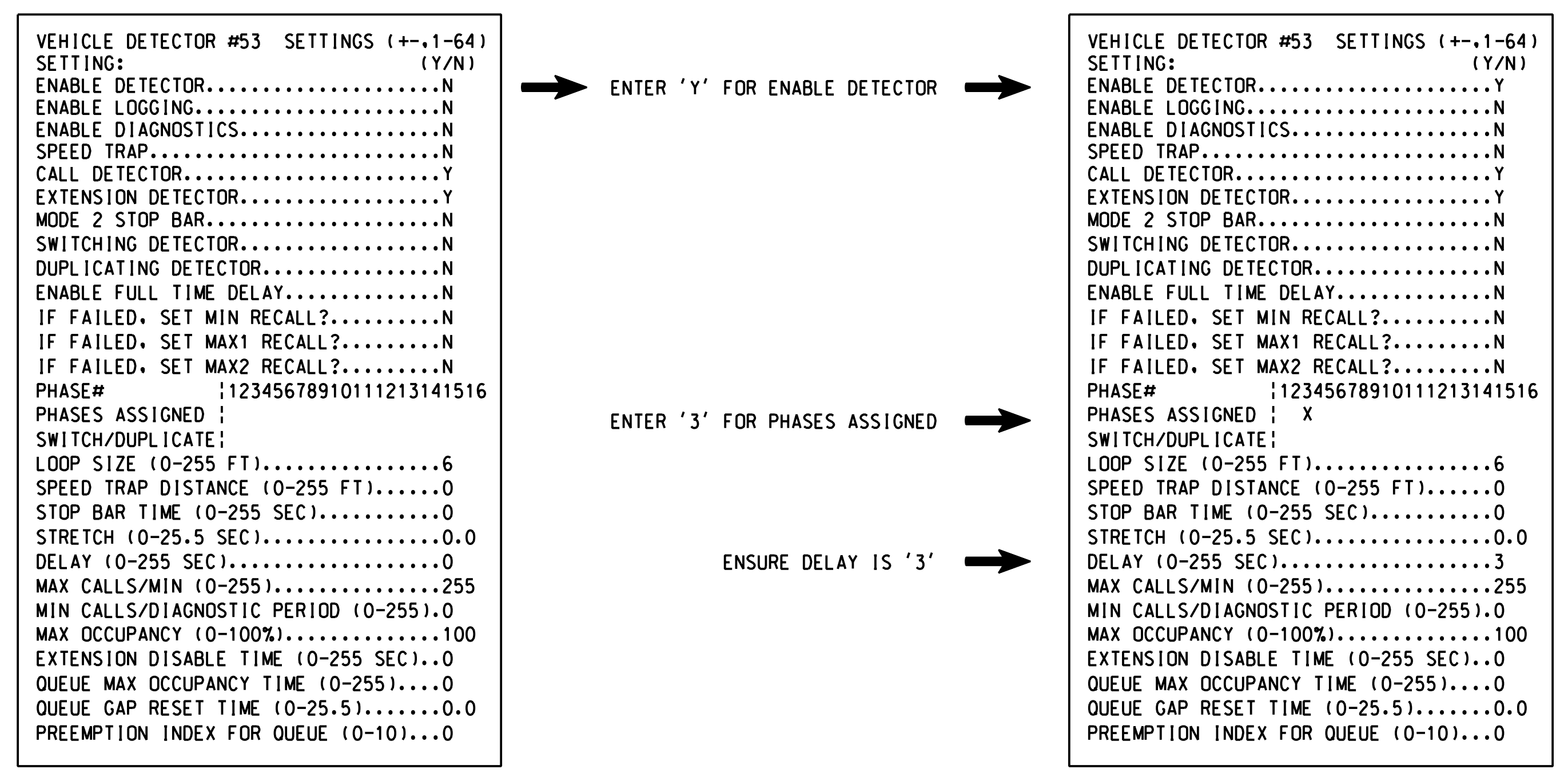
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 12 IS REACHED.



### 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.

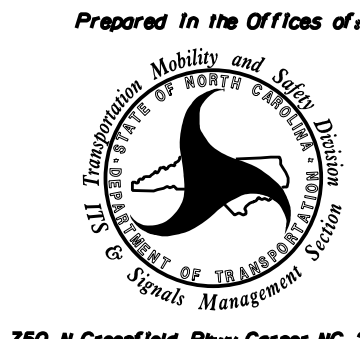
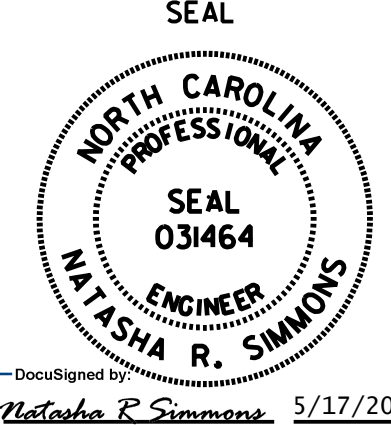


NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T3  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 5 of 6  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Division 3 New Hanover County Wilmington	PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	
REVISIONS:		INIT. DATE	DocuSigned by: <i>Natasha R. Simmons</i> 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-0331T3



## 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 phases for heads 11 and 31 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.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

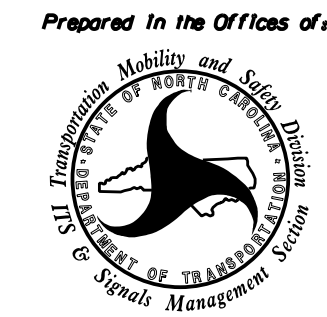
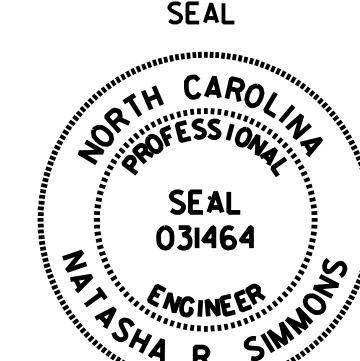
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331T3  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 6 of 6  
(Construction Phase 2)

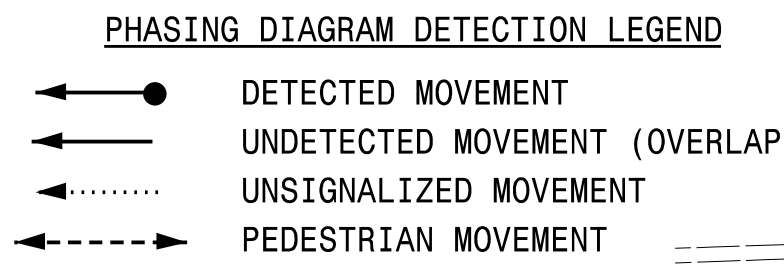
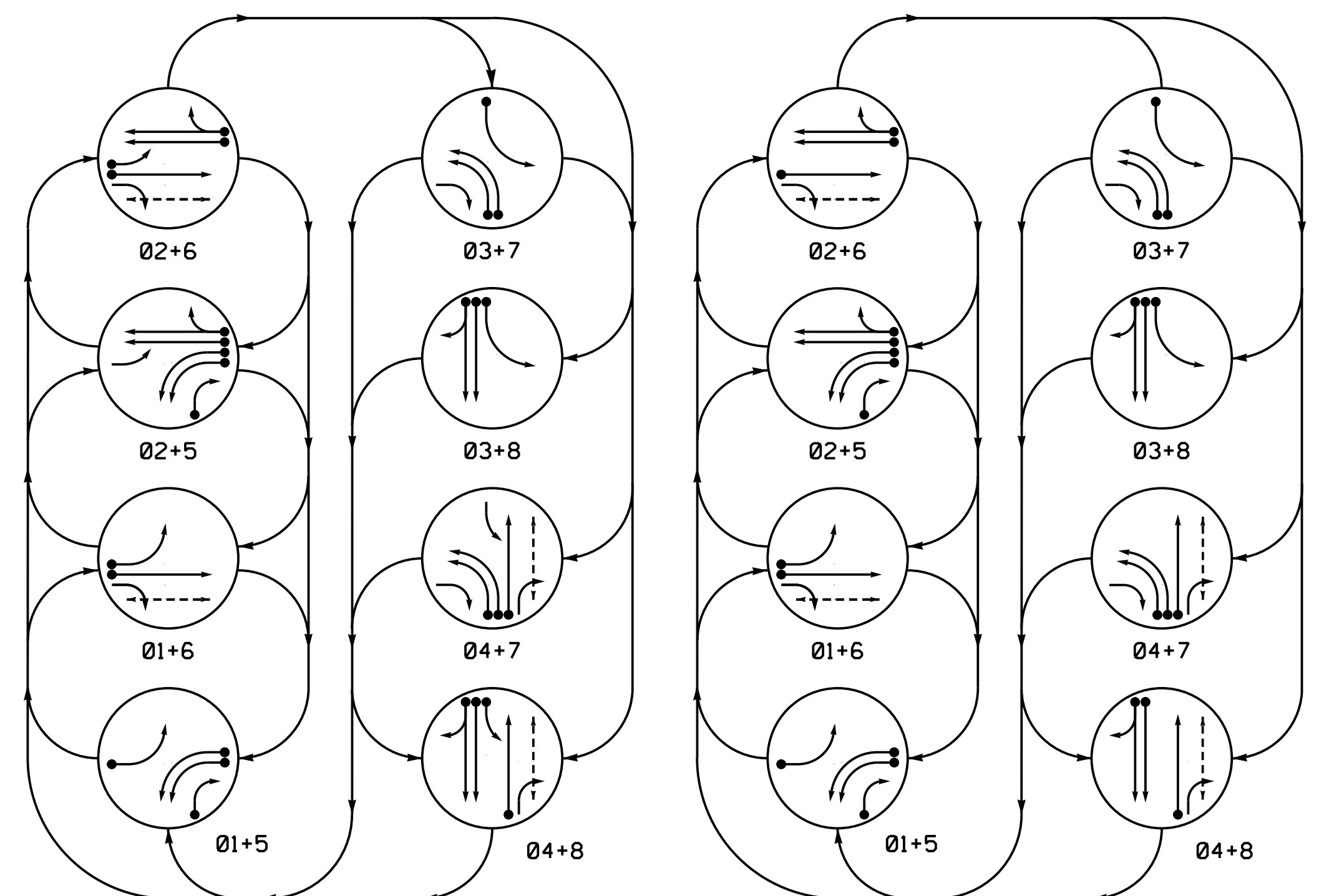
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small; text-align: center;">Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)</p> <p>Division 3    New Hanover County    Wilmington</p> <p style="font-size: x-small;">PLAN DATE: August 2023    REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>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>SEAL</p>  <p style="font-size: x-small;">DocuSigned by: <b>Natasha R. Simmons</b>    5/17/2024 SIGNATURE    DATE SIG. INVENTORY NO. 03-0331T3</p>
REVISIONS	INIT.	DATE									



DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM

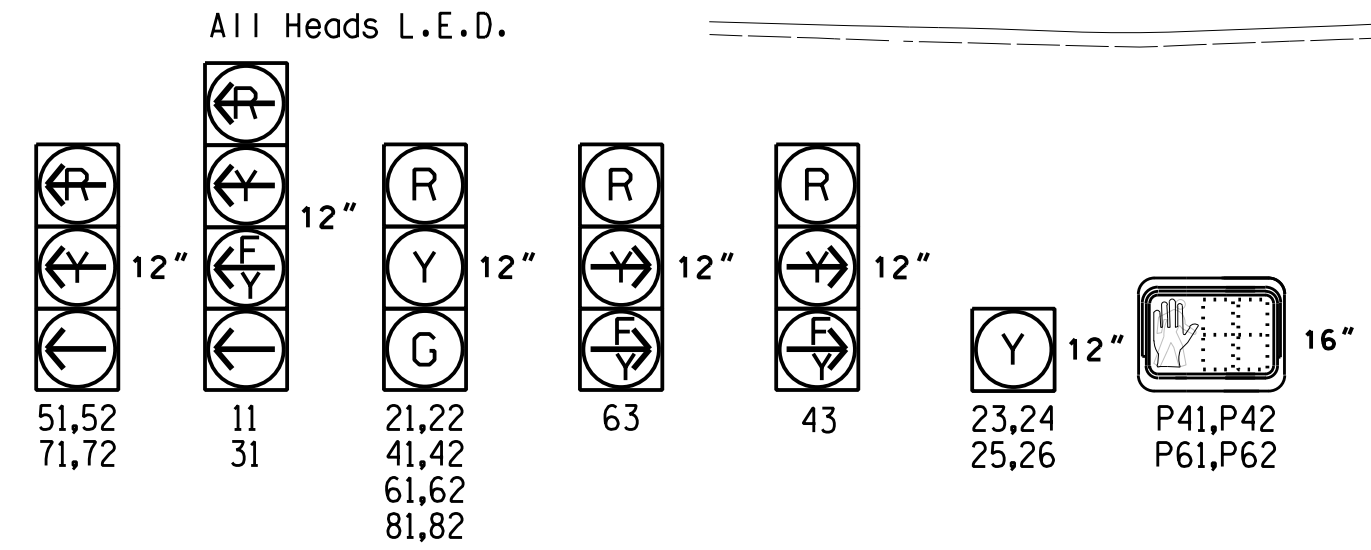


RADAR DETECTION SYSTEM table with columns for FUNCTION, Sensor 1, and Sensor 2, listing parameters like Channel, Phase, and Speed Range.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART table with columns for ZONE, SIZE, DISTANCE, TURNS, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, and NEW CARD.

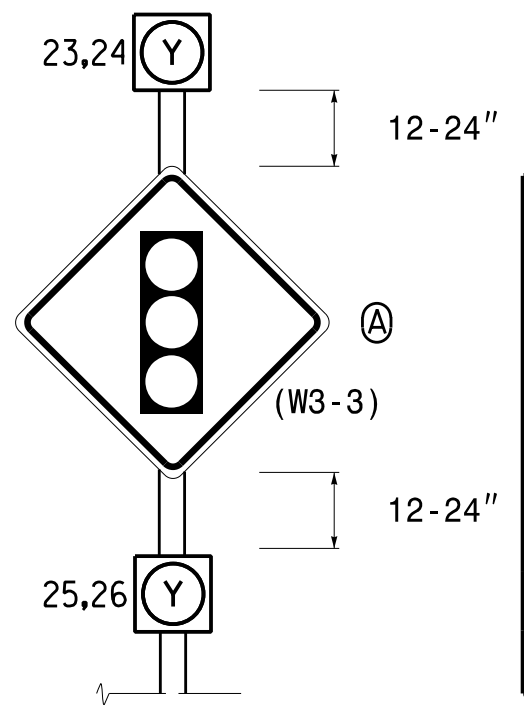
- 8 Phase Fully Actuated Wilmington Signal System NOTES. 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024... 14. Signal system data: Controller Asset #0331.

SIGNAL FACE I.D.

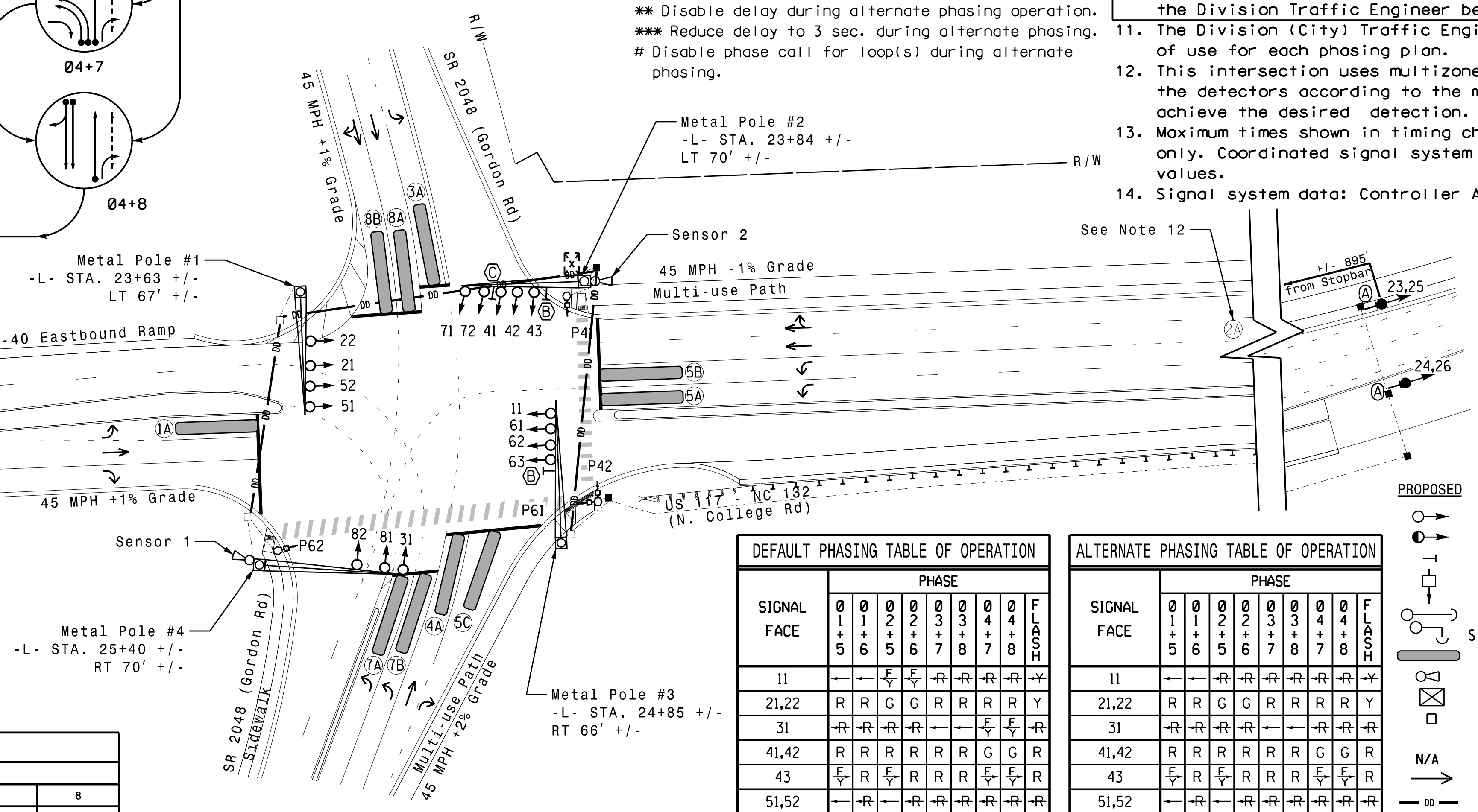


OASIS 2070 TIMING CHART table with columns for FEATURE and PHASE (1-8), listing timing values for Min Green, Extension, Max Green, etc.

Figure 1

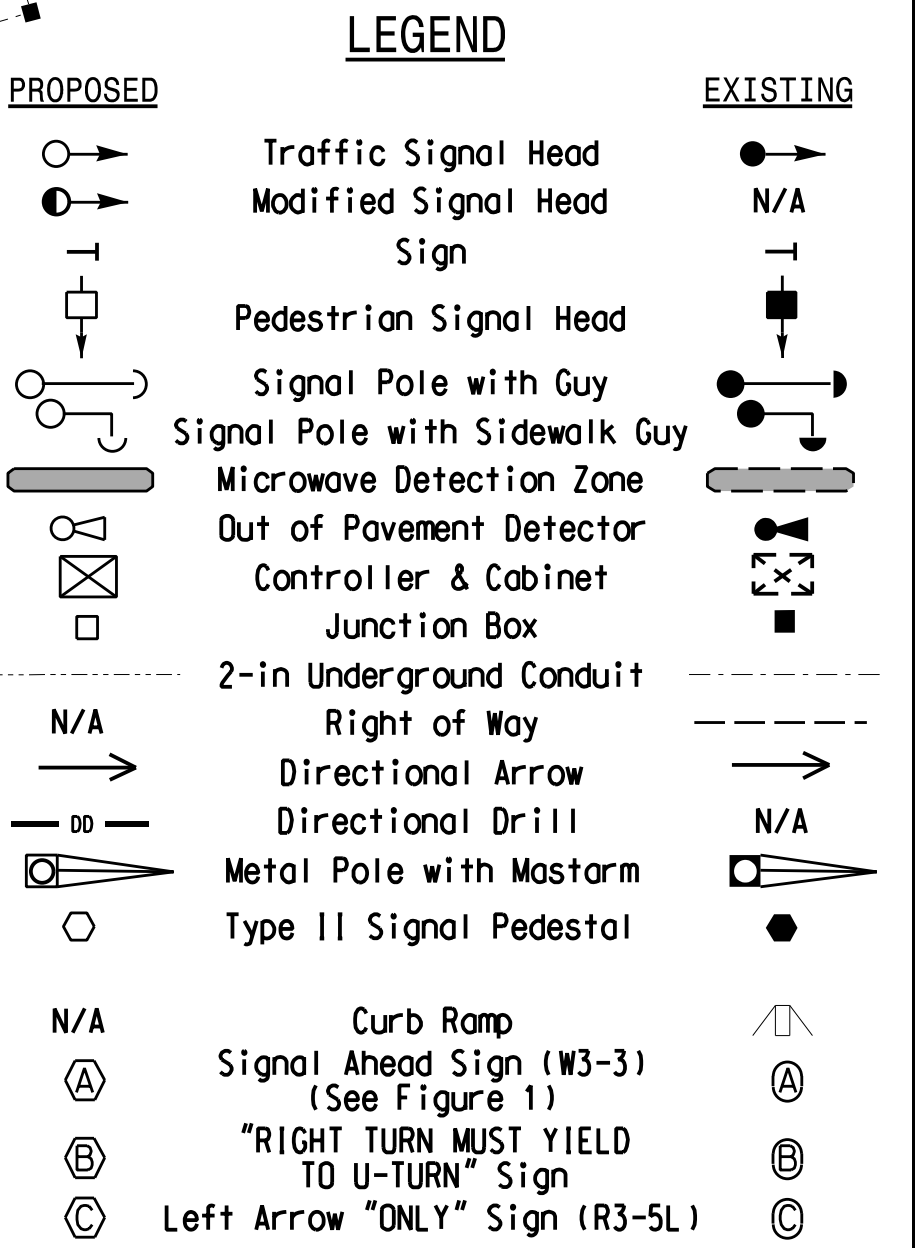


FLASH TABLE OF OPERATION table with columns for SIGNAL FACE and INTERVAL (1, 2), listing ON/OFF states for faces 23,24 and 25,26.



DEFAULT PHASING TABLE OF OPERATION table showing signal face and phase timing for default operation.

ALTERNATE PHASING TABLE OF OPERATION table showing signal face and phase timing for alternate operation.

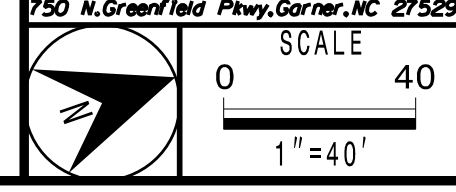


Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional seal and signature block for N. Carolina Professional Engineer N. K. Vianich, dated 5/17/2024.

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



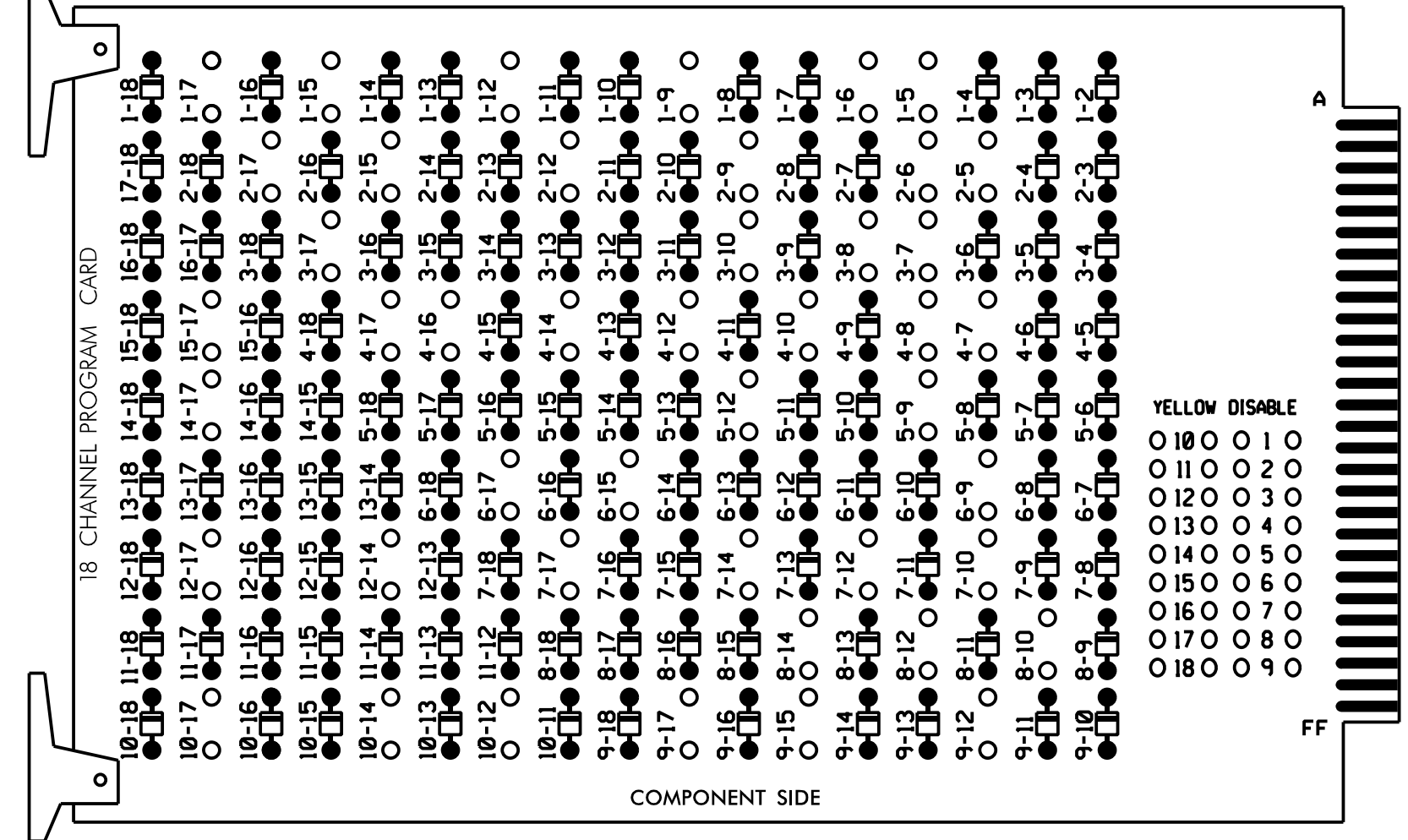
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 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 Startup in Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1, 2, and 5 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 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 S5  
 PHASES USED.....1,2,3,4,4 PED,5,6,6 PED,7,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....3+4  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....4+5  
 OVERLAP "E".....6+7  
 OVERLAP "F".....NOT USED

\* Used for Advanced Beacons

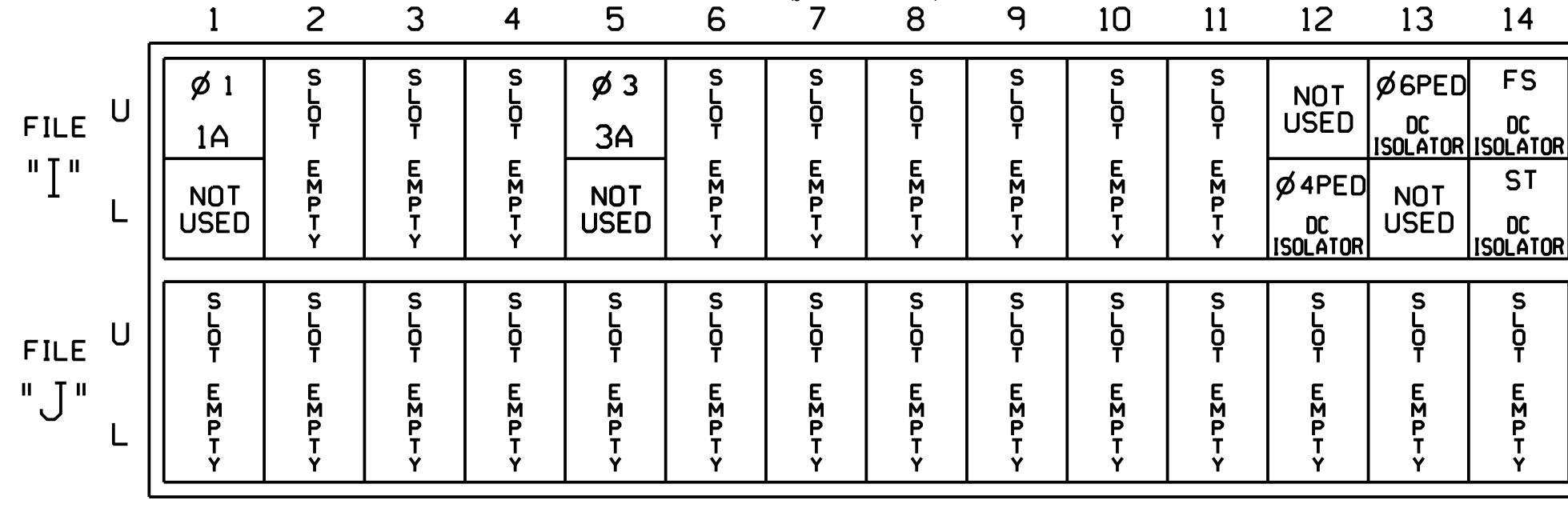
### SIGNAL HEAD HOOK-UP CHART

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	SPARE	
SIGNAL HEAD NO.	11	21,22	23,24	31	41,42	P41,P42	51,52	61,62	P61,P62	25,26	71,72	81,82	NU	11	31	63	NU	43	NU
RED		128			101			134				107				A111			
YELLOW	*	129		*	102			135				108							
GREEN		130			103			136				109							
RED ARROW								131				122			A121	A124		A101	
YELLOW ARROW								132				123			A122	A125	A112	A102	
FLASHING YELLOW ARROW															A123	A126	A113	A103	
GREEN ARROW	127			118				133				124							
PED YELLOW								104			119				** 114			** 120	
															*				

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \*\* Advance Beacons will be wired to S2P-Y and S6P-Y. See wiring and programming detail on sheet 2.  
 \* See pictorial of head wiring in detail this sheet.  
 NOTE: Load switch AUX S3 requires output remapping. See Sheet 7 of this electrical detail for instructions.

### INPUT FILE POSITION LAYOUT

(front view)



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

### SPECIAL DETECTOR NOTE

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

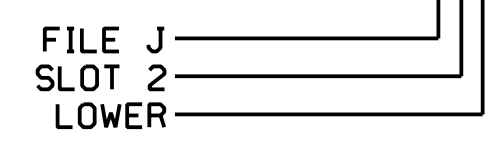
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10*	26	6	Y	Y			
	-	I1U	56	18*	51	1	Y	Y			
3A	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
PED PUSH BUTTONS											
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.

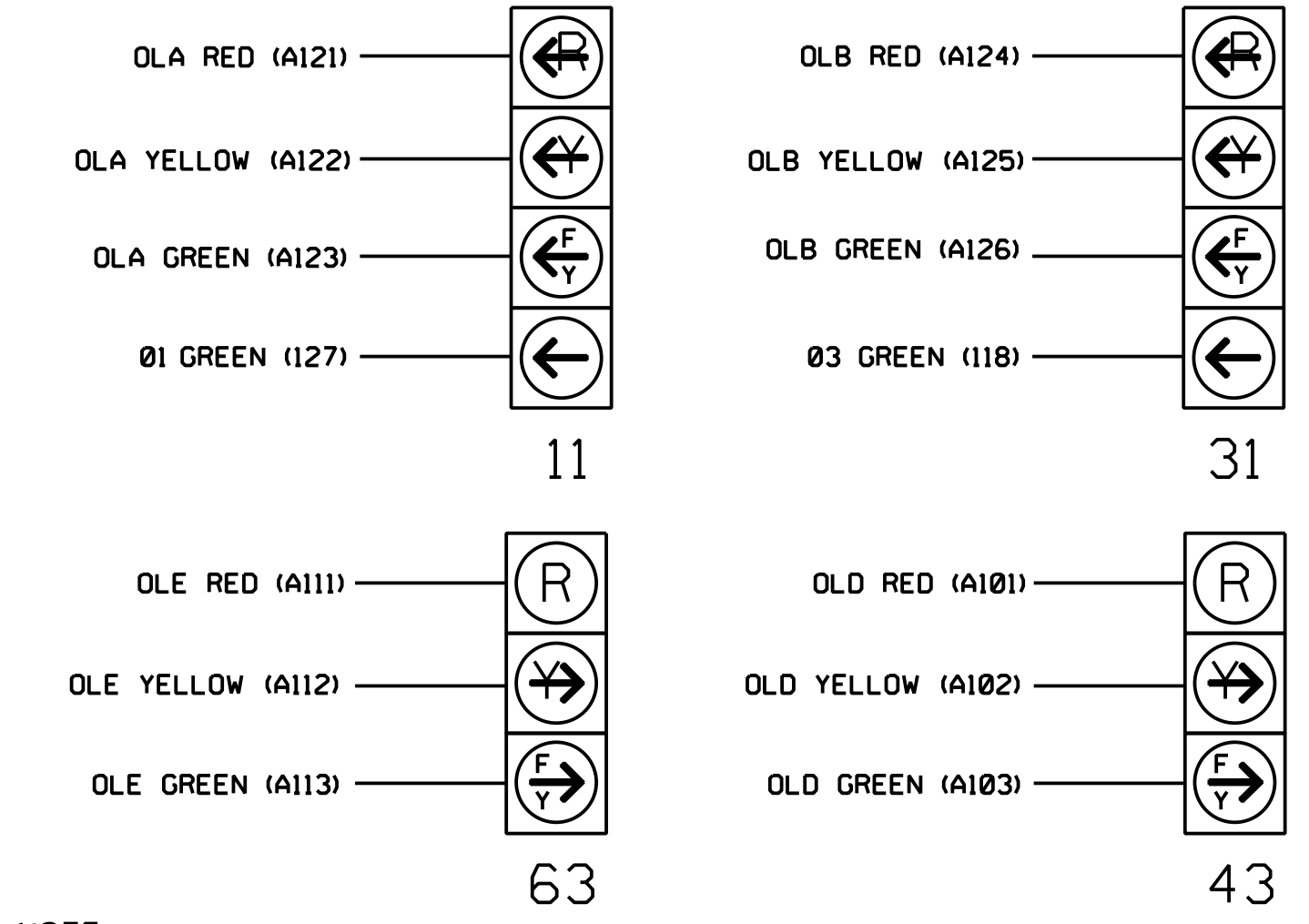
\* See Input Page Assignment programming details on sheets 4 and 5.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



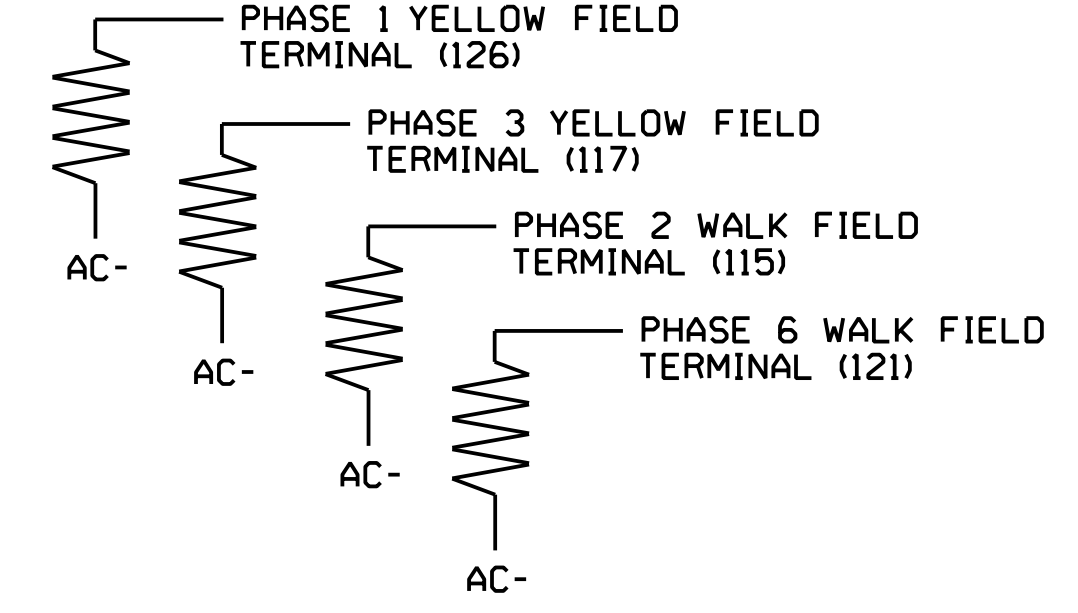
#### NOTE

The sequence display for signal heads 11 and 31 require special logic programming. See sheet 3 for programming instructions.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

This plan supersedes the plan signed and sealed on 5/17/2024.



HNTB NORTH CAROLINA, P.C.  
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 Raleigh, North Carolina 27609  
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 (919) 546-8997

Signal Upgrade - Final Design  
 Electrical Detail - Sheet 1 of 7

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

ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)

Prepared in the Offices of:

Division 3 New Hanover County Wilmington  
 PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

DocuSigned by: 11/8/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-0331







### 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).

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).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### 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 '+' TWICE

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)  
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)  
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

### 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 '+' TWICE

NOTICE PAGE 2 → PAGE 2: 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)  
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 '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)  
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

**OUTPUT REFERENCE SCHEDULE**

USE TO INTERPRET LOGIC PROCESSOR

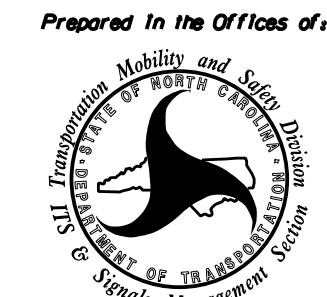
OUTPUT 47 = Overlap B Red  
OUTPUT 48 = Overlap B Yellow  
OUTPUT 49 = Overlap B Green  
OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 3 of 7


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

ELECTRICAL AND PROGRAMMING DETAILS FOR: I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)

Prepared in the Office of:  NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Division 3 New Hanover County Wilmington

PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich  
PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

DocuSigned by:  Natasha R. Simmons 5/17/2024

REVISIONS: INIT. DATE

SIG. INVENTORY NO. 03-0331



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.

PAGE: 2 C1 PIN:48 VEHICLE DETECTOR INPUT ASSIGNMENT #.....10 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).....26 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 1A - PHASE 6)

PAGE: 2 C1 PIN:48 NOT ENABLED INPUT ASSIGNMENT #.....10 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 18

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....1 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 '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....51 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 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.

VEHICLE DETECTOR #51 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 '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

VEHICLE DETECTOR #51 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: 03-0331 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade - Final Design Electrical Detail - Sheet 4 of 7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns: ELECTRICAL AND PROGRAMMING DETAILS FOR, I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd), Division 3 New Hanover County Wilmington, PLAN DATE: August 2023, REVIEWED BY: N.K. Vlanich, PREPARED BY: E.E. Tiller, REVIEWED BY: N.R. Simmons, REVISIONS, INIT., DATE, and a signature block for N. K. Vlanich dated 5/17/2024.

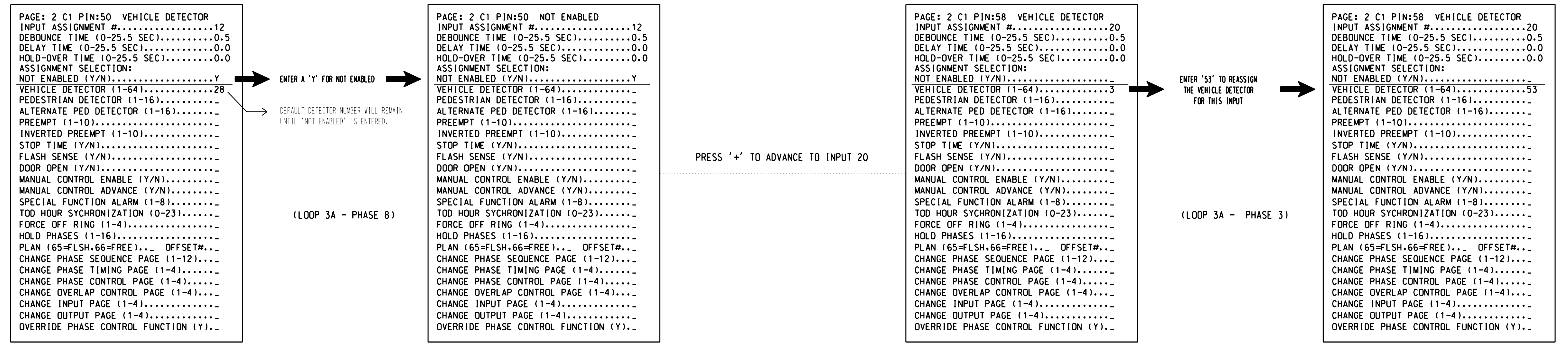


### INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(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.

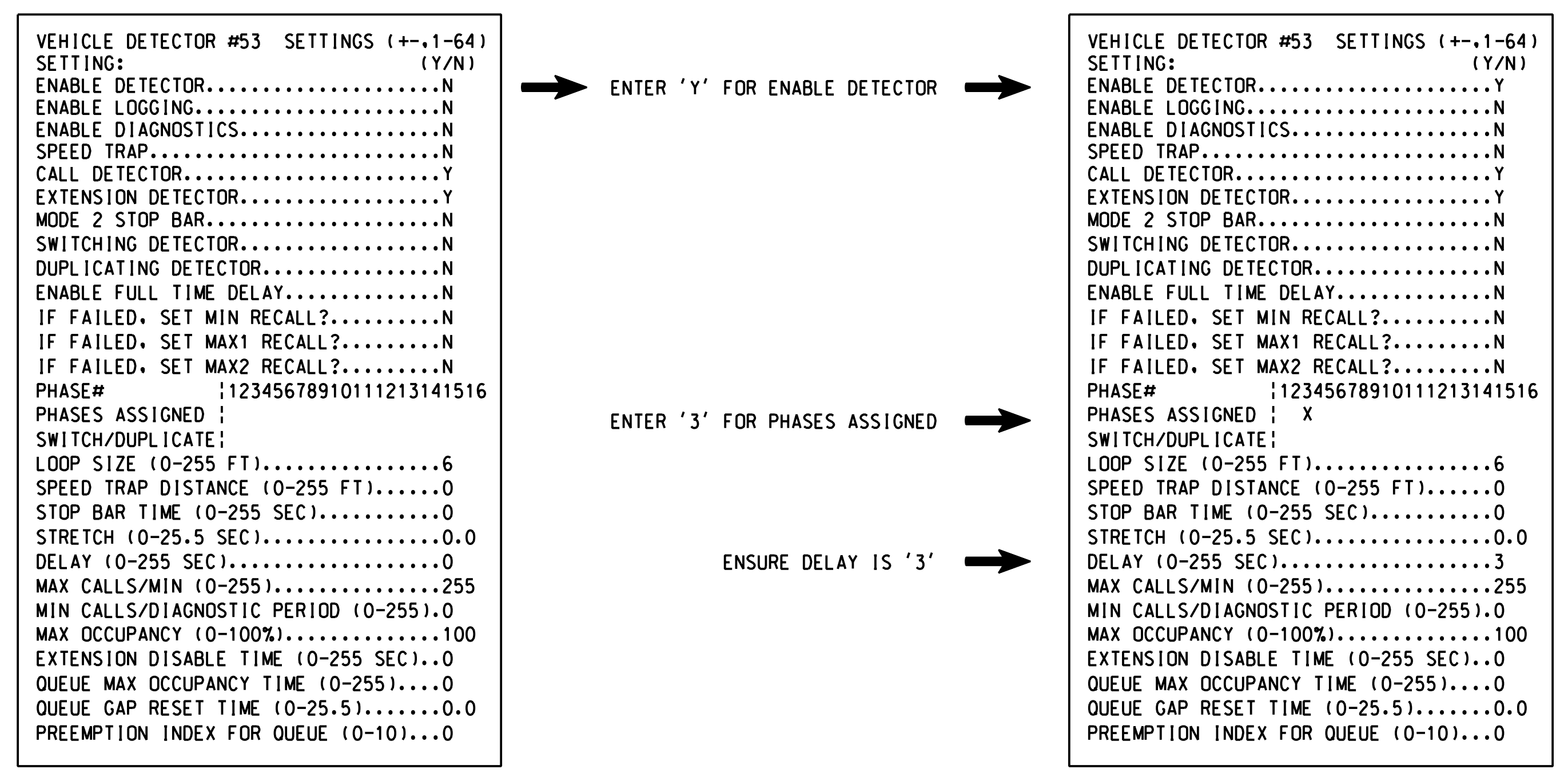
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 12 IS REACHED.



### 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.

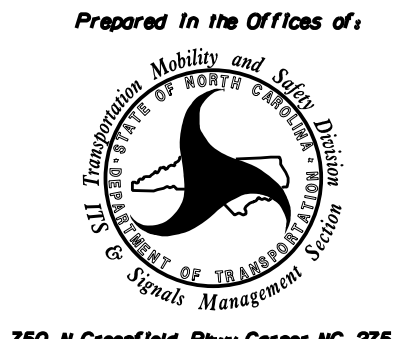
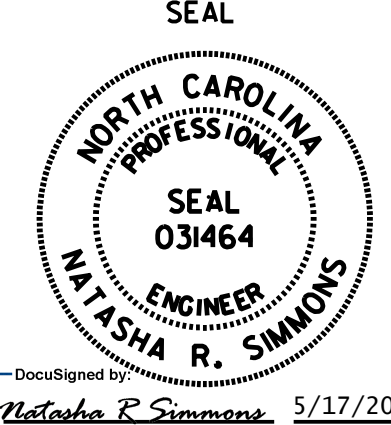



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 5 of 7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Division 3 New Hanover County Wilmington	PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	
REVISIONS		INIT.	DATE
DocuSigned by: 		5/17/2024	
750 N. Greenfield Pkwy, Garner, NC 27529		SIG. INVENTORY NO. 03-0331	



## 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 phases for heads 11 and 31 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.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

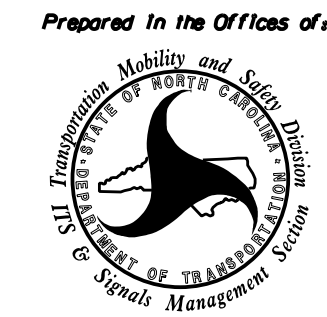
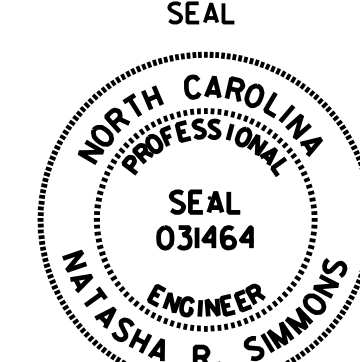
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0331  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 6 of 7

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

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared in the Offices of:</p>  <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)</p> <p>Division 3    New Hanover County    Wilmington</p> <p style="font-size: x-small;">PLAN DATE: August 2023    REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center;">SEAL</p>  <p style="font-size: x-small;">DocuSigned by: <b>Natasha R. Simmons</b>    5/17/2024</p> <p style="font-size: x-small;">SIGNATURE    DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO.    03-0331</p>
REVISIONS	INIT.	DATE						



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'.

PRESS '+' KEY FOR OUTPUT 46

```
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.....
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.....
```

```
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:93 VEHICLE OVERLAP
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.....
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.....
```

```
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.....
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.

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

```
PAGE:1 C1 PIN:101 VEHICLE OVERLAP
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.....
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.....
```

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0331  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 7 of 7

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

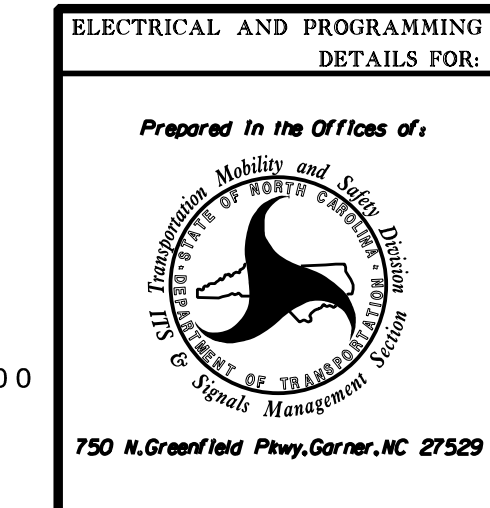
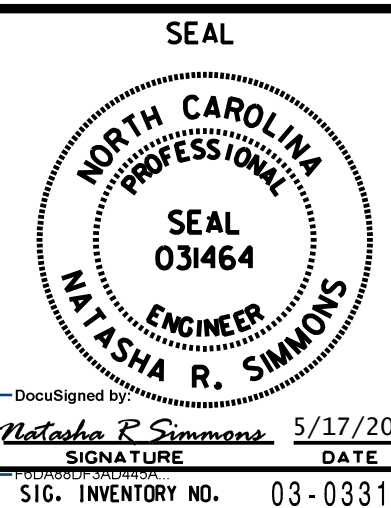
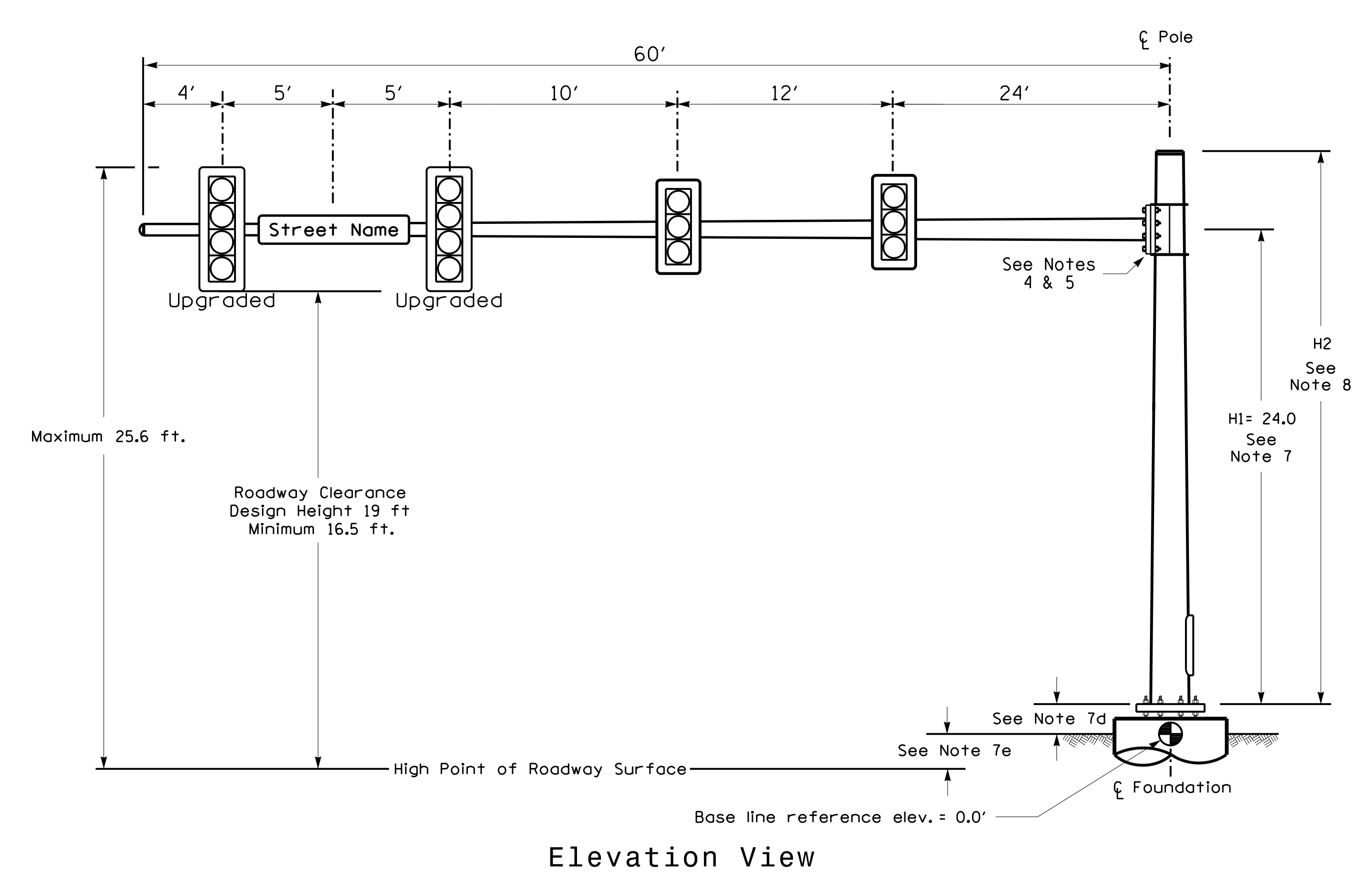


Table with columns: PLAN DATE, REVIEWED BY, PREPARED BY, REVISIONS, INITI, DATE. Includes details for I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd) in Division 3, New Hanover County, Wilmington.





**Design Loading for METAL POLE NO. 1**

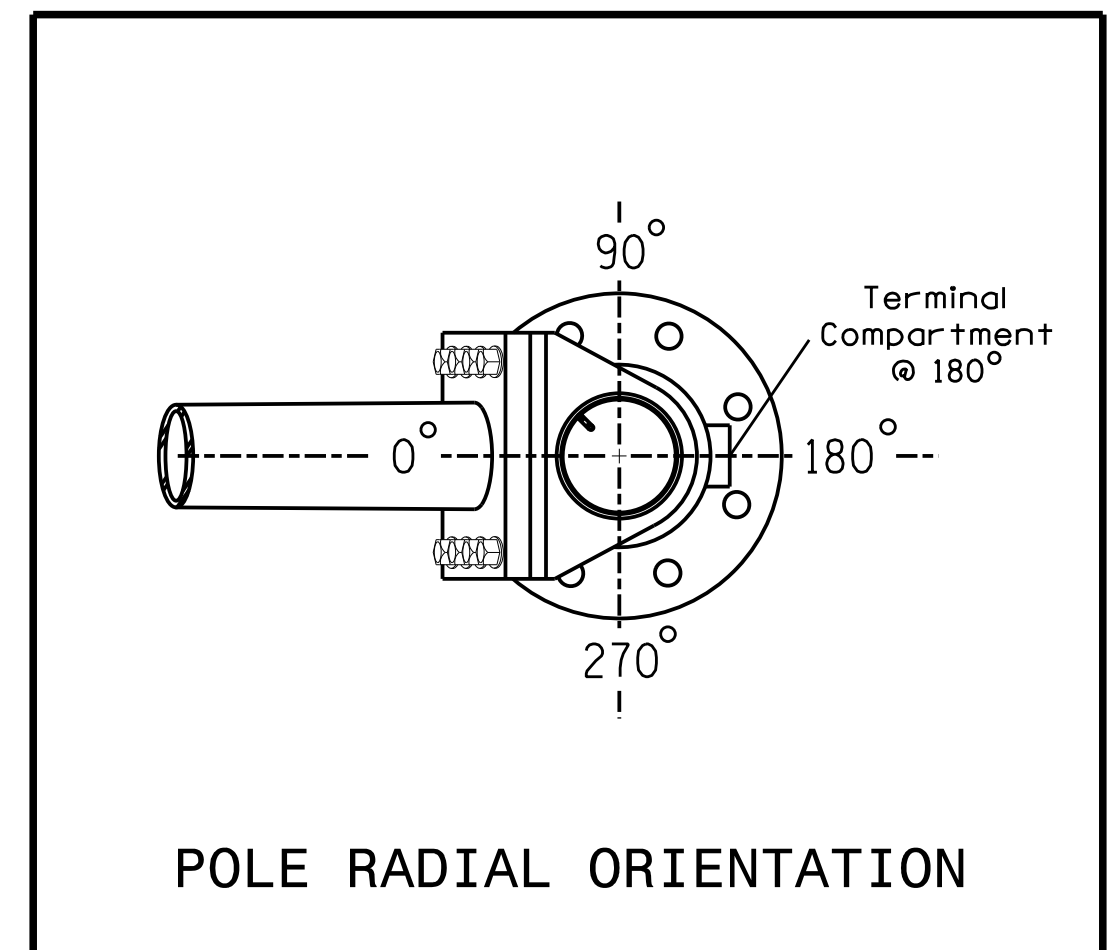


Elevation View

**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.

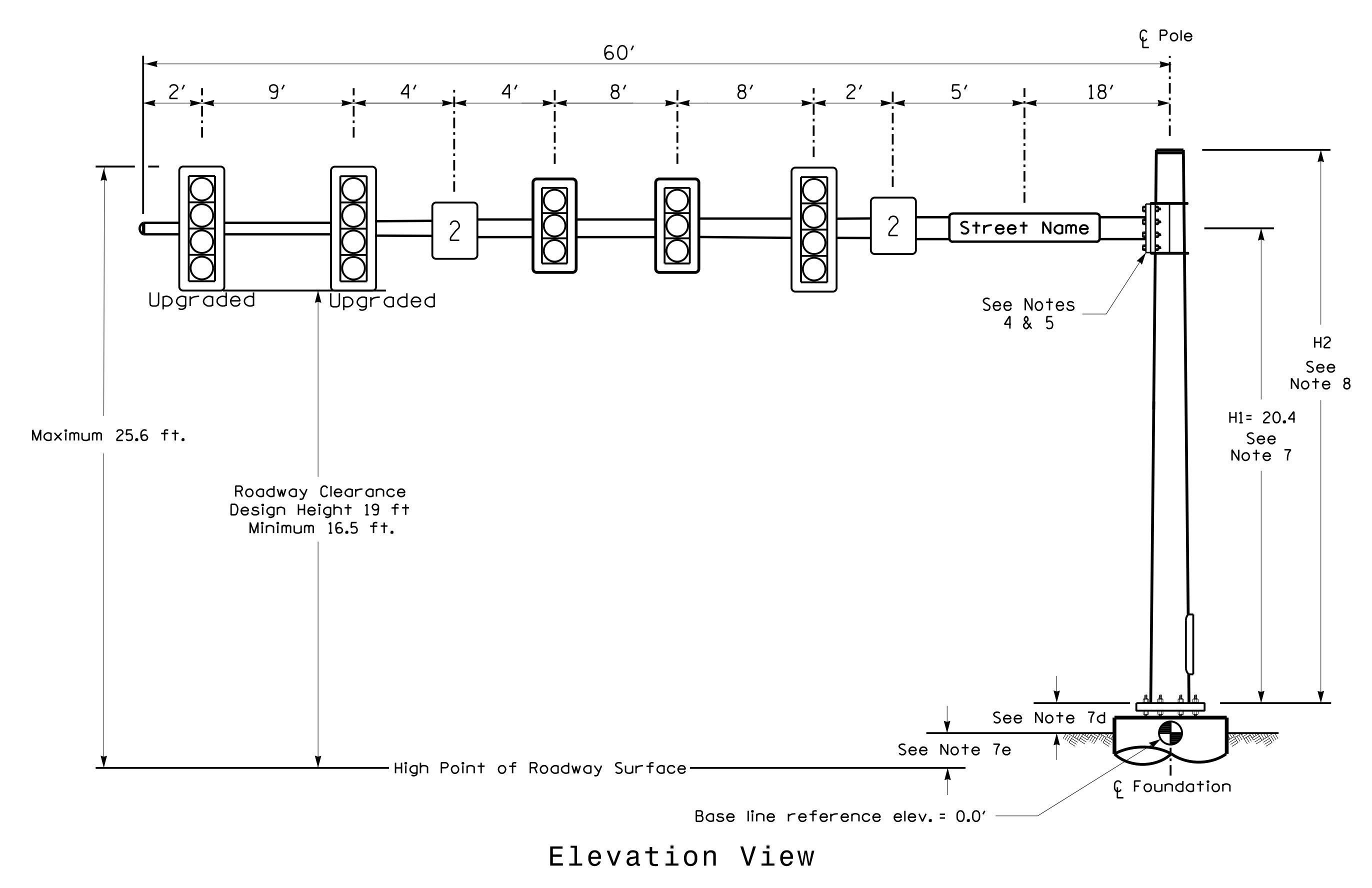
**Elevation Data for Mast Arm Attachment (H1)**

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	2.98 ft.	-0.57 ft.
Elevation difference at Edge of travelway or face of curb	2.15 ft.	-0.94 ft.

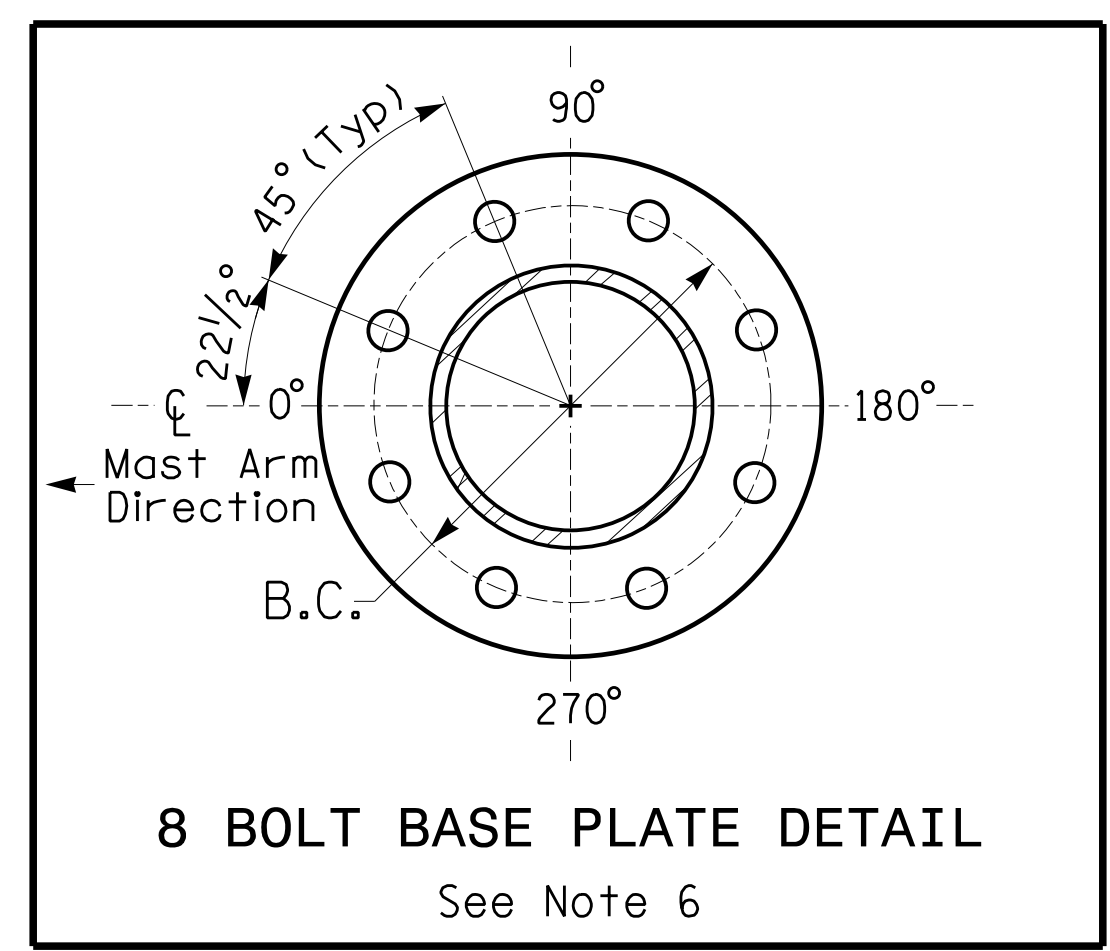


POLE RADIAL ORIENTATION

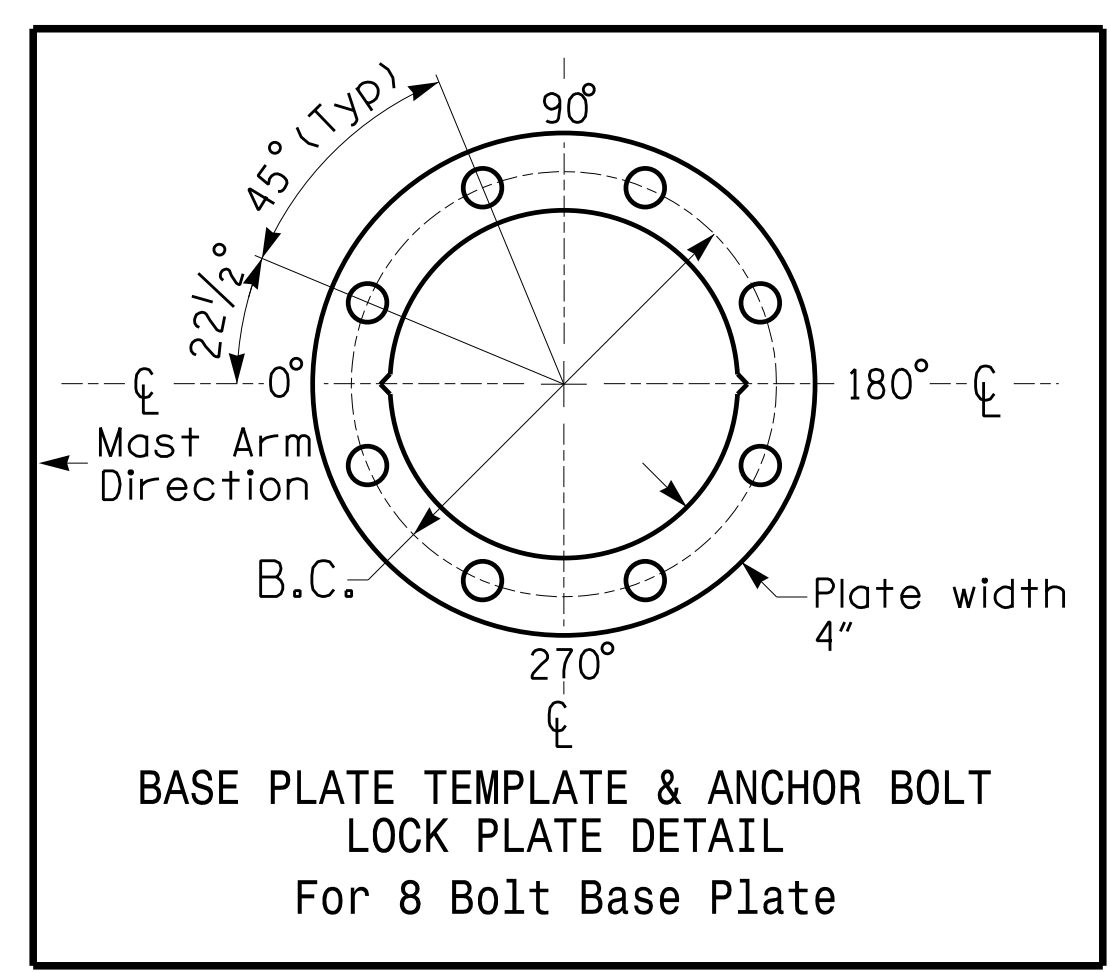
**Design Loading for METAL POLE NO. 2**



Elevation View



8 BOLT BASE PLATE DETAIL



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

**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
	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**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 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 force 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 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.

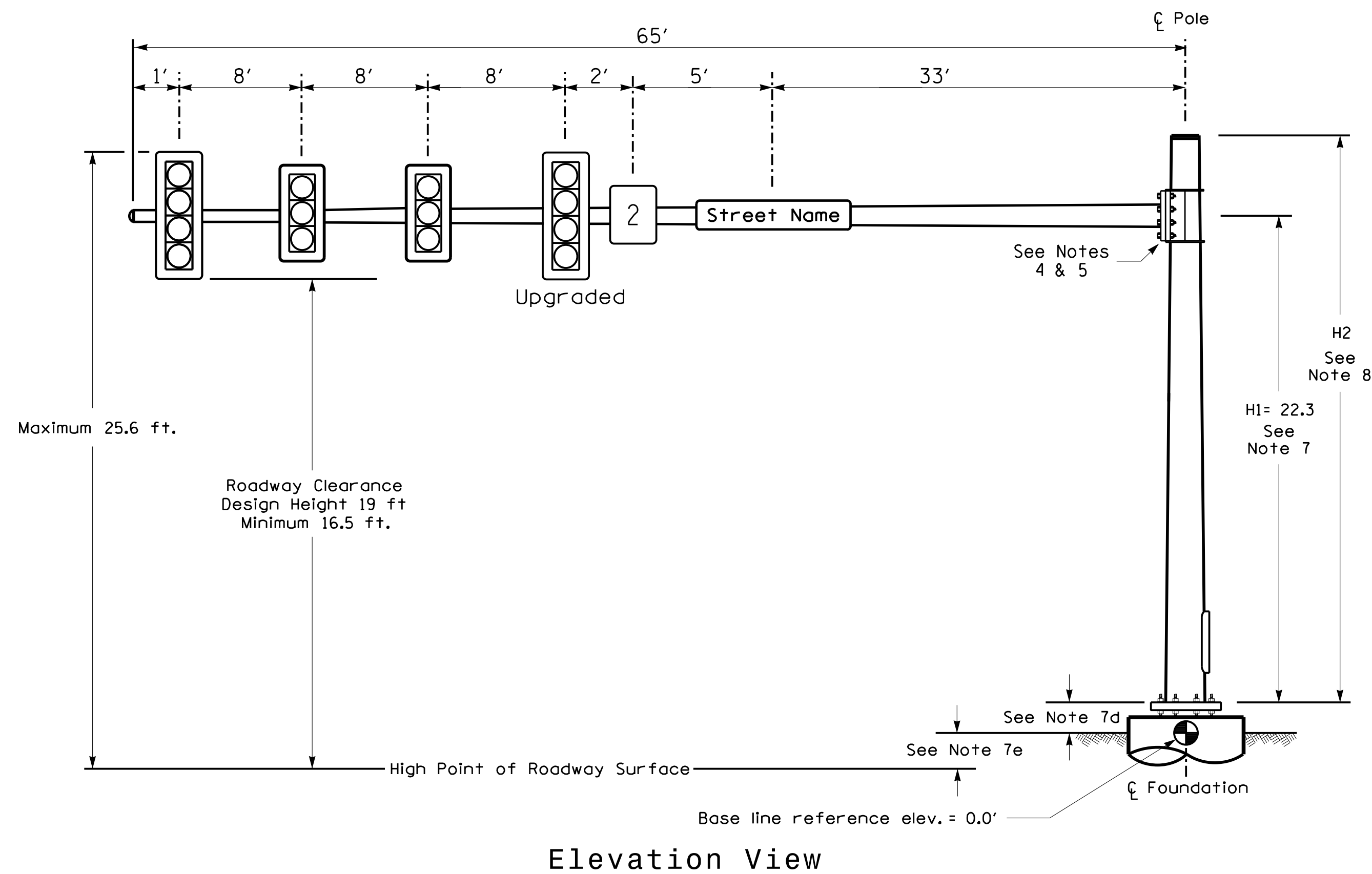
NCDOT Wind Zone 1 (150 mph)

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

	I-40 EB Ramp / US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd) Division 3 New Hanover County Wilmington		
	PLAN DATE: May 2022 PREPARED BY: E.E. Tiller SCALE: 0 N/A N/A	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons DATE: 5/17/2024	



**Design Loading for METAL POLE NO. 3**



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 $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	1.27 ft.	1.84 ft.
Elevation difference at Edge of travelway or face of curb	0.61 ft.	0.27 ft.

**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
	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

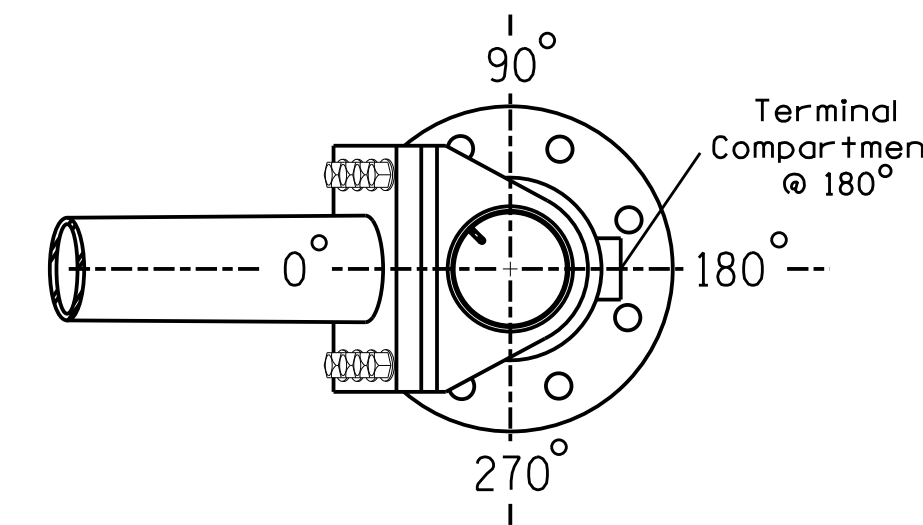
**NOTES**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 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>

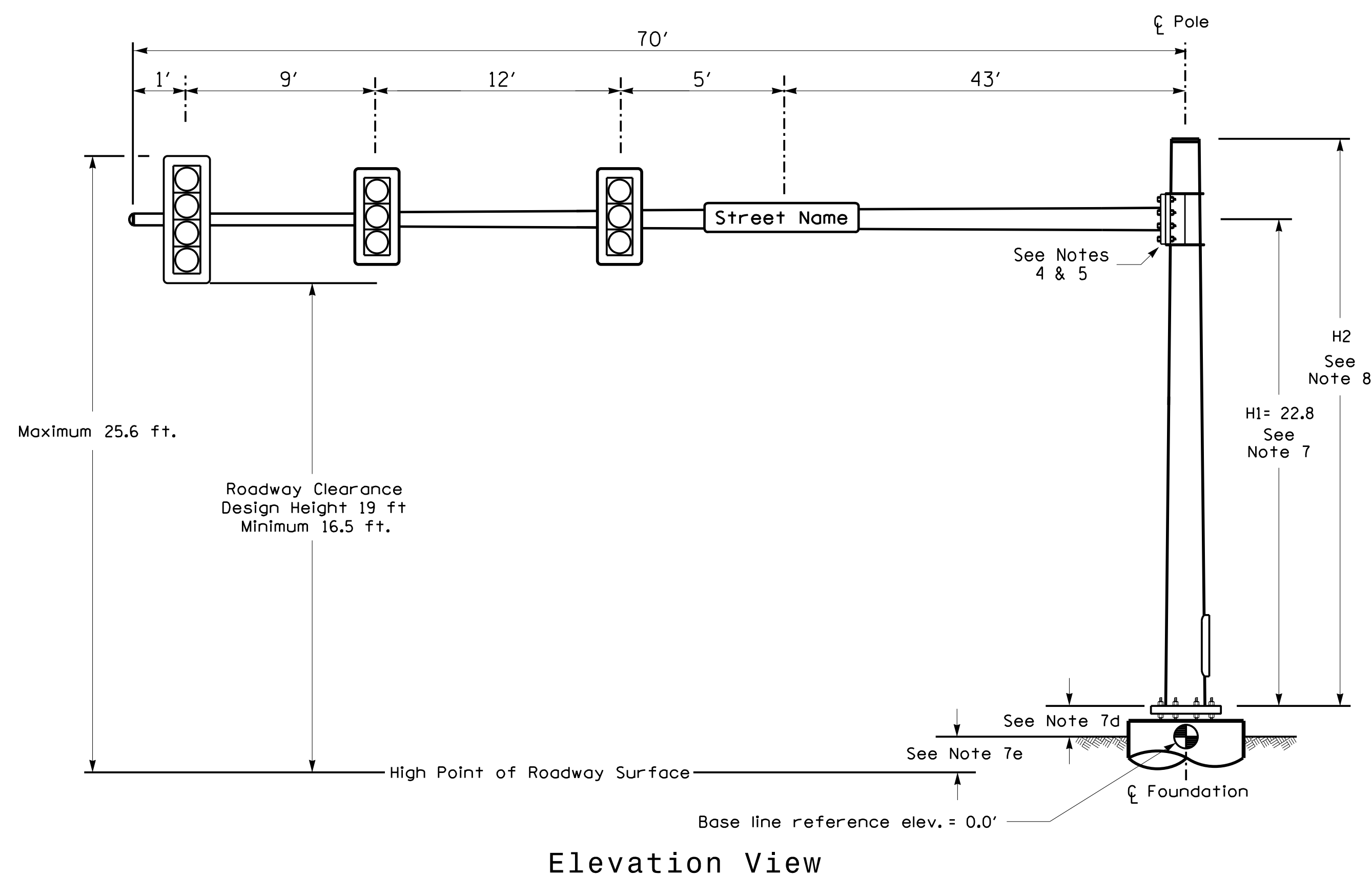
**DESIGN REQUIREMENTS**

- 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 force 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 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.

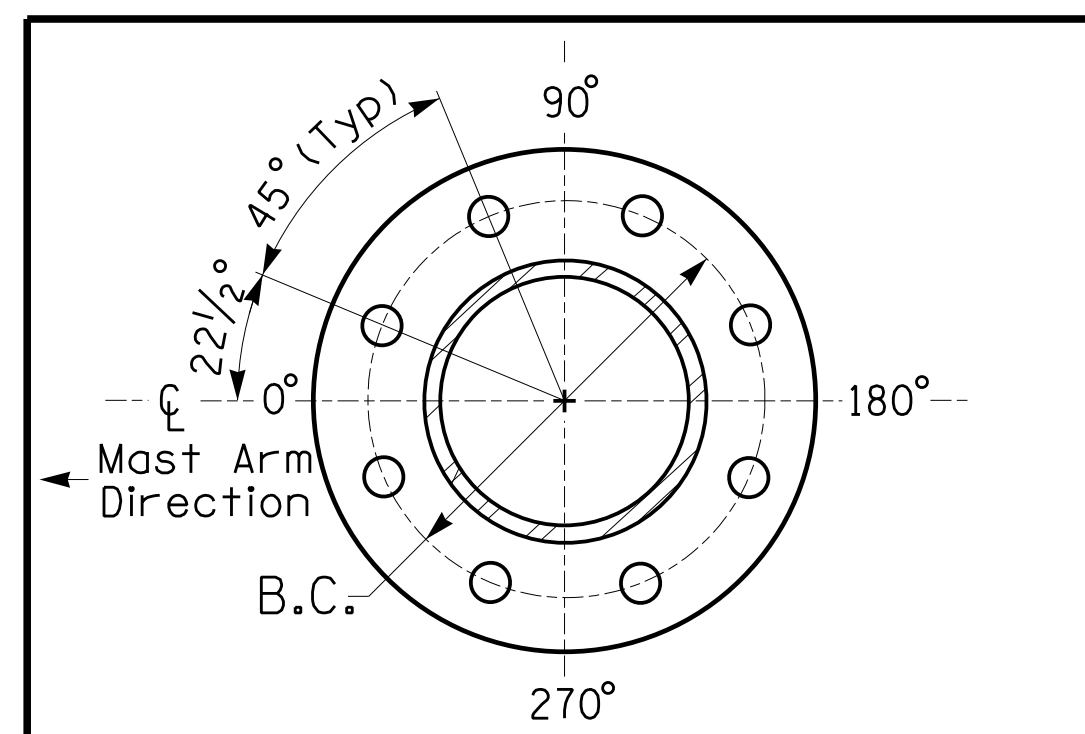


POLE RADIAL ORIENTATION

**Design Loading for METAL POLE NO. 4**

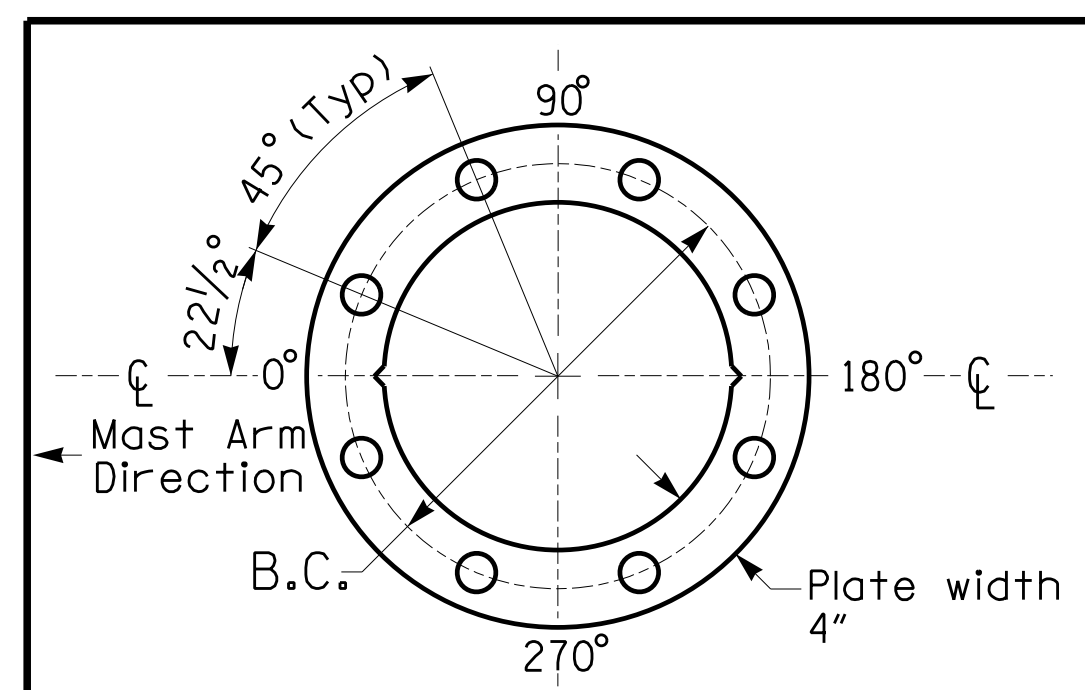


Elevation View



8 BOLT BASE PLATE DETAIL

See Note 6



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

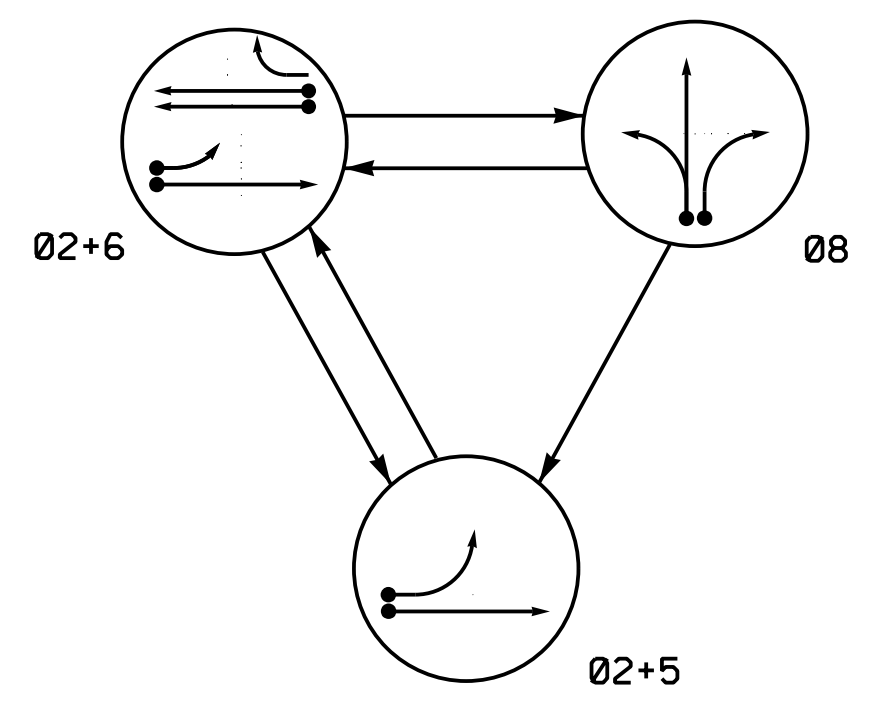
NCDOT Wind Zone 1 (150 mph)

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

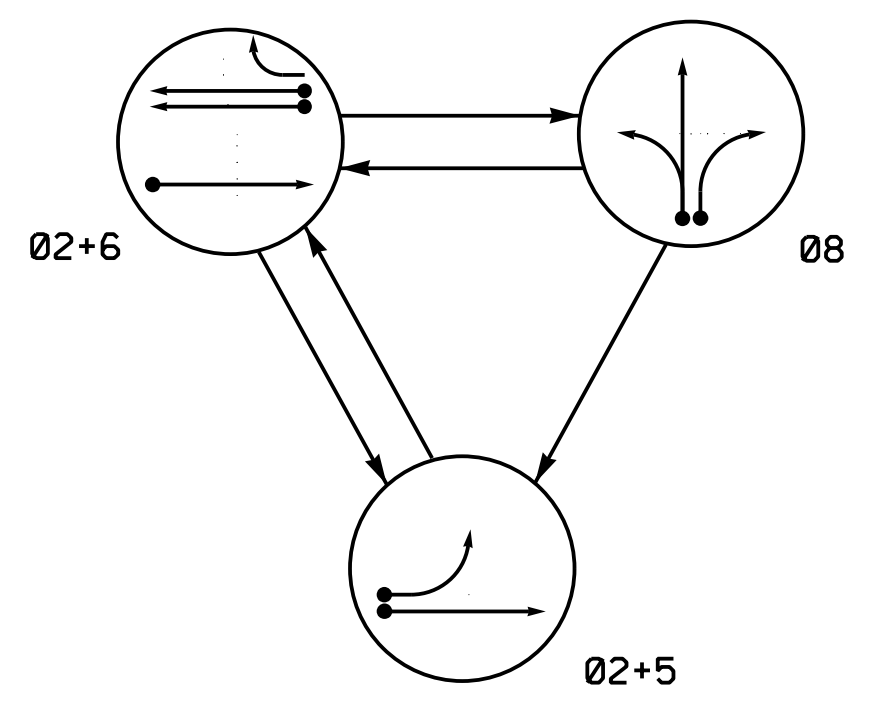
	I-40 EB Ramp/ US 117 - NC 132 (N. College Road) at SR 2048 (Gordon Rd)		
	Division 3 New Hanover County	Wilmington	
PLAN DATE: May 2022	REVIEWED BY: N.K. Vlanich	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons
750 N. Greenfield Pkwy, Garner, NC 27525	SCALE: 0 N/A	REVISIONS:	DATE: 5/17/2024
			SIG. INVENTORY NO. 03-0331



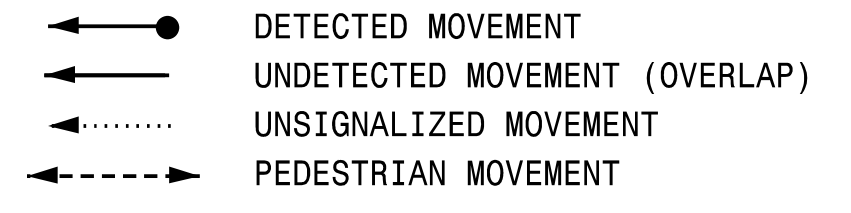
**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	—	—	R	Y
61	R	↑	R	Y
62	R	G	R	Y
81,82	R	R	G	R
83,84	R	R	—	R

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	—	—	R	Y
61	R	↑	R	R
62	R	G	R	R
81,82	R	R	G	R
83,84	R	R	—	R

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
5A	6x40	0	*	*	5	Y	Y	-	-	15**	-	Y
8A	6x40	0	*	*	2#	Y	Y	-	-	3	-	Y
8B	6x40	0	*	*	8	Y	Y	-	-	15	-	Y

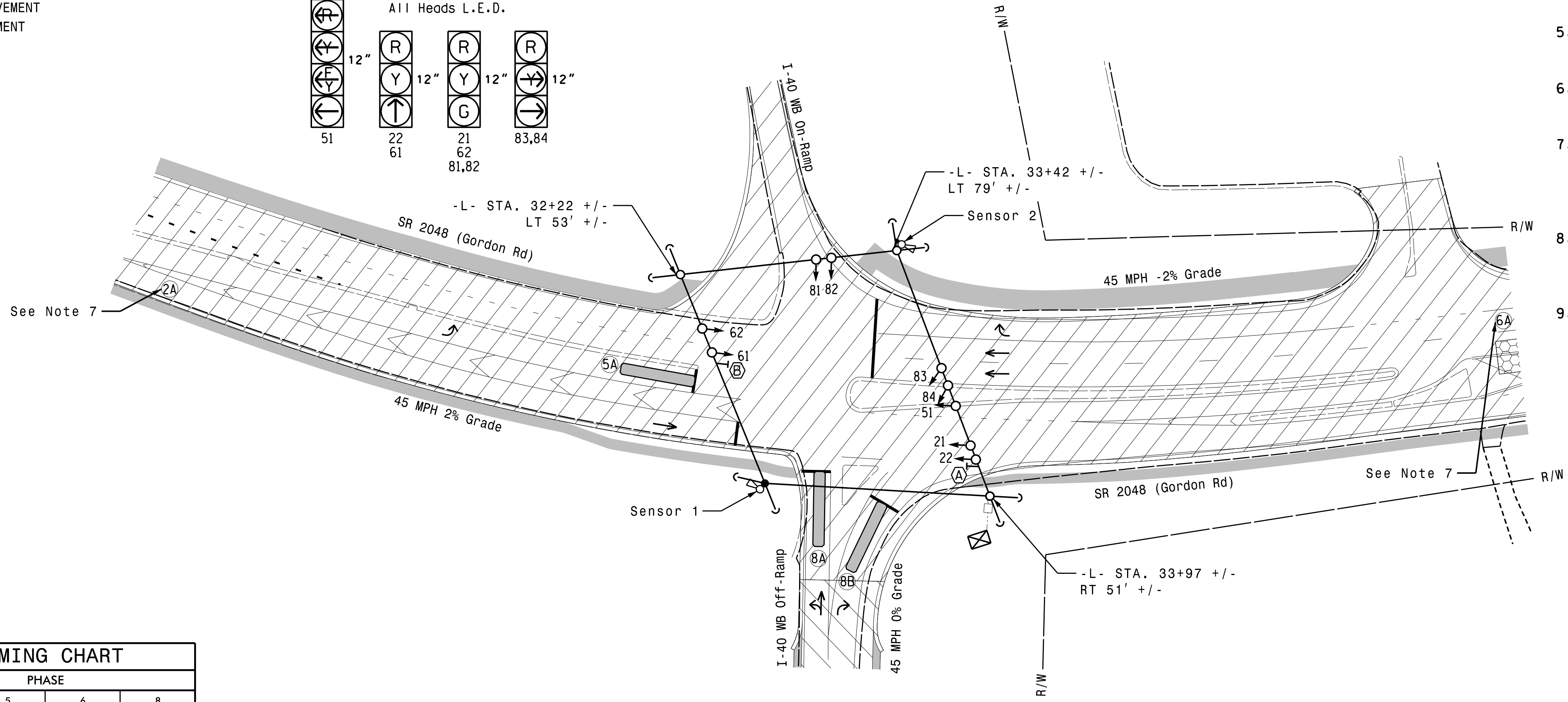
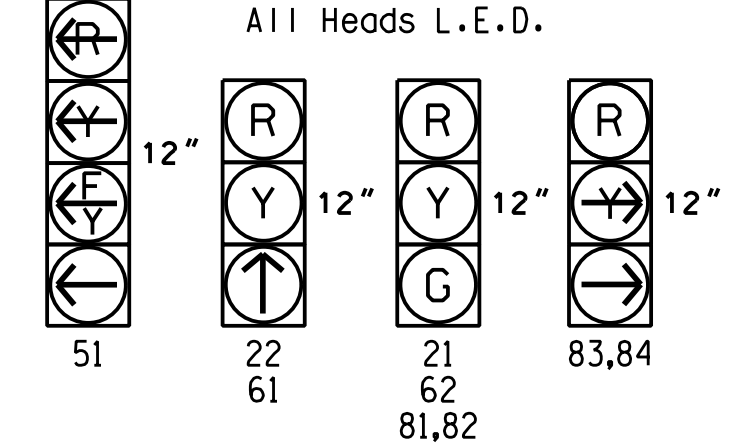
\* Multizone Microwave Detection  
 \*\* Reduce delay to 3 seconds during alternate phasing.  
 # Disable phase call for loop(s) during alternate phasing.

**3 Phase Fully Actuated Wilmington Signal System**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as to not obstruct sight distance of vehicles turning right on red.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data: Controller Asset #0258.

**SIGNAL FACE I.D.**



**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	12	5	12	5
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	90	35
Yellow Clearance	4.7	3.0	4.7	3.0
Red Clearance	1.6	2.1	1.6	3.3
Red Revert	2.0	2.0	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	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

**RADAR DETECTION SYSTEM**

FUNCTION	Sensor 1	Sensor 2
Channel	1	1
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5-6.5	1.0-6.5

**LEGEND**

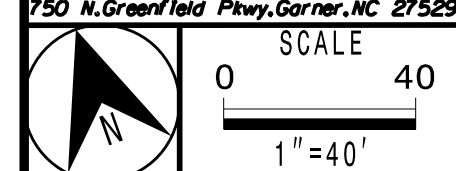
PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	○ → Modified Signal Head
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head	⊥ Pedestrian Signal Head
○ Signal Pole with Guy	○ Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	○ Signal Pole with Sidewalk Guy
○ Microwave Detection Zone	○ Microwave Detection Zone
○ Out of Pavement Detector	○ Out of Pavement Detector
□ Controller & Cabinet	□ Controller & Cabinet
□ Junction Box	□ Junction Box
○ 2-in Underground Conduit	○ 2-in Underground Conduit
— Right of Way	— Right of Way
→ Directional Arrow	→ Directional Arrow
▨ Construction Zone	▨ Construction Zone
▨ Wedge/Widen	▨ Wedge/Widen
▨ Temporary Pavement	▨ Temporary Pavement
▲ Curb Ramp	▲ Curb Ramp
ⓐ No Right Turn Sign (R3-1)	ⓐ No Right Turn Sign (R3-1)
ⓑ No Left Turn Sign (R3-2)	ⓑ No Left Turn Sign (R3-2)

Signal Upgrade-  
 Temporary Design 1  
 (Construction Phase 1)

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

	SR 2048 (Gordon Road) at I-40 WB Ramps		
	Division 3 New Hanover County Wilmington PLAN DATE: May 2022 PREPARED BY: E.E. Tiller REVISIONS: _____ INITI. DATE: _____	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons DATE: 5/17/2024 SIGNATURE: _____ DATE: _____	

**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

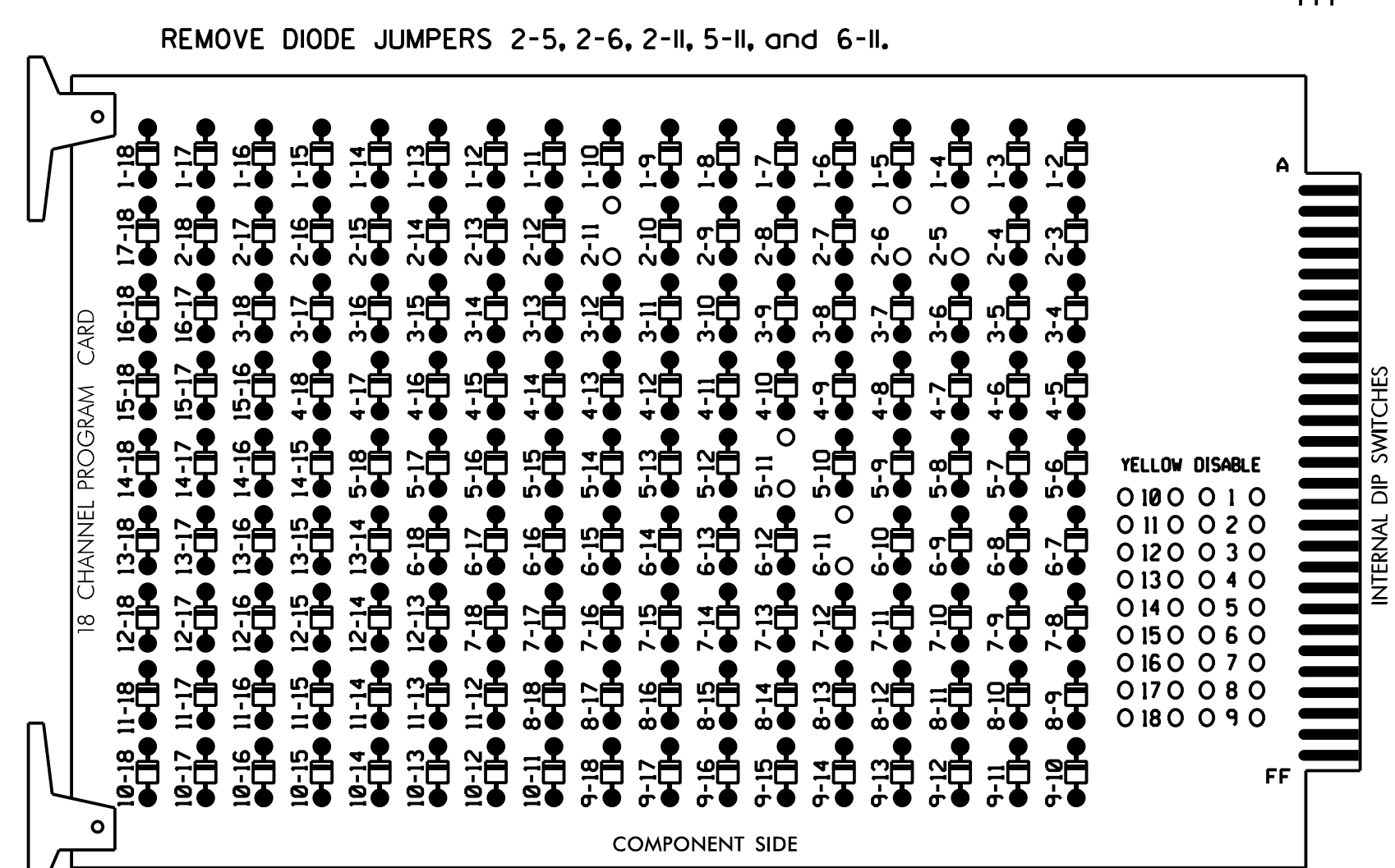


DocuSigned by:  
 Natasha R. Simmons  
 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-025811

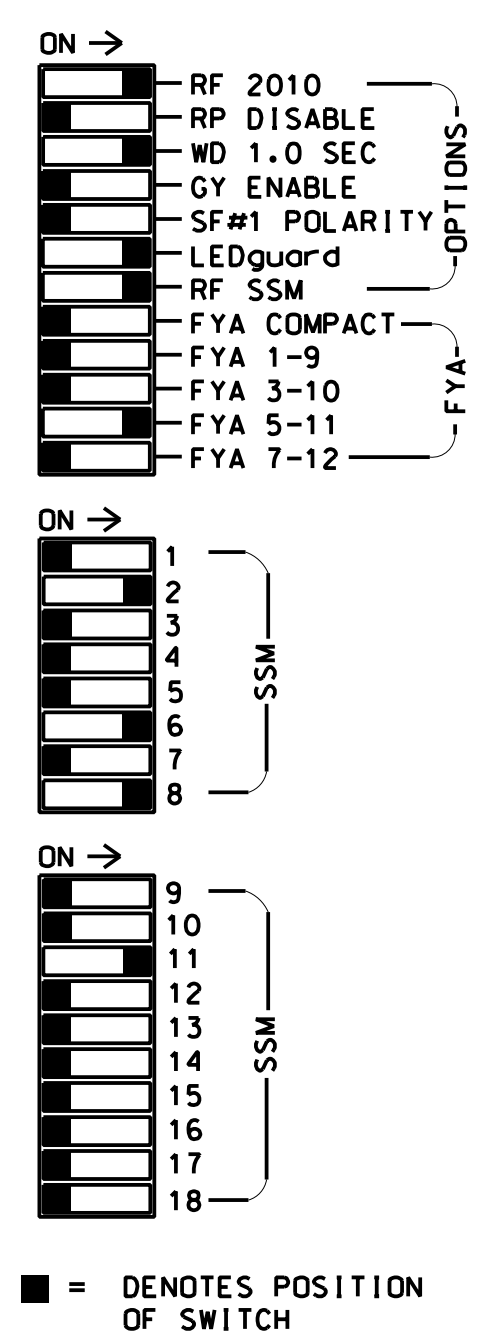


### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(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 are present on the monitor board.
  - Ensure th Red Enable is active 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 phases 2 and 6 for Startup in Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S7,S8,S11,AUX S4  
 PHASES USED.....2,5,6,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED

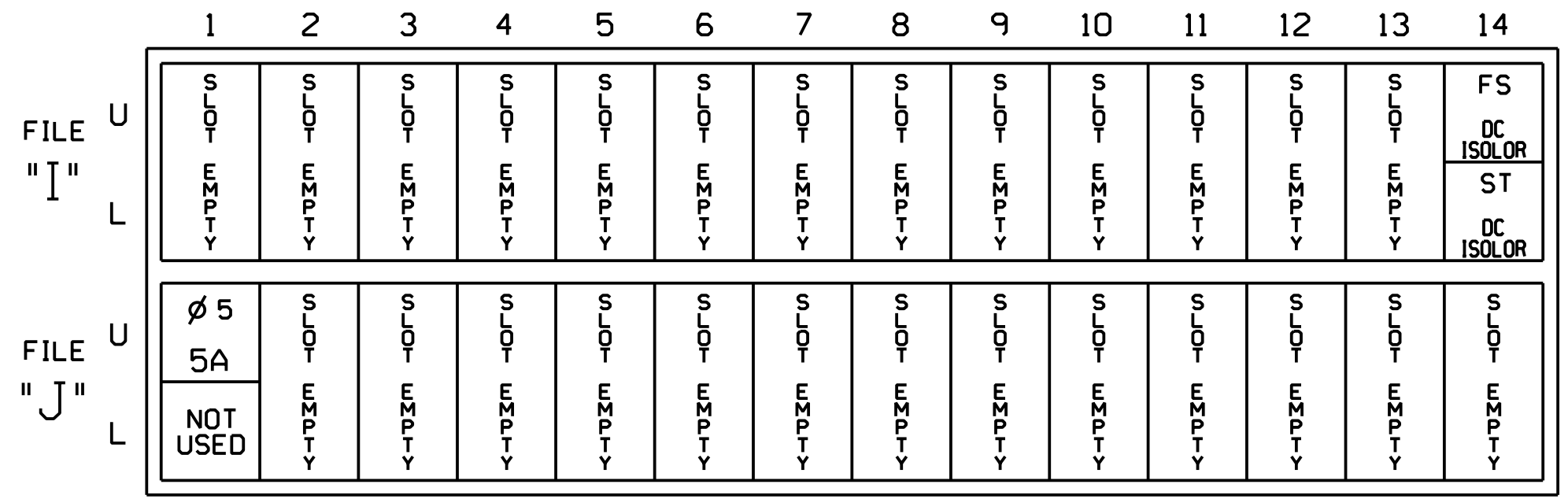
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	NU	51	61	62	NU	NU	81,82	83,84	NU	NU	NU	51	NU
RED	128	128							134	134			107	107					
YELLOW	129	129						*	135	135			108						
GREEN	130									136			109						
RED ARROW																			A114
YELLOW ARROW													108						A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW			130					133	136				109						
Hand icon																			
Person icon																			

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)



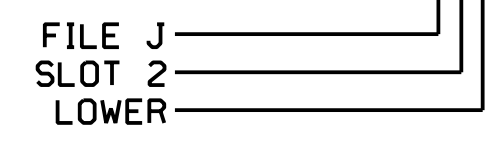
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

### 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
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	14U	47	9 ★	22	2	Y	Y			3
	-	J1U	55	17 ★	55	5	Y	Y			3

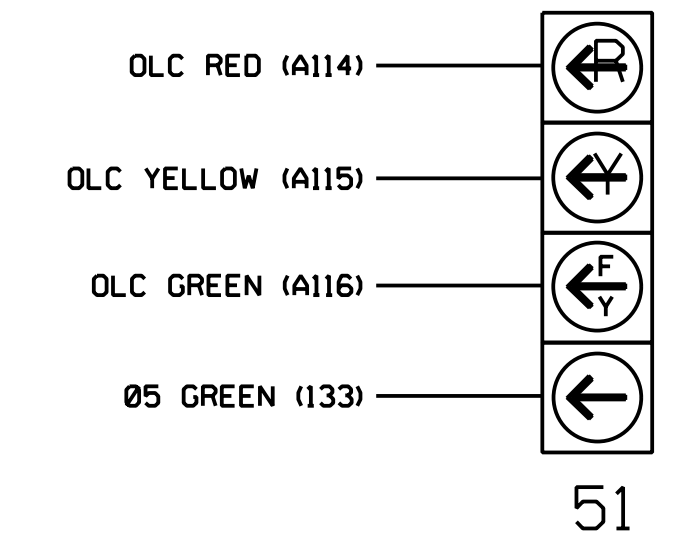
\* See Input Page Assignment programming details on sheet 3.

### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



### NOTE

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

### SPECIAL DETECTOR NOTE

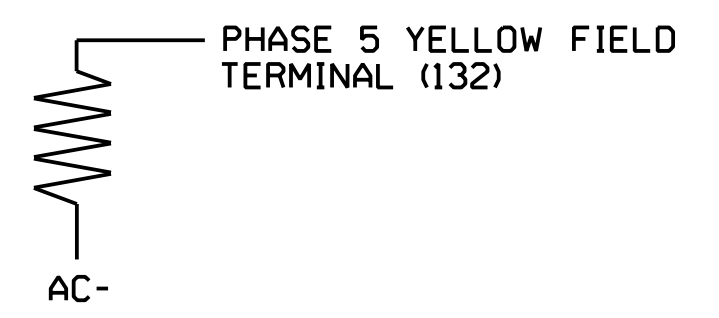
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish detection schemes shown on the Signal Design Plans.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T1  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

This plan supersedes the plan signed and sealed on 5/17/2024.



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

Signal Upgrade-  
 Electrical Detail - Sheet 1 of 4  
 (Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Division 3 New Hanover County Wilmington

SR 2048 (Gordon Rd) at I-40 WB Ramps

PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS: INIT. DATE

Signature: *Notasha R. Simmons* 11/8/2024  
 DATE: 11/8/2024  
 SIG. INVENTORY NO. 03-0258T1

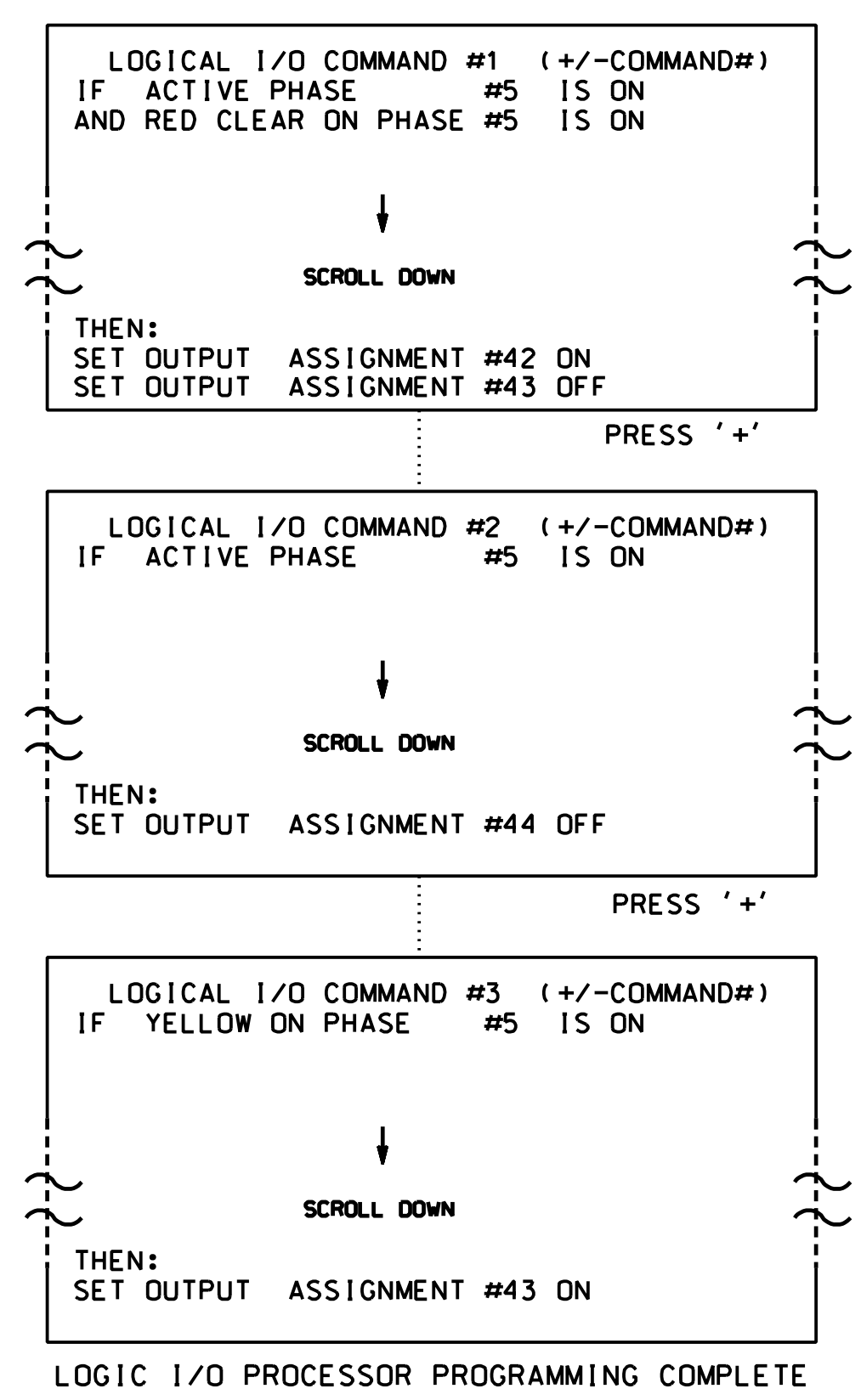
Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NOTASHA R. SIMMONS



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

*(program controller as shown below)*

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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

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

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

<b>OUTPUT REFERENCE SCHEDULE</b>	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green

**OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING**

*(program controller as shown below)*

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

```

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING**

*(program controller as shown below)*

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

PRESS '+' TWICE

NOTICE PAGE 2 →

```

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

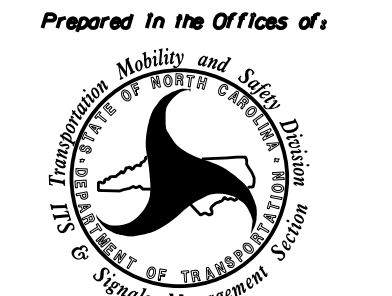
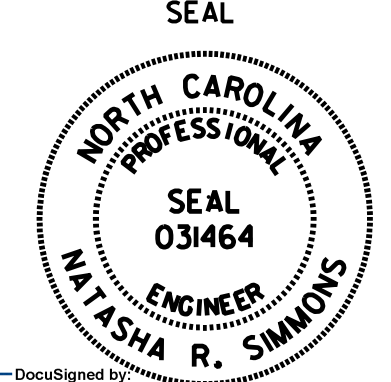
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 2 of 4  
(Construction Phase 1)

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

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NC License No: C-1554  
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 2048 (Gordon Rd) at I-40 WB Ramps	SEAL  SEAL 031464 ENGINEER NATASHA R. SIMMONS
	Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE _____ _____ _____



### 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 3 SECONDS.

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

```

PAGE: 2 C1 PIN:47 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....9
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).....22
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 5A - PHASE 2)

```

PAGE: 2 C1 PIN:47 NOT ENABLED
INPUT ASSIGNMENT #.....9
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 17

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
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).....5
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 '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
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).....55
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 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.

```

VEHICLE DETECTOR #55 SETTINGS (+,-,1-64)
SETTING: (Y/N)
ENABLE DETECTOR.....N
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....Y
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE# ;12345678910111213141516
PHASES ASSIGNED ;
SWITCH/DUPLICATE;
LOOP SIZE (0-255 FT).....6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....0
MAX CALLS/MIN (0-255).....255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0
MAX OCCUPANCY (0-100%).....100
EXTENSION DISABLE TIME (0-255 SEC).....0
QUEUE MAX OCCUPANCY TIME (0-255).....0
QUEUE GAP RESET TIME (0-25.5).....0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0

```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '3'

```

VEHICLE DETECTOR #55 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).....3
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

```

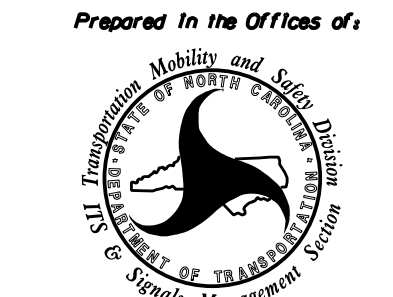
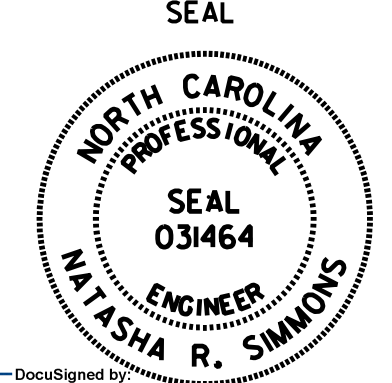

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 3 of 4  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at I-40 WB Ramps		
	Division 3	New Hanover County	
Prepared in the Office of:	PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich	DocuSigned by:  5/17/2024
	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	
	REVISIONS	INIT.	DATE



## 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 phases for head 51 to run protected turns only.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T1  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

Signal Upgrade-  
 Electrical Detail - Sheet 4 of 4  
 (Construction Phase 1)

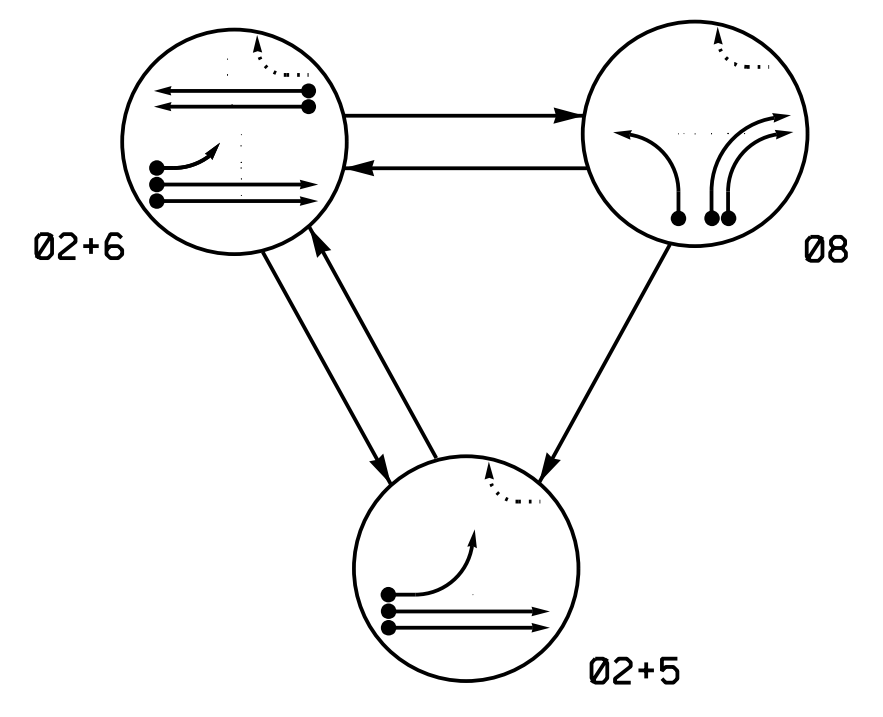
**DOCUMENT NOT CONSIDERED FINAL  
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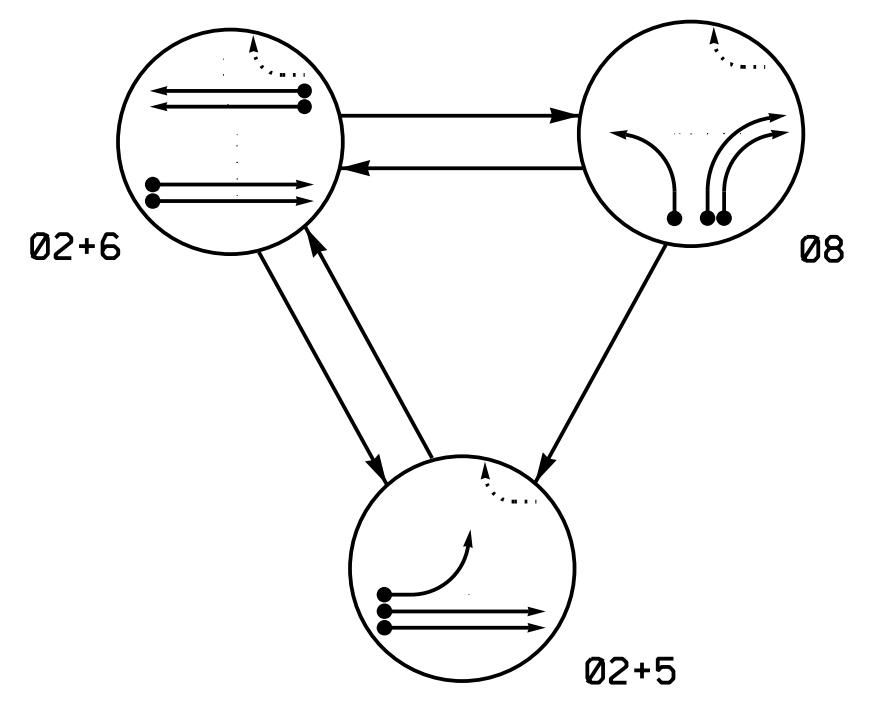
ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Office of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 2048 (Gordon Rd) at I-40 WB Ramps  Division 3    New Hanover County    Wilmington	SEAL  NATASHA R. SIMMONS					
PLAN DATE: August 2023    REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons		DocuSigned by:  NATASHA R. SIMMONS    5/17/2024 DATE SIG. INVENTORY NO. 03-0258T1					
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REVISIONS	INIT.	DATE					



**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

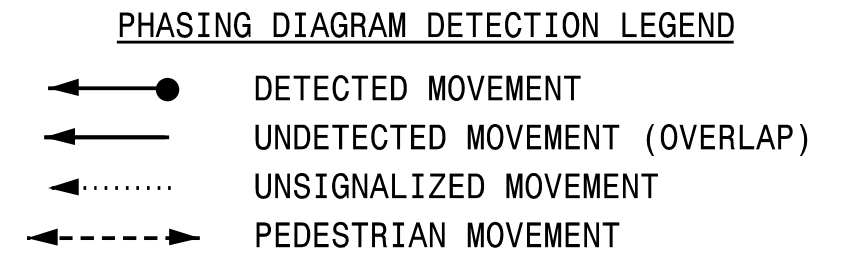
SIGNAL FACE	PHASE			
	02+5	02+6	08	F
21	G	G	R	Y
22	↑	↑	R	Y
51	←	←	←	←
61	R	↑	R	Y
62	R	G	R	Y
81,82	←	←	←	←
83,84	R	R	←	R

**ALTERNATE PHASING TABLE OF OPERATION**

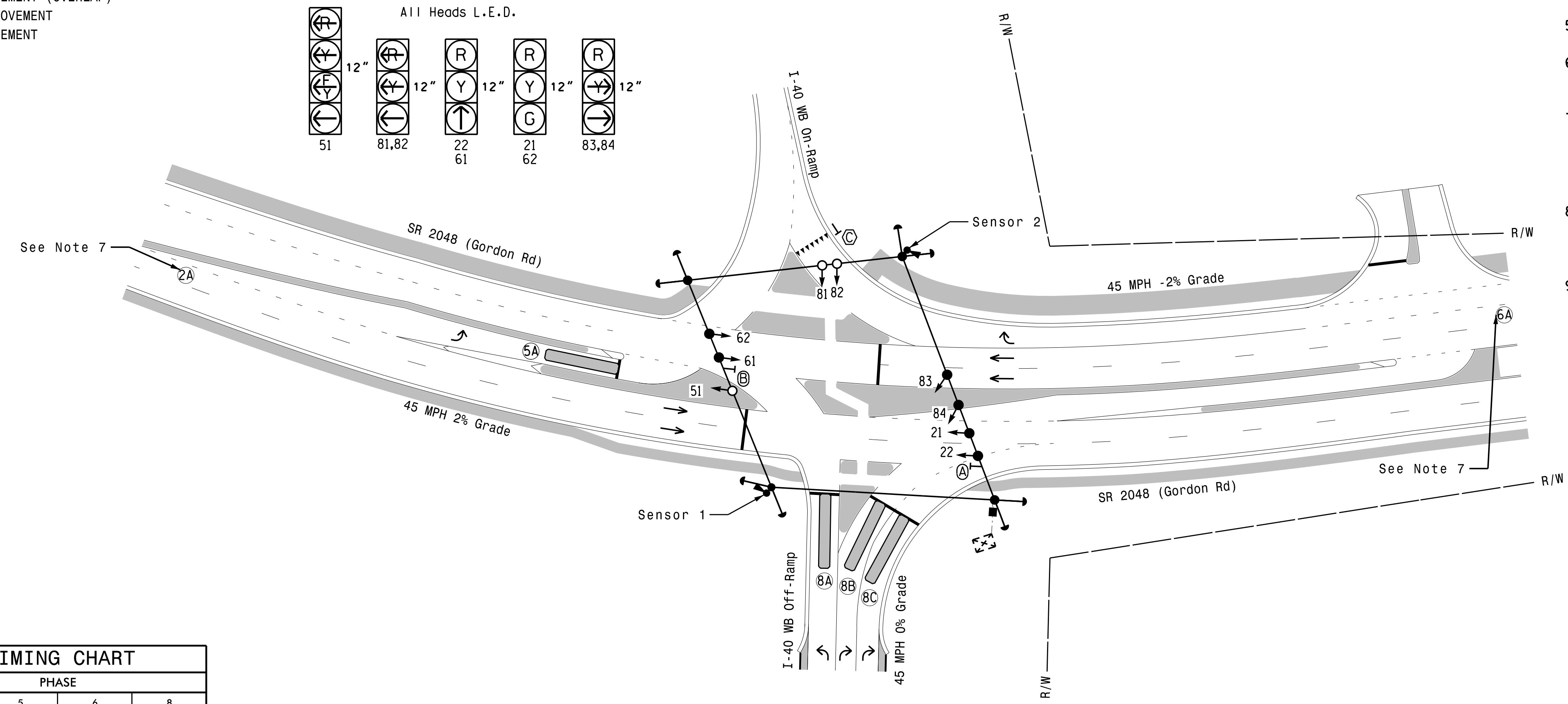
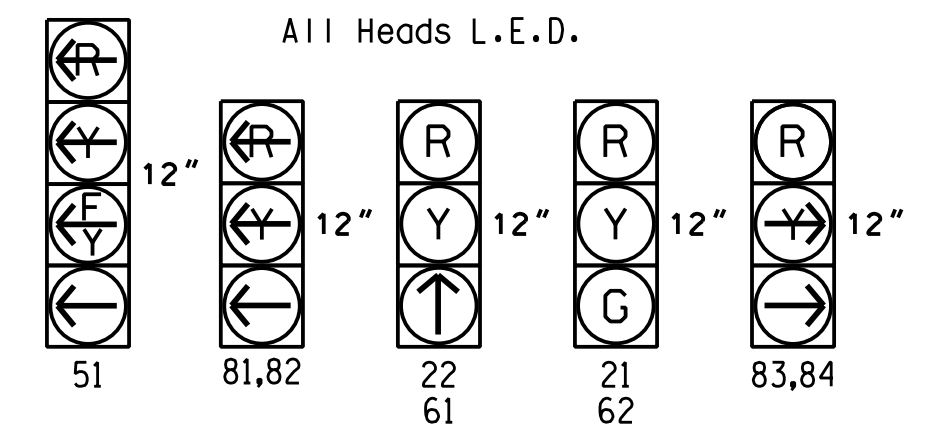
SIGNAL FACE	PHASE			
	02+5	02+6	08	F
21	G	G	R	Y
22	↑	↑	R	Y
51	←	←	←	←
61	R	↑	R	Y
62	R	G	R	Y
81,82	←	←	←	←
83,84	R	R	←	R

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
5A	6x40	0	*	*	5	Y	Y	-	15**	-	-
8A	6x40	0	*	*	2#	Y	Y	-	3	-	-
8B	6x40	0	*	*	8	Y	Y	-	15	-	-
8C	6x40	0	*	*	8	Y	Y	-	15	-	-



**SIGNAL FACE I.D.**



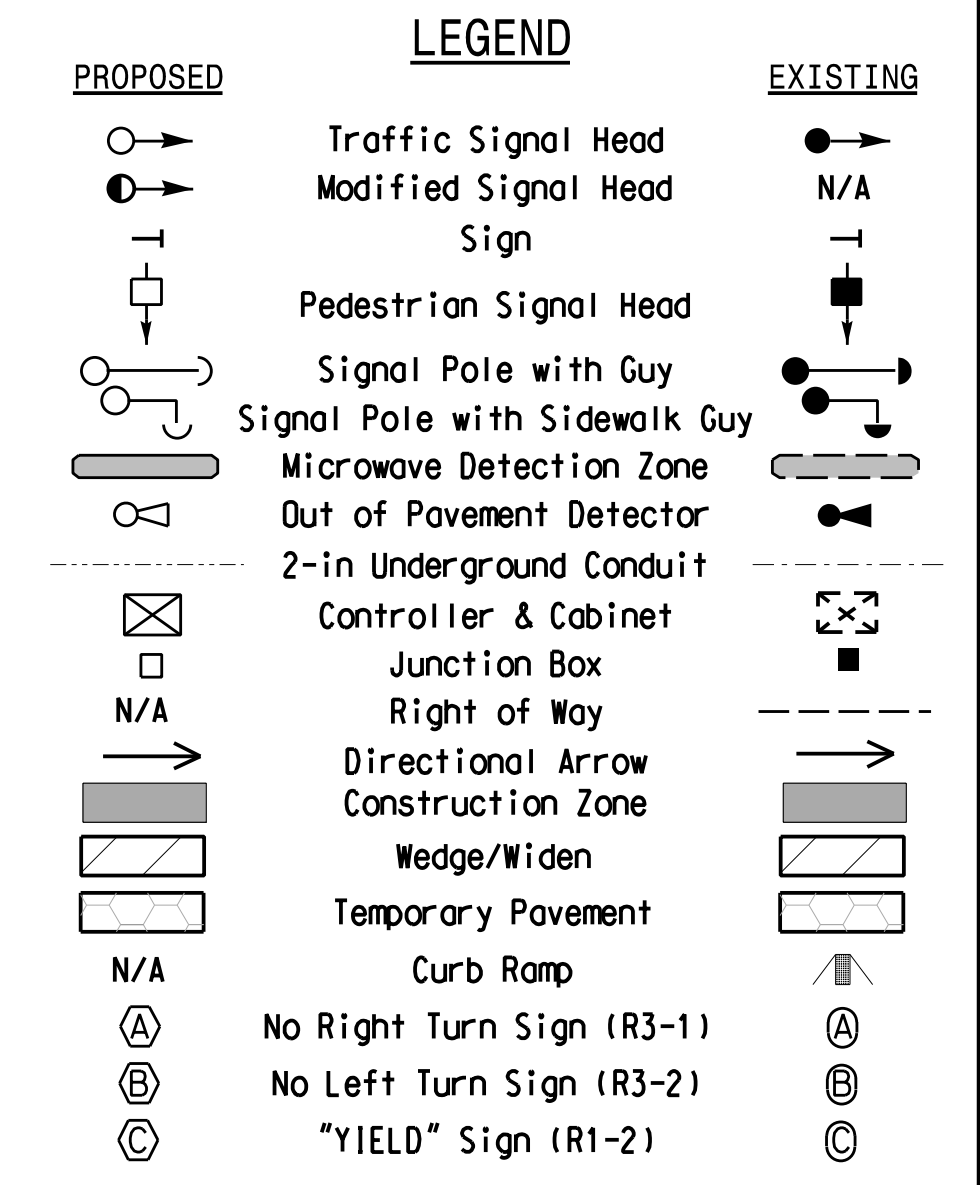
- NOTES**
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
  - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
  - Phase 5 may be lagged.
  - Reposition signal head number 84 and Sign (A).
  - Set all detector units to presence mode.
  - The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
  - This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
  - Signal system data: Controller Asset #0258.

**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	12	5	12	5
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	90	35
Yellow Clearance	4.7	3.0	4.7	3.0
Red Clearance	2.2	1.6	2.2	4.3
Red Revert	2.0	2.0	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	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

**RADAR DETECTION SYSTEM**

FUNCTION	Sensor 1	Sensor 2
Channel	1	1
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	1.0-6.5	1.0-6.5



Signal Upgrade-  
Temporary Design 2  
(Construction Phase 2)

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

Prepared for: **SR 2048 (Gordon Road) at I-40 WB Ramps**

Division 3 New Hanover County Wilmington

PLAN DATE: May 2022 REVIEWED BY: N.K. Vlanich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1" = 40'

DocuSigned by: **Natasha R. Simmons** 5/17/2024

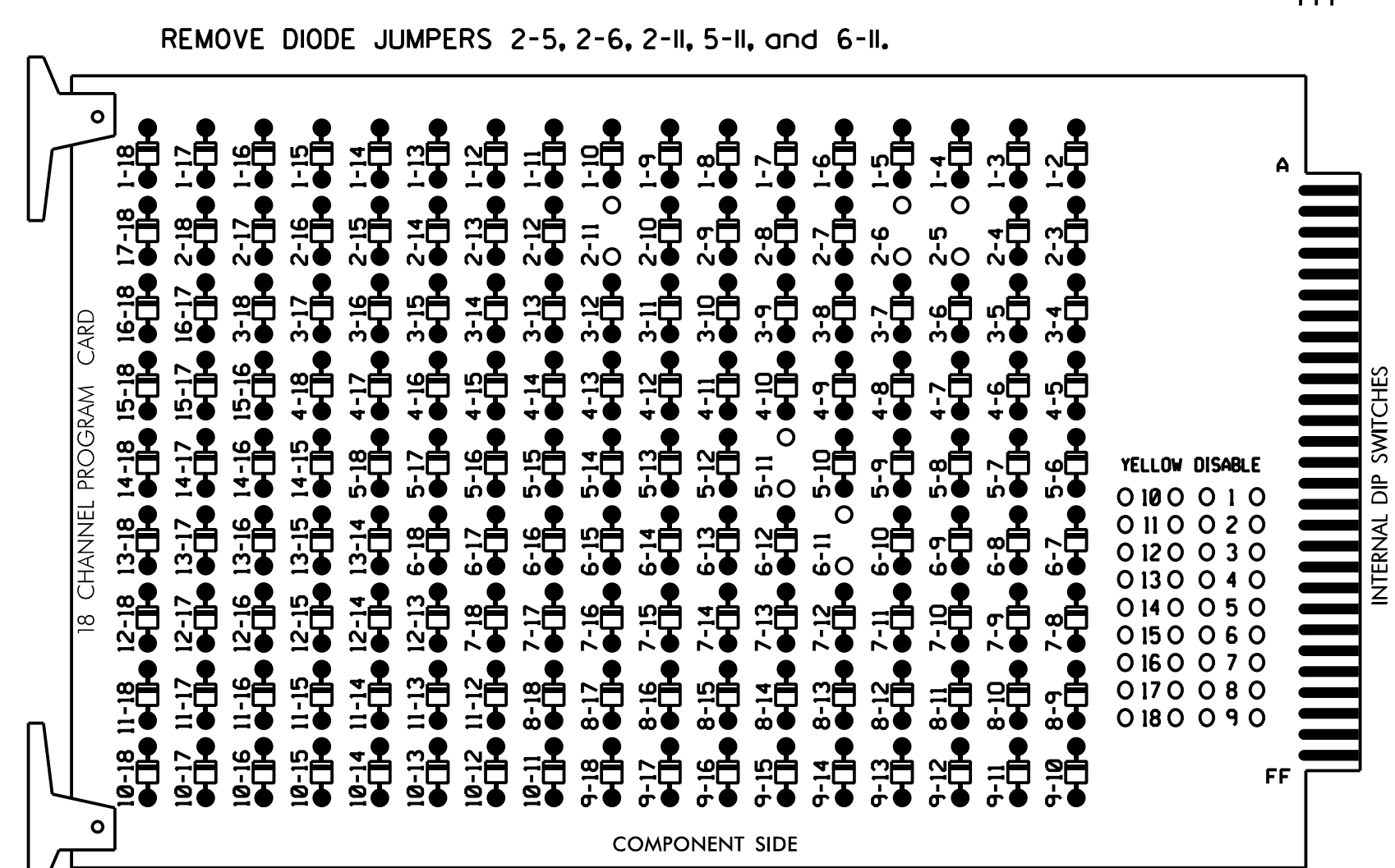
SIG. INVENTORY NO. 03-0258T2

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Raleigh, North Carolina 27609  
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### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

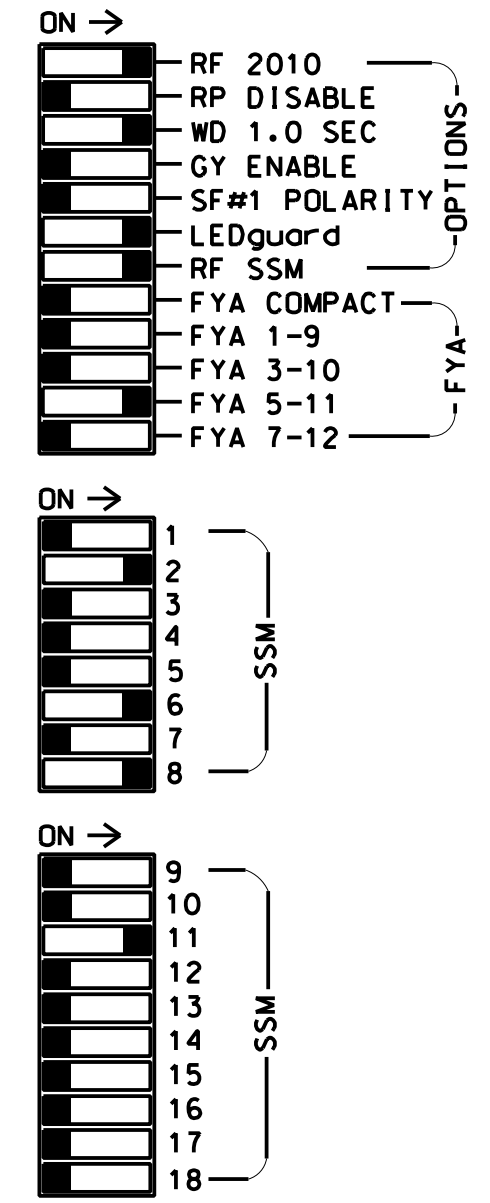
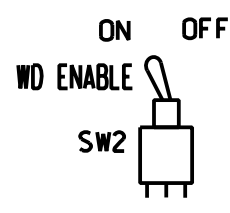
(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 are present on the monitor board.
3. Ensure th Red Enable is active all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



### NOTES

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

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S7,S8,S11,AUX S4  
 PHASES USED.....2,5,6,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED

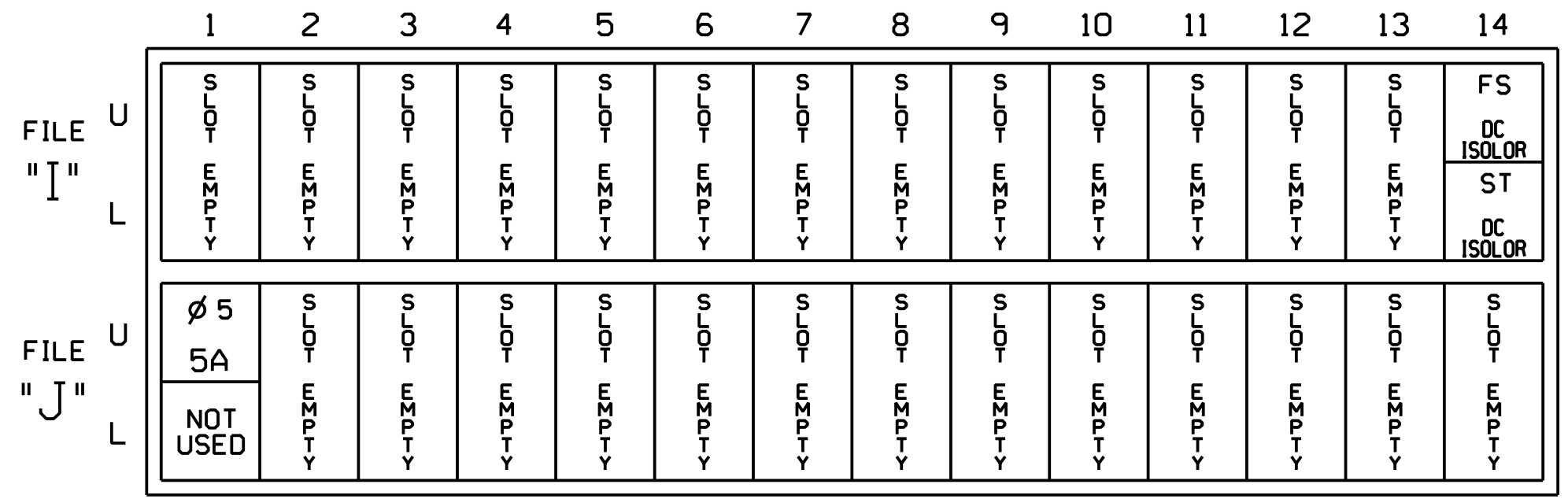
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE		
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	NU	51	61	62	NU	NU	81,82	83,84	NU	NU	NU	51	NU	
RED	128	128							134	134				107						
YELLOW	129	129						*	135	135										
GREEN	130									136										
RED ARROW													107						A114	
YELLOW ARROW														108	108					A115
FLASHING YELLOW ARROW																				A116
GREEN ARROW			130					133	136				109	109						
Hand icon																				
Person icon																				

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)



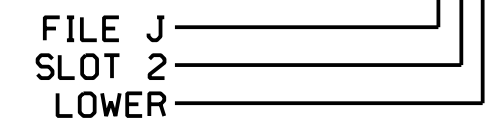
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

### 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
5A <sup>1</sup>	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	14U	47	9 ★	22	2	Y	Y			3
	-	J1U	55	17 ★	55	5	Y	Y			3

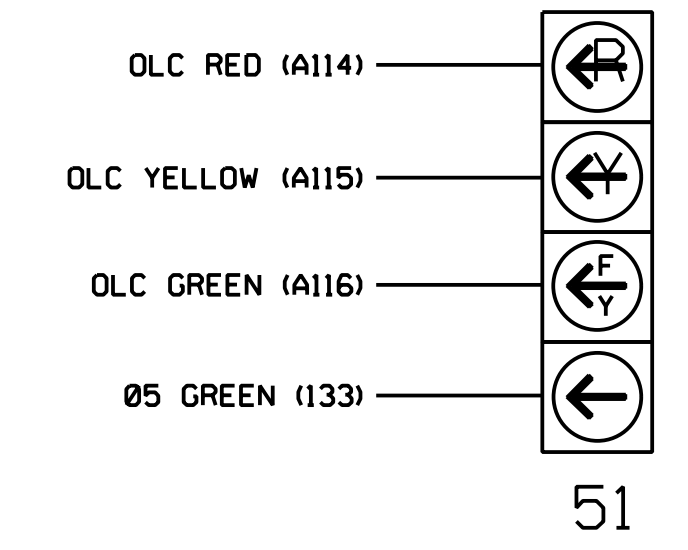
\* See Input Page Assignment programming details on sheet 3.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



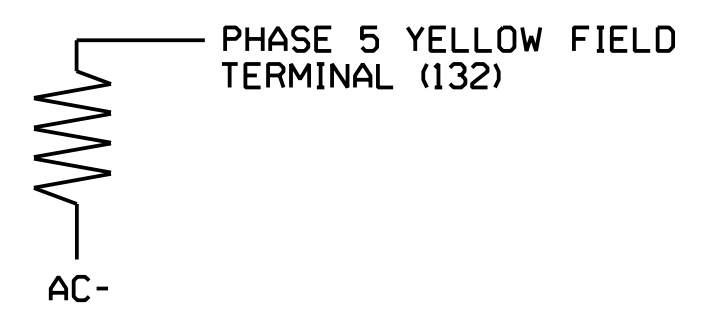
#### NOTE

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

### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



This plan supersedes the plan signed and sealed on 5/17/2024.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T2  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:



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

Signal Upgrade-  
 Electrical Detail - Sheet 1 of 4  
 (Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

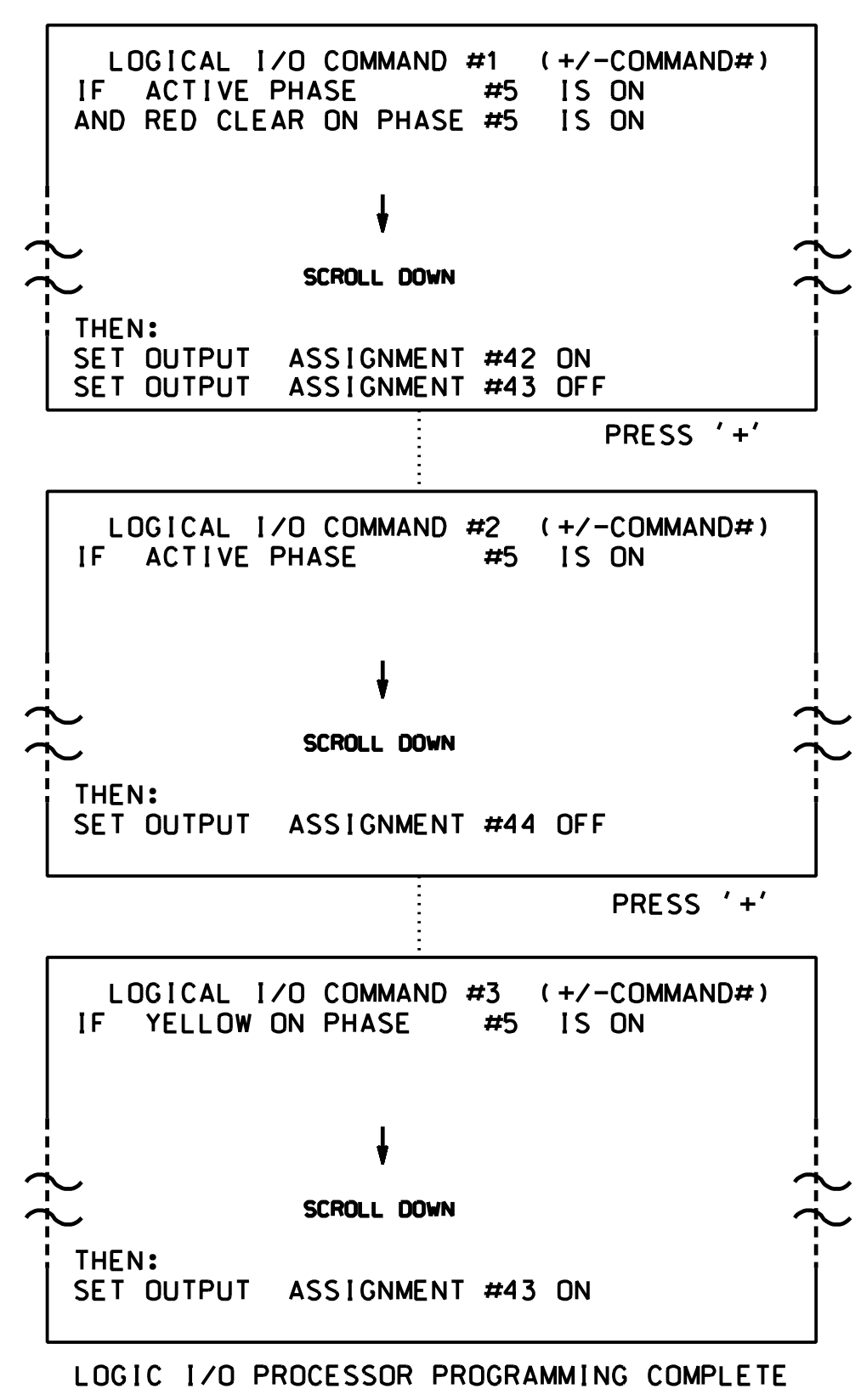
Prepared in the Office of:  
  
 SR 2048 (Gordon Rd) at I-40 WB Ramps  
 Division 3 New Hanover County Wilmington  
 PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons  
 REVISIONS: INIT. DATE  
 Signature: *Matthew R. Simmons* 11/8/2024  
 DATE: \_\_\_\_\_  
 SIG. INVENTORY NO. 03-0258T2



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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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

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

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

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

### OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

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

```

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

### 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 →

```

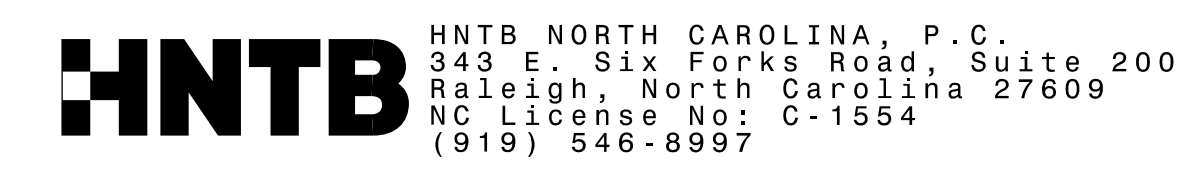
PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS:  X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN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

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 2 of 4  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Office of:  STATE OF NORTH CAROLINA Department of Transportation 750 N. Greenfield Pkwy, Garner, NC 27529	SR 2048 (Gordon Rd) at I-40 WB Ramps		SEAL  SEAL 031464 ENGINEER NATASHA R. SIMMONS
	Division 3 PLAN DATE: August 2023 PREPARED BY: E.E. Tiller	New Hanover County REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	







## 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 phases for head 51 to run protected turns only.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258T2  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

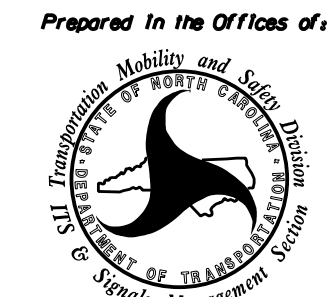
Signal Upgrade-  
 Electrical Detail - Sheet 4 of 4  
 (Construction Phase 2)

**DOCUMENT NOT CONSIDERED FINAL  
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 Raleigh, North Carolina 27609  
 NC License No: C-1554  
 (919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

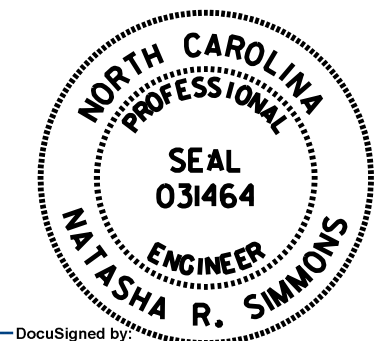
*Prepared in the Offices of:*



750 N. Greenfield Pkwy, Garner, NC 27529

SR 2048 (Gordon Rd) at I-40 WB Ramps	
Division 3 New Hanover County Wilmington	
PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL

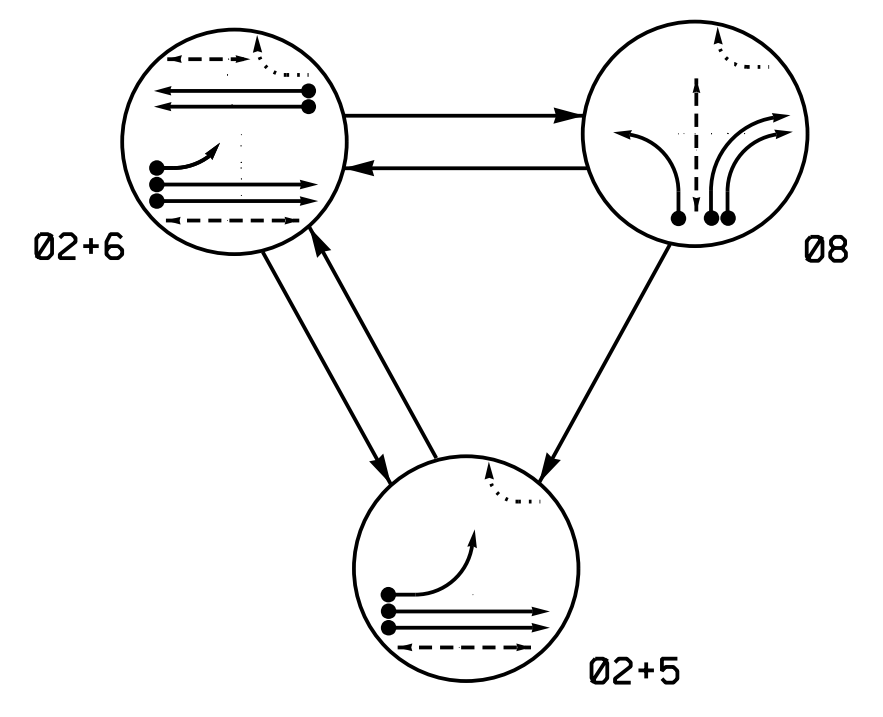


NATASHA R. SIMMONS

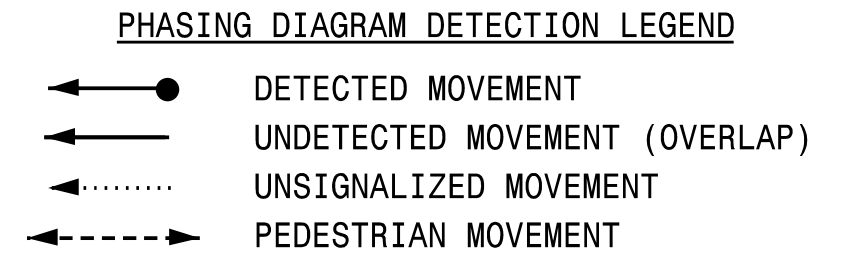
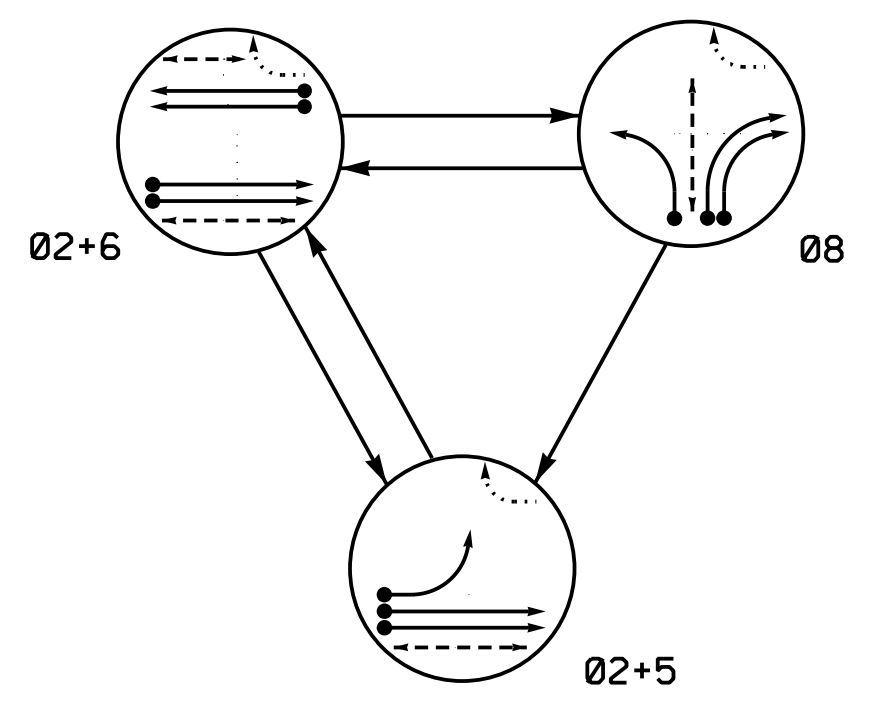
DocuSigned by:  
 Natasha R. Simmons 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-0258T2



DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	08	F
21	G	G	R	Y
22	↑	↑	R	Y
51	—	—	R	Y
61	R	↑	R	Y
62	R	G	R	Y
81,82	—R	—R	—	—R
83,84	R	R	—	R
P21,P22,P23,P24	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82,P83,P84	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	08	F
21	G	G	R	Y
22	↑	↑	R	Y
51	—	—	R	Y
61	R	↑	R	Y
62	R	G	R	Y
81,82	—R	—R	—	—R
83,84	R	R	—	R
P21,P22,P23,P24	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82,P83,P84	DW	DW	W	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
5A	6x40	0	*	*	5	Y	Y	-	15**	-	-
8A	6x40	0	*	*	8	Y	Y	-	-	-	-
8B	6x40	0	*	*	8	Y	Y	-	-	-	-
8C	6x40	0	*	*	8	Y	Y	-	-	-	-

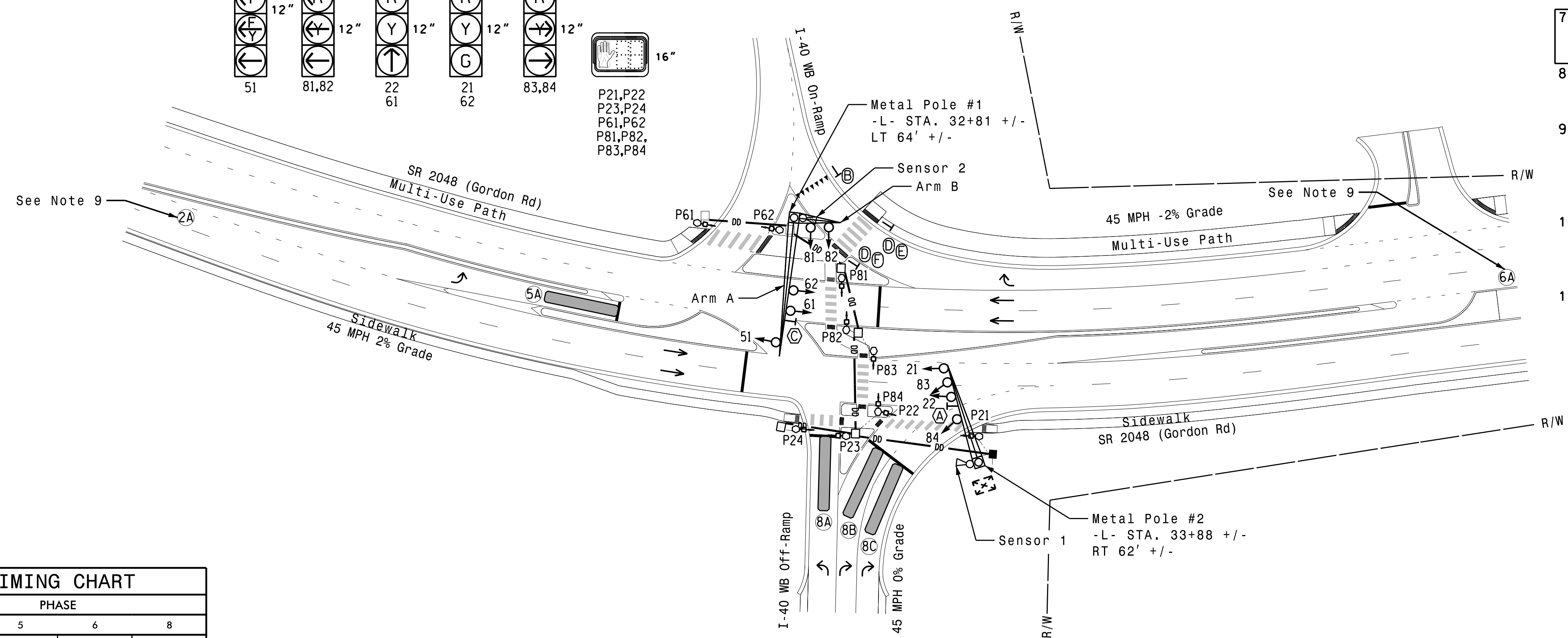
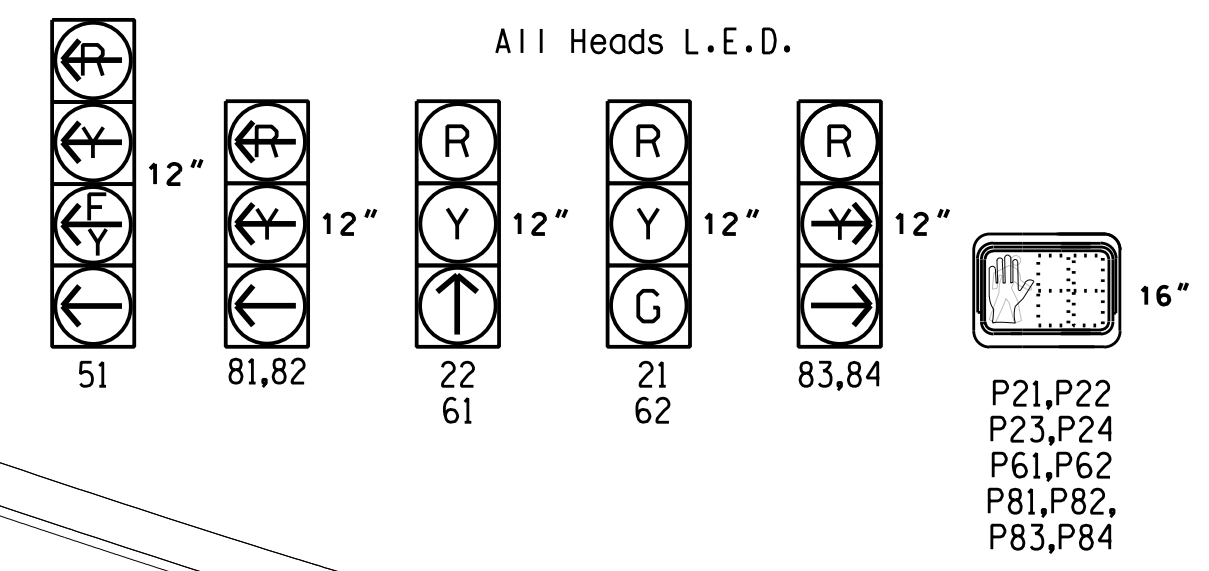
\* Multizone Microwave Detection  
 \*\* Disable Delay During Alternate Phasing Operation.  
 # Disable phase call for loop(s) during alternate phasing.

3 Phase Fully Actuated Wilmington Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 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.
- All pedestrian pushbuttons shall be located in the field by the Division Traffic Engineer before installation.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses multizone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data: Controller Asset #0258.

SIGNAL FACE I.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	12	5	12	5
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	90	35
Yellow Clearance	4.7	3.0	4.7	3.0
Red Clearance	2.2	2.3	2.2	4.3
Red Revert	5.0	2.0	5.0	2.0
Walk 1 *	7	-	7	7
Don't Walk 1	9	-	4	5
Advanced Walk *	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

\* 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.

RADAR DETECTION SYSTEM

FUNCTION	Sensor 1	Sensor 2
Channel	1	1
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	1.0-6.5	1.0-6.5

LEGEND

PROPOSED	EXISTING
○ Traffic Signal Head	● Traffic Signal Head
○ Modified Signal Head	N/A
⊥ Sign	⊥ Sign
○ Pedestrian Signal Head	⊥ Pedestrian Signal Head
○ Signal Pole with Guy	○ Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	○ Signal Pole with Sidewalk Guy
○ Microwave Detection Zone	○ Microwave Detection Zone
○ Out of Pavement Detector	○ Out of Pavement Detector
○ Controller & Cabinet	○ Controller & Cabinet
○ Junction Box	○ Junction Box
○ 2-in Underground Conduit	○ 2-in Underground Conduit
N/A Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
○ Directional Drill	N/A
○ Metal Pole with Mastarm	○ Metal Pole with Mastarm
○ Type II Signal Pedestal	○ Type II Signal Pedestal
N/A Curb Ramp	△ Curb Ramp
⊙ No Right Turn Sign (R3-1)	⊙ No Right Turn Sign (R3-1)
⊙ "YIELD" Sign (R1-2)	⊙ "YIELD" Sign (R1-2)
⊙ No U-Turn/No Left Turn Sign (R3-18)	⊙ No U-Turn/No Left Turn Sign (R3-18)
⊙ Pedestrian Crossing Sign (W11-2)	⊙ Pedestrian Crossing Sign (W11-2)
⊙ Diagonal Arrow Plaque (W16-7pL)	⊙ Diagonal Arrow Plaque (W16-7pL)
⊙ Diagonal Arrow Plaque (W16-7pR)	⊙ Diagonal Arrow Plaque (W16-7pR)

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2048 (Gordon Road) at I-40 WB Ramps

Division 3 New Hanover County Wilmington

PLAN DATE: May 2022 REVIEWED BY: N.K. Vlanich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

SCALE: 1"=40'

REVISIONS: INITI. DATE

DocuSigned by: *Nelasha R. Simmons* 5/17/2024

SIGNATURE: DATE

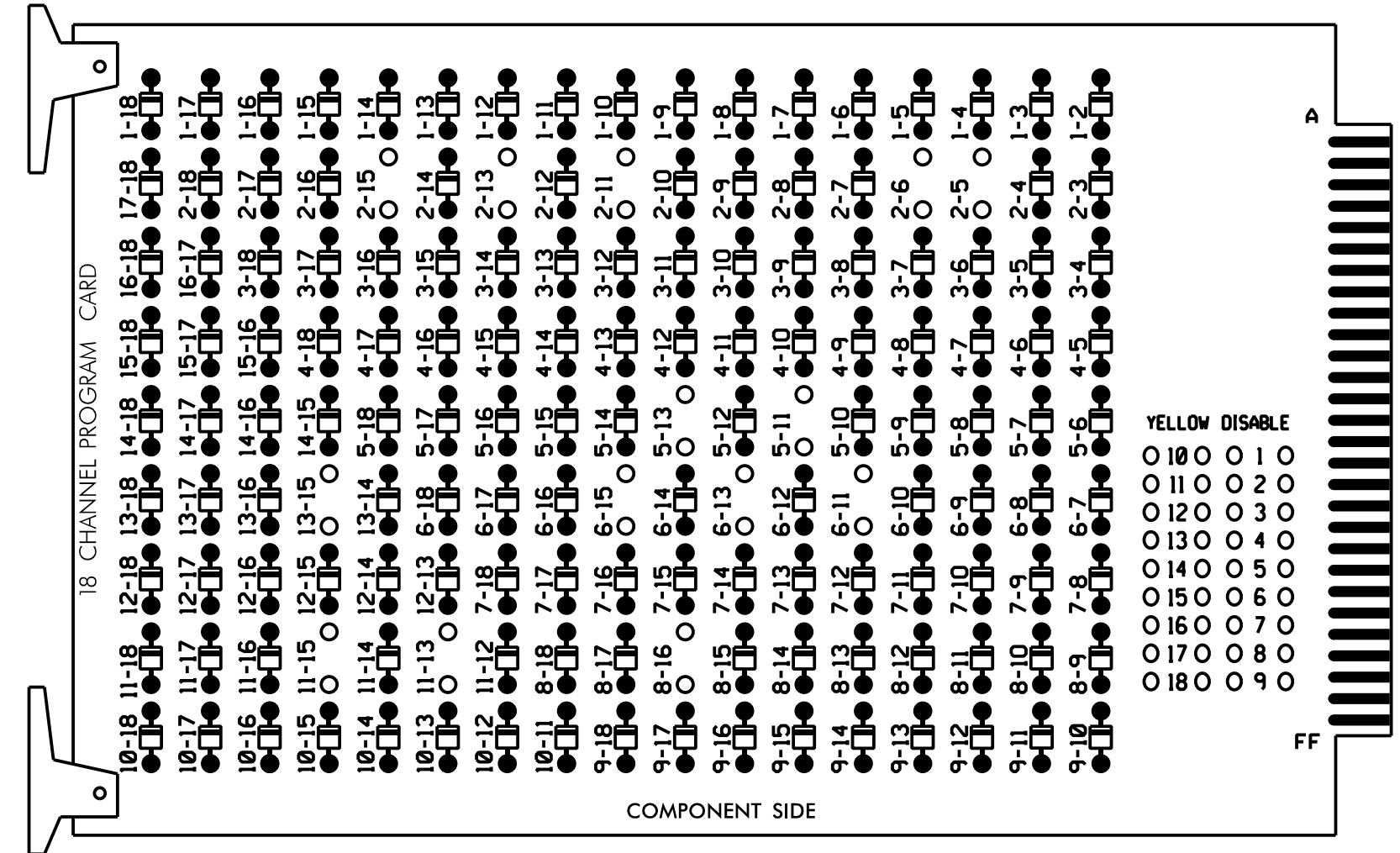
SIG. INVENTORY NO. 03-0258



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

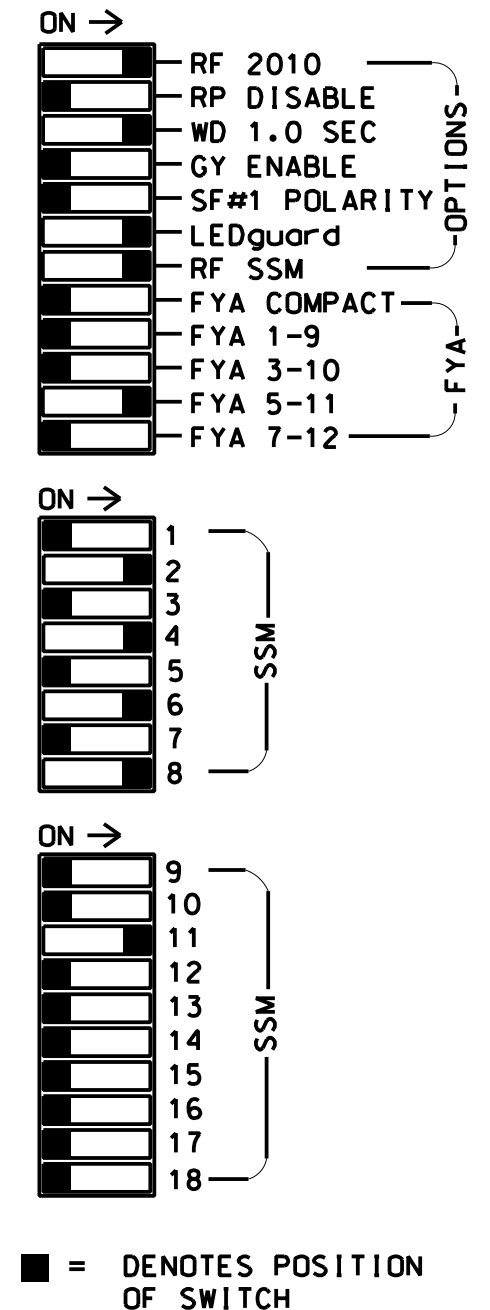
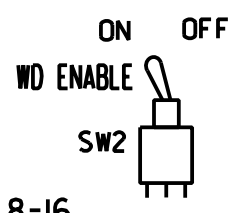
REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 2-13, 2-15, 5-11, 5-13, 6-11, 6-13, 6-15, 8-16, 11-13, 11-15, and 13-15.



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 are present on the monitor board.
- Ensure th Red Enable is active 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 phases 2 and 6 for Startup in Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S3,S7,S8,S9,S11,S12,AUX S4  
 PHASES USED.....2.2 PED,4.5.6.6 PED,8.8 PED  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED

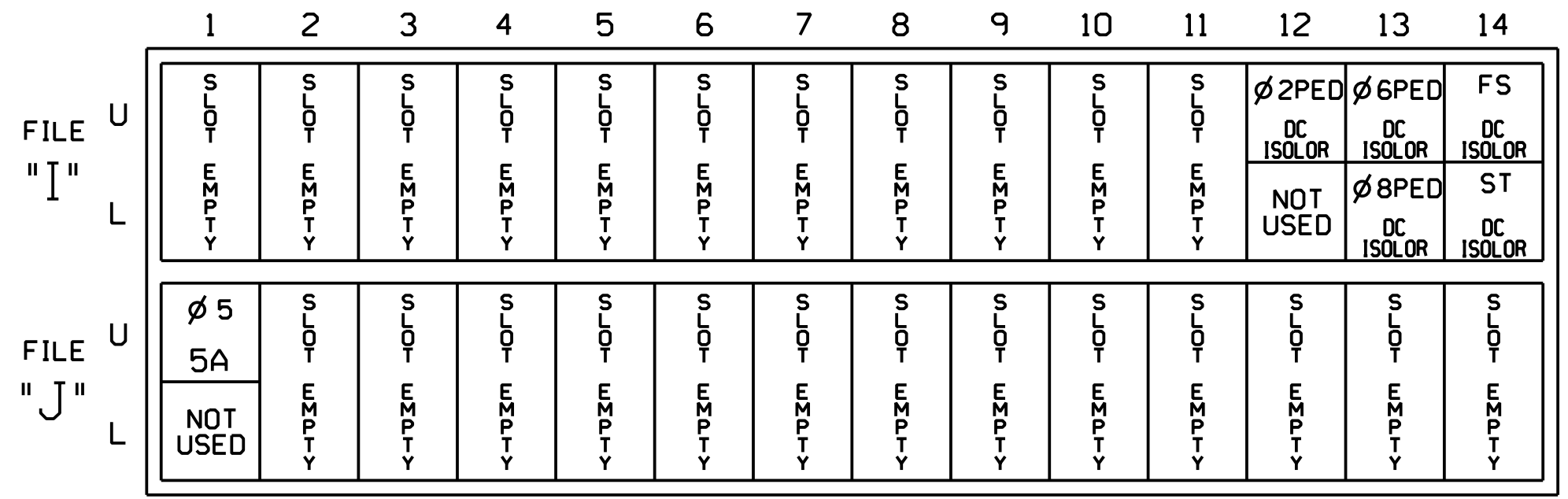
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21	22	221,222,223,224	NU	NU	NU	51	61	62	661,662	NU	81,82	83,84	881,882,883,884	NU	NU	51	NU
RED		128	128							134	134				107				
YELLOW		129	129					*	135	135									
GREEN		130								136									
RED ARROW																			A114
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW																			
Hand icon																			
Person icon																			

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

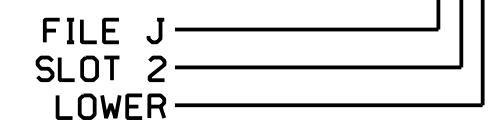
### INPUT FILE CONNECTION & PROGRAMMING CHART

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
5A <sup>1</sup>	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	14U	47	9 ★	22	2	Y	Y			
	-	J1U	55	17 ★	55	5	Y	Y			
PED PUSH BUTTONS											
P21,P22, P23,P24	T88-4,6	I12U	67	29	PED 2	2 PED					
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					
P81,P82, P83,P84	T88-8,9	I13L	70	32	PED 8	8 PED					

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

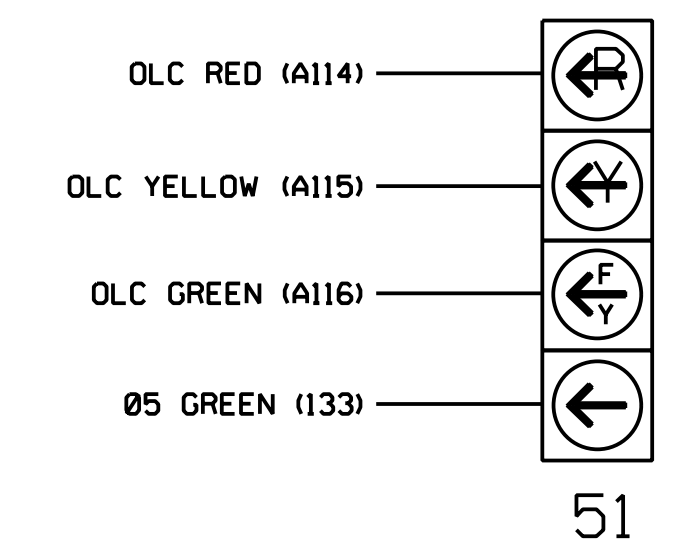
\* See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



### SPECIAL DETECTOR NOTE

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

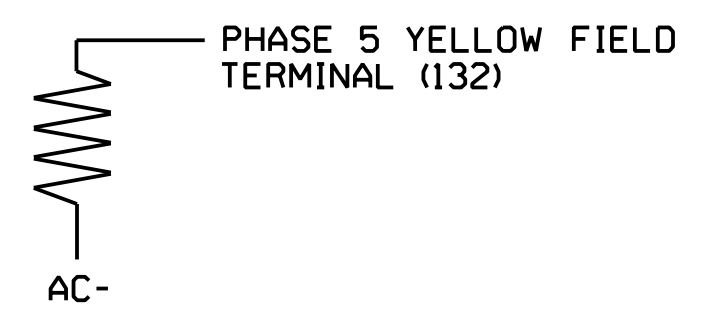
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

This plan supersedes the plan signed and sealed on 5/17/2024.



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

Signal Upgrade - Final Design  
 Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

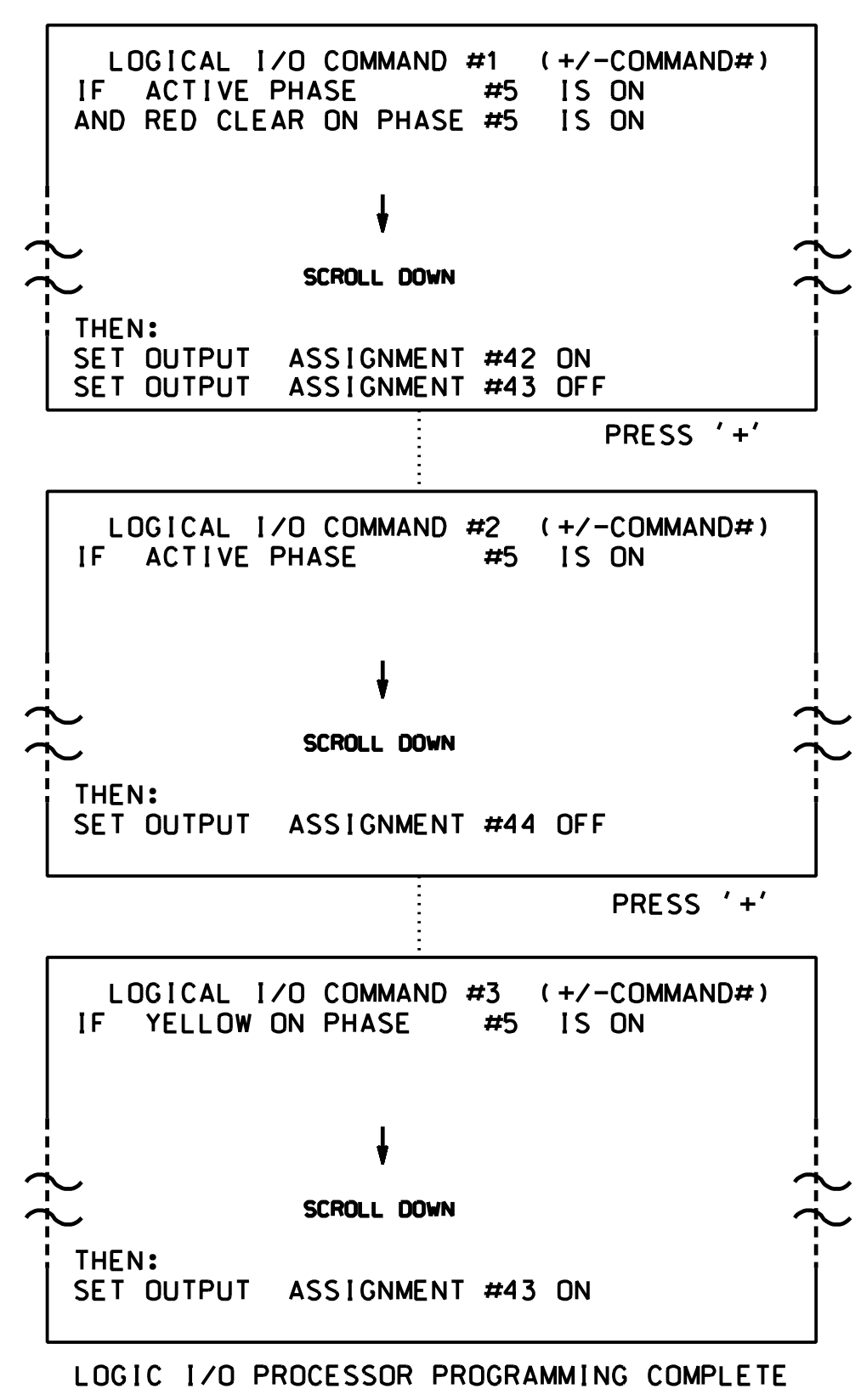
ELECTRICAL AND PROGRAMMING DETAILS FOR: 	SR 2048 (Gordon Rd)		SEAL 
	at I-40 WB Ramps		
Prepared in the Office of: 	Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons		REVISIONS INIT. DATE
750 N. Greenfield Pkwy, Garner, NC 27529			DocuSigned by: Natasha R. Simmons 11/8/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-0258



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

*(program controller as shown below)*

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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

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

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

<b>OUTPUT REFERENCE SCHEDULE</b>	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green

**OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING**

*(program controller as shown below)*

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

PRESS '+\' TWICE

```

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING**

*(program controller as shown below)*

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

PRESS '+\' TWICE

NOTICE PAGE 2 →

```

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

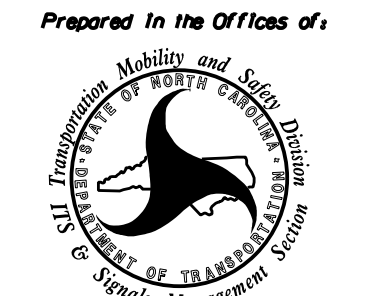
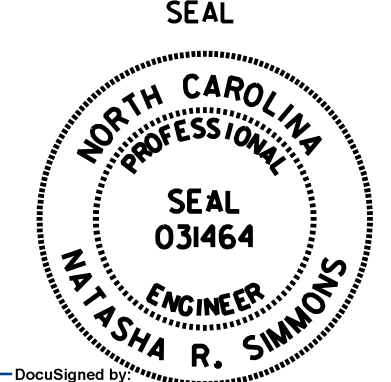
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 2 of 4

**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 in the Office of:  STATE OF NORTH CAROLINA Department of Transportation Signal Management	SR 2048 (Gordon Rd) at I-40 WB Ramps		SEAL  SEAL 031464 ENGINEER NATASHA R. SIMMONS
	Division 3 PLAN DATE: August 2023 PREPARED BY: E.E. Tiller	New Hanover County REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	Wilmington REVISIONS INIT. DATE DocuSigned by: Natasha R. Simmons 5/17/2024 DATE SIG. INVENTORY NO. 03-0258



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.

PAGE: 2 C1 PIN:47 VEHICLE DETECTOR INPUT ASSIGNMENT #.....9 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).....22 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 5A - PHASE 2)

PAGE: 2 C1 PIN:47 NOT ENABLED INPUT ASSIGNMENT #.....9 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 17

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR INPUT ASSIGNMENT #.....17 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).....5 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 '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR INPUT ASSIGNMENT #.....17 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).....55 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 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.

VEHICLE DETECTOR #55 SETTINGS (+,-,1-64) SETTING: (Y/N) ENABLE DETECTOR.....N ENABLE LOGGING.....N ENABLE DIAGNOSTICS.....N SPEED TRAP.....N CALL DETECTOR.....Y EXTENSION DETECTOR.....Y MODE 2 STOP BAR.....N SWITCHING DETECTOR.....N DUPLICATING DETECTOR.....N ENABLE FULL TIME DELAY.....N IF FAILED, SET MIN RECALL?.....N IF FAILED, SET MAX1 RECALL?.....N IF FAILED, SET MAX2 RECALL?.....N PHASE# ;12345678910111213141516 PHASES ASSIGNED ; SWITCH/DUPLICATE; LOOP SIZE (0-255 FT).....6 SPEED TRAP DISTANCE (0-255 FT).....0 STOP BAR TIME (0-255 SEC).....0 STRETCH (0-25.5 SEC).....0.0 DELAY (0-255 SEC).....0 MAX CALLS/MIN (0-255).....255 MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0 MAX OCCUPANCY (0-100%).....100 EXTENSION DISABLE TIME (0-255 SEC).....0 QUEUE MAX OCCUPANCY TIME (0-255).....0 QUEUE GAP RESET TIME (0-25.5).....0.0 PREEMPTION INDEX FOR QUEUE (0-10).....0

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

VEHICLE DETECTOR #55 SETTINGS (+,-,1-64) SETTING: (Y/N) ENABLE DETECTOR.....Y ENABLE LOGGING.....N ENABLE DIAGNOSTICS.....N SPEED TRAP.....N CALL DETECTOR.....Y EXTENSION DETECTOR.....Y MODE 2 STOP BAR.....N SWITCHING DETECTOR.....N DUPLICATING DETECTOR.....N ENABLE FULL TIME DELAY.....N IF FAILED, SET MIN RECALL?.....N IF FAILED, SET MAX1 RECALL?.....N IF FAILED, SET MAX2 RECALL?.....N PHASE# ;12345678910111213141516 PHASES ASSIGNED ; X SWITCH/DUPLICATE; LOOP SIZE (0-255 FT).....6 SPEED TRAP DISTANCE (0-255 FT).....0 STOP BAR TIME (0-255 SEC).....0 STRETCH (0-25.5 SEC).....0.0 DELAY (0-255 SEC).....0 MAX CALLS/MIN (0-255).....255 MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0 MAX OCCUPANCY (0-100%).....100 EXTENSION DISABLE TIME (0-255 SEC).....0 QUEUE MAX OCCUPANCY TIME (0-255).....0 QUEUE GAP RESET TIME (0-25.5).....0.0 PREEMPTION INDEX FOR QUEUE (0-10).....0

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade - Final Design Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns for REVISIONS, INIT., DATE, and SIGNATURE. Includes HNTB logo and project details: SR 2048 (Gordon Rd) at I-40 WB Ramps, Division 3 New Hanover County Wilmington. Prepared by: E.E. Tiller, Reviewed by: N.K. Vlanich, N.R. Simmons. Date: 5/17/2024.



### 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 phases for head 51 to run protected turns only.

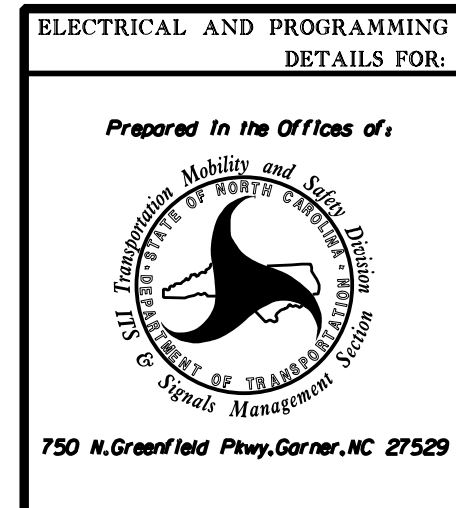
INPUTS PAGE 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0258  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

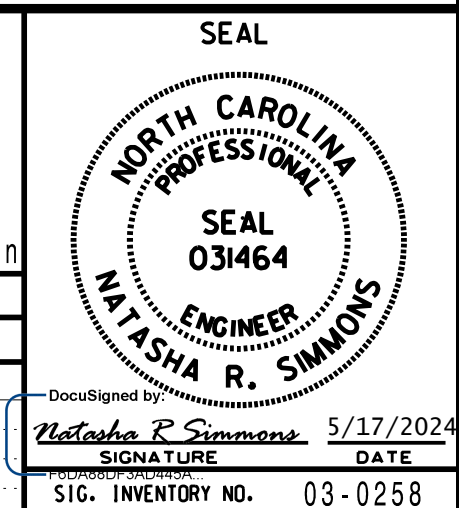
Signal Upgrade - Final Design  
Electrical Detail - Sheet 4 of 4

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 (919) 546-8997



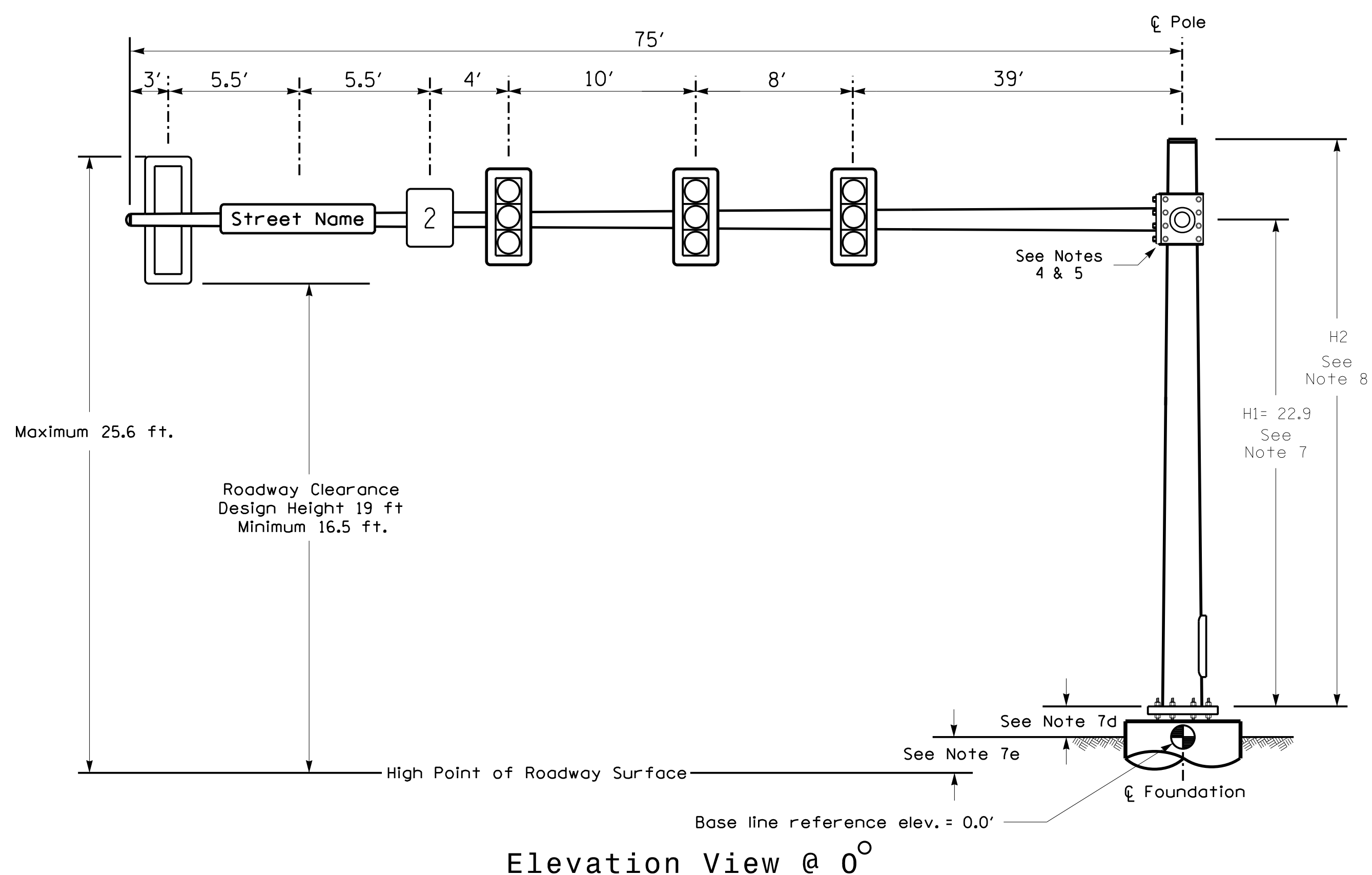
ELECTRICAL AND PROGRAMMING DETAILS FOR:		
SR 2048 (Gordon Rd) at I-40 WB Ramps		
Division 3	New Hanover County	Wilmington
PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich	
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	
REVISIONS	INIT.	DATE



DocuSigned by:  
 Natasha R. Simmons 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-0258



**Design Loading for METAL POLE NO. 1, MAST ARM A**



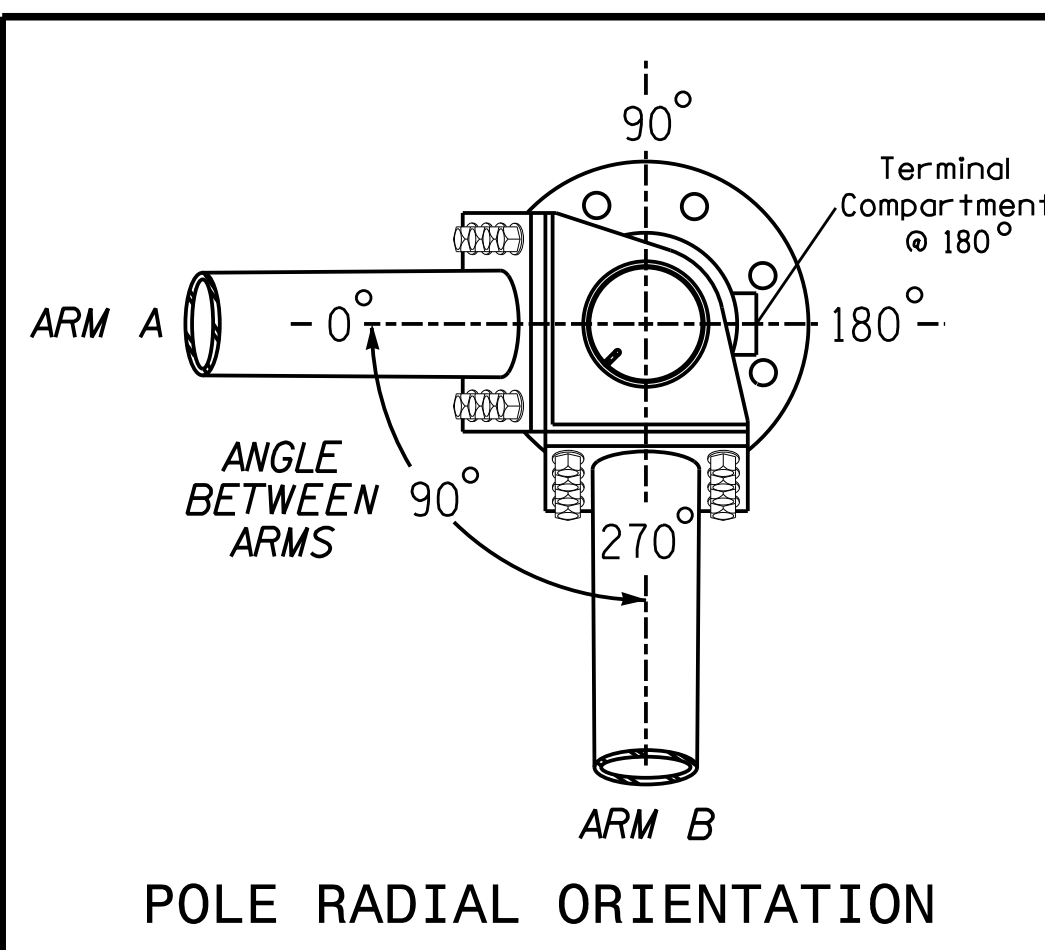
**SPECIAL NOTE**  
 The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available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

**Elevation Data for Mast Arm Attachment (H1)**

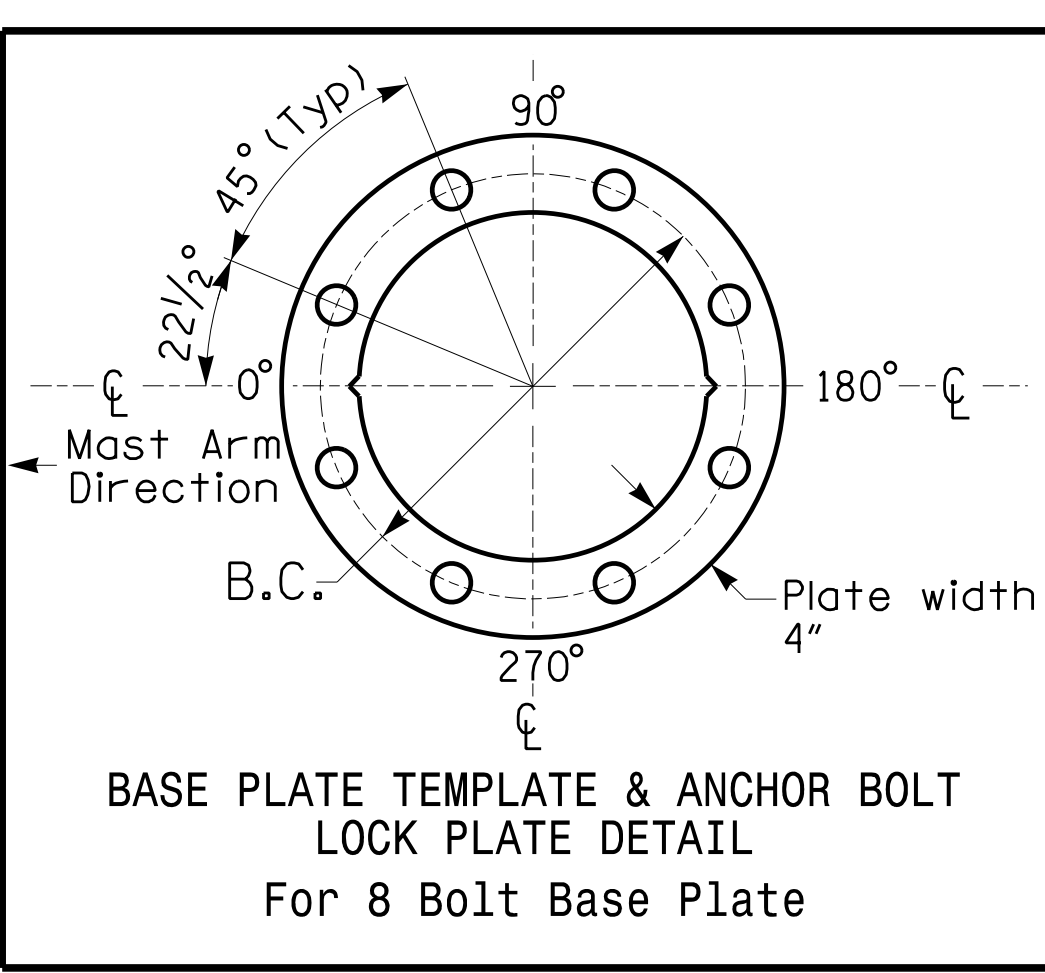
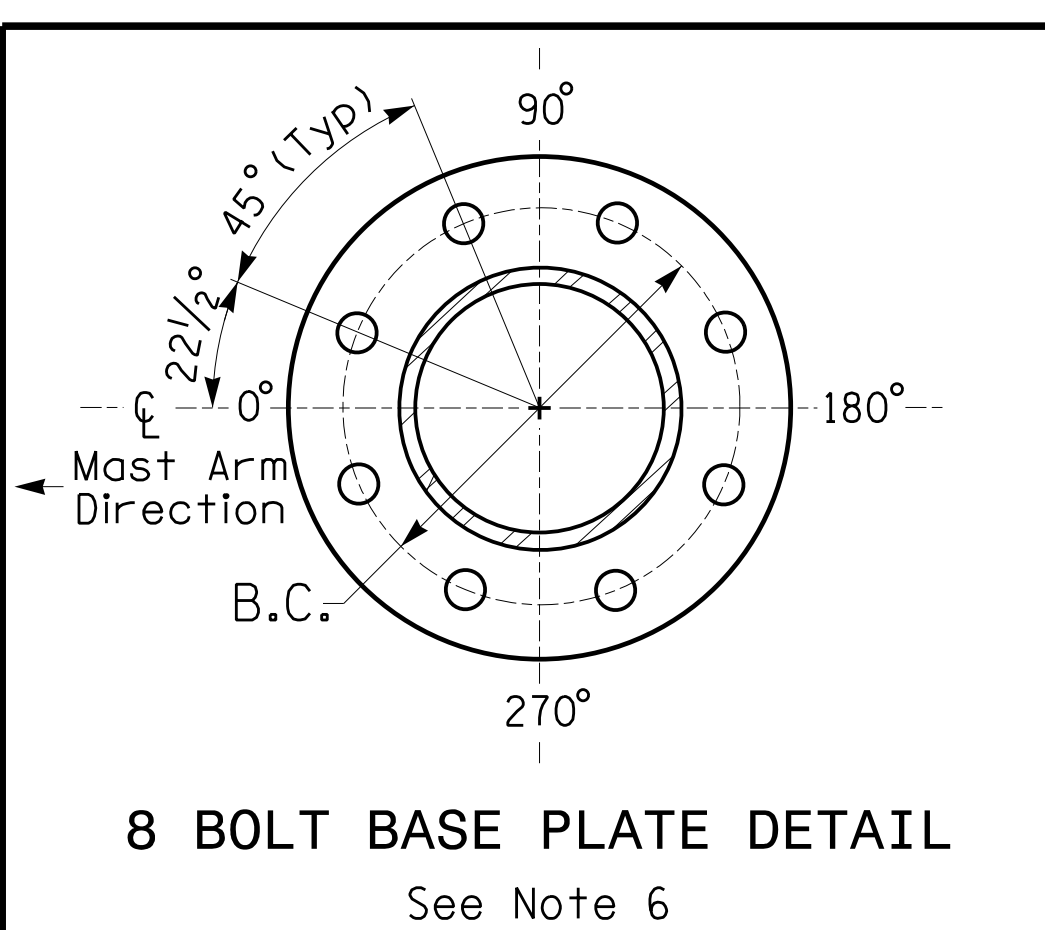
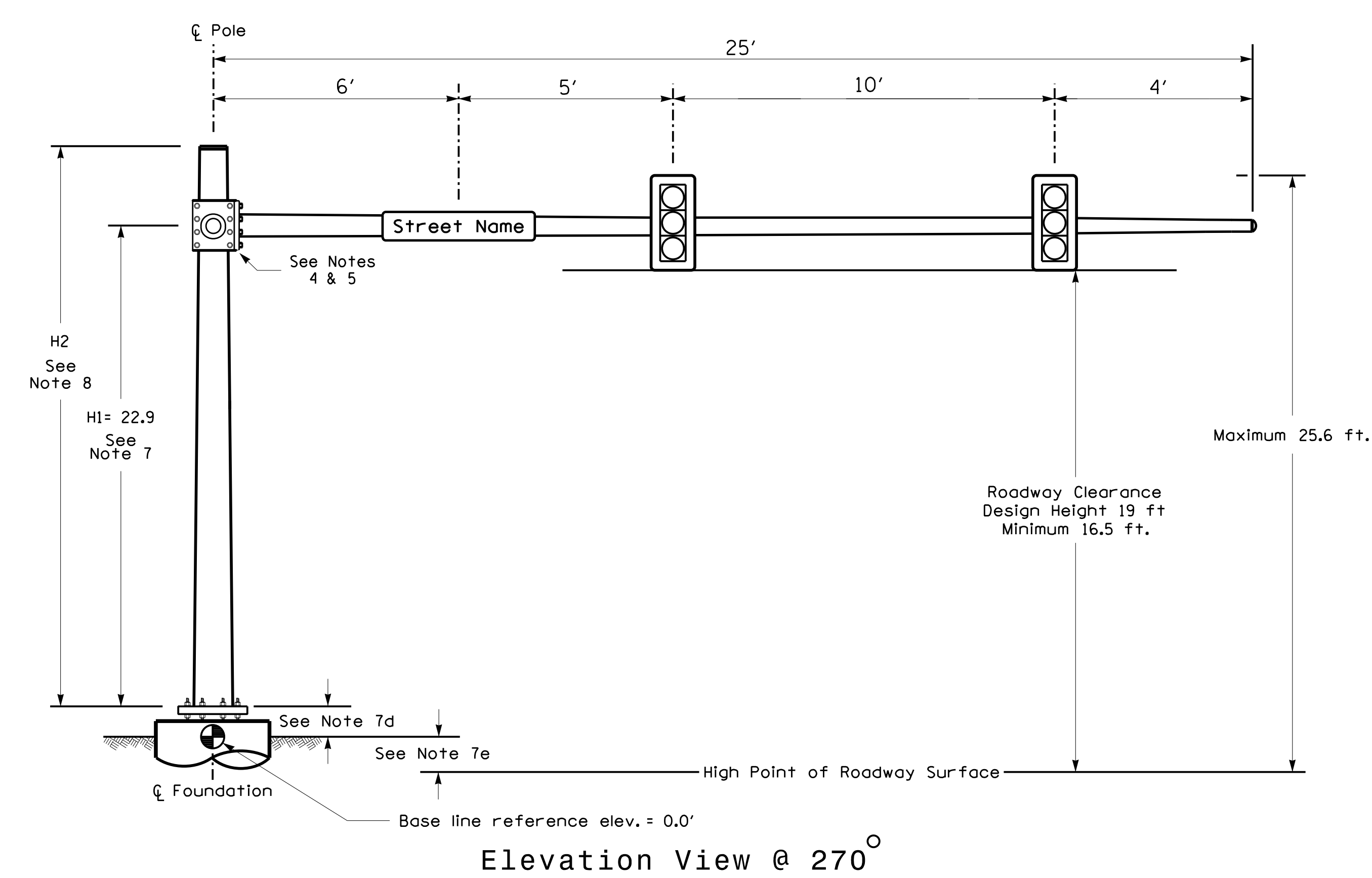
Elevation Differences for:	Arm A	Arm B
Baseline reference point at $\odot$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	1.86 ft.	-0.04 ft.
Elevation difference at Edge of travelway or face of curb	0.17 ft.	-0.04 ft.

**MAST ARM LOADING SCHEDULE**

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



**Design Loading for METAL POLE NO. 1, MAST ARM B**



**NOTES**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 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 force 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 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.

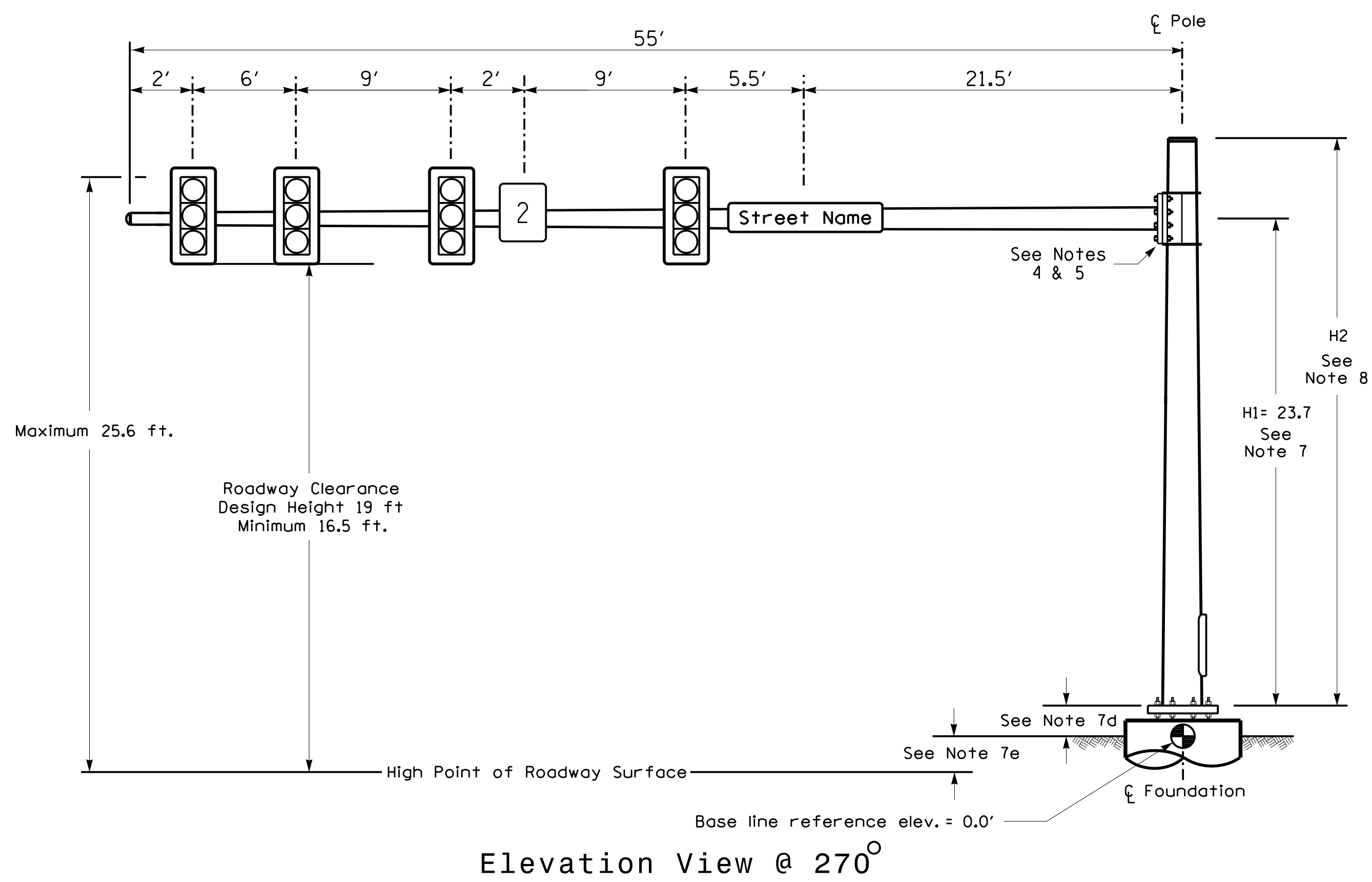
NCDOT Wind Zone 1 (150 mph)

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

<p>Prepared in the Offices of:                  Transportation Mobility and Safety Division                  STATE OF NORTH CAROLINA                  Signal Design Section                  750 N. Greenfield Pkwy, Garner, NC 27526</p>	SR 2048 (Gordon Rd) at I-40 WB Ramps Division 3 New Hanover County Wilmington		
	PLAN DATE: May 2022 PREPARED BY: E.E. Tiller SCALE: 0 N/A N/A	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons DATE: 5/17/2024	



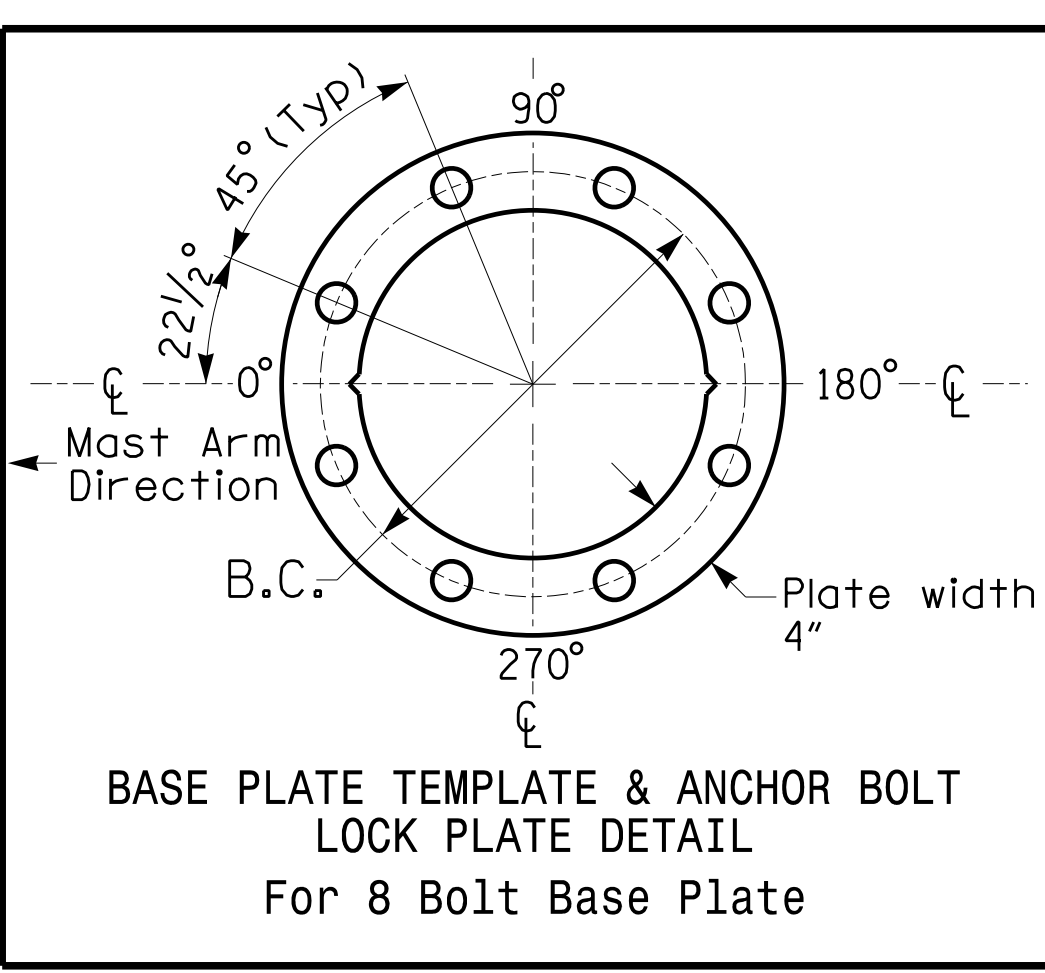
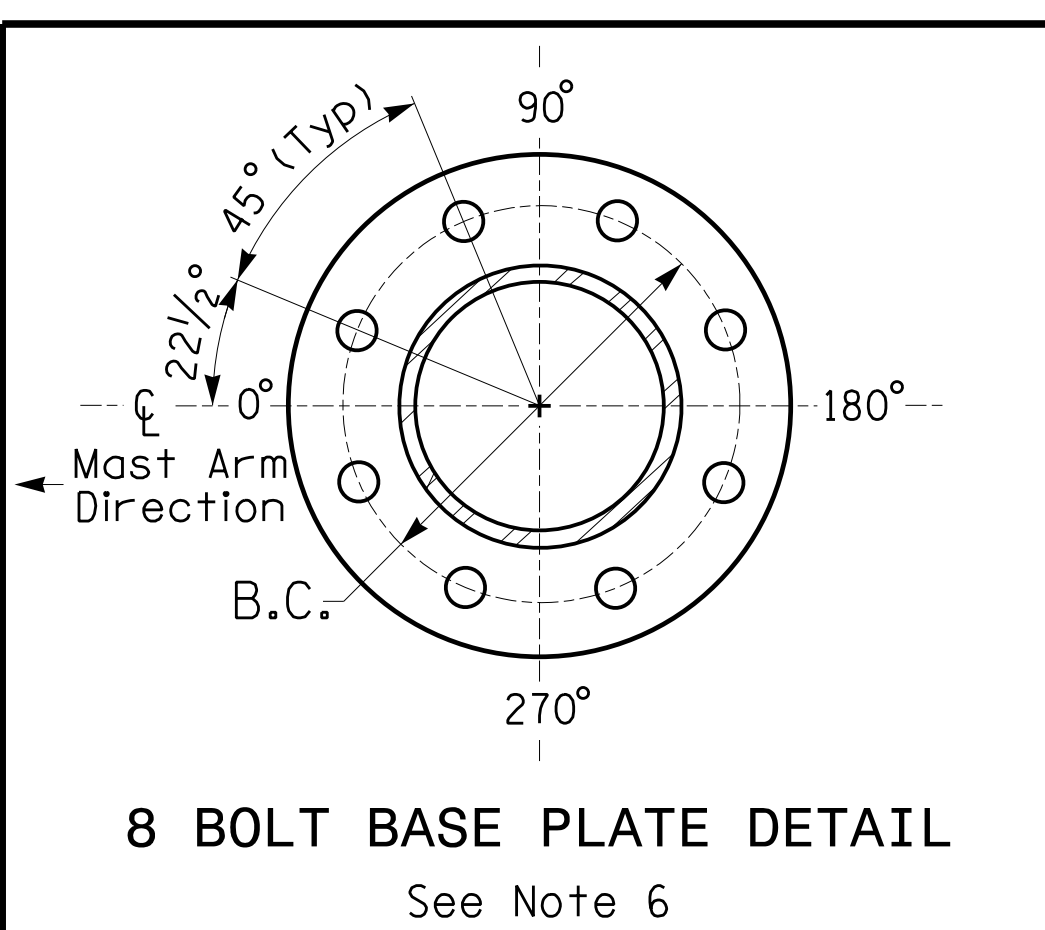
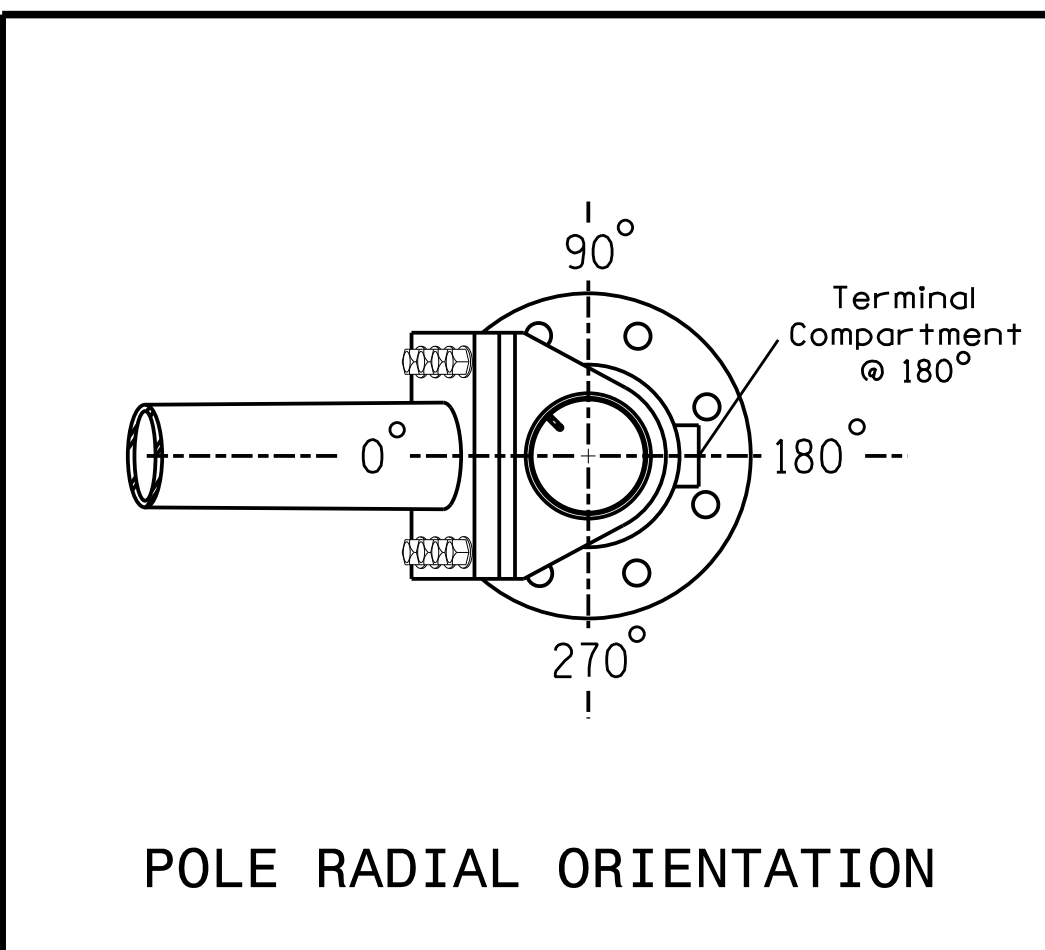
### Design Loading for METAL POLE NO. 2



**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 2	
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	3.24 ft.	
Elevation difference at Edge of travelway or face of curb	2.84 ft.	



### METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
U-6202	Sig. 8.6

**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
	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 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 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 force 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 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.

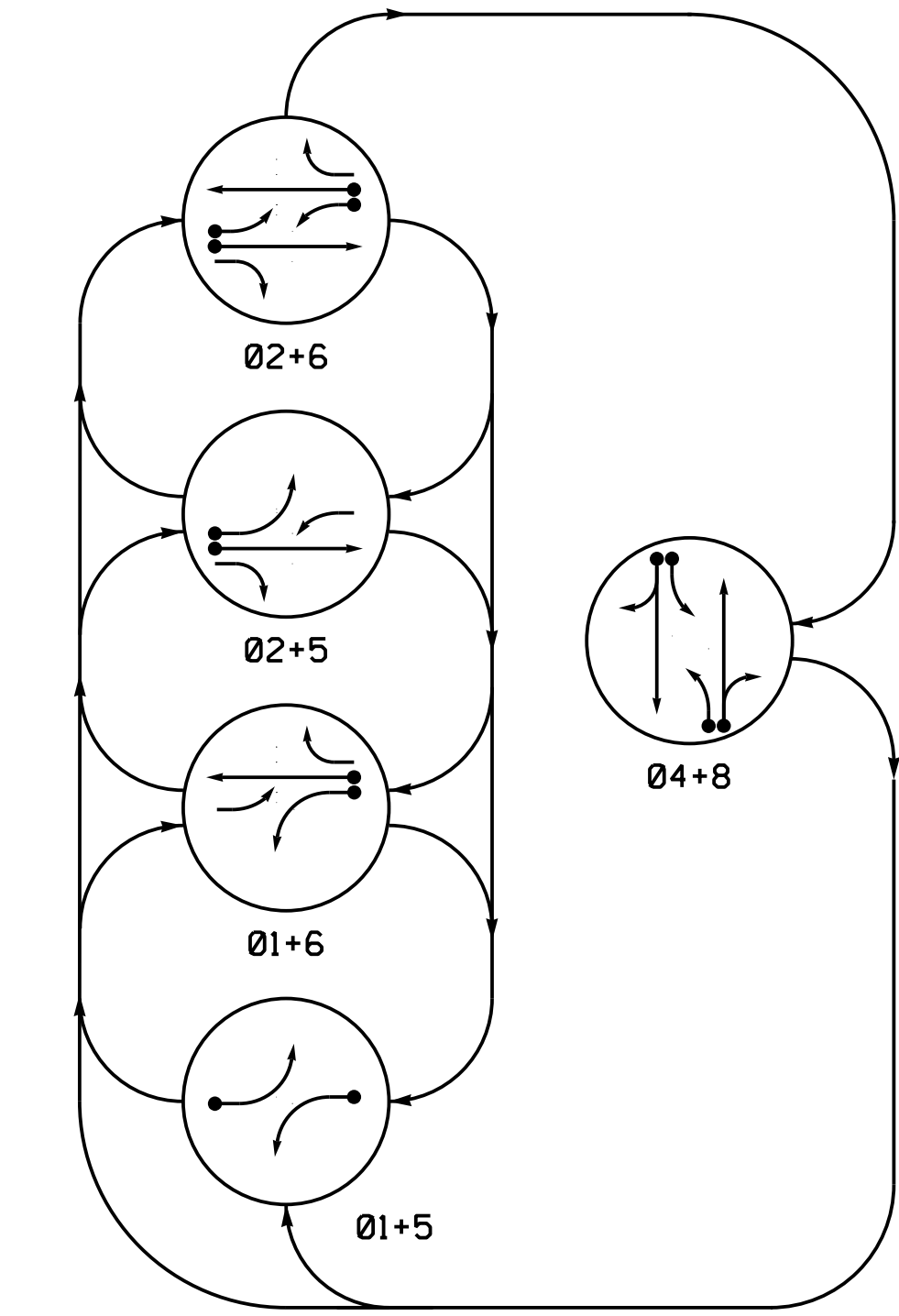
NCDOT Wind Zone 1 (150 mph)

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

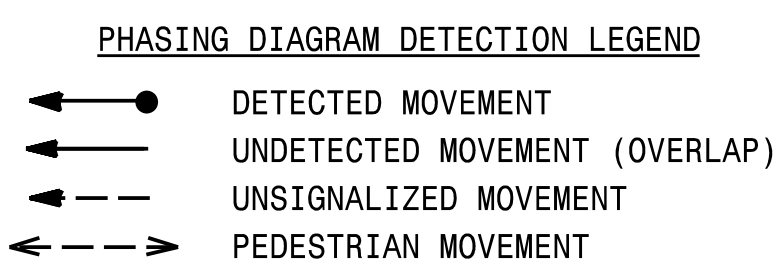
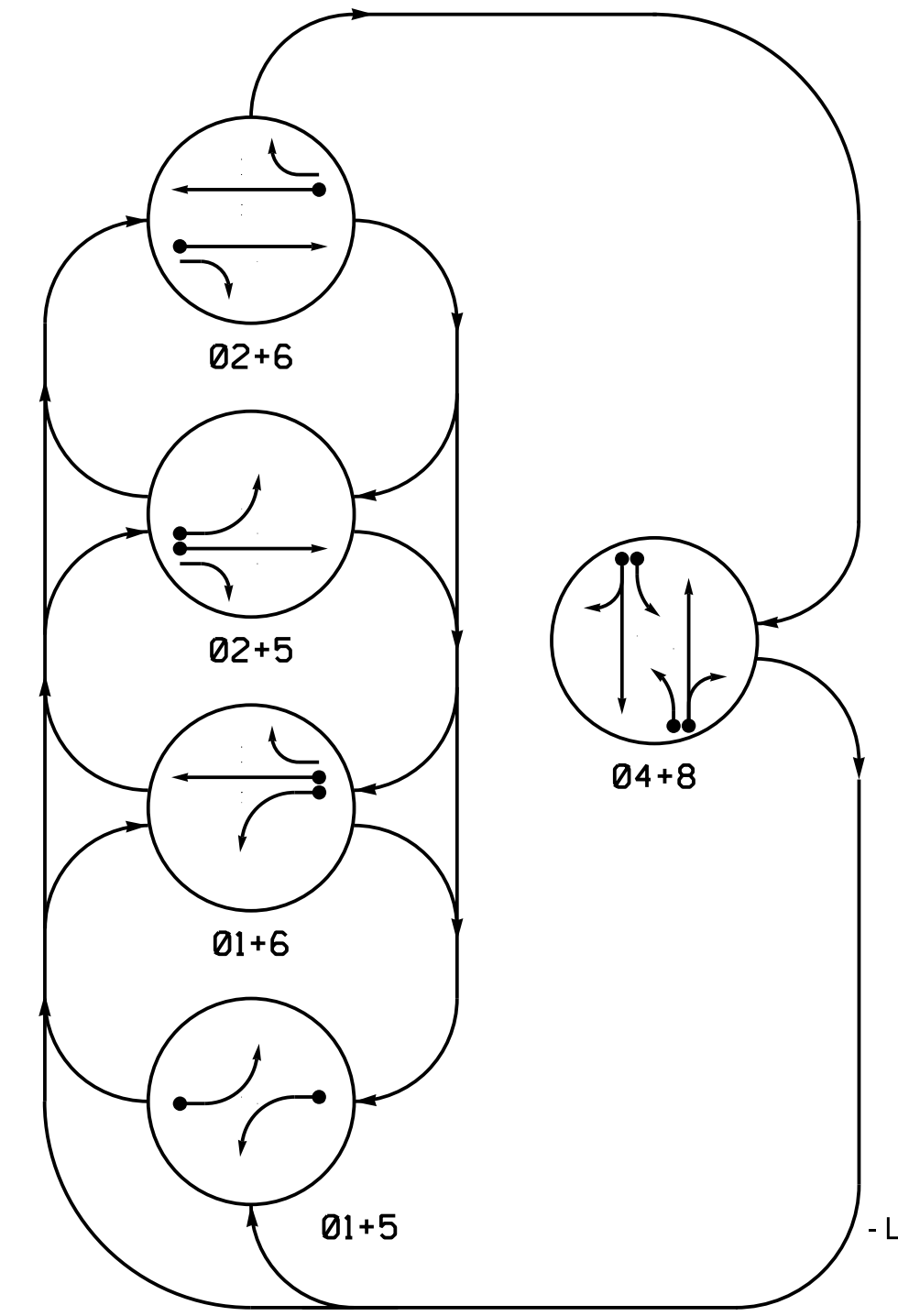
	SR 2048 (Gordon Rd) at I-40 WB Ramps		
	Division 3 New Hanover County Wilmington	PLAN DATE: May 2022	
PREPARED BY: E.E. Tiller	REVISIONS	REVIEWED BY: N.R. Simmons	DATE: 5/17/2024
SCALE: 0 N/A	DATE:	INITI. DATE	DATE:
N/A	DATE:	DATE:	DATE:



**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	P
11	—	—	—	—	—	—
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	Y
42,43	R	R	R	R	G	R
51	—	—	—	—	—	—
61,62	R	G	R	G	R	Y
81	R	R	R	R	G	Y
82,83	R	R	R	R	G	R

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	P
11	—	—	—	—	—	—
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	Y
42,43	R	R	R	R	G	R
51	—	—	—	—	—	—
61,62	R	G	R	G	R	Y
81	R	R	R	R	G	Y
82,83	R	R	R	R	G	R

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

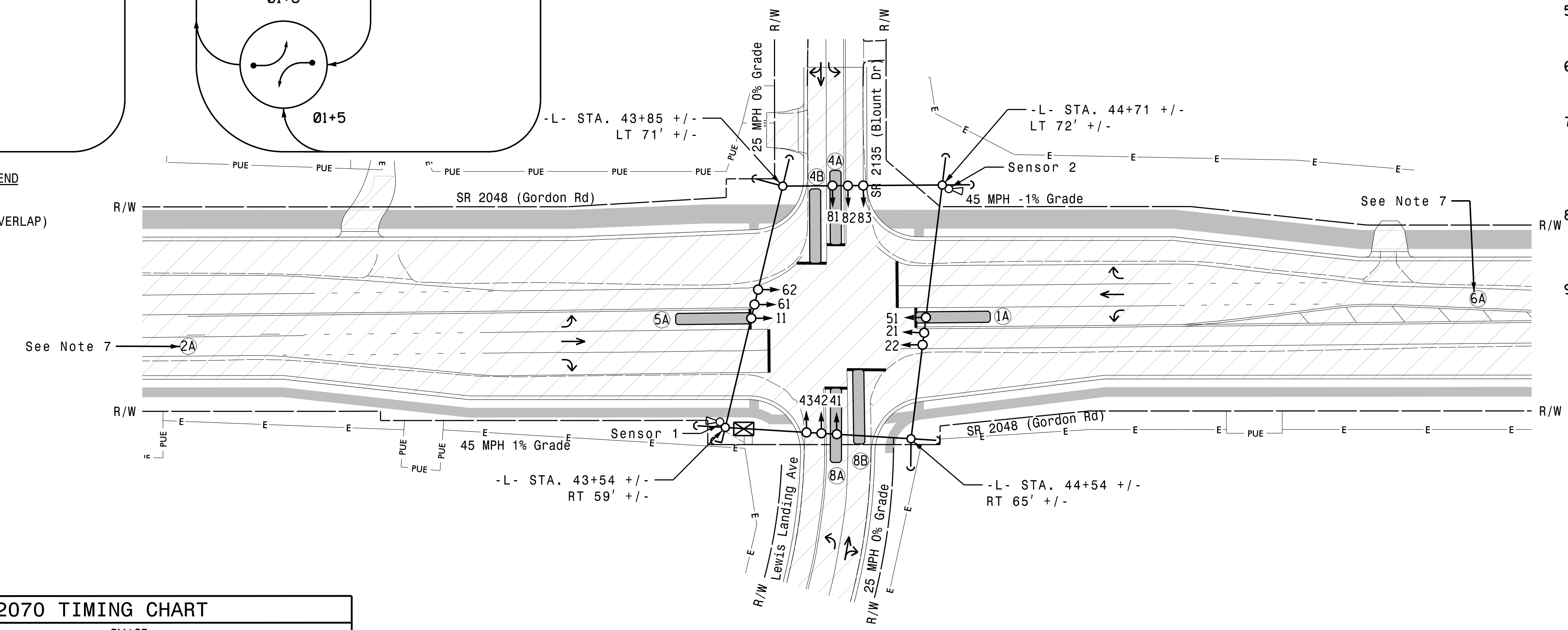
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6x40	0	*	*	1	Y	Y	-	15**	-	Y
4A	6x40	0	*	*	6#	Y	Y	-	-	-	Y
4B	6x40	0	*	*	4	Y	Y	-	3	-	Y
5A	6x40	0	*	*	5	Y	Y	-	15**	-	Y
8A	6x40	0	*	*	2#	Y	Y	-	-	-	Y
8B	6x40	0	*	*	8	Y	Y	-	3	-	Y
					8	Y	Y	-	10	-	Y

\* Multizone Microwave Detection  
 \*\* Reduce delay to 3 seconds during alternate phasing.  
 # Disable phase call for loop(s) during alternate phasing.

**5 Phase Fully Actuated Wilmington Signal System**

**NOTES**

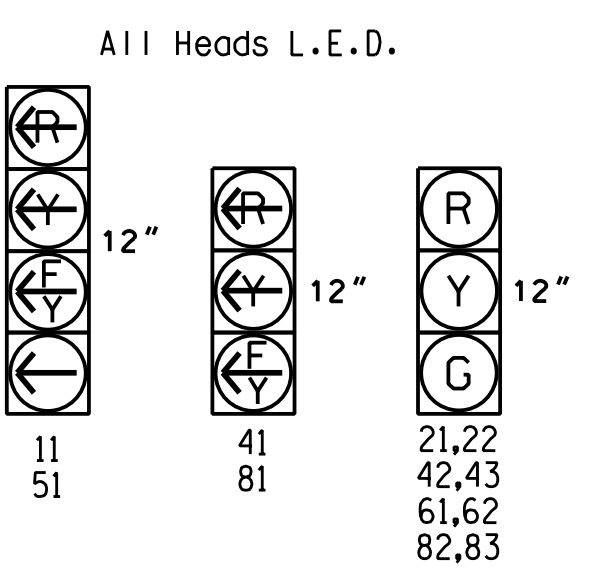
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data: Controller Asset #1139.



**OASIS 2070 TIMING CHART**

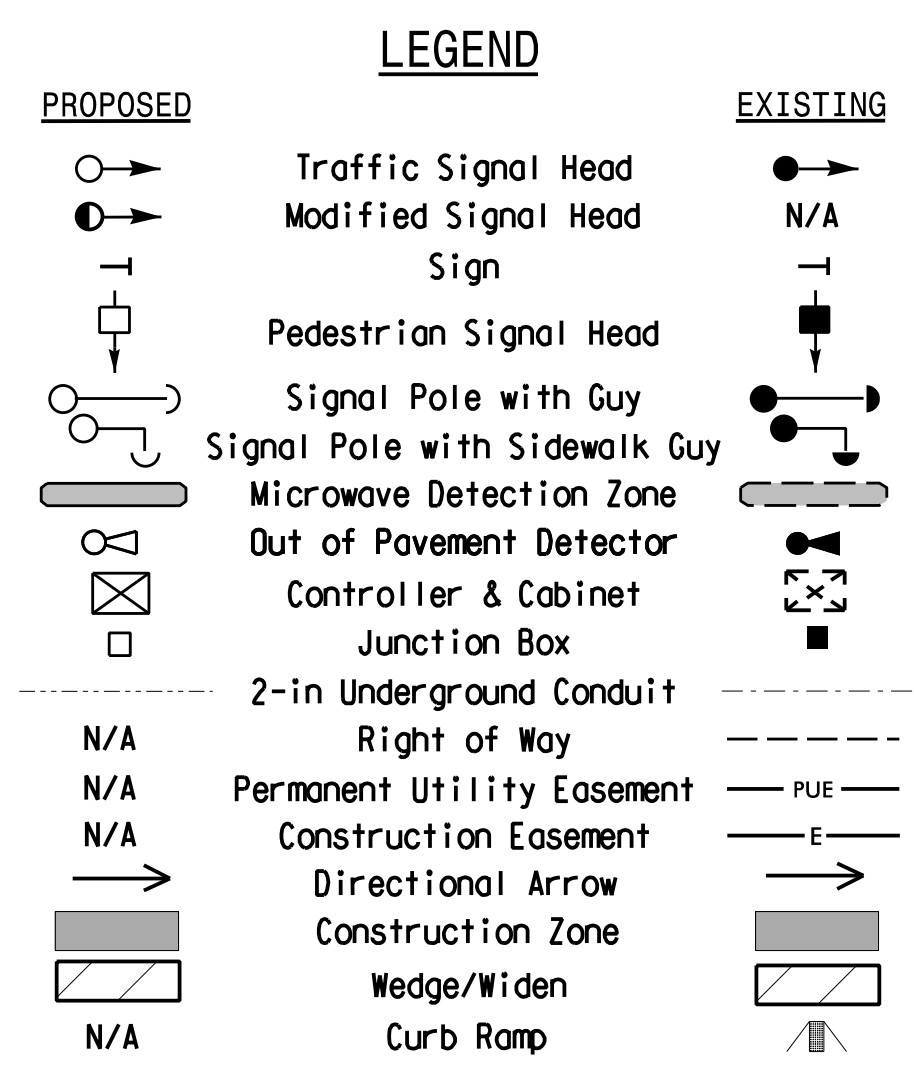
FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	5	12	5	5	12	5
Extension 1 *	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	20	90	30	20	90	30
Yellow Clearance	3.0	4.6	3.2	3.0	4.6	3.2
Red Clearance	2.3	1.0	1.7	2.3	1.0	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

**SIGNAL FACE I.D.**



**RADAR DETECTION SYSTEM**

FUNCTION	Sensor 1	Sensor 2
Channel	1	1
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5-6.5	2.5-6.5



Signal Upgrade-  
 Temporary Design 1  
 (Construction Phase 1)

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

Prepared for: **TRANSFORMATION MOBILITY AND SAFETY DIVISION**

Project: **SR 2048 (Gordon Rd) at SR 2135 (Blount Dr) / Lewis Landing Ave**

Division 3 New Hanover County Wilmington

PLAN DATE: May 2022 REVIEWED BY: N.K. Vlanich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

SCALE: 1" = 40'

5/17/2024

SIGNATURE: *Natasha R. Simmons*

SIG. INVENTORY NO. 03-113911

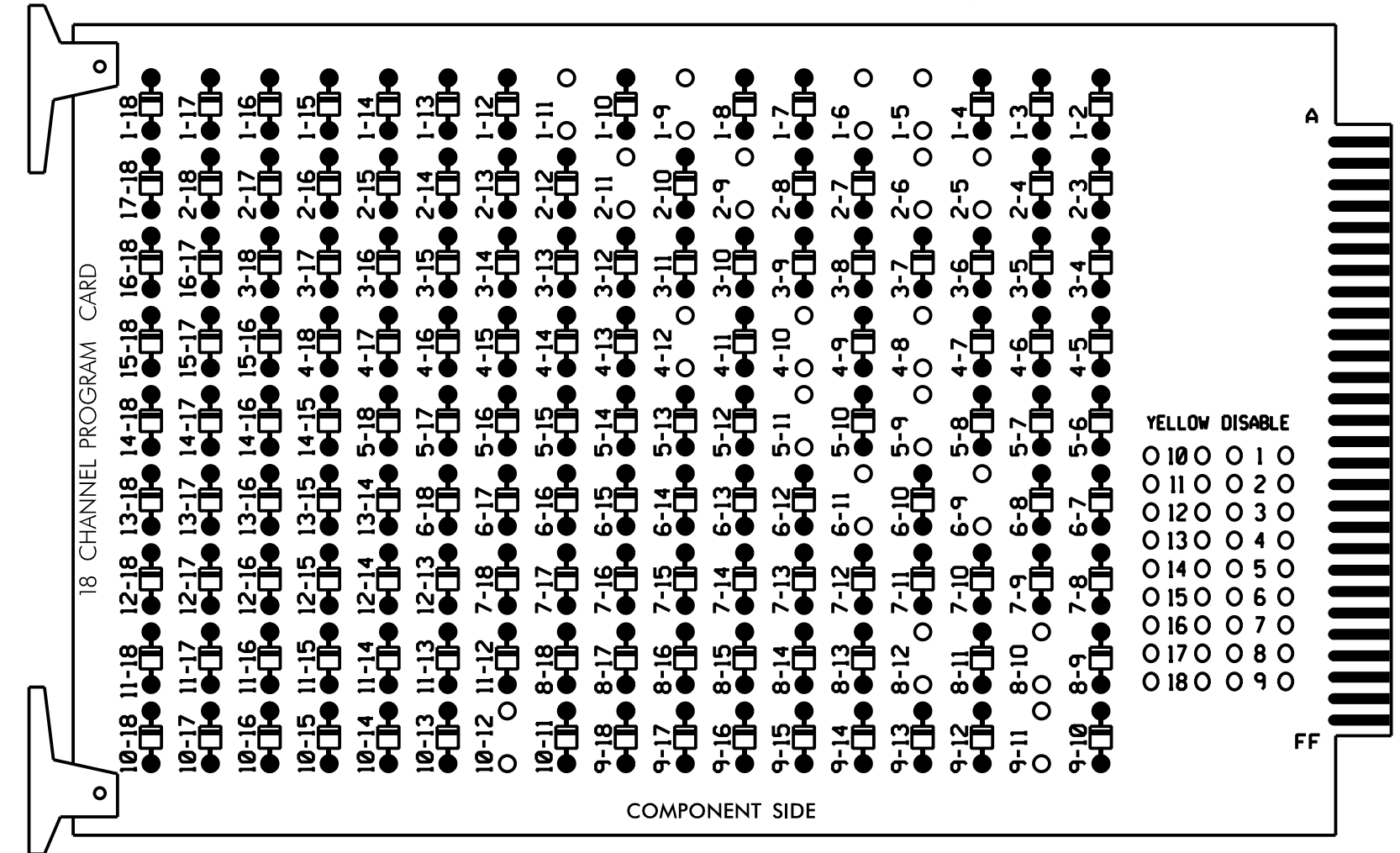
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 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.

■ = DENOTES POSITION OF SWITCH

### 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 Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,  
 AUX S2,AUX S4,AUX S5  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....4  
 OVERLAP "C".....5+6  
 OVERLAP "D".....8

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	42,43	NU	51	61,62	NU	NU	82,83	NU	11	81	NU	51	41	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127							133										
Hand icon																		
Person icon																		

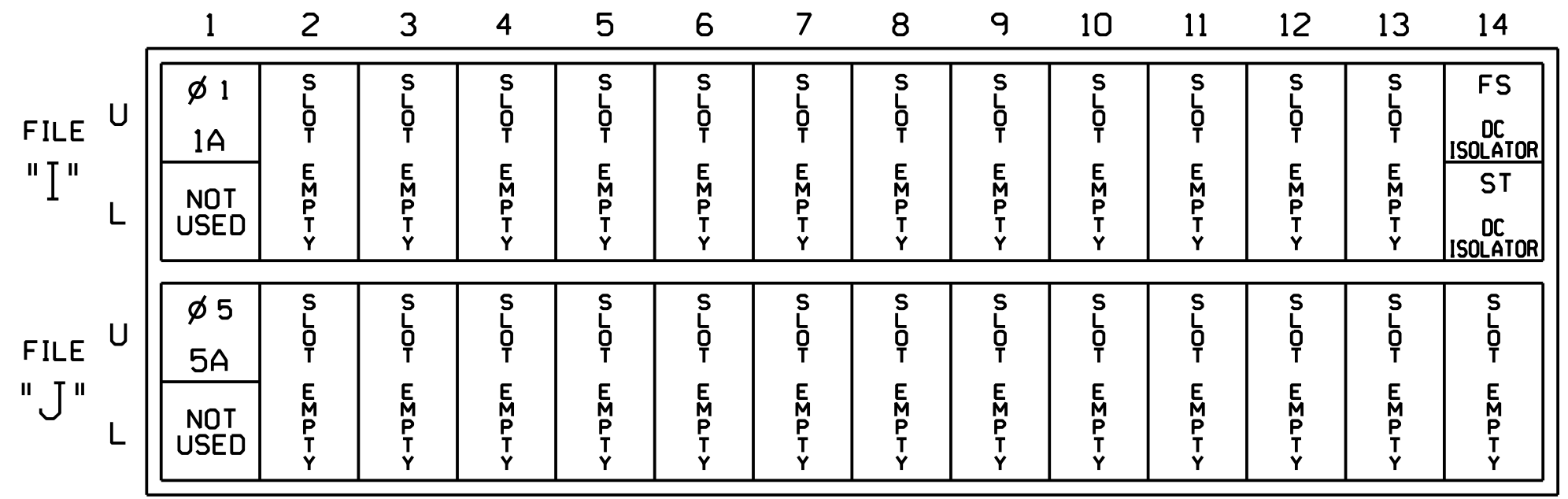
NU = Not Used

\* 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

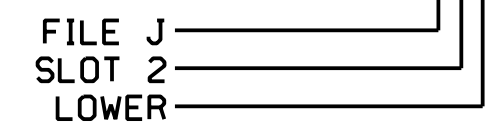
FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10 ★	26	6	Y	Y			
	-	I1U	56	18 ★	51	1	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	14U	47	9 ★	22	2	Y	Y			
	-	J1U	55	17 ★	55	5	Y	Y			3

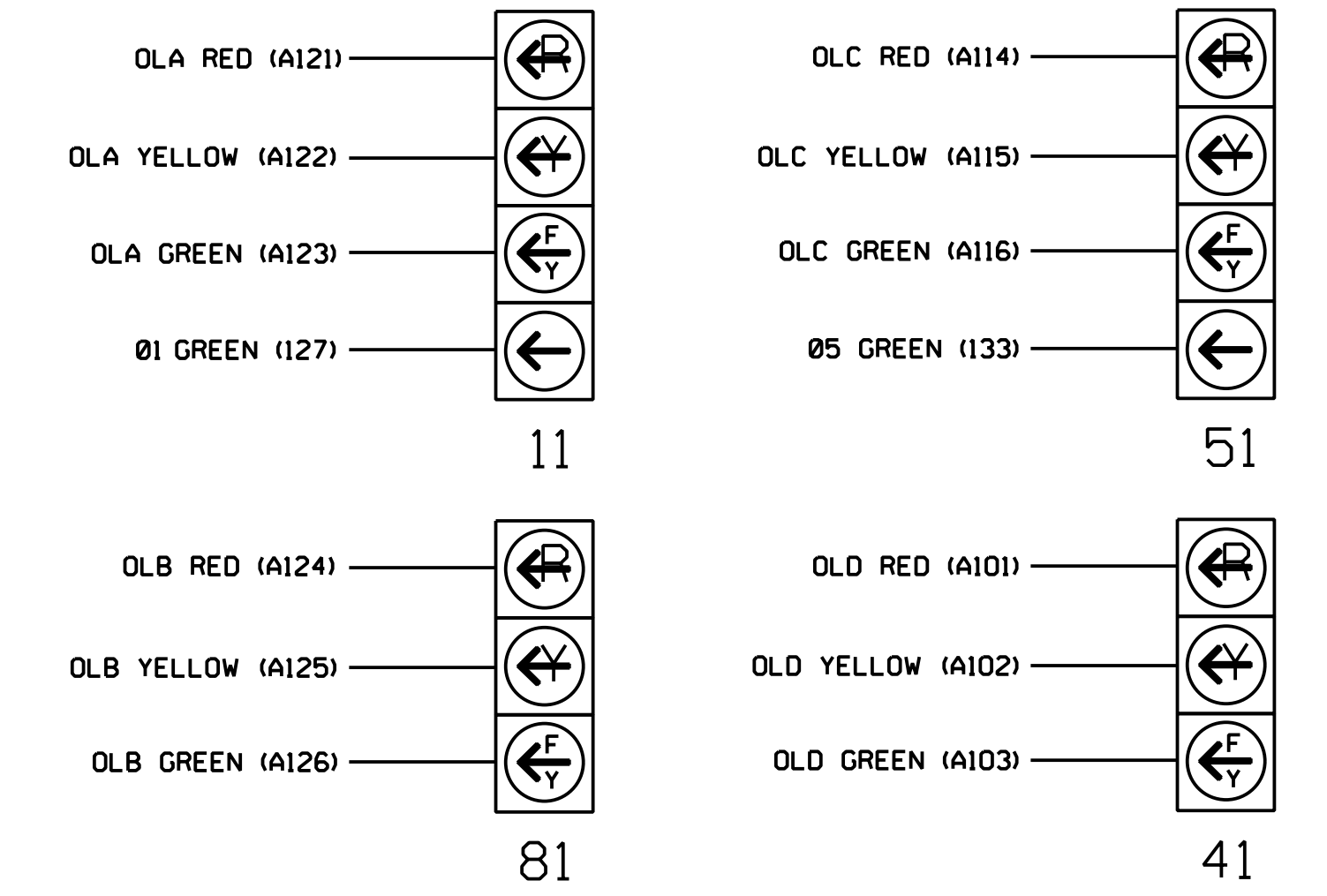
\* See Input Page Assignment programming details on sheets 3 and 4.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



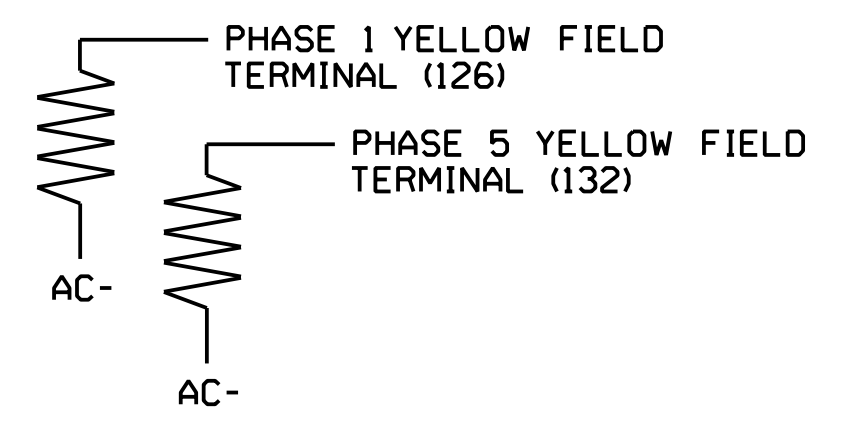
**NOTE**

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

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1139T1  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

**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

Signal Upgrade-  
 Electrical Detail - Sheet 1 of 5  
 (Construction Phase 1)

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
 SR 2048 (Gordon Rd) at  
 SR 2135 (Blount Dr)/  
 Lewis Landing Ave

Division 3 New Hanover County Wilmington

PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS: INIT. DATE

DocuSigned by:  
 Metasha R. Simmons 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-1139T1

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 031464  
 METASHA R. SIMMONS



# 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).

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

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

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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

# OVERLAP PROGRAMMING DETAIL 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

NOTICE GREEN FLASH

PRESS '+'

PAGE 1: 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 X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...N  
GREEN EXTENSION (0-255 SEC).....0  
YELLOW CLEAR (0=PARENT.3-25.5 SEC)..0.0  
RED CLEAR (0=PARENT.0.1-25.5 SEC)..0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)....0

NOTICE GREEN FLASH

PRESS '+'

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

NOTICE GREEN FLASH

PRESS '+'

PAGE 1: 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 X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...N  
GREEN EXTENSION (0-255 SEC).....0  
YELLOW CLEAR (0=PARENT.3-25.5 SEC)..0.0  
RED CLEAR (0=PARENT.0.1-25.5 SEC)..0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)....0

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

# OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

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

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

NOTICE PAGE 2

PRESS '+'

NOTICE PAGE 2

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

NOTICE GREEN FLASH

PRESS '+'

NOTICE PAGE 2

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

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

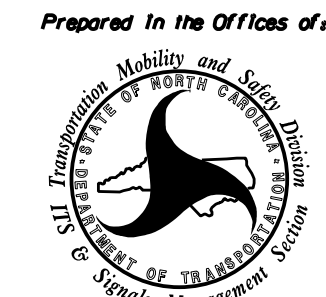
Signal Upgrade-  
Electrical Detail - Sheet 2 of 5  
(Construction Phase 1)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-1139T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:


Prepared in the Office of:



750 N. Greenfield Pkwy, Garner, NC 27529

SR 2048 (Gordon Rd) at SR 2135 (Blount Dr)/ Lewis Landing Ave	
Division 3	New Hanover County
Wilmington	
PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL



DocuSigned by:  
N. R. Simmons  
5/17/2024  
DATE

SIG. INVENTORY NO. 03-1139T1



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 3 SECONDS.

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

PAGE: 2 C1 PIN:48 VEHICLE DETECTOR INPUT ASSIGNMENT #.....10 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).....26 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 1A - PHASE 6)

PAGE: 2 C1 PIN:48 NOT ENABLED INPUT ASSIGNMENT #.....10 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 18

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....1 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 '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR INPUT ASSIGNMENT #.....18 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).....51 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 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.

VEHICLE DETECTOR #51 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 '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '3'

VEHICLE DETECTOR #51 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).....3.0 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: 03-1139T1 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 3 of 5 (Construction Phase 1)

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Electrical and Programming Details For: SR 2048 (Gordon Rd) at SR 2135 (Blount Dr)/ Lewis Landing Ave. Division 3 New Hanover County Wilmington. PLAN DATE: August 2023 REVIEWED BY: N.K. Vianich. PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons. HNTB logo and project information.