

### 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

```

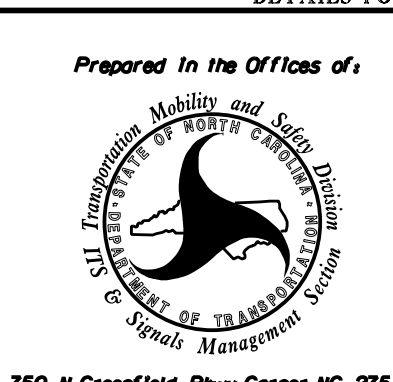
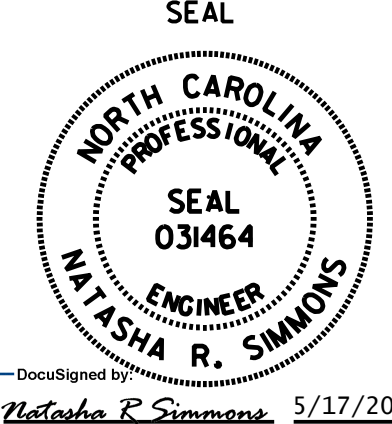

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0893T3  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade-  
Electrical Detail - Sheet 4 of 5  
(Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 1328 (White Rd)		
	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 heads 11 and 51 to run protected turns only.

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

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

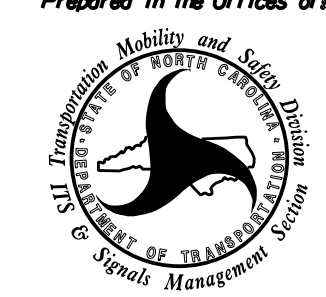
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0893T3  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

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

**DOCUMENT NOT CONSIDERED FINAL  
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ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

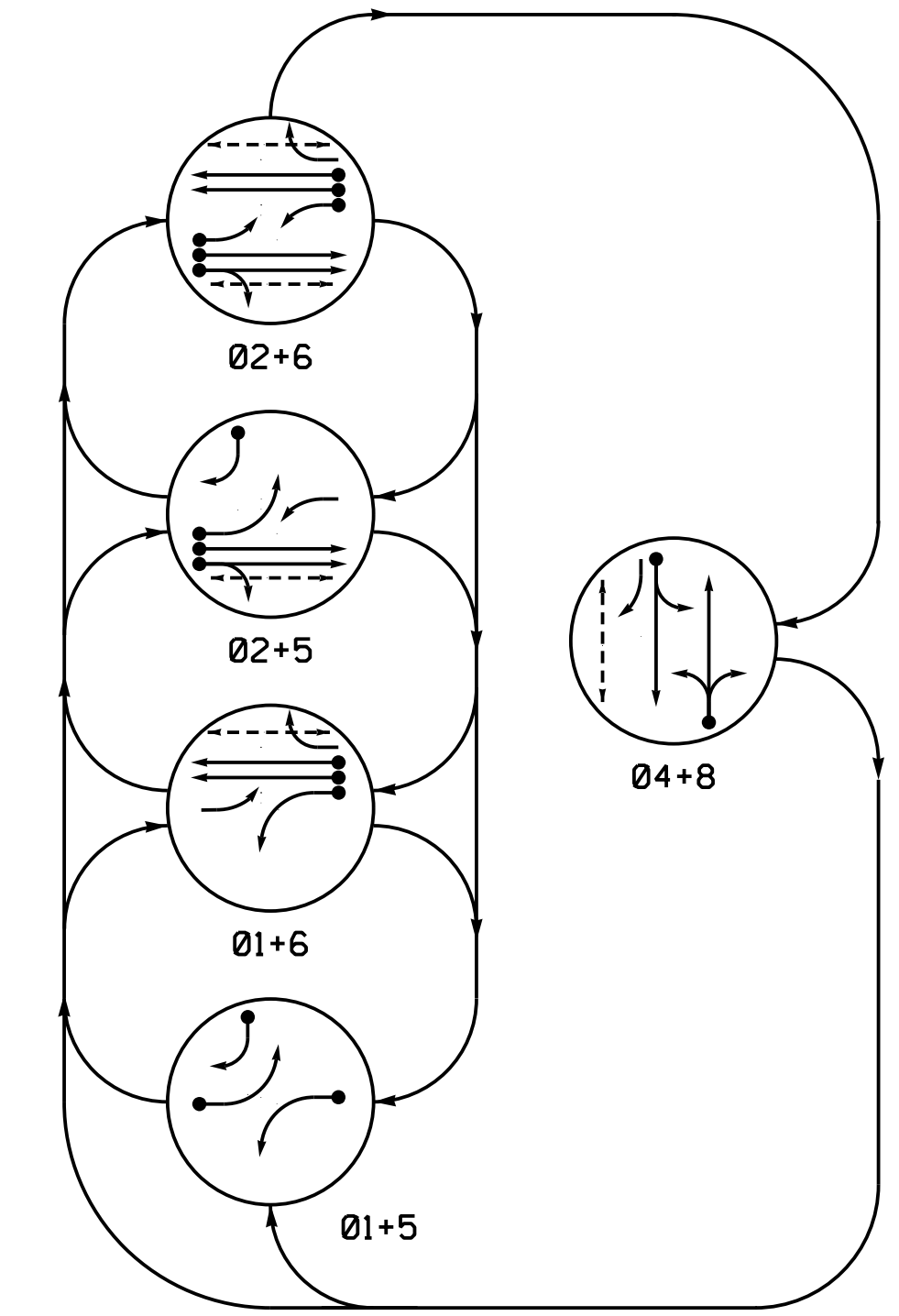
Prepared in the Office of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2048 (Gordon Rd) at SR 1328 (White 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

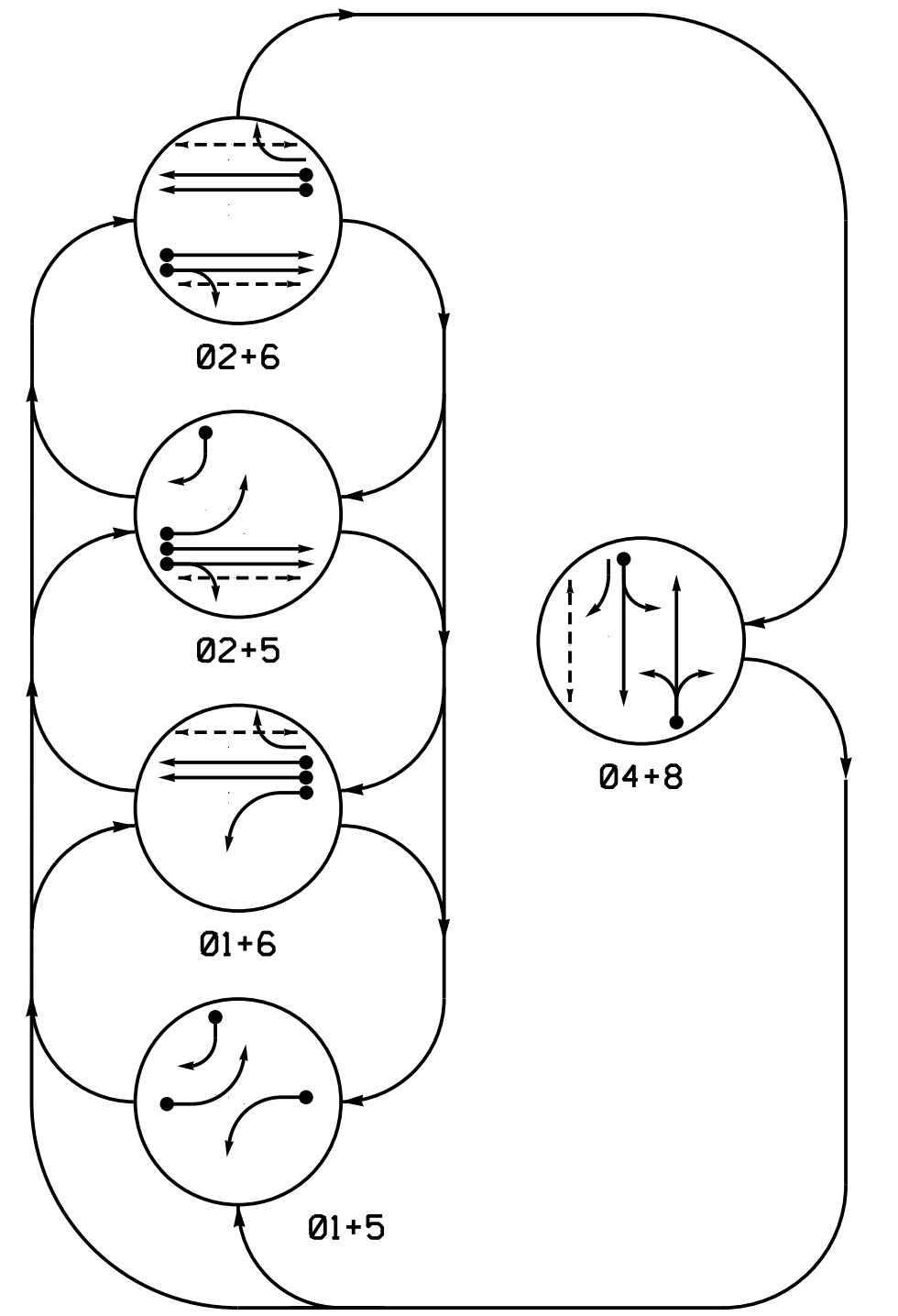
SEAL  
NORTH CAROLINA  
PROFESSIONAL  
SEAL  
031464  
ENGINEER  
NATASHA R. SIMMONS

DocuSigned by:  
  
 5/17/2024  
 SIGNATURE    DATE  
 SIG. INVENTORY NO. 03-0893T3

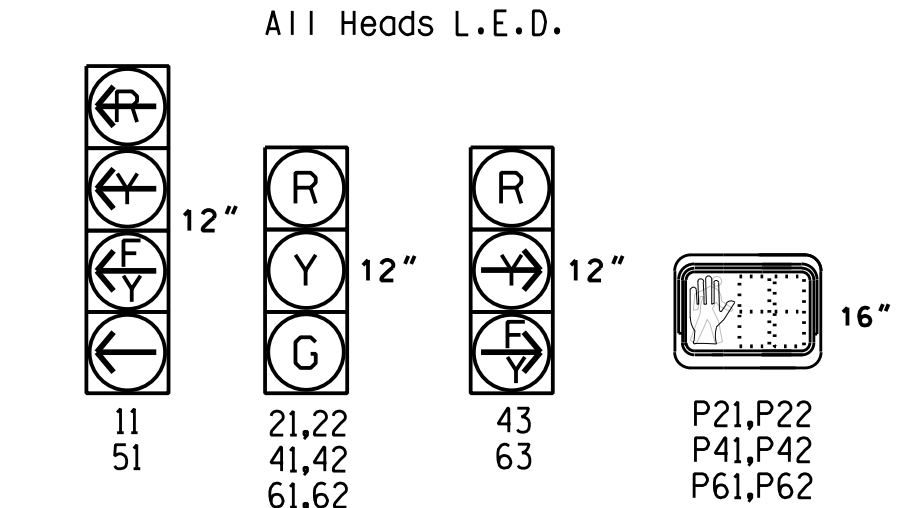
DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

Table with columns for ZONE, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, and NEW CARD. Rows include 1A, 4A, 5A, 5B, and 8A.

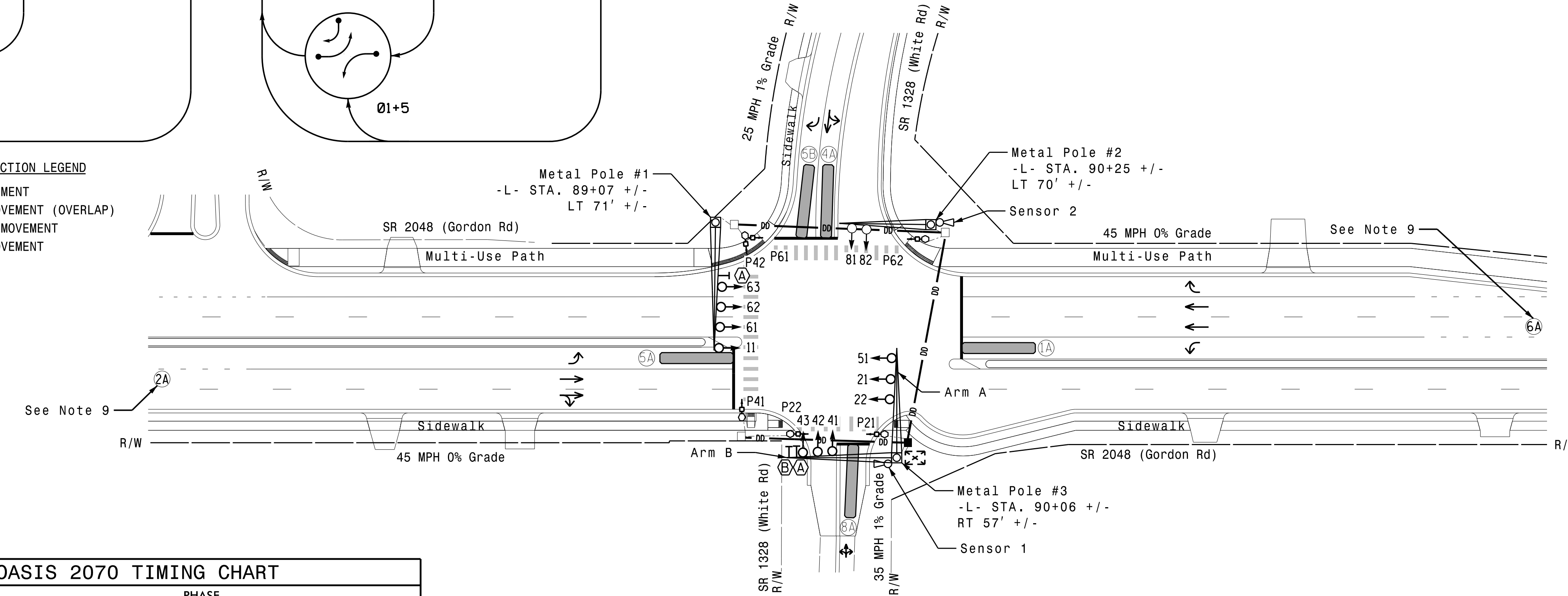
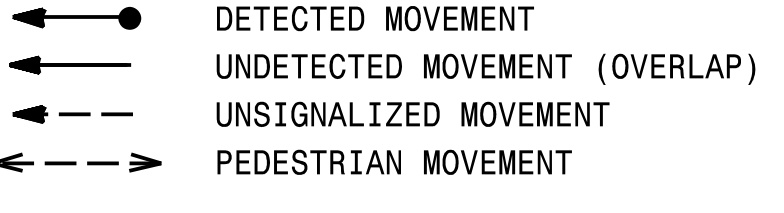
\* Multizone Microwave Detection
\*\* Disable delay during alternate phasing operation.
# Disable phase call for loop(s) during alternate phasing.

5 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. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. All pedestrian pushbuttons shall be located in the field by the Division Traffic Engineer before installation.
8. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multizone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data: Controller Asset #0893.

PHASING DIAGRAM DETECTION LEGEND



OASIS 2070 TIMING CHART

Timing chart table with columns for FEATURE and PHASE (1, 2, 4, 5, 6, 8). Rows include Min Green 1\*, Extension 1\*, Max Green 1\*, Yellow Clearance, Red Clearance, Red Revert, Walk 1\*, Don't Walk 1, Advanced 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.

\* 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

Table with columns for FUNCTION, Sensor 1, and Sensor 2. Rows include Channel, Phase, Direction of Travel, Detection Zone (ft), Enable Speed, Speed Range (mph), Enable Estimated Time of Arrival, and Estimated Time of Arrival (sec).

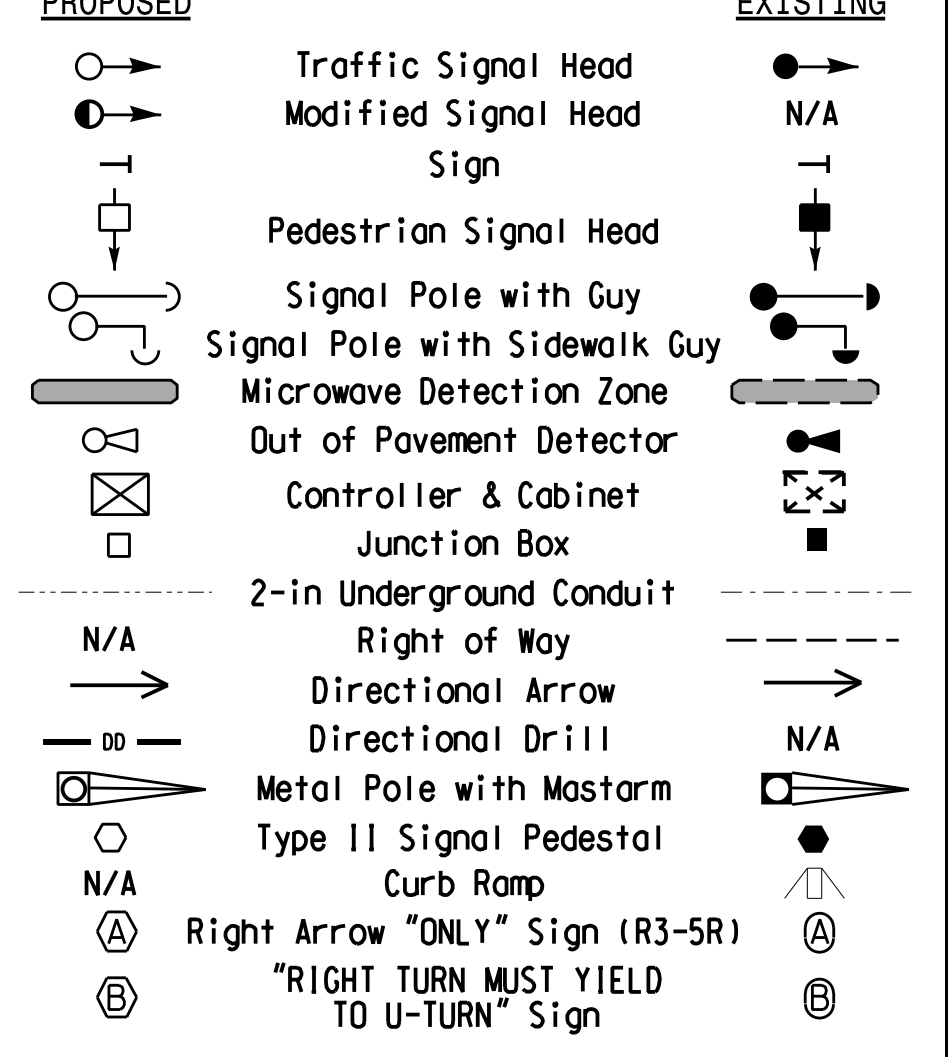
DEFAULT PHASING TABLE OF OPERATION

Table with columns for SIGNAL FACE and PHASE (0, 1, 2, 4, 5, 6, 8, FLASH). Rows include 11, 21,22, 41,42, 43, 51, 61,62, 63, 81,82, P21,P22, P41,P42, and P61,P62.

ALTERNATE PHASING TABLE OF OPERATION

Table with columns for SIGNAL FACE and PHASE (0, 1, 2, 4, 5, 6, 8, FLASH). Rows include 11, 21,22, 41,42, 43, 51, 61,62, 63, 81,82, P21,P22, P41,P42, and P61,P62.

LEGEND



Signal Upgrade - Final Design

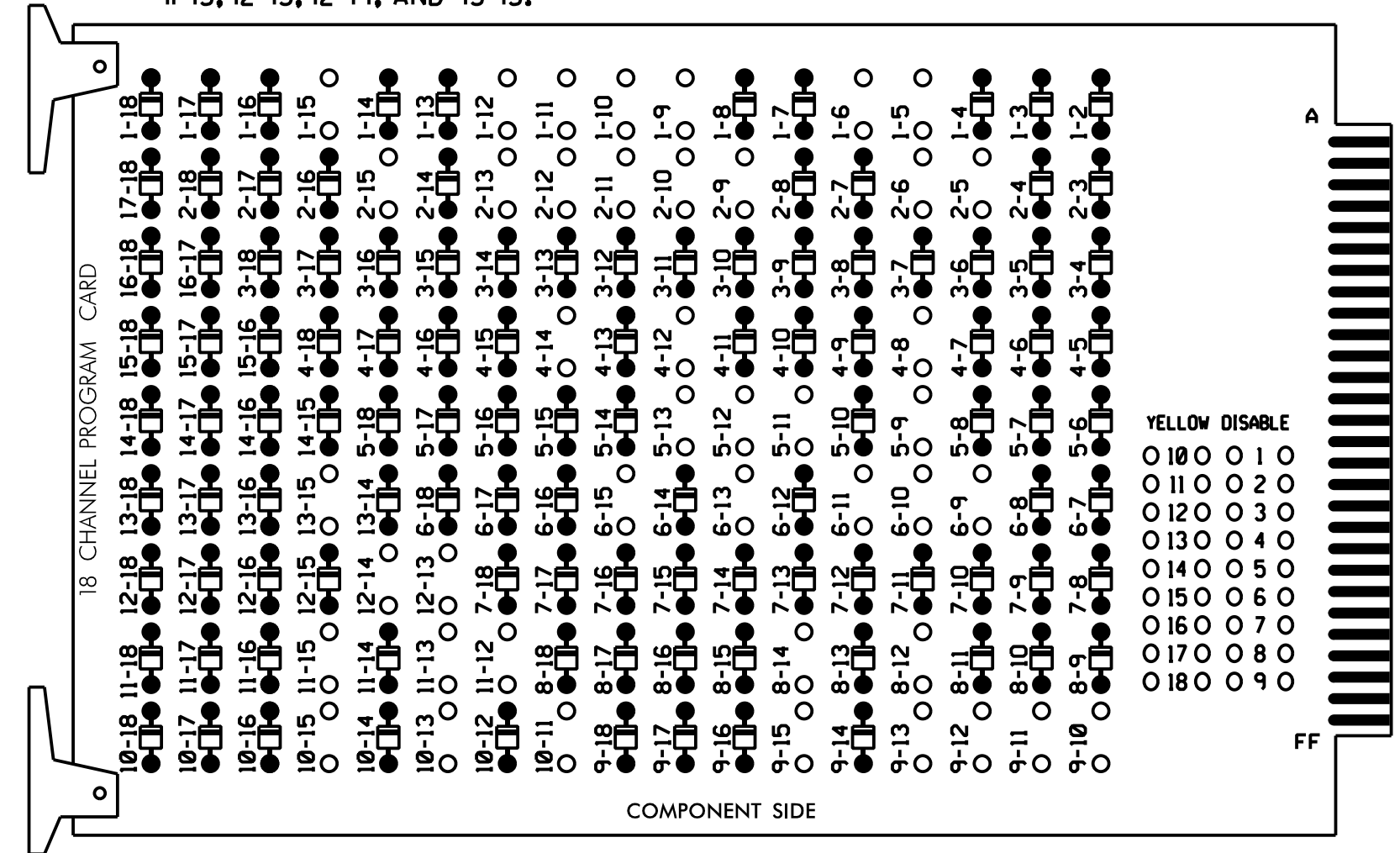
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Project information block including HNTB logo, project name (SR 2048 at SR 1328), plan date (May 2022), reviewed by (N.K. Vlanich, E.E. Tiller, N.R. Simmons), and a signature block for N. K. Vlanich and N. R. Simmons dated 5/17/2024.

### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

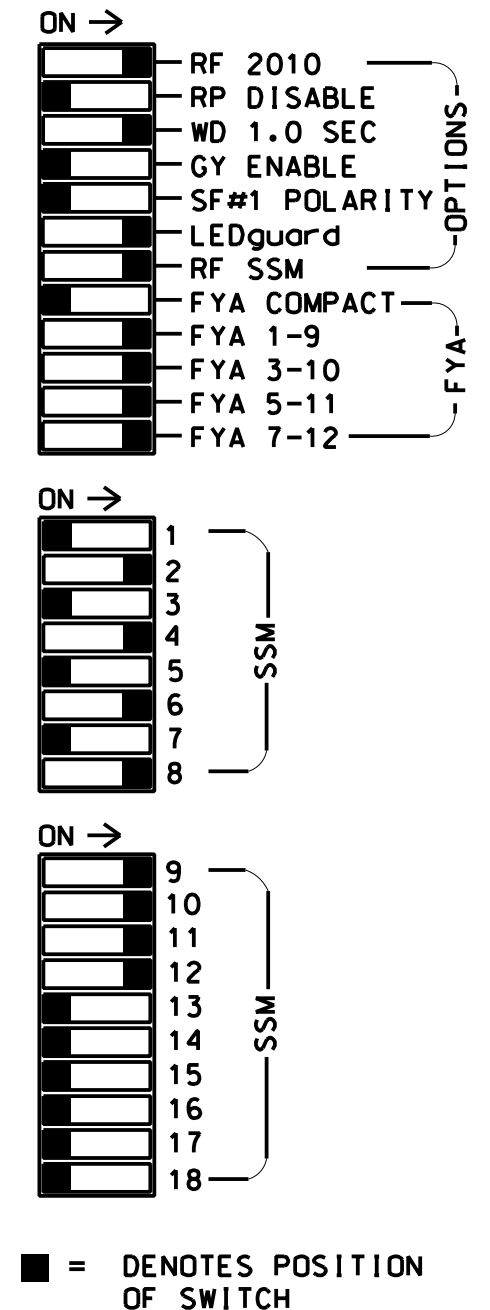
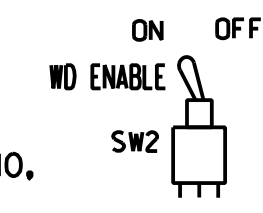
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-12, 1-15, 2-5, 2-6, 2-9, 2-10, 2-11, 2-12, 2-13, 2-15, 4-8, 4-12, 4-14, 5-9, 5-11, 5-12, 5-13, 6-9, 6-10, 6-11, 6-15, 6-16, 8-14, 9-10, 9-11, 9-12, 9-13, 9-15, 10-11, 10-13, 10-15, 11-12, 11-13, 11-15, 12-13, 12-14, AND 13-15.



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 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. Program phases 4 and 8 for Dual Entry.
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, and overlaps 1 and 2 as Wag Overlaps.
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,S5,S6,S7,S8,S9,S11, AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,2 PED,4,4 PED,5,6,6 PED,8
OVERLAP "A".....1+2
OVERLAP "B".....6
OVERLAP "C".....5+6
OVERLAP "D".....4+5

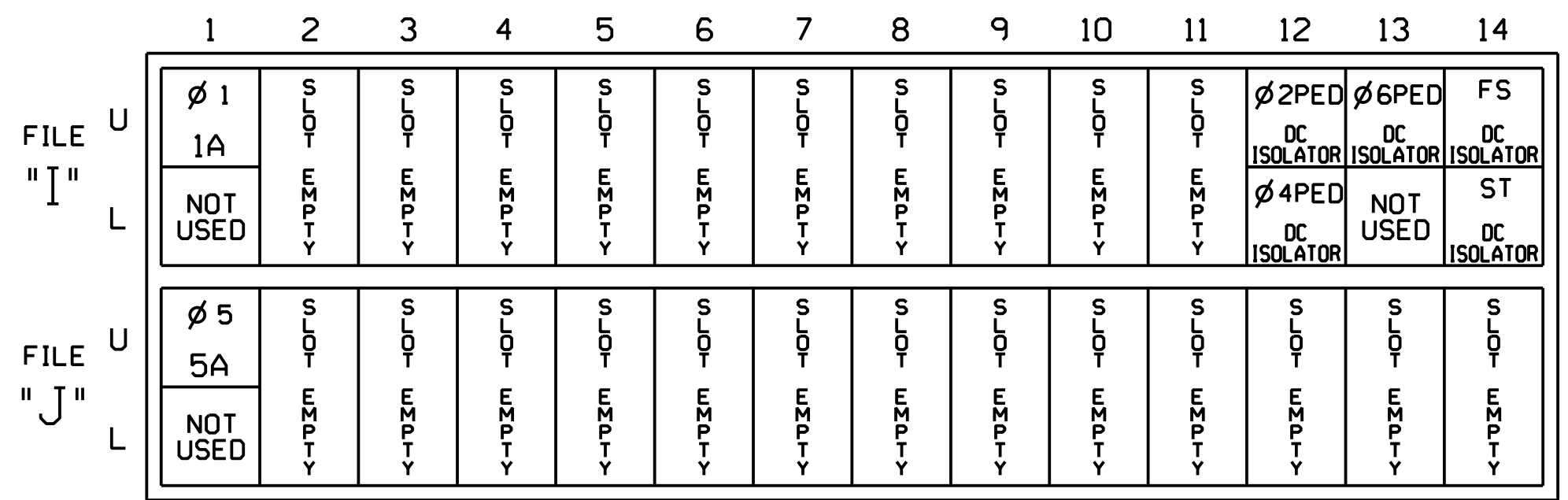
### SIGNAL HEAD HOOK-UP CHART

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) with corresponding terminal numbers.

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

### SPECIAL DETECTOR NOTE

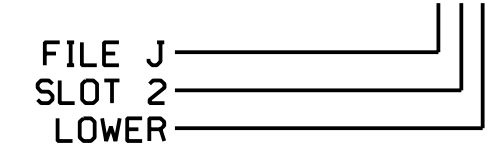
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish detection schemes shown on the Signal Design Plans.

### 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 notes on DC isolators and programming details.

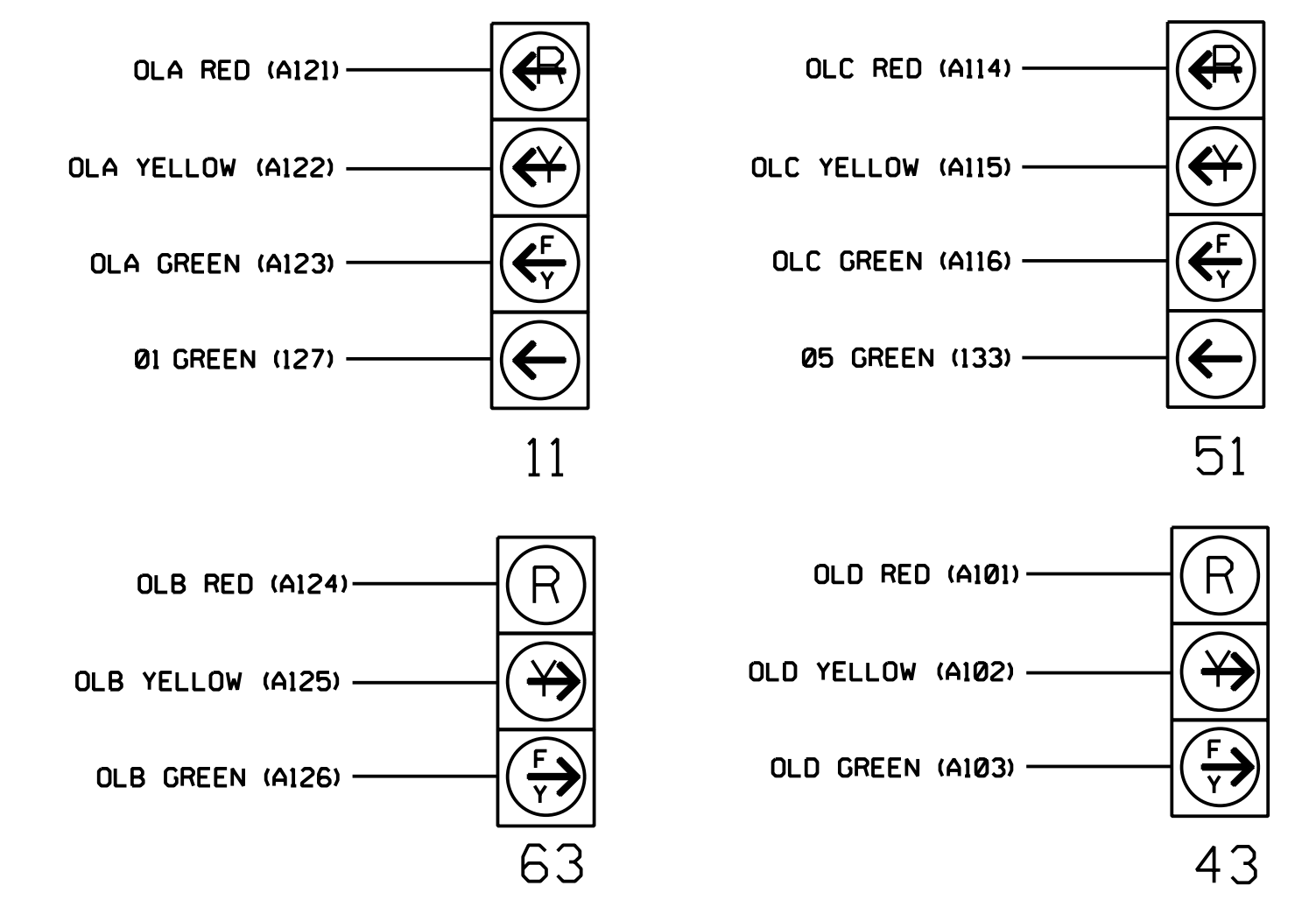
\* See Input Page Assignment programming details on sheets 3 and 4.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



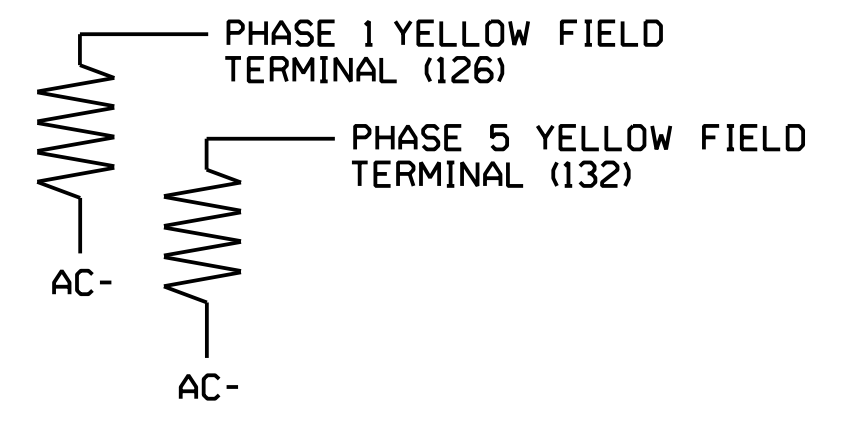
#### NOTE

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)

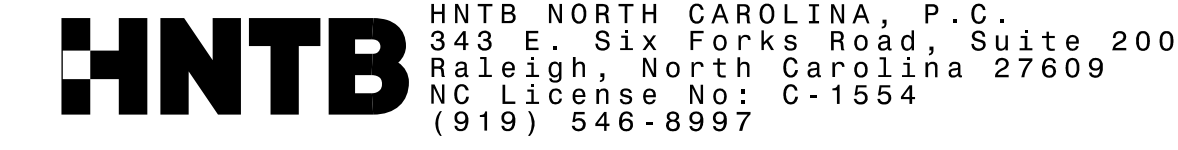
Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K (25W min), 2.0K - 3.0K (10W min).



### 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0893
DESIGNED: May 2022
SEALED: 5/17/2024
REVISED:



Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer seal for Natasha R. Simmons, North Carolina License No. 031464. Includes project details for SR 2048 and SR 1328.

### 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 2 RED CLEAR WHEN TRANSITIONING FROM Phase 2 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 2 (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 2 (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 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
    ↓
    PRESS '+'
  
```

NOTICE GREEN FLASH

```

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?...Y
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)..0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)..0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
    ↓
    PRESS '+'
  
```

NOTICE GREEN FLASH

```

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

NOTICE GREEN FLASH

```

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...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.

```

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 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 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: : 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 '+'
  
```

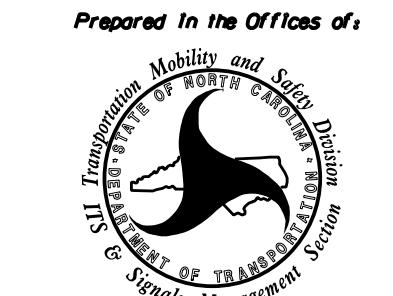
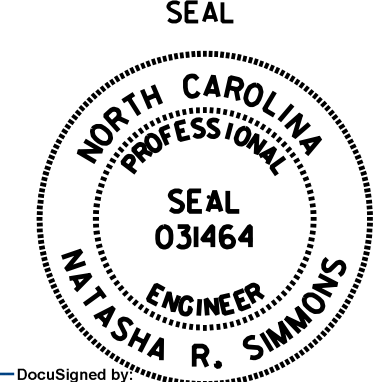

NOTICE PAGE 2

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0893  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 2 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 1328 (White 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 DATE SIG. INVENTORY NO. 03-0893

**HNTB**  
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 (919) 546-8997

### 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 2)

```

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

```

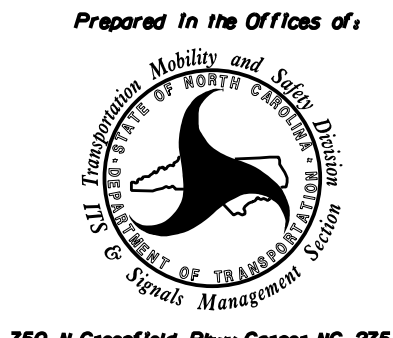
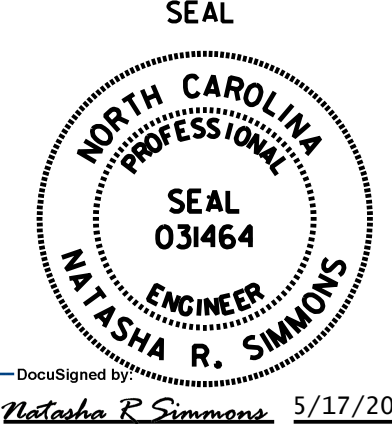
DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0893  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 3 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 1328 (White Rd)		
	Division 3	New Hanover County	
PLAN DATE: August 2023	REVIEWED BY: N.K. Vianich		
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. 03-0893			

### 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

```

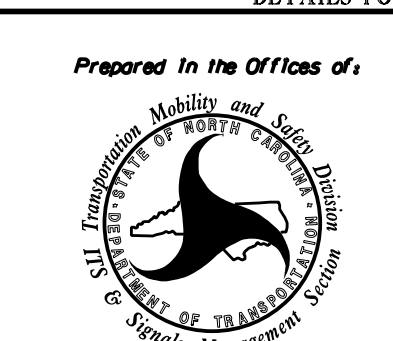
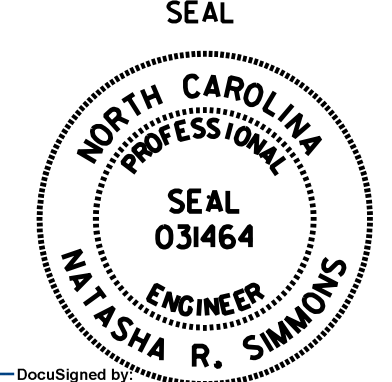

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0893  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 4 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 1328 (White 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 DATE _____ SIG. INVENTORY NO. 03-0893	

## 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 51 to run protected turns only.
- INPUTS PAGE 2:** Disables phase 6 call on loop 1A and reduces delay time for Phase 2 call on loop 1A to 0 seconds.
- 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:

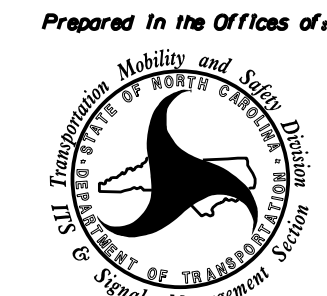
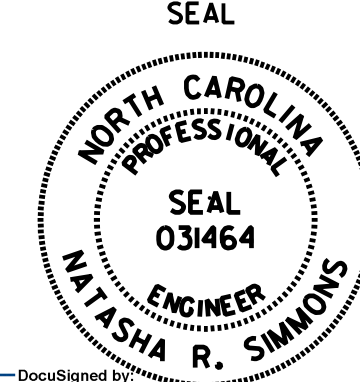

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T3-4 AND TERMINATE ON T3-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T3-5 AND TERMINATE ON T3-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 03-0893  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

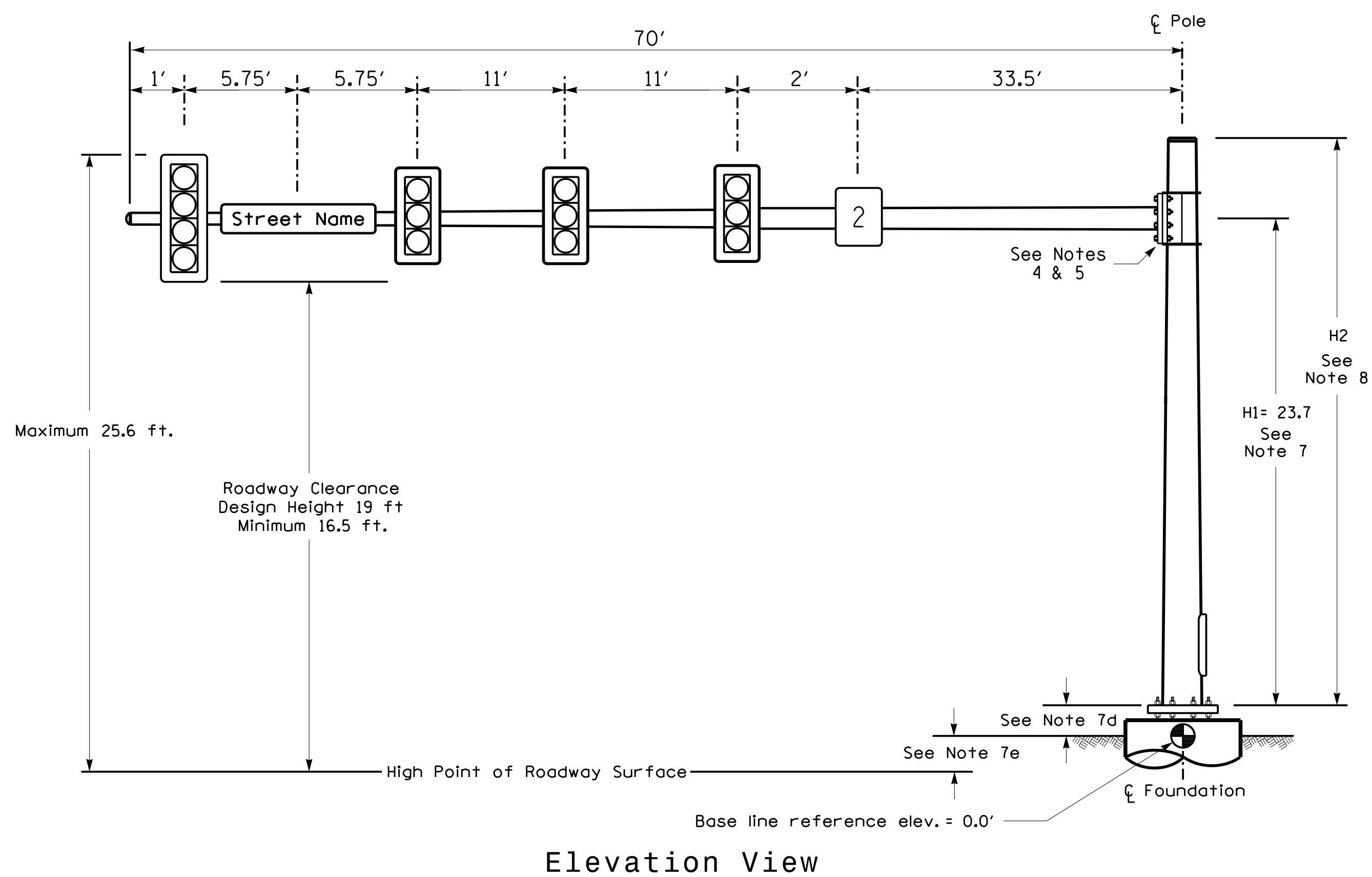
Signal Upgrade - Final Design  
 Electrical Detail - Sheet 5 of 5

**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 1328 (White 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	SEAL  SEAL 031464 ENGINEER NASHA R. SIMMONS
REVISIONS    INIT.    DATE		DocuSigned by:  5/17/2024 SIGNATURE    DATE SIG. INVENTORY NO.    03-0893



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



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

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

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	2.70 ft.	-0.19 ft.
Elevation difference at Edge of travelway or face of curb	0.72 ft.	-0.31 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

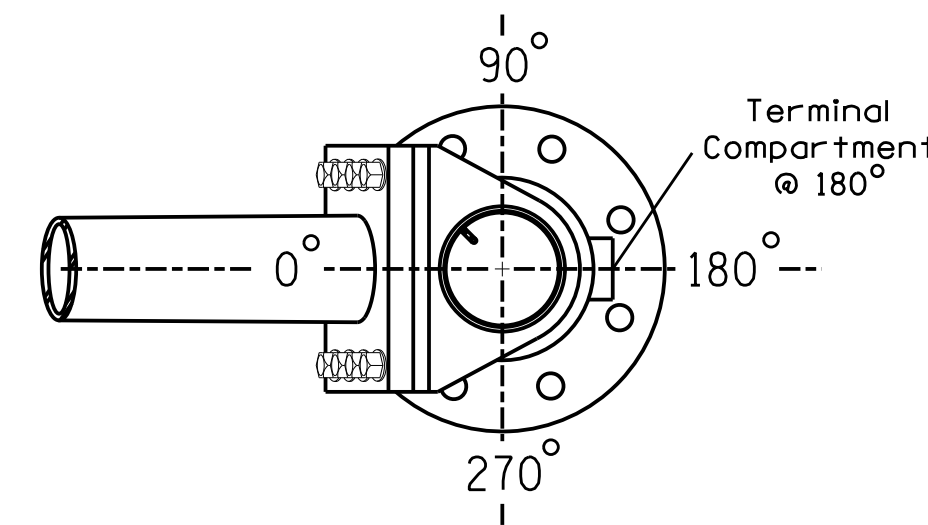
**NOTES**

**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>

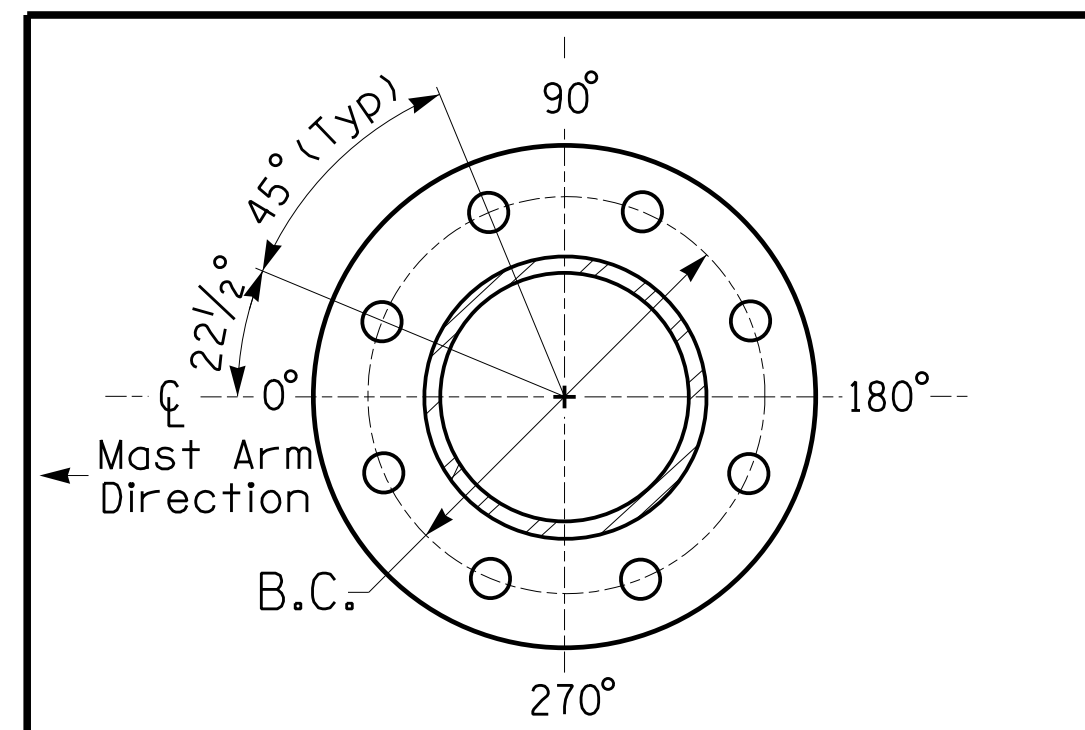
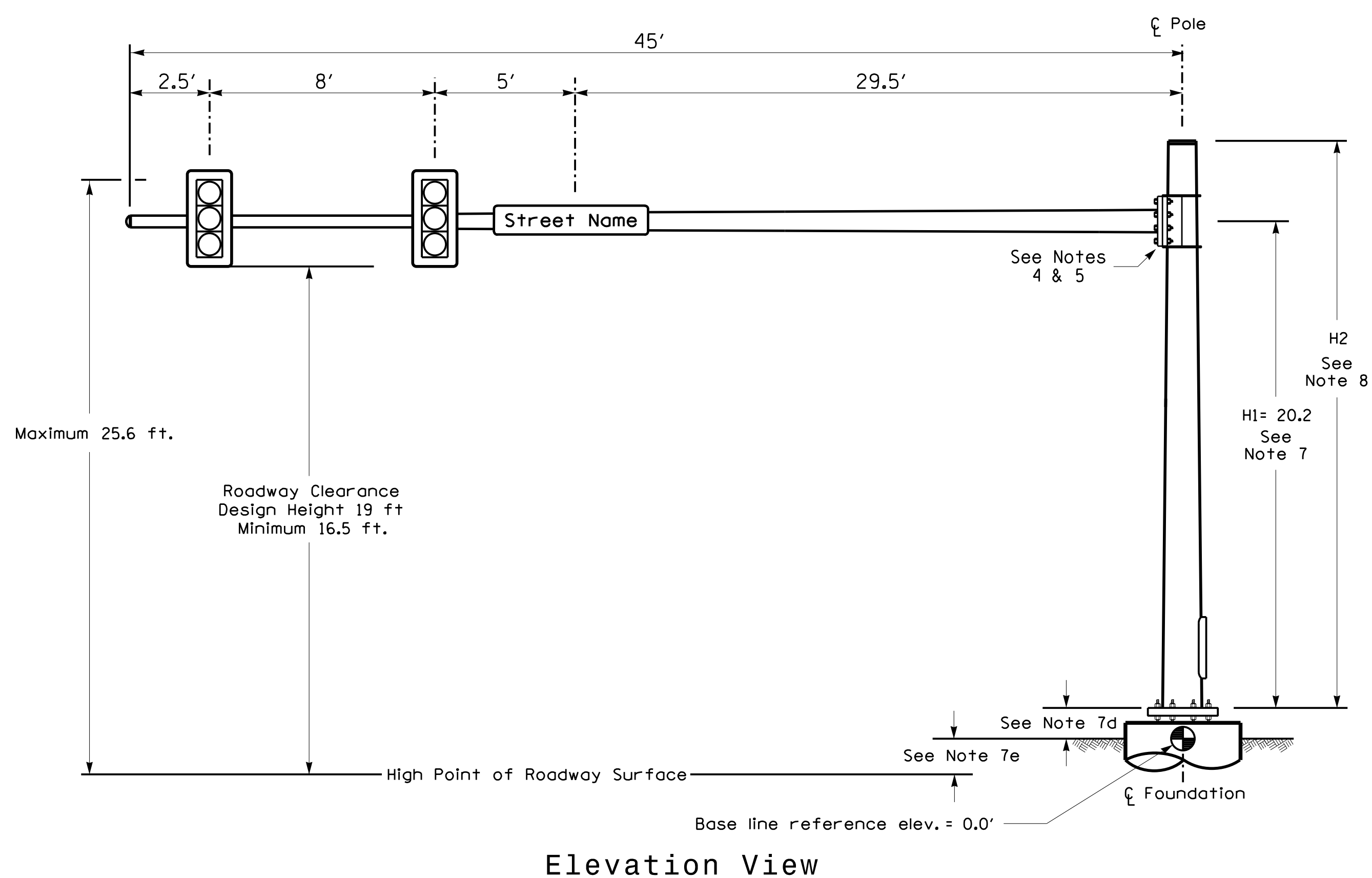
**DESIGN REQUIREMENTS**

- 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.

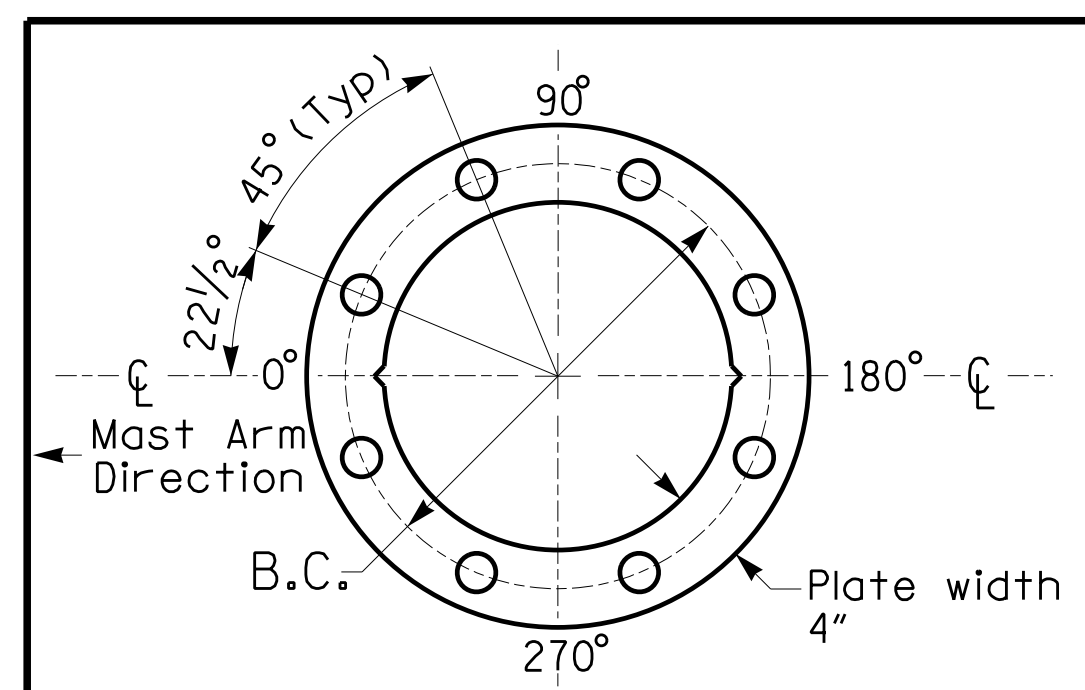


POLE RADIAL ORIENTATION

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



8 BOLT BASE PLATE DETAIL



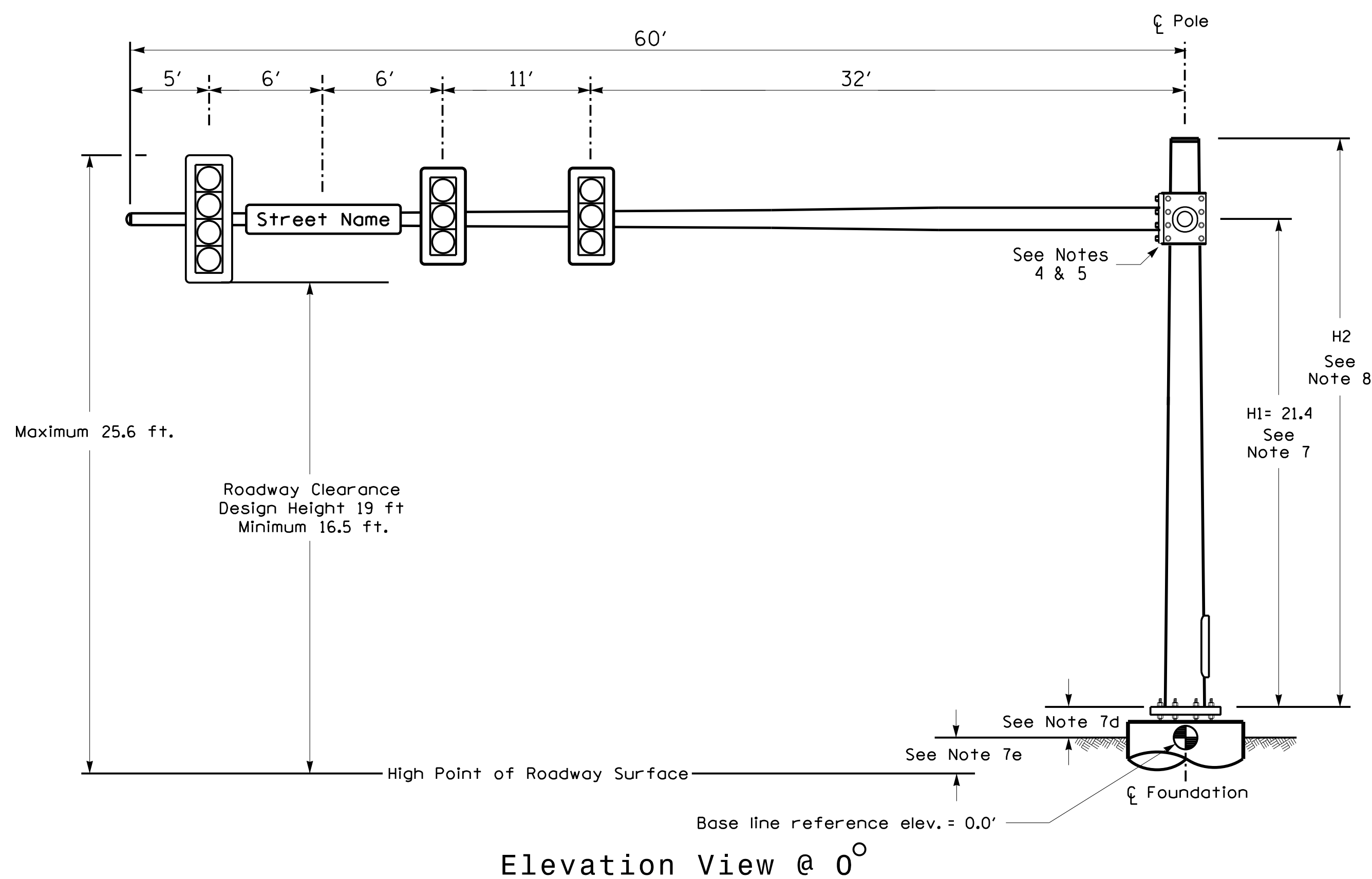
BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

NCDOT Wind Zone 1 (150 mph)

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

 Prepared in the Offices of: Transportation Mobility and Safety Division STATE OF NORTH CAROLINA Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27525	SR 2048 (Gordon Rd) at SR 1328 (White Rd)	 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER NATASHA R. SIMMONS
	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	

Design Loading for METAL POLE NO. 3 Mast Arm "A"

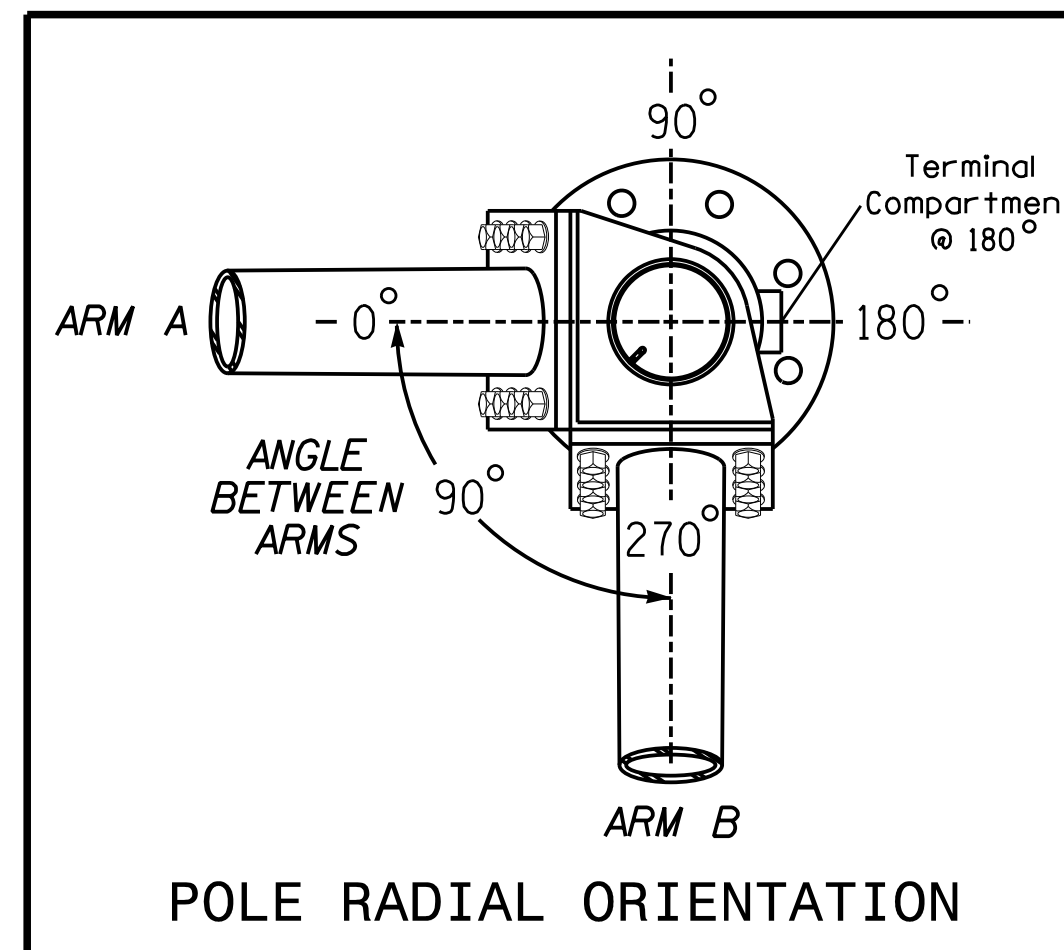


Elevation View @ 0°

**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.

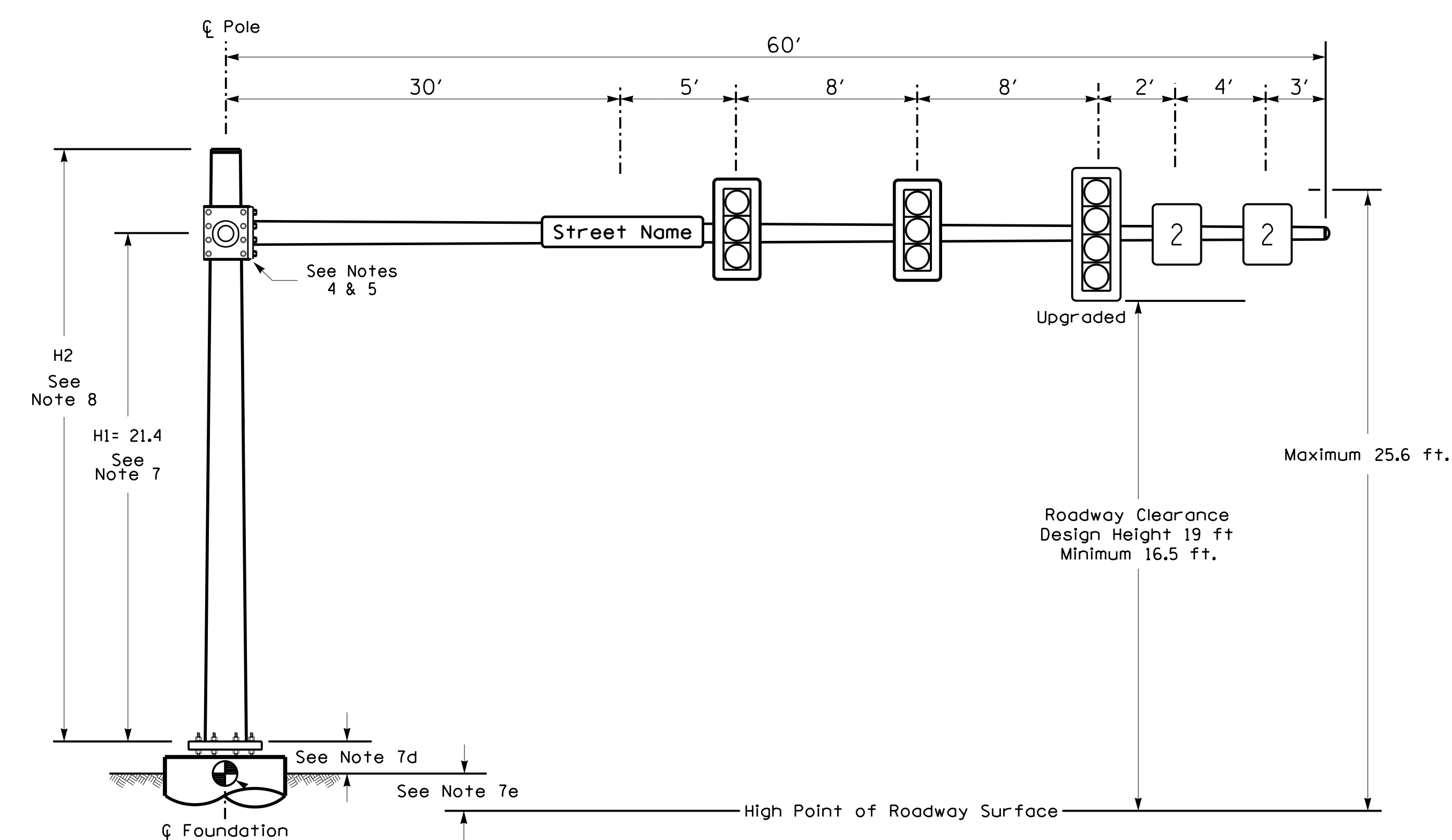
**Elevation Data for Mast Arm Attachment (H1)**

Elevation Differences for:	Arm A	Arm B
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.37 ft.	-0.08 ft.
Elevation difference at Edge of travelway or face of curb	-0.54 ft.	-0.38 ft.

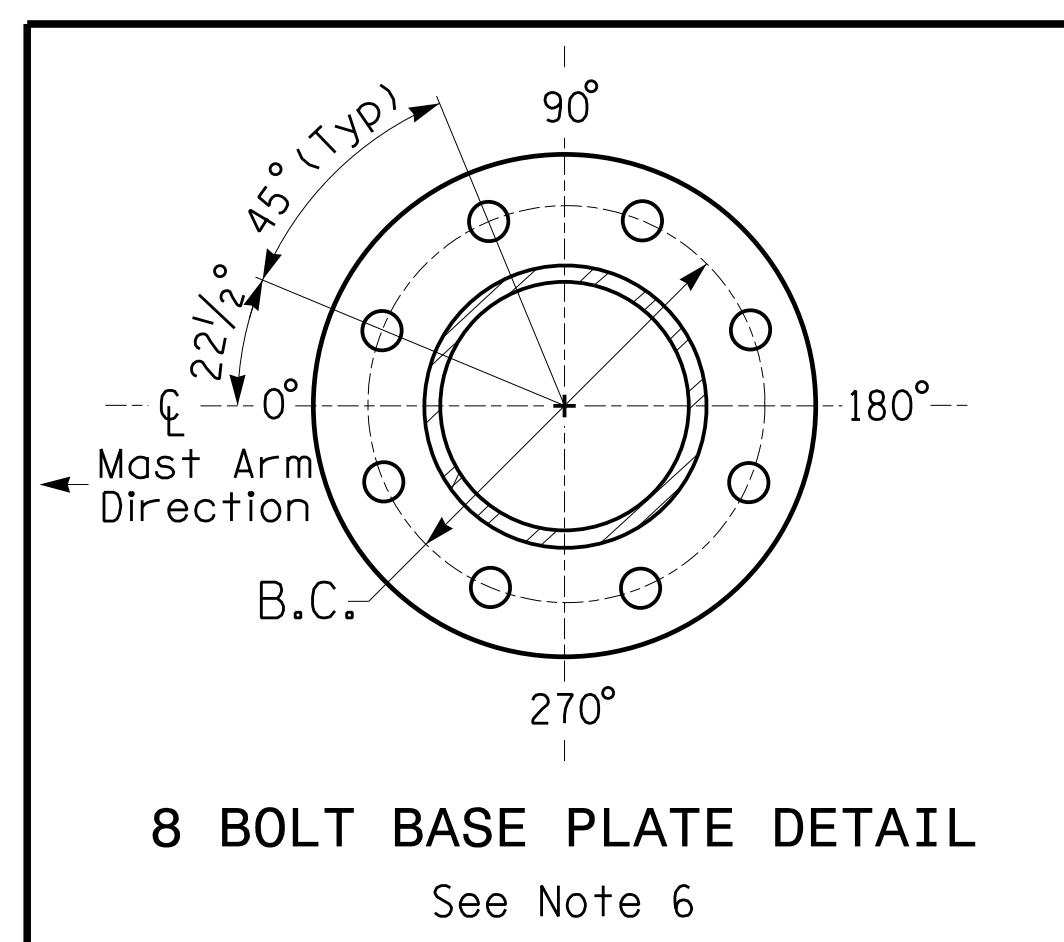


POLE RADIAL ORIENTATION

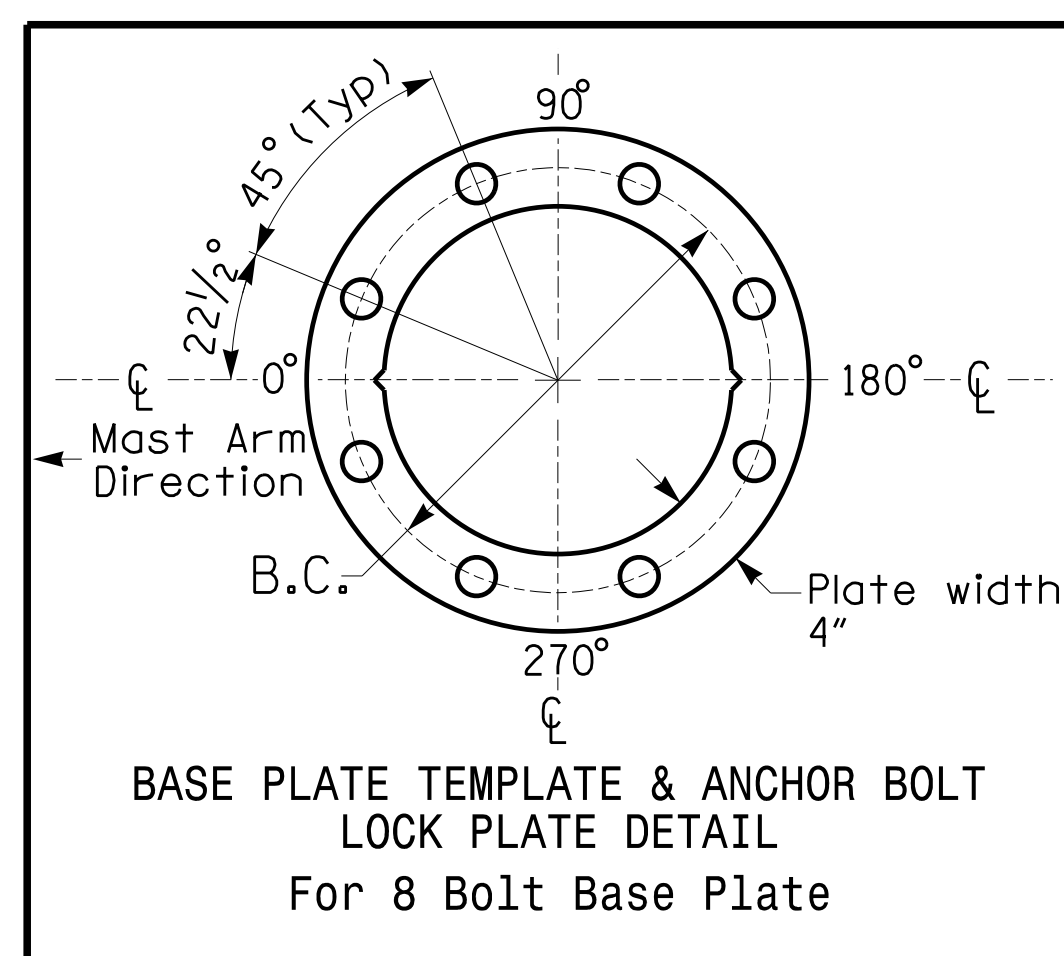
Design Loading for METAL POLE NO. 3 Mast Arm "B"



Elevation View @ 270°



8 BOLT BASE PLATE DETAIL



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

MAST ARM LOADING SCHEDULE

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

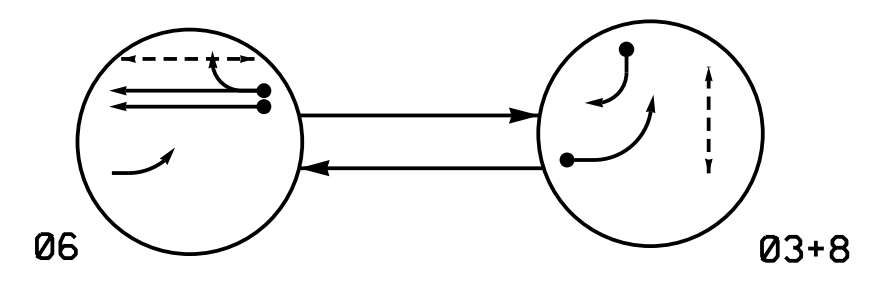
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the 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)

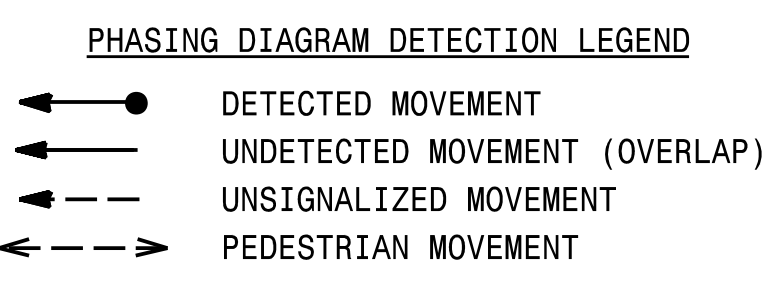
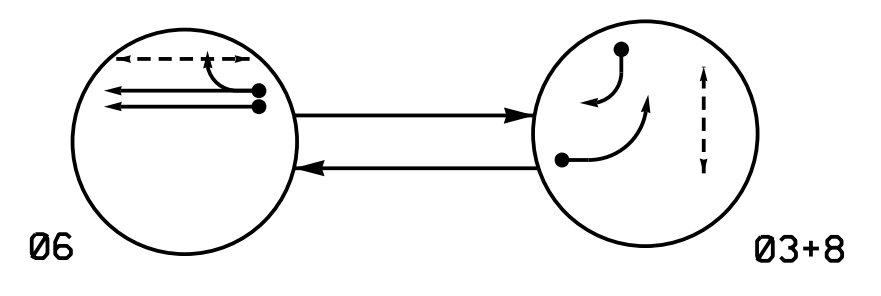
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 1328 (White 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: 0 N/A N/A	REVISIONS:	INITI. DATE	DATE: 5/17/2024 SIG. INVENTORY NO. 03-0893

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	06	03+8	F L
31,32,33	Y	Y	Y
61,62	G	R	Y
81,82,83	R	Y	R
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	06	03+8	F L
31,32,33	R	Y	Y
61,62	G	R	Y
81,82,83	R	Y	R
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

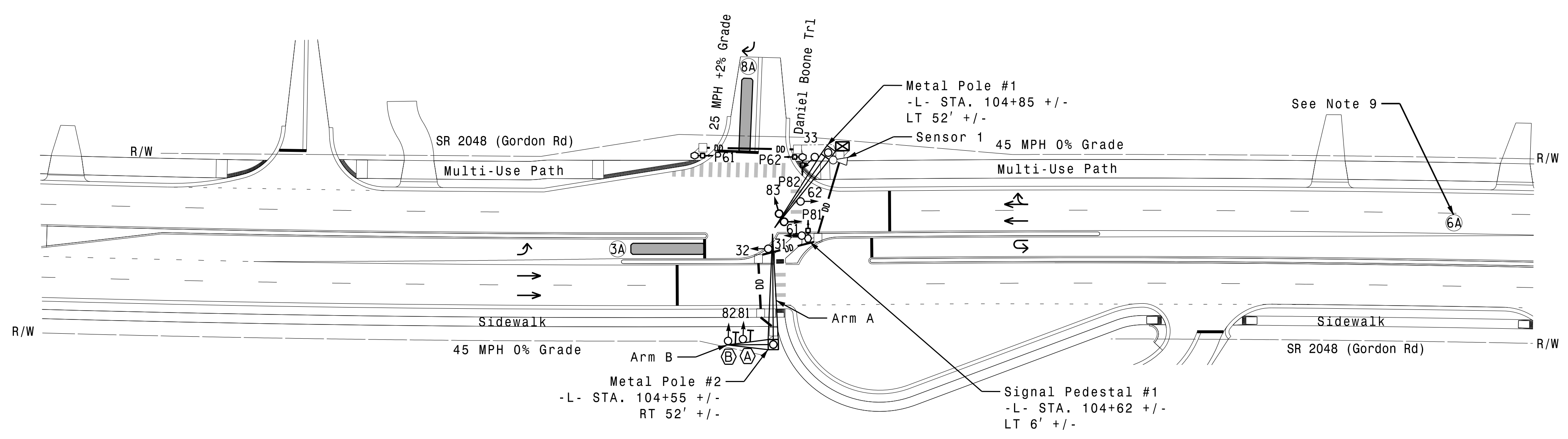
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING							
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP
3A	6X40	0	*	*	3	Y	-	-	10**	-	Y
8A	6X40	0	*	*	6#	Y	-	-	-	-	Y
					8	Y	-	-	15	-	Y

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

**2 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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 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 #1232.



**OASIS 2070 TIMING CHART**

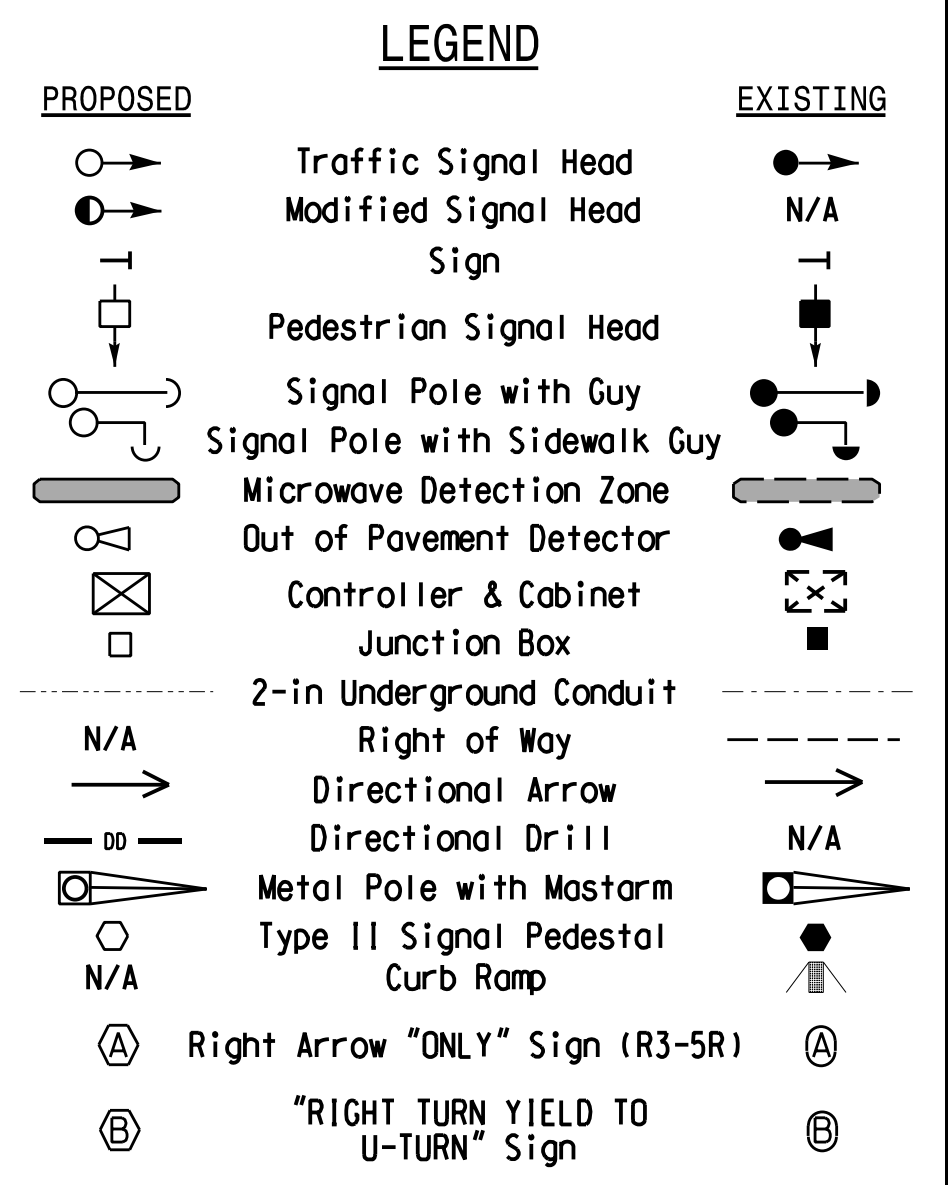
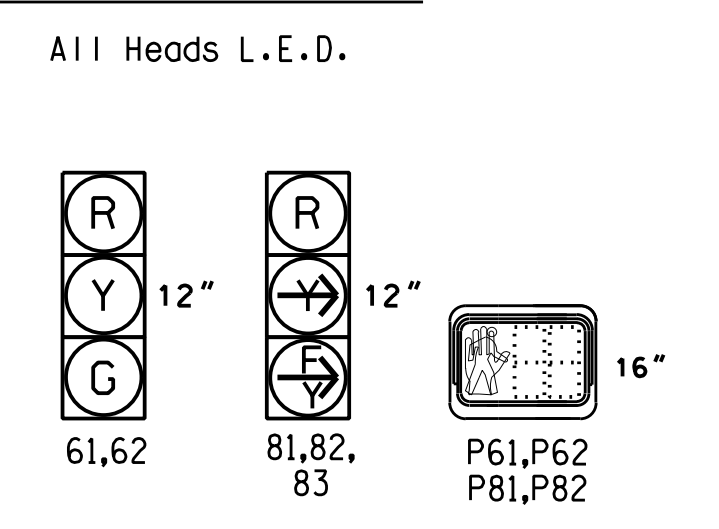
FEATURE	PHASE		
	3	6	8
Min Green 1 *	5	12	5
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	20	90	20
Yellow Clearance	3.0	4.5	3.0
Red Clearance	1.9	1.5	1.9
Red Revert	2.0	2.0	2.0
Walk 1 *	7	7	7
Don't Walk 1	7	13	7
Advanced Walk *	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
Simultaneous Gap	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 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
Channel	1
Phase	6
Direction of Travel	WB
Detection Zone (ft)	100-600
Enable Speed	Y
Speed Range (mph)	35-100
Enable Estimated Time of Arrival	Y
Estimated Time of Arrival (sec)	1.0-6.5

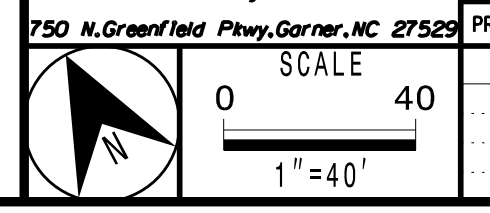
**SIGNAL FACE I.D.**



**New Installation**

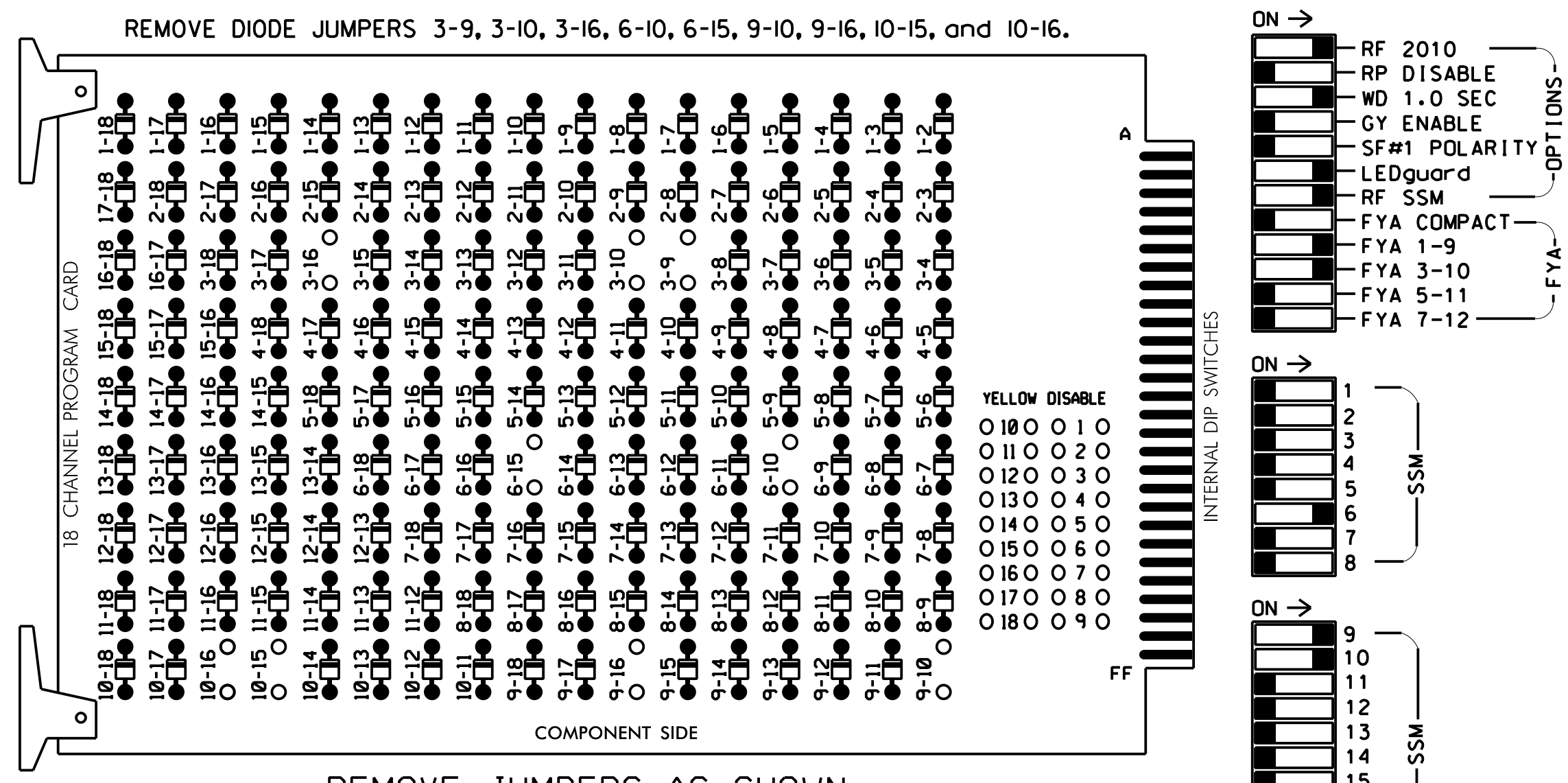
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

	SR 2048 (Gordon Rd) Westbound at Daniel Boone Trl		
	Division 3 New Hanover County Wilmington PLAN DATE: May 2022 PREPARED BY: E.E. Tiller	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	



### 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 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 3 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 6 for Startup In Green.
- Program phase 6 for Yellow Flash, and overlaps 1 and 2 as a Wag Overlap.
- 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.....S4,S8,S9,S12,AUX S1,AUX S2  
 PHASES USED.....3,6,8\*  
 OVERLAP "A".....8  
 OVERLAP "B".....3+6  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED  
 \* PHASE USED FOR TIMING PURPOSES ONLY

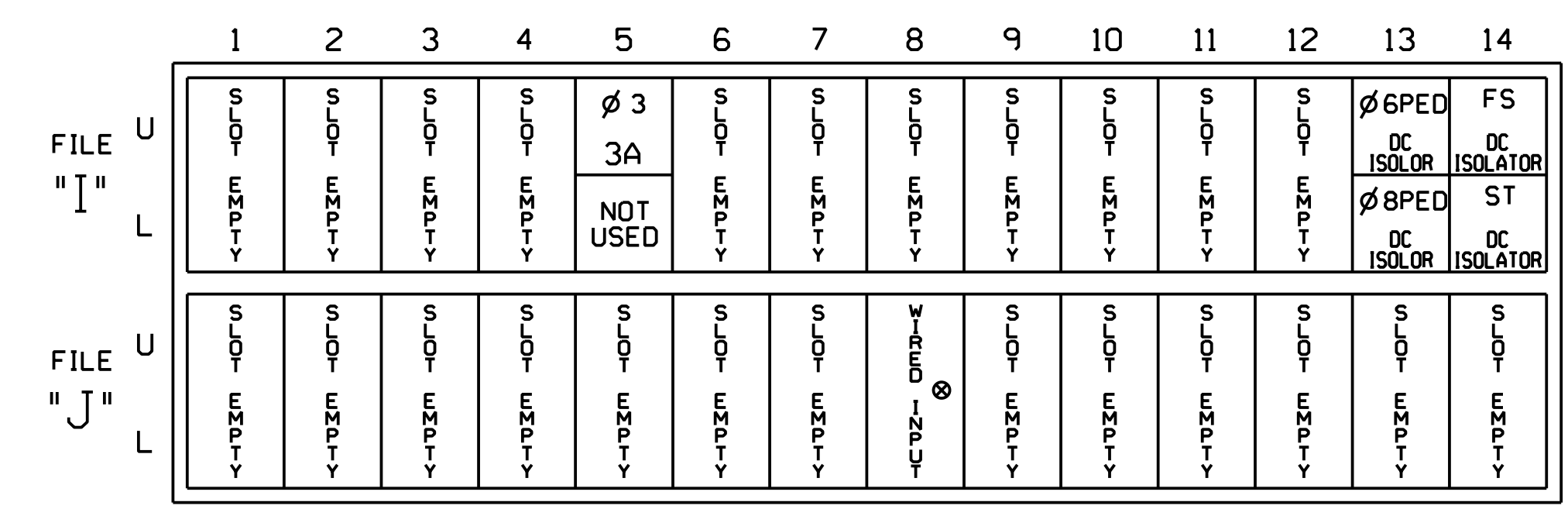
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32,33*	NU	NU	NU	61,62	P61, P62	NU	NC	P81, P82	81,82,83*	31,32,33*	NU	NU	NU	NU
RED								134					A121					
YELLOW				*				135										
GREEN								136										
RED ARROW														A124				
YELLOW ARROW														A122	A125			
FLASHING YELLOW ARROW														A123	A126			
GREEN ARROW				118														
Hand									119				110					
Walking									121				112					

NU = Not Used  
 NC = Not Connected  
 \* 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)

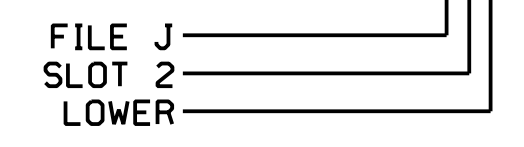


### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A <sup>1</sup>	TB4-5,6	I5U	58	20*	3	3	Y	Y			10
	-	J8U	50	12*	28	6	Y	Y			
	-	I5U	58	20*	53	3	Y	Y			
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

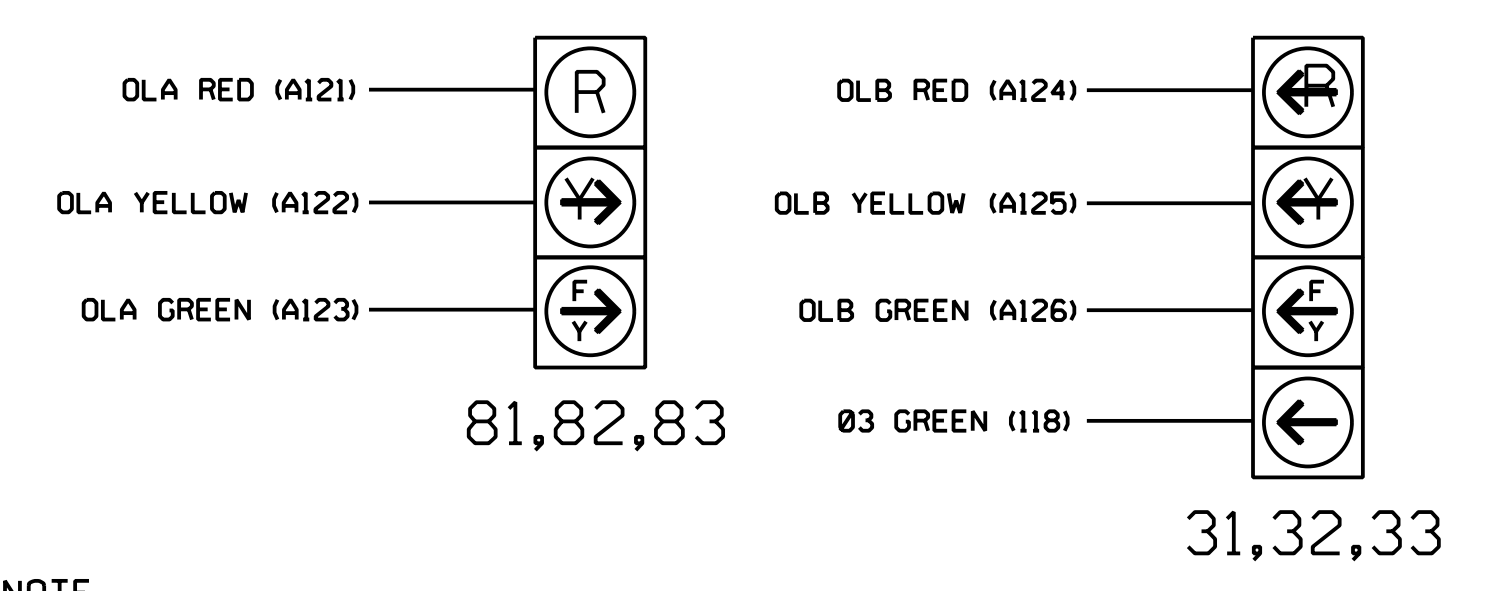
\* See Input Page Assignment programming details on sheet 3.  
<sup>1</sup> Add jumper from I5-W to J8-W, on rear of input file.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



#### NOTE

The sequence display for signal heads 31, 32, and 33 require special logic programming. See sheet 2 for programming instructions.

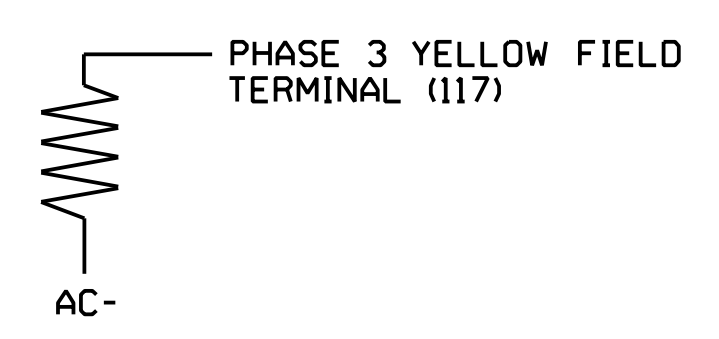
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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)

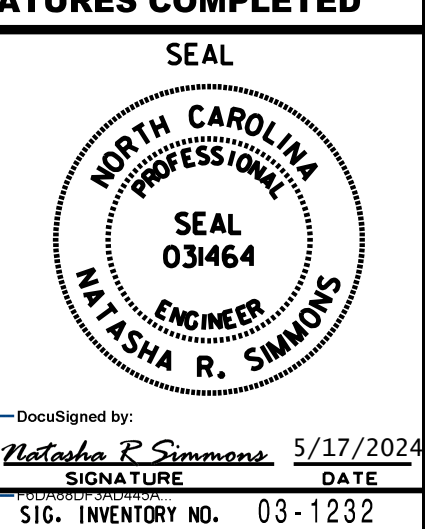
ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



#### ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 2048 (Gordon Rd) Westbound  
 at  
 Daniel Boone Trl  
 Division 3 New Hanover County Wilmington  
 PLAN DATE: March 2024 REVIEWED BY: N.K. Vlanich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1232  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

Electrical Detail - Sheet 1 of 4  
 New Installation

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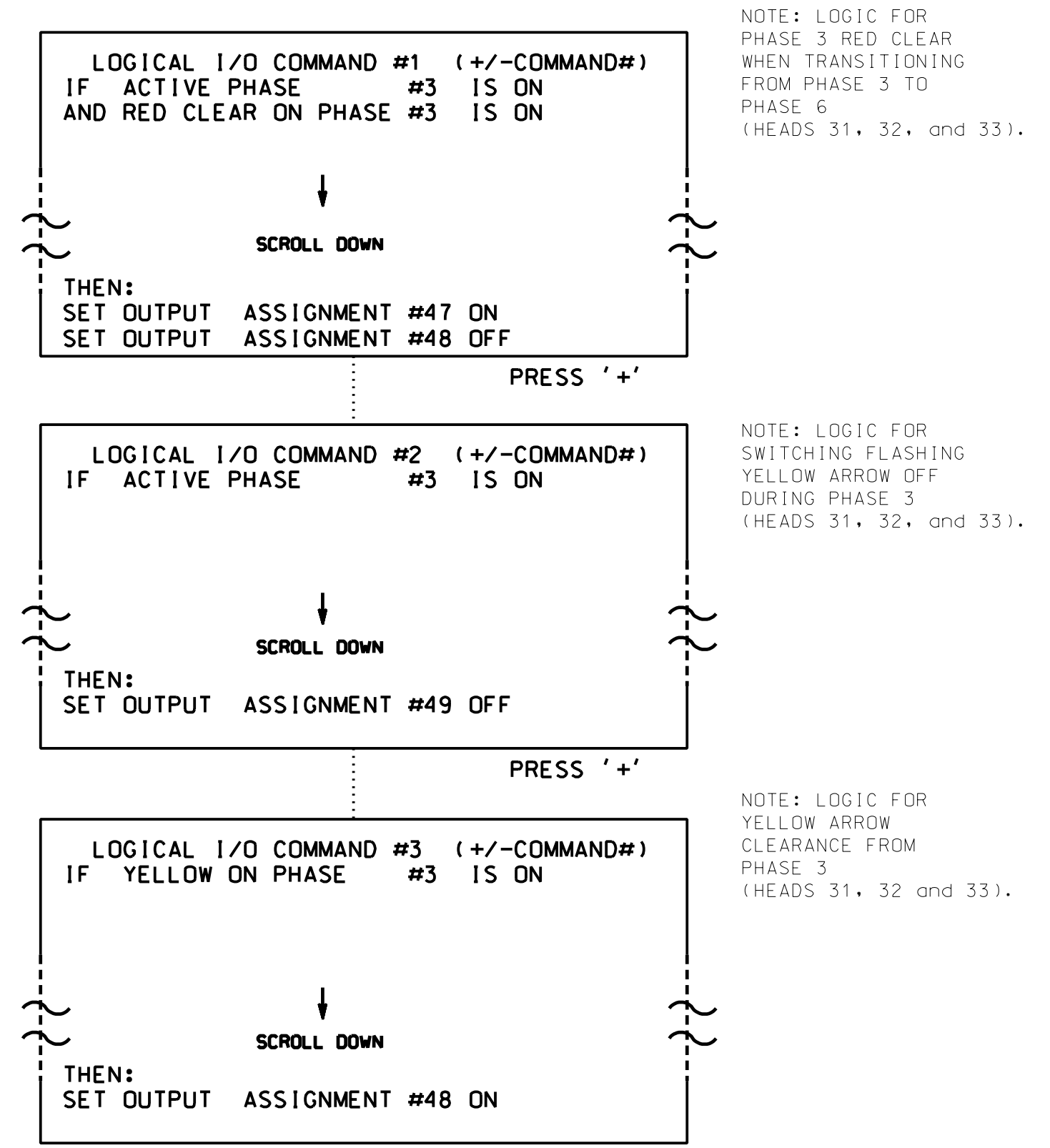
750 N. Greenfield Pkwy, Corner, NC 27529

DocuSigned by:  
 Melissa R. Simmons 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-1232

### 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).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

<b>OUTPUT REFERENCE SCHEDULE</b>	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 47 =	Overlap B Red
OUTPUT 48 =	Overlap B Yellow
OUTPUT 49 =	Overlap B Green

### OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

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

```

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

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

← NOTICE GREEN FLASH

← NOTICE GREEN FLASH

```

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:      :12345678910111213141516
VEH OVL PARENTS:  X X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
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 'B' SETTINGS
PHASE:      :12345678910111213141516
VEH OVL PARENTS:  X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
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

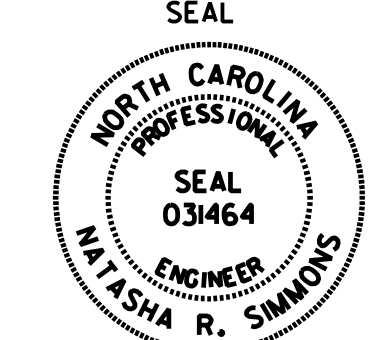
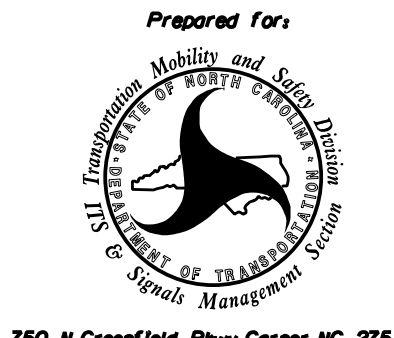

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING COMPLETE

Electrical Detail - Sheet 2 of 4  
New Installation

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1232  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

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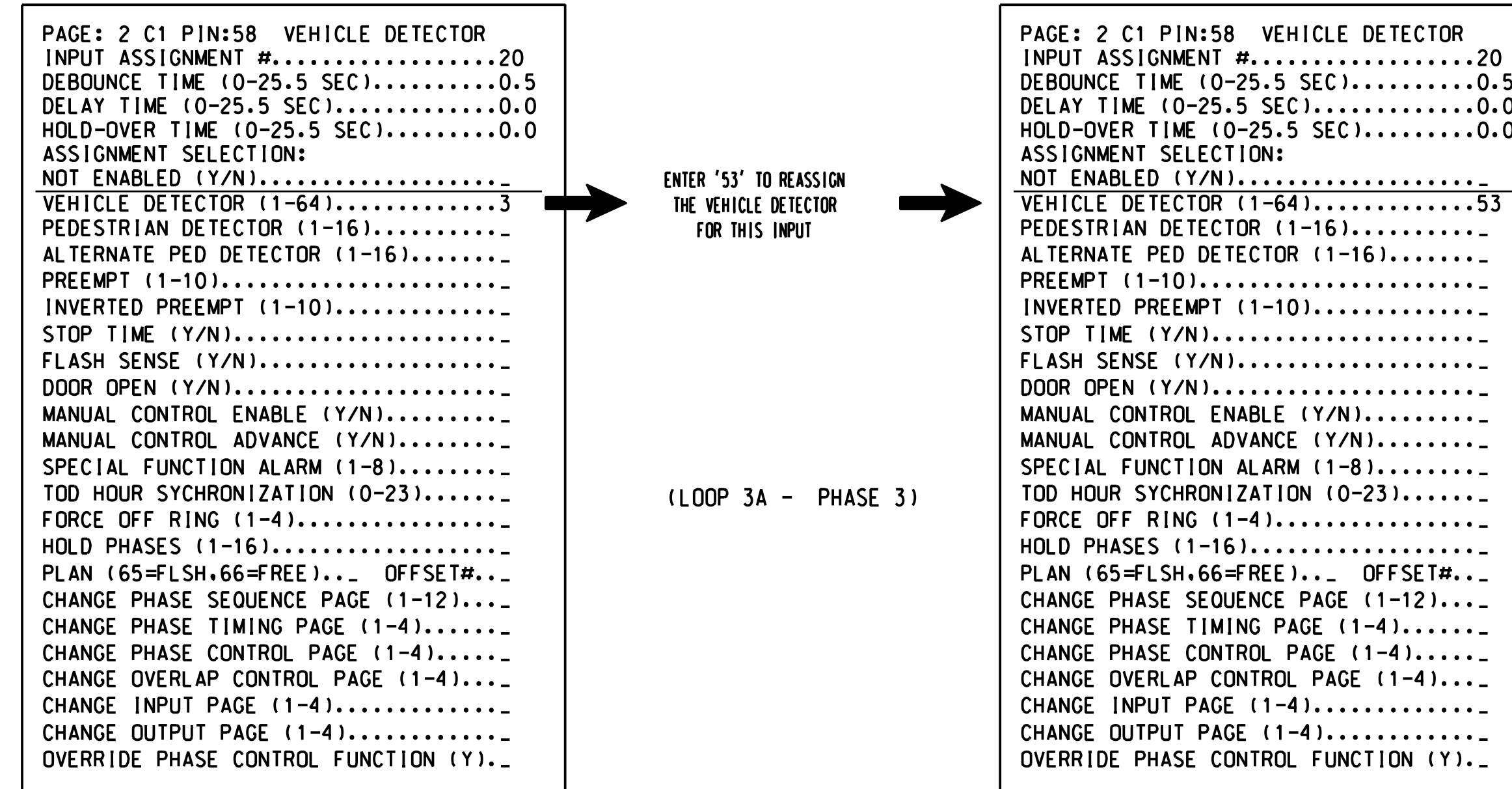
ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2048 (Gordon Rd) Westbound at Daniel Boone Trl	SEAL
Prepared for:	Division 3 New Hanover County Wilmington	
	PLAN DATE: March 2024    REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons	
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	REVISIONS    INIT.    DATE	DocuSigned by:  SIGNATURE    DATE 5/17/2024 SIG. INVENTORY NO. 03-1232

### 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 10 SECONDS TO 0 SECONDS.

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

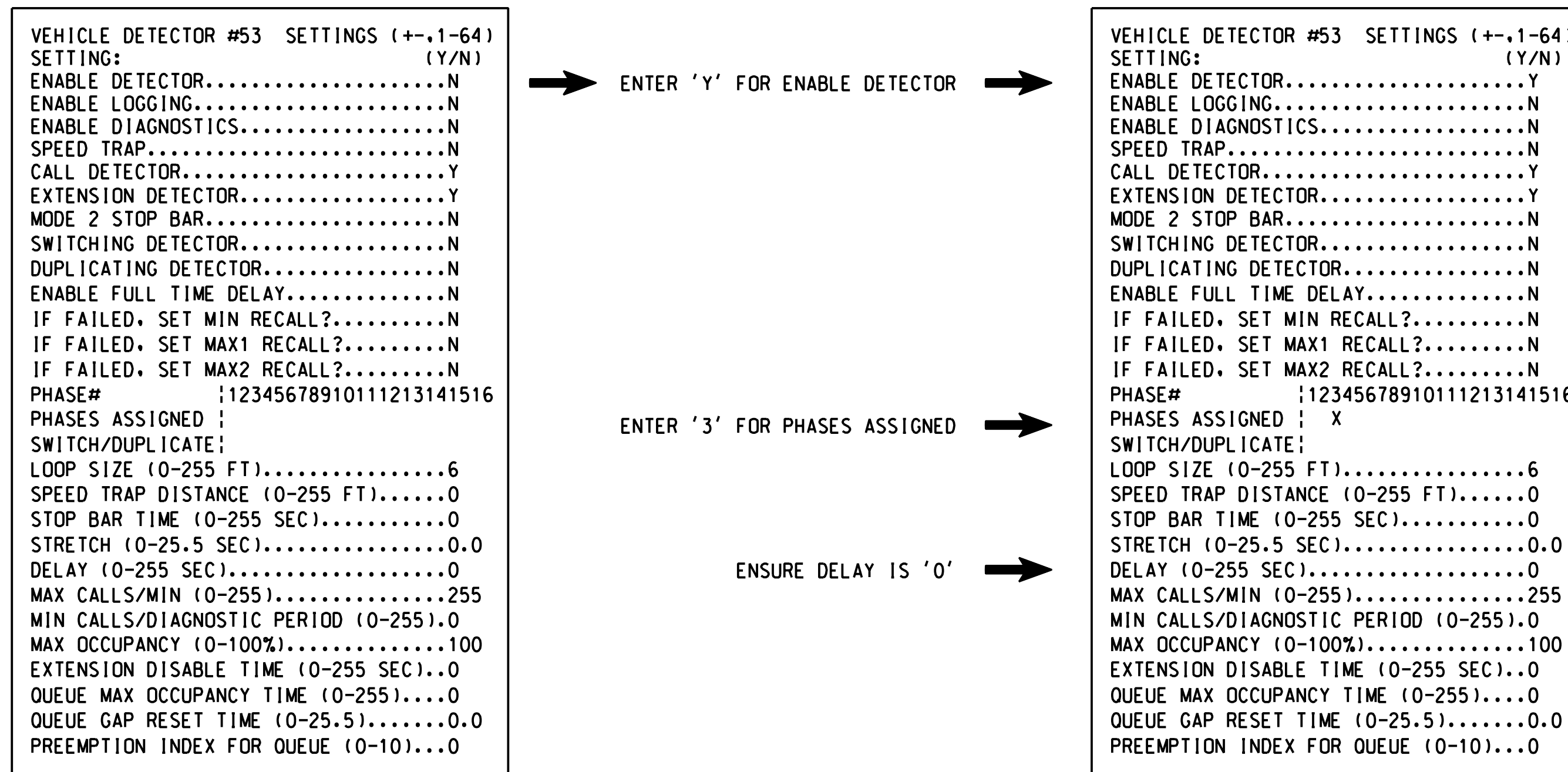


PROGRAMMING COMPLETE

### 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: 03-1232  
DESIGNED: May 2022  
SEALED: 5/17/2024  
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Electrical Detail - Sheet 3 of 4  
New Installation

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(919) 546-8997

	SR 2048 (Gordon Rd) Westbound at Daniel Boone Trl Division 3 New Hanover County Wilmington	
	PLAN DATE: March 2024 PREPARED BY: E.E. Tiller	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons
REVISIONS INIT. DATE	DocuSigned by: Melissa R. Simmons 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-1232	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 MELISSA 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 phase for heads 31, 32, and 33 to run protected turn only.

INPUTS PAGE 2: Disables phase 6 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

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


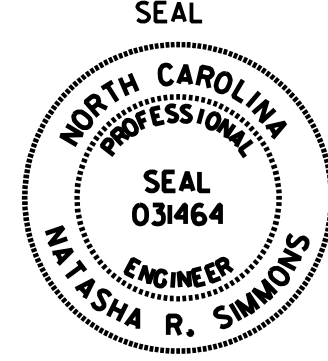

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-1232  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

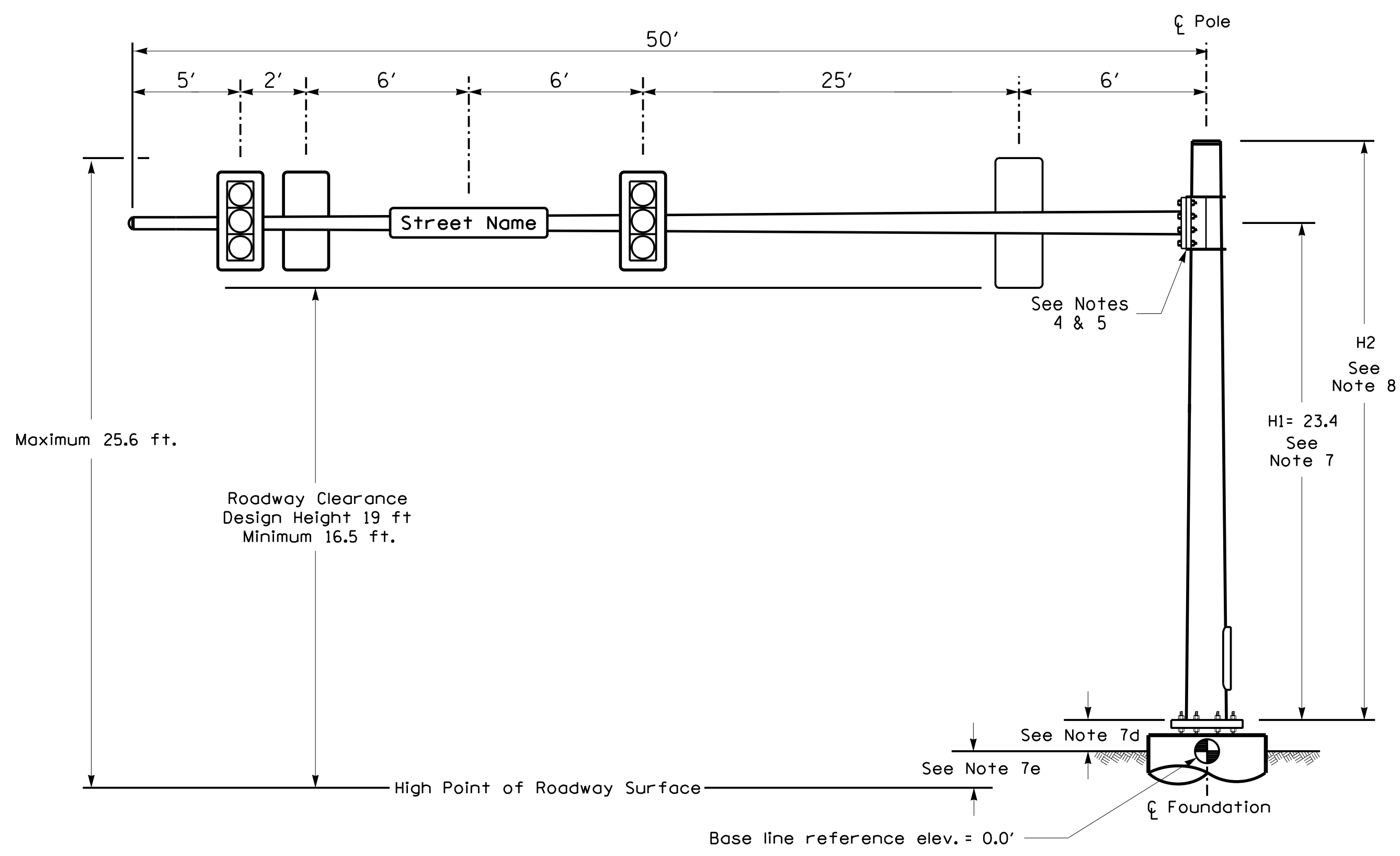
Electrical Detail - Sheet 4 of 4  
New Installation

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(919) 546-8997

Prepared for:  750 N. Greenfield Pkwy, Corner, NC 27529	SR 2048 (Gordon Rd) Westbound at Daniel Boone Trl Division 3 New Hanover County Wilmington PLAN DATE: March 2024 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	SEAL  N. R. SIMMONS ENGINEER
REVISIONS      INIT.      DATE		DocuSigned by:  N. R. SIMMONS      5/17/2024 DATE SIG. INVENTORY NO. 03-1232

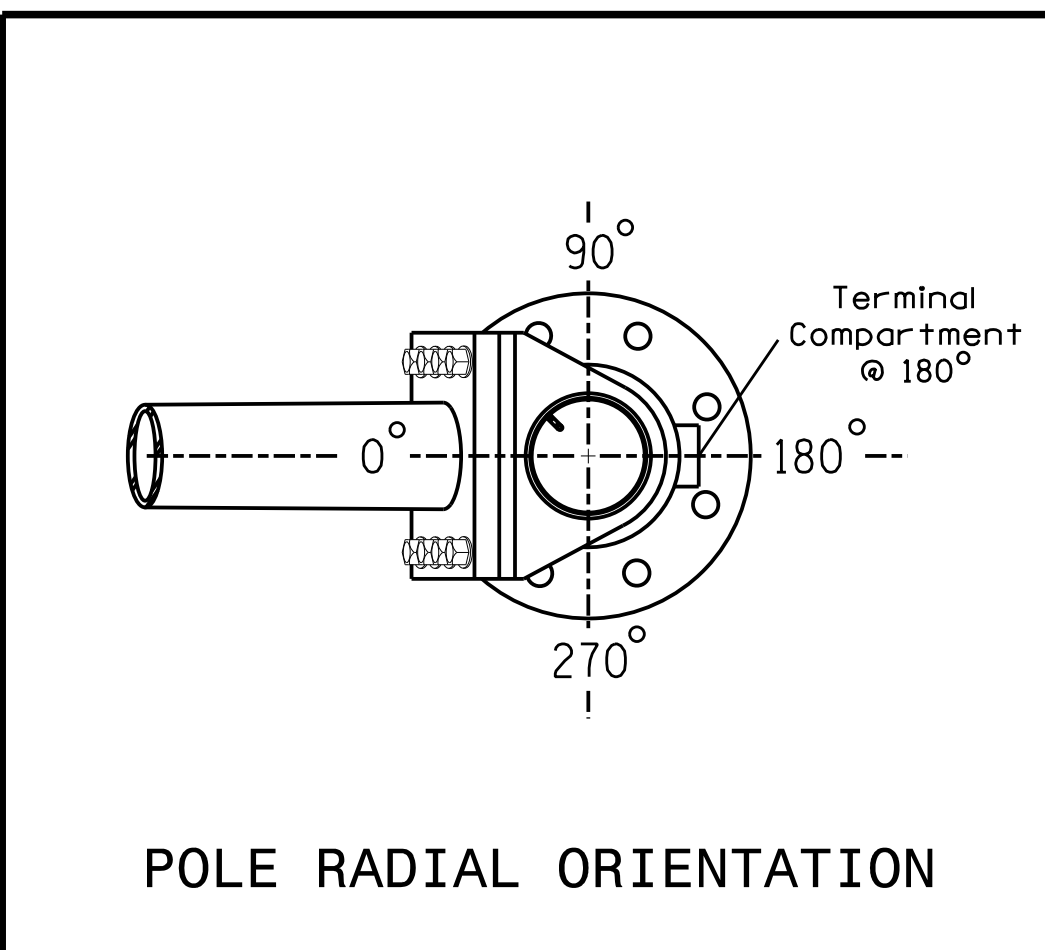
### Design Loading for METAL POLE NO. 1



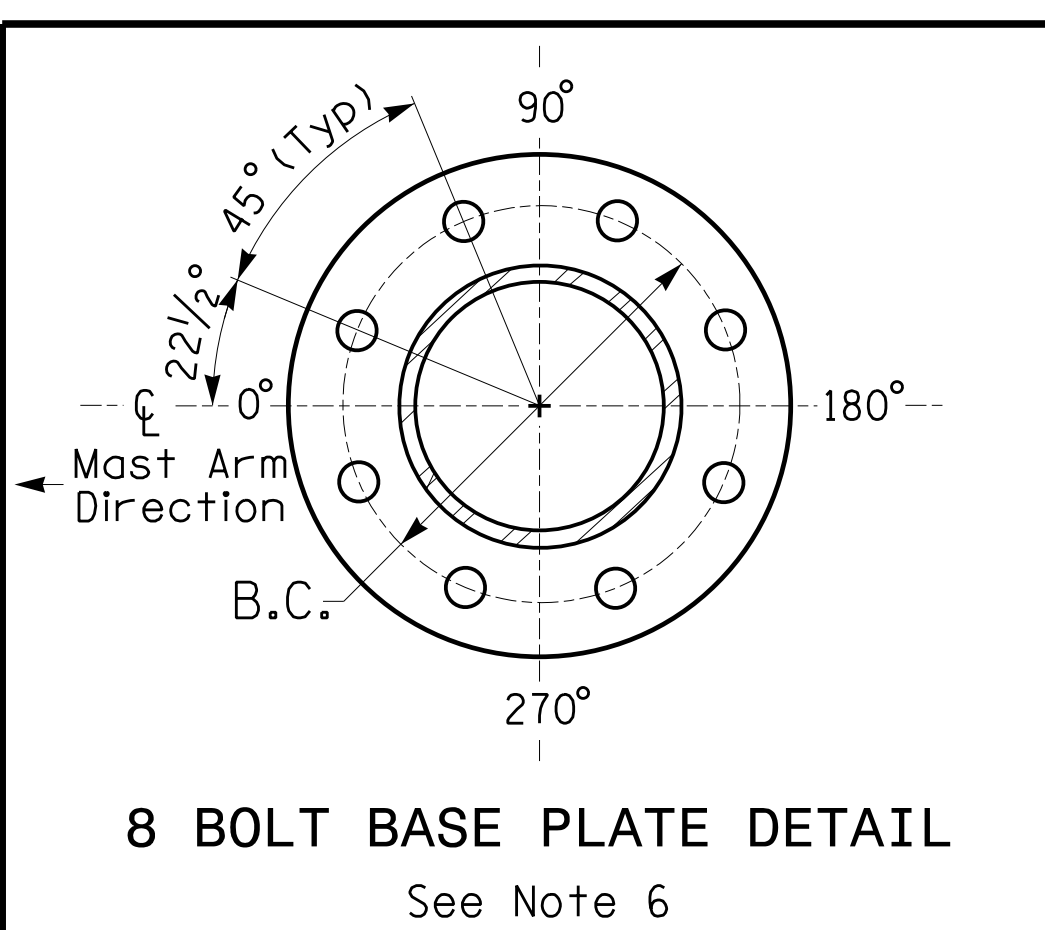
Elevation View

**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.

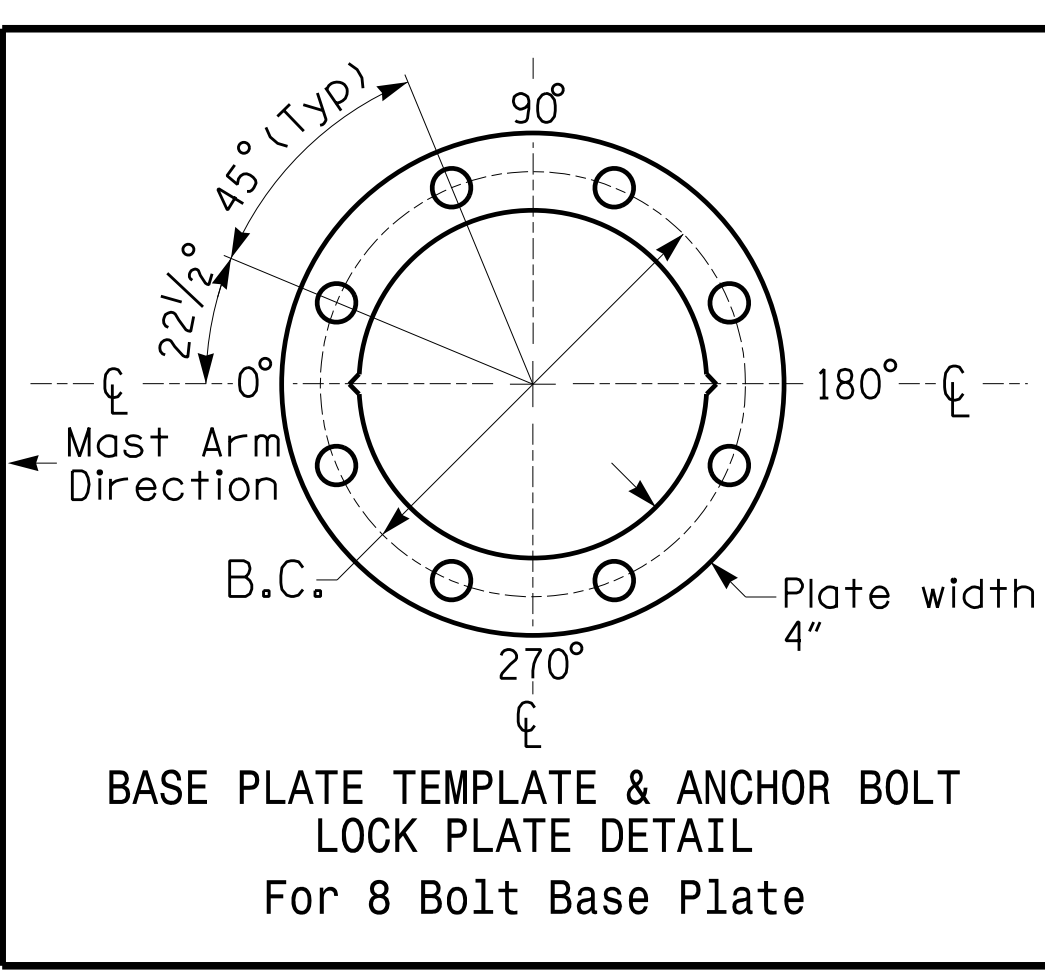
Elevation Data for Mast Arm Attachment (H1)	
Elevation Differences for:	Pole 1
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+2.35 ft.
Elevation difference at Edge of travelway or face of curb	+1.03 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL  
See Note 6



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

### METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
U-6202	Fig. 20.5

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

### NOTES

#### DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
  - The 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)

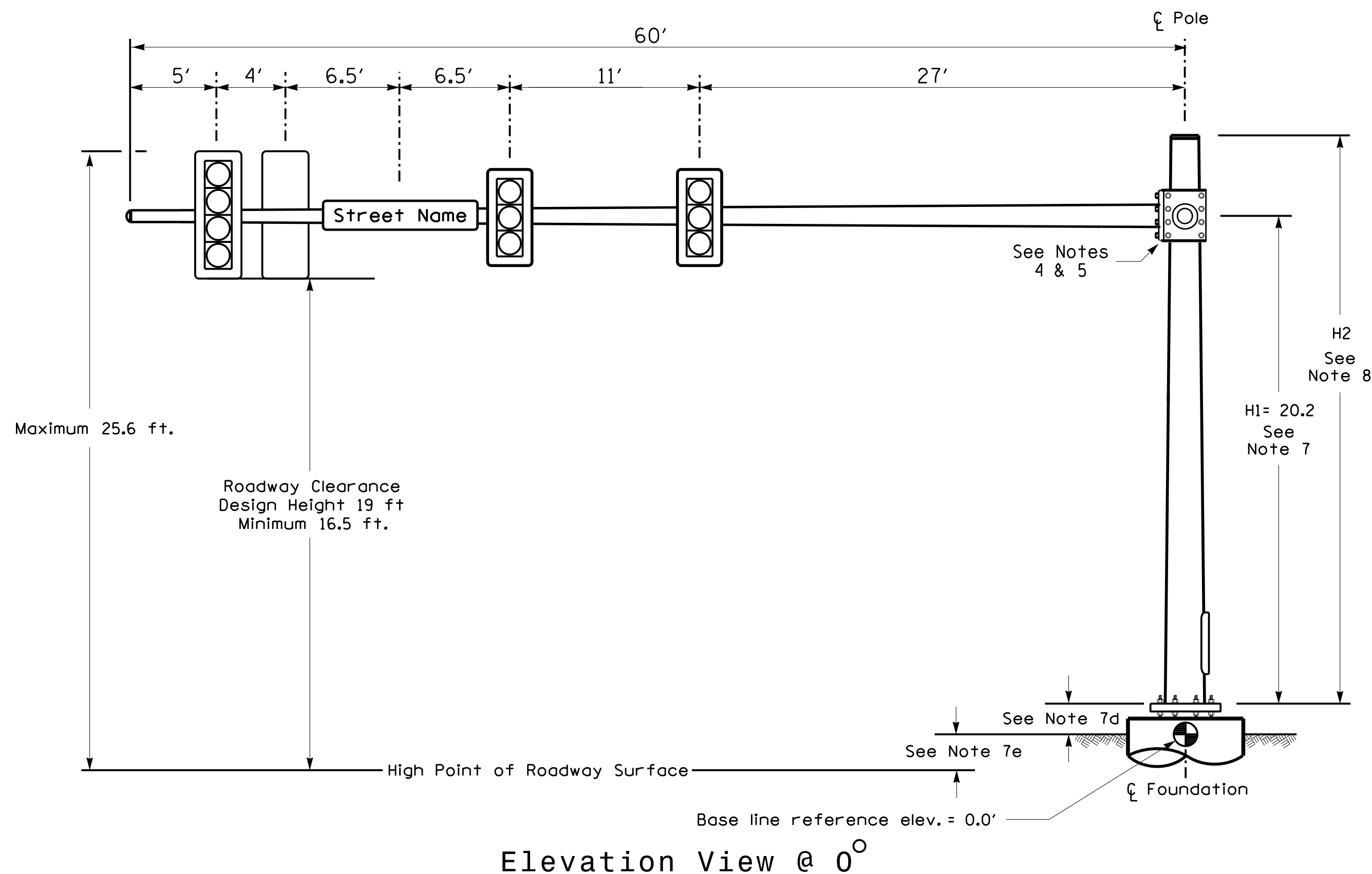
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

	SR 2048 (Gordon Rd) at Daniel Boone Tr1/ Westbound U-Turn Division 3 New Hanover County Wilmington		
	PLAN DATE: March 2024 PREPARED BY: E.E. Tiller	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	
SCALE: N/A N/A	REVISIONS:	INITI.:	DATE:

DocuSigned by:  
 Natasha R. Simmons 5/17/2024  
 DATE  
 SIG. INVENTORY NO.03-1232,03-1233

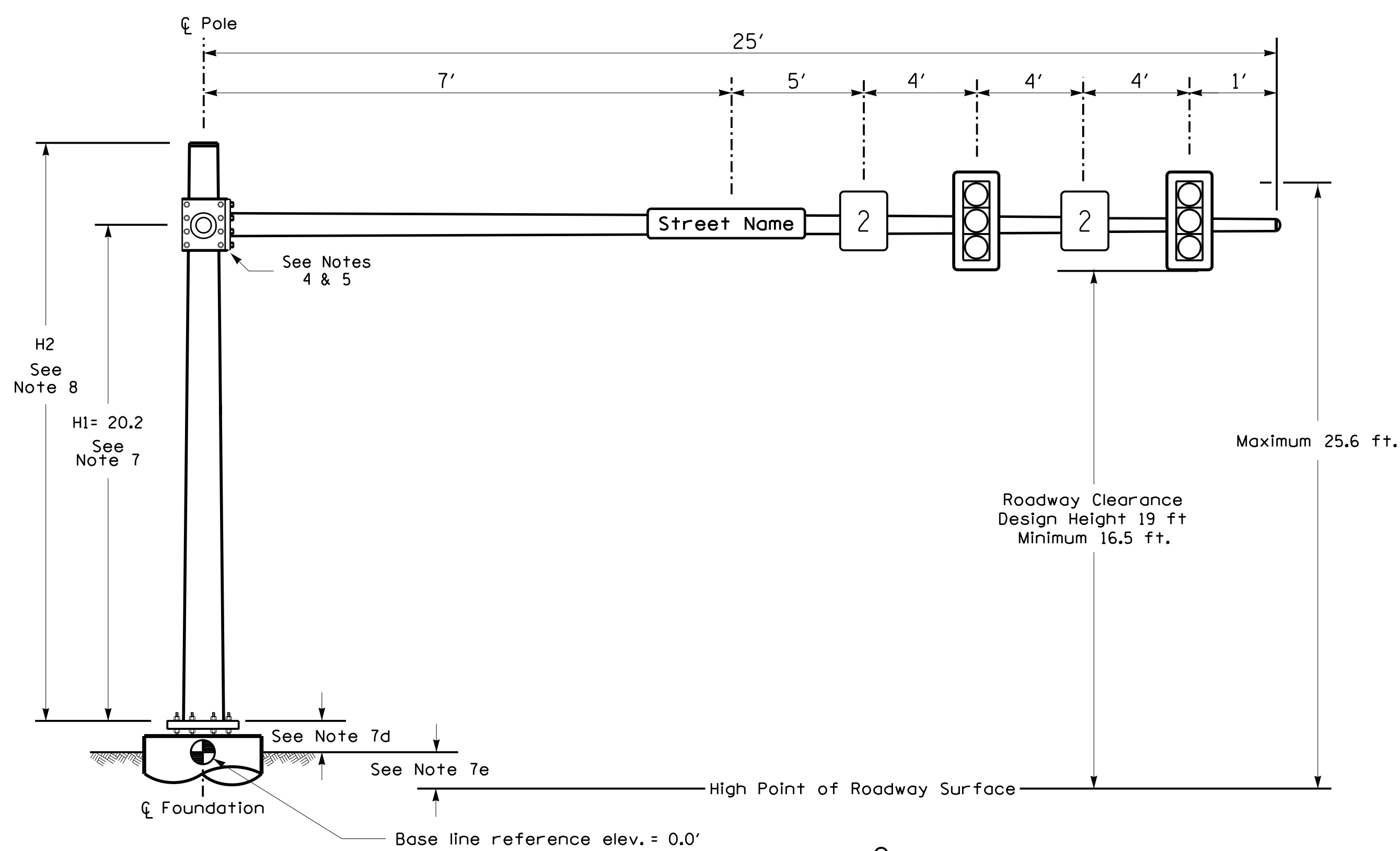


Design Loading for METAL POLE NO. 2 Mast Arm "A"



Elevation View @ 0°

Design Loading for METAL POLE NO. 2 Mast Arm "B"



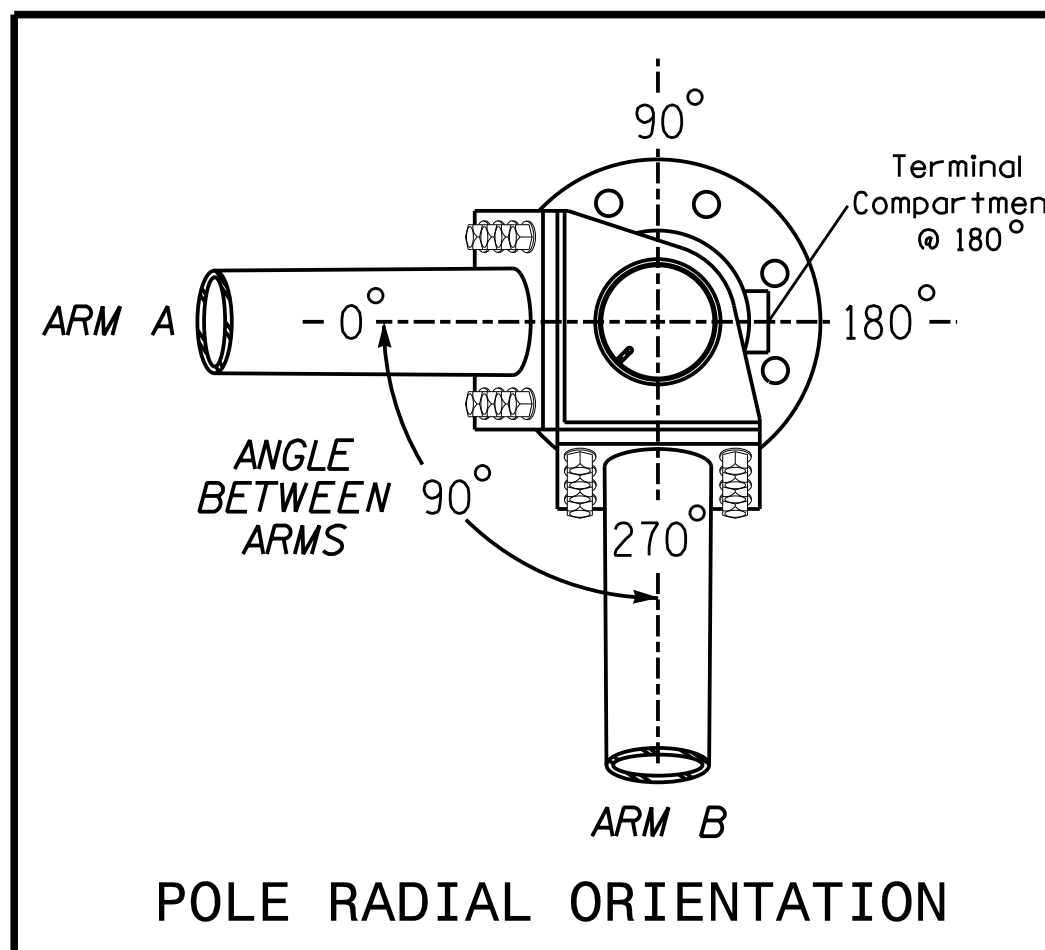
Elevation View @ 270°

SPECIAL NOTE

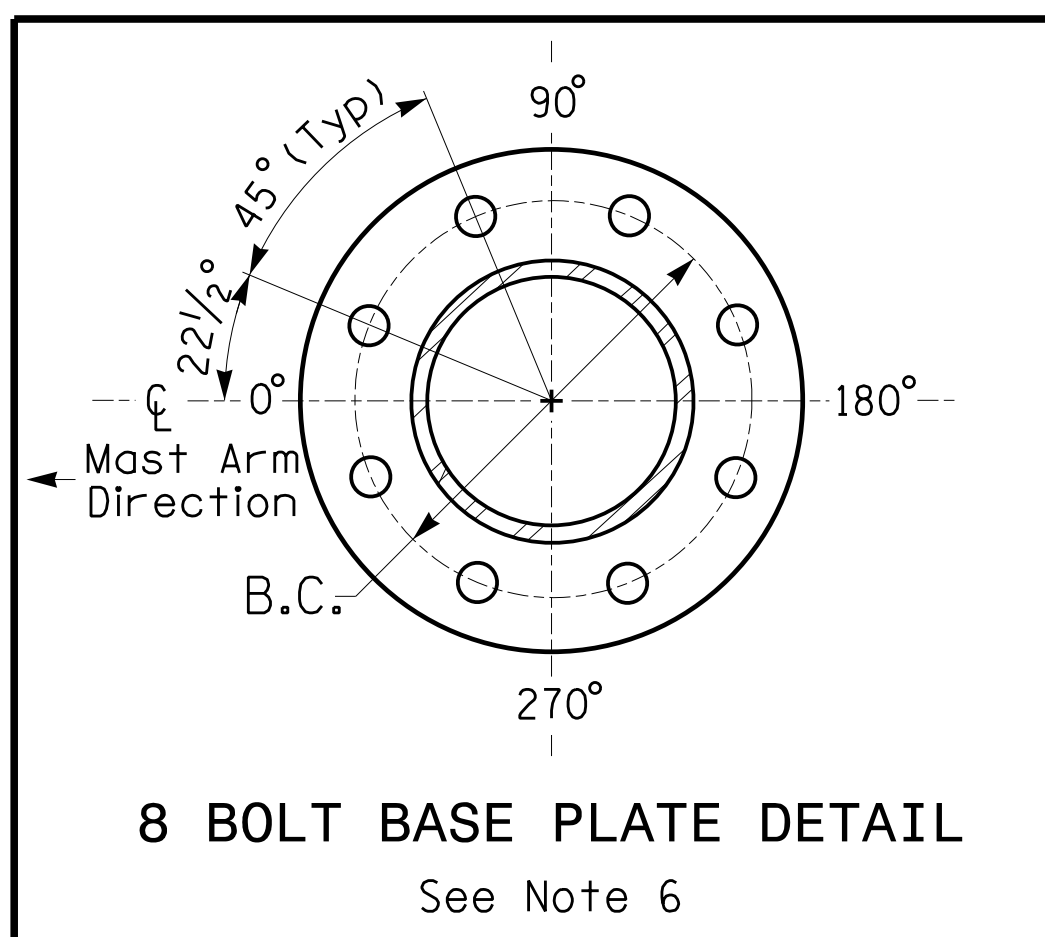
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.78 ft.	0.21 ft.
Elevation difference at Edge of travelway or face of curb	-1.54 ft.	0.00 ft.

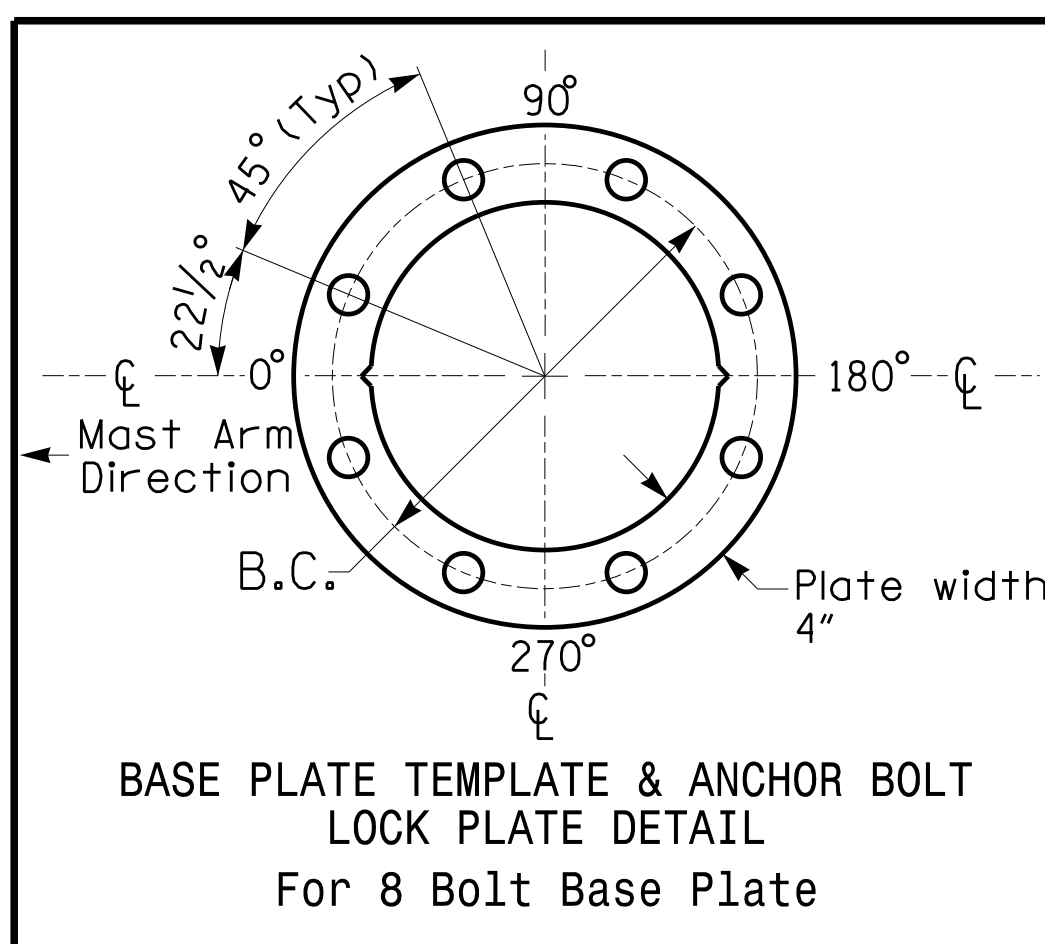


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

MAST ARM LOADING SCHEDULE

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

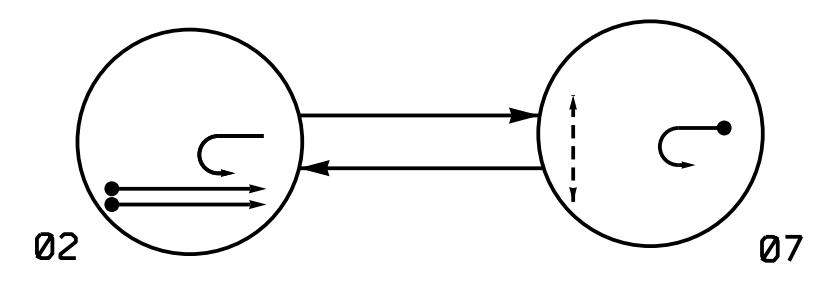
NCDOT Wind Zone 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

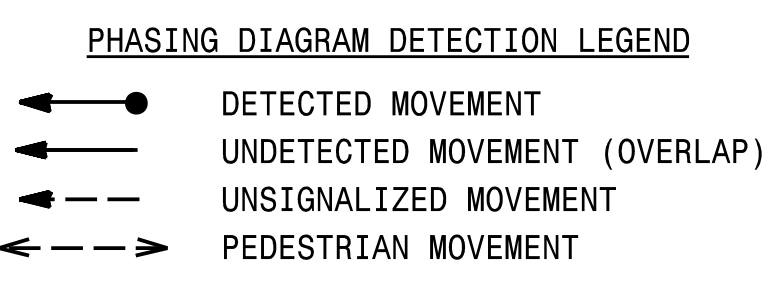
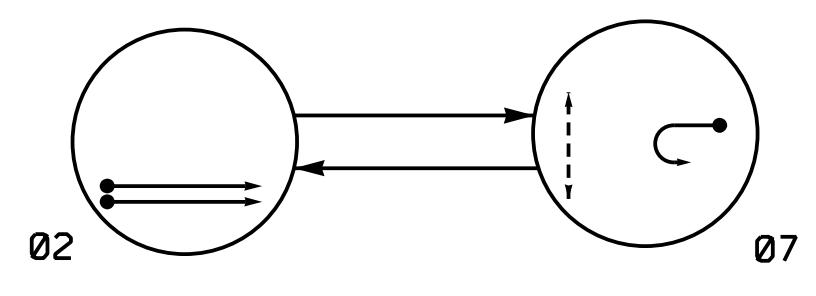
	SR 2048 (Gordon Rd) at Daniel Boone Tr1/ Westbound U-Turn Division 3 New Hanover County Wilmington		
	PLAN DATE: March 2024 PREPARED BY: E.E. Tiller SCALE: N/A	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons DATE: 5/17/2024	

DocuSigned by: Natasha R. Simmons 5/17/2024  
 DATE: 5/17/2024  
 SIG. INVENTORY NO.03-1232,03-1233

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	02	07	F
21,22	G	R	Y
71,72	Ⓡ	Ⓢ	Ⓨ
P71,P72	DW	W	DRK

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	02	07	F
21,22	G	R	Y
71,72	Ⓡ	Ⓢ	Ⓨ
P71,P72	DW	W	DRK

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

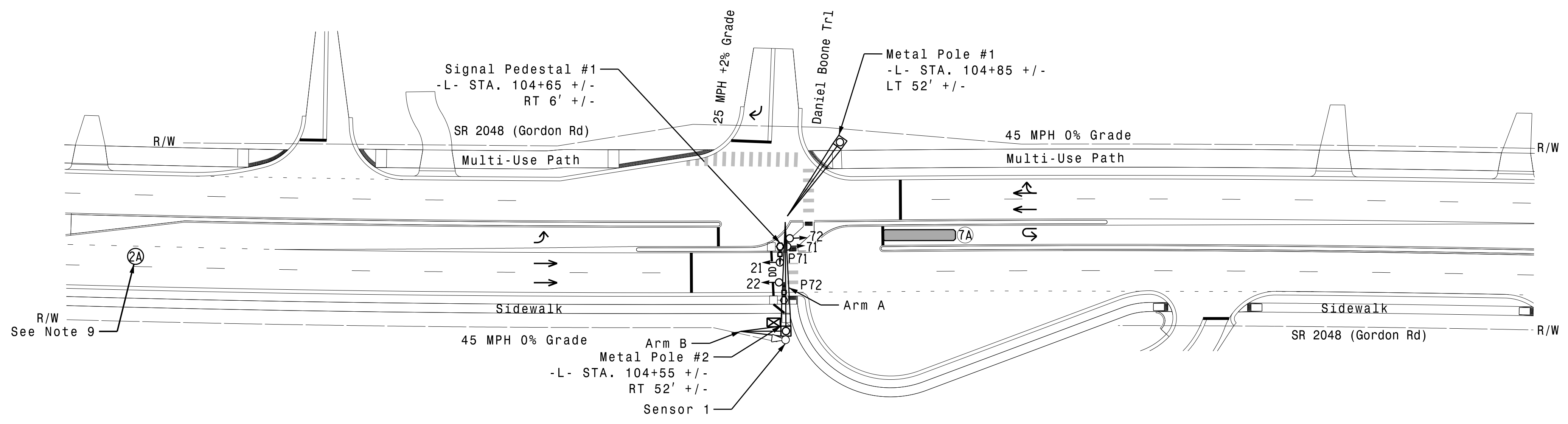
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
7A	6X40	0	*	*	7	Y	-	-	10**	-	Y
					2#	Y	-	-	-	-	Y

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

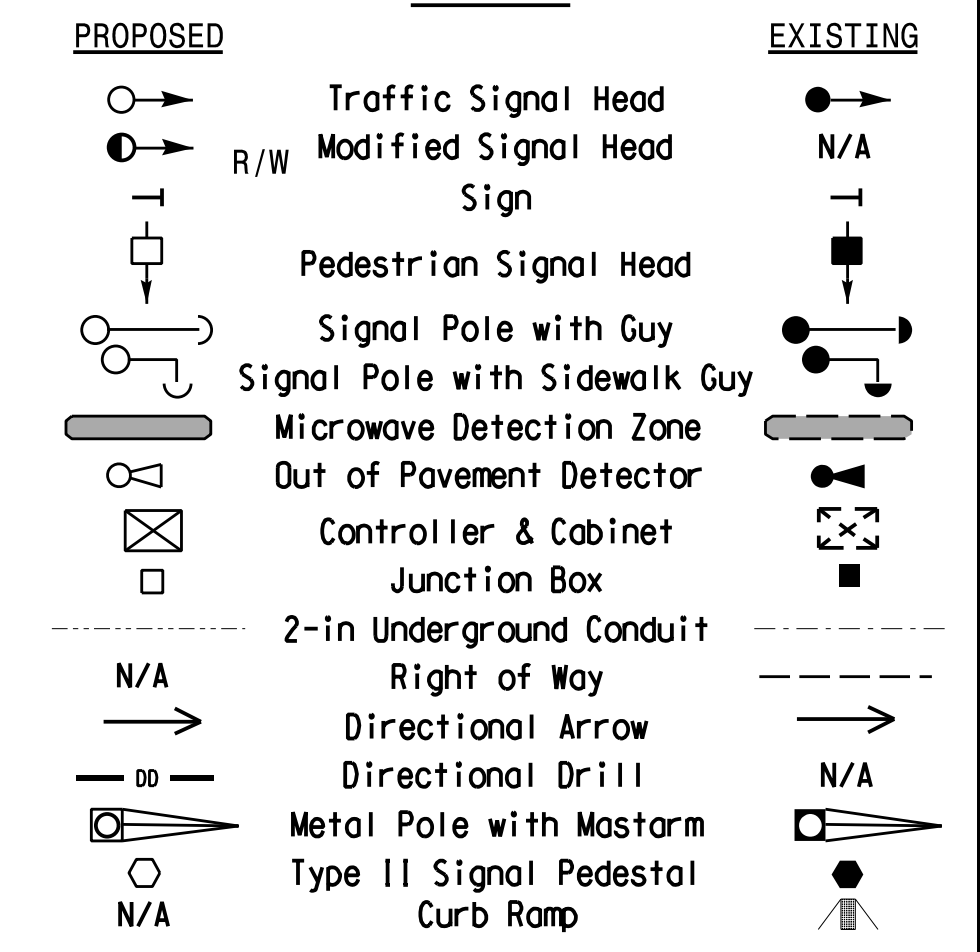
**2 Phase Fully Actuated Wilmington Signal System**

**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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 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 #1233.



**LEGEND**



**OASIS 2070 TIMING CHART**

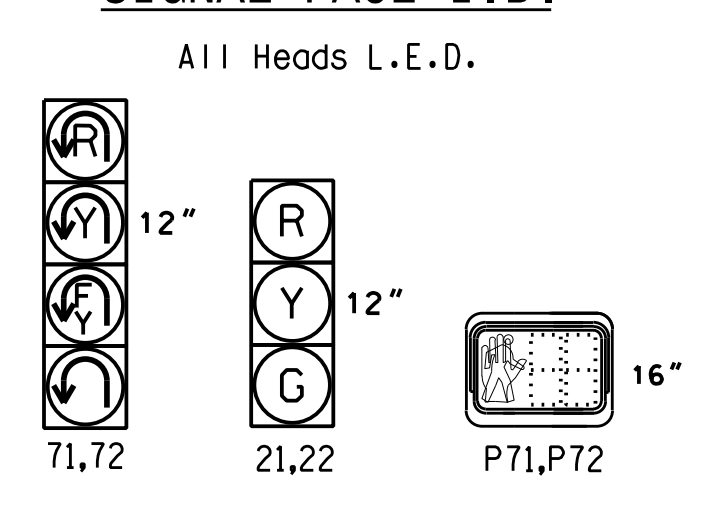
FEATURE	PHASE	
	2	7
Min Green 1 *	12	5
Extension 1 *	2.0	2.0
Max Green 1 *	90	20
Yellow Clearance	4.5	3.0
Red Clearance	1.6	2.1
Red Revert	2.0	2.0
Walk 1 *	-	7
Don't Walk 1	-	5
Advanced Walk *	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

**RADAR DETECTION SYSTEM**

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

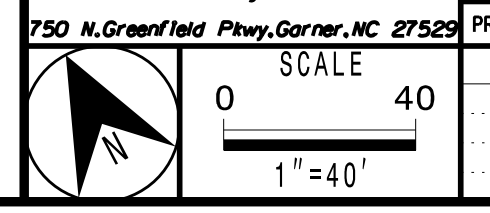
**SIGNAL FACE I.D.**



**New Installation**

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

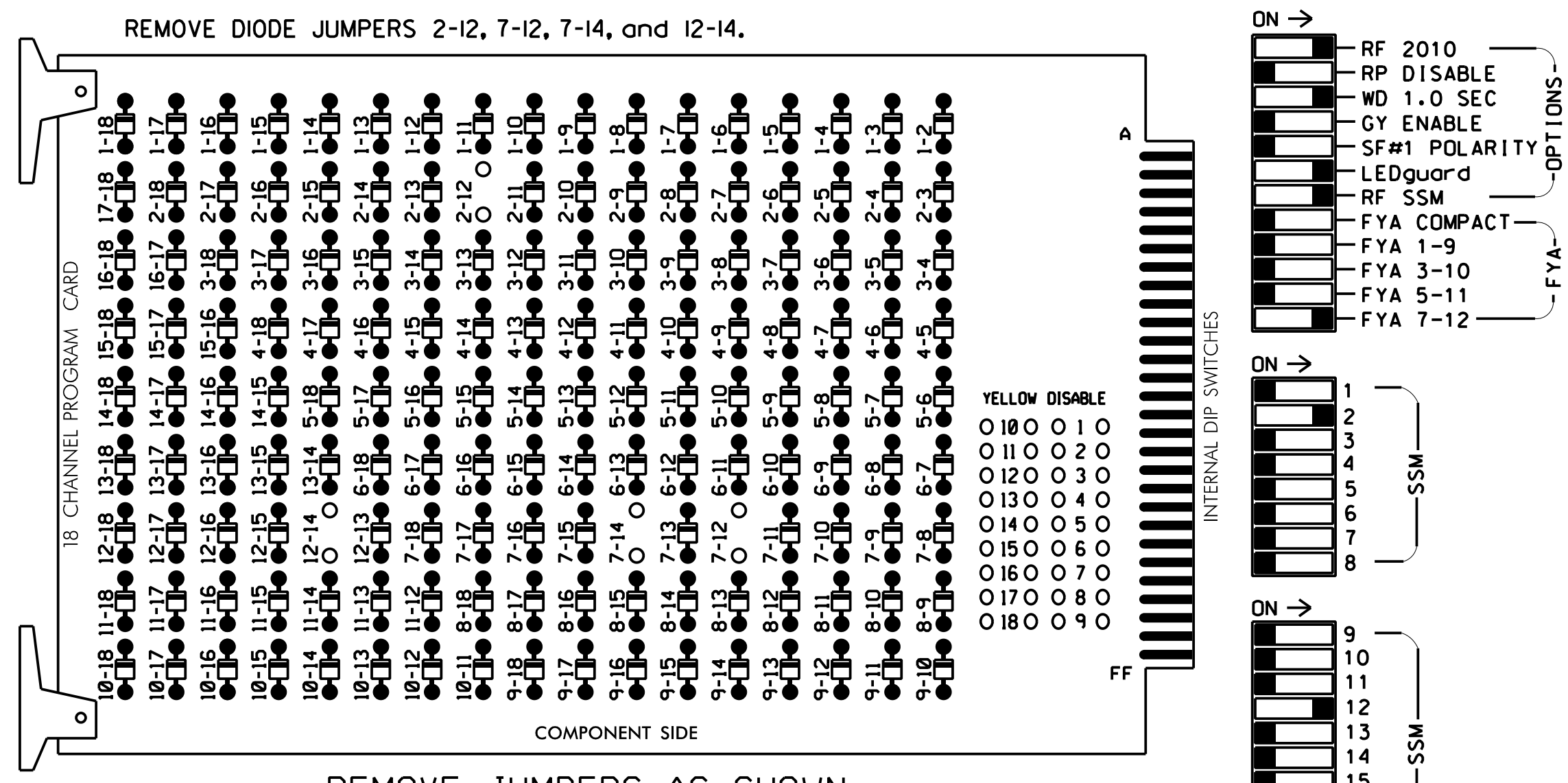
	SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn		
	Division 3 New Hanover County Wilmington PLAN DATE: May 2022 PREPARED BY: E.E. Tiller	REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	



REVISIONS	INIT.	DATE

### 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 and SEL9 are present on the monitor board.
  - Ensure that Red Enable is active at all times during normal operation.
  - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 2 for Startup In Green.
- Program phase 2 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,S6,S10,AUX S5  
 PHASES USED.....2,7  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....2+7

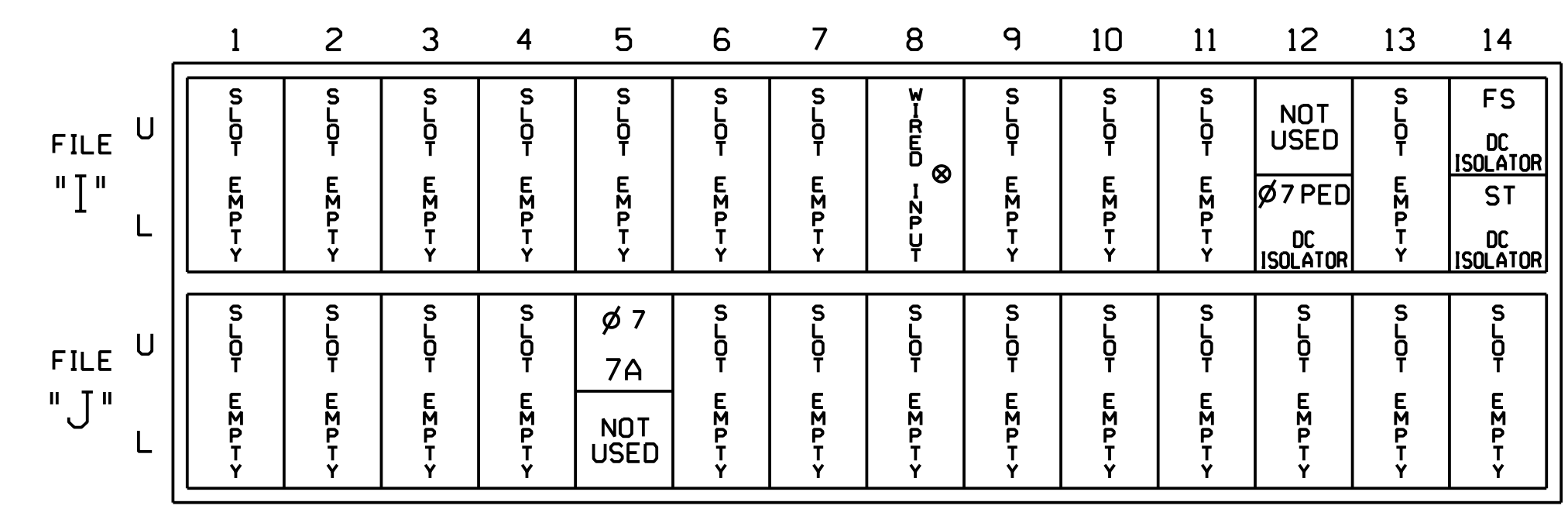
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	7 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	P71, P72	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	71,72	NU	
RED		128																	
YELLOW		129								*									
GREEN		130																	
RED ARROW																		A101	
YELLOW ARROW																			A102
FLASHING YELLOW ARROW																			A103
GREEN ARROW												124							
Hand icon																			104
Walking person icon																			106

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

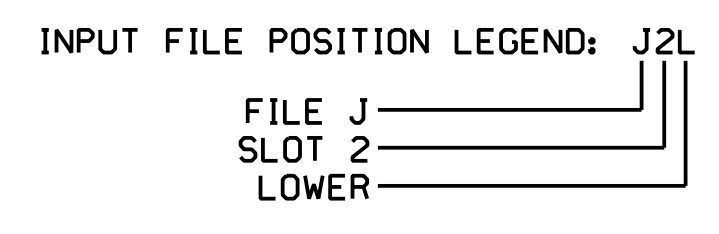
(front view)



### INPUT FILE CONNECTION & PROGRAMMING CHART

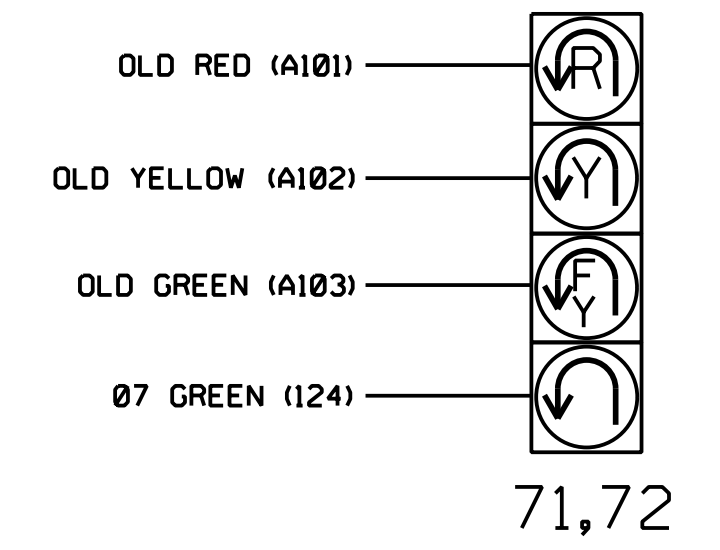
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
7A1	T85-5,6	J5U	57	19*	7	7	Y	Y			10
	-	I8U	49	11*	24	2	Y	Y			
	-	J5U	57	19*	57	7	Y	Y			
PED PUSH BUTTONS											
P71,P72	T88-5,6	I12L	69	31	PED 4	7 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT 112.  
 \* See Input Page Assignment programming details on sheet 3.  
 \* Add jumper from J5-W to I8-W, on rear of input file.



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



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

### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

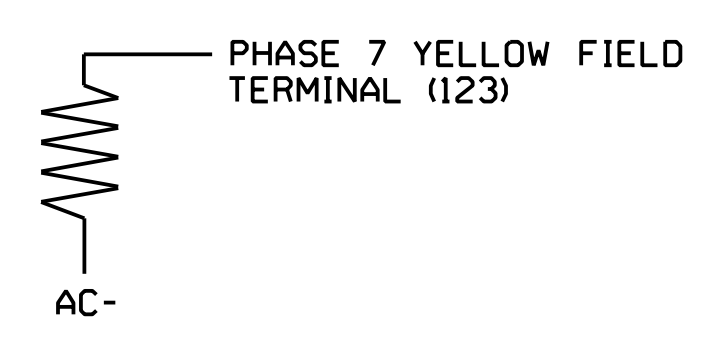
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1233  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



Electrical and Programming Details For: SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn

Division 3 New Hanover County Wilmington

PLAN DATE: March 2024 REVIEWED BY: N.K. Vlanich  
 PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS: INITI. DATE

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

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 W. T. SIMMONS

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

750 N. Greenfield Pkwy, Corner, NC 27529

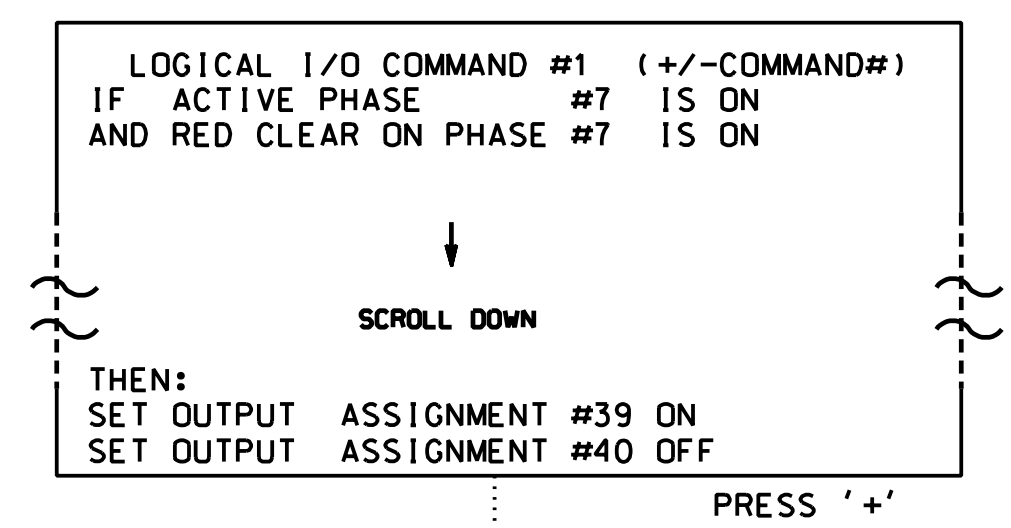
SIG. INVENTORY NO. 03-1233

Electrical Detail - Sheet 1 of 4  
 New Installation

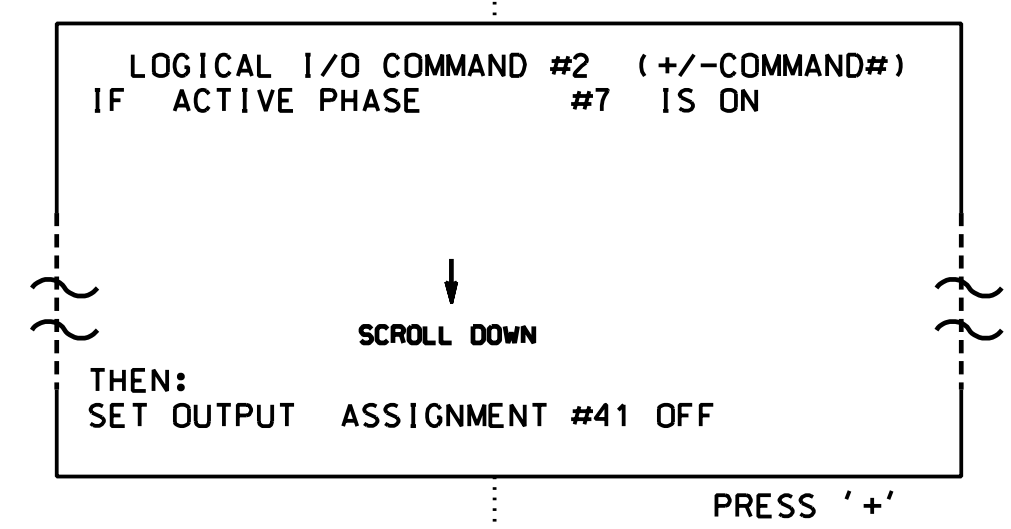
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE (program controller as shown below)

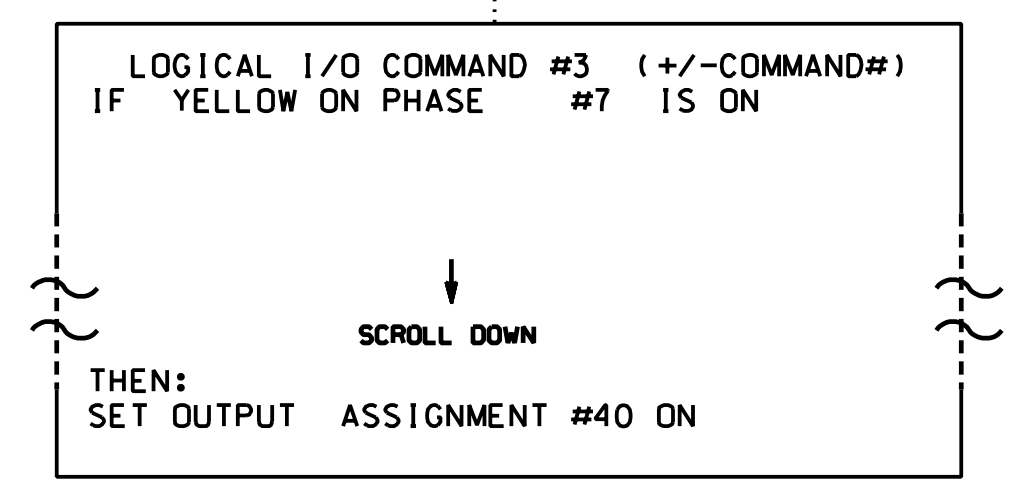
- 1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS)... 2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 2 (HEADS 71 and 72).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 7 (HEADS 71 and 72).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEADS 71 and 72).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE USE TO INTERPRET LOGIC PROCESSOR. OUTPUT 39 = Overlap D Red, OUTPUT 40 = Overlap D Yellow, OUTPUT 41 = Overlap D Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING (program controller as shown below)

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

PRESS '+' THREE TIMES

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

NOTICE PAGE 2

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 '+' THREE TIMES

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

OVERLAP PROGRAMMING COMPLETE

PED 7 PROGRAMMING DETAIL (program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

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

CHANGING INPUT ASSIGNMENTS

- 1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #4 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 4 FROM PHASE 4 TO PHASE 7

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1233 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Electrical Detail - Sheet 2 of 4 New Installation

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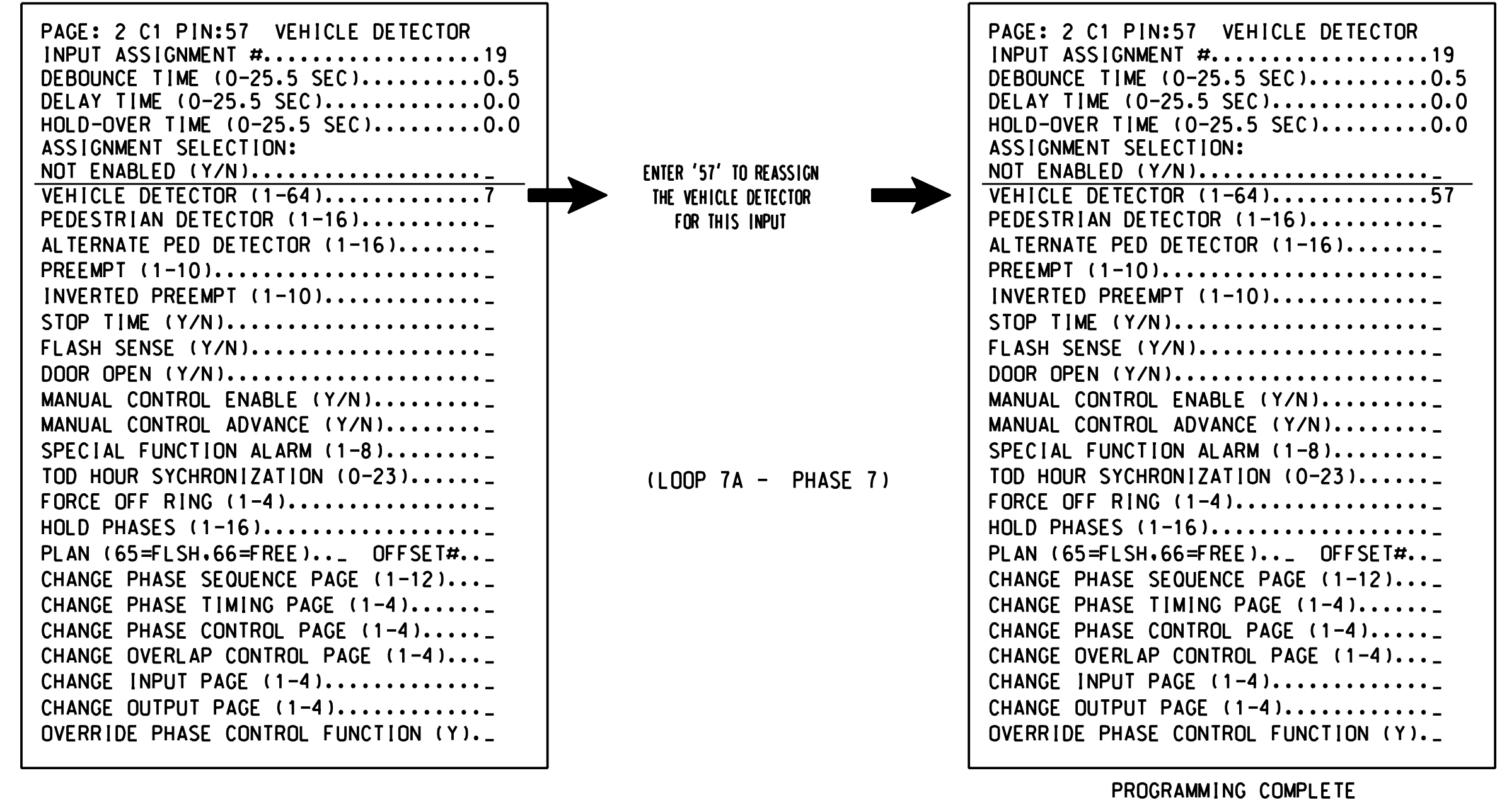
Professional engineering seal for Melissa R. Simmons, North Carolina Professional Engineer, Seal 031464. Includes project details for SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn, New Hanover County, Wilmington. Prepared by E.E. Tiller, reviewed by N.K. Vlanich and N.R. Simmons. Date 5/17/2024.

### 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 10 SECONDS TO 0 SECONDS.

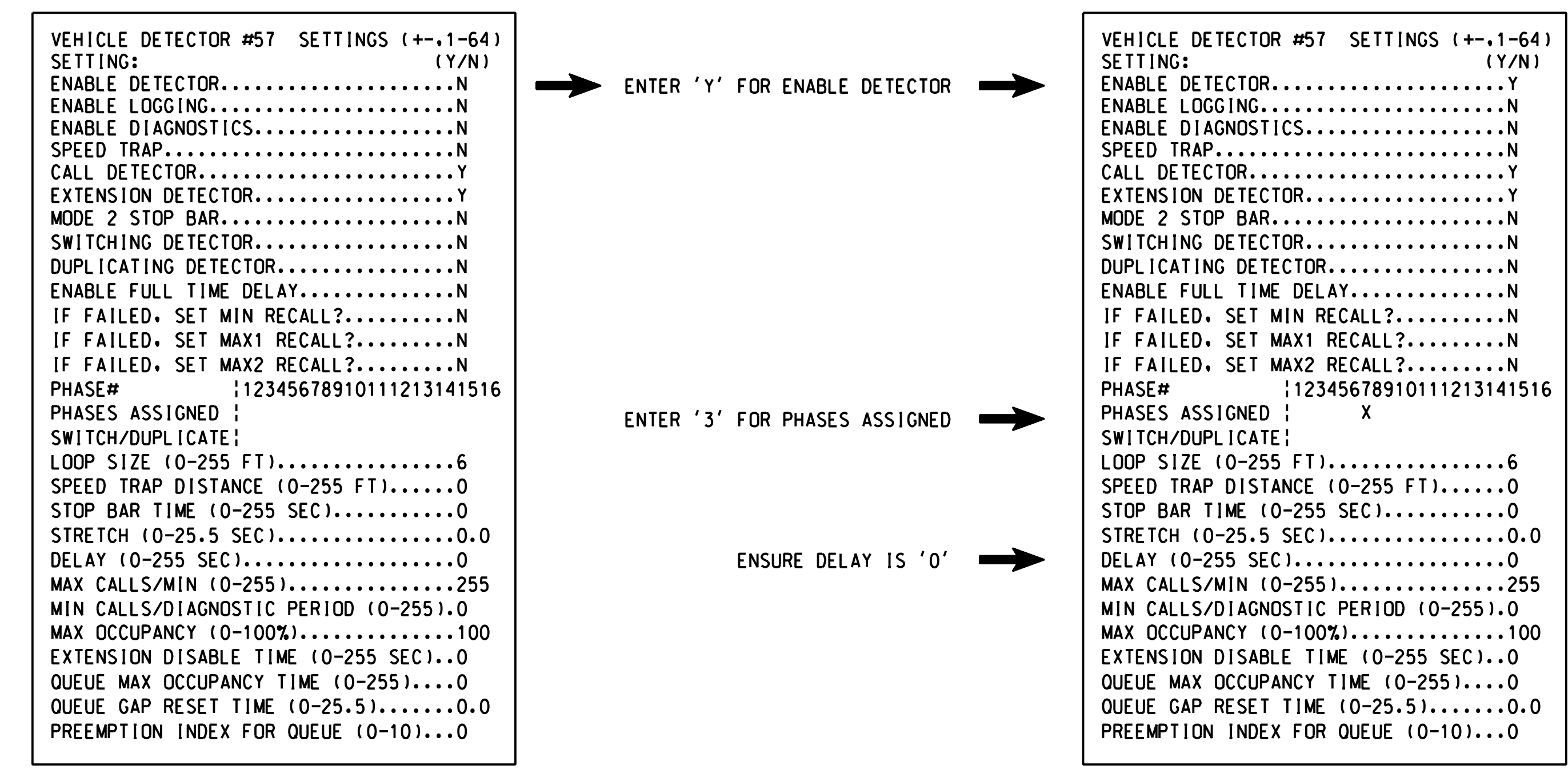
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 19 IS REACHED.



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

(program controller as shown below)

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1233  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Electrical Detail - Sheet 3 of 4  
New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

	SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn		
	Division 3 New Hanover County Wilmington	PLAN DATE: March 2024 REVIEWED BY: N.K. Vlanich	
REVISIONS	INIT.	DATE	DocuSigned by: 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-1233

## ALTERNATE PHASING ACTIVATION DETAIL

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

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

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

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

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

### ALTERNATE PHASING PAGE CHANGE SUMMARY

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

OVERLAPS PAGE 2: Modifies overlap parent phase for heads 71 and 72 to run protected turn only.

INPUTS PAGE 2: Disables phase 2 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 INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

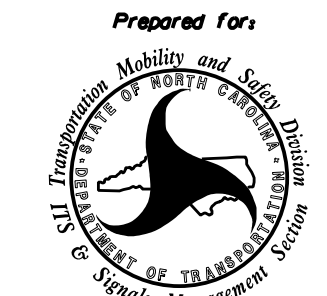

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

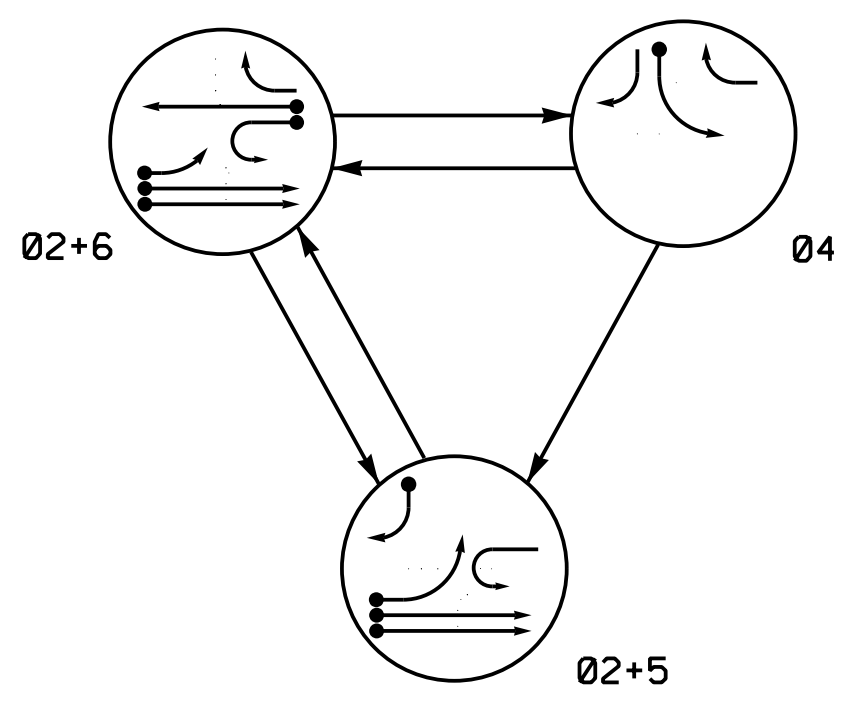
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1233  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Electrical Detail - Sheet 4 of 4  
New Installation

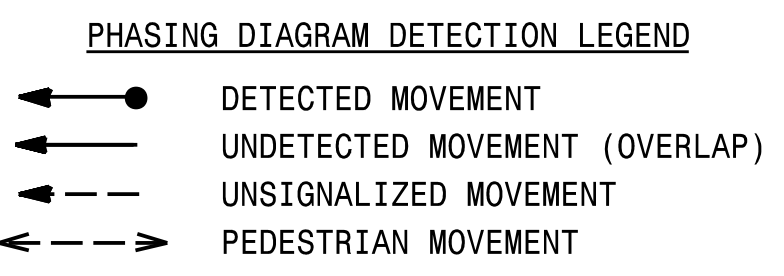
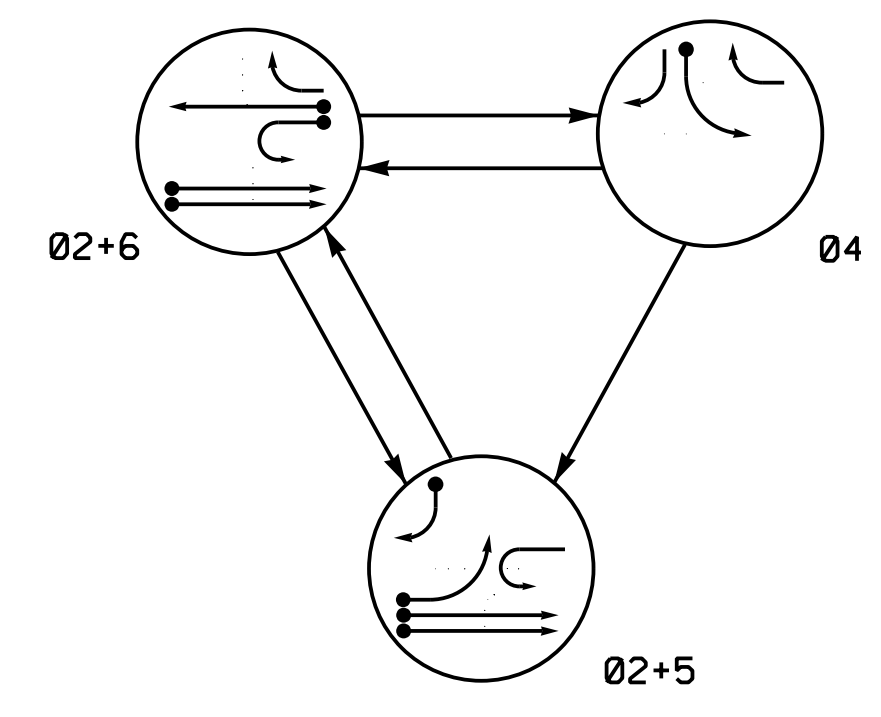
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2048 (Gordon Rd) Eastbound at Westbound U-Turn Division 3 New Hanover County Wilmington	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS
Prepared for:  750 N. Greenfield Pkwy, Corner, NC 27529	PLAN DATE: March 2024    REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. SIMMONS	DocuSigned by:  SIGNATURE    DATE 5/17/2024 SIG. INVENTORY NO. 03-1233
REVISIONS    INIT.    DATE		

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	F
21,22	G	G	R	Y
41,43	R	R	F	R
42	F	R	F	R
51	F	F	R	Y
61	F	F	R	Y
62	R	G	R	Y
63	R	G	R	Y

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	F
21,22	G	G	R	Y
41,43	R	R	F	R
51	F	R	F	R
61	F	F	R	Y
62	R	G	R	Y
63	R	G	R	Y

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

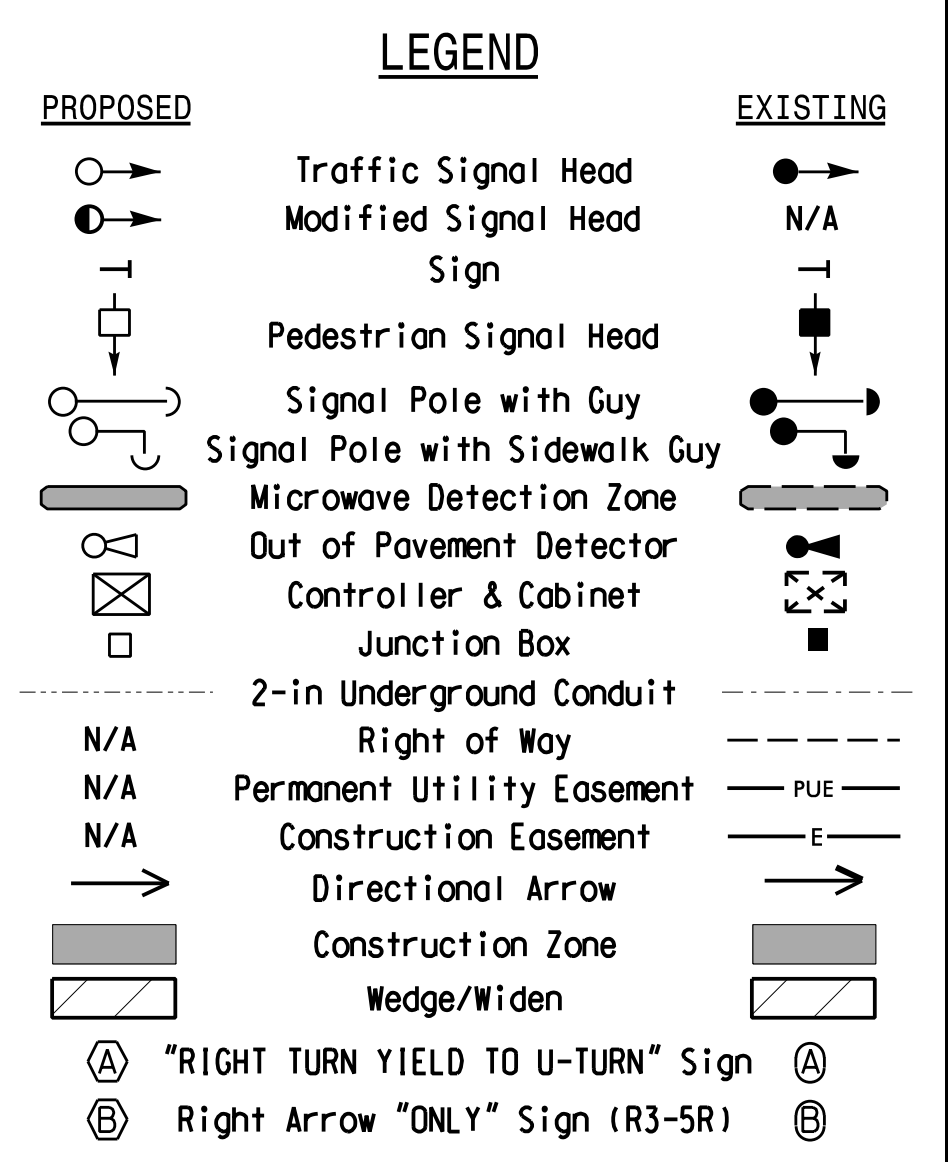
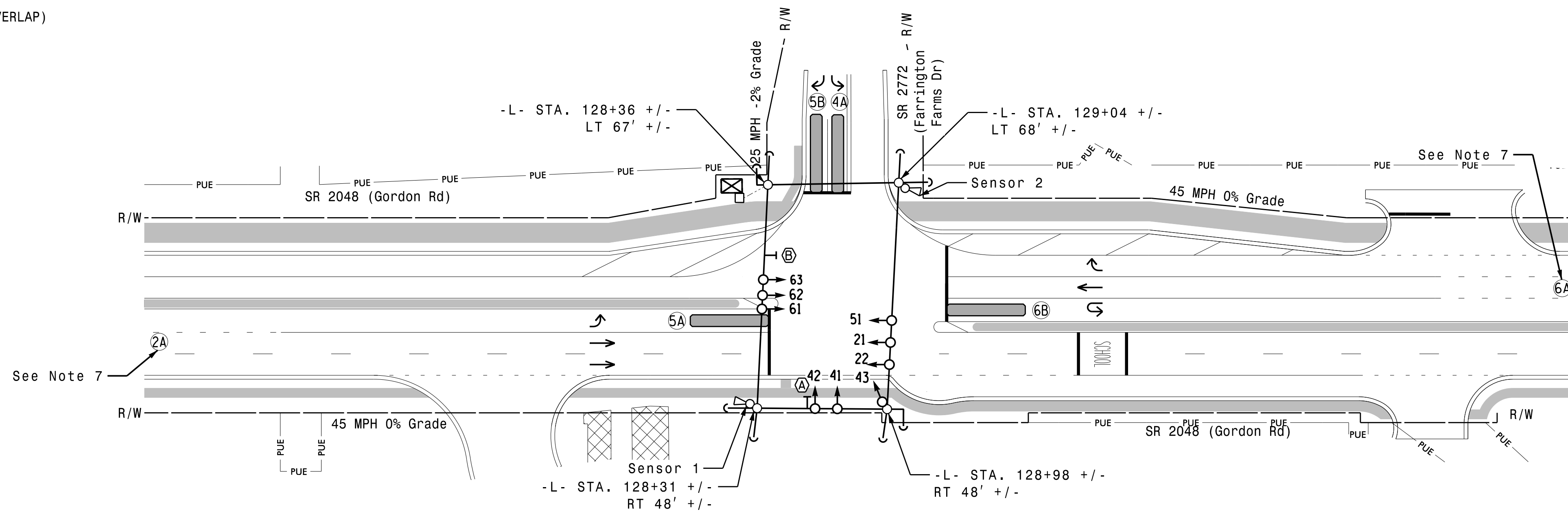
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X40	0	*	*	4	Y	Y	-	-	-	-	Y
5A	6X40	0	*	*	5	Y	Y	-	-	15**	-	Y
5B	6X40	0	*	*	5	Y	Y	-	-	15	-	Y
6B	6X40	0	*	*	6	Y	Y	-	-	-	-	Y

\* 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**

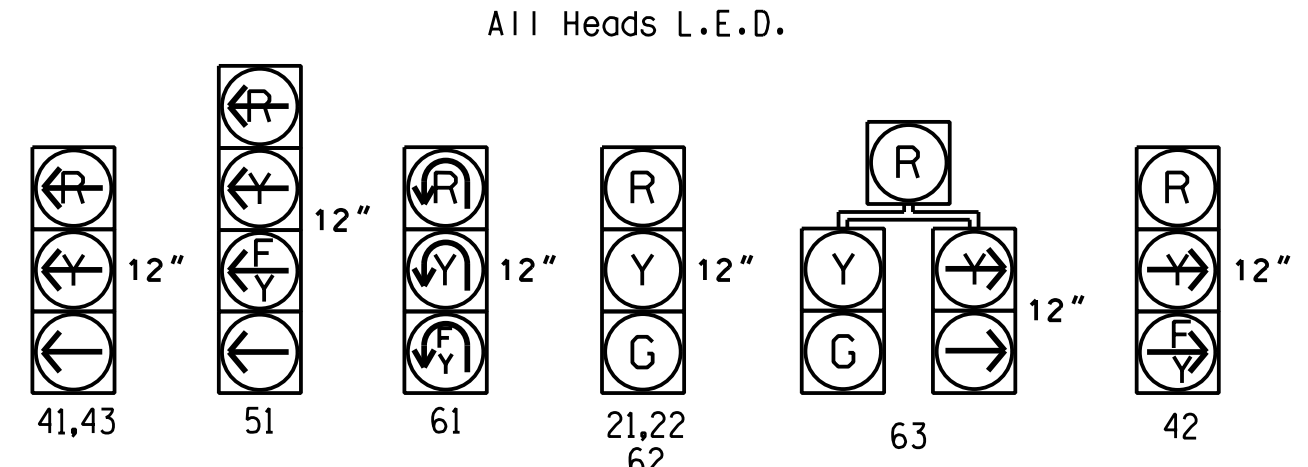
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- 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 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 #1216.



**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	5	5	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	20	90
Yellow Clearance	4.5	3.0	3.0	4.5
Red Clearance	1.5	3.2	2.1	1.5
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

**SIGNAL FACE I.D.**



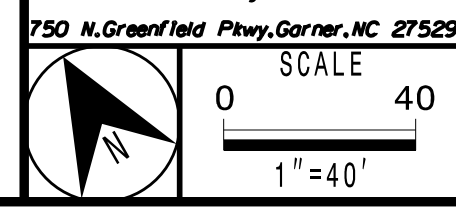
**RADAR DETECTION SYSTEM**

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)	1.0-6.5	2.5-6.5

New Installation-  
 Temporary Design 1  
 (Construction Phase 2A)

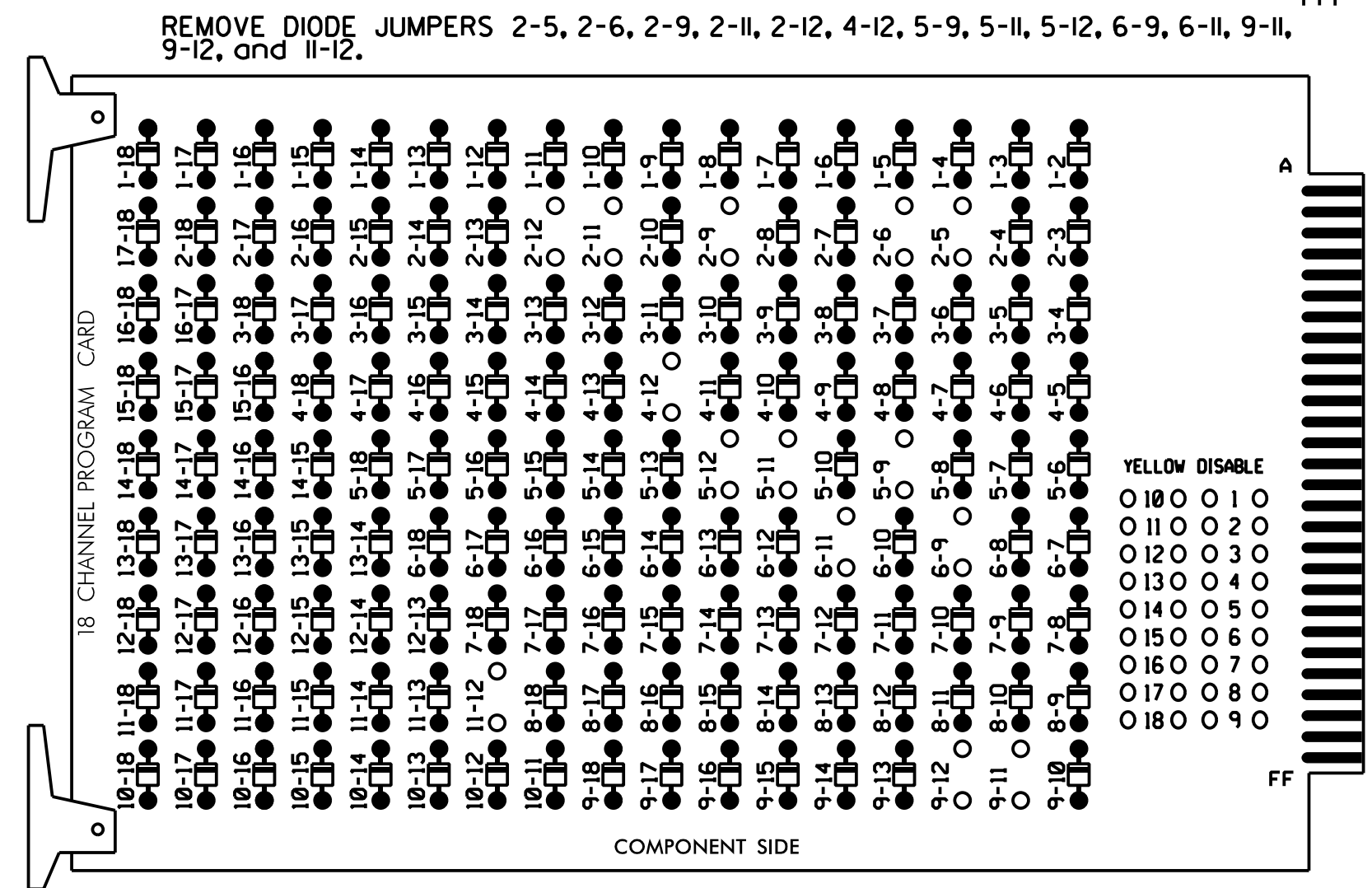
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS
	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	
REVISIONS		INITI. DATE	DATE
750 N. Greenfield Pkwy, Corner, NC 27526		5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-1216T1	

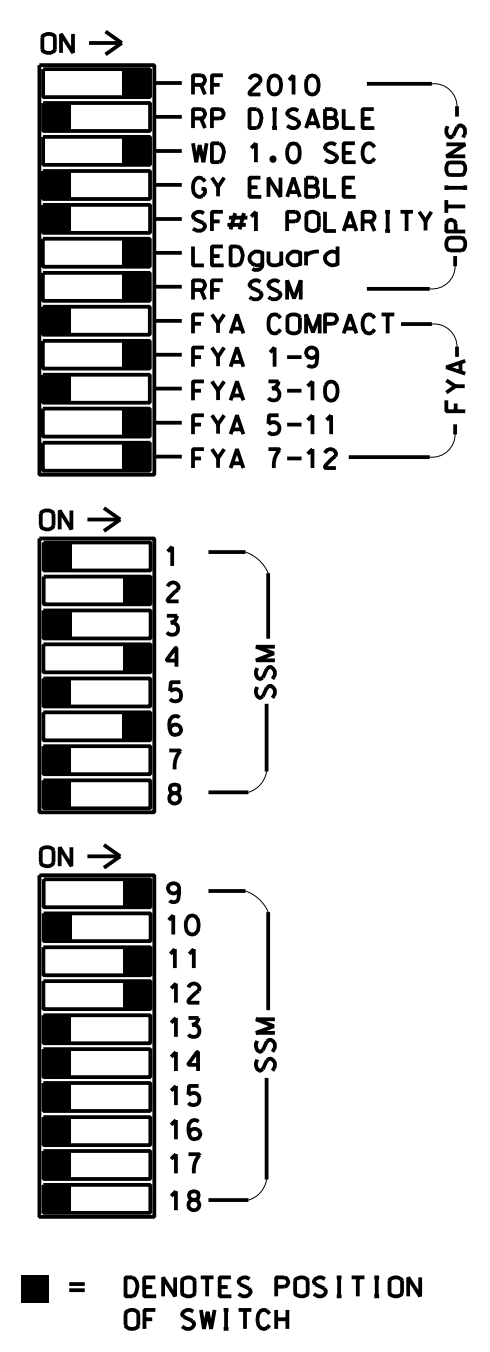


### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-12, 4-12, 5-9, 5-11, 5-12, 6-9, 6-11, 9-11, 9-12, and 11-12.
- 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 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, 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.....S2,S5,S7,S8,AUX S1,AUX S4,AUX S5  
 PHASES USED.....2,4,5,6  
 OVERLAP "A".....2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....4+5

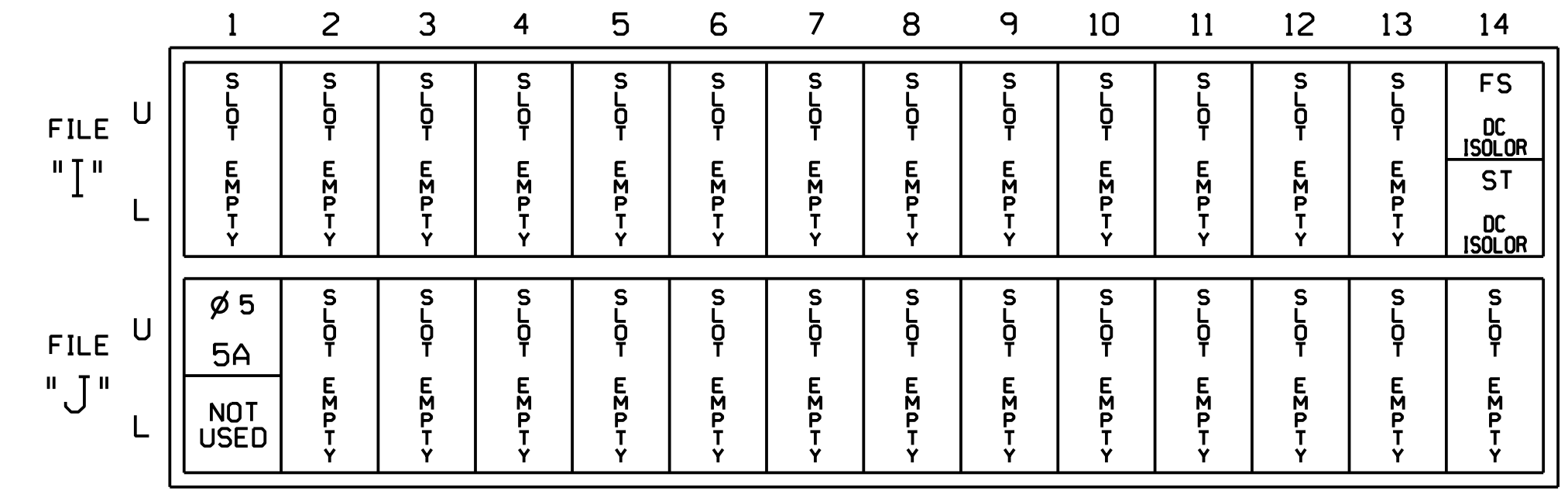
### SIGNAL HEAD HOOK-UP CHART

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	41,43	63	NU	51	62,63	NU	NU	NU	61	NU	NU	51	42	NU
RED		128																A101
YELLOW		129						*	135									
GREEN		130							136									
RED ARROW					101								A121				A114	
YELLOW ARROW					102	102							A122				A115	A102
FLASHING YELLOW ARROW													A123				A116	A103
GREEN ARROW					103	103	133											
Hand																		
Person																		

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

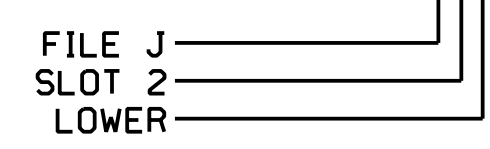
FS = FLASH SENSE  
 ST = STOP TIME

### 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			
	-	J1U	55	17 ★	55	5	Y	Y			

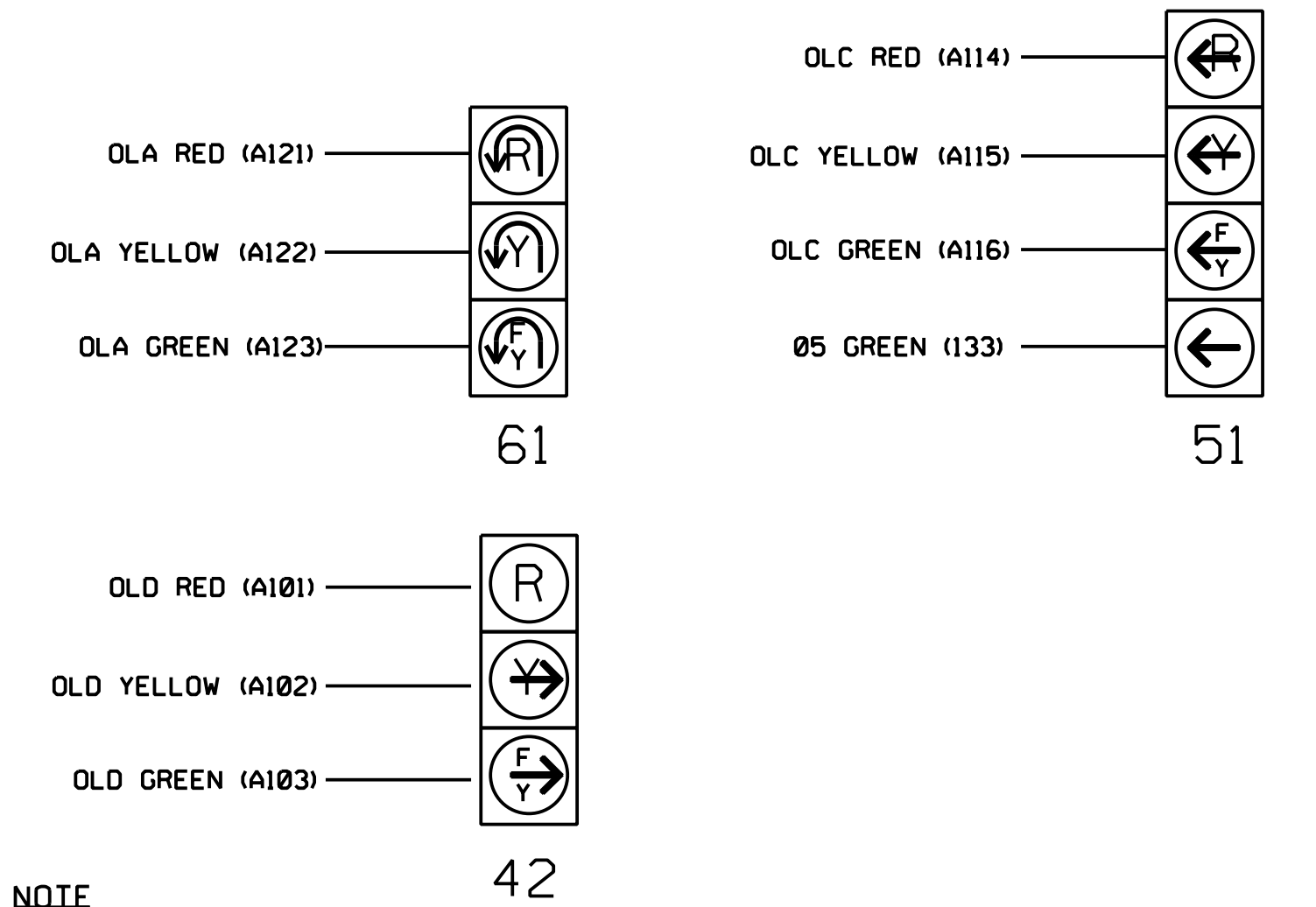
\* See Input Page Assignment programming details on sheet 3.

### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



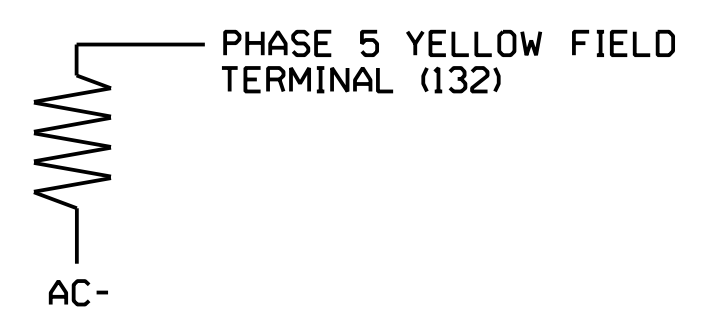
NOTE

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216T1  
 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

New Installation-  
 Electrical Detail - Sheet 1 of 4  
 (Construction Phase 2A)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2048 (Gordon Rd)  
 at  
 SR 2772 (Farrington Farms Dr)

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: *Metasha R. Simmons* 11/8/2024  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER 031464  
 METASHA R. SIMMONS

SIG. INVENTORY NO. 03-1216T1



### 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
    ↓
    LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE
  
```

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).

```

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 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 '+' 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: 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 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 '+' 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
  
```

PRESS '+'

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/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
  
```

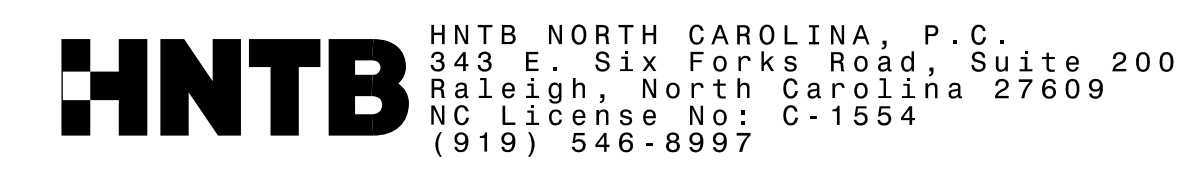
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

New Installation- Electrical Detail - Sheet 2 of 4 (Construction Phase 2A)

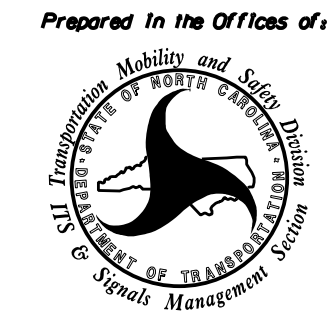
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216T1  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

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 2772 (Farrington Farms Dr)

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. 03-1216T1

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS

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: 03-1216T1 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

New Installation- Electrical Detail - Sheet 3 of 4 (Construction Phase 2A)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr), Division 3 New Hanover County Wilmington. Includes fields for PLAN DATE, PREPARED BY, REVIEWED BY, and a signature block for N. R. Simmons dated 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.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

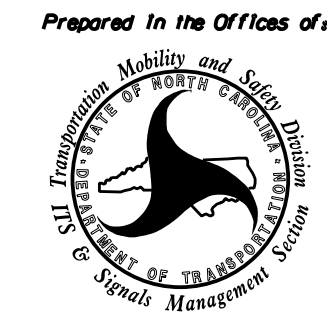
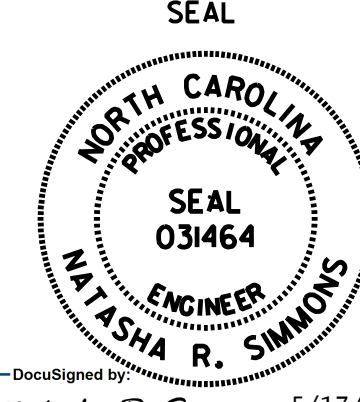
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

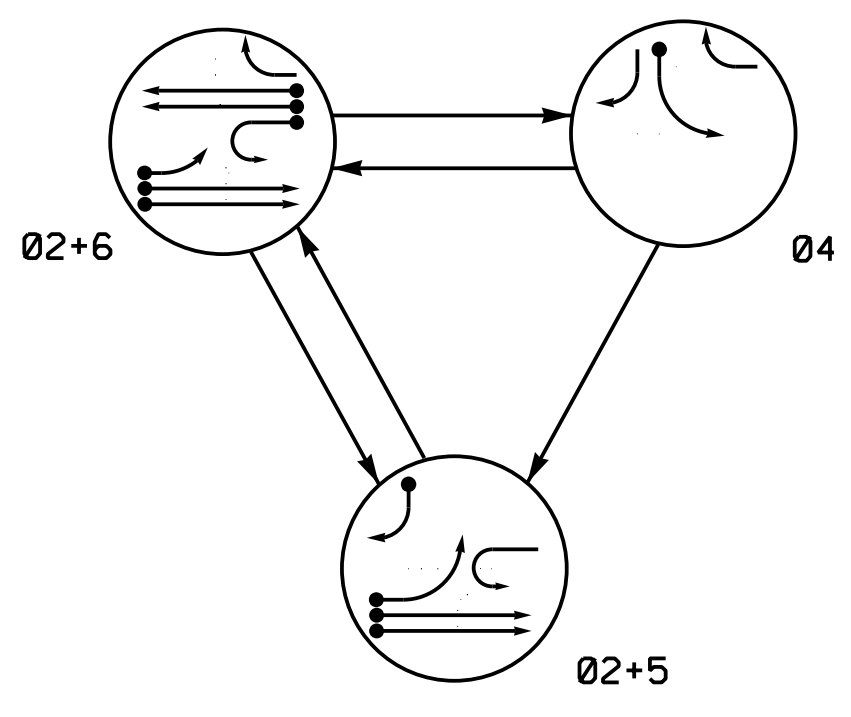
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-1216T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

New Installation-  
Electrical Detail - Sheet 4 of 4  
(Construction Phase 2A)

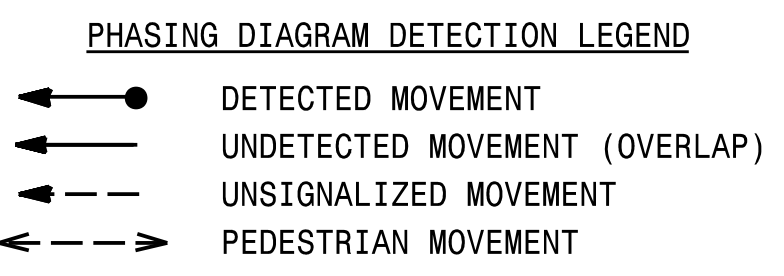
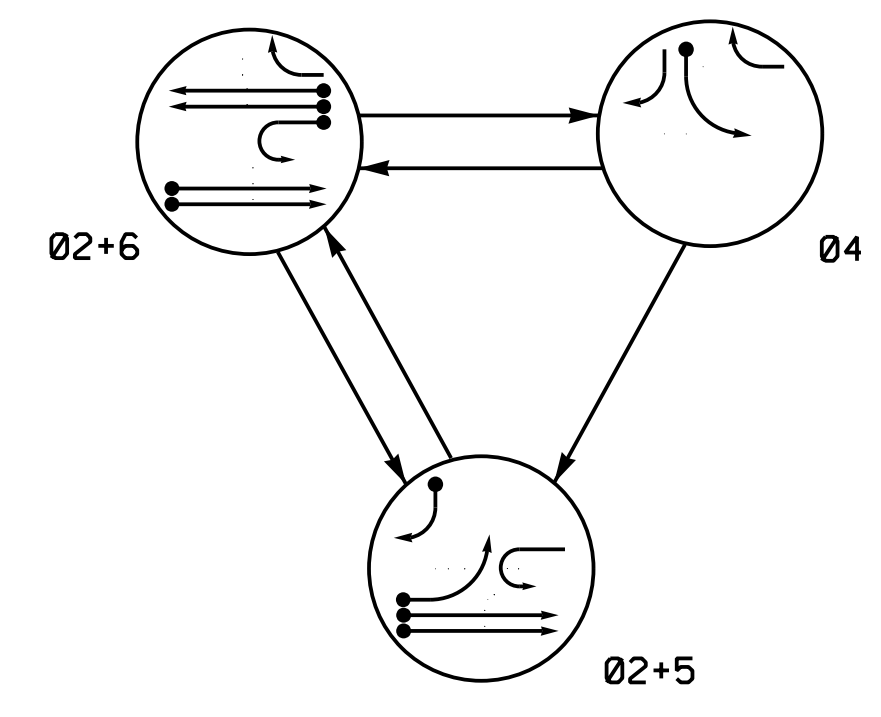
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Office of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr) 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  SEAL 031464 NATASHA R. SIMMONS 5/17/2024 DATE SIG. INVENTORY NO. 03-1216T1
---	---	--

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	0 2 + 5	0 2 + 6	0 4	F I C O N
21,22	G	G	R	Y
41,43	R	R	Y	R
42	F	R	F	R
51	F	F	R	Y
61	F	F	R	Y
62	R	G	R	Y
63	R	G	R	Y

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	0 2 + 5	0 2 + 6	0 4	F I C O N
21,22	G	G	R	Y
41,43	R	R	Y	R
42	F	R	F	R
51	F	F	R	Y
61	F	F	R	Y
62	R	G	R	Y
63	R	G	R	Y

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

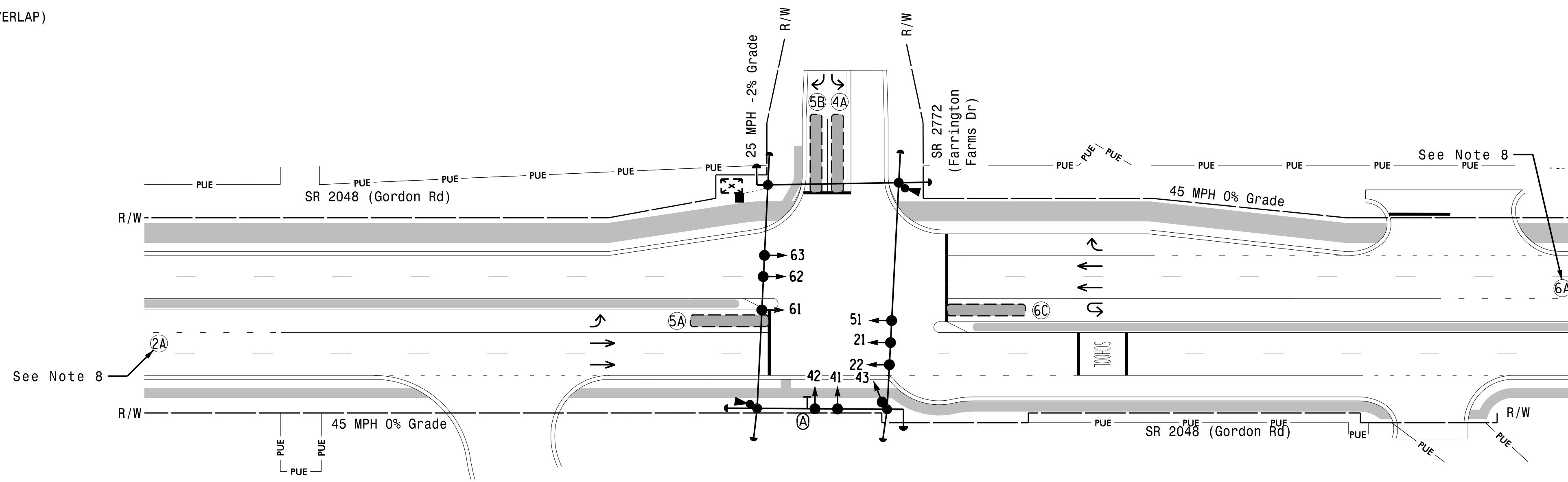
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X40	0	*	*	4	Y	Y	-	-	-	-	-
5A	6X40	0	*	*	5	Y	Y	-	-	15**	-	-
5B	6X40	0	*	*	5	Y	Y	-	-	15	-	Y
6C	6X40	0	*	*	6	Y	Y	-	-	-	-	Y

\* 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**

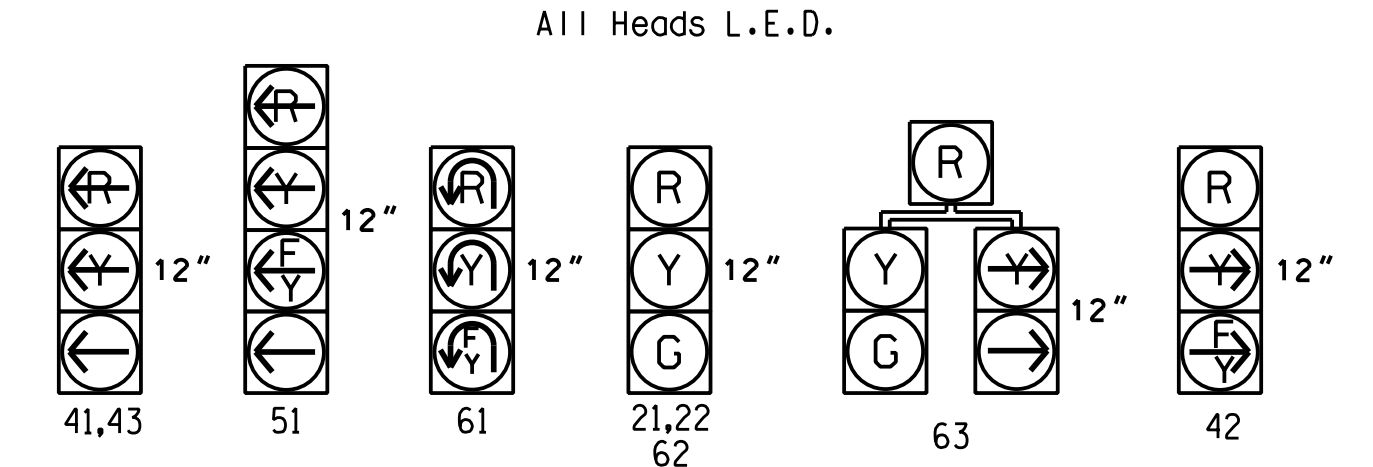
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Re-number loop 6B to 6C.
- Re-position existing signal heads numbered 62 and 63.
- 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 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 #1216.



**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	5	5	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	20	90
Yellow Clearance	4.5	3.0	3.0	4.5
Red Clearance	1.5	3.2	2.4	1.5
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

**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)	1.0-6.5	1.0-6.5

Signal Upgrade-  
 Temporary Design 2  
 (Construction Phase 3)

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

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

SR 2048 (Gordon Rd)  
 at  
 SR 2772 (Farrington Farms Dr)

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

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

750 N. Greenfield Pkwy, Corner, NC 27529

SCALE: 0 40  
 1" = 40'

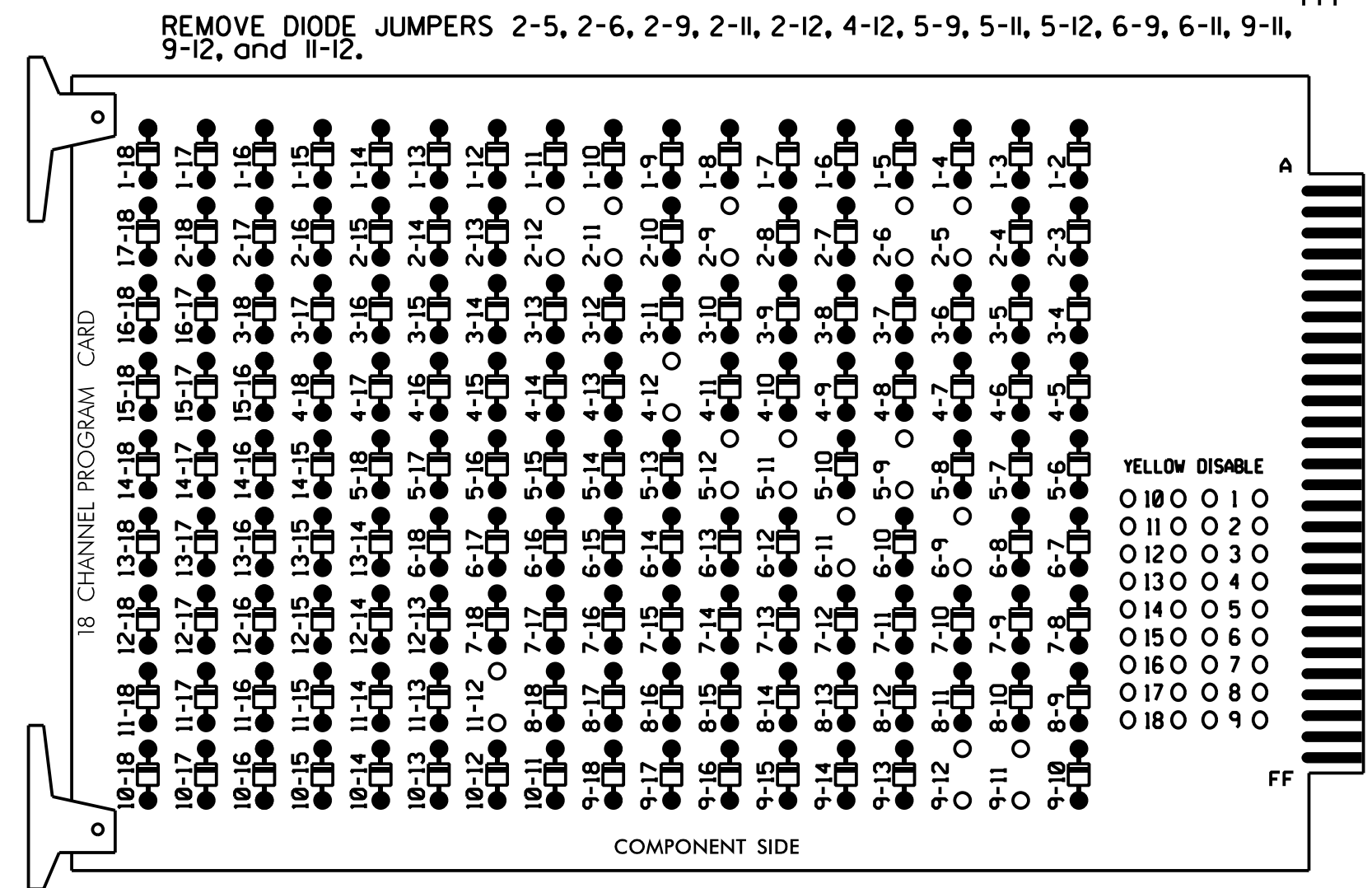
REVISIONS: INITI. DATE

DocuSigned by: *Natasha R. Simmons* 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-1216T2

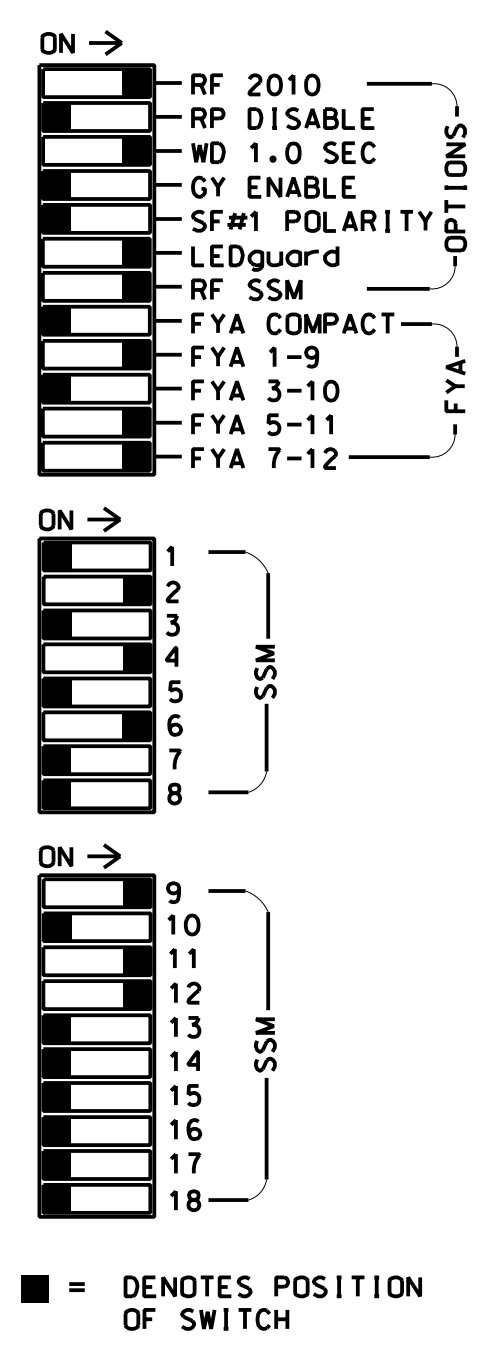
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- 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, and overlaps 1 and 2 as a Wag Overlap.
- 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,S5,S7,S8,AUX S2,AUX S4,AUX S5  
 PHASES USED.....2,4,5,6  
 OVERLAP "A".....2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....4+5

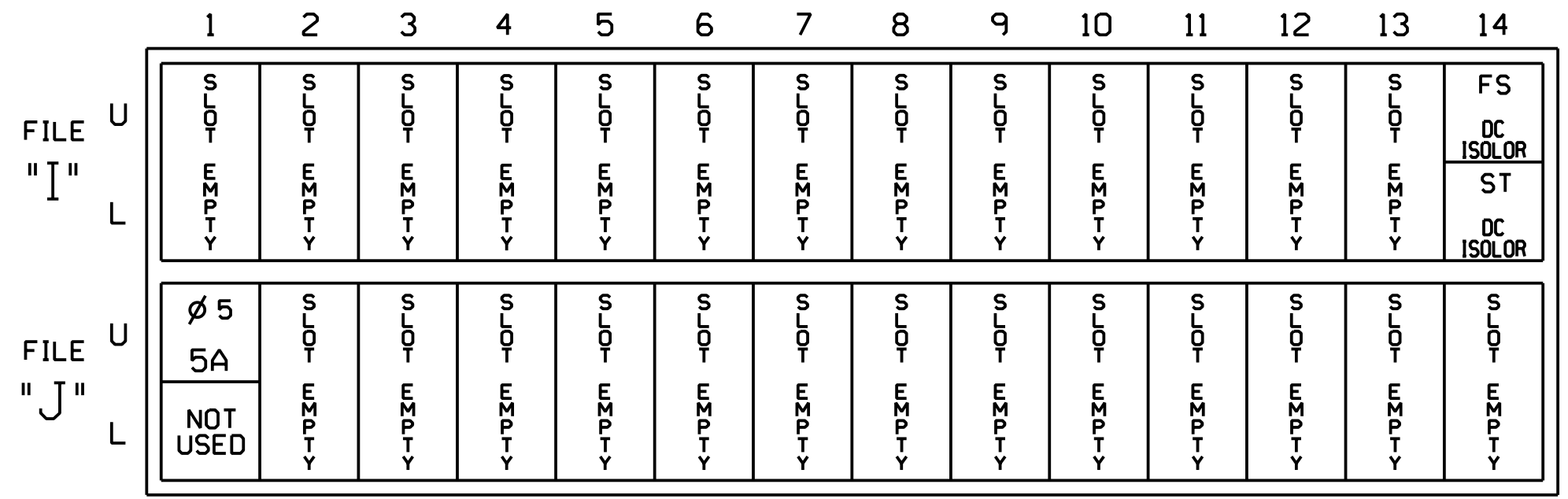
### SIGNAL HEAD HOOK-UP CHART

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	41,43	63	NU	51	62,63	NU	NU	NU	61	NU	NU	51	42	NU
RED		128								134								A101
YELLOW		129						*	135									
GREEN		130							136									
RED ARROW					101								A121			A114		
YELLOW ARROW					102	102							A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW					103	103	133											
Hand																		
Person																		

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)



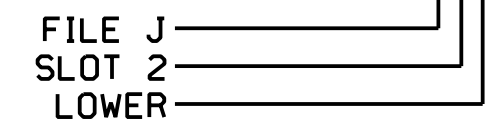
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

### 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			
	-	J1U	55	17 ★	55	5	Y	Y			

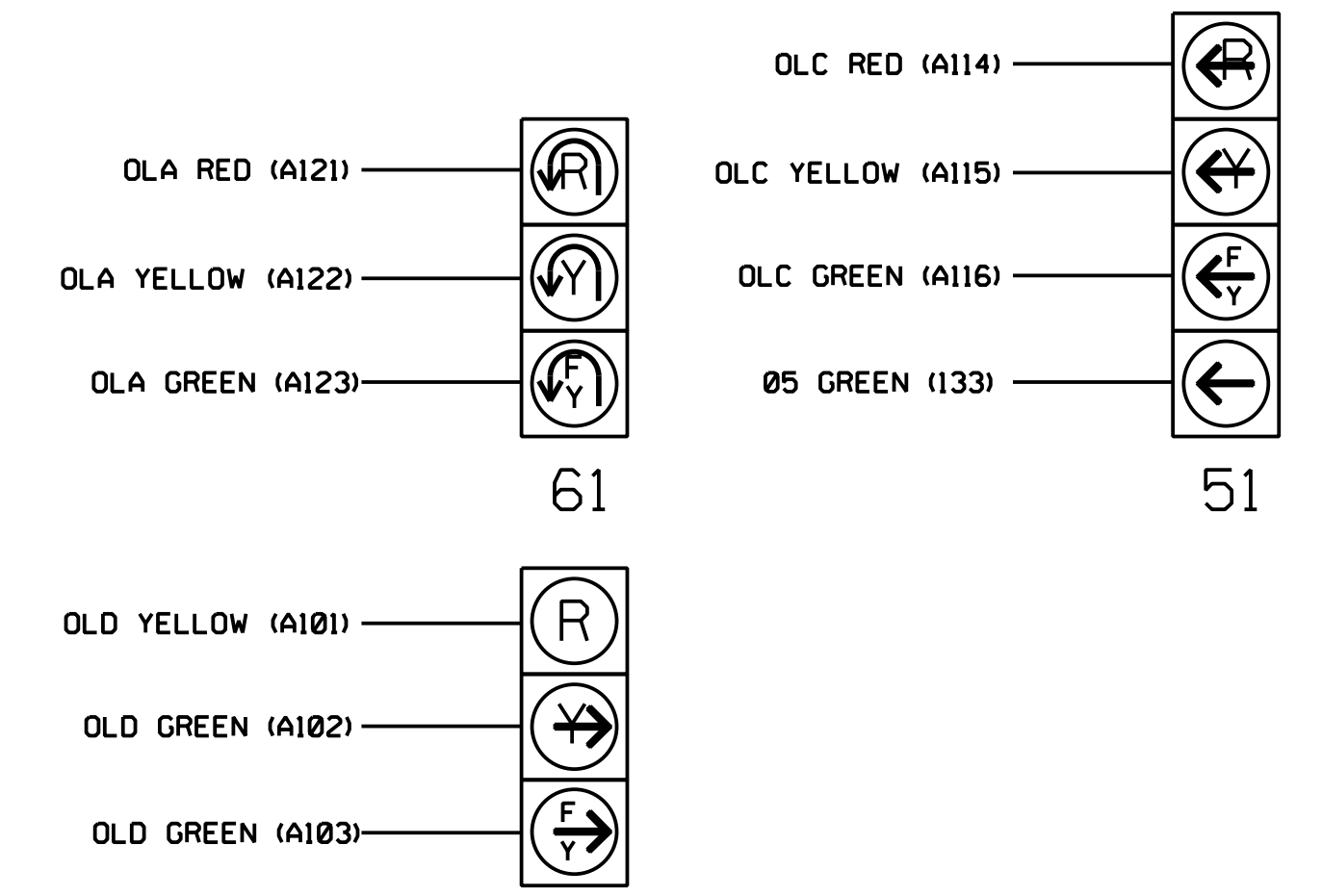
\* See Input Page Assignment programming details on sheet 3.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



#### NOTE

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

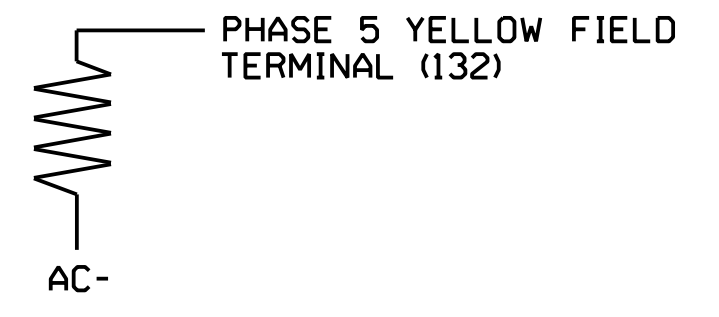
Signal Upgrade-  
 Electrical Detail - Sheet 1 of 4  
 (Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

### 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: 03-1216T2  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

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

**HNTB**  
 HNTB NORTH CAROLINA, P.C.  
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 NC License No: C-1554  
 (919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
 SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)  
 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  
 SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 031464  
 NAYASHA R. SIMMONS  
 11/8/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-1216T2

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

(program controller as shown below)

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

```

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #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
    ↓
    LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE
  
```

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).

```

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 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
RED CLEAR (0=PARENT.0.1-25.5 SEC)...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/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    ↓
    OVERLAP PROGRAMMING COMPLETE
  
```

NOTICE GREEN FLASH

```

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

NOTICE GREEN FLASH

### 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 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
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    ↓
    PRESS '+' TWICE
  
```

NOTICE GREEN FLASH

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/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    ↓
    OVERLAP PROGRAMMING COMPLETE
  
```

NOTICE GREEN FLASH

NOTICE PAGE 2 →

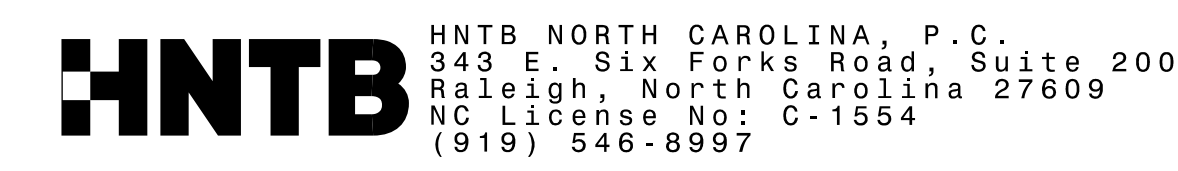
```

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
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    ↓
    PRESS '+'
  
```

Signal Upgrade-  
Electrical Detail - Sheet 2 of 4  
(Construction Phase 3)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEAL

SR 2048 (Gordon Rd)  
at  
SR 2772 (Farrington Farms Dr)

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. 03-1216T2

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: 03-1216T2 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr), Division 3 New Hanover County Wilmington. Includes fields for PLAN DATE, PREPARED BY, REVIEWED BY, and a signature block for N. K. Vianich and 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 0 seconds.

## FLASHER CIRCUIT MODIFICATION DETAIL

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

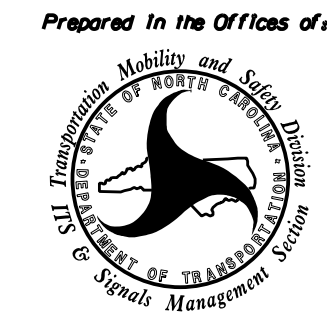

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-1216T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

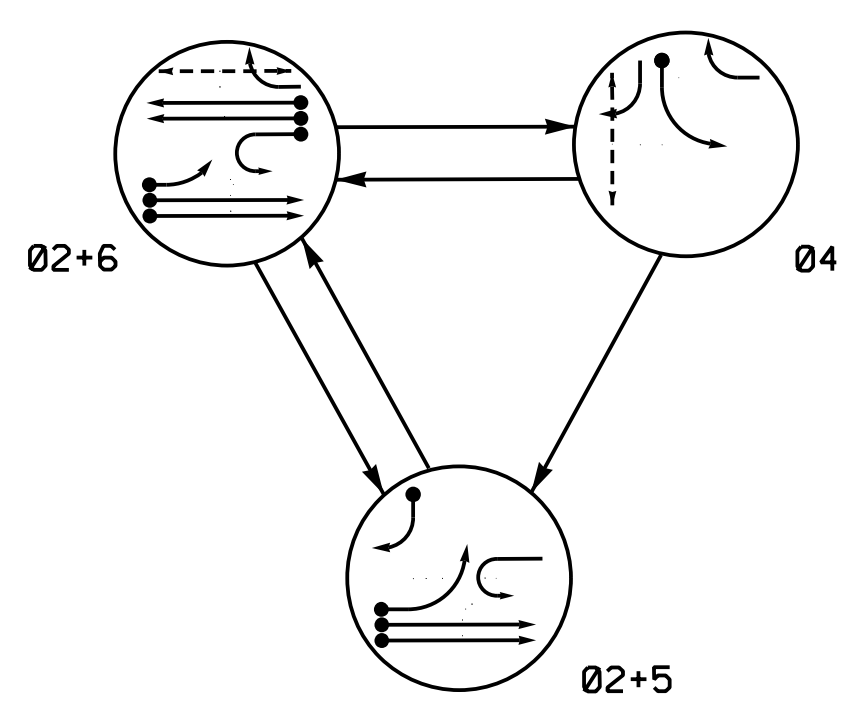
Signal Upgrade-  
Electrical Detail - Sheet 4 of 4  
(Construction Phase 3)

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

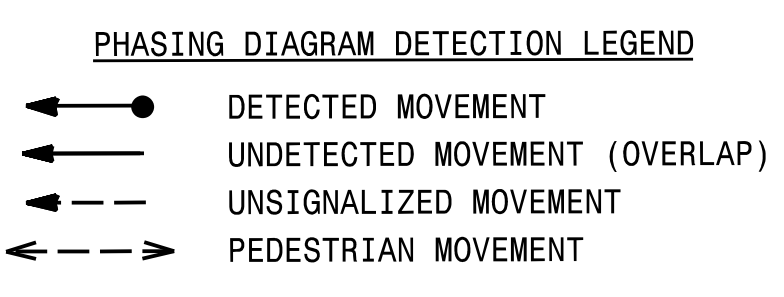
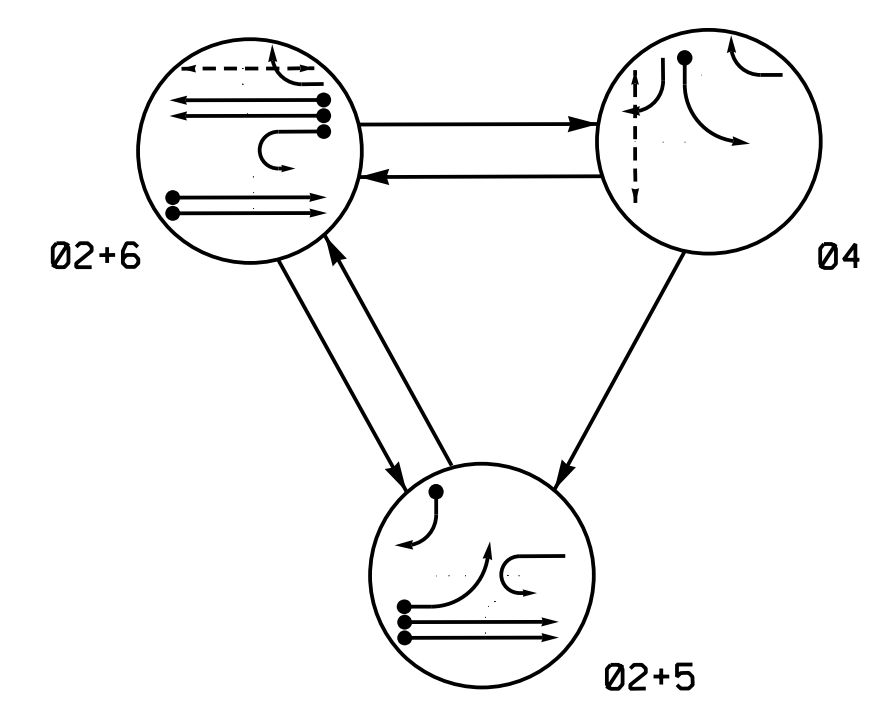
ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr) Division 3 New Hanover County Wilmington PLAN DATE: August 2023 REVIEWED BY: N.K. Vlanich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons REVISIONS      INIT.      DATE _____ _____ _____	SEAL  NATASHA R. SIMMONS 5/17/2024 DATE SIG. INVENTORY NO. 03-1216T2
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**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	F
21,22	G	G	R	Y
41,43	-R	-R	-R	-R
42	-F	R	F	R
51	-F	-R	-R	-Y
61	(F)	(F)	(R)	(Y)
62,63	R	G	R	Y
64	R	F	-Y	-Y
P41,P42	DW	DW	W	DRK
P61,P62	DW	W	DW	DRK

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	F
21,22	G	G	R	Y
41,43	-R	-R	-R	-R
42	-F	R	F	R
51	-F	-R	-R	-Y
61	(F)	(F)	(R)	(Y)
62,63	R	G	R	Y
64	R	F	-Y	-Y
P41,P42	DW	DW	W	DRK
P61,P62	DW	W	DW	DRK

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

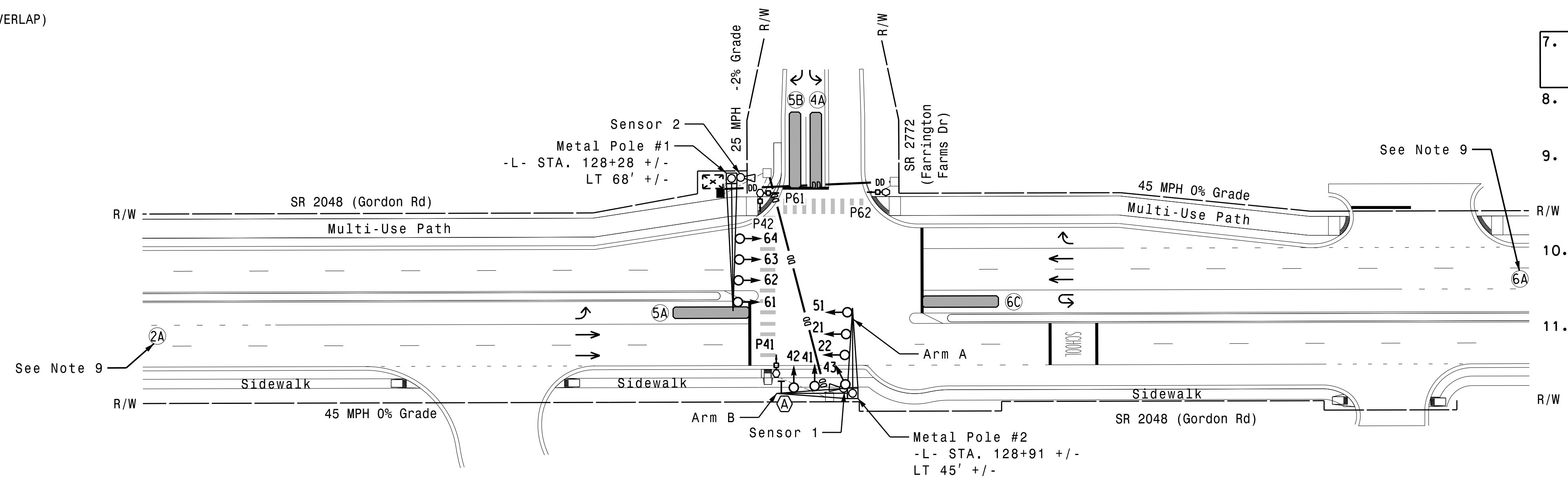
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
4A	6X40	0	*	*	4	Y	Y	-	-	-	-	-
5A	6X40	0	*	*	5	Y	Y	-	-	15**	-	-
5B	6X40	0	*	*	5	Y	Y	-	-	15	-	-
6C	6X40	0	*	*	6	Y	Y	-	-	-	-	-

\* 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**

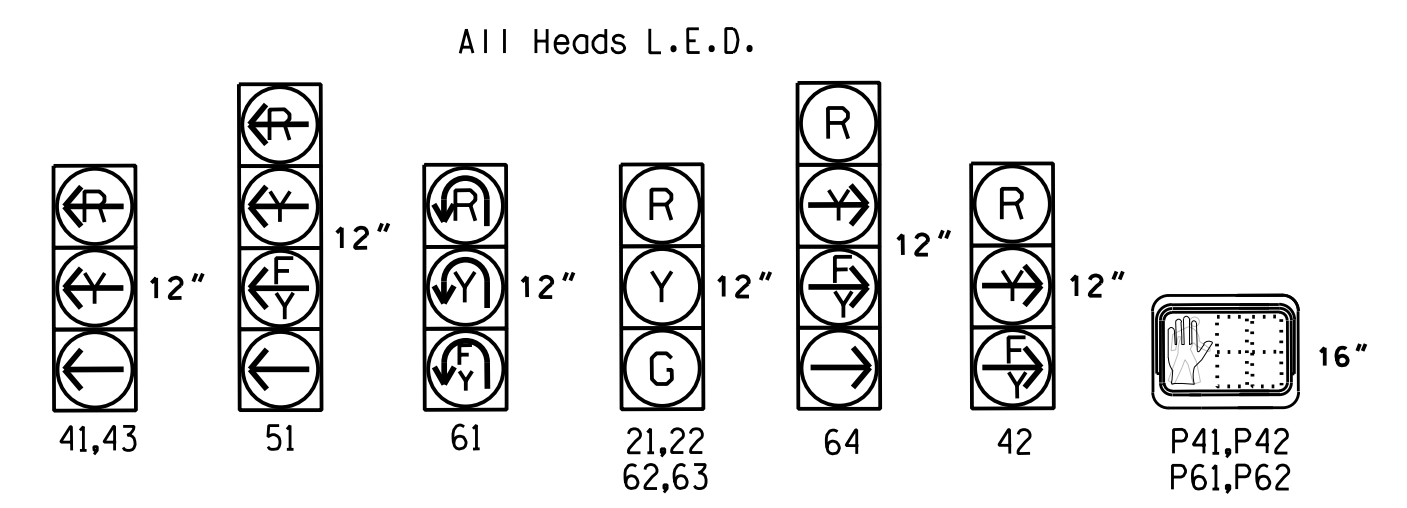
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence 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 #1216.



**OASIS 2070 TIMING CHART**

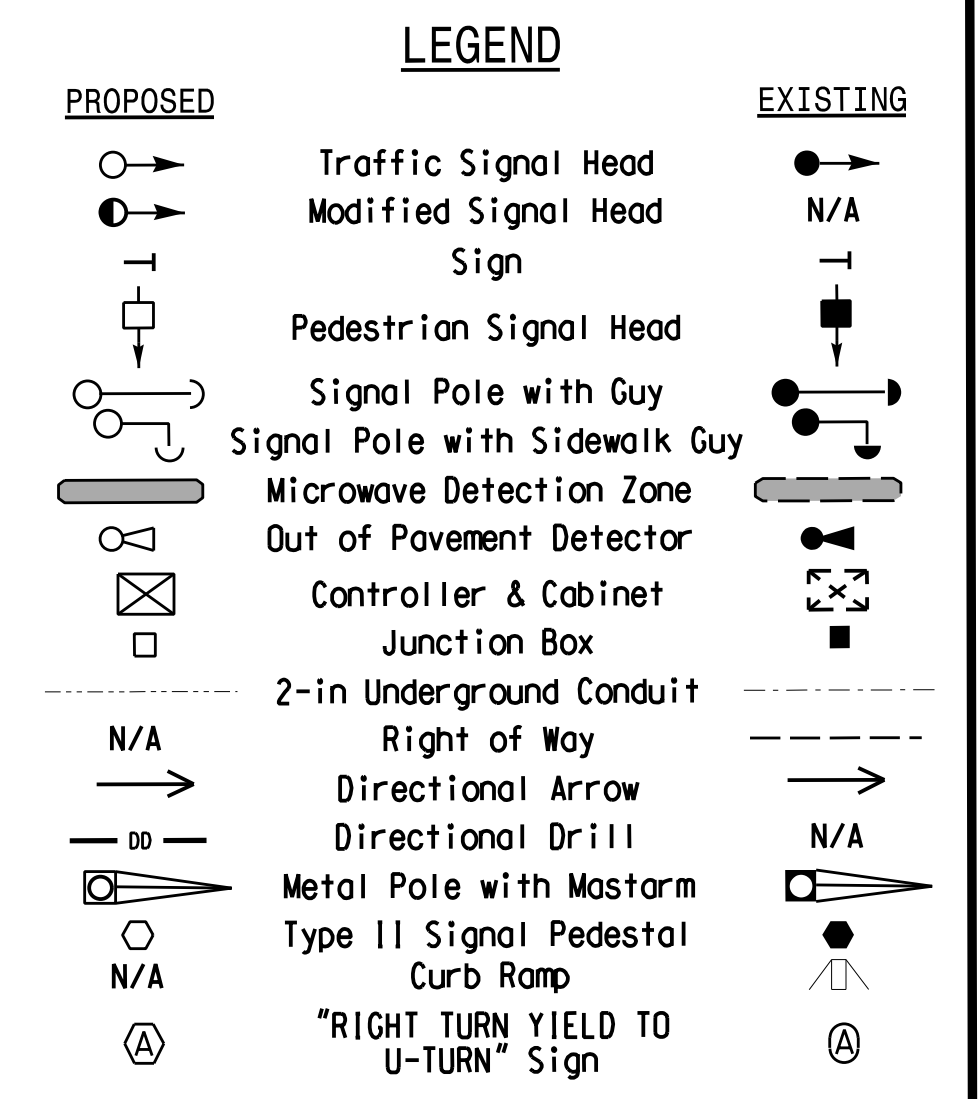
FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	5	5	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	90	30	20	90
Yellow Clearance	4.5	3.0	3.0	4.5
Red Clearance	1.5	3.2	2.6	1.5
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7
Don't Walk 1	-	21	-	11
Advanced Walk *	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable 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

**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)	1.0-6.5	1.0-6.5



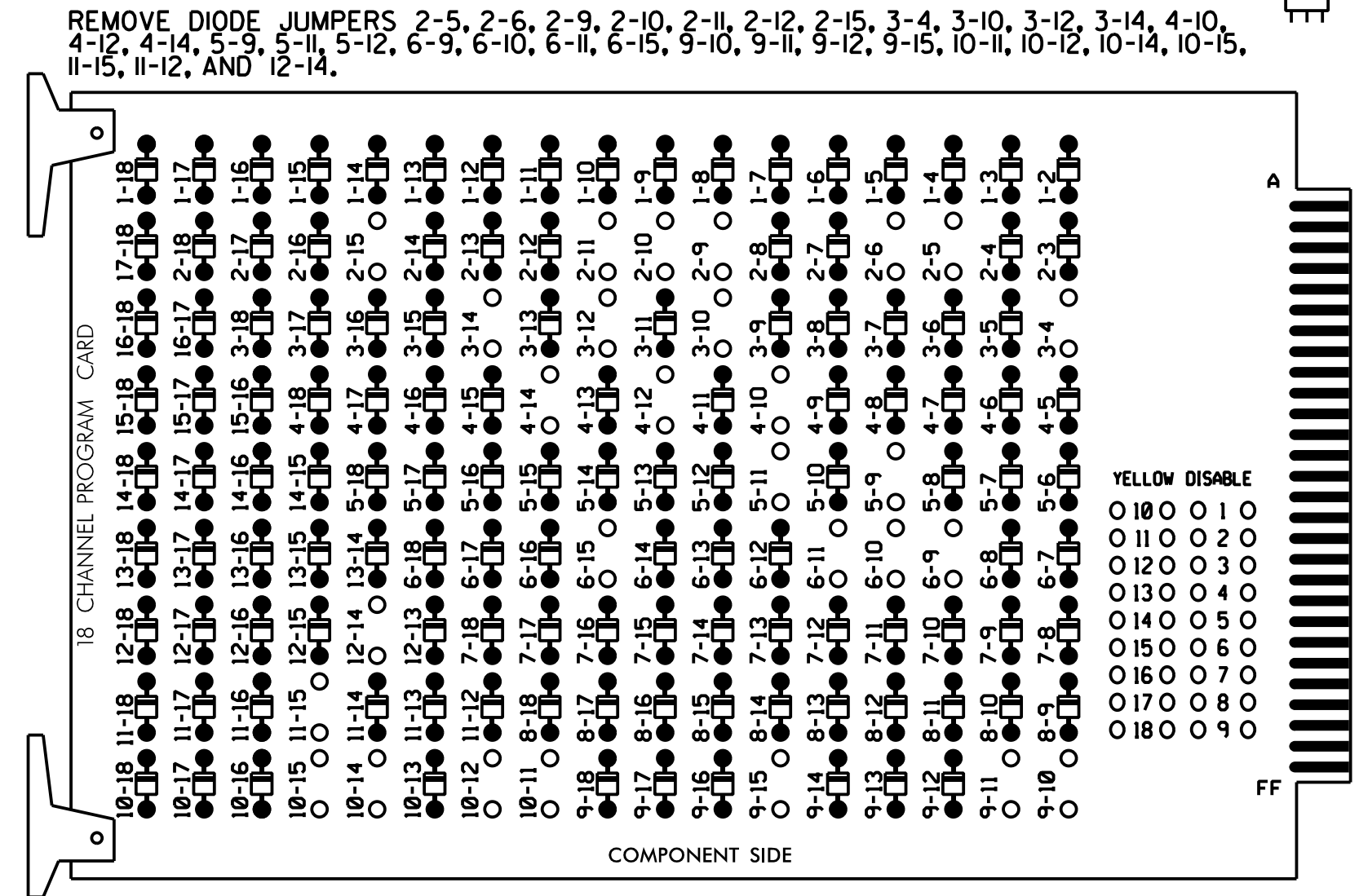
**Signal Upgrade - Final Design**

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

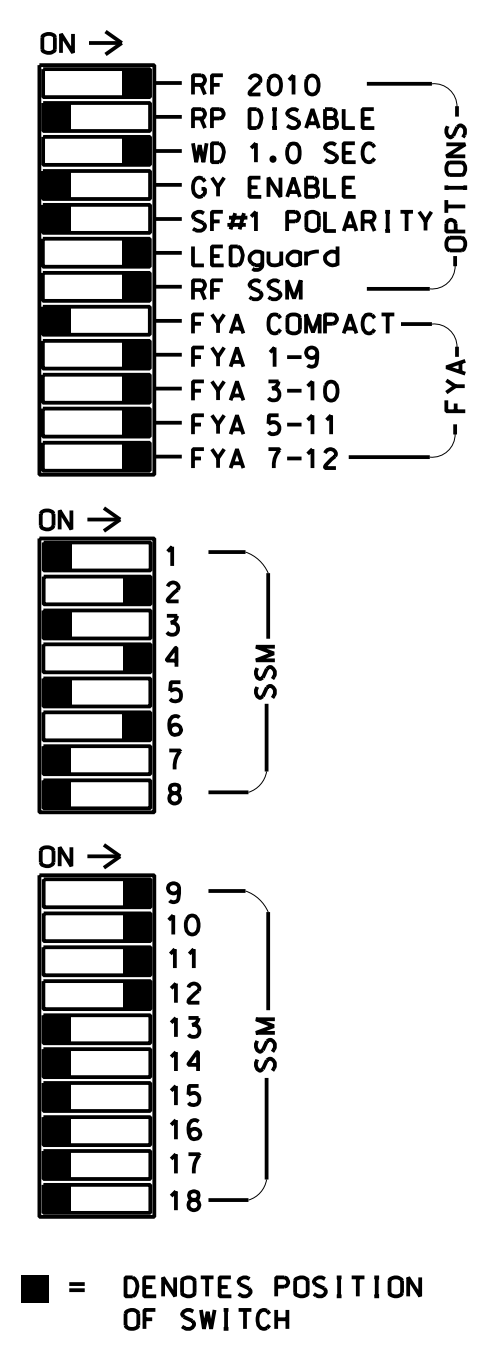
	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)		
	Division 3 New Hanover County Wilmington PLAN DATE: May 2022 PREPARED BY: E.E. Tiller REVISIONS:	REVIEWED BY: N.K. Vianich REVIEWED BY: N.R. Simmons DATE:	

### 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, 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.....S2,S4,S5,S6,S7,S8,S9,AUX S1,  
 AUX S2,AUX S4,AUX S5  
 PHASES USED.....2,4,5,6  
 OVERLAP "A".....2  
 OVERLAP "B".....4+6  
 OVERLAP "C".....5+6  
 OVERLAP "D".....4  
 OVERLAP "E".....NOT USED  
 OVERLAP "F".....NOT USED  
 OVERLAP "G".....4

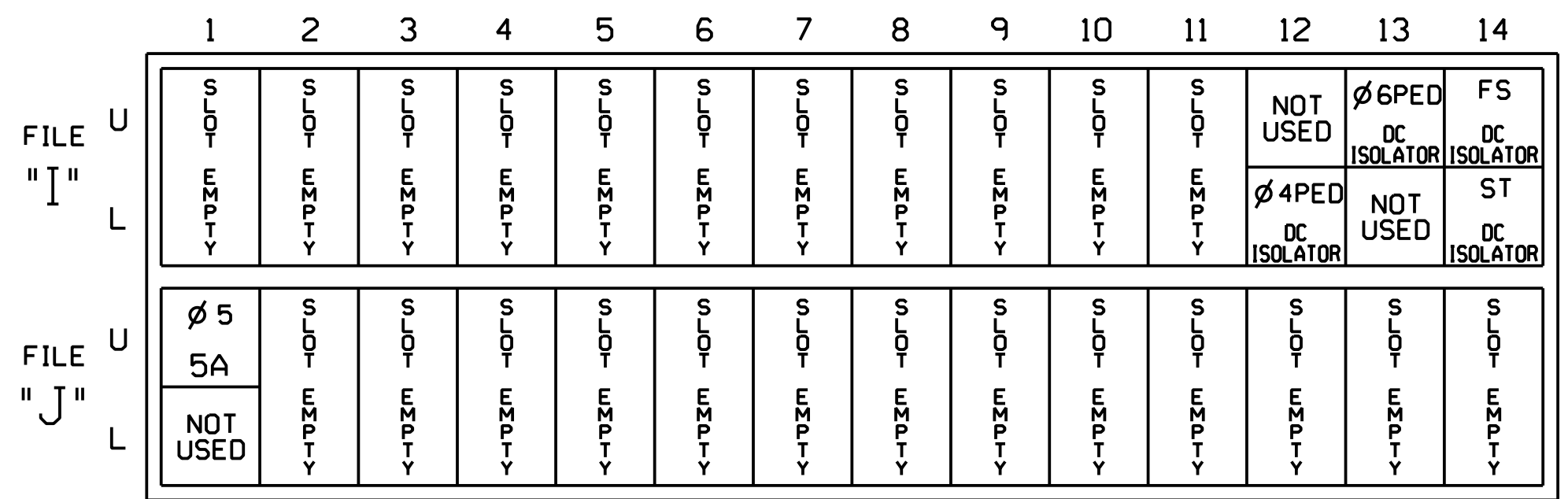
### SIGNAL HEAD HOOK-UP CHART

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	OLG	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	64	41,43	P41, P42	51	62,63	P61, P62	NU	NU	NU	61	64	NU	51	42	NU
RED		128						134						A124			A101	
YELLOW		129		*			*	135										
GREEN		130						136										
RED ARROW						101								A121			A114	
YELLOW ARROW						102								A122	A125		A115	A102
FLASHING YELLOW ARROW														A123	A126		A116	A103
GREEN ARROW						118	103	133										
Hand								104				119						
Person								106				121						

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

### INPUT FILE POSITION LAYOUT

(front view)

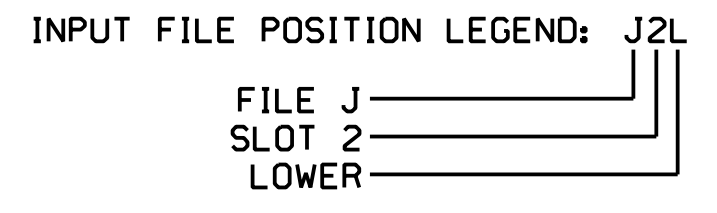


### INPUT FILE CONNECTION & PROGRAMMING CHART

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			
PED PUSH BUTTONS		J1U	55	17 ★	55	5	Y	Y			
P41,P42	T88-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					

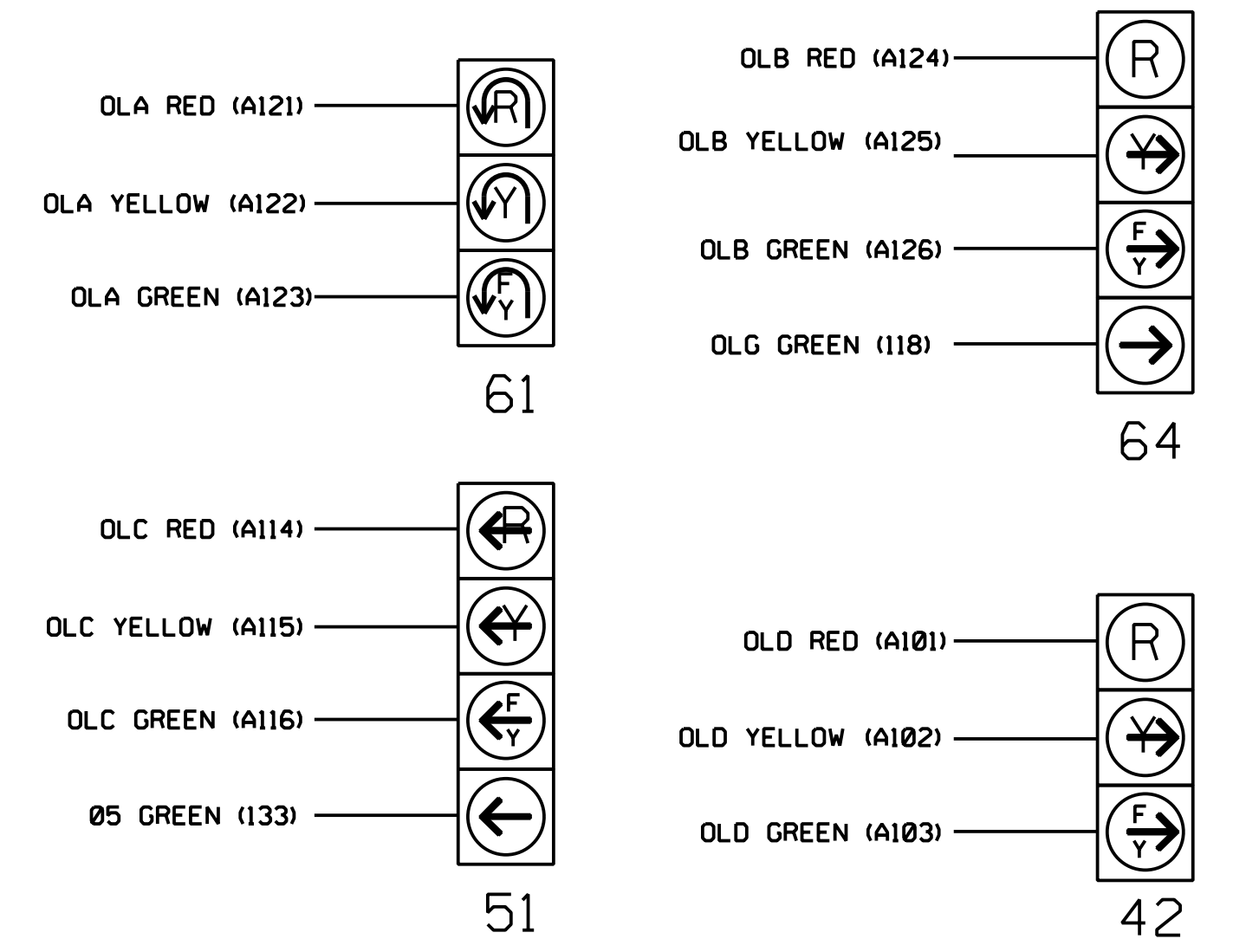
NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



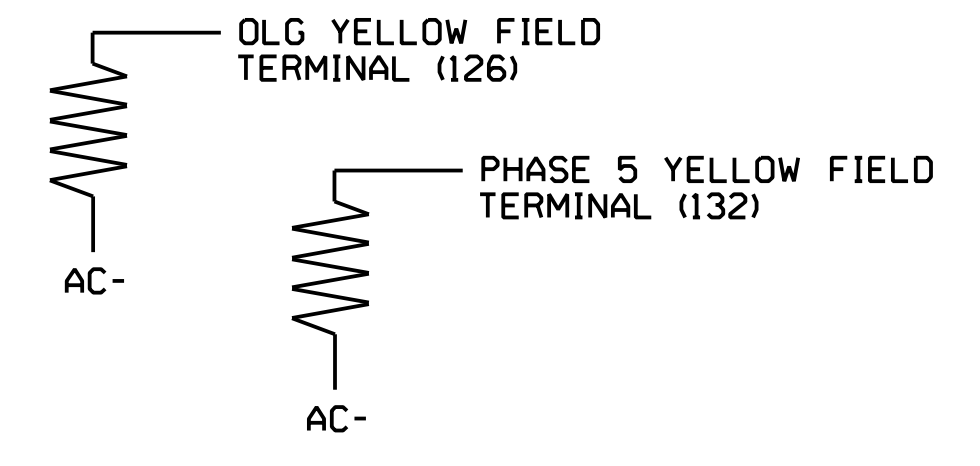
NOTE  
 The sequence display for signal heads 51 and 64 require special logic programming. See sheet 2 for programming instructions.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:



HNTB NORTH CAROLINA, P.C.  
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 (919) 546-8997

Signal Upgrade - Final Design  
 Electrical Detail - Sheet 1 of 5

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

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)

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

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464  
 N. R. SIMMONS  
 11/8/2024

SIG. INVENTORY NO. 03-1216

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```

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

      ↓
SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 6 RED CLEAR WHEN TRANSITIONING FROM PHASE 4 TO PHASE 6 (HEAD 64).

```

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

      ↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF
  
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 4 (HEAD 64).

```

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

      ↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON
  
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 4 (HEAD 64).

```

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
  
```

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
  
```

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
  
```

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

LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE

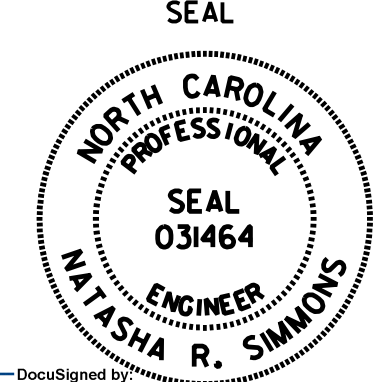
<b>OUTPUT REFERENCE SCHEDULE</b>
USE TO INTERPRET LOGIC PROCESSOR
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

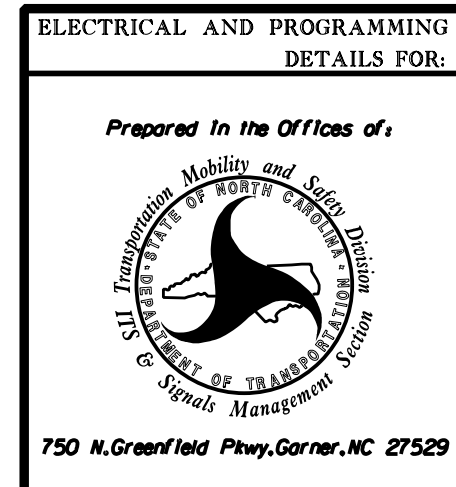
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

**HNTB** HNTB NORTH CAROLINA, P.C.  
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Signal Upgrade - Final Design  
Electrical Detail - Sheet 2 of 6

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

	<p>SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)</p> <p>Division 3    New Hanover County    Wilmington</p> <p>PLAN DATE: August 2023    REVIEWED BY: N.K. Vianich</p> <p>PREPARED BY: E.E. Tiller    REVIEWED BY: N.R. Simmons</p>	<p>SEAL</p> <p>DocuSigned by: <i>Natasha R. Simmons</i>    5/17/2024</p> <p>SIGNATURE    DATE</p> <p>SIG. INVENTORY NO.    03-1216</p>									
<table border="1" style="width: 100%; text-align: center;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			REVISIONS	INIT.	DATE						
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 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: 03-1216 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade - Final Design Electrical Detail - Sheet 4 of 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr), Division 3 New Hanover County Wilmington. Includes fields for PLAN DATE, PREPARED BY, REVIEWED BY, and a signature block for N. R. Simmons dated 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.

## FLASHER CIRCUIT MODIFICION DETAIL

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

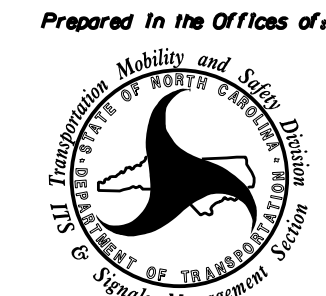
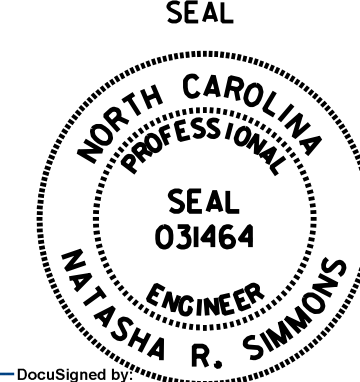
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 03-1216  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

Signal Upgrade - Final Design  
 Electrical Detail - Sheet 5 of 6

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared In the Offices of:  HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)  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  NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS
DocuSigned by: _____ SIGNATURE    DATE _____    5/17/2024 SIG. INVENTORY NO.    03-1216		

**OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL  
TO ASSIGN LOADSWITCH S4 TO OVERLAP 'G'  
(FOR SIGNAL HEAD 64)  
(program controller as shown below)**

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

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

```

PAGE:1 C1 PIN:7 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....6
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

OVERLAP "G" RED

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

```

PAGE:1 C1 PIN:7 NOT ENABLED
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN)....0
    
```

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

PRESS '+' KEY FOR OUTPUT 7

```

PAGE:1 C1 PIN:7 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....6
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.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:8 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....7
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....Y
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

OVERLAP "G" YELLOW

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

```

PAGE:1 C1 PIN:8 CONTROLLER FLASH
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN)....1
    
```

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

PRESS '+' KEY FOR OUTPUT 8

```

PAGE:1 C1 PIN:8 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....7
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.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:9 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....8
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

OVERLAP "G" GREEN

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

```

PAGE:1 C1 PIN:9 NOT ENABLED
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN)....2
    
```

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

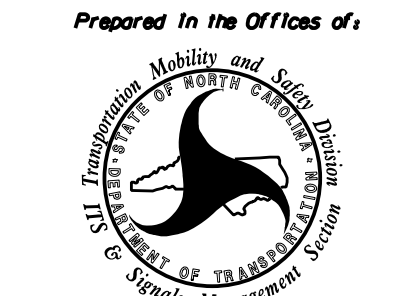
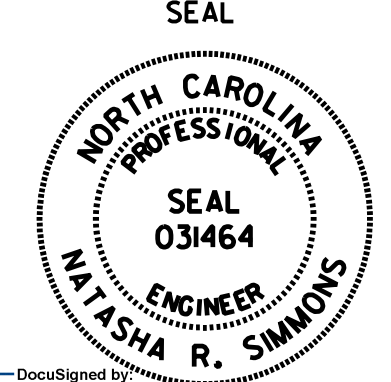
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PAGE:1 C1 PIN:9 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....8
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

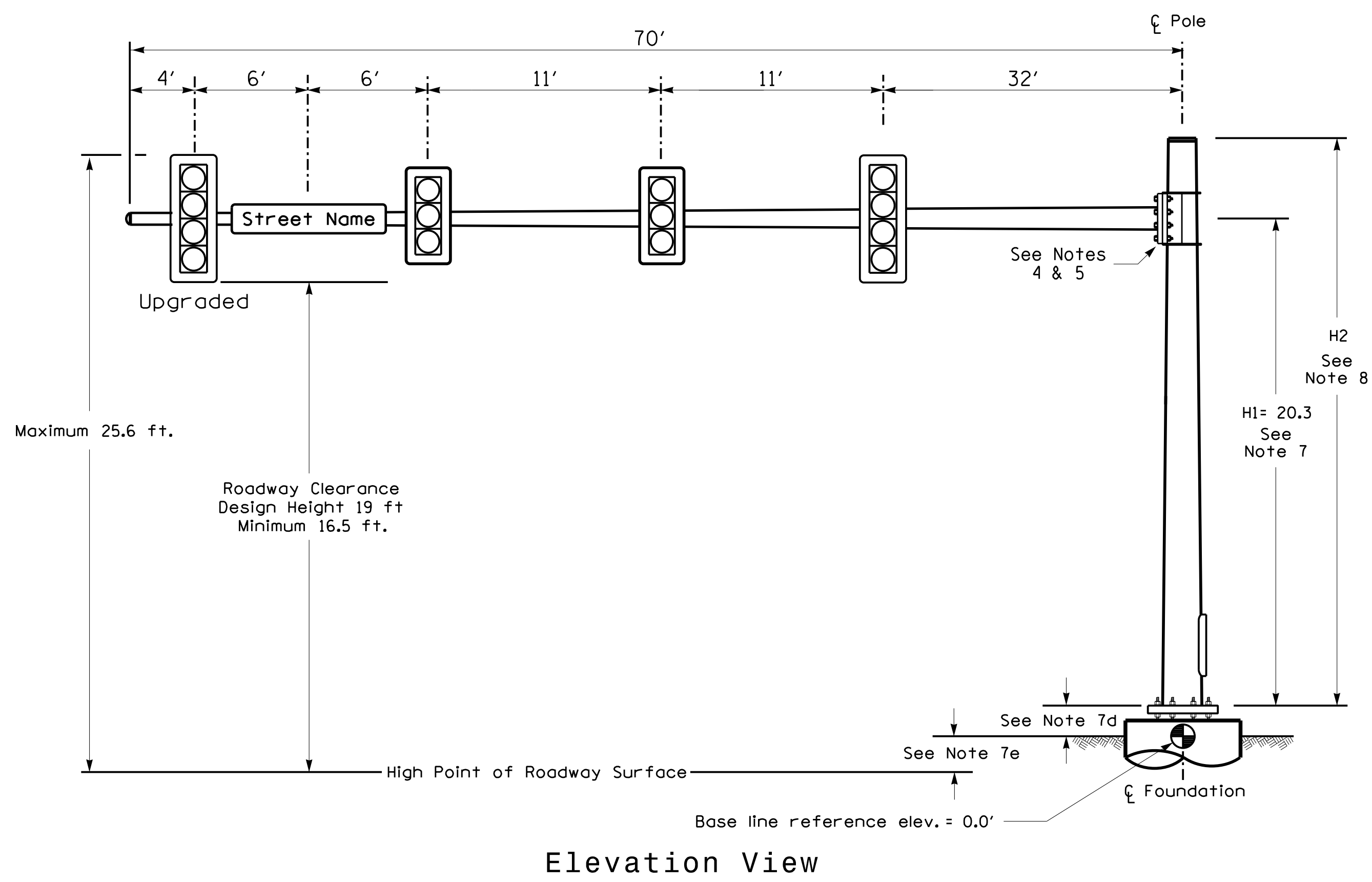
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1216  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

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

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

 <p>Prepared in the Office of: N.C. Department of Transportation Signal Management</p>	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)		
	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	REVISIONS INIT. DATE	DocuSigned by: <i>Natasha R. Simmons</i> 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-1216

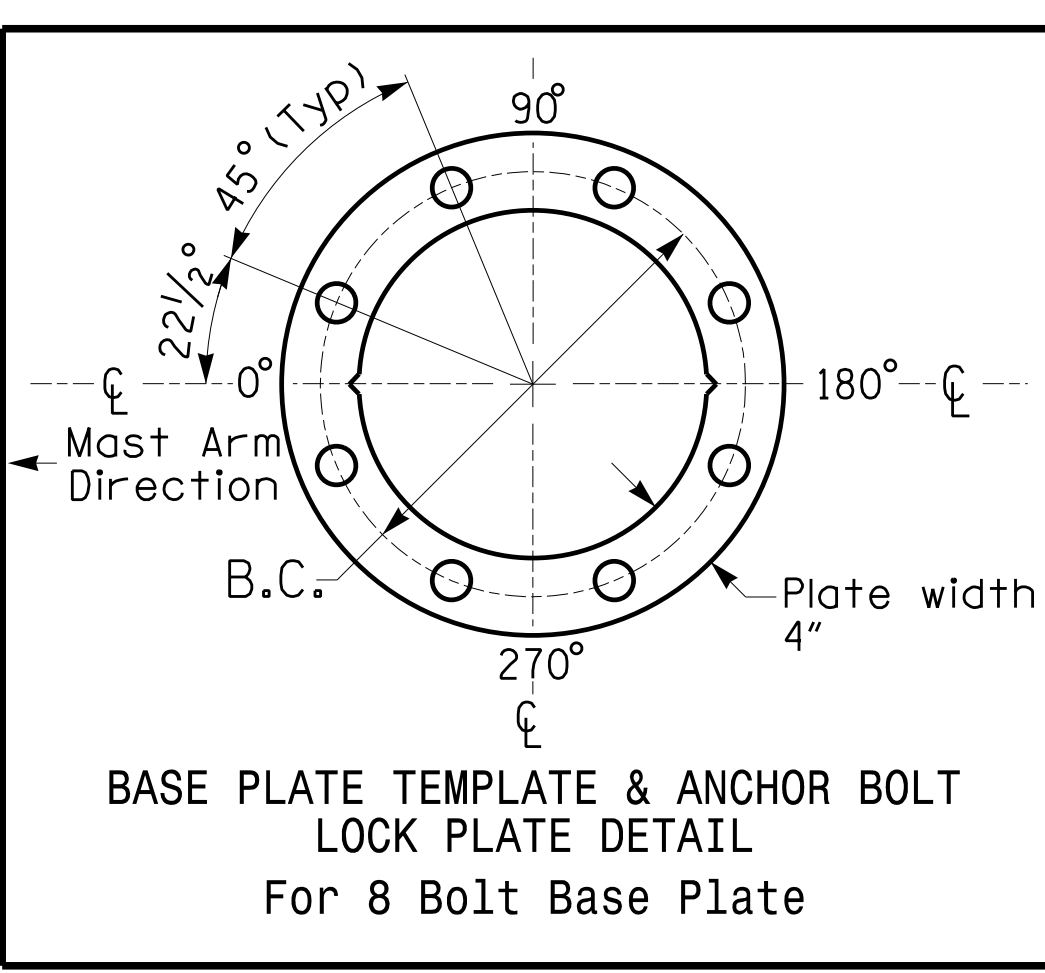
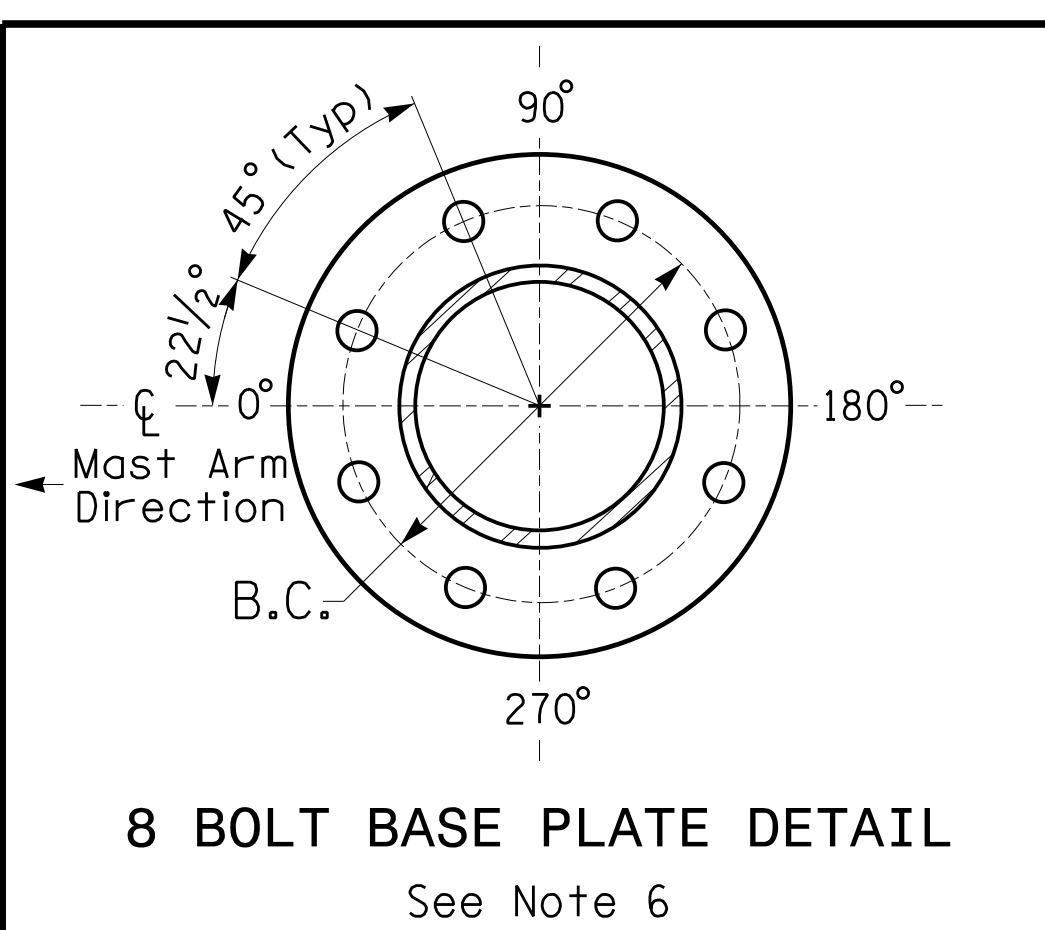
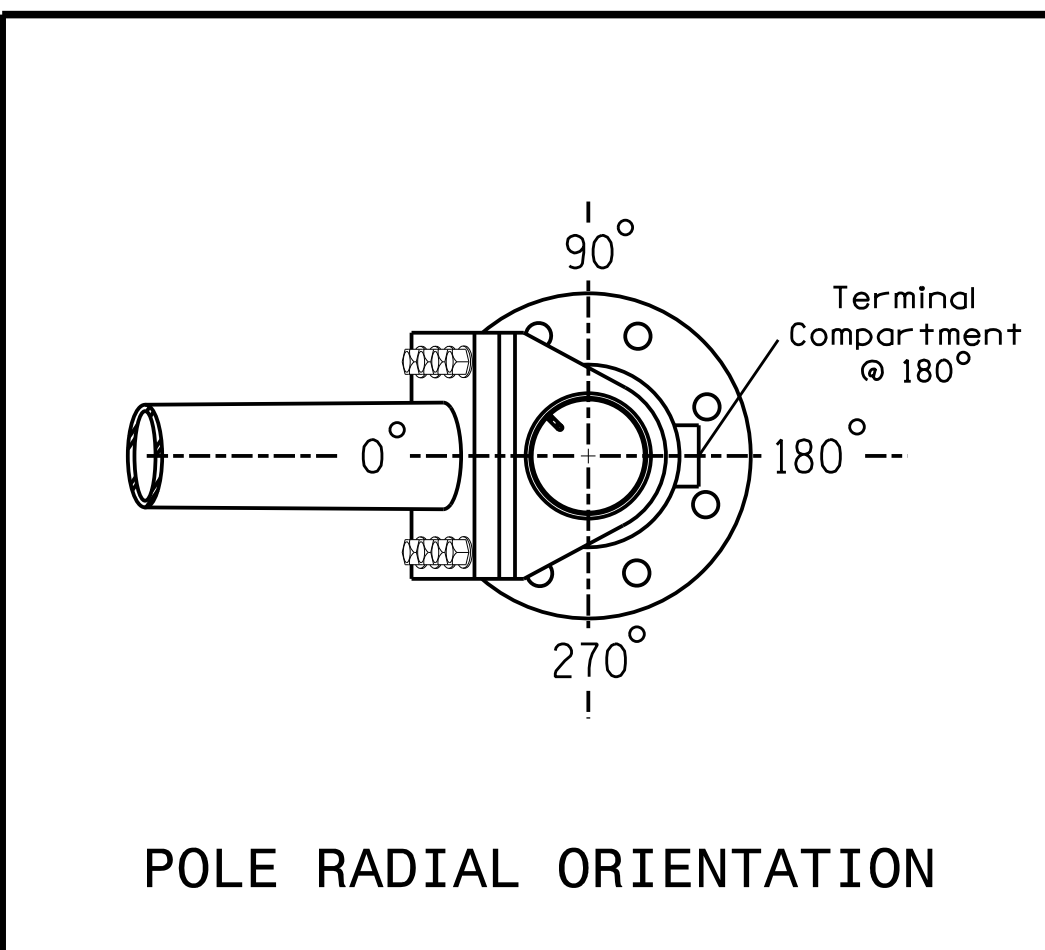
### Design Loading for METAL POLE NO. 1



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

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

Elevation Differences for:	Pole 1
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-0.72 ft.
Elevation difference at Edge of travelway or face of curb	-1.05 ft.



### METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
U-6202	Fig. 24.7

**MAST ARM LOADING SCHEDULE**

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

**NOTES**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 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.

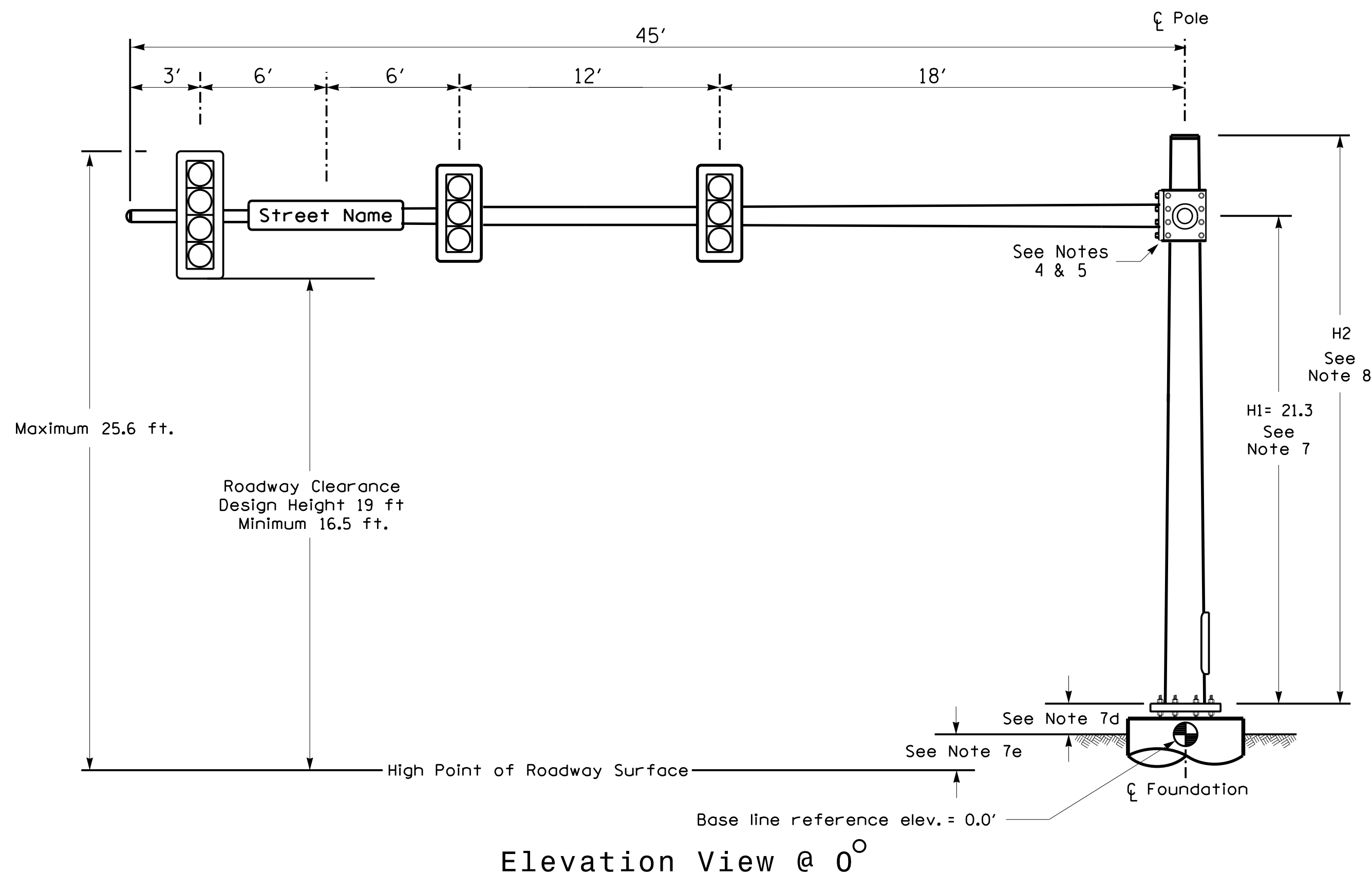
NCDOT Wind Zone 1 (150 mph)

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

 Prepared in the Offices of: Transportation Mobility and Safety Division Department of Transportation Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27525	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)	SEAL  NATASHA R. SIMMONS
	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 0 N/A N/A	REVISIONS INIT. DATE	DocuSigned by: Natasha R. Simmons 5/17/2024 DATE SIG. INVENTORY NO. 03-1216

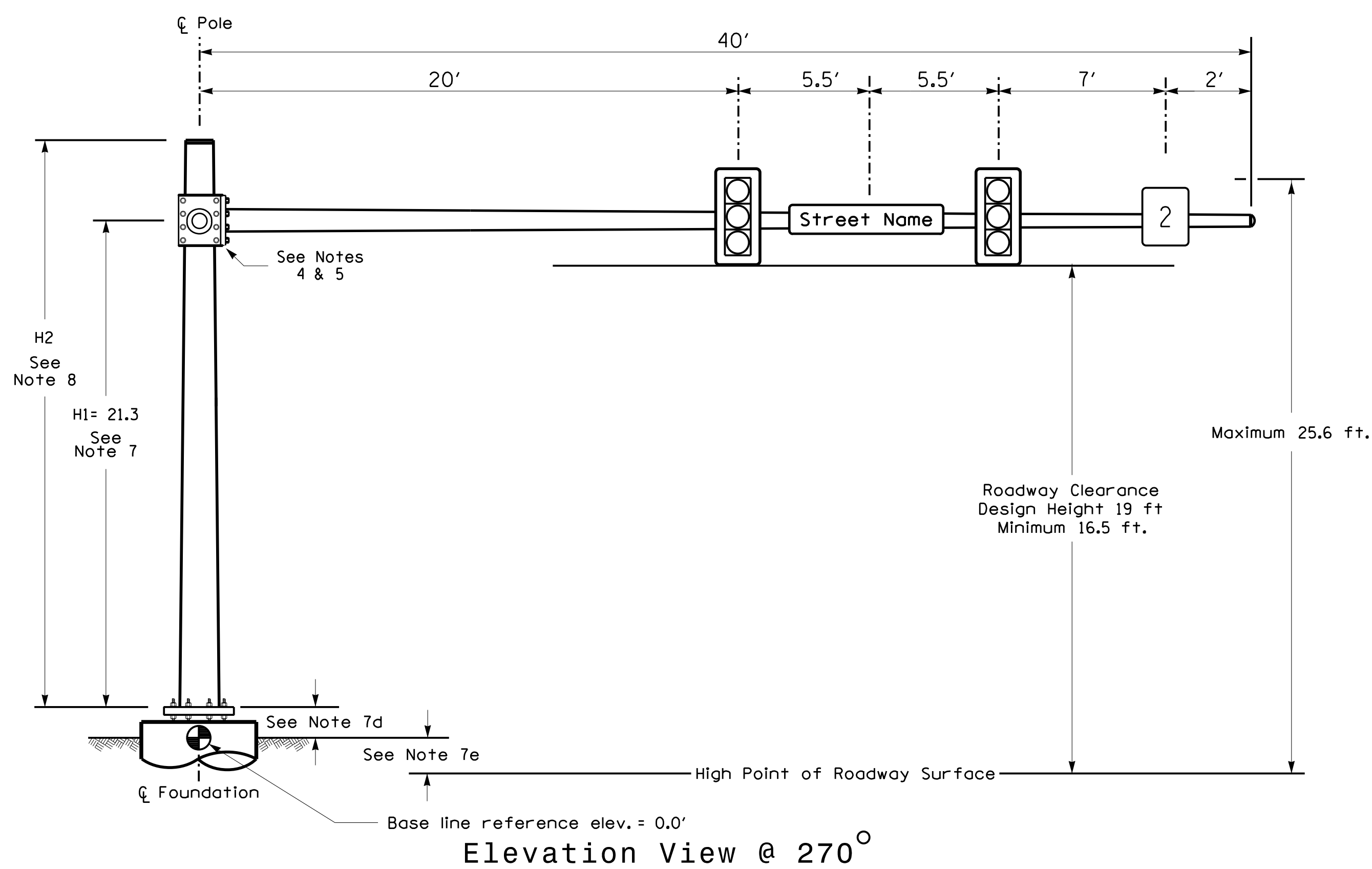


Design Loading for METAL POLE NO. 2 Mast Arm "A"



Elevation View @ 0°

Design Loading for METAL POLE NO. 2 Mast Arm "B"



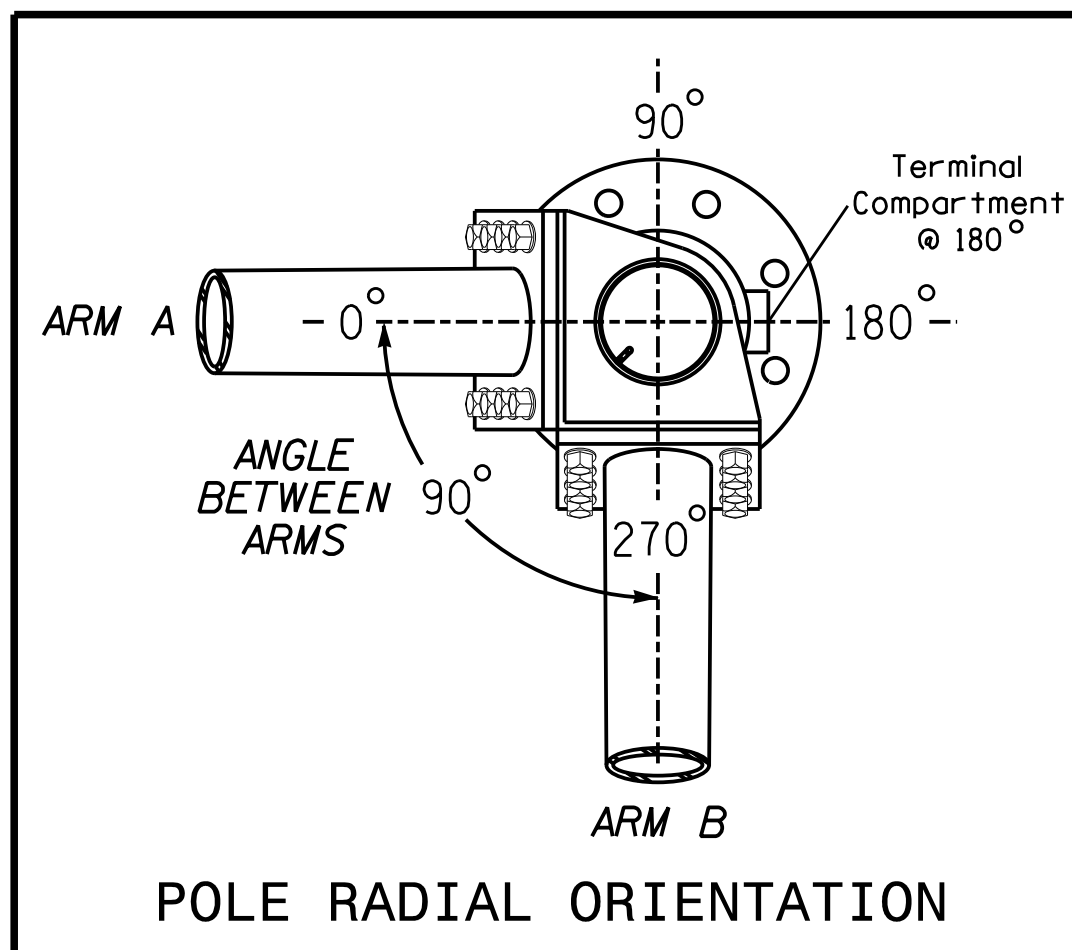
Elevation View @ 270°

SPECIAL NOTE

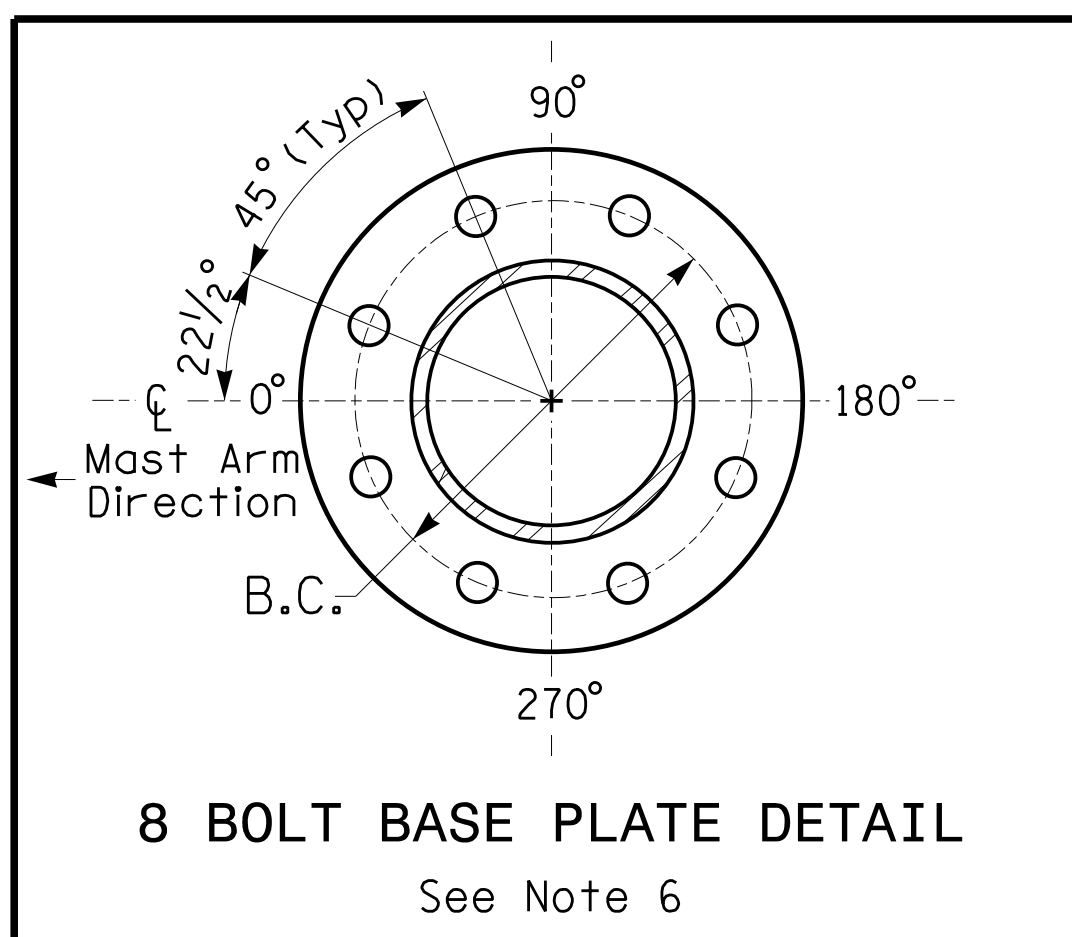
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.25 ft.	0.00 ft.
Elevation difference at Edge of travelway or face of curb	-0.51 ft.	0.00 ft.

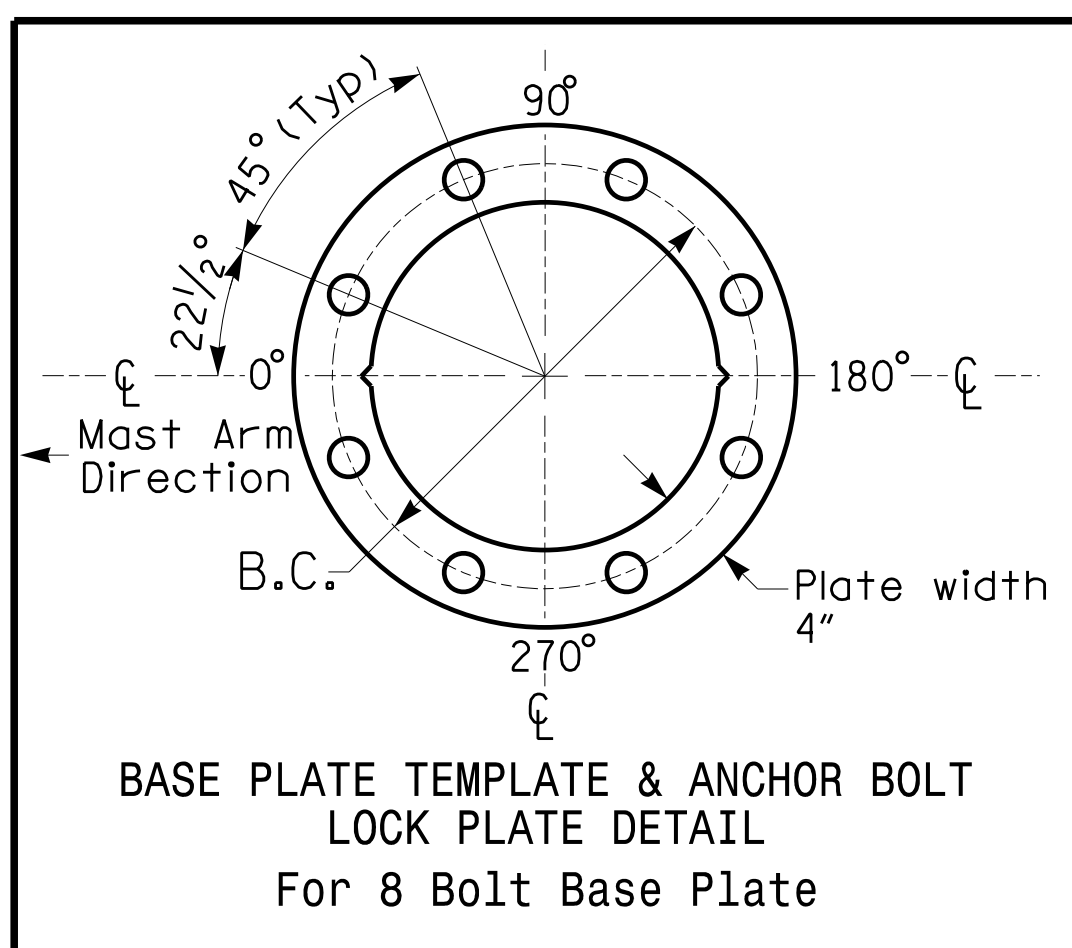


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

MAST ARM LOADING SCHEDULE

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

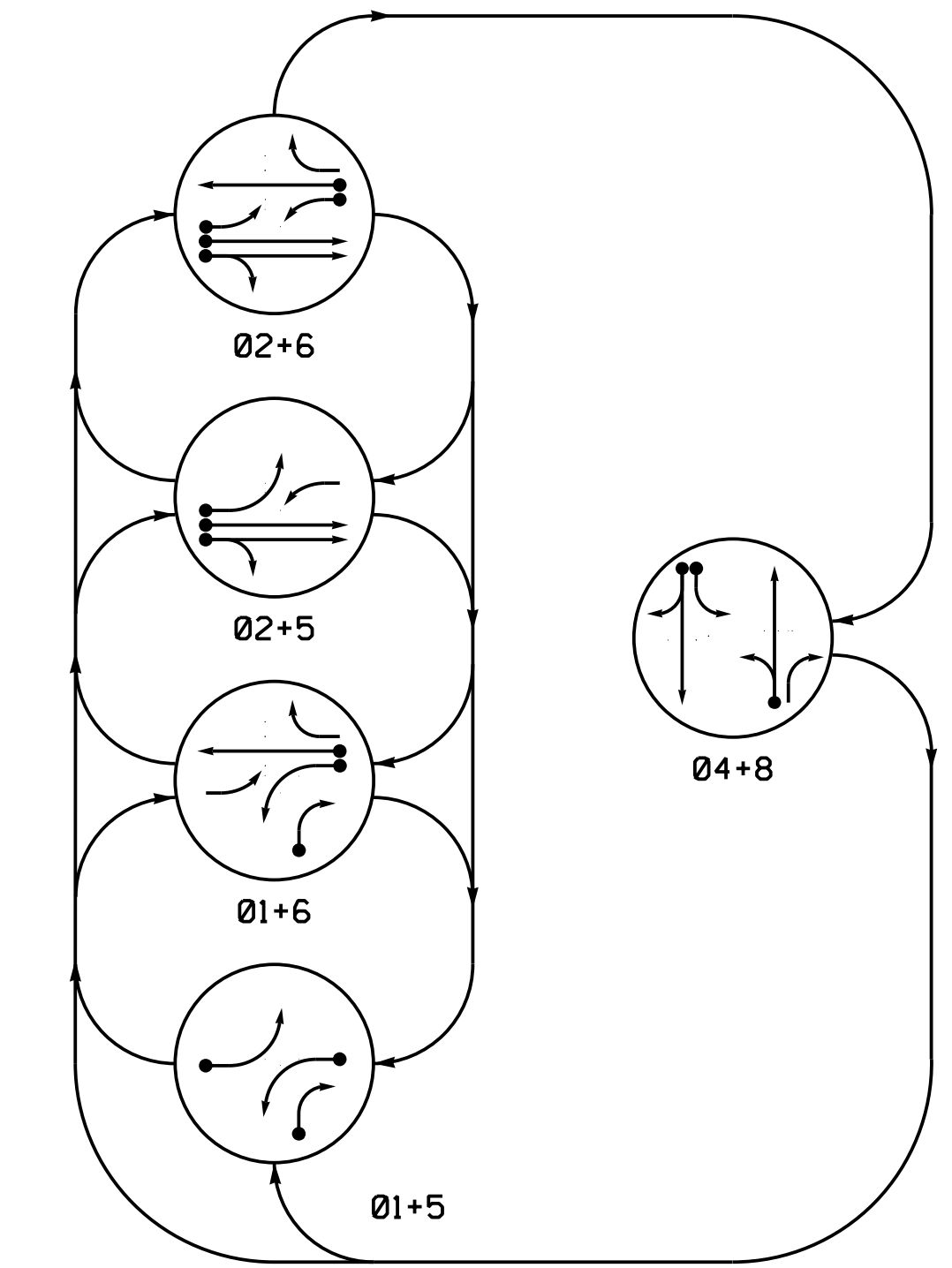
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- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for 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)

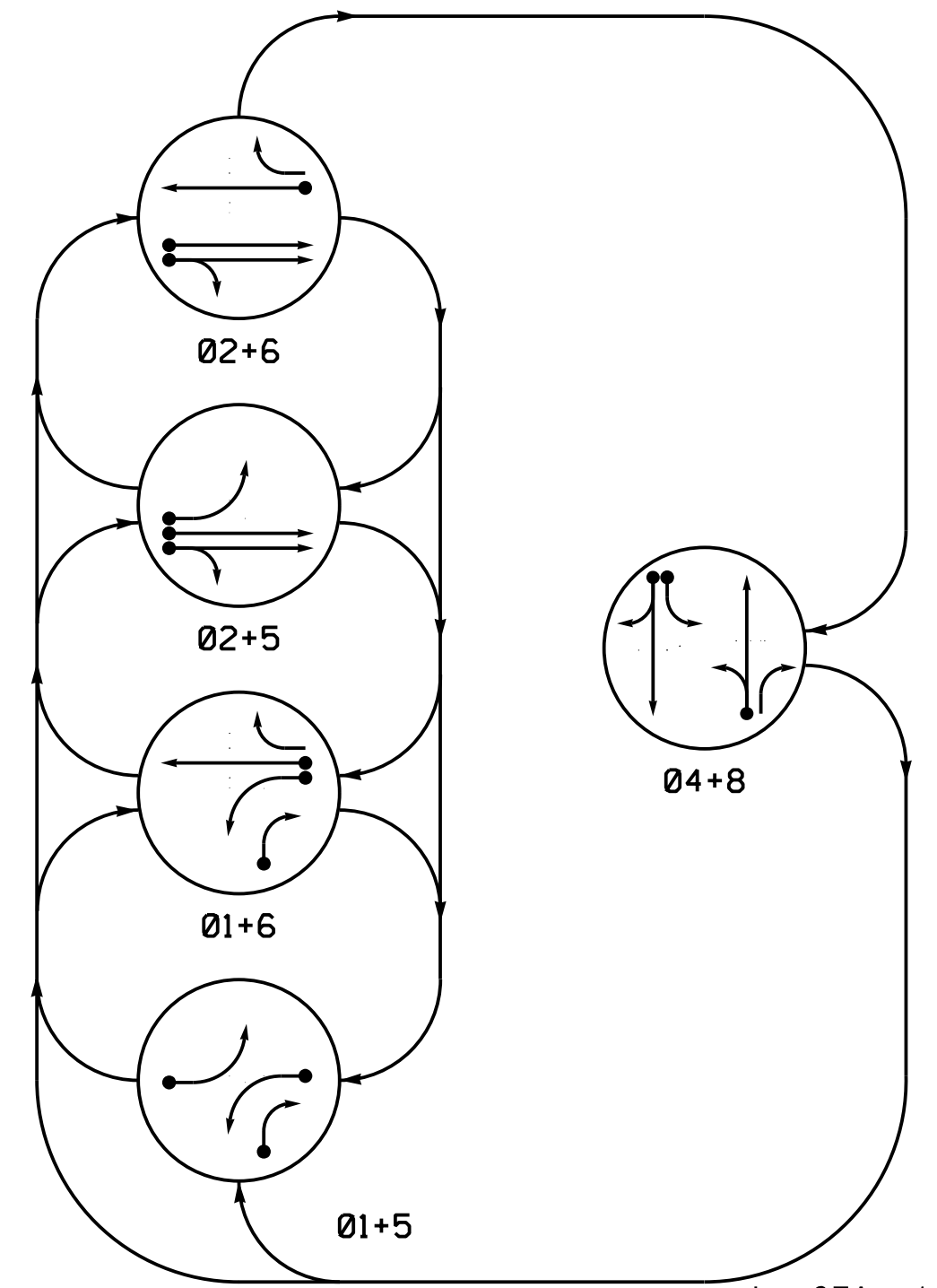
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 2772 (Farrington Farms Dr)		
	Division 3 New Hanover County PLAN DATE: May 2022 PREPARED BY: E.E. Tiller	Wilmington REVIEWED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons	
SCALE: 0 N/A N/A	REVISIONS: _____ INIT. DATE	DocuSigned by: Natasha R. Simmons 5/17/2024 DATE	SIG. INVENTORY NO. 03-1216

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

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

**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	F L
11	-	-	-	-	-	-
21,22	R	R	G	G	R	Y
41	R	R	R	R	R	Y
42,43	R	R	R	R	G	R
51	-	-	-	-	-	-
61,62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	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
1B	6X40	0	*	*	1	Y	Y	-	15	-	Y
4A	6X40	0	*	*	4	Y	Y	-	3	-	Y
4B	6X40	0	*	*	4	Y	Y	-	10	-	Y
5A	6X40	0	*	*	5	Y	Y	-	15**	-	Y
8A	6X40	0	*	*	8	Y	Y	-	3	-	Y

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

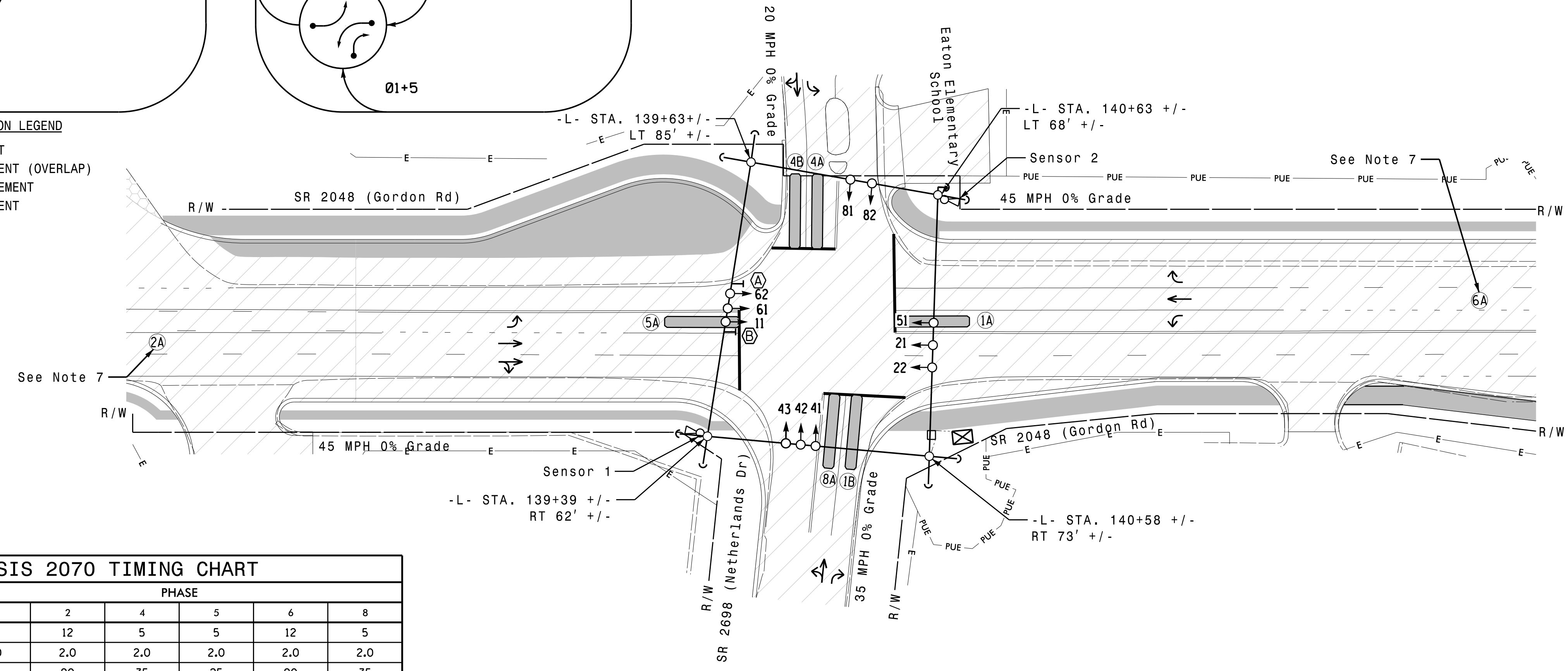
**5 Phase Fully Actuated Wilmington Signal System**

**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.
- Phases 1 and/or 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 or each phasing plan.
- This intersection uses multi-zone microwave detection. Install 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 #0847.

**PHASING DIAGRAM DETECTION LEGEND**

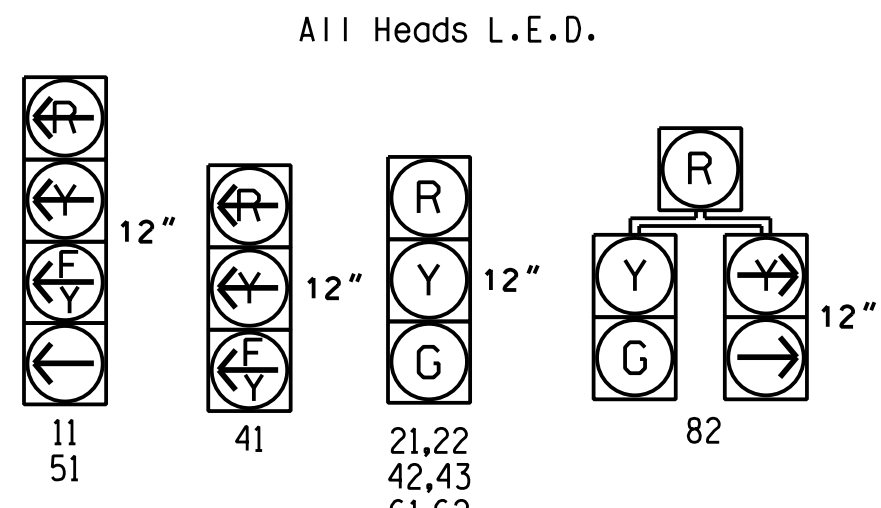
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



**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 *	25	90	35	25	90	35
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.8
Red Clearance	1.9	1.3	2.6	2.3	1.3	2.6
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)	1.0-6.5	2.5-6.5

**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
N/A Permanent Utility Easement	--- Permanent Utility Easement
N/A Construction Easement	--- Construction Easement
→ Directional Arrow	→ Directional Arrow
Construction Zone	Construction Zone
Wedge/Widen	Wedge/Widen
Curb Ramp	Curb Ramp
(A) Right Arrow "ONLY" Sign (R3-SR)	(A) Right Arrow "ONLY" Sign (R3-SR)
(B) "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	(B) "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)

Signal Upgrade-  
 Temporary Design 1  
 (Construction Phase 1)

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

Prepared for: **SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr) / Eaton Elementary School**

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

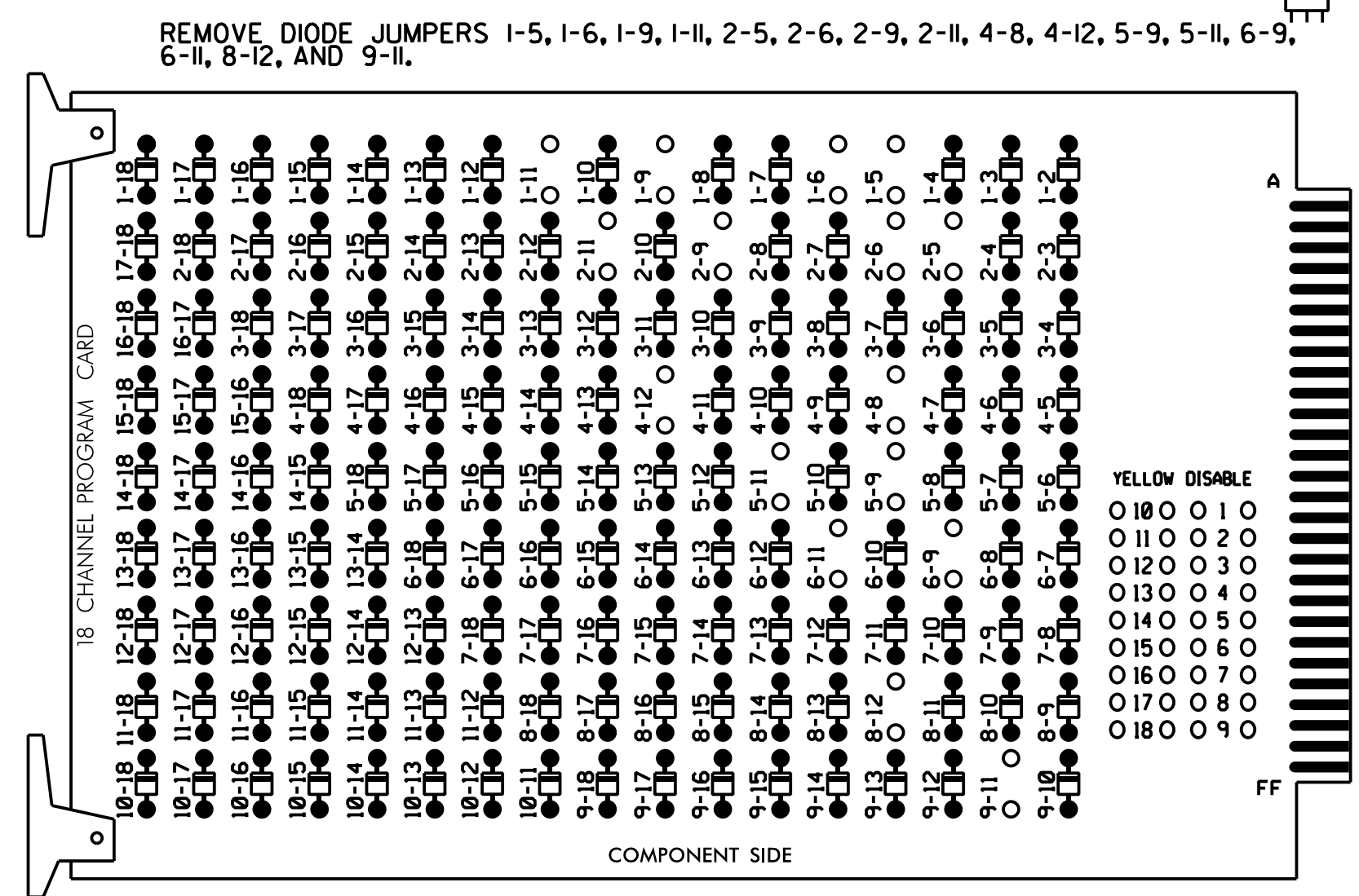
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5/17/2024

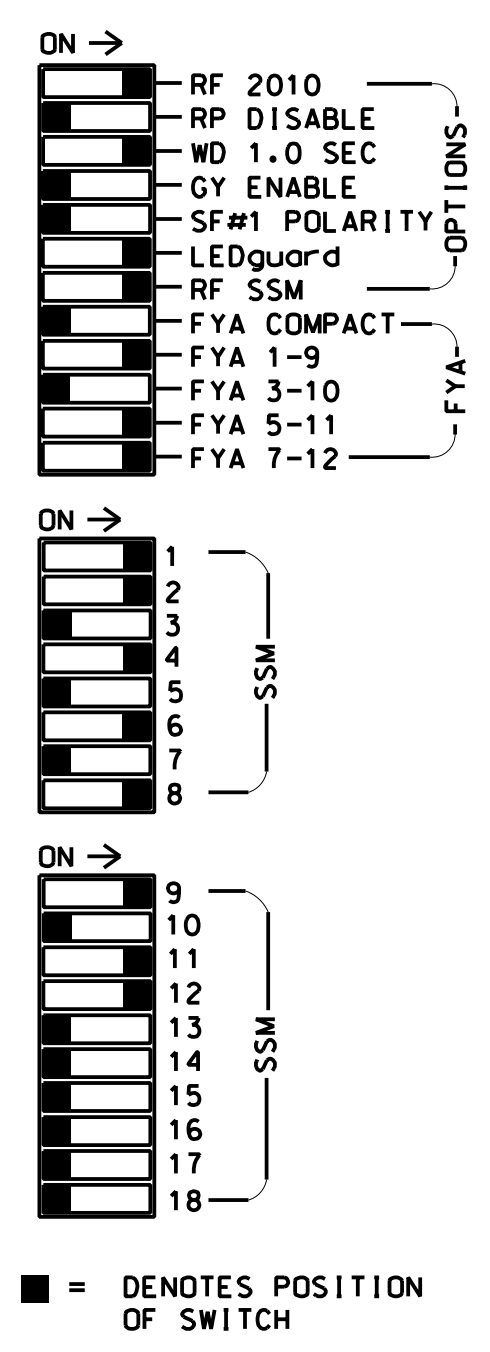
SIG. INVENTORY NO. 03-084711

### 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, 4-12, 5-9, 5-11, 6-9, 6-11, 8-12, AND 9-11.
- 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 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 overlap 1 as Wag Overlap.
- 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 S4, AUX S5

PHASES USED.....1,2,4,5,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....8

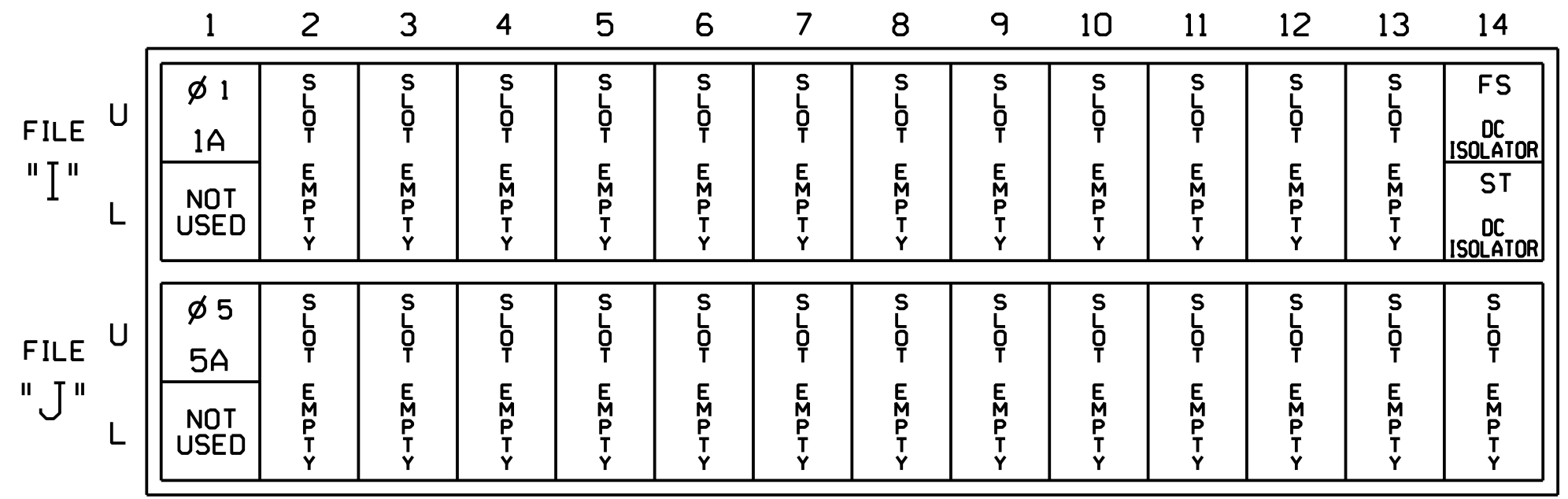
### SIGNAL HEAD HOOK-UP CHART

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	82	21,22	NU	NU	42,43	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	41	NU
RED	*	128			101			134			107								
YELLOW		129			102		*	135			108								
GREEN		130			103			136			109								
RED ARROW													A121			A114	A101		
YELLOW ARROW	126												A122			A115	A102		
FLASHING YELLOW ARROW													A123			A116	A103		
GREEN ARROW	127	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)



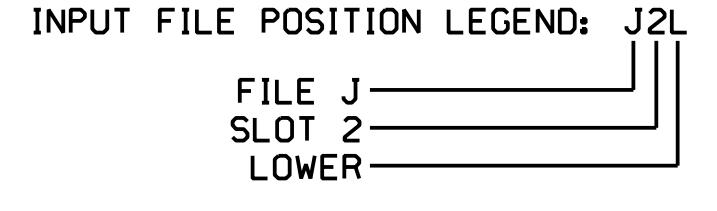
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

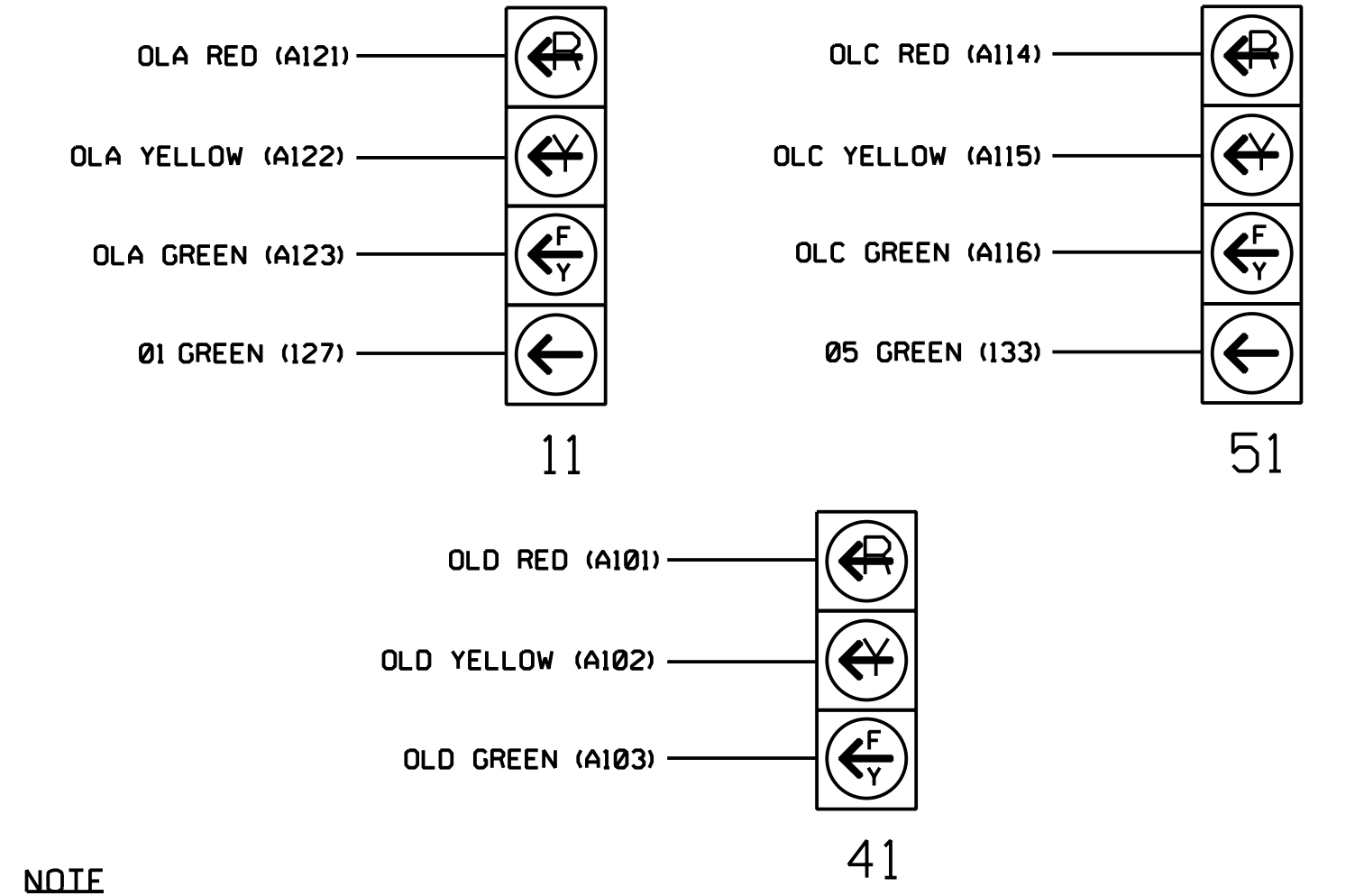
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10 ★	26	6	Y	Y			
	-	I1U	56	18 ★	51	1	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	14U	47	9 ★	22	2	Y	Y			
	-	J1U	55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

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



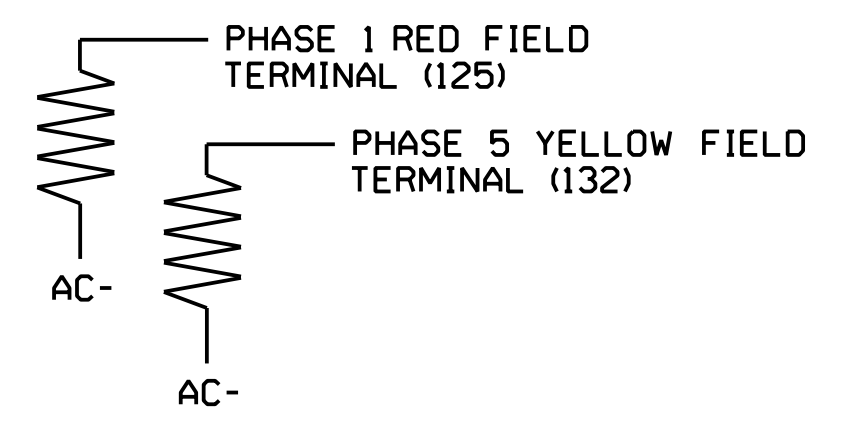
NOTE

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: 03-0847T1  
 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 2698 (Netherlands Dr/ Eaton Elementary School) 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: *Natasha R. Simmons* 5/17/2024  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-0847T1

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS

750 N. Greenfield Pkwy, Garner, NC 27529

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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 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

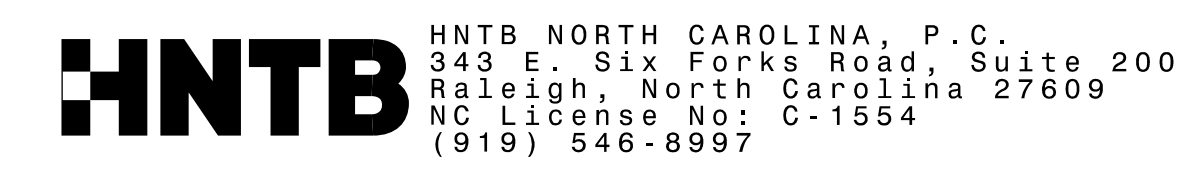
THEN:  
SET OUTPUT ASSIGNMENT #43 ON

LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0847T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:



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

NOTICE PAGE 2

PRESS '+' TWICE

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)...0.0  
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 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)...0.0  
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

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

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

	SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School)	
	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	REVISIONS INIT. DATE
750 N. Greenfield Pkwy, Garner, NC 27529		DocuSigned by: Natasha R. Simmons 5/17/2024 SIGNATURE DATE SIG. INVENTORY NO. 03-0847T1

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).....0.3 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: 03-0847T1 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School), Division 3 New Hanover County Wilmington. Includes dates (August 2023), signatures (N.K. Vianich, N.R. Simmons), and a professional seal for Natasha R. Simmons, Engineer No. 031464.

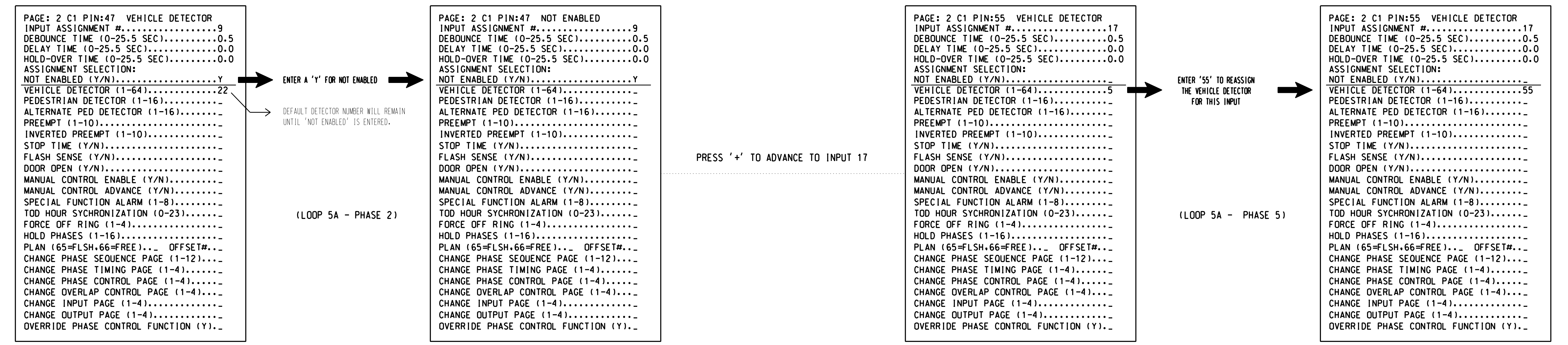
INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(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.

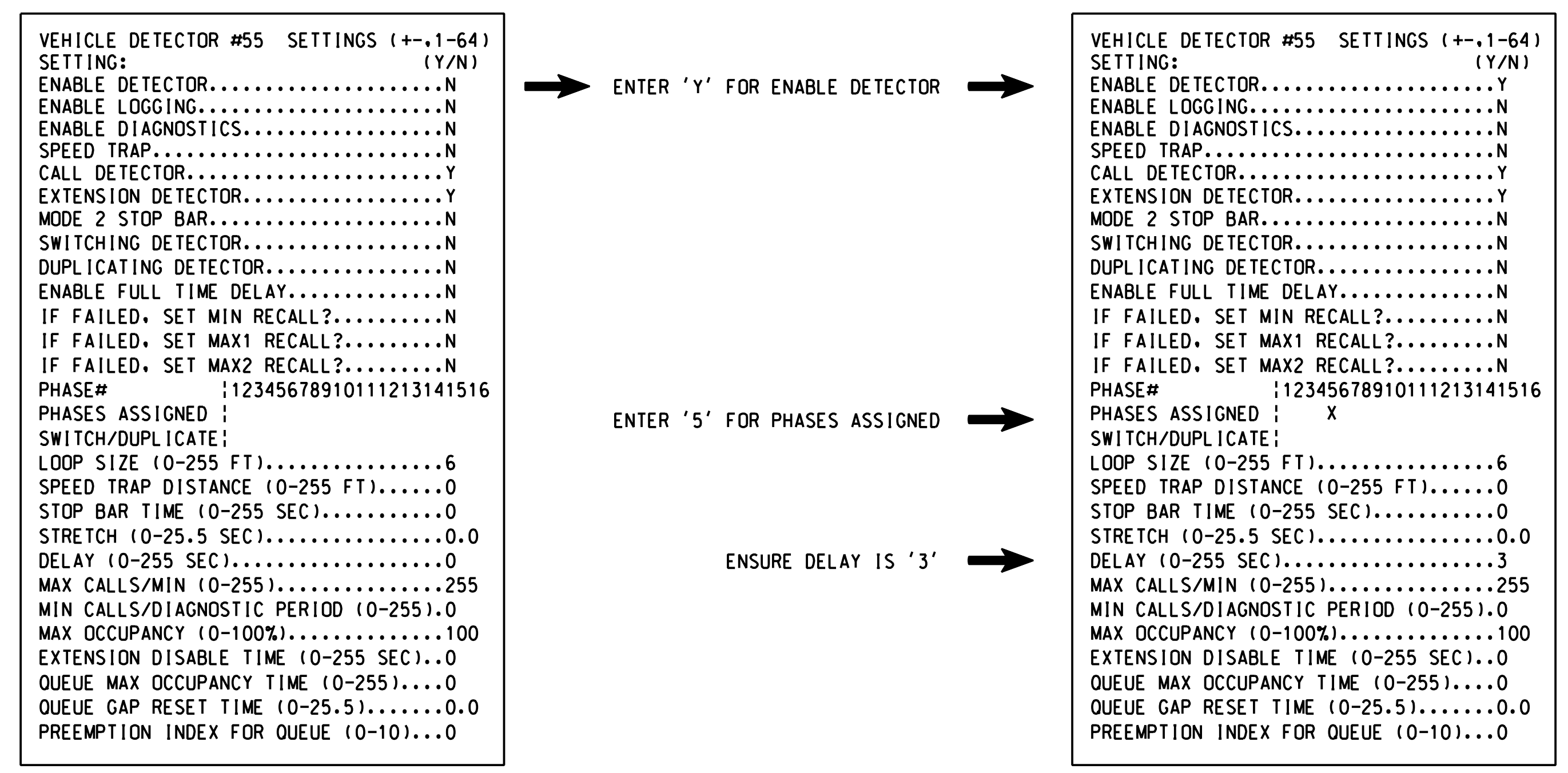


PROGRAMMING COMPLETE

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.



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: 03-0847T1 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 4 of 5 (Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional engineering stamp and revision table. Includes HNTB logo, project details (SR 2048, SR 2698), plan date (August 2023), and signature of N. K. Vianich.

## 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 51 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 3 seconds.
- Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A 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.

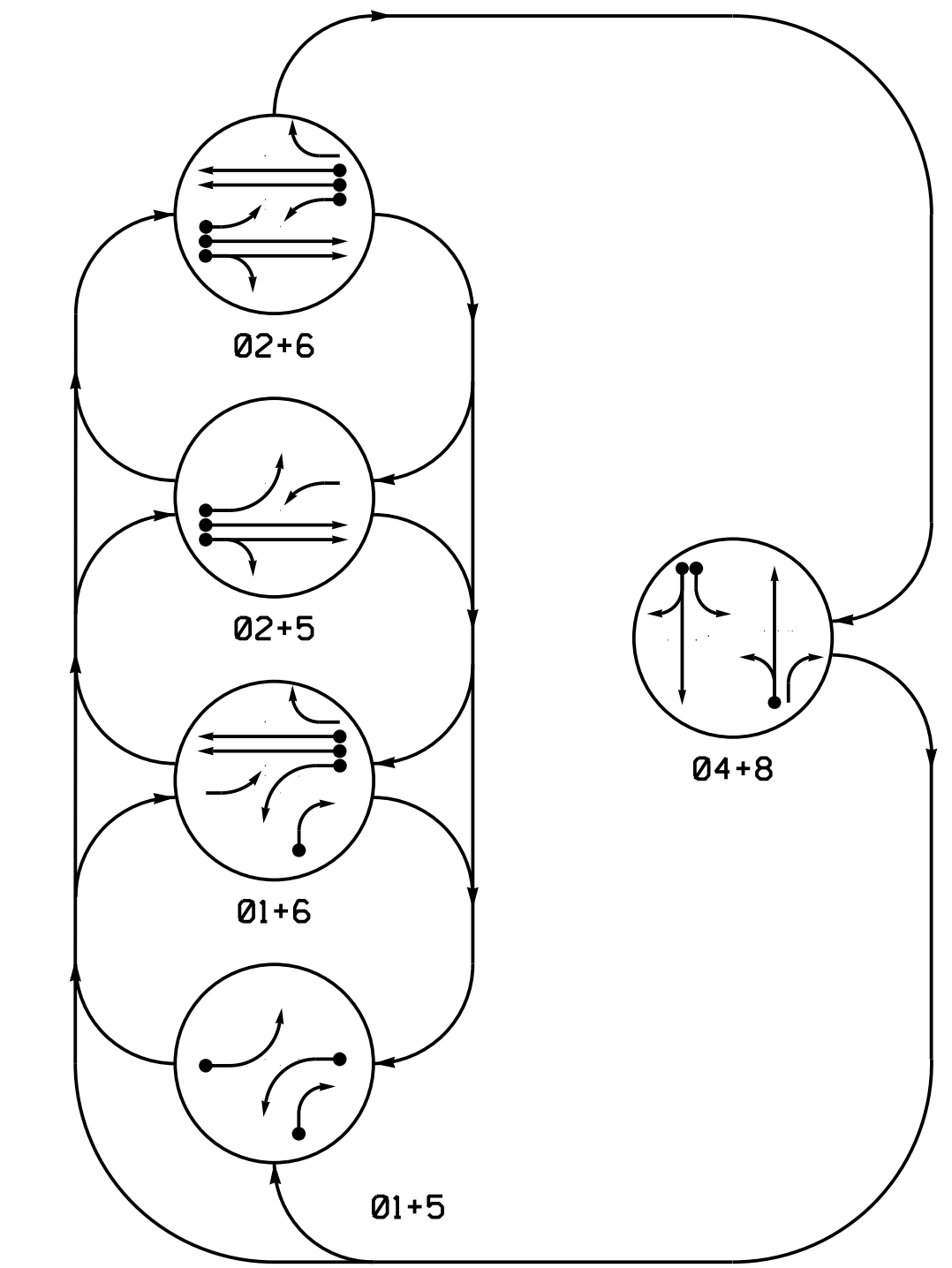
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0847T1  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

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

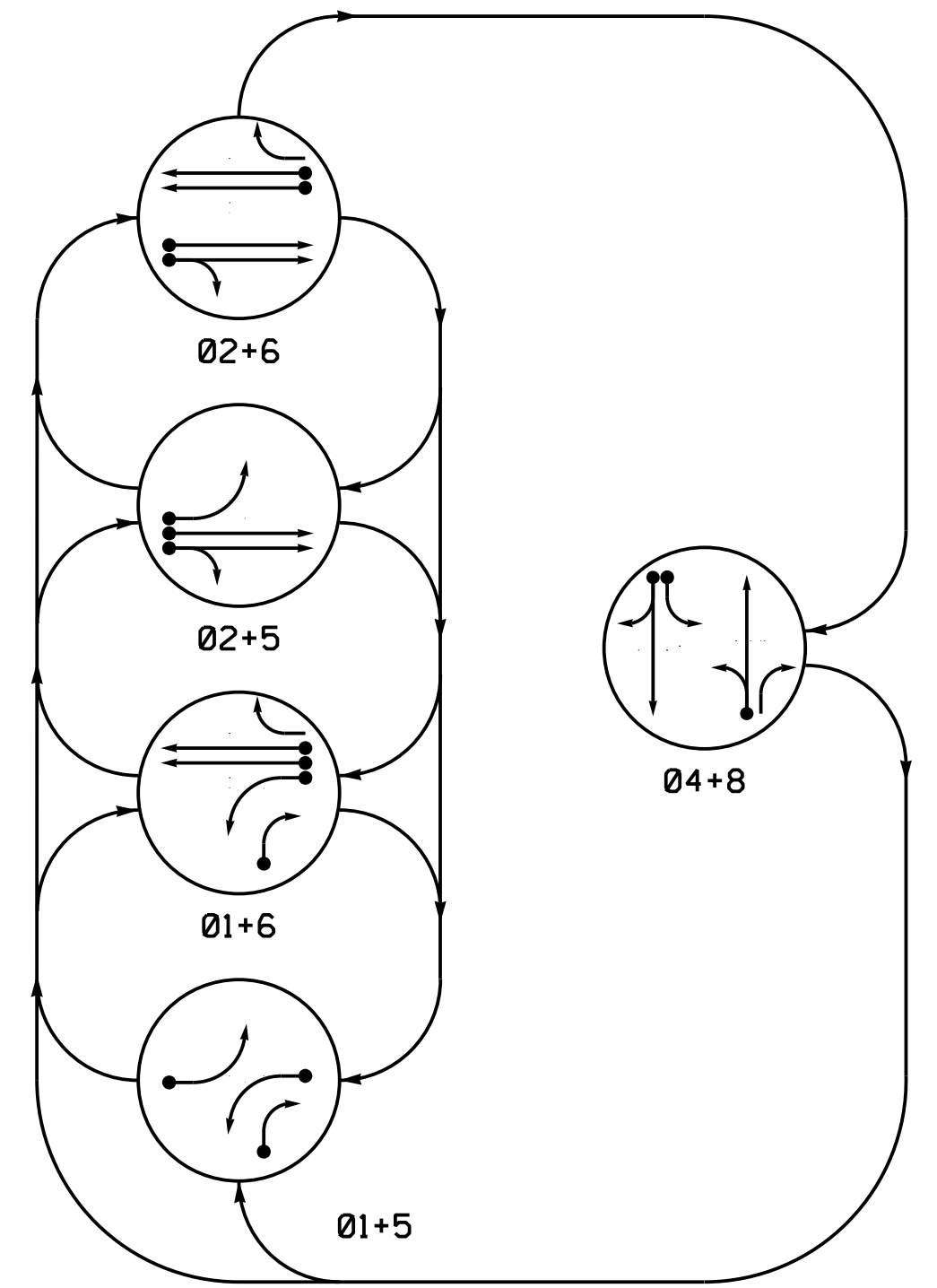
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Office of:  STATE OF NORTH CAROLINA Department of Transportation Signal Management	SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School Division 3 New Hanover County Wilmington	SEAL  NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER 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 DATE: 5/17/2024
REVISIONS    INIT.    DATE		SIG. INVENTORY NO. 03-0847T1

**DEFAULT PHASING DIAGRAM**



**ALTERNATE PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

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

**ALTERNATE PHASING TABLE OF OPERATION**

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

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

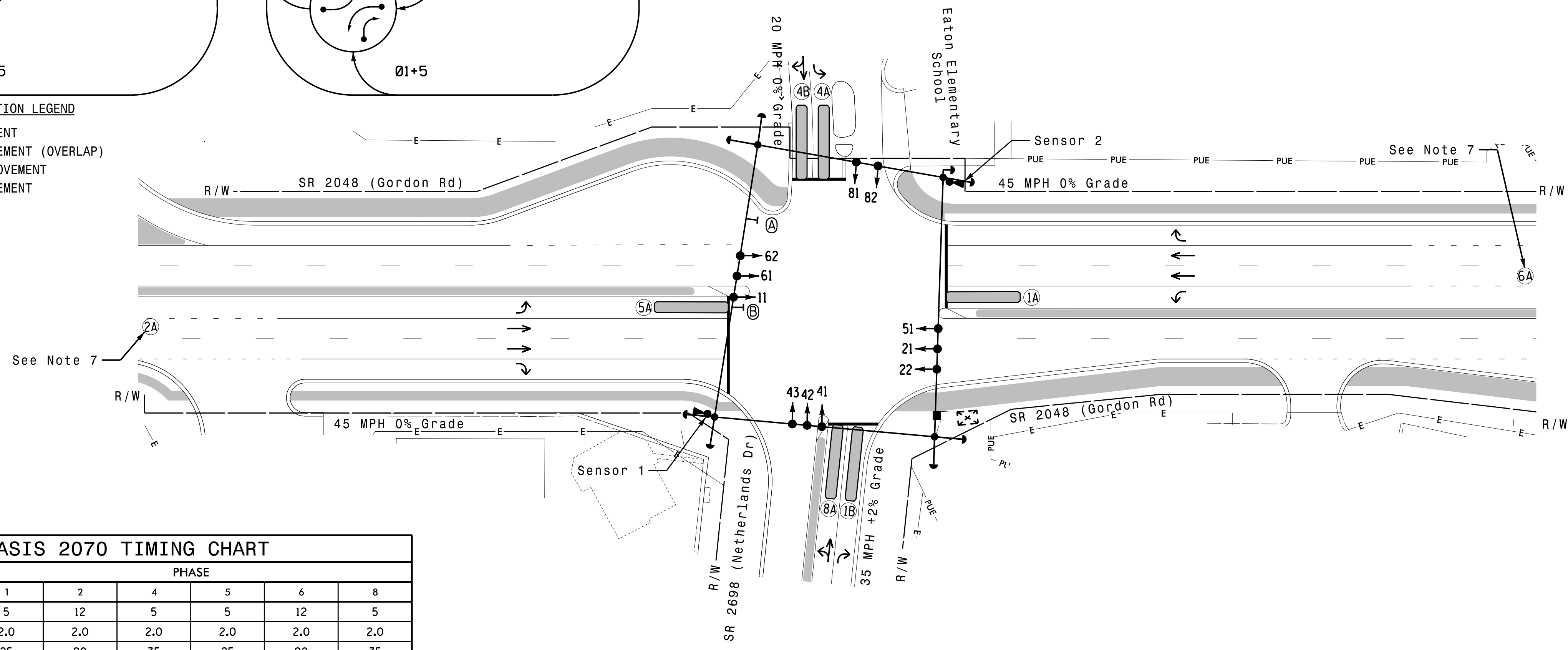
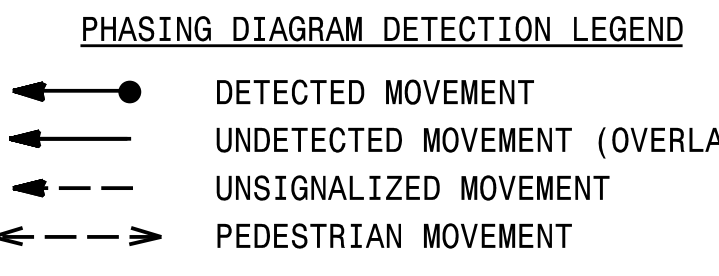
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	6X40	0	*	*	1	Y	Y	-	-	15**	-	-
1B	6X40	0	*	*	1	Y	Y	-	-	15	-	-
4A	6X40	0	*	*	4	Y	Y	-	-	3	-	-
4B	6X40	0	*	*	4	Y	Y	-	-	10	-	-
5A	6X40	0	*	*	5	Y	Y	-	-	15**	-	-
8A	6X40	0	*	*	2#	Y	Y	-	-	-	-	-
					8	Y	Y	-	-	-	-	-

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

**5 Phase Fully Actuated Wilmington Signal System**

**NOTES**

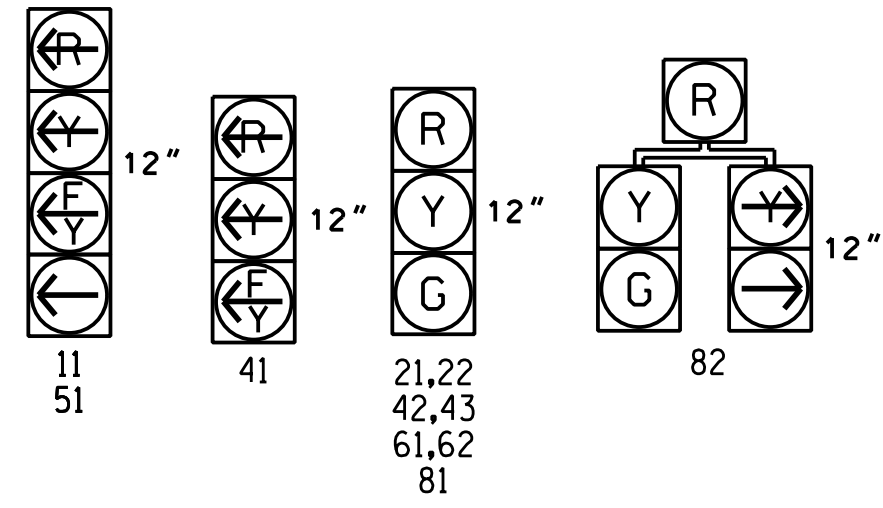
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phases 1 and/or 5 may be lagged.
- Reposition existing signal heads numbered 11, 21, 22, 51, 61, and 62 and existing 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 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 #0847.



**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 *	25	90	35	25	90	35
Yellow Clearance	3.0	4.5	3.7	3.0	4.5	3.7
Red Clearance	3.1	1.6	3.5	2.9	1.6	3.5
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.**  
All Heads L.E.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)	1.0-6.5	1.0-6.5

Signal Upgrade-  
Temporary Design 2  
(Construction Phase 2A)

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

Prepared for: **SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr) / Eaton Elementary School**

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, Corner, NC 27528

SCALE: 0 40 1"=40'

REVISIONS: INITI. DATE

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

SIGNATURE: DATE

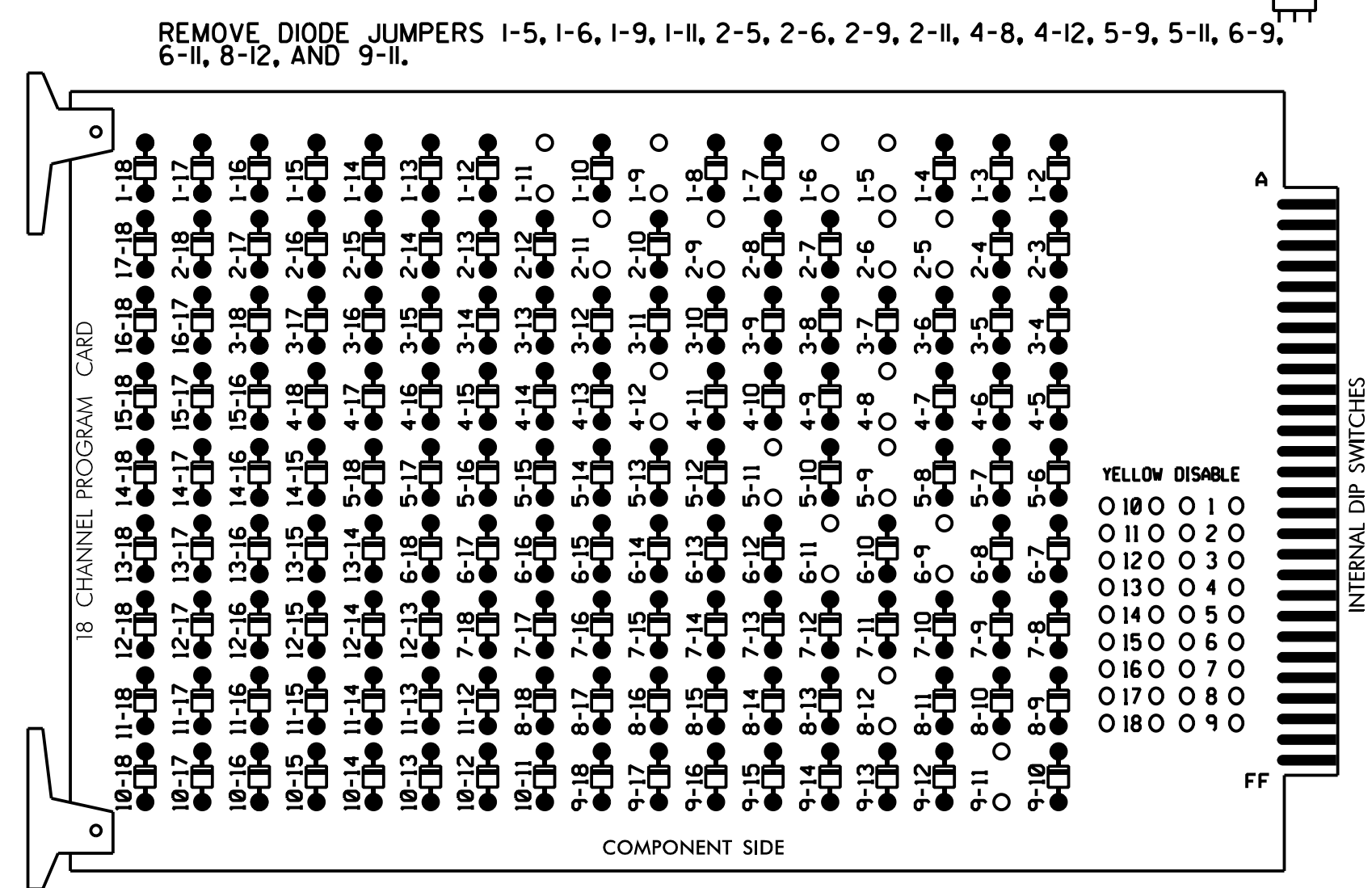
SIG. INVENTORY NO. 03-084712

\* 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 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 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 overlap 1 as Wag Overlap.
- 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 S4, AUX S5

PHASES USED.....1,2,4,5,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 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	82	21,22	NU	NU	42,43	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	41	NU
RED	*	128				101			134			107							
YELLOW			129			102		*	135			108							
GREEN				130		103			136			109							
RED ARROW													A121			A114	A101		
YELLOW ARROW	126												A122			A115	A102		
FLASHING YELLOW ARROW													A123			A116	A103		
GREEN ARROW	127	127						133											
Hand icon																			
Person icon																			

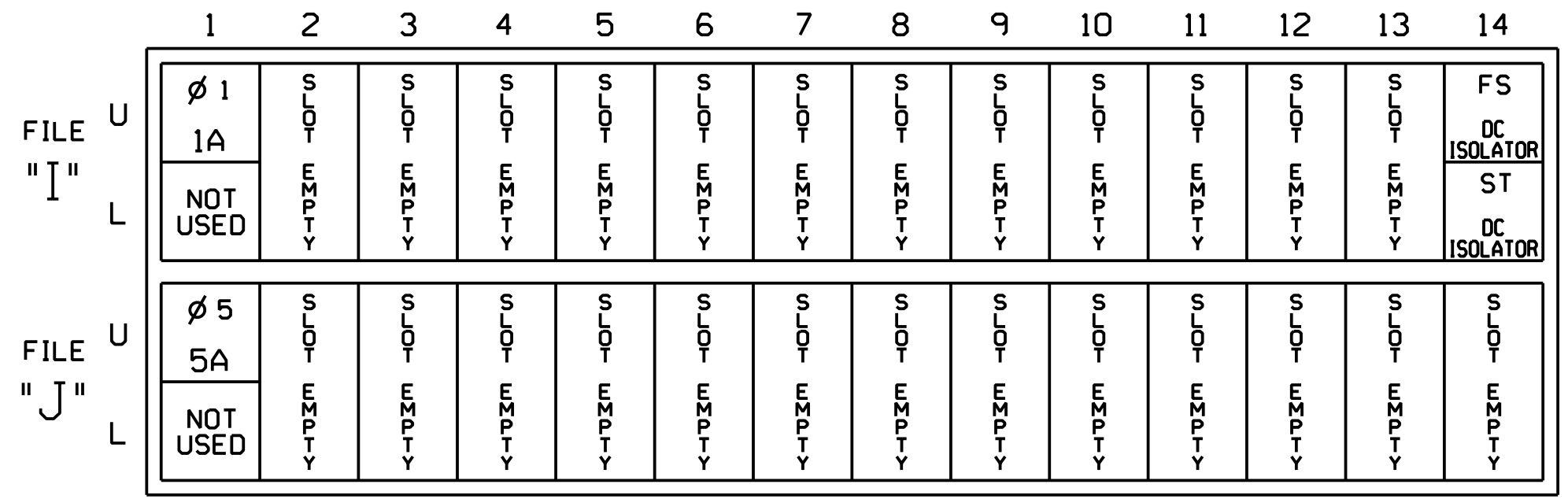
NU = Not Used

\* 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)

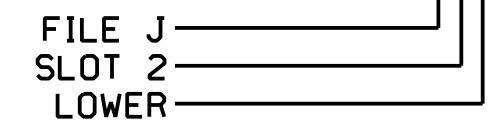


### INPUT FILE CONNECTION & PROGRAMMING CHART

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			
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			

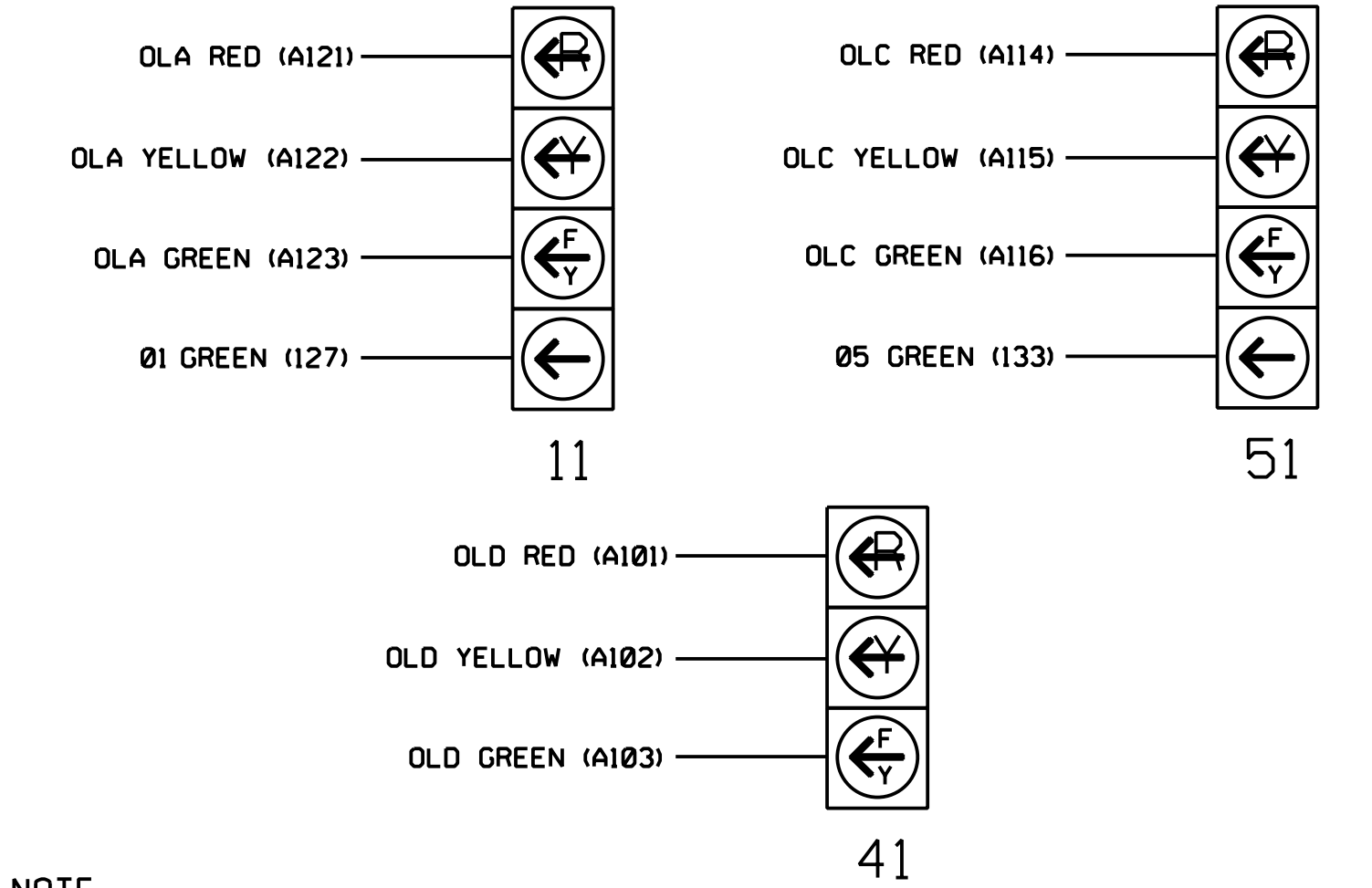
\* See Input Page Assignment programming details on sheets 3 and 4.

#### INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



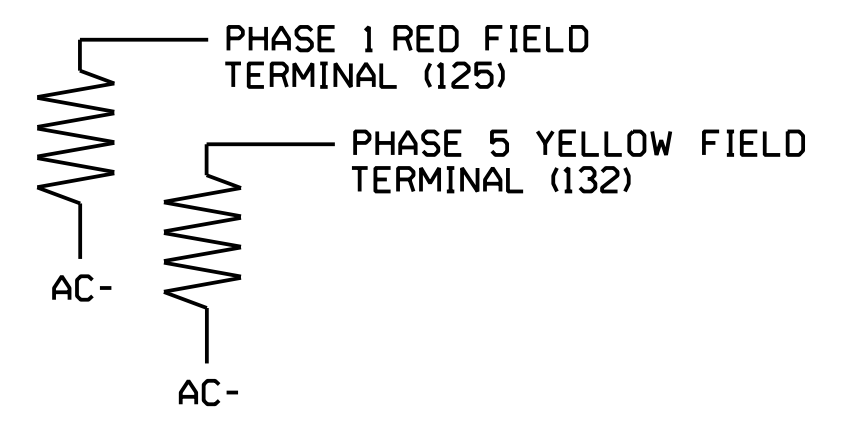
NOTE

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: 03-0847T2  
 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

Electrical and Programming Details For: SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School)

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

SIGNATURE DATE

SIG. INVENTORY NO. 03-0847T2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA 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 2 RED  
CLEAR WHEN  
TRANSITIONING  
FROM Phase 2  
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 2  
(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 2  
(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

LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE

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
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 '+' 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  
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 - RED - 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 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 '+' 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

PRESS '+'

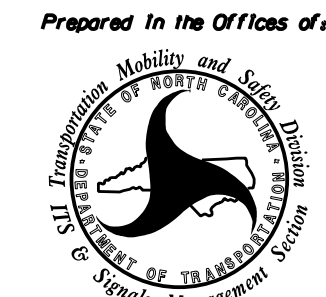
OVERLAP PROGRAMMING COMPLETE

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

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0847T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:


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	
SR 2698 (Netherlands Dr/ Eaton Elementary School)		New Hanover County Wilmington	
PLAN DATE: August 2023	REVIEWED BY: N.K. Vlanich	Division 3	
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	REVISIONS	
INIT.	DATE	DATE	
		5/17/2024	

SEAL  
NORTH CAROLINA  
PROFESSIONAL  
ENGINEER  
SEAL  
031464  
NATASHA R. SIMMONS

DocuSigned by:  
  
 NATASHA R. SIMMONS  
 DATE: 5/17/2024  
 SIG. INVENTORY NO. 03-0847T2

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 2)

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: 03-0847T2 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 3 of 5 (Construction Phase 2A)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with project details: SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School), Division 3 New Hanover County Wilmington. Includes dates (August 2023), signatures (E.E. Tiller, N.K. Vianich, N.R. Simmons), and a professional seal for Natasha R. Simmons, Engineer No. 031464.

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: 03-0847T2 DESIGNED: May 2022 SEALED: 5/17/2024 REVISED:

Signal Upgrade- Electrical Detail - Sheet 4 of 5 (Construction Phase 2A)

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 SR 2048 and SR 2698 at Eaton Elementary School, New Hanover County, Wilmington. Prepared by E.E. Tiller, reviewed by N.K. Vlanich and 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 heads 11 and 51 to run protected turns only.
- INPUTS PAGE 2:** Disables phase 6 call on loop 1A and reduces delay time for Phase 2 call on loop 1A to 0 seconds.
- 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.

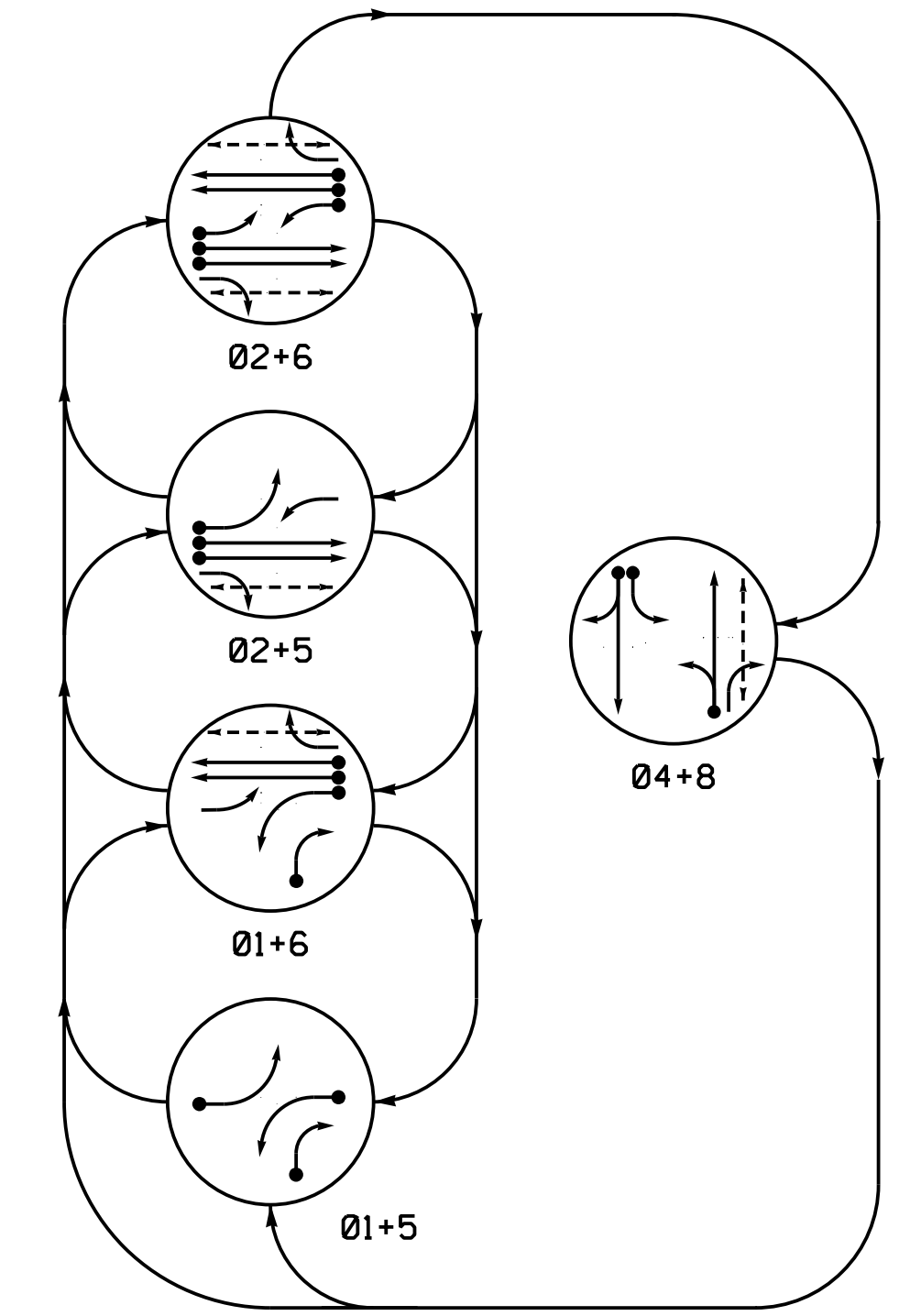
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0847T2  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

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

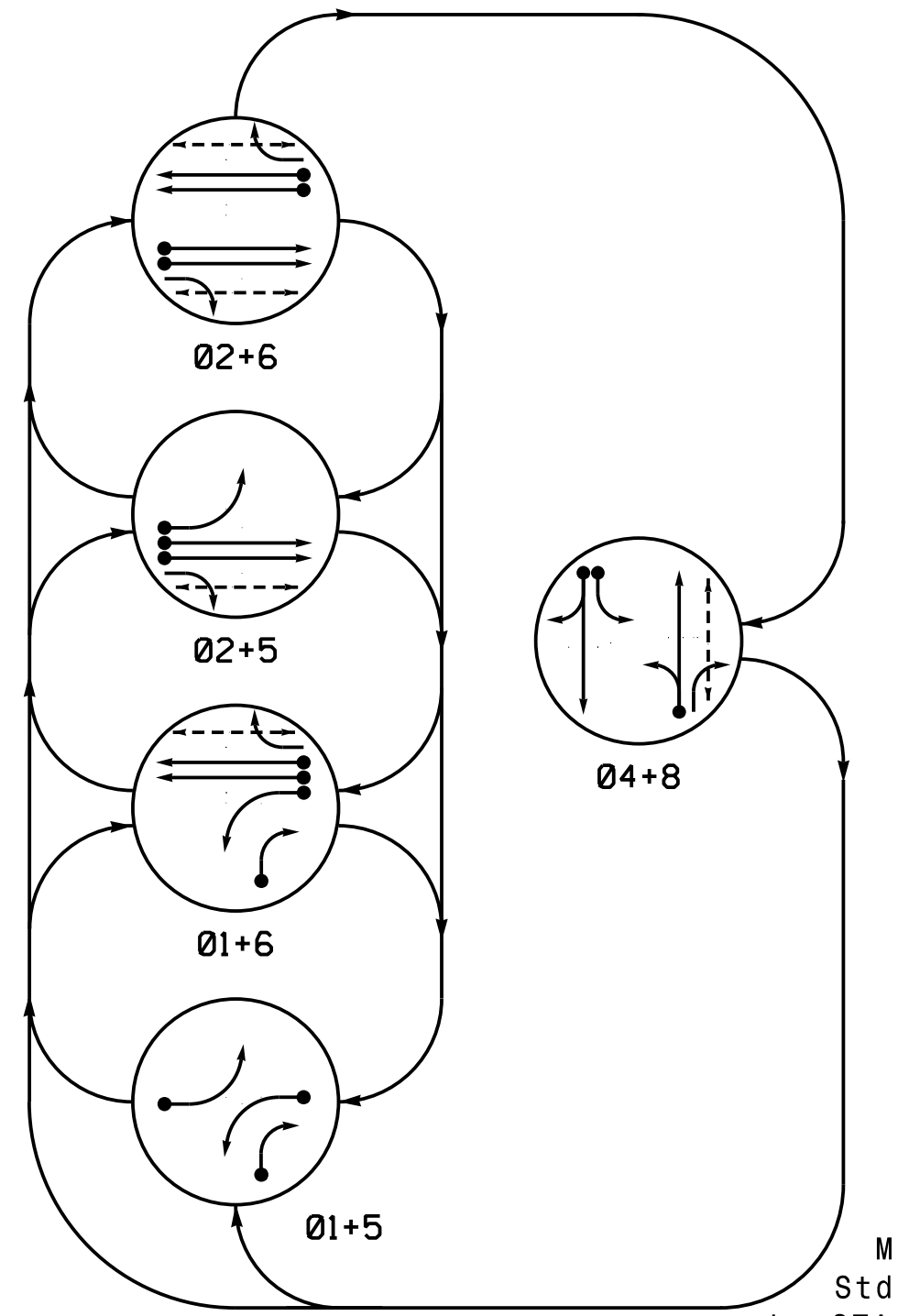
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small; text-align: center;">Prepared in the Office of:  Department of Transportation Signal Management</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School Division 3 New Hanover County Wilmington</p> <p style="font-size: x-small;">PLAN DATE: August 2023    REVIEWED BY: N.K. Vlanich 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; font-size: x-small;">SEAL</p> <div style="text-align: center;"> <p style="font-size: x-small;">NATASHA R. SIMMONS ENGINEER 031464</p> </div> <p style="font-size: x-small;">DocuSigned by: <i>Natasha R. Simmons</i> 5/17/2024 SIGNATURE    DATE SIG. INVENTORY NO. 03-0847T2</p>
REVISIONS	INIT.	DATE						

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION table with columns for SIGNAL FACE, PHASE, and signal types (R, G, Y, F, L, W, DRK).

ALTERNATE PHASING TABLE OF OPERATION table with columns for SIGNAL FACE, PHASE, and signal types (R, G, Y, F, L, W, DRK).

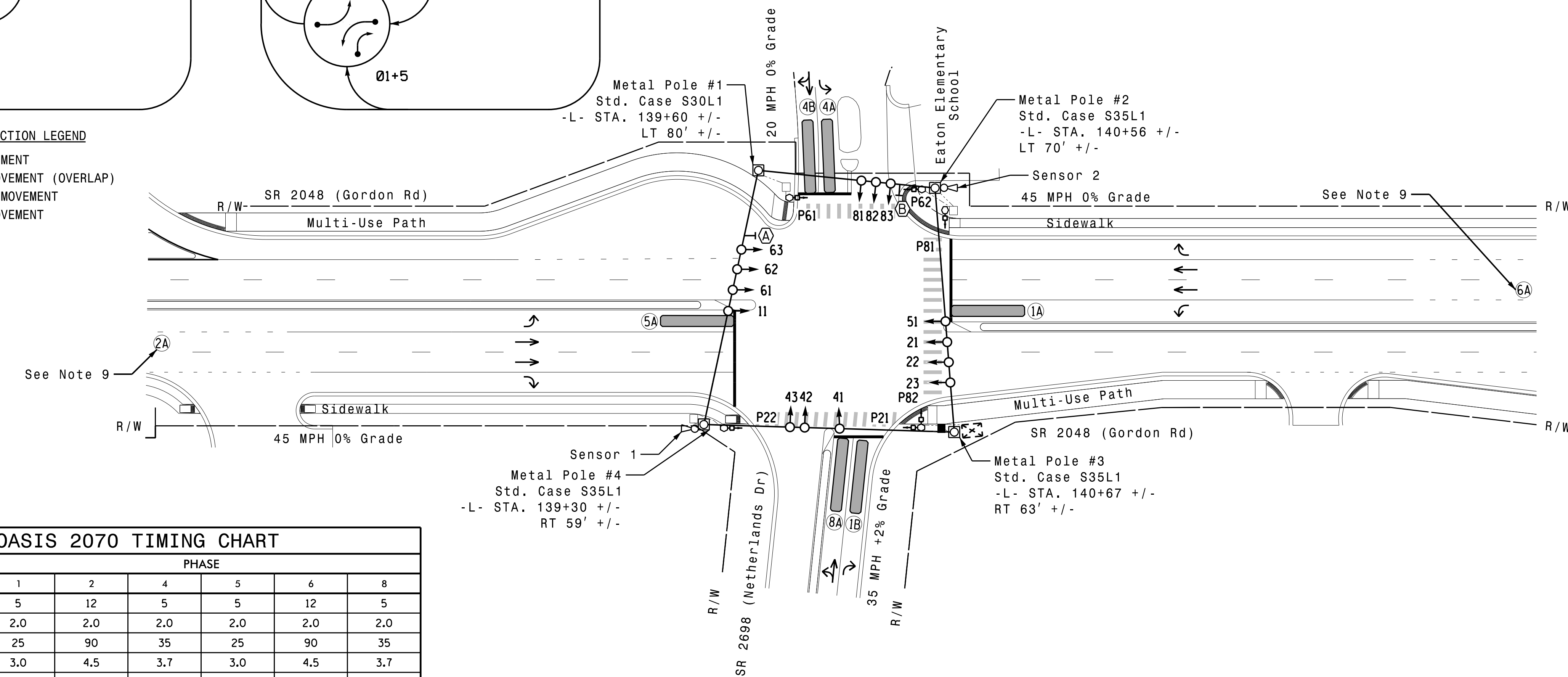
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART table with columns for ZONE, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, NEW CARD.

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

5 Phase Fully Actuated Wilmington Signal System

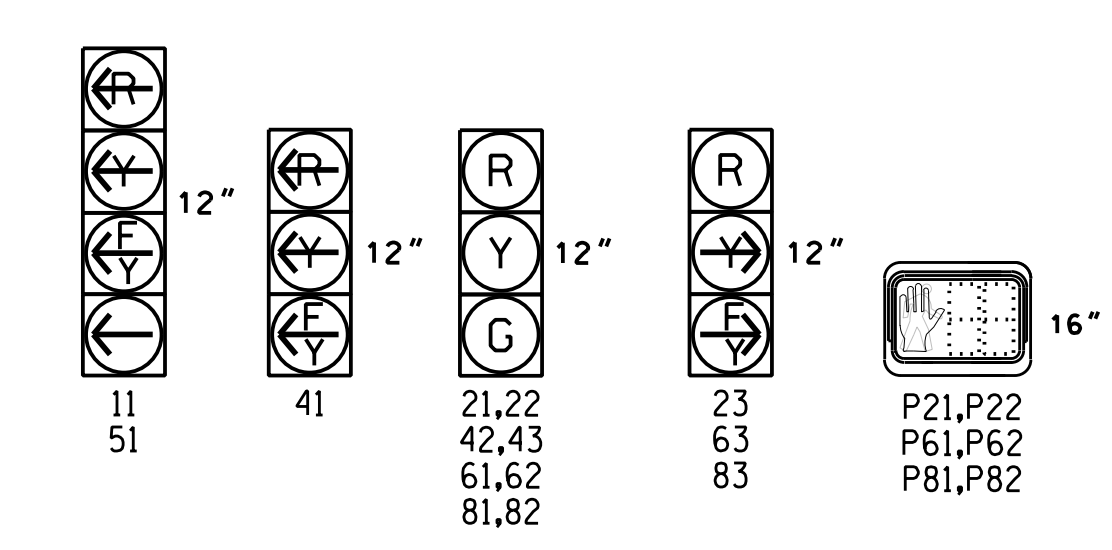
NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024...
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phases 1 and/or 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. All pedestrian pushbuttons shall be located in the field by the Division Traffic Engineer before installation.
8. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multizone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data: Controller Asset #0847.



OASIS 2070 TIMING CHART table with columns for FEATURE, PHASE (1, 2, 4, 5, 6, 8), and timing values.

SIGNAL FACE I.D. All Heads L.E.D.



RADAR DETECTION SYSTEM table with columns for FUNCTION, Sensor 1, and Sensor 2.

LEGEND table with columns for PROPOSED and EXISTING symbols and their descriptions.

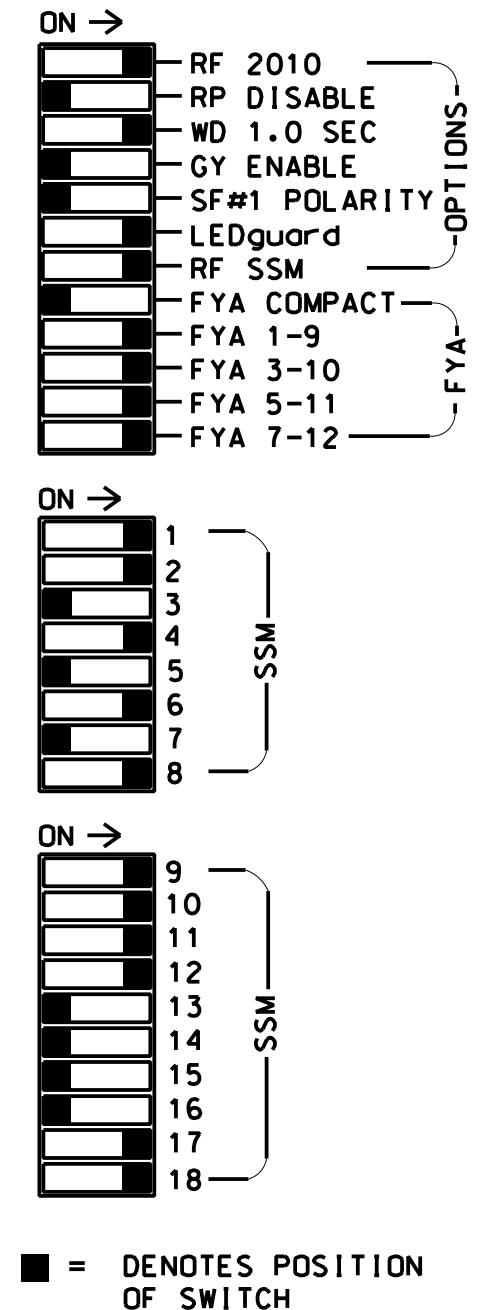
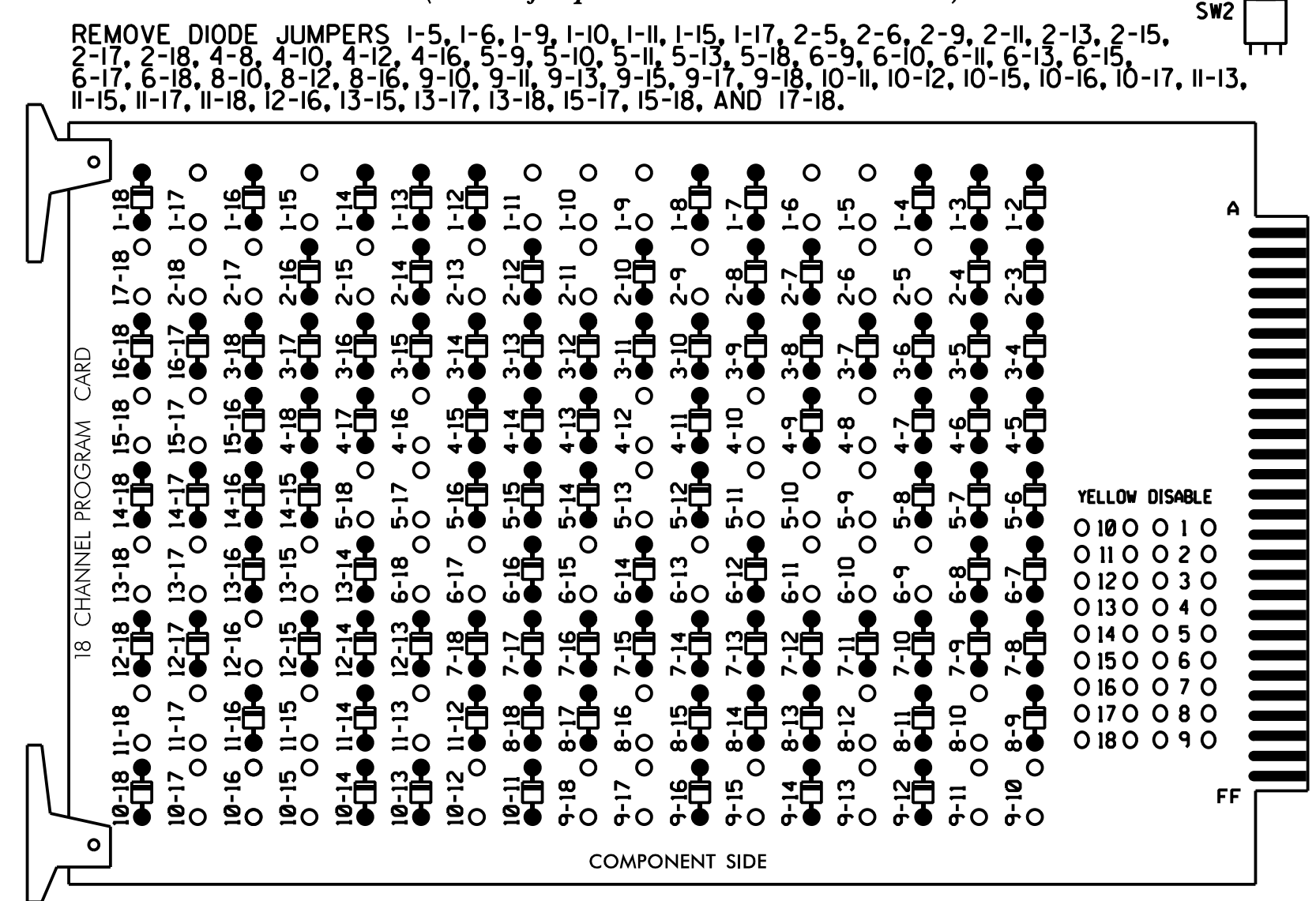
Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Project information block including location (SR 2048 at SR 2698), date (May 2022), and signatures of E.E. Tiller and N.R. Simmons.

### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for 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,S5,S7,S8,S9,S11,S12,AUX S1,  
 AUX S2,AUX S3,AUX S4,AUX S5,AUX S6  
 PHASES USED.....1,2,2 PED,4,5,6,6 PED,8,8 PED  
 OVERLAP "A".....1+2  
 OVERLAP "B".....1+8  
 OVERLAP "C".....5+6  
 OVERLAP "D".....8  
 OVERLAP "E".....6  
 OVERLAP "F".....2

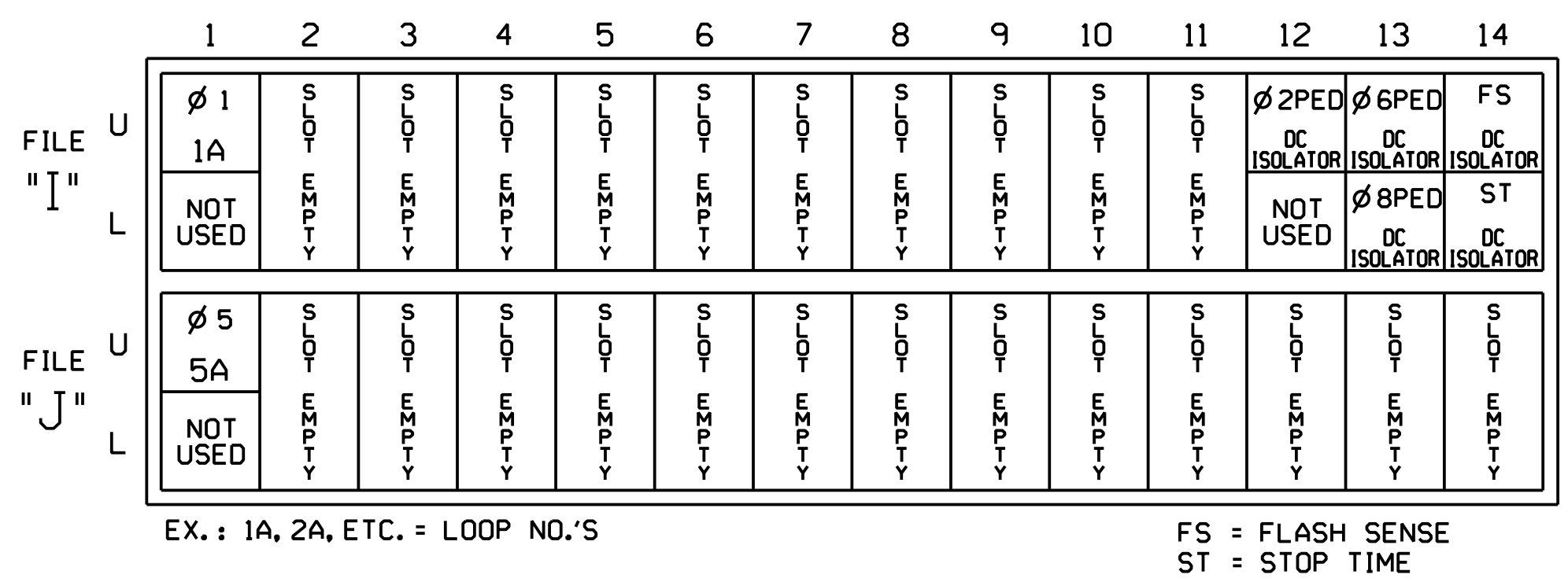
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	OLF
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	42,43	NU	51	61,62	P61, P62	NU	81,82	P81, P82	11	83	63	51	41	23
RED		128			101			134			107				A124			A104
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121		A111	A114	A101	
YELLOW ARROW													A122	A125	A112	A115	A102	A105
FLASHING YELLOW ARROW													A123	A126	A113	A116	A103	A106
GREEN ARROW	127							133										
Hand			113						119		110							
Person			115						121		112							

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail this sheet.  
 NOTE: Load switches AUX S3 and AUX S6 require output remapping. See Sheets 7 and 8 of this electrical detail for instructions.

### INPUT FILE POSITION LAYOUT

(front view)



### 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.

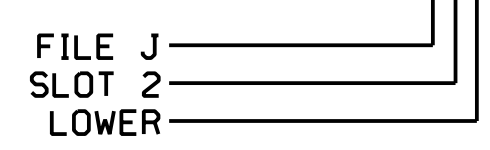
### INPUT FILE CONNECTION & PROGRAMMING CHART

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			
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			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	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 sheets 4 and 5.

### INPUT FILE POSITION LEGEND: J2L



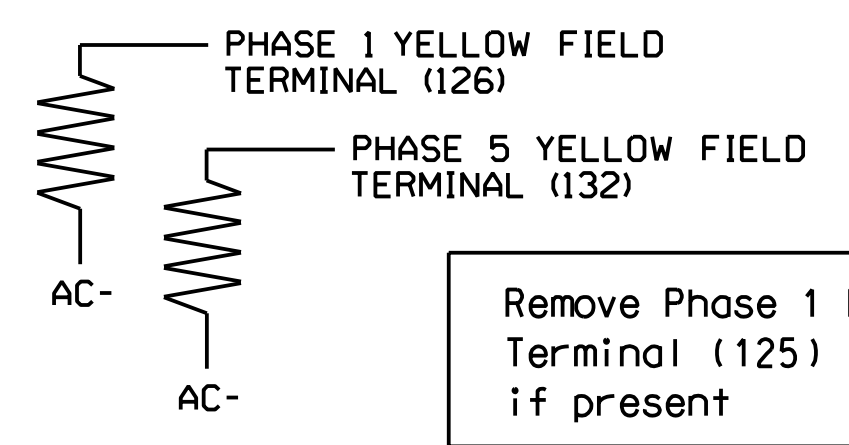
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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 resistors as shown below)

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

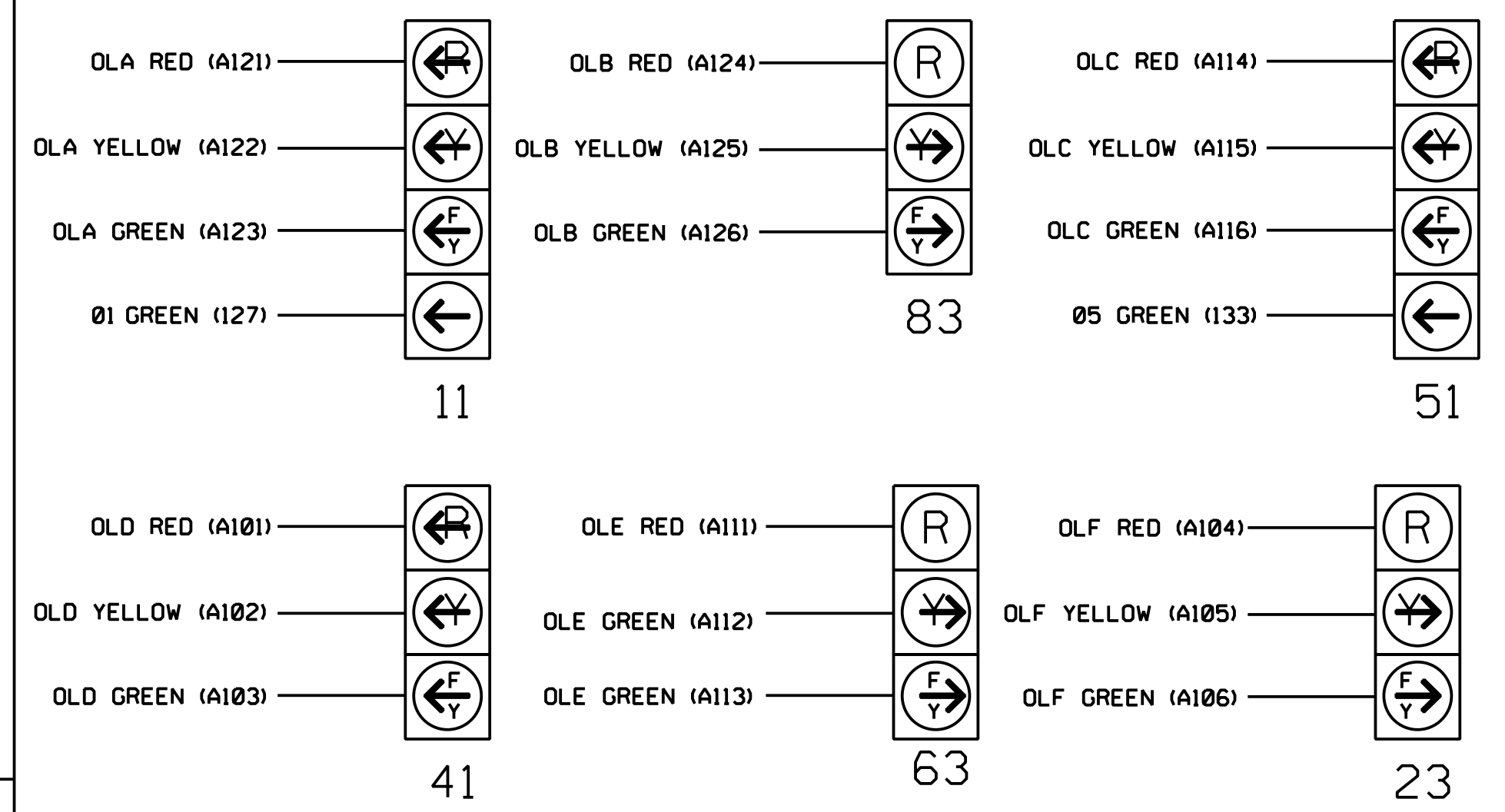


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0847  
 DESIGNED: May 2022  
 SEALED: 5/17/2024  
 REVISED:

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### 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.

Signal Upgrade - Final Design  
 Electrical Detail - Sheet 1 of 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School)

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

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464

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

SIG. INVENTORY NO. 03-0847

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```

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

      ↓
SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 2 RED CLEAR WHEN TRANSITIONING FROM PHASE 2 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
  
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 2 (HEAD 11).

```

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

      ↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON
  
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 2 (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
  
```

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
  
```

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
  
```

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

LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE

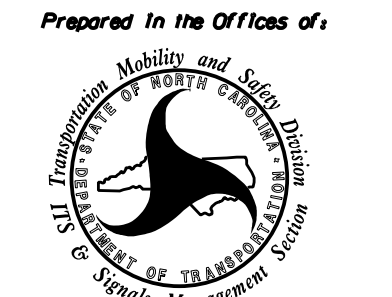

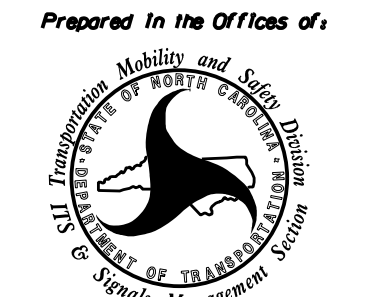
<u>OUTPUT REFERENCE SCHEDULE</u>	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0847  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 2 of 8

**DOCUMENT NOT CONSIDERED FINAL  
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ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School)	SEAL NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS
	Division 3 New Hanover County Wilmington	DocuSigned by:  5/17/2024
Prepared In the Offices of: 	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	REVISIONS    INIT.    DATE _____ _____ _____	SIG. INVENTORY NO. 03-0847



### 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 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

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'E' 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?...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 'F' 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?...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 '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 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

PRESS '+'

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'E' 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?...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 '+'

NOTICE PAGE 2 →

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

← NOTICE GREEN FLASH

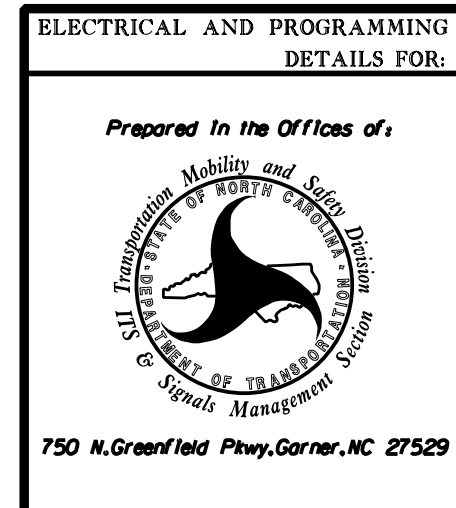
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0847  
DESIGNED: May 2022  
SEALED: 5/17/2024  
REVISED:

Signal Upgrade - Final Design  
Electrical Detail - Sheet 3 of 8

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ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 2048 (Gordon Rd) at SR 2698 (Netherlands Dr/ Eaton Elementary School)	
Prepared in the Office of: Transportation Mobility and Safety Division Office of Transportation Signal Management		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  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 031464  
NATASHA R. SIMMONS  
5/17/2024  
SIG. INVENTORY NO. 03-0847